Electronic products and relays
Technical catalogue 2010/2011

Power and productivity
for a better world™

NEW

News
Electronic Products and Relays

Primary switch mode power supplies
CP range

Power and productivity for a better world™ ABB

Extended range of power supplies CP range

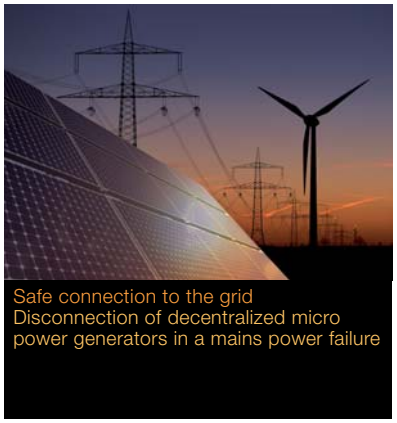
The CP-T range of three-phase power supply units is the youngest member of ABB's power supply family. In terms of design and functionality, the new range perfectly supplements the existing products and extends the range appropriately. The devices can be supplied with a three phase voltage as well as with two-phase mains. Here, ABB offers power supply units with 24 V DC and 48 V DC outputs with 5 A, 10 A, 20 A and 40 A and efficiency of up to 92 %. As in the case of all products, they are designed for an ambient temperature of up to 70 °C.

Insulation Monitoring Relays
CM range

Power and productivity for a better world™ ABB

New Insulation monitors CM-IWx

ABB developed a totally new range of insulation monitoring relays. With this new generation of measuring and monitoring relays of the CM range ABB consolidates its strengths in innovative control products. The new products are in accordance to IEC/EN61557-1 and to IEC/EN 61557-8. That means the monitoring relays can be used directly to measure the insulation resistance in unearthed AC and DC mains with a voltage up to 690 V AC and 1000 V DC! Furthermore the products feature a new measuring principle which decreases the measuring and response time to a minimum.



Safe connection to the grid
Disconnection of decentralized micro power generators in a mains power failure

Power and productivity for a better world™ ABB

Grid feeding monitoring relays CM-UFS

When a decentralized micro power station is connected to the grid, safe operation must be ensured at all times. This applies particularly to the function for disconnecting the plant from the grid, for instance during maintenance work. As the grid operator is usually unable to access the decentralized micro power station's control unit, this disconnection must take place automatically. Fast disconnection can only be achieved with a monitoring device that immediately recognizes when the grid is deactivated.

English version: 2 CDC 112 147 B0201
German version: 2 CDC 112 147 B0101

Electronic Products and Relays

Content

Approvals and marks for the world market

ABB low-voltage switching devices are developed and produced in accordance with the applicable regulations as stated in the international IEC publications, the European EN specifications and the national VDE standards.
In most countries, low-voltage switching devices are produced according to such regulations under the responsibility of the manufacturers. This is why the devices are not subject to further approval. However, for those devices which are intended for use in household or for public use our customers can request test reports of our internal laboratory for presentation to the various qualified local organizations.
In other countries, approvals are prescribed by law.
For devices installed in ships, an approval issued by independent shipping companies, such as the GL, are demanded by the maritime insurance companies.

Marks of conformity and examples of approvals (device-dependent)

International

CB scheme

The CB (Certification Body) Scheme is a system designed to facilitate international trade by establishing mutual acceptance of test reports among participating safety certification organizations (the National Certification Bodies) in more than 30 countries. The CB Scheme was established by the International Electrotechnical Committee for Conformity Testing to Standards for Electrical Equipment (IECEE).

Europe

Conformité Européen (CE)

All devices which comply with the European low voltage directive and which are intended for sale within the European Union must have the CE sign applied. All products in this catalogue are CE marked.

The CE sign must not be confused with a certificate of quality issued by the EU. It is solely used to confirm that the respective product complies with the applicable European directives *). The CE sign is part of an administrative procedure to guarantee free movement of goods within the European Community.

*) **Directives:**
Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC
Machinery Directive 98/37/EEC

Verband der Elektrotechnik Elektronik Informationstechnik (VDE)

Applicable for technical instruments covered by the German Gerätesicherheits-gesetz (GSG) as well as for single parts and electrical wiring devices.

Berufsgenossenschaft der Feinmechanik und Elektrotechnik (BGFE)

The BG-PRÜFZERT sign is a voluntary safety mark, awarded by the BGFE following successful safety testing.

Explosion protection (EX)

Explosion protection acc. to Directive 94/9/EG (ATEX 100a)

Swiss insurance institution (SUVA)

Department accident prevention suvaPRO

Germanischer Lloyd (GL)

Shipping approval

Lloyds Register

Shipping approval

Russia

In Russia, low-voltage switching devices are subject to certification and have to be provided with a sign.

Gost Standard (GOST-R)

Gost R certification is mandatory for many products. This certification is based on a safety test (IEC standards with Russia-specific deviations) and an EMC test.

Russian Maritime Register of Shipping RMRS

Shipping approval

Australia, New Zealand

C-Tick Mark

The C-Tick Mark certifies compliance with the Australian EMC requirements. The Mark is also recognized in New Zealand.

China

CCC (China Compulsory Certification)

In China the CCC certification mark is a compulsory certification mark in the field of safety and quality for products sold on the Chinese market.

North America

Canadian and US standards are more or less equivalent but considerably differ from the IEC and VDE regulations.

USA

Underwriters Laboratories (UL) Listing

Released for installation in systems and for sale as individual component in the USA.

Recognition

Released for installation in systems, if the respective system has been completely mounted and wired by qualified personnel.

Canada

Canadian Standards Association (CSA)

USA and Canada

The combined UL signs for the USA and Canada are recognized by the authorities of both countries. Devices with this certificate meet the requirements of both countries.

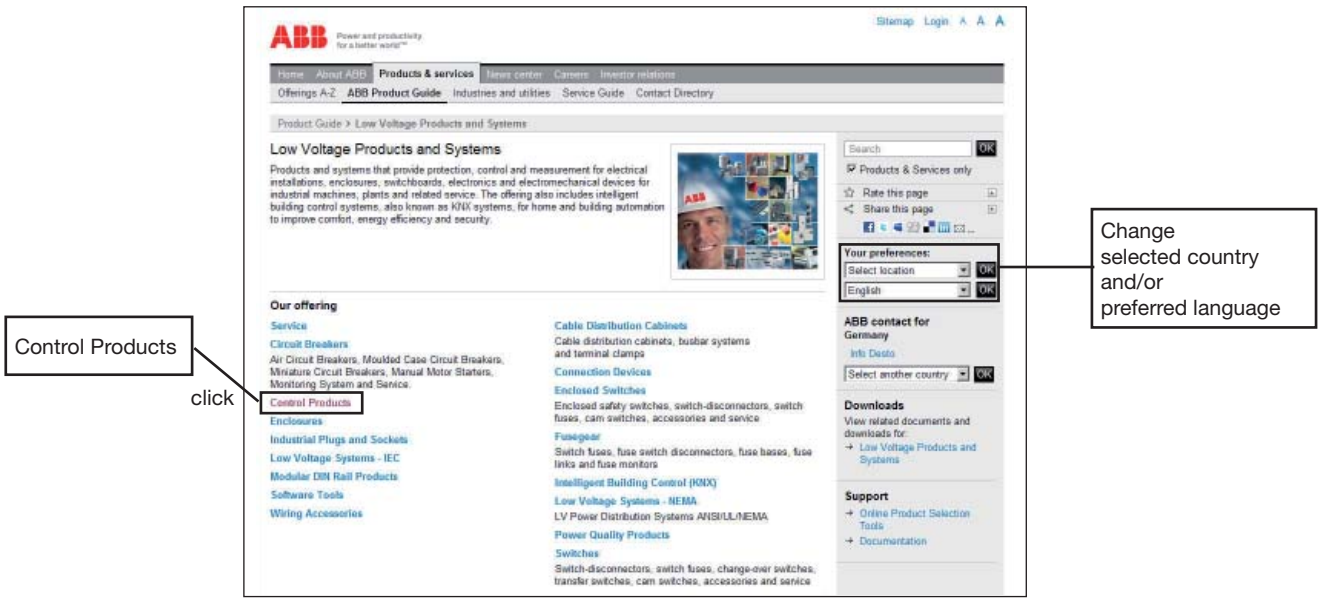
Listing

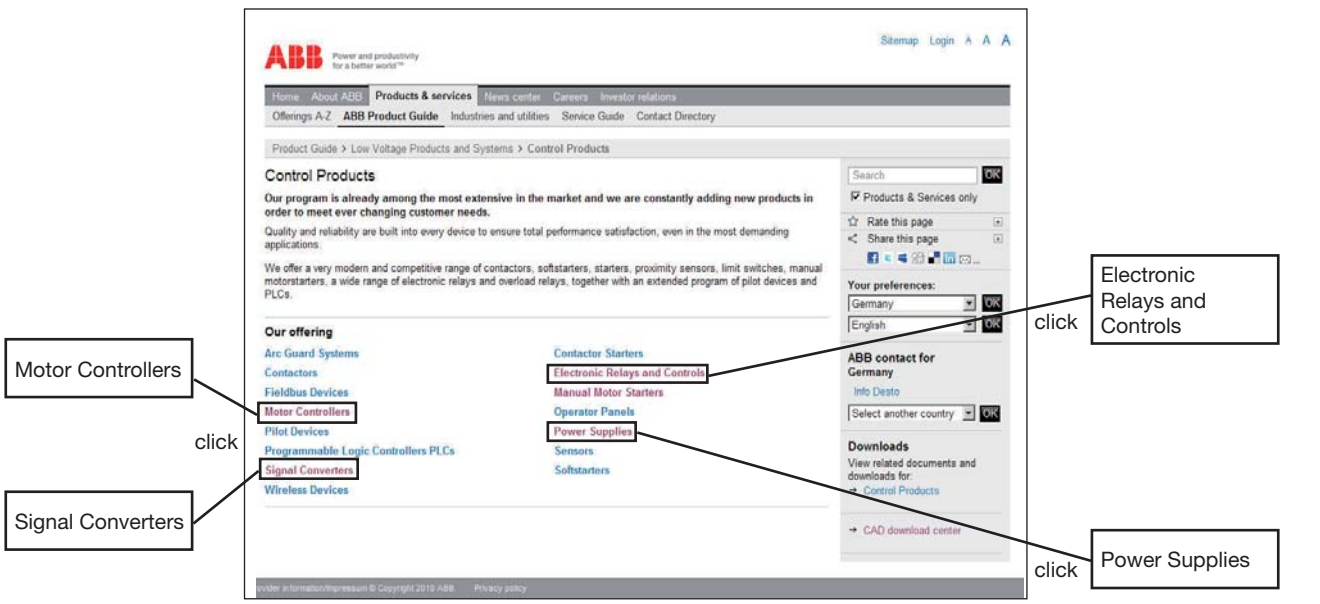
Recognition

Further product documentation see ABB Library www.abb.com/lowvoltage

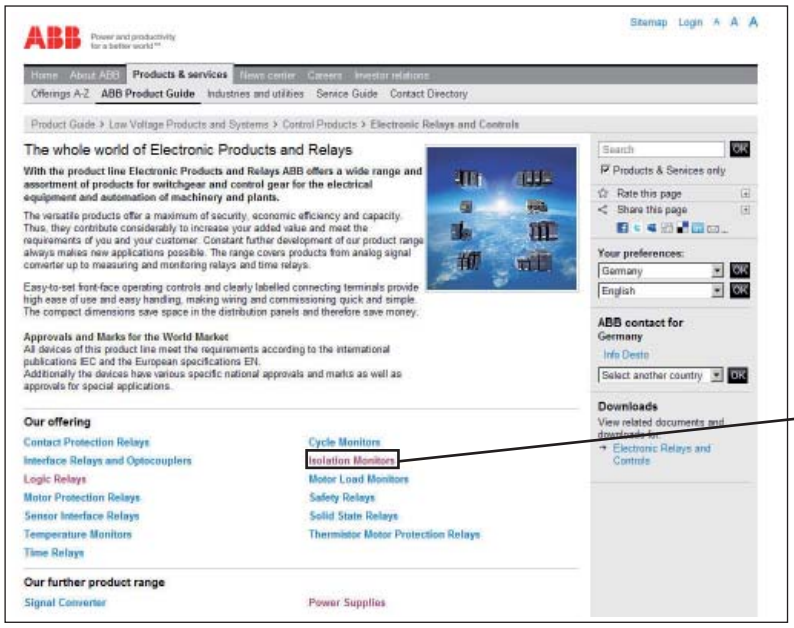
When you enter "www.abb.com/lowvoltage" for the first time, you will be asked to select your country and your preferred language (see screen shot 1). You can change this setting later if you like (see screen shot 2).

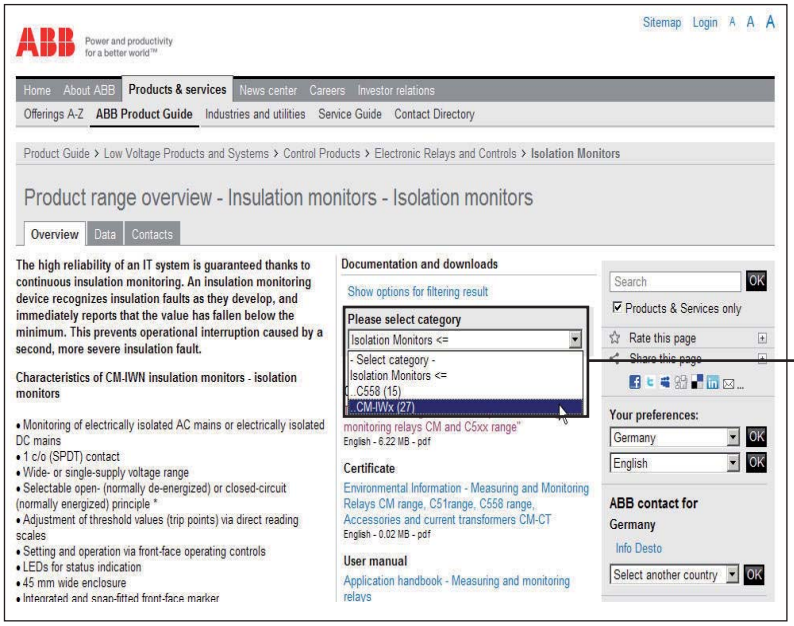
How to find "Electronic Products and Relays" in wourld wide web:



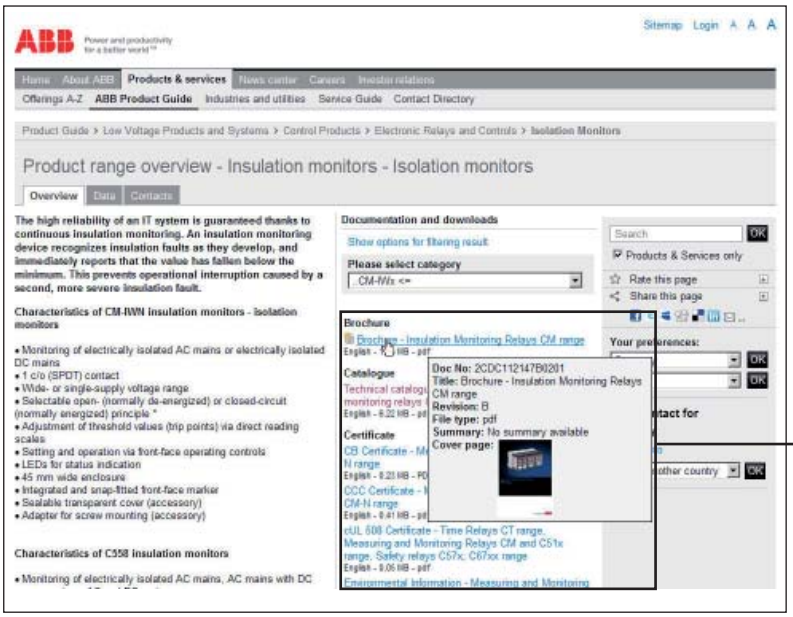


Further product documentation see ABB Library www.abb.com/lowvoltage (continued)





Further product documentation see ABB Library www.abb.com/lowvoltage (continued)



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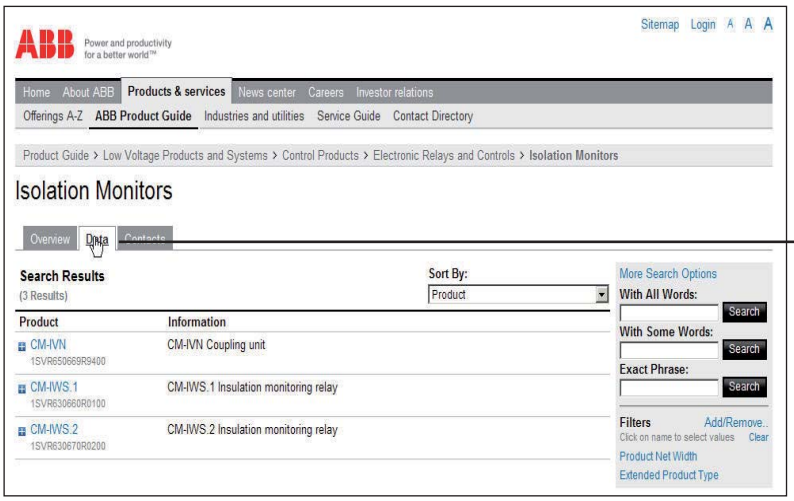
Download area for brochures, catalogues, certificates, data sheets etc.



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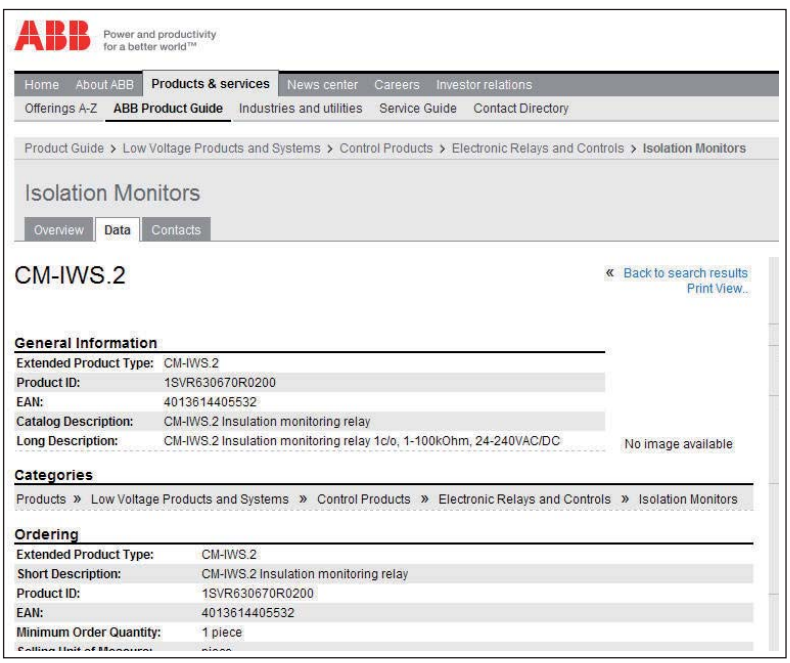
Further information via data tab from the product information system (PIS)



Notes

Electronic timers

CT range

Content

Electronic timers
CT range
Overview

Special features and differences of CT-D, CT-E and CT-S range

Electronic timers CT-D range the modular timers

Ideally suited for installation in distribution panels

- Diversity:
  - 2 multifunction timers
  - 10 single-function timers
- Devices with:
  - 1 or 2 c/o contacts
  - Control input: voltage-related triggering, polarized, capable of switching a parallel load
- Width of only 17.5 mm, this corresponds to one rail division in the distribution panel.
- Light-grey enclosure in RAL 7035, same colour as MDRC range

Electronic timers CT-E range the economic range

Perfect price-performance ratio for OEM users

- Diversity:
  - 2 multifunction timers
  - 56 single-function timers
  - 4 switching relays
- Devices with:
  - solid-state output for contactless switching (CT-MKE, CT-AKE und CT-EKE)
- Wide connecting screws in M3 (Pozidrive 1) for easy and fast connection

Electronic timers CT-S range the high end timers

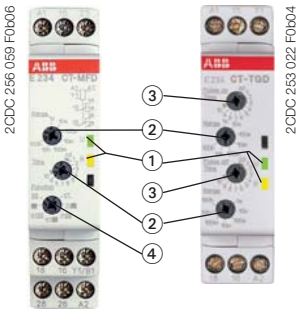
Universal and economic

- Diversity:
  - 8 multifunction timers
  - 13 single-function timers
  - 8 switching relays
- Devices with:
  - 1 or 2 c/o contacts
  - 2nd c/o contact can be selected as instantaneous contact
  - Control input: volt-free or voltage-related triggering
  - Remote potentiometer connection: When an external potentiometer is connected, the internal potentiometer is disabled.
- Sealable transparent cover for protection against unautorized changes of time and threshold values
- Integrated marker label

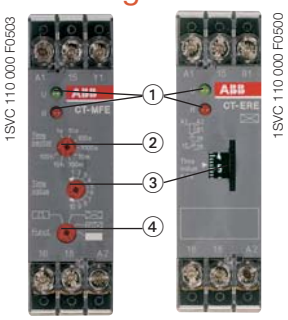
Electronic timers
CT range
Overview

① LEDs for status indication
② Time range adjustment
③ Fine adjustment of the desired time delay
④ Preselection of the desired timing function
⑤ Set the 2nd c/o contact as an instantaneous contact

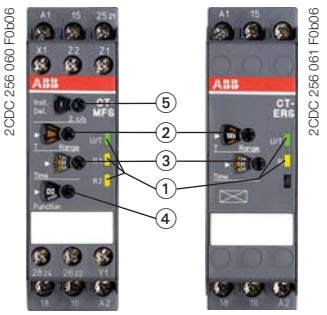
CT-D range



CT-E range



CT-S range



Timing function		multifunctional	single-functional	multifunctional	single-functional	multifunctional	single-functional
⊠	ON-delay	CT-MFD	CT-ERD	CT-MFE, CT-MKE	CT-ERE, CT-EKE	CT-MVS, CT-MFS, CT-MBS, CT-WBS	CT-ERS
■	OFF-delay	CT-MFD	CT-AHD	CT-MFE	CT-AHE, CT-ARE, CT-AKE	CT-MVS, CT-MFS, CT-MBS	CT-APS, CT-AHS, CT-ARS, CT-VBS
⊠■	ON- and OFF-delay					CT-MVS, CT-MXS, CT-MFS, CT-MBS	
1⎍⊠	Impulse-ON	CT-MFD	CT-VWD	CT-MFE, CT-MKE	CT-VWE	CT-MVS, CT-MFS, CT-MBS, CT-WBS	
1⎍■	Impulse-OFF	CT-MFD			CT-AWE	CT-MVS, CT-MFS, CT-MBS	
1⎍⊠■	Impulse-ON and OFF					CT-MXS	
⎍⊠	Flasher starting with ON	CT-MFD	CT-EBD	CT-MFE, CT-MKE		CT-MFS, CT-MBS, CT-WBS	
⎍■	Flasher staring with OFF	CT-MFD		CT-MFE, CT-MKE	CT-EBE	CT-MFS, CT-MBS, CT-WBS	
⎍⊠■	Flasher starting with ON or OFF					CT-MVS	
⊠■⎍	Pulse generator starting with ON or OFF		CT-TGD			CT-MXS	
1⎍	Pulse former	CT-MFD		CT-MFE		CT-MVS, CT-MXS, CT-MFS, CT-MBS	
⧋	Star-delta change-over		CT-SDD, CT-SAD				CT-SDS
⧋1⎍	Star-delta change-over with impulse					CT-MVS.2x, CT-MFS, CT-MBS	
⧋⊠	Star-delta change-over twice ON-delayed				CT-YDE, CT-SDE		
⊠+ ⊠1⎍ ■1⎍ ▭	further functions (depending on device)					CT-MVS, CT-MXS, CT-MFS, CT-MBS, CT-WBS	
▭	Switching relay				CT-IRE		CT-IRS

Technical data (extract)					
Time ranges	7 (0.05 s - 100 h) CT-SDD, CT-SAD: 4 (0.05 s - 10 min)	Multifunction devices: 8 (0.05 s - 100 h) Single-function devices: 5 single ranges (0.05-1 s, 0.1-10 s, 0.3-30 s, 3-300 s, 0.3-300 min)		10 (0.05 s - 300 h) CT-ARS, CT-SDS: 7 (0.05 s- 10 min)	
Control supply voltage	Wide and multi ranges	Wide ranges	Single and dual ranges	Wide, multi and single ranges	
Type and number of contacts	1 or 2 c/o contacts CT-SDD, CT-SAD: 2 n/o contacts	1 c/ o contact CT-SDE: 1 n/o contact and 1 n/c contacts CT-MKE, CT-EKE, CT-AKE: 1 thyristor		1 or 2 c/o cintacts CT-MVS.21, CT-MFS, CT-MBS: 2nd c/o contact selectable as inst. contact CT-SDS: 2 n/o contacts	
Control inputs	voltage-related triggering, polarized, capable of switching a parallel load	voltage-related triggering, polarized CT-MFE, CT-AHE, CT-AWE: with auxiliary voltage		voltage-related triggering, non-polarized, capable of switching a parallel load CT-MFS, CT-MBS, CT-AHS: volt-free triggering	

Electronic timers
CT range
Approvals and marks

■ existing
□ pending

Approvals		CT-D																		
		CT-MFD.12	CT-MFD.21	CT-ERD.12	CT-ERD.22	CT-AHD.12	CT-AHD.22	CT-VWD.12	CT-EBD.12	CT-TGD.12	CT-TGD.22	CT-SDD.22	CT-SAD.22							
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■							
	GOST	■	■	■	■	■	■	■	■	■	■	■	■							
	CB scheme	■	■	■	■	■	■	■	■	■	■	■	■							
	CCC	■	■	■	■	■	■	■	■	■	■	■	■							
Marks																				
CE	CE	■	■	■	■	■	■	■	■	■	■	■	■							
	C-Tick	■	□	■	□	■	□	■	■	■	□	□	□							

■ existing
□ pending

Approvals		CT-E																		
		CT-MFE	CT-ERE	CT-AHE	CT-ARE	CT-VWE	CT-AWE	CT-EBE	CT-YDE	CT-SDE	CT-IRE		CT-MKE	CT-EKE	CT-AKE					
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■		■	■	■					
	GL	■	■	■	■	■	■	■	■	■	■		■	■	■					
	GOST	■	■	■	■	■	■	■	■	■	■		■	■	■					
	CB scheme	■	■	■	■	■	■	■	■	■	■									
	CCC	■	■	■	■	■	■	■	■	■	■									
	RMRS	■	■	■	■	■	■	■	■	■	■		■	■	■					
Marks																				
CE	CE	■	■	■	■	■	■	■	■	■	■		■	■	■					
	C-Tick	■	■	■	■	■	■	■	■	■	■		■	■	■					

■ existing
□ pending

Approvals		CT-S																		
		CT-MVS.12	CT-MVS.2x	CT-MXS.22	CT-MFS.21	CT-MBS.22	CT-WBS.22	CT-ERS.12	CT-ERS.2x	CT-APS.12	CT-APS.2x	CT-AHS.22	CT-ARS.11	CT-ARS.21	CT-VBS.1x	CT-SDS.2x		CT-IRS.1x	CT-IRS.2x	CT-IRS.3x
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	GL	■	■	■	■	■	■	■	■	■	■	■	□	□		■				
	GOST	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
	CB scheme	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
	CCC	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
Marks																				
CE	CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
	C-Tick	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■

Electronic timers

CT-D range

Contents

Electronic timers
CT-D range
Benefits and advantages

CT-D range - the modular timers

Ideally suited for installation in distribution panels

- Diversity:
  - 2 multifunction timers
  - 10 single-function timers
- Control supply voltages:
  - Wide range: 12-240 V AC/DC
  - Multi range: 24-48 V DC, 24-240 V AC
- 7 time ranges, from 0.05 s to 100 h or
  4 time ranges, from 0.05 s - 10 min
- Width of only 17.5 mm
- Light-grey enclosure in RAL 7035
- Devices with:
  - 1 c/o contact (250 V / 6 A) or 2 c/o contacts (250 V / 5 A)
  - Control input: voltage-related triggering, polarized, capable of switching a parallel load
- Approvals / Marks
  (partly pending)

Direct reading scales

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.

2CDC 253 066 F0006


2CDC 253 132 F0006

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Connecting terminals

Wide terminal spacing allows connection of wires:
- 2 x 1.5 mm² (2 x 16 AWG) with wire end ferrules or
- 2 x 2.5 mm² (2 x 14 AWG) without ferrules.


2CDC 253 033 F0004

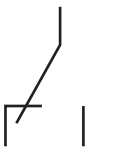
2CDC 253 021 F0004

Width 17,5 mm

With their width of 17.5 mm only, the CT-D range timers are ideally suited for installation in distribution panels.

Switching currents

The CT-D range timers allow an output load of up to 6 A on devices with 1 c/o contact and up to 5 A on devices with 2 c/o contacts.


2CDC 252 048 F0b06

Operating controls

① LEDs for status indication

U - green LED:

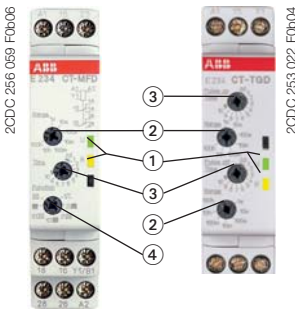
control supply voltage applied

timing

R, R1, R2 - yellow LED:

output relay energized

② Time range adjustment
③ Fine adjustment of the time delay
④ Preselection of the timing function



multifunctional **single-functional**

Synonyms

used expression	alternative expression(s)	used expression	alternative expression(s)
1 c/o contact	SPDT	voltage-related	wet / non-floating
2 c/o contacts	DPDT	volt-free	dry / floating

Electronic timers
CT-D range
Ordering details

CT-MFD.12

CT-MFD.21

CT-ERD.12

CT-ERD.22

CT-AHD.22

Type	Rated control supply voltage	Control input	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Multifunction timers						
CT-MFD: 7 functions [1], 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs						
CT-MFD.12	24-48 V DC, 24-240 V AC	■	**1SVR 500 020 R0000**	1		0.060 / 0.132
CT-MFD: 7 functions [1], 7 time ranges (0.05 s - 100 h), 2 c/o contacts, 2 LEDs						
CT-MFD.21	12-240 V AC/DC	■	**1SVR 500 020 R1100**	1		0.065 / 0.143
ON-delay timers ⊠						
CT-ERD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs						
CT-ERD.12	24-48 V DC, 24-240 V AC		**1SVR 500 100 R0000**	1		0.060 / 0.132
CT-ERD: 7 time ranges (0.05 s - 100 h), 2 c/o contacts, 2 LEDs						
CT-ERD.22	24-48 V DC, 24-240 V AC		**1SVR 500 100 R0100**	1		0.065 / 0.143
OFF-delay timers ▬						
CT-AHD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs						
CT-AHD.12	24-48 V DC, 24-240 V AC	■	**1SVR 500 110 R0000**	1		0.060 / 0.132
CT-AHD: 7 time ranges (0.05 s - 100 h), 2 c/o contacts, 2 LEDs						
CT-AHD.22	24-48 V DC, 24-240 V AC	■	**1SVR 500 110 R0100**	1		0.065 / 0.143

[1] Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Flasher starting with ON, Flasher starting with OFF, Pulse former

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Electronic timers
CT-D range
Ordering details

CT-VWD.12

CT-EBD.12

CT-TGD.12

CT-TGD.22

CT-SDD.22

Type	Rated control supply voltage	Control input	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Impulse-ON timers 1⎍⊠						
CT-VWD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs						
CT-VWD.12	24-48 V DC, 24-240 V AC		**1SVR 500 130 R0000**	1		0.060 / 0.132
Flasher, starting with ON ⎍⊠						
CT-EBD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs						
CT-EBD.12	24-48 V DC, 24-240 V AC		**1SVR 500 150 R0000**	1		0.060 / 0.132
Pulse generators ⊠⎍						
CT-TGD: 2 x 7 time ranges (0.05 s - 100 h) [2], 1 c/o contact, 2 LEDs						
CT-TGD.12	24-48 V DC, 24-240 V AC	■	**1SVR 500 160 R0000**	1		0.060 / 0.132
CT-TGD: 2 x 7 time ranges (0.05 s - 100 h) [2], 2 c/o contacts, 2 LEDs						
CT-TGD.22	24-48 V DC, 24-240 V AC	■	**1SVR 500 160 R0100**	1		0.065 / 0.143
Star-delta timers ⍋						
CT-SDD: 4 time ranges (0.05 s - 10 min), transition time 50 ms fixed, 2 n/o contacts, 3 LEDs						
CT-SDD.22	24-48 V DC, 24-240 V AC		**1SVR 500 211 R0100**	1		0.065 / 0.143
CT-SAD: 4 time ranges (0.05 s - 10 min), transition time adjustable, 2 n/o contacts, 3 LEDs						
CT-SAD.22	24-48 V DC, 24-240 V AC		**1SVR 500 210 R0100**	1		0.065 / 0.143

[2] ON and OFF times adjustable independently: 2 x 7 time ranges 0.05 s - 100 h

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Remarks

Legend

▭ Control supply voltage not applied / Output contact open

▬ Control supply voltage applied / Output contact closed

A1-Y1/B1 Control input with voltage-related triggering

Terminal designations on the device and in the diagrams

The 1st c/o contact is always designated **15-16/18**.

The 2nd c/o contact is designated **25-26/28.**

The n/o contacts of the star-delta timers are designated with **17-18** and **17-28**.

Control supply voltage is always applied to terminals **A1-A2**.

Function of the yellow LED

The yellow LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

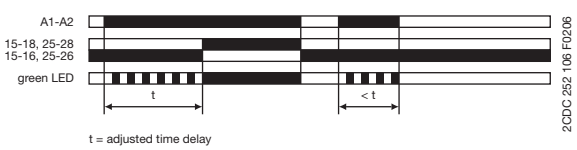
⊠ ON-delay (Delay on make) CT-ERD, CT-MFD

This function requires continuous control supply voltage for timing.

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



t = adjusted time delay

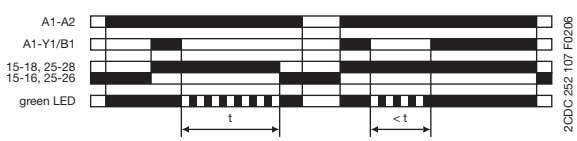
▬ OFF-delay with auxiliary voltage (Delay on break) CT-AHD, CT-MFD

This function requires continuous control supply voltage for timing.

If control input **A1-Y1/B1** is closed, the output relay energizes immediately. If control input **A1-Y1/B1** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de- energizes and the flashing green LED turns steady.

If control input **A1-Y1/B1** recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **A1-Y1/B1** re-opens.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted time delay

Electronic timers
CT-D range
Function diagrams

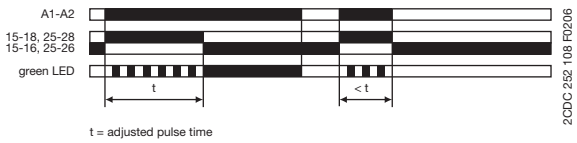
Impulse-ON (Interval) CT-VWD, CT-MFD

This function requires continuous control supply voltage for timing.

The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



t = adjusted pulse time

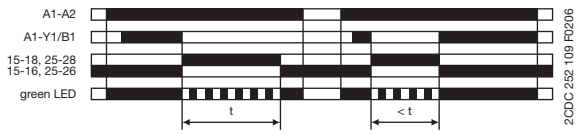
Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MFD

This function requires continuous control supply voltage for timing.

If control supply voltage is applied, opening control input **A1-Y1/B1** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input **A1-Y1/B1**, before the time delay is complete, de-energizes the output relay and resets the time delay.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



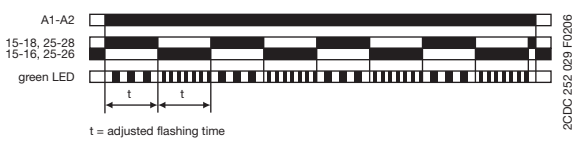
t = adjusted pulse time

Flasher, starting with the ON time (Recycling equal times, ON first) CT-EBD, CT-MFD

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



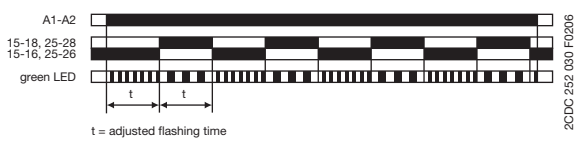
t = adjusted flashing time

Flasher, starting with the OFF time (Recycling equal times, OFF first) CT-MFD

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



t = adjusted flashing time

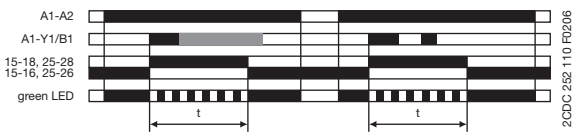
Electronic timers
CT-D range
Function diagrams

Pulse former (Single shot)
CT-MFD

This function requires continuous control supply voltage for timing.

Closing control input **A1-Y1/B1** energizes the output relay immediately and starts timing. Operating the control contact switch **A1-Y1/B1** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **A1-Y1/B1**.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

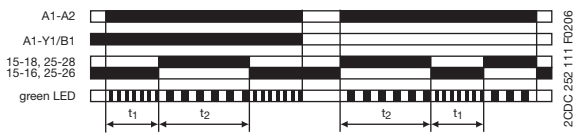
Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first)
CT-TGD

This function requires continuous control supply voltage for timing.

Applying control supply voltage, with open control input **A1-Y1/B1**, starts timing with an ON time first. Applying control supply voltage, with closed control input **A1-Y1/B1**, starts timing with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

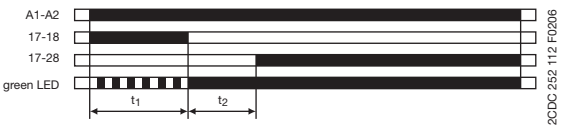


t_1 = adjusted OFF time
t_2 = adjusted ON time

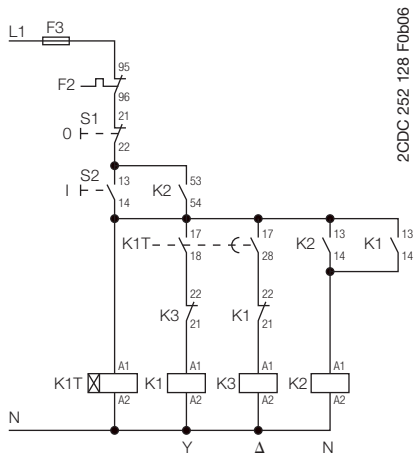
Star-delta change-over (Star-delta starting)
CT-SDD, CT-SAD

This function requires continuous control supply voltage for timing.

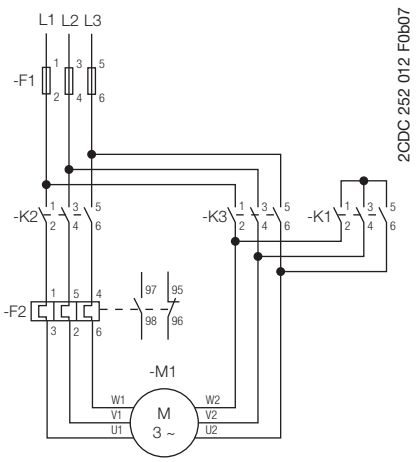
Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **17-18** and begins the set starting time t_1. The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor. Now, the transition time t_2 starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals **17-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.



t_1 = adjusted starting time
t_2 = transition time
CT-SDD: t_2 = 50 ms
CT-SAD: t_2 adjustable



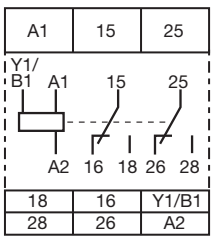
Control circuit diagram



Power circuit diagram

Electronic timers
CT-D range
Connection diagrams

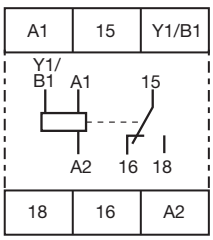
CT-MFD.21



2CDC 252 113 F0b06

A1-A2 Supply: 12-240 V AC/DC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

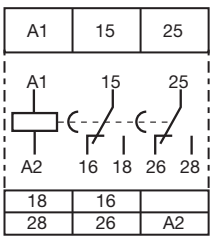
CT-MFD.12



2CDC 252 114 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

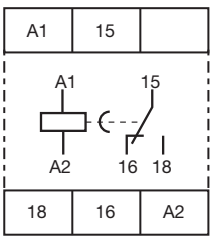
CT-ERD.22



2CDC 252 115 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact

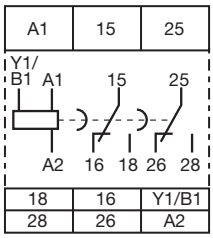
CT-ERD.12



2CDC 252 177 F0b05

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact

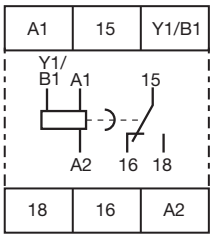
CT-AHD.22



2CDC 252 116 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

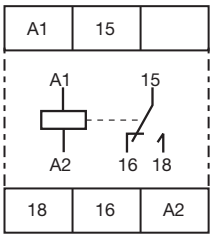
CT-AHD.12



2CDC 252 117 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

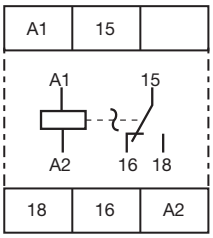
CT-VWD.12



2CDC 252 179 F0b05

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact

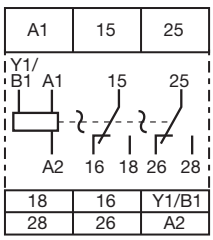
CT-EBD.12



2CDC 252 180 F0b05

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact

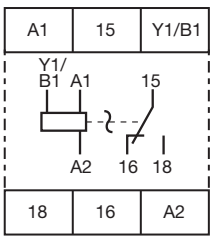
CT-TGD.22



2CDC 252 118 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

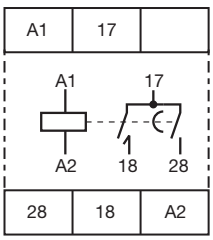
CT-TGD.12



2CDC 252 119 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

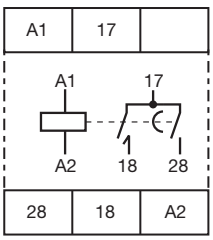
CT-SDD.22



2CDC 252 160 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
17-18 1. n/o contact (star contactor)
17-28 2. n/o contact (delta contactor)

CT-SAD.22



2CDC 252 160 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
17-18 1. n/o contact (star contactor)
17-28 2. n/o contact (delta contactor)

Electronic timers
CT-D range
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type		CT-D with 1 c/o contact	CT-D with 2 c/o contacts
Input circuit - Supply circuit			
Rated control supply voltage U_S	A1-A2	24-240 V AC / 24-48 V DC	
	A1-A2	-	12-240 V AC/DC (CT-MFD.21)
Rated control supply voltage U_S tolerance		-15...+10 %	
Rated frequency	AC/DC versions	DC or 50/60 Hz	
	AC versions	50/60 Hz	
Frequency range	AC/DC versions	DC or 47-63 Hz	
	AC versions	47-63 Hz	
Typical current / power consumption	24 V DC	- / 0.6 W	see data sheet
	230 V AC	- / 1.3 VA	see data sheet
	115 V AC	- / 1.3 VA	see data sheet
Power failure buffering time		min. 20 ms	min. 30 ms
Input circuit - Control circuit			
Kind of triggering		voltage-related triggering	
Control input, Control function	A1-Y1/B1	start timing external	
Parallel load / polarized		yes / yes	
Maximum cable length to the control input		50 m - 100 pF/m	
Minimum control pulse length		30 ms	
Control voltage potential		see rated control supply voltage	
Current consumption of the control input		max. 4 mA	see data sheet
Timing circuit			
Time ranges	7 time ranges 0.05 s - 100 h	1.) 0.05-1 s 4.) 0.5-10 min	2.) 0.5-10 s 5.) 5-100 min 7.) 5-100 h 3.) 5-100 s 6.) 0.5-10 h
	4 time ranges 0.05 s - 10 min (CT-SDD, CT-SAD)	1.) 0.05-1 s	2.) 0.5-10 s 4.) 0.5-10 min 3.) 5-100 s
Recovery time		< 50 ms	
Accuracy within the rated control supply voltage tolerance		Δt < 0.005 % / V	
Accuracy within the temperature range		Δt < 0.06 % / °C	
Repeat accuracy (constant parameters)		△ t < ±0.5 %	
Star-delta transition time	CT-SDD	fixed 50 ms	
	CT-SAD	adjustable: 20 -100 ms in steps of 10 ms	
Star-delta transition time tolerance	CT-SDD, CT-SAD	±3 ms	
Indication of operational states			
Control supply voltage / timing	U: green LED	⎍: control supply voltage applied ⎍⎍⎍: timing	
Relay status	R: yellow LED	⎍: output relay 1 or 2 energized	
Output circuit			
Kind of output	15-16/18	relay, 1 c/o contact	-
	15-16/18; 25-26/28	-	relay, 2 c/o contacts
	17-18; 17-28	relay, 2 n/o contacts (CT-SDD, CT-SAD)	
Contact material		Cd-free, see data sheet	
Rated operational voltage U_e	IEC/EN 60947-1	250 V	
Minimum switching voltage / minimum switching current		12 V / 100 mA	
Maximum switching voltage / maximum switching current		see load limit curves	
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	6 A	5 A
	AC15 (inductive) at 230 V	3 A	3 A [1]
	DC12 (resistive) at 24 V	6 A	5 A
	DC13 (inductive) at 24 V	2 A	2 A [1]

[1] CT-MFD.21: Rated operational current AC15 (n/c contact) = 0.75 A; Rated operational current DC13 = 1 A

[2] CT-MFD.21 (n/c contact): Utilization category = C 300, max. continuous thermal current at C 300 = 2.5 A, Make / Break at C 300 = 1800/180 VA

Electronic timers
CT-D range
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

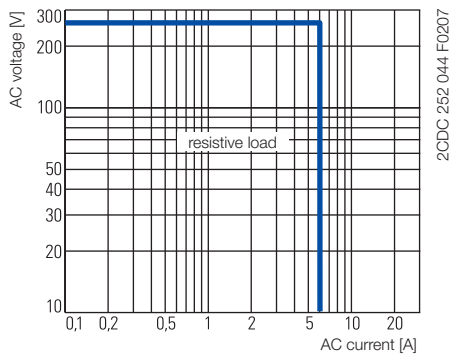
Type			CT-D with 1 c/o contact	CT-D with 2 c/o contacts
AC rating (UL 508)		Utilization category (Control Circuit Rating Code)	B 300	B 300 [2]
		max. rated operational voltage	300 V AC	
		max. continuous thermal current at B 300	5 A	5 A [2]
		max. making /breaking apparent power at B 300	3600/360 VA	3600/360 VA [2]
Mechanical lifetime			30 x 10^6 switching cycles	
Electrical lifetime		at AC12, 230 V, 4 A	0.1 x 10^6 switching cycles	
Max. fuse rating to achieve short-circuit protection (IEC/EN 60947-5-1)		n/c contact	6 A fast-acting	
		n/o contact	10 A fast-acting	
General data				
Duty time			100%	
Dimensions (W x H x D)			17.5 x 70 x 58 mm (0.69 x 2.76 x 2.28 in)	17.5 x 80 x 58 mm (0.69 x 3.15 x 2.28 in)
Weight			see ordering details	
Mounting			DIN rail (IEC/EN 60715), snap-mounting without any tool	
Mounting position			any	
Minimum distance to other units		horizontal / vertical	no / no	
Degree of protection		enclosure / terminals	IP50 / IP20	
Electrical connection				
Wire size		fine-strand with(out) wire end ferrule	2 x 0.5-1.5 mm^2 (2 x 20-16 AWG) 1 x 0.5-2.5 mm^2 (1 x 20-14 AWG)	
		rigid	2 x 0.5-1.5 mm^2 (2 x 20-16 AWG) 1 x 0.5-4 mm^2 (1 x 20-12 AWG)	
Stripping length			7 mm (0,28 in)	
Tightening torque			0.5-0.8 Nm	
Environmental data				
Ambient temperature range		operation / storage	-20 ... +60 °C / -40 ... +85 °C	
Damp heat (cyclic) (IEC/EN 60068-2-30)			6 x 24 h cycles, 55 °C, 95 % RH	
Vibration (sinusoidal) (IEC/EN 60068-2-6)			40 m/s^2, 20 cycles, 10....150...10 Hz	
Shock (half-sine) (IEC/EN 60068-2-27)			100 m/s^2, 11 ms	
Isolation data				
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC/EN 60664-1)			4 kV; 1.2/50 µs	
Pollution category (IEC/EN 60664-1, VDE 0110, UL 508)			3	
Overvoltage category (IEC/EN 60664-1, VDE 0110, UL 508)			III	
Rated insulation voltage U_i		input circuit / output circuit	300 V	
		output circuit 1 / output circuit 2	300 V	
Basic insulation (IEC/EN 61140)		input circuit / output circuit	300 V	
Protective separation (VDE 0106 part 101 and part 101/A1; IEC/EN 61140)		input circuit / output circuit	250 V	
Power-frequency withstand voltage test (test voltage, routine test) between all isolated circuits			2.5 kV, 50 Hz, 1 s	
Standards				
Product standard			IEC 61812-1, EN 61812-1 + A11, DIN VDE 0435 part 2021	
Low Voltage Directive			2006/95/EC	
EMC Directive			2004/108/EC	
RoHS Directive			2002/95/EC	
Electromagnetic compatibility				
Interference immunity to			IEC/EN 61000-6-1, IEC/EN 61000-6-2	
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
surge		IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission			IEC/EN 61000-6-3, IEC/EN 61000-6-4	
high-frequency radiated		IEC/CISPR 22, EN 55022	Class B	
high-frequency conducted		IEC/CISPR 22, EN 55022	Class B	

• **Approvals and marks** 1/4

Technical diagrams

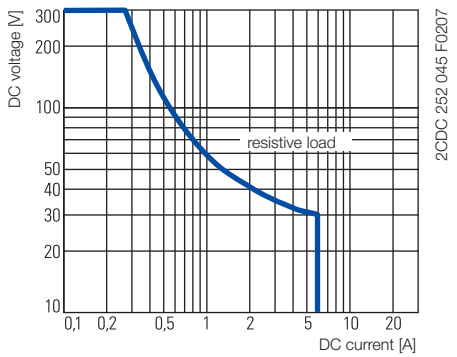
Load limit curves

AC load (resistive)

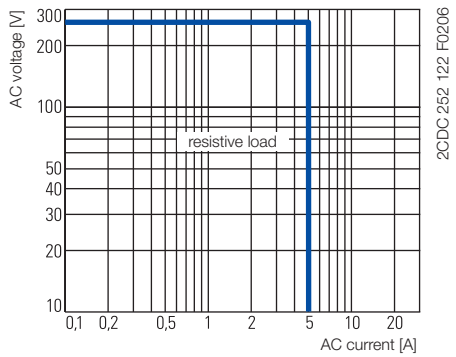


CT-D.1x

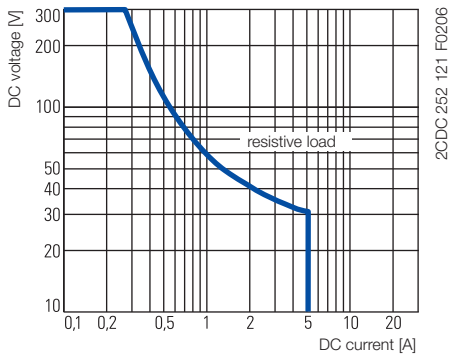
DC load (resistive)



CT-D.1x

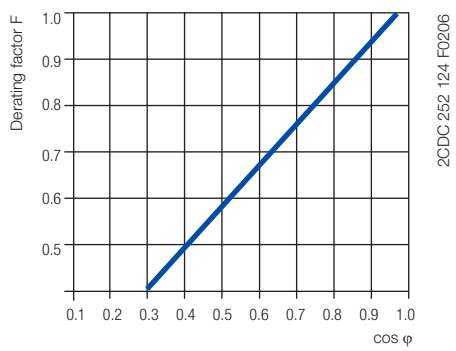


CT-D.2x

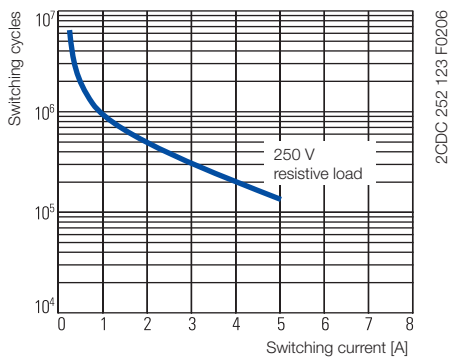


CT-D.2x

Derating factor F
for inductive AC load



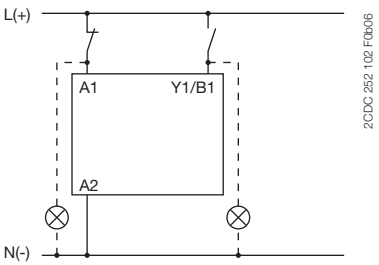
Contact lifetime



Electronic timers
CT-D range
Wiring notes, Dimensional drawings

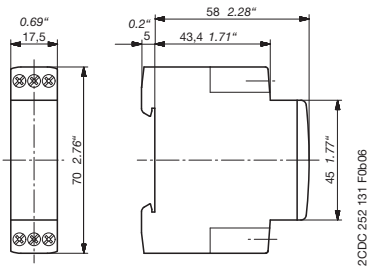
Wiring notes for devices with control input

A parallel load to the control input is possible

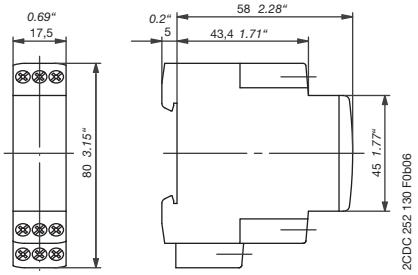


Dimensional drawings

dimensions in mm



CT-D devices with 1 c/o contact or 2 n/o contacts



CT-D devices with 2 c/o contacts

Electronic timers

CT-E range

Contents

Electronic timers
CT-E range
Benefits and advantages

CT-E range - the economy range

Perfect price-performance ratio for OEM users

- Diversity:
  - 2 multifunction timers
  - 56 single-function timers
  - 4 switching relays
- Control supply voltages
  - Single range: 110-130 V AC, 220-240 V AC
  - Dual range: 24 V AC/DC
  - Wide range: 24-240 V AC/DC (CT-MFE)
- Time ranges:
  - 5 single time ranges: 0.05-1 s, 0.1-10 s, 0.3-30 s, 3-300 s, 0.3-30 min
  - 8 time ranges: 0,05 s - 100 h (CT-MFE)
- Devices with:
  - 1 c/o contact (250 V / 4 A) or solid-state output for high switching frequencies (thyristor 0.8 A)
- Wide connecting screws for easy and fast connection
- Switching relay CT-IRE for added switching contacts with either side-by-side or diagonal positioned connection terminals
- Approvals / Marks (depending on device)

Direct reading scales

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Connecting screws in M3 (Pozidrive 1)

Easy and fast tightening and release of the connecting screws with pozidrive, pan- or crosshead screwdriver.

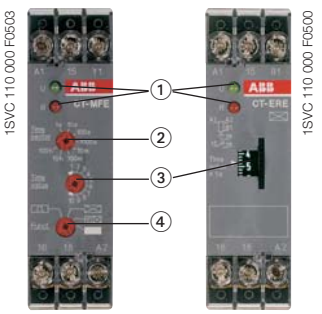
Operating controls

① LEDs for status indication

U - green LED:
control supply voltage applied

R2: red LED:
output relay energized

② Time range adjustment
③ Fine adjustment of the time delay
④ Preselection of the timing function



multifunctional single-functional

Synonyms

used expression	alternative expression(s)	used expression	alternative expression(s)
1 c/o contact	SPDT	voltage-related	wet / non-floating
2 c/o contacts	DPDT	volt-free	dry / floating

Electronic timers
CT-E range
Ordering details

CT-MFE

CT-ERE

CT-AHE

CT-ARE

Type	Rated control supply voltage	Time range	Control input	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Multifunction timer							
CT-MFE: 6 functions[1], 8 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs							
CT-MFE	24-240 V AC/DC	0.05 s - 100 h	■	**1SVR 550 029 R8100**	1		0.08 / 0.18
ON-delay timers ⊠							
CT-ERE: 1 c/o contact, 2 LEDs							
CT-ERE	24 V AC/DC, 220-240 V AC	0.1-10 s		**1SVR 550 107 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 107 R4100**	1		0.08 / 0.18
		3-300 s		**1SVR 550 107 R2100**	1		0.08 / 0.18
		0.3-30 min		**1SVR 550 107 R5100**	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		**1SVR 550 100 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 100 R4100**	1		0.08 / 0.18
		3-300 s		**1SVR 550 100 R2100**	1		0.08 / 0.18
		0.3-30 min		**1SVR 550 100 R5100**	1		0.08 / 0.18
OFF-delay timers ▬							
CT-AHE: 1 c/o contact, 2 LEDs							
CT-AHE	24 V AC/DC	0.1-10 s	■	**1SVR 550 118 R1100**	1		0.08 / 0.18
		0.3-30 s	■	**1SVR 550 118 R4100**	1		0.08 / 0.18
		3-300 s	■	**1SVR 550 118 R2100**	1		0.08 / 0.18
	110-130 V AC	0.1-10 s	■	**1SVR 550 110 R1100**	1		0.08 / 0.18
		0.3-30 s	■	**1SVR 550 110 R4100**	1		0.08 / 0.18
		3-300 s	■	**1SVR 550 110 R2100**	1		0.08 / 0.18
	220-240 V AC	0.1-10 s	■	**1SVR 550 111 R1100**	1		0.08 / 0.18
		0.3-30 s	■	**1SVR 550 111 R4100**	1		0.08 / 0.18
		3-300 s	■	**1SVR 550 111 R2100**	1		0.08 / 0.18
CT-ARE: without auxiliary voltage, 1 c/o contact, 1 LED							
CT-ARE	24 V AC/DC, 220-240 V AC	0.1-10 s		**1SVR 550 127 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 127 R4100**	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		**1SVR 550 120 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 120 R4100**	1		0.08 / 0.18

[1] Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Flasher starting with ON, Flasher starting with OFF, Pulse former

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Electronic timers
CT-E range
Ordering details

CT-VWE

CT-AWE

CT-EBE

CT-YDE

Type	Rated control supply voltage	Time range	Control input	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Impulse-ON timers 1⎍⌧							
CT-VWE: 1 c/o contact, 2 LEDs							
CT-VWE	24 V AC/DC, 220-240 V AC	0.1-10 s		**1SVR 550 137 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 137 R4100**	1		0.08 / 0.18
		3-300 s		**1SVR 550 137 R2100**	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		**1SVR 550 130 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 130 R4100**	1		0.08 / 0.18
		3-300 s		**1SVR 550 130 R2100**	1		0.08 / 0.18
Impulse-OFF timers 1⎍▬							
CT-AWE: without auxiliary voltage, 1 c/o contact, 2 LEDs							
CT-AWE	24 V AC/DC	0.05-1 s		**1SVR 550 158 R3100**	1		0.08 / 0.18
	110-130 V AC			**1SVR 550 150 R3100**	1		0.08 / 0.18
	220-240 V AC			**1SVR 550 151 R3100**	1		0.08 / 0.18
CT-AWE: with auxiliary voltage, 1 c/o contact, 2 LEDs							
CT-AWE	24 V AC/DC	0.1-10 s	■	**1SVR 550 148 R1100**	1		0.08 / 0.18
		0.3-30 s	■	**1SVR 550 148 R4100**	1		0.08 / 0.18
		3-300 s	■	**1SVR 550 148 R2100**	1		0.08 / 0.18
	110-130 V AC	0.1-10 s	■	**1SVR 550 140 R1100**	1		0.08 / 0.18
		0.3-30 s	■	**1SVR 550 140 R4100**	1		0.08 / 0.18
		3-300 s	■	**1SVR 550 140 R2100**	1		0.08 / 0.18
	220-240 V AC	0.1-10 s	■	**1SVR 550 141 R1100**	1		0.08 / 0.18
		0.3-30 s	■	**1SVR 550 141 R4100**	1		0.08 / 0.18
		3-300 s	■	**1SVR 550 141 R2100**	1		0.08 / 0.18
Flasher, starting with OFF 1⎍▬							
CT-EBE: with symmetrical ON & OFF times, 1 c/o contact, 2 LEDs							
CT-EBE	24 V AC/DC, 220-240 V AC	0.1-10 s		**1SVR 550 167 R1100**	1		0.08 / 0.18
	110-130 V AC			**1SVR 550 160 R1100**	1		0.08 / 0.18
Star-delta timers △⌧, △1⎍							
CT-YDE: ON-delayed, OFF-delayed without auxiliary voltage, 1 c/o contact, 2 LEDs							
CT-YDE	24 V AC/DC, 220-240 V AC	0.1-10 s		**1SVR 550 207 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 207 R4100**	1		0.08 / 0.18
		3-300 s		**1SVR 550 207 R2100**	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		**1SVR 550 200 R1100**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 200 R4100**	1		0.08 / 0.18
		3-300 s		**1SVR 550 200 R2100**	1		0.08 / 0.18

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Electronic timers
CT-E range
Ordering details

CT-SDE

CT-IRE

CT-MKE

CT-EKE

CT-AKE

Type	Rated control supply voltage	Time range	Control input	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CT-SDE: ON-delayed with fixed transition time, 1 n/c contact, 1 n/o contact, internally wired, 2 LEDs							
CT-SDE	24 V AC/DC, 220-240 V AC	0.3-30 s		**1SVR 550 217 R4100**	1		0.08 / 0.18
	110-130 V AC			**1SVR 550 210 R4100**	1		0.08 / 0.18
	380-415 V AC			**1SVR 550 212 R4100**	1		0.08 / 0.18
Switching relays							
CT-IRE: Impulse-OFF, A1/A2 diagonally, 1 c/o contact, 2 LEDs							
CT-IRE	24 V AC/DC			**1SVR 550 228 R9100**	1		0.08 / 0.18
	220-240 V AC/DC			**1SVR 550 221 R9100**	1		0.08 / 0.18
CT-IRE: Impulse-OFF, A1/A2 on top, 1 c/o contact, 2 LEDs							
CT-IRE	24 V AC/DC			**1SVR 550 238 R9100**	1		0.08 / 0.18
	220-240 V AC/DC			**1SVR 550 231 R9100**	1		0.08 / 0.18
Solid-state output / contactless							
Multifunction timer							
CT-MKE: 4 functions[1], solid-state output, functions and time range selection via external jumpers, 1 LED							
CT-MKE	24-240 V AC/DC	0.1-10 s, 3-300 s		**1SVR 550 019 R0000**	1		0.08 / 0.18
ON-delay timers							
CT-EKE: solid-state output, 1 LED							
CT-EKE	24-240 V AC/DC	0.1-10 s		**1SVR 550 509 R1000**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 509 R4000**	1		0.08 / 0.18
		3-300 s		**1SVR 550 509 R2000**	1		0.08 / 0.18
OFF-delay timers							
CT-AKE: solid-state output, 1 LED							
CT-AKE	24-240 V AC	0.1-10 s		**1SVR 550 519 R1000**	1		0.08 / 0.18
		0.3-30 s		**1SVR 550 519 R4000**	1		0.08 / 0.18
		3-300 s		**1SVR 550 519 R2000**	1		0.08 / 0.18

Notice:

CT-...KE are solid-state timers with thyristor output for 2-wire applications. They are connected directly in series with the control coil of contactors or relays. Voltage should not be applied without a load connected, because there is no current limiting in the unit.

[1] Functions: ON-delay (AC/DC), Impulse-ON (AC only), Flasher starting with ON (AC only), Flasher starting with OFF (AC only)

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Electronic timers
CT-E range
Function diagrams

Remarks

Legend

▭	Control supply voltage not applied / Output contact open
▬	Control supply voltage applied / Output contact closed
A1-Y1/B1	Control input with voltage-related triggering

Terminal designations on the device and in the diagrams

The c/o contact is always designated **15-16/18**.
The n/o contacts are designated with **15-16** and **15-18**.
Control supply voltage is always applied to terminals **A1-A2/B1**.

Function of the red LED

The red LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

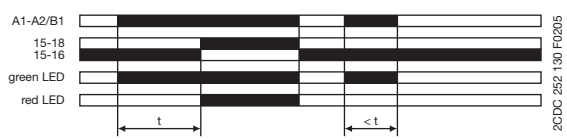
⊠ ON-delay (Delay on make) CT-ERE, CT-MFE

Timing begins when control supply voltage is applied. When the selected time delay is complete, the output relay energizes.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Interrupting control supply voltage before the time delay is complete, resets the time delay. The output relay does not energize.

Control input **A1-Y1** of the CT-MFE is disabled when this function is selected.



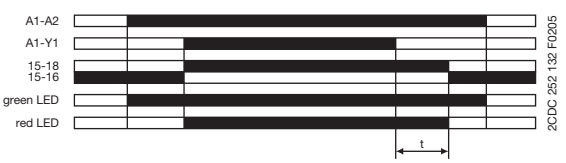
t = adjusted time delay

▬ OFF-delay, with auxiliary voltage (Delay on break) CT-AHE, CT-MFE

This function requires continuous control supply voltage for timing.

Timing is controlled by a control input, connected to terminals **A1-Y1**. If the control contact is closed, the output relay energizes. If control input **A1-Y1** is opened, the selected time delay starts. When the time delay is complete, the output relay de-energizes.

If control input **A1-Y1** closes before the time delay is complete, the time delay is reset. Timing starts again when the control input re-opens.



t = adjusted time delay
Minimum control pulse length: 20 ms

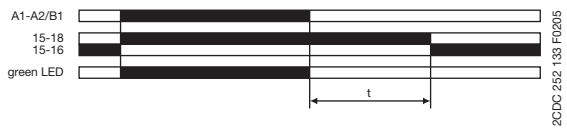
OFF-delay, without auxiliary voltage (true delay on break) CT-ARE

The OFF-delay function without auxiliary voltage does not require control supply voltage for timing.

Applying control supply voltage, energizes the output relay. If control supply voltage is interrupted, the OFF-delay starts. When timing is complete, the output relay de-energizes.

If control supply voltage is re-applied, before the time delay is complete, the time delay is reset and the output relay remains energized.

Control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.



t = adjusted time delay

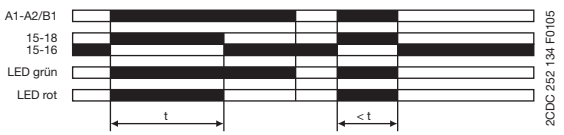
Impulse-ON (Interval) CT-VWE, CT-MFE

The output relay energizes immediately when control supply voltage is applied and de-energizes when the selected time delay is complete.

If control supply voltage is interrupted before the time delay is complete, the output relay de-energizes and the time delay is reset.

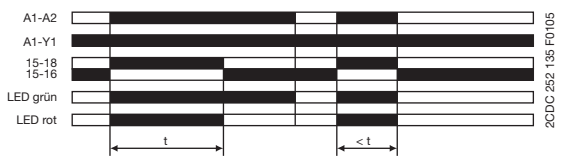
The control input **A1-Y1** of the CT-MFE has to be jumpered if this timing function is configured.

CT-VWE:



t = adjusted pulse time

CT-MFE:



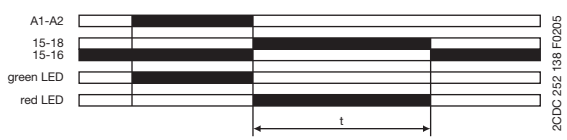
t = adjusted pulse time

Impulse-OFF, without auxiliary voltage (True trailing edge interval) CT-AWE

The Impulse-OFF function without auxiliary voltage does not require control supply voltage for timing.

If control supply voltage is interrupted, the output relay energizes and the OFF time starts. When timing is complete, the output relay de-energizes.

If control supply voltage is re-applied, before the time delay is complete, the time delay is reset and the output relay de-energizes.
Control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.

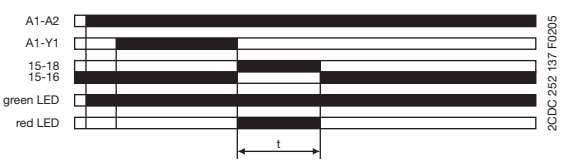


t = adjusted pulse time

Impulse-OFF, with auxiliary voltage (Trailing edge interval) CT-AWE

This function requires continuous control supply voltage. Opening control input **A1-Y1**, energizes the output relay immediately and timing begins. When the selected time delay is complete, the output relay de-energizes.

Interrupting control supply voltage or closing control input **A1-Y1**, before the time delay is complete, de-energizes the output relay and resets the time delay.



t = adjusted pulse time

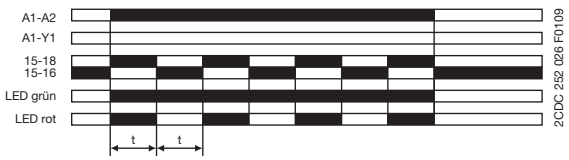
Electronic timers
CT-E range
Function diagrams

Flasher starting with ON (Recycling equal times, ON first) CT-MFE

Applying control supply voltage, starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1** of the CT-MFE has to be open when this function is selected.



t = adjusted flashing time

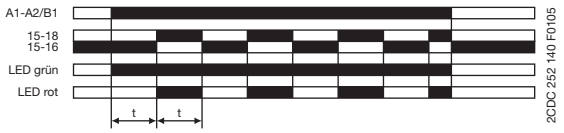
Flasher starting with OFF (Recycling equal times, OFF first) CT-EBE, CT-MFE

Applying control supply voltage, starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

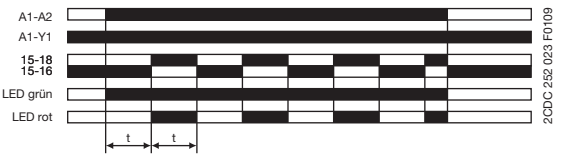
Control input **A1-Y1** of the CT-MFE has to be jumpered when this function is selected.

CT-EBE:



t = adjusted flashing time

CT-MFE:



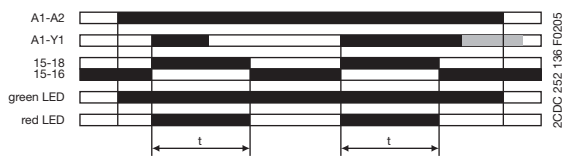
t = adjusted flashing time

Pulse former (Single shot) CT-MFE

Closing the control input connected to terminals **A1-Y1**, with control supply voltage applied, energizes the output relay for the selected ON time. When the ON time is complete, the output relay de-energizes. Operating the control input switch **A1-Y1** during the time delay has no effect.

After the time delay is complete, it can be restarted by closing control input **A1-Y1**.

If control supply voltage is interrupted during timing, the output relay de-energizes and the ON time is reset.



t = adjusted pulse time

Switching relay CT-IRE

The switching relay may be used to increase the number of available contacts or to reinforce contacts, or as a coupling/decoupling interface.

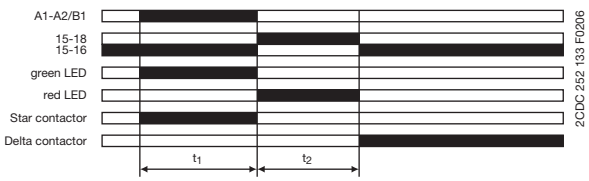
Applying control supply voltage, energizes the output relay. The output relay de-energizes if supply voltage is interrupted.

Star-delta change-over
CT-YDE

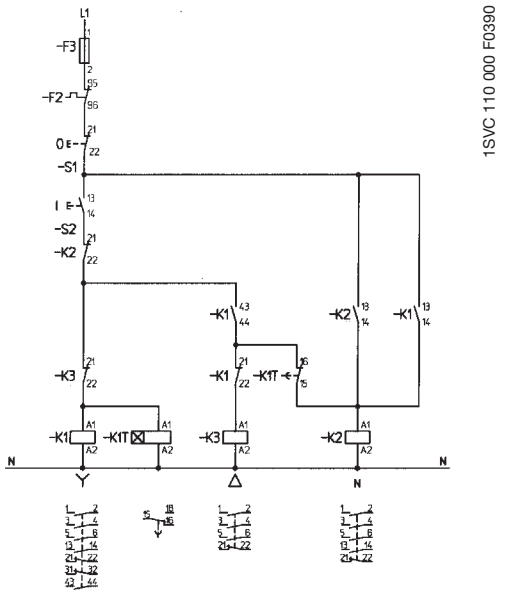
Applying control supply voltage, energizes the star contactor (K1) and the line contactor (K2) and begins the set starting time.

When the starting time is complete, contact **15-16** de-energizes the star contactor (K1) Now, the fixed transition time starts.

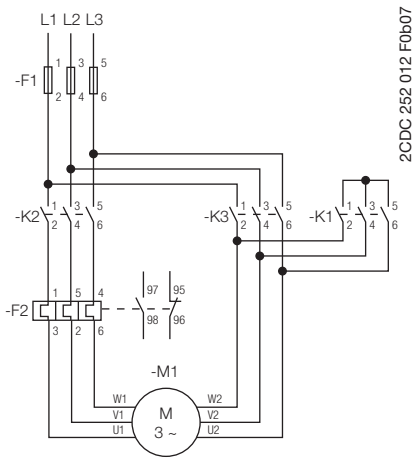
When the transition time is complete, contact **15-16** energizes the delta contactor (K3).



t_1 = adjustable starting time
t_2 = fixed transition time of 50 ms



Control circuit diagram



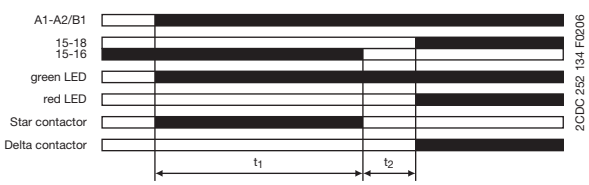
Power circuit diagram

Star-delta change-over
CT-SDE

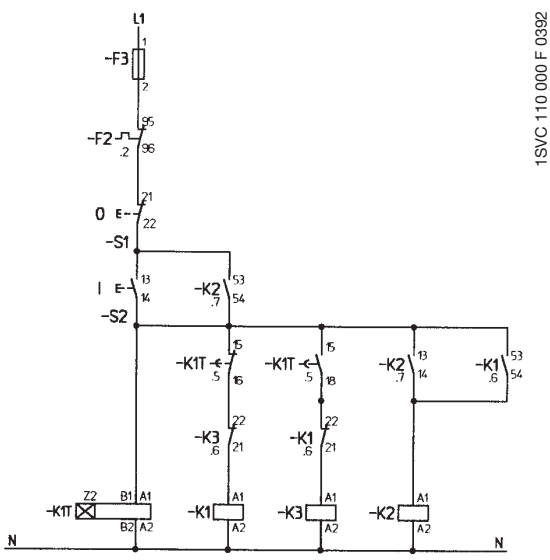
Applying control supply voltage, energizes the star contactor (K1) and the line contactor (K2) and begins the set starting time.

When the starting time is complete, contact **15-16** de-energizes the star contactor (K1). Now, the fixed transition time starts.

When the transition time is complete, contact **15-18** energizes the delta contactor (K3).



t_1 = adjustable starting time
t_2 = fixed transition time of 30 ms



Control circuit diagram

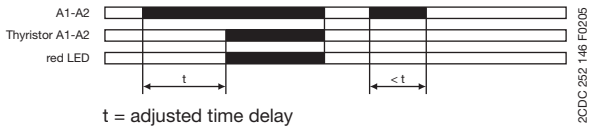
Electronic timers
CT-E range
Function diagrams

Multifunction timer CT-MKE

Functions and time ranges are programmed by simply plugging in external wire jumpers.

ON-delay (Delay on Make)

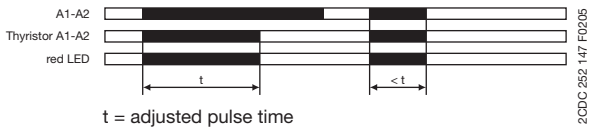
Without external connection. Timing begins when control supply voltage is applied to terminal **A1** and the load connected in series with **A2**. When the selected time delay is complete, the load connected to **A1-A2** energizes. If control supply voltage is interrupted, the load de-energizes and the time delay is reset. Interrupting control supply voltage before the time delay is complete, resets the time delay. The load does not energize.



t = adjusted time delay

Impulse-ON (Interval)

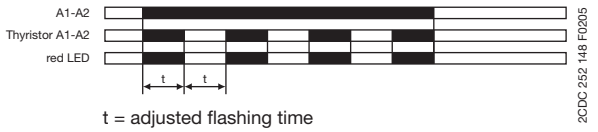
External connection **X1-X4** required. The load energizes and timing starts when control supply voltage is applied to terminal **A1** and the load connected in series with **A2**. When the selected time delay is complete, the load de-energizes. Interrupting control supply voltage before the time delay is complete, de-energizes the load and resets the time delay.



t = adjusted pulse time

Flasher, starting with ON

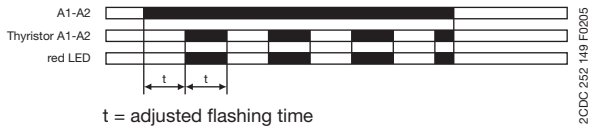
External connection **X1-X4** and **X2-X4** required. When control supply voltage is applied to terminal **A1** and the load connected in series with **A2**, the load energizes and de-energizes with the selected ON & OFF times. The ON & OFF times are equal. The cycle starts with an ON time first (load energized). If control supply voltage is interrupted, the load de-energizes and the time delay is reset.



t = adjusted flashing time

Flasher, starting with OFF

External connection **X2-X4** required. When control supply voltage is applied to terminal **A1** and the load connected in series with **A2**, the load energizes and de-energizes with the selected ON & OFF times. The ON & OFF times are equal. The cycle starts with an OFF time first (load de-energized). If control supply voltage is interrupted, the load de-energizes and the time delay is reset.



t = adjusted flashing time

Programming the time ranges

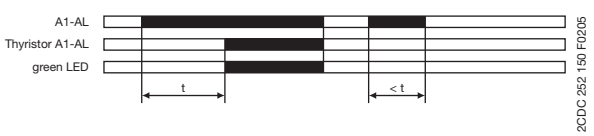
X_3-X_4 jumpered: 0,1-10 s X_3-X_4 open: 3-300 s

ON-delay (Delay on make) CT-EKE

Timing begins when control supply voltage is applied to terminal **A1** and the load connected in series with **AL**. When the selected time delay is complete, the load energizes. The green LED glows as long as the load is energized.

If control supply voltage is interrupted, the load de-energizes and the time delay is reset.

Interrupting control supply voltage before the time delay is complete, resets the time delay. The load does not energize.



t = adjusted time delay

OFF-delay, with auxiliary voltage (Delay on break) CT-AKE

The OFF-delay function with auxiliary voltage requires continuous control supply voltage at terminal **A1** and the load connected in series with **AL**, for timing.

Timing is controlled by a control input, connected to terminals **Y2-A2**. When the control input closes, the load energizes. If the control input opens, the selected time delay starts (minimum control pulse length is 20 ms). The green LED glows as long as the load is energized.

When the selected time delay is complete, the load de-energizes.

If control input **Y2-A2** closes before the time delay is complete, the time delay is reset and the load remains energized. Timing starts again when the control input re-opens.

Interrupting control supply voltage resets the time delay and de-energizes the load.

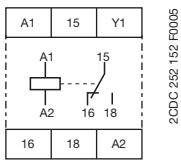
t = adjusted time delay

Notice:

CT-...KE are solid-state timers with thyristor output for 2-wire applications. They are connected directly in series with the control coil of contactors or relays. Voltage should not be applied without a load connected, because there is no current limiting in the unit.

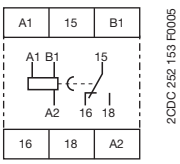
Electronic timers
CT-E range
Connection diagrams

CT-MFE



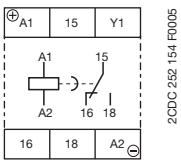
A1-A2 Supply: 24-240 V AC/DC
A1-Y1 Control input
15-16/18 c/o contact

CT-ERE



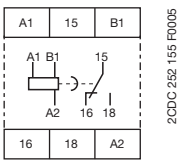
A1-A2 Supply: 220-240 V AC or 110-130 V AC
A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

CT-AHE [1)]



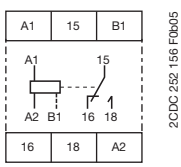
A1(+)-A2(-) Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC
A1-Y1 Control input
15-16/18 c/o contact

CT-ARE



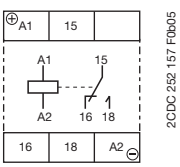
A1-A2 Supply: 220-240 V AC or 110-130 V AC
A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

1 CT-VWE



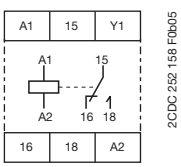
A1-A2 Supply: 220-240 V AC or 110-130 V AC
A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

1 CT-AWE



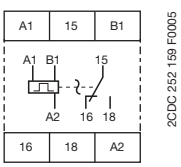
Device without aux. voltage
A1(+)-A2(-) Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC
15-16/18 c/o contact

1 CT-AWE [1)]



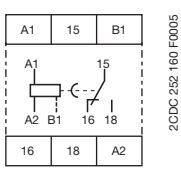
Device with aux. voltage
A1-A2 Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC
A1-Y1 Control input
15-16/18 c/o contact

CT-EBE



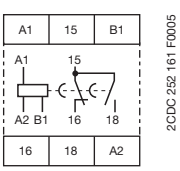
A1-A2 Supply: 220-240 V AC or 110-130 V AC
A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

CT-YDE



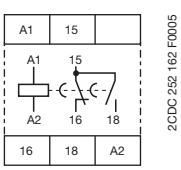
A1-A2 Supply: 220-240 V AC or 110-130 V AC
A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

CT-SDE



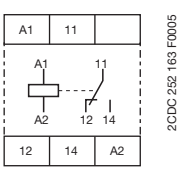
Device:
1SVR 550 217 R4100
A1-A2 Supply: 220-240 V AC
A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

CT-SDE



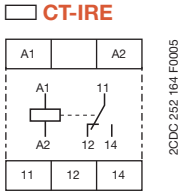
Devices:
1SVR 550 210 R4100, 1SVR 550 212 R4100
A1-A2 Supply: 110-130 V AC or 380-415 V AC
15-16/18 c/o contact

CT-IRE



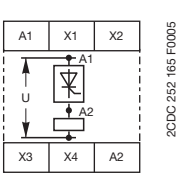
Supply terminals diagonally positioned
A1-A2 Supply: 24 V AC/DC or 220-240 V AC/DC
11-12/14 c/o contact

CT-IRE



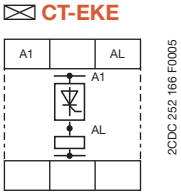
Supply terminals on one side of the device
A1-A2 Supply: 24 V AC/DC or 220-240 V AC/DC
11-12/14 c/o contact

CT-MKE



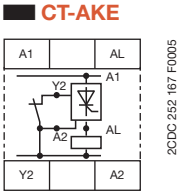
A1-A2 Supply: 24-240 V AC/DC
A1-A2 Thyristor
X1-X4 Timing function adjustment
X2-X4 Timing function adjustment
X3-X4 Time range adjustment
(Details see function diagrams)

CT-EKE



A1-AL Supply: 24-240 V AC/DC
A1-AL Thyristor

CT-AKE



A1-AL Supply: 24-240 V AC
A1-AL Thyristor
Y2-A2 Control input

• [1)] **Wiring notes** 1/30

Electronic timers
CT-E range
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type		CT-E (relays)	CT-E (solide-state)
Input circuit - Supply circuit			
Rated control supply voltage U_S	A1-A2, A1-AL	24-240 V AC/DC	
	A1-A2, A1-AL	24-240 V AC	
	A1-A2	110-130 V AC	-
	A1-A2	220-240 V AC	-
	A1-A2	380-415 V AC	-
	A1-B1	24 V AC/DC	-
Rated control supply voltage U_S tolerance		-15...+10 %	
Rated frequency	AC/DC versions	DC or 50/60 Hz	
	AC versions	50/60 Hz	
Current / power consumption	24-240 V AC/DC, 24-240 V AC	approx. 1.0-2.0 VA/W	
	110-130 V AC, 220-240 V AC	approx. 2.0 VA	-
	380-415 V AC	approx. 3.0 VA	-
	24 V AC/DC	approx. 1.0 VA/W	-
Current consumption while timing		-	≤ 2 mA (24-60 V AC/DC) ≤ 8 mA (60-240 V AC/DC)
Input circuit - Control circuit			
Kind of triggering		voltage-related triggering	-
Control input, Control function	A1-Y1	start timing external	-
Parallel load / polarized		no / yes [1]	-
Minimum control pulse length		20 ms	-
Control voltage potential		see U_S	-
Timing circuit			
Time ranges	1 of 5 time ranges per singlefunction device	0.05-1 s 0.1-10 s 0.3-30 s 3-300 s 0.3-30 min	
	8 time ranges 0.05 s - 100 h (CT-MFE)	1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 50-1000 s 5.) 0.5-10 min 6.) 5-100 min 7.) 0.5-10 h 8.) 5-100 h	-
	2 time ranges 0.1-300 s (CT-MKE)	-	1.) 0.1-10 s 2.) 3-300 s
Recovery time		<50 ms CT-ARE: <200 ms CT-AWE, CT-SDE: <400 ms CT-YDE: <500 ms	CT-MKE: <100 ms CT-AKE: <300 ms
Accuracy within the rated control supply voltage tolerance		Δt <0.5 % / V	
Accuracy within the temperature range		Δt <0.1 % / °C	
		CT-MFE: Δt <0.06 % / °C	-
Repeat accuracy (constant parameters)		Δt <1 %	
Star-delta transition time	CT-YDE / CT-SDE	50 ms / 30 ms	-
Minimum energizing time	CT-ARE	200 ms	-
Indication of operational states			
Control supply voltage	U: green LED	⌜⌝: control supply voltage applied	
Relay status	R: red LED	⌜⌝: output relay energized	
Output circuit			
Kind of output	15-16/18	relay, 1 c/o contact	-
	A1-A2, A1-AL	-	Thyristor
Contact material		AgCdO	-
Rated operational voltage U_e (VDE 0110, IEC 60947-1)		250 V	
Maximum switching voltage		250 V AC, 250 V DC	-
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A	-
	AC15 (inductive) at 230 V	3 A	-
	DC12 (resistive) at 24 V	4 A	-
	DC13 (inductive) at 24 V	2 A	-

[1] CT-MFE: yes / no

2CDC110004C0207

Electronic timers
CT-E range
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			CT-E (relays)	CT-E (solide-state)
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300	-
	max. rated operational voltage		300 V AC	-
	max. continuous thermal current at B 300		5 A	-
	max. making /breaking apparent power at B 300		3600/360 VA	-
Mechanical lifetime			30 x 10^6 switching cycles	-
Electrical lifetime		at AC12, 230 V, 4 A	0.1 x 10^6 switching cycles	-
Max. fuse rating to achieve short circuit protection (IEC/EN 60947-5-1)		n/c contact	10 A fast-acting, CT-ARE: 5 A	-
		n/o contact	10 A fast-acting, CT-ARE: 5 A	-
Minimum load current			-	CT-MKE: 20 mA CT-EKE, CT-AKE: 10 mA
Maximum load current			-	CT-MKE: 0.8 A at T_a = 20 °C CT-EKE, CT-AKE: 0.7 A
Load current reduction / Derating			-	10 mA/°C
Maximum surge current			-	CT-MKE: ≤ 20 A for t ≤ 20 ms CT-EKE, CT-AKE: ≤ 15 A
Voltage drop in connected state			-	≤ 3 V
Cable length between solid-state timer and connected load at 50 Hz and a cable capacity of 100 pF/m :		at 24 V AC	-	220 m / 22 nF
		at 42 V AC	-	100 m / 10 nF
		at 60 V AC	-	65 m / 6.5 nF
		at 110 V AC	-	50 m / 5 nF
		at 240 V AC	-	22 m / 2.2 nF
General data				
Duty time			100 %	
Dimensions (W x H x D)			22.5 x 78.5 x 78 mm (0.886 x 3.09 x 3.07 in)	
Weight			approx. 80 g (0.176 lb)	
Mounting			DIN rail (IEC/EN 60715)	
Mounting position			any	
Minimum distance to other units		horizontal / vertical	no / no	
Degree of protection		enclosure / terminals	IP50 / IP20	
Electrical connection				
Wire size	fine-strand	with wire end ferrule	2 x 0.75-1.5 mm² (2 x 18-16 AWG)	
		without wire end ferrule	2 x 1-1.5 mm² (2 x 18-16 AWG)	
	rigid		2 x 0.75-1.5 mm² (2 x 18-16 AWG)	
Tightening torque			10 mm (0.39 in)	
Tightening torque			0.6-0.8 Nm	
Environmental data				
Ambient temperature range		operation / storage	-20...+60 °C / -40...+85 °C	
Damp heat (IEC 68-2-30)			24 h cycles, 55 °C, 93 % rel., 96 h	
Operational reliability (IEC 68-2-6)			6 g	
Mechanical resistance (IEC 68-2-6)			10 g	
Isolation data				
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC 664)			4 kV; 1.2/50 µs	
Pollution category (VDE 0110, IEC 664, IEC 255-5)			III/C	
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)			III/C	
Test voltage between all isolated circuits (type test)			2.5 kV, 50 Hz, 1 s	
Rated insulation voltage U_i between supply circuit, control circuit and output circuit (VDE 0110, IEC 60947-1)			300 V (supply up to 240 V)	
			500 V (supply up to 440 V)	
Standards				
Product standard			IEC 61812-1, EN 61812-1 + A11, DIN VDE 0435 Teil 2021	
Low Voltage Directive			2006/95/EC	
EMC Directive			2004/108/EC	

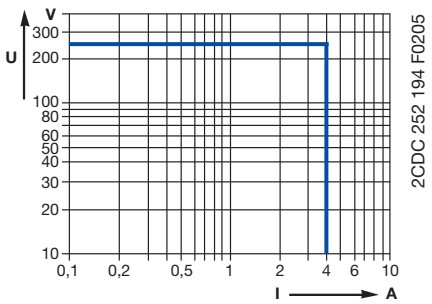
Electronic timers
CT-E range
Technical diagrams, Wiring notes, Dimensional drawing

Data at T_a = 25 °C and rated values, unless otherwise indicated

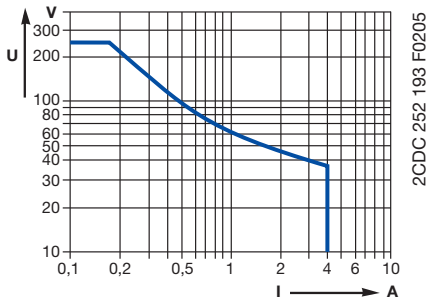
Type		CT-E (relays)	CT-E (solide-state)
Electromagnetic compatibility			
Interference immunity to		IEC/EN 61000-6-1, IEC/EN 61000-6-2	
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)	
harmonics and interharmonics	IEC/EN 61000-4-13	Level 3	
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4	
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B	
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B	

Load limit curves

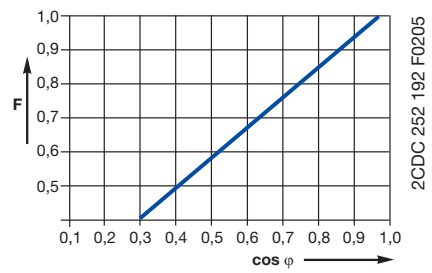
AC load (resistive)



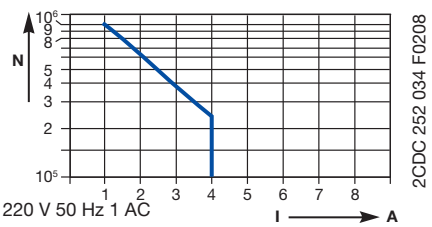
DC load (resistive)



Derating factor F for inductive AC load



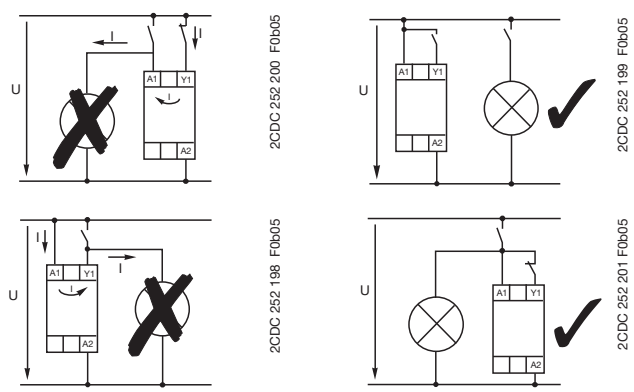
Contact lifetime



220 V 50 Hz 1 AC
360 cycles/h

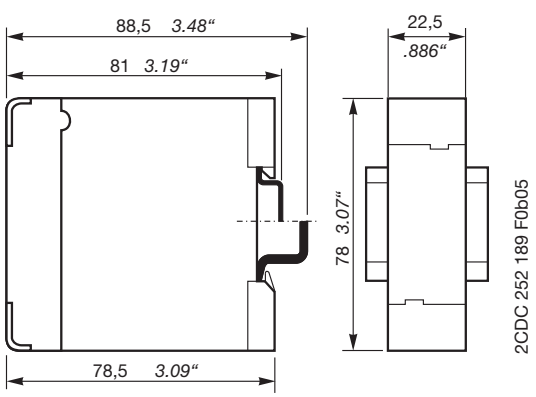
Wiring notes

for single-function devices with control contact
(CT-AHE, CT-AWE with auxiliary voltage)



Dimensional drawing

Dimensions in mm



• **Approvals and marks** 1/4

Electronic timers

CT-S range

Contents

Electronic timers
CT-S range
Benefits and advantages

CT-S range - the high end timers

universal and economic


2CDC 255 057 F0b06

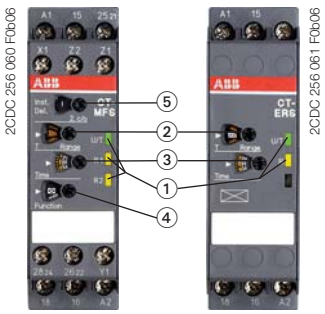
- Diversity:
  - 8 multifunction timers
  - 13 single-function timers
  - 8 switching relays
- Control supply voltages:
  - Multi range: 24-48 V DC, 24-240 V AC
  - Wide range: 24-240 V AC/DC
  - Single range: 380-440 V AC
- Devices with:
  - 1 or 2 c/o contacts
  - 2nd c/o contact can be selected as instantaneous contact [1)]
  - Remote potentiometer connection [1)]
  - Control input with volt-free or voltage related triggering e.g. to start timing, pause timing
  - Extended operating temperature range down to -40 °C [1)]
- Sealable transparent cover for protection against unauthorized changes of time values
- Integrated marker label
- Approvals / Marks (partly pending)

1) selected devices

Operating controls

① LEDs for status indication
U/T / U - green LED:
control supply voltage applied
timing
R / R1 / R2 - yellow LED:
1. / 2. output relay energized

② Time range adjustment
③ Fine adjustment of the time delay
④ Preselection of the timing function
⑤ Set the 2nd c/o contact as an instantaneous contact



Time range preselection and fine adjustment

Direct assignment of the preselected time range to the fine adjustment potentiometer scale by multicolor scales.

2CDC 253 062 F0006

2CDC 253 063 F0006

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Double-chamber cage connecting terminals

Double-chamber cage connecting terminals provide connection of wires up to 2 x 2.5 mm² (2 x 14 AWG), rigid or fine-strand, with or without wire end ferrules. Potential distribution does not require additional terminals.


2CDC 253 010 F0003


1SVC 110 000 F0507

Remote potentiometer connection

The CT-S range offers the possibility of connecting a remote potentiometer for the fine adjustment of the time delay. When an external potentiometer is connected, the internal, front-face potentiometer is disabled.

Integrated marker label

Integrated marker labels allow the product to be marked quickly and simply. No additional marker labels are required.

2CDC 253 064 F0006


2CDC 253 065 F0006

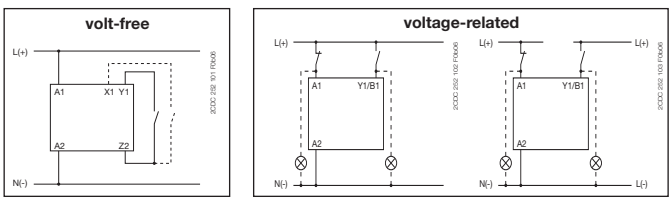
Sealable transparent cover

Protection against unauthorized changes of time and threshold values.
Available as an accessory.

Control input with volt-free or voltage-related triggering [1)]

The new CT-S range offers two types of devices:
one with volt-free and one with voltage-related triggering.

The control inputs of the devices with voltage-related triggering are capable of switching a parallel load and are not polarized. They can be powered either by the control supply voltage applied to A1 or by another voltage out of the rated control supply voltage range.



1) selected devices

Synonyms

used expression	alternative expression(s)	used expression	alternative expression(s)
1 c/o contact	SPDT	voltage-related	wet / non-floating
2 c/o contacts	DPDT	volt-free	dry / floating

Electronic timers
CT-S range
Ordering details

CT-MVS.21

CT-MXS.22

CT-MFS.21

CT-MBS.22

CT-WBS.22

Type	Rated control supply voltage	Control input	Remote potentio-meter connection	2nd c/o cont. selec-table as inst. contact	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Multifunction timers								
CT-MVS: 11 functions [1], 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 3 LEDs – 40 °C NEW EXTENDED TEMPERATURE								
CT-MVS.21	24-240 V AC/DC	■	1x	•	**1SVR 630 020 R0200**	1		0.137 / 0.302
CT-MVS: 11 functions [1], 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs								
CT-MVS.22	24-48 V DC, 24-240 V AC	■			**1SVR 630 020 R3300**	1		0.131 / 0.289
CT-MVS.23	380-440 V AC	■			**1SVR 630 021 R2300**	1		0.135 / 0.298
CT-MVS: 10 functions [2], 10 time ranges (0.05 s- 300 h), 1 c/o contact, 2 LEDs								
CT-MVS.12	24-48 V DC, 24-240 V AC	■			**1SVR 630 020 R3100**	1		0.101 / 0.223
CT-MXS: 5 functions [3], 2 x 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs								
CT-MXS.22	24-48 V DC, 24-240 V AC	■	2x		**1SVR 630 030 R3300**	1		0.131 / 0.289
CT-MFS: 10 functions [4], 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 3 LEDs – 40 °C NEW EXTENDED TEMPERATURE								
CT-MFS.21	24-240 V AC/DC	□/□	1x	•	**1SVR 630 010 R0200**	1		0.134 / 0.295
CT-MBS: 10 functions [4], 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 3 LEDs								
CT-MBS.22	24-48 V DC, 24-240 V AC	□	1x	•	**1SVR 630 010 R3200**	1		0.129 / 0.284
Impulse and flasher timer								
CT-WBS: 7 functions [5], 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs								
CT-WBS.22	24-48 V DC, 24-240 V AC				**1SVR 630 040 R3300**	1		0.115 / 0.254

■ Control input with voltage-related triggering

□ Control input with volt-free triggering

[1] Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Star-delta change-over with impulse, Pulse former, Accumulative ON-delay, ON/OFF-function

[2] Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Pulse former, Accumulative ON-delay, ON/OFF-function

[3] Functions: Select function via DIP switches behind the marker label on the front of the unit, asymmetrical ON- and OFF-delay, Impulse-ON/OFF, Pulse generator starting with ON or OFF, Single pulse generator, ON/OFF-function

[4] Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON, Flasher starting with OFF, Star-delta change-over with impulse, Pulse former, ON/OFF-function

[5] Functions: Flasher starting with ON, Flasher starting with OFF, Impulse-ON, ON-delay, fixed impulse with adjustable time delay, Adjustable impulse with fixed time delay, ON/OFF-function

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Electronic timers
CT-S range
Ordering details

CT-ERS.21

CT-APS.12

CT-AHS.22

CT-VBS.17

CT-SDS.23

Type	Rated control supply voltage	Control input	Remote potentio-meter connection	2nd c/o cont. selec-table as inst. contact	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
ON-delay timers ⋈								
CT-ERS: 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs –40 °C NEW EXTENDED TEMPERATURE								
CT-ERS.21	24-240 V AC/DC				**1SVR 630 100 R0300**	1		0.121 / 0.267
CT-ERS.22	24-48 V DC, 24-240 V AC				**1SVR 630 100 R3300**	1		0.113 / 0.249
CT-ERS: 10 time ranges (0.05 s- 300 h), 1 c/o contact, 2 LEDs								
CT-ERS.12	24-48 V DC, 24-240 V AC				**1SVR 630 100 R3100**	1		0.097 / 0.214
OFF-delay timers ▬								
CT-APS: 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs –40 °C NEW EXTENDED TEMPERATURE								
CT-APS.21	24-240 V AC/DC	■			**1SVR 630 180 R0300**	1		0.136 / 0.306
CT-APS.22	24-48 V DC, 24-240 V AC	■			**1SVR 630 180 R3300**	1		0.128 / 0.282
CT-APS: 10 time ranges (0.05 s- 300 h), 1 c/o contact, 2 LEDs								
CT-APS.12	24-48 V DC, 24-240 V AC	■			**1SVR 630 180 R3100**	1		0.101 / 0.223
CT-AHS: 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs								
CT-AHS.22	24-48 V DC, 24-240 V AC	□			**1SVR 630 110 R3300**	1		0.125 / 0.276
CT-ARS: without auxiliary voltage, 7 time ranges (0.05 s- 10 min), 1 c/o contact, 1 LED								
CT-ARS.11	24-240 V AC/DC				**1SVR 630 120 R3100**	1		0.119 / 0.262
CT-ARS: without auxiliary voltage, 7 time ranges (0.05 s- 10 min), 2 c/o contacts, 1 LED								
CT-ARS.21	24-240 V AC/DC				**1SVR 630 120 R3300**	1		0.137 / 0.302
CT-VBS: without auxiliary voltage, for DC contactor coils								
CT-VBS.17	100-127 V AC				**1SVR 430 261 R6000**	1		0.123 / 0.271
CT-VBS.18	200-240 V AC				**1SVR 430 261 R5000**	1		0.118 / 0.260
Star-delta timers ◬								
CT-SDS: 7 time ranges (0.05 s- 10 min), 50 ms transition time, 2 n/o contacts, 3 LEDs								
CT-SDS.22	24-48 V DC, 24-240 V AC				**1SVR 630 210 R3300**	1		0.105 / 0.231
CT-SDS.23	380-440 V AC				**1SVR 630 211 R2300**	1		0.111 / 0.245

■ Control input with voltage-related triggering
□ Control input with volt-free triggering

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Electronic timers
CT-S range
Ordering details

CT-IRS.35

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Switching relays ▭					
CT-IRS: 1 c/o contact, 2 LEDs					
CT-IRS.16	24 V AC/DC	**1SVR 430 220 R9100**	1		0.121 / 0.267
CT-IRS.14	110-240 V AC	**1SVR 430 221 R7100**	1		0.126 / 0.278
CT-IRS: 2 c/o contacts, 1 LED					
CT-IRS.26	24 V AC/DC	**1SVR 430 220 R9300**	1		0.135 / 0.298
CT-IRS.24	110-240 V AC	**1SVR 430 221 R7300**	1		0.141 / 0.311
CT-IRS: 2 c/o contacts with gold-plated contacts, 1 LED					
CT-IRS.26G	24 V AC/DC	**1SVR 430 230 R9300**	1		0.147 / 0.324
CT-IRS.24G	110-240 V AC	**1SVR 430 231 R7300**	1		0.150 / 0.331
CT-IRS: 3 c/o contacts, 1 LED					
CT-IRS.36	24 V AC/DC	**1SVR 430 220 R9400**	1		0.159 / 0.351
CT-IRS.35	220-240 V AC	**1SVR 430 221 R1400**	1		0.161 / 0.355

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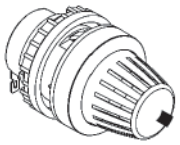
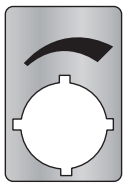
Electronic timers
CT-S range
Ordering details - Accessories

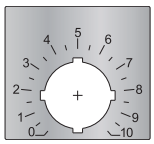


MT-x50B

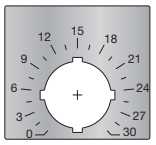
30 mm adapters



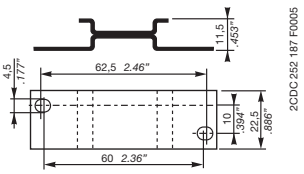
Marker label
29.6 x 44.5 mm



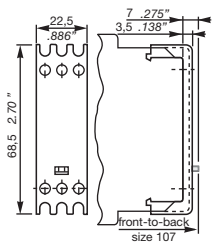
Marker label
with scale 0-10
48.5 x 44.5 mm



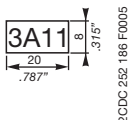
Marker label
with scale 0-30
48.5 x 44.5 mm



ADP.01



COV.01



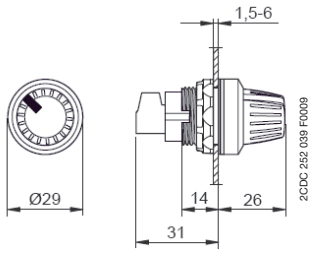
MAR.01

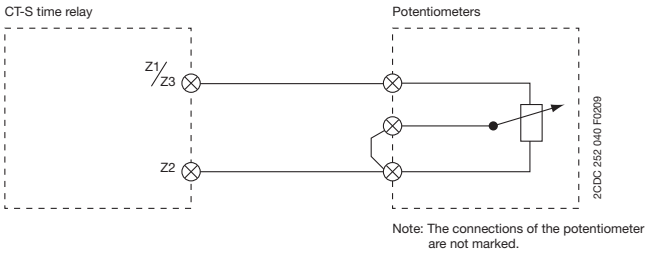
Accessories

Remote potentiometer

50 kΩ ±20 % - 0,2 Ω, degree of protection IP66

Type	Material	Diameter in mm	Order code	Pack.-unit pieces	Price 1 piece	Weight 1 piece g / oz
MT-150B	Plastic, black	22.5	**1SFA 611 410 R1506**	1		0.040
MT-250B	Plastic, chrome	22.5	**1SFA 611 410 R2506**	1		0.040
MT-350B	Metal, chrome	22.5	**1SFA 611 410 R3506**	1		0.048





Note: Technical specifications see data sheet

30 mm adapter for attaching the potentiometer 22.5 mm in 30.5 mm mounting hole

Type	Material	Order code	Pack.-unit pieces	Price 1 piece	Weight 1 piece g / oz
KA1-8029	Plastic, black	**1SFA 616 920 R8029**	1		
KA1-8030	Metal, chrome	**1SFA 616 920 R8030**	1		

Marker label

Type	Caption	Order code	Pack.-unit pieces	Price 1 piece	Weight 1 piece g / oz
SK 615 562-87	Symbol (see illustration)	**GJD6 155 620 R0087**	1		0.002
SK 615 562-88	Scale 0 - 10	**GJD6 155 620 R0088**	1		0.002
MA16-1060	Scale 0 - 30	**1SFA 611 940 R1060**	1		0.002

Type	for devices	Width in mm	Order code	Pack.-unit pieces	Price 1 piece	Weight 1 piece g / oz
Adapter for screw mounting						
ADP.01	CT-S	22,5	**1SVR 430 029 R0100**	1		18.4/0.65
Sealable transparent cover						
COV.01	CT-S	22,5	**1SVR 430 005 R0100**	1		5.2/0.18

Marker label

Type	for devices	for devices	Order code	Pack.-unit pieces	Price 1 piece	Weight 1 piece g / oz
MAR.01	CT-S	without DIP switch	**1SVR 366 017 R0100**	10		0.19/0.007
MAR.02	CT-S	with DIP switch	**1SVR 430 043 R0000**	10		0.13/0.005

Remarks

Legend

▭	Control supply voltage not applied / Output contact open
▬	Control supply voltage applied / Output contact closed
A1-Y1/B1	Control input with voltage-related triggering
Y1-Z2	Control input with volt-free triggering
X1-Z2	Control input with volt-free triggering

Remote potentiometer connection:

When an external potentiometer is connected to the remote potentiometer connection (terminals **Z1-Z2**, **Z3-Z2** respectively), the internal, front-face potentiometer is disabled and the time adjustment is made via the external potentiometer.

2nd c/o contact selectable as instantaneous contact:

When switch position Inst. "**I**" is selected, the functionality of the 2nd c/o contact changes to an instantaneous contact. It acts like the c/o contacts of a switching relay, i.e. applying or interrupting the control supply voltage energizes or de-energizes the c/o contact. The designation of the 2nd c/o contact changes from **25-26/28** to **21-22/24**, when selected as instantaneous contact.

Terminal designations on the device and in the diagrams:

The 1st c/o contact is always designated **15-16/18**.
The 2nd c/o contact is designated **25-26/28**, if it responds to the time delay.
If the 2nd c/o contact is selected as an instantaneous contact, the designation **25-26/28** is replaced by **21-22/24**.
Control supply voltage is always applied to terminals **A1-A2**.

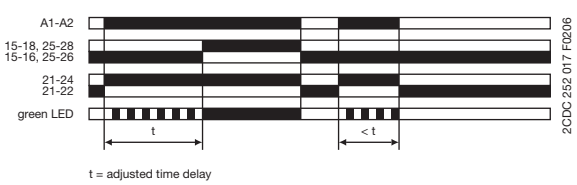
Function of the yellow LEDs:

On devices without the function '2nd c/o contact selectable as instantaneous contact', the yellow LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

Devices with the function '2nd c/o contact selectable as instantaneous contact' have two yellow LEDs, designated **R1** and **R2**. LED **R1** shows the status of the 1st c/o contact (**15-16/18**) and LED R2 shows the status of the 2nd c/o contact (**25-26/28**, **21-22/24** resp.). LED **R1** or **R2** glow as soon as the corresponding output relay energizes and turns off when the corresponding output relay de-energizes.

ON-delay
(Delay on make)
CT-MVS, CT-ERS, CT-WBS

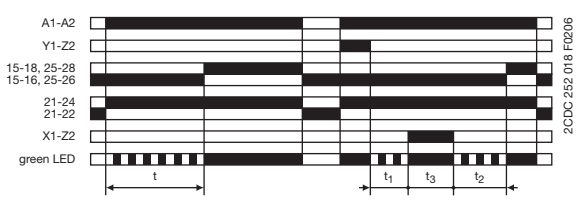
This function requires continuous control supply voltage for timing.
Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted time delay

ON-delay
(Delay on make)
CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.
If control input **Y1-Z2** is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input **Y1-Z2** also starts timing. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.
If control input **Y1-Z2** closes before the time delay is complete, the time delay is reset and the output relay remains de-energized.
Pause timing / Accumulative ON-delay (CT-MFS):
Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened. This can be repeated as often as required.
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted time delay

$t_1 + t_2 = t$
t_3 = pause timing

Electronic timers
CT-S range
Function diagrams

Accumulative ON-delay (Accumulative delay on make) CT-MVS

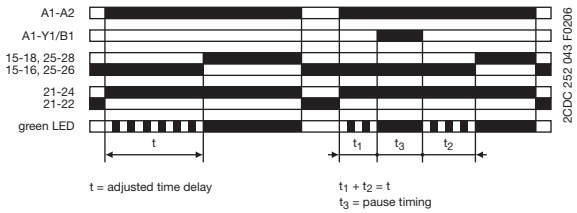
This function requires continuous control supply voltage for timing.

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

Timing can be paused by closing control input **A1-Y1/B1**. The elapsed time t_1 is stored and continues from this time value when **A1-Y1/B1** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



OFF-delay with auxiliary voltage (Delay on break) CT-MFS, CT-MBS, CT-AHS

This function requires continuous control supply voltage for timing.

If control input **Y1-Z2** is closed, the output relay energizes immediately. If control input **Y1-Z2** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de- energizes and the flashing green LED turns steady.

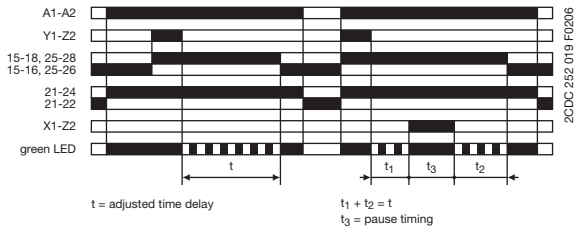
If control input **Y1-Z2** closes before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **Y1-Z2** re-opens.

Pause timing / Accumulative OFF-delay (CT-MFS):

Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



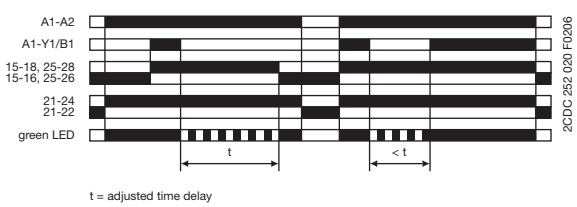
OFF-delay with auxiliary voltage (Delay on break) CT-MVS, CT-APS

This function requires continuous control supply voltage for timing.

If control input **A1-Y1/B1** is closed, the output relay energizes immediately. If control input **A1-Y1/B1** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady.

If control input **A1-Y1/B1** recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **A1-Y1/B1** re-opens.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

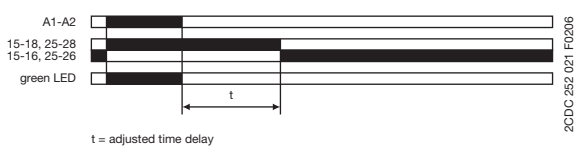


OFF-delay without auxiliary voltage (True delay on break) CT-ARS

The OFF-delay function without auxiliary voltage does not require continuous control supply voltage for timing. After a storage time of several months without any voltage, a formatting time of about 5 minutes is necessary.

Applying control supply voltage energizes the output relay immediately. Applied control supply voltage is displayed by the glowing green LED. If control supply voltage is interrupted, the OFF-delay starts and the LED turns off. When timing is complete, the output relay de-energizes.

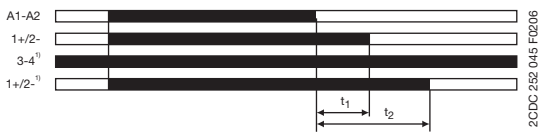
For correct operation of the unit, it is necessary to complete the minimum energizing time. As soon as timing starts, the LED turns off.



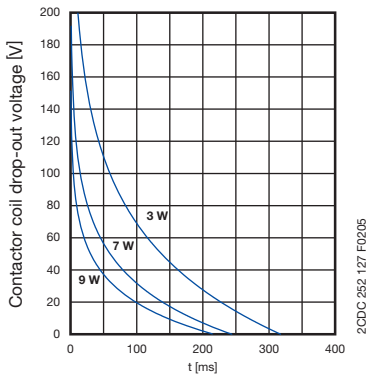
OFF-delay without auxiliary voltage for DC contactor coils CT-VBS

The DC contactor coil connected to the output is energized when control supply voltage is applied.

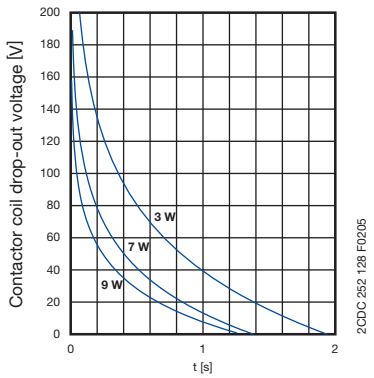
If control supply voltage is disconnected, the DC contactor coil remains energized for a short time delay. This time delay depends on the coil drop-out voltage and on the wattage of the contactor coil.



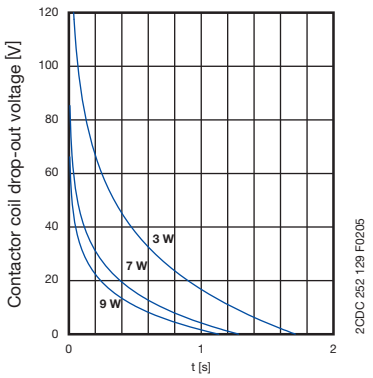
t_1 = OFF-delay (without jumper between terminals 3 and 4 [1])
t_2 = OFF-delay (with jumper between terminals 3 and 4 [1])
[1]) only for version 200-240 V AC



Time delay guideline values
200-240 V AC version without jumper 3/4



Time delay guideline values
200-240 V AC version with jumper 3/4



Time delay guideline values
110-127 V AC version

Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MFS, CT-MBS

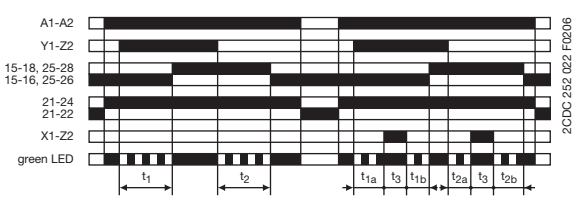
This function requires continuous control supply voltage for timing.

Closing control input **Y1-Z2** starts the ON-delay t_1. When timing is complete, the output relay energizes. Opening control input **Y1-Z2** starts the OFF-delay t_2. Both timing functions are displayed by the flashing green LED. When the OFF-delay t_2 is complete, the output relay de-energizes.

If control input **Y1-Z2** opens before the ON-delay t_1 is complete, the time delay is reset and the output relay remains de-energized. If control input **Y1-Z2** closes before the OFF-delay t_2 is complete, the time delay is reset and the output relay remains energized.

Pause timing / Accumulative, symmetrical ON-delay and OFF-delay (CT-MFS): Timing can be paused by closing control input **X1-Z2**. The elapsed time t_{1a} or t_{2a} is stored and continues from this time value when **X1-Z2** is re-opened. This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t_1 = adjusted ON-delay
t_2 = adjusted OFF-delay
$t_1 = t_2$

$t_{1a} + t_{1b} = t_1$
$t_{2a} + t_{2b} = t_2$
t_3 = pause timing

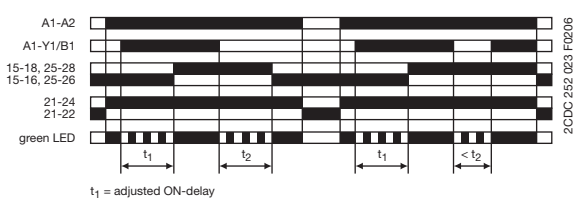
Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MVS

This function requires continuous control supply voltage for timing.

Closing control input **A1-Y1/B1** starts the ON-delay t_1. When timing is complete, the output relay energizes. Opening control input **A1-Y1/B1** starts the OFF-delay t_2. Both timing functions are displayed by the flashing green LED. When the OFF-delay t_2 is complete, the output relay de-energizes.

If control input **A1-Y1/B1** opens before the ON-delay t_1 is complete, the time delay is reset and the output relay remains de-energized. If control input **A1-Y1/B1** closes before the OFF-delay t_2 is complete, the time delay is reset and the output relay remains energized.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t_1 = adjusted ON-delay
t_2 = adjusted OFF-delay
$t_1 = t_2$

Electronic timers
CT-S range
Function diagrams

Asymmetrical ON-delay and OFF-delay (Asymmetrical delay on make and delay on break) CT-MXS

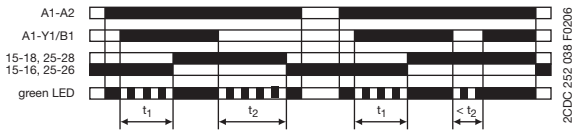
This function requires continuous control supply voltage for timing.

Closing control input **A1-Y1/B1** starts the ON-delay t_1. When timing is complete, the output relay energizes. Opening control input **A1-Y1/B1** starts the OFF-delay t_2. When the OFF-delay is complete, the output relay de-energizes. Both timing functions are displayed by the flashing green LED. The ON-delay and OFF-delay are independently adjustable.

If control input **A1-Y1/B1** opens before the ON-delay is complete ($<t_1$), the time delay is reset and the output relay remains de-energized.

If control input **A1-Y1/B1** closes before the OFF-delay is complete ($<t_2$), the time delay is reset and the output relay remains energized.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



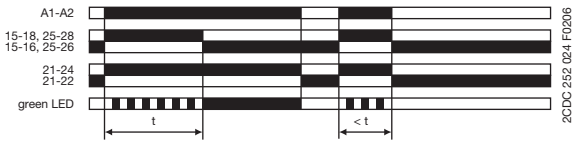
t_1 = adjusted ON-delay
t_2 = adjusted OFF-delay
t_1 and t_2 independently adjustable

Impulse-ON (Interval) CT-MVS, CT-WBS

This function requires continuous control supply voltage for timing.

The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

Impulse-ON (Interval) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.

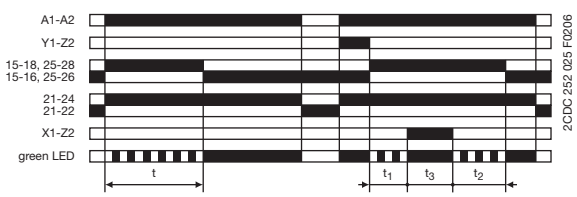
The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. If control input **Y1-Z2** is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input **Y1-Z2** starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input **Y1-Z2**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

Pause timing / Accumulative impulse-ON (CT-MFS):
Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

$t_1 + t_2 = t$
t_3 = pause timing

Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.

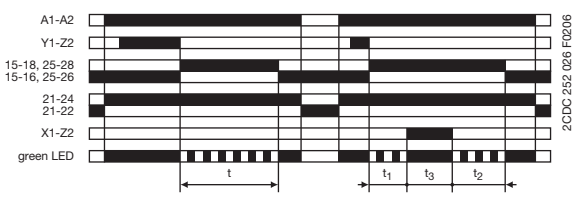
If control supply voltage is applied, opening control input **Y1-Z2** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input **Y1-Z2**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

Pause timing / Accumulative impulse-OFF (CT-MFS):
Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

$t_1 + t_2 = t$
t_3 = pause timing

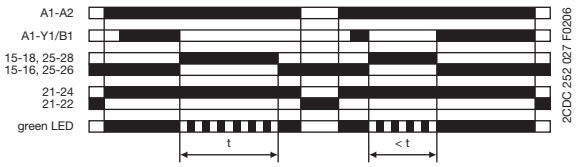
Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MVS

This function requires continuous control supply voltage for timing.

If control supply voltage is applied, opening control input **A1-Y1/B1** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input **A1-Y1/B1**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

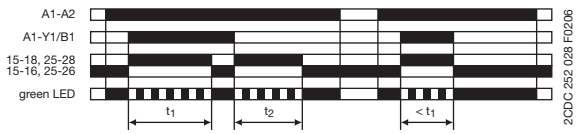
Impulse-ON and impulse-OFF (Interval and trailing edge interval) CT-MXS

This function requires continuous control supply voltage for timing.

If control supply voltage is applied, closing control input **A1-Y1/B1** energizes the output relay immediately and starts the pulse time t_1. The green LED flashes during timing. When t_1 is complete, the output relay de-energizes and the flashing green LED turns steady. Re-opening control input **A1-Y1/B1** energizes the output relay immediately and starts the pulse time t_2. The green LED flashes during timing. When t_2 is complete, the output relay de-energizes and the flashing green LED turns steady. t_1 and t_2 are independently adjustable.

If control input **A1-Y1/B1** changes state before the pulse time is complete, the output relay de-energizes and the pulse time is reset. If control input **A1-Y1/B1** changes state again, the interrupted pulse time restarts.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

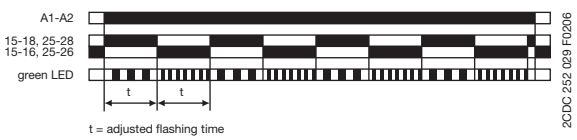


t_1 = adjusted pulse time 1
t_2 = adjusted pulse time 2

Flasher, starting with the ON time (Recycling equal times, ON first) CT-WBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

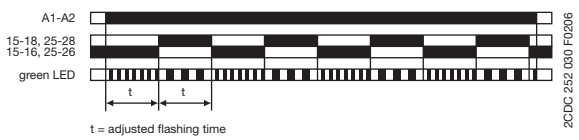


t = adjusted flashing time

Flasher, starting with the OFF time (Recycling equal times, OFF first) CT-WBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted flashing time

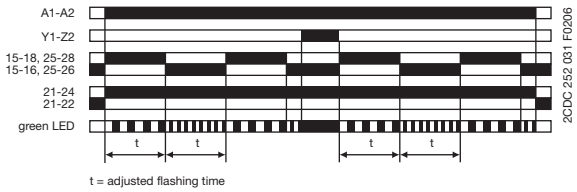
Electronic timers
CT-S range
Function diagrams

Flasher with reset, starting with the ON time (Recycling equal times with reset, ON first) CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The time delay can be reset by closing control input **Y1-Z2**. Opening control input **Y1-Z2** starts the timer pulsing again with symmetrical ON & OFF times.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



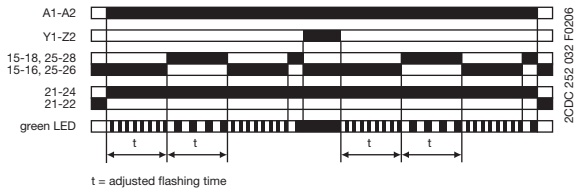
t = adjusted flashing time

Flasher with reset, starting with the OFF time (Recycling equal times with reset, OFF first) CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The time delay can be reset by closing control input **Y1-Z2**. Opening control input **Y1-Z2** starts the timer pulsing again with symmetrical ON & OFF times.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



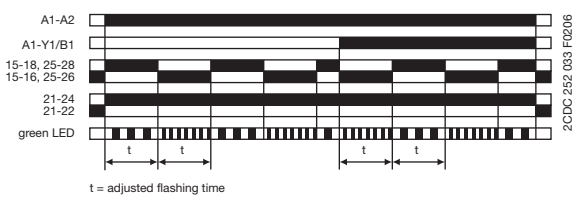
t = adjusted flashing time

Flasher, starting with the ON or OFF time (Recycling equal times, ON or OFF first) CT-MVS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first.

Closing control input **A1-Y1/B1**, with control supply voltage applied, starts the cycle with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



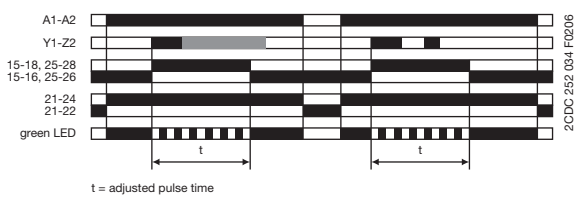
t = adjusted flashing time

Pulse former (Single shot) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.

Closing control input **Y1-Z2** energizes the output relay immediately and starts timing. Operating the control contact switch **Y1-Z2** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **Y1-Z2**.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

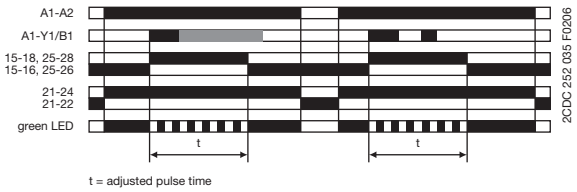
Electronic timers
CT-S range
Function diagrams

Pulse former (Single shot) CT-MVS

This function requires continuous control supply voltage for timing.

Closing control input **A1-Y1/B1** energizes the output relay immediately and starts timing. Operating the control contact switch **A1-Y1/B1** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **A1-Y1/B1**.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t = adjusted pulse time

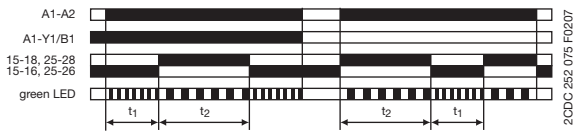
Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first) CT-MXS

This function requires continuous control supply voltage for timing.

Applying control supply voltage, with open control input **A1-Y1/B1**, starts timing with an ON time t_2 first. Applying control supply voltage, with closed control input **A1-Y1/B1**, starts timing with an OFF time t_1 first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



t_1 = adjusted OFF time
t_2 = adjusted ON time

Single-pulse generator, starting with the OFF time (Delay on make with interval output) CT-MXS

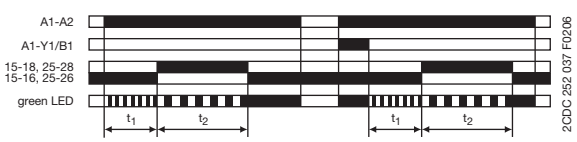
This function requires continuous control supply voltage for timing.

Applying control supply voltage, or, if control supply voltage is already applied, opening control input **A1-Y1/B1** energizes the output relay after the OFF time t_1 is complete. When the following ON time t_2 is complete, the output relay de-energizes. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable.

Closing control input **A1-Y1/B1**, with control supply voltage applied, de-energizes the output relay and resets the time delay.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



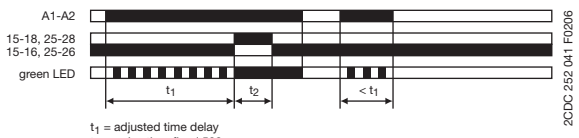
t_1 = adjusted OFF time
t_2 = adjusted ON time
t_1 and t_2 independently adjustable

Fixed impulse with adjustable time delay (Delayed pulse output) CT-WBS

This function requires continuous control supply voltage for timing.

The time delay t_1 starts when control supply voltage is applied. The green LED flashes during timing. When t_1 is complete, the output relay energizes for the fixed impulse time t_2 of 500 ms and the flashing green LED turns steady.

If control supply voltage is interrupted, the time delay is reset. The output relay does not change state.



t_1 = adjusted time delay
t_2 = pulse time fixed 500 ms

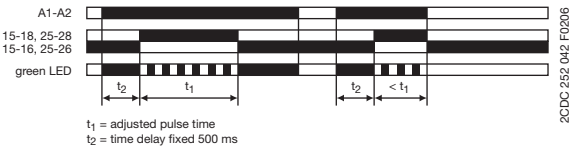
Electronic timers
CT-S range
Function diagrams

Adjustable impulse with fixed time delay (Delayed Interval) CT-WBS

This function requires continuous control supply voltage for timing.

Applying control supply voltage starts the fixed time delay t_2 of 500 ms. When t_2 is complete, the output relay energizes and the selected pulse time t_1 starts. The green LED flashes during timing. When t_1 is complete, the output relay de-energizes and the flashing green LED turns steady.

If control supply voltage is interrupted, the pulse time is reset. The output relay does not change state.



t_1 = adjusted pulse time
t_2 = time delay fixed 500 ms

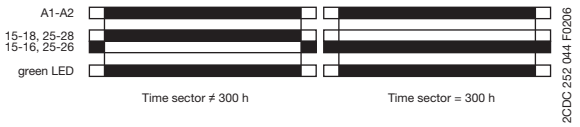
ON/OFF-Function CT-MFS, CT-MBS, CT-MVS, CT-MXS, CT-WBS

This function is used for test purposes during commissioning and troubleshooting.

If the selected max. value of the time range is smaller than 300 h (front-face potentiometer “Time sector” ≠ 300 h), applying control supply voltage energizes the output relay immediately and the green LED glows. Interrupting control supply voltage, de-energizes the output relay.

If the selected max. value of the time range is 300 h (front-face potentiometer “Time sector” = 300 h) and control supply voltage is applied, the green LED glows, but the output relay does not energize.

Time settings and operating of the control inputs have no effect on the operation.



Switching relays CT-IRS

The switching relay may be used to increase the number of available contacts or to reinforce contacts, or as a coupling/decoupling interface.

Approx. 10 ms after applying control supply voltage to terminals **A1-A2**, the output relay energizes.

If control supply voltage is interrupted, the output relay de-energizes.

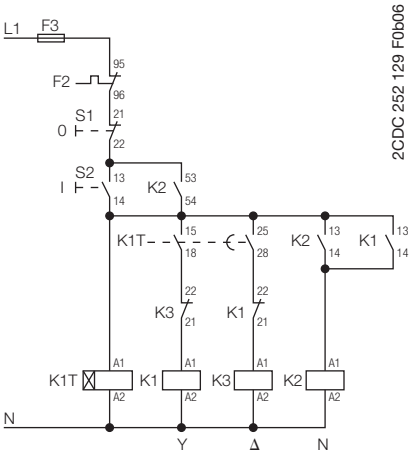
n = 1, 2 or 3

Star-delta change-over with impulse function (Star-delta starting, interval/delay on make) CT-MFS, CT-MBS, CT-MVS.2x

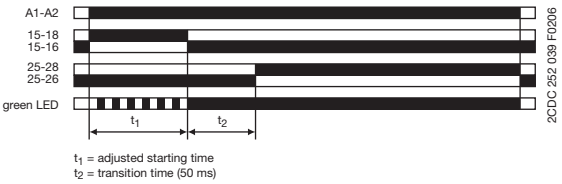
This function requires continuous control supply voltage for timing.

Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **15-18** and begins the set starting time t_1. The green LED flashes during timing. When the starting time is complete, the first c/o contact de-energizes the star contactor.

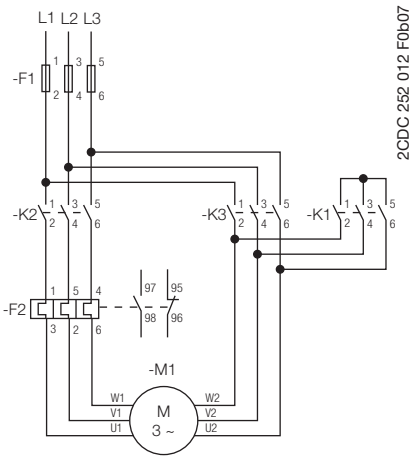
Now, the fixed transition time t_2 of 50 ms starts. When the transition time is complete, the second c/o contact energizes the delta contactor connected to terminals **25-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.



Control circuit diagram



t_1 = adjusted starting time
t_2 = transition time (50 ms)



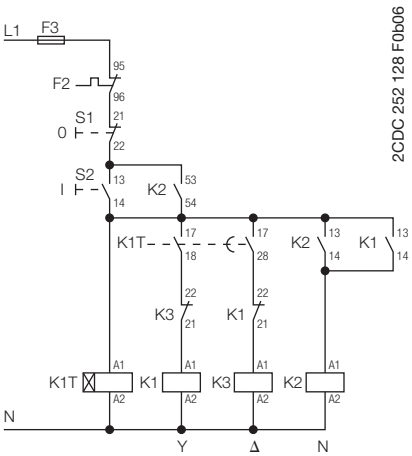
Power circuit diagram

Star-delta change-over (Star-delta starting) CT-SDS

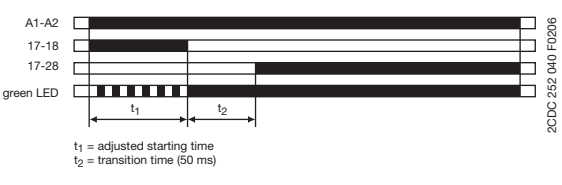
This function requires continuous control supply voltage for timing.

Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **17-18** and begins the set starting time t_1. The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor.

Now, the fixed transition time t_2 of 50 ms starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals **17-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.



