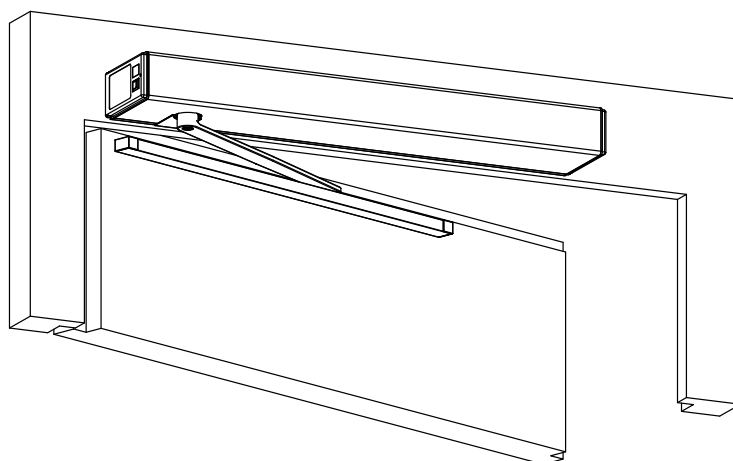


Swing door drive mechanism

FD 10

Mounting and operating instructions

Original



Com. no. Pos. Construction year

Operator

Operating place

0549-990/02c
2021.04

GILGEN
DOOR SYSTEMS

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1 GENERAL REMARKS

The present instructions contains all instructions for mounting, commissioning, operation, service (maintenance/checking) as well as troubleshooting. It is the basis guaranteeing a faultless and safe operation of the installation and must be completely read and understood before starting the work.

The following document is associated with this installation:

- Control booklet 0549-991/12 onto the installation

Applicable documents:

- Mounting and operating instructions 0549-990/02
- Operator manual 0549-991/02

1.1 Target group

All the work described in the present instructions must only be carried out by experts!

Experts are persons who, based on their professional training and experience, have sufficient knowledge in the field of powered windows, doors and gates. They are sufficiently familiar with the relevant federal regulations for work protection and accident prevention, with the guidelines and generally recognized rules applicable for this field of technology which enables them to evaluate if powered windows, doors and gates can be safely operated.

Only the trained experts of the manufacturer or the supplier are counted among these persons.

1.2 Addresses

Distribution agent/
After-sales service



Manufacturer

Gilgen Door Systems AG
Freiburgstrasse 34
CH-3150 Schwarzenburg
Phone +41 31 734 41 11
Fax +41 31 734 43 79
www.gilgendoorsystems.com
info@gilgends.com

1.3 Auxiliary tools and service performances

The auxiliary tools and service performances listed hereafter are available, depending on the respective situation and authorization (please ask your distribution agent):

- Company portrait
- Homepage
- E-shop (authorization)
- Solution Designer (the company's own product configuration system)
 - Project administration
 - Print out quotation and order confirmation for project
 - Configuration of installations
 - 3D-Visualization
 - Calculate prices for normalized and standard doors
 - Visualization of lists of parts
 - Draw up work drawings
- News
- Info-News via E-mail
- Product brochures
- Product presentation (PowerPoint)
- Submission texts
- Reference list
- Test/homologation certificates
- CAD data
- Application sheets
- Plans of installations and cutouts
- Training courses
- Spare parts
- Maintenance contracts
- Around-the-clock service (not available in all the countries)

2 SAFETY

2.1 Appropriate use

The swing door drive mechanism FD 10 has been exclusively designed for operating swing doors. Any other use beyond these application limits is deemed inappropriate and inadmissible! In the event of an inappropriate use of this system, the safety of the user may be jeopardized and/or the installation be damaged. The manufacturer declines all responsibility for these injuries/damages!

2.2 Safety notices

The present instructions uses the following symbols and notes in order to point out certain residual dangers:



Warning:
Involving danger to life and limb.



Attention:
A situation where material could be damaged or the function impaired.

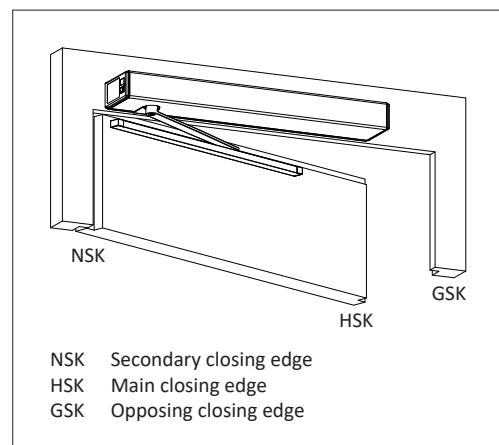


Note:
Hints which facilitate the work.

2.3 Safety regulations

2.3.1 Principles

- Children must not be involved in the cleaning or user maintenance of this system. Very young children must not operate the system. Young children must only operate the system when under the close supervision of an adult. Older children and vulnerable persons may use this system safely once they have been shown, while under suitable supervision, how to use it appropriately. Highly vulnerable persons can only use the system safely when under close supervision, or if it is fitted with corresponding additional equipment that amply fulfils the scope-of-use standards of the norm EN 16005.
- According to standard EN 16005 describing the safety-related requirements for automatic door systems, a risk evaluation is to be carried out (in consideration of the groups of door users and the local situation). This is the basis for the choice of the different protecting measures. The risk evaluation has to be carried out already during the planning stage to guarantee that the automatic door system can be safely installed and operated (see Risk evaluation for automatic swing door P 01.02.20).



- When configuring the installation, it is essential to make sure that the locally applicable regulations with regard to the closing edges are complied with, in order to avoid crushing and shearing points. It is particularly important to make sure that the door leaves do not have any sharp edges. The secondary closing edges must be designed by customers in such a fashion as to eliminate any dangerous crushing and shearing points.
- In order not to create any dangerous squeezing and shearing points, no structural modification must be made within the door surroundings, without prior authorization from Gilgen Door Systems. Furthermore, it is important that no objects (such as furniture, pallets, etc.) be placed in the vicinity of the door.
- The door leaves and their fillings must be manufactured according to the applicable standards (e.g. EN 16005). For the door leaf fillings, brake-proof material respectively safety glass shall be used. There must be no sharp cutting edges, and the glass must not produce sharp splinters if it is broken. Transparents door leaves (or their surfaces) must be clearly recognizable, e.g. by means of a permanent marking or dyed materials.
- The application limits must be observed.
- The choice of fastening elements depends on the construction base.
- Door sills or other protruding elements of the door system are to be identified by warning stickers or another appropriate marking means.
- In its assembled state, the installation must answer all the safety requirements specified by the machinery directive.
- The swing door drive mechanism FD 10 may only be installed and operated in dry rooms. If this condition cannot be fulfilled, the customer must provide sufficient protection from moisture.
- The swing door drive mechanism FD 10 must not be mounted within locations presenting explosion hazards. The presence of flammable gases or smoke represents a considerable safety hazard.
- All further interventions on and modifications of the installation that are not described in the present instructions are forbidden!
- Wrapping materials (such as plastic foil, polystyrene foam, strings,) represent a source of danger for children and must therefore be kept out of reach of the latter.
- The installation has been calculated, designed and manufactured on the basis of the latest state-of-the-art technology and the generally recognized safety-relevant rules and regulations. It may only be operated if it is in perfect condition, taking into account the specifications of the present instructions. Any use beyond the defined application limits is inadmissible!
- The installation is to be operated and maintained in such condition that the safety is guaranteed at all times. An integral part of this condition is the appropriate use, the compliance with the operating conditions prescribed by the manufacturer, as well as the regular service (maintenance/checking).
- The installation's conformity with the machinery directive must be confirmed.

2.3.2 Service

In order to guarantee the safety of the users at all times, the installation must be checked with regard to its safe condition before the first commissioning and during normal operation, **at least once a year**, by a expert. The correct maintenance/checking must be confirmed by entering the date and signature into the control booklet.

2.3.3 Safety devices

It is inadmissible to bypass, shunt or disable the safety devices. Any defective safety devices may not be disconnected in order to be able to continue the operation of the installation.

2.3.4 Malfunctions

If any malfunctions occur which might be detrimental to the safety of the users, the installation must be immediately taken out of operation. It may only be taken back into operation after the malfunction has been repaired and all danger eliminated.

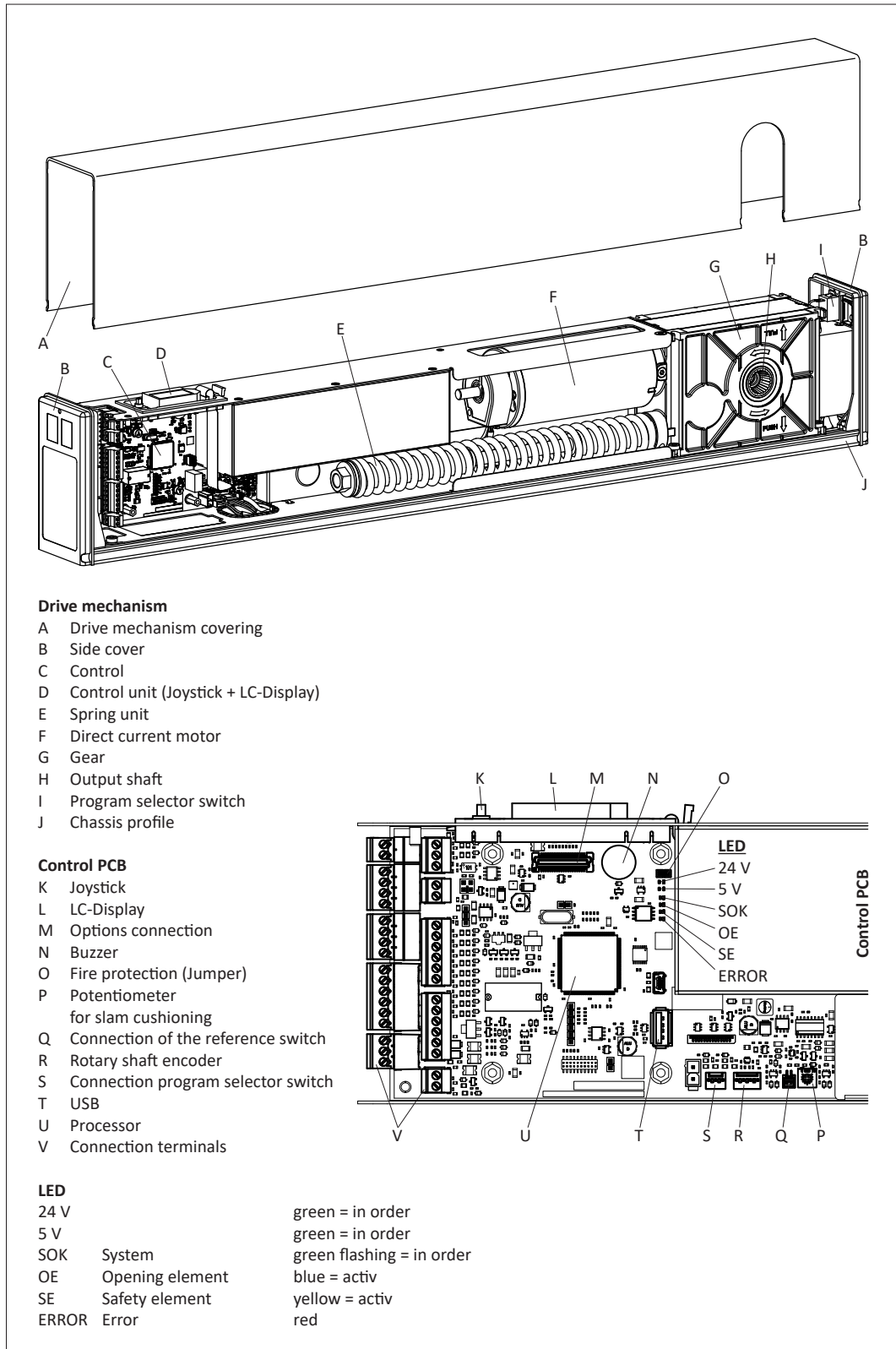
2.3.5 Accessories/Spare parts

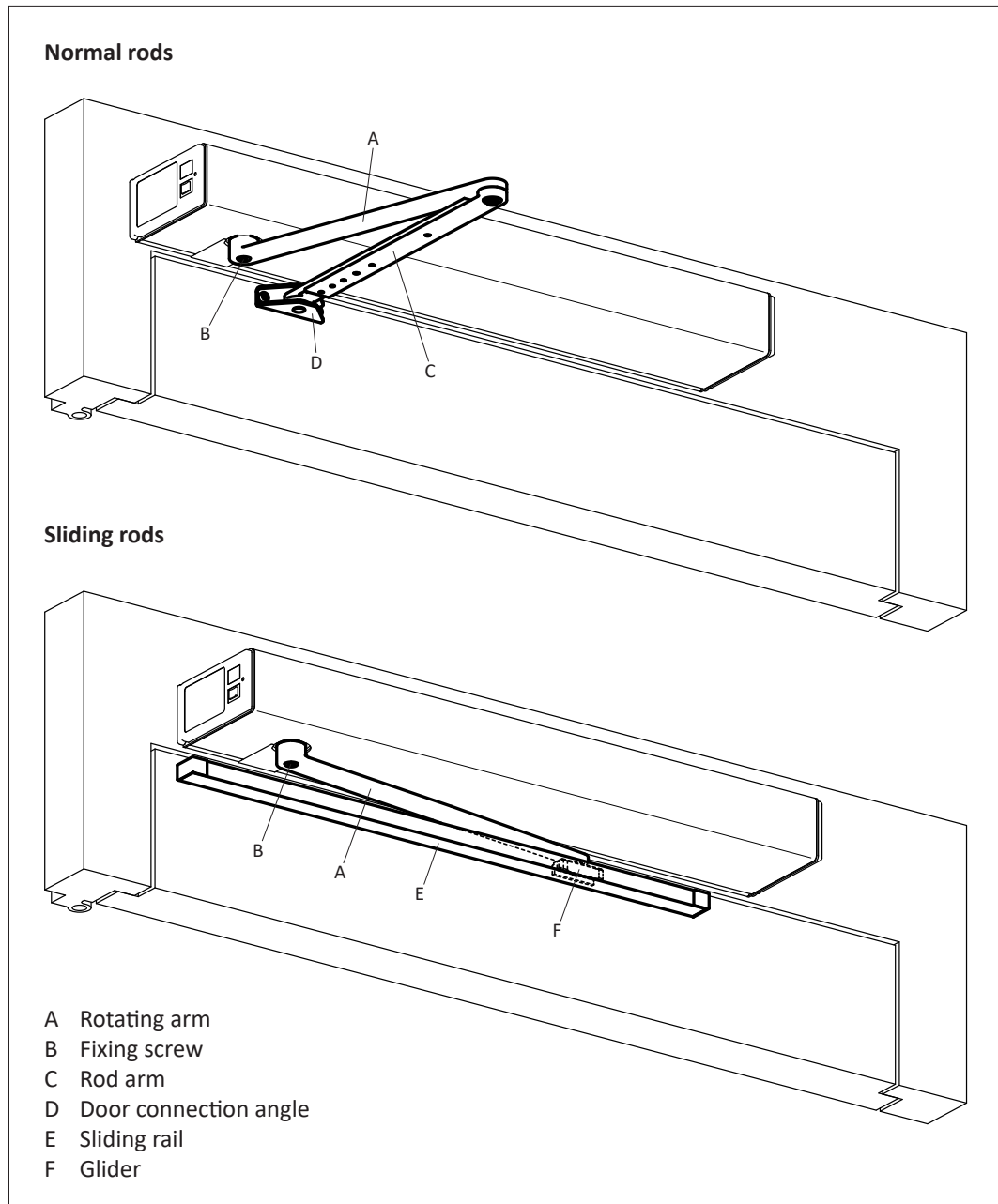
A safe and reliable function of the installation can only be guaranteed if it is operated with the original Gilgen Door Systems accessories/spare parts. Gilgen Door Systems declines all responsibility for damages resulting from unauthorized modifications of the installation or from the use of foreign accessories/spare parts.

3 PRODUCT DESCRIPTION

3.1 General remarks

The swing door drive mechanism FD 10 opens and closes the door leaf via a rod assembly (is not shown in the illustration).





3.2 Standard application

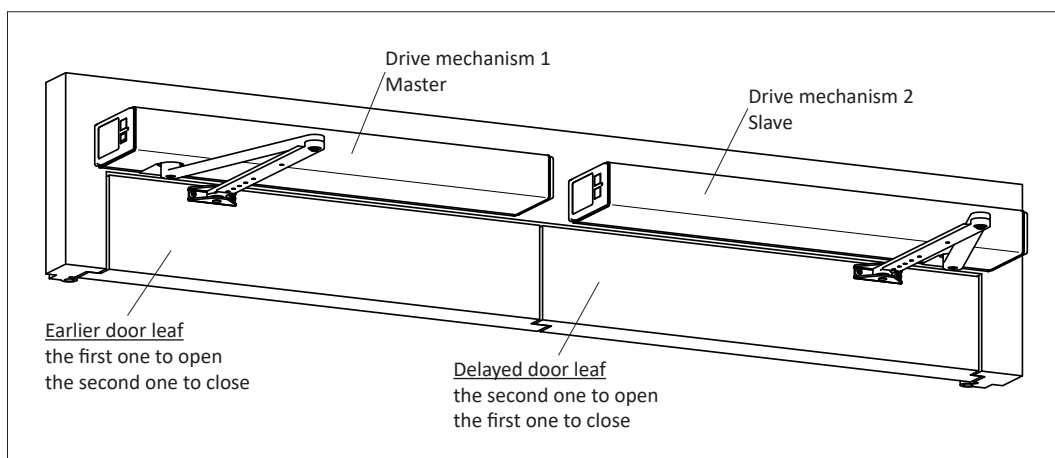
During normal operation, the opening and closing movements of the door leaf are motorized. The automatically opening is performed via opening elements. The automatically closing starts as soon as the programmed hold-open time has expired.

Function in the event of a mains failure

The door leaf is closed from any position by means of spring power. The motor attenuation ensures a controlled closing.

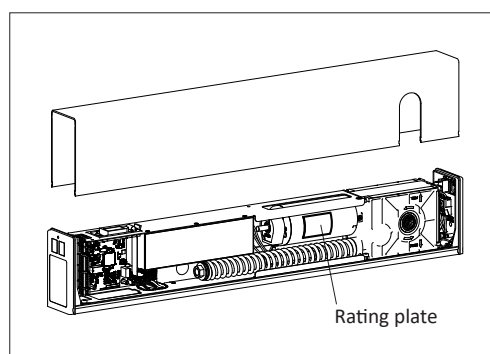
3.3 Automatic closing sequence control

For bi-parting installations, two separate FD 10 swing door drive mechanisms are used, which are connected via connection terminals.



3.4 Rating plate

The rating plate (including TÜV and EC identification) can be found on the direct current motor (below the drive mechanism covering).



3.5 Technical data

Drive mechanism	Standard
Power transmission	Normal rods Sliding rods
Dimensions drive mechanism	Height 70 mm Width 730 mm Depth 125 mm
Weight drive mechanism	8,2 kg
Ambient temperature	-15...+50 °C
May only be used in dry rooms	max. relative humidity 85 %
Protection type	IP 20
Operating voltage	230 VAC (+10/-15 %), 50 Hz
Mains supply by customer	230 VAC (+10/-15 %), 50 Hz, 10/13 A
Power consumption drive mechanism	max. 350 W
Motor power rating	100 W
Power supply external consumer	24 VDC (±10 %), 1,4 A
Torque output shaft	56 Nm permanent 165 Nm max.
Lintel depth	normal rods max. 250 mm sliding rods pl -50/+150 mm ps -50/+150 mm
Door leaf opening angle	max. 105°
Door leaf weight	max. 150 kg
Door leaf width	730...1'100 mm (lintel mounting) 800...1'100 mm (leaf mounting)
Opening speed	2,4...20 s adjustable (max. 40°/s)
Closing speed	2,4...20 s adjustable (max. 40°/s)
Forceful closing range (without mains power)	≈10...15° not adjustable
Forceful closing cushioning (without mains power)	stepless adjustable (adjusting trimmer)
Hold-open time	0...60 s
Hold-open time Night	0...180 s

3.6 Application limits without safety elements according to EN 16005



Warning:

In the event of swing doors installed in a non publicly accessible areas, without installation of safety elements that monitor the door leaf movement, the setting values specified hereafter for the **opening speed V_o** and the **closing speed V_c** must not be exceeded.

Opening force F_o and closing force F_c = max. 4!

Lintel mounting (all rod assemblies)

Leaf weight \ Leaf width	0...40 kg	41...60 kg	61...80 kg	81...100 kg	101...120 kg	121...150 kg
730...750 mm	12	11	10	9	8	7
EN 2 751...850 mm	11	10	9	8	7	7
EN 3 851...950 mm	10	9	8	7	6	6
EN 4 951...1'100 mm	9	8	7	6	5	5

Leaf mounting (all rod assemblies)

Leaf weight \ Leaf width	0...40 kg	41...60 kg	61...80 kg	81...100 kg	101...120 kg	121...150 kg
EN 2 800...850 mm	9	9	8	7	6	6
EN 3 851...950 mm	9	8	7	6	5	5
EN 4 951...1'100 mm	9	8	7	6	5	5

4 MOUNTING

4.1 General



Attention:

It is recommended that a door leaf stop piece be mounted by the customer. This stop piece prevents the door leaf/drive mechanism from being damaged in the manual operating mode, in case of misuse or vandalism. The internal open position stop piece cannot ensure this protective function.



Attention:

Check the free running movement of the door leaf. Should it fail to move smoothly and silently, or if it is out of balance (i. e. it opens or closes by itself), these problems must be eliminated first!



Warning:

The fastening bases must provide sufficient solidity. If necessary they have to be reinforced by the appropriate means.



Attention:

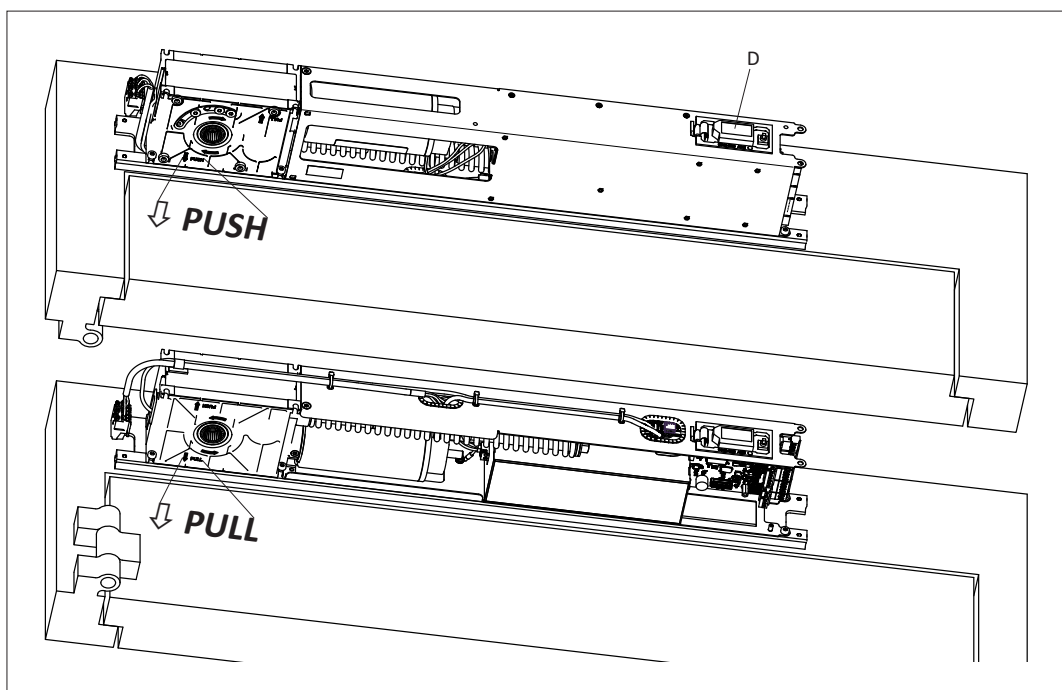
The maximum admissible undulation of the fastening base is 1 mm. The drive mechanism must be fastened without torsion and perpendicularly, using all the six fixing holes!

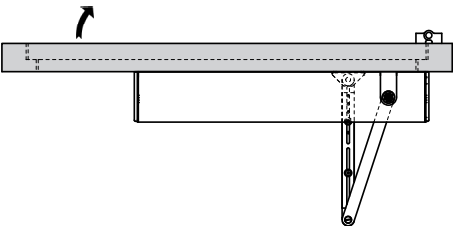
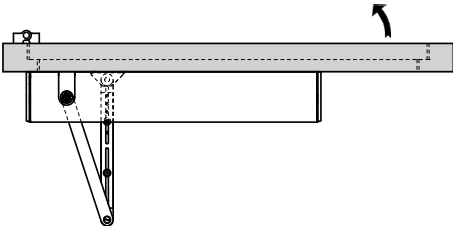
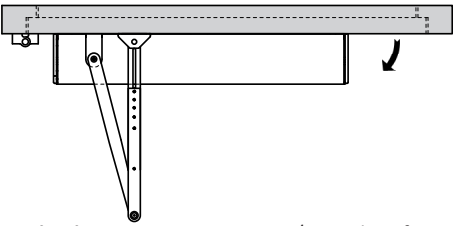
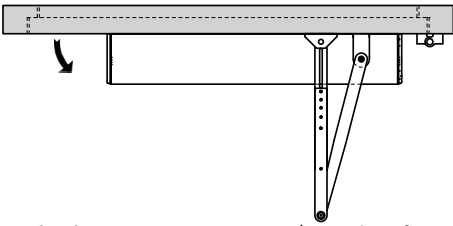
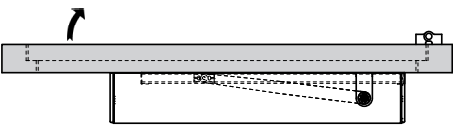
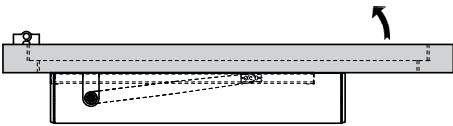
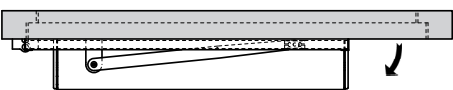
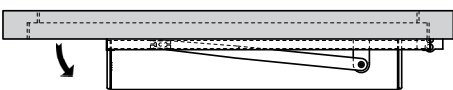
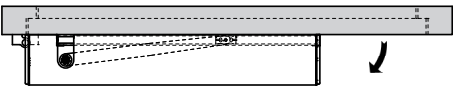
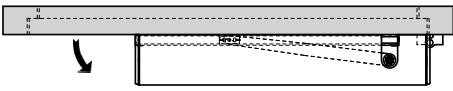
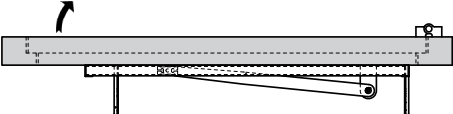
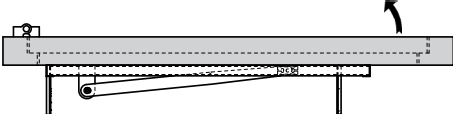
4.2 Mounting versions



Note:

The output shaft of the drive mechanism is close to the door hinge at all times. The drive mechanism turns in one direction only. It must rotate through 180° (depending on the type of installation). The position of the control unit (D) must be established in advance accordingly.



