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ENGLISH

## 1. CE DECLARATION OF CONFORMITY FOR MACHINES (DIRECTIVE 98/37/CE)

**Manufacturer:** FAAC S.p.a.

**Address:** Via Benini, 1 - 40069 - Zola Predosa - BOLOGNA - ITALY

**Declares that:** 415 mod. operator

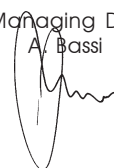
- is built to be integrated into a machine or to be assembled with other machinery to create a machine under the provisions of Directive 98/37/CE;
- conforms to the essential safety requirements of the following EEC directives:

73/23 EEC and subsequent amendment 93/68/EEC.  
89/336 EEC and subsequent amendment 92/31/EEC and 93/68/EEC

and also declares that the machinery must not be put into service until the machine in which it will be integrated or of which it will become a component has been identified and declared as conforming to the provisions of Directive 98/37/CE.

Bologna, 01.02.2005

The Managing Director  
A. Bassi



## 2. DESCRIPTION

The **415** automated system for swing gates is an electro-mechanical non-reversing operator that transmits motion to the leaf via a worm screw system.

The operator is available in many versions. The "LS" versions are equipped with opening and closing limit switches.

The non-reversing system ensures the leaf is mechanically locked when the motor is not operating. A convenient and safe release system with customised key makes it possible to manually move the leaf in the event of a malfunction or of a power failure.



### ATTENTION:

- The correct operation and the declared specifications only apply if FAAC accessories and safety devices are used.
- As no mechanical clutch device is fitted, a control unit with adjustable electronic clutch is required to ensure the necessary anti-crushing safety.
- The 415 automated system was designed and built for controlling vehicle access. Avoid any other use whatever.

Pos.	Description
1	Operator
2	Release device
3	Rod
4	Front bracket
5	Rear bracket
6	Rear fitting
7	Rear fitting pin
8	Terminal board cover

