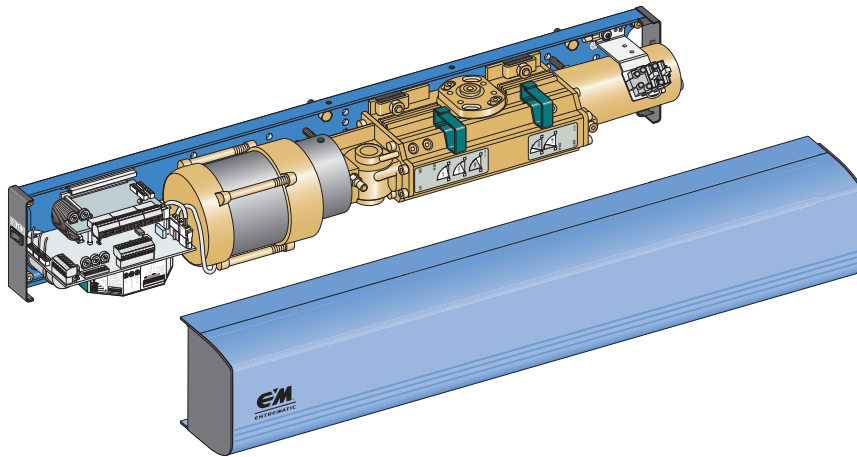




Entrematic Swing Door Operator EMSW

Ruko DA501



Installation and Service Manual - Original instructions

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1 Revision

Following pages have been revised:

Page	Revision 4.0 → 5.0
	New illustration on the front page
5	Module texts updated
7	Technical specification updated
11	10 sec changed to 14 sec.
12	Error messages added
45	New sentence
21	New chapter
51	Text updates, new sub section, new illustration
15, 40, 41, 42, 43, 47, 50	Illustrations updated
18	New cable kit
66	Troubleshooting about flashing LED added
55	Illustration updated
53	New section
18	Cable inlet added
18	Middle piece kit added
49	Middle piece cover added
27	Section updated. New installation instructions.
44	New section

2 Important information



Failure to observe the information in this manual may result in personal injury or damage to equipment.

Save these instructions for future reference.

2.1 Intended use

The door is designed to offer continuous use, a high degree of safety and maximum lifetime.

The Entrematic EMSW is an automatic swing door operator developed to facilitate entrances to buildings and within buildings through swing doors. The EMSW is an electrohydraulic operator approved for fire door applications. It is to be installed indoors where it is suitable for almost all types of external and internal swing doors. This widely-used operator can be found on applications ranging from handicapped-access in private homes to high-traffic retail operations.

Door operator used in escape routes shall be installed so that the door opens in the escape direction unless the system allows breakout in this direction.

These operators shall be connected to a fire alarm system, see section 10.1, 13.2 or 13.3.

The motor, oil pump and hydraulic unit are combined into a compact unit mounted alongside the control unit within the cover. The operator is connected to the door leaf with a range of different arm systems.

For use see User manual 1004131.

2.2 Safety precautions

Do not climb on door parts.

Do not let children play with the door or the fixed controls.

Be sure to complete the site acceptance test before taking the door into operation, see PRA-0007.

To avoid bodily injury, material damage and malfunction of the product, the instructions contained in this manual must be strictly observed during installation, adjustment, repairs and service etc. Training is needed to carry out these tasks safely. Only Entrematic-trained technicians should be allowed to carry out these operations.

2.3 Electronic equipment reception interference

The equipment complies with the European EMC directive (US market FCC Part 15), provided installed according to Installation and Service manual.

The equipment may generate and use radio frequency energy and if not installed and used properly, it may cause interference to radio, television reception or other radio frequency type systems.

If other equipment does not fully comply with immunity requirements interference may occur. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna.

- Relocate the receiver with respect to the equipment.
- Move the receiver away from the equipment.
- Plug the receiver into a different outlet so that equipment and receiver are on different branch circuits.
- Check that protective earth (PE) is connected.

If necessary, the user should consult the dealer or an experienced electronic technician for additional suggestions.

2.4 Environmental requirements

Entrematic products are equipped with electronics and may also be equipped with batteries containing materials which are hazardous to the environment. Remove this material from the operator before it is scrapped and make sure that it is disposed of properly as was done with the packaging.

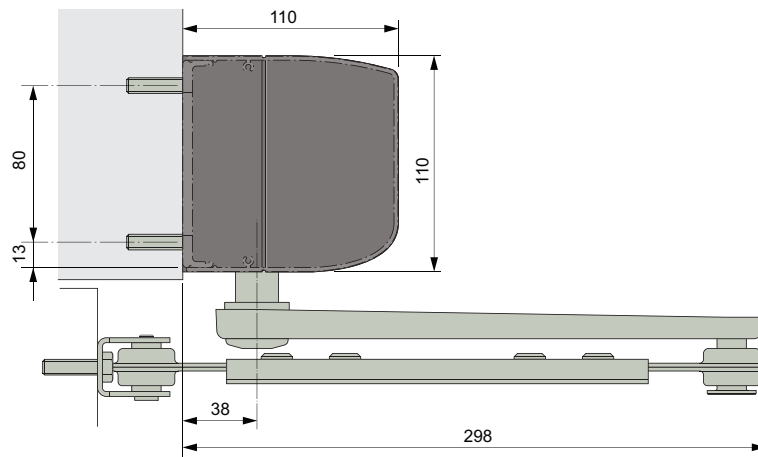
This manual contains the necessary details and instructions for the installation, maintenance and service of the Swing Door Operator Entrematic EMSW.

3 Technical specifications

Ensure that the door operator with technical specification below is suitable for the installation.

Manufacturer:	Ditec Entrematic Nordic AB
Address:	Lodjursgatan 2, SE-261 25 Landskrona, Sweden
Type:	EMSW
Mains power supply:	230 V AC $\pm 10\%$, 50 Hz, mains fuse max 10A Note! The mains power supply shall be installed with protection and an all-pole mains switch with isolating capability of Category III, at least 3 mm between contacts, shall be installed according to local regulations. These articles are not provided with the door.
Power consumption:	Max. 230 W (Max 460 W Double door set)
Auxiliary voltage:	24 V DC, 700 mA (stabilized)
Motor fuse F1:	6,3 AT
Control fuse F2:	250 mAT
Recommended max. door weight:	Arm system PUSH: 250 kg for door leaf width 1600 mm
	Arm system PULL / PULL-P: 100 kg for door leaf width 1400 mm
	<u>The EMSW complies with the door weights/widths stated in the:</u> Controlled door closing, EN 1154 Table I, size 3-6 Coordination unit for rebated doors, EN 1158 Türschliesser mit Öffnungsautomatik (Drehflügelantrieb), DIN 18263-4 AU Grösse 3-6
Safety requirements:	In compliance with DIN 18650-1/2
Ambient temperature:	-15°C to +30°C
Relative humidity (non-condensing):	max. 85%
Dimensions:	Length: EMSW (standard cover) 716 mm EMSW-SPEC 750-1600 mm EMSW-2 1435-3200 mm Height: 110 mm Depth: 110 mm
Degree of protection:	IP 20
Degree of protection, control actuators:	IP54
Approvals:	Third party approvals from established certification organizations valid for safety in use, see Manufacturer's declaration.

This product is to be installed internally.



4 How the EMSW works

The EMSW works electro-hydraulically. It opens with an AC-motor that via a hydraulic unit and an arm system transmits the power to the door leaf. The closing power is from a coil spring. The movement of the door is controlled by limit switches and valve screws.

4.1 Opening

When an opening impulse is received by the control unit, the motor starts and the hydraulic unit rotates the drive shaft and arm system (door) with high speed towards open position. Before fully open position, the speed is reduced to low speed. The door stops and the motor rotation ceases when the selected door opening angle is reached. This open position is kept by a hydraulic valve.

4.2 Closing

The spring closing starts when the hold open time has run out. Before fully closed position the speed is reduced to low speed, which will be kept until the door is completely closed. The door is kept closed by spring power. To overcome the resistance of a striking plate a “lock kick” can be adjusted to required level.

4.3 Functions on the Control Unit CSDB

4.3.1 Key Impulse

Key impulse will open the door in programme selection OFF, EXIT and AUTO and keep the door open during key hold open time.

Key hold open time can be adjusted between 0-30 sec.

4.3.2 Outer Impulse

Outer impulse will open the door if programme selection is AUTO and keep the door open during the outer hold open time, which can be adjusted between 0-30 s.

4.3.3 Multi Voltage Input (MVI)

MVI impulse accepts a potential-free contact or 6-24 V AC/DC.

Status of lock (operation mode) can be selected via a function selector FS2 and depends on input TB2:11 and 13.

FS-2 = OFF /factory setting) FS-3 = OFF (factory setting)	TB2:11 and 13 	TB2:11 and 13 	TB2:11 and 13 6-24 V AC/DC*
CSDB (No PS)	OFF	AUTO	
EXB OFF		OFF	
EXB EXIT		EXIT	
EXB AUTO		AUTO	
EXB OPEN		OPEN	

FS-2 = ON FS-3 = OFF (factory setting)	TB2:11 and 13s —+—	TB2:11 and 13 —+—	TB2:11 and 13 6-24 V AC/DC*
CSDB (No PS)	AUTO	OFF	
EXB OFF	OFF		
EXB EXIT	EXIT		
EXB AUTO	AUTO		
EXB OPEN	OPEN		
FS-2 = OFF (factory setting) FS-3 = ON	TB2:11 and 13 —+—	TB2:11 and 13 —+—	TB2:11 and 13 6-24 V AC/DC*
CSDB (No PS)	OFF	Open door	
EXB OFF	OFF	Open door	
EXB EXIT	EXIT	Open door	
EXB AUTO	AUTO	Open door	
EXB OPEN	OPEN	Open door	
FS-2 = ON FS-3 = ON	TB2:11 and 13 —+—	TB2:11 and 13 —+—	TB2:11 and 13 6-24 V AC/DC*
CSDB (No PS)	Open door	OFF	
EXB OFF	Open door	OFF	
EXB EXIT	Open door	EXIT	
EXB AUTO	Open door	AUTO	
EXB OPEN	Open door	OPEN	

* +6-24 V DC **must be** connected to TB2:13 and MVI jumper must be removed.

Programme selector **must not** be connected to TB2:13 if input is 6-24 V. Connect instead programme selector to EXB.

MVI impulse will unlock the lock and open the door **or** only unlock the lock (changes the operation mode of the operator). Can be selected via the function selector FS3.

MVI hold open time can be adjusted between 0-30 sec.

4.3.4 Kill Input

When kill is activated, the door will close immediately if not already closed. Hold open and low pass filter timers are reset.

Key impulse will open lock during activated kill if not connected to TB2:5 for 0 V DC.

When kill is deactivated, the door will act according to current input status.

Several kill inputs are possible to connect in parallel with other CSDB control units. Connect kill on the first operator according to the connection diagram. The second, third etc. operator is only to be connected in parallel, from terminal 5 to 5 and 6 to 6.

Kill function is selected via a function selector (Kill jumper).

As an alternative to the shown connection under “Connection of activation units and accessories” on page 47, an alarm loop 24 VDC can be connected to the CSDB connect +24 VDC to terminal 6 and 0 VDC to terminal 5.

4.3.5 Limit Switch Open

The limit switch indicates a fully open door and can be adjusted for opening angles up to 120°. When the limit switch is activated the motor will stop. If the limit switch is not activated, the motor will stop after 14 sec.

If the limit switch is deactivated when the door is open, the motor will restart to reposition the door.

The LED indicates an activated limit switch.

Contact rating: 1A, 48 V DC, normally open.

4.3.6 Home Switch (optional)

When no home switch is mounted and the limit switch is deactivated in open position, a timer starts and after 6 sec the status will change from closing to closed door.

If the **optional** home switch is mounted, this will indicate closed door instead of the timer.

“Opening delay” for lock (0-3s) is ignored as soon as home switch is not activated.

“Slave delay” (0,5s) is ignored as soon as home switch for the master is not activated.

Presence impulse is ignored when home switch indicates a closed door within 6 seconds.

The LED indicates an activated home switch.

4.3.7 Lock Output

The lock output is short circuit proof and can source a lock with 24V, 375 mA.

The output can be locked with power or locked without power. It can be selected via a function selector (Locked w. / w.o. power).

The lock activation time can be either 1,5 s + (opening delay) or until closing. It can be selected via a function selector (Lock time 1,5 s/until closing).

“Opening delay” for lock, the time that will pass before the motor starts, can be adjusted from 0-3 s.

If a home switch is installed, the lock opening time will first start when the home switch is deactivated. This to prevent door to jam in the lock, if presence detection is activated.

4.3.8 Double Door

The CSDB works as the master in a double door application and is connected to the slave unit CSDA-S.

The slave unit has a standard opening delay of 0,2 sec. The delay can be increased to 0,5 sec. to prevent jamming of thicker door leaves. This can be selected via a function selector (Slave Delay). Home switch is recommended to prevent delay during closing.

When there is a need for more power supply than a single CSDB can deliver, a second CSDB can be connected as a slave. The CSDB on the slave unit must then be configured as a slave. This can be selected via a function selector (Master / Slave).

To enable only one door to open, connect impulse parallel on both units. Slave door must have CSDB+EXB and the low pass filter potentiometer adjusted.

4.3.9 Push to Go

A push on the door will, from closed position, start an automatic opening cycle if the programme selection is AUTO or EXIT and remain open during the hold open time “Outer HOT” (0-30 s).

A home switch on the operator is needed to achieve Push to Go. Can be selected via a function selector (Push to Go).

The LED indicates when the home switch is active.

4.3.10 Error Messages

The LED indicates:

- Sensor error; 1 flash of 0,2 sec and then 1 sec pause etc.
- Lock error (too high current draw or short circuit); 1 flash of 0,2 sec and then 0,2 sec pause etc.
- CSDB defect; 3 or 4 flashes of 0,2 sec and 0,2 pause
- No slave connected and Slave monitoring jumper is missing; 7 flashes of 0,2 sec and 0,2 pause
- Slave connected but Slave monitoring jumper is not removed; 7 flashes of 0,2 sec and 0,2 pause
- Defect slave CSDB-S; 7 flashes of 0,2 sec and 0,2 pause
- Old slave connected and Slave monitoring jumper removed; 7 flashes of 0,2 sec and 0,2 pause

4.3.11 Programme Selector

A programme selector PS-3B, with three positions OFF-AUTO-OPEN, can be connected to the CSDB.

Note! If the MVI-input is used for 6-24 V, the PS-3B can not be used.

The key impulse is still valid in programme selection OFF.

Presence sensors are enabled in all programme selector settings but not when kill is active.

4.4 Functions on the Extension Unit EXB

4.4.1 Inner Impulse

Inner impulse will open the door if programme selection is AUTO or EXIT and keep the door open during the hold open time.

The hold open time is adjustable from 0-30 sec.

4.4.2 Low Pass Filter (automatic cycle delay)

This function demands a constant inner impulse for a certain time to start an automatic cycle. The time can be adjusted from 0-5 sec.

During closing the door will reopen immediately if impulsed.

4.4.3 Presence Impulse

Presence impulse will prevent an open door from closing and will re-open a closing door and the control will make sure that the hold open time is not shorter than 1,5 s.

Presence impulse is ignored when home impulse is active.

Presence impulse is not a valid impulse if the door is manually opened.

Presence impulse is a valid impulse if the door is opened with Push to Go.

The input can be either “normally open” or “normally closed”, which can be selected via a function selector (Presence Impulse NO/NC).

4.4.4 Presence Detection

Presence Detection will prevent a closed door from opening and stop an opening door.

A blank out switch is used to blank out the sensor from seeing for instance a wall close to the open door. There can be two switches overlapping each other for the master door and two for the slave door.

Two LED's indicate the blank out switch status. One LED for the master door and one for the slave door. The LED will light up if either of the two blanking switches is activated.

Presence detection can be selected via two function selectors, "Presence Detect Master" and "Presence Detect Slave".

4.4.5 Sensor Monitoring

Test of **Presence detection** is performed before opening. Test of **Presence impulse** is performed before closing. The master sensors are tested first and the slave sensors are tested when the answer is received from master sensors.

If sensor test is **not** performed successfully the door will enter **manual mode** and report sensor error. The sensor test will continue during manual mode.

If no slave operator is present, when sensor monitoring is enabled, the "presence impulse slave" should be connected to "sensor test slave".

It is only possible to monitor sensors with output of type normally closed (NC).

If the sensor error disappears during manual mode the door will re-enter automatic mode again.

Monitoring can be selected via a function selector (Presence Sensor Monitoring).

4.4.6 Overhead Presence Detection (OPD)

OPD impulse will prevent a closed door from opening and an open door from closing.

A moving door will ignore the OPD input. The OPD will be active 6 sec. after the door has started to close. If a home switch is mounted, the OPD will be active as soon as the door is closed.

OPD can be selected via a function selector (Sensor type OPD/Mat).

4.4.7 Mat Safety

Mat safety impulse will prevent a closed door from opening and an open door from closing.

No impulses are accepted during closing if mat is activated.

Mat safety can be selected via a function selector (Sensor type OPD/Mat).

4.4.8 LockOut

LockOut is used to ignore the OPD sensor during opening and closing. Output will be low when the door is considered closed, high during opening and open and toggling when the door is closing.

LockOut output will be low when the door is manually opened.

4.4.9 Programme selector

Programme selector PS-4C can be connected to the EXB.

The PS-4C, compared to PS-3B, has a fourth position EXIT that will make the CSDB ignore the outer impulse device.

Presence sensors are enabled in all programme selector settings but not when kill is active.

5 Models

Three main models of the Entrematic EMSW are available:

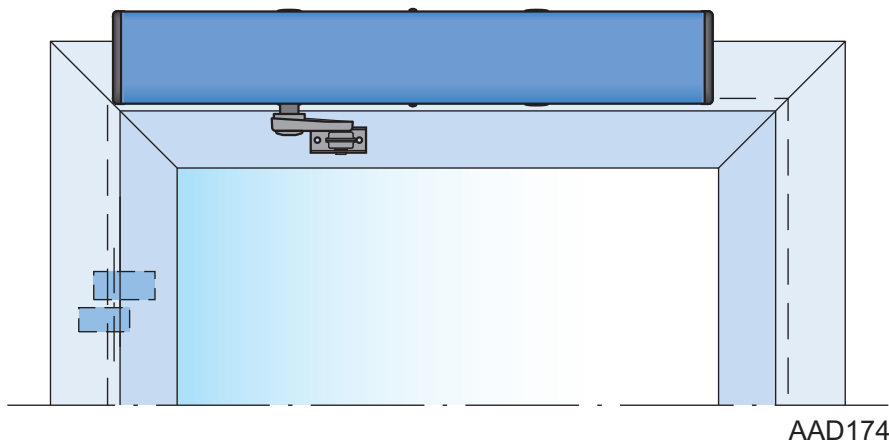
- EMSW, standard cover
- EMSW-SPEC, cover with optional length
- EMSW-2, double door operators

The operators are non-handed and not dependent on the hinges. The operators suit both pushing and pulling arm systems.

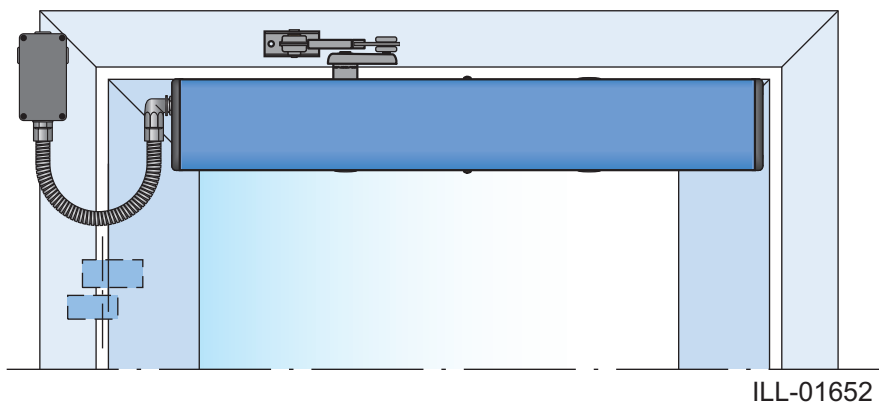
5.1 EMSW, standard cover (wall or door leaf mounted)

EMSW is the standard operator. Pushing arm system on a wall-mounted and on a door leaf-mounted operator shown.

Wall mounted



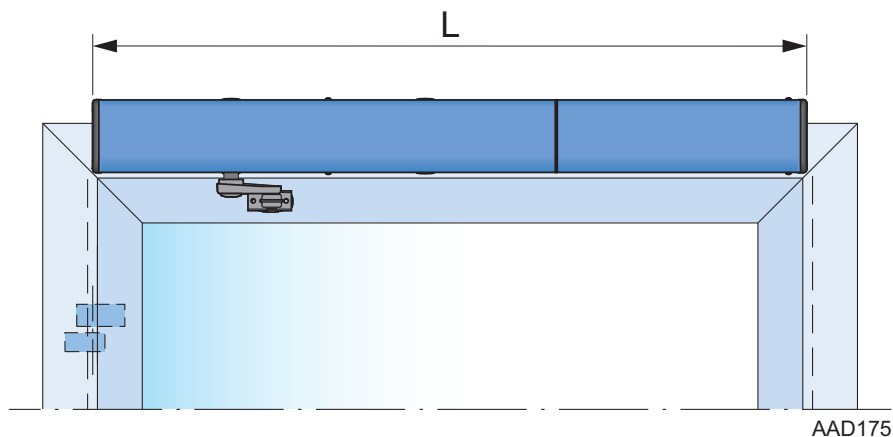
Door leaf mounted



5.2 EMSW-SPEC, cover with optional length (wall mounted)

The EMSW-SPEC carries a cover with optional length e.g. with the same width as the door. The length L must be specified in the order.

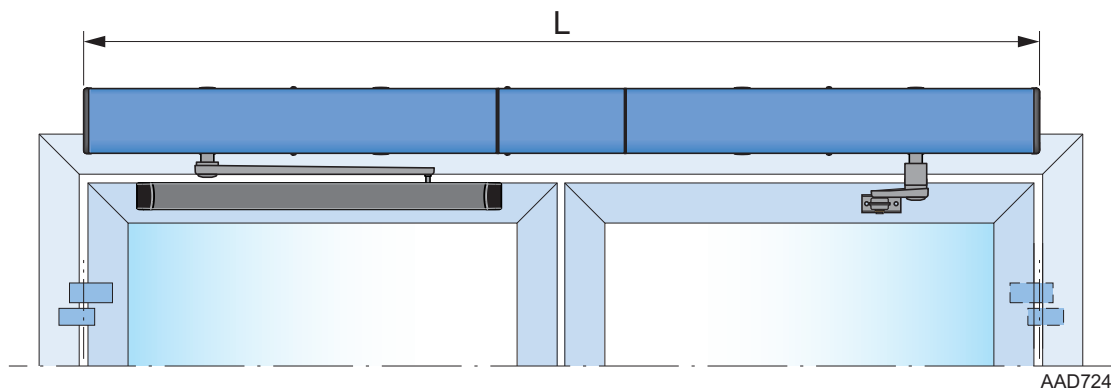
Pushing arm system shown.



