CE 0158

FABA™

INSTALLATION GUIDE

SYSTEM AL2

The legally valid language for these instructions is English. All other languages are translations of the original English instructions.

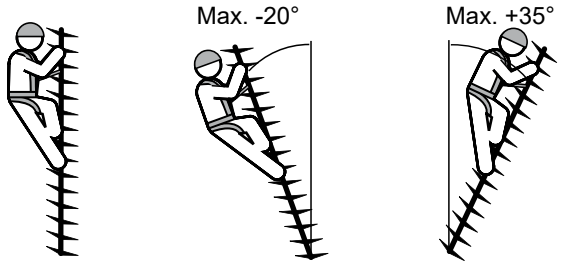
Tractel®

Climbing protection ladders / Climbing protection rail system FABA™ AL2

The climbing protection system is designed in accordance with EN 353-1:2018. The FABA™ climbing protection ladders also comply with DIN 18799-2 and EN ISO 14122-4.

General

Masonry / support structures (e.g. steel constructions) as well as the installation base (concrete or stone) must be sufficiently supporting. A specialist must check that there is sufficient load bearing capacity before installation.
Observe accident prevention regulations!



Installation

The components are supplied ready for installation. In the case of accessories such as brackets, connectors, etc. the corresponding fastening is either attached in a hand-tight manner or enclosed.
Essentially all screw connections are selected so that they will not seize up even in systems where they are left in place for a long time.
The **screw locking devices** are chosen dependent on the type of use:

- **Screw connections with self-locking nut as per ISO 10511 (DIN 985)**
- **Screw connections with spring washers DIN 6796**
- **Screw connections with lock nuts**
- **Screws with plastic dry locking coating** (can be undone and reused up to three times)

Installation on buildings should take place from the bottom to the top. When **positioning securing holes** ensure that the vertical distance is always a **multiple of 280 mm**. The brackets are screwed in to the backs of the rails. When fitting ensure that the individual ladder ends align with each other. The installation procedure is left up to the installation company.
For anchor fastenings, the guidelines of the anchor manufacturer are to be observed.
Ambient conditions must be observed for the assembly of the ladders or rails (e.g. aggressive surroundings). They must not be mounted in potentially explosive areas. Due to the risk of an invisible stress corrosion cracking, ladders and rails must not be installed in a highly corrosive atmosphere (e.g. above a swimming pool) unless particular control measures have been initiated or compatibility has been verified.

On site adjustment (see also page 12):

If ladder parts or rails must be adjusted on site, the cutting edges should be deburred.

Gap dimensions (tolerance of 0 to +2 mm):

Because aluminum climbing protection rails or ladders have almost double the temperature-dependent length expansion in contrast with a foundation or ground made from steel and concrete, then the ladder ends must be left with a minimum gap when installed:

Outside temperature -10° C:	gap approx. 3.5 mm
Outside temperature 0° C:	gap approx. 3.0 mm
Outside temperature +10° C:	gap approx. 2.5 mm
Outside temperature +20° C:	gap approx. 1.5 mm

AFTER INSTALLATION check that all screws are correctly tightened. Check whether all necessary catches are fitted.
The complete climbing protection system must be run with the fall prevention device. Fitted parts such as gates, detachable catches, entry and exit sections etc. are to be checked for correct operation.

