BOX L MF1D

UNIVERSAL MOTOR CONTROLLER

For one motor doors at 230VAC

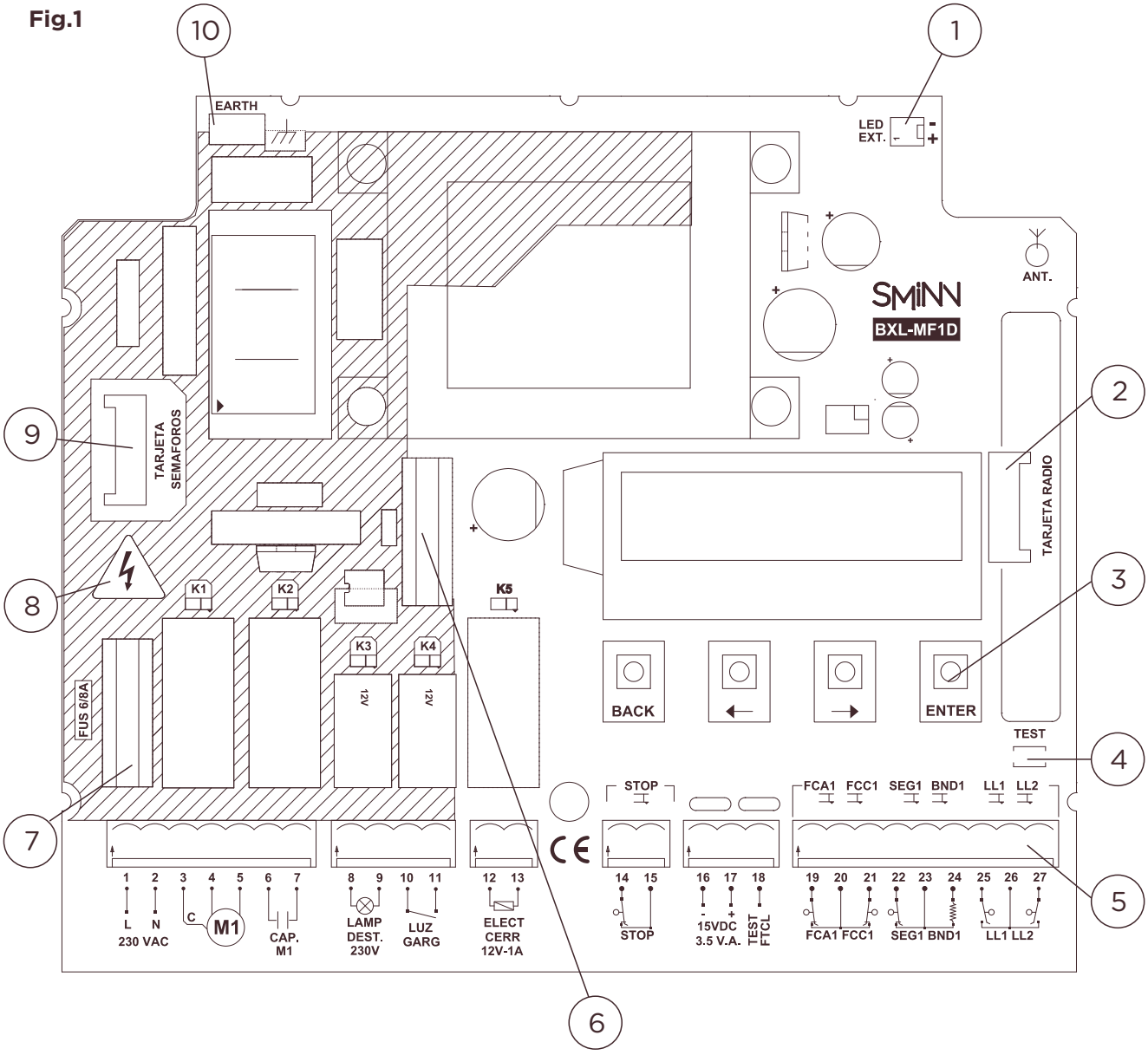
INSTRUCTIONS MANUAL

SMiNN

innovative in electronics

COMPONENTS SITUATION

Fig.1



1. Box cover LED terminal
2. TRSH radio card slot
3. Configuration keyboard
4. TEST start button
5. Terminal strip
6. Electrolock fuse
7. Power fuse
8. High voltage zone
9. Semaphore card slot
10. Earth fast-on terminal

INDEX

Simbols

.....Motor


.....Capacitor


.....Flash lamp


.....Electrolock


.....Safety edge


.....Normaly close contact


.....Normaly open contact

.....Earth


.....High voltage zone

FEATURES

The BXL-MF1D universal motor controller is designed to be part of a gate automation system for swing, rising, sliding, or overhead gates of one electromechanical or hydraulic 230VAC engine.

Among other features the motor controller provides:

- Control of 1 motor of 230VAC - 0.75CV max.
- Automatic activation of the motor relays and lights without spark.
- Independent connection terminals for motor capacitor.
- Independent regulation of the power applied to the motor both in startup, maneuver and stop.
- Quick maneuver learning to ease installation.
- Limit switches control.
- Independent terminals for light barrier and safety edge with safety test option conforming to regulations.
- Connection to electric lock, garage light (impulsive or latched) and beacon light.
- Two independent key inputs for complete and pedestrian maneuvers.
- Connection sockets for radio card and SMINN semaphore card.
- Status LEDs for all the inputs and outputs.
- Peripheral power output with resettable fuse.
- Optocoupled inputs with high electrical insulation.
- Intuitive menu using a keyboard and LCD that eases the configuration and maintenance of the panel.
- Ability to protect the configuration with a password.
- Storage of the number of maneuvers and security failures to ease the maintenance.

