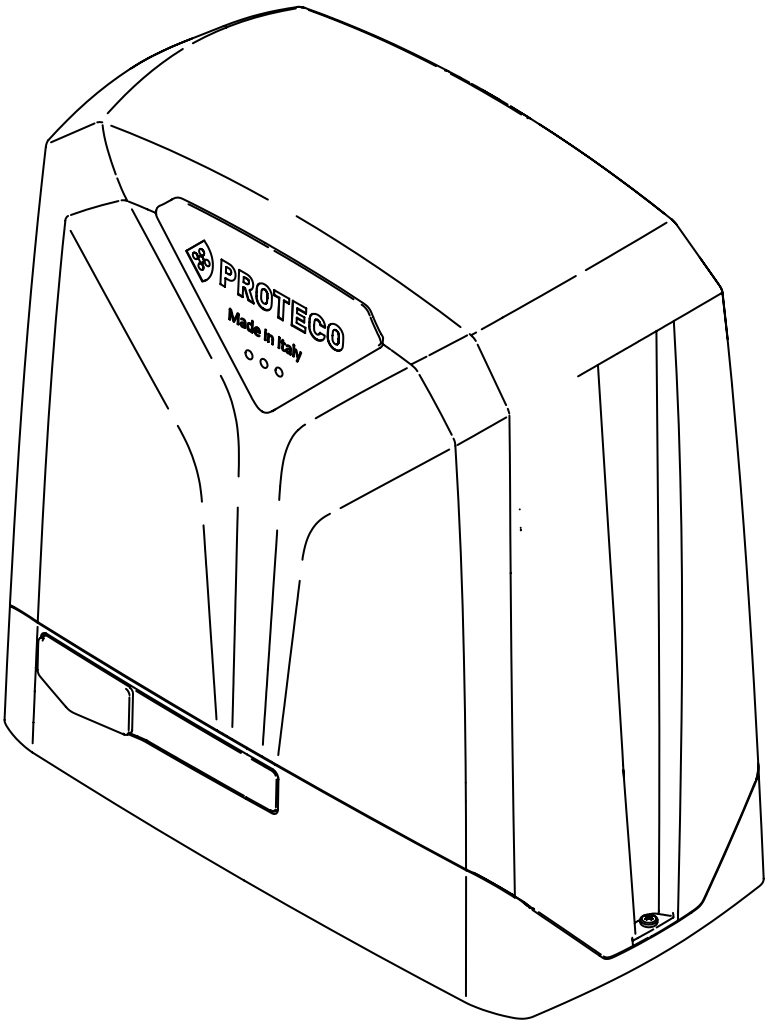
MATRIX

RACK-DRIVEN SLIDING GATE SYSTEM

Installation and User manual



PROTECO®
GATE AUTOMATIONS

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1. WARNINGS

This manual for MATRIX series contains important information concerning personal safety. An incorrect installation or an improper use may lead to severe injuries.
Read carefully and pay particular attention to the safety sections marked by the yellow triangle ⚠ .

⚠ The installation of automatic doors, gates and barriers must comply with the Machinery Directive 2006/42/CE and EN 12453 regulation, and performed by qualified personnel.

⚠ Make sure the main power line is equipped with state of the art safety grounding system; as well be sure the whole installation is protected by a power cut switch and against overcurrent.

Make sure the area is clear from flammable gases and/or electromagnetic interferences: it could lead to very dangerous injuries.

⚠ Switch the power and batteries OFF before any operation.

After installation, packaging and waste materials (cardboard, plastic, metal parts etc.) must be kept away from children as they could be potentially harmfull.

Use only original spare parts. Any alteration to the system is prohibited.

Proteco Srl will not respond in case of using additional and/or fake spares.

⚠ Before commissioning the system, deliver the last pages of this manual to the user (section 5. END USER'S TIPS starting from page 13).
Proteco S.r.l. reserves the right to make changes to the product without notice.

2. TECHNICAL FEATURES

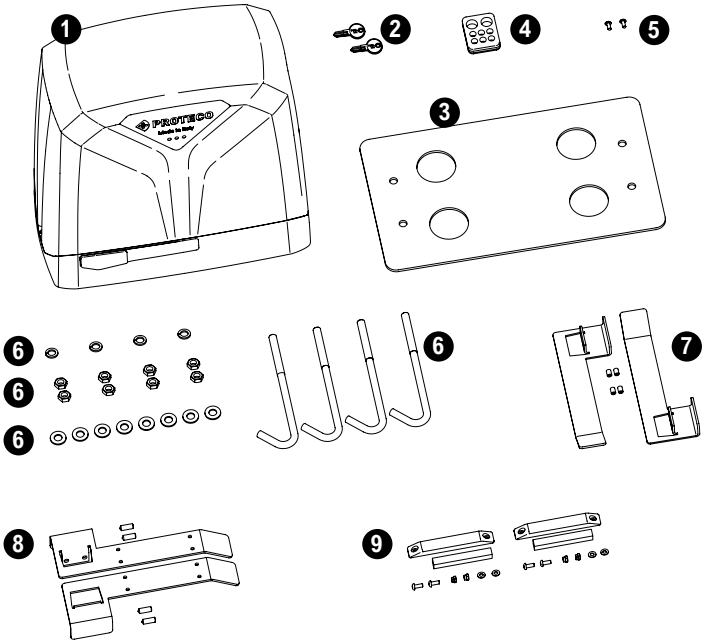
2.1 Introduction

MATRIX range is the new Proteco's electromechanical rack-driven motor generation designed to automate sliding gates in residential, block and industrial areas.
Any other use than that described is to be considered improper and prohibited.
All models grant the mechanical locking of the gate with an irreversible gear system; it is therefore not necessary to install any type of lock.
MATRIX works by electricity, in case of power cut the motor can be manually unlocked using a special lever system protected by key.

2.2 Technical features

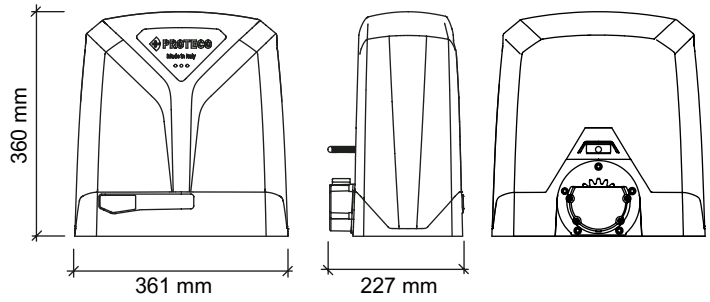
	Matrix 2500	Matrix 1800	Matrix BLDC	Matrix High Speed
Power supply	230 V 50/60 Hz	230 V 50/60 Hz	230 V 50/60 Hz	230 V 50/60 Hz
Motor voltage	6 A	4,5 A	4,5 A	3 A
Start up current	2,5 A	2 A	1,4 A	1,3 A
Rated current	230 V 50/60 Hz	230 V 50/60 Hz	48 V dc	48 V dc
Rated power	550W	500W	350W	300W
Fuse	8A	8A	5A + 30A@48V	5A + 30A@48V
Start up capacitor	25 µF	30 µF	-	-
Standard capacitor	25 µF	20 µF	-	-
Start up thrust	2000 N	1400 N	1600 N	1400 N
Rated thrust	1100 N	900 N	1000 N	700 N
Thermal cut off	150°C	150°C	-	-
Max. opening speed	11 m/min	11 m/min	13 m/min	20 m/min
Max. leaf weight	2500 Kg	1800 Kg	2500 Kg	1800 Kg
Duty cycle	50%	50%	80%	80%
Operating temperature	-30° C ÷ + 55° C	-30° C ÷ + 55° C	-30° C ÷ + 55° C	-30° C ÷ + 55° C
IP rating	44	44	44	44
Limit switch type	Mechanical/ Magnetic	Mechanical/ Magnetic	Mechanical/ Magnetic	Mechanical/ Magnetic

2.3 Content

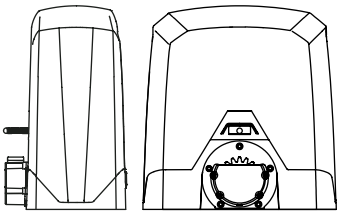


DESCRIPTION	ITEM	PIECES
Gearmotor		1
Release key		2
Ground plate	MPIS06	1
Wires membrane	MPC06	1
Screws4,2x13	MVI4213DI	2
Anchor screws M10	MTRF10185Z	4
Bolt M10	MDAM10Z	8
Washer M10	MRO10Z	8
Grower washer M10	MRO10EZ	4
MECHANICAL limit switch		
RH limit switch cam	MSLF01D	1
LH limit switch cam	MSLF01S	1
Dowel M6x16	MGR0616Z2	4
MAGNETIC limit switch		
RH limit switch cam	MSLF07D	1
LH limit switch cam	MSLF07S	1
Dowel M6x16	MGR0616Z2	4
Fittings bag	SSAS15	1

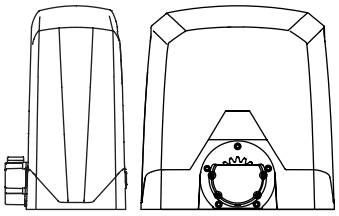
2.4 Dimensions



2.5 Limit switches



Picture 1: Mechanical limit switch



Picture 2: Magnetic limit switch

2.6 Duty cycles

The calculation of cycles refers to a gate of standard length, installed according to the standards in force, free from mechanical and/or accidental friction, with an outside temperature of 20 ° C, as per EN 60335-2-103 regulations.
The number of working cycles depends very much on the length and weight of the gate, as well as the Matrix model choosen for the installation.

Table 1: Gate Length

	Matrix 2500	**Matrix 1800**	**Matrix BLDC**	**Matrix High Speed**
Gate length (m)	Max. Cycles/ Hour	Max. Cycles/ Hour	Max. Cycles/ Hour	Max. Cycles/ Hour
Up to 6	28	28	40	58
From 6 to 10	14	14	28	40
From 10 to 12	12	12	22	32
From 12 to15	8	-	15	20
From 15 to18	-	-	10	-

Table 2: Reduction of duty cycle rate according to gate weight

	Matrix 2500/ Matrix BLDC	**Matrix 1800**	**Matrix High Speed**
Gate weight	Duty cycle rate	Duty cycle rate	Duty cycle rate
600 Kg	100	100	100
From 600 to 1000	80	70	70
From 1000 to 1500	70	50	50
From 1500 to 1800	50	30	30
From 1800 to 2500	40	-	-

Example:
Gate length 10 m, gate weight 1500Kg, Matrix 2500
14 x 0,7 (70%) = 9,8
Approximately 10 cycles per hour

In addition, there may be other factors that can affect the shelf life of the product.
Factors may vary depending on the environment in which the automation is installed.

	Matrix 2500	**Matrix 1800**	**Matrix BLDC**	**Matrix High Speed**
Normal operation frequently cut due to obstacle	1	1	1	1,5
Seaside areas	1	1	1	1
Sandy and/or dusty areas	0,5	0,5	0,5	0,5
Outside temperatures often beyond 40° or below 0°	0,5	0,5	0,5	0,5

2.7 Life line

The life of the gearmotor may be affected by multiple waste factors. The life expectation can be calculated using the criteria outlined in the below table.
In order to get the waste rate add together all values that comply with the installation scenario and according to the accessories fitted.

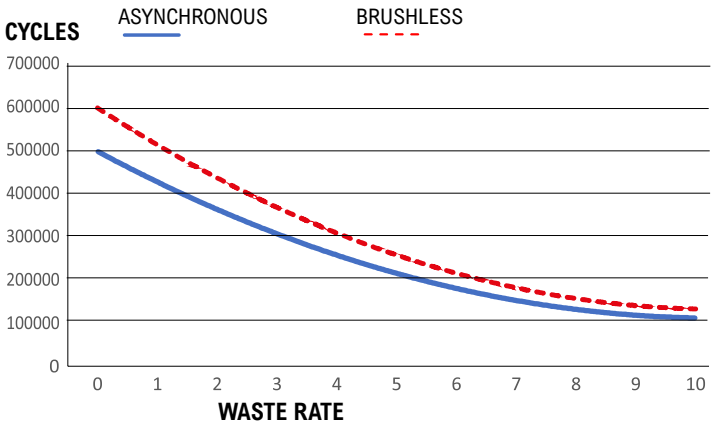
ATTENTION:
If the waste rate obtained is beyond 10, move to a superior version in order to fulfill the expected performances.

	Matrix 2500	Matrix 1800	Matrix BLDC	Matrix High Speed
Normal operation frequently cut due to obstacle	1	1	1	1,5
Seaside areas	1	1	1	1
Sandy and/or dusty areas	0,5	0,5	0,5	0,5
Outside temperatures often beyond 40° or below 0°	0,5	0,5	0,5	0,5

Gate weight	Matrix 2500/ Matrix BLDC	Matrix High Speed/ Matrix 1800
Up to 600 Kg	0,5	0,5
From 600 to 1000	1	2
From 1000 to 1500	2	3
From 1500 to 1800	3	4
From 1800 to 2500	4	-

Gate length	Matrix 2500/ Matrix BLDC	Matrix High Speed/ Matrix 1800
Up to 6 m	0,5	0,5
From 6 to10	1	1
From 10 to 12	1,5	1,5
From 12 to 15	2	2,5
From 15 to 18	3,5	-

Follow the waste rate line of the graph to get the estimated duty cycles.
Duty cycles obtained may be compromised if the maintenance plan is not carefully respected.
Duty cycles are determined on the base of design analysis, project calculations and tests carried out at factory.
Therefore the duty cycles achieved are a mere estimation.



3. INSTALLATION

3.1 Introduction

Matrix must be installed by qualified personnel, complying with law regulations and instructions contained in this manual.

For a proper installation, strictly follow the following procedure, respecting the below chronological order:

- Prepare a strong basement using ferro concrete.
- Fix the gearmotor to ground.
- Fit the rack and the according limit switches.
- Fit safety devices (sensors, blinker, safety edges ....)

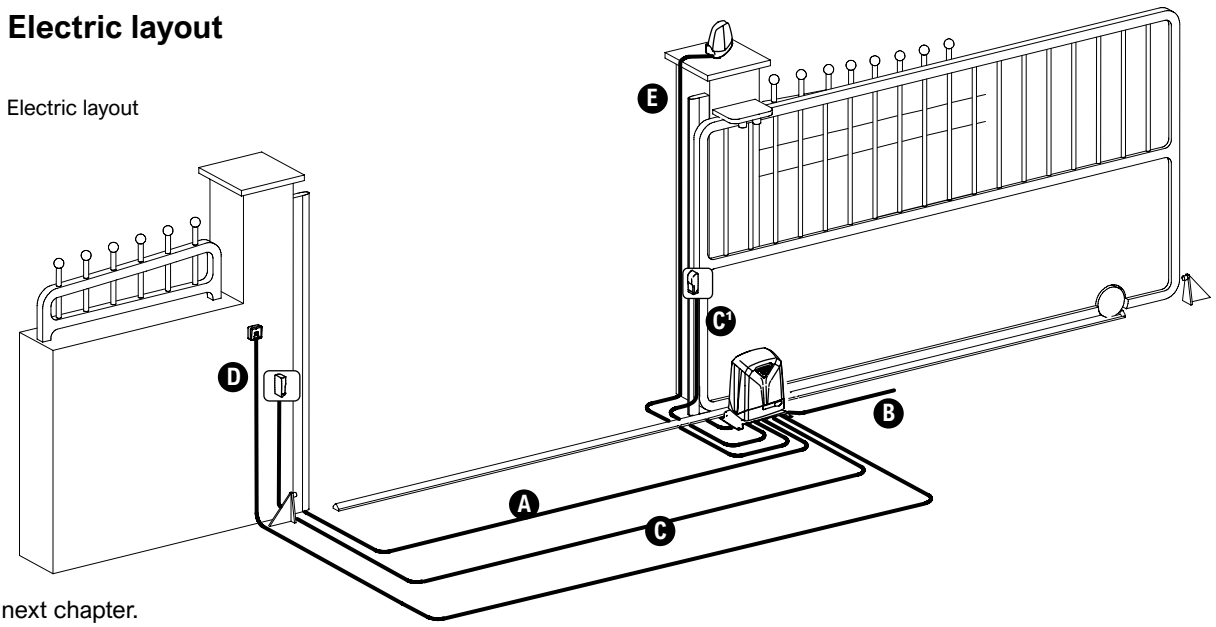
3.2 Preliminary checks

Before proceeding to installation, it is necessary to double check the good condition of every component and make sure the site is suitable for installation purposes.

- All components must be integral and suitable to use.
- Make sure the installation site complies with system's dimensions.
- Make sure the concrete basement grants stability and solidity.
- Make sure the area around the system is clear enough to allow eazy and safe manual operation.
- Make sure gate features are suitable to automate.
- Make sure weight, dimensions and gate features are suitable to the model you have choosen.
- Make sure cogwheel case doesn't hit against any fixing points of the gate (as screws, bolts, gate's wheels).
- Make sure the gate area is fitted with ground stops both in opening and closing.
- Make sure the installation area grants fixing stability and solidity.
- Make sure the gate is mechanically free of friction.
- Make sure the automation fixing area is compatible with the dimensions of the ground plate and that there is sufficient space to carry out manual operation easily and safely.
- Make sure the automation positioning area is not subject to flooding; possibly install the automation raised from the ground.
- If the system is installed in areas where vehicles transit, it is advisable to provide adequate protection against accidental impacts.
- Make sure the electric circuit is connected to a state of the art safety grounding.
- Make sure the fixing surfaces of the photocells are flat and allow correct alignment between transmitter and receiver.

