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TO FUTURE.

Cable ladders

Assembly instructions

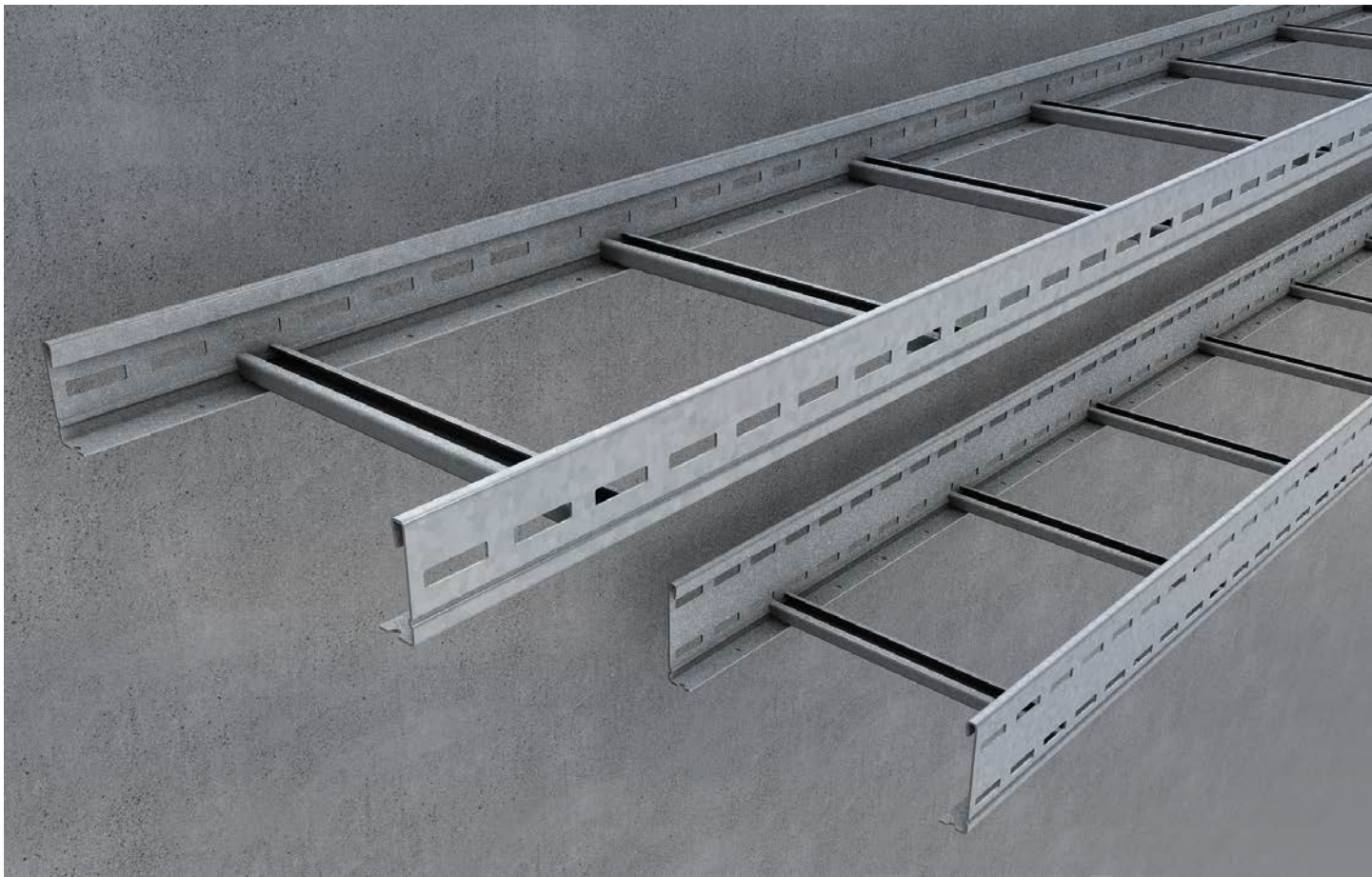


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General notes

Cable ladders are used to bridge medium to high mounting distances. They are suitable for power cables or cables without deflection. The support structures must be planned by engineers.

