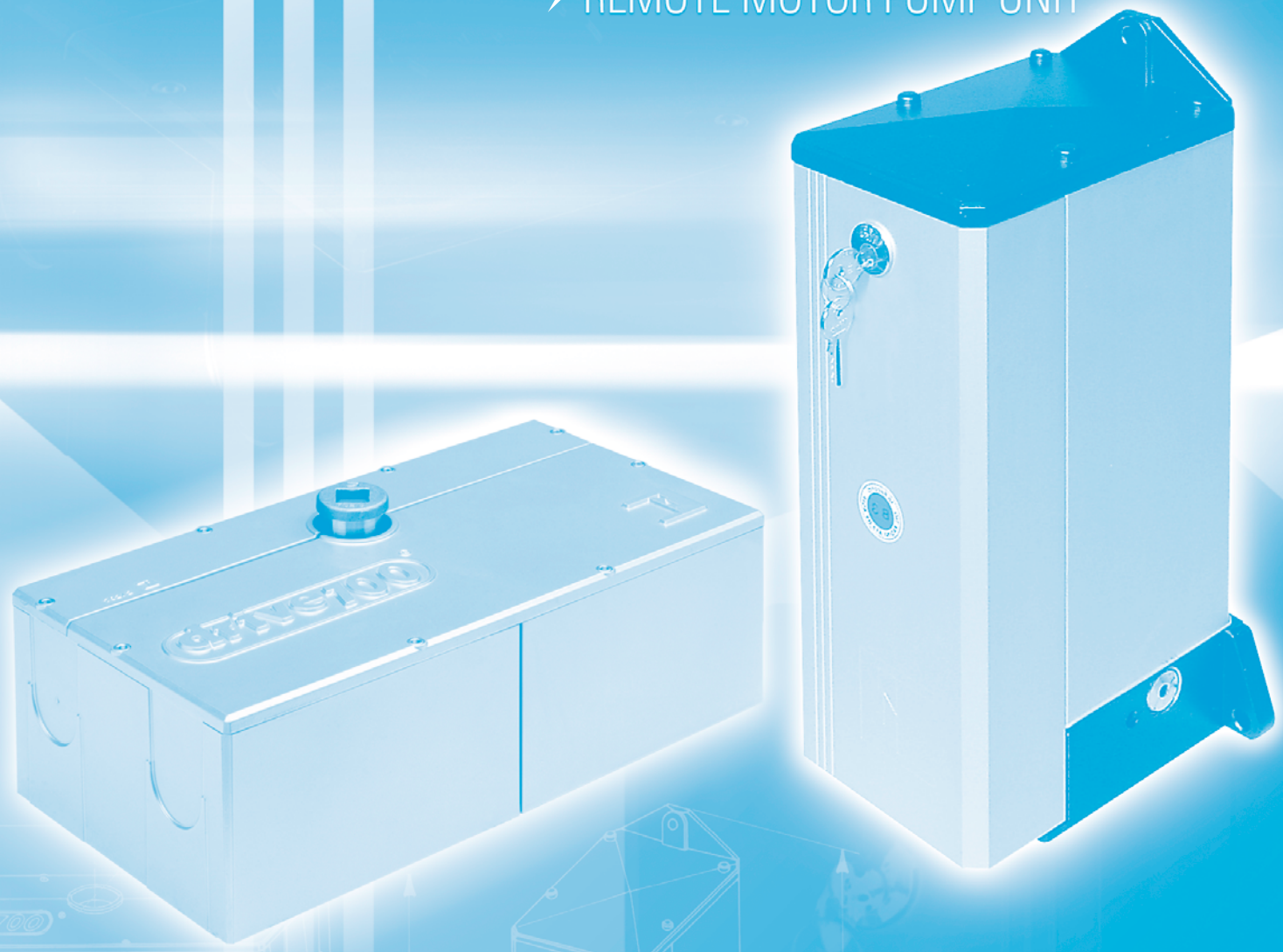
DRIVE 700

- UNDERGROUND OIL-HYDRAULIC OPERATOR
- FOR SWINGING GATES
- REMOTE MOTOR PUMP UNIT



INSTALLATION MANUAL

GB

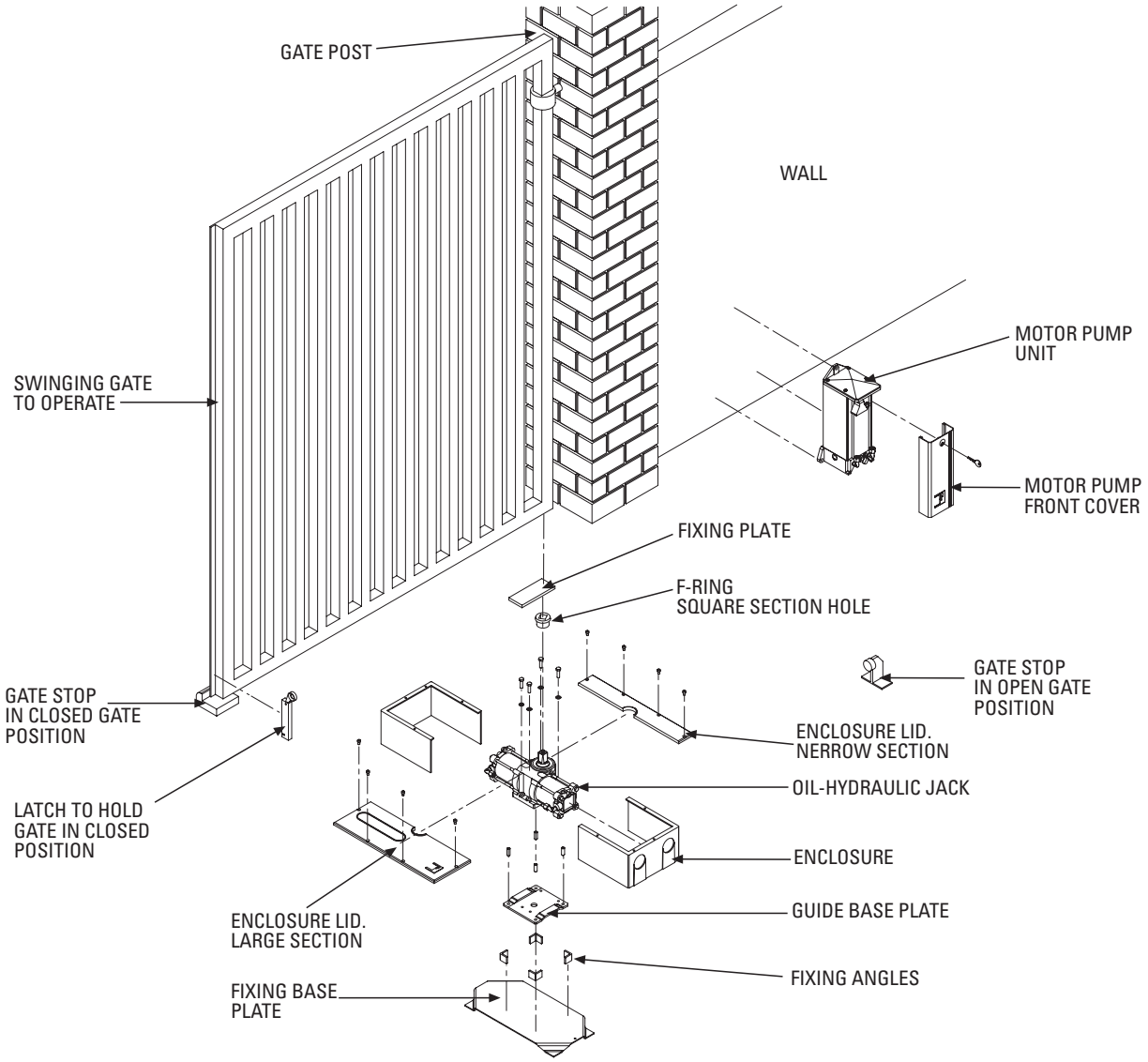
FADINI®
the gate opener

DRIVE 700
INSTRUCTIONS TO INSTALL THE SYSTEM

FOR A PERFECT APPLICATION AND PERFORMANCE OF DRIVE 700 SYSTEM IT IS RECOMMENDED TO KEEP TO THE INSTRUCTIONS AND THE DIAGRAMS IN THIS MANUAL.
IMPORTANT:THE INSTALLATION IS TO BE CARRIED OUT BY QUALIFIED TECHNICAL PEOPLE IN COMPLIANCE WITH EN 12453 - EN 12445 SAFETY NORMS AND 98/37/EC MACHINE DIRECTIVE.

