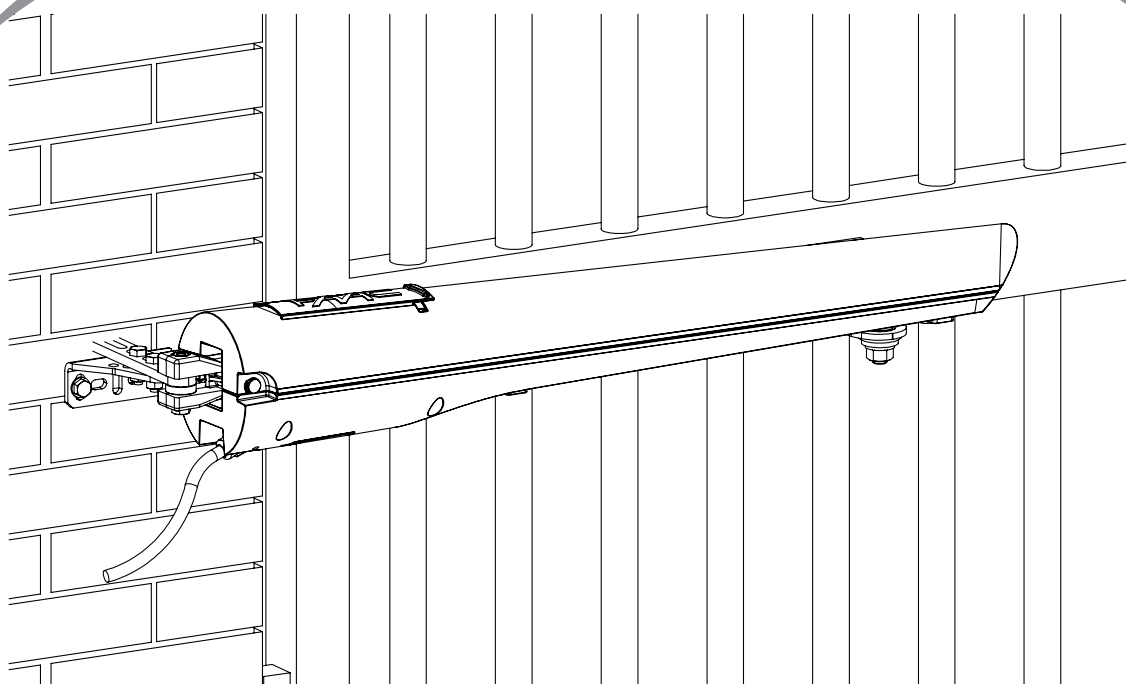


# S418

## Electromechanical Swing Gate Operator



**Intertek**

UL325 - UL991

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# FAAC

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## IMPORTANT SAFETY INFORMATION

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### 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.

*Important Installation Instructions (continued)*

9. For gate operators that utilize a contact sensor (edge sensor or similar):
  - Locate one or more contact sensors where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and post mounted both inside and outside of a vehicular horizontal slide gate
  - Locate one or more contact sensors at the bottom edge of a vehicular vertical lift gate.
  - Locate one or more contact sensors at the bottom edge of a vertical barrier (arm).
  - Locate one or more contact sensors at the pinch point of a vehicular vertical pivot gate.
  - Locate hard-wired contact sensors and wiring so that communication between sensor and gate operator is not subjected to mechanical damage.
  - Locate wireless contact sensors, such as those that transmit radio frequency (RF) signals, where the transmission of signals are not obstructed or impeded by building structures, natural landscaping or similar hindrances. Wireless contact sensors shall function under their intended end-use conditions.
  - Use only FAAC MSE MO, CN60 or M60 edge sensors.

**General Safety Precautions****Gate Construction**

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

For more information, contact ASTM at: [www.astm.org](http://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

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### RESIDENTIAL VEHICULAR GATE OPERATOR CLASS I

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

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### 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.

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### 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.

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### 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.

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## Installing the Warning Signs

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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.



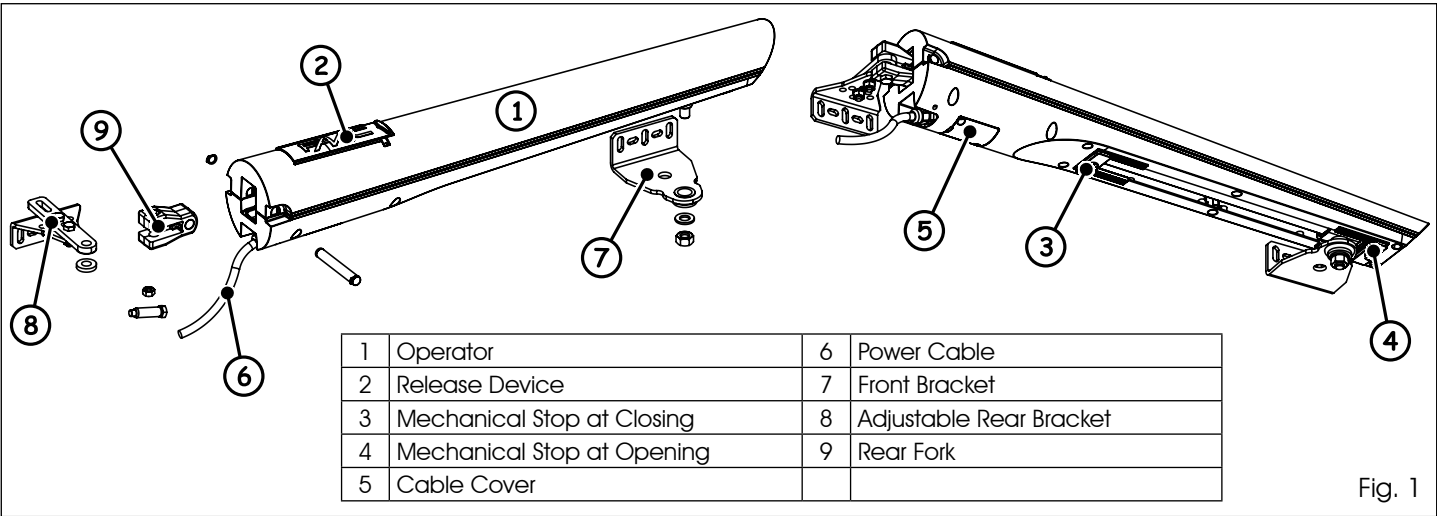
S418 OPERATOR

1. DESCRIPTION AND SPECIFICATION

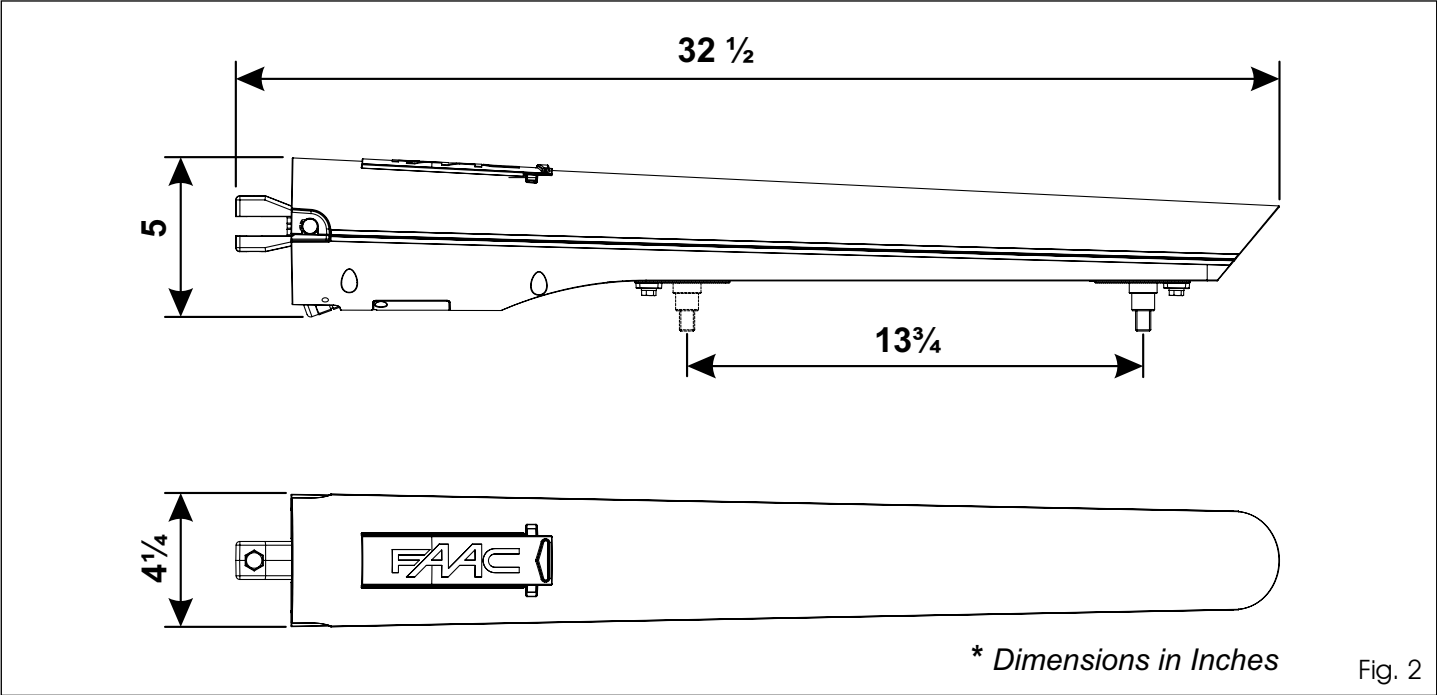
The FAAC 418 is an automatic gate operator for swinging gate leaves. It is designed for residential applications and can accommodate gate leaves up to 12 ft long. The self-contained S418 operator consists of an electric motor that drives a worm screw housed in an aluminum casing.

The non reversible mechanism guarantees the mechanical locking of the leaf when the motor is not operating. An easy-to-use release device allows to move the leaf in case of malfunction or a power outage. The rear bracket is adjustable to guarantee maximum flexibility during the installation phase.

The S418 Operator is designed and built to automate vehicular swing leaf gates. Do not use for any other purpose.



1.1 Dimensions



## 1.2 Technical Specifications

Power Supply	24 Vdc
Nominal Power	35 W
Absorbed Current	1.5 A
Maximum Thrust Force	404 lbf (180 daN)
Stroke	13.8 in (350 mm) <sup>1</sup>
Cycles per day at 68 °F (approx)	80
Class of operation	Residential
Rod speed (inches/sec)	0.7 in/sec (1.8 cm/sec)
Maximum Size of Leaf (feet)	12
Ambient Operating Temperature	4°F +131°F (-20 °C +55°C)
Operator Weight	13.2 lb (6 Kg)
Protection Class	IP54

<sup>1</sup> If the mechanical stops on opening and closing are not used the operator stroke increases to 15.3 in (390 mm)

## 1.3 Electrical Setup

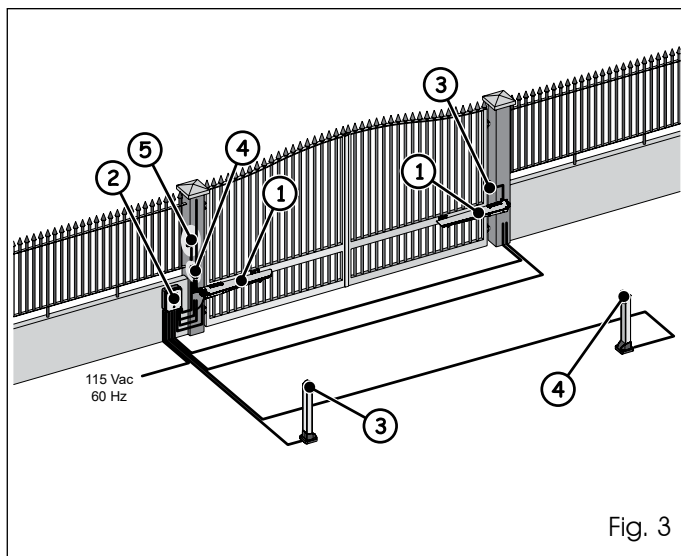


Fig. 3

Part	Description	Cables
1	Operators	2 x AWG 14 (max 30') AWG 12 (max 50') AWG 10 (max 100')
2	Control Unit	3 x AWG 14 (AC Power)
3	TX Photocells	4 x AWG 20
4	RX Photocells	2 x AWG 20
5	Key Switch	2 x AWG 20 (1 contact)

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

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

## 2. INSTALLATION

### 2.1 Preliminary Checks

The structure of the gate directly influences the reliability and safety of the automated system. To ensure correct operation, the structure of the gate must have the following characteristics:

- The length of leaf must conform to what is shown in the technical specifications.
- The structure of the leaves must be sturdy and rigid, suitable for an automated system.
- There must be regular and uniform movement of the leaves, with no friction or sticking along their entire movement.
- Hinges must be solid and in good condition.
- Gate must swing level.

### 2.2 Installation Dimensions

Select the assembly position of the operator on the gate, referring to Figure 4 and the relative table. Choose whether or not to use the built in mechanical positive stops; eliminating the mechanical stops increases the working stroke of the operator and values **A** and **B** must be changed.