The following general instructions must be observed before starting installation:

1. The permissible torque must be observed for all screw connections. (see Tab.: „Selection of screw tightening torques“).
2. The following applies to all fittings, changes of direction or open ends: The maximum distance of 300 mm between the end of the fitting and support must be observed. (see fig. 1)
3. Carry out cutting and separating work with the utmost care and in compliance with occupational health and safety. (see fig. 2)
4. All cutting and separating points must be galvanised on site after deburring. Cold zinc paint (KZF)/ cold zinc spray (KZS) can be used to repair cut edges or defects for strip/pre-galvanised material (version S). Only KZF may be used for the final/piece galvanised version (version F).
5. Joints must be adequately bolted. Ladders with a side rail height of 60 mm must be bolted once and ladders with a side rail height of 100 mm must be bolted twice per connector end.
6. In the case of high temperature fluctuations, a fixed and sliding bearing must be taken into account in the butt joint. (see fig. 3)

Recommended tightening torques

Nominal thread diameter	Property class Screw GV/F (DIN EN ISO 898-1)	Tightening torque acc. to VDI 2230 Nm	Property class Screw E/E4 (DIN EN ISO 3506-1)	Tightening torque acc. to VDI 2230 Nm
M6	4.6	**3.7**	50	**4.6**
M8	4.6	**9.1**	50	**11.2**
M10	4.6	**18.3**	50	**22.2**
M12	4.6	**31.0**	50	**38.0**
M6	8.8	**10.1**	70	**10.0**
M8	8.8	**24.6**	70	**24.1**
M10	8.8	**48.0**	70	**47.7**
M12	8.8	**84.0**	70	**82.0**



Wear safety goggles



Wear ear protection



Observe the tightening torque for fasteners

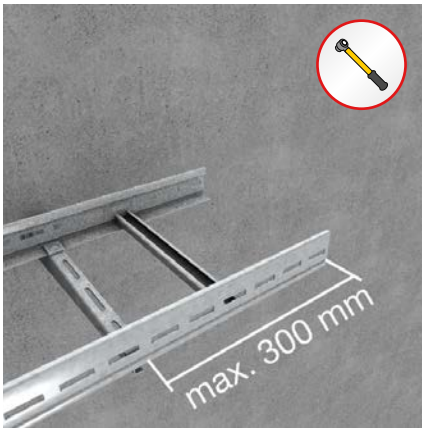


Fig. 1: Support distance to the end of the cable ladder (max. 300 mm)



Fig. 2: Observe occupational safety measures during cutting and separating work

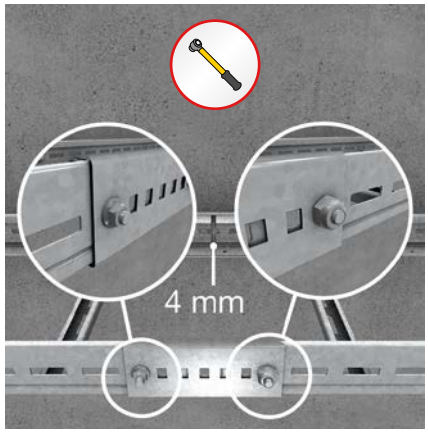


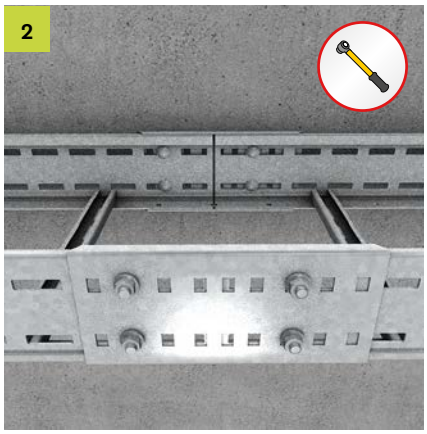
Fig. 3: left: Fixed bearing (KLS 8x16); right: sliding bearing (FRSV, SEMSS); Gap dimension 4 mm, tightening torque hand-tight (max. 4 Nm).

Connector assembly

Connection of the cable ladder sides



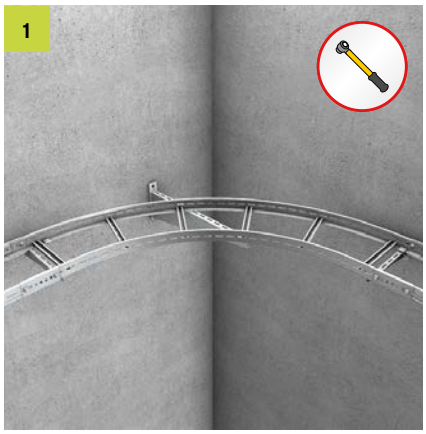
Ladder connector (LGV)
Push the LGV from the outside onto the side rail of the cable ladder and screw it with the clamp fastening (KLS 8x16) for each side rail. Insert the connecting ladder and screw it to the LGV.



