# STAGO FIBRE-OPTIC DUCT SYSTEM CATALOGUE 2022



**stago®**
powered by wibe group
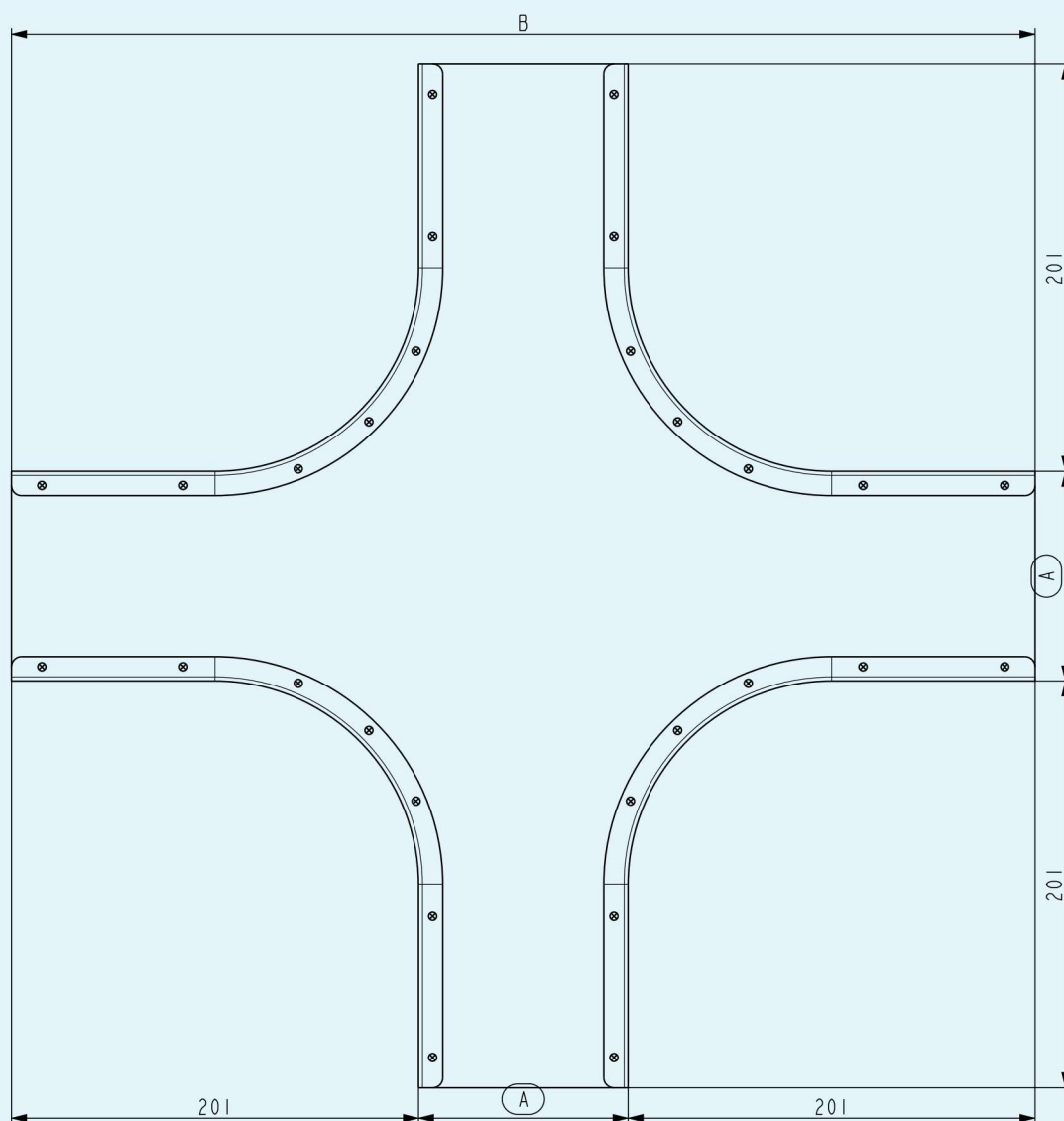
# Creating clever, uplifting solutions, together with our clients for almost 100 years. Reimagined in June 2021 – for the coming century.

Stago – the broadest metal cable tray range with the most clickable components providing a fast and efficient solution for a multitude of applications. Also well known for the innovate yellow fibre optic duct system.
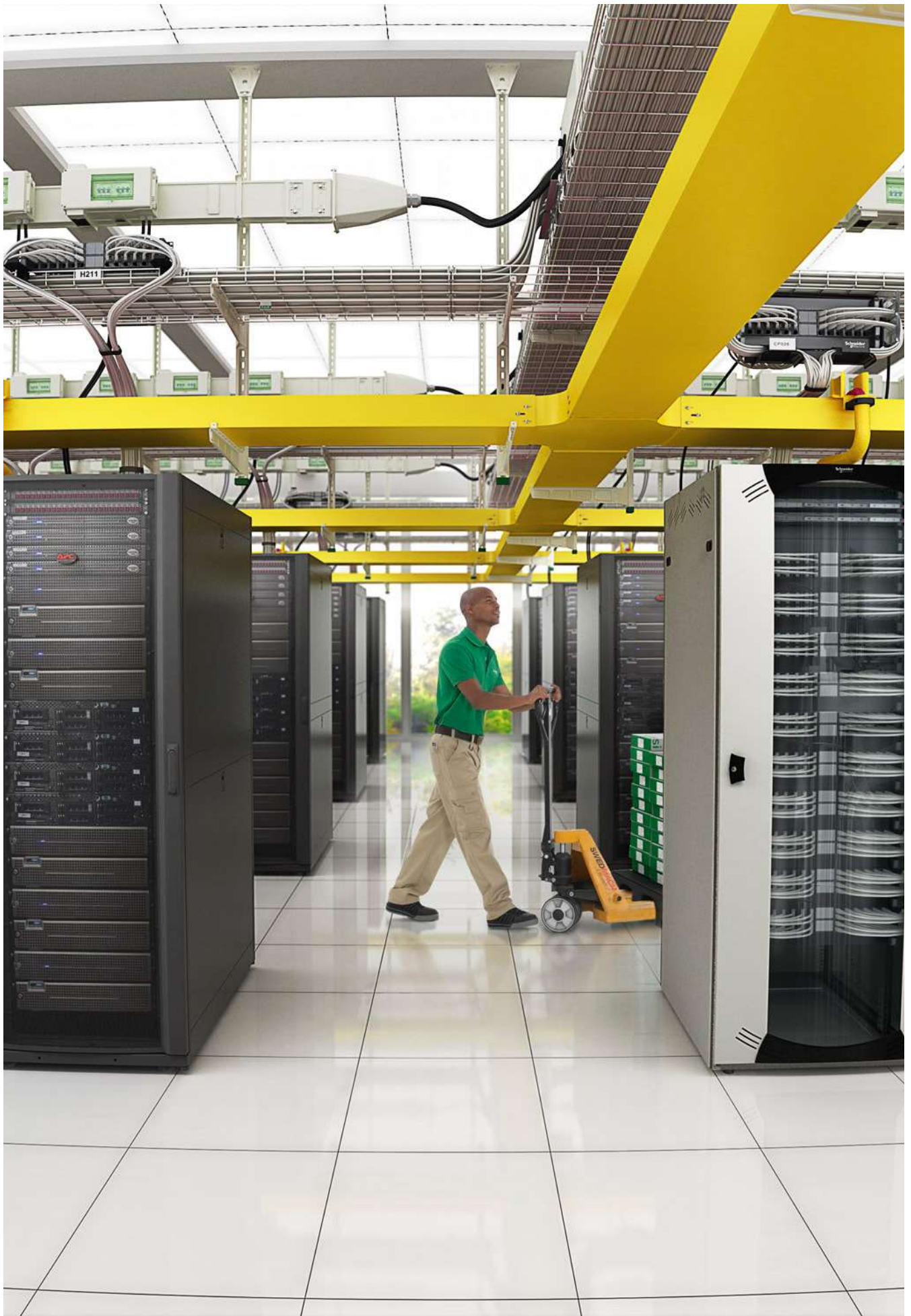
**wibe®**
**group**

# General contents

# Managing the Big Data for 100 % uptime and constant change

The Data Centre is practically a living being, continuously evolving. This complex creation with its vigorous rhythm of energy pulsating through the infrastructure is always prepared for the unpredictable evolution that defines a modern Data Centre – a character trait ensuring long lasting life cycle and the best possible return on investment.

## 0 % CO₂

It sounds almost too good to be true. But thanks to green ambitions and innovative systems, Wibe Group can offer a range of data centre solutions running on 100 % renewable energy, leaving 0 % $CO_2$ emissions.

### The full-scale Data Centre provider

Wibe-Group has the unique potential of providing basically everything needed to run a high-performance Data Centre, no matter how big or small. The only components excluded in our offer are the servers. All systems are thoroughly tested together to ensure flawless performance as well as easy installations in this complex environment.

### Tailor-made solutions

In addition to fully integrated systems and products, each Data Centre also demands its own special solutions. This is why our own DCIM* team continuously develops tailor-made modules that are ready to be clicked in on site.

