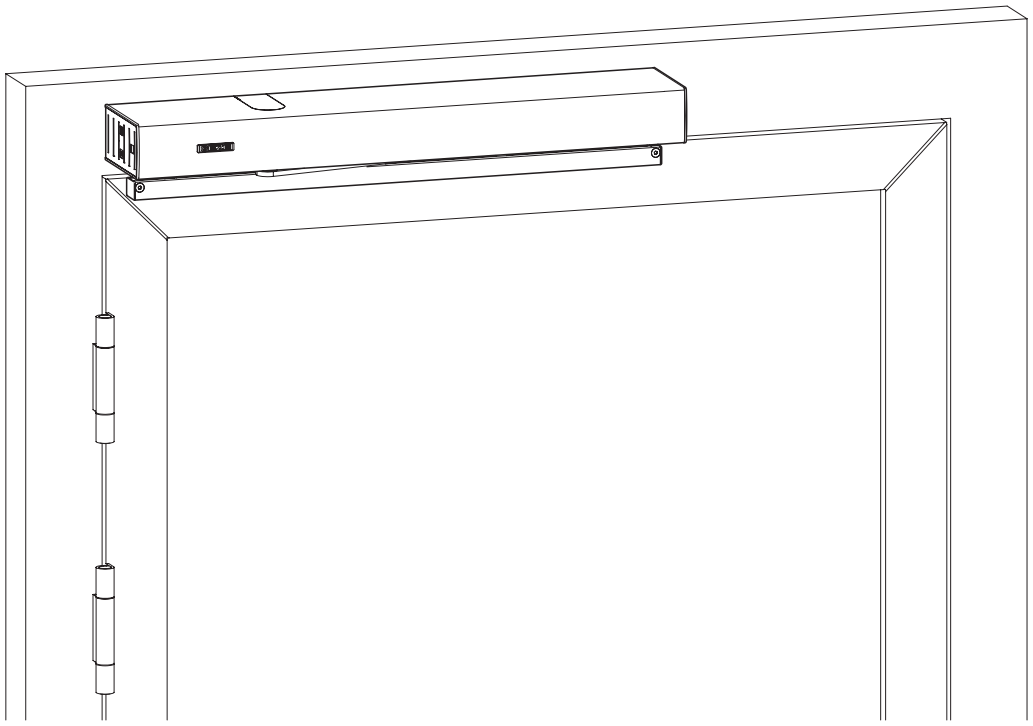


Powerturn

Valid for variants:
Powerturn (1-leaf/2-leaf)
Powerturn F (1-leaf)
Powerturn F-IS (2-leaf)
Powerturn F/R (1-leaf)
Powerturn F/R-IS (2-leaf)

EN Installation and service instructions

156563-05

GEZE

Contents

Symbols and illustrations

Warning notices

In these instructions, warning notices are used to warn against material damage and injuries.

- ▶ Always read and observe these warning notices.
- ▶ Observe all measures marked with the warning symbol and warning word.

Warning symbol	Warning word	Meaning
	**WARNING**	Danger to persons. Non-compliance can result in death or serious injuries.

Further symbols and illustrations

Important information and technical notes are highlighted to explain correct operation.

Symbol	Meaning
	means “important note”. Information to prevent property damage, to understand or optimise the operation sequences.
	means “additional Information”
▶	Symbol for an action: This means you have to do something. ▶ If there are several actions to be taken, keep to the given order.

Product liability

In compliance with the liability of the manufacturer for his products as defined in the German “Product Liability Act”, compliance with the information contained in this brochure (product information and intended use, misuse, product performance, product maintenance, obligations to provide information and instructions) must be ensured. Failure to comply releases the manufacturer from his statutory liability.

Reference documents

Type	Name
Wiring diagram	Powerturn

The diagrams are subject to change without notice. Use only the most recent version.

1 General information

The automatic swing door drive is an incomplete machine. It complies with all the relevant regulations of the guidelines 2014/35/EU and 2014/30/EU and may be installed and operated in automatic door systems in accordance with the Machinery Directive. The manufacturer of this machine must ensure that all requirements resulting from the Machinery Directive are observed. A risk assessment must be carried out and documented. Before initial commissioning, the manufacturer of the machine must issue an EC Declaration of Conformity in accordance with Annex II of the Machinery Directive 2006/42/EC and attach the CE marking visibly and permanently to the door system.

The form „Supplementary risk assessment“ is available to support the implementation of a risk assessment. The **supplementary risk assessment**, **installation instructions** and **declaration of installation** for the door drive must be enclosed with the technical documents.

1.1 Safety instructions

- The mandatory installation, maintenance and repair work must be performed by properly trained personnel authorised by GEZE.
- The country-specific laws and regulations are to be observed during safety-related tests.
- If unauthorised changes are made to the system, GEZE cannot be held liable in any way whatsoever for any resulting damage, and the statement of approval for use in escape and rescue routes is no longer valid.
- GEZE does not accept any warranty for combinations with third-party products.
- Furthermore, only original GEZE parts may be used for repair and maintenance work.
- The connection to the mains voltage must be made by a professional electrician. Perform the power connection and protective earth connection test in accordance with VDE 0100 Part 610.
- Use an on-site automatic cut-out as the line-side disconnecting device, the dimensioning of which is matched to the type, cross-section, type of routing and ambient conditions of the on-site power supply circuit. The automatic cut-out must have at least 4 A and max. 16 A.
- Protect the display programme switch against unauthorised access.
- Observe the latest versions of guidelines, standards and country-specific regulations, in particular:
  - ASR A1.7 “Guidelines for doors and gates”
  - DIN 18650 “Building hardware - Powered pedestrian doors”
  - DIN EN 16005 “Power operated pedestrian doorsets - Safety in use - Requirements and test methods”
  - DIN VDE 0100-600 “Testing electrical systems”
  - DIN EN 60335-2-103, DIN 18263-4
  - Accident prevention regulations, especially DGUV regulation 1 “Principles of prevention” and DGUV regulation 3 “Electrical installations and equipment”

The product should be installed or incorporated in such a way that effortless access to the product is guaranteed during any repairs and/or maintenance, and that any removal costs do not stand out of economic proportion to the value of the product.

1.2 Safety-conscious working

- Secure workplace against unauthorised entry.
- Watch the swivelling range of long system parts.
- Never carry out work with a high safety risk (e.g. installing the drive, cover or door leaf) while alone.
- Secure the cover/drive panels against falling.
- Use only the cables specified on the cable plan provided. Cables must be shielded in compliance with the wiring diagram.
- Secure loose, internal drive cables with cable ties.
- Before working on the electrical system disconnect the drive from the 230 V power supply and check the isolation from supply.
- Note that if an Uninterruptible Power Supply (UPS) is used, the system will still be supplied with voltage despite the fact that the power supply is disconnected.
- Always use insulated wire-end ferrules for wire cores.
- Make sure of sufficient lighting.
- Use safety glass.
- Attach safety stickers to glass door leaves.
- Danger of injury with opened drive. Hair, clothing, cables, etc. can be drawn in by rotating parts!
- Danger of injury caused by unsecured crushing, impact, drawing-in or shearing spots!
- Danger of injury due to glass breakage!
- Danger of injury due to sharp edges in the drive!
- Danger of injury during installation through freely moving parts!

1.3 Inspection of the installed system

Measures for protection and prevention of pinching, impact, shearing or drawing-in spots:

- Check the function of safety sensors and movement detectors.
- Check protective earth connection to all metal parts that can be touched.
- Perform a safety analysis (risk analysis).

1.4 Environmentally conscious working

- When disposing of the door system, separate the different materials and have them recycled.
- Do not dispose of batteries and rechargeable batteries with household waste.
- Comply with the statutory regulations when disposing of the door system and the batteries/rechargeable batteries.

2 Tools and aids

Tool	Closer size
Drill bit	Ø 4.2 mm and Ø 5 mm
Threading tap	M 5 and M6
Allen key set	1.5 mm … 6 mm
Slot screwdriver	2.5 mm
Cross-tip screwdriver	PH2
Centre punch	
Hammer	
Wire stripper	
Crimping pliers for cables	
Torque spanner up to 15 Nm	
Installation tool for lever installation for the type of installation involving a roller guide rail	Mat. no. 158454

3 Scope of delivery and completeness

▶ Open packaging units and check for completeness.

Powerturn drive unit with roller guide rail or link arm

- Drive unit
  - Drive
  - Set of fixing screws
  - Counter piece, set for fastening the lever
  - Mounting plate
  - Connection - 230V
- Cover
- Side panels
- Cap section cover

Depending on order:

- Roller guide rail
  - Rail
  - Roller cpl.
  - Lever
  - Set of fixing screws
- Sensor roller guide rail
  - Rail
  - Lever
  - Roller cpl.
  - Set of fixing screws

or

- Link arm (closer size depending on reveal depth)
  - Set of fixing screws
  - Sensor link arm
  - Sensor adapter

Accessories (optional)

Activation devices in compliance with the specifications on the wiring diagram:

- Door stop buffer
- Integrated opening restrictor (only for roller guide rail)
- Display programme switch / service terminal ST220 / GEZEconnects
- Smoke control unit
- Manual trigger switch
- IS kit for 2-leaf systems, see separate installation instructions
- Installation tool for lever installation
- Extended suspension bolt

Additional optional accessories possible.

4 Transportation and storage

- The Powerturn drive unit is not built for hard knocks or for falling from a height. Do not throw, do not drop.
- Storage temperatures under –30 °C and above +60 °C can result in damage to the device.
- Protect against humidity.
- The cable binders are used as transport securing devices and must not be loosened before the construction site is reached.

5 Product description

5.1 System description and technical data

The Powerturn
- is a swing door drive with fully automatic operation activated by sensors or push buttons,
- operates electrically during opening and closing.

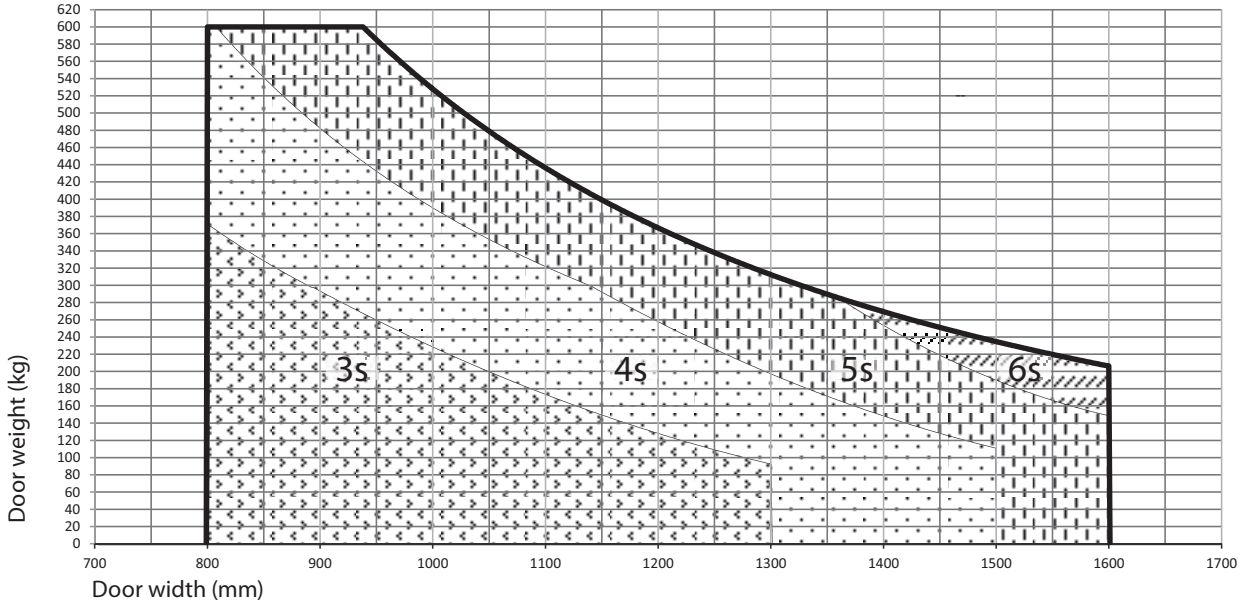
Use on 2-leaf doors is possible in conjunction with 2x Powerturn.

5.1.1 Max. range of use - Powerturn

This chart shows maximum values for door width and door weights for the use of the Powerturn/Powerturn F.
The closing time to be set must be determined in accordance with the specifications below.

- The curve depicts the maximum values of the opening time for a door opening angle of up to 90°. All possible pairs can be used below the curve.
- ▶ Set closing time min. 1 s longer than the opening time.
- For transom installation-opposite hinge side-roller guide rail: Time from diagram + 1 s

Limitation of use of Powerturn with opening times up to 90° door opening angle



Example calculation
- Closing time = opening time + 1 s

Example: 1200 mm with 220 kg = 4 s + 1 s = **5 s**

Differences to the actual opening time can occur depending on installation.

5.1.2 Mechanical data

Dimensions (H x D x L):	70 × 130 × 720 mm
Max. ambient temperature range:	–15 °C … +50 °C
Drive mass:	approx. 10.3 kg

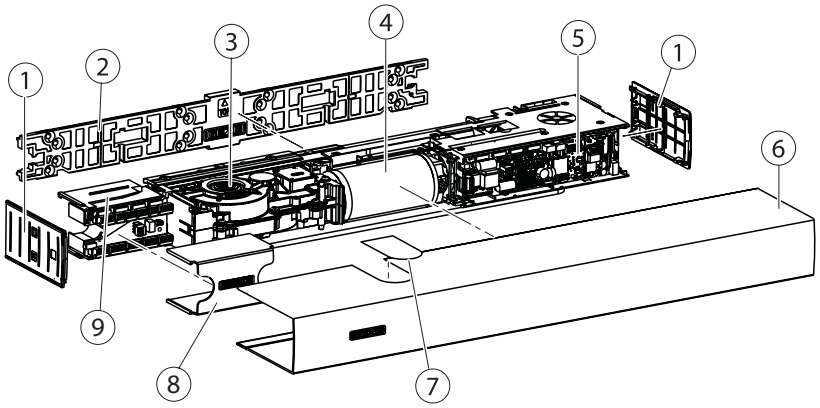
5.1.3 Electrical data

Mains connection:	230 V AC, +10% / –14%, 50/60 Hz
Capacity rating:	max. 200 W
Externally connectable devices:	24 V DC, max. 1200 mA

5.2 Basic structure and extension

5.2.1 Drive

1 Side panels
2 Mounting plate
3 Drive axle, continuous
4 Motor gear unit
5 Control unit
6 Cover
7 Cap section cover
8 E-cover
9 Connector panel

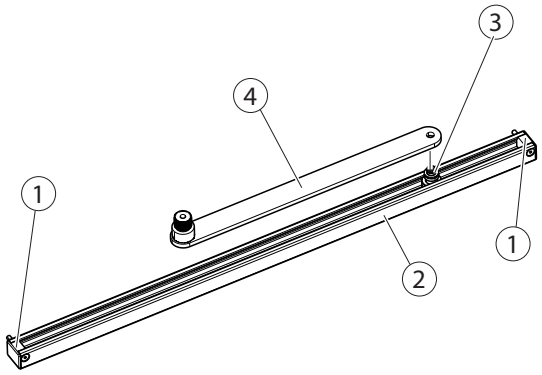


5.2.2 Roller guide rail with lever

Installation depends on the type of installation chosen.

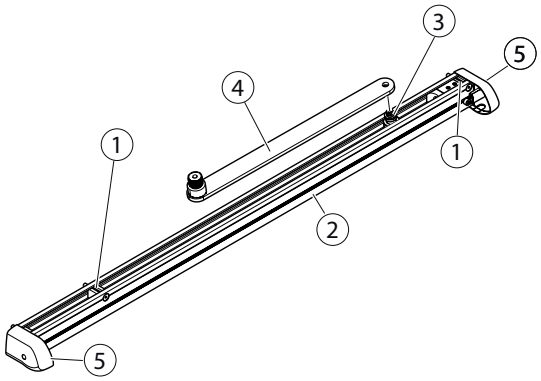
Standard roller guide rail with lever:

1 End cap
2 Roller guide rail
3 Suspension bolt cpl.
4 Roller lever



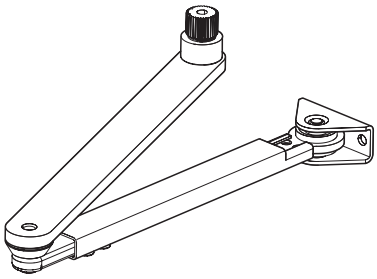
Sensor roller guide rail with lever:

1 Spacer blocks
2 Roller guide rail
3 Suspension bolt cpl.
4 Roller lever
5 End cap

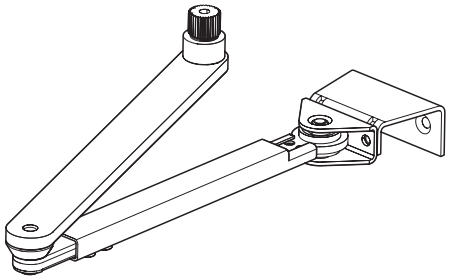


5.2.3 Link arm

Standard link arm:



Sensor link arm (with link arm adapter):



5.2.4 Activation devices (accessories)

Further information under „Reference documents“ on page 4, Wiring diagram.

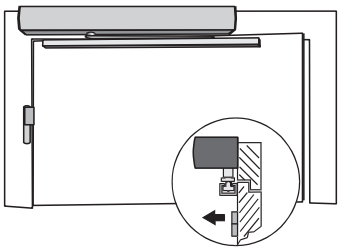
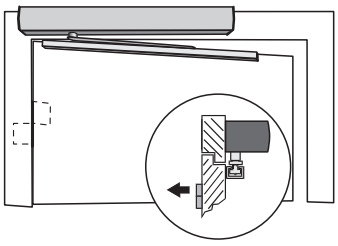
5.3 Types of installation

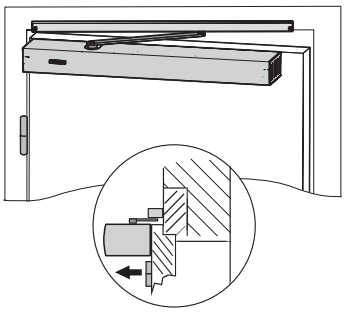
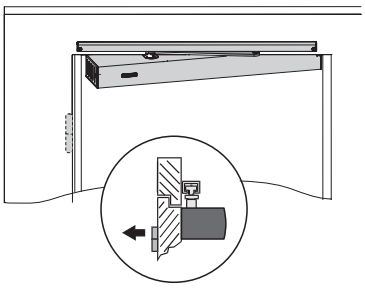
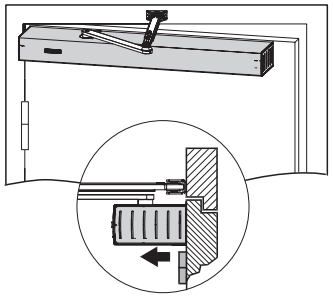
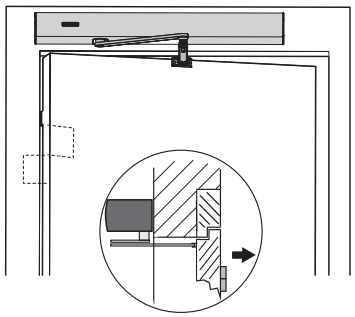
- The opening angle of the door always has to be limited by a door stop.
- Loads due to wind pressure, negative pressure or excess pressure must be taken into account.

