

Instrucciones de instalación y reglaje.
Instructions de montage et de réglage.
Istruzioni per l'installazione e la regolazione.
Installation and ajustament instructions.
Instruções de instalação e afinação.
Einbau-und einstellanleitung.

automatismos



marathon DC

Receptor integrado + conector tarjeta TRV + kit batería (opcional).

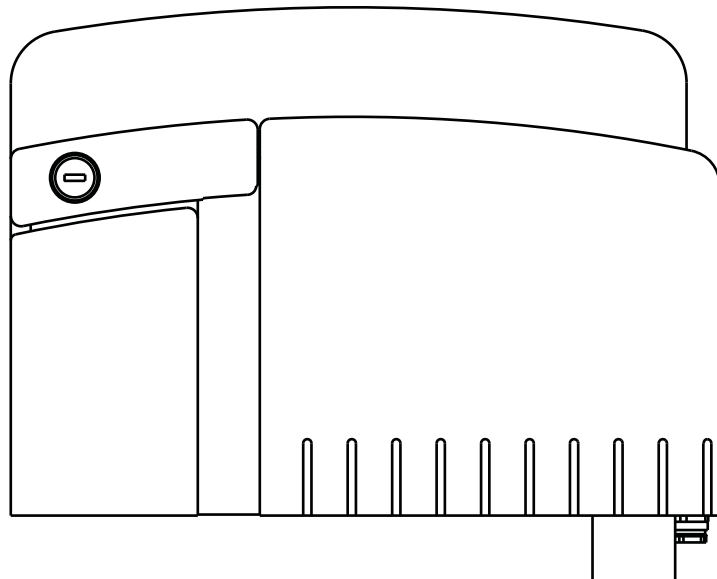
Récepteur Intégré + connecteur carte TRV + Kit batterie (optionnel)

Ricettore Integrato + connettore scheda TRV + Kit batteria (opzionale)

Integrated receiver + TRV card connector + Battery Kit (optional)

Receptor integrado + conector placa TRV + Kit batería (opcional).

Integrierter Empfänger + Stecker für TRV-Karte + Batterie-Set (optional).