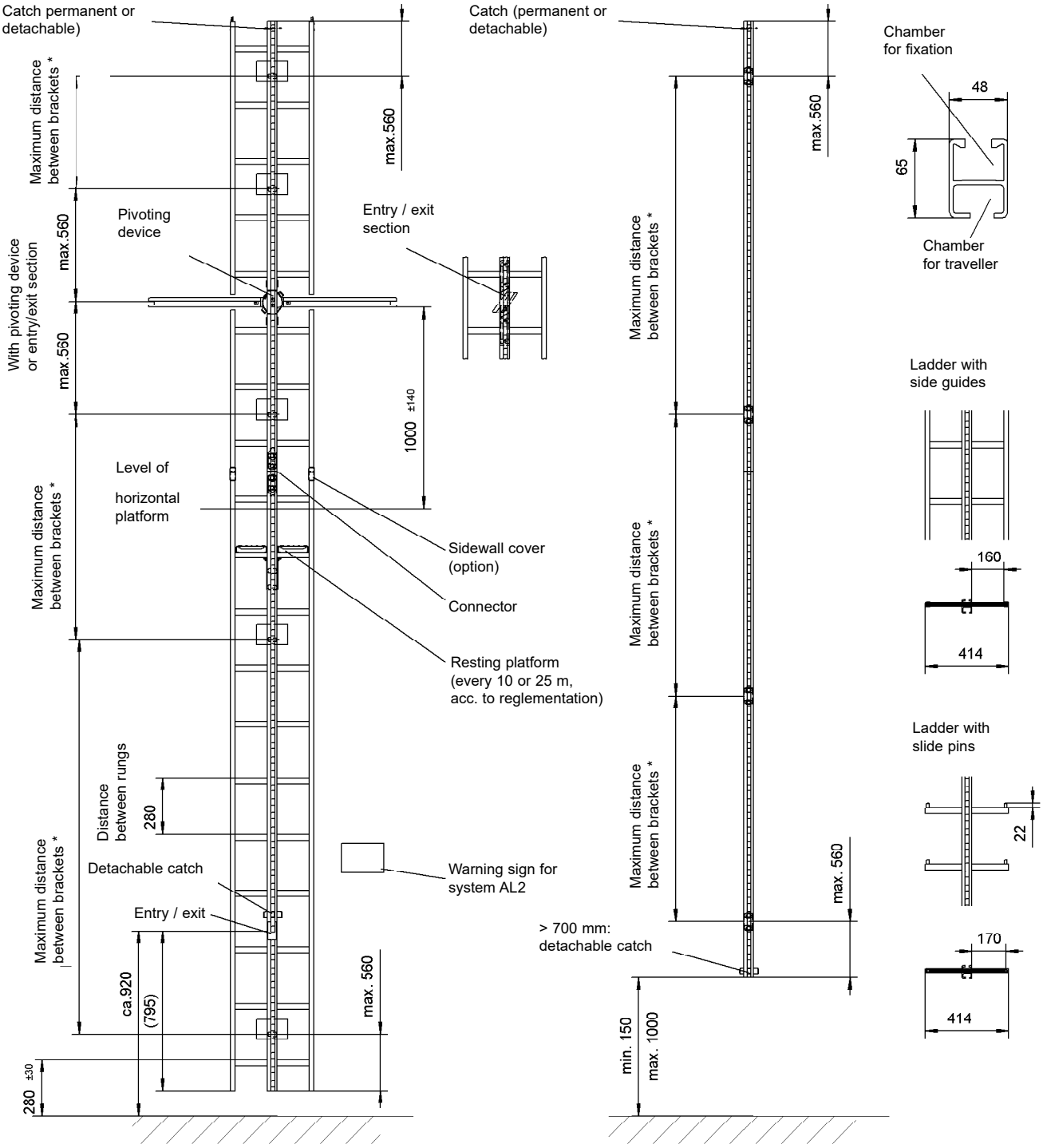
All screw connections must be tightened / checked using the torques listed below:

Thread diameter	Screw connection / Material	Tightening torque Stacked components	Tightening torque **Non**-stacked components (e.g.clamps)
M8	A2-70 / A4-70 / 8.8 tZn	18 Nm	12 Nm
M10	A2-70 / A4-70 / 8.8 tZn	35 Nm	23 Nm
M12	A2-70 / A4-70 / 8.8 tZn	60 Nm	40 Nm
M16	A2-70 / A4-70 / 8.8 tZn	120 Nm	80 Nm
M20	A2-70 / A4-70 / 8.8 tZn	240 Nm	158 Nm

General layout of a FABA™ climbing protection system AL2

FABA™ climbing protection ladder AL2 with side guide (or with slide pins - no fig.)