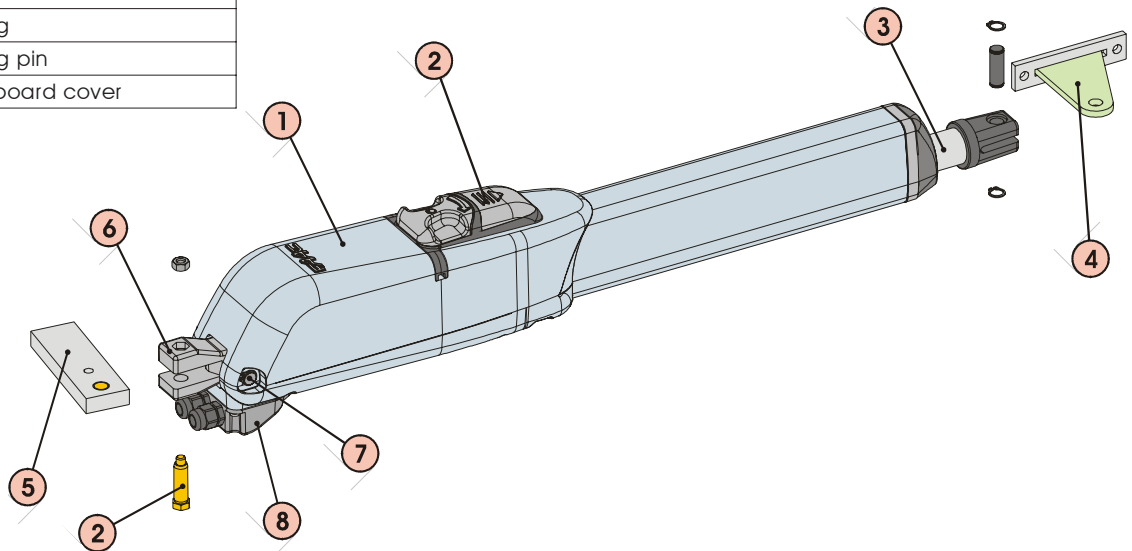


Fig. 1

### 2.1. Dimensions

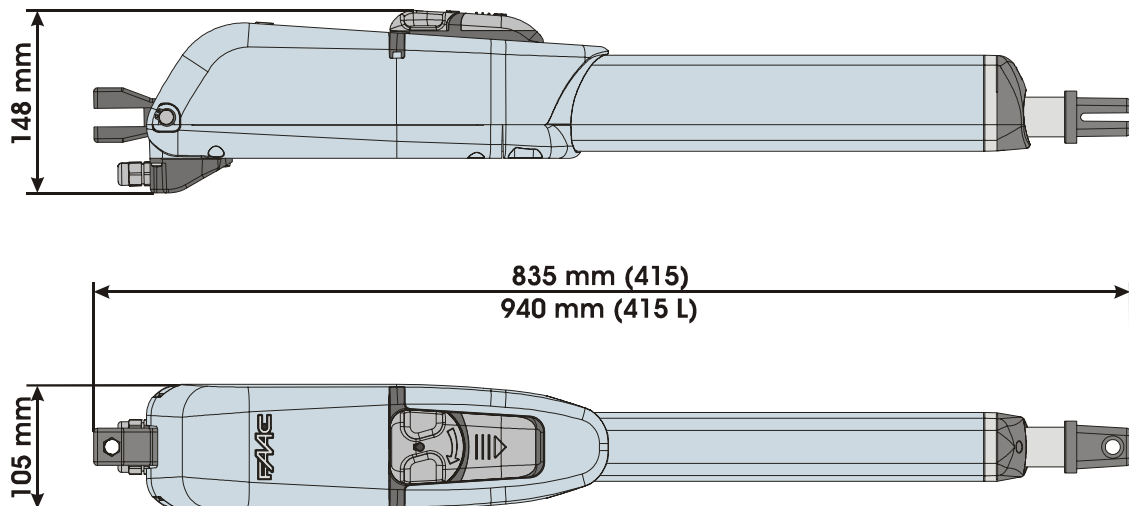


Fig. 2

### 3. TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS	415	415 LS	415 L	415 L LS	415	415 LS	415 L	415 L LS	415	415 LS	415 L	415 L LS
					24V	24V	24V	24V	115V	115V	115V	115V
Power supply	230 V~				24 Vdc				115 V~			
Power (W)	300				70				300			
Current (A)	1.3				3				2.5			
Thermal protection (°C)	140				-				140			
Capacitor (µF)	8				-				25			
Thrust (daN)	300				280				300			
Travel (mm)	300		400		300		400		300		400	
Rod extension speed (cm/sec)	1,6								1.85			
Leaf max. (m)	3 <sup>(1)</sup>		4 <sup>(2)</sup>		3 <sup>(1)</sup>		4 <sup>(2)</sup>		3 <sup>(1)</sup>		4 <sup>(2)</sup>	
Type and use frequency at 20° C	S3 30%	S3 35%	S3 30%	S3 35%	100%				S3 30%	S3 35%	S3 30%	S3 35%
Approximate cycle/hour at 20° C	~ 30		~ 25		~ 75				~ 30		~ 25	
Operating ambient temperature (°C)	-20 +55											
Operator weight (Kg)	7.8		8		7.8		8		7.8		8	
Operator length (mm)	see fig.2											
Operator dimensions (mm)	see fig.2											
Protection class	IP54											

<sup>(1)</sup> With leaves exceeding 2.5 m the fitting of an electric lock is required to ensure the leaf locking

<sup>(2)</sup> With leaves exceeding 3 m the fitting of an electric lock is required to ensure the leaf locking

