BOX L TF1D

UNIVERSAL MOTOR CONTROLLER

For one three-phase motor gate at 230 / 400 VAC

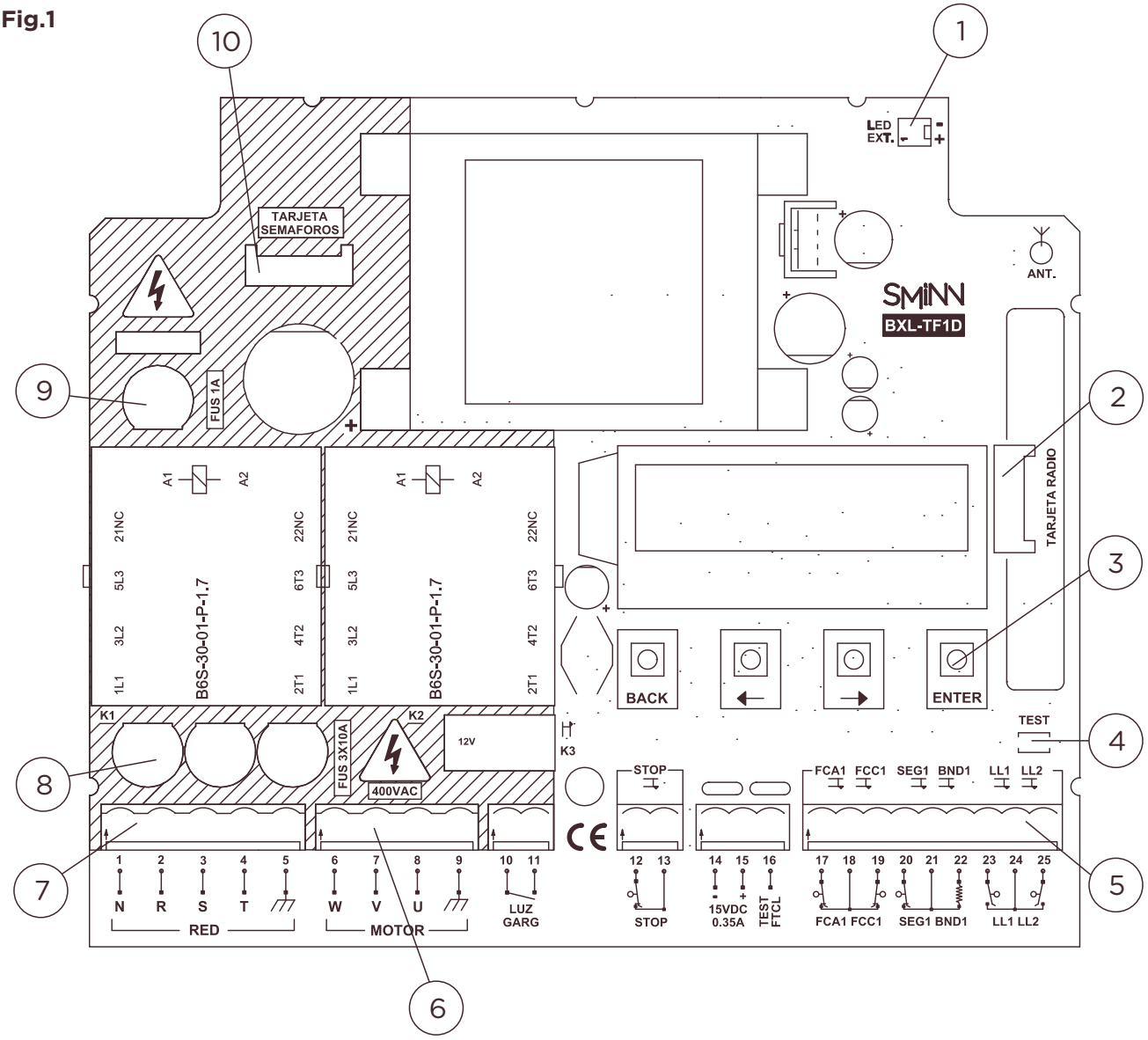
INSTRUCTIONS MANUAL

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. Maneuver control terminal strip
6. Motor terminal strip
7. General power strip
8. R/S/T protection fuses
9. Power fuse
10. Semaphore card slot

INDEX

Simbols


.....Three-phase Motor 400V Star Configuration


.....Three-phase Motor 230V Triangle Configuration

.....Single-phase Motor


.....Flash lamp


.....Capacitor


.....Safety edge


.....Normally close contact


.....Normally open contact

.....Earth


.....High voltage zone

FEATURES

The BXL-TF1D universal motor controller is designed to be part of a gate automation system for rising, sliding, or overhead gates with one 230/400VAC three-phase motor.

