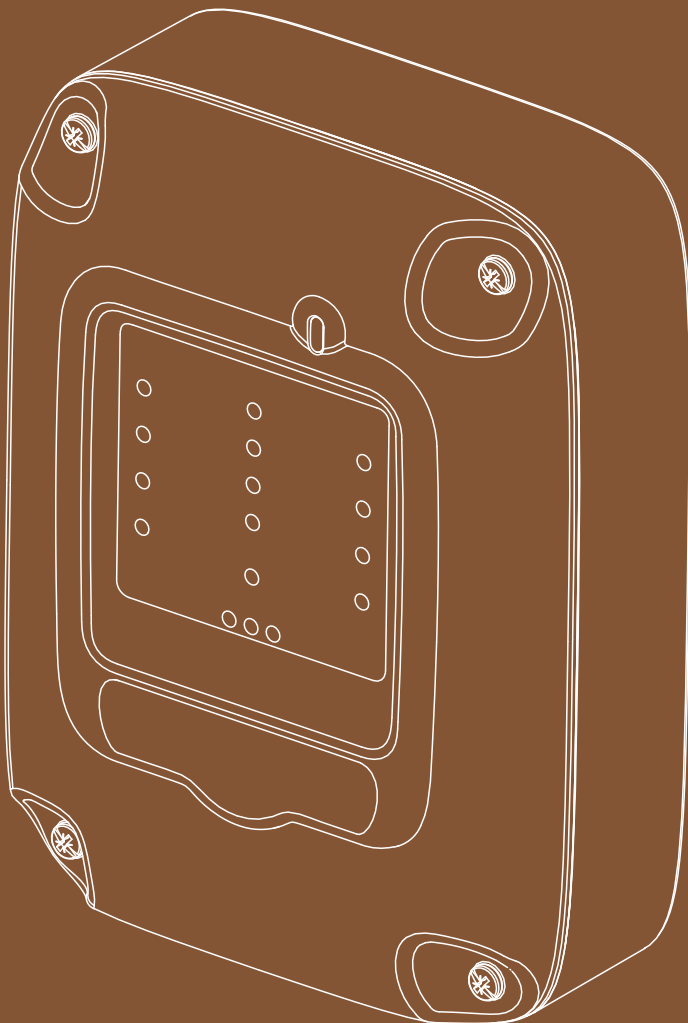


# BOX L CB2D

## UNIVERSAL PUMP CONTROLLER

For 2 three-phase 230 / 400 VAC motors

### INSTRUCTIONS MANUAL

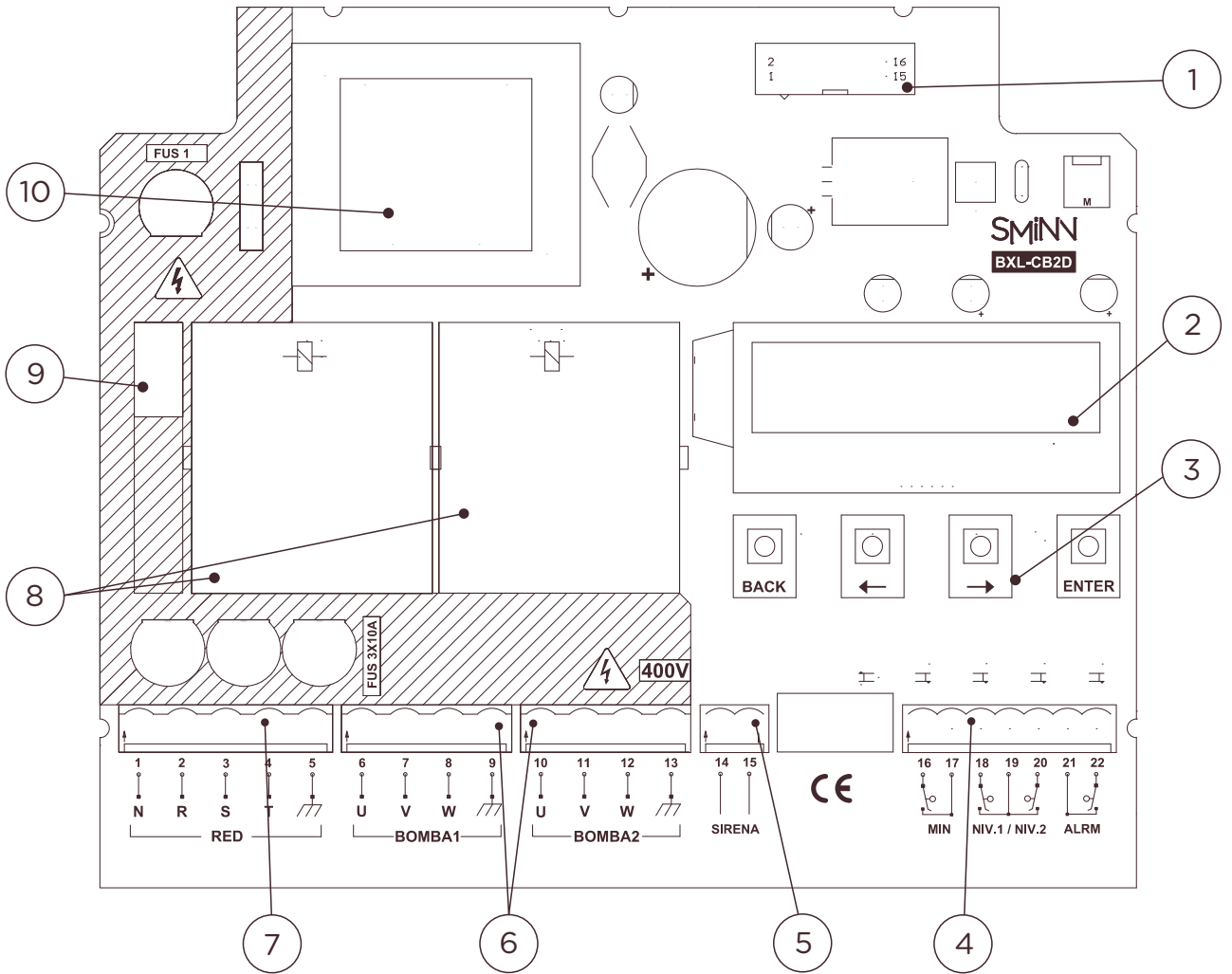


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# COMPONENTS SITUATION

Fig.1











- 1. Frontal display connector
- 2. LCD Display
- 3. Configuration Keyboard
- 4. Input terminal strip
- 5. External alarm contact

- 6. Motors terminal strips
- 7. Power terminal strips
- 8. Contactors
- 9. Phase detection card
- 10. Transformer

# INDEX

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## Simbols

	.....400V Three-phase motor Star topology
	.....230V Three-phase motor Delta topology
	.....Single-phase motor
	.....Capacitor
	.....Normally closed contact
	.....Normally open contact
	.....Earth
	..... High Voltage area

## DESCRIPTION

The **BXL-CB2D** universal pump controller is designed to control two 230/400VAC three-phase pumps using four buoys for water level detection.

Among other features, the pump controller provides:

- Control of two 230/400 VAC three-phase motors (8A max. see table)
- Low voltage control of motor activation contactors.
- Separate built-in protection for each motor via current sensors.
- Water level sensors control.
- External cover shows current water levels, pumps status and allows manual activation and rearming of pumps.
- Power phase presence detection.
- Status leds for all inputs and outputs.
- Programmable alarm output through dry contact.
- Highly isolated optocoupled inputs.
