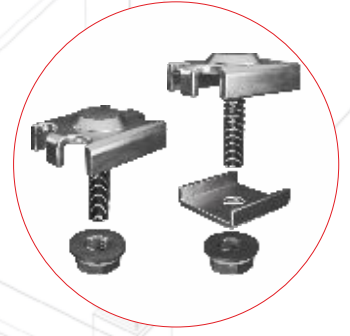
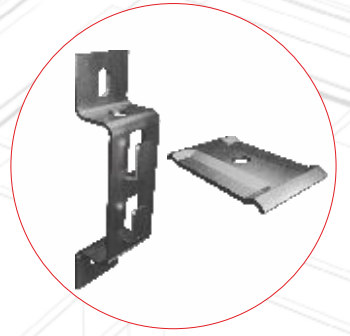
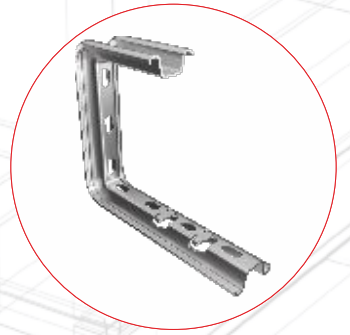
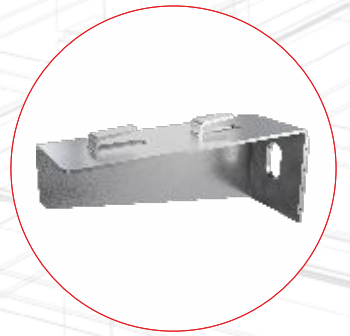
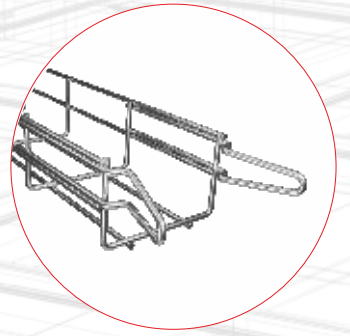




KOPPOS

# INSTALLATION INSTRUCTIONS

## WIRE CABLE TRAYS Gemini



## Introductory provisions

- **General product description**

Cable support systems are products used to set up a cable route for free laid cables. The system consists of wire cable trays and also mounting accessories for cable routes on the wall, hanging to the ceiling etc.

- **Manual content**

This manual is intended for specialists and workers who are knowledgeable in the line of electrical installations and are thus able to perform tasks that are expected for such workers, so these tasks are not included in the manual. The manual is a help for installation, maintenance or extension of systems.

## Safety measures

- **Risk of injury from cutting**

Although the cable trays are produced with maximum effort to minimize sharper edges, it is necessary to wear protective gloves to carry, grip and work with cable elements.

- **Risk of fall**

Using cable support systems as bridges or footways is not allowed. It is forbidden to enter them. If permitted load capacity is exceeded it would cause structure collapses and worker falls with the risk of serious injury or death.

- **Risk of system collapse**

It is important to respect maximum allowed load capacity of cable management systems. Load charts of individual systems are listed in the catalogue of the manufacturer published on paper or placed on the manufacturer's website. It is necessary to respect maximum load limits for individual cable management systems.

The load limits do not include any additional loads such as snow, water, wind, seismic forces... These circumstances must be already taken into account when planning a route.

- **Electricity injury**

As individual components of cable management systems are made of electrical conductive material, it is essential not to work with a system near live electrical parts. Infringement of the safety regulations may cause serious injury of health or death.

## Certification

Wire cable management systems are produced in accordance with ČSN EN 61537.

All standards related to creating of electrical installations must be taken into account when installing cable management systems. This manual cannot and does not aim to describe all possibilities and methods of installation that may appear in practice.

## Transport and storage

- **Transport**

During transport, all components of the cable management system must be properly fastened to the loading area of a transport vehicle. In case the cable trays are placed on a pallet, a forklift can be used for unloading. If material is free loaded, the unloading is required preferably by hand. This will significantly reduce the risk of a cable trays damage. Use extreme caution and ensure work safety during loading and unloading. For sea transport, it is appropriate to use packaging intended specifically for this type of transport.

**ATTENTION!!:** Trays, ladders and their accessories can be damaged during handling and transport. In case of individual elements damage we do not recommend subsequent installation due to nonobservance of the allowed loading and corrosion protection.

- **Storage**

Wire cable management systems and other system components should be stored in dry areas. Storage in humid or outdoor conditions can lead to white corrosion. According to the standard, this cosmetic defect is not a cause for complaint and it is a natural chemical process of zinc hydroxide beginning.

Access of the air is also important during storage. Especially when stored outdoors and covered with an airtight sheet, moisture condensation and complete devastation of stored material by corrosion occurs.

Overseas packaging which ensures protection from the marine environment influences must be used when ship transporting.