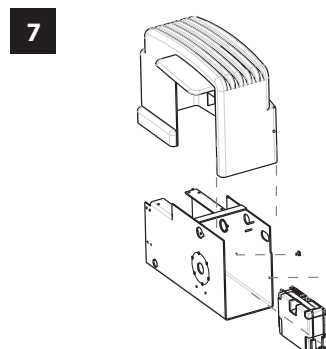
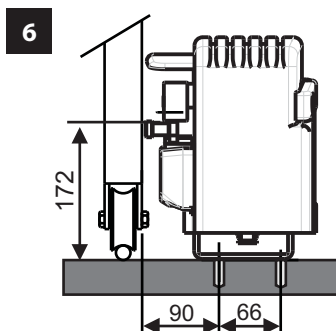
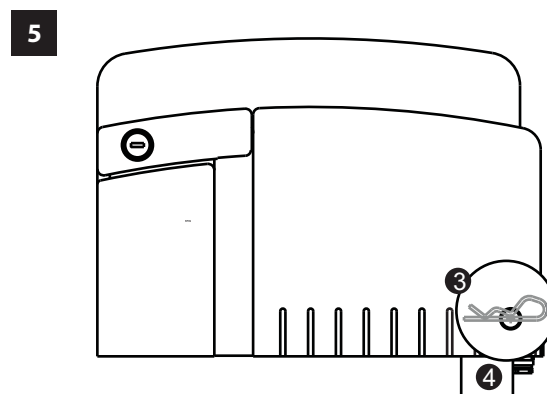
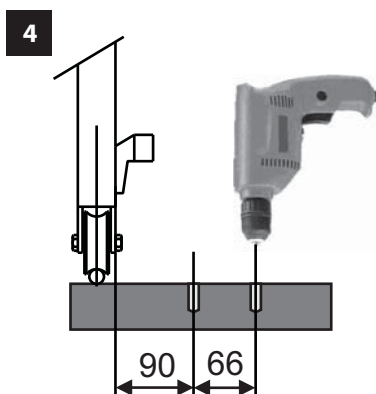
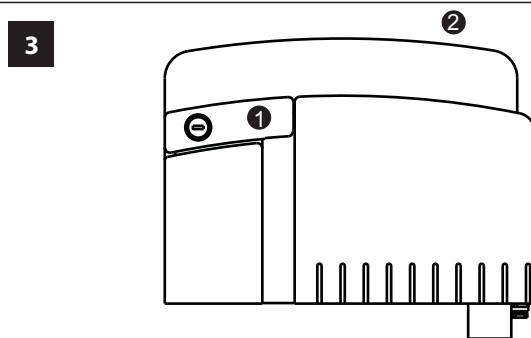
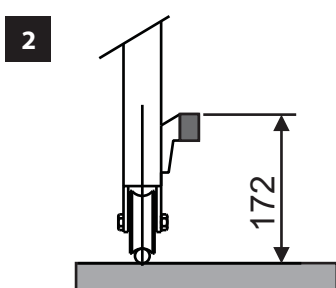
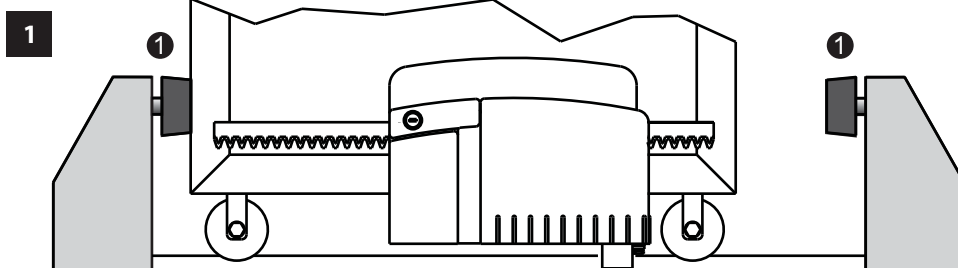
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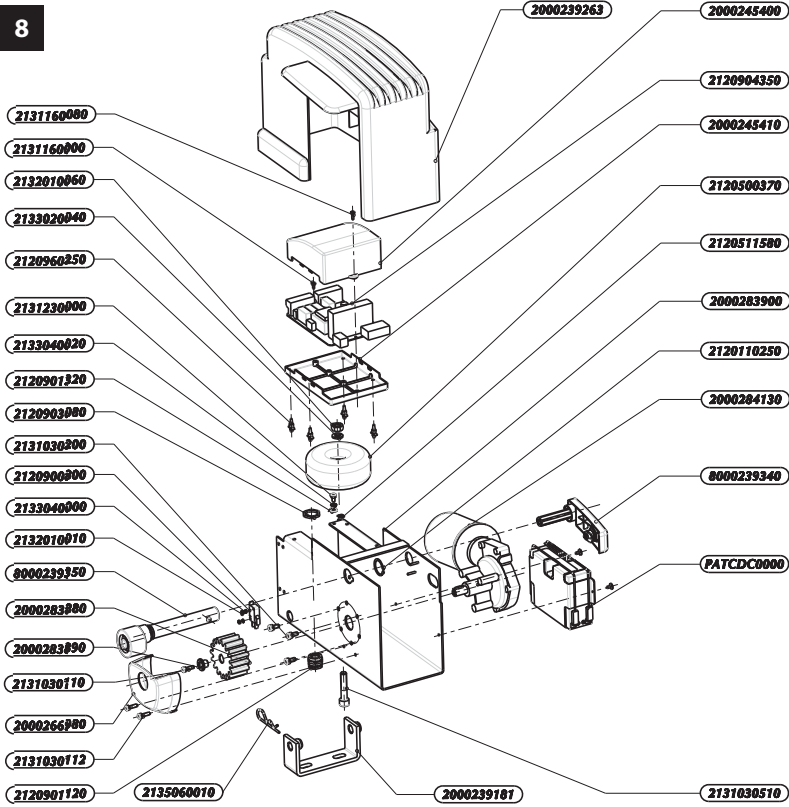
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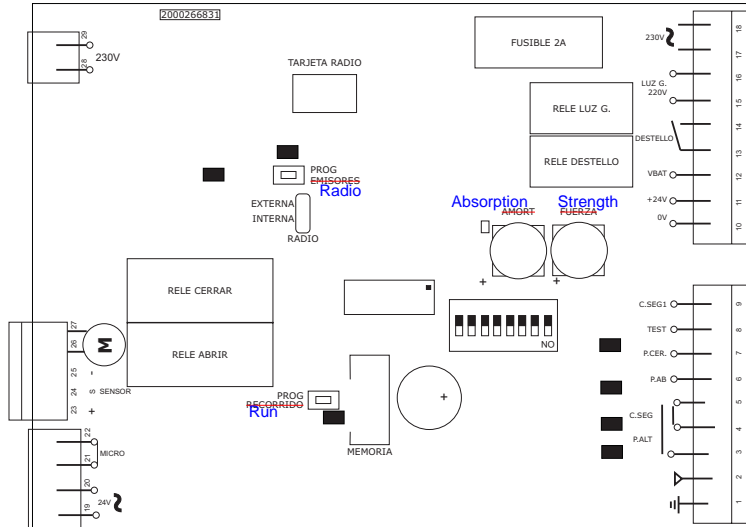


