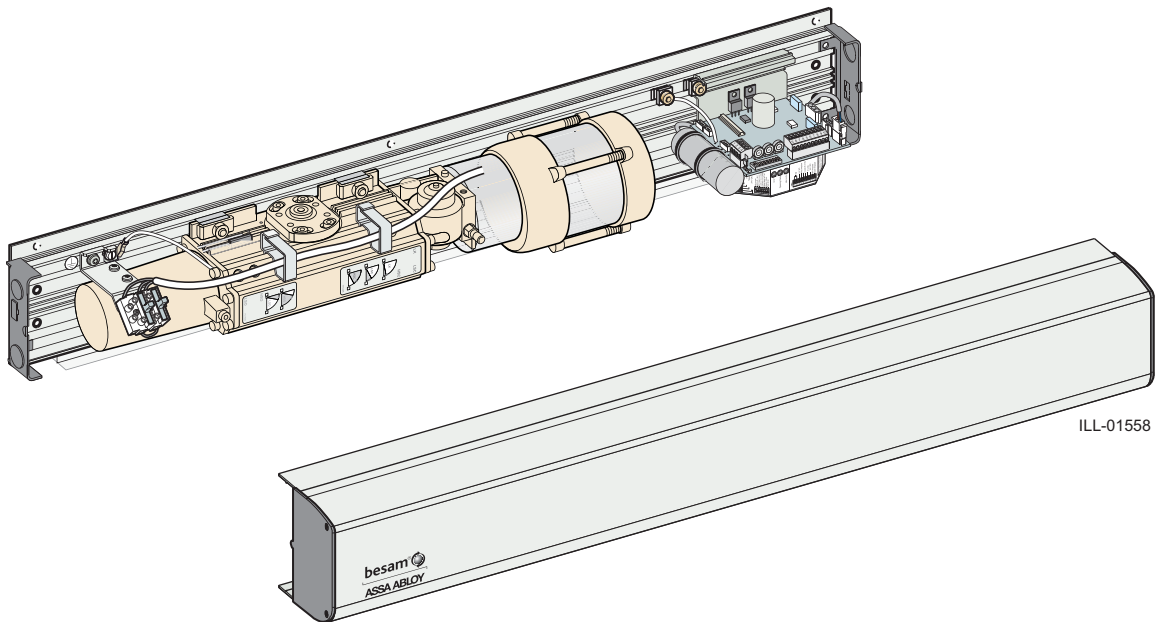


Besam Swing Door Operator PowerSwing (CSDB)

Installation and Service Manual



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Following pages have been revised:

Page	Revision
5	New paragraph; 2.4 Glazing Material. Part of sentence in paragraph 2.3 deleted.
7	Changed length dimensions. New standard (CSA C22.2 No.247) added
11	Text change; "Outer Hold Open Time" added
14	Text change; "not" and new dimensions added in section "Single Operator"
15	Two Part Numbers changed
32	Chapter 11; Sentence "If the power cable.."deleted. New paragraphs; 11.1.3.Program Selectors, 11.1.4 Safety Instructions, 11.1.5 Grounding Instructions
36	Text change; "For entrapment see "ANSI / BHMA A156.10" on page 41 and "ANSI / BHMA A156.19" on page 45." added
41	New chapter added; "15 ANSI / BHMA A156.10"
46	New chapter added; "16 ANSI / BHMA A156.19"

2.1 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.

2.2 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.

2.3 Environmental requirements

Besam products are equipped with electronics 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.

2.4 Glazing Material

The glazing material for swing doors shall comply with ANSI Z97.1.

This manual contains the necessary details and instructions for the installation, maintenance and service of the Besam PowerSwing.

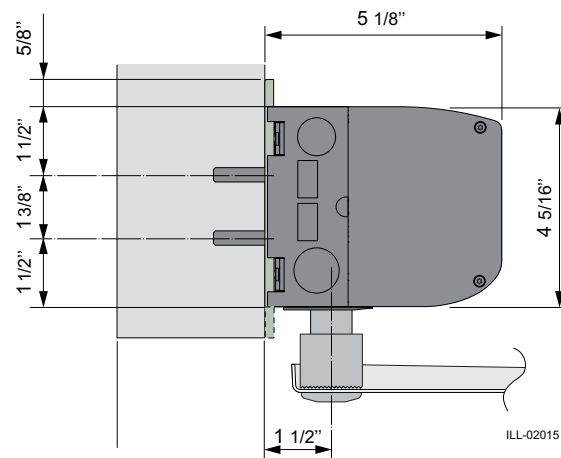
The Besam PowerSwing is suitable for most types of external and internal swing doors. The operator can be mounted to walls on either side of the door for pull or push action and is suitable for single or double doors fitted with butt hinges or pivots. It can also be installed on the door leaf.

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.

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

Mains power supply	120 V AC $\pm 10\%$, 60 Hz fuse 10 A Note! A readily accessible switch with clearly marked OFF-position, having a contact separation of at least 1/8" in all poles, must be incorporated in the fixed wiring in accordance with local codes.
Power consumption	max. 230 W
Auxiliary voltage	24 V DC, 700 mA (stabilized)
Motor fuse F1	10 Amp (10 ATH)
Control fuse F2	1/2 Amp (500 mA T)
Recommended max. door weight	Arm system PUSH: 550 lb for door leaf width 63" Arm system PULL: 220 lb for door leaf width 55" Higher door weights on request
Standards	The PowerSwing complies with ANSI/BHMA A156.10, A156.19, UL 325/CSA C22.2 No.247
Door opening angle:	Push arm: 80° - 120°, with reveal 0 - 19" Pull arm: 80° - 120°, with reveal 0 - 5 1/8"
Opening time (0° - 80°)	variable between 2 to 6 seconds
Closing time (90° - 10°)	variable between 2 to 6 seconds
Hold Open Time (HOT)	variable between 0 to 30 seconds
Ambient temperature	+5°F to +86°F
Relative humidity (non-condensing)	max. 85%
Dimensions	Length: PowerSwing (standard cover) 39 1/4", 51", 99" Height: 4 11/32" Depth: 5 1/8"
Class of protection	IP 20

This product is to be installed internally.



The PowerSwing works electro-hydraulically. It opens with an AC-motor that through 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.

5.1 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, causing the door to open at a high rate of speed. Before reaching the 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. The open position is held by a hydraulic valve.

5.2 Closing

The spring closing starts when the hold open time has expired. Before reaching the fully closed position the speed is reduced to low speed, which continues until the door is completely closed. The door is held closed by spring power. To overcome the resistance of a strike plate a “lock kick” can be adjusted to meet the requirements of most installations.

5.3 Functions on the Control Unit CSDB

5.3.1 Key Impulse

Key impulse will open the door in program mode selections OFF, EXIT and AUTO and will keep the door open during key hold open time.

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



5.3.2 Outer Impulse



Outer impulse will open the door if the Program Selector is set to AUTO therefore keeping the door open during the outer hold open time, which can be adjusted between 0 to 30 s.



5.3.3 Multi Voltage Input (MVI)



MVI impulse accepts a dry (no voltage) contact or 6-24 V AC/DC.

Status of lock (operation mode) can be selected through a function selector FS2 which 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 13 	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.

Program selector **must not** be connected to TB2:13 if input is 6-24 V. Instead, connect program 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), when using the function selector FS3.

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

5.3.4 Kill Input

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

Key impulse will activate lock when kill is activated if key impulse 0 VDC is not connected to TB2:5.

When Kill mode is deactivated, the door will act according to one of the current input statuses.

Several Kill mode inputs are possible to connect in parallel with other CSDB control units. Connect to Kill electrical lug on 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 through the function selector FS1 (Kill Jumper).

5.3.5 Open Limit Switch

The Open Limit Switch indicates a fully open door and can be adjusted for opening angles up to 120°.

When the Open Limit Switch is activated the motor will stop. If the open limit switch is not activated, the motor will stop 10 seconds after an activation impulse is received.

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

The illuminated LED indicates an activated limit switch.

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

5.3.6 Home Switch (optional)

When no home switch is installed and the open limit switch is deactivated (when the door is closing) and no activation impulse received, a timer starts and after 6 sec. the status will change from Close to Closed Door.

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

“Opening Delay” for lock (0 to 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.

5.3.7 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 through the Function Selector FS4 (Locked w. / w.o. power).

The lock activation time can be either 1,5 s + opening delay or until closing. It can be selected through the function selector FS5 (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 to 3 s.

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

5.3.8 Double Door

The CSDB on the Slave Unit must be configured as a slave. This can be selected through the function selector FS7 (Master / Slave).

To prevent the thicker door panels from jamming, a delay of 0,5 sec. can be selected through Function Selector FS6 (Slave Delay). A Home Switch is recommended to prevent an open delay, if a activation impulse should be received while closing.

5.3.9 Push to Go

A push or pull on the door from Closed Position will start an automatic opening cycle if the program selection is AUTO or EXIT, and remain open during the hold open time “Outer Hold Open Time” (0 to 30 s).

A home switch on the operator is needed to achieve Push to Go and the Function Selector FS8 (Push to Go) must be set to ON.

The LED indicates when the Home Switch is active.

5.3.10 Error Messages

The LED indicates sensor error; 1 flash of 0,2 sec. and then 1 sec. pause etc.

5.3.11 Program Selector

Program Selector PS-3B, having 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 will work even in program selection OFF position.

Presence sensors are enabled in all Program Selector settings, unless in the Kill Mode of operation.

5.4 Functions on the Extension Unit EXB

5.4.1 Inner Impulse

Inner impulse will open the door if Program Selection is set to AUTO or EXIT and keep the door open during the hold open time.

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

5.4.2 Low Pass Filter (automatic cycle delay)

This function is used in Europe for handicap individuals who want to use an automatic door. This function requires the individual to push and hold or maintain the **inner** impulse signal for a specified amount of time to automatically open the door. The time can be adjusted from 0 to 5 sec.

5.4.3 Presence Impulse Approach, Door Mounted

Presence Impulse will prevent an open door from closing and will re-open a closing door.

Presence impulse is ignored when home impulse is active.

Presence impulse is ignored if the door is manually opened.

Presence impulse is not ignored if the door is opened with Push to Go.

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

5.4.4 Presence Detection Swingpath, Door Mounted

Presence Detection prevents a closed door from opening and stop a door from continuing to open.

A switch can be used to blank out / inhibit the sensor from detecting a wall or object close to the open door. In addition, a second switch can be added to extend the inhibit zone.

Two LED's indicate the blank out/inhibit switch status. One LED for the master door and one for the slave door. The LED will illuminate if either of the two blanking/inhibit switches are activated.

Presence detection can be selected through two function selectors jumpers, “Presence Detect Master” and “Presence Detect Slave”.

5.4.5 Sensor Monitoring

Monitoring can be selected through a function selector jumper (Presence 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.

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

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

5.4.6 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 seconds after the door has started to close. If a home switch is installed, the OPD will be active as soon as the door is closed.

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

5.4.7 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 through a function selector jumper (Sensor type OPD/Mat).

5.4.8 LockOut

LockOut is used to ignore the OPD sensor during opening and closing. Output will be low (0 V DC) when the door is considered closed, high during opening and open and toggling when the door is closing.

LockOut output will be low (0 V DC) when the door is manually opened.

5.4.9 Program selector

Program 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 Program Selector settings but not when Kill Mode has been activated.

Two main models of the PowerSwing are available:

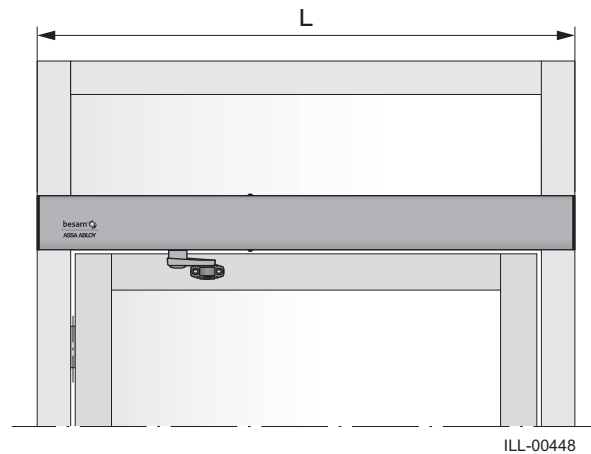
- Single Operator
- Double Operator

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

6.1 Single Operator

The product is delivered complete with back plate, control unit, end plates and cover. Length not including end plates, $L = 39 \frac{1}{4}''$ or $51''$.

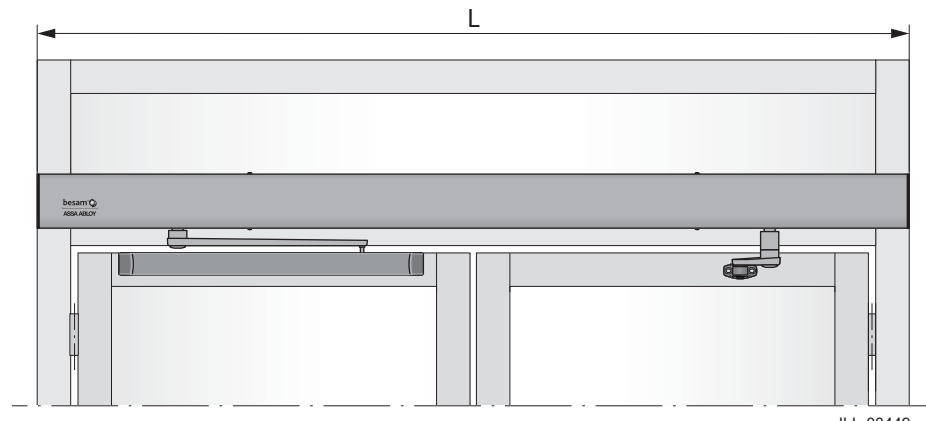
Pushing arm system shown.