Among other features the motor controller provides:

- Control of one 230/400VAC three-phase motor - 3 HP max.
- Low voltage control of the motor activation contactors.
- Built-in protection via current sensing system.
- Quick maneuver learning to ease installation.
- Limit switches control.
- Independent terminals for light barrier and safety edge with safety test option conforming to regulations.
- Two independent key inputs for complete and pedestrian maneuvers (sliding), open/close.
- 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.

THE USAGE INSTRUCTIONS OF THIS DEVICE SHALL BE HANDED TO THE USER, WHO WILL HAVE THEM IN THEIR POSSESSION. IF THEY ARE MISLAID, THE USER CAN ASK FOR A COPY OR DOWNLOAD IT DIRECTLY FROM THE WEBSITE WWW.SMINN.COM

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 using the programing wizard.

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

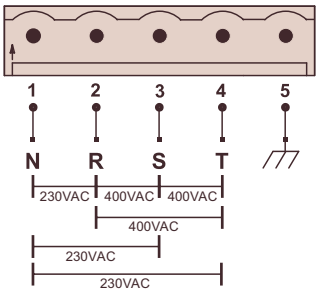
Once the controller is installed, as a prevention measure, the user must:

- 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.

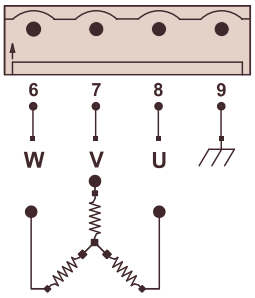
If you detect a malfunction of the system, call INMEDIATELY the technical service. You must not use the mechanism as it can cause damage.

CONNECTIONS

IMPORTANT: Take care when wiring the phase terminals as an incorrect connection can damage the electronics. Make sure there is **400VAC** between the **R, S and T** phases and **230VAC** between **N and any of R, S and T**.

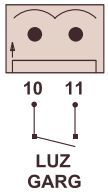


The motor controller is powered with 230VAC 50Hz supplied through N (Terminal 1) and R (Terminal 2).
The 400V phases must be connected to the terminals 2, 3 and 4.
EARTH must be connected to terminal 5 ( )

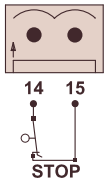


The board can control an AC three-phase motor of up to 3 HP connected to terminals 6, 7 and 8.

NOTE: It is important to connect the motor ground to terminal 9.

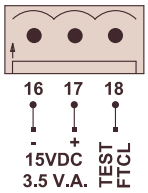


Terminals 10 and 11 connect to a potential-free relay that breaks 5A max.
These terminals can be used to act on a garage light switch, turn on a timmed lamp, switch a flashing lamp or free an electronic brake.
See: Connection schematics (Page 16)

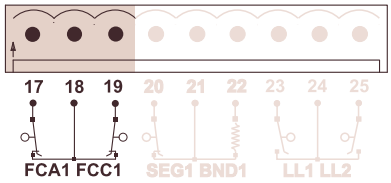


Terminals 14-15 allow the connection of an emergency switch to end the maneuver instantaneously. After an emergency stop usually a complete emergency maneuver is forced.

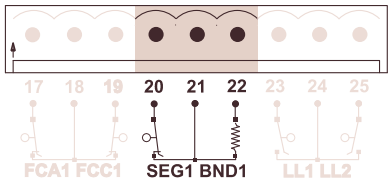
NOTE: If not used these terminals must be bridged.



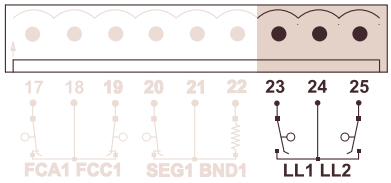
The board has a peripheral power output of 15VDC – 3,5VA in the terminals 16 and 17 protected with a resettable fuse designed to power devices like light barriers. Also, terminal 18 is used as an specific negative for light barrier test. According to regulations. See Fig.2.