## Assembly of supporting elements

- **Supporting system**

The distance of cable system supports depends on cable trays loading and is given by a project. To determine support distances and options loading of cable trays it is also possible to use the information (load charts), which are listed in the catalog Cable management systems. This is available in a paper form or on [www.kopos.com](http://www.kopos.com).

Suitable fasteners must be used for support system mounting. These must be chosen with regard to the material of the walls on which supporting elements are fastened. The specified drill hole depth must also be observed. Details are given in the catalog or in catalogs of individual fastener manufacturers.

The cable system can also be installed on a building steel structure. As in case of fixing to walls and ceilings, in this case it is also necessary to consider the mechanical load capacity of the structures with regard to the loads that the installation of cable management systems will cause.

- **Cable tray accessories**

Elements used for cable route deviation (bends, T-joints, etc.) are created by cutting the required wire and connecting it using a coupling.

Another important aspect of the assembly is the creation of expansion gaps, as thermal length expansion can be (especially in larger systems) quite considerable.

Cable route separation is best performed using professional cutting pliers.

Areas of wire cable trays, accessories, or the support system that have been damaged by cutting, drilling, or other means must be treated with zinc spray or zinc paint.

## Grounding and bonding

When connection of wire cable trays using integrated coupling or coupling DZS, their connection is ensured. It is tested in accordance with ČSN EN 61357 standard where are routes with characteristics of electric continuity for securing of protective connection and connection with ground, according to articles 6.3.2. During the test, the alternating current of 25 A run trough wire cable trays and the loop impedance must be less than 50 mW. The cable trays have stood the test.

## Corrosion resistance

The wire cable trays are supplied in various surface treatments that meet requirements for placing cable management systems in environments with different influences. The risk of corrosion depends on the intensity of external influences according to ČSN EN ISO 14713-1 and ČSN EN ISO 14713-2. The classification is divided into degrees C1-C5. More information is available in the catalog.

## Surface treatments

- **elektrolytic galvanizing**

According to ČSN EN ISO 2081 - Metallic and other inorganic coatings - Electrolytically deposited zinc coatings with additional treatment on iron or steel.

Galvanizing in electrolytic bath - protective coating layer 10±4 µm.

Suitable for indoor environment.

- **Hot Dip Galvanizing**

According to ČSN EN ISO 1461 - Hot dip galvanized zinc coating

The finished products from sheet without any surface treatment are sunk into a zinc bath at the temperature of approximately 450°C. A layer of iron and zinc alloy covered with a layer of pure zinc is formed on steel after removing from the zinc bath.

The layer of zinc layer depends on the thickness of the material. For material of <1.5 mm thick, the average zinc layer is 45 µm according to the standard.

Suitable for outdoor environment.

- **Pre-galvanizing by Sendzimir method**

According to the standard ČSN EN 10 143, ČSN EN 10346 - Steel sheets and strips continuously metal plated.

After preparation, the cold rolled steel strip passes through the continuous bath of liquid zinc. The resulting zinc layer guarantees increased protection from corrosion, zinc layer 15-27 µm (or 10-22 µm).

Suitable for indoor environment.

- **non-electrolytic galvanizing**

Inorganic microlayer base system with cathodic protection of surfaces, electrical conductive, with high protective efficiency in salt spray test according to ISO 9227, ASTM B 117-73 and DIN 50021.

Protective coating layer 5-15 µm.

This surface treatment is mainly used for fasteners and accessories of smaller dimensions (e.g. couplings).

Suitable for outdoor environment.

- **Magnelis® - Zinc Coating with Zn + Al + Mg Alloy**

According to standards ČSN EN 10143, ČSN EN 10346 – Continuously Hot-Dip Coated Steel Sheets and Strips.

A cold-rolled steel strip undergoes a cleaning and pickling process before passing through a zinc alloy bath containing 3.5% aluminum and 3% magnesium. The resulting zinc coating provides enhanced corrosion protection, with a zinc layer thickness of 18–31 µm.

The surface treatment has a self-healing property, ensuring gradual protection on cut edges of the material.

Suitable for indoor and outdoor environments.

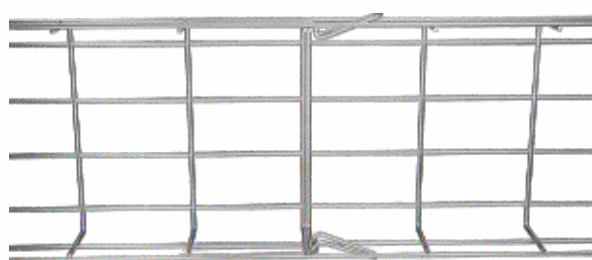
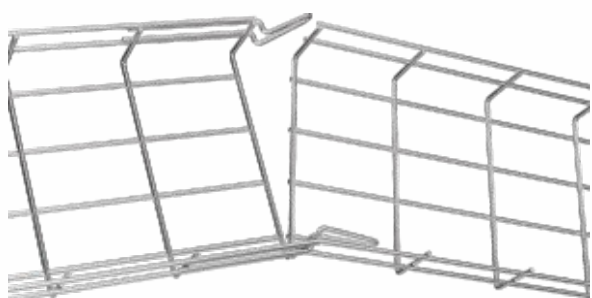
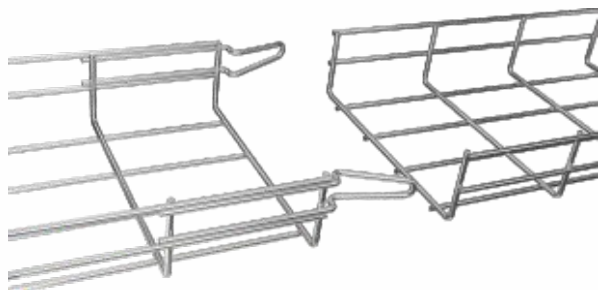
- **Stainless steel**