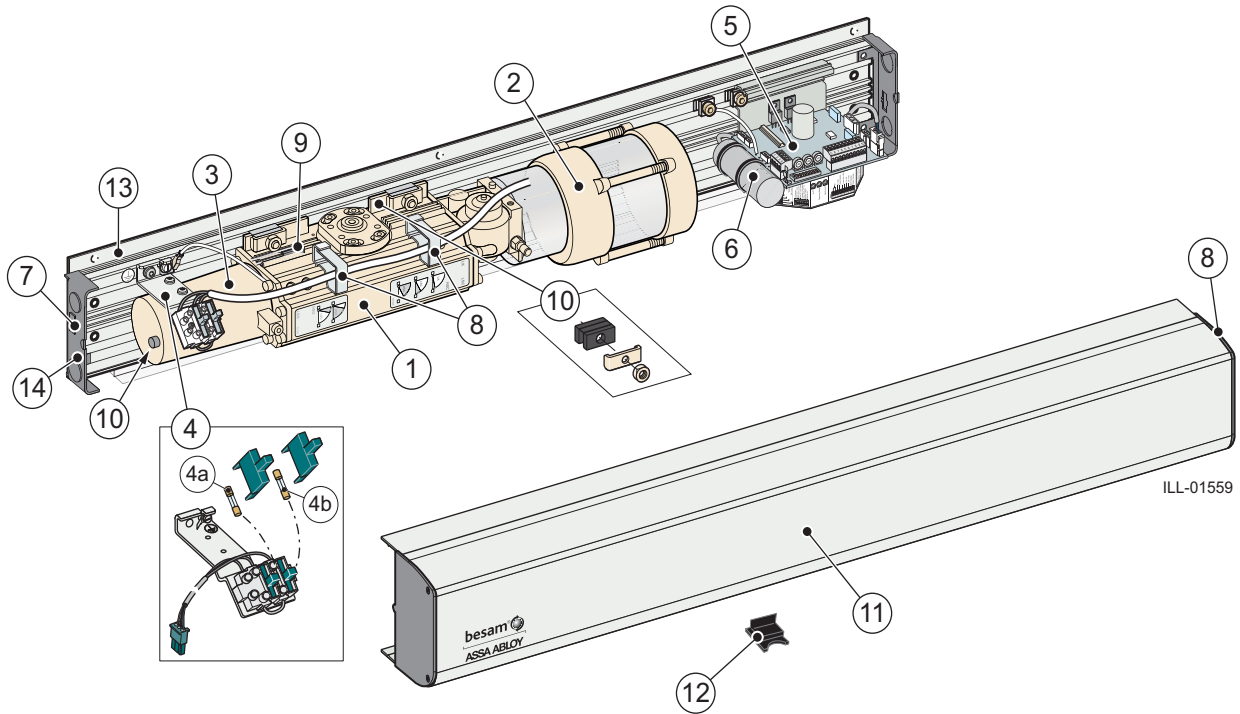


6.2 Double Operator (Consult Product Order form for availability)

The product is delivered complete with back plate, control unit, end plates and cover. Cover length L is optional.

Two operators can be mounted under the same cover to open one door each. Pushing and pulling arm system shown (double egress).

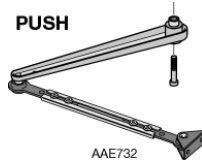




Item No.	P/N	Description
1	173721	Hydraulic unit 100/120 V AC, complete with motor, pump and spring tube
2	—	Motor / Pump
3	—	Spring tube
4	655580	Mains connection harness, 100/120 V
4a	714254	Fuse 0.5 AT slow, 120 V
4b	715236	Fuse 10 ATH slow, 120 V
5	1004204	Control unit CSDB, 120 V AC
	1004116	Extension unit EXB (see page 18)
6	655600	Capacitor (25 μ F) 120 V, complete
7	1004117	3-position switch, PS-3B for CSDB (see page 18)
8	1003542	Top end plate
9	655614	Limit switch, L = 19 3/4" (see page 18)
	1004205	Limit switch, L = 78 3/4" for double doors (see page 18)
10	1003882	Vibration absorbers at hydraulic unit and magnetic oil plug
11	US04-1402	Cover profile - State L and surface treatment
12	1003545	Fill cover
13	US04-0505	Back plate - State L and surface treatment
14	1003543	Bottom end plate

8.1 Arm systems

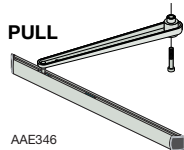
8.1.1 Arm System, PUSH, Heavy Duty Arm / Hybrid



PUSH: P/N: 173099BK
 Heavy Duty Arm / Hybrid: P/N: 21-06-173383

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.

8.1.2 Arm System, PULL

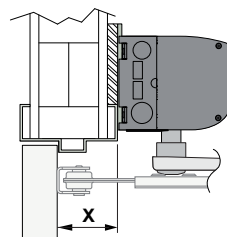


P/N: 100125 BK

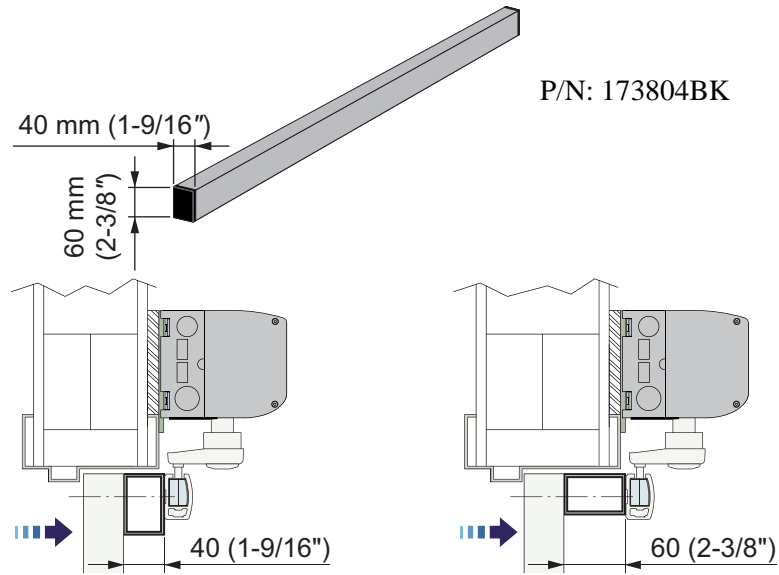
This arm system is delivered with drive arm, guide shoe and door fitting. It is used if the operator is installed on the wall on the same side as the door swing, for example the door is pulled open.

8.1.3 PUSH / SAS-F Arm Extensions

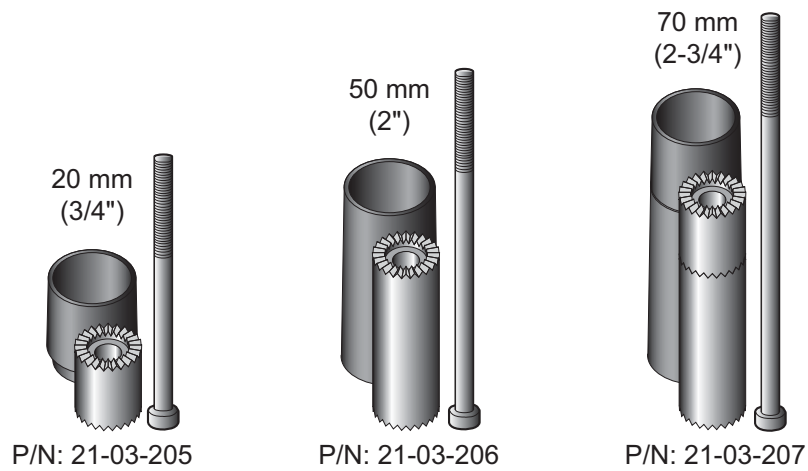
Reveal = X	Extension/Joint part		P/N
Up to 4 3/8"	None (standard arm)	–	–
4 3/8" to 9 1/4"	13 9/16"		21-06-173005
9 1/4" to 14 1/8"	9 1/16" + Joint part		21-06-173004 21-06-173191
14 1/8" to 19"	13 9/16" + Joint part		21-06-173005 21-06-173191



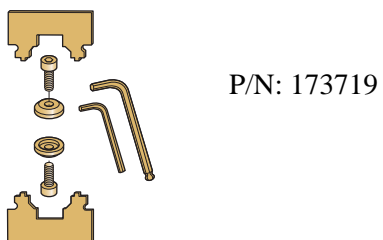
8.1.4 Reveal Spacer, PULL



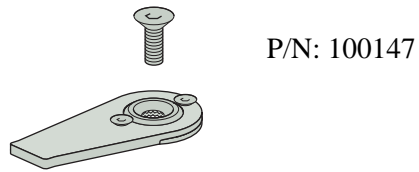
8.1.5 Drive Shaft Extension Kits



8.2 Tool Kit to change rotation direction



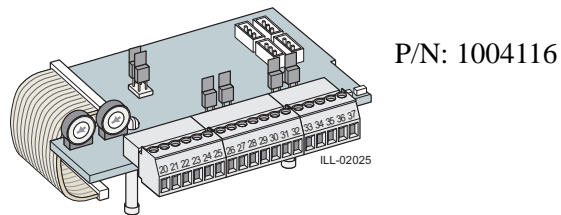
8.3 Door Stop



8.4 Limit Switch

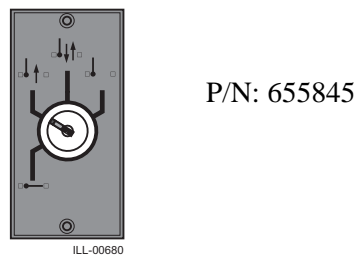


8.5 Extension Unit, EXB

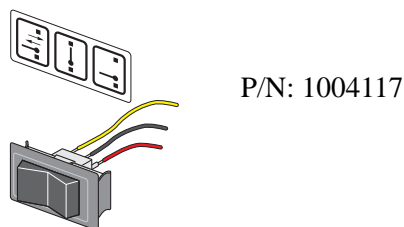


8.6 Control Switches

8.6.1 4-Position Switch with Key PS-4C (with EXB)



8.6.2 3-Position Switch PS-3B



8.7 Labels



P/N: 75-20-100
Dual Side “Automatic Door / Do Not Enter” – (Out)



P/N: 75-20-101
Dual Side “Automatic Door / Do Not Enter” – (In)



P/N: 75-20-102
Dual Side “Caution Automatic Door”



P/N: 1001695
Dual Side “Supervision of child”

PUSH TO
ACTIVATE

P/N: 21-24-006
Push side “Push to Activate”

PULL TO
ACTIVATE

P/N: 21-24-008
Pull side “Pull to Activate”

ACTIVATE
SWITCH TO
OPERATE

P/N: 21-24-007
Dual Side “Activate Switch to Operate”

8.8 Push Plates

8.8.1 Push Plates



P/N: 75-02-101



P/N: 75-02-102



P/N: 75-02-107



P/N: 75-02-108



P/N: 75-02-280

8.8.2 Remote Transmitter Push Plates



P/N: 75-02-273



P/N: 75-02-272



P/N: 75-02-269



P/N: 75-02-270

8.8.3 Installation Box for Narrow Plates



P/N: 75-21-002

8.8.4 Remote Receiver



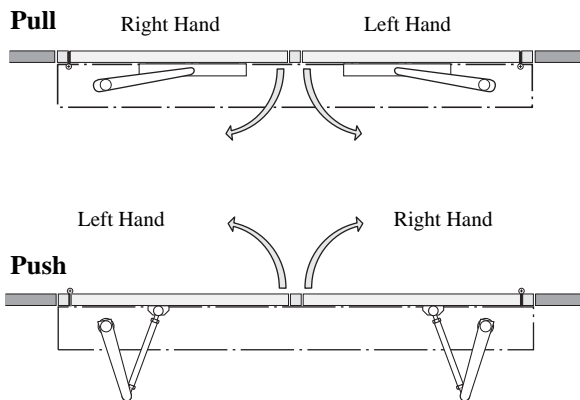
P/N: USRD433

9.1 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.