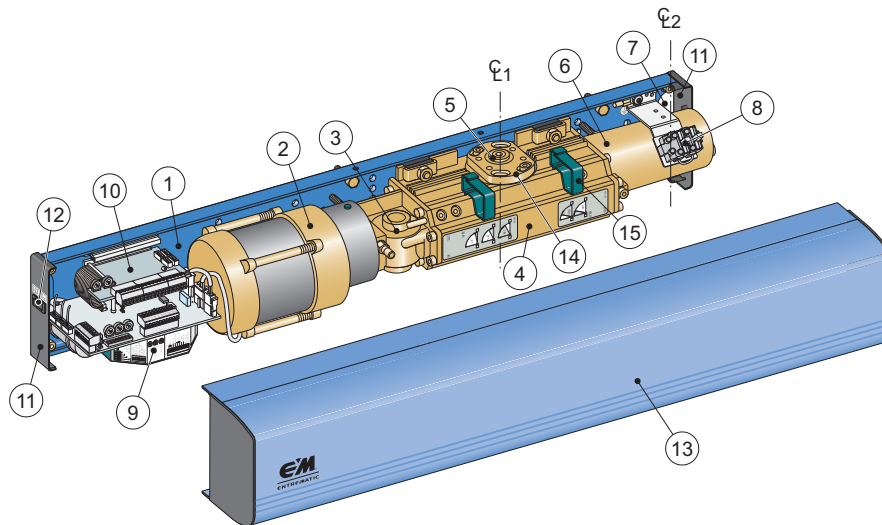
5.3 EMSW-2, double door operators (wall mounted)

The EMSW-2 consists of two operators that are mounted under the same cover to open one door each. The length L must be specified in the order.

Pushing and pulling arm system shown. It is also possible to use two pushing or two pulling arm systems.

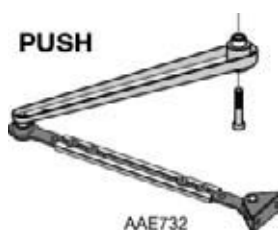


6 Part identification & Accessories



No.	Description	No.	Description
1	Mounting plate	10	Extension unit, EXB (option)
2	Motor/pump	11	End plate
3	Magnetic valve	12	Programme selector, PS-3B (option)
4	Hydraulic unit	13	Cover
5	Drive shaft	14	Bearing sleeve
6	Spring tube	15	Cable holder
7	Cable inlet	CL1=	Centre line, drive shaft
8	Mains connection	CL2=	Centre line, hinge
9	Control unit, CSDB		

6.1 Arm systems, PUSH / PUSH-325



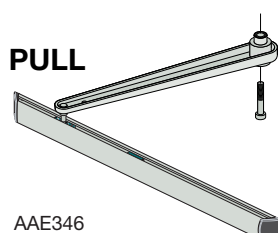
PUSH: Art. No. 1003576BK

PUSH-325: Art. No. 1007134BK

These arm systems are delivered with drive arm, telescopic part and door fitting.

They are used if the operator is installed on the wall on the opposite side of the door swing and approved for fire door applications.

6.2 Arm system, PULL

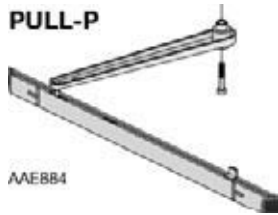


Art. No. 1003577BK

This arm system is delivered with drive arm, guide shoe and door fitting.

It is used if the operator is installed on the wall on the same side as the door swing, i.e. the door is pulled open.

6.3 Arm system, PULL-P

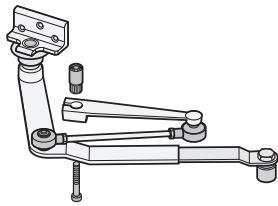


Art. No. 1005273BK

This arm system is delivered with drive arm, guide shoe and door fitting with break-out unit.

It is used if the operator is installed on the wall on the same side as the door swing and break-out unit is required.

6.4 Arm system, ST-V / ST-H



Art. No.: ST-V 172313

Art. No.: ST-H 172315

This arm system is delivered with drive arm and guide roller.

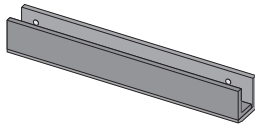
It is used if the operator is installed on the wall on the same side as the door swing and break-out unit is required.

Note! Door fitting not included.

6.4.1 Options for ST-V / ST-H

Door fitting standard

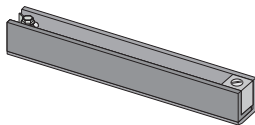
Art. No.: 172071



Door fitting Break-out

Art. No. 172325 for pivot (break-out) door, **right** when the reveal A = 0-60 mm (0-2 3/8") or **left** when A > 60-100 mm (>2 3/8"-3 15/16") for ST-H/ST-V

Art. No. 172327 for pivot (break-out) door, **right** when A > 60-100 mm (>2 3/8"-3 15/16") or **left** when A = 0-60 mm (0-2 3/8")

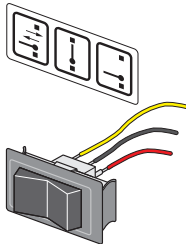
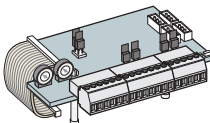
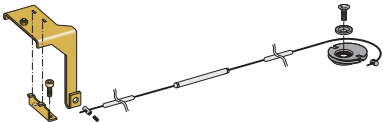
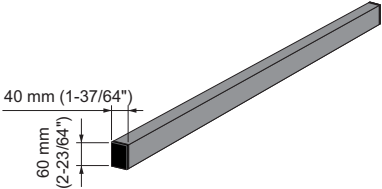
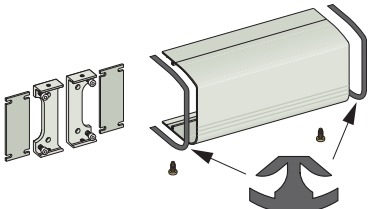
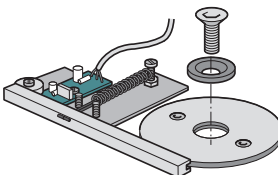
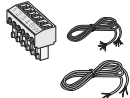
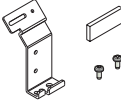
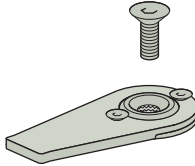


Arm extension

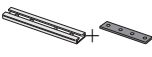
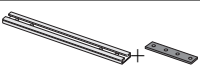
Art. No. 172320 required when the reveal A > 60-100 mm (>2 3/8"-3 15/16")



6.5 Further accessories

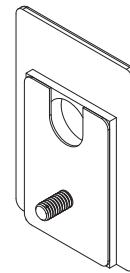
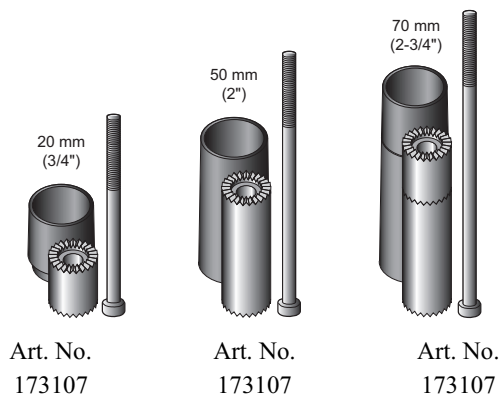
4-Position Switch (with EXB) PS-4C  Art. No. 655845	2-Position Switch PSW-2  Art. No. 655843 PSK-2  ILL-01578 Art. No. 655844	3-Position Switch PS-3B  Art. No. 1004117	Extension unit EXB  Art. No. 1004116
Coordination unit, COOA Art. No. 100091 	PULL-Arm Reveal Spacer Art. No. 173804BK for PULL Art. No. 173831BK for PULL-P  40 mm (1-37/64") 60 mm (2-23/64")	Middle piece kit Art. No. 1008385 	
Finger protection strips  Art. No. 833333  Art. No. 833334	Push & Go (PAG)  Art. No. 600149		
Cable kit slave  Art. No. 656064	PCB Attachment plate  Art. No. 1003884	Door stop  Art. No. 100147	

PUSH, Arm Extensions

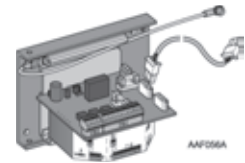
Reveal	Extension		Art. No.
0-110 mm Up to 4-3/8"	None (Standard arm)	-	-
110-235 mm 4-3/8" to 9-1/4"	345 mm		173005
235-360 mm 9-1/4" to 14-1/8"	230 mm + Joint part		173004 + 173191
360-485 mm 14-1/8" to 19"	345 mm + Joint part +		173005 + 173191

Cable inlet

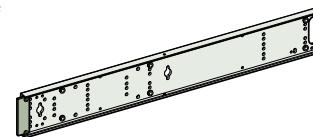
Art. No. 1007567

**Drive Shaft Extension Kits****Control unit, CSDA-F**

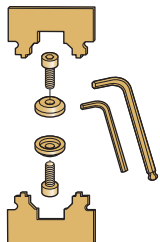
Art. No. 600081

**Drilling template**

Art. No. 1000219

**Tool kit to change rotation direction**

Art. No. 173719

**Restore after alarm button**

Art. No. 600090

**Limit Switch**

Art. No. 655614 (L = 500 mm)

Art. No. 1004205 (L = 2000 mm)

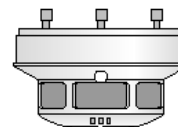
**Cut-out in cover incl. smoke detector
ORS 142, socket and necessary screws**

(cover not included)

Art. No. 173840

**Smoke Detector ORS 142**

Art. No. 738794



Ceiling socket 143A
for smoke detector
Art. No. 738795

Ceiling socket 143W
for smoke detector
Art. No. 738795

Mounting plate

L (mm)	H (mm)	T (mm)	Art. No.
State	125	6	173680
	160	8	173661

Door mounting kit
(for door leaf mounted operators)
Art. No. 100132

Shaft extension, SEK
(including bearing for extension 70-420 mm)
Art. No. 173039

6.6 Labels

Label kit - including all below

Art. No. 1005227

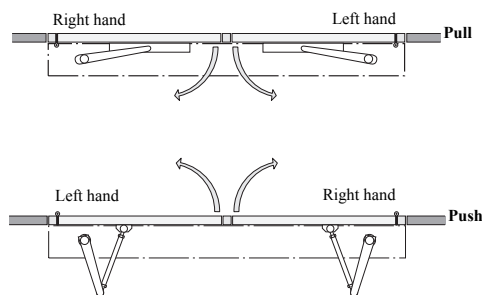
	Emergency break-out, DIN right door Art. No. 1001785
	Emergency break-out, DIN left door Art. No. 1001786
	Activation by disabled people Art. No. 1003963
	Operator designed for disabled people Art. No. 1003964
	Supervision of child Art. No. 1001695

7 Pre-Installation

7.1 General tips/Safety concerns

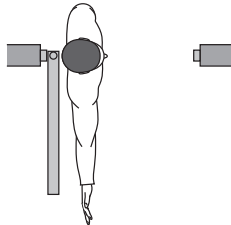
- For enhanced security and vandalism protection, always mount the operator access in the interior of a building whenever possible.
- Make sure that the power is off before installing.
- Make sure that the door leaf and the wall are properly reinforced at the installation points.
- Inspect the door hinges before installation to ensure that they are in good repair.
- Unpack the operator and make sure that all parts are delivered in accordance with the packing note.

7.2.1 Operator handing



7.2.2 Door handing (Automatic Door Industry)

Door handing is determined by standing with your back to the hinges. The side to which the door normally opens (right or left) is the “handing” of the door. The diagram below shows a right-handed door.



7.3 Fastening requirements

Always make sure, before commencing the installation, that the door leaf and the wall are properly reinforced at the fixing points.

Also check the mechanical condition of the door that it is correctly balanced and opens and closes properly.

Base material	Minimum requirements of wall profile
Steel	5 mm *
Aluminium	6 mm *
Reinforced concrete	min. 50 mm from the underside
Wood	50 mm
Brick wall	Expansion shell bolt, min. M6x85, UPAT PSEA B10/25, min. 50 mm from the underside

* Thinner wall profiles must be reinforced with rivnuts

7.4 Tools required

- Torx T8, T10, T20 and T25
- Metric hexagonal key 3, 4 and 6 mm
- Flatblade screwdriver, small
- Torque wrench with metric Allen socket 6 mm

7.5 Installation on double doors

If the operators are to be mounted at the same height with pushing and pulling arm systems, the height is determined by the pulling arm system, PULL/ST. The pushing arm system PUSH must always have a shaft extension, minimum 50 mm.

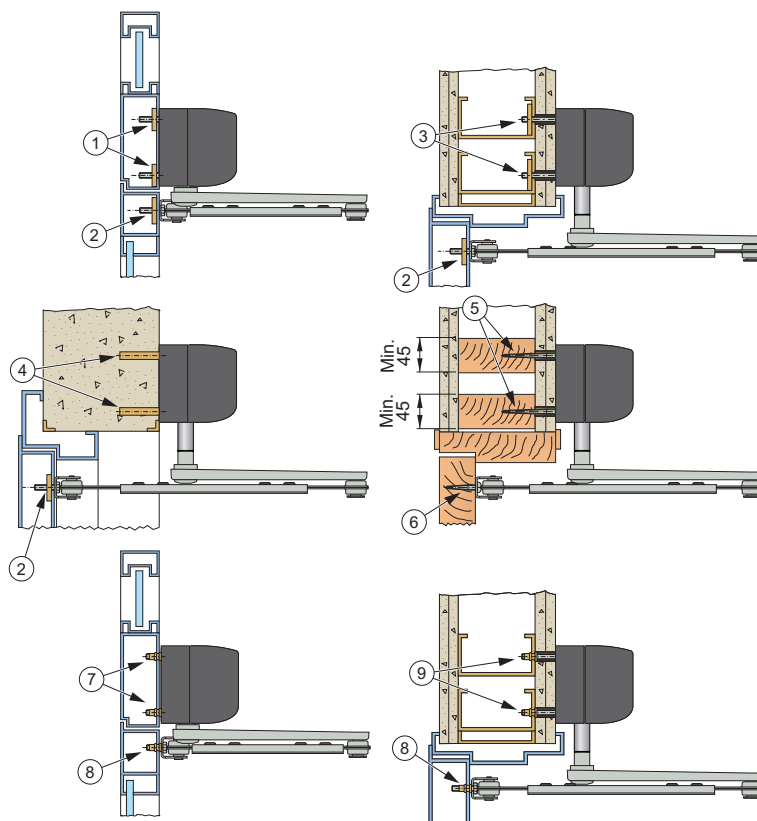
Example: If PULL has a 20 mm extension, the PUSH must have a 70 mm extension.

For installation follow the instructions for the applicable arm system.

7.6 Installation examples for fire approved doors

Illustrations below show examples of approved reinforcements when mounting a fireproof swing door operator.

Note! The type approval for fireproof swing doors is valid only with the arm system PUSH. Reveal max 480 mm and shaft extension max 50 mm.

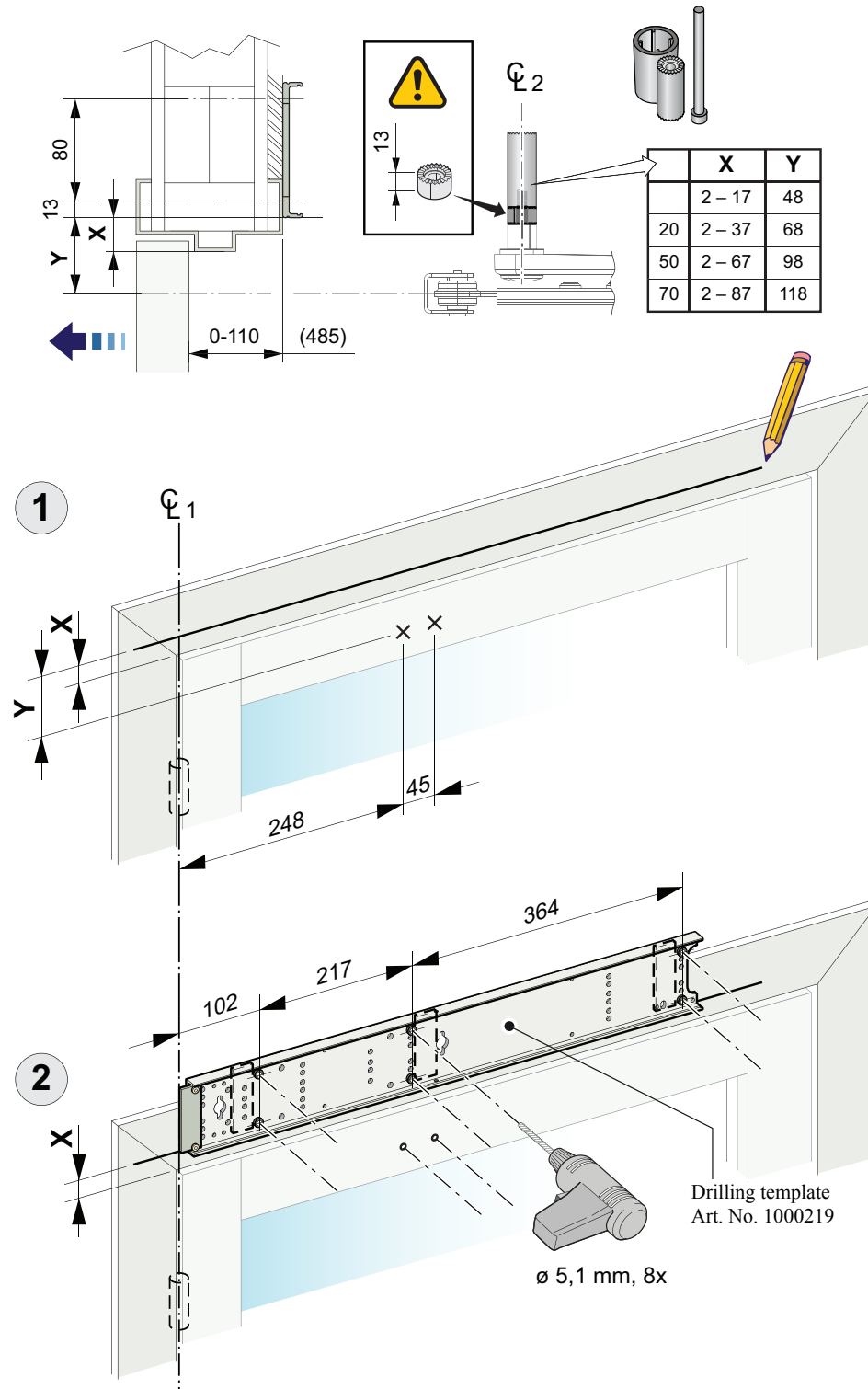


No.	Description	No.	Description
1	Steel min. 50x5, L=min. 100, centered for mounting holes (4x) This is a requirement with aluminium profiles. Screw M6, FS-TT FZB, Taptite, L=40 (4x)	6	Wood screw M6, KST, L=45 (2x)
2	Steel min. 50x5, L=min. 150, centered at the arms length on the door. This is a requirement with aluminium profiles. Screw M6, FS-TT FZB, Taptite, L=40 (2x)	7	Rivnut M6, FTT/ST, L=15,9 (4x) Screw M6, FS-TT FZB, Taptite, L=40 (4x). Rivnuts are only allowed to be used with steel profiles with thickness of min 1,5 mm.
3	Steel min. 50x5, L=min. 100, centered for mounting holes (4x) This is a requirement with aluminium profiles. Screw M6, FS-TT FZB, Taptite, L=50 (4x) Distance piece ø10/13	8	Rivnut M6, FTT/ST, L=15,9 (2x) Screw M6, FS-TT FZB, Taptite, L=40 (2x). Rivnuts are only allowed to be used with steel profiles
4	Expansion-shell bolt (4x) (for brickwall min. M6x85, UPAT PSEA B 10/25)	9	Rivnut M6, FTT/ST, L=15,9 (4x) Screw M6, FS-TT FZB, Taptite, L=50 (4x) Distance piece ø10/13. Rivnuts are only allowed to be used together with a plasterboard beam made of steel with a material thickness of min 1,5 mm.
5	Wood screw M6, KST, L=min. 70 (4x) Distance piece ø10/13		

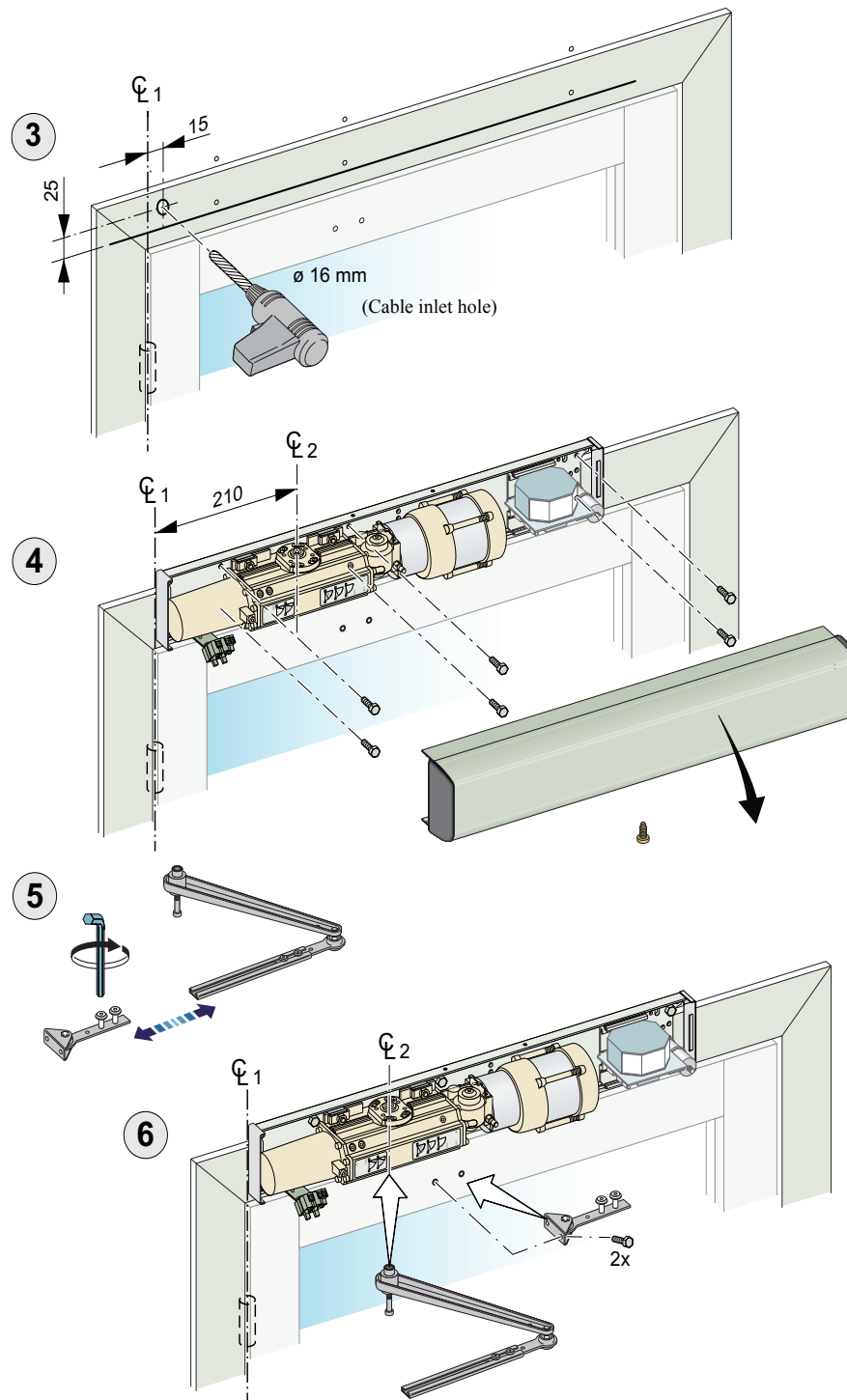
8 Mechanical installation

This instruction comprises the installation of the Entrematic EMSW with arm systems **PUSH**, which push the door open and **PULL / ST-V/H**, which pull the door open. See also “QuickStart” which is enclosed with each operator.

