400

Hydraulic Swing Gate Operator

C US

UL325 Compliant

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FAAC

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IMPORTANT SAFETY INFORMATION

Important Safety Instructions

- WARNING: TO REDUCE THE RISK OF SEVERE INJURY OR DEATH:
- READ AND FOLLOW ALL INSTRUCTIONS.
- Never let children operate or play with the gate controls. Keep remote controls away from children.
- Always keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF A MOVING GATE.
- Test the gate operator monthly. The gate MUST reverse on contact with a rigid object or when an object activates a non-contact sensor. If necessary, adjust the force or the limit of travel and then retest the gate operator. Failure to properly adjust and retest the gate operator can increase the risk of injury or death.
- Use the manual release mechanism only when the gate is not moving.
- KEEP GATE PROPERLY MAINTAINED. Have a qualified service person make repairs to gate hardware.
- The entrance is for vehicles only. Pedestrians must use a separate entrance.

SAVE THESE INSTRUCTIONS.

Important Installation Instructions

1. Install the gate operator only when the following conditions have been met:
   - The operator is appropriate for the type and usage class of the gate.
   - All openings of a horizontal slide gate have been guarded or screened from the bottom of the gate to a minimum of 4 feet (1.25 m) above the ground to prevent a 2.25 inch (55 mm) diameter sphere from passing through openings anywhere in the gate or through that portion of the adjacent fence that the gate covers when in the open position.
   - All exposed pinch points are eliminated or guarded.
   - Guarding is supplied for exposed rollers.
2. The operator is intended for installation on gates used by vehicles only. Pedestrians must be provided with a separate access opening.
3. To reduce the risk of entrapment when opening and closing, the gate must be installed in a location that allows adequate clearance between the gate and adjacent structures. Swinging gates shall not open outward into public access areas.
4. Before installing the gate operator, ensure that the gate has been properly installed and that it swings freely in both directions. Do not over-tighten the operator clutch or pressure relief valve to compensate for a damaged gate.
5. User controls must be installed at least 6 feet (1.83 m) away from any moving part of the gate and located where the user is prevented from reaching over, under, around or through the gate to operate the controls. Controls located outdoors or those that are easily accessible shall have security features to prevent unauthorized use.
6. The Stop and/or Reset buttons must be located within line-of-sight of the gate. Activation of the reset control shall not cause the operator to start.
7. All warning signs and placards must be installed and easily seen within visible proximity of the gate. A minimum of one warning sign shall be installed on each side of the gate.
8. For gate operators that utilize a non-contact sensor (photo beam or the like):
   - See instructions on the placement of non-contact sensors for each type of application.
   - Exercise care to reduce the risk of nuisance tripping, such as when a vehicle trips the sensor while the gate is still moving.
   - Locate one or more non-contact sensors where the risk of entrapment or obstruction exists, such as at the reachable perimeter of a moving gate or barrier.
   - Use only FAAC "Photobeam" photoelectric eyes to comply with UL325.
9. For gate operators that utilize a contact sensor (edge sensor or similar):
   - Locate one or more contact sensors where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and post mounted both inside and outside of a vehicular horizontal slide gate
   - Locate one or more contact sensors at the bottom edge of a vehicular vertical lift gate.
   - Locate one or more contact sensors at the bottom edge of a vertical barrier (arm).
   - Locate one or more contact sensors at the pinch point of a vehicular vertical pivot gate.
   - Locate hard-wired contact sensors and wiring so that communication between sensor and gate operator is not subjected to mechanical damage.
   - Locate wireless contact sensors, such as those that transmit radio frequency (RF) signals, where the transmission of signals are not obstructed or impeded by building structures, natural landscaping or similar hindrances. Wireless contact sensors shall function under their intended end-use conditions.
   - Use only FAAC MSE MO, CN60 or M60 edge sensors.

General Safety Precautions

Gate Construction

Vehicular gates should be constructed and installed in accordance with ASTM F2200: Standard Specification for Automated Vehicular Gate Construction.

For more information, contact ASTM at: www.astm.org

Installation

- If you have any questions or concerns regarding the safety of the gate operating system, do not install the operator and consult the manufacturer.
- The condition of the gate structure itself directly affects the reliability and safety of the gate operator.
- Only qualified personnel should install this equipment. Failure to meet this requirement could cause severe injury and/or death, for which the manufacturer cannot be held responsible.
- The installer must provide a main power switch that meets all applicable safety regulations.
- It is extremely unsafe to compensate for a damaged gate by increasing hydraulic pressure.

- Install devices such as reversing edges and photo beams to provide better protection for personal property and pedestrians. Install reversing devices that are appropriate to the gate design and application.
- Before applying electrical power, ensure that voltage requirements of the equipment correspond to the supply voltage. Refer to the label on your gate operator system.

Usage

- Use this equipment only in the capacity for which it was designed. Any use other than that stated should be considered improper and therefore dangerous.
- The manufacturer cannot be held responsible for damage caused by improper, erroneous or unreasonable use.
- If a gate system component malfunctions, disconnect the main power before attempting to repair it.
- Do not impede the movement of the gate, you may injure yourself or damage the gate system as a result.
- This equipment may reach high thermal temperatures during normal operation, therefore use caution when touching the external housing of the gate operator.
- Use the manual release mechanism according to the procedures presented in this manual.
- Before performing any cleaning or maintenance operations, disconnect power to the equipment.
- All cleaning, maintenance or repair work must performed by qualified personnel.

UL325 Gate Operator Classifications

RESIDENTIAL VEHICULAR GATE OPERATOR CLASS I

A vehicular gate operator system intended for use in a single family dwelling, garage or associated parking area.

COMMERCIAL / GENERAL ACCESS VEHICULAR GATE OPERATOR CLASS II

A vehicular gate operator system intended for use in commercial locations or buildings such as multi-family housing units (five or more single family units), hotels, parking garages, retail stores or other buildings that service the general public.

INDUSTRIAL / LIMITED ACCESS VEHICULAR GATE OPERATOR CLASS III

A vehicular gate operator system intended for use in industrial locations or buildings such as factories, loading docks or other locations not intended to service the general public.

RESTRICTED ACCESS VEHICULAR GATE OPERATOR CLASS IV

A vehicular gate operator system intended for use in guarded industrial locations or buildings such as airport security areas or other restricted access locations that do not service the general public, and in which unauthorized access is prevented via supervision by security personnel.

Installing the Warning Signs

This FAAC swing gate operator is supplied with two warning signs to alert people that a possible hazard exists and that appropriate actions should be taken to avoid the hazard or to reduce exposure to it.

Permanently install one warning sign on each side of the gate so they are fully visible to traffic and pedestrians.

Use appropriate hardware such as metal screws (not supplied) to permanently install each warning sign.

400 OPERATOR

1 DESCRIPTION AND TECHNICAL SPECIFICATIONS

The FAAC Model 400 Swing Gate Operator consists of an electric pump and a hydraulic piston which transmits drive to the gate leaf.

Models with hydraulic locking do not require the installation of electric locks, as they provide mechanical locking of the leaf when the motor is not operating.

Models without hydraulic locking require the installation of electric locks to ensure that the leaf is mechanically locked. FAAC 400 Operators were designed and built to automate swing leaf gates. Do not use for any other purpose.

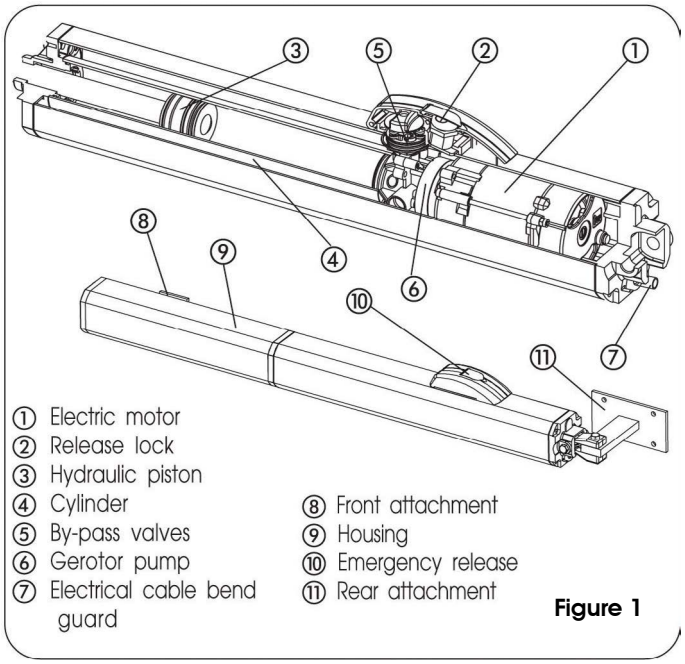


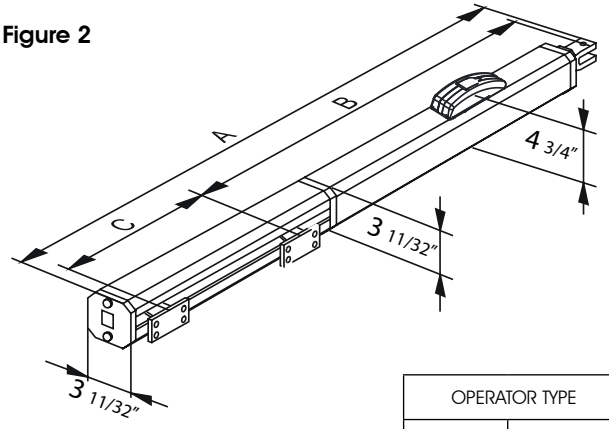
Figure 1

Table 1: 400 Operator – Technical Specifications

MODEL	CBC	CBAC	SB	SBS	CBAC R	CBAC EG	SB EG
Max Traction / Thrust Force: (daN)	620	620	620	775	465	465	465
Effective Rod Stroke: (inches)	10 1/4	10 1/4	10 1/4	10 1/4	10 1/4	15	15
Linear Rod Speed: (inches/sec)	0.4	0.4	0.4	0.3	0.6	0.6	0.6
Operator Weight: (lbs)	19	19	19	19	19	22	22
Use Frequency: (cycles/hour)	70	70	70	60	80	50	50
Pump Flow-Rate: (liters/min)	1	1	1	0.75	1.5	1.5	1.5
Hydraulic Locking: *(1) = Closing* *(2) = Opening and Closing*	(1)	(2)	/	/	(2)	(2)	/
Max Leaf Length: (feet)	16	16	18	20	12	18	20
Min Leaf Length: (feet)	9.5	9.5	9.5	12.5	9.5	11.5	11.5
Power Supply	115 VAC ± 10% or 230 VAC +6% -10% 50/60 Hz.						
Absorbed Power	220 W						
Absorbed Current	1A (230V) or 2A (115V)						
Electric Motor	1400 rpm - 4 poles						
Thermal Protection on Windings	248 °F (120°C)						
Thrust Capacitor	25uF / 115 V or 8uF / 230 V						
Ambient Operating Temperature Range	-4°F +131°F (-20 °C +55°C)						
Protection Class	IP55						

1.1 DIMENSIONS

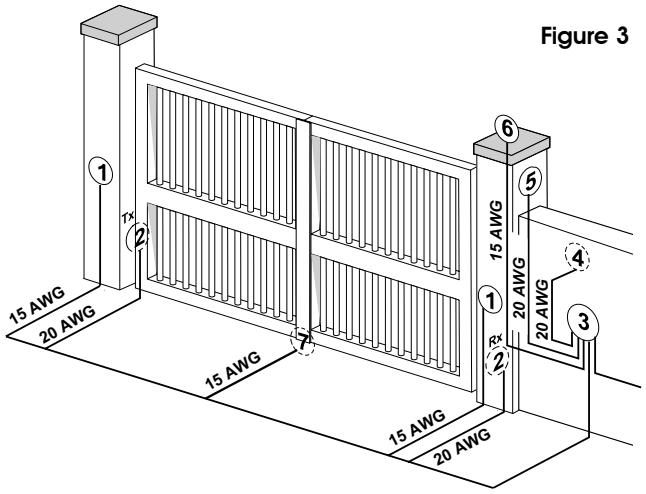
Figure 2



	OPERATOR TYPE	
	STANDARD	EG
A	40 1/2 in	50 1/2 in
B	27 1/2 in	32 1/4 in
C	10 1/4 in	15 in

1.2 WIRING

Figure 3



1. Operators Mod 400
2. Photocells
3. Electronic control unit
4. Key operated push-button
5. Radio receiver
6. Warning light
7. Electric lock (if necessary)

Always separate low voltage wiring from AC power cables. Use separate conduits to avoid electrical interference.
The installer is responsible for grounding the gate and operator systems, for providing the main power breaker switch, and for making sure that the entire gate system meets all applicable electrical codes.
Make sure to locate all controls that operate the gate system at least 6 ft away from any moving parts.

2 INSTALLATION

2.1 PRELIMINARY CHECKS

To ensure a correctly operating automated system, the structure of the gate must satisfy the following requirements:

- Leaf length should not exceed "Max Leaf Length" dimensions in Table 1.
- The gate should have a strong and rigid leaf structure.
- The gate leaves should have a smooth, uniform movement during the entire length of travel without any irregular friction.
- Existing hinges should be in good condition.
- Travel limit mechanical stops must be provided.
- The condition of the structure directly influences the reliability and safety of the automated system.
- The gate must swing level

2.2 INSTALLATION DIMENSIONS

Figure 4

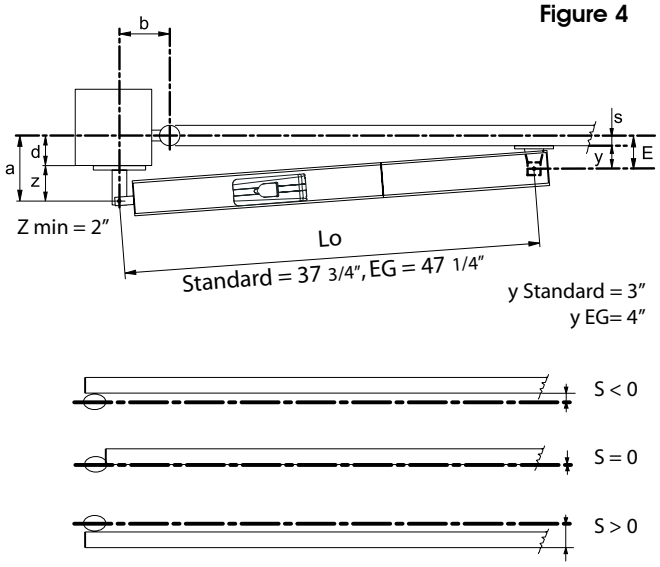


Table A: Recommended Dimensions for Standard Operators

Opening Angle	*a*	*b*	*c(*)*	*d(**)*	*s*
90°	5 1/16	5 1/16	10 1/4	3 1/8	3/4
115°	4	4 3/4	10 1/4	2	3/4
125°	3 1/2	4 3/4	10 1/4	1 1/2	0

(*) Rod effective stroke (**) maximum dimension *- in inches*

Table B: Recommended Dimensions for EG Operators

Opening Angle	*a*	*b*	*c(*)*	*d(**)*	*s*
90°	7 7/8	6 1/4	15	5 7/8	3/4
115°	6 3/4	6 1/4	15	4 3/8	3/4
125°	5 1/8	6 3/4	15	3 1/8	3/4

(*) Rod effective stroke (**) maximum dimension *- in inches*

c = In order to prevent the rod from reaching its stop point internally when opening and closing, the effective rod stroke is shorter than the maximum stroke.