DIN left	DIN right
 <p>Normal rods RS Lintel mounting Lintel depth Drive mechanism</p> <p>0548-163 pushing function see chapter 4.4 0...250 mm 0549-010 alu / 0549-011 inox</p>	 <p>Normal rods RS Lintel mounting Lintel depth Drive mechanism</p> <p>0548-163 pushing function see chapter 4.4 0...250 mm 0549-010 alu / 0549-011 inox</p>
 <p>Normal rods RS Leaf mounting Lintel depth Drive mechanism</p> <p>0548-163/02 pushing function see chapter 4.5 0...90 mm 0549-010 alu / 0549-011 inox</p>	 <p>Normal rods RS Leaf mounting Lintel depth Drive mechanism</p> <p>0548-163/02 pushing function see chapter 4.5 0...90 mm 0549-010 alu / 0549-011 inox</p>
 <p>Sliding rods RG Lintel mounting Lintel depth Drive mechanism</p> <p>0548-164 pushing function see chapter 4.6 -30/+150 mm 0549-010 alu / 0549-011 inox</p>	 <p>Sliding rods RG Lintel mounting Lintel depth Drive mechanism</p> <p>0548-164 pushing function see chapter 4.6 -30/+150 mm 0549-010 alu / 0549-011 inox</p>
 <p>Sliding rods RG Leaf mounting Lintel depth Drive mechanism</p> <p>0548-164/02 pushing function see chapter 4.7 -50/+200 mm 0549-010 alu / 0549-011 inox</p>	 <p>Sliding rods RG Leaf mounting Lintel depth Drive mechanism</p> <p>0548-164/02 pushing function see chapter 4.7 -50/+200 mm 0549-010 alu / 0549-011 inox</p>
 <p>Sliding rods RG Lintel mounting Lintel depth Drive mechanism</p> <p>0548-164 pulling function see chapter 4.8 -50/+150 mm 0549-010 alu / 0549-011 inox</p>	 <p>Sliding rods RG Lintel mounting Lintel depth Drive mechanism</p> <p>0548-164 pulling function see chapter 4.8 -50/+150 mm 0549-010 alu / 0549-011 inox</p>
 <p>Sliding rods RG Leaf mounting Lintel depth Drive mechanism</p> <p>0548-164/02 pulling function see chapter 4.9 -50/+200 mm 0549-010 alu / 0549-011 inox</p>	 <p>Sliding rods RG Leaf mounting Lintel depth Drive mechanism</p> <p>0548-164/02 pulling function see chapter 4.9 -50/+200 mm 0549-010 alu / 0549-011 inox</p>

4.3 Drive mechanism

1. Mark and drill fixing holes in the lintel/door leaf (according to the respective situation).



Note:

You can use the chassis profile (B) as a drilling template.

Observe the alignment of the chassis profile (B).

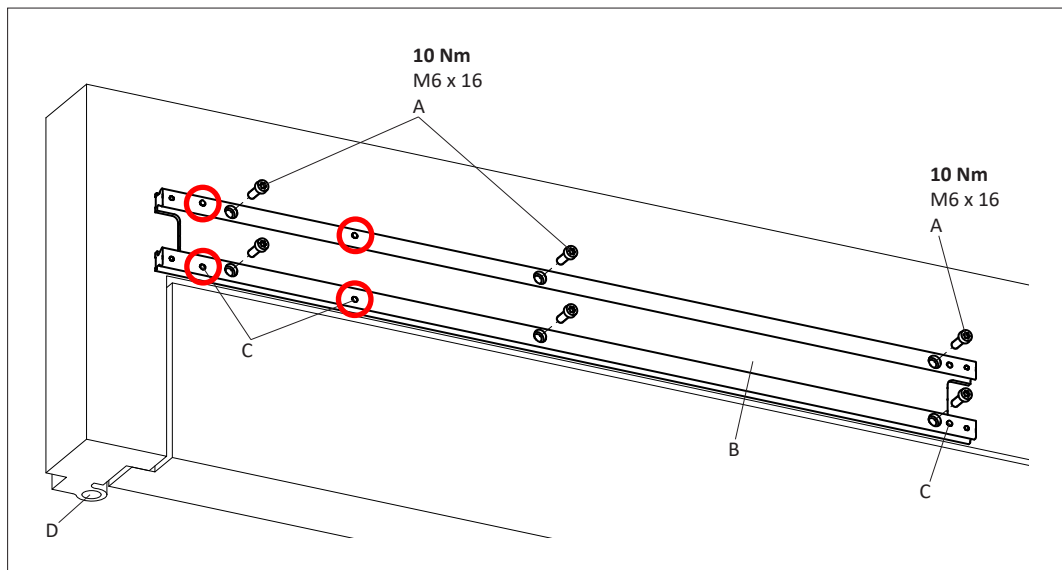
Four of the six drive-module fixing screws (C) are located near to the door hinge (D).

2. Use the six fixing screws (A) to mount the chassis profile (B).

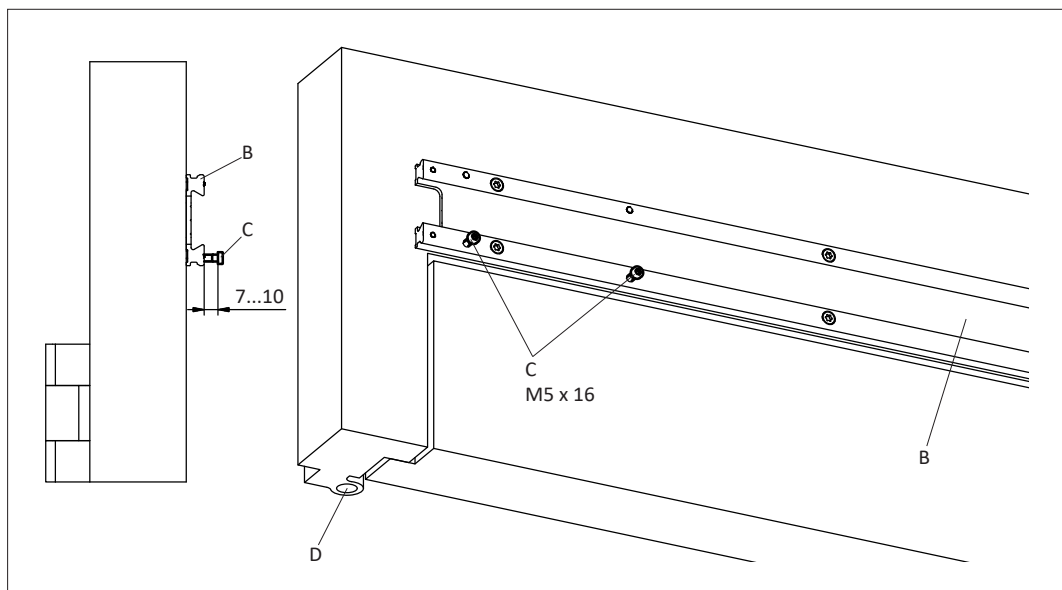


Warning:

Tighten all the six fixing screws (A) with a torque of **10 Nm**!



3. Attach the drive module to the chassis profile (B):
 - a) Provisionally attach the two lower screws (C) – of the four nearer to door hinge (D) – to chassis profile (B) at a distance, measured from screw-head to chassis, of 7 to 10 mm.



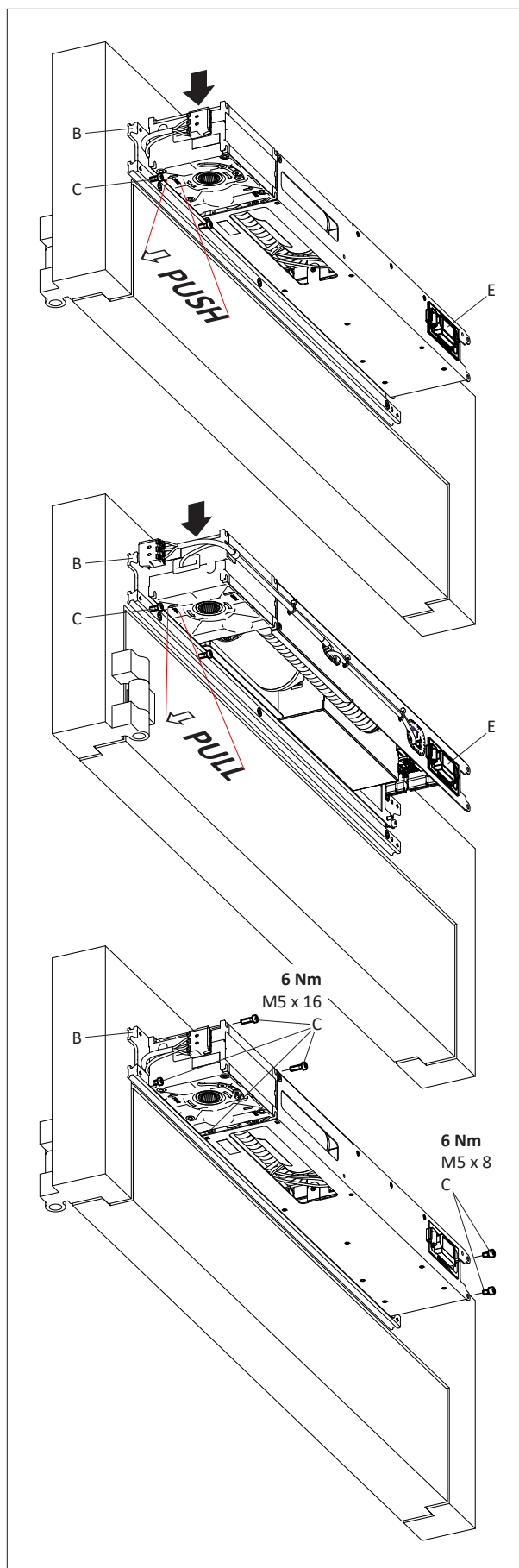
- b) For normal rods RS and sliding rods RG pushing function:
 Hang the drive module, with the **PUSH** sign facing the chassis profile (B), onto the two pre-inserted screws (C).
 Adjust the position of the control unit (E) before proceeding.

- c) For sliding rods RG pulling function:
 Hang the drive module, with the **PULL** sign facing the chassis profile (B), onto the two pre-inserted screws (C).

- d) Tighten all the six fixing screws (C).



Warning:
 Tighten all the six fixing screws (C) with a torque of **6 Nm!**



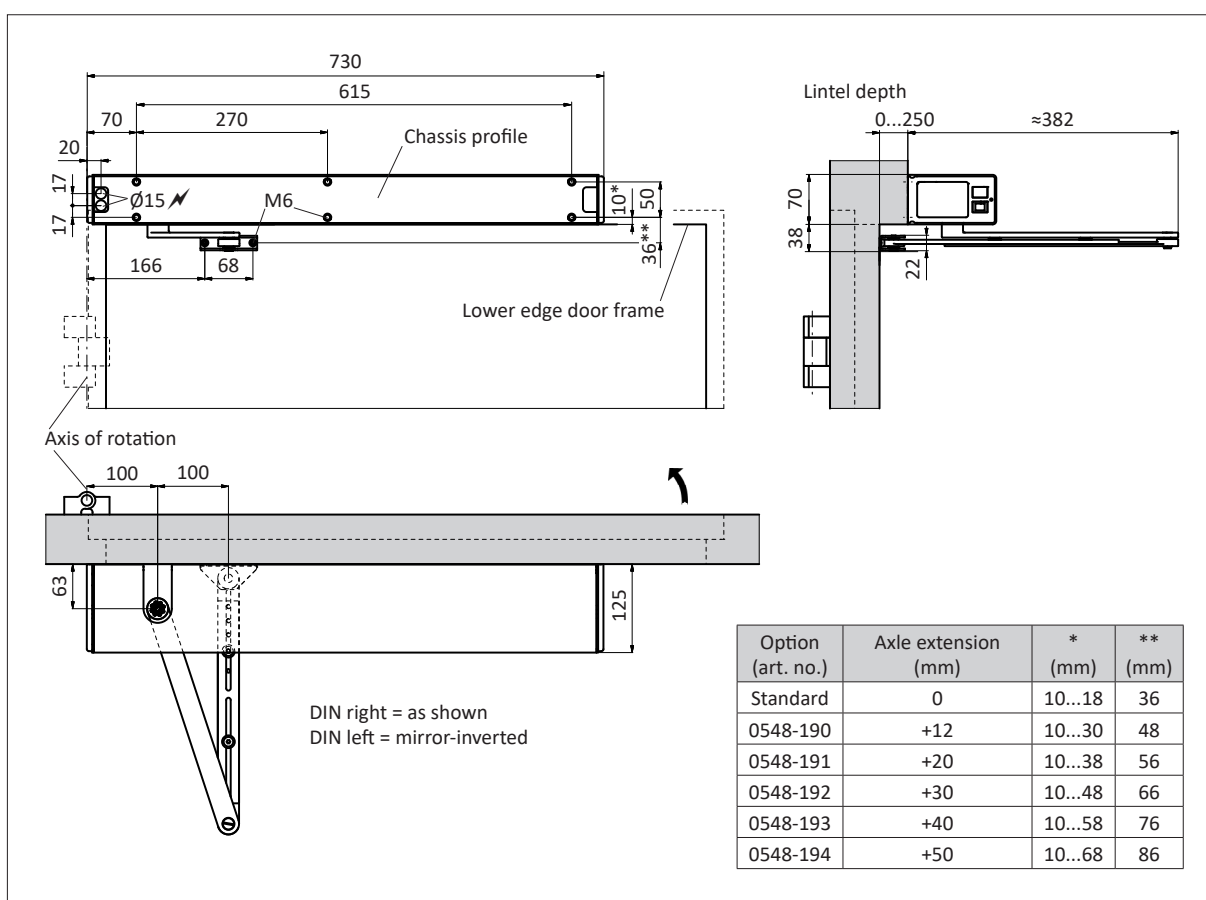
4.4 Normal rods RS pushing function / Lintel mounting

Material:

1	Drive mechanism	0549-010	Covering aluminium
	Drive mechanism	0549-011	Covering inox
	incl. fixing set	0549-104	
1	Normal rods RS	0548-163	

Procedure:

1. Mark out/drill the fastening holes on the lintel/door leaf and mount the drive mechanism.



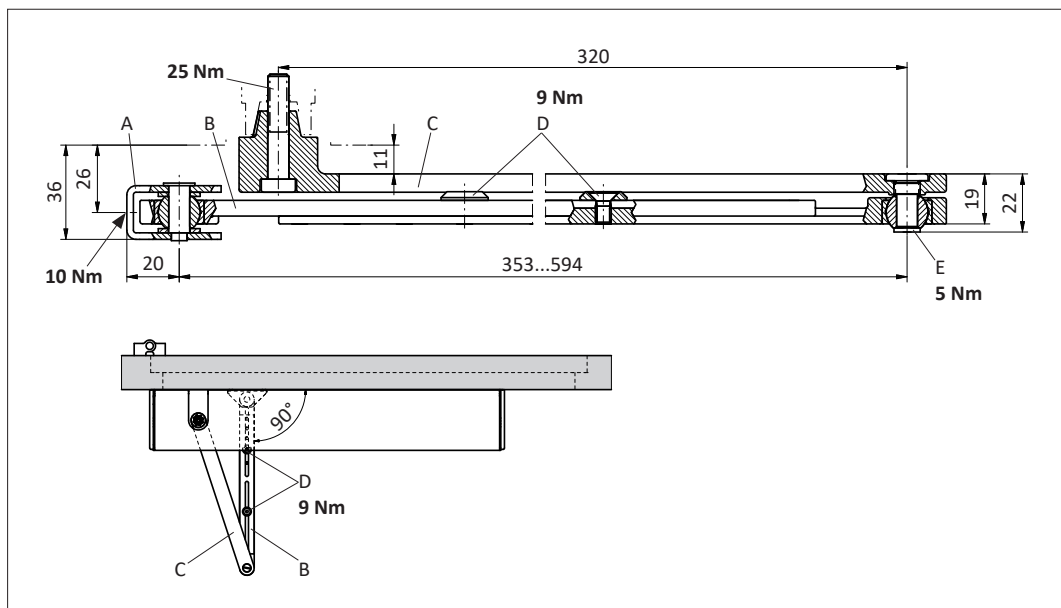
2. Close the door leaf.
3. Separate the rotating arm (C) from the rod arm (B) by loosen the screw (E).
4. Fasten the rod arm (B), by means of the door connection angle (A), onto the door leaf:
For metric screws = tightening moment **10 Nm**.
5. Position the rotating arm (C) approx. perpendicularly with regard to the door leaf and screw it down in this position ⇒ Tightening moment **25 Nm**.
6. Slightly loosen the screws (D) and fasten the rotating arm (C), by means of the screw (E) to the rod arm (B) ⇒ Tightening moment **5 Nm**.
Attention:
Adjust the rods to the required length. Choose the largest possible distance between both screws (D).
7. Prestress the rotating arm (C) until the rod arm (B) forms a right angle with the door leaf.
Fasten the rod arm (B) by means of the screws (D) ⇒ Tightening moment **9 Nm**.



Attention:

Check the motional sequence of the door leaf: The rods must not touch!

⇒ forward to chapter 4.10



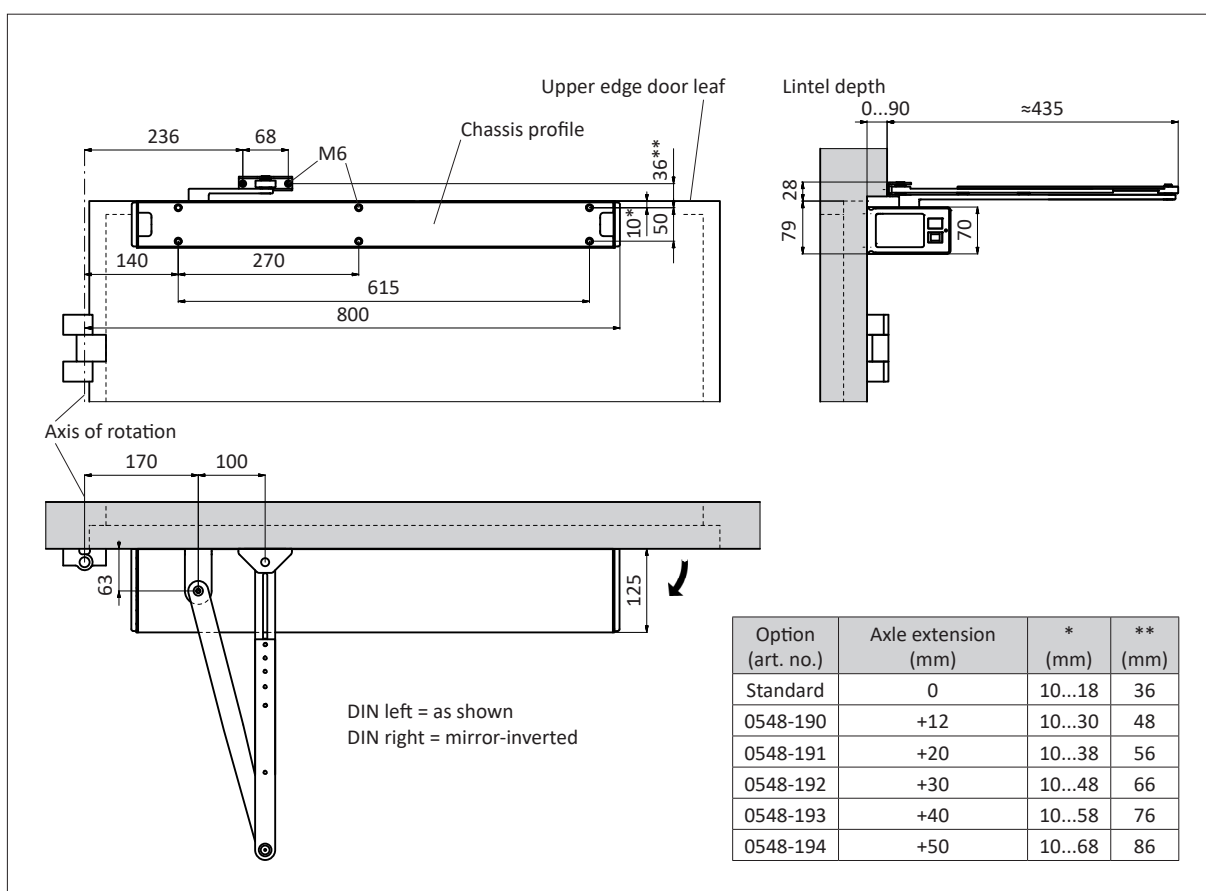
4.5 Normal rods RS pushing function / Leaf mounting

Material:

1	Drive mechanism	0549-010	Covering aluminium
	Drive mechanism	0549-011	Covering inox
	incl. fixing set	0549-104	
1	Normal rods RS	0548-163/02	

Procedure:

1. Mark out/drill the fastening holes on the lintel/door leaf and mount the drive mechanism.



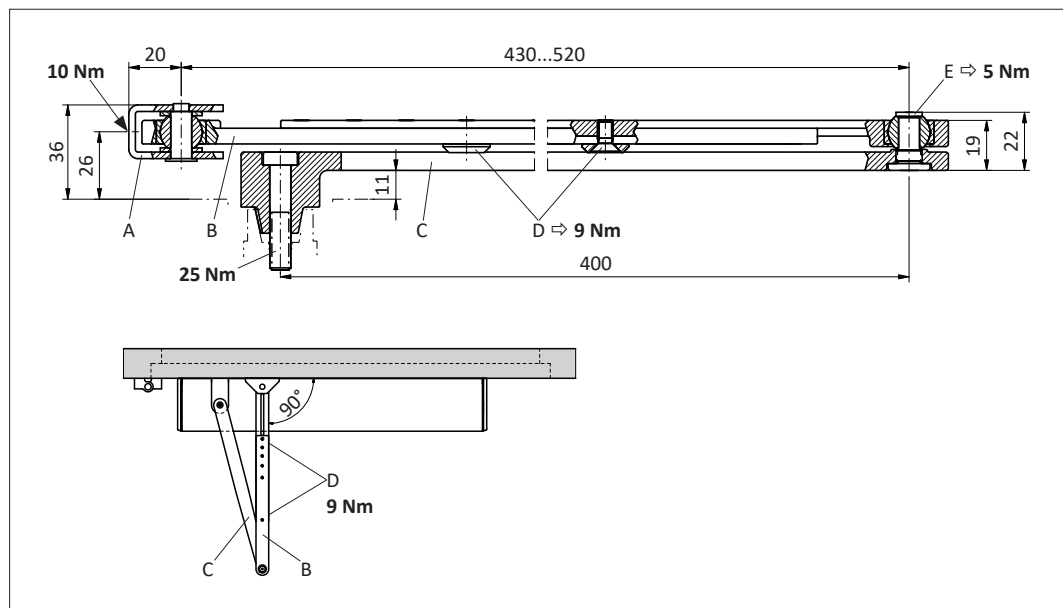
2. Close the door leaf.
3. Separate the rotating arm (C) from the rod arm (B) by loosen the screw (E).
4. Fasten the rod arm (B), by means of the door connection angle (A), onto the lintel:
For metric screws = tightening moment **10 Nm**.
5. Position the rotating arm (C) approx. perpendicularly with regard to the door leaf and screw it down in this position ⇒ Tightening moment **25 Nm**.
6. Slightly loosen the screws (D) and fasten the rotating arm (C), by means of the screw (E) to the rod arm (B) ⇒ Tightening moment **5 Nm**.
Attention:
Adjust the rods to the required length. Choose the largest possible distance between both screws (D).
7. Prestress the rotating arm (C) until the rod arm (B) forms a right angle with the door leaf.
Fasten the rod arm (B) by means of the screws (D) ⇒ Tightening moment **9 Nm**.



Attention:

Check the motional sequence of the door leaf: The rods must not touch!

⇒ forward to chapter 4.10



4.6 Sliding rods RG pushing function / Lintel mounting

Material:

1	Drive mechanism	0549-010	Covering aluminium
	Drive mechanism	0549-011	Covering inox
	incl. fixing set	0549-104	
1	Sliding rods RG	0548-164	650 mm incl. sliding bolts 18/46 mm

Procedure:

1. Mark out/drill the fastening holes on the lintel/door leaf and mount the drive mechanism.



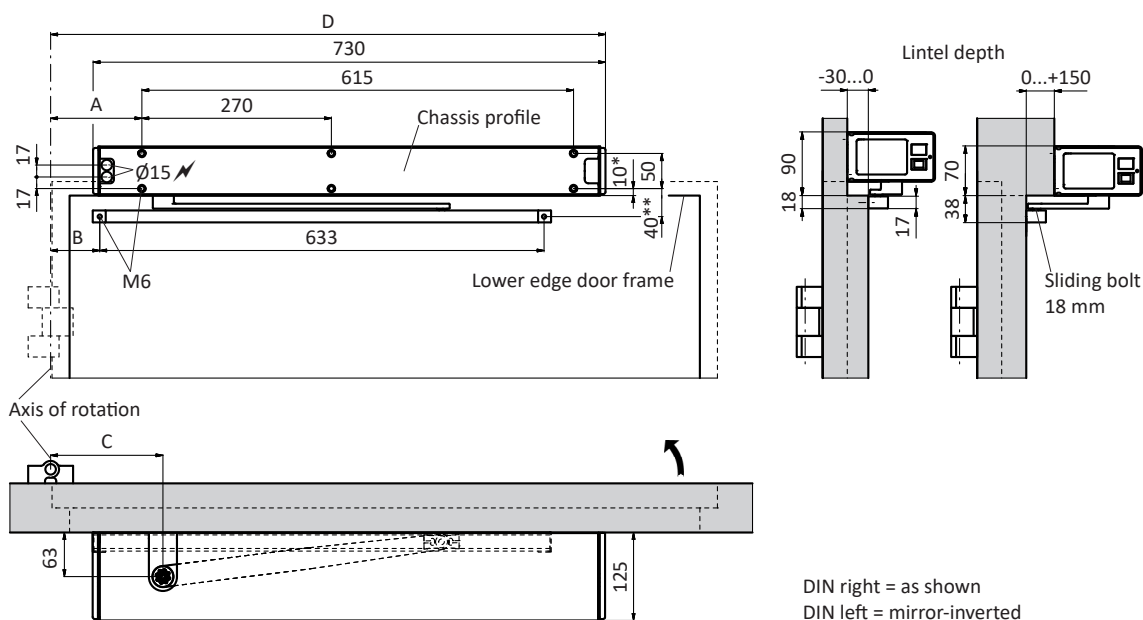
Note:

The illustration shows the 18 mm sliding bolt. Depending on the situation, this bolt can be replaced by the version 46 mm. This will change the respective dimensions by plus 28 mm.