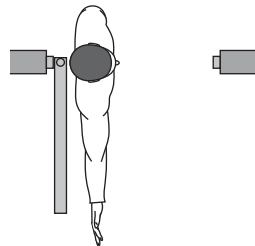
9.2 Door/Operator handing

9.2.1 Operator handing

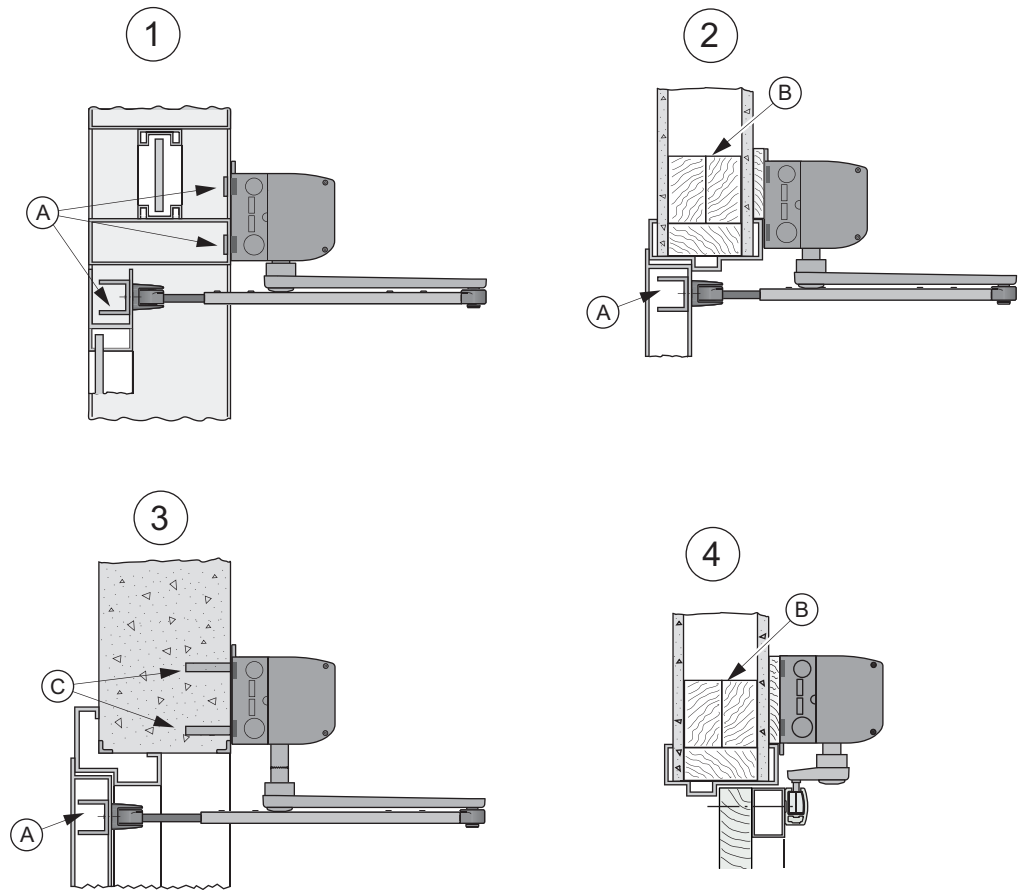


9.2.2 Door handing (Automatic Door Industry)

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.



9.3 Installation examples



1. Aluminum profile system
2. Plasterboard wall
3. Reinforced concrete wall and brick wall
4. Plasterboard wall

- A. Steel reinforcement or rivnut
B. Wood reinforcement
C. Expansion-shell bolt (for brick wall min. M6x85, UPAT PSEA B10/25)

9.4 Fastening requirements

Base material	Minimum requirements of wall profile*
Steel	3/16" **
Aluminum	1/4" **
Reinforced concrete	min. 2" from the underside
Wood	2"
Brick wall	Expansion-shell bolt, min. M6x85, UPAT PSEA B10/25, min. 2" from the underside

* Besam minimum recommended requirements. Building Codes may give different specifications. Refer to AHJ (Authority Having Jurisdiction).

** Thinner wall profiles must be reinforced with rivnuts.

9.5 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
- Carpenter's level
- Tape rule
- Power drill and set of drill bits
- Center punch
- Wire stripper
- Silicone sealant
- Installation and Service Manual 1004935-US-3.0 (this manual)

9.6 Installation on double doors

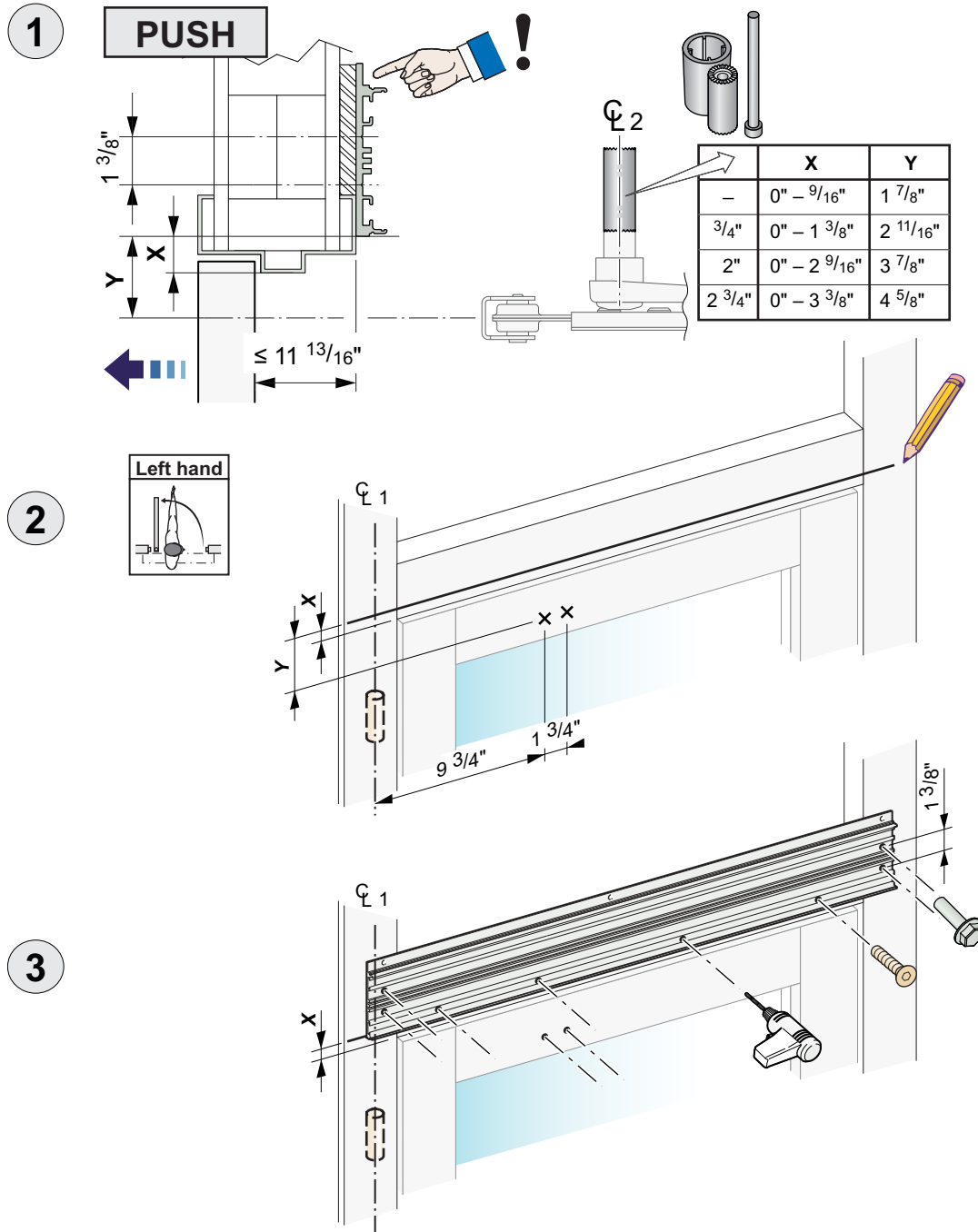
If the operators are to be mounted at the same height with pushing and pulling arm systems, the height is determined by the pulling arm system, PULL. The pushing arm system PUSH/SAS-F must always have a shaft extension, minimum 2".

Example: If PULL has a 3/4" extension, the PUSH/SAS-F must have a 2 3/4" extension.

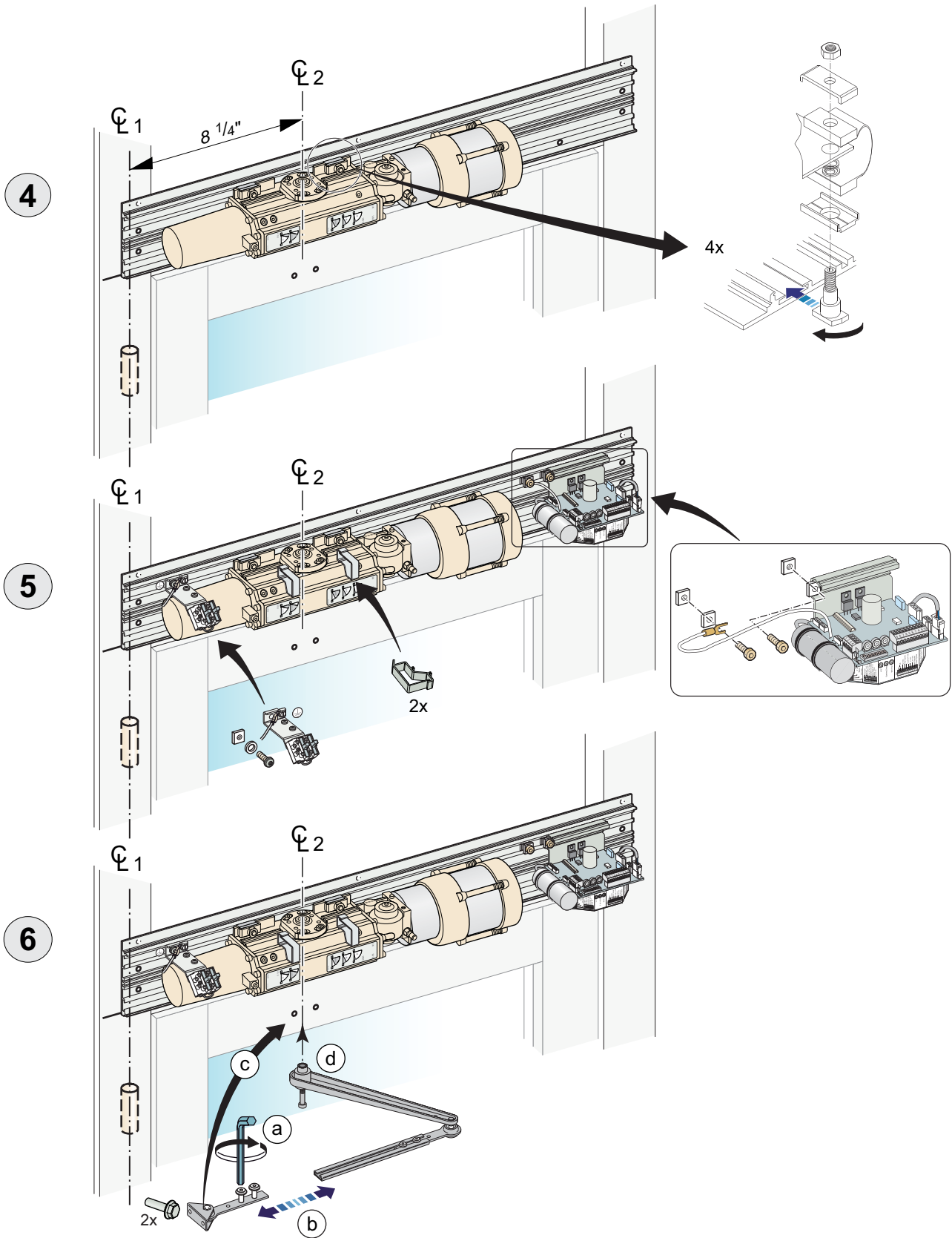
For installation follow the instructions for the applicable arm system.

This instruction comprises the installation of the Besam PowerSwing with arm systems **PUSH/SAS-F**, which push the door open and **PULL**, which pull the door open. See also "QuickStart" which is enclosed with each operator.

10.1 Wall Mounted Operator with Arm System PUSH / SAS-F

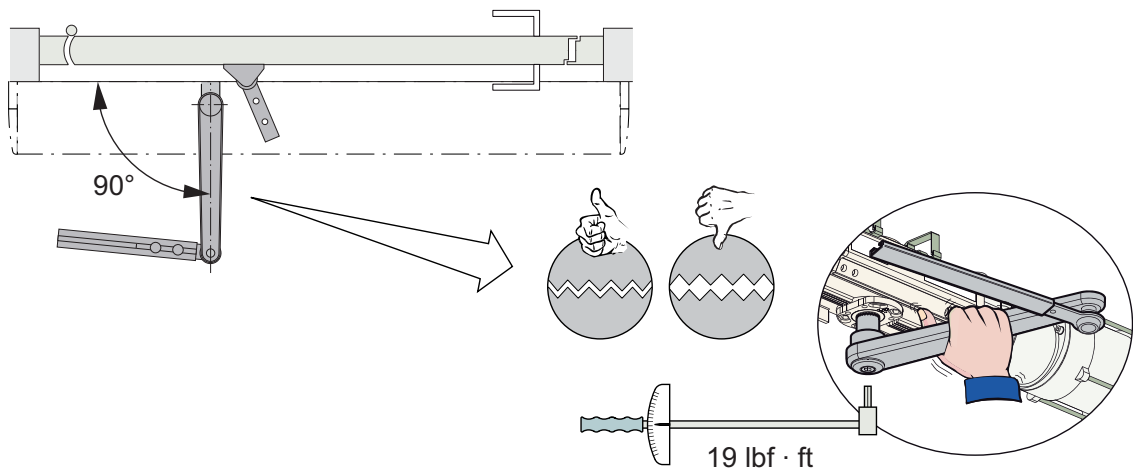


Cont. "Wall Mounted Operator with Arm System PUSH / SAS-F"

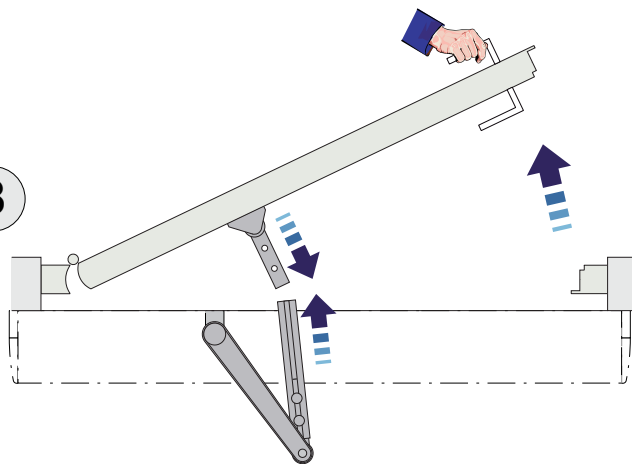


Cont. "Wall Mounted Operator with Arm System PUSH / SAS-F"