3.3 Electric layout

Picture 3: Electric layout



Refer to next chapter.

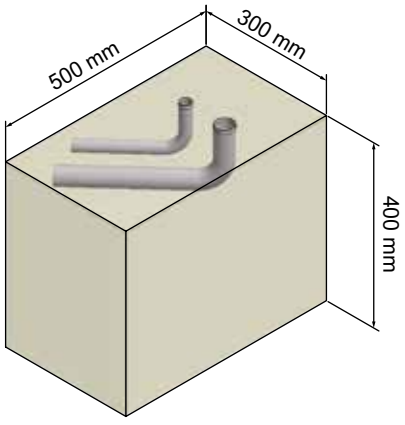
3.4 Wires features

Cables necessary for the installation of the system (not included) may vary according to the quantity and type of accessories and devices fitted.

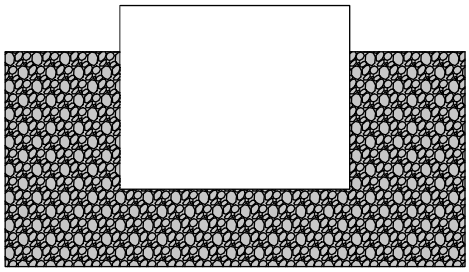
	230V	24V
A Safety edge	2x0,5	2x0,5
B Power supply	2x1,5+T	2x1,5+T
C Photocells	Rx 4x0,5	Rx 4x0,5
C1 Photocells	Tx 2x0,5	Tx 2x0,5
D Key switch	2x0,5	2x0,5
E Blinker	2x0,5	2x0,5

3.5 Basement preparation

It is absolutely key to build a solid concrete basement (at least EN206 C25/30 proof).
Basement dimensions must be no less than 500x300mm and no less than 400mm deep.
We recommend to consider an extra concrete surface of 100 mm all around the basement. (**Picture 4**).



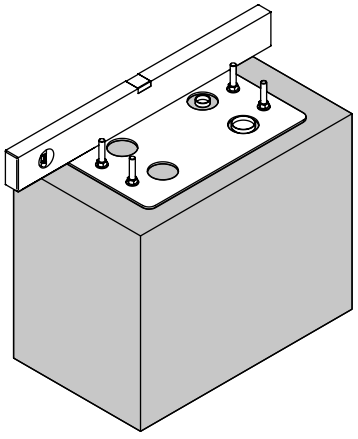
Picture 4: ferro concrete basement



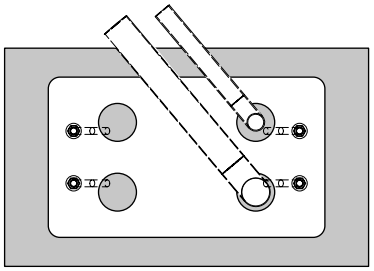
Picture 5: basement section

Pay attention while arising the basement, since **the concrete work cannot impede to stud the fixing screws.**

Do not forget wirings! While preparing the concrete basement keep a duct of the proper dimension to connect the main power and any possible additional devices.
Drive the wires guide through the right hole of the ground plate and keep it oriented towards the property.
Make sure ground plate is properly levelled. (**Picture 6**)

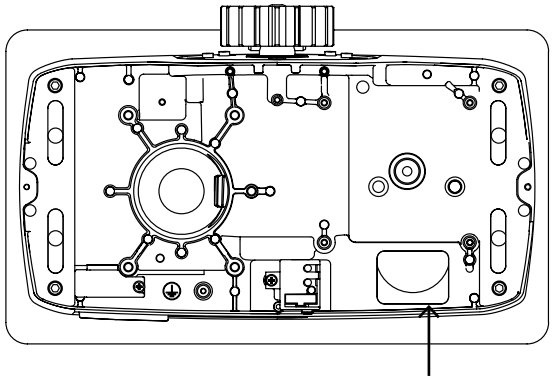


Picture 6:
Basement and ground plate



Picture 7: Top view

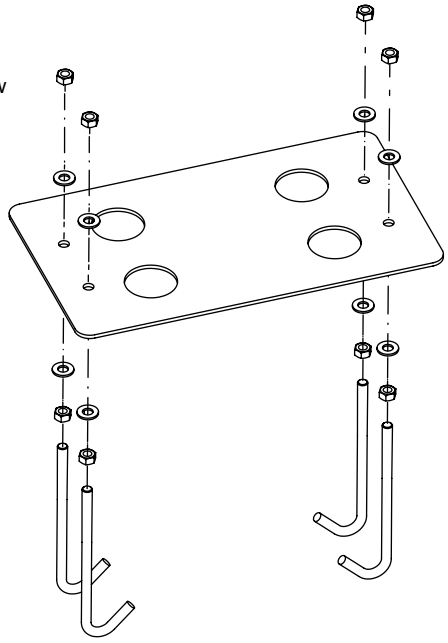
PROPERTY VIEW



Picture 8: Gearmotor top view

Screw nut and washer M10 to the anchor bolts, keeping the same distance for all of them, in order to create a balanced support for the ground plate.
Put anchor bolts M10 into holes, then tighten washers and bolts M10 as shows **Picture 10**.

Picture 9:
Ground plate view



Picture 10: Anchor screws view

Cast the concrete and, before setting begins, put the ground plate in the center, leaving a margin of 40/60mm; ground plate has to be aligned to the gate and properly levelled.
Wait for the concrete to set completely.

ATTENTION: Keep the ground plate surface and anchor bolts as clean as possible (screen the anchor bolts).

Leave electrical cables at least 30-50cm longer to allow easy connection to the control unit.

3.6 Fixing on ground

Loose washers and bolts M10 screwed on the ground plate.
Proceed to remove Matrix's cabinet.

Lay the gearmotor on the ground plate.

Match anchor bolts protruding from the ground plate to the aluminium base slots.

Fix the gearmotor to ground plate using flat washers M10, Grower washers and bolts M10 provided in the fittings bag.
Pay attention while fixing, cogwheel must be oriented towards the gate.
Attention! Drive electric cables through the aluminium base and keep them away from components that may warm up (as motor, transformer, etc etc).

Cut the membrane keeping an extra margin of 3 cm from ground plate edge and fit the cables for safety devices and power supply connection.

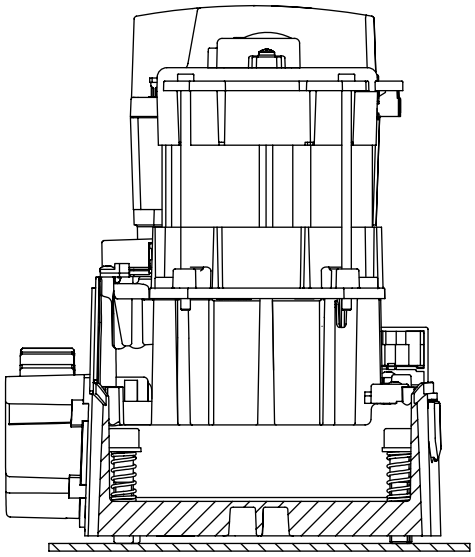


Figura 11:

It is possible to adjust the heigth of the aluminium base calibrating the 4 screws 10x50 and springs (this will be necessary only if Matrix serves as replacement of a previous installation, refer to **picture 11**)

Heigth can be adjusted up to max. 19mm (without washer).
Unlock the gearmotor and set it to manual operation mode.

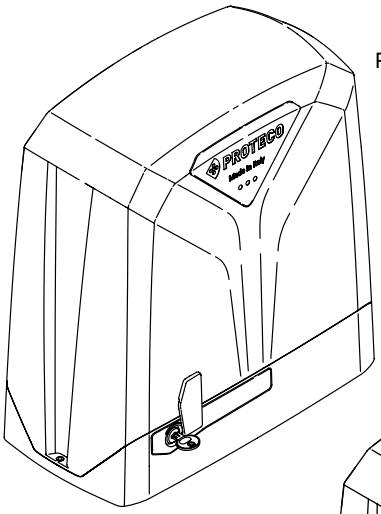
3.7 Manual operation

Switch the power off and release the gearmotor using the lock barrel positioned on the alluminium base.

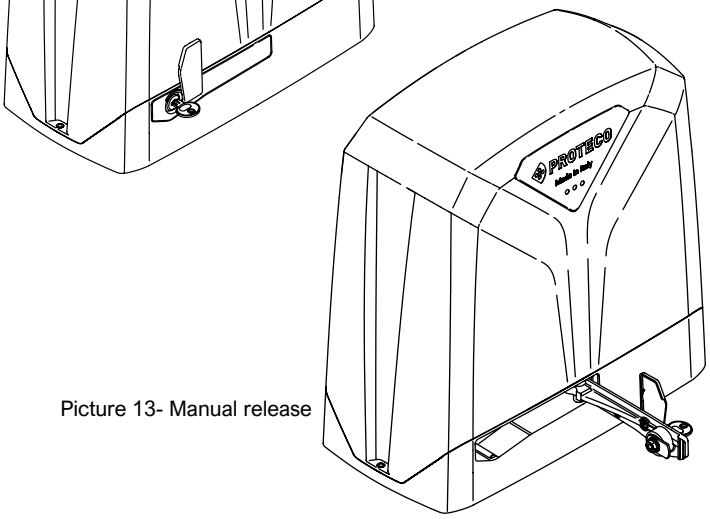
Lift the plastic tang to accede to the lock (**Picture 12**).
Plug the key in and turn it counter clockwise.

Pull the release lever completely to full opening (90°), (**Picture 13**).
Now you can move the gate manually.

ATTENTION: Be carefull, the gate may accidentally move.



Picture 12- Lock barrel



Picture 13- Manual release

To lock the gearmotor back, put the release lever to its original closing position and turn the key clockwise (**Picture 12**).

Remove the key from the barrel and pull down the plastic tang.

Move the gate to restore the lock system.
Power the gearmotor.

Manually move the gate to opening position.
Fit the three bolts to the rack in the centre of each slot (**Picture 14**).

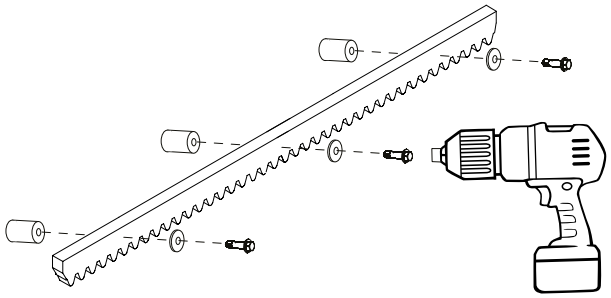
Rack has to be aligned to the gate.

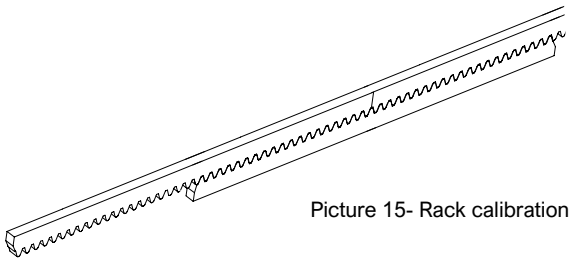
While positioning the rack, keep a small gap between rack and cogwheel of 1/2mm and level. Weld the first bolt to the gate.

Move the gate manually making sure the rack properly matches the cogwheel, then weld the second and third bolt.

Place another rack piece beside, using another one underneath for calibration. See **Picture 15**

Picture 14- Rack installation





Picture 15- Rack calibration

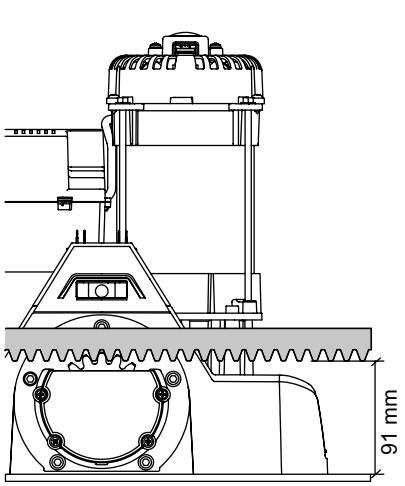
Move the gate manually and weld the three bolts.
Close the gate manually for about 0,5 m, and join the second rack piece to the first one, keeping match to the cogwheel.

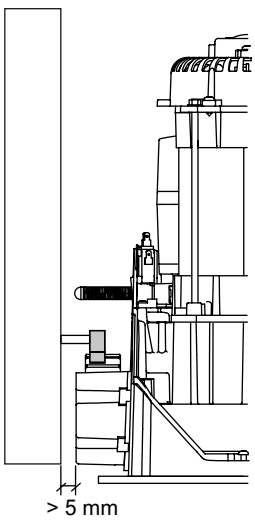
Make sure rack is properly levelled and fix.

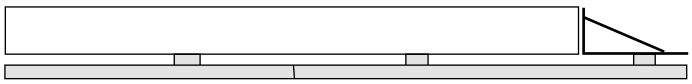
3.8 Rack installation

3.8.1 B102 steel rack - type M4 12x30mm - 1m length

ATTENTION:
Fit the rack as shown in the below picture.





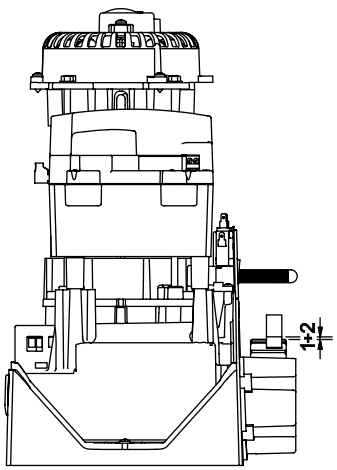


Picture 16: - Extension bracket

Repeat the same procedure for the whole gate's length.
The last rack piece may exceed the gate length: in this case add a bracket as gate extension and as rack support (**Picture 16**).

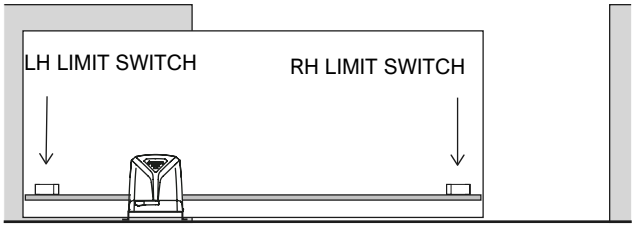
ATTENTION: Make sure the gate regularly reaches mechanical ground stops keeping match between rack and cogwheel. Make sure as well the gate is free of friction points during cruising.

IMPORTANT: Avoid the gate overloads the gearmotor. Keep a small gap between the rack and the cogwheel (Picture 17).



3.9 Limit switches installation

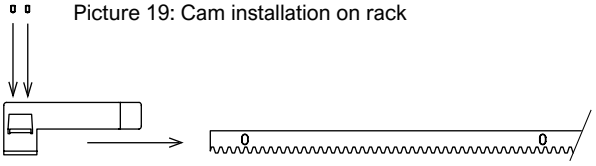
3.9.1 Mechanical limit switches



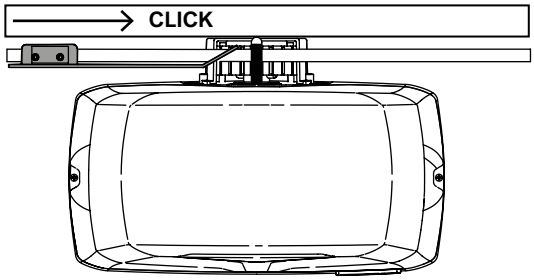
Picture 18

Once the motor position is determined, adjust limit switches accordingly. (**Picture 18**)

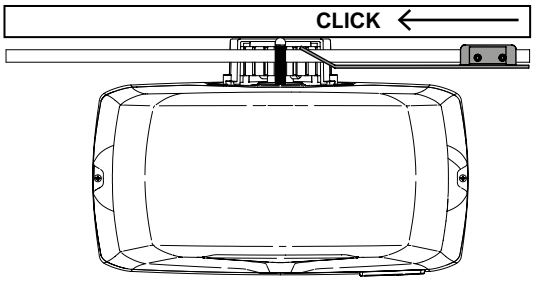
- Manually close the gate and keep a margin of 3 cm before reaching the closing mechanical stop.
- Fit the two dowels to the limit switch cam.
- Lean the cam and slide until the limit switch is activated.
- Tighten the dowels to secure the cam to the rack.
- Manually move the gate to opening position and repeat the same procedure.
- Take the dowels and fix the limit switch cams.



Picture 19: Cam installation on rack



Picture 20



Picture 21

Once the installation of the limit switch cams has been completed, manually move the gate in opening and closing and check that cams always activate the limit switch without reaching the mechanical stop. (Pictures 20/21)

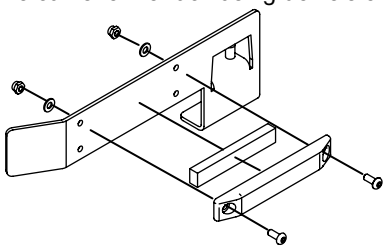
This check guarantees the correct functioning of the automation and preserves the good mechanical condition of the gate.