*Data Centre Infrastructure Management

### Carry

A Data Centre is subject to constant change and adjustment. As the only supplier being able to deliver power and network in one, fully integrated solution, we pave the way for easy additions, adjustments, service and maintenance. The result is a future-proof investment that allows you to benefit from superior reliability as well as major savings on installation time.

### Connect

Our Data Centre offer includes products for both server and patching areas. With a density potential of up to 2000 connectors per m², Schneider Electric presents the most costefficient use of the facility. Both space and performance are optimised thanks to innovative solutions for deploying extensions and new configurations. The overhead frame makes also maintenance more manageable than ever.

### Energize

Reliable power supply is key and any type of malfunction causing downtime can be both hazardous and very costly. Based on our 0 % downtime ambition, our array of robust switch- gears together with the integrated busbar distri-bution form the perfect foundation of the Data Centre. The switchgear solutions include total digital control to ensure that any type of interference is immediately detected and taken care of.
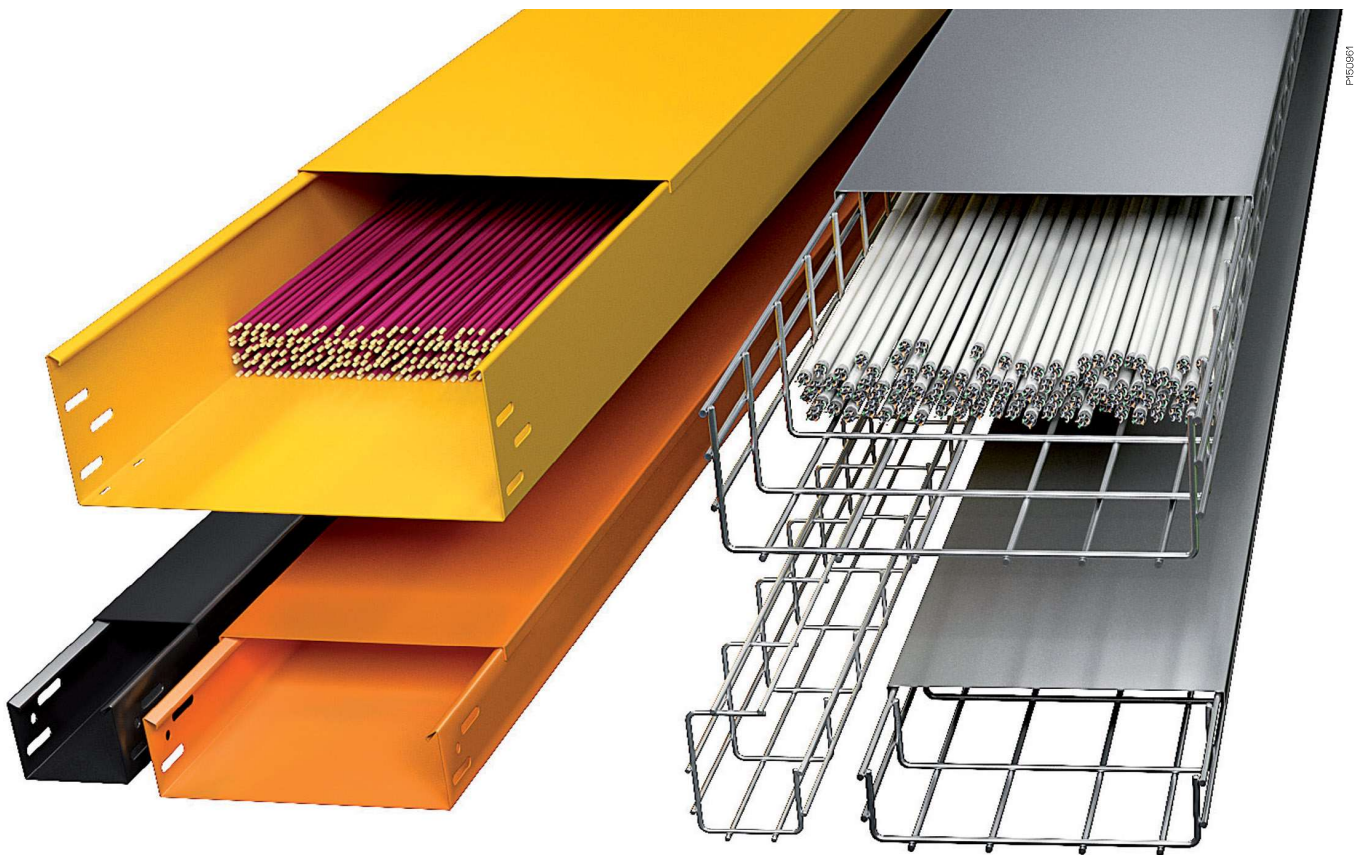
# Working together for full-scale effect of the infrastructure

## Network solutions

A large-scale Data Centre means large-scale cable management. Our wide range of fibre ducts and mesh trays provides flawless orderliness as well as easy adjustment and maintenance.

### Stago Fibre-Optic Duct
### – smooth, robust and versatile

In the Data Centre, rows and rows of smooth and robust fibre ducts provide safe and reliable distribution of sensitive cables. These sturdy steel ducts come with a wide range of accessories – bends, risers, junctions, reducers, and drop-offs. All designed to handle the most complex configurations, always with excellent protection of the cables.

### Defem Mesh Tray
### – flexible and lightweight

The mesh trays, with dedicated accessories and support systems, are excellent for the routing of huge amounts of copper-based data cables. Easily assembled with impressive capacity and long support distances, the mesh tray range reach from wide, heavy-duty versions to the flexible mini mesh, ideal for tricky installations in narrow spaces.
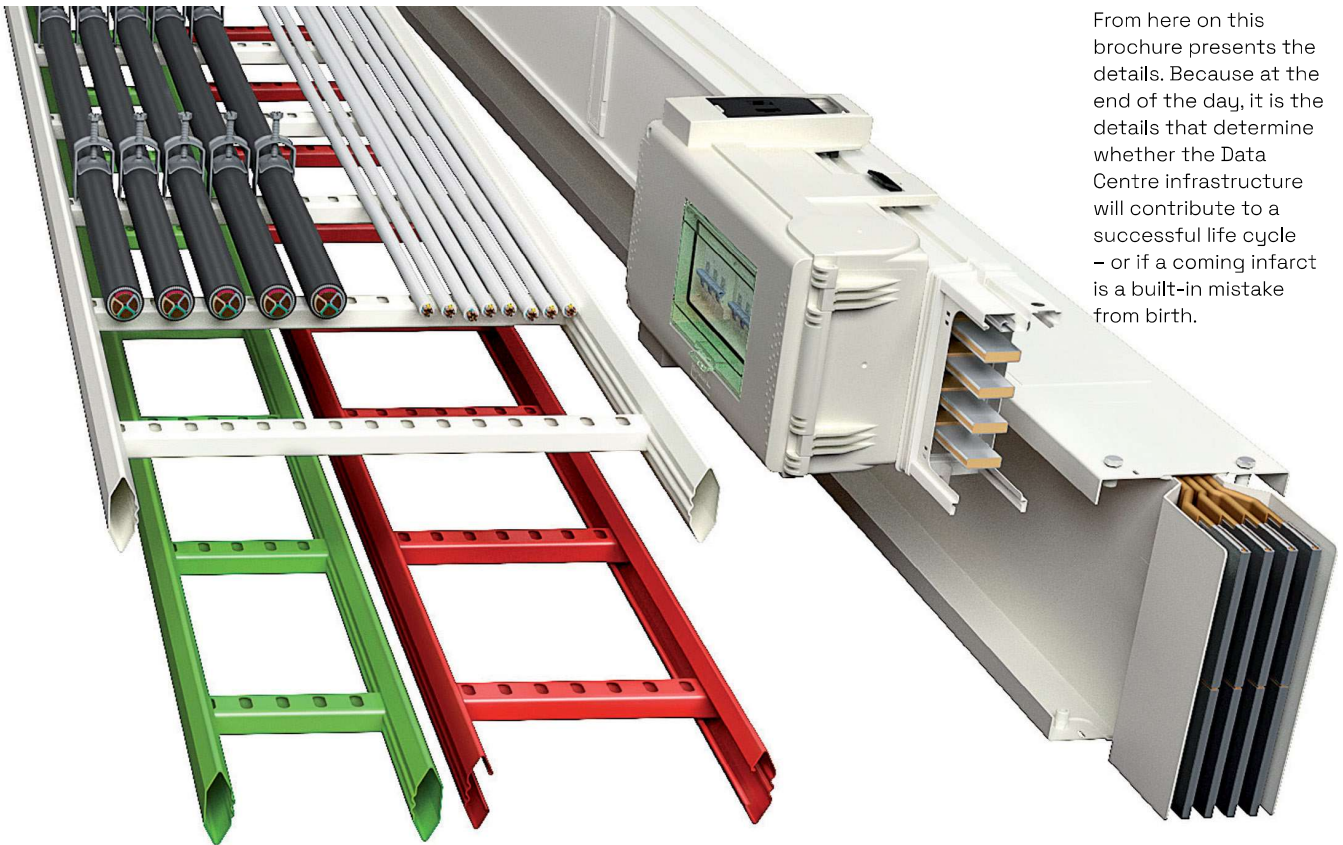
# Power solutions

A reliable, efficient power supply system is the backbone of the Data Centre. As needs are in constant change, the power solution must be as reliable as it is flexible.

