- Vertical ladders for vertical routing
- Lightweight, heavyweight and industrial versions
- Electrical function maintenance with high loads
- Safe installation with systems tested to DIN 4102 Part 12

Function maintenance with vertical ladder systems

Overview of vertical ladder systems
Standard support constructions

Vertical ladders for vertical routing of function maintenance cables, to be mounted with or without connectors. The following parameters apply to all the systems:

- Cable load: max. 20 kg/m
- Rung distance: max. 0.3 m
- Fastening distance: max. 1.2 m
- Single cable assignment: diameter not limited
- Routing with cable bundles: max. 3 cables with a diameter of max. 25 mm
- Approved for all cable types

Lightweight ladder routing type
- Rising track width: 200, 300, 400 mm

Heavyweight ladder routing type
- Rising track width: 400, 500, 600 mm

Industrial ladder routing type
- Rising track width: 400, 500, 600 mm

Cable strain relief
Cables on rising tracks must be effectively supported in the transfer area between vertical and horizontal outing, to prevent bending or sliding. Continuous cable systems are only awarded function maintenance classification when there is effective support at a maximum distance of 3.5 m.

Strain relief through loops
To prevent the cable from breaking due to its own weight if there is a fire, route the cables in a loop. The horizontal cable length must be at least 0.3 m. The fastening clips on the horizontal may not, as with vertical mounting, exceed a spacing of 0.3 m. During the installation, the permissible bending radii of the cables may also be observed. The 3.5 m spacing of these supports may not be exceeded.

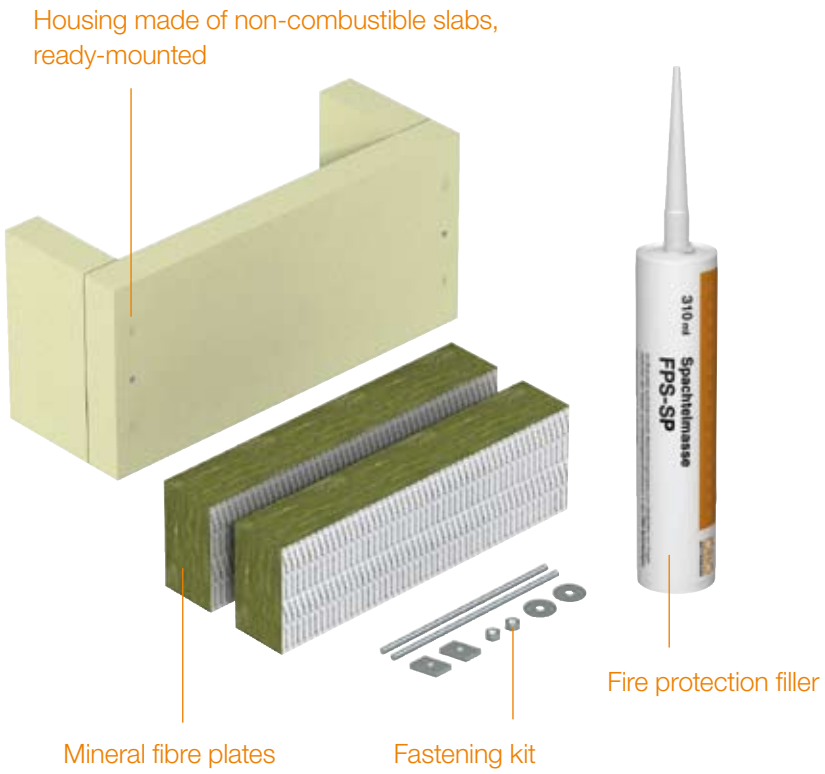
Strain relief through cable insulation
An additional support option is the installation of approved cable insula tions in the ceiling openings. In so doing, the fire resistance length of the insulation system must correspond to the function maintenance class of the installed cable system. In this case, the storey height may not exceed 3.5 m.

Strain relief for vertical routing

The OBO ZSE90 strain relief allows avoidance of the costly loops, in accordance with DIN 4102 Part 12. The universally applicable solution is approved for all E30/E90 vertical ladder types and, naturally, also for single clips, which run cables vertically. There is no dependency on specific cable types or manufacturers. This allows highly economical and space-saving support of the vertically installed function maintenance cables according to DIN standards.