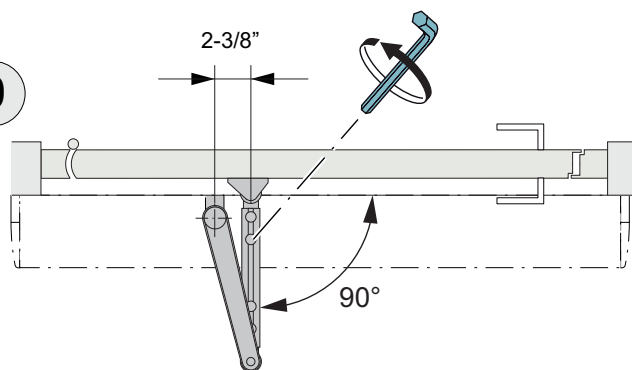
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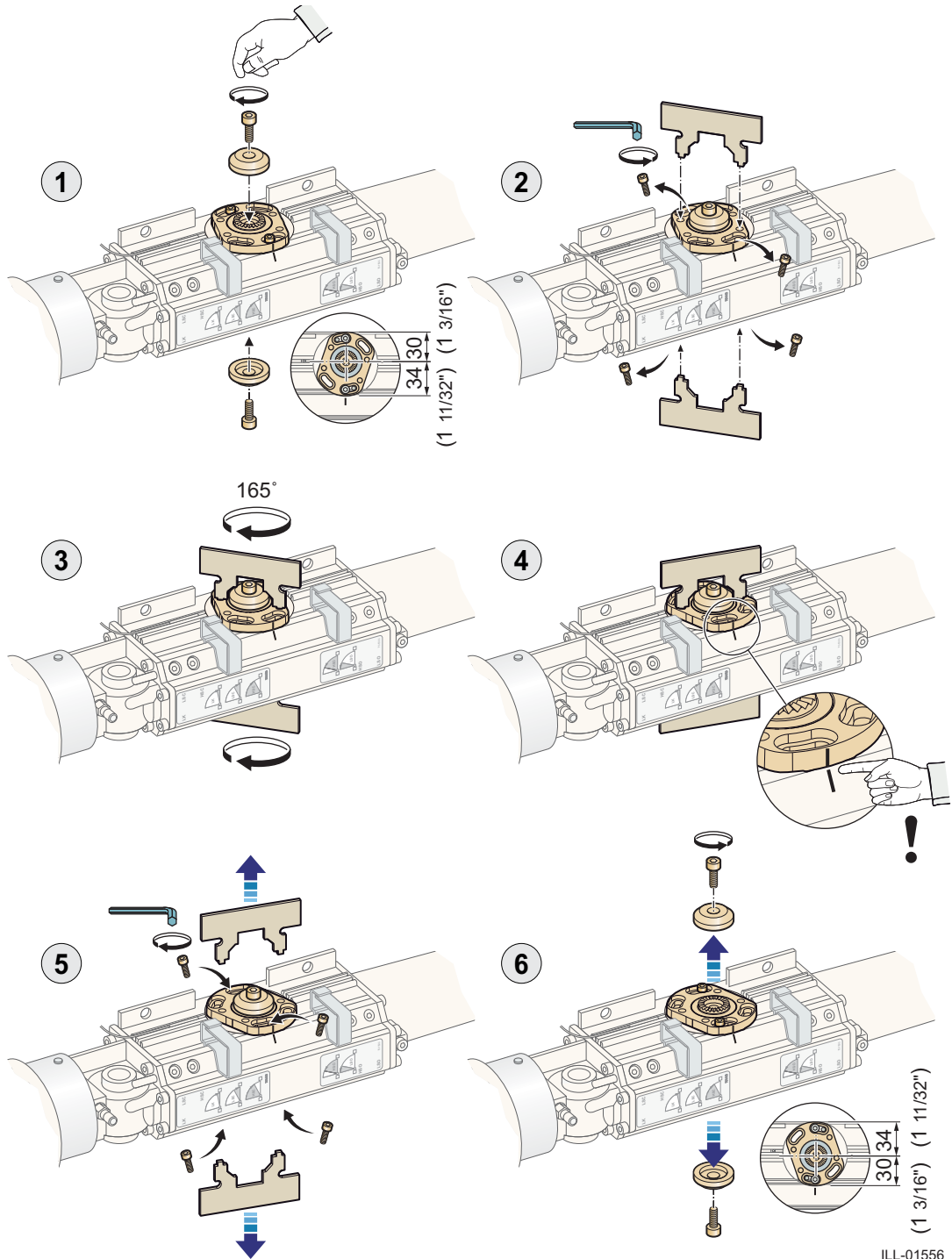


10.2 Wall Mounted Operator with Arm System PULL

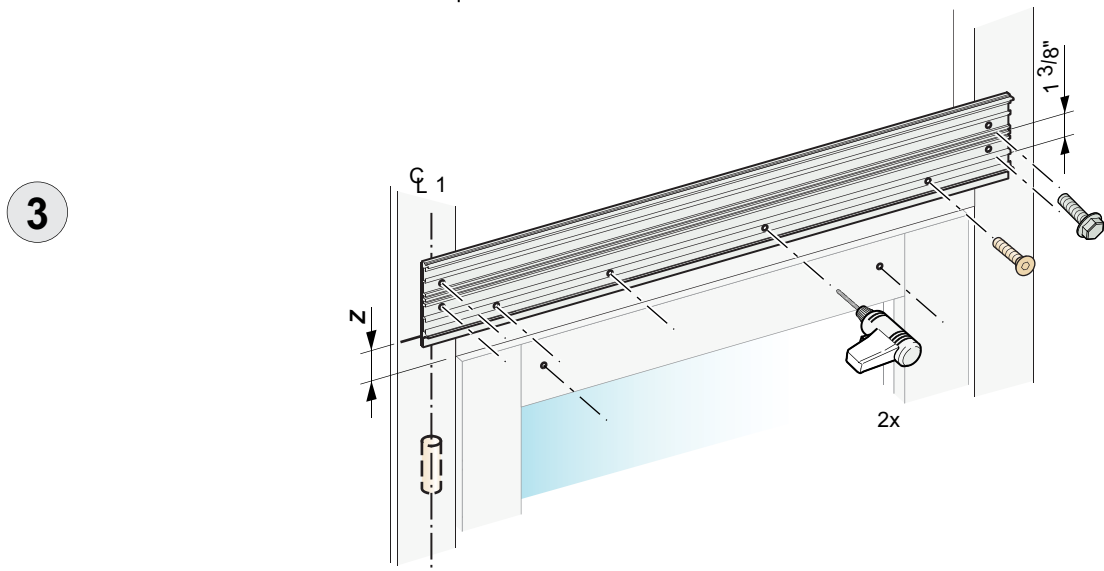
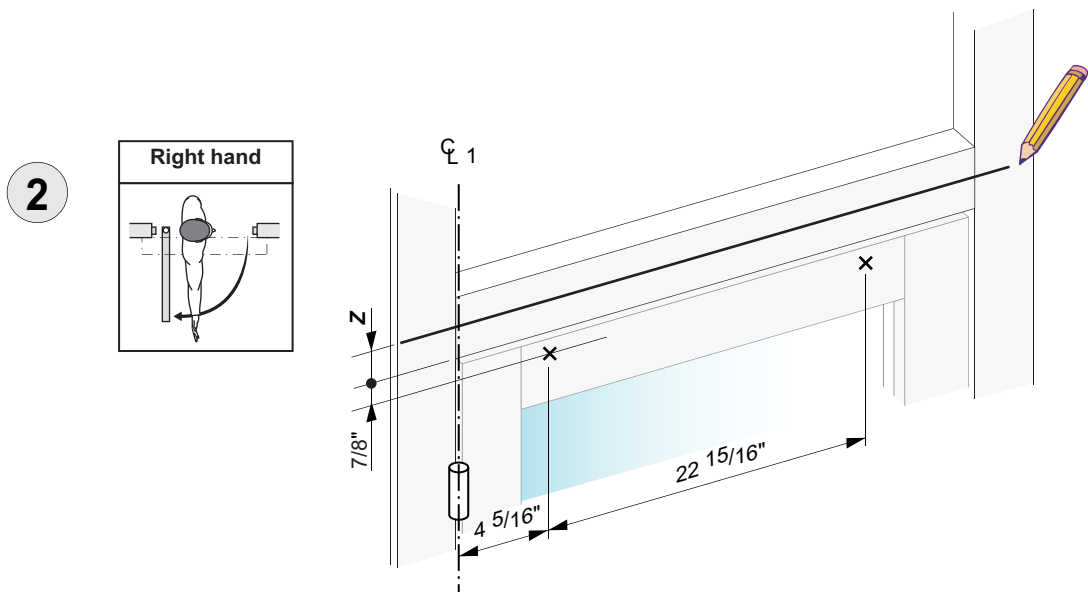
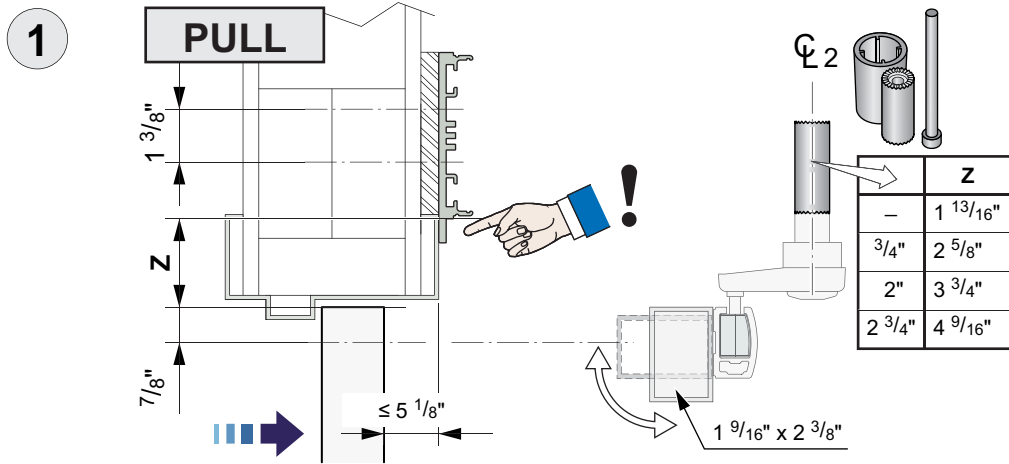
Note!

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

10.2.1 Changing the direction of rotation

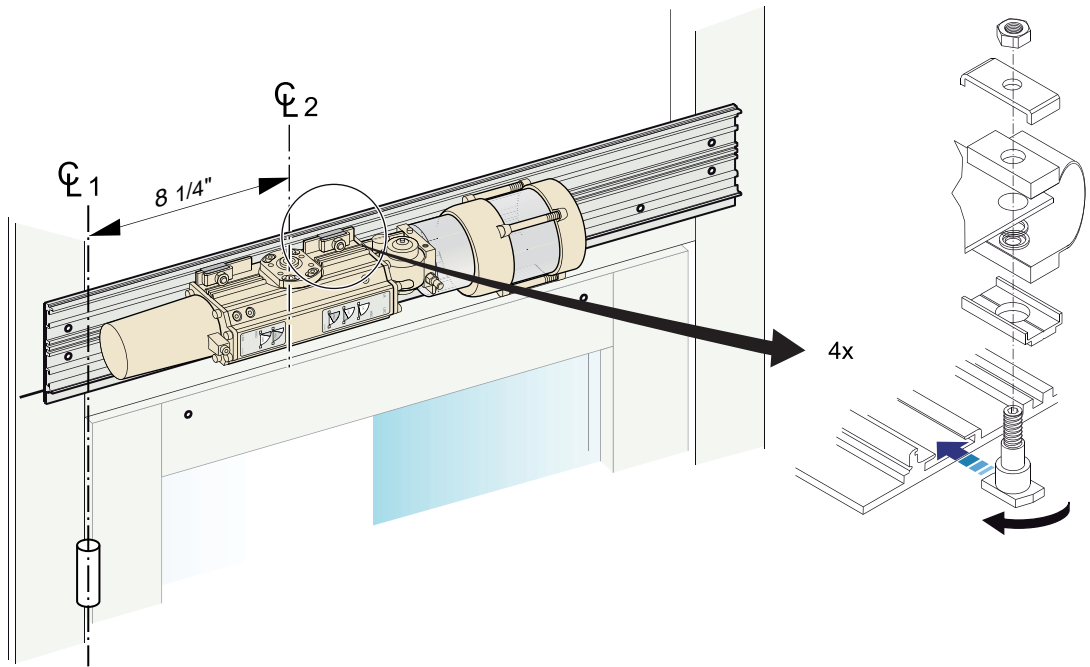


10.2.2 Installation of Operator with Arm System PULL

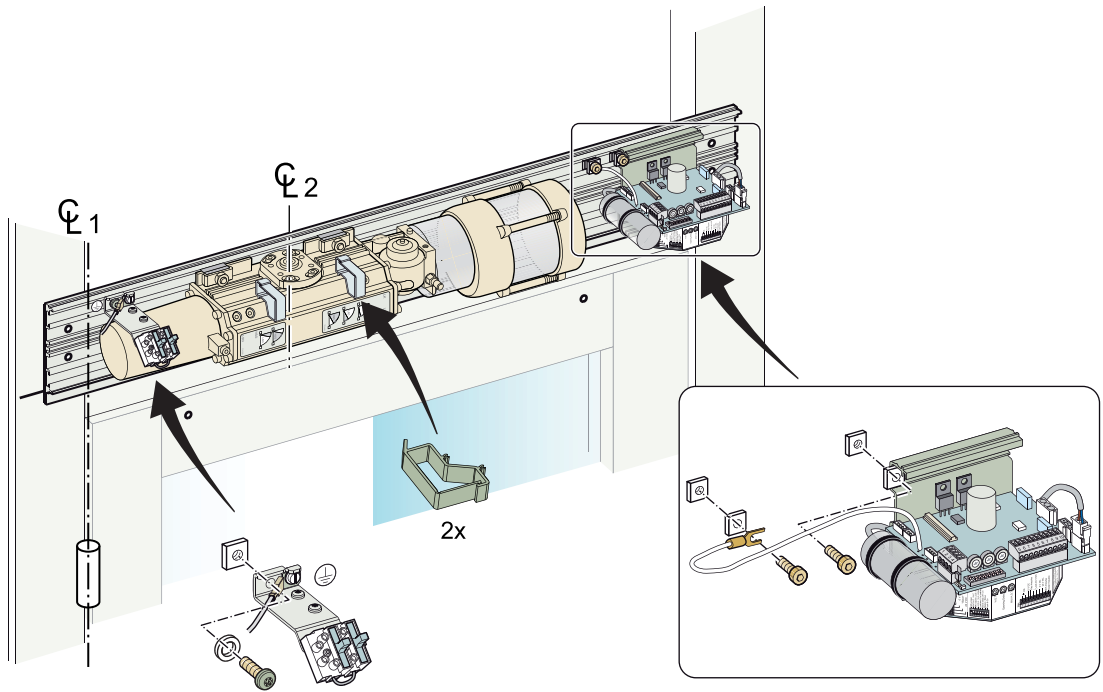


Cont. "Installation of Operator with Arm System PULL"