- The 2-leaf version corresponds to the 1-leaf type of installation.
- We recommend the installation type involving link arms for the external doors.

The Powerturn allows the following types of installation, each in DIN left and DIN right:

5.3.1 Rail installation and link arm

Type of installation	Dimension	Powerturn	Powerturn F
Transom installation hinge side rail 	Reveal depth LT [mm]	0–100 [5] (60–200) [1, 5]	0–100
	Door overlap Ü [mm]	0–30	
	Max. door opening angle TÖW [°]	approx. 102–133 [2]	
	Standard roller guide rail L = [mm]	691	
	Lever L = [mm]	330	
	Hinge clearance [mm]	190	
	EN class / Closing torque (at 0–4°) [Nm]	4–6 / 59 (70) [6]	
Transom installation opposite hinge side rail 	Reveal depth + door leaf thickness [mm]	max. 100	
	Max. door opening angle TÖW [°]	approx. 108 [3]	
	Standard roller guide rail L = [mm]	691	
	Lever L = [mm]	450	
	Hinge clearance [mm]	190	
	EN class / Closing torque (at 0–4°) [Nm]	4–6 / 63 (65) [6]	

Type of installation	Dimension	Powerturn	Powerturn F
Door installation hinge side rail			
	Reveal depth LT [mm]	0–50	
	Door overlap Ü [mm]	0–30	
	Max. door opening angle TÖW [°]	approx. 126 [3]	
	Standard roller guide rail L = [mm]	738	
	Lever L = [mm]	330	
	Hinge clearance [mm]	220	
	EN class / Closing torque (at 0–4°) [Nm]	4–6 / 70 (78) [6]	
Door installation opposite hinge side rail			
	Reveal depth LT [mm]	0	
	Max. door leaf thickness [mm]	100 [7]	
	Max. door opening angle TÖW [°]	approx. 104	
	Standard roller guide rail L = [mm]	738	
	Lever L = [mm]	450	
	Hinge clearance [mm]	220	
	EN class / Closing torque (at 0–4°) [Nm]	5–6 / 59 (62) [6]	
Door installation hinge side link arm			
	Reveal depth LT [mm]	0	
	Door overlap Ü [mm]	0–30	0
	Hinge clearance [mm]	220	
	Max. door opening angle TÖW [°]	approx. 115	
	EN class / Closing torque (at 0–4°) [Nm]	6–7 / 124 (128) [6]	
Transom installation opposite hinge side link arm			
	Standard reveal depth LT [mm]	up to 510	up to 300
	Reveal depths LT with link arm adapter for sensor link arm [mm]	up to 560	up to 300
	Max. door leaf thickness [mm]	150	
	Max. door opening angle TÖW [°]	approx. 110–135 [2,3,4]	
	Hinge clearance [mm]	190	
	EN class / Closing torque (at 0–4°) [Nm]	6–7 / 97 (123) [6]	

1) With lever (450 mm)

2) Refer to the following charts to determine the max. door opening angle

3) TÖW through a collision between the lever/drive and the door/frame

4) Transom installation-opposite hinge side-link arm/reveal-max. door opening angle chart - see below

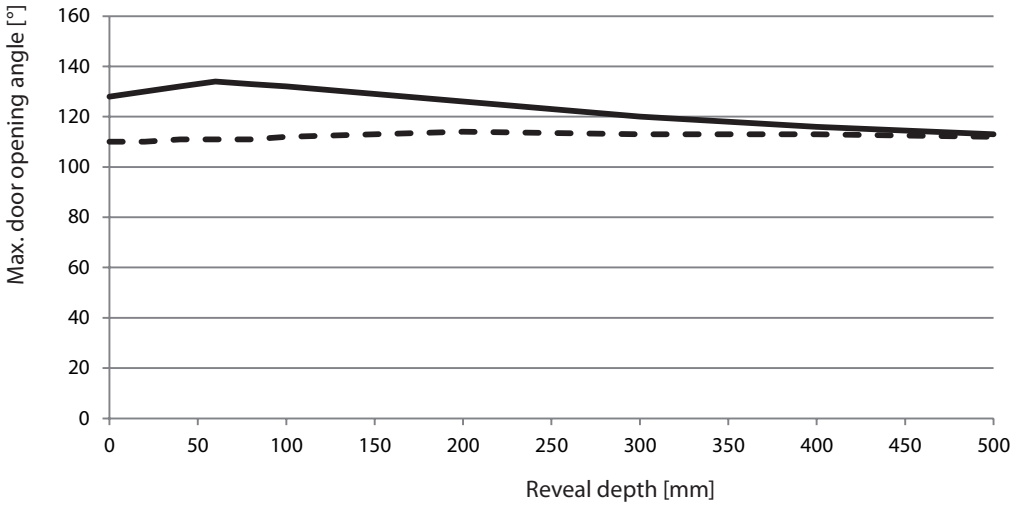
5) Transom installation-hinge side-rail/reveal-max. door opening angle chart - see below

6) Values in brackets at max. door opening angle 95°

Possible damage to the drive if the prescribed closing torque is not observed.

7) If the max. door leaf thickness is exceeded, the roller guide rail must be moved

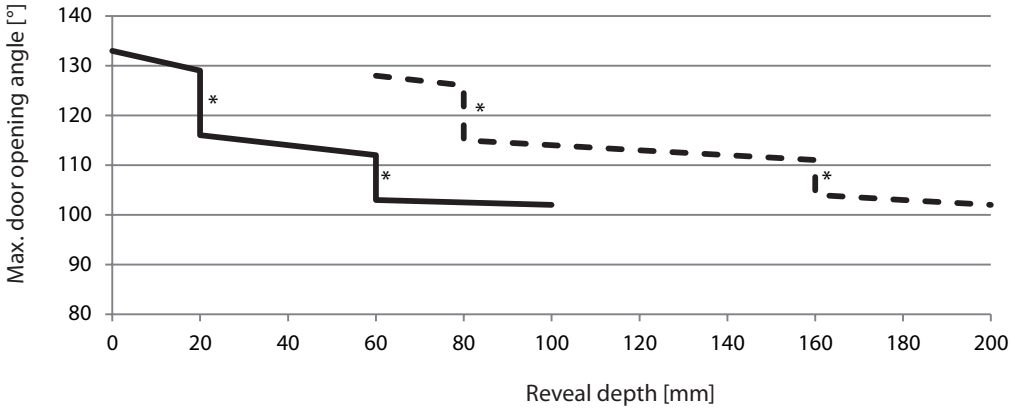
Transom installation-opposite hinge side-link arm / reveal / max. door opening angle chart



Door opening angle (TÖW)

Door opening angle (TÖW) with sensor link arm

Transom installation-hinge side-rail / reveal / max. door opening angle chart



* Preload

Lever 330 mm

Lever 450 mm (not permissible for Powerturn F)
See sales unit: Roller guide rail Powerturn transom installation opposite hinge side

An integrated opening restrictor has no effect when the reveal depth is > 130 mm

6 Preparing installation

6.1 General installation information

- Observe all the instructions. Incorrect installation can result in serious injuries.
- Observe the specified ambient temperature range at the installation location of the drive.
- After completing installation, check the settings and functionality of the drive.

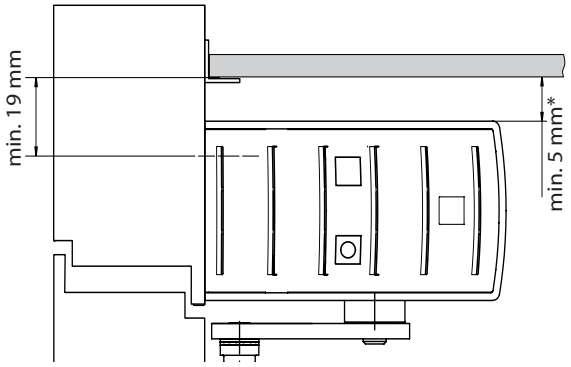
6.1.1 Preparations to be made on site

Checking of the location conditions and the required space

- The substructure must ensure safe attachment of the drive.
- The sub-structure must be able to withstand a force load of 700 Nm.
- The bottom edge of the element mounted at the lowest point (roller guide rail or link arm) must be mounted at least 2 m above the floor.
- ▶ Only use suitable means of fastening such as wall plugs, riveting nuts, etc.
- ▶ Before installation of the drive check whether the door leaf is in a good mechanical state and can be opened and closed easily.
- ▶ Lay cables in accordance with the cable plan.
- ▶ Check the planned type of installation on the leaf or frame profile (see section 5.3).

Check the space available

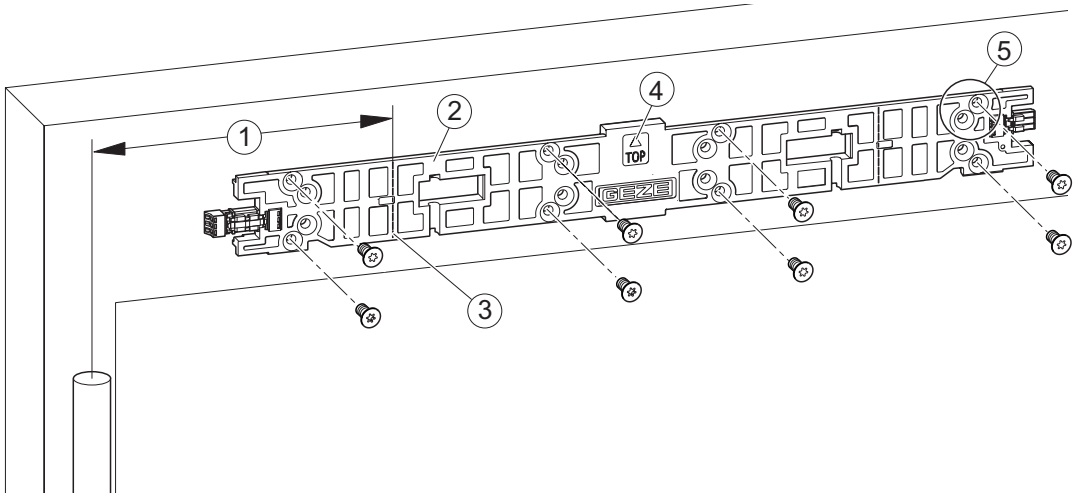
- ▶ Maintain free space of at least 5 mm above the drive *)
- ▶ Maintain free space of at least 19 mm between the upper row of holes and the ceiling.



* For versions with smoke switch see the separate installation instructions for the minimum clearance. With a clearance of 5-10 mm, the connector panel must be loosened during assembly of the drive, cf. chapter 7.6

Explanation of hinge clearance
There is a dotted line (3) on the mounting plate (2). The tape measure (1) can be fastened to the dotted line.

Explanation of screwing point
There are a total of 8 screwing points (5) with 2 drill holes each in the mounting plate (2), one inner and one outer drill hole. The outer drill holes are to be preferred for fastening the mounting plate.



6.1.2 Notes on fastening the mounting plate

- Make sure the mounting plate is in the correct position, see directional arrow (4).
- Set one screw at all eight screwing points (5), preferably at the outer screwing points.
- Screw the mounting plate (2) on using 8 screws.

The tightening torque required depends on the base and the fasteners used.

Base	Fasteners	Size	Tightening torque
Steel/aluminium	Rivet nut made of steel with countersunk head, Countersunk head screw	M6, M6 x 35	8 Nm
Concrete, solid stone	Plastic all-purpose dowel, Dowel screw with countersunk head	8 x 46, 6 x 60	-
Wood, drywall	Fitting screw with countersunk head	6 x 40	4 Nm

- Installation and use of the fasteners in accordance with manufacturer's specifications.

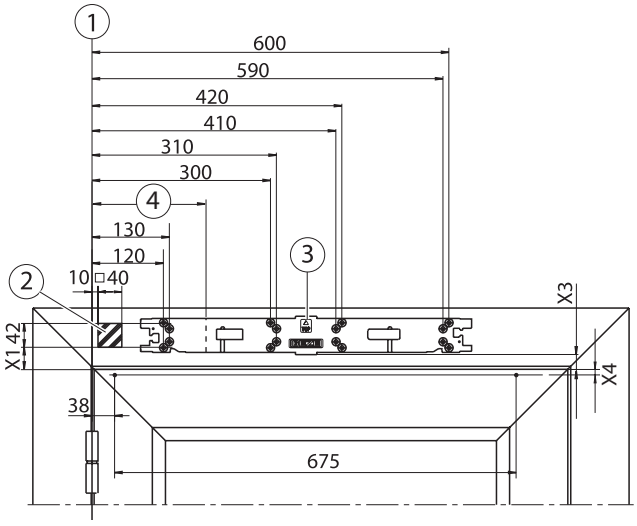
- Minimum requirements for rivet nut made of steel with countersunk head: 7000 N extraction force

6.2 Fitting dimensions for the installation types

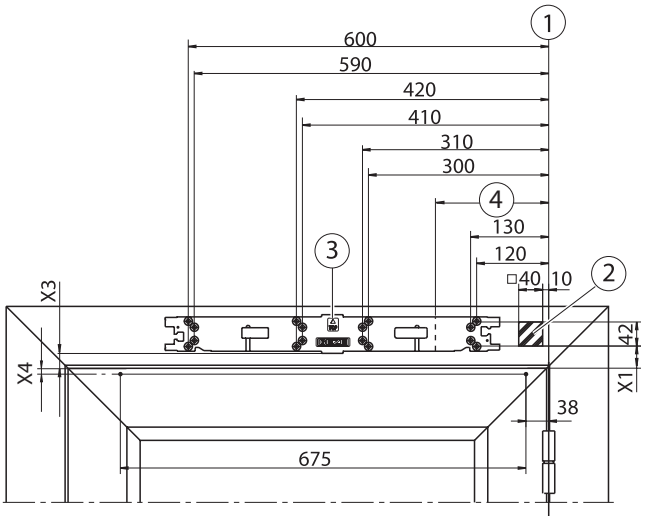
6.2.1 Transom installation hinge side with standard roller guide rail

- Hole pattern DIN left and DIN right reversed.
- Follow different installation instructions for a sensor roller guide rail.

Fastening DIN left

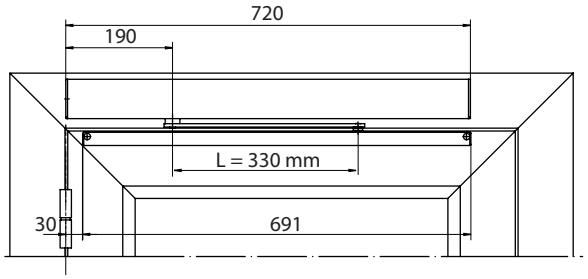


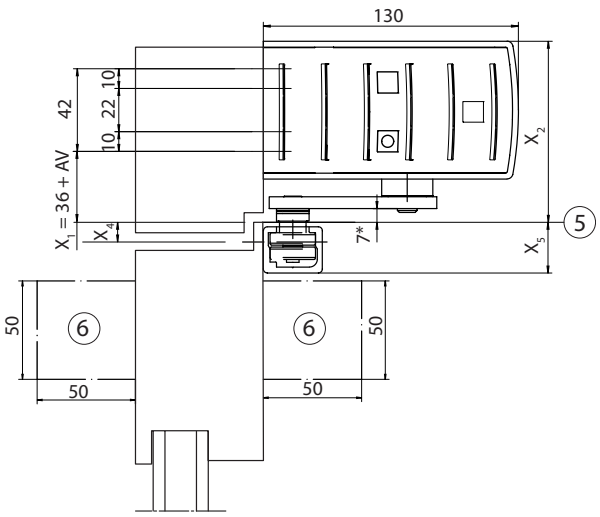
Fastening DIN right



1 Dimensional reference centre of hinge/top edge of door
2 concealed line-feed possible in the hatched area, e.g. Ø 20 mm for the mains connection cable or low-voltage connection (a side line-feed is also possible as an option, see chapter 7.2)
3 Directional arrow for precise positioning of the mounting plate
4 Hinge size 190 mm

Space requirement and fastening of standard roller guide rail





AV	X_1	X_2	X_3
0	36	92	25
30	66	122	55
50	86	142	75

Suspension bolt	X_4	X_5
Standard	10	26
23 mm elongated	33	49

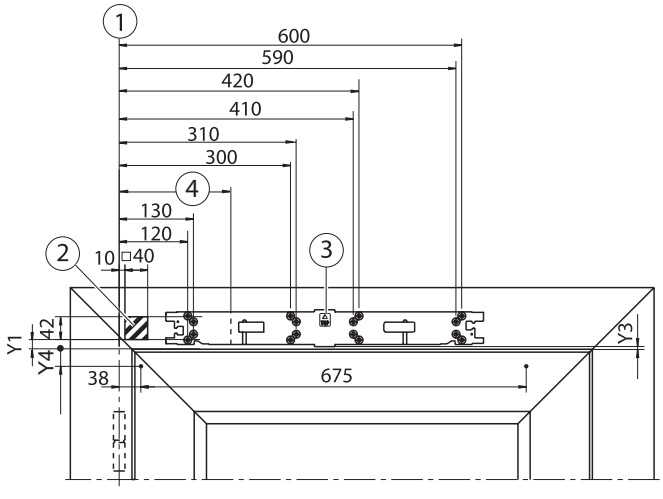
AV Spindle extension
L Lever length

5 Base - Upper edge of door
6 Space requirement for sensors
* important functional dimension

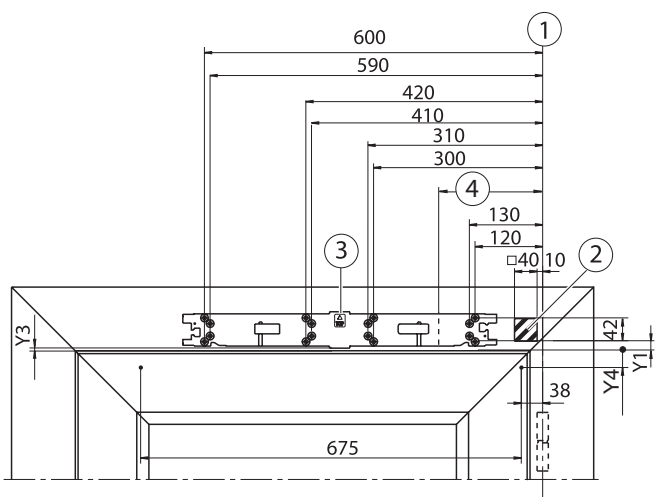
6.2.2 Transom installation opposite hinge side with standard roller guide rail

- Hole pattern DIN left and DIN right reversed.
- Follow different installation instructions for a sensor roller guide rail.