LG 60 lightweight industrial ladder with ZSE90 strain relief

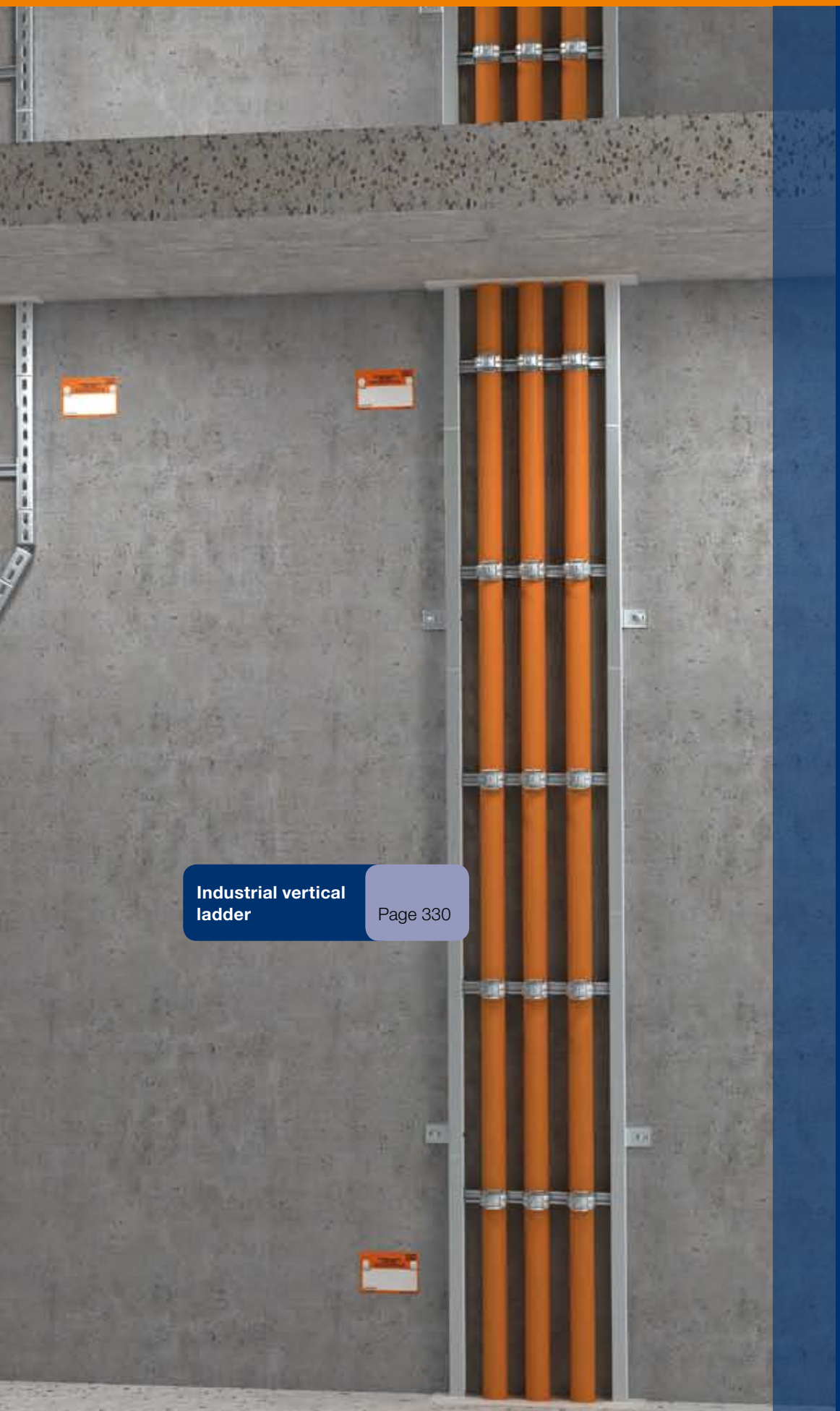
SLS vertical industrial ladder with ZSE90 strain relief



Individual clips or clamp clips on profile rail with ZSE90 strain relief

No restriction on cable types, approved for E30 and E90 with one type. Fastening in the profile rail or next to the cable line. Penetration of the ladder rails approved.

System overview
Function maintenance with vertical ladder systems



Industrial vertical ladder Page 330

Standard support constructions: lightweight vertical ladder

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mer Part 4 Function maintenance classes E 30 and E 90

Approved data	
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	200, 300, 400
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

The routing type with lightweight vertical ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. The lightweight vertical ladders have a rung spacing of 0.30 m and can be used for widths of up to 400 and 600 mm. The cables must be fastened on each rung with clamp clips of type 2056 UM/... made of galvanised sheet steel with a riveted metal pressure trough.
According to the surveyor's comments, bundling of up to three cables in a clamp clip is possible. The individual diameter of the bundles cables may not exceed 25 mm.
There is no limit to the diameter of cables individually fastened with clamp clips.

System components

Lightweight vertical ladder, straight connector, bolt tie, fire protection bolt tie, clamp clip, identification plate.

Wall application area without connectors

Standard support construction made of vertical ladder L 6... VS. The joint is mounted without connectors.

Wall application area with connectors

Standard support construction made of vertical ladder L 6... VS. Mounting with straight connectors is approved at any point between the fastening points.

Draw on the anchor holes

Transfer the position of the holes drilled in the vertical ladder to the wall.

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Always indicate the article number when ordering.

Standard support constructions: lightweight vertical ladder

Drilling of the anchor holes

Drill the anchor holes in the wall.