### Wibe Ladders
### – light, strong and dependable

As part of one of the most comprehensive cable support solutions on the market, Wibe cable ladders can be mounted in any direction or angle, distributing the cables safely and efficiently throughout the building. Maintenance is carried out with little effort, in a work environment that provides both superb accessibility and overview.

### Canalis Busbar Trunking
### – effective power distribution

Using Canalis busbar trunking in addition to traditional cables is the fast way to truly effective power distribution. Make great savings on installation time and space, while benefiting from exceptional flexibility and cost efficiency. The system provides excellent conditions for service and maintenance, as no power shutdowns are necessary.
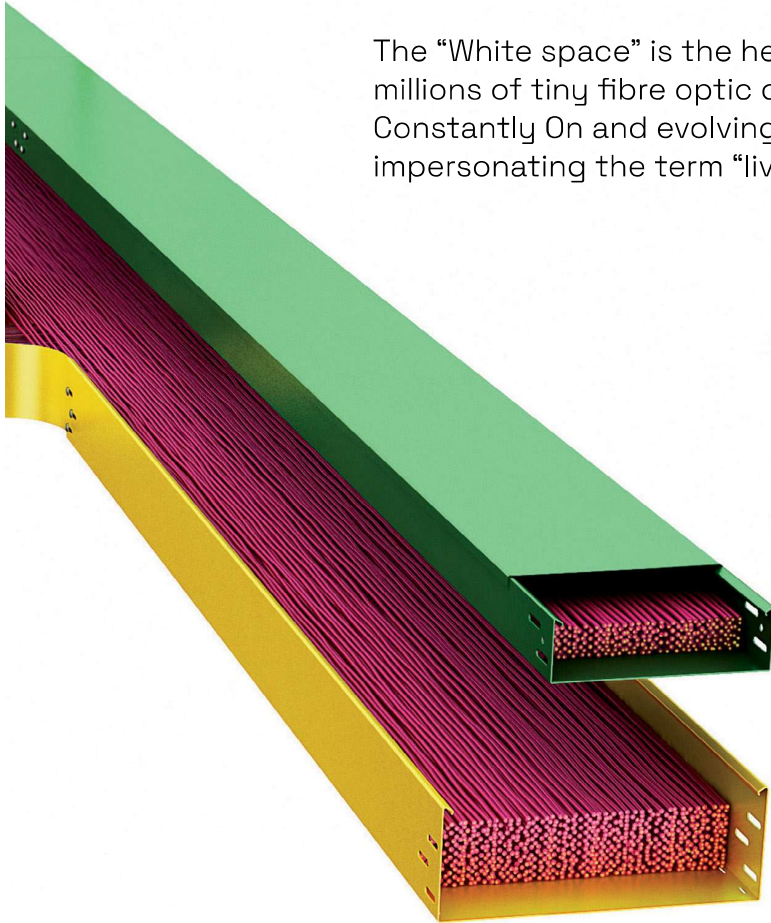
**W stago®**

# Stago Fibre-Optic Duct
# A dynamic and durable carrier

The "White space" is the heart of the Data Centre. The hub where millions of tiny fibre optic cables connect at the speed of light. Constantly On and evolving in pace with increasing demands, impersonating the term "living being".

The Stago Fibre-Optic Ducts are the carriers of all heavy traffic in the Data Centre. Stable and strong, they are ready to perform. And once mounted, they will last and always be ready to evolve for new, unpredictable demands.

### The evolving system

Quick and easy to install, made for continuous development – always avoiding downtime. Swiftly adaptable to changing needs thanks to modular, tool-less accessories.  A true "plug & play" concept.

### With efficiency in mind

A sturdy and robust steel system that allows long support distances without sagging, thus saving mounting time. And the consoles with one side open for cable management saves cabling and maintenance time. By suiting all ducts, ladders and busbars, the support system is both rational and economical.

Support distance 2-3 m

Duct length 3 m

**+**
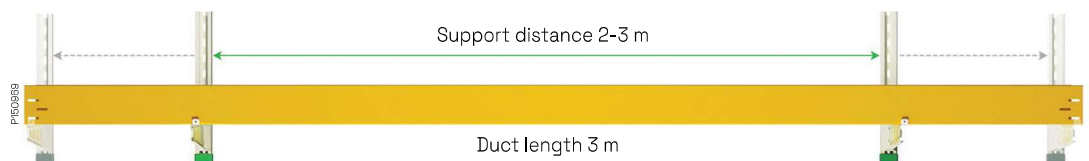
The Stago Fibre-Optic Duct is all metal and carries a higher load compared to non-metal systems. This means longer spans, minimised support, no sagging – and an overall more efficient and easily expandable installation.

### Ideal rail lengths

The 3-m duct is optimised for fast but non-heavy mounting. Add smart modular covers and support distances up to 3 m and you have a high-speed installation.
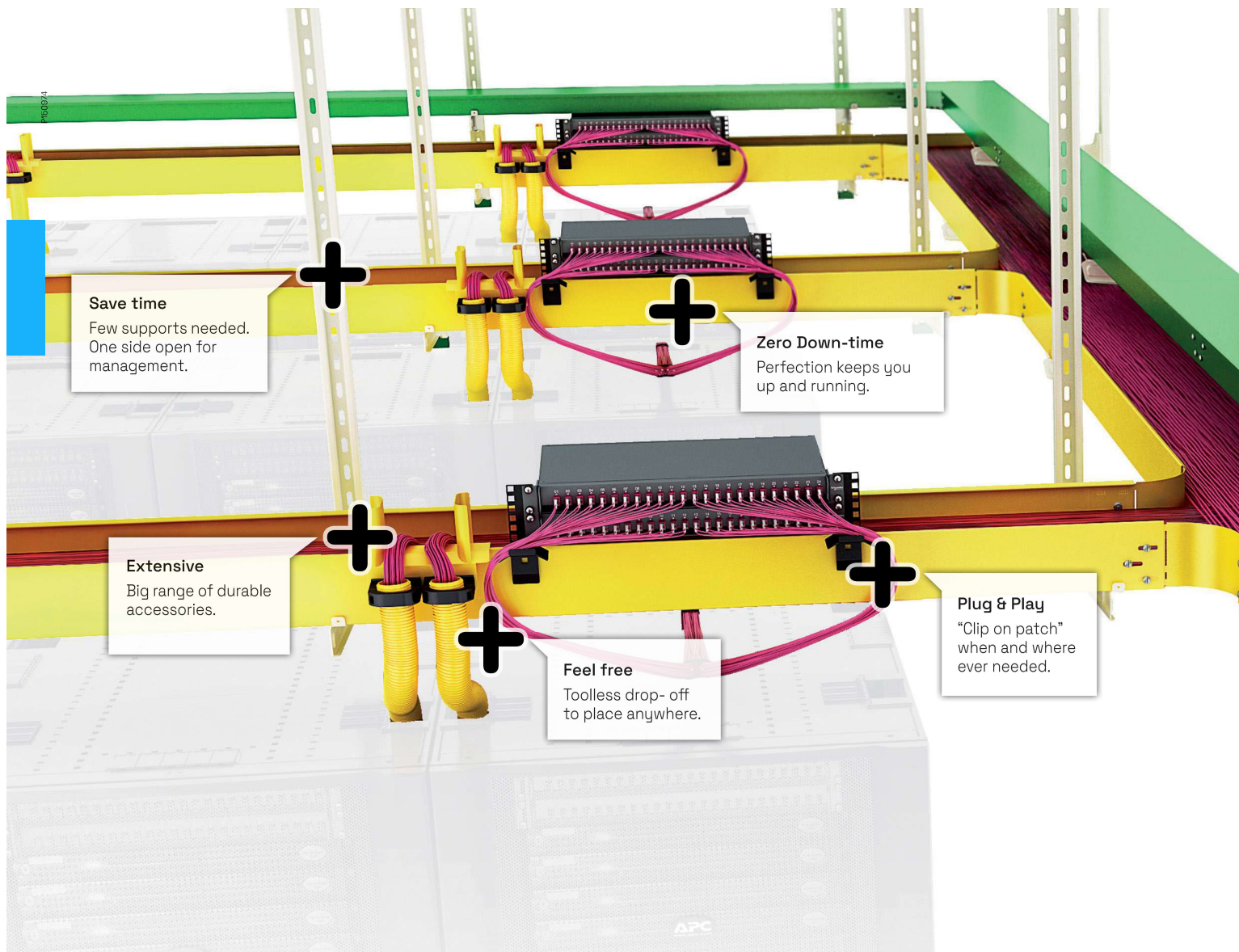
### Suitable dimensions

Stago FO ducts are available in heights of 60 or 110 mm, and widths of 100, 200, or 300 mm. All with the same smooth and soft shape.