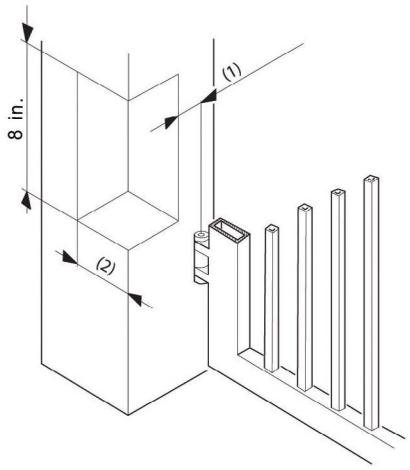
2.3 GENERAL RULES

If the dimensions indicated in table A or B cannot be achieved, the following must be considered in order to calculate different measurements:

- To obtain 90° opening of the leaf: **a + b = c**.
- To obtain over 90° opening of the leaf: **a + b < c**.
- Lower **a and b** dimensions will result in higher speeds.
- Limit the difference between **a and b** to within 1.5 inches. Higher differences will considerably vary gate opening and closing speed.
- The minimum **Z** dimension is 2 inches (Fig. 4);
- If the pillar dimensions or the position of the hinge (dimension **d**) do not make it possible to keep dimension **a** at the required size, a niche must be made in the pillar as shown in Fig. 5.
- Dimension **a** must always be larger than dimension **E**.

For installations that open outward, refer to Section 6.

Figure 5



(1) Length of Dimension "a" - 2 in.
(2) Length of Dimension "b" + 4 in.

2.4 INSTALLING THE OPERATOR

Attention: To avoid compromising operator functionality, use measurements and dimensions indicated.

1.) Fasten the rear attachment to a pillar or column support. Follow the measurements indicated in Tables A / B. If necessary, modify the length of the supplied attachment.

- For iron pillars, weld the rear attachment (Fig. 6, Ref. 2) directly to the pillars.
- For masonry pillars, select one of the following solutions:

  A.) Install an appropriate wall plate and then accurately weld the rear attachment.

  OR

  B.) Use screws and expansion plugs to secure the rear attachment plate (Fig. 6, Ref. a) to the pillar. Then weld the rear attachment to the plate as shown in Figure 6.

2.) Secure the operator to the rear attachment with the supplied screws (Fig. 6).

3.) Screw, halfway down, the front attachment onto the rod (Fig. 8, Ref.1). Tighten with the supplied nut.

4.) Release the operator (*see Section 5*).

5.) Fully extend the rod out to its stopping point, then push it back approximately 1/4 inch (Fig. 7).

Figure 6

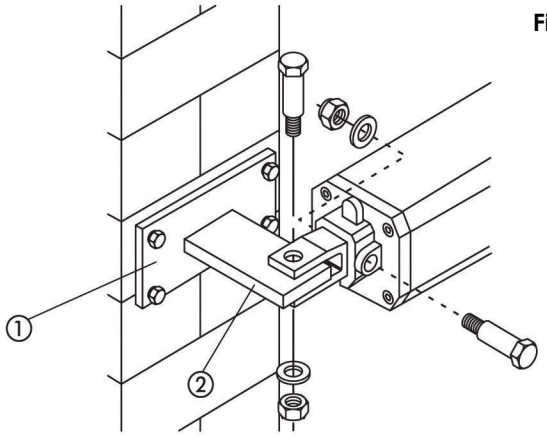
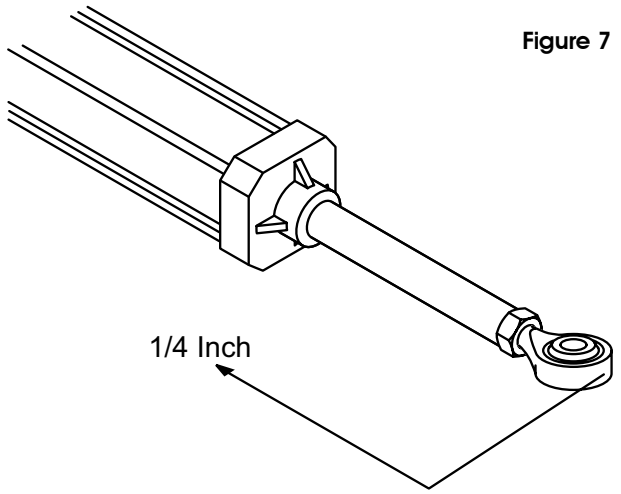


Figure 7



6.) Relock the operator (*see Section 5.1*).

7.) Fit the front bracket onto the rod (Fig. 8, Ref. 2)

8.) Close the gate leaf and, while keeping the operator perfectly horizontal, identify and mark the location of the front bracket on the leaf (Fig. 9).

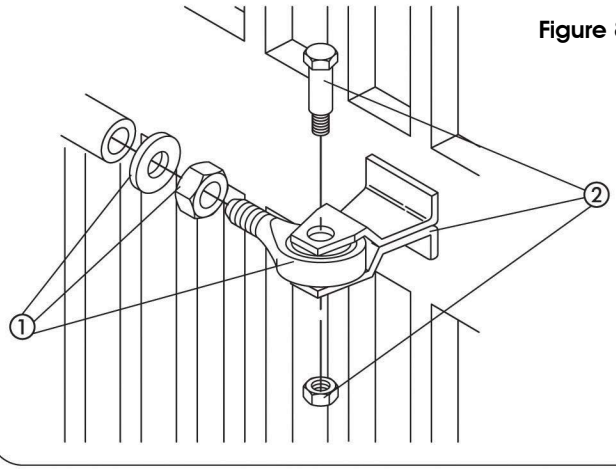
9.) Temporarily fasten the front bracket to the leaf with two weld spots (protect rod from welding slag).

If the gate structure does not permit the bracket to be firmly fastened, modify the structure to create a solid support base.

10.) Release the operator and manually check that the gate can freely and completely open. Ensure that it stops via the travel limit mechanical stops and that leaf movement is good and frictionless.

11.) Temporarily release the operator from the bracket and then permanently weld the bracket to the leaf. ***Prevent welding slag from damaging the rod.*** (Fig.10). If welding is not feasible, secure the front and rear attachment plates with screws.

Figure 8



12.) Grease all securing pins of the attachments.

13.) Prepare the protective housing and fit it on the operator as shown in Fig. 11. Fit the electric cable strain relief (Fig. 12, Ref. 3).

14.) Re-lock the operator and make electrical connections to the electronic control unit following the instructions in the 455D section.

Figure 9

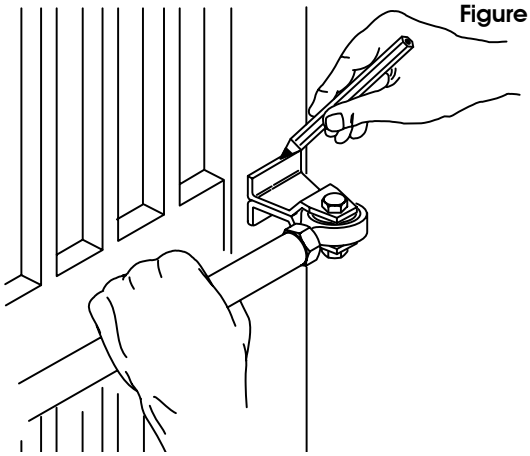


Figure 10

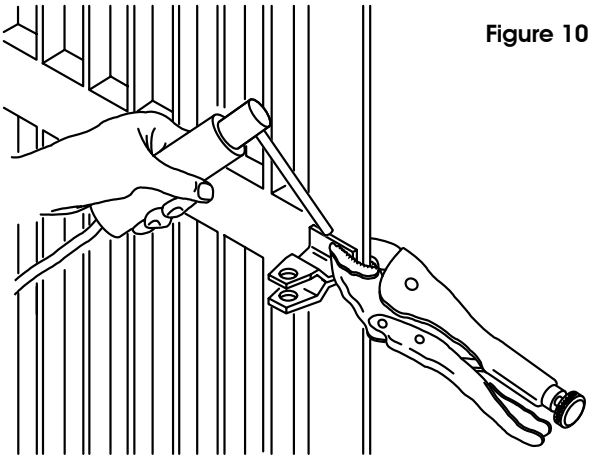
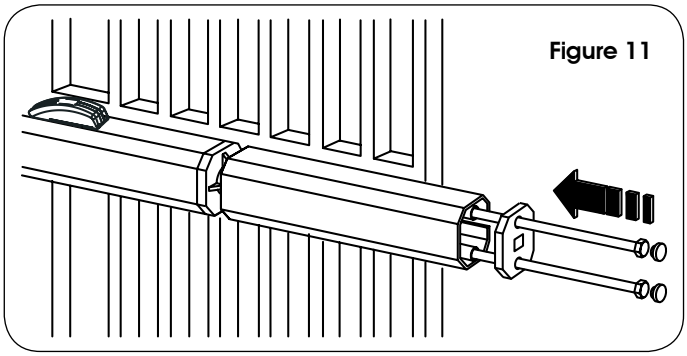


Figure 11



15.) Connect the power cable to the operator and fasten the screws (Figure 14A).

2.5 BY-PASS VALVES ADJUSTMENT

The Model 400 has an anti-crushing safety device which limits the operator's force when an obstacle is encountered while the gate is moving. Follow these steps to adjust the intervention threshold of the anti-crushing system:

- Lift the protective cap (Fig. 13, Ref.1) and insert the supplied key (Fig. 13, Ref. 2).
- Turn the key 90°clockwise to open the cover.
- Lift the cover (Fig. 14).
- Remove the screw (Fig. 14, Ref. 3) which secures the knob and then remove the knob (Fig. 14, Ref. 4).
- Locate the force adjustment screws (By-Pass) on the operator (Fig. 14, Ref. 5 and 6) .
  - OPEN pressure screw (green wording): gate opening direction.
  - CLOSE pressure screw (red wording): gate closing direction.
- To reduce torque, turn screws counter-clockwise.
- To increase torque, turn screws clockwise.
- Test the bypass adjustment by physically obstructing the gate during its travel and make corrections as appropriate
- When you have finished making adjustments, re-position the knob (Fig. 14, Ref. 4) and tighten the screw (Fig. 14, Ref. 3).
- Close the cover and lock it by turning the key counter-clockwise.

WARNING: Do not overtighten the screws to compensate for a damaged gate.

3 FINAL OPERATIONS

Finish the installation procedure as follows:

- Close the cover of the release device with the key.
- Remove the vent screw (Fig.12, Ref. 2).

WARNING: Failure to remove the vent screw may result in erratic operation.

Figure 12

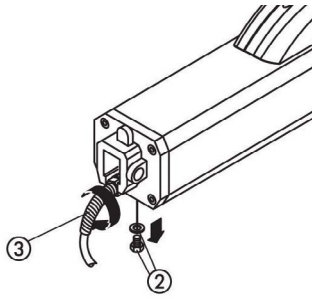


Figure 13

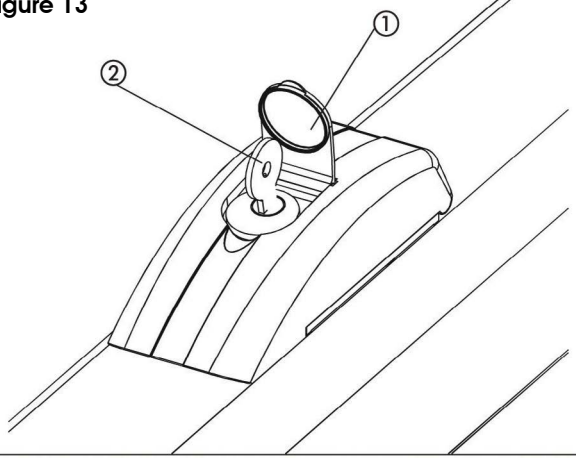


Figure 14

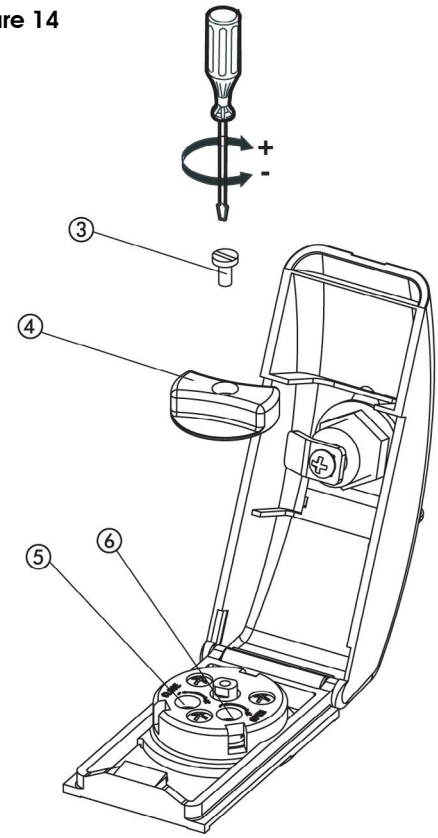
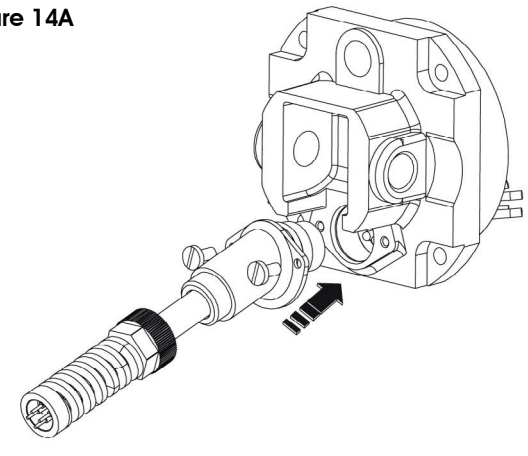


Fig. 14

Figure 14A



4 SYSTEM TEST

When you have finished installing the unit, run a functional check of the automated system and all accessories connected to it, especially safety devices.

5 MANUAL OPERATION

If the gate has to be moved manually due to a power failure or a fault in the system, use the release device as described below.