Fastening DIN right

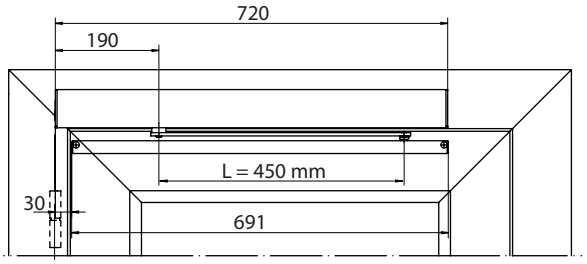


Fastening DIN left



1 Dimensional reference centre of hinge/bottom edge of frame
2 concealed line-feed possible in the hatched area, e.g. Ø 20 mm for the mains connection cable or low-voltage connection (a side line-feed is also possible as an option, see chapter 7.2)
3 Directional arrow for precise positioning of the mounting plate
4 Hinge size 190 mm

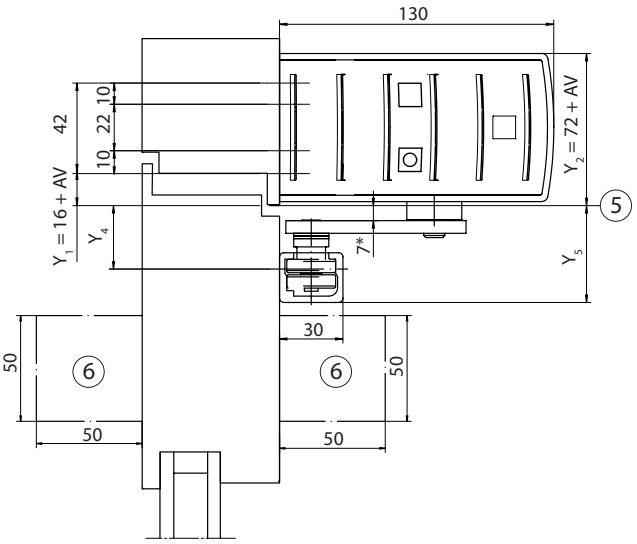
Space requirement and fastening of standard roller guide rail



AV	Y_1	Y_2	Y_3
0	16	72	5
30	46	102	35
50	66	122	55

Suspension bolt	Y_4	Y_5
Standard	30	46
23 mm elongated	53	69

AV Spindle extension
L Lever length

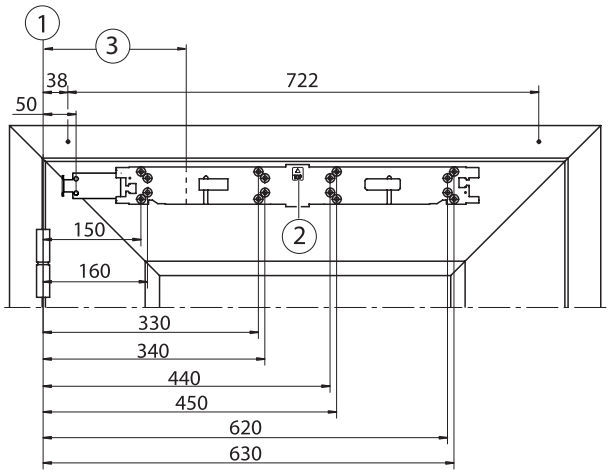


5 Base lower edge of lintel
6 Space requirement for sensors
* important functional dimension

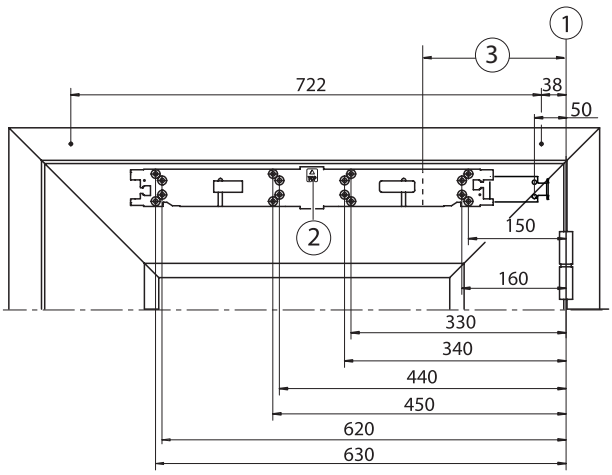
6.2.3 Door leaf installation, hinge side, with standard roller guide rail

Hole pattern DIN left and DIN right reversed.

Fastening DIN left

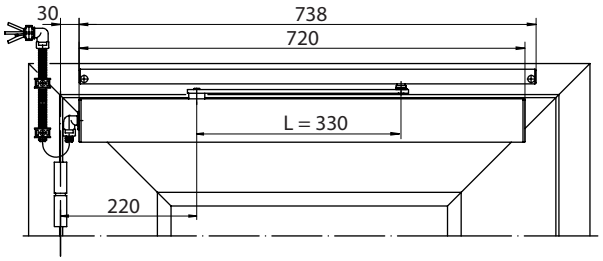


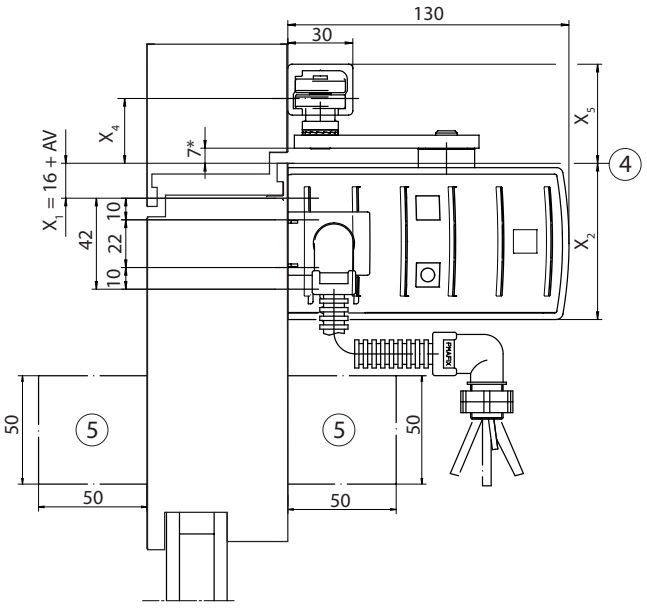
Fastening DIN right



1 Dimensional reference centre of hinge/top edge of door
2 Directional arrow for precise positioning of the mounting plate
3 Hinge size 220 mm

Space requirement and fastening of standard roller guide rail





AV	X_1	X_2
0	16	72
30	46	102
50	66	122

Suspension bolt	X_4	X_5
Standard	30	46
23 mm elongated	53	69

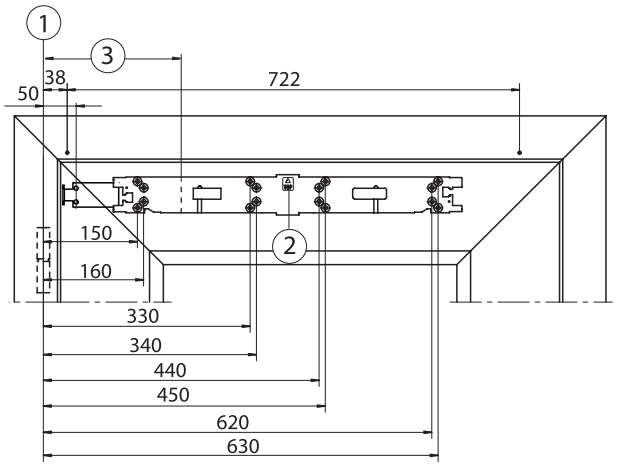
AV Spindle extension
L Lever length

4 Base - Upper edge of door
5 Space requirement for sensors
* important functional dimension

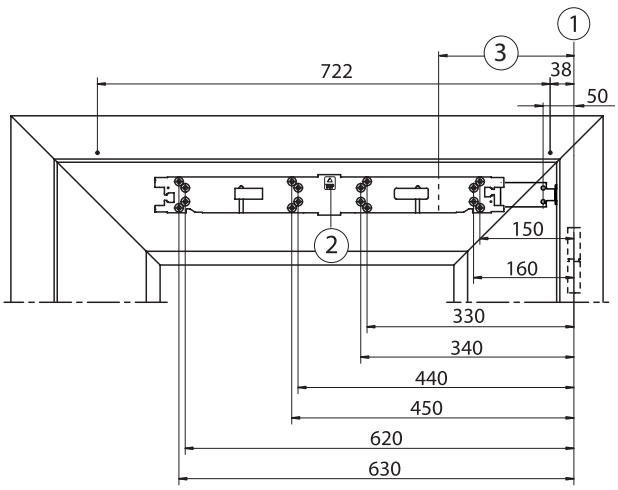
6.2.4 Door leaf installation, opposite hinge side, with standard roller guide rail

Hole pattern DIN left and DIN right reversed.

Fastening DIN right

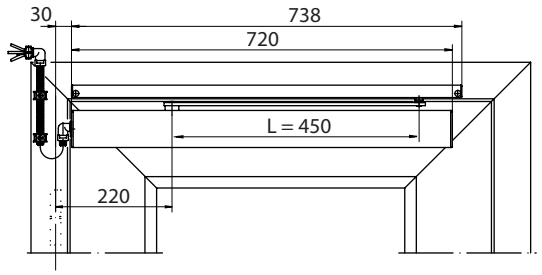


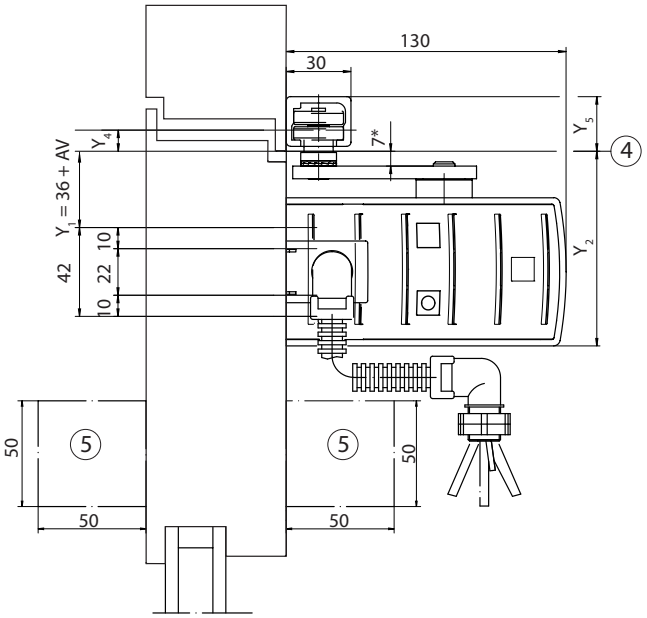
Fastening DIN left



1 Dimensional reference centre of hinge/bottom edge of frame
2 Directional arrow for precise positioning of the mounting plate
3 Hinge size 220 mm

Space requirement and fastening of standard roller guide rail





AV	Y_1	Y_2
0	36	92
30	66	122
50	86	142

Suspension bolt	Y_4	Y_5
Standard	10	46
23 mm elongated	33	69

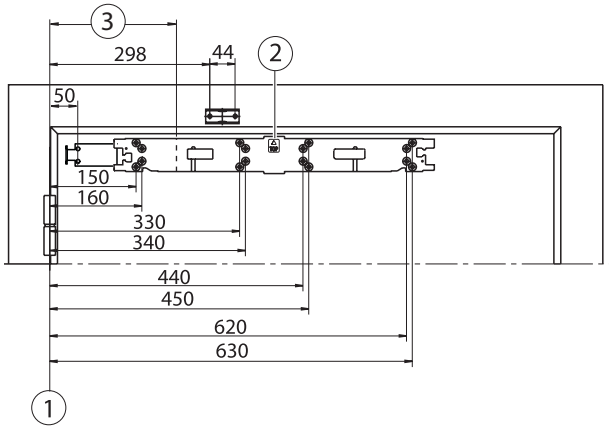
AV Spindle extension
L Lever length

4 Base lower edge of lintel
5 Space requirement for sensors
* important functional dimension

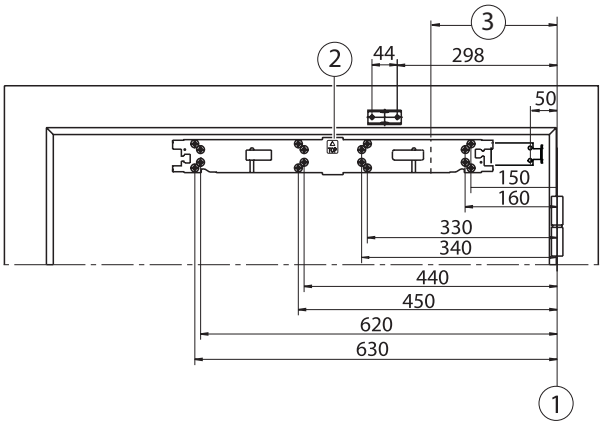
6.2.5 Door installation, hinge side, with link arm

Hole pattern DIN left and DIN right reversed.

Fastening DIN left

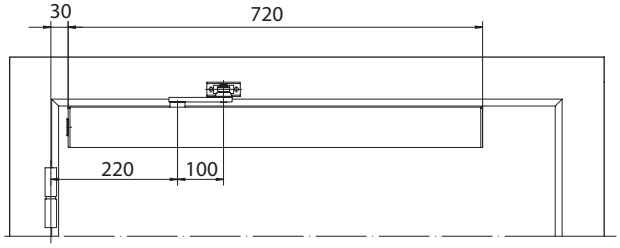


Fastening DIN right



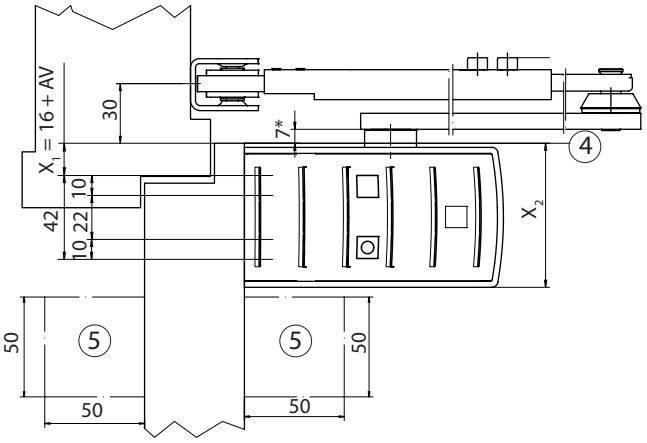
1 Dimensional reference centre of hinge
2 Directional arrow for precise positioning of the mounting plate
3 Hinge size 220 mm

Space requirement and fastening of link arm



AV	X_1	X_2
0	16	72
30	46	102
50	66	122

AV Spindle extension

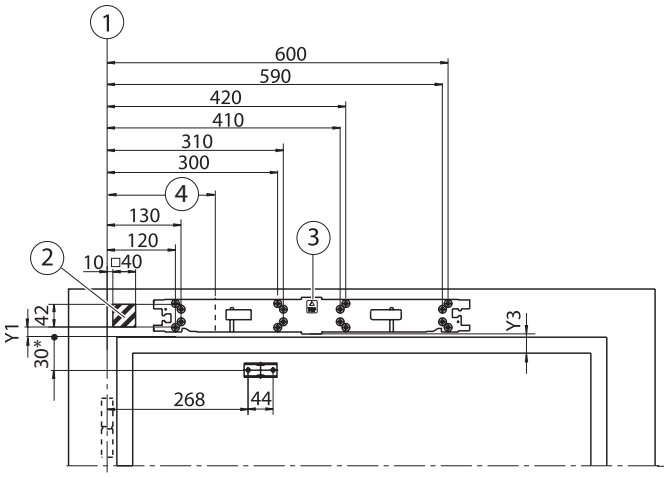


4 Base - Upper edge of door
5 Space requirement for sensors
* important functional dimension

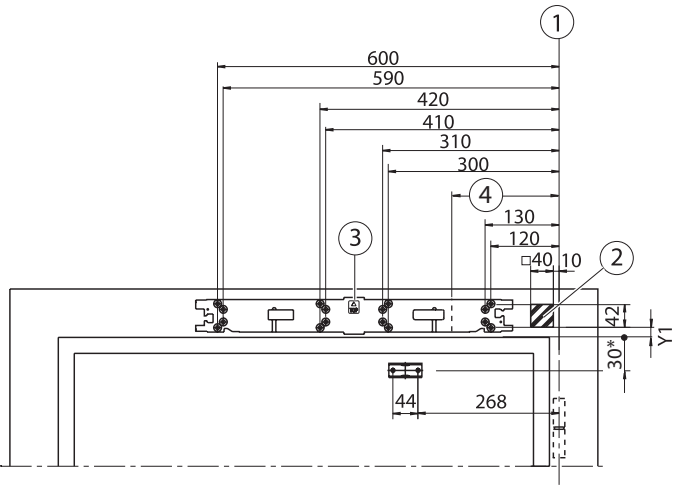
6.2.6 Transom installation opposite hinge side with link arm

Hole pattern DIN left and DIN right reversed.

Fastening DIN right

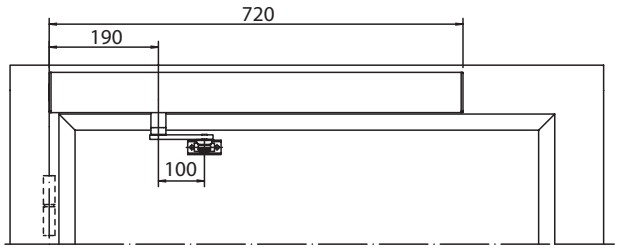


Fastening DIN left



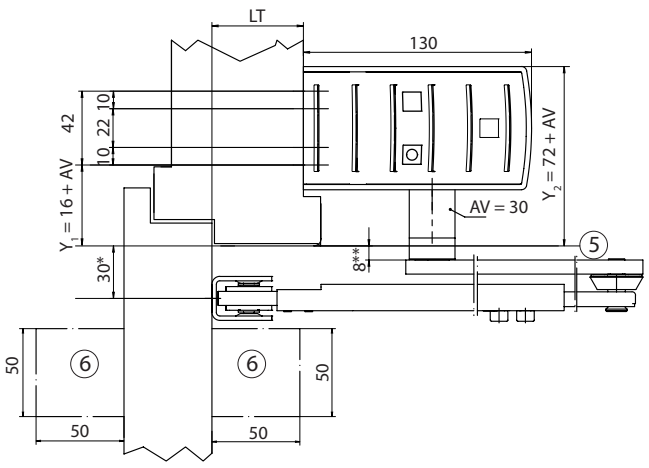
1 Dimensional reference centre of hinge
2 concealed line-feed possible in the hatched area, e.g. Ø 20 mm for the mains connection cable or low-voltage connection (a side line-feed is also possible as an option, see chapter 7.2)
3 Directional arrow for precise positioning of the mounting plate
4 Hinge size 190 mm
* With sensor adapter 35.5 mm

Space requirement and fastening of link arm



AV	Y_1	Y_2	Y_3
0	16	72	5
30	46	102	35
50	66	122	55

AV Spindle extension



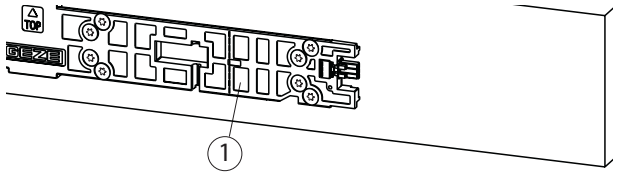
5 Base lower edge of lintel
6 Space requirement for sensors
* With sensor adapter 35.5 mm
** important functional dimension
LT Reveal depth

6.2.7 1-leaf installation with cover extension kit or extended cover

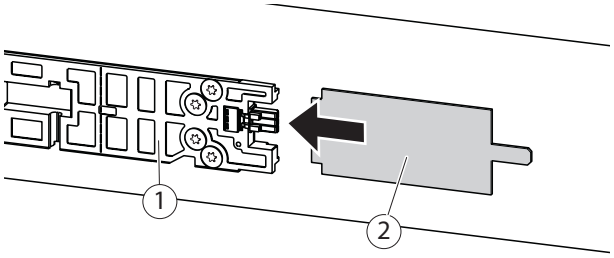
Only install approved components.