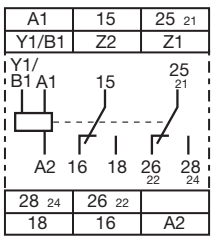
Control circuit diagram



t_1 = adjusted starting time
t_2 = transition time (50 ms)

Electronic timers
CT-S range
Connection diagrams

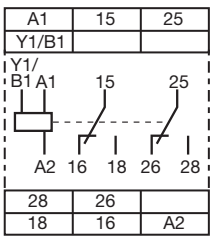
CT-MVS.21



2CDC 252 002 F0b06

A1-A2	Supply: 24-240 V AC/DC
15-16/18	1. c/o contact
25-26/28	2. c/o contact
21-22/24	2. c/o contact as instantaneous contact
A1-Y1/B1	Control input
Z1-Z2	Remote potentiometer connection

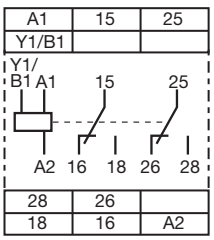
CT-MVS.22



2CDC 252 003 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact
25-26/28	2. c/o contact
A1-Y1/B1	Control input

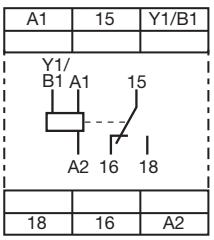
CT-MVS.23



2CDC 252 003 F0b06

A1-A2	Supply: 380-440 V AC
15-16/18	1. c/o contact
25-26/28	2. c/o contact
A1-Y1/B1	Control input

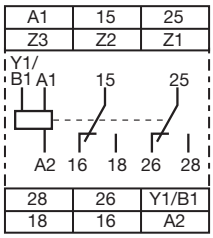
CT-MVS.12



2CDC 252 004 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact
A1-Y1/B1	Control input

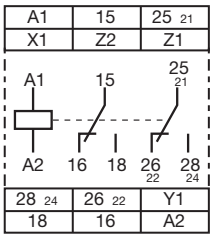
CT-MXS.22



2CDC 252 005 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact
25-26/28	2. c/o contact
A1-Y1/B1	Control input
Z1-Z2	Remote potentiometer connection
Z3-Z2	Remote potentiometer connection

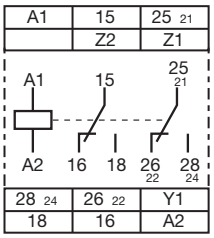
CT-MFS.21



2CDC 252 006 F0b06

A1-A2	Supply: 24-240 V AC/DC
15-16/18	1. c/o contact
25-26/28	2. c/o contact
21-22/24	2. c/o contact as instantaneous contact
Y1-Z2	Control input
X1-Z2	Control input
Z1-Z2	Remote potentiometer connection

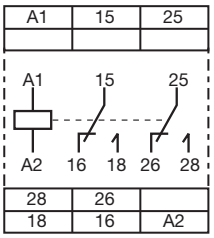
CT-MBS.22



2CDC 252 007 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact
25-26/28	2. c/o contact
21-22/24	2. c/o contact as instantaneous contact
Y1-Z2	Control input
Z1-Z2	Remote potentiometer connection

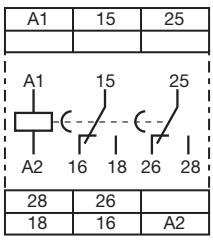
CT-WBS.22



2CDC 252 008 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact
25-26/28	2. c/o contact

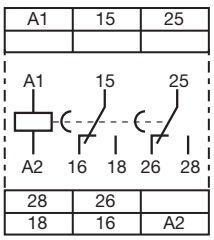
⊠ CT-ERS.21



2CDC 252 009 F0b06

A1-A2	Supply: 24-240 V AC/DC
15-16/18	1. c/o contact
25-26/28	2. c/o contact

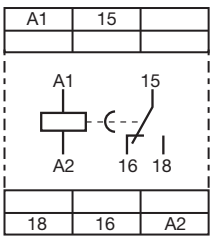
⊠ CT-ERS.22



2CDC 252 009 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact
25-26/28	2. c/o contact

⊠ CT-ERS.12

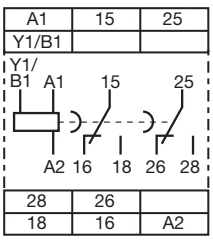


2CDC 252 010 F0b06

A1-A2	Supply: 24-48 V DC or 24-240 V AC
15-16/18	1. c/o contact

Electronic timers
CT-S range
Connection diagrams

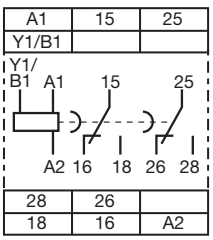
CT-APS.21



2CDC 252 011 F0b06

A1-A2 Supply: 24-240 V AC/DC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

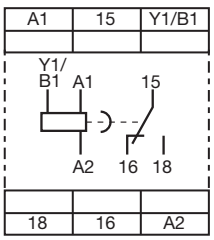
CT-APS.22



2CDC 252 011 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

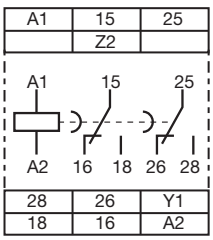
CT-APS.12



2CDC 252 012 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

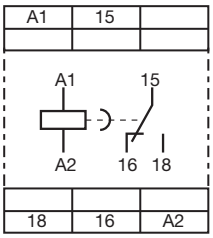
CT-AHS.22



2CDC 252 013 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
Y1-Z2 Control input

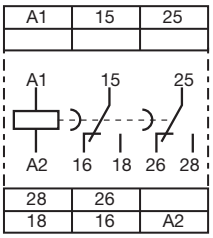
CT-ARS.11



2CDC 252 014 F0b06

A1-A2 Supply: 24-240 V AC/DC
15-16/18 1. c/o contact

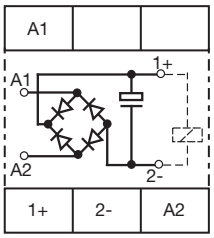
CT-ARS.21



2CDC 252 015 F0b06

A1-A2 Supply: 24-240 V AC/DC
15-16/18 1. c/o contact
25-26/28 2. c/o contact

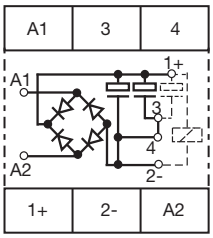
CT-VBS.17



2CDC 252 107 F0b05

A1-A2 Supply: 110-127 V AC
1+ - 2- Contactor coil

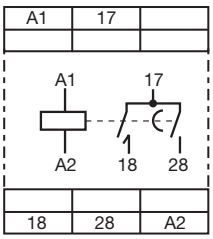
CT-VBS.18



2CDC 252 108 F0b05

A1-A2 Supply: 200-240 V AC
1+ - 2- Contactor coil
3-4 Jumper for setting the time delay (see time delay diagram)

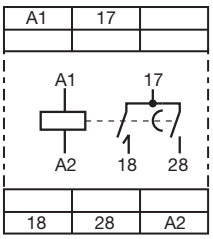
⚠ CT-SDS.22



2CDC 252 016 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
17-18 1. n/o contact
17-28 2. n/o contact

⚠ CT-SDS.23

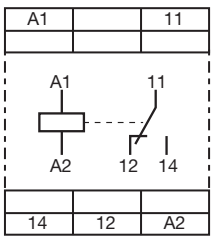


2CDC 252 016 F0b06

A1-A2 Supply: 380-440 V AC
17-18 1. n/o contact
17-28 2. n/o contact

Electronic timers
CT-S range
Connection diagrams

CT-IRS.16

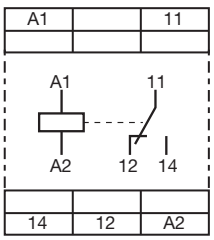


2CDC 252 123 F0b05

A1-A2 Supply: 24 AC/DC

11-12/14 1. c/o contact

CT-IRS.14

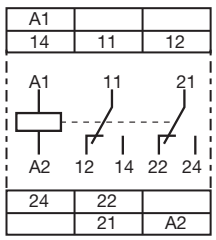


2CDC 252 123 F0b05

A1-A2 Supply: 110-240 V AC

11-12/14 1. c/o contact

CT-IRS.26

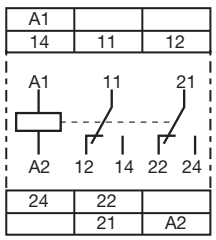


2CDC 252 124 F0b05

A1-A2 Supply: 24 AC/DC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.24

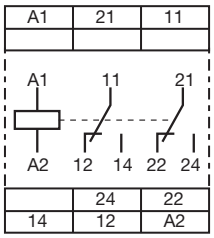


2CDC 252 124 F0b05

A1-A2 Supply: 110-240 V AC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.26G (gold-plated cont.)

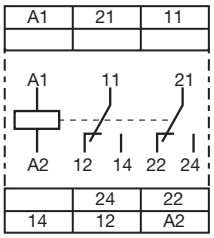


2CDC 252 125 F0b05

A1-A2 Supply: 24 AC/DC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.24G (gold-plated cont.)

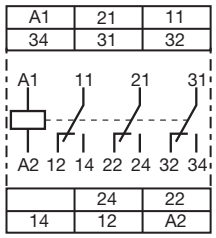


2CDC 252 125 F0b05

A1-A2 Supply: 110-240 V AC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.36

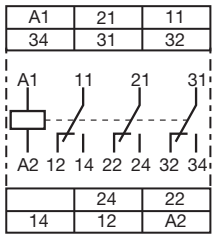


2CDC 252 035 F0b08

A1-A2 Supply: 24 V AC/DC

11-12/14 1. c/o contact
21-22/24 2. c/o contact
31-32/34 3. c/o contact

CT-IRS.35



2CDC 252 035 F0b08

A1-A2 Supply: 220-240 V AC

11-12/14 1. c/o contact
21-22/24 2. c/o contact
31-32/34 3. c/o contact

Electronic timers
CT-S range
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			**CT-S**		
Input circuit - Supply circuit			**A1-A2**		
Rated control supply voltage U_S		CT-xxx.x1	24-240 V AC/DC		
		CT-xxx.x2	24-48 V DC, 24-240 V AC		
		CT-xxx.x3	380-440 V AC		
		CT-xxx.x4	110-240 V AC		
		CT-xxx.x5	220-240 V AC		
		CT-xxx.x6	24 V AC/DC		
		CT-xxx.x7	100-127 V AC or 110 V DC		
		CT-xxx.x8	200-240 V DC		
Rated control supply voltage U_S tolerance			-15...+10 %		
Rated frequency			DC or 50/60 Hz		
Frequency range AC			47-63 Hz		
Typical current / power consumption		24 V DC	9-28 mA (depending on device, see data sheet)		
		230 V AC	11-60 mA (depending on device, see data sheet)		
		400 V AC	3-5 mA (depending on device, see data sheet)		
Power failure buffering time		24 V DC	min. 15 ms		
		230/400 V AC	min. 20 ms		
Input circuit - Control circuit					
Kind of triggering		CT-MVS, CT-MXS, CT-APS	voltage-related triggering		
Control input, Control function	A1-Y1/B1	CT-MVS, CT-MXS, CT-APS	start timing external		
Parallel load / polarized			yes / no		
Maximum cable length to the control input			50 m - 100 pF /m		
Minimum control pulse length			20 ms		
Control voltage potential			see rated control supply voltage		
Current consumption of the control input		24 V DC	1.2 mA		
		230 V AC	8 mA		
		400 V AC	6 mA		
Kind of triggering		CT-MFS, CT-MBS, CT-AHS	volt-free triggering		
Control input, Control function	Y1-Z2	CT-MFS, CT-MBS, CT-AHS	start timing external		
	X1-Z2	CT-MFS	pause timing / accumulative functions		
Maximum switching current in the control circuit			1 mA		
Maximum cable length to the control input			50 m - 100 pF /m		
Minimum control pulse length			20 ms		
No-load voltage at the control inputs			10-40 V DC		
Remote potentiometer					
Remote potentiometer connections, Resistance value	Z1-Z2	CT-MFS, CT-MBS, CT-MVS.21, CT-MXS	50 kΩ		
	Z3-Z2	CT-MXS	50 kΩ		
Maximum cable length to remote potentiometer			2 x 25 m, shielded with 100pF/m		
Shield connection			Z2		
Timing circuit					
Time ranges		10 time ranges 0.05 s - 300 h	1.) 0.05-1 s 4.) 1.5-30 s 7.) 1.5-30 min	2.) 0.15-3 s 5.) 5-100 s 8.) 15-300 min 10.) 15-300 h	3.) 0.5-10 s 6.) 15-300 s 9.) 1.5-30 h
		7 time ranges 0.05 s - 10 min (CT-SDS, CT-ARS)	1.) 0.05-1 s 4.) 1.5-30 s	2.) 0.15-3 s 5.) 5-100 s 7.) 0.5-10 min	3.) 0.5-10 s 6.) 15-300 s
Recovery time		24-240 V AC/DC	< 50 ms		
		24-48 V DC, 24-240 V AC	< 80 ms		
		380-440 V AC	< 60 ms		
Repeat accuracy (constant parameters)			Δt < ±0.2 %		
Accuracy within the rated control supply voltage tolerance			Δt < 0.004 % / V		
Accuracy within the temperature range			Δt < 0.03 % / °C		
Star-delta transition time	CT-SDS, CT-MBS, CT-MFS, CT-MVS.2x		fixed 50 ms		
Star-delta transition time tolerance	CT-SDS, CT-MBS, CT-MFS, CT-MVS.2x		±2 ms		
Minimum energizing time		CT-ARS	100 ms		
Formatting time [1]		CT-ARS	5 min		
Indication of operational states					

[1]) prior to first commissioning and after a six-month stop in operation

Electronic timers
CT-S range
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Control supply voltage / timing	U/T: green LED	⎍: control supply voltage applied ⎍⎍: timing
Control supply voltage	U: green LED	⎍: control supply voltage applied
Relay state	R1: yellow LED	⎍: output relay 1 energized
	R2: yellow LED	⎍: output relay 2 energized
	R: yellow LED	⎍: output relay energized
Output circuit		
Kind of output	15-16/18	relay, 1 c/o contact
	15-16/18; 25-26/28	relay, 2 c/o contacts
	15-16/18; 25(21)-26(22)/28(24)	relay, 2 c/o contacts, 2nd c/o contact selectable as inst. contact
	17-18; 17-28	relay, 2 n/o contacts (CT-SDS)
Contact material		Cd-free, on request
Rated operational voltage U_e	IEC/EN 60947-1	250 V
Minimum switching voltage / minimum switching current		12 V / 10 mA (CT-IRS.2xG: 10 mV / 10 µA)
Maximum switching voltage / maximum switching current		see load limit curves (CT-IRS.2xG: 10 V / 200 mA)
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A
	AC15 (inductive) at 230 V	3 A
	DC12 (resistive) at 24 V	4 A
	DC13 (inductive) at 24 V	2 A (CT-ARS; 1.5 A)
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B300
	max. rated operational voltage	300 V AC
	max. continuous thermal current at B 300	5 A
	max. making /breaking apparent power at B 300	3600/360 VA
Mechanical lifetime		30 x 10^6 switching cycles
Electrical lifetime	at AC12, 230 V, 4 A	0.1 x 10^6 switching cycles
Max. fuse rating to achieve short-circuit protection (IEC/EN 60947-5-1)	n/c contact	6 A fast-acting
	n/o contact	10 A fast-acting
General data		
Duty time		100%
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)
Weight		see ordering details
Mounting		DIN rail (IEC/EN 60715), snap mounting without any tool
Mounting position		any
Minimum distance to other units	horizontal / vertical	no/ no
Degree of protection	enclosure / terminals	IP50 / IP20
Electrical connection		
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)
Stripping length		7 mm (0.28 in)
Tightening torque		0.6-0.8 Nm
Environmental data		
Ambient temperature range	operation / storage	-25...+60 °C / -40...+85 °C
Extended operating temperature range for CT-MVS.21, CT-MFS.21, CT-ERS.21, CT-APS.21	operation / storage	-40...+60 °C / -40...+85 °C
Damp heat (cyclic) (IEC/EN 60068-2-30)		6 x 24 h cycle, 55 °C, 95 % RH
Vibration, sinusoidal (IEC/EN 60068-2-6)	functioning	40 m/s², 10...58/60...150 Hz
	resistance	60 m/s², 10-58/60-150 Hz, 20 cycles
Vibration, seismic (IEC/EN 60068-3-3)	functioning	20 m/s²
Shock, half-sine (IEC/EN 60068-2-27)	functioning	100 m/s², 11 ms, 3 shocks/direction
	resistance	300 m/s² , 11 ms, 3 shocks/direction
Isolation data		
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC/EN 60664)		4 kV; 1.2/50 µs
Pollution category (IEC/EN 60664-1, VDE 0110, UL 508)		3
Overvoltage category (IEC/EN 60664-1, VDE 0110, UL 508)		III
Rated insulation voltage U_i	input circuit / output circuit	500 V
	output circuit 1 / output circuit 2	300 V

Electronic timers
CT-S range
Technical data, Technical diagrams

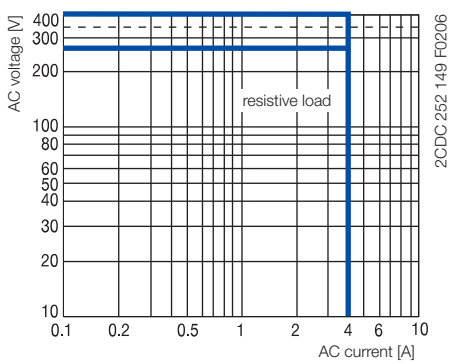
Data at T_a = 25 °C and rated values, unless otherwise indicated

Isolation data		
Basic insulation (IEC/EN 61140)	input circuit / output circuit	500 V
Protective separation (VDE 0106 part 101 and part 101/A1; IEC/EN 61140)	input circuit / output circuit	250 V
Power-frequency withstand voltage test (test voltage) between all isolated circuits	type test	2.5 kV, 50 Hz, 1 min
	routine test	2.0 kV, 50Hz, 1 s
Standards		
Product standard		IEC 61812-1, EN 61812-1 + A11, DIN VDE 0435 part 2021
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
RoHS Directive		2002/95/EC
Electromagnetic compatibility		
Interference immunity to		IEC/EN 61000-6-2, IEC/EN 61000-6-1
electrostatic discharge	IEC/EN 61000-4-2	Level 3 6 kV / 8 kV
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 10 V/m (10 GHz) 3 V/m (2 GHz) 1 V/m (2.7 GHz)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 2 kV / 5 kHz
surge	IEC/EN 61000-4-5	Level 4 2 kV A1-A2
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 10 V
harmonics and interharmonics	IEC/EN 61000-4-13	Level 3
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B

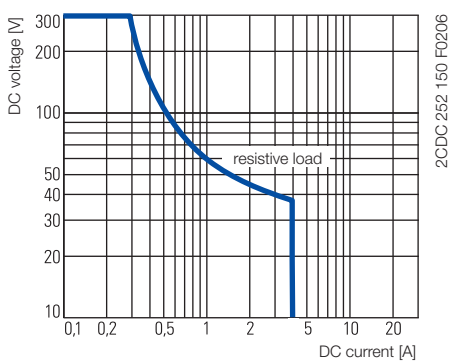
Technical diagrams

Load limit curves

AC load (resistive)

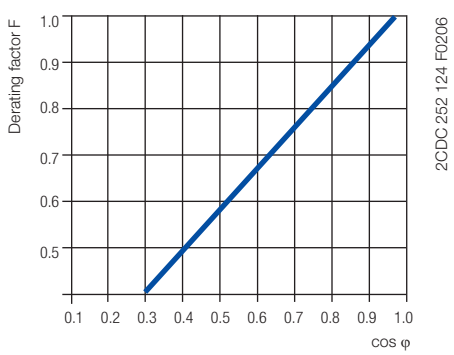


DC load (resistive)

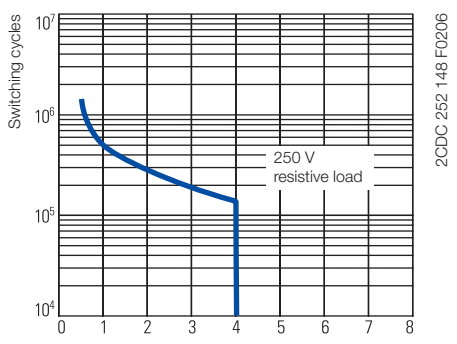


Derating factor F

for inductive AC load



Contact lifetime

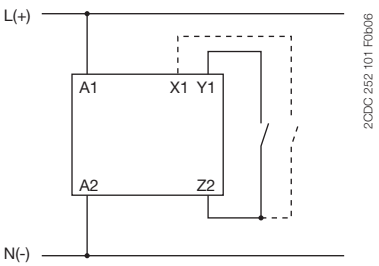


• **Approvals and marks** 1/4

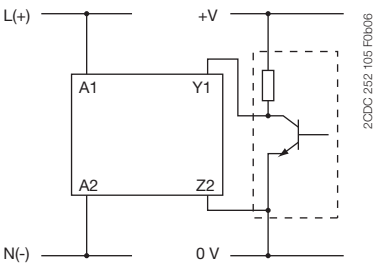
Electronic timers
CT-S range
Wiring notes, Dimensional drawing

Wiring notes

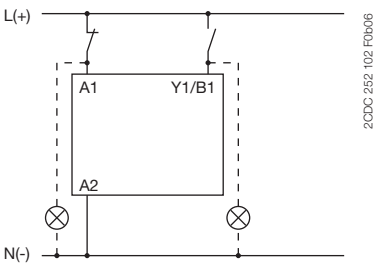
Control inputs (volt-free triggering)

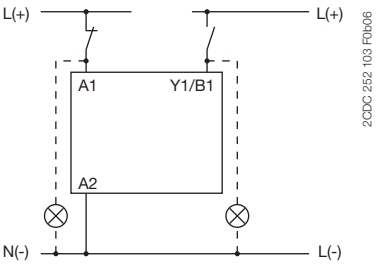


Triggering of the control inputs (volt-free) with a proximity switch (3 wire)



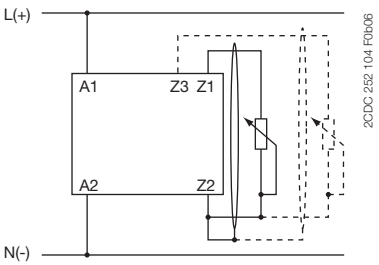
Control inputs (voltage-related triggering)





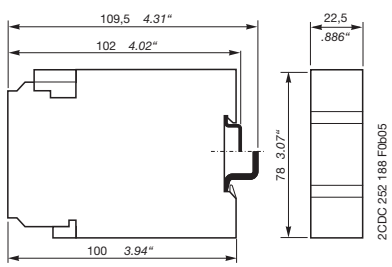
The control input **Y1/B1** is triggered with electric potential against **A2**. It is possible to use the control supply voltage from terminal **A1** or any other voltage within the rated control supply voltage range.

Remote potentiometer



Dimensional drawing

dimensions in mm



Measuring and monitoring relays

CM and C5xx range

Content

Measuring and monitoring relays
CM range
Benefits and advantages

2CDC 255 078 F0b07

CM-E range: Economic

1SVR 550 851 F9400

- Only 22.5 mm wide enclosure
- Output contacts: 1 c/o contact or 1 n/o contact
- One supply voltage range
- One monitoring function
- Cost-efficient solution for OEM applications
- Preset monitoring ranges

Combination screws

Easy tightening and release of the connecting screws with pozidrive, pan- or crosshead screwdriver.

1SVC 110 000 F0506

2CDC 253 011 F0003

Safety

The "real distance" is hidden.
The clearance and the creepage distances of our products exceed international standards and substantially increase the safety of our products.

Measuring and monitoring relays
CM range
Benefits and advantages

CM-S range: Universal and multifunctional


1SVR 430 824 F 9300

- Only 22.5 mm wide enclosure
- Output contacts: 1 or 2 c/o contacts
- One supply voltage range or supplied by measuring circuit
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- Integrated and snap-fitted front-face marker
- Sealable transparent cover (accessory)


2CDC 253 089 F0004

Direct reading scales

Direct adjustment of the threshold values of measuring and monitoring relays without any additional calculation provides accurate time delay adjustment.

LEDs for status Indication

All actual operational states are indicated by front-face LEDs, thus simplifying commissioning and troubleshooting.

2CDC 253 014 F0003

Double-chamber cage connection terminals


2CDC 253 010 F0003

Double-chamber cage connection terminals provide connection of wires up to 2 x 2.5 mm² (2 x 14 AWG), rigid or fine-strand, with or without wire end ferrules. Potential distribution does not require additional terminals, thus saving time and money. Wiring is considerably simplified through integrated cable guides.

CM-N range: Multifunctional


1SVR 450 335 F0100

- 45 mm wide enclosure
- Output contacts: 2 c/o contacts
- Continuous voltage range (24-240 V AC/DC) or single-supply
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- Adjustable time delays
- Integrated and snap-fitted front-face marker label
- Sealable transparent cover (accessory)

Integrated marker label

Integrated marker labels allow the product to be marked quickly and simply.
No additional marking labels are required.

2CDC 253 064 F0006


2CDC 253 009 F0005

Sealable transparent covers

Protection against unauthorized changes of time and/or threshold values in sizes 22.5 and 45 mm wide (optionally available as an accessory).

Safety

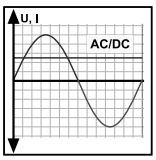
The "real distance" is hidden.
The clearance and the creepage distances of our products exceed international standards and substantially increase the safety of our products.


2CDC 253 011 F 0003

Measuring and monitoring relays
CM and C5xx range
Monitoring features and application ranges

Single-phase current and voltage monitoring

- Over- or undercurrent monitoring
  CM-SRS and CM-SRS.M
- Over- and undercurrent monitoring
  CM-SFS
- Over- or undervoltage monitoring
  CM-ESS and CM-ESS.M
- Over- and undervoltage monitoring
  CM-EFS



Current monitoring

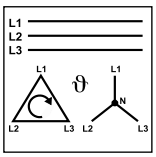
- Monitoring of motor current consumption
- Monitoring of lighting installations and heating circuits
- Monitoring of hoisting gear and transportation equipment overload
- Monitoring of locking devices, electromechanical brake gear and locked rotor

Voltage monitoring

- Speed monitoring of DC motors
- Monitoring of battery voltages and other supply networks
- Monitoring of upper and lower voltage threshold values

Three-phase monitoring

- Phase loss
  CM-PBE
- Over- and undervoltage
  CM-PVE
- Phase sequence and phase loss
  CM-PFE and CM-PFS
- Phase sequence and phase loss,
  over- and undervoltage
  CM-PSS.xx and CM-PVS.xx
- Phase sequence and phase loss, unbalance
  CM-PAS.xx
- Phase sequence and phase loss, unbalance,
  over- and undervoltage
  CM-MPS.xx and CM-MPN.xx
- Over- and undervoltage, over-
  and underfrequenzy CM-UFS.x

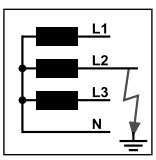


Three-phase voltage monitoring

- Voltage monitoring of mobile three-phase equipment
- Protection of personnel and installations against phase reversal
- Monitoring of the supply voltage to machines and installations
- Protection of equipment against damage caused by unstable supply voltage
- Switching to emergency or auxiliary supply
- Protection of motors against damage caused by unbalanced phase voltages and phase loss
- Automatic connection & disconnection of decentralised power stations to the grid

Insulation monitoring

CM-IWS.2 for electrically isolated AC systems, and CM-IWS.1 & CM-IWN 1 for electrically isolated AC, DC and mixed AC/DC systems.

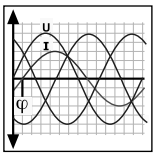


Insulation monitoring

- Monitoring of electrically isolated supply mains for insulation resistance failure
- Detection of initial faults
- Protection against earth faults

Motor load monitoring

CM-LWN monitors load states of single- and three-phase asynchronous motors.



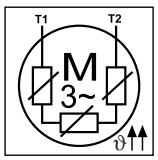
Motor load monitoring

- Detection of V-belt breaking
- Motor protection against overload
- Monitoring of filters for clogging
- Protection of pumps against dry running
- Detection of high pressure in conduit systems
- Monitoring for dulling blades in sawing and cutting machines

Measuring and monitoring relays
CM and C5xx range
Monitoring features and application ranges

Thermistor motor protection

CM-MSE, CM-MSS and CM-MSN provide full protection of motors with integrated PTC resistor sensors.



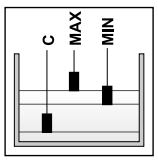
2CDC 252 029 F0004

Thermistor motor protection

- Protection of motors against thermal overload, e. g. caused by insufficient cooling, heavy load starting conditions, undersized motors, etc.

Liquid level monitoring

CM-ENE, CM-ENS and CM-ENN for control and regulation of liquid levels and ratios of mixtures of conductive fluids.

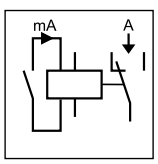


Liquid level monitoring and control

- Protection of pumps against dry running
- Protection against container overflow
- Control of liquid levels
- Detection of leaks
- Control of mixing ratios

Contact protection, sensor evaluation

The CM-KRN protects sensitive control contacts from excessive loads and can store switch positions. The CM-SIS supplies and evaluates NPN and PNP sensors.



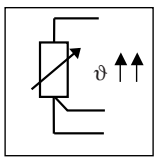
2CDC 252 031 F0004

Contact protection / sensor evaluation

- Storage of the switching states of bouncing contacts
- Amplification of the switch state information of sensitive contacts
- Supply and evaluation of NPN or PNP sensors

Temperature monitoring

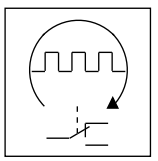
Acquisition, messaging and regulation of temperatures of solid, liquid and gaseous media in processes and machines via PT100, PT1000, KTY83, KTY 84 or NTC sensors with C510, C511, C512, C513.



Temperature monitoring

- Motor and system protection
- Control cabinet temperature monitoring
- Frost monitoring
- Temperature limits for process variables, e.g. in the packing or electroplating industry
- Control of systems and machines like heating, air-conditioning and ventilation systems, solar collectors, heat pumps or hot water supply systems
- Monitoring of servomotors with KTY sensors
- Bearing and gear oil monitoring
- Coolant monitoring

Cycle monitoring


2CDC 252 036 F0004

Cycle monitoring

- External monitoring of the correct function of programmable logic controllers (plc) and industrial pcs (ipc)

Measuring and monitoring relays
CM and C5xx range
Approvals and marks

■ existing
□ pending

Approvals		Current and voltage monitoring, single-phase								Three-phase monitoring													
		CM-SRS.1x	CM-SRS.2x	CM.SRS.M	CM-SFS.2	CM-ESS.2x	CM-ESS.M	CM-EFS.2		CM-PBE	CM-PVE	CM-PFE	CM-PFS	CM-PSS.x1	CM-PVS.x1	CM-PAS.x1	CM-MPS.x1	CM-MPS.x3	CM-MPN.52	CM-MPN.62	CM-MPN.72	CM-UFS.1	CM-UFS.2
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■			
	GL	□	□	□	□	□	□	□					■	■	■	■	■	■	■	■	■		
	GOST	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■		
	CB scheme	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■		
	CCC	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■		
	RMRS	■	■	■	■	■	■	■		■	■	■	■										
	VDE V 0126-1-1																					■	
	ENEL DK 5940 Ed. 2.2																						■
Marks																							
CE	CE	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■		

■ existing
□ pending

Approvals		Insulation monitors for ungrounded supply mains					Motor load monitoring			Temperature monitoring					Contact protection, sensor interface							
		CM-IWS.2	CM-IWS.1	CM-IWN.1	CM-IVN		CM-LWN			C510	C511	C512	C513		CM-KRN	CM-SIS						
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■		■			■	■	■	■		■	■						
	GL	□	□	□	□		■								■							
	GOST	□	□	□	□		■								■	■						
	CB scheme	□	□	□	□		■															
	CCC	□	□	□	□		■															
	RMRS						■								■	■						
Marks																						
CE	CE	■	■	■	■		■			■	■	■	■		■	■						
	C-Tick	□	□	□	□		■									■						

■ existing
□ pending

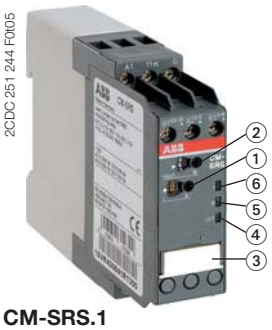
Approvals		Cycle monitoring				Thermistor motor protection									Liquid level monitoring							
		CM-WDS				CM-MSE	CM-MSS (1)	CM-MSS (2)	CM-MSS (3)	CM-MSS (4)	CM-MSS (5)	CM-MSS (6)	CM-MSS (7)	CM-MSN	CM-ENE MIN	CM-ENE MAX	CM-ENS	CM-ENS UP/...	CM-ENN	CM-ENN UP/...		
	UL 508, CAN/CSA C22.2 No.14	■				■	■	■	■	■	□	■	■	■	■	■	■	■	■	■		
	GL						■	■	■	■	■	■	■	■			■		■			
	GOST					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	II (2) G D, PTB 02 ATEX 3080								■	■		■	■	■								
	CB scheme					■	■	■	■	■	■	■	■		■	■	■	■	■	■		
	CCC					■	■	■	■	■	■	■	■		■	■	■	■	■	■		
	RMRS	■				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Marks																						
CE	CE	■				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	C-Tick					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		

[1] Versions with safety isolation without GL approval

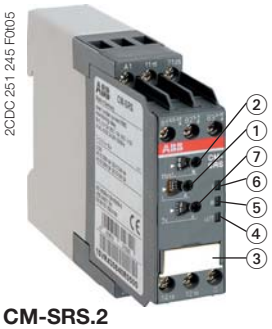
Current and voltage monitors, single-phase

Content

Current monitoring relays, single-phase AC/DC - CM-SRS.1 and CM-SRS.2
Ordering details



CM-SRS.1



CM-SRS.2

① Threshold value adjustment
② Hysteresis adjustment
③ DIP switches (see DIP switch functions)
④ U/T: green LED - control supply voltage, (timing)
⑤ R: yellow LED - relay status
⑥ I: red LED - over- / undercurrent
⑦ Adjustment of the tripping delay T_V

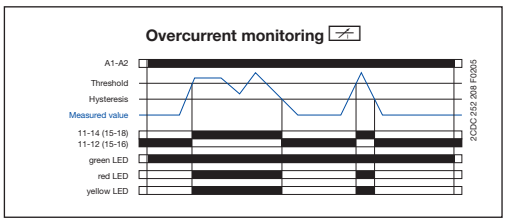
- Monitoring of DC- and AC-currents
  CM-SRS.x1: 3 mA - 1 A
  CM-SRS.x2: 0.3-15 A
- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- or undercurrent monitoring configurable
- Hysteresis adjustable from 3-30 %
- **CM-SRS.2:**
  Tripping delay T_V adjustable 0; 0.1-30 s
- 3 supply voltage versions
- **CM-SRS.1:** 1 c/o contact
  CM-SRS.2: 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

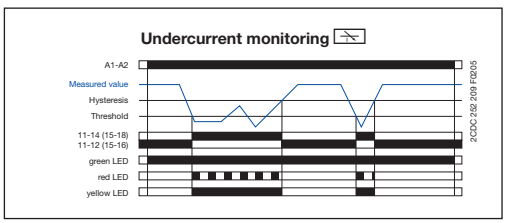
Depending on the configuration, the current monitoring relays **CM-SRS.1** and **CM-SRS.2** can be used for over- or undercurrent monitoring in single-phase AC and/or DC systems. The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. The devices work according the the open-circuit principle.

If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-SRS.1 immediately, on the CM-SRS.2 after the set tripping delay T_V. If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s).

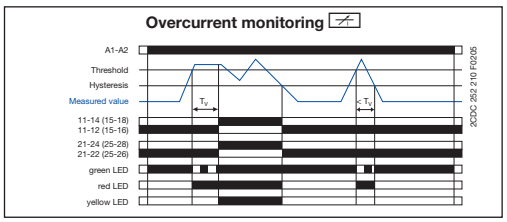
The hysteresis is adjustable within a range of 3-30 % of the threshold value.

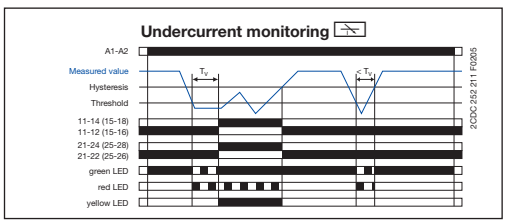
Function diagrams CM-SRS.1



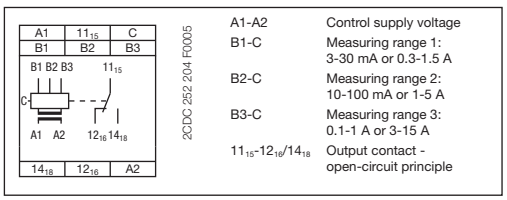


Function diagrams CM-SRS.2



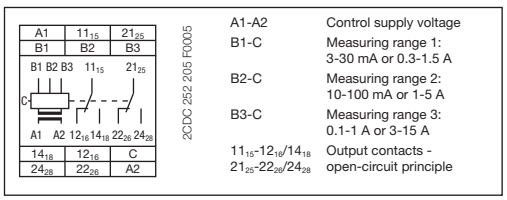


Connection diagram CM-SRS.1



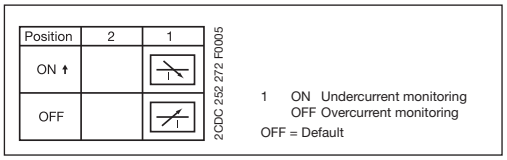
A1-A2	Control supply voltage
B1-C	Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C	Measuring range 2: 10-100 mA or 1-5 A
B3-C	Measuring range 3: 0.1-1 A or 3-15 A
11_{15}-12_{16}/14_{18}	Output contact - open-circuit principle

Connection diagram CM-SRS.2



A1-A2	Control supply voltage
B1-C	Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C	Measuring range 2: 10-100 mA or 1-5 A
B3-C	Measuring range 3: 0.1-1 A or 3-15 A
11_{15}-12_{16}/14_{18} 21_{25}-22_{26}/24_{28}	Output contacts - open-circuit principle

DIP switch functions CM-SRS.1, CM-SRS.2



1 ON Undercurrent monitoring
OFF Overcurrent monitoring
OFF = Default

Type	Control supply voltage 50/60 Hz	Tripping delay T_V	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0.1-1 A						
CM-SRS.11	24-240 V AC/DC	without	**1SVR 430 840 R0200**	1		0.12 / 0.26
	110-130 V AC		**1SVR 430 841 R0200**	1		0.15 / 0.33
	220-240 V AC		**1SVR 430 841 R1200**	1		0.15 / 0.33
Measuring ranges AC/DC: 0.3-1.5 A; 1-5 A; 3-15 A						
CM-SRS.12	24-240 V AC/DC	without	**1SVR 430 840 R0300**	1		0.12 / 0.26
	110-130 V AC		**1SVR 430 841 R0300**	1		0.15 / 0.33
	220-240 V AC		**1SVR 430 841 R1300**	1		0.15 / 0.33
Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0.1-1 A						
CM-SRS.21	24-240 V AC/DC	adjustable 0 or 0.1-30 s	**1SVR 430 840 R0400**	1		0.12 / 0.26
	110-130 V AC		**1SVR 430 841 R0400**	1		0.15 / 0.33
	220-240 V AC		**1SVR 430 841 R1400**	1		0.15 / 0.33
Measuring ranges AC/DC: 0.3-1.5 A; 1-5 A; 3-15 A						
CM-SRS.22	24-240 V AC/DC	adjustable 0 or 0.1-30 s	**1SVR 430 840 R0500**	1		0.12 / 0.26
	110-130 V AC		**1SVR 430 841 R0500**	1		0.15 / 0.33
	220-240 V AC		**1SVR 430 841 R1500**	1		0.15 / 0.33

- **Approvals and marks** 2/6
- **Technical data** 2/14
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- **Accessories** 2/104
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Current monitoring relays, single-phase AC/DC, multifunctional - CM-SRS.M
Ordering details

CM-SRS.M

① Threshold value adjustment
② Hysteresis adjustment
③ Adjustment of the tripping delay T_V
④ Adjustment of the start-up delay T_S
⑤ DIP switches (see DIP switch functions)
⑥ U/T: green LED - control supply voltage, timing
⑦ R: yellow LED - relay status
⑧ I: red LED - over- / undercurrent

- Monitoring of DC- and AC-currents **CM-SRS.M1:** 3 mA - 1 A **CM-SRS.M2:** 0.3-15 A
- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- or undercurrent monitoring configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Hysteresis adjustable from 3-30 %
- Start-up delay T_S adjustable 0; 0.1-30 s
- Tripping delay T_V adjustable 0; 0.1-30 s
- 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

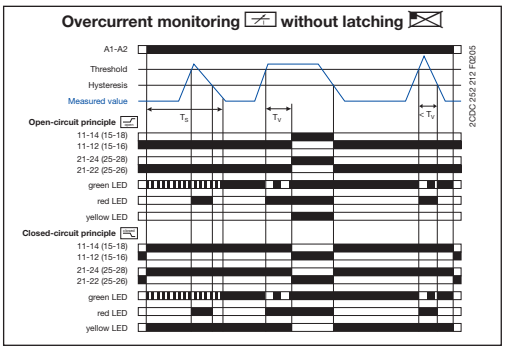
Depending on the configuration, the current monitoring relays **CM-SRS.M** can be used for over- or undercurrent monitoring in single-phase AC and/or DC systems. The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. Open or closed-circuit principle are configurable.

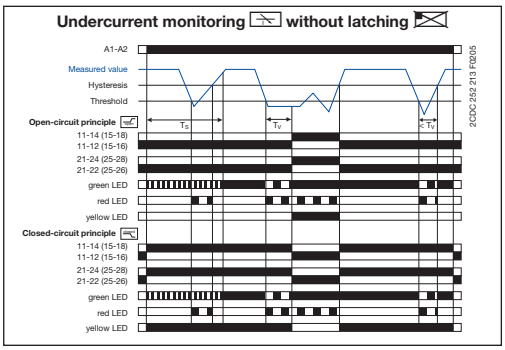
If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state. If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize / de-energize.

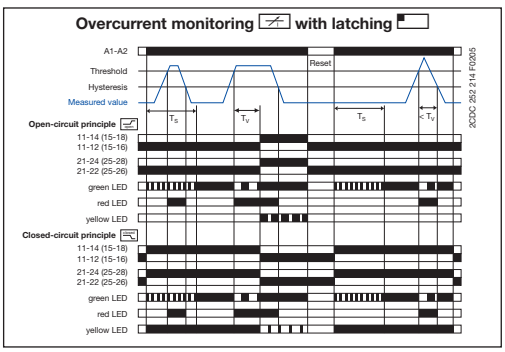
If the measured value exceeds resp. drops below the threshold value minus resp. plus the set hysteresis and the latching function is not activated, the output relays de-energize / energize. With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

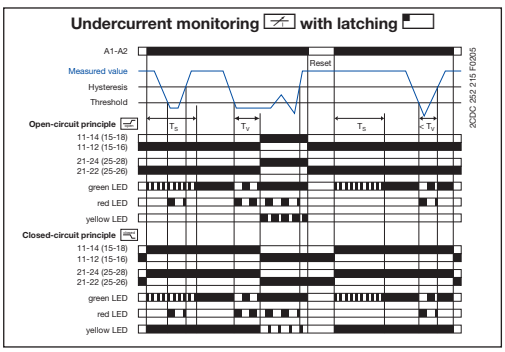
The hysteresis is adjustable within a range of 3-30 % of the threshold value.

Function diagrams CM-SRS.M

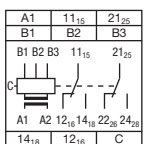




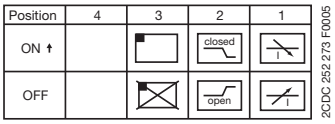




Connection diagram CM-SRS.M



DIP switch functions CM-SRS.M



1 ON Undercurrent monitoring
OFF Overcurrent monitoring
2 ON Closed-circuit principle
OFF Open-circuit principle
3 ON Latching function activated
OFF Latching function not activated
OFF = Default

Type	Control supply voltage 50/60 Hz	Tripping delay T_V	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0,1-1 A						
CM-SRS.M1	24-240 V AC/DC	0 or 0.1-30 s	**1SVR 430 840 R0600**	1		0.12 / 0.26
Measuring ranges AC/DC: 0,3-1,5 A; 1-5 A; 3-15 A						
CM-SRS.M2	24-240 V AC/DC	0 or 0.1-30 s	**1SVR 430 840 R0700**	1		0.12 / 0.26

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Current monitoring relay, single-phase AC/DC, window monitoring - CM-SFS.2
Ordering details

CM-SFS.2

① Threshold value adjustment >I for overcurrent
② Threshold value adjustment <I for undercurrent
③ Adjustment of the tripping delay T_V
④ Adjustment of the start-up delay T_S
⑤ DIP switches (see DIP switch functions)
⑥ U/T: green LED - control supply voltage, timing
⑦ R: yellow LED - relay status
⑧ I: red LED - over- / undercurrent

- Monitoring of DC- and AC-currents **CM-SFS.21:** 3 mA - 1 A **CM-SFS.22:** 0.3-15 A
- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- and undercurrent monitoring
- ON-or OFF-delay configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Thresholds for I_{min} and I_{max} adjustable
- Fixed hysteresis of 5 %
- Start-up delay T_S adjustable 0; 0.1-30 s
- Tripping delay T_V adjustable 0; 0.1-30 s
- 1x2 c/o contacts (common signal) or 2x1 c/o contact (separate signals for I_{min} and I_{max})
- 22.5 mm width
- 3 LEDs for status indication

The current window monitoring relays **CM-SFS.2** can be used for the simultaneous monitoring of over- (>I) and undercurrents (<I) in single-phase AC and/or DC systems. Depending on the configuration, one c/o contact each 2x1 c/o or both c/o contacts in parallel 1x2 c/o can be used for the over- and undercurrent monitoring. The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. Open- or closed-circuit principle as well as an adjustable ON or OFF tripping delay are configurable.

ON-delayed current window monitoring with parallel switching c/o contacts 1x2 c/o:

If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state.

If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts, when is configured. If T_V is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize /de-energize .

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated , the output relays de-energize / energize . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

OFF-delayed current window monitoring with parallel switching c/o contacts 1x2 c/o:

If the measured value exceeds resp. drops below the adjusted threshold value when the set start-up delay T_S is complete, the output relays energize / de-energize , when is configured, and remain in this position during the set tripping delay T_V.

If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated , the tripping delay T_V starts.

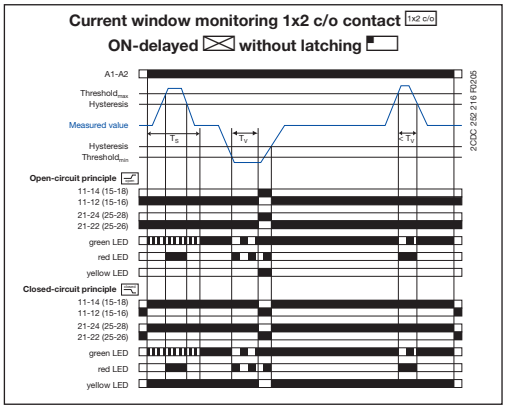
After completion of T_V, the output relays de-energize / energize , provided that the latching function is not activated . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

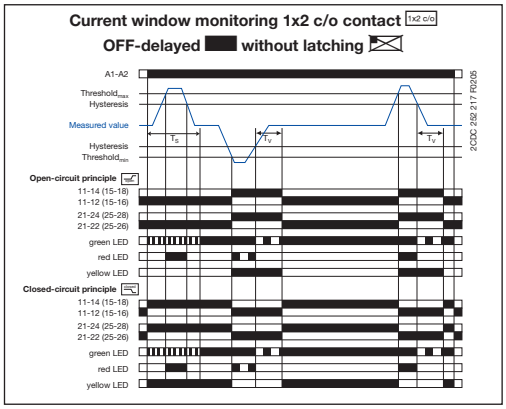
When 2x1 c/o is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

">I" = 11_{15}-12_{16}/14_{18} ; "<I" = 21_{25}-22_{26}/24_{28}

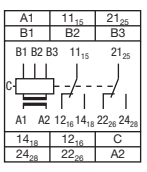
Function diagrams CM-SFS.2

Further function diagrams see data sheet.



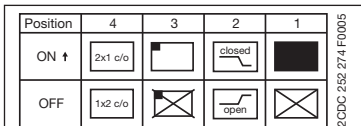


Connection diagram CM-SFS.2



A1-A2	Control supply voltage
B1-C	Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C	Measurign range 2: 10-100 mA or 1-5 A
B3-C	Measuring range 3: 0.1-1 A or 3-15 A
11_{15}-12_{16}/14_{18} 21_{25}-22_{26}/24_{28}	Output contacts - open-or closed circuit principle

DIP switch function CM-SFS.2



OFF = Default

1 ON OFF-delay / OFF ON-delay
2 ON Closed-circuit principle / OFF Open-circuit principle
3 ON Latching function activated / OFF Latching function not activated
4 ON 2x1 c/o contact / OFF 1x2 c/o contacts

Type	Control supply voltage 50/60 Hz	Tripping delay T_V	Order code	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0.1-1 A						
CM-SFS.21	24-240 V AC/DC	0 or 0.1-30 s	**1SVR 430 760 R0400**	1		0.12 / 0.26
Measuring ranges AC/DC: 0.3-1.5 A; 1-5 A; 3-15 A						
CM-SFS.22	24-240 V AC/DC	0 or 0.1-30 s	**1SVR 430 760 R0500**	1		0.12 / 0.26

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Voltage monitoring relays, single-phase AC/DC - CM-ESS.1 and CM-ESS.2
Ordering details

CM-ESS.1

CM-ESS.2

① Threshold value adjustment
② Hysteresis adjustment
③ Adjustment of the measuring range
④ DIP switches (see DIP switch functions)
⑤ U/T: green LED - control supply voltage, timing
⑥ R: yellow LED - relay status
⑦ U: red LED - over- / undervoltage
⑧ Adjustment of the tripping delay T_V

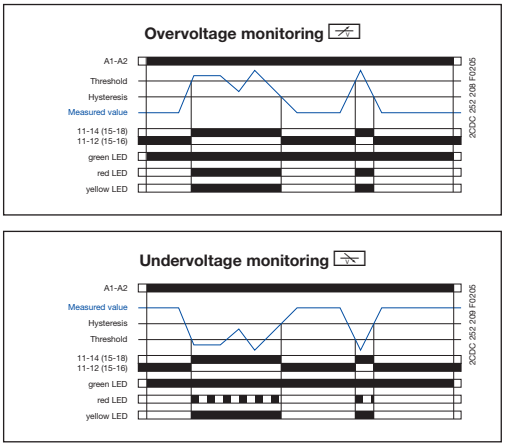
- Monitoring of DC- and AC-voltages from 3-600 V
- TRMS measuring principle
- One device includes 4 measuring ranges: 3-30 V, 6-60 V, 30-300 V, 60-600 V
- Over- or undervoltage monitoring configurable
- Hysteresis adjustable from 3-30 %
- **CM-ESS.2:** Tripping delay T_V adjustable 0; 0.1-30 s
- 3 supply voltage versions
- **CM-ESS.1:** 1 c/o contact **CM-ESS.2:** 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

Depending on the configuration, the voltage monitoring relays **CM-ESS.1** and **CM-ESS.2** can be used for over- or undervoltage monitoring in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. The devices work according the open-circuit principle.

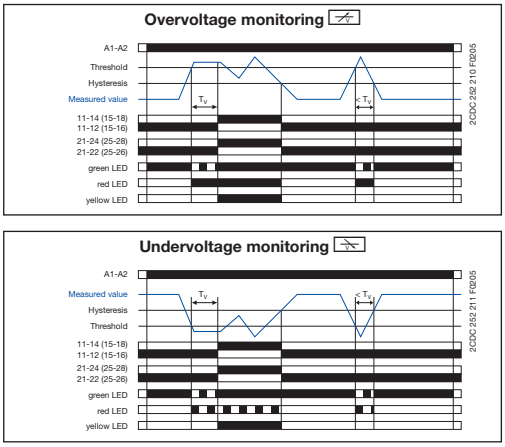
If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-ESS.1 immediately, on the CM-ESS.2 after the set tripping delay T_V. If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s).

The hysteresis is adjustable within a range of 3-30 % of the threshold value.

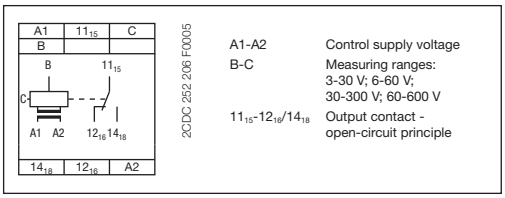
Function diagrams CM-ESS.1



Function diagrams CM-ESS.2

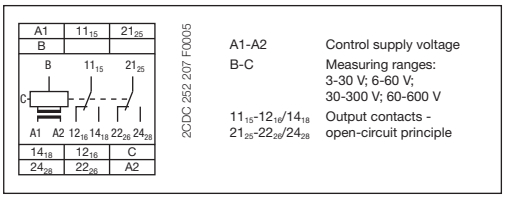


Connection diagram CM-ESS.1



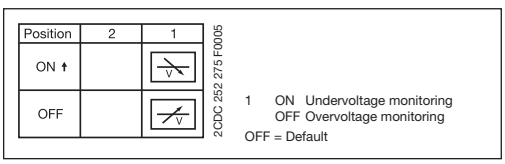
A1-A2 Control supply voltage
B-C Measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
11_{15}-12_{16}/14_{18} Output contact - open-circuit principle

Connection diagram CM-ESS.2



A1-A2 Control supply voltage
B-C Measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
11_{15}-12_{16}/14_{18} Output contacts - 21_{25}-22_{26}/24_{28} open-circuit principle

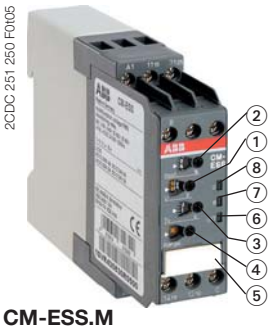
DIP switch functions CM-ESS.1, CM-ESS.2



1 ON Undervoltage monitoring
OFF Overvoltage monitoring
OFF = Default

Type	Control supply voltage 50/60 Hz	Tripping delay T_V	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Measuring ranges AC/DC: 3-30 V; 6-60 V; 30-300 V; 60-600 V						
CM-ESS.1	24-240 V AC/DC	without	**1SVR 430 830 R0300**	1		0.12 / 0.26
	110-130 V AC		**1SVR 430 831 R0300**	1		0.15 / 0.33
	220-240 V AC		**1SVR 430 831 R1300**	1		0.15 / 0.33
CM-ESS.2	24-240 V AC/DC	adjustable 0 or 0.1-30 s	**1SVR 430 830 R0400**	1		0.12 / 0.26
	110-130 V AC		**1SVR 430 831 R0400**	1		0.15 / 0.33
	220-240 V AC		**1SVR 430 831 R1400**	1		0.15 / 0.33

Voltage monitoring relay, single-phase AC/DC, multifunctional - CM-ESS.M
Ordering details



CM-ESS.M

① Threshold value adjustment
② Hysteresis adjustment
③ Adjustment of the tripping delay T_V
④ Adjustment of the measuring range
⑤ DIP switches (see DIP switch functions)
⑥ U/T: green LED - control supply voltage
⑦ R: yellow LED - relay status
⑧ U: red LED - over- / undervoltage

- Monitoring of DC- and AC-voltages from 3-600 V
- TRMS measuring principle
- One device includes 4 measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
- Over- or undervoltage monitoring configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Hysteresis adjustable from 3-30 %
- Tripping delay T_V adjustable 0; 0.1-30 s
- 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

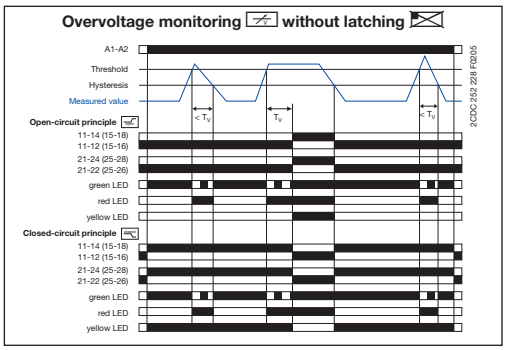
Depending on the configuration, the voltage monitoring relay **CM-ESS.M** can be used for over- or undervoltage monitoring in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. Open or closed-circuit principle are selectable.

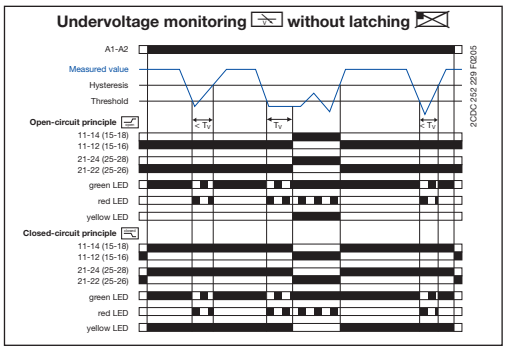
If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize / de-energize.

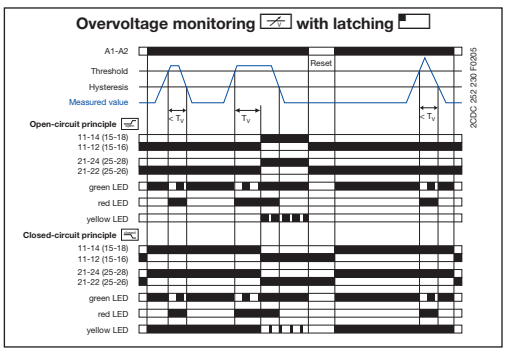
If the measured value exceeds resp. drops below the threshold value plus resp. minus the set hysteresis and the latching function is not activated, the output relays de-energize / energize. With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

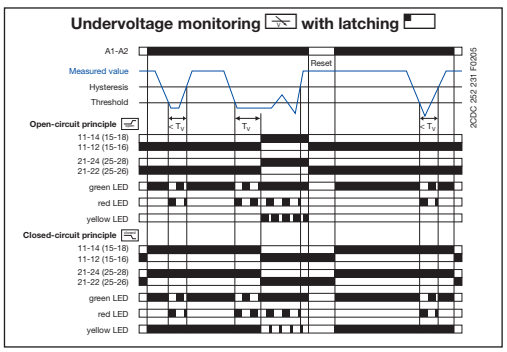
The hysteresis is adjustable within a range of 3-30 % of the threshold value.

Function diagrams CM-ESS.M

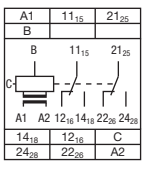






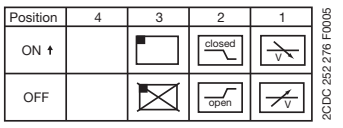


Connection diagram CM-ESS.M



A1-A2 Control supply voltage
B-C Measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
11_{15}-12_{16}/14_{18} 21_{25}-22_{26}/24_{28} Output contacts - Open- or closed circuit principle

DIP switch functions CM-ESS.M



1 ON Undervoltage monitoring
OFF Overvoltage monitoring
2 ON Closed-circuit principle
OFF Open-circuit principle
3 ON Latching function activated
OFF Latching function not activated
OFF = Default

Type	Control supply voltage 50/60 Hz	Tripping delay T_V	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Measuring ranges AC/DC: 3-30 V; 6-60 V; 30-300 V; 60-600 V						
CM-ESS.M	24-240 V AC/DC	0 or 0.1-30 s	**1SVR 430 830 R0500**	1		0.12 / 0.26

Voltage monitoring relay, single-phase AC/DC, window monitoring - CM-EFS.2
Ordering details

CM-EFS.2

① Threshold value adjustment >U for overvoltage
② Threshold value adjustment <U for undervoltage
③ Adjustment of the tripping delay T_V
④ Adjustment of the measuring range
⑤ DIP switches (see DIP switch functions)
⑥ U/T: green LED - control supply voltage, timing
⑦ R: yellow LED - relay status
⑧ U: red LED - over- / undervoltage

- Monitoring of DC- and AC-voltages from 3-600 V
- T RMS measuring principle
- One device includes 4 measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
- Over- and undervoltage monitoring
- ON-or OFF-delay configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Thresholds for U_{min} and U_{max} adjustable
- Fixed hysteresis of 5 %
- Tripping delay T_V adjustable 0; 0.1-30 s
- 1x2 c/o contacts (common signal) or 2x1 c/o contact (separate signals for U_{min} and U_{max})
- 22.5 mm width
- 3 LEDs for status indication

The voltage window monitoring relay **CM-EFS.2** can be used for the simultaneous monitoring of over- (>U) and undervoltages (<U) in single-phase AC and/or DC systems. Depending on the configuration, one c/o contact each 2x1 c/o or both c/o contacts in parallel 1x2 c/o can be used for the over- and undervoltage monitoring. The voltage to be monitored (measured value) is applied to terminals B-C. Open- or closed-circuit principle as well as an adjustable ON or OFF tripping delay are configurable.

ON-delayed voltage window monitoring with parallel switching c/o contacts 1x2 c/o:

If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_V starts, when is configured. If T_V is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize /de-energize .

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated , the output relays de-energize / energize . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

OFF-delayed voltage window monitoring with parallel switching c/o contacts 1x2 c/o:

If the measured value exceeds resp. drops below the adjusted threshold value, the output relays energize / de-energize , when is configured, and remain in this position during the set tripping delay T_V.

If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated , the tripping delay T_V starts.

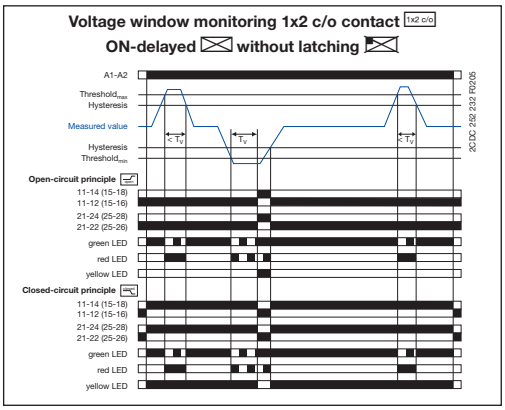
After completion of T_V, the output relays de-energize / energize , provided that the latching function is not activated . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

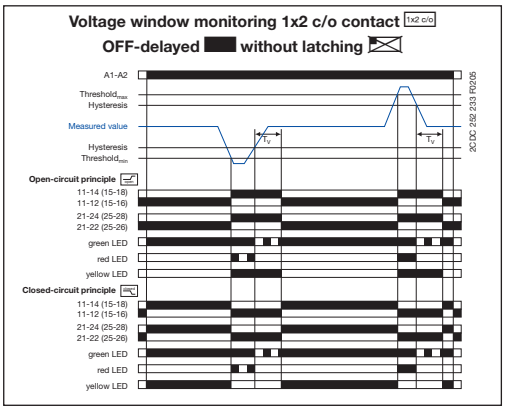
When 2x1 c/o is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

">U" = 11_{15}-12_{16}/14_{18} ; "<U" = 21_{25}-22_{26}/24_{28}

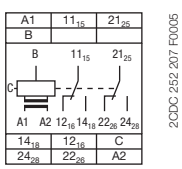
Function diagrams CM-EFS.2

Further function diagrams see data sheet.



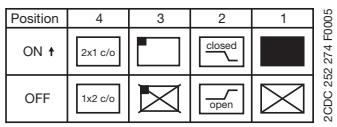


Connection diagram CM-EFS.2



A1-A2	Control Supply voltage
B-C	Measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
11_{15}-12_{16}/14_{18} 21_{25}-22_{26}/24_{28}	Output contacts - open- or closed circuit principle

DIP switch functions CM-EFS.2



OFF = Default

1 ON OFF-delay / OFF ON-delay
2 ON Closed-circuit principle / OFF Open-circuit principle
3 ON Latching function activated / OFF Latching function not activated
4 ON 2x1 c/o contact / OFF 1x2 c/o contacts

Type	Control supply voltage 50/60 Hz	Tripping delay T_V adjustable	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
Measuring ranges AC/DC: 3-30 V; 6-60 V; 30-300 V; 60-600 V						
CM-EFS.2	24-240 V AC/DC	0 or 0.1-30 s	**1SVR 430 750 R0400**	1		0.12 / 0.26

Current monitoring relays, single-phase
CM-SRS.1, CM-SRS.2, CM-SRS.M and CM-SFS.2
Technical data

Type		CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2
Input circuit - Supply circuit	**A1-A2**				
Rated control supply voltage U_S	A1-A2	110-130 V AC			
	A1-A2	220-240 V AC			
	A1-A2	24-240 V AC/DC			
Rated control supply voltage U_S tolerance		-15...+10 %			
Rated frequency	AC versions	50/60 Hz			
	AC/DC versions	50/60 Hz or DC			
Current / power consumption		24 V DC	115 V AC	230 V AC	
	110-130 V AC	-	24 mA / 2.6 VA	-	
	220-240 V AC	-	-	12 mA / 2.6 VA	
	24-240 V AC/DC	30 mA / 0.75 W	17 mA / 1.9 VA	11 mA / 2.6 VA	
On-period		100 %			
Power failure buffering time		20 ms			
Transient overvoltage protection		Varistors			
Input circuit - Measuring circuit	**B1/B2/B3-C**				
Monitoring function		over- or undercurrent monitoring configurable			over- and under-current monitoring
Measuring method		True RMS measuring principle			
Measuring inputs		CM-SxS.x1			CM-SxS.x2		
	Terminal connection	B1-C	B2-C	B3-C	B1-C	B2-C	B3-C
	Measuring ranges AC/DC	3-30 mA	10-100 mA	0.1-1 A	0.3-1.5 A	1-5 A	3-15 A [2]
	Input resistance	3.3 Ω	1 Ω	0.1 Ω	0.05 Ω	0.01 Ω	0.0025 Ω
	Pulse overload capacity t < 1 s	500 mA	1 A	10 A	15 A	50 A	100 A
	Continous capacity	50 mA	150 mA	1.5 A	2 A	7 A	17 A
Threshold value(s)		adjustable within the indicated measuring range			
Setting accuracy of threshold value		10 %			
Repeat accuracy (constant parameters)		±0.07 % of full scale			
Hysteresis related to the threshold value		3-30 % adjustable			5 % fixed
Measuring signal frequency range		DC / 15 Hz - 2 kHz			
Rated measuring signal frequency range		DC / 50-60 Hz			
Maximum response time		AC: 80 ms / DC: 120 ms			
Accuracy within the control supply voltage tolerance		ΔU ≤ 0.5 %			
Accuracy within the temperature range		ΔU ≤ 0.06 % / °C			
Timing circuit					
Start-up delay T_S		none		0 or 0.1-30 s adjustable	
Tripping delay T_V		none	0 or 0.1-30 s adjustable		
Repeat accuracy (constant parameters)		±0.07 % of full scale			
Accuracy within the control supply voltage tolerance		-	Δt ≤ 0.5 %		
Accuracy within the temperature range		-	Δt ≤ 0.06 % / °C		
Indication of operational states					
Control supply voltage	U/T: green LED	⎍: control supply voltage applied, ⎍⎍⎍: start-up delay T_S active, ⎍⎍: tripping delay T_V active			
Measured value	I: red LED	⎍: overcurrent, ⎍⎍: undercurrent			
Relay status	R: yellow LED	⎍: relay energized, no latching function ⎍⎍⎍: relay energized, active latching function ⎍⎍⎍: relay de-energized, active latching function			
Output circuits		**11(15)-12(16)/14(18), 21(25)-22(26)/24(28) - Relays**			
Kind of output		1 c/o contact	2 c/o contacts		1x2 c/o contacts or 2x1 c/o contact configurable
Operating principle [1]		open-circuit principle		open- or closed-circuit principle configurable	
Contact material		AgNi			
Rated operational voltage U_e	IEC/EN 60947-1	250 V			
Minimum switching voltage / minimum switching current		24 V / 10 mA			
Maximum switching voltage / maximum switching current		250 V AC / 4 A AC			

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Current monitoring relays, single-phase
CM-SRS.1, CM-SRS.2, CM-SRS.M and CM-SFS.2
Technical data

Type			CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V		4 A			
	AC15 (inductive) at 230 V		3 A			
	DC12 (resistive) at 24 V		4 A			
	DC13 (inductive) at 24 V		2 A			
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power (Make/Break) at B 300		3600/360 VA			
Mechanical lifetime			$30x10^6$ switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)			$0.1x10^6$ switching cycles			
Max. fuse rating to achieve short circuit protection		n/c contact	6 A fast-acting	10 A fast-acting		6 A fast-acting
		n/o contact	10 A fast-acting			
General data						
Dimensions (W x H x D)			22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)			
Mounting			DIN rail (IEC/EN 60715)			
Mounting position			any			
Degree of protection		enclosure / terminals	IP50 / IP20			
Electrical connection						
Wire size	fine-strand with(out) wire end ferrule		2 x 0.75-2.5 mm^2 (2 x 18-14 AWG)			
	rigid		2 x 0.5-4 mm^2 (2 x 20-12 AWG)			
Stripping length			7 mm (0.28 in)			
Tightening torque			0.6-0.8 Nm			
Environmental data						
Ambient temperature range		operation / storage	-20...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)			55 °C, 6 cycles			
Vibration (sinusoidal) (IEC/EN 60255-21-1)			Class 2			
Shock (IEC/EN 60255-21-2)			Class 2			
Isolation data						
Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	600 V			
		supply / output 1 / output 2	250 V			
Rated impulse withstand voltage U_{imp} (IEC/EN 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	6 kV 1.2/50 µs			
		supply / output 1 / output 2	4 kV 1.2/50 µs			
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)			3			
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)			III			
Standards						
Product standard			IEC/EN 60255-6			
Low Voltage Directive			2006/95/EC			
EMC Directive			2004/108/EC			
Electromagnetic compatibility						
Interference immunity to			IEC/EN 61000-6-2			
electrostatic discharge		IEC/EN 61000-4-2	Level 3			
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3			
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3			
surge		IEC/EN 61000-4-5	Level 3			
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3			
Interference emission			IEC/EN 61000-6-3			
high-frequency radiated		IEC/CISPR 22; EN 55022	Class B			
high-frequency conducted		IEC/CISPR 22; EN 55022	Class B			

[1] Open-circuit principle: output relay energizes if the measured value exceeds ⊟ / falls below ⊟ the adjusted threshold value
Closed-circuit principle: output relay de-energizes if measured value exeeds ⊟ / falls below ⊟ the adjusted threshold value

[2] In case of measured currents > 10 A, lateral spacing has to be min. 10 mm

• **Approvals** 2/6

Voltage monitoring relays, single-phase CM-ESS.1, CM-ESS.2, CM-ESS.M and CM-EFS

Technical data

Type		CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2
Input circuit - Supply circuit	**A1-A2**				
Rated control supply voltage U_S	A1-A2	110-130 V AC			
	A1-A2	220-240 V AC			
	A1-A2	24-240 V AC/DC			
Rated control supply voltage U_S tolerance		-15...+10 %			
Rated frequency	AC versions	50/60 Hz			
	AC/DC versions	50/60 Hz or DC			
Current / power consumption		24 V DC	115 V AC	230 V AC	
	110-130 V AC	-	24 mA / 2.6 VA	-	
	220-240 V AC	-	-	12 mA / 2.6 VA	
	24-240 V AC/DC	30 mA / 0.75 W	17 mA / 1.9 VA	11 mA / 2.6 VA	
On-period		100 %			
Power failure buffering time		20 ms			
Transient overvoltage protection		Varistors			
Input circuit - Measuring circuit	**B-C**				
Monitoring function		over- or undervoltage monitoring configurable			
Measuring method		True RMS measuring principle			
Measuring inputs		CM-ExS			
	Terminal connection	B-C	B-C	B-C	B-C
	Measuring range AC/DC				
	Input resistance	Ω	Ω	Ω	Ω
	Pulse overload capacity t < 1 s				
	Continous capacity				
Threshold value(s)		adjustable within the indicated measuring range			
Setting accuracy of threshold value		10 %			
Repeat accuracy (constant parameters)		±0.07 % of full scale			
Hysteresis related to the threshold value		3-30 % adjustable			5 % fixed
Measuring signal frequency range		DC / 15 Hz - 2 kHz			
Rated measuring signal frequency range		DC / 50-60 Hz			
Maximum response time		AC: 80 ms / DC: 120 ms			
Accuracy within the control supply voltage tolerance		$\Delta U \leq 0.5$ %			
Accuracy within the temperature range		$\Delta U \leq 0.06$ % / °C			
Transient overvoltage protection		Varistors			
Timing circuit					
Delay time T_V		none	0 or 0.1-30 s adjustable		
Repeat accuracy (constant parameters)		±0.07 % of full scale			
Accuracy within the control supply voltage tolerance		-	$\Delta t \leq 0.5$ %		
Accuracy within the temperature range		-	$\Delta t \leq 0.06$ % / °C		
Indication of operational states					
Control supply voltage	U/T: green LED	: control supply voltage applied, : tripping delay T_V active			
Measured value	U: red LED	: overvoltage, : undervoltage			
Relay status	R: yellow LED	: relay energized, no latching function : relay energized, active latching function : relay de-energized, active latching function			
Output circuits		**11(15)-12(16)/14(18), 21(25)-22(26)/24(28) - Relays**			
Kind of output		1 c/o contact	2 c/o contacts		1x2 c/o contacts or 2x1 c/o contact configurable
Operating principle [1]		open-circuit principle		open- or closed-circuit principle configurable	
Contact material		AgNi			
Rated operational voltage U_e	IEC/EN 60947-1	250 V			
Minimum switching voltage / minimum switching current		24 V / 10 mA			
Maximum switching voltage / maximum switching current		250 V AC / 4 A AC			

Voltage monitoring relays, single-phase
CM-ESS.1, CM-ESS.2, CM-ESS.M and CM-EFS
Technical data

Type			CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V		4 A			
	AC15 (inductive) at 230 V		3 A			
	DC12 (resistive) at 24 V		4 A			
	DC13 (inductive) at 24 V		2 A			
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power (Make/Break) at B 300		3600/360 VA			
Mechanical lifetime			$30x10^6$ switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)			$0.1x10^6$ switching cycles			
Max. fuse rating to achieve short circuit protection		n/c contact	6 A fast-acting	10 A fast-acting		6 A fast-acting
		n/o contact	10 A fast-acting			
Gerneral data						
Dimensions (W x H x D)			22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)			
Mounting			DIN rail (IEC/EN 60715)			
Mounting position			any			
Degree of protection		enclosure / terminals	IP50 / IP20			
Electrical connection						
Wire size	fine-strand with(out) wire end ferrule		2 x 0.75-2.5 mm^2 (2 x 18-14 AWG)			
	rigid		2 x 0.5-4 mm^2 (2 x 20-12 AWG)			
Stripping length			7 mm (0.28 in)			
Tightening torque			0.6-0.8 Nm			
Environmental data						
Ambient temperature range		operation / storage	-20...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)			55 °C, 6 cycle			
Vibration (sinusoidal) (IEC/EN 60255-21-1)			Class 2			
Shock (IEC/EN 60255-21-2)			Class 2			
Isolation data						
Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	600 V			
		supply / output 1 / output 2	250 V			
Rated impulse withstand voltage U_{imp} (IEC/EN 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	6 kV 1.2/50 µs			
		supply / output 1 output 2	4 kV 1.2/50 µs			
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)			3			
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)			III			
Standards						
Product standard			IEC/EN 60255-6			
Low Voltage Directive			2006/95/EC			
EMC Directive			2004/108/EC			
Electromagnetic compatibility						
Interference immunity to			IEC/EN 61000-6-2			
electrostatic discharge		IEC/EN 61000-4-2	Level 3			
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3			
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3			
surge		IEC/EN 61000-4-5	Level 3			
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3			
Interference emission			IEC/EN 61000-6-3			
high-frequency radiated		IEC/CISPR 22; EN 55022	Class B			
high-frequency conducted		IEC/CISPR 22; EN 55022	Class B			

[1] Open-circuit principle: output relay energizes if the measured value exceeds ⊿ / falls below ⊾ the adjusted threshold value
Closed-circuit principle: output relay de-energizes if measured value exeeds ⊿ / falls below ⊾ the adjusted threshold value[2]

• **Approvals** 2/6

Notes

Three-phase monitors

Content

Three-phase monitoring relays

Expanded functionality

ABB's new generation of three-phase monitoring relays feature additional functions making the application field for the devices considerably larger.

Selectable phase sequence monitoring

The phase sequence monitoring can be switched off by means of a rotary switch or a DIP switch. This enables monitoring of three-phase mains where phase sequence is not relevant for the application, for example in case of motors with forward and reverse rotation, heating applications, etc.

Automatic phase sequence correction

The automatic phase sequence correction is activated by means of a DIP switch. With activated phase sequence correction, it is ensured that for any non-fixed or portable equipment, e.g. construction machinery, the correct phase sequence is always applied to the input terminals of the load. For details regarding the wiring, please see function description / diagrams.

Structure of the type designation

CM-_ _ x.yz

x: width of enclosure

y: Control supply voltage / measuring range

1	110, 115, 120, 127 V supply systems (phase-neutral)
2	220, 230, 240 V supply systems (phase-neutral)
3	200, 208, 220, 230, 240, 257, 260 V supply systems (phase-phase)
4	440, 460 V supply systems (phase-phase)
5	480, 500 V supply systems (phase-phase)
6	575, 600 V supply systems (phase-phase)
7	660, 690 V supply systems (phase-phase)

z: Rated frequency / output circuit

1	50/60 Hz – 1x2 c/o
2	50/60 Hz – 1x2 or 2x1 c/o
3	50/60/400 Hz – 1x2 oder 2x1 c/o

NEW

CM-UFS
Grid feeding monitoring relay

The number of decentralized plants that obtain power from the sun, wind, water or biogas is increasing rapidly around the world. The use of renewable energy sources has great potential from both an environmental and an economic point of view.

Photovoltaic systems, solar-thermal systems, wind turbines and block-type thermal power stations are used. The electricity generated in these decentralized micro power stations is not simply used to meet the operator's own energy requirements. Above all, a profit is made by feeding it into the public grid at various places.

When a decentralized micro power station is connected to the grid, safe operation must be ensured at all times. This applies particularly to the function for disconnecting the plant from the grid, for instance during maintenance work. As the grid operator is usually unable to access the decentralized micro power station's control unit, this disconnection must take place automatically. Fast disconnection can only be achieved with a monitoring device that immediately recognizes when the grid is deactivated.

The new CM-UFS monitoring relay

A fast response can now be ensured using ABB's three-phase monitoring relay CM-UFS, which constantly monitors the three phases of the public mains supply. The CM-UFS detects overvoltage and undervoltage (voltage increase and decrease protection) as well as any changes in grid frequency (frequency increase and decrease protection*). Where necessary, the CM-UFS monitoring relay generates a control signal to disconnect the plant from the grid. The CM-UFS thus ensures the safe connection of decentralized power stations to the grid at all times.

The features of the CM-UFS.1

- Monitoring device for realizing an automatized grid connection as per DIN V VDE V 0126-1-1: February 2006
- Can be directly combined with ABB switchgear
- Voltage increase protection ≥ 115 % of U
- Voltage decrease protection ≤ 80 % of U_S
- Frequency increase protection > 50.2 H_z
- Frequency decrease protection < 47.5 H_z
- 10 minutes average value 110-115 % of U_S, adjustable

The features of the CM-UFS.2

- Type-tested in accordance with the "Guideline for connections to ENEL distribution network" December 2008, Ed. I
- Can be directly combined with ABB switchgear
- Voltage increase protection ≥ 120 % of U_S
- Voltage decrease protection ≤ 80 % of U_S
- Frequency increase protection > 50,3 or 51 Hz
- Frequency decrease protection < 49,7 or 49 Hz

Three-phase monitoring relays
Selection and conversion table

adjustable
fix fixed value

	CM-PBE	CM-PBE	CM-PVE	CM-PVE	CM-PFE	CM-PFS	CM-PSS.31	CM-PSS.41	CM-PVS.31	CM-PVS.41	CM-PAS.31	CM-PAS.41	CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41	CM-MPS.23	CM-MPS.43	CM-MPN.52	CM-MPN.62	CM-MPN.72
Rated control supply voltage U_s																					
Phase to Phase																					
160-300 V AC									■		■				■						
200-500 V AC						■															
208-440 V AC					■																
300-500 V AC										■		■				■		■			
320-460 V AC				■																	
350-580 V AC																			■		
380 V AC							■														
380-440 V AC		■																			
400 V AC								■													
450-720 V AC																				■	
530-820 V AC																					■
Phase to neutral																					
90-170 V AC													■								
180-280 V AC														■			■				
185-265 V AC			■																		
220-240 V AC	■																				
Rated frequency																					
50/60 Hz	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	■	■
50/60/400 Hz																	■	■			
Suitable for monitoring																					
Single-phase mains [1]	■		■										■	■			■				
Three-phase mains	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Monitoring function																					
Phase failure	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Phase sequence					■	■	⟲	⟲	⟲	⟲	■	■	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲
Automatic phase sequence correction																	⟲	⟲	⟲	⟲	⟲
Overvoltage			■	■			■	■	■	■			■	■	■	■	■	■	■	■	■
Undervoltage			■	■			■	■	■	■			■	■	■	■	■	■	■	■	■
Unbalance											■	■	■	■	■	■	■	■	■	■	■
Neutral [2]	■		■										■[3]	■[3]			■[3]				
Thresholds																					
Thresholds	fix	fix	fix	fix	fix	fix	fix	fix	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲
Timing function for tripping delay t_v / times																					
ON-delay						fix					⟲	⟲									
ON- and OFF-delay	fix	fix	fix	fix	fix																
ON- or OFF-delay (⟲)							⟲	⟲	⟲	⟲			⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲	⟲
Output contacts																					
n/o contacts	1	1	1	1																	
c/o contacts					1	2	2	2	2	2	2	2	2	2	2	2	2[4]	2[4]	2[4]	2[4]	2[4]
Indication of operational states																					
LED(s)	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Replacement for / conversion table																					
CM-PSS (1SVR 430 784 R2300)							■														
CM-PSS (1SVR 430 784 R3300)								■													
CM-PVS (1SVR 430 794 R1300)									■												
CM-PVS (1SVR 430 794 R3300)										■											
CM-PAS (1SVR 430 774 R1300)											■										
CM-PAS (1SVR 430 774 R3300)												■									
CM-MPS (1SVR 430 885 R1300)													■								
CM-MPS (1SVR 430 885 R3300)														■							
CM-MPS (1SVR 430 884 R1300)															■						
CM-MPS (1SVR 430 884 R3300)																■					

[1] Devices with neutral monitoring are also suitable for monitoring single-phase mains, for example control circuits. For this, all three external conductors L1, L2 and L3 have to be jumpered and connected as one single conductor. If available, phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

[2] The external conductor voltage towards the neutral conductor is measured.

[3] Interruppted neutral monitoring

[4] Operating mode 1x2 or 2x1 c/o (SPDT) contact can be selected. (2x1 c/o contact is only possible with over- and undervoltage monitoring and is compulsory for automatic phase sequence correction).

Three-phase monitoring relays CM-PBE and CM-PVE
Ordering details

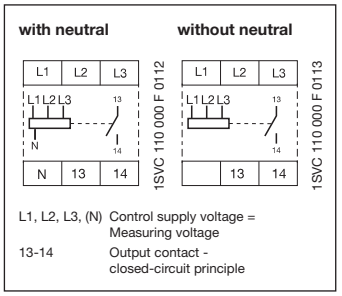
CM-PBE

① R: yellow LED - relay status

Single- and three-phase monitoring relays for phase failure detection

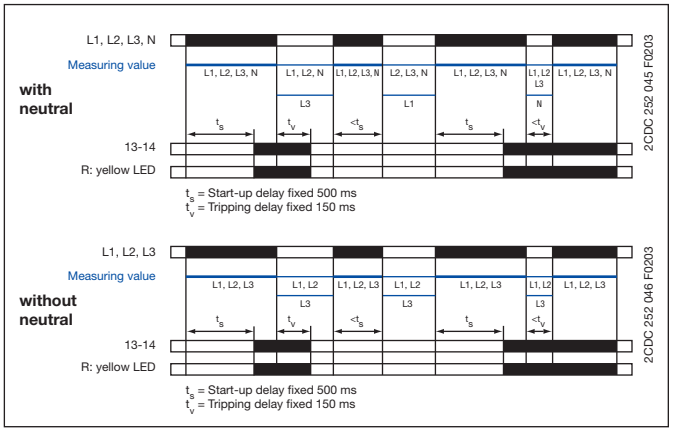
The **CM-PBE** is used to monitor supply voltages for phase failure (U_{meas} < 60 % x U_N). If all phases (and the neutral) are present, the output relay energizes after the start-up delay t_s is complete. If a phase failure occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. As soon as the voltage returns to the tolerance range, timing of t_s starts. When timing is complete, the output relay re-energizes automatically. The yellow LED glows when the output relay is energized.

Connection diagrams



L1, L2, L3, (N) Control supply voltage = Measuring voltage
13-14 Output contact - closed-circuit principle

Function diagrams - Three-phase monitoring



t_s = Start-up delay fixed 500 ms
t_v = Tripping delay fixed 150 ms

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
With neutral monitoring					
CM-PBE	3x380-440 V AC, 220-240 V AC	**1SVR 550 881 R9400**	1		0.08 / 0.17
Without neutral monitoring					
CM-PBE	3x380-440 V AC	**1SVR 550 882 R9500**	1		0.08 / 0.17

The version with neutral monitoring is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

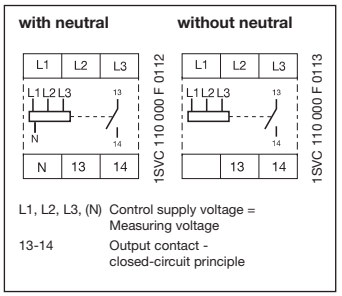
CM-PVE

① R: yellow LED - relay status

Single- and three-phase monitoring relays for over- / undervoltage and phase failure detection

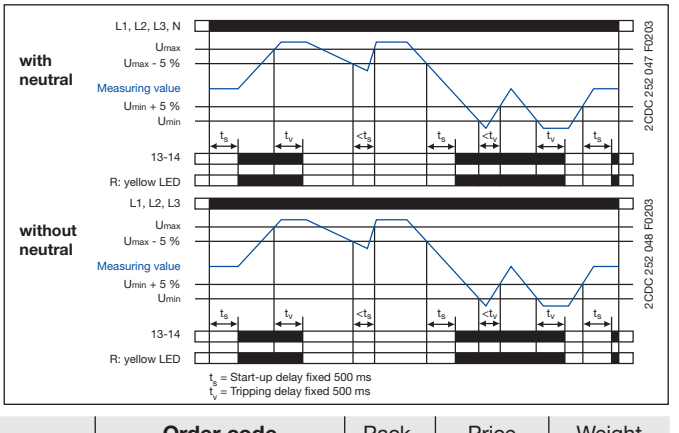
The **CM-PVE** is used to monitor supply voltages for over- and undervoltage and phase failure. If all phases (and the neutral) are present with correct voltage, the output relay energizes after the start-up delay t_s is complete. If the voltage exceeds or falls below the fixed threshold value or if a phase failure occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. As soon as the voltage returns to the tolerance range, timing of t_s starts. When timing is complete, the output relay re-energizes automatically. The yellow LED glows when the output relay is energized.

Connection diagrams



L1, L2, L3, (N) Control supply voltage = Measuring voltage
13-14 Output contact - closed-circuit principle

Function diagrams - Three-phase monitoring



t_s = Start-up delay fixed 500 ms
t_v = Tripping delay fixed 500 ms

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
With neutral monitoring					
CM-PVE	3x320-460 V AC, 185-265 V AC	**1SVR 550 870 R9400**	1		0.08 / 0.17
Without neutral monitoring					
CM-PVE	3x320-460 V AC	**1SVR 550 871 R9500**	1		0.08 / 0.17

The version with neutral monitoring is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

• **Technical data**..... 2/33 • **Technical diagrams** .....2/102 • **Dimensional drawings** 2/103

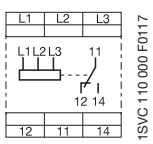
Three-phase monitoring relays CM-PFE and CM-PFS
Ordering details

① R: yellow LED - relay status

Three-phase monitoring relays for phase sequence monitoring and phase failure detection

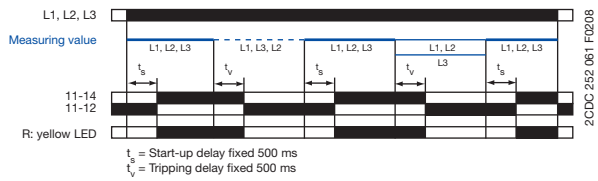
The **CM-PFE** is used to monitor three-phase mains for incorrect phase sequence and phase failure. If all phases are present with the correct phase sequence, the output relay energizes after the start-up delay t_s is complete. If a phase failure or a phase sequence error occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. The yellow LED glows when the output relay is energized.
In case of motors which continue running with only two phases, the CM-PFE detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.

Connection diagram



L1-L2-L3 Control supply voltage = Measuring voltage
11-12/14 Output contact Closed-circuit principle

Function diagram



t_s = Start-up delay fixed 500 ms
t_v = Tripping delay fixed 500 ms

For applications where a reverse fed voltage > 60% is expected, we recommend to use our three-phase monitoring relays for unbalance CM-PAS.xx.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PFE	3x208-440 V AC	**1SVR 550 824 R9100**	1		0.08 / 0.17

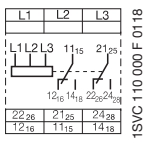
CM-PFS

① R: yellow LED - relay status
② Marker label

Three-phase monitoring relays for phase sequence monitoring and phase failure detection

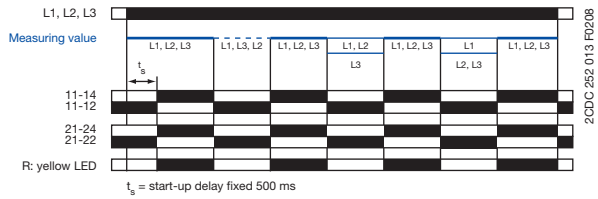
The **CM-PFS** is used to monitor three-phase mains for incorrect phase sequence and phase failure. If all phases are present with the correct phase sequence, the output relay energizes after the start-up delay t_s is complete. If a phase failure or a phase sequence error occurs, the output relay de-energizes instantaneous. The yellow LED glows when the output relay is energized.
In case of motors which continue running with only two phases, the CM-PFS detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.

Connection diagram



L1-L2-L3 Control supply voltage = Measuring voltage
11_{15}-12_{16}/14_{18}, 21_{25}-22_{26}/24_{28} Output contact - Closed-circuit principle

Function diagram



t_s = start-up delay fixed 500 ms

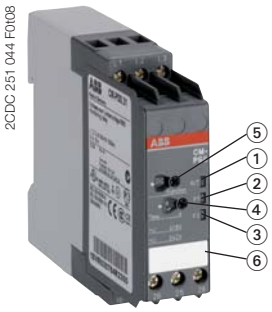
ATTENTION
If several CM-PFS units are placed side by side and the control supply voltage is higher than 415 V, spacing of at least 10 mm has to be kept between the individual units.

For applications where a reverse fed voltage > 60% is expected, we recommend to use our three-phase monitoring relays for unbalance CM-PAS.xx.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PFS	3x200-500 V AC	**1SVR 430 824 R9300**	1		0.15 / 0.33

• **Technical data**..... 2/33
• **Technical diagrams** ..... 2/102 • **Dimensional drawings** .....2/103 • **Accessories** 2/104

Three-phase monitoring relays CM-PSS.x1 and CM-PVS.x1
Ordering details



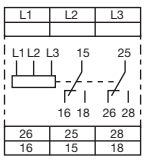
CM-PSS.x1

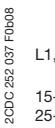
① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Function selection (see rotary switch "Function")
⑥ Marker label

Three-phase monitoring relays for over- and undervoltage with fixed threshold values ± 10 %

The **CM-PSS.31** and the **CM-PSS.41** are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage. The threshold values for over- and undervoltage are fixed.

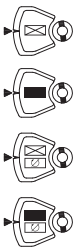
Connection diagram





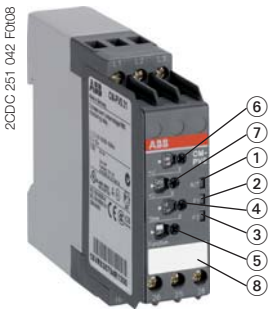
L1, L2, L3 Control supply voltage = measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

Rotary switch "Function"



ON-delay with phase sequence monitoring
OFF-delay with phase sequence monitoring
ON-delay without phase sequence monitoring
OFF-delay without phase sequence monitoring

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PSS.31	3x380 V AC	**1SVR 630 784 R2300**	1		0.13 / 0.29
CM-PSS.41	3x400 V AC	**1SVR 630 784 R3300**	1		0.13 / 0.29



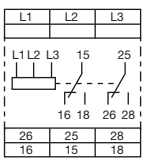
CM-PVS.x1

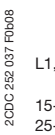
① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Function selection (see rotary switch "Function")
⑥ Adjustment of the threshold value for overvoltage
⑦ Adjustment of the threshold value for undervoltage
⑧ Marker label

Three-phase monitoring relays for over- and undervoltage with adjustable threshold values

The **CM-PVS.31** and the **CM-PVS.41** are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage. The threshold values for over- and undervoltage are adjustable.

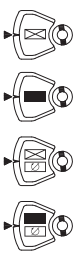
Connection diagram





L1, L2, L3 Control supply voltage = measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

Rotary switch "Function"

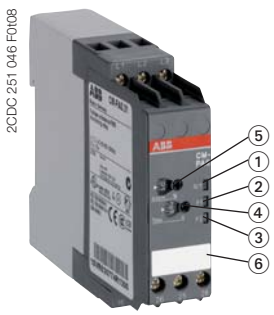


ON-delay with phase sequence monitoring
OFF-delay with phase sequence monitoring
ON-delay without phase sequence monitoring
OFF-delay without phase sequence monitoring

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PVS.31	3x160-300 V AC	**1SVR 630 794 R1300**	1		0.13 / 0.29
CM-PVS.41	3x300-500 V AC	**1SVR 630 794 R3300**	1		0.13 / 0.29

• **Conversion table** 2/21
• **Technical diagrams** 2/102
• **Function diagrams** 2/28
• **Dimensional drawings** 2/103
• **Technical data** 2/35
• **Accessories** 2/104

Three-phase monitoring relays CM-PAS.x1 and CM-MPS.x1
Ordering details



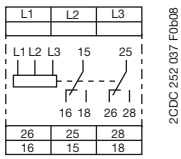
CM-PAS.x1

① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Adjustment of the threshold value for phase unbalance
⑥ Marker label

Three-phase monitoring relays for phase unbalance

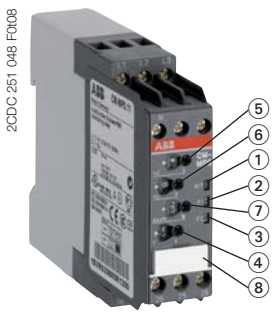
The **CM-PAS.31** and the **CM-PAS.41** are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure and phase unbalance. The threshold value for phase unbalance is adjustable.

Connection diagram



L1, L2, L3 Control supply voltage = measuring voltage
15-16/18 Output contacts - closed-circuit principle
25-26/28 closed-circuit principle

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PAS.31	3x160-300 V AC	**1SVR 630 774 R1300**	1		0.13 / 0.29
CM-PAS.41	3x300-500 V AC	**1SVR 630 774 R3300**	1		0.13 / 0.29



CM-MPS.x1

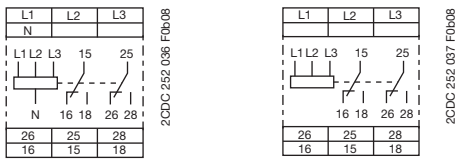
① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Adjustment of the threshold value for overvoltage
⑥ Adjustment of the threshold value for undervoltage
⑦ Adjustment of the threshold value for phase unbalance
⑧ Function selection (see DIP switch functions) / Marker label

Multifunctional three-phase monitoring relays

The **CM-MPS.x1** are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance. CM-MPS.11 and CM-MPS.21 also monitor the neutral for interruption. The threshold values for over- and undervoltage and phase unbalance are adjustable.

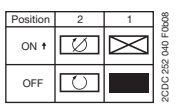
CM-MPS.11 and CM-MPS.21 are also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor. Phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

Connection diagram



L1, L2, L3, (N) Control supply voltage = measuring voltage
15-16/18 Output contacts - closed-circuit principle
25-26/28 closed-circuit principle

DIP switch functions



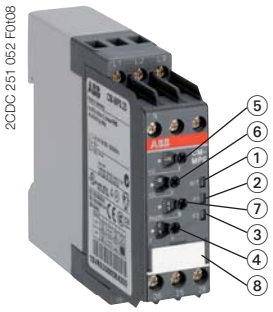
1 Timing function
ON ON-delayed
OFF OFF-delayed

2 Phase sequence monitoring
ON deactivated
OFF activated

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
With interrupted neutral monitoring					
CM-MPS.11	3x90-170 V AC	**1SVR 630 885 R1300**	1		0.13 / 0.29
CM-MPS.21	3x180-280 V AC	**1SVR 630 885 R3300**	1		0.13 / 0.29
Without interrupted neutral monitoring					
CM-MPS.31	3x160-300 V AC	**1SVR 630 884 R1300**	1		0.13 / 0.29
CM-MPS.41	3x300-500 V AC	**1SVR 630 884 R3300**	1		0.13 / 0.29

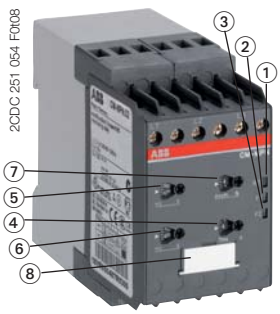
• **Conversion table** 2/21
• **Technical diagrams** 2/102
• **Function diagrams** 2/28
• **Dimensional drawings** 2/103
• **Technical data** ..... 2/35 and 2/37
• **Accessories** 2/104

Three-phase monitoring relays CM-MPS.x3 and CM-MPN.x2
Ordering details



CM-MPS.x3

① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Adjustment of the threshold value for overvoltage
⑥ Adjustment of the threshold value for undervoltage
⑦ Adjustment of the threshold value for phase unbalance
⑧ Function selection (see DIP switch functions) / Marker label



CM-MPN.x2

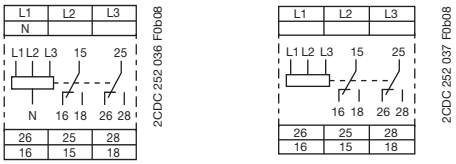
① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Adjustment of the threshold value for overvoltage
⑥ Adjustment of the threshold value for undervoltage
⑦ Adjustment of the threshold value for phase unbalance
⑧ Function selection (see DIP switch functions) / Marker label

Multifunctional three-phase monitoring relays, automatic phase sequence correction and separate monitoring of over- and undervoltage (window monitoring) configurable

The **CM-MPS.x3** are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance.
CM-MPS.23 also monitors the neutral for interruption. The threshold values for over- and undervoltage and phase unbalance are adjustable.

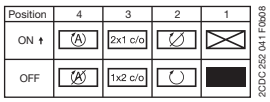
The devices can be used for mains with a frequency of 45-440 Hz.
CM-MPS.23 is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor. Phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

Connection diagram



L1, L2, L3, (N) Control supply voltage = measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

DIP switch functions



1 Timing function
ON ON-delayed
OFF OFF-delayed

2 Phase sequence monitoring
ON deactivated
OFF activated

3 Operating principle of output
ON 2x1 c/o contact
OFF 1x2 c/o contacts

4 Phase sequence correction
ON activated
OFF deactivated

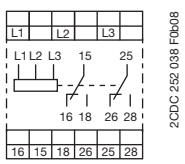
[1] Output relay R1 is responsive to overvoltage, output relay R2 is responsive to undervoltage. In case of other faults, both output relays react synchronously.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
With interrupted neutral monitoring					
CM-MPS.23	3x180-280 V AC	**1SVR 630 885 R4300**	1		0.13 / 0.29
Without interrupted neutral monitoring					
CM-MPS.43	3x300-500 V AC	**1SVR 630 884 R4300**	1		0.13 / 0.29

Multifunctional three-phase monitoring relays, automatic phase sequence correction and separate monitoring of over- and undervoltage (window monitoring) configurable

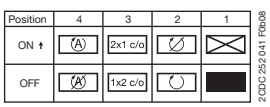
The **CM-MPN.52**, **CM-MPN.62** and **CM-MPN.72** are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance.The threshold values for over- and undervoltage and phase unbalance are adjustable.

Connection diagram



L1, L2, L3 Control supply voltage = measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

DIP switch functions



1 Timing function
ON ON-delayed
OFF OFF-delayed

2 Phase sequence monitoring
ON deactivated
OFF activated

3 Operating principle of output
ON 2x1 c/o contact
OFF 1x2 c/o contacts

4 Phase sequence correction
ON activated
OFF deactivated

[1] Output relay R1 is responsive to overvoltage, output relay R2 is responsive to undervoltage. In case of other faults, both output relays react synchronously.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-MPN.52	3x350-580 V AC	**1SVR 650 487 R8300**	1		0.13 / 0.29
CM-MPN.62	3x450-720 V AC	**1SVR 650 488 R8300**	1		0.13 / 0.29
CM-MPN.72	3x530-820 V AC	**1SVR 650 489 R8300**	1		0.13 / 0.29

• **Conversion table** **2**/ 21
• **Technical diagrams** **2**/102
• **Function diagrams** **2**/ 24
• **Dimensional drawing** **2**/103
• **Technical data** **2**/ 39
• **Accessories** **2**/104

NEW

Three-phase monitoring relays CM-UFS

Ordering details

CM-UFS.1

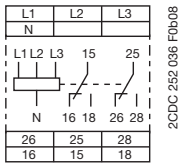
① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the threshold value for the 10 minutes average value
⑤ Selection of neutral conductor, connected or not
⑥ Marker label

Application

The CM-UFS.1 is a monitoring relay for feeding in three-phase mains. The device is connected between decentral electrical energy source such as photovoltaic systems, wind turbines, block-type thermal power stations, and the public grid. In case the public grid is disconnected due to any reason, for instance during maintance work, the CM-UFS.1 recognizes this powerless situation. Then, in conjunction with a switching device, the CM-UFS.1 disconnects the decentral electrical energy source from the public grid. The device detects overvoltage and undervoltage (voltage increase and decrease protection) as well as any changes in grid frequency (frequency increase and decrease protection) in accordance with DIN V VDE V 0126-1-1. The connection of the neutral conductor is configurable. The threshold value for the 10 minutes average value is adjustable. The CM-UFS.1 is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

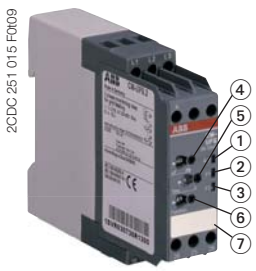
- Monitoring of three-phase mains for grid feeding
- Type-tested in accordance with DIN V VDE V 0126-1-1: February 2006
- Neutral conductor connection configurable
- Can also be used to monitor single-phase mains
- Threshold value for the 10 minutes average value adjustable (110-115% of U_s)
- Start-up delay t_{S1} prior to first grid connection and after a short-term interruption, 30 s fixed
- Restart delay t_{S2}, 30 s fixed
- Powered by the measuring circuit
- True RMS measuring principle
- 2 c/o (SPDT) contacts
- 3 LEDs for status indication

Connection diagram



L1, L2, L3, N Control supply voltage = Measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-UFS.1	3 x 400 V AC (L-L) / 230 V AC (L-N)	**1SVR 630 736 R0300**	1		0.14 / 0.31



CM-UFS.2

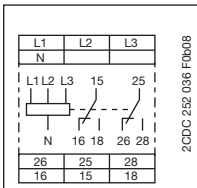
① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Selection of the frequency threshold values
⑤ Adjustment of the restart delay tS2
⑥ Selection of neutral conductor, connected or not
⑦ Marker label

Application

The CM-UFS.2 is a monitoring relay for feeding in three-phase mains. The device is connected between decentral electrical energy source such as photovoltaic systems, wind turbines, block-type thermal power stations, and the public grid. In case the public grid is disconnected due to any reason, for instance during maintance work, the CM-UFS.2 recognizes this powerless situation. Then, in conjunction with a switching device, the CM-UFS.2 disconnects the decentral electrical energy source from the public grid. The device detects overvoltage and undervoltage (voltage increase and decrease protection) as well as any changes in grid frequency (frequency increase and decrease protection) in accordance with the Guideline for connections ENEL distribution network, December 2008, Ed. I. The connection of the neutral conductor and the frequency threshold values are configurable. The CM-UFS.2 is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

- Monitoring of three-phase mains for grid feeding
- Type-tested in accordance with the Guideline for connections to ENEL distribution network, December 2008, Ed. I
- Neutral conductor connection configurable
- Can also be used to monitor single-phase mains
- Frequency threshold values configurable (± 0.3 Hz / ± 1Hz)
- Start-up delay tS1 prior to first grid connection and after a short-term interruption, 1 s fixed
- Restart delay tS2, adjustable (0 s; 0.1-30 s)
- Powered by the measuring circuit
- True RMS measuring principle
- 2 c/o (SPDT) contacts
- 3 LEDs for status indication

Connection diagram



L1, L2, L3, N Control supply voltage = Measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-UFS.2	3 x 400 V AC (L-L) / 230 V AC (L-N)	**1SVR 630 736 R1300**	1		0.14 / 0.31

• **Function diagrams CM-UFS.1**... **2**/31
• **TTechnical data** **2**/41
• **Function diagrams CM-UFS.2** ..**2**/ 32
• **Dimensional drawing** **2**/103
• **Accessories** **2**/104

Phase sequence and phase failure monitoring
CM-PSS.xx, CM-PVS.xx, CM.PAS.xx, CM-MPS.xx, CM-MPN.xx

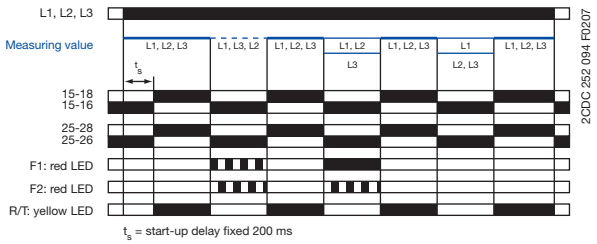
Applying control supply voltage begins the fixed start-up delay t_S. When t_S is complete and all phases are present with correct voltage, the output relays energize and the yellow LED R/T glows.

Phase sequence monitoring

If phase sequence monitoring is activated, the output relays de-energize as soon as a phase sequence error occurs. The fault is displayed by alternated flashing of the LEDs F1 and F2. The output relays re-energize automatically as soon as the phase sequence is correct again.

Phase failure monitoring

The output relays de-energize instantaneous if a phase failure occurs. The fault is indicated by lightning of LED F1 and flashing of LED F2. The output relays re-energize automatically as soon as the voltage returns to the tolerance range.



t_s = start-up delay fixed 200 ms

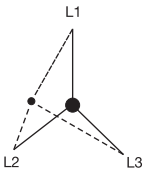
Interrupted neutral monitoring
CM-MPS.11, CM-MPS.21, CM-MPS.23

The interruption of the neutral in the main to be monitored is detected by means of phase unbalance evaluation.

Determined by the system, in case of unloaded neutral, i.e. symmetrical load between all three phases, it may happen that an interruption of the neutral will not be detected.

If the star point is displaced by asymmetrical load in the three-phase main, an interrupted neutral will be detected.

Displacement of the star point



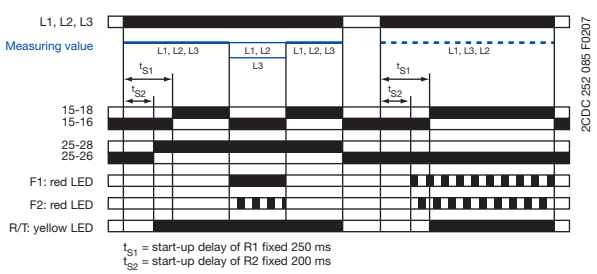
Automatic phase sequence correction
CM-MPS.x3, CM-MPN.x2

This function can be selected only if phase sequence monitoring is activated ↻ and operating mode 2x1 c/o (SPDT) contact 1x2 c/o is selected.

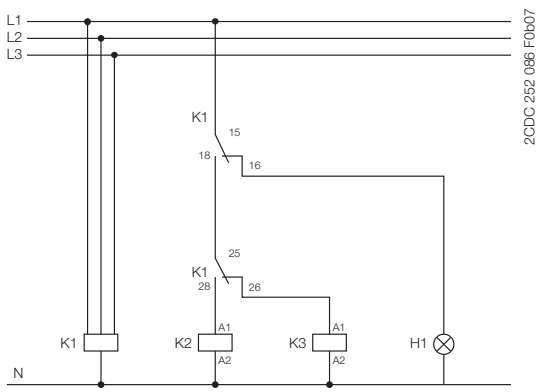
Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage, output relay R1 energizes. Output relay R2 energizes when the fixed start-up delay t_{S2} is complete and all phases are present with correct phase sequence. Output relay R2 remains de-energized if the phase sequence is incorrect.

If the voltage to be monitored exceeds or falls below the set threshold values for phase unbalance, over- or undervoltage or if a phase failure occurs, output relay R1 de-energizes and the LEDs F1 and F2 indicate the fault.

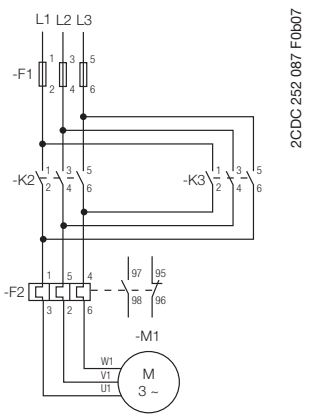
Output relay R2 is responsive only to a false phase sequence. In conjunction with a reversing contactor combination, this enables an automatic correction of the rotation direction. See circuit diagrams on the right.



t_{S1} = start-up delay of R1 fixed 250 ms
t_{S2} = start-up delay of R2 fixed 200 ms



Control circuit diagram (K1 = CM-MPS.xx or CM-MPN.xx)



Power circuit diagram

Over- and undervoltage monitoring 1x2 c/o

CM-PSS.xx[1], CM-PVS.xx[2], CM-MPS.xx[2], CM-MPN.xx[2]

Applying control supply voltage begins the fixed start-up delay t_S. When t_S is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the fixed[1] or set[2] threshold value, the output relays de-energize after the set tripping delay t_V is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

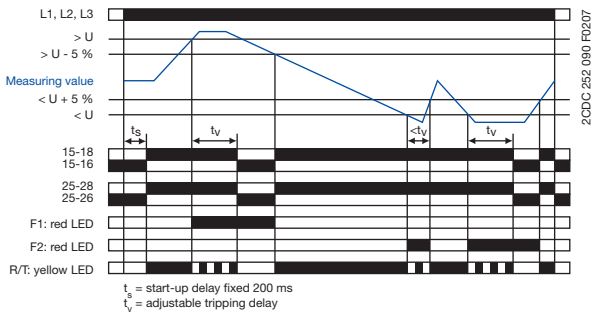
The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 % and the LED R/T glows.

Type of tripping delay = OFF-delay

If the voltage to be monitored exceeds or falls below the fixed[1] or set[2] threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

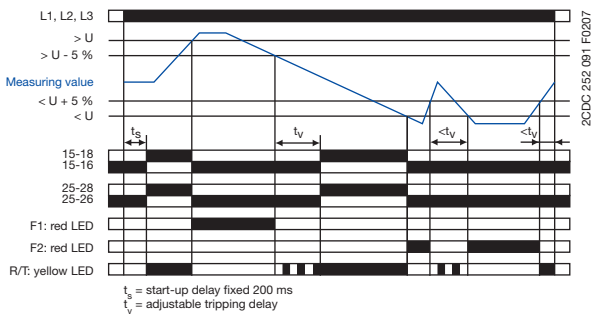
As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize automatically after the set tripping delay t_V is complete. The LED R/T flashes during timing and turns steady when timing is complete.

ON-delay ⊠, 1x2 c/o contacts 1x2 c/o



t_s = start-up delay fixed 200 ms
t_v = adjustable tripping delay

OFF-delay ■, 1x2 c/o contacts 1x2 c/o



t_s = start-up delay fixed 200 ms
t_v = adjustable tripping delay

Over- and undervoltage monitoring 2x1 c/o

CM-MPS.x3, CM-MPN.x2

Applying control supply voltage begins the fixed start-up delay t_S. When t_S is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize. The yellow LED R/T glows as long as at least one output relay is energized.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the set threshold value, output relay R1 (overvoltage) or output relay R2 (undervoltage) de-energizes after the set tripping delay t_V is complete. The LED R/T flashes during timing.

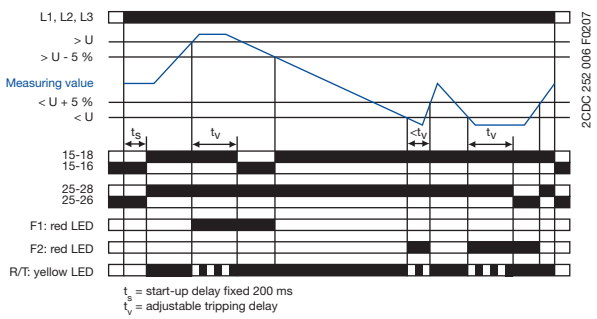
The corresponding output relay re-energizes automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %.

Type of tripping delay = OFF-delay

If the voltage to be monitored exceeds or falls below the set threshold value, output relay R1 (overvoltage) or output relay R2 (undervoltage) de-energizes instantaneously.

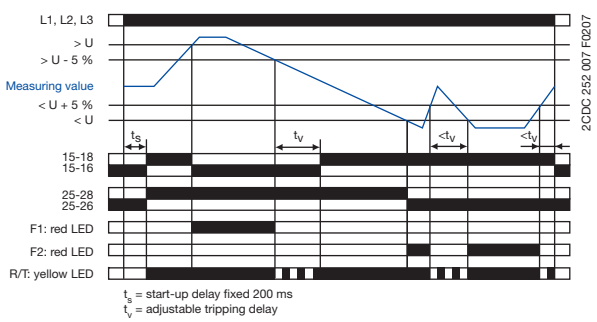
As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the corresponding output relay re-energizes automatically after the set tripping delay t_V is complete. The LED R/T flashes during timing.

ON-delay ⊠, 2x1 c/o contact 2x1 c/o



t_s = start-up delay fixed 200 ms
t_v = adjustable tripping delay

ON-delay ■, 2x1 c/o contact 2x1 c/o



t_s = start-up delay fixed 200 ms
t_v = adjustable tripping delay

Three-phase monitoring relays CM-PSS.xx, CM-PVS.xx, CM-PAS.xx and MPx.xx
Function description / -diagrams

Phase unbalance monitoring
CM-PAS.xx, CM-MPS.xx, CM-MPN.xx

Applying control supply voltage begins the fixed start-up delay t_S. When t_S is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize after the set tripping delay t_V is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

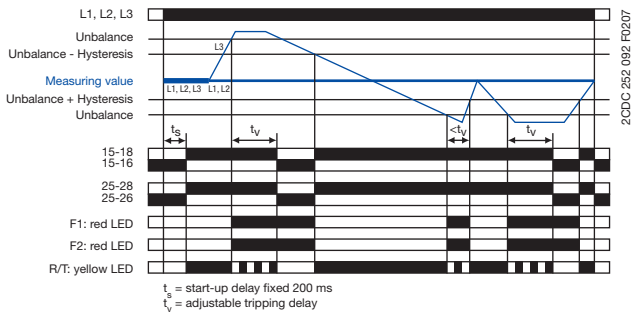
The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 % and the LED R/T glows.

Type of tripping delay = OFF-delay

If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

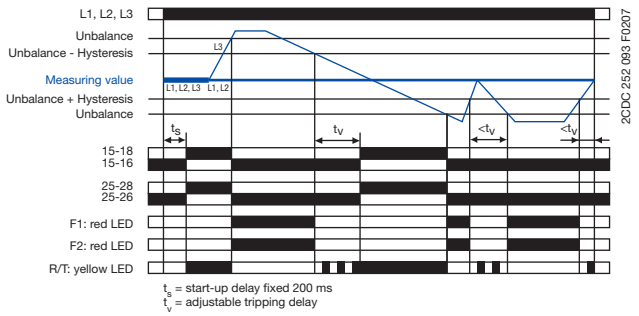
As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 %, the output relays re-energize automatically after the set tripping delay t_V is complete. The LED R/T flashes during timing and turns steady when timing is complete.

ON-delay ⊠



t_s = start-up delay fixed 200 ms
t_v = adjustable tripping delay

OFF-delay ■



t_s = start-up delay fixed 200 ms
t_v = adjustable tripping delay

LED functions
CM-PSS.xx, CM-PSV.xx, CM-PAS.xx, CM-MPS.xx, CM-MPN.xx

Function	R/T: yellow LED	F1: red LED	F2: red LED
Control supply voltage applied, output relay energized	⎍	-	-
Tripping delay t_V active	⎍⎍	-	-
Phase failure	-	⎍	⎍⎍
Phase sequence	-	⎍⎍ alternating	
Overvoltage	-	⎍	-
Undervoltage	-	-	⎍
Phase unbalance	-	⎍	⎍
Interruption of the neutral	-	⎍	⎍⎍
Adjustment error [1]	⎍⎍	⎍⎍	⎍⎍

[1] Possible misadjustments of the front-face operating controls:
Overlapping of the threshold values: An overlapping of the threshold values is given, if the threshold value for overvoltage is set to a smaller value than the threshold value for undervoltage.
DIP switch 3 = OFF and DIP switch 4 = ON: Automatic phase sequence correction is activated and selected operating mode is 1x2 c/o contacts
DIP switch 2 and 4 = ON: Phase sequence detection is deactivated and the automatic phase sequence correction is actived

Type of tripping delay
CM-PSS.xx, CM-PSV.xx, CM-PAS.xx, CM-MPS.xx, CM-MPN.xx

The type of tripping delay ⊠ / ■ can be adjusted via a rotary (CM-PxS.xx) or a DIP switch (CM-MPx.xx).

Switch position ON-delay ⊠:
In case of a fault, the de-energizing of the output relays and the respective fault message are suppressed for the adjusted tripping delay t_V.

Switch position OFF-delay ■:
In case of a fault, the output relays de-energize instantaneously and a fault message is displayed and stored for the length of the adjusted tripping delay t_V. Thereby, also momentary undervoltage conditions are recognized.

NEW

Grid feeding monitoring relays CM-UFS.1

Function description / -diagrams

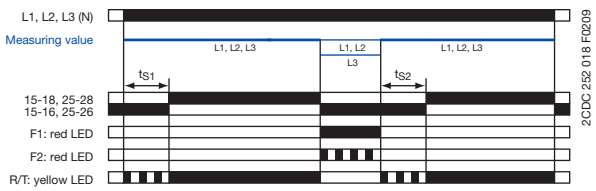
Function of the yellow LED

The yellow LED is flashing during timing and turns steady as soon as the output relays are energized.

Phase failure monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize. They de-energize instantaneously if a phase failure occurs. The fault is indicated by LEDs.

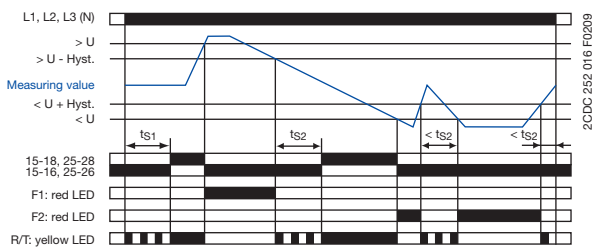
As soon as all 3 phases are present again, the output relays re-energize automatically after the fixed restart delay t_{S2} is complete.



t_{S1} = Start-up delay prior to first grid connection and after a short-term interruption, 30 s fixed
t_{S2} = Restart delay, 30 s fixed

Over- and undervoltage monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize. If the voltage to be monitored exceeds or falls below the fixed threshold value, the output relays de-energize instantaneously. The fault type is indicated by LEDs. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize after the fixed restart delay t_{S2} is complete.

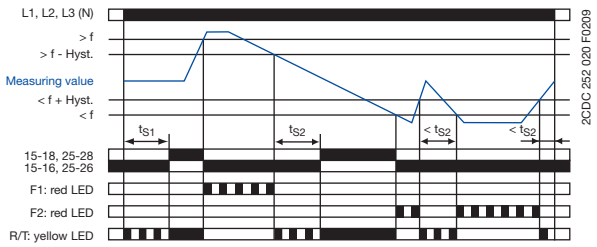


t_{S1} = Start-up delay prior to first grid connection and after a short-term interruption, 30 s fixed
t_{S2} = Restart delay, 30 s fixed

Over- and underfrequency monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

If the frequency to be monitored exceeds or falls below the fixed threshold value, the output relays deenergize instantaneously. The fault type is indicated by LEDs.
As soon as the frequency returns to the tolerance range, taking into account a fixed hysteresis, the output relays re-energize after the fixed restart delay t_{S2} is complete.



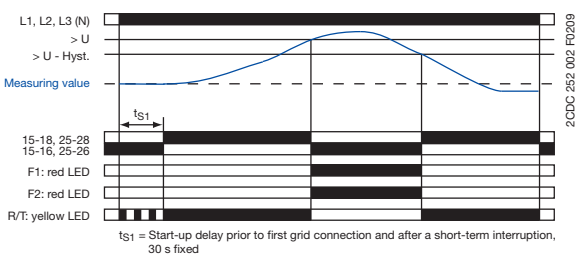
t_{S1} = Start-up delay prior to first grid connection and after a short-term interruption, 30 s fixed
t_{S2} = Restart delay, 30 s fixed

10 minutes average value monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

The voltages of the individual phases are measured over a period of 10 minutes and the average value is calculated. If the 10 minutes average value of a phase exceeds the set threshold value, the output relays de-energize instantaneously. The fault is indicated by LEDs.

As soon as the 10 minutes average value drops again below the set threshold value, the output relays re-energize instantaneously.



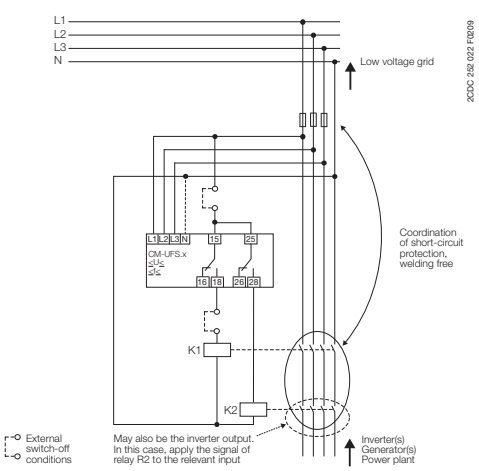
t_{S1} = Start-up delay prior to first grid connection and after a short-term interruption, 30 s fixed

Function diagram legend

Control supply voltage not applied / Output contact open / LED off
Control supply voltage applied / Output contact closed / LED glowing

LEDs

Function	R/T: yellow LED	F1: red LED	F2: red LED
Output relay energized	⎍	-	-
Delay active	⎍⎍	-	-
Overvoltage	-	⎍	-
Undervoltage	-	-	⎍
Overfrequency	-	⎍⎍	-
Underfrequency	-	-	⎍⎍
Exceedance of the average value	-	⎍	⎍
Phase failure	-	⎍	⎍⎍



Automatized grid connection instead of a permanently accessible switching point with a disconnection function

NEW

Grid feeding monitoring relays CM-UFS.2

Function description / -diagrams

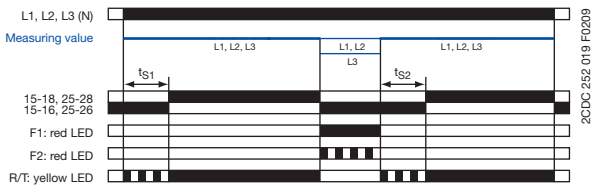
Function of the yellow LED

The yellow LED is flashing during timing and turns steady as soon as the output relays are energized.

Phase failure monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize. They de-energize instantaneously if a phase failure occurs. The fault is indicated by LEDs.

As soon as all 3 phases are present again, the output relays re-energize automatically after the set restart delay t_{S2} is complete.

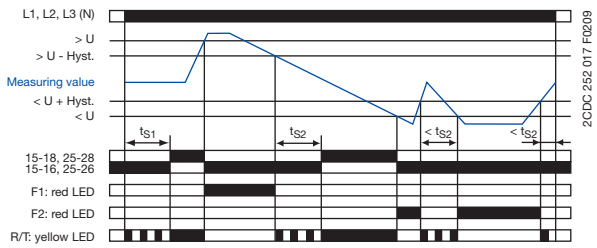


t_{S1} = Start-up delay prior to first grid connection and after a short-time interruption, 1 s fixed
t_{S2} = Restart-up delay, adjustable

Over- and undervoltage monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

If the voltage to be monitored exceeds or falls below the fixed threshold value, the output relays de-energize instantaneously. The fault type is indicated by LEDs. As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize after the set restart delay t_{S2} is complete.

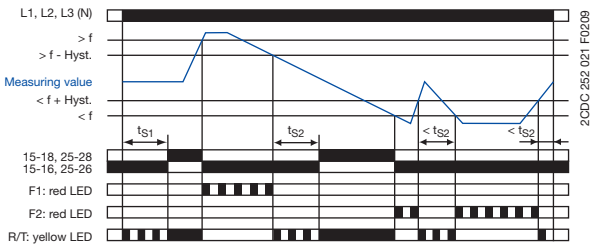


t_{S1} = Start-up delay prior to first grid connection and after a short-time interruption, 1 s fixed
t_{S2} = Restart-up delay, adjustable

Over- and underfrequency monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1}. When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

If the frequency to be monitored exceeds or falls below the fixed threshold value, the output relays deenergize instantaneously. The fault type is indicated by LEDs. As soon as the frequency returns to the tolerance range, taking into account a fixed hysteresis, the output relays re-energize after the set restart delay t_{S2} is complete.



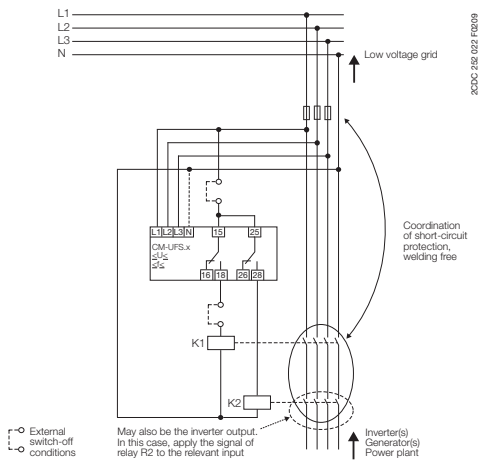
t_{S1} = Start-up delay prior to first grid connection and after a short-time interruption, 1 s fixed
t_{S2} = Restart-up delay, adjustable

Function diagram legend

Control supply voltage not applied / Output contact open / LED off
Control supply voltage applied / Output contact closed / LED glowing

LED Funktionen

Function	R/T: yellow LED	F1: red LED	F2: red LED
Output relay energized	⎍	-	-
Delay active	⎍⎍	-	-
Overvoltage	-	⎍	-
Undervoltage	-	-	⎍
Overfrequency	-	⎍⎍	-
Underfrequency	-	-	⎍⎍
Phase failure	-	⎍	⎍⎍



Automatized grid connection instead of a permanently accessible switching point with a disconnection function

Three-phase monitoring relays CM-PBE, CM-PVE, CM-PFE and CM-PFS
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type		**CM-PBE** [1]	**CM-PBE**	**CM-PVE** [1]	**CM-PVE**	**CM-PFE**	**CM-PFS**
Supply circuit = measuring circuit		**L1-L2-L3-N**	**L1-L2-L3**	**L1-L2-L3-N**	**L1-L2-L3**	**L1-L2-L3**	
Rated control supply voltage U_S = measuring voltage		3x380-440 V AC, 220-240 V AC	3x380-440 V AC	3x320-460 V AC, 185-265 V AC	3x320-460 V AC	3x208-440 V AC	3x200-500 V AC
Power consumption						approx. 15 VA	
Rated control supply voltage U_S tolerance		-15...+15 %		-15...+10 %		-10...+10 %	-15...+10 %
Rated frequency		50/60 Hz		50/60 Hz (-10...+10 %)			50/60 Hz
Duty time		100 %					
Measuring circuit		**L1-L2-L3-N**	**L1-L2-L3**	**L1-L2-L3-N**	**L1-L2-L3**	**L1-L2-L3**	
Monitoring functions	phase failure	■	■	■	■	■	■
	phase sequence	-	-	-	-	■	■
	over- / undervoltage	-	-	■	■	-	-
	neutral	■	-	■	-	-	-
Measuring ranges		3x380-440 V AC, 220-240 V AC	3x380-440 V AC	3x320-460 V AC, 185-265 V AC	3x320-460 V AC	3x208-440 V AC	3x200-500 V AC
Thresholds	U_{min}	0.6 x U_N		fixed 185 V / 320 V	fixed 320 V	0.6 x U_N	
	U_{max}			fixed 265 V / 460 V	fixed 460 V		
Hysteresis related to the threshold value		fixed 5 % (release value = 0.65 x U_N)		fixed 5 %			
Measuring voltage frequency		50/60 Hz (-10 %...+10 %)				50/60 Hz	
Response time		40 ms		80 ms		500 ms	
Accuracy within the rated control supply voltage tolerance						ΔU ≤ 0.5 %	
Accuracy within the temperature range				ΔU ≤ 0.06 % / °C			
Timing circuit							
Start-up delay t_S		fixed 500 ms (±20 %)				fixed 500 ms	
Tripping t_V		fixed 150 ms (±20 %)		at over-/undervoltage fixed 500 ms (±20 %)		fixed 500 ms	-
Indication of operational states							
Relay status	R: yellow LED	⌐¬ Output relay energized					
Output circuits		**13-14**				**11-12/14**	**11(15)-12(16)/14(18), 21(25)-22(26)/24(28)**
Kind of output		1 n/o contact				1 c/o contact	2 c/o contacts
Operating principle [2]		closed-circuit principle					
Contact material		AgCdO					AgNi
Rated operational voltage U_e	IEC/EN 60947-1	250 V					
Minimum switching voltage / Minimum switching current		- / -					
Maximum switching voltage		250 V AC, 250 V DC					
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	4 A					
	AC15 (inductive) 230 V	3 A					
	DC12 (resistive) 24 V	4 A					
	DC13 (inductive) 24 V	2 A					
Mechanical lifetime		30 x 10^6 switching cycles					
Electrical lifetime (AC12, 230 V, 4 A)		0.1 x 10^6 switching cycles					
Max. fuse rating to achieve short circuit protection	n/c contact	10 A fast-acting					4 A fast-acting
	n/o contact	10 A fast-acting					6 A fast-acting
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300					
	max. rated operational voltage	300 V AC					
	max. continuous thermal current at B 300	5 A					
	max. making/breaking apparent power at B 300	3600/360 VA					
General data							
Dimensions (W x H x D)		22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)					22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)
Mounting position		any					
Degree of protection	enclosure / terminals	IP50 / IP20					
Mounting		DIN rail (IEC/EN 60715)					

2CDC110004C0207

Three-phase monitoring relays
CM-PBE, CM-PVE, CM-PFE and CM-PFS
Technical data

Type	CM-PBE [1]	CM-PBE	CM-PVE [1]	CM-PVE	CM-PFE	CM-PFS
Electrical connection						
Wire size fine-strand with wire end ferrule	2 x 0.75-1.5 mm² (2 x 18-16 AWG)					2 x 0.75-2.5 mm² (2 x 18-14 AWG)
fine-strand without wire end ferrule	2 x 1-1.5 mm² (2 x 18-16 AWG)					2 x 0.75-2.5 mm² (2 x 18-14 AWG)
rigid	2 x 0.75-1.5 mm² (2 x 18-16 AWG)					2 x 0.5-4mm² (2 x 20-12 AWG)
Stripping length	10 mm (0.39 in)					7 mm (0.28 in)
Tightening torque	0.6-0.8 Nm					
Environmental data						
Ambient temperature range operation / storage	-20..+60 °C / -40...+85 °C					
Environmental testing (IEC 68-2-30)	24 h cycle time, 55 °C, 93 % rel., 96 h					
Operational reliability (IEC 68-2-6)	6 g					4 g
Mechanical resistance (IEC 68-2-6)	10 g					6 g
Isolation data						
Rated insulation volt. between supply, measuring and output circuits (VDE 0110, IEC 60947-1)	400 V				500 V	
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC 664)	4 kV / 1.2 - 50 µs					
Test voltage between all isolated circuits	2.5 kV, 50 Hz, 1 min.					
Pollution category (VDE 0110, IEC/EN 60664, IEC 255-5)	3					
Overvoltage category (VDE 0110, IEC/EN 60664, IEC 255-5)	III					
Standards						
Product standard	IEC 255-6, EN 60255-6					
Low Voltage Directive	2006/95/EC					
EMC Directive	2004/108/EC					
Electromagnetic compatibility						
Interference immunity to	EN 61000-6-2					
electrostatic discharge IEC/EN 61000-4-2	Level 3 - 6 kV/ 8 kV					
radiated, radio-frequency, electromagnetic field IEC/EN 61000-4-3	Level 3 - 10 V/m					
electrical fast transient / burst IEC/EN 61000-4-4	Level 3 - 2 kV / 5 kHz					
surge IEC/EN 61000-4-5	Level 4 - 2 kVL-L					
conducted disturbances, induced by radio-frequency fields IEC/EN 61000-4-6	Level 3 - 10 V					
Interference emission	EN 61000-6-4					

[1] Device with neutral monitoring: The external conductor voltage towards the neutral conductor is measured.
[2] Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

• **Approvals** **2**/6

Three-phase monitoring relays CM-PSS.xx, CM-PVS.xx and CM-PAS.xx
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			CM-PSS.31	CM-PSS.41	CM-PVS.31	CM-PVS.41	CM-PAS.31	CM-PAS.41
Input circuit = Measuring circuit			**L1, L2, L3**					
Rated control supply voltage U_S = measuring voltage			3x380 V AC	3x400 V AC	3x160-300 V AC	3x300-500 V AC	3x160-300 V AC	3x300-500 V AC
Rated control supply voltage U_S tolerance			-15...+10 %					
Rated frequency			50/60 Hz					
Frequency range			45-65 Hz					
Typical current / power consumption			25 mA / 18 VA (380 V AC)	25 mA / 18 VA (400 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)
Measuring circuit			**L1, L2, L3**					
Monitoring functions		Phase failure	■	■	■	■	■	■
		Phase sequence	can be switched off				■	■
		Automatic phase sequence correction	-	-	-	-	-	-
		Over- / undervoltage	■	■	■	■	-	-
		Phase unbalance	-	-	-	-	■	■
		Neutral	-	-	-	-	-	-
Measuring range		Overvoltage	3x418 V AC	3x440 V AC	3x220-300 V AC	3x420-500 V AC	-	-
		Undervoltage	3x342 V AC	3x360 V AC	3x160-230 V AC	3x300-380 V AC	-	-
		Phase unbalance	-	-	-	-	2-25 % of average of phase voltages	
Thresholds		Overvoltage	fixed		adjust. within meas. range		-	-
		Undervoltage	fixed		adjust. within meas. range		-	-
		Phase unbalance (switch-off value)	-	-	-	-	adjust. within meas. range	
Hysteresis related to the threshold value		Over- / undervoltage	fixed 5 %				-	
		Phase unbalance	-	-	-	-	fixed 20 %	
Rated frequency of the measuring signal			50/60 Hz					
Frequency range of the measuring signal			45-65 Hz					
Maximum measuring cycle time			100 ms					
Accuracy within the rated control supply voltage tolerance			$\Delta U \leq 0.5$ %					
Accuracy within the temperature range			$\Delta U \leq 0.06$ % / °C					
Measuring method			True RMS					
Timing circuit								
Start-up delay t_S			fixed 200 ms					
Tripping delay t_V			ON- or OFF-delay 0; 0.1-30 s adjustable				ON- delay 0; 0.1-30 s adjustable	
Accuracy within the rated control supply voltage tolerance			$\Delta t \leq 0.5$ %					
Accuracy within the temperature range			$\Delta t \leq 0.06$ % / °C					
Indication of operational states			Details see function description / -diagrams					
Output circuits			**15-16/18, 25-26/28**					
Kind of output			2x1 c/o contacts (Relays)					
Operating principle [1]			closed-circuit principle					
Contact material			AgNi alloy, Cd free					
Rated operational voltage U_e	IEC/EN 60947-1		250 V					
Minimum switching power			24 V / 10 mA					
Maximum switching voltage			see load limit curve					
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) 230 V		4 A					
	AC15 (inductive) 230 V		3 A					
	DC12 (resistive) 24 V		4 A					
	DC13 (inductive) 24 V		2 A					
AC rating (UL 508)		Utilization category (Control Circuit Rating Code)	B 300					
		max. rated operational voltage	300 V AC					
		max. continuous thermal current at B 300	5 A					
		max. making/breaking apparent power at B 300	3600/360 VA					

Three-phase monitoring relays CM-PSS.xx, CM-PVS.xx and CM-PAS.xx
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			CM-PSS.31	CM-PSS.41	CM-PVS.31	CM-PVS.41	CM-PAS.31	CM-PAS.41
Mechanical lifetime			30 x 10^6 switching cycles					
Electrical lifetime (AC12, 230 V, 4 A)			0,1 x 10^6 switching cycles					
Max. fuse rating to achieve short circuit protection		n/c contact	6 A fast-acting					
		n/o contact	10 A fast-acting					
General data								
Duty time			100 %					
Dimensions (W x H x D)			22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)					
Weight			0.13 kg (0.29 lb)					
Mounting			DIN rail (IEC/EN 60715), snap-on mounting without any tool					
Mounting position			any					
Minimum distance to other units		horizontal / vertical	none / none					
Degree of protection		enclosure / terminals	IP50 / IP20					
Electrical connection								
Wire size	fine-strand with(out) wire end ferrule		2 x 0.75-2.5 mm² (2 x 18-14 AWG)					
		rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)					
Stripping length			7 mm (0.28 in)					
Tightening torque			0.6-0.8 Nm					
Environmental data								
Ambient temperature ranges		operation / storage	-25...+60 °C / -40...+85 °C					
Damp heat (IEC 60068-2-30)			55 °C, 6 cycles					
Climatic category			3K3					
Vibration (sinusoidal) (IEC/EN 60255-21-1)			Class 2					
Shock (IEC/EN 60255-21-2)			Class 2					
Isolation data								
Rated insulation voltage U_i	input circuit / output circuit		600 V					
	output circuit 1 / output circuit 2		300 V					
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)		input circuit	6 kV; 1.2/50 µs					
		output circuit	4 kV; 1.2/50 µs					
Test voltage between all isolated circuits (type test)			2.5 kV, 50 Hz, 1 s					
Basis isolation	input circuit / output circuit		600 V					
Protective separation (VDE 0106 part 101 and 101/A, IEC/EN 61140)		input circuit / output circuit	-					
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)			3					
Overvoltage category (VDE 0110, IEC 60664, UL 508)			III					
Standards								
Product standard			IEC/EN 60255-6, EN 50178					
Low Voltage Directive			2006/95/EG					
EMC directive			2004/108/EG					
RoHS directive			2002/95/EG					
Electromagnetic compatibility								
Interference immunity to			EN 61000-6-1, EN 61000-6-2					
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)					
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)					
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)					
surge		IEC/EN 61000-4-5	Level 4 (2 kV L-L)					
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)					
harmonics and interharmonics		IEC/EN 61000-4-13	Class 3					
Interference emission			EN 61000-6-3, EN 61000-6-4					
high-frequency radiated		IEC/CISPR 22, EN 50022	Class B					
high-frequency conducted		IEC/CISPR 22, EN 50022	Class B					

[1] Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

• **Approvals** **2**/6

Three-phase monitoring relays
CM-MPS.x1
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41
Input circuit = Measuring circuit			**L1, L2, L3, N**		**L1, L2, L3**	
Rated control supply voltage U_S = measuring voltage			3x90-170 V AC	3x180-280 V AC	3x160-300 V AC	3x300-500 V AC
Rated control supply voltage U_S tolerance			-15...+10 %			
Rated frequency			50/60 Hz			
Frequency range			45-65 Hz			
Typical current / power consumption			25 mA / 10 VA (115 V AC)	25 mA / 18 VA (230 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)
Measuring circuit			**L1, L2, L3, N**		**L1, L2, L3**	
Monitoring functions		Phase failure	■	■	■	■
		Phase sequence	can be switched off			
		Automatic phase sequence correction	-	-	-	-
		Over- / undervoltage	■	■	■	■
		Phase unbalance	■	■	■	■
		Interrupted neutral	■	■	-	-
Measuring range		Overvoltage	3x120-170 V AC	3x240-280 V AC	3x220-300 V AC	3x420-500 V AC
		Undervoltage	3x90-130 V AC	3x180-220 V AC	3x160-230 V AC	3x300-380 V AC
		Phase unbalance	2-25 % of average of phase voltages			
Thresholds		Overvoltage	adjustable within measuring range			
		Undervoltage	adjustable within measuring range			
		Phase unbalance (switch-off value)	adjustable within measuring range			
Hysteresis related to the threshold value		Over- / undervoltage	fixed 5 %			
		Phase unbalance	fixed 20 %			
Rated frequency of the measuring signal			50/60 Hz			
Frequency range of the measuring signal			45-65 Hz			
Maximum measuring cycle time			100 ms			
Accuracy within the rated control supply voltage tolerance			$\Delta U \leq 0.5$ %			
Accuracy within the temperature range			$\Delta U \leq 0.06$ % / °C			
Measuring method			True RMS			
Timing circuit						
Start-up delay t_S			fixed 200 ms			
Tripping delay t_V			ON- or OFF-delay 0; 0.1-30 s adjustable			
Accuracy within the rated control supply voltage tolerance			$\Delta t \leq 0.5$ %			
Accuracy within the temperature range			$\Delta t \leq 0.06$ % / °C			
Indication of operational states			Details see function description / -diagrams			
Output circuits			**15-16/18, 25-26/28**			
Kind of output			1x2 c/o contacts (Relays)			
Operating principle [1]			closed-circuit principle			
Contact material			AgNi alloy, Cd free			
Rated operational voltage U_e	IEC/EN 60947-1		250 V			
Minimum switching power			24 V / 10 mA			
Maximum switching voltage			see load limit curve			
Rated operational current I_e (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	4 A			
		AC15 (inductive) 230 V	3 A			
		DC12 (resistive) 24 V	4 A			
		DC13 (inductive) 24 V	2 A			
AC rating (UL 508)		Utilization category (Control Circuit Rating Code)	B 300			
		max. rated operational voltage	300 V AC			
		max. continuous thermal current at B 300	5 A			
		max. making/breaking apparent power at B 300	3600/360 VA			

Three-phase monitoring relays
CM-MPS.x1
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type		CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41
Mechanical lifetime		30 x 10^6 switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)		0,1 x 10^6 switching cycles			
Max. fuse rating to achieve short circuit protection	n/c contact	6 A fast-acting			
	n/o contact	10 A fast-acting			
General data					
Duty time		100 %			
Repeat accuracy (constant paramaters)		< ±0.2 %			
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)			
Weight		0.14 kg (0.31 lb)		0.13 kg (0.29 lb)	
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position		any			
Minimum distance to other units	horizontal / vertical	none / none			
Degree of protection	enclosure / terminals	IP50 / IP20			
Electrical connection					
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)			
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)			
Stripping length		7 mm (0.28 in)			
Tightening torque		0.6-0.8 Nm			
Environmental data					
Ambient temperature ranges	operation / storage	-25...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)		55 °C, 6 cycles			
Climatic category		3K3			
Vibration (sinusoidal) (IEC/EN 60255-21-1)		Class 2			
Shock (IEC/EN 60255-21-2)		Class 2			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	600 V			
	output circuit 1 / output circuit 2	300 V			
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)	input circuit	6 kV; 1.2/50 µs			
	output circuit	4 kV; 1.2/50 µs			
Test voltage between all isolated circuits (type test)		2.5 kV, 50 Hz, 1 s			
Basis isolation	input circuit / output circuit	600 V			
Protective separation (VDE 0106 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit	yes		-	
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)		3			
Overvoltage category (VDE 0110, IEC 60664, UL 508)		III			
Standards					
Product standard		IEC/EN 60255-6, EN 50178			
Low Voltage Directive		2006/95/EG			
EMC directive		2004/108/EG			
RoHS directive		2002/95/EG			
Electromagnetic compatibility					
Interference immunity to		EN 61000-6-1, EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)			
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)			
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)			
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-N)		Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)			
harmonics and interharmonics	IEC/EN 61000-4-13	Class 3			
Interference emission		EN 61000-6-3, EN 61000-6-4			
high-frequency radiated	IEC/CISPR 22, EN 50022	Class B			
high-frequency conducted	IEC/CISPR 22, EN 50022	Class B			

[1] Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

• **Approvals** **2**/6

Three-phase monitoring relays CM-MPS.x3 and CM-MPN.x2
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			CM-MPS.23	CM-MPS.43	CM-MPN.52	CM-MPN.62	CM-MPN.72
Input circuit = Measuring circuit			**L1, L2, L3, N**	**L1, L2, L3**			
Rated control supply voltage U_S = measuring voltage			3x180-280 V AC	3x300-500 V AC	3x350-580 V AC	3x450-720 V AC	3x530-820 V AC
Rated control supply voltage U_S tolerance			-15...+10 %				
Rated frequency			50/60/400 Hz		50/60 Hz		
Frequency range			45-440 Hz		45-65 Hz		
Typical current / power consumption			5 mA / 4 VA (230 V AC)	5 mA / 4 VA (400 V AC)	29 mA / 41 VA (480 V AC)	29 mA / 52 VA (600 V AC)	29 mA / 59 VA (690 V AC)
Measuring circuit			**L1, L2, L3, N**	**L1, L2, L3**			
Monitoring functions		Phase failure	■	■	■	■	■
		Phase sequence	can be switched off				
		Automatic phase sequence correction	configurable				
		Over- / undervoltage	■	■	■	■	■
		Phase unbalance	■	■	■	■	■
		Interrupted neutral	■	-	-	-	-
Measuring range		Overvoltage	3x240-280 V AC	3x420-500 V AC	3x480-580 V AC	3x600-720 V AC	3x690-820 V AC
		Undervoltage	3x180-220 V AC	3x300-380 V AC	3x350-460 V AC	3x450-570 V AC	3x530-660 V AC
		Phase unbalance	2-25 % of average of phase voltages				
Thresholds		Overvoltage	adjustable within measuring range				
		Undervoltage	adjustable within measuring range				
		Phase unbalance (switch-off value)	adjustable within measuring range				
Hysteresis related to the threshold value		Over- / undervoltage	fixed 5 %				
		Phase unbalance	fixed 20 %				
Rated frequency of the measuring signal			50/60/400 Hz		50/60 Hz		
Frequency range of the measuring signal			45-440 Hz		45-65 Hz		
Maximum measuring cycle time			100 ms				
Accuracy within the rated control supply voltage tolerance			$\Delta U \leq 0.5$ %				
Accuracy within the temperature range			$\Delta U \leq 0.06$ % / °C				
Measuring method			True RMS				
Timing circuit							
Start-up delay t_S and t_{S2}			fixed 200 ms				
Start-up delay t_{S1}			fixed 250 ms				
Tripping delay t_V			ON- or OFF-delay 0; 0.1-30 s adjustable			ON-delay 0; 0.1-30 s adjustable	
Accuracy within the rated control supply voltage tolerance			$\Delta t \leq 0.5$ %				
Accuracy within the temperature range			$\Delta t \leq 0.06$ % / °C				
Indication of operational states			Details see function description / -diagrams				
Output circuits			**15-16/18, 25-26/28**				
Kind of output			2x1 or 1x2 c/o contacts configurable (Relays)				
Operating principle [1]			closed-circuit principle				
Contact material			AgNi alloy, Cd free				
Rated operational voltage U_e		IEC/EN 60947-1	250 V				
Minimum switching power			24 V / 10 mA				
Maximum switching voltage			see load limit curve				
Rated operational current I_e (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	4 A				
		AC15 (inductive) 230 V	3 A				
		DC12 (resistive) 24 V	4 A				
		DC13 (inductive) 24 V	2 A				
AC rating (UL 508)		Utilization category (Control Circuit Rating Code)	B 300				
		max. rated operational voltage	300 V AC				
		max. continuous thermal current at B 300	5 A				
		max. making/breaking apparent power at B 300	3600/360 VA				

Three-phase monitoring relays CM-MPS.x3 and CM-MPN.x2
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type		CM-MPS.23	CM-MPS.43	CM-MPN.52	CM-MPN.62	CM-MPN.72
Mechanical lifetime		30 x 10^6 switching cycles				
Electrical lifetime (AC12, 230 V, 4 A)		0,1 x 10^6 switching cycles				
Max. fuse rating to achieve short circuit protection	n/c contact	6 A fast-acting		10 A fast-acting		
	n/o contact	10 A fast-acting				
General data						
Duty time		100 %				
Repeat accuracy (constant paramaters)		< ±0.2 %				
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)		45 x 78 x 100 mm (1.78 x 3.07 x 3.94 in)		
Weight		0.14 kg (0.31 lb)	0.13 kg (0.29 lb)	0.22 kg (0.49 lb)		
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool				
Mounting position		any				
Minimum distance to other units	horizontal / vertical	none / none				
Degree of protection	enclosure / terminals	IP50 / IP20				
Electrical connection						
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)				
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)				
Stripping length		7 mm (0.28 in)				
Tightening torque		0.6-0.8 Nm				
Environmental data						
Ambient temperature ranges	operation / storage	-25...+60 °C / -40...+85 °C				
Damp heat (IEC 60068-2-30)		55 °C, 6 cycles				
Climatic category		3K3				
Vibration (sinusoidal) (IEC/EN 60255-21-1)		Class 2				
Shock (IEC/EN 60255-21-2)		Class 2				
Isolation data						
Rated insulation voltage U_i	input circuit / output circuit	600 V		1000 V		
	output circuit 1 / output circuit 2	300 V				
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)	input circuit	6 kV; 1.2/50 µs		8 kV; 1.2/50 µs		
	output circuit	4 kV; 1.2/50 µs				
Test voltage (type test) between	isolated output circuits	2.5 kV, 50 Hz, 1 s				
	input circuit and isolated output circuits	2.5 kV, 50 Hz, 1 s		4 kV, 50 Hz, 1 s		
Basis isolation	input circuit / output circuit	600 V		1000 V		
Protective separation (VDE 0106 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit	-				
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)		3				
Overvoltage category (VDE 0110, IEC 60664, UL 508)		III				
Standards						
Product standard		IEC/EN 60255-6, EN 50178				
Low Voltage Directive		2006/95/EG				
EMC directive		2004/108/EG				
RoHS directive		2002/95/EG				
Electromagnetic compatibility						
Interference immunity to		EN 61000-6-1, EN 61000-6-2				
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)				
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)				
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)				
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-N)	Level 4 (2 kV L-L)			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)				
harmonics and interharmonics	IEC/EN 61000-4-13	Class 3				
Interference emission		EN 61000-6-3, EN 61000-6-4				
high-frequency radiated	IEC/CISPR 22, EN 50022	Class B				
high-frequency conducted	IEC/CISPR 22, EN 50022	Class B				

[1] Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

• **Approvals** **2**/6

NEW

Grid feeding monitoring relays CM-UFS.x
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			**CM-UFS.1**		**CM-UFS.2**	
Input circuit - Measuring circuit			**L1, L2, L3**	**L-N**	**L1, L2, L3**	**L-N**
Rated control supply voltage U_S = measuring voltage			3 x 400 V AC	3 x 230 V AC	3 x 400 V AC	3 x 230 V AC
Rated control supply voltage tolerance U_S			-20...+20 %			
Control supply voltage range			3 x 300-500 V AC	3 x 180-280 V AC	3 x 300-500 V AC	3 x 180-280 V AC
Rated frequency			50 Hz			
Frequency range			45-55 Hz			
Typical current / power consumption			23 mA / 16 VA			
Power failure buffering time			min. 20 ms			
Input circuit - measuring circuit			**L1, L2, L3**	**L-N**	**L1, L2, L3**	**L-N**
Monitoring functions		Phase failure	■			
		Over-/ undervoltage	■			
		Over-/ underfrequency	■			
		10 minutes average value	■		–	
Measuring range		Voltage range	3 x 320-460 V AC	3 x 184-264,5 V AC	3 x 320-480 V AC	3 x 184-276 V AC
		Frequency range	45-55 Hz			
Thresholds		Overvoltage	fix, 115 % of U_s		fix, 120 % of U_s	
		Undervoltage	fix, 80 % of U_s		fix, 80 % of U_s	
		Overfrequency	fix, 50,2 Hz		50,3 or 51 Hz, configurable	
		Underfrequency	fix, 47,5 Hz		49,7 or 49 Hz, configurable	
		10 minutes average value	adjustable, 110-115 % of U_s		–	
Hysteresis related to the threshold value		Over-/ undervoltage	fix 5 %			
		Over-/ underfrequency	fix 20 mHz			
Rated frequency of the measuring signal			50 Hz			
Frequency range of the measuring signal			45-55 Hz			
Maximum measuring cycle time			50 ms			
Maximum reaction time (time between fault detection and change of switching status of the relay)		Over-/ undervoltage	< 120 ms			
		Over-/ underfrequency	< 100 ms			
		10 minutes average value	without delay		–	
Accuracy within the rated control supply voltage tolerance			ΔU ≤ 0,5 %			
Accuracy within the temperature range			ΔU ≤ 0,06 % / °C			
Measuring method			True RMS			
Timing circuit						
Start-up delay t_{S1} prior to grid connection after a short interruption			fix, 30 s		fix, 1 s	
Restart delay t_{S2}			fix, 30 s		adjustable, 0 s; 0,1 – 30 s	
Accuracy within the rated control supply voltage tolerance			Δt ≤ 0,5 %			
Accuracy within the temperature range			Δt ≤ 0,06 % / °C			
Indication of operational states			1 yellow LED, 2 red LEDs Details see operation mode and function description/diagrams			
Output circuits			**15-16/18, 25-26/28**			
Kind of output			Relais, 1 x 2 changeover			
Operation principle [1]			closed-circuit principle			
Contact material			AgNi alloy, Cd free			
Rated operational voltage U_e (IEC/EN 60947-1)			250 V			
Minimum switching voltage / switching current			24 V / 10 mA			
Maximum switching voltage / switching current			see load limit curve			
Rated operational current I_e (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	4 A			
		AC15 (inductive) 230 V	3 A			
		DC12 (resistive) 24 V	4 A			
		DC13 (inductive) 24 V	2 A			
Mechanical lifetime			30 x 10^6 switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)			0,1 x 10^6 switching cycles			
Max. fuse rating to achieve short circuit protection		n/c contact	6 A fast-acting			
		n/o contact	10 A fast-acting			

[1] Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

NEW

Grid feeding monitoring relays CM-UFS.x
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Type			CM-UFS.1	CM-UFS.2
General data				
Duty time			100 %	
Repeat accuracy (constant parameters)			< ± 0,5 %	
Dimensions (W x H x D)			22,5 x 78 x 100 mm (0,89 x 3,07 x 3,94 in)	
Weight			0,14 kg (0,31 lb)	
Mounting			DIN-Rail (EN 60715), snap-on mounting without any tool	
Mounting position			any	
Minimum distance to other units			not necessary	
Degree of protection		enclosure / terminals	IP50 / IP20	
Electrical connection				
Wire size	fine-strand with/without wire end ferrule		2 x 0,75 – 2,5 mm² (2 x 18-14 AWG)	
	rigid		2 x 0,5 – 4 mm² (2 x 20-12 AWG)	
Stripping length			7 mm (0,28 in)	
Tightening torque			0,6 – 0,8 Nm (5,31 – 7,08 in.lb)	
Environmental data				
Ambient temperature range		operation / storage	-25...+60 °C / -40...+85 °C	
Damp heat, cyclic (IEC/EN 60068-2-30)			2 x 12 h cycle, 55 °C, 95 % RH	
Climatic category (IEC/EN 60721-3-1)			3K3	
Vibration (sinusoidal) (IEC/EN 60255-21-1)			Class 2	
Shock (IEC/EN 60255-21-2)			Class 2	
Isolation data				
Rated impulse withstand voltage U_i	input circuit / output circuit		600 V	
	output circuit 1 / output circuit 2		300 V	
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)		input circuit	6 kV; 1,2/50 µs	
		output circuit	4 kV; 1,2/50 µs	
Test voltage between all isolated circuits (type test)			2,5 kV, 50 Hz, 1 s	
Basis isolation		input circuit / output circuit	600 V	
Protective separation (VDE 0160 Part 101 and 101/A, IEC/EN 61140)		input circuit / output circuit	yes	
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)			3	
Overvoltage category (VDE 0110, IEC 60664, UL 508)			III	
Standards				
Product standard			IEC/EN 60255-6, DIN V VDE V 0126-1-1: February 2006	Type-tested in accordance with the "Guideline for Connections to ENEL distribution network" December 2008, Ed. I
Further standards			EN 50178, EN 61727	
Low Voltage Directive			2006/95/EG	
EMV-Directive			2004/108/EG	
RoHS-Directive			2002/95/EG	
Electromagnetic compatibility				
Interference immunity to			IEC/EN 61000-6-1, IEC/EN 61000-6-2	
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)	
surge		IEC/EN 61000-4-5	Level 4 (2 kV L-L, L-N)	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)	
harmonics and interharmonics		IEC/EN 61000-4-13	Class 3	
Interference emission			IEC/EN 61000-6-3, IEC/EN 61000-6-4	
high-frequency radiated		IEC/CISPR 22, EN 50022	Class B	
high-frequency conducted		IEC/CISPR 22, EN 50022	Class B	

[1] Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

• **Approvals** 2/6

Insulation monitors for unearthed supply systems

NEW

Content

NEW

Insulation monitors for unearthed supply systems

Overview

ABB developed a totally new range of insulation monitoring relays. With this new generation of measuring and monitoring relays of the CM range ABB consolidates its strengths in innovative control products.

