

# Mounting instructions

Strain relief ZSE90



## **Strain relief ZSE90**

Mounting instructions

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# 1 About these instructions

## 1.1 Target group

These instructions are aimed at installation engineers trained in fire protection.

## 1.2 Relevance of these instructions

- These instructions are based on the standards valid at the time of compilation (November 2020).
- Please read the instructions carefully before starting installation. We will not accept any warranty claims for damage caused through non-observance of these instructions.
- Any images are intended merely as examples. Mounting results may look different.
- In these instructions, cables and lines are referred to simply as cables.
- To find out more about planning and mounting the system, we recommend a comprehensive training course.

## 1.3 Types of warning information

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**Type of risk!**

Shows a possibly risky situation. If the situation is not avoided, then light or minor injury or damage to property may result.

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**Type of risk!**

Shows a possibly damaging situation. If the situation is not avoided, then damage to the product or the surroundings may occur.

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**Note!** *Indicates important information or assistance.*

## 1.4 Correct use

The strain relief ZSE90 is a component offering effective support of a vertical cable system with integrated maintenance of electrical function according to DIN 4102 Part 12. A vertical cable system, in which cables for the maintenance of electrical function are installed on wall or vertical ladders with single clips or clamp clips, must be given effective support at distances of maximum 3.5 m. In cases of fire, the strain relief insulates the fastening material and cables. Depending on the maintenance of electrical function class, the cable jacketing in the area of the strain relief may not burn for up to 90 minutes. In this area, cable cannot slip and remain permanently fixed in single or clamp clips. Thus, the strain relief prevents possible cable tearing in cases of fire. The maintenance of electrical function is guaranteed for up to 90 minutes, depending on the function maintenance class.

The ZSE90 strain relief is approved as a standard cable structure for the vertical routing of cables with vertical ladders, on profile rails with clamp clips and with single clips (designated as cable spacer clips in these instructions).

Maintenance of electrical function classes E30 to E90.

The strain relief is not designed for any other purpose than the one described here. If the strain relief is installed and used for another purpose, any liability, warranty or damage claims shall be rendered null and void.

## 1.5 Applicable documents

- Surveyor reports GS 3.2/17-361-1-r1 and GA-2020/049-Nau
- General type approval Z-19.53-2391, PYROPLUG® Block
- General type approval Z-19.53-2338, PYROSIT® NG
- Safety data sheets at [www.obo-bettermann.com](http://www.obo-bettermann.com):
  - ASX ablation coating
  - PYROSIT® NG fire protection foam
  - PYROPLUG® Block foam block
  - FBA-SP filler

## 1.6 Basic standards and regulations

- DIN 4102 Part 12

## 1.7 General safety information

Observe the following general safety information on handling the system:

- Ensure that the installation of the strain relief does not compromise the stability of the adjacent element – even in the event of a fire. Consult the proof of application of the component.
- Observe and comply with all the appropriate regulations and technical regulations of other units, in particular those for electrical engineering.

## 2 Product description, strain relief ZSE90

### 2.1 Basic principles

The ZSE90 strain relief is available in 3 versions (ZSE90-.../ZSE90-...L/ZSE90-...LH) and different sizes. They basically consist of a non-combustible housing, a filler and fastening material. The strain relief can be mounted either directly on the wall, on profile rails, on vertical ladder rungs and vertical ladder rails. Depending on the type of strain relief, the filling material can consist of mineral fibre plates/mineral wool, PYROPLUG® Block foam blocks and/or PYROSIT® NG fire protection foam.

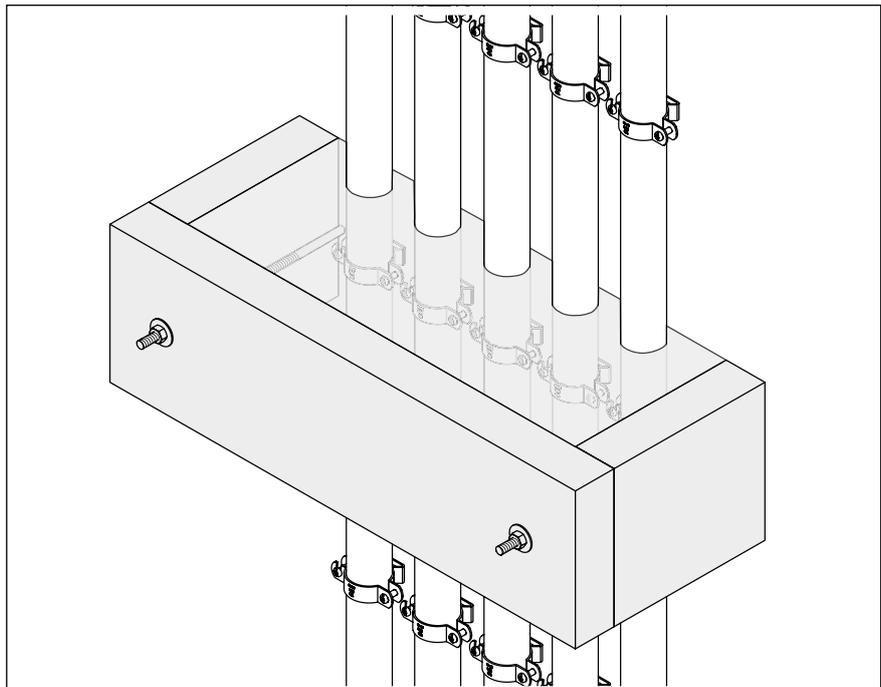
The fastening material contained in the scope of delivery, consisting of threaded rods, slide nuts, nuts and washers, is suitable for any possible housing mounting.

The housing can be fastened at different points, depending on the type of strain relief and type and scope of the cable installation.

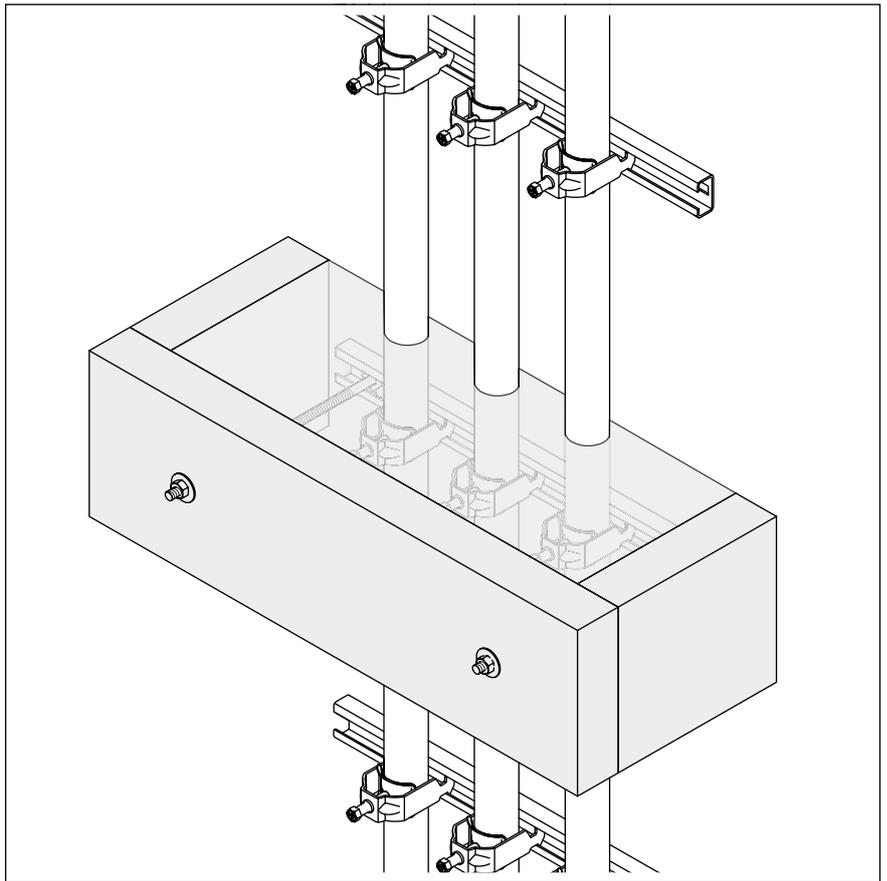
Overview, ZSE 90 strain relief:

Type	Cable installation	Housing fastening	Filling
Type ZSE90-...	Direct wall mounting with - Cable spacer clips - With profile rails and clamp clips - With vertical ladders and clamp clips	- Directly on the wall - On profile rails - On vertical ladder rungs	Mineral fibre plate/ mineral wool
Type ZSE90-... L	Direct wall mounting with - Cable spacer clips - With profile rails and clamp clips - With vertical ladders and clamp clips	- Directly on the wall - On profile rails - On vertical ladder rungs	- PYROSIT® NG fire protection foam - PYROPLUG® Block foam block
Type ZSE90-... LH	- With clamp clips on suspended vertical ladder	- On vertical ladder rails	- PYROSIT® NG fire protection foam

