

Fig. 3

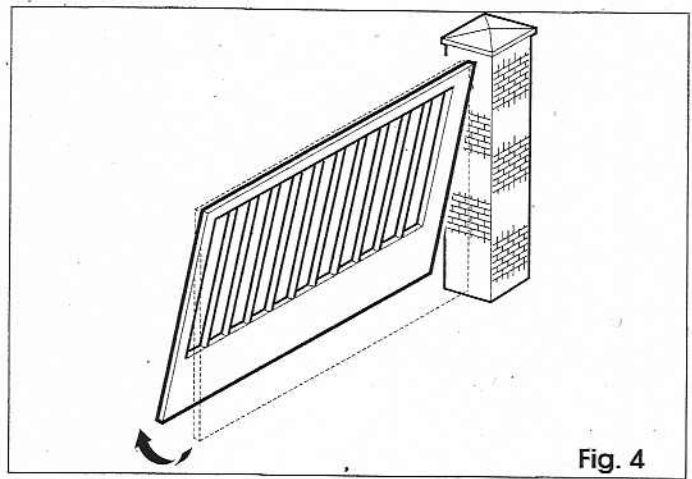


Fig. 4

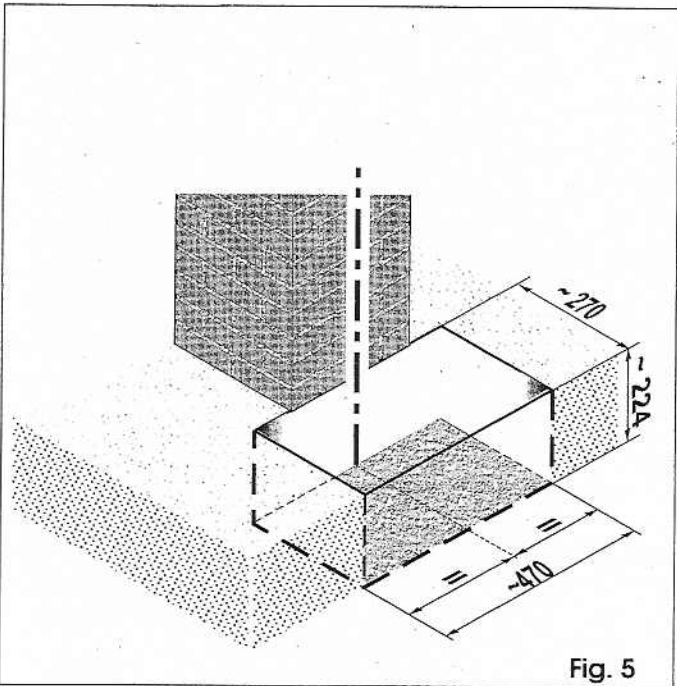


Fig. 5

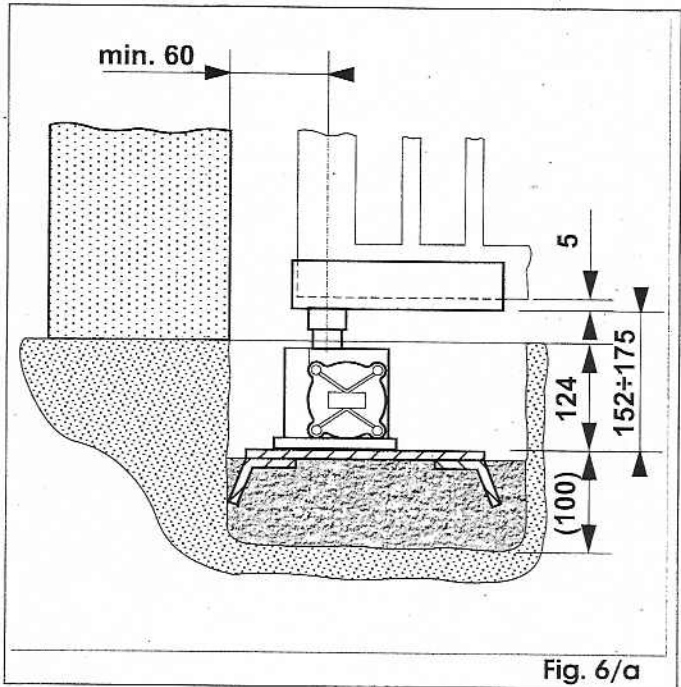


Fig. 6/a

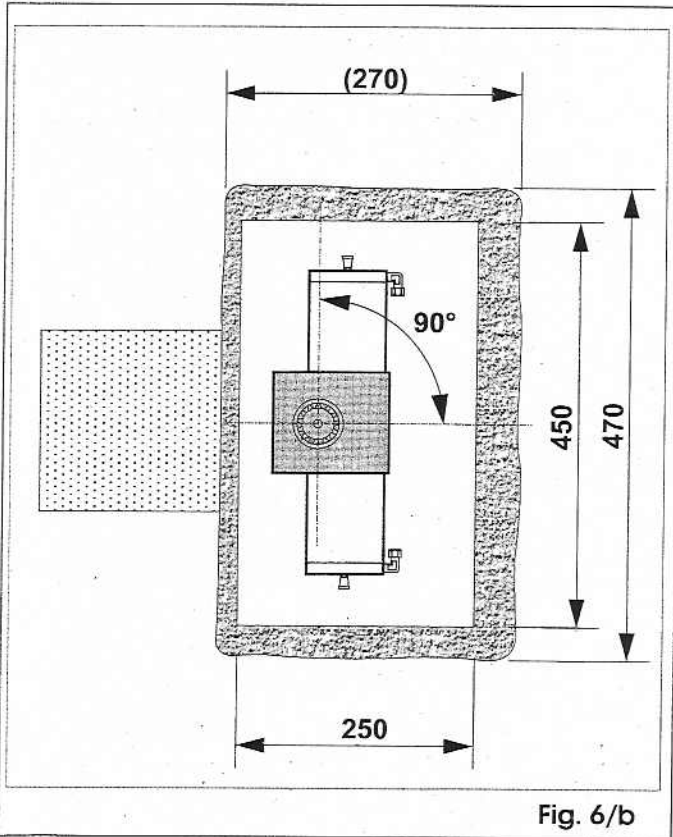


Fig. 6/b

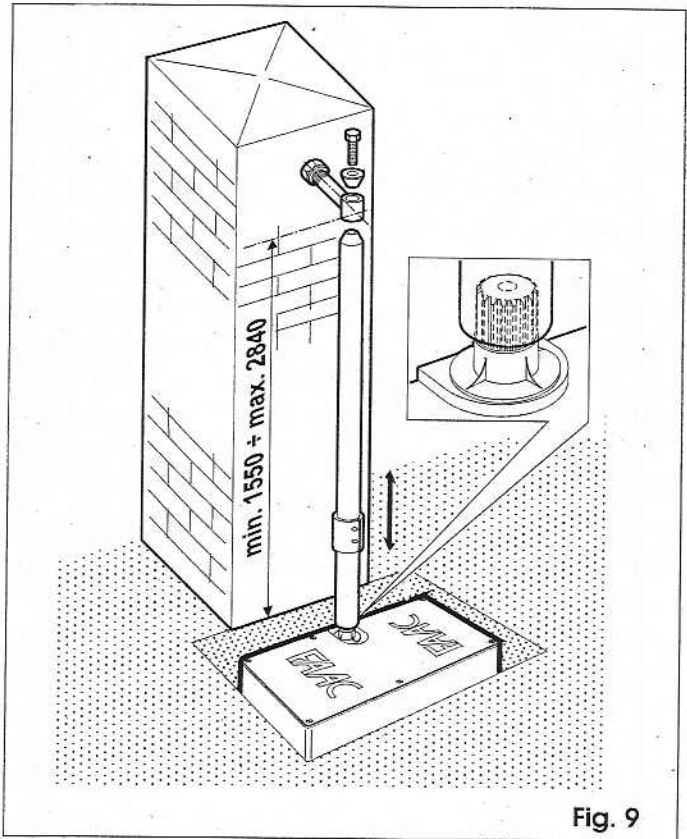


Fig. 9

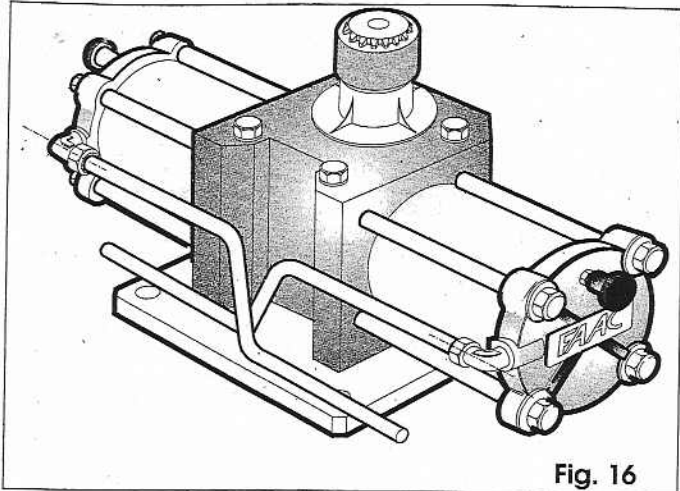


Fig. 16

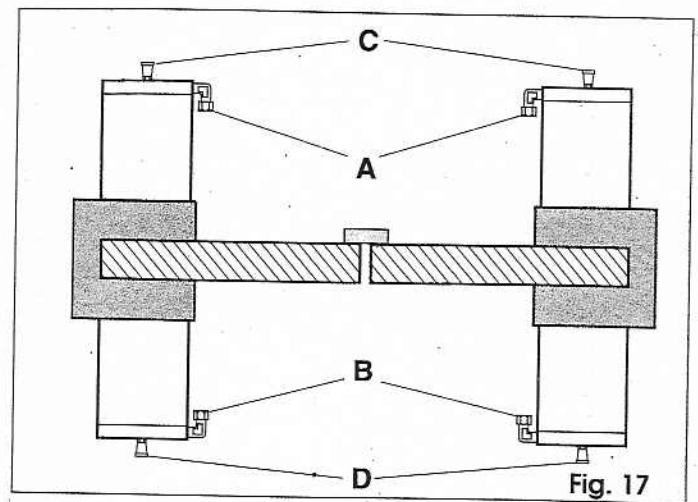