The new products are in accordance to IEC/EN 61557-1 and to IEC/EN 61557-8.

That means the monitoring relays can be used directly to measure the insulation resistance in unearthed AC and DC mains with a voltage up to 690 V AC and 1000 V DC!

Furthermore the products feature a new prognostic measuring principle which decreases the measuring and response time significantly.

Standardisation background:

- EC/EN 61557-1 "Electrical safety in low voltage distribution system up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements"
- IEC/EN 61557-8 "Electrical safety in low voltage distribution system up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 1: Insulation monitoring devices for IT systems"

Insulation monitors for unearthed pure AC systems:

Characteristics

- For monitoring the insulation resistance of unearthed IT system: up to U_n = 400 V AC
- According to IEC/EN 61227-8 "Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring o der monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems"
- Rated control supply voltage 24–240 V AC/DC
- Superimposed DC signal
- One measuring range 1–100 kΩ
- Precise adjustment of the threshold value in 1 kΩ steps
- Interrupted wire detection
- Fault storage/latching configurable by control input
- 1 c/o contact, closed-circuit principle
- 22.5 mm [0.89 in] width
- 3 LEDs for status indication

Insulation monitors for unearthed AC, DC or mixed AC/DC systems:

Characteristics

- For monitoring the insulation resistance of unearthed IT systems up to U_n= 250 V AC and 300 V DC or U_n= 400 V AC and 600 V DC
- According to IEC/EN 61227-8 "Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring oder monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems"
- Rated control supply voltage 24-240 V AC/DC
- Prognostic measuring principle with superimposed square wave signal
- 1 or 2 measuring ranges (1-100kΩ or 1-100 kΩ + 2-200 kOhm)[1)]
- 1 or 2 (configurable) c/o contact[1)]
- Precise adjustmemt of the measuring value in 1 or 2 kΩ steps[1)]
- (non-volatile) fault storage, configurable latching, interrupted wire protection, open- or closed-circuit principle selectable[1)]
- 22.5 or 45 mm width
- 3 LEDs for status indication

[1)] depending on device

In electricity supply systems, an earthing system defines the electrical potential of the conductors relative to that of the earth's conductive surface. The choice of earthing system has implications for the safety and electromagnetic compatibility of the power supply. Note that regulations for earthing (grounding) systems vary considerably among different countries.

The international standard IEC 60364 distinguishes three families of earthing arrangements, using the two-letter codes TN, TT and IT.

The first letter indicates the connection between earth and the power-supply equipment (generator or transformer):
T: direct connection of a point with earth (Latin: terra)
I: no point is connected with earth (insulation), except perhaps via a high impendance

The second letter indicates the connection between earth and the electrical device being supplied:
T: direct connection of a point with earth
N: direct connection to neutral at the origin of installation, which is connected to the earth

IT supply systems

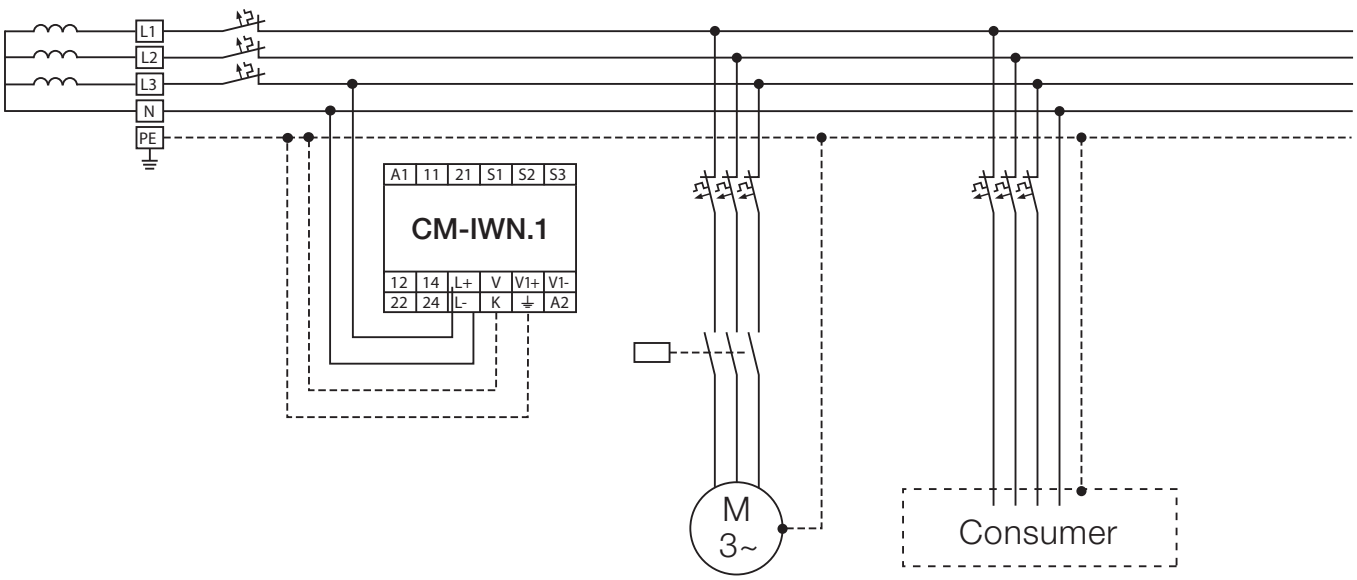
The IT system is supplied either by an isolation transformer or a voltage source, such as battery or a generator.

In this system no active conductor is directly connected to earth potential. The advantage of this is that only a small fault current can flow in case of an insulation fault. This current is essentially caused by the system's leakage capacitance.

The systems's fuse or MCB does not respond, thus maintaining the voltage supply and therefore operation even in case of a phase-to-earth fault.

The high reliability of an IT system is guaranteed thanks to continous insulation monitoring.

The insulation monitoring device recognizes insulation faults as they develop, and immediately reports that the value has fallen below the minimum. This prevents operational interruptions caused by a second more severe insulation fault.



NEW

Insulation monitors for unearthed supply systems
Selection and Conversion table




Typical applications

Benefits of ABB's new range of insulation monitoring relays:

- Extended measuring voltage range AC and DC
- All devices with wide supply voltage range
- Reduced number of references

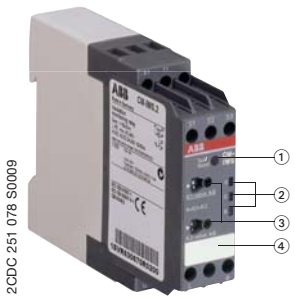
	CM-IWS.2	CM-IWS.1	CM-IWN.1	CM-IVN
Measuring resistance range				
1 – 100 kΩ	■	■	■	
2 – 200 kΩ			■	
Measuring voltage range				
0 – 460 V AC	■		■	
0 – 287,5 V AC		■		
0 – 793,5 V AC			▬	
0 – 345 V AC		■		
0 – 690 V AC			■	
0 – 1150 V AC			▬	
Measuring frequency range				
45 – 65 Hz	■	■		
13,5 – 440 Hz			■	■
System leakage capacitance max				
10 µF	■	■		
20 µF			■	■
Rated supply voltage				
24 – 240 V AC/DC	■	■	■	

Conversion		Measuring voltage				
1SAR470020R0004	C558.01	90 – 132 V AC		■		
1SAR470020R0005	C558.01	230 V AC		■		
1SAR471020R0004	C558.02	90 – 132 V AC			■	
1SAR471020R0005	C558.02	systems > 400 V AC / 600 V AC			▬	
1SAR471020R0005	C558.02	230 V AC			■	
1SAR471020R0006	C558.02	systems > 400 V AC / 600 V AC			▬	
1SAR472020R0004	C558.03	90 – 132 V AC			■	
1SAR472020R0004	C558.03	systems > 400 V AC / 600 V AC			▬	
1SAR472020R0005	C558.03	230 V AC			■	
1SAR472020R0005	C558.03	systems > 400 V AC / 600 V AC			▬	
1SAR477000R0100	C558.10	external kΩ meter		no replacement		
1SVR450065R0000	CM-IWN-DC	24 – 240 V AC/DC		■		
1SVR450071R0000	CM-IWN-AC	110 – 130 / 220 – 240 AC/DC	■			
1SVR450075R0000	CM-IWN-AC	24 – 240 V AC/DC	■			

NEW

Insulation monitors for unearthed supply systems

Insulation monitoring relay CM-IWS.2
For unearthed AC systems up to U_n = 400 V AC



① Test and reset button
② Status indication
U: green LED - control supply voltage
F: red LED - fault message
R: yellow LED - relay status
③ Configuration and setting
Front-face rotary switches for threshold value adjustment:
R.1 for R1 tens figures: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 kΩ in ten kΩ steps
R.2 for R1 units figures: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 kΩ in one kΩ steps
④ Marker label

- For monitoring the insulation resistance of unearthed IT systems up to U_n = 400 V AC
- According to IEC/EN 61557-8 "Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems"
- Rated control supply voltage 24-240 V AC/DC
- Measuring principle with suerimposed DC voltage
- One measuring range 1-100 kΩ
- Precise adjustment of the threshold value in 1 kΩ steps
- Fault storage / latching configurable by control input
- 1 c/o contact, closed-circuit principle
- 22.5 mm [0.89 in] width
- 3 LEDs for status indication

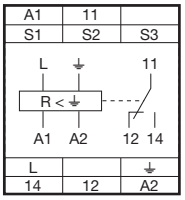
Application / monitoring function

The CM-IWS.2 serves to monitor insulation resistance in accordance with IEC 61557-8 in unearthed IT AC systems. The insulation resistance between system lines and system earth is measured.
If this falls below the adjustable threshold values, the output relay de-energizes. The device can monitor control circuits (single-phase) and main circuits (3-phase). Supply systems with voltages U_n = 0-400 V AC (45-65 Hz) can be directly connected to the measuring inputs and their insulation resistance being monitored. For systems with voltages above 400 V AC the insulation monitoring relay CM-IWN.1 with or without the coupling unit CM-IVN can be used.

Measuring principle

A superimposed DC measuring signal is used for measurement. From the superimposed DC measuring voltage and its resultant current the value of the insulation resistance of the system to be monitored is calculated.

Connection diagram



A1-A2	Control supply voltage
S1-S3	Remote test
S2-S3	Remote reset
L	Measuring circuit/input, system connection
⏚	Measuring circuit/input, earth connections
11-12/14	Output relay, closed-circuit principle

Operating state indication

LEDs, status information and fault messages

Operational state	LED U (green)	LED F (red)	LED R (yellow)
Start-up	⎍⎍	OFF	OFF
No fault	⎍	OFF	⎍
Insulation fault (below threshold value)	⎍	⎍	OFF
Invalid measuring result	⎍	⎍⎍	OFF
Internal system fault	OFF	⎍⎍⎍	OFF
Test function	⎍⎍⎍	OFF	OFF
No fault after fault storage[1]	⎍	[2]	⎍⎍⎍

[1] The device has triggered after an insulation fault. The fault has been stored and the insulation resistance has returned to a higher value than the threshold value plus hysteresis.
[2] Depending on the fault.

Operating mode

The system to be monitored is connected to terminal L. The earth potential is connected to terminal ⏚. The device operates according to the closed-circuit principle (fault state: relay de-energized). Once the control supply voltage has been applied the insulation monitoring relay runs through a system test routine. The system is diagnosed and the settings are tested. If no internal or external faults are found after this test routine is completed, the output relay energizes. If the measured value drops below the set threshold value, the output relay de-energizes. If the measured value exceeds the threshold value plus hysteresis, the output relay re-energizes. All operating states are signalled by the front-face LEDs. See table "LEDs, status information and fault messages".

Test function

The test function is only possible when there is no fault.
By pressing the front-face combined test/reset button a system test routine is executed. The output relay remains de-energized as long as the test/reset button is pressed, the control contact S1-S3 is closed or the test functions are processed. The test function can be activated either with the front-face combined test/reset button or with a remote test button connected.

Fault storage, reset function and remote reset

The output relay remains de-energized and only energizes after the combined test/reset button is pressed or after the remote reset (terminals S2-S3) is activated, and when the insulation resistance is higher than the set threshold value plus hysteresis.

Configuration and settings
Rotary switches R.1 and R.2 (treshold value)

By means of two separate 10 position rotary switches with direct reading scales, the threshold value for the insulation resistance R_F of the systems to be monitored can be adjusted.
With the R.1 rotary switch the tens figure is set and with the R.2 rotary switch the units figure is set. The set threshold value is then the addition of the two values. For example, R1.1 set to 70 and R1.2 set to 8 leads to a threshold value for R1 of 78 kΩ.

Order data

Type	Nominal voltage U_n of the distribution system to be monitored	Rated control supply voltage	Order code	Pack. unit piece	Price 1 piece
CM-IWS.2	0-400 V AC	24-240 V AC/DC	**1SVR 630 670 R0200**	1	

NEW

Insulation monitors for unearthed supply systems

CM-IWS.1 for unearthed AC, DC and mixed AC/DC systems up to U_n = 250 V AC and 300 V DC

① Test and reset button
② Status indication
U: green LED - control supply voltage
F: red LED - fault message
R: yellow LED - relay status
③ Configuration and setting
Front-face rotary switches for threshold value adjustment:
R.1 for R1 tens figures: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 kΩ in ten kΩ steps
R.2 for R1 units figures: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 kΩ in one kΩ steps
④ Marker label

- For monitoring the insulation resistance of unearthed IT systems up to U_n = 250 V AC and 300 V DC
- According to IEC/EN 61557-8 "Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems"
- Rated control supply voltage 24-240 V AC/DC
- Prognostic measuring principle with superimposed square wave signal
- One measuring range 1-100 kΩ
- Precise adjustment of the threshold value in 1 kΩ steps
- Interrupted wire detection
- Fault storage / latching configurable by control input
- 1 c/o [SPDT] contact, closed-circuit principle
- 22.5 mm [0.89 in] width
- 3 LEDs for status indication

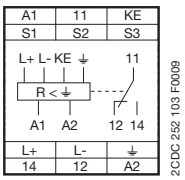
Application / monitoring function

The CM-IWS.1 serves to monitor insulation resistance in accordance with IEC 61557-8 in unearthed IT AC systems, IT AC systems with galvanically connected DC circuits, or unearthed IT DC systems. The insulation resistance between system lines and system earth is measured. If this falls below the adjustable threshold value, the output relay de-energizes. The device can monitor control circuits (single-phase) and main circuits (3-phase). Supply systems with voltages U_n = 0-250 V AC (15-400 Hz) or 0-300 V DC can be directly connected to the measuring inputs and their insulation resistance being monitored. For systems with voltages above 250 V AC and 300 V DC the insulation monitoring relay CM-IWN.1 with or without the coupling unit CM-IVN can be used.

Measuring principle

A pulsating measuring signal is fed into the system to be monitored and the insulation resistance calculated. This pulsating measuring signal alters its form depending on the insulation resistance and system leakage capacitance. From this altered form the change in the insulation resistance is forecast. When the forecast insulation resistance corresponds to the insulation resistance calculated in the next measurement cycle and is smaller than the set threshold value, the output relay de-energizes. This measuring principle is also suitable for the detection of symmetrical insulation faults.

Connection diagram



A1-A2	Control supply voltage
S1-S3	Remote test
S2-S3	Remote reset
L+, L–	Measuring circuit/input, system connection
⏚, KE	Measuring circuit/input, earth connections
11-12/14	Output relay, closed-circuit principle

Operating state indication
LEDs, status information and fault messages

Operational state	LED U (green)	LED F (red)	LED R (yellow)
Start-up	⎍⎍⎍	OFF	OFF
No fault	⎍	OFF	⎍
Insulation fault (below threshold value)	⎍	⎍	OFF
KE/⏚ wire interruption	⎍	⎍⎍⎍	OFF
System leakage capacitance too high / invalid measurement result	⎍	⎍⎍⎍	OFF
Internal system fault	OFF	⎍⎍⎍⎍	OFF
Test function	⎍⎍⎍⎍	OFF	OFF
No fault after fault storage[1]	⎍	[2]	⎍⎍⎍⎍

[1] The device has triggered after an insulation fault. The fault has been stored and the insulation resistance has returned to a higher value than the threshold value plus hysteresis.
[2] Depending on the fault.

Additional monitoring functions

The CM-IWS.1 cyclically monitors the measuring circuit connections ⏚ and KE for wire interruption. In case of a wire interruption in one of the connections, the output relay de-engergizes. In addition, the unearthed AC-, DC- or AC/DC system is monitored for inadmissible system leakage capacitance. If the system leakage capacitance is too high, the output relay de-energizes.

Configuration and settings
Rotary switches R.1 and R.2 (treshold value)

By means of two separate 10 position rotary switches with direct reading scales, the threshold value for the insulation resistance R_F of the systems to be monitored can be adjusted. With the R.1 rotary switch the tens figure is set and with the R.2 rotary switch the units figure is set. The set threshold value is then the addition of the two values. For example, R1.1 set to 70 and R1.2 set to 8 leads to a threshold value for R1 of 78 kΩ.

Operating mode

The system to be monitored is connected to terminals L+ and L-. The earth potential is connected to terminals ⏚ and KE. The device operates according to the closed-circuit principle (fault state: relay de-energized). Once the control supply voltage has been applied the insulation monitoring relay runs through a system test routine. The system is diagnosed and the settings are tested. If no internal or external faults are found after this test routine is completed, the output relay energizes. If the measured value drops below the set threshold value, the output relay de-energizes. If the measured value exceeds the threshold value plus hysteresis, the output relay re-energizes. All operating states are signalled by the front-face LEDs. See table "LEDs, status information and fault messages".

Test function

The test function is only possible when there is no fault. By pressing the front-face combined test/reset button a system test routine is executed. The output relay remains deenergized as long as the test/reset button is pressed, the control contact S1-S3 is closed or the test functions are processed. The test function can be activated either with the front-face combined test/reset button or with a remote test button connected.

Fault storage, reset function and remote reset

The output relay remains de-energized and only energizes after the combined test/reset button is pressed or after the remote reset (terminals S2-S3) is activated, and when the insulation resistance is higher than the set threshold value plus hysteresis.

Order data

Type	Nominal voltage U_n of the distribution system to be monitored	Rated control supply voltage	Order code	Pack. unit piece	Price 1 piece
CM-IWS.1	0-250 V AC / 0-300 V DC	24-240 V AC/DC	**1SVR 630 660 R0100**	1	

NEW

Insulation monitors for unearthed supply systems

CM-IWN.1 for unearthed AC, DC and mixed AC/DC systems up to U_n = 400 V AC and 600 V DC

① Configuration and setting Front-face rotary switches to adjust the threshold value:
R1.1 for R1 tens figure: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 kW in ten kW steps
R1.2 for R1 units figure: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 kW in one kW steps
R2.1 for R2 20 figure: 0, 20, 40, 60, 80, 100, 120, 140, 160, 180 kW in ten kW steps
R2.2 for R2 units figure: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 kW in two kW steps

② Test and reset button

③ Status indication
U: green LED - control supply voltage
F: red LED - fault message
R: yellow LED - relay status

④ Function selection and marker label
See "DIP switches"

- For monitoring the insulation resistance of unearthed IT systems up to U_n = 400 V AC and 600 V DC
- Rated control supply voltage 24-240 V AC/DC
- Prognostic measuring principle with superimposed square wave signal
- Two measuring ranges 1-100 kW and 2-200 kΩ
- One (1 x 2 c/o) or two (2 x 1 c/o) threshold values Ran1/R11) (final switch-off) and Ran2/R21) (prewarning) configurable
- Precise adjustment of the threshold values in 1 kΩ steps (R1) and 2 kΩ steps (R2)
- Interrupted wire detection configurable
- Non-volatile fault storage configurable
- Open- or closed-circuit principle configurable
- 3 LEDs for status indication
- 45 mm [1.77 in] width

[1] term. acc. to IEC/EN 61557-8
[2] R2 only active with 2 x 1 c/o configuration

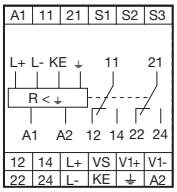
Application / monitoring function

The CM-IWN.1 serves to monitor insulation resistance in accordance with IEC 61557-8 in unearthed IT AC systems, IT AC systems with galvanically connected DC circuits, or unearthed IT DC systems. The insulation resistance between system lines and system earth is measured. If this falls below the adjustable threshold values, the output relays switch into the fault state. The device can monitor control circuits (single-phase) and main circuits (3-phase). Supply systems with voltages U_n = 0-400 V AC (15-400 Hz) or 0-600 V DC can be directly connected to the measuring inputs and their insulation resistance being monitored. For systems with voltages above 400 V AC and 600 V DC the coupling unit CM-IVN can be used for the expansion of the CM-IWN.1 voltage range.

Measuring principle

A pulsating measuring signal is fed into the system to be monitored and the insulation resistance calculated.
This pulsating measuring signal alters its form depending on the insulation resistance and system leakage capacitance. From this altered form the change in the insulation resistance is forecast. When the forecast insulation resistance corresponds to the insulation resistance calculated in the next measurement cycle and is smaller than the set threshold value, the output relays are activated or deactivated, depending on the device configuration. This measuring principle is also suitable for the detection of symmetrical insulation faults.

Connection diagram



A1-A2	Control supply voltage
S1-S3	Remote test
S2-S3	Remote reset
L+, L–	Measuring circuit/input, system connection
⏚, KE	
VS, V1+, V1-	Measuring circuit/input, earth connections
11-12/14	Connections for the coupling unit (if used)
21-22/24	Output relay 1, open- or closed-circuit principle
	Output relay 2, open- or closed-circuit principle

Operating state indication

LEDs, status information and fault messages

Operational state	LED U (green)	LED F (red)	LED R (yellow)
Start-up		OFF	OFF
No fault		OFF	
Prewarning			
Insulation fault (below threshold value)			[1]
KE/⏚ wire interruption			[1]
L+/L- wire interruption during system start-up / test function	/		[1]
System leakage capacitance too high / invalid measurement result			[1]
Internal system fault	[1]		[1]
Setting fault[2]			
Test function		OFF	[1]
No fault after fault storage[3]		[4]	

1) Depending on the configuration
2) Possible faulty setting: The threshold value for final switch-off is set at a higher value than the threshold value for prewarning.
3) The device has triggered after an insulation fault. The fault has been stored and the insulation resistance has returned to a higher value than the threshold value plus hysteresis.
4) Depending on the fault

Additional monitoring functions

When interrupted wire detection is activated, the CM-IWN.1 automatically controls the system/measuring circuit connections L+ and L- when the system starts up. This can be repeated at any time by activating the test function.
The CM-IWN.1 cyclically monitors the measuring circuit connections ⏚ and KE for wire interruption. In case of a wire interruption in one of the connections, the output relays switch to the fault state.
In addition, the unearthed AC-, DC- or AC/DC system is monitored for inadmissible system leakage capacitance. If the system leakage capacitance is too high, the output relays switch to the fault state.
Also incorrect settings that could cause a faulty function of the device are monitored. When the device detects such an incorrect setting, the output relays switch to the fault state.

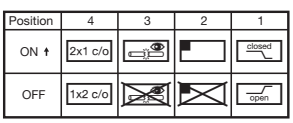
Configuration 1 x 2 c/o contacts (final switch-off)

With this configuration the settings for the threshold value for prewarning (R2) have no influence on the operating function. If the measured value drops below the set threshold value, the output relays switch into the fault state. If the measured value exceeds the threshold value plus hysteresis, the output relays switch back into their original state.

Configuration 2 x 1 c/o contact (prewarning and final switch-off)

If the measured value drops below the set threshold value for prewarning the second output relay 21-22/24 switches. If the measured value drops below the threshold value for final switch-off, the first output relay 11-12/14 switches. If the measured value exceeds the threshold value for final switch-off plus hysteresis, the first output relay 11-12/14 switches back into its original state. If the measured value exceeds the threshold value for prewarning plus hysteresis, also the second output relay 21-22/24 switches back to its original state.

DIP switches



	ON	OFF (default)
DIP switch 1 Operating principle of the output relays	Closed-circuit principle If closed-circuit principle is selected, the output relays de-energize in case a fault is occuring. In non-fault state the relays are energized.	Open-circuit principle If open-circuit principle is selected, the output relays energize in case a fault is occuring. In non-fault state the relays are de-energized.
DIP switch 2 Non-volatile fault storage	Fault storage activated (latching) If the fault storage function is activated, the output relays remain in tripped position until a reset is done either by the front-face button or by the remote reset connection S2-S3. This function is non-volatile.	Fault storage de-activated (non latching) If the fault storage function is de-activated, the output relays switch back to their original position as soon as the insulation fault no longer exists.
DIP switch 3 Interrupted wire detection	Interrupted wire detection activated With this configuration, the CM-IWN.1 monitors the wires connected to ⏚ and KE for interruptions.	Interrupted wire detection de-activated With this configuration the interrupted wire detection is de-activated.
DIP switch 4 2 x 1 c/o, 1 x 2 c/o	2 x 1 c/o (SPDT) contact If operating principle 2 x 1 c/o contact is selected, the output relay R1 (11-12/14) reacts to threshold value R1 (final switch-off) and the output relay R2 (21-22/24) reacts to threshold value R2 (prewarning)	1 x 2 c/o (SPDT) contacts If operating principle 1 x 2 c/o contacts is selected, both output relays R1 (11-12/14) and R2 (21-22/24) react synchronously to threshold value R1. Settings of the threshold value R2 have no effect on the operation.

Order data

Type	Nominal voltage U_n of the distribution system to be monitored	Rated control supply voltage	Order code	Pack. unit piece	Price 1 piece
CM-IWN.1	0-400 V AC / 0-600 V DC	24-240 V AC/DC	**1SVR 650 660 R0200**	1	

NEW

Insulation monitors for unearthed supply systems

CM-IVN for expansion of the insulation monitoring relay CM-IWN.1 measuring range up to U_n = 690 V AC and 1000 V DC

2CDC 251 081 S0009

- Expansion of the nominal voltage range of the insulation monitoring relay CM-IWN.1 for monitoring the insulation resistance of unearthed IT systems up to 690 V AC and 1000 V DC
- According to IEC/EN 61557-8 “Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems"
- Passive device, no supply voltage needed
- 45 mm [1.77 in] width

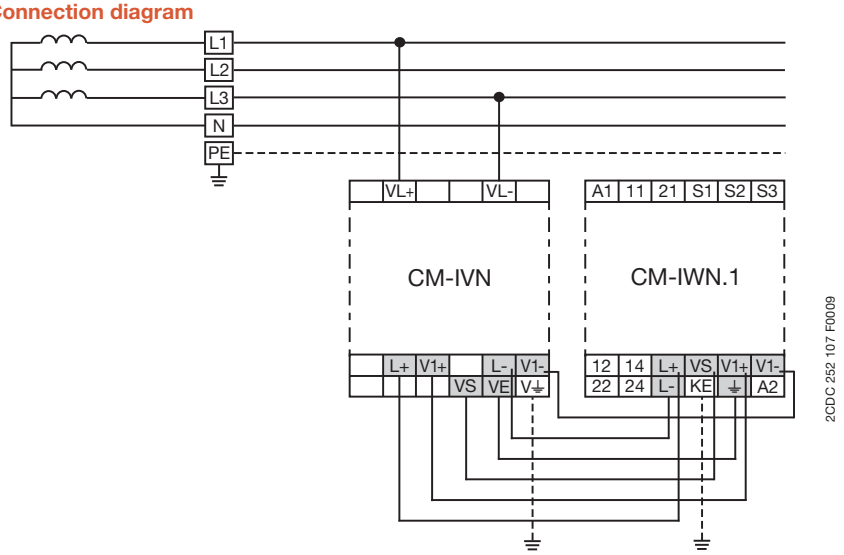
Application / monitoring function

The coupling unit CM-IVN is designed to extend the nominal voltage range of the insulation monitoring relay CM-IWN.1 up to 690 V AC and 1000 V DC. The coupling unit can be connected to the system to be monitored by means of the terminals VL+ and VL-. The terminal $V_{\perp}$ has to be connected to the earth potential. The terminals L+, V1+, L-, V1-, VS and VE have to be connected to the CM-IWN.1 as shown in the connection diagrams below. Supply systems with voltages U_n = 0-690 V AC (15-400 Hz) or 0-1000 V DC can be connected.

Measuring principle

With CM-IWN.1 a pulsating measuring signal is fed into the system to be monitored and the insulation resistance calculated. This pulsating measuring signal alters its form depending on the insulation resistance and system leakage capacitance. From this altered form the change in the insulation resistance is forecast. When the forecast insulation resistance corresponds to the insulation resistance calculated in the next measurement cycle and is smaller than the set threshold value, the output relays are activated or deactivated, depending on the device configuration. This measuring principle is also suitable for the detection of symmetrical insulation faults.

Connection diagram



2CDC 252 107 F0009

VE	Connection to CM-IWN.1 - ⏚	V1-	Connection to CM-IWN.1 - V1-
VS	Connection to CM-IWN.1 - VS	VL+, VL-	Measuring circuit / Measuring input Connection to the system
L+	Connection to CM-IWN.1 - L+	$V_{\perp}$	Measuring circuit / Measuring input Connection to earth
V1+	Connection to CM-IWN.1 - V1+		
L-	Connection to CM-IWN.1 - L-		

Coupling unit

Type	Nominal voltage U_n of the distribution system to be monitored	Rated control supply voltage	Order code	Pack. unit piece	Price 1 piece
CM-IVN	0-690 V AC / 0-1000 V DC	Passive device, no control supply voltage needed	**1SVR 650 669 R9400**	1	

NEW

Insulation monitors for unearthed supply systems
CM-IWS.2, CM-IWS.1 and CM-IWN.1
Technical data

Technical data
Data at T_a = 25 °C and rated values, unless otherwise indicated

		CM-IWS.2	CM-IWS.1	CM-IWN.1
Input circuit - Supply circuit		**A1 - A2**		
Rated control supply voltage U_s		24-240 V AC/DC		
Rated control supply voltage tolerance		-15...+10 %		
Typical current / power consumption	24 V DC	30 mA / 0.7 VA	35 mA / 0.9 VA	55 mA / 1.3 VA
	115 V AC	12 mA / 1.4 VA	17 mA / 2.0 VA	20 mA / 2.3 VA
	230 V AC	12 mA / 2.8 VA	14 mA / 3.2 VA	15 mA / 3.5 VA
Rated frequency f_s		DC or 15-400 Hz		
Frequency range AC		13.5-440 Hz		
Power failure buffering time	min.	20 ms		
Input circuit - Measuring circuit		**L, ⏚**	**L+, L-, ⏚, KE**	**L+, L-, ⏚, KE**
Monitoring function		insulation resistance monitoring of IT systems (IEC/EN 61557-8)		
Measuring principle		superimposed DC voltage	prognostic measuring principle with superimposed square wave signal	
Nominal voltage U_n of the distribution system to be monitored		0-400 V AC	0-250 V AC / 0-300 V DC	400 V AC / 0-600 V DC
Voltage range of the distribution system to be monitored		0-460 V AC (tolerance +15 %)	0-287.5 V AC / 0-345 V DC (tolerance +15 %)	0-460 V AC / 0-690 V DC (tolerance +15 %)
Rated frequency f_N of the distribution system to be monitored		50-60 Hz	DC or 15-400 Hz	DC or 15-400 Hz
Tolerance of the rated frequency f_N		45-65 Hz	13.5-440 Hz	13.5-440 Hz
System leakage capacitance C_e	max.	10 µF		20 µF
Extraneous DC voltage U_{fg} (when connected to an AC system)	max.	none	290 V DC	460 V DC
Number of possible response / threshold values		1		2
Adjustment range of the specified response value R_{an} (threshold)	min.-max.	1-100 kΩ		–
	min.-max. R1	–		1-100 kΩ
	min.-max. R2	–		2-200 kΩ (activated / de-activated by DIP-switch)
Adjustment resolution		1 kΩ		
	R1	1 kΩ		1 kΩ
	R2	–		2 kΩ
Tolerance of the adjusted threshold value / Relative percentage uncertainty A at -5...+45 °C, U_n = 0-115 %, U_s = 85-110 %, f_N, f_s, C_e = 1µF	at 1-10 kΩ R_F	±0.5 kΩ		–
	at 10-100 kΩ R_F	±6 %		–
	at 1-15 kΩ R_F	–		±1 kΩ*
	at 15-200 kΩ R_F	–		±8 %
Hysteresis related to the threshold value		25 %; min. 2 kΩ		
Internal impedance Z_i	at 50 Hz	135 kΩ	100 kΩ	155 kΩ
Internal DC resistance R_i		185 kΩ	115 kΩ	185 kΩ
Measuring voltage U_m		15 V	22 V	24 V
Tolerance of measuring voltage U_m		+10 %		
Measuring current I_m	max.	0.1 mA	0.3 mA	0.15 mA
Response time t_{an}				
pure AC system	0.5 x R_{an} and C_e = 1 µF	max. 10 s		
DC system or AC system with connected rectifiers		–	max. 15 s	
Repeat accuracy (constant parameters)		< 0.1 % of full scale		

*in combination with CM-IVN ±1.5 kΩ

NEW

Insulation monitors for unearthed supply systems
CM-IWS.2, CM-IWS.1 and CM-IWN.1
Technical data

		CM-IWS.2	CM-IWS.1	CM-IWN.1
Accuracy of R_a (measured value) within the rated control supply voltage tolerance		< 0.05 % of full scale		
Accuracy of R_a (measured value) within the operation temperature range	at 1-10 kΩ R_F	5 Ω / K		
	at 10-100 kΩ R_F	0.05 % / K		–
	at 10-200 kΩ R_F	–		0.05 % / K
Transient over voltage protection (⏚ - terminal)		Z-diode	avalanche diode	
Input circuit - Control circuits		**S1 - S2 - S3**		
Control inputs - volt free	S1-S3 S2-S3	remote test remote reset		
Maximum switching current in the control circuit		1 mA		
Maximum cable length to the control inputs		50 m - 100 pF/m [164 ft - 30.5 pF/ft]		
Minimum control pulse length		150 ms		
No-load voltage at the control input		24 V ± 5 %	≤ 24 V DC	
User interface				
Indication of operational states				
Control supply voltage		LED U (green)*		
Fault message		LED F (red)*		
Relay status		LED R (yellow)*		
Output circuits				
Kind of output		relay, 1 c/o (SPDT) contact		2 x 1 or 1 x 2 c/o (SPDT) contacts configurable
Operating principle		closed-circuit principle[1)]		open- or closed-circuit principle[1)] configurable
Contact material		AgNi alloy, Cd free		
Rated voltage (VDE 0110, IEC 60947-1)		250 V AC / 300 V DC		
Min. switching voltage / Min. switching current		24 V / 10 mA		
Max. switching voltage / Max. switching current		see data sheet		
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A		
	AC15 (inductive) at 230 V	3 A		
	DC12 (resistive) at 24 V	4 A		
	DC13 (inductive) at 24 V	2 A		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300, pilot duty general purpose (250 V, 4 A, cos φ 0.75)		
	max. rated operational voltage	250 V AC		
	max. continuous thermal current at B 300	4 A		
	max. making/breaking apparent power at B 300	3600/360 VA		
Mechanical lifetime		30 x 10^6 switching cycles		
Electrical lifetime (AC12, 230 V, 4 A)		0.1 x 10^6 switching cycles		
Max. fuse rating to achieve short-circuit protection	n/c contact n/o contact	6 A fast-acting 10 A fast-acting		
Conventional thermal current I_{th} (IEC/EN 60947-1)		4 A		

1) Closed-circuit principle: Output relay(s) de-energize(s) if measured value falls below the adjusted threshold value R_{an}

NEW

Insulation monitors for unearthed supply systems
CM-IWS.2, CM-IWS.1 and CM-IWN.1
Technical data

		CM-IWS.2	CM-IWS.1	CM-IWN.1
General data				
Duty time		100 %		
Dimensions (W x H x D)		22.5 x 78 x 100 mm [0.89 x 3.07 x 3.94 in]		45 x 78 x 100 mm [1.78 x 3.07 x 3.94 in]
Weight	gross weight, with packaging and instruction sheet	0.149 kg [0.328 lb]	0.163 kg [0.359 lb]	0.258 kg [0.569 lb]
	net weight	0.127 kg [0.280 lb]	0.133 kg [0.293 lb]	0.231 kg [0.509 lb]
Mounting		DIN rail (EN 60715), snap-on mounting without any tool		
Mounting position		any		
Minimum distance to other units	vertical	not necessary		
	horizontal	10 mm [0.4 in] at U_n > 240 V	not necessary	10 mm [0.4 in] at U_n > 400 V
Degree of protection	enclosure / terminal	IP50 / IP20		
Electrical connection				
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)		
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)		
Stripping length		7 mm [0.28 in]		
Tightening torque		0.6-0.8 Nm [5.31-7.08 lb.in]		
Environmental data				
Ambient temperature ranges	operation/storage/ transport	-25...+60 °C/-40...+85 °C/-40...+85 °C		
Climatic category	IEC/EN 60721-3-3	3K5 (no condensation, no ice formation)		
Damp heat, cyclic	IEC/EN 60068-2-30	6 x 24 h cycle, 55 °C, 95 % RH		
Vibration, sinusoidal	IEC/EN 60255-21-1	Class 2		
Shock, half-sine	IEC/EN 60255-21-2	Class 2		
Isolation data				
Rated impulse withstand voltage U_{imp} between all isolated circuits (IEC/EN 60947-1, IEC/EN 60664-1, VDE 0110-1)	supply / measuring circuit	6 kV		–
	supply / output circuit	6 kV		–
	measuring / output circuit	6 kV		–
	output 1 / output circuit 2	–		4 kV
Pollution degree (IEC/EN 60664-1, VDE 0110-1, UL 508)		3		
Overvoltage category (IEC/EN 60664-1, VDE 0110-1, UL 508)		III		
Rated insulation voltage U_i (IEC/EN 60947-1, IEC/EN 60664-1, VDE 0110-1)	supply / measuring circuit	400 V	300 V	600 V
	supply / output circuit	300 V		
	supply / measuring circuit	400 V	300 V	600 V
	output 1 / output circuit 2	–	–	300 V
Basis isolation for rated control supply voltage (IEC/EN 60664-1, VDE 0110-1)	supply / measuring circuit	400 V AC / 300 V DC	250 V AC / 300 V DC	400 V AC / 600 V DC
	supply / output circuit	250 V AC / 300 V DC		
	measuring / output circuit	400 V AC / 300 V DC	250 V AC / 300 V DC	400 V AC / 600 V DC
	output 1 / output 2	250 V AC / 300 V DC		
Protective separation (IEC/EN 61140)	supply / output circuit	250 V AC / 250 V DC		
	supply / measuring circuit	250 V AC / 250 V DC		
	measuring / output circuit	250 V AC / 250 V DC		

NEW

Insulation monitors for unearthed supply systems
CM-IWS.2, CM-IWS.1 and CM-IWN.1
Technical data

		CM-IWS.2	CM-IWS.1	CM-IWN.1
Test voltage between all isolated circuits, routine test (IEC/EN 60255-5, IEC/EN 61010-1)	supply / output circuit	2.32 kV, 50 Hz, 2 s		
	supply / measuring circuit	2.32 kV, 50 Hz, 2 s		
	measuring / output circuit	2.2 kV, 50 Hz, 1 s		2.53 kV, 50 Hz, 1 s
Standards				
Product standard		IEC/EN 61557-8, IEC/EN 60255-6		
Other standards		EN 50178		
Low Voltage Directive		2006/95/EC		
EMC Directive		2004/108/EC		
RoHS Directive		2002/95/EC		
Electromagnetic compability				
Interference immunity to		IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61326-2-4		
electrostatic discharge	IEC/EN 61000-4-2	Level 3, 6 kV / 8 kV		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3, 10 V/m (1 GHz) / 3 V/m (2 GHz) / 1 V/m (2.7 GHz)		
electrical fast transient/burst	IEC/EN 61000-4-4	Level 3, 2 kV / 5 kHz		
surge	IEC/EN 61000-4-5	Level 3, installation class 3, supply circuit and measuring circuit 1 kV L-L, 2 kV L-earth		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3, 10 V		
voltage dips, short interruptions and voltage variations	IEC/EN 61000-4-11	Level 3		
harmonics and interharmonics	IEC/EN 61000-4-13	Level 3		
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4		
high-frequency radiated	IEC/CISPR 22, EN 50022	Class B		
high-frequency conducted	IEC/CISPR 22, EN 50022	Class B		

NEW

Insulation monitors for unearthed supply systems
CM-IVN
Technical data

Technical data
Data at T_a = 25 °C and rated values, unless otherwise indicated

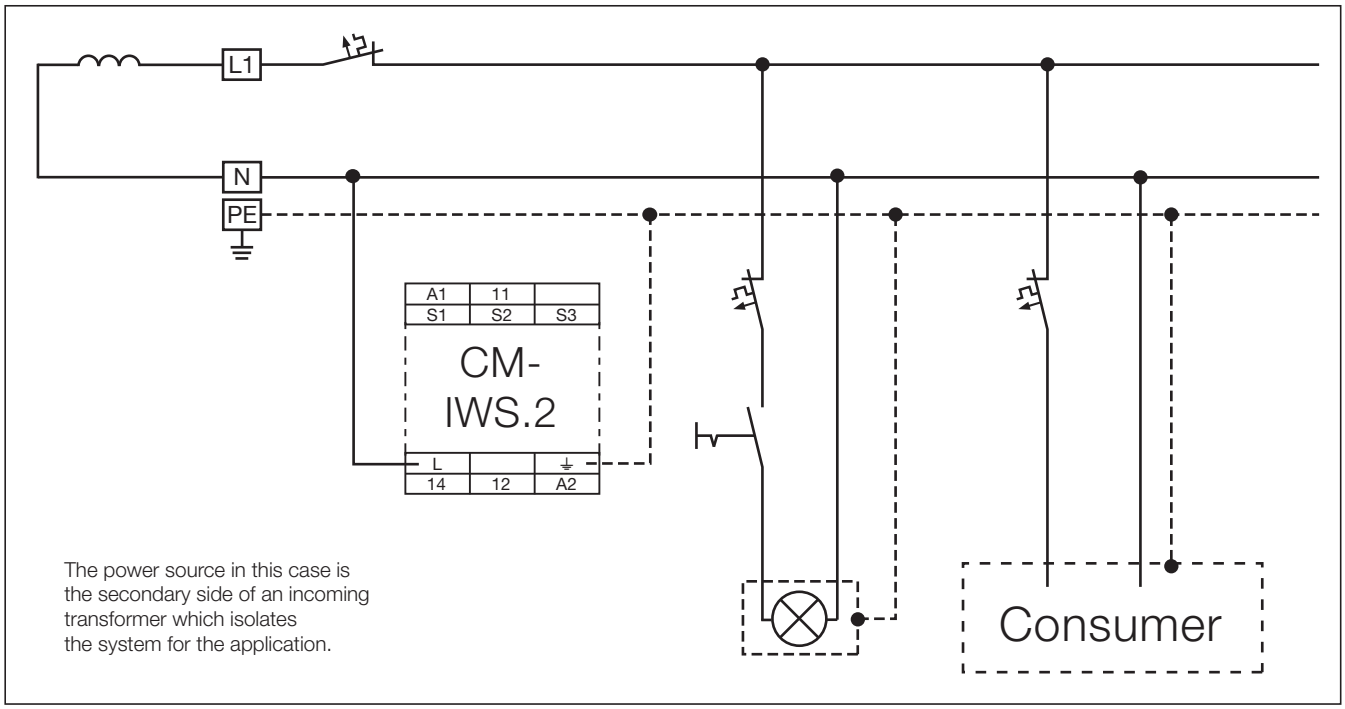
Input circuits		
Input circuit - Measuring circuit		**VL+, VL-, V⏚**
Function		expansion of the nominal voltage range of the insulation monitoring relay CM-IWN.1 to 690 V AC or 1000 V DC, max. length of connection cable 40 cm
Measuring principle		see CM-IWN.1
Nominal voltage U_n of the distribution system to be monitored		0-690 V AC / 0-1000 V DC
Voltage range of the distribution system to be monitored		0-793.5 V AC / 0-1150 V DC (tolerance +15 %)
Rated frequency f_N of the distribution system to be monitored		DC or 15-400 Hz
Tolerance of the rated frequency f_N		13.5-440 Hz
System leakage capacitance C_e	max.	20 µF
Extraneous DC voltage U_{ig} (when connected to an AC system)	max.	793.5 V DC
Tolerance of the adjusted threshold value / Relative percentage uncertainty A at -5...+45 °C, U_n = 0-115 %, U_s = 85-110 %, f_N, f_s, C_e = 1µF	at 1-15 kΩ R_F	±1.5 kΩ
	at 15-200 kΩ R_F	±8 %
Internal impedance Z_i	at 50 Hz	195 kΩ
Internal DC resistance R_i		200 kΩ
Measuring voltage U_m		24 V
Tolerance of measuring voltage U_m		+10 %
Measuring current I_m		0.15 mA
Input circuits		
General data		
MTBF		on request
Duty time		100 %
Dimensions (W x H x D)		45 x 78 x 100 mm [1.78 x 3.07 x 3.94 in]
Weight	gross weight, with packaging and instruction sheet	0.200 kg [0.441 lb]
	net weight	0.169 kg [0.373 lb]
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool
Mounting position		any
Minimum distance to other units	vertical	not necessary
	horizontal	10 mm [0.4 in] at U_n > 600 V
Degree of protection		IP50 / IP20
Electrical connection		
Wire size	fine-strand with(out)wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)
Stripping length		7 mm [0.28 in]
Tightening torque		0.6-0.8 Nm [5.31-7.08 lb.in]
Max. length of connection cable to CM-IWN.1		40 cm

NEW

Insulation monitors for unearthed supply systems
CM-IVN
Technical data

Environmental data		
Ambient temperature ranges	operation	-25...+60 °C
	storage	-40...+85 °C
	transport	-40...+85 °C
Climatic category	IEC/EN 60721-3-3	3K5 (no condensation, no ice formation)
Damp heat, cyclic	IEC/EN 60068-2-30	6 x 24 h cycle, 55 °C, 95 % RH
Vibration, sinusoidal	IEC/EN 60255-21-1	Class 2
Shock, half-sine	IEC/EN 60255-21-2	Class 2
Isolation data		
Rated impulse withstand voltage U_{imp} between all isolated circuits (IEC/EN 60947-1, IEC/EN 60664-1,VDE 0110-1)	input circuit / PE	8 kV
Pollution degree (IEC/EN 60664-1, VDE 0110-1, UL 508)		3
Overvoltage category (IEC/EN 60664-1, VDE 0110-1, UL 508)		III
Rated insulation voltage U_i (IEC/EN 60947-1, IEC/EN 60664-1,VDE 0110-1)	input circuit / PE	1000 V
Test voltage between all isolated circuits, routine test (IEC/EN 60255-5, IEC/EN 61010-1)	input circuit / PE	3.3 kV, 50 Hz, 1 s
Standards		
Product standard		IEC/EN 61557-8, IEC/EN 60255-6
Other standards		EN 50178
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
RoHS Directive		2002/95/EC
Electromagnetic compability		
Interference immunity to		IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61326-2-4
electrostatic discharge	IEC/EN 61000-4-2	Level 3, 6 kV / 8 kV
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3, 10 V/m (1 GHz) / 3 V/m (2 GHz) / 1 V/m (2.7 GHz)
electrical fast transient/burst	IEC/EN 61000-4-4	Level 3, 2 kV / 5 kHz
surge	IEC/EN 61000-4-5	Level 3, installation class 3, supply circuit and measuring circuit 1 kV L-L, 2 kV L-earth
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3, 10 V
voltage dips, short interruptions and voltage variations	IEC/EN 61000-4-11	Level 3
harmonics and interharmonics	IEC/EN 61000-4-13	Level 3
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4
high-frequency radiated	IEC/CISPR 22, EN 50022	Class B
high-frequency conducted	IEC/CISPR 22, EN 50022	Class B

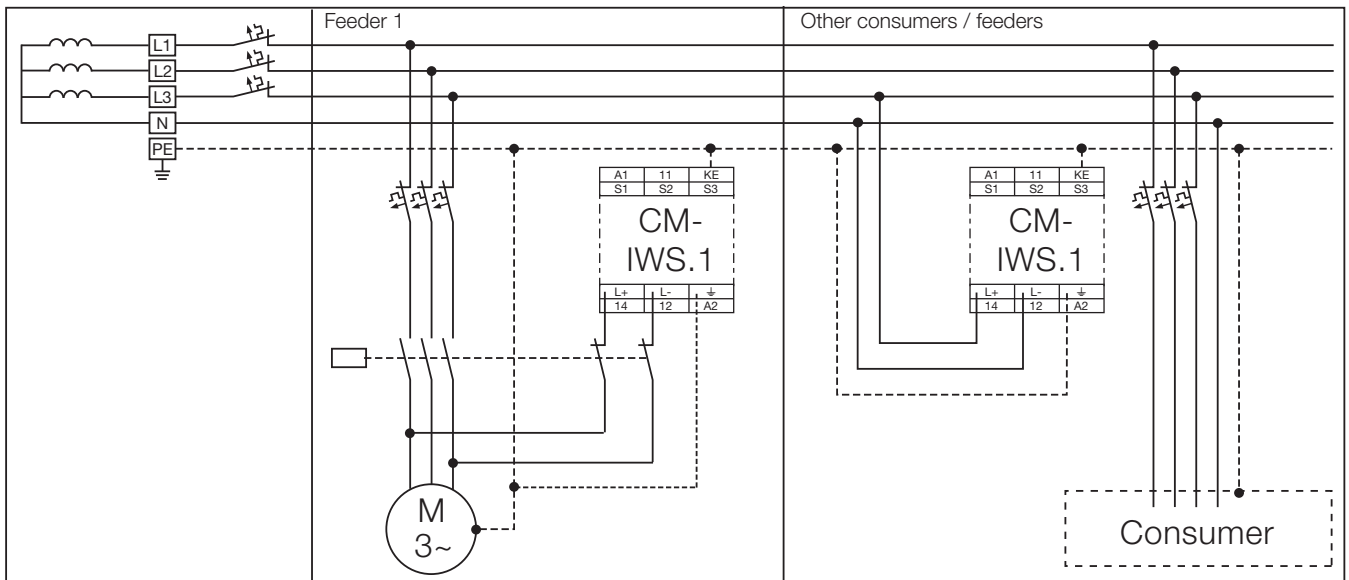
Application example CM-IWS.2



The power source in this case is the secondary side of an incoming transformer which isolates the system for the application.

2CDC 252 011 F0210

Application example CM-IWS.1



The power source in this case is the secondary side of an incoming transformer which isolates the system for the application.

The insulation resistance of this feeder is monitored always when the motor is switched off. The two n/c contacts are connecting the measuring circuit to the motor lines when the motor contactor is de-energized.

This insulation monitoring relay is continously monitoring the insulation resistance of the supply system with the connected consumers.

2CDC 252 014 F0210

Notes

Motor load monitors

Content

Motor load monitors
Fields of application

The motor load monitor monitors the load states of single-phase and three-phase asynchronous motors.
The evaluation of the phase angle between current and voltage allows a very precise monitoring of the load states.

Compared with other conventional measuring principles (e.g. pressure transducers, current measurement), cos φ monitoring is a more precise and economical alternative. The motor is used as a sensor for its own load status.

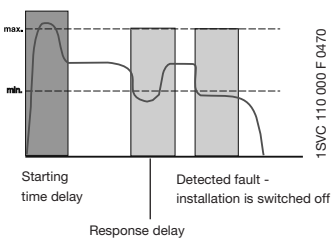
2

Main applications

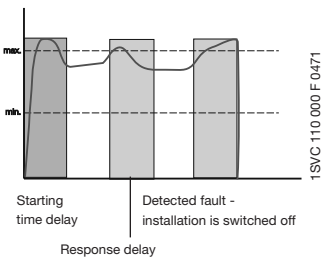
- Pump monitoring
  - Dry-running protection (underload)
  - Closed valves (overload)
  - Pipe break (overload)
- Heating, air-conditioning, ventilation
  - Monitoring of filter pollution
  - V-belt breakage (underload)
  - Closed shutters/valves (overload)
  - Air ventilating volume
- Agitating machines
  - High consistency within the tank (overload)
  - Pollution of the tank (overload)
- Transport/Conveyance
  - Congested conveyor belts (overload)
  - Jamming of belts (overload)
  - Material accumulation in spiral conveyors (overload)
  - Lifting platforms
- Machine installation
  - Wear of tools, e.g. worn saw blades in circular saws, etc. (overload)
  - Tool breakage (underload)
  - V-belt drives (breakage underload)

Pump control

Dry-running protection

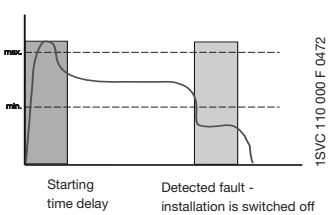


Filter pollution

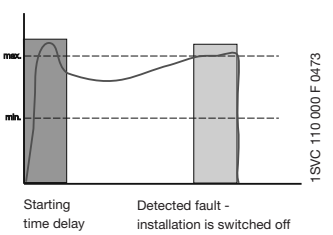


Ventilator monitoring

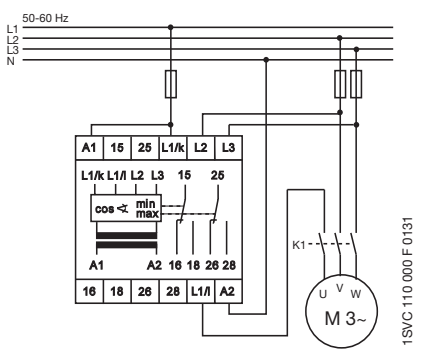
V-belt monitoring

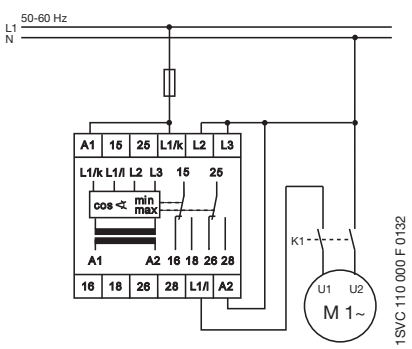


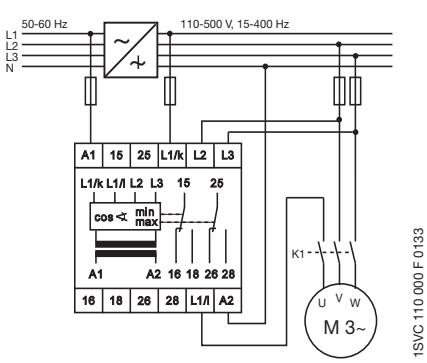
Filter pollution

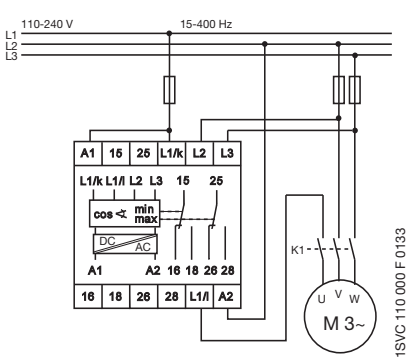


Wiring examples (for motor currents ≤ 20 A)

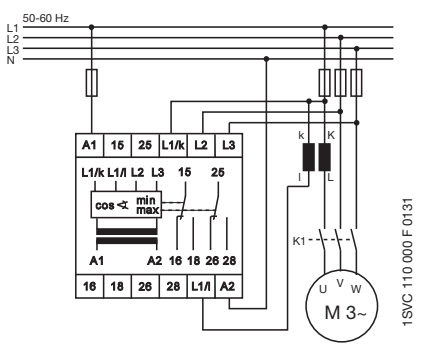


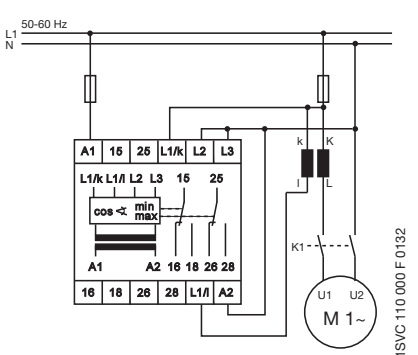






Wiring examples (for motor currents ≥ 20 A)





• **Current transformers** 2/105

2CDC110004C0207

Motor load monitors
CM-LWN
Ordering details

CM-LWN

① Response delay "Time R"
② Threshold for load limit "cos φ_{min}"
③ cos φ_{max}: red LED - cos φ_{max} exceeded
④ cos φ_{min}: red LED - below cos φ_{min}
⑤ Reset button
⑥ U: green LED - Control supply voltage
⑦ Threshold for load limit "cos φ_{max}"
⑧ Starting delay "Time S"
⑨ Marker label

- Load status monitoring for asynchronous motors
- Under- and overload monitoring cos φ_{min} and cos φ_{max} in one unit
- Adjustable starting delay 0.3-30 s
- Direct measurement of currents up to 20 A
- Adjustable response time delay 0.2-2 s
- Single-phase or three-phase monitoring
- 2 x 1 c/o contact, closed-circuit principle
- 3 LEDs for status indication

The **CM-LWN** module monitors the load status of inductive loads.

The primary application is the monitoring of single- or three-phase asynchronous motors (squirrel cage) under varying load conditions. The measuring principle is based on the evaluation of the phase shift (φ) between the voltage and the current in one phase.

The phase difference is nearly inversely proportional to the load. Therefore, cos φ, measured relatively from 0 to 1, measures the relationship of effective power to apparent power. A value towards 0 indicates low load and a value towards 1 indicates high load.

Threshold values can be set individually for cos φ_{max} and cos φ_{min} If the set threshold value is reached, a LED lights up and the relay is de-energized.

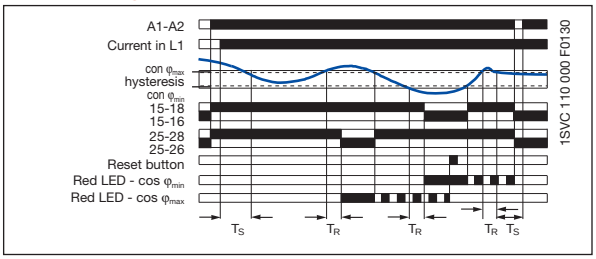
If cos φ returns to the acceptable limits (taking into account the hysteresis), the relay is reset to its original state and the LED flashes permanently to indicate the occurrence of the trip event. This message can be deleted using the reset button or by switching off the supply.

A time delay (Time S) of 0.3 to 30 s can be set for the starting phase of the motor. It is also possible to set a response delay time (Time R) of 0.2 to 2 s to suppress unwanted tripping due to unavoidable short load changes during normal operation.

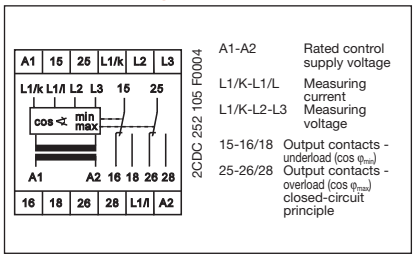
To guarantee correct operation of the response delay (Time R), the adjusted value for cos φ_{max} has to be higher than the value for cos φ_{min} plus the hysteresis. Consequently, the overload and underload indication must not be active at the same time.

Due to the internal electrical isolation of the supply circuit and the measuring circuit, it is also possible to use the device in systems with different supply voltages.

Function diagram CM-LWN



Connection diagram CM-LWN



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Current range: 0.5-5 A					
CM-LWN	24-240 V AC/DC	**1SVR 450 335 R0000**	1		0.30 / 0.66
	110-130 V AC	**1SVR 450 330 R0000**	1		0.30 / 0.66
	220-240 V AC	**1SVR 450 331 R0000**	1		0.30 / 0.66
	380- 440 V AC	**1SVR 450 332 R0000**	1		0.30 / 0.66
	480-500 V AC	**1SVR 450 334 R0000**	1		0.30 / 0.66
Current range: 2-20 A					
CM-LWN	24-240 V AC/DC	**1SVR 450 335 R0100**	1		0.30 / 0.66
	110-130 V AC	**1SVR 450 330 R0100**	1		0.30 / 0.66
	220-240 V AC	**1SVR 450 331 R0100**	1		0.30 / 0.66
	380-440 V AC	**1SVR 450 332 R0100**	1		0.30 / 0.66
	480-500 V AC	**1SVR 450 334 R0100**	1		0.30 / 0.66

• **Technical data** 2/62
• **Accessories** 2/104
• **Technical diagrams** 2/102
• **Current transformers** 2/105
• **Dimensional drawings** 2/103

Motor load monitors
CM-LWN
Technical data

Type			CM-LWN	
Input circuit - Supply circuit			**A1-A2**	
Rated control supply voltage U_S - power consumption		**A1-A2**	24-240 V AC/DC	approx. 8.4 VA/W
		A1-A2	110-130 V AC	approx. 3.6 VA
		A1-A2	220-240 V AC	approx. 3.6 VA
		A1-A2	380-440 V AC	approx. 3.6 VA
		A1-A2	480-500 V AC	approx. 3.6 VA
Rated control supply voltage U_S tolerance			-15 %...+10 %	
Rated frequency		AC versions	50-60 Hz	
		AC/DC versions	15-400 Hz or DC	
Duty time			100 %	
Measuring circuit			**L1/L-L1/K-L2-L3**	
Monitoring function			Motor load monitoring by cos φ	
Voltage range		L1/K-L2-L3	110-500 V AC single-phase or three-phase	
Current range		L1/L-L1/K	0.5-5 A version	2-20 A version
Permissible overload of current input			25 A for 3 s	100 A for 3 s
Thresholds			cos φ_{min} and cos φ_{max} adjustable from 0 to 1	
Hysteresis (related to phase angle φ in °)			4°	
Frequency of measuring voltage			15-400 Hz	
Response time			300 ms	
Timing circuits			**indication of over- and undervoltage fault**	
Start-up time (Time S)			0.3-30 s, adjustable	
Response delay (Time R)			0.2-2 s, adjustable	
Accuracy within the rated control supply voltage tolerance			$\Delta t \leq 0.5$ %	
Accuracy within the temperature range			$\Delta t \leq 0.06$ % / °C	
Indication of operational states				
Control supply voltage			U: green LED	
below cos φ_{min}			cos φ_{min}: red LED	
cos φ_{max} exceeded			cos φ_{max}: red LED	
Output circuits			**15-16/18, 25-26/28**	
Kind of output			2 x 1 c/o contact	
Operational principle [1]			closed-circuit principle	
Contact material			AgCdO	
Rated voltage (VDE 0110, IEC 664-1, IEC 947-1)			250 V	
Max. switching voltage			400 V AC, 300 V DC	
Rated operational current I_e (IEC/EN 60947-1)		AC12 (resistive) 230 V	4 A	
		AC15 (inductive) 230 V	3 A	
		DC12 (resistive) 24 V	4 A	
		DC13 (inductive) 24 V	2 A	
AC rating (UL 508)		Utilization category (Control Circuit Rating Code)	B 300	
		max. rated operational voltage	300 V AC	
		max. continuous thermal current at B 300	5 A	
		max. making/breaking apparent power at B 300	3600/360 VA	
Mechanical lifetime			30 x 10^6 switching cycles	
Electrical lifetime		at AC12, 230 V, 4 A	0.1 x 10^6 switching cycles	
Max. fuse rating to achieve short circuit protection		n/c / n/o contact	10 A fast-acting / 10 A fast-acting	
General data				
Dimensions (W x H x D)			45 mm x 78 mm x 100 mm (1.77 inch x 3.07 inch x 3.94 inch)	
Mounting position			any	
Degree of protection		enclosure / terminals	IP50 / IP20	
Ambient temperature range		operation / storage	-25...+65 °C / -40...+85 °C	
Mounting			DIN rail (IEC/EN 60715)	
Electrical connection				
Wire size		fine-strand with wire end ferrule	2 x 2.5 mm² (2 x 14 AWG)	
Standards				
Product standard			IEC 255-6, EN 60255-6	
Low Voltage Directive			2006/95/EC	
EMC Directive			2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC	
Electromagnetic compatibility			EN 61000-6-2, EN 61000-6-4	
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
surge		IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)	
Operational reliability (IEC 68-2-6)			5 g	
Mechanical resistance (IEC 68-2-6)			10 g	
Environmental testing (IEC 68-2-30)			24 h cycle time, 55 °C, 93 % rel., 96 h	
Isolation data				
Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5)				
Rated insulation voltage between supply- , measuring- and output circuit			250 V, 400 V, 500 V depending on the version	
Rated impulse withstand voltage between all isolated circuits			4 kV / 1.2 - 50 µs	
Test voltage between all isolated circuits			2,5 kV, 50 Hz, 1 min.	
Pollution category			3	
Overvoltage category			III	

[1] Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

• **Approvals** 2/6

2CDC110004C0207

Motor control and protection

UMC100-FBP

NEW

Content

NEW

Motor control and protection
UMC100-FBP

UMC100-FBP is a flexible, modular and expandable motor management system for constant-speed low-voltage range motors.
It's most important tasks include motor protection, prevention of plant standstills and the reduction of down time. This is made possible by early information relating to possible motor problems which avoids unplanned plant standstills. Even if a motor trips, quick diagnosis of the cause of the fault serves to reduce downtime.

UMC100-FBP combines in a very compact unit:

Motor protection
- Overload, blocked rotor, low/high current
- Phase failure, unbalance, phase sequence
- Earth-leakage
- Thermistor protection
- One single version covers the rated motor current from 24 mA to 63 A

Motor control
- Integrated and easy to parametrize starter functions like direct, reversing, stardelta
- Free programmable logic for special, application-specific control functions
- Expansion modules for more or special I/Os

Motor diagnostics
- Quick and comprehensive access to all data via control station, fieldbus and operator panel

Communication
- Communication-neutral basic device
- Freely selectable fieldbus protocol with FieldBusPlug

Typical applications
- oil & gas
- cement
- paper
- mining
- steel
- chemical industry
- water supply and distribution
- food and beverage

Further information

UMC & FBP Catalogue	2CDC 190 022 D0201
UMC & FBP Brochure	2CDC 135 011 B0201

NEW

Motor control and protection
UMC100-FBP

Basic device UMC100-FBP

Main power	
Voltage	max 1000 V AC
Frequency	45 to 65 Hz
Rated motor current	0.24 to 63 A, without accessories
	Greater currents with transformer
Transformer diameter	11 mm (max 25 mm2)
Tripping classes	5, 10, 20, 30, 40 in accordance with EN/IEC 60947-4-1
Short-circuit protection	Separate fuse on network side

Control unit	
Supply voltage	24 V DC
Reverse polarity protection	yes
Inputs	6 digital inputs 24 V DC
	1 PTC input
Outputs	3 relay outputs relay
	1 digital output transistor
Interfaces	1 for ABB FieldBusPlug
	1 for UMC100-PAN control station
	1 for expansion module
Parametric assignment	via fieldbus, control station and / or software
Addressing	Control station or addressing set
LEDs	3 LEDs: green, yellow, red

Environment and mechanical data	
Fastening	on DIN busbar (EN50022-35) or with 4 screws x M4
Dimensions (W x H x D)	70 x 105 x 110 mm (incl. FieldBusPlug and control panel)
Weight	0.39 kg
Terminal cross-section	max. 2.5 mm² or 2 x 1.5 mm²

Expansion modules DX111 / DX122

A DX111/122 expansion module can be connected per UMC100-FBP via a simple two-wire line
Application also possible via simple parametric assignment (without programming), e.g. for error messages and warnings

Supply voltage		24 V DC
Inputs	DX111	8 digital inputs 24 V DC
	DX122	8 digital inputs 110/230 V AC
Outputs		4 relay outputs relay 1 analogue output, 0/4 to 20 mA / 0 to 10 V configurable
Fastening		on DIN busbar (EN50022-35)
Dimensions (W x H x D)		45 x 77 x 100 mm (without terminal block)

Control panel UMC100-PAN

Installation on the device or on the switching cabinet door
Graphics-enabled and backlit display, 3 LEDs for status indication
Freely configurable error messages
Multilingual: German, English, French, Italian, Portuguese, Spanish

Notes

Thermistor motor protection relays

Content

Thermistor motor protection relays CM-MSE, CM-MSS, CM-MSN
Benefits and advantages, Selection table

Operating principle and fields of application for thermistor motor protection relays

The CM range of thermistor motor protection relays are used to control motors equipped with PTC temperature sensors. The PTC temperature sensors are incorporated in the motor windings to measure the motor heating. This enables direct control and evaluation of the following operating conditions:

- heavy duty starting
- increased switching frequency
- single-phase operation
- high ambient temperature
- insufficient cooling
- break operation
- unbalance

The relay is independent of the rated motor current, the insulation class and the method of starting.

The PTC sensors are connected in series to the terminals T_a and T_b (or T_a and T_{bx} without short-circuit detection). The number of possible PTC sensors per measuring circuit is limited by the sum of the individual PTC sensor resistances: $R_G = R_1 + R_2 + R_N \leq 1.5\ k\Omega$.

Under normal operating conditions the resistance is below the response threshold. If only one of the PTC resistors heats up excessively, the output relay de-energizes. If the autoreset function is configured, the output relay energizes automatically after cooling down.

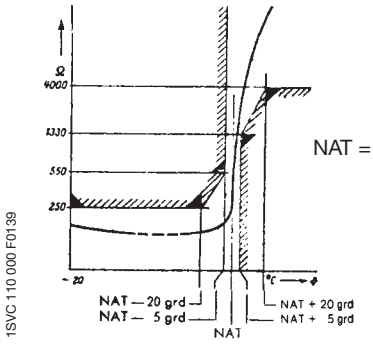
Devices with manual (pushbutton on front-side) or remote reset configuration have to be controlled via the control input by the required signal.

Further applications:

Temperature monitoring of equipment with PTC sensors integrated, such as

- machine rolling bearings,
- hot-air ventilators,
- oil,
- air,
- heating installations, etc.

Resistance characteristic
for one single temperature sensor acc. to DIN 44 081.



NAT = Nominal response temperature

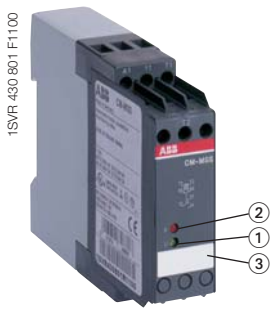
Selection table thermistor motor protection relays

Type	CM-MSE	CM-MSS (1)	CM-MSS (2)	CM-MSS (3)	CM-MSS (4)	CM-MSS (5)	CM-MSS (6)	CM-MSS (7)	CM-MSN
Function									
Measuring range									
Number of sensor circuits	1	1	1	1	1	1	2	3	6
Wire break monitoring	●	●	●	●	●	●	●	●	●
Short-circuit detection	–	–	–	● 1)	●	●	●	●	●
Non-volatile fault storage	–	–	–	–	● 2)	● 2)	–	● 2)	● 2)
Operation/Reset									
Auto reset	●	●	●	●	● 2)	● 2)	● 2)	● 2)	● 2)
Manual reset	–	–	●	●	●	●	●	●	●
Remote reset	–	–	●	●	●	●	●	●	●
Test button	–	–	–	–	●	●	●	●	●
Output contacts									
Operational principle	closed-circuit principle								
Number / type	1 c/o	1 n/o	2 c/o	2 c/o	1 n/o + 1 n/c	2 c/o	1 c/o per sensor circuit	1 n/o + 1 n/c accumulative evaluation	1 n/o + 1 n/c accumulative evaluation
Width of enclosure	22.5 mm								45 mm
Supply voltages and order codes									
24 V AC	**1SVR550805R9300**		**1SVR430811R9300**						
24 V AC/DC		**1SVR430800R9100**	**1SVR430810R9300**	**1SVR430710R9300**					
110-130 V AC	**1SVR550800R9300**		**1SVR430811R0300**	**1SVR430711R0300**					
220-240 V AC	**1SVR550801R9300**	**1SVR430801R1100**	**1SVR430811R1300**	**1SVR430711R1300**					
380-440 V AC				**1SVR430711R2300**					
24-240 V AC/DC					**1SVR430720R0400**	**1SVR430720R0300**	**1SVR430710R0200**	**1SVR430720R0500**	**1SVR450025R0100**

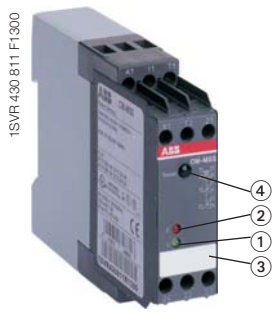
1) configurable via terminals
2) Auto reset without non-volatile fault storage configurable by permanent jumpering of connecting terminals S1-T2 or S1/X1-S2/X2

Thermistor motor protection relays CM-MSE, CM-MSS
Ordering details

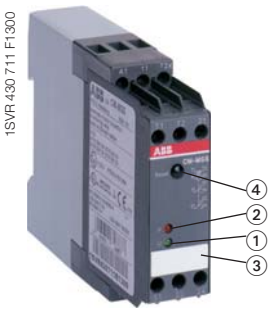
CM-MSE



CM-MSS (1)



CM-MSS (2)

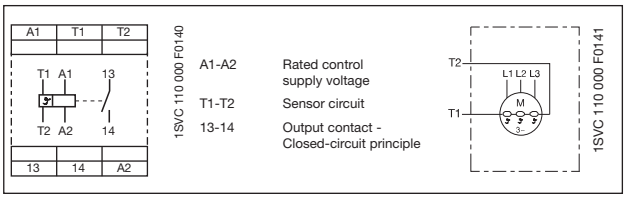


CM-MSS (3)

① F: red LED - fault tripping
② U: green LED - control supply voltage
③ Marker label
④ Reset button

CM-MSE

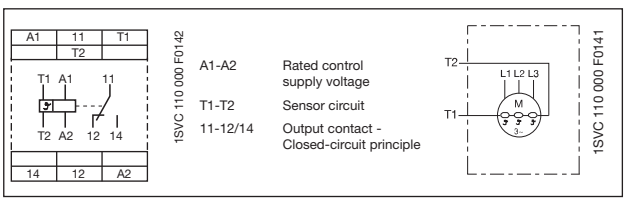
- Auto reset
- Connection of several sensors (max. 6 sensors conn. in series)
- Monitoring of bimetals
- 1 n/o contact
- Excellent cost / performance ratio



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSE	24 V AC	**1SVR 550 805 R9300**	1		0.11 / 0.24
	110-130 V AC	**1SVR 550 800 R9300**	1		0.11 / 0.24
	220-240 V AC	**1SVR 550 801 R9300**	1		0.11 / 0.24

CM-MSS (1), 1 c/o contact

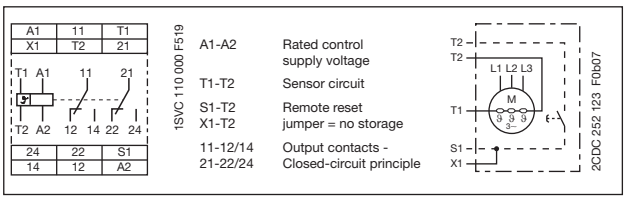
- Auto reset
- Connection of several sensors
- Monitoring of bimetals
- 1 c/o contact
- 2 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (1)	24 V AC/DC [1]	**1SVR 430 800 R9100**	1		0.15 / 0.33
	220-240 V AC	**1SVR 430 801 R1100**	1		0.15 / 0.33

CM-MSS (2), 2 c/o contacts

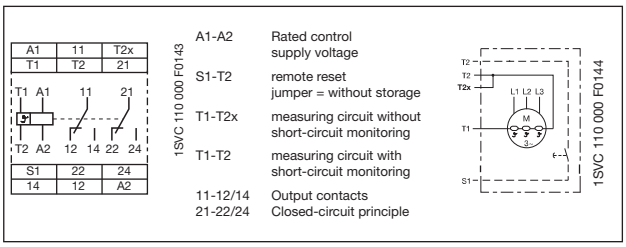
- Fault storage can be switched off
- Auto reset configurable
- Reset button
- Remote reset
- Monitoring of bimetals
- 2 c/o contacts
- 2 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (2)	24 V AC/DC [1]	**1SVR 430 810 R9300**	1		0.15 / 0.33
	24 V AC	**1SVR 430 811 R9300**	1		0.15 / 0.33
	110-130 V AC	**1SVR 430 811 R0300**	1		0.15 / 0.33
	220-240 V AC	**1SVR 430 811 R1300**	1		0.15 / 0.33

CM-MSS (3), 2 c/o contacts, short-circuit monitoring configurable

- Fault storage can be switched off
- Auto reset configurable
- Reset button
- Remote reset
- Monitoring of bimetals
- Short-circuit monitoring of the sensor circuit configurable
- 2 c/o contacts
- 2 LEDs for status indication

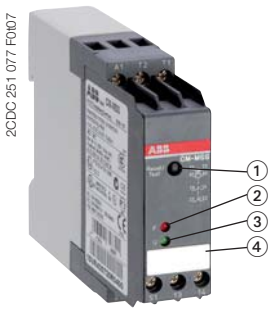


Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (3)	24 V AC/DC [1]	**1SVR 430 710 R9300**	1		0.15 / 0.33
	110-130 V AC	**1SVR 430 711 R0300**	1		0.15 / 0.33
	220-240 V AC	**1SVR 430 711 R1300**	1		0.15 / 0.33
	380-440 V AC	**1SVR 430 711 R2300**	1		0.15 / 0.33

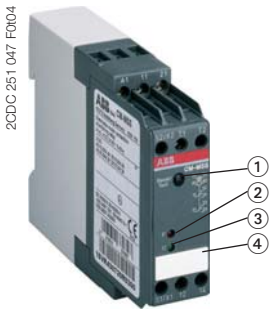
[1] not electrically isolated

- **Accessories: PTC sensors** 2/72
- **Technical diagrams** 2/102
- **Technical data** 2/73
- **Dimensional drawings** 2/103
- **Accessories** 2/104

Thermistor motor protection relays CM-MSS
Ordering details

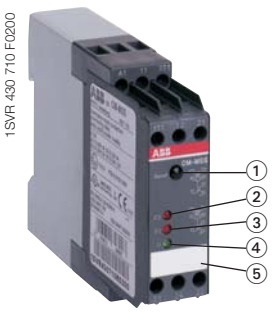


CM-MSS (4)



CM-MSS (5)

① Reset / test button
② F: red LED - fault tripping
③ U: green LED - control supply voltage
④ Marker label



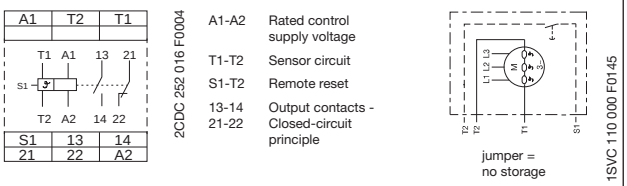
CM-MSS (6)

① Reset button
② to ③ F1-F2: red LED - fault tripping 1 to 2
④ U: green LED - control supply voltage
⑤ Marker label

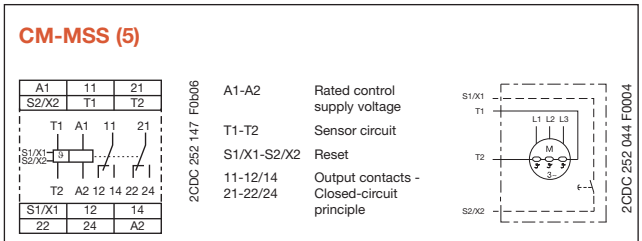
CM-MSS (4) + CM-MSS (5), 1-channel

- Short-circuit monitoring of the sensor circuit
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage selectable
- Reset and test button
- Remote reset
- Auto reset configurable
- Output contacts: 1 n/c and 1 n/o or 2 c/o contacts
- 2 LEDs for status indication

CM-MSS (4)



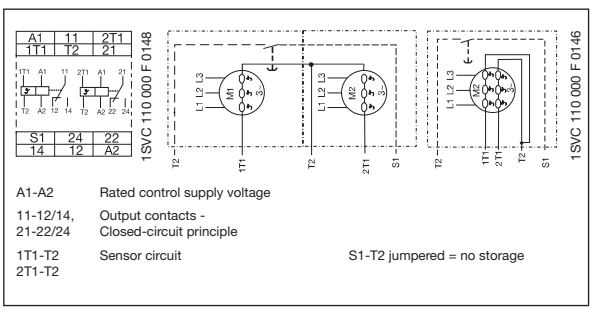
CM-MSS (5)



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (4) 1-channel 1n/c, 1n/o	24-240 V AC/DC	**1SVR 430 720 R0400**	1		0.15 / 0.33
CM-MSS (5) 1-channel 2 c/o	24-240 V AC/DC	**1SVR 430 720 R0300**	1		0.15 / 0.33

CM-MSS (6), 2-channel, single evaluation

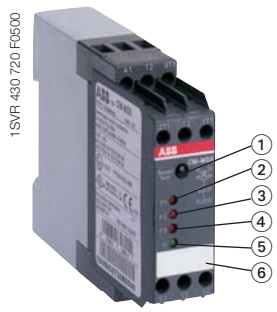
- Short-circuit monitoring for the sensor circuits
- Wide supply voltage range: 24-240 V AC/DC
- 2 separate sensor circuits for monitoring of two motors or one motor with 2 sensor circuits (prewarning and final switch off)
- Reset button
- Auto reset configurable
- Output contacts: 2 x 1 c/o contact
- 3 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (6)	24-240 V AC/DC	**1SVR 430 710 R0200**	1		0.15 / 0.33

• **Accessories: PTC sensors** 2/72
• **Technical diagrams** 2/102
• **Technical data** 2/73
• **Dimensional drawings** 2/103
• **Accessories** 2/104

Thermistor motor protection relays CM-MSS, CM-MSN
Ordering details

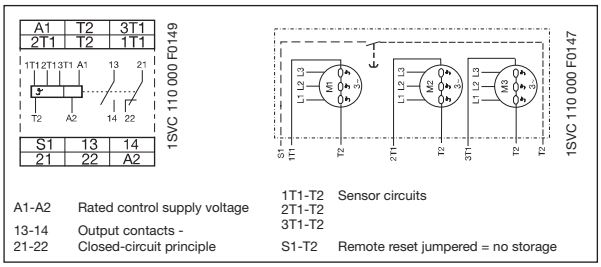


CM-MSS (7)

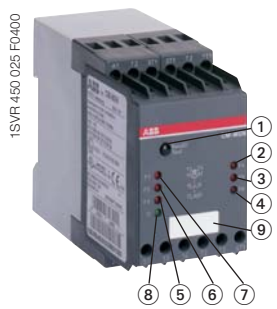
① Reset / test button
② to ④
F1-F3: red LED - fault tripping 1 to 3
⑤ U: green LED - control supply voltage
⑥ Marker label

CM-MSS (7), 3 sensor circuits, accumulative evaluation

- Short-circuit monitoring for the sensor circuits
- Wide supply voltage range 24-240 V AC/DC
- Non-volatile fault storage configurable
- Remote reset
- Auto reset configurable
- Reset and test button
- Output contacts: 1 n/c and 1 n/o contact
- 4 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (7)	24-240 V AC/DC	**1SVR 430 720 R0500**	1		0.15 / 0.33

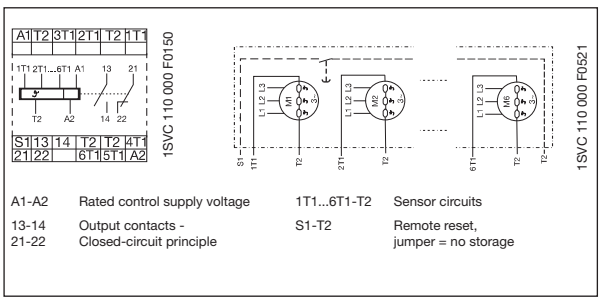


CM-MSN

① Reset / Test button
② to ⑦
F1-F6: red LED - fault tripping F1 to F6
⑧ U: green LED - control supply voltage
⑨ Marker label

CM-MSN, 6 sensor circuits, accumulative evaluation

- Short-circuit monitoring of the sensor circuit
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage configurable
- Remote reset
- Auto reset configurable
- Reset and test button
- Output contacts: 1 n/c, 1 n/o contact
- 7 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSN	24-240 V AC/DC	**1SVR 450 025 R0100**	1		0.23 / 0.51

accumulative evaluation = if any input exeeds the threshold, the output relay will trip

• **Accessories: PTC sensors** 2/72
• **Technical diagrams** 2/102
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• **Dimensional drawings** 2/103
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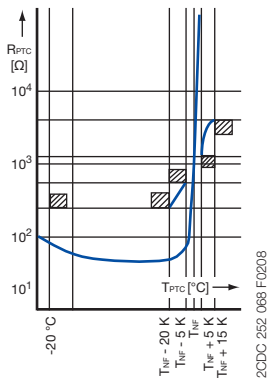
Thermistor motor protection
PTC temperature sensors C011
Ordering details, technical data

Temperature sensor characteristic



The PTC temperature sensors (temperature-dependent with positive temperature coefficient) are selected by the manufacturer of the motor depending on:

- the motor insulation class according to IEC/EN 60034-11,
- the special characteristics of the motor, such as the conductor cross-section of the windings, the permissible overload factor etc.
- special conditions prescribed by the user, such as the permissible ambient temperature, risks resulting from locked rotor, extent of permitted overload etc.

One temperature sensor must be embedded in each phase winding. For instance, in case of three-phase squirrel cage motors, three sensors are embedded in the stator windings. For pole-changing motors with one winding (Dahlander connection), 3 sensors are also sufficient. Pole-changing motors with two windings, however, require 6 sensors.

If an additional warning is required before the motor is switched off, separate sensors for a correspondingly lower temperature must be embedded in the winding. They have to be connected to a second control unit.

The sensors are suitable for embedding in motor windings with rated operating voltages of up to 600 V AC.
Conductor length: 500 mm per sensor.

A 14 V varistor can be connected in parallel to protect the sensors from overvoltage.

Due to their characteristics, the thermistor motor protection relays can also be used with PTC temperature sensors of other manufacturers which comply with DIN 44 081 and DIN 44 082.

Type	Rated response temperature T_{NF}	Color coding	Order code	Pack. unit set	Price 1 set	Weight 1 piece kg / lb
Temperature sensor C011, standard version acc. to DIN 44081						
1 set = 3 pieces						
C011-70	70 °C	white-brown	**GHC 011 0003 R0001**	1		0.02/0.044
C011-80	80 °C	white-white	**GHC 011 0003 R0002**	1		0.02/0.044
C011-90	90 °C	green-green	**GHC 011 0003 R0003**	1		0.02/0.044
C011-100	100 °C	red-red	**GHC 011 0003 R0004**	1		0.02/0.044
C011-110	110 °C	brown-brown	**GHC 011 0003 R0005**	1		0.02/0.044
C011-120	120 °C	gray-gray	**GHC 011 0003 R0006**	1		0.02/0.044
C011-130	130 °C	blue-blue	**GHC 011 0003 R0007**	1		0.02/0.044
C011-140	140 °C	white-blue	**GHC 011 0003 R0011**	1		0.02/0.044
C011-150	150 °C	black-black	**GHC 011 0003 R0008**	1		0.02/0.044
C011-160	160 °C	blue-red	**GHC 011 0003 R0009**	1		0.02/0.044
C011-170	170 °C	white-green	**GHC 011 0003 R0010**	1		0.02/0.044

Type	Rated response temperature T_{NF}	Color coding	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Triple temperature sensor C011-3						
C011-3-150	150 °C	black-black	**GHC 011 0033 R0008**	1		0.05/0.11

Technical data

Characteristic data	Sensor type C011
Cold-state resistance	50 -100 Ω at 25 °C
Warm-state resistance ± 5 up to 6 K of rated response temperature T_{NF}	10 000 Ω
Thermal time constant, sensor open [1]	< 5 s
Permitted ambient temperature	+180 °C

Rated response temperature ± tolerance $T_{NF} \pm \Delta T_{NF}$	PTC resistance R from -20 °C to T_{NF} - 20 K	PTC resistance R at PTC temperatures of:		
		$T_{NF} - \Delta T_{NF}$ ($U_{PTC} \leq 2.5$ V)	$T_{NF} + \Delta T_{NF}$ ($U_{PTC} \leq 2.5$ V)	$T_{NF} + 15$ K ($U_{PTC} \leq 7.5$ V)
70 ±5 °C	≤ 100 Ω	≤ 570 Ω	≥ 570 Ω	-
80 ±5 °C				
90 ±5 °C		≤ 550 Ω	≥ 1330 Ω	≥ 4000 Ω
100 ±5 °C				
110 ±5 °C				
120 ±5 °C				
130 ±5 °C				
140 ±5 °C				
150 ±5 °C				
160 ±5 °C				
170 ±7 °C		≤ 570 Ω	≥ 570 Ω	-

[1] Not embedded in windings.

[2] For triple temperature sensor take values x 3.

Thermistor motor protection relays CM-MSE, CM-MSS, CM-MSN
Technical data

Type			CM-MSE	CM-MSS	CM-MSN
Input circuit					
Rated control supply voltage U_S - power consumption	**A1-A2**		24 V AC	approx. 1.5 VA	
	A1-A2		24 V AC/DC	approx. 1.1 VA / 0.6 W	
	A1-A2		110-130 V AC	approx. 1.5 VA	
	A1-A2		220-240 V AC	approx. 1.5 VA	
	A1-A2		380-440 V AC	approx. 1.7 VA	
	A1-A2		24-240 V AC/DC	approx. 1.4-1.7 W / approx. 3.5-5.7 VA	
Rated control supply voltage U_S tolerance			-15 % ... +10 %		
Rated frequency			AC: 50-60 Hz / 24-240 V AC/DC versions: 15-400 Hz		
Duty time			100 %		
Measuring circuit			**T1-T2**	**T1-T2/T2x, 1T1...6T1-T2**	**1T1...6T1-T2**
Monitoring function			temperature monitoring by means of PTC sensors		
Number of senor circuits			1	1, 2 oder 3 (see order. details)	6
Short-circuit monitoring			-	see ordering details	yes
Non-volatile fault storage			-	see ordering details	configurable
Test function			-	see ordering details	yes
Sensor circuit					
Temperature threshold (relay de-energizes)			2.7-3.7 kΩ	CM-MSS (1+2): 3050±550 Ω CM-MSS (3-7): 3.6 kΩ ±5 %	3.6 kΩ ±5 %
Temperature hysteresis (relay energizes)			1.7-2.3 kΩ	CM-MSS (1+2): 1900±400 Ω CM-MSS (3-7): 1.6 kΩ ±5 %	1.6 kΩ ±5 %
Short circuit threshold (relay de-energizes)			<20 Ω		
Short circuit hysteresis (relay energizes)			>40 Ω		
Maximum total resistance of sensors connected in series (cold state)			≤1.5 kΩ		
Maximum sensor cable length for short-circuit detection			2 x 100 m at 0.75 mm², 2 x 400 m at 2.5 mm²		
Response time			<100 ms		
Control circuit for storage and hysteresis function					
Remote reset	**S1-T2 or S1/X1-S2/X2**		-	n/o contact	
Maximum no-load voltage			-	approx. 25 V, 24-240 V; AC/DC versions: 5.5 V	
Maximum cable length			-	≤ 50 m, 100-200 m if shielded	
Indication of operational states					
Control supply voltage	U: green LED		-	⎍: control supply voltage applied	
Fault indication	F: red LED		-	⎍: output relay de-energized	
Output circuits			**13-14**	**11-12/14, 21-22/24, 13-14, 21-22**	**13-14, 21-22**
Kind of output			1 n/o contact	CM-MSS (1): 1 c/o contact CM-MSS (2,3,5): 2 c/o contacts CM-MSS (4, 7): 1 n/o + 1 n/c CM-MSS (6): 2x1 c/o contact	1 n/o + 1 n/c contact
Operational principle			closed-circuit principle (output relay de-energizes if the measured value exceeds/drops below the adjusted threshold)		
Contactma terial			AgCdO	CM-MSS (1+2+6): AgCdO CM-MSS (3+4+5+7): AgNi	AgNi
Rated voltage	(VDE 0110, IEC 664-1, IEC 60947-1)		250 V		
Maximum switching voltage			250 V		
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive)	230 V	4 A		
	AC15 (inductive)	230 V	3 A		
	DC12 (resistive)	24 V	4 A		
	DC13 (inductive)	24 V	2 A (1.5 A - n/c contact[1])		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300		
	max. rated operational voltage		300 V AC		
	max. continuous thermal current at B 300		5 A		
	max. making/breaking apparent power at B 300		3600/360 VA		
Mechanical lifetime			30 (10 [1]) x 10⁶ switching cycles		
Electrical lifetime (AC12, 230 V, 4 A)			0.1 x 10⁶ switching cycles		
Max. fuse rating to achieve short circuit protection		n/c contact	10 A fast-acting	4 A (10 A[1]) fast-acting	10 A fast-acting
		n/o contact	10 A fast-acting	6 A (10 A[1]) fast-acting	10 A fast-acting
General data					
Dimensions (W x H X D)			22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)	22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)	45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)
Weight			approx. 0.11 kg (0.24 lb)	approx. 0.15 kg (0.33 lb)	approx. 0.23 kg (0.51 lb)
Mounting position			any		
Degree of protection		enclosure / terminals	IP50 / IP20		
Ambient temperature range		operation	-20...+60 °C		-25...+65 °C
		storage	-40...+85 °C		
Mounting			DIN rail (IEC/EN 60715)		

[1] 1SVR 430 710 R 0200, 1SVR 430 8xx R xxxx

Thermistor motor protection relays CM-MSE, CM-MSS, CM-MSN
Technical data

Type		CM-MSE	CM-MSS	CM-MSN
Electrical connection				
Wire size	fine strand with wire end ferrule	2 x 1.5 mm² (2 x 16 AWG)	2 x 2.5 mm² (2 x 14 AWG)	
	fine strand without wire end ferrule	2 x 0.75-1.5 mm² (2 x 18-16 AWG)	2 x 0.75-2.5 mm² (2 x 18-14 AWG)	
	rigid	2 x 1-1.5 mm² (2 x 18-16 AWG)	2 x 0.75-2.5 mm² (2 x 18-14 AWG)	
Stripping length		2 x 0.75-1.5 mm² (2 x 18-16 AWG)	2 x 0.5-4 mm² (2 x 20-12 AWG)	
Tightening torque		10 mm (0.39 inch)	7 mm (0.28 inch)	
Standards				
Product standard		IEC 255-6, EN 60255-6		
Low Voltage Directive		2006/95/EC		
EMC Directive		2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC		
Electromagnetic compatibility		EN 61000-6-2, EN 61000-6-4		
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)		
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)		
surge	IEC/EN 61000-4-5	Level 3/4 (1/2 kV)		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)		
Operational reliability (IEC 68-2-6)		6 g	4 g	5 g
Resistance to vibration (IEC 68-2-6)		10 g	6 g	10 g
Environmental testing (IEC 68-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h		
Isolation data				
Rated voltage between supply, measuring and output circuit		250 V		
Rated impulse withstand voltage between all isolated circuits		4 kV / 1.2 - 50 µs		
Test voltage between all isolated circuits		2.5 kV, 50 Hz, 1 min.		
Pollution degree		3		
Overvoltage category		III		

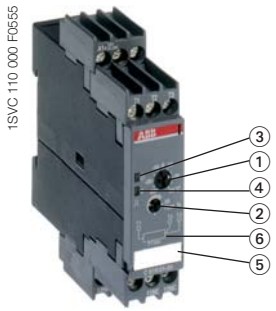
• **Approvals** 2/6

2CDC110004C0207

Temperature monitors for PT100, PT1000, KTY83, KTY84 and NTC sensors

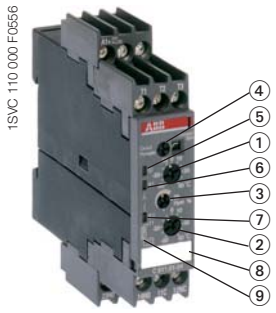
Content

Analog temperature monitoring relays C510 and C511
Ordering details



C510

① Threshold value adjustment
② Hysteresis adjustment
③ LED: control supply voltage
④ LED ϑ: relay status
⑤ Marker label
⑥ Circuit diagram



C511

① Threshold value 1 (tripping) adjustment
② Threshold value 2 (warning) adjustment
③ Hysteresis adjustment for threshold value 1
④ Selection switch for open- or closed circuit principle
⑤ LED: control supply voltage
⑥ LED ϑ1: relay 1 energized
⑦ LED ϑ2: relay 2 energized
⑧ Marker label
⑨ Circuit diagram

Analog tripping devices - C510 and C511

- Sensor types: PT100
- Measuring principle for 2- and 3-wire sensors
- Electrical isolation between the sensors and the power supply (except for 24 V AC/DC devices)
- Separate design for the crossing of the upper or lower threshold
- Depending on the version, measurement ranges for -50...+50 °C / 0...+100 °C / 0...+200 °C
- no storage
- Adjustment precision ± 5 %
- 22.5 mm enclosure with 12 terminals

C510

- 1 threshold ajdustable via absolute scale in °C
- Hysteresis adjustable from 2-20 %
- 1 n/o and 1 n/c contact
- 2 LEDs for status indication
- Closed-circuit principle

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
Monitoring function: Overtemperature						
C510.01-24	24 V AC/DC	**1SAR 700 001 R0005**	-50...+50 °C	1		0.15/0.33
C510.01-K	110/230 V AC	**1SAR 700 001 R0006**	-50...+50 °C	1		0.19/0.42
C510.02-24	24 V AC/DC	**1SAR 700 002 R0005**	0...+100 °C	1		0.15/0.33
C510.02-K	110/230 V AC	**1SAR 700 002 R0006**	0...+100 °C	1		0.19/0.42
C510.03-24	24 V AC/DC	**1SAR 700 003 R0005**	0...+200 °C	1		0.15/0.33
C510.03-K	110/230 V AC	**1SAR 700 003 R0006**	0...+200 °C	1		0.19/0.42
Monitoring function: Undertemperature						
C510.11-24	24 V AC/DC	**1SAR 700 004 R0005**	-50...+50 °C	1		0.15/0.33
C510.11-K	110/230 V AC	**1SAR 700 004 R0006**	-50...+50 °C	1		0.19/0.42
C510.12-24	24 V AC/DC	**1SAR 700 005 R0005**	0...+100 °C	1		0.15/0.33
C510.12-K	110/230 V AC	**1SAR 700 005 R0006**	0...+100 °C	1		0.19/0.42
C510.13-24	24 V AC/DC	**1SAR 700 006 R0005**	0...+200 °C	1		0.15/0.33
C510.13-K	110/230 V AC	**1SAR 700 006 R0006**	0...+200 °C	1		0.19/0.42

C511

- 2 thresholds (warning and switch-off) adjustable via absolute scale in °C
- Hysteresis for threshold 1 adjustable from 2-20 %
- Hysteresis for threshold 2 fixed 5 %
- 1 n/o and 1 c/o
- 3 LEDs for status indication
- Open- or closed-circuit principle selectable

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
Monitoring function: Overtemperature						
C511.01-24	24 V AC/DC	**1SAR 700 011 R0005**	-50...+50 °C	1		0.17/0.37
C511.01-W	24-240 V AC/DC	**1SAR 700 011 R0010**	-50...+50 °C	1		0.18/0.40
C511.02-24	24 V AC/DC	**1SAR 700 012 R0005**	0...+100 °C	1		0.17/0.37
C511.02-W	24-240 V AC/DC	**1SAR 700 012 R0010**	0...+100 °C	1		0.18/0.40
C511.03-24	24 V AC/DC	**1SAR 700 013 R0005**	0...+200 °C	1		0.17/0.37
C511.03-W	24-240 V AC/DC	**1SAR 700 013 R0010**	0...+200 °C	1		0.18/0.40
Monitoring function: Undertemperature						
C511.11-24	24 V AC/DC	**1SAR 700 014 R0005**	-50...+50 °C	1		0.17/0.37
C511.11-W	24-240 V AC/DC	**1SAR 700 014 R0010**	-50...+50 °C	1		0.18/0.40
C511.12-24	24 V AC/DC	**1SAR 700 015 R0005**	0...+100 °C	1		0.17/0.37
C511.12-W	24-240 V AC/DC	**1SAR 700 015 R0010**	0...+100 °C	1		0.18/0.40
C511.13-24	24 V AC/DC	**1SAR 700 016 R0005**	0...+200 °C	1		0.17/0.37
C511.13-W	24-240 V AC/DC	**1SAR 700 016 R0010**	0...+200 °C	1		0.18/0.40

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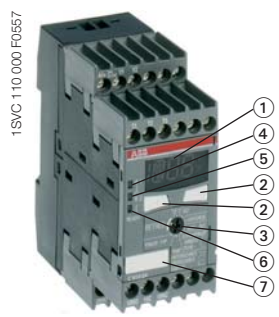
Digital temperature monitoring relays C512 and C513
Ordering details



C512, C513

① Display
② Adjustment button
③ Menu selection switch
④ LED ϑ1: Threshold value 1
⑤ LED ϑ2: Threshold value 1
⑥ LED Ready: device in function
⑦ Marker label

Digital tripping devices - C512 und C513

- Adjustable sensor types: PT100, PT1000, KTY83, KTY84, NTC-B57227-K333-A1
- Measuring principle for 2-wire and 3-wire sensors
- Electrical isolation (except 24 V AC/DC devices)
- Adjustable over-, undertemperature monitoring or range monitoring function
- 2 thresholds
- Hysteresis for both thresholds (1-99 Kelvin)
- Adjustable time delay from 0-999 s affects to both thresholds
- Storage function selectable via external signal (Y1-Y2)
- Non-volatile storage of parameter settings
- 1 n/o (for wire-break and short-circuit detection) and 2 c/o
- Multifunctional digital display
- 3 LEDs for status indication
- Open- or closed-circuit principle selectable
- 45 mm wide enclosure with 24 terminals

C512

- Temperature monitor for 1 sensor circuit

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece k g /lb
Monitoring function: Over- and undertemperature, range monitoring function						
C512-24	24 V AC/DC	**1SAR 700 100 R0005**	-50...+500 °C *)	1		0.32/0.71
C512-W	24-240 V AC/DC	**1SAR 700 100 R0010**	-50...+500 °C *)	1		0.33/0.73

C513

- Temperature monitor for 1-3 sensor circuits
- In the 3-sensor version the status of the single sensors is displayed if the temperature exceeds or falls below the threshold.

This way it can be easily determined which one of the connected sensors has exceeded or dropped below either one or both threshold values.

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
Monitoring function: Over- and undertemperature, range monitoring function						
C513-W	24-240 V AC/DC	**1SAR 700 110 R0010**	-50...+500 °C *)	1		0.34/0.75

Accessories - Replaceable cover marking for digital devices

Type	use for	Order code	Language	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
C512-D	C512	**1SAR 700 101 R0100**	German	5		
C512-E	C512	**1SAR 700 102 R0100**	English	5		
C513-D	C513	**1SAR 700 111 R0100**	German	5		
C513-E	C513	**1SAR 700 112 R0100**	English	5		

*) The measuring range depends on the used sensor type:

- PT100: -50...+500 °C
- PT1000: -50...+500 °C
- NTC: +80...+160 °C
  (Typ Siemens Matsushita B57272-A333-A1 - 100 °C: 1,8 kΩ, 25 °C: 32,762 kΩ)
- KTY83: -50...+175 °C
- KTY84: -40...+300 °C

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Temperature monitoring relays
C51x range
Overview, functional description and diagrams

Overview

The C51x temperature monitoring relays can be used for temperature measurement in solid, liquid and gaseous media.

The temperature is acquired by the sensor in the medium, evaluated by the device and monitored to determine whether it is within an operating range (range monitoring function) or has exceeded or fallen below a threshold.

The family is composed of analog adjustable devices with one or two thresholds, and digital devices which are a good alternative especially in the low-end range.

The output relay switches on or off at the thresholds, depending on the configured functionality (open- or closed-circuit principle selectable).

Functional description

Analog tripping devices

Once the temperature has reached the set threshold, output relay K1 changes its switching state. In devices with 2 thresholds relay K2 reacts correspondingly if the second threshold is reached.
No time delay can be set (t = 0).

The relays immediately return to their original switching state if the temperature reaches the set hysteresis value.

Once the temperature has reached the upper threshold of υ1, output relay K1 changes its switching state after the set time t.
The relay immediately returns to its original switching state if the temperature reaches the set hysteresis value.
K2 reacts correspondingly at the lower threshold value of υ2.

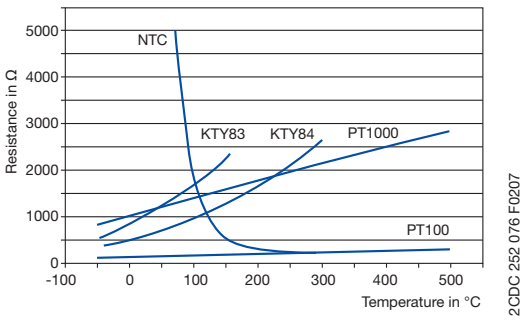
Once the temperature has reached the set threshold of υ1, output relay K1 changes its switching state after the set time t has elapsed. (K2 reacts in the same way at υ2).

The relays return to their original state if the temperature drops below the set hysteresis value and the connection Y1-Y2 is interrupted for a short time.

Digital tripping devices

Once the temperature has reached the set threshold of υ1, output relay K1 changes its switching state after the set time delay t has elapsed (K2 reacts in the same way for υ2).

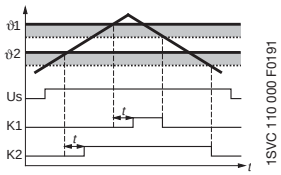
Characteristic curves of resistance sensors



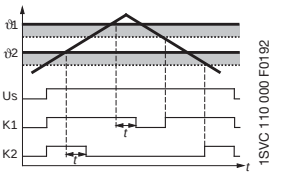
Function diagrams

Overtemperature

Open-circuit principle

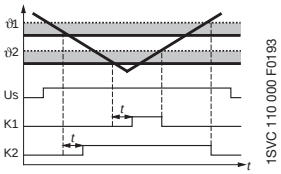


Closed-circuit principle

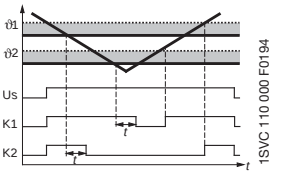


Undertemperature

Open-circuit principle

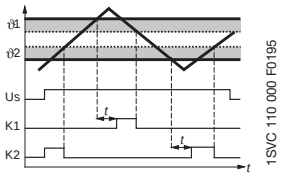


Closed-circuit principle

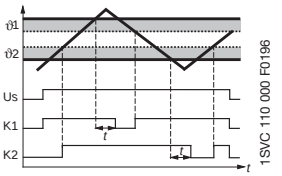


Range monitoring (only digital devices)

Open-circuit principle

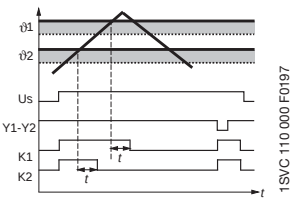


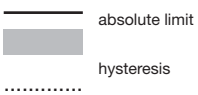
Closed-circuit principle



Function principle with storage function

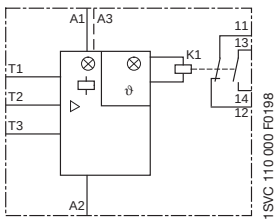
using overtemperature with closed-circuit principle as an example





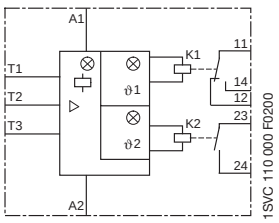
Temperature monitoring relays
C51x range
Connection diagrams, connection of resistance thermometer sensors

Connection diagrams



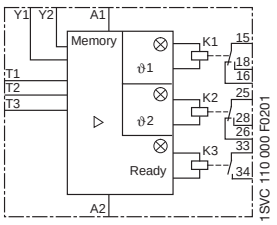
C510

A1/A3-A2	Rated control suppy voltage
11-12	Output contacts
13-14	
T1-T3	Sensor connection



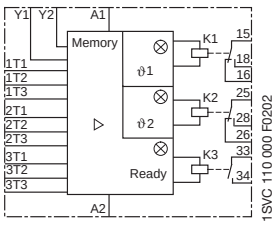
C511

A1-A2	Rated control suppy voltage
11-12/14	Output contacts
23-24	
T1-T3	Sensor connection



C512

A1-A2	Rated control suppy voltage
15-16/18	Output contacts
25-26/28	
33-34	
T1-T3	Sensor connection
Y1-Y2	Connection for storage bridge



C513

A1-A2	Rated control suppy voltage
15-16/18	Output contacts
25-26/28	
33-34	
1T1-1T3	Sensor connection 1
2T1-2T3	Sensor connection 2
3T1-3T3	Sensor connection 3
Y1-Y2	Connection for storage bridge

Connection of resistance thermometer sensors

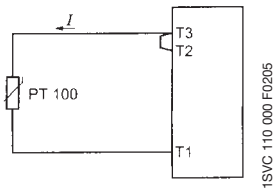
2-wire measurement

When using 2-wire temperature sensors the sensor resistance and the wire resistance are added together.

The resulting systematic errors must be taken into account when adjusting the tripping device.

A jumper must be connected between the terminals T2 and T3.

The following table can be used for PT100 sensors to determine the temperature errors caused by the line length.



ATTENTION!

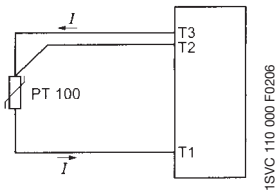
When using resistance sensors with two-wire connection a bridge must be inserted between terminals T2 and T3.

3-wire measurement

To minimize the influence of the wire resistance, a three-wire connection is usually used.

By means of the additional wire two measuring circuits are created.

One of these two circuits is used for reference. This way, the tripping device can calculate and take into account the wire resistance automatically.



Error caused by the line

The error resulting from the line resistance amounts to approx. 2.5 Kelvin/Ohm. If the resistance of the line is not known and it is not possible to measure it, the error caused by the line can be estimated using the following table.

Temperature error

(depending on the line length and conductor cross section for PT100 sensors at an ambient temperature of 20 °C, in K)

Line length in m	Wire size mm²			
	0.50	0.75	1	1.5
0	0.0	0.0	0.0	0.0
10	1.8	1.2	0.9	0.6
25	4.5	3.0	2.3	1.5
50	9.0	6.0	4.5	3.0
75	13.6	9.0	6.8	4.5
100	18.1	12.1	9.0	6.0
200	36.3	24.2	18.1	12.1
500	91.6	60.8	45.5	30.2

Temperature monitoring relays
C51x range
Technical data

Type			C510	C511	C512	C513
Input circuit						
Rated control supply voltage U_S		A1-A2	24 V AC/DC			-
		A1-A2	230 V AC	24-240 V AC/DC		
		A3-A2	110 V AC	-		
Power consumption		AC	< 4 VA		< 7 VA	
		DC	< 2 W		< 4 W	
Rated control supply voltage U_S tolerance			-15...+10 %			
Rated frequency		AC	50/60 Hz			
Sensor circuit						
Sensor type			PT100		PT100, PT1000, KTY83, KTY84, NTC	
Sensor current		PT100	typ. 1 mA			
		PT1000, KTY83, KTY84, NTC	-		typ. 0.2 mA	
Wire-break detection			no		yes (not for NTC)	
Short-circuit detection			no		yes	
3-wire connection			yes (2-wire connection of sensors with terminals T2 and T3 bridged)			
Measuring circuit						
Setting accuracy at T_a = 20 °C (T_{20})			typ. < ± 5 % of full-scale value		< ±2 K ± 1digit	
Accuracy within the temperature range			< 2 %		0.05 °C / °C deviation from T_{20}	
Response time			-		500 ms	
Hysteresis settings		temperature 1	2-20 % of full-scale value		1-99 kelvin	
		temperature 2	-	5 % of full-scale value	1-99 kelvin	
Tripping delay			-		0-999 s	
Output circuit						
Kind of output			1 n/o + 1 n/c	1 c/o + 1 n/o	2 c/o + 1n/o	2 c/o + 1 n/o
Rated operating current I_e (IEC/EN 60947-1-5)	AC12	(resistive) 230 V	3 A			
	AC15	(inductive) 230 V	3 A			
	DC12	(resistive) 24 V	1 A			
	DC13	(inductive) 24 V	0.1 A			
Mechanical lifetime			3 x 10^6 switching cycles		30 x 10^6 switching cycles	
Electrical lifetime (AC15 at 3 A)			0.1 x 10^5 switching cycles			
Max. fuse rating to achieve short circuit protection			4 A, operating class gL/gG			
General data						
Dimensions (W x H x D)			22.5 x 101.6 x 86 mm (0.89 x 4 x 3.39 in)		45 x 105.9 x 86 mm (1.77 x 4.17 x 3.39 in)	
Tightening torque			0.8-1.2 Nm			
Mounting position			any			
Degree of protection	enclosure / terminals		IP 40 / IP 20			
Ambient temperature range		operation	-25...+60 °C			
		storage	-40...+80 °C			
Mounting			DIN rail (IEC/EN 60715)			
Electrical connection						
Wire size		rigid	1 x 4 mm² (1 x 12 AWG), 2 x 2.5 mm² (2 x 14 AWG)			
		fine-strand with wire end ferrule	1 x 2.5 mm² (1 x 14 AWG), 2 x 1.5 mm² (2 x 16 AWG)			
Standards						
Environmental conditions			IEC 60721-3-3			
Low Voltage Directive			IEC 60947-5-1, VDE 0660			
Electromagnetic compatibility	Interference immunity		EN 61000-6-2			
	Interference emission		EN 61000-6-4			
Vibration resistance (IEC 68-2-6)			5-26 Hz / 0.75 mm			
Shock resistance (IEC 68-2-27)			15 g / 11 ms			
Isolation data						
Rated insulation voltage			300 V AC			
Pollution degree			3			

• **Approvals** 2/6

Liquid level monitors and controls

Content

Liquid level relays
CM-ENE MIN, CM-ENE MAX
Ordering details

CM-ENE MIN

CM-ENE MAX

① R: yellow LED - relay status

- Monitoring of pump systems for dry running (ENE MIN) and overflow (ENE MAX)
- Connection of 2 electrodes possible at C and MIN/MAX
- 3 supply voltage versions
- Optimal price/performance ratio
- 1 n/o contact: Open-circuit principle for CM-ENE MIN
- Closed-circuit principle for CM-ENE MAX
- LED for status indication

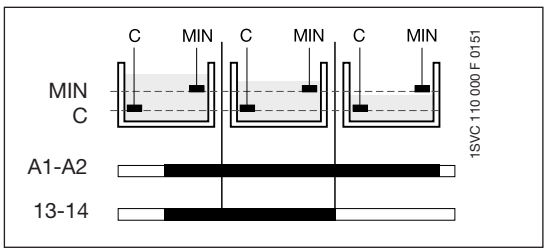
The liquid level relays CM-ENE MIN and CM-ENE MAX are used to monitor levels of conductive liquids, for example in pump control systems for dry-running or overflow monitoring.

The measuring principle is based on the occurring resistance change when moisting single-pole electrodes. The single-pole electrodes (see also section Accessories) are connected to the terminals C and MIN or MAX.

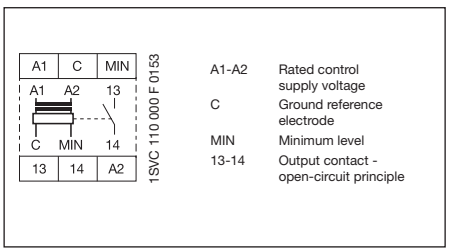
If the supply voltage is applied to A1-A2 and the electrodes are wet, the output relay of the CM-ENE MIN is energized and the output relay of the CM-ENE MAX is de-energized.

The output relay of the CM-ENE MIN de-energizes if the electrodes are no longer wet. The output relay of the CM-ENE MAX energizes if the electrodes are no longer wet.

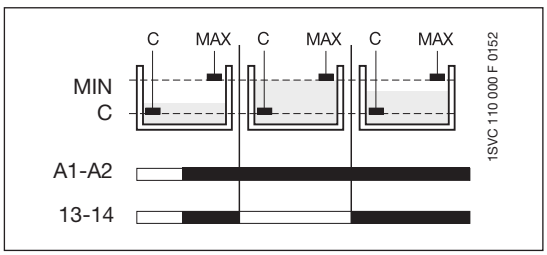
Function diagram CM-ENE MIN



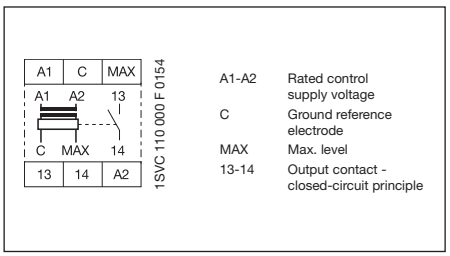
Connection diagram CM-ENE MIN



Function diagram CM-ENE MAX



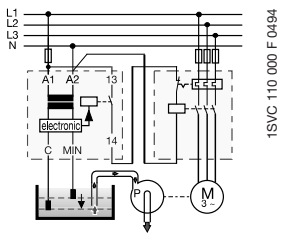
Connection diagram CM-ENE MAX



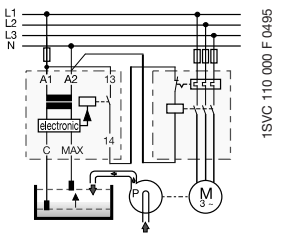
If a metal tank is used, the ground reference electrode C is not required. In this case the cable can be connected directly to the metal surface of the tank.

Application examples

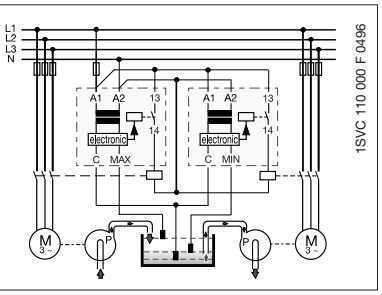
CM-ENE MIN



CM-ENE MAX



CM-ENE MIN und CM-ENE MAX



Suitable for		Not suitable for	
spring water	acids, bases	chemically pure water	ethylene glycol
drinking water	liquid fertilizers	fuel	concentrated alcohol
sea water	milk, beer, coffee	oils	paraffin
sewage	non-concentrated alcohol	explosive areas (liquid gas)	lacquers

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENE MIN	24 V AC	**1SVR 550 855 R9500**	1		0.15 / 0.33
	110-130 V AC	**1SVR 550 850 R9500**	1		0.15 / 0.33
	220-240 V AC	**1SVR 550 851 R9500**	1		0.15 / 0.33
CM-ENE MAX	24 V AC	**1SVR 550 855 R9400**	1		0.15 / 0.33
	110-130 V AC	**1SVR 550 850 R9400**	1		0.15 / 0.33
	220-240 V AC	**1SVR 550 851 R9400**	1		0.15 / 0.33

• **Accessories**..... 2/87 and 2/104 • **Technical data**.....2/88 • **Dimensional drawings** 2/103

Liquid level relays
CM-ENS
Ordering details

CM-ENS

① "Sens." - sensitivity potentiometer for adjusting the response sensitivity
② R: yellow LED - relay status
③ U: green LED - control supply voltage
④ Marker label

- Monitoring and control of liquid levels (when draining or filling liquids in tanks)
- Monitoring and control of mixture ratios (conductivity of liquids)
- Adjustable response sensitivity 5-100 kΩ
- 4 supply voltage versions 24 - 415 V AC
- Version with protective separation acc. to VDE 0160
- Cascadable
- 1 c/o contact or 1 n/o and 1 n/c contact
- 2 LEDs for status indication

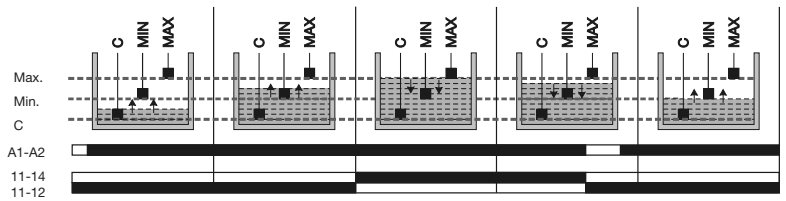
The CM-ENS monitors levels of conductive liquids and is used for example for liquid level control in pump systems. It can be used for filling or draining tanks for example.

It is also suitable for monitoring the conductivity of liquids. The measuring principle is based on the resistance change sensed by single-pole electrodes. After the supply voltage is applied to the terminals A1 and A2, the output relay is de-energized. The probes must be connected to C, MAX, MIN.

The output relay energizes if the liquid exceeds the maximum level (C and MAX wet) and de-energizes if the liquid level is below the minimum level (MAX and MIN dry).

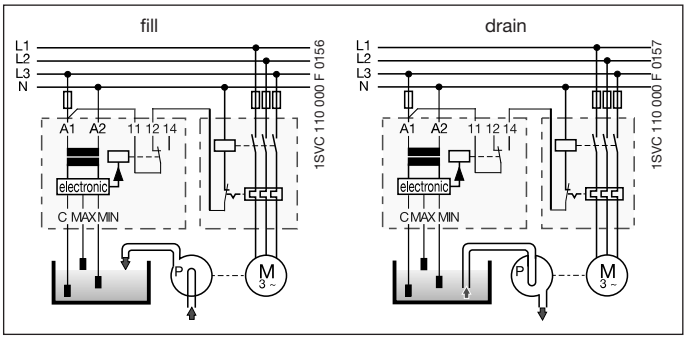
Based on the measuring circuit there will be a response delay of approx. 250 ms at maximum sensitivity. Different levels in one tank can be controlled by up to 5 CM-ENS without interfering with each other.

Function diagram CM-ENS

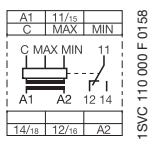


When using a metal tank the electrode C is not required. In this case the cable can be connected directly to the metal surface of the tank.

Application examples

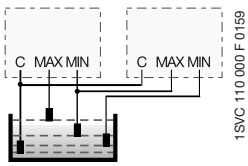


Connection diagram CM-ENS



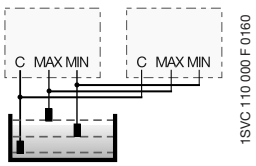
A1-A2	Rated control supply voltage
C	Ground reference electrode
MAX	Maximum level
MIN	Minimum level
11(15)-12(16)/14(18)	Output contacts - open-circuit principle

Cascading
The electrode inputs can be interconnected as required, which ensures simple monitoring of different liquid levels.



Redundancy
Redundant liquid level monitoring or control can be implemented by connecting the electrodes to two units.

This makes the application much safer.

