Besam Curved Sliding Door System CMD

Installation and Service Manual

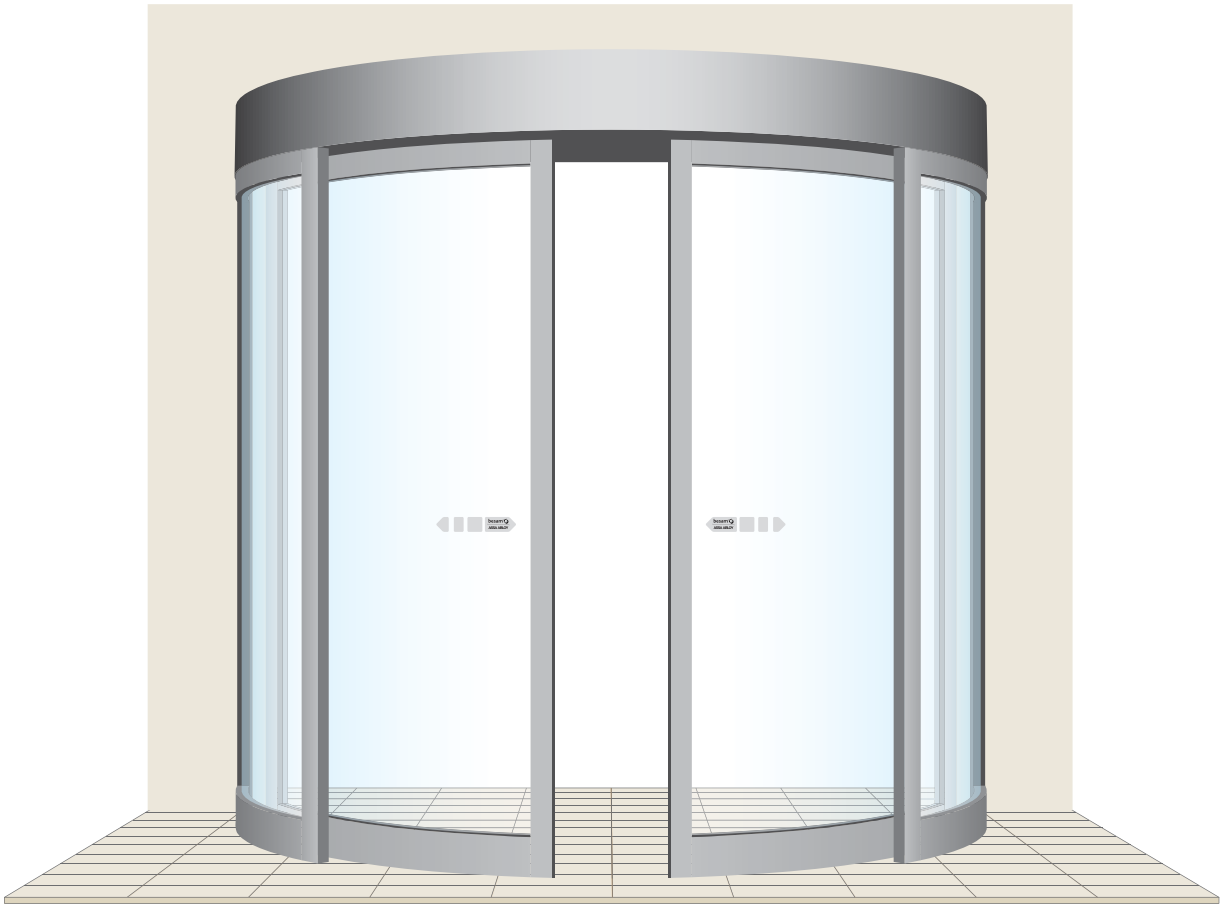

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Table of content

1 Revision

Page	Revision
8	Part of section “Emergency escape” deleted

2 Important information

Important notice

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. Only Besam-trained technicians should be allowed to carry out these operations. Save these instructions.

Electronic equipment reception interference

This equipment may generate and use radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, it may cause interference to radio, television reception or other radio frequency type systems. It has been designed to comply with the emission limits in accordance with EN 61000-6-3 (US market FCC Part 15), which are designed to provide reasonable protection against such interference in a residential installation.

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.

Environmental requirements

Besam 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 safely as was done with the packaging.

3 Introduction

This manual contains necessary details and instructions for the installation, maintenance and service of Besam Curved Sliding Door System CMD.

The CMD is designed to be surface-mounted to the wall or beam. It is easy to install for both new construction and retrofit application, and it can be adapted to a wide range of door requirements.

A CMD operator ensures all-around safety. It can be combined with the full range of Besam safety units, such as presence and motion sensors.

Each installation is, however, unique and must therefore be equipped and adjusted for the application-relevant safety requirements. Preventative maintenance must be performed as specified for the selected product in a given environment.

Design

The sliding door CMD works electromechanically. The motor, control unit, transmission – and optional emergency unit and electromechanical locking device – are all assembled in a support beam with an integrated cover. The motor and gear box transmit movement to the door leaves by means of a tooth belt. The door leaf is fitted to a door adapter/carriage wheel fitting and hangs on a sliding track. Movement of the bottom of the door leaf is controlled by the floor guides.

Function

Opening

When an opening impulse is received by the control unit the motor starts and transmits movement to the door leaves, which move to the open position.

Closing

The closing starts when no “opening impulse” is received and the “hold open time” has run out.

Safety functions integrated in the operator

To permit safe passage between closing doors, the doors immediately reverse if an obstruction is detected, then resume their interrupted movement at low speed to check whether the obstruction has disappeared or not. If an obstruction is detected between opening doors and surrounding walls or interior fittings, the doors immediately stop and then close after a time delay.

Microprocessor for precise control

The microprocessor has a routine for self-monitoring, which detects any interference or faulty signals in door operation. If an input signal does not correspond to the preprogramming, the microprocessor automatically takes necessary actions to ensure safe door operation.

Emergency escape

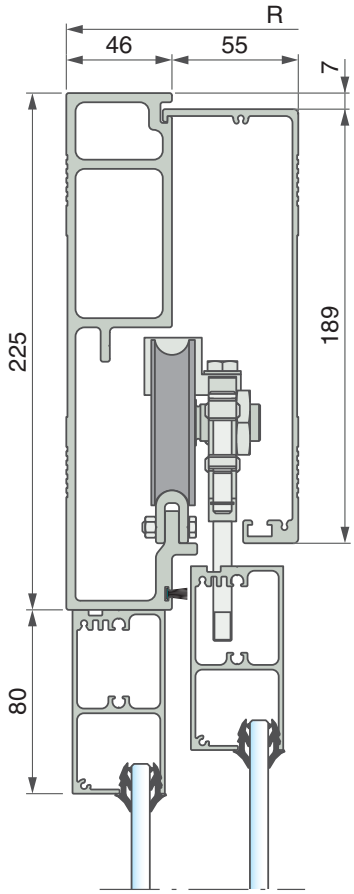
The Besam CMD can be combined with an emergency unit that automatically opens or closes[1] the doors in the event of a power failure and can also be interfaced with the fire alarm or smoke detector.

Doors used for emergency escape in buildings such as hospitals and homes for elderly people may not be locked or put in programme selection OFF.

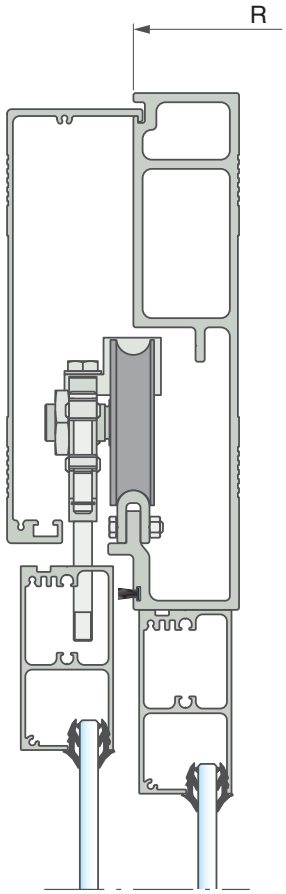
[1] Electrical emergency unit only

Mains power supply	120 V AC -10% to 240 V AC +10% 50/60 Hz fuse 10 AT **Note!** Switch with clearly marked off-position, having a contact separation of at least 3 mm in all poles, must be incorporated in the fixed wiring, be installed at a minimum height of 1.5 m and not be accessible for the public.
Power consumption	Max. 250 W
Auxiliary voltage	24 V DC, 640 mA
Control unit fuse	6,3 AT
Recommended max. door weight	100 kg/leaf
Minimum radius	900 mm
Opening and closing speed	Variable up to approx. 1.4 m/s
Hold open time	0-60 s
Ambient temperature	-20°C to +50°C
Relative humidity (non-condensing)	Max. 85%
Approvals	Third party approvals from established certification organizations valid for safety in use and escape route safety. For details see Declaration of Conformity.
For indoor use only	

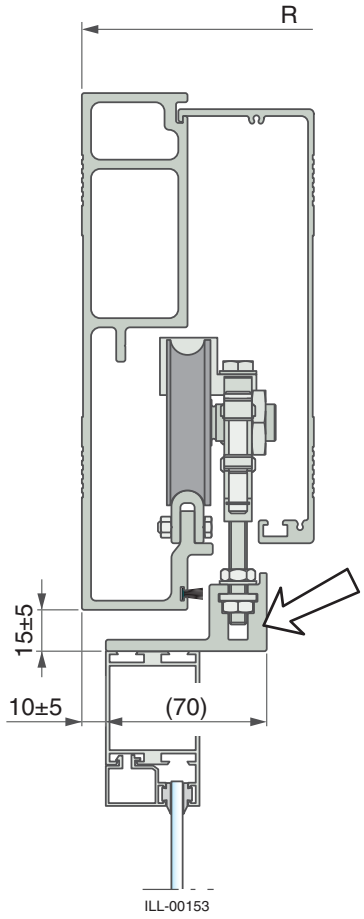
Internal door

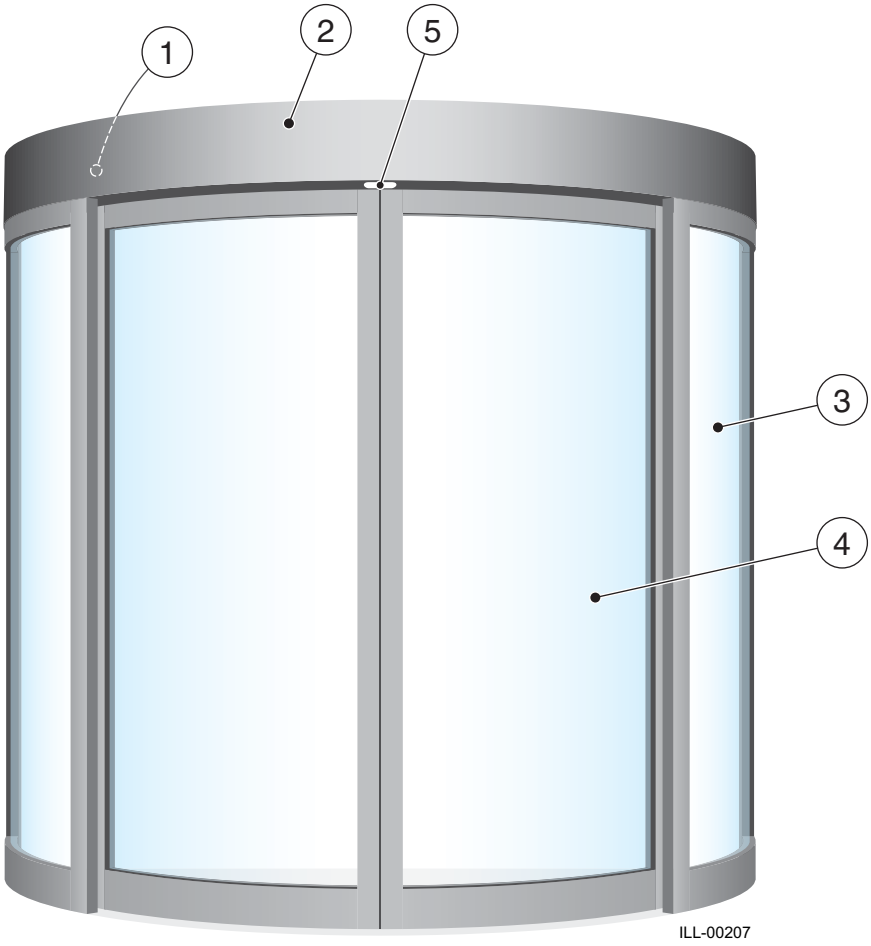


External door



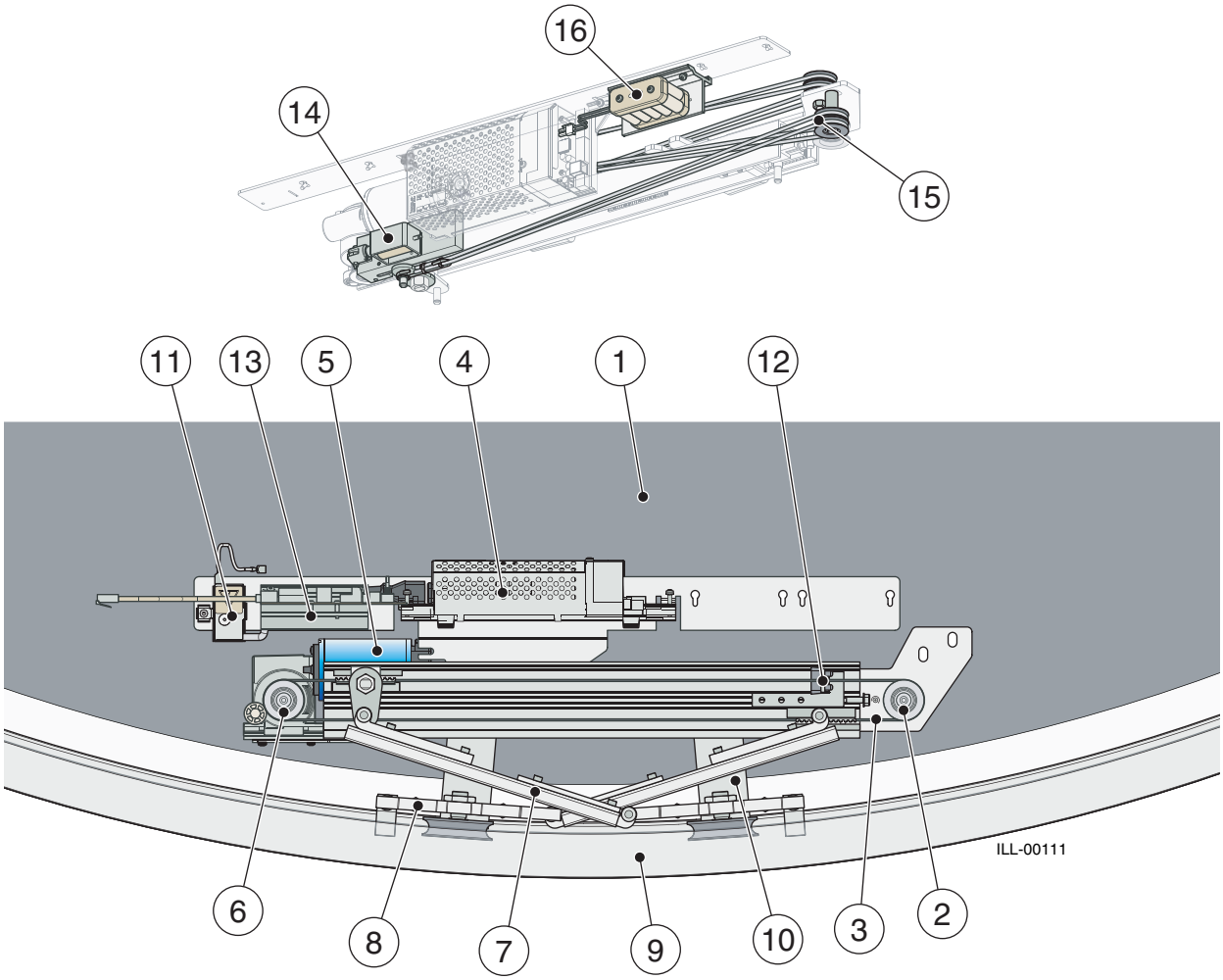
Door adaptor for third party doors





No.	Description
1	Operator cover
2	Operator support beam (incl. sliding track)
3	Screens left and right
4	Doors left and right (incl. floor guide)
5	Presence sensor