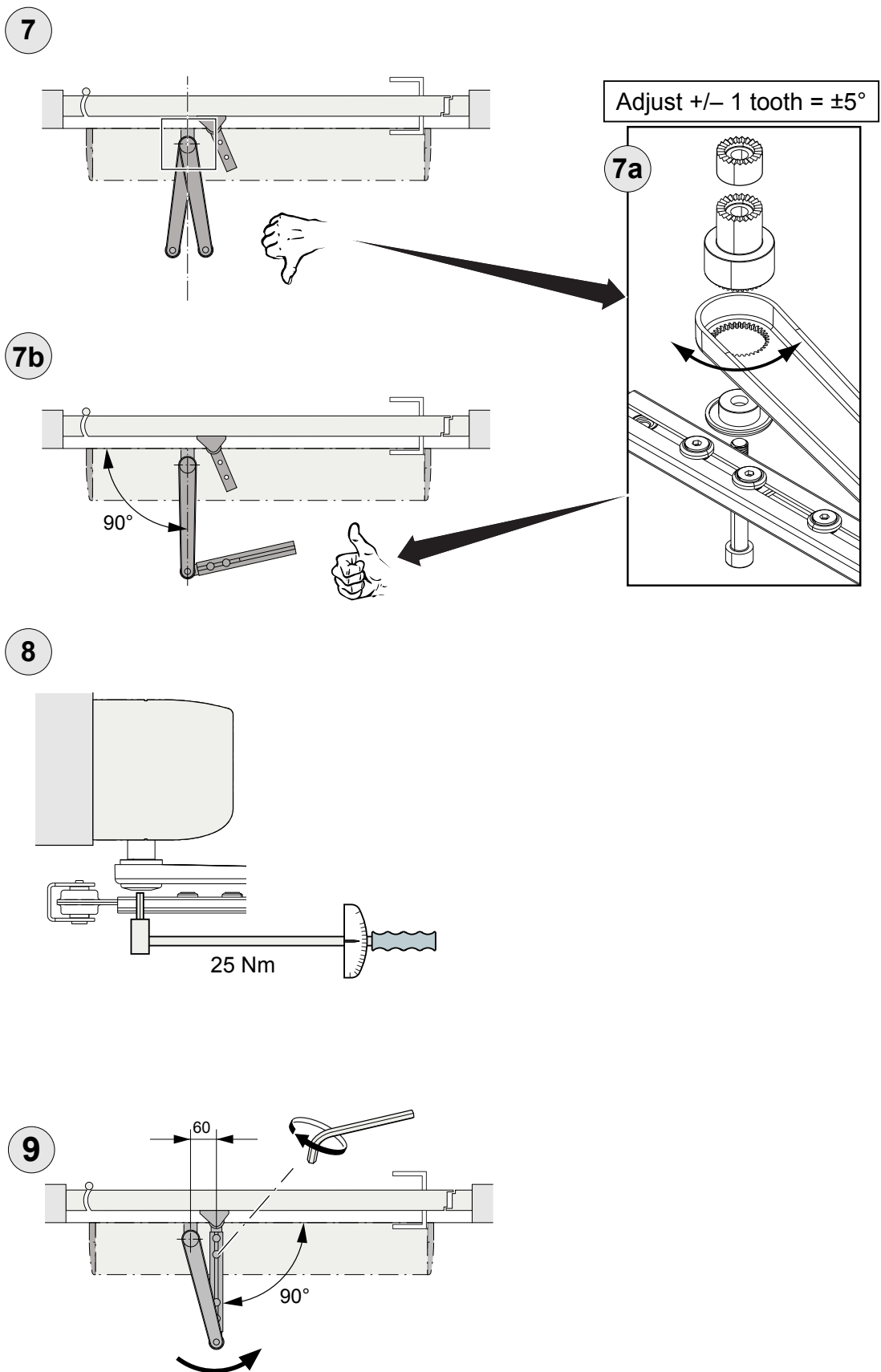
8.1 Wall mounted operator with arm system PUSH



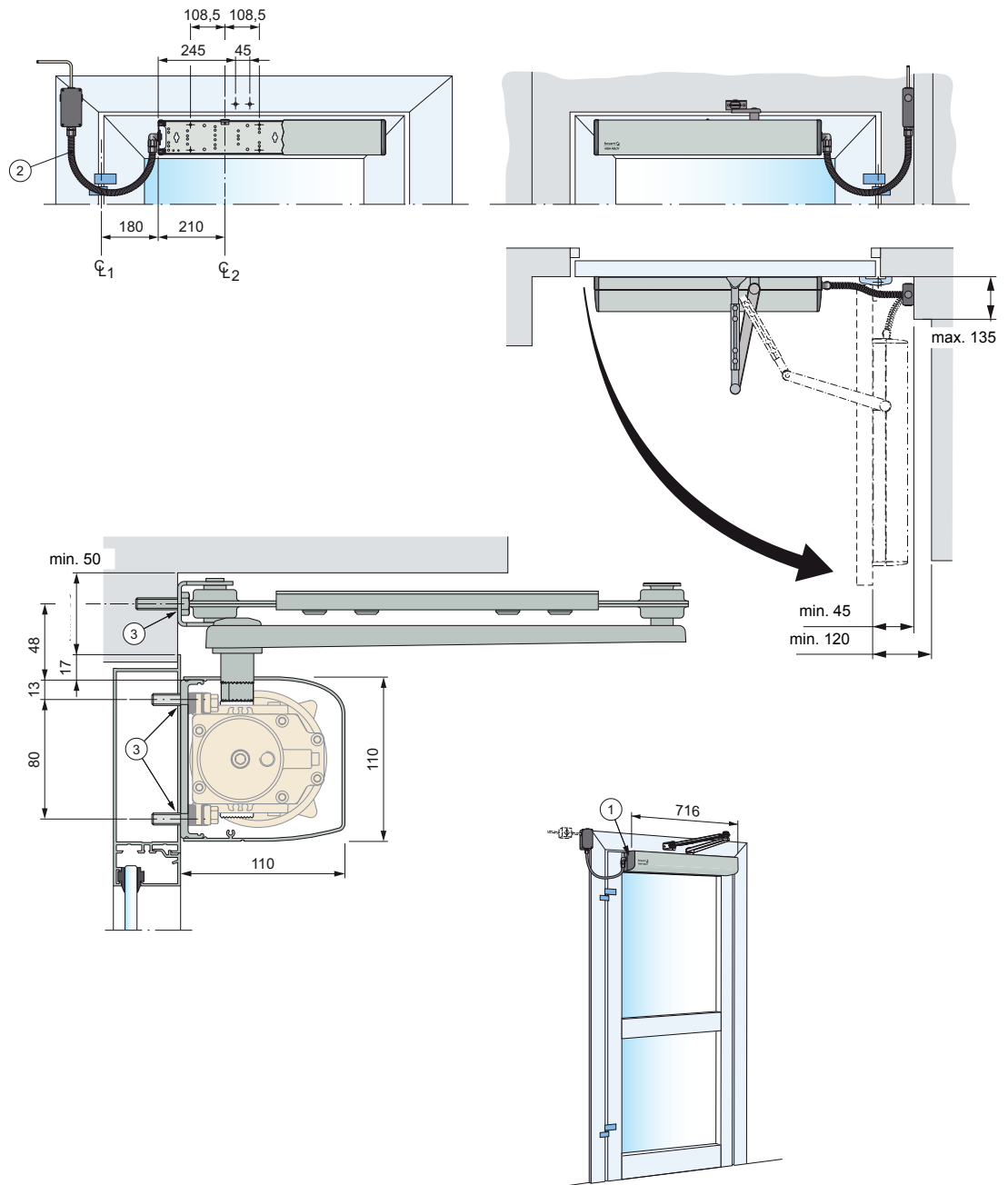
Cont. "Wall mounted operator with arm system PUSH"



Cont. "Wall mounted operator with arm system PUSH"



8.2 Door leaf mounted operator EMSW E with arm system PUSH-325

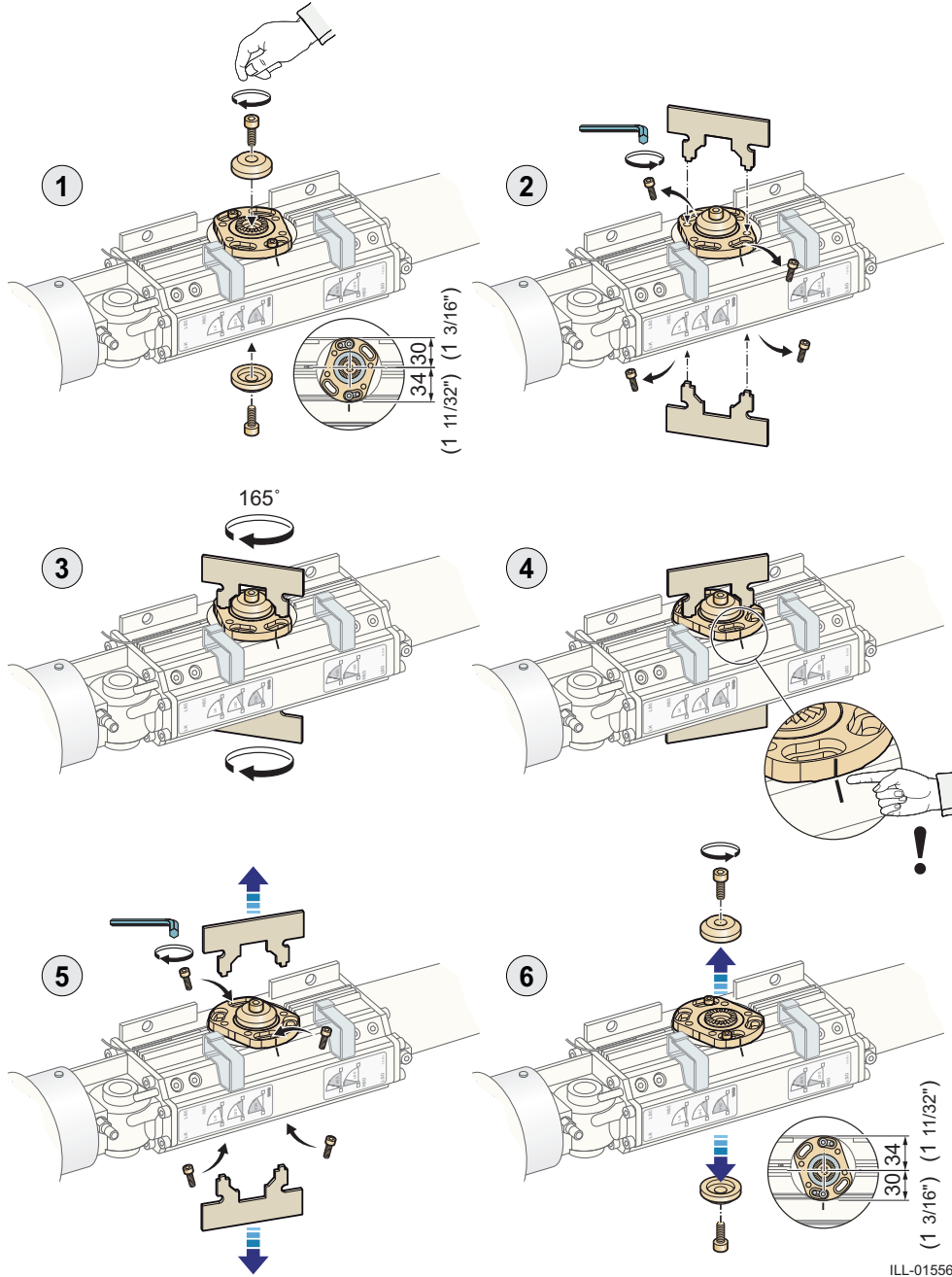


- CL1 Pivot or butt hinges
- CL2 Operator drive shaft
- 1 Cable inlet at end plate
- 2 Door mounting kit, Art. No. 100132, optional
- 3 Reinforcements required in door leaf and at the fixing holes

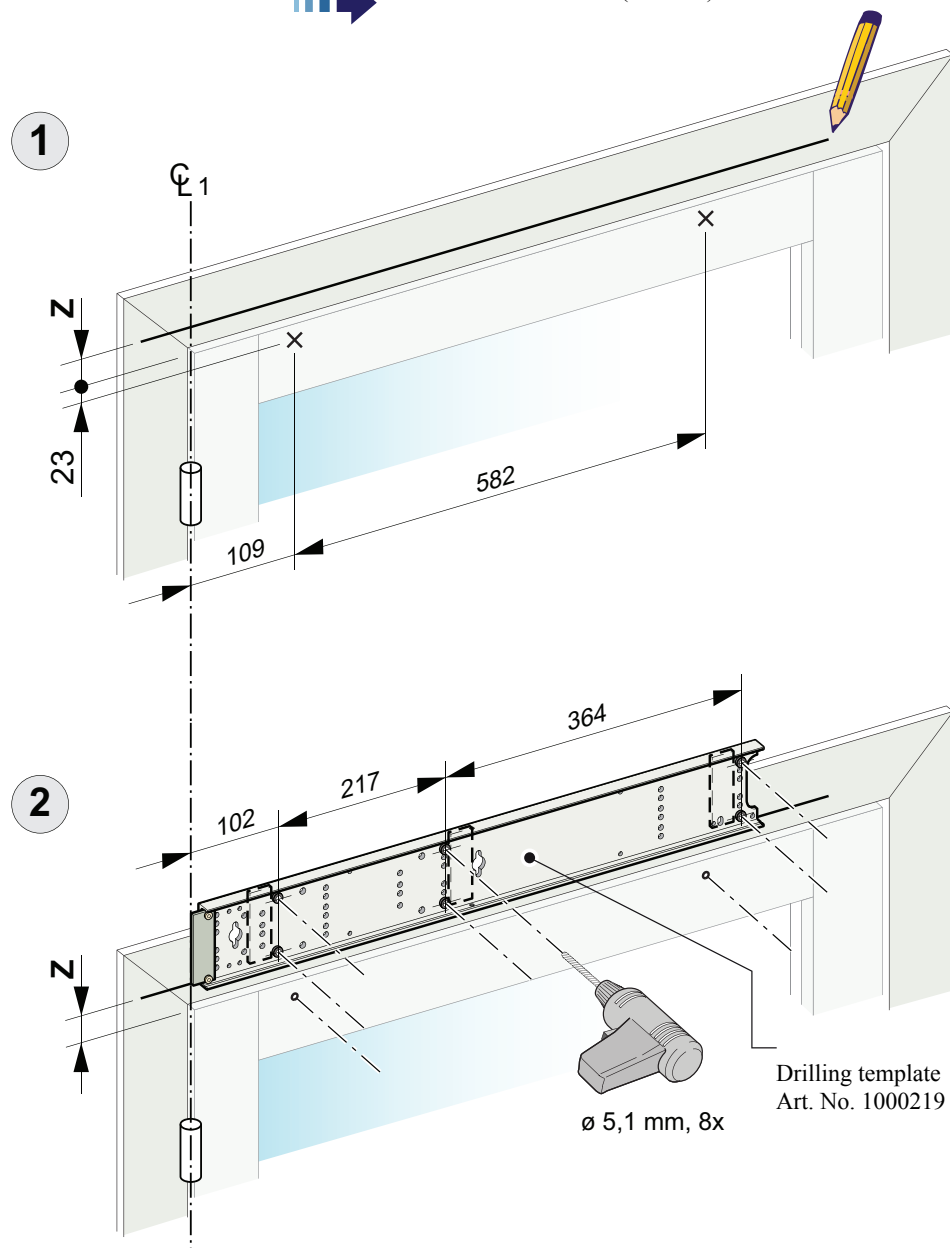
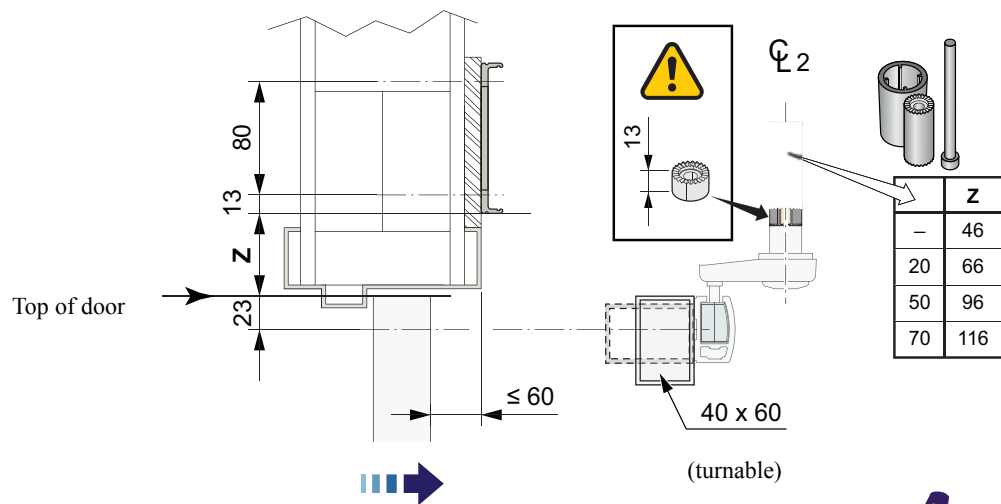
8.3 Wall mounted operator with arm system PULL, PULL-P and ST

Note! If the operator is **not** ordered for **pulling** arm system, the direction of rotation must be reversed.

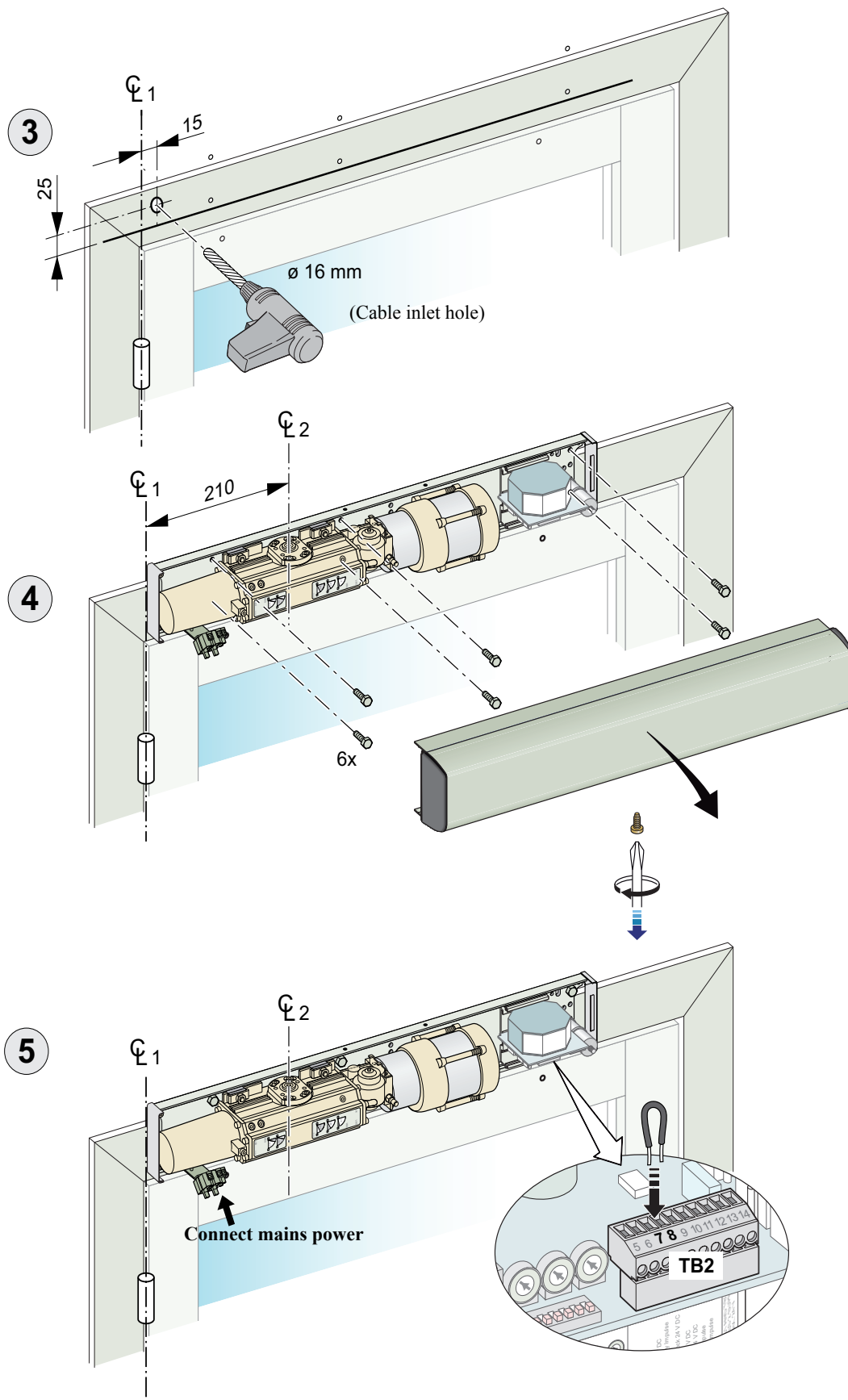
8.3.1 Changing the direction of rotation



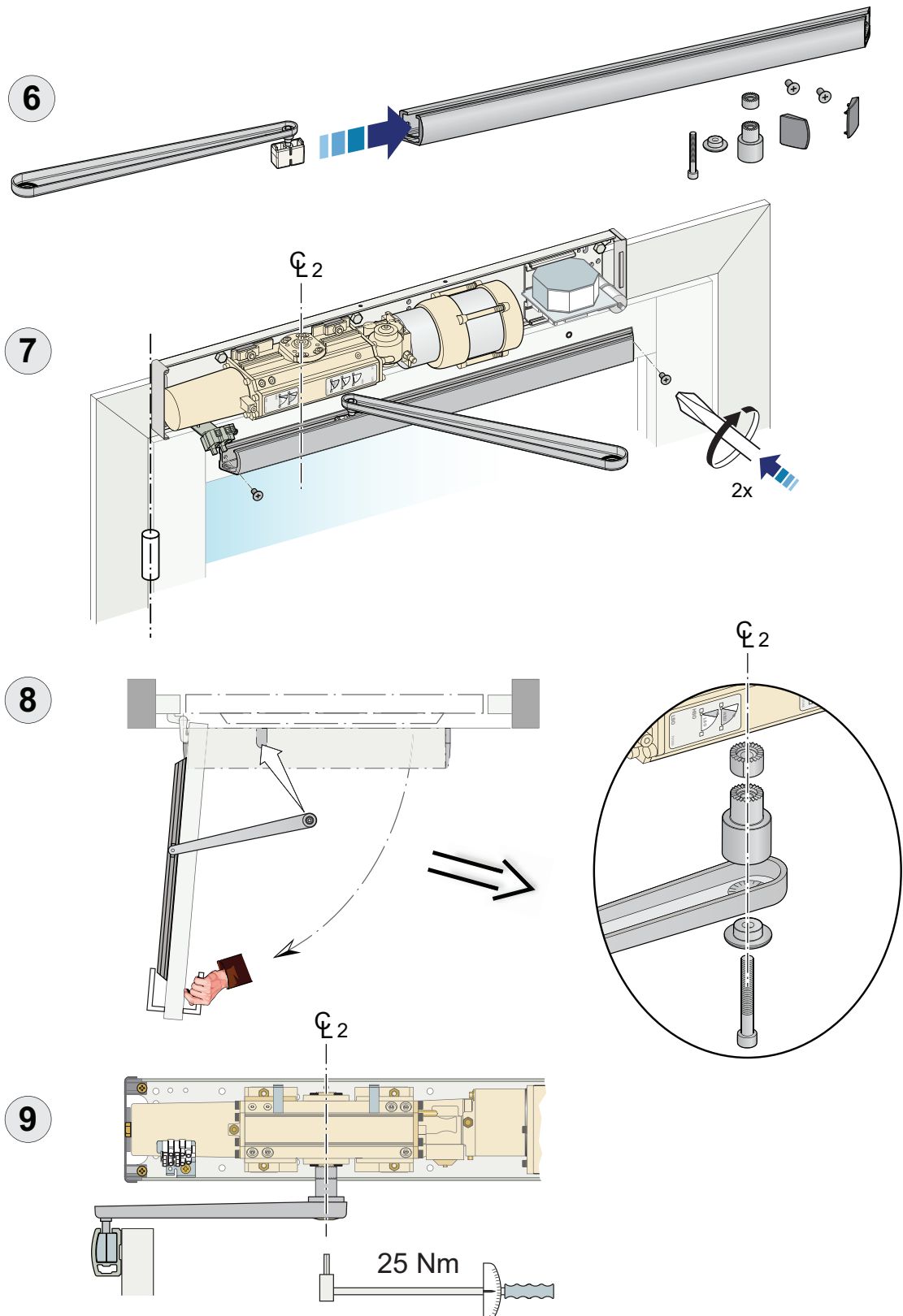
8.3.2 Installation of operator with arm system PULL