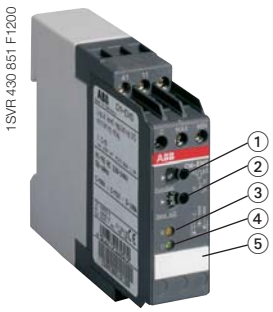


Suitable for		Not suitable for	
spring water	acids, bases	chemically pure water	ethylene glycol
drinking water	liquid fertilizers	fuel	concentrated alcohol
sea water	milk, beer, coffee	oils	paraffin
sewage	non-concentrated alcohol	explosive areas (liquid gas)	lacquers

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENS	24 V AC	**1SVR 430 851 R9100**	1		0.15 / 0.33
	110-130 V AC	**1SVR 430 851 R0100**	1		0.15 / 0.33
	220-240 V AC	**1SVR 430 851 R1100**	1		0.15 / 0.33
	380-415 V AC	**1SVR 430 851 R2100**	1		0.15 / 0.33
Version with protective separation acc. to VDE 0160, 1 n/o, 1 n/c					
CM-ENS	220-240 V AC	**1SVR 430 851 R1300**	1		0.15 / 0.33

• **Accessories** ..... 2/87 and 2/104
• **Technical data** 2/89
• **Technical diagrams** 2/102
• **Dimensional drawings** 2/103

Liquid level relays
CM-ENS UP/DOWN
Ordering details



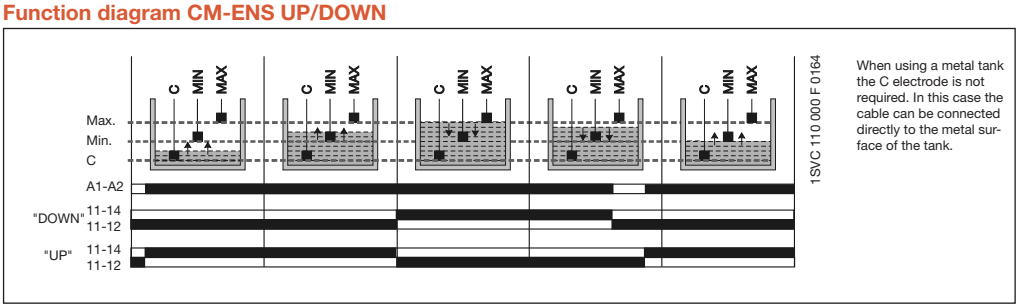
CM-ENS UP/DOWN

① "Func." - function selector switch:
"UP"- fill
"DOWN" - drain
② "Sens." - sensitivity potentiometer for adjusting the response sensitivity
③ R: yellow LED - relay status
④ U: green LED - control supply voltage
⑤ Marker label

- Monitoring and control of liquid levels
- Selectable function "fill" or "drain"
- Adjustable response sensitivity 5-100 kΩ
- Cascadable
- 1 c/o contact
- 2 LEDs for status indication

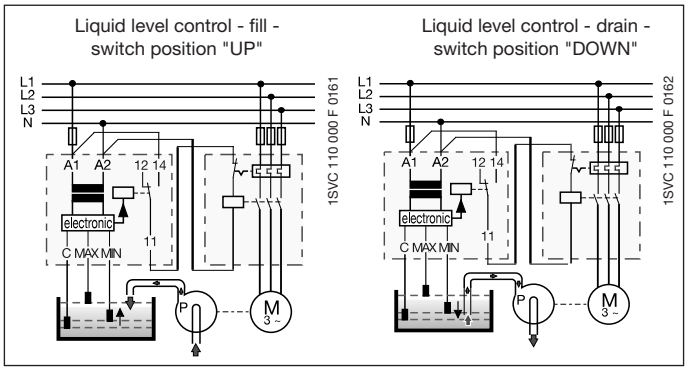
The CM-ENS UP/DOWN monitors levels of conductive liquids and other media, and is used e.g. for liquid level control in pump systems.
The measuring principle is based on the resistance change sensed by single-pole electrodes.
The output relay functions fill (UP) or drain (DOWN) can be selected on a front-face selector switch.
If the "UP" function is selected, the output relay is energized until the MAX electrode becomes wet. Then it is de-energized and not re-energized until the MIN electrode becomes dry.
If the "DOWN" function is selected, the output relay is energized as soon as the MAX electrode becomes wet. It remains energized until the liquid level has dropped below the MIN electrode.
The electrodes can be connected to more than one CM-ENS unit without interference.

Function diagram CM-ENS UP/DOWN

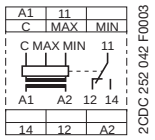


When using a metal tank the C electrode is not required. In this case the cable can be connected directly to the metal surface of the tank.

Application examples

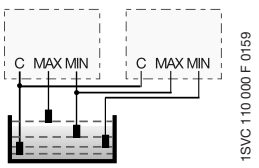


Connection diagram CM-ENS UP/DOWN

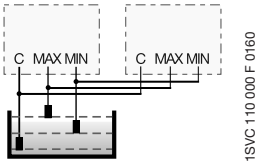


A1 - A2	Rated control supply voltage
C	Ground reference electrode
MAX	Maximum level
MIN	Minimum level
11-12/14	Output contacts - open-circuit or closed-circuit principle selectable

Cascading of electrodes
The electrode inputs can be interconnected as required, which ensures simple monitoring of different liquid levels.



Redundancy
Redundant liquid level monitoring or control can be implemented by connecting the electrodes to two units.
This makes the application much safer.

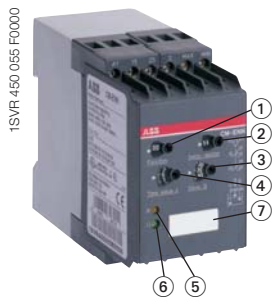


Suitable for		Not suitable for	
spring water	acids, bases	chemically pure water	ethylene glycol
drinking water	liquid fertilizers	fuel	concentrated alcohol
sea water	milk, beer, coffee	oils	paraffin
sewage	non-concentrated alcohol	explosive areas (liquid gas)	lacquers

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENS UP/DOWN	24 V AC	**1SVR 430 851 R9200**	1		0.15/0.33
	110-130 V AC	**1SVR 430 851 R0200**	1		0.15/0.33
	220-240 V AC	**1SVR 430 851 R1200**	1		0.15/0.33

• **Accessories** ..... 2/87 and 2/104
• **Technical diagrams** 2/102
• **Technical data** 2/89
• **Dimensional drawings** 2/103

Liquid level relays
CM-ENN
Ordering details



CM-ENN

① "Function" - time function selector switch:
- ⊠ ON-delay
- ■ OFF-delay

② "Sens.-sector" - measuring range selector switch

③ "Sens. " - sensitivity potentiometer for adjusting the response sensitivity

④ "Time value" - fine adjustment of time delay

⑤ R: yellow LED - relay status

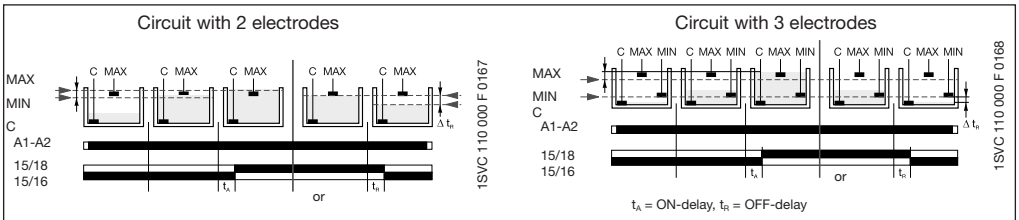
⑥ U: green LED - control supply voltage

⑦ Marker label

- Monitoring and control of liquid levels (when emptying or filling liquids in tanks)
- Monitoring and control of mixture ratios (conductivity of liquids)
- 3 response sensitivities from 250 Ω - 500 kΩ in one unit
- 5 supply voltage versions 24 V AC/DC - 415 V AC
- Selectable ON- or OFF-delay 0.1-10 s
- 2 c/o contacts
- 2 LEDs for status indication

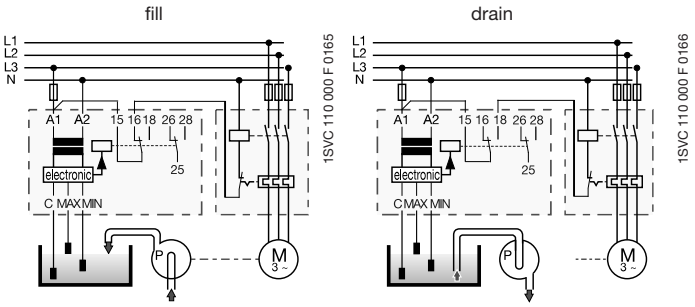
The CM-ENN monitors levels of conductive liquids and is used for example for liquid level monitoring in pump control systems, for dry-running protection of submersible pumps or overflow monitoring of tanks. It is also suitable for conductivity monitoring of liquids.
The measuring principle is based on the resistance change sensed by single-pole electrodes (wet or dry).
Instead of electrodes, other sensors or transducers can also be used if their output quantities are different resistance values. The measuring, output and supply circuits are electrically isolated for potential separation and to prevent electrical interference.
Due to the integrated ON- or OFF-delay, it is possible to set up time-dependent liquid controls using only two electrodes (C, MAX). Different liquid levels in one tank can be controlled by up to 5 CM-ENN (AC version) without mutual interference.

Function diagrams CM-ENN



When using a metal tank the C electrode is not required. In this case the cable can be connected directly to the metal surface of the tank.

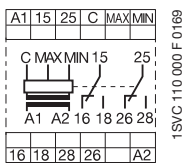
Application examples



For commissioning, set both potentiometers (response sensitivity = R value and ON-delay = time value) to the minimum value (5) and select a suitable resistance range (sector).
After all electrodes have been wetted by the liquid being monitored, turn the sensitivity potentiometer towards maximum value (100) until the relay energizes. If the relay does not energize, select a higher Ω value (sector) on the device and proceed as before.
Then it has to be checked if the relay de-energizes properly as soon as the electrodes C and MIN are no longer wet. Liquid levels higher than the maximum level electrode can be obtained by setting an ON-delay (TA = 0.1...10 s).

Liquid levels lower than the minimum level electrode can be obtained by setting an OFF-delay time (TR = 0.1...10 s), e.g. for emptying tanks.

Connection diagram CM-ENN



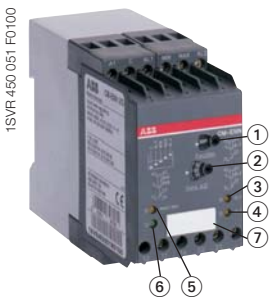
A1-A2	Rated control supply voltage
C	Ground reference electrode
MIN	Min. level electrode
MAX	Max. level electrode
15-16/18 25-26/28	Output contacts - open-circuit principle

Typ	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENN	24-240 V AC/DC	**1SVR 450 055 R0000**	1		0.30 / 0.66
	24 V AC	**1SVR 450 059 R0000**	1		0.30 / 0.66
	110-130 V AC	**1SVR 450 050 R0000**	1		0.30 / 0.66
	220-240 V AC	**1SVR 450 051 R0000**	1		0.30 / 0.66
	380-415 V AC	**1SVR 450 052 R0000**	1		0.30 / 0.66

Response sensitivity	Max. electrode current	Max. cable capacity	Max. cable length	
250 Ω - 5 kΩ	8 mA	200 nF	1000 m	
2.5-50 kΩ	2 mA	20 nF	100 m	
25-500 kΩ	0.5 mA	4 nF	20 m	

- **Accessories** ..... 2/87 and 2/104
- **Technical data** 2/90
- **Technical diagrams** 2/102
- **Dimensional drawings** 2/103

Liquid level relays - Liquid level control with two alarm outputs - CM-ENN UP/DOWN
Ordering details



CM-ENN UP/DOWN

① "Func." - function selector switch:
"UP"- fill
"DOWN" - drain
② "Sens." - sensitivity potentiometer for adjusting the response sensitivity
③ R AL1: yellow LED - relay status AL1
④ R AL2: yellow LED - relay status AL2
⑤ R: MIN/MAX: yellow LED - relay status MIN/MAX
⑥ U: green LED - control supply voltage
⑦ Marker label

- Liquid level relay with 5 electrode inputs
- Level control with integrated overflow and dry-running protection
- Adjustable response sensitivity 5-100 kΩ
- Cascadable
- 1 c/o contact and 2 n/c contacts as alarm outputs
- 4 LEDs for status indication

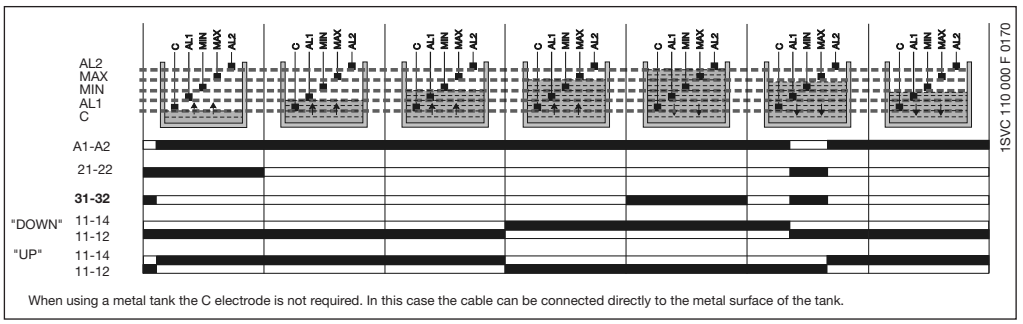
The CM-ENN UP/DOWN monitors levels of conductive liquids and media and is used e.g. for liquid level control in pump systems. The measuring principle is based on the resistance change sensed by single-pole electrodes.

The function of the output relay 11-12/14 can be selected by a selector switch on the front of the unit to fill "UP" or drain "DOWN". If the "UP" function is selected, the output relay is energized until the MAX electrode becomes wet. Then it is de-energized and not re-energized until the MIN electrode becomes dry.

If the "DOWN" function is selected, the output relay is energized as soon as the MAX electrode becomes wet. It remains energized until the liquid level has dropped below the MIN electrode.

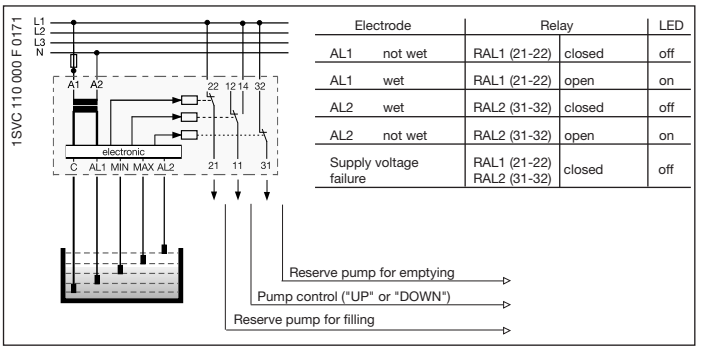
The electrode inputs AL1 and AL2 energize/de-energize the correspopnding output relays RAL1 (21-22) and RAL2 (31-32). AL1 opens if contact RAL1 (21-22) is wet. AL2 closes if contact RAL2 (31-32) is wet. This way, two additional alarm outputs for exceeding or dropping below the normal level can be implemented in addition to the filling levels MAX and MIN.

Function diagram CM-ENN UP/DOWN



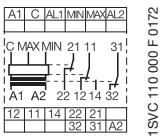
When using a metal tank the C electrode is not required. In this case the cable can be connected directly to the metal surface of the tank.

Application example



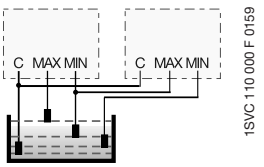
Electrode		Relay		LED
AL1	not wet	RAL1 (21-22)	closed	off
AL1	wet	RAL1 (21-22)	open	on
AL2	wet	RAL2 (31-32)	closed	off
AL2	not wet	RAL2 (31-32)	open	on
Supply voltage failure		RAL1 (21-22) RAL2 (31-32)	closed	off

Connection diagram CM-ENN UP/DOWN



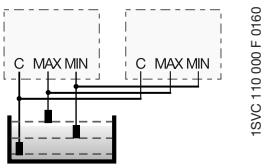
A1-A2	Rated control supply voltage
C	Ground reference electrode
MIN	Minimum level electrode
MAX	Maximum level electrode
AL1	Alarm electrode 1
AL2	Alarm electrode 2
11-12/14 21-22 31-32	Output contacts - open-circuit or closed-circuit principle selectable

Cascading of electrodes
The electrode inputs can be interconnected as required, which ensures simple monitoring of different liquid levels.



Redundancy
Redundant liquid level monitoring or control can be implemented by connecting the electrodes to two units.

This makes the application much safer.



Suitable for		Not suitable for	
spring water	acids, bases	chemically pure water	ethylene glycol
drinking water	liquid fertilizers	fuel	concentrated alcohol
sea water	milk, beer, coffee	oils	paraffin
sewage	non-concentrated alcohol	explosive areas (liquid gas)	lacquers

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENN UP/DOWN	24 V AC	**1SVR 450 059 R0100**	1		0.15 / 0.33
	110-130 V AC	**1SVR 450 050 R0100**	1		0.15 / 0.33
	220-240 V AC	**1SVR 450 051 R0100**	1		0.15 / 0.33
	380-415 V AC	**1SVR 450 052 R0100**	1		0.15 / 0.33

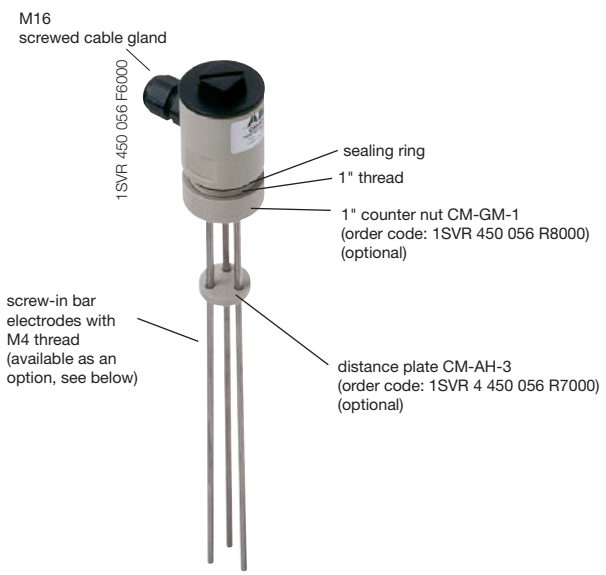
• **Accessories** .....2/87 and 2/104
• **Technical diagrams** 2/102
• **Technical data** 2/89
• **Dimensional drawings** 2/103

Liquid level relays - Accessories
Electrodes
Ordering details, dimensional drawings

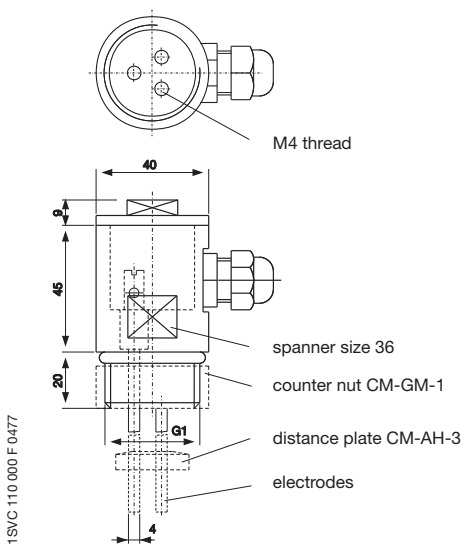
Compact support CM-KH-3 for 3 bar electrodes

Dimensions in mm

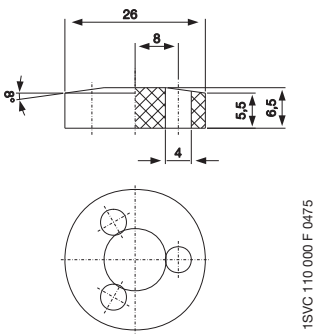
- Ideally suited for use with liquid level relays CM-ENS and CM-ENN
- Wire connection by screw terminals
- Pull relief by M16 screwed cable glands
- Temperature range up to 90 °C
- Food safe material (PPH)
- Screw-in electrodes (M4 thread)
- Distance plate (CM-AH-3) and locking nut (CM-GM-1) optionally available as an accessory



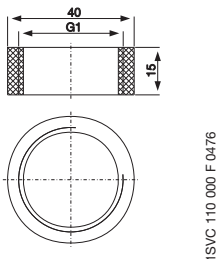
Compact support CM-KH-3



Distance plate CM-AH-3



Counter nut CM-GM-1

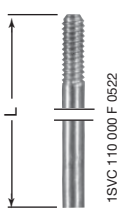


Technical data compact support

Type of mounting:	G 1" thread
Mounting position:	any
Enclosure material:	PPH
Sealing:	NBR 70
Temperature range:	90 °C max.
Pressure:	10 bar max. (60 °C)

Type	Description	Order code	Pack. unit 1 piece	Price 1 piece	Weight 1 piece kg / lb
CM-KH-3	Compact support for 3 bar electrodes	**1SVR 450 056 R6000**	1		0.06 / 0.132
CM-AH-3	Distance plate for 3 bar electrodes	**1SVR 450 056 R7000**	1		0.06 / 0.132
CM-GM-1	Counter nut for 1" thread	**1SVR 450 056 R8000**	1		0.06 / 0.132

Screw-in bar electrodes for compact support CM-KH-3

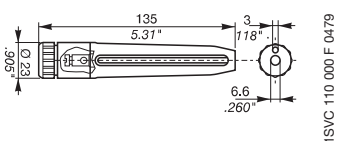


Thread M4

Material: stainless steel 304, high-grade steel 14301

Suspension electrode CM-HE

Steel electrode
(X14CrMoS17) with sleeve
(Lupulen 6011 L)
suitable up to 60°C max.



During project engineering the compatibility of the electrode material with the medium to be supervised is to be examined!

Type	Length	Order code	Pack. unit 1 piece	Price 1 piece	Weight 1 piece kg / lb
CM-SE-300	300 mm	**1SVR 450 056 R0000**	1		0.08 /0.176
CM-SE-600	600 mm	**1SVR 450 056 R0100**	1		0.08 /0.176
CM-SE-1000	1000 mm	**1SVR 450 056 R0200**	1		0.08 /0.176
CM-HE	-	**1SVR 402 902 R0000**	1		0.08 /0.176

Liquid level relays
CM-ENE MIN, CM-ENE MAX
Technical data

Type			CM-ENE MIN	CM-ENE MAX
Supply circuit				
Rated control supply voltage U_S - power consumption		**A1-A2**	24 V AC	approx. 1.5 VA
		A1-A2	110-130 V AC	approx. 1.2 VA
		A1-A2	220-240 V AC	approx. 1.4 VA
Rated control supply voltage U_S tolerance			-15...+15 %	
Rated frequency			50-60 Hz	
Duty time			100 %	
Measuring circuit			**MIN-C, MAX-C**	
Monitoring function			dry-running protection	overflow protection
Response sensitivity			0-100 kΩ, not adjustable	
Maximum electrode voltage			30 V AC	
Maximum electrode current			1.5 mA	
Electrode supply line		max. cable capacity	3 nF	
		max. cable length	30 m	
Timing circuit				
Time delay			-	
Tripping delay			fixed approx. 200 ms	
Indication of operational states				
Output relay energized			R: yellow LED	
Output circuits			**13-14**	
Kind of output			1 n/o contact	
Operational principle [1]			open-circuit principle	closed-circuit principle
Contact material			AgCdo	
Rated operational voltage U_e		(IEC/EN 60947-1)	250 V	
Mininimum switching voltage / minimum switching current			- / -	
Maximum switching voltage			250 V	
Rated operational current I_e (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	4 A	
		AC15 (inductive) 230 V	3 A	
		DC12 (resistive) 24 V	4 A	
		DC13 (inductive) 24 V	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300	
	max. rated operational voltage		300 V AC	
	max. continuous thermal current at B 300		5 A	
	max. making/breaking apparent power at B 300		3600/360 VA	
Mechanical lifetime			30 x 10^6 switching cycles	
Electrical lifetime (AC12, 230 V, 4 A)			0.3 x 10^6 switching cycles	
Max. fuse rating to achieve short circuit protection		n/c contact	-	
		n/o contact	10 A fast-acting	
General data				
Dimensions (W x H x D)			22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)	
Mounting position			any	
Degree of protection		enclosure / terminals	IP50 / IP20	
Ambient temperature range		operation / storage	-20...+60 °C / -40...+85 °C	
Mounting			DIN rail (IEC/EN 60715)	
Electrical connection				
Wire size	fine-strand with wire-end ferrule		2 x 0.75-1.5 mm² (2 x 18-16 AWG)	
	fine-strand without wire-end ferrule		2 x 1-1.5 mm² (2 x 18-16 AWG)	
	rigid		2 x 0.75-1.5 mm² (2 x 18-16 AWG)	
Stripping length			10 mm (0.39 inch)	
Tightening torque			0.6-0.8 Nm	
Standards				
Product standard			IEC 255-6, EN 60255-6	
Low Voltage Directive			2006/95/EC	
EMC Directive			2004/108/EC	
Electromagnetic compatibility			EN 61000-6-2, EN 61000-6-4	
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
surge		IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)	
Resistance to vibration (IEC 68-2-6)			6 g	
Mechanical resistance (IEC 68-2-6)			10 g	
Isolation data				
Rat. insulation volt. betw. supply, meas. & output circuit (VDE 0110, IEC 60947)			250 V	
Rated impulse withstand voltage between all isolated circuits (VDE0 110, IEC 664)			4 kV / 1.2-50 µs	
Test voltage between all isolated circuits			2.5 kV, 50 Hz, 1 min.	
Pollution category (VDE 0110, IEC 664, IEC 255-5)			3 / C	
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)			III / C	
Environmental testing (IEC 68-2-30)			24 h cycle time, 55 °C, 93 % rel., 96 h	

[1] Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

• **Approvals** 2/6

2CDC110004C0207

Liquid level relays
CM-ENS, CM-ENS UP/DOWN
Technical data

Type			CM-ENS	CM ENS UP/DOWN
Supply circuit				
Rated control supply voltage U_S - power consumption		**A1-A2**	24 V AC	24 V AC
		A1-A2	110-130 V AC approx. 1.5 VA	110-130 V AC approx. 4 VA
		A1-A2	220-240 V AC approx. 1.5 VA	220-240 V AC approx. 4 VA
		A1-A2	380-415 V AC approx. 1.5 VA	
Rated control supply voltage U_S tolerance			-15...+10 %	
Rated frequency			50-60 Hz	
Duty time			100 %	
Measuring circuit			**MAX-MIN-C**	
Monitoring function			liquid level control	
Response sensitivity			5-100 kΩ, adjustable	
Maximum electrode voltage			30 V AC	
Maximum electrode current			1 mA	
Electrode supply line		max. cable capacity	10 nF	
		max. cable length	100 m	
Timing circuit				
Time delay			-	
Tripping delay			approx. 250 ms	
Indication of operational states				
Control supply voltage			U: green LED	
Output relay energized			R MAX/MIN: yellow LED	
Alarm relay AL1			-	R AL1: yellow LED
Alarm relay AL2			-	R AL2: yellow LED
Output circuits			**11-12/14, 21-22, 31-32**	
Kind of output			1 c/o contact, 1 n/o + 1 n/c contact [2]	
Operational principle [1]			open-circuit principle	open- and closed-circuit principle
Contact material			AgCdo	
Rated operational voltage U_e		(IEC/EN 60947-1)	250 V	
Minimum switching voltage / minimum switching current			- / -	
Maximum switching voltage			250 V	
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive)	230 V	4 A	
	AC15 (inductive)	230 V	3 A	
	DC12 (resistive)	24 V	4 A	
	DC13 (inductive)	24 V	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300	
	max. rated operational voltage		300 V AC	
	max. continuous thermal current at B 300		5 A	
	max. making/breaking apparent power at B 300		3600/360 VA	
Mechanical lifetime			30 x 10^6 switching cycles	
Electrical lifetime (AC12, 230 V, 4 A)			0.3 x 10^6 switching cycles	
Max. fuse rating to achieve short circuit protection		n/c / n/o contact	10 A (4 A [2]) fast-act. / 10 A (6 A [2]) fast-act.	10 A fast-acting / 10 A fast-acting
General data				
Dimensions (W X H X D)			22.5 x 70 x 100 mm (0.89 x 3.07 x 3.94 in)	
Mounting position			any	
Degree of protection		enclosure / terminals	IP50 / IP20	
Ambient temperature range		operation / storage	-20...+60 °C / -40...+85 °C	
Mounting			DIN rail (IEC/EN 60715)	
Electrical connection				
Wire size		fine-strand with wire end ferrule	2 x 2.5 mm² (2 x 14 AWG)	
Standards				
Product standard			IEC 255-6, EN 60255-6	
Low Voltage Directive			2006/95/EG	
EMC Directive			2004/108/EG	
Electromagnetic compatibility			-	
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (6 kV / 8kV)	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
surge		IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)	
Resistance to vibration (IEC 68-2-6)			4 g	
Mechanical resistance (IEC 68-2-6)			6 g	
Isolation data				
Rated insulation voltage between supply, measuring and output circuit (VDE 0110, IEC 60947)			250 V	
Rated impulse withstand voltage between all isolated circuits (VDE0 110, IEC 664)			4 kV / 1.2 - 50 µs	
Test voltage between all isolated circuits			2,5 kV, 50 Hz, 1 min.	
Pollution category (VDE 0110, IEC 664, IEC 255-5)			3 / C	
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)			III / C	
Environmental testing (IEC 68-2-30)			24 h cycle time, 55 °C, 93 % rel., 96 h	

[1] Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

[2] 1SVR 430 851 R1300 (version with safe isolation)

• **Approvals** 2/6

Liquid level relays
CM-ENN UP/DOWN, CM-ENN
Technical data

Type			CM-ENN UP/DOWN	CM-ENN		
Supply circuit						
Rated control supply voltage U_S - power consumption		**A1-A2**	24 V AC	24 V AC		
		A1-A2	110-130 V AC approx. 1.5 VA	110-130 V AC approx. 2.5 VA		
		A1-A2	220-240 V AC approx. 1.5 VA	220-240 V AC approx. 3 VA		
		A1-A2	380-415 V AC approx. 1.5 VA	380-415 V ACapprox. 4 VA		
		A1-A2		24-240 V AC/DC approx. 2 VA/W		
Rated control supply voltage U_S tolerance			-15...+10 %			
Rated frequency			50-60 Hz	50-60 Hz oder DC		
Duty time			100 %			
Measuring circuit			**MAX-MIN-C**			
Monitoring function			liquid level control			
Response sensitivity			adjustable 5-100 kΩ	adjustable		
				250 Ω - 5 kΩ	2.5-50 kΩ	25-500 kΩ
Maximum electrode voltage			30 V AC	20 V AC		
Maximum electrode current			1 mA	8 mA	2 mA	0.5 mA
Electrode supply line		max. cable capacity	10 nF	200 nF	20 nF	4 nF
		max. cable length	100 m	1000 m	100 m	20 m
Timing circuit						
Time delay			-	0.1-10 s, adjustable, ON- or OFF-delay		
Tripping delay			approx. 250 ms	-		
Indication of operational states						
Control supply voltage			U: green LED			
Output relay energized			R MAX/MIN: yellow LED	R: yellow LED		
Output circuits			**11-12/14, 21-22, 31-32**	**15-16/18, 25-26/28**		
Kind of output			1 c/o + 2 n/c contacts	2 c/o contacts		
Operational principle [1]			open-circuit principle	open- and closed-circuit principle		
Contact material			AgCdo			
Rated operational voltage U_e	(IEC/EN 60947-1)		250 V	400 V		
Minimum switching voltage / minimum switching current			- / -			
Maximum switching voltage			250 V	400 V		
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive)	230 V	4 A	5 A		
	AC15 (inductive)	230 V	3 A			
	DC12 (resistive)	24 V	4 A	5 A		
	DC13 (inductive)	24 V	2 A	2.5 A		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power at B 300		3600/360 VA			
Mechanical lifetime			30 x 10^6 switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)			0.3 x 10^6 switching cycles	0.1 x 10^6 switching cycles		
Max. fuse rating to achieve short circuit protection	n/c / n/o contact		4 A fast-acting / 6 A fast-acting			
General data						
Diemensions (W X H X D)			45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)			
Mounting position			any			
Degree of protection	enclosure / terminals		IP50 / IP20			
Ambient temperature range	operation / storage		-25...+65 °C / -40...+85 °C			
Mounting			DIN rail (IEC/EN 60715)			
Electrical connection						
Wire size	fine-strand with wire end ferrule		2 x 2.5 mm² (2 x 14 AWG)			
Standards						
Product standard			IEC 255-6, EN 60255-6			
Low Voltage Directive			2006/95/EG			
EMC Directive			2004/108/EG			
Electromagnetic compatibility			-			
electrostatic discharge	IEC/EN 61000-4-2		Level 3 (6 kV / 8kV)			
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3		Level 3 (10 V/m)			
electrical fast transient / burst	IEC/EN 61000-4-4		Level 3 (2 kV / 5 kHz)			
surge	IEC/EN 61000-4-5		Level 4 (2 kV L-L)			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6		Level 3 (10 V)			
Resistance to vibration (IEC 68-2-6)			5 g			
Mechanical resistance (IEC 68-2-6)			10 g			
Isolation data						
Rated insulation voltage between supply, measuring and output circuit (VDE 0110, IEC 60947)			250 V	500 V		
Rated impulse withstand voltage between all isolated circuits (VDE0 110, IEC 664)			4 kV / 1.2 - 50 µs			
Test voltage between all isolated circuits			2,5 kV, 50 Hz, 1 min.			
Pollution category (VDE 0110, IEC 664, IEC 255-5)			3 / C			
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)			III / C			
Environmental testing (IEC 68-2-30)			24 h cycle time, 55 °C, 93 % rel., 96 h			

[1] Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

• **Approvals** 2/6

2CDC110004C0207

Contact protection relays
Sensor interface relay

Content

Contact protection relay CM-KRN
Ordering details

CM-KRN

① Time range selector switch
② Response (ON-)delay
③ U: green LED - control supply voltage
④ R: yellow LED - relay status
⑤ Marker label

- Protects and reduces load from sensitive control contacts
- Adjustable ON-delay 0.05-30 s
- Acts as two-position switch
- Stores switch positions
- Electrically isolated circuits
- 2 c/o contacts
- 2 LEDs for status indication

The CM-KRN protects sensitive control contacts from excessive load. It can be used with latching function or without. Bounce time of control contacts can be bypassed by the adjustable response delay time.

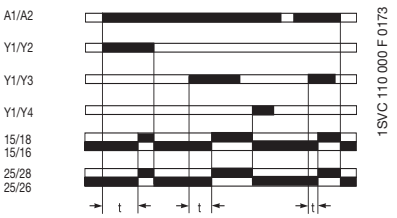
Use for contact protection

The contact to be protected is connected to terminals Y1 and Y2.

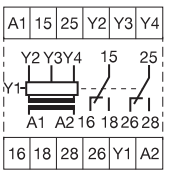
Use for contact protection with latching capacity

The output relay energizes after contact Y1-Y3 has been closed for at least 20 ms. It remains energized until contact Y1-Y4 closes. The switching positions are stored.
The relay is suitable for load reduction purposes for devices with minimum and maximum contacts.
The CM-KRN can be operated via 3-wire proximity sensors for switching of higher power. The supply circuit, the control circuit and the output circuit are electrically isolated against each other.

Function diagram CM-KRN



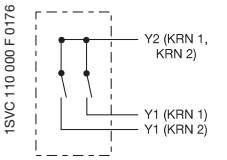
Connection diagram CM-KRN



A1-A2 Rated control supply voltage

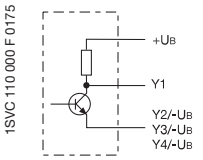
Measuring circuits:
Y1-Y2 "On-Off" input (max. switch-on resistance 6-10 kΩ, min. switch-off resistance 15-20 kΩ)
Y1-Y3 "Set" input (max. switch-on resistance 6-10 kΩ)
Y1-Y4 "Reset" input (max. switch-off resistance 15-20 kΩ)
15-16/18 Output contacts - open-circuit principle
25-26/28 open-circuit principle

Use, applications



Actuators with 2 contacts and one common point can be connected to 2 separate CM-KRN units.
Connect the common point of contacts to terminals Y2 of the two CM-KRN units.

Operation via 3-wire proximity sensors NPN



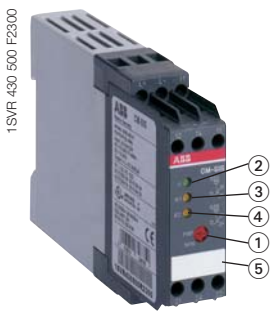
On; relay energizes, Y1/Y3 or Y2
Off; relay de-energizes, Y1/Y4 or Y2

Type	Rated control supply voltage 50-60 Hz	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
with timing circuit 0.05-30 s					
CM-KRN	24 V AC	**1SVR 450 089 R0000**	1		0.30 / 0.66
	110-130 V AC	**1SVR 450 080 R0000**	1		0.30 / 0.66
	220-240 V AC	**1SVR 450 081 R0000**	1		0.30 / 0.66
	380-415 V AC	**1SVR 450 082 R0000**	1		0.30 / 0.66
without timing circuit					
CM-KRN	24 V AC	**1SVR 450 099 R0000**	1		0.30 / 0.66
	110-130 V AC	**1SVR 450 090 R0000**	1		0.30 / 0.66
	220-240 V AC	**1SVR 450 091 R0000**	1		0.30 / 0.66
	24 V AC/DC [1]	**1SVR 450 099 R1000**	1		0.30 / 0.66

[1] not electrically isolated

• **Technical data**..... 2/94 • **Technical diagrams**.....2/102 • **Dimensional drawings**..... 2/103
• **Accessories** 2/104

Sensor interface relay
CM-SIS
Ordering details



CM-SIS

① Rotary switch for sensor type selection
② U: green LED - control supply voltage
③ R1: red LED - relay status R1
④ R2: red LED - relay status R2
⑤ Marker label

- High efficiency
- Low heating
- Wide range of supply voltage
- Constant output voltage 24 V DC
- Safe isolation acc. to EN 50178 (VDE 0160)
- Short-circuit and overload proof
- Input protected by internal fuse
- 2 x 1 c/o contact
- 3 LEDs for status indication

The CM-SIS is used to supply 2- or 3-wire NPN or PNP sensors with power and to evaluate their switching signals. Two sensors of the types NPN or PNP can be connected simultaneously. Selection is done via the front-face rotary switch.

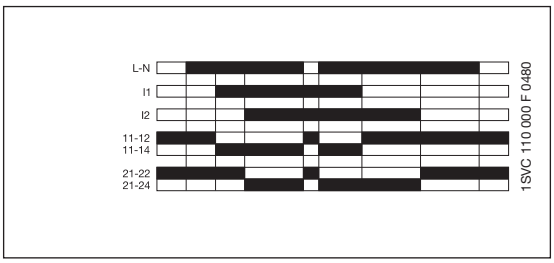
The CM-SIS (terminals L+, L-) supplies the connected sensors with voltage (24 V DC), the maximum power supply current is 0.5 A. The supply voltage and the sensor inputs are electrically isolated from the supply circuit. To ensure maximum safety when using these sensors, the principle of safe isolation has been included.

Each sensor input signal energizes the corresponding output relay without delay. The relay is energized as soon as a threshold current is exceeded at input I1 or I2. Sensor leakage currents of up to 8 mA don't affect the evaluation. The threshold value is about 9 mA. If the threshold value at input I1 or I2 is exceeded the corresponding relay R1 or R2 energizes and the corresponding LED lights up.

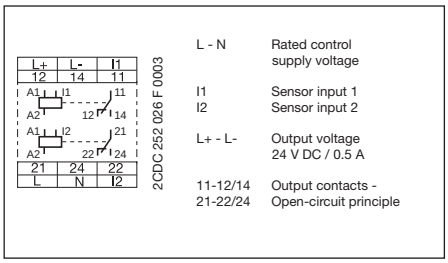
The wide-range supply voltage input of CM-SIS allows its application in nearly all supply systems.

The CM-SIS is also suitable for other applications, for example it is also possible to connect PTC or NTC resistors instead of PNP or NPN sensors or to operate the SIS directly by switching contacts.

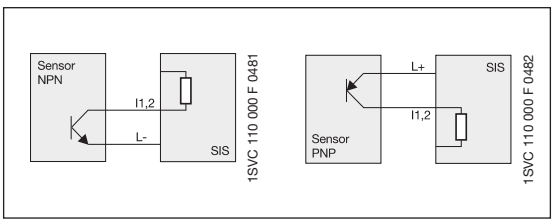
Function diagram CM-SIS



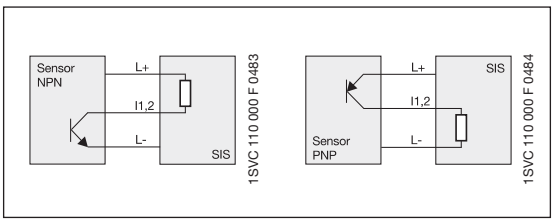
Connection diagram CM-SIS



Connection of 2-wire sensors



Connection of 3-wire sensors



Type	Rated control supply voltage 50-60 Hz	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-SIS	110-240 V AC / 105-260 V DC	**1SVR 430 500 R2300**	1		0.22 / 0.48

• **Technical data**..... 2/95 • **Technical diagrams**.....2/102 • **Dimensional drawings**..... 2/103
• **Accessories** 2/104

Contact protection relay
CM-KRN
Technical data

Type			CM-KRN	
Supply circuit			**A1-A2**	
Rated control supply voltage U_S - power consumption		A1-A2	24 V AC	- approx. 3.5 VA
		A1-A2	24 V AC/DC	- approx. 3.5 VA
		A1-A2	110-130 V AC	- approx. 3,5 VA
		A1-A2	220-240 V AC	- approx. 3.5 VA
		A1-A2	380-415 V AC	- approx. 3.5 VA
Rated control supply voltage U_S tolerance			-15...+10 %	
Rated frequency			50-60 Hz	
Duty time			100 %	
Timing circuit				
ON-delay time			0.05-1 s, 1.5-30 s	
OFF-delay time			max. 50 ms	
Measuring circuit / contact circuit			**Y1-Y2/Y3/Y4**	
Measuring input	contact protection without latching		Y1-Y2	
	contact protection with latching		Y1-Y3/Y4	
Threshold		Y1-Y2/Y3	6-10 kΩ	
Threshold-Hysteresis		Y1-Y2/Y4	15-20 kΩ	
No-load voltage at the measuring input			≤ 10 V DC	
Contact time for latching (CM-KRN without timing circuit)			min. 20 ms	
Switching current at the measuring input			3 mA	
Maximum applied voltage at the measuring input			≤ ±30 V (contact voltage)	
Indication of operational states				
Control supply voltage		U: green LED	⎍: control supply voltage applied	
Relay status		R: yellow LED	⎍: output relay energized	
Output circuit			**15-16/18, 25-26/28**	
Kind of output			relay, 2 c/o contacts	
Operating principle [1]			open-circuit principle	
Rated operational voltage (VDE 0110, IEC 60947-5-1)			400 V	
Rated switching voltage			400 V AC	
Rated operational current I_e (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	5 A	
		AC15 (inductive) 230 V	3 A	
		DC12 (resistive) 24 V	5 A	
		DC13 (inductive) 24 V	2.5 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300	
	max. rated operational voltage		300 V AC	
	max. continuous thermal current at B 300		5 A	
	max. making/breaking apparent power at B 300		3600/360 VA	
Mechanical lifetime			30 x 10^6 switching cycles	
Electrical lifeteime (AC12, 230 V, 5 A)			0.1 x 10^6 switching cycles	
Max. fuse rating to achieve short circuit protection		n/c / n/o contact	10 A fast-acting / 10 A fast-acting	
General data				
Dimensions (W x H x D)			45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)	
Mounting position			any	
Degree of protection		enclosure / terminals	IP20 / IP50	
Ambient temperature range		operation / storage	-25...+65 °C / -40...+85 °C	
Mounting			DIN rail (IEC/EN 60715)	
Electrical connection				
Wire size	fine-strand with wire end ferrule		2 x 2.5 mm² (2 x 14 AWG)	
Standards				
Product standard			IEC 255-6, EN 60255-6	
Low Voltage Directive			2006/95/EC	
EMC Directive			2004/108/EC	
Electromagnetic compatibility				
Interference immunity				
electrostatic discharge		IEC/EN 61000-4-2	6 kV / 8 kV	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	10 V/m	
electrical fast transient / burst		IEC/EN 61000-4-4	2 kV / 5 kHz	
surge		IEC/EN 61000-4-5	2 kV symmetrical	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	10 V	
Isolation data				
Rated insulation voltage (IEC 60947-1)			400 V	
Rated impulse withstand voltage U_{imp} (IEC 644-6)			4 kV	
Pollution category (IEC 255-5, IEC 664)			3	
Overvoltage category (IEC 255-5, IEC 664)			III	

[1] Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.

• **Approvals** 2/6

Sensor interface relay
CM-SIS
Technical data

Type			CM-SIS
Input circuit			
Supply voltage	L-N	AC	110-240 V AC (-15...+10 %)
		DC	110-240 V (max. 105-260 V DC)
Frequency, AC supply			47-440 Hz
Supply voltage failure bridging time			10 ms min. at 100 % load
Current consumption		max.	0.35 A
		at 115 V AC	0.27 A
		at 230 V AC	0.14 A
Inrush current at 25°C (≤ 2 ms)			33 A
Internal input fuse			800 mA slow-acting
Measuring circuit			**L+, L- / I1, I2**
Sensor voltage		L+ L-	24 V DC ± 3%
Sensor current / power			max. 0.5 A / 12 W
Residual ripple			max. 100 mV_{pp}
Deviation with		load change statical	max. ± 0.5 %
		load change dynamical 10-90 %	max. .5 %
		change of the input voltage	max. ± 0.5 %
Short-circuit protection			overcurrent switch-off with automatic restart
Overload protection			excess temperature and overcurrent switch-off
Reset after thermal overload switch-off			automatic reset after cooling down
Sensor type connection possibilities		I1, I2	2- or 3-wire connection, NPN or PNP selectable by front-face switch
Input resistance			approx. 2.5 kΩ
Threshold value for relays R1, R2			$U_{emitter\text{-}collector}$ < 2,3 V (I1, I2 > 8 mA)
Maximum switching frequency			approx. 20 Hz
Output circuit			**11-12/14, 21-22/24**
Kind of output			2 relays, 1 c/o contact each
Operating principle [1]			open-circuit principle
Rated operational voltage			250 V
Maximum switching voltage			250 V AC
Rated operational current I_e (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	4 A
		AC15 (inductive) 230 V	3 A
		DC12 (resistive) 24 V	4 A
		DC13 (inductive) 24 V	2 A
AC rating (UL 508)		Utilization category (Control Circuit Rating Code)	B 300
		max. rated operational voltage	300 V AC
		max. continuous thermal current at B 300	5 A
		max. making/breaking apparent power at B 300	3600/360 VA
Mechanical lifetime			10 x 10^6 switching cycles
Electrical lifetime			0.1 x 10^6 switching cycles
Max. fuse rating to achieve short circuit protection		n/c / n/o contact	6 A fast-acting / 10 A fast-acting
Indication of operational states			
Control supply voltage		U: green LED	⎍: control supply voltage applied
Relay status R1		R1: yellow LED	⎍: threshold value at input I1 exceeded
Relay status R2		R2: yellow LED	⎍: threshold value at input I2 exceeded
General data			
Efficiency at rated load			approx. 84 % (at 230 V AC)
Ambient temperature range		operation / storage	0...+55 °C / -25...+75 °C
Dimensions (W x H x D)			22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)
Mounting position			horizontally
Mounting			DIN rail (IEC/EN 60715)
Minimum distance to other units			left-hand side 10 mm (0.39 in), vertical distance 50 m (1.97 in)
Electrical connection			
Wire size			2 x 2,5 mm^2 (2 x 14 AWG)
Standards			
Product standard			IEC 255-6, EN 60255-6
Electrical safety			IEC(EN) 60255-5, EN 50178 (VDE 0160), EN60950, UL 508, CSA 22.2
Galvanic isolation			safe isolation between L+,L-, I1,I2, and L,N,11,12,14,21,22,24

• **Approvals** 2/6

Sensor interface module CM-SIS
Technical data

Type		CM-SIS
Electromagnetic compatibility		
Interference immunity		EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 4 (4 kV)
surge	IEC/EN 61000-4-5	Inst. class 3 (2 kV)
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)
Interference emission	EN 50081-2	radiated noise EN 55011, class B
Input current harmonics		no limitation
Isolation data		
Insulation testing		2.5 kV AC (routine test), 3 kV AC (type test)
Degree of pollution		2
Overvoltage category		II

[1] Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.

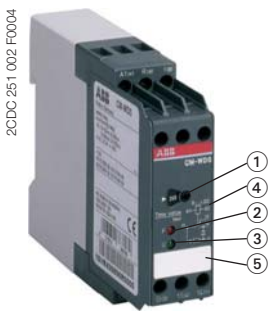
• **Approvals** 2/6

2CDC110004C0207

Cycle monitor with watchdog function

Content

Cycle monitoring relay with watchdog function CM-WDS
Ordering details



CM-WDS

① Setting the lower threshold value of cycle monitoring time
② F: red LED - cycle error
③ U: green LED - control supply voltage
④ Wiring diagram
⑤ Marker label

- Cycle monitor for monitoring the function of programmable logic controllers or industrial pcs
- 4 selectable cycle monitoring time ranges from 0.5 to 1000 ms
- 24 V DC supply
- 1 c/o contact
- 2 LEDs for status indication

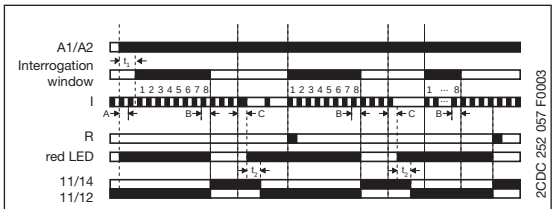
The cycle monitoring relay CM-WDS (watchdog) observes if a regularly intermittent pulse is applied to its pulse input "I". It is, for example, possible to connect the output of a programmable logic controller (plc), which is set and reset regularly (e. g. once each cycle). The connected cycle pulse must be generated by suitable programming of the plc/ipc. Now, the CM-WDS monitors if the cycle time of the plc/ipc program is smaller than the cycle monitoring time setted by means of the front-face selector switch "time value (ms)".

The output relay 11-12/14 of the CM-WDS energizes and the red LED is switched off, if there are minimum 8 successive regular pulses on input "I". When the pulse signal stays out or is not regular, the output relay de-energizes and the red LED is illuminated.

In case the monitoring time is too short or too long, this can be adjusted by a modified programming of the plc/ips or by modified setting of the monitoring time "time value (ms)".

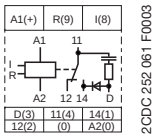
A fault recognized and stored with the CM-WDS can be reset by an H-impulse (0-1-transition) on the reset input "R(9)", so that the cycle monitoring is again released. The reset impulse can be generated by means of a reset button or by suitable programming of the controller (plc/ipc).

Funktion diagram CM-WDS



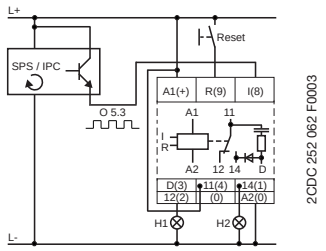
A = Cycle monitor
B = Cycle is correct, no cycle error
C = Cycle failure 1: pulse > monitoring window
Cycle failure 2: pulse stays out
t_1 = 300 ms
t_2 = 260 ms

Connection diagram CM-WDS



A1/A2	Rated control supply voltage
I	Cycle pulse input
R	Reset input
11-12/14	Output relay
D	Protected output (freewheeling diode)

Example of application - circuit diagram



Application

The CM-WDS is designed for the external monitoring of the correct function of programmable logic controllers (plc) and industrial pcs (ipc).

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-WDS	24 V DC	**1SVR 430 896 R0000**	1		0.15 / 0.33

• **Technical data**..... 2/99
• **Technical diagrams** ..... 2/102 • **Dimensional drawings** .....2/103 • **Accessories**..... 2/104

Cycle monitoring relay with watchdog function CM-WDS
Technical data

Type		CM-WDS
Input circuit		**A1-A2**
Rated control supply voltage U_S - power consumption	A1-A2	24 V DC - approx. 1 W
Tolerance of the rated control supply voltage U_S		-30 % - +30 %
Duty time		100 %
Measuring circuit		**I**
Monitoring function		cycle monitoring
Measuring voltage		24 V DC
Current consumption at the measuring input		approx. 5 mA
Setting range of cycle monitoring time		selectable: 0.5-150 ms, 0.5-260 ms, 0.5-500 ms, 0.5-1000 ms
Response time		approx. 0.5-1000 ms
Accuracy within the supply voltage tolerance		$\Delta U \leq 0.5$ %
Accuracy within the temperature range		$\Delta U \leq 0.06$ % / °C
Timing circuit		
ON-delay		approx. 2.2-10 s
Tripping delay		approx. 260 ms
Indication of operational states		
Control supply voltage		U: green LED
Output relay de-energized / cycle error		F: red LED
Output circuit		**11-12/14**
Kind of output		1 c/o
Operating principle [1]		Closed-circuit principle
Contact material		AgCdo
Rated operational voltage U_e	IEC/EN 60947-1	250 V
Minimum switching voltage / Minimum switching current		
Maximum switching voltage		250 V AC, 250 V DC
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	4 A
	AC15 (inductive) 230 V	3 A
	DC12 (resistive) 24 V	4 A
	DC13 (inductive) 24 V	2 A
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300
	max. rated operational voltage	300 V AC
	max. continuous thermal current at B 300	5 A
	max. making/breaking apparent power at B 300	3600/360 VA
Mechanical lifetime		10 x 10^6 switching cycles
Electrical lifeteime (AC12, 230 V, 4 A)		0.1 x 10^6 switching cycles
Max. fuse rating to achieve short circuit protection	n/c / n/o contacts	10 A fast-acting / 10 A fast-acting
General data		
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)
Mounting position		any
Degree of protection	enclosure / terminals	IP50 / IP20
Ambient temperature range	operation / storage	-20...+60 °C / -40...+85 °C
Mounting		DIN rail (IEC/EN 60715)
Electrical connection		
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm^2 (2 x 14 AWG)
Standards		
Product standard		IEC 255-6, EN 60255-6
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Operational reliability (IEC 68-2-6)		4 g
Mechanical shock resistance (IEC 68-2-6)		6 g
Electromagnetic compatibility		
Interference immunity to		EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
surge	IEC/EN 61000-4-5	Level 3 (2 kV L-L)
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)
Interference emission		EN 61000-6-4

• **Approvals** 2/6

Cycle monitoring relay with watchdog function
CM-WDS
Technical data

Isolation data	
Rated insulation voltage between supply-, control- and output circuit (VDE 0110, IEC 60947-1)	250 V
Rated impulse withstand between all isolated circuits (VDE 0110, IEC 664)	4 kV / 1.2-50 µs
Test voltage between all isolated circuits	2.5 kV, 50 Hz, 1 min
Pollution degree (VDE 0110, IEC 664, IEC 255-5)	3/C
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)	III
Environmental tests (IEC 68-2-30)	24 h cycle, 55 °C, 93 % rel. 96 h

[1] Closed-circuit principle: Output relay de-energizes if a cycle error occurs

• **Approvals** 2/6

General technical data, Accessories, Current transformers

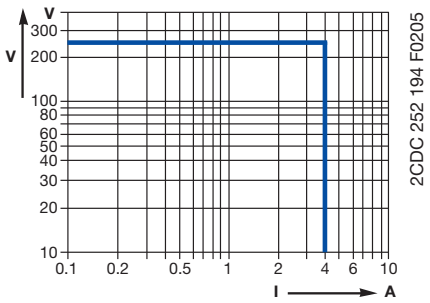
Content

Measuring and monitoring relays
CM range
Technical diagrams

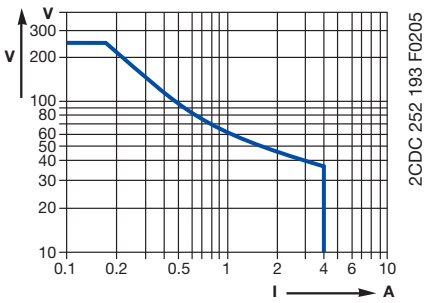
Load limit curves

CM-S (22.5 mm), CM-E (22.5 mm)

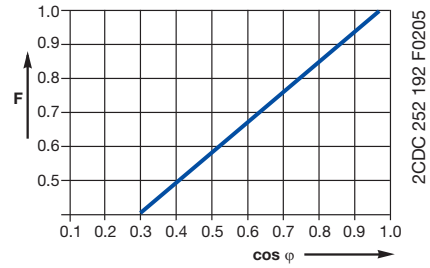
AC load (resistive)



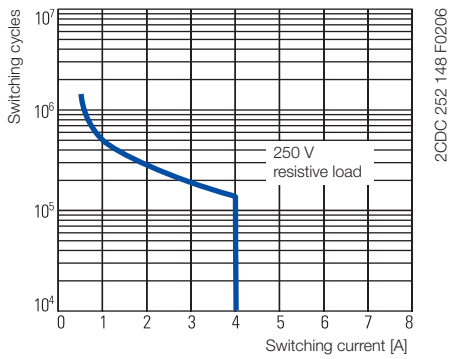
DC load (resistive)



Derating factor F for inductive AC load

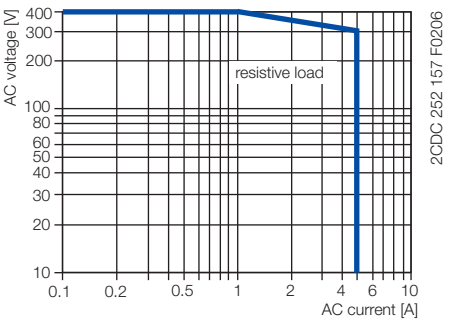


Contact lifetime

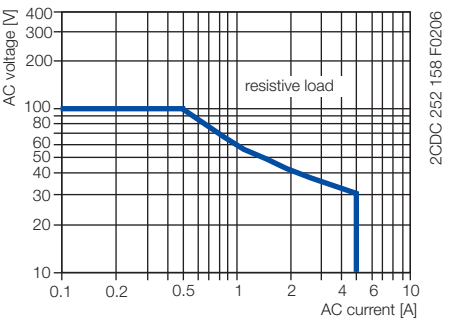


CM-N (45 mm)

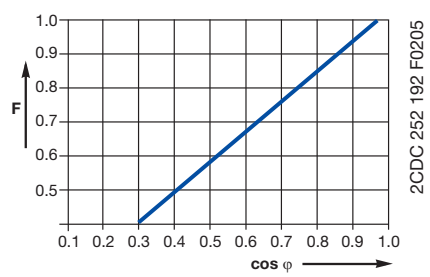
AC load (resistive)



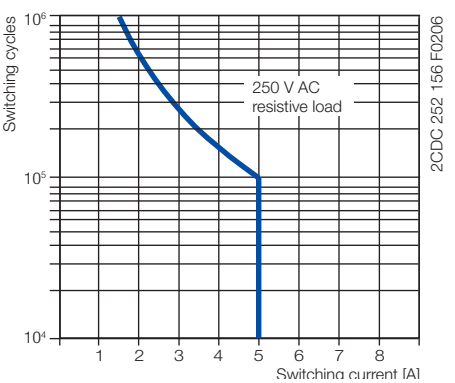
DC load (resistive)



Derating factor F for inductive AC load



Contact lifetime



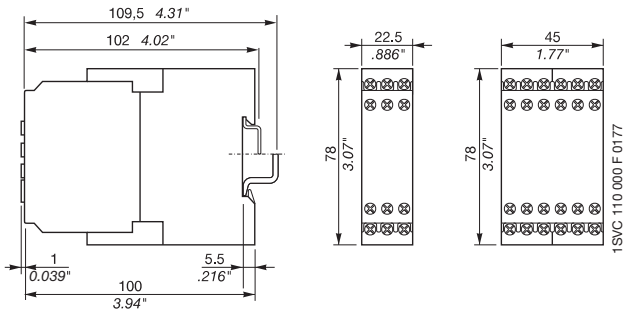
Dimensional drawings

Dimensions in mm

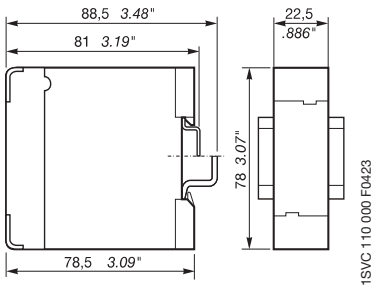
Measuring and monitoring relays CM range

CM-S
22.5 mm

CM-N
45 mm

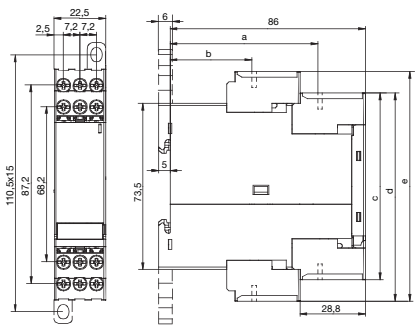


CM-E
22.5 mm



Temperature monitoring relays C51x range

C510 / C511
22.5 mm

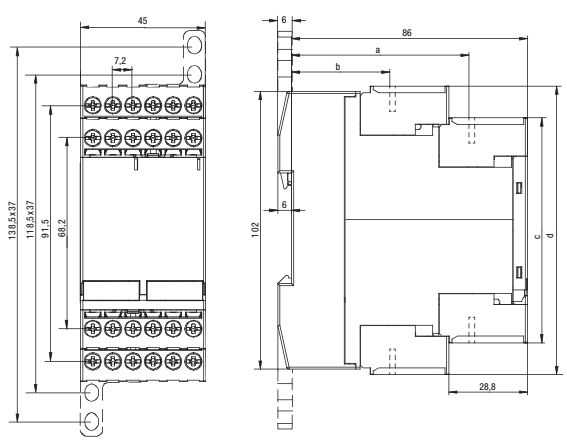


	C510, C511
Ø 5 ... 6 mm / PZ2	0,8 ... 1,2 Nm 7 ... 10.3 lb·in
10	1 x 0,5 ... 4,0 mm² 2 x 0,5 ... 2,5 mm²
10	2 x 0,5 ... 1,5 mm² 1 x 0,5 ... 2,5 mm²
10	—
AWG	2 x 20 ... 14

2CDC 252 287 F0005

	a	b	c	d	e
C510, C511	65	36	82,6	92,2	101,6

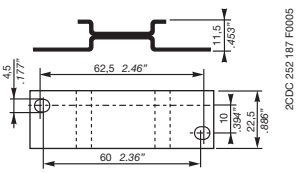
C512/C513
45 mm



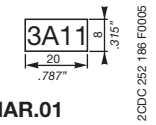
	C512 C513
Ø 5 ... 6 mm / PZ2	0,8 ... 1,2 Nm 7 ... 10.3 lb·in
10	1 x 0,5 ... 4,0 mm² 2 x 0,5 ... 2,5 mm²
10	2 x 0,5 ... 1,5 mm² 1 x 0,5 ... 2,5 mm²
10	—
AWG	2 x 20 ... 14

2CDC 252 288 F0005

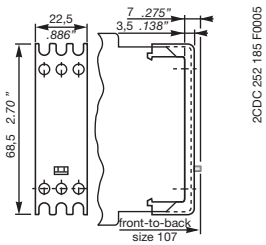
	a	b	c	d
C512, C513	65	36	82,6	105,9



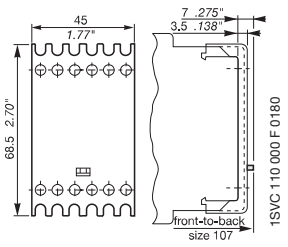
ADP.01



MAR.01



Sealable cover COV.01



Sealable cover COV.02

Accessories

Adapter for screw mounting

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
ADP.01	CM-S	22.5	**1SVR 430 029 R0100**	1		18.4/0.65
ADP.02	CM-N	45.0	**1SVR 440 029 R0100**	1		36.7/1.30

Marker label

Type	for type	for devices	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
MAR.01	CM-S, CM-N	without DIP switches	**1SVR 366 017 R0100**	10		0.19/0.007
MAR.02	CM-S, CM-N	with DIP switches	**1SVR 430 043 R0000**	10		0.13/0.005

Sealable transparent cover

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
COV.01	CM-S	22.5	**1SVR 430 005 R0100**	1		5.2/0.18
COV.02	CM-N	45.0	**1SVR 440 005 R0100**	1		7.7/0.27

2CDC 251 002 F0005

CM-CT

2CDC 251 003 F0005

CM-CT
with mounted accessories

2CDC 251 159 F0b06

CM-CT-A
mounted on DIN rail

Plug-in current transformers CM-CT

- Without primary conductor though with foot angle, insulating protective cap and bar fastening screws
- Primary / rated current from 50 A to 600 A
- Secondary current of 1 A or 5 A
- Class 1

Secondary current 1 A

Type	Rated / primary current	Burden / class	Order code	Pack. unit pieces	Price 1 piece
CM-CT 50/1	50 A	1 VA / 1	**1SVR 450 116 R1000**	1	
CM-CT 75/1	75 A	1.5 VA / 1	**1SVR 450 116 R1100**	1	
CM-CT 100/1	100 A	2.5 VA / 1	**1SVR 450 116 R1200**	1	
CM-CT 150/1	150 A	2.5 VA / 1	**1SVR 450 116 R1300**	1	
CM-CT 200/1	200 A	2.5 VA / 1	**1SVR 450 116 R1400**	1	
CM-CT 300/1	300 A	5 VA / 1	**1SVR 450 117 R1100**	1	
CM-CT 400/1	400 A	5 VA / 1	**1SVR 450 117 R1200**	1	
CM-CT 500/1	500 A	5 VA / 1	**1SVR 450 117 R1300**	1	
CM-CT 600/1	600 A	5 VA / 1	**1SVR 450 117 R1400**	1	

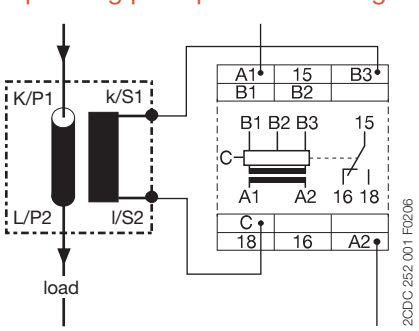
Secondary current 5 A

Type	Rated / primary current	Burden / class	Order code	Pack. unit pieces	Price 1 piece
CM-CT 50/5	50 A	1 VA / 1	**1SVR 450 116 R5000**	1	
CM-CT 75/5	75 A	1.5 VA / 1	**1SVR 450 116 R5100**	1	
CM-CT 100/5	100 A	2.5 VA / 1	**1SVR 450 116 R5200**	1	
CM-CT 150/5	150 A	2.5 VA / 1	**1SVR 450 116 R5300**	1	
CM-CT 200/5	200 A	5 VA / 1	**1SVR 450 116 R5400**	1	
CM-CT 300/5	300 A	5 VA / 1	**1SVR 450 117 R5100**	1	
CM-CT 400/5	400 A	5 VA / 1	**1SVR 450 117 R5200**	1	
CM-CT 500/5	500 A	5 VA / 1	**1SVR 450 117 R5300**	1	
CM-CT 600/5	600 A	5 VA / 1	**1SVR 450 117 R5400**	1	

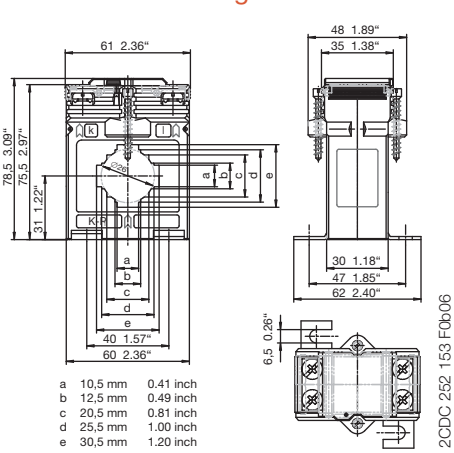
Accessories

Type	Description	Order code	Pack. unit pieces	Price 1 piece
CM-CT-A	Snap-on fastener for DIN rail mounting of CM-CT	**1SVR 450 118 R1000**	10	

Operating principle / circuit diagram



Dimensional drawing



Notes

NEW

Safety Solutions

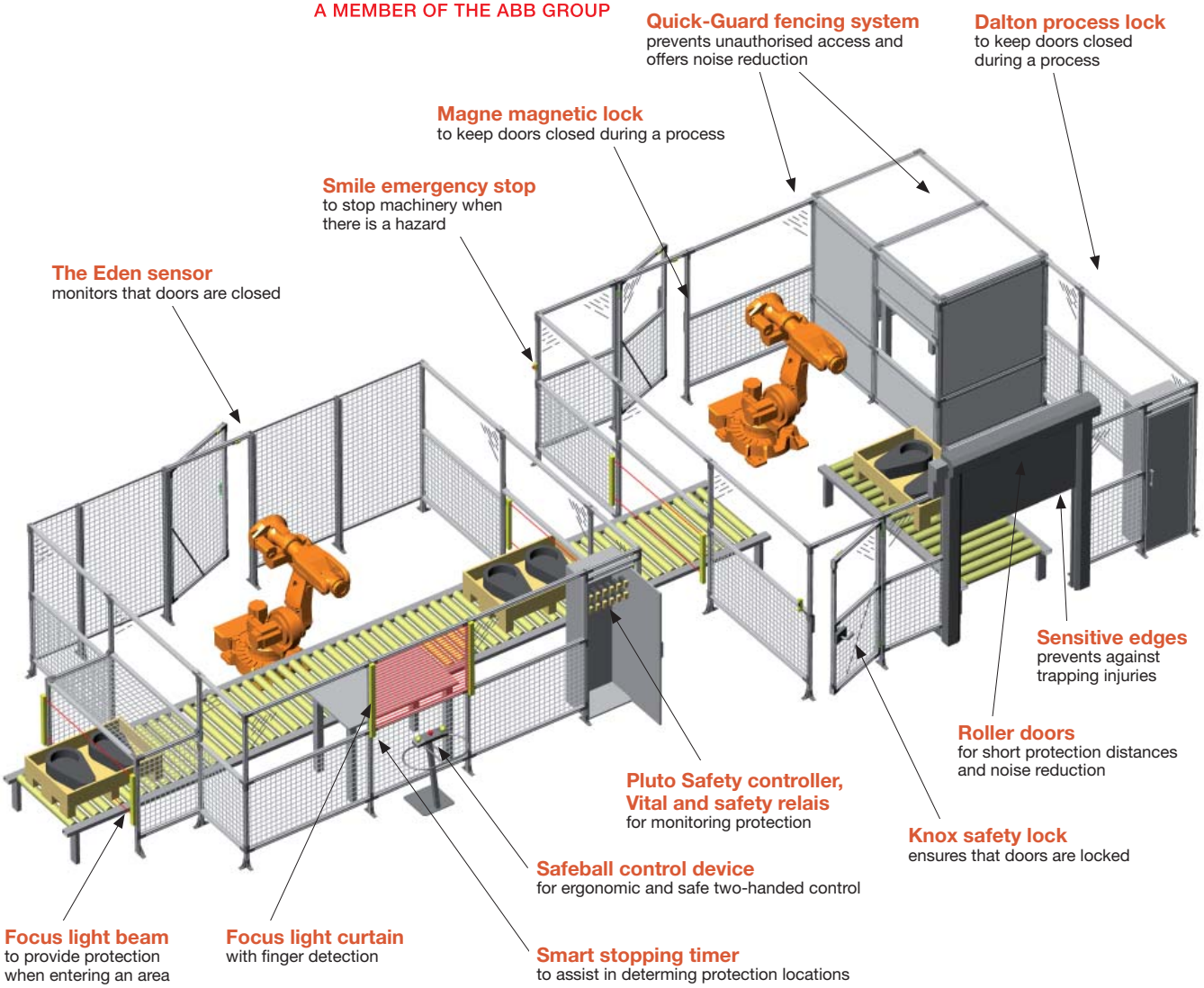
Content

NEW

Safety Solutions

systems from JOKAB SAFETY

A MEMBER OF THE ABB GROUP



JOKAB SAFETY

A MEMBER OF THE ABB GROUP

We are offering

Safety products:	Safety relays, safety controllers, safety sytems, safety sensors and locks, safety control devices, light curtains and beams, emergency stop devices, fencing systems, safety mats
Trainings:	Product selection according to the assessment, traninings on products, solutions and standards (ISO + IEC). Sistema Add ons.

Safety Solutions

ABB – your Partner for Safety Solutions.

NEW

Safety Solutions
Conversion table

		RT6	RT7	RT9	JSBRT11	JSBR4	JSBT4	JSBT5T	BT50T	BT51T	BT50/JSBT5	BT51	JSHT2AB	JSHT2A/B/C	E1T	JSR1T	JSR2A	JSR3T
Applications	Interlocking Switch/Gate/Hatch	■	■	■	■	■	■	■	■	■	■	■						
	Light Curtains	■	■	■	■													
	Light beams	■	■	■	■													
	Safety Mats	■	■	■		■	■											
	Contact strips	■	■	■		■	■											
	Two Hand Control Device					■												
	Emergency Stop	■	■	■	■	■	■	■	■	■	■	■						
	Hold to run/enabling device	■	■	■	■	■	■							■				
	Food control device	■	■	■	■	■	■							■				
	Area Supervision	■	■	■	■	■	■											
	Time resetting												■					
	Time bypassing												■	■				
	Inching													■				
	Output expansions	■	■	■	■		■	■	■	■	■	■			■	■	■	
	Displayed output		■					■	■	■					■	■		■
Safety Input	Safety Category	1..4	1..4	1..4	1..4	4	4	1..4	1..4	1..4	1..4	1..4	1..4	1..4	1..4	1..4	1..4	1..4
	Single Channel, 1NO from +24VDC	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■
	Two Channel, 2NO from +24VDC	■	■	■	■													
	Two Channel, 1NO & 1NC from +24VDC	■	■	■	■													
	Two Channel, 1NO from 0V & 1NO from +24VDC	■	■	■	■	■	■						■	■	■	■	■	■
reset and test input	Monitored Manual	■	■	■	■	■												
	Automatic/Unmonitored manual	■	■	■	■		■	■	■	■	■	■						
	Testing of contactors, relays, valves, ...	■	■	■	■	■	■	■	■	■	■	■	■	■				
Output	NO	3	2	2	7	3	3				3	4			4	4	4	
	NO delayed		2					3	3	4					4	4		2
	NO impulse outputs												2	2				
	NC	1	1		2	1	1				1					1	1	
	NC delayed							1	1							1		
	Info output	2	3	1					1	1								

Conversion	C571							■										
	C571-AC	no replacement																
	C573							■										
	C581	■																
	C576			■														
	C577			■														
	C572	■																
	C574		■															
	C575					■												
	C579														■			
	C6700	no replacement																
	C6701	Pluto safety controller																
	C6702	Pluto safety controller																

Further Information: Jokab Safety Catalogue "The Safety Handbook"
Jokab Safety Panorama "Product Profile"

Notes

Primary switch mode power supplies

CP range

Content

4

Primary switch mode power supplies
CP range
Overview

Special features of CP range primary switch power supplies

- **Primary switch mode power supplies**
  - High efficiency of approx. 90 %
  - Low power dissipation and low heating
  - Long lifetime
- **Wide range of AC or DC supply voltages**
  - World wide use also in high fluctuating networks and battery-powered plants
- **Constant or adjustable output voltage (depending on type)**
- **Use in very harsh industrial environments**
  - Reliable construction
  - According to EMC Directives EN 61000-6-2 (Interference immunity) and EN 61000-6-4 (Interference emission)
- **Open-circuit, overload and short-circuit proof**
- **Integrated input fuse**
- **Safety**
  - Closed construction
  - Touch-proof connecting terminals
  - Electrical isolation
- **Easy and fast mounting**
  - Mounting on DIN rail
- **LED(s) for status indication**
- **Example of application**
  - Supply of programmable logic controllers (PLC) e. g. AC31, AC500

Primary switch mode power supplies
CP range
Selection table

			CP-D						CP-E								CP-T							CP-S			CP-C		
Rated output current			0.42 A	0.83 A	1.3 A	2.1 A	2.5 A	4.2 A	0.625 A	0.75 A	1.25 A	2.5 A	3 A	5 A	10 A	20 A	5 A	10 A	20 A	40 A	5 A	10 A	20 A	5 A	10 A	20 A	5 A	10 A	20 A
Rated output voltage		5 V DC											■																
		12 V DC		■		■						■			■														
		24 V DC	■		■		■	■		■	■	■		■	■	■	■	■	■	■				■	■	■	■	■	■
		48 V DC							■		■			■	■						■	■	■						
Rated output power / voltage	10 W	12 V DC		■																									
		24 V DC	■																										
	15 W	5 V DC											■																
	18 W	24 V DC								■																			
	30 W	12 V DC				■						■																	
		24 V DC			■						■																		
		48 V DC							■																				
	60 W	24 V DC					■					■																	
		48 V DC									■																		
	100 W	24 V DC						■																					
	120 W	12 V DC													■														
		24 V DC												■			■							■			■		
	240 W	24 V DC													■			■							■			■	
		48 V DC												■							■								
	480 W	24 V DC														■			■							■			■
		48 V DC													■						■								
	960 W	24 V DC																		■									
		48 V DC																					■						
Rated input voltage		100-240 V AC	■	■	■	■	■	■	■	■	■	■	■																
		115 / 230 V AC auto select												■	■[1]														
		115-230 V AC													■[2]	■													
		110-240 V AC																						■			■	■	■
		110-120 V AC / 220-240 V AC																							■	■			
		400-500 V AC															■	■	■	■	■	■	■						
Accessories		Redundancy unit							■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
		Control module																						■	■	■	■	■	■
		Messaging module																									■	■	■
Structure of the type designation			**CP-x y/z.z** CP: Power supply x: Product range y: Rated output voltage z: Rated output current																										

[1] CP-E 12/10.0 and CP-E 24/10.0

[2] CP-E 48/10.0

Primary switch mode power supplies
CP range
Approvals and marks

■ existing
□ pending

Approvals		CP-D						
		CP-D 12/0.83	CP-D 12/2.1		CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
	UL 508, CAN/CSA C22.2 No.14	■[1]	■[1]		■[1]	■[1]	■[1]	■[1]
	UL 1310, CAN/CSA C22.2 No.223 (Class 2 Power Supply)	■[1]	■[1]		■[1]	■[1]	■[1]	
	UL 60950, CAN/CSA C22.2 No.60950	■[1]	■[1]		■[1]	■[1]	■[1]	■[1]
	GOST	■	■		■	■	■	■
	CCC	■[1]	■[1]		■[1]	■[1]	■[1]	■[1]
Marks								
CE	CE	■	■		■	■	■	■
	C-Tick	□	□		□	□	□	□

■ existing
□ pending

Approvals		CP-E														CP-T							
		CP-E 5/3.0	CP-E 12/2.5	CP-E 12/10.0	CP-E 24/0.75	CP-E 24/1.25	CP-E 24/2.5	CP-E 24/5.0	CP-E 24/10.0	CP-E 24/20.0	CP-E 48/0.62	CP-E 48/1.25	CP-E 48/5.0	CP-E 48/10.0		CP-RUD		CP-T 24/5.0	CP-T 24/10.0	CP-T 24/20.0	CP-T 24/40.0		CP-T 48/5.0	CP-T 48/10.0	CP-T 48/20.0
	UL 508, CAN/CSA C22.2 No.14	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]				■[1]	■[1]	■[1]	■[1]		■[1]	■[1]	■[1]
	UL 1310, CAN/CSA C22.2 No.223 (Class 2 Power Supply)	■	■		■	■	■				■	■													
	ANSI/ISA-12.12 (Class I, Div. 2, hazardous locations) CAN/CSA C22.2 No. 213	■	■	■	■	■	■	■	■	■	■	■	■	■				■	■	■	■		■	■	■
	UL 60950, CAN/CSA C22.2 No.60950	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]				■[1]	■[1]	■[1]	■[1]		■[1]	■[1]	■[1]
	GOST	■	■	■	■	■	■	■	■	■	■	■	■	■				□	□	□	□		□	□	□
	CCC	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]	■[1]				□[1]	□[1]	□[1]	□[1]		□[1]	□[1]	□[1]
Marks																									
CE	CE	■	■	■	■	■	■	■	■	■	■	■	■	■		■		■	■	■	■		■	■	■
	C-Tick	■	■	□	■	■	■	□	□	□	■	■	□	□		■		□	□	□	□		□	□	□

■ existing
□ pending

Approvals		CP-S				CP-C					CP-A		
		CP-S 24/5.0	CP-S 24/10.0	CP-S 24/20.0		CP-C 24/5.0	CP-C 24/10.0	CP-C 24/20.0		CP-C MM		CP-A RU	CP-A CM
	UL 508, CAN/CSA C22.2 No.14	■[1]	■[1]	■[1]		■[1]	■[1]	■[1]					
	UL 508, CAN/CSA C22.2 No.14											■[1]	□
	UL 1604 (Class I, Div. 2, hazardous locations), CAN/CSA C22.2 No.213	■[1]	■[1]	■[1]		■[1]	■[1]	■[1]				■	■
	UL 60950, CAN/CSA C22.2 No.60950	■[1]	■[1]	■[1]		■[1]	■[1]	■[1]				■[1]	■[1]
	GOST	■	■	■		■	■	■		■		■	■
CB	CB scheme	■	■	■		■	■	■		□		■	■
	CCC	■[1]				■[1]	■[1]	■[1]					
Marks													
CE	CE	■	■	■		■	■	■		■		■	■
	C-Tick	■	■	■		■	■	■		■		■	□

[1] Approvals refer to the rated input voltage U_{in}.

2CDC110004C0207

Primary switch mode power supplies

CP-D range

Content

Primary switch mode power supplies
CP-D range
Benefits and advantages


2CDC 275 031 F0b07

- Output voltages 12 V, 24 V DC
- Adjustable output voltages (devices > 10 W)
- Output currents 0.42 A / 0.83 A / 1.3 A / 2.1 A / 2.5 A / 4.2 A
- Power range 10 W, 30 W, 60 W, 100 W
- Wide range input 100-240 V AC (90-264 V AC, 120-370 V DC)
- High efficiency of up to 89 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -40 °C...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic (fold-forward behaviour at overload – no switch-off)
- LEDs for status indication
- Light-grey enclosure in RAL 7035
- Approvals / Marks (depending on device, partly pending):

Width and structural form

With their width between 18 to 90 mm only, the CP-D range switch mode power supplies are ideally suited for installation in distribution panels.


2CDC 271 027 F0007

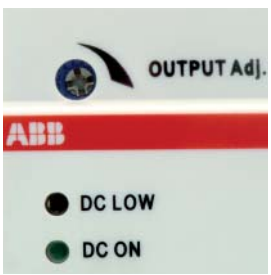
Wide range input

Optimised for world-wide applications: The CP-D power supplies can be supplied with 90-264 V AC or 120-370 V DC.

2CDC 276 033 F0007

Adjustable output voltage

The CP-D range types > 10 W feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.



2CDC 276 032 F0007-a

Primary switch mode power supplies
CP-D range
Ordering details

CP-D 12/0.83,
CP-D 24/0.42

CP-D 12/2.1
CP-D 24/1.3

CP-D 24/2.5

CP-D 24/4.2

Type	Input voltage range	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-D 12/0.83	90-264 V AC/ 120-370 V DC	12 V DC / 0.83 A	**1SVR 427 041 R1000**	1		0.06 / 0.13
CP-D 12/2.1	90-264 V AC/ 120-370 V DC	12 V DC / 2.1 A	**1SVR 427 043 R1200**	1		0.19 / 0.41
CP-D 24/0.42	90-264 V AC/ 120-370 V DC	24 V DC / 0.42 A	**1SVR 427 041 R0000**	1		0.06 / 0.13
CP-D 24/1.3	90-264 V AC/ 120-370 V DC	24 V DC / 1.3 A	**1SVR 427 043 R0100**	1		0.19 / 0.41
CP-D 24/2.5	90-264 V AC/ 120-370 V DC	24 V DC / 2.5 A	**1SVR 427 044 R0200**	1		0.25 / 0.55
CP-D 24/4.2	90-264 V AC/ 120-370 V DC	24 V DC / 4.2 A	**1SVR 427 045 R0400**	1		0.32 / 0.71

• Approvals **4**/4
• Technical data ..... **4**/8 • Technical diagrams .....**4**/12 • Dimensional drawings **4**/12

Primary switch mode power supplies
CP-D range (12 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-D 12/0.83	CP-D 12/2.1
Input circuit - supply circuit		**L, N**	
Rated input voltage U_{in}		100-240 V AC	
Input voltage range		90-264 V AC / 120-370 V DC	
Frequency range AC		47-63 Hz	
Typical input current / typical power consumption	at 110 V AC	200 mA / 12.68 W	502 mA / 31.14 W
	at 230 V AC	128.3 mA / 13.01 W	277 mA / 31.2 W
Inrush current limiting	at 230 V AC	30 A (max. 3 ms)	50 A (max. 3 ms)
Power failure buffering time		min. 30 ms	
Internal input fuse		1 A slow-acting / 250 V AC	2 A slow-acting / 250 V AC
Power factor correction (PFC)		no	
Indication of operational states			
Output voltage	DC ON: green LED	⎍: output voltage applied	
	DC LOW: red LED	⎍: output voltage too low	
Output circuit		**+, -**	**++, --**
Rated output voltage		12 V DC	
Tolerance of the output voltage		±1 %	
Adjustment range of the output voltage		-	12-14 V DC
Rated output power		10 W	30 W
Rated output current I_r	$T_a \leq 60$ °C	0.83 A	2.1 A
Derating of the output current	60 °C < $T_a \leq$ 70 °C	2.5 %/K	
Maximum deviation with	load change statical	1 %	
	change of output voltage within the input voltage range	1 %	
Control time		< 1 ms	
Starting time after applying the supply voltage	at I_r	1000 ms	
Rise time	at rated load	typ. 1 ms	
Residual ripple and switching peaks	BW = 20 MHz	50 mV	
Parallel connection		no	
Series connection		yes, to increase voltage	
Resistance to reverse feed		18 V / 1 s	
Output circuit - No-load, overload and short-circuit behaviour			
Characteristic curve of output		U/I characteristic curve	
Short-circuit protection		continuous short-circuit stability	
Short-circuit behaviour		continuation with output power limiting	
Current limiting at short circuit		typ. 1.4 A	typ. 5.9 A
Overload protection		output power limiting	
No-load protection		continuous no-load stability	
Starting of capacitive loads		unlimited	
Gerneral data			
Efficiency		typ. 78 %	typ. 82 %
Duty time		100 %	
Dimensions (WxHxD)		18 x 91 x 57.5 mm [0.71 x 3.58 x 2.26 in]	53 x 91 x 57.5 mm [2.09 x 3.58 x 2.26 in]
Weight		0.066 kg (0.13 lb)	0.196 kg (0.41 lb)
Material of enclosure		plastic	
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool	
Mounting position		horizontal	
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)	
Degree of protection	enclosure / terminals	IP20 / IP20	
Protection class		II	

Primary switch mode power supplies
CP-D range (12 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-D 12/0.83	CP-D 12/2.1
Electrical connection - Input circuit / Output circuit			
Wire size	fine-strand with wire end ferrule	0.2-2 mm² (24-14 AWG)	
	fine-strand without wire end ferrule		
	rigid		
Stripping length		6 mm (0.24 in)	
Tightening torque		0.36-0.56 Nm	
Environmental data			
Ambient temperature range	operation	-40…+70 °C	
	rated load	-40…+60 °C	
	storage	-40…+85 °C	
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH	
Vibration (sinusoidal) (IEC/EN 60068-2-6)		50 m/s², 10 Hz - 2 kHz	
Shock (half-sine) (IEC/EN 60068-2-27)		40 m/s², 22 ms	
Isolation data			
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC	
Pollution degree		2	
Overvoltage category (UL/IEC/EN 60950-1)		II	
Standards			
Product standard		EN 61204	
Low Voltage Directive		2006/95/EC	
EMC Direcitve		2004/108/EC	
Electrical safety		UL 508, UL 60950-1, EN 60950-1	
Protective low voltage		SELV (EN 60950-1)	
Electromagnetic compatibility			
Interference immunity to		EN 61000-6-2	
electrostatic discharge	IEC/EN 61000-4-2	Level 4 (4 kV / 8 kV)	Level 4 (8 kV / 15 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4 (4 kV)	
surge	IEC/EN 61000-4-5	Level 3 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission		EN 61000-6-3	
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B	
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B	

• **Approvals** **4**/4

Primary switch mode power supplies
CP-D range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
Input circuit - supply circuit		**L, N**			
Rated input voltage U_{in}		100-240 V AC			
Input voltage range		90-264 V AC / 120-370 V DC			
Frequency range AC		47-63 Hz			
Typical input current / typical power consumption	at 110 V AC	184 mA / 11.62 W	600 mA / 37.92 W	1120 mA / 69.3 W	1800 mA / 117.3 W
	at 230 V AC	120.6 mA / 12 W	344 mA / 38.16 W	660 mA / 70.1 W	900 mA / 114.4 W
Inrush current limiting	at 230 V AC	30 A (max. 3 ms)	50 A (max. 3 ms)	60 A (max. 3 ms)	
Power failure buffering time		min. 30 ms		min. 60 ms	
Internal input fuse		1 A slow-acting / 250 V AC	2 A slow-acting / 250 V AC		3.15 A slow-acting / 250 V AC
Power factor correction (PFC)		no			
Indication of operational states					
Output voltage	DC ON: green LED	⎍: output voltage applied			
	DC LOW: red LED	⎍: output voltage too low			
Output circuit		**+, -**	**++, --**		
Rated output voltage		24 V DC			
Tolerance of the output voltage		±1 %			
Adjustment range of the output voltage		-	24-28 V DC		
Rated output power		10 W	30 W	60 W	100 W
Rated output current I_r	$T_a \leq 60$ °C	0.42 A	1.3 A	2.5 A	4.2 A
Derating of the output current	60 °C < $T_a \leq$ 70 °C	2.5 %/K			
Maximum deviation with	load change statical	1 %			
	change of output voltage within the input voltage range	1 %			
Control time		< 1 ms			
Starting time after applying the supply voltage	at I_r	1000 ms			
Rise time	at rated load	typ. 1 ms			
Residual ripple and switching peaks	BW = 20 MHz	50 mV			
Parallel connection		no			
Series connection		yes, to increase voltage			
Resistance to reverse feed		35 V / 1 s			
Output circuit - No-load, overload and short-circuit behaviour					
Characteristic curve of output		U/I characteristic curve			
Short-circuit protection		continuous short circuit stability			
Short-circuit behaviour		continuation with output power limiting			
Current limiting at short circuit		typ. 0.78 A	typ. 4.2 A	typ. 6.05 A	typ. 11.5 A
Overload protection		output power limiting			
No-load protection		continuous no-load stability			
Starting of capacitive loads		unlimited			
Gerneral data					
Efficiency		typ. 80 %	typ. 83 %	typ. 86 %	typ. 89 %
Duty time		100 %			
Dimensions (WxHxD)		18 x 91 x 57.5 mm [0.71 x 3.58 x 2.26 in]	53 x 91 x 57.5 mm [2.09 x 3.58 x 2.26 in]	71 x 91 x 57.5 mm [2.80 x 3.58 x 2.26 in]	89.9 x 91 x 57,5 mm [3.54 x 3.58 x 2.26 in]
Weight		0.066 kg (0.13 lb)	0.196 kg (0.41 lb)	0.252 kg (0.55 lb)	0.386 kg / (0.72 lb)
Material of enclosure		plastic			
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position		horizontal			
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)			
Degree of protection	enclosure / terminals	IP20 / IP20			
Protection class		II			

Primary switch mode power supplies
CP-D range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

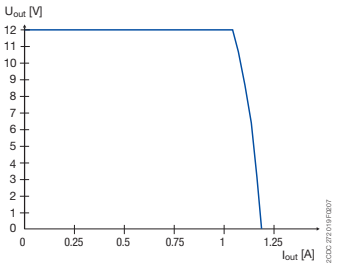
Type		CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
Electrical connection - Input circuit / Output circuit					
Wire size	fine-strand with wire end ferrule	0.2-2 mm² (24-14 AWG)			
	fine-strand without wire end ferrule				
	rigid				
Stripping length		6 mm (0.24 in)			
Tightening torque		0.36-0.56 Nm			
Environmental data					
Ambient temperature range	operation	-40…+70 °C			
	rated load	-40…+60 °C			
	storage	-40…+85 °C			
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH			
Vibration (sinusoidal) (IEC/EN 60068-2-6)		50 m/s², 10 Hz - 2 kHz			
Shock (half-sine) (IEC/EN 60068-2-27)		40 m/s², 22 ms			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC		4 kV AC	3 kV AC
Pollution degree		2			
Overvoltage category (UL/IEC/EN 60950-1)		II			
Standards					
Product standard		EN 61204			
Low Voltage Directive		2006/95/EC			
EMC Direcitve		2004/108/EC			
Electrical safety		UL 508, UL 60950-1, EN 60950-1			
Protective low voltage		SELV (EN 60950-1)			
Electromagnetic compatibility					
Interference immunity to		EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	Level 4 (4 kV / 8 kV)	Level 4 (8 kV / 15 kV)		Level 4 (4 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)			
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4 (4 kV)			
surge	IEC/EN 61000-4-5	Level 3 (2 kV L-L)			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)			
Interference emission		EN 61000-6-3			
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B			
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B			

• **Approvals** **4**/4

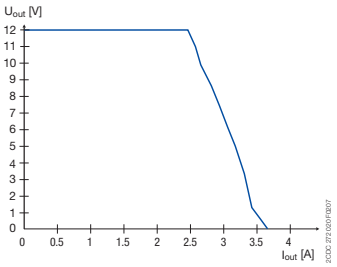
Primary switch mode power supplies
CP-D range
Technical diagrams, Dimensional drawings

Technical diagrams

Output curve at T_a = 25 °C

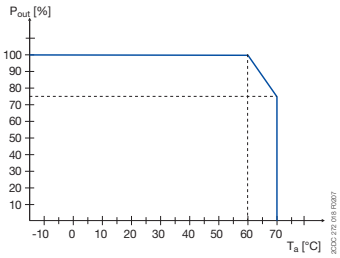


CP-D 12/0.83

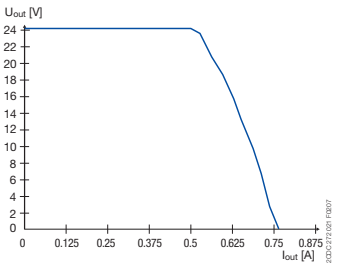


CP-D 12/2.1

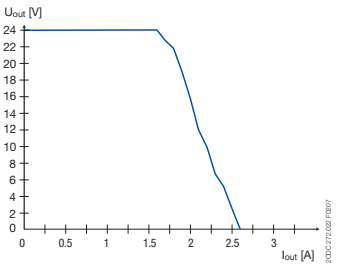
Temperature curve at rated output voltage



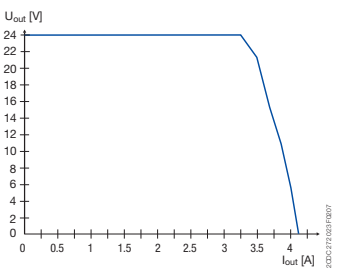
CP-D



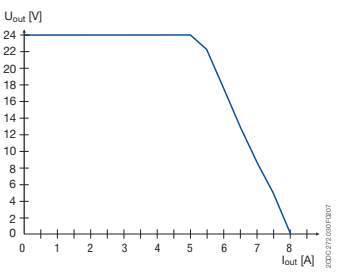
CP-D 24/0.42



CP-D 24/1.3



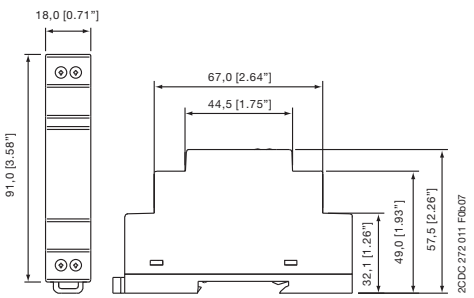
CP-D 24/2.5



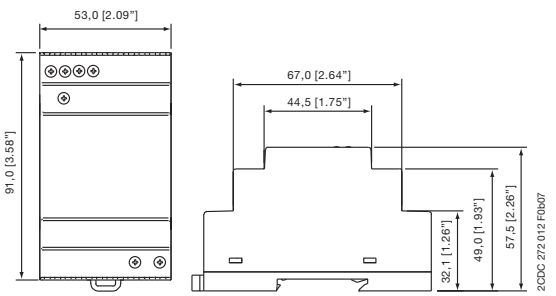
CP-D 24/4.2

Dimensional drawings

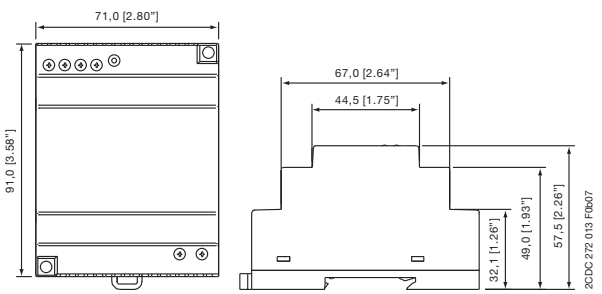
dimensions in mm



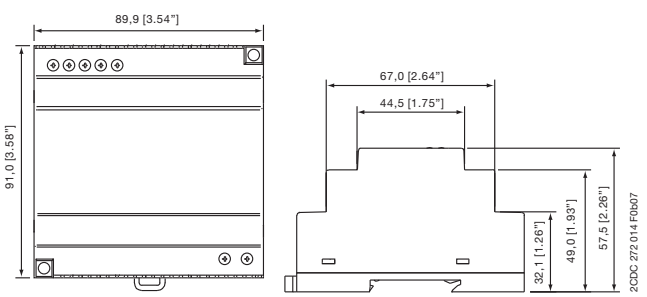
CP-D 12/0.83, CP-D 24/0.42



CP-D 12/2.1, CP-D 24/1.3



CP-D 24/2.5



CP-D 24/4.2

Primary switch mode power supplies

CP-E range

Content

Primary switch mode power supplies
CP-E range
Benefits and advantages


2CDC 275 004 F0b06

- Output voltages 5 V, 12 V, 24 V, 48 V DC
- Adjustable output voltages
- Output currents 0.625 A / 0.75 A / 1.25 A / 2.5 A / 3 A / 5 A / 10 A / 20 A
- Power range 15 W, 18 W, 30 W, 60 W, 120 W, 240 W, 480 W
- High efficiency of up to 90 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic curve on devices > 18 W (fold-forward behaviour at overload – no switch-off)
- Redundancy units offering true redundancy
- LED(s) for status indication
- Signalling output/contact for output voltage OK
  - Transistor on 24 V devices > 18 W and < 120 W
  - Relay on 24 V devices ≥ 120 W
- Approvals / Marks (depending on device, partly pending):

Signalling output/contact

The CP-E range 24 V devices > 18 W offer an output/contact for monitoring of the output voltage and remote diagnosis.

2CDC 276 008 F0006

Wide range input

Optimised for world-wide applications: The CP-E power supplies can be supplied within a wide range of AC or DC voltage.

2CDC 276 009 F0006

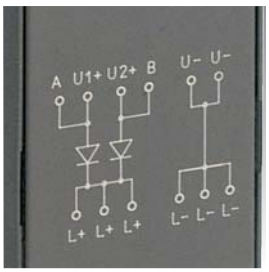
Adjustable output voltage

The CP-E range types feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.

2CDC 276 008 F0006

Redundancy units

For decoupling of parallelized power supply units ≤ 40 V. Thus, true redundancy can be achieved.



2CDC 271 006 F0003

Primary switch mode power supplies
CP-E range
Ordering details

CP-E 5/3.0

CP-E 12/2.5

CP-E 24/0.75

CP-E 24/2.5

CP-E 48/0.62

CP-RUD

Type	Input voltage range	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-E 5/3.0	90-265 V AC/ 120-370 V DC	5 V DC / 3 A	**1SVR 427 033 R3000**	1		0.15 / 0.33
CP-E 12/2.5	85-264 V AC/ 90-375 V DC	12 V DC / 2.5 A	**1SVR 427 032 R1000**	1		0.29 / 0.64
CP-E 12/10.0	90-132 V AC, 186-264 V AC/ 210-370 V DC	12 V DC / 10 A	**1SVR 427 035 R1000**	1		1.00 / 2.20
CP-E 24/0.75	90-265 V AC/ 120-370 V DC	24 V DC / 0.75 A	**1SVR 427 030 R0000**	1		0.15 / 0.33
CP-E 24/1.25	85-264 V AC/ 90-375 V DC	24 V DC / 1.25 A	**1SVR 427 031 R0000**	1		0.29 / 0.64
CP-E 24/2.5	85-264 V AC/ 90-375 V DC	24 V DC / 2.5 A	**1SVR 427 032 R0000**	1		0.36 / 0.79
CP-E 24/5.0	90-132 V AC, 186-264 V AC/ 210-370 V DC	24 V DC / 5 A	**1SVR 427 034 R0000**	1		1.00 / 2.20
CP-E 24/10.0	93-132 V AC, 186-264 V AC/ 210-370 V DC	24 V DC / 10 A	**1SVR 427 035 R0000**	1		1.36 / 3.01
CP-E 24/20.0	90-264 V AC/ 120-370 V DC	24 V DC / 20 A	**1SVR 427 036 R0000**	1		1.90 / 4.19
CP-E 48/0.62	85-264 V AC/ 90-375 V DC	48 V DC / 0.625 A	**1SVR 427 030 R2000**	1		0.29 / 0.64
CP-E 48/1.25	85-264 V AC/ 90-375 V DC	48 V DC / 1.25 A	**1SVR 427 031 R2000**	1		0.36 / 0.79
CP-E 48/5.0	93-132 V AC, 186-264 V AC/ 210-370 V DC	48 V DC / 5 A	**1SVR 427 034 R2000**	1		1.36 / 3.01
CP-E 48/10.0	90-264 V AC/ 120-370 V DC	48 V DC / 10 A	**1SVR 427 035 R2000**	1		1.90 / 4.19

Redundancy units
for decoupling of two CP-E power supply units

Type	suitable for decoupling of CP-E power supply units	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-RUD: 2 inputs each up to 2.5 A and 1 output up to 5 A					
CP-RUD	≤ 35 V and < 5 A	**1SVR 423 418 R9000**	1		0.15 / 0.33
CP-A RU: 2 inputs each up to 20 A and 1 output up to 40 A					
CP-A RU	≤ 40 V and ≥ 5 A	**1SVR 427 071 R0000**	1		0.89 / 1.96

• Approvals **4**/4
• Technical data **4**/16
• Technical diagrams **4**/25
• Wiring instructions **4**/25
• Dimensional drawings **4**/26

Primary switch mode power supplies
CP-E range (5 V DC and 12 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		**CP-E 5/3.0**	**CP-E 12/2.5**	**CP-E 12/10.0**
Input circuit		**L, N**		
Rated input voltage U_{in}		100-240 V AC		115 / 230 V AC auto select
Input voltage range		90-265 V AC / 120-370 V DC	85-264 V AC / 90-375 V DC	90-132 V AC, 186-264 V AC / 210-370 V DC
Frequency range AC		47-63 Hz		
Typical input current	at 115 V AC	297 mA	555 mA	2.8 A
	at 230 V AC	183.2 mA	328 mA	1.4 A
Typical power consumption		19.8 W	35.9 W	143 W
Inrush current limiting	at 115 V AC	10 A (max. 3 ms)	20 A (max. 3 ms)	24 A (max. 5 ms)
	at 230 V AC	18 A (max. 3 ms)	40 A (max. 3 ms)	48 A (max. 5 ms)
Discharge current	input / output	0.25 mA		
	input / PE	3.5 mA		
Power failure buffering time	at 115 V AC	min. 20 ms	min. 20 ms	min. 25 ms
	at 230 V AC	min. 75 ms	min. 30 ms	min. 30 ms
Internal input fuse		2 A slow-acting / 250 V AC		3.15 A slow-acting / 250 V AC
Power factor correction (PFC)		no		yes, passive, 0.7
Indication of operational states				
Output voltage	green LED	OK: ⎍: output voltage OK	OUTPUT OK: ⎍: output voltage OK	OUTPUT OK: ⎍: output voltage OK
	red LED	LOW: ⎍: output voltage too low	-	OUTPUT LOW: ⎍: output voltage too low
Output circuit		**L+,L-**	**L+, L+, L-, L-**	
Rated output voltage		5 V DC	12 V DC	
Tolerance of the output voltage		0...+1 %		
Adjustment range of the output voltage		4.7-6 V DC	12-15 V DC	11.4-14.5 V DC
Rated output power		15 W	30 W	120 W
Rated output current I_r	$T_a \leq 60$ °C	3.0 A	2.5 A	10 A
Derating of the output current	60 °C < $T_a \leq$ 70 °C	3 %/°C	2.5 %/°C	
Signalling output for output voltage OK	DC OK	-	-	-
Maximum deviation with	load change statical	±2 %	0.5 %	±1 % (single mode) ±5 % (parallel mode)
	change of output voltage within the input voltage range	±1 %	0.5 %	±0.5 %
Control time		< 2 ms		
Starting time after applying the supply voltage	at I_r	max. 1 s		
	with 3500 µF	-	max. 2 s	-
	with 7000 µF	max. 1.5 s	-	max. 1.5 s
Rise time	at rated load	max. 150 ms		
	with 3500 µF	-	max. 500 ms	-
	with 7000 µF	max. 500 ms	-	max. 500 ms
Fall time		max. 150 ms		
Residual ripple and switching peaks	BW = 20 MHz	50 mV		
Parallel connection		yes, to enable redundancy		configurable, to increase power, up to 3 devices, min. 0.1 I_r - max. 0.9 I_r
Series connection		yes, to increase voltage		yes, to increase voltage, max. 2 devices
Resistance to reverse feed		1 s-max. 7.5 V DC	1 s-max. 18 V DC	max. 18 V DC
Output circuit - No-load, overload and short-circuit behaviour				
Characteristic curve of output		Hiccup-mode	U/I characteristic curve	
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		Hiccup-mode	continuation with output power limiting	
Overload protection		output power limiting		
No-load protection		continuous no-load stability		
Starting of capacitive loads		7000 µF	3500 µF	7000 µF

Primary switch mode power supplies
CP-E range (5 V DC and 12 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-E 5/3.0	CP-E 12/2.5	CP-E 12/10.0
General data				
Power dissipation		typ. 5 W	typ. 5.6 W	typ. 24 W
Efficiency		typ. 75 %	typ. 84 %	typ. 84 %
Duty time		100 %		
Dimensions (W x H x D)		23.9 x 88.5 x 115 mm [0.94 x 3.48 x 4.53 in]	43.5 x 88.5 x 115 mm [1.71 x 3.48 x 4.53 in]	63.2 x 123.6 x 123.6 mm [2.49 x 4.87 x 4.87 in]
Weight		0.144 kg (0.33 lb)	0.287 kg (0.64 lb)	0.888 kg (2.20 lb)
Material of enclosure		Plastic		Metall
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool		
Mounting position		horizontal		
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals	IP20 / IP20		
Protection class		I		
Electrical connection - input circuit / output circuit				
Wire size	fine-strand with wire end ferrule	0.2-2 mm² (24-14 AWG)		0.2-4 mm² (24-11 AWG)
	fine-strand without wire end ferrule			0.2-6 mm² (24-10 AWG)
	rigid			
Stripping length		6 mm (0.24 in)		8 mm (0.31 in)
Tightening torque	input / output	0.5-0.6 Nm		1 Nm / 0.6 Nm
Environmental data				
Ambient temperature range	operation	-25…+70 °C		
	rated load	-25...+60 °C		
	storage	-25…+85 °C		
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH		95 % without condensation
Vibration (sinusoidal) (IEC/EN 60068-2-6)		10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis		
Shock (half-sine) (IEC/EN 60068-2-27)		15 G, 11 ms, 3 axes, 6 faces, 3 times for each face		
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC		
	input / PE	1.5 kV AC		
Pollution degree		2		
Overvoltage category (UL/IEC/EN 60950-1)		II		
Standards				
Product standard		EN 61204-3		
Low Voltage Directive		2006/95/EG		
EMC directive		2004/108/EG		
RoHS directive		2002/95/EG		
Electrical safety		EN 50178, EN 60950-1, UL 60950-1, UL 508		IEC/EN 60950-1
Protective low voltage		SELV (EN 60950)		SELV
Electromagnetic compatibility				
Interference immunity to		IEC/EN 61000-6-2		
electrostatic discharge	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)		
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4 (4 kV)		
surge	IEC/EN 61000-4-5	L-L Level 3 (2 kV), L-PE Level 4 (4 kV)		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)		
Interference emission		IEC/EN 61000-6-3		
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B		
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B		

• **Approvals** **4**/4

Primary switch mode power supplies
CP-E range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		**CP-E 24/0.75**	**CP-E 24/1.25**	**CP-E 24/2.5**
Input circuit		**L, N**		
Rated input voltage U_{in}		100-240 V AC		
Input voltage range		90-265 V AC / 120-370 V DC	85-264 V AC / 90-375 V DC	
Frequency range AC		47-63 Hz		
Typical input current	at 115 V AC	321 mA	543 mA	1033 mA
	at 230 V AC	197.4 mA	326.6 mA	570 mA
Typical power consumption		22.8 W	36.7 W	69.2 W
Inrush current limiting	at 115 V AC	10 A (max. 3 ms)	20 A (max. 3 ms)	30 A (max. 3 ms)
	at 230 V AC	18 A (max. 3 ms)	40 A (max. 3 ms)	60 A (max. 3 ms)
Discharge current	input / output	0.25 mA		
	input / PE	3.5 mA		
Power failure buffering time	at 115 V AC	min. 20 ms	min. 20 ms	
	at 230 V AC	min. 75 ms	min. 30 ms	
Internal input fuse		2 A slow-acting / 250 V AC		
Power factor correction (PFC)		no		
Indication of operational states				
Output voltage	green LED	OK: ⎍: output voltage OK	OUTPUT OK: ⎍: output voltage OK	
	red LED	LOW: ⎍: output voltage too low	-	-
Output circuit		**L+,L-**	**L+, L+, L-, L-**	
Rated output voltage		24 V DC		
Tolerance of the output voltage		0 ... +1 %		
Adjustment range of the output voltage		21.6-28.8 V DC	24-28 V DC	
Rated output power		18 W	30 W	60 W
Rated output current I_r	$T_a \leq 60$ °C	0.75 A	1.25 A	2.5 A
Derating of the output current	60 °C < $T_a \leq$ 70 °C	3 %/°C	2.5 %/°C	
Signalling output for output voltage OK	DC OK	-	Transistor	
Maximum deviation with	load change statical	±2 %	0.5 %	
	change of output voltage within the input voltage range	±1 %	0.5 %	
Control time		< 2 ms		
Starting time after applying the supply voltage	at I_r	max. 1 s		
	with 3500 µF	-	max. 2 s	-
	with 7000 µF	max. 1.5 s	-	max. 1.5 s
Rise time	at rated load	max. 150 ms		
	with 3500 µF	-	max. 500 ms	-
	with 7000 µF	max. 500 ms	-	max. 500 ms
Fall time		max. 150 ms		
Residual ripple and switching peaks	BW = 20 MHz	50 mV		
Parallel connection		yes, to enable redundancy		
Series connection		yes, to increase voltage		
Resistance to reverse feed		1 s - max. 35 V DC		
Output circuit - No-load, overload and short-circuit behaviour				
Characteristic curve of output		Hiccup-mode	U/I characteristic curve	
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		Hiccup-mode	continuation with output power limiting	
Overload protection		output power limiting		
No-load protection		continuous no-load stability		
Starting of capacitive loads		7000 µF	3500 µF	7000 µF

Primary switch mode power supplies
CP-E range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-E 24/0.75	CP-E 24/1.25	CP-E 24/2.5
General data				
Power dissipation		typ. 4.45 W	typ. 5.5 W	typ. 8.8 W
Efficiency		typ. 77 %	typ. 86 %	typ. 89 %
Duty time		100 %		
Dimensions (W x H x D)		23.9 x 88.5 x 115 mm [0.94 x 3.48 x 4.53 in]	43.5 x 88.5 x 115 mm [1.71 x 3.48 x 4.53 in]	
Weight		0.143 kg (0.33 lb)	0.270 kg (0.64 lb)	0.331 kg (0.79 lb)
Material of enclosure		Plastic		
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool		
Mounting position		horizontal		
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals	IP20 / IP20		
Protection class		I		
Electrical connection - input circuit / output circuit				
Wire size	fine-strand with wire end ferrule	0.2-2 mm² (24-14 AWG)		
	fine-strand without wire end ferrule			
	rigid			
Stripping length		6 mm (0.24 in)		
Tightening torque	input / output	0.5-0.6 Nm		
Environmental data				
Ambient temperature range	operation	-25…+70 °C		
	rated load	-25…+60 °C		
	storage	-25…+85 °C		
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH		
Vibration (sinusoidal) (IEC/EN 60068-2-6)		10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis		
Shock (half-sine) (IEC/EN 60068-2-27)		15 G, 11 ms, 3 axes, 6 faces, 3 times for each face		
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC		
	input / PE	1.5 kV AC		
Pollution degree		2		
Overvoltage category (UL/IEC/EN 60950-1)		II		
Standards				
Product standard		EN 61204-3		
Low Voltage Directive		2006/95/EG		
EMC directive		2004/108/EG		
RoHS directive		2002/95/EG		
Electrical safety		EN 50178, EN 60950-1, UL 60950-1, UL 508		
Protective low voltage		SELV (EN 60950)		
Electromagnetic compatibility				
Interference immunity to		IEC/EN 61000-6-2		
electrostatic discharge	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)		
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4 (4 kV)		
surge	IEC/EN 61000-4-5	Level 4 (2 kV / 4 kV)		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)		
Interference emission		IEC/EN 61000-6-3		
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B		
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B		

• **Approvals** **4**/4

Primary switch mode power supplies
CP-E range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		**CP-E 24/5.0**	**CP-E 24/10.0**	**CP-E 24/20.0**
Input circuit		**L, N**		
Rated input voltage U_{in}		115 / 230 V AC auto select		115-230 V AC
Input voltage range		90-132 V AC, 186-264 V AC / 210-370 V DC	93-132 V AC, 186-264 V AC / 210-370 V DC	90-264 V AC, 120-370 V DC
Frequency range AC		47-63 Hz		
Typical input current	at 115 V AC	2.8 A	5.4 A	7 A
	at 230 V AC	1.4 A	2.2 A	3.5 A
Typical power consumption		140 W	270 W	539 W
Inrush current limiting	at 115 V AC	24 A (max. 5 ms)	30 A (max. 5 ms)	25 A (max. 5 ms)
	at 230 V AC	48 A (max. 5 ms)	60 A (max. 5 ms)	50 A (max. 5 ms)
Discharge current	input / output	0.25 mA		
	input / PE	3.5 mA		
Power failure buffering time	at 115 V AC	min. 25 ms		min. 30 ms
	at 230 V AC	min. 30 ms		
Internal input fuse		3.15 A slow-acting / 250 V AC	6.3 A slow-acting / 250 V AC	10 A slow-acting / 250 V AC
Power factor correction (PFC)		yes, passive, 0.7		yes, active 115 V AC: 0.99 230 V AC: 0.97
Indication of operational states				
Output voltage	green LED	OUTPUT OK: ⎍: output voltage OK		
	red LED	OUTPUT LOW: ⎍: output voltage too low		
Output circuit		**L+, L+, L-, L-**		
Rated output voltage		24 V DC		
Tolerance of the output voltage		0...+1 %		
Adjustment range of the output voltage		22.5-28.5 V DC		
Rated output power		120 W	240 W	480 W
Rated output current I_r	$T_a \leq 60$ °C	5 A	10 A	-
	$T_a \leq 55$ °C	-	-	20 A
Derating of the output current	60 °C < $T_a \leq 70$ °C	2.5 %/°C		-
	55 °C < $T_a \leq 70$ °C	-	-	2.5 %/°C
Signalling contact for output voltage OK	13-14	Relay (max. 60 V DC, 0.3 A)		
Maximum deviation with	load change statical	±1 % (single mode) ±5 % (parallel mode)		±0.5 % (single mode) ±5 % (parallel mode)
	change of output voltage within the input voltage range	±0.5 %		
Control time		< 2 ms		
Starting time after applying the supply voltage	at I_r	max. 1 s		
	with 3500 µF	max. 1.5 s	-	-
	with 7000 µF	-	max. 1.5 s	
Rise time	at rated load	max. 150 ms		
	with 3500 µF	max. 500 ms	-	-
	with 7000 µF	-	max. 500 ms	
Fall time		max. 150 ms		
Residual ripple and switching peaks	BW = 20 MHz	50 mV	100 mV	
Parallel connection		configurable, to increase power, up to 3 devices, min. 0.1 I_r - max. 0.9 I_r		
Series connection		yes, to increase voltage, max. 2 devices		
Resistance to reverse feed		max. 35 V DC		
Output circuit - No-load, overload and short-circuit behaviour				
Characteristic curve of output		U/I characteristic curve		
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		continuation with output power limiting		
Overload protection		output power limiting		
No-load protection		continuous no-load stability		
Starting of capacitive loads		3500 µF	7000 µF	

Primary switch mode power supplies
CP-E range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-E 24/5.0	CP-E 24/10.0	CP-E 24/20.0
General data				
Power dissipation		typ. 20 W	typ. 35 W	typ. 63 W
Efficiency		typ. 86 %	typ. 89 %	typ. 89 %
Duty time		100 %		
Dimensions (W x H x D)		63.2 x 123.6 x 123.6 mm [2.49 x 4.87 x 4.87 in]	83 x 123.6 x 123.6 mm [3.27 x 4.87 x 4.87 in]	175 x 123.6 x 123.6 mm [6.89 x 4.87 x 4.87 in]
Weight		0.882 kg (2.20 lb)	1.334 kg (3.01 lb)	1.850 kg (4.19 lb)
Material of enclosure		Metall		
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool		
Mounting position		horizontal		
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals	IP20 / IP20		
Protection class		I		
Electrical connection - input circuit / output circuit				
Wire size	fine-strand with wire end ferrule	0.2-4 mm² (24-11 AWG)		
	fine-strand without wire end ferrule	0.2-6 mm² (24-10 AWG)		
	rigid			
Stripping length		8 mm (0.31 in)		
Tightening torque	input / output	1 Nm / 0.6 Nm		
Environmental data				
Ambient temperature range	operation	-25…+70 °C		
	rated load	-25...+60 °C		-25...+55 °C
	storage	-25…+85 °C		
Damp heat (cyclic) (IEC/EN 60068-2-30)		95 % without condensation		
Vibration (sinusoidal) (IEC/EN 60068-2-6)		10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis		
Shock (half-sine) (IEC/EN 60068-2-27)		15 G, 11 ms, 3 axes, 6 faces, 3 times for each face		
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC		
	input / PE	1.5 kV AC		
Pollution degree		2		
Overvoltage category (UL/IEC/EN 60950-1)		II		
Standards				
Product standard		EN 61204-3		
Low Voltage Directive		2006/95/EG		
EMC directive		2004/108/EG		
RoHS directive		2002/95/EG		
Electrical safety		IEC/EN 60950-1		
Protective low voltage		SELV		
Electromagnetic compatibility				
Interference immunity to		IEC/EN 61000-6-2		
electrostatic discharge	IEC/EN 61000-4-2	Level 4		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3		
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4		
surge	IEC/EN 61000-4-5	L-N Level 3, L/N-FG Level 4		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3		
Interference emission		IEC/EN 61000-6-3		
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B		
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B		

• **Approvals** **4**/4

Primary switch mode power supplies
CP-E range (48 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-E 48/0.62	CP-E 48/1.25	CP-E 48/5.0	CP-E 48/10.0
Input circuit		**L, N**			
Rated input voltage U_{in}		100-240 V AC		115 / 230 V AC auto select	115-230 V AC
Input voltage range		85-264 V AC / 90-375 V DC		93-132 V AC, 186-264 V AC / 210-370 V DC	90-264 V AC, 120-370 V DC
Frequency range AC		47-63 Hz			
Typical input current	at 115 V AC	541 mA	1033 mA	5.4 A	7 A
	at 230 V AC	320 mA	573 mA	2.2 A	3.5 A
Typical power consumption		35.7 W	69.0 W	267 W	528 W
Inrush current limiting	at 115 V AC	20 A (max. 3 ms)	30 A (max. 3 ms)	30 A (max. 5 ms)	25 A (max. 5 ms)
	at 230 V AC	40 A (max. 3 ms)	60 A (max. 3 ms)	60 A (max. 5 ms)	50 A (max. 5 ms)
Discharge current	input / output	0.25 mA			
	input / PE	3.5 mA			
Power failure buffering time	at 115 V AC	min. 20 ms		min. 25 ms	min. 30 ms
	at 230 V AC	min. 30 ms			
Internal input fuse		2 A slow-acting / 250 V AC		6.3 A slow-acting / 250 V AC	10 A slow-acting / 250 V AC
Power factor correction (PFC)		no		yes, passive, 0.7	yes, active 115 V AC: 0.99 230 V AC: 0.97
Indication of operational states					
Output voltage	green LED	OUTPUT OK: ⌜‾‾‾⌝: output voltage OK			
	red LED	-	-	OUTPUT LOW: ⌜___⌝: output voltage too low	
Output circuit		**L+, L+, L-, L-**			
Rated output voltage		48 V DC			
Tolerance of the output voltage		0...+1 %			
Adjustment range of the output voltage		48-55 V DC		47-56 V DC	
Rated output power		30 W	60 W	240 W	480 W
Rated output current I_r	$T_a \leq 60$ °C	0.625 A	1.25 A	5 A	-
	$T_a \leq 55$ °C	-	-	-	10 A
Derating of the output current	60 °C < $T_a \leq$ 70 °C	2.5 %/°C			-
	55 °C < $T_a \leq$ 70 °C	-	-	-	2.5 %/°C
Signalling output for output voltage OK	DC OK	-	-	-	-
Maximum deviation with	load change statical	0.5 %		±1 % (single mode) ±5 % (parallel mode)	±0.5 % (single mode) ±5 % (parallel mode)
	change of output voltage within the input voltage range	0.5 %		±0.5 %	
Control time		< 2 ms			
Starting time after applying the supply voltage	at I_r	max. 1 s			
	with 3500 µF	max. 2 s	-	-	-
	with 7000 µF	-	max. 1.5 s	max. 1.5 s	
Rise time	at rated load	max. 150 ms			
	with 3500 µF	max. 500 ms	-	-	-
	with 7000 µF	-	max. 500 ms	max. 500 ms	
Fall time		max. 150 ms			
Residual ripple and switching peaks	BW = 20 MHz	50 mV		100 mV	
Parallel connection		yes, to enable redundancy		configurable, to increase power, up to 3 devices, min. 0.1 I_r - max. 0.9 I_r	
Series connection		yes, to increase voltage		yes, to increase voltage, max. 2 devices	
Resistance to reverse feed		1 s - max. 63 V DC			
Output circuit - No-load, overload and short-circuit behaviour					
Characteristic curve of output		U/I characteristic curve			
Short-circuit protection		continuous short-circuit proof			
Short-circuit behaviour		continuation with output power limiting			
Overload protection		output power limiting			
No-load protection		continuous no-load stability			
Starting of capacitive loads		3500 µF	7000 µF		

Primary switch mode power supplies
CP-E range (48 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type		CP-E 48/0.62	CP-E 48/1.25	CP-E 48/5.0	CP-E 48/10.0
Gerneral data					
Power dissipation		typ. 4.9 W	typ. 7.8 W	typ. 32 W	typ. 60 W
Efficiency		typ. 86 %	typ. 89 %	typ. 90 %	
Duty time		100 %			
Dimensions (W x H x D)		43.5 x 88.5 x 115 mm [1.71 x 3.48 x 4.53 in]		83 x 123.6 x 123.6 mm [3.27 x 4.87 x 4.87 in]	175 x 123.6 x 123.6 mm [6.89 x 4.87 x 4.87 in]
Weight		0.264 kg (0.64 lb)	0.316 kg (0.79 lb)	1.322 kg (3.01 lb)	1.839 kg (4.19 lb)
Material of enclosure		Plastic		Metall	
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position		horizontal			
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)			
Degree of protection	enclosure / terminals	IP/20 / IP20			
Protection class		I			
Electrical connection - input circuit / output circuit					
Wire size	fine-strand with wire end ferrule	0.2-2 mm² (24-14 AWG)		0.2-4 mm² (24-11 AWG)	
	fine-strand without wire end ferrule			0.2-6 mm² (24-10 AWG)	
	rigid				
Stripping length		6 mm (0.24 in)		8 mm (0.31 in)	
Tightening torque	input / output	0.5-0.6 Nm		1 Nm / 0.6 Nm	
Environmental data					
Ambient temperature range	operation	-25…+70 °C			
	rated load	-25...60 °C			-25...+55 °C
	storage	-25…+85 °C			
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 Zyklen, 40 °C, 95 % RH		95 % without condensation	
Vibration (sinusoidal) (IEC/EN 60068-2-6)		10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis			
Shock (half-sine) (IEC/EN 60068-2-27)		15 G, 11 ms, 3 axes, 6 faces, 3 times for each face			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC			
	input / PE	1.5 kV AC			
Pollution degree		2			
Overvoltage category (UL/IEC/EN 60950-1)		II			
Standards					
Product standard		EN 61204-3			
Low Voltage Directive		2006/95/EG			
EMC directive		2004/108/EG			
RoHS directive		2002/95/EG			
Electrical safety		EN 50178, EN 60950-1, UL 60950-1, UL508		IEC/EN 60950-1	
Protective low voltage		SELV (EN 60950)		SELV	
Electromagnetic compatibility					
Interference immunity to		IEC/EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)			
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)			
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4 (4 kV)			
surge	IEC/EN 61000-4-5	L-L Level 3 (2 kV), L-PE Level 4 (4 kV)			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)			
Interference emission		IEC/EN 61000-6-3			
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B			
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B			

• **Approvals** **4**/4

Primary switch mode power supplies
Redundancy units for CP-E range
Technical data

Data at T_a = 25 °C, unless otherwise indicated

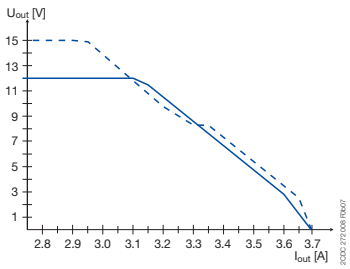
Type		**CP-RUD**	**CP- A RU**
Input circuit - Supply circuit		**A: U1+/-U ; B: U2+/-U**	**(+/ -, +/ -)**
Rated input voltage U_{in}		24 V DC	
Input voltage range		5-35 V DC	10-40 V DC
Rated input current I_{in} per channel		0.5-2.5 A	1-20 A
Maximum input current per channel		10 A for 300 s	30 A for 300 s
Transient overvoltage protection		no	yes
Output circuit		**L+, L+, L+, L-, L-, L-**	**(++/--)**
Rated output voltage U_{out}		24 V DC	
Voltage drop		typ. 0.6 V, max. 0.7 V	typ. 0.6 V, max. 0.9 V
Rated output current I_{out}		0.5-5 A	1-40 A
Peak output current		20 A for 150 s	60 A for 300 s
Resistance to reverse feed		< 35 V	< 40 V
General data			
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 4.02 in)	56.5 (60 [1]) x 130 x 135.5 mm (2.22 (2.36 [1]) x 5.12 x 5.39 in)
Weight		0.135 kg (0.30 lb)	0.89 kg (1.96 lb)
Minimum distance to other units	horizontal / vertical	10 mm / 10 mm (0.39 in / 0.39 in)	10 mm / 50 mm (0.39 in / 1.97 in)
Degree of protection	enclosure / terminals	IP20 / IP20	
Material of enclosure	enclosure shell / cover	plastic / plastic	aluminium / zinc-coated sheet steel
Protection class		-	III [2]
Mounting		DIN rail (IEC/EN 60715)	
Mounting position		horizontal	
Electrical connection - Input circuit / Output circuit			
Wire size	fine-strand with wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)	2.5-10 mm² (14-8 AWG)
	fine-strand without wire end ferrule		0.5-10 mm² (20-8 AWG)
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)	0.5-16 mm² (20-6 AWG)
Stripping length		7 mm (0.28 in)	12 mm (0.47 in)
Tightening torque		0.6-0.8 Nm	1.2-1.5 Nm
Environmental data			
Ambient temperature range	operation	-20...+60 °C	-25...+70 °C
	rated load	-20...+60 °C	-25...+60 °C (without derating)
	storage	-40...+85 °C	
Damp heat (IEC/EN 60068-2-3)		93 % at 40 °C, no condensation	
Climatic category (IEC/EN 60721)		-	3K3
Vibration (IEC/EN 60068-2-6)			
Shock (IEC/EN 60068-2-27)			
Isolation data			
Insulation voltage	between input / output / enclosure	-	500 V AC (routine test)
Pollution degree (EN 50178)		2	
Standards			
Product standard			IEC/EN 61204
Low Voltage Directive		2006/95/EG	
EMC Directive		2004/108/EG	
Electrical safety		EN 50178	EN 50178, EN 60950, UL 60950, UL 508
Electromagnetic compatibility			
Interference immunity to		IEC/EN 61000-6-2	
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (air discharge ±8 kV, contact discharge ±6 kV)	
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient/burst	IEC/EN 61000-4-4	Level 3 (±2 kV)	
surge	IEC/EN 61000-4-5	Level 1 (±0.5 kV)	
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission		IEC/EN 61000-6-3	
high-frequency radiated	IEC/CISPR 22 / EN 55022	Class B	
high-frequency conducted	IEC/CISPR 22 / EN 55022	Class B	

[1] incl. lateral screw

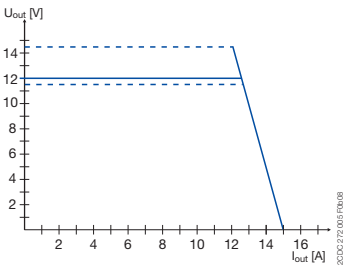
[2] This device is designed for connection to a safety extra-low voltage source. If no safety extra-low voltage is used at the input side, the lateral screw can be used for grounding of the enclosure (protection class I).

Technical diagrams

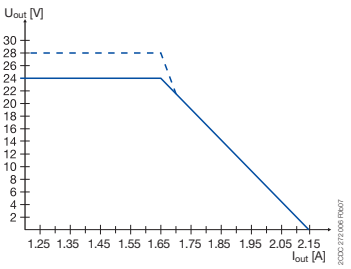
Output curve at T_a = 25 °C



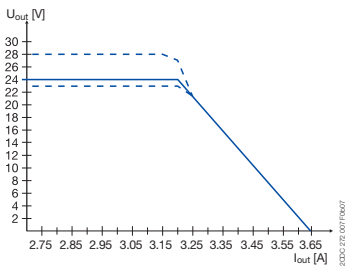
CP-E 12/2.5



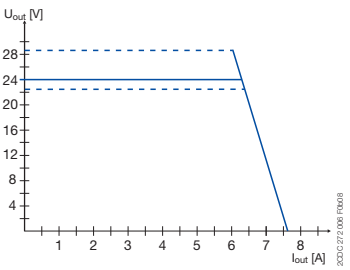
CP-E 12/10.0



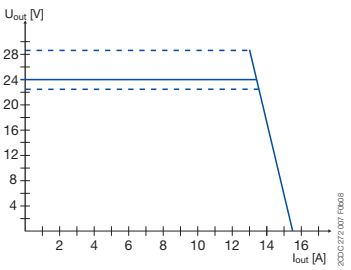
CP-E 24/1.25



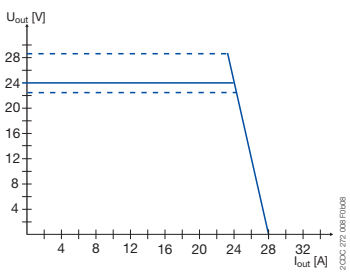
CP-E 24/2.5



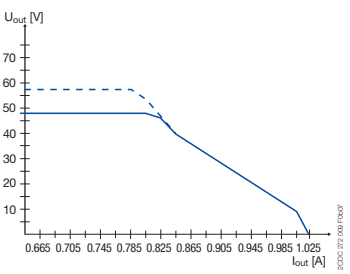
CP-E 24/5.0



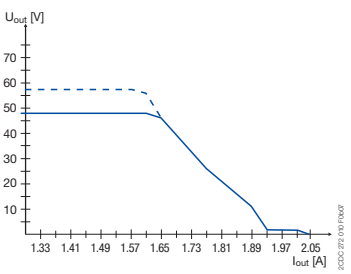
CP-E 24/10.0



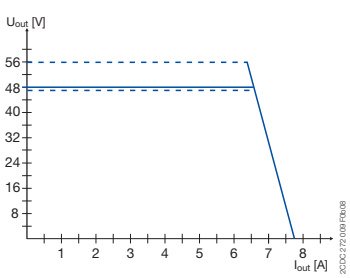
CP-E 24/20.0



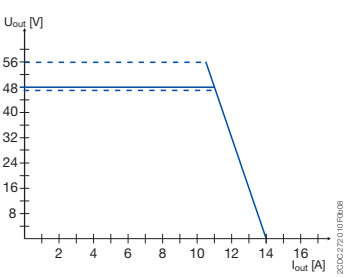
CP-E 48/0.62



CP-E 48/1.25

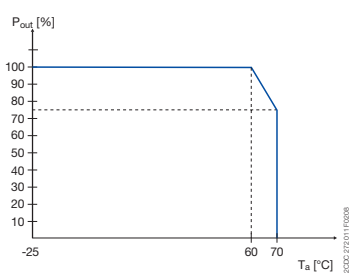


CP-E 48/5.0

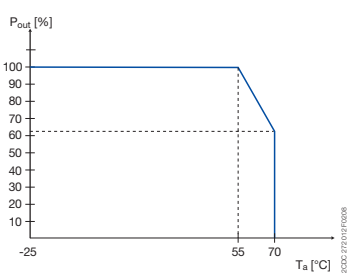


CP-E 48/10.0

Temperature curve at rated output voltage

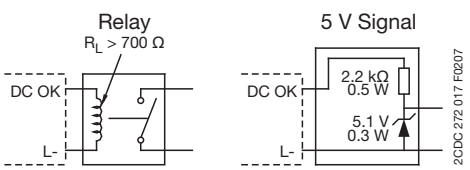


CP-E < 480 W



CP-E 480 W

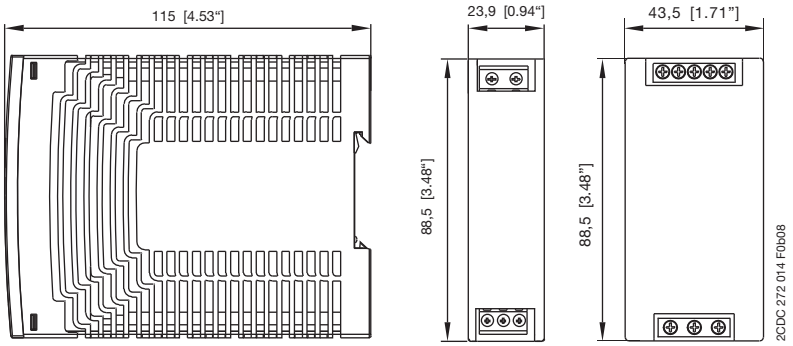
Wiring instructions



CP-E 24/1.25, CP-E 24/2.5

Dimensional drawings

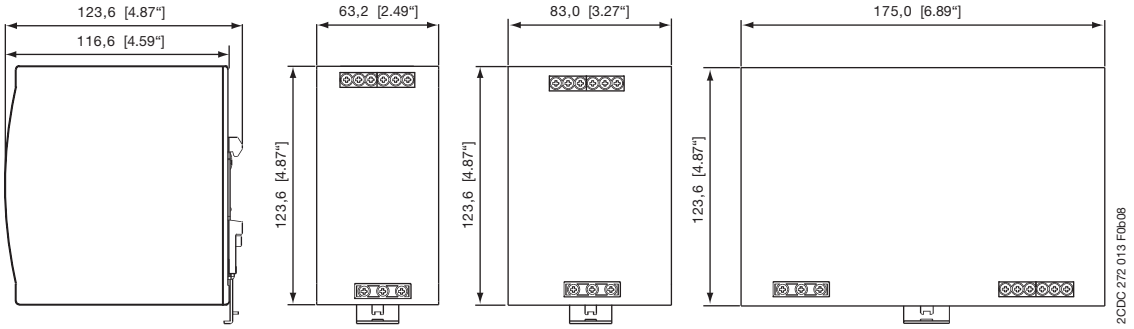
dimensions in mm



CP-E 5/3.0,
CP-E 24/0.75

CP-E 12/2.5,
CP-E 24/1.25,
CP-E 24/2.5,
CP-E 48/0.62,
CP-E 48/1.25

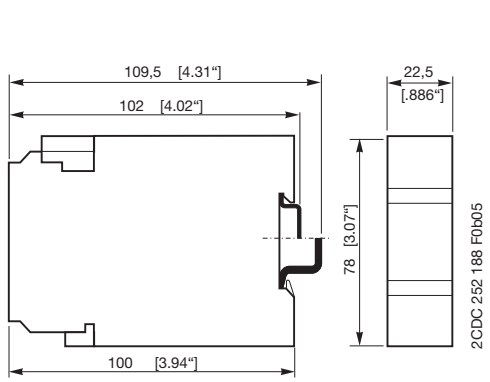
4



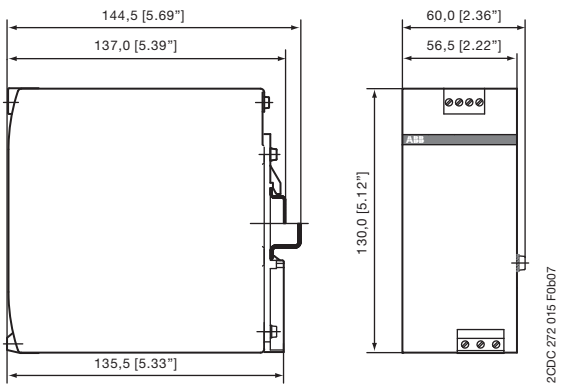
CP-E 12/10.0,
CP-E 24/5.0

CP-E 24/10.0,
CP-E 48/5.0

CP-E 24/20.0,
CP-E 48/10.0



CP-RUD



CP-A RU

NEW

Primary switch mode power supplies

CP-T range

Content

NEW

Primary switch mode power supplies CP-T range

Benefits and advantages

4

- Rated output voltages 24 V, 48 V DC
- Output voltage adjustable via front-face rotary potentiometer “OUTPUT Adjust”
- Rated output currents 5 A, 10 A, 20 A, 40 A
- Rated output powers 120 W, 240 W, 480 W, 960 W
- Three-phase or two-phase operation (see derating note)
- Supply range 3 x 400 – 500 V AC (3 x 340 – 575 V AC, 480 – 820 V DC)
- Typical efficiency of 93 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- Redundancy unit CP-A RU offering true redundancy, available as accessory
- LEDs for status indication
- Signalling contact "13-14" (Relay) for output voltage OK
- Approvals / marks (depending on device, partly pending):

„DC OK“ output

The devices of the CP-T series offer a relay contact for function monitoring and remote diagnostics.

Wide range

Wide range input optimized for world-wide applications:
The CP-T power supplies can be used in 3x340 - 575 V AC or 480 - 820 V DC supply systems.

Adjustable output voltage

The CP-T range feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.