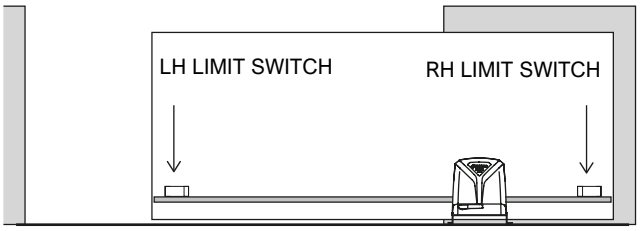
ATTENTION: Remove any exceeding rack.

3.9.2 Magnetic limit switches

Mounting the metal cam:

- Fit the magnet inside the proper seat.
  Pay attention to the cam orientation, LH or RH.
- Fit the magnet holder to the cam using the fittings provided.
- Use the upper holes as shown in the picture.
- Finally fit the cams to the rack using dowels 6 x 16 provided.

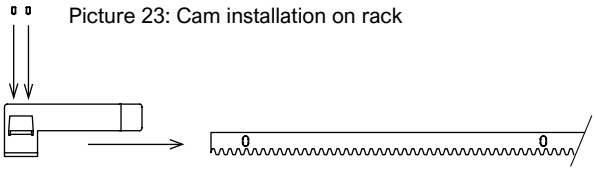




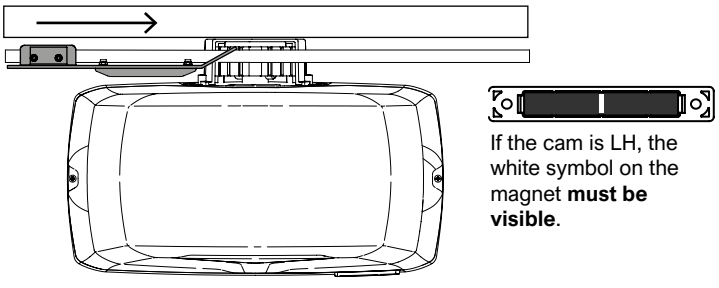
Picture 22

Once the motor position is determined, adjust limit switches accordingly. (**Picture 22**)

- Manually close the gate and keep a margin of 3 cm before reaching the closing mechanical stop.
- Fit the two dowels to the closing limit switch cam.
- Lean the cam and slide until the limit switch is activated.
- Tighten the dowels to secure the cam to the rack.
- Manually move the gate to opening position and repeat the same procedure.
- Take the dowels and fix the limit switch cams.

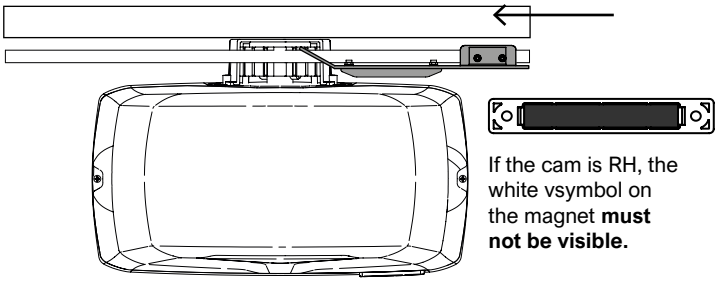


Picture 23: Cam installation on rack



If the cam is LH, the white symbol on the magnet **must be visible**.

Picture 24: LH MATRIX MAG version



If the cam is RH, the white vsymbol on the magnet **must not be visible.**

Picture 25: RH MATRIX MAG version

Once the installation of the limit switch cams has been completed, proceed to general test. (**Pictures 24/25**).
This procedure guarantees the correct functioning of the automation and preserves the good mechanical condition of the gate.

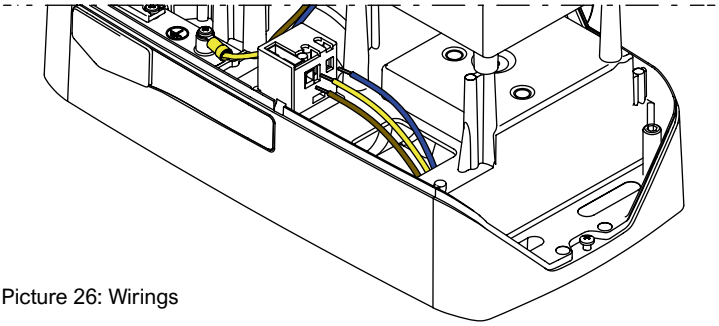
ATTENTION: The magnetic limit switch is activated when approaching the magnetic area.
Leave the gear and control unit visible to double check the good operation of the system.

ATTENTION: Remove any exceeding rack.

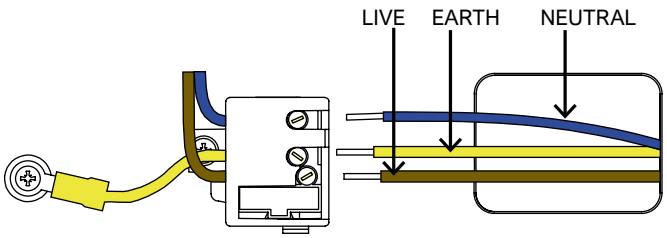
3.10 Wirings

The power connection must be performed by experienced qualified personnel, in full compliance with laws, rules and regulations.

Insert the electrical cables into the supplied cable gland, breaking through the membranes and place the cable gland in the appropriate seat on the base of the gearmotor.
Connect all power and grounding cables to the appropriate terminal block located near the symbol ⏚ .



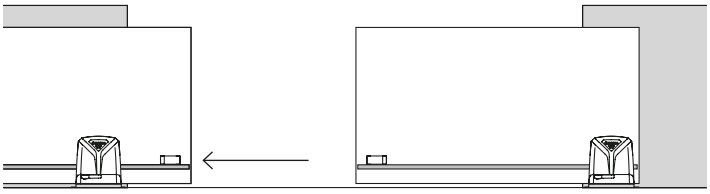
Picture 26: Wirings



Picture 27: Wirings terminal block

3.11 Master and Slave configuration

Picture 28: TWIN mode - full opening



Picture 29: TWIN mode - pedestrian/partial opening

PARTIAL/PEDESTRIAN start command is performed only by MASTER motor.
The TWIN function allows to synchronize two mirror sliding gates as shows **Picture 28**.
For more details refer to chapter "TWIN mode".

3.12 General test

Before starting the general test, be sure programming has been carried out (**Refer to chapter "3.5 Start Up" of the control unit manual**).

Once mechanical installation and electrical connections have been completed, power the automation and proceed with a careful test of the gearmotor, accessories and safety devices connected.

Important! Programming procedure must be repeated every time anything concerning the gate has been changed (speed, weight, rail, wheels ...)

Most importantly, check that opening and closing limit switches work correctly, stopping the gearmotor before it reaches the mechanical stops.

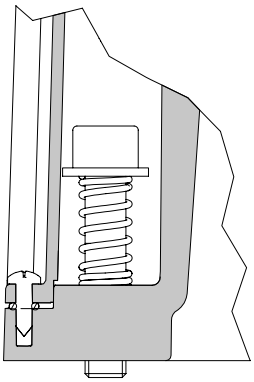
After powering the gearmotor, manually move the leaf to opening and closing position and check that LO (Opening limit switch) and LC (Closing limit switch) are displayed on the control unit before reaching the mechanical stop.
Make sure both messages are properly displayed.

Deliver the end user chapter of this manual to the customer and instruct him how the automation works and how to use it.

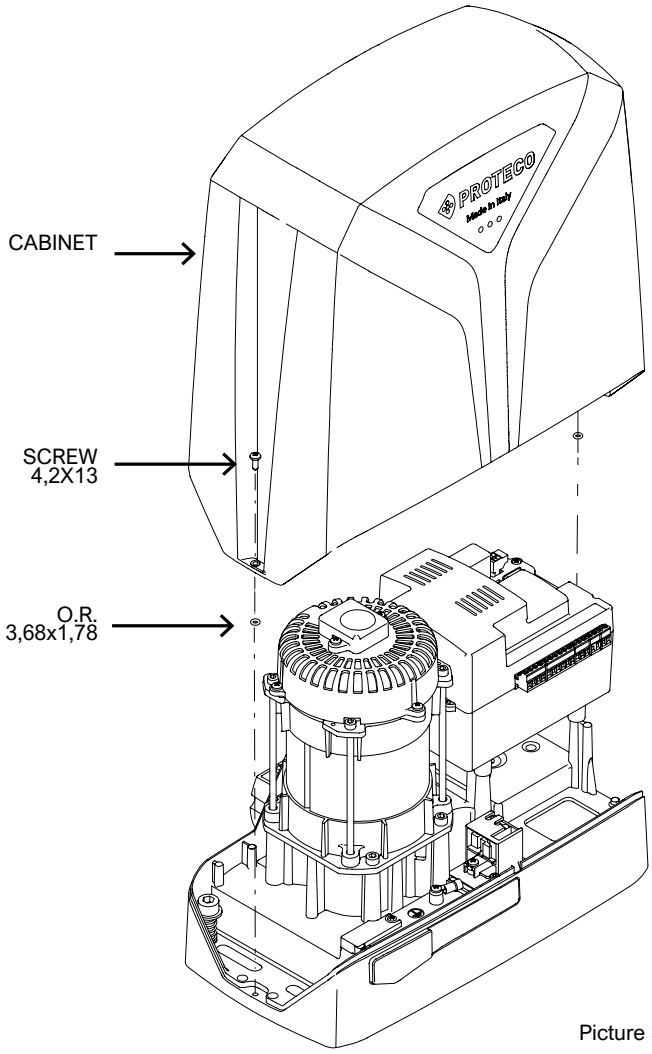
3.13 Cabinet installation

Once both mechanical and electrical installations are completed, proceed to fit the cabinet.

Lean the cabinet onto the alluminium base, just put a little pressure on the upper side.
Use the two screws 4,2x13 to fix the cabinet, as show **Pictures 30** and **31**.



Picture 30: Matrix section view



Picture 31

4. MAINTENANCE

Attention! Maintenance service must be carried out by qualified technical personnel, in full compliance with the safety standards required by the laws in force.
Maintenance has to be carried out every six months.

Regular maintenance is required to keep the automation safe and in good operation over time.

In order to proceed to maintenance service, follow the below checks:

- Turn the POWER OFF.
- Check screw connections are properly tightened.
- Check the condition of moving components: cogwheel, rack and gate parts. Proceed to replace the wasted parts.
- Turn the POWER ON and proceed to the expected tests outlined in the chapter.
- Lock the gearmotor back and proceed to test.

4.1 Release system test

To check the efficiency of the release system, perform the following checks.
Disconnect any power source, use the supplied key to release the lock barrel on the aluminium base.
Pull the release lever and move the gate manually to check proper operation.
Gate leaf must slide freely during the whole cruise.

DATE	NOTES	INSTALLER'S SIGNATURE	END USER'S SIGNATURE

5. END USER GUIDELINES

The following pages contain important information for your safety and for complying with standing safety regulations.
Keep this manual for future reference.

5.1 Safety tips

⚠ Keep children under 8 away from the system.

⚠ Children over 8, people with reduced physical or mental abilities, or lacking experience, may only use the automation under supervision, or if they have been instructed on how to use safely the system and have understood the related dangers.

⚠ This product was designed and built exclusively for the intended use indicated. Any other use could compromise the integrity and safety of the product and should be avoided.

⚠ Do not access, for any reason, the internal parts of the automation: it may be dangerous and components can only be repaired or replaced by qualified personnel.

⚠ Do not start transmitters or other command devices unless the area is visible and clear from danger.

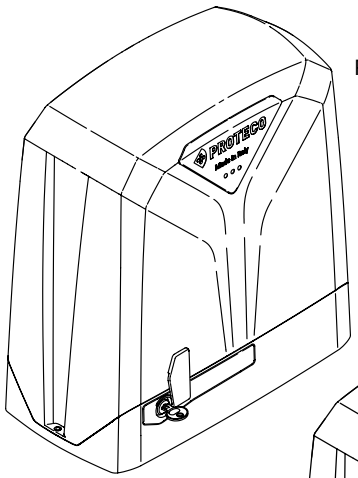
⚠ Do not allow children play within the automation area.

5.2 Manual operation

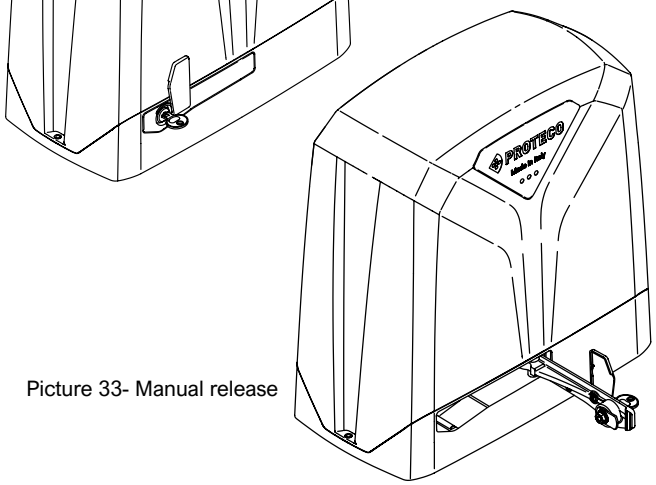
To release the gearmotor use the lock barrel positioned on the aluminium base.
Lift the plastic tang to accede to the lock (**Picture 32**).

Plug the key in and turn it counter clockwise.
Pull the release lever completely to full opening (90°), (**Picture 33**).
Now you can move the gate manually.

ATTENTION: Be carefull, the gate may accidentally move.



Picture 32- Lock barrel



Picture 33- Manual release

To lock the gearmotor back, put the release lever to its original closing position and turn the key clockwise (**Picture 32**).

Remove the key from the barrel and pull down the plastic tang.
Move the gate to restore the lock system.

ATTENTION: put the gate exactly in the same previous position, or switch the power off during 5/10 seconds and then turn the power on again.

ATTENTION: store key and installation manual in a safe place for future reference.

5.3 Maintenance

To keep the automation safety and in good operation over time, it is advisable to schedule a periodic maintenance plan with the installer, or at least report any anomalous behaviors that may require inspection.

In case of malfunctions it is advisable to contact the installer who carried out the whole installation, rather than others.

Periodic maintenance and repairs must be reported by the installer and the owner must keep them safe and available for future reference.
End user may only take care of photocells and automation housing cleaning.

5.4 Disposal

5.4.1 Disposal of the system

Any part of the system, including devices such as remote controls, must be disposed in compliance with current legislation, as they may be harmfull for the environment.

Most of the materials used are similar to solid urban waste and can be handled accordingly.
They can be recycled through separate collection and disposed in authorized centers.

Other components (electronic boards, batteries, etc.) may instead contain polluting substances.
They must therefore be removed and delivered to companies authorized for their recovery and disposal.
Before proceeding, it is always advisable to check the specific regulations in force.

5.4.2 Disposal of packing

Packaging components (cardboard, plastics, etc.) are sare similar to solid urban waste and can be handled accordingly without any difficulty, simply by carrying out separate collection for recycling.
Before proceeding, it is always advisable to check the specific regulations in force.

⚠ **DO NOT POLLUTE THE ENVINRONMENT!**
Some components may contain polluting or dangerous substances, if dispersed they could affect the environment and human health.

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GATE AUTOMATIONS

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English

MATRIX

Q90SA Control Unit

Installation and User manual

PROTECO
GATE AUTOMATIONS

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1. WARNING

This manual for MATRIX series contains important information concerning personal safety.
An incorrect installation or an improper use may lead to severe injuries.
Read carefully and pay particular attention to the safety sections marked by the yellow triangle ⚠ .

⚠ The installation of automatic doors, gates and barriers must comply with the Machinery Directive 2006/42/CE and EN 12453 regulation, and performed by qualified personnel.

⚠ Make sure the main power line is equipped with state of the art safety grounding system; as well be sure the whole installation is protected by a power cut switch and against overcurrent.

Make sure the area is clear from flammable gases and/or electromagnetic interferences: it could lead to very dangerous injuries.

⚠ Switch the power and batteries OFF before any operation.

After installation, packaging and waste materials (cardboard, plastic, metal parts etc.) must be kept away from children as they could be potentially harmfull.
Use only original spare parts. Any alteration to the system is prohibited.
Proteco Srl will not respond in case of using additional and/or fake spares.

Proteco S.r.l. reserves the right to make changes to the product without notice.