LGV 60 are screwed together once with clamping screw (KLS 8x16) per side rail and LGV 100 are screwed together twice (top and bottom) with clamping screw (KLS 8x16) per side rail.

Horizontal change of direction

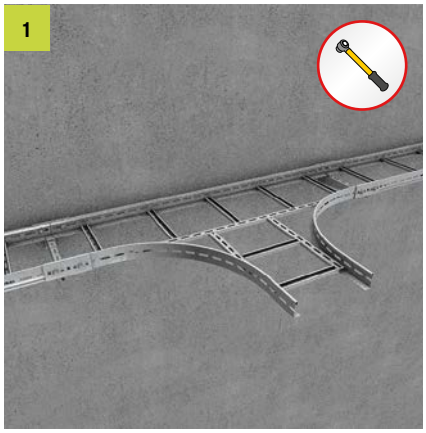
With standard fittings



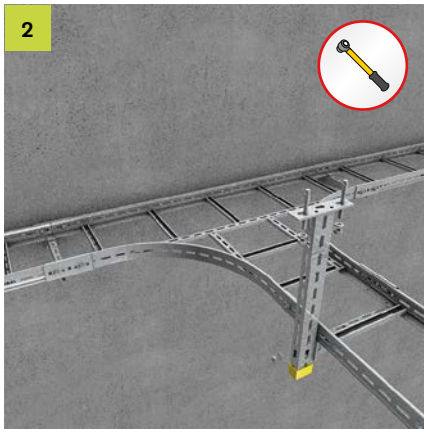
Horizontal bend (LGAB/LGIB)
Mount the ladder connector (LGV) (see picture ladder connector). Push in LGAB/LGIB and screw together with LGV.



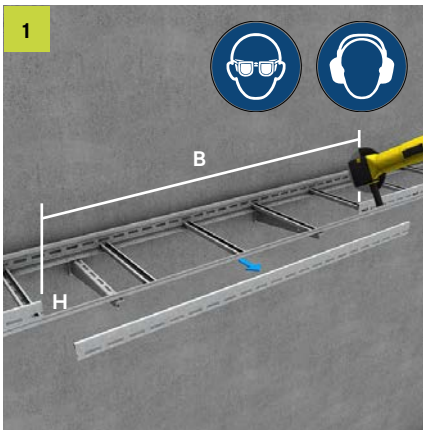
Screw the LGV to the free end of the horizontal bend with the clamp fastening (KLS 8x16), insert the connecting ladder and screw it to the LGV.



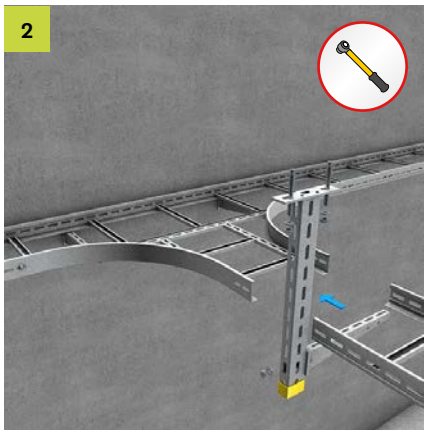
Ladder branch (LGA)
Mount the ladder connector (LGV). Insert the LGA and screw it to the ladder connector (LGV).



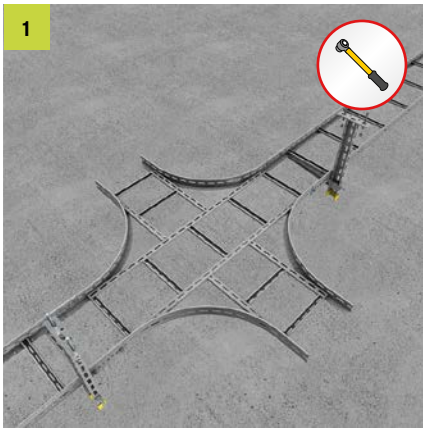
Screw the LGV to the free end of the branch with the clamp fastening (KLS 8x16), insert the connecting ladders and screw them to the LGV.