NEW

Primary switch mode power supplies
CP-T range
Ordering details

CP-T 24/5.0

CP-T 24/10.0
CP-T 48/5.0

CP-T 24/20.0
CP-T 48/10.0

CP-T 24/40.0
CP-T 48/20.0

CP-A RU

Type	Input voltage range	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-T 24/5.0	340-575 V AC/ 480-820 V DC	24 V DC / 5 A	**1SVR 427 054 R0000**	1		0.8 / 1.77
CP-T 24/10.0	340-575 V AC/ 480-820 V DC	24 V DC / 10 A	**1SVR 427 055 R0000**	1		1.05 / 2.31
CP-T 24/20.0	340-575 V AC/ 480-820 V DC	24 V DC / 20 A	**1SVR 427 056 R0000**	1		1.75 / 3.86
CP-T 24/40.0	340-575 V AC/ 480-820 V DC	24 V DC / 40 A	**1SVR 427 057 R0000**	1		3.20 / 7.05
CP-T 48/5.0	340-575 V AC/ 480-820 V DC	48 V DC / 5 A	**1SVR 427 054 R2000**	1		1.05 / 2.31
CP-T 48/10.0	340-575 V AC/ 480-820 V DC	48 V DC / 10 A	**1SVR 427 055 R2000**	1		1.75 / 3.86
CP-T 48/20.0	340-575 V AC/ 480-820 V DC	48 V DC / 20 A	**1SVR 427 056 R2000**	1		3.4 / 7.50

Redundancy units
for decoupling of two CP-T power supply units

Type	suitable for decoupling of two CP-24 V DC power supply units	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-A RU: 2 inputs each up to 20 A and 1 output up to 40 A					
CP-A RU	≤ 40 V and ≥ 5 A	**1SVR 427 071 R0000**	1		0.89 / 1.96

• Approvals **4**/4
• Technical diagrams ..... **4**/34 • Technical data .....**4**/30 • Dimensional drawings **4**/34

NEW

Primary switch mode power supplies CP-T range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 3 x 400 V AC and rated values, unless otherwise indicated

Type		CP-T 24/5.0	CP-T 24/10.0	CP-T 24/20.0	CP-T 24/40.0
Input circuit		**L1, L2, L3**			
Rated input voltage U_{in}		3 x 400-500 V AC			
Input voltage range		340-575 V AC			
		480-820 V DC			
Frequency range AC		47-63 Hz			
Typical current consumption		0.36 A	0.85 A	1.1 A	1.72 A
Typical power consumption		135 W	270 W	538 W	1058 W
Inrush current limiting		10 A	20 A		30 A
Power failure buffering time		min. 20 ms			min. 15 ms
Internal input fuse	per phase	2 A / 600 V AC		T3.15 A / 500 V AC	T 5 A / 500 V AC
Recommended backup fuse		3 pole miniature circuit breaker ABB Type S203			
Power factor correction (PFC)		Yes, passive			
Discharge current	towards PE	< 3.5 mA			
	input / output	< 0.25 mA			
Indication of operational states					
Output voltage	OUTPUT OK: green LED	output voltage OK			
	OUTPUT LOW: red LED	output voltage too low			
Output circuit		**L+, L+, L-, L-**			
Rated output voltage		24 V DC			
Tolerance of the output voltage		0...+1 %			
Adjustment range of the output voltage		22.5-28.5 V DC			
Rated output power		120 W	240 W	480 W	960 W
Rated output current Ir	Ta ≤ 60 °C	5 A	10 A	20 A	40 A
Derating of the output current	60 °C < Ta ≤ 70 °C	2.5 %/°C			3.5 %/°C
Signalling contact for output voltage OK	13-14	Relay (max. 60 V DC, 0.3 A)			
	Threshold	17.6-19.4 V			
	Isolation voltage	500 V DC			
Maximum deviation with	load change statical	±1 % (single mode)			
			± 5 % (parallel mode)		
	change of output voltage within the input voltage range	± 0.5 %			
Control time	at nominal load	< 2 ms			
Starting time after applying the supply voltage	at Ir	max. 1 s			
	with 3500 µF	max. 1.5 s			
Rise time	at nominal load	max. 150 ms			
	with 3500 µF	max. 500 ms			
Fall time		max. 150 ms			
Residual ripple and switching peaks	BW = 20 MHz	100 mV			80 mV
Parallel connection		not supported	configurable, to increase power, up to 2 devices, reduction: (number of devices x I_r) x 0.9		to increase power, up to 2 devices, reduction: (number of devices x I_r) x 0.9, use active current balancing
Series connection		not supported	yes, to increase voltage, max. 2 devices		
Resistance to reverse feed		approx. 35 V			
Output circuit - No-load, overload and short-circuit behaviour					
Characteristic curve of output		combined U/I characteristic curve and hiccup mode		U/I- or Hiccup-mode adjustable	hiccup / fold back behavior
Short-circuit protection		continuous short-circuit proof			
Short-circuit behaviour		current limiting			

NEW

Primary switch mode power supplies CP-T range (24 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 3 x 400 V AC and rated values, unless otherwise indicated

Type		CP-T 24/5.0	CP-T 24/10.0	CP-T 24/20.0	CP-T 24/40.0
Overload protection		hiccup mode			
No-load protection		continuous no-load stability			
Overtemperature protection		yes, automatic recovery after temperature went down			
Starting of capacitive loads		3500 µF	7000 µF	7000 µF	7000 µF
General data					
Efficiency		typ. 89 %	typ. 90 %		typ. 92 %
Duty time		100%			
Dimensions (W x H x D)		74.3 x 124 x 118.8 mm [2.92 x 4.88 x 4.68 in]	89 x 124 x 118.8 mm [3.5 x 4.88 x 4.68 in]	150 x 124 x 118.8 mm [5.91 x 4.88 x 4.68 in]	275.8 x 124 x 118.8 mm [10.86 x 4.88 x 4.68 in]
Weight		24 / 5.0 0.78 kg (1.72 lb)	24 / 0.0 1.045 kg (2.30 lb)	24 / 20.0 1.657 kg (3.653 lb)	24 / 40.0 3.275 kg (7.220 lb)
Material of enclosure		Metal			
Mounting		DIN rail (IEC EN 60715), snap-on mounting without any tool			
Mounting position		horizontal			
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)			
Degree of protection	enclosure / terminals	IP20 / IP20			
Protection class		I			
Electrical connection - input circuit / output circuit					
Wire size	fine-strand with wire end ferrule	0.2-4 mm² (24-11 AWG)			0.2-4 mm² (24-11 AWG) / 0.5-10 mm² (20-6 AWG)
	fine-strand without wire end ferrule	0.2-6 mm² (24-10 AWG)			
	rigid				
Stripping length		8 mm (0.31 in)			
Tightening torque	input / output	1 Nm / 0.6 Nm			1 Nm / 1.8 Nm
Environmental data					
Ambient temperature range	operation	-25…+70 °C			
	rated load	-25...+60 °C			
	storage	-25…+85 °C			
Damp heat (cyclic) (IEC/EN 60068-2-30)		95 % without condensation			
Vibration (sinusoidal) (IEC/EN 60068-2-6)		Random wave, 10-500 Hz, 2G, each along X, Y, Z axes 10 min / cycle, 60 min			
Shock (half-sine) (IEC/EN 60068-2-27)		Half sine wave, 4G, 22 ms, 3 axes, 6 Faces, 3 times for each face			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC			
	input / PE	1.5 kV AC			
Pollution degree		2			
Standards					
Product standard					
Low Voltage Directive		2006/95/EG			
EMC directive		2004/108/EG			
RoHS directive		2002/95/EG			
Electrical safety		IEC/EN 60950-1			
Protective low voltage		SELV			
Electromagnetic compatibility					
Interference immunity to		IEC/EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	Level 4			
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3			
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4			
surge	IEC/EN 61000-4-5	L-N Level 3, L / N-FG Level 4	L-N Level 3, L / N-G Level 4		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3			
Interference emission		IEC/EN 61000-6-3			
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B			
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B			

• **Approvals** **4**/4

NEW

Primary switch mode power supplies CP-T range (48 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 3 x 400 V AC and rated values, unless otherwise indicated

Type		CP-T 48/5.0	CP-T 48/10.0	CP-T 48/20.0
Input circuit		**L1, L2, L3**		
Rated input voltage U_{in}		3 x 400-500 V AC		
Input voltage ranget		340-575 V AC		
		480-820 V DC		
Frequency range AC		t		
Typical current consumption		0.85 A	1.1 A	1.72 A
Typical power consumption		264 W	535 W	1050 W
Inrush current limiting		20 A		30 A
Power failure buffering time		min. 20 ms		min. 15 ms
Internal input fuse	per phase	2 A / 600 V AC	T3.15 A / 500 V AC	T 5 A / 500 V AC
Power factor correction (PFC)		yes, passive		
Discharge current	towards PE	< 3.5 mA		
	input / output	< 0.25 mA		
Indication of operational states				
Output voltage	OUTPUT OK: green LED	output voltage OK		
	OUTPUT LOW: red LED	output voltage too low		
Output circuit		**L+, L+, L-, L-**		
Rated output voltage		48 V DC		
Tolerance of the output voltage		0...+1 %		
Adjustment range of the output voltage		47-56 V DC		
Rated output power		240 W	480 W	960 W
Rated output current I_r	$T_a \leq 60$ °C	5 A	10 A	20 A
Derating of the output current	60 °C < $T_a \leq$ 70 °C	2.5 %/°C		3.5 %/°C
Maximum deviation with	load change statical	±1 % (single mode)		
		± 5 % (parallel mode)		
	change of output voltage within the input voltage range	±0.5 %		
Control time	at rated load	< 2 ms		
Starting time after applying the supply voltage	at Ir	max. 1 s		
	with 7000 µF	max. 1.5 s		
Rise time	at rated load	max. 150 ms		
	with 7000 µF	max. 500 ms		
Fall time		max. 150 ms		
Residual ripple and switching peaks	BW = 20 MHz	100 mV		80 mV
Parallel connection		configurable, to increase power, up to 2 devices, reduction: (number of devices x I_r) x 0.9		to increase power, up to 2 devices, reduction: (number of devices x I_r) x 0.9, use active current balancing
Series connection		yes, to increase voltage, max. 2 devices		
Resistance to reverse feed		approx. 35 V	approx. 63 V	approx. 63 V
Output circuit - No-load, overload and short-circuit behaviour				
Characteristic curve of output		combined U/I and hiccup mode	U/I or hiccup mode, configurable	hiccup mode / fold back behavior
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		current limiting		
Overload protection		hiccup mode		
No-load protection		continuous no-load stability		
Over temperature protection		yes, automatic recovery after temperature went down		
Starting of capacitive loads		7000 µF		

NEW

Primary switch mode power supplies CP-T range (48 V DC)
Technical data

Data at T_a = 25 °C, U_{in} = 3 x 400 V AC and rated values, unless otherwise indicated

Type		CP-T 48/5.0	CP-T 48/10.0	CP-T 48/20.0
General data				
Efficiency		typ. 91 %		typ. 93 %
Duty time		100%		
Dimensions (W x H x D)		89 x 124 x 118.8 mm [3.5 x 4.88 x 4.68 in]	150 x 124 x 118.8 mm [5.91 x 4.88 x 4.68 in]	275.8 x 124 x 118.8 mm [10.86 x 4.88 x 4.68 in]
Weight		48 / 5.0 1.045 kg (2.30 lb)	48 / 10.0 1.657 kg (3.653 lb)	48 / 20.0 3.275 kg (7.22 lb)
Material of enclosure		Metal		
Mounting		DIN rail (IEC EN 60715), snap-on mounting without any tool		
Mounting position		horizontal		
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals	IP20 / IP20		
Protection class		I		
Electrical connection - input circuit / output circuit				
Wire size	fine-strand with wire end ferrule	0.2-4 mm² (24-11 AWG)		0.2-4 mm² (24-11 AWG) / 0.5-10 mm² (20-6 AWG)
	fine-strand without wire end ferrule rigid	0.2-6 mm² (24-10 AWG)		
Stripping length		8 mm (0.31 in)		
Tightening torque	input / output	1 Nm / 0.6 Nm		1 Nm / 1.8 Nm
Environmental data				
Ambient temperature range	operation	-25…+70 °C		
	rated load	-25...+60 °C		
	storage	-25…+85 °C		
Damp heat (cyclic) (IEC/EN 60068-2-30)		95 % without condensation		
Vibration (sinusoidal) (IEC/EN 60068-2-6)		Random wave, 10-500 Hz, 2G, each along X, Y, Z axes 10 min / cycle, 60 min		
Shock (half-sine) (IEC/EN 60068-2-27)		Half sine wave, 4G, 22 ms, 3 axes, 6 Faces, 3 times for each face		
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC		
	input / PE	1.5 kV AC		
Pollution degree		2		
Standards				
Product standard				
Low Voltage Directive		2006/95/EG		
EMC directive		2004/108/EG		
RoHS directive		2002/95/EG		
Electrical safety		IEC/EN 60950-1		
Protective low voltage		SELV		
Electromagnetic compatibility				
Interference immunity to		IEC/EN 61000-6-2		
electrostatic discharge	IEC/EN 61000-4-2	Level 4		
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3		
electrical fast transient/burst	IEC/EN 61000-4-4	Level 4		
surge	IEC/EN 61000-4-5	L-N Level 3, L / N-G Level 4		
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3		
Interference emission		IEC/EN 61000-6-3		
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B		
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B		

• **Approvals** **4**/4

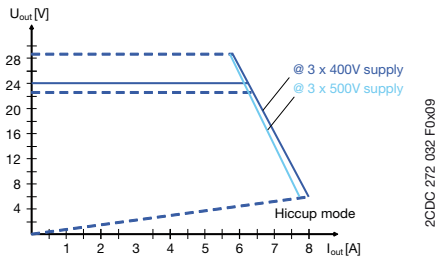
NEW

Primary switch mode power supplies
CP-T range
Dimensional drawings

Technical diagrams

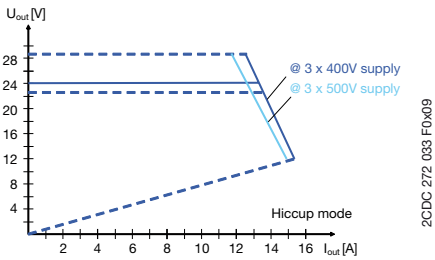
dimensions in mm

Output curve at T_U = 25 °C



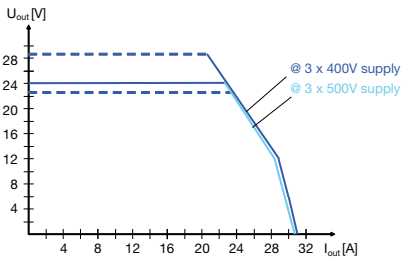
2CDC 272 032 F0x09

CP-T 24/5.0



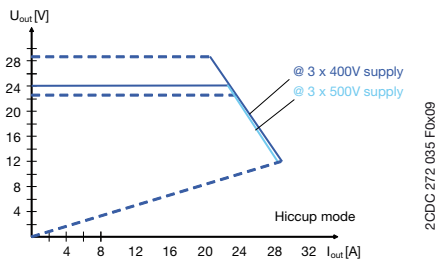
2CDC 272 033 F0x09

CP-T 24/10.0



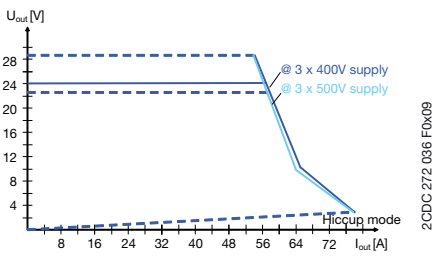
2CDC 272 034 F0x09

CP-T 24/20.0 U/I curve



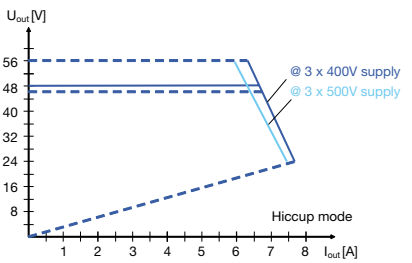
2CDC 272 035 F0x09

CP-T 24/20.0 Hiccup mode



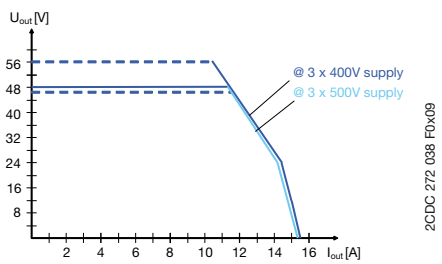
2CDC 272 036 F0x09

CP-T 24/40.0 (preliminary curve)



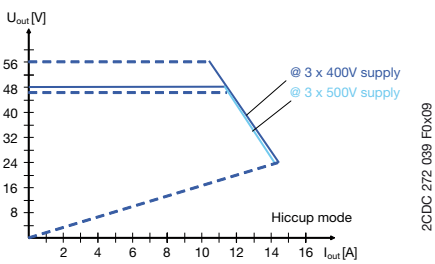
2CDC 272 037 F0x09

CP-T 48/5.0



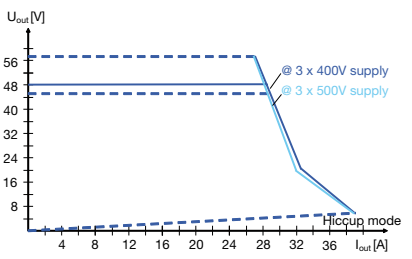
2CDC 272 038 F0x09

CP-T 48/10.0 U/I curve



2CDC 272 039 F0x09

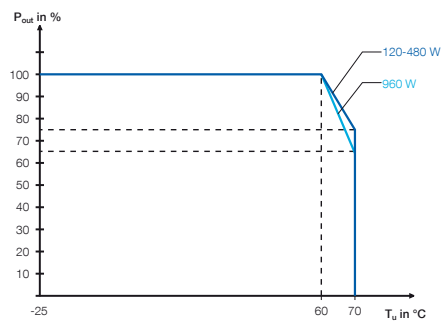
CP-T 48/10.0 Hiccup mode



2CDC 272 040 F0x09

CP-T 48/20.0 (preliminary curve)

Temperature curve at rated load

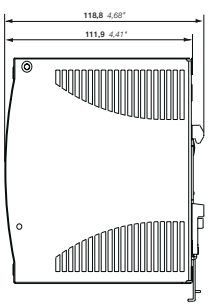


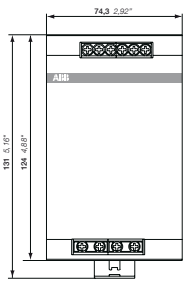
2CDC 272 001 F0010

CP-T < 960 W

Dimensional drawings

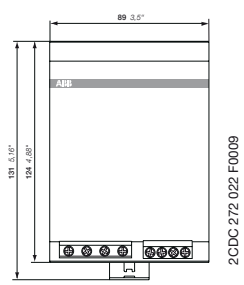
dimensions in mm





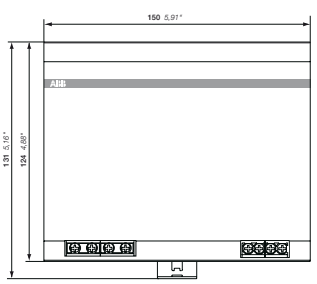
2CDC 272 021 F0009

CP-T 24/5.0



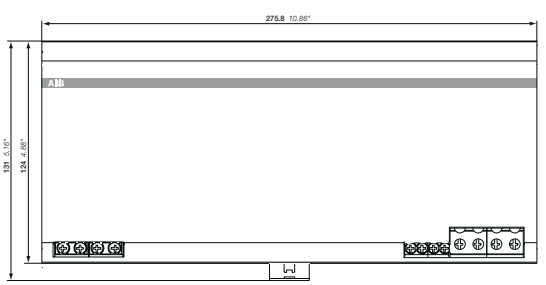
2CDC 272 022 F0009

CP-T 24/10.0, CP-T 48/5.0



2CDC 272 023 F0009

CP-T 24/20.0, CP-T 48/10.0



2CDC 272 024 F0009

CP-T 24/40.0, CP-T 48/20.0

Primary switch mode power supplies

CP-S, CP-C, CP-A range

Content

4

Primary switch mode power supplies CP-S, CP-C and CP-A range
Benefits and advantages


2CDC 275 015 F0b04

CP-S and CP-C range

- Output current 5 A, 10 A and 20 A
- Integrated power reserve of up to 50 %
- 5 A and 10 A devices with pluggable connecting terminals
- Approvals / marks
  (depending on device, partly pending)

CP-S range

- 10 A and 20 A device with front-face selector switch to adjust rated input voltage range: 110-120 V AC or 220-240 V AC
- Output voltage fixed at 24 V DC
- Parallel operation for redundancy

CP-C range

- Wide range input 110-240 V AC
  (85-264 V AC, 100-350 V DC)
- Output voltage adjustable in a range of 22-28 V DC
- Parallel operation for increased capacity and redundancy
- Power factor correction (PFC) acc. to EN 61000-3-2
- Function module pluggable onto the front side

Messaging module CP-C MM:

- LED for status indication
- Relay outputs "Input OK" and "Output OK"
- REMOTE ON/OFF function to switch on and off the power supply externally
- Output voltage monitoring is only possible in decoupled parallel operation

CP-A range

Redundancy unit CP-A RU

- Redundancy unit with 2 inputs / channels for decoupling of 2 CP-S or 2 CP-C power supplies
- up to 20 A per input / channel and output up to 40 A
- True redundancy by 100 % decoupling with 2 integrated diodes

Control module CP-A CM

- pluggable onto redundancy unit CP-A RU
- one relay output per monitored input / channel
- threshold values adjustable (14-28 V)
- indicates the presence of both input voltages (of the CP-A RU) via LEDs and energized output relays

Integrated power reserve

The new CP-S and CP-C range power supplies feature an integrated power reserve of up to 50 %. No oversized electricity supply is needed, especially under heavy load conditions.


2CDC 273 056 F0004

Pluggable connecting terminals

Extended flexibility in operation due to pluggable connecting terminals (this feature is not offered on all devices).


2CDC 273 057 F0004

Adjustable output voltage

The CP-C range types feature a continuously adjustable output voltage from 22 to 28 V. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by long line length.

2CDC 273 046 F0004

Pluggable function modules

The CP-C range power supplies can be equipped with pluggable modules to add additional functions (e.g. messaging module). Thus, the power supplies can be ideally adapted to the relevant application.


2CDC 273 058 F0004


2CDC 271 003 F0b05

CP-A RU + CP-A CM

Primary switch mode power supplies
CP-S, CP-C and CP-A range
Ordering details

CP-S 24/5.0

CP-C 24/10.0

CP-S 24/20.0

CP-A RU

CP-A CM

Type	Input voltage range	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-S range						
CP-S 24/5.0	85-264 V AC/ 110-350 V DC	24 V DC / 5 A	**1SVR 427 014 R0000**	1		0.96 / 2.11
CP-S 24/10.0	85-132 V AC, 184-264 V AC/ 220-350 V DC	24 V DC / 10 A	**1SVR 427 015 R0100**	1		1.07 / 2.35
CP-S 24/20.0	85-132 V AC, 184-264 V AC/ 220-350 V DC	24 V DC / 20 A	**1SVR 427 016 R0100**	1		2.83 / 6.23
CP-C range						
CP-C 24/5.0	85-264 V AC/ 110-350 V DC	24 V DC / 5 A	**1SVR 427 024 R0000**	1		0.96 / 2.11
CP-C 24/10.0	85-264 V AC/ 110-350 V DC	24 V DC / 10 A	**1SVR 427 025 R0000**	1		1.34 / 2.95
CP-C 24/20.0	85-264 V AC/ 110-350 V DC	24 V DC / 20 A	**1SVR 427 026 R0000**	1		3.15 / 6.94

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Accessories for CP-C range					
CP-C MM	Messaging module	**1SVR 427 081 R0000**	1		0.065 / 0.14
Accessories for CP-S and C range					
CP-A RU	Redundancy unit	**1SVR 427 071 R0000**	1		0.89 / 1.96
CP-A CM	Control module	**1SVR 427 075 R0000**	1		0.063 / 0.14

• Approvals ..... **4**/4 • Technical data .....**4**/38 • Technical diagrams **4**/44
• Dimensional drawings **4**/44

Primary switch mode power supplies CP-S and CP-C range
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type			CP-C 24/5.0 CP-S 24/5.0	CP-C 24/10.0 CP-S 24/10.0	CP-C 24/20.0 CP-S 24/20.0
Input circuit - supply circuit			**L, N**		
Rated input voltage U_{in}	CP-C		110-240 V AC		
	CP-S	switch position 115	110-240 V AC	110-120 V AC	
		switch position 230		220-240 V AC	
Input voltage range	CP-C		85-264 V AC / 100-350 V DC [1]		
	CP-S	switch position 115	85-264 V AC / 100-350 V DC [1]	85-132 V AC	
		switch position 230		184-264 V AC / 220-350 V DC [1]	
Frequency range AC			47-63 Hz		
Current consumption		at 110-240 V AC	approx. 2.2-1.2 A	approx. 2.6-1.2 A	approx. 5.5-2.5 A
		at 110-120 V AC	-	approx. 4.2-4.0 A	approx. 9.0-8.0 A
		at 220-240 V AC	-	approx. 2.4-2.2 A	approx. 4.5-4.0 A
Power consumption			typ. 135 W	typ. 269 W	typ. 538 W
Inrush current limiting / I^2t (cold start)	CP-C		< 23 A / approx. 0.9 A^2s	< 33 A / approx. 0.2 A^2s	< 40 A / approx. 1.9 A^2s
	CP-S			< 40 A / approx. 1.8 A^2s	< 70 A / approx. 8 A^2s
Power failure buffering time	CP-C		min. 100 ms	min. 40 ms	min. 40 ms
	CP-S			min. 50 ms	min. 50 ms
Transient overvoltage protection			varistors		
Internal input fuse (apparatus protection, not accessible)			4 A (slow-acting)	6.3 A (slow-acting)	12 A (fast-acting)
Power factor correction (PFC)	CP-C		yes, active		
	CP-S		no		
Indication of operational states					
Output voltage		OUTPUT OK: green LED	: output voltage OK		
Output circuit			**L+, L+, L-, L- : short-circuit, no-load and overload proof**		
Rated output voltage			24 V DC		
Tolerance of the output voltage	CP-C		±1 %		
	CP-S		-1...+5 %		
Adjustment range of the output voltage	CP-C		22-28 V DC, default setting 24 V ±0.5 %		
	CP-S		fixed		
Rated output power			120 W	240 W	480 W
Rated output current		$T_a \leq 60$ °C	5 A	10 A	20 A
Peak output current (power reserve)		$T_a \leq 40$ °C	typ. ≤ 7.25 A	typ. ≤ 12.25 A	typ. ≤ 22.5 A
Derating		60 °C < $T_a \leq 70$ °C	2.5 % per Kelvin temperature increase		
Deviation with	CP-C	load change statical 10-90 %	typ. < ±0.05 %		
	CP-S	load change statical 10-90 %	typ. < ±0.1 %		
		load change dynamical 10-90 %	typ. < ±3 %		
		change of the input voltage of ±10 %	typ. < ±0,05 %		
Control time			typ. < 1 ms		
Starting time after applying supply voltage	CP-C		< 200 ms	< 200 ms	typ. < 200 ms
	CP-S			< 250 ms	typ. < 300 ms
Rise time 10-90 %	CP-C		typ. < 30 ms	typ. < 4 ms	typ. < 12 ms
	CP-S			typ. < 5 ms	typ. < 15 ms
Residual ripple and switching peaks		BW = 20 MHz	typ. < 50 mV_{PP}		
Parallel connection			yes, up to 5 devices, to enable redundancy and to increase power, current not symmetrical (CP-S only redundancy)		
Series connection			yes, to increase voltage		
Resistance to reverse feed			approx. 35 V DC		
Output circuit - No-load, overload and short-circuit behaviour			**see also U/I- and I/T-characteristic curves**		
Characteristic curve of output			U/I characteristic curve with power reserve		
Current limiting at short circuit			approx. 11 A	approx. 19 A	approx. 25 A
Short-circuit protection			continuous short-circuit stability		
Overload protection			thermal protection		
Starting of capacitive loads			unlimited		
General data					
Power dissipation			typ. < 15 W	typ. < 29 W	typ. < 58 W
Efficiency			typ. 89 %		
Discharge current for PE			< 3.5 mA		
MTBF	CP-C		500.000 h		
	CP-S		350.000 h		
Dimensions (W x H x D)			56.5 (60 [2]) x 130 x 135.5 mm [2.22 (2.36 [2]) x 5.12 x 5.35 in]	90 (93.5 [2]) x 130 x 135.5 mm [3.54 (3.68 [2]) x 5.12 x 5.35 in]	200 (203.5 [2]) x 130 x 135.5 mm [7.87 (8.01 [2]) x 5.12 x 5.35 in]

Primary switch mode power supplies
CP-S and CP-C range
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Type			CP-C 24/5.0 CP-S 24/5.0	CP-C 24/10.0 CP-S 24/10.0	CP-C 24/20.0 CP-S 24/20.0
Weight	CP-C		approx. 0.96 kg (2.12 lb)	approx. 1.34 kg (2.95 lb)	approx. 3.15 kg (6.94 lb)
	CP-S			approx. 1.07 kg (2.36 lb)	approx. 2.83 kg (6.23 lb)
Minimum distance to other units		horizontal / vertical	10 mm / 80 mm (0.39 in / 3.15 in)		
Degree of protection		enclosure / terminals	IP20 / IP20		
Material of enclosure		enclosure shell / cover	aluminium / zinc-coated sheet steel		
Protection class (EN 61140)			I		
Mounting			DIN rail (IEC/EN 60715), snap-on mounting		
Mounting position			horizontal		
Electrical connection - Input circuit			[3]	[3]	-
Wire size		fine-strand with wire end ferrule	0.2-2.5 mm² (24-14 AWG)		2.5-10 mm² (14-8 AWG)
		fine-strand without wire end ferrule			0.5-10 mm² (20-8 AWG)
		rigid			0.5-16 mm² (20-6 AWG)
Stripping length			7 mm (0.28 in)		12 mm (0.47 in)
Tightening torque			0.4 Nm		1.2-1.5 Nm
Electrical connection - Output circuit			[3]	[3]	-
Wire size		fine-strand with wire end ferrule	0.12-2.5 mm² (26-14 AWG)		2.5-10 mm² (14-8 AWG)
		fine-strand without wire end ferrule			0.5-10 mm² (20-8 AWG)
		rigid			0.5-16 mm² (20-6 AWG)
Stripping length			8 mm (0.31 in)		12 mm (0,47 in)
Tightening torque			0.4 Nm		1.2-1.5 Nm
Environmental data					
Ambient temperature range		operation	-25...+70 °C		
		rated load	0...+60 °C (without derating)		
		storage	-40...+85 °C		
Damp heat (IEC/EN 60068-2-3)			93 % at +40 °C, no condensation		
Climatic category (IEC/EN 60721)			3K3		
Vibration (IEC/EN 60068-2-6)					
Shock (IEC/EN 60068-2-27)					
Isolation data					
Rated insulation voltage U_i between all isolated circuits (IEC/EN 60950-1; EN 50178)		input / output	300 V		
		input / PE	300 V		
		output / PE	50 V		
Rated impulse withstand voltage U_{imp} between all isolated circuits (IEC/EN 60950-1; EN 50178)		input / output	4 kV; 1,2/50 µs		
		input / PE	2.5 kV; 1,2/50 µs		
		output / PE	500 V; 1,2/50 µs		
Power-frequency withstand voltage test (test voltage) (routine test / type test)		input / output	1.5 kV AC / 3.0 kV AC		
		input / PE	1.5 kV AC / 3.0 kV AC		
		output / PE	500 V DC / 500 V DC		
Pollution degree (IEC/EN 60950-1; EN 50178)			2		
Overvoltage category (IEC/EN 60950-1; EN 50178)			II		
Standards					
Product standard			IEC/EN 61204		
Low Voltage Directive			2006/95/EC		
EMC Directive			2004/108/EC		
Electrical safety			EN 50178, EN 60950, UL 60950, UL 508		
Protective low voltage			SELV (EN 60950)		
Electromagnetic compatibility					
Interference immunity to			IEC/EN 61000-6-2		
electrostatic discharge		IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)		
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)		
electrical fast transient / burst		IEC/EN 61000-4-4	Level 4 (4 kV)		
surge		IEC/EN 61000-4-5	Level 4 (2 kV symmetrical, level 3 - 3 kV asymmetrical)		
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)		
Interference emission			IEC/EN 61000-6-3		
high-frequency radiated		IEC/CISPR 22; EN 55022	Class B		
high-frequency conducted		IEC/CISPR 22; EN 55022	Class B		

[1] at U > 264 V use additionally an appropriate external fuse
[2] with lateral screw
[3] pluggable connecting terminals, actuate only when power is off

• **Approvals** **4**/4

Primary switch mode power supplies
Accessory for CP-C range
Technical data

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Typ			CP-C MM
Input circuit - Supply circuit			
Rated input voltage U_{in}			powered by the output circuit of the power supply
Input voltage range			70-264 V AC / 80-350 V DC
Power consumption			2.5 VA / 1.5 W
Input circuit - Control circuit			
Kind of triggering			volt-free triggering
Control input, control function		Remote OFF	remote off
Threshold "Switching-off power supply unit"			R ≤ 1 kΩ
Threshold "Switching-on power supply unit"			R ≥ 10 kΩ
Input current			typ. 1 mA (200 mA for 200 µs)
Maximum cable length to the control input			25 m - 100 pF/m
Measuring circuit - INPUT			
Monitoring function			undervoltage monitoring of input voltage of the power supply unit
Thresholds			85 V AC / 90 V DC
Hysteresis, related to the threshold value			AC: typ. -8 % / DC -30 %
Accuracy, tolerance			-5 % at AC and DC
Maximum measuring cycle			typ. < 50 ms
Measuring circuit - OUTPUT			
Monitoring function			undervoltage monitoring of output voltage of the power supply unit
Thresholds			20 V DC
Hysteresis, related to the threshold value			typ. 5 %
Accuracy, tolerance			±1 %
Maximum measuring cycle			typ. < 10 ms
Indication of operational states			
Remote off		REMOTE OFF: green LED	⎍: „REMOTE OFF“ input R ≤ 1kΩ
Status of power supply input		Input OK: green LED	⎍: relay „INPUT OK“ energized
Status of power supply output		OUTPUT OK: green LED	⎍: relay „OUTPUT OK“ energized
Output circuits			**11-12/14, 21-22/24**
Kind of output			relays, 2 x 1 c/o contacts
Operating principle			closed-circuit principle
Contact material			AgNi
Rated voltage (VDE 0110, IEC/EN 60947-1)			250 V
Minimum switching voltage / Minimum switching current			24 V / 10 mA
Maximum switching voltage / Maximum switching current			250 V / 1 A
Rated operating current I_e (IEC/EN 60947-1)	AC12 (resistive)	230 V	1 A
	AC15 (inductive)	230 V	1 A
	DC12 (resistive)	24 V	1 A
	DC13 (inductive)	24 V	1 A
Mechanical lifetime			30 x 10^6 switching cycles
Electrical lifetime			0.1 x 10^6 switching cycles
Short circuit proof, maximum fuse rating		n/c contact	2 A, gL
		n/o contact	2 A, gL
General data			
Duty time			100 %
Dimensions (W x H x D, when mounted)			56.5 x 54 x 24 mm (2.22 x 2.13 x 0.94 in)
Weight			0.065 kg (0.14 lb)
Degree of protection		enclosure / terminals	IP20 / IP20
Material of enclosure			UL 94 V0
Protection class (EN 61140)			II
Mounting			snap-on mounting, without any tool
Mounting position			plugged onto the power supply unit
Electrical connection			
Wire size		fine-strand with wire end ferrule	0.2-2.5 mm² (24-14 AWG)
		fine-strand without wire end ferrule	
		rigid	0.2-4 mm² (24-12 AWG)
Stripping length			7.5 mm (0.3 inch)
Tightening torque			0.4-0.6 Nm

2CDC110004C0207

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

Typ		CP-C MM
Environmental data		
Ambient temperature range	operation	-25...+70 °C
	storage	-40...+85 °C
Damp heat (IEC/EN 60068-2-3)		93 % at +40 °C, no condensation
Climatic category (IEC/EN 60721)		3K3
Vibration (IEC/EN 60068-2-6)		
Shock (IEC/EN 60068-2-27)		
Isolation data		
Rated insulation voltage U_i (IEC/EN 60974-1, EN 50178, VDE 0160)		250 V
Protective separation (EN 50178, EN 60950) supply / measuring circuits / relay outputs		yes
Rated impulse withstand voltage U_{imp} between all isolated circuits (IEC 664, VDE 0110)		4 kV; 1.2/50 µs
Test voltage between all circuits (type test)		2.5 kV AC
Pollution degree (EN 60950)		2
Overvoltage category (EN 60950)		II
Standards		
Product standard		IEC/EN 61204
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electrical safety		EN 50178, EN 60950, UL 60950, UL 508
Elektromagnetic compatibility		
Interference immunity to		IEC/EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3 and 4 (6 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 4 and 2 (4 kV power input / 1 kV control input)
surge	IEC/EN 61000-4-5	Level 3 and 2 (4 kV symmetrical power input / 1 kV control input)
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level (10 V)
Interference emission		IEC/EN 61000-6-3
high-frequency radiated	IEC/CISPR 22; EN 55022	Class B
high-frequency conducted	IEC/CISPR 22; EN 55022	Class B

4

• **Approvals** **4**/4

Data at T_a = 25 °C, unless otherwise indicated

Type			CP-A RU	CP-A RU in combination with CP-A CM
Input circuit - Supply circuit			**(+/ -, +/ -)**	
Rated input voltage U_{in}			24 V DC	
Input voltage range per channel			10-28 V DC	13-28 V DC
Rated input current I_{in} per channel			1-20 A	
Maximum input current per channel			30 A for 300 s	
Transient overvoltage protection			yes	
Output circuit			**(++/--)**	
Rated output voltage U_{out}			24 V DC	
Voltage drop			typ. 0.6 V, max. 0.9 V	
Rated output current I_{out}			1-40 A	
Output ratings per channel		T_a = 60 °C	10-28 V DC / 40 A	13-28 V DC / 40 A
		T_a = 70 °C	10-28 V DC / 30 A	13-28 V DC / 30 A
Derating		60 °C < T_a ≤ 70 °C	2,5 % per Kelvin temperature increase	
Peak output current			60 A for 300 s	
Resistance to reverse feed			< 40 V	
General data				
Dimensions (W x H x D)			56.5 (60 [1]) x 130 x 135.5 mm (2.22 (2.36 [1]) x 5.12 x 5.35 in)	
Weight			0.89 kg (1.96 lb)	
Minimum distance to other units		horizontal / vertical	10 mm / 50 mm (0.39 in / 1.97 in)	
Degree of protection		enclosure / terminals	IP20 / IP20	
Material of enclosure		enclosure shell / cover	aluminium / zinc-coated sheet steel	
Protection class			III [2]	
Mounting			DIN rail (IEC/EN 60715)	
Mounting position			horizontal	
Electrical connection - Input circuit / Output circuit				
Wire size		fine-strand with wire end ferrule	2.5-10 mm² (14-8 AWG)	
		fine-strand without wire end ferrule	0.5-10 mm² (20-8 AWG)	
		rigid	0.5-16 mm² (20-6 AWG)	
Stripping length			12 mm (0.47 in)	
Tightening torque			1.2-1.5 Nm	
Environmental data				
Ambient temperature range		operation	-25...+70 °C	
		rated load	-25...+60 °C (without derating)	
		storage	-40...+85 °C	
Damp heat (IEC/EN 60068-2-3)			93 % at 40 °C, no condensation	
Climatic category (IEC/EN 60721)			3K3	
Vibration (IEC/EN 60068-2-6)				
Shock (IEC/EN 60068-2-27)				
Isolation data				
Insulation voltage	between input / output / enclosure		500 V AC (routine test)	
Pollution degree (EN 50178)			2	
Standards				
Product standard			IEC/EN 61204	
Low Voltage Directive			2006/95/EC	
EMC Directive			2004/108/EC	
Electrical safety			EN 50178, EN 60950, UL 60950, UL 508	
Electromagnetic compatibility				
Interference immunity to			IEC/EN 61000-6-2	
electrostatic discharge		IEC/EN 61000-4-2	Level 3 (air discharge ±8 kV, contact discharge ±6 kV)	
radiated, radio-frequency, electromagnetic field		IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient / burst		IEC/EN 61000-4-4	Level 3 (±2 kV)	
surge		IEC/EN 61000-4-5	Level 1 (±0.5 kV)	
conducted disturbances, induced by radio-frequency fields		IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission			IEC/EN 61000-6-3	
high-frequency radiated		IEC/CISPR 22 / EN 55022	Class B	
high-frequency conducted		IEC/CISPR 22 / EN 55022	Class B	

[1] incl. lateral screw

[2] This device is designed for connection to a safety extra-low voltage source. If no safety extra-low voltage is used at the input side, the lateral screw can be used for grounding of the enclosure (protection class I).

• **Approvals** **4**/4

Primary switch mode power supplies
Accessory for CP-S and CP-C range: CP-A range
Technical data

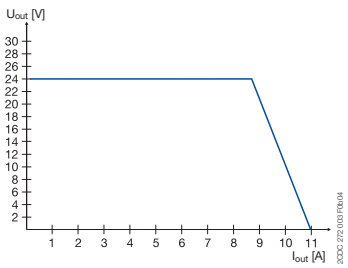
Data at T_a = 25 °C, unless otherwise indicated

Type		CP-A CM
Input circuit - Supply circuit		
Rated input voltage U_{in}		24 V DC
Input voltage range		13-28 V DC
Rated input current	at rated sense load and 24 V DC	120 mA
Power consumption	at 24 V DC	approx. 1 W
Measuring circuit		**11-12/14, 21-22/24**
Monitoring function		undervoltage monitoring
Measuring voltage		rated operational voltage
Thresholds		14-28 V
Hysteresis, related to the threshold value		fix: 3-5 %
Accuracy, tolerance		10 % of full-scale value
Maximum measuring cycle		6 ms
Indication of operational states		
Status of input 1	IN 1: green LED	: voltage at input 1 > than threshold 1 = no faults present
Status of input 2	IN 2: green LED	: voltage at input 2 > than threshold 2 = no faults present
Output status	OUT: green LED	: U_{OUT} > 3 V = no faults present
Output circuit		**+, +, -**
Kind of output		relays, 2 x 1 c/o contact
Contact material		AgNi
Operating principle		closed-circuit principle
Rated operational voltage U_e (IEC/EN 60947-1, VDE 0110)		250 V
Minimum switching voltage / Minimum switching current		24 V / 10 mA
Maximum switching voltage / Maximum switching current		250 V / 1 A
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	1 A
	AC15 (inductive) 230 V	1 A
	DC12 (resistive) 24 V	1 A
	DC13 (inductive) 24 V	1 A
Mechanical lifetime		30 x 10^6 switching cycles
Electrical lifetime		0.1 x 10^6 switching cycles
Rating according UL 508	General purpose (GP) 250 V AC	1 A
Maximum fuse rating to achieve short-circuit protection	n/o contact	2 A, gL
	n/c contact	2 A, gL
Sense output (+, +, -)		1 SVR 427 075 R0000
Sense output voltage		13-28 V DC
Sense output current		0.1 A
Maximum fuse rating		For applications acc. UL the sense output shall be provided with a listed DC fuse 3 A
General data		
Duty time		100 %
Dimensions (W x H x D, when mounted)		56.5 x 54 x 24 mm (2.22 x 2.13 x 0.94 in)
Weight		0.063 kg (0.14 lb)
Degree of protection	enclosure / terminals	IP20 / IP20
Material of enclosure		UL94V0
Protection class		II
Mounting		snap-on mounting, without any tool
Mounting position		plugged onto the redundancy unit CP-A RU
Electrical conection		
Wire size	fine-strand with wire end ferrule	0.2-2.5 mm^2 (24-14 AWG)
	fine-strand without wire end ferrule	
	rigid	0.2-4 mm^2 (24-12 AWG)
Stripping length		7.5 mm (0.3 in)
Tightening torque		0.4-0.6 Nm
Isolation data		
Rated insulation voltage U_i (IEC/EN 60947-1, EN 50178, VDE 0160)		250 V
Rated impulse withstand voltage U_{imp} (type test) between all circuits (IEC 664, VDE 0110)		2.5 kV
Power-frequency withstand voltage test (routine test) between all circuits		1.2 kV AC
Protective separation (EN 50178) between input and output		yes
Pollution degree		2
Overvoltage category		II
Environmental data		
Ambient temperature range	operation	-25...+70 °C
	storage	-40...+85 °C
Damp heat (IEC/EN 60068-2-3)		93 %at 40 °C, no condensation
Climatic category (IEC/EN 60721)		3K3
Vibration (IEC/EN 60068-2-6)		
Shock (IEC/EN 60068-2-27)		

Primary switch mode power supplies
CP-S, CP-C and CP-A range
Technical diagrams, Dimensional drawings

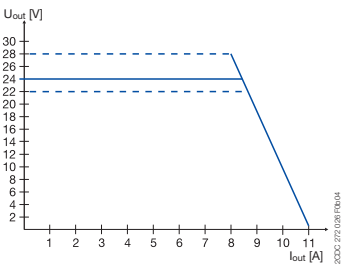
Technical diagrams

Output curve at 25 °C



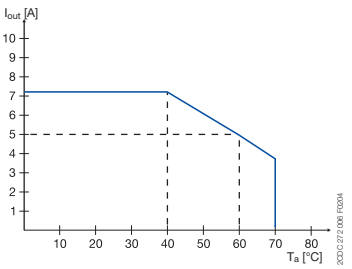
CP-S 24/5.0

Output curve at 25 °C

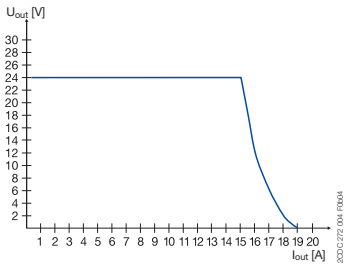


CP-C 24/5.0

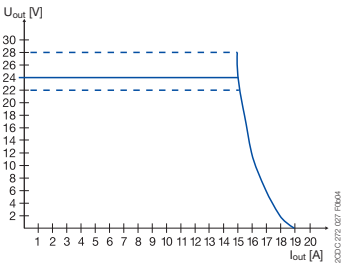
Temperature curve at U_{out} = 24 V DC



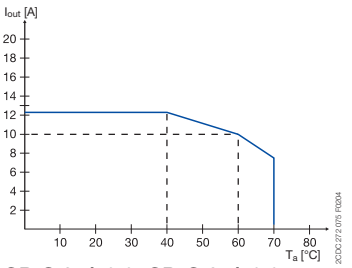
CP-S 24/5.0, CP-C 24/5.0



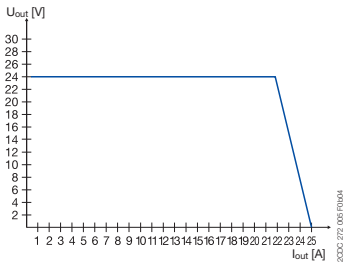
CP-S 24/10.0



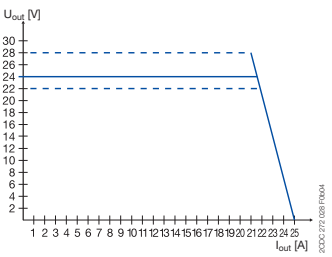
CP-C 24/10.0



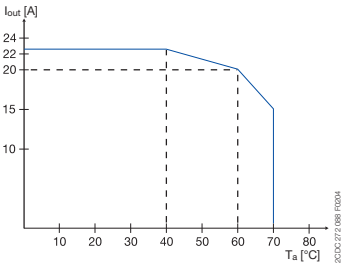
CP-S 24/10.0, CP-C 24/10.0



CP-S 24/20.0



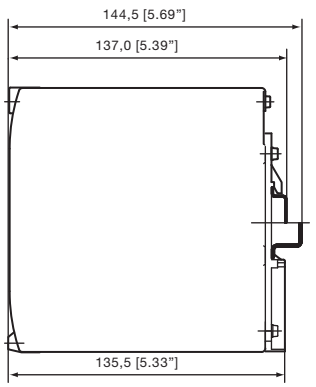
CP-C 24/20.0

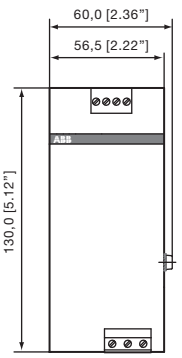


CP-S 24/20.0, CP-C 24/20.0

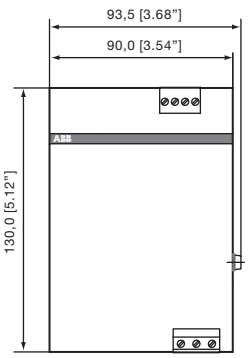
Dimensional drawings

dimensions in mm

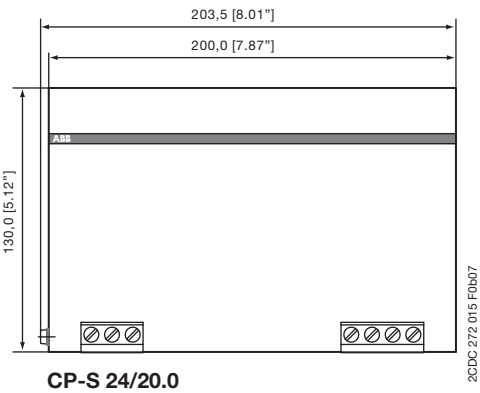




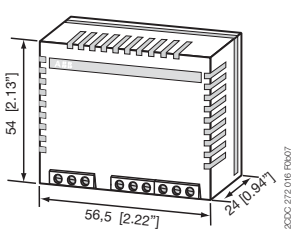
CP-S 24/5.0
CP-C 24/5.0
CP-A RU



CP-S 24/10.0
CP-C 24/10.0



CP-S 24/20.0
CP-C 24/20.0



CP-C MM
CP-A CM

NEW

Ultra capacitor based buffer modules

CP-B range

Content

4

NEW

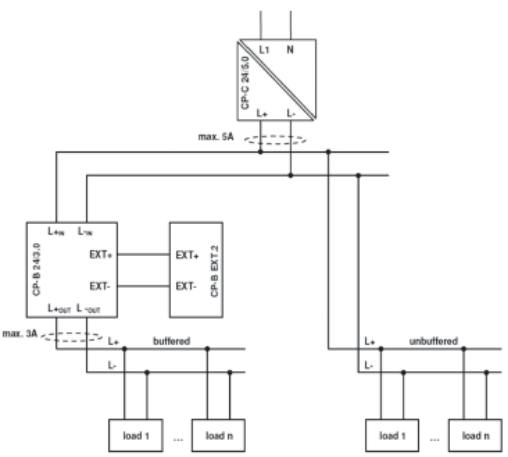
Ultra capacitor based buffer modules
CP-B range

Power supply systems have to be highly reliable in most areas of energy management and automation technology.
Often batteries are used for supporting the supply system in case of mains failures. Batteries have limited lifetimes depending on environmental parameters and have to be maintained regularly, which causes efforts and costs.

Using the latest ultra-capacitor technology, ABB offers an innovative and completely maintenance free new product for buffering the 24 V DC supply in case of interrupted mains on the primary side of the switch mode power supply.

The CP-B range is an ultra-capacitor buffer energy storage for power supply units which ensures a short term uninterrupted power supply system. In case of a power loss, the energy stored in the capacitor guarantees that the load is continually provided up to several hundred seconds depending on the load current.

Application example



Characteristics

- 3 buffer modules for buffering 24 V DC:
  CP-B 24/3.0 (3 A / 1 kWs[1])
  CP-B 24/10.0 (10 A / 10 kWs[1])
  CP-B 24/20.0 (20 A / 8 kWs[1])
- CP-B 24/3.0 and CP-B 24/20.0 expandable with additional extension module(s) CP-B EXT.2 (2 kWs[1])
- LEDs for status indication
- Relay contacts for status messaging
- Very high backup times (e.g. with CP-B 24/10.0 up to 8 minutes at 1 A load current)
- Short charging times
- High efficiency, higher than 90%
- Wide temperature range
- DIN rail mountable, compact enclosures
- Advantages in comparison to battery buffers
  - Maintenance free
  - No deep discharge
  - Temperature resistant
- c UL us LISTED approval (UL508, CSA22.2 No 14)[2]

[1] internal energy buffer; [2] pending

NEW

Ultra capacitor based buffer modules
CP-B range

Product selection table

		CP-B 24/3.0	CP-B 24/10.0	CP-B 24/20.0	CP-B EXT.2
Order code		1SVR427060R0300	1SVR427060R1000	1SVR427060R2000	1SVR427065R0000
Rated input voltage		24 V DC	24 V DC	24 V DC	–
Rated current		3 A DC	10 A DC	20 A DC	–
Energy storage (min.)		1.000 Ws	10.000 Ws	8.000 Ws	2.000 Ws
Typical charging time at load current	100 %	65 s	120 s	68 s	
	0 %	56 s	82 s	62 s	
Typical buffer time[1] at load current	100 %	14 s	40 s	15 s	
	50 %	28 s	80 s	30 s	
	25 %	74 s	140 s	60 s	
	10 %	148 s	380 s	150 s	
Dimensions					
Width		60.00 mm	127.00 mm	84.00 mm	60.00 mm
Height		92.50 mm	163.00 mm	192.00 mm	92.50 mm
Depth		116.00 mm	150.00 mm	198.00 mm	116.00 mm

[1] buffering time = $\frac{\text{energy storage x 0.9}}{\text{current x output voltage}}$

2CDC 271 001 S0010

CP-B 24/3.0

2CDC 271 002 S0010

CP-B 24/10.0

2CDC 271 003 S0010

CP-B 24/20.0

2CDC 271 004 S0010

CP-B EXT.2

Type	Rated input voltage	Rated current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-B range						
CP-B 24/3.0	24 V DC	3 A DC	**1SVR 427 060 R0300**	1		0.55 / 1.21
CP-B 24/10.0	24 V DC	10 A DC	**1SVR 427 060 R1000**	1		2.10 / 4.63
CP-B 24/20.0	24 V DC	20 A DC	**1SVR 427 060 R2000**	1		2.20 / 4.85
CP-B EXT.2	–	–	**1SVR 427 065 R0000**	1		1.00 / 2.21

Notes

NEW

Electronic protection devices
EPD range

Content

NEW

Electronic Protection Devices
for use behind 24 V DC Switch Mode Power Supplies

EPD24-TB-101

The protection devices EPD24 extend the ABB product range of modular DIN rail components by electronic overcurrent protection modules for selective protection of 24V DC load circuits.

This protection is achieved by a combination of active electronic current limitation in the case of a short circuit and an overload deactivation from 1.1 x I_n upwards.

If a fault occurs in a load circuit, the protection device EPD24 will detect this rapidly and reliably, disable the power output transistor and hence interrupt the current flow in the defective circuit. The maximum possible overcurrent is always limited to 1.5…1.8 times the selected rated current. An activation of capacitive loads up to 20,000 µF is possible, deactivation only occurring in the case of overloads or short circuits. Selective deactivation of the defective current circuit means undefined error states and a complete system stop are prevented.

Features

- Selective load protection one, electronic trip characteristics.
- Active current limitation for safe connection of capacitive loads up to 20,000 µF and on overload/short circuit.
- Current ratings 0.5 A...12 A.
- Reliable overload disconnection with 1.1 x I_N
- Manual ON/OFF button
- Clear status and failure indication through LED and auxiliary contact.
- Integral fail-safe element adjusted to current rating.
- Width per unit only 12.5 mm.
- Rail mounting
- Ease of wiring through busbar LINE+ and 0 V as well as signal bars.
- UL- and CSA-approvals allow international use of the devices.

Selection table

Rated current I_n in A	Order details Type code	Order code	bbn 40 16779 EAN	Price 1 piece	Price group	Weight 1 piece kg	Pack unit pc.
0.5	**EPD24-TB-101-0.5A**	2CDE 601 101 R2905	**829960**			0.065	4
1	**EPD24-TB-101-1A**	2CDE 601 101 R2001	**829984**			0.065	4
2	**EPD24-TB-101-2A**	2CDE 601 101 R2002	**830003**			0.065	4
3	**EPD24-TB-101-3A**	2CDE 601 101 R2003	**830027**			0.065	4
4	**EPD24-TB-101-4A**	2CDE 601 101 R2004	**830041**			0.065	4
6	**EPD24-TB-101-6A**	2CDE 601 101 R2006	**830065**			0.065	4
8	**EPD24-TB-101-8A**	2CDE 601 101 R2008	**830089**			0.065	4
10	**EPD24-TB-101-10A**	2CDE 601 101 R2010	**830102**			0.065	4
12	**EPD24-TB-101-12A**	2CDE 601 101 R2012	**830126**			0.065	4

Selection table accessories

	Order details Type code	Order code	bbn 40 16779 EAN	Price 1 piece	Price group	Weight 1 piece kg	Pack unit pc.
Busbars for LINE+ and 0 V, grey insulation, length 500 mm [1)]	**EPD-BB500**	2CDE 605 100 R0500	**830140**			0.20	10
Signal Bars for aux. contacts, grey insulation, length 21 mm	**EPD-SB21**	2CDE 605 200 R0021	**830164**			0.04	10

1) Max. load with one line entry I_{max} = 50 A (recommended: center-feeding)
Max. load with two line entries I_{max} = 63 A

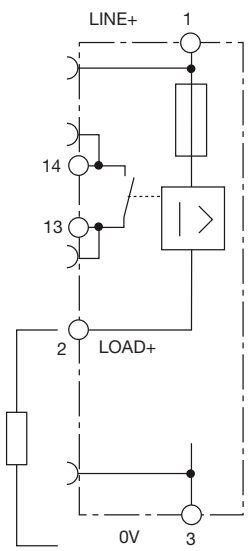
NEW

Electronic Protection Devices EPD24-TB-101
Technical data ($T_{amb.}$ = 25 °C, U_B = 24 V DC)
for use behind 24 V DC Switch Mode Power Supplies

Wiring diagramm

EPD24-TB-101
without signal input
with signal output F
(single signal, NO)

Operating condition: 13-14 closed
Fault condition: 13-14 open



Operating data	
Operating voltage U_B:	24 V DC (18...32 V)
Current rating I_N:	fixed current ratings: 0.5, 1, 2, 3, 4, 6, 8, 10, 12 A
Closed current I_0:	ON condition: typically 20...30 mA depending on signal output
Staus indication by means of:	– multicolour LED: Green: – unit is ON (S1 = ON) – load circuit / Power-MOSFET is switched on
	Orange: – in the event of overload or short circuit until electronic disconnection
	Red: – unit electronically disconnected – load circuit/Power-MOSFET OFF – undervoltage (U_B < 8 V) – after switch-on till the end of the delay period
	OFF: – manually switched off (S1 = OFF) or device is dead
	– potential-free auxiliary contact F
	– ON/OFF/ condition of switch S1
Load circuit	
Load output	Power-MOSFET switching output (high slide switch)
Overload disconnection	typically 1.1 x I_N (1.05...1.35 x I_N)
Short-circuit current I_K	active current limitation (see table 1)
Trip time	see time/current characteristics
For electronic disconnection	typically 3 s at I_{Load} > 1.1 x I_N typically 100 ms...3 s at I_{Load} > 1.8 x I_N (or 1.5 x I_N/1.3 x I_N,)
Temperature disconnection	internal temperature monitoring with electronic disconnection
Low voltage monitoring load output	with hysteresis, no reset required: load »OFF« at U_B< 8 V
Starting delay t_{Start}	typically 0.5 sec after every switch-on and after applying U_S
Disconnection of load circuit	electronic disconnection
Free-wheeling circuit	suitable external free-wheeling circuit to be used with inductive load
Several load outputs must not be connected in parallel	
Signal output	
Electrical data	potential-free auxiliary contact max. 30 V DC/0.5 A, min. 10 V DC/10 mA
ON condition LED green	voltage U_B applied, switch S1 is in ON position no overload, no short circuit
OFF condition LED off	– device switched off (switch S1 is in OFF position) – no voltage U_B applied
Fault condition LED orange	overload condition > 1.1 x I_N up to electronic disconnection
Fault condition LED red	– electronic disconnection upon overload or short circuit – Device switched off with control signal (switch S1 is in ON position)
Aux. contact	single signal, make contact contact open, terminal 13-14
Fault	signal output fault conditions – no operating voltage U_B – ON/OFF switch S1 is in OFF position – red LED lighted (electronic disconnection)

NEW

Electronic Protection Devices EPD24-TB-101

Technical data ($T_{amb.}$ = 25 °C, U_B = 24 V DC)

for use behind 24 V DC Switch Mode Power Supplies

General data	
Fail-Safe element	backup fuse for EPD24 not required because of the integral redundant fail-safe element
Housing material	moulded
Mounting	symmetrical rail to EN 50022-35x7.5
Ambient temperature	0...+50 °C (without condensation, see EN 60204-1)
Storage temperature	-20...+70 °C
Humidity	96 hrs/95 % RH/40 °C to IEC 60068-2-78, test Cab. climate class 3K3 to EN 60721
Vibration	3 g, test to IEC 60068-2-6 test Fc
Degree of protection	housing: IP20 DIN 40050 terminals: IP20 DIN 40050
EMC **(EMC directive, CE logo)**	emission: EN 61000-6-3 susceptibility: EN 61000-6-2
Isolations coordination **(IEC 60934)**	0.5 kV/pollution degree 2 reinforced insulation in operating area
Dielectric strength	max. 32 V DC (load circuit)
Isolation resistance (OFF condition)	n/a, only electronic disconnection
Approvals/Declarations of conformity	UL 2367 Solid State Overcurrent Protectors UL 1604, (class I, division 2, groups A, B, C, D) UL 508 CSA C22.2 No. 213 (class I, division 2) CSA C22.2 No. 142 CE logo
Dimensions (B x H x T)	12.5 x 80 x 83 mm
Weight	approx. 65 g
Terminals	**Line+/LOAD+/0V**
Screw terminals	M4
Max. cable cross section flexible with wire end ferrule w/wo plastic sleeve	0.5 – 10 mm^2
Multi-lead connection (2 identical cables) rigid/flexible	0.5 – 4 mm^2
Flexible with wire end ferrule without plastic sleeve	0.5 – 2.5 mm^2
Flexible with TWIN wire end ferrule with plastic sleeve	0.5 – 6 mm^2
Wire stripping length	10 mm
Tightening torque (EN 60934)	1.5 – 1.8 Nm
Terminals	**aux. contacts**
Screw terminals	M3
Max. cable cross section flexible **with wire end ferrule w/wo plastic sleeve**	0.25 - 2.5 mm^2
Wire stripping length	8 mm
Tightening torque (EN 60934)	0.5 Nm

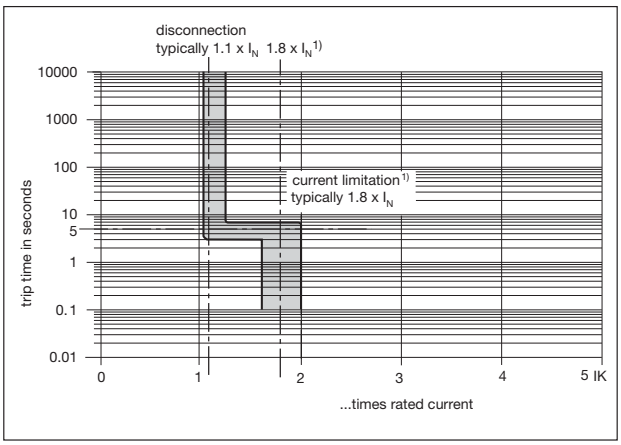
Table 1: voltage drop, current limitation, max. load current

current rating	typically voltage drop	active current	max. load current at 100 % ON duty	
I_N	U_{ON} at I_N	limitation (typically)	$T_{ambient}$ = 40 °C	$T_{ambient}$ = 40 °C
0.5 A	70 mV	1.8 x I_N	0.5 A	0.5 A
1 A	80 mV	1.8 x I_N	1 A	1 A
2 A	130 mV	1.8 x I_N	2 A	2 A
3 A	80 mV	1.8 x I_N	3 A	3 A
4 A	100 mV	1.8 x I_N	4 A	4 A
6 A	130 mV	1.8 x I_N	6 A	5 A
8 A	120 mV	1.5 x I_N	8 A	7 A
10 A	150 mV	1.5 x I_N	10 A	9 A
12 A	180 mV	1.3 x I_N	12 A	10.8 A

Attention: when mounted side-by-side without convection the ERD24 should not carry more than 80 % of its rated load with 100% ON duty due to thermal effects.

Time/Current characteristic curve (T_U = 25 °C)

- The trip time is typically 3 s in the range between 1.1 and 1.8 x I_N[1)].
- Electronic current limitation occurs at typically 1.8 x I_N[1)] which means that under all overload conditions (independent of the power supply and the resistance of the load circuit) the max. overload before disconnection will not exceed 1.8 x I_N[1)] times the current rating. Trip time is between 100 ms and 3 sec (depending on overload or at short circuit).
- Without this current limitation a considerably higher overload current would flow in the event of an overload or short circuit.



[1)] Current limitation typically 1.8 x I_N at I_N = 0.5 A...6 A
Current limitation typically 1.5 x I_N at I_N = 8 A or 10 A
Current limitation typically 1.3 x I_N at I_N = 12 A

Maximum cable lenghts

EPD24 reliably trips from 0 Ω up to max. circuit resistance R_{max}.

Calculation of R_{max}

Selected rating I_N (A)	**3**	**6**
Operating voltage U_S (V DC) (= 80 % of 24 V) [2)]	19.2	19.2
Trip current I_{ab} = 1.25 x I_N (A) (EPD24 trips after 3 s)	3.75	7.50
R_{max} (Ω) = (U_B/I_{ab}) -0.050	**5.07**	**2.51**

[2)] Voltage drop of EPD24 and tolerance of trip point (typically 1.1 x I_N = 1.05 ... 1.35 x I_N) have been taken into account

Selection table for the incoming cable lengths with different cable cross-sections

Cable cross section A (mm²)	0.14	0.25	0.34	0.5	0.75	1.00	1.50
Cable length L (m) (= single length)	**cable resistance (Ω) = (ρ_0 x 2 x L) / A** [3)]						
5	1.27	0.71	0.52	0.36	0.24	0.18	0.12
10	2.54	1.42	1.05	0.71		0.47 0.36	0.24
15	3.81	2.14	1.57	1.07	0.71	0.53	0.36
20	5.09	2.85	2.09	1.42	0.95	0.71	0.47
25	6.36	3.56	2.62	1.78	1.19	0.89	0.59
30	7.63	4.27	3.14	2.14	1.42	1.07	0.71
35	8.90	4.98	3.66	2.49	1.66	1.25	0.83
40	10.17	5.70	4.19	2.85	1.90	1.42	0.95
45	11.44	6.41	4.71	3.20	2.14	1.60	1.07
50	12.71	7.12	5.24	3.56	2.37	1.78	1.19
75	19.07	10.68	7.85	5.34	3.56	2.67	1.78
100	25.34	14.24	10.47	7.12	4.75	3.56	2.37
125	31.79	17.80	13.09	8.90	5.93	4.45	2.97
150	38.14	21.36	15.71	10.68	7.12	5.34	3.56
175	44.50	24.92	18.32	12.46	8.31	6.23	4.15
200	50.86	28.48	20.94	14.24	9.49	7.12	4.75
225	57.21	32.04	23.56	16.02	10.68	8.01	5.34
250	63.57	35.60	26.18	17.80	11.87	8.90	5.93

[3)] Resistivity of copper ρ_o = 0.0178 (Ω x mm²)/m

Example 1: max. length for 1.5 mm² and 3 A: **214 m**

Example 2: max. length for 1.5 mm² and 6 A: **106 m**

Example 3: mixed wiring: (Control cabinet --- sensor/actuator level)
R1 = 40 m for 1.5 mm² and R2 = 5 m for 0.25 mm²:
R1 = 0.95 Ω, R2 = 0.71 Ω, **total (R1 + R2) = 1.66** Ω

Please note

The user should ensure that the cable cross sections of the relevant load circuit are suitable for the current rating of the EPD24 used.
Automatic start-up of machinery after shut down must be prevented (Machinery Directive 98/37/EG and EN 60204-1).
In the event of a short circuit or overload the load circuit will be disconnected electronically by the EPD24.

Information on UL approvals/CSA approvals

UL1604

Operating Temperature Code T5
– This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only

WARNING:
– Exposure to some chemicals may degrade the sealing properties of materials used in the following device: relay
  Sealant Material:
    Generic Name: Modified diglycidyl ether of bisphenol A
    Supplier: Fine Polymers Corporation
    Type: Epi Fine 4616L-160PK
  Casing Material:
    Generic Name: Liquid Crystal Polymer
    Supplier: Sumitomo Chemical
    Type: E4008, E4009, or E6008

RECOMMENDATION:
– Periodically inspect the device named above for any degradation of properties and replace if degradation is found

WARNING – EXPLOSION HAZARD:
– Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous
– Substitution of any components may impair suitability for Class I, Division 2

UL2367
Non-hazardous use

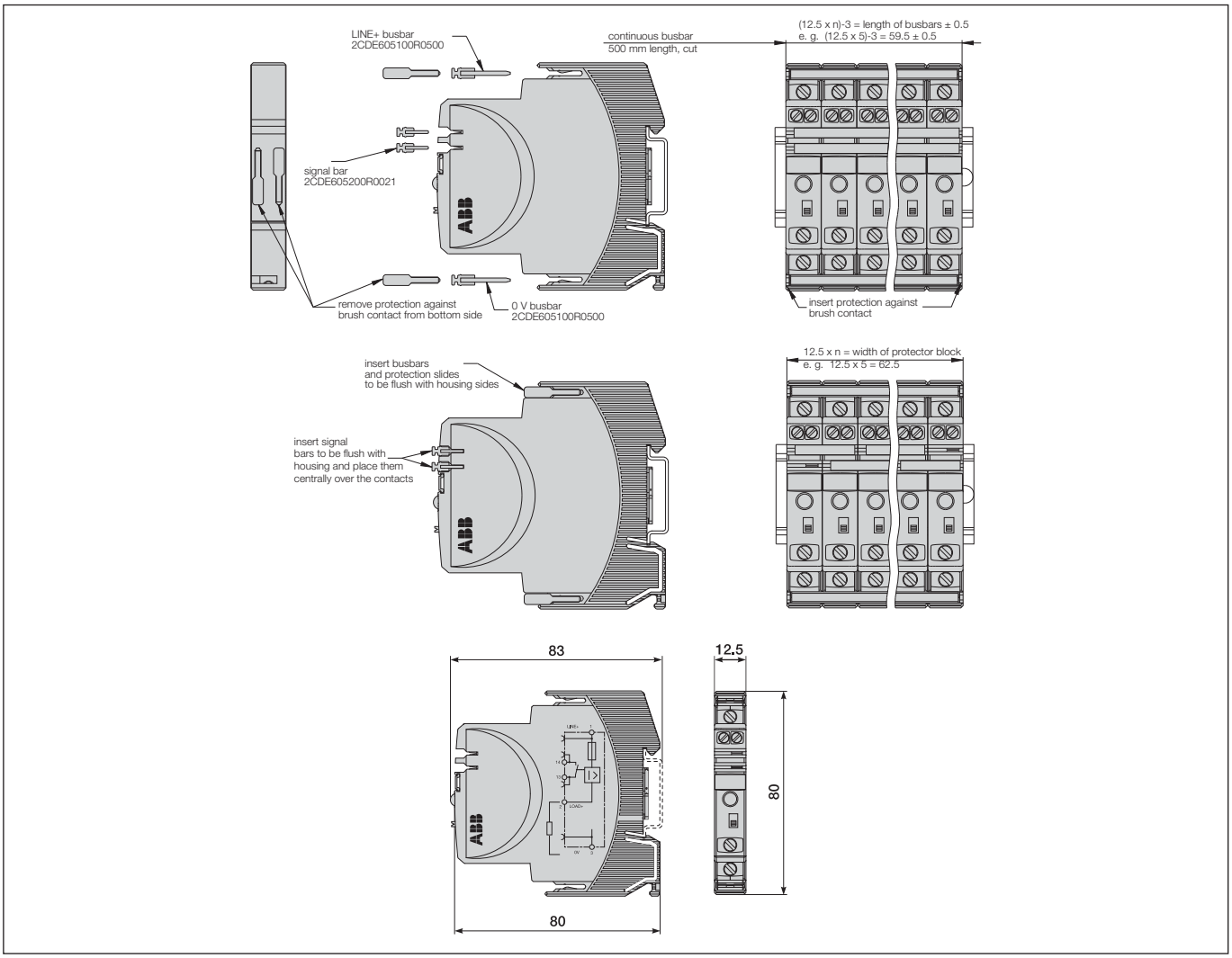
UL 508
Non-hazardous use

CSA C22.2 No. 213 (Class I, Division 2)
CSA C22.2 No. 142

Class 2
Meets requirement for Class 2 current limitation (EPD24 ... -0,5 A/1 A/2 A/3 A)

The EPD24 features an integral power distribution system.
The following wiring modes are possible with various pluggable current and signal busbars:

- LINE+ (24 V DC)
- 0 V
  Caution: The electronic devices EPD24 require a 0 V connection
- Auxiliary contacts



Mounting procedure

Before wiring insert busbars into protector block. A maximum of 10 connection cycles are permissible using connecting busbars.

Recommendation

After 10 units the busbars should be interrupted and receive a new entry live.

Table of length for busbars

(Order code 2CDE605100R0500)

No. of units	2	3	4	5	6	7	8	9	10
Length of busbar (mm) ± 0.5 mm	22	34.5	47	59.5	72	84.5	97	109.5	122

Notes

Analog signal converters

CC range

Serial data converters

ILPH range

Content

5

Notes

Analog signal converters
CC range

Serial data converters
ILPH range

Content

Analogue Signal Converters CC-range

Serial data converters ILPH range

Analog signal converters
CC range
Benefits and advantages

5

Product range for analog signal processing

CC-U range

- **8 different standard signal outputs on one device**
- **Input and output side universally configurable**
- **Also available with 2 threshold relay outputs**
- **Adjustment and operating elements on the front side**
- **Safe operation by electrical 3-way isolation**
- **Plug-in connecting terminals, unambiguously and clearly marked**

Conversion, measurement and separation of

- standard signals
- signals of RTD sensors (PT10, PT100, PT1000)
- thermocouple signals
- RMS values of currents and voltages

Characteristics

- The required input and output ranges can be configured for all devices by means of directly accessible DIP switches positioned on the side.
- Due to the wide input range of the gain and offset stages all input signals between the minimum and the maximum input value can be universally converted to all common output signals.
- Devices for DC or AC (50/60 Hz) supply available.

CC-E range

- **Universally configurable devices and single-function devices**
- **Adjustment and operating elements on the front side**
- **Safe operation by electrical 3-way isolation**
- **Unambiguous and clear connecting terminal markings**

Conversion, measurement and separation of

- standard signals (0-5 V, 0-10 V, 0-20 mA, 4-20 mA)
- temperature signals of RTD sensors (PT 100)
- thermocouple signals (types J and K)
- current measurement signals (0-5 A, 0-20 A AC/DC)

Characteristics of single-function devices

- No adjustment or balancing necessary.

Characteristics of universal devices

- The required input and output ranges can be configured by means of directly accessible DIP switches positioned on the side
- Gain adjustment of ± 5 % by means of an adjustment potentiometer on the front-side
- Offset adjustment of ±5 % by means of adjustment potentiometers on the front-side

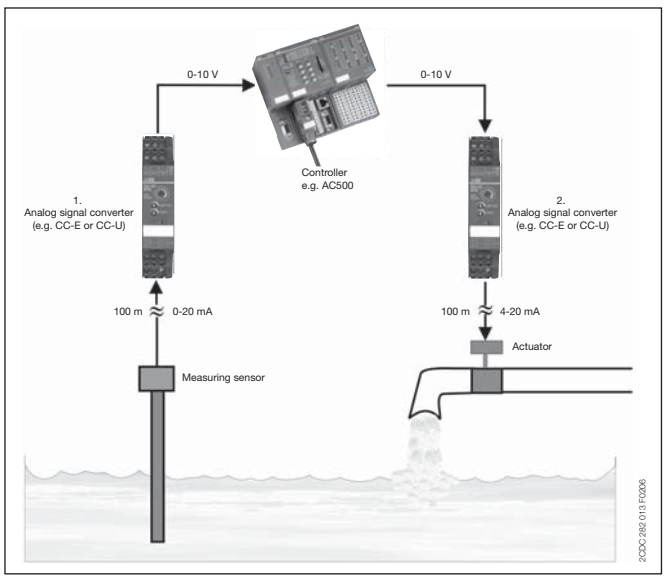
Analog signal converters
CC range
Application, Approvals and marks

Applications for analog signal processing and correct solution using CC-E and CC-U converters

Nearly every process includes a control system that receives data by means of analog signals and then evaluates the data and sets the respective parameters correspondingly.

When transmitting analog signals numerous problems may arise which can disturb or even block an ideal behavior of the process.

Below we have listed some processing problems together with the respective solutions to solve these problems:



Signal conversion

Sometimes the available signals cannot be processed by the controller or the actuator. In this case, signal converters are required to convert the input signal (or different input signals) to the desired output signal.

Signal amplification

If long lines or high burdens have to be operated, it may be necessary to amplify the signal. CC analog signal converters require only low input power and provide high output power.

Thus, there are no restrictions for the converter's position on the line, i.e. it can be used

- for signal refreshing ① at the end of the line (low input power)
- or for signal amplification ② at the beginning of the line (high output power).

Signal filtering

Particularly on long lines or in rough industrial environments the signals are exposed to high electromagnetic interferences. The frequency of the coupled interference signals may be in the range of the common mains frequency (50 Hz) or even much higher (in case of frequency converters). According to the specific requirements, analog signal converters are available which provide reliable suppression of those interferences by means of an input low-pass filter.

Signal separation

- **Protection against overvoltage**
  The increased use of micro-electronics make controls much more sensitive against overvoltages, resulting from lightning discharges or switching processes. Suppression diodes are incorporated in the input of the CC analog signal converters which enable the converters to arrest overvoltages with low energy level (resulting from switching processes) by themselves. The products furthermore provide electrical isolation between input, output and supply circuit for protection of the controller connected to the output.

- **Protection against ground loops**
  If components are used which refer to ground, the measuring signals can be falsified by a so-called ground loop. In this case, certain parts of the signal are transmitted via earth and not via the analog transmission line, thus causing incorrect evaluation of the signal. The electrical isolation between the input and the output disconnects these ground loops and thus enables correct signal transmission.

5

■ **existing**
▲ **existing for some devices**
□ **pending**

Approvals		CC-E/STD	CC-E I/I	CC-U/STD	CC-U/STDR	CC-E/RTD	CC-U/RTD	CC-U/RTDR	CC-E/TC	CC-U/TC	CC-U/TCR	CC-E/I	CC-E I_{AC}/ILPO	CC-U/I	CC-U/V
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	UL 1604 (Class I, Div 2, hazardous locations), CAN/CSA C22.2 No.213	▲		■		▲	■		▲	■		▲		■	■
CB	CB scheme				■			■			■				
	CCC				■			■			■				
Marks															
CE	CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Analog standard signal converters
CC-E/STD, CC-E x/x
Ordering details

CC-E/STD

CC-E V/V

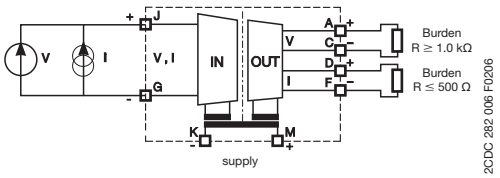
① U: green LED - supply voltage
② Gain adjustment
③ Offset adjustment
④ DIP switch for input and output configuration (only available on universal devices)

[1] UL 1604 Class I, Div.2 (universal device)

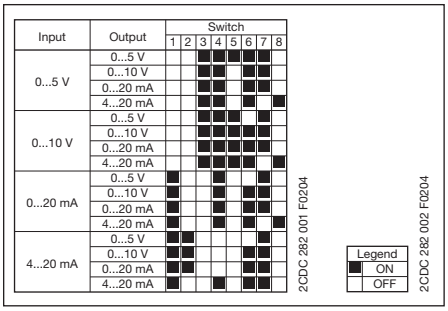
CC-E/STD analog signal converter with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/STD)
- 2x10 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Wiring instruction



DIP switch settings (universal devices)



Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
Supply voltage: 24 V DC universal					
CC-E/STD	0-5 V, 0-10 V 0-20 mA, 4-20 mA	0-5 V, 0-10 V 0-20 mA, 4-20 mA	**1SVR 011 700 R0000**[1]	1	
single-function					
CC-E V/V	0-10 V	0-10 V	**1SVR 011 710 R2100**	1	
CC-E V/I		0-20 mA	**1SVR 011 711 R1600**	1	
CC-E V/I		4-20 mA	**1SVR 011 712 R1700**	1	
CC-E I/V	0-20 mA	0-10 V	**1SVR 011 713 R1000**	1	
CC-E I/I		0-20 mA	**1SVR 011 714 R1100**	1	
CC-E I/I		4-20 mA	**1SVR 011 715 R1200**	1	
CC-E I/V	4-20 mA	0-10 V	**1SVR 011 716 R1300**	1	
CC-E I/I		0-20 mA	**1SVR 011 717 R1400**	1	
CC-E I/I		4-20 mA	**1SVR 011 718 R2500**	1	
CC-E V/V	-10...+10 V	-10...+10 V	**1SVR 011 719 R2600**	1	
Supply voltage: 110-240 V AC universal					
CC-E/STD	0-5 V, 0-10 V 0-20 mA, 4-20 mA	0-5 V, 0-10 V 0-20 mA, 4-20 mA	**1SVR 011 705 R2100**	1	
single-function					
CC-E V/V	0-10 V	0-10 V	**1SVR 011 720 R2300**	1	
CC-E V/I		0-20 mA	**1SVR 011 721 R1000**	1	
CC-E V/I		4-20 mA	**1SVR 011 722 R1100**	1	
CC-E I/V	0-20 mA	0-10 V	**1SVR 011 723 R1200**	1	
CC-E I/I		0-20 mA	**1SVR 011 724 R1300**	1	
CC-E I/I		4-20 mA	**1SVR 011 725 R1400**	1	
CC-E I/V	4-20 mA	0-10 V	**1SVR 011 726 R1500**	1	
CC-E I/I		0-20 mA	**1SVR 011 727 R1600**	1	
CC-E I/I		4-20 mA	**1SVR 011 728 R2700**	1	
CC-E V/V	-10...+10 V	-10...+10 V	**1SVR 011 729 R2000**	1	

• Technical data ..... 5/21 • Dimensional drawings 5/27

Current/current isolator
CC-E I/I-1 and CC-E I/I-2
Ordering details

CC-E I/I-1

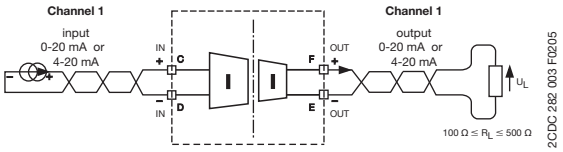
CC-E I/I-2

Loop-powered current/current isolator without external power supply for analog current signals of 0-20 mA and 4-20 mA

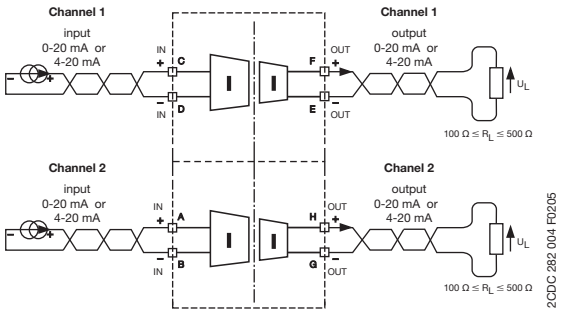
- Electrical isolation between input and output
- Very low internal voltage drop ≤ 2.5 V
- Available with one or two independent channels
- Width only 18 mm (1 and 2 channels)

Wiring instructions

CC-E I/I-1



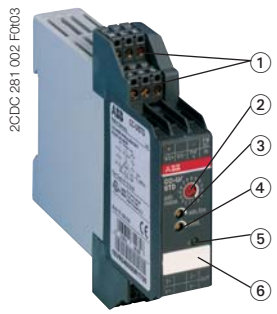
CC-E I/I-2



Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
1 channel					
CC-E I/I-1	0-20 mA, 4-20 mA	0-20 mA, 4-20 mA	**1SVR 010 200 R1600**	1	
2 channel					
CC-E I/I-2	0-20 mA, 4-20 mA	0-20 mA, 4-20 mA	**1SVR 010 201 R0300**	1	

• Technical data ..... **5**/21 • Dimensional drawings **5**/27

Analog standard signal converter CC-U/STD
Ordering details



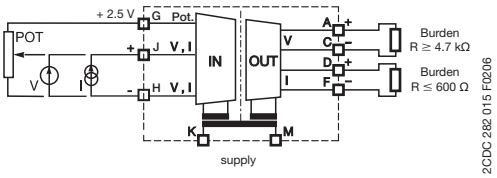
CC-U/STD

① Plug-in terminals
② Gain: Coarse adjustment
③ Gain: Fine adjustment
④ Offset adjustment
⑤ U: green LED - supply voltage
⑥ Marker label

CC-U/STD universal signal converter with 3-way electrical isolation

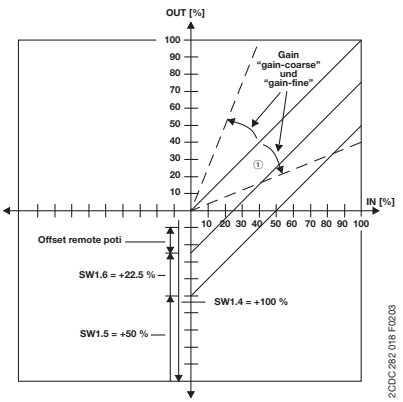
- More than 120 configurations possible
- Configurable output signal response on input voltage signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- Very fast signal transmission enables use in control systems

Wiring instruction



Adjustment range

Continuously variable adjustment range:
Example ①:
Input configuration: 0...10 V
Output configuration: -5...5 V



DIP switch settings

Input	Switch 1 1	2	3	4	5	6	7	8	Gain	Coarse Type
Potentiometer	■								0	0
0...50 mV									A...D	C
0...100 mV									4...5	5
0...250 mV									0...1	1
0...500 mV	■								7...9	8
0...1 V	■								3...4	3
0...2.5 V	■								0	0
0...5 V		■							5...7	6
0...10 V		■							2	2
1...5 V		■			■	■			7...9	8
2... 10 V		■			■	■			2...4	3
-10...+10 V		■	■		■				0	0
0...125 mV									3...4	3
0...8 V			■						3...4	3
-22.5...+22.5 mV				■		■			B...F	D
-11...+11 V			■	■		■			0	0
2.5...7.5 V			■			■			5...7	6
3.33...9.99 V			■			■			3...4	4
10...0 V			■	■					2	2
100...0 mV				■					4...5	5
0...1 mA	■								A...D	B
0...20 mA	■	■							2...4	3
4...20 mA	■	■			■	■			4...5	4
10...50 mA	■	■			■	■			0...1	1
20...4 mA	■	■		■	■				4...5	4
20...0 mA	■	■		■					4...2	3
-0.45...+0.45 mA	■			■		■			B...F	D
-55...+55 mA	■		■	■		■			4...6	5
High fail safe *)							■		-	-
Low faile safe *)								■	-	-
No fail safe *)									-	-

2CDC 282 019 F0203

Output	Switch 2 1	2	3	4	5	6
0...5 V			■		■	
0...10 V					■	
1...5 V	■	■	■		■	
2...10 V	■	■	■			
-10...+10 V				■		
-5...+5 V				■	■	
-10...0 V			■	■		
-5...0 V			■	■	■	
0...6.66 V		■			■	
-10...+3.33 V		■		■		
-5...+1.66 V		■		■	■	
0...8 V		■	■			
0...4 V		■	■		■	
-10...-2 V		■	■	■		
-5...-1 V		■	■	■	■	
1.25...6.25 V	■		■		■	
-7.5...+2.5 V	■		■	■		
-3.75...+1.25 V	■		■	■	■	
1.66...8.33 V	■	■			■	
-6.66...+6.66 V	■	■		■		
-3.33...+3.33 V	■	■		■	■	
-8...0 V	■	■	■	■		
-4...0 V	■	■	■	■	■	
0...1 mA					■	
0...20 mA					■	■
4...20 mA	■	■	■			■
0...10 mA			■		■	■
0...0.5 mA			■		■	
0...13.33 mA	■				■	■
0...666 µA	■				■	
0...16 mA	■	■				■
0...800 µA	■	■				
0...8 mA	■	■			■	■
0...400 µA	■	■			■	
2.5...12.5 mA	■		■		■	■
125...625 µA	■		■		■	
3.33...16.66 mA	■	■			■	■
166...833 µA	■	■			■	
0.2...1 mA	■	■	■			
2...10 mA	■	■	■		■	■
100...500 µA	■	■	■		■	

2CDC 282 020 F0203

Legend
■ ON
OFF
▩ no influence

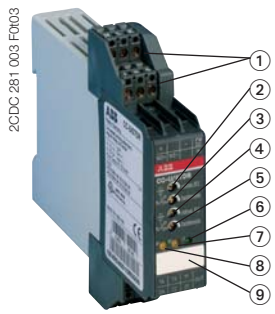
2CDC 282 003 F0204

*) Detection of input voltage signal interruptions:
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe). If "No fail safe" is configured, input signal interruptions are not detected.

Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/STD	24-48 V DC	**1SVR 040 000 R1700**	1	
	110-240 V AC	**1SVR 040 001 R0400**	1	

• Accessories **5**/20
• Technical data **5**/21
• Dimensional drawings **5**/27

Analog standard signal converter CC-U/STDR with relay output
Ordering details



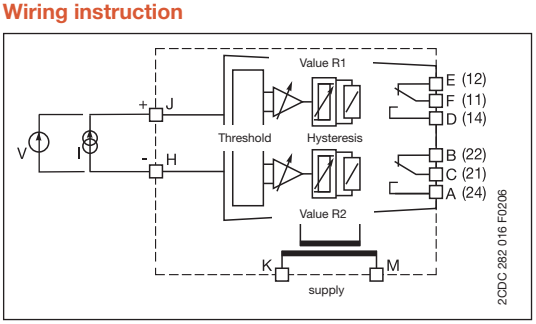
CC-U/STDR

① Plug-in connecting terminals
② Threshold value for R1
③ Hysteresis for R1
④ Threshold value for R2
⑤ Hysteresis for R2
⑥ U: green LED - supply voltage
⑦ R2: yellow LED - Relay 2 energized
⑧ R1: yellow LED - Relay 1 energized
⑨ Marker label

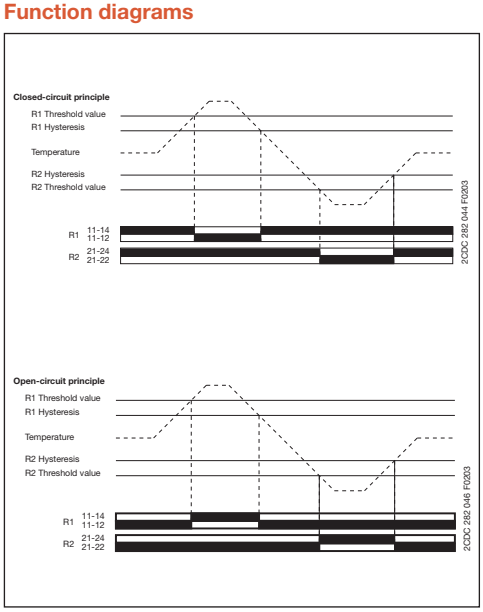
CC-U/STDR universal signal converter for standard signals, with 2 threshold relay outputs and with 3-way electrical isolation

- Standard signal converter with 7 setting ranges
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



Function diagrams



DIP switch settings

Input	Switch 1	2	3	4	5	6
0...0 V						
0...5 V	■					
0...1 V		■				
-10...+10 V			■			
1...5 V	■				■	
0...20 mA		■			■	
4...20 mA		■			■	■
Output						
Closed-circuit principle						■
Open-circuit principle						

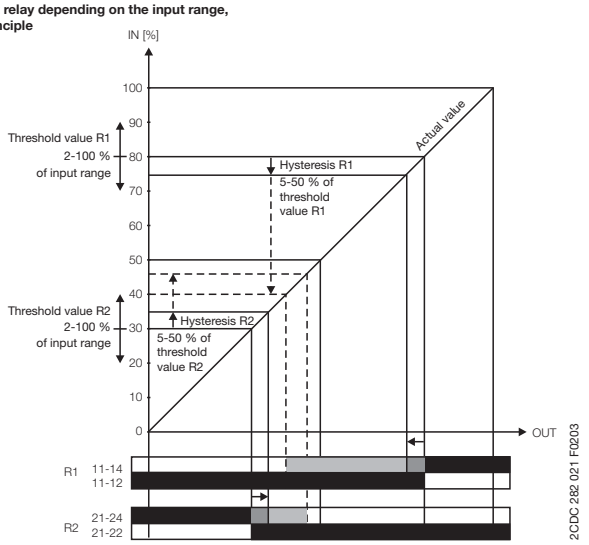
2CDC 282 005 F0204

Legend
■ ON
OFF
no influence

2CDC 282 003 F0204

Switching points

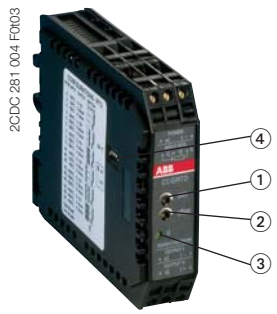
Switching points of the output relay depending on the input range, configuration open-circuit principle



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/STDR	24-48 V DC	**1SVR 040 010 R0000**	1	
	110-240 V AC	**1SVR 040 011 R2500**	1	

• Accessories **5**/20
• Technical diagrams **5**/27
• Technical data **5**/21
• Dimensional drawings **5**/27

Temperature signal converter for RTD sensors CC-E/RTD
Ordering details



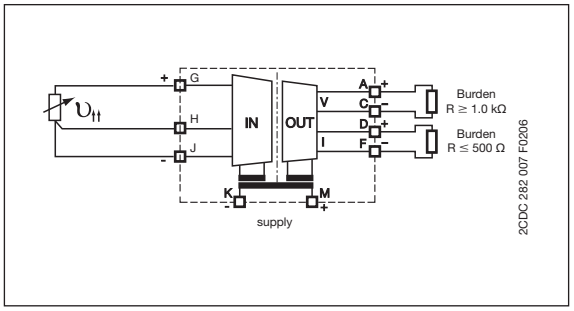
CC-E/RTD

① Gain adjustment
② Offset adjustment
③ U: green LED - supply voltage
④ DIP switch for input and output configuration (only available on universal devices)

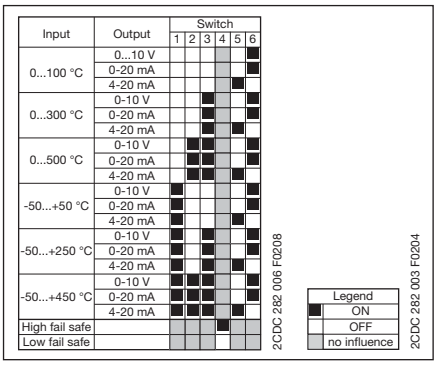
CC-E/RTD temperature signal converter for RTD sensors, linearized with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/RTD)
- 2x12 single-function devices
- "Plug and Work", no adjustment of single-function devices required
- Temperature signal converter for PT100 sensors
- 2- or 3-wire connection

Wiring instruction



DIP switch settings (universal devices)

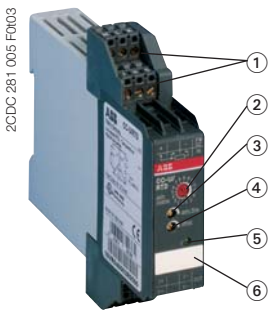


Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
Supply voltage: 24 V DC universal					
CC-E/RTD	refer to table	0-10 V, 0-20 mA, 4-20 mA	**1SVR 011 701 R2500**[1)]	1	
single-function					
CC-E RTD/V	PT100 0...100 °C	0-10 V	**1SVR 011 730 R2500**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 731 R1200**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 732 R1300**	1	
CC-E RTD/V	PT100 -50...+50 °C	0-10 V	**1SVR 011 733 R1400**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 734 R1500**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 735 R1600**	1	
CC-E RTD/V	PT100 0...300 °C	0-10 V	**1SVR 011 736 R1700**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 737 R1000**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 738 R2100**	1	
CC-E RTD/V	PT100 -50...+250 °C	0-10 V	**1SVR 011 739 R2200**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 740 R0700**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 741 R2400**	1	
Supply voltage: 110-240 V AC universal					
CC-E/RTD	refer to table	0-10 V, 0-20 mA, 4-20 mA	**1SVR 011 706 R2200**	1	
single-function					
CC-E RTD/V	PT100 0...100 °C	0-10 V	**1SVR 011 788 R2400**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 789 R2500**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 790 R2200**	1	
CC-E RTD/V	PT100 -50...+50 °C	0-10 V	**1SVR 011 791 R1700**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 792 R1000**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 793 R1100**	1	
CC-E RTD/V	PT100 0...300 °C	0-10 V	**1SVR 011 794 R1200**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 795 R1300**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 796 R1400**	1	
CC-E RTD/V	PT100 -50...+250 °C	0-10 V	**1SVR 011 797 R1500**	1	
CC-E RTD/I		0-20 mA	**1SVR 011 798 R2600**	1	
CC-E RTD/I		4-20 mA	**1SVR 011 799 R2700**	1	

[1)] UL 1604 Class I, Div.2 (universal device)

• Technical data ..... 5/21 • Dimensional drawings 5/27

Temperature signal converter for RTD sensors CC-U/RTD
Ordering details



CC-U/RTD

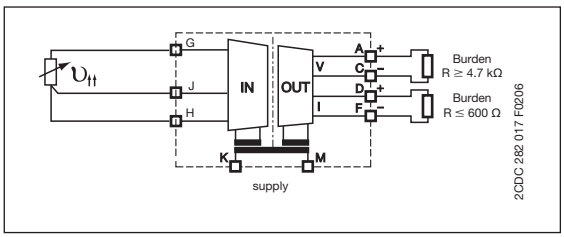
① Plug-in connecting terminals
② Gain: Coarse adjustment
③ Gain: Fine adjustment
④ Offset adjustment
⑤ U: green LED - supply voltage
⑥ Marker label

CC-U/RTD universal signal converter for PT10, PT100, PT1000 temperature sensors (acc. to IEC 751 and JIS C 1604[1)], linearized with 3-way electrical isolation

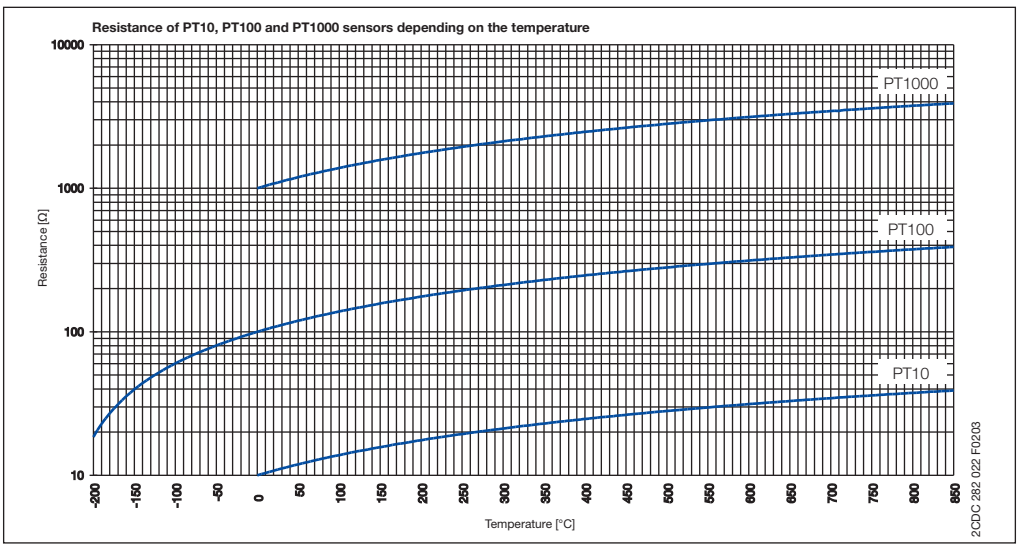
- Configurable output signal response on input signal interruption (low / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

1) Japanese standard

Wiring instruction



Characteristic curves



DIP switch settings

Input Type	Input Range	Switch 1 1	2	3	4	5	6	Switch 2 1	2	3	4	5	6	Gain Coarse
PT10	0...500 °C	■						■			■			F
	0...550 °C	■						■			■			E
	0...600 °C	■						■			■			D
	0...650 °C	■						■						C
	0...700 °C	■						■						B
	0...750 °C	■						■						A
	0...800 °C	■						■						9
	0...850 °C	■						■						8
PT100	0...50 °C		■						■		■			F
	0...60 °C		■						■		■			E
	0...70 °C		■						■					B
	0...80 °C		■						■					A
	0...90 °C		■						■					9
	0...100 °C		■						■					8
	0...200 °C		■						■					3
	0...300 °C		■						■					2
	0...400 °C		■						■					1
	0...500 °C		■						■					0
PT1000	0...10 °C			■										8
	0...20 °C			■										3
	0...30 °C			■										2
	0...40 °C			■										1
	0...50 °C			■										0
	0...60 °C			■										0
Low fail safe *)													■	-
High fail safe *)													■	-

2CDC 282 023 F0203

*) Detection of input signal interruptions:
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

Output	Switch 3 1	2	3	4	5	6
0...5 V			■		■	
0...10 V					■	
1...5 V	■	■	■		■	
2...10 V	■	■	■			
-10...+10 V				■		
-5...+5 V				■	■	
-10...0 V			■	■		
-5...0 V			■	■	■	
0...6.66 V		■			■	
-10...+3.33 V		■		■		
-5...+1.66 V		■		■	■	
0...8 V		■	■			
0...4 V		■	■		■	
-10...-2 V		■	■	■		
-5...-1 V		■	■	■	■	
1.25...6.25 V	■		■		■	
-7.5...+2.5 V	■		■	■		
-3.75...+1.25 V	■		■	■	■	
1.66...8.33 V	■	■			■	
-6.66...+6.66 V	■	■		■		
-3.33...+3.33 V	■	■		■	■	
-8...0 V	■	■	■	■		
-4...0 V	■	■	■	■	■	
0...1 mA					■	
0...20 mA					■	■
4...20 mA	■	■	■		■	■
0...10 mA			■		■	■
0...0.5 mA			■		■	■
0...13.33 mA		■			■	■
0...666 µA		■			■	
0...16 mA		■	■			■
0...800 µA		■	■			
0...8 mA		■	■		■	■
0...400 µA		■	■		■	
2.5...12.5 mA	■		■		■	■
125...625 µA	■		■		■	
3.33...16.66 mA	■	■			■	■
166...833 µA	■	■			■	
0.2...1 mA	■	■	■			
2...10 mA	■	■	■		■	■
100...500 µA	■	■	■		■	

2CDC 282 024 F0203

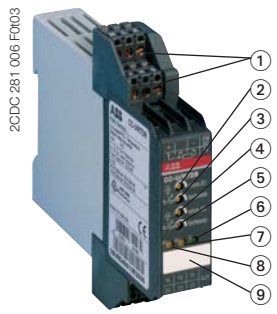
Legend	
■	ON
	OFF
■	no influence

2CDC 282 003 F0204

Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/RTD	24-48 V DC	**1SVR 040 002 R0500**	1	
	110-240 V AC	**1SVR 040 003 R0600**	1	

• Accessories **5**/20
• Technical data **5**/21
• Dimensional drawings **5**/27

Temperature signal converter for RTD sensors CC-U/RTDR with relay output
Ordering details



CC-U/RTDR

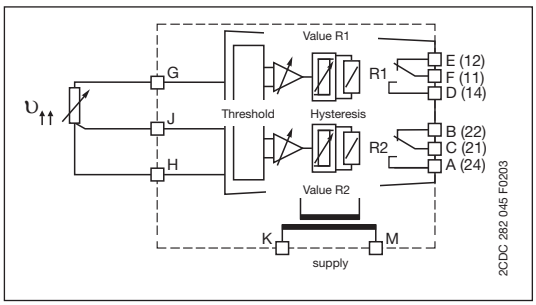
① Plug-in connecting terminals
② Threshold value for R1
③ Hysteresis for R1
④ Threshold value for R2
⑤ Hysteresis for R2
⑥ U: green LED - supply voltage
⑦ R2: yellow LED - Relay 2 energized
⑧ R1: yellow LED - Relay 1 energized
⑨ Marker label

5

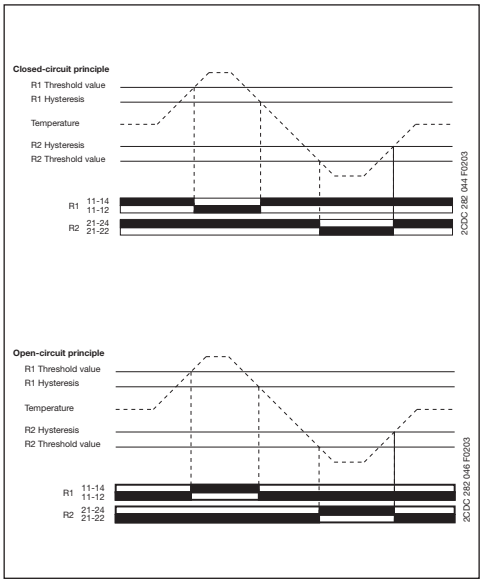
CC-U/RTDR universal signal converter for temperature and resistance signals, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for PT100 signals (5 ranges up to 800 °C) and variable resistances from 0-380 Ω
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

Wiring instruction



Function diagrams



DIP switch settings

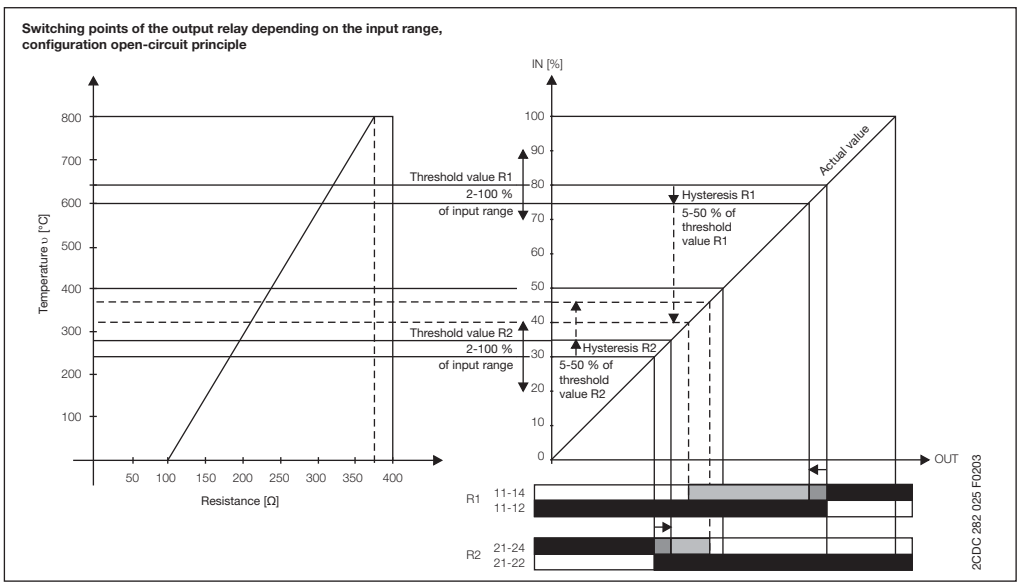
Input PT100	Switch 1	2	3	4	5	6
0...100 °C	■					
0...200 °C		■				
0...400 °C			■			
0...600 °C				■		
0...800 °C					■	
Output						
Closed-circuit principle						■
Open-circuit principle						

2CDC 282 007 F0204

Legend
■ ON
OFF
▨ no influence

2CDC 282 003 F0204

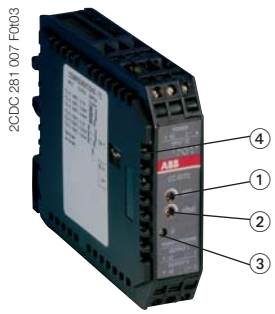
Switching points



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/RTDR	24-48 V DC 110-240 V AC	**1SVR 040 012 R2600** **1SVR 040 013 R2700**	1 1	

• Accessories **5**/20
• Technical diagrams **5**/27
• Technical data **5**/21
• Dimensional drawings **5**/27

Temperature signal converter for thermocouples CC-E/TC
Ordering details



CC-E/TC

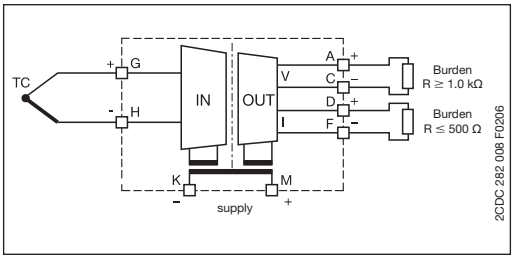
① Gain adjustment
② Offset adjustment
③ U: green LED - supply voltage
④ DIP switch for input and output configuration (only available on universal devices)

[1] UL 1604 Class I, Div.2 (universal device)

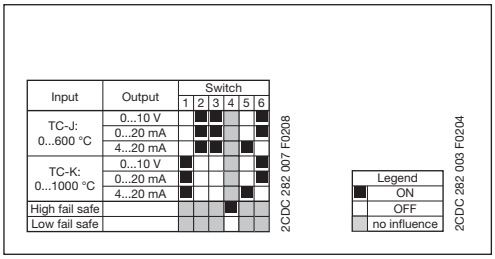
CC-E/TC analog signal converter for thermocouple signals of the types J and K with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/TC)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Wiring instruction



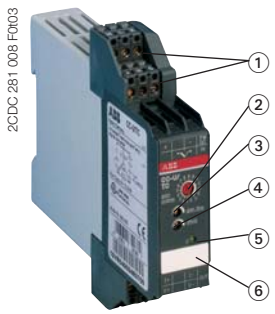
DIP switch settings (universal devices)



Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
Supply voltage: 24 V DC universal					
CC-E/TC	thermocouple types J and K	0-10 V, 0-20 mA, 4-20 mA	**1SVR 011 702 R2600**[1]	1	
single-function					
CC-E TC/V	type J 0...600 °C	0-10 V	**1SVR 011 750 R0100**	1	
CC-E TC/I		0-20 mA	**1SVR 011 751 R2600**	1	
CC-E TC/I		4-20 mA	**1SVR 011 752 R2700**	1	
CC-E TC/V	type K 0...1000 °C	0-10 V	**1SVR 011 753 R2000**	1	
CC-E TC/I		0-20 mA	**1SVR 011 754 R2100**	1	
CC-E TC/I		4-20 mA	**1SVR 011 755 R2200**	1	
Supply voltage: 110-240 V AC universal					
CC-E/TC	thermocouple types J and K	0-10 V, 0-20 mA, 4-20 mA	**1SVR 011 707 R2300**	1	
single-function					
CC-E TC/V	type J 0...600 °C	0-10 V	**1SVR 011 760 R0300**	1	
CC-E TC/I		0-20 mA	**1SVR 011 761 R2000**	1	
CC-E TC/I		4-20 mA	**1SVR 011 762 R2100**	1	
CC-E TC/V	type K 0...1000 °C	0-10 V	**1SVR 011 763 R2200**	1	
CC-E TC/I		0-20 mA	**1SVR 011 764 R2300**	1	
CC-E TC/I		4-20 mA	**1SVR 011 765 R2400**	1	

• Technical data ..... 5/21 • Dimensional drawings 5/27

Temperature signal converter for thermocouples CC-U/TC
Ordering details



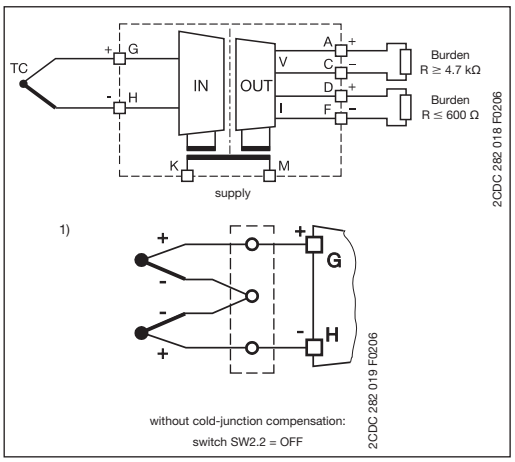
CC-U/TC

① Plug-in connecting terminals
② Gain: Coarse adjustment
③ Gain: Fine adjustment
④ Offset adjustment
⑤ U: green LED - supply voltage
⑥ Marker label

CC-U/TC universal signal converter for thermocouples with 3-way electrical isolation

- Temperature signal converter for thermocouples of the types K, J, T, S, E, N, R, B
- Continuously adjustable voltage signal input 0-10 mV and 0-50 mV
- Differential temperature meas. possible 1)
- Configurable output signal response on input signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



DIP switch settings

Output	Switch 3					
	1	2	3	4	5	6
0...5 V			■			■
0...10 V						■
1...5 V	■	■	■			■
2...10 V	■	■	■			
-10...+10 V				■		
-5...+5 V				■		■
-10...0 V				■	■	
-5...0 V				■	■	■
0...6.66 V		■				■
-10...+3.33 V		■		■		
-5...+1.66 V		■		■		■
0...8 V		■	■			
0...4 V		■	■			■
-10...-2 V		■	■	■		
-5...-1 V		■	■	■		■
1.25...6.25 V	■			■		■
-7.5...+2.5 V	■			■	■	
-3.75...+1.25 V	■			■	■	■
1.66...8.33 V	■	■				■
-6.66...+6.66 V	■	■		■		
-3.33...+3.33 V	■	■		■	■	
-8...0 V	■	■	■	■		
-4...0 V	■	■	■	■	■	
0...1 mA						■
0...20 mA					■	■
4...20 mA	■	■	■			■
0...10 mA			■		■	■
0...0.5 mA			■			■
0...13.33 mA		■			■	■
0...666 µA		■				■
0...16 mA		■	■			■
0...800 µA		■	■			
0...8 mA		■	■		■	■
0...400 µA		■	■			■
2.5...12.5 mA	■			■		■
125...625 µA	■			■		
3.33...16.66 mA	■	■				■
166...833 µA	■	■			■	
0.2...1 mA	■	■	■			
2...10 mA	■	■	■		■	■
100...500 µA	■	■	■		■	

2CDC 282 017 F0208

Legend
■ ON
OFF
no influence

2CDC 282 003 F0204

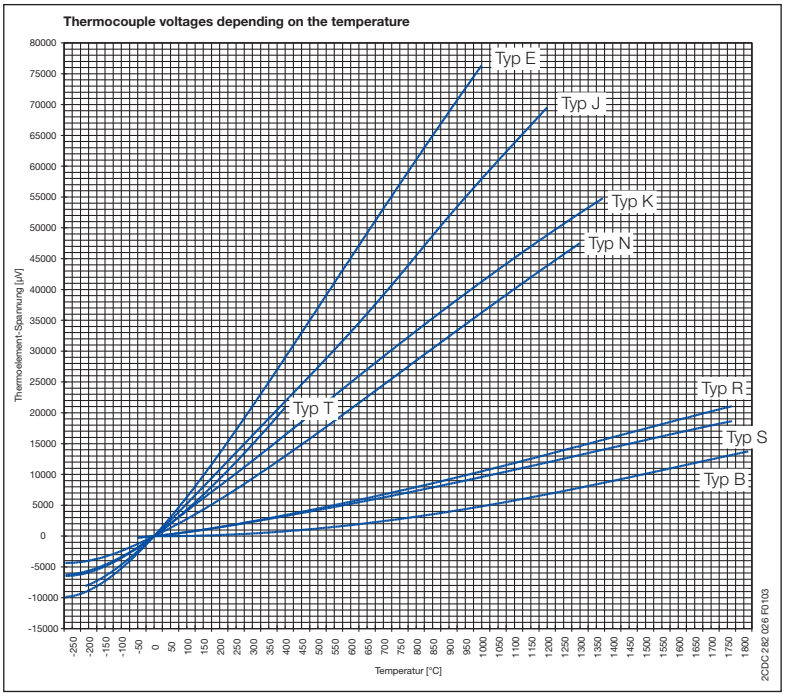
Type	Range	Input	Switch 1						Switch 2					
			1	2	3	4	5	6	1	2	3	4	5	6
K	0-100...900 °C		■			■			■	■				
	0-250...1350 °C			■		■			■	■			■	
J	0-100...750 °C	■							■	■				
T	0-100...400 °C		■	■					■	■	■			
	-150-0...400 °C		■	■					■	■	■	■		
S	0-250...1550 °C		■	■		■	■		■	■				
E	0-100...700 °C								■	■				
	0-200...1000 °C								■	■			■	
N	0-100...650 °C		■			■			■	■				
	0-200...1300 °C		■			■			■	■			■	
R	0-250...1350 °C		■	■	■	■	■		■	■				
	0-450...1700 °C		■	■	■	■	■		■	■			■	
B	0-700...1750 °C		■	■	■	■	■							
mV	0-2...10 mV		■	■	■	■	■							
	0-10...50 mV													
Low fail safe *)														■
High fail safe *)														

2CDC 282 010 F0204

*) Detection of input signal interruptions:

If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

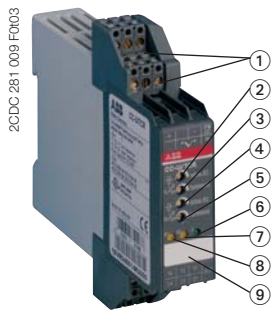
Characteristic curves



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/TC	24-48 V DC 110-240 V AC	**1SVR 040 004 R0700** **1SVR 040 005 R0000**	1 1	

• Accessories **5**/20
• Technical data **5**/21
• Dimensional drawings **5**/27

Temperature signal converter for thermocouples CC-U/TCR with relay output
Ordering details



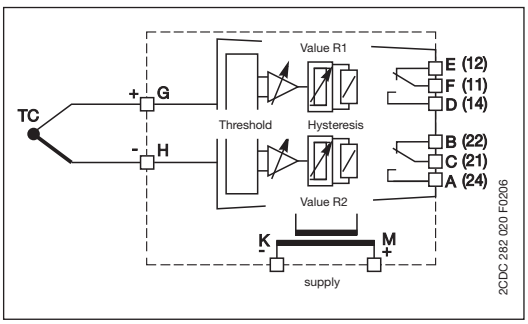
CC-U/TCR

① Plug-in connecting terminals
② Threshold value for R1
③ Hysteresis for R1
④ Threshold value for R2
⑤ Hysteresis for R2
⑥ U: green LED - supply voltage
⑦ R2: yellow LED - Relay 2 energized
⑧ R1: yellow LED - Relay 1 energized
⑨ Marker label

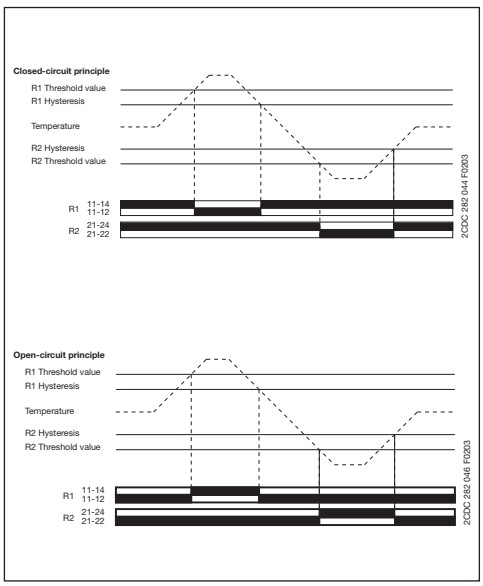
CC-U/TCR universal signal converter for thermocouples, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for thermocouples of the types K, J, T, S
- 2 threshold relay outputs with one change-over contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



Function diagrams



DIP switch settings

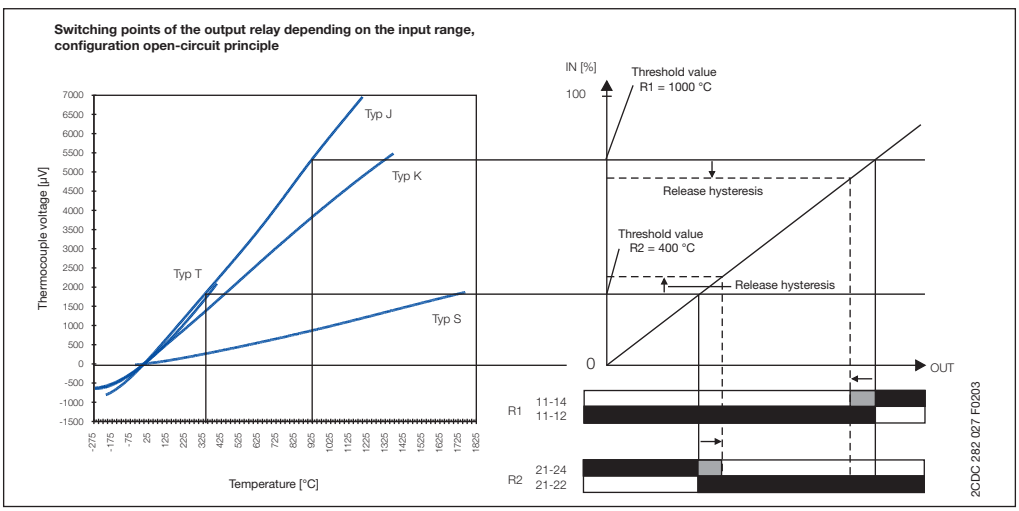
Input		Switch					
Type	Range	1	2	3	4	5	6
J	0...240 °C				■		
	0...480 °C			■	■		
	0...1200 °C						
K	0...250 °C	■			■		
	0...500 °C	■		■	■		
	0...1350 °C	■					
T	-150...+120 °C	■				■	■
	0...220 °C	■			■	■	
	0...400 °C	■		■	■		
S	0...210 °C		■		■		
	0...380 °C		■	■	■		
	0...860 °C		■				
	0...1550 °C		■	■			
Output							
Closed-circuit principle							■
Open-circuit principle							

2CDC 282 004 F0204

Legend
■ ON
OFF
no influence

2CDC 282 003 F0204

Switching points



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/TCR	24-48 V DC 110-240 V AC	**1SVR 040 014 R2000** **1SVR 040 015 R2100**	1 1	

• Accessories **5**/20
• Technical diagrams **5**/27
• Technical data **5**/21
• Dimensional drawings **5**/27

Measuring converter for sinusoidal and DC currents CC-E/I
Ordering details

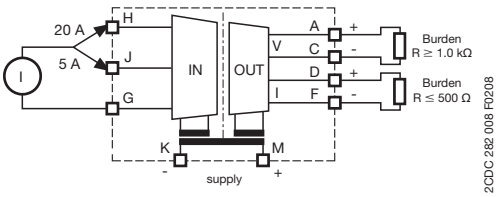
CC-E/I

① Gain adjustment
② Offset adjustment
③ U: green LED - supply voltage
④ DIP switch for input and output configuration (only available on universal devices)

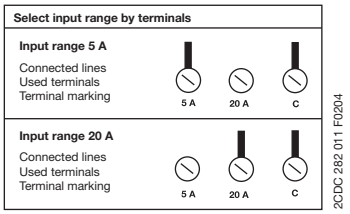
CC-E/I measuring converter for current signals 0-5 A, 0-20 A, AC/DC with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/I)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

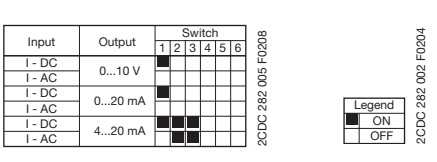
Wiring instruction



Input range selection



DIP switch settings (universal devices)

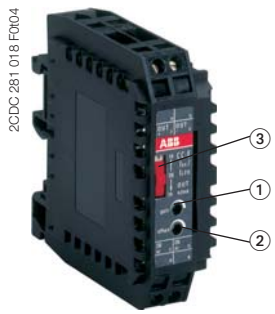


Type	Input signal	Output signal	Order code	Pack. unit pieces	Price 1 piece
Supply voltage: 24 V DC universal					
CC-E/I	0-5 A, 0-20 A, AC/DC	0-10 V, 0-20 mA, 4-20 mA	**1SVR 011 703 R2700**[1)]	1	
single-function					
CC-E I_{AC}/V	0-5 A, 0-20 A, AC	0-10 V	**1SVR 011 770 R0500**	1	
CC-E I_{AC}/I		0-20 mA	**1SVR 011 771 R2200**	1	
CC-E I_{AC}/I		4-20 mA	**1SVR 011 772 R2300**	1	
CC-E I_{DC}/V	0-5 A, 0-20 A, DC	0-10 V	**1SVR 011 773 R2400**	1	
CC-E I_{DC}/I		0-20 mA	**1SVR 011 774 R2500**	1	
CC-E I_{DC}/I		4-20 mA	**1SVR 011 775 R2600**	1	
Supply voltage: 110-240 V AC universal					
CC-E/I	0-5 A, 0-20 A, AC/DC	0-10 V, 0-20 mA, 4-20 mA	**1SVR 011 708 R0400**	1	
single-function					
CC-E I_{AC}/V	0-5 A, 0-20 A, AC	0-10 V	**1SVR 011 780 R1100**	1	
CC-E I_{AC}/I		0-20 mA	**1SVR 011 781 R0600**	1	
CC-E I_{AC}/I		4-20 mA	**1SVR 011 782 R0700**	1	
CC-E I_{DC}/V	0-5 A, 0-20 A, DC	0-10 V	**1SVR 011 783 R0000**	1	
CC-E I_{DC}/I		0-20 mA	**1SVR 011 784 R0100**	1	
CC-E I_{DC}/I		4-20 mA	**1SVR 011 785 R1100**	1	

[1)] UL 1604 Class I, Div.2 (universal device)

• Technical data ..... 5/21 • Dimensional drawings 5/27

Measuring converter for sinusoidal currents
CC-E I_{AC}/ILPO
Ordering details



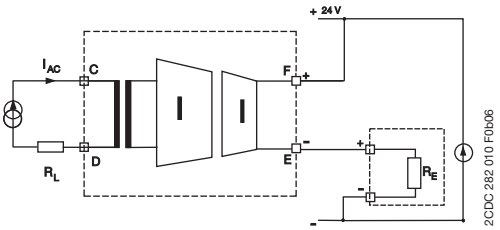
CC-E I_{AC}/ILPO

① Gain adjustment
② Offset adjustment
③ Selection of measuring range

CC-E I_{AC}/ILPO measuring converter without auxiliary power for sinusoidal currents 0-1 A, 0-5 A, output 4-20 mA

- Measuring converter for sinusoidal currents (0-1 A, 0-5 A)
- Measuring range selection by front-face sliding switch
- 4-20 mA output current in proportion to input current
- no additional power supply required

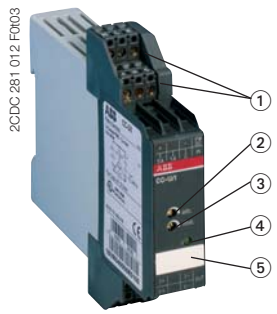
Wiring instruction



Type	Input signal	Order code	Pack. unit pieces	Price 1 piece
CC-E I_{AC}/ILPO	0-1 A, 0-5 A, AC	**1SVR 010 203 R0500**	1	

• Technical data ..... **5**/21 • Dimensional drawings **5**/27

Measuring converter for current RMS values CC-U/I
Ordering details



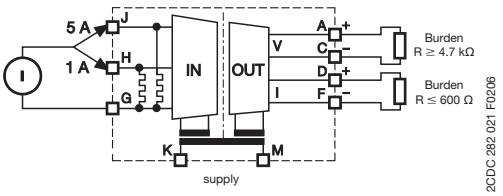
CC-U/I

① Plug-in connecting terminals
② Gain adjustment
③ Offset adjustment
④ U: green LED - supply voltage
⑤ Marker label

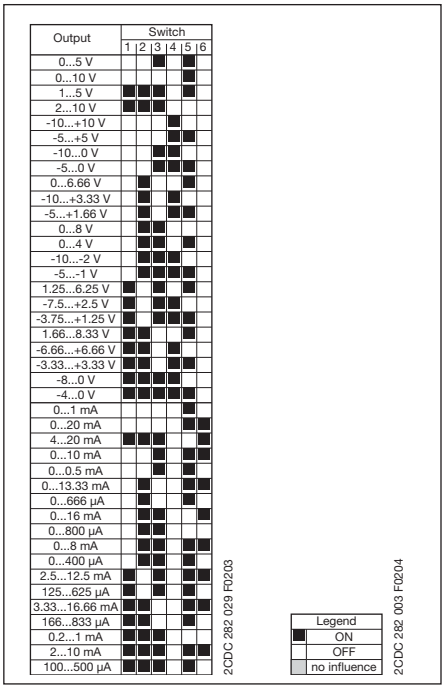
CC-U/I universal measuring converter for RMS values of 0-1 A and 0-5 A, with 3-way electrical isolation

- RMS converter for current signals up to 1 A and up to 5 A of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

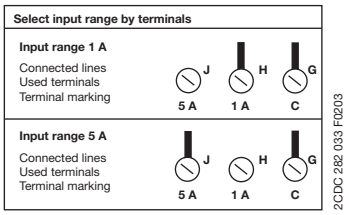
Wiring instruction



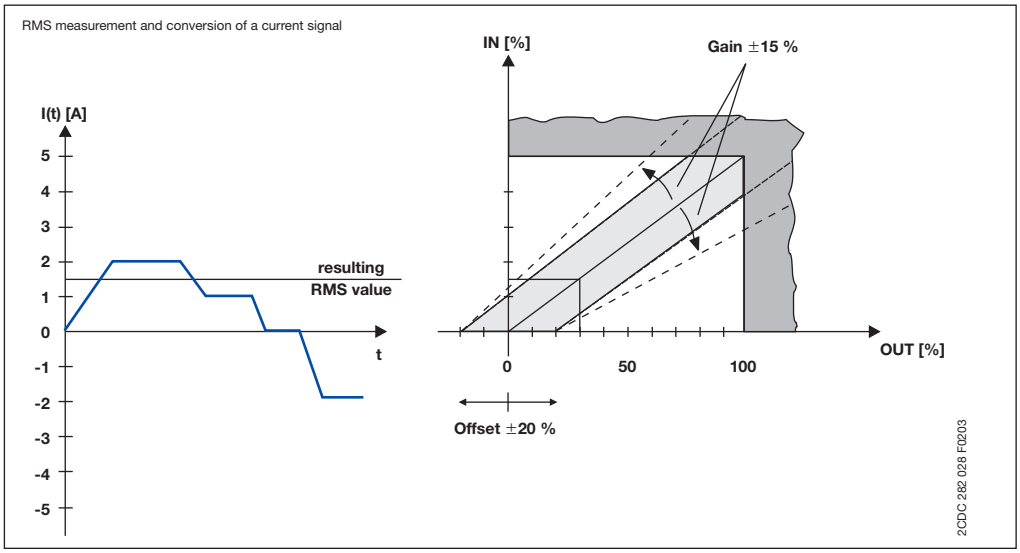
DIP switch settings



Input range selection



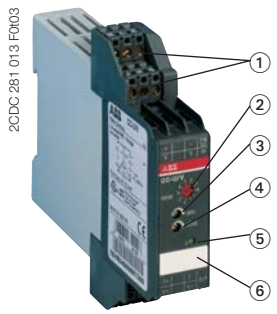
Example of application



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/I	24-48 V DC 110-240 V AC	**1SVR 040 006 R0100** **1SVR 040 007 R0200**	1 1	

• Accessories **5**/20
• Technical data **5**/21
• Dimensional drawings **5**/27

Measuring converter for voltage RMS values CC-U/V
Ordering details



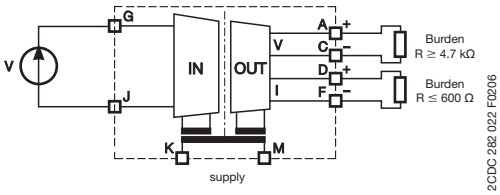
CC-U/V

① Plug-in connecting terminals
② Input voltage range selection
③ Gain adjustment
④ Offset adjustment
⑤ U: green LED - supply voltage
⑥ Marker label

CC-U/V universal measuring converter for RMS values of 0-600 V, with 3-way electrical isolation

- RMS converter for voltage signals up to 600 V of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



DIP switch settings

Output	Switch 1	2	3	4	5	6
0...5 V			■			■
0...10 V						■
1...5 V	■		■			■
2...10 V	■	■	■			
-10...+10 V				■		
-5...+5 V				■		■
-10...0 V			■	■		
-5...0 V			■	■		■
0...6.66 V		■				■
-10...+3.33 V		■		■		
-5...+1.66 V		■		■		■
0...8 V		■	■			
0...4 V		■	■			■
-10...-2 V		■	■	■		
-5...-1 V		■	■	■		■
1.25...6.25 V	■		■			■
-7.5...+2.5 V	■		■	■		
-3.75...+1.25 V	■		■	■		■
1.66...8.33 V	■	■				■
-6.66...+6.66 V	■	■		■		
-3.33...+3.33 V	■	■		■		■
-8...0 V	■	■	■	■		
-4...0 V	■	■	■	■		■
0...1 mA					■	
0...20 mA					■	■
4...20 mA	■	■	■			■
0...10 mA			■		■	■
0...0.5 mA			■		■	
0...13.33 mA		■			■	■
0...666 µA		■			■	
0...16 mA		■	■			■
0...800 µA		■	■			
0...8 mA		■	■			■
0...400 µA		■	■			■
2.5...12.5 mA	■		■			■
125...625 µA	■		■			■
3.33...16.66 mA	■	■				■
166...833 µA	■	■				■
0.2...1 mA	■	■	■			
2...10 mA	■	■	■			■
100...500 µA	■	■	■			■

2CDC 282 029 F0203

Legend	
■	ON
	OFF
	no influence

2CDC 282 003 F0204

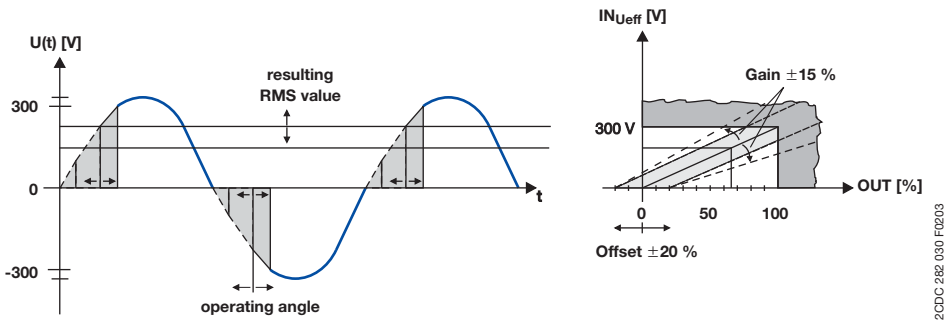
Input range selection

Selecting input range by front-face rotary switch	Switch position
0...100 V	1
0...150 V	2
0...250 V	3
0...300 V	4
0...400 V	5
0...450 V	6
0...550 V	7
0...600 V	8

2CDC 282 012 F0204

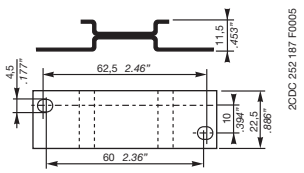
Example of application

RMS measurement and conversion of a phase-angle controlled voltage signal L1 = 230 V



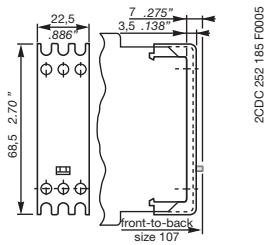
Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/V	24-48 V DC 110-240 V AC	**1SVR 040 008 R1300** **1SVR 040 009 R1400**	1 1	

• Accessories **5**/20
• Technical data **5**/21
• Dimensional drawings **5**/27



ADP.01

MAR.01



Sealable cover
COV.01

Accessories

Adapter for screw mounting

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
ADP.01	CC-U	22.5	**1SVR 430 029 R0100**	1		18.4/0.65

Marker label

Type	for type		Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
MAR.01	CC-U		**1SVR 366 017 R0100**	10		0.19/0.007

Sealable transparent cover

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
COV.01	CC-U	22.5	**1SVR 430 005 R0100**	1		5.2/0.18

5

Analog signal converters
CC-E/STD, CC-E x/x, CC-E/RTD, CC-E/TC
Technical data

Type		CC-E/STD		CC-E/RTD [3]	CC-E/TC
Input circuits - Analog inputs	**J-G-H**	**Current**	**Voltage**	**Temperature sensors**	**Thermocouples (IEC 584-1 and 2)**
Input signal		Standard signals		PT100	TC.K, TC.J
Rated input range		0...20 mA / 4...20 mA	0...5 V / 0...10 V / -10...+10 V	-50...+500 °C	TC.K: 0...1000 °C, TC.J: 0...600 °C
Limitation of input signals		+55 mA	± 11 V		
Influence of line resistance		-		< 0.01 %/Ω	< 0.5 % / 100 Ω
Gain adjustment range		± 5 % (universal devices)			
Offset adjustment range		± 5 % (universal devices)			
Input impedance		50 Ω	1 MΩ	-	-
Suppression at 50 Hz		-		-	> 35 dB
Common-mode rejection		-		100 dB	
Output circuits - Analog outputs	**D-F, A-C**	**Current**		**Voltage**	
Output signal		0-20 mA, 4-20 mA		0-5 V, 0-10 V	
Output burden		≤ 500 Ω		≥ 1.0 KΩ	
Accuracy [1]		± 0.5 % of full-scale			
Residual ripple		< 0.5 %			
Response time		200 µs		10 ms	
Transmission frequency		2 kHz		80 Hz	2 Hz (up to -3 dB)
Reaction to input circuit interruption				High fail safe: Output voltage > 115 % of measuring range [2] Low fail safe: Output voltage < -0.6 V, output current = 0 mA	
Supply circuits	**K-M**	**DC versions**		**AC versions**	
Supply voltage		24 V DC		110-240 V AC - 50/60 Hz	
Supply voltage tolerance		-15...+15 %		-15...+10 %	
Power consumption		1.5 W typ.		1.5 VA typ.	
Indication of operational states					
Rated control supply voltage U_S		U: green LED			
General data					
Ambient temperature range	operation / storage	0...+60 °C / -20...+80 °C			
Temperature coefficient		± 500 ppm/°C			
Degree of protection (DIN 40050)		IP20			
Mounting position		ventilation slots on top and bottom			
Mounting		DIN rail (IEC/EN 60715), snap-on mounting			
Electrical connection					
Wire size	rigid	0.2-4 mm² (24-12 AWG)			
	fine-strand with(out) wire end ferrule	0.2-2.5 mm² (24-14 AWG)			
Stripping length		7 mm (0.28 inch)			
Tightening torque		0.5 Nm (4.4 lb.in)			
Electromagnetic compatibility					
Interference immunity		EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m			
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kH)			
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV			
HF line emission	IEC/EN 61000-4-6	10 V			
Interference emission	EN 61000-6-4	Class B			
Isolation data					
Test voltage between all isolated circuits		2.5 kV AC			
Rated insulation voltage		-		-	-

[1] includes: non-linearity, factory setting, drift of temperature, supply voltage and output load
[2] Only -/RTD and -/TC: Single-function devices respond with Low fail safe to input signal interruptions
[3] When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

• Approvals 5/3

Analog signal converter
CC-E I/I-1, CC-E I/I-2
Technical data

Type		CC-E I/I
Input circuits - Analog inputs		**Current**
Input current I_{IN}		0-20 mA, 4-20 mA
Min. input current		< 100 µA
Max. input current		50 mA[1] (V_{IN} < 18 V)
Input voltage U_{IN}		< 2.5 V + (I_{IN} x R_L)
Input voltage drop U_i		< 2.5 V (20 mA, R_L = 0 Ω)
Max. input voltage		18 V[1] (I_{IN} < 50 mA)
Output circuits		
Output current I_{OUT}		0-20 mA, 4-20 mA
Output load R_L		0-500 Ω
Output voltage U_{OUT}		I_{OUT} x R_L
Residual ripple		< 20 mV_{pp} (500 Ω, 20 mA)
Response time (0-100 %)		< 15 ms (0-500 Ω, 20 mA), < 5 ms (500 Ω, 20 mA, 25 °C)
Accuracy		≤ 0.1 % of full-scale (20 mA)
Load influence (0-500 Ω)		≤ ±0.05 % / 100 Ω, ≤ -0.1 % / 100 Ω (25 °C)
General data		
Width of the enclosure		18 mm
Weight	1 channel	approx. 0.037 kg (0.082 lb)
	2 channel	approx. 0.044 kg (0.097 lb)
Mounting position		any
Degree of protection	enclosure / terminals	IP20 / IP20
Ambient temperature range	operation / storage	-25...+60 °C / -40...+85 °C
Temperature coefficient		< ±50 ppm / °C
Mounting		DIN rail (IEC/EN 60715)
Electrical connection		
Wire size	rigid	0.2-4 mm^2 (24-12 AWG)
	fine-strand with(out) wire end ferrule	0.2-2.5 mm^2 (24-14 AWG)
Stripping length		7 mm (0,28 inch)
Tightening torque		0.5 Nm (4.4 lb.in)
Standards		
Product standard		EN 50178
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electromagnetic compatibility		
Interference immunity		EN 61000-6-2
electrostatic discharge (ESD)	EN 61000-4-2	Level 3 (±6 kV / ±8 kV)
electromagnetic field (HF radiation resistance)	EN 61000-4-3	10 V/m
fast transients (Burst)	EN 61000-4-4	Level 3 (±2 kV / 5 kH)
powerful impulses (Surge)	EN 61000-4-5	±2 kV / ±1 kV
HF line emission	EN 61000-4-6	10 V
magnetisches Feld	EN 61000-4-8	30 A/m
Interference emission		EN 61000-6-4
Radiated noise	EN 55011	Class B
Operational reliability (EN 68-2-6)		4 g
Mechanical resistance (EN 68-2-6)		10 g
Environmental testing (IEC 68-2-30 Db)		24 h cycle, 55 °C, 93 % rel., 96 h
Isolation data		
Insulation voltage input / output		500 V_{eff} / 50 Hz
Insulation voltage between channels		5 kV_{eff} / 50 Hz (device with 2 channels)
Pollution category		2
Overvoltage category		II

[1] The input parameters have to be limited to the indicated maximum values.