- Lift the protective plug (Fig. 16, Ref. 1) and insert the supplied key (Fig. 16, Ref. 2).
- Turn the key 90°clockwise to open the cover.
- Lift the cover (Fig. 16, Ref.3).
- Turn the release knob counter-clockwise approximately two complete turns (Fig. 16, Ref. 4).

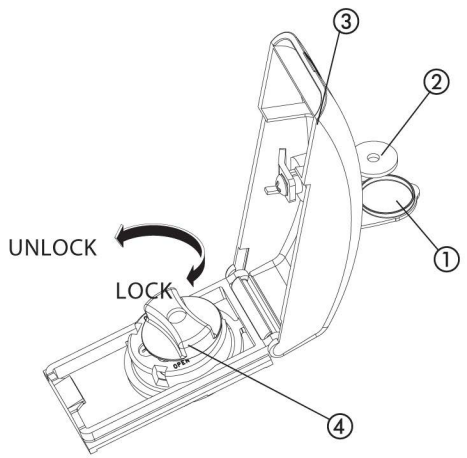
You can now open or close the leaf manually.

5.1 RESTORING NORMAL OPERATING MODE

To prevent an involuntary pulse from activating the operator during manual operation, cut power to the system before re-locking the operator.

- To re-lock the operator, turn the release knob clockwise until it stops (Fig. 16, Ref. 4).
- Do not force the red knob as it's designed to strip out before damaging the operator.
- Close the cover and turn the key 90° counter-clockwise (Fig. 16, Ref. 2).
- Finally, remove the key and close the protective plug (Fig. 16, Ref. 1).

Figure 16



6 OUTWARD OPENING

Refer to Table C for this particular application. Select the operator according to leaf length as detailed in Table 1. Installation dimensions are provided in Table C.

To adjust the anti-crushing system for outward opening gates only, perform the following steps (note that these steps differ somewhat from instructions provided in Section 4.1):

- OPEN screw (green wording): gate closing direction.
- CLOSE screw (red wording): gate opening direction.
- To reduce torque, turn screws counter-clockwise.
- To increase torque, turn screws clockwise.

Figure 17

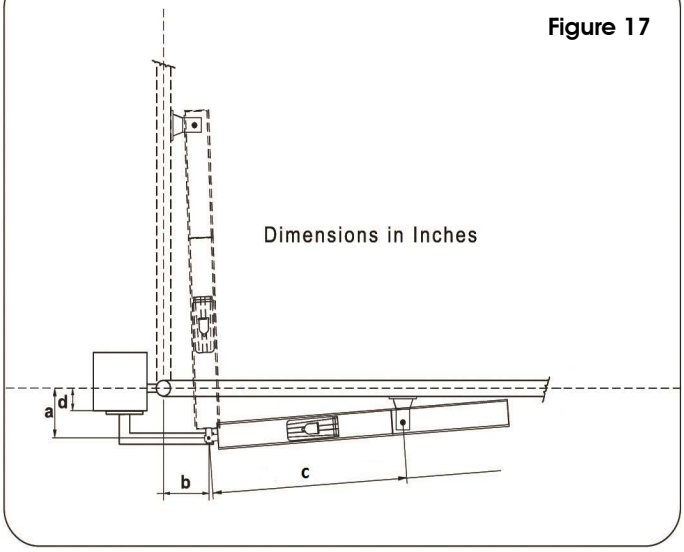


Table C: Standard Operators Recommended Dimensions

Opening Angle	a (inches)	b (inches)	d(**) (inches)	c (inches)
90°	5 1/16	5 1/16	n/a	28
115°	4	4 3/4	n/a	28

Table D: EG Operators Recommended Dimensions

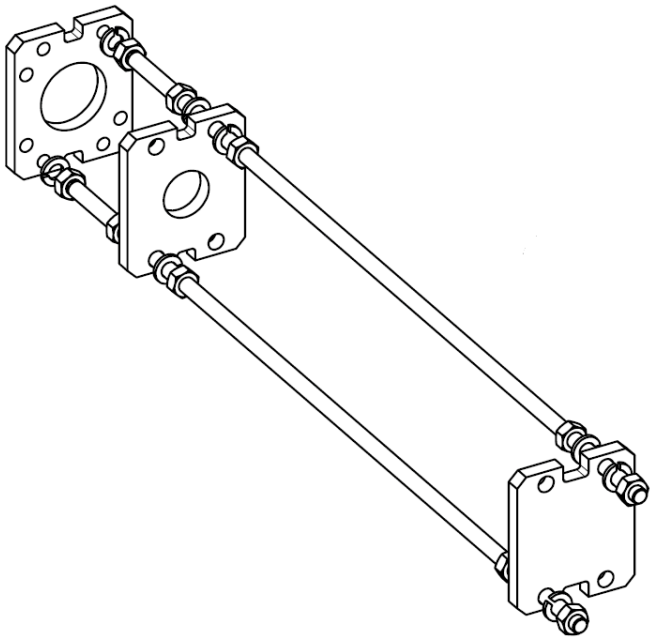
Opening Angle	a (inches)	b (inches)	d(**) (inches)	c (inches)
90°	7 7/8	7 1/2	n/a	32 3/4
115°	5 3/4	7	n/a	32 3/4

(**) The dimension is not a constraint

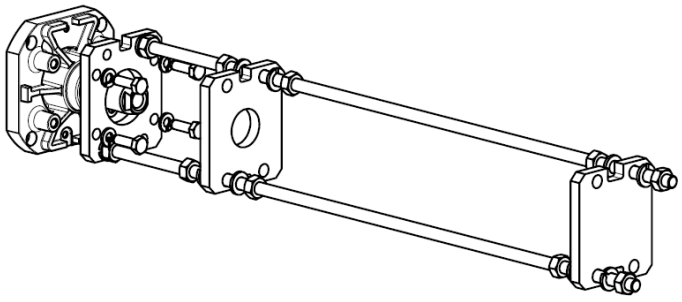
7 POSITIVE STOP ACCESSORY

In case the gate doesn't have built in mechanical stops, it is possible to install, directly on the operator, an accessory to limit the rod's travel in both directions.

(P/N: 490109 STANDARD, 490043 EG)



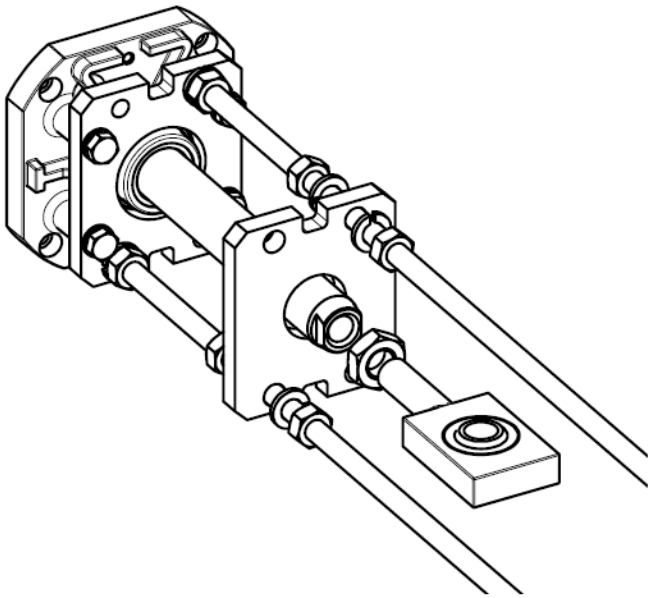
The accessory is mounted on the front flange of the operator using the supplied bolts.



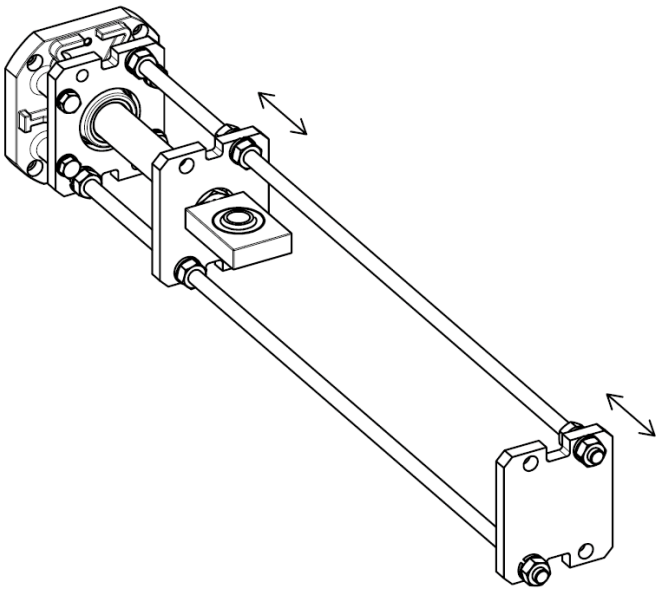
NOTE: The positive stops has 4 rods, 2 are shown for illustration purpose only.

For additional details please refer to the instructions included with the positive stop accessory.

With the use of the proper square shaped swivel joint (supplied):



It's possible to limit the rod's travel and create two solid mechanical stop positions.



8 MAINTENANCE AND REPAIRS

Periodically check for correct adjustment of the anti-crushing safety device and the effectiveness of the release system to allow manual operation.
Safety devices installed on the system must be checked every 6 months.