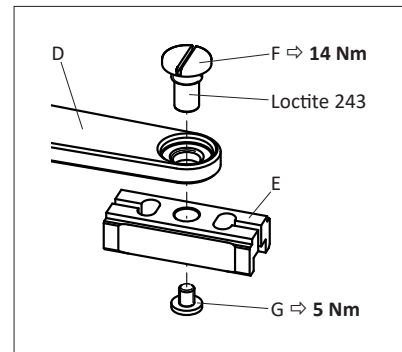
Lintel depth (mm)	Max. door leaf opening angle (°)	Rod as- semblies (art. no.)	A (mm)	B (mm)	C (mm)	D (mm)
-30...+30	105	0548-164	130	70	160	790
31...50	105	0548-164	130	60	160	790
51...80	105	0548-164	140	50	170	800
81...100	105	0548-164	150	50	180	810
101...120	100	0548-164	150	40	180	810
121...150	95	0548-164	160	30	190	820

Option (art. no.)	Axle exten- sion (mm)	* (mm)	** Sliding bolt 18 mm	** Sliding bolt 46 mm
Standard	0	10...18	40	68
0548-190	+12	10...30	52	80
0548-191	+20	10...38	60	88
0548-192	+30	10...48	70	98
0548-193	+40	10...58	80	108
0548-194	+50	10...68	90	118

With lintel depths >100 mm we recommend using the normal rods.



2. Close the door leaf.
3. First loosen the screw (G) of the glider (E), then the bolt (F) of the rotating arm (D).
4. Depending on the situation, select the short 18 mm or long 46 mm bolt (F) and fasten it to the rotating arm (D) by means of screw locking adhesive Loctite 243 \Rightarrow Tightening moment **14 Nm**.
5. Push the glider (E) over the bolt (F) and fasten it by means of screw (G) \Rightarrow Tightening moment **5 Nm**.



Attention:

When tightening the screw (G), the bolt (F) must not come loose!

6. Screw down the rotating arm (D) on the drive unit \Rightarrow Tightening moment **25 Nm**.
Attention:
The pre-stressing of the rotating arm (D) depends on the existing lintel depth.
Example: Lintel depth 0 mm, pre-stressing of the rotating arm (D) $\approx 15^\circ$ (1 grid increment of the output shaft = 15°).
7. Slide the sliding rail (C) over the glider (E) and the open position stop piece (B) and bolt it onto the door leaf: For metric screws = tightening moment **10 Nm**.



Note:

The open position stop piece (B) will bolt into place only after the commissioning (see chapter 7.1).

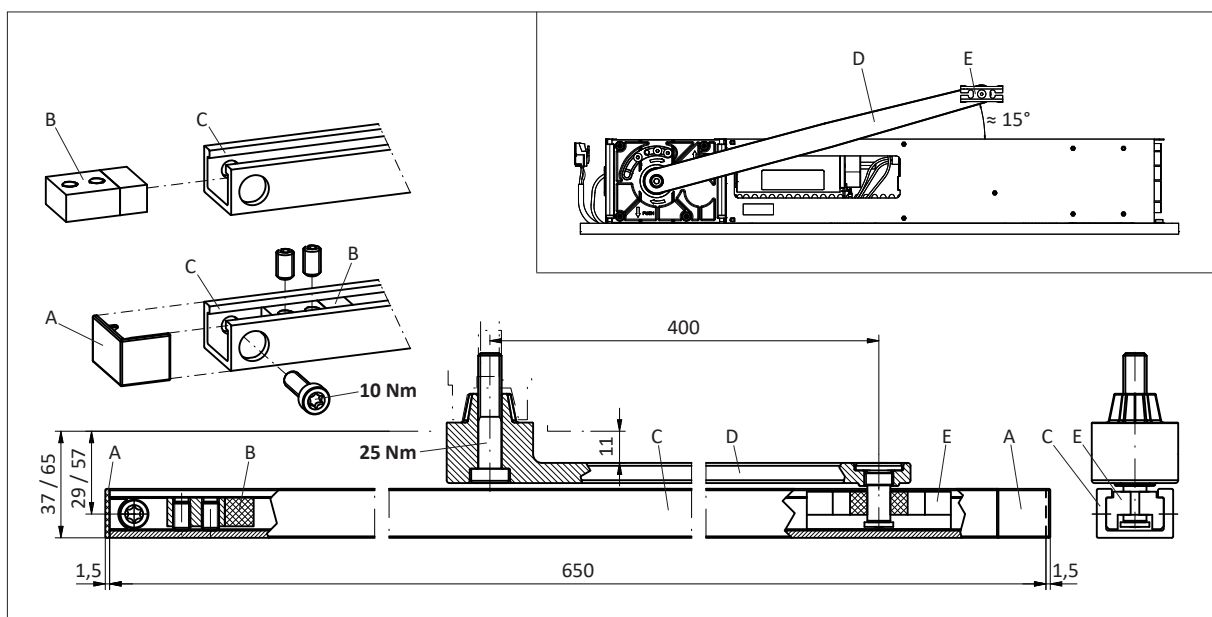
8. Insert the covering caps (A) on both sides.



Attention:

Check the motional sequence of the door leaf: The rods must not touch!
If the glider (E) makes screeching noises, it needs to be lubricated with a little WD40.

\Rightarrow forward to chapter 4.10



4.7 Sliding rods RG pushing function / Leaf mounting

Material:

1	Drive mechanism	0549-010	Covering aluminium
	Drive mechanism	0549-011	Covering inox
	incl. fixing set	0549-104	
1	Sliding rods RG	0548-164/02	800 mm incl. sliding bolts 18/46 mm

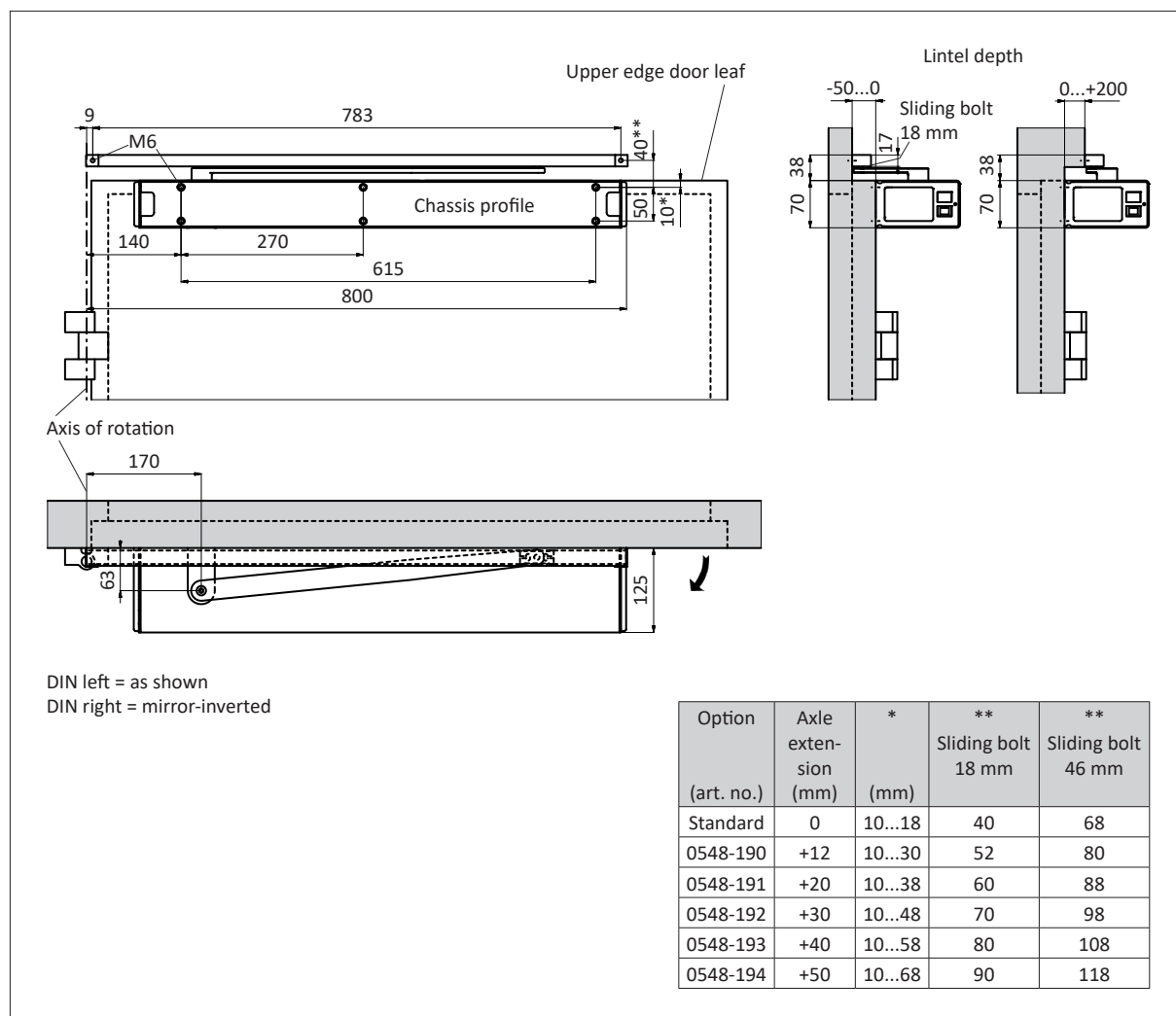
Procedure:

1. Mark out/drill the fastening holes on the lintel/door leaf and mount the drive mechanism.

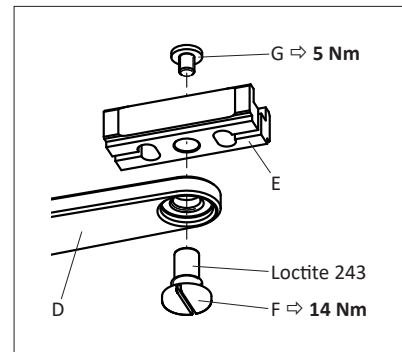


Note:

The illustration shows the 18 mm sliding bolt. Depending on the situation, this bolt can be replaced by the version 46 mm. This will change the respective dimensions by plus 28 mm.



2. Close the door leaf.
3. First loosen the screw (G) of the glider (E), then the bolt (F) of the rotating arm (D).
4. Depending on the situation, select the short 18 mm or long 46 mm bolt (F) and fasten it to the rotating arm (D) by means of screw locking adhesive Loctite 243 \Rightarrow Tightening moment **14 Nm**.
5. Push the glider (E) over the bolt (F) and fasten it by means of screw (G) \Rightarrow Tightening moment **5 Nm**.



Attention:

When tightening the screw (G), the bolt (F) must not come loose!

6. Screw down the rotating arm (D) on the drive unit \Rightarrow Tightening moment **25 Nm**.
Attention:
The pre-stressing of the rotating arm (D) depends on the existing lintel depth.
Example: Lintel depth 0 mm, pre-stressing of the rotating arm (D) $\approx 15^\circ$ (1 grid increment of the output shaft = 15°).
7. Slide the sliding rail (C) over the glider (E) and the open position stop piece (B) and bolt it onto the lintel: For metric screws = tightening moment **10 Nm**.



Note:

The open position stop piece (B) will bolt into place only after the commissioning (see chapter 7.1).

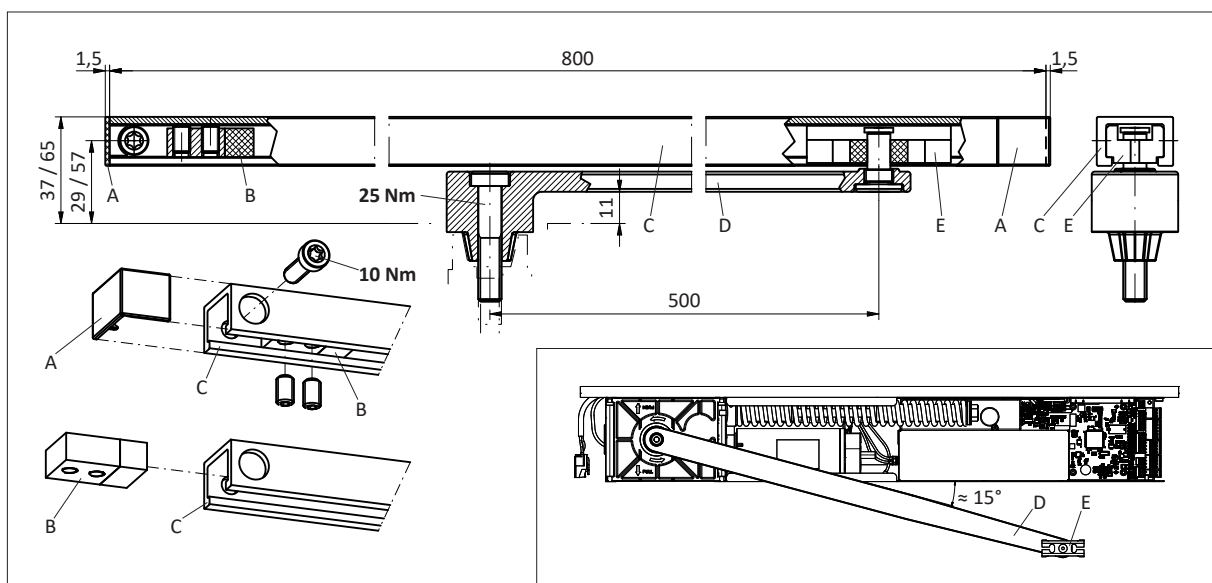
8. Insert the covering caps (A) on both sides.



Attention:

Check the motional sequence of the door leaf: The rods must not touch!
If the glider (E) makes screeching noises, it needs to be lubricated with a little WD40.

\Rightarrow forward to chapter 4.10



4.8 Sliding rods RG pulling function / Lintel mounting

Material:

1	Drive mechanism	0549-010	Covering aluminium
	Drive mechanism	0549-011	Covering inox
	incl. fixing set	0549-104	
1	Sliding rods RG	0548-164	650 mm incl. sliding bolts 18/46 mm

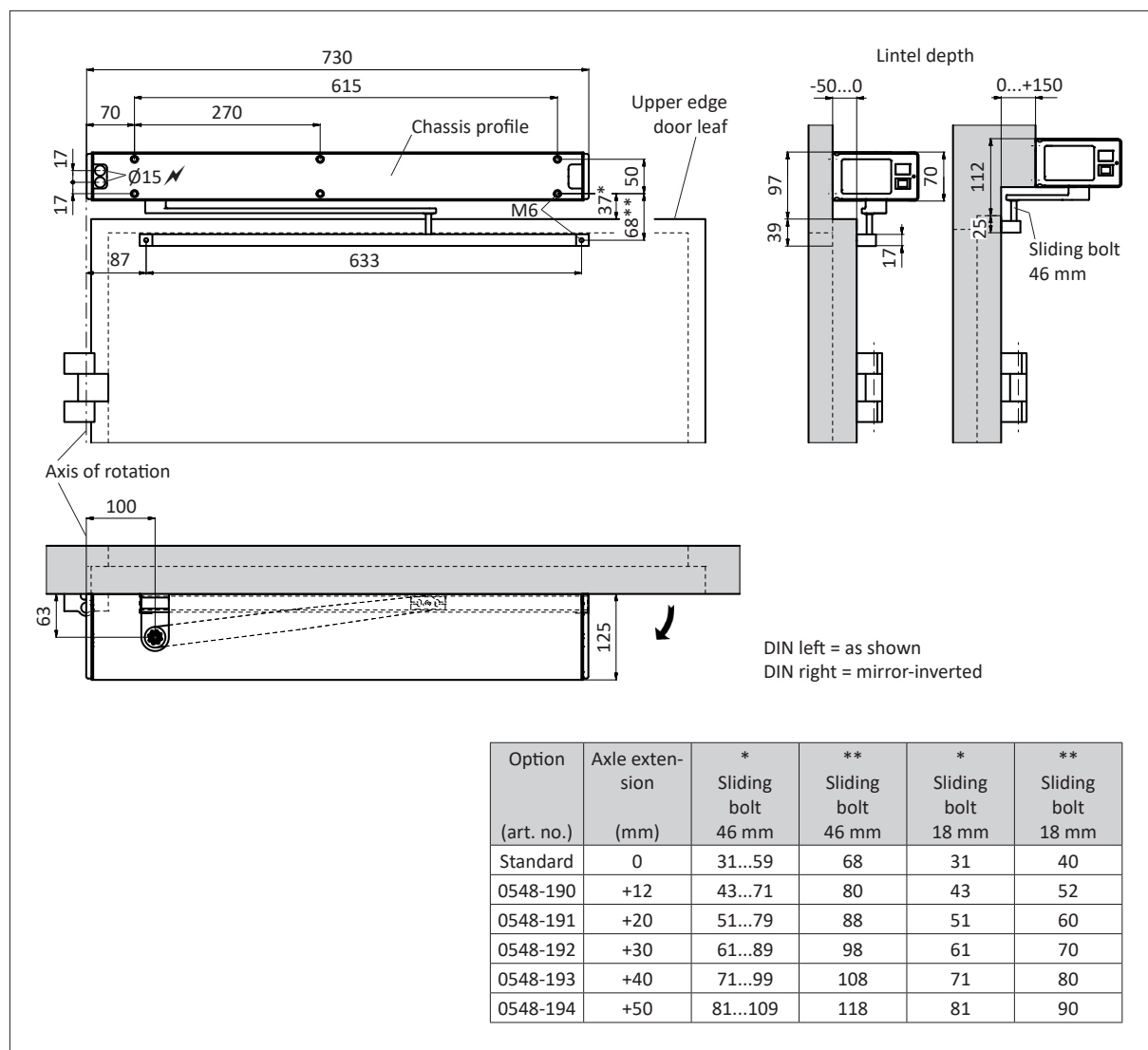
Procedure:

1. Mark out/drill the fastening holes on the lintel/door leaf.

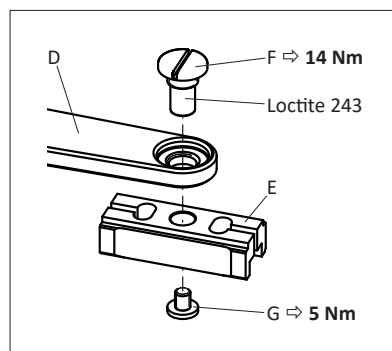


Note:

The illustration shows the 46 mm sliding bolt. Depending on the situation, this bolt can be replaced by the version 18 mm. This will change the respective dimensions by minus 28 mm.



2. Close the door leaf.
3. First loosen the screw (G) of the glider (E), then the bolt (F) of the rotating arm (D).
4. Depending on the situation, select the short 18 mm or long 46 mm bolt (F) and fasten it to the rotating arm (D) by means of screw locking adhesive Loctite 243 \Rightarrow Tightening moment **14 Nm**.
5. Push the glider (E) over the bolt (F) and fasten it by means of screw (G) \Rightarrow Tightening moment **5 Nm**.



Attention:

When tightening the screw (G), the bolt (F) must not come loose!

6. Prior to the installation of the drive unit:
Screw down the rotating arm (D) on the drive unit \Rightarrow Tightening moment **25 Nm**.
Attention: The pre-stressing of the rotating arm (D) depends on the existing lintel depth.
Example: Lintel depth 0 mm, pre-stressing of the rotating arm (D) $\approx 15^\circ$ (1 grid increment of the output shaft = 15°).
7. While mounting the drive unit, push the rotating arm (D) back by the pre-stressing angle of 20° .
8. Slide the sliding rail (C) over the glider (E) and the open position stop piece (B) and bolt it onto the door leaf: For metric screws = tightening moment **10 Nm**.



Note:

The open position stop piece (B) will bolt into place only after the commissioning (see chapter 7.1).

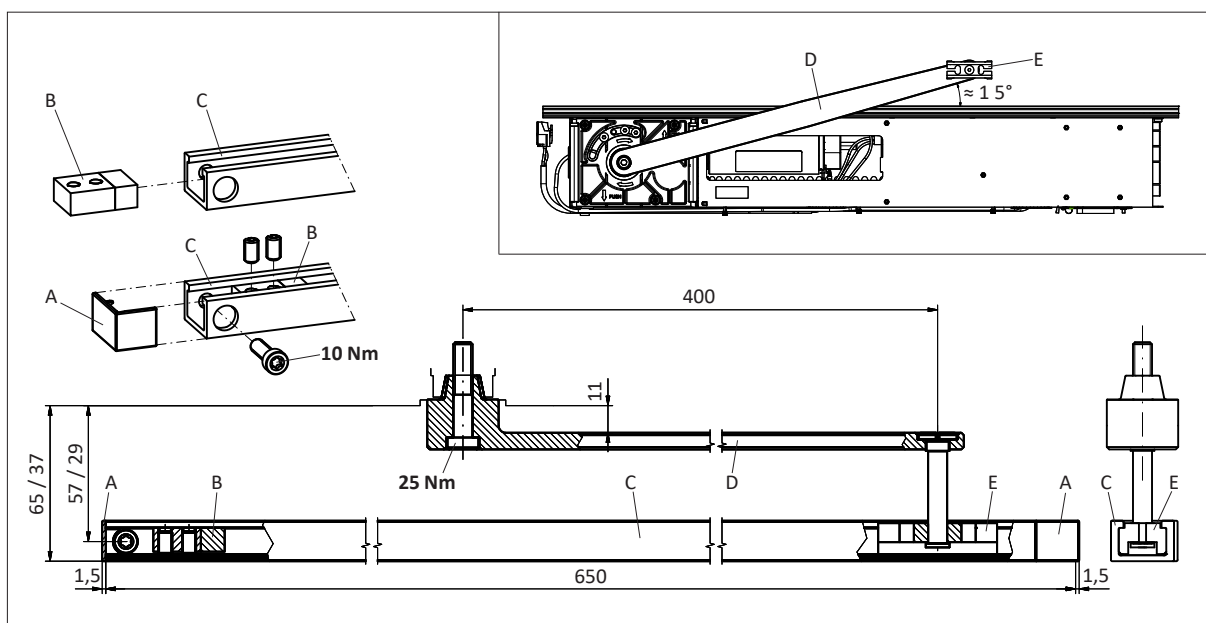
9. Insert the covering caps (A) on both sides.



Attention:

Check the motional sequence of the door leaf: The rods must not touch!
If the glider (E) makes screeching noises, it needs to be lubricated with a little WD40.

\Rightarrow forward to chapter 4.10



4.9 Sliding rods RG pulling function / Leaf mounting

Material:

1	Drive mechanism	0549-010	Covering aluminium
	Drive mechanism	0549-011	Covering inox
	incl. fixing set	0549-104	
1	Sliding rods RG	0548-164/02	800 mm incl. sliding bolts 18/46 mm

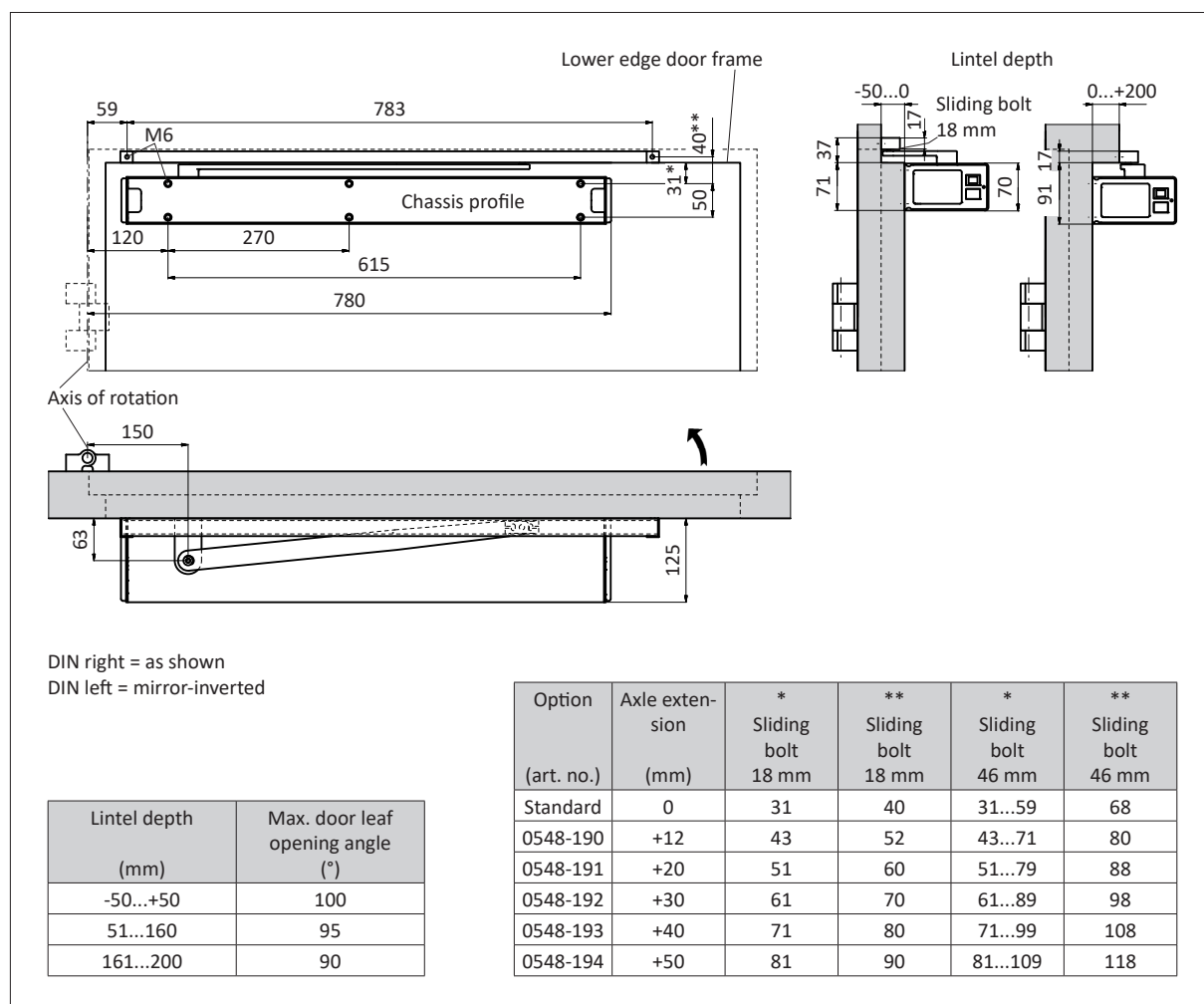
Procedure:

1. Mark out/drill the fastening holes on the lintel/door leaf.

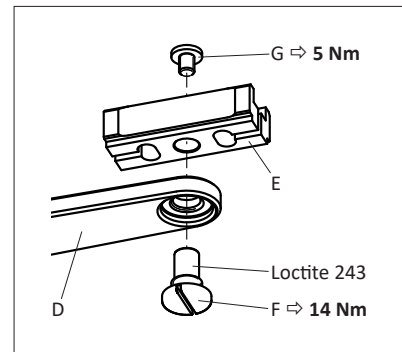


Note:

The illustration shows the 18 mm sliding bolt. Depending on the situation, this bolt can be replaced by the version 46 mm. This will change the respective dimensions by plus 28 mm.