### More than yellow

Standard colour of the ducting is yellow, RAL 1023. Other colours can be delivered on special order.
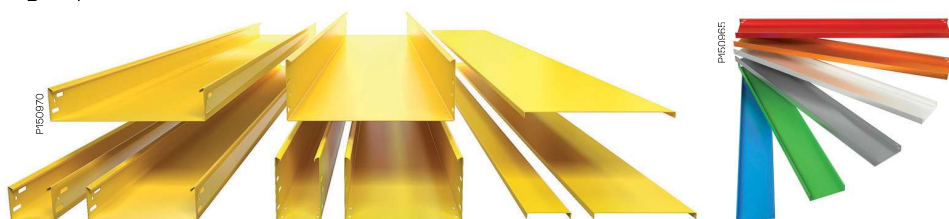
**Save time**
Few supports needed.
One side open for
management.

**Zero Down-time**
Perfection keeps you
up and running.

**Extensive**
Big range of durable
accessories.

**Plug & Play**
"Clip on patch"
when and where
ever needed.

**Feel free**
Toolless drop- off
to place anywhere.

## Drop-off UDF

Tooless installation – the UDFs ensure safe radius for the FO cables and can be moved sidewise to fit enclosure intake. Easily slided to meet new needs. Available in three sizes.

## Dividable tube

The dividable tube provides a very neat and tidy solution for guiding the fibre and UTP down to the cabinet. Black colour is standard, yellow can be delivered on request.

## Modular covers

Often the installation requires a cover. As there are different sizes of covers available, all types of installations can be fully covered with maintained accessibility.

## Optimised support system

The single pendant support with robust consoles leaves one side open, allowing fast and easy cable management. Suits all types of cable support and busbars.
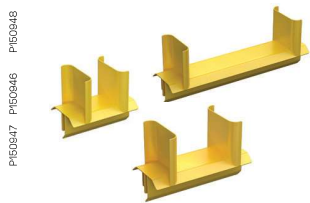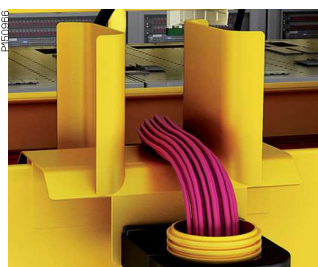
# Stago Fibre-Optic Duct High-performance management

It's crucial to carefully handle the fibre not to damage it or lose performance. But equally important is that the system is truly future-proof and competent enough to evolve smoothly and reliably.

Every component of the Stago FO Duct range is designed and developed with the same passionate care about both the fibre and the management. No matter how complex the configuration is, our ambition is that you do not have to worry about what is already installed, because it just works. Instead you can enjoy the easiness of further development of the plant to create new opportunities.

All in all, Stago FO Duct system is built to last and develop. Versatile, flexible and durable.
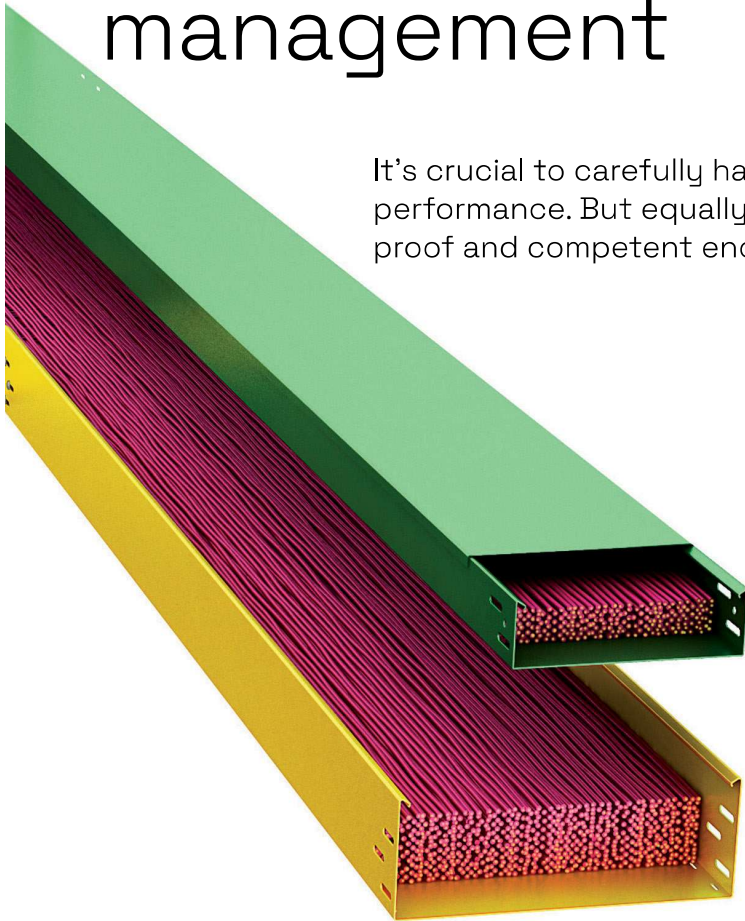
### Clip-on panel bracket

The tool-less patch panel attachment with clip-on-top significantly reduces down-time.

### Clip-on patch panel

Handy mini-patch. Six keystone footprints for UTP and FO. Space-saving and scalable.
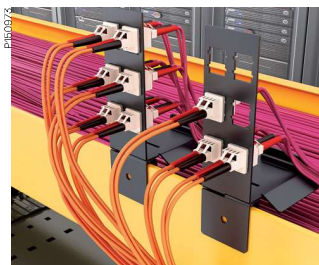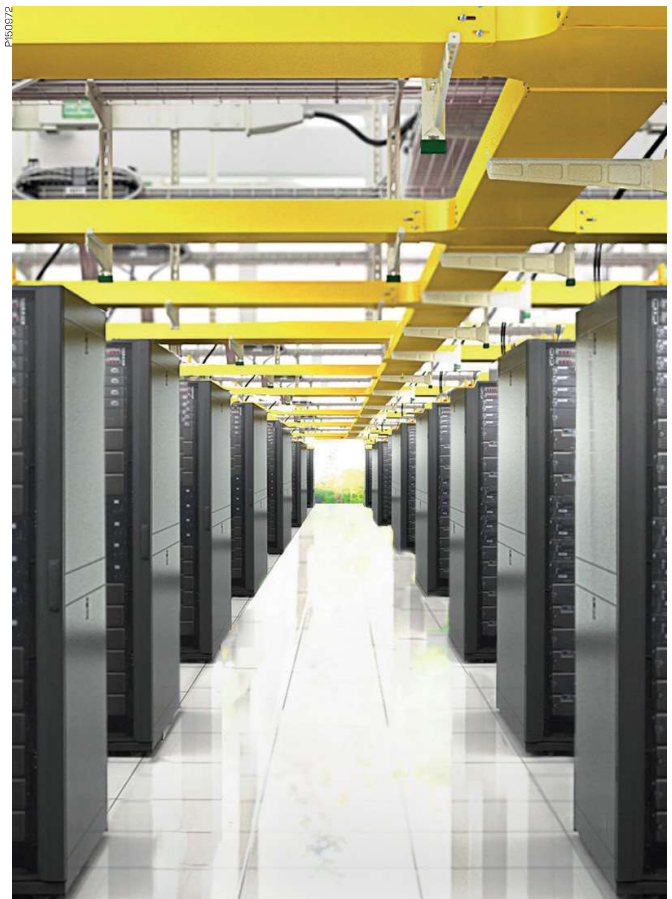
# Mounting

1. Fibre-Optic Duct
2. Duct cover
3. Separation wall
4. Branching piece
5. Internal riser

6. External riser
7. 90° Bend
8. T-piece
9. X-piece
10. End piece

11. Drop-off UDF
12. Patch panel bracket set
13. RJ45 bracket
14. Hinge coupler

15. External coupler
16. Bolt set (M6)
17. Cover clamp
18. Internal coupler (unilock)



19. Claw
20. Ceiling bracket 2F
21. Bracket 50i
22. C bracket
23. Omega L
24. Omega C
25. Suspension beam
26. Threaded rod

# Length material

## Duct

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|---|---|---|---|---|---|

Metallic Fibre-Optic Duct for routing cables throughout the system. 3 meter length material ensures efficient system installation. Designed with rounded safety edges to protect cables. Connect individual lengths by using internal or external couplers and M6x16 bolts, nuts & star washers.
Material: steel, pre-galvanized, powder coated RAL1023.

| **Height = 60 mm** | | **H** | **W** | **L** | | |
|------|---|---|---|---|---|---|
| Fibre-Optic Duct | 100 | 60 | 100 | 3000 | 5801 | **CSU7600104FS123** |
| | 200 | 60 | 200 | 3000 | 8228 | **CSU7600204FS123** |
| | 300 | 60 | 300 | 3000 | 10 655 | **CSU7600304FS123** |
| **Height = 110 mm** | | **H** | **W** | **L** | | |
| Fibre-Optic Duct | 100 | 110 | 100 | 3000 | 8228 | **CSU7100104FS123** |
| | 200 | 110 | 200 | 3000 | 10 655 | **CSU7100204FS123** |
| | 300 | 110 | 300 | 3000 | 13 082 | **CSU7100304FS123** |