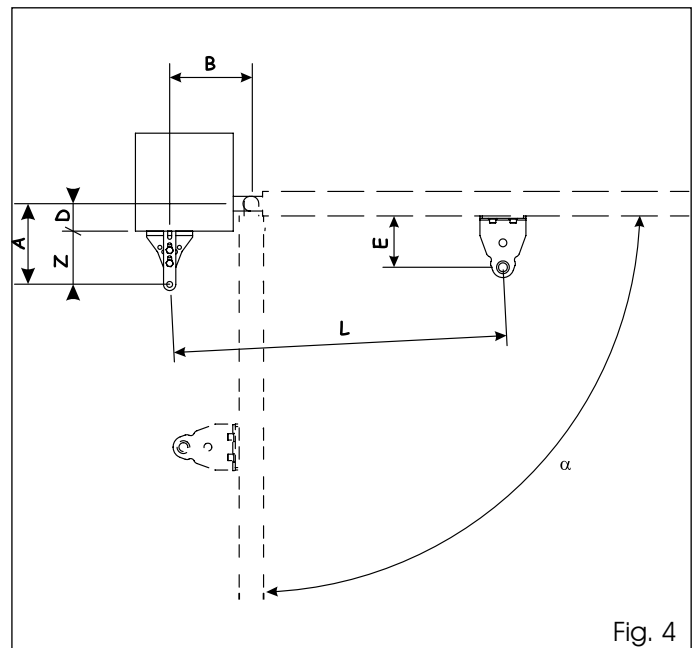


Fig. 4

	$\alpha$	A	B	C <sup>1</sup>	D <sup>2</sup>	Z <sup>3</sup>	L	E <sup>3</sup>
With both stops	90°	6½	6½	13	3½	3	27	4½
		6⅞	6⅞	13¾	3½	3⅞	27	4⅞
With open stop	90°	6⅞	6½	13⅞	4	3	28	4⅞
		7	7	14⅞	4	3⅞	28	4⅞
With no stops	90°	6¼	6¼	14⅞	3½	2¾	28	4⅞
	110°	6⅞	6⅞	15	4	2¾	28	4⅞

Dimensions in Inches

<sup>1</sup> Working stroke of the operator.

<sup>2</sup> Maximum value.

<sup>3</sup> Minimum value.

If pillar dimensions or hinge position do not allow the installation of the operator, cut a niche into the pillar (as shown in Fig. 6) 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.

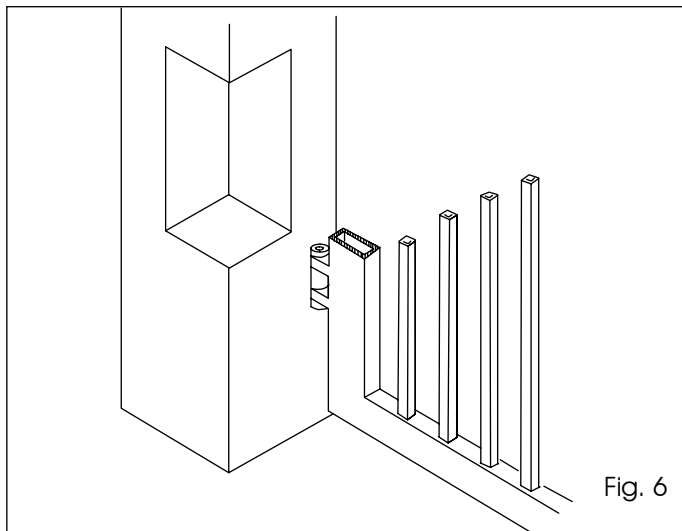


Fig. 6

The rear bracket can be assembled in different configurations to give an array of options to achieve the proper values of the dimensions **A** and **B**.

Fig. 7 shows some of different assembly options of the bracket; all the intermediate positions can also be obtained.

The configuration chosen must permit the assembly of the bracket using both securing bolts.

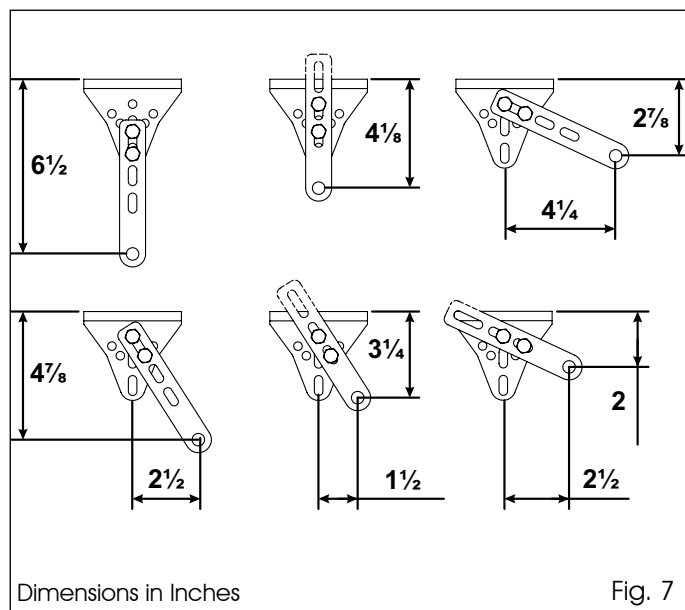


Fig. 7

### 2.2.1 General Rules for Determining Installation Values

- To obtain opening of the leaf to 90°:  $A+B=C$ .
- To obtain opening of the leaf more than 90°:  $A+B<C$ .
- Lower A and B values produce higher peripheral leaf speeds.
- Limit the difference between value A and value B to within 1 1/2 inches, greater differences may cause variations in speed during opening and closing gate movements.
- Maintain a Z value that keeps the operator from hitting the pillar.
- The mechanical stops intervene during the first and final 1 1/2 inches of the stroke. Not utilizing the entire operator stroke could limit the possible adjustments or reduce them to zero.

### 2.3 Installing The Operator

To correctly install the operator, follow the procedure below:

1. Secure the fixed part of the rear bracket in the position determined previously, using a suitable assembly method depending on the material of the pillar. In case of steel pillars the bracket may be welded directly to the them, see Figures 8 and 9.

**IMPORTANT:** make sure that the bracket is perfectly horizontal using a level.

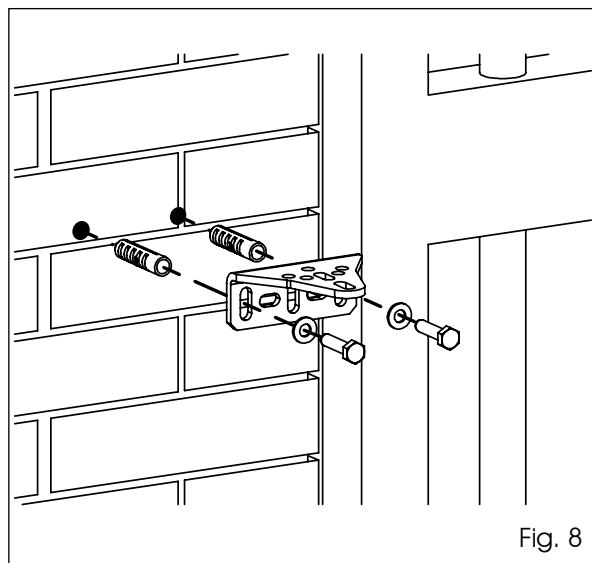


Fig. 8

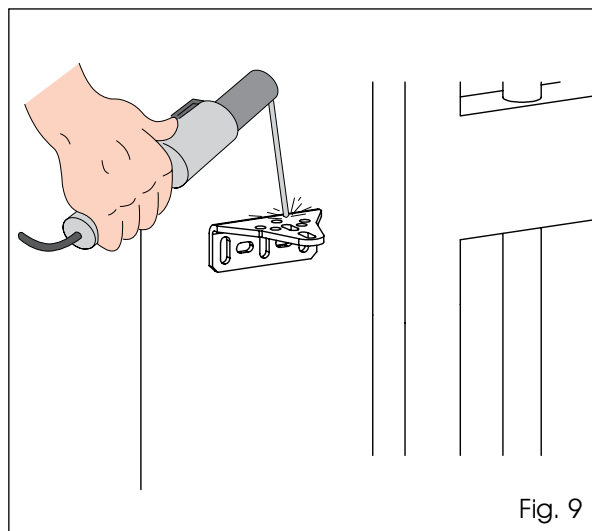
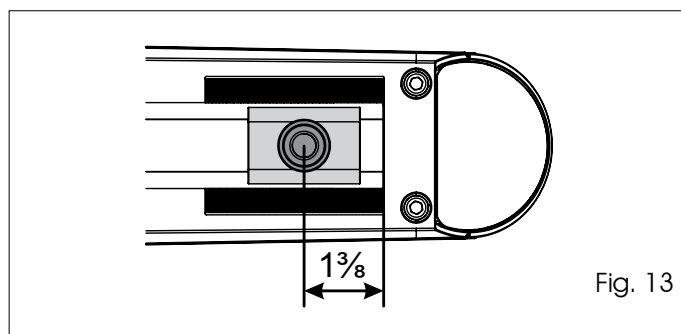
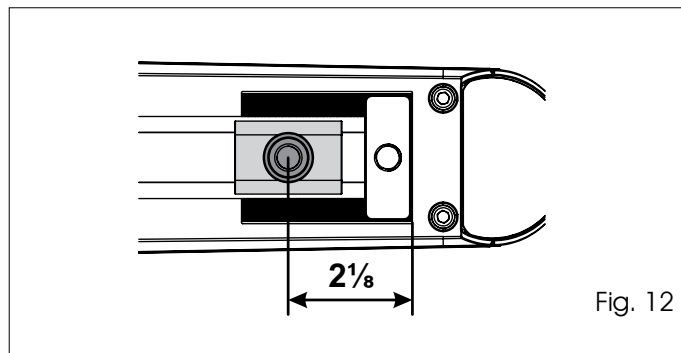
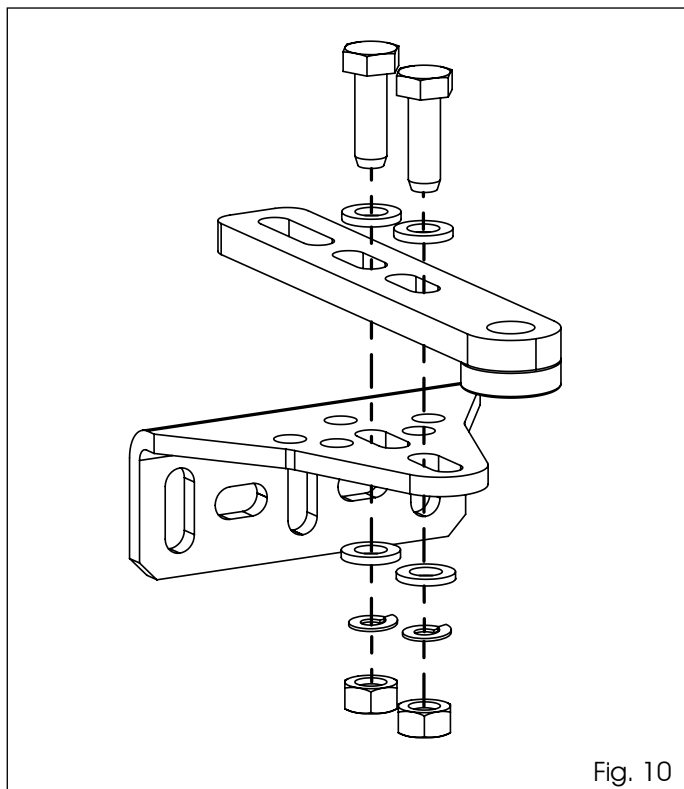


Fig. 9

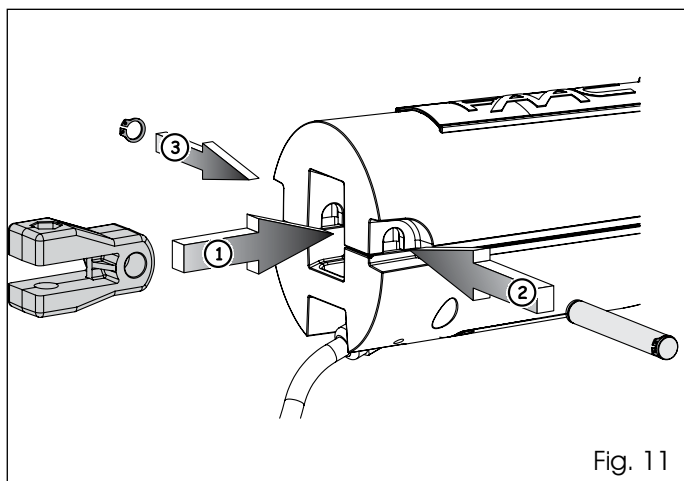


2. Install the rear bracket as shown in Figure 10, so as to follow the A and B values determined previously.



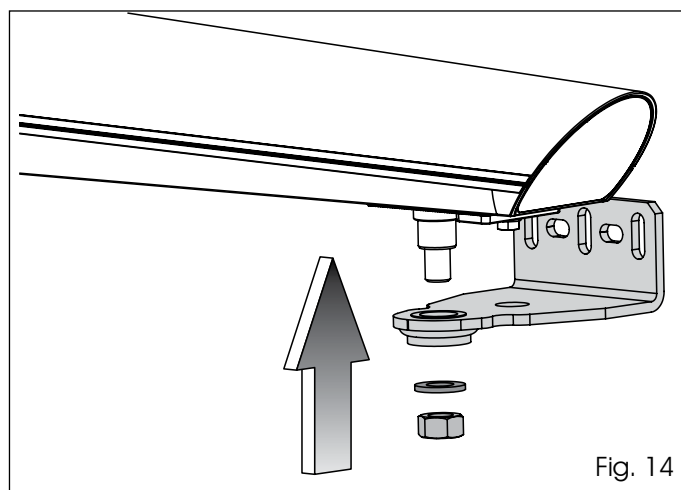
Dimensions in Inches

3. Secure the rear fork of the operator as indicated in Figure 11.



4. Bring the moving part of the operator in the position indicated in Fig. 12 (if the mechanical stop at closing is used) or in Fig. 13 (if no mechanical stop at closing is used). The operator could be temporarily powered with a 12Vdc battery to accomplish this.