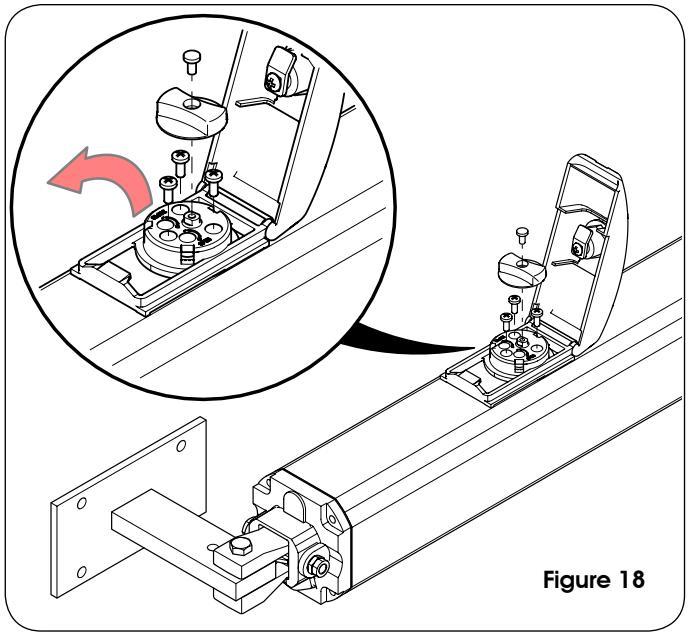


Figure 18

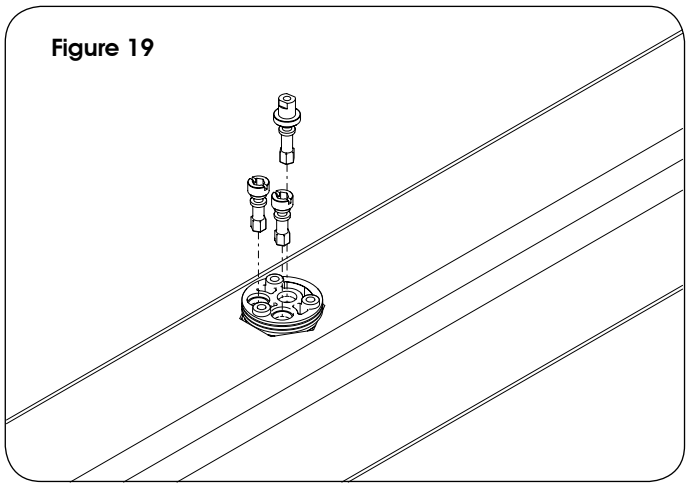


Figure 19

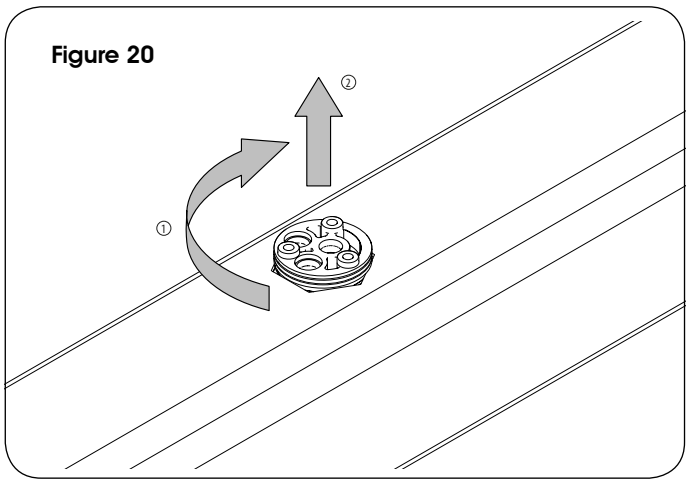


Figure 20

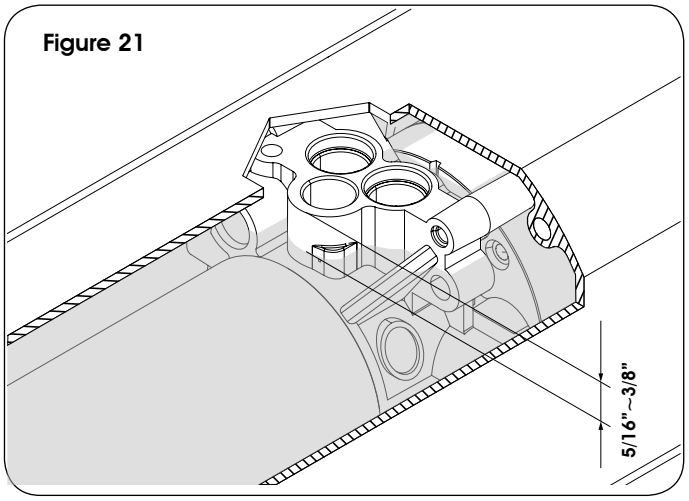


Figure 21

8.1 OIL LEVEL CHECK

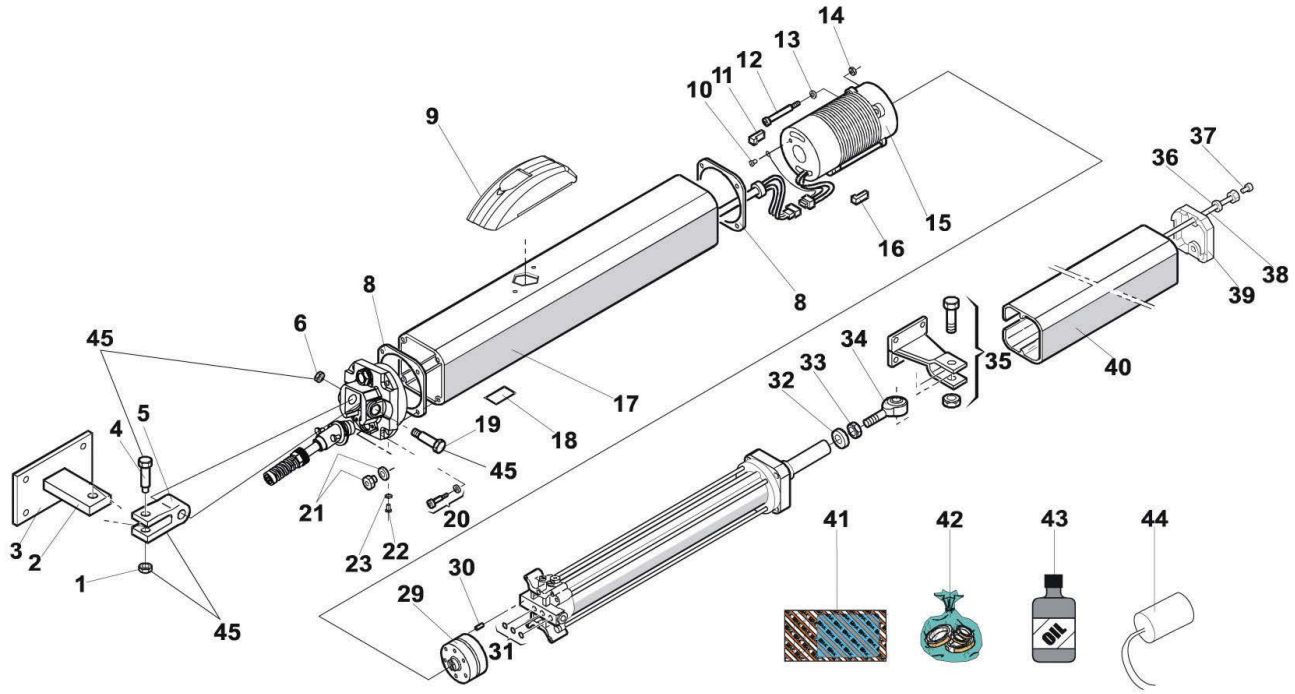
Make sure the operator is perfectly level, powered off and that the piston is fully retracted (gate in the open position).

- Unlock the manual release cover and hinge it open
- Remove the red knob after removing the screw (Figure 18)
- The remove the 3 T20 security screws that are below the red knob (Figure 18)
- Grab the manual release from both ends and gently rock it while pulling up.
- Make sure to remove the o-ring that fits between the manual release and the body of the operator
- Set the parts on a clean towel/location
- Next remove the 3 extensions grabbing them with plyers and pulling straight up (Figure 19)
- Now rotate the collar (silver in color) clockwise by hand and then lift straight up (Figure 20). It's very important to not use tools or pry on this piece
- Now look into the body of the machine and to the left, the fluid should be up to the center of the tie rod (top for 400 standard or center for 400 EG when the piston is fully retracted)
- The fluid should be 5/16" to 3/8" from the top of the valve body as shown in Figure 21
- If the unit is low pour fluid in here until it reaches the target level. If you overfill the unit it will come out the breather hole in the rear flange.
- **USE ONLY FAAC HP OIL** ⚠
- Re-assembly the parts in reverse order making sure the o-rings and surfaces are clear of debri

REPAIRS

For repairs, contact FAAC's authorized repair centers.

400 CBAC



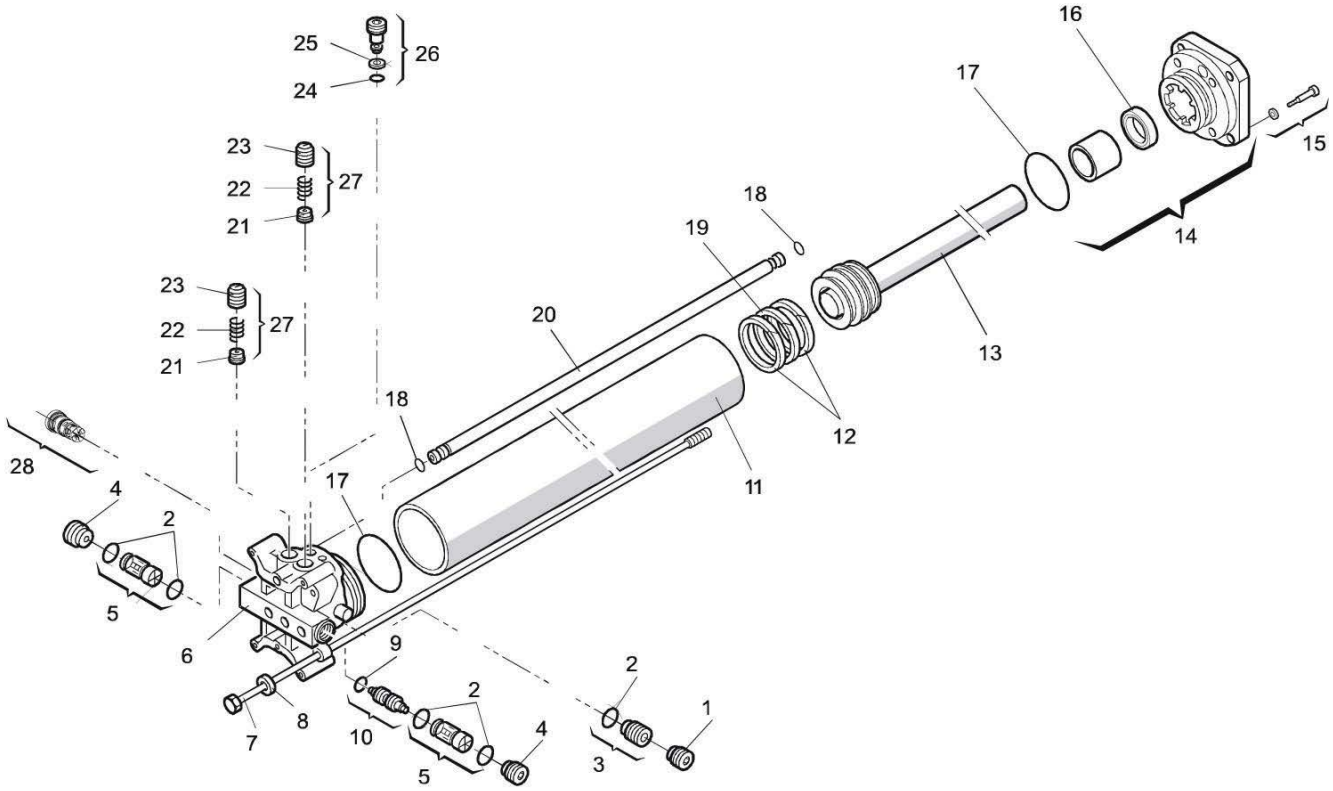
Part	Part Number	Description
01	2036	Galvanized Nut (8mm)
02	7220015	Rear Bracket
03	7284005	Rear Bracket Plate
04	7182075	Short Pin
05	7228015	Rear Fork
06	2037	Self-Locking Nut (8 mm)
07	70991015	Gasket (D80)
09	4185045.5	Locking Cap Kit
10	701803	Self Threading Screw (4mm)
11	7119475	Vibration Dampener
12	2365	Motor Bolt (4x50 mm)
13	2366	Lock Washer (4 mm)
14	2367	Hex Nut (4 mm)
15	77000425*	115V 1400 RPM Motor
16	7119485	Vibration Dampener
17	7161825	Operator Body 400
17a	7161835	Operator Body (EG)
18	7320065	Vent Screw Label
19	7182175	Long Pin
20	701829	T20 Torx (5 x 20mm)
21	7110015	Oil Plug
22	2275	Vent Screw (4x18 mm)
23	7094065	Gasket (copper)
29	3204425	1 Lt. Lobe Pump

Part	Part Number	Description
30	706152	Pump Pin (4x28mm)
31	7090010015	O-Ring
32	3060	Washer (Swivel)
33	2069	Swivel Jam Nut (10mm)
34	7073095	Swivel Joint square
35	7220355	Front Mounting Bracket
35a	7220365	Front Mounting Bracket (EG)
36	703401	Star Washer (5mm)
37	7119405	Protective Cover End Cap Plug
38	7019195	Tie-Rod (Protective Cover)
38a	7019225	Tie-Rod (Protective Cover EG)
39	4170015	Protective Cover End Cap
40	7272105	Protective Cover
40a	7272115	Protective Cover (EG)
41	3900985	Skin Pack: 400
41a	3900975	Skin Pack: 400 (EG)
42	2167.1	Seal Kit
43	714019 Qt.1	FAAC Oil: 1 qt.
43a	7140251 Qt.1	FAAC Arctic Oil: 1 qt.
44**	2707	Capacitor 8uF: 220V
45	7228015.1	Aluminum Fork Kit

NOTE:

* 220 VAC 8 uF Motor	p/n 7700205
* 220 VAC 16 uF Motor	p/n 77000415
** 16uF Capacitor for 220 VAC Motor	p/n 2706
** 25uF Capacitor for 115 VAC Motor	p/n 2705

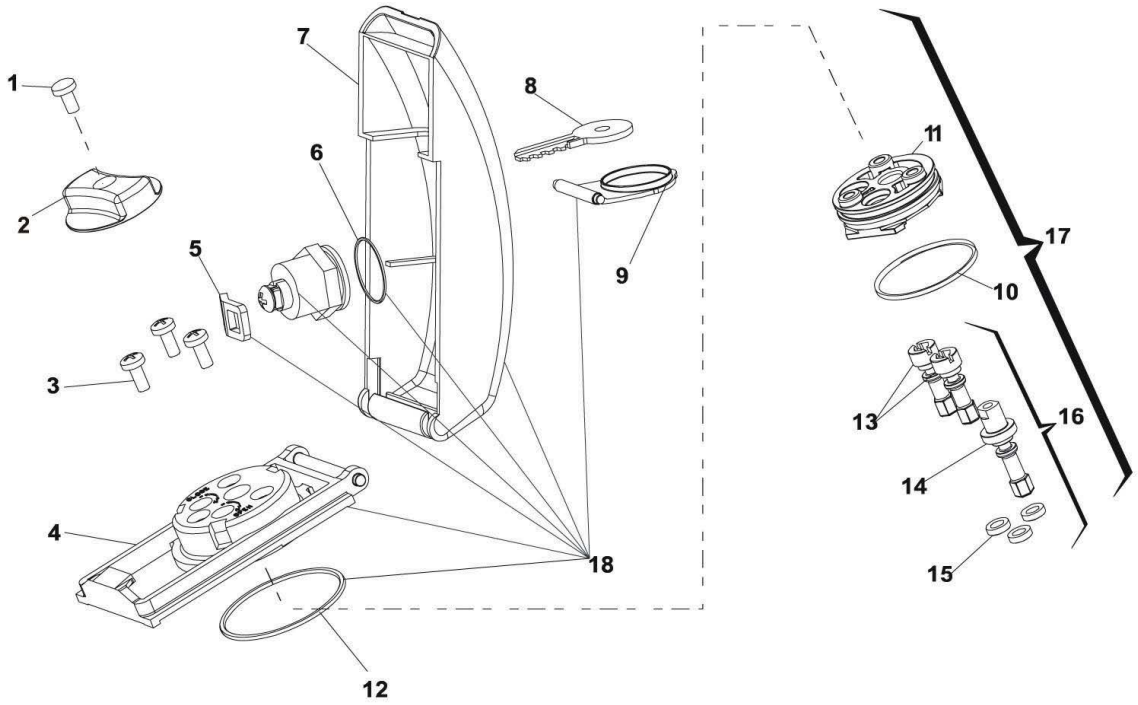
Cylinder



Part	Part Number	Description
01	7049135	Valve Retainer
02	70900500	O-Ring (10.82 x 1.78mm)
03	4404065	Inlet Valve
04	7049005	Retainer (Brass)
05	4404085	Lock Valve (Bi-Metal)
06	4994655	Distribution flange (CBAC)
07	7230295	Tie-Rod (Cylinder)
07a	7230305	Tie-Rod (Cylinder) (EG)
08	703204	Star Washer (5 mm)
09	70903000	O-Ring (7.66 x 1.78mm)
10	4180285	Shuttle Piston
11	7366025	Cylinder
11a	7366015	Cylinder (Long/EG)
12	7091015	Piston Rod Seals
13	4350105	Piston Rod Assembly
13a	4350115	Piston Rod Assembly (EG)

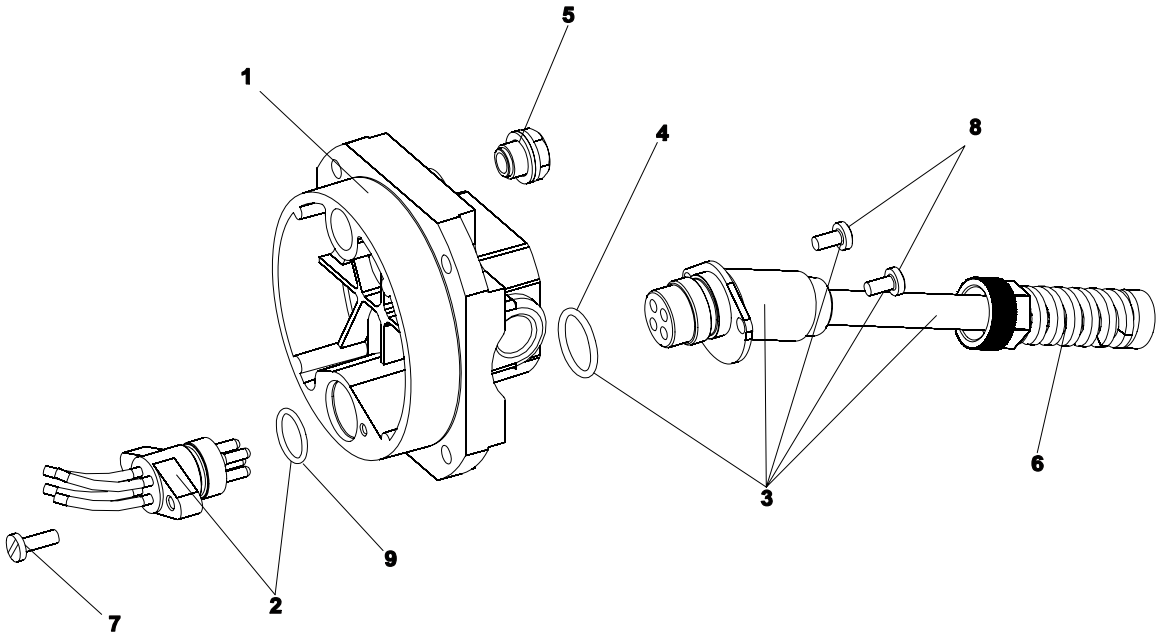
Part	Part Number	Description
14	4994625	Front Flange
15	701829	Front Flange Bolt (M5 x 20 mm)
16	63000315	Seal Front Flange (Internal)
17	7090360025	O-Ring (Distribution flange)
18	7090815	O-Ring (Retract Tube
19	7049005	Guide Ring (Piston)
20	7361335	Retract Tube
21	7310315	By-Pass Cap Spacer (see #27)
22	7210025	By-Pass Cap Spring (see #27)
23	711021	By-Pass Cap (see #27)
24	7090280015	O-Ring (Manual Release)
25	7043055	Spacer (Manual Release)
26	4180195	Manual Release
27	4180415	By-Pass Cap Kit
28	4404095	Inlet Valve (Bi-Directional)