4

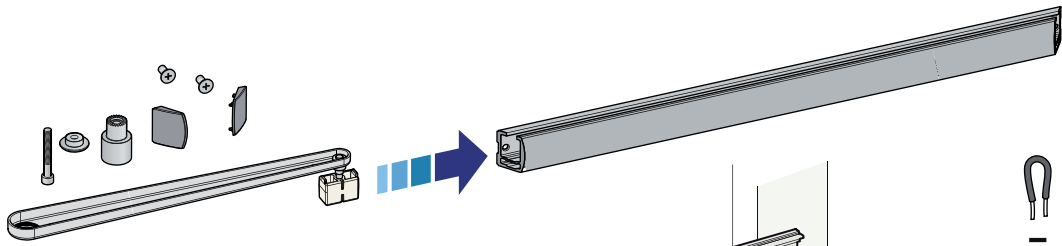


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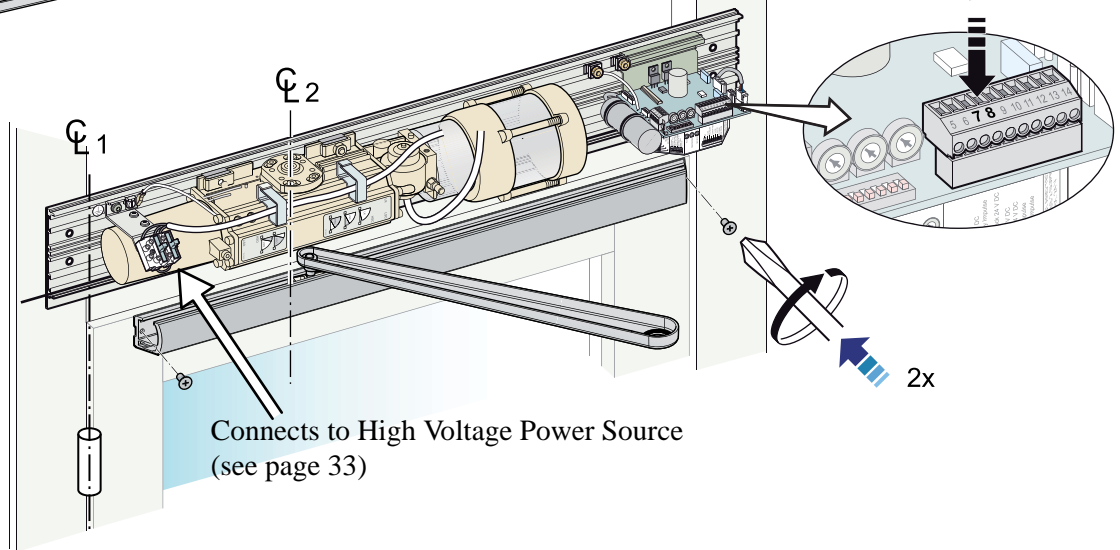


Cont. "Installation of Operator with Arm System PULL"

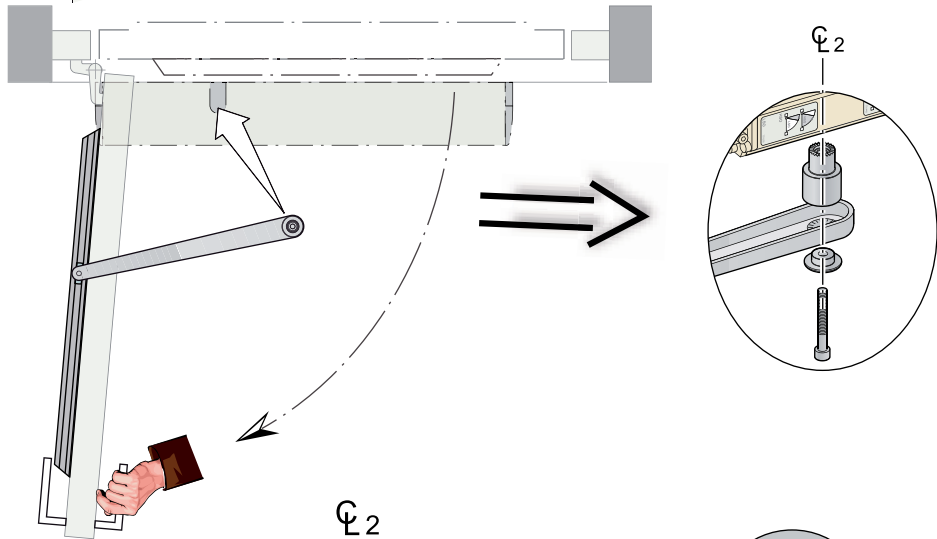
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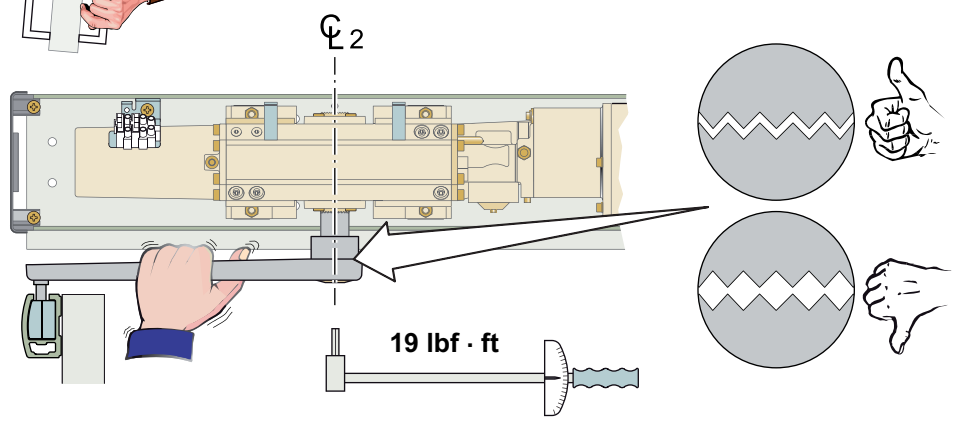
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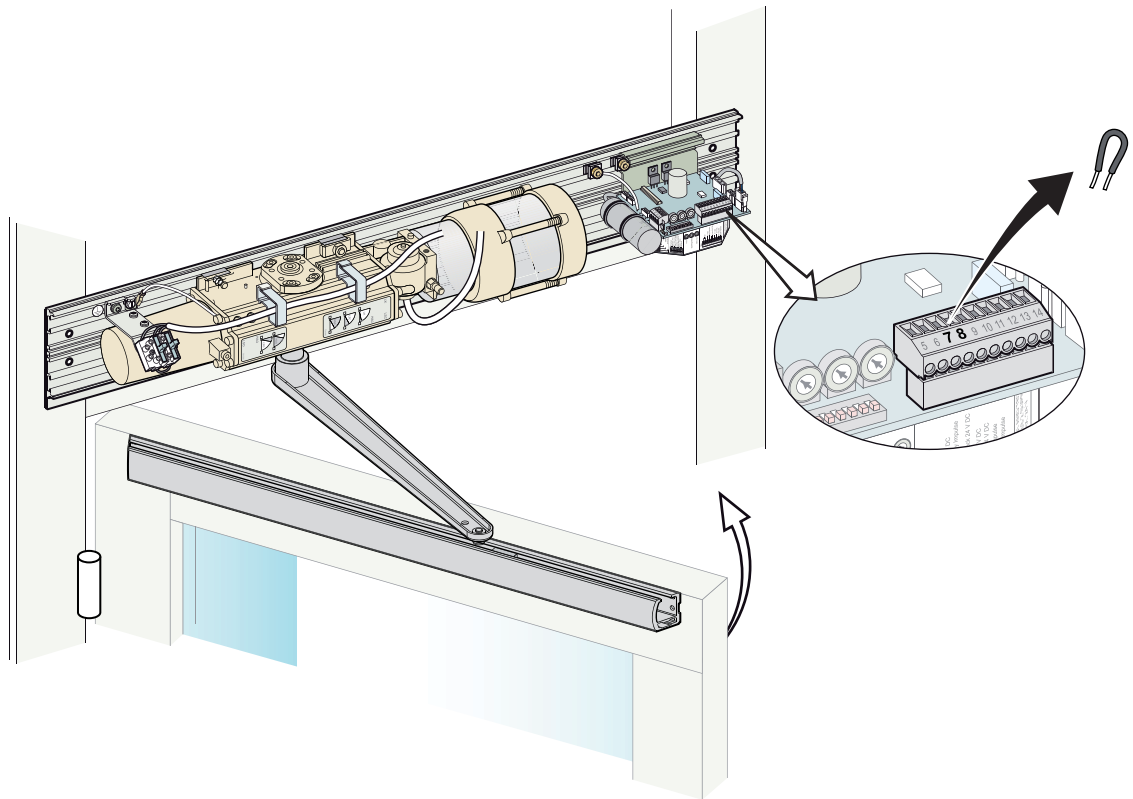


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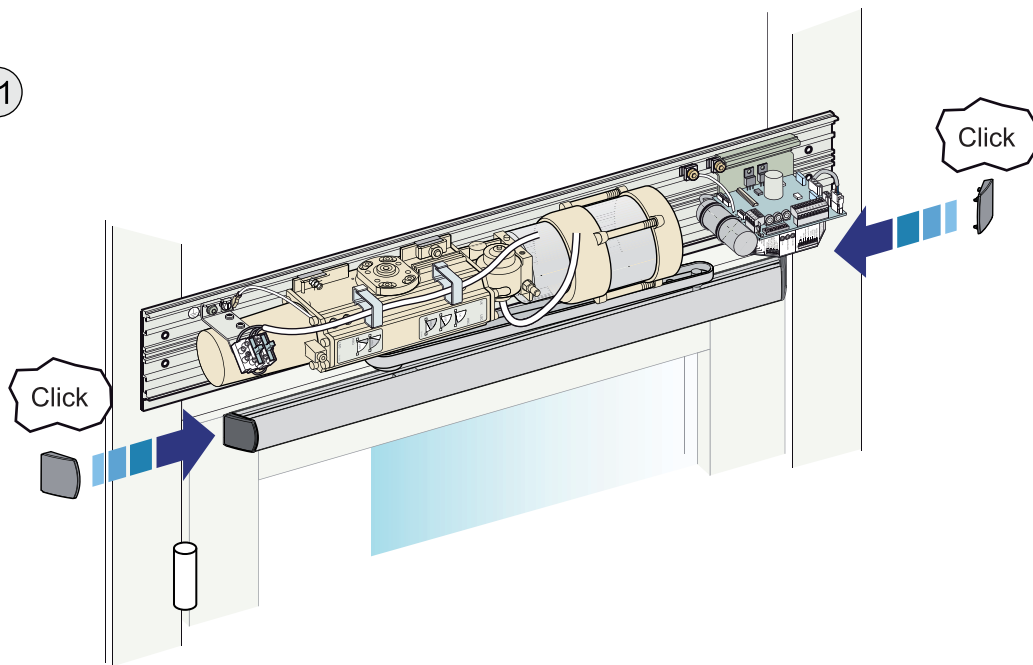


Cont. "Installation of Operator with Arm System PULL"

10



11



During any work with the electrical connections the power supply must be disconnected.

11.1 Control Units

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

11.1.1 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.

11.1.2 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.

11.1.3 Program Selectors and Push Buttons

Shall be installed in a location from which operation of the door can be observed by the person operating the switch.

11.1.4 Safety Instructions

WARNING!

To reduce the risk of fire, electric shock, or injury to persons, installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards.

11.1.5 Grounding Instructions

WARNING!