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 23-24 to connect a switch that starts a complete maneuver and the terminals 24-25 to connect another switch for pedestrian maneuver 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)

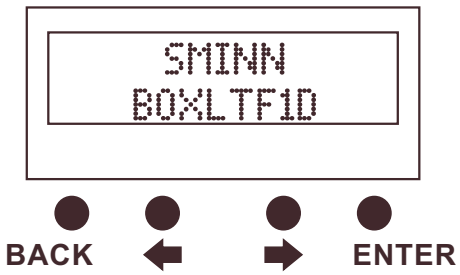
The <- / -> keys, are used to move through the selected menu options or settings.
The ENTER key is used to accept and validate the selection.

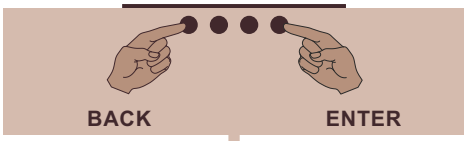
The controller has a configuration wizard that allows the installer to set up the most important configuration parameters and get the board working faster.

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
- LIGHT BARRIER CLOSING
- OPTIONAL AUTOMATIC
- INVERT ON KEY
- PARTIAL TIMES
- LIGHT BARRIER
- LIGHT BARRIER TEST
- LIGHT BARRIER MODE ON OPEN
- LIGHT BARRIER MODE ON CLOSE
- SAFETY EDGES
- SAFETY EDGE MODE ON OPEN
- SAFETY EDGE MODE ON CLOSE
- PUSH MODE ON OPEN
- PUSH MODE ON CLOSE
- CLOSE ON BOOT
- LIGHT RELAY MODE
- FLASHING SEMAPHORE
- AUXILIARY DEAD-MAN
- SWITCH 1 BLOCK
- SWITCH 2 BLOCK

TIMINGS
- OPENING TIME
- PEDESTRIAN OPENING TIME
- CLOSING TIME
- PEDESTRIAN CLOSING TIME
- EXTRA TIME
- AUTOMATIC CLOSING
- PEDESTRIAN AUTO CLOSE
- LIGHT BARRIER CLOSE
- DIREC. CHANGE TIME/INVERSION
- PREFLASHING
- LIGHT GARAGE
- PUSH CURRENT SENS.
- PUSH CURRENT LIMIT
- OVERCURRENT LIMIT

MAINTENANCE
- PARTIAL COUNTER
- INPUT STATUS
- ENABLE PASSWORD

PROGRAMMING WIZARD

DOOR TYPES

The controller can be set up for 3 different kind of gates:

- RISING (Vertical)

- SWING

- 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.

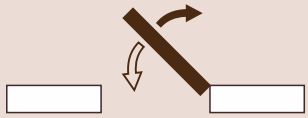
ALTERNATING STOP
In this mode LL1 and radio starts a full maneuver and LL2 starts a pedestrian maneuver. It is possible to interrupt the maneuver using any of these inputs; when the gate is moving any input will make it stop, when it is stopped any input will make it go the other way.

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.

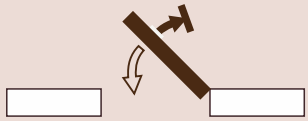
NORMAL FUNCTIONALITY OF SECURITIES

CLOSING LIGHT BARRIER

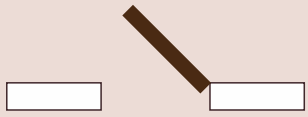


Closing: Inverts the maneuver
Opening: Nothing

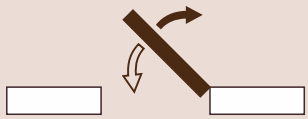
CLOSING SAFETY EDGE



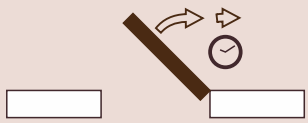
Closing: Inverts 3 seconds and stops
Opening: Stops immediately