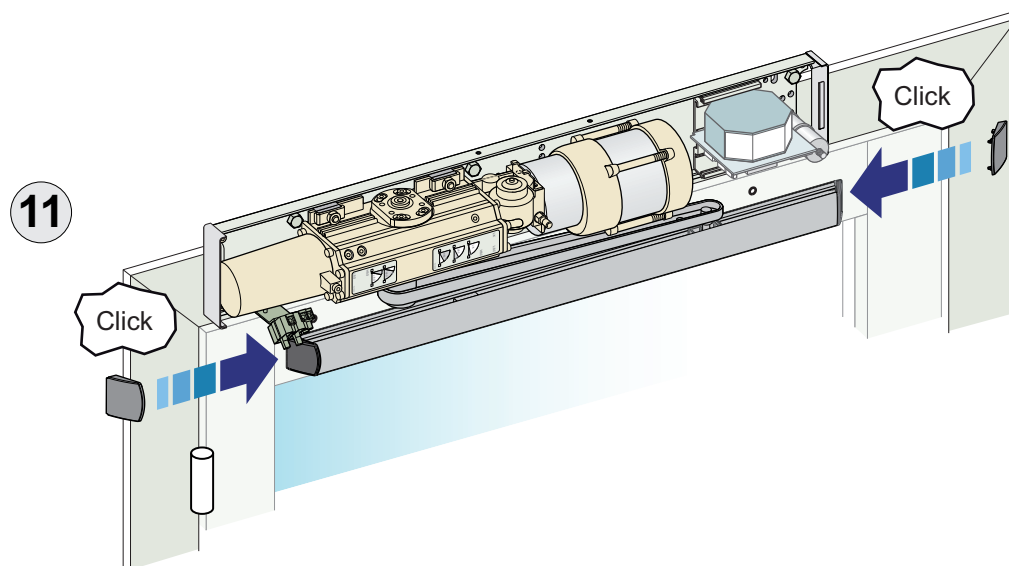
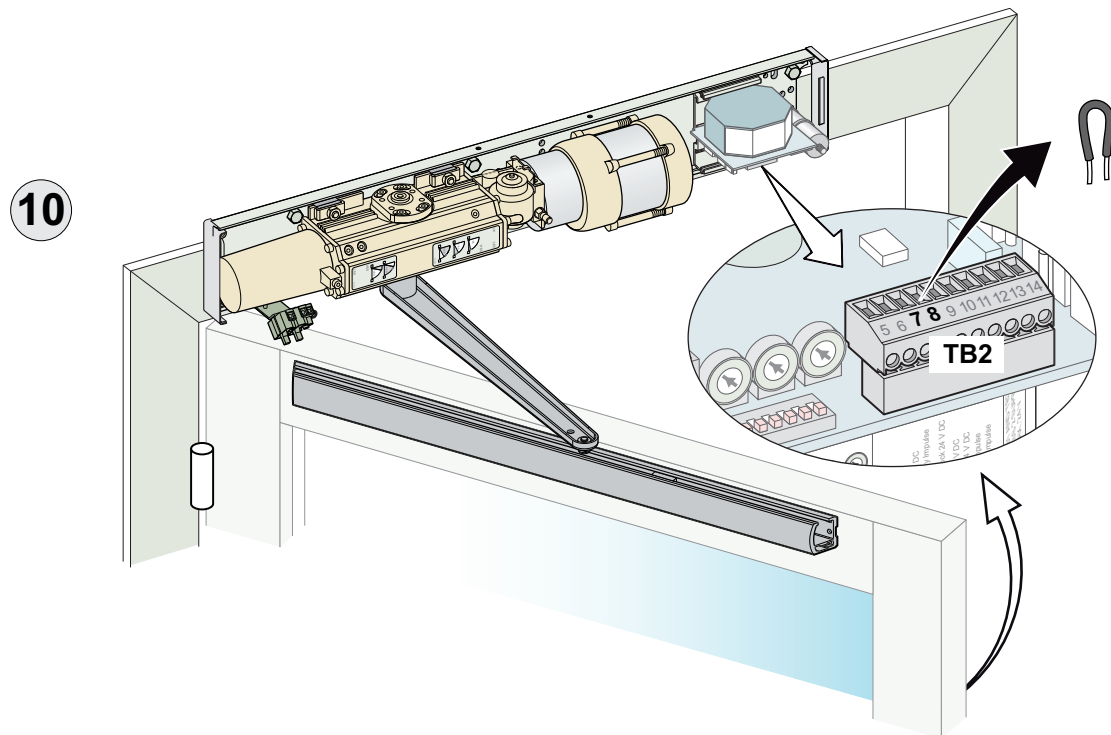
Cont. "Installation of operator with arm system PULL"



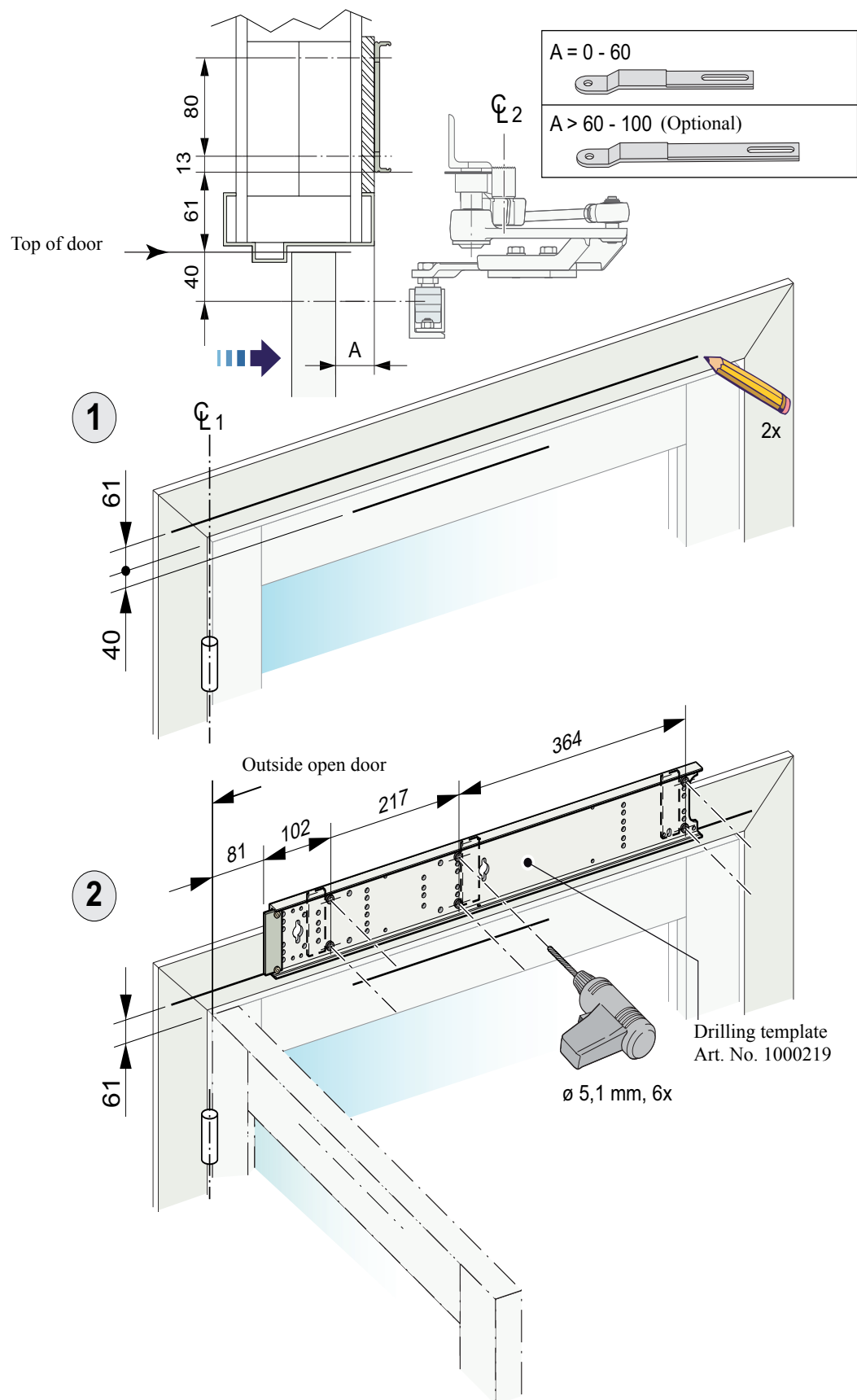
Cont. "Installation of operator with arm system PULL"



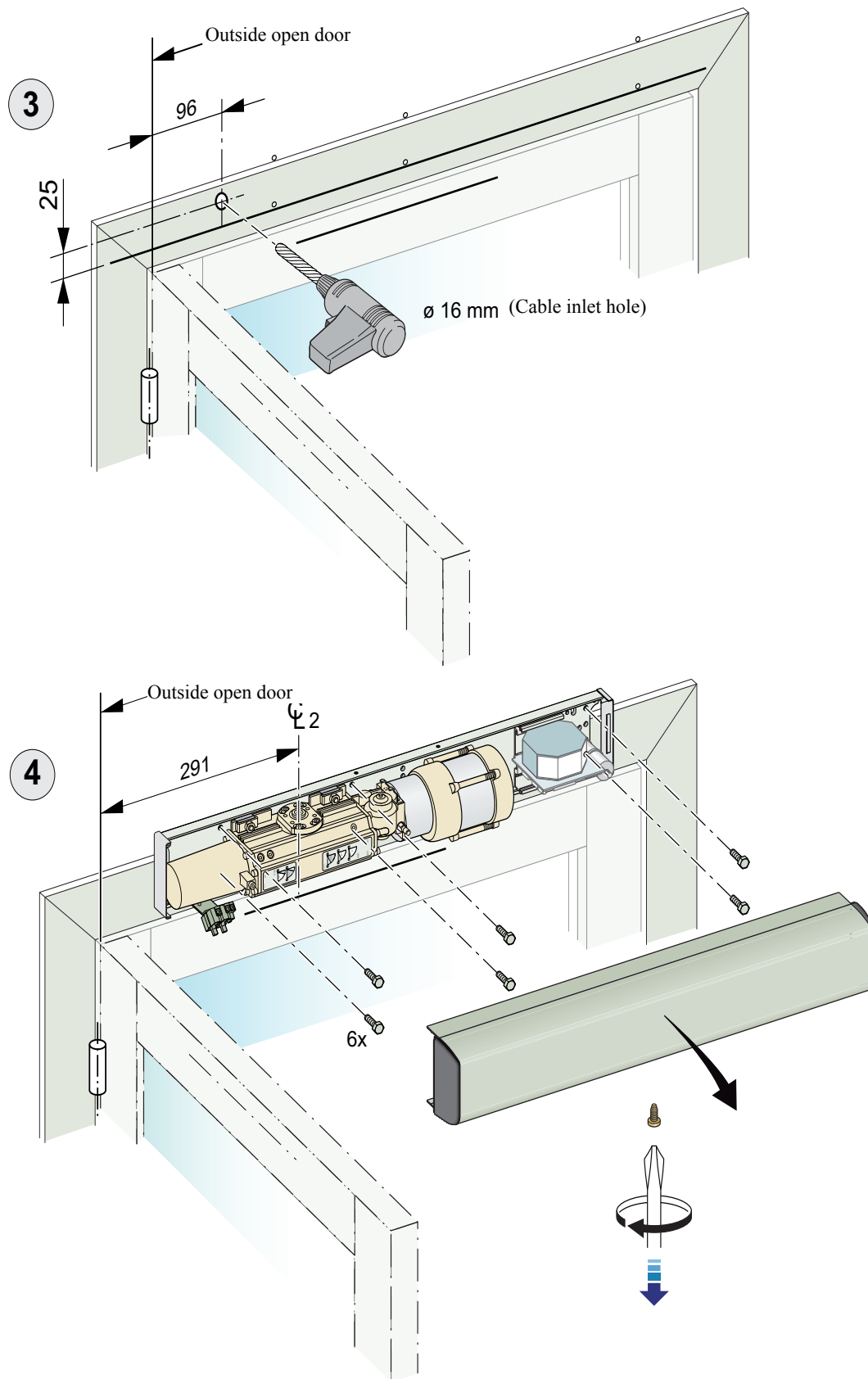
Cont. "Installation of operator with arm system PULL"



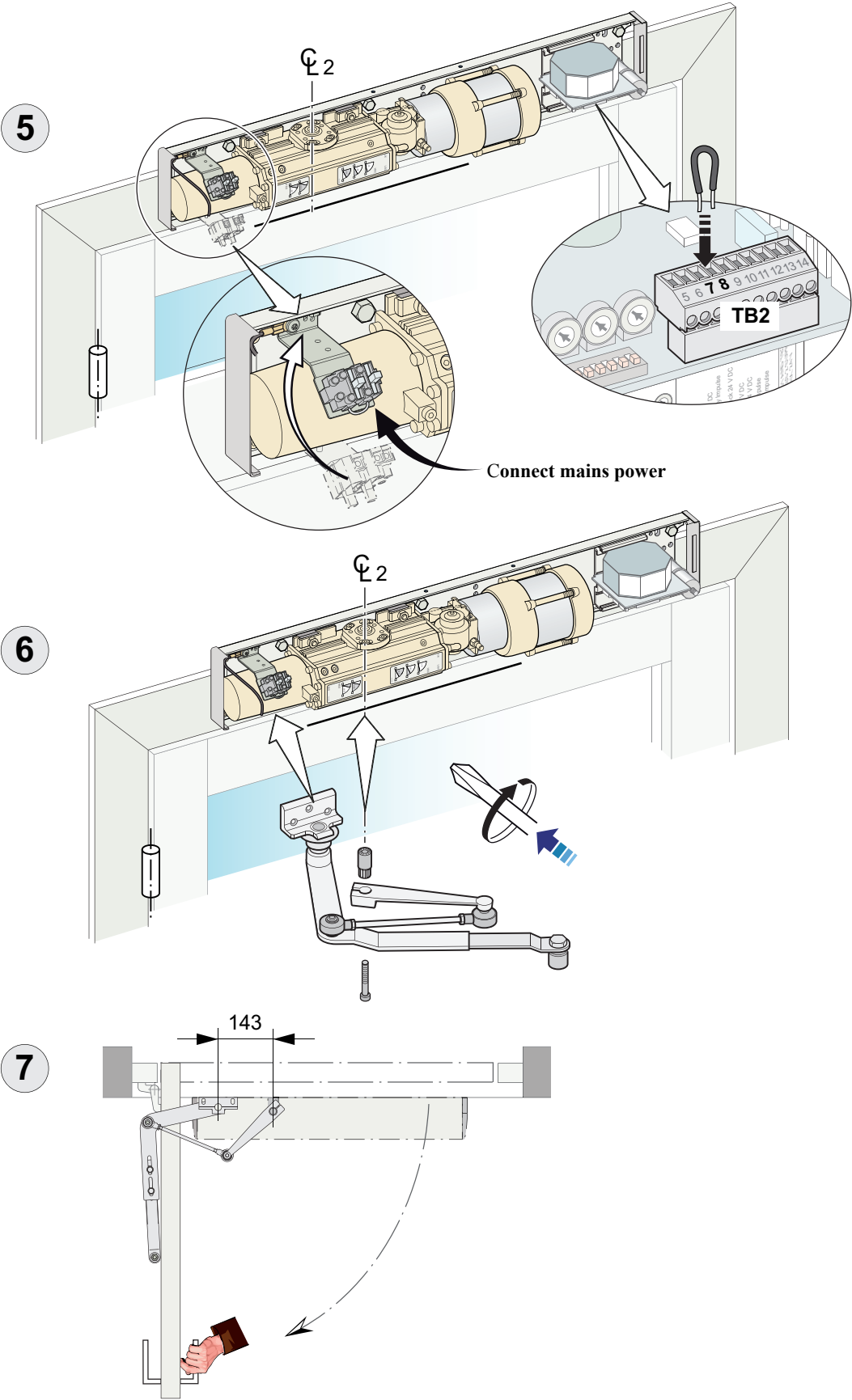
8.3.3 Installation of operator with arm system ST



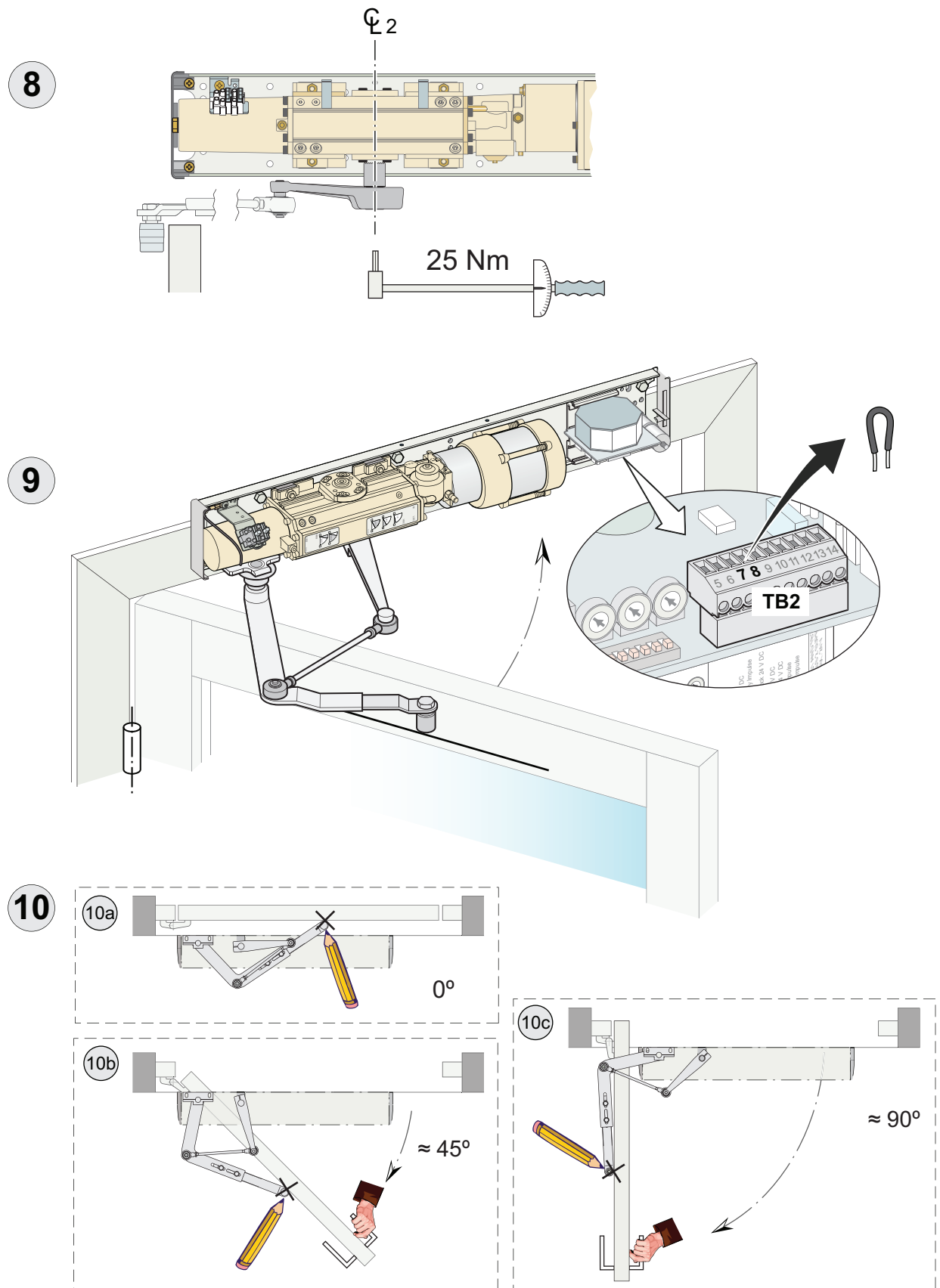
Cont. "Installation of operator with arm system ST"



Cont. “Installation of operator with arm system ST”

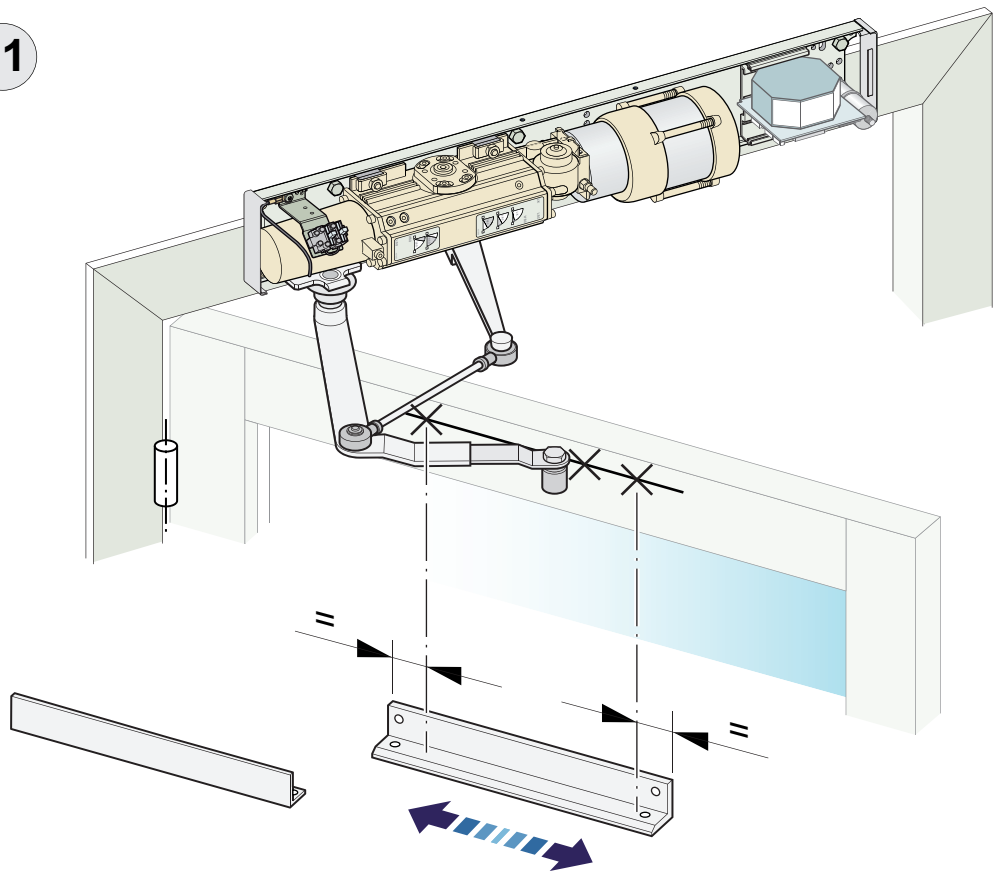


Cont. "Installation of operator with arm system ST"