FABA™ climbing protection rail AL2 (e.g. for a manhole ladder or twin-rail ladder)



ATTENTION! Only components approved for the system may be used.
For every FABA™ climbing protection system a warning sign should be attached at the entry point.
The climbing protection ladder with release facility may only be installed as the lowermost ladder segment in the access level area (safe standing point).
Catches must be mounted at all points where the carriage can leave the rail:
– Detachable catches if the carriage may be removed (including position above the release facility),
– Permanent catches if the carriage may not be removed.
*) = Fitting of brackets and bracket spacing see pages 4 and 5

Fitting of support brackets

Fastening method	**Implementation** (all measures in mm)		
	Climbing protection ladder with side guides	Climbing protection ladder without side guides	Climbing protection rail
max. bracket distance	2520	1680	2520
Weld-on bracket or clamping device	2520	1680	2520
Connection to steel structures with M12	2520	1680	2520
in manhole rings with anchor bolt FZA 14x60, M10/20 [1])	not applicable	not applicable	not applicable
in concrete at least B25 with anchor bolt FZA 14x60, M10/20 [1])	2520	1680	2520
with brickwork [2])	1120	1120	1120
on existing twin-rail ladder	not applicable	not applicable	2520
on existing step irons	not applicable	not applicable	2520

Notes:

[1]) Fastening can also be carried out using other similar anchor fittings authorized by the building authorities.
[2]) Since there are no approved anchor fittings for use with brickwork, it will be necessary for an anchor fitting manufacturer to check and determine the type and size of anchor fittings to be used by means of tensile tests carried out on-site prior to installation. Documentation and certification of the anchor fittings used must be available.

Number of support brackets

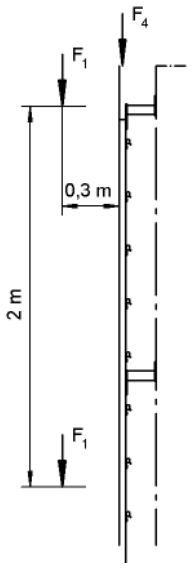
- Calculation = total ladder or rail length divided by separation distance given above between support brackets, round up, + 1 support bracket
- Example (ladder length = 15000 mm, distance between support brackets = 1,680 mm) = 15000 / 1680 = 8.9 round up + 1 = 10 support brackets, or = 10 + x, if special components require the use of additional support brackets.

- When using special components, such as entry and exit sections or gates, etc., additional support brackets must be incorporated and their minimum distances observed in accordance with the applicable system installation manual. The support brackets required therefore must be included in the example calculation shown above.

PLEASE OBSERVE

- FABA™ AL2 Climbing protection systems with an overall height of less than 3360 mm must be connected to the ground beneath by means of at least 3 fasteners
- For climbing protection systems with a total height of more than 3360 mm, at least 4 brackets are to be used.
- The structure to which the FABA™ AL2 climbing protection system is secured, must be capable of absorbing a falling load of at least 6 kN.
- Each FABA™ AL2 ladder or rail element is to be fastened to the structure with at least one bracket. With a butt joint, at least one of the two rails or ladders must be fastened with at least 2 brackets. The topmost rail or ladder must be fastened with at least 2 brackets.

The falling load (extreme effects) should be assumed to be equal to an equivalent load along the rail axis of F4 = 6 kN. Derivation of the load may be carried out on a square element (see also DIN 18799, part 2). The traffic load (variable effect) is to be set with F1 = 1.5 kN in a line of action 30 cm parallel to the longitudinal axis of the ladder every 2 m (see drawing on right).



Mounting on brickwork

The maximum bracket distance is dependent on what loading can be absorbed by the anchor fastening. If it can be demonstrated in an anchor pull-out test that the pull-out force in an unfavourable position is at least 10 kN, the maximum bracket distance is 1120 mm.

Since there are no approved anchor fittings for use with brickwork, it will be necessary for an anchor fitting manufacturer to check and determine the type and size of anchor fittings to be used by means of tensile tests carried out on-site prior to installation. Documentation and certification of the anchor fittings used must be available.

The climbing protection system must be secured with at least 4 brackets. We recommend brackets with square tubing for fastening on brickwork.

Position of the FABA™ climbing protection rail or ladder

The FABA™ climbing protection rail is asymmetric. When installing **always** note the position of the side piece and sign (wider side piece lies to the left, arrow points upwards).
See figure 1.