• **Approvals** **5**/3

Analog signal converters
CC-U/STD, CC-U/RTD, CC-U/TC
Technical data

Type		CC-U/STD			CC-U/RTD [3]	CC-U/TC	
Input circuits - Analog inputs	**J-G-H**	**Current**	**Voltage**	**Potentio-meter**	**Temperature sensors**	**Thermocouples (IEC 584-1 and 2)**	
Input signal		0-20 mA 4-20 mA 10-50 mA 0-1 mA	0-100 mV 0-1 V 0-5 V 1-5 V 0-10 V 2-10 V ± 10 V	470 Ω - 1 MΩ [2]	PT10, PT100, PT1000 (IEL 751 and JICC 1604)	TC.K TC.T TC.E TC.R	TC.J TC.S TC.N TC.B
Limitation of input signals		± 55 mA	± 11 V		-	-	
Rated input range		-	-	-	Max. temperature adjustable: 6-60 °C for PT1000 50-500 °C for PT100 500-850 °C for PT10	refer to temperature specs. of individual thermocouples	
Influence of line resistance		-	-	-	0.015 °C/Ω	< 0.01 % / 100 Ω	
Gain adjustment range (universal devices)		0.9-110 mA	45 mV - 22 V	-	see DIP switch settings		
Offset adjustment range (universal devices)		-137.5...+62.5 %			± 5 %	± 10 %	
Input impedance		for different ranges			-	-	
	without detection of input signal interruption	51 Ω	6 MΩ	3 GΩ	-	-	
	with detection of input signal interruption	51 Ω	3.5 MΩ	9.5 GΩ	-	-	
Suppression at 50 Hz		-	-	-	-	> 40 dB	
Common-mode rejection		-	-	-	120 dB	105 dB	

Output circuits - Analog outputs	**D-F, A-C**	**Current**	**Voltage**	
Output signal		0-20 mA, 4-20 mA	0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V	
Output burden		≤ 600 Ω	≥ 4.7 KΩ	
Accuracy [1]		±0.1 % of full-scale	±0.2 % of full-scale	±0.1 % of full-scale
Residual ripple		-	< 0.15 %	-
Response time		200 µs	10 ms	200 ms
Transmission frequency		1 kHz	80 Hz	2 Hz (to -3 dB)

Supply circuits	**K-M**		
Rated supply voltage		24-48 V DC	110-240 V AC
Supply voltage range		24-48 V DC / 24 V AC	110-240 V AC / 100-300 V DC
Supply voltage tolerance		DC: -15...+15 %	AC: -15...+10 %
Rated frequency		0 Hz or 50/60 Hz	
Power consumption		2 W at 24 V DC	4.5 VA at 230 V AC

Indication of operational states	
Supply voltage	U: green LED

General data				
Ambient temperature range	operation / storage	-20...+60 °C / -40...+80 °C		
Temperature coefficient		±150 ppm/°C	±250 ppm/°C	±200 ppm/°C at min. offset ±400 ppm/°C at max. offset
Mounting position		any		
Mounting		DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter		

Electrical connection		
Wire size	rigid	plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)
Stripping length		7 mm (0.28 inch)
Tightening torque		0.4 Nm (3.5 ib.in)

Electromagnetic compatibility		
Interference immunity		EN 61000-6-2
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kH)
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV
HF line emission	IEC/EN 61000-4-6	10 V
Interference emission	EN 61000-6-4	Class B

Isolation data	
Isolation test (between all isolated circuits)	1.5 kV
Test voltage (between all isolated circuits)	1.5 kV / 50 Hz

[1] includes: non-linearity, factory setting, drift of temperature, supply voltage and output load
[2] Detection of an input signal break (fail safe) and resistance > 10 kΩ results in a linearity of ±0,2 %.
[3] When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

• **Approvals** **5**/3

Analog signal converters with relay output
CC-U/STDR, CC-U/RTDR, CC-U/TCR
Technical data

Type			CC-U/STDR		CC-U/RTDR [1]	CC-U/TCR
Input circuits - Analog inputs		**J-H**	**Current**	**Voltage**	**Temperature sensors**	**Thermocouples (IEC 584-1 and 2)**
Measuring signal / input range			0-20 mA 4-20 mA	0-1 V / 1-5 V 0-10 / ±10 V	PT100	TC.K, TC.J TC.T, TC.S
Input resistance			approx. 50 Ω	approx. 1,5 MΩ		
Adjustable threshold			2-100 % of selected input range			
Adjustable hysteresis			5-50 % of threshold			
Repeat accuracy (constant parameters)			±0.5 % of full-scale			
Output circuits - Relay outputs		**E-D-F, B-C-A**	**Relay, 2 c/o contacts**			
Rated switching voltage			250 V AC			
Rated switching current	AC12 (resistive) 230 V		4 A			
	AC15 (inductive) 230 V		3 A			
	DC12 (resistive) 24 V		4 A			
	DC13 (inductive) 24 V		2 A			
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power at B 300		3600/360 VA			
Minimum switching voltage			12 V			
Minimum switching current / power			10 mA / 0.6 VA (W)			
Response time			10 ms			
Mechanical lifetime			30 x 10^6 switching cycles			
Electrical lifetime	at AC12, 230 V, 4 A		0.1 Mio. switching cycles			
Supply circuits		**K-M**				
Rated supply voltage			24-48 V DC		110-240 V AC	
Supply voltage range			24-48 V DC / 24 V AC		110-240 V AC / 100-300 V DC	
Supply voltage tolerance			DC: -15...+15 %		AC: -15...+10 %	
Rated frequency			0 Hz or 50/60 Hz			
Power consumption			2 W at 24 V DC		4.5 VA at 230 V AC	
Indication of operational states						
Supply voltage			U: green LED			
1st / 2nd output relay energized			R1: yellow LED / R2: yellow LED			
General data						
Ambient temperature range	operation / storage		-20...+60 °C / -40...+80 °C			
Temperature coefficient			±300 ppm/°C			
Mounting position			any			
Mounting			DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter			
Electrical connection						
Wire size	rigid		plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)			
	fine-strand with(out) wire end ferrule		plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)			
Stripping length			7 mm (0.28 inch)			
Tightening torque			0.4 Nm (3.5 ib.in)			
Electromagnetic compatibility						
Interference immunity			EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2		Level 3 (±6 kV / ±8 kV)			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3		10 V/m			
fast transients (Burst)	IEC/EN 61000-4-4		Level 3 (±2 kV / 5 kH)			
powerful impulses (Surge)	IEC/EN 61000-4-5		±2 kV / ±1 kV			
HF line emission	IEC/EN 61000-4-6		10 V			
Interference emission	EN 61000-6-4		Class B			
Isolation data						
Insulation voltage (between all isolated circuits)			2.5 kV			
Test voltage (between all isolated circuits)			2.5 kV			

[1] When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

• **Approvals** **5**/3

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Analog signal converters
CC-E/I, CC-E I_{AC}/ILPO
Technical data

Type		CC-E/I		CC-E I_{AC}/ILPO
Input circuits - Analog inputs		**J-G-H**		**C-D**
		AC current	**DC current**	**2 meas. ranges selectable**
Rated input range		0-5 A / 0-20 A	0-5 A / 0-20 A	0-1 A / 0-5 A / sinusoidal
Measuring frequency				50/60 Hz
Overload capacity of inputs	input range 1	10 x I_{Nom} (50 A) for max. 1 s		10 x I_{Nom} (50 A) for max. 2 s
	input range 2	10 x I_{Nom} (200 A) for max. 1 s		10 x I_{Nom} (200 A) for max. 2 s
Gain adjustment range		±5 % (universal devices)		-
Offset adjustment range		±5 % (universal devices)		-
Input impedance / resistance		5A : 65 mΩ	20 A : 2.5 mΩ	5 mΩ
Output circuits - Analog outputs		**D-F Current**	**A-C Voltage**	**F-E passive current output in proportion to input current**
Output signal		0-20 mA / 4-20 mA	0-10 V	4-20 mA
Output burden / load		≤ 500 Ω	≥ 1.0 Ω	12 V DC: 150 Ω, 24 V DC: 750 Ω 30 V DC: 1050 Ω
Accuracy [1]		± 2 % of full-scale		
Offset adjustment range		±5 % (universal device)		± 5 %
Gain adjustment range		±5 % (universal device)		± 20 %
Residual ripple		< 0.5 %		
Response time		0.5 s		0.6 s
Transmission frequency		DC or 50/60 Hz		AC: 50/60 Hz
Reaction to input circuit interruption		Low fail safe: output voltage < 200 mA, output current < 400 µA		-
Supply circuits	**K-M**	**DC versions**	**AC versions**	
Supply voltage		24 V DC	110-240 V AC 50/60 Hz	12-30 V DC
Supply voltage tolerance		-15...+15 %	-15...+10 %	-
Power consumption		typ 1.5 W	typ 1.5 VA	-
Indication of operational states				
Supply voltage		U: green LED		-
General data				
Ambient temperature range	operation / storage	0...+60 °C / -20...+80 °C		-20...+60 °C / -40...+80 °C
Temperature coefficient		± 500 ppm/°C		300 ppm/°C
Degree of protection (DIN 40050)		IP20		
Mounting position		ventilation slots on top and bottom		
Mounting		DIN rail (IEC/EN 60715), snap-on mounting		
Electrical connection				
Wire size	rigid	0.2-4 mm² (24-12 AWG)		
	fine-strand with(out) wire end ferrule	0.2-2.5 mm² (24-14 AWG)		
Stripping length		7 mm (0.28 inch)		
Tightening torque		0.5 Nm (4.4 lb.in)		
Electromagnetic compatibility				
Interference immunity		EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kH)		
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference emission	EN 61000-6-4	Class B		
Isolation data				
Test voltage (between all isolated circuits)		2.5 kV AC		
Rated insulation voltage		-		250 V AC

[1] includes: non-linearity, factory setting, drift of temperature, supply voltage and output load

• **Approvals** **5**/3

Analog signal converters
CC-U/I, CC-U/V
Technical data

Type		CC-U/I	CC-U/V
Input circuits - Analog inputs	**J-G-H**	**any current signals, RMS measurement**	**any voltage signals, RMS measurement**
Rated input range		0-1 A 0-5 A	0-100 V, 0-200 V 0-300 V, 0-400 V 0-500 V, 0-600 V
Measuring frequency		0-600 Hz	
Overload capacity of inputs	input range 1	10 x I_{Nom} (10 A) for max. 2 s	-
	input range 2	10 x I_{Nom} (50 A) for max. 2 s	-
Gain adjustment range		±15 %	
Offset adjustment range		±20 %	
Input impedance / resistance		1A: 60 mΩ, 5 A: 12 mΩ	> 800 kΩ
Output circuits - Analog outputs	**D-F, A-C**	**Current**	**Voltage**
Output signal		0-20 mA, 4-20 mA	0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V
Output load		≤ 600 Ω	≥ 4.7 KΩ
Accuracy[1)]		±0.5 % of full-scale	
Temperature coefficient		±250 ppm/°C max.	±300 ppm/°C max.
Residual ripple		< 0.15 %	
Response time		150 ms	
Supply circuits	**K-M**		
Rated supply voltage		24-48 V DC	110-240 V AC
Supply voltage range		24-48 V DC, 24 V AC	110-240 V AC, 100-300 V DC
Supply voltage tolerance		DC: -15...+15 %	AC: -15...+10 %
Rated frequency		0 Hz or 50/60 Hz	
Power consumption		2 W at 24 V DC	4.5 VA at 230 V AC
Indication of operational states			
Supply voltage		U: green LED	
General data			
Ambient temperature range	operation / storage	-20...+60 °C / -40...+80 °C	
Mounting position		any	
Mounting		DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter	
Electrical connection			
Wire size	rigid	plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)	
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)	
Stripping length		7 mm (0.28 inch)	
Tightening torque		0.4 Nm (3.5 lb.in)	
Standards			
Product standard		-	
Low Voltage directive		2006/95/EG	
EMC directive		2004/108/EG	
RoHS directive		2002/95/EG	
Electromagnetic compatibility			
Interference immunity		EN 61000-6-2	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kH)	
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV	
HF line emission	IEC/EN 61000-4-6	10 V	
Interference emission	EN 61000-6-4	Class B	
Isolation data			
Insulation voltage (between all isolated circuits)		1.5 kV	
Test voltage (between all isolated circuits)		1.5 kV / 50 Hz	

[1)] includes: non-linearity, factory setting, drift of temperature, supply voltage and output load

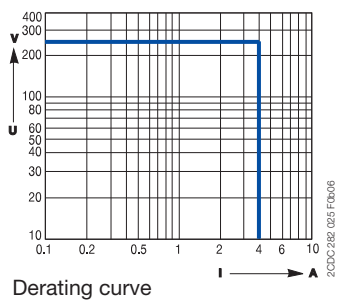
• **Approvals** **5**/3

Analog signal converters
CC-E, CC-U
Technical diagr., Connection diagr., Dimensional drawings

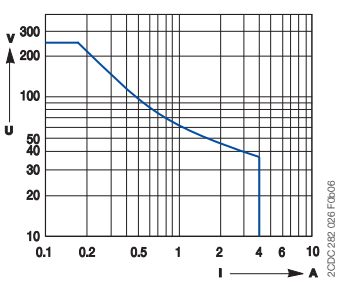
Technical diagrams

Load limit curves CC-U/xxR

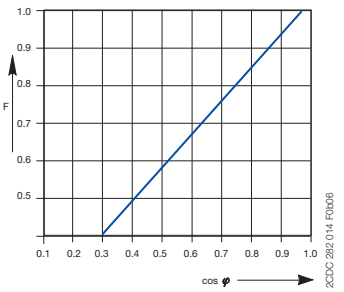
Resistive AC load



Resistive DC load

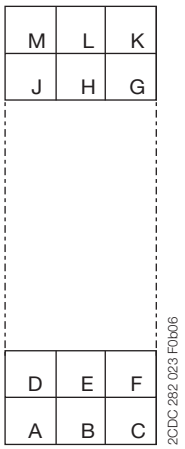


Derating curve



Connection diagram CC-U/x

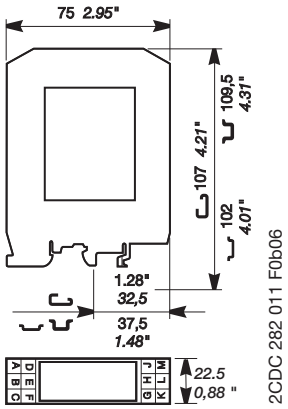
Width 22.5 mm (0.89 in)



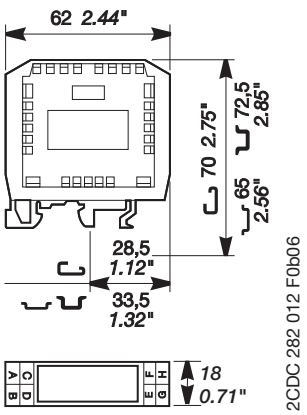
Dimensional drawings

Dimensions in mm

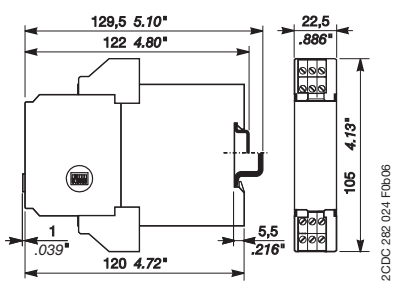
CC-E/x



CC-E I_{AC}/ILPO, CC-E I/I



CC-U/x , CC-U/xR



5

Notes

Serial data converters

ILPH range

Content

Serial data converters
ILPH range
Uses

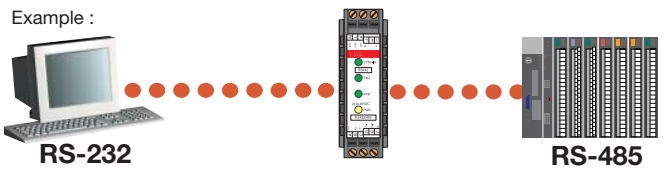
In the field of industrial data transmission, various processes of data transmission and interfaces are used today. Already existing systems need to be updated or connected to new devices for continuity of process. When new communication functions are not build-in, ABB propose a range of converters to be able to use from the standard RS232 or RS485, to the Ethernet open products or the Optical Fiber.

Ethernet communication is now one of the main features need in open communication, ABB propose the e-ILPH to connect the serial devices to the web world.

Uses

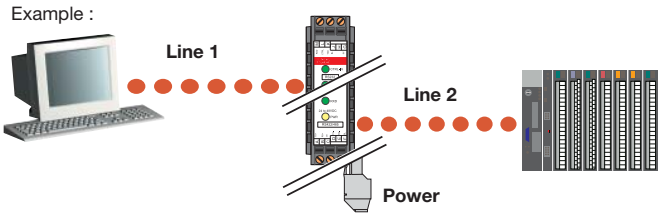
Adaptation

The use of converters allows the connection of two devices using different interfaces.
To add new equipment to existing installations.



Galvanic Isolation

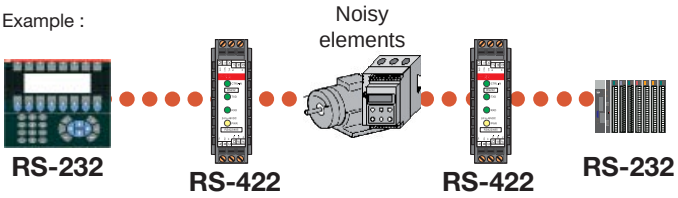
To protect sensitive equipment it is sometimes necessary to use converters which allow galvanic isolation.



To cross a disturbed environment

Some interfaces are more sensitive to noise. Electrically, it is preferable, in some cases, to change the interface or support.

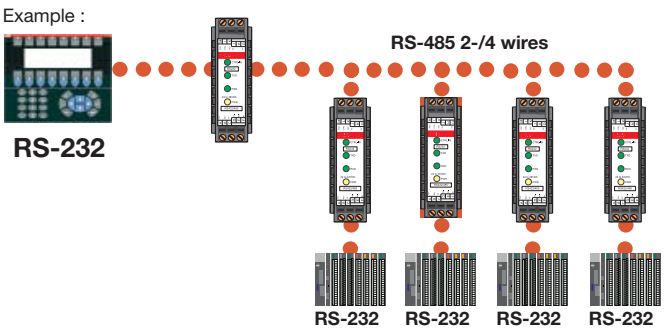
Type of connection	Immunity to noise
RS232	Low
RS422	High
RS485	High
CL	High
OF	Very high
Ethernet	High



Multipoint connections

Some equipments are only designed to communicate in RS232 point to point connection. To communicate with several devices it is then necessary to use converters RS232 to RS422, RS485, CL or OF to reach multipoint mode.

Type of connection	Connection
RS232	Point to point
RS422	12 points
RS485	32 points
CL	5-6 points
OF	32 points
Ethernet	Point to point or multipoint

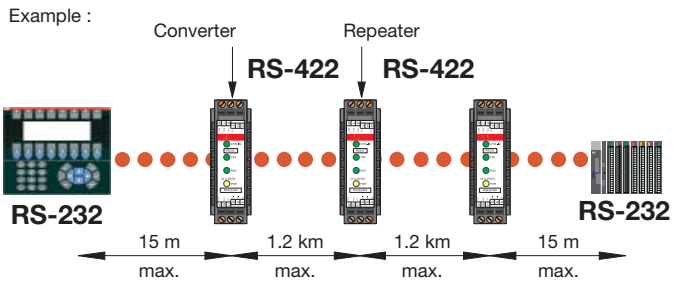


Increase in the transmission and amplification distances of the signals

Every connection has its own limits, to increase the communication distances you only have to change the type of link (converter) or amplify the signal (Repeater) using an ILPH.

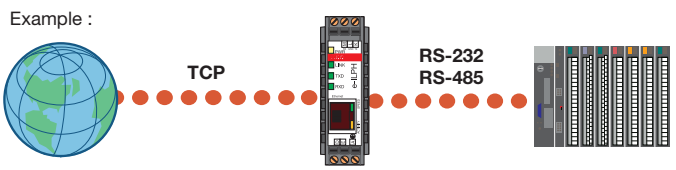
Type of connection	Max. distances *
RS232	15m
RS422	1.2km
RS485	1.2km
CL	300-500m
OF	4km
Ethernet	100 m with CAT5 cable

* Depending on transmission speed.



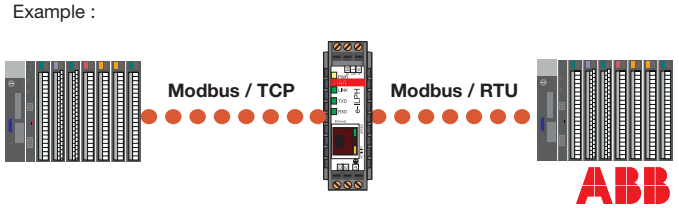
"World Wide" communication

Communication is more and more used with Ethernet support. The interests are to have a distant access, to use an already existing network and to upload information and data on a supervisor or a computer. The conversions from serial to Ethernet protocol are used to connect local network to Ethernet.



Protocol conversion

Modbus is one of the main protocols used in the industrial networks. The creation of Modbus/TCP allows an adapted access to the Ethernet network. So, the conversion between these 2 protocols is necessary.



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Serial data converters
ILPH range
Selection table

	RS232	RS422 / RS485	CL	OF-S	OF-P	Ethernet	24 V DC	24-48 V DC	110-240 V AC	24-42 V AC/DC	10-34 VDC, 10-24 VAC	Insulation *	Part numbers
RS232	●							●				In-Ps-Out	1SNA **684 234** R**2**000
	●								●			In-Ps-Out	1SNA **684 244** R**02**00
		●					●					Wi	1SNA **684 231** R**25**00
		●					●					In-Out	1SNA **684 233** R**27**00
		●						●				In-Ps-Out	1SNA **684 333** R**23**00
		●							●			In-Ps-Out	1SNA **684 334** R**24**00
			●				●					In-Out	1SNA **684 202** R**01**00
				●						●		In-Ps-Out	1SNA **684 236** R**22**00
				●					●			In-Ps-Out	1SNA **684 237** R**23**00
					●					●		In-Ps-Out	1SNA **684 238** R**04**00
					●				●			In-Ps-Out	1SNA **684 239** R**05**00
RS422 /RS485		●					●					In-Out	1SNA **684 212** R**22**00
			●				●					In-Out	1SNA **684 232** R**26**00
RS485				●						●		In-Ps-Out	1SNA **684 246** R**04**00
				●					●			In-Ps-Out	1SNA **684 247** R**05**00
					●					●		In-Ps-Out	1SNA **684 248** R**16**00
					●				●			In-Ps-Out	1SNA **684 249** R**17**00
RS232 / RS485						●					●	In-Ps-Out	1SNA **684 252** R**02**00

* In=Input, Ps=Power supply, Out=Output, Wi=Without insulation

- **RS 232 - EIA-232 / V.24 / V.28**
  Point-to-point connection
  Max. 15 m transmission distance
  Rate up to 19.2 kbit/s
  Full-duplex

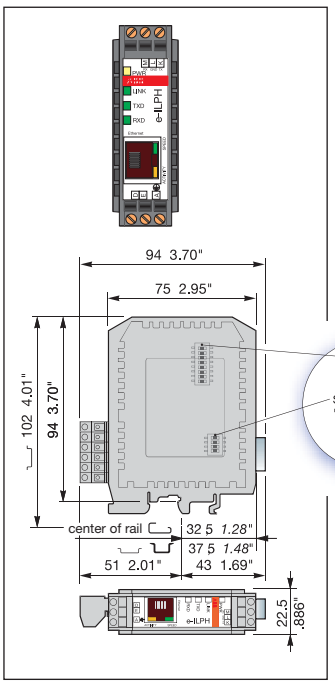
- **RS 422 - EIA-422 / V.11**
  Point-to-point connection
  (1 Transmitter - 10 Receivers)
  Differential voltage transmission
  Full-duplex
  Up to 1200 m/ 10Mbit/s
  Good EMC characteristics

- **Current loop(TTY)**
  Point-to-point / multi-point connection
  Active or passive current loop
  Full-duplex
  Up to 1200 m/19.2 kBit/s
  Good EMC characteristics

- **RS 485 - ISO/IEC/EIA-485**
  Multi-point connection up to 32 units
  Differential voltage transmission
  Half-duplex on 1 pair
  Full-duplex on 2 pairs
  Up to 1200 m / 10Mbit/s
  Good EMC characteristics

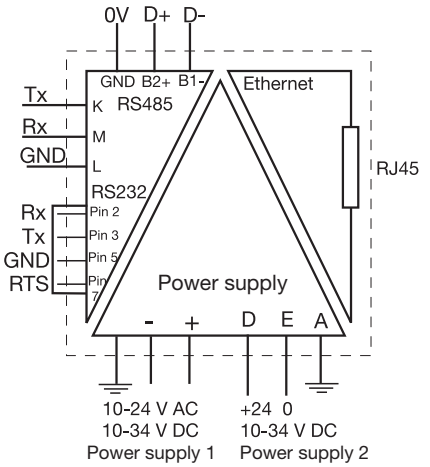
- **Optical fiber interface**
  Point-to-point connection
  Full-duplex
  From 40m up to 4km transmission distance
  according to optical fiber material (plastic / glass)
  and wavelength used up to 10 Mbit/s
  Excellent EMC characteristics

- **Ethernet Interface**
  Point to point connexion or multipoint connection.
  Up to 100m using CAT5 cable without Hub or Switch
  10/100 Mbit/s
  Good EMC characteristics



ILPH RS 232 - 485 / Ethernet

Isolated RS232 or/and RS485 to Ethernet converter
- Triple galvanic isolation
- RS232 on SUBD 9 points or screw connectors
- RS485 on removable screw connectors
- Ethernet 10/100 Mbit/s, RJ45 connector
- Power supply 10-34 VDC et 10-24 VAC
- Possible to have a redundant 10-34 VDC power supply
- Economic with low consumption
- Up to 100m with CAT5 cable without Hub or Switch
- Good EMC characteristics
- Up to 2 Modbus®\TCP Masters



Available modes:
- Modbus®\TCP to Modbus® RTU conversion
- Transparent Client or Server mode
- SMTP mode (Mail send)

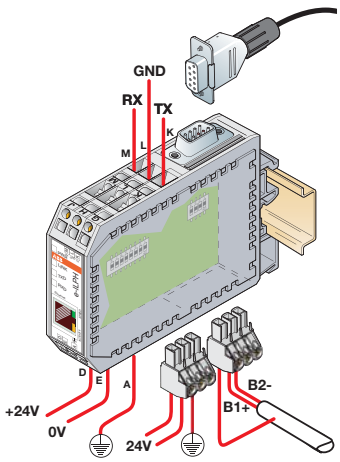
Standards: TPC/IP, TELNET, DHCP, FTP

Specifics functions in Modbus® protocol:
- Concentrator (Asynchronous mode) up to 1200 words
- AC31 programming
- Modbus® Easy Net mode : this mode could be used to exchange data without a Modbus®/TCP master. The data are logged in a table and could be distributed to one or all the others e-ILPH participants on Ethernet.

Description	Type	Order P/N		Packaging	Weight kg
Serial data converter e-ILPH	ILPH RS 232-RS 485 / Ethernet	1SNA **684 252** R**0**200		1	0.12

5

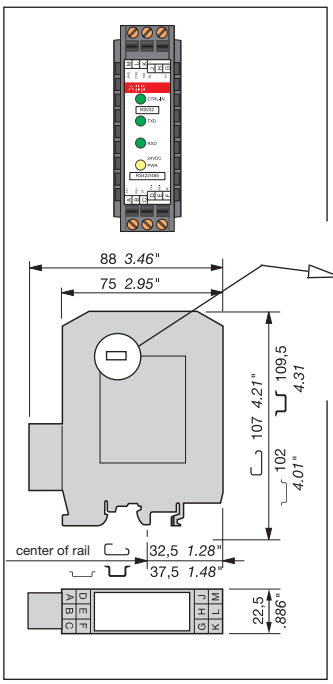
SubD9 connector
pin 2 = RX
pin 3 = TX
pin 5 = GND
pin 7 = RTS



Technical data

Power supply 1	
Voltage	10...34 V DC, 10...24 V AC
Voltage tolerance	-10%, +10%
Consumption	2 W max
Connections	coding screw removable connector 0 to 2.5 mm² (22-14 AWG)
Power supply 2	
Voltage	10...34 V DC
Voltage tolerance	-10%, +10%
Consumption	2 W max
Connections	screw connector (AWG 20)
Serial link 1 : RS 232	EIA RS 232
Overvoltage protection	integrated
Baud rate / Transmission distance	max. 115.2 kbits/s / max. 15 m
Connections	2.5 mm² screw connector (AWG 20) or male SubD 9 points
Serial link 2 : RS 485	EIA RS 485
Overvoltage protection	integrated
Line polarization	integrated
End line resistance	integrated
Baud rate / Transmission distance	max. 115.2 kbits/s / max. 1200 m
Connections	coding screw removable connector 0 to 2.5 mm² (22-14 AWG)
Ethernet link	
Overvoltage protection	integrated
Baud rate / Transmission distance	10-100 Mbits/s / max. 100 m without Hub or Switch with CAT5 cable
Connections	RJ45 connector
Traffic indication	
Voltage	1 yellow LED
Status of signal	3 green LED (RxD, TxD, LINK), 2 amber or green LED (Speed, Activity)
EMC behavior	
Electrostatic discharge	EN 61000-4-2
Radiated electromagnetic field	EN 61000-4-3
Burst	EN 61000-4-4
Surge	EN 61000-4-5
Electromagnetic compatibility	EN 55022
Other characteristics	
Galvanic isolation between serial link / power supply / Ethernet link	750 VDC / 1500 VAC
Configuration of the operating mode	using internal switches or/and software (TELNET or HYPERTERMINAL)
Operating temperature	0°C ... +60°C
Storage temperature	-20°C ... +70°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid
Dimensions (W x D x H)	94 x 22.5 x 100 mm
Weight	120 g

Serial data converters
ILPH range
Ordering details, technical data



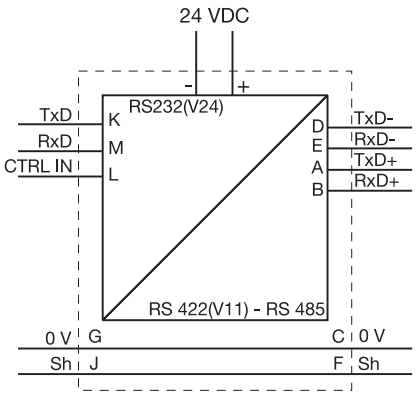
Configuration of the jumper

Rt R E

ILPH RS 232 / RS 422 - 485

RS 232 to RS 422-485 serial link without isolation

- Economic version without isolation
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24 V DC power supply
- CE mark



Description	Type	Order P/N		Packaging	Weight kg
Serial link interface without galvanic isolation	ILPH RS 232 / RS 422-485	1SNA **684 231** R**2**500		1	0.1

RS 485 LINK ON ONE PAIR

R	R ON/OFF	Jumper R in position	R ON/OFF
E	E ON/OFF	Jumper E in position	E ON/OFF

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the CTRL IN signal.

CTRL IN STATUS	ACTION ON RS 485
0 logic (+3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

NOTE : For RS 232 products running the RTS (REQUEST TO SEND) signal, connect RTS to CTRL IN.
Otherwise, connect M (RxD ILPH) to L (CTRL IN).

RS 485 LINK ON 2 PAIRS

R	R ON	Jumper R in position	R ON
E	E ON/OFF	Jumper E in position	E ON/OFF

Receiver permanently active
Transmitter controlled by the signal CTRL IN (see table for Transmitter operation as a function of CTRL IN)

RS 422 LINK ON TWO PAIRS

R	R ON	Jumper R in position	R ON
E	E ON	Jumper E in position	E ON

The Transmitter and Receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized. The ILPH is used to polarize the reception channel :
Connection by 1 wire P+ (J1.1) with 5V (J1.4)
Connection by 1 wire P- (J1.2) with 0V (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

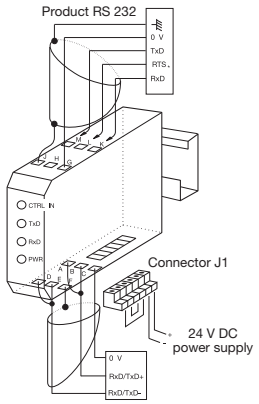
The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :

Rt * Line adaptation, Rt = 120 Ω (general case)

Rt * Line adaptation, Rt = 220 Ω

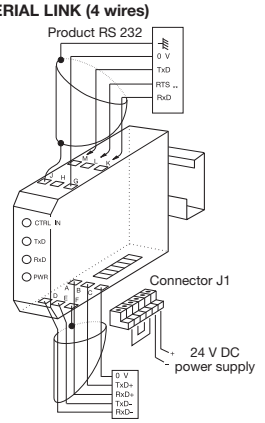
Rt * No line adaptation, Rt = ∞

RS 422 - RS 485
SERIAL LINK (2 wires)



*CAUTION :
When the RTS Signal is not activated, M terminal (RxD ILPH) has to be connected to L terminal (CTRL IN).

RS 422 - RS 485
SERIAL LINK (4 wires)

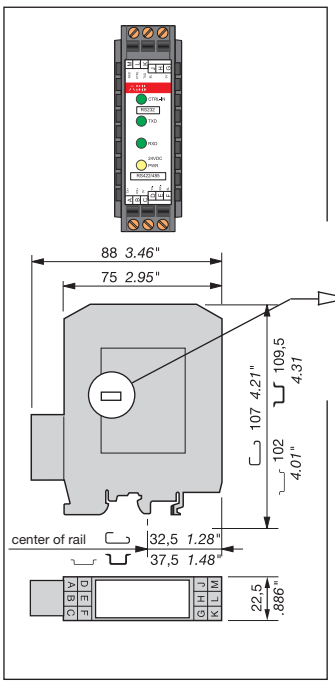


** CAUTION :
To be connected to 2 wired RS 485 only (not possible for 4 wired RS 422).
When the RTS Signal is not activated, M terminal (RxD ILPH) has to be connected to L terminal (CTRL IN).

Technical data

Power supply	polarized
Voltage	24 V DC
Voltage tolerance	8.5...28 V DC
Supply current	100 mA max
Connections	removable screw connectors (AWG 20)
RS 232-1 serial link	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
Baud rate / Transmission distance	max. 38.4 kbits/s / max. 1200 m
Connections	2.5 mm² screw connectors (AWG 20)
RS 422-485-2 serial link	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
Baud rate / Transmission distance	max. 38.4 kbits / max. 1200 m
Connections	2.5 mm² screw connectors (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input / power supply / output	no
Configuration of the operating mode	using internal jumper
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

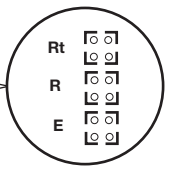
Serial data converters
ILPH range
Ordering details, technical data



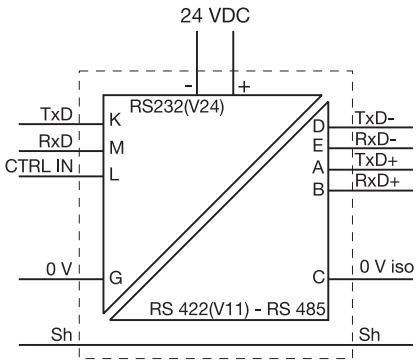
ILPH RS 232 / RS 422 - 485

Galvanic isolated converter for RS 232 to RS 422-485 serial links.

- Galvanic isolation between input/output and output/power supply
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24 V DC power supply
- CE mark



Configuration of the jumpers



Description	Type	Order P/N		Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH RS 232 / RS 422-485	1SNA **684 233** R2700		1	0.1

RS 485 LINK ON ONE PAIR

R	R ON/OFF	Jumper R in position R ON/OFF
E	E ON/OFF	Jumper E in position E ON/OFF

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the CTRL IN signal.

CTRL IN STATUS	ACTION ON RS 485
0 logic (+3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

CAUTION : For RS 232 products running the RTS (REQUEST TO SEND) signal, connect RTS to CTRL IN. Otherwise, connect M (RxD ILPH) to L (CTRL IN).

RS 485 LINK ON 2 PAIRS

R	R ON	Jumper R in position R ON
E	E ON/OFF	Jumper E in position E ON/OFF

Receiver permanently active
Transmitter controlled by the signal CTRL IN (see table for Transmitter operation as a function of CTRL IN)

RS 422 LINK ON TWO PAIRS

R	R ON	Jumper R in position R ON
E	E ON	Jumper E in position E ON

The Transmitter and Receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

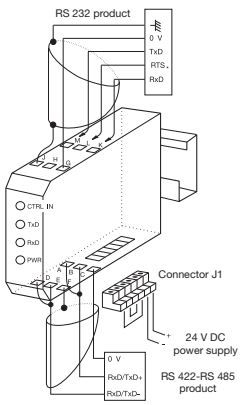
The line must always be polarized. The ILPH is used to polarize the reception channel :
Connection by 1 wire P+ (J1.1) with 5V (J1.4)
Connection by 1 wire P- (J1.2) with 0V (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus.
The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :

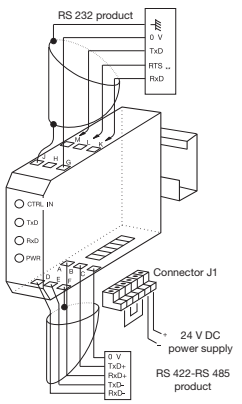
Rt	* Line adaptation, Rt = 120 Ω (general case)
Rt	* Line adaptation, Rt = 220 Ω
Rt	* No line adaptation, Rt = ∞

RS 422 - RS 485
2 WIRE SERIAL LINKS



* **CAUTION** :
If the RTS signal is not generated, connect M (RxD ILPH) to L (CTRL IN).

RS 422 - RS 485
4 WIRE SERIAL LINKS

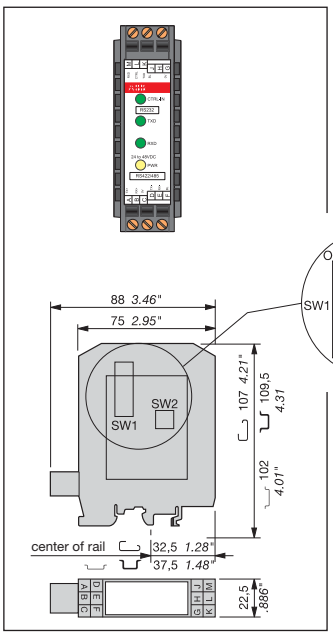


** **CAUTION** :
Only to be connected for RS 485 two pairs (of no use for RS 422 two pairs). If the RTS signal is not generated, connect M (RxD ILPH) to L (CTRL IN).

Technical data

Power supply	polarized
Voltage	24 V DC
Voltage tolerance	8.5...28 V DC
Supply current	100 mA max
Connections	Removable screw connectors (Omniconnect)
RS 232-1 serial link	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50µs)
Baud rate / Transmission distance	max. 38.4 kbits/s / max. 15 m
Connections	2.5 mm² screw connectors (AWG 20)
RS 422-RS485-2 serial link	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
Baud rate / Transmission distance	max. 38.4 kbits / max. 1200 m
Connections	2.5 mm² screw connectors (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	3 green LED (RxD, TxD and CTRL-IN)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between RS 232/RS 422-485 and RS 422-485/power supply	500 V DC
Configuration of the operating mode	using internal jumper
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

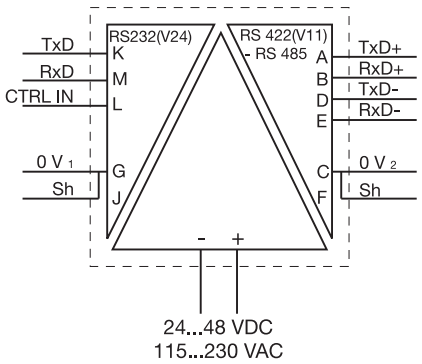
Serial data converters
ILPH range
Ordering details, technical data



ILPH RS 232 / RS 422 - 485

3 way galvanic isolated converter for RS 232 to RS 422-485 serial links.

- 3 way galvanic isolation between power supply and input/output
- RS 485 switch on 2 or 4 wires
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24...48 V DC and 115...230 V AC power supply
- CE marking



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface	ILPH RS 232 / RS 422-485			
3 way galvanic isolation	24...48 V DC power supply	1SNA **684 333** R**2**300	1	0.1
	115...230 V AC power supply	1SNA **684 334** R**2**400	1	0.1

RS 485 LINK ON ONE PAIR

Set SW1-1, SW1-3, SW1-6, SW1-7 and SW1-8 to position ON.
The receiver and the transmitter are activated alternately (never at the same time), depending on the status of the CTRL IN signal.

CTRL IN STATUS	Action on RS 485
0 Logic (3V ≤ U ≤ + 25V)	Transmitter active / Receiver inactive
1 Logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

CAUTION : For RS 232 products running the RTS signal (REQUEST TO SEND), connect RTS to CTRL IN.
Otherwise, set SW2-1 to position ON.

RS 485 LINK ON TWO PAIRS

Set SW1-1, SW1-3, SW1-7 in position OFF.
Set SW1-6, SW1-8 in position ON.
The receiver is permanently active.
The transmitter is controlled by the signal CTRL IN
(see table for transmitter operation as a fonction of CTRL IN).

RS 422 LINK ON TWO PAIRS

Set SW1-1, SW1-3, SW1-7 and SW1-8 in position OFF.
Set SW1-6 in position ON.
Transmitter and receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized.
The ILPH is used to polarize the reception channel :
Set SW1-4 and SW1-5 in position ON.

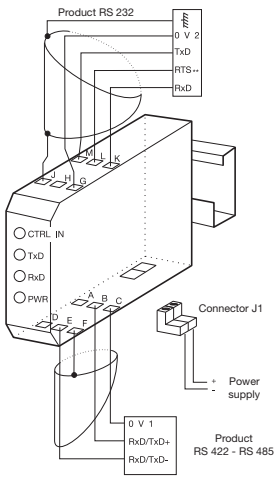
ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus.

The ILPH is used to adapt the reception channel by setting the jumper SW1-2 correctly :

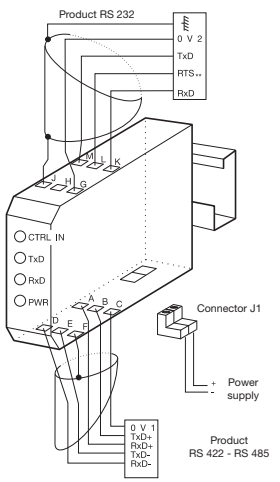
SW1-2 in position ON ⇒ line adaptation, Rt = 120 Ω (standard)
SW1-2 in position OFF ⇒ no line adaptation, Rt = ∞

RS 422 - RS 485
2 WIRE SERIAL LINK



***CAUTION :**
When the RTS signal is not generated, set SW2-1 in position ON.

RS 422 - RS 485
4 WIRE SERIAL LINKS

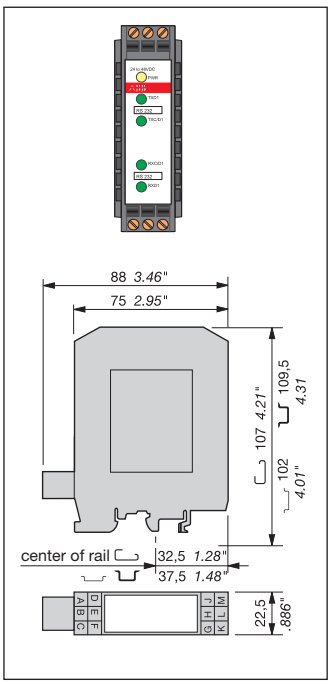


****CAUTION :**
Only to be connected for RS 485 two pairs (of no use for RS 422 two pairs).
If the RTS signal is not generated, set SW2-1 in position ON.

Technical data

Power supply	Polarization for DC model	
Voltage	24...48 V DC	115...230 V AC (50/60 Hz)
Voltage tolerance	-15% ... +20%	-15% ... +15%
Supply current	24 V DC<110 mA, 48 V DC<55 mA, 115 V AC<40 mA, 230 V DC<26 mA	
Supply power	≃ 3 W	≃ 3 VA
Connections	Removable screw connector (Omniconnect)	
RS 232-1 serial link	EA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)	
Baud rate / Transmission distance	max. 19,2 kbits/s / max. 15 m / 2500 pF	
Connections	2.5 mm² screw (AWG 20)	
RS 422/485-2 serial link	EIA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1.2/50µs)	
Baud rate / Transmission distance	max. 19.2 kbits/s / max. 15 m	
Connections	2.5 mm² screw (AWG 20)	
Traffic indication		
Voltage	1 yellow LED	
Status of signal	4 green LED (RxD, RxC/D, TxD, TxC/D)	
EMC behavior		
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV	
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m	
Burst	EN 61000-4-4 level 3 1 kV	
Electromagnetic compatibility	EN 55022 class B	
Other characteristics		
Galvanic isolation between		
RS 232 / Power supply / RS 422-RS 485	1,5 kV	
Configuration of the operating mode	No	
Operating temperature	0°C ... +50°C	
Storage temperature	-25°C ... +80°C	
Mounting	any required	
DIN rail fixing (EN 50002)	snap-on mounting	
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid	
Dimensions (WxDxH)	88 x 22,5 x 100 mm	
Weight	100 g	

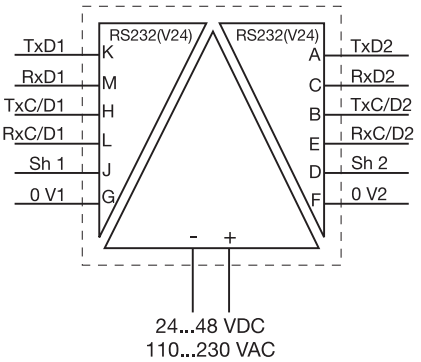
Serial data converters
ILPH range
Ordering details, technical data



ILPH RS 232 / RS 232

3 way galvanic isolator between RS 232 serial interface and another RS 232 serial interface.

- Ensures triple insulation between the 2 serial interfaces and between each and power supply
- Baudrate up to 19.2 kbit/s (up to 64 kbit/s depending on cable)
- Transmission distance up to 15 m
- Can be used in "noisy" environments
- Power supply from 24...48 V DC and 115...230 V AC
- CE marking



Description	Type	Order P/N		Packaging	Weight kg
Serial link interface	ILPH RS 232 / RS 232				
3 way galvanic isolation	24...48 V DC power supply	1SNA **684 234** R**2**000		1	0.1
	115...230 V DC power supply	1SNA **684 244** R**0**200		1	0.1

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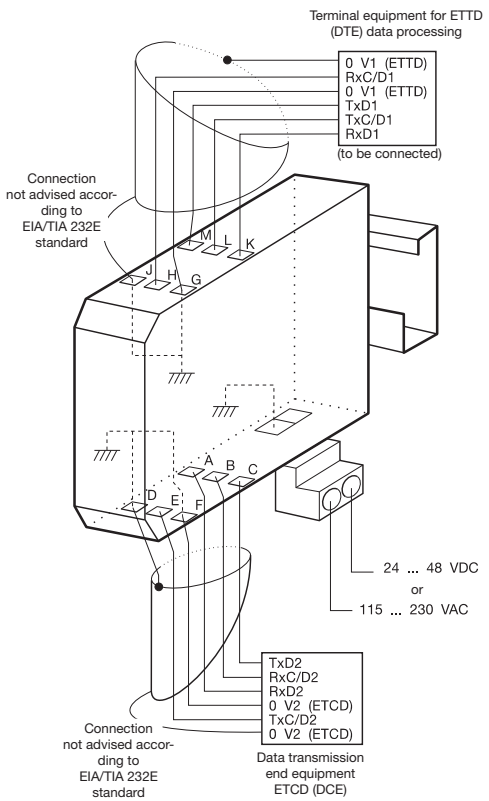
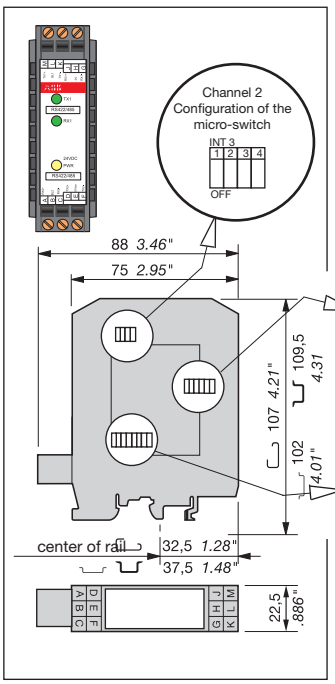


Technical data

Power supply	DC model polarized	
Voltage	24...48 V DC	115...230 V AC (50/60Hz)
Voltage tolerance	-15%...+20%	-15%...+15%
Supply current	24 V DC<155 mA;48 V DC<77 mA;110 V AC<40 mA;230 V DC<26 mA	
Supply power	≃ 3.15 W	≃ 3.15 VA
Connections	Removable screw connector (Omniconnect)	
RS 232-1 interface	EIA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)	
Transmission capacity / Transmission distance	max. 19.2 kbits/s / max. 15 m / 2500 pF	
Connections	2.5 mm² screw (AWG 20)	
RS 232-2 interface	EIA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1.2/50µs)	
Transmission capacity / Transmission distance	max. 19.2 kbits/s / max. 15 m	
Connections	2.5 mm² screw (AWG 20)	
Traffic indication		
Voltage	1 yellow LED	
Status of signal	4 green LED (RxD, RxC/D, TxD, TxC/D)	
EMC behavior		
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV	
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m	
Burst	EN 61000-4-4 level 3 1 kV	
Electromagnetic compatibility	EN 55022 class B	
Other characteristics		
Galvanic isolation between input / power supply / output	1.5 kV	
Configuration of the operating mode	No	
Operating temperature	0°C ... +50°C	
Storage temperature	-25°C ... +80°C	
Mounting	any required	
DIN rail fixing (EN 50002)	snap-on mounting	
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid	
Dimensions (WxDxH)	88 x 22.5 x 100 mm	
Weight	100 g	

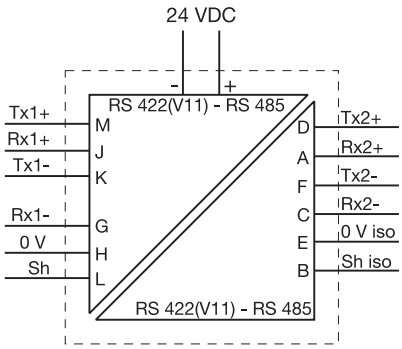
Serial data converters
ILPH range
Ordering details, technical data



ILPH RS 422 - 485 / RS 422 - 485

Galvanic isolated connection between an RS 422-485 (1 or 2 pairs) and an RS 422 485 (1 or 2 pairs) serial link. It amplifies the signal beyond the 1200 m limit distance of the RS 422-485 and only needs a minimum of 1.5 character delay time to switch off the RS 485 drivers.

- Galvanic isolation between power supply/output and input/output
- Baudrate up to 500 kbit/s (up to 200 m)
- Transmission distance up to 1200m at 38.4 kbit/s
- Usable in "noisy" environments
- 2/4 wires automatic handling
- 24 V DC power supply
- CE mark



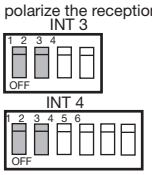
	INT 1	INT 2	INT 3	INT 4
BAUD RATE	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4 5 6
FULL DUPLEX	0 0 0 0	0 0 0 0	X X X 1	X X X 1 0 1
500 Kb/s	1 1 1 1	1 1 1 1	X X X 0	X X X 0 0 0
187.5 Kb/s	1 1 1 1	1 1 1 0	X X X 0	X X X 0 0 0
93.75 Kb/s	1 1 1 1	1 1 0 0	X X X 0	X X X 0 0 0
38.4 Kb/s	1 1 1 1	1 0 0 0	X X X 0	X X X 0 0 0
19.2 Kb/s	1 1 1 1	0 0 0 0	X X X 0	X X X 0 0 0
9.6 Kb/s	1 1 1 0	0 0 0 0	X X X 0	X X X 0 0 0
4.8 Kb/s	1 1 0 0	0 0 0 0	X X X 0	X X X 0 0 0
2.4 Kb/s	1 0 0 0	0 0 0 0	X X X 0	X X X 0 0 0
1.2 Kb/s	0 0 0 0	0 0 0 0	X X X 0	X X X 0 0 0

N_u = not used
X = zero
1 = contact closed
0 = contact open (aus) (off)

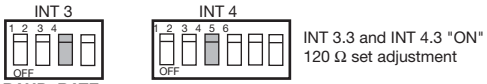
Description	Type	Order P/N		Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH RS 422 - 485 / RS 422 - 485 24 V DC power supply	1SNA **684 212** R**2**200		1	0.1

RS 422 - RS 485 DRIVERS CONTROL
The RS 422 - RS 485 Drivers Control (transmitters and receivers) makes the ILPH easy to use. The control of the 2 channels is completely automatic ; you only have to configure the baud rate needed.
The minimum turn off delay is about 1.5 character/time from 27 µs to 10 ms depending on the baud rate selected.

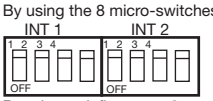
POLARIZATION OF THE RS 422 - RS 485 CONNECTIONS
The connections must always be polarized. The ILPH is used to polarize the reception channels :



ADAPTING THE RS 422 - RS 485 CONNECTIONS
The connections must always be adjusted to the level of the reception channel of each subscriber forming the end of the bus.
The ILPH is used to adjust the reception channel by setting the micro-switch INT 3.3 and INT 4.3.

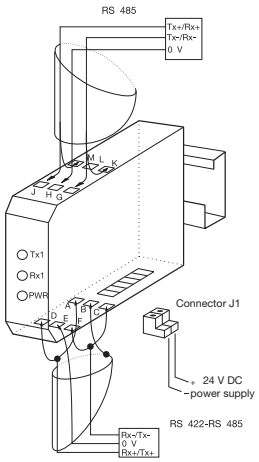


BAUD RATE
By using the 8 micro-switches inside the box.

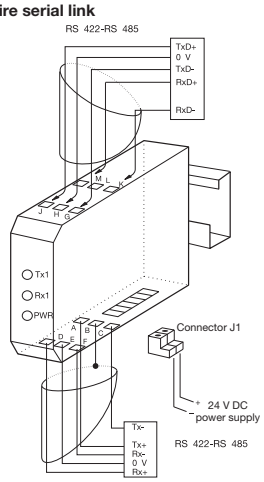


Permits to define up to 8 transmission speeds and to select the Full Duplex operation mode (RS 422 / RS 422) in addition with the INT 3.4 INT 4.4 and INT 4.5 micro switches.

RS 422 - RS 485
2 wire serial link



RS 422 - RS 485
4 wire serial link

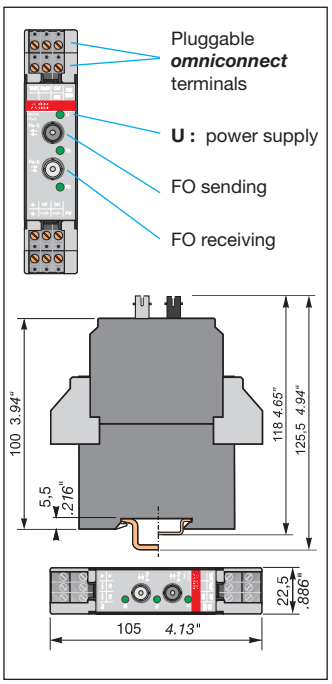


Caution :
The transmission channels of both RS 422 - RS 485 serial link interfaces always have to be independently polarized.

Technical data

Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-15%
Supply current	120 mA max.
Connections	Removable screw connector (Omniconnect)
RS 422-485-1 interface	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
RS 485 data switching	Time switching / Time delay transmission/reception 27 µs ...10 ms
Baudrate / Transmission distance	from 1.2 to 500 kbits/s / max. 1200 m up to 38.4 kbit/s
Connections	2.5 mm² screw (AWG 20)
RS 422-485-2 interface	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
RS 485 data switching	Time switching / Time delay transmission/reception 27 µs ...10 ms
Baudrate / Transmission distance	from 1.2 to 500 kbits/s / max. 1200 m up to 38.4 kbit/s
Connections	2.5 mm² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD,)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input / power supply / output	500 V DC
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

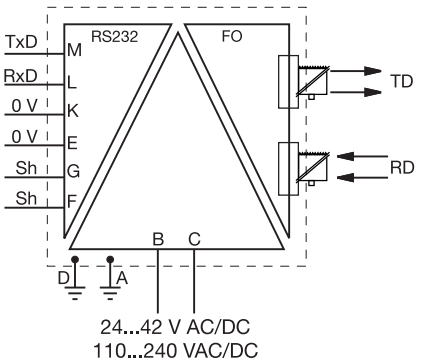
Serial data converters
ILPH range
Ordering details, technical data



ILPH RS 232 / FO

3 way galvanic isolated Converter for RS 232 to optical fiber serial link glass (S) or plastic (P).

- 3 way galvanic isolation between power supply and input/output
- Baud rate up to 115.2 kbit/s
- Available for glass or plastic fiber
- Transmission distance up to 4 km
- Usable in "very noisy" environments
- 20...42 V AC/DC and 110...240 V AC/DC power supply
- CE marked



Description	Type	Order P/N		Packaging	Weight kg
Serial link interface	ILPH RS 232 / FO-S				
3 way galvanic isolation	24...42 V AC/DC Power supply	1SNA **684 236** R**2**200		1	0.15
	110...240 V AC/DC Power supply	1SNA **684 237** R**2**300		1	0.15
Serial link interface	ILPH RS 232 / FO-P				
3 way galvanic isolation	24...42 V AC/DC Power supply	1SNA **684 238** R**0**400		1	0.15
	110...240 V AC/DC Power supply	1SNA **684 239** R**0**500		1	0.15

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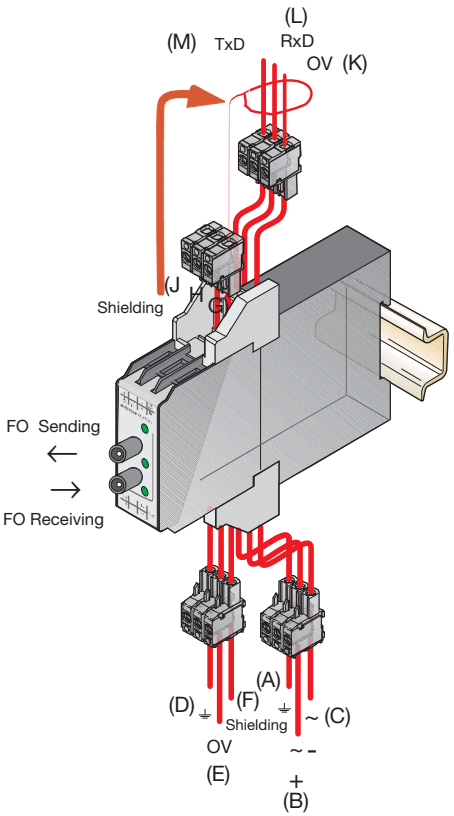
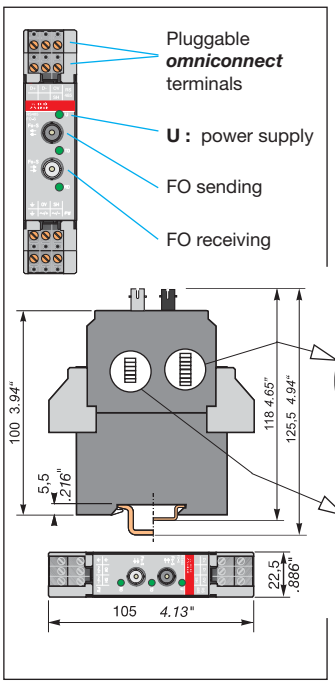
RS 232 / FO



Technical data

Power supplies		
Supply voltage	24...42 V AC/DC (50/60 Hz)	110...240 V AC/DC (50/60 Hz)
Voltage tolerance	-15% ... +10%	-15% ... +10%
Connections	Omniconnect pluggable connector	
RS 232 Interface 1	CCITT V.24/DIN 66020- CCITT V.28 DIN 66259-EIA 232 E	
Protection	Integrated (transil 8 kV 1.2/50µs)	
Max. speed / Max. distance	Max. 115.2 kbits/s / max. 15 m / 2500 pF	
Connections	Omniconnect pluggable connector	
Fiber optic interface 2	DIN VDE 0888-1	
Type of fiber / Connections	Multimode fiber Glass : ST connector Plastic : FSMA screw connector	
Wavelength	Glass : 820 nm Plastic : 655 nm	
Max. transmission power	Glass : 50/125 µm : -14.4 db/m Glass : 62.5/125 µm : -14 db/m Plastic : 980/1000 µm : -8 db/m	
Max. reception power	Glass : -28 db/m Plastic : -20 db/m	
Max. speed	Max. 115.2 kbits/s	
Max. distance	Glass : 50/125 µm : 3 km Glass : 62.5/125 µm : 4 km Plastic : 980/1000 µm : 40 m	
Status indication		
Power supply / Data exchange	1 green LED / 2 green LEDs (RxD, TxD)	
EMC behavior		
Electrostatic discharge	EN 61000-4-2 Level 3 6/8 kV	
Radiated electromagnetic field	EN 61000-4-3 Level 3 10 V/m	
Burst	EN 61000-4-4 Level 3 1 kV	
Electromagnetic compatibility	EN 55022 Class B	
Other characteristics		
Galvanic isolation input / power supply / output	2.5 kV	
Operating temperature	-20°C ... +60°C	
Storage temperature	-40°C ... +85°C	
Mounting	Onto DIN Rail (EN 50002)	
Connections	14 AWG (2.5 mm²) fine stranded / 12 AWG (4 mm²) rigid	
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"	
Weight	150 g / 0.33 lb	

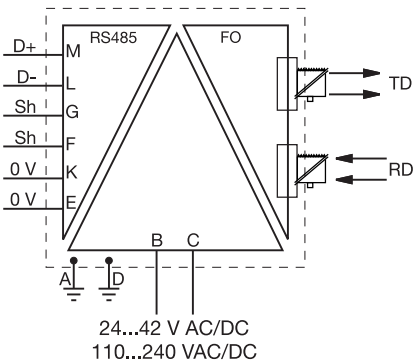
Serial data converters
ILPH range
Ordering details, technical data



ILPH RS 485 / FO

3 way galvanic isolated converter for RS 485 (1 pair) to optical fiber serial link glass (S) or plastic (P).

- 3 way galvanic isolation between power supply and input/output
- Baud rate up to 1.5 Mbit/s
- Available for glass fiber or plastic fiber
- Transmission distance up to 4 km
- Usable in "very noisy" environments
- 20...42 V AC/DC and 110...240 V AC/DC power supply
- CE marked



Baud rate :
SW1 DIP switch configuration

Baudrate bit/s	SW 1							
	1	2	3	4	5	6	7	8
1500000		■		■	■			
500000	■		■		■			
375000	■	■				■		
187500	■		■		■	■		
136000		■				■		
115200		■	■		■	■		
93750	■	■	■	■			■	
75000	■		■	■		■	■	
57600			■	■	■	■	■	
38400			■		■	■		
19200	■		■			■	■	
9600		■					■	
4800		■	■	■	■	■		■
300			■					■

Legend
■ on
□ off

End-of-line resistor, polarization
SW2 DIP switch configuration

	SW 2					
	1	2	3	4	5	6
Polarization	■	■				
EOL 60 ohm				■	■	■
EOL 120 ohm					■	■
EOL 180 ohm				■	■	
EOL 240 ohm					■	
EOL indefinite						

Description	Type	Order P/N	Packaging	Weight kg
Serial link interface	ILPH RS 485 / FO-S			
3 way galvanic isolation	24...42V AC/DC Power supply	1SNA **684 246** R**0**400	1	0.15
	110...240 V AC/DC Power supply	1SNA **684 247** R**0**500	1	0.15
Serial link interface	ILPH RS 485 / FO-P			
3 way galvanic isolation	24...42V AC/DC Power supply	1SNA **684 248** R**1**600	1	0.15
	110...240 V AC/DC Power supply	1SNA **684 249** R**1**700	1	0.15

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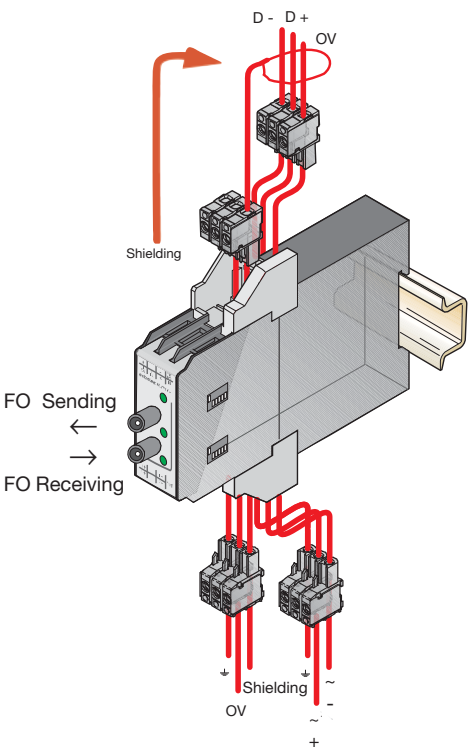
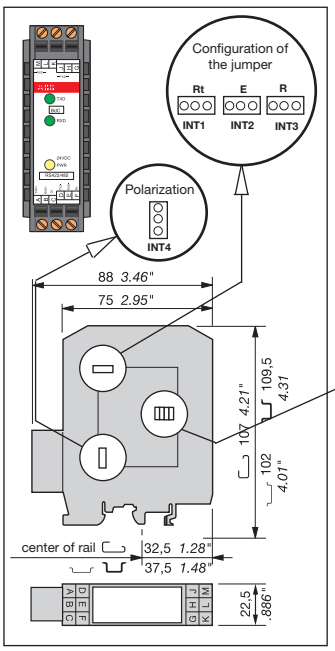
RS 485 / FO

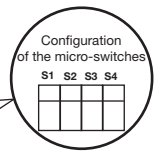


Technical data

Power supplies		
Supply voltage	24...42 V AC/DC (50/60 Hz)	110...240 V AC/DC (50/60 Hz)
Voltage tolerance	-15% ... +10%	-15% ... +10%
Connections	Omniconnect pluggable connector	
RS 485 interface 1	ISO / IEC 8482 / DIN 66 259-4; EIA 485	
Protection	Integrated (8 kV 1.2/50µs)	
Max. speed / max. distance	Max. 1.5 Mbits/s / max. 1200 m (38.4 kbit/s)	
Connections	Omniconnect Pluggable connector	
Optic fiber interface 2	DIN VDE 0888-1	
Type of fiber / Connections	Multimode fiber Glass : ST connector Plastic : FSMA screw connector	
Wavelength	Glass : 820 nm Plastic : 655 nm	
Max. transmission power	Glass : 50/125 µm : -14.4 db/m Glass : 62.5/125 µm : -14 db/m Plastic 980/1000 µm : -8 db/m	
Max. reception power	Glass : -28 db/m Plastic : -20 db/m	
Max. speed	Max. 1.5 Mbit/s	
Max. distance	Glass : 50/125 µm : 3 km Glass : 62.5/125 µm : 4 km Plastic 980/1000 µm : 40 m	
Status indication		
Power supply / Data exchange	1 green LED / 2 green LEDs (RxD, TxD)	
EMC behavior		
Electrostatic discharge	EN 61000-4-2 Level 3 6/8 kV	
Radiated electromagnetic field	EN 61000-4-3 Level 3 10 V/m	
Burst	EN 61000-4-4 Level 3 1 kV	
Electromagnetic compatibility	EN 55022 Class B	
Other characteristics		
Galvanic isolation input / power supply / output	2.5 kV	
Function configuration	With DIP-Switches	
Operating temperature	-20°C ... +60°C	
Storage temperature	-40°C ... +85°C	
Mounting	Onto DIN Rail	
Connections	14 AWG (2.5mm²) / fine stranded, 12 AWG (4 mm²) rigid	
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"	
Weight	150 g / 0.33lb	

Serial data converters
ILPH range
Ordering details, technical data

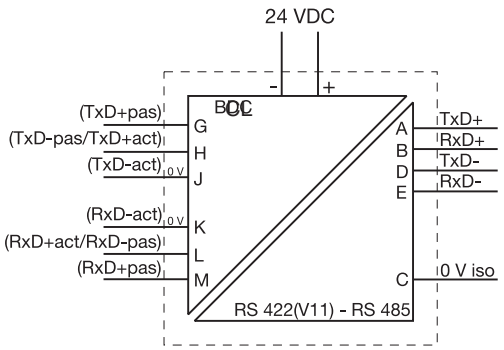




ILPH CL / RS 422 - 485

Galvanic isolated converter for current loop to RS 422-485 (1 or 2 pairs) serial link.

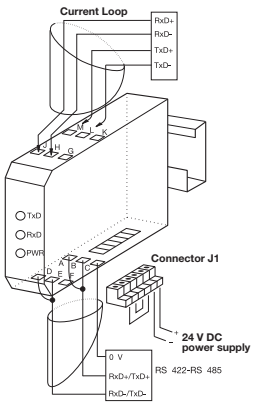
- Galvanic isolation between power supply/current loop and RS 422-485/current loop
- Active/passive 0...20 mA / 4...20 mA selectable
- Positive or negative logic selectable
- Baudrate up to 38.4 kbit/s (up to 2400 m)
- Transmission distance up to 2400 m (1200 m RS 485 and 1200 m current loop)
- Usable in "noisy" environments
- 24 V DC power supply
- CE marking



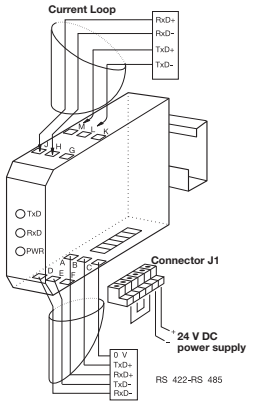
Description	Type	Order P/N		Packaging	Weight kg
Serial link interface	ILPH BdC / RS 422 - 485				
with galvanic isolation	24 V DC power supply	1SNA **684 232** R**2**600		1	0.1

RS 422 - RS 485
2 wire serial link

CONNECTIONS
Example of connection with a CL (current Loop) product, Transmission (TxD) in active mode and Reception (RxD) in passive mode.
Then, the ILPH must be configured and connected Reception (RxD) in passive mode and Transmission (TxD) in active mode.
Note : For any other configuration, see schematic diagram or front sticker of the product.



RS 422 - RS 485
4 wire serial link



Note :
The TxD channel of the RS 422 - RS 485 link must be polarized independently too.

LINE AMPLIFIER CONFIGURATION
Configuration of amplifiers of the RS 422 - RS 485 (Receiver, Transmitter) line provides greater flexibility of use.
The various configurations can be selected using the 2 jumpers (R INT2, E INT1) located inside the box.

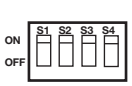
RS 485 LINK ON ONE PAIR
R INT2 R ON/OFF Jumper R in position R ON/OFF
E INT3 E ON/OFF Jumper E in position E ON/OFF
The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the Current Loop Reception signal.

RS 485 LINK ON TWO PAIRS
R INT2 R ON — R ON — Jumper R in position R ON
E INT3 E ON / OFF — E ON/OFF — Jumper E in position E ON/OFF
Receiver permanently active. Transmitter controlled by the Current Loop Reception signal.

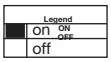
RS 422 LINK ON TWO PAIRS
R INT2 R ON — R ON — Jumper R in position R ON
E INT3 E ON — E ON — Jumper E in position E ON
The Receiver and the Transmitter are both permanently active.

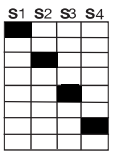
POLARIZATION OF THE RS 422 - RS 485 LINE
The line must always be polarized. The ILPH is used to polarize the reception channel :
Connection by 1 wire P+ (J1.1) with 5 Viso (J1.4)
Connection by 1 wire P- (J1.2) with 0 Viso (J1.3)

ADAPTING THE RS 422 - RS 485 LINE
The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :
Rt INT1* Line adaptation, Rt = 120 Ω (Standard)
Rt INT1* No line adaptation, Rt = ∞



Transmission (TxD) active
Transmission(TxD) passive
Reception (RxD) active
Reception (RxD) passive
4...20 mA Signal
0...20 mA Signal
Signal logic 1 = 20 mA
Signal logic 0 = 20 mA



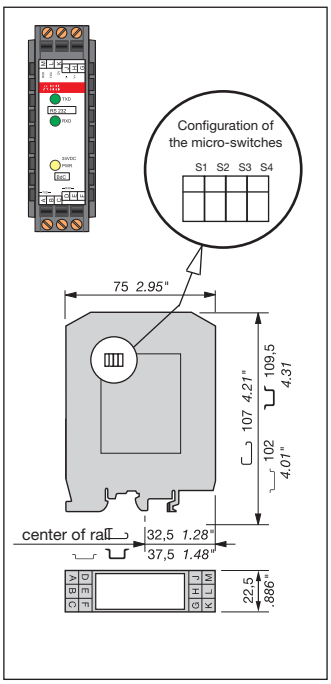


POLARIZATION
The polarization can be configured using the INT4 jumper.
INT4 Protection ON
INT4 Protection OFF, used if power supply at minimum value (21.6 V).

Technical data

Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omniconnect)
CL interface (Current Loop 1)	active/passive 0...20 mA / 4...20 mA, mode is settable
Logic level	0 = 20 mA or 1 = 20 mA, settable
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm² screw (AWG 20)
RS 422/485-2 serial link	EIA RS 485 and EIA RS 422 / CCITT V 11
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 2 4/4 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 1 0.5 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between	depending on Current Loop (active/passive)
input /output and power supply / output	500 V DC (active) / 2000 V DC (passive)
RS 422-485 power supply	500 V DC
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

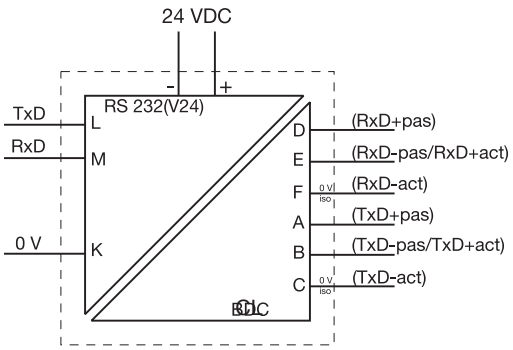
Serial data converters
ILPH range
Ordering details, technical data



ILPH RS 232 / CL

Galvanic isolated Converter for RS 232 to current loop serial link.

- Galvanic isolation between power supply/current loop and RS 232/current loop
- Active/Passive 0...20 mA / 4...20 mA selectable
- Positive or negative logic selectable
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- Usable in "noisy" environments
- 24 V DC power supply
- CE marking



Description	Type	Order P/N		Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH RS 232 / BdC 24 V DC power supply	1SNA **684 202 R0100**		1	0.1

CONFIGURATION
The various configurations can be selected using the 4 micro-switches located inside the box.

OPERATING MODE ACTIVE OR PASSIVE
The Current Loop's Transmission and Reception can be independently in active or passive mode.

Select operating mode using **S1** and **S2**.

S1 Transmission(TxD) ON = Active / OFF = Passive
S2 Reception (RxD) ON = Active / OFF = Passive

SIGNAL LEVEL

Select signal level 4-20 mA or 0-20 mA.
This selection is made using micro-switch S3

S3 ON = 4-20 mA / OFF = 0-20 mA

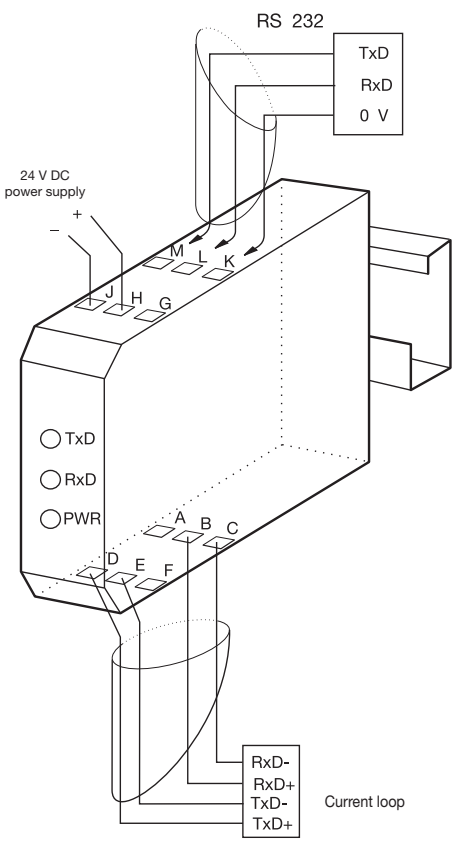
Caution :
It is not possible to select a 4-20 mA signal when the Reception is in active mode.

LOGIC LEVEL

Configuration : Positive logic (0 Logic = 20 mA)
or negative logic (1 Logic = 20 mA)

using micro-switch S4

S4 ON = (1 = 20 mA) / OFF = (0 = 20 mA)



CONNECTIONS
Example of connection with a CL (Current Loop) product, Transmission (TxD) in active mode and Reception (RxD) in passive mode. Then, the ILPH must be configured and connected Reception (RxD) in passive mode and Transmission (TxD) in active mode.

CAUTION : For any other configuration, see schematic diagram or front sticker of the product.

Technical data

Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omniconnect)
RS 232-1 serial link	EIA RS 232 C / CCITT V 24 V 28
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 15 m
Connections	2.5 mm² screw (AWG 20)
BdC serial link (current loop) 2	active/passive 0...20 mA / 4...20 mA mode settable
Logic level	0=20 mA or 1=20 mA settable
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between	depending on current loop (active/passive)
Current loop / RS 232	500 V DC (active) / 2000 V DC (passive)
Current loop / power supply	500 V DC (active) / 2000 V DC (passive)
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm² / stranded with ferrule, 4 mm² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

Notes

Pluggable interface relays
CR-P, CR-M and CR-U range

Interface relays and optocoupler
R500 and R600 range

Content

6

Notes

Pluggable interface relays

CR-P, CR-M and CR-U range

Content

Pluggable interface relays CR-P, CR-M and CR-U range
Benefits and advantages

6

Pluggable pcb relays CR-P

- 9 different coil voltages
  - DC versions:
    12 V, 24 V, 48 V, 110 V
  - AC versions:
    24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts:
  - 1 c/o contact (16 A) or
  - 2 c/o contacts (8 A)
    optionally equipped with
    gold contacts
- Logical or standard sockets
- Cadmium-free contact material
- Width on socket: 15,5 mm
- Pluggable function modules
  - Reverse polarity protection/
    Free wheeling diode
  - LED indication
  - RC elements
  - Overvoltage protection

Pluggable miniature relays CR-M

- 12 different coil voltages
  - DC versions:
    12 V, 24 V, 48 V, 60 V,
    110 V, 125 V, 220 V
  - AC versions:
    24 V, 48 V, 60 V, 110 V, 120 V, 230 V
- Output contacts
  - 2 c/o contacts (12 A) or
  - 3 c/o contacts (10 A) or
  - 4 c/o contacts (6 A)
    optionally equipped with
    gold contacts, LED and free
    wheeling diode
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Logical or standard sockets
- Cadmium-free contact material
- Width on socket: 27 mm
- Pluggable function modules
  - Reverse polarity protection/
    Free wheeling diode
  - LED indication
  - RC elements
  - Overvoltage protection

Pluggable universal relays CR-U

- 10 different coil voltages
  - DC versions:
    12 V, 24 V, 48 V, 110 V, 125 V, 220 V
  - AC versions:
    24 V, 48 V, 60 V, 110 V, 120 V, 230 V
- Output contacts
  - 2 c/o contacts (10 A) or
  - 3 c/o contacts (10 A)
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Cadmium-free contact material
- Width on socket: 38 mm
- Pluggable function modules
  - Reverse polarity protection/
    Free wheeling diode
  - LED indication
  - RC elements
  - Overvoltage protection
  - Multifunction time module

Pluggable interface relays
CR-P, CR-M and CR-U range
Approvals and marks

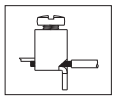
Kinds of sockets

Standard sockets - Position of connecting terminals:
Coil connection (A1-A2) on lower socket side,
contact connections (n/o and n/c contacts)
on the lower and upper socket side.

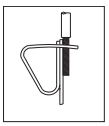
Logical sockets - Position of connecting terminals:
Coil connection (A1-A2) on lower socket side,
all contact connections (common contacts,
n/o and n/c contacts) on upper socket side.

Details see connection diagrams

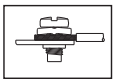
Kind of connecting terminals



Screw type



Spring type



Fork type

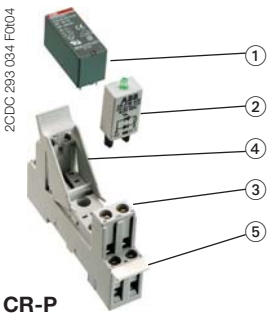
Approvals and marks

■ **existing**
□ **pending**

Approvals		Relays				Sockets							Modules	
		CR-P	CR-M	CR-U		CR-PLS CR-PSS	CR-PLC	CR-M..L.. CR-M..SS	CR-M..SF	CR-U..S CR-U..E	CR-U..SM		CR-P/M	CR-U
	UL 508	■	■ [1]	■		■	■	■		■				
	CAN/CSA C22.2 No.14	■	■ [2]	■									■ [6]	■ [7]
	CAN/CSA C22.2 No.14	■	■ [3]	■		■		■	■	■				
	VDE	■	■ [4]	■										
	GOST	■	■	■		■	■	■	■	■	■		■	■
	Lloyds Register		■ [5]	■										
	CCC	■	■	■										
	RMRS	■	■	■		■	■	■	■	■	■			
Marks														
CE	CE	■	■	■		■		■	■	■	■		■	■

[1] except 60 V DC and 125 V DC devices with gold contacts
[2] except devices with gold contacts
[3] except 60 V DC and 125 V DC devices
[4] except 125 V DC devices
[5] only devices with 4 c/o contacts
[6] except CR-P/M 42B, CR-P/M 42BV, CR-P/M 42C, CR-P/M 42CV, CR-P/M 52D, CR-P/M 62E, CR-P/M 62EV, CR-P/M 62D, CR-P/M 62DV
[7] except CR-U 41B, CR-U 41BV, CR-U 41C, CR-U 41CV, CR-U 51D, CR-U 61CV, CR-U 61E, CR-U 61EV, CR-U 61D, CR-U 61DV, CR-U 91C, CR-U T

Pluggable interface relays CR-P
Pcb relays
Ordering details



CR-P

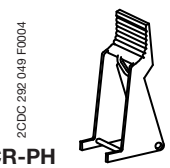
① interface relay
② Pluggable function module
③ Socket
④ Holder
⑤ Marker

CR-P

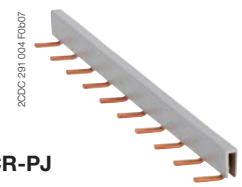
CR-PLS

CR-PSS

CR-PLC



CR-PH



CR-PJ

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
Interface relays				
1 c/o contact: 250 V, 16 A				
CR-P012DC1	12 V DC	1SVR 405 600 R4000	10	
CR-P024DC1	**24 V DC**	**1SVR 405 600 R1000**	10	
CR-P048DC1	48 V DC	1SVR 405 600 R6000	10	
CR-P110DC1	110 V DC	1SVR 405 600 R8000	10	
CR-P024AC1	**24 V AC**	**1SVR 405 600 R0000**	10	
CR-P048AC1	48 V AC	1SVR 405 600 R5000	10	
CR-P110AC1	**110 V AC**	**1SVR 405 600 R7000**	10	
CR-P120AC1	120 V AC	1SVR 405 600 R2000	10	
CR-P230AC1	**230 V AC**	**1SVR 405 600 R3000**	10	
2 c/o contacts: 250 V, 8 A				
CR-P012DC2	12 V DC	1SVR 405 601 R4000	10	
CR-P024DC2	**24 V DC**	**1SVR 405 601 R1000**	**10**	
CR-P048DC2	48 V DC	1SVR 405 601 R6000	10	
CR-P110DC2	110 V DC	1SVR 405 601 R8000	10	
CR-P024AC2	**24 V AC**	**1SVR 405 601 R0000**	**10**	
CR-P048AC2	48 V AC	1SVR 405 601 R5000	10	
CR-P110AC2	**110 V AC**	**1SVR 405 601 R7000**	**10**	
CR-P120AC2	120 V AC	1SVR 405 601 R2000	10	
CR-P230AC2	**230 V AC**	**1SVR 405 601 R3000**	**10**	
Interface relays with gold contacts				
2 c/o gold contacts: 250 V, 8 A				
CR-P024DC2G	24 V DC	1SVR 405 606 R1000	10	
CR-P024AC2G	24 V AC	1SVR 405 606 R0000	10	
CR-P110AC2G	110 V AC	1SVR 405 606 R7000	10	
CR-P230AC2G	230 V AC	1SVR 405 606 R3000	10	

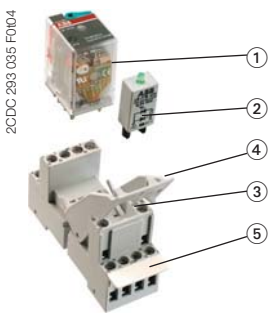
Accessories - Sockets

Type	Version	Connection terminals	Order code	Pack. unit pieces	Price 1 piece
Sockets					
CR-PLS	**Logical socket** with protective separation	screw	**1SVR 405 650 R0000**	**10**	
CR-PLSx	**Logical socket** [1]	screw	**1SVR 405 650 R0100**	**10**	
CR-PLC	**Logical socket** [1]	spring connection	**1SVR 405 650 R0200**	**10**	
CR-PSS	**Standard socket**	screw	**1SVR 405 650 R1000**	**10**	
Socket accessories					
CR-PH	**Plastic Holder**		**1SVR 405 659 R0000**	**10**	
CR-PJ	**Jumper bar** for sockets with screw connection		**1SVR 405 658 R5000**	**10**	
Markers					
CR-P	**Marker**		**1SVR 405 658 R0000**	**10**	

[1] can be used with time modules CR-P/M T...
Bold printed products = stocked products

• Pluggable function modules ..... **6**/10 • Technical data .....**6**/13 • Dimensional drawings **6**/17

Pluggable interface relays CR-M
Miniature relays
Ordering details



CR-M

① Interface relay
② Pluggable function module
③ Socket
④ Holder
⑤ Marker

CR-M

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
Interface relays without LED				
2 c/o contacts: 250 V, 12 A				
CR-M012DC2	12 V DC	1SVR 405 611 R4000	10	
CR-M024DC2	**24 V DC**	**1SVR 405 611 R1000**	**10**	
CR-M048DC2	48 V DC	1SVR 405 611 R6000	10	
CR-M060DC2	60 V DC	1SVR 405 611 R4200	10	
CR-M110DC2	110 V DC	1SVR 405 611 R8000	10	
CR-M125DC2	125 V DC	1SVR 405 611 R8200	10	
CR-M220DC2	220 V DC	1SVR 405 611 R9000	10	
CR-M024AC2	**24 V AC**	**1SVR 405 611 R0000**	**10**	
CR-M048AC2	48 V AC	1SVR 405 611 R5000	10	
CR-M110AC2	**110 V AC**	**1SVR 405 611 R7000**	**10**	
CR-M120AC2	120 V AC	1SVR 405 611 R2000	10	
CR-M230AC2	**230 V AC**	**1SVR 405 611 R3000**	**10**	
3 c/o contacts: 250 V, 10 A				
CR-M012DC3	12 V DC	1SVR 405 612 R4000	10	
CR-M024DC3	**24 V DC**	**1SVR 405 612 R1000**	**10**	
CR-M048DC3	48 V DC	1SVR 405 612 R6000	10	
CR-M060DC3	60 V DC	1SVR 405 612 R4200	10	
CR-M110DC3	110 V DC	1SVR 405 612 R8000	10	
CR-M125DC3	125 V DC	1SVR 405 612 R8200	10	
CR-M220DC3	220 V DC	1SVR 405 612 R9000	10	
CR-M024AC3	**24 V AC**	**1SVR 405 612 R0000**	**10**	
CR-M048AC3	48 V AC	1SVR 405 612 R5000	10	
CR-M060AC3	60 V AC	1SVR 405 612 R5200	10	
CR-M110AC3	**110 V AC**	**1SVR 405 612 R7000**	**10**	
CR-M120AC3	120 V AC	1SVR 405 612 R2000	10	
CR-M230AC3	**230 V AC**	**1SVR 405 612 R3000**	**10**	
4 c/o contacts: 250 V, 6 A				
CR-M012DC4	12 V DC	1SVR 405 613 R4000	10	
CR-M024DC4	**24 V DC**	**1SVR 405 613 R1000**	**10**	
CR-M048DC4	48 V DC	1SVR 405 613 R6000	10	
CR-M060DC4	60 V DC	1SVR 405 613 R4200	10	
CR-M110DC4	110 V DC	1SVR 405 613 R8000	10	
CR-M125DC4	125 V DC	1SVR 405 613 R8200	10	
CR-M220DC4	220 V DC	1SVR 405 613 R9000	10	
CR-M024AC4	**24 V AC**	**1SVR 405 613 R0000**	**10**	
CR-M048AC4	48 V AC	1SVR 405 613 R5000	10	
CR-M110AC4	**110 V AC**	**1SVR 405 613 R7000**	**10**	
CR-M120AC4	120 V AC	1SVR 405 613 R2000	10	
CR-M230AC4	**230 V AC**	**1SVR 405 613 R3000**	**10**	

Bold printed products = stocked products

• Pluggable function modules ..... **6**/10 • Technical data .....**6**/13 • Dimensional drawings **6**/17

Pluggable interface relays CR-M
Miniature relays
Ordering details (continued)

CR-M

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
Interface relays with LED				
2 c/o contacts: 250 V, 12 A				
CR-M012DC2L	12 V DC	1SVR 405 611 R4100	10	
CR-M024DC2L	**24 V DC**	**1SVR 405 611 R1100**	**10**	
CR-M048DC2L	48 V DC	1SVR 405 611 R6100	10	
CR-M060DC2L	60 V DC	1SVR 405 611 R4300	10	
CR-M110DC2L	110 V DC	1SVR 405 611 R8100	10	
CR-M125DC2L	125 V DC	1SVR 405 611 R8300	10	
CR-M220DC2L	220 V DC	1SVR 405 611 R9100	10	
CR-M024AC2L	**24 V AC**	**1SVR 405 611 R0100**	**10**	
CR-M048AC2L	48 V AC	1SVR 405 611 R5100	10	
CR-M110AC2L	**110 V AC**	**1SVR 405 611 R7100**	**10**	
CR-M120AC2L	120 V AC	1SVR 405 611 R2100	10	
CR-M230AC2L	**230 V AC**	**1SVR 405 611 R3100**	**10**	
3 c/o contacts: 250 V, 10 A				
CR-M012DC3L	12 V DC	1SVR 405 612 R4100	10	
CR-M024DC3L	**24 V DC**	**1SVR 405 612 R1100**	**10**	
CR-M048DC3L	48 V DC	1SVR 405 612 R6100	10	
CR-M060DC3L	60 V DC	1SVR 405 612 R4300	10	
CR-M110DC3L	110 V DC	1SVR 405 612 R8100	10	
CR-M125DC3L	125 V DC	1SVR 405 612 R8300	10	
CR-M220DC3L	220 V DC	1SVR 405 612 R9100	10	
CR-M024AC3L	**24 V AC**	**1SVR 405 612 R0100**	**10**	
CR-M048AC3L	48 V AC	1SVR 405 612 R5100	10	
CR-M110AC3L	**110 V AC**	**1SVR 405 612 R7100**	**10**	
CR-M120AC3L	120 V AC	1SVR 405 612 R2100	10	
CR-M230AC3L	**230 V AC**	**1SVR 405 612 R3100**	**10**	
4 c/o contacts: 250 V, 6 A				
CR-M012DC4L	12 V DC	1SVR 405 613 R4100	10	
CR-M024DC4L	**24 V DC**	**1SVR 405 613 R1100**	**10**	
CR-M048DC4L	48 V DC	1SVR 405 613 R6100	10	
CR-M060DC4L	60 V DC	1SVR 405 613 R4300	10	
CR-M110DC4L	110 V DC	1SVR 405 613 R8100	10	
CR-M125DC4L	125 V DC	1SVR 405 613 R8300	10	
CR-M220DC4L	220 V DC	1SVR 405 613 R9100	10	
CR-M024AC4L	**24 V AC**	**1SVR 405 613 R0100**	**10**	
CR-M048AC4L	48 V AC	1SVR 405 613 R5100	10	
CR-M110AC4L	**110 V AC**	**1SVR 405 613 R7100**	**10**	
CR-M120AC4L	120 V AC	1SVR 405 613 R2100	10	
CR-M230AC4L	**230 V AC**	**1SVR 405 613 R3100**	**10**	
Interface relays with LED and free-wheeling diode				
4 c/o contacts: 250 V, 6 A				
CR-M024DC4LD	24 V DC	1SVR 405 614 R1100	10	

Bold printed products = stocked products

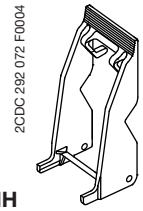
• Pluggable function modules ..... **6**/10 • Technical data .....**6**/13 • Dimensional drawings **6**/17

CR-M

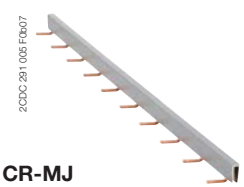
CR-M4SS

CR-M4LS

CR-M4LC



CR-MH



CR-MJ

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
Interface relays with gold contacts				
4 c/o contacts: 250 V, 6 A				
CR-M024DC4G	24 V DC	1SVR 405 618 R1000	10	
CR-M024AC4G	24 V AC	1SVR 405 618 R0000	10	
CR-M110AC4G	110 V AC	1SVR 405 618 R7000	10	
CR-M230AC4G	230 V AC	1SVR 405 618 R3000	10	
Interface relays with gold contacts and LED				
4 c/o contacts: 250 V, 6 A				
CR-M012DC4LG	12 V DC	1SVR 405 618 R4100	10	
CR-M024DC4LG	**24 V DC**	**1SVR 405 618 R1100**	**10**	
CR-M048DC4LG	48 V DC	1SVR 405 618 R6100	10	
CR-M060DC4LG	60 V DC	1SVR 405 618 R4300	10	
CR-M110DC4LG	110 V DC	1SVR 405 618 R8100	10	
CR-M125DC4LG	125 V DC	1SVR 405 618 R8300	10	
CR-M220DC4LG	220 V DC	1SVR 405 618 R9100	10	
CR-M024AC4LG	**24 V AC**	**1SVR 405 618 R0100**	**10**	
CR-M048AC4LG	48 V AC	1SVR 405 618 R5100	10	
CR-M110AC4LG	**110 V AC**	**1SVR 405 618 R7100**	**10**	
CR-M120AC4LG	120 V AC	1SVR 405 618 R2100	10	
CR-M230AC4LG	**230 V AC**	**1SVR 405 618 R3100**	**10**	
Interface relays with gold contacts, LED and free-wheeling diode				
4 c/o contacts: 250 V, 6 A				
CR-M012DC4LDG	12 V DC	1SVR 405 618 R4400	10	
CR-M024DC4LDG	24 V DC	1SVR 405 618 R1400	10	

Accessories - Sockets

Type	Version	Connection terminals	Order code	Pack. unit pieces	Price 1 piece
Sockets					
CR-M2LS	**Logical socket [1] for 2 c/o**	screw	**1SVR 405 651 R1100**	**10**	
CR-M3LS	**Logical socket [1] for 3 c/o**		**1SVR 405 651 R2100**	**10**	
CR-M4LS	**Logical socket [1] for 2/4 c/o**		**1SVR 405 651 R3100**	**10**	
CR-M2LC	**Logical socket [1] for 2 c/o**	spring connection	**1SVR 405 651 R1200**	**10**	
CR-M4LC	**Logical socket [1] for 2/4 c/o**		**1SVR 405 651 R3200**	**10**	
CR-M2SS	**Standard socket for 2 c/o**	screw	**1SVR 405 651 R1000**	**10**	
CR-M3SS	**Standard socket for 3 c/o**		**1SVR 405 651 R2000**	**10**	
CR-M4SS	**Standard socket for 2/4 c/o**		**1SVR 405 651 R3000**	**10**	
CR-M2SF	**Standard socket for 2 c/o**	fork type	**1SVR 405 651 R1300**	**10**	
CR-M4SF	**Standard socket for 2/4 c/o**		**1SVR 405 651 R3300**	**10**	
Socket accessories					
CR-MH	**Plastic holder**		**1SVR 405 659 R1000**	**10**	
CR-MH1	**Metal holder**		**1SVR 405 659 R1100**	**25**	
CR-MJ	**Jumper bar** for sockets with screw connection		**1SVR 405 658 R6000**	**10**	
Markers					
CR-M	**Marker**		**1SVR 405 658 R1000**	**10**	

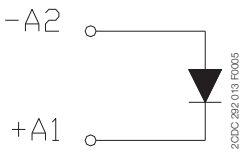
[1] can be used with time modules CR-P/M T...
Bold printed products = stocked products

• Pluggable function modules ..... **6**/10 • Technical data .....**6**/13 • Dimensional drawings **6**/17

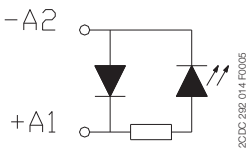
CR-P/M ..

Type	Rated control supply voltage	Version	Order code	Pack. unit pieces	Price 1 piece
Diode - Reverse polarity protection/free wheeling diode					
CR-P/M 22	**6-230 V DC**	**A1+, A2-**	**1SVR 405 651 R0000**	**10**	
Diode and LED - Reverse polarity protection/free wheeling diode					
CR-P/M 42	**6-24 V DC**	**red, A1+, A2-**	**1SVR 405 652 R0000**	**10**	
CR-P/M 42V	**6-24 V DC**	**green, A1+, A2-**	**1SVR 405 652 R1000**	**10**	
CR-P/M 42B	**24-60 V DC**	**red, A1+, A2-**	**1SVR 405 652 R4000**	**10**	
CR-P/M 42BV	**24-60 V DC**	**green, A1+, A2-**	**1SVR 405 652 R4100**	**10**	
CR-P/M 42C	**110-230 V DC**	**red, A1+, A2-**	**1SVR 405 652 R9000**	**10**	
CR-P/M 42CV	**110-230 V DC**	**green, A1+, A2-**	**1SVR 405 652 R9100**	**10**	
RC element - Spark quenching					
CR-P/M 52B	**6-24 V AC**		**1SVR 405 653 R0000**	**10**	
CR-P/M 52D	**24-60 V AC**		**1SVR 405 653 R4000**	**10**	
CR-P/M 52C	**110-230 V AC**		**1SVR 405 653 R1000**	**10**	
Diode and LED					
CR-P/M 62	**6-24 V AC/DC**	**red, for DC A1+, A2-**	**1SVR 405 654 R0000**	**10**	
CR-P/M 62V	**6-24 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 654 R1000**	**10**	
CR-P/M 62E	**24-60 V AC/DC**	**red, for DC A1+, A2-**	**1SVR 405 654 R4000**	**10**	
CR-P/M 62EV	**24-60 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 654 R4100**	**10**	
CR-P/M 92	**110-230 V AC/DC**	**red, for DC A1+, A2-**	**1SVR 405 654 R0100**	**10**	
CR-P/M 92V	**110-230 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 654 R1100**	**10**	
Varistor and LED - Overvoltage protection					
CR-P/M 62C	**6-24 V AC/DC**	**red, for DC A1+, A2-**	**1SVR 405 655 R0000**	**10**	
CR-P/M 62CV	**6-24 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 655 R1000**	**10**	
CR-P/M 62D	**24-60 V AC/DC**	**red, for DC A1+, A2-**	**1SVR 405 655 R4000**	**10**	
CR-P/M 62DV	**24-60 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 655 R4100**	**10**	
CR-P/M 92C	**110-230 V AC/DC**	**red, for DC A1+, A2-**	**1SVR 405 655 R0100**	**10**	
CR-P/M 92CV	**110-230 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 655 R1100**	**10**	
Varistor - Overvoltage protection					
CR-P/M 72	**24 V AC**		**1SVR 405 656 R0000**	**10**	
CR-P/M 72A	**115 V AC**		**1SVR 405 656 R1000**	**10**	
CR-P/M 82	**230 V AC**		**1SVR 405 656 R2000**	**10**	

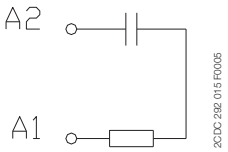
Connection diagrams



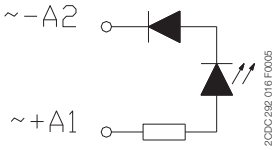
CR-P/M 22



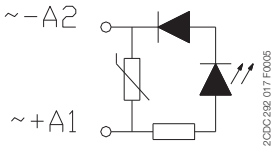
CR-P/M 42, CR-P/M 42B, CR-P/M 42C, CR-P/M 42V, CR-P/M 42BV, CR-P/M 42CV



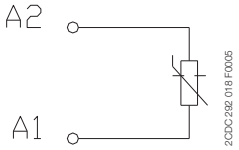
CR-P/M 52B, CR-P/M 52C, CR-P/M 52D,



CR-P/M 62, CR-P/M 62E, CR-P/M 92, CR-P/M 62V, CR-P/M 62EV, CR-P/M 92V



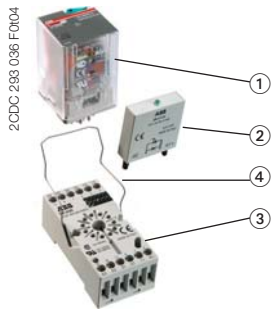
CR-P/M 62C, CR-P/M 62D, CR-P/M 92C, CR-P/M 62CV, CR-P/M 62DV CR-P/M 92CV



CR-P/M 72, CR-P/M 72A, CR-P/M 82

Bold printed products = stocked products

Pluggable interface relays CR-U
Universal relays
Ordering details



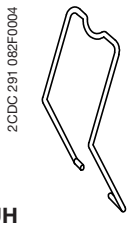
CR-U

① Interface relay
② Pluggable function module
③ Socket
④ Holder

CR-U

CR-U3S

CR-U3E



CR-UH

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
Interface relays without LED: 2 c/o contacts: 250 V, 10 A				
CR-U012DC2	12 V DC	1SVR 405 621 R4000	10	
CR-U024DC2	**24 V DC**	**1SVR 405 621 R1000**	**10**	
CR-U048DC2	48 V DC	1SVR 405 621 R6000	10	
CR-U110DC2	110 V DC	1SVR 405 621 R8000	10	
CR-U220DC2	220 V DC	1SVR 405 621 R9000	10	
CR-U024AC2	**24 V AC**	**1SVR 405 621 R0000**	**10**	
CR-U048AC2	48 V AC	1SVR 405 621 R5000	10	
CR-U110AC2	**110 V AC**	**1SVR 405 621 R7000**	**10**	
CR-U120AC2	120 V AC	1SVR 405 621 R2000	10	
CR-U230AC2	**230 V AC**	**1SVR 405 621 R3000**	**10**	
Interface relays without LED: 3 c/o contacts: 250 V, 10 A				
CR-U012DC3	12 V DC	1SVR 405 622 R4000	10	
CR-U024DC3	**24 V DC**	**1SVR 405 622 R1000**	**10**	
CR-U048DC3	48 V DC	1SVR 405 622 R6000	10	
CR-U110DC3	110 V DC	1SVR 405 622 R8000	10	
CR-U125DC3	125 V DC	1SVR 405 622 R8200	10	
CR-U220DC3	220 V DC	1SVR 405 622 R9000	10	
CR-U024AC3	**24 V AC**	**1SVR 405 622 R0000**	**10**	
CR-U048AC3	48 V AC	1SVR 405 622 R5000	10	
CR-U060AC3	60 V AC	1SVR 405 622 R5200	10	
CR-U110AC3	**110 V AC**	**1SVR 405 622 R7000**	**10**	
CR-U120AC3	120 V AC	1SVR 405 622 R2000	10	
CR-U230AC3	**230 V AC**	**1SVR 405 622 R3000**	**10**	
Interface relays with LED: 2 c/o contacts: 250 V, 10 A				
CR-U012DC2L	12 V DC	1SVR 405 621 R4100	10	
CR-U024DC2L	**24 V DC**	**1SVR 405 621 R1100**	**10**	
CR-U048DC2L	48 V DC	1SVR 405 621 R6100	10	
CR-U110DC2L	110 V DC	1SVR 405 621 R8100	10	
CR-U220DC2L	220 V DC	1SVR 405 621 R9100	10	
CR-U024AC2L	**24 V AC**	**1SVR 405 621 R0100**	**10**	
CR-U048AC2L	48 V AC	1SVR 405 621 R5100	10	
CR-U110AC2L	**110 V AC**	**1SVR 405 621 R7100**	**10**	
CR-U120AC2L	120 V AC	1SVR 405 621 R2100	10	
CR-U230AC2L	**230 V AC**	**1SVR 405 621 R3100**	**10**	
Interface relays with LED: 3 c/o contacts: 250 V, 10 A				
CR-U012DC3L	12 V DC	1SVR 405 622 R4100	10	
CR-U024DC3L	**24 V DC**	**1SVR 405 622 R1100**	**10**	
CR-U048DC3L	48 V DC	1SVR 405 622 R6100	10	
CR-U110DC3L	110 V DC	1SVR 405 622 R8100	10	
CR-U220DC3L	220 V DC	1SVR 405 622 R9100	10	
CR-U024AC3L	**24 V AC**	**1SVR 405 622 R0100**	**10**	
CR-U048AC3L	48 V AC	1SVR 405 622 R5100	10	
CR-U110AC3L	**110 V AC**	**1SVR 405 622 R7100**	**10**	
CR-U120AC3L	120 V AC	1SVR 405 622 R2100	10	
CR-U230AC3L	**230 V AC**	**1SVR 405 622 R3100**	**10**	

Accessories - Sockets

Type	Version	Order code	Pack. unit pieces	Price 1 piece
Sockets				
CR-U2S	**Socket for 2 c/o and module**	**1SVR 405 670 R0000**	**10**	
CR-U3S	**Socket for 3 c/o and module**	**1SVR 405 660 R0000**	**10**	
CR-U3E	**Socket for 3 c/o**	**1SVR 405 660 R0100**	**10**	
CR-U2SM	**Socket small for 2 c/o**	**1SVR 405 670 R1100**	**10**	
CR-U3SM	**Socket small for 3 c/o**	**1SVR 405 660 R1100**	**10**	
Accessories Sockets				
CR-UH	**Holder for CR-U socket**	**1SVR 405 669 R0000**	**10**	

Bold printed products = stocked products

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Pluggable interface relays CR-U - Accessories
Pluggable function modules
Ordering details, Connection diagrams

2CDC 291 038 F0b04

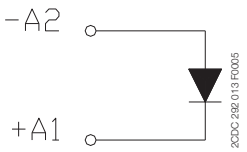
CR-U ..

2CDC 291 032 F0b05

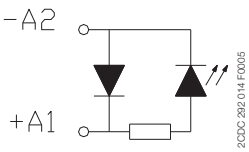
CR-U T

Type	Rated control supply voltage	Version	Order code	Pack. unit pieces	Price 1 piece
Diode - Reverse polarity protection/free wheeling diode					
CR-U 21	**6-230 V DC**	**A1+, A2-**	**1SVR 405 661 R0000**	**10**	
Diode and LED - Reverse polarity protection/free wheeling diode					
CR-U 41	**6-24 V DC**	**red, A1+, A2-**	**1SVR 405 662 R0000**	**10**	
CR-U 41V	**6-24 V DC**	**green, A1+, A2-**	**1SVR 405 662 R1000**	**10**	
CR-U 41B	**24-60 V DC**	**red, A1+, A2-**	**1SVR 405 662 R4000**	**10**	
CR-U 41BV	**24-60 V DC**	**green, A1+, A2-**	**1SVR 405 662 R4100**	**10**	
CR-U 41C	**110-230 V DC**	**red, A1+, A2-**	**1SVR 405 662 R9000**	**10**	
CR-U 41CV	**110-230 V DC**	**green, A1+, A2-**	**1SVR 405 662 R9100**	**10**	
RC element - Spark quenching					
CR-U 51B	**6-24 V AC**		**1SVR 405 663 R0000**	**10**	
CR-U 51D	**24-60 V AC**		**1SVR 405 663 R4000**	**10**	
CR-U 51C	**110-230 V AC**		**1SVR 405 663 R1000**	**10**	
Diode and LED					
CR-U 61	**6-24 V AC/DC**	**red, for DC: A1+, A2-**	**1SVR 405 664 R0000**	**10**	
CR-U 61V	**6-24 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 664 R1000**	**10**	
CR-U 61E	**24-60 V AC/DC**	**red, for DC: A1+, A2-**	**1SVR 405 664 R4000**	**10**	
CR-U 61EV	**24-60 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 664 R4100**	**10**	
CR-U 91	**110-230 V AC/DC**	**red, for DC: A1+, A2-**	**1SVR 405 664 R0100**	**10**	
CR-U 91V	**110-230 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 664 R1100**	**10**	
Varistor and LED - Overvoltage protection					
CR-U 61C	**6-24 V AC/DC**	**red, for DC: A1+, A2-**	**1SVR 405 665 R0000**	**10**	
CR-U 61CV	**6-24 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 665 R1000**	**10**	
CR-U 61D	**24-60 V AC/DC**	**red, for DC: A1+, A2-**	**1SVR 405 665 R4000**	**10**	
CR-U 61DV	**24-60 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 665 R4100**	**10**	
CR-U 91C	**110-230 V AC/DC**	**red, for DC: A1+, A2-**	**1SVR 405 665 R0100**	**10**	
CR-U 91CV	**110-230 V AC/DC**	**green, for DC A1+, A2-**	**1SVR 405 665 R1100**	**10**	
Varistor - Overvoltage protection					
CR-U 71	**24 V AC**		**1SVR 405 666 R0000**	**10**	
CR-U 71A	**115 V AC**		**1SVR 405 666 R1000**	**10**	
CR-U 81	**230 V AC**		**1SVR 405 666 R2000**	**10**	
Multifunction time module					
CR-U T	**24-240 V AC/DC**	**pluggable onto CR-U2S and CR-U3S**	**1SVR 405 667 R0000**	**10**	

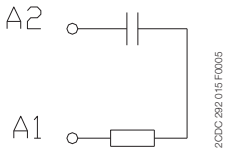
Connection diagrams



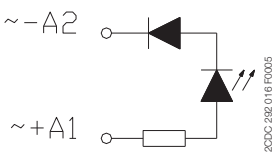
CR-U 21



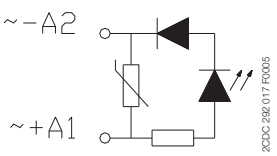
CR-U 41, CR-U 41B, CR-U 41C, CR-U 41V, CR-U 41BV, CR-U 41CV



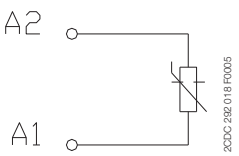
CR-U 51B, CR-U 51C CR-U 51D,



CR-U 61, CR-U 61E, CR-U 91, CR-U 61V, CR-U 61EV, CR-U 91V



CR-U 61C, CR-U 61D, CR-U 91C, CR-U 61CV, CR-U 61DV CR-U 91CV



CR-U 71, CR-U 81 CR-U 71A,

All CR-U modules can be plugged onto sockets CR-U2S and CR-U3S.
Bold printed products = stocked products

Input circuit - coil data

CR-P range

	Rated control supply voltage U_s	Rated frequency	Make voltage (at 20 °C)	Maximum voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	8.4 V DC	30.6 V DC	≥ 0.1 U_s	0.4-0.48 W	360 Ω	± 10%
	24 V DC	-	16.8 V DC	61.2 V DC	≥ 0.1 U_s	0.4-0.48 W	1440 Ω	± 10%
	48 V DC	-	33.6 V DC	122.4 V DC	≥ 0.1 U_s	0.4-0.48 W	5700 Ω	± 10%
	110 V DC	-	77 V DC	280 V DC	≥ 0.1 U_s	0.4-0.48 W	25200 Ω	± 10%
AC coils	24 V AC	50 / 60 Hz	19.2 V AC	28.8 V AC	≥ 0.15 U_s	0.75 VA	400 Ω	± 10%
	48 V AC	50 / 60 Hz	38.4 V AC	57.6 V AC	≥ 0.15 U_s	0.75 VA	1550 Ω	± 10%
	110 V AC	50 / 60 Hz	88 V AC	132 V AC	≥ 0.15 U_s	0.75 VA	8900 Ω	± 10%
	120 V AC	50 / 60 Hz	96 V AC	144 V AC	≥ 0.15 U_s	0.75 VA	10200 Ω	± 10%
	230 V AC	50 / 60 Hz	184 V AC	276 V AC	≥ 0.15 U_s	0.75 VA	38500 Ω	± 10%

CR-M range

	Rated control supply voltage U_s	Rated frequency	Make voltage (at 20 °C)	Maximum voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	9.6 V DC	13.2 V DC	≥ 0.1 U_s	0.9 W	160 Ω	± 10%
	24 V DC	-	19.2 DC	26.4 V DC	≥ 0.1 U_s	0.9 W	640 Ω	± 10%
	48 V DC	-	38.4 V DC	52.8 V DC	≥ 0.1 U_s	0.9 W	2600 Ω	± 10%
	60 V DC	-	48.0 V DC	66.0 V DC	≥ 0.1 U_s	0.9 W	4000 Ω	± 10%
	110 V DC	-	88 V DC	121 V DC	≥ 0.1 U_s	0.9 W	13600 Ω	± 10%
	125 V DC	-	100 V DC	137,5 V DC	≥ 0.1 U_s	0.9 W	16000 Ω	± 10%
	220 V DC	-	176 V DC	242 V DC	≥ 0.1 U_s	0.9 W	54000 Ω	± 10%
AC coils	24 V AC	50 / 60 Hz	19.2 V AC	26.4 V AC	≥ 0.2 U_s	1.6 VA	158 Ω	± 10%
	48 V AC	50 / 60 Hz	38.4 V AC	52.8 V AC	≥ 0.2 U_s	1.6 VA	640 Ω	± 10%
	60 V AC	50 / 60 Hz	48.0 V AC	66.0 V AC	≥ 0.2 U_s	1.6 VA	930 Ω	± 10%
	110 V AC	50 / 60 Hz	88 V AC	121 V AC	≥ 0.2 U_s	1.6 VA	3450 Ω	± 10%
	120 V AC	50 / 60 Hz	96 V AC	132 V AC	≥ 0.2 U_s	1.6 VA	3770 Ω	± 10%
	230 V AC	50 / 60 Hz	184 V AC	253 V AC	≥ 0.2 U_s	1.6 VA	16100 Ω	± 10%

CR-U range

	Rated control supply voltage U_s	Rated frequency	Make voltage (at 20 °C)	Maximum voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	9.6 V DC	13.2 V DC	≥ 0.1 U_s	1.5 W	110 Ω	± 10 %
	24 V DC	-	19.2 V DC	26.4 V DC	≥ 0.1 U_s	1.5 W	430 Ω	± 10 %
	48 V DC	-	38.4 V DC	52.8 V DC	≥ 0.1 U_s	1.5 W	1750 Ω	± 10 %
	110 V DC	-	88.0 V DC	121.0 V DC	≥ 0.1 U_s	1.5 W	9200 Ω	± 10 %
	125 V DC	-	96.0 V DC	132.0 V DC	≥ 0.1 U_s	1.5 W	11000 Ω	± 10 %
	220 V DC	-	176.0 V DC	242.0 V DC	≥ 0.1 U_s	1.5 W	37000 Ω	± 10 %
AC coils	24 V AC	50 / 60 Hz	19.2 V AC	26.4 V AC	≥ 0.15 U_s	2.8 VA (50 Hz) 2.5 VA (60 Hz)	75 Ω	± 10 %
	48 V AC	50 / 60 Hz	38.4 V AC	52.8 V AC	≥ 0.15 U_s	2.8 VA (50 Hz) 2.5 VA (60 Hz)	305 Ω	± 10 %
	60 V AC	50 / 60 Hz	48.0 V AC	66.0 V AC	≥ 0.15 U_s	2.8 VA (50 Hz) 2.5 VA (60 Hz)	475 Ω	± 10 %
	110 V AC	50 / 60 Hz	88.0 V AC	121.0 V AC	≥ 0.15 U_s	2.8 VA (50 Hz) 2.5 VA (60 Hz)	1700 Ω	± 10 %
	120 V AC	50 / 60 Hz	96.0 V AC	132.0 V AC	≥ 0.15 U_s	2.8 VA (50 Hz) 2.5 VA (60 Hz)	1910 Ω	± 10 %
	230 V AC	50 / 60 Hz	184.0 V AC	253.0 V AC	≥ 0.15 U_s	2.8 VA (50 Hz) 2.5 VA (60 Hz)	7080 Ω	± 10 %

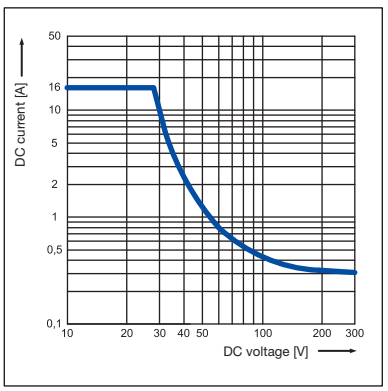
Technical data (continued)

Type			CR-P...1	CR-P...2	CR-M...2	CR-M...3	CR-M...4	CR-U...2	CR-U...3
Output circuit(s)			**11-12/14**	**11-12/14 21-22/24**	**11-12/14 21-22/24**	**11-12/14 21-22/24 31-32/34**	**11-12/14 21-22/24 31-32/34 41-42/44**	**11-12/14 31-32/34**	**11-12/14 21-22/24 31-32/34**
Kind of output			Relay, 1 c/o	Relay, 2 c/o	Relay, 2 c/o	Relay, 3 c/o	Relay, 4 c/o	Relay, 2 c/o	Relay, 3 c/o
Contact material			AgNi	AgNi AgNi/Au 5 µm	AgNi	AgNi	AgNi AgNi/Au 5 µm	AgNi	
Rated operational voltage U_e (VDE 0110, IEC 60947-1)			250 V						
Minimum switching voltage			5 V						
Maximum switching voltage		DC	300 V DC		250 V DC				
		AC	400 V AC		250 V AC				
Minimum switching current			5 mA (AgNi), 2 mA (AgNi/Au)						
Rated free air thermal current I_{th}			16 A	8 A	12 A	10 A	6 A	10 A	
Rated operational current (IEC 60947-5-1)	AC12 (resistive)	230 V	16 A	8 A	12 A	10 A	6 A	10 A	
	AC15 (inductive)	230 V	1.5 A	1 A	1.5 A	1.5 A	1 A	1.5 A	
	DC12 (resistive)	24 V	16 A	8 A	12 A	10 A	6 A	10 A	
	DC13 (inductive)	24 V	2 A	2 A	8 A	8 A	6 A	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		-		-			-	B 300
	max. rated operational voltage		-		-			-	300 V AC
	max. continuous thermal current at B 300		-		-			-	5 A
	max. making / breaking apparent power at B 300		-		-			-	3600/360 VA
	Utilization category General Purpose (single phase)		-		-			10 A, 250 V AC	10 A, 250 V AC
	Utilization category (Resistive)		16 A, 250 V AC	8 A, 250 V AC	10 A, 250 V AC 12 A, 150 V AC	6 A, 250 V AC 10 A, 150 V AC	6 A, 250 V AC 10 A, 150 V AC	10 A, 250 V AC	-
Minmum switching power			0.3 W (AgNi), 0.1 W (AgNi/Au)					0.3 W	
Maximum switching power		AC-1	4000 VA	2000 VA	3000 VA	2500 VA	1500 VA	2500 VA	
Contact resistance			≤ 100 mΩ		≤ 100 mΩ				
Maximum switching capacity		rated load AC-1	600 switching cycles/h		1200 switching cycles/h				
		without load	72000 switching cycles/h		18000 switching cycles/h			12000 switching cycles/h	
Mechanical lifetime			> 3 x 10^7 switching cycles		> 2 x 10^7 switching cycles				
Electrical lifetime		AC1 (resistive)	> 10^5 switching cycles		> 10^5 switching cycles			> 10^5 switching cycles	
			(16 A, 250 V)	(8 A, 250 V)	(12 A, 250 V)	(10 A, 250 V)	(6 A, 250 V)	(10 A, 250 V)	
		cos φ	see reduction factor F						
Response time			typ. 7 ms		typ. 13 ms (DC),10 ms (AC)			typ. 18 ms (DC), 12 ms (AC)	
Release time			typ. 3 ms		typ. 3 ms (DC), 8 ms (AC)			typ. 7 ms (DC), 10 ms (AC)	
Isolation data									
Rated insulation voltage			400 V AC		250 V AC				
Insulation class			C250 / B400		C250 / B250			C250	
Rated impulse withstand voltage U_{imp}	between coil and contacts		5 kV AC		2.5 kV AC				
	between open contacts		1 kV AC		1.5 kV AC				
	between c/o contacts		2.5 kV AC		2.5 kV AC		2 kV AC	2 kV AC	
Clearance	between coil and contacts		≥ 10 mm		≥ 2.5 mm		≥ 1.6 mm	≥ 3 mm	
Creepage distance	between coil and contacts		≥ 10 mm		≥ 4 mm		≥ 3.2 mm	≥ 4.2 mm	
Overvoltage category			III		III		II	III	
Pollution degree			3		3		2	3	

Type		CR-P...1	CR-P...2	CR-M...2	CR-M...3	CR-M...4	CR-U...2	CR-U...3
General data								
Dimensions (W x H x D) when mounted		12.7 x 29 x 15.7 mm		21.2 x 27.5 x 35.6 mm			35 x 35 x 54.4 mm	
Weight		14 g (0.031 lb)		35 g (0.077 lb)			83 g (0.18 lb)	
Mounting		on socket (see accessories)						
Mounting position		any						
Degree of protection		IP 67		IP 40				
Electrical connection								
Connection		by socket						
Environmental data								
Ambient temperature range	operation DC	-40 ... +85 °C		-40 ... +70 °C				
	operation AC	-40 ... +70 °C		-40 ... +55 °C				
	storage	-40 ... +85 °C						
Vibration resistance 10-150 Hz	n/o contact	10 g		5 g			5 g	
	n/c contact	10 g	5 g	5 g			5 g	
Shock resistance	n/o contact	30 g	20 g	10 g			10 g	
	n/c contact	30 g	20 g	5 g			10 g	
Standards								
Product standard		EN 61810-1, EN 60255-23 IEC 60664-1		EN 60810-1, EN 60255-23 IEC 61810-7			EN 60255-1-00	
Low Voltage Directive		73/23/EEC						

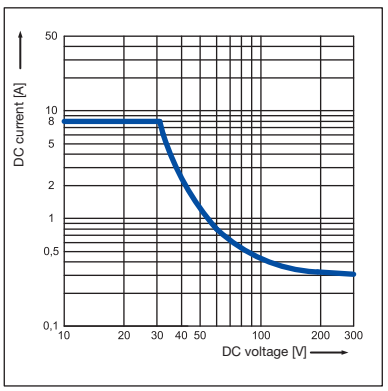
Load limit curves - Maximum switching power at resistive DC load

CR-P with 1 c/o contact



2CDC 292 005 F0204

CR-P with 2 c/o contacts



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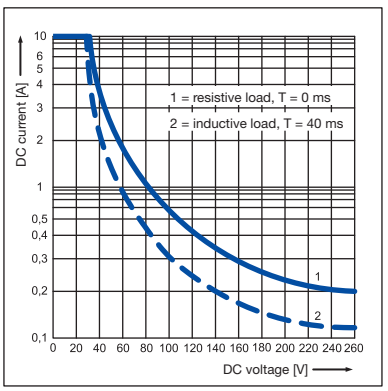
CR-U with 2 and 3 c/o contacts



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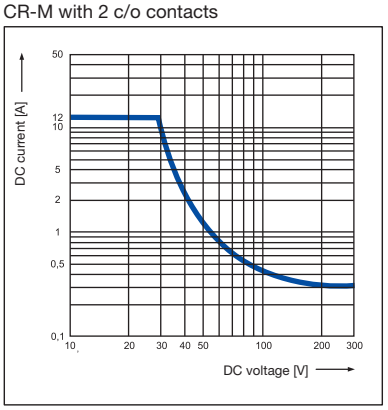
CR-M with 2 c/o contacts



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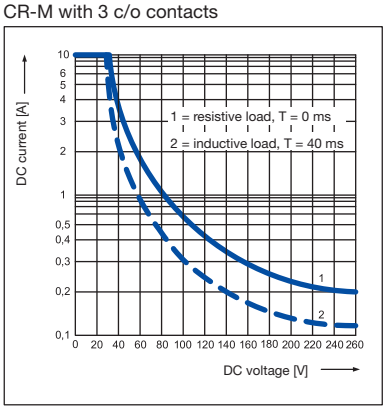
CR-M with 3 c/o contacts



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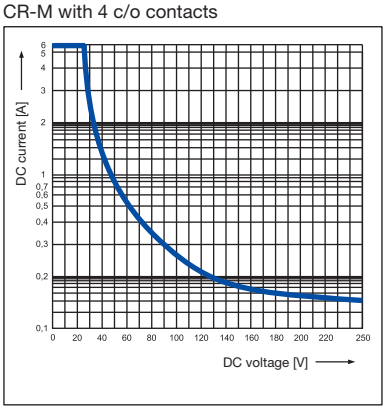
CR-M with 4 c/o contacts



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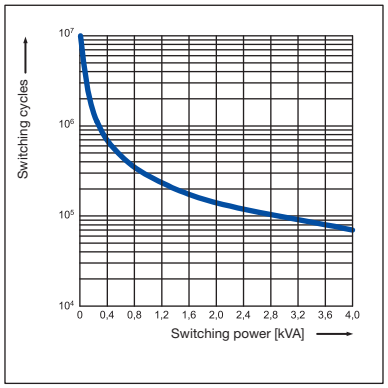
6

• **Approvals** **6**/5

Load limit curves - Electrical lifetime at resistive AC load

CR-P with 1 c/o contact



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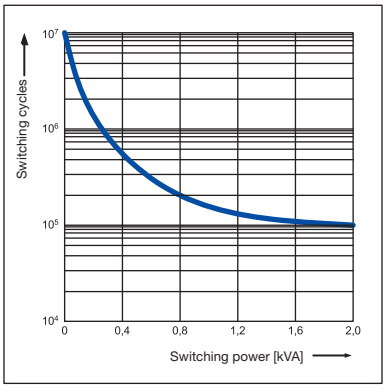
CR-P with 2 c/o contacts



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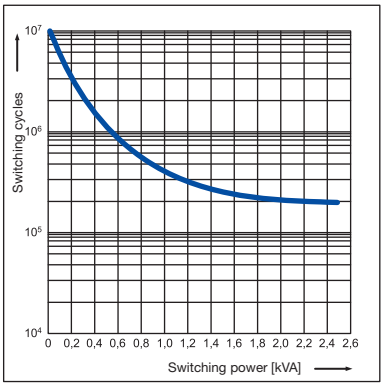
CR-U with 2 and 3 c/o contacts



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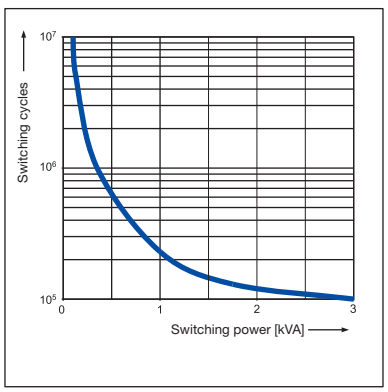
CR-M with 2 c/o contacts



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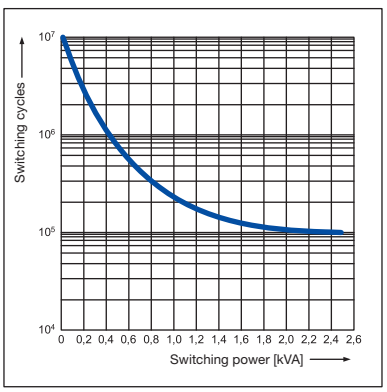
CR-M with 3 c/o contacts



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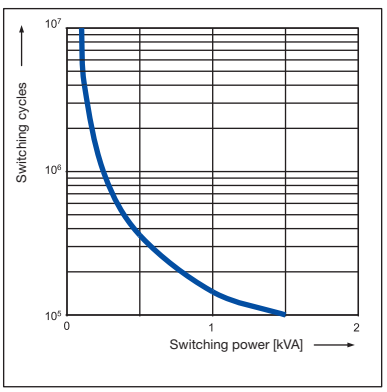
CR-M with 4 c/o contacts



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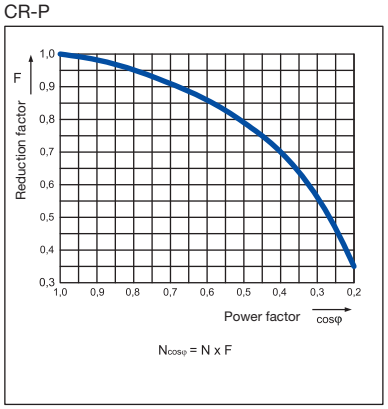
6

Reduction factor F at inductive AC load

CR-P



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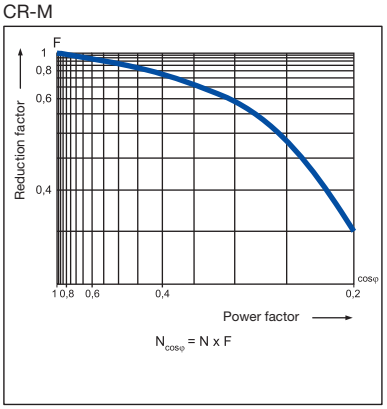
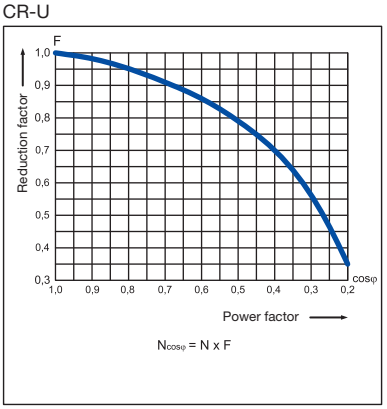
CR-M



2CDC 292 014 F0204

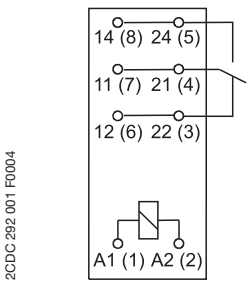
CR-U



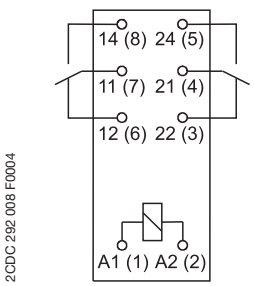
2CDC 292 029 F0204

Pluggable interface relays CR-P, CR-M and CR-U
Pcb-, miniature- and universal relays
Connection diagrams, dimensional drawings

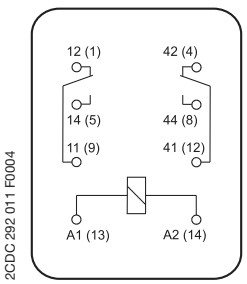
Connection diagrams



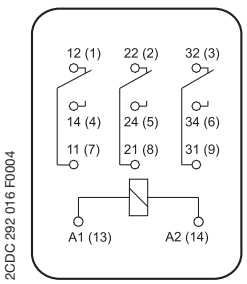
CR-P with 1 c/o contact



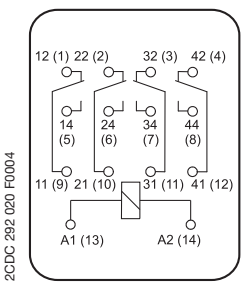
CR-P with 2 c/o contacts



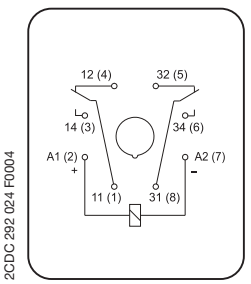
CR-M with 2 c/o contacts



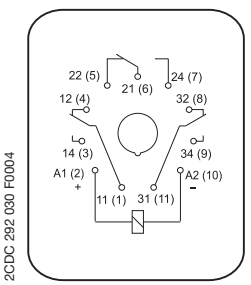
CR-M with 3 c/o contacts



CR-M with 4 c/o contacts



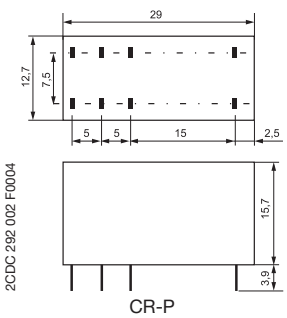
CR-U with 2 c/o contacts



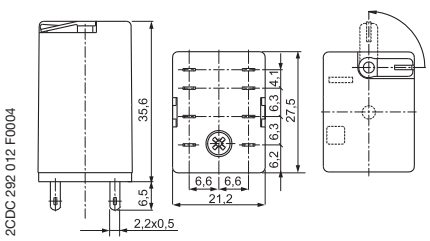
CR-U with 3 c/o contacts

Dimensional drawings

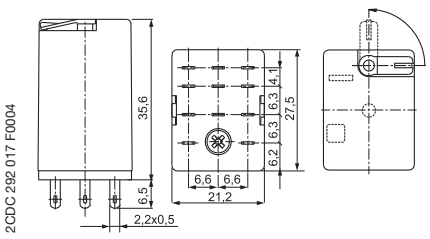
Dimensions in mm



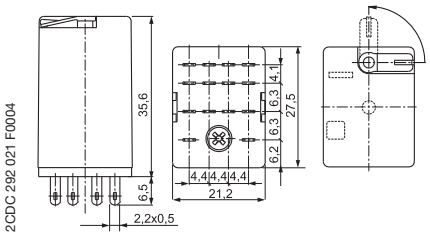
CR-P



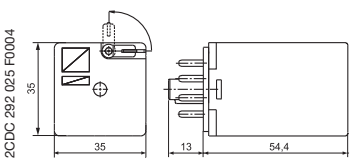
CR-M with 2 c/o contacts



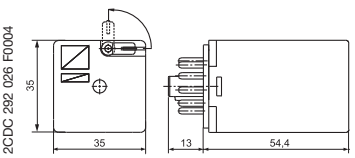
CR-M with 3 c/o contacts



CR-M with 4 c/o contacts



CR-U with 2 c/o contacts



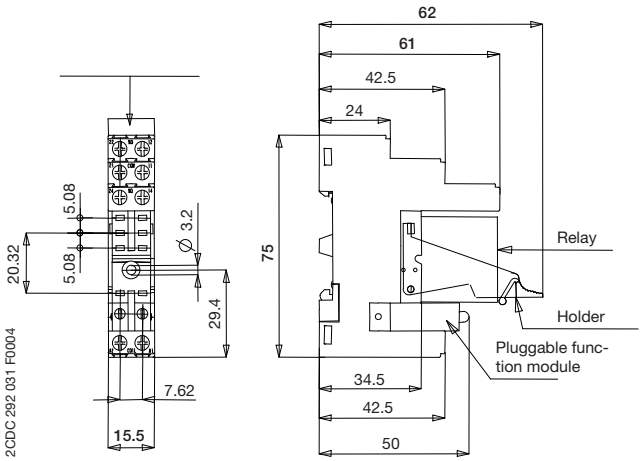
CR-U with 3 c/o contacts

6

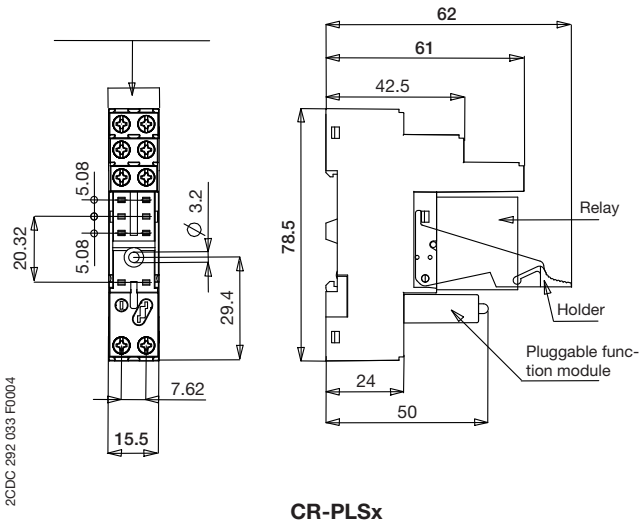
Dimensional drawings

Dimensions in mm

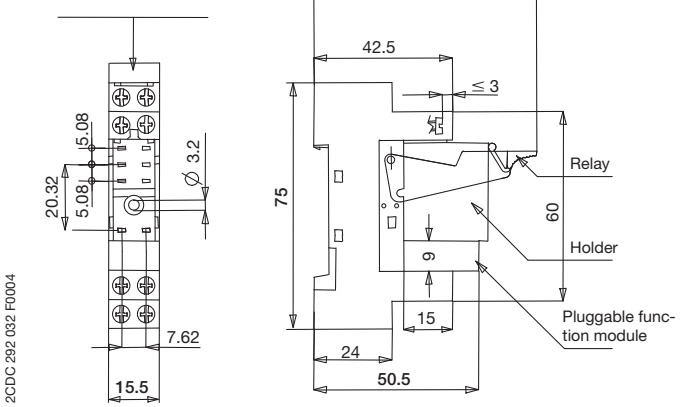
Sockets for screw connection



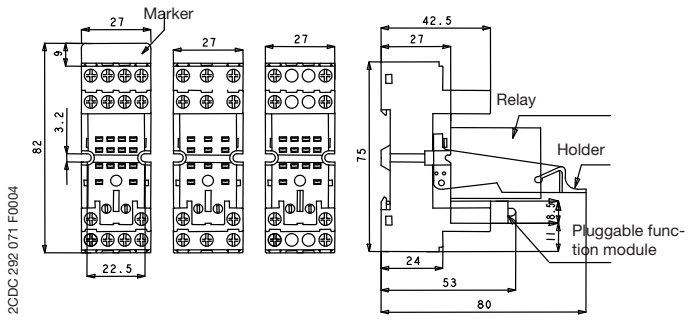
CR-PLS



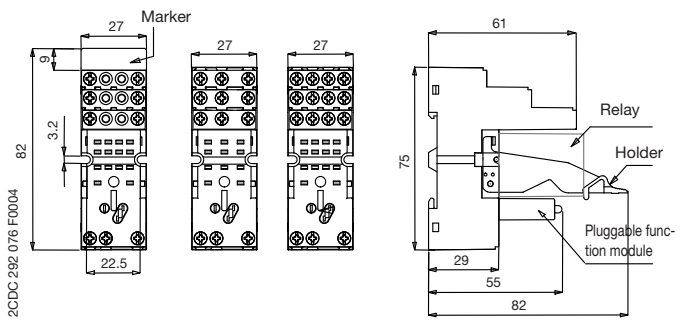
CR-PLSx



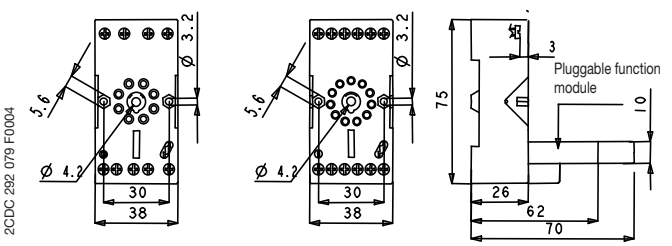
CR-PSS



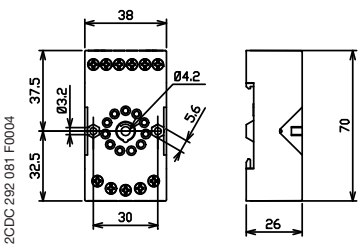
CR-M2SS - CR-M3SS - CR-M4SS



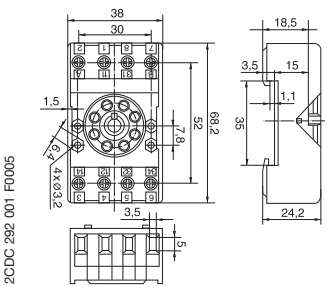
CR-M2LS - CR-M3LS - CR-M4LS



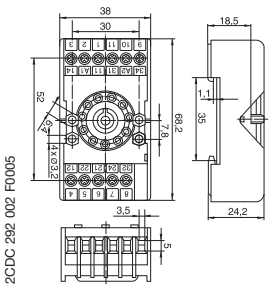
CR-U2S - CR-U3S



CR-U3E



CR-U2SM

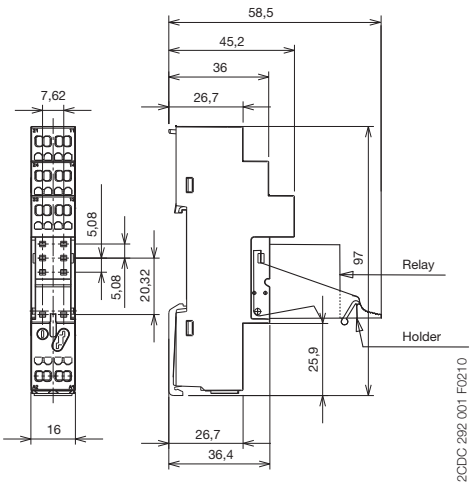


CR-U3SM

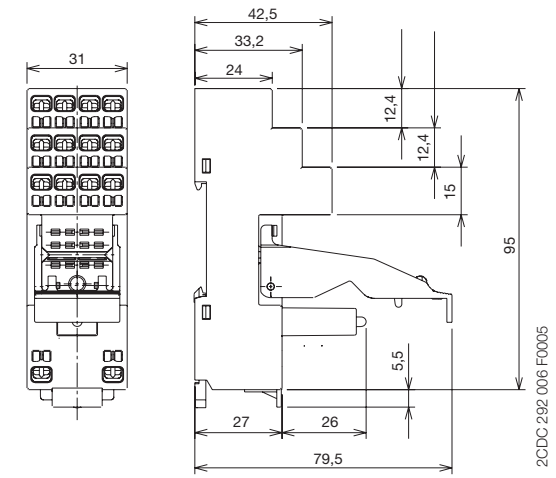
Dimensional drawings

Dimensions in mm

Sockets for spring connection

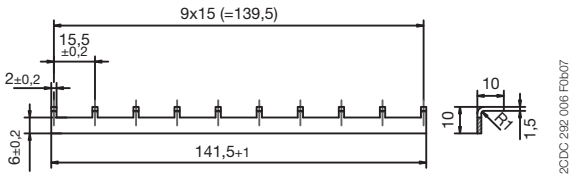


CR-PLC

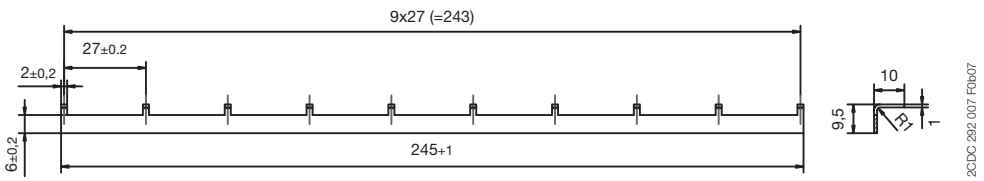


CR-M2LC , CR-M4LC

Jumper



CR-PJ



CR-MJ

6

Notes

Relays and optocouplers

Contents

COMFORT

Easy marking

Box function with markers type RC610
Wire connection with markers type RC65
Electrical schematic of the block on the side of the block

Type RC610

Type RC65

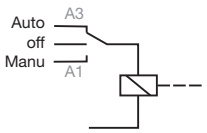
Manual or automatic functionning

Micro-Switch allowing forcing of the coil input to 0 or 1 for interventions in equipments.