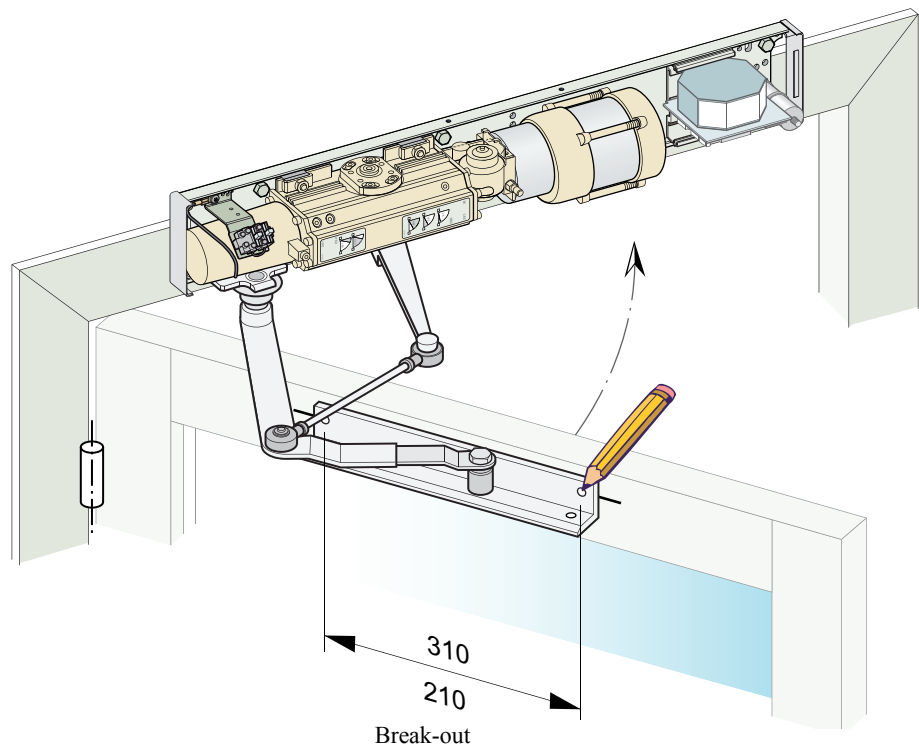


Cont. "Installation of operator with arm system ST"

11

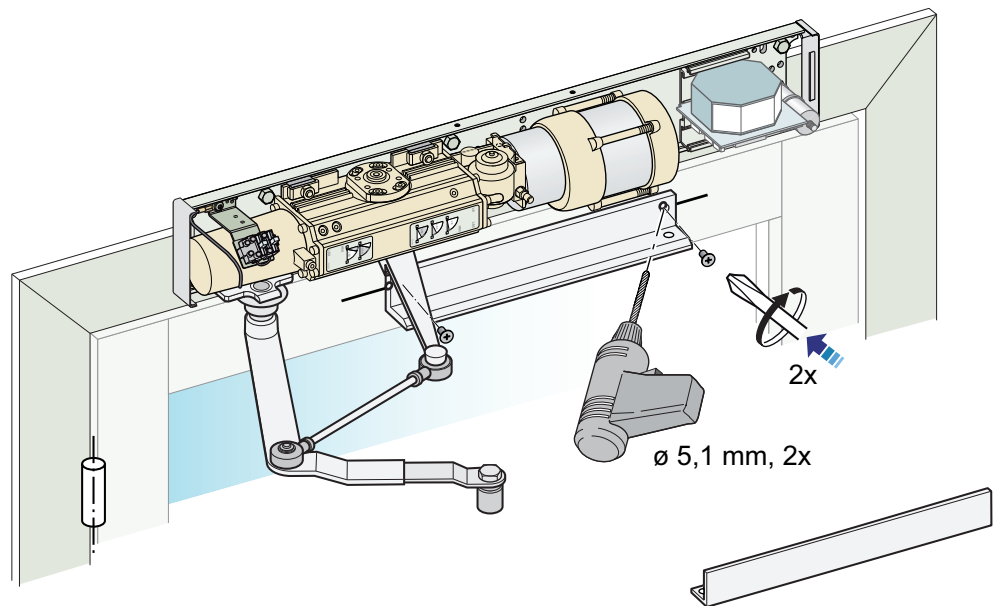


12

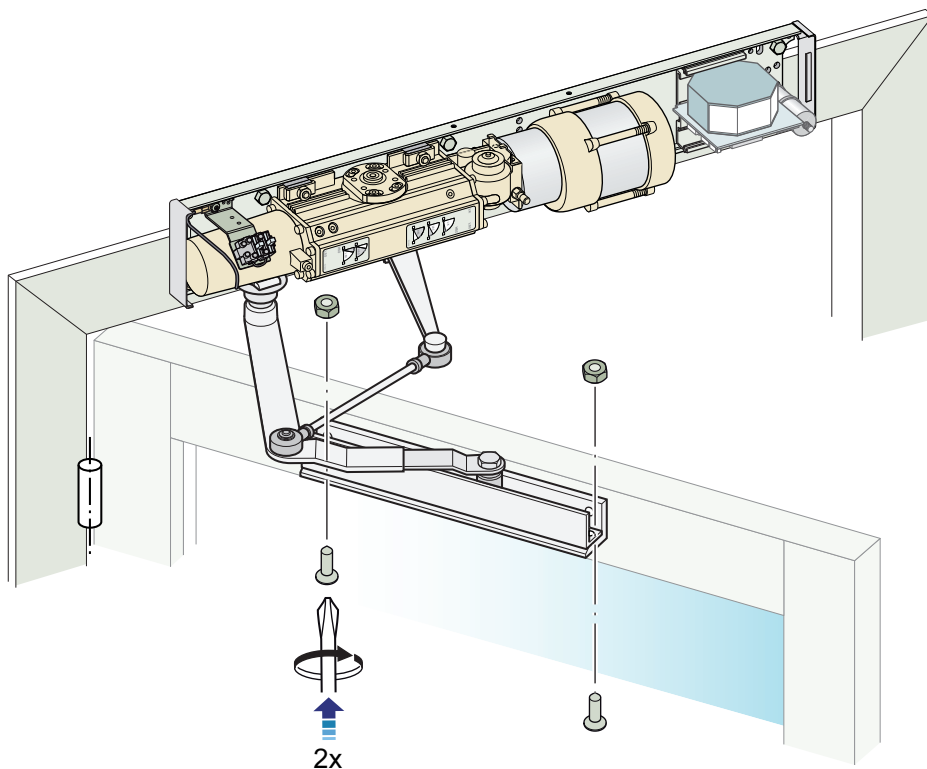


Cont. "Installation of operator with arm system ST"

13



14



9 Electrical connection

Note! During any work with the electrical connections the **mains power** must be disconnected.

9.1 Control units

The operator can be equipped with different control units adapted to the functions required.

9.1.1 CSDB

This basic control unit is equipped with inputs for connection of automatic and manual activation units such as radars, photocells, normal push buttons, emergency push buttons etc. Electro-mechanical striking-plate and slave control unit CSDA-S for double doors can be connected.

9.1.2 CSDA-S

This slave control unit is used together with CSDB for double doors as explained above.

9.1.3 EXB

This extension unit is mounted on top of the CSDB to extend the CSDB functions with inputs for presence impulse, presence detection, inner impulse, off and exit.

9.1.4 CSDA-F

This unit is, together with CSDB, mainly used for fire doors. Electro-mechanical striking-plate 24 V AC can be connected.

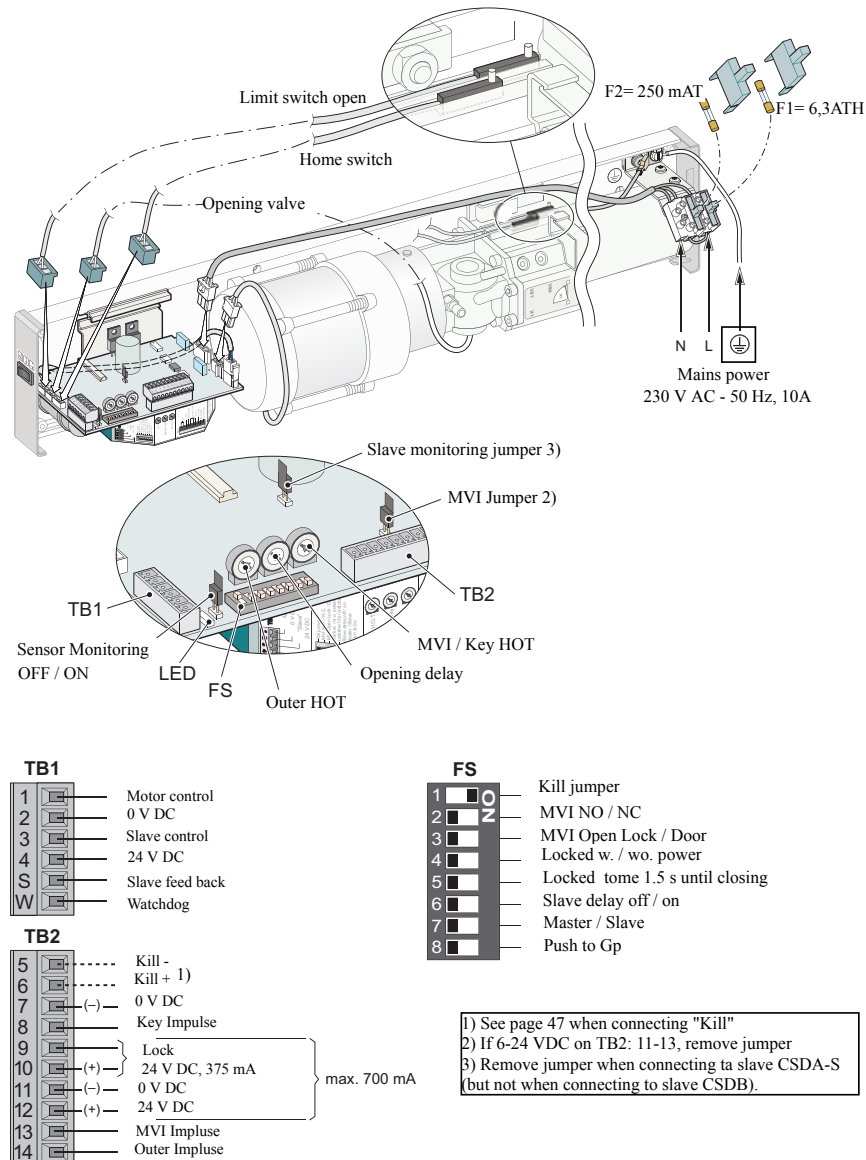
9.2 Connection of control unit CSDB – single doors

Connect the mains power to the mains terminal block.

Note! Accessories and activation units must **not** be connected until the adjustment of speeds etc. has been carried out.

Note! It is important that the high and low voltage cables are well separated and fixed. The high voltage cables must be routed and fixed on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be

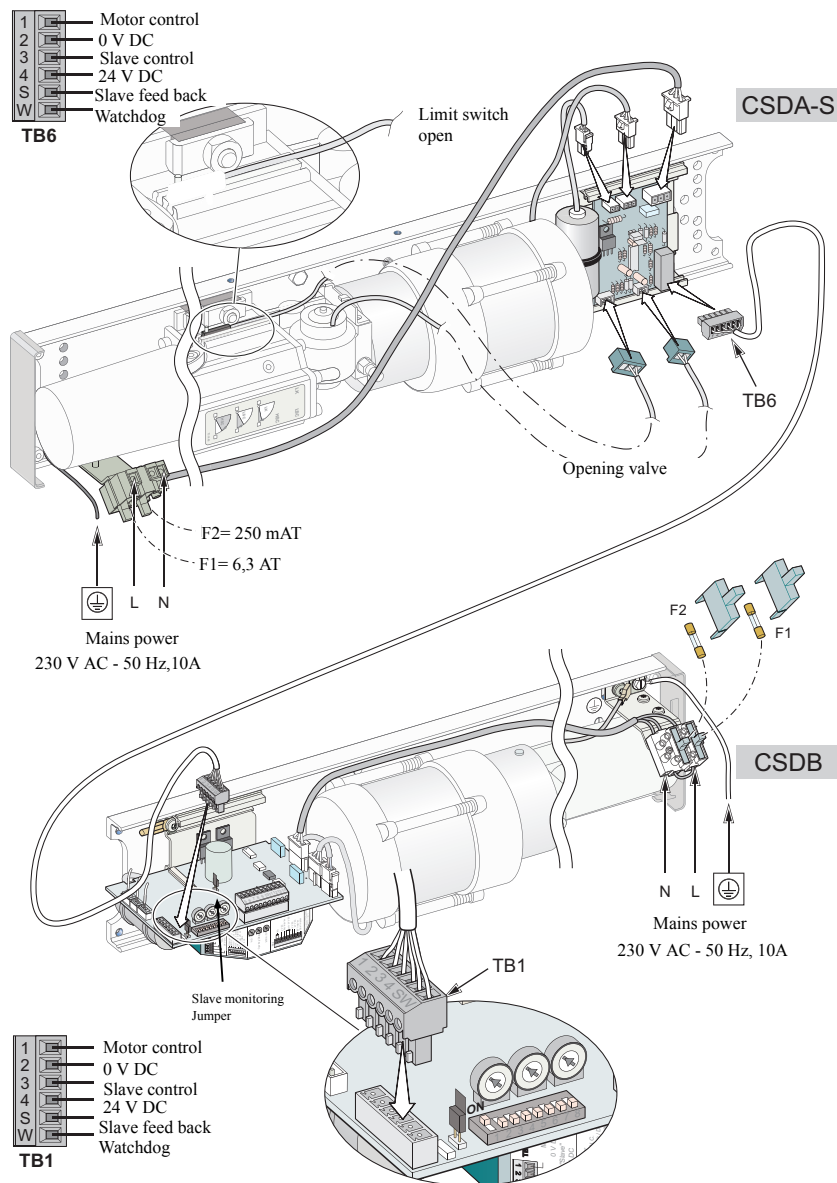
routed on the opposite side using the same type of cable holders.



9.3 Connection of control units CSDB and CSDA-S – double doors

For double door operators, both operators have to be connected to the mains. A four-pole cable (enclosed) has to be connected between TB1 on the CSDB and TB6 on the CSDA-S.

Note! It is important that the high and low voltage cables are well separated and fixed. The high voltage cables must be routed and fixed on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be routed on the opposite side using the same type of cable holders.



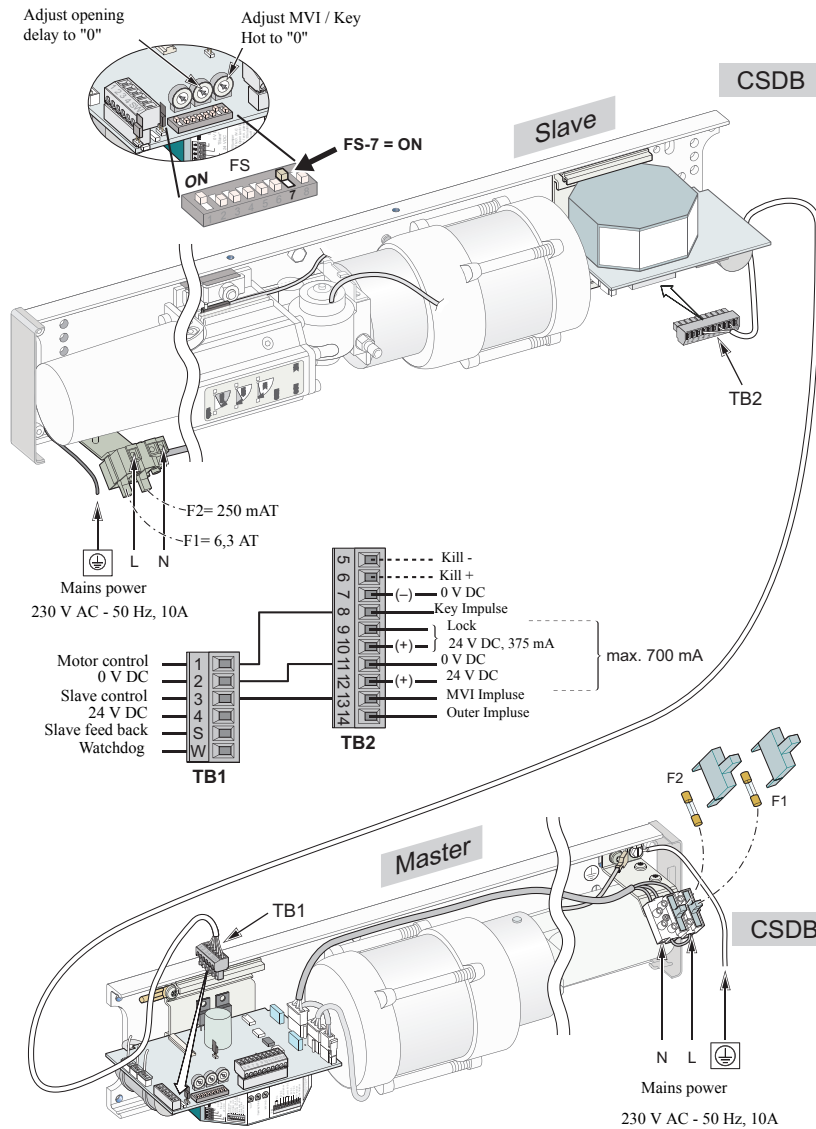
Remove jumper when connecting to slave CSDA-S

9.4 Connection of control units CSDB/CSDB – double doors

For double door operators both operators have to be connected to the mains. A three-pole cable (not enclosed) has to be connected between TB1 on the CSDB (master) and TB2 on the CSDB (slave).

Note! It is important that the high and low voltage cables are well separated and fixed. The high voltage cables must be routed and fixed on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be routed on the opposite side using the same type of cable holders.

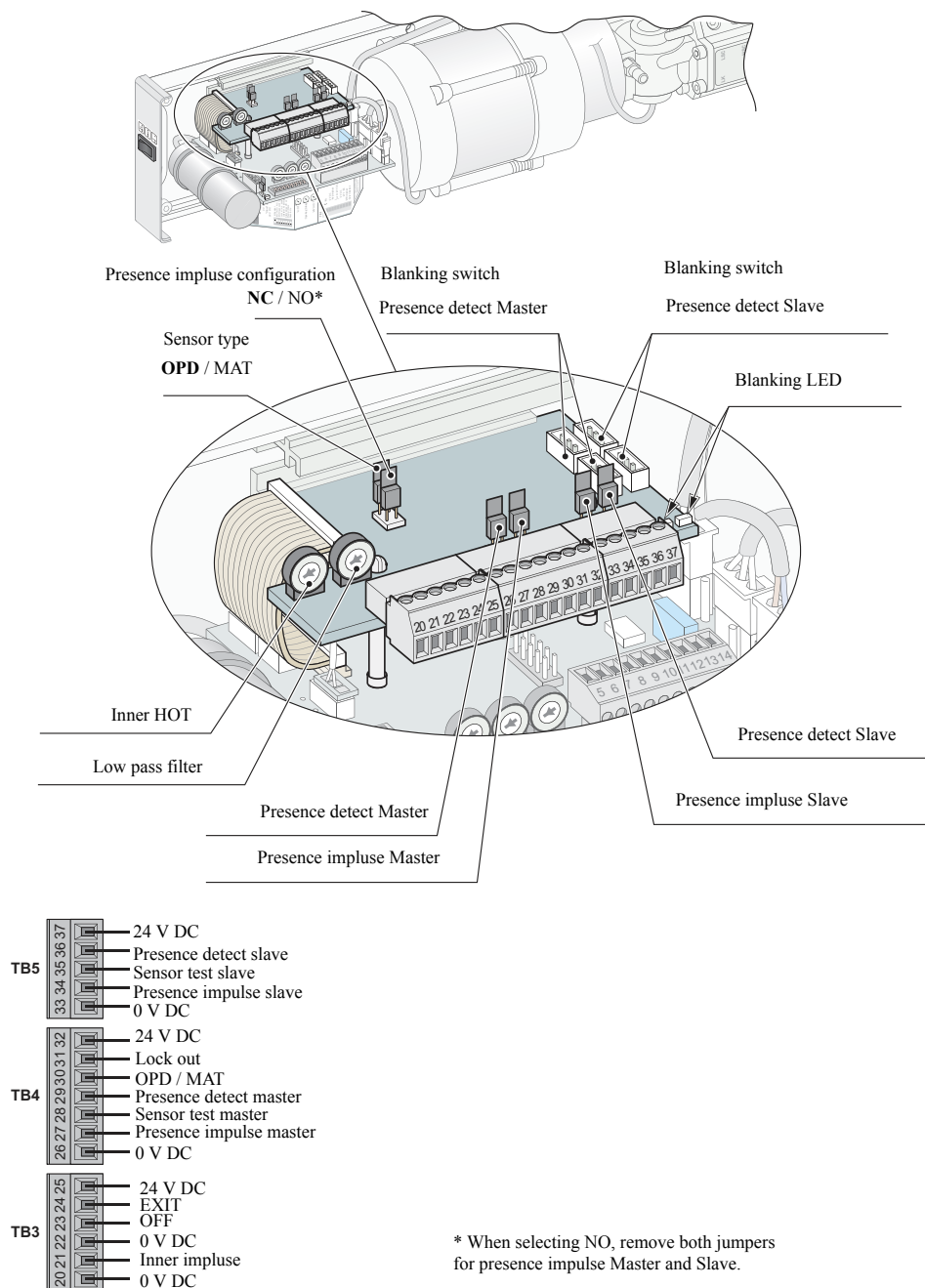
Door mounted sensors must be connected to it's own master and slave CSDB/EXB.