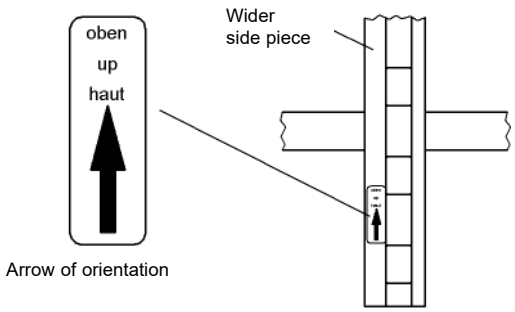


Figure 1

Ladder and rail: Fitting of attachment parts

The securing nut is used to secure attachment parts, e.g. brackets, from the rear to the back of the rail. It is shaped so that it can be inserted through any position on the rail through the rear slit. It is locked by turning. Ensure the correct installation location.
See figure 2.

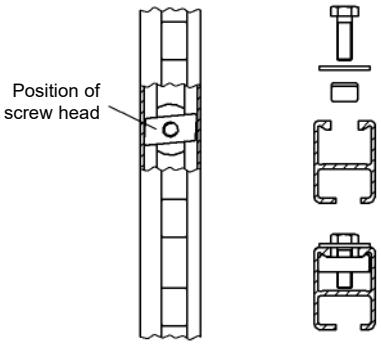


Figure 2

Detachable catch

The detachable catch can be fitted every 70 mm in the FABA™ climbing protection rail. Insert the plate through the rear slit in the rail, insert the bolt with the spring through the front slit, the window in the bar and the plate. Push the lug from behind onto the bolt and secure using the split pin; push on a metal cap as protection.
See figure 3.

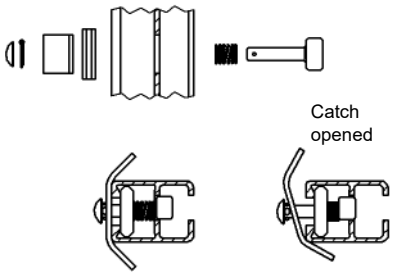


Figure 3

Permanent catch

Mounted in a climbing protection system at the top or bottom.It is fitted in the second square hole from the rail end. Feed the screw with washer into the rail slot from the front and through the square hole and the complete profile, then put the second washer onto the threaded part in the back side of the rail and tighten the locking nut with max. 40 Nm.
See figure 4.

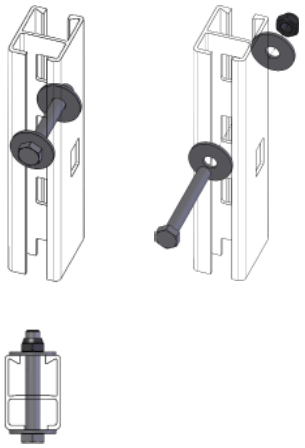


Figure 4

Butt joint

The butt joint is arranged on the back side of the profile. Insert the square fishplate into the rear chamber of the profile and screw together with the twofold curved counter fishplate using the two screws. The clamping is carried out on the rear profile lips. When connecting the parts of the ladder, the curved counterpart plate is supported on the rung underneath it, thus allowing it to be positioned in an optimum position. When connecting rails (without rung), take care that the clamping is located centred on the rail joint. Tighten the screws to 60 Nm.
See figure 5.

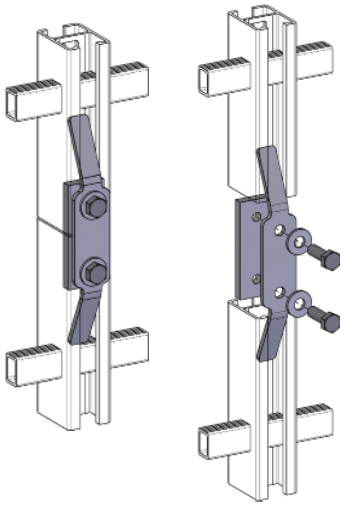


Figure 5

Sidewall cover (option)

The end cover is mounted on the side guides on the ladder end. To do this push the clamp with the rigid hook from above onto the guide pins, turn and allow the flexible hook to snap into place. Push the cover from the outside over the side rail profile until the arms engage.
See figure 6.