#### 3.1. Versions

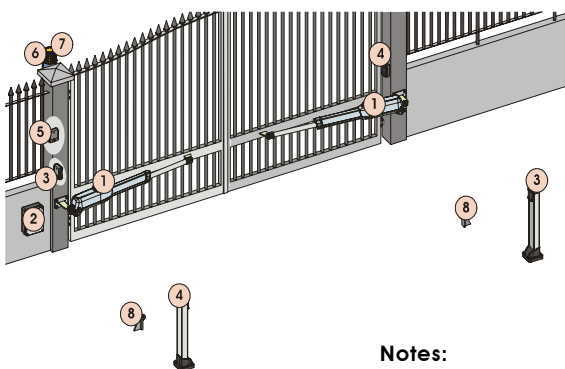
MODEL	VERSION
Operator 415	230 V~ non-reversing operator
Operator 415 LS	230 V~ non-reversing operator with opening / closing limit switches
Operator 415 L	230 V~ non-reversing operator
Operator 415 L LS	230 V~ non-reversing operator with opening / closing limit switches
Operator 415 24V	24 Vdc non-reversing operator
Operator 415 LS 24V	24 Vdc non-reversing operator with opening / closing limit switches
Operator 415 L 24V	24 Vdc non-reversing operator
Operator 415 L LS 24V	24 Vdc non-reversing operator with opening / closing limit switches
Operator 415 115V	115 V~ non-reversing operator
Operator 415 LS 115V	115 V~ non-reversing operator with opening / closing limit switches
Operator 415 L 115V	115 V~ non-reversing operator
Operator 415 L LS 115V	115 V~ non-reversing operator with opening / closing limit switches



For CSA-UL approved operators, control unit 455 MPS UL 115 must be used in order to maintain the approval.

### 4. INSTALLATION

#### 4.1. Electrical set-up (standard system)



Pos.	Description	Cables
1	Operators	4x1.5 mm <sup>2</sup> (2x1.5 mm <sup>2</sup> )
2	Control unit	3x1.5 mm <sup>2</sup> (power supply)
3	TX photocells	4x0.5 mm <sup>2</sup>
4	RX photocells	2x0.5 mm <sup>2</sup>
5	Key-operated selector switch	2x0.5 mm <sup>2</sup> (3x0.5 mm <sup>2</sup> )
6	Flashing lamp	2x1.5 mm <sup>2</sup>
7	Receiver	3x0.5 mm <sup>2</sup>
8	Mechanical stops	-

**Notes:**

- Use suitable tubes and/or hoses to lay electric cables
- To avoid any kind of interference always separate low-voltage accessories and control cables from 230/115 V~ power supply cables using separate sheaths.

Fig. 3

### 4.2. Preliminary checks

To ensure a correct operation of the automated system, make sure the following requirements are observed as for the gate structure (existing or to be created):

- the mechanical parts must conform to the provisions of Standards EN 12604 and EN 12605.
- leaf length in compliance with the operator specifications.
- sturdy and stiff structure of the leaves, suitable for automation
- regular and uniform movement of the leaves, without any friction and dragging during their entire opening
- stiff hinges in good conditions
- presence of both opening and closing mechanical limit stops
- presence of an efficient earthing for electrical connection of the operator

Perform any necessary metalwork job before installing the automated system.

**The condition of the gate structure directly affects the reliability and safety of the automated system.**

### 4.3. Installation dimensions

Determine the fitting position of the operator with reference to Fig.4.

Check with care if the distance between the open leaf and any obstacles (walls, fences etc.) is higher than the operator dimensions

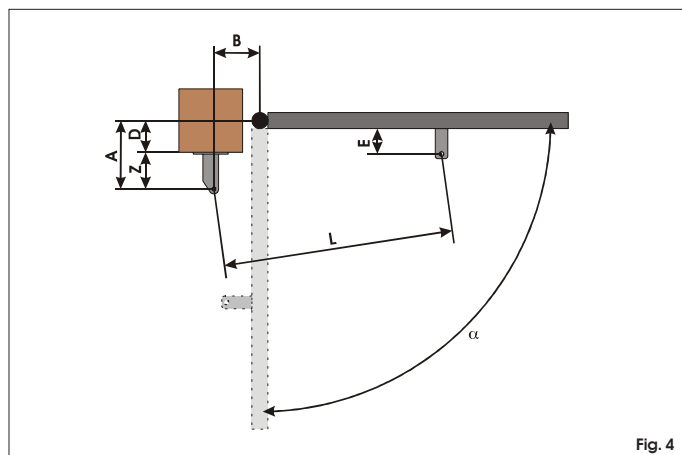


Fig. 4

Model	$\alpha$	A	B	C <sup>(1)</sup>	D <sup>(2)</sup>	Z <sup>(3)</sup>	L	E <sup>(3)</sup>
415 / 415 LS / 415 24V / 415 LS 24V / 415 115V / 415 LS 115V	90°	145	145	290	85	60	1110	45
	110°	120	135	295	60	60	1110	
415 L / 415 L LS / 415 L 24V / 415 L LS 24V / 415 L 115V / 415 L LS 115V	90°	195	195	390	125	70	1290	45
	110°	170	170	390	110	60	1290	