9.5 Connection of extension unit EXB – option

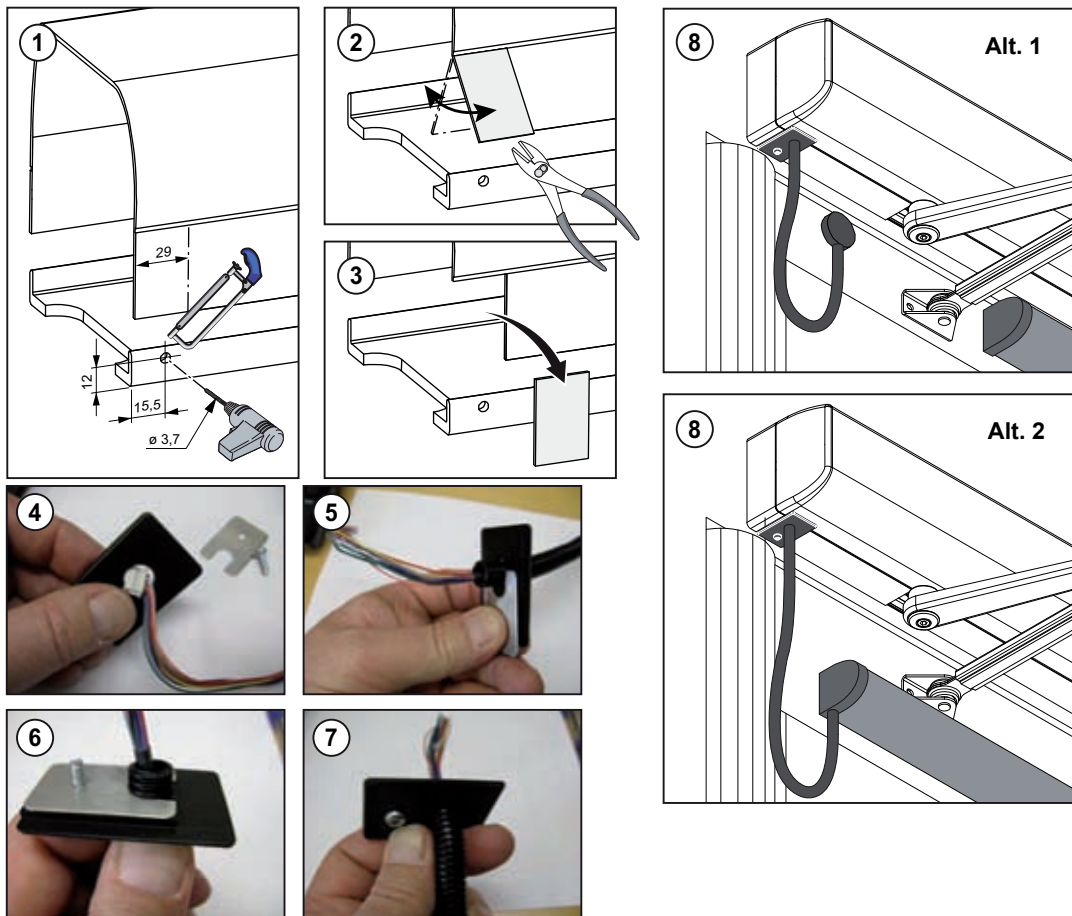
The extension unit EXB is to be installed on top of the CSDB.

- a Connect the flat cable on the EXB to the CSDB.
- b Snap on the EXB to the CSDB.



Note! It is important that the high and low voltage cables are well separated and fixed. The high voltage cables must be routed and fixed on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be routed on the opposite side using the same type of cable holders.

9.6 Sensor cable inlet



10 Start-Up

Adjust the operator to have maximum 25% duty cycle, which means motor run time.

Give a short opening impulse by strapping the impulse input and adjust if necessary as follows. See also illustration under Closing torque.

- a Set the hold open time with the potentiometer on the control unit.
- b Adjustment of the **opening speed**.
 - Adapt the high speed opening HSO, to the existing traffic situation. Turning clockwise decreases the speed.
 - The low speed opening LSO, needs to be adjusted only if the door is extremely heavy. Turning clockwise decreases the speed.

Note! If it is hard to obtain an even and smooth braking, the opening torque (pump pressure) must be reduced.

- c Adjustment of the **closing speed**.
 - Adjust the low speed closing LSC as low as the traffic situation allows. Turning clockwise decreases the speed.
 - If a higher closing speed is required, open the high speed closing valve HSC (closed from factory).

Note! If the installation requires adjustment of the closing torque follow the instructions on “Closing torque” on page 45.

- d Fine-adjust the **opening angle** by means of the **limit switch**. The limit switch is slid into a groove in the hydraulic unit and tightened with a lock screw. By moving the limit switch sideways, the opening angle is changed.

Note! To make the adjustment easier, the limit switch can be moved to the underside of the hydraulic unit. Any of the grooves at the motor side of the outgoing shaft can be used.

- e If an electromechanical striking plate is installed, an additional “**lock-kick**” can be obtained during the last 5° of the closing cycle by adjusting the screw LK on the hydraulic unit. This screw is normally closed. Adjust by opening the screw 90° and check the function.

Note! Opening the screw too much may delay the opening.

- f Connect the activation units.
- g Check that the installation complies with valid regulations and requirements from the authorities.
- h Special care should be taken regarding entrapment between driven parts and surrounding fixed parts.

10.1 Closing torque

To comply with authority requirements or to overcome over/under pressure the closing torque can be adjusted.

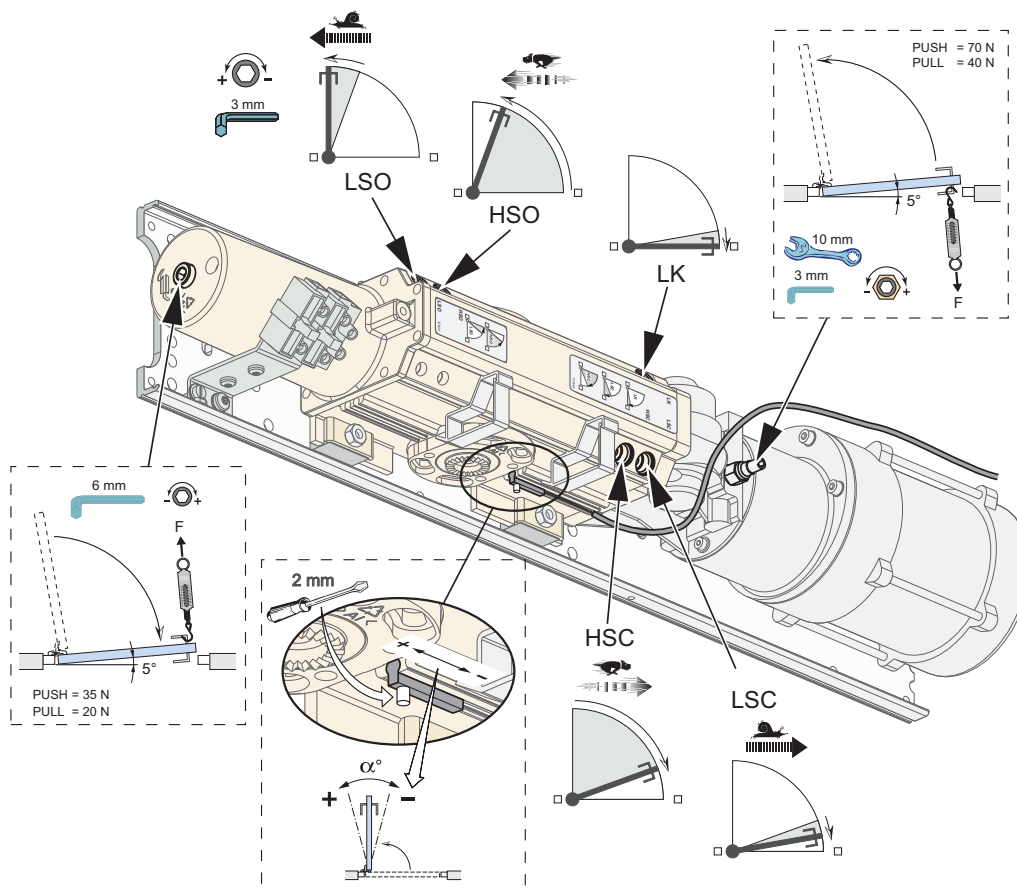
The closing torque (spring force) is adjusted by means of an Allen screw placed at the end of the spring tube. The end plate has to be dismantled. Turning the screw clockwise increases the force. One turn equals a torque change of approx. 1 Nm (28 turns from min. to max.). The door must be in open position when **extremely low** torque is adjusted.

10.2 Opening torque

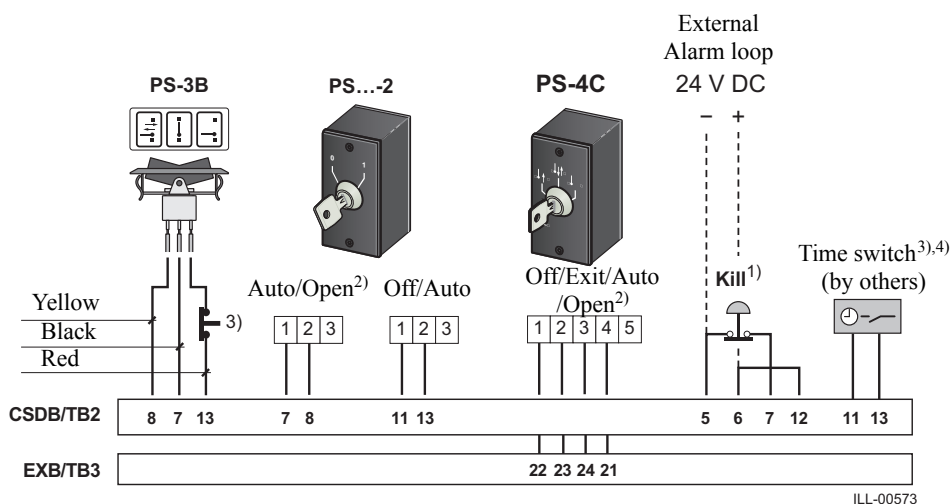
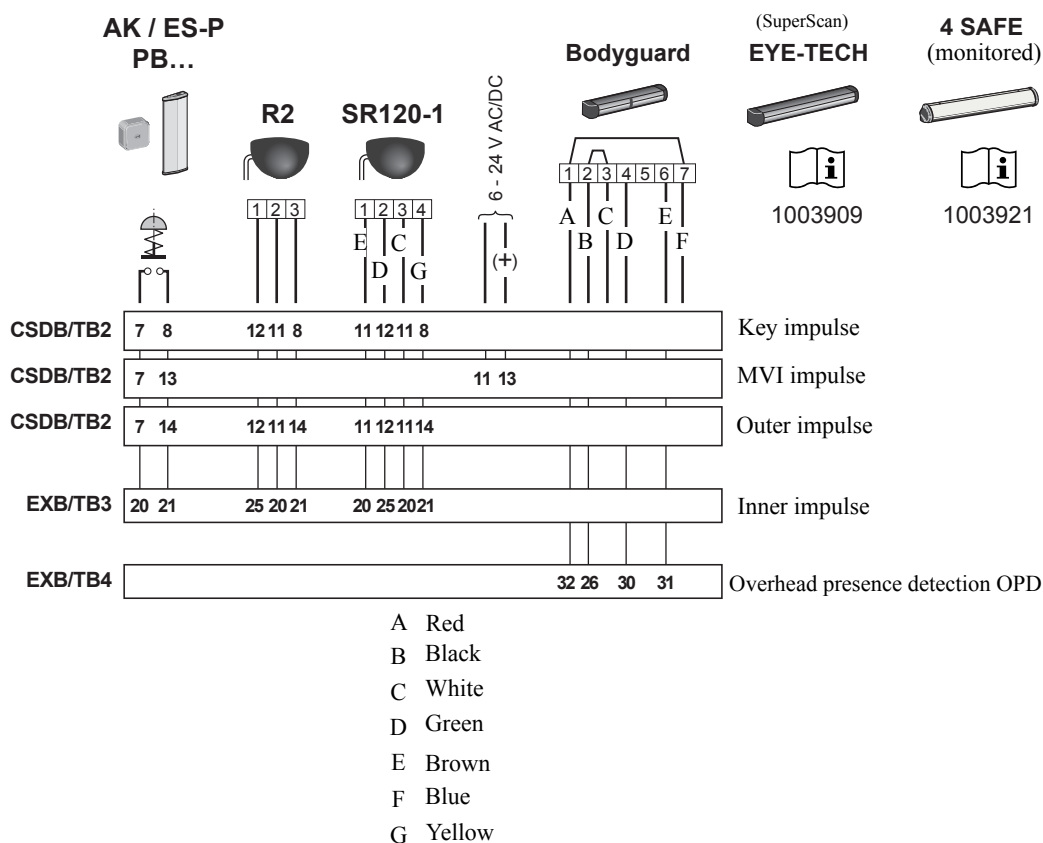
If the closing torque (spring force) has been changed, or if the door does not open to its full extent, the opening torque (pump pressure) must be adjusted as follows:

- The factory set torque for PUSH is 70 Nm and for PULL 40 Nm at a door opening angle of 0-2°.
- Measure the opening torque by using a spring balance and adjust if necessary.

The torque is adjusted by means of an Allen screw placed on the pump. Turning clockwise increases the opening torque/pump pressure. One turn equals a torque change of approx. 30 Nm.



10.3 Connection of activation units and accessories



1) Set FS-1 to OFF, when connecting "Kill"

2) Set FS-2 to ON

3) If PS-3B and "Time switch", connect "Time Switch" in serial to TB2:13

4) Switching is dependent on Key HOT

11 Cover

The cover and mounting plate are manufactured in clear anodized aluminium. The end plates are made of a black self-extinguishing plastic material.

11.1 Fitting and removing the cover

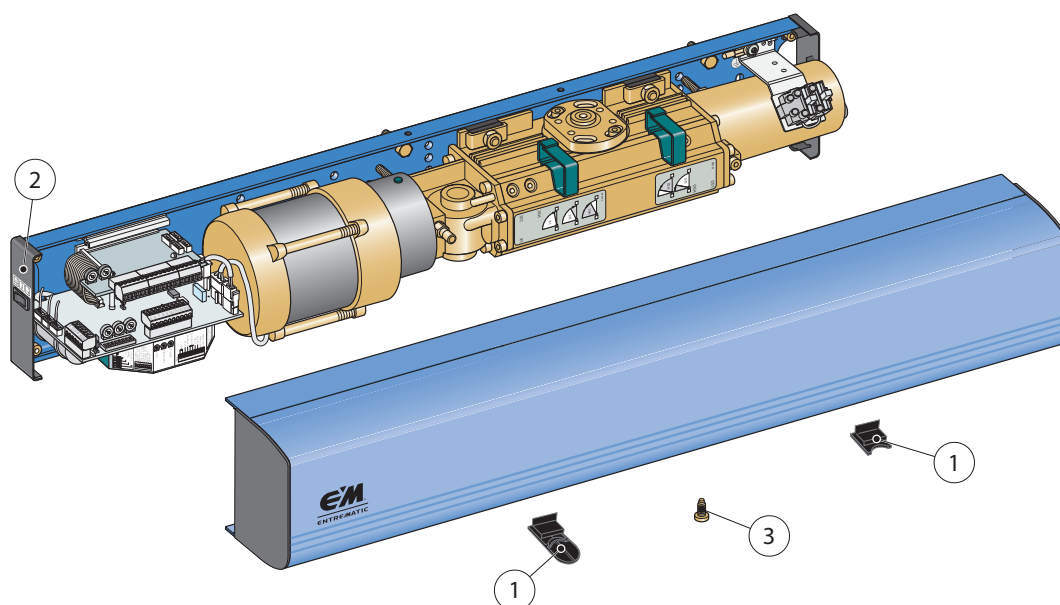


Break off and snap on the fill cover into the mounting plate for output shaft. Snap on the other fill cover for the second slot.

The cover is slid over flanges in the end plates and fixed to the underside of the mounting plate with one screw for earth connection.

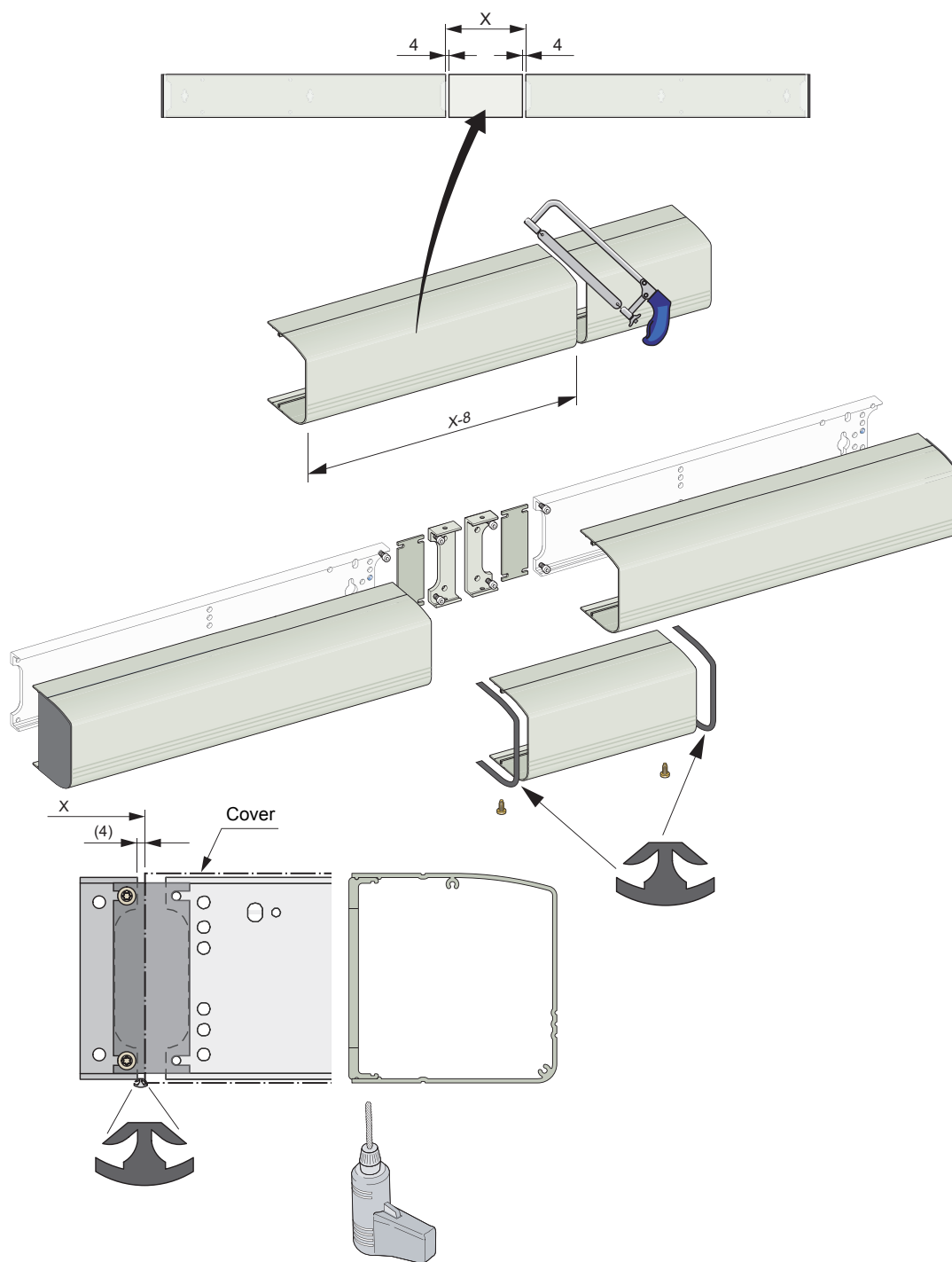
Stick the Entrematic logotype to the cover – see below.

If properly installed and adjusted, attach the product label, which includes the CE mark.



- 1 Fill cover (2 pcs)
- 2 End plate
- 3 Earth/Fastening screw

11.2 Middle piece cover



12 Signage



Action		If problem occurs
Check that all required signage is applied and intact. Mandatory indicates that the signage is required by European directives and equivalent national legislation outside the European Union.		
(A)	Product label: Mandatory	
(B)	Emergency break-out: Mandatory, if approved for escape route.	
(C)	Entrematic door sticker: Mandatory, if applicable to highlight the presence of the glass (applied to all glass sections that are moving).	
(D)	Supervision of child: Mandatory, if applicable (applied to both sides of the door). To be placed on entrances where the risk analysis shows use by children, elderly and disabled.	
(E)	Operator designed for disabled people: Recommended, if applicable (applied to both sides of the door)	
(F)	Activation by disabled people: Recommended, if applicable	

13 Installation on fire doors

- The Entrematic EMSW is approved in accordance with DIN 18263-4 for use on fire doors. The approval covers compliance with EN1154 Table 1, sizes 3-6, for use on fire doors with controlled door closing. For size 3 max door leaf weight is 60 kg and max door leaf width is 950 mm. For size 6 max door leaf weight is 120 kg and max door leaf width is 1400 mm.
- For rebated double doors the coordination unit COOA, which is an accessory integrated in the EMSW, can be used. The COOA is in compliance with EN1158, which guarantees for a correct closing order both after manual and automatic openings.
- The EMSW can be connected to the overriding fire alarm central and, if required, emergency push buttons for door closing can be installed locally. When the signal is broken, an opening or open door will immediately close.
- The Arm System PUSH must be used.

13.1 Control unit CSDA-F (option)

For a more advanced solution, a special control unit CSDA-F can be installed alongside the basic control unit CSDB. This unit can be used as a central for required detectors, manual push button for closing etc. It also secures that the automatic door opening function will not be restored after alarms from detectors or after manual door closing. To restore the automatic door operation each door must receive a separate restoring signal.

The connection of CSDA-F can be carried out in two ways:

- For automation of fire doors **without** overriding fire detection and alarm system.
- For automation of fire doors **with** overriding fire detection and alarm system.

Different connection examples are shown on “Automation of fire doors without overriding fire detection and alarm system” on page 54 and “Automation of fire doors with overriding fire detection and alarm system” on page 55.