2. Close the door leaf.
3. First loosen the screw (G) of the glider (E), then the bolt (F) of the rotating arm (D).
4. Depending on the situation, select the short 18 mm or long 46 mm bolt (F) and fasten it to the rotating arm (D) by means of screw locking adhesive Loctite 243 \Rightarrow Tightening moment **14 Nm**.
5. Push the glider (E) over the bolt (F) and fasten it by means of screw (G) \Rightarrow Tightening moment **5 Nm**.

**Attention:**

When tightening the screw (G), the bolt (F) must not come loose!

6. Prior to the installation of the drive unit:
Screw down the rotating arm (D) on the drive unit \Rightarrow Tightening moment **25 Nm**.
Attention:
The pre-stressing of the rotating arm (D) depends on the existing lintel depth.
Example: Lintel depth 0 mm, pre-stressing of the rotating arm (D) $\approx 15^\circ$ (1 grid increment of the output shaft = 15°).
7. While mounting the drive unit, push the rotating arm (D) back by the pre-stressing angle of 20° .
8. Slide the sliding rail (C) over the glider (E) and the open position stop piece (B) and bolt it onto the lintel: For metric screws = tightening moment **10 Nm**.

**Note:**

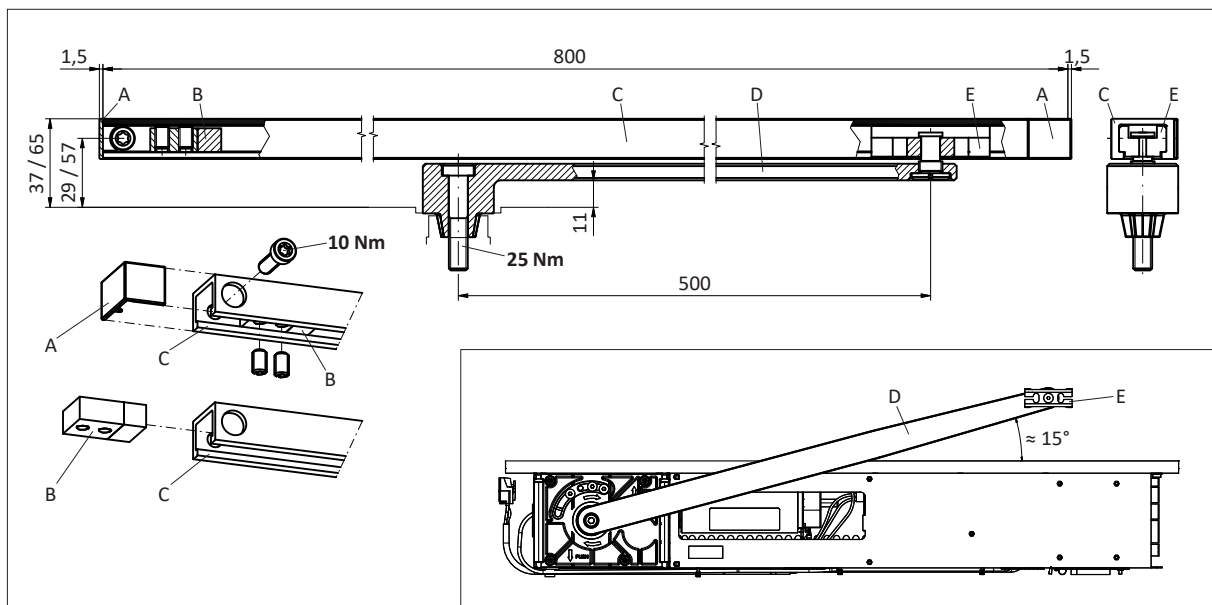
The open position stop piece (B) will bolt into place only after the commissioning (see chapter 7.1).

9. Insert the covering caps (A) on both sides.

**Attention:**

Check the motional sequence of the door leaf: The rods must not touch!
If the glider (E) makes screeching noises, it needs to be lubricated with a little WD40.

\Rightarrow forward to chapter 4.10



4.10 Adjusting the pre-stressing of the closing spring

Upon delivery, the closing spring (B) is pre-stressed for a measure $X = 300$ mm. In exceptional cases, the spring tension (setting X) may be set to between 300 mm and a maximum of 267 mm (without the pre-fitted rod assembly).



Note:

The correct pre-stressing of the closing spring must imperatively be adjusted before carrying out the automatic teach-in procedure! As a general rule, the closing spring (B) force can be reduced when setting the standard drive mechanism.

A possibly existing door lock must be correctly engaged to lock the leaf.

Otherwise: adapt the pre-stressing of the closing spring or the door slam cushioning (potentiometer) accordingly.

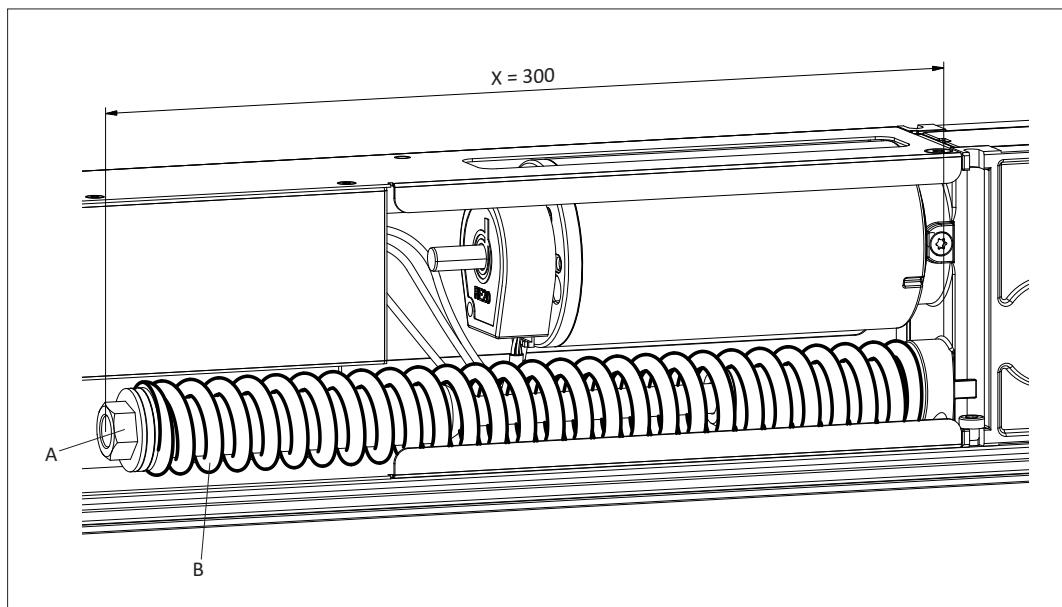
Procedure:

1. Close the door leaf.
2. Using the setting screw (A), adjust the measure X in function of the respective situation.
3. Open the door leaf by at least 60° and then let it be closed.



Warning:

The force necessary for manually opening a door must not exceed **150 N**. This effort shall be measured as a static force on the main closing edge (perpendicularly to the door leaf), at a height of $1'000 \text{ mm} \pm 10 \text{ mm}$.



4.11 Setting the forceful closing function

While an installation is in the state without mains power or in the operating mode MANUAL, the motor acts as an attenuator, thus guaranteeing a constant closing speed until the forceful closing range is reached.

To make sure that, when switched to the de-energized state or in the operating mode MANUAL, the door leaf is reliably engaged by the door lock, the drive mechanism is equipped with a forceful closing function (acceleration causing a forceful closing). By means of the potentiometer, the forceful closing cushioning (shortly before the door leaf reaches the closed position) can be adjusted accordingly.

Procedure:

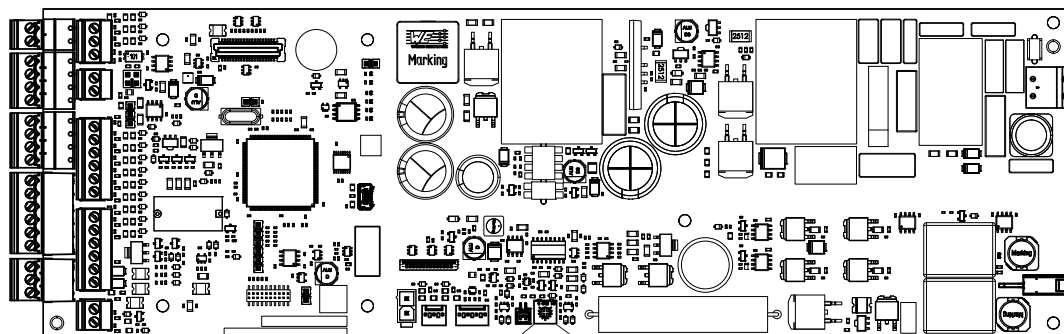
1. Open the door leaf by 90° and then let it be closed.
2. Should the door leaf fail to engage in the lock, set the forceful closing cushioning (by means of the potentiometer provided on the control unit).



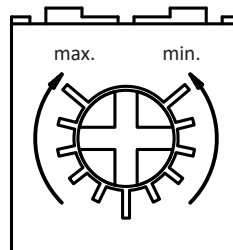
Warning:

In de-energized state or in the operating mode MANUAL, the closing procedure must last at least 3 seconds (from the open position 90° up to the closed position 0°).

Control PCB



Adjusting trimmer
Closing speed/Forceful closing
cushioning



Function adjusting trimmer (depending on position of the door leaf):

Open position up to forceful closing range (reference switch) ⇒ Adjusting closing speed

Forceful closing range (reference switch) up to closed position ⇒ Adjusting forceful closing cushioning

5 ELECTRICAL CONNECTIONS

5.1 Power supply

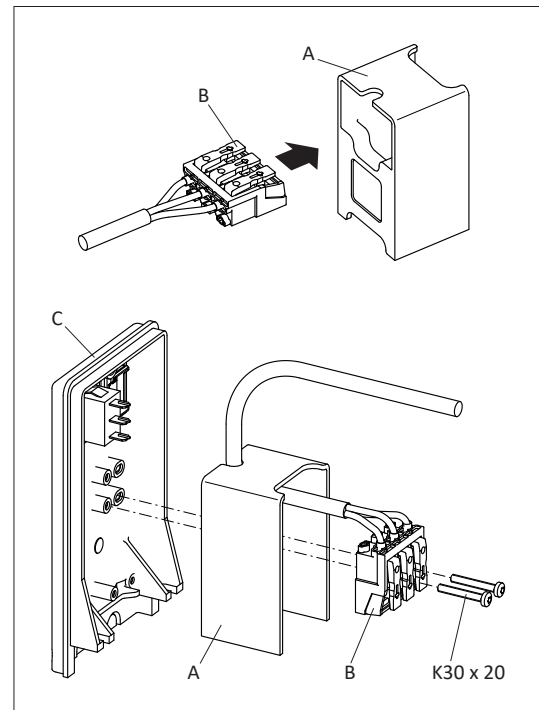


Warning:

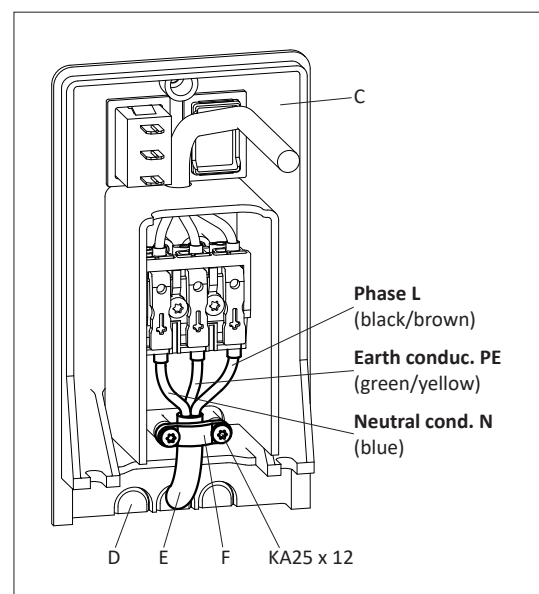
Electric shock hazard! Before working on the drive mechanism, completely disconnect the local mains power supply and block it to prevent accidental or unauthorised reactivation. Ensure also that country-specific regulations are observed. The mains power supply must meet the following requirements: 230 VAC (+10/-15 %), 50 Hz, 10/13 A.

Procedure:

1. Guide the power connection terminal (B) of the drive module through the protection shield (A) and attach on the side cover (C).



2. If required: Break out the pre-perforated flaps (D) on the side cover (C).
3. Connect the mains cable (E) and fit the strain relief clamp (F).

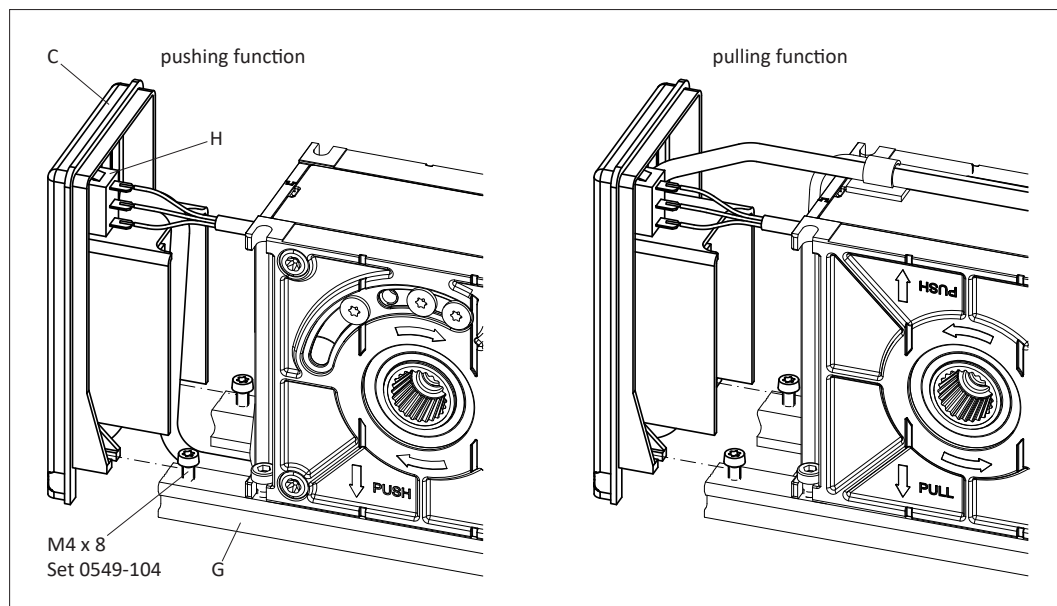


4. Attach both side covers (C) to the chassis profile (G).

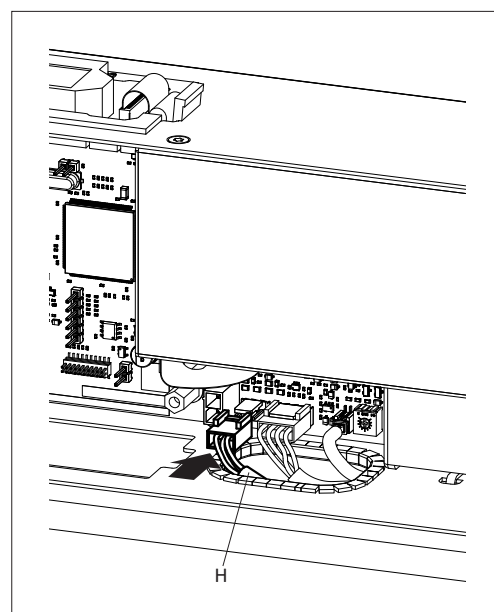


Note:

Depending on the assembly situation, it may be advisable to install the program selector switch (H) on the opposite side.



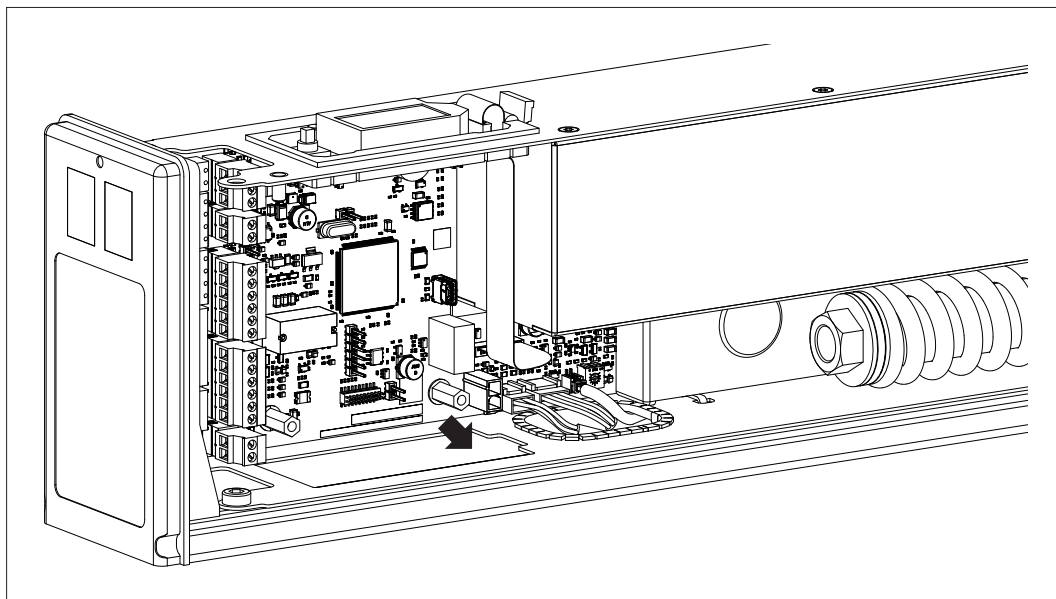
5. Connect the program selector switch (H) to the control unit.



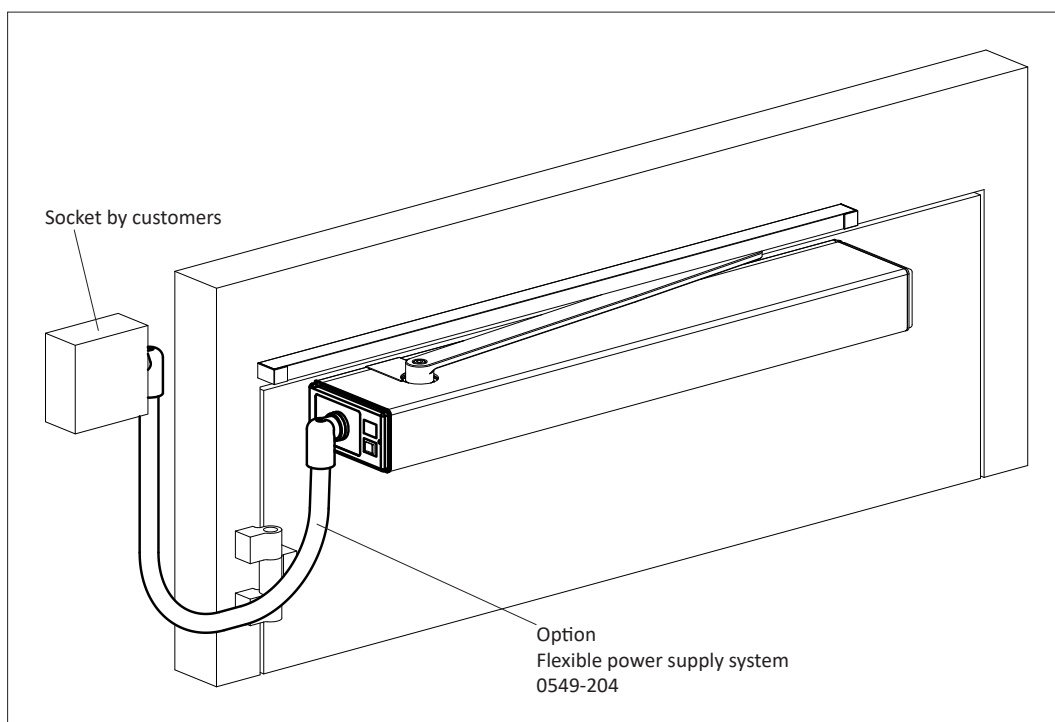
5.2 Cable layout

5.2.1 Lintel mounting

Be sure to run the cable between the drive module and the chassis profile wherever possible!



5.2.2 Leaf mounting



5.3 External elements

1. Mount all the required control and safety elements at their respective place.
2. Lead the cables of the elements up to the drive mechanism (by customers).
3. Connect the cables according to the diagram E4-0141-724 (in the appendix).



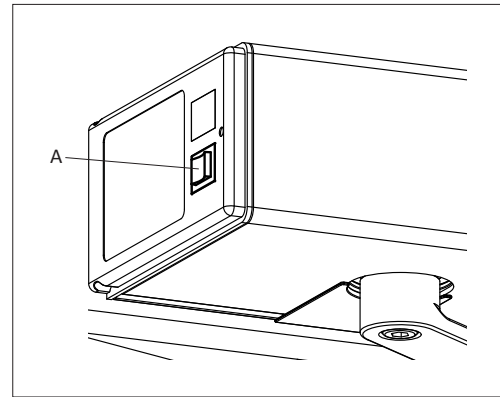
Note:

If an electric lock is provided, its connection rating is 24 VDC and max. 0,5 A (or 24 VAC/1,5 A by customers). It should be designed for a duty cycle of 100 %. The electric lock locks the door leaf in the desired operating modes and is configurable.

6 CONTROL

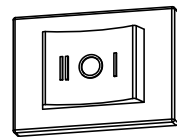
6.1 Program selector switch

The drive mechanism is supplied with a built-in program selector switch (A), which allows enabling the operating modes AUTOMATIC, OPEN and MANUAL.



6.2 Operating modes

The following operating modes can be enabled by means of the program selector switch (A):



AUTOMATIC (I)

Automatic opening via the opening elements inside/outside + Key.
Automatic closing upon expiration of the adjustable hold-open time.

MANUAL (0)

The drive mechanism and the control elements are switched off.
The door leaf can be manually opened.
The door leaf is closed by spring power from any position.

OPEN (II)

The door leaf is automatically opened and remains in the OPEN position.

A selector switch can be connected to the corresponding terminals on the control unit for the following operating modes (see circuit diagram in appendix):

NIGHT

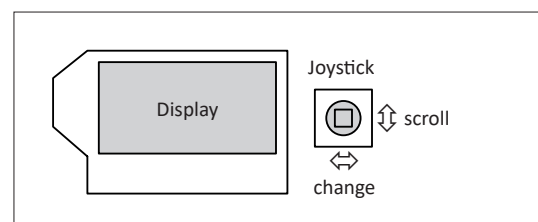
The door leaf can only be opened via the opening element Key (key-operated switch outside).

EXIT

The door leaf can only be opened via the opening elements inside and Key.

6.3 Display and joystick

The parameters can be changed on the control unit by means of the display and the joystick.
The movements of the joystick have the following effects:



- Vertical joystick movement (upward/downward) ⇒ Scroll through the displayed information.
- Horizontal joystick movement (to the left/to the right) ⇒ Change the settings.
- Shortly press in the joystick in the rest position ⇒ Validation OK.

7 COMMISSIONING



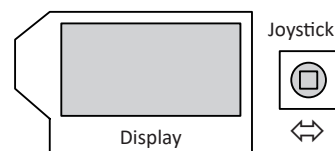
Warning:

During the teach-in procedure (which must only be carried out by experts), the safety devices (radar, sensors, ...) are switched off!

Before initiating the teach-in procedure, it is important to make sure that neither persons nor objects remain within the danger area of the moving door leaf, in order to avoid injuries or damages!

Procedure:

1. Switch on the drive mechanism on the side cover (Power-up).
2. Using the joystick, adjust the display direction: Move the joystick downward once \Rightarrow the display direction is switched to a readable position.
3. Programming the type of rod assembly Rod:
Move the joystick to the left/to the right (see parameter chapter 7.4). Validate the correct type of rod assembly by means of OK: In the rest position, shortly push in the joystick.
4. Adjust the distance dAxis (distance in cm between the rotation axis of the door hinges and the mounting level of the drive mechanism \Rightarrow see illustration below).



Press
Down

Rod
STD-PH

dAxis
5cm



Note:

dAxis is an approximate value. Depending on the installation situation, dAxis may have to be adapted.

5. Adjust the opening angle Ao and validate by means of OK.



Attention:

The steps 4 and 5 are influenced by the installation measures/ distance between the door hinges.

Ao
95°

6. If existing:
Select Low Energy (low energy operation) (\Rightarrow ON) and confirm with OK.

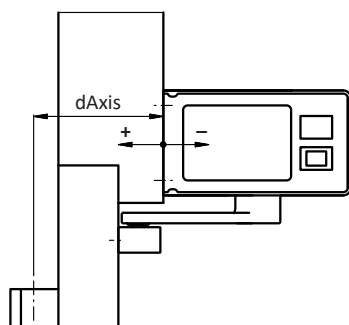
Low En
OFF

7. Adjust the door leaf width and validate by means of OK.

Width
85 cm

8. Adjust the door leaf weight and validate by means of OK.

Weight
75 kg



9. Adjust the opening speed V_o and validate by means of OK.
10. Adjust the closing speed V_c and validate by means of OK.
11. Adjust the teach-in procedure (Teach) and validate by means of OK.
12. Start the teach-in procedure (Teach): validate by means of OK.
13. Upon expiry of 10 seconds the teach-in procedure (Teach) is automatically initiated (or immediately by means of moving the joystick $\Rightarrow \Uparrow \Rightarrow \Downarrow$ without OK). During the teach-in procedure the drive mechanism continues to beep. The following learning run is carried out:
 - Super-slow speed opening direction
 - Super-slow speed closing direction.
14. Upon completion of the learning run the following message is displayed:
15. The display should now supply the following information:
E11 indicates that the teach-in procedure (Teach) is not yet completed.
16. By giving an opening command, open the door leaf and let it be closed again. \Rightarrow The door leaf will open and close at normal speed (without obstacle detection feature).
Remark:
The door leaf must not be obstructed!
Now the display should provide the following information:
E13 indicates that the spring tension test is still pending.
17. By giving an opening command, open the door leaf and let it be closed again. \Rightarrow The door leaf will open at normal speed. After expiry of the hold-open time, the door leaf closes by means of spring force (thereby the closing time is measured).

Remark:
The door leaf must not be obstructed!
Now the display should provide the following information:

If the required minimum closing time is not respected, error E86 is displayed.
In this case, the spring tension must be reduced until the required minimum closing time is met.
Menu Diagnostics shows the nominal and the effective closing time.

V_o
6

V_c
4

Teach

Teach
ok?

Teach1
x E10

Teach2
x E10

Done !
x E11

>##<
 E11

>##<
 E13

>##<


>##<
 E86

nominal → 4.00 s
effective → 3.27 s

**Note:**

A renewed teach-in procedure (Teach) is required if:

- the spring tension has been changed
- the door leaf width has been changed
- the door leaf weight has been changed
- the type of rod assembly has been changed
- the opening angle A_o has been changed
- the Teach has been obstructed before reaching an opening angle of 20°
- the distance between axles (dAxis) has been changed
- the spring tension is too high.