MOTOR CONTROLLER USAGE RESTRICTIONS

Operation is not guaranteed when installed in different equipment than the specified.

The manufacturer reserves the right to change the specifications of these systems as well as this manual without prior warning. The equipment must be manipulated only by specialized and/or skilled personnel.

WARNING

This product must be used in installations which has been conceived for, considering any other as improper use. The packaging must not be dumped in the environment.
Keep products, packaging, wrapping, documentation, etc., out of the reach of children.
Follow the current local, national or European regulations. The information contained in this document may have some mistakes that will be corrected in future editions. The manufacturer reserves the right to modify the contents of this document or the product without any prior warning.

INSTALLATION

The motor controller is fixed to the wall with just 3 screws, all of them external. See fig.3
Make three holes in the wall following the printed cutout template at the bottom of the cardboard box.
Cut the cable glands located at the bottom of the case and pass through them the wiring tube inside the case.
See the IMPORTANT SAFETY INSTRUCTIONS FOR INSTALLATION.
Connect the power supply, motor and device cables to the terminals of the terminal strip as indicated in the printed circuit board. See fig 1.
After activating the power supply, the ON led will switch on . See fig.1
Set up the timings and configuration of the board.

IMPORTANT SAFETY INSTRUCTIONS FOR INSTALLATIONS

Before installing the panel you should:
- Check that the door/shutter is in good mechanical condition and well balanced.
- Remove from the surroundings anything that is not needed and turn off AC power (VAC).
- Install the motor controller at a minimum height of 1,5m, preferably next to the door.
- Use power and motor cables of enough gauge.
- Power the board through a circuit breaker or security switch that can be easily reached by the end user.

The European regulations for doors EN 12453 and EN 12445 specify the minimum protection and safety levels for doors installed in houses and community and public facilities.
Collision with any object must be prevented or the contact force must be limited (safety edge), and in the case of automatic cycle, a presence detector must be used too (i.e. light barrier).
With the LED associated to each one of these inputs.

Check that the limit switches, and if installed, the light barrier and the safety edge, are all working. See fig. 1
Make sure the safety edge is not activated when the door/shutter is fully closed.
Press the TEST button (fig.1) to start an opening maneuver. If the motor doesn´t move its conection could be reversed. Correct it and repeat this step.

SMINN MOTOR CONTROLLERS ARE EQUIPPED WITH A LED TO LET KNOW IF THE DEVICE IS POWERED.

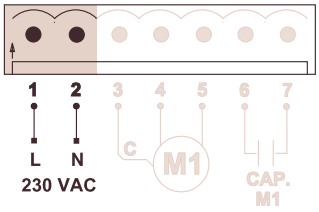
IMPORTANT SAFETY INSTRUCTIONS FOR USAGE

Once the controller is installed, as a prevention measure, the user must:

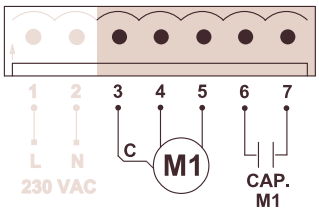
- Keep the controller out of reach of children.
- Observe that there are no objects or people in the way when the gate is moving.
- You must take precautions when handling the gate manually (unblocked) because it can move without control, due to its own weight, the state of fixing points, springs and counterweights.

If you detect a malfunction of the system, call IMMEDIATELY the technical service. You must not use the mechanism as it can cause damage.

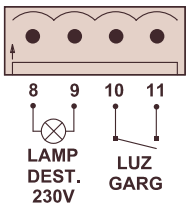
CONNECTIONS



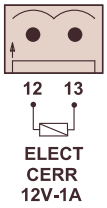
The motor controller is powered with 230VAC 50Hz (optionally 125VAC 60Hz) through terminals 1 and 2 and the ground connection is made in the FAST-ON connector located at the top left of the motor controller, marked EARTH.



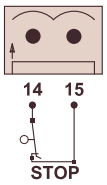
The motor controller can handle an AC electromechanical or hydraulic motor. The 3, 4 and 5 terminals are used for motor connection.
The motor controller has specific terminals for a motor capacitor in case the motor needs it (terminals 6-7).



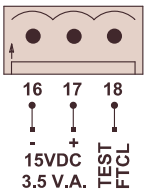
If desired, connect a 230VAC – 40W lamp in the terminals 8-9 to act as a maneuver beacon.
It is also possible to activate the garage light or turn on a temporization device using the terminals 10-11.



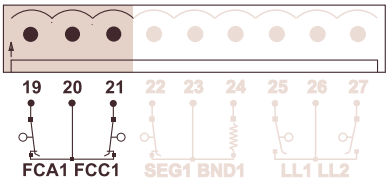
Use the terminals 12-13 to connect a 12V 1A electric lock. The controller can be set to activate the lock when opening and has options like “Reversing stroke” and “Final stroke”.