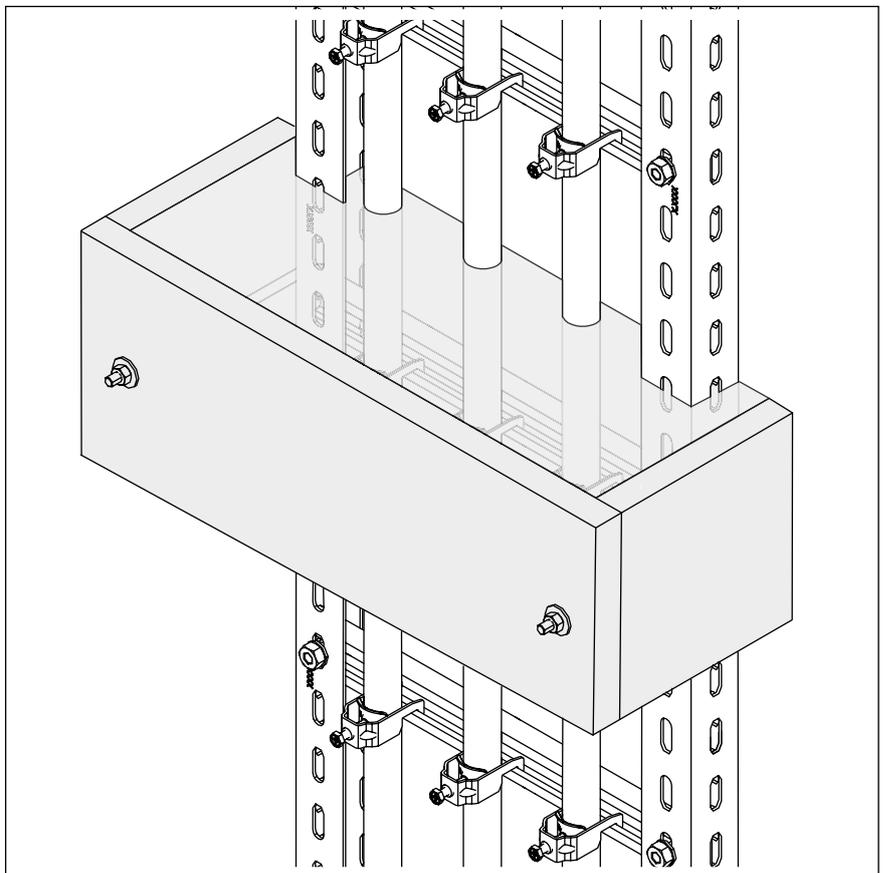
#### Installation examples:



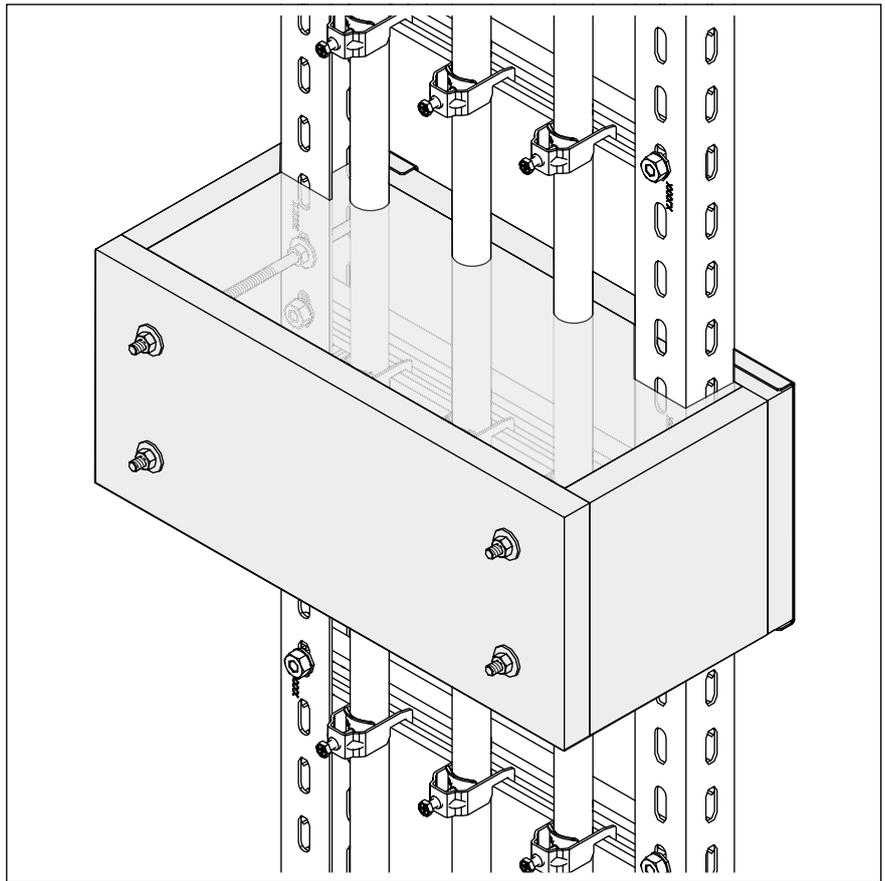
**Fig. 1:** ZSE90-.../ZSE90-...L strain relief for cable installation with cable spacer clips



**Fig. 2:** ZSE90-... /ZSE90-...L strain relief for cable installation on profile rail



**Fig. 3:** ZSE90.../ZSE90-...L strain relief for cable installation on vertical ladders on the wall



**Fig. 4:** ZSE90-... LH strain relief for cable installation on suspended vertical ladder

## 2.2 System components, housing, type ZSE90-...

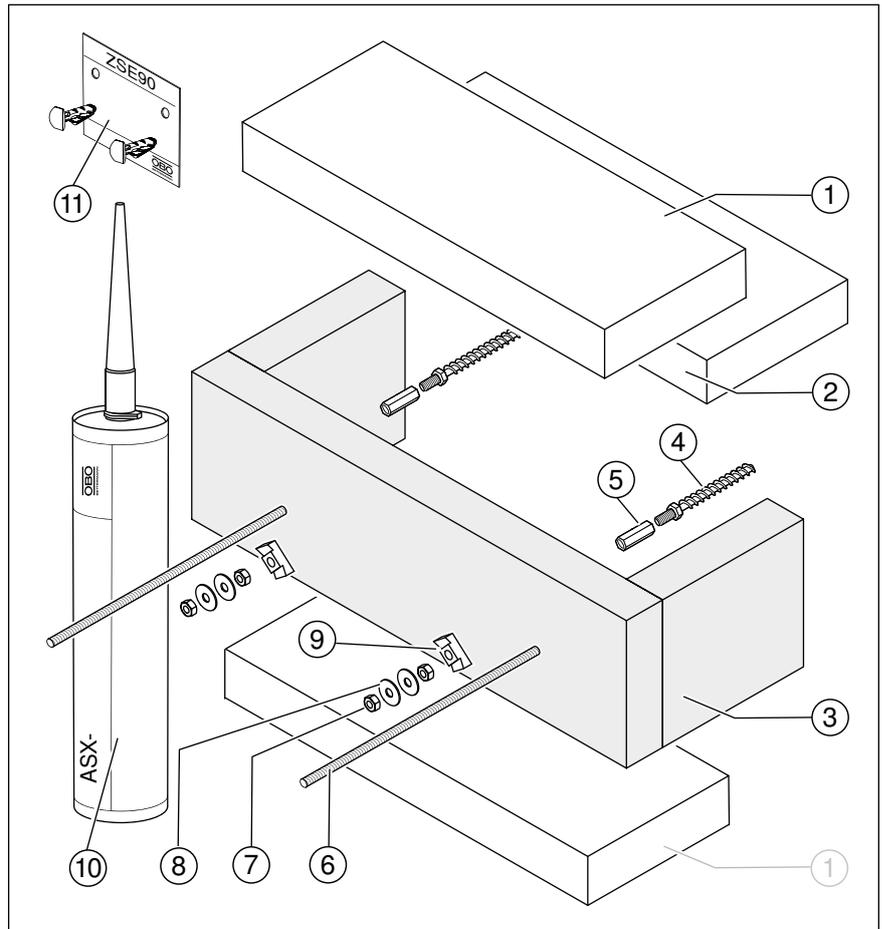


Fig. 5: System components, housing, type ZSE90-...

	Component	Function
①	Coated mineral fibre plate	Filling of the housing
②	Uncoated mineral fibre plate	Filling of the housing
③	Housing	Enclosure of the cable installation
④	Bolt ties	Housing fastening
⑤	Connection sleeve	Housing fastening
⑥	Threaded rod	Housing fastening
⑦	M6 hexagonal nut	Housing fastening
⑧	Washer	Housing fastening
⑨	Slide nut	Threaded rod fastening in profile rail
⑩	ASX-K ablation coating	Filling and sealing of the housing
⑪	KS-ZSE identification plate	Labelling of the strain relief