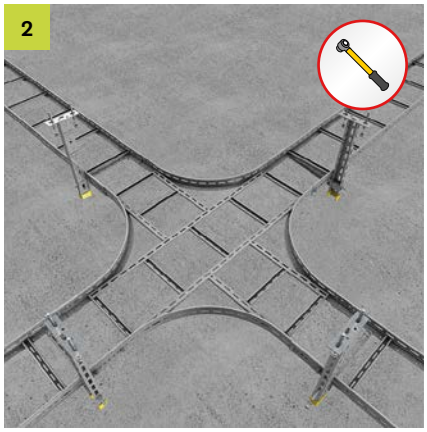
Ladder attachment branch (LGAA)
Cut out the side rail of the cable ladder in a width B = width of connecting cable ladder + 800 mm to dimension H (LGAA 60 = 40.5 mm; LGAA 100 = 80.5 mm), deburr and cold galvanise.



Attach the LGAA and secure it to each side rail with one bolted connection. Insert the connecting ladder into the LGAA and screw it together like the ladder connector (LGV).



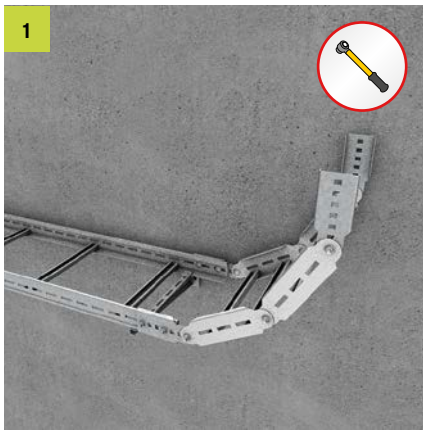
Ladder crossing (LGK)
Mount the ladder connector (LGV). Insert the LGK and screw it to the LGV.



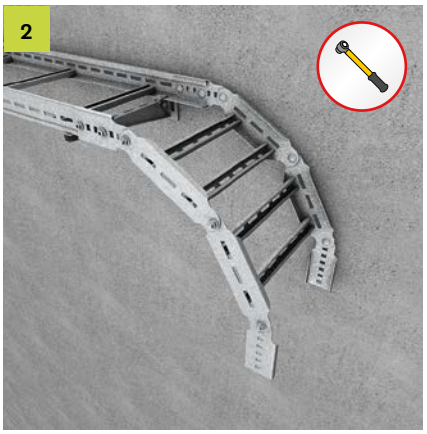
Screw the LGV to the free end of the crossing with the clamp fastening (KLS 8x16), insert the connecting ladders and screw them to the LGV.

Vertical change of direction

With standard fittings

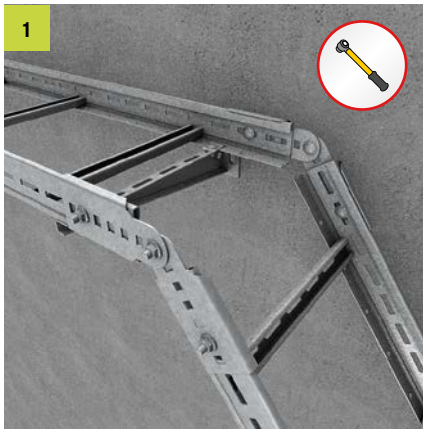


Riser or drop section with vertical bend (LGVB)
Insert LGVB into cable ladder, adjust desired change of direction and screw together like ladder connector (LGV).

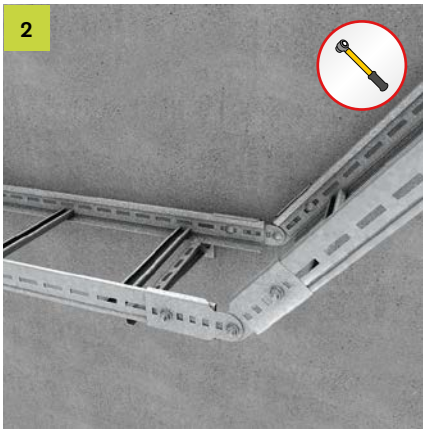


Insert the connecting cable ladder into the end of the fitting and screw it together like the LGV.