OPENING LIGHT BARRIER



Closing: Inverts the maneuver
Opening: Pauses the maneuver



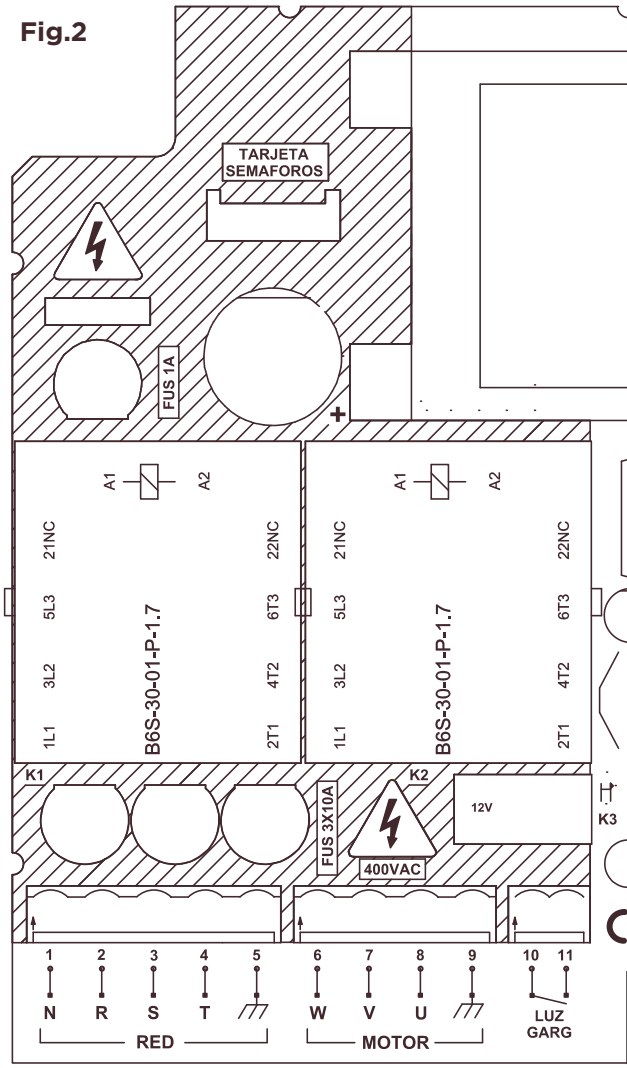
After STOP or a safety edge collision the next maneuver is a forced security maneuver (STANDARD and ALTERNATING STOP modes).

It is posible to set up the configuration for opening and closing for each active security; the previous configuration is the default one.

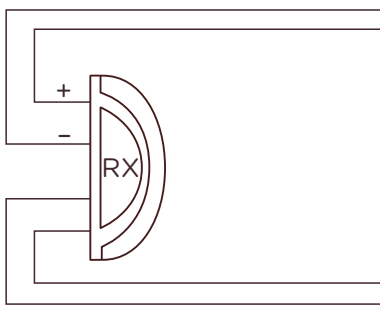
ELECTRICAL CONNECTIONS

1	Neutral 230VAC	POWER
2	400VAC - R Phase	
3	400VAC - S Phase	
4	400VAC - T Phase	
5	Earth connection	
6	Motor Phase W	MOTOR
7	Motor Phase V	
8	Motor Phase U	
9	Earth Connection	
10 11	POTENTIAL FREE relay contacts for garage light or auxiliary lamp.	
12 13	STOP safety switch contact	
14 15	Negative Positive Power output for light barriers and other peripherals	
16	Negative power output for light barrier with autotest	
17	NC opening limit switch	
18	Limit switch common	
19	NC closing limit switch	
20	NC light barrier contac	
21	Securities common	
22	R8K2/NC contact for safety edge	
23	START complete maneuver input	
24	Start/Stop common	
25	Pedestrian start/dead-man input	