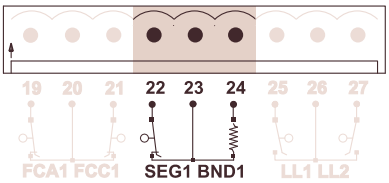
Terminals 14-15 allow the connection of an emergency switch to end the maneuver instantaneously. After an emergency stop usually a complete emergency closing maneuver is forced.
Note: If not used those terminals must be bridged.



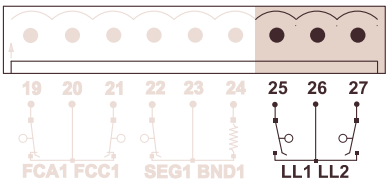
The board has a peripheral power output of 15VDC – 3,5VA in the terminals 16 and 17 protected with a resettable fuse designed to power devices like light barriers. Also, terminal 18 is used as an specific negative for light barrier test. According to regulations.



The board has specific inputs for opening and closing limit switches. The contacts are normally closed and have a shared common to ease installation.



The controller can manage light barriers and a safety edge. The safety edge input can be set to manage a second light barrier or any kind of safety edge (resistive or contact). Light barriers must always be normally closed. See options.



Use the terminals 25-26 to connect a switch that starts a complete maneuver and the terminals 26-27 to connect another switch for pedestrian manuever or closing.

The radio socket can be used to connect an SMINN radio card, allowing the controller to be used with radio transmitters.

The semaphore card socket allows the board to manage, via an SMINN semaphore card, a two light semaphore and optionally use the red light as a maneuver beacon.

CONFIGURATION

The controller has an advanced menu system using an integrated keyboard and backlit LCD display to make configuration and maintenance easy, fast and intuitive.

Press the BACK and ENTER keys simultaneously to access the configuration menu. The LCD backlight will power on.
There are 4 keys to move through the menu:

BACK (exit)
ENTER (accept)
<- (back)
-> (forward)

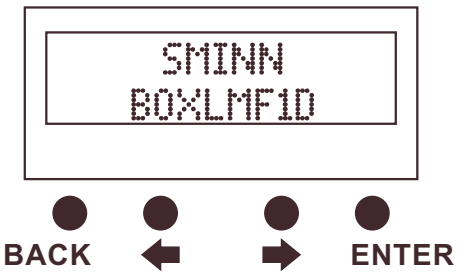
The <- / -> keys, are used to move through the selected menu options or settings.
The ENTER key is used to accept and validate the selection.

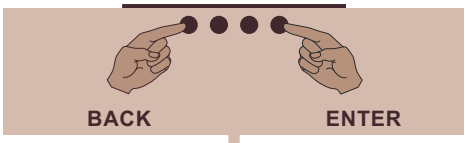
The controller has a configuration wizard that allows the installer to set up the most important configuration parameters and get the board working faster.

To use the wizard, go into the main menu pressing BACK + ENTER, press → until “MANEUVER PROG” is shown in the screen and accept pressing ENTER.
After this, the controller will ask one by one the most important configuration parameters to the installer. Please choose the appropiate settings using ← and → and press ENTER to continue or BACK to go back.

Once the needed configuration is done, the controller will prompt the installer to press ENTER to start the learning maneuver.

From here on the ENTER key, the LL1 input or a radio transmitter can be used for the learning process.





CONFIGURATION MENUS

OPTIONS
- AUTOMATIC CLOSING
- FAST BEAM CLOSING
- OPTIONAL AUTOMATIC
- AUTO DELAY ON KEY
- INVERT ON KEY
- PARTIAL TIMES
- SAFETY EDGES
- LIGHT BARRIER
- LIGHT BARRIER TEST
- LIGHT BARRIER MODE
- BAND
- SOFT STOP
- CLOSE ON BOOT
- FLASHING SEMAPHORE
- AUXILIARY DEAD-MAN
- TIME ENCODER
- SWITCH LOCK

TIMINGS
- LEAF OPENING
- LEAF CLOSE
- EXTRA TIME
- AUTOMATIC CLOSING
- CLOSE ON BEAM
- ELECTROLOCK
- REVERSE STROKE
- POWER
- REGULATED STARTUP
- SOFT STOP
- FINAL STROKE
- HYDRAULIC PRESSURE
- PREFLASHING
- LIGHT GARAGE

MAINTENANCE
- PARTIAL COUNTER
- INPUT STATUS
- ENABLE PASSWORD

PROGRAMMING WIZARD

DOOR TYPES

The controller can be set up for four different kind of gates.

- **SWING**
- **RISING (Vertical)**
- **OVERHEAD**
- **SLIDING**

OPERATING MODES

In all the modes securities worked as shown in the attached chart except when indicated otherwise.
The STOP input stops instantaneously the maneuver.

STANDARD
In this mode LL1 and radio starts a full maneuver and LL2 starts a pedestrian maneuver. It is not possible to interrupt the opening in this mode.

OPEN/CLOSE
In this mode LL1 opens and LL2 closes. Any of these signals interrupt the current maneuver immediately.