Mounting of the vertical ladder

Screw the vertical ladder using the bolt ties (size 10 mm) with push-through mounting. In the case of mounting on masonry walls, push the bolt tie through the ladder rails and screw it into the drill hole.

Joint design with connector

Screw the straight connectors in both ladder rails using a total of 4 truss-head bolts.

Joint plate mounting without connectors

Fasten the two adjoining ladder ends with anchors in both rails at a distance of maximum 100 mm from the rail end.

Fastening the cables

Fasten the cables to each rung of the cable ladder with clamp clips.

Cable strain relief

Create the necessary strain relief using additional profile rails. Arrange and space of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

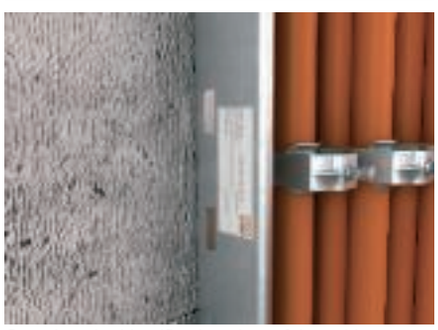
Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling



Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

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Standard support constructions: lightweight vertical ladder

System parameters at a glance

Approved data

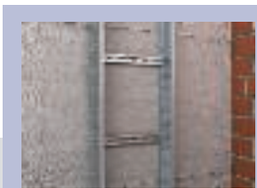
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	200, 300, 400
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per connection point

Cable ladders LG 6...VS	1
Straight connector LLV 60	2
Truss-head bolt FRS 8x16	4
Identification plate KS-E	*

* Number as necessary



Profile rails for strain relief

Profile rail 1268	*
Profile rail 2068	*

* Number as necessary

Locking of the clamp clips

Slide nut 5019	*
Washer DIN440/7	*
Hexagonal bolt 342/M6x16	*

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	*
Fire protection anchor FNA II M6/5	*
Fire protection anchor FNA II 6x30	*

* Number as necessary

Masonry wall

Fire protection bolt tie MMS 10 x 80	*
Fire protection bolt tie MMS 6 x 50	*

* Number as necessary

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Always indicate the article number when ordering.

Standard support constructions: lightweight vertical ladder

Fastening clips

	**Clamp clip with metal pressure trough 2056/M**	*	
	**Clamp clip with metal pressure trough 2056/M2**	*	
	**Clamp clip with metal pressure trough 2056/M3**	* * Number as necessary	

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Standard support constructions: heavyweight vertical ladder

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mer Part 4 Function maintenance classes E 30 and E 90

Approved data	
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

The routing type with heavyweight vertical ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. Vertical ladders of widths between 400 and 600 mm can be used. Mount the rungs at a maximum spacing of 300 mm. To fasten the cables on each rung, use clamp clips of type 2056 UM/... made of galvanised sheet steel with a riveted metal pressure trough.
Bundles of up to three cables may be created under a clamp clip. The individual diameter of the bundles cables may not exceed 25 mm.
There is no limit to the diameter of cables individually fastened with clamp clips.

System components

Heavyweight vertical ladder, U support connector, bolt tie, fire protection bolt tie, clamp clip, identification plate

Wall application area without connectors

Standard support construction made of vertical ladder SLM50C40F. The joint is mounted without connectors.

Wall application area with connectors

Standard support construction made of vertical ladder SLM50C40F. Mounting with straight connectors is approved at any point between the fastening points.

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Standard support constructions: heavyweight vertical ladder

Mounting preparations

Draw on the exact position of the drill holes for the vertical ladders using a chalk mark.

Drilling of the anchor holes

Drill the anchor holes in the wall.

Mounting of the vertical ladder

Screw the vertical ladder using the bolt ties (size 10 mm) with push-through mounting. In the case of mounting on masonry walls, push the bolt tie through the ladder rails and screw it into the drill hole.

Joint design with connector

Screw the straight connectors in both ladder rails using truss-head bolts.

Joint plate mounting without connectors

Fasten the two adjoining ladder ends with anchors in both rails at a distance of maximum 100 mm from the rail end.

Fastening the cables

Fasten the cables to each rung of the cable ladder with clamp clips.

Cable strain relief

Creation of the necessary strain relief using additional profile rails. Arrange and space of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

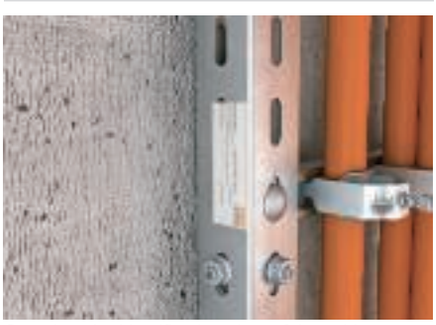
Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling



Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

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Standard support constructions: heavyweight vertical ladder

System parameters at a glance

Approved data

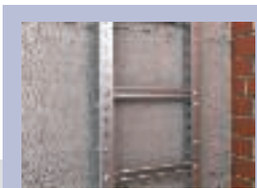
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per connection point

Vertical ladder, SLM50C40F	1
U support connector VUS 5	2
Identification plate KS-E	*

* Number as necessary



Profile rail for strain relief

Profile rail CPS 4	*

* Number as necessary

Locking of the clamp clips

Slide nut GMH18	*
Washer DIN440/7	*
Hexagonal bolt 342/M6x16	*

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	*
Fire protection anchor FNA II M6/5	*
Fire protection anchor FNA II 6x30	*

* Number as necessary

Masonry wall

Fire protection bolt tie MMS 10 x 80	*
Fire protection bolt tie MMS 6 x 50	*

* Number as necessary

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Always indicate the article number when ordering.