Partitioned cover, length = min. 115 mm

- Install the mounting plate (1) (refer to chapter 7.1).

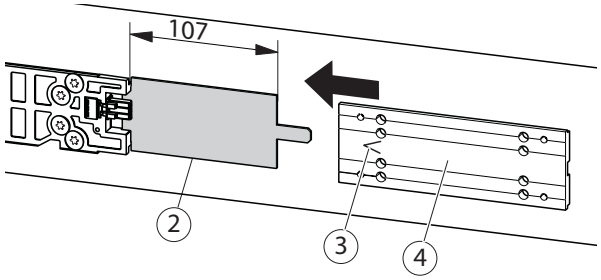


- Slide the template (2) into the mounting plate (1).



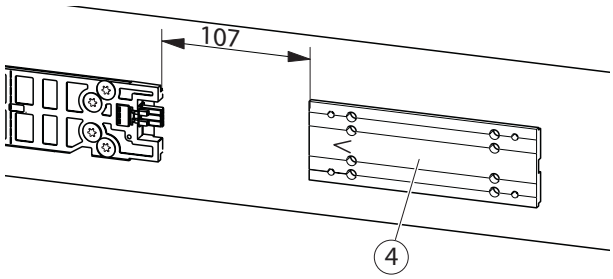
- Adjust the base plate (4) to the template (2) or the shape of the door using a spirit level if necessary.
- Mark the drill hole positions.
- Remove the template.

If a smoke switch is installed, the V-marking (3) must be pointing towards the drive.



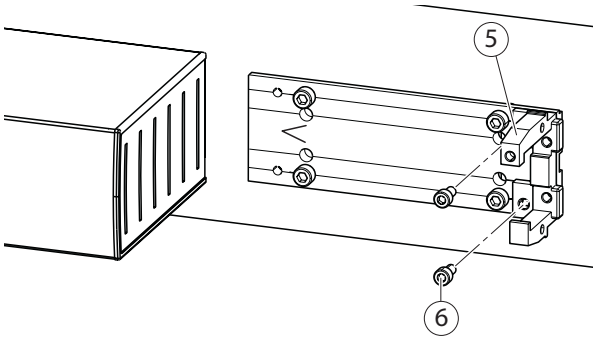
- Drill bore-holes and screw down the base plate (4).

If the base plate is longer than 500 mm, additional fixing drill holes are prepared in the centre of the base plate.



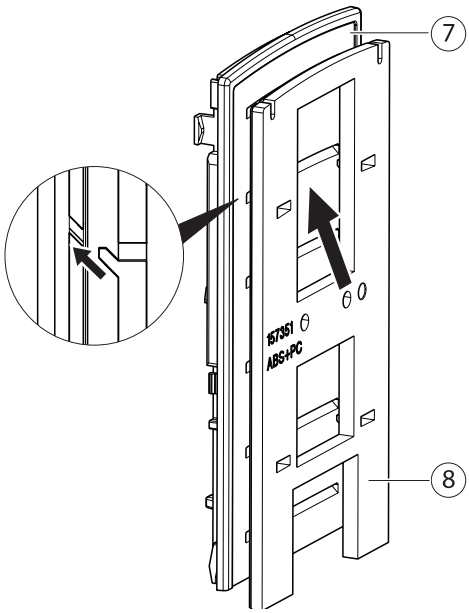
- Fix the cover fixings (5) with 2 cylinder head screws M5 × 10 (6) each.

If the base plate is longer than 500 mm, an additional cover fixing is provided in the centre.

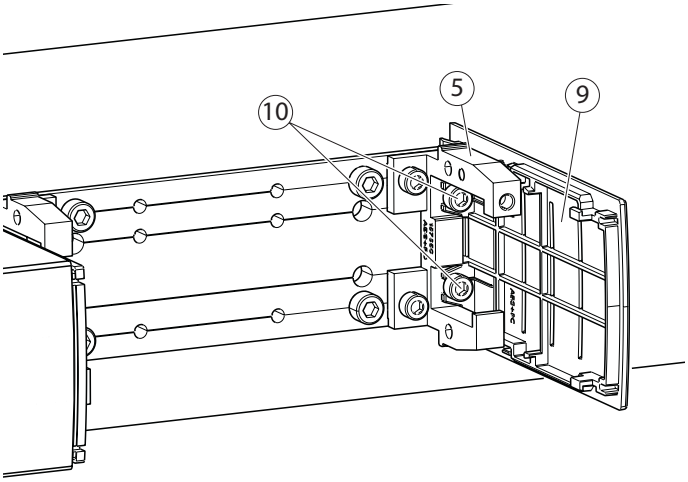


- ▶ Take the side panel (7) off the drive.
- ▶ Push the additional side panel (8) into the side panel from below.

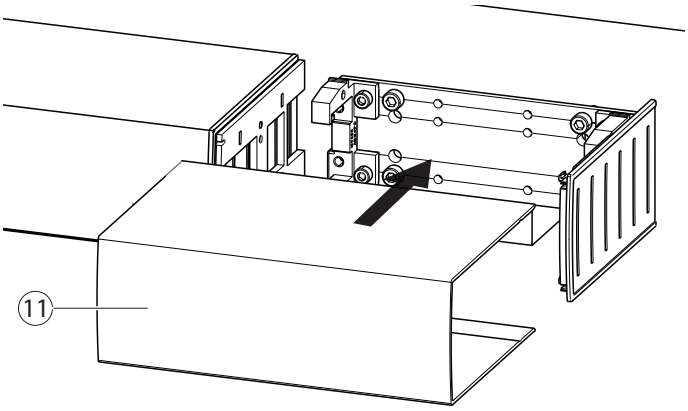
Not for continuous cover.



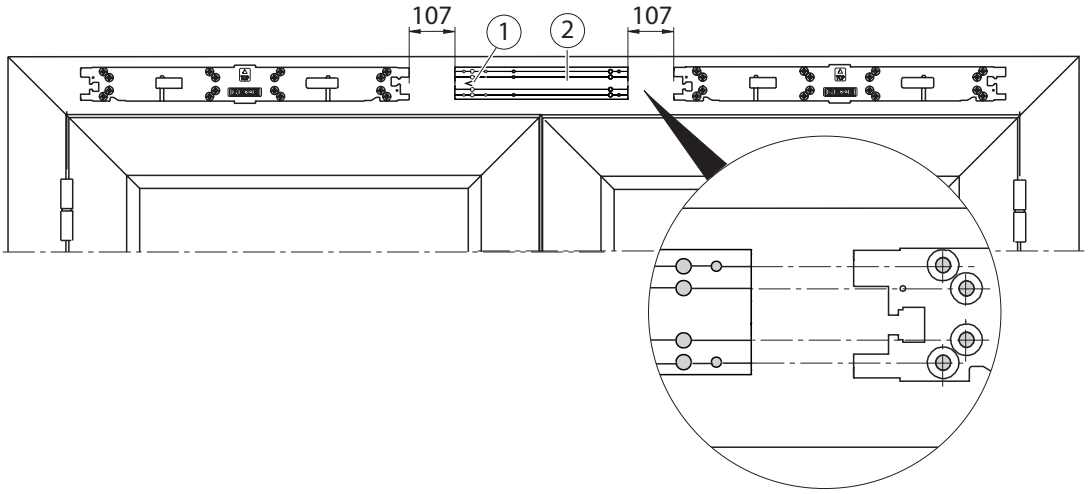
- ▶ Attach the side panel (9) to the cover fixing (5) using 2 screws M5 × 10 (10).



- ▶ Push the divided cover (11) or, as the case may be, the continuous cover, onto the cover fixing.



6.2.8 2-leaf installation with intermediate cover kit with partitioned or continuous cover

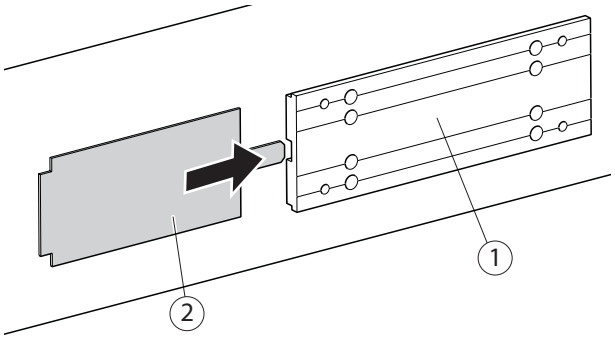


- ▶ Adjust the position of the base plate (2) in the centre or in relation to the shape of the door, using a spirit level if necessary.

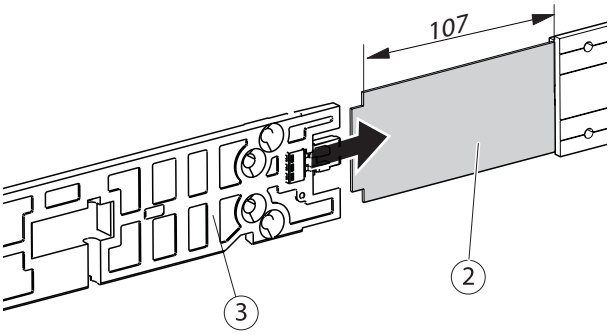
If a smoke switch is installed, the V-marking (1) must be pointing towards the active leaf.

Vertical adjustment for
- Transom installation hinge side with standard roller guide rail see chapter 6.2.1
- Transom installation opposite hinge side with standard roller guide rail see chapter 6.2.2
- Transom installation opposite hinge side with link arm see chapter 6.2.6

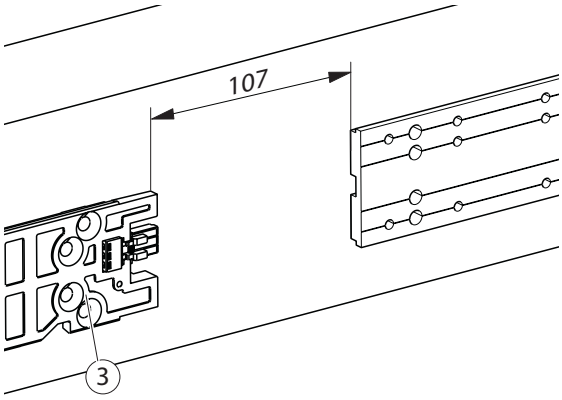
- ▶ Mark the drill hole positions for the base plate (1).
- ▶ Screw down the base plate.
- ▶ Insert the template (2) into the base plate (1).



- ▶ Slide the mounting plate (3) into the template.
- ▶ Adjust the position in relation to the shape of the door using a spirit level.
- ▶ Mark the drill holes.
- ▶ Remove the template (2).



- Screw down the mounting plate (3).
- Install the 2nd drive on the right side in the same way.



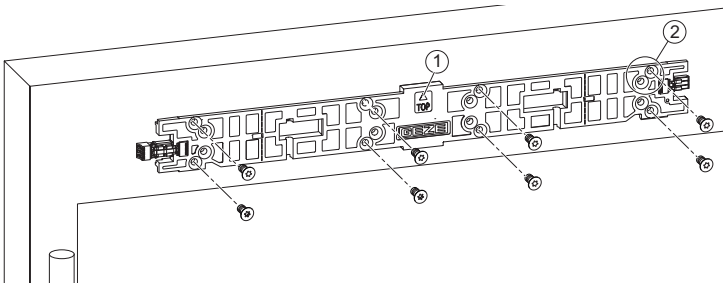
7 Installation

Heed the installation check list in chapter 11.

7.1 Installing the mounting plate

- Make sure the mounting plate is in the correct position, see directional arrow (1).
- Use one screw per screwing point (2). Refer also to "Explanation of screwing point" on page 15.
- Prefer the outer drill grooves.

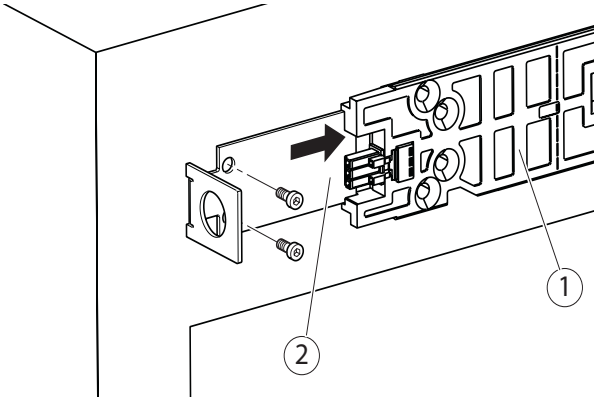
▶ Screw the mounting plate down at a minimum of 8 screwing points.



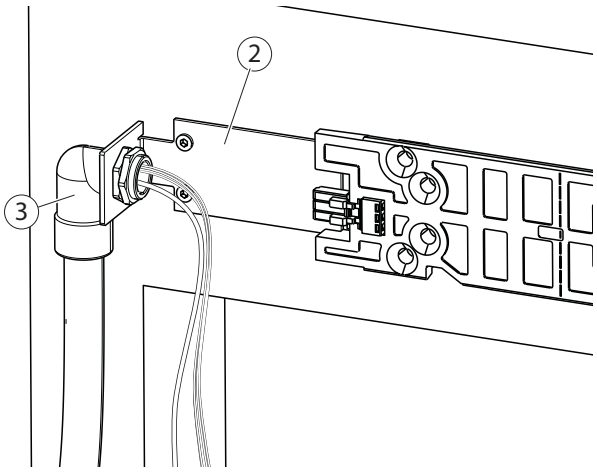
7.2 Cable guide surface-mounted on the hinge-side end cap

7.2.1 Cable guide via door transmission cable for door leaf installation

▶ Push the connecting bracket (2) under the mounting plate (1) and screw it tight using 2 screws.



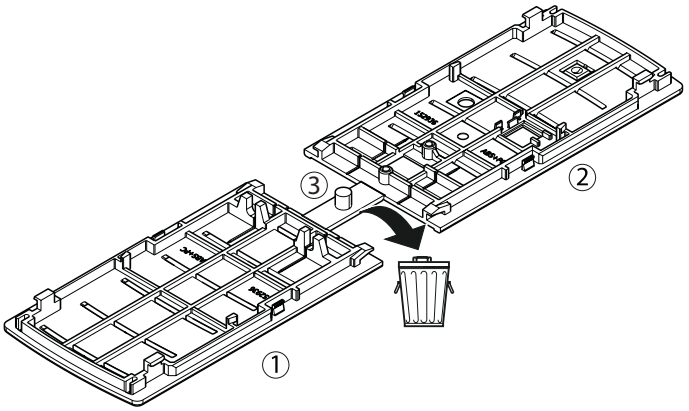
▶ Screw the door transmission cable onto the connecting bracket (2).



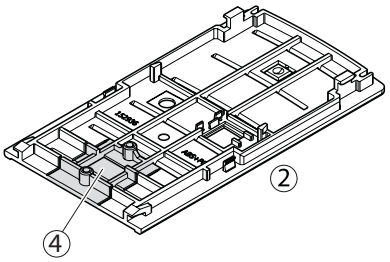
Preparing end cap

The pocket (4) only needs to be cut out if a door transmission cable is being used.
- For all other installation types, carefully detach both side panels (1) and (2).

- Remove the side panels from the packaging and carefully detach the left-hand side panel (2).
- Dispose of the gate (3).



- Cut the pocket (4) out of the end cap (2) along the perforation.
- Install the end cap, see chapter 9.3.2.

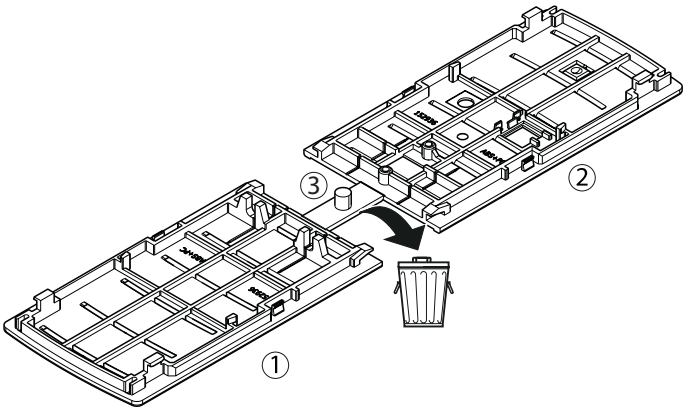


7.2.2 Sensor cable guiding via door transmission cable in the case of transom installation

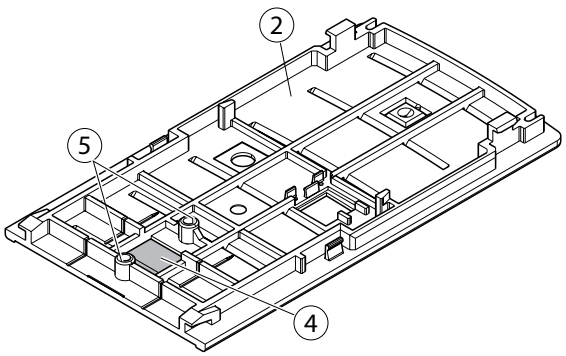
Preparing end cap

Cutting out a pocket (4) and drilling through the screw domes (5) is only necessary when a drip loop is used from the sensor to the drive.

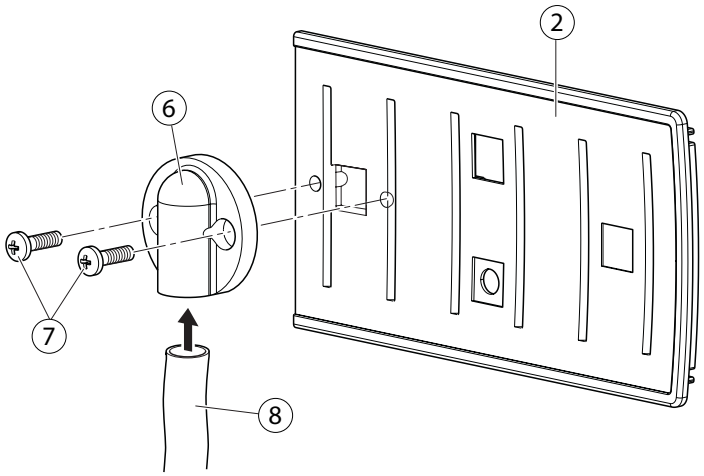
- Remove the end caps from the packaging and carefully detach the left-hand end cap (2).
- Dispose of the gate (3).