Without standard fittings



Vertical change of direction with vertical connector (LGVV)
For vertical changes of direction without fitting, push LGVV from the outside onto the side rail of the cable ladder



and screw it with the clamp fastening (KLS 8x16) per side rail. Adjust the vertical connector to the angle. Insert the connecting ladder and screw it to the LGVV.

Accessory installation



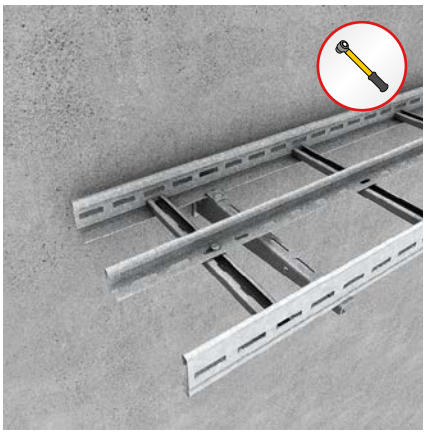
Fastening cable ladder LGG to bracket with clamp fastening (KLU)
Screw the cable ladder with KLU twice onto the bracket.



Clamp fastening (KLUT)
Screw the KLUT for cable ladders to the steel body from below. Applies only for securing the position.



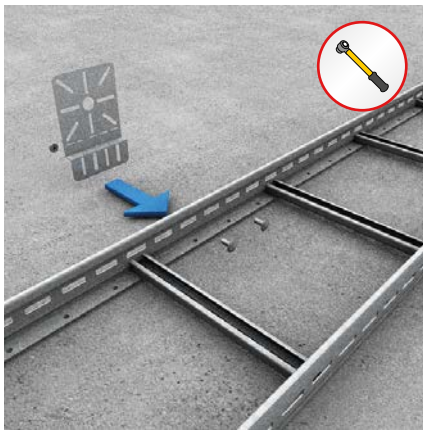
Ladder drop-out plate (LGKAB)
Place the LGKAB on the desired rung and screw it twice to the rung with a channel nut (AM16 M6) and slotted cylinder head screw (FKS 6x10).



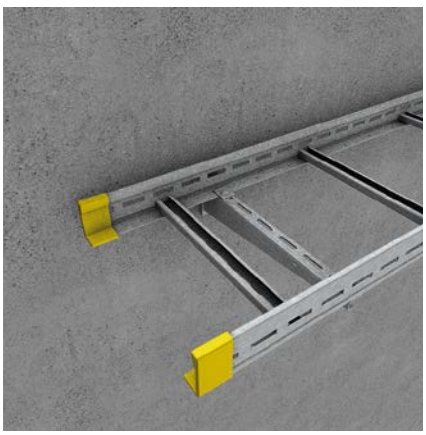
Ladder divider (LGTR)
Screw LGTR three times with channel nut (AM16 M6) and slotted cylinder head screw (FKS 6x10) to rung (first rung from both partition ends as well as centrally).



Ladder divider, variable (LGTRV)
Assembly analogous to LGTR. The angle can be freely selected in fittings due to the separating web segments.



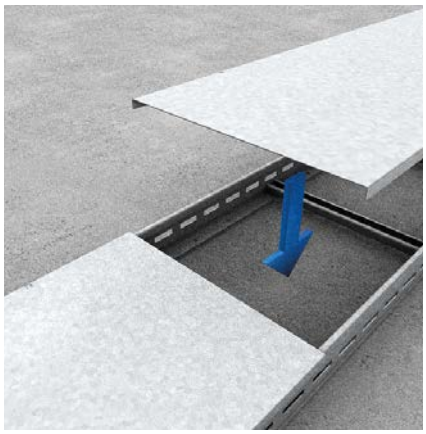
Mounting plate (MP-L)
Screw MP-L for electrical component to the side rail of the cable ladder twice.



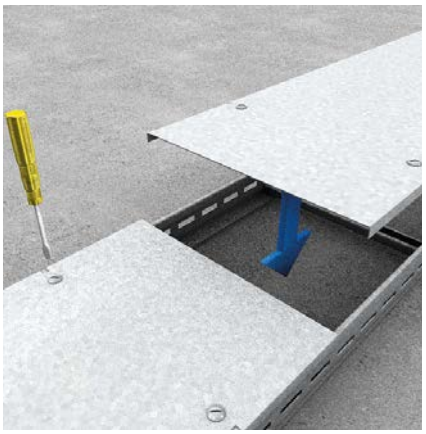
Protection cap (SL)
Depending on the situation, slide the SL onto the side rail.