GENERAL FEATURES
DRIVE 700 is an electro-hydraulic mechanism, part of which to be fitted under the ground while the motor pump unit is external and separately fitted, to operate single or double swinging gates. Recommended gate weight is 700 kg per gate.
The two basic versions allow rotation angles of 110 and 175 degrees respectively. Both versions are also available in different options, as follows: **non locking** (an electric lock is recommended to be fitted to the gate/s); **locking** where the gates are **hydraulicaly** locked in any required position by DRIVE 700 in either directions of movement ie. opening or closing; **Braking on Opening and Closing, non Braking**; and eventually they can be **fitted with a flow regulator** to control and keep constant the speed of the gates during the rotation movements.
IMPORTANT: All the above models of DRIVE 700 imply that the gates are fitted with an electric lock in case they are wider than 2 meters.

PRELIMINARY INSPECTION OF THE GATE CONDITION
Before going on fitting DRIVE 700 it is recommended to carry out the following:
- Make sure that the gate structure is adequate to be electrically operated: check that all the metallic parts, if any, are all right and do not show deformation, strengthen possible weak points and inspect the hinges to be in perfect good condition without any friction points etc.
- No obstacle is to interfere with the gate travel: make sure that the ground in the area of the gate movement is levelled.
- The gates are to be well built, mounted straight and aligned.
- **IMPORTANT: Gate stops are to be provided and firmly fixed in the required open and closed gate positions. Verify solidity before operating the system.**



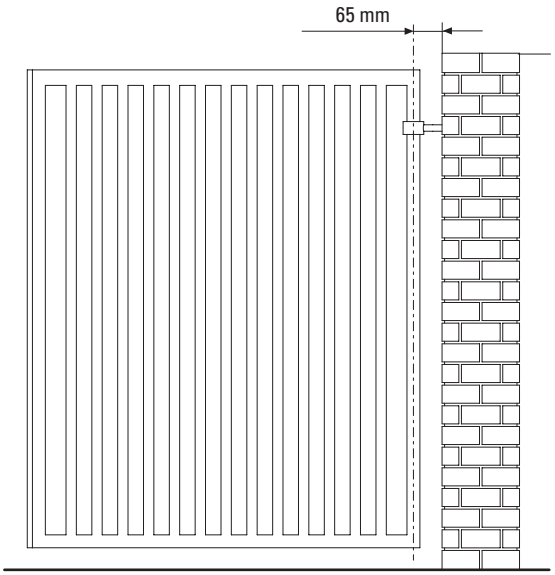
PIC. 1

PREPARING THE GATE

The gate to be operated must be prepared to take the DRIVE 700 mechanism. For a perfect performance of the system, it is most important that the gate is hanged only by the top hinge whereas the mechanism rotation shaft is to provide a seat for the gate and replaces the lower hinge (Pic. 2).

IMPORTANT: Ideally the gate hinge centre line should be approximately 65 mm away from the gate post surface line (Pic.2) With existing gates, it is sufficiente that the DRIVE 700 jack, ie. the underground mechanism, is positioned closed to the gate post in axis with the centre line of the gate top hinge.

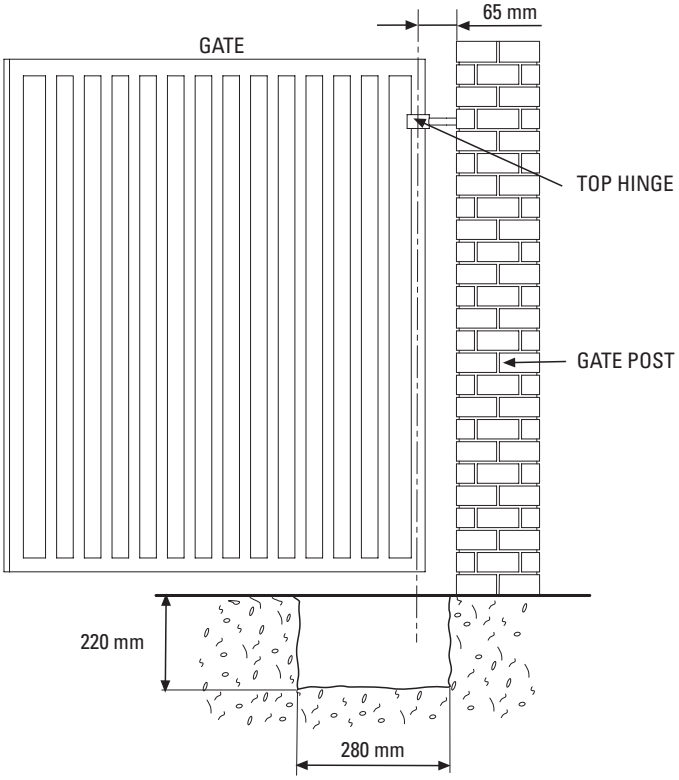
NOTE: With existing gates, remove the lower hing and fit the shaft ring in compliance with the indications provided on page 4, "Putting the jacks in phase".



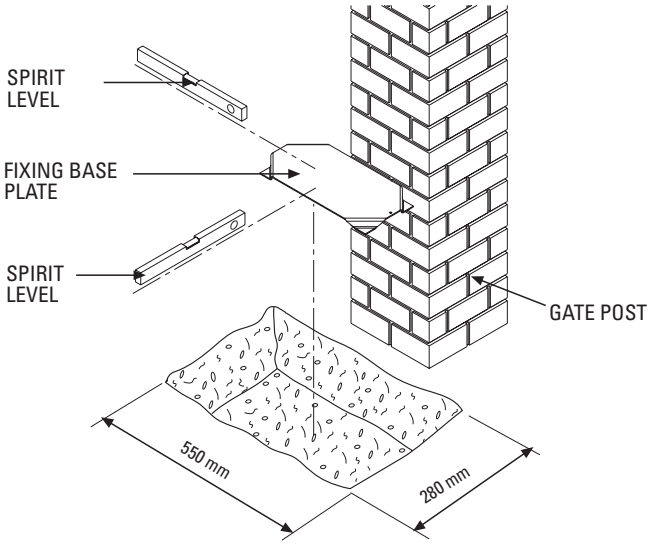
PIC. 2

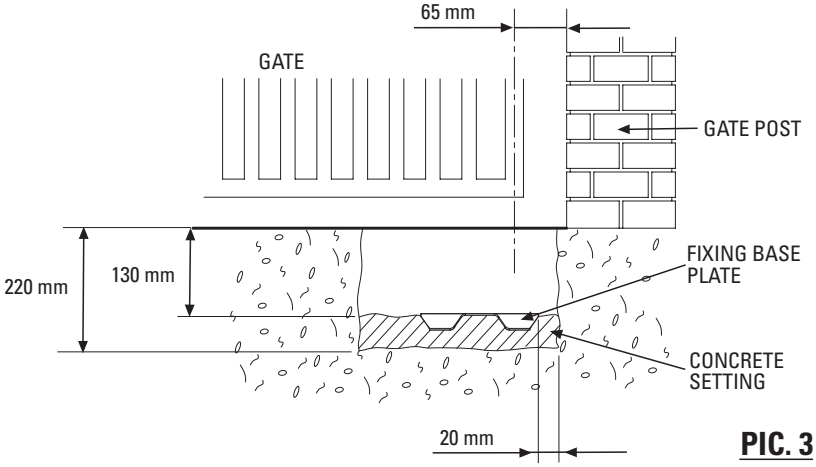
FITTING THE JACK

- Dig a hole in the ground at the gate foot, close to the gate post, as indicated in Pic. 3.
  IMPORTANT: The dimensions indicated are in consideration that the hole has to be large enough to accomodate the jack, to fit the two halves of the enclosure around it, and the piping between the jack and the external motor pump unit (read the section "installation of the motor pump" on page 5).
- Set the **fixing base plate** with concrete at the bottom of the hole ie. 130 mm deep from ground level. Make sure that it is perfectly straight and levelled as it is to take the **hydraulic jack** on to it and ensure that the shaft center and the top hinge center are aligned on the same axis.
- Let the concrete set well around the **fixing base plate** so this can provide a firm setting to further operations (Pic.3).