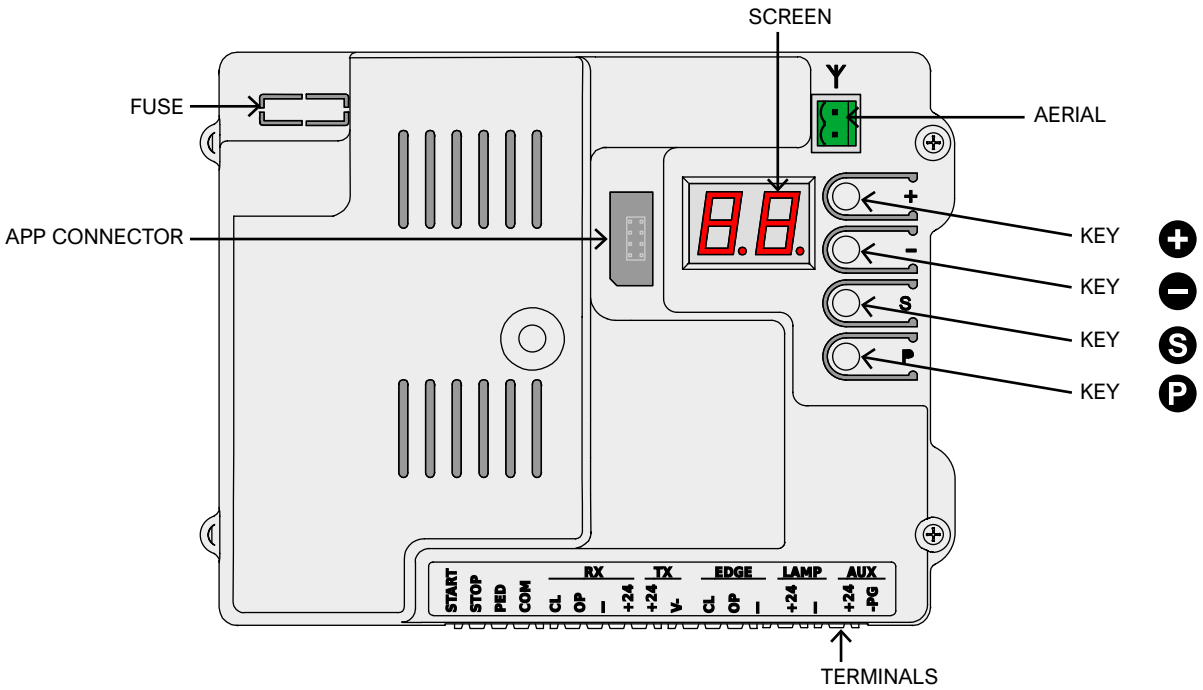
2. FEATURES

2.1 Technical features

	Version 1800 kg	**Version 2500 kg**
Power supply	230V - 50Hz	
Max. absorption	4,5A	6A
Absorption in stand-by	2,1 W	
Motor's voltage	230V - 50 Hz	
Fuse	8A	
Capacitor	20 + 30	25 + 25
Accessories' voltage	24V dc (12 W photocells, 18 W blinker +AUX)	
Max. speed	11 m/min	11 m/min
Working cycle	50%	50%
Working temperature	da -30 °C a +55 °C	

START contacts	Start, Stop, Pedestrian.
Radio	Built-in 433 MHz radio receiver, storage up to 96 random or rolling codes.
Safety devices	Opening and closing photocell (self-test optional), powered at 24 Vdc 500 mA max., mechanical safety edge N.C. or resistive 8K2.
Outputs	Flashing light 24V DC 750 mA max. AUX 24V DC (programmable) 24 Vdc 750 mA max. Blinker + AUX = max. 750 mA totally.
Optional interfacesi	Expansion connector for optional module cards Connector for home automation usb key /APP. PMXM01 Twinning card and MRX01 2nd radio channel card.
Optional functions	Operation mode, Obstacle detection, Follow me closing, Start up automatic closing, Pre-blinking, Cycles counter, Maintenance recall, Installation date.

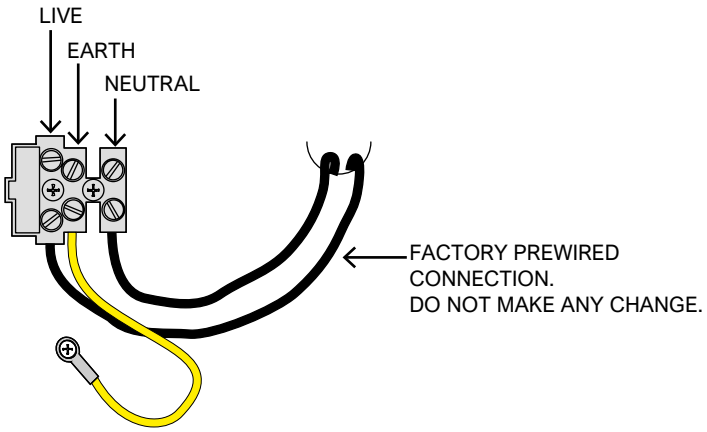
2.2 Control unit layout



3. Wirings

3.1 Main power 230V

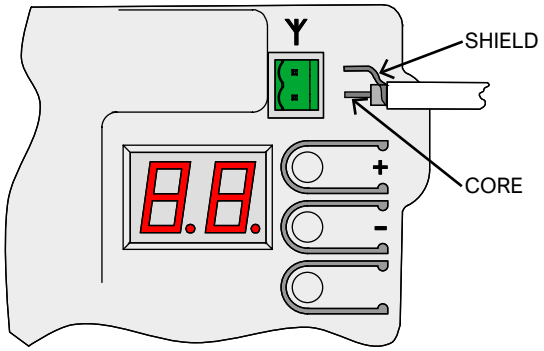
Locate the terminal block with fuse holder mounted close to gear block (picture on the left).
Wire live, earth and neutral as shown below:



It is fundamental to wire the system to the earth.

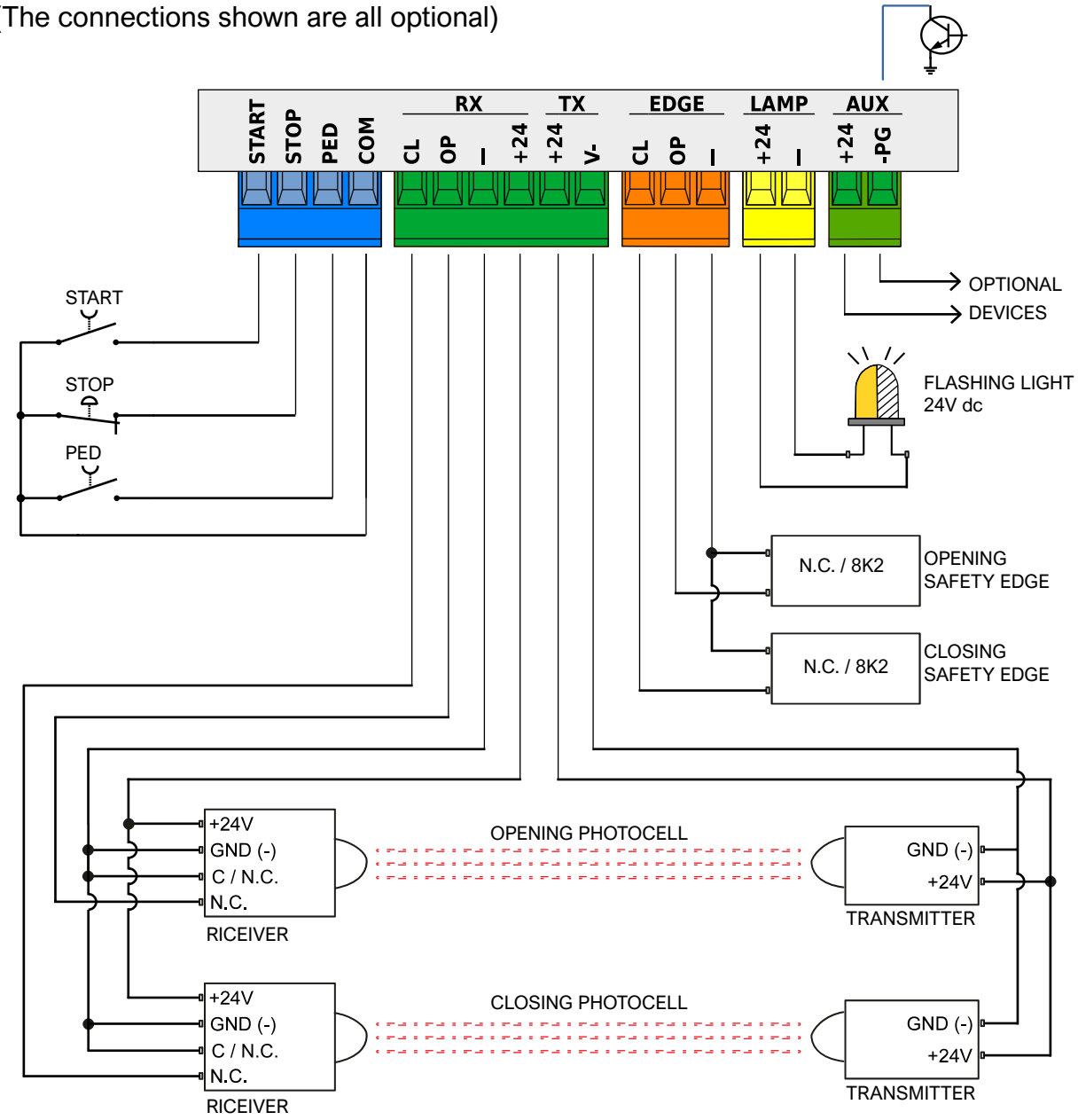
3.2 Stand-alone Antenna (optional)

The control unit is itted with a Whip antenna.
If you wish to connect an external stand-alone atenna, remove the Whip aerial and wire the core cable (RG58); wire the shield cable on the other terminal as shown in the picture.

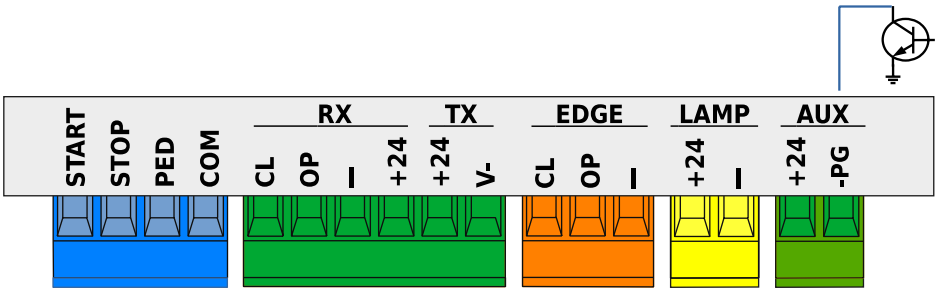


3.3 Wiring diagram

(The connections shown are all optional)



3.4 Terminals



3.4.1 START

3.4.1.1 START - wired contacts, key switch, key pad, timer
Any start contact shall be wired to this terminal, refer to Chapter C.5, page 11.
Any pulse below 10 seconds is considered as a regular **START** command, and once duty cycle is completed, it starts the automatic closing countdown (Chapter L.1, page 11); any pulse
over 10 seconds activates the timer mode and the gate will remain in opening position according to the timer set up.
Wire **N.O.** contacts between **START** (or **PED**) and **COM**.
Any additional contact shall be wired in parallel.

3.4.1.2 STOP – emergency push button or similar devices
Any stop contact shall be wired to this terminal.
Multiple stop contacts shall be wired in series between **STOP** and **COM**.
If no **STOP** contact is wired, deactivate **P.1** at page 12, otherwise no operation will start.
Any STOP command immediately stops any operation.

3.4.1.3 PED (Pedestrian: partial opening)
The operation logic is the same of **START**: adjust **L.3** to set the desired opening width and set L.2 to activate the pedestrian automatic closing, page 11.

3.4.2 RX and TX - Photocells

3.4.2.1 CL (RX) – Closing photocell (N.C. dry contact)
Any closing photocell and similar devices shall be wired to this terminal, N.C. contacts.
Wire the receiver's N.C. contact between CL and "**-**".
Additional photocells shall be wired in series.
Power the receiver from +24 and "**-**", while power the transmitter from +24 and "**V-**" (TX terminal).
Refer to Chapter 3.3 page 5, to get the complete wiring view.

3.4.2.2 OP (RX) – Opening photocell (N.C. dry contact)
Any opening photocell and similar devices shall be wired to this terminal, N.C. contacts.
Wire the receiver's N.C. contact between OP and "**-**".
Additional photocells shall be wired in series.
Power the receiver from +24 and "**-**", while power the transmitter from +24 and "**V-**" (TX terminal).
Refer to Chapter 3.3 page 5, to get the complete wiring view.

3.4.2.3 "-" and +24 (RX)
These terminals permanently power photocell's receivers.
Attention: voltage for receivers and transmitters is limited to a single fuse of 500 mA.

3.4.2.4 +24 and V- (TX block)
These terminals power photocell's transmitters .
Unlike terminals "**-**" and +24 of RX block, TX terminal cuts power during photocell test.
Attention: voltage for receivers and transmitters is limited to a single fuse of 500 mA.

3.4.3 EDGE – Safety edges

Safety edges shall be wired to this terminal, N.C. or resistive 8K2 contacts; set **P.4** and **P.5** according to the kind of contact used.
Additional contacts shall be wired in series, as explained in the below example (closing safety edge):
- If you have 2 N.C. contacts set **P4 to 1.**
- If you have 1 N.C. ckontact and 1 8K2 set **P4 to 2.**
- If you have just 1 8K2 resistive contact set **P4 to 2.**

Every series can only take 1 8K2 resistive contact.
If you have 1 NC contact and 1 8K2 resistive contact, this last one will command.

3.4.3.1 CL (EDGE)
Wire the closing safety edge between **CL** and "**-**".

3.4.3.2 OP (EDGE)
Wire the opening safety edge between **OP** e "**-**".

3.4.4 LAMP -+24 and "-" - FLASHING LIGHT

Wire the flashing light to these terminals, that deliver intermitting 24V DC during operation.
It is possible to switch the intermittance to permanent voltage, just during operation, setting up **H.2.**
Attention: LAMP + AUX outputs together are limited to max. 750 mA.

3.4.5 AUX -+24 and "-PG" PROGRAMMABLE OUTPUT

AUX terminal is 24V DC powered and can be configurated performing several functions, see Chapter A.6 page 10.
Terminal +24 is always powered at 24 volt; terminal -PG is normally an open circuit, that automatically floats to GND (earth)
when the output is activated.
This output allows to command garden lights, warning lights, and relays (24Vdc).
Attention: LAMP + AUX outputs together are limited to max. 750 mA.

3.5 Start Up

Once mechanical and electrical installation is completed proceed to the following steps, respecting the cronological order:

- Proceed **to programming**, starting C.1 page 10.
  In this way travel and proper values will be saved to command the gearmotor.
  If speed changes, the whole programming procedure shall be repeated.
- Adjust any parameters if needed.
- Store remote controls: A.1 if you wish to store **START** and A.2 if you wish to store **PED** (pedestrian), page 10.
- Proceed to general test - **safety devices in particular**.

For more details on operation refer to chapter 4.1 page 7, while refer to chapter 5 page 8 to get an overview on parameters and functions.

4. OPERATION

4.1 Operational modes

During normal operation the gate may be in one of the following modes:

- STILL, in stand-by for operation.
  Only when in STILL mode it is possible to enter parameters.
  Flashing light is switched off, but it may blink if faults occur.
  Screen shows a couple of horizontal lines blinking.
- OPENING; flashing light blinks slowly,and the screen displays vertical lines opening.
  If during opening an obstacle is detected, the gate reverts, remains in stand-by during 10 seconds and starts to open again (screen shows countdown).
- AUTOMATIC CLOSING COUNTDOWN; flashing light blinks shortly; when time left is below 12 seconds the flashing light remains switched on and fixed.
  Screen shows countdown.
  If working logic is STANDARD (see C.5, page 11) a START command will STOP the gate.
- CLOSING; if during closing an obstacle is detected, position. Flashing light blinks regularly and quickly.

4.1.1 Automatic closing after power cut

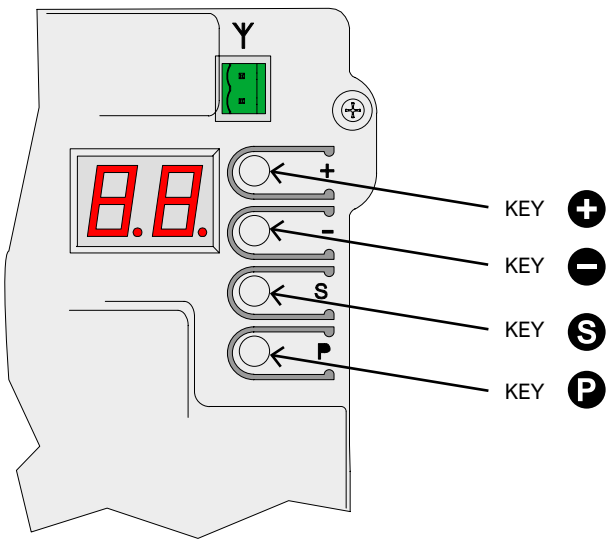
Once the power supply is restored, the control unit counts 15 seconds and then the gate starts closing, if all the following conditions have been fulfilled:
- **H.4**, page 11 is activated.
- **C.4**, page 11 is not set to position 2 (factory setting).
- No wired/radio command is sent, no key is pressed.

During the 15 seconds the system doubles check that all the a.m. conditions have been respected.
If this is the case, the blinker will flash shortly to confirm closing will start soon.

4.1.2 Programming keys

Pressing any key during operation the gate stops.
With an exception for ⊕ key: if pressed during countdown (see **chapter 4.1**) it makes the gate start working again.