AISI 304 (DIN 1.4301)

Standard stainless steel is resistant to water, water vapor, air humidity, edible acids and slight organic and inorganic acids. It resists weathering outside the coastal areas or outside environments where the concentration of aggressive chemicals is higher. It has a wide spectrum of using. Used in the food industry, chemical industry, dairy industry, brewing industry, wine industry, pharmaceutical industry and cosmetic industry.

### cable trays with intergrated coupling connection

By inserting one side and snapping in the other side of the integrated coupling.



### cable trays without integrated coupling connection

connection using a coupling DZS (INOXDZS)



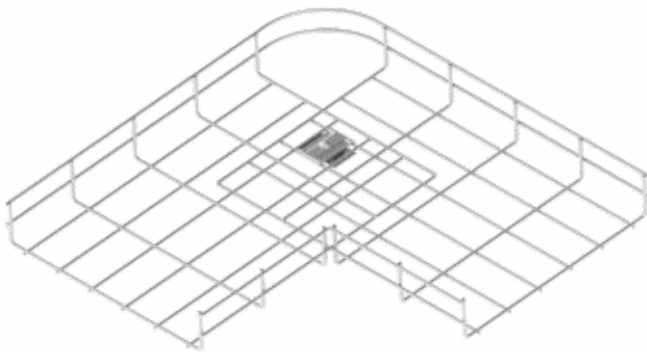
### interior space of wire cable trays partition

- partitions NPZ, NIXPZ are intended to split the space
- partition fastening into a wire cable tray with coupling DZS every 0.5 m



### creating a bend for cable trays

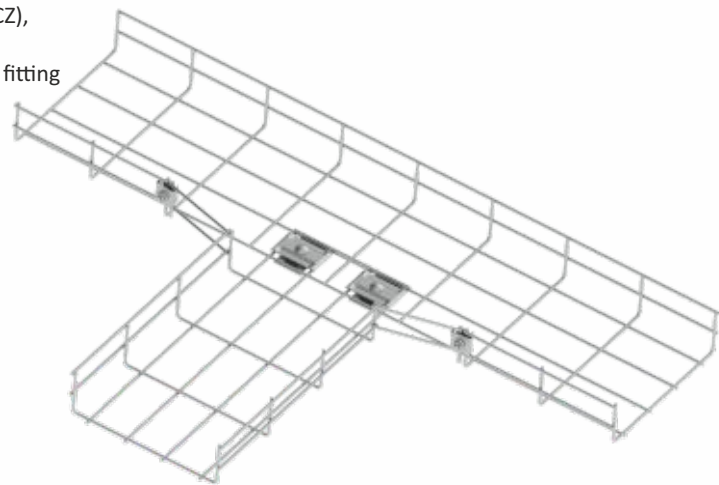
- the bend is created by cutting a section from the bottom and sides of the wire tray
- the side walls of the tray are bent into a 90° curve
- reinforcement of the bend is done using two central hangers DZCZ (INOXDZCZ) rotated 90° and fixed with a screw S 6x20 and a nut M 6
- increasing the number of connection points will enhance the strength of the bend
- for tray widths of 60 and 100 mm, a DZS (INOXDZS) coupling is used for connection



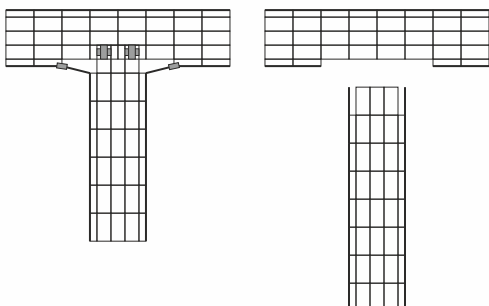
tray width	cutting out of areas	montage
60		
100		
150		
200		
300		
400		
500		
600		