5. Secure the front bracket to the operator as indicated in Figure 14.



6. Secure the operator to the rear bracket using the supplied bolt, as indicated in Fig. 15.

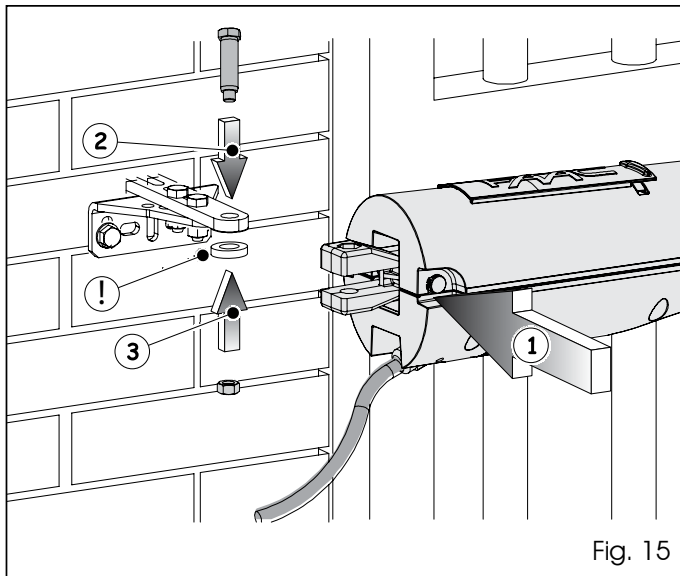


Fig. 15

7. Move the gate leaf to the closed position.
8. Bring the operator, together with the front bracket, alongside the leaf.
9. Check that the operator is horizontal using a level **on the bottom side of the operator as indicated in Fig. 16**, and temporarily secure the front bracket with clamps or two welding spots.

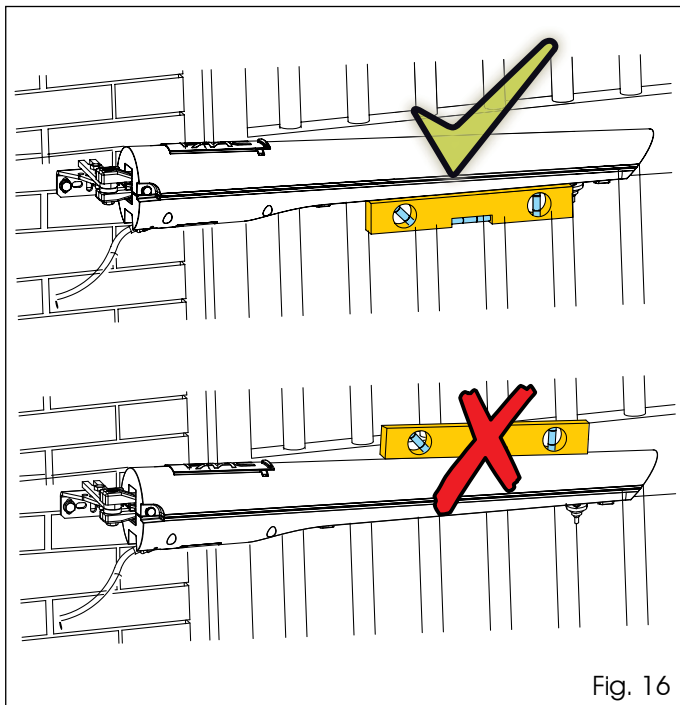


Fig. 16

NOTE: The axis of the holes of the front bracket must be aligned with the axis of the holes of the rear bracket, as shown in Fig. 17.

*If the structure of the gate does not allow reliable mounting of the front bracket it must be reinforced with plates or similar.*

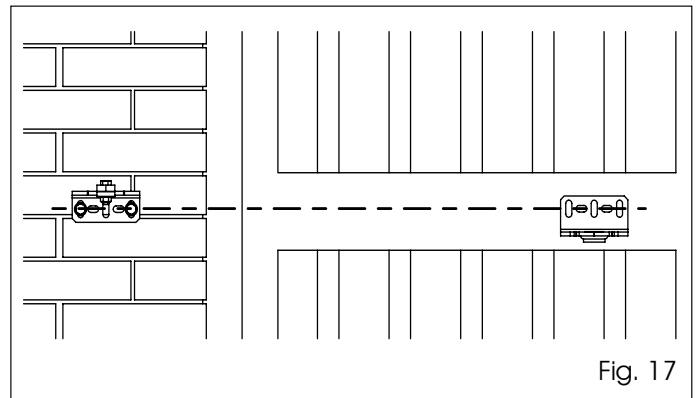


Fig. 17

10. Disengage the operator's manual release (see Par. 3) and move the leaf manually, checking that it completes the entire swing, stopping at the mechanical stops.

*If during this test the operator hits the leaf of the gate, the value **E** may be increased, (see Fig. 4), up to a maximum of 4½ inches, using appropriate spacers placed between the front bracket and the gate's leaf.*

11. Make all the necessary corrections and repeat the procedures from step 9 if needed.
12. Permanently secure the front bracket, using a suitable system as indicated in Fig. 18.

*if the front bracket will be welded directly to the leaf, the operator must be temporarily removed. Wait for the bracket to cool before reattaching the operator.*

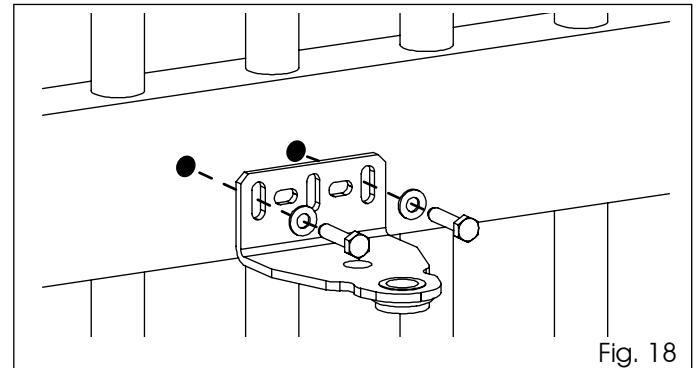


Fig. 18

## 2.4 Wiring The Operator

The operator is supplied with the cable already connected. If the cable has to be replaced, use a UL rated cable for outdoor use.

## 2.5 Mechanical Stops

The S418 operator is supplied with mechanical stops on opening and closing as standard. These may be used in place of mechanical stop-points for the leaf. For adjustment of the stops, proceed as follows:

### 2.5.1 Mechanical Stop at Opening

1. Disengage the operator's manual release (see Par. 4).
2. Manually move the leaf into its opening position.
3. Loosen the bolt, Fig. 19 ref. 1. The bolt does not need to be completely removed.

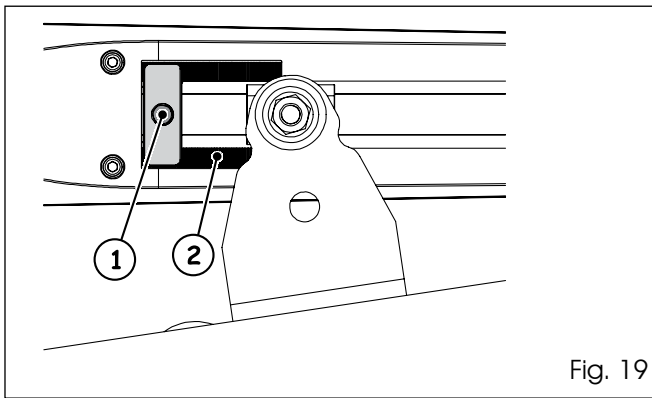


Fig. 19

4. Move the mechanical stop until it is close to the back side of the bracket, as indicated in Figure 20.

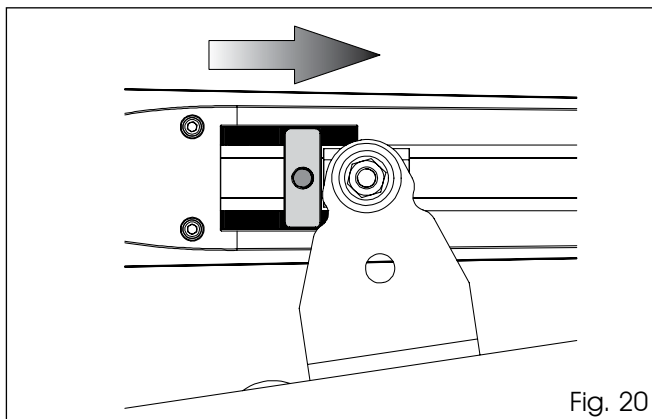


Fig. 20

5. Tighten the bolt.

*The mechanical stop is coupled to a toothed section on the operator's body, Fig. 19 Ref. 2. In case of difficulties moving the stop check that the coupling is free. **Do not force it.***

### 2.5.2 Mechanical Stop at Closing

1. Disengage the operator's manual release (see Par. 3)
2. Manually move the leaf into its closing position.
3. Loosen the bolt, Fig. 21 ref. 1. The bolt does not need to be completely removed.

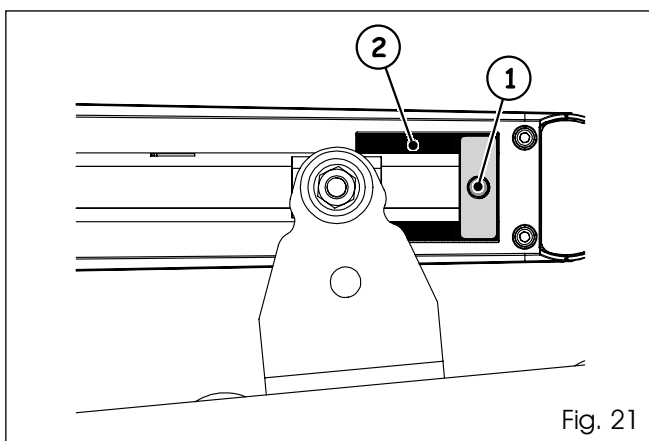


Fig. 21

4. Move the mechanical stop until it is close to the front side of the bracket, as indicated in Fig. 22.
5. Tighten the bolt.

*The mechanical stop is coupled to a toothed section on the operator's body, Fig. 21 Ref. 2. In case of difficulties moving the stop check that the coupling is free. **Do not force it.***

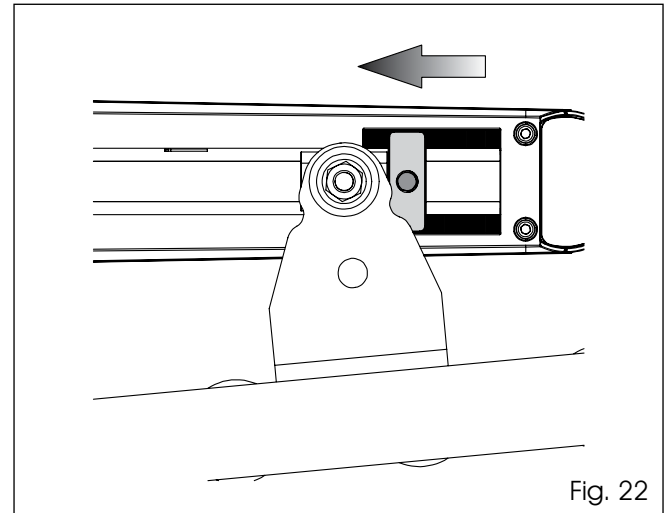


Fig. 22

## 3. MANUAL OPERATION

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

1. Turn power off at the main breaker and disconnect the backup battery if present.
2. Slide off the protective cap, Fig. 23 Ref. 1.
3. Insert the supplied release key, Fig. 23 Ref. 2, and turn it counter-clockwise until it stops, Fig. 23 Ref. 3. The release position is indicated by an open padlock.
4. Move the leaf manually.

