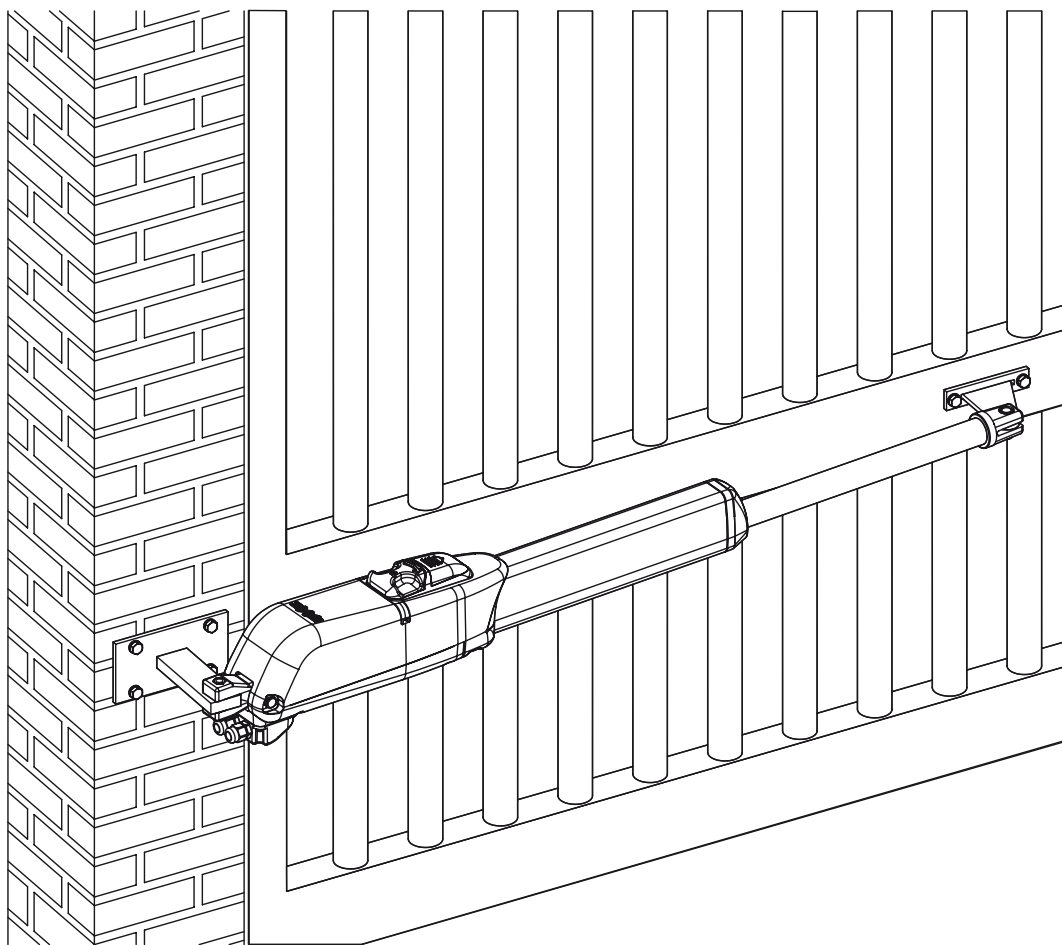


415 115Vac

Electromechanical Swing Gate Operator



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IMPORTANT SAFETY INFORMATION

WARNING - to reduce the risk of severe injury or death:

1. READ AND FOLLOW ALL INSTRUCTIONS.
2. Never let children operate or play with the gate controls. Keep remote controls away from children.
3. Always keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF A MOVING GATE.
4. Test the gate operator monthly. The gate MUST reverse on contact with a rigid object or stop when an object activates the non-contact sensors. After adjusting the force or the limit of travel, retest the gate operator. Failure to adjust and retest the gate operator properly can increase the risk of injury or death.
5. Use the emergency release only when the gate is not moving.
6. KEEP GATES PROPERLY MAINTAINED. Read the user's manual. Have a qualified service person make repairs to gate hardware.
7. The entrance is for vehicles only. Pedestrians must use a separate entrance.
8. SAVE THESE INSTRUCTIONS.

IMPORTANT INSTALLATION INFORMATION

a) Install the gate operator only when:

- 1) The operator is appropriate for the construction of the gate and usage Class of the gate,
- 2) All openings of a horizontal slide gate are guarded or screened from the bottom of the gate to a minimum of 1.83 m (6 ft) above the ground to prevent a 57.2 mm (2-1/4 in) diameter sphere from passing through openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position,
- 3) All areas of the moving vertical pivot gate panel from the bottom of the gate to the top of the gate or a minimum of 1.83 m (72 in) above grade, whichever is less, that pass by a fixed stationary object, and in the area of the adjacent fence that the gate covers during the travel of the gate, shall be designed, guarded or screened to prevent a 57.2 mm (2-1/4 in) diameter sphere from passing through such areas.
- 4) All exposed pinch points are eliminated or guarded, and

- 5) Guarding is supplied for exposed rollers.
 - 6) The operator instructions shall list the maximum number of open and close entrapment protection devices capable of being connected to the operator.
- b) The operator is intended for installation only on gates used for vehicles. Pedestrians must be supplied with a separate access opening. The pedestrian access opening shall be designed to promote pedestrian usage. Locate the gate such that persons will not come in contact with the vehicular gate during the entire path of travel of the vehicular gate.
- c) The gate must be installed in a location so that enough clearance is supplied between the gate and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates shall not open into public access areas.
- d) The gate must be properly installed and work freely in both directions prior to the installation of the gate operator. Do not over-tighten the operator clutch or pressure relief valve to compensate for an improperly installed, improperly functioning, or damaged gate.
- e) For gate operators utilizing Type D protection:
- 1) The gate operator controls must be placed so that the user has full view of the gate area when the gate is moving,
 - 2) An additional placard that is marked in letters at least 6.4-mm (1/4-in) high with the word "WARNING" and the following statement or the equivalent: "Moving Gate Has the Potential of Inflicting Injury or Death – Do Not Start Gate Unless Path is Clear." shall be placed adjacent to the controls,
 - 3) An automatic closing device (such as a timer, loop sensor, or similar device) shall not be employed, and
 - 4) No other activation device shall be connected.
- f) Permanently mounted controls intended for user activation must be located at least 1.83 m (6 ft) away from any moving part of the gate and where the user is prevented from reaching over, under, around or through the gate to operate the controls.
- Exception: Emergency access controls only accessible by authorized personnel (e.g. fire, police, EMS) may be placed at any location in the line-of-sight of the gate.*
- g) 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.
- h) A minimum of two (2) WARNING SIGNS shall be installed, in the area of the gate. Each placard is to be visible by persons located on the side of the gate on which the placard is installed.
- i) For gate operators that utilize a non-contact sensor (photo beam or similar):
- 1) See instructions on the placement of non-contact sensors for each type of application,
 - 2) Care should be exercised to reduce the risk of nuisance tripping, such as when a vehicle trips the sensor while the gate is still moving, and
 - 3) One or more non-contact sensors shall be located where the risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate or barrier.

- j) For gate operators that utilize a contact sensor (edge sensor or similar):
- 1) One or more contact sensors shall be located where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and postmounted both inside and outside of a vehicular horizontal slide gate.
 - 2) One or more contact sensors shall be located at the bottom edge of a vehicular vertical lift gate.
 - 3) One or more contact sensors shall be located at the pinch point of a vehicular vertical pivot gate.
 - 4) A hardwired contact sensor shall be located and its wiring arranged so that the communication between the sensor and the gate operator is not subjected to mechanical damage.
 - 5) A wireless device such as one that transmits radio frequency (RF) signals to the gate operator for entrapment protection functions shall be located where the transmission of the signals are not obstructed or impeded by building structures, natural landscaping or similar obstruction. A wireless device shall function under the intended end-use conditions.
 - 6) One or more contact sensors shall be located on the inside and outside leading edge of a swing gate. Additionally, if the bottom edge of a swing gate is greater than 152 mm (6 in) but less than 406 mm (16 in) above the ground at any point in its arc of travel, one or more contact sensors shall be located on the bottom edge.
 - 7) One or more contact sensors shall be located at the bottom edge of a vertical barrier (arm).

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 a copy of the standard, contact ASTM directly at 610-832-9585 or 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.
- 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 the operator's force.
- 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

CLASS I - RESIDENTIAL VEHICULAR GATE OPERATOR

A vehicular gate operator (or system) intended for use in garages or parking areas associated with a residence of one to four single families.

CLASS II - COMMERCIAL / GENERAL ACCESS VEHICULAR GATE OPERATOR

A vehicular gate operator (or system) intended for use in commercial locations or buildings such as multi-family housing units (five or more single family units), hotel, garages, retail store, or other buildings accessible by or servicing the general public.

CLASS III - INDUSTRIAL / LIMITED ACCESS VEHICULAR GATE OPERATOR

A vehicular gate operator (or system) intended for use in an industrial location or building such as a factory or loading dock area or other locations not accessible by or intended to service the general public.

CLASS IV - RESTRICTED ACCESS VEHICULAR GATE OPERATOR

A vehicular gate operator (or system) intended for use in guarded industrial locations or buildings such as an airport security area or other restricted access locations not servicing the general public, 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.



415 OPERATOR

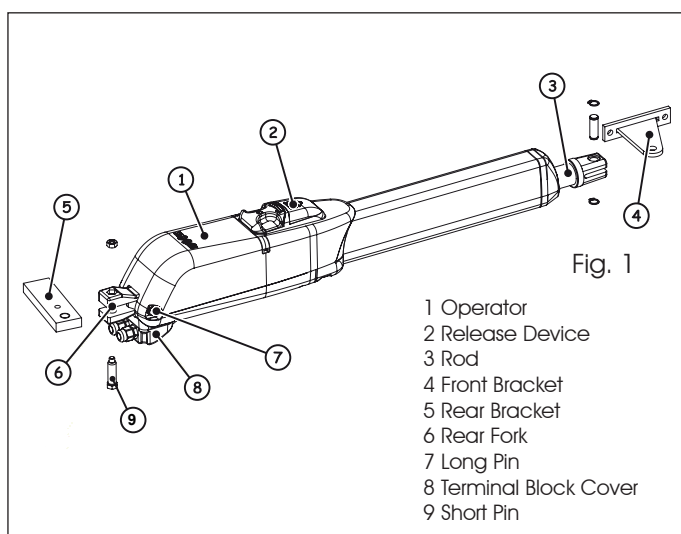
1. DESCRIPTION AND SPECIFICATION

The FAAC 415 is an automatic gate operator for swinging gates. It is designed for residential applications and can accommodate gate leaves up to 15 ft long. The self-contained 415 operator consists of an electric motor that drives a worm screw housed in an aluminum casing.