Additional parameter and menu navigation \Rightarrow see chapter 7.4

7.1 Adjusting the open position stop pieces



Note:

The commissioning must be completed according to chapter 7.

7.1.1 Adjusting the internal open position stop piece

Procedure:

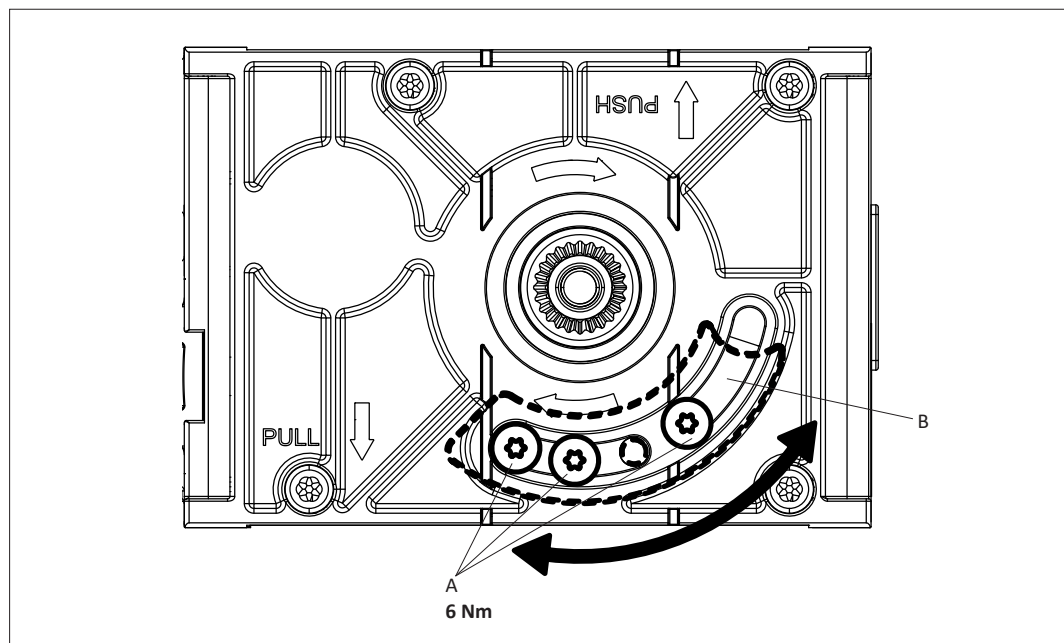
1. Select operating mode OPEN (door leaf opens and remains in the open position).
2. Loosen the three screws (A) on the open position stop piece (B).



Note:

If the open position stop piece (B) sticks, gently tap the screws (A) to loosen it. Remove the screws (A) only if necessary and individually. The open position stop piece (B) must always be held by at least one screw (A)! Otherwise, the open position stop piece (B) may fall out.

3. Push the open position stop piece (B) counterclockwise as far as it will go, then push back by ≈ 2 mm and tighten all the screws (A) \Rightarrow Tightening moment **6 Nm**.
4. Select operating mode AUTOMATIC (door leaf closes).



7.1.2 Adjusting the open position stop piece of the sliding rod

Procedure:

1. Select operating mode OPEN (door leaf opens and remains in the open position).
2. Shift the open position stop piece in the sliding rail up to the glider, then push it back approx. 5 mm and bolt into place \Rightarrow Tightening moment **9 Nm**.
3. Select operating mode AUTOMATIC (door leaf closes).

7.2 Low Energy mode

If no sensor system is used, the drive mechanism must be operated in the Low Energy mode, which answers the low energy requirements according to EN 16005.

In the Low Energy mode, the drive mechanism is automatically set so that the door leaf does not exceed an energy of 1,69 J. For this purpose, the LowEnergy parameter must be set on ON during commissioning. Afterwards, the door leaf weight and door leaf width are queried. Based on the parameters entered, the drive mechanism regulates the correct opening and closing time.

7.3 Servo operation

In the Servo operation, the drive mechanism compensates the closing force of the spring. For the user, the door behaves like a normal door (without drive mechanism).

In the servo-operation, the door behaviour is as follows:

- The door always closes automatically.
- If the door is pushed open again by hand during the automatic closing procedure, the drive mechanism switches back to servo operation.
- The servo support can be adjusted in 5 stages (depending on door leaf width and weight).
- In the servo operation, the door can still be opened automatically by means of Key command (push-button/radio).

Example:

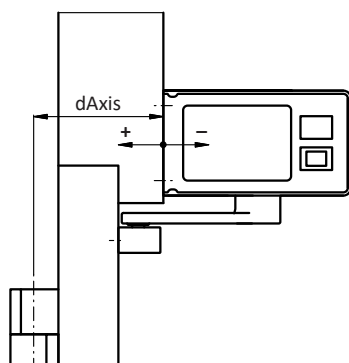
For normal users, the door behaves like any normal manually operated door. For disabled persons, the door can be opened automatically.

7.4 Adjustings

The parameters can be changed on the control unit by means of the display and the joystick.

7.4.1 Motional parameters (PARAMETER)

Parameter	Description	Setting range	Default
Vo	Opening speed (velocity open)	0...14 (5...40°/s)	6
Vc	Closing speed (velocity close)	0...14 (5...40°/s)	4
TOEx	Hold-open time opening element inside/outside (time hold opening element inside/outside)	0...60 s	3 s
TKey	Hold-open time Key (time hold opening element Key)	0...180 s	5 s
TDelay	Starting delay (time delay lock)	0,0...4,0 s	0,2 s
FDelay	Relieving force during unlocking (force delay) ⇒ only effective if TDelay is > 0	0,0...7,0 A	OFF
TLock	Door rectification time (time press close)	0,0...4,0 s	0,5 s
FLock	Pressing force during locking (force lock) ⇒ only effective if TLock is > 0	0,0...7,0 A	2,0 A
FSlam	Accelerating function (force slam)	0...10	OFF
FWind	Obstacle detection optimized for exterior doors (force wind)	OFF OPEN CLOSE BOTH	OFF
Fo	Opening force (force open)	0...9	4
Fc	Closing force (force close)	0...9	4
Foh	Hold-open force (force open hold)	0...9	0
Fch	Interlocking force (force close hold) ⇒ automatically programs FLock and FDelay if these are 0	0,0...3,5 A	0
LowEN	Low-energy operation (Low Energy) according to EN 16005	OFF BOTH CLOSE OPEN	OFF
Width	Width door leaf to be adjusted ⇒ only if LowEn is active	75...110 cm	75 cm
Weight	Weight door leaf to be adjusted ⇒ only if LowEn is active	50...150 kg	50 kg
Ao	Door leaf opening angle (angle open) If the opening angle is changed during the operating mode OPEN, the operating mode MANU-AL needs to be selected for closing the door.	20...(190°) Rod depending	95° *
Rod	Type of rod assembly (Rod) Lintel mounting Normal rods pushing fonction Sliding rods pulling fonction Sliding rods pushing fonction Sliding rods pushing fonction Sliding rods pulling fonction Sliding rods pulling fonction Normal rods pushing fonction Leaf mounting Sliding rods pushing fonction Sliding rods pulling fonction Sliding rods pulling fonction Normal rods pushing fonction	STD-PH SLI-PL SLI-PH WIN-PH WIN-PL WIN-ST	STD-PH *
dAxis	Distance between rotation axis of the door hinges and the mounting level of the drive mechanism (distance Axis). dAxis is an approximate value. Depending on the installation situation, dAxis may have to be adapted.	-8...+25 cm Rod depending	0/+8 cm Rod dep. *

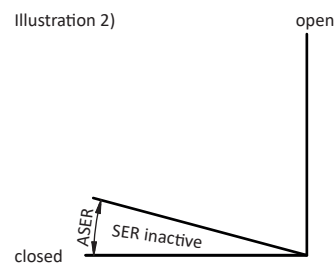
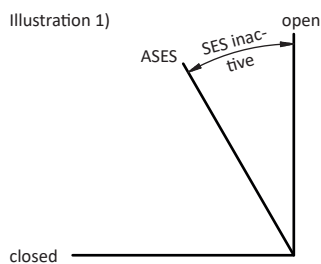


* Note:
A renewed teach-in procedure (Teach) is required.

7.4.2 Configuration (CONFIG)

Parameter	Description	Setting range	Default
Servo	Support for manual push to open. The key opens automatically. Five-position adjustment, depending on the width and weight of the door leaf.	OFF 1...5	OFF
APuGo	Triggering angle Push&Go (angle push&go)	OFF, 2...10°	OFF
ASES	Suppression point Safety Element stop (angle safety element stop) ⇒ see illustration 1). If Ao is changed, ASES is automatically set to Ao.	45°...Ao	95° Ao depending (95°)
ASER	Suppression range of the safety element reversing (angle safety element reversing) ⇒ see illustration 2)	0...60°	0°
SeOpCo	Persistent opening (safety element open continue) After a Safety Element Stop during the opening procedure, the door shall continue its opening move (instead of closing), as soon as SES is activated.	OFF ON	OFF
SeOpTi	Waiting time till the drive mechanism closes even if SeOpCo = ON (safety element opening time), in the event that a fixed object blocks the door (only visible if SeOpCo = ON).	PERMAN 1...60 s	20 s
SESClo	Safety element Stop activated/deactivated during the closing motion (safety element stop closing)	ACTIVE INACTI	INACTI
EMY-IN	Configuration of the Emergency terminal (break contact) (emergency input)	CL-SPR (spring) STOP OPEN CL-MOT (motor)	CL-SPR
OExStp	Step-by-step control function (opening element step)	OFF OEI OEO KEY	OFF
RC 0.1	Parametrizable relay output 1 on optional PCB 1 (relay contact) (only visible if relay PCB 0 is plugged in)	CLOSED OPENNG	CLOSED
RC 0.2	Parametrizable relay output 2 on optional PCB 1 (relay contact) (only visible if relay PCB 0 is plugged in)	OPEN CLOSNG	OPEN
RC 0.3	Parametrizable relay output 3 on optional PCB 1 (relay contact) (only visible if relay PCB 0 is plugged in)	ERROR PSAUTO	ERROR
RC 0.4	Parametrizable relay output 4 on optional PCB 1 (relay contact) (only visible if relay PCB 0 is plugged in)	PSNGHT PSEXIT	GONG
RC 1.1	Parametrizable relay output 1 on optional PCB 2 (relay contact) (only visible if relay PCB 1 is plugged in)	PSOPEN PSMANU	OPENNG
RC 1.2	Parametrizable relay output 2 on optional PCB 2 (relay contact) (only visible if relay PCB 1 is plugged in)	GONG LOCKED	CLOSNG
RC 1.3	Parametrizable relay output 3 on optional PCB 2 (relay contact) (only visible if relay PCB 1 is plugged in)	SIX30S	PSAUTO
RC 1.4	Parametrizable relay output 4 on optional PCB 2 (relay contact) (only visible if relay PCB 1 is plugged in)	EMY_AL	LOCKED
Unlock	Impulse/Permanent unlocking (impulse unlock)	IMPULS PERMAN	IMPULS
UnloCl	Engage (unlock) and secure the motorised lock before closing, if the door leaf is to be closed.	INACTI ACTIVE	INACTI
EL-Fb	Return signal of the electric lock (electric lock feed back) N.O. ⇒ Contact open if in the unlocked state (-), .closed if in the locked state (+) N.C. ⇒ Contact open in the locked state (+), closed in the unlocked state (-) (+) and (-) indicate the status in the diagnostic menu.	OFF N.O. N.C.	OFF
LockAU	Operating mode AUTOMATIC locked (locked automat) (only visible if Unlock = Perman)	UNLOCK LOCK	UNLOCK
LockEX	Operating mode EXIT locked (locked exit) (only visible if Unlock = Perman)	UNLOCK LOCK	LOCK
LockMA	Operating mode MANUAL locked (locked manual) (only visible if Unlock = Perman)	UNLOCK LOCK	UNLOCK

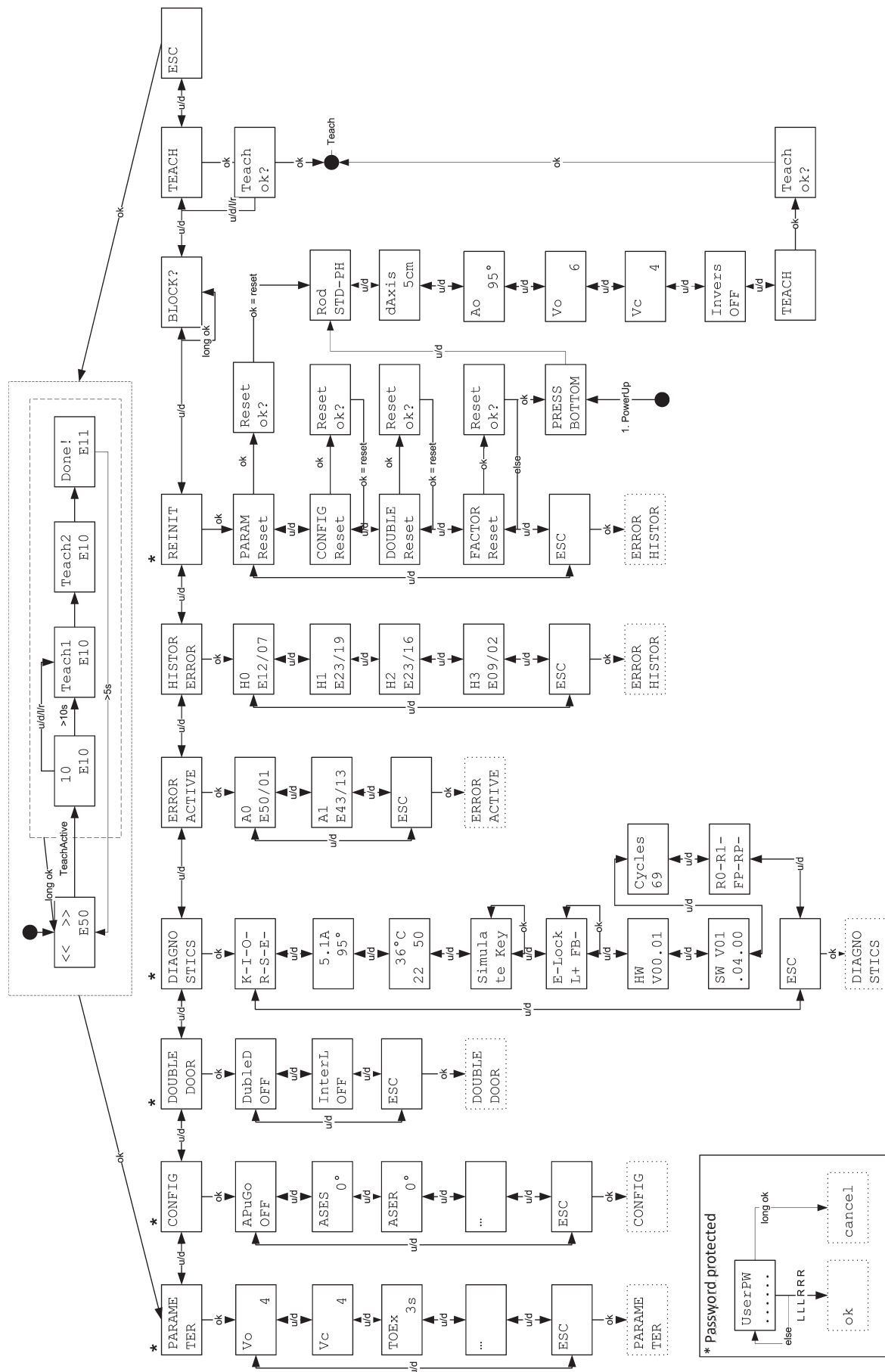
LcdDir	Orientation of the display (LCD direction)	0...1	0
MovCon	Endurance test Open/Close (moving continuous)	OFF ON-FLT ON-PRM	OFF
OExMAN	Acceptance of opening commands after a manual door opening (only if APuGo = OFF) (opening element inside/outside manual)	OFF ON	OFF
OEOSIR	Safety device on opposite side to door hinge as opening element (only from Closed position). Note: This parameter must be set to OFF for teaching-in of the LZR-FLATSCAN. (SER as OEO)	OFF ON	OFF
PSKIZe	Zero position of the program setting (operating mode); fixed program position that can only be changed by means of the terminals on the control unit (program selector key in the side cover inactive). Use for external program switch (only four terminals) or for controlling the program positions via the terminals on the control unit. (program selection terminal zero)	No Act PSOpen PSHand PSAuto PSExit PSNigt	No Act
SCBlOc	Lock the program selector key in the side cover (side cover block) Toggle = Lock/unlock (press active program key during at least 5 seconds). Time = Lock (automatically after 5 minutes without any activation of the program keys), unlocking (press active program key during at least 5 seconds).	OFF Toggle Time	OFF
Buzzer	The buzzer signals the door leaf movement (persons with amblyopia/without hindrance)	OFF BOTH OPEN CLOSE	OFF



7.4.3 Installations with multiple door leaves (DOUBLE DOOR)



Parameter	Description	Setting range	Default
DubleD	Closing sequence role (Master/Slave) and interlock side (A/B)	OFF MastrA SlaveA MastrB SlaveB	OFF
AoSeq	Current delay angle for opening sequence control (Slave) (only visible if DupleD is active)	0...110°	20°
AcSeq	Current delay angle for closing sequence control (Master) (only visible if DupleD is active)	0...110°	20°
InterL	Interlock	OFF SideA SideB	OFF
ILAuto	Interlock mode Operating mode AUTOMATIC (only visible if InterL is active)	Inacti Active	Active
ILExit	Interlock mode Operating mode EXIT (only visible if InterL is active)	Inacti Active	Active
ILNigt	Interlock mode Operating mode NIGHT (only visible if InterL is active)	Inacti Active	Active
ILType	Safety The two doors function as an interlock (in all operating modes). The second door only opens when the first one is closed. This applies to both doors. Spital Automatic sequence ⇒ whenever a door opening command is issued, the door receiving the command is opened. Once it has closed again, the second door opens automatically. NL The second door only opens when the first one is closed, or after the override period has elapsed.	Safety Spital NL	Safety
TOverd	Only visible in ILType NL When the override period has elapsed, the interlock function is cancelled. Once both doors are closed, the interlock function is activated. (override time)	OFF 1...60 s	OFF
RdrOEI	OFF OEO/OEI radar function activates normally. The door closes if both are inactive. ON The OEO deactivates the (OEI) radar inside smaller interlocks to prevent it from keeping the door open.	OFF ON	OFF
ILCdRc	Active Open commands are temporarily stored, and then carried out as soon as the second door is closed. Inactive Open commands are not carried out until the second door is closed. (interlock open command recording)	Active Inacti	Active



On the **1st level**, the following information is shown on the display:

1st display line:

The door position is represented by means of the arrows (><). Alternatively, the motion-relevant opening and safety signals are displayed. The double hash signs (##) indicate that the door is locked. In the open position the hold-open time is shown in the form of a countdown.

Display of the door position:

<REF?>	Waits for reference switch
< ?? >	Unknown
><	Closed
>##<	Closed and locked
<< >>	Opening
< >	Open
>> <<	Closing
==	Stopping

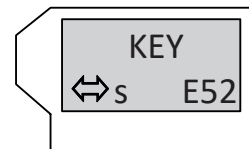
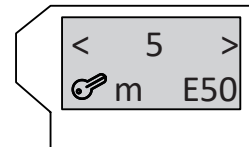


Display of the door control:

OEO	Opening element outside
OEI	Opening element inside
KEY	Opening element NIGHT
SES	Safety element Stop
SER	Safety element Reversing
SEF	Safety element Force (obstacle detection)
EMY	Emergency element
PUGO	Push-and-Go

2nd display line:

- at the bottom, left-hand side, the presently enabled operating mode is displayed (a frame around the symbol indicates the overriding operating mode).
- (m) means closing sequence - Master
- (s) means closing sequence - Slave
- (w) means interlock
- at the bottom, right-hand side, the presently active errors are displayed.



By means of OK you can switch over from the first to the second level.

For all the menus of the following list, exiting is possible by remaining on the OK key, or by means of the menu item ESC.

On the **2nd level**, the following menus are available:

PARAMETER

Setting the motional parameters

- A changed parameter value is shown by a flashing display.
Press OK in order to validate the change.

CONFIG

Setting the functionalities

- A changed parameter value is shown by a flashing display.
Press OK in order to validate the change.

DOUBLE DOOR

Setting the closing sequence and interlock function

- A changed parameter value is indicated by a flashing display.
In order to validate the change, OK must be pressed.

DIAGNOSTICS

Diagnostic tools

- K-I-O-R-S-E shows the inputs KEY (K), OEI (I), OEO (O), SER (R), SES (S), EMY (E).
(+) stands for active, (-) for inactive.
 - 5.1A 95° shows the motor current and the door opening angle.
 - Simulate Key: OK triggers a Key command.
 - E-Lock: L- shows the status of Lock (L). FB- shows the input EI-Fb. OK actuates the electric lock.
L+ resp. FB+ means locked. L- resp. FB- means unlocked.
 - HW Version: Version of the Logic PCB.
 - SW Version: Version of the Software.
 - Cycles: Total number of openings (this value is memorized).
 - Read out spring tension test/cushioning test (nominal closing time and effective closing time).
- Optional PCBs ⇒ see chapter 13.5.

ERROR ACTIVE

Pending active errors

- The pending active errors are displayed in a list. This list is updated at the end and the latest additions appear during the next passage.
A0 indicates the latest error that has occurred.
- Exit the list by pressing OK.

HISTOR ERROR

Formerly active errors

- H0 indicates the latest error that has occurred.

REINIT

Carry out a re-initialization

- PARAM Reset sets all the motional parameters back to the default values (inclusive opening angle, rod assemblies and dAxis).
- CONFIG Reset sets all the configuration settings back to the default values.
- DOUBLE Reset sets all the closing sequence and interlock settings back to the default values.
- FACTOR Reset
The control unit is reset to the delivery configuration programmed by the manufacturer.
This means that all the motional parameters, configurations, closing sequence and interlock settings are reinitialized with the default settings.
- Reset OK? is validated by means of OK and aborted by any other joystick movement.

BLOCK/UNBLOC

Lock/unlock the joystick

- **BLOCK**

Lock the joystick. For a temporary unlocking, press OK for more than 1 second.
60 seconds after the last joystick actuation, the joystick is automatically relocked.

- **UNBLOC**

Permanent unlocking of the joystick.

UPDATE SW

Carry out a Software-Update

TEACH

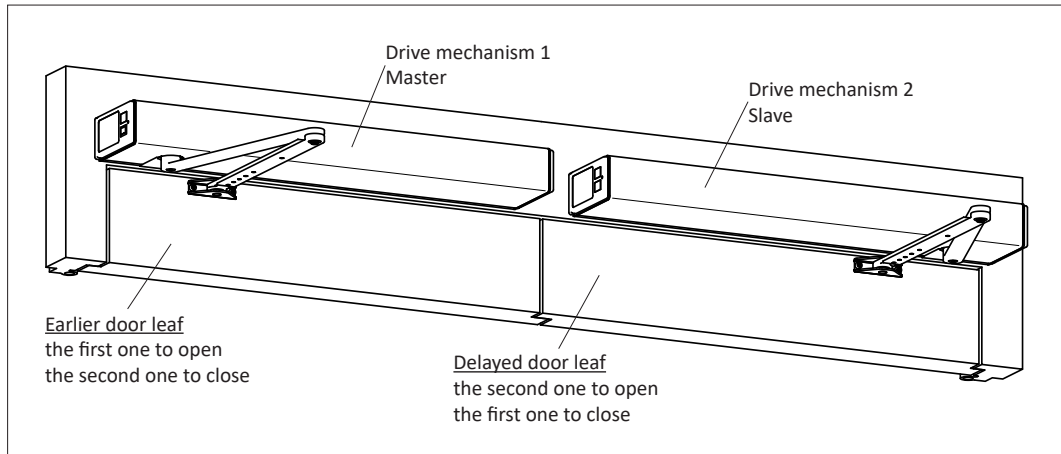
Completely close the door leaf. Initiate a teach-in procedure (during the teach-in procedure the drive mechanism continues to beep).

- Teach OK? is validated by means of OK and aborted by any other joystick movement.
- The teach-in procedure can be canceled by means of the D-BEDIX (C-key).

Setting of the opening angle (Ao): During the first teach-in run, the drive mechanism moves to the open position (Ao) or up to the recommended open position stop piece, whichever event happens first, and the obtained result is memorized as opening angle. In the event of an excessively big difference between the actual opening angle and the displayed angle (in the diagnostic menu), this angle can be corrected (by means of dAxis). If the difference persists, the installation precision should be checked.

7.5 Closing sequence control

For bi-parting installations, the closing sequence control determines the order in which the door leaves are opened and closed. For the opening procedure, the earlier door leaf (Master leaf) is the first one to be opened, whereas for the closing procedure the delayed door leaf (Slave leaf) is the first one to be closed. This sequence ensures a correct overlapping of the door leaves.



Connections:

Opening elements (KE, OEO and OEI) connected to Master only act upon the Master (single leaf operation). Opening elements connected to Slave act upon the Master as well as on the Slave (bi-parting operation).

The safety elements SER and SES are connected to the respective drive mechanism.

An active EMCY element connected to the Master carries out the EMY-IN action configured on the Master (for both door leaves). An active EMCY element connected to the Slave switches the latter to the spring-powered operation.

An electric lock, which locks the Master leaf, is connected to the Master. Accordingly, an electric lock, which locks the Slave leaf, is connected on the Slave.

Function:

The first door leaf to be put in motion for the opening procedure is the Master; by means of DubleD, this leaf is configured as MastrA. Its partner is the Slave, which is configured as SlaveA by means of DubleD.

In the event of an existing connection, the Master is identified by a small black (m) and the Slave by a small black (s). If however there is no connection, this is indicated by a small white (m) respectively a small white (s).

The parameter settings for the Master and the Slaves are entirely independent from each other. It is thus possible to select a $V_o = 4$ for the Master and a $V_o = 5$ for the Slave.

In order to guarantee a collision-free opening of both door leaves, the Slave leaf lets the Master leaf go ahead and initiate the opening. This time lag can be defined on the Slave by means of AoSeq. The default value of AoSeq is 20° , which is sufficient for most of the bi-parting installations. This means that the Slave only starts to open after the Master has exceeded an opening angle of 20° .

From then on, it is admissible for the Slave to catch up with and pass the Master if this should be required. This is done by configuring a higher V_o value for the Slave than the one for the Master. In cases where (due to an electric lock connected to the Master) TDelay of the Master is configured with a higher value than 0,0 s, then the angle between the Slave and the Master is accordingly increased. To compensate this, AoSeq can be reduced in accordance.

An AoSeq value of 0° means that both door leaves will be simultaneously opened, i.e. that no opening delay is active.

The default value of AcSeq is 20° and thus sufficient for the majority of bi-parting installations. In cases where a mechanical closing sequence regulator is used with a mechanical closing delay of e.g. 90° , AcSeq must be programmed with a value of 90° or more.