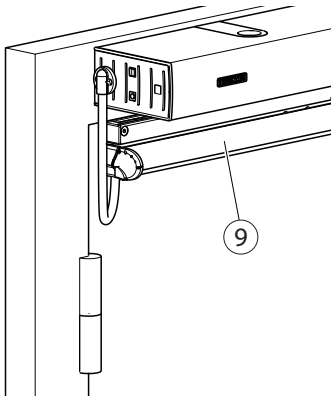
- Cut the pocket (4) out of the end cap (2) along the perforation.
- Drill blind holes with a drilling diameter of 2.5 mm on the screw domes (5).



- Insert corrugated tube (8) into the wall bracket (6).
- Use the two enclosed screws (7) to install the wall bracket (6) on the end cap (2).

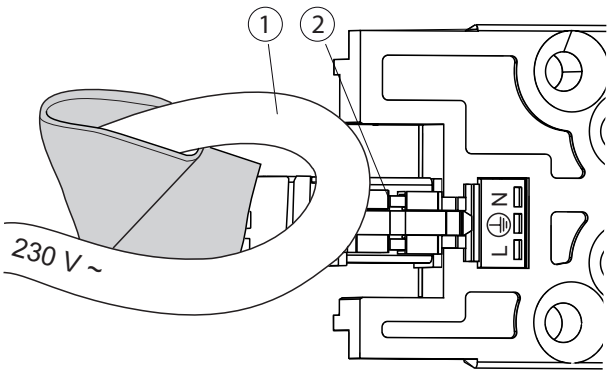


- Place the sensor cable in the corrugated tube (8).
- Connect sensor cable in accordance with the installation instructions for the sensor (9).



7.3 Preparing the electrical connection

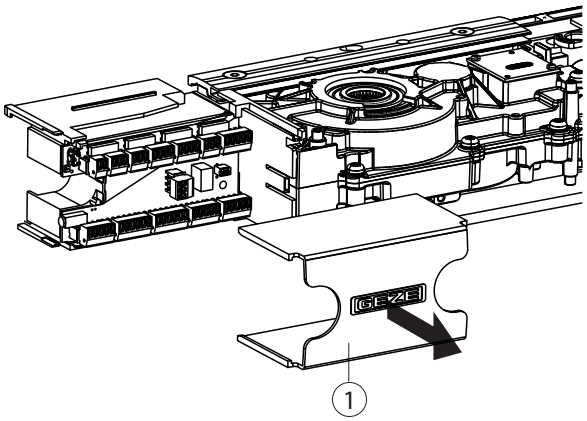
- Lay the 230 V connection cable (1) flat above the plug connection (2).
- For further working steps, see the wiring diagram Powerturn, mat. no. 154919.



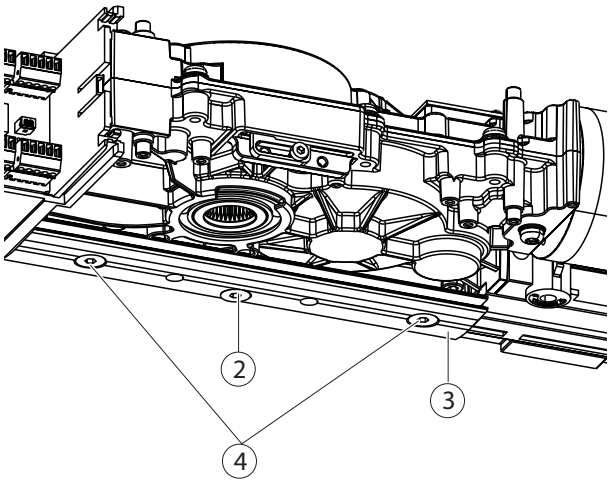
7.4 Preparing the drive

- For the correct position and alignment of the drive, see chapter 6.2.
- At the drive, detach the clamping claw (3) located on the **lower** side after the drive has been installed.
- Only loosen the clamping claw by approx. 3–6 mm otherwise the flat ribbon cable could slip out of the clamping claw (3).
  Danger of crushing the cable.

- Remove the e-cover (1).

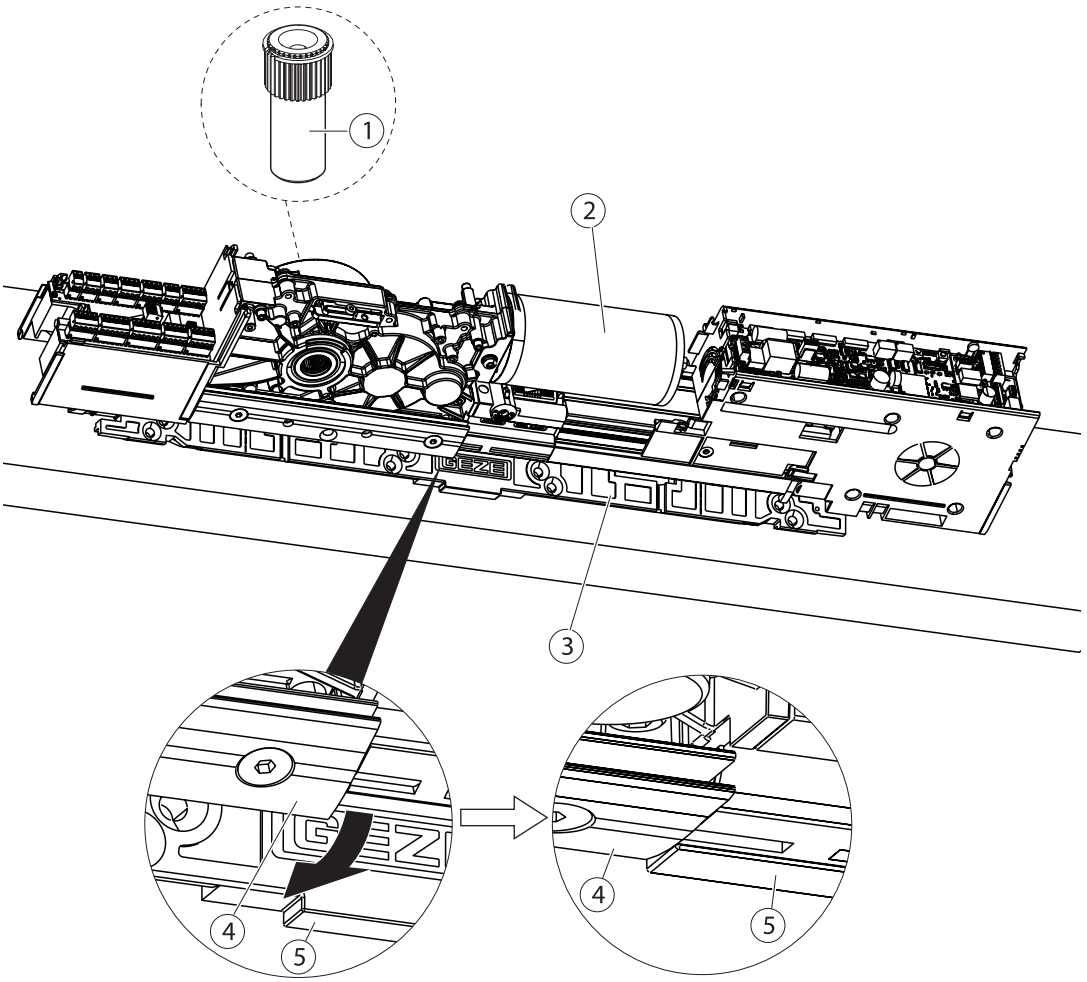


- Undo the 2 screws (4) on the lower clamping claw (3).
- Unscrew and keep the screw (2) M6 × 40.

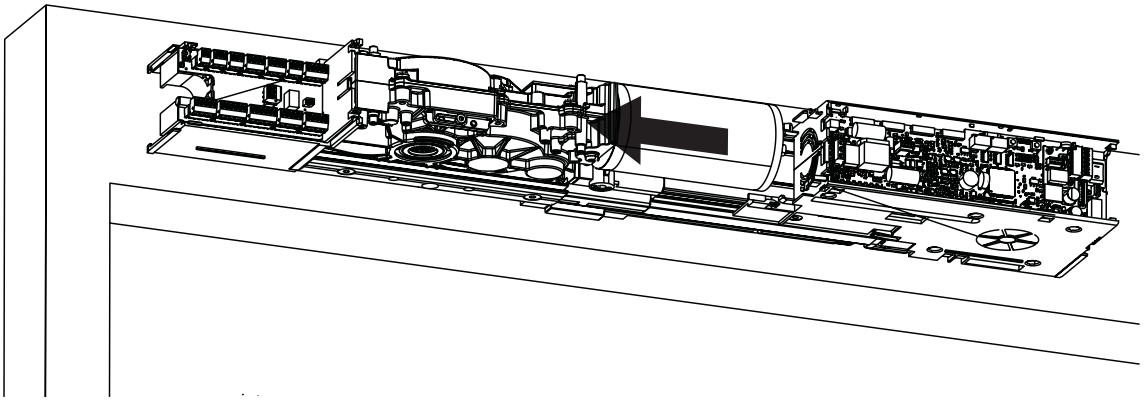


7.5 Hooking the drive into the mounting plate

- The connector panel must be loosened with 5-10 mm clearance to the ceiling above, see chapter 7.6.
- If there is insufficient space above the drive, insert the counter piece (1) and the optional spindle extension **before** the drive is installed (see chapter 7.12 and 7.13).



▶ Hook the drive (2) into the mounting plate (3) from above.
The clamping claw (4) and the shoulder (5) of the mounting plate (3) must line up with each other for this.



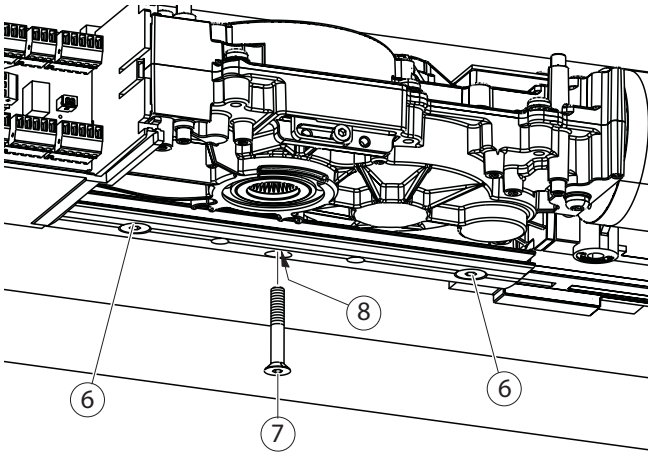
▶ Push the drive on the mounting plate firmly towards the door hinge (range of movement = approx. 20 mm).
▶ Check for smooth movement.
▶ Make sure that no cables become jammed in the connector panel.

▫ When it comes to the installation of the door, the hinge-side side panel must be clipped on before the drive is pushed in the direction of the hinge.

The drive is considered to have been installed properly when the screw tunnel (8) for the screw (7) is aligned.

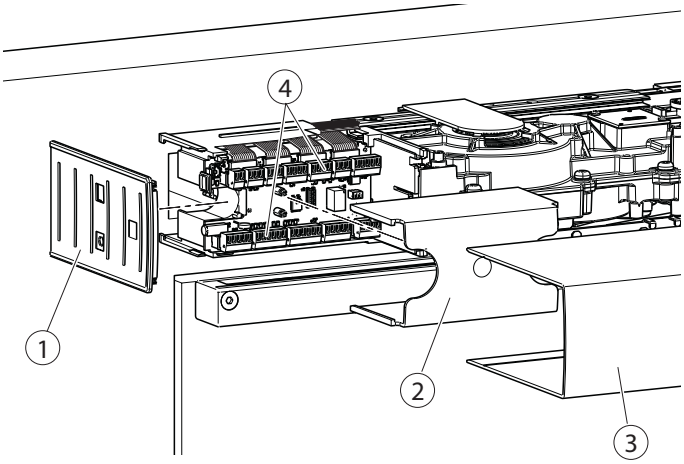
- ▶ Screw in the screw (7) (M6 × 40) (tightening torque approx. 10 Nm).
- ▶ Tighten the screws (6) at the lower clamping claw (tightening torque approx. 10 Nm).

The drive is now fixed on the mounting plate.



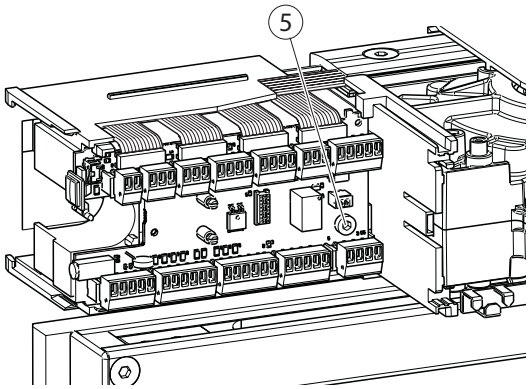
7.6 Access to the 230 V connection with drive installed

- ▶ Remove the cover (3), e-cover (2) and the side panel (1).
- ▶ Unplug the plug-in connectors from the plugs (4) of the connector panel.

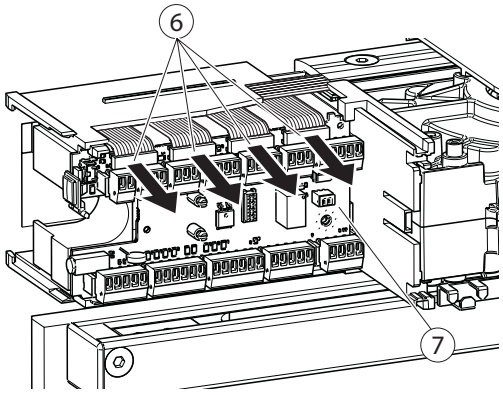


- ▶ Pay attention to the crown gear while removing the earthing screw.

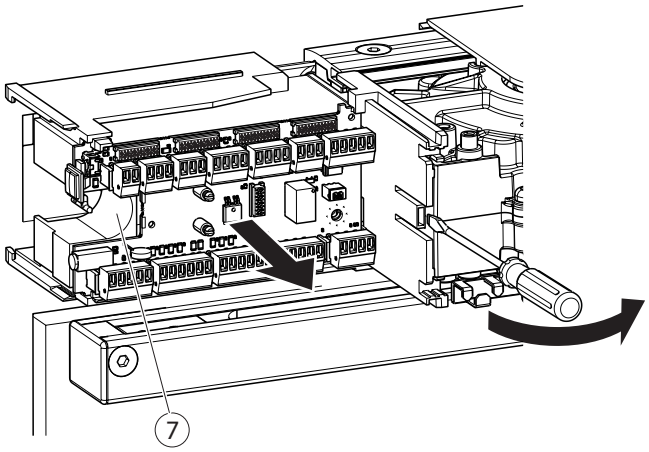
- ▶ Unscrew and keep the earthing screw (5).



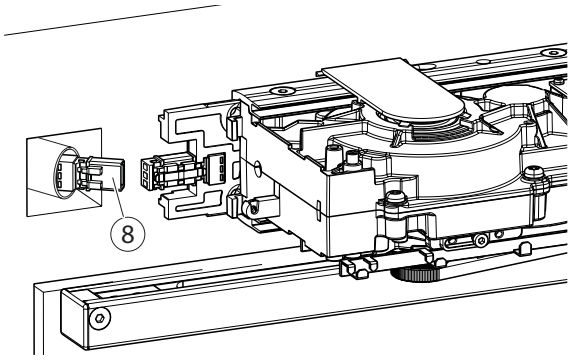
- ▶ Pull the flat ribbon cable (6) off the connector panel (7).



- Use a screwdriver to remove the connector panel (7) incl. housing, and detach it in the direction of the arrow.



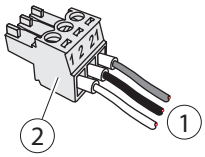
The 230 V terminal (8) is now accessible and can be connected.



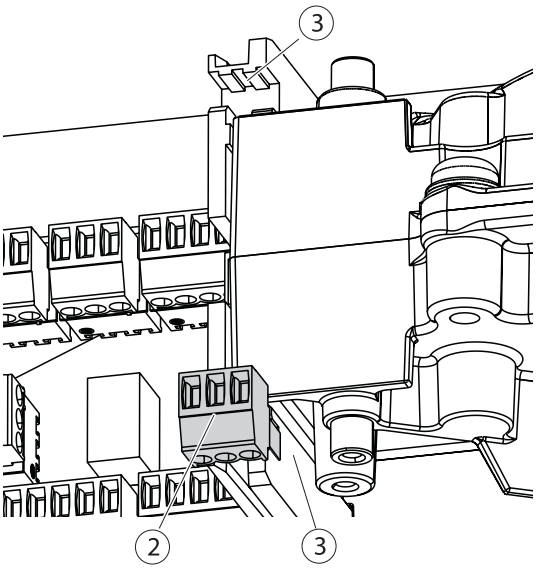
- Then mount all parts again in reverse order. Make sure that the ribbon cables have been laid properly again.

7.7 Establishing electrical plug-in connections

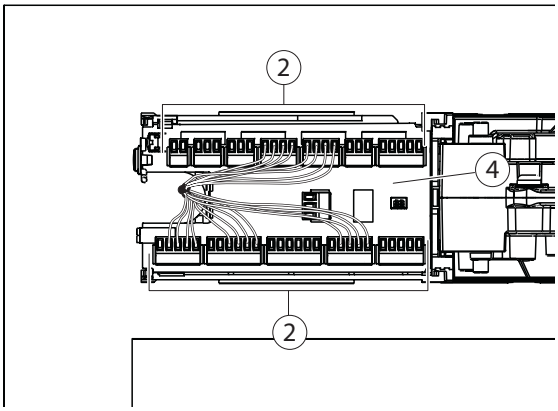
- Connect the sensor cables and control cables (1) to the enclosed connectors (2) as per the wiring diagram.



To simplify the installation process, the connectors (2) can be attached in the position shown (3).



- Connect the electrical plug-in connectors (2) to the adapter board DCU802 (4) (refer to the wiring diagram for the Powerturn).

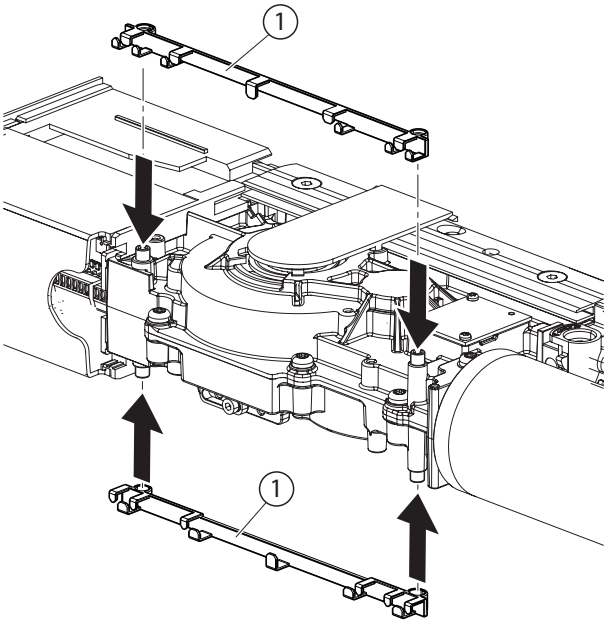


7.8 Installing cable guides

A cable guide can be used to route cables through the drive. The max. cable diameter at the top and bottom is 6 mm.