Fig. 17

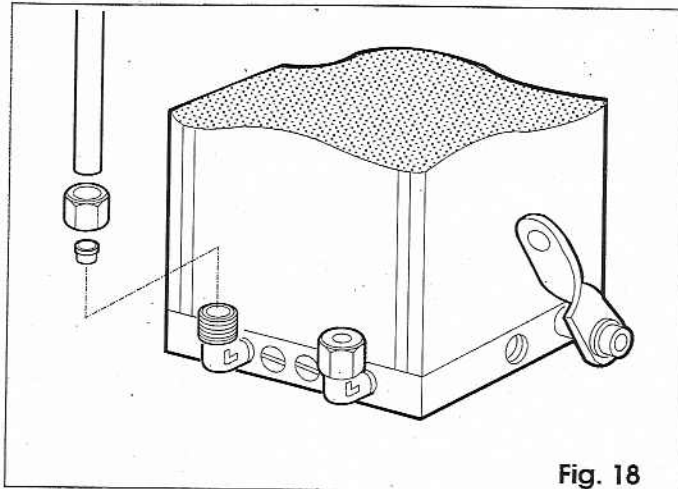


Fig. 18

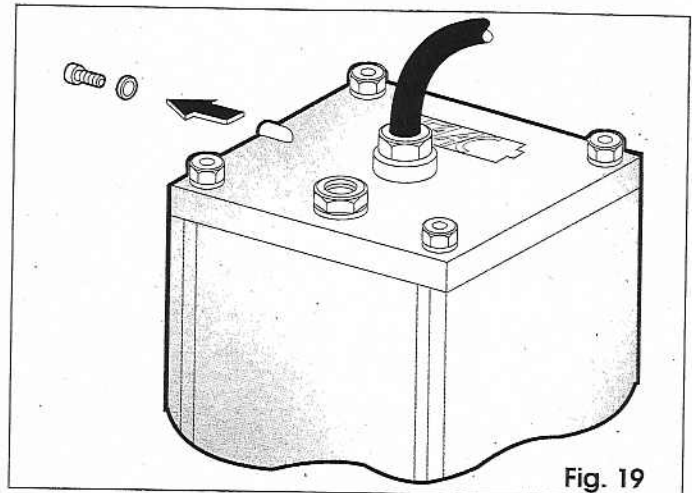


Fig. 19

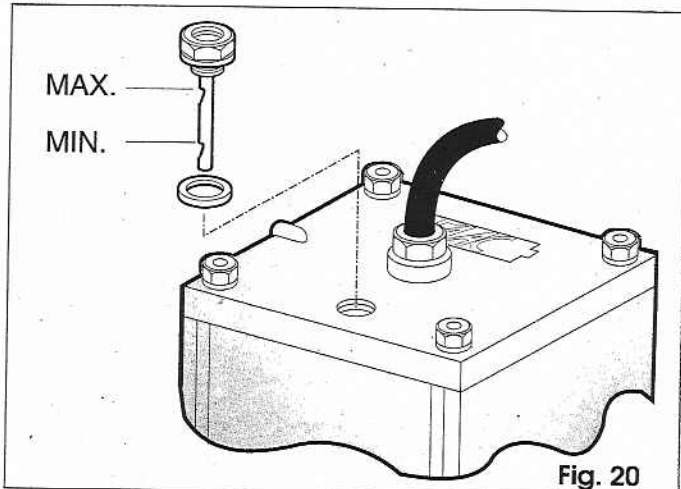


Fig. 20

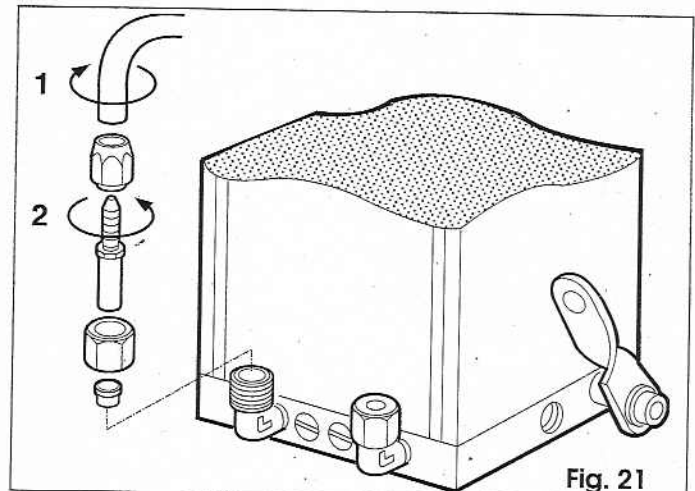


Fig. 21

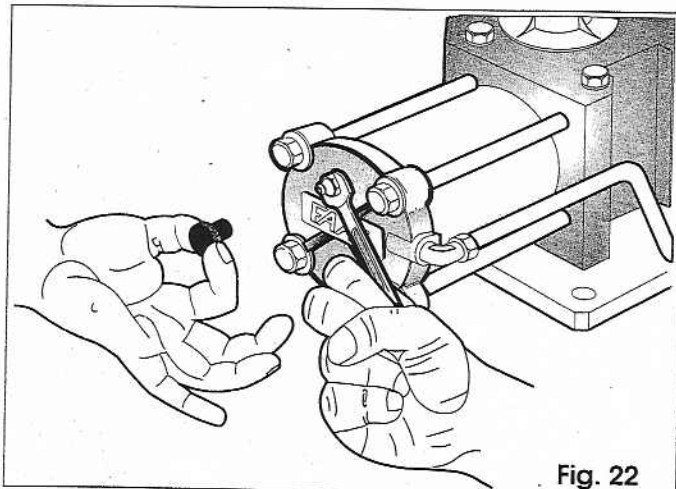


Fig. 22

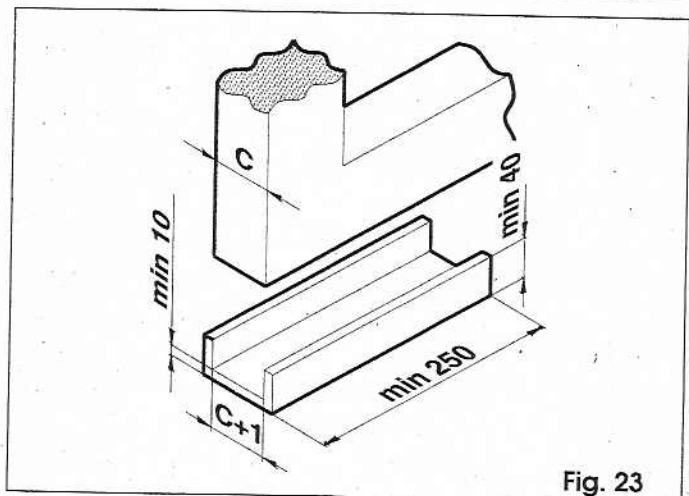


Fig. 23

