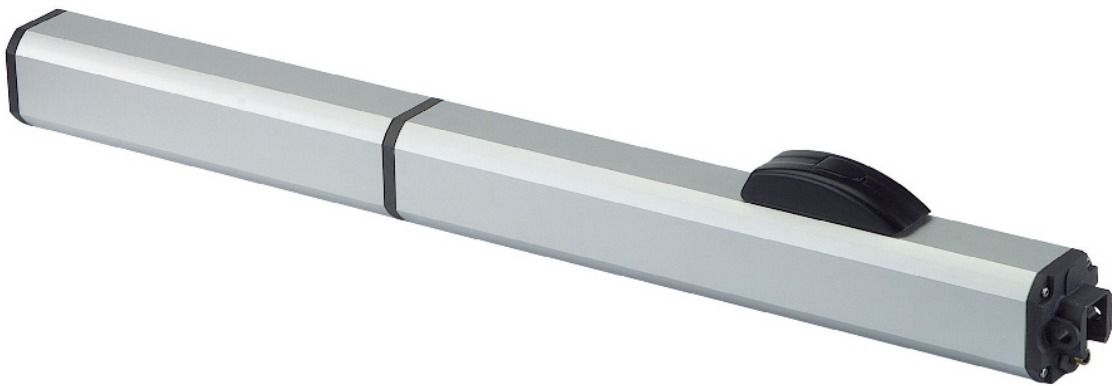


400

Hydraulic Swing Gate Operator



UL325 Compliant

FAAC International Inc.
Headquarter & East Coast Operations
5151 Sunbeam Road
Suites 9-11
Jacksonville, FL 32257
Tel. 866 925 3222
www.faacusa.com

FAAC International Inc.
West Coast Operations
357 South Acacia Avenue
Unit 357
Fullerton, CA 92831
Tel. 800 221 8278

The FAAC logo, consisting of the letters 'FAAC' in a bold, stylized font, set against a grey semi-circular background.

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Read this instruction manual before you begin installing the product.



= Information regarding personal safety and proper maintenance of the product.



= Information regarding the product's characteristics or operation.

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):

Important Installation Instructions (continued)

- 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 be 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.



MODEL 400 OPERATOR

These instructions apply to the following models:

400 CBC, 400 CBAC, 400 SB, 400 SBS, 400 CBACR, 400 CBAC EG, 400 SB EG.

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.

1. TECHNICAL SPECIFICATIONS

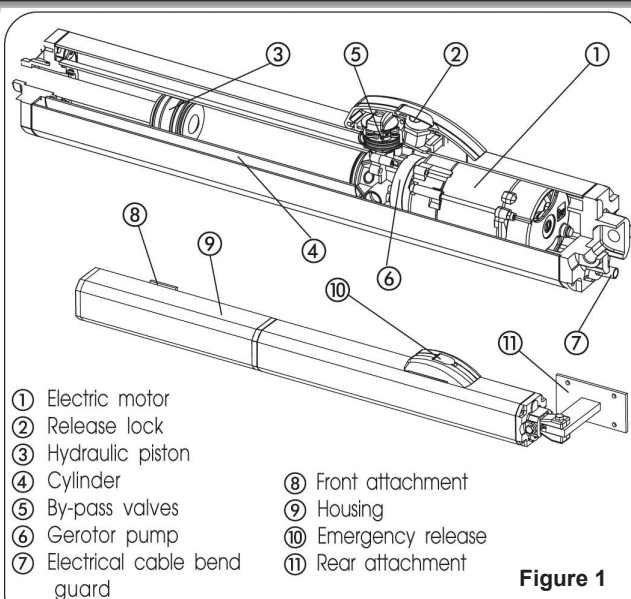


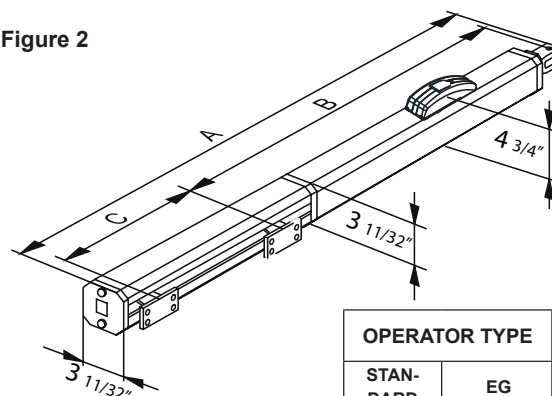
Figure 1

Table 1: 400 Operator – Technical Specifications

MODEL	CBC	CBAC	SB	SBS	CBACR	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
Power Supply	115 VAC \pm 10% or 230 VAC +6% -10% 50/60 Hz.						
Absorbed Power (W)	220						
Absorbed Current (A)	1 (230V) or 2 (115V)						
Electric Motor (rpm)	1400 - 4 poles						
Thermal Protection on Winding (°F)	248°						
Thrust Capacitor	25uF / 115 V or 8uF / 230 V						
Ambient Operating Temperature Range (°F)	- 4° to 131°						
Protection Class	IP55						

Dimensions

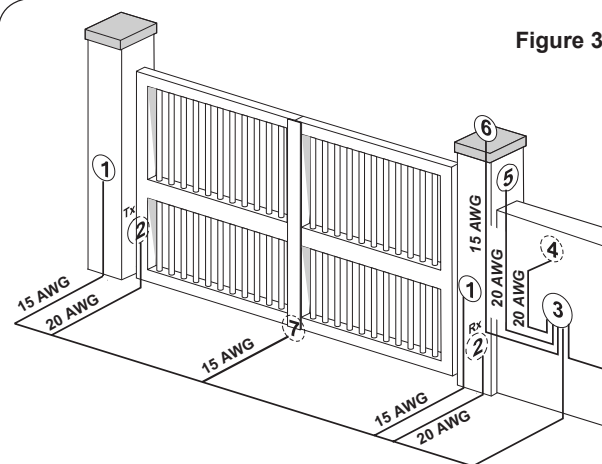
Figure 2



		OPERATOR TYPE	
		STAN- DARD	EG
A	OVERALL DIMENSIONS	40 1/2 "	50 1/2 "
B	DISTANCE BETWEEN ATTACHMENTS	27 1/2 "	32 1/4 "
C	EFFECTIVE STROKE	10 1/4 "	15"

2. WIRING

Figure 3



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



When laying electrical cables, use conduits with adequate rigidity and flexibility.



Always separate low voltage wiring from AC power cables. Use separate sheaths to avoid electrical interference.

3. INSTALLING THE MODEL 400

3.1. 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.
- Gate should have a strong and rigid leaf structure.
- 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.
- Perform all metal work before installing the automated gate operator system.
- The condition of the structure directly influences the reliability and safety of the automated system.

3.2. Installation Dimensions

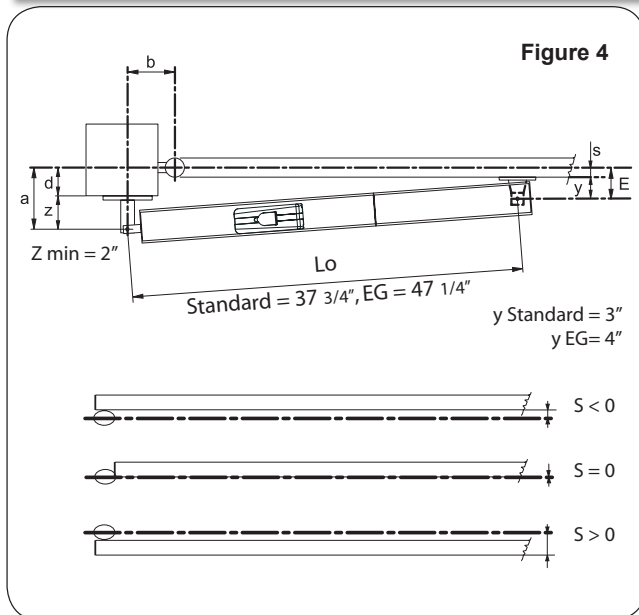


Table A: Recommended Dimensions for Standard Operators

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

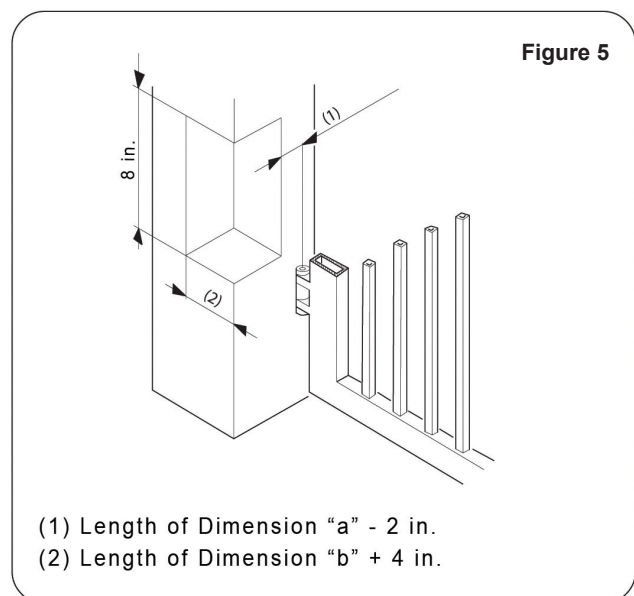
c = In order to prevent the rod from reaching its stop point internally when opening and closing, the effective rod stroke is shorter than the maximum stroke.

3.3 General Rules for Determining Installation Dimensions

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 9.1.



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

3.4. 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 7).