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PRELIMINARY WARNINGS

CONDITIONS OF USE

The MARATHON DC actuators are intended for installation in sliding doors by qualified staff. The MARATHON DC actuators are designed and built for installation in sliding doors according to the weight limits found in the technical specifications table. The reducer must not be used in any other installations except in those mentioned above.

APPLICABLE REGULATION

The MARATHON DC actuators comply with the following European regulations:

Directive CEE/CEEA/CE 23 of 02/19/1973 - Directive CEE/CEEA/CE 336 of 05/03/1989 - Directive CEE/CEEA/CE 93/68 of 07/22/1993
Besides, the design and manufacture have been made according to the following technical standards: EN 292, parts 1 and 2: Safety of machinery - Basic concepts, general principles for design Basic terminology, methodology. EN 294: Safety of machinery - Safety distances to prevent access to dangerous areas. EN 60335-1: Safety of household and similar electrical appliances. The MARATHON DC's CE marking refers only to the actuator and not to the whole system (actuator, door, frames) The installer is responsible for the CE compliance of the door-actuator assembly.

AVOIDING ACCIDENTS DURING INSTALLATION

Connection of the actuator to the power supply should not be performed unless the installation operations described below are completed. Connection of the actuator should only be done for the direction test and for the end of stroke test. The direction test and end of stroke tests should be performed with the installer keeping a safe distance from the door movement area.

INSTALLATION SPECIFICATIONS

The actuator must be installed in such a way that its disassembly would require special tools. In the case of a door with no element, you must assure there are no fixed structures near to the door that can cause crushing areas. Photocells or sensors will be installed when current regulation so requires.

AVOIDING ACCIDENTS DURING MAINTENANCE

Maintenance must be carried out only after the actuator is changed to safety mode. This is achieved opening the all-pole switch on the start-up control and ensuring that it cannot be reset during the maintenance operation (closed with key, signals, etc.)

NOTE FOR THE USER

Maintenance or verification of the reducer must be done by qualified staff.



ATTENTION

1. Follow carefully these instructions to keep people safe. Incorrect installation or inadequate use of the product may cause serious damage to people.
2. Read these instructions carefully before installing the product.
3. Keep these instructions for future use.
4. This product has been designed and manufactured exclusively to be used as indicated in this manual. Any other use could damage the product and/or represent a hazard source.
5. Do not install the device in an explosive atmosphere: Gas or flammable fumes constitute a serious safety hazard.
6. Mechanical constructive elements must comply with EN 12604 and EN 12605 standards.
7. Automatismos Pujol cannot be held responsible for incompliance of good manufacturing techniques of the motorized doors deformations which can take part in its use.
8. Automatismos Pujol cannot be held responsible for any damage caused by improper use or different from the use for which the device is destined to.
9. A sign adequately fixed to the frame, the devices indicated in item "21", and at least one luminous signal indication device is advised to be used for each equipment
10. Automatismos Pujol cannot be held responsible for safety and good operation of the automation if installation components are from other manufacturers.
11. For maintenance, use exclusively Automatismos Pujol original parts.
12. Do not make any change in the automation system components.
13. The installer must provide all the information related to the operation of the system in the event of emergencies, and give the user of the equipment the "user's guide" which comes with the product.
14. Packaging material (plastic, polystyrene etc.) is a potential hazard and must be kept out of reach of children.
15. Do not allow children and people to stand near the product while operating.
16. Keep any remote radio controls or control devices out of reach of children so as to avoid any unintentional operation.
17. Disconnect the power supply before working on the installation.
18. An omnipolar switch with a contact opening of at least 3 mm is required for installation. We recommend using a 6A all-pole thermal-magnetic circuit breaker.
19. Check that the installation has a suitable 0.03A thermal-magnetic circuit breaker upstream of the system.
20. Check that the earth connection is in perfect condition and connect the metallic parts of the closing to earth.
21. The safety measures (EN 12978 standard) allow protecting any danger areas against mechanical movement risks, such as crushing, dragging, shearing.