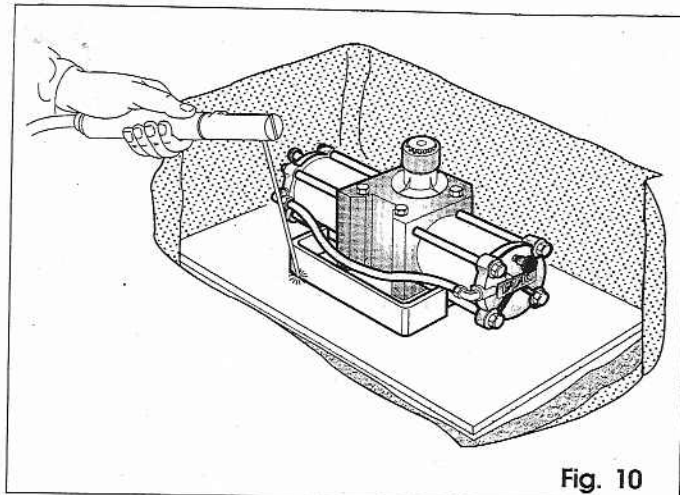


Fig. 10

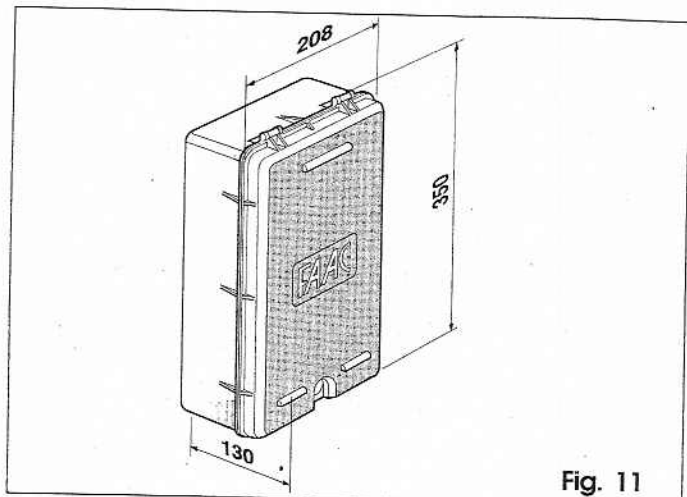


Fig. 11

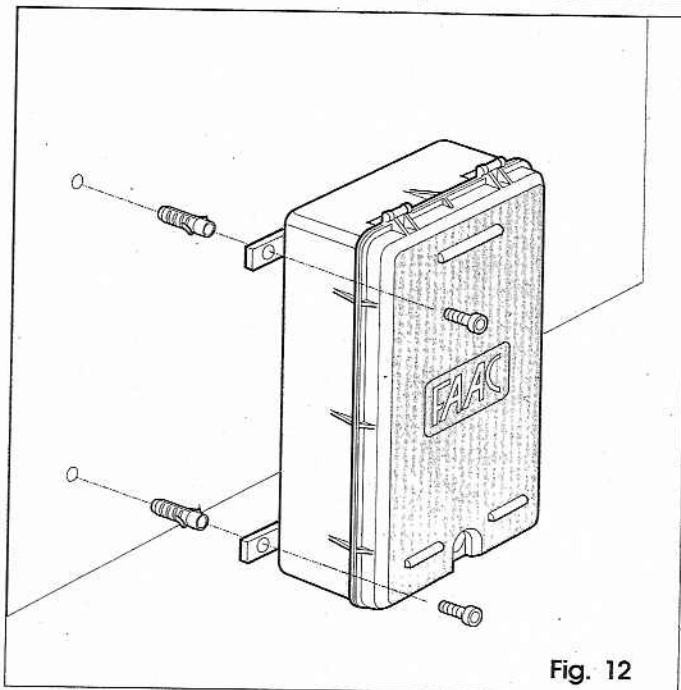


Fig. 12

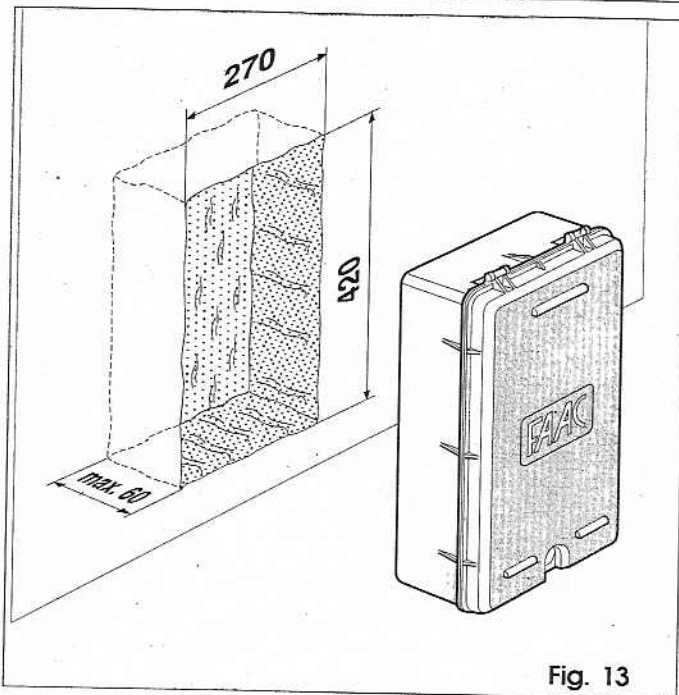


Fig. 13

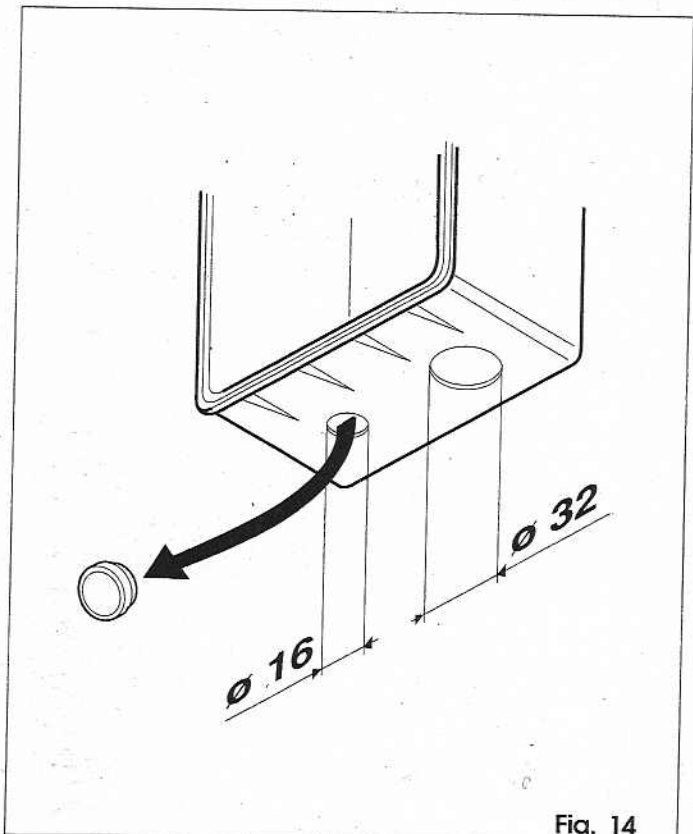


Fig. 14

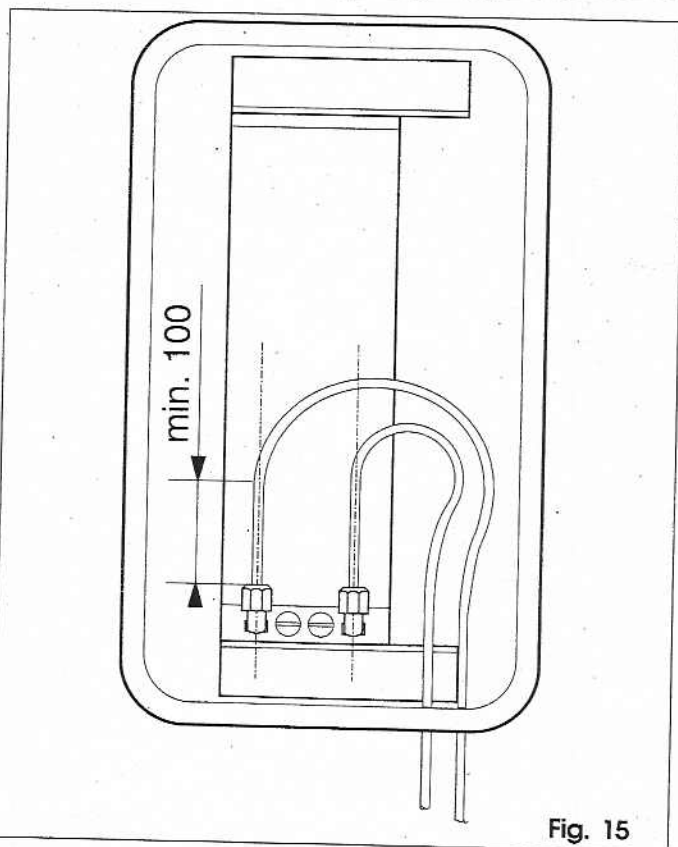


Fig. 15

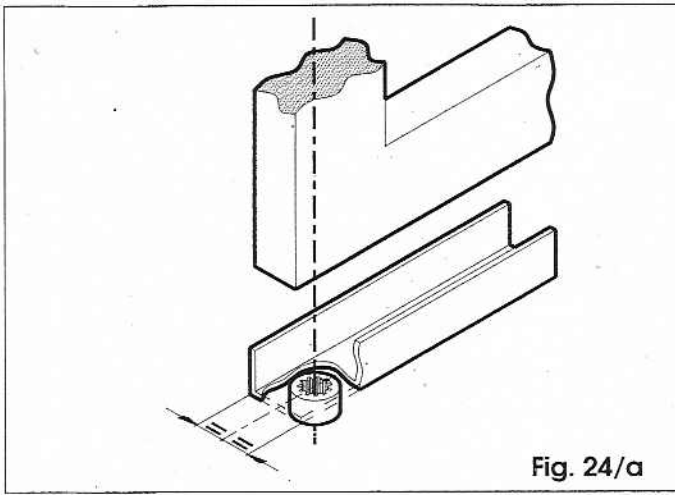