AcSeq 20° means: The Master only starts closing as soon as the Slave has gained a lead of 20° . This advance guarantees that the Master will be closed in one go (without intermittence), which results in an optically pleasing closing motion.

The Master is allowed to overtake the Slave. 20° (value AcSeq) before reaching the closed position, the Master checks whether the Slave is already closed. If not, the Master will perform an intermediate stop in order to prevent a collision.

An active SES signal on a door leaf causes a safety stop of both door leaves. The same applies for the SER signal. An active SER signal causes both door leaves to reverse their motion.

A bi-parting installation can be operated in the single-leaf mode. An active EMCY signal on the Slave programs the closing sequence as a single-leaf configuration.

If only the EMCY signal on the Master is active, then this EMCY signal is applicable for both door leaves. In accordance with the action configured on the Master by means of EMY-IN, both door leaves carry out a CL-SPR (Close Spring), STOP, OPEN or CL-MOT (Close Motor).

If only the EMCY signal on the Slave is active, then the Slave carries out a CL-SPR, regardless of the action configured on the Slave by means of EMY-IN.

If both EMCY signals are active, then the Master performs its configured EMY-IN action and the Slave performs a CL-SPR. One exception of this rule is the Master in the EMY-IN configuration OPEN. In this case, both door leaves will be opened.

Procedure:

1. Connect both control units by means of the three-pole cable (terminal X109, CG/CL/CH).

**Note:**

The respective control and safety elements are connected to the corresponding drive mechanism.

2. Take the Master drive mechanism into operation (see chapter 7).
3. For the Master drive mechanism: Select the operating mode OPEN.
4. Take the Slave drive mechanism into operation (see chapter 7).
5. Configuration of the Master drive mechanism:
 - DupleD = MastA
 - AcSeq = desired time lag of the closing angle.

**Note:**

In cases where a mechanical closing sequence regulator is used, start with a AcSeq of 90°; afterwards AcSeq can be reduced.

6. Configuration of the Slave drive mechanism:
 - DupleD = SlaveA
 - AoSeq = desired time lag of the opening angle.

Control:

1. Check the display of the Master control unit to see if a small black (m) is visible on the first level (connection existing). On the display of the Slave control unit, a small black (s) must be visible.

**Note:**

A small white (m) resp. (s) indicates: missing connection.

2. Transmit a Key command to the Slave drive mechanism:
 - The Master-drive mechanism is the first one to open, followed by the Slave drive mechanism (which is delayed by the value of the opening angle).
 - In the open position the hold-open time expires on the display of the Slave control unit.
 - The Slave drive mechanism is the first one to close, followed by the Master drive mechanism which is delayed by the value of the closing angle).

Parameters:**Note:**

See chapter 7.

7.6 Interlock operation

To create an interlock, two consecutive doors are electrically connected (by means of CAN cable) and configured as an interlock unit during the commissioning.

7.6.1 Standard interlock (IL Type Safety)

Both doors need a separate opening command. The second door can only receive the opening commands if the first door is closed. If the second door receives the opening command before the first door is closed, this command can be intermediately stored by means of parameter ILCdRc. The second is then automatically opened as soon as the first door has been closed.

7.6.2 Hospital interlock (IL Type Hospital)

Basically, the hospital interlock functions in the same way as the standard interlock. However, only one opening command is required at the first door to open both doors. This happens in an automatic sequence.

As soon as the first door is closed, the opening command is forwarded to the second door. The second door thus opens without an additional opening command.



Warning:

For the event that someone should get entrapped in the interlock or wants to return through the first door, an emergency button must be installed (invalidation of the interlock function).

7.6.3 Netherland interlock (ILType NL)

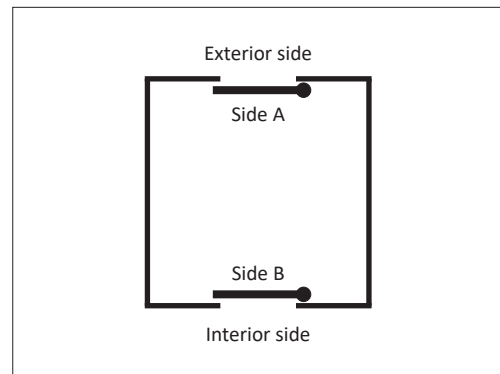
Basically, the Netherland interlock functions in the same way as the hospital interlock. In addition, there is an adjustable override time. If this override time is exceeded, the second door can be opened even if the first door is not yet closed.

The override time is reset as soon as both doors have been closed again.

Procedure:

Note:
Both installations must be plugged into resp. out of the same power supply.

1. Connect both control units by means of the three-pole cable (terminal X109, CG/CL/CH).
2. Normal commissioning of both drive mechanisms.
3. Configuration of the drive mechanism for the exterior door (A):
 - InterL = SideA
4. Configuration of the drive mechanism for the interior door (B):
 - InterL = SideB

**Control:**

1. Check the display of the Master control unit to see if a small black (w) is visible on the first level (connection existing).



Note:
A small white (w) indicates: Missing connection.

2. Transmit a Key command to the exterior door (A):
 - On the display a big black (W) appears (door is not closed).
 - While the exterior door (A) is open, transmit a Key command to the interior door (B) (the latter must not be opened).
3. Transmit a Key command to the interior door (B):
 - On the display a big black (W) appears (door is not closed).
 - While the interior door (B) is in the open position, transmit a Key command to the exterior (A) (the latter must not be opened).

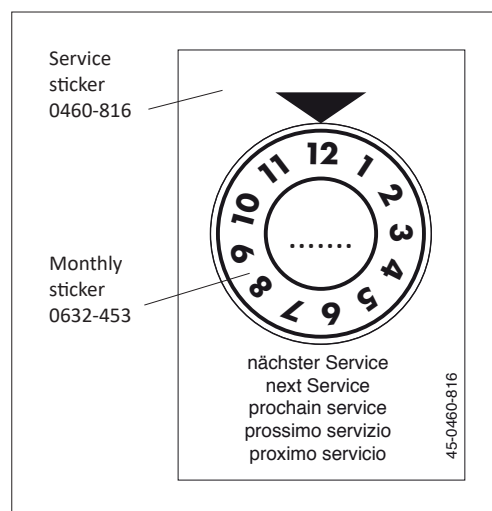


Note:
The parameters ILAuto, ILExit and ILNigt enable you to configure the operating modes in which the interlock system shall be active.

7.7 Adhesive labels

7.7.1 Service sticker

1. Attach the service sticker (outside) onto the degreased surface of the drive mechanism covering, at a place that is easily visible for the customer.
2. Stick the monthly sticker onto the service sticker, turning the monthly sticker until the checking date matches the arrow.
3. Using a water-proof felt tip pen, enter the year of the next checkup on the monthly sticker.



7.7.2 Arrow sticker

1. For transparent door leaves or door leaf surfaces:
Attach arrow sticker onto the degreased surface of the door leaves (inside, at eye level).



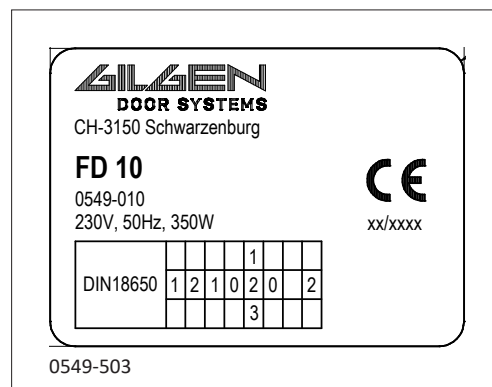
7.7.3 Glass sticker

1. Attach the glass sticker onto the degreased surface of the door leaves (outside at the bottom, near the closing edge).



7.7.4 Rating plate

1. Attach the rating plate (outside) onto the degreased surface of the drive mechanism covering, at a place that is easily visible.



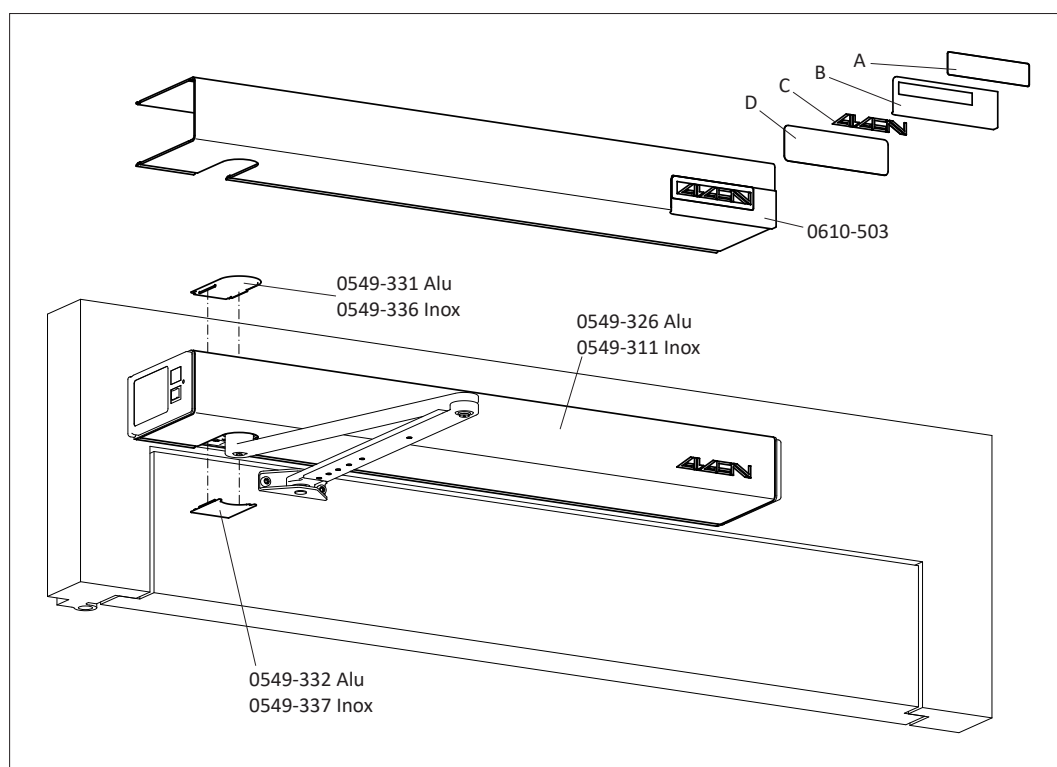
7.8 Mount the drive mechanism covering

Material:

1	Covering	0549-326	Aluminium
1	Covering accessories	0549-105	Aluminium
1	Gilgen-Logo	0610-503	Set 0549-997/01
or			
1	Covering	0549-311	Stainless steel
1	Covering accessories	0549-109	Stainless steel
1	Gilgen-Logo	0610-503	Set 0549-997/01

Procedure:

- Attach the Gilgen Logo:
 - Degrease the gluing surface on the covering.
 - Remove the white cover sheeting of the sticker (D).
 - Position the template (B) with the logo (C) in the lower right-hand corner of the covering and tightly press on the logo (C).
 - Remove the transparent protective foil (A).
 - Remove the template (B).
- Mount the covering and the accessories as shown in the illustration.



8 SERVICE

A regular service (maintenance/checking) is absolutely indispensable in order to guarantee a safe operation and long lifetime of the installation. The service must be carried out by a expert, **at least once a year**, according to the following checklist.

This checkup work basically refers to visual and functional checking destined to evaluate the integrity, the condition and the efficiency of the components and safety devices (checking of the different elements as far as these are included in the installation).



Warning:

To avoid jeopardizing the safety of persons, any defective safety elements may not be disconnected in order to continue the operation of the installation!



Attention:

In order to guarantee the availability of the installation, any elements showing signs of wear must be replaced as a preventive measure!



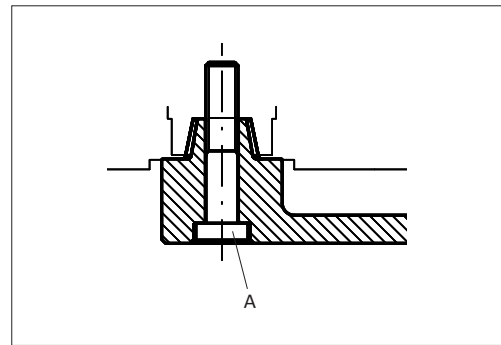
Note:

- Every service which has been carried out shall be entered into the control booklet!
- The following service description refers to the basic components. The options are described in detail in chapter "Options".



Attention:

If the fastening screw (A) of the rotating arm is released, this screw must be secured upon tightening by means of Loctite 243, or else a new original screw needs to be inserted (see chapter: Spare parts).



8.1 Service for pedestrian doors



Warning:

Electrocution hazard! Before working on any live elements, pull out the mains plug as well as any existing plug of the emergency battery respectively switch off the main installation switch!

	Check	Clean ²	Grease	Adjust
Installation				
General condition	x			
Free door movement (manually)	x			x
Door guides/Bottom guide rail	x	x		x
Door sealing joints	x	x		x
Sliding door leaves/Side panels/Protection leaves	x	x		
Coverings/hinge-type covers	x	x		
Tight fitting of screws and nuts	x			
Drive mechanism				
Drive mechanism	x	x		x
Transmission elements such as: Toothed belts, flat belts, cables, rods or chains	x	x		x
Running carriages with carrying pulleys and counter-pressure pulleys	x	x		x
Carrier rails	x	x	x	
Open/Closed position	x			x
Control elements				
All the existing control elements such as: Detectors, radars, key-operated switches, contact carpets, etc.	x	x		x
Control unit				
Electrical connections	x			
Functions related to installation	x			x
Program switch functions	x			
Emergency battery	x			
Escape way doors				
Emergency opening with mains failure ¹	x			
Opening speed 80 % in 3 seconds ¹	x			x
Activation escape way detector 1,5 m in front of the door ¹	x			x
Minimum escape way width ¹	x			x
Maximum opening force at Break-Out leaf 220 N (1 m from floor)	x			x
Safety elements				
Reversing/stopping mechanism	x	x		x
Door locking/Manual unlocking mechanism	x	x	x	x
Rubber cable	x			x
Monitoring switch	x	x		x
Light barrier/Presence detector	x	x		x
Safety according EN16005				
Protections against impact				
Protections against crushing				
Protections against getting caught in				
Protections against shearing				
Protections against imprisoning				
Safety deficiencies must be communicated to the operator (in writing)!				
Miscellaneous				
Rating plate, arrow sticker, glass sticker, etc. existing?				
Control booklet existing and completed?				

¹ Only for redundant drive mechanisms.

² Gilgen cleans all the elements of the installation provided this is necessary for the function of the installation. A general cleaning of the installation is not planned.

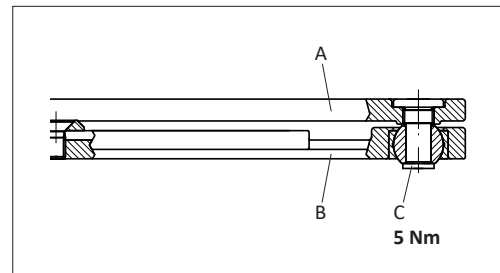
8.2 Fundamental checking



Warning:

Electrocution hazard! Before working on any live elements, pull out the mains plug respectively switch off the main installation switch!

1. Dismount the covering of the drive mechanism.
2. Check all the cable connections.
3. Normal rods:
Separate the rotating arm (A) from the rod arm (B) by loosen the screw (C).
4. Check the free running movement of the door leaf.
5. Check the bearings of the drive mechanism for increased noise level.
6. Normal rods:
Fasten the rotating arm (A), by means of the screw (C) to the rod arm (B) ⇒ Tightening moment **5 Nm**.
7. Mount the covering of the drive mechanism.



9 TROUBLESHOOTING



Warning:

Electric shock hazard! Before working on any live elements, pull out the mains plug respectively switch off the main installation switch!

If a malfunction occurs which might be detrimental to the safety of the users, and which cannot be eliminated without delay, the operator must be informed and if required the installation shall be taken out of operation. The installation must be repaired as soon as possible.

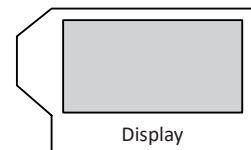


Note:

Every troubleshooting procedure which is carried out must be entered into the control booklet!

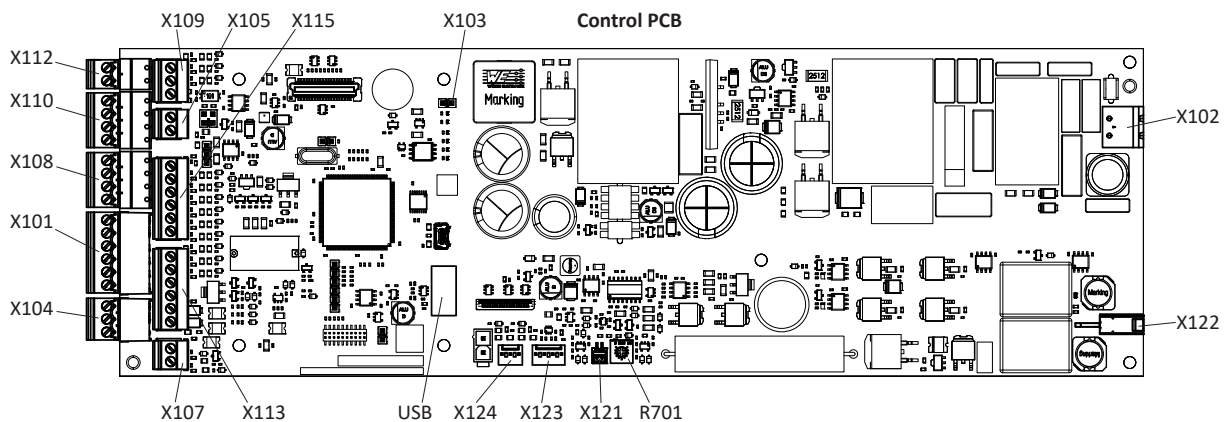
9.1 Malfunction with error-no.

The error is indicated on the display of the control unit.



Definition of the column "Reaction".

- A The drive mechanism deactivates itself during a certain period.
Manual operating mode or stopping position.
- F Fatal error
- H Manual operating mode with re-starting attempt
- W Warning



9.1.1 Drive mechanism

No.	Description	Cause	Elimination	Checking time	Reaction
E01	Encoder	Channel A lost	Check the encoder connection. Check the motor cable. The door is blocked. Check if a jumper has been inserted on X103.	During run	H
		Channel B lost			
		Channels A + B lost			
		Short-circuit A + B			
		Dysfunctions		Prior to start-up	H
		Channels A + B interchanged			
		No channel A			
		No channel B			
		No channel A + B			
		Short-circuit A + B			
		Malfunction		During testing	H
		Malfunction			
		Not connected		Permanent	H
		Current too high			
E02	Motor current	Current too high	Check the motor cable. Check if a jumper has been inserted on X103.	Prior to start-up	H
		Current too low Jumper missing			
E04	Reference switch	Detected in the open position	Check the connection and the switching point of the reference switch. The reference switch must be activated in the closed position (switching contact open).	Open position	F
		Not detected in the closed position		Prior to the first teach-in run	A
		Not detected in open position			
E05	Power limitation	Overload of the control. the maximum power is restricted.	Check/correct the friction of the door leaf and the pre-stressing of the closing spring	Permanent	A

9.1.2 Operating

No.	Description	Cause	Elimination	Checking time	Reaction
E10	Fullteach required	Parameter Ao, Rod or dAxis changed	Carry out a teach	Upon changing the drive mechanism configuration	H
		Minimum opening angle has not been reached	Check the locking/electric lock. Carry out a Factory Reset.	During the Teach	H
		Adjusted opening angle Ao has not been reached during the Teach	Check/correct dAxis. Carry out a Teach.		
E11	Halfteach required (Opening)	Parameter Vo changed	Carry out a complete and unhindered opening cycle	Upon changing the motional parameters	W
	Halfteach required (Closing)	Parameter Vc or FSlam changed	Carry out a complete and unhindered closing cycle		
E12	Excessively high current consumption during the Teach in the open position (> 5 A)	Drive unit pushes against the open position stop piece or an obstacle. The spring tension is possibly too high.	Check/correct dAxis. Reduce the opening angle Ao. Reduce the spring tension. Carry out a Factory Reset.	Open position Teach 3 (E11)	F
E13	Spring tension test pending	Teach not completed	Complete spring tension test by means of opening command	During the Teach	W
E14	Locking/electric lock	The door leaf got caught in the locking/electric lock. Feedback: the electric lock ELFB does not switch.	Check the function of the locking/electric lock. Feedback: check the electric lock ELFB.	When opening from a closed position	H
		The interlocking force Fch has not been programmed	Program/increase the interlocking force Fch	At the end of the teach-in procedure	W
E15	Obstacle in opening direction	Too many successive obstacles have occurred	Examine the installation. Remove the obstacle. Move the door leaf to the target position.	Permanent	H, A Restart after 60 s
	Obstacle in closing direction				

9.1.3 Safety elements

No.		Description	Cause	Elimination	Checking time	Reaction
E18	01	EMY Test	Malfunction EMY input	Check the jumper EMY. Check the cabling EMY.	Permanent	H
E20	01	SER Test	SER Test signal unsuccessful	SER short-circuit to the earth. Check the cabling of the sensor or the jumper.	Prior to closing	A
	02		SER too slow	SER reacts too slowly. Check the cabling of the sensor. Check for polarity reversal/test signal.		
E21	01	SES Test	SES Test signal unsuccessful	SES short-circuit to the earth. Check the cabling of the sensor or the jumper.	Prior to opening	A
	02		SES too slow	SES reacts too slowly. Check the cabling of the sensor. Check for polarity reversal/test signal.		
E22	01	EMY Test	EMY input on 24 V	Check the jumper EMY.	Permanent	H
	02		Malfunction EMY input	Check the cabling EMY.		A

9.1.4 Feeding

No.		Description	Cause	Elimination	Checking time	Reaction
E30	01	30 V Error	30 V too low	Mains failure, overload motor. Check the feed-in. Replace the hardware.	Permanent	A
	02		30 V too high			
	03		Error upon switching-on			
E31	01	24 V General	Error upon switching-on	Overload 24 VDC onto terminals X101, X104, X108, X110, X113	Permanent	A Restart after 10 s
	02		Over- resp. under-voltage			
E32	01	24 V Safety	Over- resp. under-voltage			
E33	01	24 V E-Lock	Error: Over- resp. under-voltage			
	02		Premonition: Over- resp. under-voltage			
E34	01	24 V CAN	Over- resp. under-voltage	Overload, short-circuit external power supply CAN		

9.1.5 System

No.		Description	Cause	Elimination	Checking time	Reaction
E50	01...99	System error	Unexpected hardware or software event	Switch the drive mechanism off/on. Carry out a Factory Reset, carry out a Software Update, inform the manufacturer.	Permanent	W or H or F
E51	01...99					
E52	01...99					
E53	01...99					

9.1.6 Options

No.		Description	Cause	Elimination	Checking time	Reaction
E60	00	Relay PCB 0	Option PCB has been removed, its address changed or become defective	Check if the option is provided. If defective: Replace or remove from the configuration. Note: Deleting of error 60 ⇒ see chapter 13.5.1.	Permanent	W
	10	Relay PCB 1			Permanent	W
	20	Relay PCB			Permanent	W
	30	Fire-protection PCB			Permanent	A

9.1.7 Closing sequence / Interlock function

No.		Description	Cause	Elimination	Checking time	Reaction
E70	xx	Bus setting	Address xx existing twice	Correctly define the role of the closing sequence or the interlock function	Permanent	W
E71	01	Connection	No connection	Connect the terminals, check or replace the cable. Check if all the participants are switched on.	Permanent	W

9.1.8 Internal safety test

No.		Description	Cause	Elimination	Checking time	Reaction
E80	01	The internal safety test has failed	Malfunction	Switch the drive mechanism off/on	Permanent	W
	02					F
E82	01		Malfunction	Switch the drive mechanism off/on	After start-up	W
	02					F
E83	01		Motor current test failed	Switch the drive mechanism off/on	After start-up and thereafter every 24 h	W
	02					F
E84	01		Cushioning test failed	Switch the drive mechanism off/on	After start-up and thereafter every 24 h	W
	02					F
E86	02	Spring tension test failed	Closing speed too high (by means of the spring force)	Check/reduce spring tension. Check/adjust door leaf width and door leaf weight.	While closing the door leaf during the Teach	F
E87	01	Cushioning test failed once	Closing speed too high (by means of the spring force)	Test is repeated automatically after 2 hours	After start-up and thereafter every 24 h	W
E88	01	Motor cutoff relay test failed	Malfunction	Check free running movement of door leaf. Check/increase spring tension.	While closing the door leaf during the Teach, after start-up and thereafter every 24 h	F

9.2 Malfunction without error-no.

In some cases, it will be technically impossible to display an "irregular functioning" of the installation by a definite error number. An alleged error may by all means also be due to "correct" causes. For this reason the list shown hereafter has been established, which contains the probable or already encountered irregular functioning, their possible causes as well as the corrective action (error elimination) to be taken.

Malfunction	Analysis	Possible causes	Remedy
Drive unit fails to react: • No automatic opening. • No reaction on the control elements (side cover/D-Bedix).	• LED 5 V (green) on the control is not lighted.	Power supply voltage is missing.	• Measure the mains supply voltage, check its cabling and eliminate any detected deficiencies.
Drive unit fails to open.	• LED SE (safety element, yellow) is lit. • Determine the active safety element via the diagnostic level.	One or more safety elements are active or incorrectly cabled.	• Remove the obstacle. • Check the cabling between the safety element and the control unit, and eliminate any detected deficiencies. • Replace the safety element.
	• LED SE (safety element, yellow) is not lighted. • LED OE (opening command, blue) reacts to the opening element. • Determine the opening element via the diagnostic level.	Depending on the enabled operating mode, the opening commands (inside/outside, etc.) are ignored.	• Change the operating mode. • Correct the cabling of the opening elements.
	• LED SE (safety element, yellow) is not lighted. • LED OE (opening command, blue) is not lighted despite the active opening element.	The opening ocommand is not evaluated.	• Check the cabling between the opening element and the control unit and eliminate any detected deficiencies. • Replace the opening element.
Drive unit fails to close.	• LED SE (safety element, yellow) is lit.	One or more safety elements are active or incorrectly cabled.	• Remove the obstacle. • Check the cabling between the safety element and the control unit and eliminate any detected deficiencies. • Replace the safety element.
	• LED SE (safety element, yellow) is not lighted. • LED OE (opening command, blue) is lit.	An opening command is pending.	• Check the cabling between the opening element and the control unit and eliminate any detected deficiencies. • Replace the opening element.
	• Check the operating mode.	The operating mode OPEN is active.	• Change the operating mode.
The operating mode cannot be changed.	• The program selection switch in the side cover does not work.	The plug is not plugged in.	• Check the cabling and eliminate any detected deficiencies.
	• The operating mode symbol on the display is underlined.	The operating mode is overridden via connection terminal X115.	• Change the operating mode by means of the external program selector switch. • Correct the cabling of the external program selector switch.