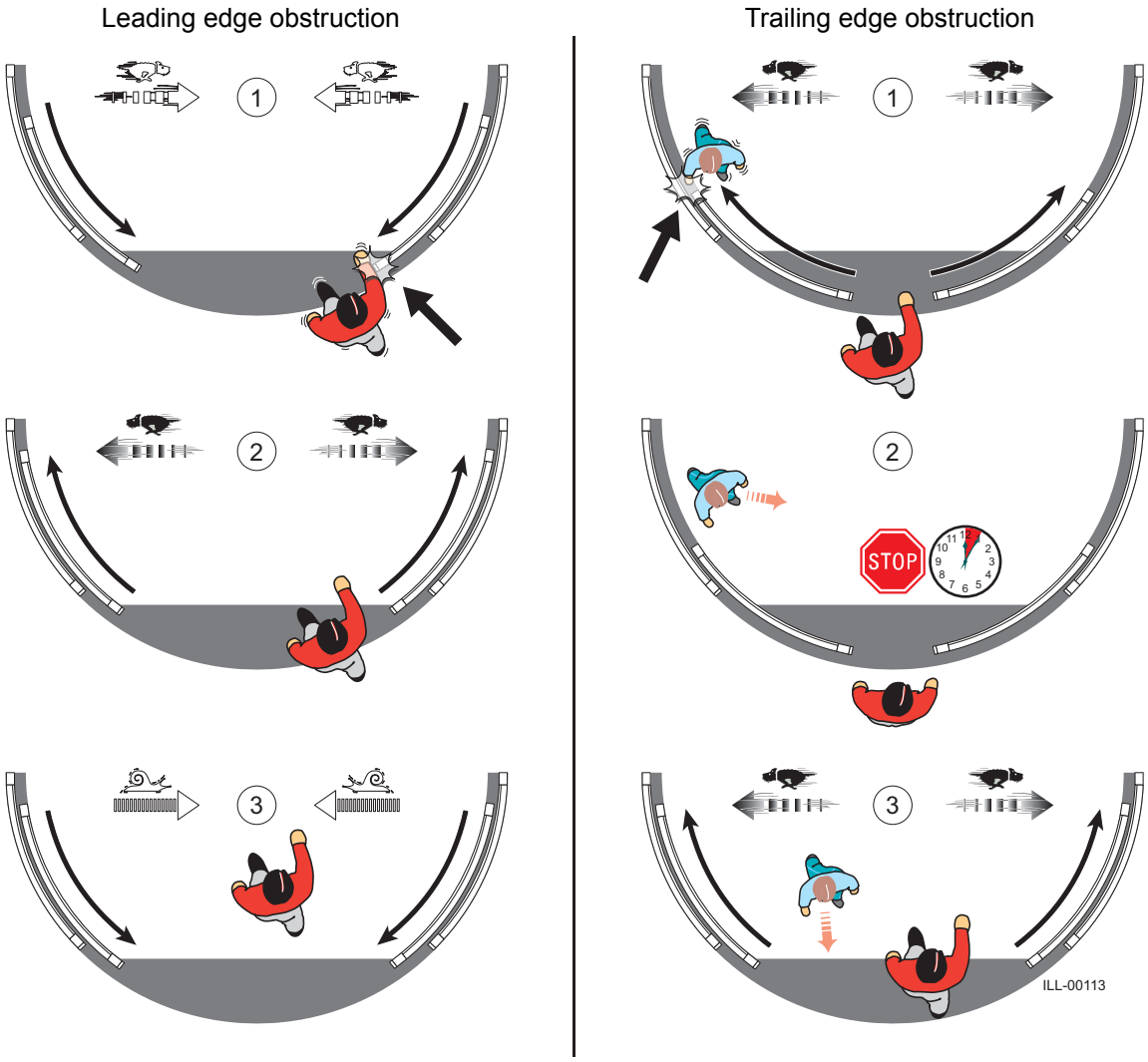
7.1 Operator



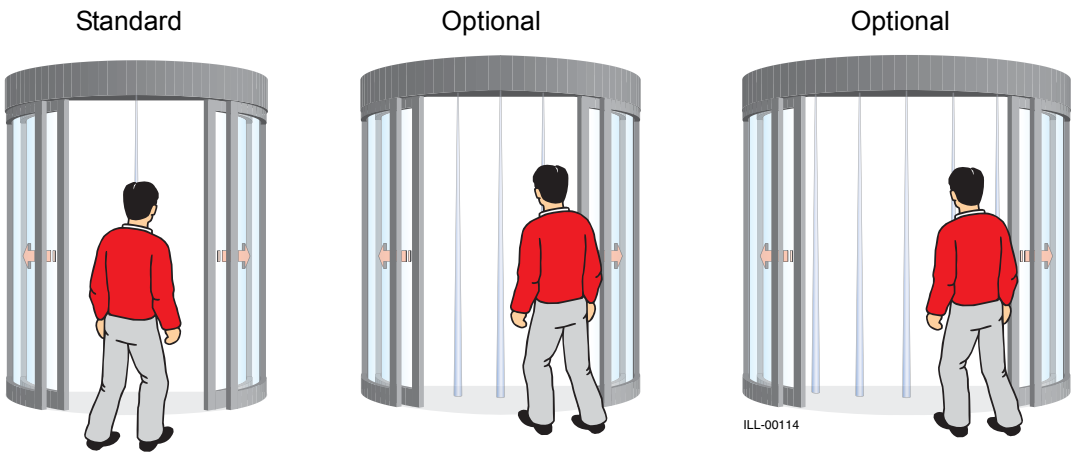
No.	Description
1	Cover
2	Tension wheel
3	Tooth belt
4	Control unit
5	Drive unit
6	Drive wheel
7	Drive arm
8	Carriage wheel fitting
9	Operator support beam (incl. sliding track)
10	Bracket for drive module
11	Mains power connection block
12	Door stop
13	Programme selector board
14	Electromechanicl locking device, option
15	Mechanical Emergency UniT (MEU), option
16	Electrical Emergency Unit (EEU), option

7.2 Function

7.2.1 Integrated safety detection



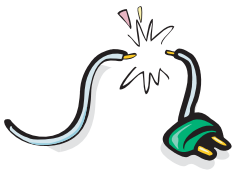
7.2.2 Safety detection with presence sensor



7.2.3 Emergency escape

- The operator can be fitted with different emergency escape units to ensure a safe evacuation of the building: Mechanical emergency unit (MEU) or Electrical emergency unit (EEU). The units can also be interfaced with the fire alarm or smoke detector.

1



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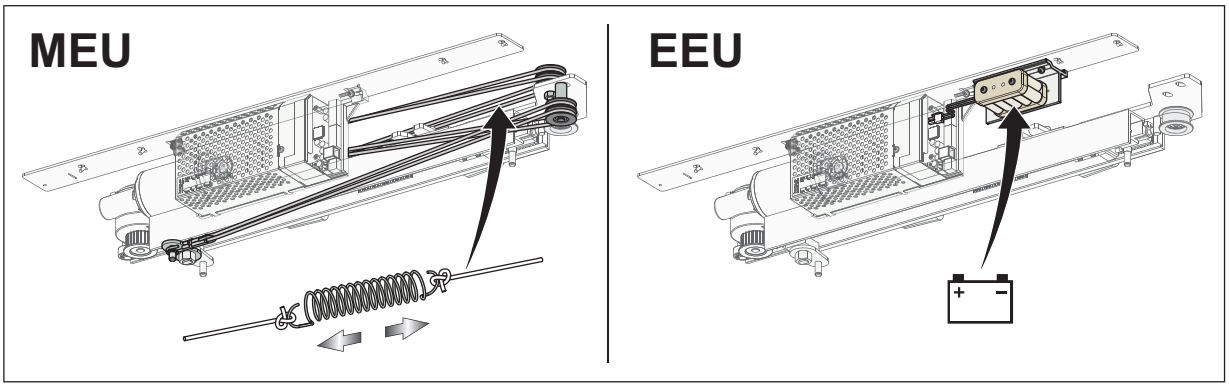

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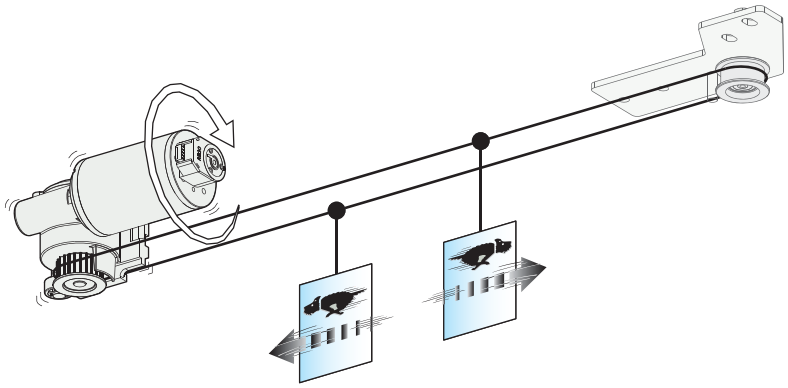
3

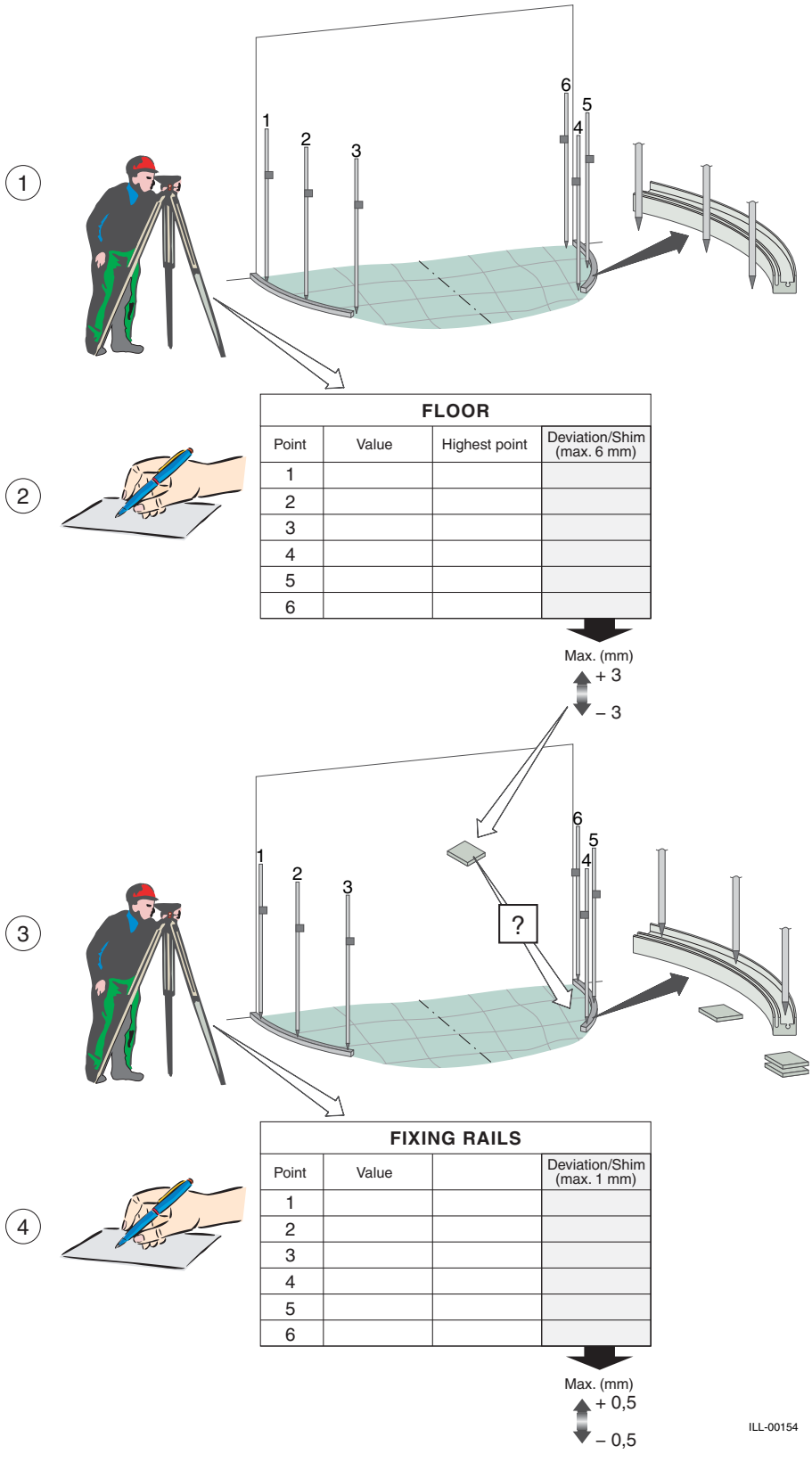


The door is opened by means of an emergency escape unit in the event of a power failure. The door remains in this position until the power is restored. The operator will then resume the function set by the programme selector. The emergency unit is monitored by the operator control unit. A monitoring error means that the door opens and remains open until the error is cleared.

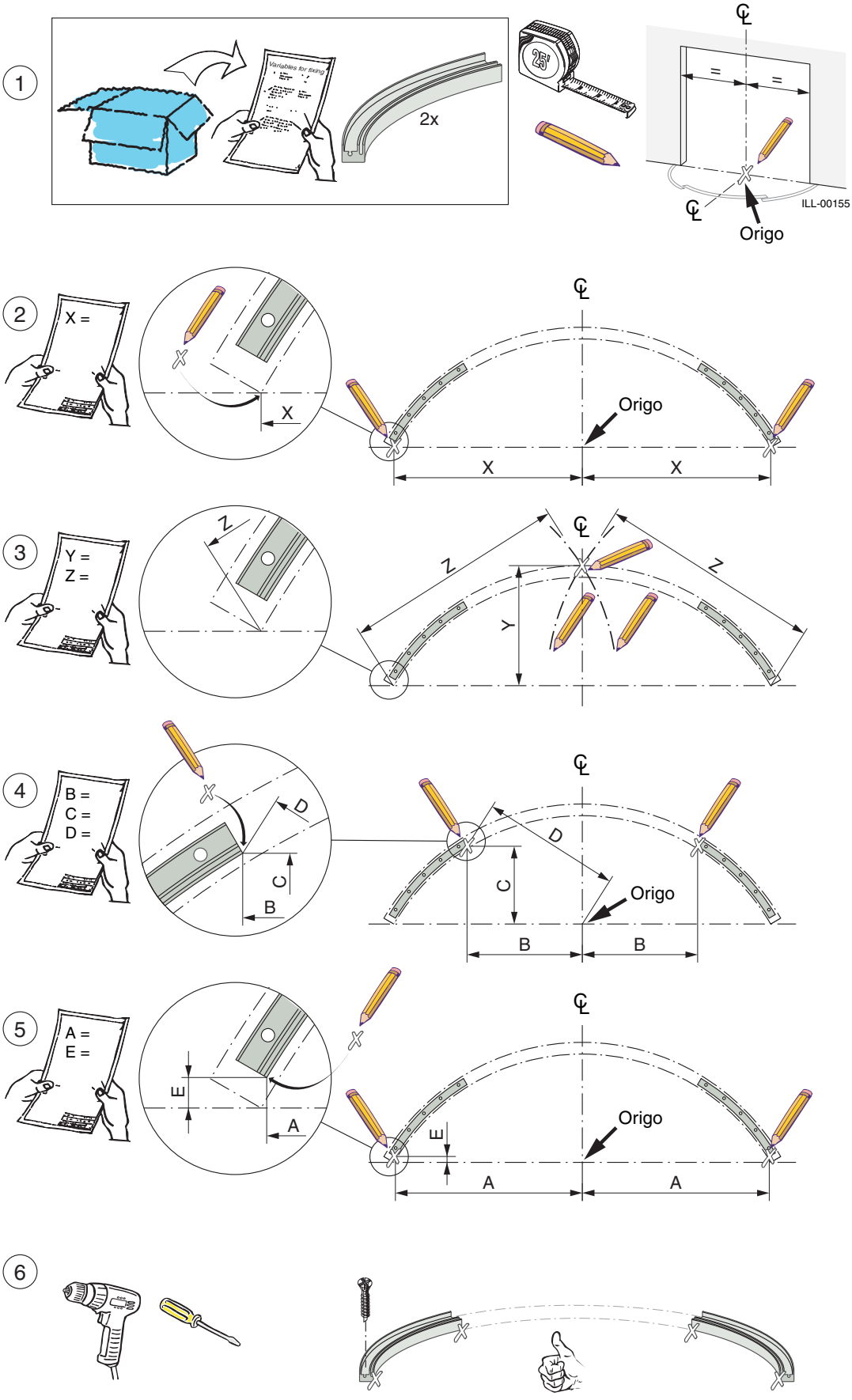
For further information see “General accessories” on page 45.