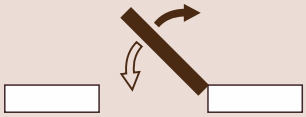
ALTERNATING STOP
In this mode LL1 and radio starts a full maneuver and LL2 starts a pedestrian maneuver. It is possible to interrupt the maneuver using any of these inputs; when the gate is moving any input will make it stop, when it is stopped any input will make in go the other way.

DEAD MAN
This mode only allows the gate to move while the LL1 input or radio are active (open) or the LL2 input is active (close). The maneuver interrupts immediately when there is no active input.
In this mode securities only pause the maneuver.

SEMIAUTOMATIC DEAD MAN
The gate opens fully when the LL1 input or radio are active but only allows closing while the LL2 input is kept active. Securities function normally while opening and only pause while closing.

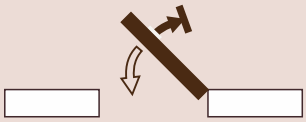
NORMAL FUNCTIONALITY OF SECURITIES

CLOSING LIGHT BARRIER

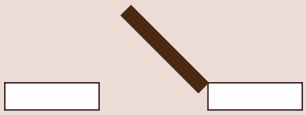


Closing: Inverts the maneuver
Opening: Nothing

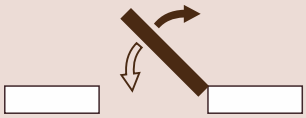
CLOSING SAFETY EDGE



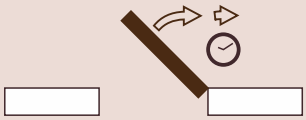
Closing: Inverts 3 seconds and stops
Opening: Stops immediately



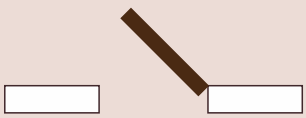
OPENING LIGHT BARRIER



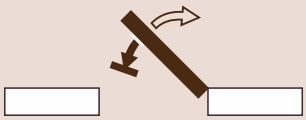
Closing: Inverts the maneuver
Opening: Pauses the maneuver



OPENING SAFETY EDGE



Closing: Stops the maneuver.
Opening: Inverts 3 seconds and stops

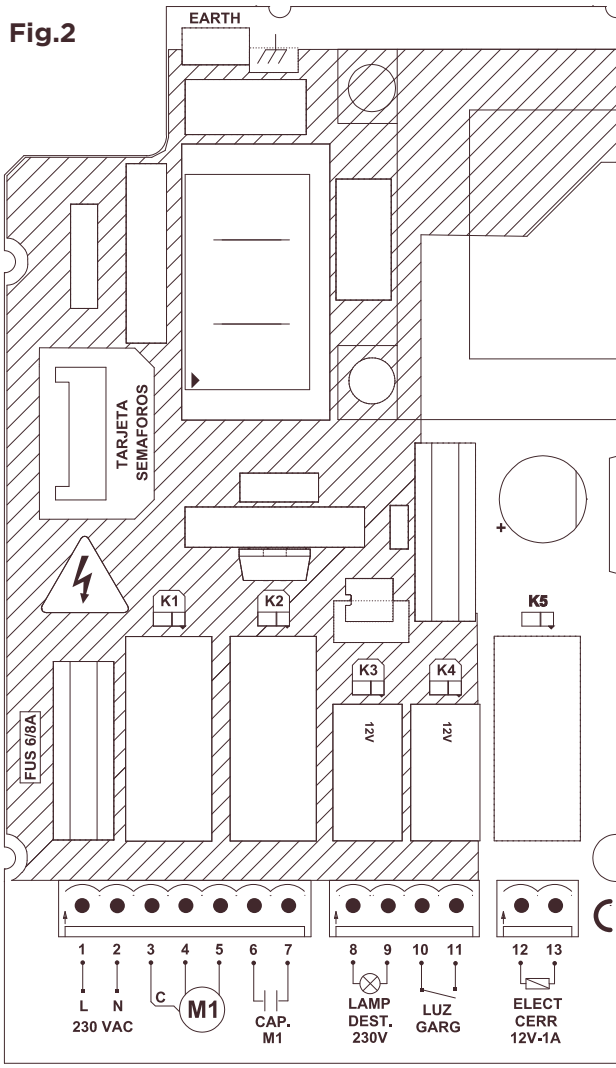


After STOP or a safety edge collision the next maneuver is a forced security closing (STANDARD and ALTERNATING STOP modes).

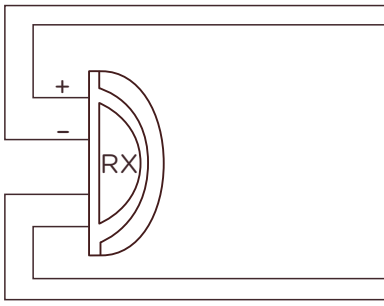
ELECTRICAL CONNECTIONS

1	230VAC Phase
2	230VAC Neutral
3	Motor common
4	Motor opening
5	Motor closing
6 7	Motor capacitor
8 9	Beacon light (230VAC 40W)
10 11	POTENTIAL FREE relay contacts for garage light or auxiliary lamp
12 13	Electric lock 12V AC/DC
14 15	STOP Safety switch contact
16 17	Negative Positive Power output for light barriers and other peripherals
18	Negative power output for light barrier with autotest
19	NC opening limit switch
20	Limit switch common
21	NC closing limit switch
22	NC light barrier contact
23	Securities common
24	R8K2/NC contact for safety edge
25	Start complete maneuver input
26	Start/Stop common
27	Pedestrian start/dead-man input