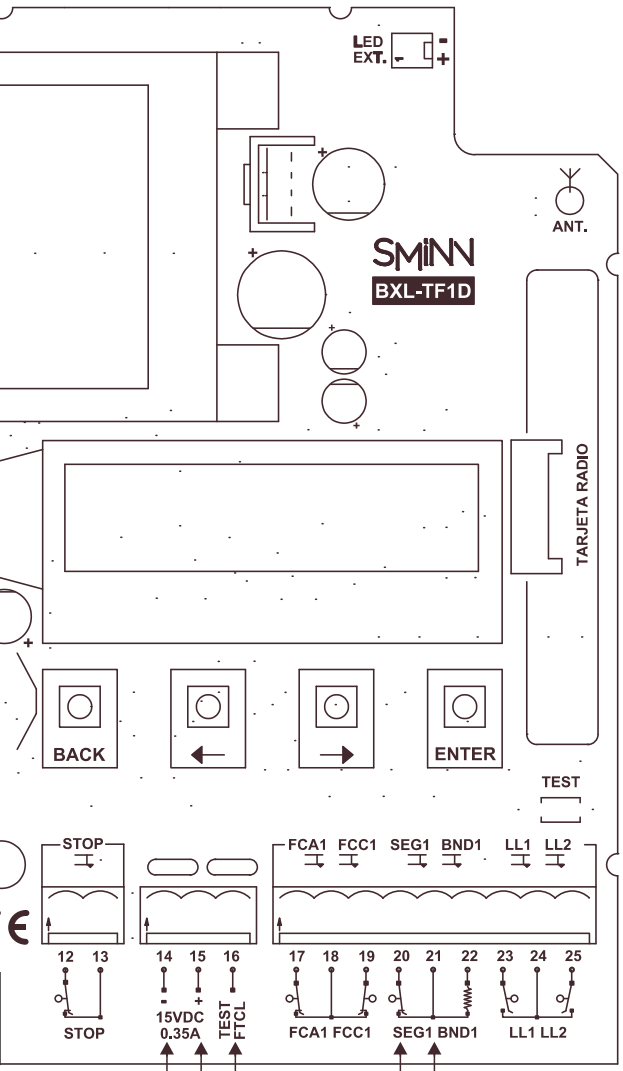
Fig.2



LIGHT BARRIER POWER CONECTIONS

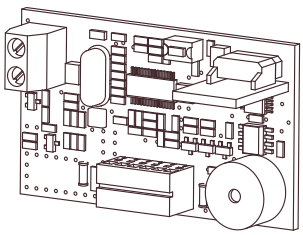


Light barrier transmitter negative must be co

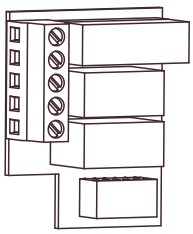


nnected to terminal 16 to use light barrier test

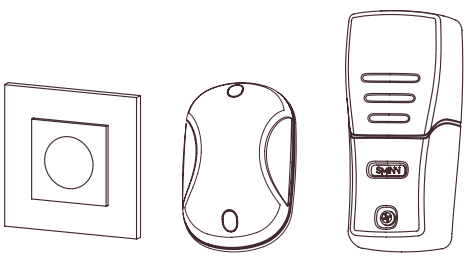
ACCESORIES AND PERIPHERALS



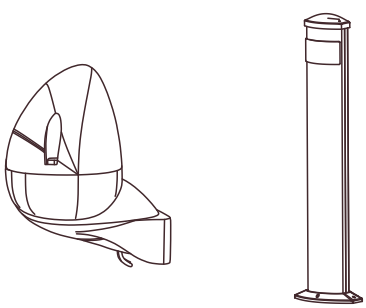
Radio card



Semaphore card



Transmitter-receiver light barrier set



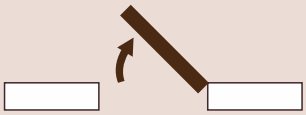
Beacon light and light barrier stand

LEARNING MANEUVER

The learning maneuver is useful to set the temporization parameters of the controller.

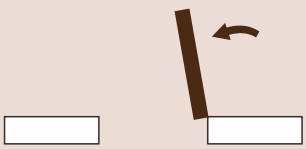
Close door

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

ERROR MESSAGE

When an error happens during maneuver, the controller stores the error along with other previous errors so that next time the configuration menu is accessed they can be displayed. When there are errors to be displayed an “E” appears in the four corners of the screen. When the configuration menu is accessed the controller displays one by one the stored errors.

The possible errors are:

SEG 1 / 2 TEST FAIL
The test procedure of the indicated security has failed. For SEG 1/2 it is the standard test procedure for light barriers.

BND 1 TEST FAIL
The test procedure of the indicated security has failed.
The safety edge may be blocked or have an electrical problem.

SECURITY FAIL SEG BLOCKED
At least one security was blocked before starting the maneuver.

MOTOR OC
The motor stopped because of overconsumption. This security activates when surpassing the current limit set in the menu.

MOTOR SC
The motor stopped because of a shortcircuit.