- With 2-leaf systems there is a danger of collision with the closing sequence control Powerturn IS.

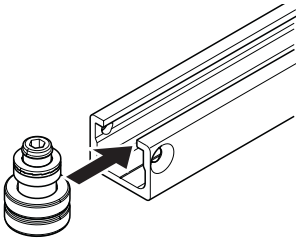
- Insert the cable guide (1) onto the gear at the top or bottom.



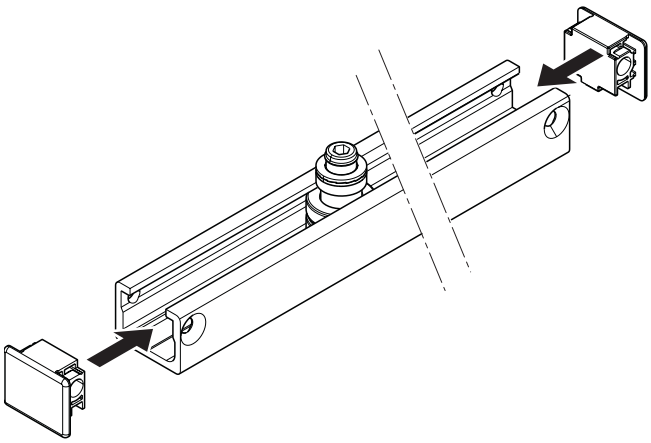
7.9 Installing the standard roller guide rail

Heed the separate installation instructions for sensor roller guide rail.

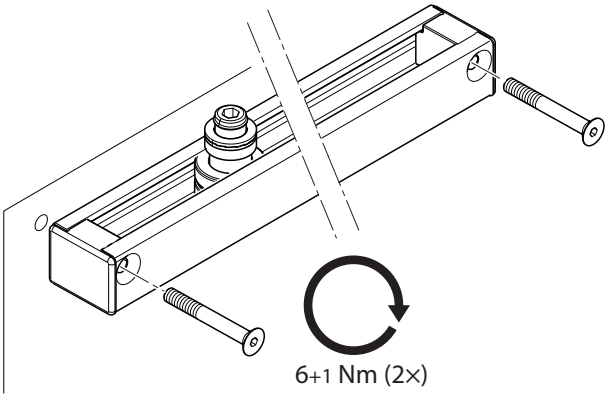
- Push the suspension bolts completely into the rail.
- Push the optional opening restrictor into the rail (refer to chapter 7.10).



- Insert the end caps left and right into the standard roller guide rail.



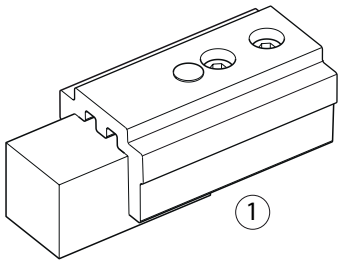
- Screw the standard roller guide rail on with 2 screws. Tightening torque 6^{+1} Nm (2×).



7.10 Installing the integrated opening restrictor

When a suspension bolt extension is used, an external door stopper must be set instead of the integrated opening restrictor.

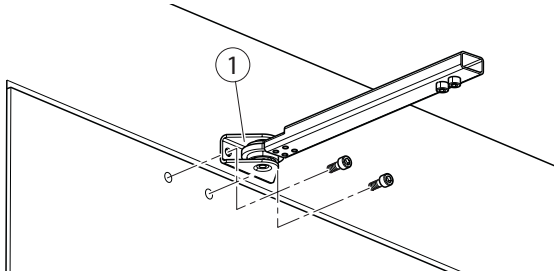
The installation process for the integrated opening restrictor (1) is described in the installation instructions for the opening restriction, mat. no. 156338.



7.11 Installing the link arm bearing block

Follow separate installation instructions in situations involving the use of the sensor link arm.

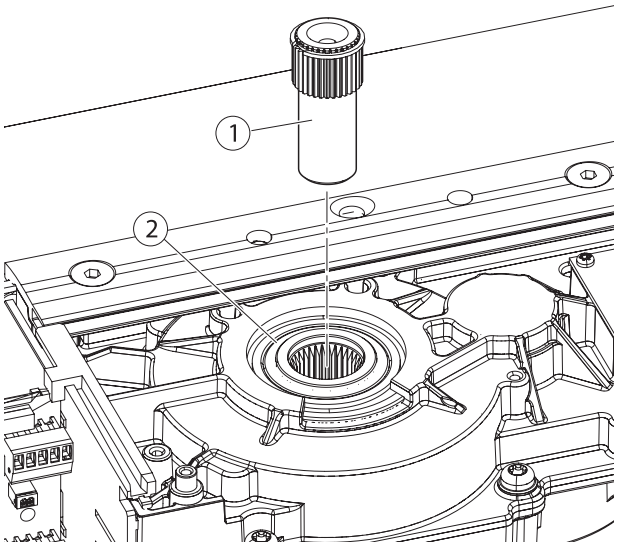
- ▶ Screw the link arm bearing block (1) on with 2 screws.



7.12 Inserting the counter piece

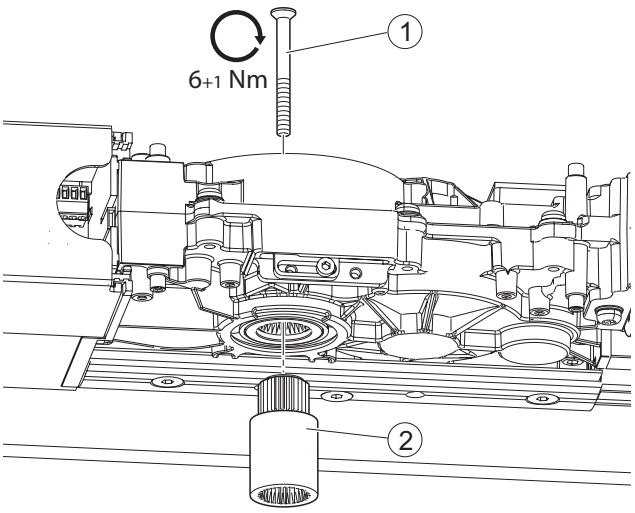
- ▶ If there is insufficient space above the drive, insert the counter piece before the drive is installed.

- ▶ Insert the counter piece (1) into the drive (2) from above.



7.13 Installing the spindle extension

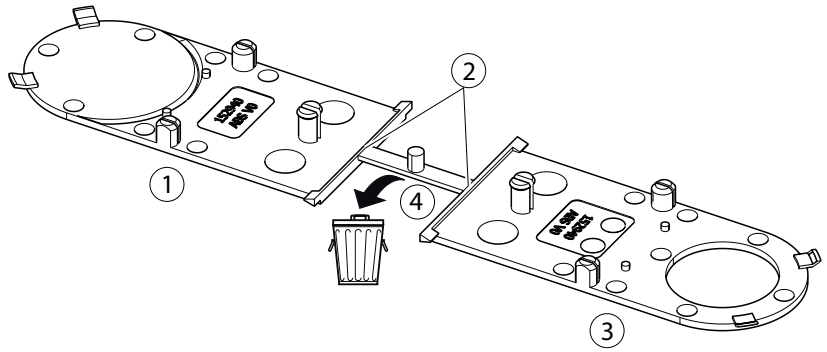
- ▶ Insert the spindle extension (2) into the drive from below.
- ▶ Fasten the spindle extension using a countersunk screw (1).
  Tightening torque 6+1 Nm.



7.14 Installing the shaft cover

Both shaft covers must be inserted before the lever is installed.

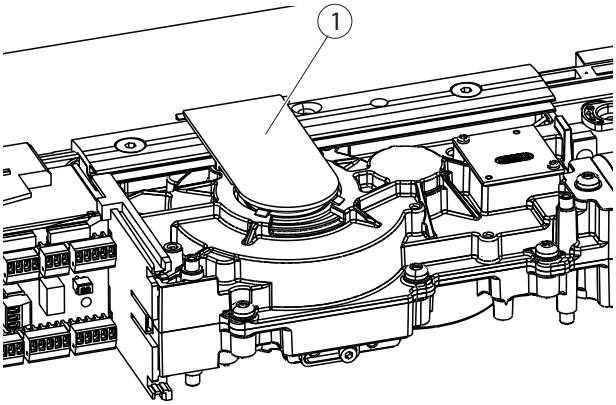
Preparing the shaft covers



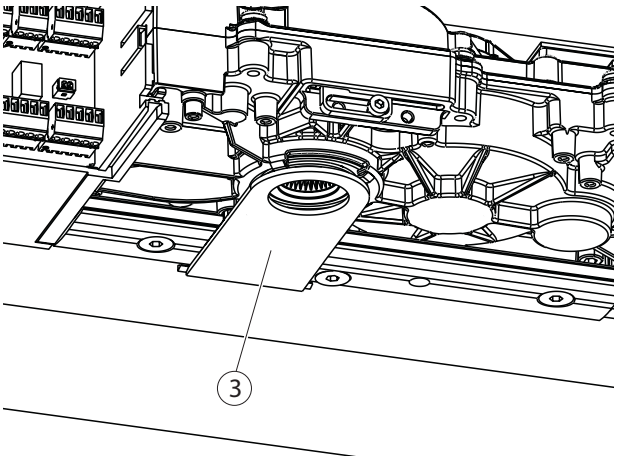
1 Shaft cover on the counter piece side
2 Disconnection points
3 Shaft cover on the lever-side
4 Gate

- ▶ Carefully detach both shaft covers at the disconnection points (2).
- ▶ Dispose of the gate (4).

- ▶ Install the shaft cover (1) on the counter piece side.



- ▶ Install the shaft cover (3) on the lever side.



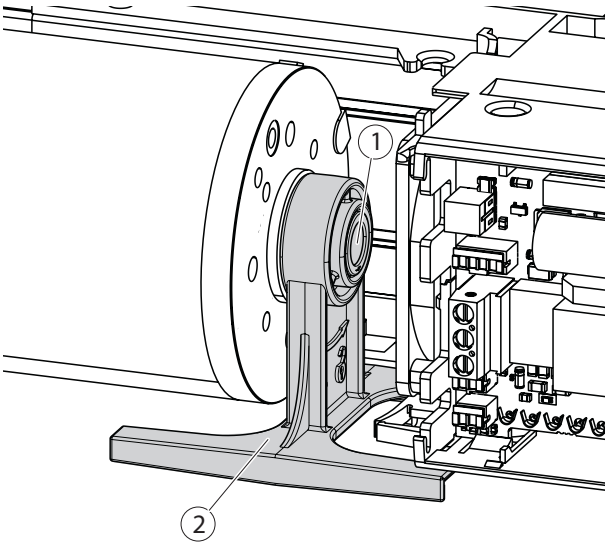
7.15 Fitting the mounting aid

- The mounting aid (mat. no. 158454) is only required for installing the roller guide rail. It is not required for installing the link arm.
- The mounting aid is reusable, and can remain with the fitter.

When the mounting aid (2) has been attached, the lever can be tensioned in the direction of the opening in a manner that ensures that it remains in this position.
Heed the direction of rotation. The installation aid only produces a locking effect in one direction.

▶ If necessary, attach the installation aid the other way round.

▶ Position the mounting aid (2) on the motor shaft (1).



7.16 Installing and removing the lever (for installation with roller guide rail)

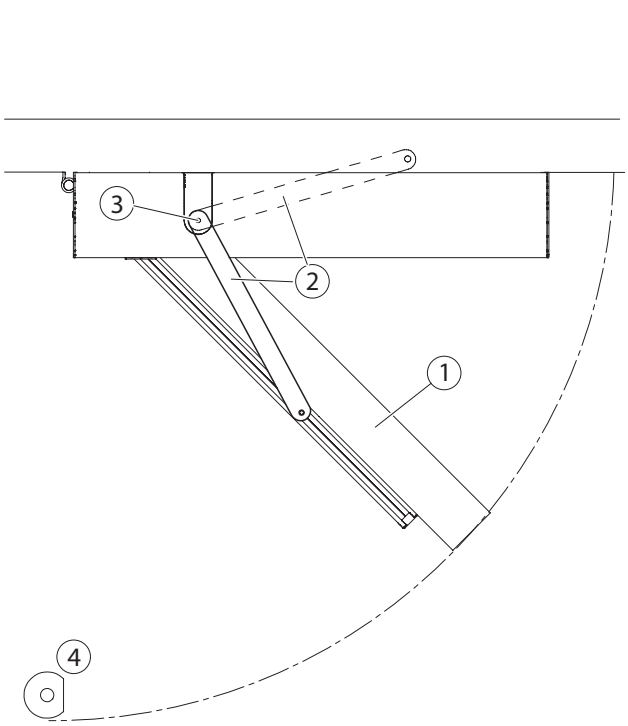
7.16.1 Installing the lever

WARNING!
Danger of injury
The mounted and pre-tensioned lever is braked electrically. If a motor cable is disconnected, the stored energy of a tensioned lever is freed without braking and the lever accelerates back into its initial position.

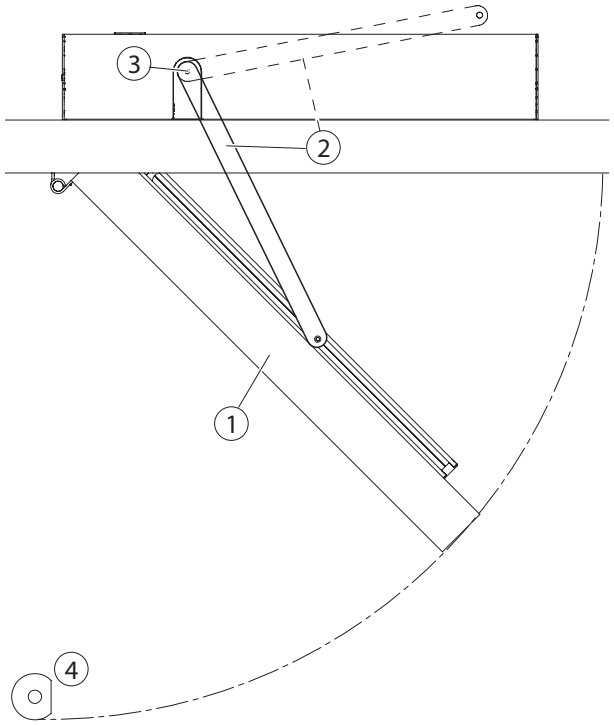
▶ Do not disconnect any of the motor cables.
▶ Check the correct connection.

Transom installation hinge side with roller guide rail

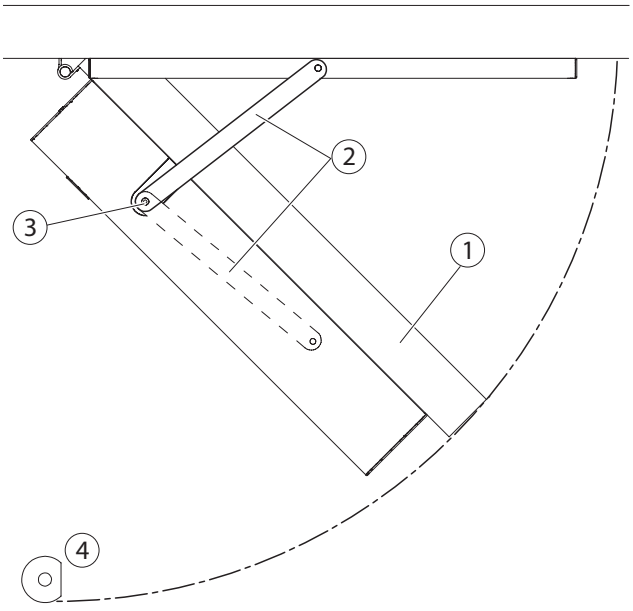
- ▶ Note the chart with preload, see "Transom installation-hinge side-rail / reveal / max. door opening angle chart" on page 14



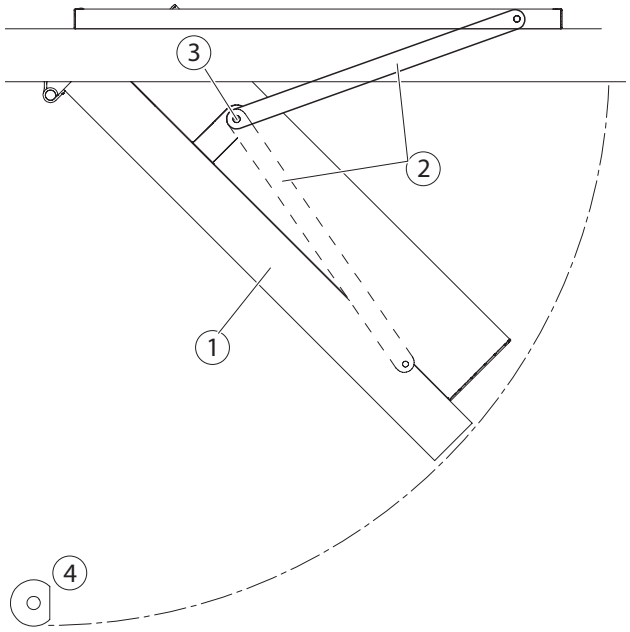
Transom installation opposite hinge side with roller guide rail



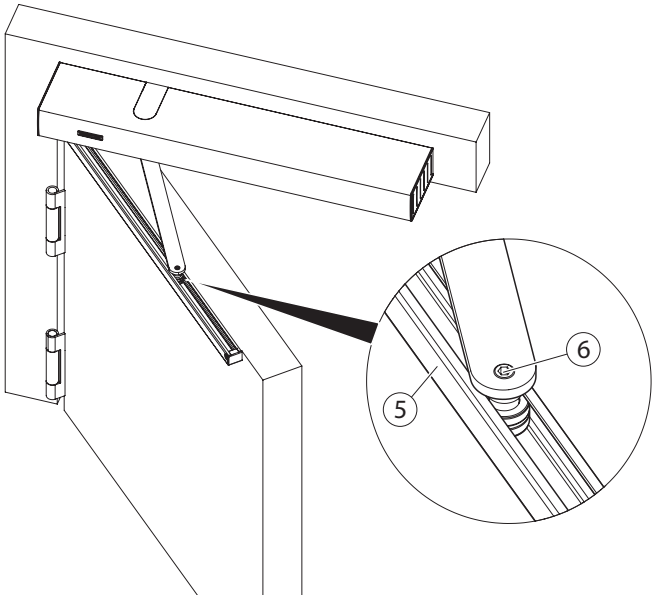
Door leaf installation hinge side with roller guide rail



Door leaf installation opposite hinge side with roller guide rail



- ▶ Open the door (1).
- ▶ Attach the mounting aid (see chapter 7.15).
- ▶ Install the lever (2) as shown in the dotted position.
  Additional fitting instructions on the supplementary installation sheet, see chapter 12
- ▶ Tighten the screw (3) (tightening torque: approx. 10 Nm).
- ▶ Check whether the mounting aid has been installed properly.
- ▶ Pretension the lever (2), until it becomes possible to comfortably install the suspension bolts.