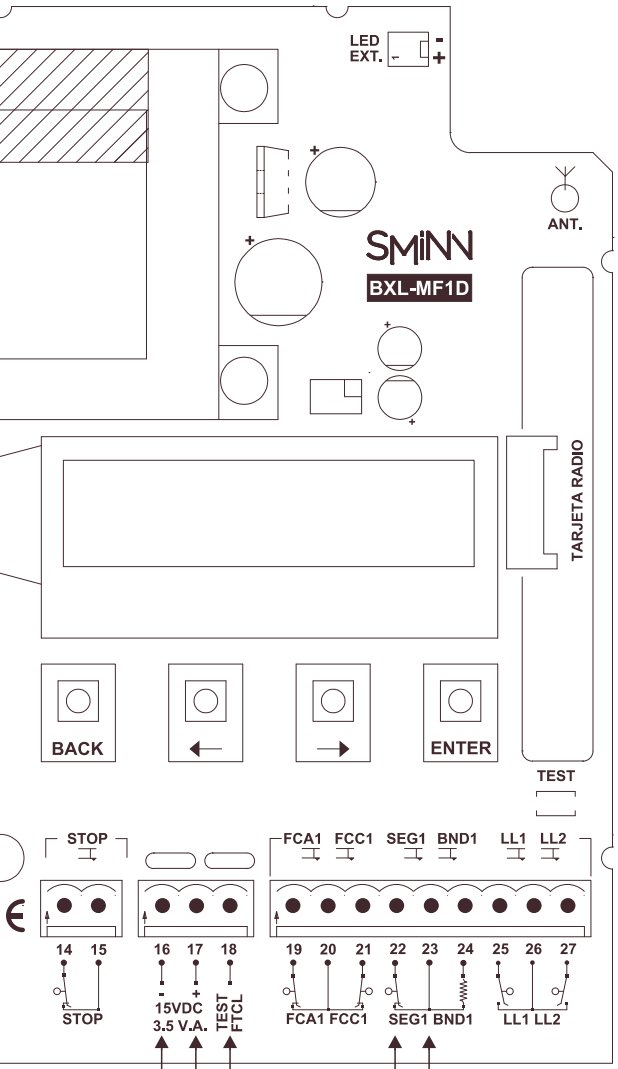
Fig.2



LIGHT BARRIER POWER CONECTIONS

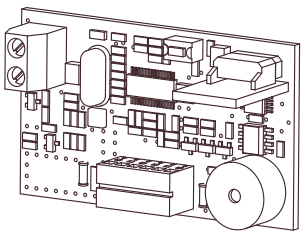


Light barrier transmitter negative must be co

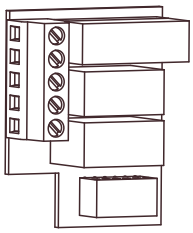


nnected to terminal 18 to use light barrier test

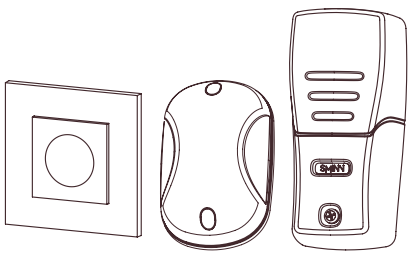
ACCESORIES AND PERIPHERALS



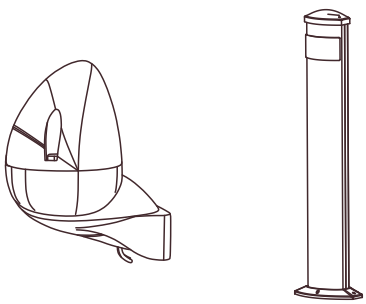
Radio card



Semaphore card



Transmitter-receiver light barrier set



Beacon light and light barrier stand

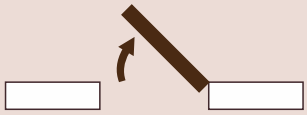
LEARNING MANEUVER

The learning maneuver is useful to set the temporization parameters of the controller. It is different depending on whether slow stop has been activated or not.

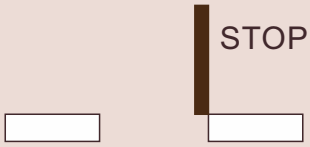
LEARNING WITHOUT SOFT STOP

Close door

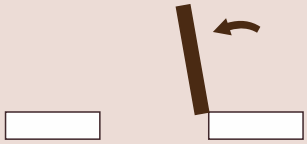
Press ENTER to learn opening



Press ENTER to stop the gate or wait for opening limit switch (FCA)



Press ENTER to learn closing



Press ENTER to stop the gate or wait for closing limit switch (FCC)

Gate closed

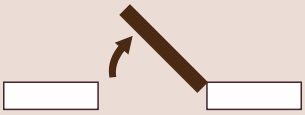
CLOSING OPERATION

The closing learning manoeuvre is homologous to the opening manoeuvre, but in the opposite direction. Follow the same instructions as for opening.

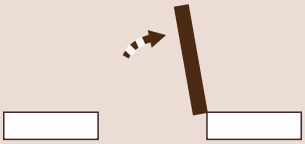
LEARNING WITH SOFT STOP

Close gate.