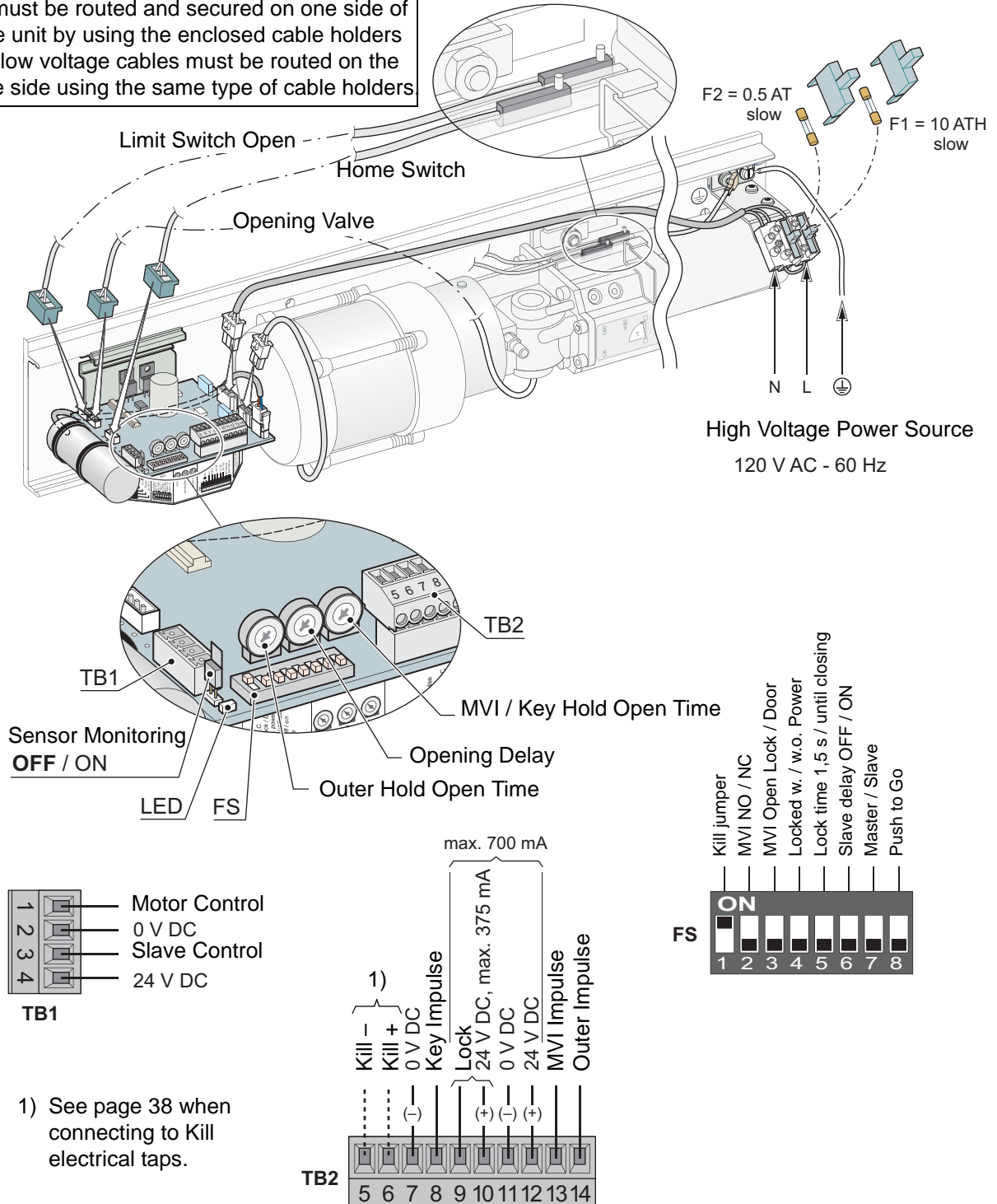
This product must be connected to a grounded, metal, permanent wiring system.

11.2 Connection of Control Unit CSDB – single doors

Connect the electrical input cable to the Terminal Block where and as indicated.

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

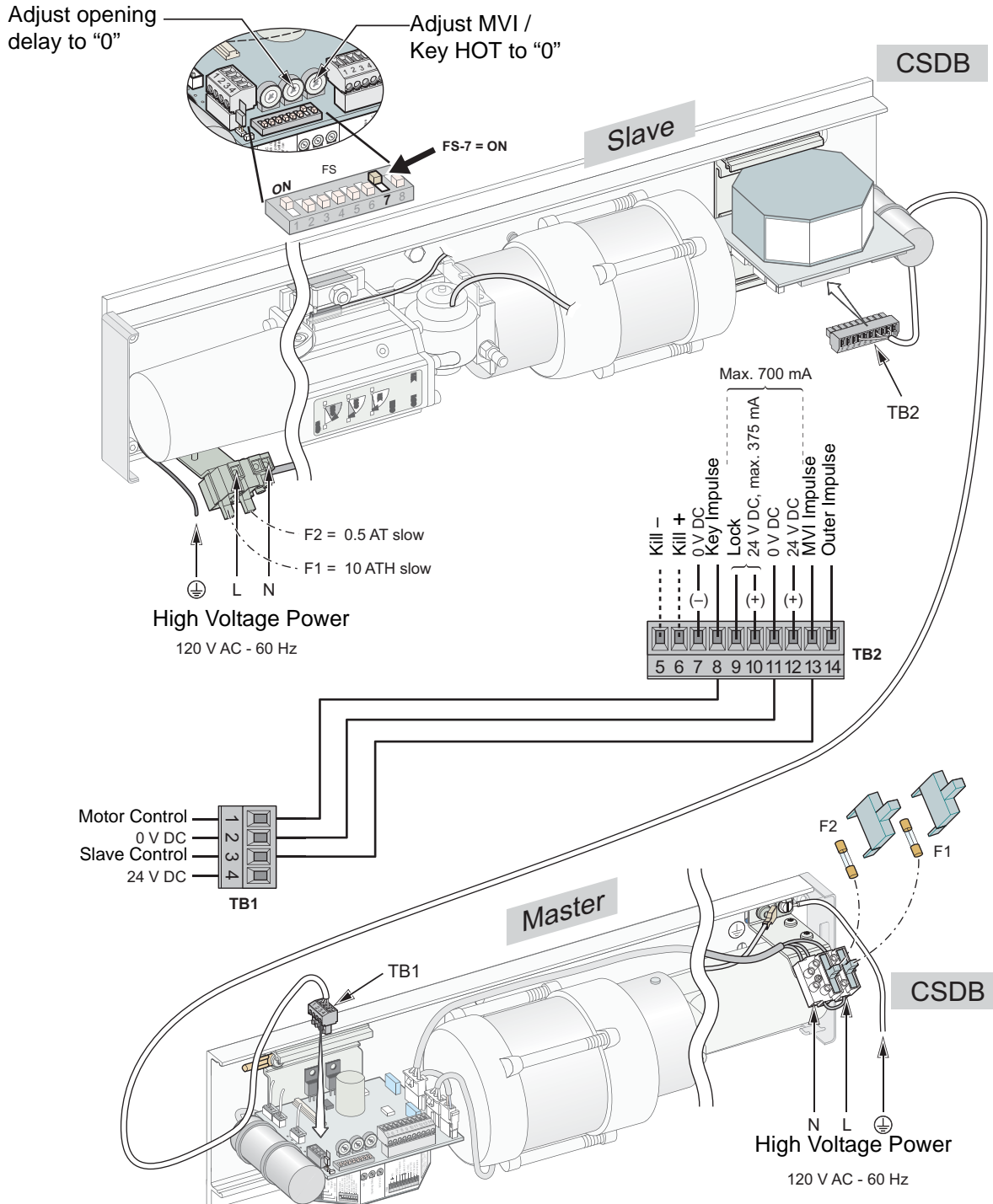
Note! It is important that the high and low voltage cables are separated and secured. The high voltage cables must be routed and secured on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be routed on the opposite side using the same type of cable holders



11.3 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).

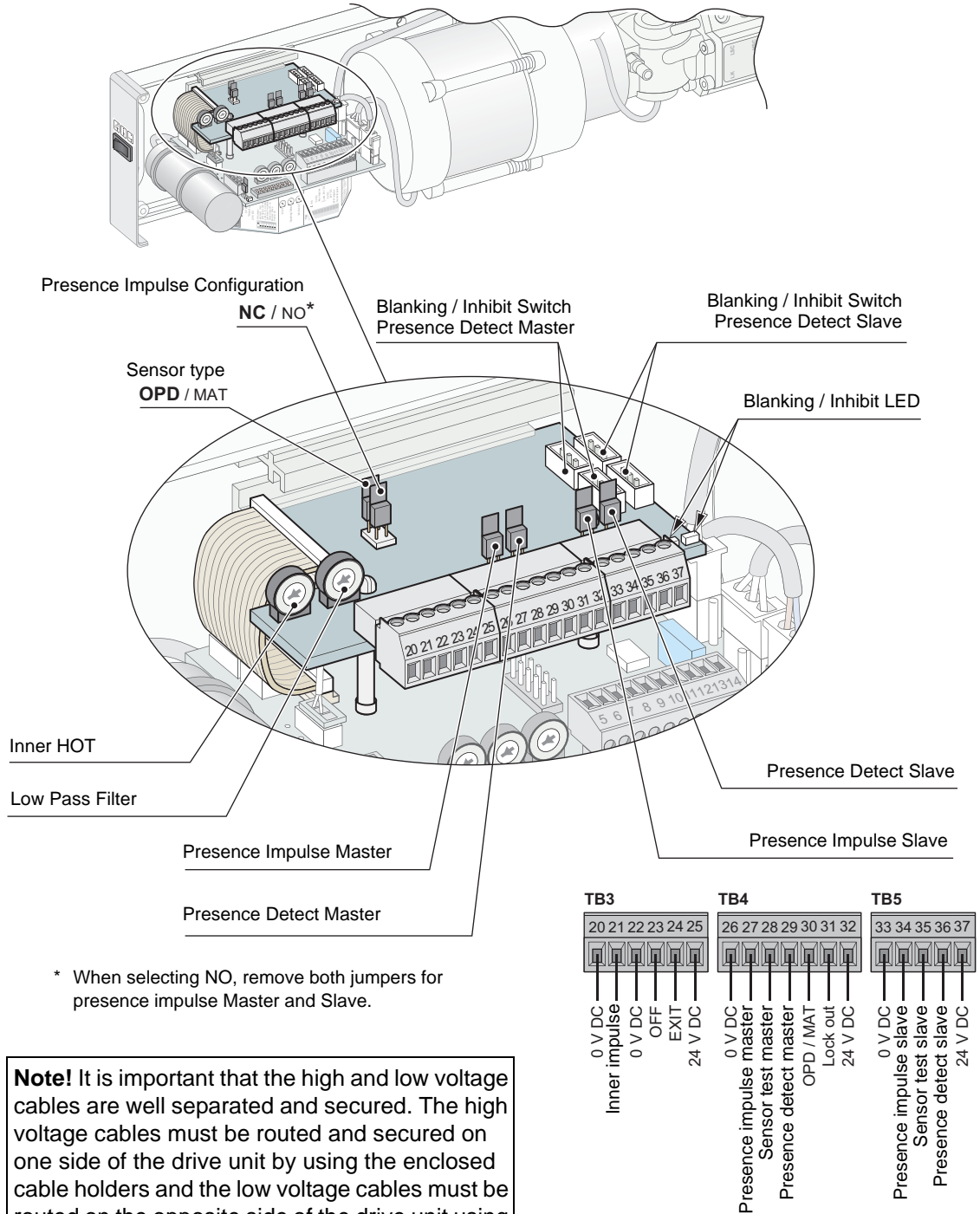
Note! It is important that the high and low voltage cables are separated and secured. The high voltage cables must be routed and fixed on one side of the drive unit by using the enclosed cable holders and the low voltage cables must be routed on the opposite side of the unit using the same type of cable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



11.4 Connection of Extension Unit EXB – option

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

1. Connect the flat cable on the EXB to the CSDB.
2. Snap on the EXB to the CSDB.



Note! It is important that the high and low voltage cables are well separated and secured. The high voltage cables must be routed and secured 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 of the drive unit using the same type of cable holders.

Give a short opening impulse by strapping the impulse input and adjust if necessary as follows. See also illustration on page 37.

1. Set the hold open time with the potentiometer on the Control Unit.
2. To adjust the **opening speed**.
 - a Adapt the High Speed Opening (HSO), to the existing traffic situation. Turning clockwise decreases the speed.
 - b 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.

3. Adjustment of the **closing speed**.
 - a Adjust the Low Speed Closing (LSC) as low as the traffic situation allows. Turning clockwise decreases the speed.
 - b 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 page 37.

4. Adjust the **opening angle** by using 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.

5. If an electric strike or panic hardware is installed, additional **“lock-kick”** can be obtained during the last 5° of the closing cycle by adjusting the LK screw 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.

6. Connect the activation units.
7. Check that the installation complies with valid regulations and requirements from the authorities. For entrapment see “ANSI / BHMA A156.10” on page 41 and “ANSI / BHMA A156.19” on page 45.
8. Special care should be taken regarding entrapment between driven parts and surrounding fixed parts.

12.1 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. Turning the screw clockwise increases the force. One turn equals a torque change of approx. 0.7 lbf·ft (28 turns from min. to max. The door must be in the open position when **extremely low** torque is adjusted.