ESCAVATE UNDER THE GATE FOOT CLOSE TO THE GATE POST

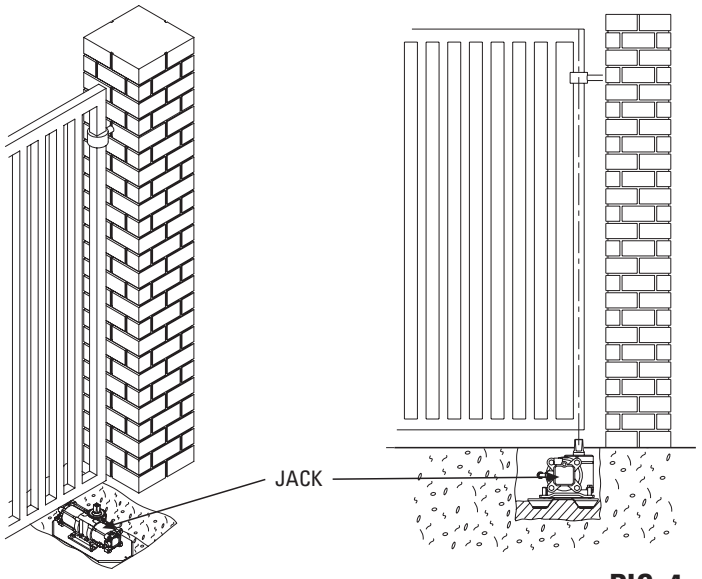




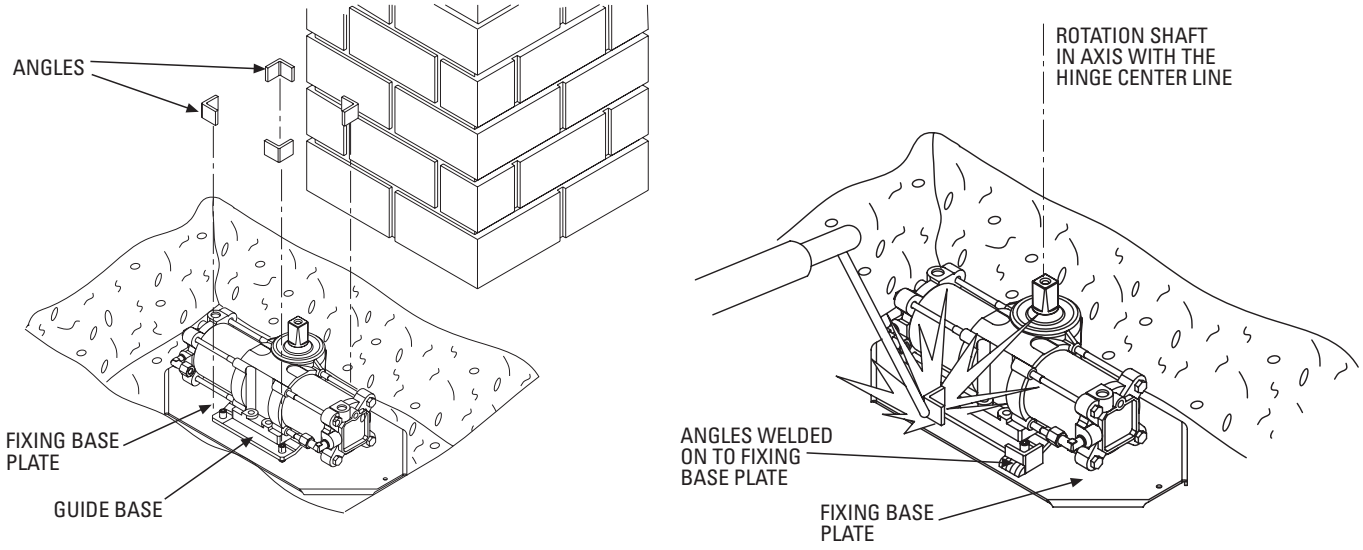
PIC. 3

- Lay the **jack**, which is fitted with a **guide base plate**, on to the **ground fixing base plate**.
- Make sure that the **jack**, once fitted on to the base plate fixed to the ground, has the shaft straight with the top hinge center line: a "plumb line" is recommended in this case to ensure that the jack shaft is in true vertical position (Pic.4).
- Weld the four **angles**, provided with the equipment, on to the **ground fixing base plate** to match the position of the corners of the jack **base plate**, to keep the **jack** in the correct position (Pic.5).

NOTE: Before fixing the corners, operate the gate manually open and closed to assess smoothness and alignment.



PIC. 4

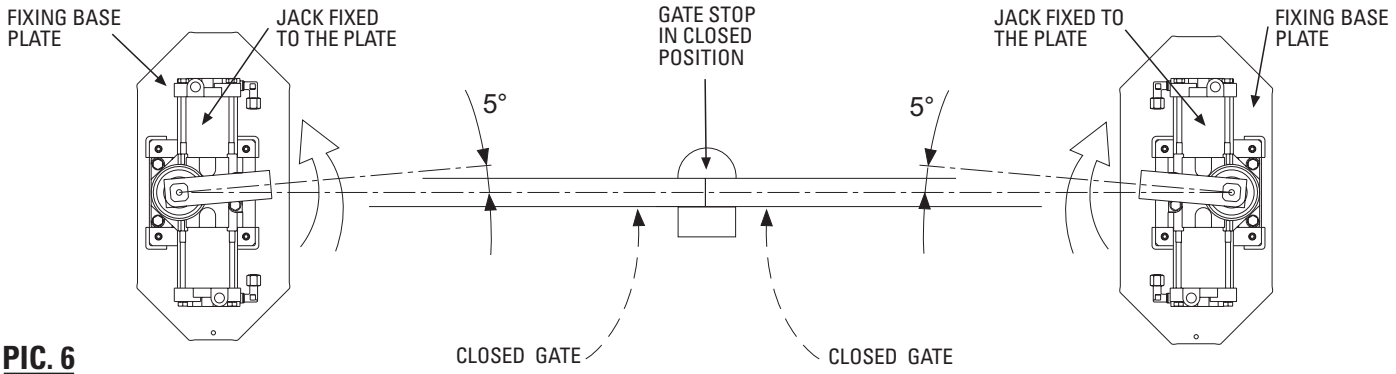


PIC. 5

PUTTING THE JACKS IN PHASE

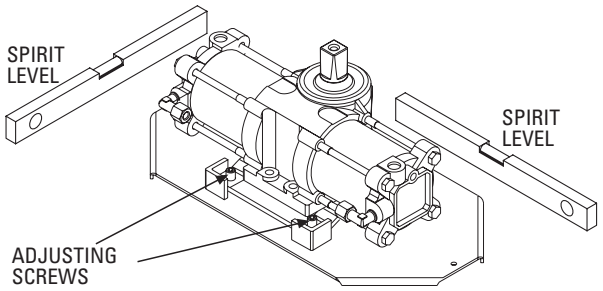
The **oil-hydraulic jack** is to be fitted to the gate by means of a specially designed **ferrule (f-ring)** having **a square center hole**.
A reinforcement plate is generally recommeded to fix the F-ring to the gate foot. Before this operation, it is needed to **put the jacks in phase**: that is to say to set the **jack shaft** in the required position to achieve correct gate operation by rotating the shaft to the limit of the permitted stroke in closed gate position; this is to be done before welding the **angles** on to the **fixing base plate** and before piping the jack to the **motor pump unit**.
PLEASE NOTE: It is extremely important that the jack shafts are in the correct phase to ensure that the gates are properly and securely driven to close position and the setting is maintained for long time.

- By means of a **wrench rotate the jack shaft until you can feel that the limit of the permitted stroke in closed gate position is reached**: in this position it can be noted that one of the flattened sides of the shaft is now positioned 5 degrees beyond the closed gate line (no need to rotate hard, as the jack is not piped yet and no fluid is inside it yet).

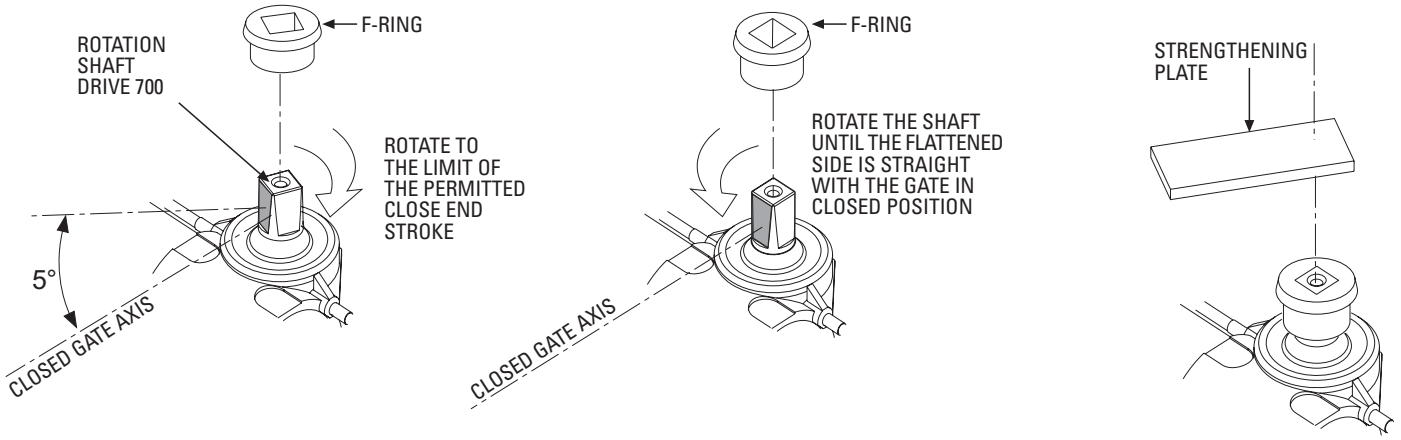


PIC. 6

- Make sure that the **hydraulic jack** is perfectly levelled before fixing the **F-ring** by tightening or loosening the **adjusting screws** in the jack **guide base** (Pic.7). A spirit level can be used to assess levelling.
- Fit the **F-ring** to the jack shaft and indelibly mark it so that the required shaft fitting position can be noted on it (this is quite simple as both the shaft and the F-ring have four flattened faces).
- Remove the **F-ring** from the shaft (Pic.8)
- Rotate the shaft back by a **wrench** so that the nearest flattened "face" is aligned with the gate in closed position.
- Fit the F-ring back to the shaft in the same position as marked before.
- Before definitely fixing the parts, spot weld the **F-ring** to the **plate** and the plate to the gate and carry out some maual open and close operations of the gate.