When in still mode, the screen displays two symbols (weak flashing) or just one if energy save mode is on.
In this case it is possible to use some of the keys or a combination of them, to start some functions.



KEYS (User mode)	FUNCTION
⊕	START command
⊖	PEDESTRIAN command
Press Ⓢ hold and press ⊕	OPENING command
Press Ⓢ hold and press ⊖	CLOSING command
Ⓟ (press and hold for short seconds)	Programming menu: the display shows **A.1**

When in programming mode the display alternatively shows the outstanding setting and its value.
Ex.: setting H.2 / value 1, the display reads first "**H.2**" and after "**01.**".
In this circumstance it is possible to handle the following programming keys and functions:

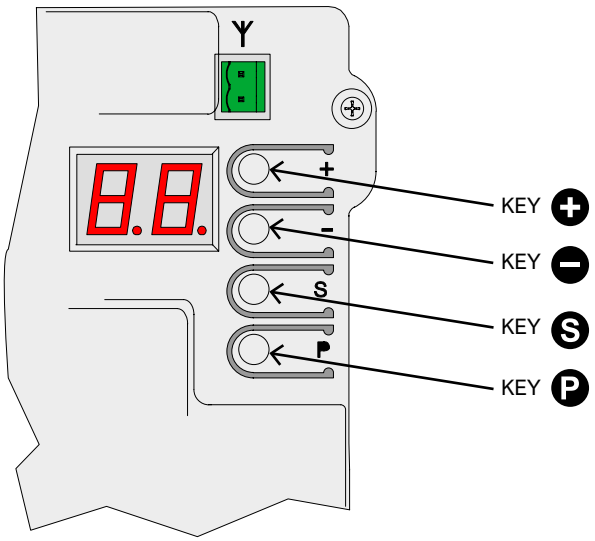
KEYS (Programming mode)	FUNCTION
⊕	This key increases the value of the setting. Keep pressed to speed.
⊖	This key decreases the value of the setting till 0. Keep pressed to get to zero.
Ⓟ	This key switches from menu to menu (ex. H.3 - J.1). From U.x menu the control unit returns back to A.1.
Ⓢ	This key switches from setting to setting (ex. H.3 - H.4). From last setting control unit re-turns back to the first one (ex. H.6 - H.1).
Ⓟ + Ⓢ (press Ⓟ hold and press Ⓢ)	This key quits the programming and returns to USER mode.

5. PROGRAMMING

5.1 Settings' configuration

Proceed to programming only when the gearmotor is in still mode (any key pressed during operation stops the operation).
Press key Ⓟ and hold shortly (a quick pulse is insufficient): display reads "**A.1**".

Press Ⓟ as many times as to find the desired setting.
Then press Ⓢ as many times as to find the figure corresponding to the desired parameter (right side of the display).
EX.: If you wish to go to **H.2** and you are in **A.1** position, press 3 times key Ⓟ (scrolling through **C.1, F.1** and **H.1), t**hen press key Ⓢ one time (to move from **H.1 t**o **H.2**).



If you wish to reduce or increase the value of the setting use ⊕ ⊖.
A ttention! when you reach the desired setting, wait shortly while the screen displayes the current value and setting alternatively.
If you wish to move to a different setting, press Ⓟ and then Ⓢ as previously outlined.

To quit the programming press Ⓟ and Ⓢ together.
The control unit automatically goes out of the programming mode after 2 minutes of no operation. Just parameter U.6 takes 16 minutes to quit the programming in case of no operation.

Some settings are mere functions and therefore have no value.
They may need longer or shorter pression of key ⊕ to be activated.
Usually the display shows a line "-" close to key ⊕ to confirm function is activated.
Unlike other settings as **A.1, A.2** and **A.3** that do only need confirmation after receiving a radio signal.

5.2 Settings' list

Here below you will find a resume of all available settings and functions.
More details are found in **Chapter 5.3**, page 10.

	ID	DESCRIPTION	LINK
A	A.1	Store a remote control as “START” command	C.5
	A.2	Store a remote control as PED pedestrian command	C.5
	A.3	Store a remote control as AUX / 2nd channel	A.6
	A.4	Delete a single remote control	
	A.5	Delete all remote controls	
	A.6	AUX / 2nd channel output configuration	A.3 U.4
C	C.1	Automatic programming	C.4
	C.3	Reset (factory default)	
	C.4	Opening orientation/motor's position	C.1
	C.5	Working logic configuration	
F	F.1	Obstacle detection	
H	H.1	Pre-blinking	
	H.2	Fixed-light blinker	
	H.3	"Follow me" closing	
	H.4	Automatic closing after power cut	
	H.5	Slowdown OFF / Soft Start OFF	
	H.6	Master / Slave - TWINNING configuration	
L	L.1	Automatic closing (START)	
	L.2	Pedestrian automatic closing (PED)	
	L.3	Pedestrian opening	
	L.4	Slowdown in Opening	
	L.5	Slowdown in Closing	
P	P.1	STOP	
	P.2	CL (RX) – closing photocell	
	P.3	OP (RX) – opening photocell	
	P.4	CL (EDGE) – closing safety edge	
	P.5	OP (EDGE) – opening safety edge	
U	U.1	Cycles counter	
	U.2	Maintenance countdown	U.4
	U.3	Maintenance recall	U.4
	U.4	Maintenance recall signalling mode	U.3
	U.5	Installation date	
	U.6	Trouble shooting and "dead man" functions	

5.3 Setting's description

5.3.1 A. RADIO

This menu includes procedures about how to store radio devices, remote controls mainly.
The control unit responds just to radio codes "**already stored**"; every remote control is matched to a progressive number that is displayed on the screen at every start command pulse.
In this way if by accident a remote control is lost it can be easily deleted from the control unit memory.
It is possible to store up to 96 different users; when a remote control is deleted its radio position still remains available for a new remote control storage.
Any key of the remote control can be set up as follows:

- **START** command, corresponding to a wired contact to **START** terminal.
- **PEDESTRIAN** command, corresponding to a wired contact to **PED** terminal
- **AUX**, known as well as 2nd radio channel, matched to **AUX** output.

Choose the function you need before starting storing any key of the remote control.
There are three different settings available (**A.1, A.2** and **A.3**) corresponding to different functions.

A.1 Store a remote control as START command

Set **A.1.** Press the remote control (the display reads"**Y-**") and while holding, press key ⊕ to store and confirm.
If successfull the display will show the radio position matched to the remote control.
In case of an already existing remote control, the display will only show its radio position (01, 02, …).
If storage capacity is full the display will reads "**FF**".

It is important to press key ⊕ when the remote control is transmitting, otherwise the radio code storage will not be successfull and the control unit might save any incoming undesired radio signal.
If you have additional remote controls to store, repeat the same procedure.
Make sure the screen displays "**Y-**" or a number, then press ⊕ .

A.2 Store a remote control as PED command (pedestrian)

Set **A.2** and repeat the above procedure.
For more details refer to Chapter 3.4.1.3 PED, page 6.

A.3 Store a remote control as AUX (2nd channel)

Set **A.6** according to the AUX function you need or in alternative plug the optional interface card MRX01 duly set up.
Then proceed to set **A.3** carrying out the same procedure applied for **A.1** and **A.2** configuration.

A.4 Delete a single remote control

Every remote control stored is matched to a radio position identified by a number.
Set **A.4**, press ⊕ or ⊖ to find the remote control you need to delete, then press both keys together and hold until the display flashes " 88".

If there is just a remote control stored, the display will show just that one.

A.5 Delete all remote controls

Set "**A5**", or when the screen displays "**.-**" press ⊕ to confirm you wish to delete all remote controls stored and hold during 5 seconds; if all remote controls have been successfully deleted, the display flashes " 88".

A.6 AUX/2nd channel output configuration

The **AUX** is a multifunction output: it can be used as maintenance recall, refer to Chapter U.4 page 12.
Or in alternative it can set up the following modes/functions:

A.6	AUX - Functions/Modes
0	AUX output is OFF. AUX output is ON if U.4 maintenance recall is activated.
1 (factory set up)	2nd channel / MONOSTABLE: the output is activated by a remote control stored in A.3 AUX. The contact closes when giving and holding a start pulse with the remote control. The contact opens just when the remote control's key is released.
2	2nd channel /BISTABLE: the output is activated by a remote control stored in A.3 AUX. The contact closes or opens when giving a start pulse with the remote control.
3	SIGNALLING GATE IS FULLY OPENED: the output is activated when the gate is fully opened. The optional interface card MRX01 can perform the same function but in a slightly different way.
4	SIGNALLING GATE IS FULLY CLOSED: the output is activated when the gate is fully closed.
5	COURTESY LIGHT (30"): the output is activated when the contact closes and remains closed during the whole working cycle. The contact opens after 30 seconds after working cycle is completed.
6	COURTESY LIGHT (60"): the output is activated when the contact closes and remains closed during the whole working cycle. The contact opens after 60 seconds after working cycle is completed.
7	COURTESY LIGHT (90"): the output is activated when the contact closes and remains closed during the whole working cycle. The contact opens after 90 seconds after working cycle is completed.

5.3.2 C. PROGRAMMING

C.1 Automatic programming

This procedure allows to learn the mechanical features of the gate: working cycle, speed, torque and accelerations; programming may be carried out just when installation is completed.
Matrix gearmotor is built in such a way that, when properly installed, its mechanical characteristics do not change over time, so programming can normally be performed only once.

The procedure carries out two opening and two closing operations; before start programming make sure that everything is in order: if one of the operations is interrupted (due to the pressure of a button or the intervention of a safety device) the procedure must be repeated from the beginning.
Set **C.1** and press ⊕ holding during 5 seconds.
If **C.4** is not configurated yet (as in case of a brand new control unit), the screen will display the opening direction of the gate.
Press ⊕ to set RH opening and ⊖ to set LH opening.
If **C.4** is configurated the display remains clear.

The gate performs 4 steps; every step is shown on the display (01, 02, 03...) with a short pause in between.
In any moment it is possible to stop the operation, just pressing any key.

Step (01), gate slowly starts opening until detecting the mechanical limit switch. If the gate works to the opposite direction, stop the operation and properly set up **C.4**. Then repeat **C.1**.
Step (02), gate slowly starts closing until detecting the closing position; the following steps are meant to double check all settings are correct.
The automatic learning is successfully completed when display shows " 88 " flashing.

If the gate is very heavy or it is not working smoothly, the programming can be compromised and not completed, because at low speed the torque (thrust) of the motor is not sufficient.
In this case set function **H.5** at **1** to turn the slowdown **OFF**, and then repeat the whole programming procedure.

C.3 Reset (factory default)
Set **C.3**, press ⊕ and hold during 5 seconds to confirm reset (return to factory settings).
This setting allows to delete any configuration previously set, but parameters **U.5, U1** and **U.2 CANNOT** be reset and no remote control previously stored can be deleted.
Now repeat **C.1** procedure.
Reset is successfully completed when display shows "44" flashing.

C.4 Opening orientation/motor's position
This parameter shows the gate's opening direction or the motor's position.
Looking from inside the property values are intended as follows:

C.4	Boom configuration
0	Motor is positioned to the right, opening to the left.
1	Motor is positioned to the left, opening to the right.
2 (factory set up)	No configuration is set, motor is intended to the right.

C.5 Working logic configuration
Set the working logic of start commands, inputs START and PED; the remote controls will follow the same logic.

C.5	Working logic
0 (factory set up)	SEQUENTIAL (STEP BY STEP) Every START command stops or reverts the working cycle according to the sequence: **OPEN - STOP - CLOSE - OPEN ...**
1	PRIORITY TO OPENING Every START command gives priority to opening; gate automatically closes according to the time set (refer to L.1 Automatic closing, page 10)
2	SEMI AUTOMATIC (OPEN-CLOSE separate) START terminal commands the opening; START2 terminal commands the closing. Automatic closing activates if configurated, refer to L.1 Automatic closing and L.2 Automatic closing pedestrian opening.
3	DEAD MAN mode: This setting allows the user to command the gate in dead man mode using two separate switch buttons. The opening command shall be wired to terminal START while the closing command shall be wired to terminal PED. The gate opens or closes just while the switch button is hold pressed. During dead man mode remote controls, automatic and follow-me closing, closing when power restores will not be active. Electric limit switches, photocells and safety edge will be active partially, just stopping the motion without inversion.
4	STEP BY STEP Every START pulse starts or stops the operation of the gate, according the sequence **OPEN-STOP-CLOSE-STOP...**

5.3.3 F. Obstacle detection

F.1 Obstacle detection
Obstacle detection is a safety feature that complies with outstanding regulations and makes the gate area more protected and safer.
If during operation any speed alteration or sudden stress are detected, the gate stops in order to avoid or limit damages to persons or objects.

This feature can be adjusted on different sensitivity levels:
0 = detection is OFF while 10 = maximum detection sensitivity; factory value (default) is set to 5.

5.3.4 H. Special functions

H.1 Pre-blinking
Pre-blinking feature warns the user that closing will start soon.
Receiving a start command the blinker starts flashing during a few seconds before gate starts closing.
Pre-blinking time is adjustable, from 0 (factory value) to 8 seconds.

H.2 Fixed-light blinker
If you wish to switch the blinker to fixed-light mode, set **H.2** to **1**.
Factory value is 0.

H.3 "Follow me" closing
This function allows the gate to immediately close after cutting the photocell beam.
Vehicle is detected by the closing photocell, when working cycle is operating.

H.3	"Follow me" closing - Functions
0 (factory set up)	The function is OFF. The gate closes according to the automatic closing time set up.
1	The gate closes 2 seconds after completing the opening, if vehicle is detected.
2 ... 10	The gate closes when vehicle is detected, no matters if opening is completed, according to the delay time set, from 2 to 10 seconds.

H.4 Automatic closing after power cut
If you set **H.4** to 1, in case of power cut the gate will close 15 seconds after power is restored. Factory value is 0.
This function can be activated only if conditions included in Chapter 4.1.2 page 7 areapplied.

H.5 Slowdown OFF / Soft Start OFF
It is possible to turn the slowdown OFF.
This function is recommended in case of very heavy gates and when the torque (thrust) developped at low speed during programming is not enough to complete the working cycle.
Set H5 to 1 and repeat the programming (function C.1).
It is possible as well to turn the soft start OFF.
In this case the motor is started at maximum torque in order to overcome the gate's inertia.
We recommend to turn the soft-start OFF only if strictly necessary, since the motor may be affected by mechanical stress.

H.5	How to turn the slowdown and the soft start OFF
0 (default)	Both slowdown and Soft Start are ON
1	Slowdown OFF
2 ... 10	Soft Start OFF
3	Both slowdown and Soft Start are OFF

H.6 Master/slave con iguration
This parameter allows to set up TWINNING feature in case of a double gate installation (mirror motors).
It is necessary to plug the optional interface card.

H.6	Master/slave (TWINNING) configuration
0 (factory set up)	TWINNING = OFF
1	Set 1 to configurate the master gearmotor.
2	Set 2 to configurate the slave gearmotor.

5.3.5 L. Working times

L.1 Automatic closing
This parameter sets the automatic closing time, adjustable from 0 = automatic closing OFF to 99 seconds.

L.2 Pedestrian automatic closing
This parameter sets the automatic closing time for PED opening, adjustable from 0 = automatic closing OFF to 99 seconds.
L.1 and **L.2** are totally independent one to the other: they can be set up in different ways with different times.
Also **L.1** can be **ON** while **L.2** can be OFF, and viceversa.

L.3 Pedestrian opening
This parameter sets the pedetrian opening width expressed in decimeters.

L.4 Slowdown in Opening
This function allows to adjust SLOWDOWN in opening.
Values are expressed in decimeters.
Ex.: 00 = OFF 01 = 10 cm 02 = 20 cm
FOR BRUSHLESS ONLY: During SLOW DOWN an additional speed reduction will be carried out when approaching the limit switch.

L.5 Slowdown in Closing
This function allows to adjust SLOWDOWN in closing.
Values are expressed in decimeters.
Ex.: 00 = OFF 01 = 10 cm 02 = 20 cm
FOR BRUSHLESS ONLY: During SLOW DOWN an additional speed reduction will be carried out when approaching the limit switch.

5.3.6 P. Safety devices

P.1 STOP
The factory setting is **0 = output OFF**.
If you wish to connect a stop device, set **P.1** to **1** position.

P.2 CL (RX) - Closing photocell
Closing photocell can be set up in the following ways:

P.2	CL (RX) Output
0	Output is OFF, the closing photocell is not activated.
1	Closing photocell is working without test.
2 (factory set up)	Closing photocell is working with test at every duty cycle.

The photocell test is a safety provision that helps detecting a faulty or unsafety photocell.
The test works as follows: before closing, the control unit switches the power off from +TX photocell terminal, in this way the photocell has no other option but to open the contact.
If the contact doesn't open in short time, it means the photocell is faulty and the gate remains still.

P.3 OP (RX) Opening photocell
Opening photocell can be set up in the following ways.

P.3	OP (RX) Output
0 (factory set up)	Output is OFF, the opening photocell is not activated.
1	Opening photocell is working without test.
2	Opening photocell is working with test at every duty cycle.