<sup>(1)</sup> operator useful travel

<sup>(2)</sup> max. dimension

<sup>(3)</sup> min. dimension

#### 4.3.1. General rules to determine the installation dimensions

- to obtain 90° leaf openings :  $A+B=C$
- to obtain leaf openings exceeding 90° :  $A+B<C$
- **Smaller A and B dimensions determine higher peripheral speed of the leaf.**
- **Limit the difference between A and B dimension within 4 cm:** higher differences cause great speed variations during the gate opening and closing movement.
- Keep a Z dimension in such a way that the operator does not strike the pillar.
- **in the LS versions the limit switches are triggered for the first and the last 30 mm. Therefore use such A and B dimensions in order to use the whole operator travel. Shorter travels could limit or cancel the limit switch adjustment range.**

If the pillar dimensions or the hinge position do not allow the installation of the operator, a niche on the pillar, as shown in Fig. 5, should be created in order to maintain the A dimension as determined. The niche should be dimensioned in such a way to enable easy installation, operator rotation and operation of the release device.

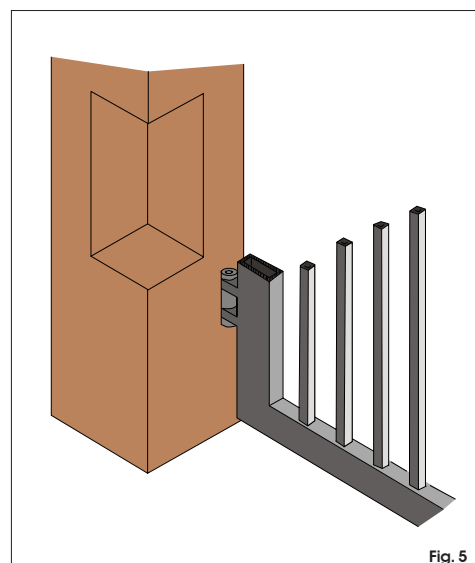


Fig. 5

#### 4.4. Installing the operators

1) Fix the rear bracket in the position determined before. In the event of iron pillar carefully weld the bracket directly on the pillar (Fig.6). In the event of masonry pillar, use the suitable plate (optional) for the fixing to screw (Fig.7) by making use of suitable fastening systems. Then carefully weld the bracket to the plate.

During the fastening operations, check if the bracket is perfectly horizontal by means of a level.