PIC. 7



PIC. 8

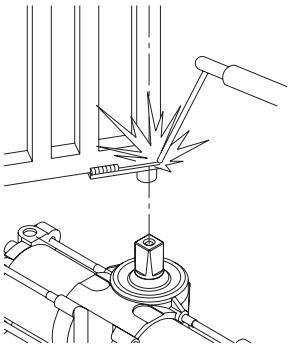
- Weld the **F-ring** to the gate foot and interpose a **strengthening plate** between them, making sure that the parts are vertically straight with the gate top hinge center line and that the fixing geometry has been strictly respected as indicated before. Perfect alignment of the DRIVE 700 shaft with the gate hinge is essential to the correct operation of the gates (Pic.9).

FITTING THE MOTOR PUMP UNIT

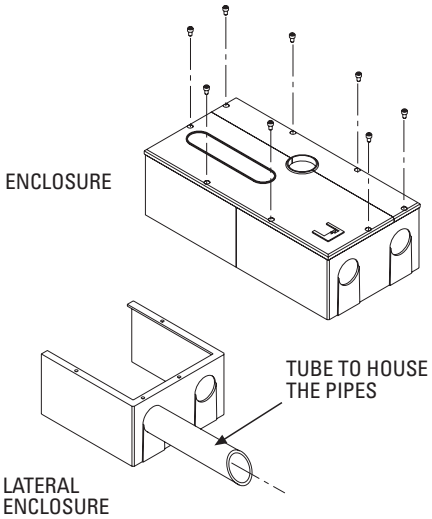
The **hydraulic motor pump unit** is to be fitted at a suitable distance from the **jack** so as piping can be as easy as possible in respect of the site requirements. It is also to be considered that an easy access to the internal parts of the **hydraulic motor pump unit** is recommended during the fitting operations and to be able to override the system for manual operations in events like an emergency or power failure.

PLEASE NOTE: for gates wider than 2 meters it is always recommended to use the non locking version of the motor pump unit and fit the gates with an electric lock

- Before starting the piping operations, bring the **enclosure** "apart". Drill a hole in the lateral component, where piping is required, the size of the hole must be adequate to take a tube through it , into which the **pipes** from the **motor pump unit** to the jack are to be laid (Pic.10 and 12).



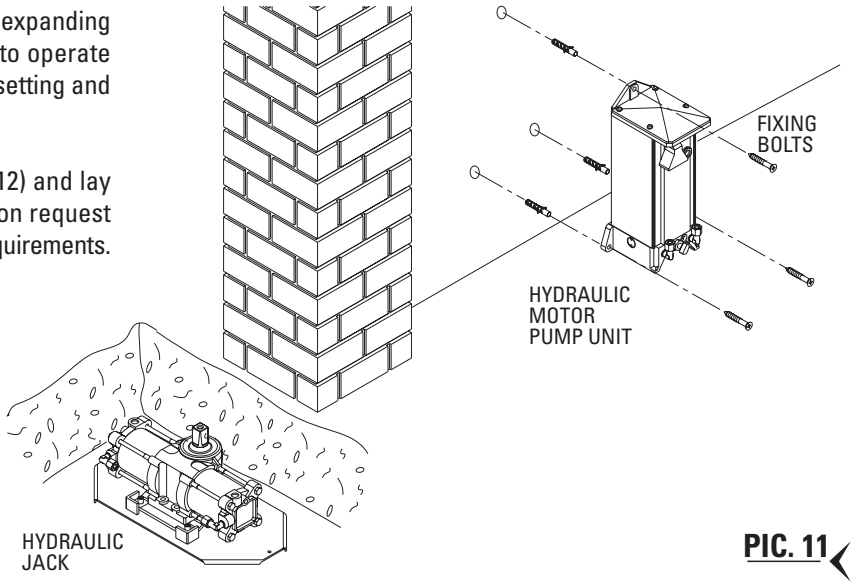
PIC. 9



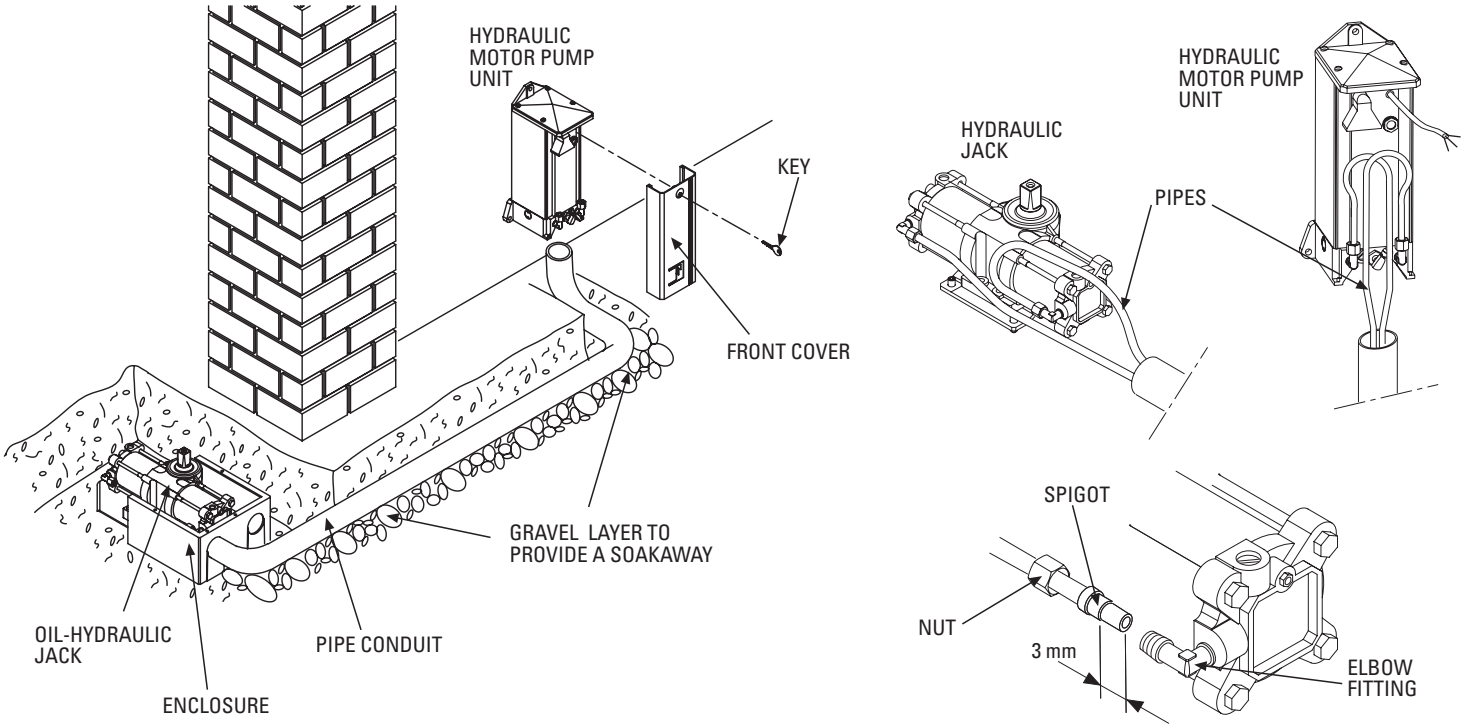
PIC. 10

- Fix the **electro-hydraulic motor pump unit** by means of expanding bolts (not included). It is to be fixed close to the gate to operate in the most suitable position considering all the fitting, setting and testing operations involved.

- Excavate between the **jack** and the **motor pump** (Pic.12) and lay a tube to house the pipes: copper pipes are supplied on request in one length to be bent on site to meet the application requirements.