Locking Cap



Part	Part Number	Description
01	2151	Knob Screw (ss) 4mm x 8mm
02	7290445	Manual Release Knob w/ screw
03	701526	Screw (ss) 4 x 10mm
04	720344	Locking Cap Base
05	729043	Lock
06	7090290015	O-Ring (Lock Cylinder)
07	7275285	Top Cover
08	7131005	Key (Viro)
09	7275275	Cover, Key
10	7090855	O-Ring Extension Receptacle
11	722795	Extension Receptacle
12	7090865	O-Ring (Base to Body)
13	718358	By-Pass Extensions
14	718359	Manual Release Extensions
15	7090845	O-Ring, Extensions
16	490327	Extensions with O-Rings
17	490326	Manual Release Kit
18	4185045	Locking Cap Complete

Rear Flange



Part	Part Number	Description
01	7171485	Rear Flange
02	417010	Wiring Harness
03	63001005	Cable With Molded Connector
04	7090895	O-Ring 21x2 mm
05	7110015	Oil Plug
06	7109135	Cable Strain Relief
07	701479	Screw 3 x 12mm
08	701466	SCREW 3 x 8 mm
09	7090905	O-Ring 14 x 1.5 mm

455D CONTROL BOARD

1. General Description

The 455 D control board is used to operate the FAAC High Voltage swing gate operators. It has several operating logics built in, programmable with the help of a display and push-buttons. The board allows connection of various accessories including monitored photocell for compliance with the UL325 standard Ed: 6.

The 455 D control board should be installed in an enclosure that is conveniently located as close as possible to the gate operator. All electrical connections from the control board to the operator must be made in a weatherproof junction box.

2. Technical Specifications

Input Voltage	115 V~ ± 10% or 230 V~ +6% -10% 50/60 Hz
Input Power	10 W
Motor Max. Load	800 W
Accessories Max. Load	0,5 A
Electric Lock Max. Load	15 VA
Ambient Operating Temperature Range	-4°F to +131°F
Protection Fuses	5A (230V version) 10A (115V Version) 800 mA (accessory)

3. Features

Function Logics:

Semi-automatic / Automatic / Safety Devices / "Stepped" Semi-automatic / "Stepped" Automatic / "Stepped" Safety Devices / Semi-automatic B / Dead-man C

Opening/Closing Time:

Programmable (from 0 to 120 s)

Pause Time:

Programmable (from 0 to 4 min.)

Closing Leaf Delay:

Programmable (from 0 to 4 min.)

Opening Leaf Delay:

2 s (can be excluded)

Thrust Force:

Adjustable on 50 levels for each motor

Terminal Board Inputs:

Open / Open Free Leaf / Stop / Limit-switch / Opening Safety Devices / Closing Safety Devices / Power Supply + Earth.

Terminal Board Outputs:

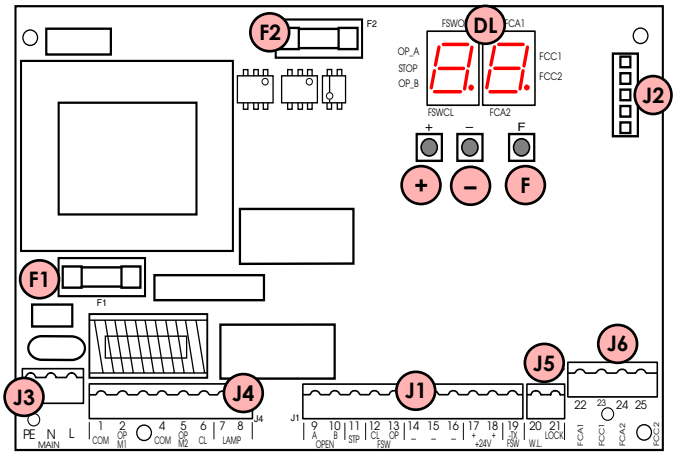
Flashing Lamp / Motors / 24 VDC Accessories Power Supply / 24 VDC Indicator-Light / Fail Safe / 12 VAC Electric Lock Power Supply

Programmable Functions:

Logic / Pause Time / Thrust Force / Torque at Initial Thrust / Opening and Closing Leaf Delay / Reversing Stroke / Over-Pushing Stroke / Indicator-Light / Pre-Flashing / Electric Lock / Fail Safe / Safety Devices Logic / Assistance Request / Detection Time of Obstacle or Contact Point

Learning Function:
Simple or complete work time learning, with or without Limit-switches

4. Layout and Components



DL STATUS AND PROGRAMMING DISPLAY

J1 LOW VOLTAGE TERMINAL BLOCK

J2 CONNECTOR FOR RADIO RECEIVER

J3 AC POWER SUPPLY TERMINAL BLOCK

J4 MOTORS AND WARNING LAMP TERMINAL BLOCK

J5 INDICATOR-LIGHT AND ELECTRIC LOCK TERMINAL BLOCK

J6 LIMIT-SWITCH TERMINAL BLOCK

F1 MOTORS AND TRANSFORMER PRIMARY WINDING FUSE (F 5A - 230V) (F 10A - 115V)

F2 LOW VOLTAGE AND ACCESSORIES FUSE (T 800mA)

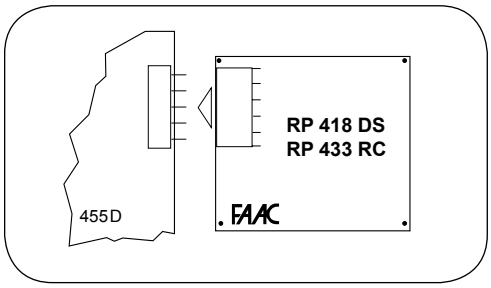
F "F" PROGRAMMING PUSH-BUTTON

– "–" PROGRAMMING PUSH-BUTTON

+ "+" PROGRAMMING PUSH-BUTTON

Connector J2 - Rapid Connection to RP Receivers

The 5 pin J2 connector allows to plug in the FAAC RP radio receivers

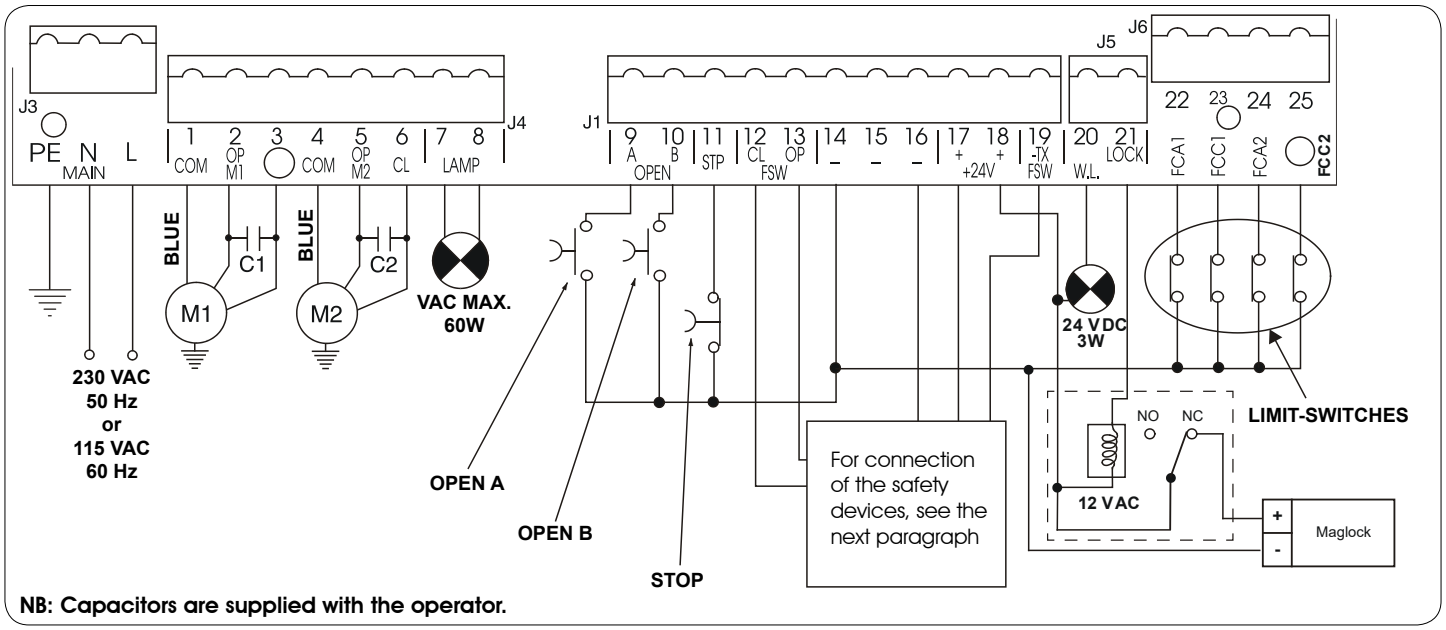


Terminal Block J3 - Power Supply

PE: Earth Connection / Ground
N: AC V~ power supply (Neutral)
L: AC V~ power supply (Line)

⚠ The installer is responsible for grounding the operator system, for providing the main power breaker switch, and for making sure that the entire gate system meets all applicable electrical codes.

5. Electric Connections



NB: Capacitors are supplied with the operator.

Terminal Block J4 - Motors and Warning Lamp

M1: COM / OP / CL: Connection to Motor 1
Must be used for single-leaf configuration

M2: COM / OP / CL: Connection to Motor 2
Cannot be used in single-leaf configurations

LAMP: Warning lamp output (AC V ~)

Terminal Block J1 - Accessories

OPEN A - "Total Opening" Command (N.O.):

Any pulse generator (push-button, detector, etc.) which, by closing a contact, commands opening and/or closing of both gate leaves. To install several full opening pulse generators, connect the N.O. contacts in parallel.

OPEN B - "Partial Opening" Command (N.O.) / Closing:

Any pulse generator (push-button, detector, etc.) which, by closing a contact, commands opening and/or closing of the leaf driven by motor M1. In the B and C logics, it always commands closing of both leaves. To install several partial opening pulse generators, connect the N.O. contacts in parallel. See logic chart for exact operation.

STP - STOP Contact (N.C.):

Any device (e.g. a push-button) which, by opening a contact, is able to stop gate movement. To install several STOP devices, connect the N.C. contacts in series.

NB: If STOP devices are not used, connect a jumper between the STP terminals and -.

CL FSW - Closing Safety Contact (N.C.):

The closing safety input is used to protect the leaf movement area during closing. While closing, an activation of the the safety device connected to this input will reverse the movement of the gate leaves. This input is inactive during the opening cycle. To be compliant with the UL325 standard **at least one monitored safety device must be connected to this input**. See the next paragraph on how to connect a monitored device. If this input is active when the gate is open it will prevent the leaf closing movement.

OP FSW - Opening safety devices contact (N.C.):

The opening safety input is used to protect the leaf movement area during opening. While opening, an activation of the the safety device connected to this input will reverse the movement of the gate leaves. This input is inactive during the closing cycle. To be compliant with the UL325 standard if this input is used to protect an entrapment zone at least one monitored safety device must be connected to it. See the next paragraph on how to connect a monitored device. If this input is active when the gate is closed it will prevent the leaf opening movement.

– - Negative for power supply to accessories

+ - 24 VDC - Positive for power supply to accessories

Important: Accessories max. load is 500 mA. To calculate current draw, refer to the instructions for individual accessories.

-TX FSW - Negative Power to photocell transmitters.

This terminal is used for the photocells monitoring feature. Compliance with the UL325 standard requires connecting the transmitter photocell negative power to this input and activating the FAIL SAFE function (see *Advanced Programming).* This will allow the 455 D board to check the correct operation of the safety photecells before each opening or closing cycle.

Terminal Block J5 - Indicator-Light and Electric Lock

W.L. - Power supply to indicator-light

Connect a 24 VDC - 3 W max. indicator-light, if necessary, between this terminal and the +24V supply. To avoid compromising correct operation of the system, do not exceed the indicated power.

LOCK - Power supply to electric lock

If necessary, connect a 12 Vac electric strike lock between this terminal and the +24V power supply. Or connect a 12 Vac relay and a Maglock following the schematic above.

Terminal Block J6 - Limit-Switches

These inputs are dedicated to the connection of opening and closing limit switches

6. Connection of Safety devices

Entrapment protection

To comply with the UL325 standard for gate operators every entrapment zone, as defined in ASTMF2200, must be protected by two independent entrapment protection devices. One of the devices is inherent in the FAAC operators or the control board design, the other can be external, like a photocell or an edge sensor.

See this picture for the photocells positioning:

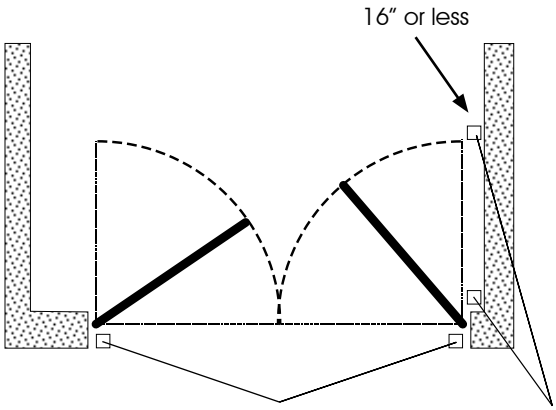


Figure C

Opening Safety Devices:

Are active only during the gate opening movement, and are suitable for protecting the area between the opening leaves and fixed obstacles (walls, etc) agains the risk of entrapment

Closing Safety Devices:

Are active only during the gate closing movement, and are suitable for protecting the closing area against the risk of entrapment.