### 2.3 System components, housing, type ZSE90-...L

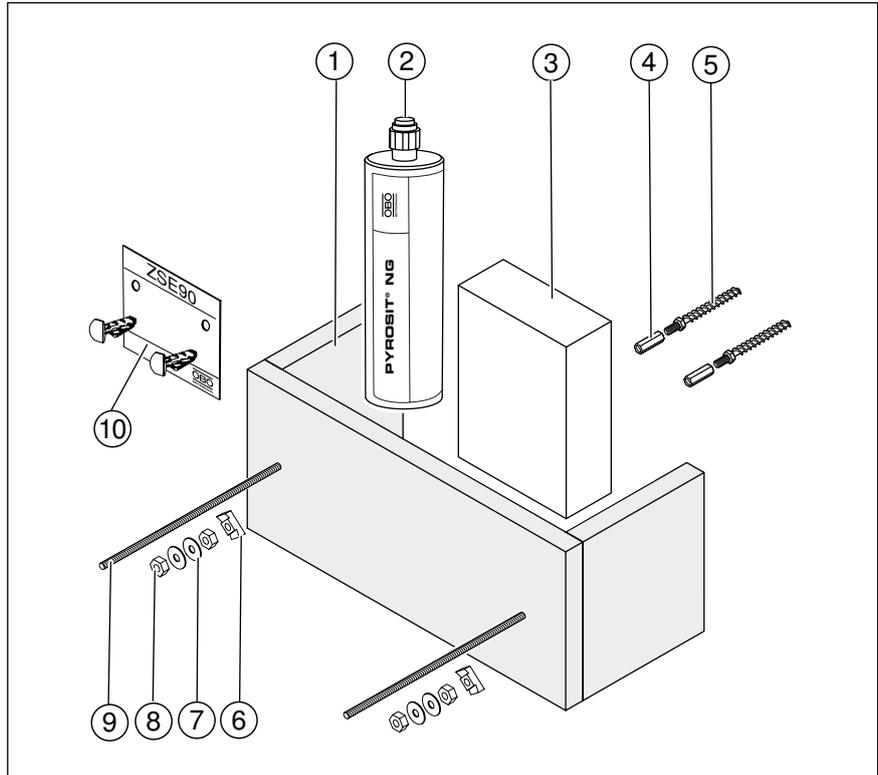


Fig. 6: System components, housing, type ZSE90-...L

	Component	Function
①	Housing	Enclosure of the cable installation
②	PYROSIT® NG fire protection foam	Filling and sealing of the housing
③	PYROPLUG® Block FBA-B200-14 foam block	Filling of the housing
④	Connection sleeve	Housing fastening
⑤	Bolt ties	Housing fastening
⑥	Slide nut	Threaded rod fastening in profile rail
⑦	M6 hexagonal nut	Housing fastening
⑧	Washer, large	Housing fastening
⑨	Threaded rod	Housing fastening
⑩	KS-ZSE identification plate	Labelling of the strain relief

## 2.4 System components, housing, type ZSE90-...LH

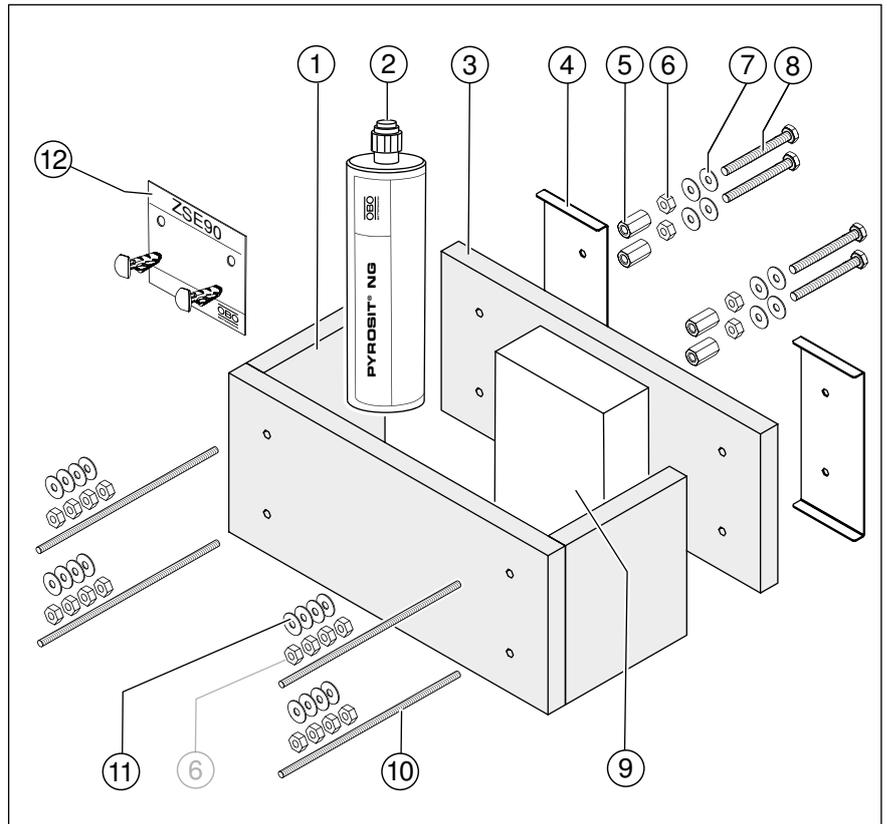
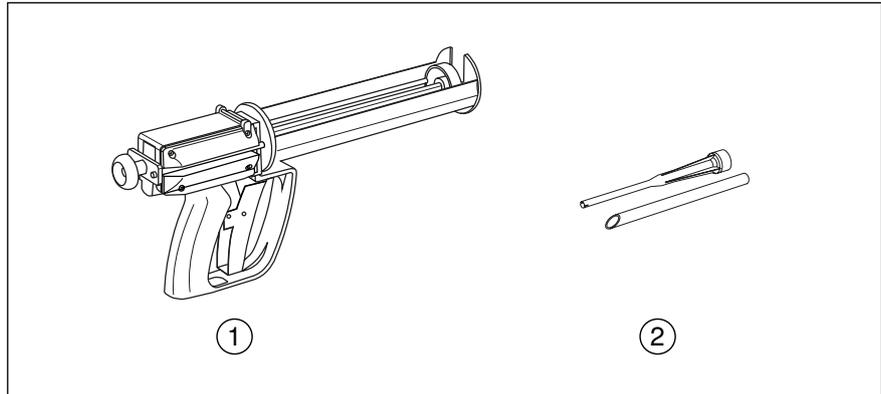


Fig. 7: System components, housing, type ZSE90-...LH

	Component	Function
①	Housing	Enclosure of the cable installation
②	PYROSIT® NG fire protection foam	Filling and sealing of the housing
③	Housing back plate	Fastening of the housing to the vertical ladder
④	Housing lock plate	Fastening of the housing to the vertical ladder
⑤	Connection sleeve	Housing fastening
⑥	M6 hexagonal nut	Housing fastening
⑦	Washer	Housing fastening
⑧	Hexagonal bolt	Housing fastening
⑨	PYROPLUG® Block FBA-B200-14 foam block	Filling of the housing
⑩	Threaded rod	Housing fastening
⑪	Washers, large	Housing fastening
⑫	KS-ZSE identification plate	Labelling of the strain relief

### 2.5 Accessories



**Fig. 8:** Accessories

- ① FBS-PH cartridge pistol for PYROSIT® NG fire protection foam  
Alternatively: FBS-PA cartridge pistol, battery-powered
- ② FBS-M mixing tube set for PYROSIT® NG fire protection foam

## 3 Approved installations and installation locations

### 3.1 General information

Cable installations must be performed according to the valid certificates.

### 3.2 Approved installations

The ZSE90 strain relief is approved for cable systems with integrated maintenance of electrical function according to DIN 4102 Part 12 when standard support structures are used with vertical cable routing. Cables with integrated maintenance of electrical function are permitted in the cable systems, as are all types of vertical ladder and single steel clips, which route cables vertically.

### 3.3 Fastening substrate

The bolt ties contained in the scope of delivery are suitable for concrete, as well as masonry made of solid calcareous limestone brick, porous calcareous limestone brick or full brick. For fastenings on other substrates, anchors must be used which are suitable for the substrate and which have been tested for fire protection.

## 4 Mounting the product

The housing of the strain relief is fastened in the area of the clamp or cable spacer clips. Then, it is filled with filling material and, depending on the housing type, sealed with fire protection filler.

The housing of the strain relief can be fastened as follows:

- Directly on the wall with fire-tested bolt ties
- With slide nuts on profile rails and vertical ladder rungs
- On suspended vertical ladders on the vertical ladder rail with back plate and lock plates

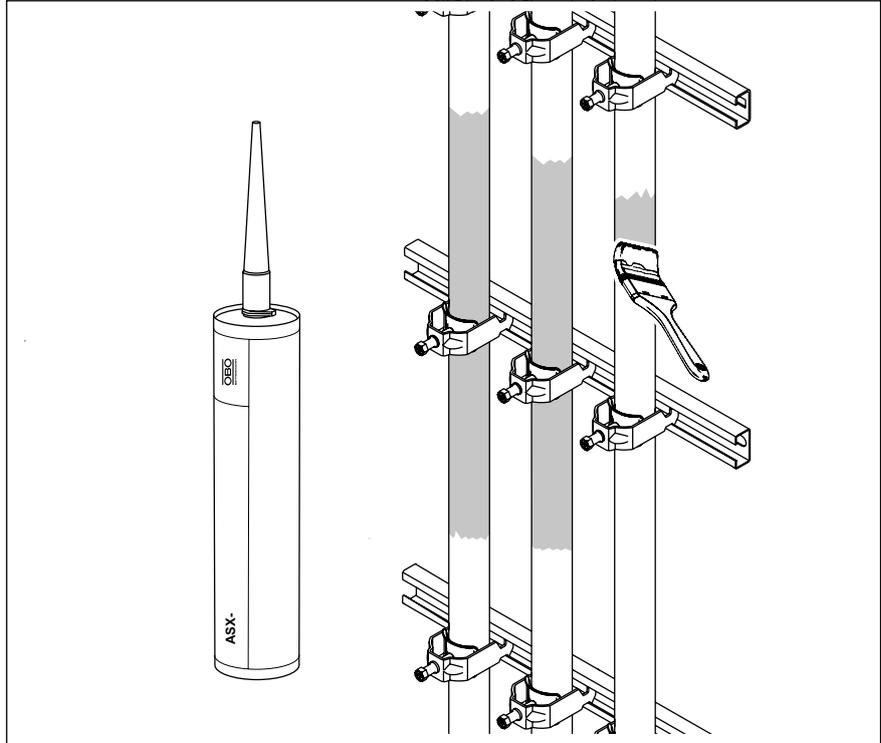
Possible fastening points for the housing, depending on the type of strain relief and type and scope of the cable installation:

Type	Cable installation	Housing fastening
Type ZSE90-...	<ul style="list-style-type: none"> <li>- Direct wall mounting with cable spacer clips</li> <li>- With profile rails and clamp clips</li> <li>- With vertical ladders and clamp clips</li> </ul>	<ul style="list-style-type: none"> <li>- Directly on the wall</li> <li>- On profile rails</li> <li>- On vertical ladder rungs</li> </ul>
Type ZSE90-... L	<ul style="list-style-type: none"> <li>- Direct wall mounting with cable spacer clips</li> <li>- With profile rails and clamp clips</li> <li>- With vertical ladders and clamp clips</li> </ul>	<ul style="list-style-type: none"> <li>- Directly on the wall</li> <li>- On profile rails</li> <li>- On vertical ladder rungs</li> </ul>
Type ZSE90-... LH	<ul style="list-style-type: none"> <li>- With clamp clips on suspended vertical ladder</li> </ul>	<ul style="list-style-type: none"> <li>- On vertical ladder rails</li> </ul>

### 4.1 Preparing cables for ZSE90-...

To provide the cables with additional insulation, they are coated with ASX fire protection filler in the area of the strain relief.

**Note!** *The coating of the cables with fire protection filler is only necessary with the ZSE90-... strain relief.*



**Fig. 9:** Coating cables with fire protection filler

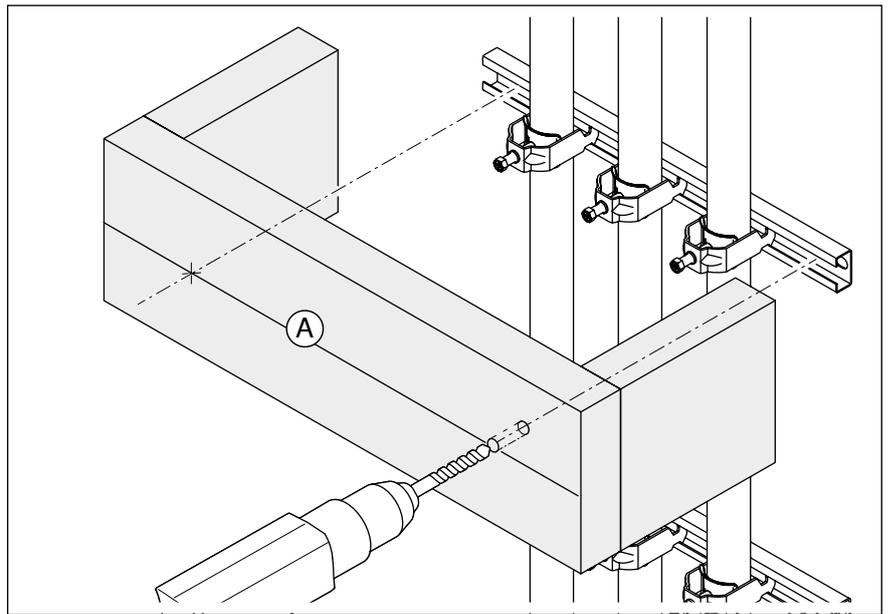
1. Stir the fire protection filler, if necessary with water, until it reaches a spreadable consistency.
2. Coat the cables with filler in the area of the housing height.

## 4.2 Preparing the housing for ZSE90-.../ZSE90-...L

To avoid tearing or cracking of the housing, it must be pre-drilled for direct wall fastening and mounting on the profile rail or vertical ladder rung.

**Note!** *The predrilling of the housing is only necessary with the ZSE90-... and ZSE90-...L strain reliefs.*

**Note!** *The fastening points for slide nuts in the profile rail or vertical ladder rung are not pre-marked. Slide nuts are positioned in those points where there is space. However, we recommend positioning the slide nuts as close to the outside as possible. If this is not possible due to cable assignment, mount the housing on the wall. Then, drill the fastening points directly to the right and left beside the profile rail or the vertical ladder rails.*



**Fig. 10:** Pre-drilling the housing

1. Measure the spacing between fastening points.
2. Apply the drilling spacing to the marked line (A) on the housing.
3. Pre-drill the drill holes with  $\varnothing$  9–10 mm in the housing.

### 4.3 Fastening the housing on the wall



#### Function loss!

The strain relief function can be restricted if the housing is not positioned centrally over cable spacer clips, profile rails or vertical ladder rungs. Drill the drill holes in the wall in a line with cable spacer clips, profile rails or vertical ladder rungs.

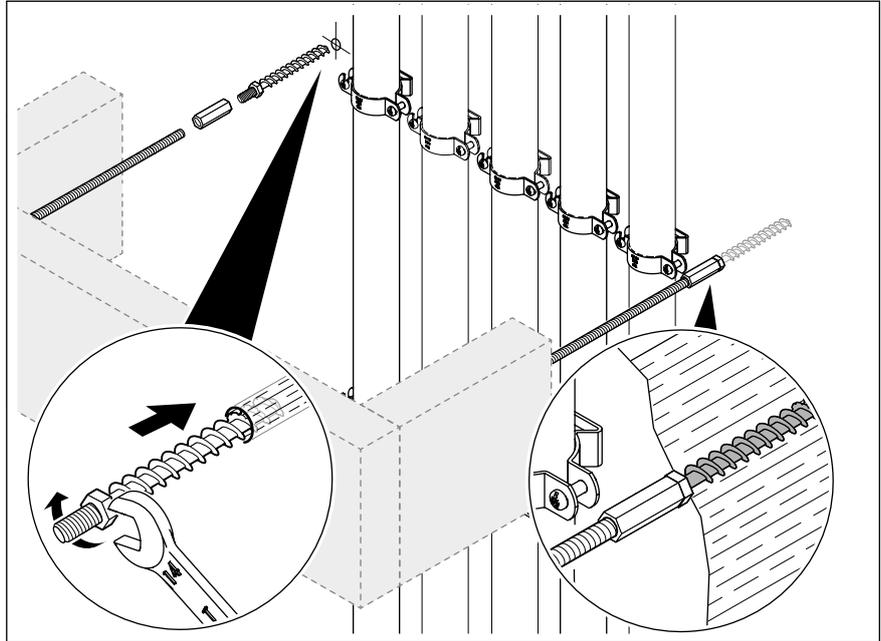
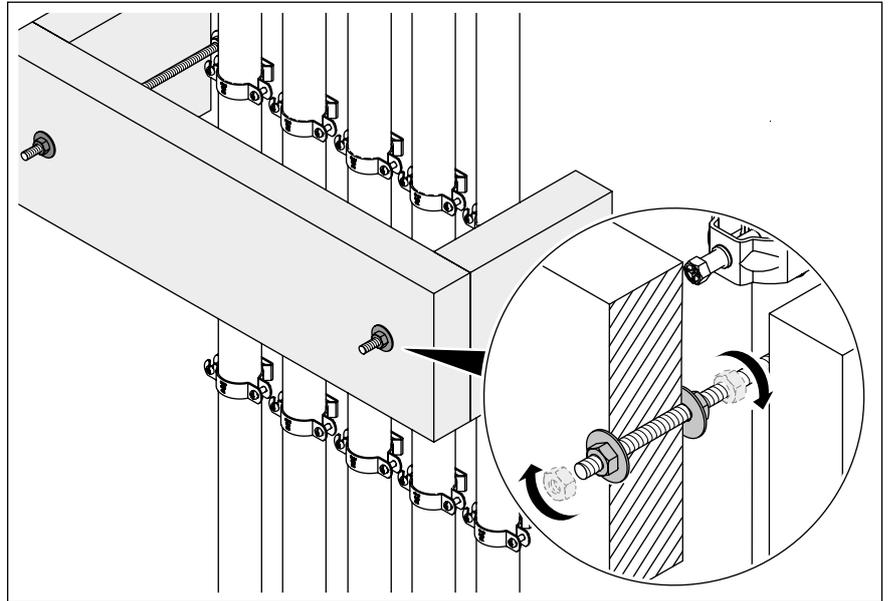


Fig. 11: Fastening threaded rods on the wall

1. Apply the drilling spacing to the wall.
2. Drill anchor holes of a 6 mm diameter and drill hole depth  $\geq 65$  mm.
3. Turn in the bolt ties.
4. Screw the connection sleeves to the bolt ties.
5. Screw the threaded rods into the connection sleeves.

**ATTENTION****Risk of breakage on the housing!**

The housing may break due to excessive pressure of the fastening material. When mounting the housing, always mount washers on the inner side and hexagonal nuts as spacers to the wall, before fastening the housing.