Standard support constructions: heavyweight vertical ladder

Fastening clips

Clamp clip with metal pressure trough 2056U/M

*

* Number as necessary

Standard support constructions: industrial vertical ladder

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mer Part 4 Function maintenance classes E 30 and E 90

Approved data	
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

The routing type with industrial vertical ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. Vertical ladders of widths between 400 and 600 mm can be used. When mounting rungs, maintain a spacing of maximum 300 mm. To fasten the cables on each rung, use clamp clips of type 2056 UM/... made of galvanised sheet steel with a riveted metal pressure trough.
Bundles of up to three cables may be created under a clamp clip. The individual diameter of the bundles cables may not exceed 25 mm.
There is no limit to the diameter of individually fastened cables.

System components

Industrial vertical ladder, I support connector, bolt tie, fire protection bolt tie, identification plate

Wall application area without connectors

Standard support construction made of vertical ladder SLS80C40F. The joint is mounted without connectors.

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Standard support constructions: industrial vertical ladder

Mounting preparations

Draw on the exact position of the drill holes for the vertical ladders using a chalk mark.

Mounting the fastening bracket

Mount the fastening bracket with bolt tie (dimension 10 mm) in push-through style. In the case of mounting on masonry walls, push the bolt tie through the fastening bracket and screw it into the drill hole.

Mounting of vertical ladder

Screw the vertical ladder to the fastening brackets using a truss-head bolt.

Joint fastening

Fasten of the two adjoining ladder ends with fastening brackets on both rails at a distance of maximum 100 mm from the rail end.

Fastening the cables

Fasten the cables to each rung of the cable ladder with clamp clips.

Cable strain relief

Create the necessary strain relief using additional profile rails. Arrange and space of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

Standard support constructions: industrial vertical ladder

System parameters at a glance

Approved data

Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

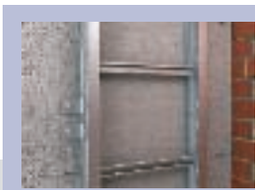
Components per connection point

Vertical ladder, SLS80C40F — 1

Fastening bracket BW80/55 — 2

Identification plate KS-E — *

* Number as necessary



Profile rail for strain relief

Profile rail CPS 4 — *

* Number as necessary

Locking of the clamp clips

Slide nut GMH18 — *

Washer DIN440/7 — *

Hexagonal bolt 342/M6x16 — *

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 12/10 — *

Fire protection anchor FNA II M6/5 — *

Fire protection anchor FNA II 6x30 — *

* Number as necessary

Masonry wall

Fire protection bolt tie MMS 10 x 80 — *

Fire protection bolt tie MMS 6 x 50 — *

* Number as necessary

Fastening clips

Clamp clip with metal pressure trough 2056U/M — *

* Number as necessary

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Always indicate the article number when ordering.

Strain relief to DIN

Support measure for vertical routing to DIN 4102 Part 12 Surveyor's comments 8357/2007 MPA BS Function maintenance classes E 30/E 90

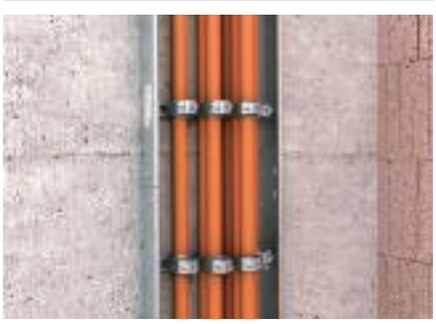
Approved technical data	
Lightweight vertical ladder, max.	400 mm
Heavyweight vertical ladder, max.	600 mm
Industrial vertical ladder, max.	600 mm
Individual clips, vertical	600 mm
BBS clips with C rail	600 mm
Max. distance	3.5 m
Any cable tested to DIN 4102 Part 12 is approved.	

With vertical routing of function maintenance cables to DIN 4102 Part 12 with vertical ladders or in single clips, the standard requires effective cable support at a spacing of max. 3.5 m. If there is a fire, the ZSE 90 strain relief ensures that the "insulated" profile rail or rung stays relatively "cold" in comparison to the fire area. Now, the most which will be suspended from the strain relief is the copper weight of the 3.5 m cable. This limits the risk that the cable breaks. This guarantees sure function maintenance.
The OBO ZSE 90 strain relief can be used for all widths of rising track. There is no restriction to tested cable combinations. The ZSE 90 is approved for all function maintenance cables.