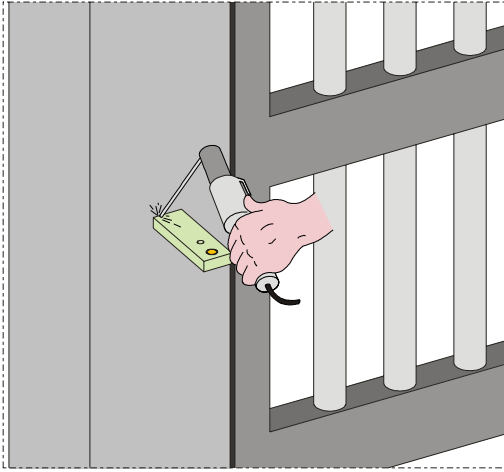


Fig. 6

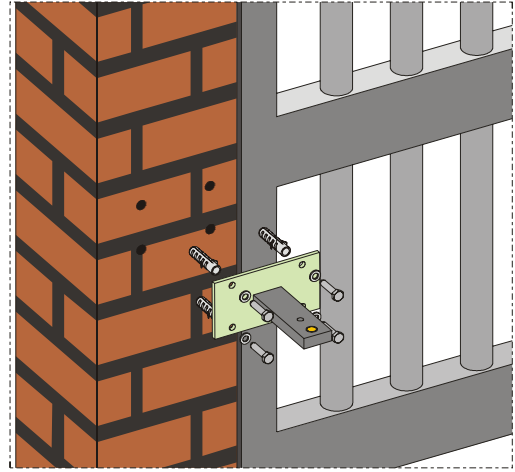


Fig. 7

- 2) Assemble the rear fitting to the operator as shown in Fig.8.
- 3) Set the operator for manual operation (see paragraph 6 )
- 4) Completely extend the rod till it reaches the limit stop, fig.9 ref.1.
- 5) Lock the operator again (see paragraph 6.1 )
- 6) Turn the rod clockwise half a revolution / a revolution, Fig.9 ref.2
- 7) Assemble the front bracket as shown in Fig.10.

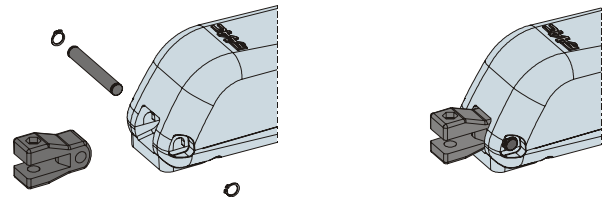


Fig. 8

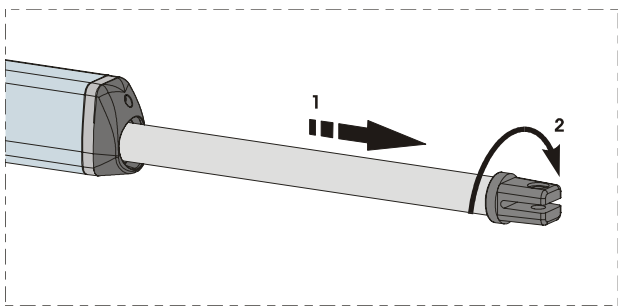


Fig. 9

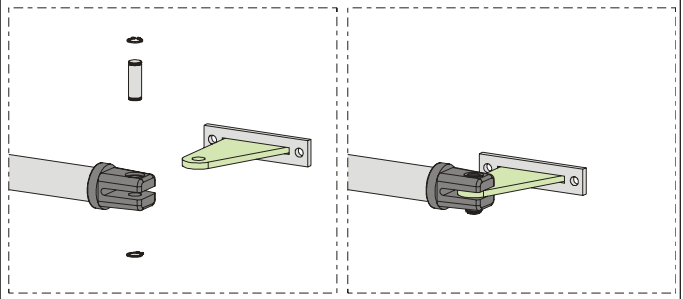


Fig. 10

8) Fix the operator to the rear bracket by means of the supplied pins as shown in Fig.11.



**Attention:** before fastening the operator on the bracket you have just welded, wait for the bracket to cool.

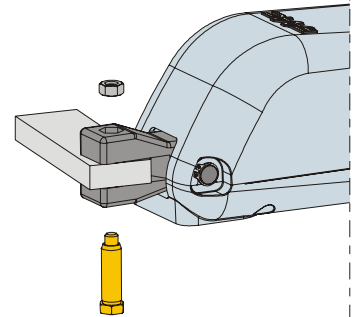


Fig. 11

- 9) Close the leaf and, keeping the operator in a perfect horizontal position, determine the fastening point of the front bracket (Fig.12).
- 10) Temporarily fix the front bracket with two welding spots (Fig.12).