PIC. 11



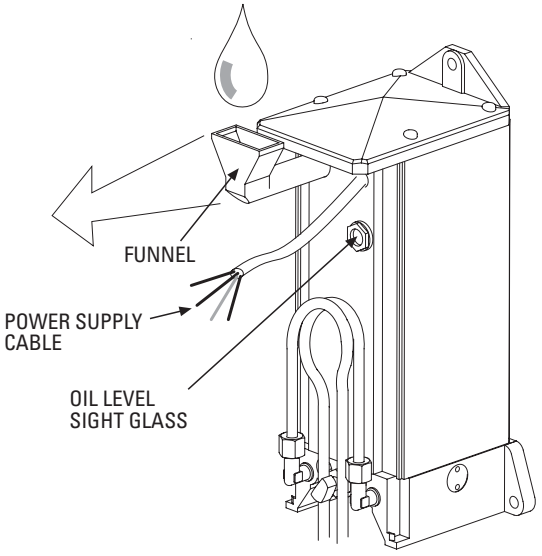
PIC. 12

IMPORTANT: Avoid sharp bending in the pipes between the motor pump unit and the jack; make sure that all nuts in the jack and motor pump are well tightened.

- Assemble the **enclosure** around the **jack** and fix it with concrete. Fill in the whole escavation from the hole where the **jack** is located to the **motor pump unit** where the pipes are laid.

FILLING THE MOTOR PUMP WITH POWER OIL

- Unlock the **motor pump front cover** by the provided key and remove it. Incorporated in the **motor pump unit** is a **funnel**. Pull it outwards (2 cm approx.) and turn it up (Pic. 13).
- The power oil, supplied with the equipment in a 3 ℓ container, is to be poured up to the sight glass.

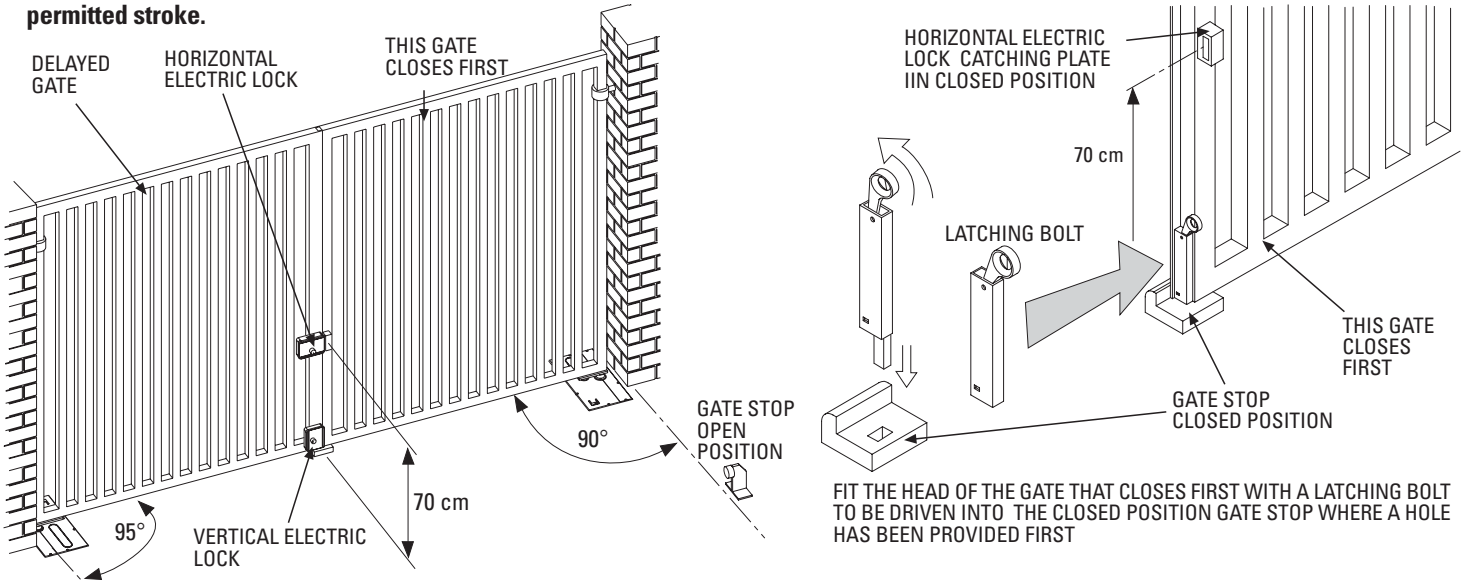


PIC. 13

FITTING THE ELECTRIC LOCK, THE MECHANICAL LATCHING BOLT AND THE GATE STOPS

It is recommended to fit the gates with an electric lock either vertically or horizontally positioned (70 cm high from ground level in the second case) in order to better hold the gates in the closed position. The gate that is fitted with the electric lock is to be 5 degrees out of phase against the other one and has to reach the stop closed position a bit later than the gate that is fitted with the catching plate. In the case where the gate lock is horizontally fitted, it is also needed to fit a latching bolt to the gate that first reaches the gate stop. The bolt is latched into the gate stop by the other ie. the delayed gate on approaching the gate stop (Pic.14).

IMPORTANT: Provide the installation with gate stops in the open gate position to be fixed 5° before the jack reaches the very end of the permitted stroke.



PIC. 14

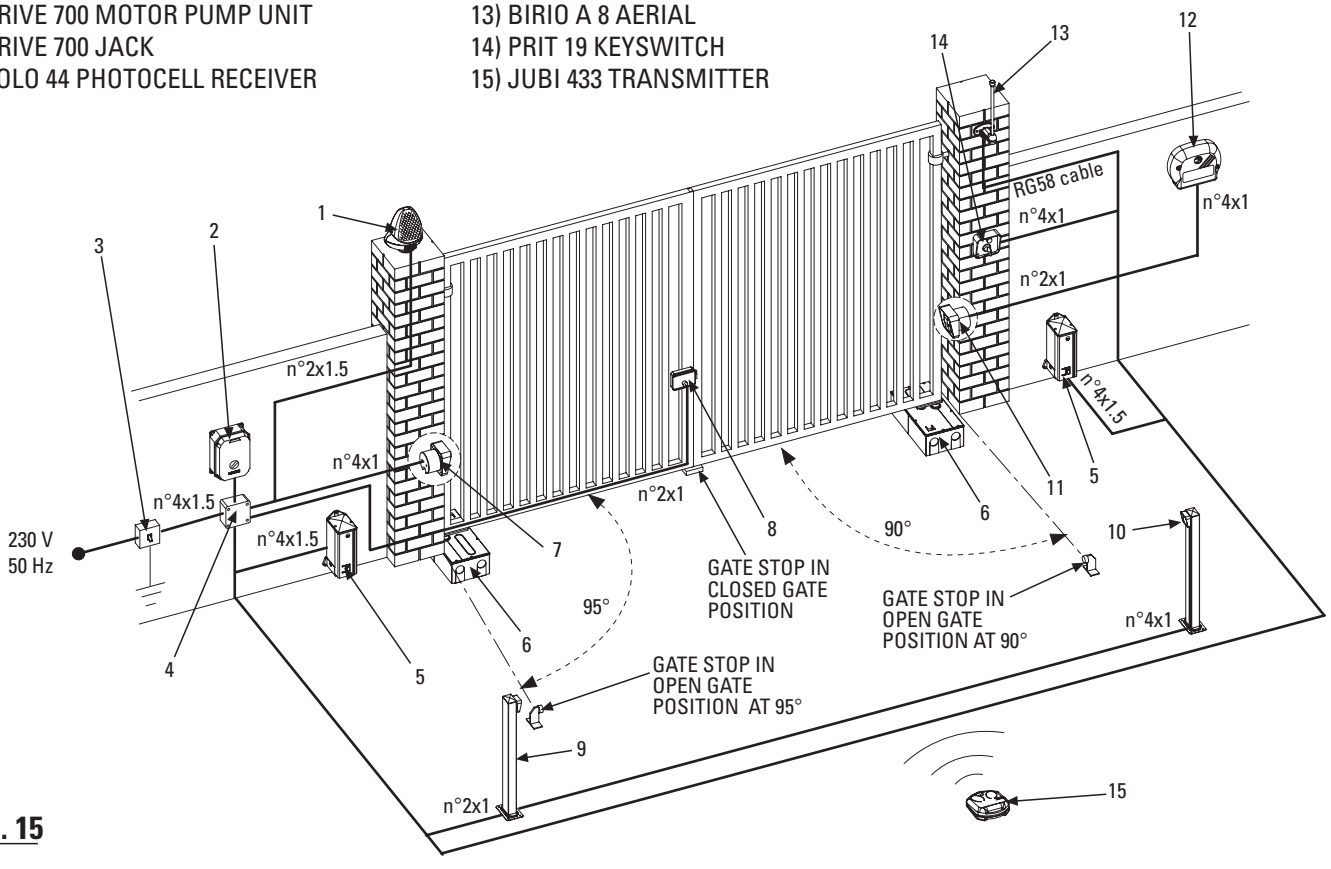
ELECTRICAL CONNECTIONS TO ELPRO 13 CEI CONTROL PANEL

Before carrying out any electrical connections read the enclosed electrical wiring diagrams (Pic.15).