Fig. 24/a

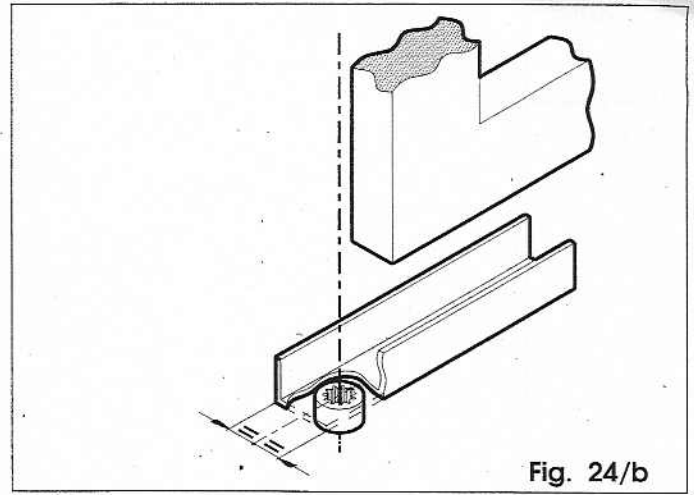


Fig. 24/b

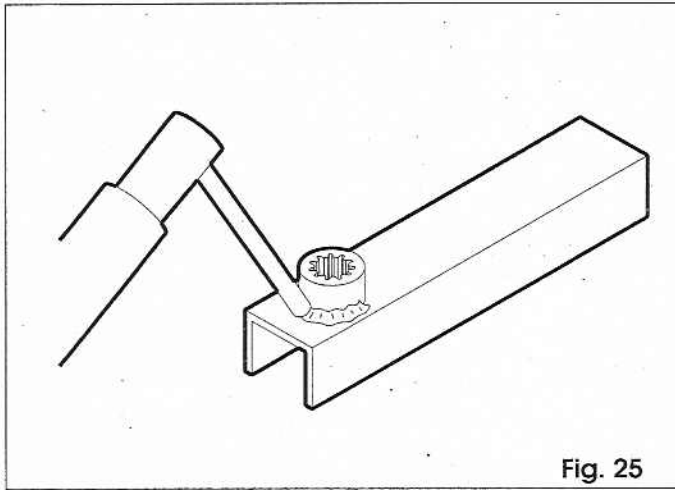


Fig. 25

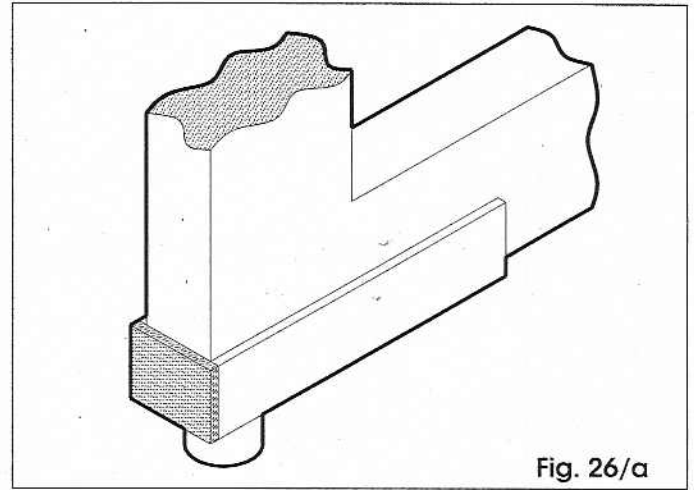


Fig. 26/a

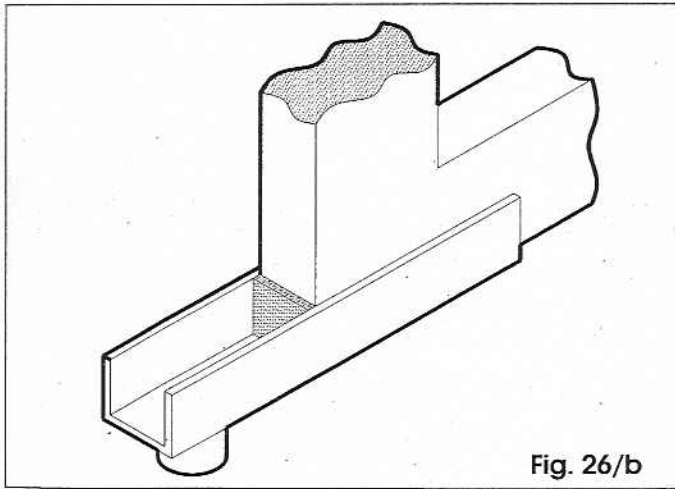


Fig. 26/b

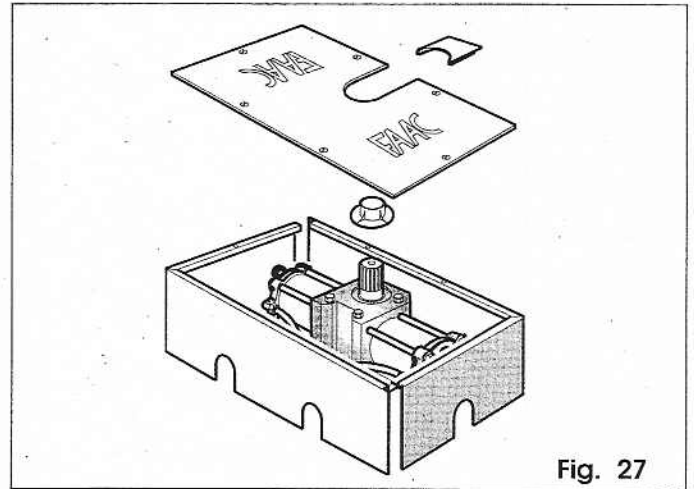


Fig. 27

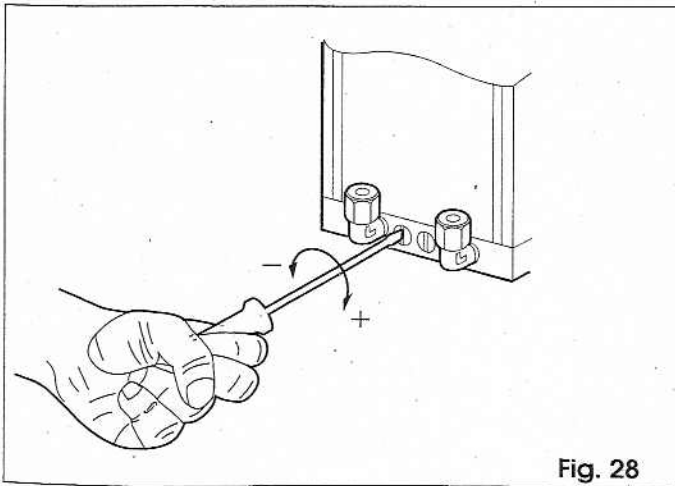


Fig. 28

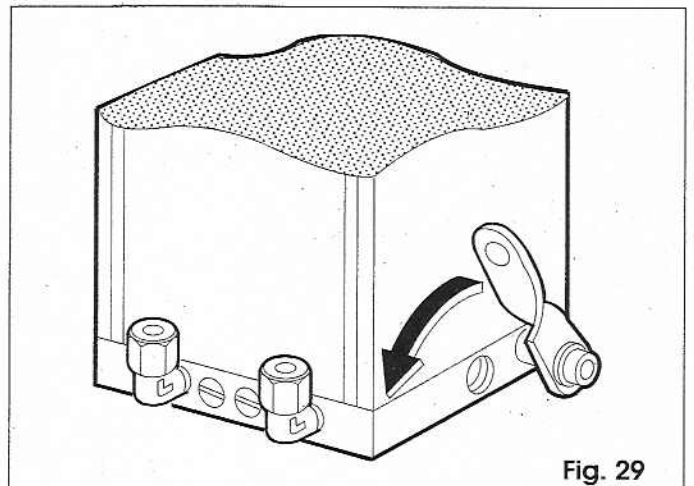


Fig. 29

## THE 750 AUTOMATION SYSTEM

The **750** automation system operates swing gates. It is invisible being installed underground. The system is composed of an underground ram which transmits the leaf movement, and a hydraulic unit positioned on the gate post. The two components are connected by copper or flexible tubes.