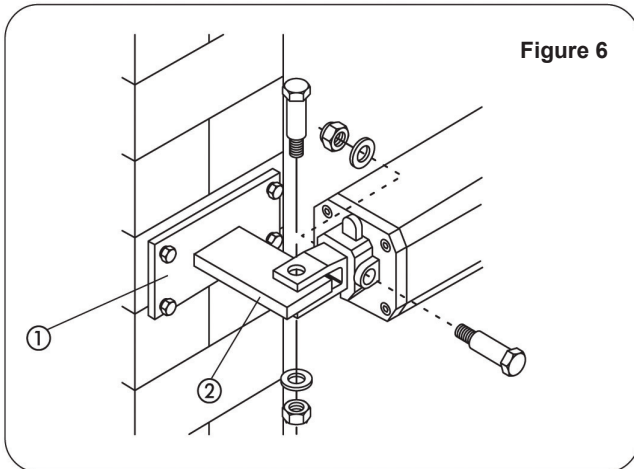


Figure 6

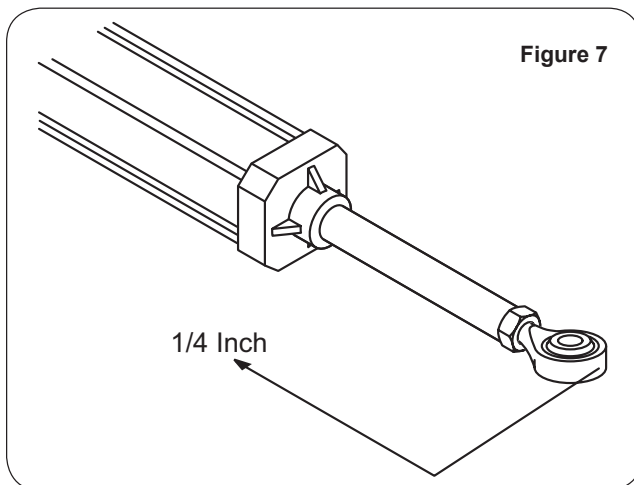



Figure 7

- 5.) Fully extend the rod out to its stopping point, then push it back approximately 1/4 inch (Fig. 7).
- 6.) Relock the operator (see Section 8).
- 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.

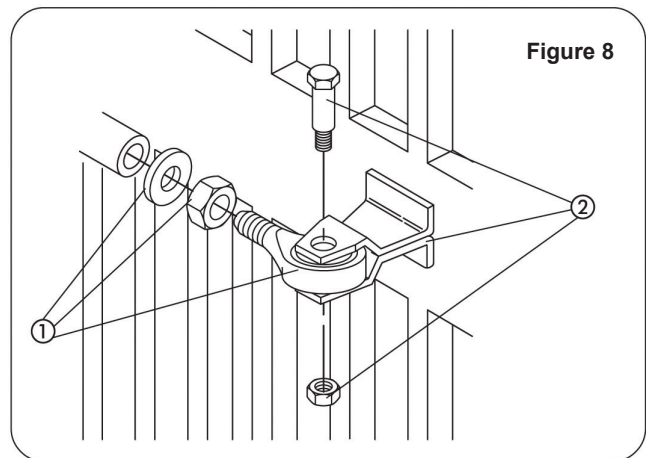


Figure 8

- 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.
- 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 Chapter 13.

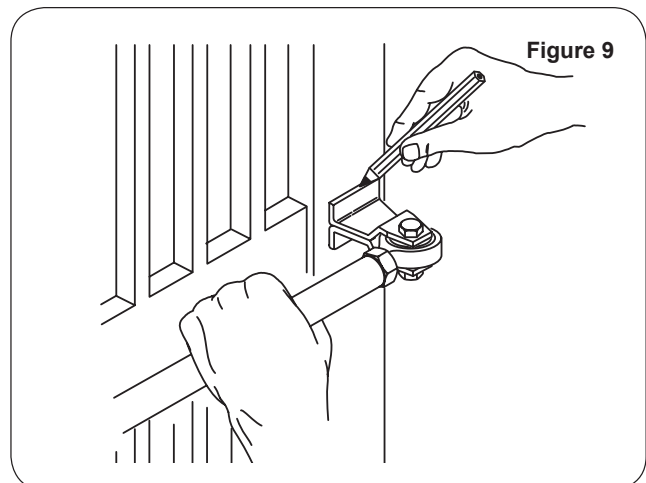


Figure 9

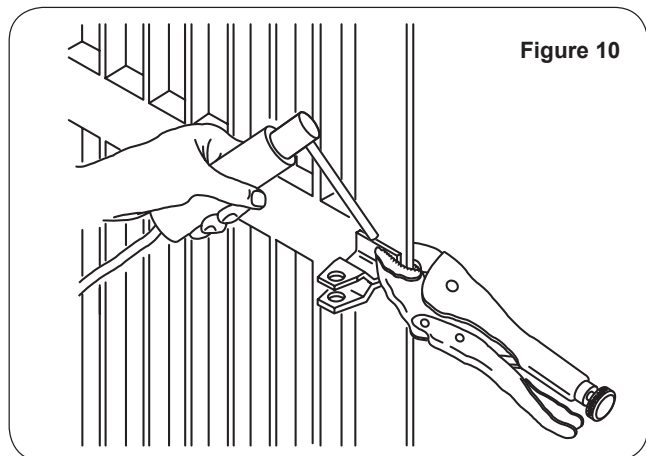


Figure 10

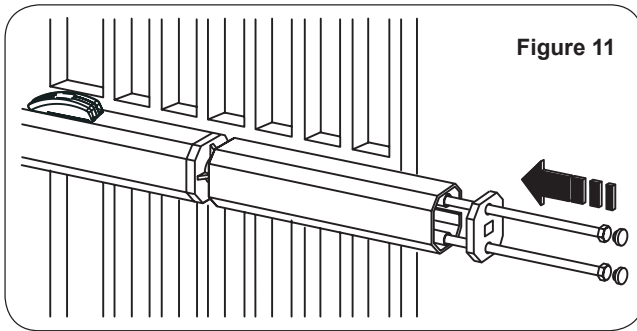


Figure 11

4. START-UP

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

Anti-Crushing System Adjustments

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. To adjust the intervention threshold of the anti-crushing system, temporarily open the release cover.

- 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.
- 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.

5. 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.

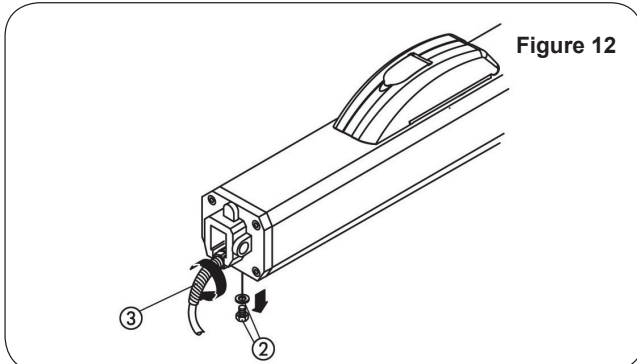


Figure 12

Figure 13

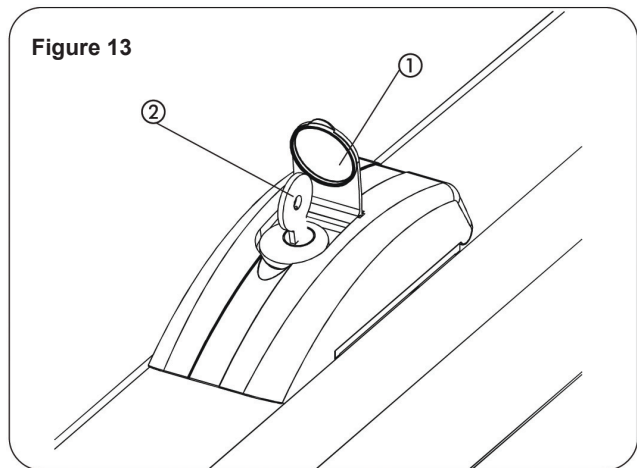


Figure 14

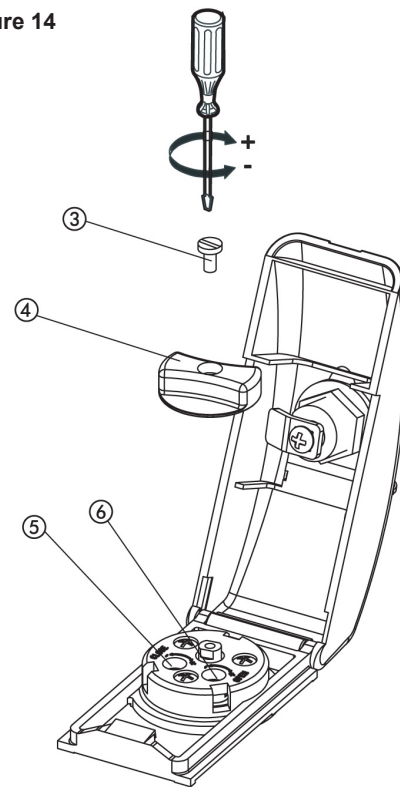
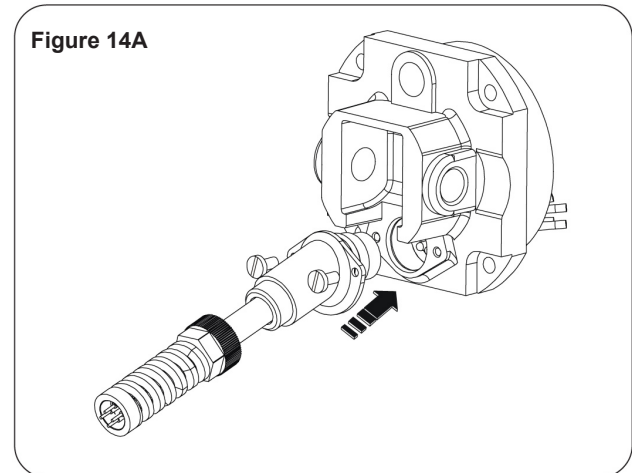


Fig. 14

Figure 14A



6. 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. Explain to the client the correct operation and use of the operator and indicate potentially dangerous areas of the automated system.

7. 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.

8. 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).
- 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).