System components

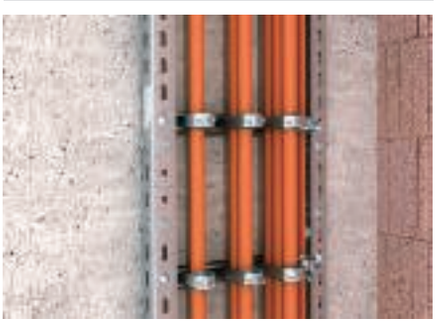
Housing strain relief, coated mineral fibre plates, fire protection filler, mounting set with fastening material

Lightweight rising track



Usable in the lightweight version with VS rung.

Heavyweight rising track



Usable in the heavyweight version with U profiles and CPS4 rung.

Industrial rising track

Usable in the industrial version with IS8 profiles and CPS4 rung.

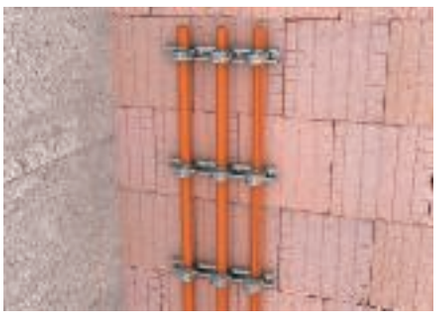
Always indicate the article number when ordering.

Strain relief to DIN

Vertical routing with single clips

Usable with single clip through fastening next to the cables with fire protection bolt tie.

Clamp clip and profile rail



Usable with clamp clips with 1268/2068 profile rail through fastening in the profile rail with slide nut.

Mounting in a rising track

Push the threaded rod, with the slide nut on it, into the rail. Turning the threaded rod causes the slide nut to cross-thread, thus securing the threaded rod in place.

Mount spacer

Hexagonal nuts with large washers are screwed onto the threaded rods according to the distance of the internal housing dimension. This prevents break-
age of the fire protection plates when the nuts are tightened from the outside.

Determining the drill size

Measure the spacing of the threaded rods in the profile rail.

Transfer dimension

Transfer the measured value to the centre line of the housing and draw it on.

Drilling

Drill the holes for the M8 threaded rods. In so doing, work carefully and without great pressure, to avoid breaking the plates.

Attachment of the housing

The housing is pushed carefully onto the threaded rods and up to the wall. If necessary, correct the distance of the internal nuts. Then, fasten it on the outside with nuts and large washers.

Insert mineral fibre plate

The mineral fibre plate, adapted to the cable contours, is fitted into the housing so that it has a tight fit. Residual openings behind the cables are filled with cuttings.

Mineral wool filling

The cavity of the housing is filled with loose mineral wool (melting point > 1,000 °C). Then the top plate is installed so that it is tightly fitting.

Closing residual joints

Finally, close off all the joints with fire protection filler from the cartridge.

Finished support

Approved solution as effective support according to DIN 4102 Part 12. Universal solution for E 30 to E 90; all cable manufacturers approved.

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Strain relief to DIN

Support, heavyweight rising track

Support, industrial rising track

Support, single clip/clamp clip

Alternative fastening

Finished mounting

When the rising track is fully assigned or there is no profile rail, the threaded rods are fastened with the MMS-ST 7.5 fire protection bolt tie and the M8 connection sleeve. Drill 6 mm to the side of the rising track. Further mounting steps are described above.

System parameters at a glance

Approved technical data

Lightweight vertical ladder, max.	400 mm
Heavyweight vertical ladder, max.	600 mm
Industrial vertical ladder, max.	600 mm
Individual clips, vertical	600 mm
BBS clips with C rail	600 mm
Max. distance	3.5 m
Any cable tested to DIN 4102 Part 12 is approved.	

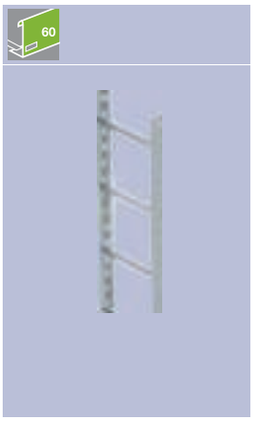
Strain relief every 3.5 m

	**Strain relief ZSE90**	*	
	Mounting set	*	
		* Number as necessary	

Always indicate the article number when ordering.