- ▶ Align the door with the roller guide rail (5) and the suspension bolts (6).

Danger of damage to the thread.
- ▶ Ensure that the suspension bolt is screwed in straight.

- ▶ Screw in the suspension bolt (6) and tighten it in a counter-clockwise direction (tightening torque = approx. 15 Nm).
- ▶ Remove the mounting aid.

The door closes and remains in the closed position on account of the pre-load.

- ▶ Install the door stop buffer (4) (for max. opening angle see chapter 5.3).
- ▶ Set the position of the integrated opening restrictor, see chapter 7.10.

7.16.2 Disassembling the lever

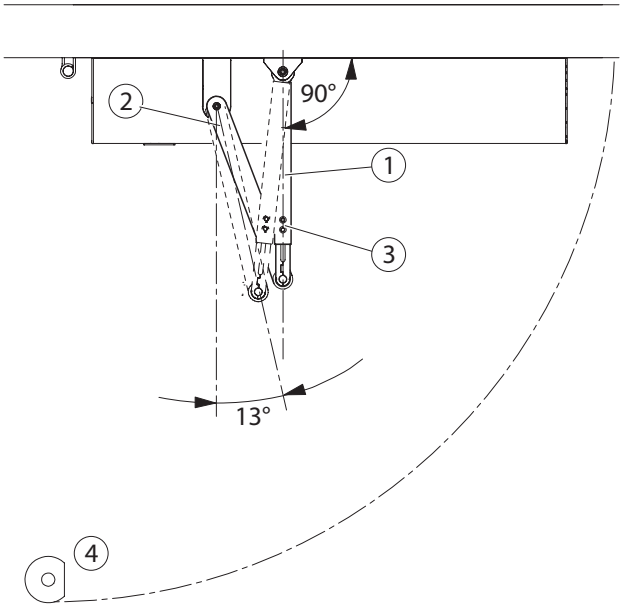
The lever is disassembled in the reverse order of installation for all types.
The door can assume any position.

Pay attention to the correct direction of rotation of the mounting aid.

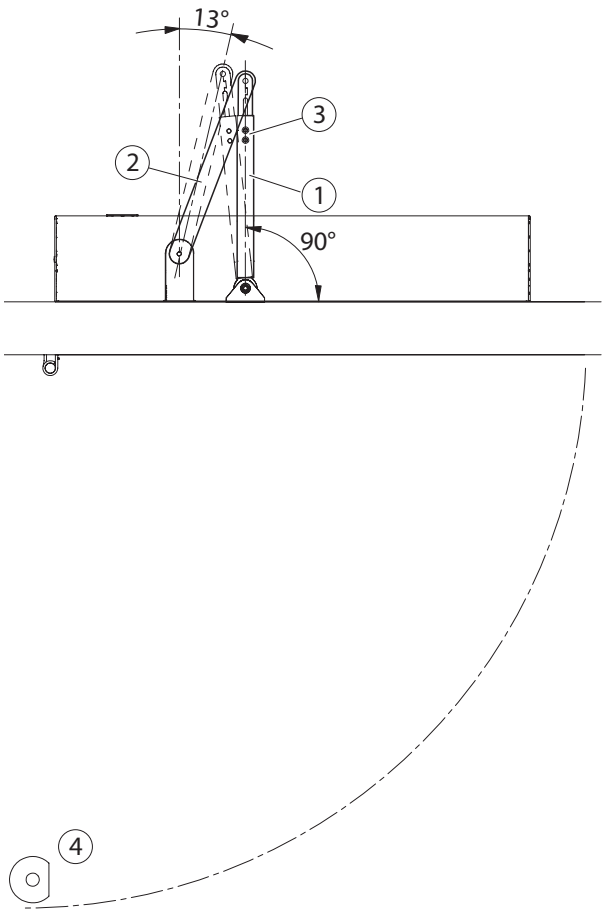
- ▶ Attach the mounting aid (see chapter 7.15).
- ▶ Release the suspension bolts and remove the lever.
- ▶ Remove the mounting aid.

7.17 Installing and removing the link arm

7.17.1 Installing the link arm



Door leaf installation hinge side with link arm



Transom installation opposite hinge side with link arm

1 Telescope bar
2 Lever
3 Screws
4 Door stop buffer

- ▶ Open the screws (3) on the telescopic rod (1).
- ▶ Move the door to the closed position.
- ▶ Attach the telescopic rod (1) to the door/door frame.
- ▶ Set the lever (2) on the drive axle (position represented by dotted lines).
  Additional fitting instructions on the supplementary installation sheet, see chapter 12
- ▶ Screw in the cylinder head screw M6 × 45 (from the “counter piece” assembly group), and tighten it with 15 Nm.
- ▶ Pre-tension the lever (2) until the telescopic rod (1) is perpendicular to the door.
- ▶ Firmly tighten the screws (3) on the telescopic rod (1).
- ▶ Install the on-site door stop buffer (4). For max. opening angle see chapter 5.3.

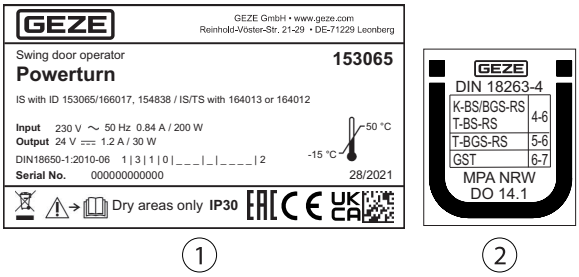
7.17.2 Removing the link arm

- ▶ Move the door to the closed position.
- ▶ Undo the screws (3) on the telescopic rod (1).
  The pre-load is relieved and the position depicted in the “link arm pre-tensioned” illustration is reached.
- ▶ Undo and screw out cylinder head screw M6 × 45 (from the ‘counter piece’ assembly group).
- ▶ Pull the lever (2) out of the drive axle.

7.18 Installing the integrated closing sequence selector

See additional installation instructions mat. no. 154872.

7.19 Entries on the identification plate

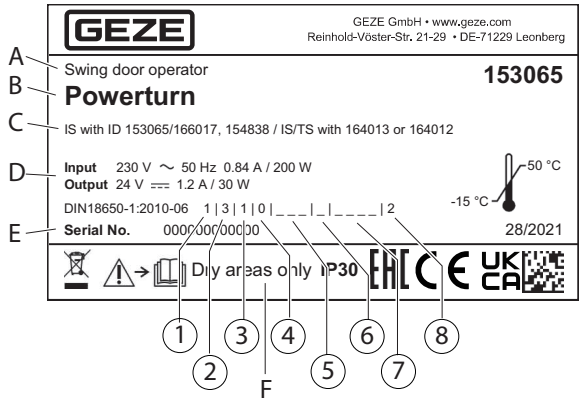


1 Identification plate
2 "Ü" symbol

The EN class range for rail installation is EN 4-6 and EN 5-6.
The EN class range for link arm installation is EN 6-7.

- The entries are obligatory.

Entries on the identification plate (in compliance with DIN 18650-1:2010-06)



① **Drive type (first character)**

1 Swing door drive (classified in the factory)

② **Durability of the drive (second character)**

3 1,000,000 test cycles, with at least 4,000 cycles/24 h (classified in the factory)

③ **Type of door design (third character)**

1 Swing door (classified in the factory)

④ **Suitability as a fire protection door (fourth character)**

0 Not suitable as fire protection door
1 Suitable as smoke protection door
2 Suitable as fire protection door
3 Suitable as fire and smoke protection door

Note: Only one class may be entered. If the Powerturn rather than the Powerturn F is installed, the digit "0" must always be entered!

⑤ **Safety devices on the drive (fifth character)**

1 Force limitation

2 Connection for external safety systems which have been approved by the drive manufacturer

3 Low-energy

Note: Several classes may be specified.

⑥ **Special requirements made on the drive/functions/installations (sixth character)**

0 No special requirements

2 On escape routes without turning fitting

4 For self-locking fire protection doors without turning fitting

Note: Only one class may be entered. Powerturn F must always be used for self-locking fire protection doors (4)!

⑦ **Safety at automatic door systems — version/installation (seventh character)**

A distinction is made between five classes of safety devices on door leaves:

0 No safety devices

1 With sufficiently dimensioned safety distances

2 With protection against crushing, shearing and drawing-in of fingers

3 With built-in turning fitting unit

4 With sensor-controlled protective devices

Note: Several classes may be entered!

⑧ **Ambient temperature (eighth character)**

2 –15 °C to +50 °C (classification factory provided)

Explanation of the text entries on the identification plate

A Product category
B Product name
C Text describing the combination options
D Electrical power data: Input / Output
E Serial number
F Use in dry rooms only

8 Electrical connection

A safety analysis must be carried out and safety sensors installed if necessary (see Powerturn wiring diagram).

8.1 Mains connection

WARNING!
Risk of fatal injury due to electric shock!
- ▶ The electrical system (230 V) may only be connected and disconnected by a professional electrician.
- ▶ Carry out the power connection and protective earth connection test in accordance with applicable guidelines.
- ▶ Before working on the electrical system, always disconnect the system from the mains.
- ▶ Heed the wiring diagram.

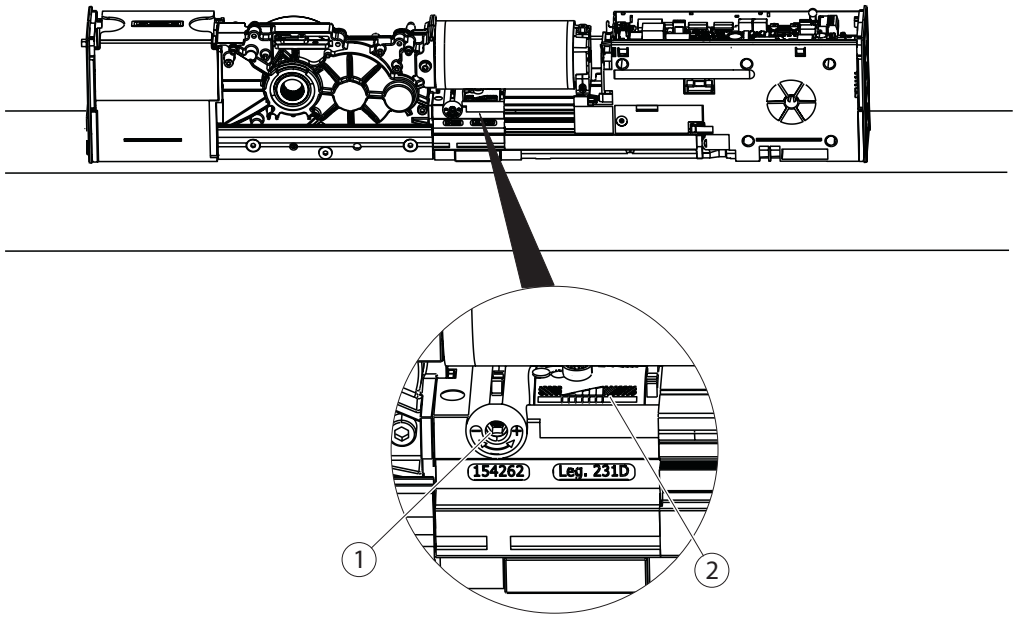
- ▫ In accordance with the valid regulations it must be possible to de-energise the drive unit at a suitable point.
- ▶ De-energise the drive unit at the main switch in the control casing.
- ▫ See the wiring diagram for further details.

9 Settings

9.1 Setting the closing force

- The closing force must be set at the power storage device for all installation types in such a way that the door closes in a secure manner when in the de-energised state. (For types of installation see chapter 5.3).
- The spring force may only be changed when the door is closed.

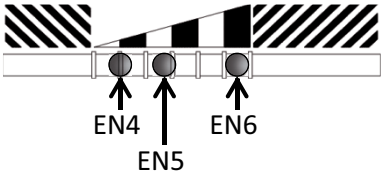
- The closing force must be set in accordance with DIN 18263-4 depending on the door width, use as a fire protection door and the assignment of EN classes (see next page).
- Measurement of the closing force is only possible in a de-energised state.
- ▶ Before measurement, activate the door at least once.
- For information regarding the setting of the spring force, see the table below.

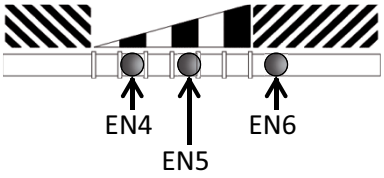
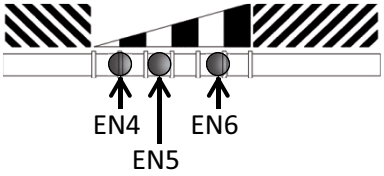
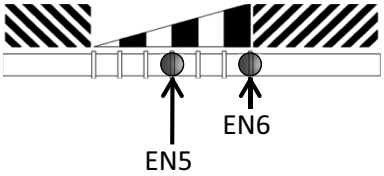
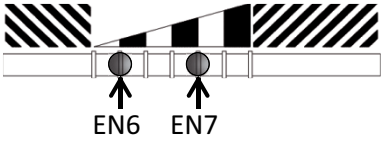
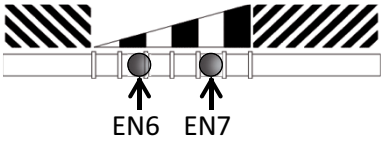


▶ Use an Allen key (size 5) to set the adjustment screw (1) to the desired spring force.
The spring force is displayed in the window (2).

- The illustrations for the EN class setting are only intended as a guide.
- The closing torques to be observed at 0–4° door opening angle are listed in the table below.
- Risk of faults on the drive. Do not exceed maximum closing torques.

DIN 18263-4	EN 4	EN 5	EN 6	EN 7
max. door width (mm)	1100	1250	1400	1600
∢ 0–4° $M_{min.}$ [Nm]	26	37	54	87

Type of installation	Max. closing torque / at 0–4° TÖW [Nm]	Setting the spring force
Transom installation hinge side rail	59 (70) *	

Type of installation	Max. closing torque / at 0–4° TÖW [Nm]	Setting the spring force
Transom installation opposite hinge side rail	63 (65) *	
Door installation hinge side rail	70 (78) *	
Door installation opposite hinge side rail	59 (62) *	
Door installation hinge side link arm	128 (128) *	
Transom installation opposite hinge side link arm	97 (123) *	

* Values in brackets at max. door opening angle 95°

9.2 Closing time and latching action function for de-energised operation

Danger of jamming due to excessive door acceleration.
▶ Do not set more than 10° latching action on the door.

The closing speed must be set using the braking force parameter to match the drive version, type of installation and door weight.

- A power connection is necessary for setting the braking force parameter.
- See the Powerturn wiring diagram for more details on setting the braking force parameter.

▶ Set the "braking force" parameter using
  - DPS (display programme switch):
    b2 01 … 14.
  - ST220 (service terminal):
    Set "Movement parameters", "Speeds", "Braking force" using the keys or to the desired braking force (01 … 14) and press the ↵ key.

Setting "brake force" parameter with Powerturn F
Brake force parameter (standard value = 13).
▶ Set the closing time to 5 s.
Measure the closing time:
▶ Open the door up to 90° in the de-energised state.
▶ Release the door and record the time until the closed position is reached.
▶ Repeat the procedure if necessary until the closing time is suitable. Refer to the wiring diagram for the Powerturn in addition.

Setting “brake force” parameter with Powerturn (without fire protection requirement)
The closing speed must be set in such a way that the requirements on low-energy function are met in the de-energised state.

- ▶ Measure the closing time from 90° to 10° and set depending on door weight and door leaf width (refer also to the table in the “Low-energy function” chapter in the Powerturn wiring diagram).

Adjusting latching action
When the drive reaches the switching point of the latching action switch, the braking effect is cancelled by the motor.

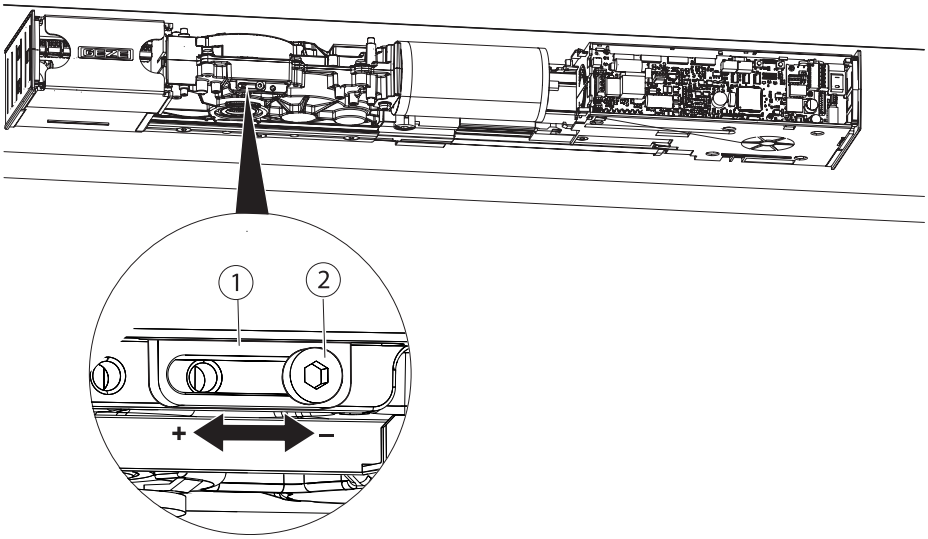
- ▶ Undo the Allen screw (2).

Door falls too heavily into the lock:

- ▶ Move the face plate (1) in the “–” direction.

Door does not fall safely into the lock:

- ▶ Move the face plate (1) in the “+” direction.
  The braking effect is interrupted earlier.
- ▶ Tighten the Allen screw (2).



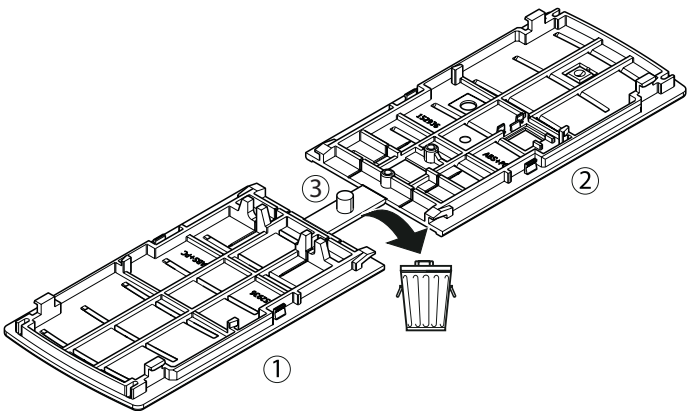
The latching action is active in the illustrated position.
The latching action position can be adapted to the circumstances at the door.
The setting of a minimum latching action is obligatory (safety function).