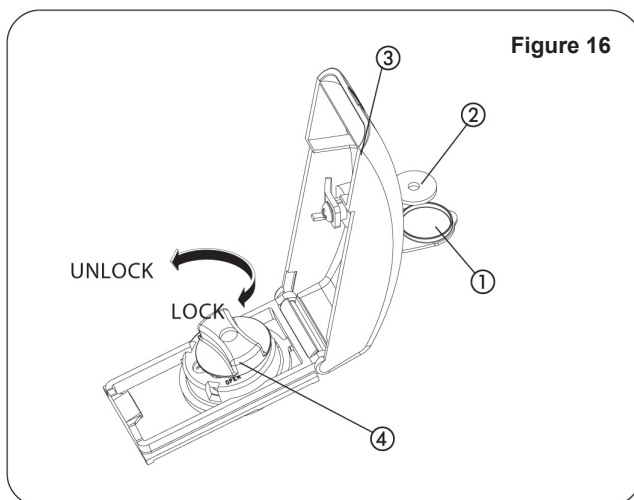


Figure 16

9. SPECIAL APPLICATIONS FOR SWING LEAF GATES

Opening Outward, with Operator Installed Inside

Refer to Table 1 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.

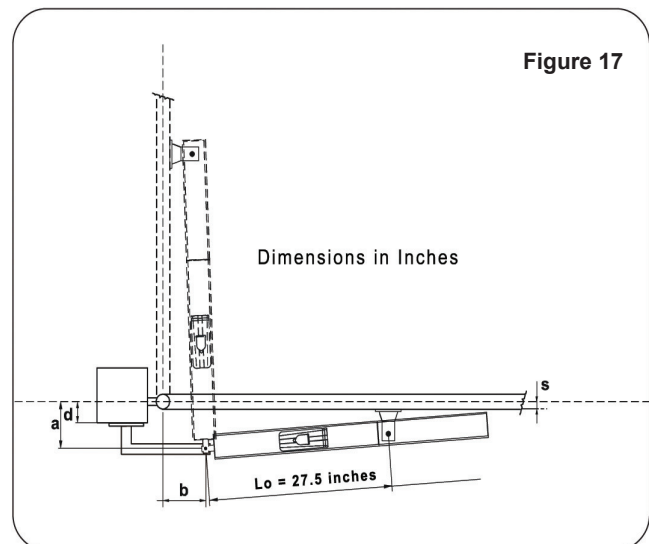


Figure 17

Table C: Standard Operators Recommended Dimensions

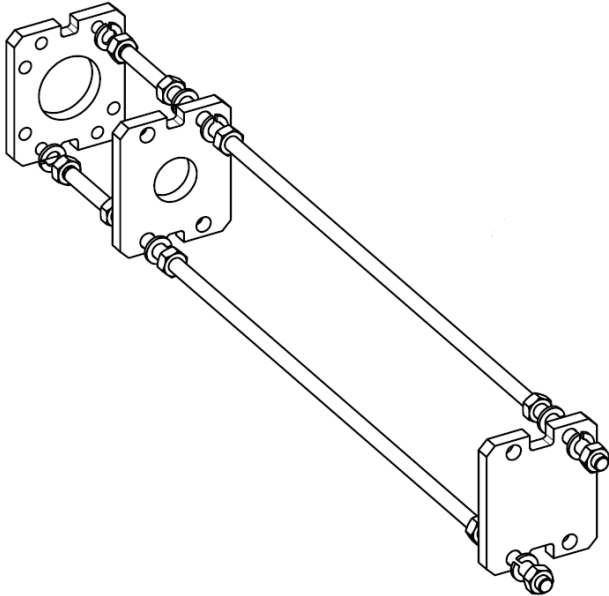
Opening Angle	a (inches)	b (inches)	s (inches)	d(**) (inches)	c(*) (inches)
90°	4	3 1/2	0	2	7 1/2
90°	4 5/16	4	0	2 3/8	8 1/4
90°	4 3/4	4 5/16	0	2 3/4	9
90°	5 1/8	4 3/4	0	3 1/8	9 7/8

(*) Rod effective stroke (**) maximum dimension

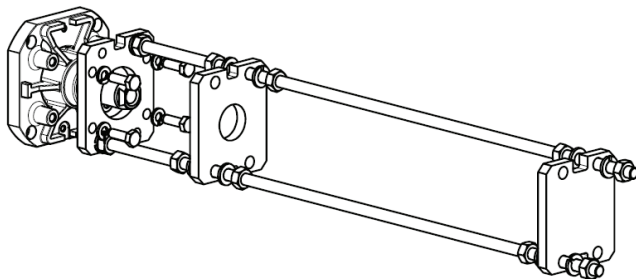
10. POSITIVE STOP ACCESSORY

In case the gate doesn't allow you to 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.

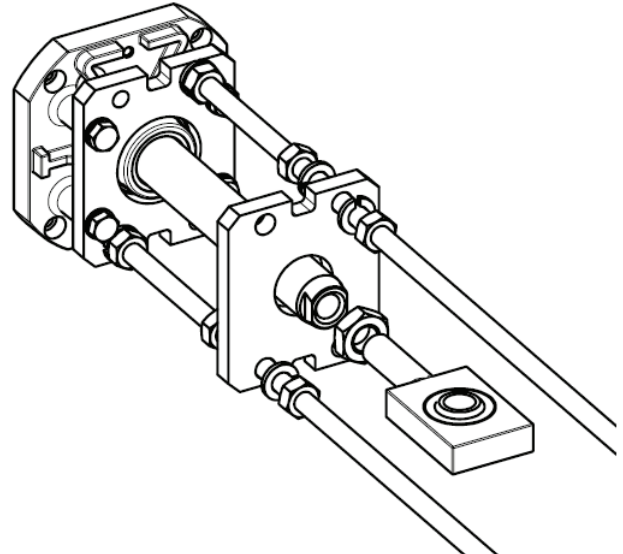
(P/N: 490109 STANDARD, 490043 EG)



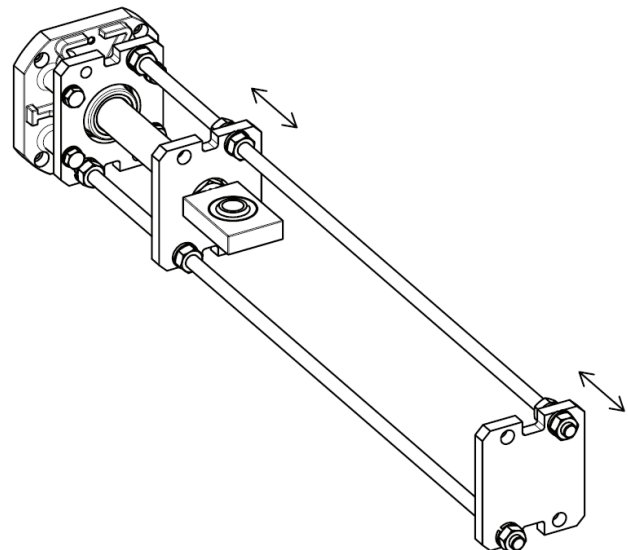
The accessory is mounted on the front flange of the operator using the supplied bolts.



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.



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

11. MAINTENANCE AND REPAIRS

Run a functional check of the system at least twice a year. Pay special attention to the efficiency of safety and release devices (Including the thrust force of the operator), and the perfect operation of the gate hinges.

Checking Oil Level:

Periodically check the oil level inside the tank.

- Cut power to the system.
- Position the operator vertically, with the rear flange high up.
- Remove the oil fill plug.
- Insert a screwdriver until it comes in contact with the electric motor as shown in Fig. 18.
- Remove the screwdriver and check oil level as shown in Fig. 18.



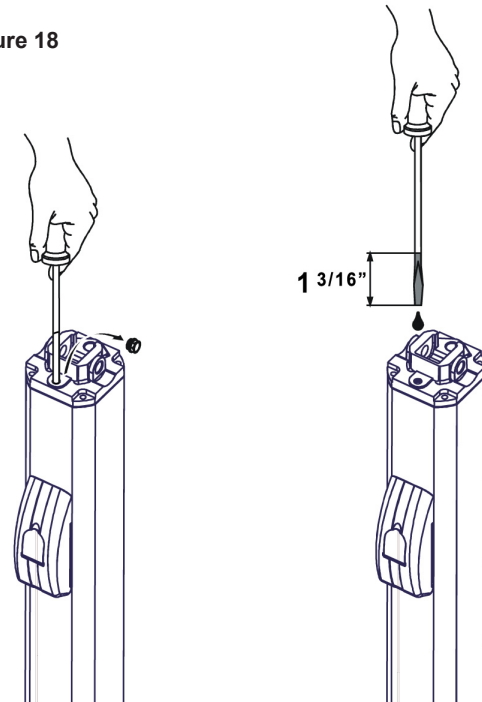
USE ONLY FAAC HP FLUID OIL

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.

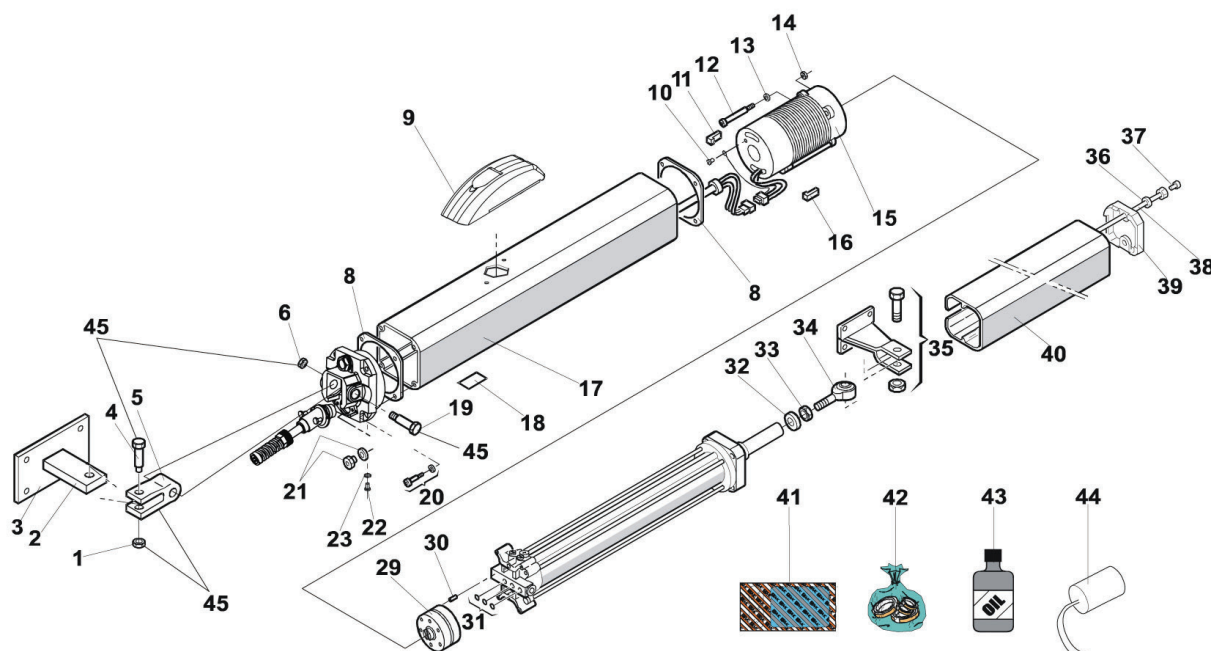
For repairs, contact FAAC's authorized repair centers.