### creating a T-joint for cable trays

- the T-joint is created from two pieces of wire trays
- on the "branching" tray, one section of the sidewall is cut off from the bottom
- on the "main" tray, the sidewall is cut off, with the number of sections depending on the width of the "branching" tray
- the tray bottoms are connected using two central hangers DZCZ (INOXDZCZ), rotated 90° and fixed with a screw S 6x20 and a nut M 6
- increasing the number of connection points enhances the strength of the fitting
- the sidewalls are connected using a DZS (INOXDZS) coupling
- T-joint can also be created using trays of different widths

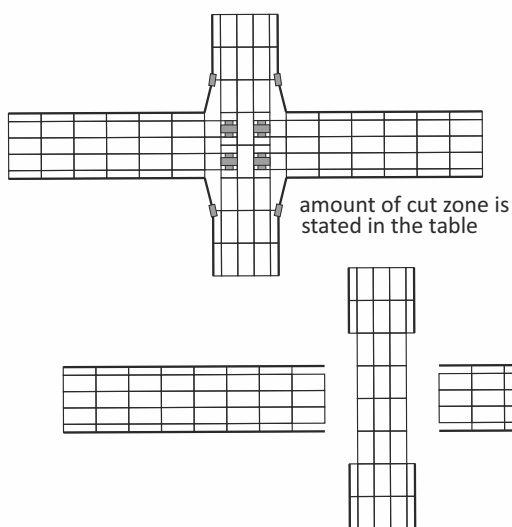
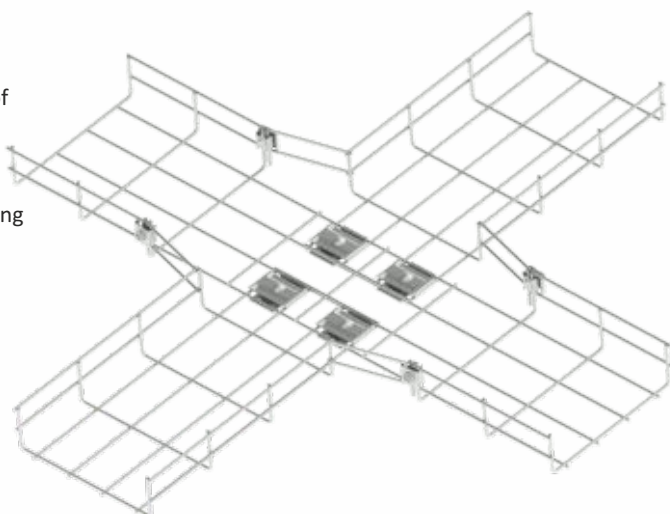


amount of cut out zones is stated in the table



tray width	amount of zones (sides) for removal
100	2
150	3
200	4
300	5
400	6
500	7
600	8

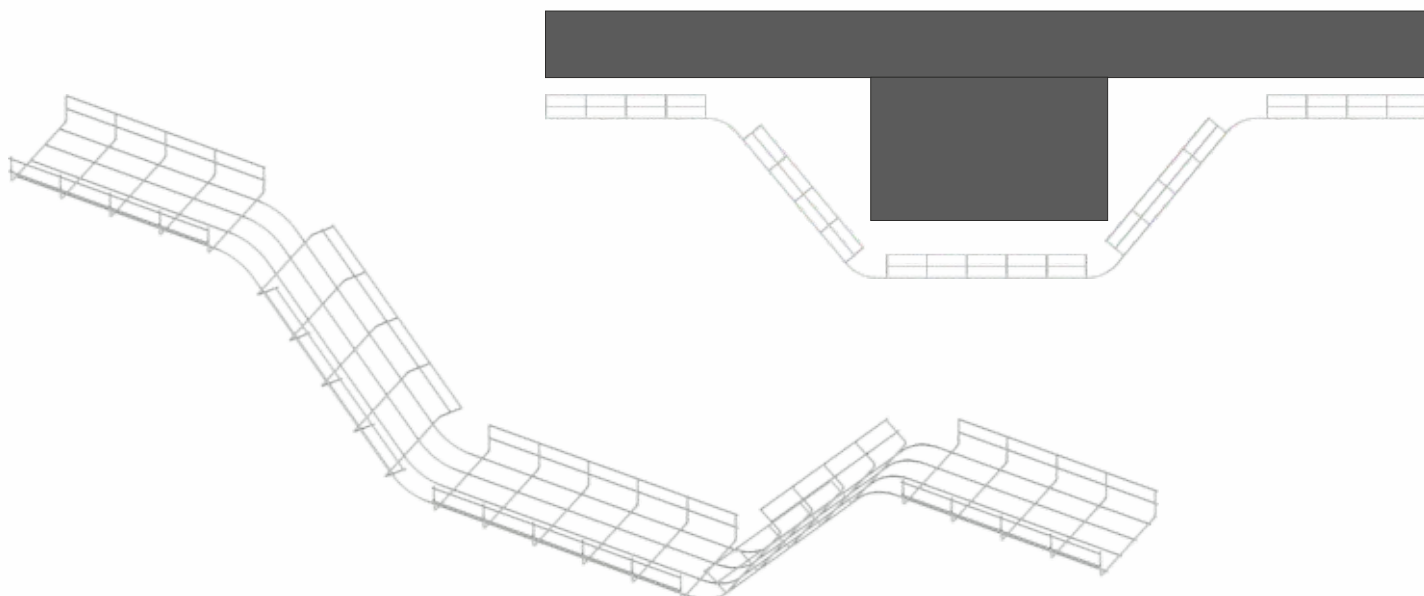
- **creating a cross-joint for cable trays**
- for the two "branching" trays, one section of the sidewall is cut off from the bottom
- on the "main" tray, the sidewalls are cut off on both sides, with the number of sections depending on the width of the connected tray
- the tray bottoms are connected using two central hangers DZCZ (INOXDZCZ), rotated 90° and fixed with a screw S 6x20 and a nut M 6
- increasing the number of connection points enhances the strength of the fitting
- the sidewalls are connected using a DZS (INOXDZS) coupling
- cross-joint can also be created using trays of different widths