9.3 Final installation

9.3.1 Breaking the end caps out

- ▶ Remove end caps (1) and (2) from the packaging, carefully detach them from the bar.
- ▶ Dispose of the gate (3)

1 Right end cap
2 Left side panel
3 Gate

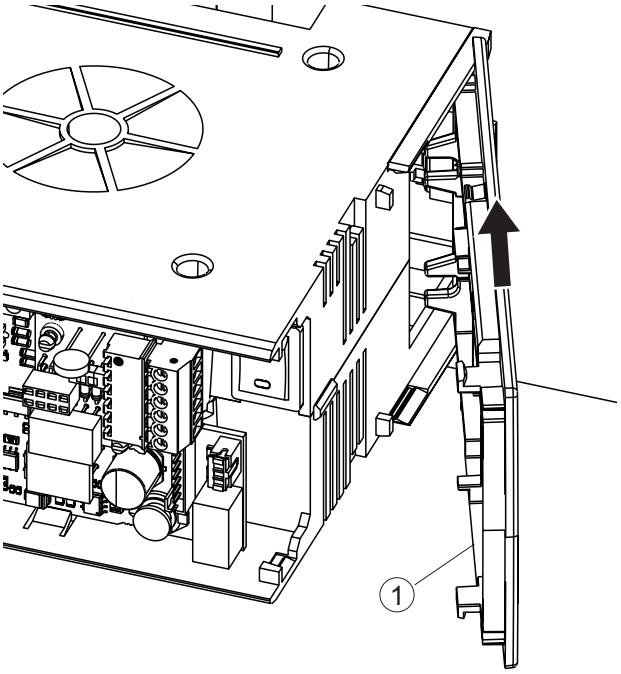


9.3.2 Inserting end caps

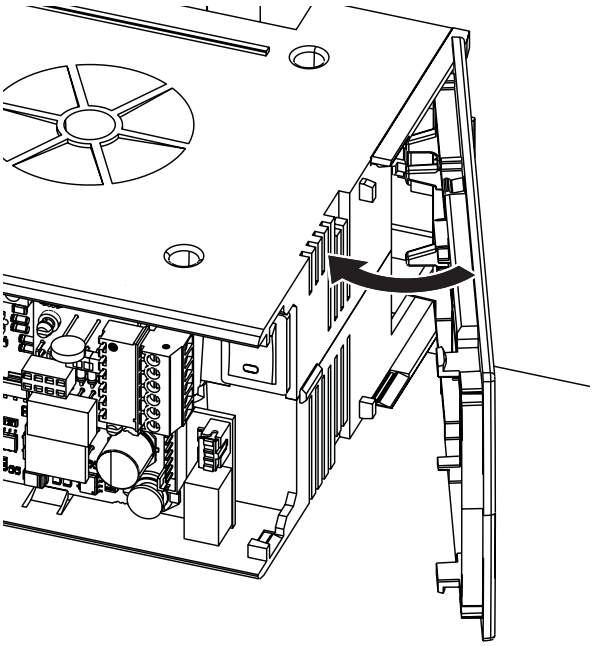
The side panel can also be inserted after the cover has been put on.

Insert the side panel at the main closing edge

- Set the side panel (1) in place at the rear and clip it in.

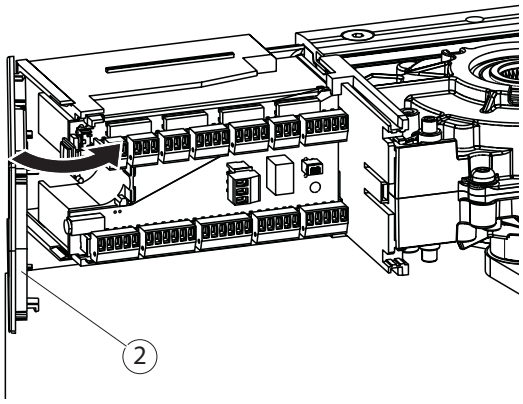


- Clip the side panel in at the front.

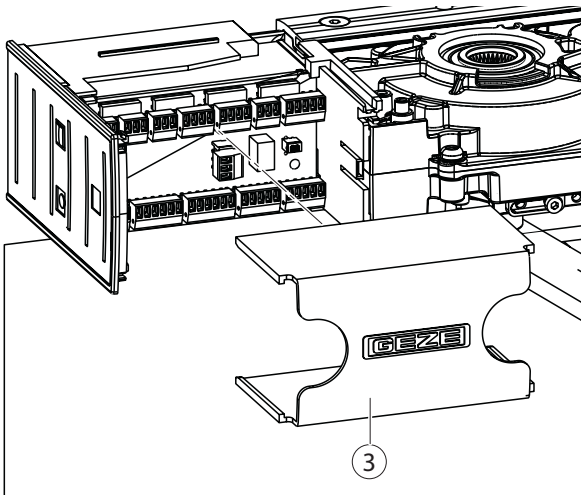


Inserting the side panel with the e-cover

- Attach the side panel (2) at the rear and clip it in.

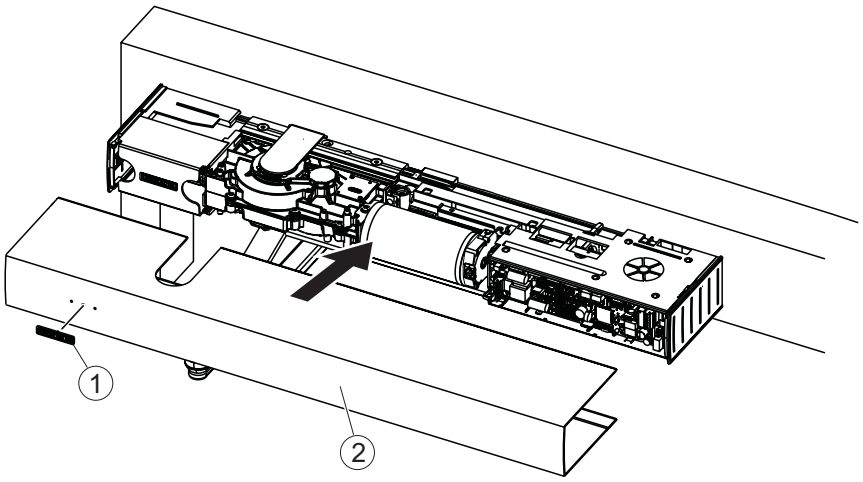


- Slide the e-cover (3) over the connector panel.



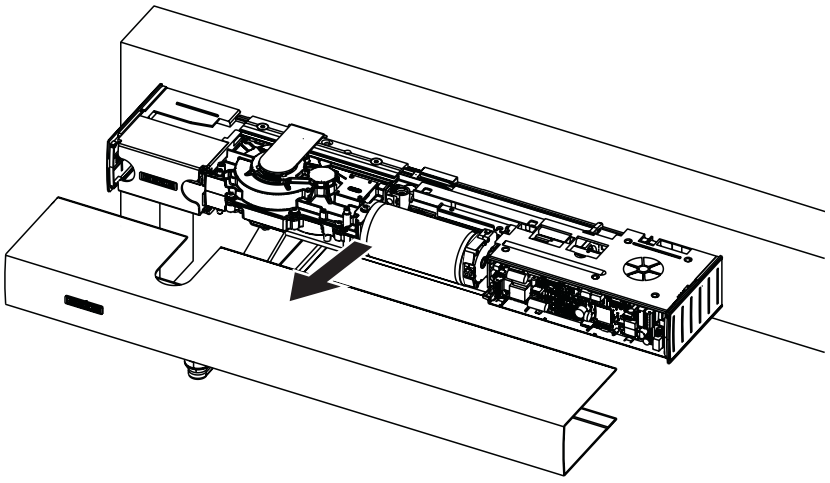
9.3.3 Attaching the cover

- Make sure that no cables become jammed.



- Clip on the GEZE logo (1) in a suitable position on the cover and turn by 180° if necessary.
- Slide the cover (2) over the drive and engage it.

9.3.4 Removing the cover and side panels



- Unlatch the cover and pull it off the drive.
- Remove the side panels.

10 Service and maintenance

The maintenance work described below must be performed by an expert at least once a year and after 1 million cycles in the case of the Powerturn or after 500,000 cycles in the case of Powerturn F.
If there is a display programme switch, the service display lights up in the display.

- ▶ Service and maintenance should then be carried out promptly.

10.1 Dangers during mechanical service

WARNING!
Risk of fatal injury due to electric shock!

- ▶ Use the drive-side main switch to disconnect all poles of the power supply from the drive and secure it against being switched back on again (refer to chapter 8.1).

WARNING!
Danger of injury caused by crushing!

- ▶ Ensure that you have no extremities in the swivelling range during swing movements of the lever or of the link arm.

WARNING!
Risk of burns due to hot motor!
The motor in the drive can become very hot after continuous operation or poor ease of movement or other defects.

- ▶ Disconnect the system from the mains before working on the motor.
- ▶ Let the motor cool down.

10.2 Maintenance work

The Powerturn is maintenance-free to a great extent and no extensive work has to be carried out with the exception of that specified below:

- ▶ Check fixing screws for tightness.
- ▶ Check the rollers of the suspension bolt. If necessary, replace the suspension bolt (for information on the disassembly process, refer to chapter 7.9).
- ▶ Clean the inside of the roller guide rail.
- ▶ Check that the door latch functions correctly and is clean, lubricate lightly if necessary.
- ▶ Check the roller lever or the link arm for damage, replace if necessary.
- ▶ Tighten the fixing screw for the link arm or roller lever with 15 Nm.

Test run

- ▶ Use the on-site main switch to disconnect all poles of the power supply from the drive.
- ▶ Ensure that the door moves properly.
- ▶ Correct installation and closing sequence (for 2-leaf doors).
- ▶ Open the door(s), check the closing speed and latching action (see chapter 9.2), and adjust if necessary.
- ▶ Switch on the mains voltage.

10.3 Electrical service

- ▶ Record inspections and keep the records on hand.

The number of openings, operating hours and remaining time until the next servicing can be queried as described in the wiring diagram (see wiring diagram, Chapters “Commissioning and service” and “Service mode”).

- ▶ After completing the maintenance work, always execute the Learning function for the Powerturn (see wiring diagram, “Commissioning and service” chapter).
- ▶ Check the function of the activation and presence sensors and replace if necessary.

10.4 Electrical faults

Fault messages are stored and can be retrieved using the display programme switch or the service terminal ST220.
If a fault is currently active, it is shown every 10 seconds on the display programme switch or the service terminal ST220.
If the dot lights up on the left half of the display programme switch, the system was unable to completely initialise after being switched on. There is either an obstruction in the way or something in the system itself has become jammed.
The dot extinguishes as soon as the door has been opened completely and closed again once.
For troubleshooting and fault elimination see the fault table in the wiring diagram, chapter “Fault messages” chapter.

- After changes to the drive (spring pre-load, opening width, fitting dimensions, change in the coupling elements) or modifications to the “Open” safety sensor, check the control parameters (see wiring diagram).
- Reteach the drive (see wiring diagram).
- Let “service mode” be executed completely (see wiring diagram).

11 Powerturn installation check list

No.	Test	on Page	in Chapter	Completed
1	All cables routed correctly for installation of the Powerturn?	–	–	
2	Mounting plate installed?	27	7.1	
	Option: Door transmission angle installed for door leaf installation?	27	7.2	
	Option: Cover mounting plate installed?	23	6.2.7	
3	▫ Rail installed; suspension bolt and opening restrictor inserted beforehand?	34	7.9	
	▫ Link arm bearing block installed?	36	7.11	
4	230-V connection with locking latch established?	29	7.3	
	Option: Connection can be set up later by a professional electrician; separate 230-V Schuko plug cable used for set-up?	32	7.6	
5	Bottom clamping claw released?	29	7.4	
	Option: Insert counter piece?	31	7.5	
6	Drive unit: ▫ set in place? Option: Door leaf installation with door transmission angle, insert side panel	31	7.5	
	▫ locked? (slide)	31	7.5	
	▫ Corrugated-head screw set?	32	7.5	
	▫ Clamping claw tightened?	32	7.5	
7	Counter piece inserted?	36	7.12	
	Option: Spindle extension attached?	36	7.13	
8	Shaft cover installed?	37	7.14	
	Option: Mounting aid used?	38	7.15	
9	Lever inserted on the drive and fastened (pre-tensioned corresponding to the type of installation)? Set lever in place, see supplementary installation sheet, chapter 12 Lever pre-load ≠ Spring pre-load. ▶ Follow the installation instructions.	38	7.16	
10	Connection to the door element established (suspension bolt screwed into the lever or link arm jammed)? Mounting aid removed?	38	7.16	
11	Identification plate completed?	42	7.19	
12	Mechanical mobility of the door checked?	–	–	
13	Closing force set? ▫ Set closing force, see supplementary installation sheet, chapter 12 ▫ The closing time for the de-energised state must be set using the braking force parameter. 230 V is required at the drive for this (see chapter 9.2).	45	9.1	
14	Latching action adjusted?	47	9.2	
15	End caps cut out and drilled? Sensor strips installed?	47	9.3.1	
16	Peripheral cables connected?	33	7.7	
17	End caps inserted? Option: The side panel at the control unit can also be installed after the cover.	47	9.3.2	
18	E-cover fitted onto the connection panel? All cables secured?	48	9.3.2	
19	Additional cable guide set in place?	34	7.8	
20	Cover attached?	49	9.3.3	

No.	Test	on Page	in Chapter	Completed
21	Powerturn put into operation with ST220 (jack plug on the side panel)? (See wiring diagram) ▶ Set the opening time to “Limitation of use of Powerturn with opening times up to 90° door opening angle” in accordance with chart Page 10. For fire protection doors: ▶ Set the door stop buffer.	–	–	

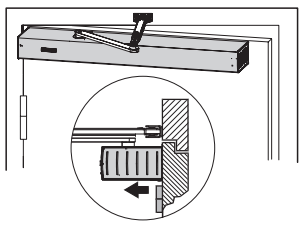
12 Supplementary installation sheet for fitting the lever in the correct position

For assistance, the closing torques to be set are listed on the supplementary installation at the end of the installation instructions.

Use the supplementary installation sheets as follows:

- Cut the supplementary sheets along the grey dashed line and taken them out of the manual.
- Cut out the openings for the lever mandrel along the black dashed line.
- Place the supplementary installation sheet on the lever mandrel on the drive in accordance with the type of installation.

The correct insertion position of the lever can now be checked.



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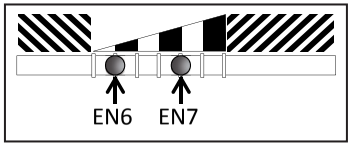

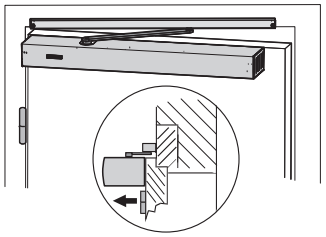

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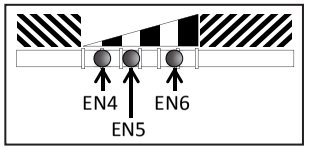

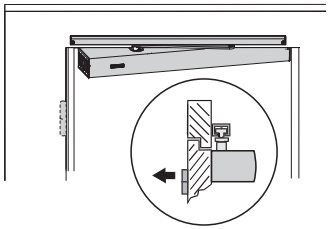

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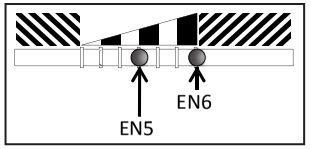

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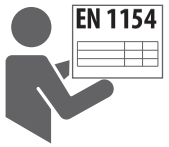

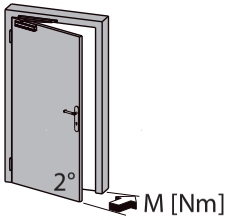

EN 1154	EN 4	EN 5	EN 6	EN 7
2° $M_{min.}$ [Nm]	26	37	54	87

2

2

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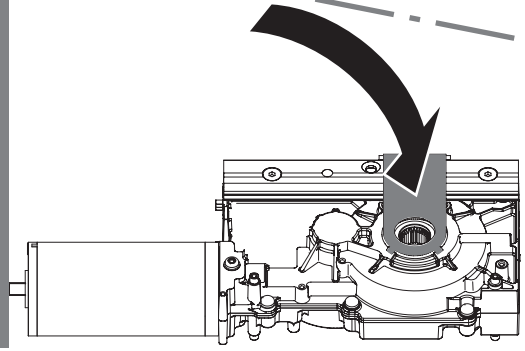

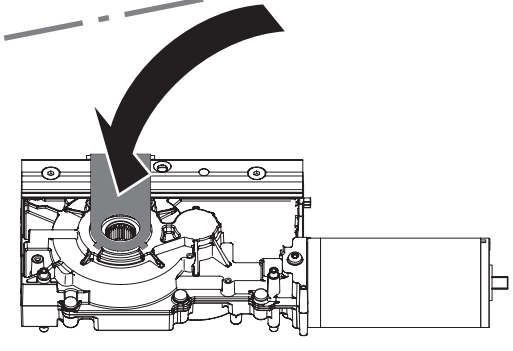

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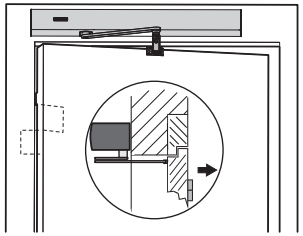

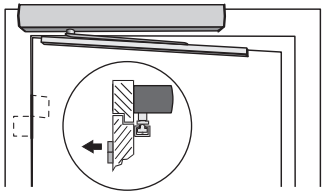

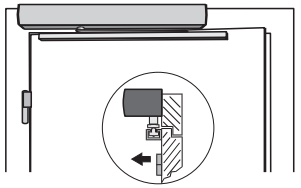

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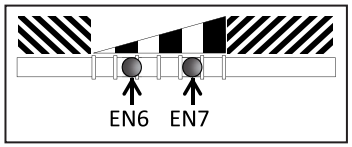

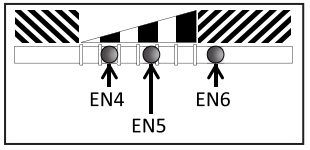

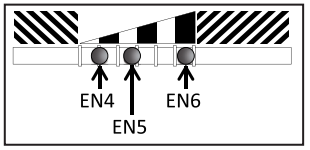

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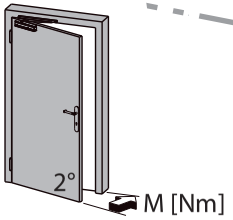
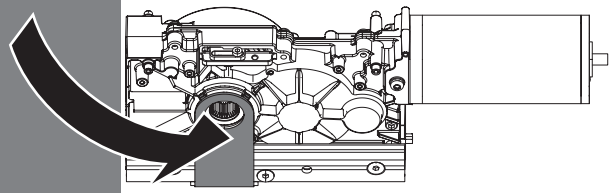


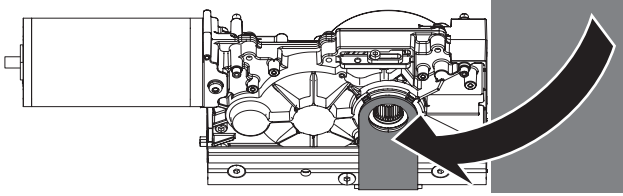
2

EN 1154	EN 4	EN 5	EN 6	EN 7
2° $M_{min.}$ [Nm]	26	37	54	87

3

3





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