Figure 18



12. EXPLODED VIEWS

400 CBAC



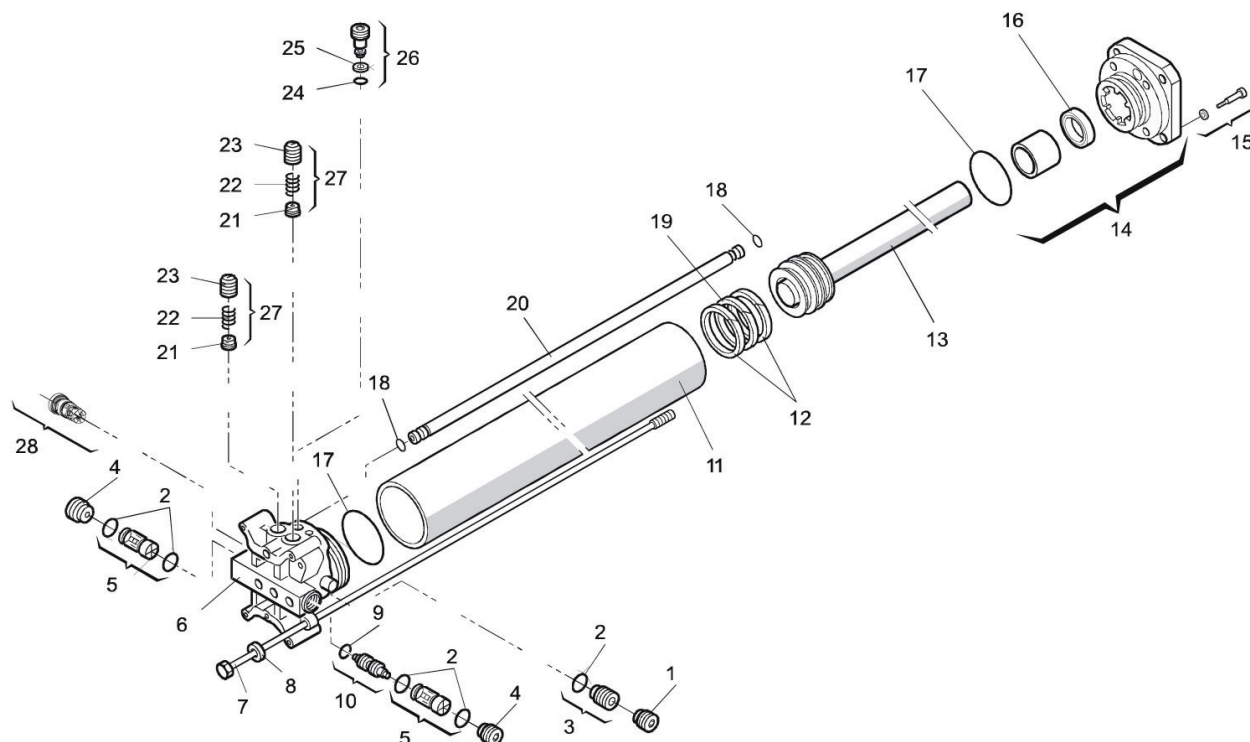
POS.	P/N	DESCRIPTION
01	702202	GALVANIZED NUT (8 MM)
02	7220015	REAR MOUNTING BRACKET
03	7284005	REAR MOUNTING PLATE
04	7182075	SHORT PIN
05	7228015	DIE-CAST REAR FORK
06	702302	SELF-LOCKING NUT
08	70991015	GASKET DIAMETER 80
09	490325	KIT LOCKING CAP
10	701803	M4X10 SELF TAPPING SCREW
11	7119475	VIBRATION DAMPENER
12	701006	4X45 BOLT
13	703101	LOCK WASHER (4 MM)
14	702003	HEX NUT (4 MM)
15*	7700205	MOTOR 220V 4P.
16	7119485	VIBRATION DAMPENER
17	7161825	400 OPERATOR TANK
18	7320065	VENT SCREW LABEL
19	7182175	LONG PIN
20	701829	TORX M5X20 INOX SCREW
21	7110015	OIL PLUG

POS.	P/N	DESCRIPTION
22	701039	VENT SCREW 4X6
23	7094065	SOFT COPPER WASHER
29	3204425	CAST-IRON PUMP LT.1
30	706152	PIN 4x28 m6
31	7090010015	GASKET OR 4.48X1.78
32	7039025	OPERATOR FRONT WASHER
33	702201	HEX. NUT
34	7073095	SWIVEL JOINT SQUARE
35	7220355	FRONT MOUNTING BRACKET
36	703401	LOCK WASHER 4.3X9
37	7119405	PLUG FOR COVER
38	7019195	TIE ROD FOR COVER
39	4170015	END CAP FOR COVER
40	7272105	PROTECTIVE COVER
41	3900985	SKINPACK 400
42	2167+	SEAL KIT 400
43	714017	FAAC HP OIL LT.1
44**	2707	8 µF CAPACITOR
45	7228015+	SWING GATE OPERATOR ALUMINIUM FORK KIT

* P/N for 115V Motor: 77000423

** P/N for 115V Motor Capacitors: 2705

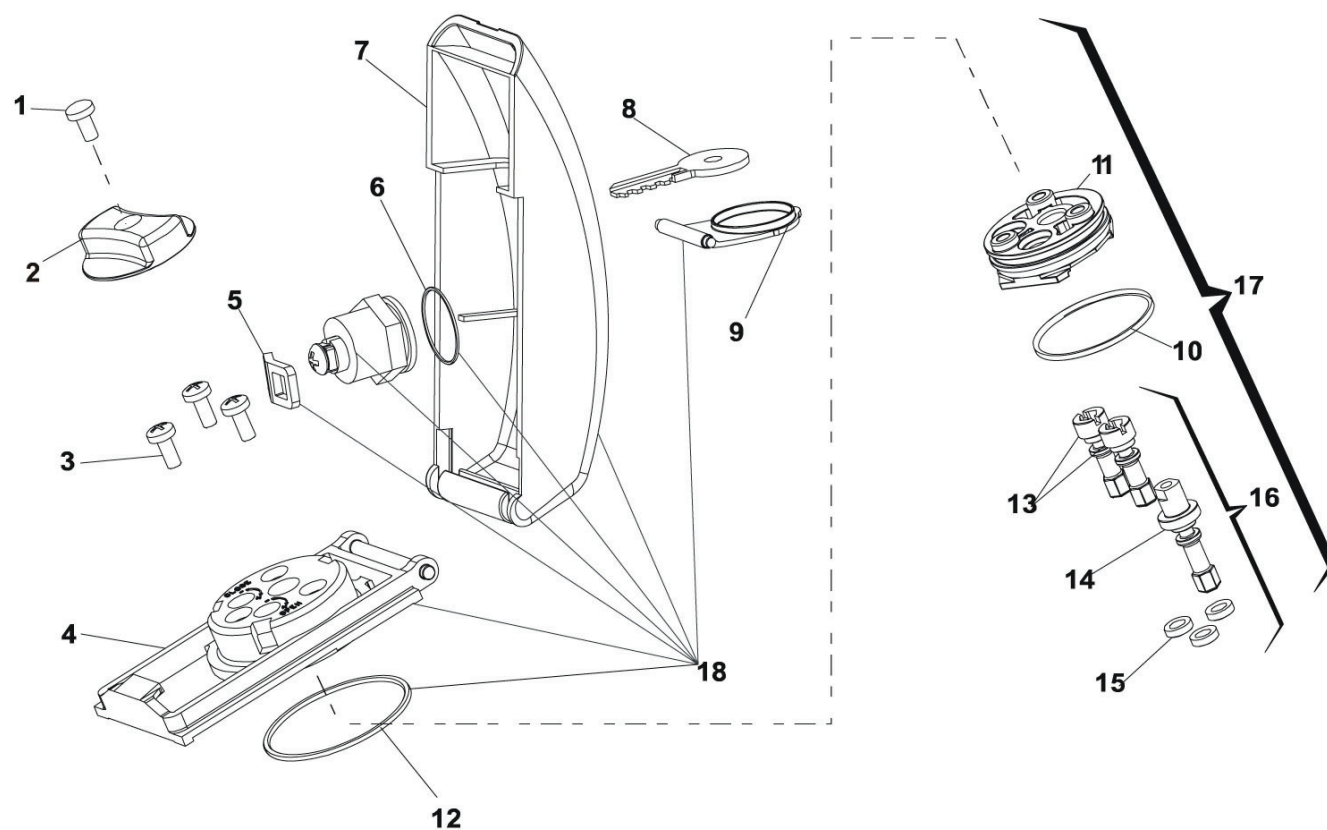
Cylinder



POS.	P/N	DESCRIPTION
01	7049135	RETAINING RING NUT
02	7090050015	GASKET O-RING 10.82X1.78
03	4404065	INLET VALVE WITH SPRING
04	7049005	RETAINER
05	4404085	LOCK VALVE IN ZAMACK
06	4994655	VALVE BODY
07	7230295	TIE ROD CYLINDER
08	703204	STAR WASHER
09	7090300015	GASKET O-RING 7.66X1.78
10	4180285	SHUTTLE PISTON WITH O-RING
11	7366025	CYLINDER
12	7091015	SEAL (PISTON)
13	4350105	PISTON ASSEMBLY
14	4994625	FRONT FLANGE