**Note: if the gate structure does not allow a fix bracket fastening it is necessary to create a sturdy supporting base in the gate structure.**

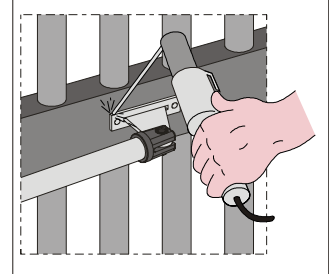
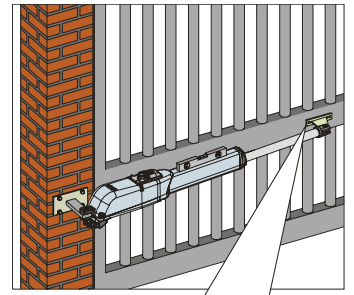


Fig. 12

- 8) Release the operator (see paragraph 6) and manually check if the gate can completely open without hindrances and stop at the mechanical travel stops as well as if the leaf moves regularly without any friction.
- 9) Carry out the necessary corrective measures and repeat from point 8.
- 10) Temporarily release the operator from the front bracket and weld the bracket definitively.

If the leaf structure prevents the bracket from being welded, screw it to the leaf with adequate securing systems. Therefore, act as we explained before.



**Note: we recommend to grease all the fastening pins of the fittings.**

#### 4.5. Wiring the operator

A terminal board is fitted in the lower part of the operator for the connection of the motor, of any limit switch and for the earthing of the operator.



**IMPORTANT : To connect the motor, the supplied cable must be used for the mobile section, or a cable for mobile laying from the outside.**

Motor wiring operations:

- 1) Open one of the two pre-drilled holes in the supplied cover, Fig.13; in case of operators with limit switches, open both holes.
- 2) Fit the supplied cable gland.
- 3) Connect the motor and the earthing with reference to Fig.14 and to the table.

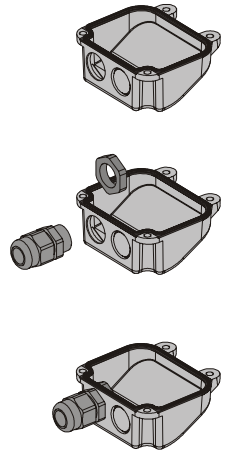
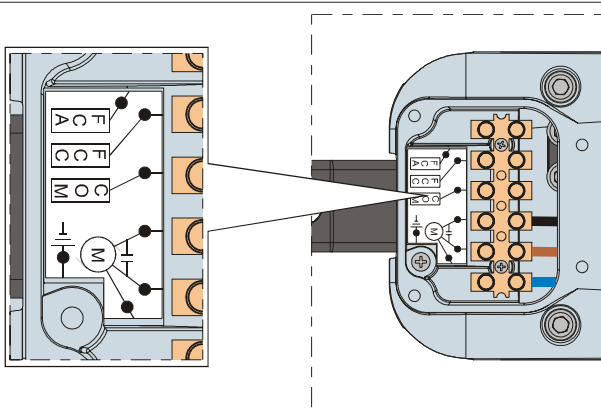


Fig. 13



**To maintain approval for CSA-UL approved operators, position the capacitor (secured in a stable manner) inside a CSA-UL approved enclosure.**



415 230 V~ (115V~)		
POS.	COLOUR	DESCRIPTION
1	Blue (White)	Common cable
2	Brown (Red)	Phase 1
3	Black (Black)	Phase 2
T	Yellow / Green (Green)	Earthing
415 24 Vdc		
POS.	COLOUR	DESCRIPTION
1	Blue	Phase 1
2	Not used	/
3	Brown	Phase 2
T	Not used	/

Fig. 14

- 4) Close the cover with the four supplied screws, Fig.15.

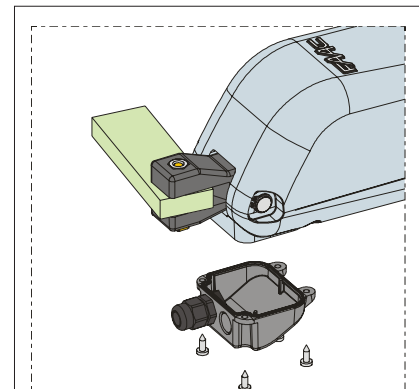


Fig. 15

## 4.6. Limit switches

"LS" models are equipped with opening and closing limit switches. Therefore they require the use of a control board able to control these inputs.



**Note:** Limit switches are triggered for the first and the last 30 mm of the travel. Therefore the operator should use the whole available travel during the opening phase. Shorter travels can limit or completely cancel the limit switch adjustment range.