9.3 Software update via USB

A software update of the FD 10 control unit can be easily and rapidly achieved by means of an USB memory stick.



Note:

Not all the USB memory sticks can be used. We thus recommend a previous testing of their function together with the FD 10.

9.3.1 Preparation

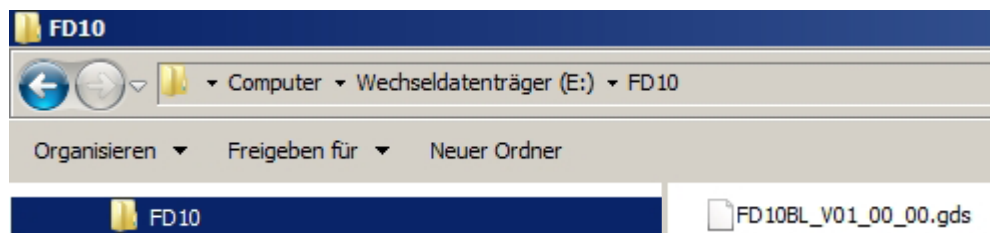
The USB stick must contain a folder FD10.

The file name of the application must specify FD10.

The name of the file extension must be **gds**.

⇒ The stick shall only contain one single FD10 folder.

⇒ There must be only one single file in the FD10 folder.



9.3.2 Procedure

1. FD 10 plug in the mains plug.
2. Plug the USB stick into the control unit ⇒ socket X111.
3. Go to UPDATE SW ⇒ in the menu and press the joystick once.
4. When "update last?" appears on the display ⇒ press the joystick once.
5. The software download takes approx. 1 minute ⇒ Watch the LED display on the control unit.
The drive mechanism will switch off automatically while the download is taking place.
The drive mechanism will reactivate automatically once the download is complete.
6. Remove the memory stick USB.

update
last?

9.3.3. LED display on the control

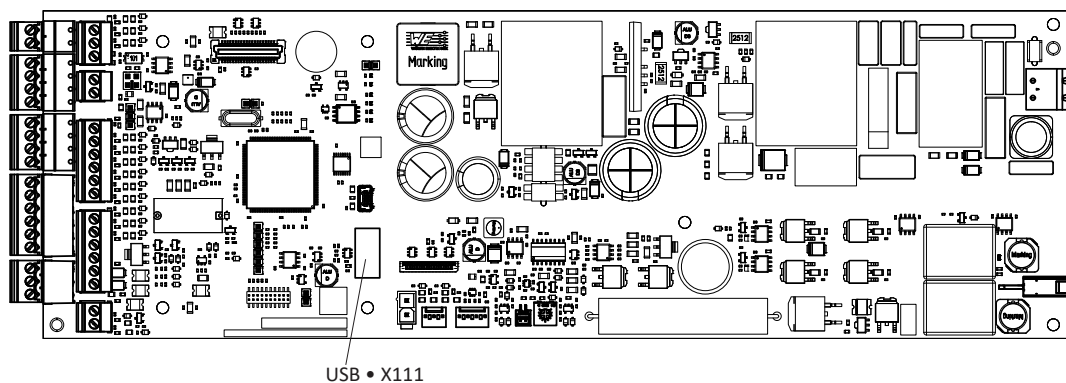
The display of the functions is ensured via three LEDs on the control PCB:

SOK	Green	USB-Loader started
OE	Blue	Activity in progress (delete/write memory)
SOK + OE	Green/Blue	Download completed ⇒ remove the stick
SE	Yellow	Error

9.3.4 Possible errors

- Incorrectly formatted USB stick
⇒ this stick must be FAT or FAT 32 formatted (File Allocation Table from Microsoft).
- Several drives existing on the USB stick
⇒ only one drive is legible.
- Invalid file
⇒ Not encrypted, damaged, FD10 missing in the file name, **gds** missing in the file extension.

Control PCB



10 SHUT-DOWN

No particular measures need to be taken for de-commissioning the installation.

If the swing door drive mechanism will not be used during at least 1 month, it is recommended to pull out the mains plug.

For taking the installation back into operation, all you have to do is to plug in the mains cable and select the operating mode.

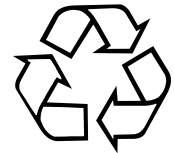


Attention:

If the installation is re-commissioned at low temperatures, it must be switched on 1...2 hours prior to the actual teach-in procedure (so that the operating temperature can be reached).

11 DISPOSAL OF THE INSTALLATION

An ecologically acceptable disposal of the installation is ensured if the different materials are separated and recycled. No particular measures are required for the protection of the environment. However, the relevant legal prescriptions applicable for the installation site have to be complied with!



12 SPARE PARTS

Article No.	Designation	Remark	
0549-118	Drive module complete		■
0549-104	Fixing set		
0549-206	Relay PCB	Option	
0549-119	Control PCB		■
0635-142	D-BEDIX	Option	
0548-133	Service D-BEDIX	for fitter	
0549-113	Drive mechanism covering complete	Aluminium	■
0549-105	Covering accessories	Aluminium	
0549-114	Drive mechanism covering complete	Stainless steel	■
0549-109	Covering accessories	Stainless steel	
0549-112	Side cover complete incl. program selector switch		
0549-103	Side cover		
0549-500	Rating plate		
0549-204	Flexible cable routing	Option	
0549-322	Protective plug		
0548-163	Normal rods RS		
0548-163/02	Normal rods RS for leaf mounting incl. rotating arm 400 mm		
0548-164	Sliding rods RG		
0548-164/02	Sliding rods RG for leaf mounting incl. sliding rail 800 mm		
0549-115	Connection plate for wooden door leaf normal rods	Option	
0548-190	Axle extension RG/RS + 12 mm	incl. Tuflok screw	
0548-191	Axle extension RG/RS + 20 mm	incl. Tuflok screw	
0548-192	Axle extension RG/RS + 30 mm	incl. Tuflok screw	
0548-193	Axle extension RG/RS + 40 mm	incl. Tuflok screw	
0548-194	Axle extension RG/RS + 50 mm	incl. Tuflok screw	

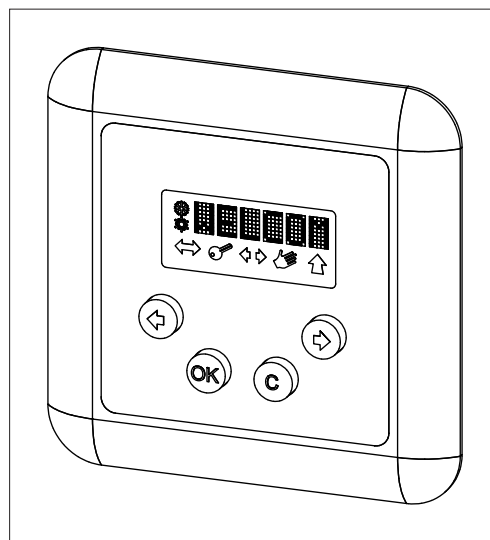
13 OPTIONS

13.1 D-BEDIX

The different operating modes can be directly enabled by means of the D-BEDIX. In addition, it provides easy programming of the most important door settings.

The operating modes, menu settings as well as possible errors are displayed in a clearly arranged synopsis.

The D-BEDIX is connected to the control unit FD 10 via a screened two-core connection cable (e.g. U72M or EIB-Y(St)Y, max. length 50 m). Only one D-BEDIX can be connected per door installation.



13.1.1 Keys






	C-key (Cancel) <ul style="list-style-type: none"> • Exit the menu • Invalidate entry.
	OK-key <ul style="list-style-type: none"> • Confirm the selection • Confirm the entry.
	Arrow keys <ul style="list-style-type: none"> • Navigate within the menus • Short simultaneous actuation of both keys = acces to the menu level.

13.1.2 Symbols

	Operating mode symbols <ul style="list-style-type: none"> • Show the possible operating modes (see chapter: Operating modes). 	
	Selection frame (active and preselected operating mode) <ul style="list-style-type: none"> • Shows what has been presently selected. 	
	Selection frame (active operating mode) <ul style="list-style-type: none"> • Shows what has been presently selected but is still inhibited. A control element with higher priority (e.g. key-operated switch) determines the operating mode. 	
	Bar (preselected operating mode) <ul style="list-style-type: none"> • Shows the preselected operating mode. 	

13.1.3 Operating modes

With the D-BEDIX, the following operating modes can be selected by means of the corresponding symbols:

	AUTOMATIC Automatic operation. The installation can be locked.
	NIGHT The installation is locked ¹ . As opening commands, only the key-operated impulse switch is accepted. The delayed switchover to the operating mode NIGHT can be activated by means of parameter TdNigt. Function: If the program selector switch is changed to the operating mode NIGHT from any random operating mode, the internal radar will still remain active during the programmed time TdNigt (EXIT).
	OPEN The installation is opened and remains in the open position.
	MANUAL The installation stops. The swing door leaf is released and can be manually opened and closed.
	EXIT One-way traffic from inside towards the outside. The installation is locked ² (shop closing switching mode).

¹ Provided that the locking mechanism (optional) is installed.

² Each operating mode can be locked (this is configurable).

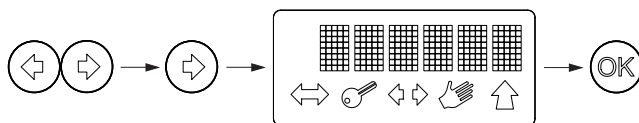
13.1.4 Display of the door position

The following door positions are represented on the D-BEDIX display:

<REF?>	Waits for reference switch
< ?? >	Unknown
><	Closed
>##<	Closed and locked
<< >>	Opening
< >	Open
>> <<	Closing
==	Stopping

13.1.5 Menu level

Short and simultaneous actuation of both arrow keys (=access to the menu level).
 Select the desired menu item by means of the arrow key.
 Confirm by means of the OK key.



Display	Description
PARAMETER	Setting the motional parameters *
CONFIG	Setting the functionalities *
DOUBLE DOOR	Setting the closing sequence and interlock function *
DIAGNOSTICS	Diagnostic tool
ERROR ACTIVE	Active pending errors
ERROR HISTORY	Formerly active errors
REINIT	Carry out a re-initialization *
BLOCK/UNBLOC	Lock/unlock keys
TEACH	Initiate a teach-in procedure ⇒ make sure that the door leaf is completely closed.

* password protected



Note:

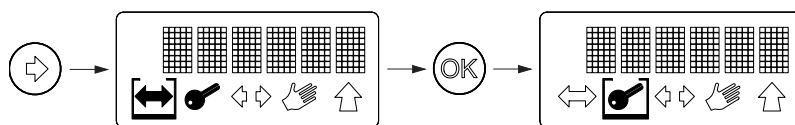
The detailed settings are described in chapter 7.

13.1.6 Setting examples

Changing the operating mode

Select the desired symbol by means of the arrow key (symbol starts flashing).

Confirm with the OK key (frame/bar switch over).

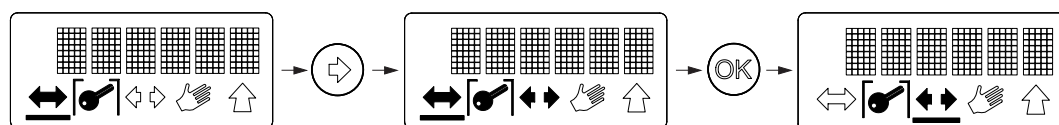


Preselecting the operating mode

An overriding switch is active and determines the operating mode (only the selection frame is visible, the bar underlines the preselected operating mode). Now you can select the operating mode you want to be active upon cancellation of the overriding switch:

Select the desired symbol by means of the arrow key (symbol starts flashing).

Confirm with the OK key (bar switches over).

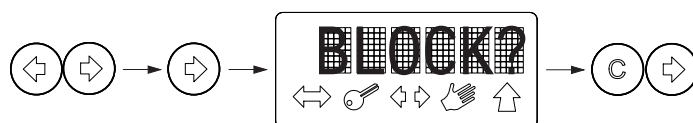


Enabling the keylock

Short simultaneous actuation of both arrow keys (= access to the menu level).

By means of the arrow key, select BLOCK.

Confirm with the C-key and the right-hand arrow key.



Temporarily disabling the keylock (60 s)

Short simultaneous actuation of the C-key and the right-hand arrow key.



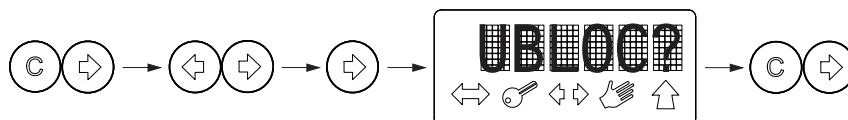
Disabling the keylock

Short simultaneous actuation of the C-key and the right-hand arrow key.

Short simultaneous actuation of the arrow keys (= access to the menu level).

By means of the arrow key, select UNBLOC.

Confirm with the C-key and the right-hand arrow key.



Parameters (hold-open timeday)

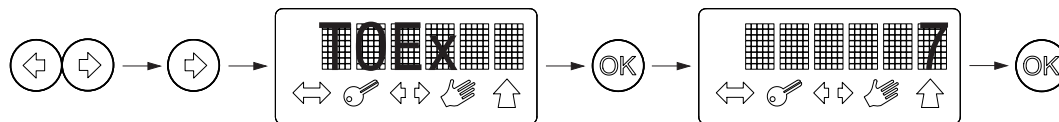
Short simultaneous actuation of the arrow keys (= access to the menu level).

By means of the arrow key, select TOEx.

Confirm with the OK key.

By means of the arrow key, change the value.

Confirm with the OK key.

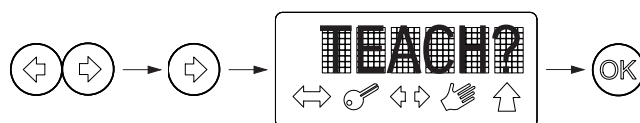
**Teach**

Completely close the door leaf.

Short simultaneous actuation of the arrow keys (= access to the menu level).

By means of the arrow key, select Teach.

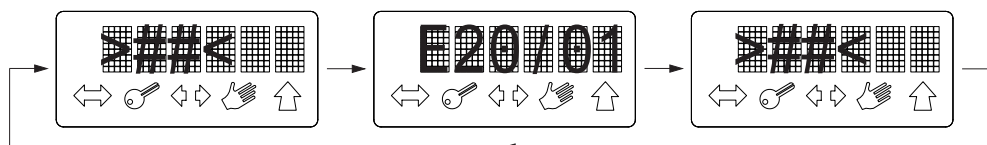
Confirm with the OK key.

**13.1.7 Error display**

In the event of an error, the display shows (alternating with the door position status) the presently active error number (e.g. E20/01).

Error list: see chapter Troubleshooting.

This sequence will be repeated until the error has been eliminated.



13.2 KOMBI-D-BEDIX

In addition to the functions of the D-BEDIX, the KOMBI-D-BEDIX contains a key-operated switch (round or profile cylinder) with the following function:

Lockout of the KOMBI-D-BEDIX against unauthorized use.

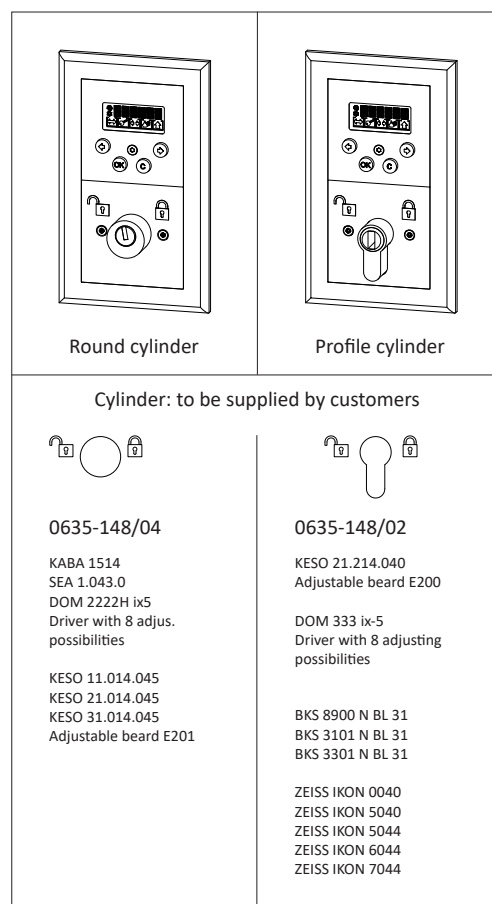
Free



Locked

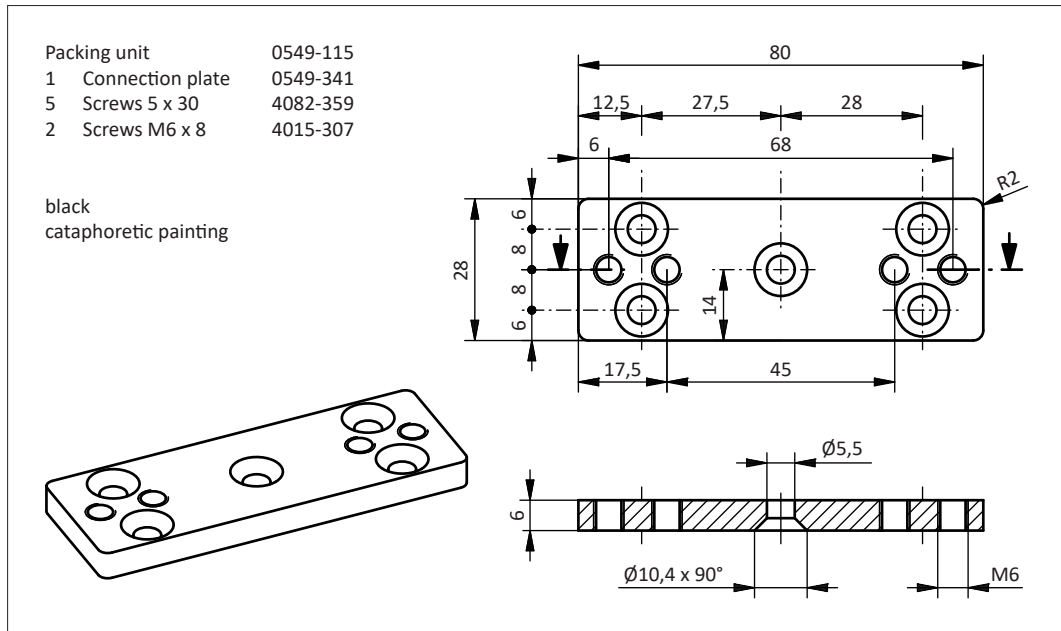


If this lockout is enabled, all the keys are shortly lit (as a confirmation of the lockout).



13.3 Connection plate for wooden door leaf (normal rods)

The connection plate is mounted below the door connection angle of the normal rod assembly and screwed down by means of countersunk chipboard screws 5 x 30.



13.4 Continuous covering

For bi-parting installations, the two drive mechanisms can be optically connected by inserting an intermediate covering piece.

Set with drive mechanism covering 0,78 m Alu

0549-210 or

Set with drive mechanism covering 0,78 m Inox

0549-211

1 Drive mechanism covering Alu natural anodised E6/EV1

0549-343

Drive mechanism covering Inox

0549-344

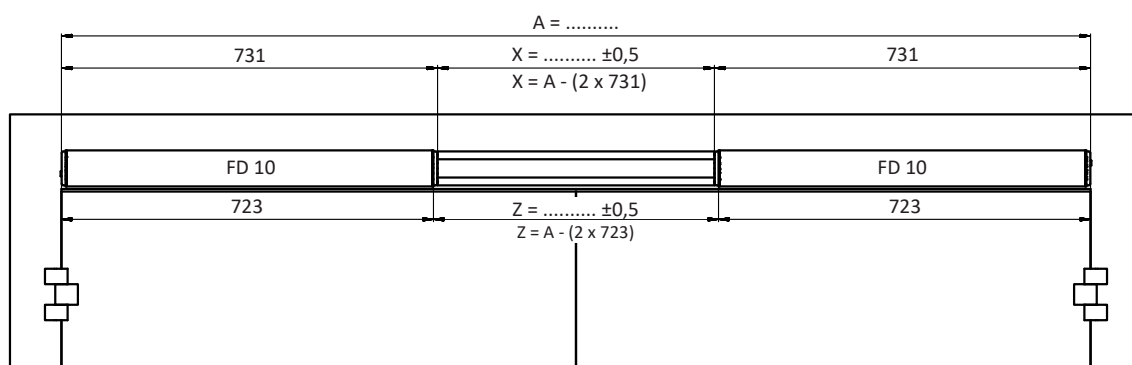
1 Intermediate profile Aluminium untreated 0,78 m

0549-346

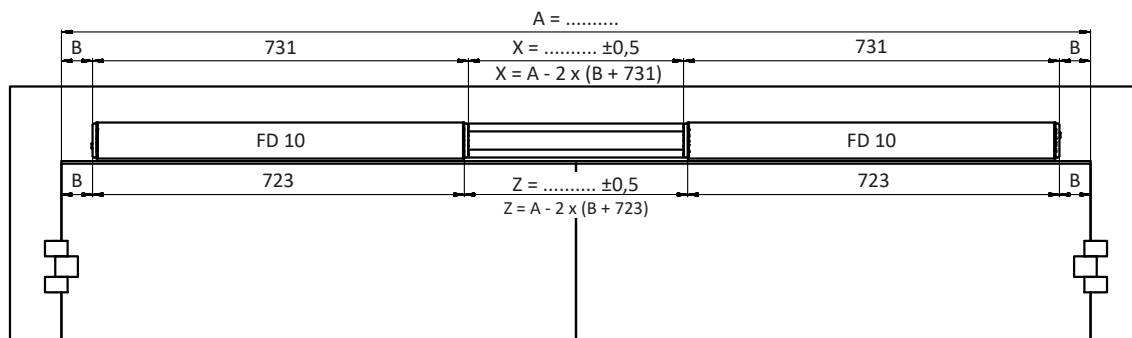
1 Fixing set

0549-210/90

**Normal rod
Sliding rod pulling function**



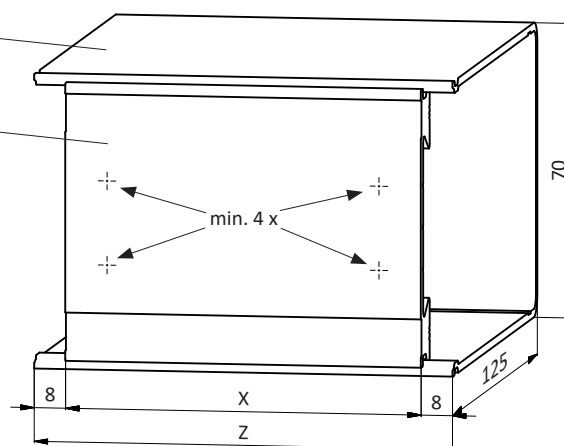
Sliding rod pushing function



Lintel depth (mm)	B (mm)
-30...+50	60
51...80	70
81...120	80
121...150	90

0549-343 Alu
0549-344 Inox

0549-346



13.5 Optional PCBs

All the optional PCBs are plugged into the control unit via a universal connector. A maximum number of two optional PCBs can be combined.



Attention:

All optional PCBs must only be plugged into/removed from the control unit after the drive unit has been disconnected from the power supply source!

13.5.1 Relay PCB

The relay PCB (blue) offers four outputs to be freely used by the customer.

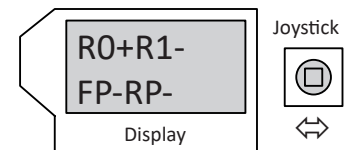
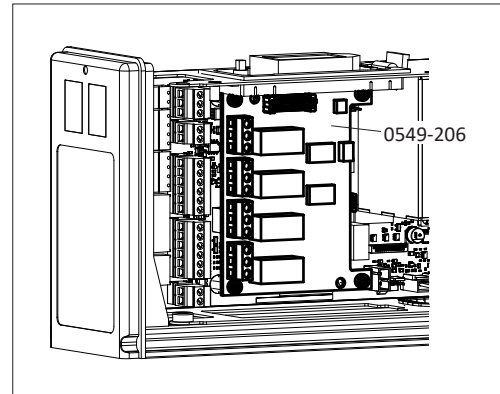
Commissioning:

1. Addressing of the relay PCB by means of DIP-Switch:
DIP-Switch Addr0 or Addr1.

2. Switch-on the main installation switch on the drive mechanism ⇒ the relay PCB is automatically identified.

The identified relay PCB is displayed as follows in the diagnostic menu:

R0 Addr0
R1 Addr1
FP Fire protection PCB
RP Radio PCB
+ identified and ready for operation
- neither identified nor registered
e defective or error
x removed



3. Enabling of the desired function per relay: under Settings ⇒ Configuration RC0.1 up to RC0.4 (for Addr 0) and RC1.1 up to RC1.4 (for Addr 1).

Remove the relay PCB:

1. Switch-off the main installation switch on the drive mechanism.
2. Remove the relay PCB.
3. Switch-on the main installation switch on the drive mechanism.
Display: E60/00 ⇒ Addr0
E60/10 ⇒ Addr1

4. Select menu: Diagnostics
R0-R1-...
R0xR1-...
R0-R1x...
R0xR1x...



5. In the rest position, press in the joystick: Reset OK? ⇒ The relay PCB is deleted from the configuration.

13.6 Safety sensors

Safety sensors are fitted to automated swing doors to monitor and protect their pivoting area. They are fitted to both sides of the door leaf. This guarantees maximum protection during both opening and closing of the door.

Basically, the instructions of the sensor manufacturer must always be observed when mounting the safety sensors! If the connecting wires of the safety sensors are not tin-plated, end sleeves must be used for the strands!