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TECHNICAL SPECIFICATIONS

- Maneuver and safety for obstacles controlled by microprocessor and Hall effect sensor. Motor acceleration and deceleration ramps.
- Indication of the state of pushbuttons, photocells and safety device with LEDs.
- Activation / deactivation of automatic close timer.
- Automatic close digital timer (2 sec. minimum and 2 min. maximum).
- Selection of two kinds of manoeuvre (A/B).
- Maximum duration of maneuver limited to 2 min.
- 433.92 Mhz incorporated receiver (Vario Code system).
- Radio Card Connector.
- Tension-free relay contact for the flash light lamp (maximum current 16 A at 220V).
- Auxiliary lights output is 220V. for 3 minutes. (maximum 10 A).
- Auxiliary output is 24 VDC, 150 mA.
- Input for 8.2 Kohm resistive element.
- 2A protection fuse.

- End of stroke mechanical bumpers are installed at the end of the door stroke
- Speed of output shaft 60r.p.m./Tm
- Door speed:9 m/min.
- M4 - 16 teeth output pinion module
- Service factor:100%.
- Maximum door weight: 400 Kg
- Maximum drag strength: 22 Kg
- Maximum starting torque: 50 Nm
- Power supply 230 V / $\pm 10\%$
- Motor tension is 24 VDC.
- Power drawn: 120 W
- Motor maximum current 2.6 Amp.
- 220 - 24V, 63 VA transformer.
- Battery: Two 12V. 1.3 Ah. units
- Working temperature: -10°C to +40°C.
- Maintenance: no lubrication needed.
- Auxiliary output is 24 VDC, 150 mA.
- Input for 8.2 Kohm resistive element.

MARATHON DC GENERAL INSTALLATION (Fig. 6)

MOUNTING THE RACK

Fix the rack to the door (Fig. 2) making sure it is 172 mm. above the level where the actuator will be fixed. Secure the rack using its supplied screws and washers.

INSTALLING THE ACTUATOR

With the supplied spanner, open the lock and pull the release handle outward (Fig. 3 (1)). Next, remove the cover (Fig. 3 (2)) in an upward direction. Remove the pin (R) (Fig. 5 (3)) and the support (Fig. 5(4)). Drill the holes according to (Fig. 4) so as to fix the actuator's support with special screws or wallplugs. Once the support has been secured, the actuator can be positioned by passing the rack which is attached to the door, between the pinion and the roller guide (Fig. 6). In this way the actuator remains supported by the rack and tilting on the support thereby absorbing any irregularities in the door's roll path. The maximum working inclination angle is +8° to -4°. Next we will attach the actuator using the pin (R), leaving it in the unlocked position and without the cover.

INSTALLING THE END OF STROKE BUMPERS

For the user's safety, any movements that have a risk of crushing, cutting or dragging should be eliminated or properly controlled. Automatismos Pujol advises that sliding doors must have mechanical safety bumpers at the end of the strokes so as to not pose any risks, thereby complying with UN 12445. *DO NOT PLACE BUMPERS ON THE RACK* Consequently, we will use the installed mechanical bumpers to regulate the automatic stroke of the door. (Image 1). These bumpers, with code 2120515400, are supplied by Automatismos Pujol

POWER SUPPLY

Before making the automation installation, be sure to disconnect the power supply. Connect 220V A.C. mains power to the terminals 17,18. The 220V output on terminals 28,29 are the ones to be connected to the primary of the 24V transformer.

MOTOR

The motor is connected between terminals 26 and 27. If necessary, change the initial rotating direction of the motor by changing microswitch n° 3.

SENSOR

The Hall sensor, used to detect overexertion (obstacles) and smooth stopping, is connected between the terminals 23 (+) 24 (signal) and 25 (-)

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SELECTING THE TYPE OF OPERATION

Microswitch no. 2 allows the selection of the type of operation.

Switch 2 OFF, mode A

- . There is no pre-warning on the flash light lamp before beginning the maneuver.
- . Each operation on the maneuver input causes it to be reversed
- . The close safety causes re-opening.

Switch 2 ON, mode B

- . Flash light lamp pre-warning before each maneuver.
- . Close safety causes a slight delay and delays the door.
- . Incorporation of alternative maneuver.