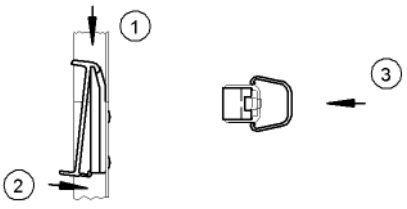


Figure 6

Fitting of support brackets to the building

If the door cover is to be fitted, see page 12.
The bracket is screwed onto the back of the rail with the side with the longer lug (see also figure 2).
The securing point of the building is higher than that on the rail. In exceptional cases a bracket can also be fitted in a rotated position.
See figure 7.

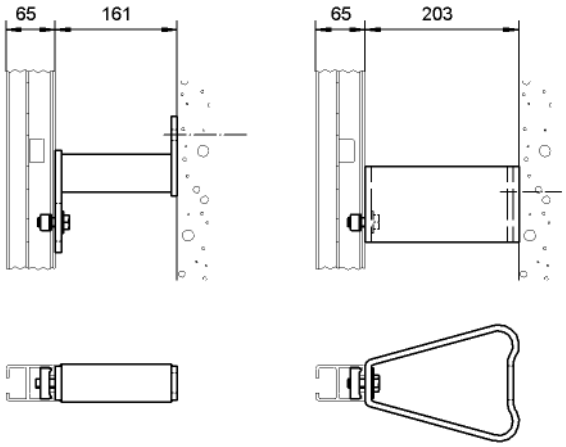


Figure 7

Resting platform

The resting platform is fitted with its bracket positioned from the rear onto the back of the rail (see also figure 2). The height is aligned so that the folded out resting platform lies horizontal with the stepping surface of the rung.
See figure 8.

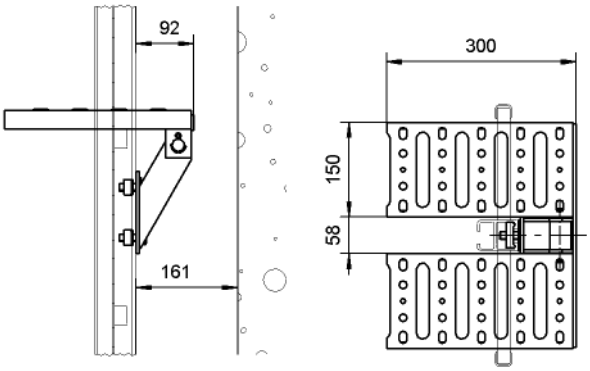


Figure 8

Entry and exit sections

The entry and exit must be located between two rungs and are fitted subsequently using a cutting template.
To do this a section must be cut out of the central rail following the instructions for cutting template.
See figure 9.
For fastening of the entry and exit sections to the rail, see figure 2.

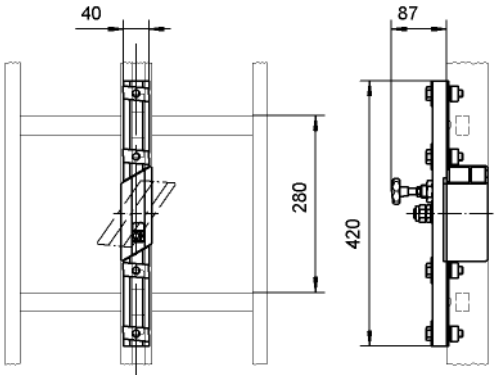


Figure 9

Straight step-over with climbing protection ladder

The side rail reinforcement is supplied with preassembled brackets for securing to the building as well as to the climbing protection ladder.
The side rail reinforcement is fitted to the the building in accordance with figure 10. The guidelines of the anchor manufacturer are to be observed.
The climbing protection ladder with 7 lower rungs is fitted to the side rail reinforcement as shown in figure 10. The top rung must not be higher than the standing surface (refer to DIN 18799-2 and EN ISO 14122-4).
Optionally an entry or exit or detachable catch may be fitted to the top end of the ladder.
See figure 10 (the entry and exit is represented swivelling to the left).