tray width	amount of zones (sides) for removal
100	2 + 2
150	3 + 3
200	4 + 4
300	5 + 5
400	6 + 6
500	7 + 7
600	8 + 8

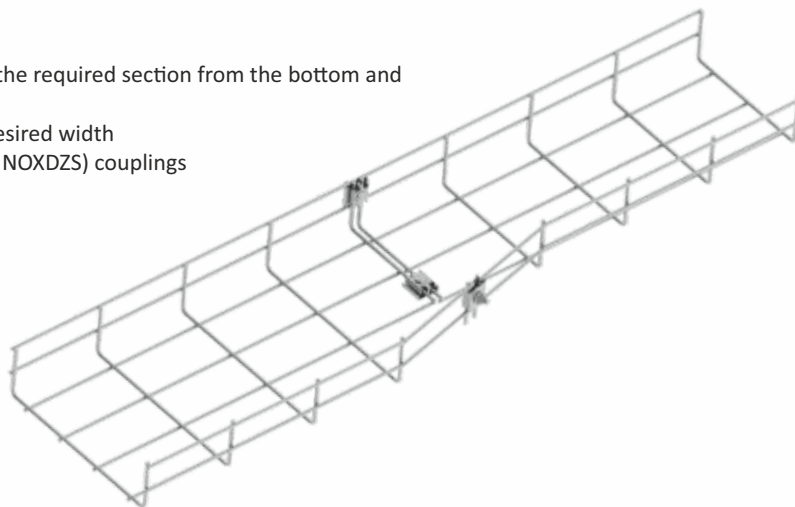
amount of cut zone is stated in the table

- **creating a rising/low elbow for cable trays**
- any change in the horizontal level can be achieved by cutting the corresponding section and bending the wire tray at that point until the desired shape is





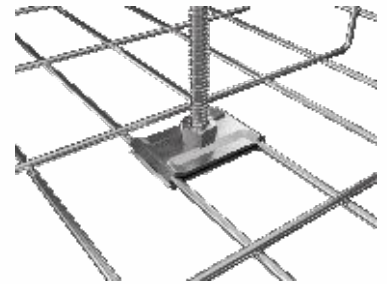
- **creating a cable tray reduction**
- the reduction is created by cutting the required section from the bottom and sidewalls
- the side of the tray is bent to the desired width
- the connection is made using DZS (INOXDZS) couplings



### hanging on one threaded rods

- **central hanger - inner DZCZ (INOXDZCZ)**
- for the hanging it is necessary to use two central hanger pieces, two nuts M 8 (INOXM 8) and the threaded rod ZT 8 (INOXZT 8)
- there is recommended for cable trays width max. 300 mm

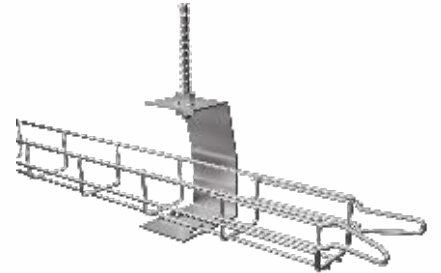
Product list for one mounthing point	
DZCZ (INOXDZCZ)	2
M 8 (INOXM 8)	2
ZT 8 (INOXZT 8)	1
KKZ, KKZM, KPOZ, DSOS, DSZT, DSS, US (INOXKPOZ)	1



### hanging on one threaded rods

- **central hanger - outer DZSZ**
- for the hanging it is necessary to use thread rod ZT 8 and two nuts M 8
- the wire cable tray is inserted into the attaching parts, the ends of the attaching parts are squeezed and the tray is fixed to the suspension
- hanger suitable for 60x60 and 60x100 cable trays