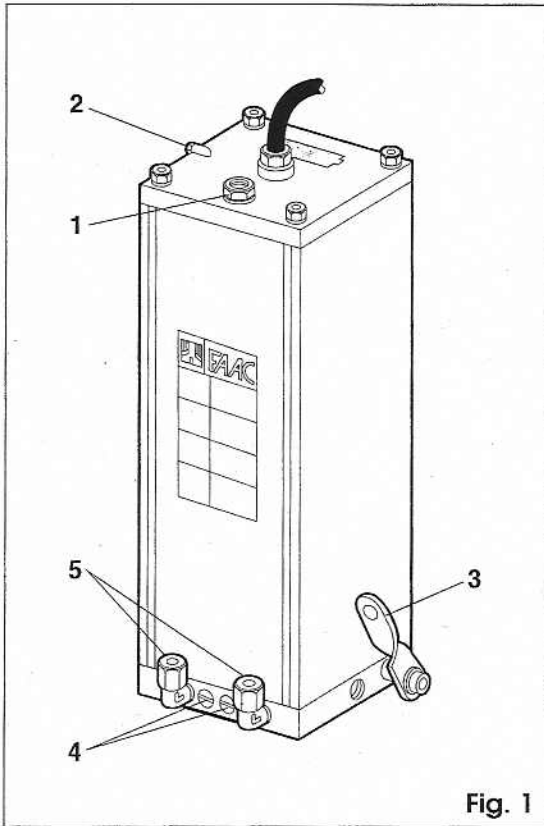


Fig. 1

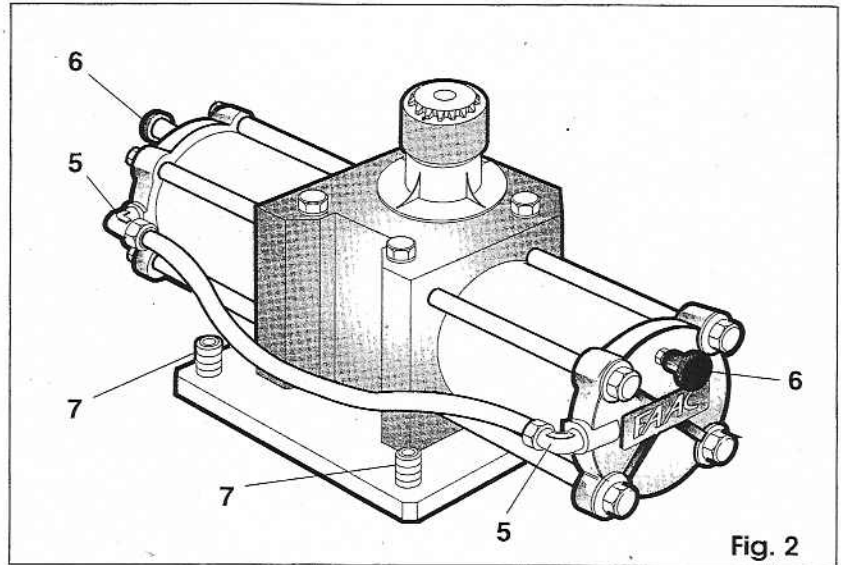


Fig. 2

### 1. DESCRIPTION AND TECHNICAL SPECIFICATIONS

- 1. - Oil filler plug
- 2. - Vent screw
- 3. - Release lever
- 4. - By-pass screws
- 5. - Hydraulic couplings
- 6. - Bleed screws
- 7. - Levelling bolts

**N.B.:** the dimensions shown in the figures are indicated in mm.

Table 1: Technical specifications of the hydraulic unit

MODEL	750 CBAC	750 SB	750 SBS
Power supply	230 V~ (+6% -10%) 50-60 Hz		
Absorbed power	220 W		
Current drawn	1A		
Electric motor	4 pole 1400 rpm		6 pole 960 rpm
Capacitor	16 $\mu$ F		8 $\mu$ F
Power cable length	90 cm		
Motor winding thermal cutout	120 °C		
Duty cycle	see paragraph 1.1		
Quantity of oil	1 litre		
Type of oil	FAAC OIL XD 220		
Ambient temperature range	- 20 °C + 55 °C		
Housing protection	IP 54 (with suitable cable /pipe sleeves)		
Weight	7,5 Kg		
Pump delivery	0.75 l/min		0.5 l/min
Max. operating pressure	60 bar		30 bar
Max. length per leaf	1.80 m	2.5 m	3.5 m
Hydraulic lock	opening/closing		no



Table 2: Technical specifications of the hydraulic ram

MODELS	100° RAM	180°RAM
Max. weight per leaf	800 Kg	
Max. angle of rotation	118 °	200°
Max. torque	543 Nm (750 CBAC/SB) - 272 Nm (750 SBS)	
Angular speed	0.13 rad / s (750 CBAC/SB) - 0.09 rad / s (750 SBS)	
Quantity of oil	0.3 l	0.5 l
Housing protection	IP 67	
Weight	8 Kg	9 Kg

1.1. MAXIMUM DUTY CYCLE CURVE

The curve makes it possible to determine maximum operating time (T) on the basis of duty cycle (F).

For example: 750 CBAC/SB operators can run continuously at a duty cycle of 60%.

To ensure a smooth running, operation should be kept within the area below the duty cycle curve.

**IMPORTANT NOTE:** The curve has been plotted for operation at 24°C. Allow a reduction of up to 20% in the duty cycle if the system has to operate in direct sunlight.

CALCULATING THE DUTY CYCLE

The duty cycle is the percentage of actual operating time (opening and closing) compared with total cycle time (opening + closing + pause time).

In practice:

$$\%F = \frac{TA + TC}{TA + TC + TP + TI} \times 100$$

Where:

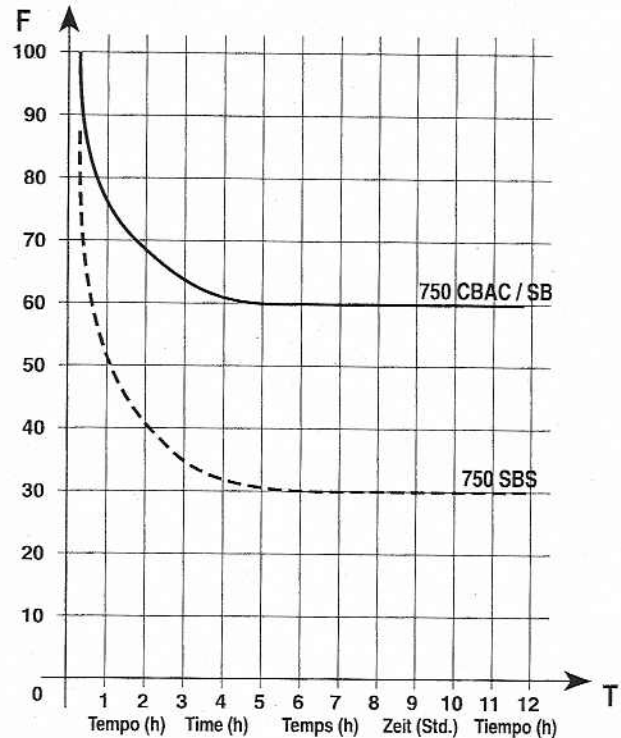
TA = opening time

TC = closing time

TP = pause time

TI = time between one complete cycle and the next.