TERMINALS DESCRIPTION

1. Ground (Mesh)	16. 220V Garage light output
2. Aerial (Live)	17. 220V AC Power supply
3. Alternative pushbutton (N.O.)	18. 220V AC Power supply
4. Safety position (N.C.) (photocell)	19. 24 Volt AC Power supply
5. Pushbuttons and photocell common wire	20. 24 Volt AC Power supply
6. Open pushbutton (N.O.)	21. Safety device (N.C.) Motor
7. Close pushbutton (N.O.)	22. Motor common safety device
8. Photocell test	23. Sensor power supply, positive (brown)
9. Safety position 1 (N.C.) / 8.2 KOhm range	24. Sensor signal (green)
10. 0 Volt complementary power supply	25. Sensor power supply, negative (white)
11. 24 Volt complementary power supply	26. Motor (blue)
12. Battery charger	27. Motor (red)
13. Flash light position. Free of tension	28. 220V (primary of the transformer)
14. Flash light position. Free of tension	29. 220V (primary of the transformer)
15. 220V Garage light output	

Note: N.O. Normally Open
N.C. Normally Closed

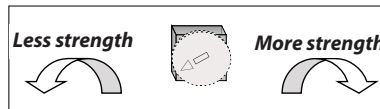
FUNCTIONS OF THE DIP-SWITCHES

DIP-1	ON	-	The board closes automatically
	OFF	-	There is no automatic close
DIP-2	ON	-	Operation mode B
	OFF	-	Operation mode A
DIP-3	ON	-	Changes motor direction
	OFF	-	Motor direction is the stated one
DIP-4	ON	-	Terminal 9 acts as a safety band
	OFF	-	Terminal 9 acts as safety position 1
DIP-5	ON	-	Photocell test disabled
	OFF	-	Photocell test enabled
DIP-6	ON	-	Programming via radio enabled
	OFF	-	Programming via radio disabled
DIP-7	ON	-	Pedestrian opening
	OFF	-	Normal opening
DIP-8	ON	-	Variable smooth stop programming (variable slow down)
	OFF	-	Smooth stop set at 20cm (slow down at 20cm)

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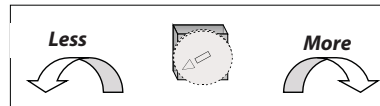
STRENGTH REGULATION

Turning the strength potentiometer clockwise, allows the door to exert more strength before it stops and reverses, when overexertion is detected by the hall sensor. When it is turned counter clockwise, the sensor becomes more sensitive in the event of an obstacle.



SHOCK ABSORPTION REGULATION

When the potentiometer is turned clockwise the door absorbs more shock during the smooth stop (slower speed, less strength, greater sensibility to obstacles). When the potentiometer is turned counter clockwise the door absorbs less shock during the smooth stop (greater speed, more strength, less sensibility to obstacles).



CHECKING THE MANEUVER DIRECTION

When the door is electrically connected and the alternative pushbutton or open button is activated, the first maneuver of the door is to open. Position the door in the middle of its stroke, connect power to the system, activate the alternative pushbutton and the door should open. If not, change the position of microswitch nº 3. Adjust the strength to the desired level (this can be done while the door is moving).

PROGRAMMING THE DOOR'S STROKE AND AUTOMATIC CLOSE

For the door to come to a gentle stop before the end of its stroke, it is necessary to program its stroke. On this maneuver, the automatic close time and the smooth stop will also be programmed (see Smooth stop programming). To program the stroke, the door must be completely closed. Press the programming pushbutton PROG for 1.5 seconds. The red Led will blink, showing that the equipment is ready to be programmed. The stroke can now be programmed. The programming process closes automatically upon completing a door cycle.

Stroke programming process

- 1) With the door at the closed position, activate the programming mode as explained above, the red LED will flash intermittently.
- 2) Start the opening maneuver by pressing the alternative pushbutton "P.ALT" or the remote control. The opening maneuver terminates on detection of a bumper and the opening stroke will be memorised.
- 3) With the door open, the automatic close time will be recorded until the closing maneuver starts.
- 4) Start the closing maneuver by pressing the alternative pushbutton "P.ALT" or the remote control. The closing maneuver terminates on detection of a bumper and the closing stroke will be memorised.
- 5) The programming will be automatically disabled when a complete door cycle is over. The maximum recording time is 2 minutes, after which the maneuver will end and the limit will be recorded. If the programming is enabled but no maneuver is performed, after 1 minute the programming will be disabled. During programming the motor operates at a lower speed.