The operator has built in limit switches, that can be used in place of positive stops to limit the gate travel.

Built-in security and anti-crushing measures of the 415 Operator include reverse on contact and an electronic torque adjustment to control the force transmitted to the gate leaf.

The 415 Operator is designed and manufactured to automate vehicular swing gates. Do not use for any other purpose.



1.1 Technical Specifications

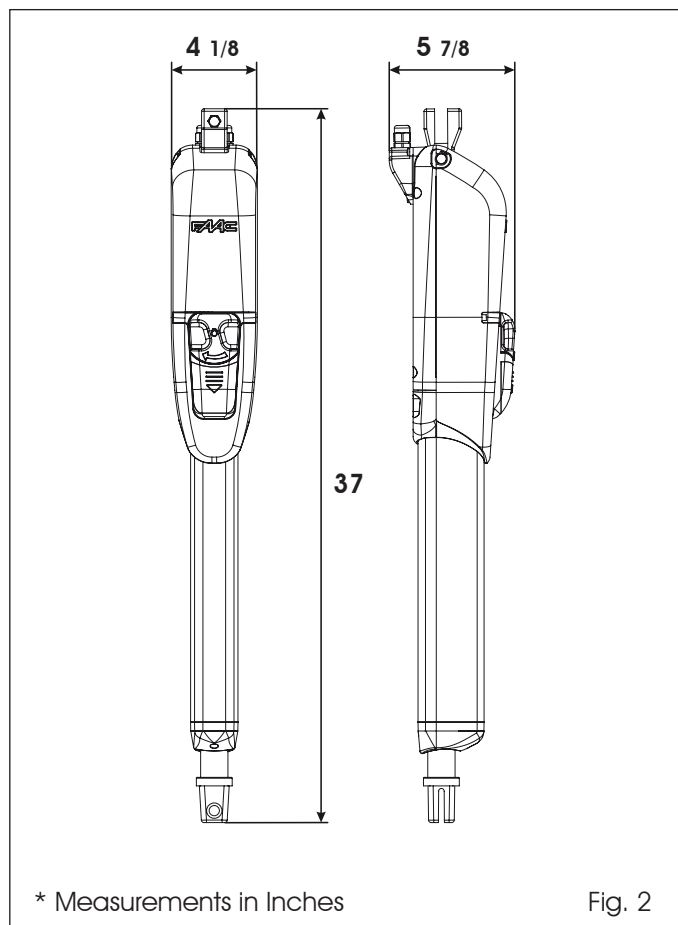
Input Voltage	115Vac (+10% -6%)
Power	300 W
Current	2.5 A
Thrust	674 lbf (300 daN)
Effective Rod Stroke	15.7 in (400 mm)
Rod Extension Speed	0.73 in /sec (1.85 cm/sec)
Min Leaf Length	7.5 ft (2.3 m)
Max Leaf Length	15 ft (4.6 m)
Max Leaf Weight	700 lb (318 Kg)
Ambient Temperature	4°F +131°F (-20 °C +55°C)
Operator Weight	17.6 lb (8 Kg)
Protection Class	IP 54

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

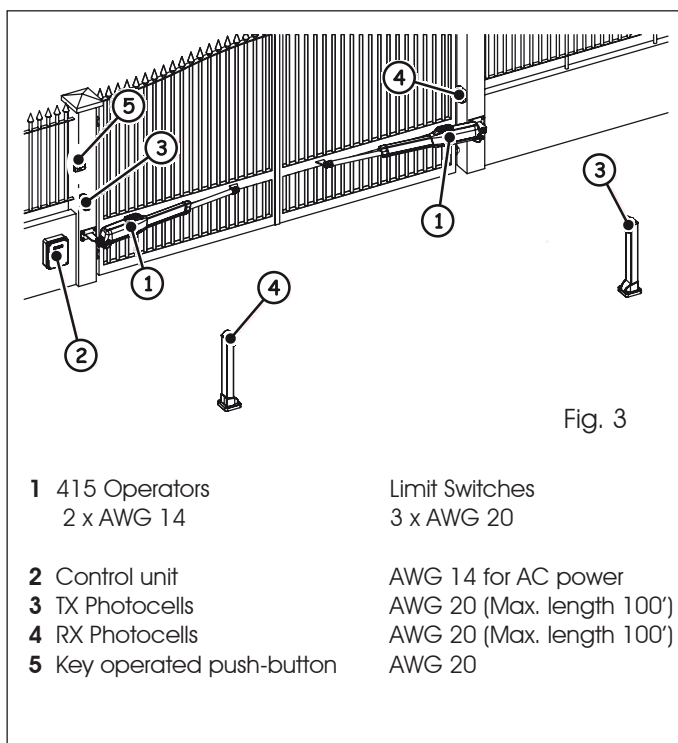
The installer is responsible for grounding the gate and operator systems, for providing the main power breaker switch, and for making sure that the entire gate system meets all applicable electrical codes.

Make sure to locate all controls that operate the gate system at least 6 ft away from any moving parts.

1.2 Dimensions



1.3 Electrical Setup



2. INSTALLATION

2.1 Preliminary Checks

The condition of the gate structure directly affects the reliability and safety of the automated system. Before installing the 415 operator, prepare the gate by performing the following:

- Make sure that the gate structure is solidly built. Add reinforcing crosspieces to the gate leaves if necessary.
- Make sure that the gate moves smoothly on its hinges without excessive friction by swinging it opened and closed by hand. If necessary, lubricate all the gate's moving parts.

Positive stops are not needed with the 415 operator, the built limit switches can be used to limit the rod travel.

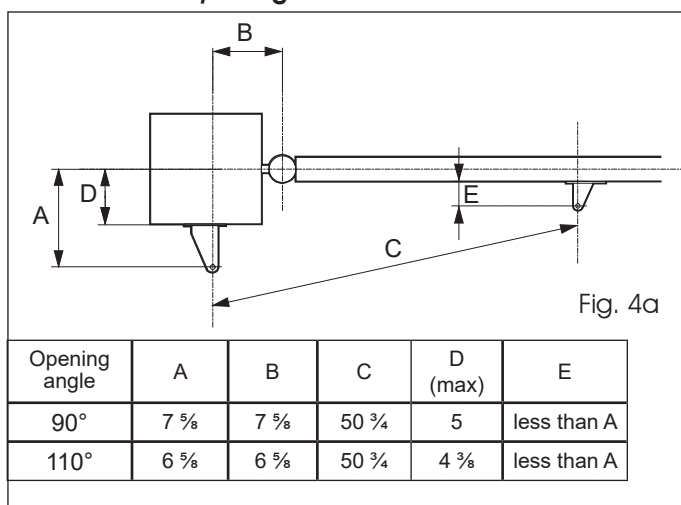
2.2 Installation Dimension

Select the installation position of the operator on the gate referring to the dimensions in Fig 4a for inward opening or 4b for outward opening.

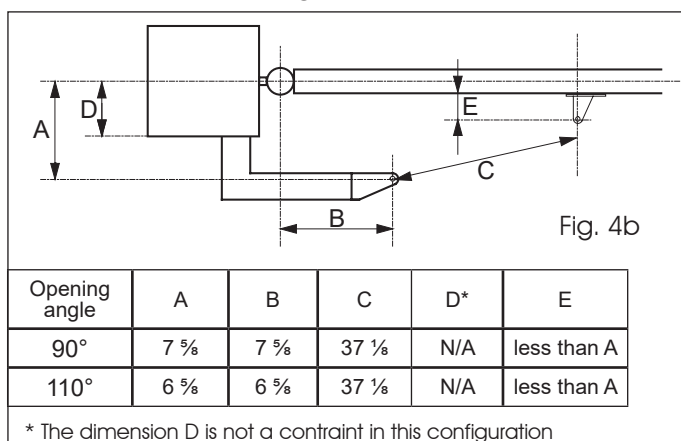
In case of inward opening make sure that there is enough clearance between the gate leaf and possible obstacles like walls or fences.

In case of outward opening construct a steel elbow of adequate size to allow the operator to be mounted as in Fig. 4b

2.2.1 Inward Opening



2.2.2 Outward Opening

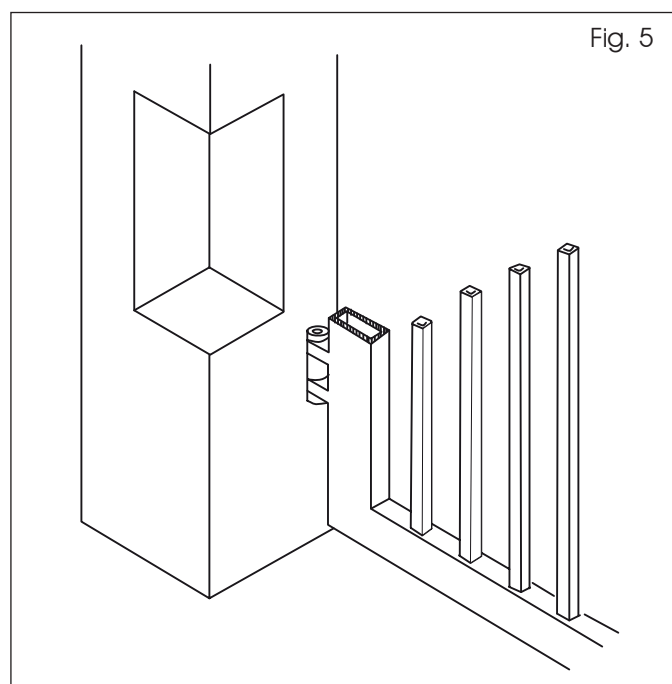


2.2.3 Guidelines for Installation Dimensions

If the dimensions indicated in Fig. 4a cannot be obtained use the following general rules to determine different installation dimensions:

- For 90° leaf openings: A+B=rod stroke
- For leaf openings exceeding 90°: A+B<rod stroke
- Smaller A and B dimensions provide higher peripheral leaf speed.
- Limit the difference between A and B dimensions to less than 1.5 inches. Greater differences cause speed variations during gate opening and closing movements.
- Limit switches are triggered during the first and last 1.25 inches of gate travel. Therefore select A and B dimensions that utilize the entire operator travel. Short travel ranges can restrict or cancel the limit switch adjustment range.