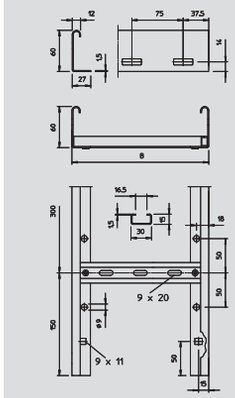
Vertical ladder: products

Vertical ladder, LG 60 VS

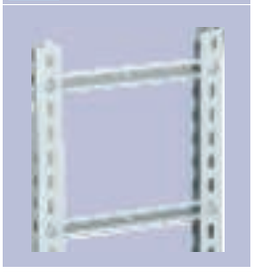


Type	Width mm	Rail thickness mm	Frame distance mm	Length mm	Weight borders	Item No. ST / FS	Price /m
LG 620 VS	200	1.5	300	6000	273.800	**6208 62 7**	
LG 630 VS	300	1.5	300	6000	298.000	**6208 63 0**	
LG 640 VS	400	1.5	300	6000	322.200	**6208 63 3**	

Cable ladder with perforated side rail of side height 60 mm with riveted C profile rungs, open in an upwards direction (VS version).



Vertical ladder, SLM50



Type	Width mm	Frame distance mm	Length mm	Weight borders	Item No. ST / FT	Price /m
SLM50C40F	400	300	3000	766.000	**6010 00 8**	
SLM50C40F	500	300	3000	821.000	**6010 01 6**	
SLM50C40F	600	300	3000	876.000	**6010 02 4**	

Heavyweight vertical ladder system for electrical function maintenance to DIN 4102 Part 12. Approved clips, type 2056 U/M. Supplied unmounted.

Vertical ladder, SLS80

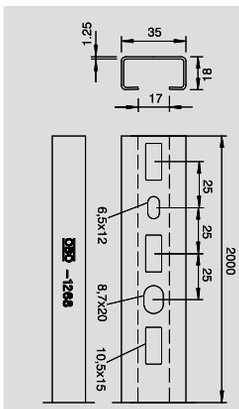
Type	Width mm	Frame distance mm	Length mm	Weight borders	Item No. ST / FT	Price /m
SLS80C40F	400	300	3000	1487.000	**6010 10 5**	
SLS80C40F	500	300	3000	1542.000	**6010 11 3**	
SLS80C40F	600	300	3000	1597.000	**6010 12 1**	

Industrial vertical ladder system for electrical function maintenance to DIN 4102 Part 12. Approved clips, type 2056 U/M. Supplied unmounted.

Profile rail

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
1268	200	1.25	25	14.300	**1104 26 8**	
1268	300	1.25	25	21.450	**1104 28 4**	
1268	400	1.25	10	28.550	**1104 29 2**	
1268	500	1.25	10	35.750	**1104 30 6**	
1268	2000	1.25	20	71.500	**1104 50 0**	

Lightweight profile rail, perforated, slot width 17 mm.



Always indicate the article number when ordering.

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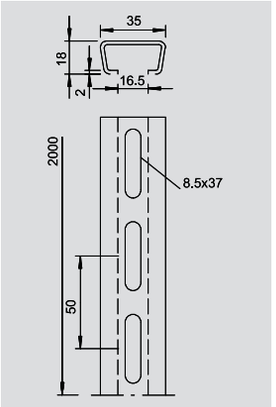
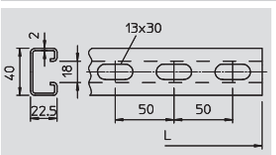
Vertical ladder: products

Profile rail



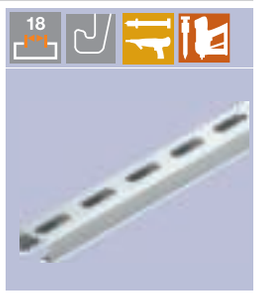
Type	Length	Material thickness	Pack.	Weight	Item No.	Price /% m
	mm	mm	m	borders	ST / FT	
2068	2000	1.5	20	89.000	**1119 65 6**	

Profile rail, perforated, slot width 16.5 mm.

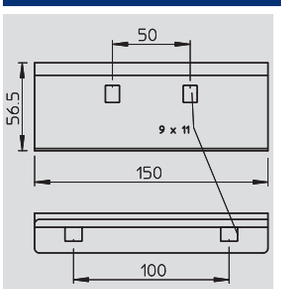


Type	Length	Material thickness	Pack.	Weight	Item No.	Price /% m
	mm	mm	m	borders	ST / FT	
CPS 4	2000	2	10	160.000	**1121 97 9**	

Heavyweight profile rail, perforated, slot width 18 mm.

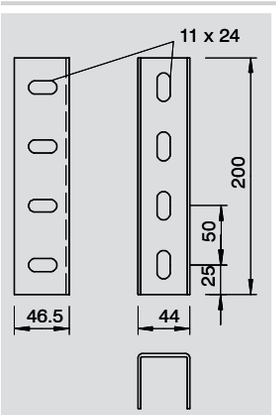


Connector



Type	Side height	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
LLV 60	60	20	18.000	**6208 80 0**	

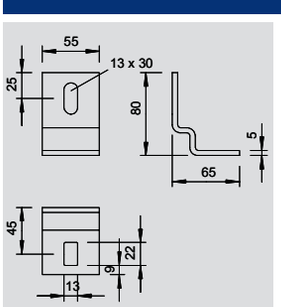
Straight connectors as internal connectors to connect cable ladders and fittings of 60 mm side height.



Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
VUS 5	10	80.000	**6018 50 5**	

U support connector to connect US 5 supports.

Fastening bracket



Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
BW 80/55	10	32.000	**6019 52 8**	

Fastening bracket for mounting IS 8 supports on the wall.

Always indicate the article number when ordering.

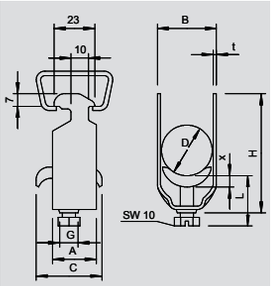
Vertical ladder: products

Clamp clip

16–17 mm

Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M	8 -12	16	30	1.5	100	3.200	**1156 00 4**	
2056/M	12 -16	20	30	1.5	100	3.500	**1156 01 2**	
2056/M	16 -22	27	30	1.5	100	4.400	**1156 02 0**	
2056/M	22 -28	33	30	2	100	6.100	**1156 03 9**	
2056/M	28 -34	39	35	2	100	7.700	**1156 04 7**	
2056/M	34 -40	45	35	2	100	8.600	**1156 05 5**	
2056/M	40 -46	51	35	2	100	9.600	**1156 06 3**	
2056/M	46 -52	57	35	2	100	10.400	**1156 07 1**	
2056/M	52 -58	64	35	2.5	100	13.100	**1156 09 8**	
2056/M	58 -64	70	35	2.5	100	14.500	**1156 10 1**	
2056/M	64 -70	76	35	2.5	50	16.100	**1156 12 8**	
2056/M	70 -76	82	40	2.5	25	18.300	**1156 13 6**	
2056/M	76 -82	88	40	2.5	25	19.100	**1156 14 4**	
2056/M	82 -90	97	40	3	25	23.300	**1156 15 2**	
2056/M	90 -100	107	40	3	25	25.400	**1156 16 0**	

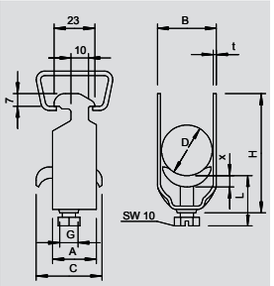
Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



16–17 mm

Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M2	8 -12	16	30	1.5	50	3.980	**1156 17 9**	
2056/M2	12 -16	20	30	1.5	50	4.750	**1156 18 7**	
2056/M2	16 -22	27	30	1.5	50	6.900	**1156 19 5**	
2056/M2	22 -28	33	34	2	50	7.800	**1156 20 9**	

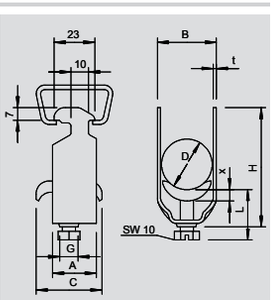
Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



16–17 mm

Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M3	8 -12	16	34	1.5	50	4.050	**1156 24 1**	
2056/M3	12 -16	20	34	1.5	50	5.800	**1156 26 8**	
2056/M3	16 -22	27	34	1.5	50	6.500	**1156 27 6**	
2056/M3	22 -28	33	34	2	50	9.500	**1156 28 4**	

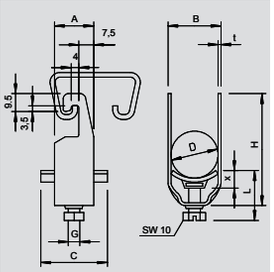
Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



18 mm 22 mm

Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056U/M	8 -12	16	34	1.5	100	3.300	**1158 00 7**	
2056U/M	12 -16	20	34	1.5	100	3.520	**1158 01 5**	
2056U/M	16 -22	27	34	1.5	100	3.960	**1158 02 3**	
2056U/M	22 -28	33	34	2	100	5.890	**1158 03 1**	
2056U/M	28 -34	39	34	2	100	7.650	**1158 05 8**	
2056U/M	34 -40	45	34	2	100	8.360	**1158 06 6**	
2056U/M	40 -46	51	40	2	100	10.890	**1158 07 4**	
2056U/M	46 -52	57	40	2	100	11.660	**1158 08 2**	
2056U/M	52 -58	64	40	2.5	100	14.740	**1158 09 0**	
2056U/M	58 -64	70	40	2.5	100	15.730	**1158 10 4**	
2056U/M	64 -70	76	40	2.5	50	18.200	**1158 11 2**	
2056U/M	70 -76	82	40	2.5	25	20.600	**1158 12 0**	

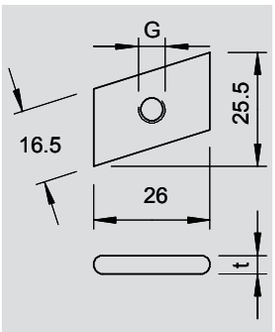
Suitable for all C profile rails with slot width 18 mm. Also suitable for flat, bracket and U irons of 4–12 mm material thickness.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Always indicate the article number when ordering.