## Duct cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|---|---|---|---|---|---|

Optional cover can be mounted for enhanced cable protection. Delivered in 2 m length. Snap-on fixation to the Fibre-Optic Duct by using universal cover clips (CSU08855000).
Material: steel, pre-galvanized, powder coated RAL1023.

| **For height = 60 mm and 110 mm** | | **H** | **W** | **L** | | |
|------|---|---|---|---|---|---|
| Duct cover | 100 | 10 | 100 | 2000 | 1571 | **CSU0816113FS123** |
| | 200 | 10 | 200 | 2000 | 2875 | **CSU0816303FS123** |
| | 300 | 10 | 300 | 2000 | 5178 | **CSU0816433FS123** |

## Separation wall

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|---|---|---|---|---|---|

Optional separation wall to be able to create separate compartments in the Fibre-Optic Duct length material. Fix to the Fibre-Optic Duct by using M6x16 bolts, nuts & star washers.
Material: steel, pre-galvanized.

| **Height = 60 mm** | **H** | **W** | **L** | | |
|------|---|---|---|---|---|
| Separation wall | 55 | 20 | 3000 | 1473 | **CSU76020000** |
| **Height = 110 mm** | **H** | **W** | **L** | | |
| Separation wall | 105 | 20 | 3000 | 2382 | **CSU71020000** |
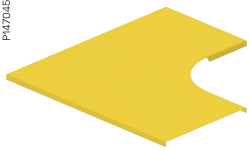
# Form piece

## 90° bend

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Can be used to construct horizontal 90° direction changes at any desired position in the fibre duct. Use M6x16 bolts, nuts & star washers to fix to the duct. Material: steel, pre-galvanized, powder coated RAL1023.

| **Height = 60 mm** | | H | W | L | | |
|---|---|---|---|---|---|---|
| 90° bend | 100 | 62 | 303 | 303 | 1036 | CSU08616109FS123 |
| | 200 | 62 | 403 | 403 | 1637 | CSU08616209FS123 |
| | 300 | 62 | 503 | 503 | 2328 | CSU08616309FS123 |
| **Height = 110 mm** | | H | W | L | | |
| 90° bend | 100 | 112 | 303 | 303 | 1472 | CSU08611109FS123 |
| | 200 | 112 | 403 | 403 | 2073 | CSU08611209FS123 |
| | 300 | 112 | 503 | 503 | 2764 | CSU08611309FS123 |

## 90° bend cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Optional 90°bend cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000). Material: steel, pre-galvanized, powder coated RAL1023.

| **For height = 60 mm and 110 mm** | | H | W | L | | |
|---|---|---|---|---|---|---|
| 90° bend cover | 100 | 10 | 304 | 304 | 440 | CSU08510109FS123 |
| | 200 | 10 | 404 | 404 | 797 | CSU08510209FS123 |
| | 300 | 10 | 504 | 504 | 1254 | CSU08510309FS123 |
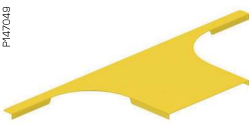
## Adjustable corner piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Can be used to construct variable horizontal bends in the fibre duct system. Use M6x16 bolts, nuts & star washers to fix to the duct. Material: steel, pre-galvanized, powder coated RAL1023.

| **Height = 60 mm** | | H | W | L | | |
|---|---|---|---|---|---|---|
| Adjustable corner piece | 100 | 56 | 340 | 340 | 128 | CSU08736109FS123 |
| | 200 | 56 | 440 | 440 | 500 | CSU08736209FS123 |
| | 300 | 56 | 540 | 540 | 759 | CSU08736309FS123 |
| **Height = 110 mm** | | H | W | L | | |
| Adjustable corner piece | 100 | 106 | 340 | 340 | 805 | CSU08731109FS123 |
| | 200 | 106 | 440 | 440 | 1258 | CSU08731209FS123 |
| | 300 | 106 | 540 | 540 | 1700 | CSU08731309FS123 |

## Universal branching piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Can be used to construct perpendicular branches at any desired position in the fibre duct. Use M6x16 bolts, nuts & star washers to fix to the duct. Material: steel, pre-galvanized, powder coated RAL1023.

| **Height = 60 mm** | | H | W | L | | |
|---|---|---|---|---|---|---|
| Universal branching piece | 100 | 62 | 225 | 503 | 647 | CSU08716109FS123 |
| | 200 | 62 | 225 | 603 | 774 | CSU08716209FS123 |
| | 300 | 62 | 225 | 703 | 903 | CSU08716309FS123 |
| **Height = 110 mm** | | H | W | L | | |
| Universal branching piece | 100 | 112 | 225 | 503 | 1016 | CSU08711109FS123 |
| | 200 | 112 | 225 | 603 | 1143 | CSU08711209FS123 |
| | 300 | 112 | 225 | 703 | 1272 | CSU08711309FS123 |

## Universal branching piece cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Optional branching piece cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000). Material: steel, pre-galvanized, powder coated RAL1023.

| **For height = 60 mm and 110 mm** | | H | W | L | | |
|---|---|---|---|---|---|---|
| Universal branching piece cover | 100 | 10 | 223 | 504 | 325 | CSU08580109FS123 |
| | 200 | 10 | 223 | 604 | 399 | CSU08580209FS123 |
| | 300 | 10 | 223 | 704 | 474 | CSU08580309FS123 |

# Form piece (cont.)

## T-piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|--|------|------|------|------|------|

Can be used to construct horizontal T-intersections at any desired position in the fibre duct. Use M6x16 bolts, nuts & star washers to fix to the duct.
Material: steel, pre-galvanized, powder coated RAL1023.

| | | H | W | L | | |
|------|--|------|------|------|------|------|
| **Height = 60 mm** | | H | W | L | | |
| T-piece | 100 | 62 | 301 | 504 | 1012 | **CSU08626109FS123** |
| | 200 | 62 | 401 | 604 | 1673 | **CSU08626209FS123** |
| | 300 | 62 | 501 | 704 | 2353 | **CSU08626309FS123** |
| **Height = 110 mm** | | H | W | L | | |
| T-piece | 100 | 112 | 301 | 504 | 1444 | **CSU08621109FS123** |
| | 200 | 112 | 401 | 604 | 2105 | **CSU08621209FS123** |
| | 300 | 112 | 501 | 704 | 2785 | **CSU08621309FS123** |

P1470S4

## T-piece cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|--|------|------|------|------|------|

Optional T-piece cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000).
Material: steel, pre-galvanized, powder coated RAL1023.

| | | H | W | L | | |
|------|--|------|------|------|------|------|
| **For height = 60 mm and 110 mm** | | H | W | L | | |
| T-piece cover | 100 | 10 | 305 | 504 | 641 | **CSU08520109FS123** |
| | 200 | 10 | 405 | 604 | 1049 | **CSU08520209FS123** |
| | 300 | 10 | 505 | 704 | 1547 | **CSU08520309FS123** |

P1470S3

## X-piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|--|------|------|------|------|------|

Can be used to construct horizontal cross intersections at any desired position in the fibre duct. Use M6x16 bolts, nuts & star washers to fix to the duct.
Material: steel, pre-galvanized, powder coated RAL1023.

| | | H | W | L | | |
|------|--|------|------|------|------|------|
| **Height = 60 mm** | | H | W | L | | |
| X-piece | 100 | 62 | 504 | 504 | 1506 | **CSU08636109FS123** |
| | 200 | 62 | 604 | 604 | 2133 | **CSU08636209FS123** |
| | 300 | 62 | 704 | 704 | 2873 | **CSU08636309FS123** |
| **Height = 110 mm** | | H | W | L | | |
| X-piece | 100 | 112 | 504 | 504 | 2028 | **CSU08631109FS123** |
| | 200 | 112 | 604 | 604 | 2655 | **CSU08631209FS123** |
| | 300 | 112 | 704 | 704 | 3395 | **CSU08631309FS123** |

P1470S6

## X-piece cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|--|------|------|------|------|------|

Optional X-piece cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000).
Material: steel, pre-galvanized, powder coated RAL1023.
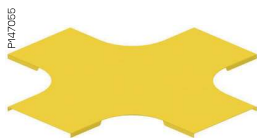
| | | H | W | L | | |
|------|--|------|------|------|------|------|
| **For height = 60 mm and 110 mm** | | H | W | L | | |
| X-piece cover | 100 | 10 | 504 | 504 | 975 | **CSU08530109FS123** |
| | 200 | 10 | 604 | 604 | 1300 | **CSU08530209FS123** |
| | 300 | 10 | 704 | 704 | 1802 | **CSU08530309FS123** |

P1470S5

# Form piece (cont.)

## Reducing cross piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|

Can be used to construct horizontal cross intersections between ducts of different widths at any desired position in the installation. Use M6x16 bolts, nuts & star washers to fix to the duct.
Material: steel, pre-galvanized, powder coated RAL1023.