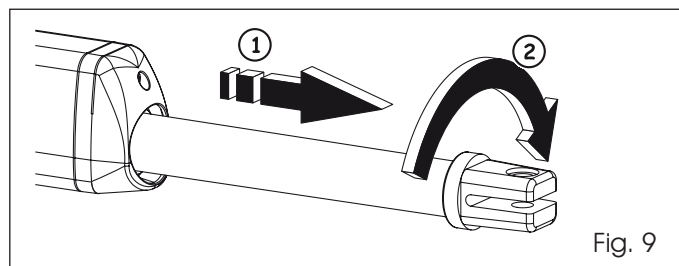
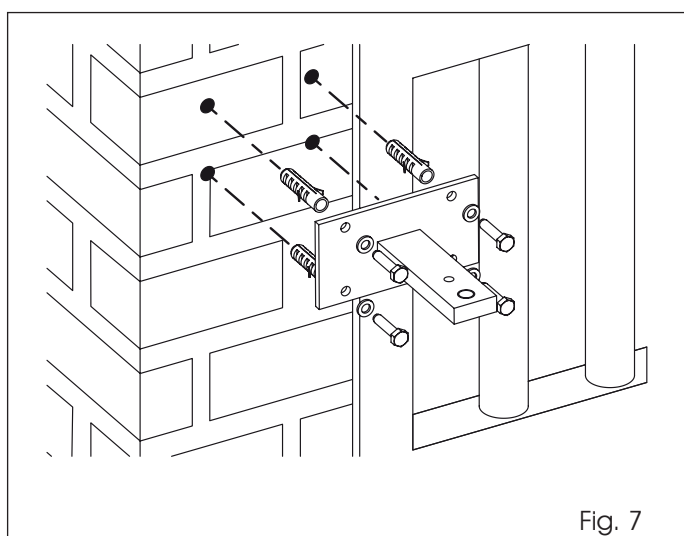
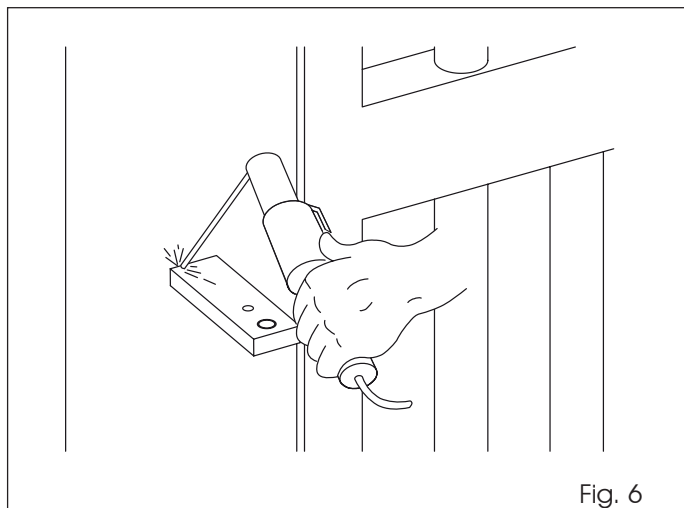
If pillar dimensions or hinge position do not allow the installation of the operator, cut a niche into the pillar (as shown in Fig. 5) in order to maintain the proper A dimension. The dimensions of the niche should enable easy installation, rotation and operation of the manual release device.



2.3 Installing the Operator

1. Fix the rear bracket in the position you previously determined in Section 2.2.
 - For steel pillars, carefully weld the bracket directly onto the pillar (Fig. 6).
 - For masonry pillars, use a steel plate (not included) to attach the rear bracket (Fig. 7). Use a suitable fastening system then carefully weld the bracket to the plate.

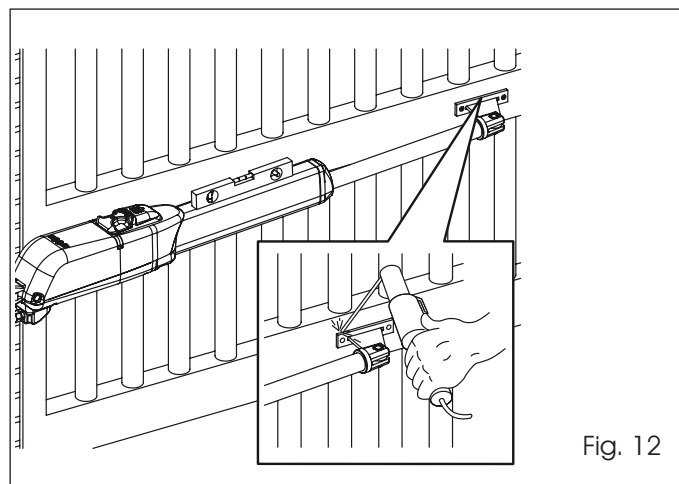
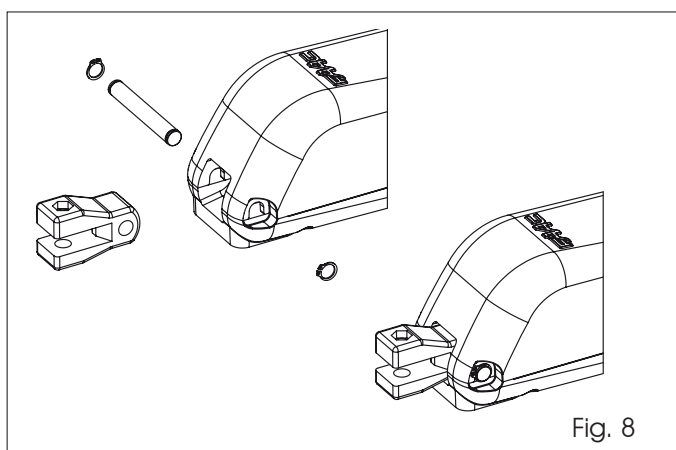
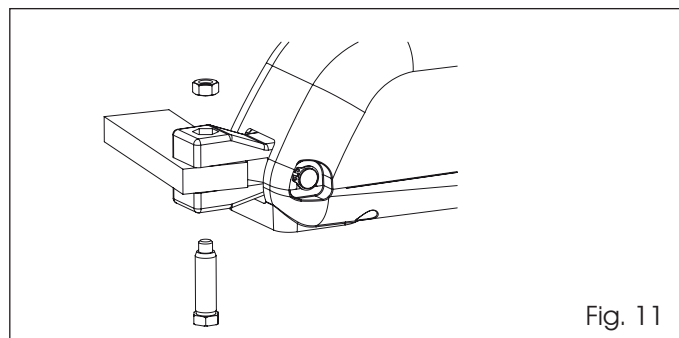
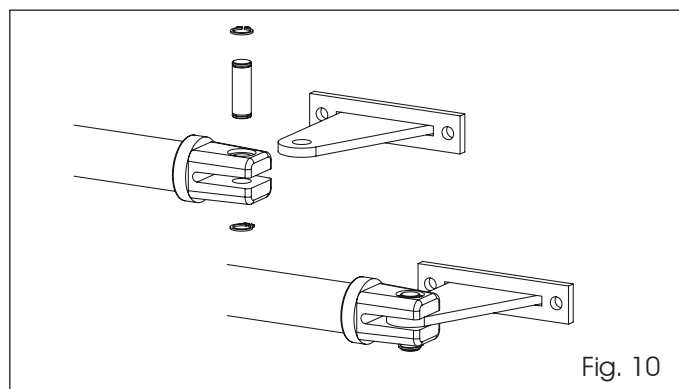
While fastening the bracket use a level to ensure that it is perfectly horizontal.



8. Mount the operator to the rear bracket using the supplied pin as shown in Fig. 11.

Warning: allow the bracket to cool down before fastening the operator to it.

9. Close the leaf and, while keeping the operator perfectly horizontal, determine the fastening point of the front bracket (Fig.12).
10. Temporarily attach the front bracket with two tack welds (Fig.12). Protect the piston during the welding.



NOTE: Make sure that the gate structure allows for a solid fastening point for the front bracket.

2. Assemble and attach the rear fork to the operator (Fig. 8).

3. Disengage the operator's manual release (see Par. 4).
4. Completely extend the rod until it reaches the limit stop (Fig. 9, Ref. 1).
5. Re-lock the operator (see Par. 4.1).
6. Turn the rod one half revolution clockwise (Fig. 9, Ref. 2).
7. Assemble the front bracket as shown in Fig. 10.

- 11. Disengage the operator’s manual release and check that the gate opens and closes smoothly, without extra friction or resistance. Ensure that it opens and closes completely, up to the travel limits.
- 12. Detach the operator from the front bracket and permanently weld the bracket to the gate.

If the leaf structure prevents the bracket from being welded, screw it to the leaf with adequate hardware.

Note: Grease all fastening pins of the fittings.

2.4 Wiring the Operator

A terminal block is available in the lower part of the operator to connect the motor and the limit switches.

IMPORTANT : Use the supplied cable or a similar UL approved cable for outdoor use.

Motor Wiring Instructions:

- 1. Open one of the pre-drilled holes in the terminal block cover, see Fig.13.
- 2. Mount the supplied strain relief.
- 3. Thread the two conductor cable through the strain relief and connect the wires as shown in Fig.14.