SMOOTH STOP PROGRAMMING

If switch no. 8 is set to ON for a variable smooth stop at the end of the maneuver, then during programming the alternative pushbutton should be activated in the spot where we want the smooth stop to commence. This is applicable to both the opening and closing maneuvers. For example, if we are programming the opening, then with the door closed we activate the alternative pushbutton, making the door open. When it gets to the spot where we think it should slow down (Smooth Stop) we activate the alternative pushbutton, which reduces the door's speed until it gets to the end of stroke bumper. With these steps, the maneuver times and smooth stop times for the opening maneuver, will be programmed.

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PEDESTRIAN OPENING (microswitch No. 7 ON)

This function allows a pedestrian (partial) opening of the door. Controls programmed to the 2nd Channel must be used (receiver incorporated) or enter using the open button on terminals 5 and 6 which changes to pedestrian. Programming the pedestrian stroke: We will only program the pedestrian stroke, the smooth stop and automatic close time will be the same as previously programmed. If an emitter has been memorised with a pushbutton, then the next pushbutton on the same emitter activates the pedestrian opening. (If we memorise pushbutton 1, partial opening = pushbutton 2; if we memorise pushbutton 2, partial opening = pushbutton 3 and so on). To program the stroke, the door must be completely closed. Press the PROG pushbutton for 1.5 seconds. The red Led will blink, showing that the equipment is ready to be programmed. Start the opening maneuver by pressing the open pushbutton or the remote control, when the desired opening is reached press it again to stop the movement and finalise the pedestrian programming.

SAFETY DEVICE

The automation has an input 21 and 22 for a normally closed contact which will activate when we unlock the door and move it manually. This inlet operates as a stop pushbutton. Once activated the motor's output is deactivated and the 'stop' state remains memorised. When we lock the motor again, and press a pushbutton, the first maneuver is executed slowly until it finds the correct "end of stroke bumper".

SUPPLEMENTS

Radio Card

Allows the use of a radio card to enable remote automation, this action is equivalent to pressing the alternative pushbutton. Situate the "Radio" bridge externally.

AUXILIARY CONNECTIONS

External Maneuver

The maneuver can be carried out externally when a Normally-Open contact closes between terminals 3 and 5 using a pushbutton or by way of a relay output of a radio control receiver. In this case the contact acts as an Alternative Pushbutton. If a pushbutton is connected between 6 and 5, it acts as an Open Pushbutton. If we connect a pushbutton between 7 and 5, it acts as a Close Pushbutton. In some automations it is possible that the door has incorporated another pedestrian access door. To protect this door which on opening the sliding door does not work, it will be necessary to install an end of stroke between terminals 7 and 5; this end of stroke will be in Normally-Open contact that will be closed on opening the pedestrian access door.

Flash Light Lamp

Between terminals 13 and 14 a Normally-Open and electricity-free contact is facilitated, which is closed while the door is in operation or in Mode B, 3 seconds before the automatic closing of the door.

24v Output

There is an output of 24Vcc. and 0.15A between terminals 10(-) and 11(+) to power auxiliary elements such as a photocell.

Garage Lights

Between terminals 15 and 16, there is an output of 220V a.c. which operates when the door opens, and stops 3 minutes later.

Photocell

The photocell, with its normally closed contact, is connected between terminals 4 and 5. It is activated only when the door closes, preventing it from closing if it is completely open or reversing the operation if it is closing.

Photocell Test (optional)

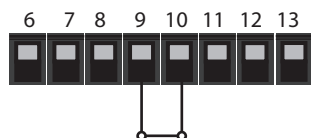
If microswitch no. 5 is set to OFF, then at the start of each maneuver the main panel will run a check on the photocell.

Safety Position 1 (nc) / 8.2 Kohm Range (microswitch No. 4)

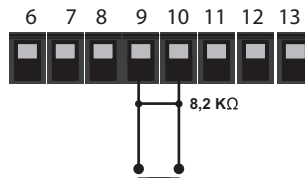
Microswitch no. 4 selects the safety input from the photocell when opening, or the resistive band when closing.