Function

In opening direction:

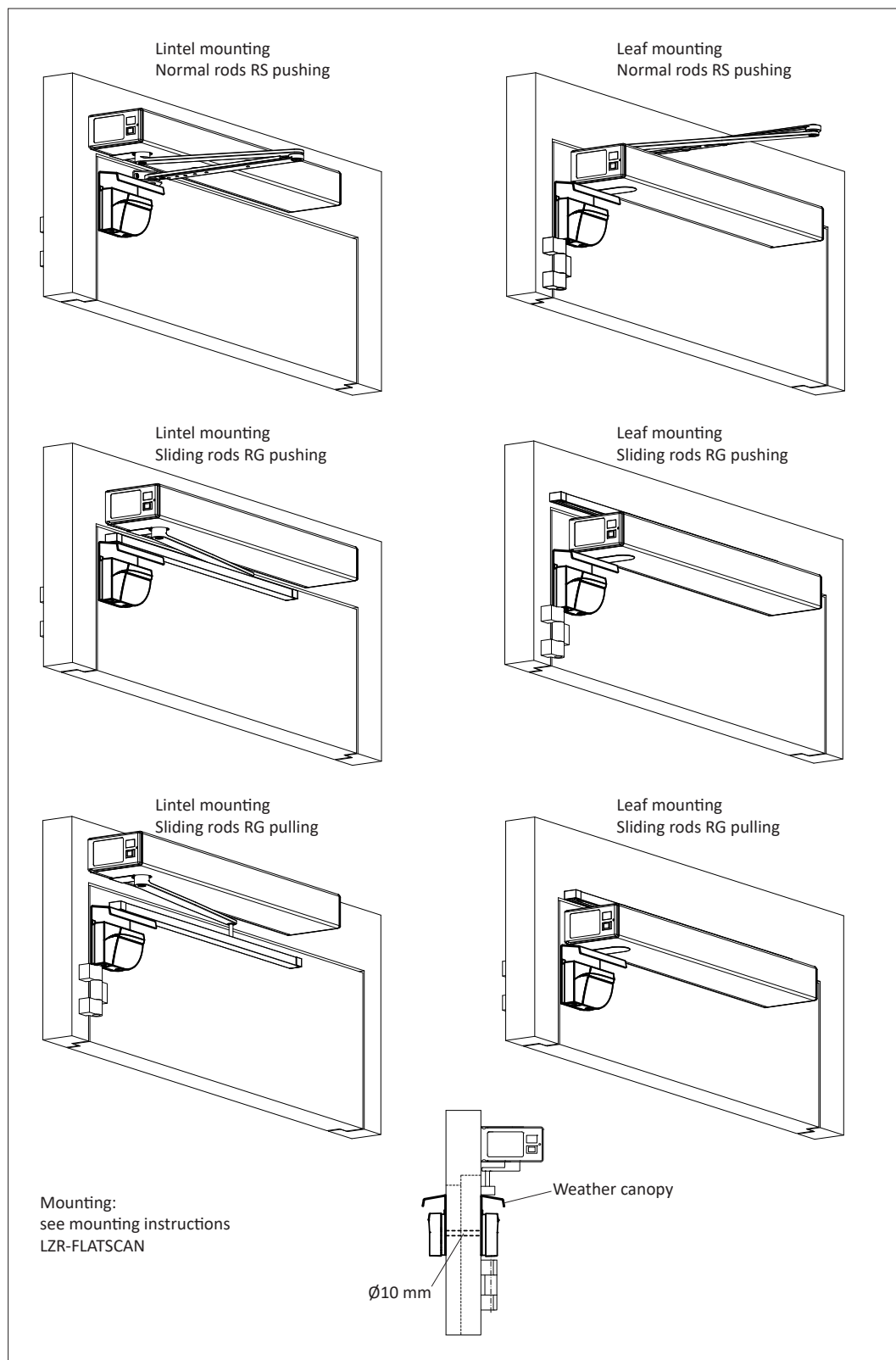
Movement of the door leaf stops whenever the sensor detects an obstacle. Wall recognition of the safety sensor can be suppressed (adjusted).

In closing direction:

The safety sensor reverses the drive mechanism, and the closing door leaf opens once more.

13.6.1 LZR-FLATSCAN

In the event of swing doors, the FLATSCAN is mounted on the moving leaf, on the upper leaf corners (as close as possible to the secondary closing edge). The FLATSCAN can only be used in pairs! Master and Slave are connected among each other (see wiring diagram in the appendix). If a door radar is mounted directly above the FLATSCAN, it is compulsory to mount the weather canopy (for screening against radar microwaves).



14 APPENDIX

The following documents are added as an appendix to this instructions:

Wiring diagramE4-0141-724

Electrical documentation

Gilgen Door Systems AG
Freiburgstrasse 34
CH-3150 Schwarzenburg

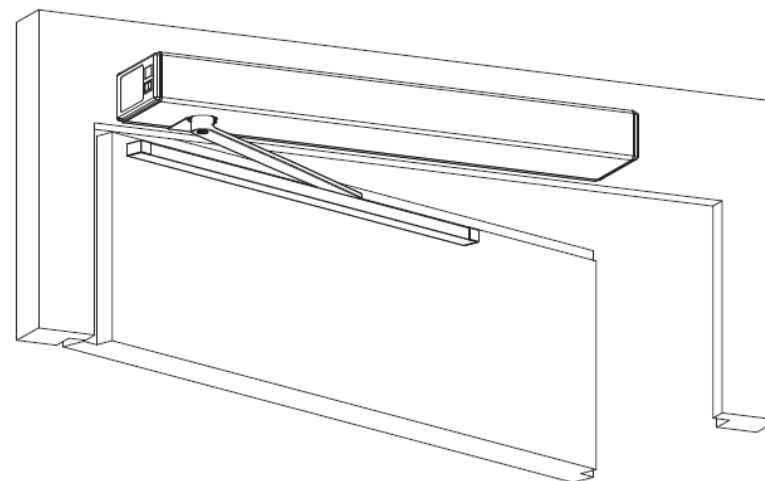
Tel. +41 (0)31 734 41 11
info@gilgendoorsystems.com
www.gilgendoorsystems.com

GILGEN
DOOR SYSTEMS

Drive mechanism for swing door FD 10

- Overview
- Options
- Variants

Standard diagram no. E4-0141-724 a



		Reviewed by		Approved by	
		Designed by	06.11.2018 bdg	Standard diagram	
a QS-Nr. 14-589		17.06.2019 lja	Reviewed by 12.06.2019 fpe		
0 Erstellung		06.11.2018 bdg	Approved by 14.06.2019 lja		
Id.	Revision	Date	Name		

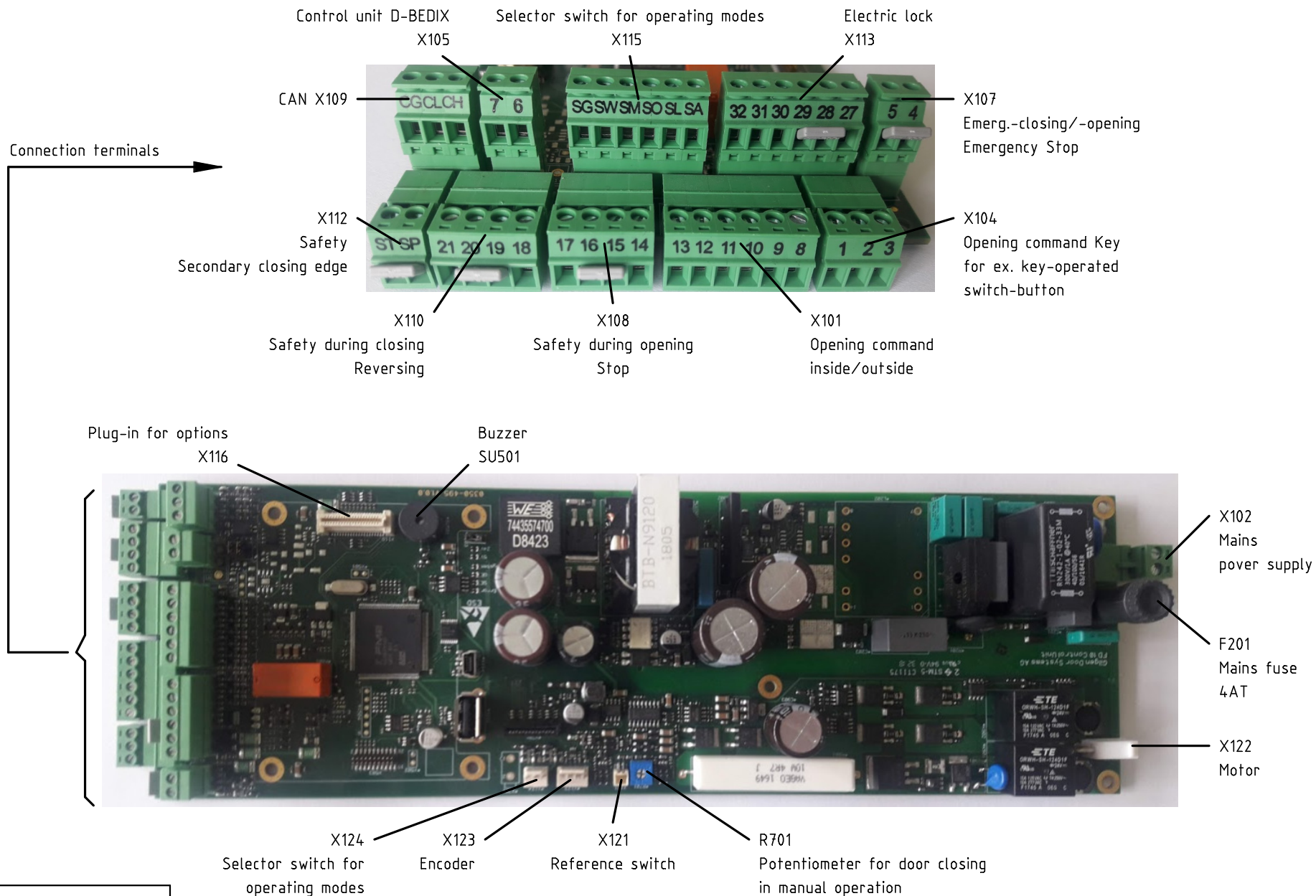
GILGEN
DOOR SYSTEMS

Drive mechanism for swing door FD 10
Cover sheet
1

		Sheet no.	
Origin:		E4-0141-724 a	1
Substitution:			

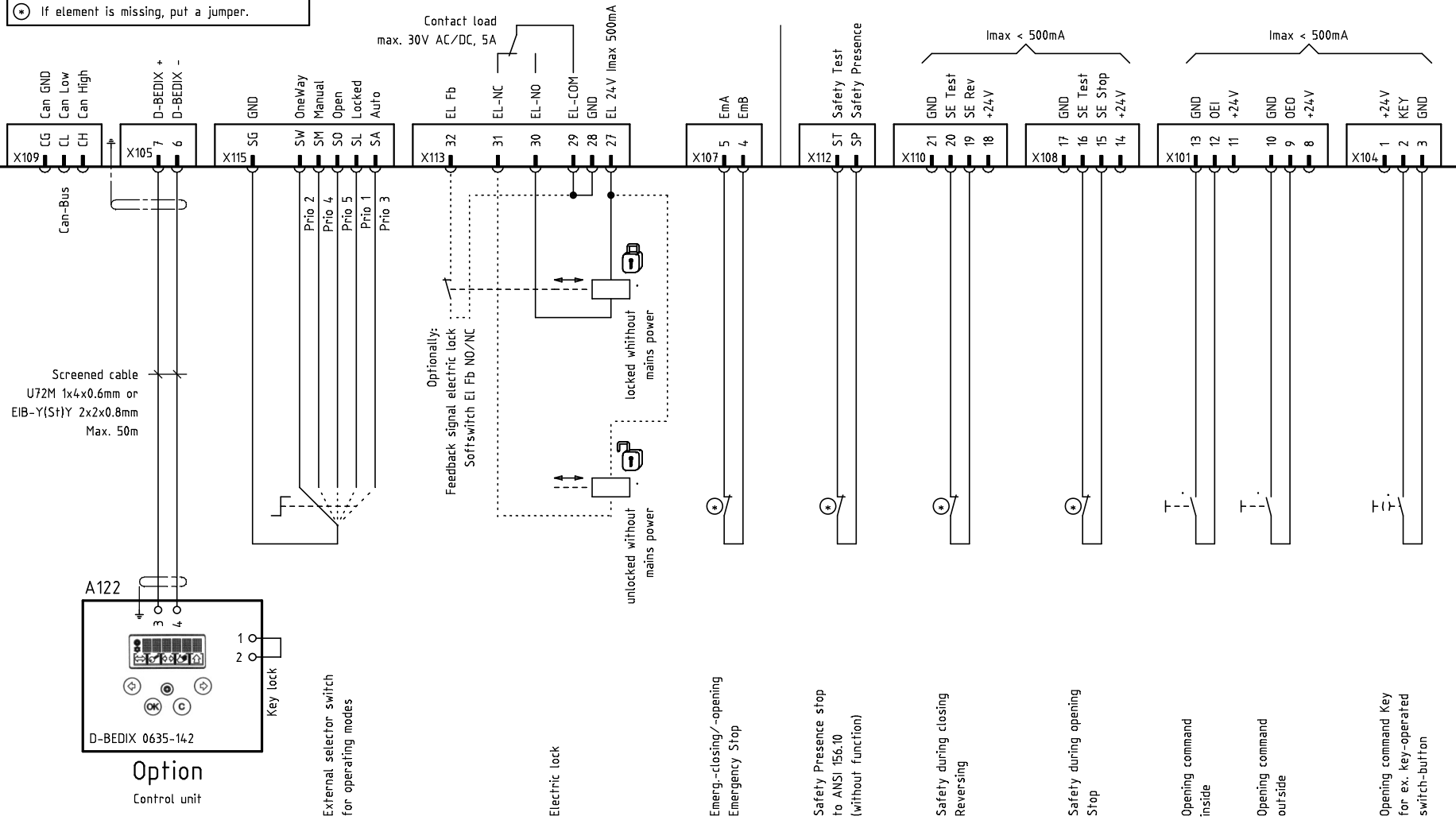
Table of contents

No.	1.Level	2.Level	3.Level	4.Level	5.Level	Sheet designation	Creator	Revision-Id.
						Special notes	Data	Data
1	Drive mechanism for swing door FD 10	Cover sheet	1				bdg	a
							06.11.2018	17.06.2019
2	Drive mechanism for swing door FD 10	Table of contents	2				bdg	
							06.11.2018	
3	Drive mechanism for swing door FD 10	Overview	11			Basic PCB Layout	bdg	a
							06.11.2018	17.06.2019
4	Drive mechanism for swing door FD 10	Overview	12			Overview connection terminals	bdg	a
							06.11.2018	17.06.2019
5	Drive mechanism for swing door FD 10	Overview	13			Power supply, Drive unit	bdg	a
							06.11.2018	17.06.2019
6	Drive mechanism for swing door FD 10	Overview	14			Operating elements internal	bdg	a
							06.11.2018	17.06.2019
7	Drive mechanism for swing door FD 10	Options	Additional PCB	21		Relay PCB	bdg	a
							06.11.2018	17.06.2019
8	Drive mechanism for swing door FD 10	Options	Safety elements	31		BEA LZR-Flatscan	bdg	a
							06.11.2018	17.06.2019
9	Drive mechanism for swing door FD 10	Variants	Double door 2-winged	Closing sequence Master-Slave	41	Settings, Function	bdg	a
							06.11.2018	17.06.2019



operating modes										in manual operation																									
			Designed by			06.11.2018			bdg			Standard diagram						Drive mechanism for swing door FD 10 Overview 11			Basic PCB Layout						Sheet no.								
a			QS-Nr. 14-509			17.06.2019			lja												Reviewed by			12.06.2019			fpe								
0			Erstellung			06.11.2018			bdg			Approved by									14.06.2019			lja											
Id.			Revision			Data			Name																		Origin; Substitution:			E4-0141-724 a			11		

- ⊛ If element is missing, put a jumper.

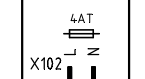


A121

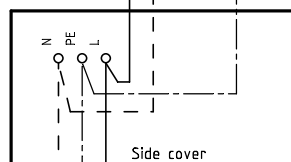
FD 10 Basic PCB, 0350-495

Power consumption
max. 350W

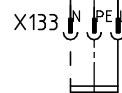
Power supply unit



br bl gn-gb 0549-505
3x0.75mm²



N PE L
3x1,5mm²



Power supply 230VAC/50Hz
Supplied by customer with:
- Socket
- Autom. line cut-out switch FI 30mA
- Fuse 13A

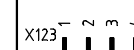
Motor



rt sw 2x0.82mm²



Encoder



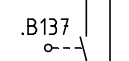
rt or br sw 4x0.82mm²



Reference switch



bl br 2x0.82mm²



Contact open
for opening 0...20°

Drive unit 0549-200

internal
external

				Designed by	06.11.2018	bdg	Standard diagram			Drive mechanism for swing door FD 10		Power supply, Drive unit				Sheet no.	
a	QS-Nr. 14-589	17.06.2019	lja	Reviewed by	12.06.2019	fpe				Overview						12	14
0	Erstellung	06.11.2018	bdg	Approved by	14.06.2019	lja											
Id. Revision		Data		Name						Origin: Substitution:		E4-0141-724		a	13		
131				132				133				134					
												135					
												136					
												137					
												138					

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A121

FD 10 Basic PCB, 0350-495

Selector switch for
operating modes

X124

br

ws

gn

0549-507-20
3x0.34mm²

S141

1 0 2

1 = Automatic
0 = Manual
2 = Open

Side cover

Configuration

X701

FFC (Flexible Flat Cable)
14x0.1mm²

A143



Joystick

Display

ConfigBoard 0350-496

internal

external

			Designed by		06.11.2018	bdg	Standard diagram		Drive mechanism for swing door FD 10 Overview 14	Operating elements internal				Sheet no.					
a	QS-Nr. 14-589	17.06.2019	lja	Reviewed by	12.06.2019	fpe							13						
0	Erstellung	06.11.2018	bdg	Approved by	14.06.2019	lja													
Id.	Revision	Data	Name																
									Origin: Substitution:	E4-0141-724 a		14							

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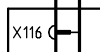
217

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A121

FD 10 Basic PCB, 0350-495

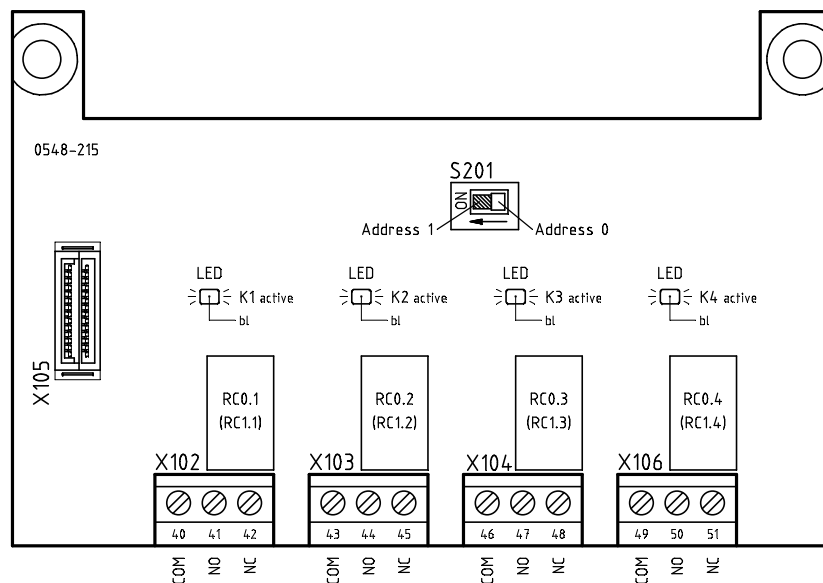
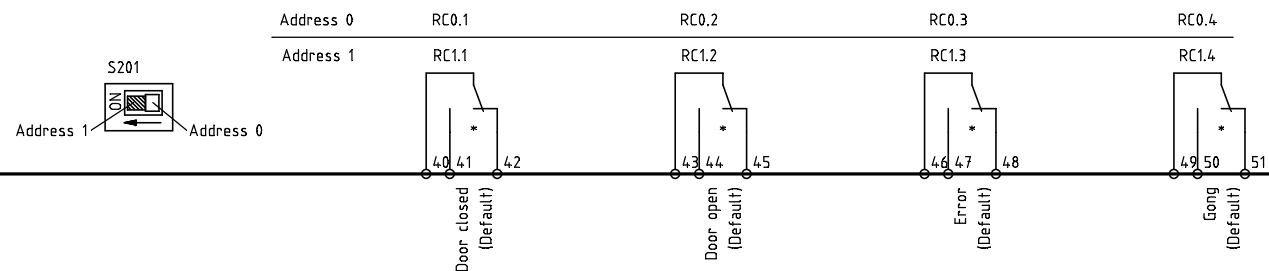
Plug-in for options



A213

Optional relay PCB, 0548-215

* Contact load in case of 30VDC; 5A ohmic



X105

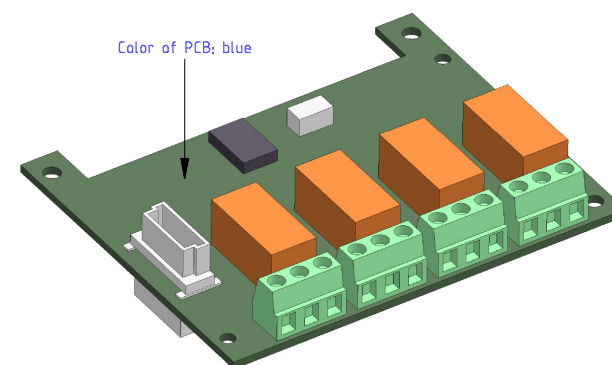
Plug-in for options
(one further option)

S201

Address
(in case of 2 optional relays)

Color LED:

bl / blau / bleu / blu / blue / azul



				Designed by	06.11.2018	bdg	Standard diagram
				Reviewed by	12.06.2019	fpe	
				Approved by	14.06.2019	lja	
a	QS-Nr. 14-589	17.06.2019	lja				
Id.	Revision	Data	Name				

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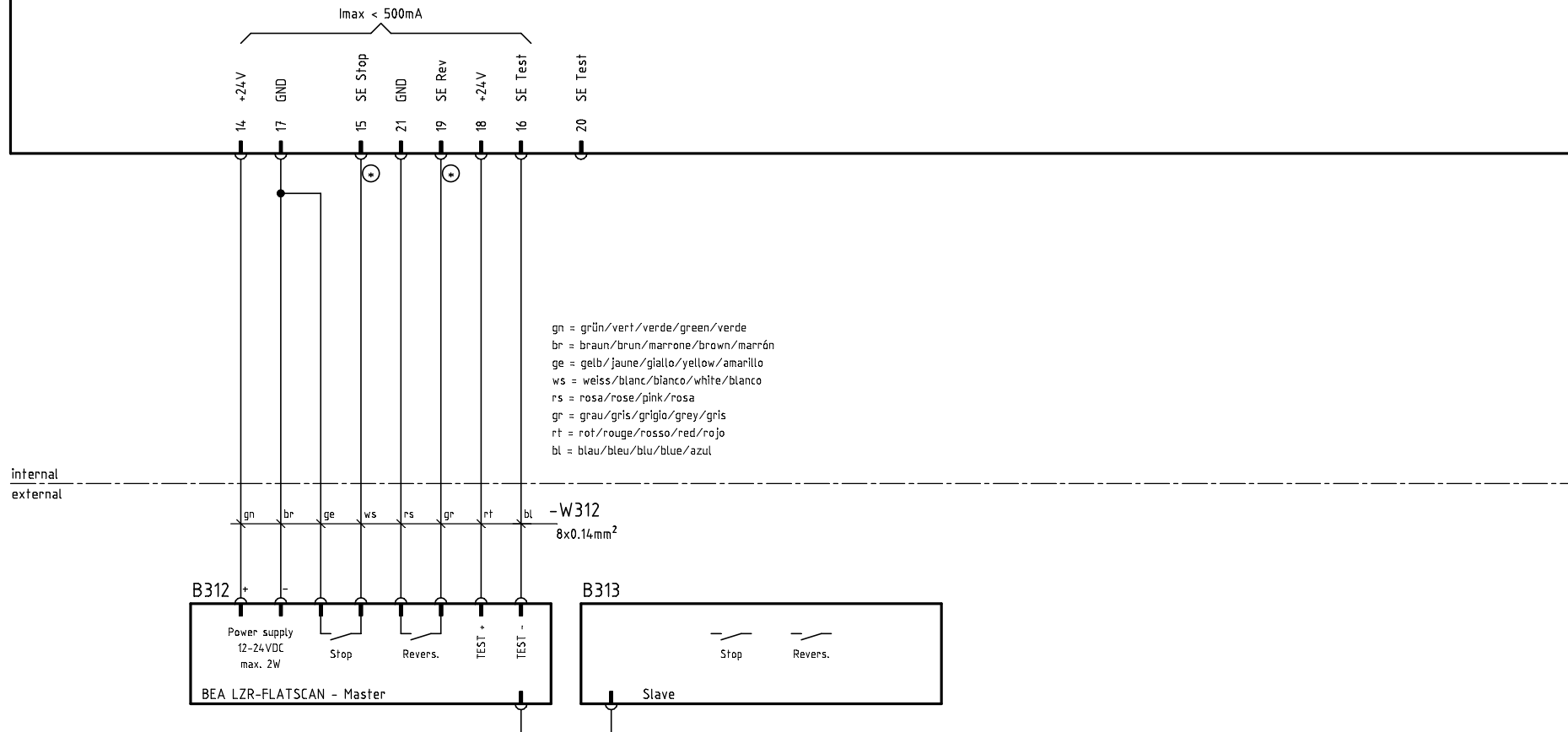
316

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A121

FD 10 Basic PCB, 0350-495



Option

Safety element
inside (Side drive unit)Safety element
outside (Opposite side)

a	OS-Nr. 14'589	17.06.2019	lja
Id.	Revision	Date	Name

Designed by 06.11.2018 bdg
Reviewed by 12.06.2019 fpe
Approved by 14.06.2019 lja

Standard diagram

GILGEN
DOOR SYSTEMS

Drive mechanism for swing door FD 10
Options
Safety elements
31

BEA LZR-FlatScan

Origin:
Substitution:

E4-0141-724 a

Sheet no.

31

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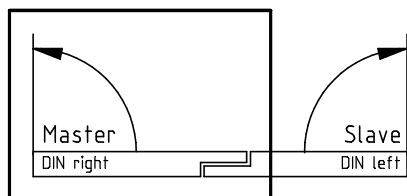
315

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318

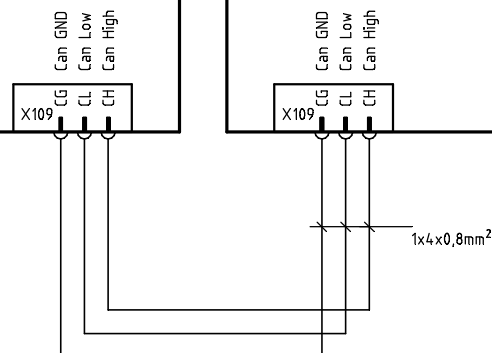
A411

FD 10 Basic PCB, 0350-495
Master

Settings Master	
Parameter	Setting
DubleD	MastrA (B)
AcSeq	0..110°
- Opening period for 1-wing operation - Starting retard (T-Delay) for Master	

Function Master	
Opening command Key/OEI/OEO	Only Master open
Selector switch for operating modes	Operating mode with highest priority is active, either pre-selection Master or pre-selection Slave
Emerg.-closing/-opening/Emergency Stop (Terminals 4-5)	Operates on MASTER and on SLAVE dependend of [CONFIG]- [EMY-IN]

A415

FD 10 Basic PCB, 0350-495
Slave

Settings Slave	
Parameter	Setting
DubleD	SlaveA (B)
AoSeq	0..110°
- Opening period for 1-wing operation - Starting retard (T-Delay) for Slave	

Function Slave	
Opening command Key/OEI/OEO	Master and Slave open
Selector switch for operating modes	Operating mode with highest priority is active, either pre-selection Master or pre-selection Slave
Emerg.-closing/-opening/Emergency Stop (Terminals 4-5)	Operates only on SLAVE

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--