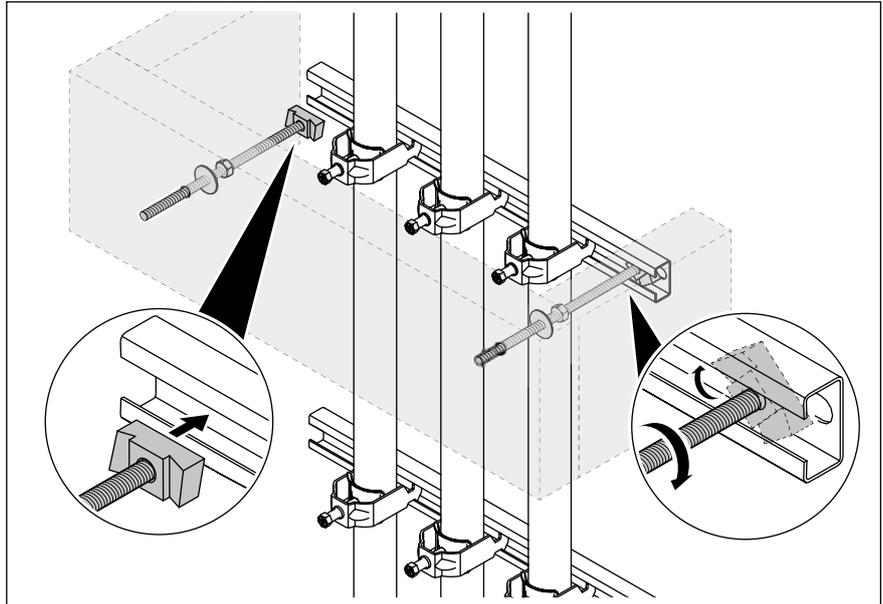


**Fig. 12:** Fastening the housing on threaded rods

6. Screw one nut and washer to threaded rods.
7. Attach the housing to the threaded rods and push it against the wall.
8. Lock washers and nuts against the inner side of the housing as spacers.
9. Lock washers and nuts against the outer side of the housing.

#### 4.4 Fastening the housing to a profile rail or vertical ladder rung

The housing can be fastened directly on the profile rail or the vertical ladder rung, when sufficient space is available. The threaded rods are then locked with slide nuts.

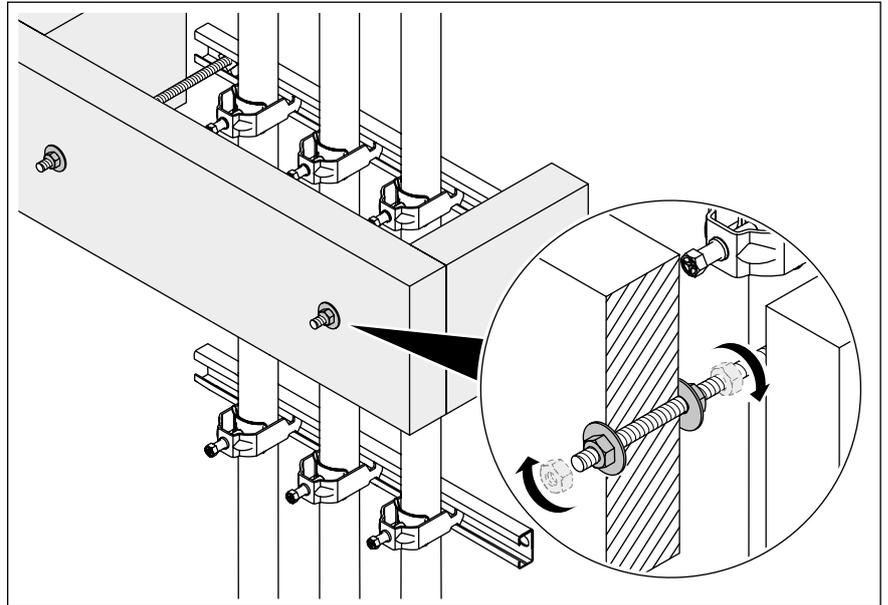


**Fig. 13:** Fastening threaded rods using slide nuts

1. Screw threaded rods in slide nuts.
2. Screw nuts and washers on the threaded rods.
3. Guide the slide nuts with threaded rods into the profile rail.
4. Turn the threaded rods until the slide nuts engage in the profile rail.

**ATTENTION****Risk of breakage on the housing!**

The housing may break due to excessive pressure of the fastening material. When mounting the housing, always mount washers on the inner side and hexagonal nuts as spacers to the wall, before fastening the housing.



**Fig. 14:** Fastening the housing on threaded rods

5. Attach the housing to the threaded rods and push it against the wall.
6. If necessary, adjust the threaded rod spacing.
7. Lock washers and nuts against the inner side of the housing as spacers.
8. Lock washers and nuts against the outer side of the housing.

## 4.5 Fastening the housing to a suspended vertical ladder

The housing is fastened to the vertical ladder with the back plate and lock plates.



### Function loss!

The strain relief function can be restricted if the housing is not positioned centrally over the vertical ladder rung.

During mounting on the vertical ladder rail, position the drill holes of the housing above and below the vertical ladder rung.

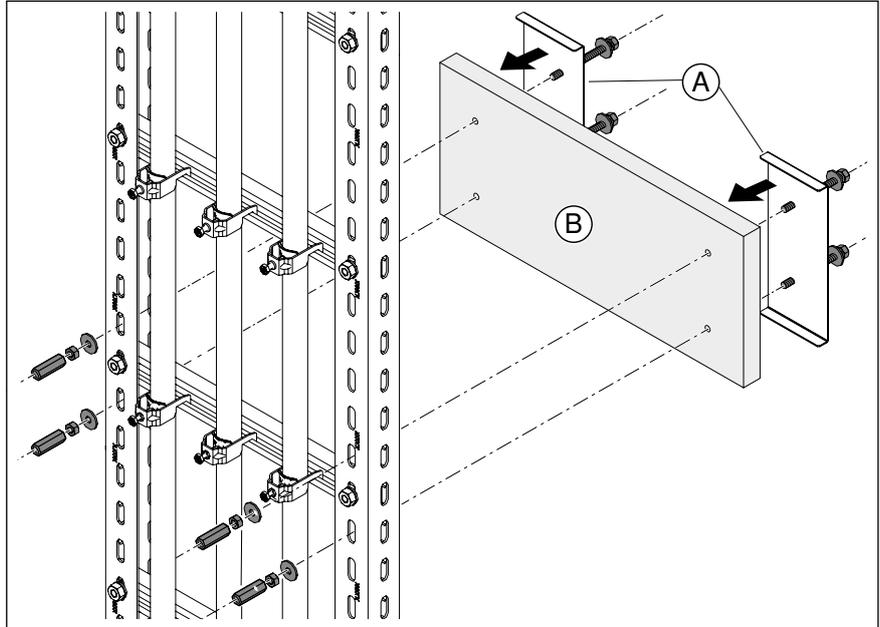


Fig. 15: Connecting the back plate to lock plates

1. Set the lock plates (A) on the rear plate (B).
2. Place the washers on hexagonal bolts.
3. Push the hexagonal bolts through the lock plates and back plate.

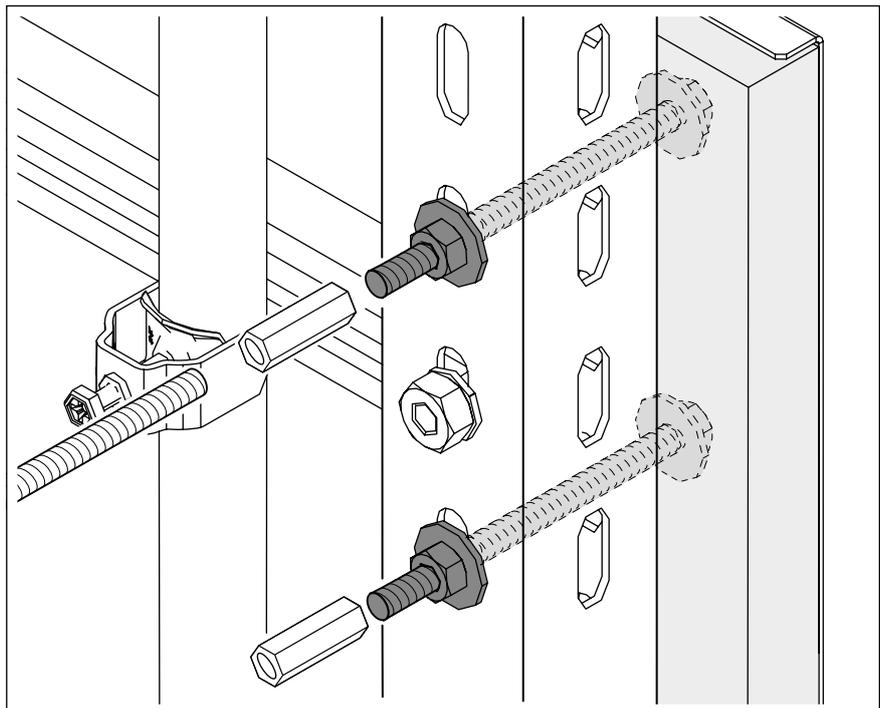


Fig. 16: Fastening the back plate to vertical ladder rails with lock plates

4. Fasten the back plate and lock plates to vertical ladder rails with washers and nuts.
5. Screw the connection sleeves to the hexagonal bolts.