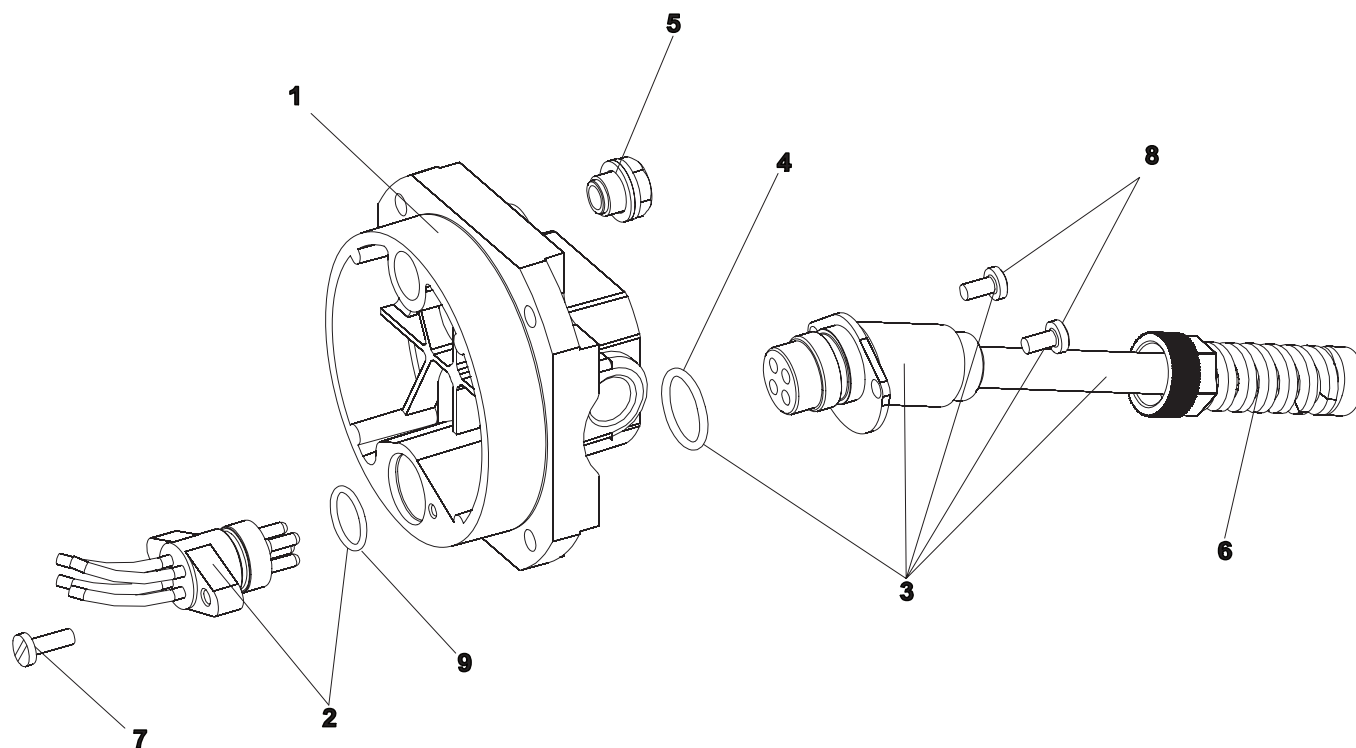
POS.	P/N	DESCRIPTION
15	701829	TORX M5X20 INOX SCREW
16	63000315	FRONT FLANGE BUSHING
17	7090360025	GASKET O-RING 40.95X2.62
18	7090815	D-RING
19	7094505	GUIDE RING
20	7361335	RETRACT TUBE
21	7310315	BY-PASS ASSEMBLY
22	7210025	BY-PASS ASSEMBLY
23	711021	BY-PASS ASSEMBLY
24	7090280015	GASKET O-RING 5.28X1.78
25	7043055	SPACER
26	4180195	MANUAL RELEASE
27	4180415	KIT BY PASS ASSEMBLY
28	4404095	BIDIRECTIONAL INLET VALVE

Locking Cap



POS.	P/N	DESCRIPTION
01	701307	SCREW 4X8 STAINLESS STEEL
02	7290445	RELEASE KNOB
03	701526	TORX 4X10 STAINLESS STEEL
04	720344	TOP COVER
05	729043	LOCK LEVER
06	7090895	21x2 O-RING
07	7275285	TOP COVER
08	7131005	KEY
09	7275275	CAP FOR LOCK

POS.	P/N	DESCRIPTION
10	7090855	O-RING 33.05X1.78
11	722795	BASE SUPPORT FOR RELEASE
12	7090865	O-RING 41X1.78
13	718358	BY-PASS EXTENSIONS
14	718359	ACTIVATION EXTENSIONS
15	7090845	O-RING 4X2.5
16	490327	KIT BY-PASS EXTENSIONS
17	490326	KIT RELEASE
18	4185045	LOCKING CAP ASSEMBLY

Rear Flange

POS.	P/N	DESCRIPTION
01	7171485	BACK FLANGE
02	417010	WIRING HARNESS
03	63001005	MOULDED CABLE KIT
04	7090895	21X2 O-RING
05	7110015	PLUG

POS.	P/N	DESCRIPTION
06	7109135	STRAIN RELIEF
07	701479	SCREW 3X12
08	701466	SCREW M3X8
09	7090725	O-RING 14X1.5

13. 455 D CONTROL BOARD

13.1 455 D Control Board Warnings



Important: Before attempting any work on the control board (connections, maintenance), always turn off power.

Please refer to Chapter 16 for AC power wiring guidelines

13.2. Technical Specifications

Power Supply 115 V~ ± 10% or 230 V~ +6% -10% 50/60 Hz

Absorbed 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 2 (see Fig. A)

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-switch and/or Gatecoder.

13.4. 455 D Layout and Components

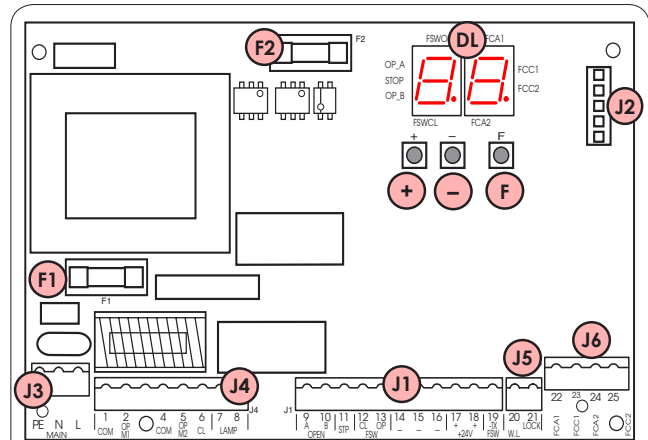


Figure A

DL SIGNALLING AND PROGRAMMING DISPLAY

J1 LOW VOLTAGE TERMINAL BLOCK

J2 CONNECTOR FOR RP RECEIVER

J3 AC POWER SUPPLY TERMINAL BLOCK

J4 MOTORS AND FLASHING LAMP CONNECTION TERMINAL BLOCK

J5 INDICATOR-LIGHT AND ELECTRIC LOCK TERMINAL BLOCK

J6 LIMIT-SWITCH AND GATECODER TERMINAL BLOCK

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

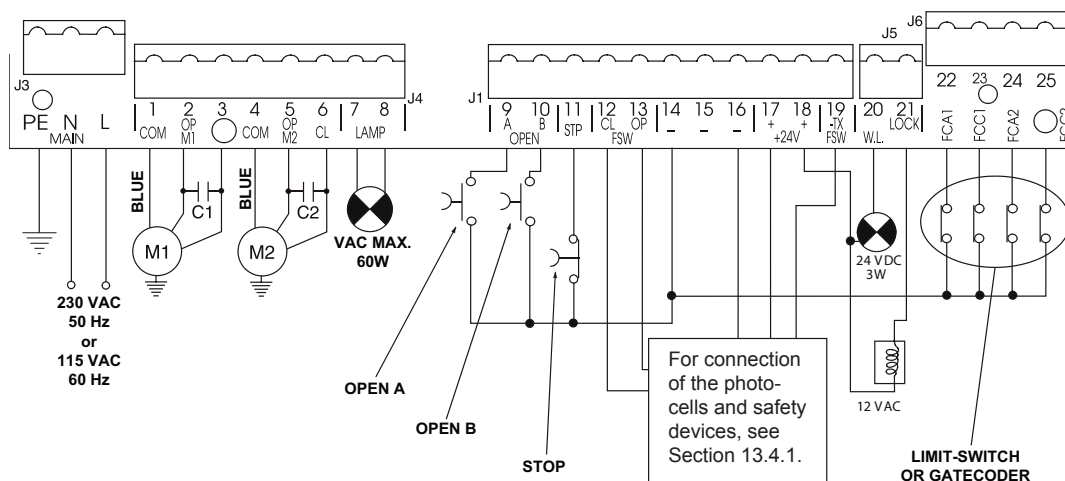
F2 LOW VOLTAGE AND ACCESSORIES FUSE (T 800mA)

F "F" PROGRAMMING PUSH-BUTTON

- "-" PROGRAMMING PUSH-BUTTON

+ "+" PROGRAMMING PUSH-BUTTON

13.3 Electric Connections



NB: Capacitors are supplied with the operator.

Figure B

13.4.1 Connection of Photocells and Safety Devices

Before connecting the photocells (or other devices), it is advisable to select the type of operation according to the movement area they have to protect (see Fig.C):

Opening Safety Devices:

They operate only during the gate opening movement and, therefore, are suitable for protecting the area between the opening leaves and fixed obstacles (walls, etc) against the risk of impact and crushing.