Cover assembly

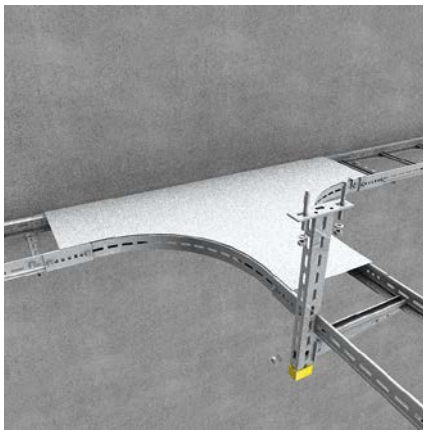
Cover fixation in the interior



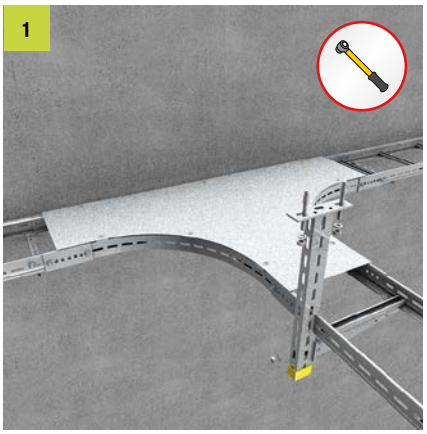
Ladder cover (LD)
Place LD on the cable ladder side rail. Only approved for indoor use!



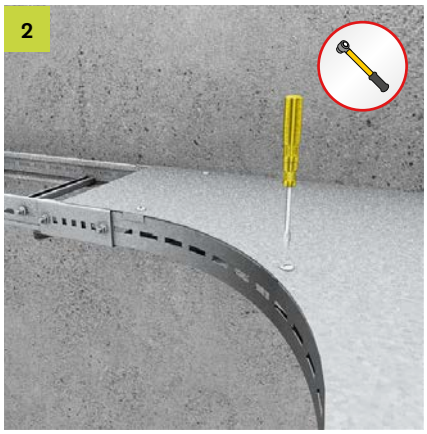
Ladder cover with turning bolt (LDR)
LDR is mounted in the same way as the ladder cover (LD). In addition, tighten the turning bolt with a screwdriver until the screw head slot points lengthwise to the side rail. Only approved for indoor use!



Fitting cover, e.g. ladder branch cover (LAD)
Place LAD on the ladder branch side rail (LGA). Only approved for indoor use!

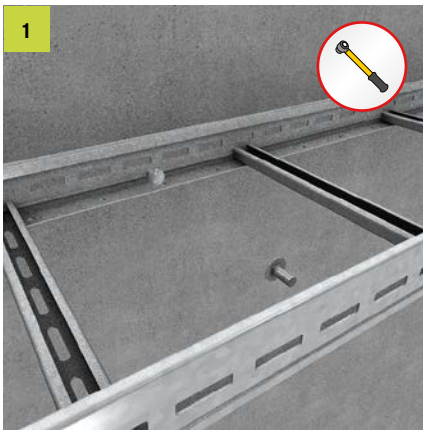


Fitting cover, e.g. ladder branch cover with turning bolt (LADR).
LADR is mounted in the same way as the ladder branch cover (LAD).

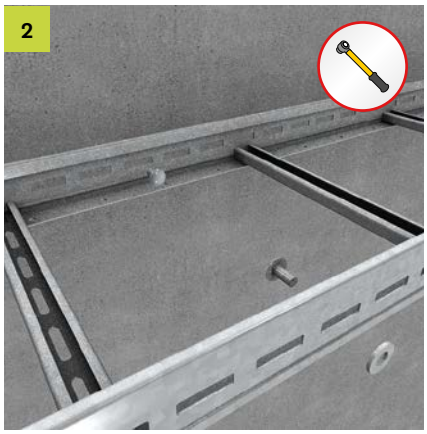


In addition, tighten the turning bolt with a screwdriver until the screw head slot points lengthwise to the side rail. Only approved for indoor use!