Percentuale di lav. %    % Duty cycle    % Fréquence d'utilisation    % Benutzungs-frequenz    % Frecuencia de utilización



2. IMPORTANT NOTES

Read these instructions carefully before installing the gate automation system. Keep these instructions for future reference.

Installation and electrical wiring must conform to current standards.

Switch off power supply before performing any work on the electronic control unit.

Install a **10 A** thermal-magnetic differential switch with **0.03 A** trip threshold up-line from the electrical system.

**FAAC** accepts no responsibility for damage or injury resulting from the incorrect use of this gate automation system.

**Important:** Read carefully and then submit to the end-user the leaflet provided with the system.

3. INSTALLATION

3.1. PRELIMINARY CHECKS

To ensure a trouble-free operation, make sure that the gate (whether existing or yet to be installed) has the following specifications:

- max. weight of single leaf 800 Kg
- max. length of single gate leaf 3.5 m (see table 1)
- strong and rigid leaf frame
- smooth gate movement, with no stiff points
- well state of existing hinges
- mechanical travel stops

If any welding or brazing has to be done on the gate, do this before installing the automation system.

The good order of the structure directly influences the reliability and safety of the automation system.

Repeat the above operations a few times on both bleed screws.

- 9) Top up the oil level to the notches embossed in the dip-stick of the oil filler plug (fig. 20). Use exclusively FAAC XD220 to complete the top up.

### **3.6. SETTING UP THE GATE**

- 1) Free the system (see paragraph 6)
- 2) **Turn the grooved bushing, fitted on the pinion, in the closing direction until it stops.**
- 3) To avoid that the piston reaches the internal mechanical stop, **rotate the bushing 5 degrees in the opening direction.**
- 4) Prepare the gate's guide bracket as follows:
  - Use a 'U' profile of the dimensions given in fig. 23.
  - Position the profile on the grooved bushing in the 'leaf closed' position.
  - Ascertain the correct location for the bushing to suit the position of the gate with respect to the axis of rotation (fig. 24/a-b).
  - Spot weld the bushing to the profile in two points.
  - Check that the system is correctly phased by simulating a complete opening.
  - Complete the welding of the bushing to the profile (fig. 25).
  - Seal the 'U' profile on the post side with a plate as shown in fig. 26/a-b.
- 5) Grease the pinion of the ram.
- 6) Fit the guide bracket over the pinion in the previous "leaf closed" position.
- 7) Fit the gate into the guide bracket and fix the top hinge.

**N.B.** The gate must rest on the guide bracket. If necessary increase the height of the ram support by turning the levelling bolts clockwise (fig. 2 - ref. 7).

**IMPORTANT:** To ensure trouble-free operation, **do NOT weld the leaf to the guide bracket or to the bushing.**

- 8) Check by hand that the gate is free to open completely and stops on the outside travel stops and that the leaf motion is smooth and there are no stiff points.
- 9) Fit the protective cover of the ram as in fig. 27.
- 10) Set the box in cement.  
If the box cover is fixed buckling will be avoided.

## **4. START-UP**

### **4.1. CHECKING THE DIRECTION OF ROTATION**

- 1) Cut-off the power to the electronic control unit.
- 2) Move the gate manually to half the opening angle
- 3) Lock the system (see paragraph 6).
- 4) Restore the power.
- 5) Send an OPEN signal and check that this makes the gate to open.

If the first OPEN signal makes it close, the phases of the electric motor must be inverted on the terminal strip of the electronic control unit. (brown and black wires).

### **4.2. ADJUSTMENT OF THE OPERATING TIME**

The open/close time is programmed by the electronic control unit (see relevant instructions).

To achieve optimum efficiency of the hydraulic locking system, programme the open/close time so that the electric motor is powered for a few seconds after the leaf reaches the mechanical stop.

### **4.3. ADJUSTMENT OF THE ANTI-CRUSHING SYSTEM**

The 750 automation system is equipped with an anti-crushing safety system that stops the gate should an obstacle be encountered.

Adjust the anti-crushing system's torque according to current standards.

FAAC recommends that 15 Kg are never exceeded at the outer edge of the gate.

Use a linear dynamometer to ensure that the force at the outer edge of the gate is measured accurately.

3) Connect up the cables to the electronic control unit (see relevant instructions).

**N.B.** During the installation the cover must be removed temporarily. This must be done with extreme care to avoid damaging the hinges.

### 3.4. HYDRAULIC CONNECTIONS

The ram must be connected to the hydraulic unit with copper pipe ( $\varnothing 6/8$  mm) or flexible hose ( $\varnothing 4/8$  mm).

#### Copper pipe

Before installation, the pipe should be cleaned thoroughly with compressed air.

- 1) Close the end of the pipe with adhesive tape.
- 2) Fit the copper pipe into the PVC tube laid earlier, from the unit to the ram.
- 3) Bend the copper pipe so that for at least a few centimetres it reaches the couplings straight in-line. (fig. 15-16).

The unit coupling next to the green by-pass screw must be connected to the ram coupling found outside the property (fig. 17-ref. A).

The unit coupling next to the red by-pass screw must be connected to the ram coupling found inside the property (fig. 17-ref. B).

These connections allow the force exerted on the gate to be adjusted during opening by the green by-pass and during closing by the red by-pass.

**N.B.:** Make wide bends to avoid throttling (fig. 15-16).

- 4) Remove the tape at the end of the pipe.
  - 5) Cut the pipe with a suitable tool.
- During this operation maximum cleanliness must be maintained
- 6) Repeat the above operations to lay the second copper pipe.
  - 7) Fix the copper pipes to the unit and ram couplings using the tips provided as shown in fig. 18.
  - 8) **Remove the vent screw** from the unit as in fig. 19.
  - 9) Top up the oil level according to the references embossed on the dip-stick on the oil filler plug (fig. 20).

The FAAC XD 220 oil can provided will fill up the run of the pipe for a length of about 2 metres.

If the length of the run is longer, use exclusively FAAC XD 220 to complete the top up.

#### Flexible hoses

To facilitate the laying of the hydraulic connections, above all with long, tortuous runs, use flexible hoses. After having laid the hose and determined its length as explained above, fix with suitable couplings as shown in fig. 21.

### 3.5. BLEEDING

During the connection of the hydraulic unit to the ram it is inevitable that air will enter the system.

Air found in the hydraulic circuit causes irregular movement of the leaf and noisy operation.

Proceed as follows to bleed the air from the system:

- 1) Give an open signal to the gate.
- 2) While the gate is opening, remove the cap and slacken off the opening bleed screw (fig. 17 ref. D) as shown in fig. 22.
- 3) Wait until only clear, bubble free oil flows out.
- 4) Tighten the bleed screw again before the operator reaches the end of the opening cycle.
- 5) Give a closing signal to the gate.
- 6) While the gate is closing, remove the cap and slacken off the closing bleed screw (fig. 17 - ref. C) as shown in fig. 22.
- 7) Wait until only clear, bubble free oil flows out.
- 8) Tighten the bleed screw again before the operator reaches the end of the closing cycle.