| Type | | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|
| **Height = 60 mm** | | H | W | L | | |
| Reducing cross piece | 300-100 | 62 | 505.5 | 705 | 2490 | CSU0863610309FS123 |
| | 300-200 | 62 | 605.5 | 705 | 3050 | CSU0863620309FS123 |
| **Height = 110 mm** | | H | W | L | | |
| Reducing cross piece | 300-100 | 112 | 505.5 | 705 | 3030 | CSU0863110309FS123 |
| | 300-200 | 112 | 605.5 | 705 | 3590 | CSU0863120309FS123 |

## Reducing cross piece cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|

Optional reducing X-piece cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000).
Material: steel, pre-galvanized, powder coated RAL1023.

| Type | | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|
| **For height = 60 mm and 110 mm** | | H | W | L | | |
| Reducing cross piece cover | 300-100 | 10 | 505.5 | 705 | 1662 | CSU0853010309FS123 |
| | 300-200 | 10 | 605.5 | 705 | 2216 | CSU0853020309FS123 |

## Internal riser

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|

Can be used to construct vertical 90° upwards direction changes at any desired position in the fibre duct. Use M6x16 bolts, nuts & star washers to fix to the duct.
Material: steel, pre-galvanized, powder coated RAL1023.

| Type | | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|
| **Height = 60 mm** | | H | W | L | | |
| Internal riser | 100 | 280 | 100 | 280 | 677 | CSU08646109FS123 |
| | 200 | 280 | 200 | 280 | 1310 | CSU08646209FS123 |
| | 300 | 280 | 300 | 280 | 1944 | CSU08646309FS123 |
| **Height = 110 mm** | | H | W | L | | |
| Internal riser | 100 | 333 | 100 | 333 | 1207 | CSU08641109FS123 |
| | 200 | 333 | 200 | 333 | 1841 | CSU08641209FS123 |
| | 300 | 333 | 300 | 333 | 2475 | CSU08641309FS123 |

## Internal riser cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|

Optional internal riser cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000).
Material: steel, pre-galvanized, powder coated RAL1023.

| Type | | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|------|
| **For height = 60 mm and 110 mm** | | H | W | L | | |
| Internal riser cover | 100 | 225 | 100 | 225 | 316 | CSU08540109FS123 |
| | 200 | 225 | 200 | 225 | 632 | CSU08540209FS123 |
| | 300 | 225 | 300 | 225 | 948 | CSU08540309FS123 |

# Form piece (cont.)

## External riser

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Can be used to construct vertical 90° downwards direction change at any desired position in the fibre duct. Use M6x16 bolts, nuts & star washers to fix to the duct. Material: steel, pre-galvanized, powder coated RAL1023.

| Height = 60 mm | | H | W | L | | |
|---|---|---|---|---|---|---|
| External riser | 100 | 280 | 100 | 280 | 571 | CSU08666109FS123 |
| | 200 | 280 | 200 | 280 | 1141 | CSU08666209FS123 |
| | 300 | 280 | 300 | 280 | 1712 | CSU08666309FS123 |
| Height = 110 mm | | H | W | L | | |
| External riser | 100 | 333 | 100 | 333 | 996 | CSU08661109FS123 |
| | 200 | 333 | 200 | 333 | 1566 | CSU08661209FS123 |
| | 300 | 333 | 300 | 333 | 2137 | CSU08661309FS123 |

## External riser cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Optional external riser cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000). Material: steel, pre-galvanized, powder coated RAL1023.
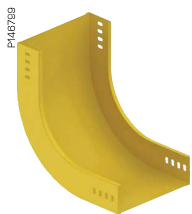
| Height = 60 mm | | H | W | L | | |
|---|---|---|---|---|---|---|
| External riser cover | 100 | 275 | 100 | 275 | 407 | CSU08566109FS123 |
| | 200 | 275 | 200 | 275 | 807 | CSU08566209FS123 |
| | 300 | 275 | 300 | 275 | 1211 | CSU08566309FS123 |
| Height = 110 mm | | H | W | L | | |
| External riser cover | 100 | 334 | 100 | 334 | 496 | CSU08561109FS123 |
| | 200 | 334 | 200 | 334 | 942 | CSU08561209FS123 |
| | 300 | 334 | 300 | 334 | 1389 | CSU08561309FS123 |

## Reducer piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Can be used to switch to any different duct size in width. Use M6x16 bolts, nuts & star washers to fix to the duct. Material: steel, pre-galvanized, powder coated RAL1023.

| Height = 60 mm | | H | W | L | | |
|---|---|---|---|---|---|---|
| Reducer piece | 200-100 | 60 | 205 | 288 | 730 | CSU082610209FS123 |
| | 300-100 | 60 | 305 | 373 | 1090 | CSU082610309FS123 |
| | 300-200 | 60 | 305 | 288 | 950 | CSU082620309FS123 |
| Height = 110 mm | | H | W | L | | |
| Reducer piece | 200-100 | 110 | 205 | 288 | 950 | CSU082110209FS123 |
| | 300-100 | 110 | 305 | 373 | 1390 | CSU082110309FS123 |
| | 300-200 | 110 | 305 | 288 | 1170 | CSU082120309FS123 |

## Reducer piece cover

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Optional reducer piece cover for enhanced cable protection. Snap-on fixation to the form piece by using universal cover clips (CSU08855000). Material: steel, pre-galvanized, powder coated RAL1023.

| For height = 60 mm and 110 mm | | H | W | L | | |
|---|---|---|---|---|---|---|
| Reducer piece cover | 200-100 | 11 | 205 | 288 | 380 | CSU083010209FS123 |
| | 300-100 | 11 | 305 | 373 | 680 | CSU083010309FS123 |
| | 300-200 | 11 | 305 | 288 | 610 | CSU083020309FS123 |

## End piece

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

End piece can be used to ensure an aesthetic finish to the ducting route. Use M6x16 bolts, nuts & star washers to fix to the duct. Material: steel, pre-galvanized, powder coated RAL1023.
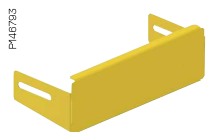
| Height = 60 mm | | H | W | L | | |
|---|---|---|---|---|---|---|
| End piece | 100 | 10.5 | 64 | 230 | 95 | CSU3618104FS123 |
| | 200 | 10.5 | 64 | 330 | 165 | CSU3618204FS123 |
| | 300 | 10.5 | 64 | 430 | 223 | CSU3618304FS123 |
| Height = 110 mm | | H | W | L | | |
| End piece | 100 | 10.5 | 114 | 230 | 247 | CSU3118104FS123 |
| | 200 | 10.5 | 114 | 330 | 350 | CSU3118204FS123 |
| | 300 | 10.5 | 114 | 430 | 452 | CSU3118304FS123 |

# Modular accessory

## Modular drop-off UDF

| Type | | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Clip-on modular drop-off can be fitted at any desired position on the lateral of the duct to ensure full flexibility in guiding fibre-optic cables from the duct to the racks / cabinets. Available in 3 different sizes.
Material: steel, pre-galvanized, powder coated RAL1023.
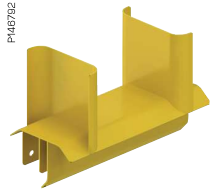
| Type | | H | W | L | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|
| Drop-off UDF | 50 | 115 | 90 | 150 | 565 | CSU0868059FS123 |
| | 100 | 135 | 90 | 200 | 790 | CSU0868109FS123 |
| | 250 | 135 | 90 | 345 | 1222 | CSU0868259FS123 |

## Universal bobbin piece

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

Magnetic bobbin piece can be fitted at any desired position of the duct or form piece for a secure and smooth guidance of fibre-optic cables. Use 2 pieces on bobbin to safely store cable over-length.
Material: steel, pre-galvanized, powder coated RAL1023.

| Type | H | W | L | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Bobbin piece | 54 | 70 | 70 | 312 | CSU0868A04FS123 |

## Patch panel bracket set

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

Patch panel bracket set. To be used to mount any 19" patch panel at any desired position directly onto the duct. Simply clip-on the bracket to the lateral of the duct. Material: sheet steel, powder coated black.

| Type | H | W | L | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Patch panel bracket 2U (set of 2 pieces) | 151 | 74 | 84 | 533 | CSU0829A01FS905 |

## RJ45 bracket

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

RJ45 clip-on bracket can be placed on the lateral of the duct to construct mini consolidation points at any desired position. The universal design accepts both Actassi S-1 and Keystone footprints.
Material: sheet steel, powder coated black.

| Type | H | W | L | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| 6 Module RJ45 bracket | 190 | 82 | 84 | 199 | CSU0829A02FS905 |

## Closed tube

| Type | Dimensions Ø (mm) x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|

Optional closed extension tube for enhanced cable protection and flexible guidance of fibre-optic cables. To be mounted directly on the drop-off by using tube mounting frame (CSU0868A01FS905).

| Type | Ø | L | Weight (g) | Cat. no. |
|---|---|---|---|---|
| Closed tube | 50 | 25 000 | 5625 | CSU0868A03FS905 |

# Modular accessory (cont.)

## Openable tube

| Type | Dimensions Ø (mm) x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|