**NOTE:** To keep the operator in manual mode the release device should be left in its current (unlocked) position and main power should be kept off

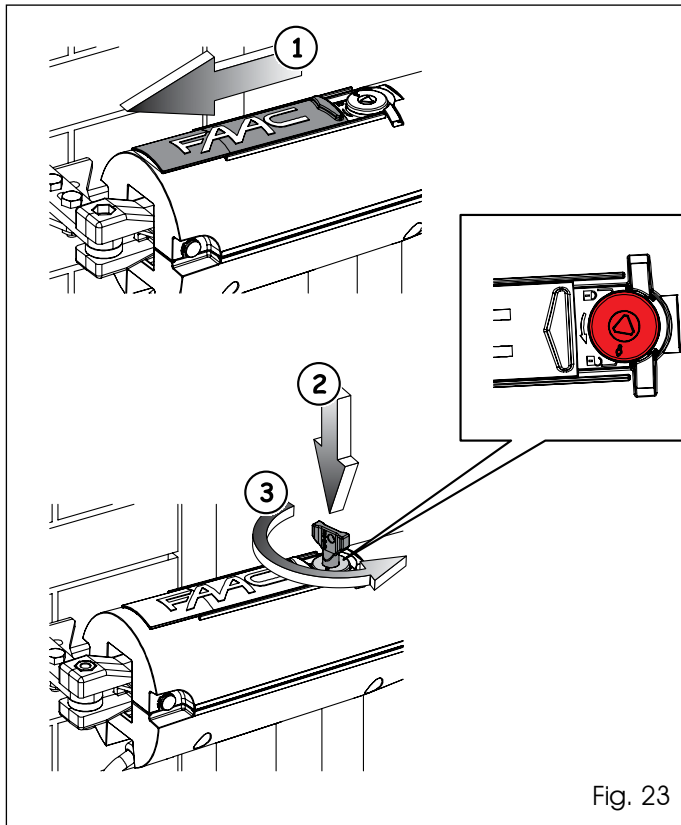


Fig. 23

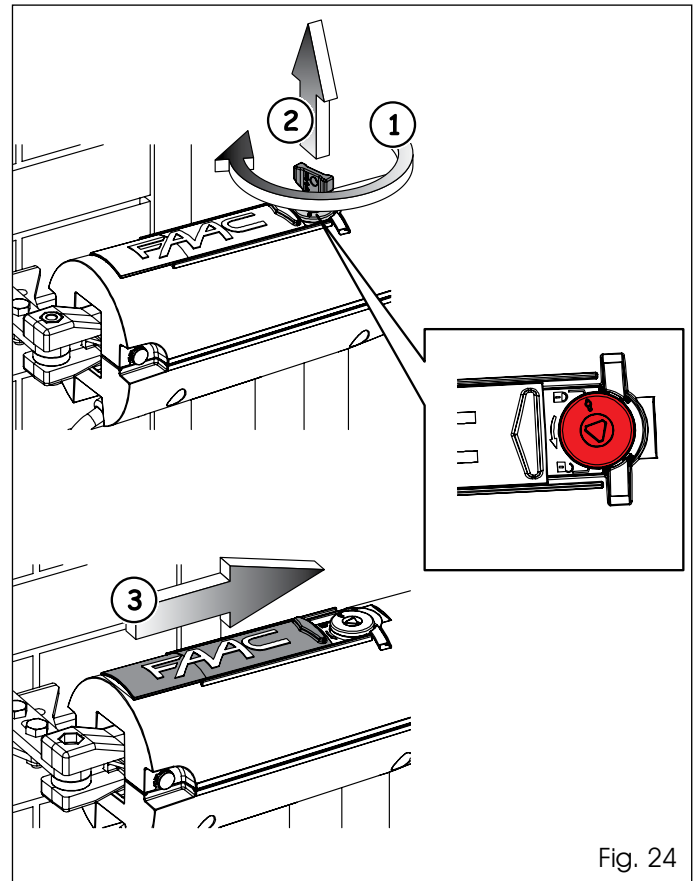


Fig. 24

### 3.1 Restoring Normal Operation

To restore normal operation mode, proceed as follows:

1. Turn power off at the main breaker and disconnect the backup battery if present.
2. Turn the release key clockwise until it stops, Fig. 24 Ref. 1, and remove the key, Fig. 24 Ref. 2. The locking position is indicated by a closed padlock.
3. Close the protective cap, Fig. 24 Ref. 3.
4. Manually move the leaf until the device engages and the leaf locks.
5. Power up the system and perform several open/close operations to check that the automated system works normally.

**NOTE:** During the first cycle, the operator might not slow down correctly. Wait for the end of the cycle and then give the opening command once again.

## 4. MAINTENANCE AND REPAIRS

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

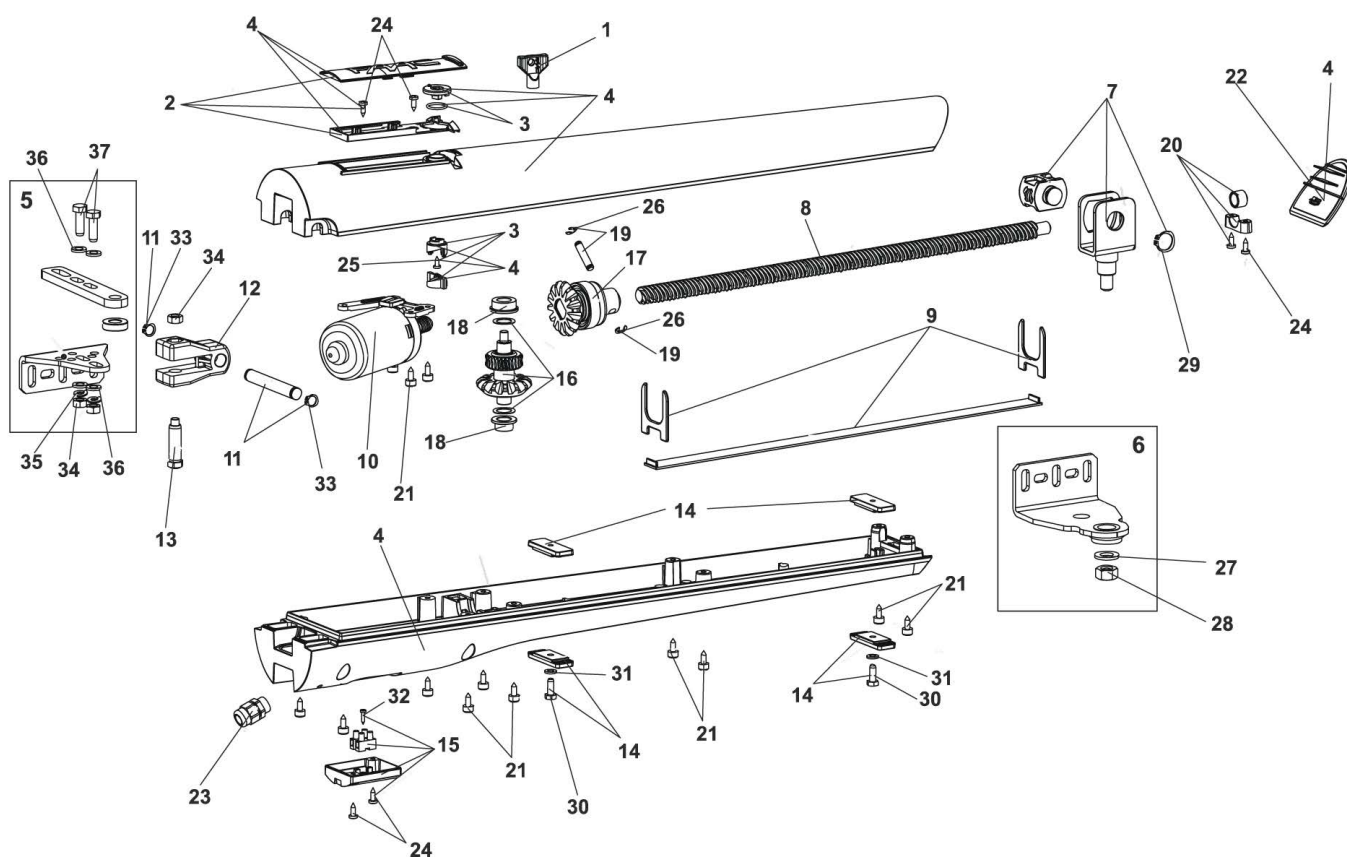
Check that the electronic force setting on the control board is adjusted correctly and that the manual release mechanism is fully functional.

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

### Repairs

For repairs, refer to FAAC authorized service centers.

## 5. SPARE PARTS DIAGRAM



Part	Part Number	Description
01	713002	Manual Release Key
02	63001555	Manual Release Cover
03	63001565	Manual Release Assembly
04	63001575	Operator Body
05	63002565	Bracket Kit (front and rear bracket come in the same kit)
06		
07	63001595	Lead Nut
08	63001525	Screw
09	63001605	Screw Cover
10	63001615	Motor
11	718366	Long Pin
12	7228015	Rear Fork
13	7182075	Short Pin
14	63001625	Mechanical Stop
15	63001635	Harness Cover
16	60202215	Tensioning Set
17	60202225	Output Shaft
18	60202165	Bushing

Part	Part Number	Description
19	718367	Pin With C Clip
20	60202355	Worm Gear Bushing
21	63001545	Screws $\varnothing 4.8 \times 13 \text{ mm}$
22	63001535	Front Cap
23	n/a	Cable Gland M16 x 1.5
24	701459	Self Tapping Screw 3.5x13 mm
25	701405	Self Tapping Screw 3.5x9.5 mm
26	704049	C Clip E 6
27	n/a	Washer 13 x 2.5 mm
28	702102	Nut ES 8
29	n/a	C Clip E 18
30	701110002	Screw 6 x 16 mm
31	703103	Lock Washer 6
32	701418	Self Tapping Screw 2.9 x 13mm
33	704002	C-clip E 10
34	702106	Nut ES. 8
35	703104	Lock Washer 8
36	n/a	Washer 8.4 x 1.6 mm
37	701122002	Screw 8 x 25 mm

## 1. E024U CONTROL BOARD DESCRIPTION & CHARACTERISTICS

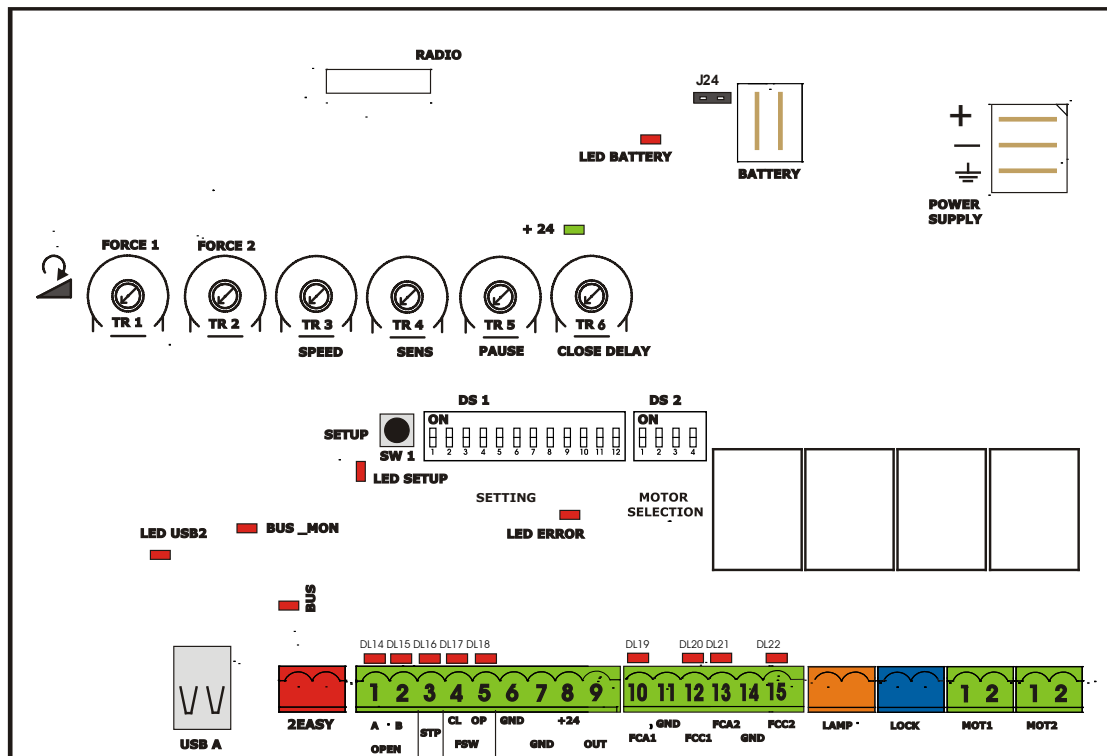


Fig. A1

### 1.1 TECHNICAL SPECIFICATIONS

Main power supply	115 V~ 60 Hz
Secondary power supply	24 Vdc - 16 A max. (min. 20 Vdc. - max. 36 Vdc.)
Power consumption	stand-by = 4W    max. = 400 W
Max load per motor	7 A
Accessory power supply	24 Vdc - 500 mA
Battery charge current	150 mA
Operating temperature	-4 °F +131 °F (-20 °C +55 °C)
Protection fuses	All self-resetting
Main power fuse	6.3 A Timed
Operating Logics	E, A, S, EP, AP, SP, B, C
Operating time out	10 min.
Pause time	Programmable (0 to 4 min) with trimmer
Motor force, speed, obstacle sensitivity, closing delay	Programmable with dedicated trimmer
Connector inputs	Power supply, Battery, Radio receiver, USB
Terminal strip inputs	Encoder, Open A, Open B, Stop, Open safety photocell, Closing safety photocell, Limit switches
Terminal strip outputs	Audio Alarm, Lock, Motors, Accessory power supply
Programming	With trimmers, dipswitches and pushbutton

### 1.2 LAYOUT AND COMPONENTS

RADIO	Connector for the radio receiver
BATTERY	Connector for the backup battery
J24	Jumper to disable battery charging (With the jumper present the battery charger is enabled)
POWER SUPPLY	DC Power supply input
TR1 to TR6	Programming Trimmers
+24 LED	DC power indicator
SW1 - SETUP	Pushbutton for automatic setup
DS1 - DS2	Programming dipswitches
LED ERROR	Troubleshooting indicator
USB A	USB connection for software upgrade

### 1.3 RADIO CONNECTION

On the radio connector it's possible to plug in receivers RP and RP2. With a single channel radio RP it will be possible to activate only the OPEN A input, with a dual channel radio RP2 it will be possible to activate both OPEN A and OPEN B inputs. Plug in the radio board with the component side towards the internal part of the board.