MOTOR PUSH
The obstacle detection security was activated while operating the motor.

OPTIONS

	LCD TEXT	DEFAULT VALUE
AUTOMATIC CLOSING Enables automatic closing after pause time	AUTO CLOSE	YES
FAST BEAM CLOSING Only if Close on Beam is activated. 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 Only visible with Optional Automatic Clossing off	AUTO DEL KEY	NO
INVERT ON KEY Allows to invert the maneuver in STANDARD mode	INVER ON KEY	YES
LIGHT BARRIER Enables management of closing light barrier (SEG1). No effect while opening, inverts while closing.	BEAM 1	NO
LIGHT BARRIER TEST Enables autotest for the SEG1 light barrier before maneuver	TEST BEAM 1	NO
LIGHT BARRIER MODE OPENING / CLOSING Configures behaviour of security when Opening/Closing to one of these modes: Nothing - Pause - Invert - Stop - Short invert	BEAM OPEN BEAM CLOSE	* *
SAFETY EDGE (NO / R8K2 / NA / NC / BEAM) Enables the input for a closing safety edge or opening light barrier. Its supports 8K2, Na or NC safety edge or NC light barrier.	EDGE 1	NO
SAFETY EDGE MODE OPENING / CLOSING Configures behaviour of security when Opening / Closing to one of these modes: Nothing - Stop - Short invert - Invert	EDGE OPEN EDGE CLOSE	* *
PUSH MODE OPENING / CLOSING Configures behaviour of security when Opening / Closing to one of these modes: Nothing - Stop - Short invert - Invert	PUSH OPEN PUSH CLOSE	* *
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
LIGHT RELAY MODE: It can be preflashing, garage light or break	L. REL. MODE	**
BRAKE ON INVERT: Configures whether the motor brake is locked while switching the motor direction.	PREINV. BRAKE	NO
FLASHING SEMAPHORE Makes the controller use the red semaphore light as a maneuver beacon. It uses the configured time in timings/preflashing.	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
SWITCH 1 / 2 BLOCK Blocks the Switch 1 / 2. Only visible when password is enabled.	LL 1 / 2 BLOCK	NO

Default values
* Depends on door type
** Preflashing

ADJUSTEMENTS

	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/1-120 sec.
Leaf 1 close time	LEAF 1 CLOSE	15 sec.	No/1-240 sec
Tiempo Cierre Peatonal Hoja	CIERRE PEAT	15 sec.	1-120 sec.
Extra time for inversion when using PARTIAL TIMES	EXTRA TIME	NO	No/1-5 sec.
Pause time before automatic closing (only STANDAR/ALTERNATING STOP)	AUTO CLOSE	60 sec.	1-360 sec.
Pause time before automatic closing after a pedestrian opening (only STANDAR / ALTERNATING STOP)	PED. AUTO CL.	20 sec.	1-240 sec.
Delay to close after light barrier	CLOSE ON BEAM.	NO	No/2-240sec
Guard time between the deactivation of a contactor and the activation of the other one when inverting.	DIR.CH.TIME	300 ms	100-5000ms
Time used for securities that are configured as a short invert.	SHORT INV. T.	2 sec.	1-240sec
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.
Push current sensibility	M1 SENSIB.	7 sec.	No/1-10 sec.
Push current limit	M1 PRES.LIM.	3A	0-10A
Overcurrent limit	M1 OC.LIM.	3A	0-25A

CURRENT READING AND PROTECTIONS

The BXL-TF1D controller has an advanced current sensing system that allows it to meter in real time one of the motor´s phases. The current reading is used to implement two configurable protections.

Overcurrent protection
The overcurrent protection works in a similar way to a circuit breaker: When the phase power consumption rises above the configured limit the motor and maneuver stop.

Impact protection
The impact protection is configured with an impact detection sensibility level and a current limit. When an impact occurs the sensibility level activates the security depending on how abrupt the current rising is. Regardless of the abruptness when the configured limit is met the security activates.
This security behaves like the safety edge of the current direction but **DOESN´T GUARANTEE** compliance with regulations regarding dynamic force.

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. This counter can only be set to 0 using the “default values” option.

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.

OPEN
Forces opening while Enter is held. Use to test the motor direction.

CLOSE
Forces closing while Enter is held. Use to test the motor direction.

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

From time to time 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.