Monitored Devices:

Additionaly the UL325 standard requires that every external entrapment protection device must be monitored for presence and correct operation. To comply with this requirement the photeocells must be wired as shown:

Connection of One Pair of Monitored Closing Photocells

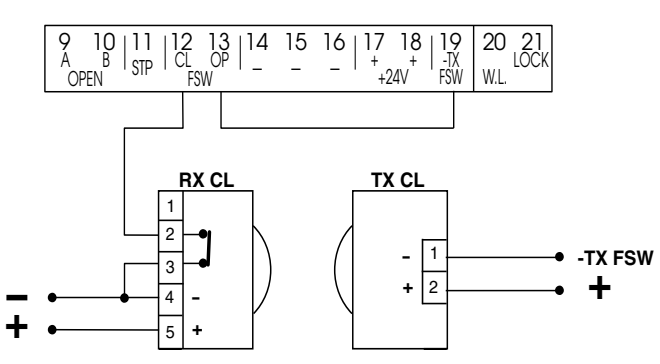
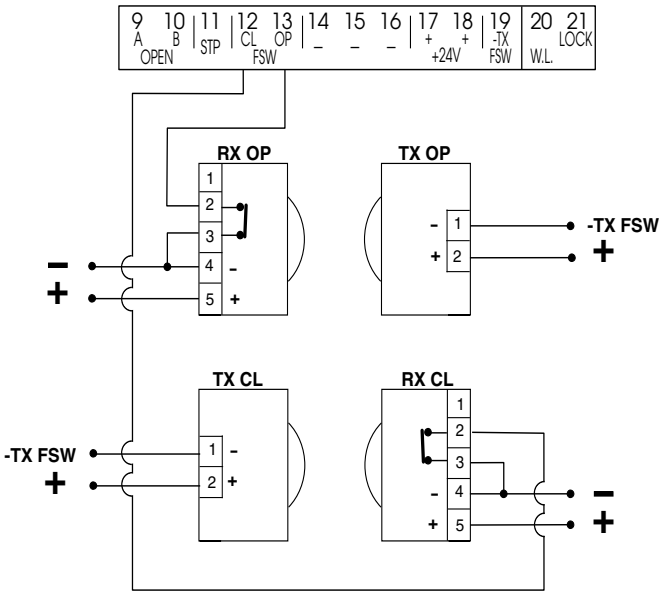


Figure I

Connection of One Pair of Monitored Opening Photocells and One Pair of Monitored Closing Photocells



Once the photocells are wired the Fail Safe mode of the 455D control board must be enabled. To enable it enter in advanced programming by pressing and holding "F" and then press "+", scroll to the "FS" parameter and select "Active".

For more details please refer to the advanced programming pararagraph.

ADVANCED PROGRAMMING (F) + (+)

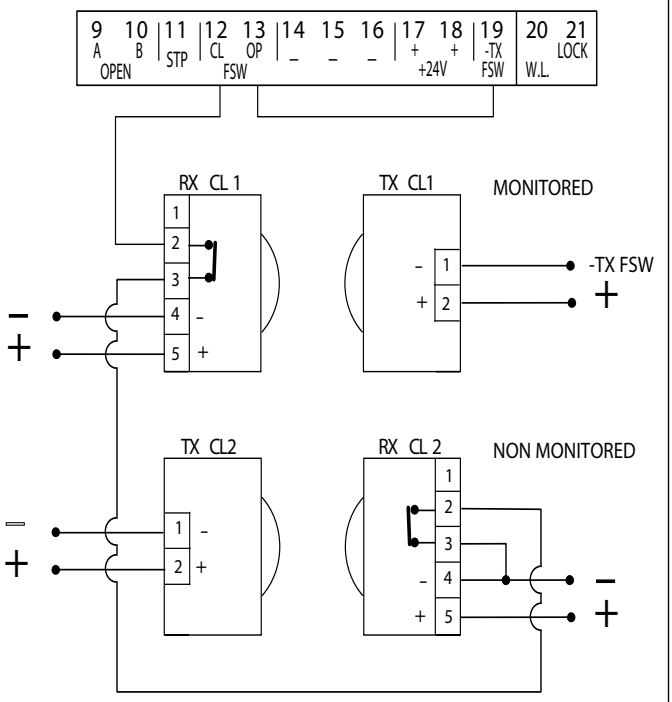
Display	Function	Default
FS	***FAIL SAFE:*** *If this function is activated, it enables a function test of the photocells before any gate movement. If the test fails (photocells not serviceable), the gate does not start the movement.* YES = *Active* NO = *Disabled*	NO

Only one monitored photocell can be connected to the Closing or Opening safety inputs. More than one photocell or other device can be connected to the safety inputs, but they will not be monitored.

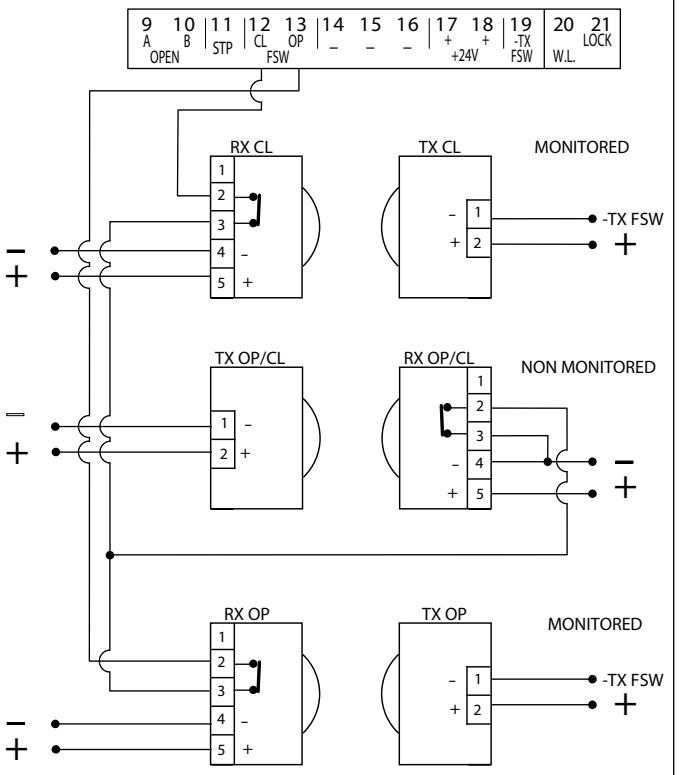
Other devices connected to the safety inputs must have normally closed contacts and wired in series with the main monitored sensor.

See the following example of one closing safety monitored photocell and one non monitored one.

Connection of Two Pairs of Closing Photocells, One Monitored and One non Monitored

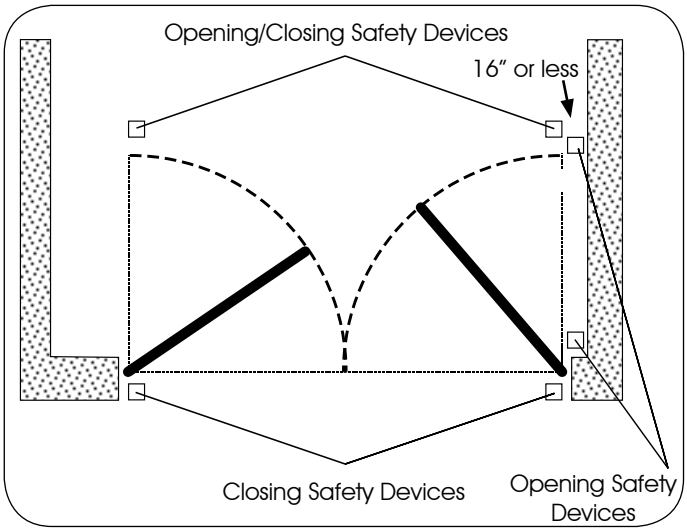


Connection of One Pair of Closing Photocells (monitored), One Pair of Opening Photocells (monitored) and One pair of Opening/Closing Photocells (non monitored)



Opening/Closing Safety Devices:

They operate during the gate opening and closing movements and are suitable to protect the opening and closing areas against the risk of impact. Typically these photocells work in combination with other monitored photocell protecting closing or opening entrapment zones. In that case they can't be monitored so they can only protect against potential impact on vehicles.



7. Operating Logics

This is a brief description of the main operating logics of the system. For a complete description please refer to Table 3

- A (automatic): The gate opens on command and automatically closes after a pause phase. A second command while opening is ignored; a second command during the pause phase interrupts the pause time; a second command during closing reopens the gate. A maintained open command will hold the gate open.
- S (security): The security mode is like A logic except that a second command during opening immediately closes the gate. A maintained open command will not hold the gate open.
- E (semi-automatic): This mode requires a command to open and a command to close. A second command during opening stops the gate. A second command during closing reopens the gate.
- EP (semi-automatic, step by step): This mode requires a command to open and a command to close. A second command during opening or closing causes the gate to stop. A third command then reverses the previous motion of the gate.
- B (manned, pulsed): This mode is designed for guard station use and requires a three button switch (pulsed) to open, close, and stop the gate.
- C (manned and constant): This mode requires constant pressure switches. One to open and one to close. No pressure on a switch stops the gate.

8. Programming

To program the 455D Control Board, you have to access "*PROGRAMMING*" mode. Programming is split into two parts: *BASIC* and *ADVANCED*.

Basic Programming:

To access BASIC PROGRAMMING, press key **F**:

- Press and hold **F**, the unit will display the name of the first function / parameter.
- When you release the key, the unit will display the parameter's current value.
- Value can be modified with keys + and - .
- Press and hold **F** again, the unit will display the name of the next function / parameter.
- When you reach the last function, press **F** to exit the program, the display resumes monitoring input status.
- IMPORTANT: Make sure to exit programming mode otherwise the changes will not be saved.

The following table displays the sequence of functions accessible in BASIC PROGRAMMING:

BASIC PROGRAMMING press (F)

Display	Function	Default
LO	***OPERATING LOGICS (see tab. 3/a - h):*** E = *Semi-automatic* A = *Automatic* S = *"Safety" Automatic* EP = *"Stepped" Semi-automatic* AP = *"Stepped" Automatic* SP = *"Safety Stepped" Automatic* b = *"B" Semi-automatic* C = *Dead-man*	E
PA	***PAUSE TIME:*** *This has effect only when automatic logic is selected. Adjustable from 0 to 59 secs. in one-second increments.* *Subsequently, display changes to minutes and tenths of seconds (separated by a decimal point), time is adjusted in 10-second increments, up to 4.1 minutes max. Thus, if the unit displays 2.5, Pause Time is 2 mins. and 50 secs.*	0
F1	***LEAF 1 FORCE:*** *Adjusts thrust of Motor 1.* 1 = *minimum force* 50 = *maximum force (hydraulic)*	25
F2	***LEAF 2 FORCE:*** *Adjusts thrust of Motor 2.* 1 = *minimum force* 50 = *maximum force (hydraulic)*	25
cd	***LEAF 1 CLOSING DELAY:*** *Delays closing start of leaf 1 with respect to leaf 2. Adjustable from 0 to 4.1 minutes (see Pause Time).*	0
tL	***TIME LEARNING (see Section F.3.):*** *Enables the selection between "simple" learning and "complete" (manual choice of deceleration and stop points) learning.* ***Simple Learning:*** (+) ≈ ***1 s.*** ***Complete Learning:*** (+) ***> 3 s.***	
In	*Exit from programming and return to inputs status monitoring.*	

For hydraulic operators, set force to the maximum level.

Advanced Programming:

To access ADVANCED PROGRAMMING, press and hold key F and then press key +:

- Release key +, the unit displays the name of the first function.
- Release key F, modify the value of the function with keys + and -.
- Press and hold key F, the unit displays the name of the next function, and if you release it, the value that can be modified with keys + and -.
- When you reach the last function, press F to exit the program, the unit resumes monitoring input status.

The following table shows the sequence of functions accessible in ADVANCED PROGRAMMING:

ADVANCED PROGRAMMING (F) + (+)

Display	Function	Default
bo	***MAXIMUM TORQUE AT INITIAL THRUST:*** *The motors operate at maximum torque (ignoring the torque setting) at start of movement. Useful for heavy leaves.* *4 = Active no = Disabled*	no
cS	***LAST STROKE AT CLOSING:*** *The motors are activated at full speed for 1 second to facilitate locking of the electric lock.* *4 = Active no =Disabled*	no
rS	***REVERSING STROKE:*** *Before opening, while the gate is closed, the motors thrust to close for 2 seconds thus facilitating release of the electric lock.* *4 = Active no = Disabled*	no
od	***LEAF 2 OPENING DELAY (2 s):*** *Enables delayed start (at opening) of leaf 2, avoiding interference between leaves.* *4 = Active no = Disabled*	no
FS	***FAIL SAFE:*** *If this function is activated, it enables a function test of the photocells before any gate movement. If the test fails (photocells not serviceable), the gate does not start the movement.* *4 = Active no = Disabled*	no
PF	***PRE-FLASHING (5 s):*** *Activates the flashing lamp for 5 seconds before start of movement.* *4 = Active no = Disabled*	no
EL	***ELECTRIC LOCK ON LEAF 2:*** *For using the electric lock on leaf 2 instead of on leaf 1.* *4 = Active no = Disabled*	no

***NOTE**: Parameter modifications take effect immediately. Exit out of programming to save changes. If the equipment is powered down before returning to normal status monitoring, any unsaved modifications will be lost.*

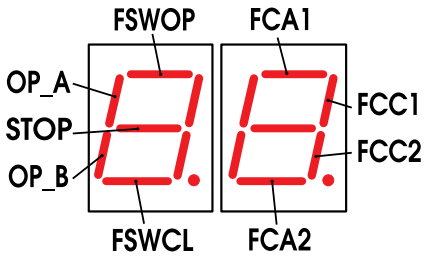
To restore programming defaults, press and hold the three buttons +, -, F simultaneously for 5 seconds.

Display	Function	Default
SP	***INDICATOR-LIGHT:*** *If 0 is selected, the output functions as a standard indicator-light (lighted at opening and pause, flashing at closing, and off when gate is closed). Different figures correspond to the extra time compared to normal work time (opening or closing) when the output can be used - via a relay - to power a courtesy light. Time can be adjusted from 1 to 59 sec. in 1 sec. steps, and from 1.0 to 4.1 min. in 10 sec. steps.* *0 = Standard indicator-light* *from 1 to 4.1 = Timed output*	0
Ph	***CLOSING PHOTOCELLS REVERSE AT RELEASE:*** *Enable this function if you want the closing photocells to stop movement and reverse at release. Default setting is immediate reverse.* *4 = Active no = Disabled*	no
Ad	***A.D.M.A.P. FUNCTION:*** *When enabled, the safety devices operate in compliance with French standard NFP 25/362.* *4 = Active no = Disabled*	no
AS	***ASSISTANCE REQUEST (combined with next function):*** *If activated, at the end of countdown (settable with the next function i.e. "Cycle programming") it affects 8 s of pre-flashing at every Open pulse (job request). Can be useful for setting scheduled maintenance jobs.* *4 = Active no = Disabled*	no
nC	***CYCLE PROGRAMMING:*** *For setting countdown of system operation cycles. Settable (in thousands) from 0 to 99 thousand cycles. The displayed value is updated as cycles proceed.* *This function can be used to check use of the board or to exploit the "Assistance request".*	0
EC	***EXTRA WORK TIME:*** *If reversing occurs, and if the leaf does not reach its end contact point, you can activate this function to increase work time.* *4 = Active no = Disabled*	no
In	*Exit from programming and return to inputs status monitoring.*	

9. Start-up

LED Indicators:

The board has a two-digit display. When not in "PROGRAMMING" mode, this display is used to indicate the status of inputs. The figure below shows how the LED segments are mapped to the corresponding the inputs.