IMPORTANT: All the equipment must be properly **earthed** (Pic.15).

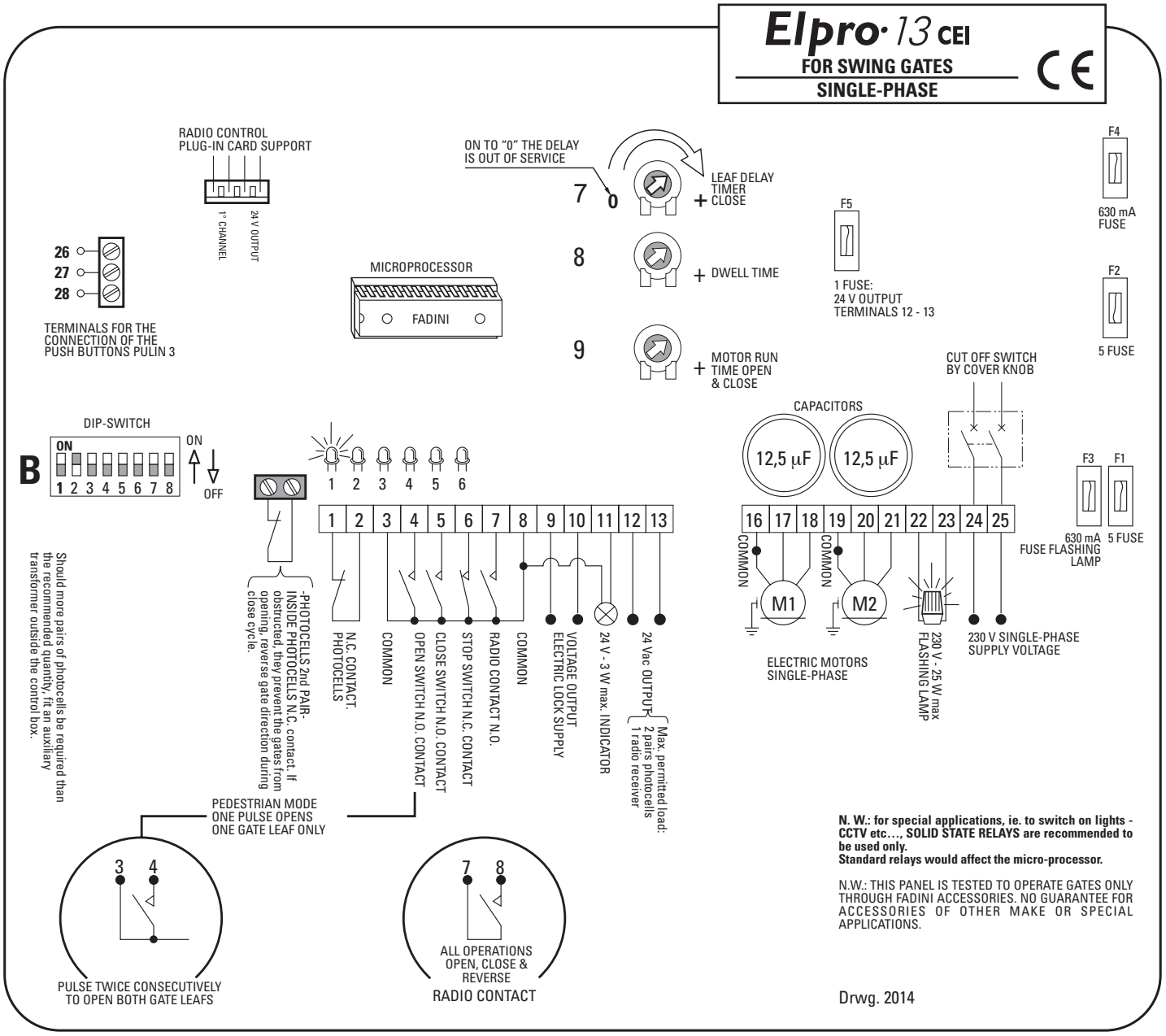
- The **mains, electric motor and flashing lamp** wires must have a 1.5 mm^2 square section for a max. distance of 50 m in case that a longer distance is required, section must be 2 mm^2.
- 1 mm^2 square section wires can be used for the **accessories** such as the **photocells, keyswitch etc.**

1) MIRI 4 FLASHING LAMP
2) ELPRO 13 CEI CONTROL PANEL
3) 0.03 A MAGNETIC-THERMAL CIRCUIT BREAKER
4) JUNCTION BOX
5) DRIVE 700 MOTOR PUMP UNIT
6) DRIVE 700 JACK
7) POLO 44 PHOTOCELL RECEIVER
8) ELECTRIC LOCK
9) POST-MOUNTED POLO 44 PHOTOCELL PROJECTOR
10) POST-MOUNTED POLO 44 PHOTOCELL RECEIVER
11) POLO 44 PHOTOCELL PROJECTOR
12) JUBI 433 EXTERNAL RADIO RECEIVER
13) BIRIO A 8 AERIAL
14) PRIT 19 KEYSWITCH
15) JUBI 433 TRANSMITTER



PIC. 15

- Carry out all the electrical connections to the **Elpro 13 CEI** control panel
- First running test: set the **Motor Run Time 09** to a value 4-5 seconds higher than the time required by the gates to reach the gate stop; set the **Dwell Time 08** (automatic mode) and **Gate Delay Time in Closing Cycle 07** (in case of double swinging gates) as required, pic. 16:
- **Automatic Mode: Dip-switch "B"** No. **3** set to ON. Once an open pulse is given (to terminals 4 and 8 in Elpro 13 CEI main terminal board, pic.16), the gates are driven to open, stopped for a time as set by the Dwell Time 08 and then automatically re-cycled to close.
- **Semi-automatic Mode: Dip-switch "B"** No. **3** set to OFF. Once an open pulse is given, the gates are automatically operated only to open; a second pulse (to terminals 5 and 8 in the Elpro 13 CEI main terminal board, pic.16) is needed to close the gates.
- **Radio Contact**: terminals 7 and 8 in the Elpro 13 CEI main terminal board, pic.16. Any pulse from a keyswitch, remote control or push button reverses the gate travel (it is recommended to carefully read the instructions provided in the control box).



PIC. 16

FEATURES OF THE ELECTRONIC PROGRAMMER FOR SWINGING GATES

All the electrical connections are to be made as per the following instructions and diagrams. Supply the terminals 24-25 with 230V - 50 Hz single phase voltage. The "red LED" switches on and stays on as long as the board is properly supplied. Through the timer No. 9 you can control the running time of the motor in both cycles, OPEN and CLOSE.

Set it so that the running time of the motor is longer than the actual travel of the gate: set the timer No. 8 -DWELL- ie. the interval between open and re-closing, so that you can meet the required interval of time.

- With the electric motor connected to terminals 19 - 20 - 21: the delay is operative in the "open" cycle, with a factory pre-set time.
- With the electric motor connected to terminals 16 - 17 - 18: the delay is operative in "close" cycle and can be adjusted through the timer No. 7 on to "less" or "more".

LOGIC OF THE ELECTRONIC PROGRAMMER: When a pulse is given, the flashing light switches on. After three seconds the motors start. During the interval before re-closing, the light stays on. When the gates are fully re-closed, the light keeps on flashing for three more seconds and then switches off automatically.

The 3 second interval (pre-flashing) which precedes the actual start of the motors can be eliminated by means of the DIP-SWITCH "B" No.4.

LED No. 1: It switches on when voltage is supplied.
LED No. 2: "PHOTOCELLS". Normally on. It switches off when the photocells are obstructed.
LED No. 3: "OPEN". It switches on when the respective switch is activated.
LED No. 4: "CLOSE". It switches on when the respective switch is activated.
LED No. 5: "STOP". Normally on. It switches off when the respective switch is activated.
LED No. 6: "RADIO". It switches on whenever a pulse is given, either from remote control, keyswitch or push buttons.