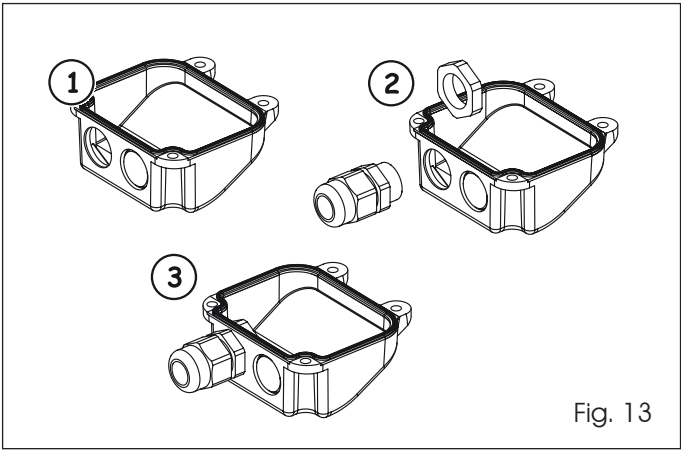


Fig. 13

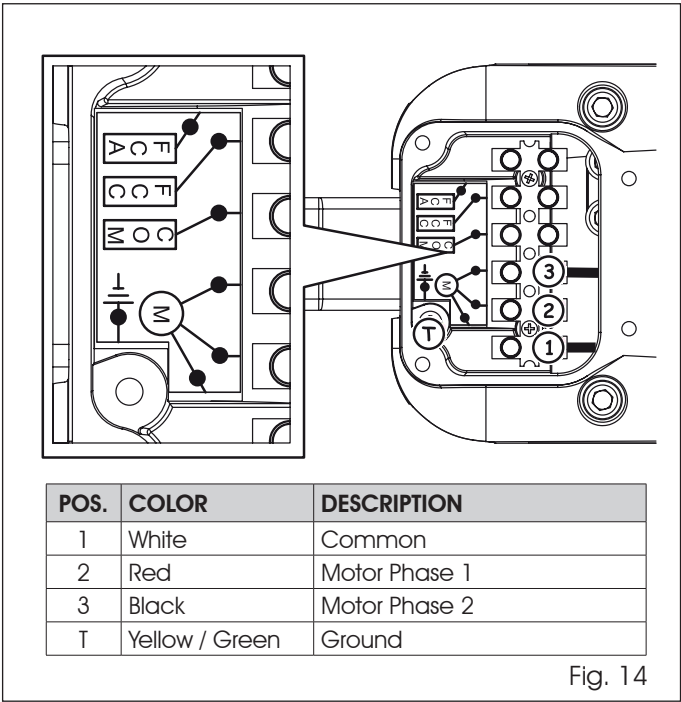


Fig. 14

Limit Switches wiring instructions:

Limit switches are wired in the same terminal block where the motor wiring has been installed. Wire the limit switches as follows:

- 1. Open the second pre-drilled hole in the cover, see Fig. 15.
- 2. Mount the supplied strain relief.
- 3. Thread the three conductor cable through the strain relief and connect the wires as shown in Fig.16.

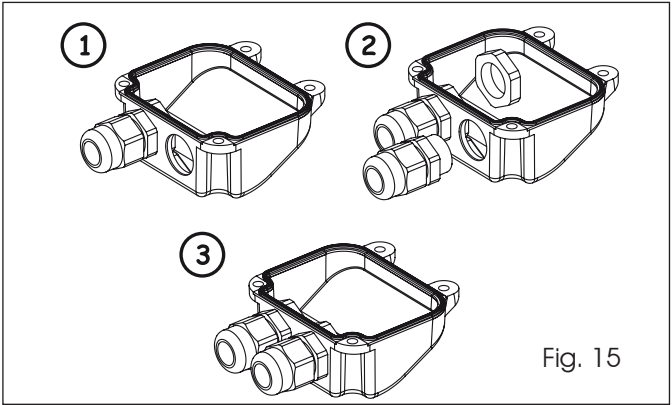


Fig. 15

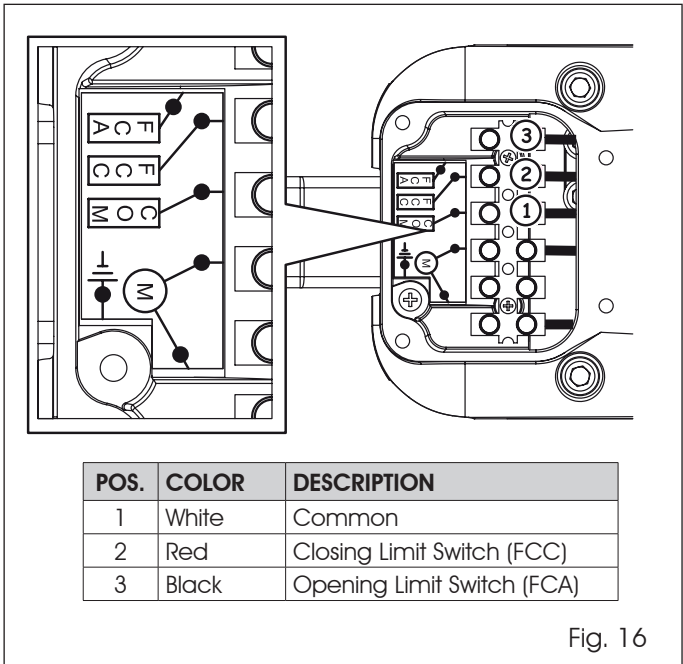


Fig. 16

- Close and secure the cover with the four supplied screws (Fig. 17).

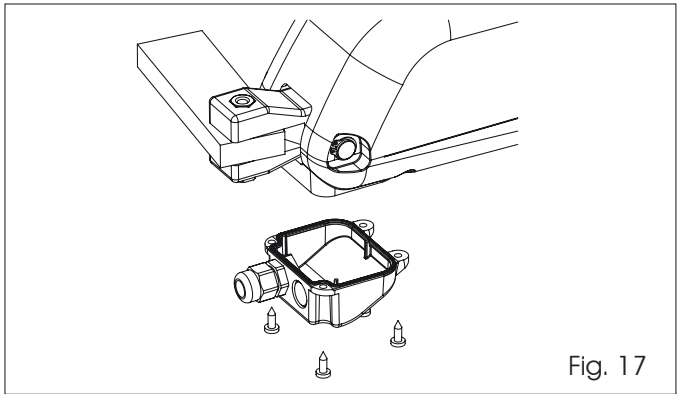


Fig. 17

2.5 Adjusting the limit switches

The limit switch adjustment is carried out as follows:

1. Unscrew the upper fastening screw, Fig.18 Ref.1, and remove the cap, Fig.18 Ref.2.

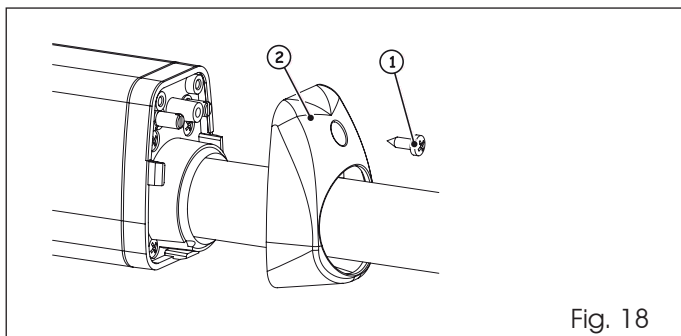


Fig. 18

2. To adjust the closing limit switch FCC, turn the adjusting screw clockwise (Fig.19 Ref. 1) to increase rod stroke and counter-clockwise to reduce it.
3. To adjust the opening limit switch FCA, turn the adjusting screw counter-clockwise (Fig. 20 Ref. 1) to increase rod stroke and clockwise to reduce it.

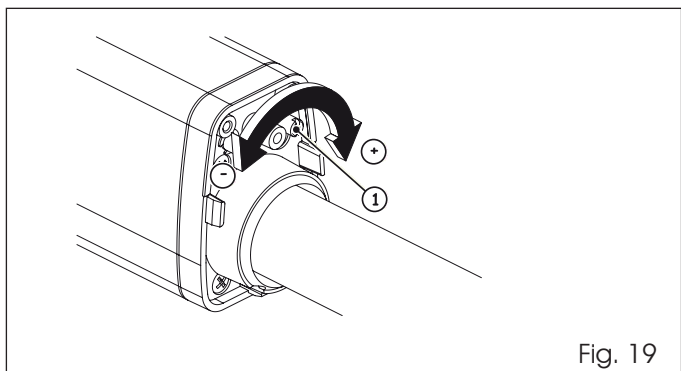


Fig. 19

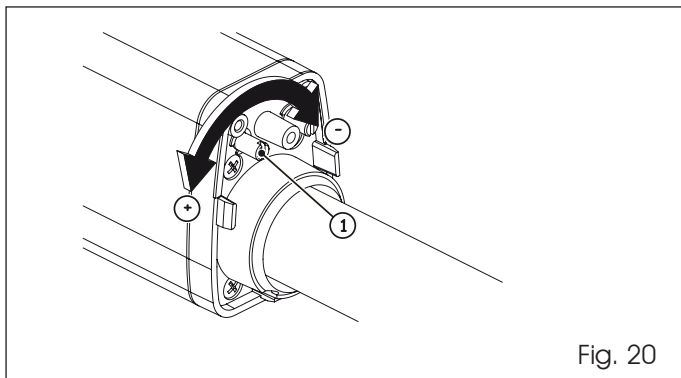


Fig. 20

4. Perform a couple of test cycles to check the correct position of the limit switch. If the limit switch needs additional adjustment, repeat the operation starting from Step 2.
5. As you manually move the gate the limit lights on the control board turn off when they are triggered. FCA - open limit; FCC - close limit
6. Reposition the cap (Fig. 18 Ref. 2) and tighten the fastening screw (Fig. 18 Ref. 1)

2.6 Time Learning with limit switches

NOTE: The time learning procedure explained in par. 10 of the 455D control board section of the manual is different for the 415 operator, due to the presence of the limit switches. Read below for the specific instructions.

Learning with limit-switches can be done in two different ways:

SIMPLE LEARNING (without slow-down):

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

The motors stop automatically when the opening limit-switches are reached, but an OPEN A pulse must be given (by radio control or key push-button) to end the cycle.

The display stops flashing; press push-button F to exit and save the programming. The procedure is finished 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 press the + push-button for more than 3 **seconds**: the display begins flashing and leaf 1 begins the opening movement.

The leaves automatically decelerate when they reach the limit switches, then the control board needs to receive a pulse on the OPEN A input (by radio control or key push-button) when the stop limits have been reached to turn off the motor.

When gate operator (1) reaches the open limit-switch, it starts to slow down. When operator (1) reaches its positive stop an open command must be given to shut the motor off.

- After the gate operator (1) has reached its positive stop and has shut off, gate operator (2) will automatically start to open

- When gate operator (2) reaches the open limit-switch, it starts to slow down. When operator (2) reaches its positive stop an open command must be given to shut the motor off.

- After operator's (2) motor shuts off it will automatically start to close.