### 4.6.1. Wiring the limit switches

Limit switches are wired in the same terminal board where the motor wiring has been carried out. Wire the limit switches as follows:

- 1) Open the second pre-drilled hole in the cover, Fig.16.
- 2) Fit the supplied cable gland, Fig.16.
- 3) Insert the cable and connect it to the terminals observing the colours specified in the table of Fig.17.
- 4) Close the cover with the four supplied screws.



**Note:**

- For limit switches connection use the cable for the external movable laying with wires having a cross section of 0.5 mm<sup>2</sup>.
- During the wiring operations, observe the wire colours as specified in the table of Fig.17.

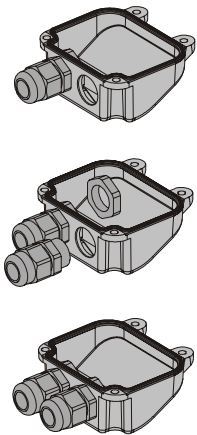
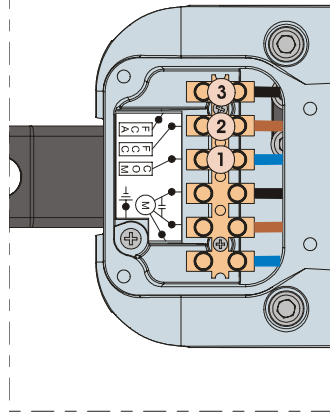


Fig. 16



POS.	COLOUR	DESCRIPTION
1	Blue	Common cable
2	Brown	Closing limit switch (FCC)
3	Black	Opening limit switch (FCA)

Fig. 17

### 4.6.2. Adjusting limit switches

Limit switches adjustment is carried out as follows:

- 1) Unscrew the upper fastening screw, Fig.18 ref.A, and remove the cap, Fig.18 ref.B.
- 2) To adjust the **closing limit switch FCC** turn the adjusting screw clockwise, Fig.19 ref.A, to increase the 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.A, to increase the rod stroke and clockwise to reduce it.
- 4) Perform a pair of test cycles to check the correct position of the limit switch. If the limit switches adjustment needs to be carried out again, repeat the operation starting from point 2.
- 5) Reposition the cap, Fig.18 ref.B, and tighten the fastening screw again, Fig.18 ref.A.