Two possibilities:

With a visible switch located on front side. (Fig. 1)

With a secure switch (Fig. 2) after acces hatch opening (Fig. 3)



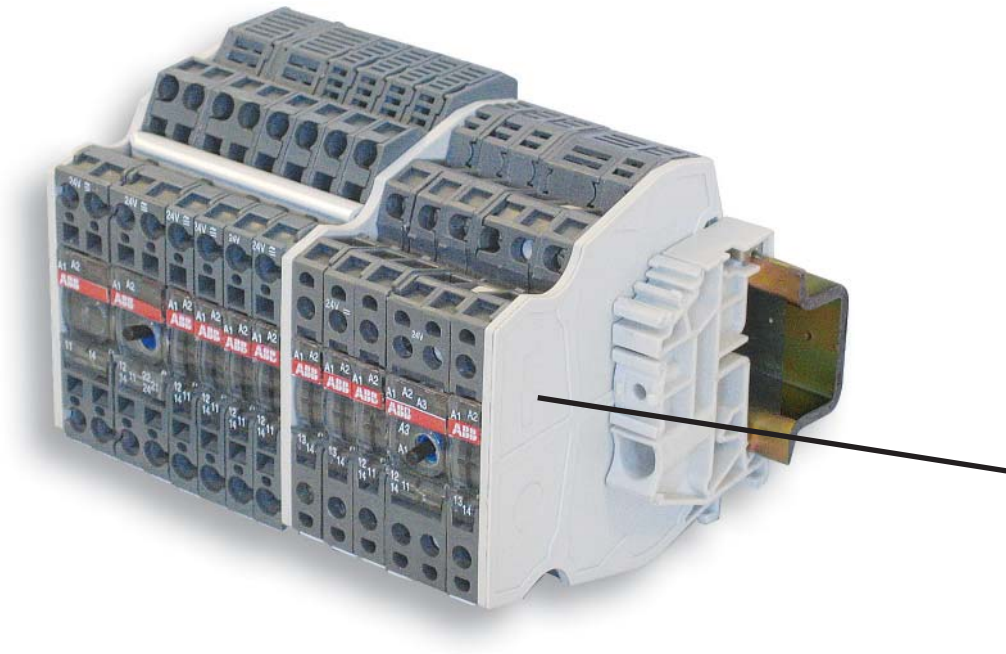
(Fig. 1)

(Fig. 3)

(Fig. 2)

Functionning Status

Functionning display through a green Led.



Jumper bar

Same jumper bar for «Screw clamp» or «Spring clamp» technologies. Independent of wire clamp and snap on held in place. Use of end sections is required to preserve IP20 protection.

Distribution block

«Screw clamp» or «Spring clamp» technologies. With protection connected to the rail.

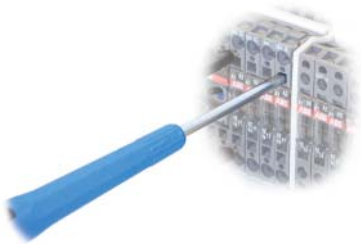
For polarity distribution on demand : coils and/or contacts.

Mesurements - Tests

Holes for holding DIA. 2 mm test plugs of the measurement apparatus in position.

Easy wiring

DIA. 3,5 mm screwdriver self-gripped into spring



SYNERGY

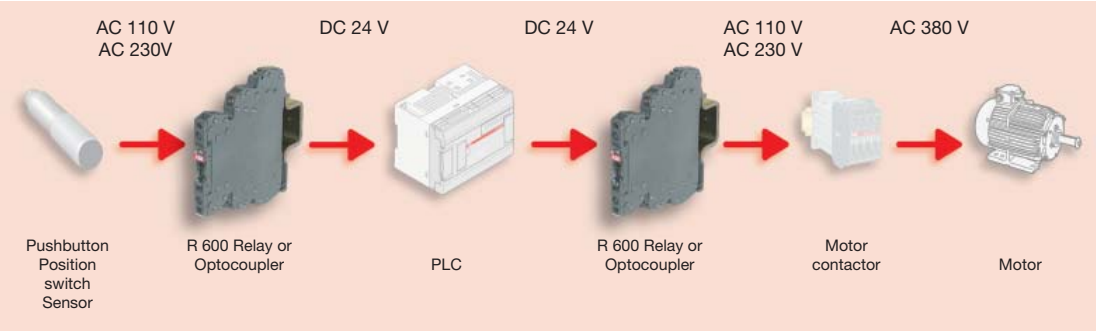
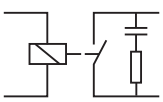


***ABB** PROVIDES A FULL SOLUTION FROM SENSOR TO MOTOR*

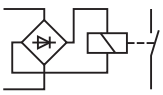
SAVING

CONTACT LIFE INCREASED



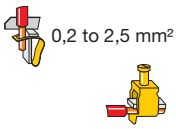
Contact protection
through RC circuit

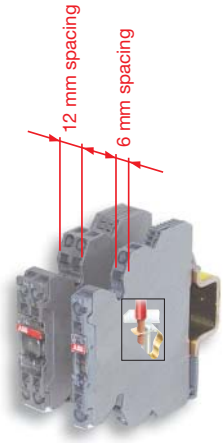
ONLY ONE PART NUMBER AC/DC

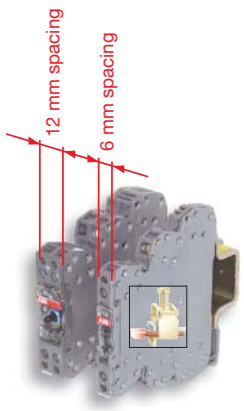


DIMENSIONS

Compact block in «spring clamp» or «screw clamp» versions with 6 mm and 12 mm spacings.







SAFETY

6

SEPARATION AND IDENTIFICATION OF SEVERAL VOLTAGES

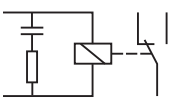
Separator end sections.

IP20 PROTECTION

NO DISTURBANCE PRODUCTION

Choice of high quality electronic components to reduce leakage currents (< 50 µA).

IMMUNITY

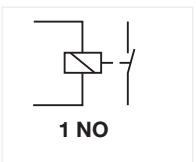


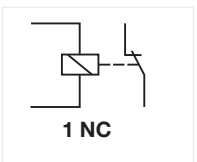
Leakage current
protection

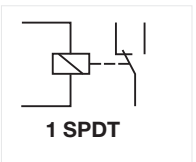
ACCORDANCE TO STANDARDS :

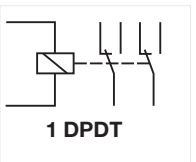
(pending) (pending) LRS (pending)

PERFORMANCES

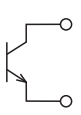


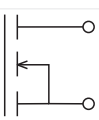


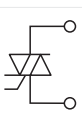




ADAPTABILITY TO ANY APPLICATION TYPE





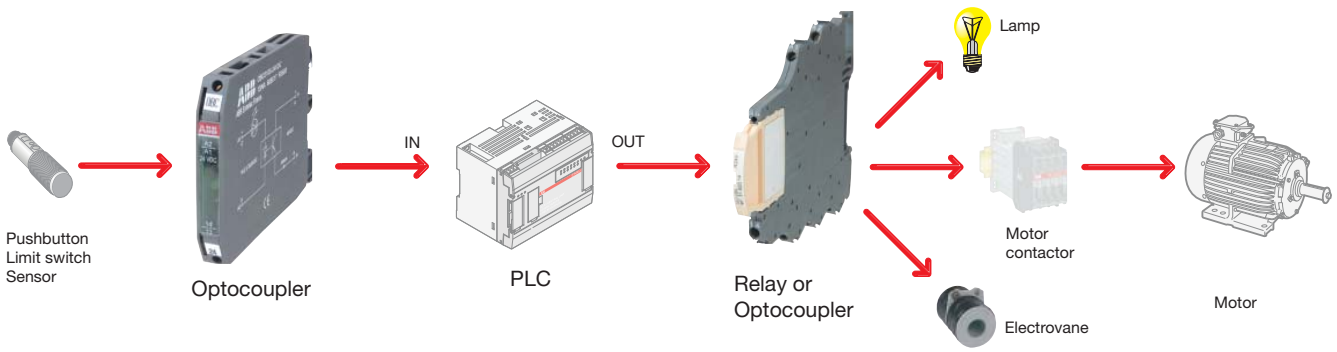


THE PLUS IN OUR PERFORMANCES

- Triac output 400 VAC (50 Hz / 60 Hz)
- Relay output 12 A in 12 mm spacing
- 100 part numbers
- Screw clamp or spring clamp connections

Relays and optocouplers
Applications

In today's automation systems, PLCs are the core of industry. They link sensors and actuators to the process, which are connected to the PLC via conventional wires.
However these PLCs are not completely isolated from the industrial environment, hence over voltage picks and transient currents can affect their operating functions. And additionally, their application field is often limited to 24 VDC / 100 mA.
So, with the aim to adapt application voltage and/or current and provide as well the right galvanic isolation to the PLC, it is recommended to install per I/O the right interface providing both voltage-current level adaptation and isolation protection.
This interfacing is possible thanks to ABB's relays and optocouplers ranges, which offer wide adaptation in both voltage (from 5 to 400 V) and current (from 10-7 to 16 A) as well as high isolation between input and output from 2 to 4 KV.



Technical data

R600 series

Standard range in screw clamp or spring clamp versions

- Spacing : 6 mm
- Wire size : 2.5 mm² (4 mm² solid wire)
- Contact type : 1 NO, 1 NC, 1 SPDT, 1 DPDT from 1 mA to 8 A / 250 V
- Transistor : 100 mA
  MOS : 1 A to 5 A
  Triac : 1 A to 2 A

R910 series

It is a relay inside a terminal block

- Spacing : 9 mm
- High wiring capacity 4 mm²
- Contact type : 1 NO from 10 mA to 5 A / 250 V
- Good isolation 3 kV

R1800 series

It is the range dedicated to special applications

- Spacing : 18 to 23 mm
- Wire size : 2.5 mm² (4 mm² solid)
- Contact type : 1 NO, 1 NC, 1 NO + 1 NC, 4 NO, 1 SPDT, 1 DPDT from 10^{-7} A to 8 A / 250 V
- Transistor : 25 mA to 1 A

R500 series

It is our range offering pluggable functions

- Spacing : 5.08 mm (the smallest in the market)
- Wire size : 2.5 mm² (4 mm² solid)
- Contact type : 1 SPDT from 10 mA to 6 A / 250 V
- Transistor : 30 mA to 100 mA
  MOS : 1 A to 2 A
  Triac : 1 A

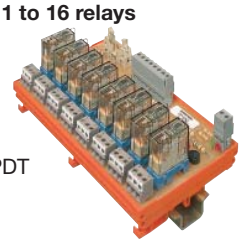
R900 series

The fastest optocoupler in the market

- Spacing : 9 to 15 mm
- Wire size : 2.5 mm² (4 mm² solid)
- Contact type : 1 SPDT or 1 DPDT contacts from 1 mA to 6 A / 250 V
- Transistor : 100 mA to 5 A
  MOS : 5 A
  Triac : 1 A to 5 A

R20000 series

It is our PCB mounted range of modules 1 to 16 relays



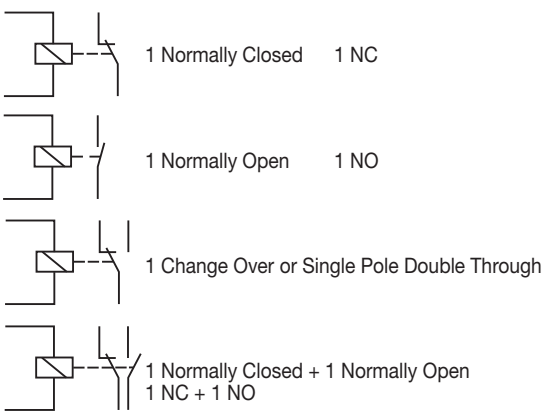
- Spacing : 12,7 to 325 mm
- Wire size : 2.5 mm²
- Contact type : 1 NO, 1 NC, 1 SPDT, 1 DPDT from 1 mA to 16 A / 250 V
- MOS : 3 A
  Triac : 3 A

Further information: Catalogue Relay & Optocoupler 1SNC 117 003 C0202

Construction of description type

SERIES	CODE	NB OF RELAYS	CONTACT TYPE	NB OF CONTACTS PER ELAY	PARTICULARITIES R
R 600 R 900 R 1800	R B	☐	☐	☐	☐
R 600	R B R	☐	☐	☐	☐
R 20000	R M	☐	☐	☐	☐
R 500	D 2,5/5 R	☐	☐	☐	☐
R 910	M 4/9 R	☐	☐	☐	☐
			0 1 2 3		None A B C N P R V I

Description of contact types

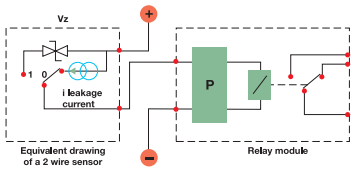


Color coding for relays

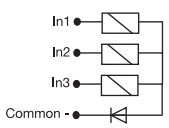
Color	Current level in contacts	Switching current	Switching voltage	Switching load power
green	Very low level	10^{-7} to 5 A	10^{-3} to 250 V	10^{-10} to 2000 VA 10^{-10} to 200 W
grey	Low level	1 mA to 8 A	5 to 250 V	0,05 to 1500 VA 0,05 to 192 W
blue	High level	10 mA to 16 A	12 to 380 V	0,6 to 4000 VA 0,6 to 240 W

Particularities description

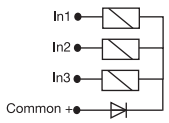
None	Input voltage	DC
A	Input voltage	AC/DC
B	Input voltage	AC
C	2 wire sensor compatibility	



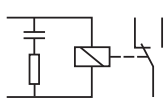
N Commons of coils connected to negative



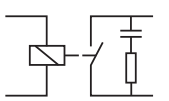
P Commons of coils connected to positive



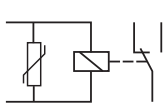
R RC circuit protection :
- Input protection against leakage current



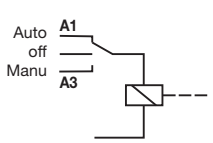
- Increases relay contacts life



V Relay protection against overvoltage peaks



I Switch to force the coil for maintenance and/or installation purposes



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Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
DC input	24 VDC	1 NO	screw	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	R	**RB 101AR-24VAC/DC**	**1SNA 645 019 R0400**	281
		1 NO	spring	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	R	RBR 101AR-24VAC/DC	1SNA **645 519** R0600	281
		1 NO	screw	1	10mA-8A	12,7	R20000	SP NRTL/C		RM 101-24VDC	1SNA **020 239** R0200	299
		1 NC	screw	1	10mA-5A	9	R910			**M 4/9.R111L-24VDC**	**1SNA 607 052 R0000**	287
		1 NC	screw	1	10mA-5A	9	R910	cULus	R	M 4/9.R111L-24VDC	1SNA **607 002** R0700	287
		1 NC	screw	1	10mA-5A	9	R910	cULus	R	M 4/9.R111L-24VDC	1SNA **607 030** R0600	287
		1 NC	screw	1	10mA-6A	6	R600	cULus SP (pending) GL LRS		**RB 111A-24VAC/DC**	**1SNA 645 014 R2700**	281
		1 NC	screw	1	10mA-6A	6	R600	cULus SP (pending) GL LRS	Is	RB 111AI-24VAC/DC	1SNA **645 063** R0000	281
		1 NC	screw	1	10 mA-6A	12	R600	cULus SP (pending) GL LRS	R	RB 111AR-24VAC/DC	1SNA **645 018** R0300	281
		1 NC	spring	1	10mA-6A	6	R600	cULus SP (pending) GL LRS		RBR 111A-24VAC/DC	1SNA **645 514** R2100	281
		1 NC	spring	1	10mA-6A	6	R600	cULus SP (pending) GL LRS	Is	RBR 111AI-24VAC/DC	1SNA **645 563** R0200	281
		1 NC	spring	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	R	RBR 111AR-24VAC/DC	1SNA **645 518** R0500	281
		1 NC	screw	1	10mA-8A	12,7	R20000	SP		RM 111-24VDC	1SNA **020 032** R1600	299
		4 NC	screw	1	0,1µA-5A	18	R1800			RB 114A-24VAC/DC	1SNA **010 126** R1700	289
		1 NC + 1 NO	screw	1	10mA-5A	18	R1800		C, V	RB 131CV-24VDC	1SNA **010 181** R1700	288
		1 NC + 1 NO	screw	1	1µA-5A	18	R1800		C, V	RB 131CV-24VDC	1SNA **010 151** R2000	288
		1 NC + 1 NO	screw	1	1µA-8A	18	R1800	SP		RB 131-24VDC	1SNA **010 055** R2300	289
		1 NC + 1 NO	screw	1	1µA-8A	18	R1800			RB 310-24VDC bistable	1SNA **010 063** R2300	289
		1 NC, 1 NC	screw	2	1µA-5A	18	R1800	SP		RB 211-24VDC	1SNA **010 014** R1200	289
		1 SPDT	screw	1	10mA-6A	6	R600	cULus (pending)		**RB 121-24VDC**	**1SNA 645 064 R0100**	282
		1 SPDT	screw	1	1 mA-6A	6	R600	cULus (pending)		**RB 121-24VDC**	**1SNA 645 065 R0200**	283
		1 SPDT	screw	1	10mA-6A	6	R600	cULus SP (pending) GL LRS		**RB 121A-24VAC/DC**	**1SNA 645 001 R0300**	282
		1 SPDT	screw	1	1 mA-6A	6	R600	cULus SP (pending) GL LRS		RB 121A-24VAC/DC	1SNA **645 005** R0700	283
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	**D 2,5/5-R121-24VDC**	**1SNA 607 217 R0200**	286
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	**D 2,5/5-R121L-24VDC**	**1SNA 607 201 R1300**	286
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	D 2,5/5-R121L-24VAC/DC	1SNA **607 231** R0000	286
		1 SPDT	screw	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	I	RB 121AI-24VAC/DC	1SNA **645 032** R2100	284
		1 SPDT	screw	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	Is	RB 121AI-24VAC/DC	1SNA **645 009** R1300	284
		1 SPDT	screw	1	1mA-6A	12	R600	cULus SP (pending) GL LRS	I	RB 121AI-24VAC/DC	1SNA **645 033** R2200	284
		1 SPDT	screw	1	1mA-6A	12	R600	cULus SP (pending) GL LRS	Is	RB 121AI-24VAC/DC	1SNA **645 010** R0700	284
		1 SPDT	spring	1	10mA-6A	6	R600	cULus (pending)		RBR 121-24VDC	1SNA **645 564** R0300	282
		1 SPDT	spring	1	1 mA-6A	6	R600	cULus (pending)		RBR 121-24VDC	1SNA **645 565** R0400	283
		1 SPDT	spring	1	10mA-6A	6	R600	cULus SP (pending) GL LRS		RBR 121A-24VAC/DC	1SNA **645 501** R0500	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus SP (pending) GL LRS		RBR 121A-24VAC/DC	1SNA **645 505** R0100	283
		1 SPDT	spring	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	I	RBR 121AI-24VAC/DC	1SNA **645 532** R2300	284
		1 SPDT	spring	1	10mA-6A	12	R600	cULus SP (pending) GL LRS	Is	RBR 121AI-24VAC/DC	1SNA **645 509** R1500	284
		1 SPDT	spring	1	1mA-6A	12	R600	cULus SP (pending) GL LRS	I	RBR 121AI-24VAC/DC	1SNA **645 533** R2400	284
		1 SPDT	spring	1	1mA-6A	12	R600	cULus SP (pending) GL LRS	Is	RBR 121AI-24VAC/DC	1SNA **645 510** R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800	cULus		**RB 121A-24VAC/DC**	**1SNA 610 004 R0700**	290
		1 SPDT	screw	1	5mA-3A	18	R1800		C, V	RB 121CV-24VAC/DC orange	1SNA **010 184** R1200	292
		1 SPDT	screw	1	1µA-5A	18	R1800		C, V	RB 121CV-24VAC/DC orange	1SNA **010 154** R2300	292
		1 SPDT	screw	1	1mA-6A	11,5	R900	cULus		RB 121A-24VAC/DC	1SNA **630 002** R0100	296
		1 SPDT	screw	1	1mA-6A	11,5	R900	cULus	I	RB 121AI-24VAC/DC	1SNA **630 007** R0600	297
		1 SPDT	screw	1	10mA-10A	17,8	R20000	SP NRTL/C		RM 121A-24VAC/DC	1SNA **020 042** R2000	300
		1 SPDT	screw	1	10mA-16A	22,5	R20000	SP NRTL/C		RM 121-24VDC	1SNA **020 046** R2400	300
		1 SPDT	screw	4	10mA-16A	89	R20000	UL		RM 421A-24VAC/DC	1SNA **020 054** R2400	301
		1 SPDT	screw	8	10mA-16A	165	R20000	UL		RM 821A-24VAC/DC	1SNA **020 070** R0000	301
		1 SPDT	screw	16	10mA-16A	325	R20000	UL		RM 1621A-24VAC/DC	1SNA **020 086** R1500	301
		1 SPDT	screw	4	1mA-8A	63,5	R20000		Negative	RM 421N-24VDC	1SNA **020 604** R0100	302
		1 SPDT	screw	8	1mA-8A	132	R20000		Negative	RM 821N-24VDC	1SNA **020 112** R1300	302
		1 SPDT	screw	16	1mA-8A	252	R20000		Negative	RM 1621N-24VDC	1SNA **020 113** R1400	302

Notes :

P Pluggable relays
R Leakage current protection
I External switch to force the coil
Is Internal switch to force the coil
V Overvoltage protection with varistor
C Static sensor compatible
Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications : GL, LRS

2CDC110004C0207

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
DC input	24 VDC	1 SPDT	screw	4	1mA-8A	63,5	R20000		Positive	RM 421P-24VDC	1SNA **020 605** R0200	302
		1 SPDT	screw	8	1mA-8A	132	R20000		Positive	RM 821P-24VDC	1SNA **020 114** R1500	302
		1 SPDT	screw	16	1mA-8A	252	R20000		Positive	RM 1621P-24VDC	1SNA **020 115** R1600	302
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-24VAC/DC**	**1SNA 645 012 R2500**	285
		1 DPDT	spring	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		RBR 122A-24VAC/DC	1SNA **645 512** R2700	285
		1 DPDT	screw	1	10mA-5A	18	R1800	cULus	V	**RBR 122AV-24VAC/DC**	**1SNA 610 121 R2000**	294
		1 DPDT	screw	1	0,1µA-5A	18	R1800	cULus		RB 122-24VDC	1SNA **610 059** R1500	294
		1 DPDT	screw	1	100mA-7A	15	R900		V	RB 122-24VDC	1SNA **630 019** R0100	298
		1 DPDT	screw	1	10µA-3A	11,5	R900			RB 122A-24VAC/DC	1SNA **630 011** R2100	298
		1 DPDT	screw	1	10mA-5A	23	R20000	CSA NRTL/C		RM 122A-24VAC/DC	1SNA **020 106** R2600	303
		1 DPDT	screw	1	10mA-5A	23	R20000	CSA NRTL/C		RM 122-24VDC	1SNA **020 139** R2600	303
		1 DPDT	screw	4	10mA-5A	76	R20000	UL	Negative	RM 422N-24VDC	1SNA **020 144** R2300	304
		1 DPDT	screw	4	10mA-5A	76	R20000	UL	Positive	RM 422P-24VDC	1SNA **020 146** R2500	304
		1 DPDT	screw	4	100mA-4A	76	R20000		Negative	RM 422N-24VDC	1SNA **020 672** R0400	305
		1 DPDT	screw	4	100mA-4A	76	R20000		Positive	RM 422P-24VDC	1SNA **020 673** R0500	305
		1 DPDT	screw	8	100mA-4A	159	R20000		Negative	RM 822N-24VDC	1SNA **020 149** R0000	305
		1 DPDT	screw	8	100mA-4A	159	R20000		Positive	RM 822P-24VDC	1SNA **020 492** R1100	305
		1 DPDT	screw	16	100mA-4A	300	R20000		Negative	RM 1622N-24VDC	1SNA **020 151** R2200	305
		1 DPDT	screw	16	100mA-4A	300	R20000		Positive	RM 1622P-24VDC	1SNA **020 493** R1200	305
	48 VDC	1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-48-60VAC/DC**	**1SNA 645 015 R2000**	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-48-60VAC/DC	1SNA **645 515** R2200	281
		1 NO	screw	1	10mA-8A	12,7	R20000			RM 111-48VDC	1SNA **020 033** R1700	299
		4 NO	screw	1	0,1µA-5A	18	R1800			RB 114A-48VAC/DC	1SNA **010 127** R1000	289
		1 NO + 1 NC	screw	1	10mA-5A	18	R1800		C, V	RB 131CV-48VDC	1SNA **010 182** R1000	288
		1 NO + 1 NC	screw	1	1µA-5A	18	R1800		V	RB 131CV-48VDC	1SNA **010 152** R2100	288
		1 NO + 1 NC	screw	1	1µA-8A	18	R1800			RB 310-48VDC Bistable	1SNA **010 064** R2400	289
		1 SPDT	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-48-60VAC/DC**	**1SNA 645 002 R0400**	282
		1 SPDT	screw	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RB 121A-48-60VAC/DC	1SNA **645 006** R0000	283
		1 SPDT	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-48-60VAC/DC	1SNA **645 502** R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-48-60VAC/DC	1SNA **645 506** R0200	283
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	D 2,5/5-R121L-48VAC/DC	1SNA **607 232** R0100	286
		1 SPDT	screw	1	10mA-8A	18	R1800		V	**RB 121AV-48VAC/DC**	**1SNA 610 006 R0100**	290
		1 SPDT	screw	1	5mA-3A	18	R1800		C, V	RB 121CV-48VDC orange	1SNA **010 185** R1300	292
		1 SPDT	screw	1	1µA-5A	18	R1800		C, V	RB 121CV-48VDC orange	1SNA **010 155** R2400	292
		1 SPDT	screw	1	1mA-5A	11,5	R900			RB 121A-48VAC/DC	1SNA **630 003** R0200	296
		1 SPDT	screw	1	10mA-10A	17,8	R20000			RM 121A-48VAC/DC	1SNA **020 043** R2100	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-48VAC/DC	1SNA **020 051** R2100	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-48VAC/DC	1SNA **020 067** R2100	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-48VAC/DC	1SNA **020 083** R1200	301
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-48-60VAC/DC**	**1SNA 645 040 R1500**	285
		1 DPDT	spring	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		RBR 122A-48-60VAC/DC	1SNA **645 540** R1700	285
		1 DPDT	screw	1	10mA-5A	18	R1800		V	**RB 122AV-48VAC/DC**	**1SNA 610 122 R2100**	294
		1 DPDT	screw	1	0,1µA-5A	18	R1800			RB 122-48VDC	1SNA **610 060** R1200	294
		1 DPDT	screw	1	10mA-5A	23	R20000	CSA NRTL/C		RM 122A-48VAC/DC	1SNA **020 107** R2700	303
		1 DPDT	screw	4	10mA-5A	76	R20000		Negative	RM 422N-48VDC	1SNA **020 145** R2400	304
		1 DPDT	screw	4	10mA-5A	76	R20000		Positive	RM 422P-48VDC	1SNA **020 147** R2600	304
	60 VDC	1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-48-60VAC/DC**	**1SNA 645 015 R2000**	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-48-60VAC/DC	1SNA **645 515** R2200	281
		1 SPDT	screw	1	10mA-4A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-48-60VAC/DC**	**1SNA 645 002 R0400**	282

Notes :

P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

V Overvoltage protection with varistor
C Static sensor compatible

Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications : GL, LRS

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
DC input	60 VDC	1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-48-60VAC/DC	1SNA **645 006** R0000	283
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-48-60VAC/DC	1SNA **645 502** R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-48-60VAC/DC	1SNA **645 506** R0200	283
		1 DPDT	screw	1	1mA-8A	12	R600	(pending) LRS		**RB 122A-48-60VAC/DC**	**1SNA 645 040 R1500**	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-48-60VAC/DC	1SNA **645 540** R1700	285
	110-115 VDC	1 NO	screw	1	10mA-6A	6	R600	(pending) LRS		**RB 111A-115VAC/DC**	**1SNA 645 016 R2100**	281
		1 NO	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 111A-115VAC/DC	1SNA **645 516** R2300	281
		1 NO	screw	1	10mA-8A	12,7	R20000			RM 111-110VDC	1SNA **020 034** R1000	299
		1 NO	screw	1	10mA-8A	12,7	R20000			RM 111A-110VAC/DC	1SNA **020 323** R2600	299
		1 SPDT	screw	1	10mA-6A	6	R600	(pending) LRS		**RB 121A-115VAC/DC**	**1SNA 645 003 R0500**	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-115VAC/DC	1SNA **645 007** R0100	283
		1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS	R	RB 121AR-115VAC/DC	1SNA **645 046** R0700	284
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-115VAC/DC	1SNA **645 503** R0700	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-115VAC/DC	1SNA **645 507** R0300	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS	R	RBR 121AR-115VAC/DC	1SNA **645 546** R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800			**RB 121A-110-230VAC/DC**	**1SNA 610 132 R2300**	290
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA **010 226** R2300	291
		1 SPDT	screw	1	10mA-8A	18	R1800		R	RB 121AR1-110VAC/DC	1SNA **010 158** R0700	291
		1 SPDT	screw	1	10mA-8A	18	R1800		R	RB 121AR2-110VAC/DC	1SNA **010 168** R0100	291
		1 SPDT	screw	1	100mA-8A	17,8	R20000			RM 121A-115VAC/DC	1SNA **020 044** R2200	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-110VAC/DC	1SNA **020 052** R2200	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-110VAC/DC	1SNA **020 068** R0200	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-110VAC/DC	1SNA **020 084** R1300	301
		1 DPDT	screw	1	1mA-8A	12	R600	(pending) LRS		**RB 122A-115VAC/DC**	**1SNA 645 041 R0200**	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-115VAC/DC	1SNA **645 541** R0400	285
		1 DPDT	screw	1	10mA-5A	23	R1800		R	**RB 122AR-110VAC/DC**	**1SNA 610 011 R2600**	294
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-115VAC/DC	1SNA **020 141** R2000	303
		1 DPDT	screw	8	100mA-4A	159	R20000			RM 822A-110VAC/DC	1SNA **020 150** R0500	305
		1 DPDT	screw	16	100mA-4A	300	R20000			RM 1622A-110VAC/DC	1SNA **020 152** R2300	305
	135 VDC	1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA **010 226** R2300	291
		1 DPDT	screw	1	10mA-3A	18	R1800		R	**RB 122AR-135VAC/DC**	**1SNA 010 228 R0500**	295
	230 VDC	1 NO	screw	1	10mA-6A	6	R600	(pending) LRS		**RB 111A-230VAC/DC**	**1SNA 645 017 R2200**	281
		1 NO	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 111A-230VAC/DC	1SNA **645 517** R2400	281
		1 SPDT	screw	1	10mA-6A	6	R600	(pending) LRS		**RB 121A-230VAC/DC**	**1SNA 645 004 R0400**	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-230VAC/DC	1SNA **645 008** R1200	283
		1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS	R	RB 121AR-230VAC/DC	1SNA **645 011** R2400	284
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-230VAC/DC	1SNA **645 504** R0000	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-230VAC/DC	1SNA **645 508** R1400	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS	R	RBR 121AR-230VAC/DC	1SNA **645 511** R2600	284
		1 SPDT	screw	1	10mA-8A	18	R1800			**RB 121A-110-230VAC/DC**	**1SNA 610 132 R2300**	290
		1 SPDT	screw	1	100mA-8A	17,8	R20000			RB 121A-230VAC/DC	1SNA **020 045** R2300	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-220VAC/DC	1SNA **020 053** R2300	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-220VAC/DC	1SNA **020 069** R0300	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-220VAC/DC	1SNA **020 085** R1400	301
		1 DPDT	screw	1	1mA-8A	12	R600	(pending) LRS		**RB 122A-230VAC/DC**	**1SNA 645 013 R2600**	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-230VAC/DC	1SNA **645 513** R2000	285
		1 DPDT	screw	1	10mA-5A	23	R1800		V, R	**RB 122AV-230VAC/DC**	**1SNA 610 123 R2200**	294
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-230VAC/DC	1SNA **020 142** R2100	303
	60-230 VDC	1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS		RB 121 A 60-230VAC/DC	1SNA **645 020** R0100	284
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS		RBR 121 A 60-230VAC/DC	1SNA **645 520** R0300	284

Notes :

P Pluggable relays
R Leakage current protection
I External switch to force the coil
Is Internal switch to force the coil
V Overvoltage protection with varistor
C Static sensor compatible
Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications : GL, LRS

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
AC input	24 VAC	1 NC	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	**RB 101AR-24VAC/DC**	**1SNA 645 019 R0400**	281
		1 NC	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	RBR 101AR-24VAC/DC	1SNA **645 519** R0600	281
		1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-24VAC/DC**	**1SNA 645 014 R2700**	281
		1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS	Is	RB 111AI-24VAC/DC	1SNA **645 063** R0000	281
		1 NO	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	RB 111AR-24VAC/DC	1SNA **645 018** R0300	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-24VAC/DC	1SNA **645 514** R2100	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS	Is	RBR 111AI-24VAC/DC	1SNA **645 563** R0200	281
		1 NO	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	RBR 111AR-24VAC/DC	1SNA **645 518** R0500	281
		4 NO	screw	1	0,1µA-5A	18	R1800			RB 114A-24VAC/DC	1SNA **010 126** R1700	289
		1 SPDT	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-24VAC/DC**	**1SNA 645 001 R0300**	282
		1 SPDT	screw	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RB 121A-24VAC/DC	1SNA **645 005** R0700	283
		1 SPDT	screw	1	10mA-6A	5,08	R600		P	**D 2,5/5-R121L-24VAC/DC**	**1SNA 607 231 R0000**	286
		1 SPDT	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	I	RB 121AI-24VAC/DC	1SNA **645 032** R2100	284
		1 SPDT	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	Is	RB 121AI-24VAC/DC	1SNA **645 009** R1300	284
		1 SPDT	screw	1	1mA-6A	12	R600	cULus CSA (pending) GL LRS	I	RB 121AI-24VAC/DC	1SNA **645 033** R2200	284
		1 SPDT	screw	1	1mA-6A	12	R600	cULus CSA (pending) GL LRS	Is	RB 121AI-24VAC/DC	1SNA **645 010** R0700	284
		1 SPDT	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-24VAC/DC	1SNA **645 501** R0500	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-24VAC/DC	1SNA **645 505** R0100	283
		1 SPDT	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	I	RBR 121AI-24VAC/DC	1SNA **645 532** R2300	284
		1 SPDT	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	Is	RBR 121AI-24VAC/DC	1SNA **645 509** R1500	284
		1 SPDT	spring	1	1mA-6A	12	R600	cULus CSA (pending) GL LRS	I	RBR 121AI-24VAC/DC	1SNA **645 533** R2400	284
		1 SPDT	spring	1	1mA-6A	12	R600	cULus CSA (pending) GL LRS	Is	RBR 121AI-24VAC/DC	1SNA **645 510** R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800	cULus		**RB 121A-24VAC/DC**	**1SNA 610 004 R0700**	290
		1 SPDT	screw	1	1mA-6A	11,5	R900	cULus		RB 121A-24VAC/DC	1SNA **630 002** R0100	296
		1 SPDT	screw	1	1mA-6A	11,5	R900	cULus	I	RB 121AI-24VAC/DC	1SNA **630 007** R0600	297
		1 SPDT	screw	1	10mA-10A	17,8	R20000	CSA NRTL/C		RM 121A-24VAC/DC	1SNA **020 042** R2000	300
		1 SPDT	screw	4	10mA-16A	89	R20000	UL		RM 421A-24VAC/DC	1SNA **020 054** R2400	301
		1 SPDT	screw	8	10mA-16A	165	R20000	UL		RM 821A-24VAC/DC	1SNA **020 070** R0000	301
		1 SPDT	screw	16	10mA-16A	325	R20000	UL		RM 1621A-24VAC/DC	1SNA **020 086** R1500	301
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-24VAC/DC**	**1SNA 645 012 R2500**	285
		1 DPDT	spring	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		RBR 122A-24VAC/DC	1SNA **645 512** R2700	285
		1 DPDT	screw	1	10mA-5A	18	R1800	cULus	V	**RBR 122AV-24VAC/DC**	**1SNA 610 121 R2000**	294
		1 DPDT	screw	1	10µA-3A	11,5	R900			RB 122A-24VAC/DC	1SNA **630 011** R2100	298
		1 DPDT	screw	1	10mA-5A	23	R20000	CSA NRTL/C		RM 122A-24VAC/DC	1SNA **020 106** R2600	303
	48 VAC	1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-48-60VAC/DC**	**1SNA 645 015 R2000**	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-48-60VAC/DC	1SNA **645 515** R2200	281
		4 NO	screw	1	0,1µA-5A	18	R1800			RB 114A-48VAC/DC	1SNA **010 127** R1000	289
		1 SPDT	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-48-60VAC/DC**	**1SNA 645 002 R0400**	282
		1 SPDT	screw	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RB 121A-48-60VAC/DC	1SNA **645 006** R0000	283
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	**D 2,5/5-R121L-48VAC/DC**	**1SNA 607 232 R0100**	286
		1 SPDT	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-48-60VAC/DC	1SNA **645 502** R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-48-60VAC/DC	1SNA **645 506** R0200	283
		1 SPDT	screw	1	10mA-8A	18	R1800		V	**RB 121AV-48VAC/DC**	**1SNA 610 006 R0100**	290
		1 SPDT	screw	1	1mA-6A	11,5	R900			RB 121A-48VAC/DC	1SNA **630 003** R0200	296
		1 SPDT	screw	1	10mA-10A	17,8	R20000			RM 121A-48VAC/DC	1SNA **020 043** R2100	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-48VAC/DC	1SNA **020 051** R2100	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-48VAC/DC	1SNA **020 067** R2100	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-48VAC/DC	1SNA **020 083** R1200	301
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-48-60VAC/DC**	**1SNA 645 040 R1500**	285

Notes :

P Pluggable relays
R Leakage current protection
I External switch to force the coil
Is Internal switch to force the coil
V Overvoltage protection with varistor
C Static sensor compatible
Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications : GL, LRS

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
AC input	48 VAC	1 DPDT	spring	1	1mA-8A	12	R600	cULus		RBR 122A-48-60VAC/DC	1SNA **645 540** R1700	285
		1 DPDT	screw	1	10mA-5A	18	R1800		V	**RB 122AV-48VAC/DC**	**1SNA 610 122 R2100**	294
		1 DPDT	screw	1	10mA-5A	23	R20000	CSA NRTL/C		RM 122A-48VAC/DC	1SNA **020 107** R2700	303
	60 VAC	1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-48-60VAC/DC**	**1SNA 645 015 R2000**	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-48-60VAC/DC	1SNA **645 515** R2200	281
		1 SPDT	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-48-60VAC/DC**	**1SNA 645 002 R0400**	282
		1 SPDT	screw	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RB 121A-48-60VAC/DC	1SNA **645 006** R0000	283
		1 SPDT	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-48-60VAC/DC	1SNA **645 502** R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-48-60VAC/DC	1SNA **645 506** R0200	283
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-48-60VAC/DC**	**1SNA 645 040 R1500**	285
		1 DPDT	spring	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		RBR 122A-48-60VAC/DC	1SNA **645 540** R1700	285
	110-115 VAC	1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-115VAC/DC**	**1SNA 645 016 R2100**	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-115VAC/DC	1SNA **645 516** R2300	281
		1 NO	screw	1	10mA-6A	12,7	R20000	CSA		RM 111A-110VAC/DC	1SNA **020 323** R2600	299
		1 NO + 1 NC	screw	1	10mA-5A	18	R1800		C, V, R	RB 131BCVR-110VAC/DC	1SNA **010 183** R1100	288
		1 NO + 1 NC	screw	1	1µA-5A	18	R1800		C, V, R	RB 131BCVR-110VAC	1SNA **010 153** R2200	288
		1 SPDT	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-115VAC/DC**	**1SNA 645 003 R0500**	282
		1 SPDT	screw	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RB 121A-115VAC/DC	1SNA **645 007** R0100	283
		1 SPDT	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	**RB 121AR-115VAC/DC**	**1SNA 645 046 R0700**	284
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	**D 2,5/5-R121L-110VAC**	**1SNA 607 264 R1100**	286
		1 SPDT	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-115VAC/DC	1SNA **645 503** R0700	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-115VAC/DC	1SNA **645 507** R0300	283
		1 SPDT	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	RBR 121AR-115VAC/DC	1SNA **645 546** R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA **010 226** R2300	291
		1 SPDT	screw	1	10mA-8A	18	R1800	cULus		**RB 121A-110-230VAC/DC**	**1SNA 610 132 R2300**	290
		1 SPDT	screw	1	10mA-8A	18	R1800	CSA NRTL/C UL	R	RB 121AR1-110VAC/DC	1SNA **010 158** R0700	291
		1 SPDT	screw	1	10mA-8A	18	R1800	CSA	R	RB 121AR2-110VAC/DC	1SNA **010 168** R0100	291
		1 SPDT	screw	1	5mA-3A	18	R1800		C, V, R	RB 121BCVR-110VAC orange	1SNA **010 186** R1400	292
		1 SPDT	screw	1	1µA-5A	18	R1800		C, V, R	RB 121BCVR-110VAC orange	1SNA **010 156** R2500	292
		1 SPDT	screw	1	1mA-5A	11,5	R900			RB 121A-110VAC 50 Hz	1SNA **630 004** R0300	297
		1 SPDT	screw	1	1mA-5A	11,5	R900	cULus		RB 121A-115VAC 60 Hz	1SNA **630 005** R0400	297
		1 SPDT	screw	1	100mA-8A	17,8	R20000	CSA NRTL/C		RM 121A-115VAC/DC	1SNA **020 044** R2200	300
		1 SPDT	screw	4	10mA-10A	89	R20000	UL		RM 421A-110VAC/DC	1SNA **020 052** R2200	301
		1 SPDT	screw	8	10mA-10A	165	R20000	UL		RM 821A-110VAC/DC	1SNA **020 068** R0200	301
		1 SPDT	screw	16	10mA-10A	325	R20000	UL		RM 1621A-110VAC/DC	1SNA **020 084** R1300	301
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-115VAC/DC**	**1SNA 645 041 R0200**	285
		1 DPDT	spring	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		RBR 122A-115VAC/DC	1SNA **645 541** R0400	285
		1 DPDT	screw	1	10mA-5A	23	R1800	cULus	R	**RB 122AR-110VAC/DC**	**1SNA 610 011 R2500**	294
		1 DPDT	screw	1	10mA-3A	18	R1800		R	RB 122AR-135VAC/DC	1SNA **010 228** R0500	295
		1 DPDT	screw	1	0,1µA-5A	23	R1800	cULus	V, R	RB 122BR-110VAC	1SNA **610 115** R2200	294
		1 DPDT	screw	1	100mA-7A	15	R900		V	RB 122A-110VAC 50 Hz	1SNA **630 021** R2300	298
		1 DPDT	screw	1	100mA-7A	15	R900		V	RB 122A-115VAC 60 Hz	1SNA **630 022** R2400	298
		1 DPDT	screw	1	10mA-5A	23	R20000	CSA NRTL/C		RM 122A-115VAC/DC	1SNA **020 141** R2000	303
		1 DPDT	screw	8	100mA-4A	159	R20000			RM 822A-110VAC/DC	1SNA **020 150** R0500	305
		1 DPDT	screw	16	100mA-4A	300	R20000			RM 1622A-110VAC/DC	1SNA **020 152** R2300	305

Notes :

P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

V Overvoltage protection with varistor
C Static sensor compatible

Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications : GL, LRS

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
AC input	135 VAC	1 SPDT	screw	1	10mA-8A	18	R1800	CSA NRTL/C		RB 121A-110-135VAC/DC	1SNA **010 226** R**23**00	291
		1 DPDT	screw	1	10mA-3A	18	R1800	CSA NRTL/C	R	**RB 122AR-135VAC/DC**	**1SNA 010 228 R0500**	295
	230 VAC	1 NO	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 111A-230VAC/DC**	**1SNA 645 017 R2200**	281
		1 NO	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 111A-230VAC/DC	1SNA **645 517** R**24**00	281
		1 SPDT	screw	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		**RB 121A-230VAC/DC**	**1SNA 645 004 R0400**	282
		1 SPDT	screw	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RB 121A-230VAC/DC	1SNA **645 008** R**12**00	283
		1 SPDT	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	**RB 121AR-230VAC/DC**	**1SNA 645 011 R2400**	284
		1 SPDT	screw	1	10mA-6A	5,08	R500	cULus (pending)	P	**D 2,5/5-R121L-230VAC/DC**	**1SNA 607 265 R1200**	286
		1 SPDT	spring	1	10mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-230VAC/DC	1SNA **645 504** R**00**00	282
		1 SPDT	spring	1	1mA-6A	6	R600	cULus CSA (pending) GL LRS		RBR 121A-230VAC/DC	1SNA **645 508** R**14**00	283
		1 SPDT	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS	R	RBR 121AR-230VAC/DC	1SNA **645 511** R**26**00	284
		1 SPDT	screw	1	10mA-8A	18	R1800	cULus		**RB 121A-110-230VAC/DC**	**1SNA 610 132 R2300**	290
		1 SPDT	screw	1	1mA-5A	11,5	R900			RB 121A-230VAC	1SNA **630 006** R**05**00	297
		1 SPDT	screw	1	100mA-8A	17,8	R20000			RM 121A-230VAC/DC	1SNA **020 045** R**23**00	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-220VAC/DC	1SNA **020 053** R**23**00	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-220VAC/DC	1SNA **020 069** R**03**00	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-220VAC/DC	1SNA **020 085** R**14**00	301
		1 DPDT	screw	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		**RB 122A-230VAC/DC**	**1SNA 645 013 R2600**	285
		1 DPDT	spring	1	1mA-8A	12	R600	cULus CSA (pending) GL LRS		RBR 122A-230VAC/DC	1SNA **645 513** R**20**00	285
		1 DPDT	screw	1	0,1µA-5A	23	R1800		R	**RB 122BR-230VAC**	**1SNA 610 089 R0400**	294
		1 DPDT	screw	1	10mA-5A	23	R1800		V, R	**RBR 122AV-230VAC/DC**	**1SNA 610 123 R2200**	294
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-230VAC/DC	1SNA **020 142** R**21**00	303
	60-230 VAC	1 SPDT	screw	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS		RB 121 A 60-230VAC/DC	1SNA **645 020** R**01**00	284
		1 SPDT	spring	1	10mA-6A	12	R600	cULus CSA (pending) GL LRS		RBR 121 A 60-230VAC/DC	1SNA **645 520** R**03**00	284

Notes :

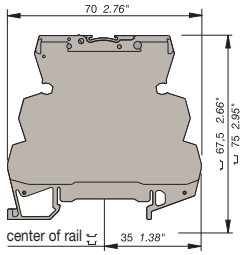
P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

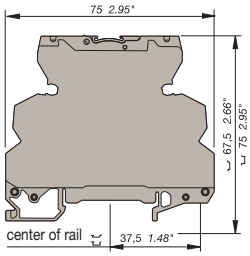
V Overvoltage protection with varistor
C Static sensor compatible

Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

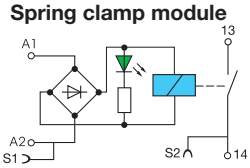
High runners in bold characters
Marine Certifications : GL, LRS



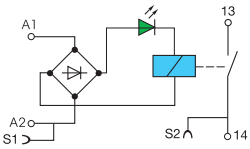
Screw clamp module



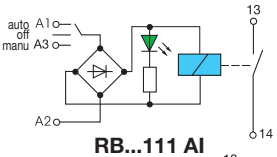
Spring clamp module



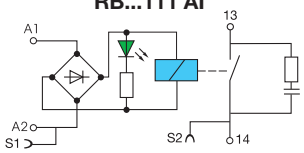
RB...111 A - 24 V AC/DC



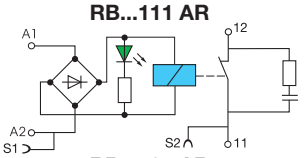
RB...111 A48-60-115-230 V AC/DC



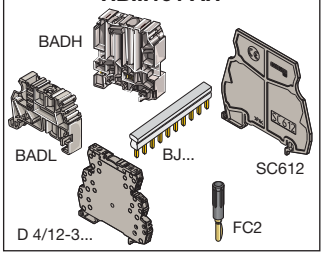
RB...111 AI



RB...111 AR



RB...101 AR

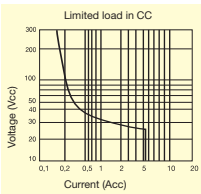


Relay : 1NO or 1NC high level contact 10 mA to 6 A - 6 mm .236" or 12 mm .472" spacing

Characteristics

Relay characteristics	RB 111 A					RB 111 AI	RB 111 AR	RB 101 AR
COIL								
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	24 VAC/DC	48 VAC/DC	60 VAC/DC	115 VAC/DC	±10% on AC +10% -15% on DC 230 VAC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,24 W	0,34 W	0,54 W	0,46 W	0,8 W	0,24 W	0,24 W	0,24 W
Rated current	10 mA	7 mA	9 mA	4 mA	3,5 mA	10 mA	10 mA	10 mA
Drop-out voltage at 20°C	4,5 V	8 V	8 V	17 V	27 V	4,5 V	4,5 V	4,5 V
Status device	green LED						green LED	green LED
CONTACT								
Type	1 NO						1 NO + RC	1 NC + RC
Voltage switching range min./max.	12 V / 250 V AC							
Current switching range min./max.	10 mA / 6 A							
Load switching range								
AC1 min. / max.	0,6 VA / 1500 VA (ohmic load)							
DC1 min. / max.	0,6 W / 140 W							
Number of on-load operations	10^5 on AC15							
Number of off-load operations	10^7							
Operating speed F	5 ms	5 ms	5 ms	6 ms	7 ms	5 ms	5 ms	5 ms
O	8 ms	8 ms	8 ms	15 ms	15 ms	8 ms	8 ms	8 ms
Bounce	1,2 ms					1,2 ms	1,2 ms	
Insulation coil / contact	4000 V RMS						3800 V RMS	4000 V RMS
Resistance to shock coil / contact	4000 V RMS							
Insulation contact / contact	1000 V RMS							
Ambient temperature storage	-40°C to +80°C							
operating	-20°C to +70°C (1)							

Other characteristics	Screw clamp	Spring clamp
Body material grey	UL 94 V0	UL 94 V0
Wire Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size	2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length	9 mm .354"	9 mm .354"
Recommended screwdriver	3,5 mm .137"	3,5 mm .137"
Protection	IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals	c UL us, SP (pending), GL, LRS, CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	



(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

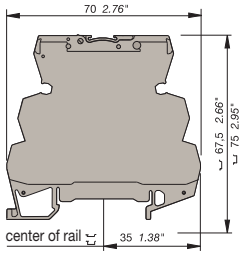
	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

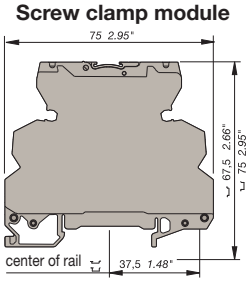
Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 NO high level 6 mm spacing	RB 111 A-24VAC/DC	1SNA **645 014** R**2700**	10	0,02
Relay module 1 NO high level 6 mm spacing	RB 111 A-48-60VAC/DC	1SNA **645 015** R**2000**	10	0,02
Relay module 1 NO high level 6 mm spacing	RB 111 A-115VAC/DC	1SNA **645 016** R**2100**	10	0,02
Relay module 1 NO high level 6 mm spacing	RB 111 A-230VAC/DC	1SNA **645 017** R**2200**	10	0,02
Relay mod. 1 NO high level w/safety switch 6 mm sp.	RB 111 AI-24VAC/DC	1SNA **645 063** R**0000**	10	0,02
Relay mod. 1 NO high level w/contact protection 12 mm sp.	RB 111 AR-24VAC/DC	1SNA **645 018** R**0300**	5	0,03
Relay mod. 1 NC high level w/contact protection 12 mm sp.	RB 101 AR-24VAC/DC	1SNA **645 019** R**0400**	5	0,03
Relay module 1 NO high level 6 mm spacing	RBR 111 A-24VAC/DC	1SNA **645 514** R**2100**	10	0,02
Relay module 1 NO high level 6 mm spacing	RBR 111 A-48-60VAC/DC	1SNA **645 515** R**2200**	10	0,02
Relay module 1 NO high level 6 mm spacing	RBR 111 A-115VAC/DC	1SNA **645 516** R**2300**	10	0,02
Relay module 1 NO high level 6 mm spacing	RBR 111 A-230VAC/DC	1SNA **645 517** R**2400**	10	0,02
Relay mod. 1 NO high level w/safety switch 6 mm sp.	RBR 111 AI-24VAC/DC	1SNA **645 563** R**0200**	10	0,02
Relay mod. 1 NO high level w/contact protection 12 mm sp.	RBR 111 AR-24VAC/DC	1SNA **645 518** R**0500**	5	0,03
Relay mod. 1 NC high level w/contact protection 12 mm sp.	RBR 101 AR-24VAC/DC	1SNA **645 519** R**0600**	5	0,03

Accessories

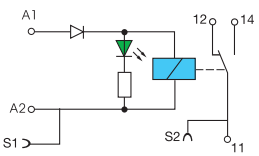
End section	BADH V0	1SNA **116 900** R**2700**	50	
	BADL V0	1SNA **399 903** R**0200**	50	
	BAM2 V0	1SNA **399 967** R**0100**	50	
Separator end section	SC 612	1SNA **290 474** R**0200**	10	
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R**0100**	10	
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R**0200**	10	
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R**2000**	5	
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R**2200**	5	
Test plug DIA. 2 mm	FC2	1SNA **007 865** R**2600**	10	
Marking method	RC65 RC610	see marking		



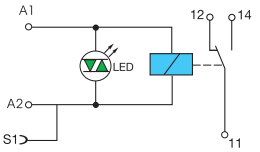
Screw clamp module



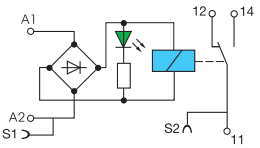
Spring clamp module



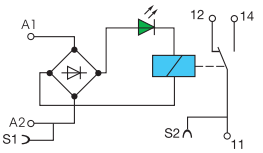
RB...121 - 5 V DC



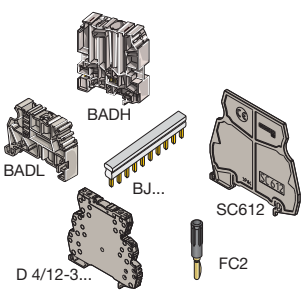
RB...121 - 12-24 V DC



RB...121 A - 24 V AC/DC



RB...121 A
48-60-115-230 V AC/DC



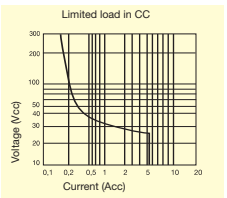
Relay : 1 SPDT high level contact 10 mA to 6 A - 6 mm *.236*" spacing

Characteristics

Relay characteristics	RB 121			RB 121A				
COIL								±10% on AC +10% -15% on DC
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	5 V DC	12 V DC	24 V DC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC
Frequency				50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,2 W	0,2 W	0,28 W	0,24 W	0,33 W	0,54 W	0,46 W	0,8 W
Rated current	40 mA	16 mA	12 mA	10 mA	7 mA	9 mA	4 mA	3,5 mA
Drop-out voltage at 20°C	1,2 V	2,2 V	1,2 V	4,5 V	8 V	8 V	17 V	27 V
Status device	green LED							
CONTACT								
Type	1 SPDT							
Voltage switching range min./max.	12 V / 250 V AC							
Current switching range min./max.	10 mA / 6 A							
Load switching range								
AC1 min. / max.	0,6 VA / 1500 VA (ohmic load)							
DC1 min. / max.	0,6 W / 140 W							
Number of on-load operations	10^5 on AC15							
Number of off-load operations	10^7							
Operating speed F	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	6 ms	7 ms
O	8 ms	8 ms	8 ms	8 ms	8 ms	8 ms	15 ms	16 ms
Bounce	1,2 ms							
Insulation coil / contact	4000 V RMS							
Resistance to shock coil / contact	4000 V RMS							
Insulation contact / contact	1000 V RMS							
Ambient temperature storage	-40°C to +80°C							
operating	-20°C to +70°C (1)							

Other characteristics		Screw clamp	Spring clamp
Body material	grey	UL 94 V0	UL 94 V0
Wire	Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size	Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size		2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length		9 mm *.354*"	9 mm *.354*"
Recommended screwdriver		3,5 mm *.137*"	3,5 mm *.137*"
Protection		IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque		0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals		c UL us (pending for 12 V DC) , SIR (pending), GL , LRS , CE	
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



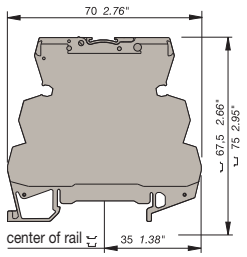
	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

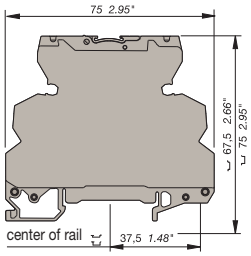
Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 SPDT high level	RB121- 5VDC	1SNA **645 034** R**2300**	10	0,02
Relay module 1 SPDT high level	RB 121-12VDC	1SNA **645 069** R**0000**	10	0,02
Relay module 1 SPDT high level	RB 121-24VDC	1SNA **645 064** R**0100**	10	0,02
Relay module 1 SPDT high level	RB 121 A-24VAC/DC	1SNA **645 001** R**0300**	10	0,02
Relay module 1 SPDT high level	RB 121 A-48-60VAC/DC	1SNA **645 002** R**0400**	10	0,02
Relay module 1 SPDT high level	RB 121 A-115VAC/DC	1SNA **645 003** R**0500**	10	0,02
Relay module 1 SPDT high level	RB 121 A-230VAC/DC	1SNA **645 004** R**0400**	10	0,02
Relay module 1 SPDT high level	RBR 121-5VDC	1SNA **645 534** R**2500**	10	0,02
Relay module 1 SPDT high level	RBR 121-12VDC	1SNA **645 569** R**0000**	10	0,02
Relay module 1 SPDT high level	RBR 121-24VDC	1SNA **645 564** R**0300**	10	0,02
Relay module 1 SPDT high level	RBR 121 A-24VAC/DC	1SNA **645 501** R**0500**	10	0,02
Relay module 1 SPDT high level	RBR 121 A-48-60VAC/DC	1SNA **645 502** R**0600**	10	0,02
Relay module 1 SPDT high level	RBR 121 A-115VAC/DC	1SNA **645 503** R**0700**	10	0,02
Relay module 1 SPDT high level	RBR 121 A-230VAC/DC	1SNA **645 504** R**0000**	10	0,02

Accessories

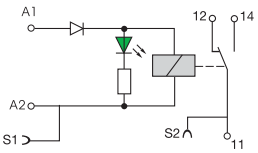
End section	BADH V0	1SNA **116 900** R**2700**	50	
	BADL V0	1SNA **399 903** R**0200**	50	
	BAM2 V0	1SNA **399 967** R**0100**	50	
Separator end section	SC 612	1SNA **290 474** R**0200**	10	
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R**0100**	10	
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R**0200**	10	
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R**2000**	5	
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R**2200**	5	
Test plug DIA. 2 mm	FC2	1SNA **007 865** R**2600**	10	
Marking method	RC65 RC610	see marking		



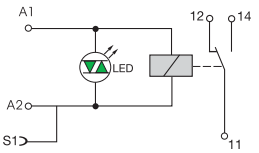
Screw clamp module



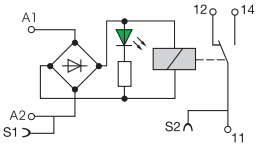
Spring clamp module



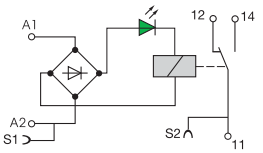
RB...121 - 5-12 V DC



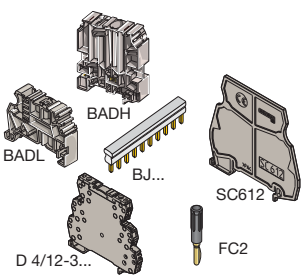
RB...121 - 24 V DC



RB...121 A - 24 V AC/DC



RB...121 A
48-60-115-230 V AC/DC

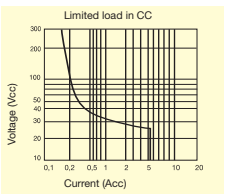


Relay : 1 SPDT low level contact 1 mA upto 6 A - 6 mm .236" spacing

Characteristics

Relay characteristics	RB 121			RB 121 A				
COIL								±10% on AC +10% -15% on DC
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	5 V DC	12 V DC	24 V DC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC
Frequency				50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,2 W	0,2 W	0,28 W	0,24 W	0,33 W	0,54 W	0,46 W	0,8 W
Rated current	40 mA	16 mA	12 mA	10 mA	7 mA	9 mA	4 mA	3,5 mA
Drop-out voltage at 20°C	1,2 V	2,2 V	1,2 V	4,5 V	8 V	8 V	17 V	27 V
Status device	green LED							
CONTACT								
Type	1 SPDT							
Voltage switching range min./max.	5 V / 250 V AC							
Current switching range min./max.	1 mA / 6 A							
Load switching range								
AC1 min. / max.	0,05 VA / 1500 VA (ohmic load)							
DC1 min. / max.	0,05 W / 140 W							
Number of on-load operations	10^5 on AC15							
Number of off-load operations	10^7							
Operating speed F	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	6 ms	7 ms
O	8 ms	8 ms	8 ms	8 ms	8 ms	8 ms	15 ms	16 ms
Bounce	1,2 ms							
Insulation coil / contact	4000 V RMS							
Resistance to shock coil / contact	4000 V RMS							
Insulation contact / contact	1000 V RMS							
Ambient temperature storage	-40°C to +80°C							
operating	-20°C to +70°C (1)							

Other characteristics		Screw clamp	Spring clamp
Body material	grey	UL 94 V0	UL 94 V0
Wire	Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size	Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size		2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length		9 mm .354"	9 mm .354"
Recommended screwdriver		3,5 mm .137"	3,5 mm .137"
Protection		IP20 NEMA1	IP20 NEMA1
Recommended torque		0,4 - 0,6 Nm 3.5 - 5.3 lb.in	0,4 - 0,6 Nm 3.5 - 5.3 lb.in
Approvals		c UL us (pending for 24 V DC) , CSA (pending) , GL , LRS , CE	
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	



(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

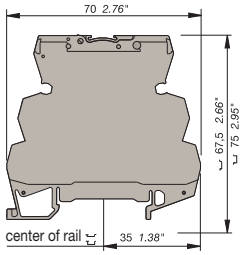
	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

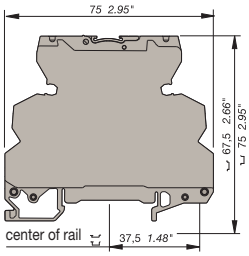
Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 SPDT low level	RB121- 5VDC	1SNA **645 036** R**2500**	10	0,02
Relay module 1 SPDT low level	RB 121-12VDC	1SNA **645 037** R**2600**	10	0,02
Relay module 1 SPDT low level	RB 121-24VDC	1SNA **645 065** R**0200**	10	0,02
Relay module 1 SPDT low level	RB 121 A-24VAC/DC	1SNA **645 005** R**0700**	10	0,02
Relay module 1 SPDT low level	RB 121 A-48-60VAC/DC	1SNA **645 006** R**0000**	10	0,02
Relay module 1 SPDT low level	RB 121 A-115VAC/DC	1SNA **645 007** R**0100**	10	0,02
Relay module 1 SPDT low level	RB 121 A-230VAC/DC	1SNA **645 008** R**1200**	10	0,02
Relay module 1 SPDT low level	RBR 121-5VDC	1SNA **645 536** R**2700**	10	0,02
Relay module 1 SPDT low level	RBR 121-12VDC	1SNA **645 537** R**2000**	10	0,02
Relay module 1 SPDT low level	RBR 121-24VDC	1SNA **645 565** R**0400**	10	0,02
Relay module 1 SPDT low level	RBR 121 A-24VAC/DC	1SNA **645 505** R**0100**	10	0,02
Relay module 1 SPDT low level	RBR 121 A-48-60VAC/DC	1SNA **645 506** R**0200**	10	0,02
Relay module 1 SPDT low level	RBR 121 A-115VAC/DC	1SNA **645 507** R**0300**	10	0,02
Relay module 1 SPDT low level	RBR 121 A-230VAC/DC	1SNA **645 508** R**1400**	10	0,02

Accessories

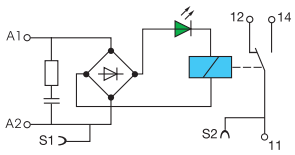
End section	BADH V0	1SNA **116 900** R**2700**	50
	BADL V0	1SNA **399 903** R**0200**	50
	BAM2 V0	1SNA **399 967** R**0100**	50
Separator end section	SC 612	1SNA **290 474** R**0200**	10
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R**0100**	10
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R**0200**	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R**2000**	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R**2200**	5
Test plug DIA. 2 mm	FC2	1SNA **007 865** R**2600**	10
Marking method	RC65 RC610	see marking	



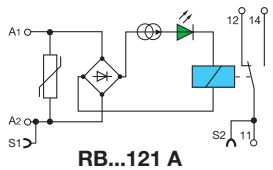
Screw clamp module



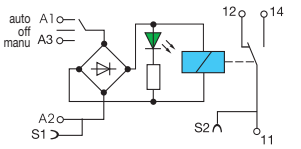
Spring clamp module



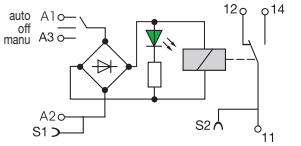
RB...121 AR



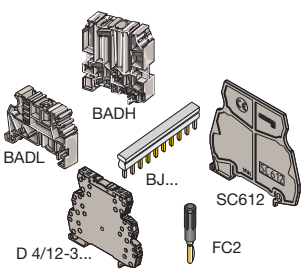
RB...121 A



RB...121 AI



RB...121 AI



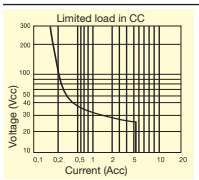
Relay : 1 SPDT high level with switch or large coil voltage range or with leakage current protection - 12 mm .472" spacing

Relay : 1 SPDT low level with switch - 12 mm .472" spacing

Characteristics

Relay characteristics	RB...121 AR		RB...121 AI		RB...121 AI		RB...121 A
COIL		±10% on AC +10% -15% on DC					
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	115 V AC/DC	230 V AC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC	60 to 253 VAC/DC
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	2 W	2,8 W	0,24 W	0,24 W	0,24 W	0,24 W	1 W
Rated current	18 mA	12 mA	10 mA	10 mA	10 mA	10 mA	4 mA max.
Drop-out voltage at 20°C	17 V	27 V	4,5 V	4,5 V	4,5 V	4,5 V	15 V
Permissible leakage current	1,6 mA	1 mA					
Status device	green LED				green LED		green LED
CONTACT							
Type	1 SPDT				1 SPDT		1 SPDT
Voltage switching range min./max.	12 V / 250 V				5 V / 250 V		12 V / 250 V
Current switching range min./max.	10 mA / 6 A				1 mA / 6 A		10 mA / 6 A
Load switching range							
AC1 min. / max.	0,6 VA / 1500 VA (ohmic load)				0,05 VA/1500 VA (ohmic load)		0,6 VA/1500 VA (ohmic load)
DC1 min. / max.	0,6 W / 140 W				0,05 W / 140 W		0,6 W / 140 W
Number of on-load operations	10^5 on AC15				10^5 on AC15		10^5 on AC15
Number of off-load operations	10^7				10^7		10^7
Operating speed F	6 ms	7 ms	5 ms	5 ms	5 ms	5 ms	7 ms
O	15 ms	16 ms	8 ms	8 ms	8 ms	8 ms	20 ms
Bounce							
Insulation coil / contact	4000 V RMS						
Resistance to shock coil / contact	4000 V RMS						
Insulation contact / contact	1000 V RMS						
Ambient temperature storage	-40°C to +80°C						
operating	-20°C to +70°C (1)						

Other characteristics	Screw clamp	Spring clamp
Body material grey	UL 94 V0	UL 94 V0
Wire Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size	2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length	9 mm .354"	9 mm .354"
Recommended screwdriver	3,5 mm .137"	3,5 mm .137"
Protection	IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals	c UL us, CSA (pending), GL, LRS, CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	



(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

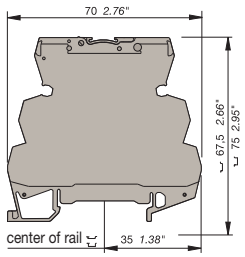
	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

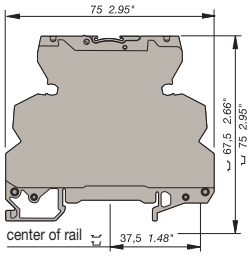
Description	Type	Order P/N	Packaging	Weight kg
Relay mod. 1SPDT high level w/leakage current protec.	RB 121 AR-115VAC/DC	1SNA **645 046** R**0700**	5	0,03
Relay mod. 1SPDT high level w/leakage current protec.	RB 121 AR-230VAC/DC	1SNA **645 011** R**2400**	5	0,03
Relay mod. 1SPDT high level w/large coil voltage range	RB 121 A 60-230VAC/DC	1SNA **645 020** R**0100**	5	0.03
Relay mod. 1SPDT high level with switch	RB 121 AI-24VAC/DC	1SNA **645 032** R**2100**	5	0,03
Relay mod. 1SPDT high level with safety switch	RB 121 AI-24VAC/DC	1SNA **645 009** R**1300**	5	0,03
Relay module 1SPDT low level with switch	RB 121 AI-24VAC/DC	1SNA **645 033** R**2200**	5	0,03
Relay module 1SPDT low level with safety switch	RB 121 AI-24VAC/DC	1SNA **645 010** R**0700**	5	0,03
Relay mod. 1SPDT high level w/leakage current protec.	RBR 121 AR-115VAC/DC	1SNA **645 546** R**0100**	5	0,03
Relay mod. 1SPDT high level w/leakage current protec.	RBR 121 AR-230VAC/DC	1SNA **645 511** R**2600**	5	0,03
Relay mod. 1SPDT high level w/large coil voltage range	RBR 121 A 60-230VAC/DC	1SNA **645 520** R**0300**	5	0.03
Relay mod. 1SPDT high level with switch	RBR 121 AI-24VAC/DC	1SNA **645 532** R**2300**	5	0,03
Relay mod. 1SPDT high level with safety switch	RBR 121 AI-24VAC/DC	1SNA **645 509** R**1500**	5	0,03
Relay module 1SPDT low level with switch	RBR 121 AI-24VAC/DC	1SNA **645 533** R**2400**	5	0,03
Relay module 1SPDT low level with safety switch	RBR 121 AI-24VAC/DC	1SNA **645 510** R**0100**	5	0,03

Accessories

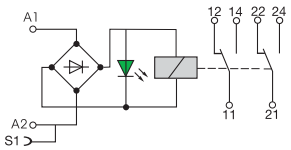
End section	BADH V0	1SNA **116 900** R**2700**	50	
	BADL V0	1SNA **399 903** R**0200**	50	
	BAM2 V0	1SNA **399 967** R**0100**	50	
Separator end section	SC 612	1SNA **290 474** R**0200**	10	
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R**0100**	10	
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R**0200**	10	
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R**2000**	5	
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R**2200**	5	
Test plug DIA. 2 mm	FC2	1SNA **007 865** R**2600**	10	
Marking method	RC65 RC610	see marking		



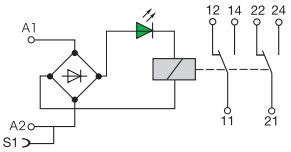
Screw clamp module



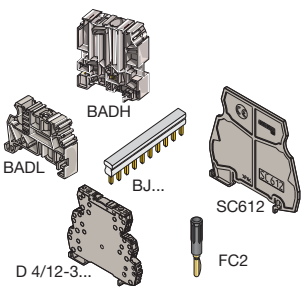
Spring clamp module



RB...122 A
24-48-60 V AC/DC



RB...122 A
115-230 V AC/DC



Relay : 1 DPDT low level contact 1 mA to 8 A - 12 mm .472" spacing

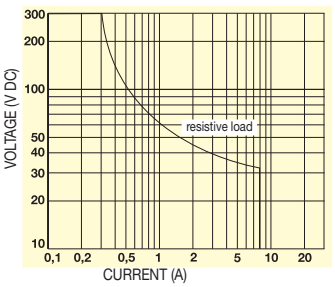
Characteristics

Relay characteristics	RB...122A				
COIL					
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	±10% on AC +10% -15% on DC 230 V AC/DC
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,48 W	0,62 W	0,96 W	0,58 W	1,15 W
Rated current	20 mA	13 mA	16 mA	5 mA	5 mA
Drop-out voltage at 20°C	5,4 V	8,8 V	8,8 V	20 V	10 V
Status device	green LED				
CONTACT					
Type	1 DPDT				
Voltage switching range min./max.	5 V / 250 V DC - 250 V AC				
Current switching range min./max.	1 mA / 8 A		1 mA / 5 A		
Load switching range					
AC1 min. / max.	5 mVA / 1500 VA				
DC1 min. / max.	5 mW / 192 W				
Number of on-load operations	10^5				
Number of off-load operations	2×10^7				
Operating speed F	6 ms	10 ms	10 ms	6 ms	6 ms
O	10 ms	14 ms	14 ms	15 ms	15 ms
Bounce	1 ms				
Insulation coil / contact	3500 V RMS				
Resistance to shock coil / contact	3500 V RMS				
Insulation contact / contact	3500 V RMS (between 2 contacts)				
Ambient temperature storage	-40°C to +80°C				
operating	-20°C to +70°C (1)				

Other characteristics	Screw clamp	Spring clamp
Body material grey	UL 94 V0	UL 94 V0
Wire Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size	2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length	9 mm .354"	9 mm .354"
Recommended screwdriver	3,5 mm .137"	3,5 mm .137"
Protection	IP20 NEMA1	IP20 NEMA1
Recommended torque	0,4 - 0,6 Nm 3.5 - 5.3 lb.in	0,4 - 0,6 Nm 3.5 - 5.3 lb.in
Approvals	c UL us , (pending) , , LRS , CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

Max. DC load breaking capacity

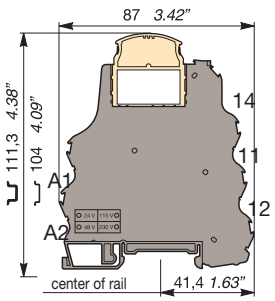


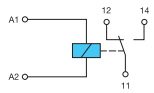
Order codes

Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 DPDT low level	RB 122 A-24VAC/DC	1SNA **645 012** R**2500**	5	0,03
Relay module 1 DPDT low level	RB 122 A-48-60VAC/DC	1SNA **645 040** R**1500**	5	0,03
Relay module 1 DPDT low level	RB 122 A-115VAC/DC	1SNA **645 041** R**0200**	5	0,03
Relay module 1 DPDT low level	RB 122 A-230VAC/DC	1SNA **645 013** R**2600**	5	0,03
Relay module 1 DPDT low level	RBR 122 A-24VAC/DC	1SNA **645 512** R**2700**	5	0,03
Relay module 1 DPDT low level	RBR 122 A-48-60VAC/DC	1SNA **645 540** R**1700**	5	0,03
Relay module 1 DPDT low level	RBR 122 A-115VAC/DC	1SNA **645 541** R**0400**	5	0,03
Relay module 1 DPDT low level	RBR 122 A-230VAC/DC	1SNA **645 513** R**2000**	5	0,03

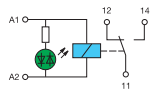
Accessories

End section	BADH V0	1SNA **116 900** R**2700**	50
	BADL V0	1SNA **399 903** R**0200**	50
	BAM2 V0	1SNA **399 967** R**0100**	50
Separator end section	SC 612	1SNA **290 474** R**0200**	10
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R**0100**	10
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R**0200**	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R**2000**	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R**2200**	5
Test plug DIA. 2 mm	FC2	1SNA **007 865** R**2600**	10
Marking method	RC65 RC610	see marking	

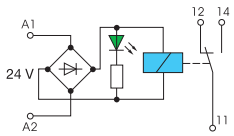




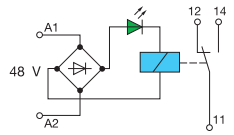
D 2,5/5-R121



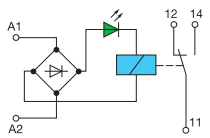
D 2,5/5-R121L



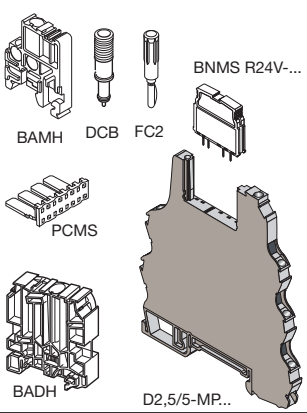
D 2,5/5-R121AL-24V



D 2,5/5-R121AL-48V



D 2,5/5-R121BL



Pluggable relay : 1 SPDT high level contact 10 mA to 6 A - 5.08 mm *.200"* spacing

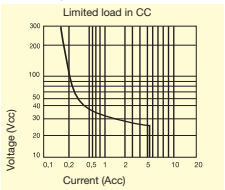
Characteristics

Relay characteristics	D 2,5/5-R121	D 2,5/5-R121L	D 2,5/5-R121AL				D 2,5/5-R121BL	
COIL								
Rated voltage +20%, -15%DC, ±15%AC	24 V DC	24 V DC	24 V AC	24 V DC	48 V AC	48 V DC	110 V AC	230 V AC
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Power	0.17 W	0.3 W	0.35 VA	0.35 W	0.44 VA	0.47 W	1.08 VA	2.13 VA
Rated current	7 mA	12 mA	12.4 mA	10 mA	7.6 mA	6.8 mA	8.4 mA	8 mA
Drop-out voltage at 20°C	2.4 V	2.4 V	4.8 V	4.8 V	10 V	10 V	25 V	45 V
Status device	green LED							
CONTACT								
Type	1 SPDT							
Voltage switching range min./max.	12 V / 250 V AC							
Current switching range min./max.	10 mA / 6 A							
Load switching range								
AC1 min. / max.	0.6 VA / 1500 VA (ohmic load)							
DC1 min. / DC13 max.	0.6 W / 140 W							
Number of on-load operations	10^5 in AC15							
Number of off-load operations	10×10^6							
Pull-in time (delay time)	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms
Drop-out time (delay time)	8 ms	8 ms	15 ms	15 ms	15 ms	15 ms	15 ms	15 ms
Bounce time	1.5 ms							
Insulation coil / contacts	4000 V RMS							
Breakdown voltage coil / contacts	4000 V RMS							
Insulation contacts/contacts	1000 V RMS							
Storage ambient temperature	- 40°C to + 80°C							
Operating ambient temperature	See derating curves							

Other characteristics

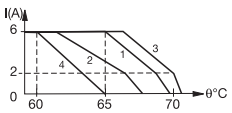
Body material	grey	UL 94 V0
Wire size	Solid wire	0.2-4 mm² / 24-12 AWG
	Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size		2.5 mm² / 12 AWG
Wire stripping length		10 mm *.394"*
Recommended screwdriver		3.5 mm *.137"*
Protection		IP 20 *NEMA 1*
Recommended torque		0.4-0.6 Nm *3.5-5.3 lb.in*
Approvals		c UL us (pending) , CE
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curves



	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

D 2,5/5-R121...L



1 : 24 V
2 : 48 V
3 : 110 V
4 : 230 V

D 2,5/5-R121

Order codes

Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 SPDT high level	D 2,5/5-R121-24VDC	1SNA **607 217** R**02**00	10	0.032
Relay module with LED 1 SPDT high level	D 2,5/5-R121L-24VDC	1SNA **607 201** R**13**00	10	0.032
Relay module with LED 1 SPDT high level	D 2,5/5-R121AL-24VAC/DC	1SNA **607 231** R**00**00	10	0.04
Relay module with LED 1 SPDT high level	D 2,5/5-R121AL-48VAC/DC	1SNA **607 232** R**01**00	10	0.04
Relay module with LED 1 SPDT high level	D 2,5/5-R121BL-110VAC	1SNA **607 264** R**11**00	10	0.04
Relay module with LED 1 SPDT high level	D 2,5/5-R121BL-230VAC	1SNA **607 265** R**12**00	10	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA **114 836** R**00**00	50	
	BAMH V0 9,1 mm	1SNA **194 836** R**01**00	50	
	BADH 12 mm	1SNA **116 900** R**27**00	50	
Comb type jumper bar 2 to 22 poles		consult us		
Jumper bar 10 poles grey	PCMS V0	1SNA **205 523** R**22**00	8	
Relay / Opto base	D 2,5/5-MP	1SNA **607 224** R**01**00	10	0.028
Relay / Opto base with LED 24 VDC	D 2,5/5-MP-24VDC	1SNA **607 222** R**07**00	10	0.028
Relay / Opto base with LED 24 VAC/VDC	D 2,5/5-MP-24VAC/DC	1SNA **607 260** R**21**00	10	0.036
Relay / Opto base with LED 48 VAC/VDC	D 2,5/5-MP-48VAC/DC	1SNA **607 261** R**16**00	10	0.036
Relay / Opto base with LED 110 VAC	D 2,5/5-MP-110VAC	1SNA **607 266** R**13**00	10	0.036
Relay / Opto base with LED 230 VAC	D 2,5/5-MP-230VAC	1SNA **607 267** R**14**00	10	0.036
Plug relay 24 V 1 SPDT 10 mA to 6 A	BNMS R24V-1	1SNA **031 820** R**14**00	4	
Plug relay 24 V 1 SPDT 1 mA to 6 A	BNMS R24V-2	1SNA **031 847** R**13**00	4	
Test device blue	DCB (1)	1SNA **105 028** R**21**00	10	
Test plug DIA. 2 mm	FC2	1SNA **007 865** R**26**00	10	
Marking method	RC55	see marking		

(1) Only on top decks.

Notes

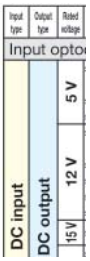
Optocouplers

Contents

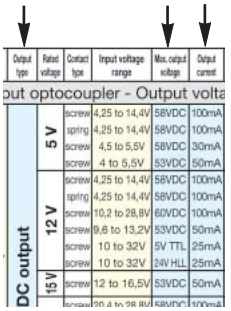
Selection guide for optocoupler modules

How to use this selection guide

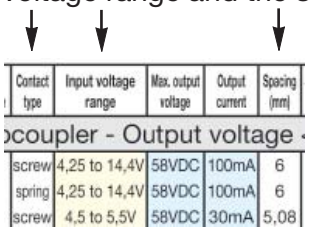
1 Choose the input voltage of the optocoupler



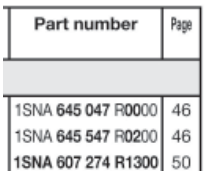
2 Choose the AC or DC output voltage of the optocoupler and the current needed



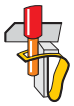
3 Verify the connection type, the input voltage range and the spacing



4 Go to see the indicated page for more technical data
or
Use the part number to place an order




Screw connection


Spring connection

6

Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
Input optocoupler - Output DC voltage, current < 100 mA													
DC input	DC output	5 V	screw	4,25 to 14,4V	58VDC	100mA	6	R600	(pending) GL LRS	H	OBIC 0100 5-12VDC	1SNA **645 047** R0000	313
			spring	4,25 to 14,4V	58VDC	100mA	6	R600	(pending) GL LRS	H	OBRIC 0100 5-12VDC	1SNA **645 547** R0200	313
			screw	4,5 to 5,5V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIC-0030 5VDC**	**1SNA 607 274 R1300**	317
			screw	4 to 5,5V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA **610 230** R1100	329
		12 V	screw	4,25 to 14,4V	58VDC	100mA	6	R600	(pending) GL LRS	H	OBIC 0100 5-12VDC	1SNA **645 047** R0000	313
			spring	4,25 to 14,4V	58VDC	100mA	6	R600	(pending) GL LRS	H	OBRIC 0100 5-12VDC	1SNA **645 547** R0200	313
			screw	10,2 to 28,8V	60VDC	100mA	9	R900		VH	**OBC 0100-24VDC**	**1SNA 608 017 R0600**	323
			screw	9,6 to 13,2V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA **610 230** R1100	329
			screw	10 to 32V	5V TTL	25mA	18	R1800		TTL	EB IDC 5	1SNA **010 031** R1300	331
			screw	10 to 32V	24V HLL	25mA	18	R1800		HLL	EB IDC 24	1SNA **010 033** R1500	331
		15 V	screw	12 to 16,5V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA **610 230** R1100	329
		24 V	screw	20,4 to 28,8V	58VDC	100mA	6	R600	(pending) GL LRS	H	**OBIC 0100 24VDC**	**1SNA 645 021 R2600**	313
			spring	20,4 to 28,8V	58VDC	100mA	6	R600	(pending) GL LRS	H	OBRIC 0100 24VDC	1SNA **645 521** R2000	313
			screw	19,2 to 27,6V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIC-0030-24VDC**	**1SNA 607 210 R1700**	317
			screw	10,2 to 28,8V	60VDC	100mA	9	R900		VH	OBC 0100-24VDC	1SNA **608 017** R0600	323
			screw	19,2 to 26,4V	53VDC	50mA	18	R1800		VH	**EBO3-DC**	**1SNA 610 230 R1100**	329
			screw	16 to 27,6V	58VDC	100mA	18	R1800			EBO1-24VAC/DC	1SNA **610 022** R2000	330
			screw	10 to 32V	5V TTL	25mA	18	R1800		TTL	EB IDC 5	1SNA **010 031** R1300	331
			screw	10 to 32V	24V HLL	25mA	18	R1800		HLL	EB IDC 24	1SNA **010 033** R1500	331

Note :
P Pluggable optocouplers
S Switch on input or output

H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

High runners in bold characters
Marine certifications : GL, LRS

VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
Input optocoupler - Output DC voltage, current < 100 mA													
DC input	DC output	48 V	screw	40,8 to 72V	58VDC	100mA	6	R600	(pending) LRS		OBIC 0100 48-60VAC/DC	1SNA **645 049** R1200	313
			spring	40,8 to 72V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 48-60VAC/DC	1SNA **645 549** R1400	313
			screw	38,4 to 55,2V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIC-0030-48VDC**	**1SNA 607 211 R0400**	317
			screw	40,8 to 57,6V	60VDC	100mA	9	R900		VH	OBC 0100-48VDC	1SNA **608 021** R0200	323
			screw	38,4 to 52,8V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA **610 230** R1100	329
			screw	29 to 58V	58VDC	100mA	18	R1800			EBO1-48VAC/DC	1SNA **010 048** R0400	330
		90 V	screw	40,8 to 72V	58VDC	100mA	6	R600	(pending) LRS		OBIC 0100 48-60VAC/DC	1SNA **645 049** R1200	313
			spring	40,8 to 72V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 48-60VAC/DC	1SNA **645 549** R1400	313
		115 V	screw	97,8 to 276V	58VDC	100mA	6	R600	(pending) LRS		**OBIC 0100 115-230VAC/DC**	**1SNA 645 022 R2700**	313
			spring	97,8 to 276V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 115-230VAC/DC	1SNA **645 522** R2100	313
		125 V	screw	93,5 to 140V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIC-0030-125VDC**	**1SNA 607 275 R1400**	317
			screw	100 to 143,8V	58VDC	100mA	9	R900			OBC 0100-110VAC/125VDC	1SNA **008 048** R1700	324
			screw	100 to 143,8V	58VDC	100mA	9	R900		VH	**OBC 0100-125VDC**	**1SNA 008 049 R1000**	324
			screw	106 to 150V	58VDC	100mA	9	R900		VH	OBC 0100S-125VDC	1SNA **008 004** R0400	324
		127 V	screw	97,8 to 140V	58VDC	100mA	18	R1800			EBO1-127VAC/DC	1SNA **610 108** R1400	330
		220 V	screw	150 to 253V	58VDC	100mA	18	R1800			EBO1-220VAC/DC	1SNA **610 023** R2100	330
		230 V	screw	97,8 to 276V	58VDC	100mA	6	R600	(pending) LRS		**OBIC 0100 115-230VAC/DC**	**1SNA 645 022 R2700**	313
			spring	97,8 to 276V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 115-230VAC/DC	1SNA **645 522** R2100	313
AC input	DC output	24 V	screw	20,4 to 26,4V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIA-0030-24VAC**	**1SNA 607 212 R0500**	318
			screw	12 to 27,6V	58VDC	100mA	18	R1800			EBO1-24VAC/DC	1SNA **610 022** R2000	330
		48 V	screw	43,2 to 66V	58VDC	100mA	6	R600	(pending) LRS		OBIC 0100 48-60VAC/DC	1SNA **645 049** R1200	313
			spring	43,2 to 66V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 48-60VAC/DC	1SNA **645 549** R1400	313
			screw	40,8 to 52,8V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIA-0030-48VAC**	**1SNA 607 213 R0600**	318
			screw	20 to 58V	58VDC	100mA	18	R1800			EBO1-48VAC/DC	1SNA **010 048** R0400	330
		60 V	screw	43,2 to 66V	58VDC	100mA	6	R600	(pending) LRS		OBIC 0100 48-60VAC/DC	1SNA **645 049** R1200	313
			spring	43,2 to 66V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 48-60VAC/DC	1SNA **645 549** R1400	313
		110 V	screw	93,5 to 152,4V	60VDC	100mA	9	R900			**OBC 0100-110VAC**	**1SNA 608 024 R0500**	323
			screw	93,5 to 152,4V	58VDC	100mA	9	R900		R	OBC 0100R-110VAC	1SNA **008 076** R0300	325
			screw	88 to 126,5V	58VDC	100mA	9	R900			OBC 0100-110VAC/125VDC	1SNA **008 048** R1700	324
		115 V	screw	103,5 to 253V	58VDC	100mA	6	R600	(pending) LRS		**OBIC 0100 115-230VAC/DC**	**1SNA 645 022 R2700**	313
			spring	103,5 to 253V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 115-230VAC/DC	1SNA **645 522** R2100	313
			screw	98 to 126,5V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIA-0030-115VAC**	**1SNA 607 214 R0700**	318
		127 V	screw	88 to 140V	58VDC	100mA	18	R1800			EBO1-127VAC/DC	1SNA **610 108** R1400	330
		230 V	screw	130 to 253V	58VDC	100mA	18	R1800			EBO1-220VAC/DC	1SNA **610 023** R2100	330
			screw	103,5 to 253V	58VDC	100mA	6	R600	(pending) LRS		**OBIC 0100 115-230VAC/DC**	**1SNA 645 022 R2700**	313
			spring	103,5 to 253V	58VDC	100mA	6	R600	(pending) LRS		OBRIC 0100 115-230VAC/DC	1SNA **645 522** R2100	313
			screw	195,5 to 253V	58VDC	30mA	5,08	R500	(pending)	P	**D2,5/5-OBIA-0030-230VAC**	**1SNA 607 215 R0000**	318
			screw	184 to 264,5V	60VDC	100mA	9	R900			OBC 0100-230VAC	1SNA **608 027** R0000	323
			screw	195 to 253V	58VDC	100mA	9	R900			OBC 0100R-230VAC	1SNA **008 077** R0400	325
Output optocoupler - Output DC voltage, current > 100 mA													
DC input	DC output	5 V	screw	4,25 to 14,4V	58VDC	2A	6	R600	(pending) LRS	H	OBOC 1000-5-12VDC	1SNA **645 050** R1700	314
			spring	4,25 to 14,4V	58VDC	2A	6	R600	(pending) LRS	H	OBROC 1000-5-12VDC	1SNA **645 550** R1100	314
			screw	4,5 to 5,5V	58VDC	100mA	5,08	R500	(pending)	P	D2,5/5-OBOC-0100-5VDC	1SNA **607 203** R1500	319
			screw	4,5 to 5,5V	58VDC	1A	5,08	R500	(pending)	P, H	**D2,5/5-OBOC-1000-5VDC**	**1SNA 607 206 R1000**	320
			screw	4,5 to 5,5V	30VDC	2A	5,08	R500	(pending)	P, H	D2,5/5-OBOC-2000-5VDC	1SNA **607 208** R2200	321
			screw	4,5 to 5,5V	60VDC	1A	9	R900		VH	OBC 1000-5VDC	1SNA **608 014** R2200	326
			screw	4,5 to 6V	60VDC	1A	18	R1800		TTL	EB ODC 5	1SNA **010 037** R1100	331
		12 V	screw	4,25 to 14,4V	58VDC	2A	6	R600	(pending) LRS	H	OBOC 1000-5-12VDC	1SNA **645 050** R1700	314
			spring	4,25 to 14,4V	58VDC	2A	6	R600	(pending) LRS	H	OBROC 1000-5-12VDC	1SNA **645 550** R1100	314
			screw	10,2 to 28,8V	60VDC	1A	9	R900		VH	**OBC 1000-24VDC**	**1SNA 608 018 R1700**	326
		24 V	screw	20,4 to 28,8V	58VDC	2A	6	R600	(pending) LRS	H	**OBOC 1000-24VDC**	**1SNA 645 051 R0400**	314
			screw	20,4 to 28,8V	58VDC	2A	6	R600	(pending) LRS		OBOC 1500-24VAC/DC	1SNA **645 025** R2200	314
			screw	20,4 to 28,8V	58VDC	5A	6	R600	(pending) LRS	H	**OBOC 5000-24VDC**	**1SNA 645 024 R2100**	315
			spring	20,4 to 28,8V	58VDC	2A	6	R600	(pending) LRS	H	OBROC 1000-24VDC	1SNA **645 551** R0600	314
			spring	20,4 to 28,8V	58VDC	2A	6	R600	(pending) LRS		OBROC 1500-24VAC/DC	1SNA **645 525** R2400	314
			spring	20,4 to 28,8V	58VDC	5A	6	R600	(pending) LRS	H	OBROC 5000-24VDC	1SNA **645 524** R2300	315
			screw	20,4 to 28,8V	58VDC	100mA	5,08	R500	(pending)		**D2,5/5-OBOC-0100-24VDC**	**1SNA 607 204 R1600**	319
			screw	20,4 to 28,8V	58VDC	1A	5,08	R500	(pending)	H	D2,5/5-OBOC-1000-24VDC	1SNA **607 207** R1100	320
			screw	20,4 to 28,8V	58VDC	1A	5,08	R500	(pending)	P	D2,5/5-OBOC-1000-24VAC/DC	1SNA **607 250** R2700	320
			screw	20,4 to 28,8V	30VDC	2A	5,08	R500	(pending)	P, H	**D2,5/5-OBOC-2000-24VDC**	**1SNA 607 209 R2300**	321
			screw	20,4 to 28,8V	30VDC	2A	5,08	R500	(pending)	P	D2,5/5-OBOC-2000-24VAC/DC	1SNA **607 255** R1000	321
			screw	10,2 to 28,8V	60VDC	1A	9	R900		VH	**OBC 1000-24VDC**	**1SNA 608 018 R1700**	326
			screw	19,2 to 28,8V	58VDC	5A	9	R900			ORC 111-24VDC	1SNA **608 068** R2100	328

Note :

P Pluggable optocouplers
S Switch on input or output

H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

High runners in bold characters
Marine certifications : GL, LRS

2CDC110004C0207

Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
Output optocoupler - Output DC voltage, current > 100 mA													
DC input	DC output	24 V	screw	19,2 to 28,8V	60VDC	1A	18	R1800		HLL	EB ODC 24	1SNA **010 039** R2300	331
			screw	9,6 to 30V	60VDC	3A	12,7	R20000			OM1C3-24VAC/DC	1SNA **020 361** R0400	332
		48 V	screw	40,8 to 72V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1000-48-60VAC/DC	1SNA **645 053** R0600	314
			spring	40,8 to 72V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-48-60VAC/DC	1SNA **645 553** R0000	314
			screw	40,8 to 57,6V	58VDC	100mA	5,08	R500	(pending)	P	**D2,5/5-OBOC-0100-48VDC**	**1SNA 607 205 R1700**	319
			screw	40,8 to 57,6V	58VDC	1A	5,08	R500	(pending)	P	D2,5/5-OBOC-1000-48VAC/DC	1SNA **607 251** R1400	320
			screw	40,8 to 57,6V	30VDC	2A	5,08	R500	(pending)	P	**D2,5/5-OBOC-2000-48VAC/DC**	**1SNA 607 256 R1100**	321
			screw	40,8 to 57,6V	60VDC	1A	9	R900		VH	OBC 1000-48VDC	1SNA **608 022** R0300	326
		60 V	screw	40,8 to 72V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1000-48-60VAC/DC	1SNA **645 053** R0600	314
			spring	40,8 to 72V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-48-60VAC/DC	1SNA **645 553** R0000	314
		115 V	screw	97,8 to 138V	58VDC	2A	6	R600	(pending) GL LRS		**OBOC 1000-115VAC/DC**	**1SNA 645 054 R0700**	314
			screw	97,8 to 138V	58VDC	5A	6	R600	(pending) GL LRS		OBOC 5000-115VAC/DC	1SNA **645 058** R1300	315
			spring	97,8 to 138V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-115VAC/DC	1SNA **645 554** R0100	314
			spring	97,8 to 138V	58VDC	5A	6	R600	(pending) GL LRS		OBROC 5000-115VAC/DC	1SNA **645 558** R1500	315
		230 V	screw	195 to 276V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1000-230VAC/DC	1SNA **645 026** R2300	314
			screw	195 to 276V	58VDC	5A	6	R600	(pending) GL LRS		OBOC 5000-230VAC/DC	1SNA **645 059** R1400	315
			spring	195 to 276V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-230VAC/DC	1SNA **645 526** R2500	314
			spring	195 to 276V	58VDC	5A	6	R600	(pending) GL LRS		OBROC 5000-230VAC/DC	1SNA **645 559** R1600	315
AC input	DC output	24 V	screw	21,6 to 26,4V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1500-24VAC/DC	1SNA **645 025** R2200	314
			spring	21,6 to 26,4V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1500-24VAC/DC	1SNA **645 525** R2400	314
			screw	21,6 to 26,4V	58VDC	1A	5,08	R500	(pending)	P	**D2,5/5-OBOC-1000-24VAC/DC**	**1SNA 607 250 R2700**	320
			screw	21,6 to 26,4V	30VDC	2A	5,08	R500	(pending)	P	D2,5/5-OBOC-2000-24VAC/DC	1SNA **607 255** R1000	321
			screw	9,6 to 30V	60VDC	3A	12,7	R20000			OM1C3-24VAC/DC	1SNA **020 361** R0400	332
		48 V	screw	43,2 to 66V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1000-48-60VAC/DC	1SNA **645 053** R0600	314
			spring	43,2 to 66V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-48-60VAC/DC	1SNA **645 553** R0000	314
			screw	43,2 to 66V	58VDC	1A	5,08	R500	(pending)	P	**D2,5/5-OBOC-1000-48VAC/DC**	**1SNA 607 251 R1400**	320
			screw	43,2 to 66V	30VDC	2A	5,08	R500	(pending)	P	D2,5/5-OBOC-2000-48VAC/DC	1SNA **607 256** R1100	321
		60 V	screw	43,2 to 66V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1000-48-60VAC/DC	1SNA **645 053** R0600	314
			spring	43,2 to 66V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-48-60VAC/DC	1SNA **645 553** R0000	314
		110 V	screw	99 to 121V	58VDC	1A	5,08	R500	(pending)	P	D2,5/5-OBOC-1000-110VAC	1SNA **607 270** R2300	320
			screw	99 to 121V	58VDC	2A	5,08	R500	(pending)	P	D2,5/5-OBOC-2000-110VAC	1SNA **607 272** R1100	321
			screw	93,5 to 152,4V	60VDC	1A	9	R900			**OBC 1000-110VAC**	**1SNA 608 025 R0600**	326
		115 V	screw	103,5 to 126,5V	58VDC	2A	6	R600	(pending) GL LRS		**OBOC 1000-115VAC/DC**	**1SNA 645 054 R0700**	314
			screw	103,5 to 126,5V	58VDC	5A	6	R600	(pending) GL LRS		OBOC 5000-115VAC/DC	1SNA **645 058** R1300	315
			spring	103,5 to 126,5V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-115VAC/DC	1SNA **645 554** R0100	314
			spring	103,5 to 126,5V	58VDC	5A	6	R600	(pending) GL LRS		OBROC 5000-115VAC/DC	1SNA **645 558** R1500	315
		230 V	screw	207 to 253V	58VDC	2A	6	R600	(pending) GL LRS		OBOC 1000-230VAC/DC	1SNA **645 026** R2300	314
			screw	207 to 253V	58VDC	5A	6	R600	(pending) GL LRS		OBOC 5000-230VAC/DC	1SNA **645 059** R1400	315
			spring	207 to 253V	58VDC	2A	6	R600	(pending) GL LRS		OBROC 1000-230VAC/DC	1SNA **645 526** R2500	314
			spring	207 to 253V	58VDC	5A	6	R600	(pending) GL LRS		OBROC 5000-230VAC/DC	1SNA **645 559** R1600	315
			screw	207 to 253V	58VDC	1A	5,08	R500	(pending)	P	D2,5/5-OBOC-1000-230VAC	1SNA **607 271** R1000	320
			screw	207 to 253V	58VDC	2A	5,08	R500	(pending)	P	D2,5/5-OBOC-2000-230VAC	1SNA **607 273** R1200	321
			screw	195 to 264,5V	60VDC	1A	9	R900			OBC 1000-230VAC	1SNA **608 028** R1100	326
Output optocoupler - Output AC voltage, current > 1 A													
DC input	AC output	5 V	screw	4,5 to 5,5V	253VAC	1A	9	R900			OBA 1000-5VDC	1SNA **608 015** R0400	327
			screw	4,5 to 6V	280VAC	1A	18	R1800		TTL	EB OAC 5	1SNA **010 034** R1600	331
		12 V	screw	10,2 to 28,8V	253VAC	1A	9	R900			**OBA 1000-24VDC**	**1SNA 608 019 R1000**	327
		24 V	screw	20,4 to 28,8V	400VAC	1A	6	R600	(pending) GL LRS		OBOA 1000-24VDC	1SNA **645 027** R2400	316
			screw	20,4 to 28,8V	230VAC	2A	12	R600	(pending) GL LRS		**OBOA 2000-24VDC**	**1SNA 645 029 R0600**	316
			spring	20,4 to 28,8V	400VAC	1A	6	R600	(pending) GL LRS		OBROA 1000-24VDC	1SNA **645 527** R2600	316
			spring	20,4 to 28,8V	230VAC	2A	12	R600	(pending) GL LRS		OBROA 2000-24VDC	1SNA **645 529** R0000	316
			screw	20,4 to 28,8V	253VAC	1A	5,08	R500	(pending)	P	**D2,5/5-OBOA-1000-24VDC**	**1SNA 607 238 R1700**	322
			screw	20,4 to 28,8V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-24VAC/DC	1SNA **607 240** R2500	322
			screw	10,2 to 28,8V	253VAC	1A	9	R900			**OBA 1000-24VDC**	**1SNA 608 019 R1000**	327
			screw	19,2 to 28,8V	135VAC	5A	9	R900			ORA 111-24VDC	1SNA **608 069** R2200	328
			screw	19,2 to 28,8V	280VAC	1A	18	R1800		TTL	EB OAC 24	1SNA **010 036** R1000	331
			screw	9,6 to 30V	280VAC	3A	12,7	R20000			OM1A3-24VAC/DC	1SNA **020 365** R0000	332
		48 V	screw	40,8 to 72V	400VAC	1A	6	R600	(pending) GL LRS		OBOA 1000-48-60VAC/DC	1SNA **645 061** R0600	316
			spring	40,8 to 72V	400VAC	1A	6	R600	(pending) GL LRS		OBROA 1000-48-60VAC/DC	1SNA **645 561** R0000	316
			screw	40,8 to 57,6V	253VAC	1A	5,08	R500	(pending)	P	**D2,5/5-OBOA-1000-48VAC/DC**	**1SNA 607 241 R1200**	322
			screw	40,8 to 57,6V	253VAC	1A	9	R900			OBA 1000-48VDC	1SNA **608 023** R0400	327
		60 V	screw	40,8 to 72V	400VAC	1A	6	R600	(pending) GL LRS		OBOA 1000-48-60VAC/DC	1SNA **645 061** R0600	316
			spring	40,8 to 72V	400VAC	1A	6	R600	(pending) GL LRS		OBROA 1000-48-60VAC/DC	1SNA **645 561** R0000	316
		115 V	screw	97,8 to 138V	400VAC	1A	6	R600	(pending) GL LRS		OBOA 1000-115VAC/DC	1SNA **645 062** R0700	316
			spring	97,8 to 138V	400VAC	1A	6	R600	(pending) GL LRS		OBROA 1000-115VAC/DC	1SNA **645 562** R0100	316

Note :

P Pluggable optocouplers
S Switch on input or output

H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

High runners in bold characters
Marine certifications : GL, LRS

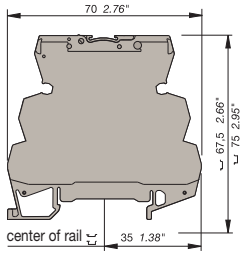
Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
Output optocoupler - Output AC voltage, current > 1 A													
DC	AC	230 V	screw	195 to 276V	400VAC	1A	6	R600	(pending) LRS		**OBOA 1000-230VAC/DC**	**1SNA 645 028 R0500**	316
			spring	195 to 276V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-230VAC/DC	1SNA **645 528** R0700	316
AC input	AC output	24 V	screw	21,6 to 26,4V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-24VAC/DC	1SNA **607 240** R2500	322
			screw	9,6 to 30V	280VAC	3A	12,7	R20000			OM1A3-24VAC/DC	1SNA **020 365** R0000	332
		48 V	screw	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-48-60VAC/DC	1SNA **645 061** R0600	316
			spring	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-48-60VAC/DC	1SNA **645 561** R0000	316
			screw	43,2 to 53V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-48VAC/DC	1SNA **607 241** R1200	322
		60 V	screw	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-48-60VAC/DC	1SNA **645 061** R0600	316
			spring	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-48-60VAC/DC	1SNA **645 561** R0000	316
		110 V	screw	99 to 121V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-110VAC	1SNA **607 268** R2500	322
			screw	93,5 to 152,4V	253VAC	1A	9	R900			OBA 1000-110VAC	1SNA **608 026** R0700	327
			screw	103,5 to 128,5V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-115VAC/DC	1SNA **645 062** R0700	316
			spring	103,5 to 128,5V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-115VAC/DC	1SNA **645 562** R0100	316
		230 V	screw	207 to 253V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-230VAC/DC	1SNA **645 028** R0500	316
			spring	207 to 253V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-230VAC/DC	1SNA **645 528** R0700	316
			screw	207 to 253V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-230VAC	1SNA **607 269** R2600	322

P Pluggable optocouplers
S Switch on input or output

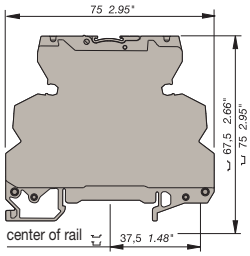
H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

High runners in bold characters
Marine certifications : GL, LRS

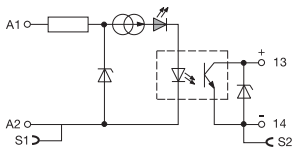
VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible



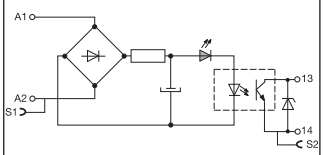
Screw clamp module



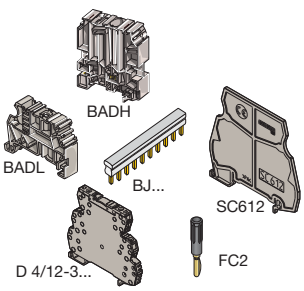
Spring clamp module



OB...IC 0100 - 5-12 V DC
115-230 V AC/DC



OB...IC 0100
24 V DC
24-48-60 V AC/DC



Optocoupler : 5 to 58 V DC output / 100 mA - 6 mm .*236*" spacing

Characteristics

Opto. characteristics		OB...IC 0100						
INPUT								
Input voltage +20% -15% on DC, +10% -10% on AC		5 V DC - 12 V DC		24 V DC		48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC
Frequency						50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input current AC/DC		5 mA	9 mA	4 mA		4 mA	5 mA	7 mA / 16mA	11.5 mA/25 mA
Pull-in voltage at Is=100%		4 V	4 V	15 V		25 V	25 V	60 VAC/70 VDC	60 VAC/70 VDC
Switching time C / O									
Operating frequency		10 µs / 500 µs		10 µs / 500 µs		5 ms / 20 ms		5 ms / 15 ms	
Permissible leakage current		1000 Hz		1000 Hz		20 Hz		20 Hz	
		0,9 mA		1 mA		0,9 mA		1,6 mA	
OUTPUT									
Output voltage		4,5 to 58 VDC							
Output current min.		1 mA							
Output current max.		100 mA							
Output leakage current at Umax.		< 50 µA							
Residual voltage at I max and U rated	typical	1 V							
	max.	1,3 V							
Frequency on inductive load									
Isolation Input / Output		2500 V RMS							
TEMPERATURE									
Ambient temperature	storage	-40°C to +80°C							
	operating	-20°C to +70°C (1)							

Other characteristics		Screw clamp	Spring clamp
Body material	grey	UL 94 V0	UL 94 V0
Wire	Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size	Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size		2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length		9 mm *.354"*	9 mm *.354"*
Recommended screwdriver		3,5 mm *.137"*	3,5 mm *.137"*
Protection		IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque		0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals		c UL us , GB (pending) , GL , LRS , CE	
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

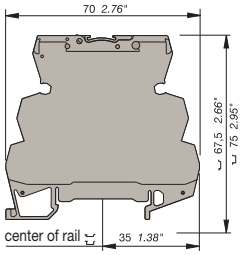
(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

Order codes

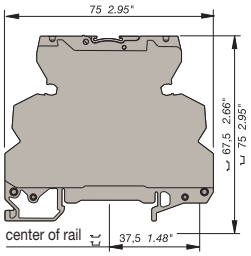
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 100 mA/DC	OBIC 0100-5-12VDC	1SNA **645 047** R0000	10	0,02
Optocoupler module 100 mA/DC	OBIC 0100-24VDC	1SNA **645 021** R2600	10	0,02
Optocoupler module 100 mA/DC	OBIC 0100-48-60VAC/DC	1SNA **645 049** R1200	10	0,02
Optocoupler module 100 mA/DC	OBIC 0100-115-230VAC/DC	1SNA **645 022** R2700	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-5-12VDC	1SNA **645 547** R0200	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-24VDC	1SNA **645 521** R2000	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-48-60VAC/DC	1SNA **645 549** R1400	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-115-230VAC/DC	1SNA **645 522** R2100	10	0,02

Accessories

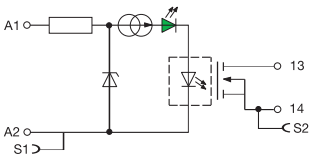
End section	BADH V0	1SNA **116 900** R2700	50
	BADL V0	1SNA **399 903** R0200	50
	BAM2 V0	1SNA **399 967** R0100	50
Separator end section	SC 612	1SNA **290 474** R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R2200	5
Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10
Marking method	RC65 RC610	see marking	



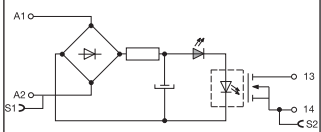
Screw clamp module



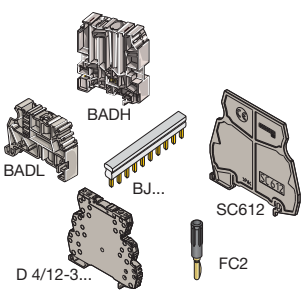
Spring clamp module



OB...OC 1000 - 5-12 V DC



OB...OC 1500 - 24 V AC/DC
OB...OC 1000
24 V DC
48-60-115-230 V AC/DC



Optocoupler : 5 to 58 V DC output / 2 A - 6 mm *.236*" spacing

Characteristics

Opto. characteristics	OB...OC 1000		OB...OC 1500	OB...OC 1000			
INPUT							
Input voltage +20% -15% on DC, +10% -10% on AC	5 V DC - 12 V DC	24 V DC	24 V AC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC
Frequency			50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input current	5 mA | 9 mA	5,4 mA	6,3 mA	4 mA	5,1 mA	4,2 mA	4 mA
Pull-in voltage at Is=100%	4 V	12 V	15 V	27 V	27 V	50 V	80 V
Switching time C / O	15 µs / 250 µs	30 µs/400 µs	1 ms/7 ms	5 ms/20 ms	5 ms/20 ms	500 µs/10 ms	1 ms / 15 ms
Operating frequency	2000 Hz	1000 Hz	60 Hz	20 Hz	20 Hz	50 Hz	35 Hz
Permissible leakage current	1 mA	0,8 mA	0,9 mA	1 mA	1 mA	0,3 mA	0,3 mA

OUTPUT	
Output voltage	4,5 to 58 VDC
Output current min.	1 mA
Output current max.	2 A
Output leakage current at Umax.	< 50 µA
Residual voltage at I max and U rated typical	0,1 V
max.	0,5 V
Frequency on inductive load	
Isolation Input / Output	2500 V RMS
TEMPERATURE	
Ambient temperature storage	-40°C to +80°C
operating	-20°C to +70°C (1)

Other characteristics	Screw clamp	Spring clamp
Body material grey	UL 94 V0	UL 94 V0
Wire Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size	2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length	9 mm *.354*"	9 mm *.354*"
Recommended screwdriver	3,5 mm *.137*"	3,5 mm *.137*"
Protection	IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals	c UL us , (pending) , GL , LRS , CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

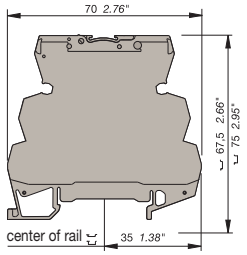
(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

Order codes

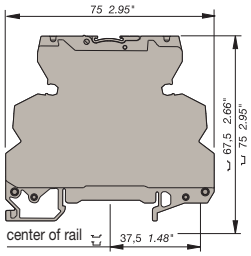
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 2 A/DC	OBOC 1000-5-12VDC	1SNA **645 050** R1700	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-24VDC	1SNA **645 051** R0400	10	0,02
Optocoupler module 2 A/DC	OBOC 1500-24VAC/DC	1SNA **645 025** R2200	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-48-60VAC/DC	1SNA **645 053** R0600	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-115VAC/DC	1SNA **645 054** R0700	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-230VAC/DC	1SNA **645 026** R2300	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-5-12VDC	1SNA **645 550** R1100	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-24VDC	1SNA **645 551** R0600	10	0,02
Optocoupler module 2 A/DC	OBROC 1500-24VAC/DC	1SNA **645 525** R2400	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-48-60VAC/DC	1SNA **645 553** R0000	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-115VAC/DC	1SNA **645 554** R0100	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-230VAC/DC	1SNA **645 526** R2500	10	0,02

Accessories

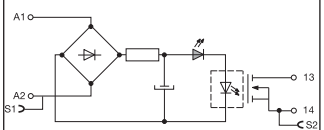
End section	BADH V0	1SNA **116 900** R2700	50
	BADL V0	1SNA **399 903** R0200	50
	BAM2 V0	1SNA **399 967** R0100	50
Separator end section	SC 612	1SNA **290 474** R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R2200	5
Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10
Marking method	RC65 RC610	see marking	



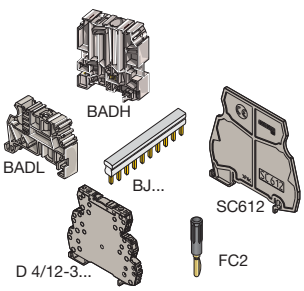
Screw clamp module



Spring clamp module



OB...OC 5000
24 V DC
24-48-60-115-230 V AC/DC



Optocoupler : 5 to 58 V DC output / 5 A - 6 mm *.236*" spacing

Characteristics

Opto. characteristics		OB...OC 5000					
INPUT							
Input voltage +20% -15% on DC, +10% -10% on AC			24 V DC			115 V AC/DC	230 V AC/DC
Frequency						50 / 60 Hz	50 / 60 Hz
Input current			5,4 mA			4,2 mA	4 mA
Pull-in voltage at Is=100%			12 V			50 V	80 V
Switching time C / O			30 µs/400 µs			500 µs/10 ms	1 ms / 15 ms
Operating frequency			1000 Hz			50 Hz	35 Hz
Permissible leakage current			0,8 mA			0,3 mA	0,3 mA
OUTPUT							
Output voltage		4,5 to 58 VDC					
Output current min.		1 mA					
Output current max.		5 A					
Output leakage current at Umax.		< 50 µA					
Residual voltage at I max and U rated	typical	0,1 V					
	max.	0,5 V					
Frequency on inductive load							
Isolation Input / Output		2500 V RMS					
TEMPERATURE							
Ambient temperature	storage	-40°C to +80°C					
	operating	-20°C to +70°C (1)					

Other characteristics		Screw clamp	Spring clamp
Body material	grey	UL 94 V0	UL 94 V0
Wire	Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
size	Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size		2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length		9 mm *.354*"	9 mm *.354*"
Recommended screwdriver		3,5 mm *.137*"	3,5 mm *.137*"
Protection		IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque		0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals		c UL us , GB (pending) , GL , LRS , CE	
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

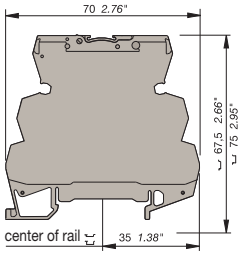
(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

Order codes

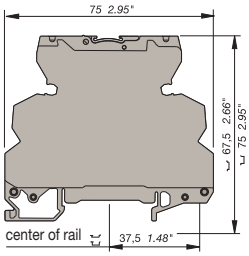
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 5 A/DC	OBOC 5000-24VDC	1SNA **645 024** R2100	10	0,02
Optocoupler module 5 A/DC	OBOC 5000-115VAC/DC	1SNA **645 058** R1300	10	0,02
Optocoupler module 5 A/DC	OBOC 5000-230VAC/DC	1SNA **645 059** R1400	10	0,02
Optocoupler module 5 A/DC	OBROC 5000-24VDC	1SNA **645 524** R2300	10	0,02
Optocoupler module 5 A/DC	OBROC 5000-115VAC/DC	1SNA **645 558** R1500	10	0,02
Optocoupler module 5 A/DC	OBROC 5000-230VAC/DC	1SNA **645 559** R1600	10	0,02

Accessories

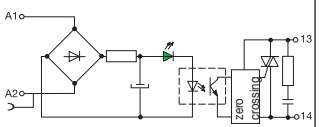
End section	BADH V0	1SNA **116 900** R2700	50
	BADL V0	1SNA **399 903** R0200	50
	BAM2 V0	1SNA **399 967** R0100	50
Separator end section	SC 612	1SNA **290 474** R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R2200	5
Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10
Marking method	RC65 RC610	see marking	



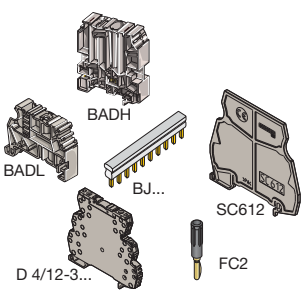
Screw clamp module



Spring clamp module



OB...OA 1000
24 V DC
48-60-115-230 V AC/DC
OB...OA 2000 - 24 V DC



Optocoupler : 24 to 400 V AC output / 2 A max. - 6 or 12 mm spacing

Characteristics

Opto. characteristics	OB...OA 1000						OB...OA 2000
INPUT							
Input voltage +20% -15% on DC, +10% -10% on AC	24 V DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC	24 V DC	
Frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Input current	3,6 mA	4,3 mA	5,5 mA	4,15 mA	4,6 mA	3,6 mA	
Pull-in voltage at Is=100%	14 V	15 V	18 V	60 V	135 V	14 V	
Switching time C / O	150 µs/1ms	3 ms / 30 ms		2,2 ms/18 ms	2,5 ms/25 ms	150 µs/1 ms	
Operating frequency	500 Hz	20 Hz		25 Hz	20 Hz	500 Hz	
Permissible leakage current	1 mA	1 mA		1 mA	1 mA	1 mA	
OUTPUT							
Output voltage	24 to 400 V AC						
Frequency	50 / 60 Hz						
Output current min.	25 mA						
Output current max.	1 A						2 A
Output leakage current at Umax.	< 0,5 mA						
Residual voltage at I max and U rated typical	1 V						
max.	1,6 V						
Frequency on inductive load							
Isolation Input / Output	2500 V RMS						
TEMPERATURE							
Ambient temperature storage	- 40°C to + 80°C						
operating	-20°C to +70°C (1)						

Other characteristics	Screw clamp	Spring clamp
Body material grey	UL 94 V0	UL 94 V0
Wire size Solid wire	0,2 - 4 mm² / 24 - 12 AWG	0,2 - 2,5 mm² / 24 - 12 AWG
Wire size Stranded wire	0,22 - 2,5 mm² / 24 - 12 AWG	0,22 - 2,5 mm² / 24 - 12 AWG
Rated wire size	2,5 mm² / 12 AWG	2,5 mm² / 12 AWG
Wire stripping length	9 mm *.354"*	9 mm *.354"*
Recommended screwdriver	3,5 mm *.137"*	3,5 mm *.137"*
Protection	IP20 *NEMA1*	IP20 *NEMA1*
Recommended torque	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*	0,4 - 0,6 Nm *3.5 - 5.3 lb.in*
Approvals	c UL us, CSA (pending), GL, LRS, CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

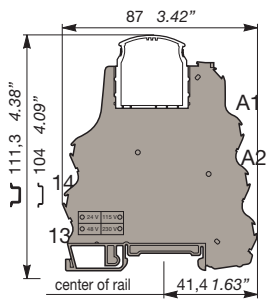
(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

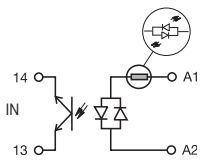
Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-24VDC	1SNA **645 027** R2400	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-48-60VAC/DC	1SNA **645 061** R0600	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-115VAC/DC	1SNA **645 062** R0700	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-230VAC/DC	1SNA **645 028** R0500	10	0,03
Optocoupler module 2 A/AC 12 mm spac.	OBOA 2000-24VDC	1SNA **645 029** R0600	5	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-24VDC	1SNA **645 527** R2600	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-48-60VAC/DC	1SNA **645 561** R0000	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-115VAC/DC	1SNA **645 562** R0100	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-230VAC/DC	1SNA **645 528** R0700	10	0,03
Optocoupler module 2 A/AC 12 mm spac.	OBROA 2000-24VDC	1SNA **645 529** R0000	5	0,03

Accessories

End section	BADH V0	1SNA **116 900** R2700	50
	BADL V0	1SNA **399 903** R0200	50
	BAM2 V0	1SNA **399 967** R0100	50
Separator end section	SC 612	1SNA **290 474** R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA **290 488** R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA **290 489** R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R2200	5
Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10
Marking method	RC65 RC610	see marking	





D 2,5/5-OBIC-0030

Pluggable optocoupler : 5 to 58 V DC output / 30 mA - 5.08 mm .200" spacing

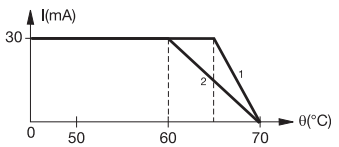
Characteristics

Opto. characteristics	D 5-OBIC-0030			
INPUT				
Input voltage	4.5 V to 5.5 VDC	19.2 V to 27.6 V DC	38.4 V to 55.2 V DC	93.5 V to 140 V DC
Frequency				
Input current	6 mA	5 mA	4.1 mA	3 mA
Pull-in voltage at Is=100%	3.5 V	12 V	21 V	50 V
Switching time C / O	20 µs / 1.3 ms	20 µs / 1.3 ms	20 µs / 1.3 ms	20 µs / 1.3 ms
Operating frequency	400 z H	400 z H	400 Hz	400 Hz
Permissible leakage current		1 mA	0.8 mA	
OUTPUT				
Output voltage	4.5 V to 58 V DC			
Output current min.	0.5 mA			
Output current max.	30 mA			
Output leakage current at Umax.	< 50 µA			
Residual voltage at I max and U rated typical	2.3 V DC			
max.	2.7 VDC			
Frequency on inductive load				
Isolation Input / Output	2500 S V RM			
TEMPERATURE				
Ambient temperature storage	- 40°C to + 80°C			
operating	See erating urve c			

Other characteristics

Body material	grey	UL 94 V0
Wire size	Solid wire	0.2-4 mm² / 24-12 AWG
	Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size		2.5 mm² / 12 AWG
Wire stripping length		10 .394" mm
Recommended screwdriver		3.5 .137"
Protection		IP NEMA 1 20
Recommended torque		0.4-0.6 m 3.5-5.3 lb.in
Approvals		c UL us pending, CE
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curve



1 : 5 V - 24 V - 48 V
2 : 115 V

D 2,5/5-OBIC-0030

Order codes

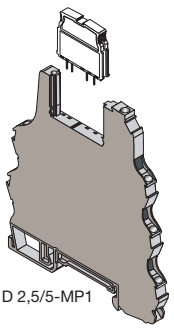
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-5VDC	1SNA **607 274** R1300	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-24VDC	1SNA **607 210** R1700	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-48VDC	1SNA **607 211** R0400	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-125VDC	1SNA **607 275** R1400	1	0.032

Accessories

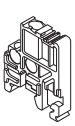
High end stop		BAMH 9,1 mm	1SNA **114 836** R0000	50	
		BAMH V0 9,1 mm	1SNA **194 836** R0100	50	
		BADH 12 mm	1SNA **116 900** R2700	50	
Comb type jumper bar 2 to 22 poles			consult us		
Jumper bar 10 poles	grey ☐	PCMS V0	1SNA **205 523** R2200	8	
Input opto base		D 2,5/5-MP1	1SNA **607 223** R0000	10	0.028
Plug OBIC 5 V	white ☐	BNMS T5V-1	1SNA **031 831** R0300	4	
Plug OBIC 24 V	white ☐	BNMS T24V-1	1SNA **031 800** R2100	4	
Plug OBIC 48 V	white ☐	BNMS T48V-1	1SNA **031 801** R1600	4	
Plug OBIC 125 V	white ☐	BNMS T125V-1	1SNA **031 845** R1100	4	
Test device	blue ☐	DCB (1)	1SNA **105 028** R2100	10	
Test plug	DIA. 2 mm	FC2	1SNA **007 865** R2600	10	
Marking method		RC55	see marking		

(1) Only on top decks.

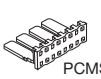
BNMS T24V-1



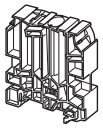
D 2,5/5-MP1



BAMH



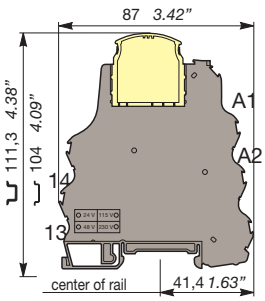
PCMS

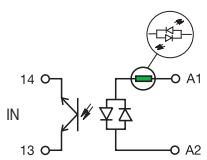


BADH

DCB

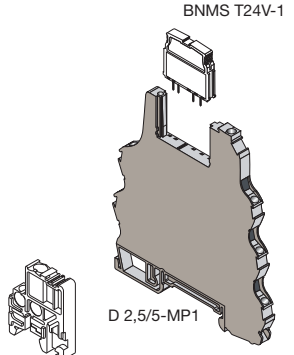
FC2





D 2,5/5-OBIA-0030

BNMS T24V-1



Pluggable optocoupler : 5 to 58 V DC output / 30 mA - 5.08 mm .200" spacing

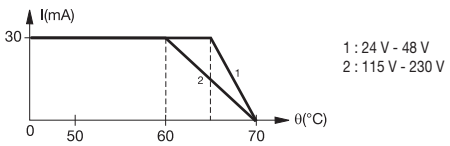
Characteristics

Opto. characteristics	D 5-OBIA-0250			
INPUT				
Input voltage	20.4 V to 26.4 V AC	40.8 V to 52.8 V AC	98 V to 126.5 V AC	195.5 V to 253 V AC
Frequency			50 / 60 Hz	50 Hz
Input current	8.5 mA	4.5 mA	8 mA	7 mA
Pull-in voltage at Is=100%	13 V	22 V	50 V	95 V
Switching time C / O	6 ms / 10 ms	6 ms / 10 ms	6 ms / 10 ms	6 ms / 10 ms
Operating frequency	30 z H	30 z H	30 z H	30 Hz
Permissible leakage current	1 mA	1 mA	2 mA	2 mA
OUTPUT	4.5 V to 58 V DC			
Output voltage				
Output current min.	0.5 mA			
Output current max.	30 mA			
Output leakage current at Umax.	< 50 µA			
Residual voltage at I max and U rated typical	2.3 V DC			
max.	2.7 VDC			
Frequency on inductive load	2500 S V RM			
Isolation Input / Output				
TEMPERATURE	- 40°C to + 80°C			
Ambient temperature storage	See erating urve c			
operating				

Other characteristics

Body material grey	UL 94 V0
Wire Solid wire	0.2-4 mm² / 24-12 AWG
size Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size	2.5 mm² / 12 AWG
Wire stripping length	10 .394" mm
Recommended screwdriver	3.5 .137"
Protection	IP NEMA 1 20
Recommended torque	0.4-0.6 m 3.5-5.3 lb.in
Approvals	c UL us pending, CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curve



1 : 24 V - 48 V
2 : 115 V - 230 V

D 2,5/5-OBIA-0030

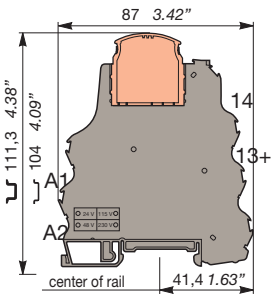
Order codes

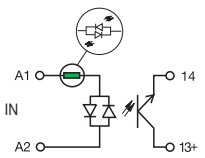
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-24VAC	1SNA **607 212 R0500**	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-48VAC	1SNA **607 213 R0600**	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-115VAC	1SNA **607 214 R0700**	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-230VAC	1SNA **607 215 R0000**	1	0.032

Accessories

High end stop	BAMH 9,1 mm	1SNA **114 836 R0000**	50	
	BAMH V0 9,1 mm	1SNA **194 836 R0100**	50	
	BADH 12 mm	1SNA **116 900 R2700**	50	
Comb type jumper bar 2 to 22 poles		consult us		
Jumper bar 10 poles grey	PCMS V0	1SNA **205 523 R2200**	8	
Input opto base	D 2,5/5-MP1	1SNA **607 223 R0000**	10	0.028
Plug OBIA 24 V yellow	BNMS T24V-1	1SNA **031 802 R1700**	4	
Plug OBIA 48 V yellow	BNMS T48V-1	1SNA **031 803 R1000**	4	
Plug OBIA 115 V yellow	BNMS T115V-1	1SNA **031 804 R1100**	4	
Plug OBIA 230 V yellow	BNMS T230V-1	1SNA **031 805 R1200**	4	
Test device blue	DCB (1)	1SNA **105 028 R2100**	10	
Test plug DIA. 2 mm	FC2	1SNA **007 865 R2600**	10	
Marking method	RC55	see marking		

(1) Only on top decks.