The electrical emergency function can also be used to close the door in the event of power failure. The fire authorities make this a requirement to stop fire or smoke from spreading throughout the building.

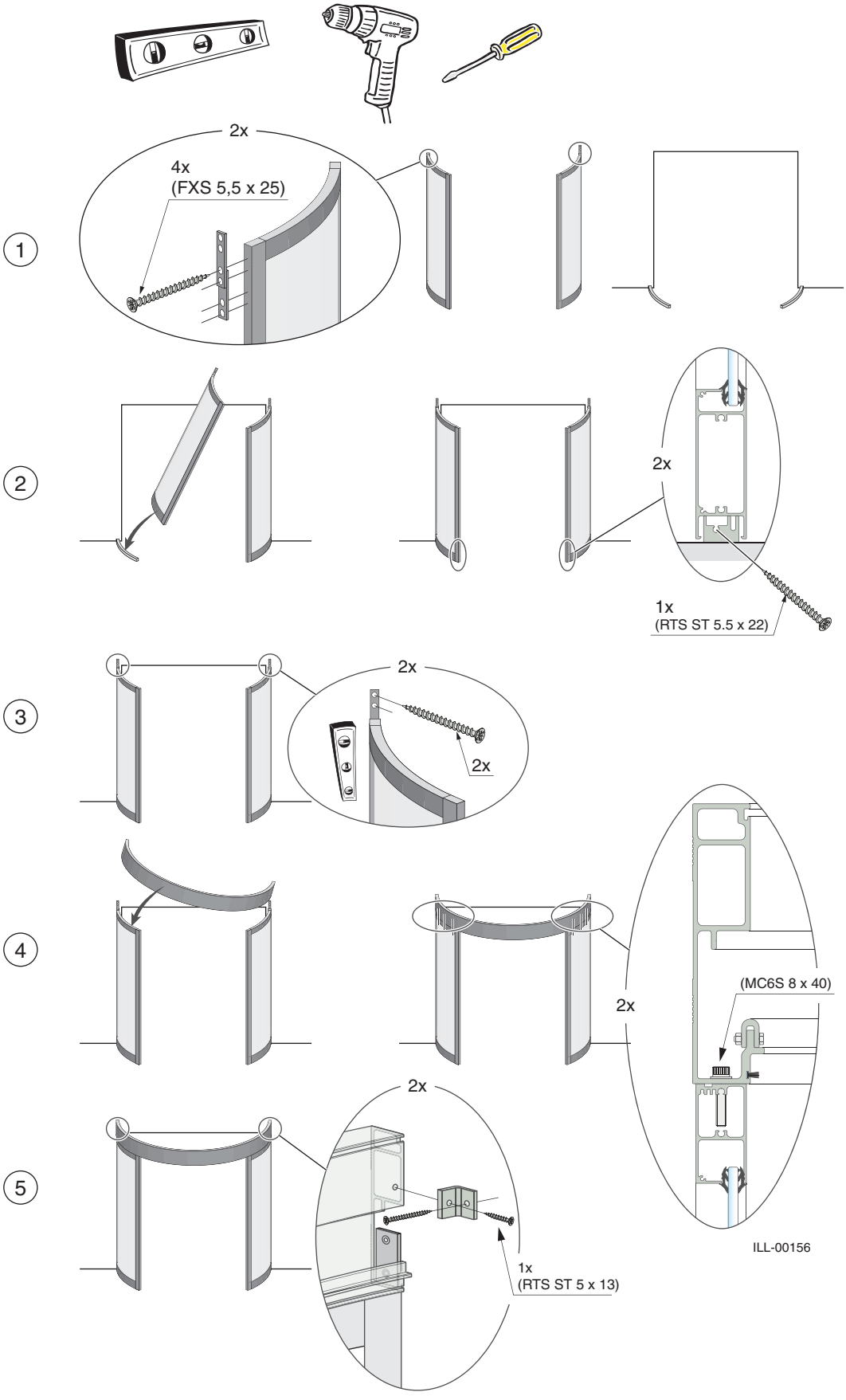
8.1 Floor surface



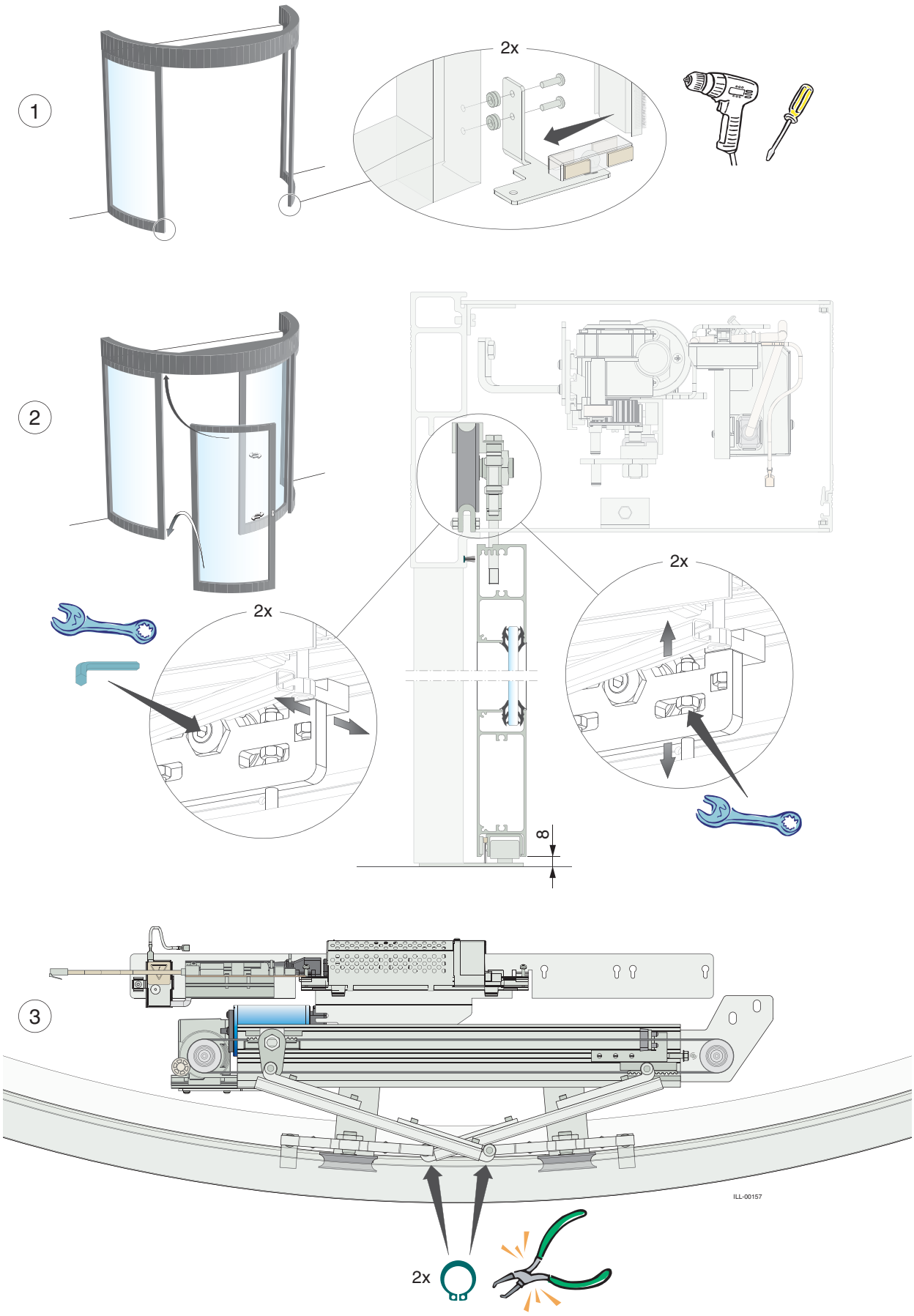
8.2 Fixing rails



8.3 Outer walls and Support beam



8.4 Hanging the door leaves



Note! During any work with the electrical connections the

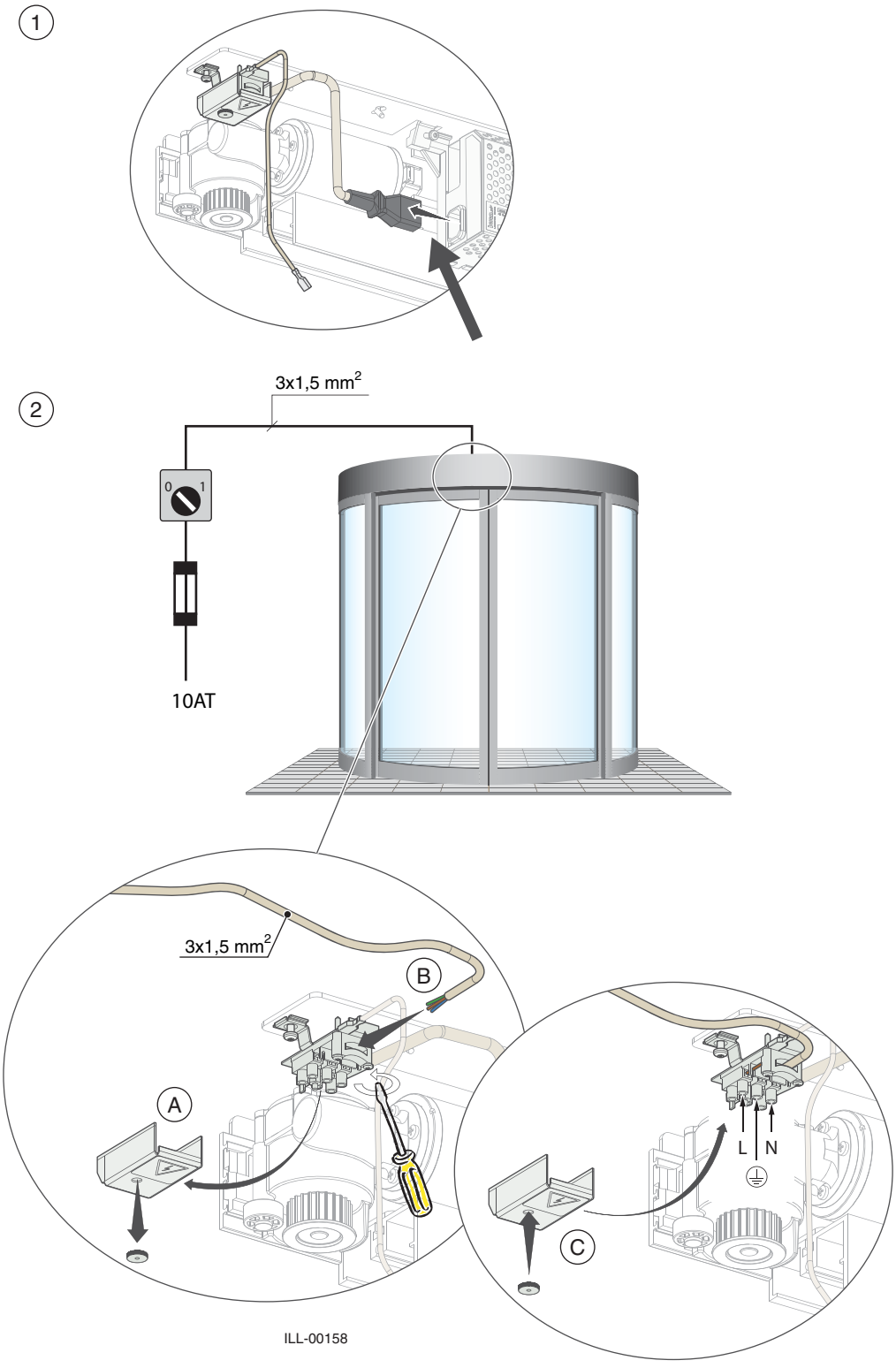
- **mains power** and the
- **electrical emergency unit must be disconnected**.

Installation

1. Open the cover.
2. Install extension unit EXU-4 or EXU-3 if required, see page 28.
3. Install and connect the mains cables, see below.
4. Carry out “Start-up”, see page 30.

Mains connection

1. Unscrew the fastening screw and remove the protective lid.
2. Connect the incoming mains power through the strain relief to the connection block as shown in the illustration below.
3. Connect the protective earth to the cover.
4. Put the protective lid back in place.


1
2
3x1,5 mm2
0
1
10AT
3x1,5 mm2
B
A
L
N
C
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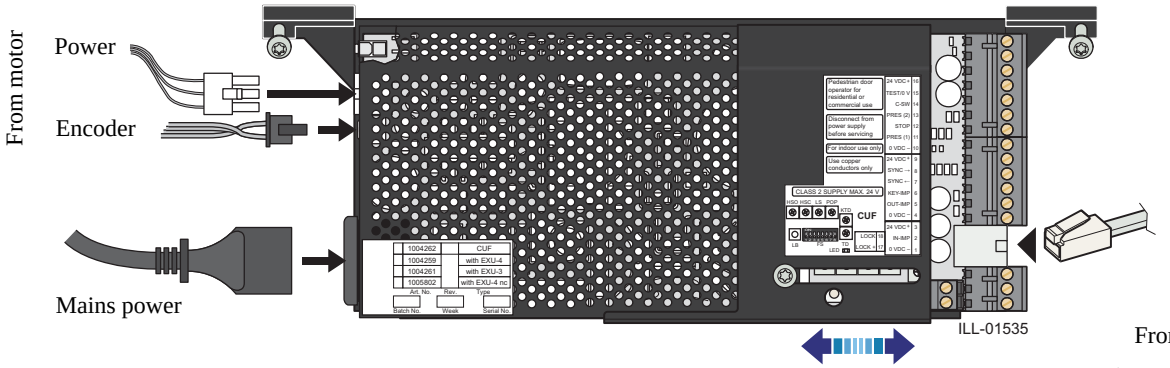
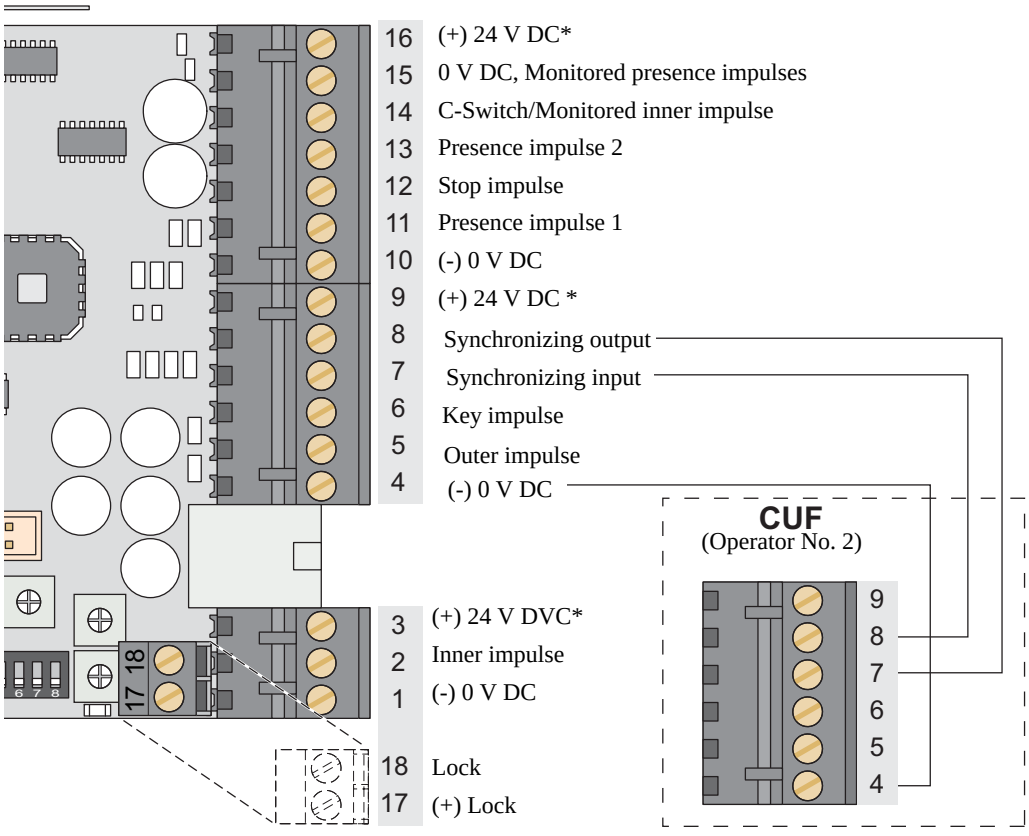
9.1 Control unit