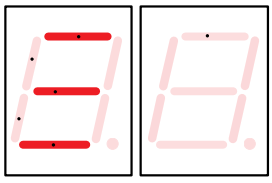
The table below shows the status of the LEDs in relation to the status of the inputs.

Note the following: **LED ON** = closed contact
LED OFF = open contact

Operation of the Status Signaling LEDs

LEDs	ON	OFF
OP_A	Command activated	**Command inactive**
OP_B	Command activated	**Command inactive**
STOP	**Command inactive**	Command activated
FSWCL	**Safety devices clear**	Safety devices triggered
FSWOP	**Safety devices clear**	Safety devices triggered
FCA1 (if used)	**Limit switch free**	Limit switch triggered
FCC1 (if used)	Limit switch free	**Limit switch triggered**
FCC2 (if used)	Limit switch free	**Limit switch triggered**
FCA2 (if used)	**Limit switch free**	Limit switch triggered

The status of the LEDs while the gate is closed at rest are shown in bold.



This is the normal status of the display with all the safety inputs clear and no activation signal present

Rotation direction and force check:

1. Program the functions of the 455 D control board according to need, as previously shown.
2. Cut power to the electronic control equipment.
3. Release the operators and manually move the gate to the mid-point of the opening angle.
4. Re-lock the operators.
5. Restore power.
6. Send an opening command on the OPEN A input and verify that the gate leaves start moving towards the open position

Note: If the first OPEN A pulse starts a closing movement, cut power and reverse the phases of the electric motor (red and black wires) on the 455 D control board.

7. Check force setting of the motors, modify if necessary.

Note: For hydraulic operators, like the 400, force should be programmed to maximum level (50)

8. Stop leaf movement with a STOP command.
9. Release the operators, close the leaves and re-lock the operators.

Opening/closing time is established by a time learning procedure which can be accomplished in "simple" or "complete" modes. The simple mode doesn't allow a slow down phase in the operator, while the complete mode does.

The slow down can be useful to reduce the mechanical stress on the gate, but it can create problems in high wind conditions.

10. Learning Operating Times

Make sure travel limit mechanical stops are present.

⚠ ***WARNING:*** *During the learning procedure, safety devices are disabled! Avoid crossing the leaf movement area when this operation is carried out.*

- SIMPLE LEARNING (Without Slow Down):

Check that the leaves are closed. Enter *"BASIC PROGRAMMING,"* select the TIME LEARNING function and then press the + push-button for **1 second**. The display begins flashing and the leaves begin to open.

As soon as the leaves reach the opening contact point, provide an OPEN A pulse (with the key operated push-button or with the radio control) to stop the movement. The leaves stop and the display stops flashing.

Press push-button **F** to exit and save the programming. The procedure is complete and the gate is ready to operate.

- COMPLETE LEARNING (With Slow Down):

Check that the leaves are closed. Enter *"BASIC PROGRAMMING,"* select the TIME LEARNING function and then press the + push-button for more than **3 seconds**. The display begins flashing and leaf 1 begins to open. The following functions can be performed by sending OPEN A pulses (by key push-button or radio control).

A total of 8 OPEN A commands required:

1. Slow down at opening of leaf 1
2. Leaf 1 stops at opening and leaf 2 begins its opening movement
3. Slow down at opening of leaf 2
4. Leaf 2 stops at opening and immediately begins its closing movement
5. Slow down at closing of leaf 2
6. Leaf 2 stops at closing and leaf 1 begins its closing movement
7. Slow down at closing of leaf 1
8. Leaf 1 stops at closing

When the display stops flashing, press push-button **F** to exit and save the programming. The procedure is complete and the gate is ready to operate.

Notes:

- *If you wish to eliminate deceleration in certain stages, wait for the leaf to reach its stop-limit and supply 2 consecutive Open pulses (by 1 second).*
- *If only one leaf is present, the entire sequence must nevertheless be completed. When the leaf has finished opening, supply 5 Open pulses until the leaf begins to close, and then resume normal operation.*

11. Final Tests

Once programming is complete and the proper operating times are stored in the board's memory perform a complete test the system. Verify that the operator(s) run properly and, most importantly, check that force is adequately adjusted and that safety devices are operating correctly.

After simple or complete learning the board will add 3 sec. to the programmed time so the operators will run against the stops.

Monitored safety test:

IMPORTANT: To make sure that the safety photocells protecting entrapment zones are monitored properly install a temporary jumper on the N.C. output of the photocell and give an OPEN A command. The gate must not move, otherwise check the wiring of the photcells and make sure that FAIl SAFE is enabled in Advanced Programming

Tab. 3/a

Logic "E"	PULSES					
GATE STATUS	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf	Opens single leaf	No effect (OPEN disabled)		No effect	No effect (OPEN disabled)
OPEN	Re-closes the leaf immediately (3)			No effect (if on part.opng. OPEN A disabled)	No effect (3) (OPEN disabled)	No effect (OPEN disabled)
CLOSING	Re-opens the leaf immediately		Stops operation	No effect (saves OPEN)	see paragraph 5.2.	Locks and, on release, reverses to open
OPENING	Stops operation (3)			Reverses to close	No effect	Locks and, on release, continues opening
LOCKED	Closes the leaf (with Closing Safety devices engaged, opens at the 2nd pulse) (3)		No effect (OPEN disabled)	No effect		No effect (OPEN disabled)

Tab. 3/b

Logic "A"	PULSES					
GATE STATUS	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf and closes it after pause time (1)	Opens single leaf and closes after pause time (1)	No effect (OPEN disabled)		No effect	No effect (OPEN disabled)
OPEN on PAUSE	Reloads pause time (1)(3)			No effect (if on part.opng. OPEN A disabled)	Reloads pause time (1) (3)	Reloads pause time (1) (OPEN disabled)
CLOSING	Re-opens the leaf immediately (1)		Stops operation	No effect (saves OPEN)	see paragraph 5.2.	Locks and, on release, reverses to open
OPENING	No effect (1) (3)			Reverses to close	No effect	Locks and, on release, continues opening
LOCKED	Closes the leaf (3)		No effect (OPEN disabled)	No effect		No effect (OPEN disabled)

Tab. 3/c

Logic "S"	PULSES					
GATE STATUS	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf and closes it after pause time	Opens single leaf and closes after pause time	No effect (OPEN disabled)		No effect	No effect (OPEN disabled)
OPEN on PAUSE	Re-closes the leaf immediately (3)			No effect (if on part.opng. OPEN A disabled)	On release, closes after 5" (OPEN disabled) (3)	On release, closes after 5" (OPEN disabled)
CLOSING	Re-opens the leaf immediately		Stops operation	No effect (saves OPEN)	see paragraph 5.2.	Locks and, on release, reverses to open
OPENING	Re-closes the leaf immediately (3)			Reverses to close	No effect (saves OPEN)	Locks and, on release, continues opening
LOCKED	Closes the leaf (3)		No effect (OPEN disabled)	No effect		No effect OPEN disabled)

Tab. 3/d

Logic "EP"	PULSES					
GATE STATUS	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf	Opens leaf for the partial opening time	No effect (OPEN disabled)		No effect	No effect (OPEN disabled)
OPEN	Re-closes the leaf immediately (3)			No effect (if on part.opng. OPEN A disabled)	No effect (OPEN disabled) (3)	No effect (OPEN disabled)
CLOSING	Stops operation		Stops operation	No effect (saves OPEN)	see paragraph 5.2.	Locks and, on release, reverses to open
OPENING	Stops operation (3)			see paragraph 5.2.	No effect	Locks and, on release, continues opening
LOCKED	Restarts movement in reverse direction (3) (always closes after a Stop)		No effect (OPEN disabled)	No effect (if it must open, it disables OPEN)	No effect (if it must close, it disables OPEN)	No effect (OPEN disabled)

(1) If maintained, it prolongs the pause until disabled by the command (timer function)

(2) If a new pulse occurs within 2 seconds after reversing, it immediately stops operation.

(3) During the partial opening cycle, an OPEN A pulse causes total opening.

NB.: Effects on other active pulse inputs in brackets.

FAAC

Tab. 3/e

Logic "AP"	PULSES					
GATE STATUS	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf and closes it after pause time	Opens single leaf and closes after pause time	Stops operation	No effect (OPEN disabled)	No effect	No effect (OPEN disabled)
OPEN on PAUSE	Stops operation (3)			No effect (if on part.opng. OPEN A disabled)	Reloads pause time (3) (OPEN disabled)	Reloads pause time (OPEN disabled)
CLOSING	Re-opens the leaf immediately			No effect (saves OPEN)	see paragraph 5.2.	Locks and, on release, reverses to open
OPENING	Stops operation (3)			Reverses to close	No effect	Locks and, on release, continues opening
LOCKED	Closes the leaf (with Closing Safety devices engaged, opens at the 2nd pulse) (3)		No effect (OPEN disabled)	No effect		No effect (OPEN disabled)

Tab. 3/f

Logic "SP"	PULSES					
GATE STATUS	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf and closes it after pause time	Opens single leaf and closes after pause time	Stops operation	No effect (OPEN disabled)	No effect	No effect (OPEN disabled)
OPEN on PAUSE	Stops operation (3)			No effect (if on part.opng. OPEN A disabled)	On release, closes after 5" (OPEN disabled) (3)	On release, closes after 5" (OPEN disabled)
CLOSING	Re-opens the leaf immediately			No effect (saves OPEN)	see paragraph 5.2.	Locks and, on release, reverses to open
OPENING	Stops operation (3)			Reverses to close	No effect (saves OPEN)	Locks and, on release, continues opening
LOCKED	Closes the leaf (3)		No effect (OPEN disabled)	No effect		No effect (OPEN disabled)

Tab. 3/g

Logic "B"	PULSES					
GATE STATUS	OPEN-A (opening)	OPEN-B (closing)	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf	No effect	Stops operation	No effect (OPEN A disabled)	No effect	No effect (OPEN A disabled)
OPEN	No effect	Closes the leaf	No effect (OPEN B disabled)	No effect	No effect (OPEN B disabled)	No effect (OPEN B disabled)
CLOSING	Reverses to open	No effect		No effect (saves OPEN A)	Stops operation (OPEN-B disabled)	Stops operation (OPEN-A/B disabled)
OPENING	No effect	No effect		Stops operation (OPEN-A disabled)	No effect	
LOCKED	Opens the leaf	Closes the leaf	No effect (OPEN A/B disabled)	No effect (OPEN-A disabled)	No effect (OPEN B disabled)	No effect (OPEN A/B disabled)

Tab. 3/h

Logic "C"	CONTROLS ALWAYS HELD DOWN		PULSES			
GATE STATUS	OPEN-A (opening)	OPEN-B (closing)	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES	OP/CL SAFETY DEVICE
CLOSED	Opens the leaf	No effect (OPEN-A disabled)	Stops operation	No effect (OPEN A disabled)	No effect	No effect (OPEN A disabled)
OPEN	No effect (OPEN-B disabled)	Closes the leaf	No effect (OPEN-A/B disabled)	No effect (OPEN A disabled)	No effect (OPEN B disabled)	No effect (OPEN B disabled)
CLOSING	Stops operation	/		No effect	Stops operation (OPEN-B disabled)	Stops operation (OPEN-A/B disabled)
OPENING	/	Stops operation		Stops operation (OPEN-A disabled)	No effect	

(1) If maintained, it prolongs the pause until disabled by the command (timer function)

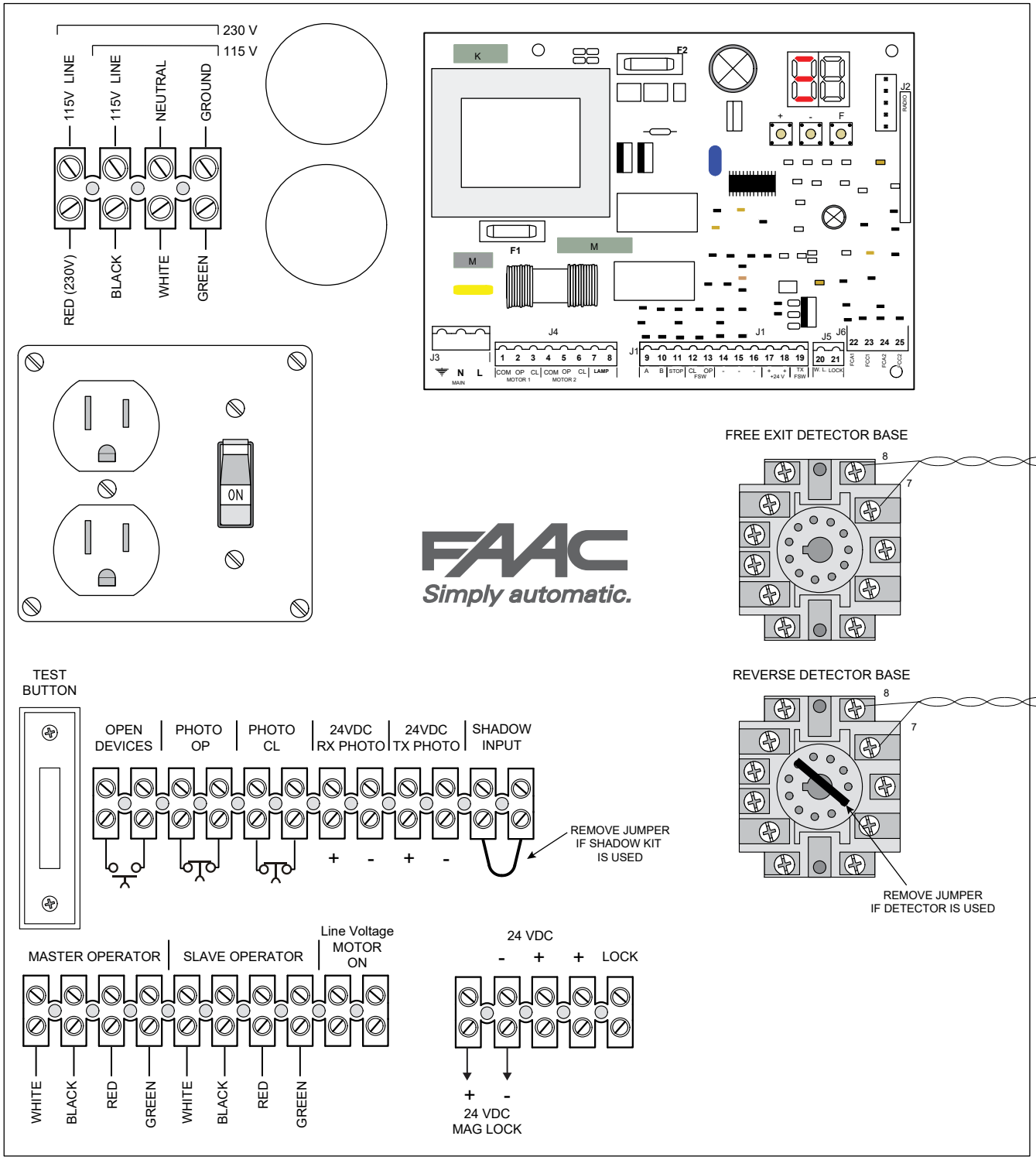
(2) If a new pulse occurs within 2 seconds after reversing, it immediately stops operation.