Make sure you insert or disconnect the board ONLY with the power off.

## 2. INPUT / OUTPUT DESCRIPTION

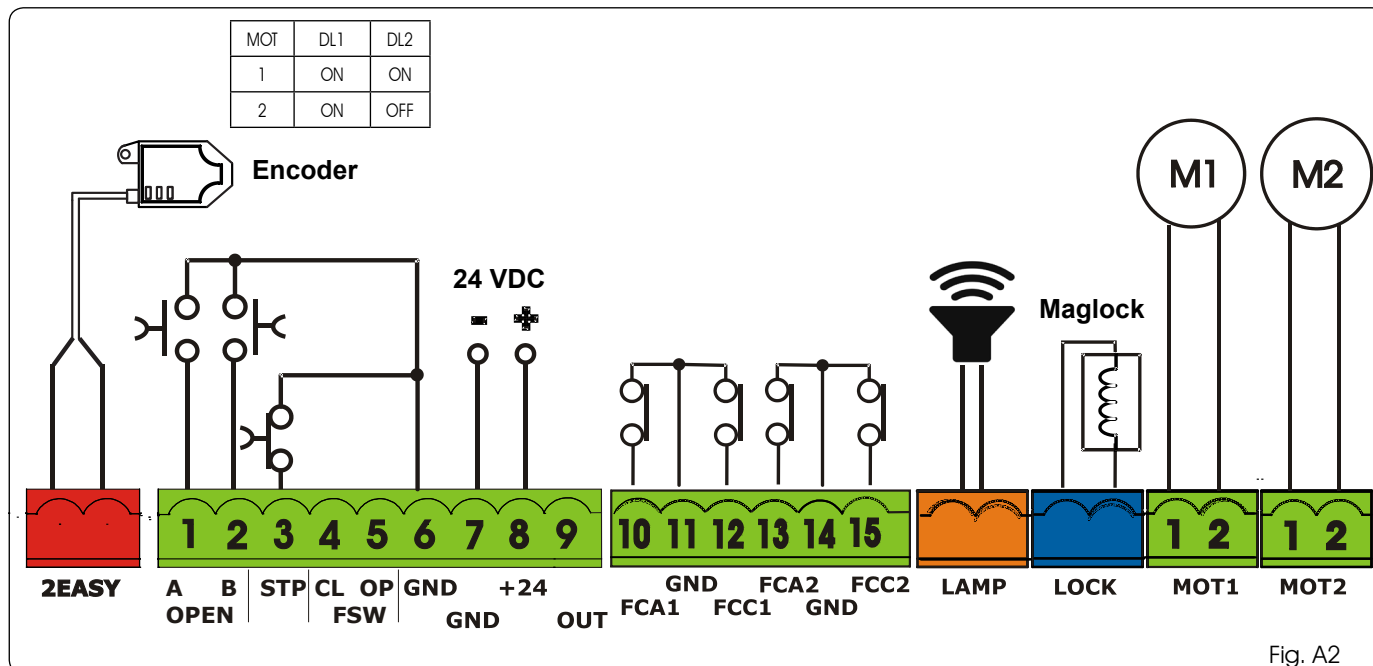


Fig. A2

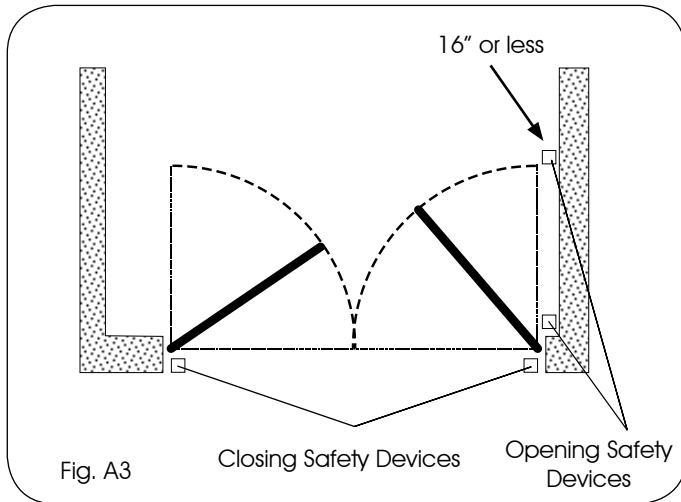
PIN	LABEL	FUNCTION
2 EASY	2 EASY	2easy BUS input for encoders (S800H and S450H only), XIB and loop detector boards
1	OPEN A	N.O. Contact for total opening command
2	OPEN B / CLOSE	OPEN B: N.O. Contact for opening of leaf 1 only (with only one leaf the opening stops at 50% of traveling) CLOSE (LOGIC B-C): N.O. Contact for closing command
3	STOP	N.C. Contact for stop command
4	FSW CL	N.C. Contact for closing safety
5	FSW OP	N.C. Contact for opening safety
6	GND (-)	24 Vdc negative
7	GND (-)	24 Vdc negative
8	+ 24	24 Vdc positive
9	OUT (-)	24 Vdc negative for warning lamp (DS1 SW12=OFF) 24 Vdc negative for safety TX photocell (monitored) (DS1 SW12=ON) <b>IMPORTANT: for UL325 compliance the negative TX photocell option must be used</b>
10	FCA 1	Open limit switch Motor 1
11	GND (-)	24 Vdc negative
12	FCC 1	Close limit switch Motor 1
13	FCA 2	Open limit switch Motor 2
14	GND (-)	24 Vdc negative
15	FCC2	Close limit switch Motor 2
LAMP	LAMP	Audio Alarm output (DS1 SW11 =OFF) Output for flashing light 24Vdc 15W max (DS1 SW11 =ON) <b>IMPORTANT: for UL325 compliance the Audio Alarm option must be used</b>
LOCK	LOCK	Output for electrical lock, max 5A pulse (DS2 - SW 4=OFF) 12 Vac / 24Vdc Always ON (maglock): max 1 A (DS2 - SW 4=ON) 24 Vdc
MOT1	MOT 1	Motor 1 output ( first moving motor )
MOT2	MOT 2	Motor 2 output ( second moving motor )
USB A	USB	Firmware upgrade input

### 3. SAFETY DEVICE CONNECTIONS

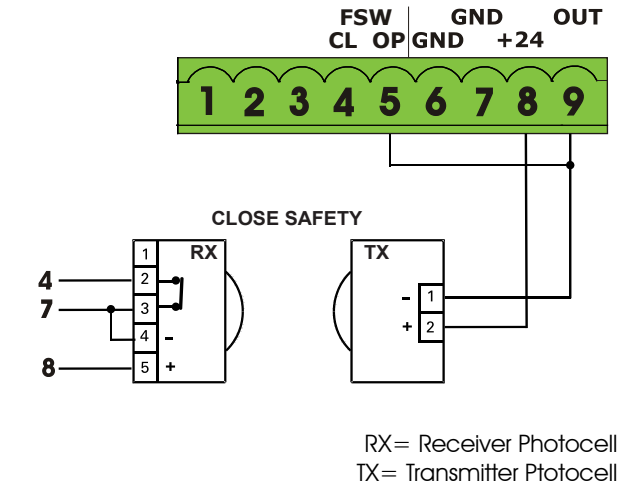
#### Entrapment protection

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 E024U control boards design, the other can be external, like a photocell or an edge sensor.

See this picture for the photocells positioning:



#### Connection of One Pair of Monitored Closing Photocells



#### 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

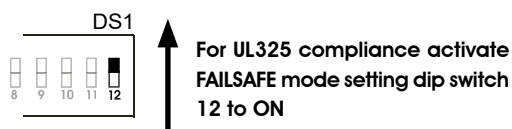
#### Closing Safety Devices:

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

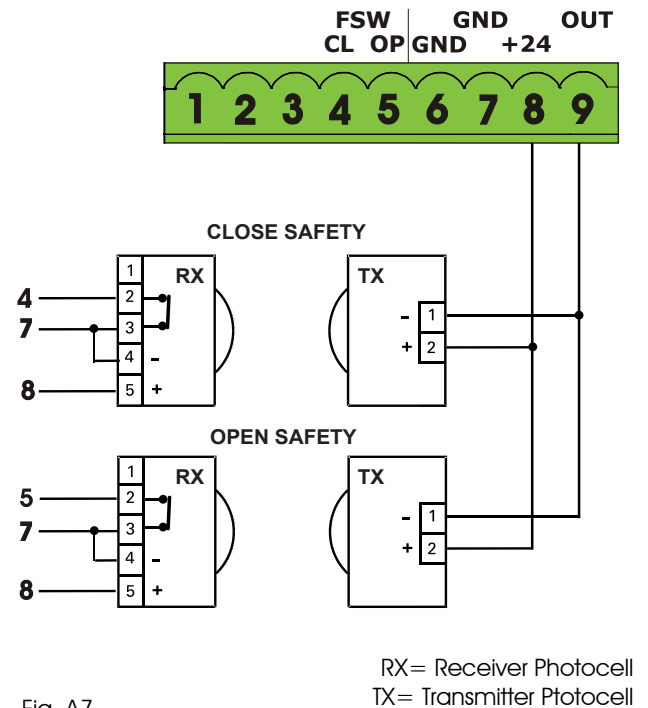
#### Monitored Devices:

Additionally the UL325 standard requires that every external entrapment protection device must be monitored for presence and correct operation. To comply with this requirement the FAILSAFE function must be activated. This function tests the photocells before each movement of the operator. In case the test fails the movement is inhibited. To activate this function set the dip-switch 12 of DS1 ON, and connect the negative of the transmitter to the OUT pin (No.9).

See Fig. A6, A7, A8, A10 for wiring examples.



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



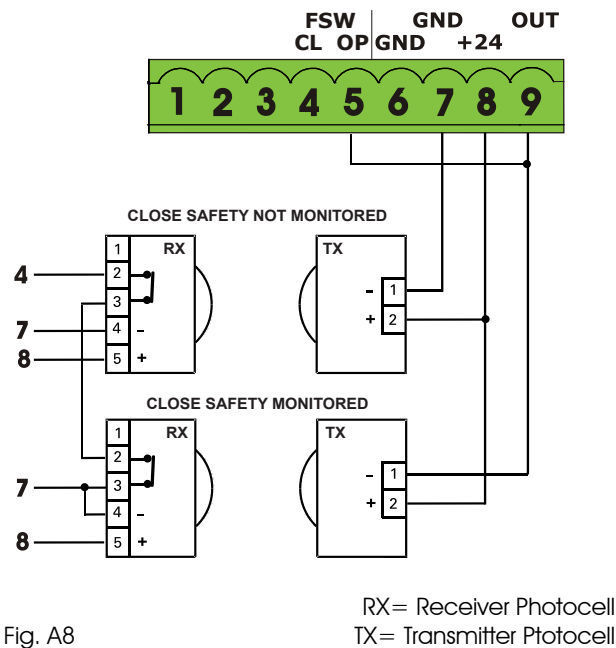


Only one monitored photocell can be connected to the Closing or Opening safety inputs. More than one photocell or other device can be connected to the safety inputs, but they will not be monitored.

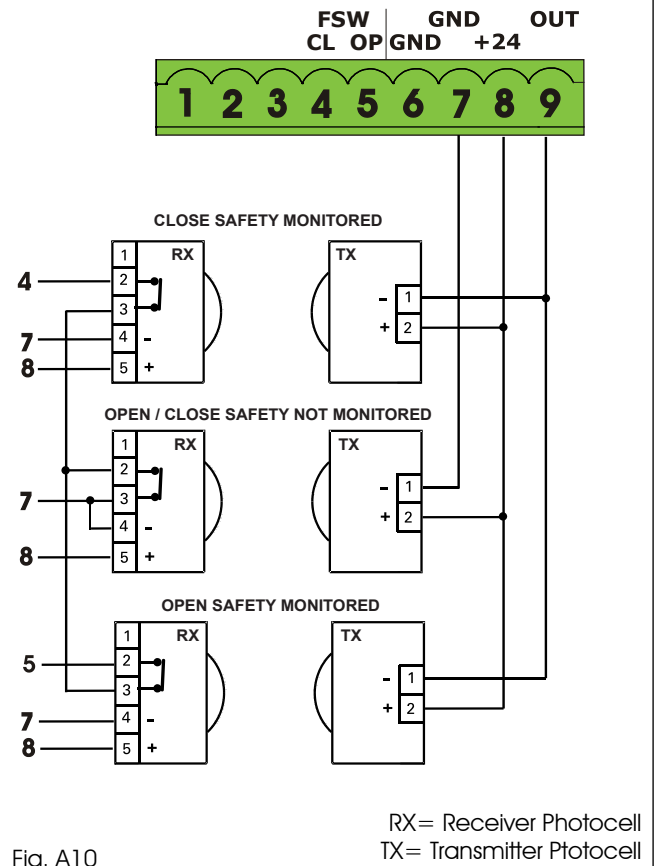
Other devices connected to the safety inputs must have normally closed contacts and wired in series with the main monitored sensor.