- When gate operator (2) reaches the closed limit-switch, it starts to slow down. When operator (2) reaches its positive stop an open command must be given to shut the motor off.

- When operator (2) reaches its positive stops and the motor shuts off, gate operator (1) will start to close automatically.

- When gate operator (1) reaches the closed limit-switch, it starts to slow down. When operator (1) reaches its positive stop an open command must be given to shut the motor off.

The display will stop flashing. Press the "F" button one last time to return to the status display and the gate is ready for normal operation.

NOTE: If you wish to eliminate the slow-down in some stages, you must supply an Open pulse within 1 second of reaching the limit-switch.

If only one leaf is present, the entire sequence must be executed, as if the second leaf is present. When the leaf 1 has finished opening, supply 5 Open pulses until the leaf begins to close, and then resume the normal programming sequence.

3. MANUAL OPERATION

If the gate needs to be moved manually due to power outage or an operator malfunction, proceed as follows:

1. Turn power off at the main breaker (even in the event of a power outage).
2. Slide the protective cap, Fig. 21, Ref. 1.
3. Insert the key and turn it 90°, Fig. 21, Ref. 2.
4. To release the operator, turn the control lever 180° in the direction indicated by the arrow on the release system, Fig. 21, Ref. 3.
5. Now the operator is released. The gate can be opened and closed manually.

Note: To keep the operator in manual mode, the control lever should be left in its current position (turned 180°) and main power should be kept off.

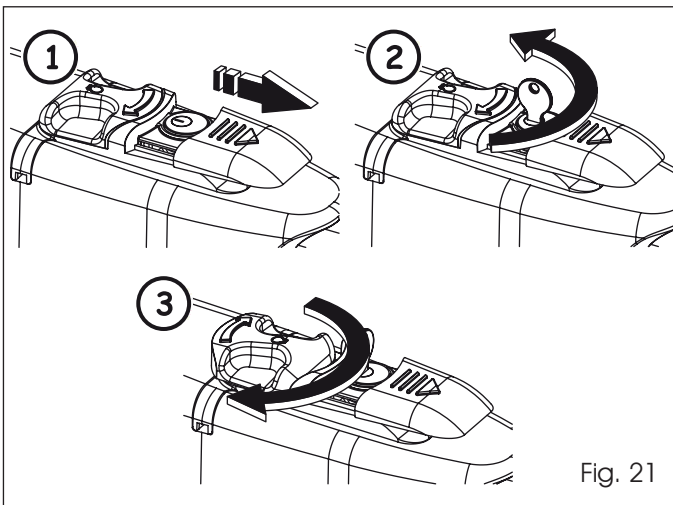


Fig. 21

3.1 Restoring Normal Operation

To restore normal operating conditions, proceed as follows:

1. Turn the release system's control lever 180° in the opposite direction of the arrow.
2. Turn the release key 90° and remove it.
3. Close the protection cover.
4. Power up the system and perform a complete cycle of movement to check that the automated system is correctly restored and all the safeties are operating properly.

4. MAINTENANCE AND REPAIRS

Periodically check the gate structure and ensure in particular that the hinges are in perfect working condition.

Check that the electronic force setting on the control board is adjusted correctly and that the manual release mechanism is fully functional.

Safety devices installed on the system must be checked every six months.

Repairs

For repairs, refer to FAAC authorized service centers.

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: 7.

The 455D control board allows the connection of 1 close and up to 2 open entrapment protection devices.

The 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~ $\pm 10\%$ 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

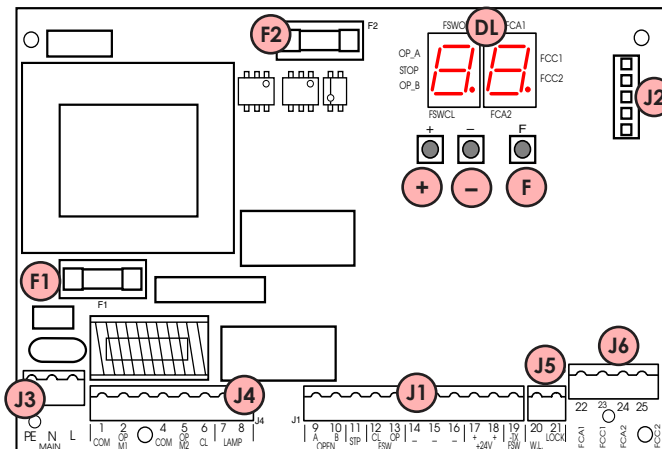
Programmable Functions:

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)

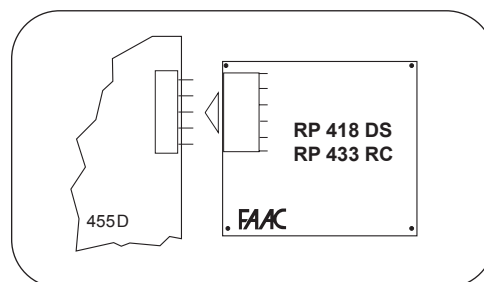
F "F" PROGRAMMING PUSH-BUTTON

- "-" 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

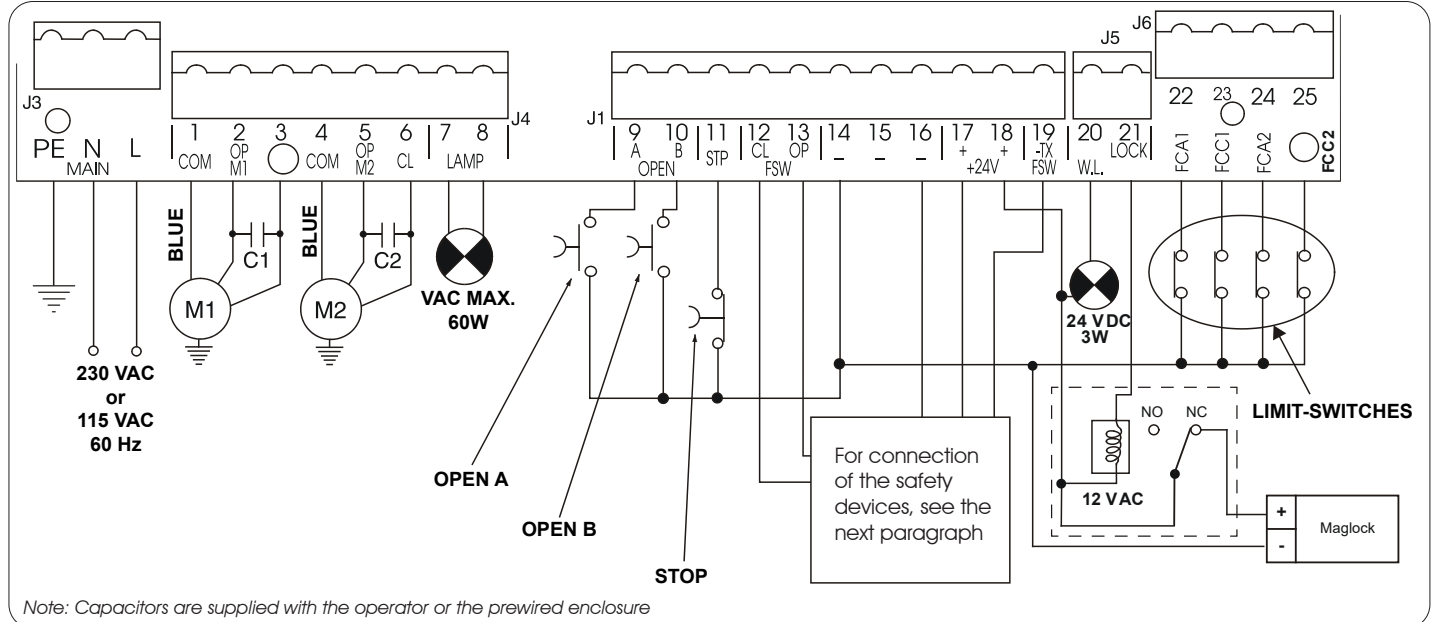
N: AC V~ power supply (Neutral)

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



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. It also can act as an additional monitored opening safety.

Note: 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 photocells 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

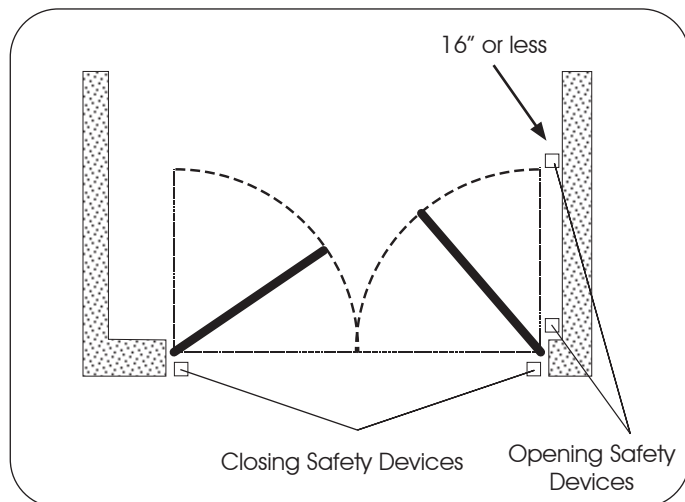
These inputs are dedicated to the connection of opening and closing limit switches

6. Connection of Safety devices

Entrapment protection

To comply with the UL325 standard for gate operators every entrapment zone, as defined in ASTM F2200, 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 the following picture for the photocells positioning:



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) against the risk of entrapment

Closing Safety Devices:

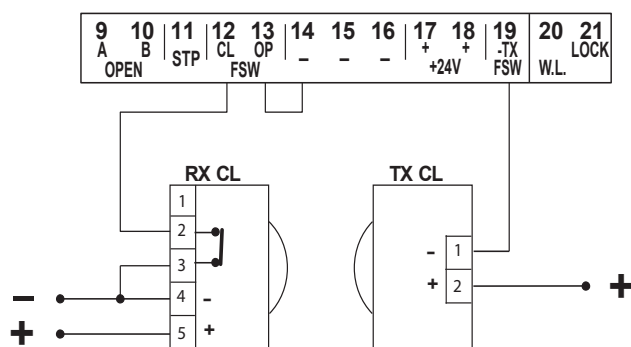
Are active only during the gate closing movement, and are suitable for protecting the closing area against the risk of entrapment.