D 2,5/5-OBOC-0100

Pluggable optocoupler : 5 to 58 V DC output / 100 mA - 5.08 mm *.200*" spacing

Characteristics

Opto. characteristics	D 2,5/5-OBOC-0100 5 V DC / 24 V DC		D 2,5/5-OBOC-0100 48 V DC
INPUT			
Input voltage	4.5 V to 5.5 V DC	20.4 V to 28.8 V DC	40.8 V to 57.6 V DC
Frequency			
Input current	8.5 mA	4.8 mA	3.9 mA
Pull-in voltage at Is=100%	2.9 V DC	16 V DC	26 V DC
Switching time C / O	20 µs / 1.3 ms	20 µs / 1.3 ms	20 µs / 1.3 ms
Operating frequency	400 Hz	400 Hz	400 Hz
Permissible leakage current	1 mA	1 mA	1 mA
OUTPUT			
Output voltage	4.5 to 58 V DC		
Output current min.	1 mA		
Output current max.	100 mA		
Output leakage current at Umax.	< 50 µA		
Residual voltage at I max and U rated typical	1 V DC		
max.	1.3 V DC		
Frequency on inductive load	See Note 1		
Isolation Input / Output	2500 V RMS		
TEMPERATURE			
Ambient temperature storage	- 40°C to + 80°C		
operating	See derating curves		

Other characteristics

Body material	grey	UL 94 V0
Wire size	Solid wire	0.2-4 mm² / 24-12 AWG
	Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size		2.5 mm² / 12 AWG
Wire stripping length		10 mm *.394*"
Recommended screwdriver		3.5 mm *.137*"
Protection		IP 20 *NEMA 1*
Recommended torque		0.4-0.6 Nm *3.5-5.3 lb.in*
Approvals		c UL us pending, CE
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Note 1 :

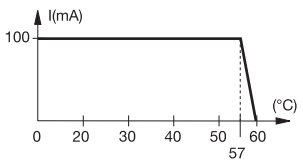
$F_{max} = (1\text{-}0{,}007 \times U_s) / (L \times I_s^2)$

or

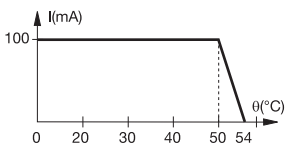
$F_{max} = (1\text{-}0{,}007 \times U_s) / (P \times \frac{L}{R})$

U_s = Output voltage
I_s = Output current
L = Inductance of load
P = Power of load
R = Resistance of load

Derating curves



D 2,5/5-OBOC-0100 5 V DC / 24 V DC



D 2,5/5-OBOC-0100 48 V DC

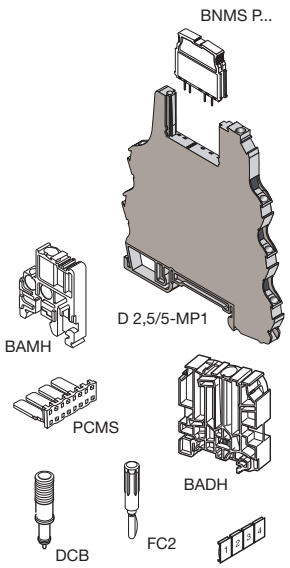
Order codes

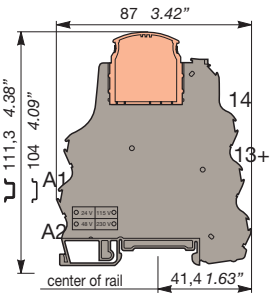
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 100 mA/DC	D 2,5/5-OBOC-0100-5VDC	1SNA **607 203** R1500	1	0.032
Optocoupler module 100 mA/DC	D 2,5/5-OBOC-0100-24VDC	1SNA **607 204** R1600	1	0.032
Optocoupler module 100 mA/DC	D 2,5/5-OBOC-0100-48VDC	1SNA **607 205** R1700	1	0.032

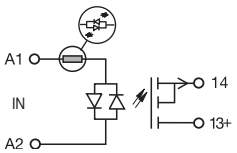
Accessories

High end stop		BAMH 9,1 mm	1SNA **114 836** R0000	50	
		BAMH V0 9,1 mm	1SNA **194 836** R0100	50	
		BADH 12 mm	1SNA **116 900** R2700	50	
Comb type jumper bar 2 to 22 poles			consult us		
Jumper bar 10 poles	grey	PCMS V0	1SNA **205 523** R2200	8	
Relay / Opto base		D 2,5/5-MP	1SNA **607 224** R0100	10	0.028
Plug for OBOC 5 V DC	red	BNMS P5V-3	1SNA **031 809** R2600	4	
Plug for OBOC 24 V DC	red	BNMS P24V-3	1SNA **031 810** R1200	4	
Plug for OBOC 48 V DC	red	BNMS P48V-3	1SNA **031 811** R0700	4	
Test device	blue	DCB (1)	1SNA **105 028** R2100	10	
Test plug	DIA. 2 mm	FC2	1SNA **007 865** R2600	10	
Marking method		RC55	see marking		

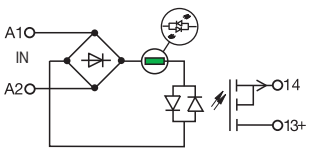
(1) Only on top decks.



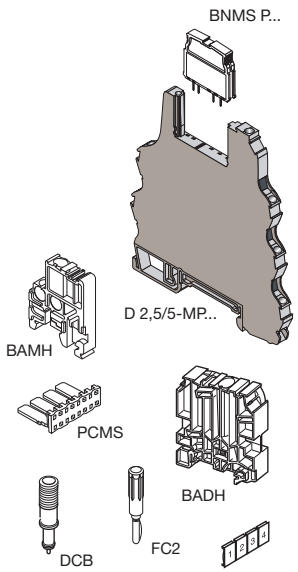




D 2,5/5-OBOC-1000 5/24 VDC



D 2,5/5-OBOC-1000
24/48 VAC/DC
110/230 VAC



Pluggable optocoupler : 5 to 58 V DC output / 1 A - 5.08 mm *.200*" spacing

Characteristics

Opto. characteristics	D 2,5/5-OBOC-1000 5/24 VDC		D 2,5/5-OBOC-1000 24/48 VAC/DC				D2,5/5-OBOC-1000-110/230VAC	
INPUT	*5 VDC*	*24 VDC*	*24 VAC*	*24 VDC*	*48 VAC*	*48 VDC*	*110 VAC*	*230 VAC*
Input voltage	4.5 to 5.5 VDC	20.4 to 28.8 VDC	24 ± 10%	20.4 to 28.8 VDC	48 ± 10%	40.8 to 57.6 VDC	110 ± 10%	230 ± 10%
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Input current	12.3 mA	6.7 mA	10.5 mA	8 mA	6.8 mA	5.8 mA	8.5 mA	7.5 mA
Pull-in voltage at Is=100%	3.5 V DC	10 V DC						
Switching time C / O	20/250 µs	50/350 µs	15/13 ms	5/13 ms	15/15 ms	6/25 ms	15/15 ms	15/15 ms
Operating frequency	2000 Hz	1500 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz
Permissible leakage current								
OUTPUT								
Output voltage	4.5 to 58 VDC		4.5 to 58 VDC					
Output current min.	1 mA		1 mA					
Output current max.	1 A		1 A					
Output leakage current at Umax.	< 50 µA		< 50 µA					
Residual voltage at I max and U rated typical	0.1 V		0.1 V					
max.	0.5 V		0.5 V					
Frequency on inductive load	See Note 1							
Isolation Input / Output	2500 V RMS							
TEMPERATURE								
Ambient temperature storage	-40°C to +80°C							
operating	See derating curve							

Other characteristics

Body material	grey	UL 94 V0
Wire size	Solid wire	0.2-4 mm² / 24-12 AWG
	Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size		2.5 mm² / 12 AWG
Wire stripping length		10 mm *.394*"
Recommended screwdriver		3.5 mm *.137*"
Protection		IP 20 *NEMA 1*
Recommended torque		0.4-0.6 Nm *3.5-5.3 lb.in*
Approvals		c UL us pending, CE
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Note 1 :

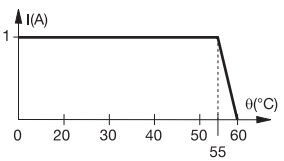
Fmax = (1-0,007 x Us) / (L x Is²)

or

Fmax = (1-0,007 x Us) / (P x $\frac{L}{R}$)

Us = Output voltage
Is = Output current
L = Inductance of load
P = Power of load
R = Resistance of load

Derating curve



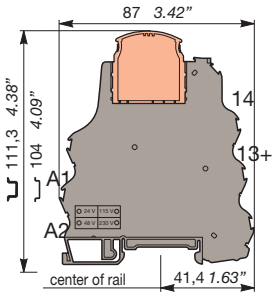
Order codes

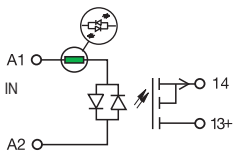
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-5VDC	1SNA **607 206** R1000	1	0.032
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-24VDC	1SNA **607 207** R1100	1	0.032
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-24VAC/DC	1SNA **607 250** R2700	1	0.04
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-48VAC/DC	1SNA **607 251** R1400	1	0.04
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-110VAC	1SNA **607 270** R2300	1	0.04
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-230VAC	1SNA **607 271** R1000	1	0.04

Accessories

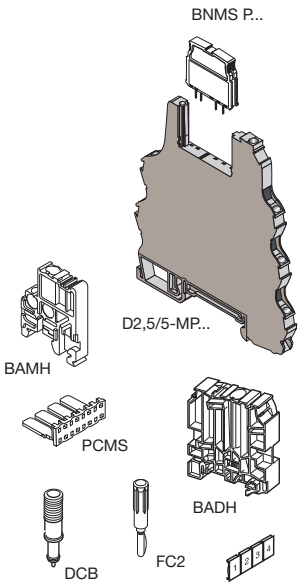
High end stop		BAMH 9,1 mm	1SNA **114 836** R0000	50	
		BAMH V0 9,1 mm	1SNA **194 836** R0100	50	
		BADH 12 mm	1SNA **116 900** R2700	50	
Comb type jumper bar 2 to 22 poles			consult us		
Jumper bar 10 poles	grey	PCMS V0	1SNA **205 523** R2200	8	
Relay / Opto base		D 2,5/5-MP	1SNA **607 224** R0100	10	0.028
Relay / Opto base with LED 24 VAC/VDC		D 2,5/5-MP-24VAC/DC	1SNA **607 260** R2100	10	0.036
Relay / Opto base with LED 48 VAC/VDC		D 2,5/5-MP-48VAC/DC	1SNA **607 261** R1600	10	0.036
Relay / Opto base with LED 110 VAC		D 2,5/5-MP-110VAC	1SNA **607 266** R1300	10	0.036
Relay / Opto base with LED 230 VAC		D 2,5/5-MP-230VAC	1SNA **607 267** R1400	10	0.036
Plug (2)	red	BNMS P5V-2 5 V/1 A	1SNA **031 818** R1600	4	
Plug (3)	red	BNMS P24V-2 24 V/1 A	1SNA **031 819** R1700	4	
Test device	blue	DCB (1)	1SNA **105 028** R2100	10	
Test plug	DIA. 2 mm	FC2	1SNA **007 865** R2600	10	
Marking method		RC55	see marking		

(1) Only on top decks.
(2) For D 2,5/5-OBOC-2000 5 V DC only.
(3) For all D 2,5/5-OBOC-2000 except 5 V DC model.





D 2,5/5-OBOC-2000



Pluggable optocoupler : 5 to 30 V DC output / 2 A - 5.08 mm *.200*" spacing

Characteristics

Opto. characteristics	D 2,5/5-OBOC-2000 5/24 VDC		D 2,5/5-OBOC-2000 24/48 VAC/DC				D 2,5/5-OBOC-2000 110/230VAC	
INPUT	*5 VDC*	*24 VDC*	*24 VAC*	*24 VDC*	*48 VAC*	*48 VDC*	*110 VAC*	*230 VAC*
Input voltage	4.5 to 5.5 VDC	20.4 to 28.8 VDC	24 ±10%	20.4 to 28.8 VDC	48 ±10%	40.8 to 57.6 VDC	110 ±10%	230 ±10%
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Input current	12.3 mA	6.7 mA	10.5 mA	8 mA	6.8 mA	5.8 mA	8.5 mA	7.5 mA
Pull-in voltage at Is=100%	3.5 V DC	10 V DC						
Switching time C / O	20/250 µs	50/350 µs	15/13 ms	5/13 ms	15/15 ms	6/25 ms	15/15 ms	15/15 ms
Operating frequency	2000 Hz	1500 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz
Permissible leakage current								
OUTPUT								
Output voltage	4.5 to 30 VDC		4.5 to 30 VDC					
Output current min.	1 mA		1 mA					
Output current max.	2 A		2 A					
Output leakage current at Umax.	< 50 µA		< 50 µA					
Residual voltage at I max and U rated typical	0.1 V		0.1 V					
max.	0.5 V		0.5 V					
Frequency on inductive load	See Note 1							
Isolation Input / Output	2500 V RMS							
TEMPERATURE								
Ambient temperature storage	-40°C to +80°C							
operating	See derating curve							

Other characteristics

Body material grey	UL 94 V0
Wire Solid wire	0.2-4 mm² / 24-12 AWG
size Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size	2.5 mm² / 12 AWG
Wire stripping length	10 mm *.394*"
Recommended screwdriver	3.5 mm *.137*"
Protection	IP 20 *NEMA 1*
Recommended torque	0.4-0.6 Nm *3.5-5.3 lb.in*
Approvals	c UL us pending, CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Note 1 :

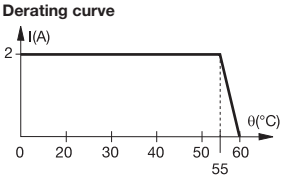
$$Fmax = (1\text{-}0{,}012 \times Us) / (L \times Is^2)$$

or

$$Fmax = (1\text{-}0{,}012 \times Us) / (P \times \frac{L}{R})$$

Us = Output voltage
Is = Output current
L = Inductance of load
P = Power of load
R = Resistance of load

Derating curve



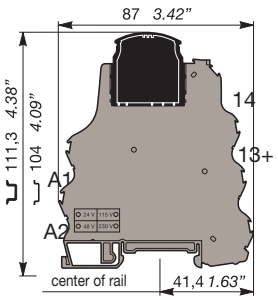
Order codes

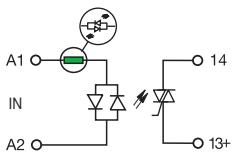
Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-5VDC	1SNA **607 208** R2200	1	0.032
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-24VDC	1SNA **607 209** R2300	1	0.032
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-24VAC/DC	1SNA **607 255** R1000	1	0.04
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-48VAC/DC	1SNA **607 256** R1100	1	0.04
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-110VAC	1SNA **607 272** R1100	1	0.04
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-230VAC	1SNA **607 273** R1200	1	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA **114 836** R0000	50	
	BAMH V0 9,1 mm	1SNA **194 836** R0100	50	
	BADH 12 mm	1SNA **116 900** R2700	50	
Comb type jumper bar 2 to 22 poles		consult us		
Jumper bar 10 poles grey	PCMS V0	1SNA **205 523** R2200	8	
Relay / Opto base	D 2,5/5-MP	1SNA **607 224** R0100	10	0.028
Relay / Opto base with LED 24 VAC/VDC	D 2,5/5-MP-24VAC/DC	1SNA **607 260** R2100	10	0.036
Relay / Opto base with LED 48 VAC/VDC	D 2,5/5-MP-48VAC/DC	1SNA **607 261** R1600	10	0.036
Relay / Opto base with LED 110 VAC	D 2,5/5-MP-110VAC	1SNA **607 266** R1300	10	0.036
Relay / Opto base with LED 230 VAC	D 2,5/5-MP-230VAC	1SNA **607 267** R1400	10	0.036
Plug (2) red	BNMS P5V-1 5 V/2 A	1SNA **031 814** R0200	4	
Plug (3) red	BNMS P24V-1 24 V/2 A	1SNA **031 815** R0300	4	
Test device blue	DCB (1)	1SNA **105 028** R2100	10	
Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10	
Marking method	RC55	see marking		

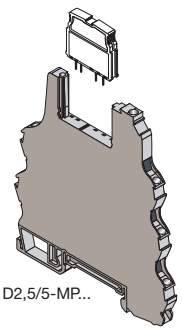
(1) Only on top decks.
(2) For D 2,5/5-OBOC-2000 5 V DC only.
(3) For all D 2,5/5-OBOC-2000 except 5 V DC model.



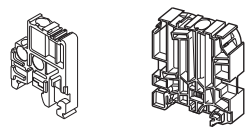


D 2,5/5-OBOA-1000

BNMS P...

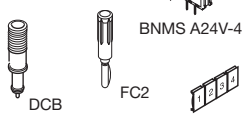


D2,5/5-MP...



BAMH BADH

PCMS BNMS A24V-4



DCB FC2

Pluggable optocoupler : 24 to 253 V AC output / 1 A - 5.08 mm *.200"* spacing

Characteristics

Opto. characteristics	D 2,5/5-... 24 VDC	D 2,5/5-OBOA-1000 24 VAC/DC-48 VAC/DC				D 2,5/5-OBOA-1000 110 VAC-230 VAC	
INPUT	24 VDC	24 VAC	24 VDC	48 VAC	48 VDC	110 VAC	230 VAC
Input voltage	20.4 to 28.8 VDC	24 ±10%	20.6 to 28.8 VDC	48 ±10%	40.8 to 57.6 VDC	110 ±10%	230 ±10%
Frequency		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Input current	4 mA	10 mA	7 mA	6 mA	5 mA	8 mA	7.5 mA
Pull-in voltage at Is=100%							
Switching time C / O	10/20 ms	20/20 ms	10/20 ms	20/20 ms	10/20 ms	20/20 ms	20/20 ms
Operating frequency	15 Hz	15 Hz	15 Hz	15 Hz	15 Hz	15 Hz	15 Hz
Permissible leakage current							

OUTPUT		
Output voltage		24 to 253 VAC - 50 / 60 Hz
Output current min.		25 mA
Output current max.		1 A
Output leakage current at Umax.		< 0.5 mA
Residual voltage at I max and U rated	typical	1 V
	max.	1.6 V
Frequency on inductive load		See Note 1
Isolation Input / Output		2500 V RMS
TEMPERATURE		
Ambient temperature	storage	-40 to +80°C
	operating	See derating curve

Other characteristics

Body material	grey	UL 94 V0
Wire size	Solid wire	0.2-4 mm² / 24-12 AWG
	Stranded wire	0.22-2.5 mm² / 24-12 AWG
Rated wire size		2.5 mm² / 12 AWG
Wire stripping length		10 mm *.394"*
Recommended screwdriver		3.5 mm *.137"*
Protection		IP 20 *NEMA 1*
Recommended torque		0.4-0.6 Nm *3.5-5.3 lb.in*
Approvals		c UL us pending, CE
Reference standards		CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Note 1 :

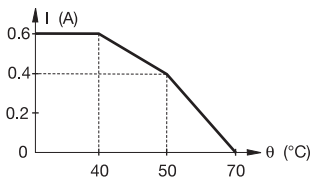
$Fmax = (1-0{,}012 \times Us) / (L \times Is^2)$

or

$Fmax = (1-0{,}012 \times Us) / (P \times \frac{L}{R})$

Us = Output voltage
Is = Output current
L = Inductance of load
P = Power of load
R = Resistance of load

Derating curve



Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-24VDC	1SNA **607 238** R1700	1	0.032
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-24VAC/DC	1SNA **607 240** R2500	1	0.04
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-48VAC/DC	1SNA **607 241** R1200	1	0.04
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-110VAC	1SNA **607 268** R2500	1	0.04
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-230VAC	1SNA **607 269** R2600	1	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA **114 836** R0000	50	
	BAMH V0 9,1 mm	1SNA **194 836** R0100	50	
	BADH 12 mm	1SNA **116 900** R2700	50	
Comb type jumper bar 2 to 22 poles		consult us		
Jumper bar 10 poles grey ■	PCMS V0	1SNA **205 523** R2200	8	
Relay / Opto base	D 2,5/5-MP	1SNA **607 224** R0100	10	0.028
Relay / Opto base with LED 24 VAC/VDC	D 2,5/5-MP-24VAC/DC	1SNA **607 260** R2100	10	0.036
Relay / Opto base with LED 48 VAC/VDC	D 2,5/5-MP-48VAC/DC	1SNA **607 261** R1600	10	0.036
Relay / Opto base with LED 110 VAC	D 2,5/5-MP-110VAC	1SNA **607 266** R1300	10	0.036
Relay / Opto base with LED 230 VAC	D 2,5/5-MP-230VAC	1SNA **607 267** R1400	10	0.036
Plug black ■	BNMS A24V-4 250 V/1 A	1SNA **031 839** R1300	4	
Test device blue ■	DCB (1)	1SNA **105 028** R2100	10	
Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10	
Marking method	RC55	see marking		

(1) Only on top decks.

Notes

Component holder Terminal blocks Plugs

Contents

Terminal blocks component holder

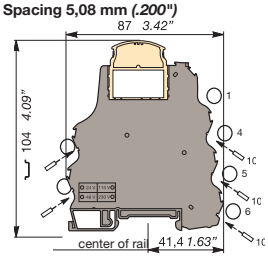
Base for pluggable plug R500 Series

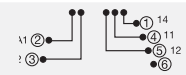
DIN 3

End stop	th. 9 mm	BADL	V0	1SNA 399 903 R0200
End stop	th. 9,1 mm	BAM	V2	1SNA 103 002 R2600
End stop	th. 9,1 mm	BAM V0	V0	1SNA 199 306 R0300
Rail	35 x 7,5 x 1	PR3.Z2		1SNA 174 300 R1700
Rail	35 x 15 x 2,3	PR4		1SNA 168 500 R1200
Rail	35 x 15 x 1,5	PR5		1SNA 168 700 R2200

D 2,5/5-MP

Spacing 5,08 mm *(.200")*

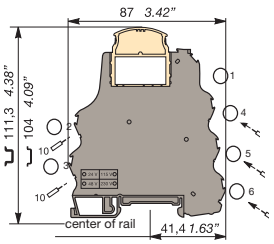


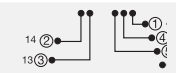


Relay/opto. base without output LED

D 2,5/5-MP1

Spacing 5,08 mm *(.200")*

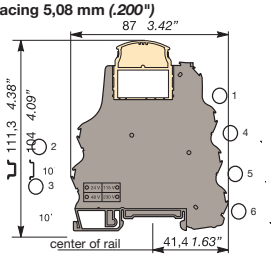


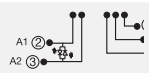


Relay/opto. base without input LED

D 2,5/5-MP...

Spacing 5,08 mm *(.200")*





Relay/opto. base with output LED

Observations

Terminal blocks are delivered without plugs.

Max. working temperature
version without LED : 100°C
version with LED : 85°C
Contact resistance : < 5 mΩ

Type	Part numbers
Grey V0 **Order plugs separately**	
D 2,5/5-MP	1SNA **607 224** R0100

Type	Part numbers
Grey V0 **Order plugs separately**	
D 2,5/5-MP1	1SNA **607 223** R0000

Type	Part numbers
Grey V0 **Order plugs separately**	
D 2,5/5-MP-24VDC	1SNA **607 222** R0700
D 2,5/5-MP-24VAC/DC	1SNA **607 260** R2100
D 2,5/5-MP-48VAC/DC	1SNA **607 261** R1600
D 2,5/5-MP-110VAC	1SNA **607 266** R1300
D 2,5/5-MP-230VAC	1SNA **607 267** R1400

Characteristics

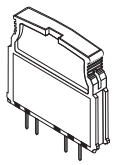
			IEC	UL/CSA pending	IEC	UL/CSA pending	IEC	UL/CSA pending
Wire size	Compression clamp	Solid wire	0,2-4 mm²	24-12 AWG	0,2-4 mm²	24-12 AWG	0,2-4 mm²	24-12 AWG
		Stranded wire	0,22-2,5 mm²	24-12 AWG	0,22-2,5 mm²	24-12 AWG	0,22-2,5 mm²	24-12 AWG
Voltage	Rated		320 V	300 V	320 V	300 V	320 V	300 V
	Pulse		4 kV		4 kV		4 kV	
	Pollution degree		3		3		3	
Current	Rated		6 A	6 A	6 A	6 A	6 A	6 A
Wire size	Rated / Gauge		2,5 mm²	12 AWG	2,5 mm²	12 AWG	2,5 mm²	12 AWG
Wire stripping length			10 mm / .394"		10 mm / .394"		10 mm / .394"	
Recommended screwdriver			3,5 mm / .137"		3,5 mm / .137"		3,5 mm / .137"	
Recommended torque			0,4-0,6 Nm / 3,5-5,3 lb.in		0,4-0,6 Nm / 3,5-5,3 lb.in		0,4-0,6 Nm / 3,5-5,3 lb.in	
Protection			IP 20 / NEMA1		IP 20 / NEMA1		IP 20 / NEMA1	

Accessories

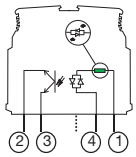
		Type		Part numbers	Type		Part numbers	Type		Part numbers
1	**1** Test device	DCB (1)	blue	1SNA **105 028** R2100	DCB (1)	blue		DCB (1)	blue	1SNA **105 028** R2100
2	**2** Test plug	FC2	DIA. 2	1SNA **007 865** R2600	FC2	DIA. 2	1SNA **105 028** R2100	FC2	DIA. 2	1SNA **007 865** R2600
	3 Relay plug 1 SPDT 10 mA/6 A	BNMS R24V-1	beige	1SNA **031 820** R1400			1SNA **007 865** R2600	BNMS R24V-1	beige	1SNA **031 820** R1400
	1 SPDT 1 mA/6 A	BNMS R24V-2	beige	1SNA **031 847** R1300				BNMS R24V-2	beige	1SNA **031 847** R1300
2	**4** Input optocoupler plug 5 V DC				BNMS T5V-1	white	1SNA **031 831** R0300			
	24 V DC				BNMS T24V-1	white	1SNA **031 848** R2400			
	24 V DC				BNMS T24V-2	white	1SNA **031 800** R2100			
	48 V DC				BNMS T48V-1	white	1SNA **031 801** R1600			
	125 V DC				BNMS T125V-1	white	1SNA **031 845** R1100			
	24 V AC				BNMS T24V-1	yellow	1SNA **031 802** R1700			
	48 V AC				BNMS T48V-1	yellow	1SNA **031 803** R1000			
	115 V AC				BNMS T115V-1	yellow	1SNA **031 804** R1100			
	230 V AC				BNMS T230V-1	yellow	1SNA **031 805** R1200			
3, 4, 5, 6, 7, 8, 9	**5** Output optocoupler plug 24 V DC/100 mA	BNMS N24V-3	red	1SNA **031 807** R1400				BNMS N24V-3	red	1SNA **031 807** R1400
	24 V DC/100 mA	BNMS P24V-3	red	1SNA **031 810** R1200				BNMS P24V-3	red	1SNA **031 810** R1200
	24 V DC/2 A	BNMS N24V-1	red	1SNA **031 813** R0100				BNMS N24V-1	red	1SNA **031 813** R0100
	24 V DC/2 A	BNMS P24V-1	red	1SNA **031 815** R0300				BNMS P24V-1	red	1SNA **031 815** R0300
	24 V DC/1 A	BNMS N24V-2	red	1SNA **031 817** R0500				BNMS N24V-2	red	1SNA **031 817** R0500
	24 V DC/1 A	BNMS P24V-2	red	1SNA **031 819** R1700				BNMS P24V-2	red	1SNA **031 819** R1700
	24 V DC/1 A	BNMS A24V-4	black	1SNA **031 839** R1300				BNMS A24V-4	black	1SNA **031 839** R1300
10	**5** Output optocoupler plug 5 V DC/100 mA	BNMS N5V-3	red	1SNA **031 806** R1300						
	5 V DC/100 mA	BNMS P5V-3	red	1SNA **031 809** R2600						
	48 V DC/100 mA	BNMS N48V-3	red	1SNA **031 808** R2500						
	48 V DC/100 mA	BNMS P48V-3	red	1SNA **031 811** R0700						
	5 V DC/2 A	BNMS N5V-1	red	1SNA **031 812** R0000						
	5 V DC/2 A	BNMS P5V-1	red	1SNA **031 814** R0200						
	5 V DC/1 A	BNMS N5V-2	red	1SNA **031 816** R0400						
	5 V DC/1 A	BNMS P5V-2	red	1SNA **031 818** R1600						
	7 Fuse plug 125 V/125 mA	BNMS F125mA-1	grey	1SNA **031 821** R0100	BNMS F125mA-1	grey	1SNA **031 821** R0100	BNMS F125mA-1	grey	1SNA **031 821** R0100
	125 V/500 mA	BNMS F500mA-1	grey	1SNA **031 838** R1200	BNMS F500mA-1	grey	1SNA **031 838** R1200	BNMS F500mA-1	grey	1SNA **031 838** R1200
	125 V/2 A	BNMS F2A-1	grey	1SNA **031 822** R0200	BNMS F2A-1	grey	1SNA **031 822** R0200	BNMS F2A-1	grey	1SNA **031 822** R0200
	125 V/5 A	BNMS F5A-1	grey	1SNA **031 823** R0300	BNMS F5A-1	grey	1SNA **031 823** R0300	BNMS F5A-1	grey	1SNA **031 823** R0300
	250 V/125 mA	BNMS F125mA-2	grey	1SNA **031 824** R0400	BNMS F125mA-2	grey	1SNA **031 824** R0400	BNMS F125mA-2	grey	1SNA **031 824** R0400
	250 V/2 A	BNMS F2A-2	grey	1SNA **031 825** R0500	BNMS F2A-2	grey	1SNA **031 825** R0500	BNMS F2A-2	grey	1SNA **031 825** R0500
	250 V/5 A	BNMS F5A-2	grey	1SNA **031 826** R0600	BNMS F5A-2	grey	1SNA **031 826** R0600	BNMS F5A-2	grey	1SNA **031 826** R0600
	125 V/125 mA	BNMS F125mA-3	grey	1SNA **031 827** R0700				BNMS F125mA-3	grey	1SNA **031 827** R0700
	250 V/125 mA	BNMS F125mA-4	grey	1SNA **031 828** R1000				BNMS F125mA-4	grey	1SNA **031 828** R1000
	125 V/2 A	BNMS F2A-7	grey	1SNA **031 849** R2500	BNMS F2A-7	grey	1SNA **031 849** R2500			
	8 Strap plug	BNMS ST1	grey	1SNA **031 829** R1100	BNMS ST1	grey	1SNA **031 829** R1100	BNMS ST1	grey	1SNA **031 829** R1100
		BNMS ST2	grey	1SNA **031 830** R1600	BNMS ST2	grey	1SNA **031 830** R1600			
	9 Converter plug 0-20 mA/0-10 V	BNMS CAI/U-500	grey	1SNA **031 832** R0400						
	4-20 mA/2-10 V	BNMS CAI/U-500	grey	1SNA **031 832** R0400						
	0-20 mA/0-5 V	BNMS CAI/U-250	grey	1SNA **031 833** R0500						
	4-20 mA/1-5 V	BNMS CAI/U-250		1SNA **031 833** R0500						
1 2 3 R	**10** Comb type jumper bar 10 poles	PCMS V0 (2)		1SNA **205 523** R2200	PCMS V0 (2)		1SNA **205 523** R2200	PCMS V0 (2)		1SNA **205 523** R2200
	R See section on marking	RC 55			RC 55			RC 55		

(1) Solely on the top stage. (2) Comb type jumper bar from 2 to 22 poles, see accessories.

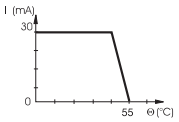
Input optocoupler plugs



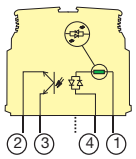
DC plugs



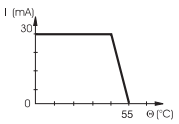
Derating curve



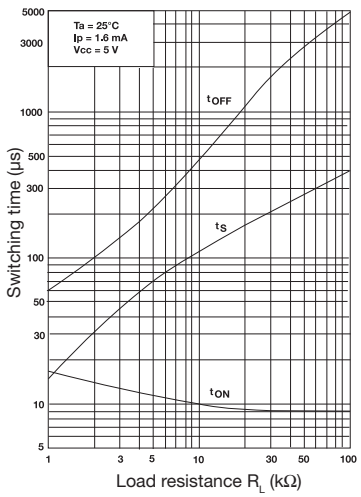
AC plugs



Derating curve



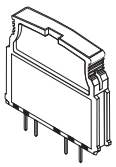
Switching time R_L curve 1 for 24 V DC plugs only



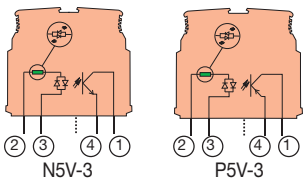
	5 V DC	24 V DC	48 V DC	125 V DC
Part number	**Type** **P/N**	**Type** **P/N**	**Type** **P/N**	**Type** **P/N**
	BNMS T5V-1 1SNA **031 831** R0300	**BNMS T24V-1** 1SNA **031 800** R2100 **BNMS T24V-2** 1SNA **031 848** R2400	**BNMS T48V-1** 1SNA **031 801** R1600	**BNMS T125V-1** 1SNA **031 845** R1100
Characteristics				
INPUT		**BNMS T24V-1** / **BNMS T24V-2**		
Voltage	4,5 V to 5,5 V DC	19,2 V to 27,6 V DC	38,4 V to 55,2 V DC	93,5 V to 140 V DC
Max. current	6 mA	5 mA	4,1 mA	3 mA
Typical triggering threshol at Is = 100%	3,5 V	12 V DC	21 V DC	50 V DC
Switching time C/O	20 µs / 1,3 ms	20 µs / 1,3 ms / 10 µs / see curve 1	20 µs / 1,3 ms	20 µs / 1,3 ms
Leakage current		1 mA	0,8 mA	
OUTPUT				
Max. voltage. / Max. current	58 V / 30 mA	58 V / 30 mA / 58 V / 5 mA	58 V / 30 mA	58 V / 30 mA
Residual voltage max. I and rated U standard	2,3 V DC	2,3 V DC / 0,3 V DC	2,3 V DC	2,3 V DC
max.	2,7 V DC	2,7 V DC / 0,5 V DC	2,7 V DC	2,7 V DC
Compatibility		TTL		
Input / Ouput isolation	2,5 kV	2,5 kV	2,5 kV	2,5 kV
TEMPERATURE				
Storage	- 30°C to + 80°C	- 30°C to + 80°C	- 30°C to + 80°C	- 30°C to + 80°C
Operating	- 20°C to + 55°C	-20°C to + 55°C	- 20°C to + 55°C	- 20°C to + 55°C

	24 V AC	48 V AC	115 V AC	230 V AC
Part number	**Type** **P/N**	**Type** **P/N**	**Type** **P/N**	**Type** **P/N**
	BNMS T24V-1 1SNA **031 802** R1700	**BNMS T48V-1** 1SNA **031 803** R1000	**BNMS T115V-1** 1SNA **031 804** R1100	**BNMS T230V-1** 1SNA **031 805** R1200
Charateristics				
INPUT				
Voltage	20,4 V to 26,4 V AC	40,8 V to 52,8 V AC	98 V to 126,5 V AC	195,5 V to 253 V AC
Max. current	8,5 mA	4,5 mA	8 mA	7 mA
Typical triggering threshold at Is = 100%	13 V AC	22 V AC	50 V AC	95 V AC
Switching time C/O	6 ms / 10 ms	6 ms / 10 ms	6 ms / 10 ms	6 ms / 10 ms
Leakage current	1 mA	1 mA	2 mA	2 mA
OUPUT				
Max. voltage / Max. current	58 V / 30 mA	58 V / 30 mA	58 V / 30 mA	58 V / 30 mA
Residual voltage max. I and rated U standard	2,3 V DC	2,3 V	2,3 V	2,3 V
max.	2,7 V DC	2,7 V	2,7 V	2,7 V
Input / Ouput isolation	2,5 kV	2,5 kV	2,5 kV	2,5 kV
TEMPERATURE				
Storage	- 30°C to + 80°C	- 30°C to + 80°C	- 30°C to + 80°C	- 30°C to + 80°C
Operating	- 20°C to + 55°C	- 20°C to + 55°C	- 20°C to + 55°C	- 20°C to + 55°C

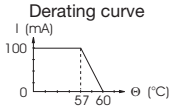
Transistor output optocoupler plugs



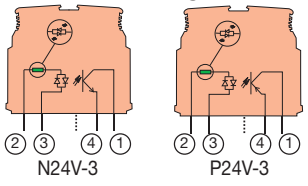
100 mA output optocoupler 5 V DC



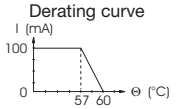
Derating curve



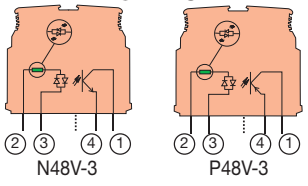
100 mA output optocoupler 24 V DC



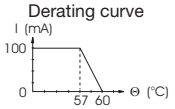
Derating curve



100 mA output optocoupler 48 V DC



Derating curve

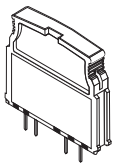


Part numbers	Type	P/N	Type	P/N	Type	P/N
	BNMS N5V-3	1SNA **031 806** R1300	**BNMS N24V-3**	1SNA **031 807** R1400	**BNMS N48V-3**	1SNA **031 808** R2500
	BNMS P5V-3	1SNA **031 809** R2600	**BNMS P24V-3**	1SNA **031 810** R1200	**BNMS P48V-3**	1SNA **031 811** R0700

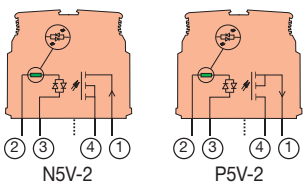
Characteristics

INPUT			
Voltage	4,5 V to 5,5 V DC	20,4 V to 28,8 V DC	40,8 V to 57,6 V DC
Max. current	8,5 mA	4,8 mA	3,9 mA
Typical triggering threshold at Is = 100 %	2,9 V DC	16 V DC	26 V DC
Switching time C/O	20 µs / 1,3 ms	20 µs / 1,3 ms	20 µs / 1,3 ms
Leakage current	1 mA	1 mA	1 mA
OUTPUT			
Max. voltage / Max. current	58 V / 100 mA	58 V / 100 mA	58 V / 100 mA
Residual voltage max. I and rated U			
standard U	1 V DC	1 V DC	1 V DC
max.	1,3 V DC	1,3 V DC	1,3 V DC
Frequency on inductive load	See Note 1	See Note 1	See Note 1
Input / Output isolation	2,5 kV	2,5 kV	2,5 kV
TEMPERATURE			
Storage	- 30°C to + 80°C	- 30°C to + 80°C	- 30°C to + 80°C
Operating	- 20°C to + 60°C	- 20°C to + 60°C	- 20°C to + 60°C

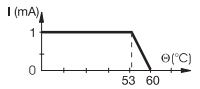
MOS output optocoupler plugs



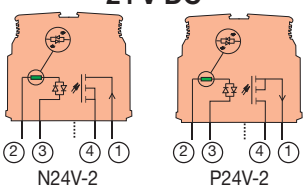
1 A output optocoupler 5 V DC



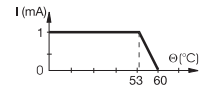
Derating curve



1 A output optocoupler 24 V DC



Derating curve



Part numbers	Type	P/N	Type	P/N
	BNMS N5V-2	1SNA **031 816** R0400	**BNMS N24V-2**	1SNA **031 817** R0500
	BNMS P5V-2	1SNA **031 818** R1600	**BNMS P24V-2**	1SNA **031 819** R1700

Characteristics

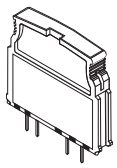
INPUT		
Voltage	4,5 V to 5,5 V DC	20,4 V to 28,8 V DC
Max. current	12,5 mA	6,7 mA
Typical triggering threshold at Is=100%	3,5 V DC	10 V DC
Switching time C/O	20 µs / 250 µs	50 µs / 350 µs
Leakage current	1 mA	1 mA
OUTPUT		
Max. voltage / Max. current	58 V / See graphs	58 V / See graphs
Residual voltage max. I and rated U		
standard U	1 V DC	1 V DC
max.	1,3 V DC	1,3 V DC
Frequency on inductive load	See Note 1	See Note 1
Input / Output isolation	2,5 kV	2,5 kV
TEMPERATURE		
Storage	- 30°C to + 80°C	- 30°C to + 80°C
Operating	- 20°C to + 60°C	- 20°C to + 60°C

Note 1 :

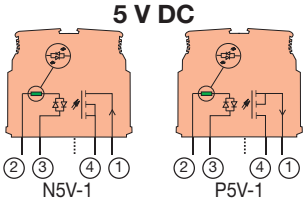
$F_{max} = (1\text{-}0{,}007 \times U_s) / (L \times I_s^2)$
or
$F_{max} = (1\text{-}0{,}007 \times U_s) / (P \times \frac{L}{R})$

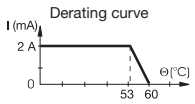
U_s = Output voltage supply
I_s = Output current
L = Inductive load
P = Load power
R = Load resistance

MOS output optocoupler plug

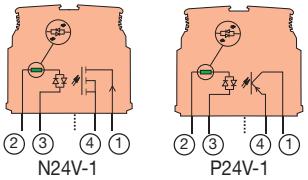


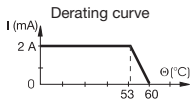
2 A output optocoupler 5 V DC





2 A output optocoupler 24 V DC





Note 2 :

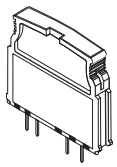
Fmax = (1 - 0,012 x Us) / (L x Is²)
or
Fmax = (1 - 0,012 x Us) / (P x $\frac{L}{R}$)

Us = Output voltage supply
Is = Output current
L = Inductive load
P = Load power
R = Load resistance

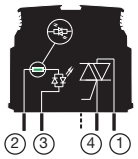
Part numbers	Type	P/N	Type	P/N
	BNMS N5V-1	1SNA **031 812** R0000	**BNMS N24V-1**	1SNA **031 813** R0100
	BNMS P5V-1	1SNA **031 814** R0200	**BNMS P24V-1**	1SNA **031 815** R0300

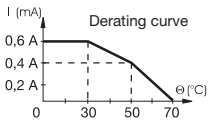
Characteristics			
INPUT			
Voltage		4,5 V to 5,5 V DC	20,4 V to 28,8 V DC
Max. current		12,5 mA	6,7 mA
Typical triggering threshold		3,5 V DC	10 V DC
Switching time	C/O	20 µs / 250 µs	50 µs / 350 µs
Leakage current		1 mA	1 mA
OUTPUT			
Max. voltage / Max. current		30 V DC / See graphs	30 V / See graphs
Residual voltage max. I and rated U			
	standard U	1 V DC	1 V DC
	max.	1,3 V DC	1,3 V DC
Frequency on inductive load		See Note 2	See Note 2
Input / Output isolation		2,5 kV	2,5 kV
TEMPERATURE			
Storage		- 30°C to + 80°C	- 30°C to + 80°C
Operating		- 20°C to + 60°C	- 20°C to + 60°C

Triac output optocoupler plug



1 A output optocoupler 24 V DC

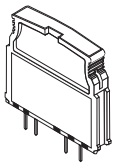




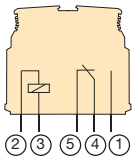
Part numbers	Type	P/N
	BNMS A24V-4	1SNA **031 839** R1300

Characteristics		
INPUT		
Voltage		20,4 V to 28,8 V DC
Max. current		3,8 mA
Typical triggering threshold		10 V DC
Switching time	C/O	9,5 ms / 12 ms
Leakage current		
OUTPUT		
Max. voltage / Max. current		24 V to 253 V AC / See derating curve
Residual voltage max. I and rated U		
	standard U	1 V AC
	max.	1,3 V AC
Input / Output isolation		2,5 kV
TEMPERATURE		
Storage		- 30°C to + 80°C
Operating		- 20°C to + 70°C

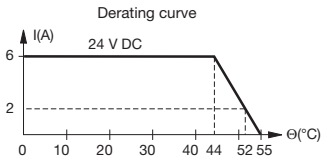
Relay plugs

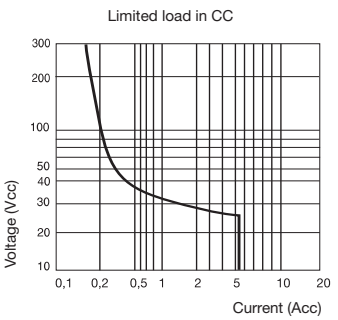


1 SPDT relay



R24V-1



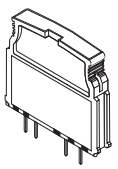


Part numbers	Type	P/N
	BNMS R24V-1	1SNA **031 820** R1400
	BNMS R24V-2	1SNA **031 847** R1300

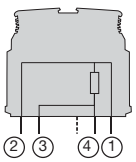
Characteristics	BNMS R24V-1	BNMS R24V-2
COIL		
Voltage	20,4 V to 28,8 V DC	
Current max.	7 mA	
Trip voltage	1,2 V	
CONTACT		
Type	1 SPDT	
Voltage mini. / max.	12 V / 250 V	5 V / 250 V
Switching current mini. / max.	10 mA / 6 A	1 mA / 6 A
Switching current AC1 mini. / max.	0,6 VA/1500 VA (resistance)	0,05 VA/1500 VA (resistance)
DC1 mini. / max.	0,6 W / 140 W	0,05 W / 140 W
Number of operations on load	10^5 operations for AC15	
Number of operations off load	$10x10^6$ operations	
Operating speed C/O	6 ms / 8 ms	
Bounce	1,5 ms	
Isolation Coil / Contact	4 kV	
Resistance to shock waves Coil / Contact	4 kV	
Isolation Contact / Contact	1 kV	
TEMPERATURE		
Storage	- 40°C to + 80°C	
Operating	- 20°C to + 55°C	

	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Analogical plugs



Current / Voltage Converter

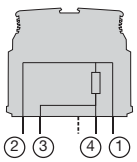


Plug with 250 Ω accuracy resistance for analogical signals.

Part numbers	Type	P/N
	BNMS CA I/U-250	1SNA **031 832** R0400

Characteristics	
Resistance	250 Ω
Power	0,35 W
Accuracy	0,1 %
Stability	25 ppm

Current / Voltage Converter

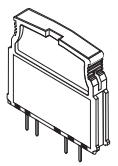


Plug with 500 Ω accuracy resistance for analogical signals.

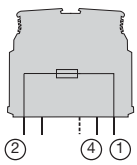
Part numbers	Type	P/N
	BNMS CA I/U-500	1SNA **031 833** R0500

Characteristics	
Resistance	500 Ω
Power	0,35 W
Accuracy	0,1 %
Stability	25 ppm

Fuse and strap plugs

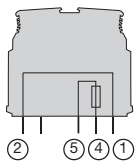


Output fuse plug



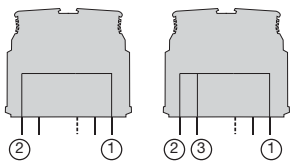
Part numbers	Type		P/N
	BNMS F125mA-1	125 V / 125 mA	1SNA **031 821** R0100
	BNMS F500mA-1	125 V / 500 mA	1SNA **031 838** R1200
	BNMS F2A-1	125 V / 2 A	1SNA **031 822** R0200
	BNMS F5A-1	125 V / 5 A	1SNA **031 823** R0300
	BNMS F125mA-2	250 V / 125 mA	1SNA **031 824** R0400
	BNMS F2A-2	250 V / 2 A	1SNA **031 825** R0500
	BNMS F5A-2	250 V / 5 A	1SNA **031 826** R0600

Input fuse plug



Part numbers	Type		P/N
	BNMS F125mA-3	125 V / 125 mA	1SNA **031 827** R0700
	BNMS F125mA-4	250 V / 125 mA	1SNA **031 828** R1000

Strap plug

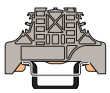


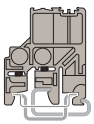
Part numbers	Type	P/N
	BNMS ST1	1SNA **031 829** R1100
	BNMS ST2	1SNA **031 830** R1600

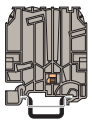
Accessories
Marking

Contents

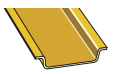

BADL

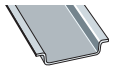

BAM2


BAMH


BADH


PR30

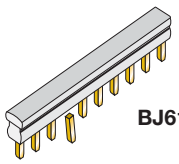

PR3.Z2

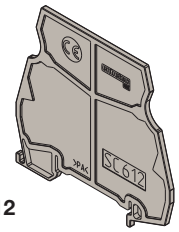

PR3.G2

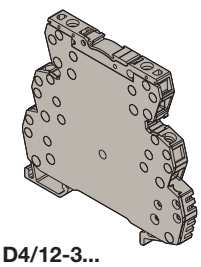

PR5


PR4


FC2


BJ612-...


SC612


D4/12-3...

End stops

The end stops are mounted at the extremity of the terminal board assembly, giving additional support to the terminal blocks as markers. For various types of marking, refer to the marker section.

Description	Type		Order P/N	Packaging	Weight kg
End stop DIN 3					
grey V0	BADL	9 mm	1SNA **399 903** R0200	50	
End stop with screws DIN 3					
grey V0	BAM2 V0	10 mm	1SNA **399 967** R0100	50	
grey V2	BAM2	10 mm	1SNA **206 351** R1600	50	
beige V0	BAM2 V0	10 mm	1SNA **296 351** R0000	50	
High end stop with screws DIN 1 and DIN 3					
grey	BAMH	9,1 mm	1SNA **114 836** R0000	50	
beige V0	BAMH V0	9,1 mm	1SNA **194 836** R0100	50	
High end stop with screws DIN 3					
grey	BADH	12 mm	1SNA **116 900** R2700	50	

Mounting rails

Symmetrical zinc bichromate plated steel prepunched rail	PR30	2 m	1SNA **173 220** R0500	1	
Symmetrical zinc bichromate plated steel rail	PR3.Z2	2 m	1SNA **174 300** R1700	1	
White, symmetrical passivated galvanized steel rail	PR3.G2	2 m	1SNA **164 800** R0300	1	
Symmetrical zinc bichromate plated steel rail	PR5	2 m	1SNA **168 700** R2200	1	
Symmetrical zinc bichromate plated steel rail	PR4	2 m	1SNA **168 500** R1200	1	

Test devices

Test plug DIA. 2 mm	FC2	1SNA **007 865** R2600	10	

Assembled jumper bar

This accessory permits electrical connection between 2 to 70 blocks with 6 mm spacing placed side by side. It can be used with screw clamp or spring clamp blocks with 6 mm or 12 mm spacing.
Interconnection of blocks not placed side by side is possible if teeth of the jumper bar have been cut in front of the blocks not to be connected. These teeth can be removed using pliers.
Use of separator end sections before and after the jumper bar is required to preserve IP20 protection of the assembly.

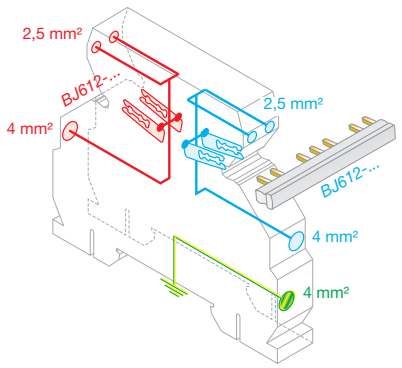
Assembled jumper bar 10 poles - 24 A	BJ612-10	1SNA **290 488** R0100	10	
Assembled jumper bar 70 poles - 24 A	BJ612-70	1SNA **290 489** R0200	10	

Separator end section

Directly mounted on the rail beside the block, it permits to identify and make electrical insulation of product groups using jumper bars. Dimensions are the same as screw clamp blocks : width 70 mm and height on rail 67,5 mm with 2 mm spacing.

Separator end section	SC612	1SNA **290 474** R0200	10	

Distribution module



This terminal block with BJ612-... jumper bars permits 2 polarities distribution *(PCL side and process side)* thanks to two separate circuits, each of them including :

- one 4 mm² input,
- two 2,5 mm² outputs
- one double output for jumper bar BJ612-...

It permits also the connection of ground to the rail though a 4 mm² input.

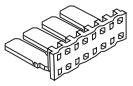
Rated voltage : 250 VAC-DC
Rated current : 32 A (4 mm²) - 16 A (2,5 mm²)
Recommended torque : 0,4 - 0,6 Nm

Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA **645 031** R2000	5	
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA **645 531** R2200	5	

Accessories

PCMS

Comb-type jumper



This accessory permits the electrical connection of 2 to 22 blocks.

No. of poles	Grey UL94V0	Red UL94V0	Blue UL94V0	Green/Yellow UL94V0
2	1SNA **205 491** R2300	1SNA **205 492** R2400	1SNA **205 493** R2500	1SNA **205 494** R2600
3	1SNA **205 495** R2700	1SNA **205 496** R2000	1SNA **205 497** R2100	1SNA **205 498** R0200
4	1SNA **205 499** R0300	1SNA **205 500** R1000	1SNA **205 501** R0500	1SNA **205 502** R0600
5	1SNA **205 503** R0700	1SNA **205 504** R0000	1SNA **205 505** R0100	1SNA **205 506** R0200
6	1SNA **205 507** R0300	1SNA **205 508** R1400	1SNA **205 509** R1500	1SNA **205 510** R0100
7	1SNA **205 511** R2600	1SNA **205 512** R2700	1SNA **205 513** R2000	1SNA **205 514** R2100
8	1SNA **205 515** R2200	1SNA **205 516** R2300	1SNA **205 517** R2400	1SNA **205 518** R0500
9	1SNA **205 519** R0600	1SNA **205 520** R0300	1SNA **205 521** R2000	1SNA **205 522** R2100
10	1SNA **205 523** R2200	1SNA **205 524** R2300	1SNA **205 525** R2400	1SNA **205 526** R2500
11	1SNA **205 527** R2600	1SNA **205 528** R0700	1SNA **205 529** R0000	1SNA **205 530** R0500
12	1SNA **205 531** R2200	1SNA **205 532** R2300	1SNA **205 533** R2400	1SNA **205 534** R2500
13	1SNA **205 535** R2600	1SNA **205 536** R2700	1SNA **205 537** R2000	1SNA **205 538** R0100
14	1SNA **205 539** R0200	1SNA **205 540** R1700	1SNA **205 541** R0400	1SNA **205 542** R0500
15	1SNA **205 543** R0600	1SNA **205 544** R0700	1SNA **205 545** R0000	1SNA **205 546** R0100
16	1SNA **205 547** R0200	1SNA **205 548** R1300	1SNA **205 549** R1400	1SNA **205 550** R1100
17	1SNA **205 551** R0600	1SNA **205 552** R0700	1SNA **205 553** R0000	1SNA **205 554** R0100
18	1SNA **205 555** R0200	1SNA **205 556** R0300	1SNA **205 557** R0400	1SNA **205 558** R1500
19	1SNA **205 559** R1600	1SNA **205 560** R1300	1SNA **205 561** R0000	1SNA **205 562** R0100
20	1SNA **205 563** R0200	1SNA **205 564** R0300	1SNA **205 565** R0400	1SNA **205 566** R0500
21	1SNA **205 567** R0600	1SNA **205 568** R1700	1SNA **205 569** R1000	1SNA **205 570** R1500
22	1SNA **205 571** R0200	1SNA **205 572** R0300	1SNA **205 573** R0400	1SNA **205 574** R0500

PEF

Identification label holders

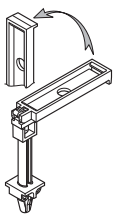
Designed to hold **RPEV** label (see opposite).

PEF * 1SNA **020 568** R0400

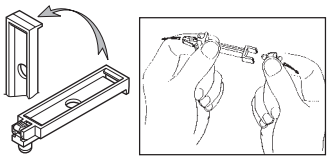
* *Delivered with labels.*

The label holders are removable and the labels can be changed easily.

- For mounting on PCB in a 3,7 mm diameter hole.



- For mounting on a PCB block in a 2 mm diameter hole (no support leg).



RPEV

Label for PEF 29 x 6 mm

Sheets of 99 pre-cut labels

✓ **Blank** **RPEV** 1SNA **173 178** R0700

DC

Test device on screw head

This patented device is mounted on the round screwdriver opening. It is used for trouble shooting, measuring and control for monitoring and repairing an installation, on blocks without a test socket. For this, the device receives an **FC2** test plug.

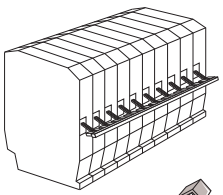
The DC's are differentiated by their colour :

blue for **MA 2,5/5** blocks

DCB 1SNA **105 028** R2100

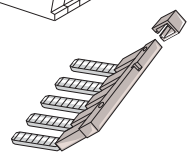
PC

Comb-type jumper bar



PC **EIP**

This accessory can be used only on the terminal blocks with at least one compression clamp connection. It permits the electrical connection of 2 to 10 blocks.
Interconnection of non-consecutive blocks is possible by removing the teeth opposite the blocks which must not be connected. The comb-type jumper bars can be cut using pliers (or a saw) : in this case, the use of an insulating tip **EIP** is recommended. The comb is placed in the compression clamp before tightening the screws, above the eventual conductor.



To be mounted on blocks series R900 and R910 :

Insulating tip for comb	**EIP**			1SNA **113 550**
Comb-type jumper bar	**PC2**00	15 A	10 poles	1SNA **210 160** R1200

BJ Jumper bar

BJS **Jumper bar not assembled**

Subassembly screw + washer + post

Perforated jumper bar to be cut to length

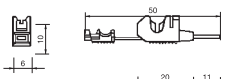
To connect terminal blocks, place the metal tube into the top center hole on each terminal block to be connected.
The metal tube contacts the terminal block's internal connector bar.
The perforated bar is cut to length and placed flat along the center opening of the series of terminal blocks.
The screw is inserted into the perforated bar's hole which is located directly above the blocks being connected. The screw goes through the threaded metal tube and is screwed into the terminal block's internal connector bar.
This completes the electrical connection to the perforated bar and connects the block.

To be mounted on blocks series R910 :

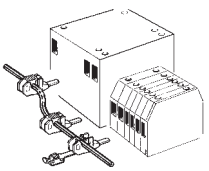
Screw + washer + post	**EV6D**			1SNA **168 400** R1600
Perforated jumper bar	**BJS9**	32 A	8 poles	1SNA **177 583** R1200
	BJS9	32 A	16 poles	1SNA **177 584** R1300

IDC jumper

(insulation displacement jumper)



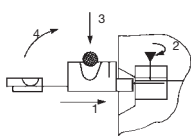
Characteristics		IEC NFC VDE	CSA
Wire size mm² / AWG	Rigid	2,5 mm²	14 AWG
	Flexible	2,5 mm²	
Voltage	V	600	600
Current	A	26	15
Rated wire size	mm² / AWG	2,5 mm²	14 AWG
Working temperature	°C	-55°C -> +110°C	
Protection		IP20 / *NEMA1*	



Quick-jump lets you interconnect screw clamp terminals of different sizes, levels and all manufacturers quickly and safely. Its insulation displacement technology makes it easy to use, fast, economical and does not require a special tool. Use as a jumper between relays, switches and other electronic components. ABB Quick-jump will fit any screw clamp type terminal block, from 6 mm .238" spacing and larger.

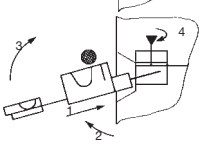
How to use : connecting Quick-jump to your terminal

1 - Insert ABB Quick-jump into your terminal screw clamp.
2 - Tighten the terminal screw.
3 - Guide jumper wire through the V-shaped opening in the Quick-jump.
4 - Secure the wire by closing the Quick-jump lever with any flat nose pliers.



Adding a shunt in an installation :

1 - Insert ABB Quick-jump into your terminal screw clamp.
2 - Guide the terminal screw clamp into contact with the wire.
3 - Secure the wire by closing the Quick-jump lever with any flat nose pliers.
4 - Tighten the terminal screw.



Insulation displacement jumper AD 2,5 1SNA **114 205** R2000

RL Lengthwise marker

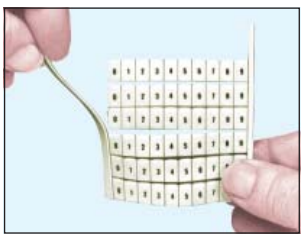
RLV **Lengthwise marker Width 9 mm .354"**

Large area for writing.
To be snapped onto the top of blocks.

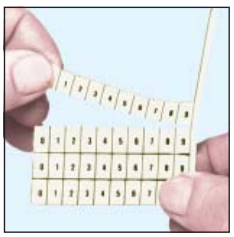
Blank marker for writing : **RLV** 1SNA **103 849** R0300

6

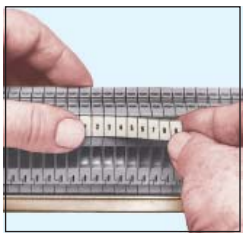
2CDC110004C0207



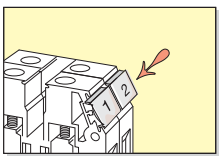
1
Remove one of the side bands of the card.



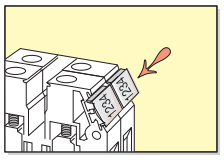
2
Separate the chosen strip from the rest of the card.



3
Press the first marker in place, hold it and slide your thomb on the rest of the strip.



Horizontal marking



Vertical marking

Refilable box of 100 cards of 18 RC markers

Marking for Interface Modules

Selection table

Markers for modules :	RC610	RC55	RC65
R500	⛔	●	⛔
R600	●	POSSIBLE	●
R900	⛔	●	⛔
R910	●	POSSIBLE	●
R1800	⛔	●	⛔

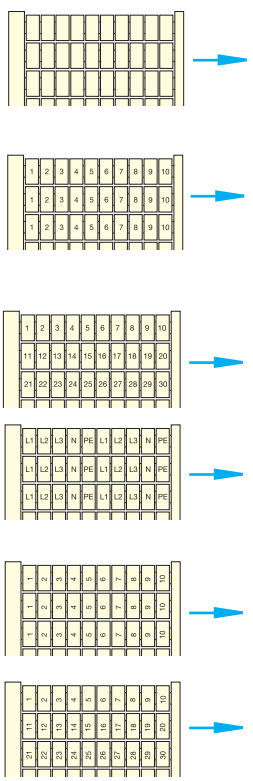
Possible mounting : POSSIBLE

Recommended mounting : ●

Impossible mounting : ⛔

Marking for terminal blocks

Standard RC marker cards



Marker sizes	(x) = Nb of cards in 5 mm spacing kit RC55	(x) = Nb of cards in 6 mm spacing kit RC65	(x) = Nb of cards in 6 mm spacing kit RC610
Blank cards	1SNA **230 000** R1200	1SNA **232 000** R0000	1SNA **233 000** R0100
Horizontal marking			
10 strips from 1 to 10	1SNA **230 002** R0000 (5)	1SNA **232 002** R2600 (5)	1SNA **233 002** R2700 (25)
10 strips from 11 to 20	1SNA **230 003** R0100 (2)	1SNA **232 003** R2700 (2)	1SNA **233 003** R2000 (10)
10 strips from 21 to 30	1SNA **230 004** R0200	1SNA **232 004** R2000	1SNA **233 004** R2100 (6)
10 strips from 31 to 40	1SNA **230 005** R0300	1SNA **232 005** R2100	1SNA **233 005** R2200 (4)
10 strips from 41 to 50	1SNA **230 006** R0400	1SNA **232 006** R2200	1SNA **233 006** R2300 (3)
10 strips from 51 to 60	1SNA **230 007** R0500	1SNA **232 007** R2300	1SNA **233 007** R2400 (2)
10 strips from 61 to 70	1SNA **230 008** R1600	1SNA **232 008** R0400	1SNA **233 008** R0500 (2)
From 1 to 100 From 101 to 200	1SNA **230 030** R0700 (2) 1SNA **230 031** R2400	1SNA **232 030** R2500 (2) 1SNA **232 031** R1200	1SNA **233 030** R2600 (15) 1SNA **233 031** R1300 (2)
20 times L1-L2-L3-N-PE	1SNA **230 131** R2500	1SNA **232 131** R1300	1SNA **233 131** R1400 (2)
Vertical marking			
10 strips from 1 to 10	1SNA **230 041** R0600	1SNA **232 041** R2400	1SNA **233 041** R2500 **(5)**
10 strips from 11 to 20	1SNA **230 042** R0700	1SNA **232 042** R2500	1SNA **233 042** R2600 **(3)**
10 strips from 21 to 30	1SNA **230 043** R0000	1SNA **232 043** R2600	1SNA **233 043** R2700 **(2)**
10 strips from 31 to 40	1SNA **230 044** R0100	1SNA **232 044** R2700	1SNA **233 044** R2000 **(2)**
From 1 to 100	1SNA **230 060** R1500	1SNA **232 060** R0300	1SNA **233 060** R0400 **(8)**

Marking kit RC 5 mm spacing or 6 mm spacing

Box with 100 cards with 18 various part numbers (see table next page)

Description	Type	Order P/N	Packaging	Weight kg
Box with 100 cards RC 5 mm spacing		1SNA **400 085** R2700	1	
Refill for box RC 5 mm		1SNA **400 145** R0700	1	
Box with 100 cards RC 6 mm spacing		1SNA **400 084** R2600	1	
Refill for box RC 6 mm		1SNA **400 144** R0600	1	

Panel heaters

Contents

Panel heaters
Benefits and advantages, heat demand calculation


2CDC 311 001 F0005


2CDC 311 003 F0005


2CDC 311 008 F0005


2CDC 311 013 F0005

Why do I need a panel heater?

Whenever the ambient temperature around the control panel exceeds the temperature inside the control panel, condensation may occur inside the control panel. Humidity may be deposited as condensation water on the devices and terminals in the control panel, leading to malfunction and short circuits.

A simple solution is heating the inside of the control panel. This ensures that the temperature inside the control panel is always a little bit higher than the outside temperature, thus avoiding condensation.

To ensure that this does not happen to your control panel or subsidiary distribution box in the winter, we recommend using panel heaters to protect your equipment from frost damages and to ensure the trouble-free functioning of your systems.

ABB's panel heaters are characterized by their flat structural form that enables positive fastening at the control panel wall without disturbing other devices. A mounting clip also enables DIN rail mounting.
Each panel heater includes overheating protection.

Fields of application

- Anti-condensation
  Avoidance of water condensation inside the control panel (eg. in carpark ticket machines)
- Anti-frost
  Avoidance of undercooling of systems and control panels inside of free-standing distributors or mobile equipment.

Features

- Flat structural form: only 3 mm thick
- Power stages: 20 W, 40 W, 100 W, 200 W, 250 W, 300 W
- Voltages: 110 V or 230 V, 50/60 Hz
- Plate temperature fixed at +70 °C or +80 °C or adjustable from +30 °C to +150 °C
- Long lifetime through low surface temperature (70 °C or 80 °C)
- Even heat distribution on the whole heating surface
- Good resistance against chemicals
- Isolation out of silicone rubber, continuous 180 °C, puncture-proof until 12 kV/mm
- Bracket: anodized aluminium
- Connecting line: 0.5 m silicone rubber, 2 x 0.75 mm^2
- The heating elements are tested in accordance to VDE 720, CEE publication 11
- Lowest ambient temperature -40 °C
- Fastening: Snap on 35 mm top hat rail according DIN EN 50022, optionally fastening with M 4 screws or by bonding
- Separate thermostat for exact temperature control

7

The panel heaters have to be installed to provide sufficient heat dissipation

Heat demand calculation

The calculation of the heat demand (watt) and the selection of the appropriate heating plate depends on different factors such as:

- size of the control panel
- material of the control panel
- place of installation
- relative humidity
- power dissipation (self-heating) of the chassis-mounted units
- ventilation of the control panel

To aid installation, we have established the guideline values on the right.

case content in litres	Location indoors heated	indoors unheated	outdoors
up to 20	10 W	20 W	40 W
30	20 W	33 W	55 W
50	30 W	55 W	90 W
75	30 W	75 W	130 W
100	55 W	90 W	150 W
120	55 W	90 W	150 W
160	55 W	130 W	180 W
240	90 W	180 W	235 W
300	90 W	180 W	275 W
420	90 W	180 W	310 W
500	90 W	240 W	360 W
600	90 W	280 W	415 W
800	130 W	280 W	630 W
1000	130 W	280 W	810 W
1200	150 W	360 W	1300 W

Panel heaters
Ordering details


2CDC 311 001 F0005

Heating element 20 W


2CDC 311 005 F0005

Mounting clips


2CDC 311 012 F0005

Heating plate 250 W


2CDC 311 010 F0005

Heating plate 100 W adjustable


2CDC 311 006 F0005

Thermostat

Type	Heating power	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
Heating elements for screw mounting, optionally DIN rail mounting with mounting clips						
Plate temperature max. 80°C, cable length 0.5 m						
20W-230V-HE	20 W	230 V AC	**GHV6 000 020 V0006**	1		0.10/0.22
40W-230V-HE	40 W	230 V AC	**GHV6 000 040 V0006**	1		0.25/0.55
Plate temperature max. 70 °C, cable length 0.5 m						
100W-230V-HE	100 W	230 V AC	**GHV6 000 100 V0006**	1		0.30/0.66
200W-230V-HE	200 W	230 V AC	**GHV6 000 200 V0006**	1		0.50/1.10
300W-230V-HE	300 W	230 V AC	**GHV6 000 300 V0006**	1		0.50/1.10
Mounting clips for heating elements						
to snap on DIN rail						
20-100W-MC	20-100 W	-	**GHV6 000 000 V0001**	1		0.01/0.22
200-300W-MC	200-300 W	-	**GHV6 000 000 V0002**	1		0.02/0.44
Heating plates with mounting clip for DIN rail mounting						
Plate temperature 70 °C fixed, cable length 0.5 m						
40W-110V-HP	40 W	110 V AC	**GHV6 010 040 V0004**	1		0.13/0.29
40W-230V-HP	40 W	230 V AC	**GHV6 010 040 V0006**	1		0.13/0.29
100W-110V-HP	100 W	110 V AC	**GHV6 010 100 V0004**	1		0.37/0.80
100W-230V-HP	100 W	230 V AC	**GHV6 010 100 V0006**	1		0.37/0.80
250W-110V-HP	250 W	110 V AC	**GHV6 010 250 V0004**	1		0.58/1.28
250W-230V-HP	250 W	230 V AC	**GHV6 010 250 V0006**	1		0.54/1.19
Plate temperature 70 °C fixed, cable length 3 m						
40W-230V-HP-E	40 W	230 V AC	**GHV6 010 040 V0007**	1		0.13/0.29
100W-230V-HP-E	100 W	230 V AC	**GHV6 010 100 V0007**	1		0.37/0.80
Plate temperature adjustable from 30 to 150 °C						
100W-230V-HP-ADJ	100 W	230 V AC	**GHV6 017 100 V0006**	1		0.39/0.85
250W-230V-HP-ADJ	250 W	230 V AC	**GHV6 017 250 V0006**	1		0.54/1.19
Thermostat						
Temperature adjustable from 10 to 60 °C						
Thermostat	-	230 V AC	**GHV6 011 060 V0001**	1		0.25/0.55

• Technical data ..... **7**/4 • Dimensional drawings **7**/6

Panel heaters
Technical data

Data at T_a = 25 °C and rated values, if noting else indicated.

Type		20W-230V-HE	40W-230V-HE	100W-230V-HE	200W-230V-HE	300W-230V-HE
Input circuit - supply circuit						
Rated operational voltage		230 V AC				
Operational voltage range		210-240 V AC/DC				
Rated frequency		50/60 Hz				
Frequency range		DC; 47-63 Hz				
Typical current / power consumption	230 V AC	87 mA / 20 VA	170 mA / 40 VA	439 mA / 100 VA	870 mA / 200 VA	1300 mA / 300 VA
	110 V AC	-	-	-	-	-
Typical inrush current		87 mA	170 mA	430 mA	870 mA	1300 mA
Output circuit						
Heating element		silicone heating element				
Bracket of the heating element		anodized aluminium				
Isolation of the heating element		silicone				
Maximum heating power		20 W	40 W	100 W	200 W	300 W
Maximum plate temperature		80 °C		70 °C		
Plate temperature adjustable		no				
Power density		0.17 W/cm²	0.13 W/cm²	0.33 W/cm²		0.5 W/cm²
General data						
Duty time		100 %				
Mounting		screw, bond, DIN rail (optional)				
Degree of protection		IP53				
Electrical connection						
Connecting line out of silicone rubber		2x0.75 mm² (2x18 AWG)				
Length of connecting line		0.5 m				
Environmental data						
Ambient temperature range	operation	-40...+20 °C		-40...+40 °C		
	storage	-60...+100 °C				
	transport	-60...+100 °C				
Standards						
Product standard		DIN EN 60355-1				
Low Voltage Directive		2006/95/EC				

Data at T_a = 25 °C and rated values, if noting else indicated.

Type		40W-110V-HP	40W-230V-HP	40W-230V-HP-E	100W-110V-HP	100W-230V-HP	100W-230V-HP-E	250W-110V-HP	250W-230V-HP	100W-230V-HP-ADJ	250W-230V-HP-ADJ
Input circuit - supply circuit											
Rated operational voltage		110 V AC	230 V AC		110 V AC	230 V AC		110 V AC	230 V AC		
Rated voltage range		105-115 V AC	210-240 V AC		105-115 V AC	210-240 V AC		105-115 V AC	210-240 V AC		
Rated frequency		50/60 Hz									
Frequency range		47-63 Hz									
Typical current / power consumption	230 V AC	-	170 mA / 40 VA		-	430 mA / 100 VA		-	1086 mA / 250 VA	430 mA / 100 VA	1086 mA / 250 VA
	110 V AC	360 mA / 40 VA	-		910 mA / 100 VA	-		2270 mA / 250 VA	-		
Typical inrush current		360 mA	170 mA		910 mA	430 mA		2270 mA	1086 mA	430 mA	1086 mA
Output circuit											
Heating element		silicone heating element									
Bracket of the heating element		anodized aluminium									
Isolation of the heating element		silicone									
Maximum heating power		40 W			100 W			250 W		100 W	250 W
Maximum plate temperature		70 °C								150 °C	
Plate temperature adjustable		no								yes, +30...+150 °C	
Power density		0.33 W/cm²						0.42 W/cm²		0.33 W/cm²	0.42 W/cm²
General data											
Duty time		100 %									
Mounting		screw, bond, DIN rail									
Degree of protection		IP53									
Electrical connection											
Connecting line out of silicone rubber		2x0.75 mm² (2x18 AWG)									
Length of connecting line		0.5 m									
Environmental data											
Ambient temperature range	operation	-40...+40 °C									
	storage	-60...+100 °C									
	transport	-60...+100 °C									
Standards											
Product standard		DIN EN 60335-1									
Low Voltage Directive		2006/95/EC									

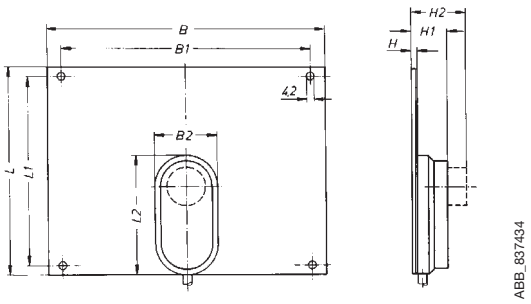
Panel heaters
Dimensional drawings

Table of dimension

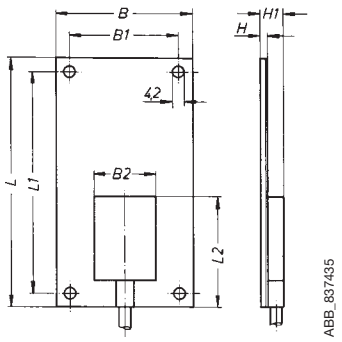
in mm

Type	L	L1	L2	B	B1	B2	H	H1	H2	Drawing no.
Heating elements for screw mounting, optionally DIN rail mounting with mounting clips										
20W-230V-HE	150	134	65	80	64	32	2.5	10	-	2
40W-230V-HE	150	130	65	200	180	45	2.5	10	-	1
100W-230V-HE	150	130	65	200	180	45	2.5	10	-	1
200W-230V-HE	300	280	95	200	180	45	2.5	10	-	2
300W-230V-HE	300	280	95	200	180	45	2.5	10	-	2
Heating plates, temperature fixed, with mounting clip for DIN rail mounting										
40W-110V-HP **40W-230V-HP** **40W-230V-HP-E**	150	134	65	80	64	32	2.5	10	-	2
100W-110V-HP **100W-230V-HP** **100W-230V-HP-E**	150	130	65	200	180	45	2.5	10	-	1
250W-110V-HP **250W-230V-HP**	300	280	85	200	180	45	2.5	10	-	2
Heating plates, temperature adjustable from 30 to 150 °C, with mounting clip for DIN rail mounting										
100W-230V-HP-ADJ	150	130	65	200	180	45	2.5	10	50	1
250W-230V-HP-ADJ	300	280	85	200	180	45	2.5	10	50	2

Dimensions



Dimensional drawing 1



Dimensional drawing 2

7

Logic relays and Display system

CL range

Contents

Logic relays, display system
CL range
System overview

Concept

CL range logic relays are suitable for small and medium-sized control tasks and are able to substitute logic wiring in a quick and simple manner.

They can be used for applications in control as well as for timing functions, e. g.

- in buildings, lighting systems, air-conditioning systems, general control functions,
- in small machines and systems or
- as stand-alone control module for small applications.

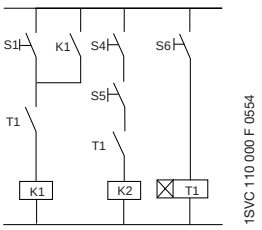
Steps to the application of CL range

- CL range can be used easily, rapidly and comfortably without any time-consuming planning and programming.
- The user can discover the advantages and the benefit of these logic relays in no time at all.
- CL range provides for the control statements according to a simple circuit diagram.
- Setup, storage, simulation and documentation are performed using the compact and user-friendly CL-SOFT software (CL-LAS.PS002).

Software characteristics (CL-SOFT)

- display on a PC monitor according to IEC, ANSI
- different languages to choose from
- easy installation on all Microsoft Windows™ operating systems

Logic links instead of wiring

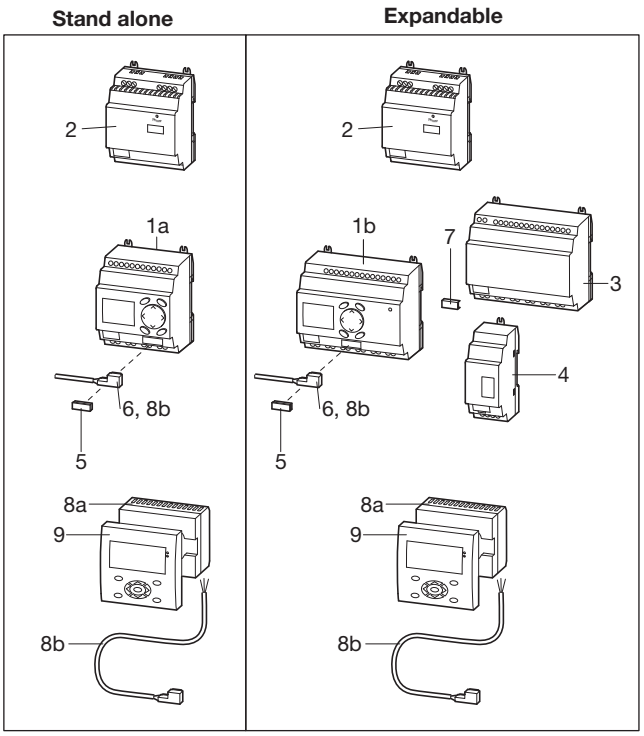


Documentation (download from the internet)

Logic relay manual	1SVC 440 795 M0100
Remote display manual	1SVC 440 795 M2100
Display system manual	1SVC 440 795 M1100

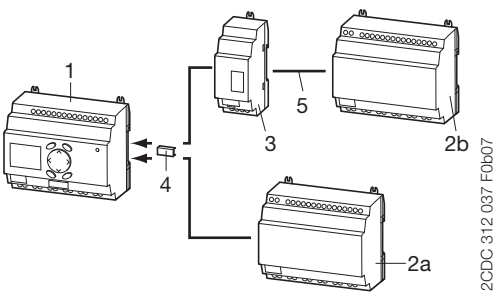
System overview

Logic relays



1a Logic relay CL-LS..
1b Expandable logic relay CL-LM..
2 Power supply CP-D...
3 I/O expansion CL-LER.., CL-LET.. for logic relays CL-LM..
4 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
5 Memory module CL-LAS.MD003 for logic relays CL-LS.., CL-LM..
6 Connecting cable CL-LAS.TK001, CL-LAS.TK002 to connect PC
7 CL-LINK plug CL-LAS.TK011
to connect expansion to logic relays CL-LM..
8a Remote display connection module CL-LDC.S..
8b Connecting cable CL-LAD.TK007
to connect a remote displays to a logic relay
9 Display module CL-LDD..

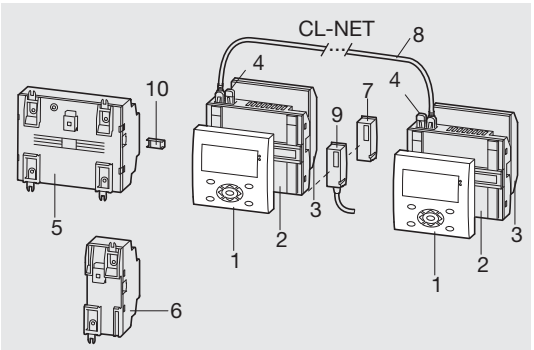
Expansion of logic relays*



1 Logic relay CL-LM..
2 I/O expansion CL-LER.., CL-LET..
2a local expansion
2b remote expansion
3 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
4 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
5 up to 30 m

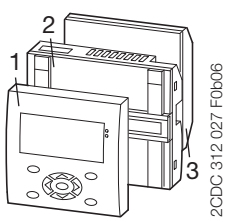
* max. 1 expansion per logic relay

Display system → Compact HMI logic relay



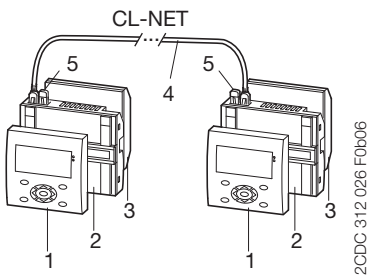
1 Display module CL-LDD..
2 Display base module CL-LDC.LN..
3 Display I/O module CL-LDR.., CL-LDT..
4 Termination resistor CL-LAD.TK009
5 I/O expansion CL-LER.., CL-LET..
6 Coupler unit CL-LEC.. for remote expansion
7 Memory module CL-LAD.MD004 for display base module
8 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
9 Connecting cable CL-LAD.TK001, CL-LAD.TK011 to connect PC
10 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
■ e.g. door of switchgear cabinet

Stand alone with I/O module



1 Display CL-LDD..
2 Remote display connection module CL-LDC.S.. incl. connecting cable
3 Display base module CL-LDC.L..

Communication via CL-NET



1 Display CL-LDD..
2 Display base module CL-LDC.LN.. for CL-NET
3 Display I/O module CL-LDR.., CL-LDT..
4 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
5 Termination resistor CL-LAD.TK009

Logic relays, display system
CL range
System overview, Approvals and marks

Technical Data overview

Logic relays

- 8 or 12 digital inputs
- 4 or 6 digital relay outputs
- optionally with 4 or 8 transistor outputs
- 128 rungs
- 3 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 2 or 4 analog inputs (not 100-240 V AC version)
- power flow display for checking the circuit diagram (devices with display)
- expansions for local or remote level
- enclosure color RAL 7035
- DIN rail mounting

Display system

- useable as compact HMI logic relay
- fully graphic, backlit display module
- 12 digital inputs
- 4 digital relay outputs
- optionally with 4 transistor outputs
- 256 rungs
- 4 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 4 analog inputs (not 100-240 V AC version)
- networking-compatible via CL-NET
- front panel mounting
- expansion for local

Remote display

- Remote display up to a distance of 5 m
- Illustration of text and status displays
- Remote adjustment via keypad
- Front panel mounting

Software

- 16 timing relays 0.01-99:59 h
- 16 counting relays for up-, down counting
- 8 weekly timer, 8 annual timers
- 16 analog value comparators
- 16 freely editable display texts
- 32 markers or auxiliary relays

■ **existing**
□ **pending**

		Logic relays					Expansions				Display system					Accessories	
Approvals		CL-LSR	CL-LST	CL-LMR	CL-LMT		CL-LER	CL-LET	CL-LEC		CL-LDD	CL-LDC	CL-LDR	CL-LDT		CL-LAS	CL-LAD
	UL	■	■	■	■		■	■	■		■	■	■	■		■ [1]	■ [2]
	CAN/CSA C22.2 No.14	■	■	■	■		■	■	■		■	■	■	■		■ [1]	■ [2]
	CAN/CSA C22.2 No.213 (hazardous locations)	■	■	■	■		■	■	■		■	■	■	■		■ [1]	■ [2]
	GL	■	■	■	■						■	■ [3]	■ [4]	■			
	GOST	■	■	■	■		■	■	■		■	■	■	■		■	■
	Lloyds Register	■	■	■	■						■	■ [3]	■ [4]	■			
Marks																	
CE	CE	■	■	■	■		■	■	■		■	■	■	■		■	■
	C-Tick	□	□	□	□		□	□	□		□	□	□	□		□	□

[1] not for: CL-LAS-PS002, CL-LAS.TD001, CL-LAS.FD001, CL-LAS.TK002, CL-LAS.TK011
[2] not for: CL-LAD.TK006, CL-LAD.TK011, CL-LAD.FD002
[3] not for: CL-LDC.SDC2, CL-LDC.SAC2, CL-LDC.LAC2, CL-LDC.LNAC2
[4] not for: CL-LDR.16AC2

2CDC110004C0207

Logic relays
CL-LSR.., CL-LST..
Stand alone

CL-LSR

CL-LST

CL-LDD.K

CL-LDC.S..

Type	Rated operational voltage	Display + Keypad	Timer	expandable	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
Logic relays								
CL-LSR: 8 inputs, 4 relay outputs								
CL-LSR.C12AC1	24 V AC	■	■		**1SVR 440 712 R0300**	1		0.20/0.44
CL-LSR.CX12AC1	24 V AC		■		**1SVR 440 712 R0200**	1		0.20/0.44
CL-LSR.12AC2	100-240 V AC	■			**1SVR 440 713 R0100**	1		0.20/0.44
CL-LSR.C12AC2	100-240 V AC	■	■		**1SVR 440 713 R0300**	1		0.20/0.44
CL-LSR.CX12AC2	100-240 V AC		■		**1SVR 440 713 R0200**	1		0.20/0.44
CL-LSR.C12DC1	12 V DC	■	■		**1SVR 440 710 R0300**	1		0.20/0.44
CL-LSR.CX12DC1	12 V DC		■		**1SVR 440 710 R0200**	1		0.20/0.44
CL-LSR.12DC2	24 V DC	■			**1SVR 440 711 R0100**	1		0.20/0.44
CL-LSR.C12DC2	24 V DC	■	■		**1SVR 440 711 R0300**	1		0.20/0.44
CL-LSR.CX12DC2	24 V DC		■		**1SVR 440 711 R0200**	1		0.20/0.44
CL-LST: 8 inputs, 4 transistor outputs								
CL-LST.C12DC2	24 V DC	■	■		**1SVR 440 711 R1300**	1		0.20/0.44
CL-LST.CX12DC2	24 V DC		■		**1SVR 440 711 R1200**	1		0.20/0.44

Type	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
Display modules					
CL-LDD: Graphic display 132 x 64 pixel					
CL-LDD.XK	-	**1SVR 440 839 R4500**	1		0.14/0.30
CL-LDD: Graphic display 132 x 64 pixel, with keypad					
CL-LDD.K	-	**1SVR 440 839 R4400**	1		0.13/0.29
Remote display connection modules					
CL-LDC: Module to displace the display from the logic relay, incl. connecting cable CL-LAD.TK007, 5 m, length adaptable					
CL-LDC.SDC2	24 V DC	**1SVR 440 841 R0000**	1		0.16/0.36
CL-LDC.SAC2	100-240 V AC	**1SVR 440 843 R0000**	1		0.16/0.36

• Approvals **8**/ 4
• Technical data ..... **8**/10 • Dimensional drawings **8**/24

Logic relays
CL-LMR.., CL-LMT..
Expandable

2CDC 311 036 F0b06

CL-LMR

2CDC 311 035 F0b06

CL-LMT

2CDC 311 037 F0b06

CL-LER

2CDC 311 038 F0b06

CL-LEC

Expandable logic relays

CL-LMR: 12 inputs, 6 relay outputs

CL-LMR.C18AC1	24 V AC	■	■	■	**1SVR 440 722 R0300**	1		0.36/0.79
CL-LMR.CX18AC1	24 V AC		■	■	**1SVR 440 722 R0200**	1		0.36/0.79
CL-LMR.C18AC2	100-240 V AC	■	■	■	**1SVR 440 723 R0300**	1		0.36/0.79
CL-LMR.CX18AC2	100-240 V AC		■	■	**1SVR 440 723 R0200**	1		0.36/0.79
CL-LMR.C18DC1	12 V DC	■	■	■	**1SVR 440 720 R0300**	1		0.36/0.79
CL-LMR.CX18DC1	12 V DC		■	■	**1SVR 440 720 R0200**	1		0.36/0.79
CL-LMR.C18DC2	24 V DC	■	■	■	**1SVR 440 721 R0300**	1		0.36/0.79
CL-LMR.CX18DC2	24 V DC		■	■	**1SVR 440 721 R0200**	1		0.36/0.79

CL-LMT: 12 inputs, 8 transistor outputs

CL-LMT.C20DC2	24 V DC	■	■	■	**1SVR 440 721 R1300**	1		0.36/0.79
CL-LMT.CX20DC2	24 V DC		■	■	**1SVR 440 721 R1200**	1		0.36/0.79

Type	Rated operational voltage	**Order code**	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb

Expansions

CL-LER: 2 relay outputs

CL-LER.2O	-	**1SVR 440 709 R5000**	1		0.07/0.15

CL-LER: 12 inputs, 6 relay outputs

CL-LER.18AC2	100-240 V AC	**1SVR 440 723 R0000**	1		0.26/0.57
CL-LER.18DC2	24 V DC	**1SVR 440 721 R0000**	1		0.22/0.49

CL-LET: 12 inputs, 8 transistor outputs

CL-LET.20DC2	24 V DC	**1SVR 440 721 R1000**	1		0.21/0.46

Coupler unit

CL-LEC: Coupler unit for remote expansion with a distance of up to 30 m

CL-LEC.CI000	-	**1SVR 440 709 R0000**	1		0.07/0.15

• Approvals **8**/ 4
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Logic relays
Accessories - CL-LA..
Ordering details

2CDC 311 012 F0b07

CL-LAS.PS002

2CDC 311 013 F0b07

CL-LAS.MD003

2CDC 311 014 F0b07

CL-LAS.TK001

2CDC 311 031 F0b07

CL-LAS.TK011

2CDC 271 027 F0b07

CP-D 24/1.3

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
Software for CL range (CL-SOFT)					
CL-LAS: Software for programming and control of CL range devices					
CL-LAS.PS002	Installation CD-ROM for Microsoft Windows™	**1SVR 440 799 R8000**	1		0.10/0.21
Memory module					
CL-LAS: Memory module for logic relays					
CL-LAS.MD003	Memory size: 32 kB	**1SVR 440 799 R7000**	1		0.02/0.04
Connecting cables					
CL-LAS: Cable with serial interface to connect PC and logic relay					
CL-LAS.TK001	Length: 2 m	**1SVR 440 799 R6000**	1		0.10/0.22
CL-LAS: Cable with USB interface to connect PC and logic relay					
CL-LAS.TK002	Length: 2 m	**1SVR 440 799 R6100**	1		
CL-LAD: Cable for point-to-point connection of remote-display connection module and logic relay, length adaptable					
CL-LAD.TK007	Length: 2 m	**1SVR 440 899 R6600**	1		0.20/0.44
Fixing brackets					
CL-LAS: Fixing brackets for screw mounting of logic relay, expansion, display base module					
CL-LAS.FD001	content: 9 fixing brackets	**1SVR 440 799 R5000**	1		0.01/0.01
Connecting plug					
CL-LAS: Spare plug (CL-LINK) for connection of logic relay to expansion					
CL-LAS.TK011	CL-LINK	**1SVR 440 799 R5100**	1		0.10/0.22

Type	Rated input voltage	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
Simulator						
CL-LAS: Input-/ output simulator with wall power supply, fits to CL-LSR and CL-LST						
CL-LAS.TD001	100-240 V AC	24 V DC	**1SVR 440 793 R0000**	1		0.19/0.43
Power supplies						
CP-D: Primary switch mode power supplies						
CP-D 24/0.42 [1]	100-240 V AC	24 V DC / 0.42 A	**1SVR 427 041 R0000**	1		0.06/0.13
CP-D 24/1.3 [2]	100-240 V AC	24 V DC / 1.3 A	**1SVR 427 043 R0100**	1		0.19/0.41

[1] replaces CL-LAS.SD001, technical data see chapter “Primary switch mode power supplies”
[2] replaces CL-LAS.SD002, technical data see chapter “Primary switch mode power supplies”

• Approvals **8**/ 4
• Dimensional drawings **8**/24

Display system
CL-LD..
Ordering details

2CDC 311 028 F0b06

CL-LDD.K

2CDC 311 031 F0b06

CL-LDC.LN..

2CDC 311 032 F0b06

CL-LDR

Type	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
Display modules					
CL-LDD: Graphic display 132 x 64 pixel					
CL-LDD.XK	-	**1SVR 440 839 R4500**	1		0.14/0.30
CL-LDD: Graphic display 132 x 64 pixel, with keypad					
CL-LDD.K	-	**1SVR 440 839 R4400**	1		0.13/0.29
Display base modules					
CL-LDC: CPU / power supply					
CL-LDC.LDC2	24 V DC	**1SVR 440 821 R0000**	1		0.16/0.36
CL-LDC.LAC2	100-240 V AC	**1SVR 440 823 R0000**	1		0.16/0.36
CL-LDC: CPU / power supply, networking-compatible (CL-NET)					
CL-LDC.LNDC2	24 V DC	**1SVR 440 821 R1000**	1		0.17/0.38
CL-LDC.LNAC2	100-240 V AC	**1SVR 440 823 R1000**	1		0.17/0.38
Display I/O modules					
CL-LDR: 12 inputs, 4 relay outputs					
CL-LDR.16AC2	100-240 V AC	**1SVR 440 853 R0000**	1		0.17/0.38
CL-LDR.16DC2	24 V DC	**1SVR 440 851 R0000**	1		0.17/0.38
CL-LDR: 12 inputs, 4 relay outputs, 1 analog output					
CL-LDR.17DC2	24 V DC	**1SVR 440 851 R2000**	1		0.17/0.38
CL-LDT: 12 inputs, 4 transistor outputs					
CL-LDT.16DC2	24 V DC	**1SVR 440 851 R1000**	1		0.14/0.30
CL-LDT: 12 inputs, 4 transistor outputs, 1 analog output					
CL-LDT.17DC2	24 V DC	**1SVR 440 851 R3000**	1		0.14/0.30

• Approvals **8**/ 4
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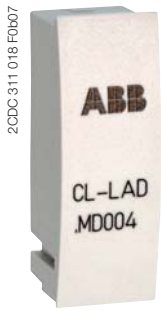
Display system
Accessories - CL-LAD..
Ordering details



2CDC 311 018 F0b07

CL-LAD.MD004


2CDC 311 019 F0b07

CL-LAD.TK001


2CDC 311 020 F0b07

CL-LAD.TK002

2CDC 311 021 F0b07

CL-LAD.TK009

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
Memory module					
CL-LAD: Memory module for display base modules					
CL-LAD.MD004	Memory size: 256 kB	**1SVR 440 899 R7000**	1		0,02/0.03
Connecting cables					
CL-LAD: Cable with serial interface to connect PC and display base module					
CL-LAD.TK001	Length: 2 m	**1SVR 440 899 R6000**	1		0.11/0.23
CL-LAD: Cable with USB interface to connect PC and display base module					
CL-LAD.TK011	Length: 2 m	**1SVR 440 899 R6700**	1		
CL-LAD: Network cable (CL-NET) to connect 2 display base modules					
CL-LAD.TK002	Length: 0.3 m	**1SVR 440 899 R6100**	1		0.05/0.12
CL-LAD.TK003	Length: 0.8 m	**1SVR 440 899 R6200**	1		0.07/0.14
CL-LAD.TK004	Length: 1.5 m	**1SVR 440 899 R6300**	1		0.08/0.18
CL-LAD: Cable for point-to-point connection of remote display connection modules and display base module, length adaptable					
CL-LAD.TK005	Length: 5 m	**1SVR 440 899 R6400**	1		0.20/0.44
CL-LAD: Cable for point-to-point connection of 2 display base modules, length adaptable					
CL-LAD.TK006	Length: 5 m	**1SVR 440 899 R6500**	1		0.12/0.26
Termination resistor					
CL-LAD: Termination resistor					
CL-LAD.TK009	content: 2 pieces	**1SVR 440 899 R6900**	1		0.01/0.02
Protective covers					
CL-LAD: Protective cover, transparent, for harsh environmental conditions and application in the food industry					
CL-LAD.FD001	-	**1SVR 440 899 R1000**	1		0.03/0.07
CL-LAD: Protective cover, transparent and sealable					
CL-LAD.FD011	-	**1SVR 440 899 R2000**	1		0.03/0.07
Assembly tool					
CL-LAD: Tool for mounting of display modules					
CL-LAD.FD002	-	**1SVR 440 899 R3000**	1		

• Approvals **8**/4

Logic relays
CL-LS.., CL-LM.., CL-LER.., CL-LET..
Technical data / Input circuit - supply circuit

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR.C...12DC1	CL-LSR....12DC2 CL-LST.C...12DC2	CL-LSR.C...12AC1	CL-LSR...12AC2
Input circuit - supply circuit					
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	100-240 V AC
Rated operational voltage tolerance		-15...+30 %	-15...+20 %	-15...+10 %	
Operational voltage range		10.2-15.6 V DC	20.4-28.8 V DC	20.4-26.4 V AC	85-264 V AC
Rated frequency		0 Hz		50/60 Hz	
Rated frequency tolerance		-		±5 %	
Residual ripple		≤ 5 %		-	
Input current	at 12 V DC	typ. 140 mA	-	-	-
	at 24 V DC	-	typ. 80 mA	-	-
	at 24 V AC	-	-	typ. 200 mA	-
	at 115/120 V AC (60 Hz)	-	-	-	typ. 40 mA
	at 230/240 V AC (50 Hz)	-	-	-	typ. 20 mA
Power failure buffering (IEC/EN 61131-2)		10 ms		20 ms	
Power dissipation	at 12 V DC	typ. 2 W	-	-	-
	at 24 V DC	-	typ. 2 W	-	-
	at 24 V AC	-	-	typ 5 VA	-
	at 115/120 V AC	-	-	-	typ. 5 VA
	at 230/240 V AC	-	-	-	typ. 5 VA

Type		CL-LMR.C...18DC1	CL-LMR.C...18DC2 CL-LMT.C...20DC2	CL-LMR.C...18AC1	CL-LMR.C...18AC2
Input circuit - supply circuit					
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	100-240 V AC
Rated operational voltage tolerance		-15...+30 %	-15...+20 %	-15...+10 %	
Operational voltage range		10.2-15.6 V DC	20.4-28.8 V DC	20.4-26.4 V AC	85-264 V AC
Rated frequency		0 Hz		50/60 Hz	
Rated frequency tolerance		-		±5 %	
Residual ripple		≤ 5 %		-	
Input current	at 12 V DC	typ. 200 mA	-	-	-
	at 24 V DC	-	typ. 140 mA	-	-
	at 24 V AC	-	-	typ. 300 mA	-
	at 115/120 V AC (60 Hz)	-	-	-	typ. 70 mA
	at 230/240 V AC (50 Hz)	-	-	-	typ. 35 mA
Power failure buffering (IEC/EN 61131-2)		10 ms		20 ms	
Power dissipation	at 12 V DC	typ. 3.5 W	-	-	-
	at 24 V DC	-	typ. 3.5 W	-	-
	at 24 V AC	-	-	typ. 7 VA	-
	at 115/120 V AC	-	-	-	typ 10 VA
	at 230/240 V AC	-	-	-	typ 10 VA

Type		CL-LER.18DC2 CL-LET.20DC2	CL-LER.18AC2		
Input circuit - supply circuit					
Rated operational voltage U_e		24 V DC	100-240 V AC		
Rated operational voltage tolerance		-15...+20 %	-15...+10 %		
Operational voltage range		20.4-28.8 V DC	85-264 V AC		
Rated frequency		0 Hz	50/60 Hz		
Rated frequency tolerance		-	±5 %		
Residual ripple		≤ 5 %	-		
Input current	at 24 V DC	typ. 140 mA	-		
	at 115/120 V AC (60 Hz)	-	typ. 70 mA		
	at 230/240 V AC (50 Hz)	-	typ. 35 mA		
Power failure buffering (IEC/EN 61131-2)		10 ms	20 ms		
Power dissipation	at 24 V DC	typ. 3.4 W	-		
	at 115/120 V AC	-	typ. 10 VA		
	at 230/240 V AC	-	typ. 10 VA		

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Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR.C...12DC1	CL-LSR....12DC2 CL-LST.C...12DC2	CL-LSR.C...12AC1	CL-LSR.C...12AC2
Input circuit - Digital inputs		**12 V DC**	**24 V DC**	**24 V AC**	**115 / 230 V AC**
Number		8			
Inputs can be used as analog inputs		2 (I7, I8)			-
Indication of operational states		LCD-Display (if existing)			
Electrical isolation	from voltage supply	no			
	between digital inputs	no			
	from the outputs	yes			
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	
	U_e on „0“ signal	4 V DC (I1-I8)	< 5 V DC (I1-I8)	0-6 V AC (sinusoidal)	0-40 V AC (sinusoidal)
	U_e on „1“ signal	8 V DC (I1-I8)	> 15 V DC (I1-I6), > 8 V DC (I7, I8)	> 9,5 V DC, 14-26,4 V AC (sinusoidal) (I1-I6), > 7 V AC (sinusoidal) (I7,I8)	79-264 V AC (sinusoidal)
Rated frequency		-		50-60 Hz	
Input current on „1“ signal		3.3 mA (at 12 V DC, I1-I6), 1.1 mA (at 12 V DC, I7, I8)	3.3 mA (at 24 V DC, I6-I7), 2.2 mA (at 24 V DC, I7, I8)	4 mA (at 24 V AC, 50 Hz, I1-I6), 2 mA (at 24 V AC, 50 Hz, I7,I8), 2 mA (at 24 V DC, I7, I8)	6x0.25 mA (at 115 V AC, 60 Hz, I1-I6), 6x0.5 mA (at 230 V AC, 50 Hz, I1-I6) 2x4 mA (at 115 V AC, 60 Hz, I7, I8), 2x6 mA (at 230 V AC, 50 Hz, I7, I8)
Time delay from „0“ to „1“	debounce ON	20 ms		80 ms (at 50 Hz), 66 2/3 ms (at 60 Hz)	
	debounce OFF	typ. 0.3 ms (I1-I6), typ. 0.35 ms (I7, I8)	typ. 0,25 ms (I1-I8)	20 ms (at 50 Hz), 16 2/3 ms (at 60 Hz)	
Time delay from „1“ to „0“	debounce ON	20 ms		80 ms (at 50 Hz, 66 2/3 ms (at 60 Hz)	80 ms (at 50 Hz, I1-I6), 66 2/3 ms (at 60 Hz, I1-I6) 160 ms (at 50 Hz, I7, I8), 150 ms (at 60 Hz, I7, I8)
	debounce OFF	typ. 0.3 ms (I1-I6), typ. 0.15 ms (I7, I8)	-	20 ms (at 50 Hz), 16 2/3 ms (at 60 Hz)	20 ms (at 50 Hz, I1-I6), 16 2/3 ms (at 60 Hz, I1-I6) 100 ms (at 50 Hz, I7. I8), 100 ms (at 60 Hz, I7, I8)
Cable length (unshielded)		100 m		-	-
Maximum cable length per input		-		40 m	40 m (I1-I6), 100 m (I7, I8)
Frequency counter	Number	2 (I3, I4)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Rapid counter inputs	Number	2 (I1, I2)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Cable length (shielded)		< 20 m		-	-
Input circuit - Analog inputs					
Number		2 (I7, I8)			-
Electrical isolation	from voltage supply	no			-
	from the digital inputs	no			-
	from the outputs	yes			-
	from PC interface, memory module, CL-NET, CL-LINK	no			-
Input type		DC voltage			-
Signal range		0-10 V DC			-
Resolution	analog	0.01 V			-
	digital	0.01 V; 10 Bit (value 1-1023)			-
Input impedance		11.2 kΩ			-
Accuracy of the actual value	two CL devices	±3 %			-
	within one device	±2 %, ±0.12 V			-
Conversion time analog/digital	Input delay ON	20 ms			-
	Input delay OFF	each cycle			-
Input current		< 1 mA			-
Cable length (shielded)		< 30 m			-

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LMR.C...18DC1	CL-LMR.C...18DC2 CL-LMT.C...20DC2	CL-LMR.C...18AC1	CL-LMR.C...18AC2
Input circuit - Digital inputs		**12 V DC**	**24 V DC**	**24 V AC**	**115 / 230 V AC**
Number		12			
Inputs can be used as analog inputs		4 (I7, I8, I11, I12)			-
Indication of operational states		LCD-Display (if existing)			
Electrical isolation	from voltage supply	no			
	between digital inputs	no			
	from the outputs	yes			
	from PC interface, memory module, CL-NET, CL-LINK	no			yes
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	
	U_e on „0“ signal	4 V DC (I1-I12)	< 5 V DC (I1-I12, R1-R12)	0-6 V AC (sinusoidal)	0-40 V AC (sinusoidal)
	U_e on „1“ signal	8 V DC (I1-I12)	> 15 V DC (I1-I6, I9, I10) > 8 V DC (I7, I8, I11, I12)	> 9.5 V DC, 14-26.4 V AC (sinusoidal) (I1-I6, I9, I10) > 7 V AC (sinusoidal) (I7,I8; I11, I12)	79-264 V AC (sinusoidal)
Rated frequency		-		50-60 Hz	
Input current on „1“ signal		3.3 mA (at 12 V DC, I1-I6, I9-I12), 1.1 mA (at 12 V DC, I7, I8),	3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12)	4 mA (at 24 V AC, 50 Hz, I1-I6, I9, I10), 2 mA (at 24 V AC, 50 Hz, I7, I8, I11, I12), 2 mA (at 24 V DC, I7, I8, I11, I12)	6x0.25 mA (at 115 V AC, 60 Hz, I1-I6), 6x0.5 mA (at 230 V AC, 50 Hz, I1-I6) 2x4 mA (at 115 V AC, 60 Hz, I7, I8), 2x6 mA (at 230 V AC, 50 Hz, I7, I8), 4x0.25 mA (at 115 V AC, 60 Hz, I9-I12), 4x0.5 mA (at 230 V AC, 50 Hz, I9-I12)
Time delay from „0“ to „1“	debounce ON	20 ms		80 ms (at 50 Hz), 66 ⅔ ms (at 60 Hz)	
	debounce OFF	typ. 0.3 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12)	typ. 0.25 ms	20 ms (at 50 Hz), 16 ⅔ ms (at 60 Hz)	
Time delay from „1“ to „0“	debounce ON	20 ms		80 ms (at 50 Hz), 66 ⅔ ms (at 60 Hz)	
	debounce OFF	typ. 0.4 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12)	-	20 ms (at 50 Hz), 16 ⅔ ms (at 60 Hz)	
Cable length (unshielded)		100 m			
Maximum cable length per input				max. 40 m, typ. 40 m (I9, I10)	typ. 40 m (I1-I6, I9-I12), typ. 100 m (I7, I8)
Frequency counter	number	2 (I3, I4)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Rapid counter inputs	number	2 (I1, I2)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Cable length (shielded)		< 20 m		-	-
Input circuit - Analog inputs					
Number		4 (I7, I8, I11, I12)			-
Electrical isolation	from voltage supply	no			-
	from the digital inputs	no			-
	from the outputs	yes			-
	from PC interface, memory module, CL-NET, CL-LINK	no			-
Input type		DC voltage			-
Signal range		0-10 V DC			-
Resolution	analog	0.01 V			-
	digital	0.01 V; 10 Bit (value 1-1023)			-
Input impedance		11.2 kΩ			-
Accuracy of the actual value	two CL devices	±3 %			-
	within one device	±2 %, ±0.12 V			-
Conversion time analog/digital	Input delay ON	20 ms			-
	Input delay OFF	each cycle			-
Input current		< 1 mA			-
Cable length (shielded)		< 30 m			-

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LER.18DC2 CL-LET.20DC2	CL-LER.18AC2
Input circuit - Digital inputs		**24 V DC**	**115 / 230 V AC**
Number		12	
Inputs can be used as analog inputs		-	
Indication of operational states		-	
Electrical isolation	from voltage supply	no	
	between digital inputs	no	
	from the outputs	yes	
	from PC interface, memory module, CL-NET, CL-LINK	no	
Rated operational voltage U_e		24 V DC	
	U_e on „0“ signal	< 5 V DC (I1-I12, R1-R12)	0-40 V AC (sinusoidal)
	U_e on „1“ signal	-	79-264 V AC (sinusoidal)
Rated frequency		-	50-60 Hz
Input current on „1“ signal		3.3 mA (at 24 V DC, R1-R12	12x0.25 mA (at 115 V AC, 60 Hz, R1-R12), 12x0.5 mA (at 230 V AC, 50 Hz, R1-R12)
Time delay from „0“ to „1“	debounce ON	20 ms	80 ms (at 50 Hz, I1-I12, R1-R12), 66 ⅔ ms (at 60 Hz, I1-I12, R1-R12)
	debounce OFF	typ. 0.25 ms (R1-R12)	20 ms (at 50 Hz, I1-I12, R1-R12), 16 ⅔ ms (at 60 Hz, I1-I12, R1-R12)
Time delay from „1“ to „0“	debounce ON	20 ms	80 ms (at 50 Hz, I1-I12, R1-R12), 66 ⅔ ms (at 60 Hz, I1-I12, R1-R12)
	debounce OFF	-	20 ms (at 50 Hz, I1-I12, R1-R12), 16 ⅔ ms (at 60 Hz, I1-I12, R1-R12)
Cable length (unshielded)		100 m	-
Maximum cable length per input		-	typ. 40 m (I1-I6, I9-I12, R1-R12), typ. 100 m (I7, I8)

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR...	CL-LMR... CL-LER...	CL-LER.2O
Output circuit - Relay outputs				
Number		4	6	2
Outputs in groups of		1		2
Parallel switching of outputs to increase capacity		not permissible		
Fusing of the output relay		circuit-breaker B16 or fuse 8 A (slow-acting)		
Electrical isolation	from voltage supply	yes		
	from the inputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	no		
	protective separation	300 V AC		
	basic isolation	600 V AC		
Mechanical lifetime		$10x10^6$ switching cycles		
Rung	conventional thermal current (10 A UL)	8 A		
	recommended for load 12 V AC/DC	> 500 mA		
	short-circuit proof cos φ = 1; characteristic B16 at 600 A	16 A		
	short-circuit proof cos φ = 0,5 up to 0,7; characteristic B16 at 900 A	16 A		
	Rated impulse withstand voltage U_{imp} contact-coil	6 kV		
	Rated operational voltage U_e	250 V AC		
Rated insulation voltage U_i		250 V AC		
Protective separation (EN 50178)	between coil and contact	300 V AC		
	between two contacts	300V AC		
Making capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles		
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles		
Breaking capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles		
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles		
Incandesent lamp load	1000 W at 230/240 V AC	25.000 switching cycles		
	500 W at 115/120 V AC	25.000 switching cycles		
Fluorescent lamp load	10 x 58 W at 230/240 V AC with electrical control gear	25.000 switching cycles		
	10 x 58 W at 230/240 V AC uncompensated	25.000 switching cycles		
	1 x 58 W at 230/240 V AC conventional compensated	25.000 switching cycles		
Switching frequency	mechanical operations	$10x10^6$		
	switching frequency	10 Hz		
	resistive load / lamp load	2 Hz		
	inductive load	0.5 Hz		
UL/CSA				
Continuous current at 240 V		10 A AC		
Continuous current at 24 V		8 A DC		
AC	Utilization catagory (Control Circuit Rating Codes)	B 300 Light Pilot Duty		
	max. rated operational voltage	300 V AC		
	max. continuous thermal current cos φ = 1 at B 300	5 A		
	max. making / breaking apparent power (Make/Break) cos φ ≠ 1 at B 300	3600/360 VA		
DC	Utilization catagory (Control Circuit Rating Codes)	R 300 Light Pilot Duty		
	max. rated operational voltage	300 V DC		
	max. continuous thermal current at R 300	1 A		
	max. making / breaking apparent power (Make/Break) at R 300	28/28 VA		

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LST...	CL-LMT...	CL-LET...
Output circuit - Transistor outputs				
Number		4	8	
Rated operational voltage U_e		24 V DC		
Operational voltage range		20.4-28.8 V DC		
Residual ripple		≤ 5 %		
Supply current	on „0“ signal	typ. 9 mA / max. 16 mA	typ. 18 mA / max. 32 mA	
	on „1“ signal	typ. 12 mA / max. 22 mA	typ. 24 mA / max. 44 mA	
Reverse voltage protection		yes (Attention: If supply voltage is reversed, applying voltage at the outputs, causes a short circuit.)		
Electrical isolation	from voltage supply	yes		
	from the inputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	-		
Rated operational current I_e on „1“ signal DC		max. 0.5 A		
Lamp load without R_v		5 W		
Residual current on „0“ signal per channel		< 0.1 mA		
Max. output voltage	on „0“ signal at external load < 10 MΩ	2.5 V		
	on „1“ signal at I_e = 0.5 A	U = U_e - 1 V		
Short-circuit protection		yes, thermal (analysis results from diagnosis input I16, I15; R15, R16)		
Short-circuit tripping current for R_a ≤ 10 mΩ		0.7 A ≤ I_e ≤ 2 A per output		
Total short-circuit current		8 A	16 A	
Peak short-circuit current		16 A	32 A	
Thermal tripping		yes		
Max. switching frequency with constant resistive load R_L < 100 kΩ (depending on active channels and their load)		40.000 switching cycles/h		
Parallel connection of outputs	with resistive load, inductive load with external suppressor, combination within one group	group 1: Q1-Q4	group 1: Q1-Q4, group 2: Q5-Q8	group 1: S1-S4, group 2: S5-S8
	number of outputs	max. 4		
	max. total current	2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.)		
Indication of operational states of the outputs		LCD-Display (if existing)		
Inductive load[1] without external suppressor				
$T_{0.95}$ = 1 ms, R = 48 Ω, L = 16 mH	utilization factor	0.25 g		
	duty time	100 %		
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles		
DC13, $T_{0.95}$ = 72 ms, R = 48 Ω, L = 1.15 H	utilization factor	0.25 g		
	duty time	100 %		
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles		
$T_{0.95}$ = 15 ms, R = 48 Ω, L = 0.24 H	utilization factor	0.25 g		
	duty time	100 %		
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles		
Inductive load[1] with external suppressor				
	demand factor	1 g		
	duty time	100 %		
	max. switching frequency max. duty time	depends on suppressor		

[1] For inductive loading, without external suppression of the transistor outputs, the following applies:
$T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95}$ 3 × $T_{0.65}$ = 3 × L/R.

Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR..., CL-LST...	CL-LMR... CL-LMT.. CL-LET.., CL-LER.18..	CL-LER.2O CL-LEC.CI000
General data				
Dimensions (W x H x D)		71.5 mm x 90 mm x 58 mm (2.81 inch x 3.54 inch x 2.28 inch)	107.5 mm x 90 mm x 58 mm (4.23 inch x 3.54 inch x 2.28 inch)	35.5 mm x 90 mm x 58 mm (1.40 inch x 3.54 inch x 2.28 inch)
Weight		0.2 kg (0.44 lb)	0.3 kg (0.66 lb)	0.07 kg (0.15 lb)
Mounting		DIN rail (IEC/EN 60715), 35 mm or screw mounting with fixing brackets CL-LAS.FD001 (accessories)		
Mounting position		horizontal / vertical		
Electrical connection				
Wire size	rigid	0.2-4 mm² (22–12 AWG)		
	fine-strand with wire end ferrule	0.2-2.5 mm² (22–12 AWG)		
Max. tightening torque		0.6 Nm		
Environmental data				
Ambient temperature range	operation	-25...+55 °C, cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2		
	storage	-40...+70 °C		
LCD-Display (clearly legible)		0...+55 °C		
Condensation		avoid condensation with suitable methods		
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %		
Air pressure (operation)		795-1080 hPa		
Degree of protection (IEC/EN 60529)		IP20		
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)		
Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks		
Drop (IEC/EN 60068-2-31) height of fall		50 mm		
Free fall, packaged (IEC/EN 60068-2-32)		1 m		
Insulation data				
Overvoltage category		II		
Pollution degree (DIN EN 60947)		2		
Rating of air and creepage distances		EN 50178, UL 508, CSA C22.2, No. 142		
Insulation resistance		EN 50178		
Standards				
Standards and directives		EN 55011, EN 55022, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27		
Electromagnetic compatibility				
Interference immunity				
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)		
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	supply cable symmetrical (AC) 2 kV, Level 2 (supply cable symmetrical (DC) 0.5 kV)		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference suppression (EN 55011, EN 55022)		class B		
Real time clock				
Back-up time		see diagram		-
Accuracy		typ. ±5 (±0.5 h/year)		-
Repeat accuracy of the time relay				
Accuracy (from value)		±1		-
Resolution	range „S“	10 ms		-
	range „M:S“	1 s		-
	range „H:M“	1 min		-
Retention behaviour				
Write cycles of retention memory (minimum)		1.000.000 (10^6)		-

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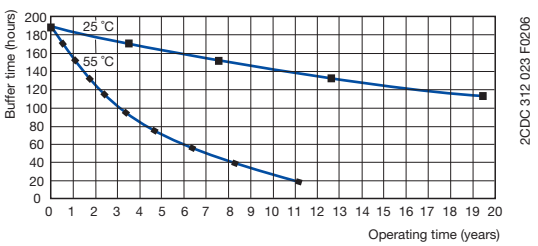
Technical diagram

Back-up time of the real time clock



Display system
Displays - CL-LDD..
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		**CL-LDD...**
Input circuit - Supply circuit		
Power failure buffering (IEC/EN 61131-2)		10 ms
General data		
Dimensions (W x H x D)		with keypad: 86.5 x 86.5 x 21.5 mm (3.41 x 3.41 x 0.85 inch) without keypad: 86.5 x 86.5 x 20 mm (3.41 x 3.41 x 0.79 inch)
Weight		0.13 kg (0.29 lb)
Mounting		2 x 22.5 mm, with 2 retainers screwed
Mounting position		horizontal / vertical
Environmental data		
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)
	storage	-40...+70 °C
LCD-Display (clearly legible)		-5...+50 °C, -10...0 °C (with backlit / continuous operation)
Condensation		avoid condensation with suitable methods
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %
Air pressure (operation)		795-1080 hPa
Degree of protection (IEC/EN 60529)		IP65
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)
Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks
Drop (IEC/EN 60068-2-31) height of fall		50 mm
Free fall, packaged (IEC/EN 60068-2-32)		1 m
Insulation data		
Pollution degree (DIN EN 60947)		3
Rating of air and creepage distances		EN 50178, UL 508, CSA 22.2, No 142
Insulation resistance		EN 50178
Standards		
Standards and directives		EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, IEC 60068-2-6, IEC 60068-2-27
Electromagnetic compatibility		
Interference immunity		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (supply cable symmetrical 2 kV, CL-LDC.L...AC2)
		Level 2 (0.5 kV supply cable symmetrical, CL-LDC.L...AC2)
HF line emission	IEC/EN 61000-4-6	10 V
Interference suppression (EN 55011, EN 55022)		class B

Logic relay, display system
Remote disp. con. / Display base mod. CL-LDC..
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDC.SDC2	CL-LDC.SAC2	CL-LDC.LDC2	CL-LCD.LAC2	CL-LDC.LNDC2	CL-LDC.LNAC2
Input circuit - Supply circuit							
Rated operational voltage U_e		24 V DC	100-240 V AC	24 V DC	100-240 V AC	24 V DC	100-240 V AC
Rated operational voltage tolerance		-15...+20 %	-15...+10 %	-15...+20 %	-15...+10 %	-15...+20 %	-15...+10 %
Operational voltage range		20.4-28.8 V DC	85-264 V AC	20.4-28.8 V DC	85-264 V AC	20.4-28.8 V DC	85-264 V AC
Frequency		0 Hz	50/60 Hz	0 Hz	50/60 Hz	0 Hz	50/60 Hz
Frequency tolerance		-	± 5 %	-	± 5 %	-	± 5 %
Residual ripple		≤ 5 %	-	≤ 5 %	-	≤ 5 %	-
Input current	at 24 V DC	typ. 185 mA	-	typ. 200 mA	-	typ. 200 mA	-
	at 115/120 V AC (60 Hz)	-	typ. 90 mA	-	typ. 90 mA	-	typ. 90 mA
	at 230/240 V AC (50 Hz)	-	typ. 60 mA	-	typ. 60 mA	-	typ. 60 mA
Power failure buffering (IEC/EN 61131-2)		10 ms					
Power dissipation	at 24 V DC	1.5 W	-	3.4 W	-	3.4 W	-
	at 115/120 V AC	-	typ. 11 VA	-	typ. 11 VA	-	typ. 11 VA
	at 230/240 V AC	-	typ. 15 VA	-	typ. 15 VA	-	typ. 15 VA
Network - point-to-point connection							
Number of stations		1		-			
Data transfer rate	CL-LS..., CL-LM...	9,6 kBaud		-			
	CL-LDD	19,2 kBaud		-			
Distance		max. 5 m		-			
Electrical isolation	to voltage supply	yes		-			
	to connected device	yes		-			
Termination system		spring-type terminal		-			
Network - CL-NET							
Number of stations		max. 1		-		max. 8	
Data transfer rate	6 m	-				1000 kBit/s	
	25 m	-				500 kBit/s	
	40 m	-				250 kBit/s	
	125 m	-				125 kBit/s	
	300 m	-				50 kBit/s	
	700 m	-				20 kBit/s	
	1000 m	-				10 kBit/s	
Electrical isolation	to voltage supply	-				yes	
	to inputs	-				yes	
	to outputs	-				yes	
	to PC interface, memory module, CL-NET, CL-LINK	-				yes	
Bus terminator (first and last station)		-				yes	
Termination system		-				RJ45, 8 pole	
General data							
Dimensions (W x H x D)		75 x 58 x 36.2 mm (2.95 x 2.28 x 1.43 inch)		107.5 x 90 x 30 mm (4.23 x 3.54 x 1.18 inch)			
Weight		0.164 kg (0.36 lb)		0.145 kg (0.32 lb)			
Mounting		plugged onto CL-LDD		plugged onto CL-LDD or on DIN rail (IEC/EN 60715)			
Mounting position							
Electrical connection - Supply circuit							
Wire size	fine-strand with wire end ferrule	0.2 mm² / 2.5 mm² (24-12 AWG)					
	rigid	0.2 mm² / 4 mm² (24-12 AWG)					
Electrical connection - Data cable							
Wire size	fine-strand with wire end ferrule	0.08 mm² / 1.5 mm² (28-12 AWG)		-		0.2 mm² / 2.5 mm² (24-12 AWG)	
	rigid	0.08 mm² / 2.5 mm² (28-12 AWG)		-		0.2 mm² / 4 mm² (24-12 AWG)	
Environmental data							
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)					
	storage	-40...+70 °C					
Condensation		avoid condensation with suitable methods					
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %					
Air pressure (operation)		795-1080 hPa					
Degree of protection (IEC/EN 60529)		IP20					
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)					

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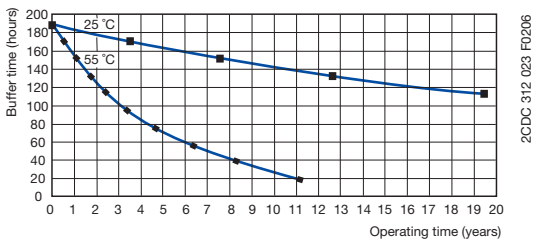
Technical data (continued)

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDC.SDC2	CL-LDC.SAC2	CL-LDC.LDC2	CL-LCD.LAC2	CL-LDC.LNDC2	CL-LDC.LNAC2
Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks					
Drop (IEC/EN 60068-2-31) height of fall		50 mm					
Free fall, packaged (IEC/EN 60068-2-32)		1 m					
Insulation data							
Degree of protection (DIN EN 60947)		2					
Rating of air and creepage distances		EN 50178, UL 508, CSA 22.2, No 142					
Isolation resistance		EN 50178					
Standards							
Standards and directives		EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, IEC 60068-2-6, IEC 60068-2-27					
Electromagnetical compatibility							
Interference immunity							
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)					
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m					
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)					
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (supply cable symmetrical 2 kV, CL-LDC.L...AC2)					
		Level 2 (1 kV supply cable symmetrical)		Level 2 (0.5 kV supply cable symmetrical, CL-LDC.L...AC2)			
HF line emission	IEC/EN 61000-4-6	10 V					
Interference suppression (EN 55011, EN 55022)		class B					
Real time clock							
Back-up time		-		see diagram			
Accuracy		-		typ. ±5 s/day (±0,5 h/year)			
Repeat accuracy of the time relay							
Accuracy (from value)		-		± 0.02 %			
Resolution	range „S“	-		5 ms			
	range „M:S“	-		1 s			
	range „H:M“	-		1 min			
Retention behaviour							
Write cycles of retention memory (minimum)		-		10^{10} (read/ write cycles)			

Technical diagram

Back-up time of the real time clock



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Display system
Display I/O-modules - CL-LDR.., CL-LDT..
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LD...16DC2	CL-LD...17DC2	CL-LDR.16AC2
Input circuit - Digital inputs		**24 V DC**		**115/230 V**
Number		12		
Inputs can be used as analog inputs		4 (I7, I8, I11, I12)		-
Indication of operational states		-		LCD-Display (if existing)
Electrical isolation	from supply voltage	no		
	from digital inputs	no		
	from the outputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	yes		
Rated operational voltage U_e		24 V DC		-
	U_e on „0“ signal	< 5 V DC (I1-I6, I9, I10), < 8 V DC (I7, I8, I11, I12)		0-40 V AC (sinusoidal)
	U_e on „1“ signal	> 15 V DC (I1-I6, I9, I10), > 8 V DC (I7, I8, I11, I12)		79-264 V AC (sinusoidal)
Rated frequency		0 Hz		50-60 Hz
Input current on „1“ signal		3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12)		12x0.2 mA (at 115 V AC, 60 Hz, I1-I12), 12x0.5 mA (at 230 V AC, 50 Hz, I1-I12)
Time delay from „0“ to „1“	debounce ON	20 ms		10 ms (at 50 Hz), 100 ms (at 60 Hz)
	debounce OFF	typ. 0.1 ms (I1-I4), typ. 0.25 ms (I5-I12)		10 ms (at 50 Hz), 100 ms (at 60 Hz)
Time delay from „1“ to „0“	debounce ON	20 ms		10 ms (at 50 Hz), 100 ms (at 60 Hz)
	debounce OFF	typ. 0.1 ms (I1-I4), typ. 0.4 ms (I5, I6, I9, I10), typ. 0.2 ms (I7, I8, I11, I12)		10 ms (at 50 Hz), 100 ms (at 60 Hz)
Cable length (unshielded)		100 m		-
Maximum cable length per input		-		typ. 60 m
Frequency counter	number	4 (I1, I2, I3, I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Incremental counter	number	2 (I1 + I2, I3 + I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	signal offset	90°		-
	pulse / pause ratio	1:1		-
Rapid counter inputs	number	4 (I1, I2, I3, I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Cable length (shielded)		< 20 m		-
Input circuit - Analog inputs				
Number		4 (I7, I8, I11, I12)		-
Electrical isolation	to voltage supply	no		-
	to digital inputs	no		-
	to outputs	yes		-
	to PC interface, memory modul, CL-NET, CL-LINK	yes		-
Input type		DC voltage		-
Signal range		0-10 V DC		-
Resolution	analog	0.01 V		-
	digital	0.01 V; 10 Bit (value 0-1023)		-
Input impedance		11.2 kΩ		-
Accuracy of the actual value	two CL-LD... devices	± 3 %		-
	within one device	± 2 %		-
Conversion time analog/digital		each cycle		-
Input current		< 1 mA		-
Cable length (shielded)		< 30 m		-

Technical data (continued)

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LD...16DC2	CL-LD...17DC2	CL-LDR.16AC2
Output circuit - Analog outputs				
Number		-	1	-
Electrical separation	from voltage supply	-	no	-
	from the digital inputs	-	no	-
	from the digital outputs	-	yes	-
	from PC interface, memory module, CL-NET, CL-LINK	-	yes	-
Output type		-	DC voltage	-
Signal range		-	0-10 V DC	-
Max. output current		-	0.01 A	-
Burden resistance		-	1 kΩ	-
Overload and short-circuit protection		-	yes	-
Resolution	analog	-	0.01 V DC	-
	digital	-	10 Bit, (value: 0-1023)	-
Setting time		-	100 ms	-
Accuracy	-25...+55 °C	-	2 %	-
	25 °C	-	1 %	-
Conversion time		-	each CPU cycle	-
General data				
Dimensions (W x H x D)		CL-LDR: 89 x 90 x 44 mm (3.5 x 3.54 x 1.73 inch) CL-LDT (build-in): 89 x 90 x 25 mm (3.5 x 3.54 x 0.98 inch)		89 x 90 x 44 mm (3.5 x 3.54 x 1.73 inch)
Weight		CL-LDR: 0.15 kg (0.33 lb) / CL-LDT: 014 kg (0.31 lb)		0.15 kg (0.33 lb)
Mounting		snap-on power supply unit		
Mounting position		horizontal / vertical		
Electrical connection				
Wire size	fine-strand with wire end ferrule	0.2 mm^2 / 2.5 mm^2 (24-12 AWG)		
	rigid	0.2 mm^2 / 4 mm^2 (24-12 AWG)		
Electrical connection - Data cable				
Wire size	fine-strand with wire end ferrule	0.08 mm^2 / 1.5 mm^2 (28-12 AWG)		
	rigid	0.08 mm^2 / 2.5 mm^2 (28-12 AWG)		
Environmental data				
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)		
	storage	-40...+70 °C		
Condensation		avoid condensation with suitable methods		
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %		
Atmospheric pressure (operation)		795-1080 hPa		
Degree of protection (IEC/EN 60529)		IP20		
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)		
Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks		
Drop (IEC/EN 60068-2-31) height of fall		50 mm		
Free fall, packaged (IEC/EN 60068-2-32)		1 m		
Insulation data				
Pollution degree		2		
Rating of air and creepage distances		EN 50178, UL 508, CSA C22.2, No. 142		
Isolation resistance		EN 50178		
Standards				
Standards and directives		EN 61000-6-1/-2/-3/-4, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27		
Electromagnetic compatibility				
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)		
electromag. field (HF radiation res.)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal cable 2 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	2 kV (supply cable symmetrical), Level 2 (0.5 kV supply cable symmetrical)		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference suppression (EN 55011, EN 55022)		class B		

Display system
Display I/O-modules - CL-LDR..
Technical data / Output circuit - Relay outputs

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDR...
Output circuit - Relay outputs		
Number		4
Outputs in groups of		-
Parallel switching of outputs to increase capacity		not permissible
Fusing of the output relay		circuit-breaker B16 or fuse 8 A (slow-acting)
Electrical isolation	from voltage supply	yes
	from the inputs	yes
	from PC interface, memory module, CL-NET, CL-LINK	yes
	protective separation	300 V AC
	Basic isolation	600 V AC
Mechanical lifetime		$10x10^6$ switching cycles
Rung	conventional thermal current (10 A UL)	8 A
	recommended load 12 V AC/DC	> 500 mA
	short-circuit proof cos φ = 1; characteristic B16 at 600 A	16 A
	short-circuit proof cos φ = 0.5 up to 0.7; characteristic B16 at 900 A	16 A
	Rated impulse withstand voltage U_{imp} contact-coil	6 kV
	Rated operational voltage U_e	250 V AC
Rated insulation voltage U_i		250 V AC
Protective separation (EN 50178)	between coil and contact	300 V AC
	between two contacts	300V AC
Making capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles
Breaking capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops/h)	200.000 switching cycles
Incandesent lamp load	1000 W at 230/240 V AC	25.000 switching cycles
	500 W at 115/120 V AC	25.000 switching cycles
Fluorescent lamp load	10 x 58 W at 230/240 V AC with electrical control gear	25.000 switching cycles
	10 x 58 W at 230/240 V AC uncompensated	25.000 switching cycles
	1 x 58 W at 230/240 V AC conventional compensated	25.000 switching cycles
Switching frequency	mechanical operations	$10x10^6$
	switching frequency	10 Hz
	resistive load / lamp load	2 Hz
	inductive load	0.5 Hz
UL/CSA		
Continuous current at 240 V		10 A AC
Continuous current at 24 V		8 A DC
AC	Utilization category (Control Circuit Rating Codes)	B 300 Light Pilot Duty
	max. rated operational voltage	300 V AC
	max. continuous thermal current cos φ = 1 at B 300	5 A
	max. making / breaking apparent power (Make/Break) cos φ ≠ 1 at B 300	3600/360 VA
DC	Utilization category (Control Circuit Rating Codes)	R 300 Light Pilot Duty
	max. rated operational voltage	300 V DC
	max. continuous thermal current at R 300	1 A
	max. making / breaking apparent power (Make/Break) at R 300	28/28 VA

Display system
Display I/O-modules - CL-LDT..
Technical data / Output circuit - Transistor outputs

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDT...
Output circuit - Transistor outputs		
Number		4
Rated operational voltage U_e		24 V DC
Operational voltage range		20.4-28.8 V DC
Residual ripple		-
Supply current	on „0“ signal	typ. 18 mA / max. 32 mA
	on „1“ signal	typ. 24 mA / max. 44 mA
Reverse voltage protection		yes (Attention: If supply voltage is reversed, applying voltage at the outputs, causes a short circuit.)
Electrical isolation	from voltage supply	yes
	from the inputs	yes
	from PC interface, memory module, CL-NET, CL-LINK	yes
Rated operational current I_e on„1“ signal DC		max. 0.5 A
Lamp load without R_v		5 W (Q1-Q4)
Residual current on „0“ signal per channel		< 0.1 mA
Max. output voltage	on „0“ signal at external load < 10 MΩ	2.5 V
	on „1“ signal at I_e = 0.5 A	U = U_e - 1 V
Short-circuit protection		thermal (Q1-Q4), (analysis results from diagnosis input I16)
Short-circuit tripping current for $R_a \leq$ 10 mΩ		0.7 A ≤ I_e ≤ 2 A per output
Total short-circuit current		8 A
Peak short-circuit current		16 A
Thermal tripping		yes
Max. switching frequency with constant resistive load R_L < 100 kΩ (depending on active channels and their load)		40.000 switching cycles/h
Parallel connection of outputs	with resistive load, inductive load with external suppressor, combination within one group	group 1: Q1-Q4
	number of outputs	max. 4
	max. total current	2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.)
Indication of operational states of the outputs		LCD-Display (if existing)
Inductive load[1)] without external suppressor		
$T_{0.95}$ = 1 ms, R = 48 Ω, L = 16 mH	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles
DC13, $T_{0.95}$ = 72 ms, R = 48 Ω, L = 1.15 H	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles
$T_{0.95}$ = 15 ms, R = 48 Ω, L = 0.24 H	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles
Inductive load[1)] with external suppressor		
	demand factor	1 g
	duty time	100 %
	max. switching frequency max. duty time	depends on suppressor

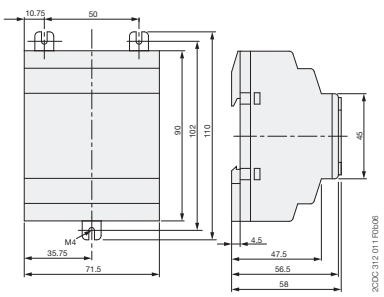
[1)] For inductive loading, without external suppression of the transistor outputs, the following applies:
$T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95}$ 3 × $T_{0.65}$ = 3 × L/R.

Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

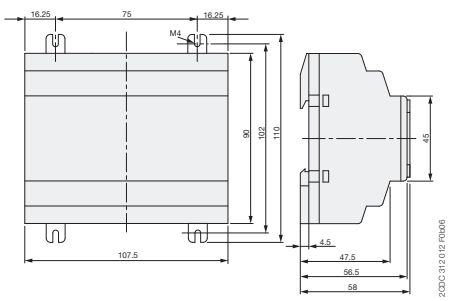
Dimensional drawings

dimensions in mm

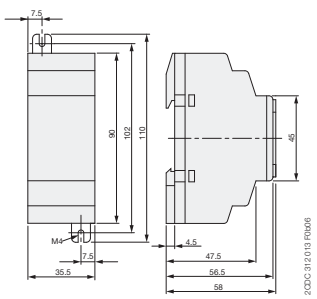
CL-LSR, CL-LST



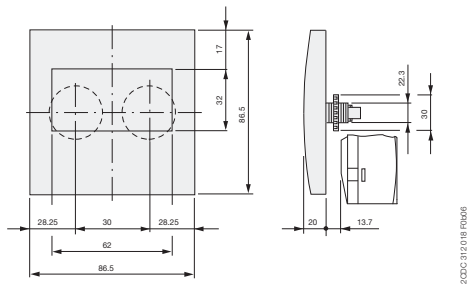
CL-LMR, CL-LMT



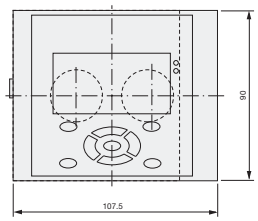
CL-LER.2O

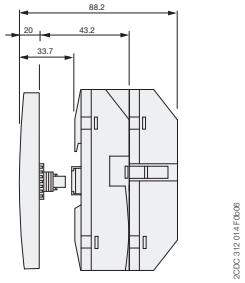


CL-LDD

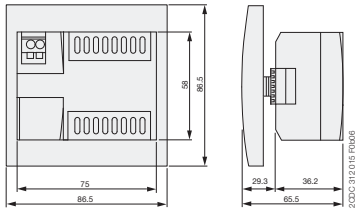


CL-LDD.K + CL-LDC.L.. + (CL-LDR or CL-LDT)

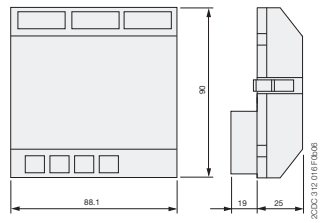




CL-LDC.S..



CL-LDR, CL-LDT



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1SNA 205 556 R0300	PCMS 18 poles red	6/063
1SNA 205 557 R0400	PCMS 18 poles blue	6/063
1SNA 205 558 R1500	PCMS 18 poles green/yellow	6/063
1SNA 205 559 R1600	PCMS 19 poles grey	6/063
1SNA 205 560 R1300	PCMS 19 poles red	6/063
1SNA 205 561 R0000	PCMS 19 poles blue	6/063
1SNA 205 562 R0100	PCMS 19 poles green/yellow	6/063
1SNA 205 563 R0200	PCMS 20 poles grey	6/063
1SNA 205 564 R0300	PCMS 20 poles red	6/063
1SNA 205 565 R0400	PCMS 20 poles blue	6/063
1SNA 205 566 R0500	PCMS 20 poles green/yellow	6/063
1SNA 205 567 R0600	PCMS 21 poles grey	6/063
1SNA 205 568 R1700	PCMS 21 poles red	6/063
1SNA 205 569 R1000	PCMS 21 poles blue	6/063
1SNA 205 570 R1500	PCMS 21 poles green/yellow	6/063
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1SNA 230 006 R0400	RC55-41A50-H	6/064
1SNA 230 007 R0500	RC55-51A60-H	6/064
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