The control unit is equipped with

9.1.1 Contacts for connection of standard units

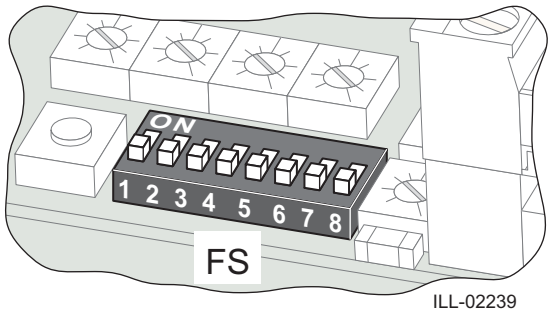


9.1.2 Terminal block for connection of accessories



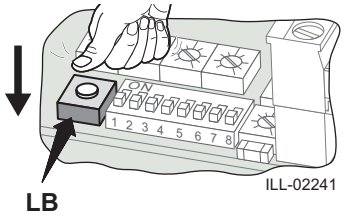
* Total load on 24 V DC = max. 640 mA

9.1.3 Function selector, FS, used to select special operating functions

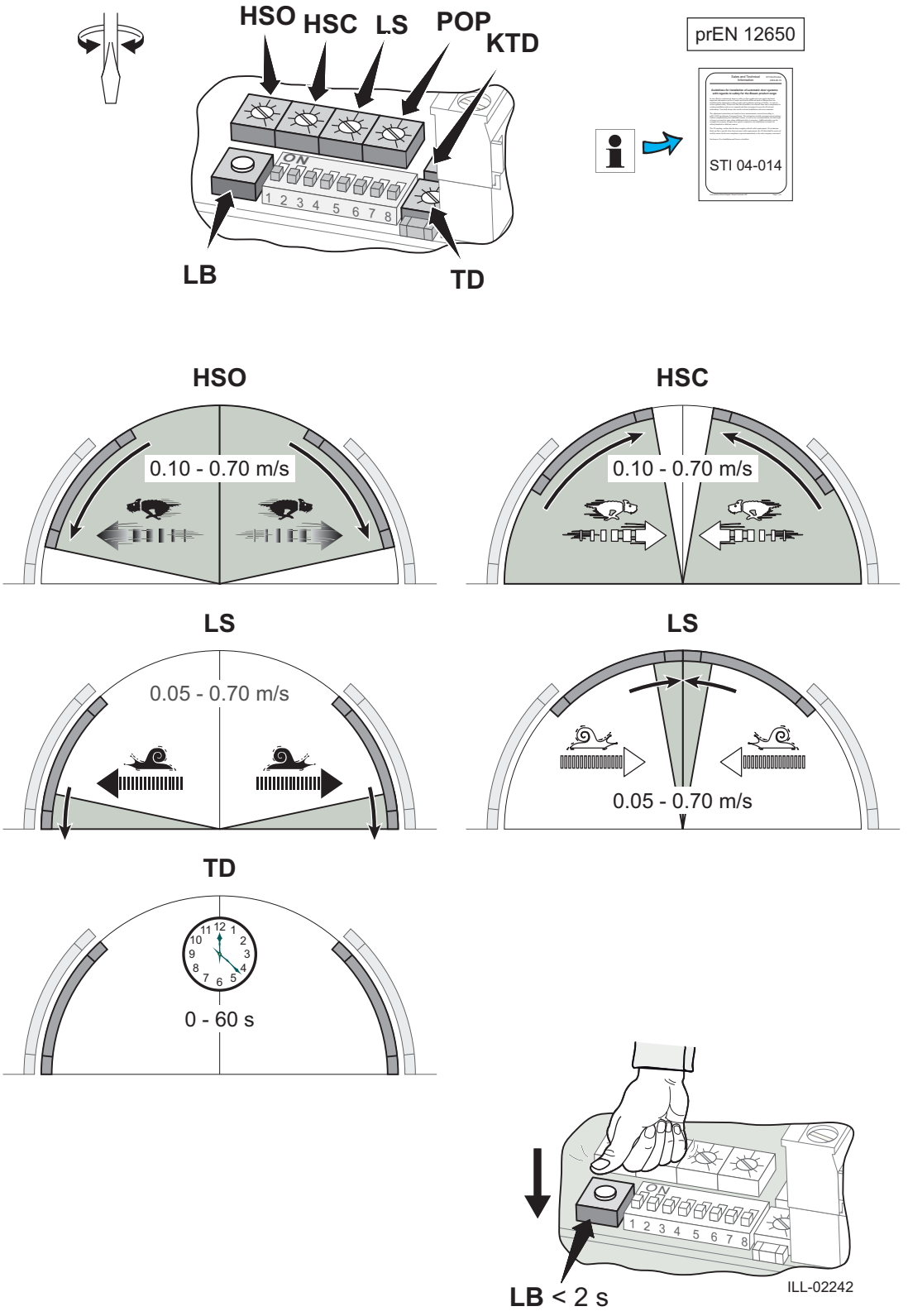


Function selector (FS)	**OFF**	**ON**
1. Motor direction of rotation [Always to be set to ON]		CW
2. Lock type (locked with/without power)	With LDP ILL-00200	Without LD LDB ILL-00201
3. Lock release [To be set to ON if electric lock is installed]	No	Yes
4. Presence detection type (normally open/closed) [Applies in common for the terminals 11, 12 and 13 on the control unit CUF and terminal 4 on the EXU-4] CUF 14 13 Presence impulse 2 12 Stop impulse 11 Presence impulse 1 10 ILL-02240	NO ILL-00203	NC ILL-00204
5. Emergency unit type [If no emergency unit is installed the parameter should be set to OFF]	EEU ILL-00205	MEU ILL-00206
6. Emergency unit monitoring [To be set in accordance with local authority requirements]	No	Yes
7. Sensor monitoring [To be set in accordance with local authority requirements]	No	Yes
8. Hold force on closed door (0 N / 45 N) [Setting ON always recommended]	No	Yes

Note! Press the learn button briefly after any FS adjustment to ensure proper configuration.



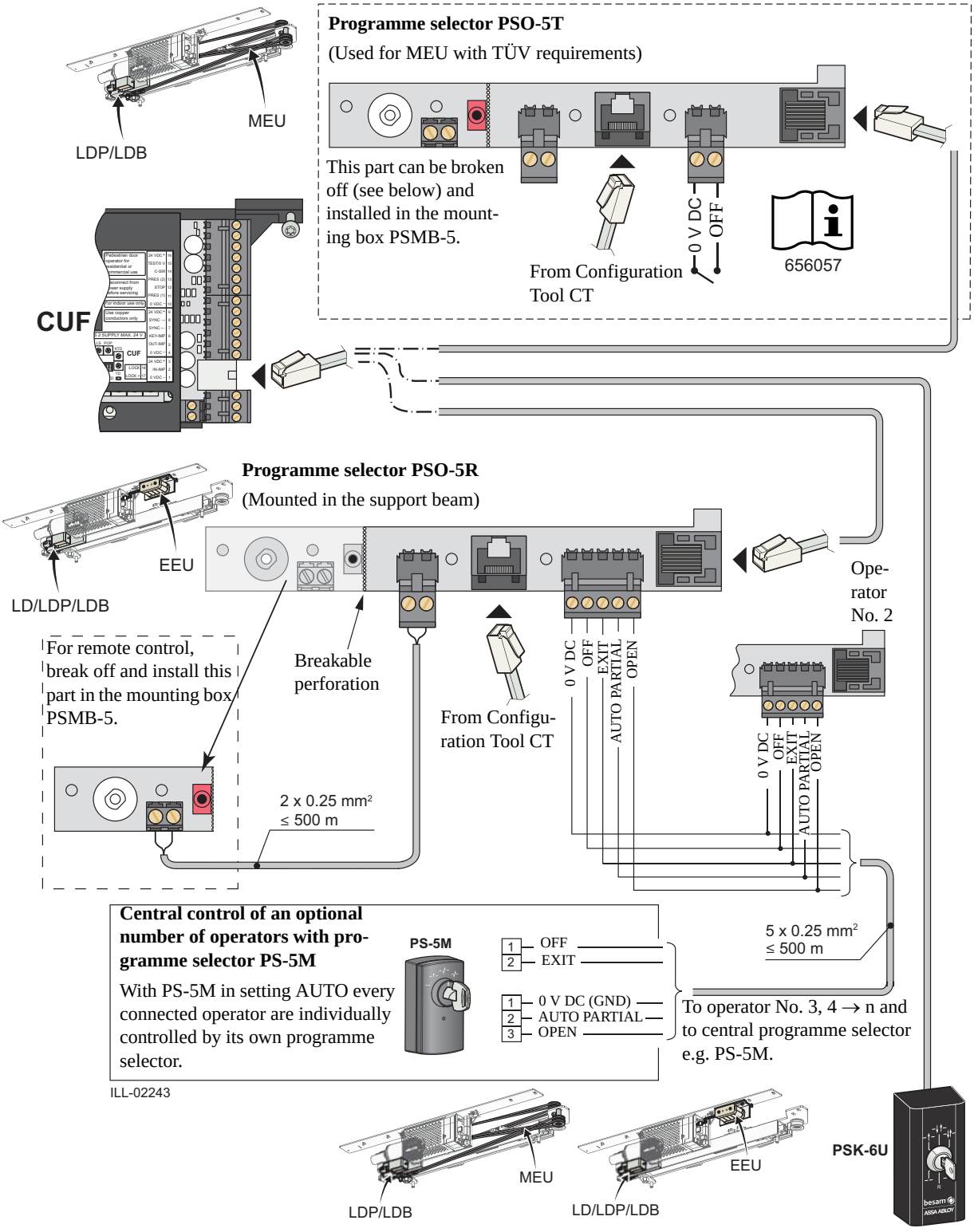
9.1.4 Potentiometers and learn button



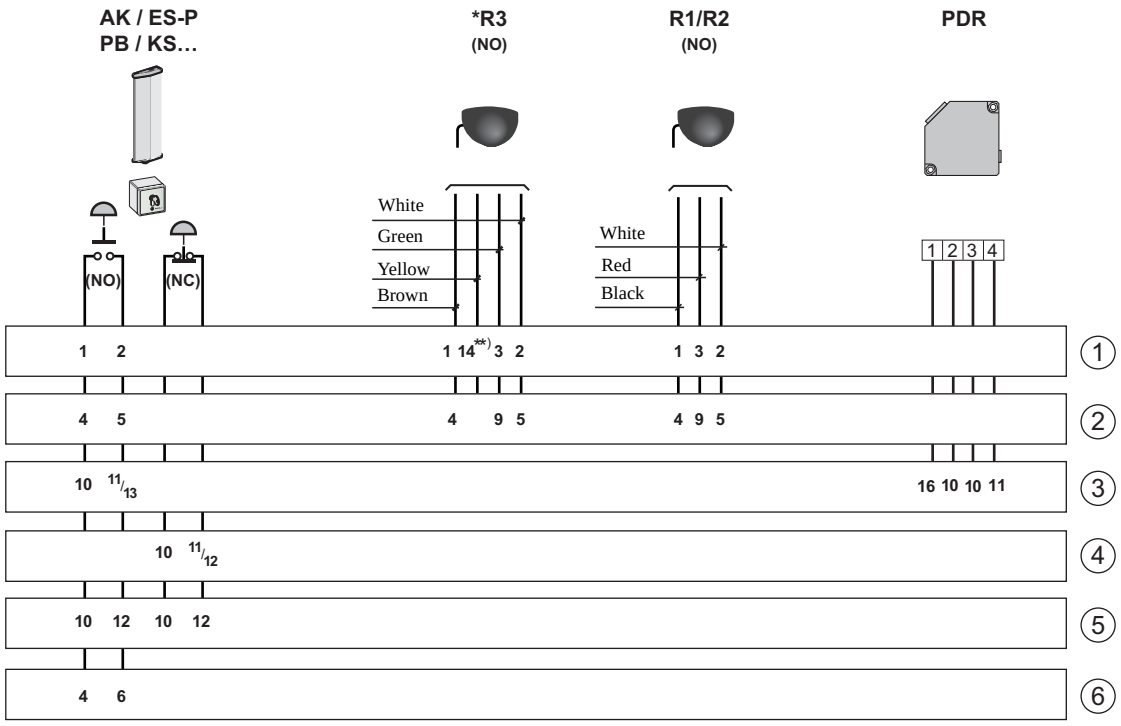
The potentiometers are factory set to approx. 50% of the adjustment range.
Note! The speed applies to a single leaf.

Note! Press the learn button briefly after any potentiometer adjustment, to use the new configuration.The speed applies to single sliding operator.