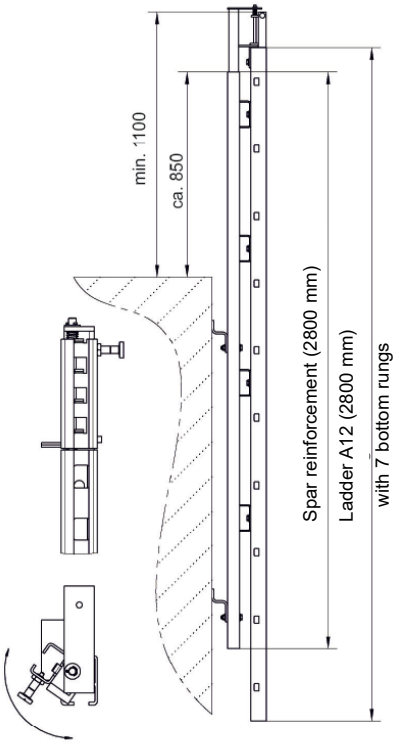


Figure 10

Straight step-over with 90° curve

The curve part with removable catch is mounted in advance on the top end of the rail of the topmost climbing protection system. Then the ladder with curve is fixed to the building.
For anchor fastenings, the guidelines of the anchor manufacturer are to be observed.
The top rung must not be higher than the standing surface (refer to DIN 18799-2 and EN ISO 14122-4).
See figure 11.

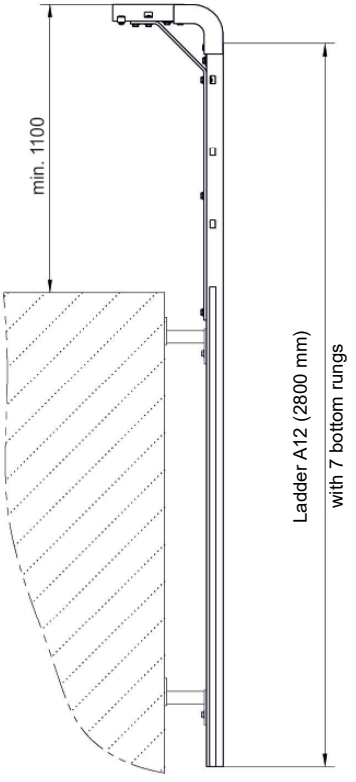
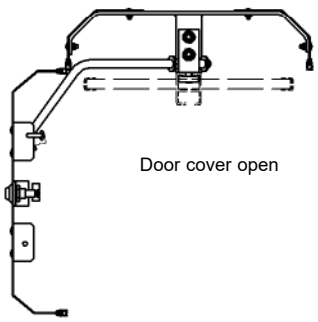


Figure 11

Door cover

If a door cover is fitted, it must be kept open or positioned in an open position before fitting of the lowest segment of the climbing protection ladder. Screw the bottom segment on to the brackets so that the tread surface of the lowest bracket is located in the correct position. Align the next ladder segment correctly with the first ladder segment and screw together using the connector. The door cover can be fitted at regular spacings (rung distance) of 280 mm in an upwards direction.
After fitting the ladder, the door cover is then screwed onto the ladder rail.
See figure 12.

Note:
A special installation guide is enclosed for fitting the door cover, **order no. 516585**.



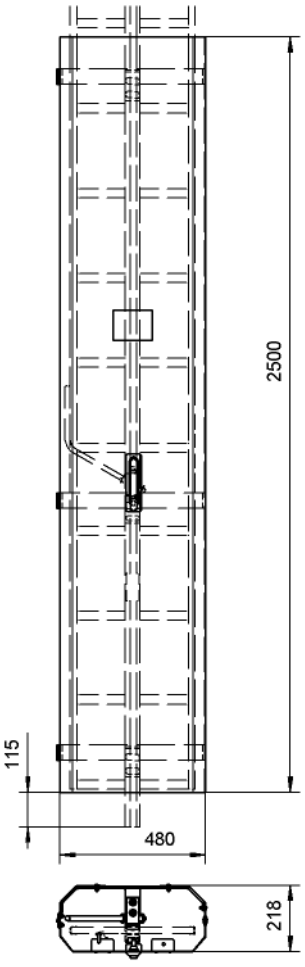


Figure 12

Cover plate

No additional fastenings to the ground or climbing protection ladder are required for the cover plate.
It is hung using the top angles on the rung. A safety bolt is pushed through the back of the rail and secured with a padlock on the bottom angles.
See figure 13.