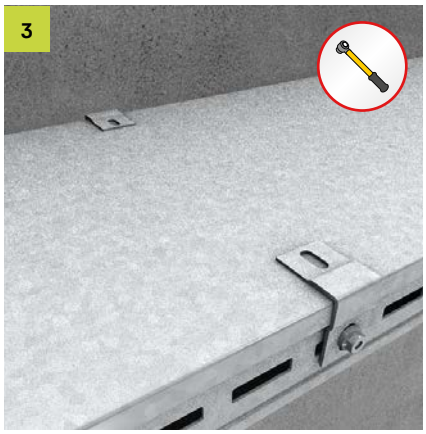
Cover fixation in the outdoor area



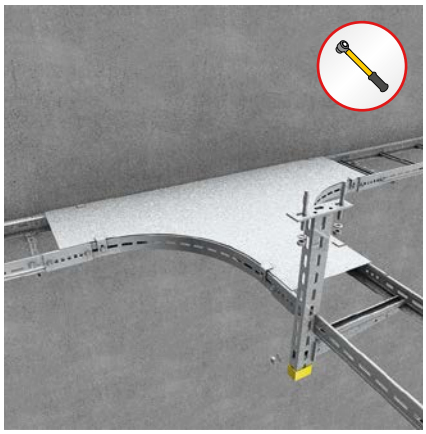
Ladder cover (LD) with storm protection angle (LD-SW).
Guide the round-head bolt (FRSV 8x16) of the LD-SW internally through the cable ladder.



Slide the captive washer (UVS M8) onto the round-head bolt (FRSV 8x16). Position the storm protection angles 100-150 mm in front of the ends and in the middle of the cable ladder.



Place the LD on the cable ladder, place the LD-SW on the cover from the outside and screw it on with the hexagonal nut (SEMS 8). Suitable for outdoor use!
6 pieces/3 metres.



Fitting cover, e.g. ladder branch cover (LAD) with storm protection angle (LD-SW)
LD-SW for fitting covers are mounted in the same way as the ladder cover (LD). Ladder internal bend cover (LIBD) 4 pieces, ladder branch cover (LAD) 6 pieces and ladder crossing cover (LKD) 8 pieces.

Index

Cable ladders

LGG 60/100	Cable ladder, L-profile, height = 60/100 mm
LGGS 60/100	Cable ladder, L-profile, heavy, height = 60/100 mm

Fittings

LGIB 60/100	Ladder internal bend, height = 60/100 mm
LGAB 60 /100	Ladder external bend, height = 60/100 mm
LGVB 60/100	Ladder vertical bend, height = 60/100 mm
LGA 60/100	Ladder branch, height = 60/100 mm
LGAA 60/100	Ladder attachment branch, height = 60/100 mm
LGK 60/100	Ladder crossing, height = 60/100 mm

Cover

LD	Ladder cover
LDR	Ladder cover with turning bolts
LIBD	Ladder internal bend cover
LIBDR	Ladder internal bend cover with turning bolts
LAD	Ladder branch cover
LADR	Ladder branch cover with turning bolts
LKD	Ladder crossing cover
LKDR	Ladder crossing cover with turning bolts
LD-SW	Storm protection angle - Ladder

Accessories

LGV 60/100	Ladder connector, height = 60/100 mm
LGVH 60/100	Ladder connector, horizontal, height = 60/100 mm
LGVV 60/100	Ladder connector, vertical, height = 60/100 mm
LGTR 60/100	Ladder divider, height = 33/80 mm
LGKAB	Ladder drop-out plate
EL	Fibre cement plate
SL 60/100	Protection cap
MP-L	Mounting plate
KZF	Cold zinc paint
KZS	Cold zinc spray

Accessories Fastening

AM16 M6	Channel nut, B 7
FKS 6x10	Slotted cylinder head screws, DIN EN ISO 1580
FRS 8X50	Round-head bolt with square, DIN 603
FRSV 6x16	Round-head bolt with short square, DIN 603
FRSV 8x16	Round-head bolt with short square, DIN 603
KLS 8x16	Clamp fastening set (Content: FRSV 8x16, SEMS 8)
SEM 8	Hexagon nut, DIN 934
SEMS 6	Hexagonal nut with flange, DIN EN 1661
SEMS 8	Hexagonal nut with flange, DIN EN 1661
SEMSS 8	Hexagon nut, self-locking, DIN 985
US 8X17	Washer, DIN 125
UVS	Captive washer
KLU	Clamp fastening set (Content: FRSV 6x16, SEMS 6)



Fittings, covers, accessories and fixing accessories are not included with the cable ladders and must be ordered separately.

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