9.1.5 Connection of programme selectors



9.1.6 Connection of activation units

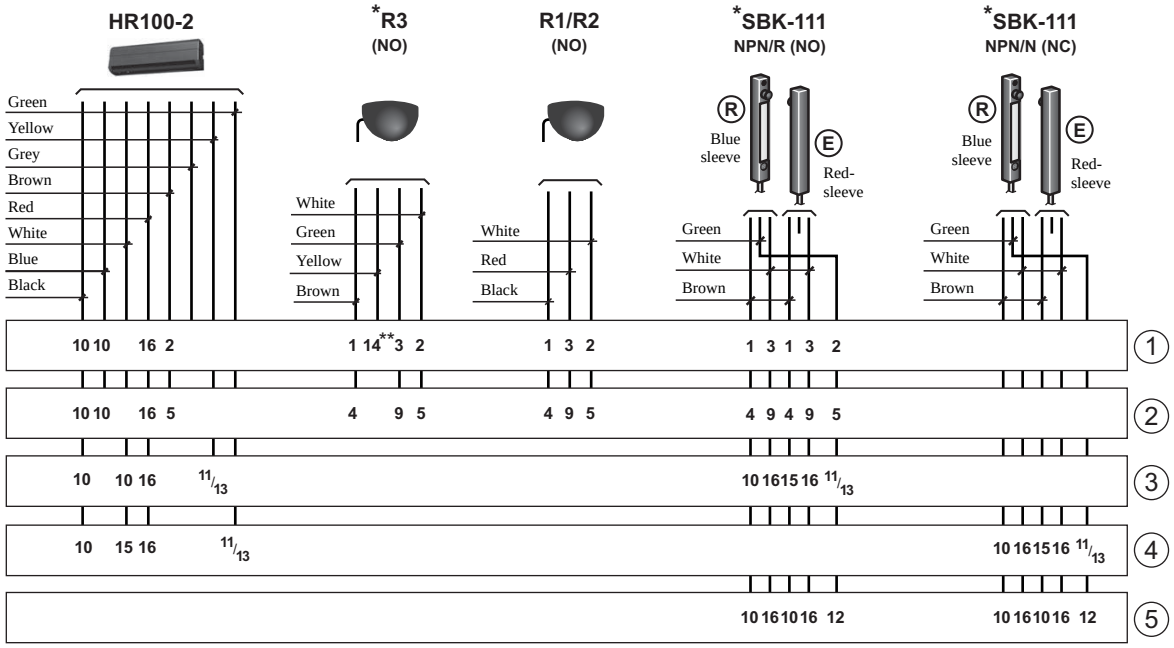


*) Can be monitored

**) Only to be connected if inner impulse monitoring is required, FS-7 = ON

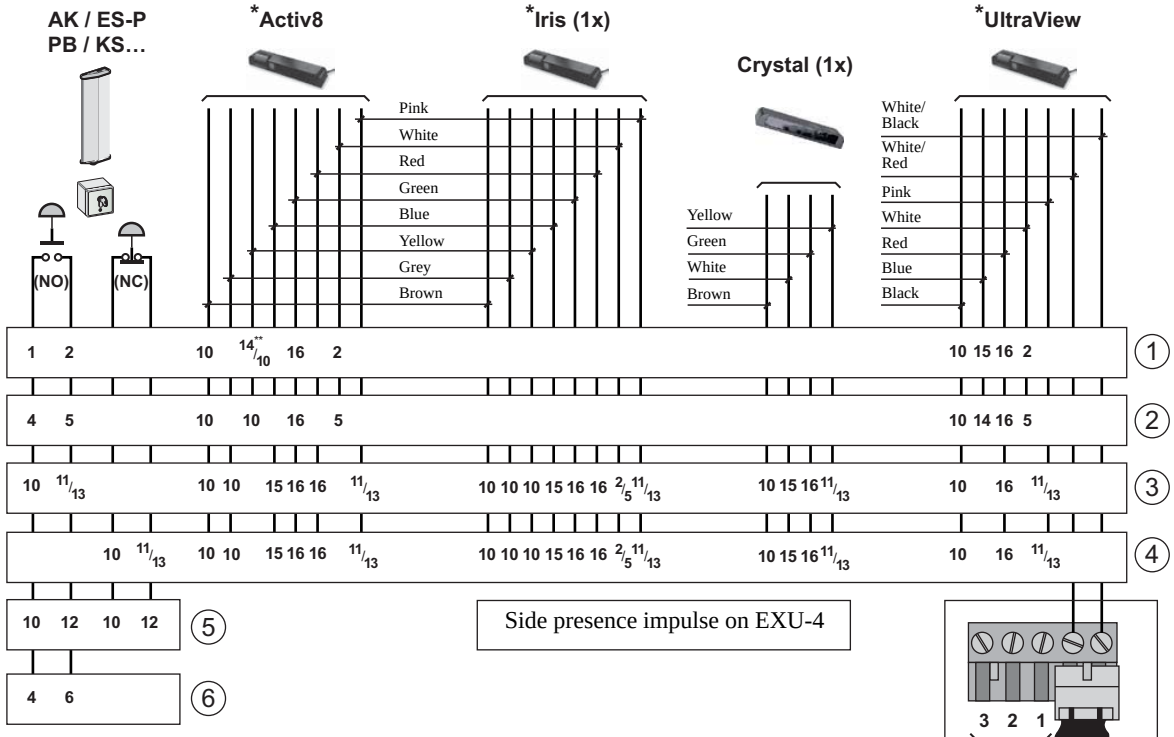
1. Inner impulse
2. Outer impulse
3. Presence impulse, NO
4. Presence impulse, NC
5. Stop impulse
6. Key impulse / (Emergency open impulse, EEU required)

Note! If necessary, adjust the sensor detection fields to meet the specific application and regulation requirements

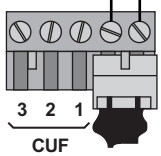


*) Can be monitored

**)Only to be connected if inner impulse monitoring is required, FS-7 = ON



Side presence impulse on EXU-4



Auxiliary terminal block and resistor termination to be mounted in the CUF terminals 1-3.

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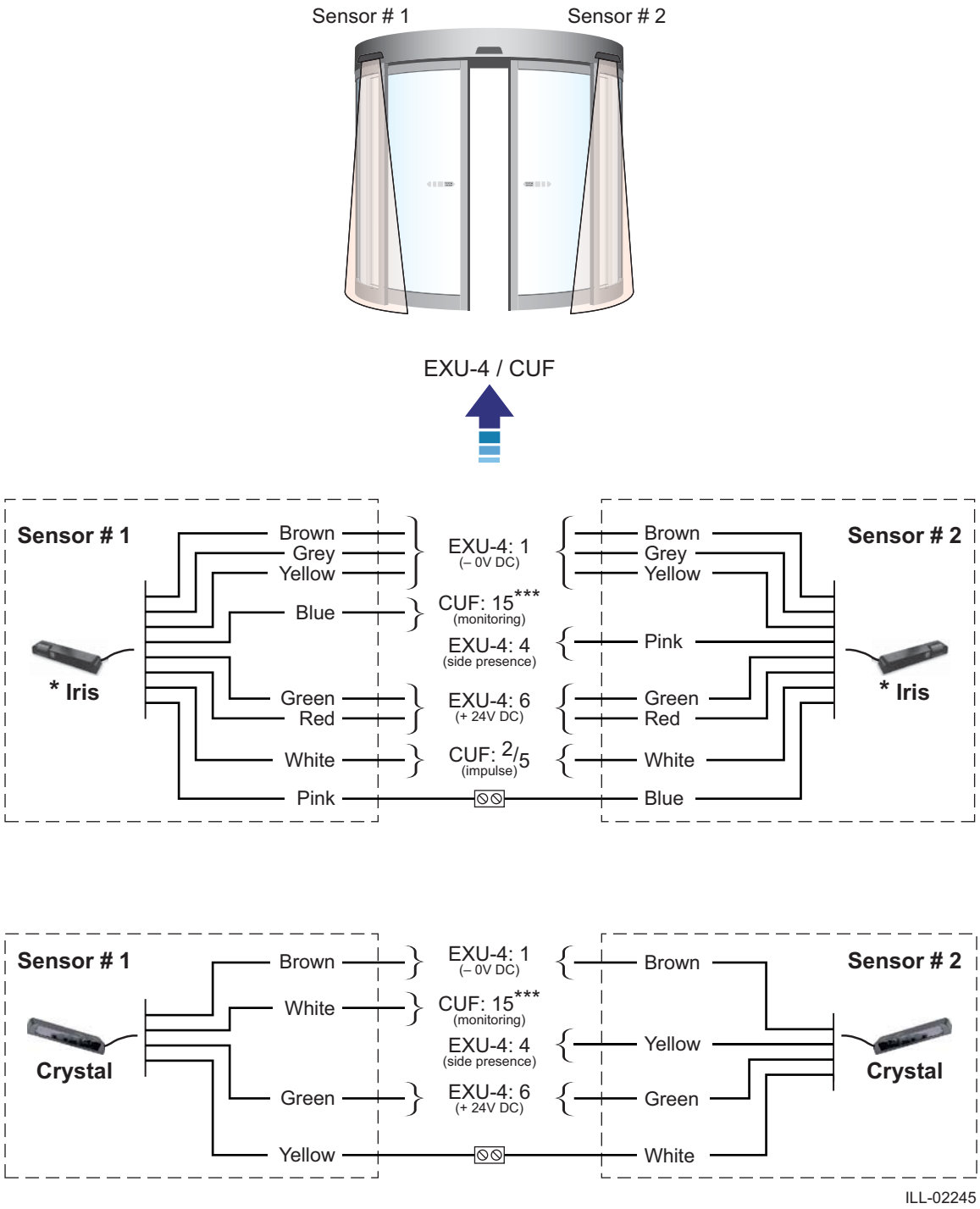
1. Inner impulse
2. Outer impulse
3. Presence impulse, NO
4. Presence impulse, NC
5. Stop impulse
6. Key impulse / (Emergency open impulse, EEU required)

9.1.7 Side presence sensors



*) Can be monitored

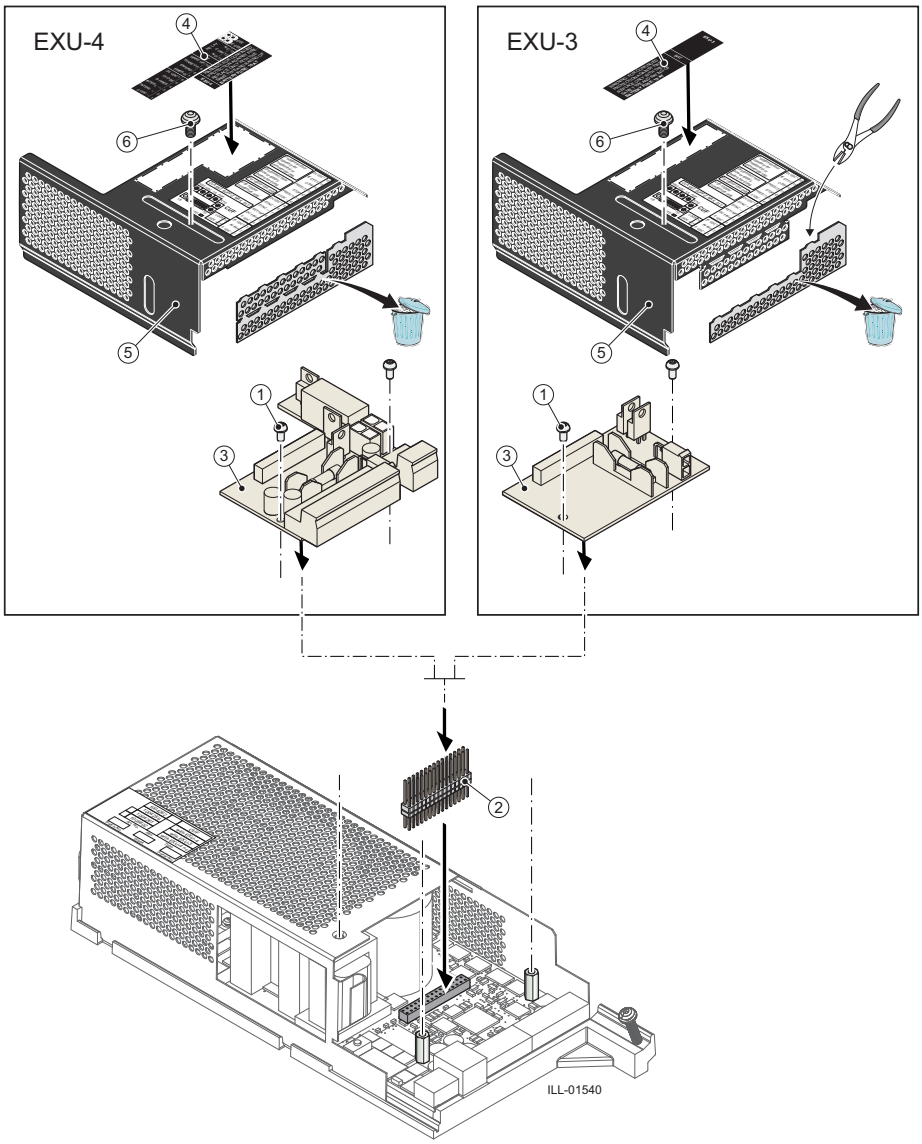
***)If side presence impulse monitoring is **not** selected (=off),
the sensor monitoring input should be connected to EXU-4: 1 (0 V DC)

9.2 Extension units

When functions beyond those implemented on the main control unit are required, two extension units are available, EXU-4 and EXU-3. These units are to be applied on top of the control unit (if not factory installed).

Note! When installing or replacing an extension unit the learn button LB **must** be pushed for a minimum of 2 seconds.

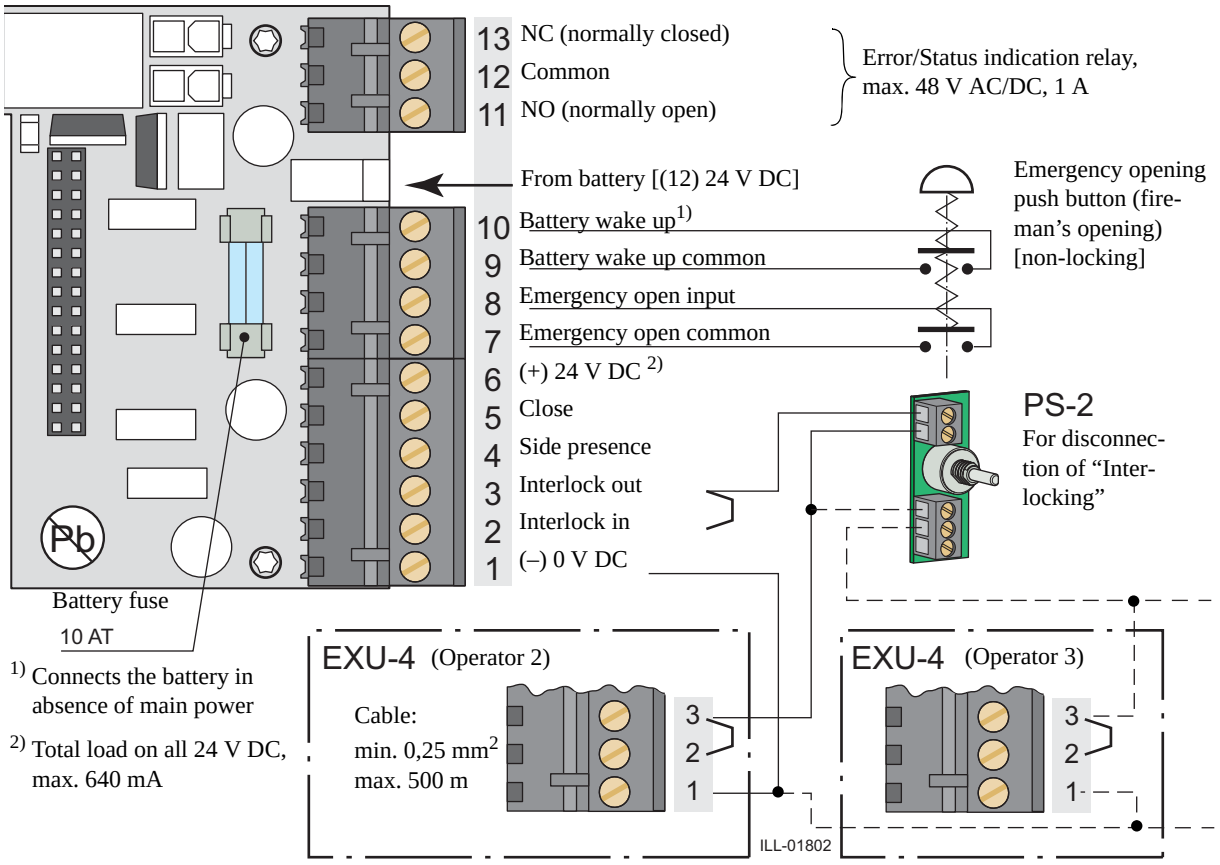
9.2.1 Fitting the extension units EXU-4 or EXU-3 to the control unit CUF



1. Fastening screws (2 pcs)
2. Tagstrip (long pins to be fitted into the EXU)
3. Extension unit, EXU-4 or EXU3
4. Label (EXU-4 or EXU-3)
5. Lid
6. Screw for fixing the lid

9.2.2 Extension unit, EXU-4

Following functions can be obtained with this unit:

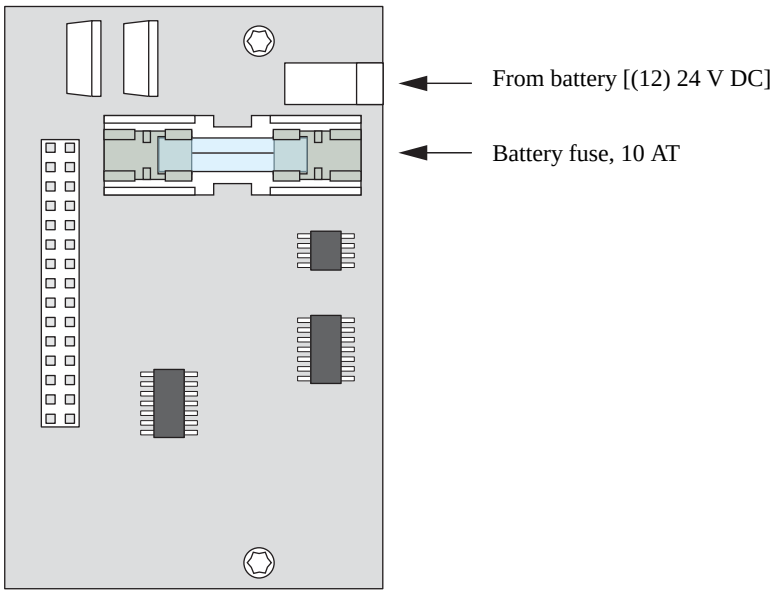


1) Connects the battery in absence of main power

2) Total load on all 24 V DC, max. 640 mA

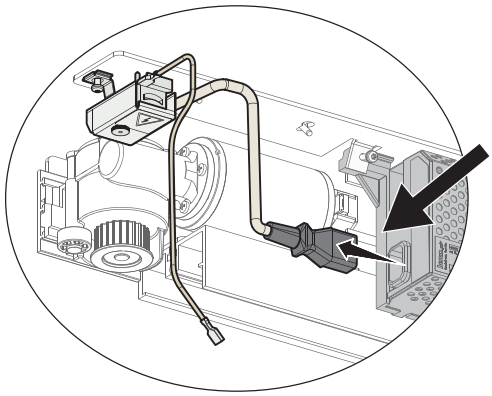
9.2.3 Extension unit, EXU-3

This extension unit has the functions **electrical emergency unit** or **convenience battery**. The battery cable is to be connected to the EXU-3.