Vertical ladder: products

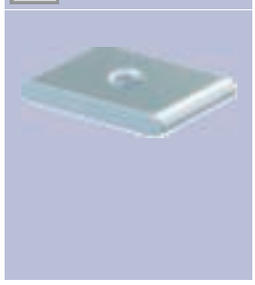
Slippage protection

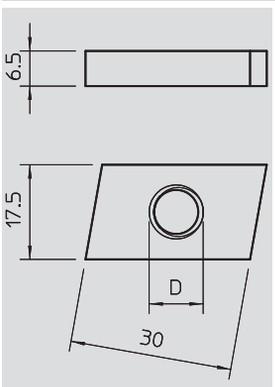


Type	Dimension G mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5019	6	4	100	1.150	**1144 10 3**	

Slide nut for profile rails with a slot width of 16–17 mm.

16-17

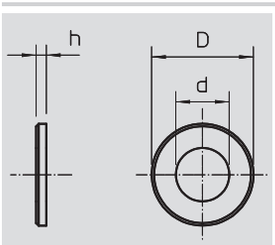




Type	Dimension D mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
GMH18	6	50	2.400	**1146 50 5**	

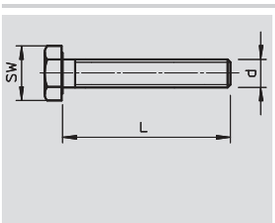
Slide nut for profile rails with a slot width of 18 mm.

18



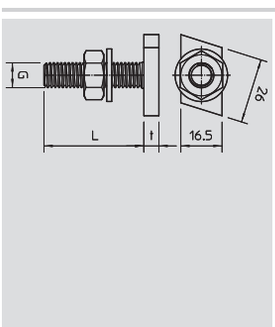
Type	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
DIN440/7	22	6.6	2	100	0.550	**6408 70 2**	

Washer of particularly large outer diameter.



Type	Thread	Length mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
342	M6	16	6	10	100	0.494	**3156 14 1**	

Hexagonal bolt to ISO 4017 with metric thread.



Type	Thread	Dimension L mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
5022	M6	25	5	50	1.960	**1151 01 0**	

Hammer-head bolt with washer and nut for profile rails with slot width 16–17 mm.

16-17

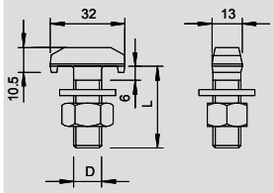
Always indicate the article number when ordering.

Vertical ladder: products

Slippage protection

Type	Thread	Dimension L mm	Dimension D mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5023	M10	30	10	50	4.130	**1153 41 2**	

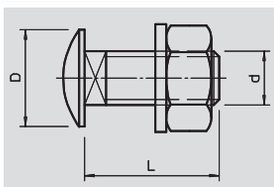
Hammer-head bolt with washer and nut for profile rails with slot width 18 mm.



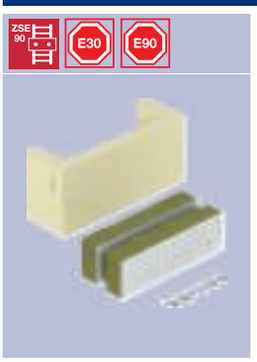
Truss-head bolt

Type	Thread	Dimension L mm	Dimension D mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
FRS 8x16	M8	16	20	8	13	50	1.900	**6406 96 3**	
FRS 8x35	M8	35	20	8	13	50	2.550	**6407 04 8**	
FRS 10x25	M10	25	24	10	17	50	4.140	**6407 56 0**	
FRS 12x25	M12	25	30	12	19	10	6.610	**6406 25 4**	

Truss-head bolt with square neck. With washer and hexagonal nut.



Strain relief



Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
ZSE90/13	1	375.000	**7215 70 1**	
ZSE90/14	1	445.000	**7215 70 5**	
ZSE90/15	1	515.000	**7215 70 8**	
ZSE90/23	1	510.000	**7215 71 2**	
ZSE90/24	1	610.000	**7215 71 5**	
ZSE90/25	1	680.000	**7215 71 8**	
ZSE90/26	1	795.000	**7215 72 5**	
ZSE90/27	1	884.000	**7215 72 9**	

Strain relief for vertical cable routing, approved for all cable types and all vertical routing systems. Function maintenance classes E 30 and E 90. Housing including mineral fibre plates, fastening material and cartridge with fire protection filler.

Mounting set

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
ZSE90/M1	1	32.000	**7215 74 1**	
ZSE90/M2	1	35.000	**7215 74 5**	

Spare parts in mounting set with all the small parts for mounting the ZSE 90 strain relief on and next to rising tracks for function maintenance.

Fire protection filler

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594. In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

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