P.4 CL (EDGE) – Closing safety edge
Closing safety edge can be set up in the following ways:

P.4	CL (EDGE) Output
0 (factory set up)	No safety edge is wired. The output is OFF.
1	Safety edge wired as N.C. contact.
2	8K2 Safety edge.
3	Set of two 8K2 safety edges wired in paralel

P.5 OP (EDGE) – Opening safety edge

P.5	OP (EDGE) Output
0 (factory set up)	No safety edge is wired. The output is OFF.
1	Safety edge wired as N.C. contact.
3	Set of two 8K2 safety edges wired in paralel

5.3.7 U. Maintenance configuration (for installers only)

U.1 Cycles counter
This feature allows to display the overall cycles performed.
No possibility of reset.
Cycles are displayed 2 by 2 figures in the following way: ex. if the gate totally performed 823.605 cycles, the screen will read:

00. 82 36 0.5.

Use ⊕ to scroll on the figures.

U.2 Cycles performed since last maintenance service
This feature allows to display the overall cycles performed since last maintenance service.
Cycles can be reset when a maintenance service has been carried out (if **U.3** is updated and set up).
If you wish to reset press ⊕ and ⊖ together holding for 3 seconds: display will flash " 99 " to confirm reset successfully completed.

U.3 Maintenance countdown
This feature allows to set the number of cycles till next maintenance service (starting from a minimum of 1000 cycles and so on).
U.3 will accordingly and automatically update **U.1** and **U.2** if activated, at every closing operation.
It is also possible to warn the end user that maintenance service is needed.
To set this function, set parameter **U.4**.

U.4 Maintenance recall signalling mode
As previously explained in parameter **U.3**, it is possible to set a visible flashing "maintenance recall".
Refer to the below table to set the desired recall configuration:

U.4	Maintenance recall – signalling configuration
0 (factory set up)	OFF – factory setting No maintenance recall has been activated.
1	SPECIAL FLASHING DURING AUTOMATIC CLOSING TIME. When the gate is opened, flashing light permanently blinks. To activate this mode the automatic closing time shall be set no less than a couple of seconds, otherwise signalling will not be sufficiently visible.
2	SPECIAL FLASHING DURING OPENING When gate is opening, the flashing light permanently blinks (instead of slow regular blinking).
3	AUX OUTPUT AUX output activates (the contact closes) when maintenance service is neeed. Otherwise AUX contact remains opened.

U.5 Installation date

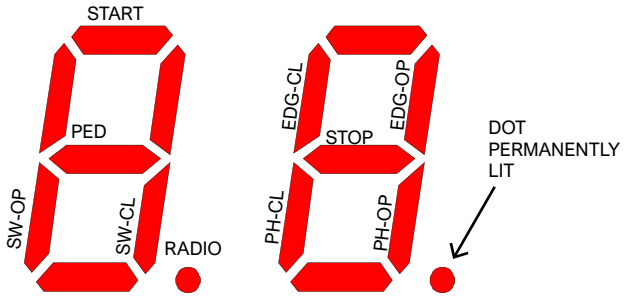
This feature allows to load the installation date.
The display will show the installation date in 3 different steps: the first figure shown is the day (from 1 to 31); pressing ⊕ the month shows up (from 1 to 12); pressing again ⊕ the year shows up with two dots.
Pressing again ⊕ the sequence RESTARTS.
EX.: if your installation date is 14-03-2019 the sequence displayed will be:

14. 03 1.9.

If you wish to set the installation date, press together ⊕ and ⊖ holding during 4 seconds; screen will read "**d**", use ⊕ and ⊖ to load the day, from 1 to 31; save pressing Ⓢ.
Screen will read "**n**", use ⊕ and ⊖ to load the month; save pressing Ⓢ.
Screen wil read "**Y**", use ⊕ and ⊖ to load the year; save pressing Ⓢ.
Installation date loading completed.

U.6 Trouble shooting and "dead man" functions

Set **U.6** and press ⊕ to confirm.
This feature allows to display the status of all inputs and at the same time allows to command direct the gate in "dead man" mode (key permanently pressed).
Press (and hold) ⊕ to open the gate and ⊖ to close it.
Release the key to stop the gate.
Attention: during all these operations, **safety devices are not working, be carefull**.
The screen displays the status of every single input, everyone identified by a symbol.
If the input is "active" the according symbol will be lit.



The symbol on the left outlines commands and limit switches (SW-OP and SW-CL stand for opening and closing limit switch).
If the input is active the symbol is lit.
Radio dot lights up when receiving a radio signal, saved or unknown.

The symbol on the right outlines safety devices; **PH-CL** and **PH-OP** stand for closing and opening photocells; **EDG-CL** and **EDG-OP** stand for closing and opening safety edge.
If the input is not active the symbol is lit (the safety device doesn't allow any operation).
If one of the **P.** settings is **OFF** (Chapter 5.3.6 page 12), the screen will not show any status (symbol permanently switched off).
The red dot on the right remains permanently lit to confirm programming is ON.
Every time a segment is switched (when giving a start command or when a safety device is activated), the flashing light blinks once; in this way it is possible to monitor the radio range of a remote control from distance.
If you wish to quit press Ⓟ and Ⓢ together.

6. DISPLAY

The display shows any gate status.
If no key is pressed, after 8 hours the display switches off; shortly press any key to light the display up.
As soon as control unit is powered, the display reads "**8.8.**" (all segments are lit so as to detect a possible fault).
After that, the display reads firmware version (ex. "1.0", or "2.3" and similars), then "**N**" (2500 kg) or "**H**" (high speed) version.
As last step, control unit goes to **STAND-BY** mode and display reads "**--**" flashing.
The remaining messages are listed in the below table.

6.1 Messages

During normal operation messages may show up.
Refer to the below table indicating possible messages and according meaning:

Messages	Meaning
Vertical segments that move from center outwards	Gate is opening
Vertical segments that move from center inwards	Gate is closing
-S (start)	Receiving a START command
-P (pedestrian)	Receiving a PED command (pedestrian)
-H (halt / stop)	Receiving a STOP pulse
PC (photo close)	Closing photocell is operative
PO (photo open)	Opening photocell is operative
LO (limit open)	Opening limit switch is reached
LC (limit close)	Closing limit switch is reached
bO (border open)	Opening safety edge is active
bC (border close)	Closing safety edge is active
Pair of figures (es. 02)	Showing a saved remote control (ex.: remote control saved on radio position 2). Usually **-S** or **-P** show up to confirm which kind of remote control has been used.
-C	A timer has been wired to START or PED, automatic closing is stopped.

6.2 Fault

The display shows faults and anomalies that may stop the gate operation: the fault message is coded with two "dots" matched to figures or letters.
Refer to the below table:

DISPLAY message	Fault
oE (obstacle encoder)	Obstacle detected due to a sudden slow-down during working cycle
oA (obstacle amperometric)	Obstacle detected due to a sudden increase of gearmotor voltage.
oS (obstacle stall)	Obstacle detected due to gearmotor stop
oC (obstacle exceeding voltage)	Obstacle detected due to exceeding gearmotor voltage (limit rate reached)
PO (photo open)	Opening photocell operating
PC (photo close)	Closing photocell operating
AH (abort halt/stop)	STOP pulse
AU (abort user)	Operation interrupted using onboard keys
FC (test photo close failed)	Test detected a faulty closing photocell
FO (test photo open failed)	Test detected a faulty opening photocell
EC (voltage)	Exceeding voltage absorption (gearmotor)
EY (temperatura)	Component overheating
EF (fail)	Gearmotor fails to start up
EL (limit switch)	Limit switch doesn't cut
ES (switch)	Limit switch error: both limit switches are active
EU (timeout)	Duty cycle exceeded time allowed
EN (encoder)	Gearmotor and/or encoder are not properly wired

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MATRIX

Q90SH (H/N) Brushless Control Unit

English

Installation and User manual

PROTECO
GATE AUTOMATIONS

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1. WARNING

This manual for MATRIX brushless series contains important information concerning personal safety. An incorrect installation or an improper use may lead to severe injuries.
Read carefully and pay particular attention to the safety sections marked by the yellow triangle ⚠ .

⚠ The installation of automatic doors, gates and barriers must comply with the Machinery Directive 2006/42/CE and EN 12453 regulation, and performed by qualified personnel.

⚠ Make sure the main power line is equipped with state of the art safety grounding system; as well be sure the whole installation is protected by a power cut switch and against overcurrent.

Make sure the area is clear from flammable gases and/or electromagnetic interferences: it could lead to very dangerous injuries.

Switch the power and batteries OFF before any operation.

⚠ After installation, packaging and waste materials (cardboard, plastic, metal parts etc.) must be kept away from children as they could be potentially harmfull.
Use only original spare parts. Any alteration to the system is prohibited.
Proteco Srl will not respond in case of using additional and/or fake spares.

Proteco S.r.l. reserves the right to make changes to the product without notice.

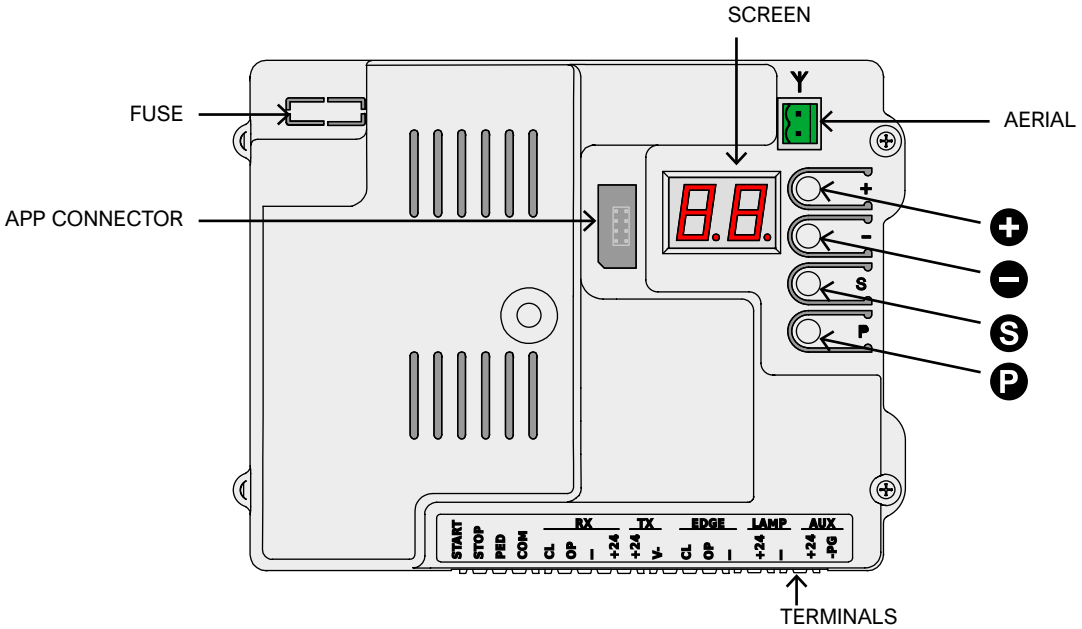
2. FEATURES

2.1 Technical features

	Version "N"	Version "H" (hi-speed)
Power supply	230V 50Hz	
Max. absorption	4,5A @ 230V	3A @ 230V
Absorption in stand-by	2,2 W	
Motor's voltage	48V dc	
Fuse	5A@230V + 30A@48V	
Accessories' voltage	24V dc (12 W photocells, 18 W blinker + AUX)	
Max. speed	13 m/min	20 m/min
Working cycle	80%	80%
Working temperature	da -30 °C a +55 °C	

START contacts	Start, Stop, Pedestrian.
Radio	Built-in 433 MHz radio receiver, storage up to 96 random or rolling codes.
Safety devices	Opening and closing photocell (self-test optional), powered at 24 Vdc 500 mA max., mechanical safety edge N.C. or resistive 8K2.
Outputs	Flashing light 24V DC 750 mA max. AUX 24V DC (programmable) 24 Vdc 750 mA max. Blinker + AUX = max. 750 mA totally.
Optional interface cards	Expansion connector for optional module cards Connector for home automation usb key / APP. PMXM01 Twinning card , KBT003 battery charger and MRX01 2nd radio channel card.
Optional functions	Operation mode, Opening and closing speed adjustable, Obstacle detection, Follow me closing, Start up automatic closing, Pre-blinking, Cycles counter, Maintenance recall, Installation date.

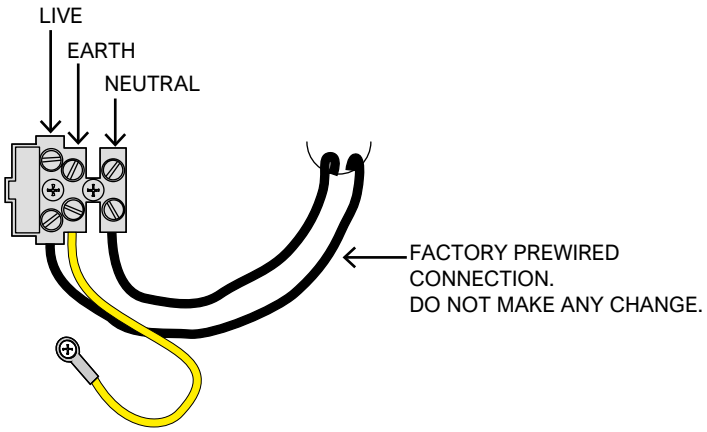
2.2 Control unit layout



3. Wirings

3.1 Main power 230V

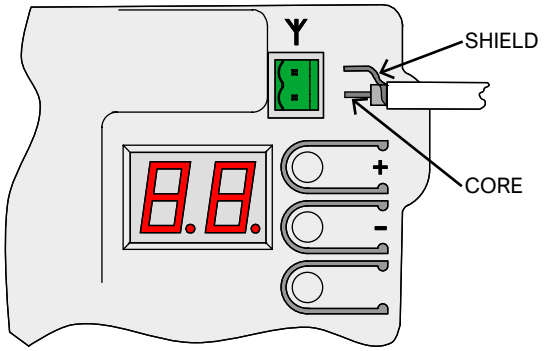
Locate the terminal block with fuse holder mounted close to gear block (picture on the left).
Wire live, earth and neutral as shown below:



It is fundamental to wire the system to the earth.

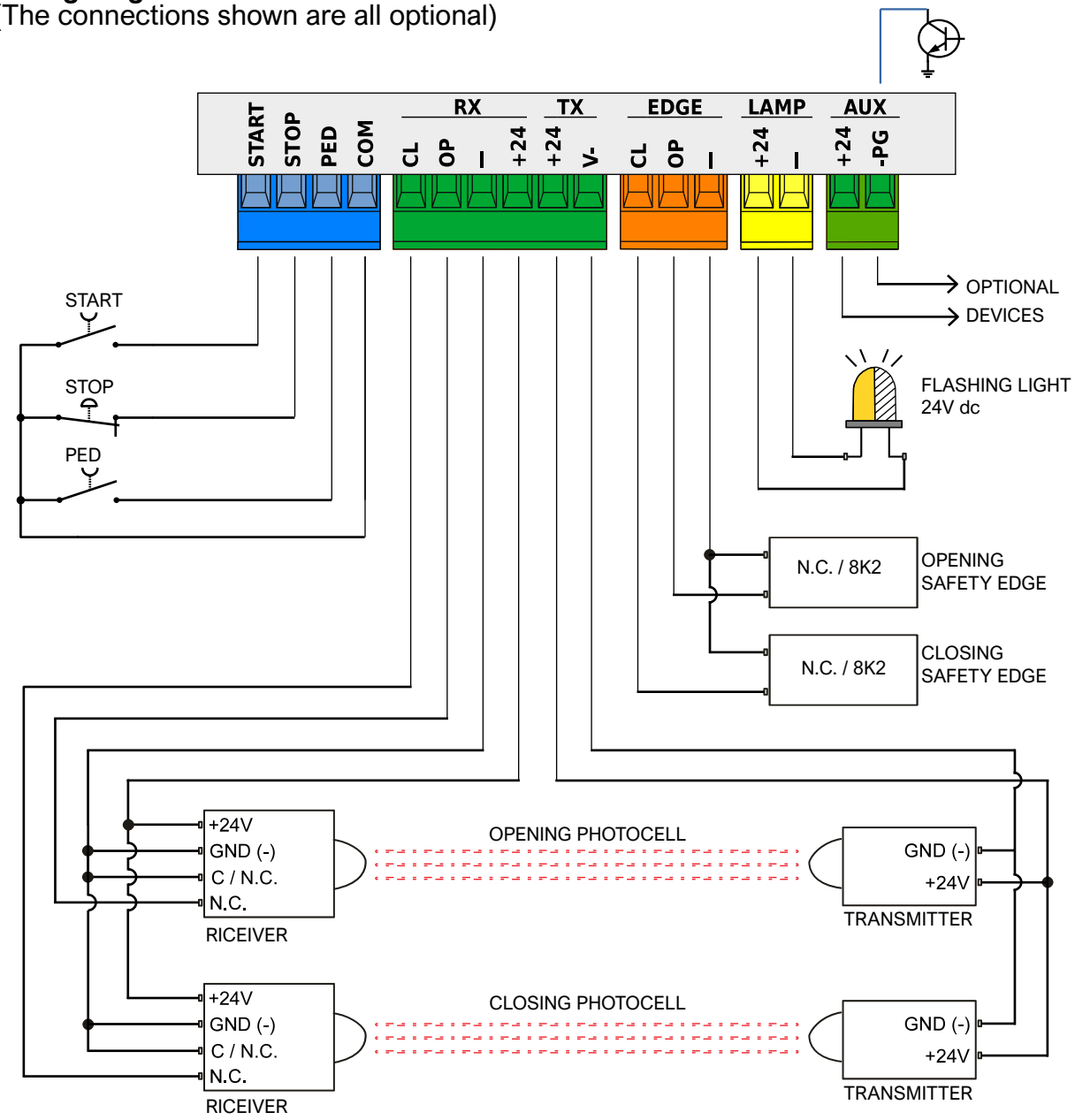
3.2 Stand-alone Antenna (optional)

The control unit is itted with a Whip antenna.
If you wish to connect an external stand-alone atenna, remove the Whip aerial and wire the core cable (RG58); wire the shield cable on the other terminal as shown in the picture.