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

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

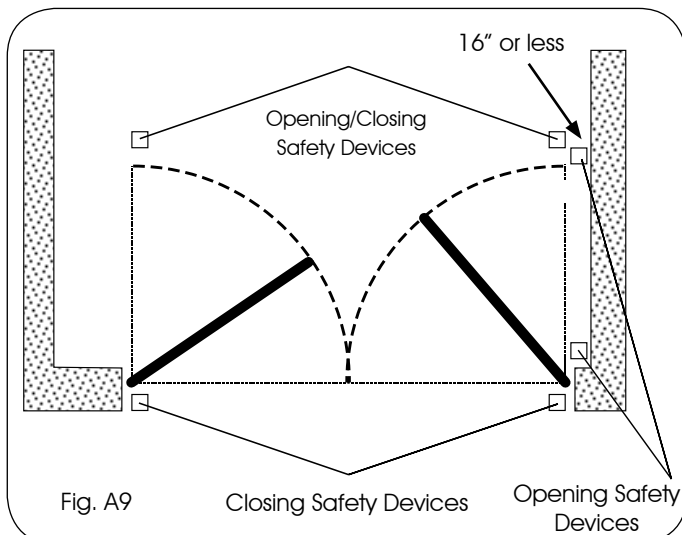


**Connection of One Pair of Closing Photocells (monitored), One Pair of Opening Photocells (monitored) and One pair of Opening/Closing Photocells (non monitored)**




### Opening/Closing Safety Devices:

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



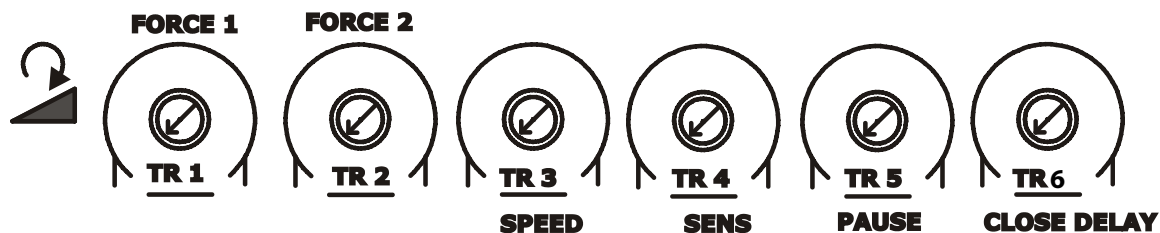
## 4. PROGRAMMING

### 4.1 DIP SWITCH DS1 SETTINGS FOR OPERATING LOGIC

OPERATING LOGIC					
DS 1: SW 1 - SW 2 - SW 3					
LOGIC	SW 1	SW 2	SW 3	PAUSE TIME	DESCRIPTION
E (default) Semiautomatic	OFF	OFF	OFF	NO	One command opens, the next one closes. A command during opening stops the gate
A Automatic	ON	ON	ON	0 - 4 min	One command opens, waits for the pause time an then closes automatically
S Security	OFF	OFF	ON	0-4 min	One command opens, waits for the pause time and then closes automatically. If the closing safety is activated or another command is given during the pause time it closes. A maintained open command will not hold the gate open
EP Semiautomatic step by step	OFF	ON	OFF	NO	One command opens, the next one closes. During the movement a command stops the gate
AP Automatic step by step	OFF	ON	ON	0-4 min	One command opens, waits for the pause time and then closes automatically. A command during the pause time holds the gate open
SP Security step by step	ON	OFF	OFF	0-4 min	One command opens, waits for the pause time and then closes automatically. If the closing safety is activated during pause time the gate closes in 5 s. A command during pause time holds open the gate
B Manned Pulsed	ON	OFF	ON	NO	An open A command opens the gate, an open B command closes the gate
C Manned Constant	ON	ON	OFF	NO	Holding open A active opens the gate, holding Open B active closes the gate

For more details on the operating logics please refer to Chapter 11 - Function Logics

## 4.2 ADJUSTING TRIMMERS



### TR1 – FORCE ADJUSTMENT MOTOR 1

Turn clockwise to increase the opening and closing force

### TR 2 – FORCE ADJUSTMENT MOTOR 2

Turn clockwise to increase the opening and closing force

### TR 3 – SPEED ADJUSTMENT FOR MOTOR1 AND MOTOR 2

Turn clockwise to increase the opening and closing speed

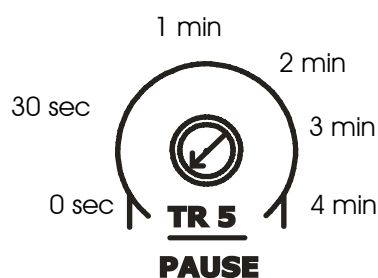
### TR 4 – SENSITIVITY ADJUSTMENT FOR OBSTACLE DETECTION FOR MOTOR 1 AND MOTOR 2

Turn clockwise to increase the sensitivity for obstacle detection.

See Par. 6.3 for more details about the obstacle detection feature

### TR 5 – PAUSE TIME ADJUSTMENT ( 0 - 4 min. )

Turn clockwise to increase the pause time.



Dip switches DS1: 1 to 3 need to be set for an operating mode with PAUSE time for this adjustment to have any effect

### TR6 - CLOSING DELAY OF LEAF 1 OVER LEAF 2 ADJUSTMENT ( 0 - 15 sec )

Turn clockwise to increase the delay

### 4.3 DIP SWITCH DS1 SETTINGS FOR BOARD SETUP

BOARD SETUP DS 1: SW 4 to SW 12			
OPENING DELAY	SW 4	The opening of leaf 2 is delayed after the opening of leaf 1. This is to avoid that the gate's leaves interfere with each other during the initial part of the movement. In case there is only one leaf it has no effect.	
0 sec (default)	OFF		
2 sec	ON		
REVERSE AND LAST STROKE	SW 5	If active, before opening, while the gate is closed, the motors thrust to close for 2 s to facilitate the release of the electric lock. At closing the motors are activated for a final stroke after slowdown to facilitate locking of the electric lock.	
inactive (default)	OFF		
active	ON		
MAX THRUST AT STARTUP	SW 6	With this function active the motors work at maximum force at startup (regardless of the force setting) during the initial phase of the movement. Useful for heavy leaves	
inactive (default)	OFF		
active for 3 sec	ON		
AUTOMATIC OPENING IN CASE OF POWER FAILURE	SW 7	If active and with the optional backup battery installed, the board will open the gate after one minute from the power failure and keep it open. Within the minute wait it's always possible to open and close the gate with a command. If the logic used has a pause time the board will close the gate when the power comes back.	
inactive (default)	OFF		
active	ON		
CLOSING SAFETY LOGIC	SW 8	With this function you can choose the behaviour of the closing safety. With SW8 OFF the gate movement will be reversed as soon as the safety is active, with SW8 ON the gate will stop when the safety is active and it will reverse only when the safety is deactivated again.	
immediate reverse (default)	OFF		
reverse when cleared	ON		
PREFLASHING	SW 9	This function activates the flashing lamp for 5s before the movement of the gate	
inactive (default)	OFF		
active for 5 sec	ON		
EXTRA SENSITIVITY TO OBSTACLE DETECTION	SW 10	If active this function allows to have an immediate reverse in case the gate hits a rigid obstacle. This function increases the safety of the gate operator, however it can generate unwanted obstacle detections.	
inactive (default)	OFF		
active	ON		
ORANGE TERMINAL FUNCTION	SW 11	If OFF after the second consecutive obstacle detection this output is activated until the STOP contact is open or the power is cycled if ON the output can be connected to a warning lamp. <b>IMPORTANT: for UL325 compliance this switch must be OFF</b>	
Audio Alarm (default)	OFF		
Warning Lamp	ON		
OUT FUNCTION (pin 9) max 100mA	SW 12	if OFF: use pin 9 as power supply negative for a warning lamp. The lamp will be active during opening, pause and stop. Flashing during close, off when the gate is closed If ON: use pin 9 as power supply negative for the safety photocells. Before any movement the board will check for the presence of the safety photocells. If the test fails the gate will not move. <b>IMPORTANT: for UL325 compliance this switch must be ON</b>	
Lamp	OFF		
Photocells FAIL SAFE active	ON		

4.4 DIP SWITCH DS2 SETTINGS FOR OPERATOR TYPE AND LOCK MODE

ON

1

2

3

4

5

6

7

8

9

10

11

12

ON

1

2

3

4

DS2

IMPORTANT

DS 2			
OPERATOR SELECTION			
OPERATOR TYPE	SW 1	SW 2	SW 3
S450H, S800H	OFF	OFF	OFF
S418	OFF	OFF	ON
415, 390, 770	ON	OFF	OFF

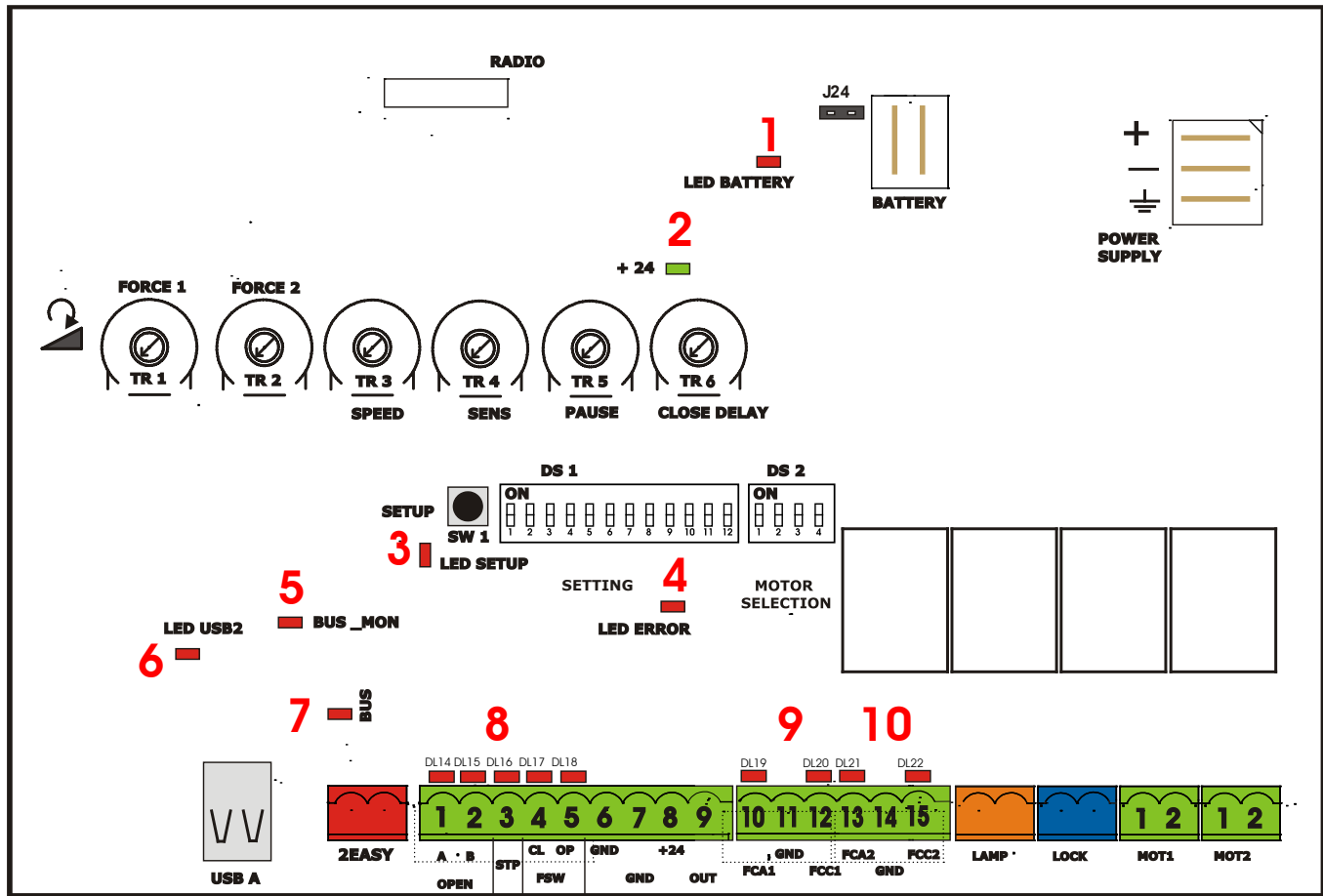
DS 2	
LOCK OUTPUT MODE	
OUTPUT MODE	SW 4
Active only for 3 sec. after an open impulse (from gate closed)	OFF
Active always except 3 sec. before an opening	ON