### 3.2. INSTALLATION OF THE RAM (Fig. 3)

The operating conditions that may be found when installing the system, with the relevant actions necessary are listed below:

a) existing gate with fixed hinges

- Remove the gate,
- Remove the bottom hinge

If the gate cannot be removed, place blocks under its bottom edge to support it.

b) existing gate with adjustable hinges

- Remove bottom hinge.
- Slacken off the top hinge.
- Swing the leaf around the axis of the top hinge (fig. 4)

c) new gate to be installed

- Fit just the top hinge, if possible use an adjustable hinge.

**N.B.:** By maintaining a minimum distance of 60 mm between the hinge rotations and the post the need to cut into the post can be avoided (fig. 6/a).

- 1) Dig out a hole as shown in fig. 5.
- 2) Bend the base plate anchors.
- 3) Cement in the plate perfectly level as shown in fig.'s 6/a-b.
- 4) Lay down the PVC tube of diameter 32mm for the passage of the copper pipe. The tube must reach the hydraulic unit (fig. 7).

Any bends in this run must be made with wide bends to avoid throttling which would prevent the subsequent passage of the hydraulic tubing.

In alternative, copper pipes can be laid on site, with a suitable pipe bender, to be subsequently sheathed (fig. 8).

It is recommended, moreover, to provide a second tube to drain off rain water, which runs from the box to the nearest drain.

**N.B.:** To lay the tubes correctly temporarily position the cover of the ram (fig. 7/8).

- 5) Wait for the concrete to set in the hole.
- 6) Set the ram on the base plate as shown in fig. 6/a-b, ensuring that it does not rest on the levelling bolts (fig. 2 - ref.7).

**The axis of the pinion must be perfectly aligned with the rotation axis of the leaf.**

**N.B.:** To facilitate positioning of the ram a special **telescopic template** to be used as in fig. 9 is available as accessory.

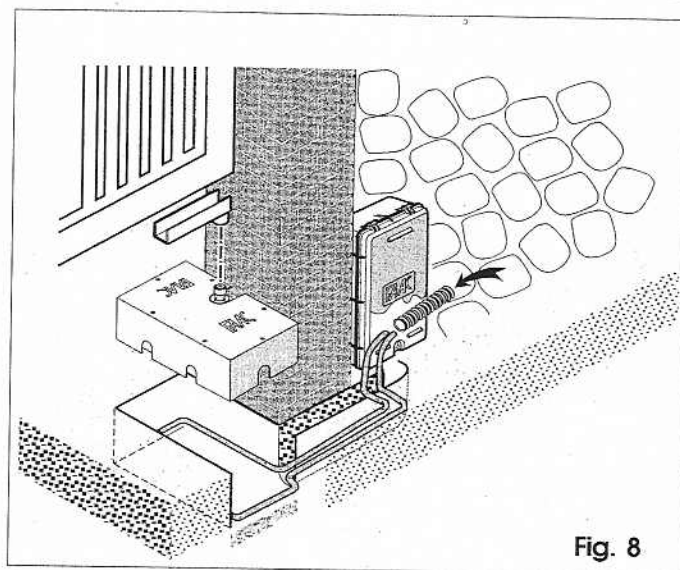
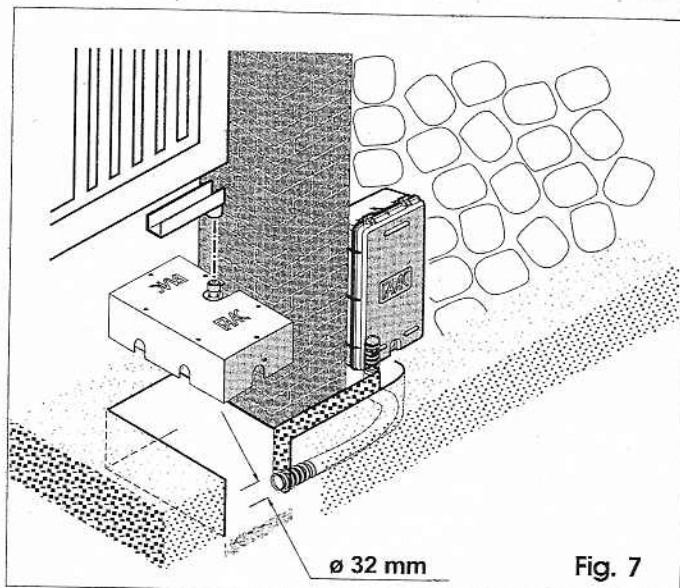
- 7) Put the 'C' brackets provided at the base of the ram and weld them directly onto the base plate as shown in fig. 10.

**IMPORTANT:** do NOT weld the ram base to the base plate or to the 'C' brackets.

### 3.3. INSTALLING THE HYDRAULIC UNIT (fig. 11)

- 1) Set the box as close as possible to the ram. The maximum distance is 20 metres. The box can be wall mounted (fig. 12) or flush-mounted (fig. 13). In both cases use the back plates provided.
- 2) Lay the PVC tube of diameter 16mm, through which to pass a 4 core electrical cable, to reach the electronic control unit.

To make the box waterproof use the appropriate pipe/box fittings (fig.14).



Turn the by-pass valve screws as shown in fig. 28 to set the anti-crushing system's threshold.

- The red screw adjusts torque in the closing cycle.
- The green screw adjusts torque in the opening cycle.

Turn the screws clockwise to increase torque.

Turn the screws anti-clockwise to decrease torque.

## **5. SAFETY**

The 750 automation system has anti-crushing valve screws that, if correctly adjusted, represent high safety and reliability.

Nevertheless, FAAC recommends that the system be always provided with other safety devices considering both current standards and the potential hazard, determined by the following parameters:

- installation environment (industrial, public, private, etc.)
- operating logic of the system (automatic, dead-man control, etc.)
- dimensions of the automated structure (length, weight, etc.)

The safety devices (e.g. photocells, safety edges, etc.) will protect the areas exposed to crushing, entrapment and general hazards, during the gate movement.

If access to the gate involves the passage of vehicles, install suitably an underground magnetic loop to detect the presence of metallic masses in this zone and thus avoid inopportune gate movements.

Furthermore, FAAC considers that it is indispensable to use at least one warning light for each installation (e.g. FAACLAMP, MINILAMP, etc.) as well as a warning plate appropriately fixed to the gate structure.

These devices will caution any person who may be in proximity of the access of the automatic movement of the gate and therefore a possible source of hazard.

Before installing the automation system all the structural modifications must be made, from the creation of safety zones and protection and/or isolation of all the zones exposed to cutting, entrapment and crushing. The electric plant must be earth connected and in respect of current standards.

## **6. MANUAL OPERATION**

If the gate has to be operated as a result of a power failure or malfunction, free the gate with the release lever as in fig. 29.

To lock the system again return the release lever to its original position ensuring that it is firmly set.

## **7. MAINTENANCE**

The oil level should be controlled periodically using the references on the dip-stick of the oil filler plug (fig. 20). With medium to low duty cycles it is sufficient to check it every 4 years. A control every two years is advisable with heavy duty cycles.

Any top ups must be made exclusively with FAAC XD 220 oil.

It is also necessary to check periodically both the correct adjustment of the by-pass screws and the efficiency of the release system (see relevant paragraphs).

Periodical controls should also be made on the gate structure and in particular, the perfect functioning of the top hinge should be checked.

The safety devices must be checked every six months.