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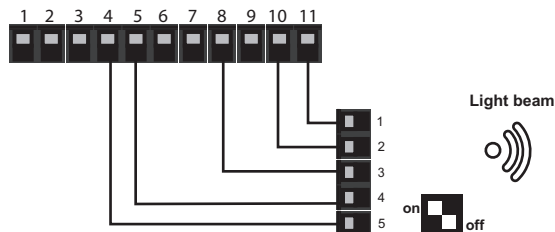
PHOTOCELL CONNECTION ON OPENING Microswitch 4: OFF



RESISTIVE BAND CONNECTION Microswitch 4: ON

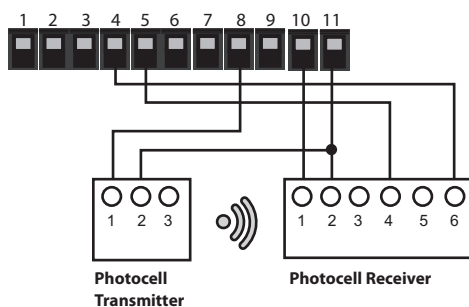


PHOTOCELL CONNECTION WITH TEST



CONNECTION DIAGRAM	
Photocell Terminal	Main Panel Terminal
1. (12/24v) 0	10. 0v
2. (12/24v) +	11. 12v DC
3. TEST	8. TEST
4. POSITION	5. Common C.S.
5. POSITION	4. C. SEG

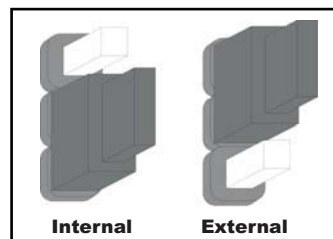
PHOTOCELL CONNECTION EMITTER/RECEIVER



CONNECTION DIAGRAM		
MAIN PANEL TERMINAL	Photocell Transmitter	Photocell Receiver
10. 0v		1
11. 12v DC	2	2
8. TEST	1	
5. Common C.S.		4
4. C. SEG		6

INTERNAL / EXTERNAL RADIO SELECTION

The main panel can operate with either the incorporated radio or with an external card if the radio devices are incompatible.



Internal / External Radio Selection

INTERNAL RADIO

Memorising the emitter code. To memorise the emitter codes, the control panel must be in a stable situation, with the door in the opened or closed position.

a) Manual Memorising. To memorise the code press the PROG EMITTER programming pushbutton for 1.5 seconds. The red LED lights up and an audible tone can be heard, when the pushbutton is released the LED remains on, indicating that the system is ready to memorise the emitter code. From this moment, any received code will be memorised. For this, we will press the emitters with the function that we want to activate the automation. The memorisation will be confirmed via a flash of the red LED and an audible tone. The system automatically exits the memorisation mode 10 seconds after having received the last code. This is indicated by the red LED turning off and two short audible tones.

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b) Radio memorisation via another emitter (Microswitch 6 ON)

To use this system it is necessary to have previously memorised at least one code via the system a). Press the special function of one of the previously memorised emitters. This will put the system into the code memorisation mode, causing the red LED to light up, and a long audible tone. From this moment, any received code with the same channel as the one that was used to memorise the emitter used with the special function, will be memorised. To memorise any other type of function, use system a). The memorisation will be confirmed via a flash of the red LED and an audible tone. The system automatically exits the memorisation mode 10 seconds after having received the last code. This is indicated by the red LED turning off. This mode can also be aborted by pressing the special function of one of the memorised emitters.

Erasing all the codes.

All the codes can be erased via a memory reset.

Press the PROG EMITTER pushbutton for 4 seconds. The red LED will flash rapidly, accompanied by short audible tones, to indicate that all the previously memorised codes have been erased. The system will remain in code memorisation mode, ready to memorise new codes.

Full Memory Indicator.

The memory is full once it contains 255 different codes, after this, trying to memorise a new code will cause the red LED to flash rapidly accompanied by an audible tone for 10 seconds.

OPTIONAL BATTERY (Fig.7)

This Kit will allow your MARATHON DC to continue operating when the mains power is cut. The kit comes with a base plate on which are placed two 12 V batteries, a small control circuit and wiring. When the mains power is connected, the control circuit automatically keeps the batteries charged. The batteries will keep the system operational, ready to be activated via pushbutton or remote control, for approximately 24 hours and 15 maneuvers.

The battery can be incorporated in series or be a separate accessory. The kit comes with all the elements assembled. If it must be installed, follow these instructions:

First of all, disconnect the electricity supply. The kit comes with all the elements already assembled, all you need to do is run the two long **RED** and **BLACK** cables underneath the installation. Fit the support to the frame as shown in figure 7 and check that it is well secured. Next, connect the **BLACK** cable to terminal no. 10, the **RED** cable to terminal no. 12, and connect the short **RED** cable, supplied loose, to the battery's free terminal. Check the connections so as not to get any crossed wires. Reconnect the mains power and let the batteries charge for one hour before turning on the installation. Check that the batteries are working properly by operating the door with the mains turned off.