LAMP

LOCK

MOT1

5. LED DIAGNOSTICS



LED D	DESCRIPTION	LED STATUS		
		In BOLD the normal state with gate closed and working		
		ON STEADY	OFF	BLINKING
1	LED BATTERY	Board working on AC power	Board working on battery power or ext supply	Battery charging
2	LED +24	<b>Main power present</b>	Main power OFF	
3	LED SET-UP		<b>Normal operation</b>	SLOW BLINK (1 sec. ON - 1 sec. OFF) SET-UP needed
				FAST BLINK (0.5 sec. ON - 0.5 sec OFF) SET UP in in progress
4	LED ERROR	Board malfunction. See possible causes below	<b>No errors</b>	Error conditions. See LED ERROR DISPLAY table
5	LED BUS_MON	<b>Communication on Bus "2easy" OK</b>	Communication bus "2Easy" inactive. Verify the bus "2Easy" devices for shorts	Bus 2Easy devices with the Same address. Verify dip switch Setting on photocells or Encoder LEDs
6	LED USB		<b>Software update done or USB key not present</b>	USB key inserted and software Update in progress (DON'T Remove the USB key)
7	RESERVED			
8	LED DL 14 OPEN A INPUT (N.O.)	OPEN A active	<b>OPEN A not active</b>	
	LED DL 15 OPEN B INPUT (N.O.)	OPEN B active	<b>OPEN B not active</b>	
	LED DL 16 STOP INPUT (N.C.)	<b>STOP non active</b>	STOP active or wiring error	
	LED DL 17 FSW CL INPUT (N.C.)	<b>Closing safety devices clear</b>	Closing safety devices triggered or wiring error	
	LED DL 18 FSW OP INPUT (N.C.)	<b>Opening safety devices clear</b>	Opening safety devices triggered or wiring error	
9	LED DL 19 FCA1: OPEN LIMIT SWITCH MOT1 (N.C.)	<b>Limit switch OFF or not used</b>	Limit Switch activated	
	LED DL 20 FCC1: CLOSE LIMIT SWITCH MOT1 (N.C.)	Limit switch OFF or not used	<b>Limit Switch activated</b>	
10	LED DL 21 FCA2: CLOSE LIMIT SWITCH MOT2 (N.C.)	<b>Limit switch OFF or not used</b>	Limit Switch activated	
	LED DL 22 FCC2: CLOSE LIMIT SWITCH MOT2 (N.C.)	Limit switch OFF or not used	<b>Limit Switch activated</b>	

BOARD MALFUNCTION ERROR POSSIBLE CAUSES	SOLUTIONS
There were two consecutive obstacle detections (the audio alarm also should sound)	Remove obstructions
One of the motor driver components has failed	The board needs to be repaired
The idle current in one of the motors is out of range	Check the motors
Both limit switches are active at the same time	Check the limit switches
Input voltage from the power supply is out of range	Check DC input voltage

The diagnostic LED shows only one error condition at a time, with the priority of the below table. In case there is more than one error once one is eliminated the LED will show the next

LED ERROR DISPLAY		
NUMBER OF FLASHES	ERROR CONDITION	SOLUTION
1	OBSTACLE DETECTION	Remove the obstacle, Check force and sensitivity settings
2	BOARD IN SLEEP MODE (Slow blinking means that the automatic open in case of power failure function is active)	Verify the presence of AC power
3	MOTOR 1 FAILURE	Inspect wiring to motor. If the wiring is good replace motor 1
4	MOTOR 2 FAILURE	Inspect wiring to motor. If the wiring is good replace motor 2
5	ENCODER on motor 1 or motor 2 error	<ul style="list-style-type: none"> <li>Verify the encoder wiring and LED status. If they are correct replace the encoder</li> <li>Verify motor and encoder wire gauge are correct</li> <li>Verify operator is not on manual and hydraulic units don't need to be bled</li> </ul>
6	FAIL SAFE FAILED	Verify the photocells wiring and alignment
7	BOARD THERMAL PROTECTION ACTIVE	Turn off the board and wait until the components cool down
8	MAX RUN TIME REACHED WITHOUT FINDING THE POSITIVE STOP (10 min. )	<ul style="list-style-type: none"> <li>- Verify that the operator manual release is not engaged</li> <li>- Verify that the board recognizes the mechanical stop, in case redo the setup procedure</li> </ul>

## 6. TIME LEARNING (SET-UP)

After powering up the board for the first time or when the board will need it the setup LED will blink at a slow frequency to indicate that the setup procedure to learn the running times is needed.

The setup can be redone at any time by pressing and holding the setup button as indicated below. The setup cannot be done until the safeties and stop inputs are wired.

After the setup first movement, if the leafs are opening instead of closing you need to reverse the wires going to the motor that moves in the wrong direction

### 6.1 AUTOMATIC TIME LEARNING

WARNING: If the time learning setup is done automatically then the slow down points are set by the board on his own

#### Move the leafs to the mid position Very important for a good result

- Press and hold the SETUP button until the SETUP LED lights up, wait about 3 sec. until it turns off and then release it immediately. NOTE: If you wait too long to release it the manual set-up will start. The LED will blink during the setup procedure
- Leaf 2 (if present) starts to move slowly in closing direction, stopping when it reaches the mechanical stop or FCC2.
- Leaf 1 begins to move slowly in closing direction, stopping when it reaches the mechanical stop, or FCC1.
- Leaf 1 starts to move slowly in opening direction, followed by leaf 2 (if present) still slowly.
- When they both reach the open mechanical stop or FCA1 and FCA2 they stop and reverse, leaf 2 (if present) automatically starts closing at full speed followed by leaf 1.
- When they reach the close mechanical stop or FCC1 and

FCC2 both leafs stop and leaf 1 restarts automatically opening at full speed followed by leaf 2 (if present).

- If you selected an automatic logic the board will wait for the pause time and then closes the gate automatically. Otherwise you have to give an OPEN command to close the gate.

### 6.2 MANUAL TIME LEARNING

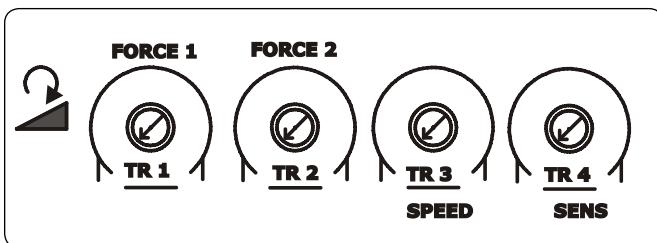
WARNING: If the manual time learning setup is done then the slow down points must be set by the installer during the procedure. Slow down is required for proper operation.

#### Move the leafs to the mid position Very important for a good result

- Press and hold the SETUP button until the SETUP LED lights up, keep it pressed for about 3 sec. until it turns off and keep it pressed more until the leaf 2 (if present) starts moving slowly. The LED will blink during the setup procedure
- Leaf 2 will move in closing direction until it reaches the mechanical stop or FCC2
- Leaf 1 starts moving slowly until it reaches the mechanical stop or FCC1
- Leaf 1 starts moving in opening direction at the set speed (trimmer speed).
- At the point where you want the slowdown to start give an OPEN A command with the push button or the remote that is already stored in memory. Leaf 1 starts to slow down and stops when it reaches the mechanical stop or FCA1.
- Leaf 2 starts moving in opening direction at the set speed (trimmer speed)

7. At the point where you want the slowdown to start give an OPEN A command with the push button or the remote that is already stored in memory. Leaf 2 starts to slow down and stops when it reaches the mechanical stop or FCA2.
8. Leaf 2 starts to close at the set speed (trimmer speed).
9. At the point where you want the slowdown to start give an OPEN A command with the push button or the remote that is already stored in memory. The leaf 2 starts to slow down and stops when it reaches the mechanical stop or FCC2.
10. Leaf 1 starts to close at the set speed (trimmer speed).
11. At the point where you want the slowdown to start give an OPEN A command with the push button or the remote that is already stored in memory. Leaf 1 starts to slow down and stops when it reaches the mechanical stop or FCC1.
12. The manual time learning procedure is complete.

After time learning test the gate to set the force, speed and sensitivity using the trimmers.



1. Apply resistance to the gate and adjust the Force to make sure that the operator creates enough thrust to reliably move the leaf.
2. Set the desired speed. Keep the speed relatively low on big and heavier gates.
3. After Force and Speed are set to the desired settings adjust the Sensitivity so the gate reverses promptly after hitting a rigid object.
4. After all the adjustments are done perform setup again.

### 6.3 OBSTACLE DETECTION FUNCTION

The obstacle detection function is achieved by controlling the current absorption and / or through the encoder connected to the motors.

If the gate encounters an obstacle during the movement of opening or closing, the obstacle detection function is activated and the operator reverses the direction of the gate.

In case of a second consecutive obstacle the operator stops the gate right away and any further command is inhibited. To re-enable the automation, you must remove power (and disconnect batteries if present) or open the STOP contact input. The Audio Alarm output will be active until this "reset".

This is a more detailed description of what happens after an obstacle detection:

#### Gate opening, obstacle detected:

Gate reverses partially (for 3 sec.) and STOPS. After that either the gate is in a halfway position or completely closed

An open\_A command is received:

the Gate tries to open from the current position:

If there is another obstacle detection:

complete stop, alarm goes off

If the gate reaches the open position:

obstructions count reset, return to normal operations

#### Gate closing, obstacle detected:

Gate reverses partially (for 3 sec.) and STOPS. After that either the gate is in a halfway position or the gate is completely open

An open\_A command is received:

In NON Automatic mode:

if the gate was not completely open:

execute an open

if the gate was completely open:

execute a close

in Automatic mode:

if the gate was not completely open:

execute an open, wait for the pause time and then closes.

if the gate was completely open:

reload the pausetime, and then closes

If there is another obstacle detection:

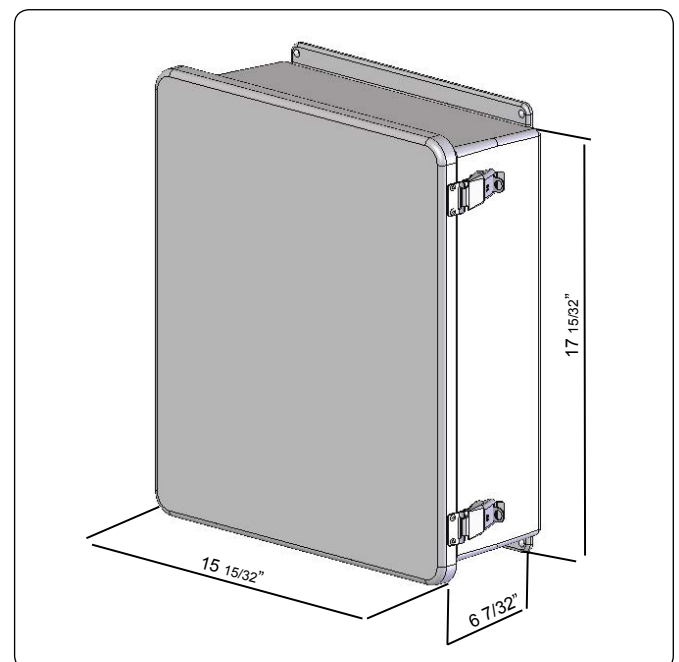
complete stop, alarm goes off

If the gate reaches the close position:

obstructions count reset, return to normal operations

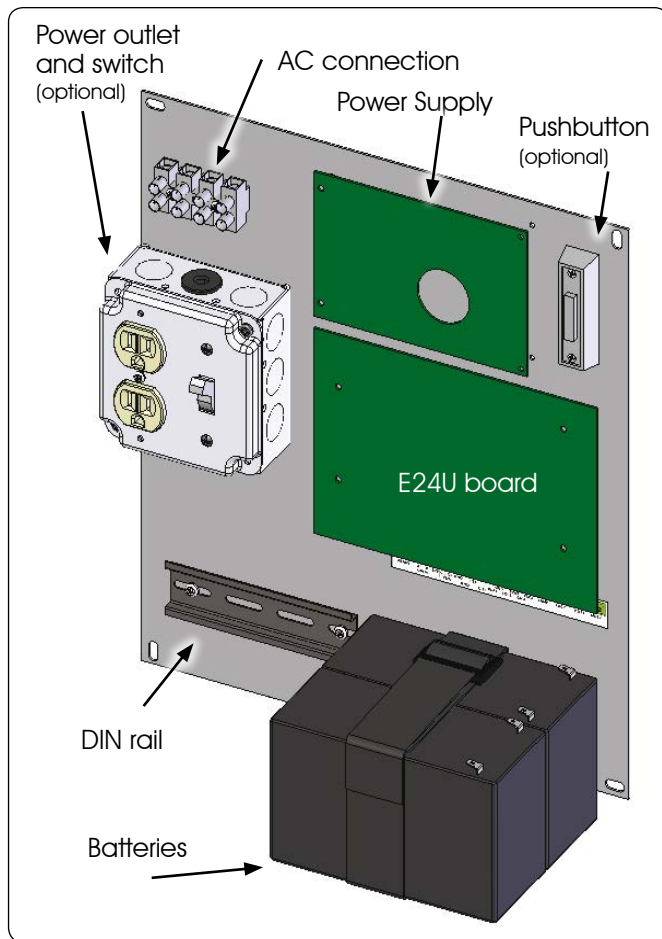
## 7. ENCLOSURE

The E024U board is supplied on a panel that fits in a 16x14" enclosure.





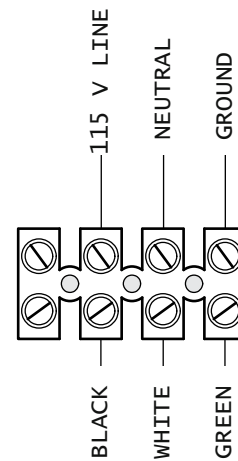
On the back panel there are: the control board, the power supply and additional accessories.