After installing the automatic door, the Start-up and adjustment must be carried out in the following order (see also “Electrical connections” on page 19).

1



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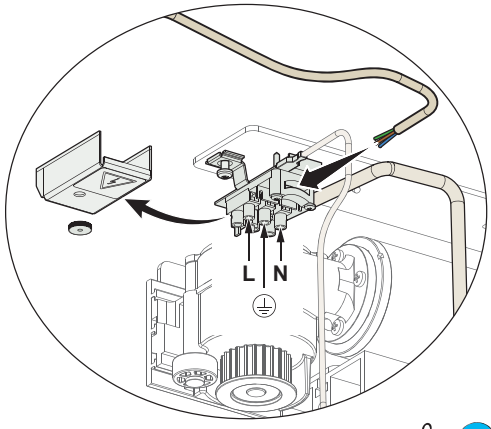

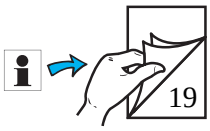

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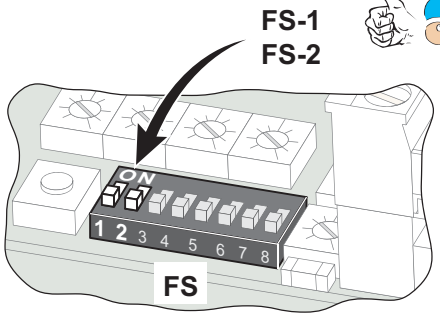

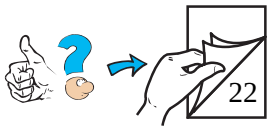

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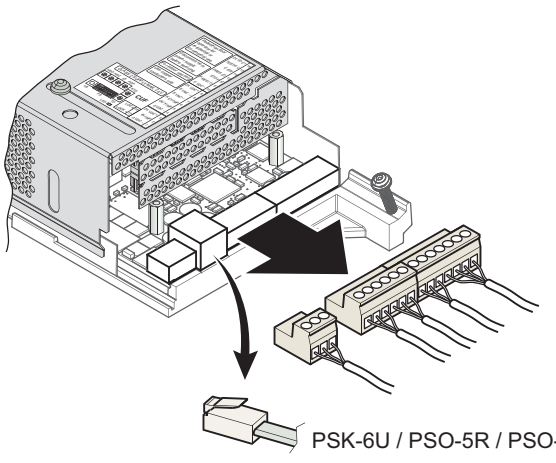

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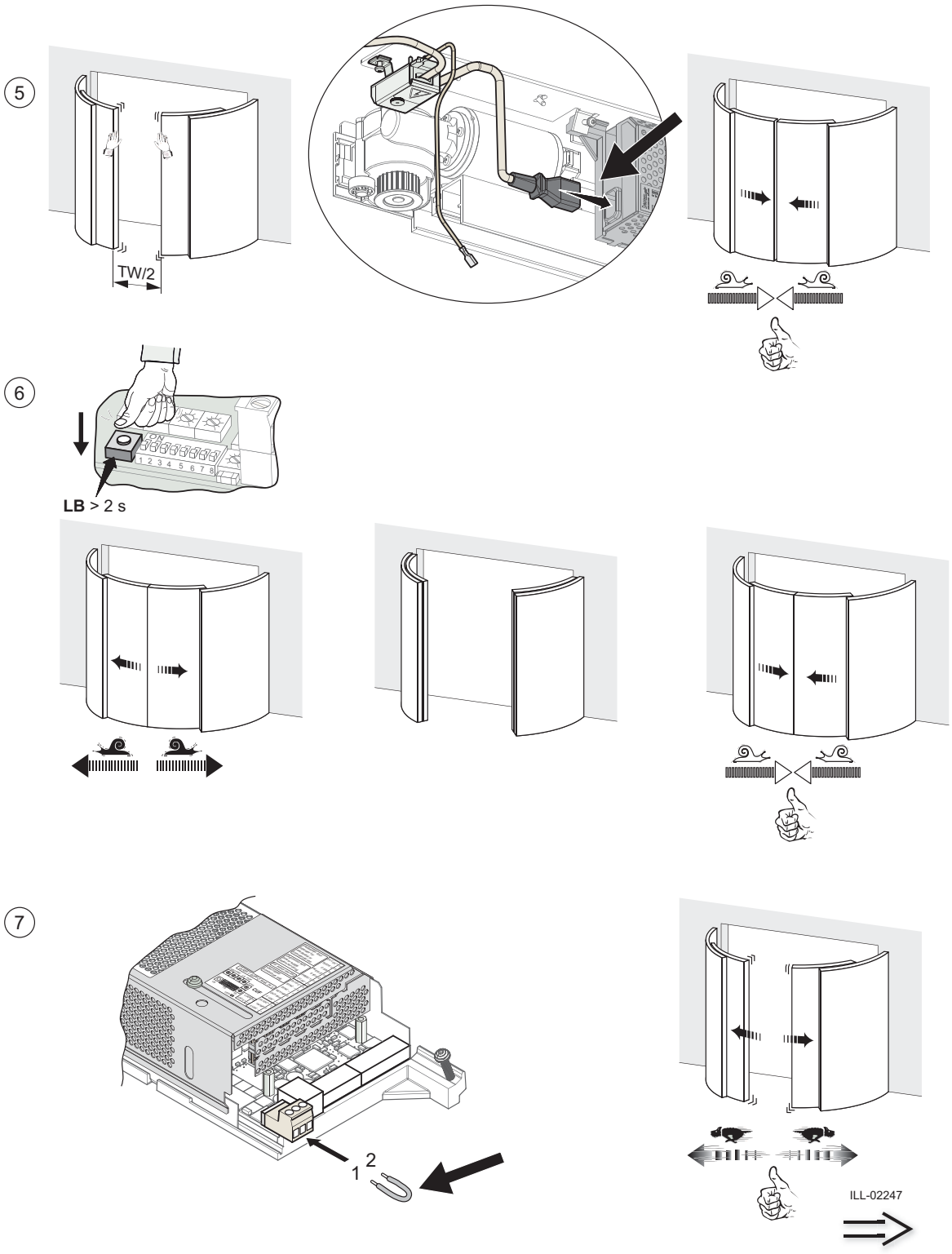
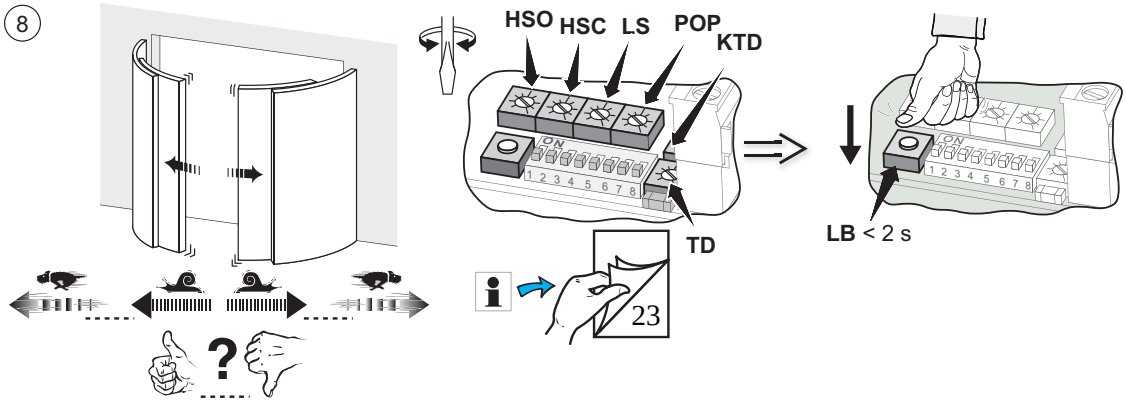
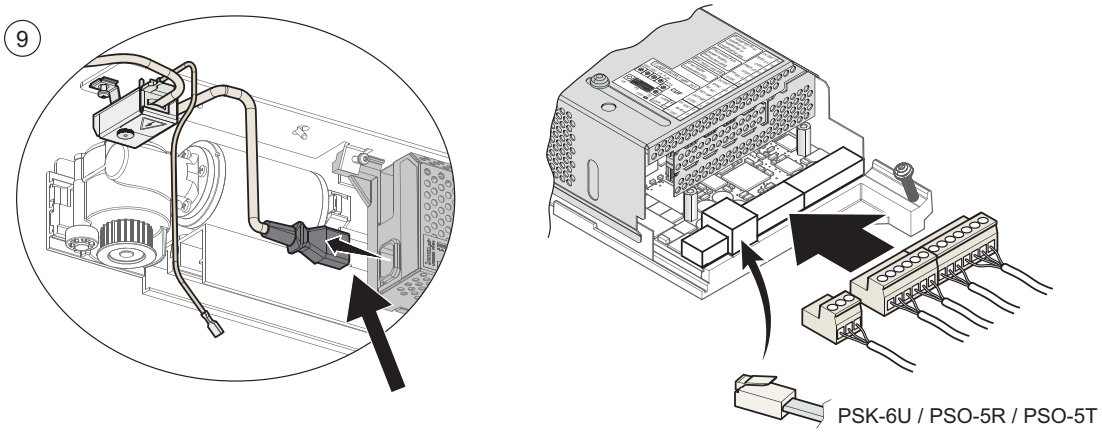
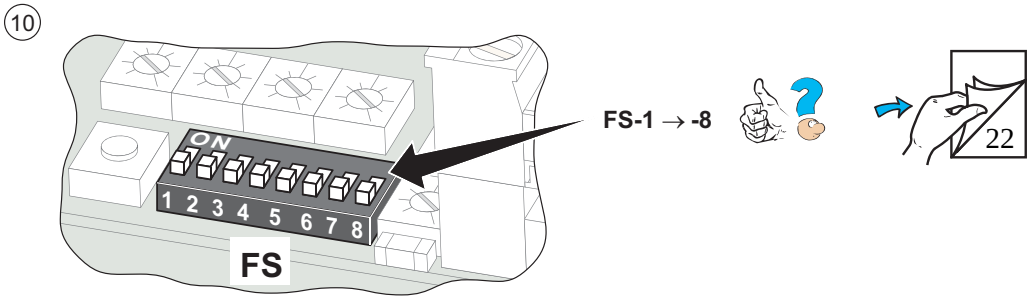


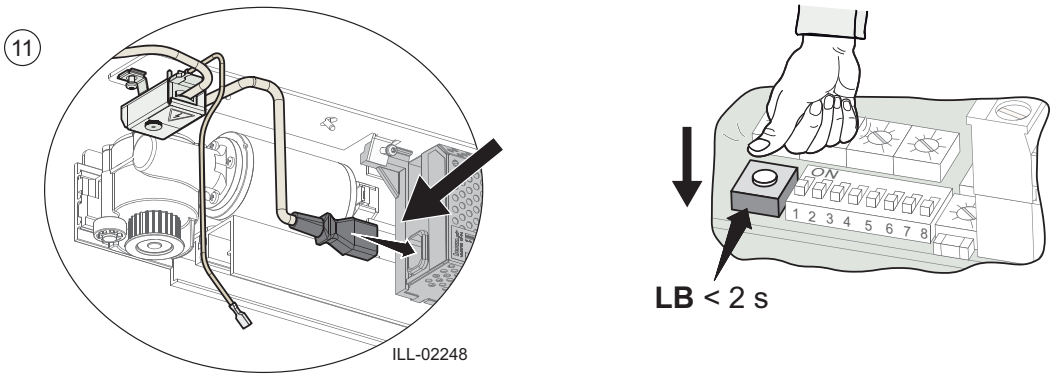
If necessary, adjust the door speeds to meet the specific application and regulation requirements.

Note! The “low speed” is self adjusting to optimal operation if the “low speed parameter” is set to **max**. Depending on authority or installation requirements the “low speed” can be further reduced.



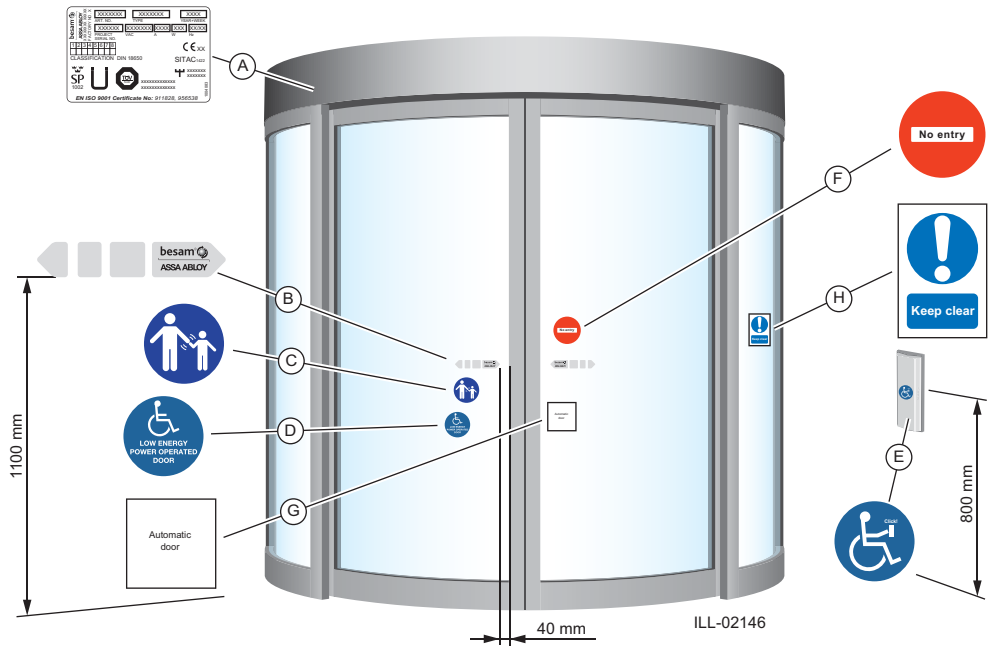






Note! Press the learn button briefly after any potentiometer adjustment, to use the new configuration.

Note! Check that the installation complies with valid regulations and requirements from the authorities.



Mandatory indicates that the signage is required by European directives and equivalent national legislation outside the European Union.

Ⓐ Product label: Mandatory

Ⓑ Besam door sticker: Mandatory, if applicable, to highlight the presence of the glass (applied to both sides of the door).