(3) During the partial opening cycle, an OPEN A pulse causes total opening.

NB.: Effects on other active pulse inputs in brackets.

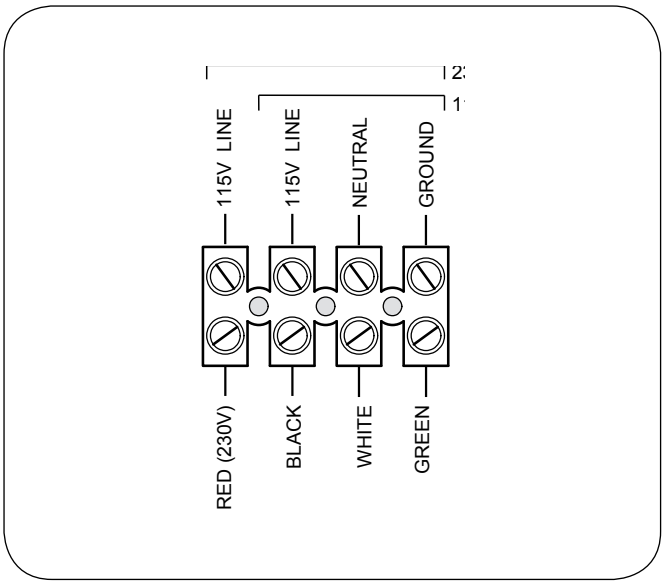
13. Prewired Enclosure

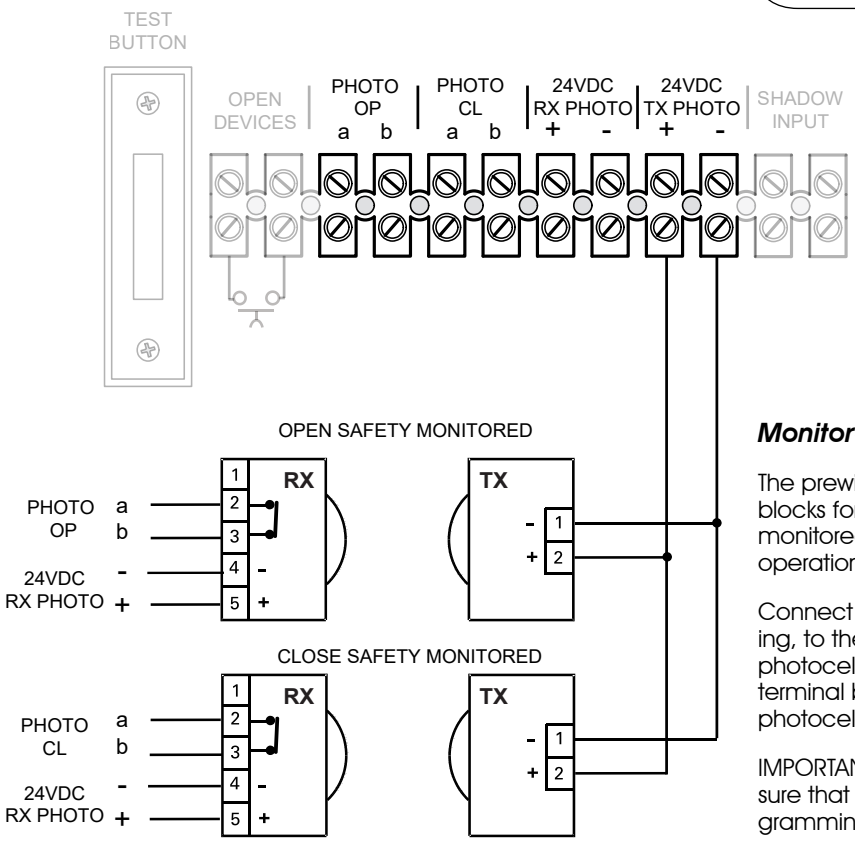
The 455D board can be easily installed in a prewired enclosure supplied by FAAC that integrates a number of functions: Power ON-OFF switch and accessory power outlet, loop detector sockets prewired to the board, large terminal strips to easily connect activations, accessories and safeties.



AC Power Wiring Guidelines

1. Check local wiring codes in all cases and follow all local building codes. Wiring and hookup should be performed by qualified electricians/installers only.
2. AC power should be supplied from a circuit breaker panel and must have its own dedicated circuit breaker. This supply must include a green ground conductor.
3. Properly ground the gate operator to minimize or prevent damage from power surges and/or lightning. Use a grounding rod if necessary. A surge suppressor is recommended for additional protection.





Monitored safety connections

The prewired enclosure comes with dedicated terminal blocks for the connection of safety photocells that can be monitored by the control board for presence and correct operation.

Connect the trasnsmitter photocells as shown on the drawing, to the dedicated TX photo outputs. Connect the receiver photocells 24V power to the dedicated outputs on the terminal block as shown. Connect the N.C. outputs of the photocells to the dedicated terminal blocks.

IMPORTANT: To enable monitoring of the photocells make sure that FAIL-SAFE mode is turned on in the advanced programming menu:

ADVANCED PROGRAMMING (F) + (+)

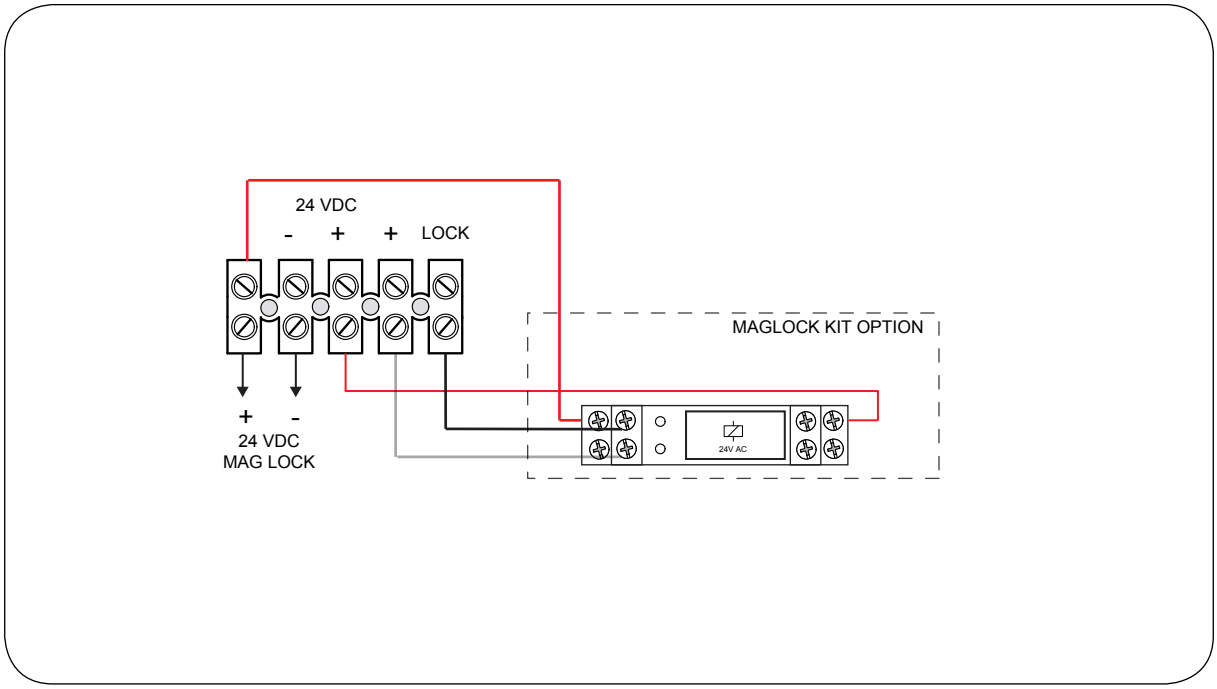
Display	Function	Default
F5	***FAIL SAFE:*** *If this function is activated, it enables a function test of the photocells before any gate movement. If the test fails (photocells not serviceable), the gate does not start the movement.* 4 = *Active* no = *Disabled*	no

Maglock connection

The prewired enclosure comes with dedicated terminal blocks for the connection of a relay to drive a Maglock.

The Maglock kit can be ordered separately as an accessory. Refer to this schematic for the connections.

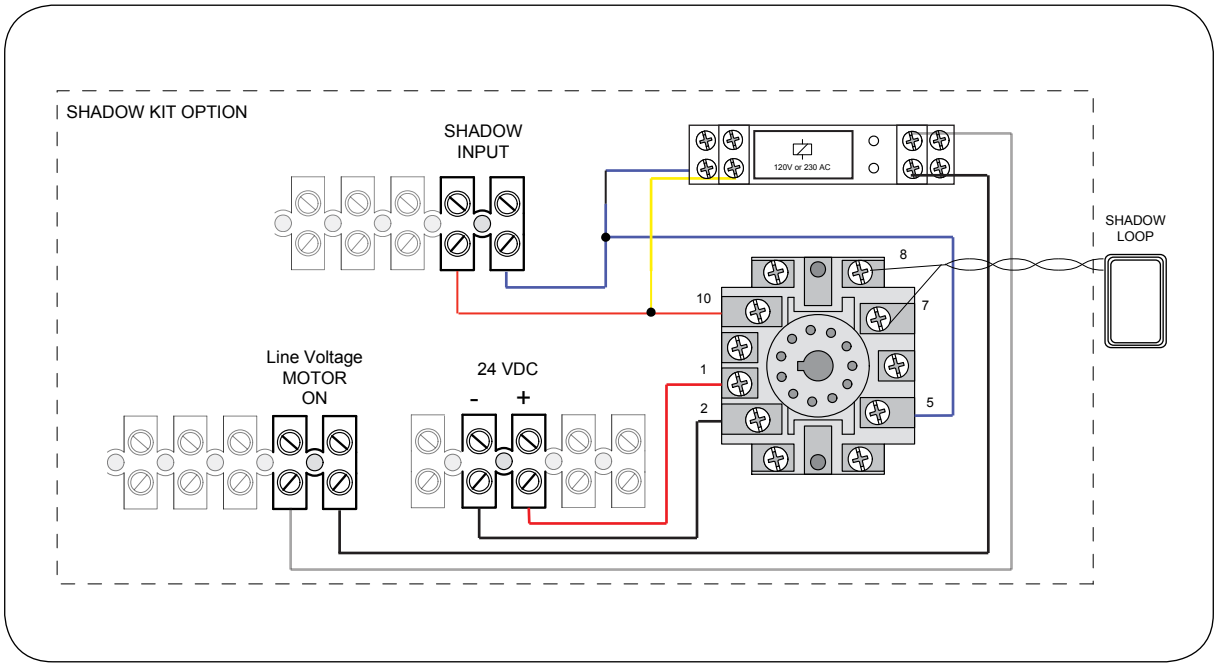
If using non-FAAC relay make sure the minimum switch voltage is less than 12Vac



Shadow Loop kit option

The prewired enclosure comes with dedicated terminal blocks for the connection of a relay and a loop detector socket to implement the shadow loop functionality. The Shadow loop kit can be ordered separately as an accessory.

Refer to this schematic for the connections.



LIMITED WARRANTY

To the original purchaser only:

FAAC International, Inc., warrants, for twenty-four (24) months from the date of invoice, the gate operator systems and other related systems and equipment manufactured by FAAC S.p.A. and distributed by FAAC International, Inc., to be free from defects in material and workmanship under normal use and service for which it was intended provided it has been properly installed and operated.

FAAC International, Inc.'s obligations under this warranty shall be limited to the repair or exchange of any part of parts manufactured by FAAC S.p.A. and distributed by FAAC International, Inc. Defective products must be returned to FAAC International, Inc., freight prepaid by purchaser, within the warranty period. Items returned will be repaired or replaced, at FAAC International, Inc.'s option, upon an examination of the product by FAAC International, Inc., which discloses, to the satisfaction of FAAC International, Inc., that the item is defective. FAAC International, Inc. will return the warranted item freight prepaid. The products manufactured by FAAC S.p.A. and distributed by FAAC International, Inc., are not warranted to meet the specific requirements, if any, of safety codes of any particular state, municipality, or other jurisdiction, and neither FAAC S.p.A. or FAAC International, Inc., assume any risk or liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

Any products and parts not manufactured by FAAC S.p.A. and distributed by FAAC International, Inc., will carry only the warranty, if any, of the manufacturer. This warranty shall not apply to any products or parts thereof which have been repaired or altered, without FAAC International, Inc.'s written consent, outside of FAAC International, Inc.'s workshop, or altered in any way so as, in the judgment of FAAC International, Inc., to affect adversely the stability or reliability of the product(s) or has been subject to misuse, negligence, or accident, or has not been operated in accordance with FAAC International, Inc.'s or FAAC S.p.A.'s instructions or has been operated under conditions more severe than, or otherwise exceeding, those set forth in the specifications for such product(s). Neither FAAC S.p.A. nor FAAC International, Inc., shall be liable for any loss or damage whatsoever resulting, directly or indirectly, from the use or loss of use of the product(s). Without limiting the foregoing, this exclusion from liability embraces a purchaser's expenses for downtime or for making up downtime, damages for which the purchaser may be liable to other persons, damages to property, and injury to or death of any persons.

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Consumers must inquire from their selling dealer as to the nature and extent of that dealer's warranty, if any. This warranty is expressly in lieu of all other warranties expressed or implied including the warranties of merchantability and fitness for use. This warranty shall not apply to products or any part thereof which have been subject to accident, negligence, alteration, abuse, or misuse or if damage was due to improper installation or use of improper power source, or if damage was caused by fire, flood, lightning, electrical power surge, explosion, wind storm, hail, aircraft or vehicles, vandalism, riot or civil commotion, or acts of God.

Jan 2016