Opening/Closing Safety Devices

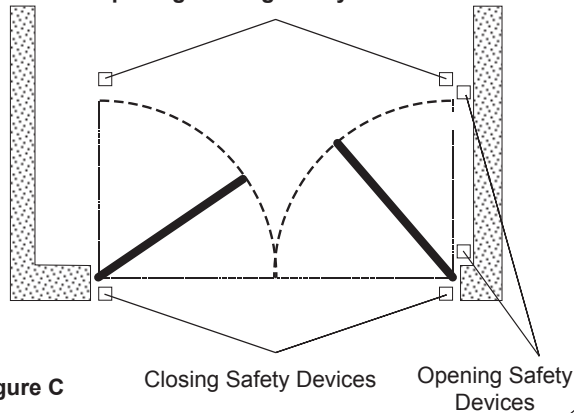


Figure C

Connection of ONE Pair of Closing Photocells, ONE Pair of Opening Photocells and ONE Pair of Opening/Closing Photocells (Recommended Layout)

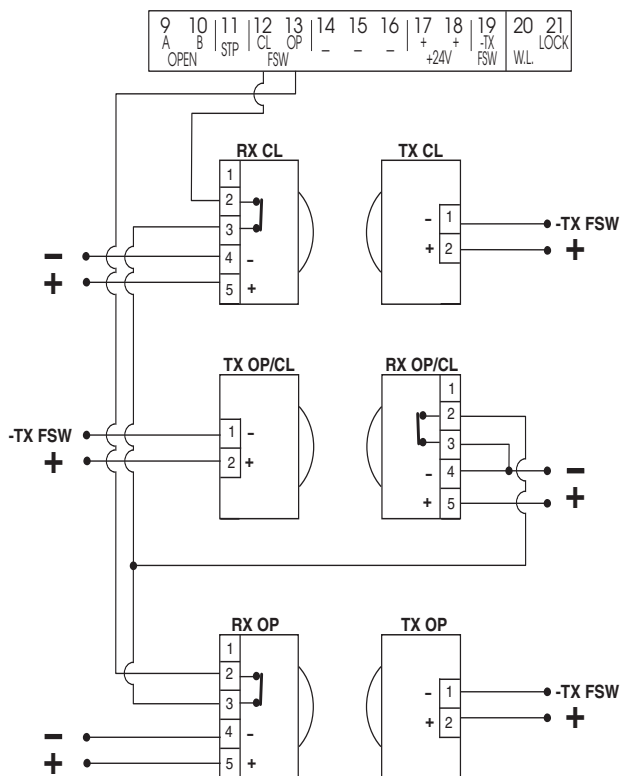


Figure D



NOTE: All safety devices must be connected using NORMALLY CLOSED outputs.

Closing Safety Devices:

They operate only during the gate closing movement and, therefore, they are suitable for protecting the closing area against the risk of impact.

Opening/Closing Safety Devices:

They operate during the gate opening and closing movements and, therefore, they are suitable for the opening and closing areas against the risk of impact.

FAAC recommends use of the lay-out in Fig. D (in the event of fixed obstacles at opening) or in Fig. E (no fixed obstacles).

N.B. If two or more devices have the same function (opening or closing), they should be connected to each other in series (see Fig. L).

Connection of ONE Pair of Closing Photocells and ONE Pair of Opening/Closing Photocells (Recommended Layout)

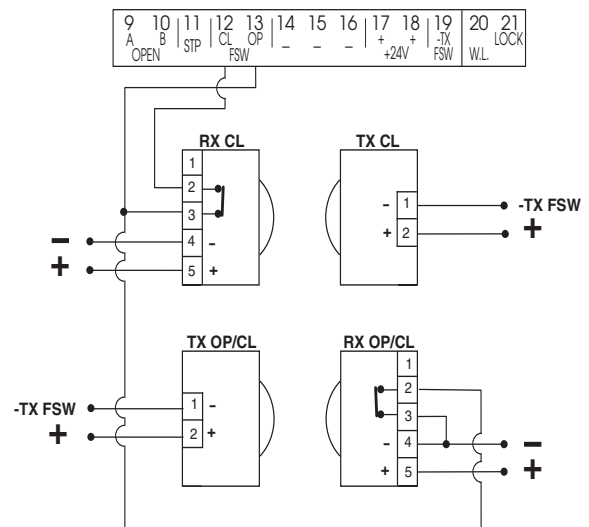


Figure E

Connection of ONE Closing Safety Device and ONE Opening Safety Device

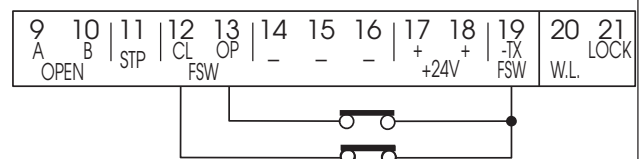


Figure F

Connection of NO Safety Devices

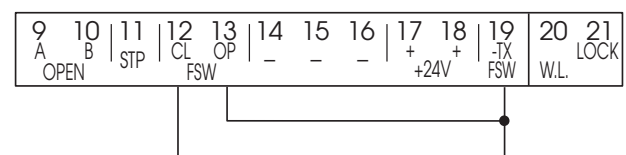
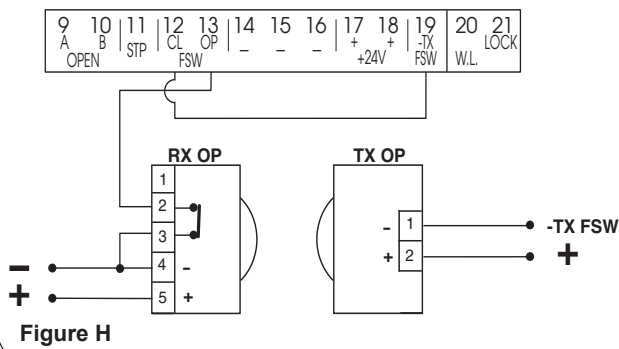
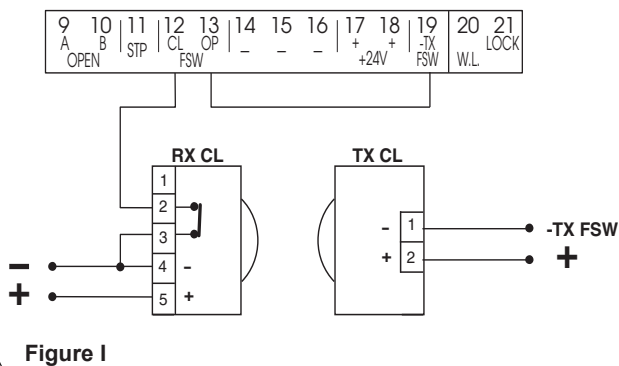


Figure G

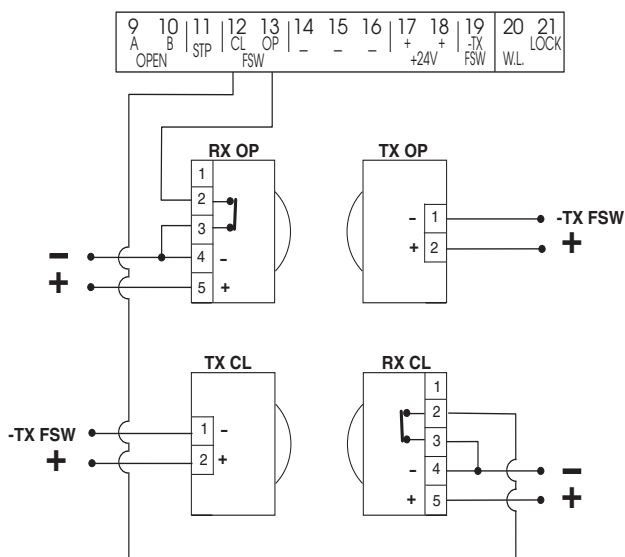
Connection of ONE Pair of Opening Photocells



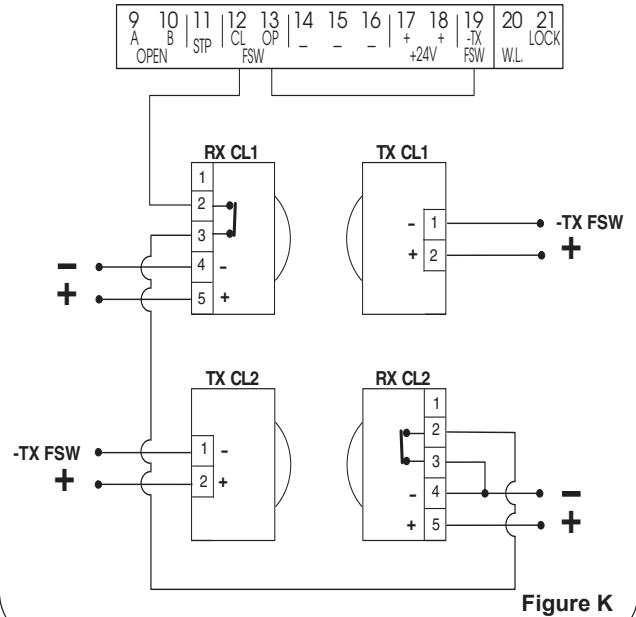
Connection of ONE Pair of Closing Photocells



Connection of ONE Pair of Opening Photocells and ONE Pair of Closing Photocells



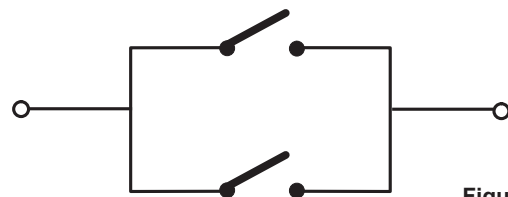
Connection of TWO Pairs of Closing Photocells



Connection of TWO N.C. Contacts in Series (e.g. Photocells, Stop)



Connection of TWO N.O. Contacts in Parallel (e.g. Open A, Open B)



13.4.2 Terminal Block J3 - Power Supply (Fig. B)

PE: Earth Connection / Ground

N: AC V~ power supply (Neutral)

L: AC V~ power supply (Line)

NB: For correct operation, the board must be properly grounded.