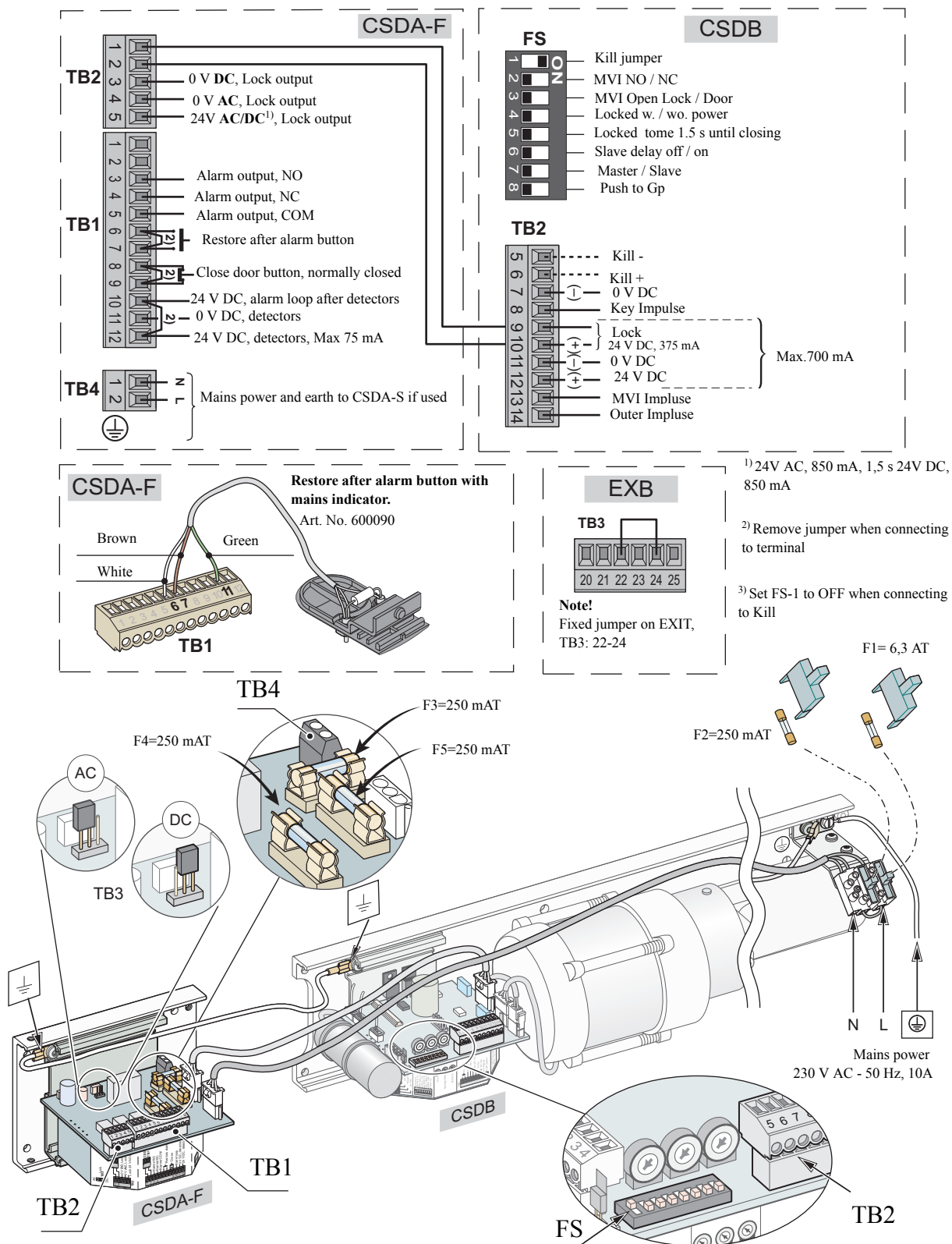
Cover length (with CSDA-F)

Single door operators L = 865-1600 mm

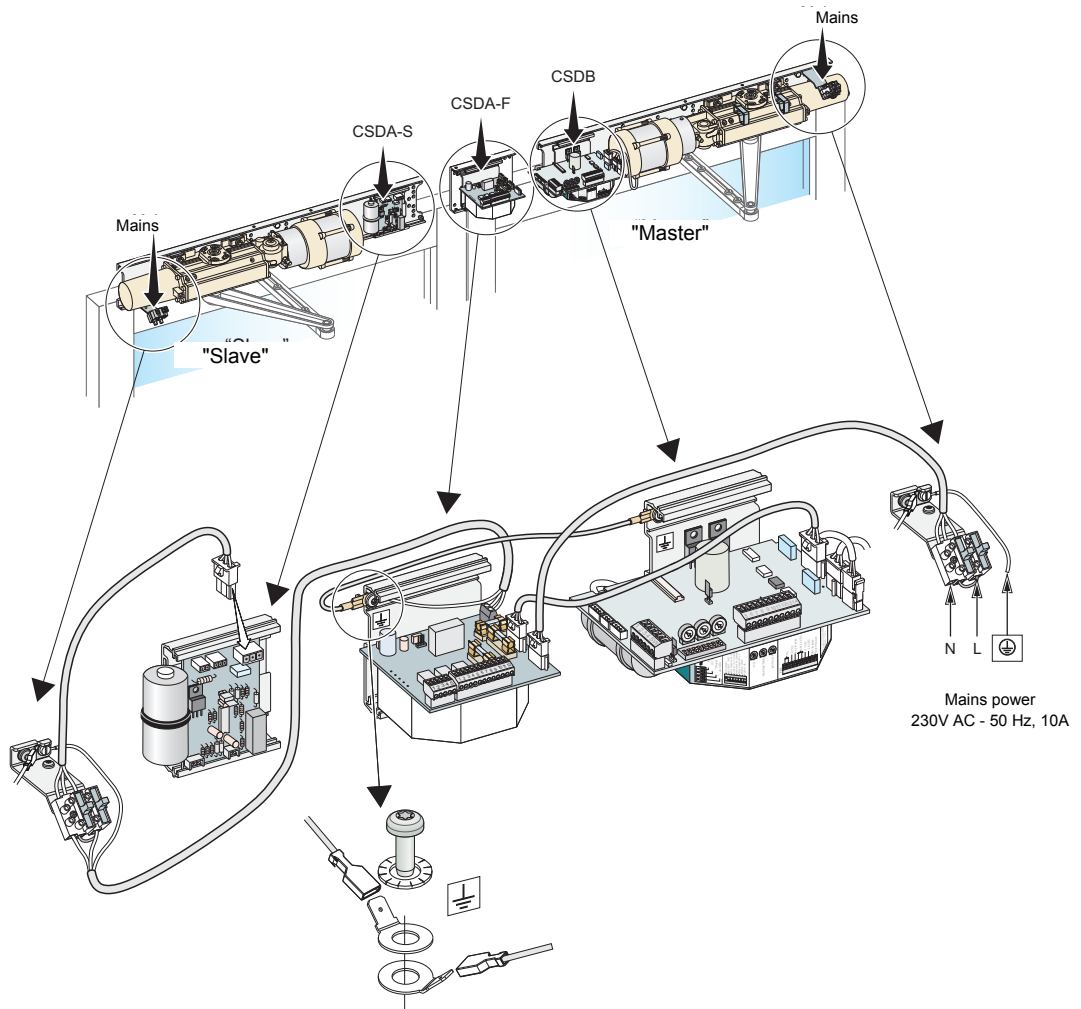
Double door operators L = 1560-3200 mm

13.1.1 Connection of control unit CSDA-F – single door

Note! It is important that the high and low voltage cables are well separated and fixed. The high voltage cables must be routed and fixed on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be routed on the opposite side using the same type of cable holders.



13.1.2 Connection of control unit CSDA-F – double door



13.1.3 Function check

Check that the systems works:

- Connect the mains.
- Give a reset on "Restore after alarm button".
- Give impuls on terminal 7-8 on CSDB.
- Cut the jumper terminal 10-12 on CSDA-F during the opeing cycle.

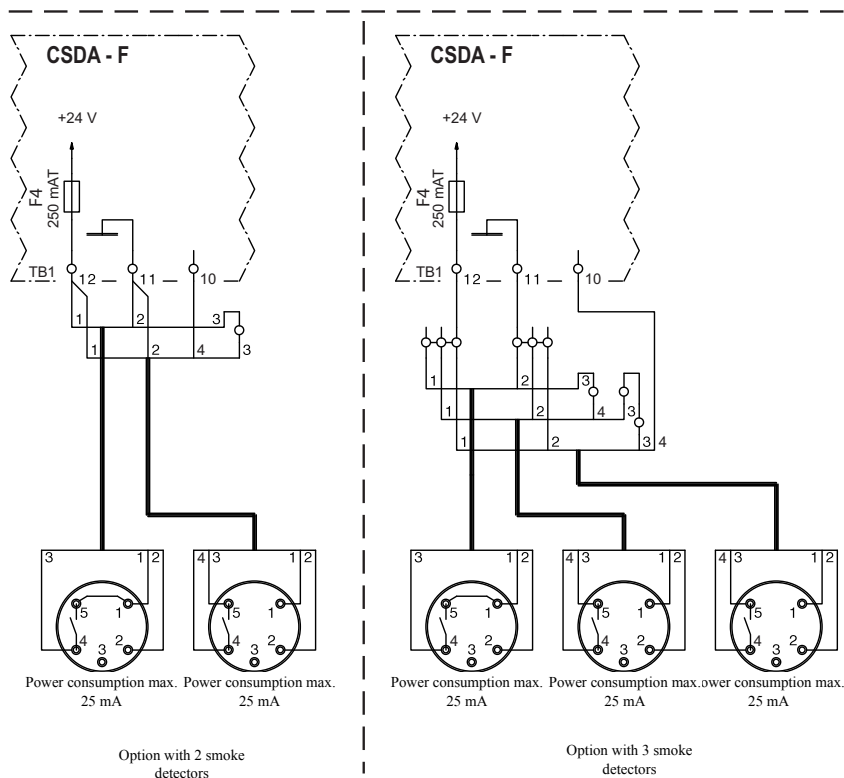
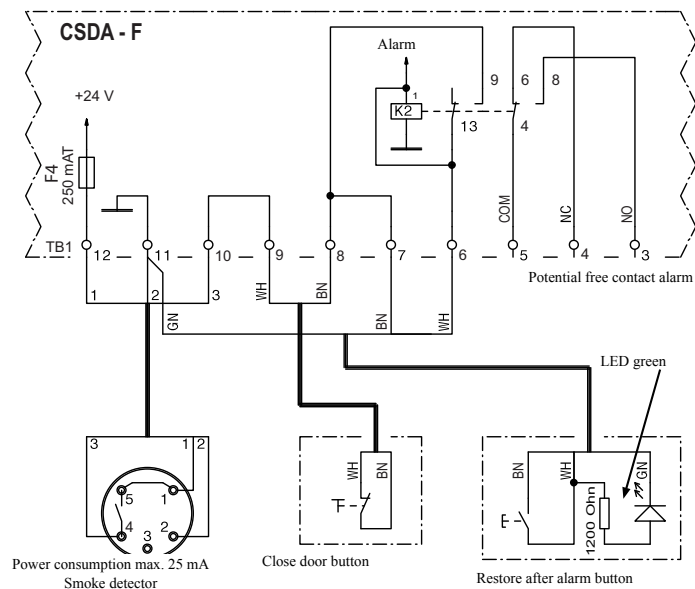
Make sure that opening cycle is interrupted and that the door closes.

- Give a new opening impulse - the operator shall not open.
- Connect the jumper (or the alarm loop) between terminal 10-12.
- Give a reset on "Restore after alarm button".
- Give a new impulse and the door shall make a new open/close cycle.

13.2 Automation of fire doors without overriding fire detection and alarm system

13.2.1 General connection

For this type of installation the required fire detectors are direct-connected to the CSDA-F.

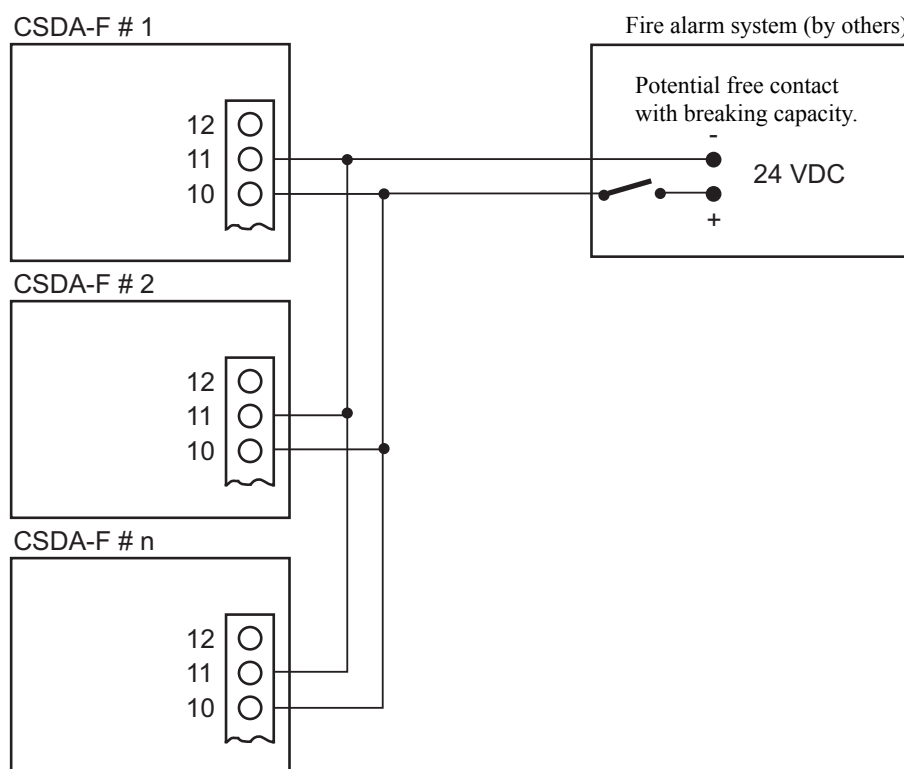


13.3 Automation of fire doors with overriding fire detection and alarm system

This connection is only possible if the fire alarm system has a potential free breaking contact. To make the fire doors close on an alarm, the contact must open. Required fire detectors are to be connected to the alarm system. A push button for manual door closing can be connected to each door. The number of fire doors that can be connected to the breaking contact in the alarm system depends on the breaking capacity of the contact.

The capacity of the fire alarm system power supply is calculated according to the number of CSDA-F used $\times 0,05 \text{ A}$.

13.3.1 Connection of CSDA-F to a fire alarm system



14 Installation and adjustments - Low Energy Operator

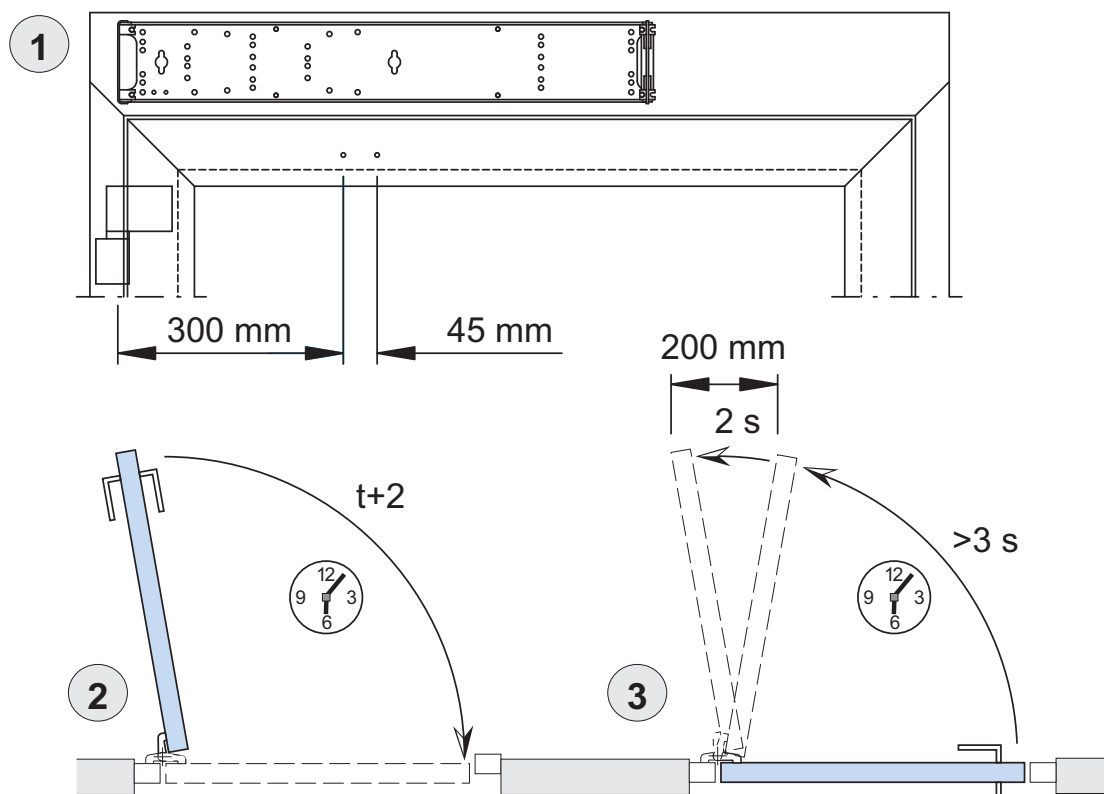
To limit entrapment force and push opening force, parameters to work with are pump pressure, opening and closing time, spring tension and the way the PUSH arm system is mounted. The PULL arm system is standard mounted.

All force measurements are made at the door handle approx. 25 mm from the leading edge.

- Install the operator as to the manual but the PUSH arm system door adaptor should be moved 50 mm further out from the hinges (illustration 1).
- Adjust the spring closing force to desired value but max 67 N. The door must be in open position when adjusting. It is only necessary to measure the force in open position where the force is highest.
- Adjust the closing time from 90-0° (illustration 2), on the LSC valve only (fully close the HSC valve). See diagram for opening and closing time.

Note! Add 2 seconds for latch check.

- Check that max manual opening force does not exceed 90 N. It is only necessary to measure the force in open position where the force is highest.
- Adjust the pump opening force to max 67 N in closed position.
- Adjust the back check (illustration 3), on the LSO valve, to 2 seconds.
- Adjust the opening time from 0-80° (approx. 200 mm from full open position, see illustration 3), on the HSO valve. See diagram for opening and closing time.
- Adjust the hold open time, on the potentiometer, to desired value but minimum 5 seconds



14.1 Complementary Safety Devices Swing Doors

If there is any risk for finger jam, add finger protection strip at the hinge side for internal doors, article No. 833334 or add finger protection roll for external doors, article No. 833333.

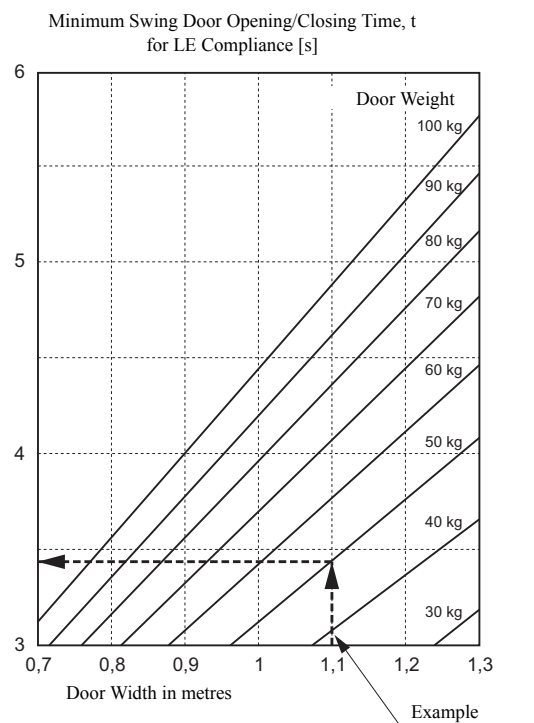
14.2 Swing Doors Opening and Closing Time

Adjust, as a minimum, the operator's opening and closing time according to the diagram below.

14.2.1 How to find the correct opening and closing time

- Measure the door width.
- If the door weight is unknown, follow the instructions in “Diagrams for door weight”.
- Go into the diagram below to find the correct minimum opening/closing time “t”.

Example: If the door width is 1.1 m and the door weight is 50 kg the minimum opening and closing time will be ~3,5 seconds.



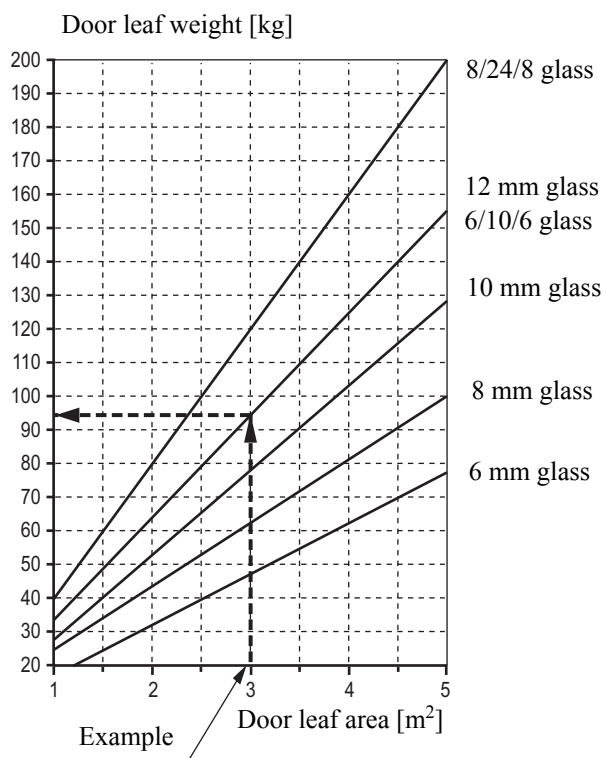
14.3 Diagrams for Door weight

- Measure the door width (DW) and the door height (DH) in metres for one door leaf only.
- Calculate the area $DW \times DH$
- Select diagram for your type of door and the actual glass thickness. Find the weight.

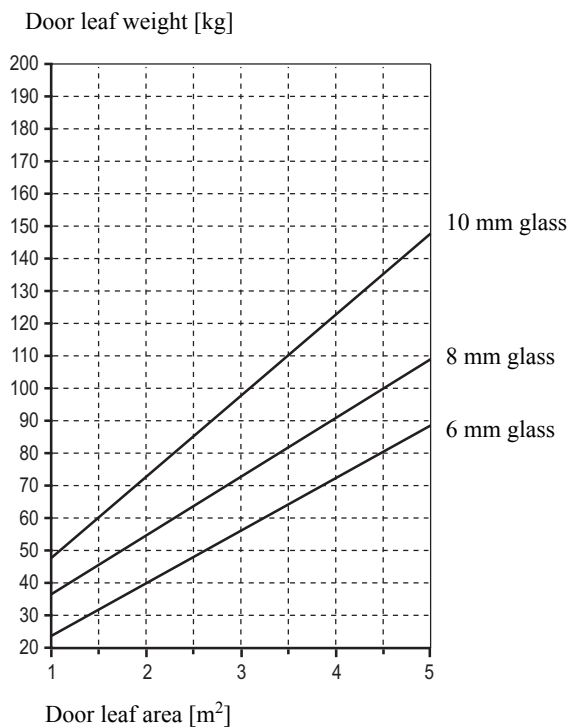
Example: Aluminium door with measurement $DW = 1.5$ m, $DH = 2$ m and glass thickness 12 mm. Calculate $1.5 \times 2 = 3$ m². Look into the first diagram for “Aluminium Frame with glass”. Start with the area and follow the line up to the 12 mm glass, go left to receive the door weight 95 kg.

Note! The weights can vary depending on the door design (the table shows only typical values).