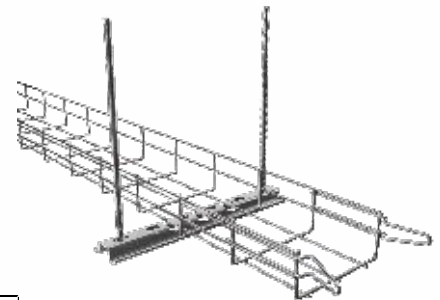
Product list for one mounthing point	
DZSZ	1
M 8	2
ZT 8	1
KKZ, KKZM, KPOZ, DSOS, DSZT, DSS, US	1



### hanging on two threaded rods

- **load bearing profile DZNP**
- load-bearing profiles are designed for threaded rod ZT 8 + M 8 + PD 8
- the wire tray is placed on the support in the prepared cutouts

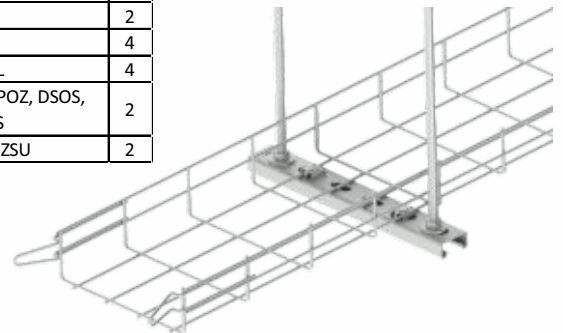
Product list for one mounthing point	
DZNP	1
M 8	4
PD 8	4
ZT 8	2
KKZ, KKZM, KPOZ, DSOS, DSZT, DSS, US	2



### hanging on two threaded rods

- **assembly profile MP (INOXMP)**
- the assembly profile has to be cut to the required length according to the tray width
- suitable for ZT 8 (INOXZT 8) or ZT 10 (INOXZT 10) threaded rods
- fastening on threaded rods ZT 8 (INOXZT 8) => nut M 8 (INOXM 8) + washer PVL 8 (INOXPVL 8)
- fastening to threaded rods ZT 10 (INOXZT 10) => nut M 10 (INOXM 10) + washer PVL 10 (INOXPVL 10)
- the wire cable tray is attached to the mounting profile using the fastening screw DZSU (INOXDZSU)

Product list for one mounthing point	
MP, INOXMP	1
ZT, INOXZT	2
M, INOXM	4
PVL, INOXPVL	4
KKZ, KKZM, KPOZ, DSOS, DSZT, DSS, US	2
DZSU, INOXDZSU	2



### hanging to the ceiling (podlahu)

- **ceiling profile SPS (INOXSPS)**
- the profile is attached to the ceiling using 2 pieces of anchors KPO 10 (INOXKPO 10)
- it is designed for suspending holders DSDZ (INOXDS)
- the holders are fastened using screws S 10x20 (INOXS 10x20) and sliding nuts PM 41 M 10 (INOXPM 41 M 10)
- for double-sided mounting, the holders are fastened using screws S 10x70 (INOXS 10x70), nuts M 10 (INOXM 10), and washers PD 10 (INOXPD 10).
- the number of holders (trays) stacked vertically is limited by the profile size and the load capacity of the fastening material
- for safety reasons, it is advisable to fit the end of the holder with an end cap OKSPS
- the tray is secured to the support DSZD by attaching the bottom of the tray to the prepared hooks
- the tray is fixed to the support INOXDS using the fastening screw INOXDZSU/INOXDZSU



Product list for one mounting point - single-sided mounting	
SPS (INOXSPS)	1
KPO 10 (INOXKPO 10)	2
DSDZ (INOXDS)	1
S 10x20, S 10x25 (INOXS 10x20)	1
PM 41 M 10 (INOXPM 41 M 10)	1
INOXDZSU	2
OKSPS	1

Product list for one mounting point - double-sided mounting	
SPS (INOXSPS)	1
KPO 10 (INOXKPO 10)	2
DSDZ (INOXDS)	2
S 10x70 (INOXS 10x70)	2
M 10 (INOXM 10)	2
PD 10 (INOXPD 10)	2
INOXDZSU	4
OKSPS	1

### threaded rods fastening

- **ceiling bracket DSZT**
- for threaded rod fastening to the ceiling
- opening 11x20 is intended for fixing to the ceiling for the anchor/bolt of dimension 8 or 10
- KPO anchors or stop anchors KKZ, KKZM + washers PD + bolts S are suitable for fastening
- Ø10.5 round opening is intended for threaded rod ZT 8 or ZT 10 hanging
- threaded rod fastening with a nut M and a washer PD

### threaded rods fastening

- **adjustable ceiling bracket DSS**
- for threaded rod fastening to the ceiling with a slight slope
- the top opening is intended to be fixed to the ceiling for anchor, bolt of dimension 8 or 10
- KPO anchors or stop anchors KKZ, KKZM + washers PD + bolts S are suitable for fastening
- opening is intended for threaded rod ZT 8 or ZT 10 hanging
- The threaded rod is secured using a M nut and PD washer (also suitable for retrofitting the threaded rod with a pre-screwed nut)