13.4.3 Terminal Block J4 - Motors and Flashing Lamp

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

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

LAMP: Flashing lamp output (AC V ~)

13.4.4 Terminal Block J1 - Accessories (Fig. B)

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.

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 connected, jumper connect the STP terminals and -.

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

The purpose of the closing safety devices is to protect the leaf movement area during closing. During closing, in the **E-A-S-EP-AP-SP** logics, the safety devices reverse the movement of the gate leaves, or stop and reverse the movement when they are released (see *Advanced Programming in Section 13.5.2*). During the closing cycle in logics **B** and **C**, they interrupt movement. They never operate during the opening cycle. If the **closing safety devices** operate when the gate is open, they prevent the leaf closing movement.

NB: If no closing safety devices are connected, jumper connect terminals **CL** and **-TX FSW** (Fig. G).

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

The purpose of the opening safety devices is to protect the leaf movement area during opening. During opening, in the **E-A-S-EP-AP-SP** logics, the safety devices reverse the movement of the gate leaves. During the opening cycle in logics **B** and **C**, they interrupt movement. They never operate during the closing cycle.

If the **opening safety devices** operate when the gate is closed, they prevent the leaf opening movement.

NB: If no opening safety devices are connected, jumper connect inputs **OP** and **-TX FSW** (Fig. G).

— - 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 for power supply to photocell transmitters.

If you use this terminal for connecting the negative for supplying power to the photocell transmitters, you may, if necessary, also use the FAIL SAFE function (see *Advanced Programming in Section 13.5.2*).

If this function is enabled, the equipment checks operation of the photocells before each opening or closing cycle.

13.4.5 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.

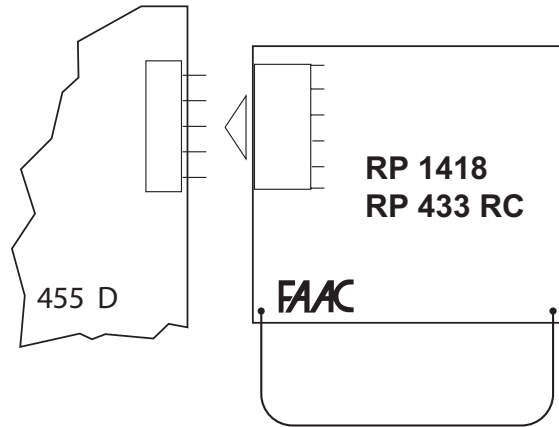
LOCK - Power supply to electric lock

If necessary, connect a 12 VAC electric strike lock between this terminal and the +24V power supply. Please refer to Chapter 16 for Magnetic Lock connection.

13.4.6 Connector J2 - Rapid Connection to RP Receivers

This is used for rapid connection to RP receivers (see Fig. Q). Connect the accessory with the components side facing the inside of the card. **Insert and remove with power OFF.**

Figure Q



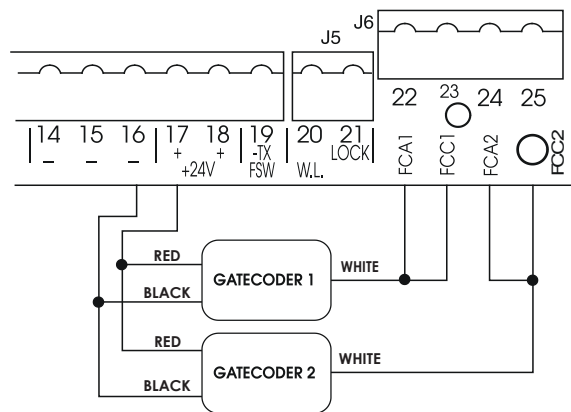
13.4.7 Terminal Block J6 - Limit-Switch or Gatecoder

These inputs are designed for connection of opening and closing limit-switches or Gatecoders

The 400 operator cannot use limit switches but only Gatecoders. They are used to detect the leaf's angular position and to thus obtain deceleration and stop positions more accurately than using the operating timing.

Please refer to Figure S for wiring information. If the Gatecoders are not used the J6 inputs can be left unconnected.

Figure S



13.4.8 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 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.

13.5 Programming

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

13.5.1 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.

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
EL	TIME LEARNING (see Section F.3.): Enables the selection between "simple" (automatic) learning and "complete" (manual choice of deceleration and stop points) learning. Simple Learning: + ≈ 1 s. Complete Learning: + > 3 s.	
ln	Exit from programming and return to inputs status monitoring.	

If using hydraulic operators, set force to maximum level.

13.5.2 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
60	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
c5	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
r5	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
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
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

NB: 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 10 to 47 min. in 10 sec. steps. 0 = Standard indicator-light from 1 to 47 = 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	ANTI-CRUSHING SENSITIVITY: When operating with the gatecoder, it controls anti-crushing sensitivity. 4 = Low no = High. EXTRA WORK TIME: When operating without a gatecoder and limit-switch, 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.	

13.6 Start-Up

13.6.1 LED Check

The board has a two-digit display. When not in "PROGRAMMING" mode, this display is used to indicate the status of inputs. Fig. U shows how the LED segments of the display exactly correspond to the inputs.

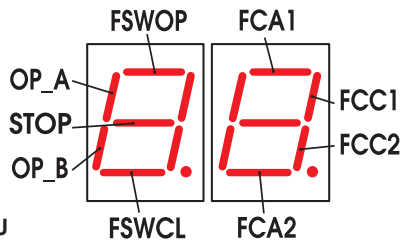


Figure U

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)	Flashes when Gatecoder 1 is in use	
FCC1 (if used)	Flashes when Gatecoder 1 is in use	
FCC2 (if used)	Flashes when Gatecoder 2 is in use	
FCA2 (if used)	Flashes when Gatecoder 2 is in use	

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

13.6.2 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 and opening command on the OPEN A input (Fig.B) and check if the gate leaves are being commanded to open.

N.B: If the first OPEN A pulse commands a closing, 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 (see Section 13.5.1).

N.B: 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.

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.

13.6.3 Learning Operating Times

Opening/closing time is established by a learning procedure which varies slightly according to whether you are using Gatecoders or not.

13.6.3.1 LEARNING NORMAL TIMES

Normal learning (i.e. without limit-switches and Gatecoders) can be accomplished in two ways:

- 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):

- 1° OPEN - Slow down at opening of leaf 1
- 2° OPEN - Leaf 1 stops at opening and leaf 2 begins its opening movement
- 3° OPEN - Slow down at opening of leaf 2
- 4° OPEN - Leaf 2 stops at opening and immediately begins its closing movement
- 5° OPEN - Slow down at closing of leaf 2
- 6° OPEN - Leaf 2 stops at closing and leaf 1 begins its closing movement
- 7° OPEN - Slow down at closing of leaf 1
- 8° OPEN - 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 effected. When the leaf has finished opening, supply 5 Open pulses until the leaf begins to close, and then resume normal operation.

13.6.4 Learning Times with Gatecoder

Learning with the Gatecoder can be accomplished in two ways:

- SIMPLE LEARNING (With Slow Down):

Check that the leaves are closed. Access "BASIC PROGRAMMING," select the TIME LEARNING function and then press the + push-button for **1 second**: the display begins flashing and the leaves begin the opening movement.

The movement stops automatically when the opening stop limit is reached. The display will stop flashing.

Press push-button **F** to exit and save the programming. The procedure is complete and the gate is ready to operate, using the default slow down set at the factory.

- COMPLETE LEARNING (With Slow Down):

Check that the leaves are closed. Access "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 radio control or key push-button):

- 1° OPEN - Leaf 1 slows down at opening (it stops automatically on reaching the stop limit)
- 2° OPEN - Leaf 2 opening movement begins
- 3° OPEN - Leaf 2 slows down at opening (it stops automatically on reaching the stop limit)
- 4° OPEN - Leaf 2 closing movement begins
- 5° OPEN - Leaf 2 slows down at closing (it stops automatically on reaching the stop limit)
- 6° OPEN - Leaf 1 closing movement begins
- 7° OPEN - Leaf 1 slows down at closing (it stops automatically on reaching the stop limit)
- 8° OPEN - End of learning

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:

- *The slow down pulse should be given before the gate reaches the positive stop to prevent the leaf from hitting it at full speed (it would be mistaken for an obstacle).*
- *If only one leaf is present, the entire sequence must nevertheless be effected. When the leaf has finished opening, supply 5 Open pulses until the leaf begins to close, and then resume normal operation.*

13.7 System Test

When you are finished programming, test the system. Verify that the entire system operates correctly. Most importantly, check that force is adequately adjusted and that safety devices are operating correctly.

14. OPERATING MODES DETAILED DESCRIPTION

Tab. 3/a

Logic "E"	PULSES				
	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS					
CLOSED	Opens the leaf	Opens single leaf		No effect (OPEN disabled)	No effect
OPEN	Re-closes the leaf immediately (3)			No effect (if on part.opng. OPEN A disabled)	No effect (3) (OPEN disabled)
CLOSING	Re-opens the leaf immediately		Stops operation	No effect (saves OPEN)	Locks and, on release, reverses to open
OPENING	Stops operation (3)			Reverses to close	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 (OPEN disabled)

Tab. 3/b

Logic "A"	PULSES				
	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS					
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
OPEN on PAUSE	Reloads pause time (1)(3)			No effect (if on part.opng. OPEN A disabled)	Reloads pause time (1) (3) (OPEN disabled)
CLOSING	Re-opens the leaf immediately (1)		Stops operation	No effect (saves OPEN)	Locks and, on release, reverses to open
OPENING	No effect (1) (3)			Reverses to close	Locks and, on release, continues opening
LOCKED	Closes the leaf (3)		No effect (OPEN disabled)		No effect (OPEN disabled)

Tab. 3/c

Logic "S"	PULSES				
	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS					
CLOSED	Opens the leaf and closes it after pause time	Opens single leaf and closes after pause time		No effect (OPEN disabled)	No effect
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)
CLOSING	Re-opens the leaf immediately		Stops operation	No effect (saves OPEN)	Locks and, on release, reverses to open
OPENING	Re-closes the leaf immediately (3)			Reverses to close	Locks and, on release, continues opening
LOCKED	Closes the leaf (3)		No effect (OPEN disabled)		No effect (OPEN disabled)

Tab. 3/d

Logic "EP"	PULSES				
	OPEN-A	OPEN-B	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS					
CLOSED	Opens the leaf	Opens leaf for the partial opening time		No effect (OPEN disabled)	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)
CLOSING	Stops operation		Stops operation	No effect (saves OPEN)	Locks and, on release, reverses to open
OPENING	Stops operation (3)			see paragraph 5.2	Locks and, on release, continues opening
LOCKED	Redrains 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 (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.