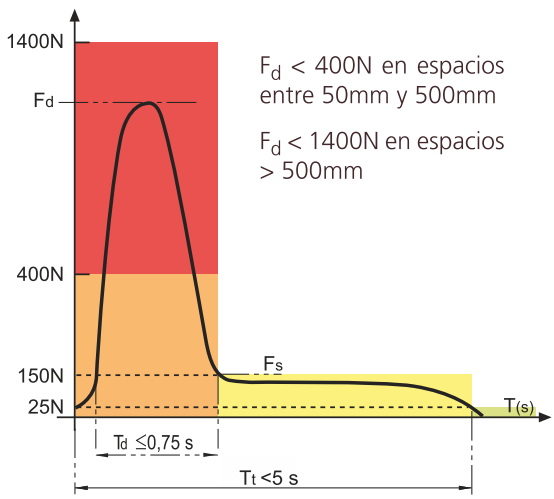
If these requirements are not met additional securities must be installed.

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.

NOTES

Rev.0816

TECHNICAL CHARACTERISTICS

Power suply	230VAC / 400VAC + Neutral
Maximun charge	3CV at 400V (Three-phase)
Main fuse	6/8A
Power output	15VDC / 3.5VA (300mA)
Power output protection	Resettable fuse
Maneuver control inputs	5 high insulation optocouled 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	1900g
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 TF1D 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

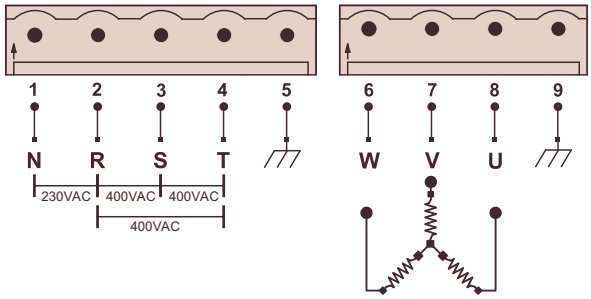
Directive 2012/19/EU - WEEE

2016.02.22 Zamudio

José Miguel Blanco Pérez
Chief Technical Officer

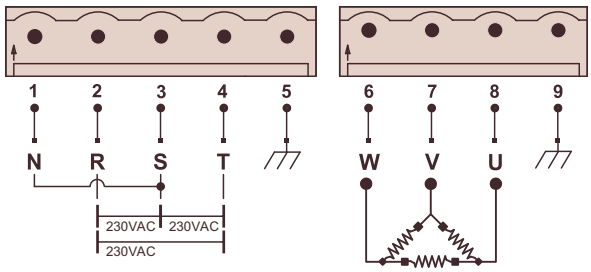
WIRING

400V Three-phase connection



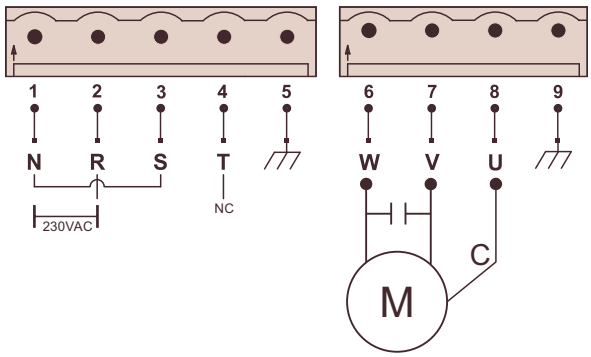
Three-phase supply
400VAC + Neutral
Three-phase Motor
400VAC on Star mode

230V Three-phase connection



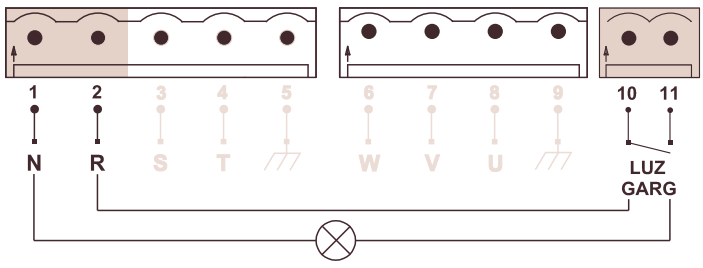
Three-phase supply
230VAC WITHOUT neutral
Three-phase Motor
230VAC on Triangle mode