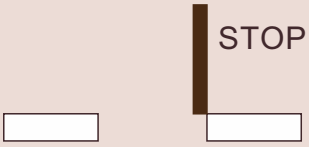
Press ENTER to learn opening



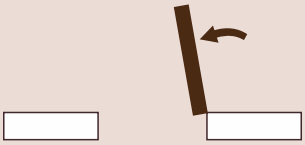
Press ENTER for soft stop



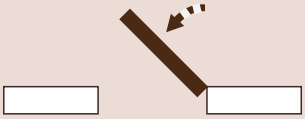
Press ENTER to stop the gate or wait for opening limit switch (FCA)



Press ENTER to learn closing



Press ENTER for soft close



Press ENTER to stop the gate or wait for closing limit switch (FCC)

Gate closed

OPTIONS

	LCD TEXT	DEFAULT VALUE
AUTOMATIC CLOSING Enables automatic closing after pause time	AUTO CLOSE	YES
FAST BEAM CLOSING If the maneuver inverts because of a light barrier the pause time is reduced to the one set in Close on Beam	FAST BEAM CLOSE	NO
OPTIONAL AUTOMATIC Allows to end the pause time prematurely	OPTIONAL AUTO	YES
AUTO DELAY ON KEY Reset pause time with each manoeuvre command Only visible with Opt. Auto Clossing off	INVERT ON KEY	NO
INVERT ON KEY Allows to invert the maneuver in STANDARD mode	INVER TECLA	YES
PARTIAL TIMES Invert as much time as the gate has closed plus extra time	PARTIAL TIMES	NO
LIMIT SWITCH Enables the inputs for limit switch	FCA1 FCC1	YES YES
LIGHT BARRIER Enables management of closing light barrier (SEG1). No effect while opening, inverts while closing.	BEAM 1	NO
LIGHT BARRIER TEST 1 - LIGHT BARRIER TEST 2 Enables autotest for the SEG1 light barrier before maneuver	TEST BEAM 1 TEST BEAM 2	NO NO
LIGHT BARRIER MODE 1 - LIGHT BARRIER MODE 2 Configures behavior of each lightbarrier when opening/closing Opts.: NOTHING / PAUSE / INVERT / STOP / SHORT INVERT	BEAM 1 OPEN BEAM 1 CLOSE BEAM 2 OPÊN BEAM 2 CLOSE	NOTHING INVER PAUSE INVER
EDGE Enables the input for a closing safety edge. Its supports 8K2, NA or NC safety edge or NC light barrier. Options: NO / R8K2 / NA / NC / BEAM	EDGE	NO NO
SAFETY EDGE MODE Configures behaviour of security when Opening / Closing Options: NOTHING / STOP / SHORT INVERT / INVERT	EDGE OPEN EDGE CLOSE	STOP SHORT INV
SOFT STOP Enables the soft stop	SOFT STOP	YES
CLOSE ON BOOT When the controller is powered on it initiates a closing maneuver if the closing limit switch is not active.	CLOSE ON BOOT	NO
FLASHING SEMAPHORE Use the red light as maneuver beacon	FLASHING SEM.	NO
AUXILIARY DEAD MAN If the light barrier test fails the controller sets itself in dead-man mode temporarily so the gate can be opened securely.	AUX DEAD MAN	YES
MOTOR TYPE Type of motor to be controlled: electromechanic or hydraulic. Motor power control and soft stop are not supported for hydraulic motor. The controller can set an interval for temporal activation of the motor so an optimal motor pressure is kept.	MOTOR TYPE	ELECTRO.
ENCODER DE TIEMPO Simulates the use of encoder counting pulses by time and power. The inversion times are more precise but it requires that the motors work in a similar way in both directions.	TIME ENCODER	NO
SWITCH 1 LOCK - SWITCH 2 LOCK Locks the switch 1 / 2 Only visible when password is enabled	LL1 LOCK LL2 LOCK	NO NO

ADJUSTMENTS

	LCD TEXT	DEFAULT VALUE	ADJUSTMENTS
Leaf 1 open time	LEAF 1 OPEN	15 sec.	1-240 sec.
Pedestrian open time	PEDESTR. OPEN	5 sec.	No/1-15 sec.
Leaf 1 close time	LEAF 1 CLOSE	15 sec.	1-240 sec.
Extra time for inversion when using PARTIAL TIMES	EXTRA TIME	NO	No/1-5 sec.
Pause time before automatic closing (only STANDARD/ALTERNATING STOP)	AUTO CLOSE	60 sec.	10-240 sec.
Pause time before automatic closing after a pedestrian opening (only STANDARD/ALTERNATING STOP)	PED. AUTO CL.	20 sec.	10-120 sec.
Delay to close after light barrier	CLOSE ON BEAM	NO	No/2-10 sec.
Time lapse in which the electric lock is kept active while the gate is opening	ELECTRIC LOCK	2 sec.	No/2-10 sec.
Time lapse in which the gate closes before opening to help unlock the electric lock.	REVERS. STROKE	2 sec.	No/1-5 sec.
Normal power to apply to the motor. Only for electromechanic motor.	POWER	80%	40-100%
Time amount in which the gate opens with a different, specific power level. Only for electromechanic motor.	STARTUP TIME	2 sec.	No/1-5 sec.
Power applied to the engines during the STARTUP TIME. Only for electromechanic motor.	STARTUP POWER	100%	40-100%
Soft stop time in opening for the 1st leaf before the scheduled maneuver ends	SOFT STOP O1	5 sec.	No/1-15sec.
Soft stop time in closing for the 1st leaf before the scheduled maneuver ends.	SOFT STOP C1	5 sec.	No/1-15 sec.
Time in full power on closing maneuver end to ensure the electric lock is secured.	FINAL STROKE	1 sec.	No/1-3sec.
Interval of time between short activations of the hydraulic motor to keep oil pressure high..	PRESS. INTER	60 min.	No/1-120sec.
Motor activation time for each interval.	PRESS. TIME	2 sec.	1-5 sec.
Time the beacon will flash before maneuver start. This time is not applied while reversing the door. It is only applied from the maneuver start	PREFLASHING	2 sec.	No/1-10sec.
Time to activate the garage light relay.	GARAGE LIGHT	120 sec.	No/1-240sec.