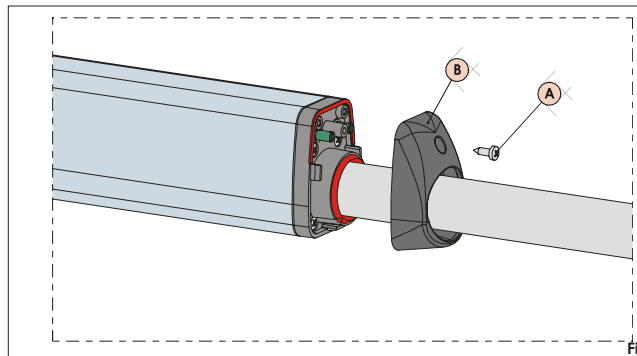


Fig. 18

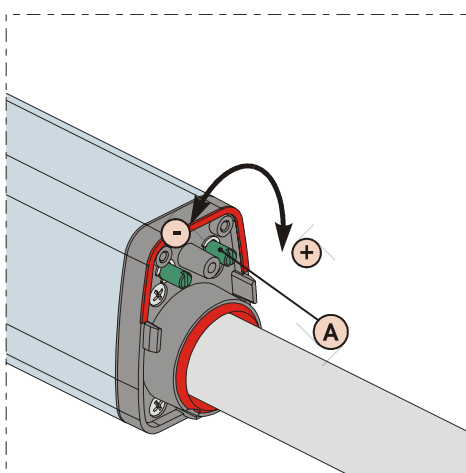


Fig. 19

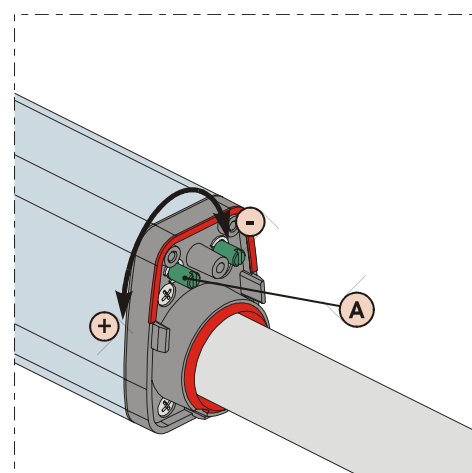


Fig. 20

## 4.7. Start-up



**ATTENTION:** Cut power before any job on the system or on the operator.

Carefully observe points 10, 11, 12, 13 and 14 of the SAFETY GENERAL RULES.

With reference to the indications in Fig.3, set the ducts and carry out the electrical connections of the control board and of the chosen accessories.

Always separate power cables from control and safety cables (push button, receiver, photocells, etc.). To avoid any electrical noise whatever in the unit, use separate sheaths.

- 1) Power up the system and check the LED condition as shown in the table of the control board instructions.
- 2) Program the control board according to the needs by following the given instructions.

## 5. TESTING THE AUTOMATED SYSTEM

- Carefully check operating efficiency of the automated system and of all accessories connected to it, paying special attention to the safety devices.
- Hand the "User's Guide" to the final user together with the Maintenance sheet.
- Explain correct operation and use of the automated system to the user.
- Indicate the potentially dangerous areas of the automated system to the user.

## 6. MANUAL OPERATION

If the automated system needs to be moved manually due to a power lack or to an operator malfunction, proceed as follows:

- 1) Cut power by means of the safety circuit breaker (even in the event of a power lack).
- 2) Slide the protective cap, Fig.21/1.
- 3) Insert the key and turn it 90°, Fig.21/2.
- 4) To release the operator turn 180° the control lever to the direction indicated by the arrow on the release system, Fig.21/3.
- 5) Open and close the leaf manually.

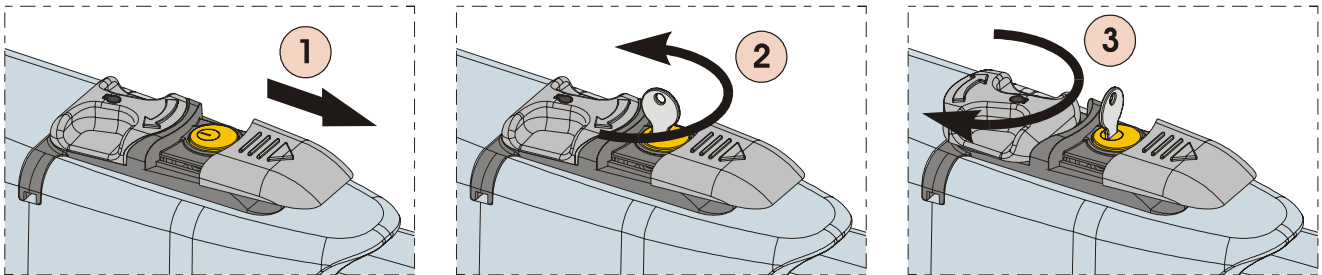


Fig. 21



**Note:** To hold the operator in manual operation the release device should be left in its current positions and the system should be without power.

### 6.1. Restoring normal operation

To restore normal operating conditions, proceed as follows:

- 1) Turn the release system 180° in the opposite direction of the arrow.
- 2) Turn 90° the release key and remove it.
- 3) Close the protection cover.
- 4) Power up the system and perform some movements in order to check the correct restoring of every function of the automated system.



## 7. MAINTENANCE

To ensure trouble-free operation and a constant safety level, an overall check of the system should be carried out every 6 months. A form for recording operations has been included in the "User's Guide" booklet.

## 8. REPAIRS

For any repairs, contact the authorised Repair Centres.

## 9. AVAILABLE ACCESSORIES

Refer to catalogue for available accessories.

## 10. SPECIAL APPLICATIONS

There is no special application other than the described use