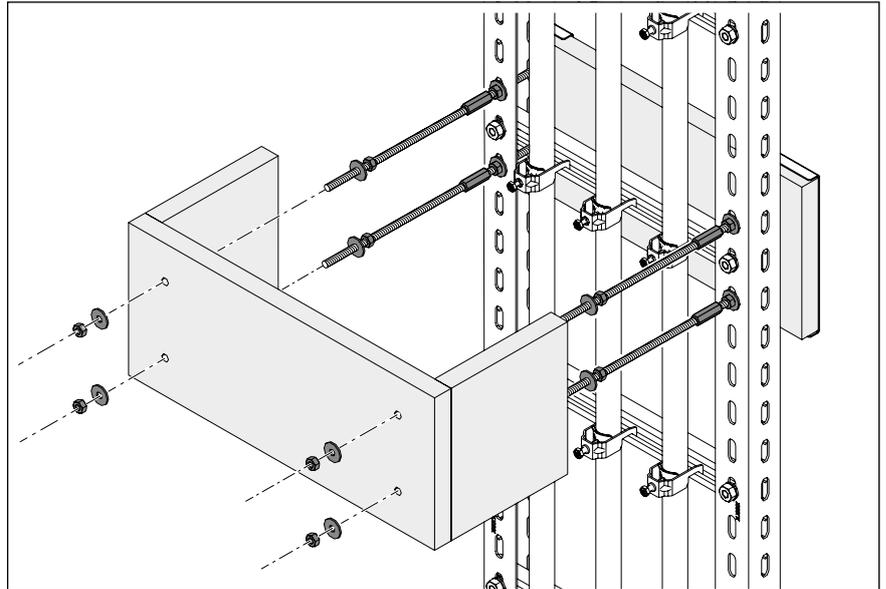


Fig. 17: Arranging the fastening material

6. Screw the threaded rods into the connection sleeves.
7. Screw nuts and washers on the threaded rods.
8. Attach the housing to the threaded rods and push it against the back plate.

**ATTENTION**

**Risk of breakage on the housing!**

The housing may break due to excessive pressure of the fastening material. When mounting the housing, always mount washers on the inner side and hexagonal nuts as spacers to the wall, before fastening the housing.

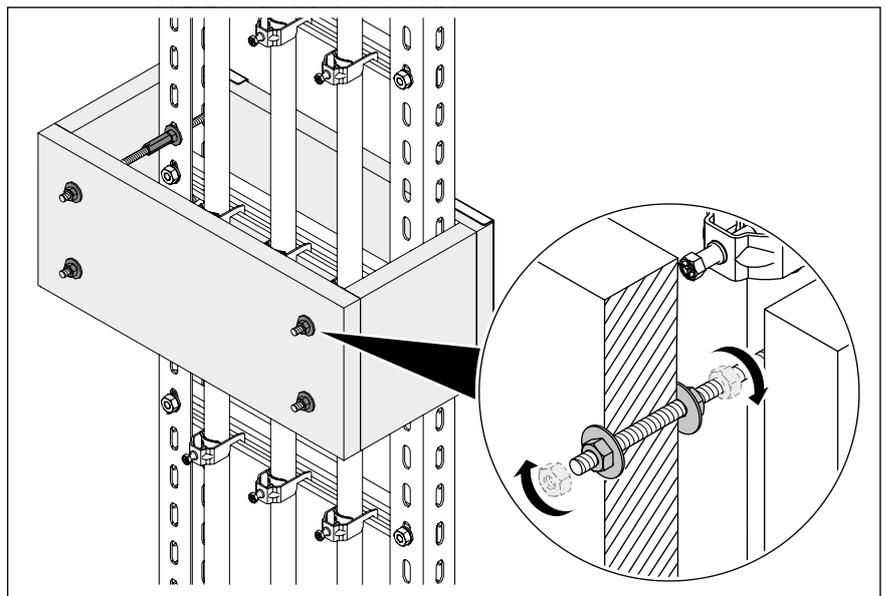


Fig. 18: Housing fastened on threaded rods

9. Lock washers and nuts against the inner side of the housing as spacers.
10. Lock washers and nuts against the outer side of the housing.

### 4.6 Filling the housing with mineral fibre plates

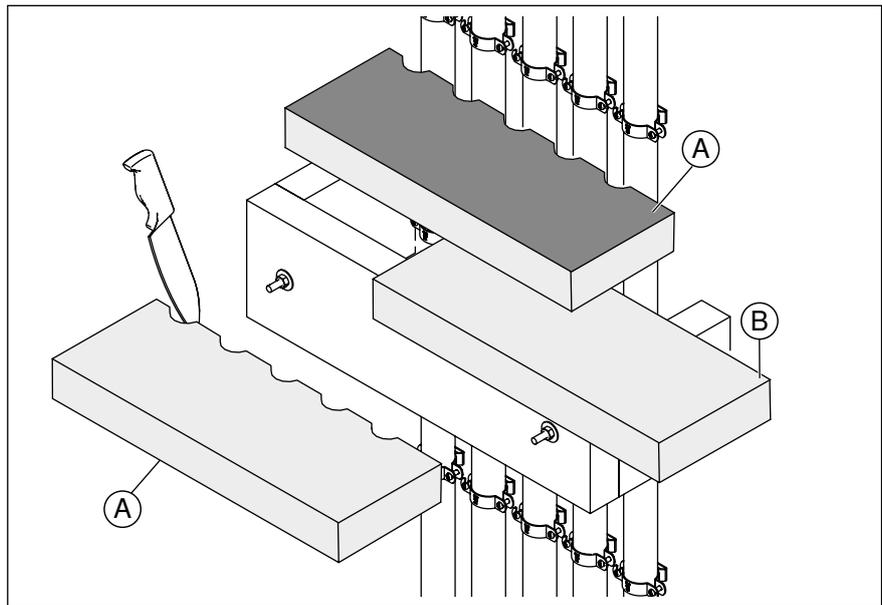
Suitable for type ZSE90-25-11, ZSE90-35-11, ZSE90-45-11, ZSE90-25-17, ZSE90-35-17, ZSE90-45-17, ZSE90-55-17, ZSE90-65-17



#### Function loss!

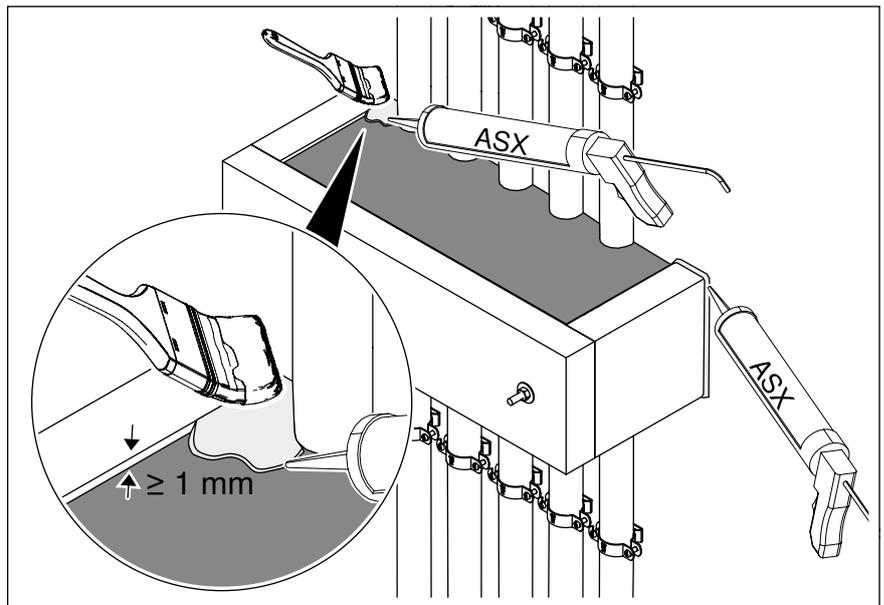
If improperly filled, the strain relief function can be impaired. Maintenance of electrical function is not then guaranteed. Fill the housing fully with filling material. Seal cavities and residual joints on the top and bottom side before coating.

The housings of the types listed above must be filled with the supplied pre-coated and uncoated mineral fibre plates. Residual joints must be filled with ASX fire protection filler.



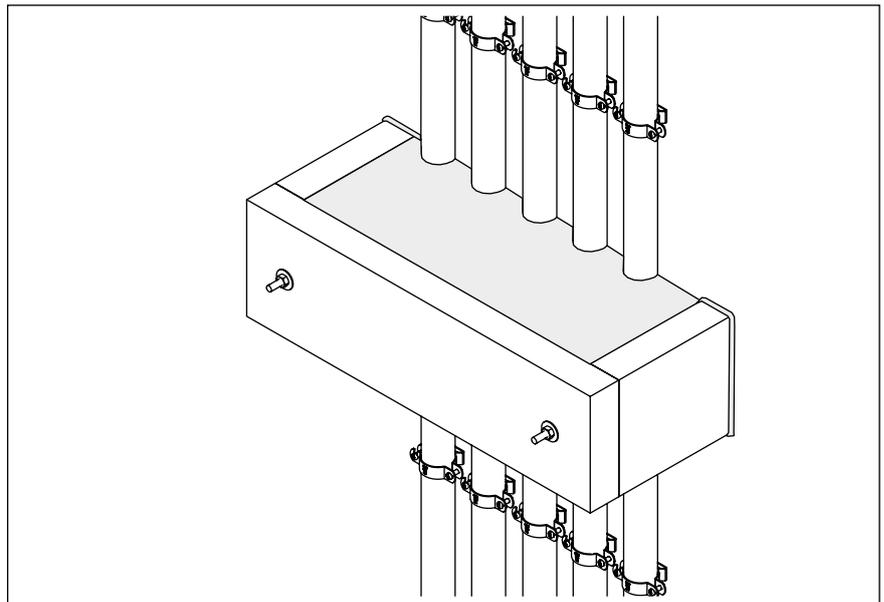
**Fig. 19:** Filling the housing

1. Cut the mineral fibre plates using a knife.
2. Lay the first coated mineral fibre plate in the housing so that the pre-coated side (A) points outward.
3. As a middle layer, insert the uncoated mineral fibre plate (B).
4. Plug the spaces between the cables with the uncoated mineral fibre plate.
5. Insert the second coated mineral fibre plate.
6. Plug the spaces between the cables with the uncoated mineral fibre plate.