Monitored Devices:

Additionally the UL325 standard requires that every external entrapment protection device must be monitored for presence and correct operation. The closing safety devices are always monitored, see the following picture for the wiring of a pair of photocells as closing safety devices.

NOTE: one closing safety device must always be connected for the system to work.

Connection of One Pair of Monitored Closing Photocells

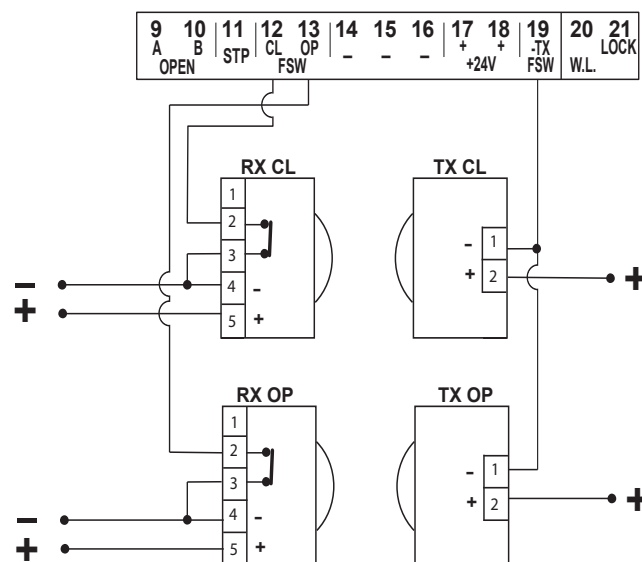


Monitoring of the opening safety devices must be enabled in the board configuration. To enable it enter in advanced programming by pressing and holding "F" and then press "+", scroll to the "FS" parameter and select "Active".

ADVANCED PROGRAMMING (F) + (+)

Display	Function	Default
FS	OPENING FAIL SAFE: If this function is activated, it enables the monitoring of the opening safety photocell before the opening movement. If the test fails the gate does not open. 4 = Active 10 = Disabled	10

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



If an additional monitored opening safety device is needed it can be connected to the STP input. The "OP" parameter in the board configuration must be set to active

OP

OPENING No. 2 FAIL SAFE:

When enabled the STOP input can be used for the connection of a second monitored opening safety device.

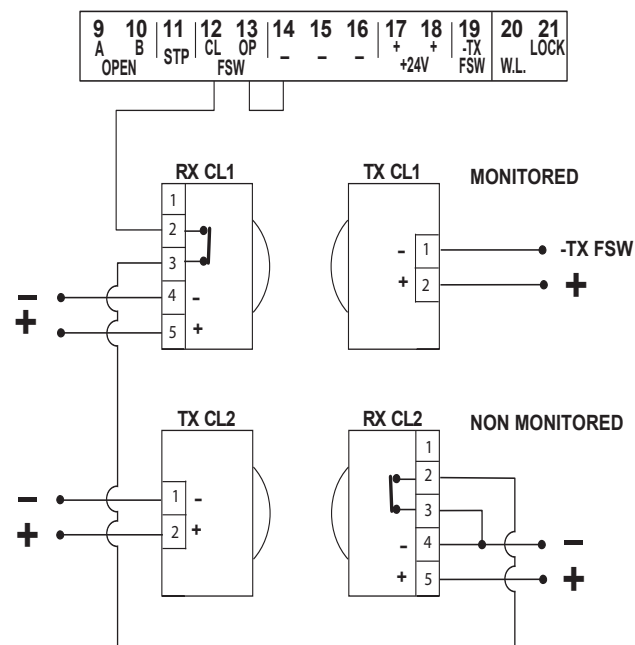
4 = Active 10 = Disabled

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.

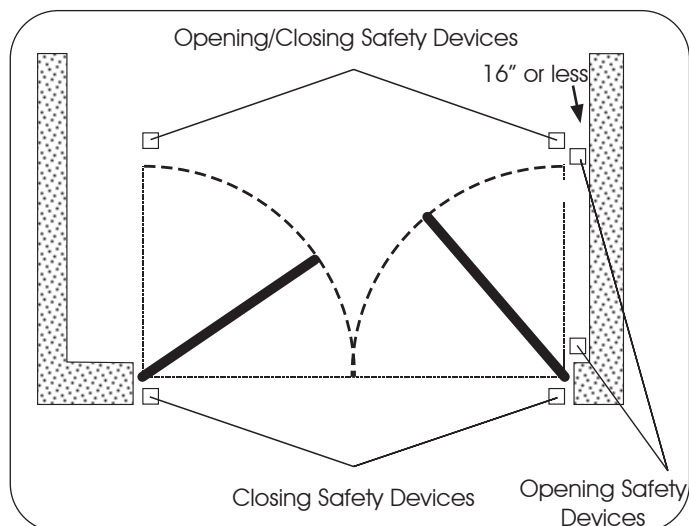
See the following example of one closing safety monitored photocell and one non monitored one.

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



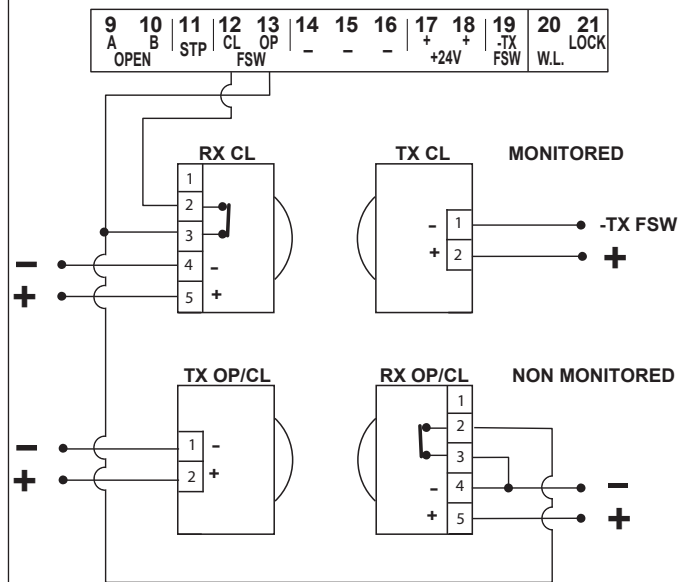
Opening/Closing Safety Devices:

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.

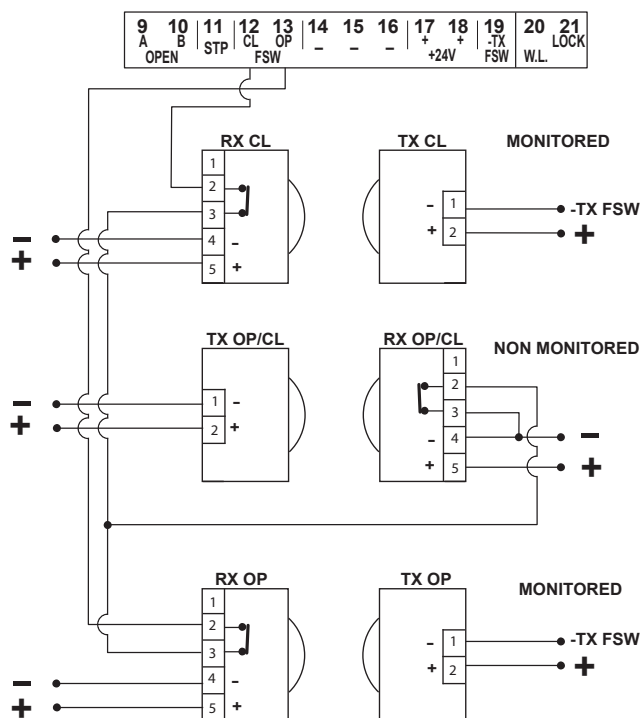


See the following connections diagrams for example of opening/closing safety wiring.

Connection of a pair of Monitored Closing Photocells, and one pair of Non Monitored Opening/Closing Photocell



Connection of One Pair of Monitored Closing Photocells, One Pair of Monitored Opening Photocells and One pair of Non Monitored Opening/Closing Photocells



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

- 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.
- A (automatic): The gate opens on command and automatically closes after the pause time. 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.
- 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 = Security EP = "Stepped" Semi-automatic AP = "Stepped" Automatic SP = "Stepped" Security b = Manned, pulsed C = Manned, constant	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 25 , Pause Time is 2 mins. and 50 secs.	0
F1	LEAF 1 FORCE: Adjusts thrust of Motor 1. 1 = minimum force 50 = maximum force (*)	25
F2	LEAF 2 FORCE: Adjusts thrust of Motor 2. 1 = minimum force 50 = maximum force (*)	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 10): 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	OPENING FAIL SAFE: If this function is activated, it enables the monitoring of the opening safety photocell before the opening movement. If the test fails the gate does not open. 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

Display	Function	Default
SP	INDICATOR-LIGHT: 0 : the output functions as a standard indicator-light (ON at opening and pause, flashing at closing, and OFF when gate is closed). 1 : the output is ON when the gate is open or in pause. OFF in all other conditions. 2 : the output is ON when the gate is closed. OFF in all other conditions. All other values 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 41 min. in 10 sec. steps.	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
OP	OPENING No. 2 FAIL SAFE: When enabled the STOP input can be used for the connection of a second monitored opening safety device 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.	

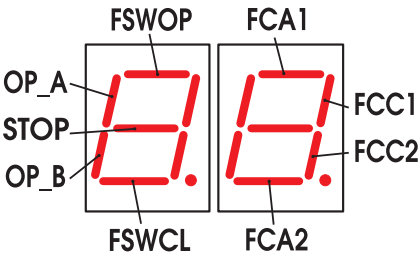
NOTE: Parameter modifications take effect immediately. Exit out of programming to save changes. If the equipment is powered down before returning to normal status monitoring, any unsaved modifications will be lost.

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

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 inputs.



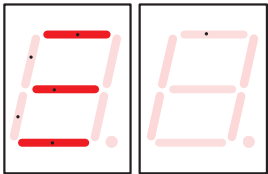
The table below shows the status of the LEDs in relation to the status of the inputs.

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. Turn power off to the control board.
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, turn power off 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 pulse on the STOP input or turning off power.
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



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

Make sure travel limit mechanical stops are present.