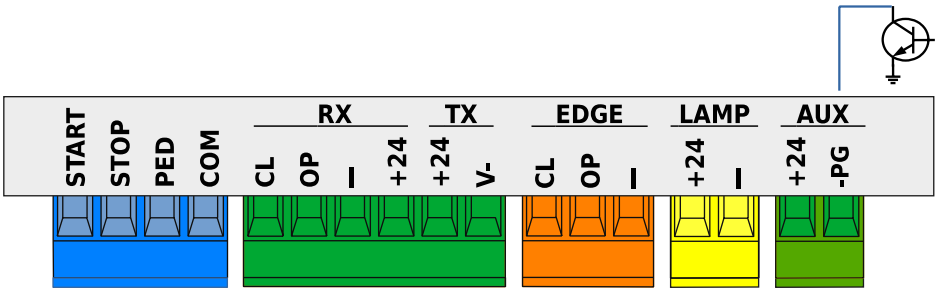


3.3 Wiring diagram

(The connections shown are all optional)



3.4 Terminals



3.4.1 START

3.4.1.1 START - wired contacts, key switch, key pad, timer
Any start contact shall be wired to this terminal, refer to Chapter C.5, page 11.
Any pulse below 10 seconds is considered as a regular **START** command, and once duty cycle is completed, it starts the automatic closing countdown (Chapter L.1, page 11); any pulse
over 10 seconds activates the timer mode and the gate will remain in opening position according to the timer set up.
Wire **N.O.** contacts between **START** (or **PED**) and **COM**.
Any additional contact shall be wired in parallel.

3.4.1.2 STOP – emergency push button or similar devices
Any stop contact shall be wired to this terminal.
Multiple stop contacts shall be wired in series between **STOP** and **COM**.
If no **STOP** contact is wired, deactivate **P.1** at page 12, otherwise no operation will start.
Any STOP command immediately stops any operation.

3.4.1.3 PED (Pedestrian: partial opening)
The operation logic is the same of **START**: adjust **L.3** to set the desired opening width and set L.2 to activate the pedestrian automatic closing, page 11.

3.4.2 RX and TX - Photocells

3.4.2.1 CL (RX) – Closing photocell (N.C. dry contact)
Any closing photocell and similar devices shall be wired to this terminal, N.C. contacts.
Wire the receiver's N.C. contact between CL and "**-**".
Additional photocells shall be wired in series.
Power the receiver from +24 and "**-**", while power the transmitter from +24 and "**V-**" (TX terminal).
Refer to Chapter 3.3 page 5, to get the complete wiring view.

3.4.2.2 OP (RX) – Opening photocell (N.C. dry contact)
Any opening photocell and similar devices shall be wired to this terminal, N.C. contacts.
Wire the receiver's N.C. contact between OP and "**-**".
Additional photocells shall be wired in series.
Power the receiver from +24 and "**-**", while power the transmitter from +24 and "**V-**" (TX terminal).
Refer to Chapter 3.3 page 5, to get the complete wiring view.

3.4.2.3 "-" and +24 (RX)
These terminals permanently power photocell's receivers.
Attention: voltage for receivers and transmitters is limited to a single fuse of 500 mA.

3.4.2.4 +24 and V- (TX block)
These terminals power photocell's transmitters .
Unlike terminals "**-**" and +24 of RX block, TX terminal cuts power during photocell test.
Attention: voltage for receivers and transmitters is limited to a single fuse of 500 mA.

3.4.3 EDGE – Safety edges

Safety edges shall be wired to this terminal, N.C. or resistive 8K2 contacts; set **P.4** and **P.5** according to the kind of contact used.
Additional contacts shall be wired in series, as explained in the below example (closing safety edge):
- If you have 2 N.C. contacts set **P4 to 1.**
- If you have 1 N.C. ckontact and 1 8K2 set **P4 to 2.**
- If you have just 1 8K2 resistive contact set **P4 to 2.**

Every series can only take 1 8K2 resistive contact.
If you have 1 NC contact and 1 8K2 resistive contact, this last one will command.

3.4.3.1 CL (EDGE)
Wire the closing safety edge between **CL** and "**-**".

3.4.3.2 OP (EDGE)
Wire the opening safety edge between **OP** e "**-**".

3.4.4 LAMP -+24 and "-" - FLASHING LIGHT

Wire the flashing light to these terminals, that deliver intermitting 24V DC during operation.
It is possible to switch the intermittance to permanent voltage, just during operation, setting up **H.2.**
Attention: LAMP + AUX outputs together are limited to max. 750 mA.

3.4.5 AUX -+24 and "-PG" PROGRAMMABLE OUTPUT

AUX terminal is 24V DC powered and can be configurated performing several functions, see Chapter A.6 page 10.
Terminal +24 is always powered at 24 volt; terminal -PG is normally an open circuit, that automatically floats to GND (earth)
when the output is activated.
This output allows to command garden lights, warning lights, and relays (24Vdc).
Attention: LAMP + AUX outputs together are limited to max. 750 mA.

3.5 Start Up

Once mechanical and electrical installation is completed proceed to the following steps, respecting the cronological order:

- Adjust F.3 and F.4 (page 11) to set both opening and closing speed.
  Factory values are 10 (max. speed), corresponding to: I
  - HI-Speed version20 m/min (opening) and 16 m/min (closing).
  - BLDC 2500 kg, 13 m/min (opening) and 11 m/min (closing).

- Proceed **to programming**, starting C.1 page 10.
  In this way travel and proper values will be saved to command the gearmotor.
  If speed changes, the whole programming procedure shall be repeated.

- Adjust any parameters if needed.

- Store remote controls: A.1 if you wish to store **START** and A.2 if you wish to store **PED** (pedestrian), page 10.

- Proceed to general test - **safety devices in particular**.

For more details on operation refer to chapter 4.1 page 7, while refer to chapter 5 page 8 to get an overview on parameters and functions.

4. OPERATION

4.1 Operational modes

During normal operation the gate may be in one of the following modes:

- STILL, in stand-by for operation.
  Only when in STILL mode it is possible to enter parameters.
  Flashing light is switched off, but it may blink if faults occur.
  Screen shows a couple of horizontal lines blinking.

- OPENING; flashing light blinks slowly,and the screen displays vertical lines opening.
  If during opening an obstacle is detected, the gate reverts, remains in stand-by during 10 seconds and starts to open again (screen shows countdown).

- AUTOMATIC CLOSING COUNTDOWN; flashing light blinks shortly; when time left is below 12 seconds the flashing light remains switched on and fixed.
  Screen shows countdown.
  If working logic is STANDARD (see C.5, page 11) a START command will STOP the gate.

- CLOSING; if during closing an obstacle is detected, position. Flashing light blinks regularly and quickly.

4.1.1 Automatic closing after power cut

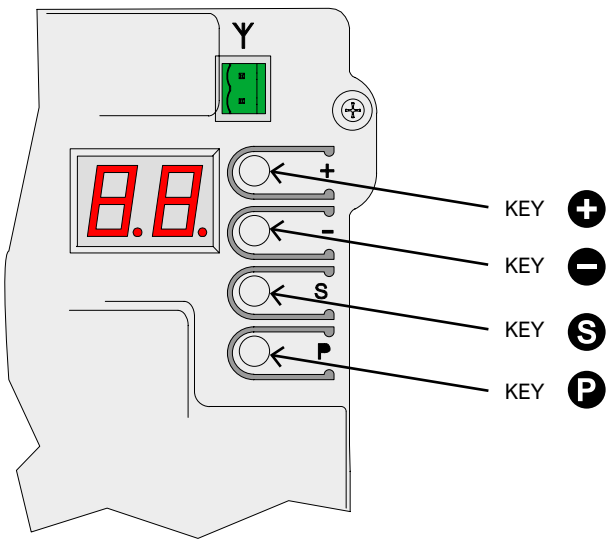
Once the power supply is restored, the control unit counts 15 seconds and then the gate starts closing, if all the following conditions have been fulfilled:
- **H.4**, page 11 is activated.
- **C.4**, page 11 is not set to position 2 (factory setting).
- No wired/radio command is sent, no key is pressed.

During the 15 seconds the system doubles check that all the a.m. conditions have been respected.
If this is the case, the blinker will flash shortly to confirm closing will start soon.

4.1.2 Programming keys

Pressing any key during operation the gate stops.
With an exception for ⊕ key: if pressed during countdown (see **chapter 4.1**) it makes the gate start working again.

When in still mode, the screen displays two symbols (weak flashing) or just one if energy save mode is on.
In this case it is possible to use some of the keys or a combination of them, to start some functions.



KEYS (User mode)	FUNCTION
⊕	START command
⊖	PEDESTRIAN command
Press Ⓢ hold and press ⊕	OPENING command
Press Ⓢ hold and press ⊖	CLOSING command
Ⓟ (press and hold for short seconds)	Programming menu: the display shows **A.1**

When in programming mode the display alternatively shows the outstanding setting and its value.
Ex.: setting H.2 / value 1, the display reads first "**H.2**" and after "**01.**".
In this circumstance it is possible to handle the following programming keys and functions:

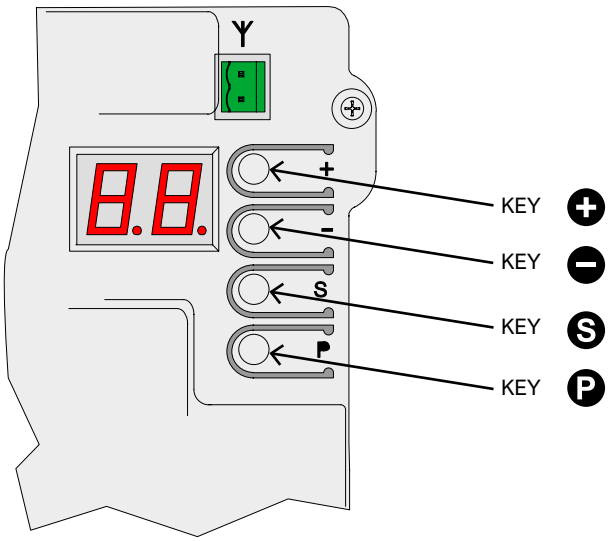
KEYS (Programming mode)	FUNCTION
⊕	This key increases the value of the setting. Keep pressed to speed.
⊖	This key decreases the value of the setting till 0. Keep pressed to get to zero.
Ⓟ	This key switches from menu to menu (ex. H.3 - J.1). From U.x menu the control unit returns back to A.1.
Ⓢ	This key switches from setting to setting (ex. H.3 - H.4). From last setting control unit returns back to the first one (ex. H.6 - H.1).
Ⓟ + Ⓢ (press Ⓟ hold and press Ⓢ)	This key quits the programming and returns to USER mode.

5. PROGRAMMING

5.1 Settings' configuration

Proceed to programming only when the gearmotor is in still mode (any key pressed during operation stops the operation).
Press key Ⓟ and hold shortly (a quick pulse is insufficient): display reads "**A.1**".

Press Ⓟ as many times as to find the desired setting.
Then press Ⓢ as many times as to find the figure corresponding to the desired parameter (right side of the display).
EX.: If you wish to go to **H.2** and you are in **A.1** position, press 3 times key Ⓟ (scrolling through **C.1, F.1** and **H.1), t**hen press key Ⓢ one time (to move from **H.1 t**o **H.2**).



If you wish to reduce or increase the value of the setting use ⊕ ⊖.
A ttention! when you reach the desired setting, wait shortly while the screen displayes the current value and setting alternatively.
If you wish to move to a different setting, press Ⓟ and then Ⓢ as previously outlined.

To quit the programming press Ⓟ and Ⓢ together.
The control unit automatically goes out of the programming mode after 2 minutes of no operation. Just parameter U.6 takes 16 minutes to quit the programming in case of no operation.

Some settings are mere functions and therefore have no value.
They may need longer or shorter pression of key ⊕ to be activated.
Usually the display shows a line "-" close to key ⊕ to confirm function is activated.
Unlike other settings as **A.1, A.2** and **A.3** that do only need confirmation after receiving a radio signal.

5.2 Settings' list

Here below you will find a resume of all available settings and functions.
More details are found in **Chapter 5.3**, page 10.

	ID	DESCRIPTION	LINK
A	A.1	Store a remote control as “START” command	C.5
	A.2	Store a remote control as PED pedestrian command	C.5
	A.3	Store a remote control as AUX / 2nd channel	A.6
	A.4	Delete a single remote control	
	A.5	Delete all remote controls	
	A.6	AUX / 2nd channel output configuration	A.3 U.4
C	C.1	Automatic programming	C.4
	C.3	Reset (factory default)	
	C.4	Opening orientation/motor's position	C.1
	C.5	Working logic configuration	
F	F.1	Obstacle detection	
	F.3	Opening speed	C.1
	F.4	Closing speed	C.1
H	H.1	Pre-blinking	
	H.2	Fixed-light blinker	
	H.3	"Follow me" closing	
	H.4	Automatic closing after power cut	
	H.6	Master / Slave - TWINNING configuration	
L	L.1	Automatic closing (START)	
	L.2	Pedestrian automatic closing (PED)	
	L.3	Pedestrian opening	
	L.4	Slowdown in Opening	
	L.5	Slowdown in Closing	
P	P.1	STOP	
	P.2	CL (RX) – closing photocell	
	P.3	OP (RX) – opening photocell	
	P.4	CL (EDGE) – closing safety edge	
	P.5	OP (EDGE) – opening safety edge	
U	U.1	Cycles counter	
	U.2	Maintenance countdown	U.4
	U.3	Maintenance recall	U.4
	U.4	Maintenance recall signalling mode	U.3
	U.5	Installation date	
	U.6	Trouble shooting and "dead man" functions	
	U.A	Calibrating the Encoder	

5.3 Setting's description

5.3.1 A. RADIO

This menu includes procedures about how to store radio devices, remote controls mainly.
The control unit responds just to radio codes "**already stored**"; every
remote control is matched to a progressive number that is displayed on the screen at every start command pulse.
In this way if by accident a remote control is lost it can be easily deleted from the control unit memory.
It is possible to store up to 96 different users; when a remote control is deleted its radio position still remains available for a new remote control storage.
Any key of the remote control can be set up as follows:

- **START** command, corresponding to a wired contact to **START** terminal.
- **PEDESTRIAN** command, corresponding to a wired contact to **PED** terminal
- **AUX**, known as well as 2nd radio channel, matched to **AUX** output.

Choose the function you need before starting storing any key of the remote control.
There are three different settings available (**A.1, A.2** and **A.3**) corresponding to different functions.

A.1 Store a remote control as START command

Set **A.1.** Press the remote control (the display reads"**Y-**") and while holding, press key ⊕ to store and confirm.
If successfull the display will show the radio position matched to the remote control.
In case of an already existing remote control, the display will only show its radio position (01, 02, …).
If storage capacity is full the display will reads "**FF**".

It is important to press key ⊕ when the remote control is transmitting, otherwise the radio code storage will not be successfull and the control unit might save any incoming undesired radio signal.
If you have additional remote controls to store, repeat the same procedure.
Make sure the screen displays "**Y-**" or a number, then press ⊕ .

A.2 Store a remote control as PED command (pedestrian)

Set **A.2** and repeat the above procedure.
For more details refer to Chapter 3.4.1.3 PED, page 6.

A.3 Store a remote control as AUX (2nd channel)

Set **A.6** according to the AUX function you need or in alternative plug the optional interface card MRX01 duly set up.
Then proceed to set **A.3** carrying out the same procedure applied for **A.1** and **A.2** configuration.

A.4 Delete a single remote control

Every remote control stored is matched to a radio position identified by a number.
Set **A.4**, press ⊕ or ⊖ to find the remote control you need to delete, then press both keys together and hold until the display flashes " 99".

If there is just a remote control stored, the display will show just that one.

A.5 Delete all remote controls

Set "**A5**", or when the screen displays "**.-**" press ⊕ to confirm you wish to delete all remote controls stored and hold during 5 seconds; if all remote controls have been successfully deleted, the display flashes " 99".