**Fig. 20:** Sealing with fire protection filler

7. Seal the residual gaps and wall connections with ASX fire protection filler.
8. Completely seal the top and bottom sides of the filling with ASX fire protection filler to a thickness of  $\geq 1$  mm. If necessary, press the filler out of the cartridge and stir with water until it can be spread.



**Fig. 21:** Fully mounted strain relief

## 4.7 Filling the housing with foam blocks and/or fire protection foam

Suitable for type ZSE90-25-11 L, ZSE90-35-11 L, ZSE90-45-11 L, ZSE90-25-17 L, ZSE90-35-17 L, ZSE90-45-17 L, ZSE90-55-17 L, ZSE90-65-17 L, ZSE90-21-17 LH, ZSE90-31-17 LH, ZSE90-41-17 LH, ZSE90-51-17 LH, ZSE90-61-17 LH



**CAUTION**

### Function loss!

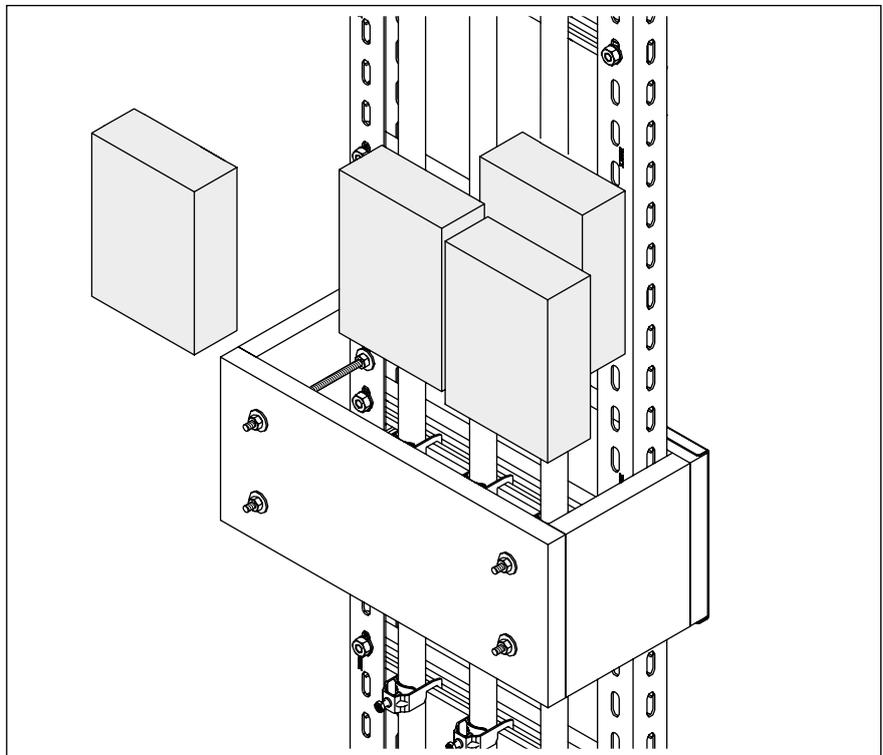
If improperly filled, the strain relief function can be impaired. Maintenance of electrical function is not then guaranteed. Fill the housing fully with filling material. Seal cavities and residual joints on the top and bottom side.

The housing on the suspended vertical ladder as well as the housing directly fastened to the wall can be filled with PYROPLUG® Block FBA-B200-14 foam blocks and PYROSIT® NG fire protection foam. Spaces with low or no assignment are filled with foam blocks. Residual joints between the foam blocks must be filled with FSB-SP fire protection filler. The remaining spaces are filled with fire protection foam. The housing can also be filled completely with fire protection foam.

In the following, it is shown how the housing on the suspended vertical ladder is filled. The housing directly fastened to the wall is filled in the same way with foam blocks and/or fire protection foam.

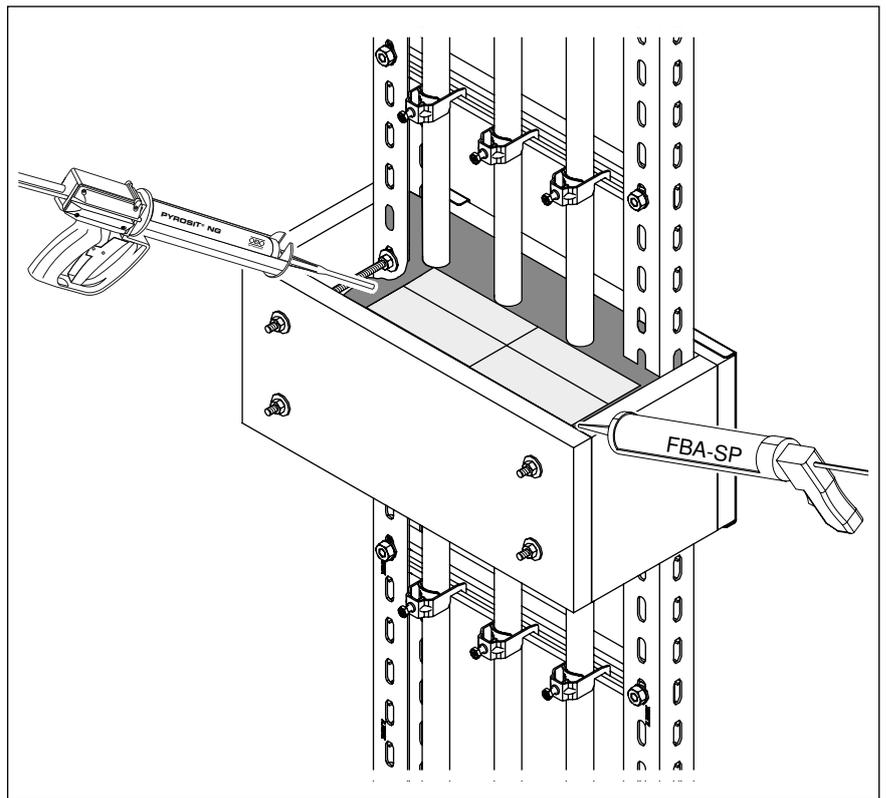
**Note!** *To prevent the foam blocks from falling out or to prevent the fire protection foam from expanding too far, the housing can first be sealed from below, e.g. with adhesive tape. After mounting, adhesive tape or similar aids must be removed again.*

### Variant A: Filling with foam blocks and fire protection foam



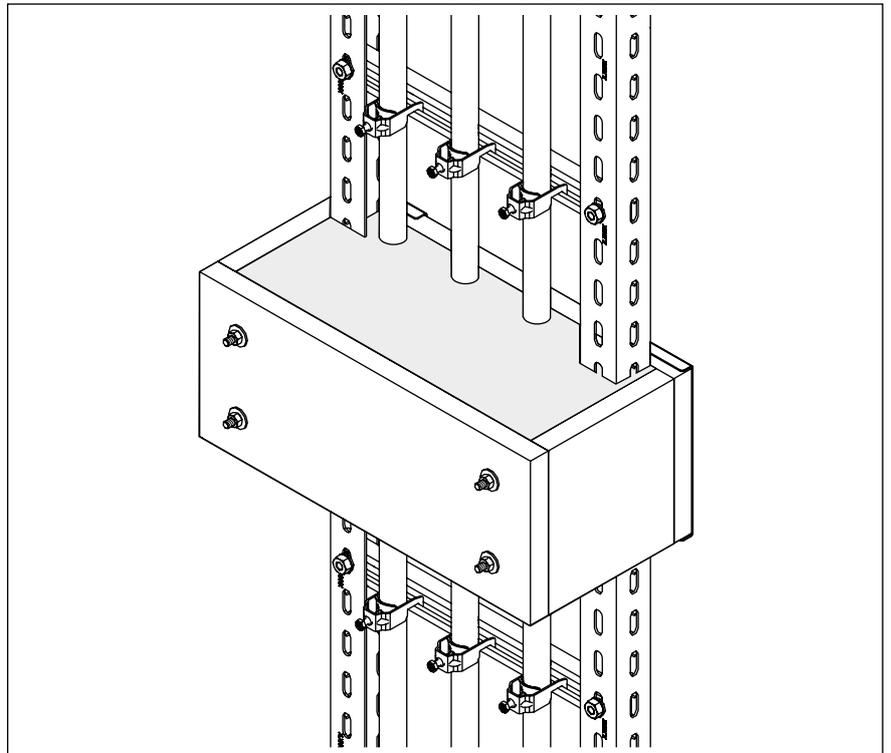
**Fig. 22:** Filling the housing with foam blocks