## AC POWER CONNECTION

To connect AC power to the controller:

1. Turn the circuit breaker for the AC gate operator power OFF before connecting the AC input wires.
2. Turn OFF the Power Switch located on the left side of enclosure before connecting the AC input wires.
3. Connect the AC input wires to the AC terminal located on the top left of the control box. See diagram below.
4. Batteries must be installed after the AC power is on. See Battery Power Connection.



## 8. POWER CONNECTION

### AC POWER GUIDELINES:

THE E024U control board and power supply uses a single phase AC power line to operate, charge the batteries, and power gate accessories. Use the following guidelines when installing the AC power:

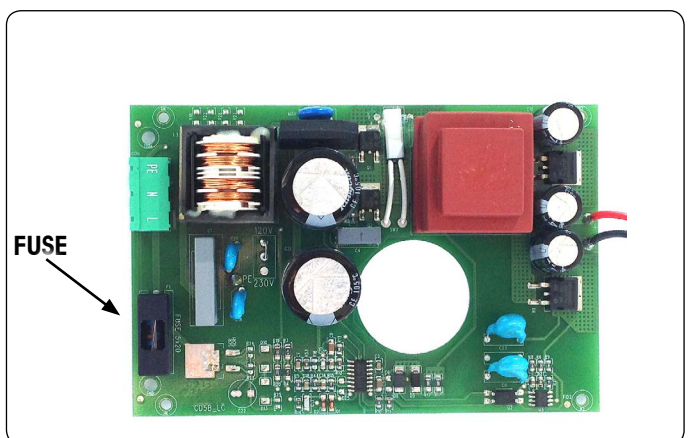
1. Check the local wiring codes in all cases and follow all local building codes. Wiring and hookup should be performed by a qualified electrician/installer only.
2. AC power should be supplied from a circuit breaker panel and must have its own dedicated circuit breaker. This supply must include a green ground conductor.
3. Use copper conductor wires with liquid tight flexible conduit UL listed for electric cable protection

**14 AWG, 600V, 80°C**  
**Terminal Block max Torque 2.1 Nm**

4. 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.

### 8.1 POWER SUPPLY

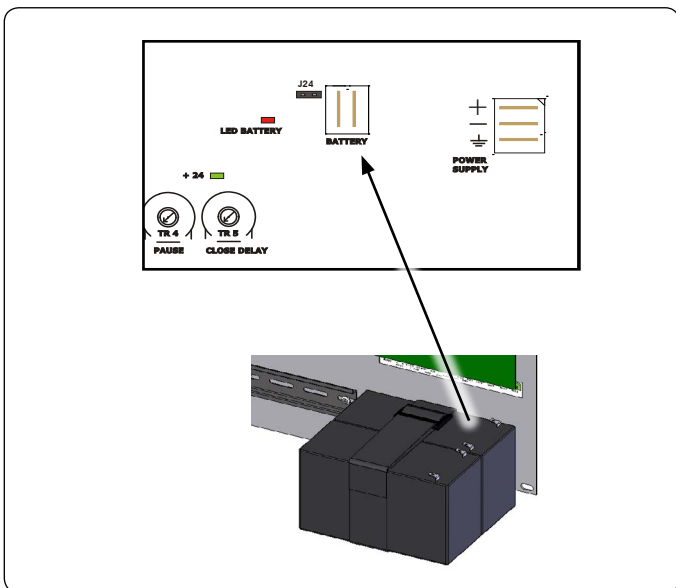
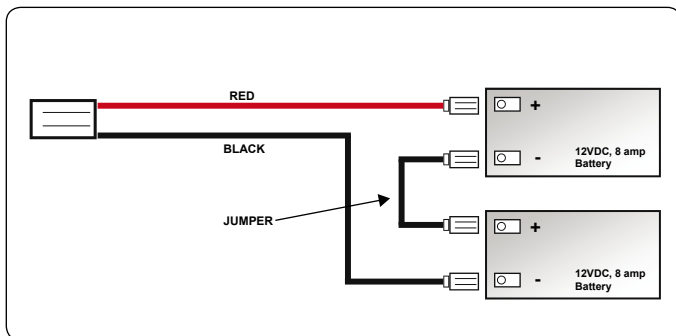
The E024U board is powered by a high efficiency switching power supply that takes 115VAC input and provides 36VDC to power the board. On the power supply board there is only one replaceable fuse: **6.3A timed**



## 9. BACKUP BATTERY

The E024U board allows the connection of a 24V backup battery to provide power to operate the gate during blackouts. For more details about how the boards handles the loss of main power and how to configure its behaviour please see par 4.3 and DS1 switch 7.

To connect the battery use the provided cable and jumper. Plug the jumper from the red (+) terminal of first battery to the black (-) terminal on the second battery and then connect the battery cable red wire to the red (+) terminal on the second battery and the black wire to the black (-) terminal on the first battery. Finally plug the cable on the BATTERY connector on the board.

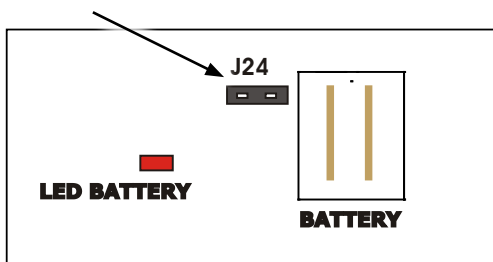


### 9.1 DISABLE THE BATTERY CHARGER

The internal battery charger must be disabled to use an external charger. To disable the battery charger unplug jumper J24

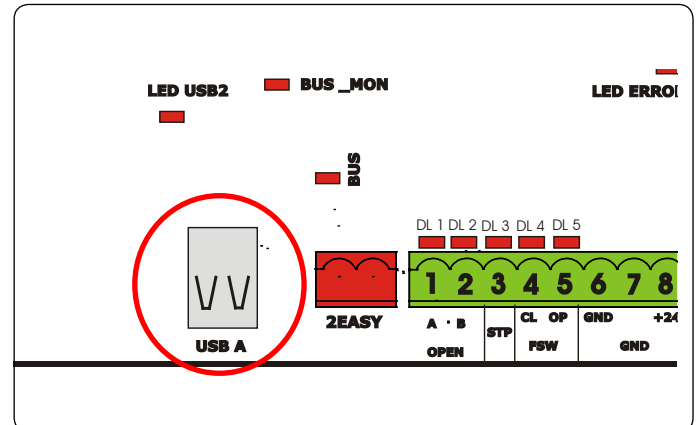
J24 PRESENT = BATTERY CHARGING ACTIVE

J24 NOT PRESENT = BATTERY CHARGING NOT ACTIVE



## 10. FIRMWARE UPGRADE

The E024U board keeps the operating firmware in a field programmable memory, it can be easily upgraded through the on board USB port



For the upgrade you need a USB Flash Drive, where you have to copy the file supplied by FAAC. Then follow these steps:

1. Disconnect the batteries if they are present.
2. Turn the AC power off and insert the Flash Drive into the USB A input on the board
3. Turn the AC power back on. The USB2 LED will start to flash to confirm the beginning of the software update. (WARNING: DON'T TURN THE POWER OFF OR REMOVE THE FLASH DRIVE UNTIL THE USB2 LED TURNS OFF.
4. Wait until the USB 2 LED turns off
5. Remove the USB Flash drive.
6. Cycle power, reconnect the batteries if needed and execute a new SETUP procedure (See chapter 6)



**WARNING:** Only upgrade the firmware with the proper file supplied by FAAC, otherwise the board could be damaged

## 11. FUNCTION LOGICS

LOGIC "E"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens the leaves	opens leaf 1	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	stops operation (1)	stops operation	stops operation	immediately reverses at closing	no effect	stops and opens at release (OPEN stops - saves CLOSE)
OPEN	recloses leaves immediately (1)	recloses leaves immediately	no effect (OPEN/CLOSE disabled)	no effect	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)
CLOSING	reopens leaves immediately	reopens leaves immediately	stops operation	no effect	reverses at opening	stops and opens at release (OPEN stops - saves CLOSE)
BLOCKED	closes leaves	closes leaves	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN stops - saves CLOSE)

(1) if the cycle began with OPEN-B (leaf 1), both leaves are activated at opening

LOGIC "A"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens and closes after pause time	opens leaf 1 and closes after pause time	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	no effect (1)	no effect	stops operation	reverses at closing	no effect	stops and opens at release (saves CLOSE)
OPEN IN PAUSE	reloads pause time (1)	reloads pause time of released leaf	stops operation	no effect	recharges pause time (CLOSE disabled)	recharges pause time (CLOSE disabled)
CLOSING	reopens leaves immediately	reopens leaves immediately	stops operation	no effect	reverses at opening	stops and opens at release (saves CLOSE)
BLOCKED	closes leaves	closes leaves	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)

(1) if the cycle began with OPEN-B (leaf 1), both leaves are activated at opening

LOGIC "S"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens and closes after pause time	opens released leaf and closes after pause time	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	no effect (1)	no effect	stops operation	reverses at closure	continues to open and recloses immediately	stops and opens at release (saves CLOSE)
OPEN IN PAUSE	recloses leaves immediately (1)	recloses leaves immediately	stops operation	no effect	stops and, at release, closes	stops and, at release, closes
CLOSING	reopens leaves immediately	reopens leaves immediately	stops operation	no effect	reverses at opening (see DS1-SW8) and closes immediately at end	stops and opens after release and closes immediately at end
BLOCKED	closes leaves	closes leaves	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)

(1) if the cycle began with OPEN-B (leaf 1), both leaves are activated at opening

LOGIC "EP"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens the leaves	opens leaf 1	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	stops operation (1)	stops operation	stops operation	immediately reverses at closure	no effect	stops and opens at release (OPEN stops - saves CLOSE)
OPEN	recloses leaves immediately (1)	recloses leaves immediately	no effect (OPEN/CLOSE disabled)	no effect	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)
CLOSING	stops operation	stops operation	stops operation	no effect	reverses at opening	stops and opens at release (OPEN stops - saves CLOSE)
BLOCKED	restarts moving in opposite direction. Always closes after STOP	restarts moving in opposite direction. Always closes after STOP	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN stops - saves CLOSE)

(1) if the cycle began with OPEN-B (leaf 1), both leaves are activated at opening

LOGIC "AP"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens and closes after pause time	opens leaf 1 and closes after pause time	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	stops operation (1)	stops operation	stops operation	reverses at closing (saves OPEN)	no effect	stops and opens at release (OPEN stops - saves CLOSE)
OPEN IN PAUSE	stops operation (1)	stops operation	stops operation	no effect	recharges pause time (CLOSE disabled)	recharges pause time (CLOSE disabled)
CLOSING	reopens leaves immediately	reopens leaves immediately	stops operation	no effect	reverses at opening (see DS1-SW8)	stops and opens at release (OPEN stops - saves CLOSE)
BLOCKED	closes leaves	closes leaves	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)

(1) if the cycle began with OPEN-B (leaf 1), both leaves are activated at opening

LOGIC "SP"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens and closes after pause time	opens leaf 1 and closes after pause time	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	stops operation (1)	stops operation	stops operation	reverses at closure	continues to open and recloses immediately	stops and opens after release and closes immediately at end (OPEN stops - saves CLOSE)
OPEN IN PAUSE	recloses leaves immediately (1)	recloses leaves immediately	stops operation	no effect	stops and, at relea- se, closes	stops and, at release, closes
CLOSING	stops operation	stops operation	stops operation	no effect	reverses at opening	stops and opens at release (saves CLOSE)
BLOCKED	restarts moving in opposite direction. Always closes after STOP	restarts moving in opposite direction. Always closes after STOP	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)

(1) if the cycle began with OPEN-B (leaf 1), both leaves are activated at opening

LOGIC "B"	PULSES					
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens the leaves	no effect	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	no effect	closes leaves	stops operation	reverses at closure	no effect	stops and, at release, closes (saves OPEN/CLOSE)
OPEN	no effect	closes leaves	no effect (OPEN/CLOSE disabled)	no effect	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)
CLOSING	opens the leaves	no effect	stops operation	no effect	reverses at opening	stops and opens at release (saves OPEN/CLOSE)
BLOCKED	opens the leaves	closes leaves	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)

LOGIC "C"	CONTINUOUS COMMANDS		PULSES			
SYSTEM STATUS	OPEN A	OPEN B	STOP	FSW OP	FSW CL	FSW CL/OP
CLOSED	opens the leaves	no effect	no effect (OPEN disabled)	no effect (OPEN disabled)	no effect	no effect (OPEN disabled)
OPENING	no effect	closes leaves	stops operation	reverses at closure	no effect	stops and, at release, closes (saves OPEN/CLOSE)
OPEN	no effect	closes leaves	no effect (OPEN/CLOSE disabled)	no effect	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)
CLOSING	opens the leaves	no effect	stops operation	no effect	reverses at opening	stops and opens at release (saves OPEN/CLOSE)
BLOCKED	opens the leaves	closes leaves	no effect (OPEN/CLOSE disabled)	no effect (OPEN disabled)	no effect (CLOSE disabled)	no effect (OPEN/CLOSE disabled)

## 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.