Note: The controller does not support motor power control nor slow stop for hydraulic motors.

MAINTENANCE

This menu can be used to check the maneuver counters, input status, password configuration and doing factory reset.

PARTIAL COUNTER
It shows the total number of maneuvers since the last reset.
Pressing ENTER on this option you can reset the partial meter, starting at 0.

TOTAL COUNTER
Displays the number of maneuvers performed since installation.
This counter can not be set to 0.

INPUT STATUS
Displays the status of all configured inputs.
The safety edge will not appear unless it is enabled

DEFAULT VALUES
Reset to the default setting (Factory Reset)

ENABLE PASSWORD
Enables a 4 digit password to access the menu. The default password is: 1234

CHANGE PASSWORD
Changes the controller 4 digit password.

SMINN offers the installer a proffesional grade technical support service that will solve any problem and extend if needed the device warranty.

Temporally and depending on use the installation must be thoroughly tested by qualified personnel to detect any sign of wear.
If the board needs repair please contact the manufacturer or the nearest official service.

Once the controller is set up the installer must ensure the power and slow stop adjustments meet the EN12453:2000 regulations by performing the meterings described in the EN12445:2000 regulations. See force graph.

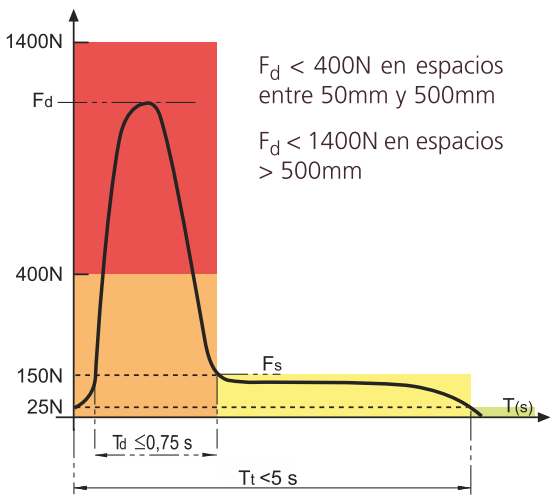
If these requirements are not met additional securities must be installed.

The dynamic force (Fd) must not surpass the following measures:

< 400N in spaces between 5-50cm
< 1400N in spaces greater than 50cm

Force graph

Fd: Dynamic force
Fs: Static force



WARRANTY

This product has undergone a complete TEST during its manufacturing process that guarantees its reliability and proper operation. The manufacturer provides 24 months of warranty to the product from the date printed in the product and against any anomaly that it may present in its appearance or operation.
Any damage caused by third parties, natural causes (flooding, fire, lightning, etc), arising from improper handling or installation, vandalism or any other cause non attributable to the manufacturer will void the warranty.
The warranty only covers repairs or replacement of the damaged device.
Any expenses derived from assembling, travelling, transport, natural wear of parts, etc., and, in general, any expenses that are not part of the repairs or replacement of the damaged element of the system are excluded.
The installer/provider will ask the manufacturer for a RMA number or authorization for transport of the system in warranty. Without this previous requisite, the manufacturer will not be able neither to process nor provide warranty service.

WASTE OF ELECTRICAL AND ELECTRONIC DEVICES (WEEE)
In accordance with the European Directive 2002/96/EC about waste electrical and electronic equipment (WEEE), the presence of this symbol (see symbol at the bottom of this text) in the product or in the packaging, means that this article shall not be disposed in local non-classified waste streams.
It is the user's responsibility to dispose this product taking it to a collection point designed for waste recycling of electrical and electronic devices. The separate collection of this product helps optimize the waste sorting and recycling of any recyclable material and also decreases the impact on health and the environment. For more information about the correct wasting of this product, please contact the local authority or the distributor where you acquired this product.