230V Single-phase connection



Single-phase supply
230VAC
Single-phase motor
230VAC with capacitor

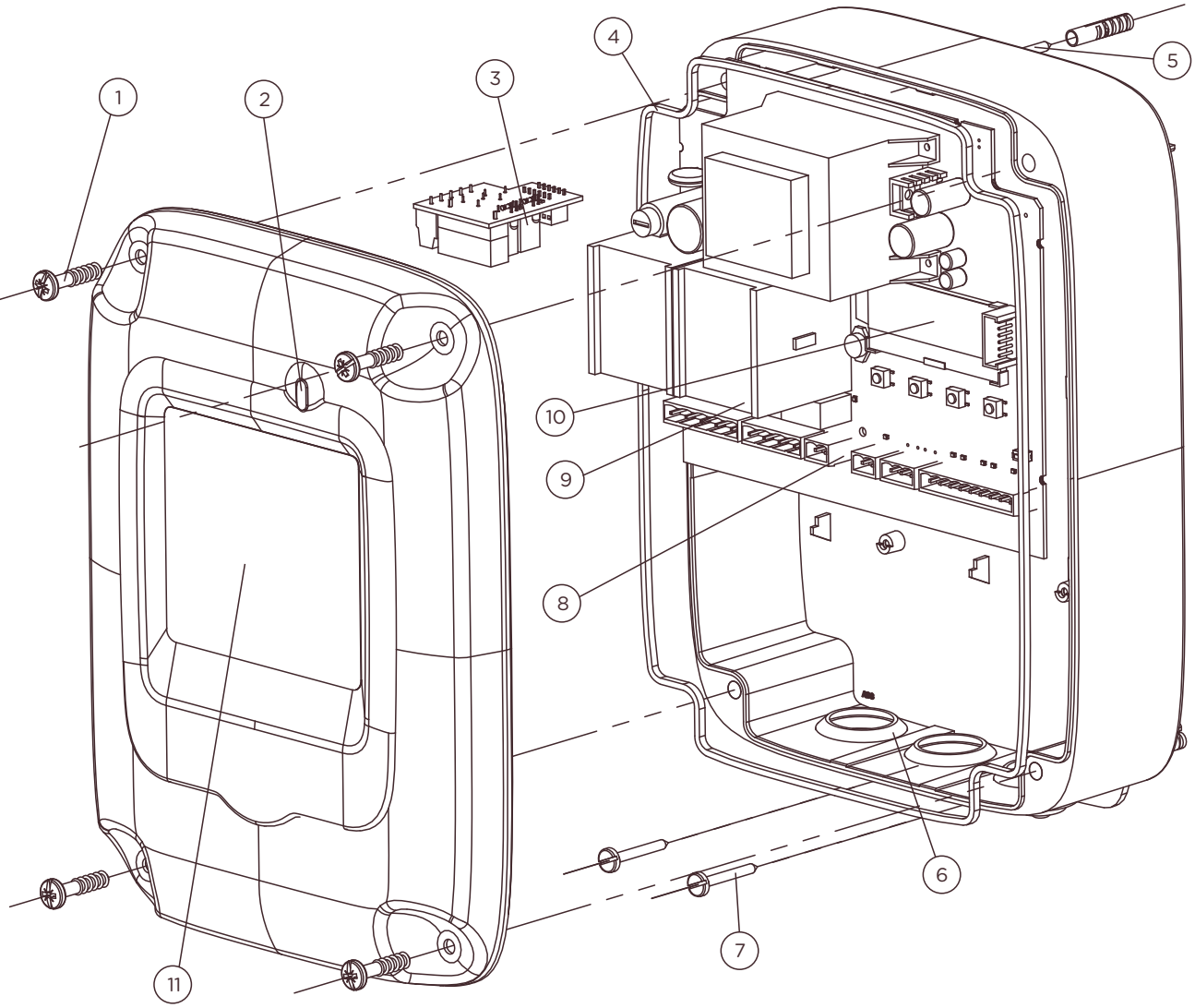
Lamp connection with timing or flash



Lamp
230VAC
40W máx.

TF1D 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. Fixing screws
8. Plug-in terminal blocks
9. Power relays
10. Display
11. Frontal space for installer/revision sticker

SMiNN

innovative in electronics