A.6 AUX/2nd channel output configuration

The **AUX** is a multifunction output: it can be used as maintenance recall, refer to Chapter U.4 page 12.
Or in alternative it can set up the following modes/functions:

A.6	AUX - Functions/Modes
0	AUX output is OFF. AUX output is ON if U.4 maintenance recall is activated.
1 (factory set up)	2nd channel / MONOSTABLE: the output is activated by a remote control stored in A.3 AUX. The contact closes when giving and holding a start pulse with the remote control. The contact opens just when the remote control's key is released.
2	2nd channel /BISTABLE: the output is activated by a remote control stored in A.3 AUX. The contact closes or opens when giving a start pulse with the remote control.
3	SIGNALLING GATE IS FULLY OPENED: the output is activated when the gate is fully opened. The optional interface card MRX01 can perform the same function but in a slightly different way.
4	SIGNALLING GATE IS FULLY CLOSED: the output is activated when the gate is fully closed.
5	COURTESY LIGHT (30"): the output is activated when the contact closes and remains closed during the whole working cycle. The contact opens after 30 seconds after working cycle is completed.
6	COURTESY LIGHT (60"): the output is activated when the contact closes and remains closed during the whole working cycle. The contact opens after 60 seconds after working cycle is completed.
7	COURTESY LIGHT (90"): the output is activated when the contact closes and remains closed during the whole working cycle. The contact opens after 90 seconds after working cycle is completed.

5.3.2 C. PROGRAMMING

C.1 Automatic programming

This procedure allows to learn the mechanical features of the gate: working cycle, speed, torque and accelerations; programming may be carried out just when installation is completed.
Matrix gearmotor is built in such a way that, when properly installed, its mechanical characteristics do not change over time, so programming can normally be performed only once.

The procedure carries out two opening and two closing operations; before start programming make sure that everything is in order: if one of the operations is interrupted (due to the pressure of a button or the intervention of a safety device) the procedure must be repeated from the beginning.
Set **C.1** and press ⊕ holding during 5 seconds.
If **C.4** i s not configurated yet (as in case of a brand new control unit), the screen will display the opening direction of the gate.
Press ⊕ to set RH opening and ⊖ to set LH opening.
If **C.4** is configurated the display remains clear.

The gate performs 4 steps; every step is shown on the display (01, 02, 03...) with a short pause in between.
In any moment it is possible to stop the operation, just pressing any key.

Step (01), gate slowly starts opening until detecting the mechanical limit switch. If the gate works to the opposite direction, stop the operation and properly set up **C.4**. Then repeat **C.1**.
Step (02), gate slowly starts closing until detecting the closing position; the following steps are meant to double check all settings are correct.
The automatic learning is successfully completed when display shows " 99 " flashing.

C.3 Reset (factory default)

Set **C.3**, press ⊕ and hold during 5 seconds to confirm reset (return to factory settings).
This setting allows to delete any configuration previously set, but parameters **U.5, U1** and **U.2 CANNOT** be reset and no remote control previously stored can be deleted.
Now repeat **C.1** procedure.
Reset is successfully completed when display shows "44" flashing.

C.4 Opening orientation/motor's position

This parameter shows the gate's opening direction or the motor's position.
Looking from inside the property values are intended as follows:

C.4	Boom configuration
0	Motor is positioned to the right, opening to the left.
1	Motor is positioned to the left, opening to the right.
2 (factory set up)	No configuration is set, motor is intended to the right.

C.5 Working logi con iguration

Set the working logic of start commands, inputs START and PED; the remote controls will follow the same logic:

C.5	Working logic
0 (factory set up)	SEQUENTIAL (STEP BY STEP) Every START command stops or reverts the working cycle according to the sequence: **OPEN - STOP - CLOSE - OPEN ...**
1	PRIORITY TO OPENING Every START command gives priority to opening; gate automatically closes according to the time set (refer to L.1 Automatic closing, page 10)
2	SEMI AUTOMATIC (OPEN-CLOSE separate) START terminal commands the opening; START2 terminal commands the closing. Automatic closing activates if configurated, refer to L.1 Automatic closing and L.2 Automatic closing pedestrian opening.
3	DEAD MAN mode: This setting allows the user to command the gate in dead man mode using two separate switch buttons. The opening command shall be wired to terminal START while the closing command shall be wired to terminal PED. The gate opens or closes just while the switch button is hold pressed. During dead man mode remote controls, automatic and follow-me closing, closing when power restores will not be active. Electric limit switches, photocells and safety edge will be active partially, just stopping the motion without inversion.
4	STEP BY STEP Every START pulse starts or stops the operation of the gate, according the sequence **OPEN-STOP-CLOSE-STOP**.....

5.3.3 F. Torque / Obstacle detection

F.1 Obstacle detection

Obstacle detection is a safety feature that complies with outstanding regulations and makes the gate area more protected and safer.
If during operation any speed alteration or sudden stress are detected, the gate stops in order to avoid or limit damages to persons or objects.

This feature can be adjusted on different sensitivity levels:
0 = detection is OFF while 10 = maximum detection sensitivity; factory value (default) is set to 5.

F.3 Opening speed

This feature allows to set the opening speed, from a minimum value of 3 (30%) to a maximum of 10 (100%) of the max. speed supported by the gearmotor.
After setting this parameter, repeat the programming procedure **C.1.**

F.4 Closing speed

This feature allows to set the opening speed, from a minimum value of 3 (30%) to a maximum of 10 (100%) of the max. speed supported by the gearmotor.
After setting this parameter, repeat the programming procedure **C.1.**

5.3.4 H. Special functions

H.1 Pre-blinking

Pre-blinking feature warns the user that closing will start soon.
Receiving a start command the blinker starts flashing during a few seconds before gate starts closing.
Pre-blinking time is adjustable, from 0 (factory value) to 8 seconds.

H.2 Fixed-light blinker

If you wish to switch the blinker to fixed-light mode, set **H.2** to **1**.
Factory value is 0.

H.3 "Follow me" closing

This function allows the gate to immediately close after cutting the photocell beam.
Vehicle is detected by the closing photocell, when working cycle is operating.

H.3	"Follow me" closing - Functions
0 (factory set up)	The function is OFF. The gate closes according to the automatic closing time set up.
1	The gate closes 2 seconds after completing the opening, if vehicle is detected.
2 ... 10	The gate closes when vehicle is detected, no matters if opening is completed, according to the delay time set, from 2 to 10 seconds.

H.4 Automatic closing after power cut

If you set **H.4** to 1, in case of power cut the gate will close 15 seconds after power is restored. Factory value is 0.
This function can be activated only if conditions included in Chapter 4.1.2 page 7 areapplied.

H.6 Master/slave configuration

This parameter allows to set up TWINNING feature in case of a double gate installation (mirror motors).
It is necessary to plug the optional interface card.

H.6	Master/slave (TWINNING) configuration
0 (factory set up)	TWINNING = OFF
1	Set 1 to configurate the master gearmotor.
2	Set 2 to configurate the slave gearmotor.

5.3.5 L. Working times

L.1 Automatic closing

This parameter sets the automatic closing time, adjustable from 0 = automatic closing OFF to 99 seconds.

L.2 Pedestrian automatic closing

This parameter sets the automatic closing time for PED opening, adjustable from 0 = automatic closing OFF to 99 seconds.
L.1 and **L.2** are totally independent one to the other: they can be set up in different ways with different times.
Also **L.1** can be **ON** while **L.2** can be OFF, and viceversa.

L.3 Pedestrian opening

This parameter sets the pedetrian opening width expressed in decimeters.

L.4 Slowdown in Opening

This function allows to adjust SLOWDOWN in opening.
Values are expressed in decimeters.
Ex.: 00 = OFF 01 = 10 cm 02 = 20 cm
FOR BRUSHLESS ONLY: During SLOW DOWN an additional speed reduction will be carried out when approaching the limit switch.

L.5 Slowdown in Closing

This function allows to adjust SLOWDOWN in closing.
Values are expressed in decimeters.
Ex.: 00 = OFF 01 = 10 cm 02 = 20 cm
FOR BRUSHLESS ONLY: During SLOW DOWN an additional speed reduction will be carried out when approaching the limit switch.

5.3.6 P. Safety devices

P.1 STOP

The factory setting is **0 = output OFF**.
If you wish to connect a stop device, set **P.1** to **1** position.

P.2 CL (RX) - Closing photocell

Closing photocell can be set up in the following ways:

P.2	CL (RX) Output
0	Output is OFF, the closing photocell is not activated.
1	Closing photocell is working without test.
2 (factory set up)	Closing photocell is working with test at every duty cycle.

The photocell test is a safety provision that helps detecting a faulty or unsafety photocell.
The test works as follows: before closing, the control unit switches the power off from +TX photocell terminal, in this way the photocell has no other option but to open the contact.
If the contact doesn't open in short time, it means the photocell is faulty and the gate remains still.

P.3 OP (RX) Opening photocell

Opening photocell can be set up in the following ways.

P.3	OP (RX) Output
0 (factory set up)	Output is OFF, the opening photocell is not activated.
1	Opening photocell is working without test.
2	Opening photocell is working with test at every duty cycle.

P.4 CL (EDGE) – Closing safety edge

Closing safety edge can be set up in the following ways:

P.4	CL (EDGE) Output
0 (factory set up)	No safety edge is wired. The output is OFF.
1	Safety edge wired as N.C. contact.
2	8K2 Safety edge.
3	Set of two 8K2 safety edges wired in paralel

P.5 OP (EDGE) – Opening safety edge

P.5	OP (EDGE) Output
0 (factory set up)	No safety edge is wired. The output is OFF.
1	Safety edge wired as N.C. contact.
2	8K2 Safety edge.
3	Set of two 8K2 safety edges wired in paralel

5.3.7 U. Maintenance configuration (for installers only)

U.1 Cycles counter

This feature allows to display the overall cycles performed.
No possibility of reset.
Cycles are displayed 2 by 2 figures in the following way: ex. if the gate totally performed 823.605 cycles, the screen will read:

00. 82 36 0.5.

Use ⊕ to scroll on the figures.

U.2 Cycles performed since last maintenance service

This feature allows to display the overall cycles performed since last maintenance service.
Cycles can be reset when a maintenance service has been carried out (if **U.3** is updated and set up).
If you wish to reset press ⊕ and ⊖ together holding for 3 seconds: display will flash " 99 " to confirm reset successfully completed.

U.3 Maintenance countdown

This feature allows to set the number of cycles till next maintenance service (starting from a minimum of 1000 cycles and so on).
U.3 will accordingly and automatically update **U.1** and **U.2** if activated, at every closing operation.
It is also possible to warn the end user that maintenance service is needed.
To set this function, set parameter **U.4**.

U.4 Maintenance recall signalling mode

As previously explained in parameter **U.3**, it is possible to set a visible flashing "maintenance recall".
Refer to the below table to set the desired recall configuration:

U.4	Maintenance recall – signalling configuration
0 (factory set up)	OFF – factory setting No maintenance recall has been activated.
1	SPECIAL FLASHING DURING AUTOMATIC CLOSING TIME. When the gate is opened, flashing light permanently blinks. To activate this mode the automatic closing time shall be set no less than a couple of seconds, otherwise signalling will not be sufficiently visible.
2	SPECIAL FLASHING DURING OPENING When gate is opening, the flashing light permanently blinks (instead of slow regular blinking).
3	AUX OUTPUT AUX output activates (the contact closes) when maintenance service is neeed. Otherwise AUX contact remains opened.

U.5 Installation date

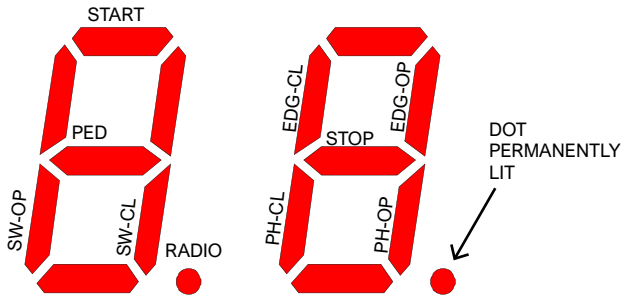
This feature allows to load the installation date.
The display will show the installation date in 3 different steps: the first figure shown is the day (from 1 to 31); pressing ⊕ the month shows up (from 1 to 12); pressing again ⊕ the year shows up with two dots.
Pressing again ⊕ the sequence RESTARTS.
EX.: if your installation date is 14-03-2019 the sequence displayed will be:

14. 03 1.9.

If you wish to set the installation date, press together ⊕ and ⊖ holding during 4 seconds; screen will read "**d**", use ⊕ and ⊖ to load the day, from 1 to 31; save pressing Ⓢ.
Screen will read "**n**", use ⊕ and ⊖ to load the month; save pressing Ⓢ.
Screen wil read "**Y**", use ⊕ and ⊖ to load the year; save pressing Ⓢ.
Installation date loading completed.

U.6 Trouble shooting and "dead man" functions

Set **U.6** and press ⊕ to confirm.
This feature allows to display the status of all inputs and at the same time allows to command direct the gate in "dead man" mode (key permanently pressed).
Press (and hold) ⊕ to open the gate and ⊖ to close it.
Release the key to stop the gate.
Attention: during all these operations, **safety devices are not working, be carefull**.
The screen displays the status of every single input, everyone identified by a symbol.
If the input is "active" the according symbol will be lit.



The symbol on the left outlines commands and limit switches (SW-OP and SW-CL stand for opening and closing limit switch). If the input is active the symbol is lit.
Radio dot lights up when receiving a radio signal, saved or unknown.

The symbol on the right outlines safety devices; **PH-CL** and **PH-OP** stand for closing and opening photocells; **EDG-CL** and **EDG-OP** stand for closing and opening safety edge.
If the input is not active the symbol is lit (the safety device doesn't allow any operation).
If one of the **P.** settings is **OFF** (Chapter 5.3.6 page 12), the screen will not show any status (symbol permanently switched off).
The red dot on the right remains permanently lit to confirm programming is ON.
Every time a segment is switched (when giving a start command or when a safety device is activated), the flashing light blinks once; in this way it is possible to monitor the radio range of a remote control from distance.
If you wish to quit press Ⓟ and Ⓢ together.

U.A Calibrating the encoder

This procedure calibrates the encoder to the motor.
The installer is not expected to perform usually this procedure because the calibration is carried out in the factory but, in certain cases such as the replacement of the control board or the replacement of the motor, the calibration made in the factory is no longer valid and therefore it is necessary to repeat it.
This procedure must be carried out with the motor unlocked.

Unlock the motor, go to parameter U.A and keep the **+** key pressed for 4-5 seconds.
As soon as the procedure starts (the display shows an abbreviation), release the key and wait: a number is displayed, followed by the calibration steps oC, o1, o2, o3.
Then the display shows " 88 " flashing, followed by an abbreviation and finally the control board returns in stand-by position ("-" flashing).
The procedure is finished, the automation can be locked again.

If after step **"o3" the display doesn't show any "** 88 **"** flashing then there might problems with the motor, or the control board or the connections between the control board and the motor or the encoder.

6. DISPLAY

The display shows any gate status.
If no key is pressed, after 8 hours the display switches off; shortly press any key to light the display up.
As soon as control unit is powered, the display reads "**8.8.**" (all segments are lit so as to detect a possible fault).
After that, the display reads firmware version (ex. " 1.0", or "2.3" and similars), then "**N**" (2500 kg) or "**H**" (high speed) version.
As last step, control unit goes to **STAND-BY** mode and display reads "**--**" flashing.
The remaining messages are listed in the below table.

6.1 Messages

During normal operation messages may show up.
Refer to the below table indicating possible messages and according meaning:

Messages	Meaning
Vertical segments that move from center outwards	Gate is opening
Vertical segments that move from center inwards	Gate is closing
-S (start)	Receiving a START command
-P (pedestrian)	Receiving a PED command (pedestrian)
-H (halt / stop)	Receiving a STOP pulse
PC (photo close)	Closing photocell is operative
PO (photo open)	Opening photocell is operative
LO (limit open)	Opening limit switch is reached
LC (limit close)	Closing limit switch is reached
bO (border open)	Opening safety edge is active
bC (border close)	Closing safety edge is active
Pair of figures (es. 02)	Showing a saved remote control (ex.: remote control saved on radio position 2). Usually **-S** or **-P** show up to confirm which kind of remote control has been used.
-C	A timer has been wired to START or PED, automatic closing is stopped.

6.2 Fault

The display shows faults and anomalies that may stop the gate operation: the fault message is coded with two "dots" matched to figures or letters.
Refer to the below table:

DISPLAY message	Fault
oE (obstacle encoder)	Obstacle detected due to a sudden slow-down during working cycle
oA (obstacle amperometric)	Obstacle detected due to a sudden increase of gearmotor voltage.
oS (obstacle stall)	Obstacle detected due to gearmotor stop
oC (obstacle exceeding voltage)	Obstacle detected due to exceeding gearmotor voltage (limit rate reached)
PO (photo open)	Opening photocell operating
PC (photo close)	Closing photocell operating
AH (abort halt/stop)	STOP pulse
AU (abort user)	Operation interrupted using onboard keys
FC (test photo close failed)	Test detected a faulty closing photocell
FO (test photo open failed)	Test detected a faulty opening photocell
EC (voltage)	Exceeding voltage absorption (gearmotor)
EY (low battery or overheating)	Some components may be overheated or batteries may be low.
EF (fail)	Gearmotor fails to start up
EL (limit switch)	Limit switch doesn't cut
ES (switch)	Limit switch error: both limit switches are active
EU (timeout)	Duty cycle exceeded time allowed
EN (encoder)	Gearmotor and/or encoder are not properly wired

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