DIP-SWITCH **B** SETTING IN ELPRO 13 CEI

N° 1 OFF = PHOTOCELLS. NO STOP IN OPEN CYCLE. REVERSE/CLOSE
N° 2 OFF = REMOTE CONTROL. REVERSE
N° 3 OFF = NO AUTOMATIC RECLOSING
N° 4 OFF = NO PRE-FLASHING
N° 5 OFF = REMOTE CONTROL. NO STOP AND HOLD AS LONG AS BUTTON DOWN. IT OPENS STRAIGHT AWAY
N° 6 OFF = BOTH LEAFS ARE OPERATED
N° 7 OFF = STROKE REVERSING PULSE OUT OF SERVICE
N° 8 OFF = LEAF DELAY OPEN CYCLE. ONE STARTS BEFORE THE OTHER

N° 1 ON = STOP DURING OPEN CYCLE
N° 2 ON = NO REVERSE DURING OPEN CYCLE
N° 3 ON = AUTOMATIC RECLOSING
N° 4 ON = PRE-FLASHING
N° 5 ON = STOP AND HOLD AS LONG AS THE BUTTON IS KEPT DOWN
N° 6 ON = PEDESTRIAN. ONE LEAF ONLY GATES IN CLOSED POSITION
N° 7 ON = S. R. P. IN SERVICE GATES IN CLOSED POSITION
N° 8 ON = NO LEAF DELAY BOTH MOTORS START TOGETHER

LAMP ON = GATE OPEN
LAMP FLASHES SLOWLY = GATE OPENING
LAMP FLASHES FAST = GATE CLOSING
LAMP OFF = GATE CLOSED

1) It is advisable not to expose the control box directly to weather conditions; if mounted outside, a suitable enclosure is recommended to protect it from sunshine and rain.
2) Bridge terminals 1 - 2 if you do not require any photocells.
3) Should two sets of photocells be required, these are to be series connected to terminals 1 - 2, contact normally closed.
4) Bridge terminals 6 - 8 if you do not require any keyswitch or push buttons.
5) Fit the mains to the control box with a high sensitivity, differential, magnetic-thermal switch, 0.03 Amps.
6) OPERATING MODE WITH TWO PAIRS OF PHOTOCELLS, INDEPENDENT FROM EACH OTHER
   Dip-switch No. 1 set to OFF, connect the pair of photocells that are inside the property to the terminals marked "2nd pair".
   The second pair always stops the gate in open cycle in case of an obstacle.
   During close cycle the second pair reverses the gate direction.
7) NOTE WELL

FAULT FINDING:

- Check supply voltage with a tester: it must be 230 V, single-phase.
- Check the high voltage fuses.
- Check the low voltage fuses.
- Check if the photocell contacts are normally closed.
- Check voltage from the control box to the electric motor(s): power might have dropped.
- The section of the electric cables to the motor(s) must not be less than 1.5 mm^2.
- Connect the other pair to the terminals 1 - 2

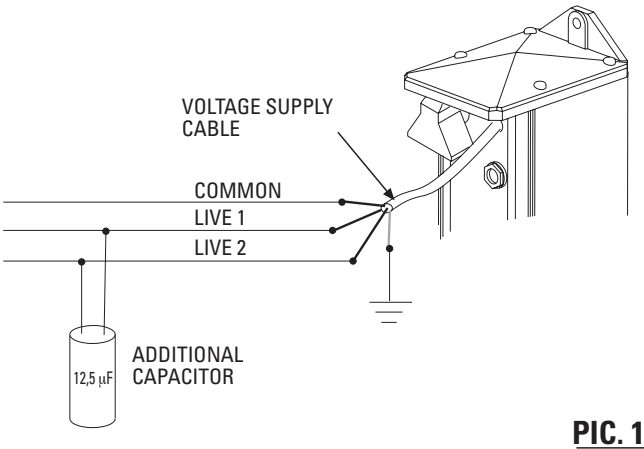
This pair performs in the standard pre-set mode, ie:
no stop during open cycle, REVERSING GATE DIRECTION DURING CLOSE CYCLE.
Terminals to stay linked out should the second pair of photocells not be used, and set the desired operating mode through Dip-switch No. 1.
* 24 V ~ output. Terminals 12 - 13. It can supply power for 2 pairs of photocells plus 1 radio receiver.
Terminal 11 provides a power output for a lamp. 24 V - 3 Wmax.
Flashing lamp output. Terminals 22 - 23. Maximun available power 25 Wmax.

FEATURES AND TECHNICAL SPECIFICATIONS

"Elpro 13 CEI" represents the latest state of the art technology for control panels. It is extremely versatile and can meet the most various requirements. It is fitted with the "Cut Off Switch" by cover knob.
It has the same functions as "Elpro 9" and incorporates additional advantages as follows: Stroke Reversing Pulse, Pedestrian Operating Mode (where one leaf only can be operated allowing people to walk in/out), STOP and HOLD function by keeping the remote control button pressed down. Further improvements can be noted in the "Elpro 13 CEI":
- Addition of a 1 Amp. fuse to the 24 V circuit as a protection for the accessories (remote control - photocells -etc.) which are connected to the terminals 12 - 13 and for the panel itself in that it can prevent short circuit during installation.
- The pulse to the electric lock is increased to 2 seconds. Releasing is so much easier as the electric lock is released with an anticipation of 100 msec. before the gate starts moving.
- A 24 V - 3 W lamp indicates gate operations (Gate CLOSED = Lamp OFF - Gate in OPEN cycle = Lamp flashes slowly - Gate OPEN = Lamp stays ON without flashing - Gate in CLOSED cycle = Lamp flashes fast).
- It provides a better switching intelligence design to enhance the reliability of the relays.
- The Motor Run Time is independent from the Leaf Delay Time in close cycle (the delay time is automatically added to the duration of the opening time).
- The 8 Dip-switches can be arranged into any of the possible patterns to achieve the required operating modes without any risk of interference with one another.

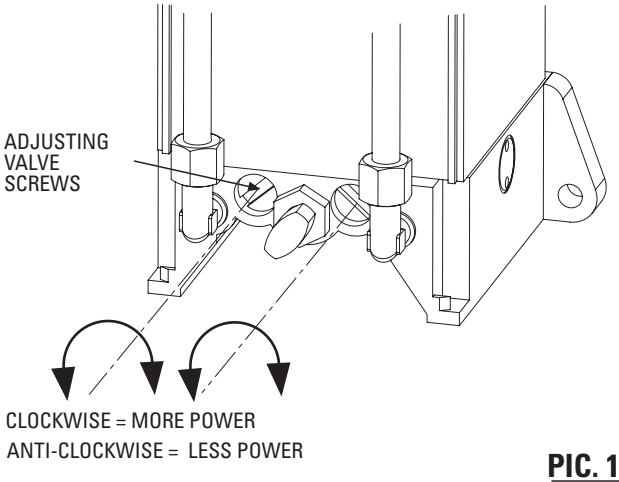
"STROKE REVERSING PULSE" and "S.1A.P."
Set Dip-switch No.7 to ON. The "Stroke Reversing Pulse" (S.R.P.) is activated only with the gate in the closed position. The pulse operates the gate in the CLOSED direction first and then immediately reverses into OPEN (This will help the gate lock to release). All the other operations will be performed in the standard way. No danger comes from the Stroke Reversing Pulse. This function remains in service with the panel set to "Pedestrian Mode". Set Dip-switch No.6 to ON for "Pedestrian Mode" (S.1A.P.), terminals 3 - 4. Only one leaf is operated when the OPEN button is pressed down. Automatic reclosing. If the OPEN button is pressed twice in a row, both leafs are opened. The S.1A.P. function is activated only when the gate is in the fully CLOSED position. The remote control always operates both gates, terminals 7 - 8.

FIRST RUNNING TEST
Once satisfied that the electrical connections have been completed as described, test the system to make sure that it works as required: it is essential that on pulsing to the **electric motors** of the **oil-hydraulic motor pump units** both gates are to be operated in the same direction. Should they fail to perform in a synchronized way, swap the electrical motor connections, ie. live 1 and 2 for both gates to open (Pic.17).
PLEASE NOTE: should the electric motors fail to start because of electric power shortage, fit a 12.5 μF capacitor between the two live wires (Pic. 17)



PIC. 17

PRESSURE ADJUSTMENT
Remove the **oil-hydraulic motor pump unit** front cover; the two pressure valve **adjustment screws** can be noted in the base of the unit, one is **red** in colour and controls pressure in the **close cycle** (check the electric motor connections), the other one is **green for the open cycle** (Pic.18).
A screwdriver is needed to adjust the valve pressure: **the "tighter the screw is driven" the higher the pressure is; by "turning it the other way round", pressure is decreased.**

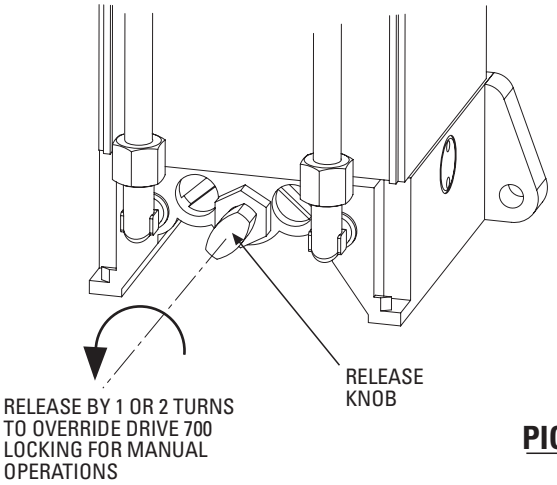


PIC. 18

OVERRIDING AND MANUAL OPERATION

In cases when power fails and during some phases of installation, it is needed to **override the system and operate the gates** by hand, DRIVE 700 operators, locking version, still fitted to the gates: remove the front cover of the oil-hydraulic motor pump unit and "unscrew" the **release "knob"** by one or max. two turns. The knob is fitted in the base of the unit (a key is supplied with the equipment to unlock the front cover (Pic.19).