TECHNICAL CHARACTERISTICS

Power supply	230VAC
Maximum charge	1x0.75CV (1x600W)
Main fuse	6/8A
Power output	15VDC / 3.5VA (300mA)
Power output protection	Rearmable fuse
Electrolock output	12VDC / 1A
Electrolock fuse	2/3A delayed
Maneuver control inputs	6 high insulation optocoupled inputs 1 analog inputs
Plug-in cards	Radio and semaphore
LCD Display	2x16 characters Chip-on-glass technology - Backlight
Operation temp.	-20ºC / 70ºC
Casing	ABS
Dimensions	L280 x W196 x H90 mm
Weight	1650g
Watertight	IP54 (IP65 with cable glands)

CE DECLARATION OF CONFORMITY

The company — ELSON ELECTRÓNICA, S. A.
Pol. Torrelarragoiti, P6 – A3
48170 Zamudio – Vizcaya (SPAIN)

Declares:
The product — BOX L MF1D motor controller
Manufactures
Under the trademark — **SMINN**
For use in — Residential, Commercial or light industry enviroments.

This device meets the provisions as long as its usage is compilant to what was envisaged, having applied the following directives:

Directive 2014/30/EU - Electromagnetic compatibility

Directive 2014/35/EU - Low tension

Directive 2006/42/EC - Machines

Directive 2011/65/EU - RoHs

Directive 2012/19/EU - WEEE

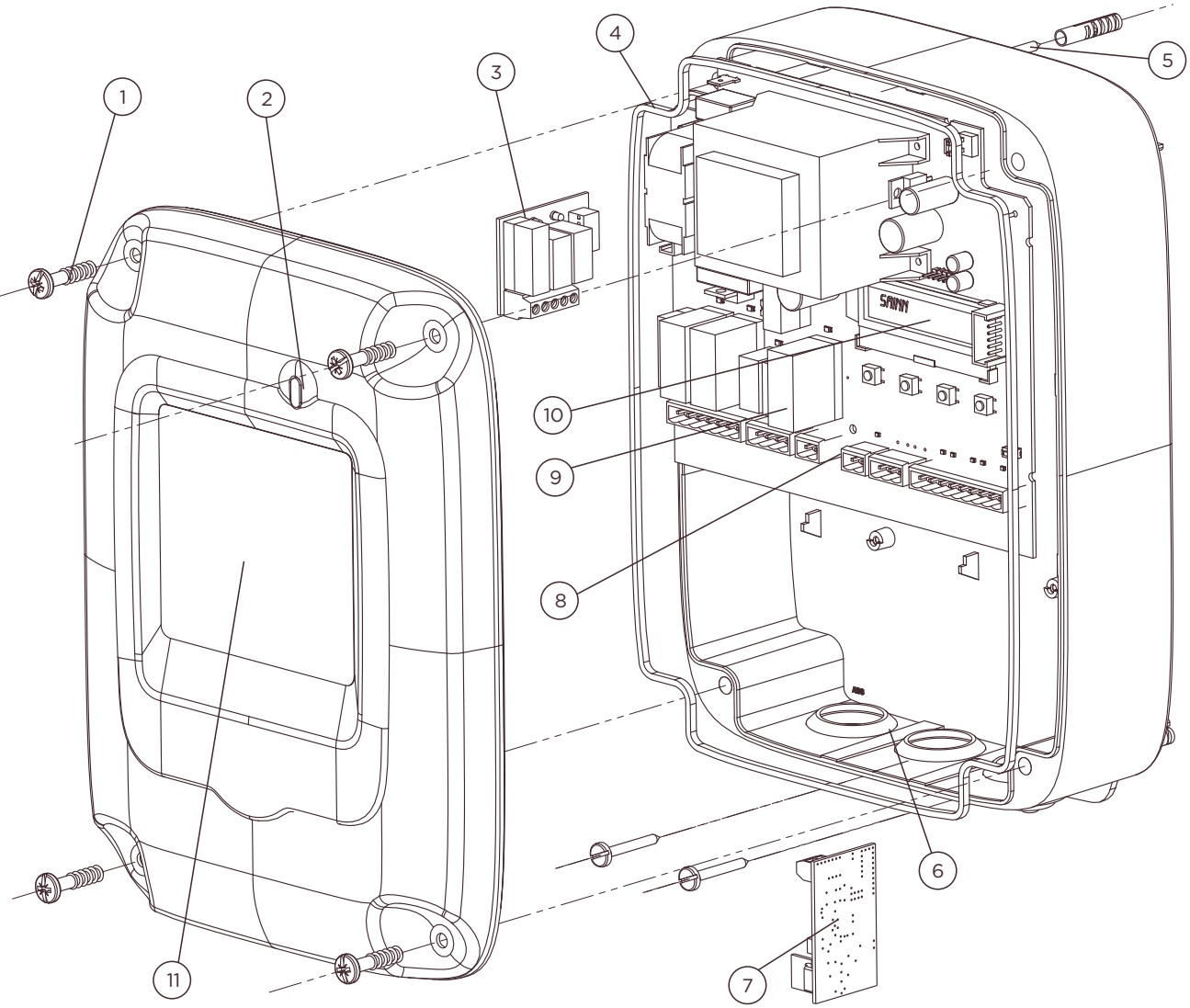
Zamudio 22.02.2016

José Miguel Blanco Pérez
Chief Technical Officer

NOTES

MF1D EXPLOSION

Fig3



1. Captive screws
2. Power status LED
3. Semaphore card
4. Vacuum rubber gasket
5. External fixing with just three screws
6. Access ports for 16/24mm tubes
7. Radio card
8. Plug-in terminal blocks
9. Power relays
10. Display
11. Frontal space for installer/revision sticker

SMiNN

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