### threaded rods fastening

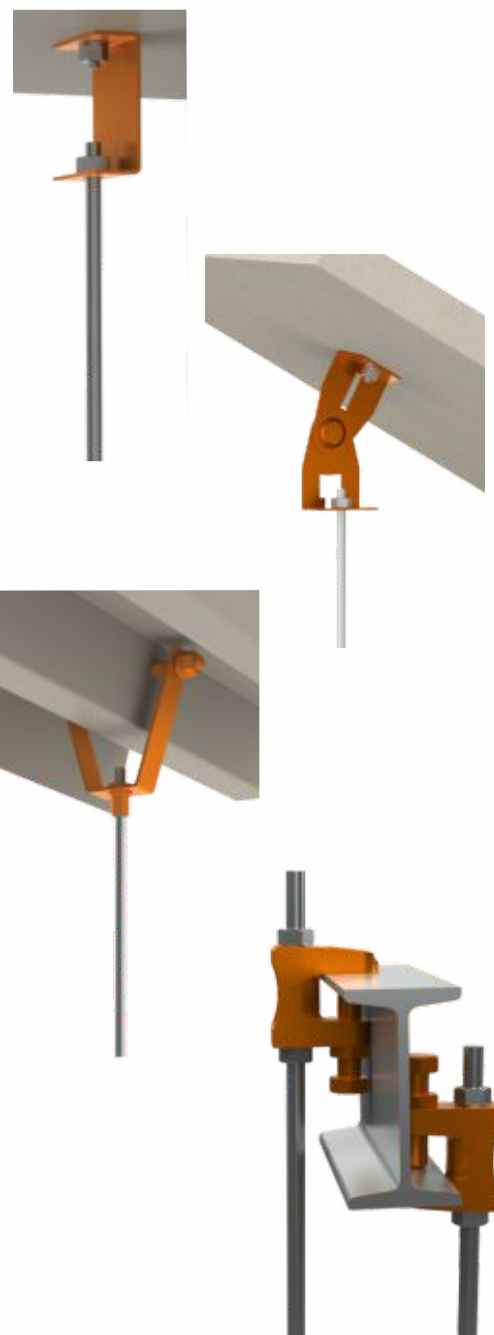
- **bracket for trapeze ceilings DSOS 8, DSOS 10**
- for threaded rod fastening to the trapezoidal metal ceiling
- after the hole creating in the trapeze sheet, the bracket is placed and M8x120 plug supplied is pulled the holes through the bracket and the metal sheet and this is ensured with supplied nuts and washers
- a threaded rod is screwed into an adjusted nut which is part of the bracket
- DSOS 8 or DSOS 10 bracket is chosen according to the dimension of ZT 8 or ZT 10 threaded rod

### threaded rods fastening

- **fixing clamp US 1, US 2, US 3**
- for threaded rod fixing to the I profile
- the clamp is pushed onto the I-profile and is fixed with a screw with the lock nut - the tightening moment is 8 Nm
- the threaded rod is screwed into the prepared hole and fastened with M nuts according to the dimension of the threaded rod
- fixing clamp US 1, US 2 or US 3 is chosen according to the dimension of the threaded rod ZT 8, ZT 10 or ZT 12

### threaded rods, bolts fastening

- **KKZ steel stop anchor**
- for threaded rods or bolts direct fixing
- dimensions for drilling the hole are listed in the catalog Cable management systems - following the dimensions is very important, wrong hole size may cause the damage of the anchor or insufficient fastening
- the opening for the anchor should be cleaned off
- insert the anchor into the hole
- beat the plug which is placed in the anchor with a hammer and a tool, until the edge of the anchor and the surface are in the same level
- suitable for the installation in non-cracked concrete, natural stone
- **KKZM brass stop anchor**
- for threaded rods or bolts direct fixing
- dimensions for drilling the hole are listed in the catalog Cable management systems - following the dimensions is very important, wrong hole size may cause the damage of the anchor or insufficient fastening
- the hole for the anchor should be cleaned off
- the anchor has an internal conical thread which expands when the threaded rod or bolt is mounted
- suitable for the installation in concrete, stone, wood, chipboard and solid brick



### hanging from the ceiling/wall

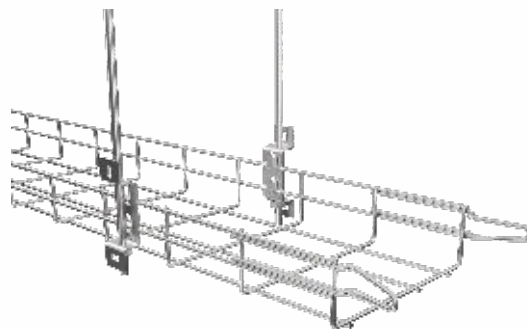
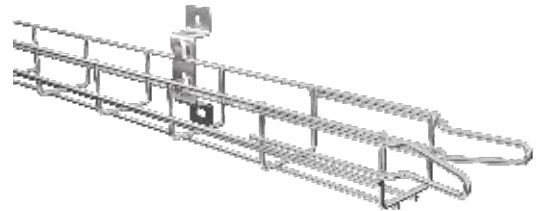
- **ceiling support DZCTS**
- the bracket is attached to the ceiling/wall using anchor KPO 8
- it is possible to reinforce the installation of the support to the ceiling and supplement the hole prepared at the end of the support with a threaded rod ZT 8
- the wire cable tray is placed onto the support into the prepared cutouts