- 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 photocells and make sure that FAIL SAFE is enabled in Advanced Programming

12. 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 see paragraph 5.2.
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/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 see paragraph 5.2.
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	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 see paragraph 5.2.
OPENING	Re-closes the leaf immediately (3)			Reverses to close	Locks and, on release, continues opening (saves OPEN)
LOCKED	Closes the leaf (3)		No effect (OPEN disabled)	No effect	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 see paragraph 5.2.
OPENING	Stops operation (3)			see paragraph 5.2.	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 (OPEN disabled) (If it must close, it disables OPEN)

(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	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS	OPENS the leaf and closes it after pause time	OPENS single leaf and closes after pause time		No effect (OPEN disabled)	No effect
CLOSED					
OPEN on PAUSE	Stops operation (3)	Stops operation (3)	Stops operation	No effect (if on part-opening, OPEN A disabled)	Reloads pause time (3) (OPEN disabled)
CLOSING	Re-opens the leaf immediately			No effect (saves OPEN)	see paragraph 5.2.
OPENING	Stops operation (3)			Reverses to close	No effect
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	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS	OPENS the leaf and closes it after pause time	OPENS single leaf and closes after pause time		No effect (OPEN disabled)	No effect
CLOSED					
OPEN on PAUSE	Stops operation (3)	Stops operation (3)	Stops operation	No effect (if on part-opening, OPEN A disabled)	On release, closes after 5" (OPEN disabled)
CLOSING	Re-opens the leaf immediately			No effect (saves OPEN)	see paragraph 5.2.
OPENING	Stops operation (3)			Reverses to close	No effect (saves OPEN)
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	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS	OPENS the leaf	No effect		No effect (OPEN A disabled)	No effect
CLOSED			No effect (OPEN B disabled)		
OPEN	No effect	Closes the leaf		No effect	No effect (OPEN B disabled)
CLOSING	Reverses to open	No effect	Stops operation	No effect (saves OPEN A)	Stops operation (OPEN-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 A/B disabled)

Tab. 3/h

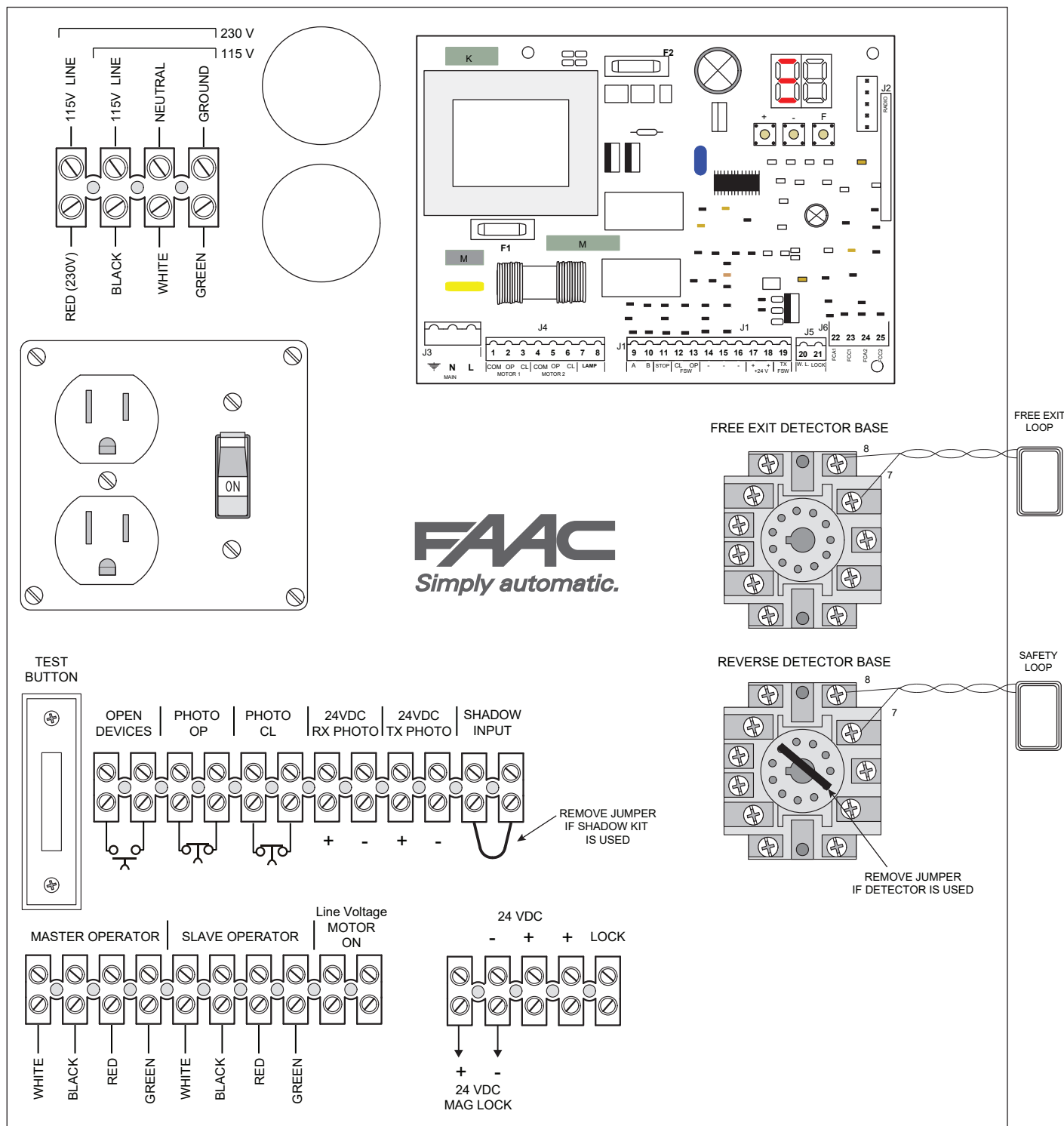
Logic "C"	CONTROLS ALWAYS HELD DOWN				
	OPEN-A (opening)	OPEN-B (closing)	STOP	OPENING SAFETY DEVICES	CLOSING SAFETY DEVICES
GATE STATUS	OPENS the leaf	No effect (OPEN-B disabled)		No effect (OPEN A disabled)	No effect
CLOSED			No effect (OPEN-A disabled)		
OPEN	No effect (OPEN-B disabled)	Closes the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

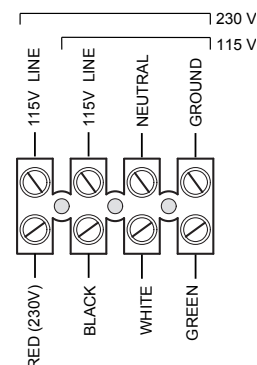
13. Prewired Enclosure

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.

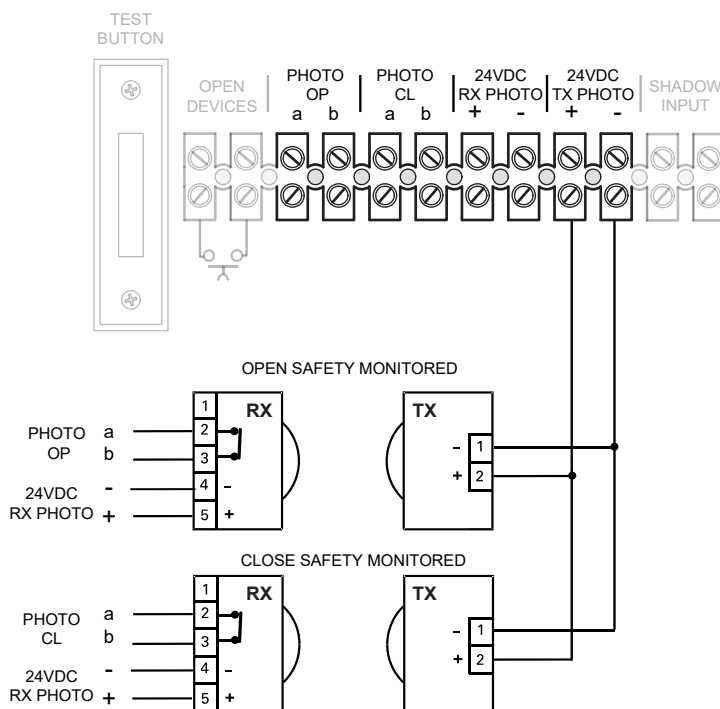
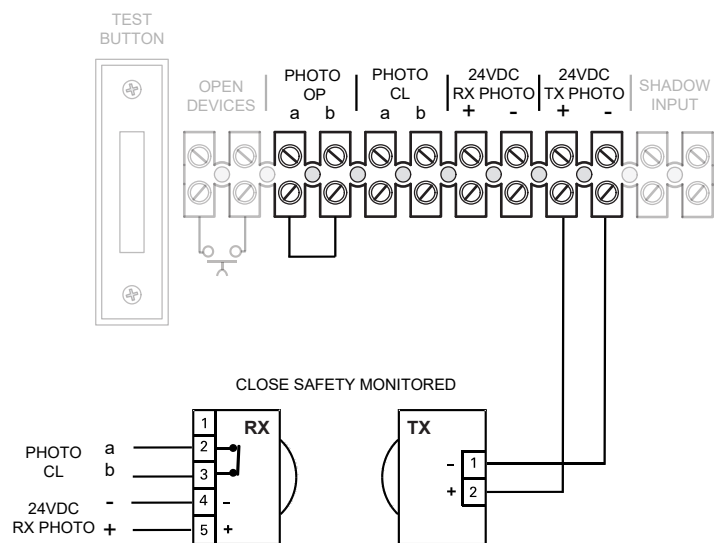


Monitored safety connections

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. One closing and one opening photocells can be connected to the dedicated terminals.

1. Connect the transmitter photocell(s) to the 24VDC TX PHOTO terminals as shown on the drawing
2. Connect the receiver photocell(s) 24V power to the 24VDC RX PHOTO terminals as shown on the drawing
3. For applications that need only closing safeties connect the N.C. outputs of the photocell to the PHOTO CL terminals and connect a jumper to the PHOTO OP terminals
4. For applications that need closing and opening safeties connect the N.C. outputs of the photocells to the PHOTO CL and PHOTO OP terminals. Program the FS parameter in advance programming to Y

IMPORTANT: The operator requires the connection of the closing safety photocell to work.