Ⓒ 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.

Ⓓ Operator designed for disabled people:
Recommended, if applicable (applied to both sides of the door)

Ⓔ Activation by disabled people: Recommended, if applicable

Ⓕ No entry, identifying one-way traffic: Mandatory in GB and US, if applicable

Ⓖ Automatic door: Only mandatory in GB

Ⓗ Keep clear: Only mandatory in GB

12 Programme selectors and functions

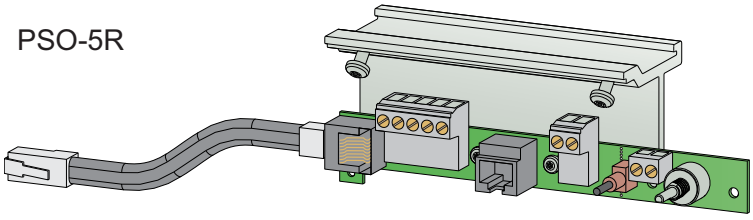
12.1 Operation

The functions of the door are set with key programme selectors. The key must always be removed on emergency escape doors after changing settings.

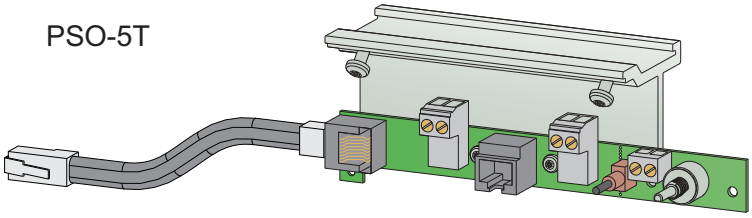
- PSO-5R, can be fully remote-controlled by PS-5M.
- PSO-5T, can be remote-controlled, day/night by PS-2, used for MEU.
- PSMB-5, mounting box, flush or surface mounted on the side screen or on the wall close to the door.
- PS-5M, flush or surface mounted, for central control of an optional number of operators. In setting “Auto” every connected operator are individually controlled by its own programme selector.
- PSK-6U, surface mounted on the side screen or on the wall close to the door.

Mounted in the operator

PSO-5R



PSO-5T

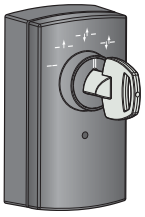


Flush mounted

PSMB-5
PS-5M

Surface mounted

PSMB-5
PS-5M

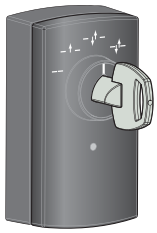


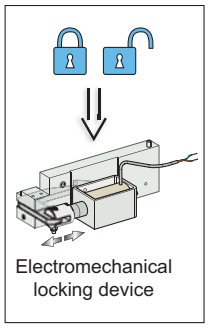
PSK-6U

12.2 Programme selector functions

Note! The key must always be removed on emergency escape doors after changing settings.

Note! In “Off”: The door can be manually pulled open if no mechanical/electromechanical lock is fitted





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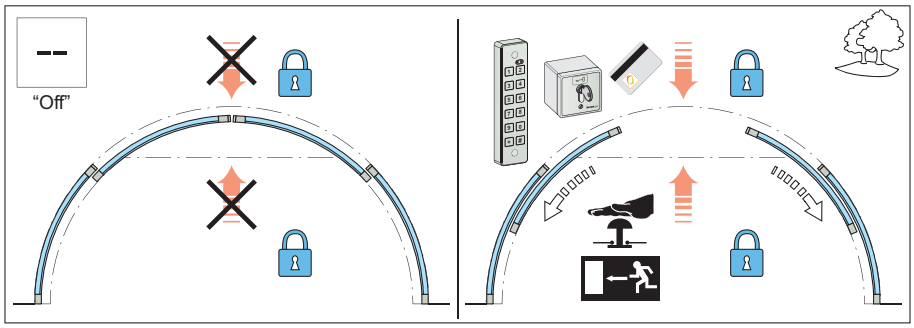
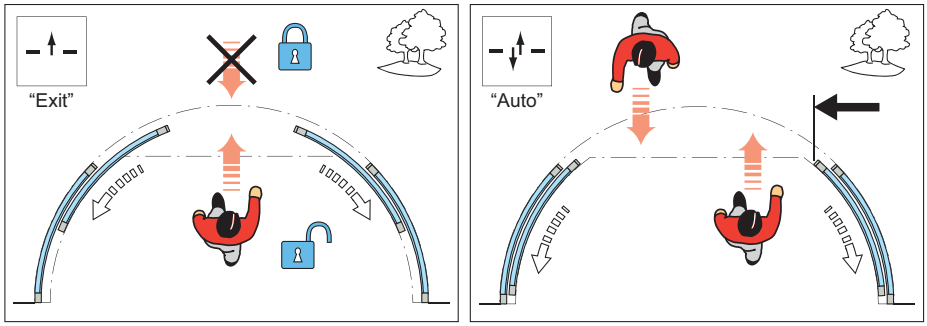
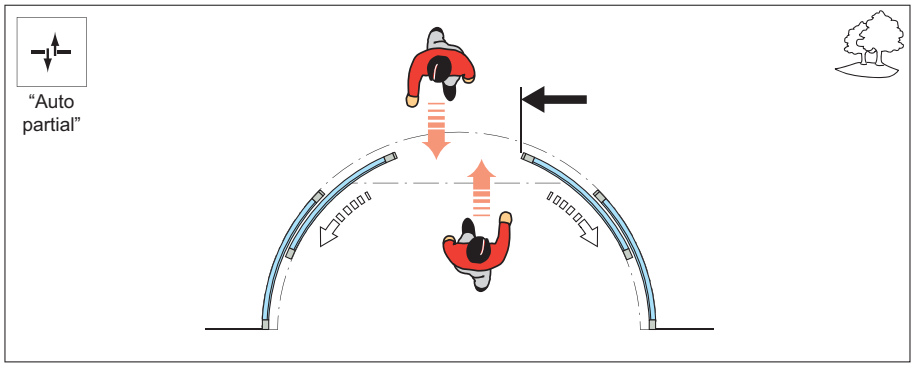
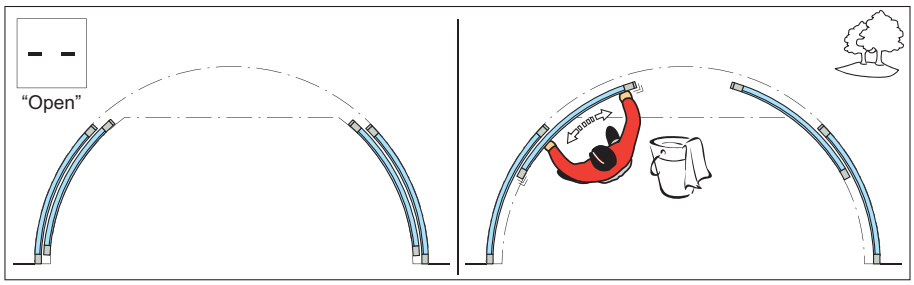
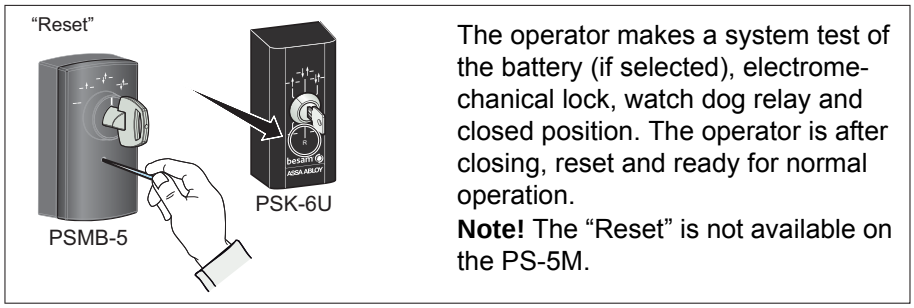










The operator makes a system test of the battery (if selected), electromechanical lock, watch dog relay and closed position. The operator is after closing, reset and ready for normal operation.

Note! The “Reset” is not available on the PS-5M.

13 Troubleshooting

Before starting the troubleshooting, check that the programme selector setting is correct and then reset the operator. Start the troubleshooting by checking the mechanical and electrical parts of the operator in the following order.

The control unit, emergency unit and electromechanical lock are fixed with brackets in the support beam. To replace, the complete unit is to be loosened and replaced.

13.1 Mechanical checking and remedies

Disconnect the mains power. Unlock all mechanical locks. Pull the door leaf manually and check that the door can be easily moved over the complete sliding track/floor guide. If the door leaf stops or is hard to move, the reason may be sand, stones, rubbish etc. in the floor guide. The door leaf may also be jamming on the floor or on the draught excluders. Clean the floor guide, adjust the door leaf height/depth or take other necessary measures e.g. replacement of wear parts until the door leaf is running smoothly when manually operated.

13.2 LED indication and CT Error codes

The control unit is equipped with a light emitting diode LED for error indication. By means of the configuration tool CT, a more detailed error description (CT error codes) can be obtained. See also separate manual for CT.

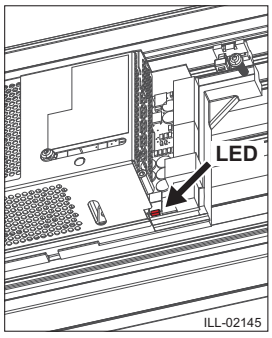
13.2.1 Normal operation/Non-critical errors

During normal operation and for non-critical errors the LED on the control unit is illuminated.

13.2.2 Power failure (no error code)

If the LED is extinguished check the mains power, power supply cable and perform a reset. If the problem remains replace the control unit.

13.2.3 LED indication



- **Sensor error**
  1 fast flash (0,2s), pause (1,0s) etc.
- **Emergency Unit error**
  2 fast flashes (0,4s), pause (1,0s) etc.
- **CUF error**
  3 fast flashes (0,6s), pause (1,0s) etc.
- **Motor/Encoder error**
  4 fast flashes (0,8s), pause (1,0s) etc.
- **Lock error**
  5 fast flashes (1,0s), pause (1,0s) etc.
- **Motor Temperature High**
  1 slow flash (1,8s), pause (0,2s) etc.
- **Normal operation/Non-Critical errors**
  Illuminated

13.2.4 Sensor Error

LED indication: 1 fast flash (0,2s), pause (1,0s), etc.

CT error code	Reason	Remedy
Presence Impulse Error	• The control unit doesn't get a test answer, from the activation unit.	• Make sure that the monitoring output is connected and the connections are OK.
		• Replace the presence activation unit.
Side Presence Impulse Error	• The control unit doesn't get a test answer, from the activation unit.	• Make sure that the monitoring output is connected and the connections are OK.
		• Replace the side presence activation unit.
Inner Impulse Error	• The control unit doesn't get a test answer, from the activation unit.	• Replace the presence activation unit.
		• Adjust sensor field so that the sensor can give a test answer.

13.2.5 Emergency Unit Error

The door is opened and stays open

LED indication: 2 fast flashes (0,4s), pause (1,0s), etc.

CT error code	Reason	Remedy
Emergency Unit Error	• The door is prevented from fulfilling its emergency unit test within a stated time, due to broken or weak rubber band, high friction or jammed door.	• Check rubber band tension or battery depending on configured "Emergency Unit Type" and make sure that the door can open to fully open position.
	• The battery voltage drops due to low capacity.	• Charge or replace battery.
Battery Error	• The battery is disconnected or short-circuited.	• Make sure that the cables are OK and connected.
		• Check the battery fuse.
		• Charge or replace battery.

13.2.6 CUF error

LED indication: 3 fast flashes (0,6s), pause (1,0s), etc.

CT error code	Reason	Remedy
RAM Error	• Internal RAM memory error.	• Reset, and if the problem remains, replace the control unit.
ROM Error	• Internal ROM memory error.	• Reset, and if the problem remains, replace the control unit.
EEPROM Error	• Serious internal EEPROM memory error.	• Reset. • Download a saved parameter set or DEFAULT parameter set and perform a reset. If the problem remains, replace the control unit.
EEPROM Critical Write Error	• Internal write EEPROM memory error. This error mainly occurs when it's impossible to change a configuration parameter.	• Reset. • Try to change the configuration parameter that caused the problem, and if the problem remains, replace the control unit.
SMPS Over Voltage	• The internal link voltage has for some reason increased to above 47 V.	• Reset, and if the problem remains, replace the control unit.
A/D Converter Error	• The internal A/D Converter or multiplexer is broken.	• Reset, and if the problem remains, replace the control unit.
Lock Circuit Error	• It is not possible to disconnect the lock with the lock relay.	• Reset, and if the problem remains, replace the control unit.
Hardware Watchdog Error	• It is not possible to disable the motor bridge.	• Reset, and if the problem remains, replace the control unit.
Output Enable Error	• Test of safety related circuits failing.	• Reset, and if the problem remains, replace the control unit.
Register Error	• Internal register error.	• Reset, and if the problem remains, replace the control unit.
OS Error	• Internal program error.	• Reset, and if the problem remains, replace the control unit.
Flash Code Error	• Serious internal programming error.	• Replace the control unit.

13.2.7 Motor / Encoder error

The motor and lock power are disconnected.

LED indication: 4 fast flashes (0,8s), pause (1,0s), etc.

CT error code	Reason	Remedy
Encoder Error	• The encoder, encoder cable, or Motor cable is damaged.	• Make sure that the encoder cable and the motor cable is connected.
	• Wrong Motor type is selected.	• Check Motor Type configuration with the CT-Tool.
Motor Current Error	• The Motor cable or Encoder cable is damaged.	• Make sure that the encoder cable and the motor cable is connected.
	• Wrong Motor type is selected.	• Check Motor Type configuration with the CT-Tool.
Encoder Cable Error	• The encoder cable is damaged.	• Make sure that the encoder cable is connected.

13.2.8 Lock error

The motor and lock power are disconnected.

LED indication: 5 fast flashes (1,0s), pause (1,0s), etc.

CT error code	Reason	Remedy
Lock Failure	• The lock or something else was preventing the door from opening the first 14 mm from closed position.	• Make sure that the lock is operating without friction.
		• Make sure that Hold Force and Lock Release are set correctly.

13.2.9 Motor Temperature High

The door is opened and stays open.

LED indication: 1 slow flash (1,8s), pause (0,2s), etc.

CT error code	Reason	Remedy
Motor Temperature High	• The duty cycle of the door is to high for the current speed settings and hold open time.	• If the motor is warm, put the door in PS OPEN and wait for at least 1 minute. Reduce speeds and increase hold open time.
	• The heavy-duty motor is replaced with a normal duty motor.	• Put the door in PS OPEN and wait for at least 5 minutes.

Note! This error is not removable by reset, only by setting the door in programme selection "Open" with the power on.

13.2.10 Non-Critical errors

These errors don't influence the door operation but are logged in the error log, and can only be displayed by means of the CT-Tool.