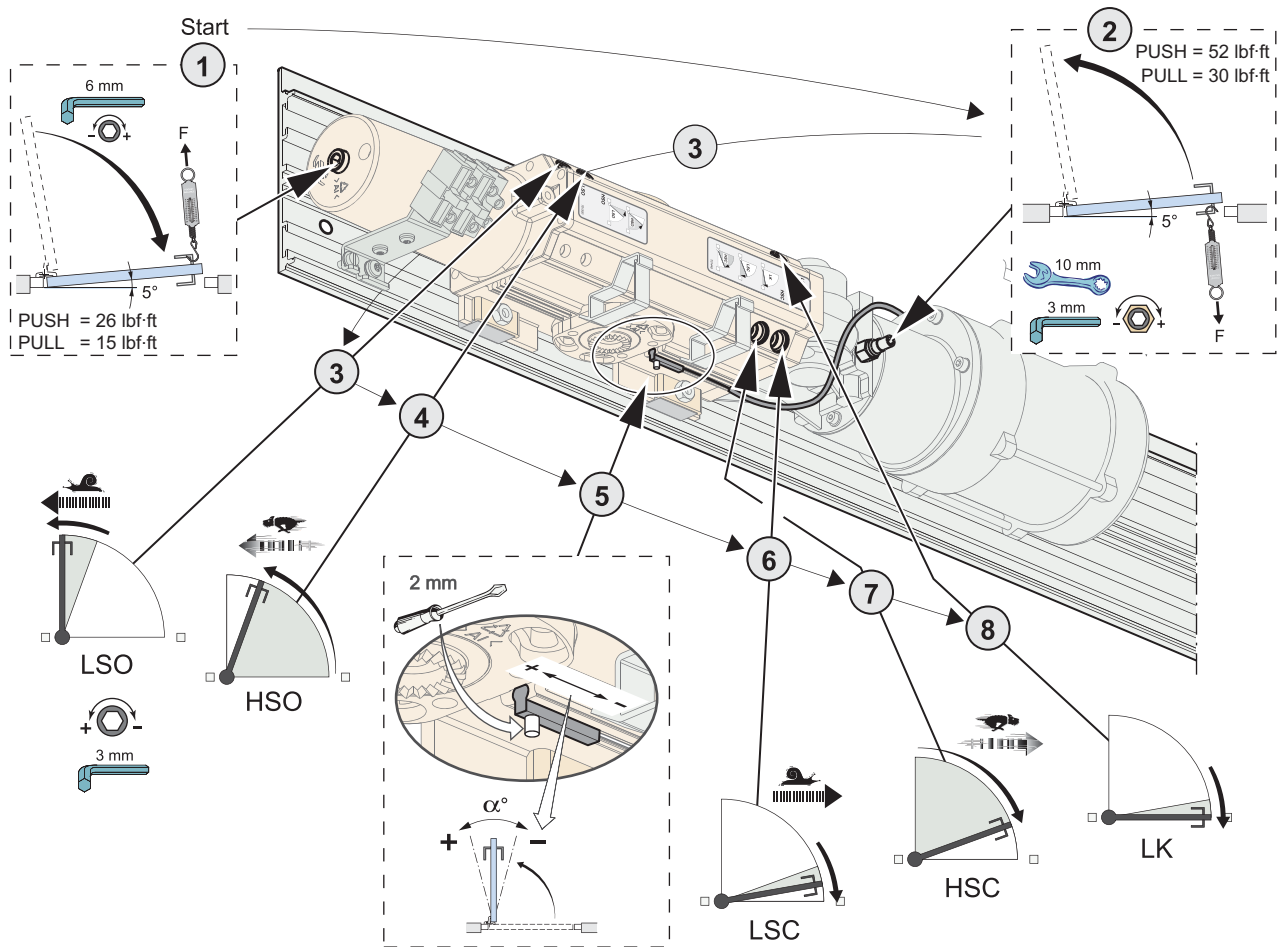
12.2 Opening torque

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:

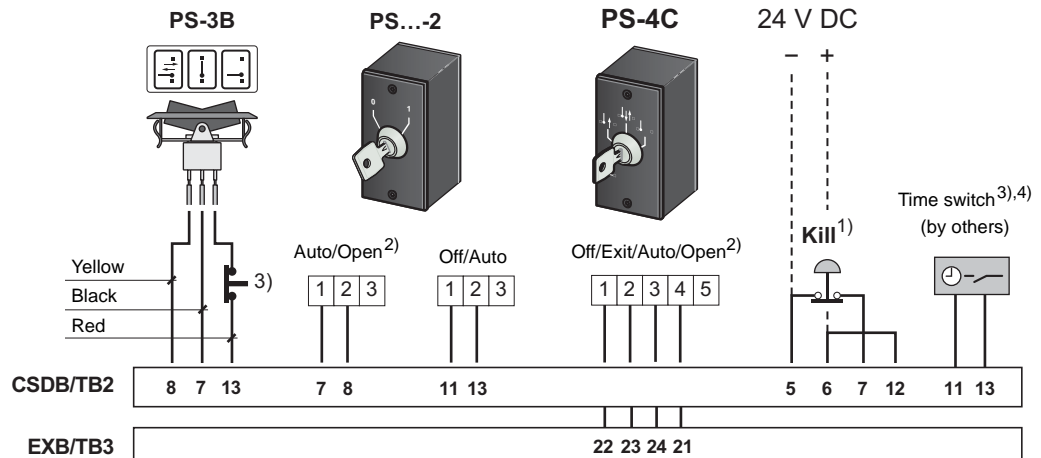
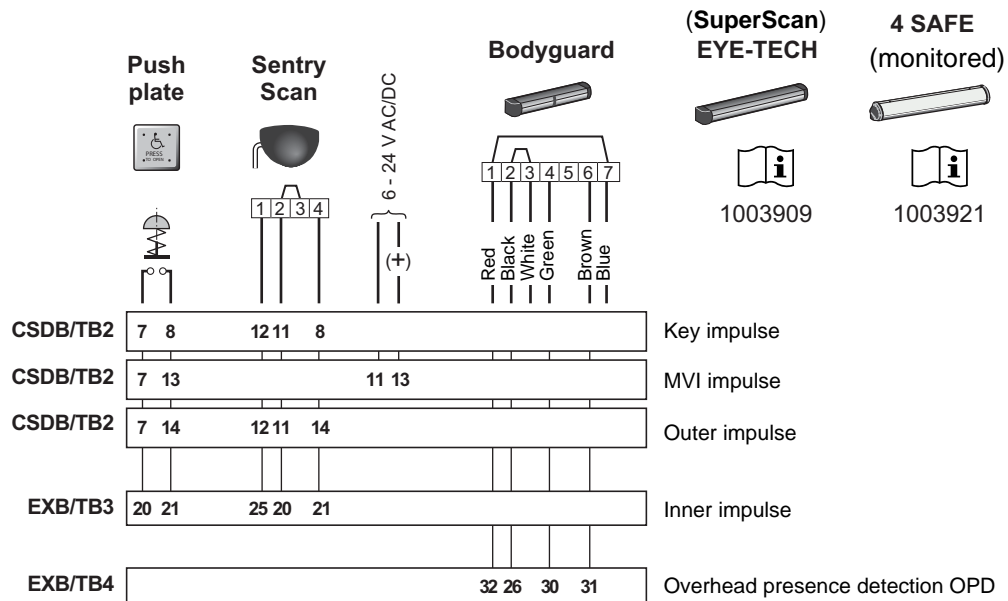
A. The factory set torque for PUSH/SAS is 52 lbf·ft and for PULL 30 lbf·ft at a door opening angle of 0 to 2°.

B. 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. 22 lbf·ft.



12.3 Connection of Activation Units and accessories



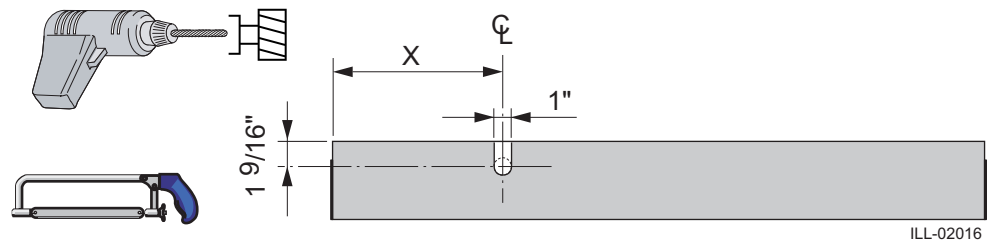
ILL-01630

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 HOT Key

The cover and mounting plate are manufactured in clear anodized aluminum.

13.1 Creating slot in the cover for the drive shaft

1. Measure the distance X on the mounted operator from the pivot end of the back plate to the center line of the output shaft.
2. Use a 1" (25 mm) hole saw to cut the round hole for the output shaft.
3. Use a hack saw to make two straight cuts.

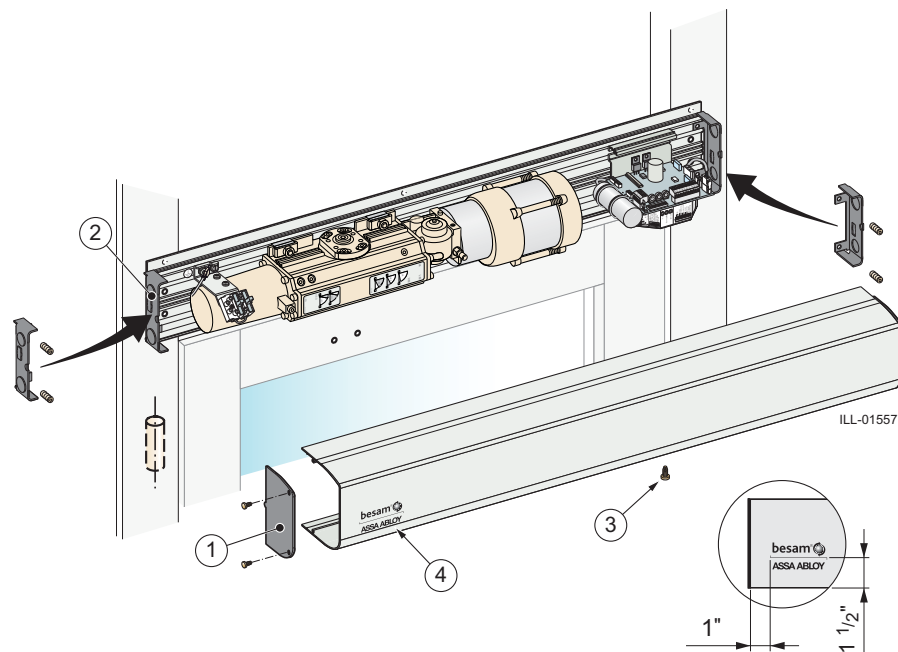


13.2 Fitting and removing the cover



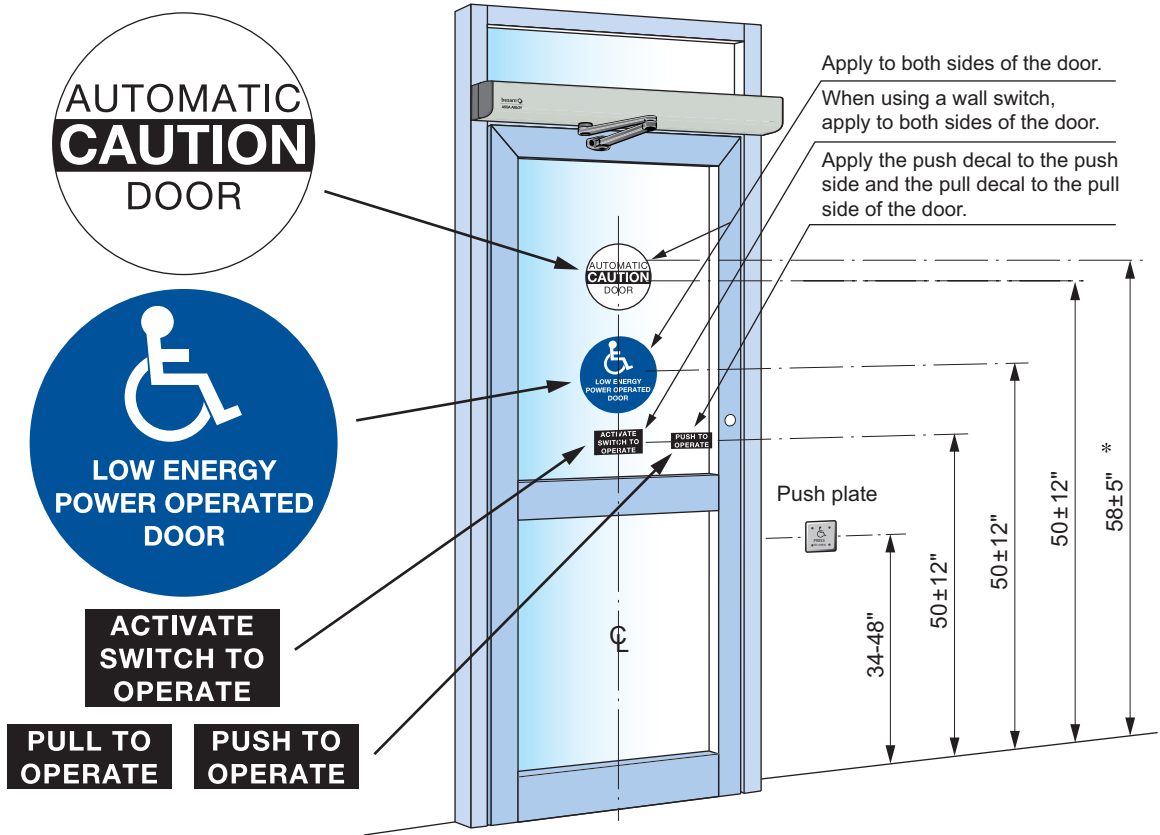
The cover is slid over flanges in the back plate so that the ridges fit in the grooves. Secure with screw.

Stick the Besam logotype to the cover – see below.