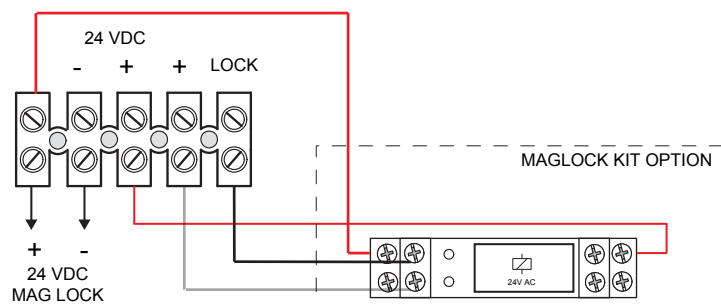


Maglock connection

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.

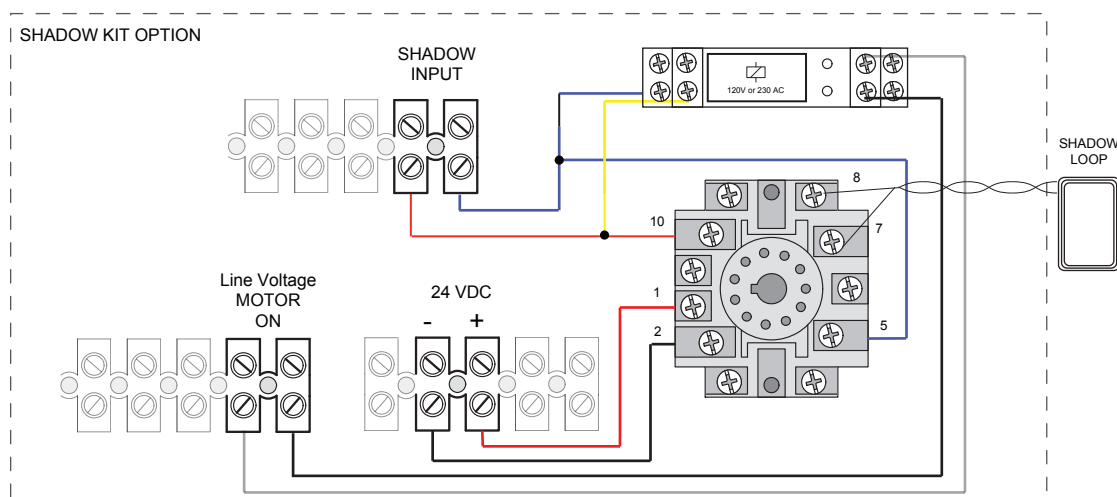
If using non-FAAC relay make sure the minimum switch voltage is less than 12Vac



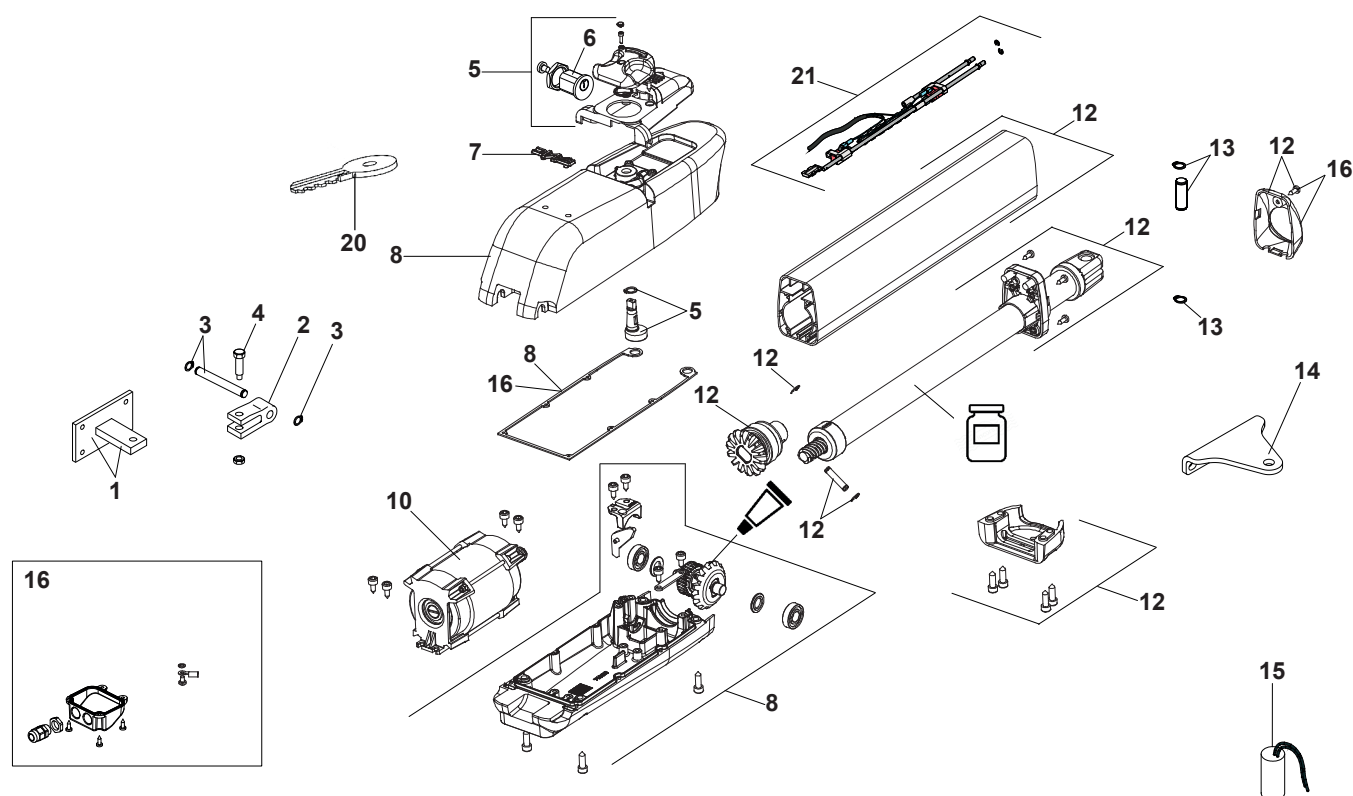
Shadow Loop kit option

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.



SPARE PARTS DIAGRAM



Part	Part Number	Description
1	72840065	Plate And Rear Bracket
2	7228015	Die-Cast Rear Fork
3	718366	Long Pin
4	7182075	Short Pin
5	428403	Release Set
6	7120885	Lock
7	7324755	Faac Name Plate
8	63000569	Bodies Group
10	770890	115v Ul/Csa Motor Group
12	63003344	415 Tube Group
13	718354	Front Pin + Snap Ring
14	728271	Front Bracket
15	6020278	Capacitor 25 Uf 450v
16	63003351	415 Small Parts
20	7131005	Release Key
21	490108	Limit Switch Assembly

LIMITED WARRANTY

FAAC International, Inc. ("Seller") warrants the first Purchaser of the product to be free from defects in material and workmanship for a specific period as defined by the Warranty disclosure on the website www.faacusa.com. The Warranty Period commences from the date of invoice.

Control Boards, Accessories or Spare Parts factory installed or sold with any of the products above carry the same warranty period as the product they are sold with, excluding batteries that carry a maximum 2 year warranty.

Products repaired under warranty carry the remainder of the original warranty period. For products repaired outside of warranty, the Seller warrants that all parts used for the repair will be free from defects in materials and workmanship for a period of ninety (90) days.

Defective products must be returned to Seller, freight prepaid by Purchaser, within the warranty period. A Return Material Authorization Number (RMA) must be obtained before product is returned. Items returned will be repaired or replaced, at Seller's option, upon an examination which discloses to the satisfaction of the Seller that the item is defective. The Seller will return the warranted item freight prepaid.

This limited Warranty covers the product under the normal use and service for which it was intended, provided it has been properly installed and operated. Seller's obligations under this warranty shall be limited to the repair or exchange of any part. This warranty shall not apply to products or parts thereof which have been repaired or altered, without Seller's written consent, outside of Seller's workshop or altered in any way so as, in the judgment of Seller, to affect adversely the stability or reliability of the product(s) or has been subject of misuse, negligence, or accident, or has not been operated in accordance with the product's instructions or has been operated under conditions more severe than, or otherwise exceeding, those set forth in the specifications for such product(s).

When the warranty service involves the exchange of an operator or part, the item the Seller replaces becomes its property and the replacement becomes Purchaser's property. The Purchaser represents that all removed items are genuine and unaltered. The replacement may not be new but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

The products are not warranted to meet the specific requirements, if any, of safety codes of any particular state, municipality, or other jurisdiction, and the Seller doesn't assume any risk or liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

The Seller does not assume nor authorizes any person to assume for them any other liability in connection with the sale or use of the products of beyond that extended herein.

The warranty hereinabove set forth shall not be deemed to cover maintenance parts, including, but not limited to hydraulic oil, motor brushes, or the like. No agreement to replace or repair shall constitute an admission by the Seller of any legal responsibility to effect such replacement to make such repair, or otherwise.

All products sold by the Seller are subject to design and/or appearance modifications, which are production standards at the time of shipment. The Seller may, but shall not be required to, modify or update products shipped prior to a current production standard.

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.

The Seller shall not 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, lost profit, damages for which the Purchaser may be liable to other persons, damage to property, and injury to or death of any persons.

This limited warranty extends only to wholesale customers who buy directly through the Seller's normal distribution channels. The Seller 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.

THE LIMITED WARRANTY OFFERED HEREIN IS THE SOLE AND EXCLUSIVE REMEDY AVAILABLE TO THE PURCHASER. CORRECTION OF DEFECTS, IN THE MANNER AND FOR THE PERIOD OF TIME DESCRIBED HEREIN, SHALL CONSTITUTE THE COMPLETE FULFILLMENT OF ALL LIABILITIES OF SELLER TO THE PURCHASER WITH RESPECT TO THE COVERED PRODUCT, AND SHALL CONSTITUTE FULL SATISFACTION OF ALL CLAIMS, WHETHER BASED ON CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL OR PUNITIVE DAMAGES ARISING OUT OF SELLER'S BREACH OF THIS LIMITED WARRANTY, OR ARISING OUT OF THE CUSTOMER'S INABILITY TO USE THE COVERED PRODUCT, EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to a particular Purchaser. This Limited Warranty gives the Purchaser specific legal rights. The Purchaser may also have other rights, which vary from state to state.

[illegible]