IMPORTANT: If DRIVE 700 **non locking version** has been fitted, and manual operation is required, unlock the gate electric lock by means of its key, and open the gate. No need to do any operation with the DRIVE 700 system.

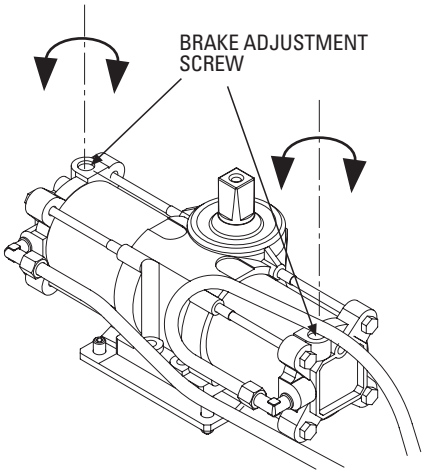


PIC. 19

BRAKE ADJUSTMENT ie. DAMPENING

Should a **DRIVE 700 system braking in Open and Close** cycles have been installed, it is necessary to adjust the brake ie. the dampening device to slow down speed over the last 40 cm of the gate travel, before the gates reach the gate stop (please remember, it is essential that the installation is fitted with **gate stops** in the open and closed gate positions). Pic 20:

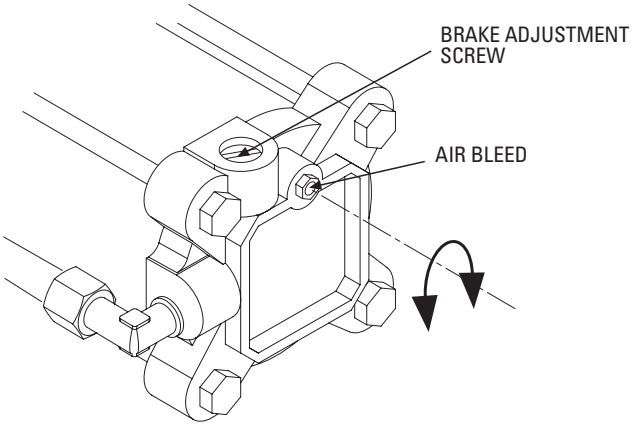
- Remove the **two parts** of the **enclosure lid**
- The **screw that controls the dampening device** is fitted in the end cap of the **oil-hydraulic jack: tighten the screw to increase the slowing down effect, loosen it to increase speed on approaching end of travel.**



PIC. 20

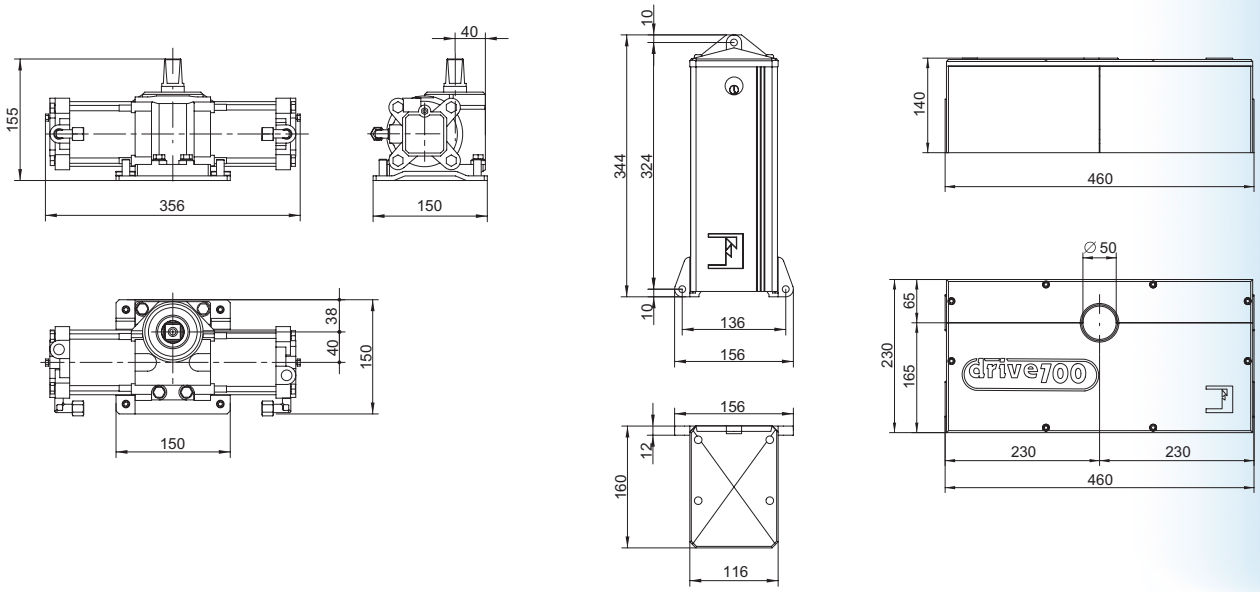
AIR BLEEDING

This operation is needed after completing and testing the installation. **A screw is fitted in the jack end cap for air bleeding. Loosen the screw for a little while. At the beginning some air and oil can be noted to come out. When only oil comes out, firmly tighten the screw. Avoid overtightening (Pic. 21).**



PIC. 21

110° DRIVE 700 OVERALL DIMENSIONS



TECHNICAL SPECIFICATIONS

ELECTRIC MOTOR

Power Yield	0.24KW (0.33HP)
Supply voltage	230V
Frequency	50Hz
Absorbed current	2A
Absorbed power	400 W
Capacitor	12.5 μF
Motor rotation speed	1'350 r.p.m.
Intermittent service	S3

OIL-HYDRAULIC MOTOR/PUMP UNIT

Pump flow rate P3	0.85 ℓ/1 min.
Average working pressure	1MPa (10bars)
Max. pump pressure	3MPa (30bars)
Oil type	OIL FADINI A 15 BY AGIP
Tank capacity	0.95 dm^3
Static weight	8 Kg
Working temperature	-20°C - +80°C
Protection standards	IP 673

OIL-HYDRAULIC JACK

Rotation angle	110°/175°
Rotation time 110°	23 s
Rotation time 175°	28 s
Max. rated torque	235Nm
Piston diametre	75mm
Piston stroke	52mm
Working temperature	-20°C - +80°C
Oil volume	0,25dm^3
Static gate weight	700Kg

PERFORMANCE

Duty cycle: .....23 s Opening - 30 s Dwell - 23 s Closing
Time of one complete cycle:.....76s
No. of complete cycles Opening-Stop-Closing.....47/Hour
137'000 cycles per year, 8 hours' service per day

CHECKING AND MAINTENANCE:

To achieve an optimum performance and longer life of the equipment and in observance of the safety regulations, it is recommended that inspections and proper maintenance are made by qualified technicians to the whole installation ie, both the mechanical and electronic parts, as well as wiring:
- Mechanical parts: maintenance every 6 months approx.
- Eletronic apparatus and safety equipment: maintenance every month.

The growth of MECCANICA FADINI has always been based on the development of guaranteed products thanks to our "TOTAL QUALITY CONTROL" system which ensures constant quality standards, updated knowledge of the European Standards and compliance with their requirements, in view of an ever increasing process of improvement.

CE **EUROPEAN MARK CERTIFYING CONFORMITY TO THE ESSENTIAL REQUIREMENTS OF THE STANDARDS 98/37/EC**

- DECLARATION OF CONFORMITY
- GENERAL WARNINGS
- EN 12453, EN 12445 STANDARDS
- CEI EN 60204-1 STANDARDS
- WARRANTY CERTIFICATE

meccanica FADINI® s.n.c.
AUTOMATIC GATE MANUFACTURERS

FADINI® the gate opener
Made in Italy

Distributor's box

Via Mantova, 177/A - 37053 Cerea (Verona) Italy - Tel. +39 0442 330422 r.a. - Fax +39 0442 331054 - e-mail: info@fadini.net - www.fadini.net