1. Top end plates for cover
2. Bottom end plate

3. Earth/Fastening screw
4. Besam logotype



* To meet ANSI A156.10 Power Operated Pedestrian door standard for one-way and two-way traffic applications.

REQUIREMENTS FOR POWER OPERATED DOORS

From American National Standard for Power-Operated Pedestrian Doors. Please refer to the full standard if necessary, obtainable through BHMA at (212) 661-4261. All figures referred to below can be found in the full standard. Excerpts reprinted with BHMA permission.

Swinging Doors

Automatic Swing Doors have a variety of configurations, including:

A single door swinging in or out, left-handed or right handed

A pair of doors simultaneously swinging in the same direction

A pair of doors simultaneously swinging in opposite directions (double egress) The door operator is concealed or surface applied. The doors are center pivoted, offset hung, balanced or butt hinged. No matter what the configuration or system, automatic swinging doors shall include guide rails, sensors, or control mats and signage for the safety and convenience of the user.

6. Guide Rails

6.1.1 Two guide rails shall be installed on the swing side of each door. Single doors shall have one on each side of the door and pairs or double egress shall have one rail on each hinge side. Rails shall project to the leading edge of the widest door in the open position.

Exception #1: A wall or separator is permitted to be used in place of a rail, provided that it meets the criteria in 6.2.1 through 6.1.5

Exception #2: Guide rails for swing doors serving both egress and ingress shall project out from the face of the door jambs on the swing side to no less than the outside leading edge of the open door plus 55 in.

Exception #3: If double egress doors or a pair of doors is installed in a hallway, no guide rails are required if the distance between the wall and the door in the 90 degree open position does not exceed 10 in.

Exception #4: Guide rails for Knowing Act swinging doors serving both egress and ingress shall project out from the face of the doorjamb on the swing side to no less than the outside leading edge of the open door plus 12 in.

6.1.2 A guide rail shall be 30 in. high minimum measured from the floor surface.

6.1.3 A guide rail shall have a panel or divider to inhibit access to the protected area.

6.1.4 There shall be 6 in. minimum clearance between the rail and the door in the fully open position or between the rail and the leading edge of the door at the point in its arc of travel when it is closest to the rail. There shall be a 2 in. minimum clearance between the rail at the hinge side and the door in the fully

open position.

6.1.5 Free standing guide rails shall have a maximum dimension between the rail and the jamb (or other adjacent surfaces) of 6 in.

For control mat adjustments, see full standard

8. Sensors

8.1 General Requirements for Sensors

8.1.1 Activating zones for swinging, sliding and folding doors shall have a minimum width equal to the width of the clear opening measured at 8 in. and 30 in. perpendicular from the face of the closed door(s). The length from the face of the door shall be 43 in. minimum measured at the center of the clear opening. Detection shall be effective to within 5 in. from the face of the door measured at the center of the clear opening.

8.1.2 Motion sensors shall detect a 28 in. minimum high person, moving at a rate of 6 in. per second minimum toward the center of the door within the detection zone described.

8.1.3 Presence sensors shall detect a stationary 28 in. minimum high person within the detection areas described for a minimum of 30 sec.

8.2 Swinging Doors

8.2.1 Swinging doors shall have an activating zone as described in 8.1.1.

8.2.2 A safety zone shall be provided on the swing side of all power operated swinging doors.

8.2.2.1 If an overhead sensor(s) is used to provide a safety zone, the length of the active area shall be effective to within 5 in. from the face of the closed door measured at the center of the door opening. The safety zone shall extend 5 in. minimum beyond the leading edge of the door in the open position when measured at the center of the door opening. The width of the active area measured perpendicular from the face of the closed door shall be the door opening less 5 in. maximum measuring both sides for a total of 10 in. maximum parallel to the face of the door at a distance of 8 in. and 30 in.

When the safety zone is occupied by a 28 in. minimum high person fully in the swing path of a fully open or closed door, the door operator shall not operate.

8.2.2.2 When an overhead sensor is prevented from providing a safety signal to the control during the closing cycle, an additional sensor, sensors or photo beam shall be used to either (1) inhibit reopening of the door until the safety zone is cleared or (2) stop, reverse or slow to a maximum latch edge speed of 4 inches per second measured within 1 inch of the latch edge before any contact is made.

8.2.2.3 If a door mounted sensor is used to provide a safety zone, it shall be effective to within 5 in. from the face of the door for the width of the door less 5 in. from the pivot point and to within 1 in. of the lead edge. A door-mounted sensor on either side of the door shall detect a 28 in. minimum high person fully in the swing path, during the opening and closing cycle and shall cause the door to reverse direction, stop or slow down to a maximum latch edge speed of 4 inches per second measured within 1 inch of the latch edge before any contact is made.

8.2.3 Swinging doors serving both egress and ingress, including nonknowing act double egress doors, shall have on the swing side, a safety zone as described in 8.2.2 and an activating zone. The length of the activating zone shall be established as follows: The activating zone starts adjacent to the safety zone and extends an additional 55 in. from the leading edge of the door in the open position. The activating zone shall have a minimum width equal to the width of the clear opening measured at 8 in. and 30 in. from the interface of the safety and activating zones.

8.2.5 When sensors are used to provide both an activating and a safety zone, if the distance between the two non-overlapping zones exceeds 8 in. the door system shall: 1) Be equipped with a safety control mat; or 2) Be equipped with a presence sensor across the door opening; or 3) Have a door closing cycle delay of 4 seconds minimum after the activating zone is clear; or 4) Be equipped with a door-mounted sensor on the non-swing side as described in 8.2.2.3.

For knowing Act and double egress doors, see full standard Section 9.

10. Entrapment Protection

10.2 Swinging Doors

10.2.1 The opening time of a swing door to 80 degrees shall not be less than 1.5 seconds

10.2.2 The force required to prevent a stopped power operated door in the last 10 degrees of opening from moving in the direction of opening shall not exceed 40 lbs. Measured 1 in. from the lock edge of the door.

10.2.3 Back check shall occur at no less than 10 degrees of the full open position.

10.2.4 Swing doors utilizing sensors or control mats shall remain open a minimum of 1.5 seconds after loss of detection unless otherwise specified in this standard.

10.2.5 A swing door shall be adjusted so that the closing times to latch shall be the minimum values in the following table:

Inches (mm)	Lbs. (kg)	Time
(D)	(W)	T (secs.)
36 (914) & under	to 100 (45)	2.0
36 (914)	to 140 (64)	2.3
42 (1067)	to 110 (50)	2.3
42 (1067)	to 150 (68)	2.7
48 (2119)	to 120 (55)	2.8
48 (2119)	to 160 (73)	3.2
48 (2119)	to 220 (99)	4.0

10.2.6 Latch Check shall occur for swinging doors at no less than 10 degrees from closed position and the door shall not close through the final 10 degrees in less than 1.5 seconds.

10.2.7 The force required to prevent a stopped power operated swinging door from moving in the direction of closing shall not exceed 30 lbs. Measured 1 in. from the lock edge of the door at any point in the closing cycle.

10.2.8 In the event of a power failure, a swing door shall be capable of being opened manually with no greater than 30 lbs. Applied 1 in. from the edge of the lock stile to open.

10.2.9 Swinging doors provided with a break away device shall require no more than 50 lbs. Applied 1 in. from the edge of the lock stile to open. When the door(s) is opened in the breakout mode, power-operating components excluding spring power shall not operate the door.

10.2.10 The opening at hinge side of swinging door shall be: a) Less than ¼ in./6 mm wide with the door in any position, or b) At least ¾ in./19 mm wide with the door in any position. A door that does not comply with the above is acceptable if provided with a finger guard.

11. Signage

Consistent with section 2.2.2 of ANSI Z535.4 the “signage and warnings” guidelines of A156.10 are recognized, industry specific standards that predate the adoption of Z535.4 and are not replaced by the standards set forth therein.

11.1 All Swinging, sliding and folding doors shall be equipped with signage visible from both sides reading “AUTOMATIC DOOR” with letters ½ in. high minimum. The sign described in figures B-1, B-3, and B-5 shall be permitted to be used to satisfy this requirement.

11.2.1 An arrow sign shall be visible from the approach side of a swinging door mounted on the door at a height of 58”+ 5 in. from the floor to the center line of the sign. The sign shall be a minimum of 6 in. in diameter, having a green circle surrounding a black arrow on a white background.



11.2.2 An International “DO NOT ENTER” sign shall be visible from the side of doors that swings towards pedestrians attempting to travel in the wrong direction mounted on the door at a height 58”+ 5 in. from the floor to the center line of the sign. The sign shall be a minimum of 6 in. in diameter, having a red circle with the wording, “DO NOT ENTER”, in the red circle.



11.2.3 Swinging doors serving both egress and ingress shall be marked with a decal visible from the swing side of the door, “AUTOMATIC CAUTION DOOR”. The sign shall be mounted on the door at a height 58”+ 5 in. from the floor to the center line of the sign. The sign shall be a minimum of 6 in. in diameter and with black lettering on a yellow background.



REQUIREMENTS FOR POWER OPERATED DOORS

The following texts are excerpts from American National Standard for power-operated doors. Please refer to the full standard if necessary.

1. Activation

The operator shall be activated by a knowing act.

2. Opening

Doors shall open from closed to back check, or 80 degrees whichever occurs first, in 3 seconds or longer as required in Table I. Backcheck shall not occur before 60 degrees opening.

Total opening time to 90 degrees shall be as in Table II. If the door opens more than 90 degrees, it shall continue at the same rate as backcheck speed.

When powered open, the door shall remain at the open position for not less than 5 seconds.

3. Closing

Doors shall close from 90 degrees to 10 degrees in 3 seconds or longer as required in Table I.

Doors shall close from 10 degrees to fully closed in not less than 1.5 seconds.

4. Force and Kinetic Energy

The force required to prevent a stopped door from opening or closing shall not exceed 15 lbf (67 N) measured 1 in (25 mm) from the latch edge of the door at any point during opening or closing.

The kinetic energy of a door in motion shall not exceed 1.25 lbf-ft (1.69 Nm). Table I provides minimum times for various widths and weights of doors for obtaining results complying with this kinetic energy.

Doors shall open with a manual force not to exceed 15 lbf (67 N) to release a latch, if equipped with a latch, 30 lbf (133 N) to set the door in motion, and 15 lbf (67 N) to fully open the door. The forces shall be applied at 1" (25 mm) from the latch edge of the door.

Table I

Minimum Opening Time to Back Check or 80 degrees, which ever occurs first, and the Minimum Closing Time from 90 degrees to Latch Check or 10 degrees.

“D” Door Leaf Width - Inches (mm)	“W” Door Weight in Pounds (kg)				
	100 (45.4)	125 (56.7)	150 (68.0)	175 (79.4)	200 (90.7)
*30 (762)	3.0	3.0	3.0	3.0	3.5
36 (914)	3.0	3.5	3.5	4.0	4.0
42 (1067)	3.5	4.0	4.0	4.5	4.5
48 (1219)	4.0	4.5	4.5	5.0	5.5

* Check applicable Building Codes for clear width requirements in Means of Egress.

Table II

Total Opening Time to 90 Degrees

Backcheck at 60 degrees	Backcheck at 70 degrees	Backcheck at 80 degrees
Table I plus 2 seconds	Table I plus 1.5 seconds	Table I plus 1second
If the door opens more than 90 degrees, it shall continue at the same rate as backcheck speed.		

Note: To determine maximum times from close to full open, the operator shall be adjusted as shown in the chart. Back check occurring at a point between positions in Table II shall use the lowest setting. For example, if the backcheck occurs at 75 degrees, the full open shall be the time shown in Table I plus 1.5 seconds.

6. Signage

- 6.1 Doors shall be equipped with signage visible from either side, instructing the user as to the operation and function of the door. The signs shall be mounted 50" +/- 12" (1270mm +/- 305mm) from the floor to the center line of the sign. The letters shall be 5/8 inch (16 mm) high minimum.
- 6.2 **Doors** All doors shall be marked with signage visible from both sides of the door, with the words "AUTOMATIC CAUTION DOOR" (see illustration below). The sign shall be a minimum of 6 inches (152 mm) in diameter with black lettering on a yellow background. Additional information may be included.

Additionally one of the following knowing act signs shall be applied:

- 6.2.1 When a **Knowing Act Switch** is used to initiate the operation of the door operator, the doors shall be provided with signs on both sides of the door with the message "ACTIVATE SWITCH TO OPERATE". The lettering shall be white and the background shall be blue.
- 6.2.2 When push/pull is used to initiate the operation of the door operator, the doors shall be provided with the message "PUSH TO OPERATE" on the push side of the door and "PULL TO OPERATE" on the pull side of the door. The lettering shall be white and the background shall be blue.

See "Signage" on page 40.

Fault	Possible reasons why	Remedies/Explanation
The door does not open <i>- The motor does not start</i>	Program selector is set to OFF	Change setting
	No motor power present	Check motor cable
	No high voltage power	Check power
	Blown fuse	Replace fuse
	Activation unit does not function	Strap impulse inputs
<i>- The motor starts</i>	Electric strike plate is binding	Adjust strike plate
	Arm system has come loose	Readjust pre-tension and tighten arm system
The door does not open to required angle	Open Limit Switch 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 delays before opening	“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 backplate	Mount two extra screws at the motor side of the backplate to secure to wall
The door does not stay open or cannot open	Magnetic valve fails to operate	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.

**HAZARD WARNING!**

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

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	1003882	24	12	6	6
SAS-F Service Kit	1003888	24	12	6	6
PULL Service Kit	1003886	24	12	6	6
Limit Switch	655614	24	12	6	6
Capacitor	655599	60	60	60	60
CSDB-120 Control Unit	1004204	60	60	60	60



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