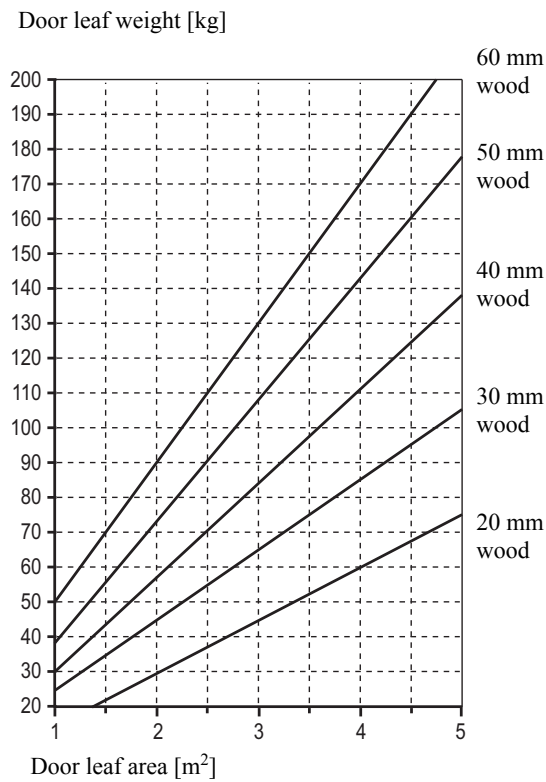
14.3.1 Aluminium frame with glass



14.3.2 Steel frame with glass



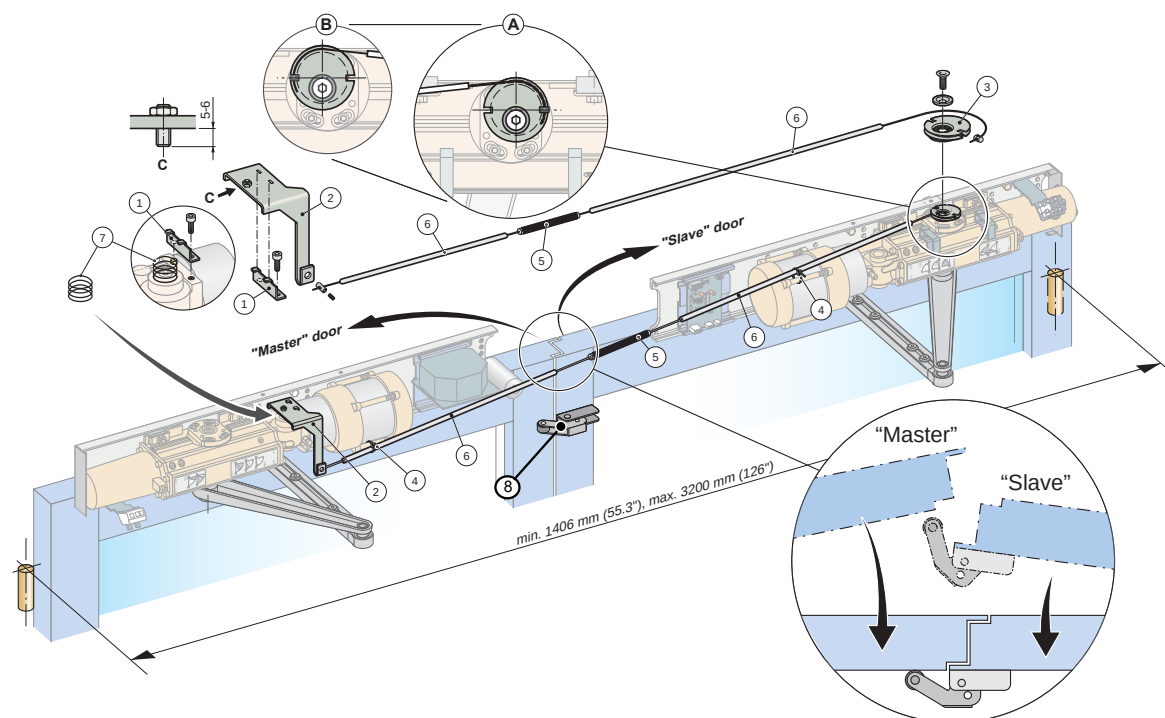
14.3.3 Solid wood



15 Installation instructions for Accessories

15.1 COOA - Coordination unit

15.1.1 EMSW 2 - Push



- | | | |
|-----------------|------------------|-----------------------------|
| 1 Hook bracket | 4 Cable strap | 7 Return spring |
| 2 Lever bracket | 5 Balance spring | 8 Follow roller (carry bar) |
| 3 Wire wheel | 6 Plastic hose | |

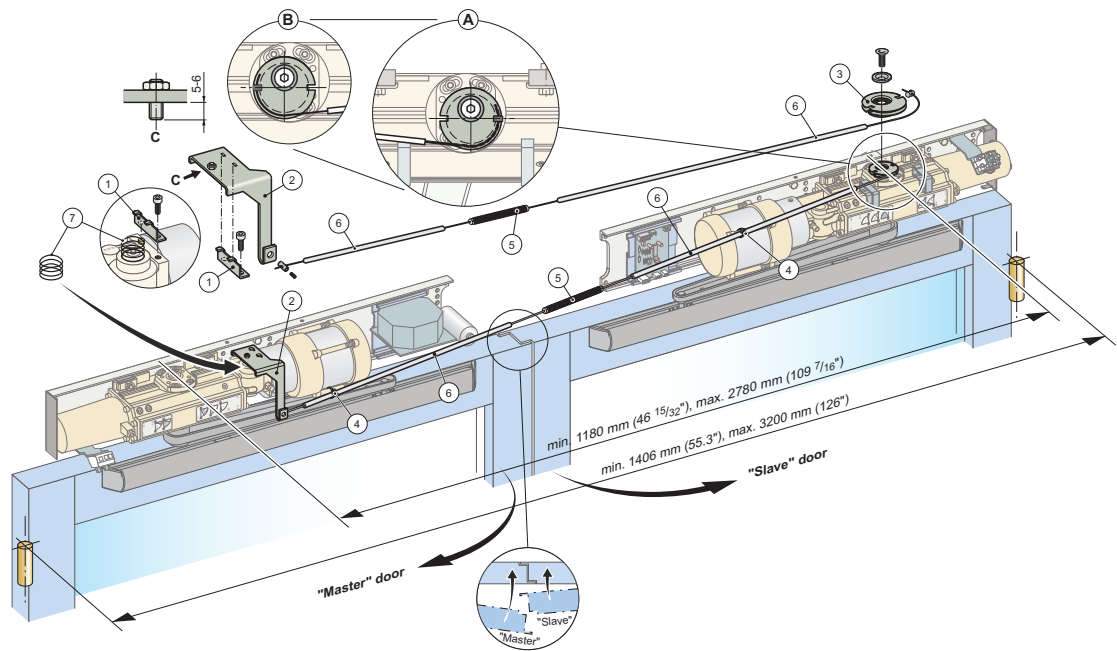
Installation of coordination unit

The brackets ① ② are to be mounted to the pump flange on the "master" door operator and the wire wheel ③ to the drive shaft on the "slave" door operator.

Note! If the "master" and "slave" doors are interchanged, the brackets are to be fitted to the underside of the pump flange.

- Fit the hook bracket ① to the pin in the pump flange and screw the bracket tight.
- Fit the lever bracket ② onto the hooks on the hook bracket ① including return spring ⑦.
- Install the wire through the plastic hoses ⑥ and fix to the motor screws with cable straps ④.
- Mount the wire wheel ③ on the "slave" door operator using screw and washer. The wheel is to be mounted in accordance with fig. A or B depending on which door being the "slave" door. Always on top of the operator.
- Close the doors and mount the wire in the lever bracket ② and in the wire wheel ③ with the spring ⑤ pre-tensioned approx. 10 mm. Open the "master" door and let it hook up. Adjust the spring tension (loosen the wire) so that the "master" door starts to close with normal speed.
- Adjust the closing time to approx. 6 seconds.
- Mount the follow roller (carry bar) ⑧ according to illustration.
- Give opening impulse and check the function.

15.1.2 EMSW 2 - Pull



- | | | |
|-----------------|------------------|-----------------|
| 1 Hook bracket | 4 Cable strap | 7 Return spring |
| 2 Lever bracket | 5 Balance spring | |
| 3 Wire wheel | 6 Plastic hose | |

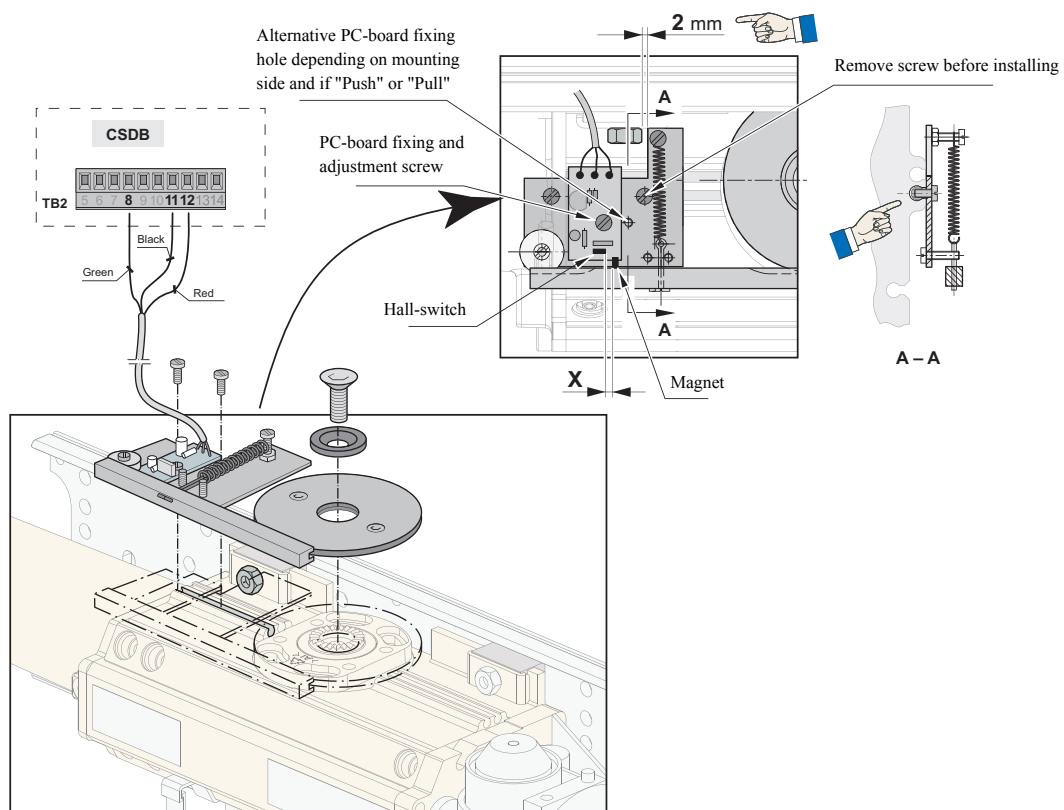
Installation of coordination unit

The brackets ① ② are to be mounted to the pump flange on the "master" door operator and the wire wheel ③ to the drive shaft on the "slave" door operator.

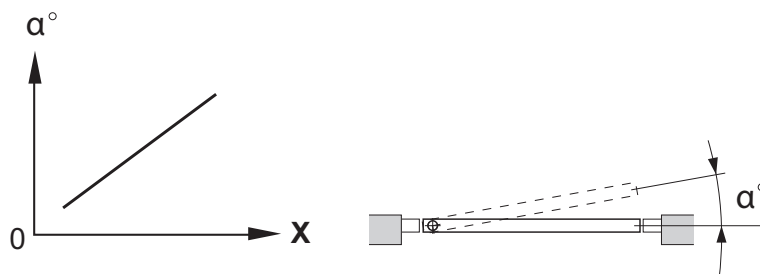
Note! If the "master" and "slave" doors are interchanged, the brackets are to be fitted to the underside of the pump flange.

- a Fit the hook bracket ① to the pin in the pump flange and screw the bracket tight.
- b Fit the lever bracket ② onto the hooks on the hook bracket ① including return spring ⑦.
- c Install the wire through the plastic hoses ⑥ and fix to the motor screws with cable straps ④.
- d Mount the wire wheel ③ on the "slave" door operator using screw and washer. The wheel is to be mounted in accordance with fig. A or B depending on which door being the "slave" door. Always on top of the operator.
- e Close the doors and mount the wire in the lever bracket ② and in the wire wheel ③ with the spring ⑤ pre-tensioned approx. 10 mm. Open the "master" door and let it hook up. Adjust the spring tension (loosen the wire) so that the "master" door starts to close with normal speed.
- f Adjust the closing time to approx. 6 seconds.
- g Give opening impulse and check the function.

15.2 PAG



Adjustment of impulse sensitivity

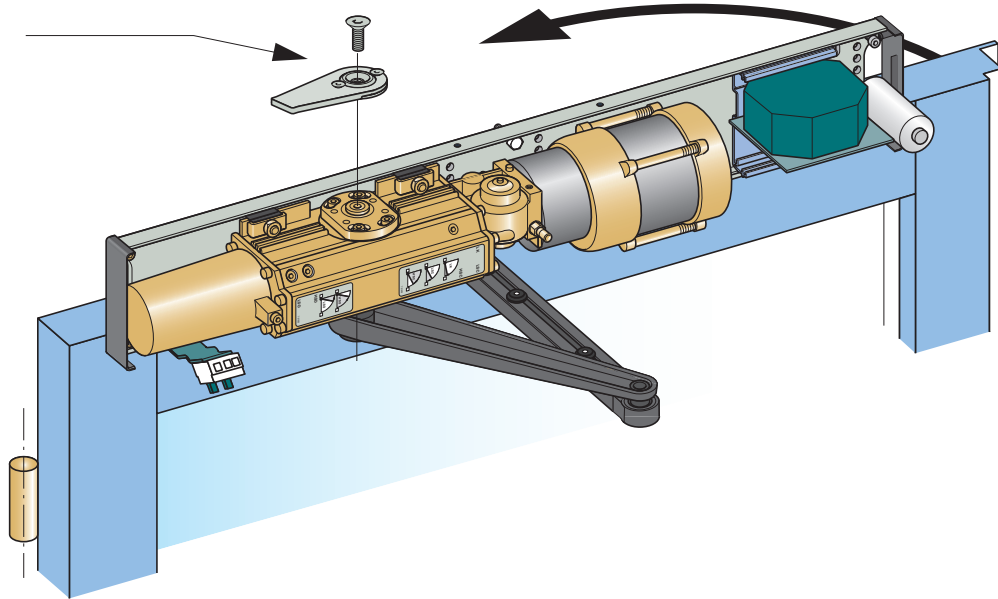


Important notice!

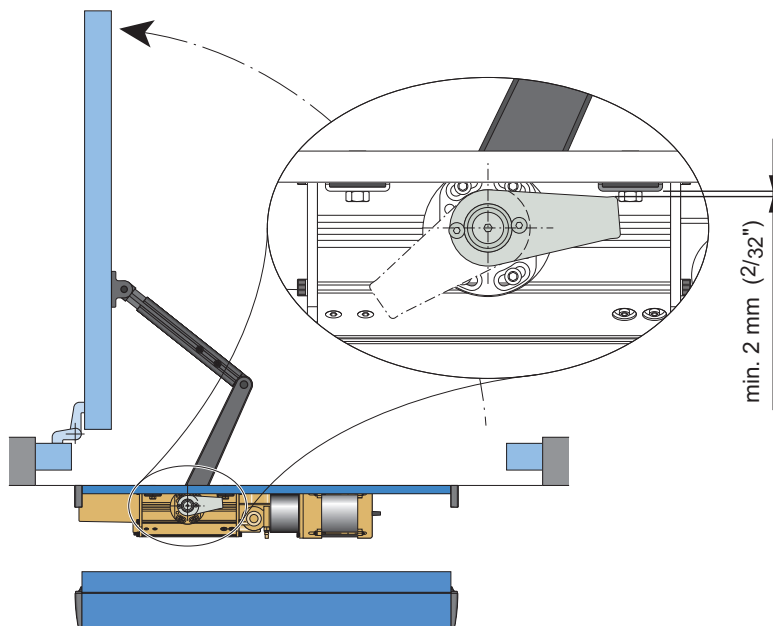
To avoid bodily injury, the opening time from closed to fully open door must not be less than 4 seconds.

If door stop is mounted on operator, PAG can be mounted on opposite side.

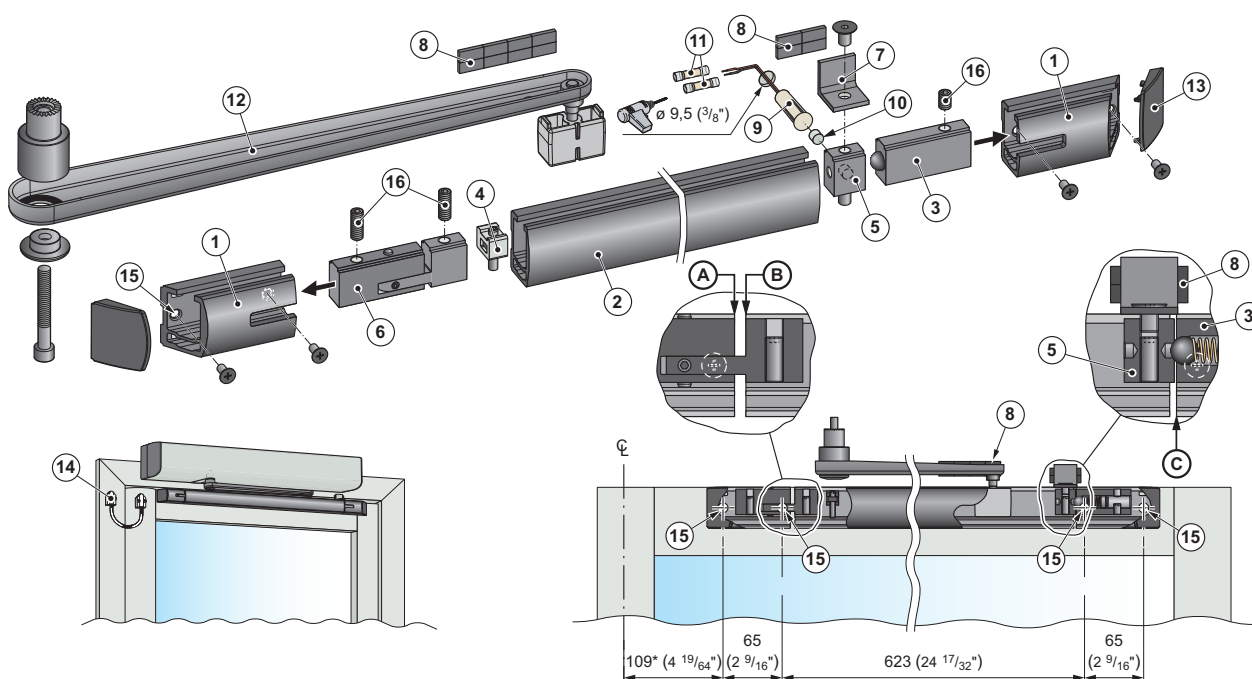
15.3 Door stop



- Install door stop to top side of output spindle to prevent door from extending beyond 90°.
 - Mount door stop when door is in open position with a clearance of 2 mm (2/32") as shown below.
- Fine adjust, if necessary, on limit switch and/or on armsystem.



15.4 Armsystem PULL-P



1	Short slide track	7	Door stop	13	End caps
2	Long slide track	8	Rubber absorber	14	Flexible steel hose FLS
3	Ball catch	9	Magnetic switch G1	15	Fastening hole (4 pcs)
4	Arm stop	10	Magnet	16	Lock screws
5	Ball seat	11	Crimp connectors	17	Reveal spacer (optional) 40 / 60 mm (1 37/64" / 2 23/64") Art. No. 173 831BK
6	Hinge	12	Drive arm		

15.4.1 Mounting instruction for magnetic switch G1

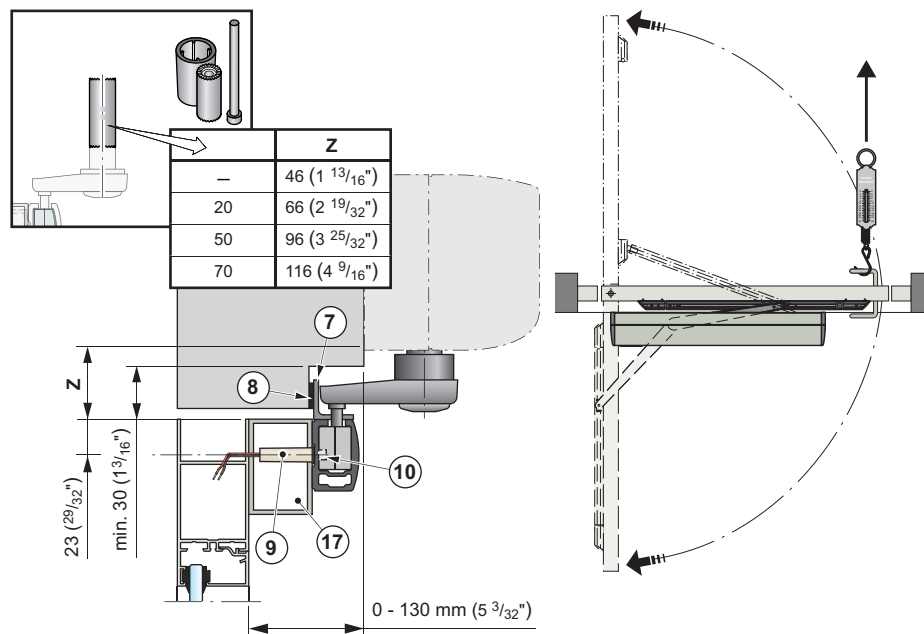
To make sure that the operator is disconnected when the door is panicked a switch must be connected to kill.

- Drill a 9.5 mm (3/8") hole in the door leaf just behind the magnet for the magnetic switch G1.
- Extend the cable length for the switch G1.
- Mount the magnetic switch G1 and the flexible steel hose FLS in accordance with the picture.
- Connect G1 to kill.

15.4.2 Installation of PULL-P

- Mark and drill the 4 fastening holes $\varnothing 4,6$ (3/16") in the door leaf.
- Mount the two short slide tracks.
- Slide the hinge into the short slide track next to the door hinge and make sure they are aligned (A). Secure with the lock screw.
- Slide the long slide track into the hinge and make sure they are aligned (B). Secure with the lock screw.
- Slide the ball catch into the short slide track at the front of the door and make sure they are aligned (C). Secure with the lock screw.

- f Slide the arm stop into the long slide track. Position it close to the hinge and secure it with the lock screw (will be adjusted later).
- g Slide the drive arm with its guide shoe into the long slide track.
- h Slide the ball seat into the long slide track. Make sure the magnet is facing the door.
- i Close the slide track and press the ball seat against the ball catch. Secure with the lock screw.
- j Mount the door stop on the ball seat.
- k Fix the rubber absorber at the door frame behind the door stop.
- l Adjust the spring pre-tension on the ball catch to its maximum and then release 2 turns.
- m Mount the drive arm to the operator (see installation manual).
- n Check break-out force with a balance by pulling the door into panic direction. Max force must not be higher than 220 N (49 lbf). Adjust if necessary.
- o Stick the rubber absorbers to the frame just behind the arm.
- p Snap on the two end caps to the slide track.



16 Troubleshooting

Fault	Possible reasons why	Remedies/Explanation
The door does not open <i>- The motor does not start</i>	Programme selector is set to OFF	Change setting
	Motor power is missing	Check motor cable
	Mains power is missing	Check power
	Fuse has blown	Replace fuse
	Activation unit does not function	Strap impulse inputs
<i>- The motor starts</i>	Electric striking plate is binding	Adjust striking plate
	Arm system has come loose	Readjust pre-tension and tighten arm system
The door does not open to required angle	Limit switch opening has come loose	Check limit switch
The door does not close	Constant impulse is created	Disconnect activation unit or replace control unit
The door does not open fast enough	Pump pressure is too low	Adjust pump pressure
The door opens with too much delay	“Lock-kick” valve is opened too much	Adjust valve screw
No smooth braking during operation	Pump pressure too high	Adjust pump pressure
	Low speed distance too short	Increase opening angle, or increase pre-tension of arm system
High sound level	Motor in contact with mounting plate	Mount two extra screws at the motor side to seduce the mounting plate to the wall
The door does not stay open or cannot open	Magnetic valve out of operation	Check by pressing the pin on top of the magnetic valve. If the door stops, then check the resistance (should be 150 ohm) for the wire between the magnetic valve and the control unit.
3 or 4 flashing LED	CSDB default	Replace control unit
7 flashing LED	No slave connected and slave monitoring jumper is missing	Replace jumper
	Slave connected but slave monitoring jumper is not removed	Remove jumper
	CSDA-S defect	Replace control unit
	Old CSDA-S connected and slave monitoring removed	Replace jumper

17 Maintenance plan

Regular inspections shall be made according to national regulations by a trained and qualified person. The number of service occasions shall be in accordance with national requirements. This is especially important when the installation concerns a fire-approved door or a door with an emergency opening function.

As with all other technical products, an automatic door needs maintenance and service. It is essential to know the importance of maintenance to have a reliable and safe product.

Service and adjustments will ensure a safe and proper operation of an automatic door unit.

The table below shows the recommended interval, in months, when to replace parts during preventive maintenance.

Part	Part number	Cycles/hour in operation			Abusive Environment
		<10	<100	>100	
		Low traffic	Medium traffic	High traffic	
Vibration absorbers and oil plug	331003882	24	12	6	6
PUSH service kit	331003888	24	12	6	6
PULL/PULL-P service kit	331003886	24	12	6	6
ST-V/H service kit	331003887	24	12	6	6
Limit switch	33655614	24	12	6	6
Capacitor	655599	60	60	60	60
CSDB-230 control unit	331004115	60	60	60	60
CSDA-S	600089	60	60	60	60
CSDA-F	600081	60	60	60	60



Ditec Entrematic Nordic AB, Box 669, SE-261 25 Landskrona, Sweden
Tel: +46 418 514 50 • Fax: +46 418 511 63
info@ditecentrematicnordic.com • www.ementrematic.com