Tab. 3/e

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

Tab. 3/h

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

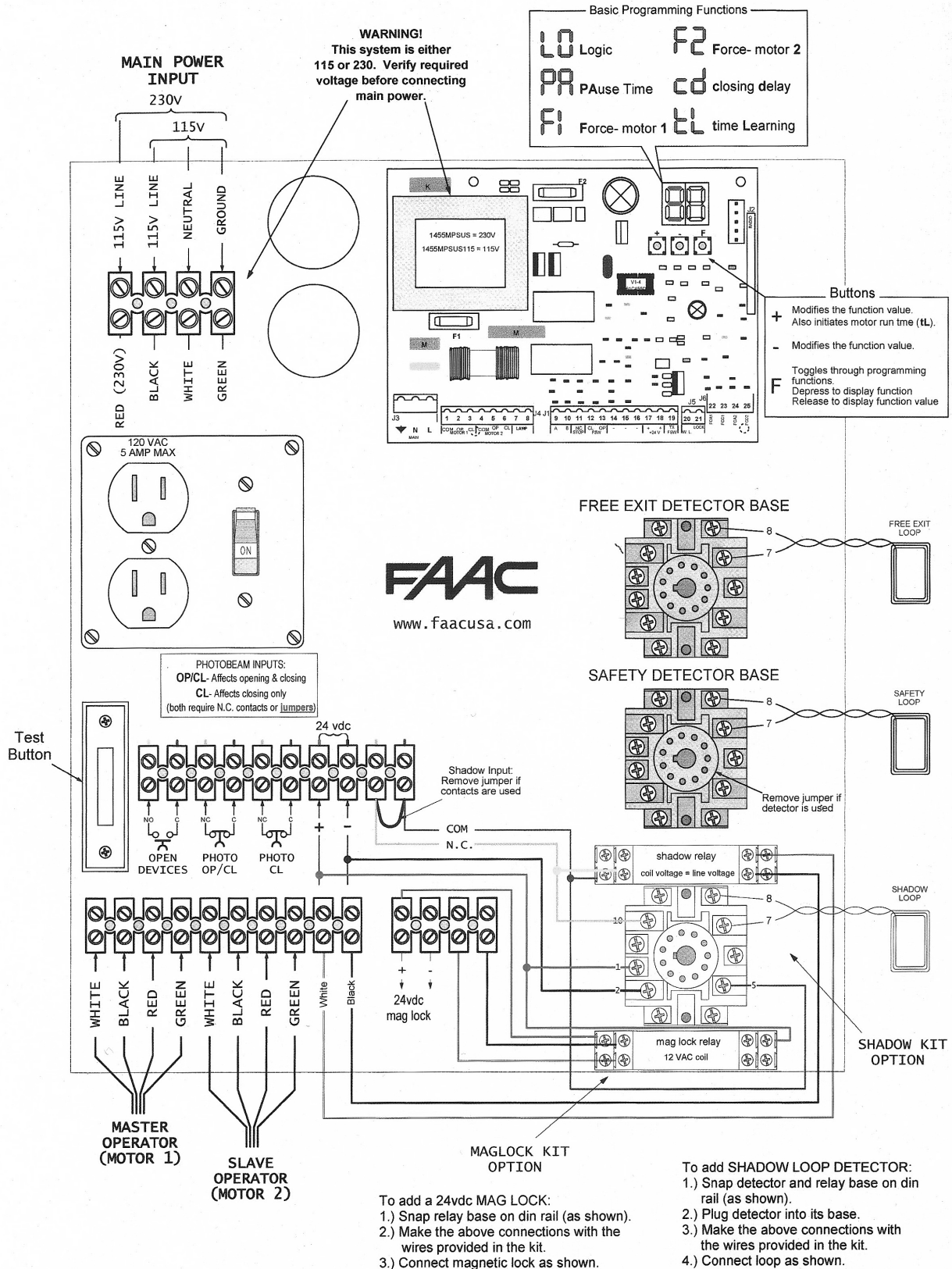
(1) If maintained, it prolongs the pause until disabled by the command (timer function)

(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.

15. PREWIRED ENCLOSURE DIAGRAM



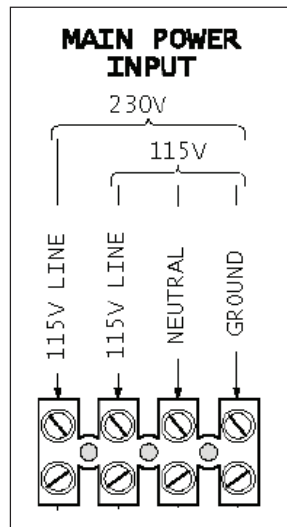
16. POWER AND ACCESSORIES CONNECTIONS

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.

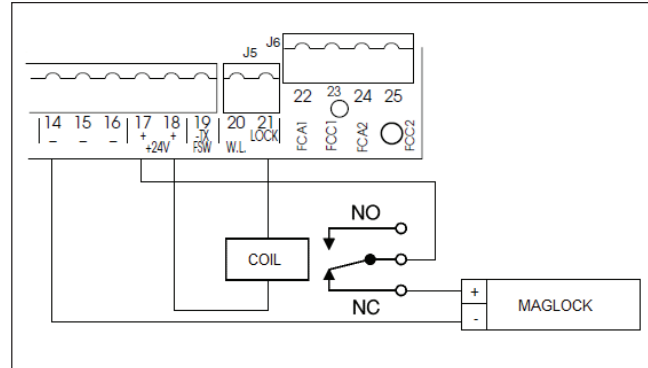
AC Power Connection

1. Turn the circuit breaker for the AC gate operator power to OFF before connecting the AC input wires.
2. Turn the Power Switch located on the left side of the prewired enclosure to OFF before connecting the AC input wires.
3. Connect the AC input wires to the AC terminal located on the top left of the enclosure. See diagram on the right.



Magnetic Lock Connection

When connecting a magnetic lock to the system, use Maglock Relay Kit (P/N: 2352) and connect it as follows:



17. TROUBLESHOOTING

The following table may help you identify and resolve some common problems.

CONDITION		SUGGESTION
A	Gate does not move.	<ul style="list-style-type: none"> • Check that main power is supplied. • Ensure that the operator is not unlocked (see Section 8). • Check the adjustment of the anti-crushing system (see Section 4.1). • Check the connection and operation of the thrust capacitor. • Check functionality of the electronic control unit. • Ensure that the torque/force is set to a maximum of 50 in programming. • Verify that the LEDs FSWOP, FSWCL, and STOP are illuminated. If they are not illuminated, be sure that you have closed circuits in the stop and reversing inputs. • Verify that your activating device works properly. OP_A should illuminate when you signal the gate to open. If OP_A does not illuminate when you signal the gate, then the problem may be in your activating device. Place a short across terminals 9 and 14. If the short causes the gate to open, then the problem is in the activating device. • Check oil level inside the tank (see Section 10, Fig. 18).
B	Gate does not open (or close), though the motor is running.	<ul style="list-style-type: none"> • Make sure that the motor is running in the right direction. • Make sure the Manual Release mechanism has fully engaged the hydraulic system. • Increase the bypass pressure in small ¼-turn increments to determine if the hydraulic system needs more pressure.
C	Gate opens but doesn't close.	Verify that the reversing devices are working properly. FSWOP and FSWCL should be illuminated except when a reversing device is triggered. If either does not illuminate, then one of your reversing devices is preventing the gate from responding to your signal. Check your reversing devices. If no reversing devices are installed, make sure a circuit is installed between appropriate terminals.
D	Gate moves slowly.	Check the adjustment of the anti-crushing system (see Section 4.1).
E	Gate doesn't fully open (or fully close).	<ul style="list-style-type: none"> • Increase the bypass pressure to determine if the hydraulic system needs more pressure. • Check the operator's open / close time selection. You should set a time that is just longer than the rated speed of your model of operator. For example, the 400 CBAC has an opening time of 17 seconds, therefore you should set the time to 20 or 25 seconds. • Check to see that there are no obstructions in the path of the gate or that the hinges are not binding.
F	Gate jerks as it moves.	<ul style="list-style-type: none"> • Make sure that you have removed the breather screw (see Section 5). • Run several complete gate opening and closing cycles, in order to release any air inside the piston. • Make sure that a flexible gate leaf is not the problem. If the gate leaf flexes, then stiffen the gate or use a slower operator.
G	Operator is losing oil from breather screw.	Initially, a small amount of oil leakage is normal. A larger leak may occur if the operator is not fitted in a perfectly horizontal plane. If the oil leak continues and/or increases, contact an FAAC authorized repair center.
H	Leaves stop at slow-down.	Check the adjustment of the anti-crushing system (see Section 4.1).
I	Gate speed not constant.	Incorrect installation dimensions (see Section 3.2).

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.

FAAC S.p.A. or FAAC International, Inc., neither assumes nor authorizes any person to assume for them any other liability in connection with the sale or use of the products of FAAC S.p.A. or FAAC International, Inc. The warranty herein above set forth shall not be deemed to cover maintenance parts, including, but not limited to, hydraulic oil, filters, or the like. No agreement to replace or repair shall constitute an admission by FAAC S.p.A. or FAAC International, Inc., of any legal responsibility to effect such replacement, to make such repair, or otherwise. This limited warranty extends only to wholesale customers who buy directly through FAAC International, Inc.'s normal distribution channels. FAAC International, Inc., does not warrant its products to end consumers.

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.