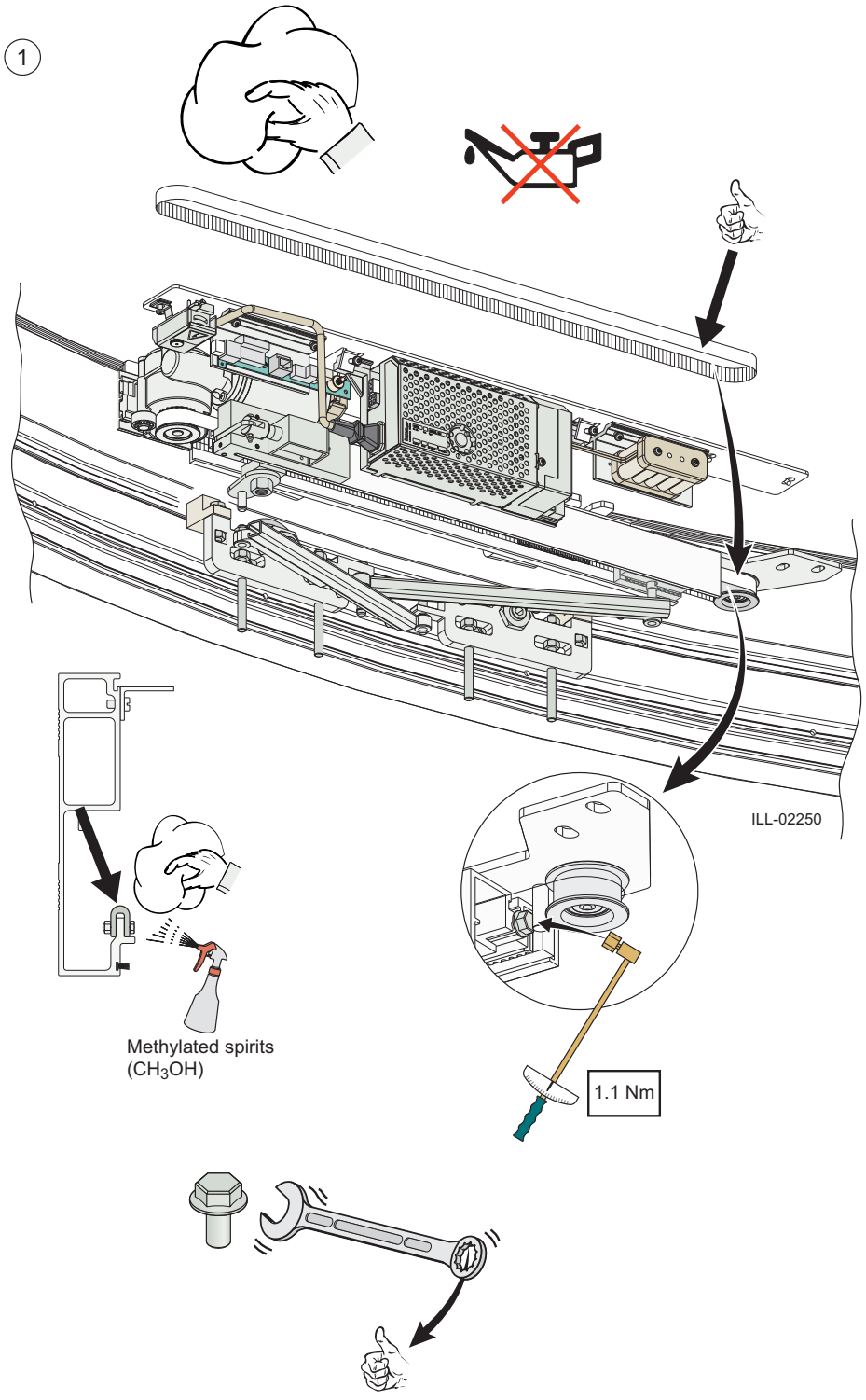
LED indication: Illuminated

CT error code	Reason	Remedy
Communication Error	• The cable to the CT-Tool was removed before performing “Disconnect” from the CT-Tool.	• Connect the CT-Tool and “Disconnect” from the CT-Tool before removing the cable.
EEPROM Access Error	• The EEPROM queue is full.	• Too many events to log in the event log. Reduce the number of events to log in the event log configuration.
EEPROM Non-critical Write Error	• The control unit cannot write error log, event log, or service log information to the EEPROM memory.	• Reset, and if the problem remains, replace the control unit if it is important to read log information.

13.3 After remedy or replacement the operator has to be checked as follows:

1. Study the door movement and adjust the functions to the values required for a smooth door operation.
2. Check that correct functions and values have been selected for the installed accessories and that the installation complies with valid regulations and requirements from the authorities.
3. Clean the cover and the doors.

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



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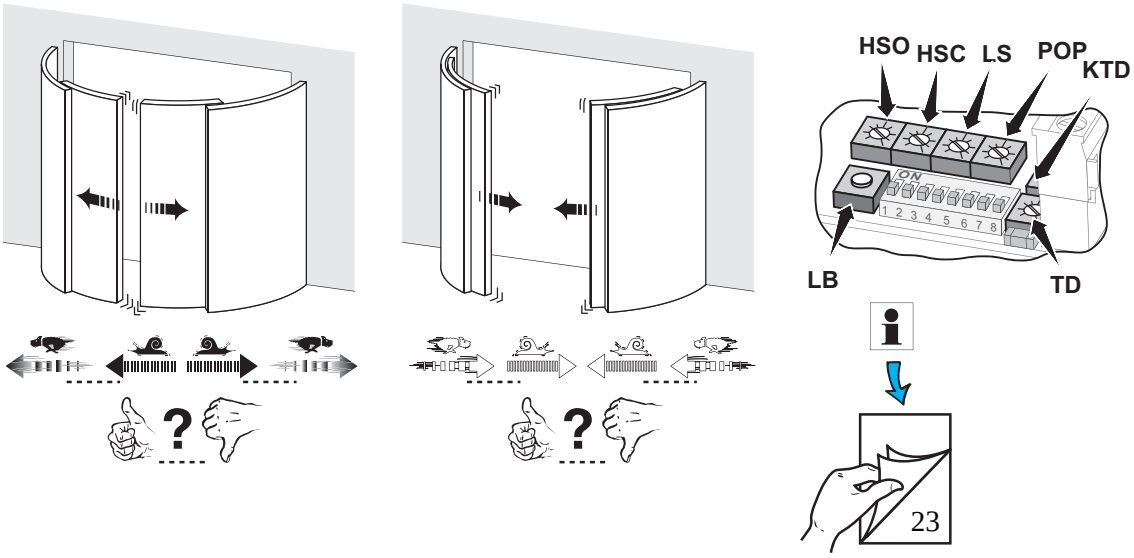

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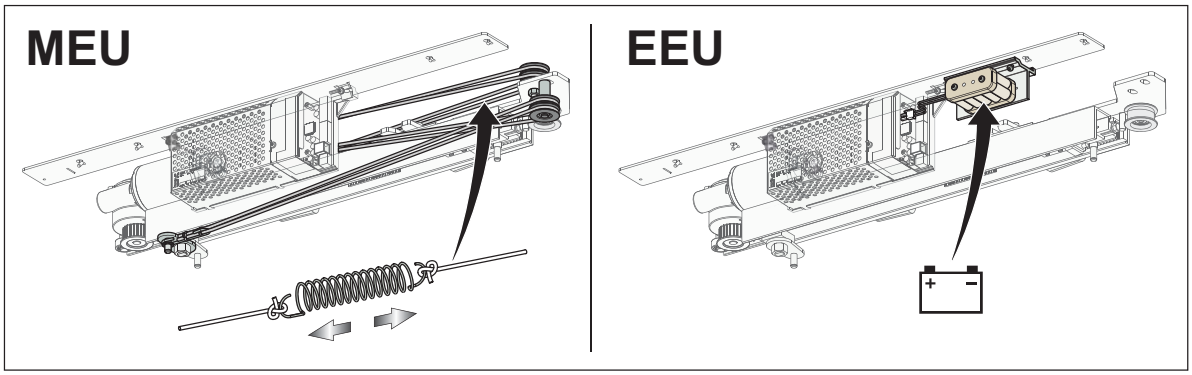

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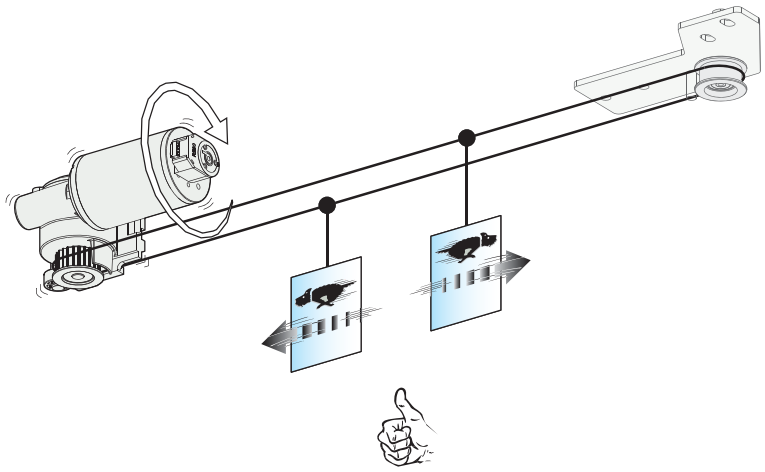

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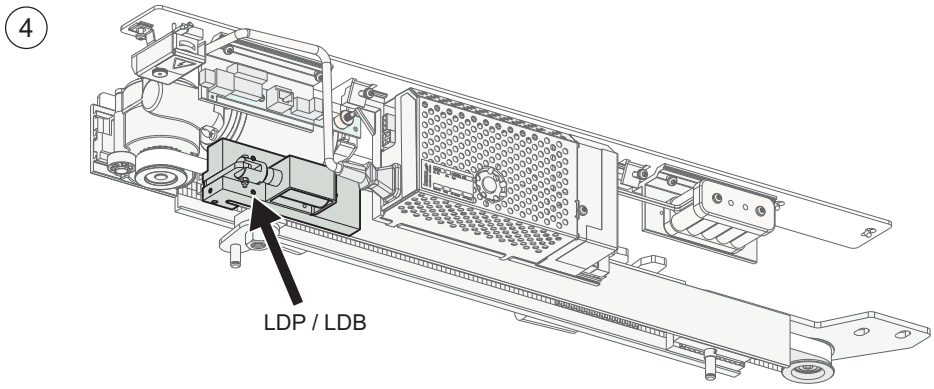

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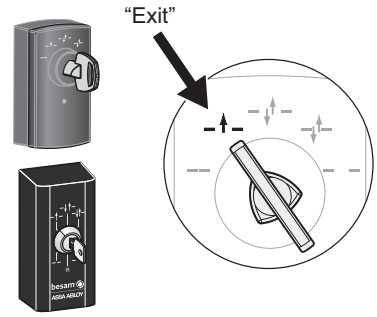

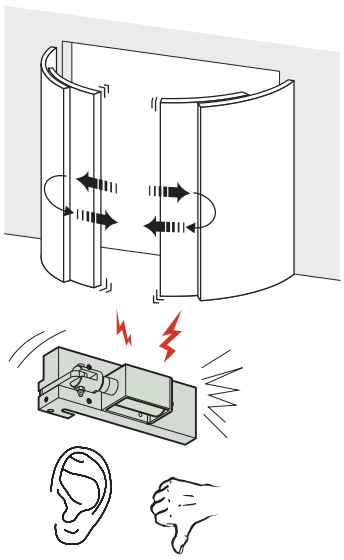

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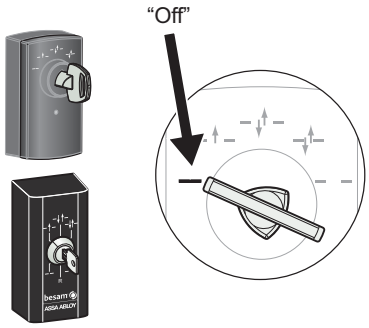

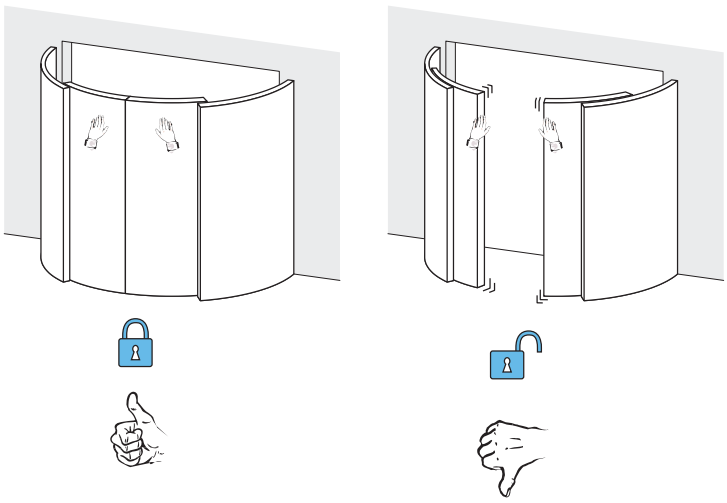

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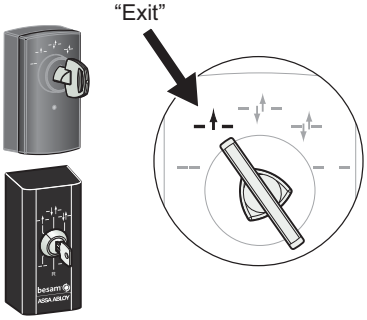

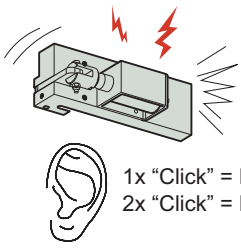

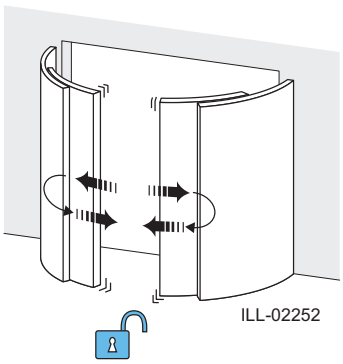

14.1 Maintenance plan

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	
Electrical emergency unit battery	33550475	24	24	24	24
Mechanical emergency unit elastic cord	331700121	12	12	12	12
Floor guide shoe Felt padded	33831622	24	12	6	6
Carriage wheel Single	246319	36	24	12	12
Tooth belt	33735251	60	48	36	24

Check that all required signage, see page 33, is applied and intact. Also check other consumable parts, such as brushes, door stops and glazing rubbers.

15 Accessories

15.1 Safety accessories

Even though the CMD is installed to comply with all applicable safety regulations, it is possible to enhance safety/comfort with the following add-ons (please contact your local Besam company for detailed description).

- Combined motion and presence sensors
- Separate presence sensors

15.2 General accessories

Your CMD can be further improved with the following add-ons (please contact your local Besam company for detailed description).

- Cover
  Made in clear anodized aluminium as standard. Paint finished in RAL colours or anodizing optional.
- Motion and presence sensors, see separate manuals or installation drawings.
- Programme selectors, see page 34 and separate installation drawings 656037 and 656058.
- Electrical locks
  Locked with power, locked without power or bistable lock. See separate installation drawing 1002012.
- Micro switch kit
  For indication of door and lock position.
- Electrical emergency unit
  Used if a door is required to be closed or opened by means of a rechargeable battery unit and remain in this position in the event of power failure, see page 6. Every 3.5 hours the following opening impulse generates an emergency opening test if monitoring of the emergency unit is selected. If there is no opening impulse within an additional time, specified by the authorities, the operator control unit generates the opening impulse itself.
  If the battery opens the door within the limited time the test is successful and the door resumes the function set by the programme selector.
  Note! The test is never performed in programme selector setting “Open”. In setting “Off” it can be selected. The test is always performed after a Reset and after changing program selection, from a position where a test is not done to a position where the test is a demand.
- Emergency closing with repeated closing
  If the door is opened by hand after an electrical emergency closing, it will close again.
- Mechanical emergency unit
  Used if a door is required to be opened and remain opened by means of an elastic cord in the event of power failure. Every 3.5 hours the following opening impulse generates an emergency opening test if monitoring of the emergency unit is selected. If there is no opening impulse within an additional time, specified by the authorities, the operator control unit generates the opening impulse itself. If the elastic cord opens the door within the limited time the test is successful and the door resumes the function set by the programme selector.

Note! The test is never performed in programme selector setting “Open”. In setting “Off” it can be selected. The test is always performed after a Reset and after changing program selection, from a position where a test is not done to a position where the test is a demand.

- Interlocking
  Used between two operators when the first operator must close before the other one can open (typical to reduce energy losses and not for security reasons). EXU-4 required.
- Convenience battery UPS
  Stand-by supply which gives continued operation during short power failure. EXU-3 or EXU-4 required.
- Emergency opening
  Opens the door in any programme selector setting (fireman's opening). EXU-4 required.
- External error indication
  Obtained if a lamp or a buzzer is connected. EXU-4 required.
- Key switches (flush and/or surface mounted)
  Used to give opening impulse to the door in any programme selector setting. With electrical emergency unit also during power failure.
- Push button
  Used to give opening impulse to the door. See separate installation drawing 656005.

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