Optional divisible extension tube for enhanced cable protection and flexible guidance of fibre-optic cables. Openable tube for easy access for cable placement. To be mounted directly on the drop-off by using tube mounting frame (CSU0868A01FS905).

| | Ø | L | | |
|---|---|---|---|---|
| Openable tube | 50 | 25 000 | 6575 | CSU0868A02FS905 |

## Tube mounting frame

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

Snap-in tube fixation to connect guiding tubes to drop-offs.

| | H | W | L | | |
|---|---|---|---|---|---|
| Tube mounting frame | 20 | 68 | 67.5 | 260 | CSU0868A01FS905 |

## Modular cover piece

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

Modular cover piece can be fitted at any desired position on lengths to enhance cable protection at drop-out points. Snap-on fixation to the fibre duct by using universal cover clips (CSU08855000). Material: steel, pre-galvanized, powder coated RAL1023.
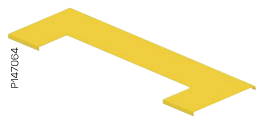
| | | H | W | L | | |
|---|---|---|---|---|---|---|
| Modular cover piece | 100 | 10 | 100 | 600 | 552 | CSU0828103FS123 |
| | 200 | 10 | 200 | 600 | 1023 | CSU0828203FS123 |
| | 300 | 10 | 300 | 600 | 1494 | CSU0828303FS123 |

## Modular brush gasket

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

Optional brush gasket for securing cover function at the position of clip-on accessories.

| | H | W | L | | |
|---|---|---|---|---|---|
| Modular brush gasket | 100 | 10 | 400 | 145 | NSYJPSVD |

## Padlock adaptor

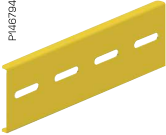| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|

Optional padlock adaptor for enhanced data protection. Use the adaptor with a padlock at any desired position in the fibre-duct to prevent easy access of fibre cables. Material: sheet steel, powder coated black.

| Height = 60 mm | H | W | L | | |
|---|---|---|---|---|---|
| Padlock adaptor | 69.5 | 122 | 40 | 153 | CSU7606100FS123 |
| | | 222 | 40 | 229 | CSU7606200FS123 |
| | | 322 | 40 | 306 | CSU7606300FS123 |
| **Height = 110 mm** | H | W | L | | |
| Padlock adaptor | 110 | 122 | 40 | 200 | CSU7106100FS123 |
| | | 222 | 40 | 276 | CSU7106200FS123 |
| | | 322 | 40 | 353 | CSU7106300FS123 |

# Mounting accessory

W stago
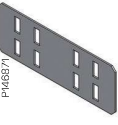
## External coupler

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|

External coupler system height 60 and 110 to be used to joint two lengths of Fibre-Optic Duct. Fixation with bolts M6x16, nuts & star washers. Use 2 couplers per duct. Material: steel, pre-galvanized, powder coated RAL1023.

| Type | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|
| **Height = 60 mm** | **H** | **W** | **L** | | |
| External coupler | 60 | 10 | 200 | 129 | CSU7605000FS123 |
| **Height = 110 mm** | **H** | **W** | **L** | | |
| External coupler | 110 | 10 | 200 | 200 | CSU7105000FS123 |

## Internal coupler (Unilock)

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|

Screwless snap-in internal coupler for system height 60 to be used to joint two lengths of Fibre-optic duct. Optional fixation with bolts M6x16, nuts and star washers. Use 2 couplers per duct. Material: steel, pre-galvanized.

| Type | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|
| **Height = 60 mm** | **H** | **W** | **L** | | |
| Internal coupler (screwless) | 21 | 55 | 175 | 82 | CSU08010109 |

## Internal coupler

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|

Internal coupler for system height 110 to be used to joint two lengths of Fibre-Optic Duct. Fixation with bolts M6x16, nuts and star washers. Use 2 couplers per Duct. Material: steel, pre-galvanized.

| Type | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|
| **Height = 110 mm** | **H** | **W** | **L** | | |
| Internal coupler | 1.5 | 106.5 | 300 | 365 | CSU71030100 |
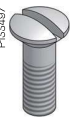
## Hinge coupler

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|

Can be used to construct any type of level change at any point of the Fibre-Optic Duct installation. Use 2 couplers per Duct. To be used in combination with bolts M6x16, nuts and star washers. Material: steel, pre-galvanized, powder coated RAL1023.

| Type | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|
| **Height = 60 mm** | **H** | **W** | **L** | | |
| Hinge coupler | 11 | 63 | 234 | 150 | CSU0875000FS123 |
| **Height = 110 mm** | **H** | **W** | **L** | | |
| Hinge coupler | 12 | 114 | 230 | 406 | CSU0875100FS123 |

## Bottom coupler

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|

Optional sleeve-on bottom coupler for enhanced system alignment. Material: steel, pre-galvanized, powder coated RAL1023.

| Type | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|
| | **H** | **W** | **L** | | |
| Bottom coupler 200 | 1 | 100 | 170 | 130 | CSU7070200FS123 |
| | **H** | **W** | **L** | | |
| Bottom coupler 300 | 1 | 100 | 270 | 209 | CSU7070300FS123 |

## Bolt

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|------|------|------|------|------|------|

M6x16 bolts delivered in a bag of 100 pieces. Material: steel, electro-galvanized.

| Type | H | W | L | Weight (g) | Cat. no. |
|------|------|------|------|------|------|
| | **H** | **W** | **L** | | |
| M6x16 bolt (pack of 100) | - | - | 16 | 100 | CSU08463000 |

# Mounting accessory (cont.)

## Flange nut

| Type | Weight (g) | Cat. no. |
|---|---|---|
| Flange nuts delivered in a bag of 100 pieces. Material: steel, electro-galvanized. | | |
| M6 flange nut (pack of 100) | 311 | **CSU08461000** |
| M10 flange nut (pack of 100) | 1200 | **CSU08890100** |

## Star washer

| Type | Weight (g) | Cat. no. |
|---|---|---|
| Star washer to be used in combination with bolt (ref: CSU08463000) and M6 nut (ref: CSU08461000) to ensure electrical continuity throughout the system when connecting different system components. Ensure use of star washer on all painted surfaces. Delivered in a bag of 100 pieces. Material: steel, electro-galvanized. | | |
| M6 star washer (pack of 100) | 323 | **CSU08190001** |

## Universal cover clip

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Universal cover clip for snap-on fixation of the covers. Delivered in a bag of 100 pieces. Material: spring steel. | | | | | |
| | H | W | L | | |
| Universal cover clip (pack of 100) | 15 | 13 | 15 | 289 | **CSU08855000** |
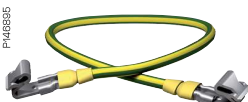
## Modular cable retainer

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Suited with double sided self-adhesive tape to be fixed inside the duct. Delivered in 10 cm pieces in a bag of 50. | | | | | |
| | H | W | L | | |
| Modular cable retainer (pack of 50) | 5.5 | 25 | 96 | 8 | **718469** |

## Protection strip

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Protection strip. To be used to protect cutted edges in the cable duct. Delivered as roll of 5 m. Material: PVC, black. | | | | | |
| | H | W | L | | |
| Protection strip | - | - | 5000 | 342 | **CSU08040000** |

## Earthing kit

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Kit including earth wire with flat pin connectors and earthing clamps. Connect to 2 cover pieces to ensure electrical continuity between each other. Delivered in a bag of 10 pieces. | | | | | |
| | H | W | L | | |
| Earthing kit (Pack of 10) | - | - | 200 | 10 | **ISM10953** |

# Support system

## Cantilever arm 50i

Medium duty cantilever arm 50i for direct wall installation or ceiling suspended installation in combination with pendant fixing rail 24/48 and T-bolt. Use bolts M6x16, nuts and star washers to fix fibre-optic duct to the bracket. Material: steel, pre-galvanized.
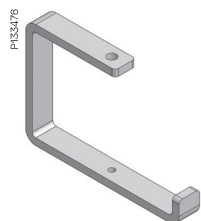
| Type | Dimensions Height x Width x Length (mm) | | | | Weight (g) | Cat. no. |
|------|-----|-----|-----|-----|-----|-----|
| | | H | W | L | | |
| Cantilever arm 50i | 100 | 80 | 43 | 159 | 190 | **791412** |
| | 200 | 85 | 43 | 259 | 290 | **791413** |
| | 300 | 110 | 43 | 359 | 460 | **791414** |

## C-bracket

C-bracket for single central suspended threaded rod installation. Use bolts M6x16, nuts and star washers to fix fibre-optic duct to the bracket. Material: steel, pre-galvanized.

| Type | Dimensions Height x Width x Length (mm) | | | | Weight (g) | Cat. no. |
|------|-----|-----|-----|-----|-----|-----|
| | | H | W | L | | |
| C-bracket | 100 | 35 | 110 | 150 | 380 | **CSU08173109** |
| | 200 | 45 | 150 | 215 | 940 | **CSU08173209** |
| | 300 | 175 | 240 | 340 | 1530 | **CSU08173309** |