*** REPLACEMENT OF THE HALL EFFECT SENSOR**

The Hall sensor is located on the inner rear zone of the DC motor. The outer part of the Hall sensor consists of two overlapping black plastic pieces, one of which is a pyramid shape and the other one (closer to the engine) has a rectangular shape. Follow the instructions below to replace the Hall sensor.

- 1° Remove the Hall wires from terminals 23, 24 and 25, removing them from the motor side.
- 2° Remove the pyramidal shape piece. Avoid removing the rectangular piece with the wires.
- 3° Remove the rectangular piece with the Hall Sensor and the wires by moving it at an angle.
- 4° Replace the Sensor by reversing the described procedure.

Troubleshooting

Problem	Possible cause	Solution
The door does not open or close	Lack of power	Check the terminals 17 and 18 or 28 and 29 to detect if they have 230 V.
	Unlocked engine	Lock the engine to activate the safety device. Check the led.
	Blown line fuse.	Replace the 1 A fuse
	Accessories have short circuit.	Disconnect all the accessories of the terminals 10 (-) and 11 (+) (there should be a DC voltage of about 24 Vdc) and reconnect them one by one.
The door does not open.	Check the sense of rotation	Press the terminals 5 and 6 with the door halfway along its stroke, it should then open.
The door does not close	The photocell is activated or damaged	Verify the power supply of the photocell, its connection and the existence of obstacles. If there is no photocell, bridge the terminals 4 and 5.
	Check the sense of rotation	Press the terminals 5 and 7 with the door halfway along its stroke, it should then close.
The door moves slowly.	The actuator has been unlocked or the power supply has been interrupted.	The two or three first manoeuvres will operate slowly so as to recognize the ends of stroke's butts.
The door opens or closes when connected to 220 V.	An accessory connected to the terminals 3 and 5, 5 and 6 or 5 and 7 in closed position.	Connect the accessory to an opened position (pushbutton, receiver...).
	Automatic close Dip-switch n° 1 enabled.	Disable the automatic close dip switch.
The door changes direction during its movement.	Adjust the level of power	Adjust with the potentiometer. Turn the potentiometer clockwise to increase the power and counter clockwise to reduce it. Check the wheels, rollers and any other item that may be causing friction. Manually check that the door is moving freely when it is unblocked.
The door stops after moving about 18 cm and the sense of the movement does not change.	Faulty Hall Sensor	Replace the Hall effect sensor following the colours and terminals. * Read appendix note for sensor replacement.
Photocell and automatic closing features of the door are inverted.	Wrong position of the rotation n° 3 dip-switch	Disconnect the power supply and change the position of the #3 dip-switch. Press the terminals 5 and 6 with the door half opened and the door should open.
The door does not close smoothly or automatically.	Wrong programming	Program correctly by following the programming instructions of the stroke and automatic close previously described. The programming must be done with the door closed.
The incorporated receiver does not work	Radio selection bridge	Place the selection bridge internally.
Note: If the door does not work after verifying the above described solutions, it is advisable to replace the electronic equipment or contact our technical department.		

After Sales Service

☎ 34-902 199 947

✉ automatismos@pujol.com

AFTER SALES SERVICE

TERM OF GUARANTEE

Automatismos Pujol guarantees its door actuators, electrical equipment and supplements against any manufacturing failures for a period of 2 years from the date they are provided.

LIABILITIES

Automatismos Pujol undertakes to repair equipment subject to guarantee, prior revision by our technical department. Any equipment delivered due to urgency before it has been decided if it is under guarantee, will be considered as a standard order to be paid.

Replaced faulty equipment under guarantee will remain property of **Automatismos Pujol**

The installer will replace said equipment at his/her own cost.

Freight will be paid by **Automatismos Pujol**

CANCELLATION

Automatismos Pujol equipments will not be covered by the guarantee in the following cases:

- Incorrect election of equipment due to door features.
- Assembly and/or connection instructions have not been followed.
- The actuators have been connected to electrical equipment or accessories that are not approved by **Automatismos Pujol**
- An actuator has been unduly opened, dismantled and manipulated.
- The actuators have been used in applications other than those for which they are designed.
- The actuator or equipment is unpaid.

Automatismos Pujol

Cannot be held responsible for insufficient or inadequate safety measures that consequently cause damage to persons or objects, in the installation of the actuator. Apart from the safety features incorporated into the actuator, we also recommend installing other independent accessories like: photoelectric cells, pneumatic bands, etc., that comply with current regulation.