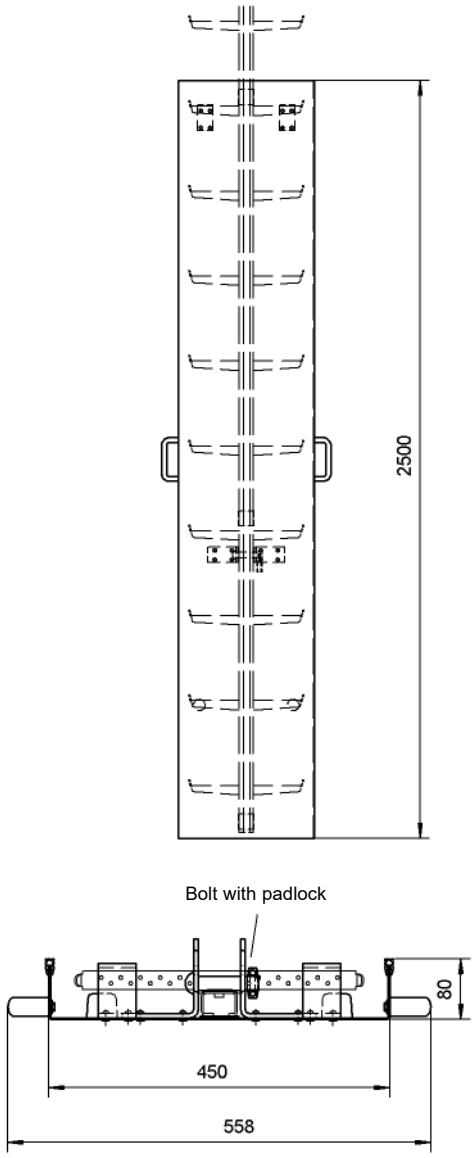


Figure 13

Shortening and cutting of ladders and rails

1. FABA™ climbing protection rail AL2

- Make cut surface between two windows (mesh spacing 70 mm)
- Make the cut surface perpendicular to the rail
- Carefully deburr the cut edges

2. FABA™ climbing protection rail AL2 with side rail

- Ladders with a side rail may only be shortened at the bottom end, the guide pins at the top end must be retained.
- Maintain the mesh spacing of 280 mm (distance between rungs)
- Make the cut surface perpendicular to the ladder
- Cut the rail and side rail of the ladder flush in the same plane
- Carefully deburr the cut edges

3. FABA™ climbing protection ladder AL2 with slide pins

- Maintain the mesh spacing of 280 mm (distance between rungs)
- Make the cut surface perpendicular to the rail
- Carefully deburr the cut edges

Checks and tests after installation

1. Check that all rail ends and entry and exit points are protected with a suitable catch.
2. Ensure that the number of brackets and their distances from each other conform to the regulations on page 4 and 5.
3. Check torques of all screw connections (table 1, column “During installation”).
4. Run through the complete installation with the fall prevention device (observe the operating instructions of the fall prevention device used).
5. Check the functionality of all mechanical components (e.g.: entry and exit sections, resting platforms, etc.), also in conjunction with use of the FABA™ fall prevention shuttle.

Table 1: Tightening torques for screw connections

Thread diameter	**Screw connection / Material**	**Tightening torque during assembly** Stacked components	**Tightening torque during assembly** **Non**-stacked components (e.g. clamps)	**Tightening torque Repeated inspection** Stacked components	**Tightening torque Repeated inspection** **Non**-stacked components (e.g. clamps)
M8	A2-70 / A4-70 / 8.8 tZn	18 Nm	12 Nm	16 Nm	11 Nm
M10	A2-70 / A4-70 / 8.8 tZn	35 Nm	23 Nm	31 Nm	21 Nm
M12	A2-70 / A4-70 / 8.8 tZn	60 Nm	40 Nm	50 Nm	36 Nm
M16	A2-70 / A4-70 / 8.8 tZn	120 Nm	80 Nm	108 Nm	72 Nm
M20	A2-70 / A4-70 / 8.8 tZn	240 Nm	158 Nm	216 Nm	142 Nm

Table 2: Minimum number of components to be checked in the repeated checks

Component	Length of the FABA™ climbing protection system			
	up to 10 m	up to 25 m	up to 50 m	over 50 m
Brackets	2	4	8	10
Connectors	1	1	2	3
End-stops	all	all	all	all
Gates	all	all	all	all
Other accessories	1	1	1	1

FABA™

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