## Omega C-bracket

Omega C-bracket for direct ceiling installation. Use bolts M6x16, nuts and star washers to fix fibre-optic duct to the bracket. Material: steel, pre-galvanized.

| Type | Dimensions Height x Width x Length (mm) | | | | Weight (g) | Cat. no. |
|------|-----|-----|-----|-----|-----|-----|
| | | H | W | L | | |
| Omega C-bracket | 100 | 196 | 50 | 153 | 516 | **4550410** |
| | 200 | 196 | 50 | 252 | 631 | **4550420** |
| | 300 | 196 | 50 | 357 | 769 | **4550430** |

## Omega L-bracket

Light duty Omega L-bracket for direct wall installation. Use bolts M6x16, nuts and star washers to fix fibre-optic duct to the bracket. Material: steel, pre-galvanized.
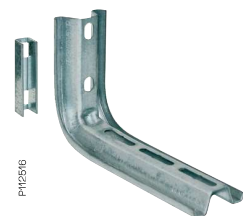
| Type | Dimensions Height x Width x Length (mm) | | | | Weight (g) | Cat. no. |
|------|-----|-----|-----|-----|-----|-----|
| | | H | W | L | | |
| Omega L-bracket | 100 | 131 | 50 | 150 | 323 | **4550310** |
| | 200 | 131 | 50 | 250 | 450 | **4550320** |
| | 300 | 131 | 50 | 350 | 575 | **4550330** |

## Suspension beam

Suspension beam for double-threaded rod suspended installation. Use bolts M6x16, nuts and star washers to fix fibre-optic duct to the beam. Material: steel, pre-galvanized.

| Type | Dimensions Height x Width x Length (mm) | | | | Weight (g) | Cat. no. |
|------|-----|-----|-----|-----|-----|-----|
| | | H | W | L | | |
| Suspension beam | 100 | 30 | 40 | 160 | 202 | **CSU08041000** |
| | 200 | 30 | 40 | 260 | 358 | **CSU08043000** |
| | 300 | 30 | 40 | 360 | 606 | **CSU08044500** |

# Support system (cont.)

## Claw

| Type | | | Dimensions Height x Width x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Can be used for light double threaded rod installations.
Material: steel, pre-galvanized.

| | H | W | L | | |
|---|---|---|---|---|---|
| Claw | 46 | 58 | 46 | 49 | CSU08150209 |

## Ceiling bracket

| Type | | | Dimensions Height x Width x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Ceiling bracket 5 with fixing rail 24/48 to construct a pendant system. Bolts and nuts not included.
Material: steel, pre-galvanized

| | H | W | L | | |
|---|---|---|---|---|---|
| Ceiling bracket 5 | 40 | 100 | 135 | 350 | 721101 |

## Vertical pieces

| Type | | | Dimensions Height x Width x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Length of the pendant can be extended by using pendant fixing rail 24/48 and rail connector 2FJ.
Material: steel, hot-dip galvanized.

| | | H | W | L | | |
|---|---|---|---|---|---|---|
| Vertical pieces 2F | 280 | 80 | 135 | 280 | 800 | 717196 |
| | 370 | 80 | 135 | 370 | 980 | 717197 |
| | 505 | 80 | 135 | 505 | 1260 | 717198 |
| | 730 | 80 | 135 | 730 | 1710 | 717199 |
| | 1000 | 80 | 135 | 1000 | 2250 | 717200 |
| | 1500 | 80 | 135 | 1491 | 2900 | 787276 |

## Pendant / Fixing rail

| Type | | | Dimensions Height x Width x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Pendant / Fixing rail for mounting of cantilever arms. Can be suspended from ceiling to ceiling bracket 5 or installed to the wall directly.
Material: steel, pre-galvanized.

| | H | W | L | | |
|---|---|---|---|---|---|
| Pendant / Fixing rail 24/48 | 26 | 48 | 5940 | 11 200 | 731721 |

## Rail connector

| Type | | | Dimensions Height x Width x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|---|

Rail connector for extending pendant / fixing rails and vertical piece pendants.
Material: steel, pre-galvanized.

| | H | W | L | | |
|---|---|---|---|---|---|
| Rail connector 2FJ | 54 | 15 | 200 | 460 | CSU795325 |

# Support system (cont.)

W stago®

## Threaded rod M10

| Type | Dimensions Ø (mm) x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|
| M10 threaded rod for suspended installations. Material: steel, electro-galvanized. | | | | |
| | Ø | L | | |
| Threaded rod | 10 | 2000 | 1000 | CSU08050000 |
| | 10 | 3000 | 1500 | CSU08050100 |

## Threaded rod extension M10

| Type | Dimensions Ø (mm) x Length (mm) | | Weight (g) | Cat. no. |
|---|---|---|---|---|
| Use threaded rod extension to extend threaded rod length if needed. Material: steel, electro-galvanized. | | | | |
| | Ø | L | | |
| Threaded rod extension | 12 | 50 | 25 | CSU08920000 |

## End plug

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| High visibility end plug for enhanced safety and easy identification. Material: PP/TPE, orange | | | | | |
| | H | W | L | | |
| End Plug 28E | 30 | 24 | 52 | 8 | 709021 |

## T-bolt M8

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| T-bolt to be used for mounting cantilever arms onto Pendant / Fixing rail 24/48 or vertical piece 2F. Material: steel, hot-dip galvanized. | | | | | |
| T-bolt 26F | H | W | L | | |
| T-bolt 26F M8x30 | 8 | 43 | 50 | 45 | 734983 |

## Draco electric metal sheer cutter

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Use electric sheer to ensure a fast, safe and clean cut of fibre duct length material. | | | | | |
| | H | W | L | | |
| Draco electric metal sheer cutter | 210 | 90 | 410 | 2700 | CSU08770200 |

## Draco electric sheer cutter knife

| Type | Dimensions Height x Width x Length (mm) | | | Weight (g) | Cat. no. |
|---|---|---|---|---|---|
| Replacement knife for Draco electric metal sheer cutter. | | | | | |
| | H | W | L | | |
| Draco electric sheer cutter knife | 120 | 12 | 200 | 68 | CSU08780200 |

# Stago Fibre-Optic Duct

### Standards

IEC 61537 specifies requirements and tests for cable tray, cable ladder and cable ducting systems intended for the support and accommodation of cables and possibly other electrical equipment in electrical and/or communication systems installation.

The standard EN 61537 establishes that for Cable Ducts with electrical continuity characteristics (metal), this continuity should be guaranteed by means of an equipotential connection and one or several connections to earth in accordance with the use of the Cable Duct system.

To guarantee a safe installation, Wibe Group recommends a proper earthing of all elements that make up the system (section and accessories), using the accessories designed specifically for this purpose.

### Cable filling capacity

The figures in the table below are calculated considering a 50 % cable loading factor.

| Dimensions Height x Width | Cable filling capacity (load factor of 50 %) Optical fibre | | | |
|---|---|---|---|---|
| (mm) | Ø 1.2 mm | Ø 1.6 mm | Ø 2 mm | Ø 3 mm |
| 60 x 100 | 1653 | 1413 | 905 | 402 |
| 60 x 200 | 4218 | 2856 | 1828 | 812 |
| 60 x 300 | 6782 | 4298 | 2751 | 1223 |
| 110 x 100 | 3820 | 2632 | 1684 | 749 |
| 110 x 200 | 8594 | 5318 | 3403 | 1513 |
| 110 x 300 | 13369 | 8004 | 5122 | 2277 |

### Working loads and span recommendations
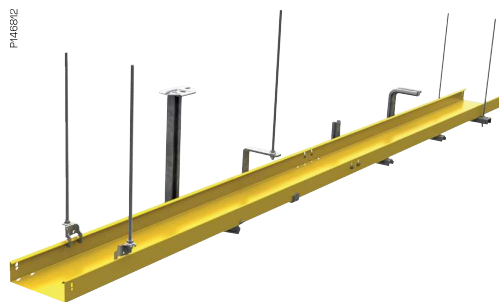


| Support width (mm) | Supports SWL (kg) | | | | |
|---|---|---|---|---|---|
| | Pendant 2F + Cantilever 50i | C-bracket | Omega wall bracket | Omega ceiling bracket | Suspension beam |
| 100 | 230.2 | 20.9 | 198 | 123 | 200 |
| 200 | 160.4 | 72.6 | 100 | 90 | 200 |
| 300 | 123.1 | 75.6 | 78 | 75 | 200 |

| Max. recommended span, considering FO cables | Pendant 2F + Cantilever 50i | C-bracket | Omega wall bracket | Omega ceiling bracket | Suspension beam |
|---|---|---|---|---|---|
| Criteria: MIN of MPL/SWL — 60 x 100 | 3 | 3 | 3 | 3 | 3 |
| 60 x 200 | 3 | 3 | 3 | 3 | 3 |
| 60 x 300 | 3 | 3 | 3 | 3 | 3 |
| 110 x 100 | 3 | 3 | 3 | 3 | 3 |
| 110 x 200 | 3 | 3 | 3 | 3 | 3 |
| 110 x 300 | 3 | 3 | 3 | 3 | 3 |

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