Product list for one mounting point	
DZCTS	1
KPO 8	1
ZT 8	1
KKZ	1

### hanging from the ceiling/wall

- **hanger DZZ (INOXDZZ)**
- the support is attached to the wall using 2 pieces of anchors KPO 6 (only for trays 60x60 and 60x100)
- the support is attached to the ceiling using 2 pieces of ZT 8 (only for trays with a 60 mm side and a width of 60-200 mm)
- the wire cable tray is secured to the support by inserting the sidewall into the hooks of the support



Product list for one mounting point - mouting to the ceiling	
DZZ (INOXDZZ)	1
ZT 8 (INOXZT 8)	2
KKZ, KKZM, KPOZ, DSOS, DSZT, DSS, US (INOXKPOZ)	2

Product list for one mounting point - mouting to the wall	
DZZ (INOXDZZ)	1
KPO 6	2

### hanging to the wall

- **wall bracket DSDZ (INOXDS)**
- the holder is attached to the wall using 1 piece of anchor KPO 8 (INOXKPO 8)
- the tray is secured to the support DSZD by attaching the bottom of the tray to the prepared hooks
- the stainless steel tray is fixed to the support INOXDS using the fastening screw INOXDZSU



DSDZ

Product list for one mounting point - mounting to the ceiling	
DSDZ (INOXDS)	1
KPO 8 (INOXKPO 8)	1
INOXDZSU	2



INOXDS

### hanging to the wall/ceiling

- **load bearing profile DZNP**
- the holder is attached to the wall using 2 pieces of anchor KPO 8
- the wire cable tray is placed onto the support into the prepared cutouts
- the ends of the attaching parts are squeezed and the tray is fixed to the suspension

Product list for one mounting point	
DZNP	1
KPO 8	2



### hanging to the wall/ceiling

- **central hanger - inner DZCZ (INOXDZCZ)**
- the holder is attached to the wall using 1 piece of anchor KPO 8 (INOXKPO 8)

Product list for one mounting point of trays with a width of 100-300 mm	
DZCZ (INOXDZCZ)	2
KPO 8 (INOXKPO 8)	2

Product list for one mounting point of trays with a width of 400-600 mm	
DZCZ (INOXDZCZ)	1
KPO 8 (INOXKPO 8)	1



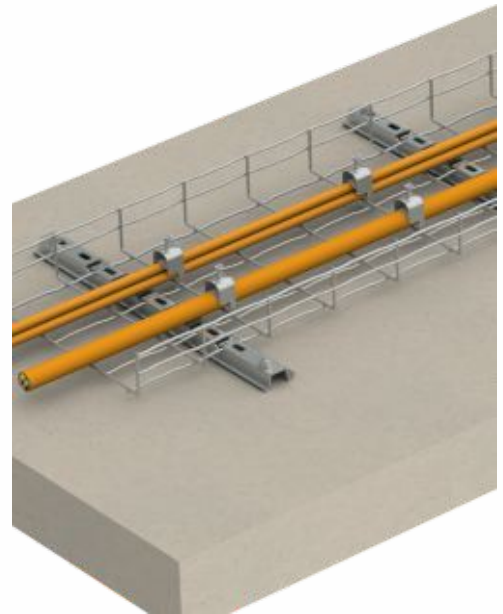
### mounting on the roof

- **support washer for the roof PPS1 3XM8**
- the wire cable tray is attached to the support pad using the central hanger DZCZ (INOXDZCZ) and screw S 8x20 (INOXS 8x20)



### cable fixing to the wire cable trays

- **cable clamp for wire trays PKDZ1**
- size of the clamp is chosen according to the cable diameter
- the clamp is designed for direct mounting to the wire cable tray
- the screw on the clamp firmly anchors the cable to the crossbar of the cable bridge



type number	diameter	
	min.-max.	(mm)
PKDZ1 12_F	6-12	
PKDZ1 14_F	10-14	
PKDZ1 16_F	12-16	
PKDZ1 18_F	14-18	
PKDZ1 22_F	16-22	
PKDZ1 26_F	22-26	
PKDZ1 30_F	22-30	
PKDZ1 34_F	28-34	
PKDZ1 38_F	34-38	
PKDZ1 42_F	34-42	
PKDZ1 46_F	40-46	
PKDZ1 50_F	46-50	
PKDZ1 54_F	46-54	
PKDZ1 58_F	52-58	



KOPOS