1. Place the foam blocks vertically in the housing.



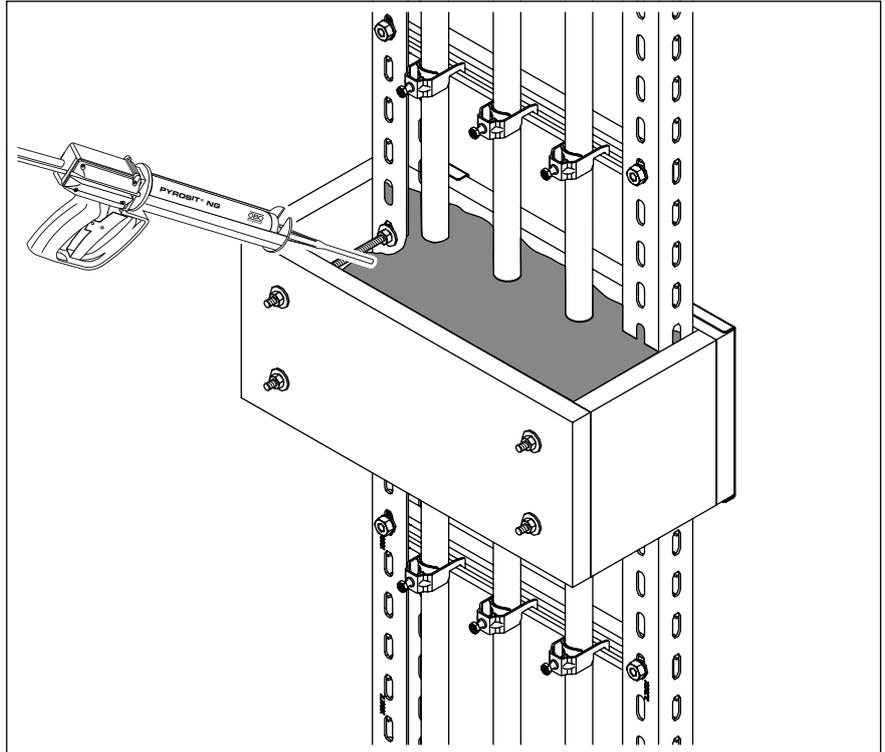
**Fig. 23:** Applying fire protection foam.

2. Fill residual cavities with fire protection foams.
3. Seal residual joints between the foam blocks with fire protection filler.



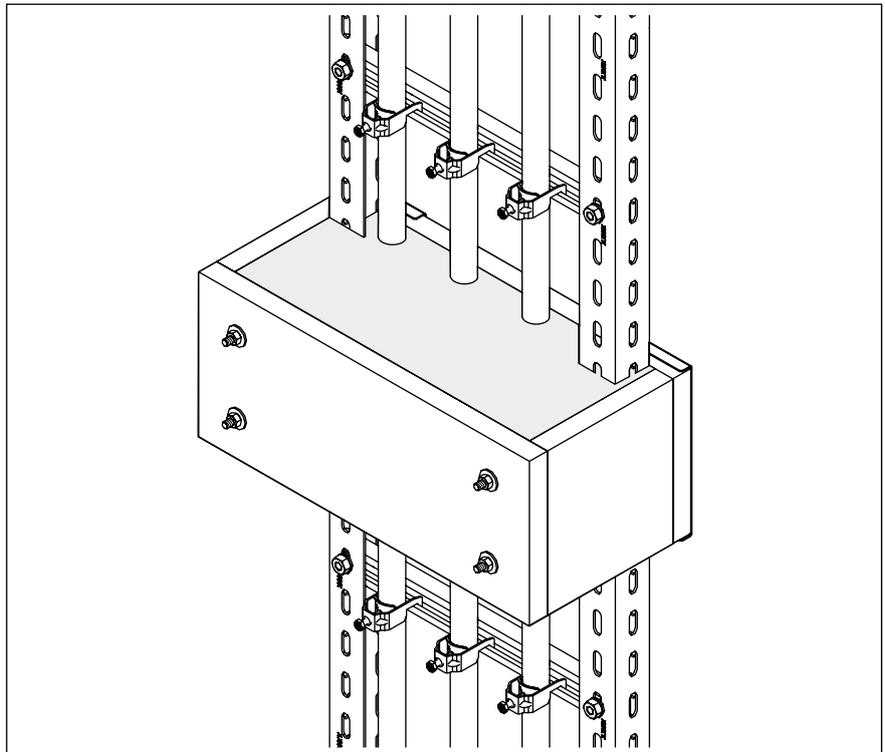
**Fig. 24:** Fully mounted strain relief on suspended vertical ladder

**Variant B: Filling with fire protection foam**



**Fig. 25:** Filling the housing with fire protection foam

1. Fill the housing with fire protection foam.



**Fig. 26:** Fully mounted strain relief on suspended vertical ladder

## 4.8 Mounting identification plates

The strain relief must be labelled with a KS-ZSE identification plate. On the identification plate, the system and the function maintenance classes are stated. In addition, the executing company, the certificate number of the surveyor's report and the year of installation must be entered.

### Mounting on the wall

1. Clearly fill out the identification plate with permanent marker.
2. Mount the identification plate on the wall next to the strain relief.

### Mounting with suspended strain relief on the housing

1. Clearly fill out the identification plate with permanent marker.
2. Using one screw, mount the identification plate on the ladder rail directly above or below the strain relief.

Alternatively:

1. Clearly fill out the identification plate with permanent marker.
2. Using cable ties, fasten the identification plate to the ladder rail, a cable or a clip.

## 4.9 Other national requirements

Outside Germany, the country-specific requirements according to the national construction law must be complied with.

### 5 Maintaining the product

The strain relief ZSE90 requires no maintenance. Nonetheless, we recommend carrying out a visual inspection of the strain relief at regular intervals, as part of the inspection of the electrical systems. Rework damage according to the original structure.

#### Disposing of the product

Comply with the local waste disposal regulations.

##### Disposal during mounting

- Residual material (also with coating): As household waste
- Packaging: As household waste

##### Disposal during building demolition

As rubble.

##### Disposal after a fire



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##### Caution: Irritant effect!

If there is a fire, burning cable insulation can create corrosive gases, which have an irritant and corrosive effect. When disposing of system components which have been subjected to a fire, wear breathing protection and protective clothing.

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If the system was subjected to fire damage, then the complete system must be removed and disposed of. We recommend obtaining the advice of the local fire damage restorer during disposal.

## 6 Technical data

### 6.1 System components

#### ZSE90-...

Strain relief internal height 115 mm	H/W/D External dimensions [mm]	w/d Internal dimensions [mm]	Article number
ZSE90-25-11	140/340/160	250/115	7215702
ZSE90-35-11	140/440/160	350/115	7215706
ZSE90-45-11	160/530/160	450/115	7215709

Strain relief internal height 175 mm	H/W/D External dimensions [mm]	w/d Internal dimensions [mm]	Article number
ZSE90-25-17	160/340/220	250/175	7215713
ZSE90-35-17	160/440/220	350/175	7215716
ZSE90-45-17	160/540/220	450/175	7215719
ZSE90-55-17	160/640/220	550/175	7215726
ZSE90-65-17	160/740/220	650/175	7215730

The scope of delivery comprises the housing, filling material (mineral fibre plates), ASX ablation coating, identification plate and fastening material.

#### ZSE90-...L

Strain relief internal height 115 mm	H/W/D External dimensions [mm]	w/d Internal dimensions [mm]	Article number
ZSE90-25-11 L	200/300/140	250/115	7215760
ZSE90-35-11 L	200/400/140	350/115	7215762
ZSE90-45-11 L	200/500/140	450/115	7215764

Strain relief internal height 175 mm	H/W/D External dimensions [mm]	w/d Internal dimensions [mm]	Article number
ZSE90-25-17 L	200/300/200	250/175	7215766
ZSE90-35-17 L	200/400/200	350/175	7215768
ZSE90-45-17 L	200/500/200	450/175	7215770
ZSE90-55-17 L	200/600/200	550/175	7215772
ZSE90-65-17 L	200/700/200	650/175	7215774

The scope of delivery comprises the housing, identification plate and fastening material.

### ZSE90-...LH

Strain relief internal height 175 mm	H/W/D External dimensions [mm]	w/d Internal dimensi- ons [mm]	Article number
ZSE90-21-17 LH	200/260/225	250/175	7215780
ZSE90-31-17 LH	200/360/225	350/175	7215782
ZSE90-41-17 LH	200/460/225	450/175	7215784
ZSE90-51-17 LH	200/560/225	550/175	7215786
ZSE90-61-17 LH	200/660/225	650/175	7125788

The scope of delivery comprises the housing with back plate and 2 lock plates, identification plate and fastening material.

## 6.2 Accessories

Article	Type	Article number	Packaging unit
Ablation coating	ASX	7203210	1
PYROSIT® NG fire protection foam cartridge	FBS-S	7203800	1
Cartridge pistol for fire protection foam	FBS-PH	7203806	1
Battery-powered cartridge pistol for fire protection foam	FBS-PA	7203813	1
Mixer pipe set	FBS-M	7203803	1
PYROPLUG® Block foam block	FBA-B200-14	7202505	4
PYROPLUG® Screed fire protection filler	FBA-SP	7202322	1
Identification plate for strain relief	KS-ZSE DE	7215750	1





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