- Easy to use menu based on 4 keys and an LCD screen that eases configuration and maintenance.
- Optional configuration protection with password.
- Storage of working times for each pump.

## 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.

VOLTAGE	KW MAX	CV MAX
230V	1,5 KW	2 CV
400V	3,5 KW	5 CV

---

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](http://WWW.SMINN.COM)

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## 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.

---

SMINN 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.

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

ESPAÑOL

ENGLISH

FRANÇAIS

ITALIANO

PORTUGÊS

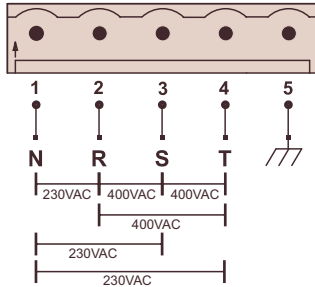
DEUTSCH

NEDERLANDS

# CONNECTIONS

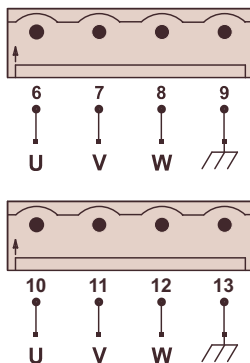
**WARNING:** make sure the phases in the power input terminal strip matches the figure below to avoid damaging the electronics.

There should be **400VAC between R, S and T** and 230VAC between NEUTRAL and any of R, S or T.



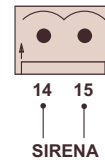
The controller is powered with 230VAC 50Hz through NEUTRAL (terminal 1) and R phase (terminal 2).

The other 400VAC phases must be connected to their respective terminals. EARTH connection is done through terminal 5, marked with the EARTH sign.



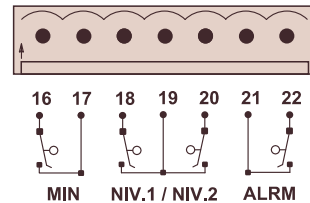
The controller can manage two three-phase AC motors connected to the 6, 7, 8 and 10, 11, 12 terminals.

**NOTE:** remember to connect each motor EARTH to the corresponding terminal.



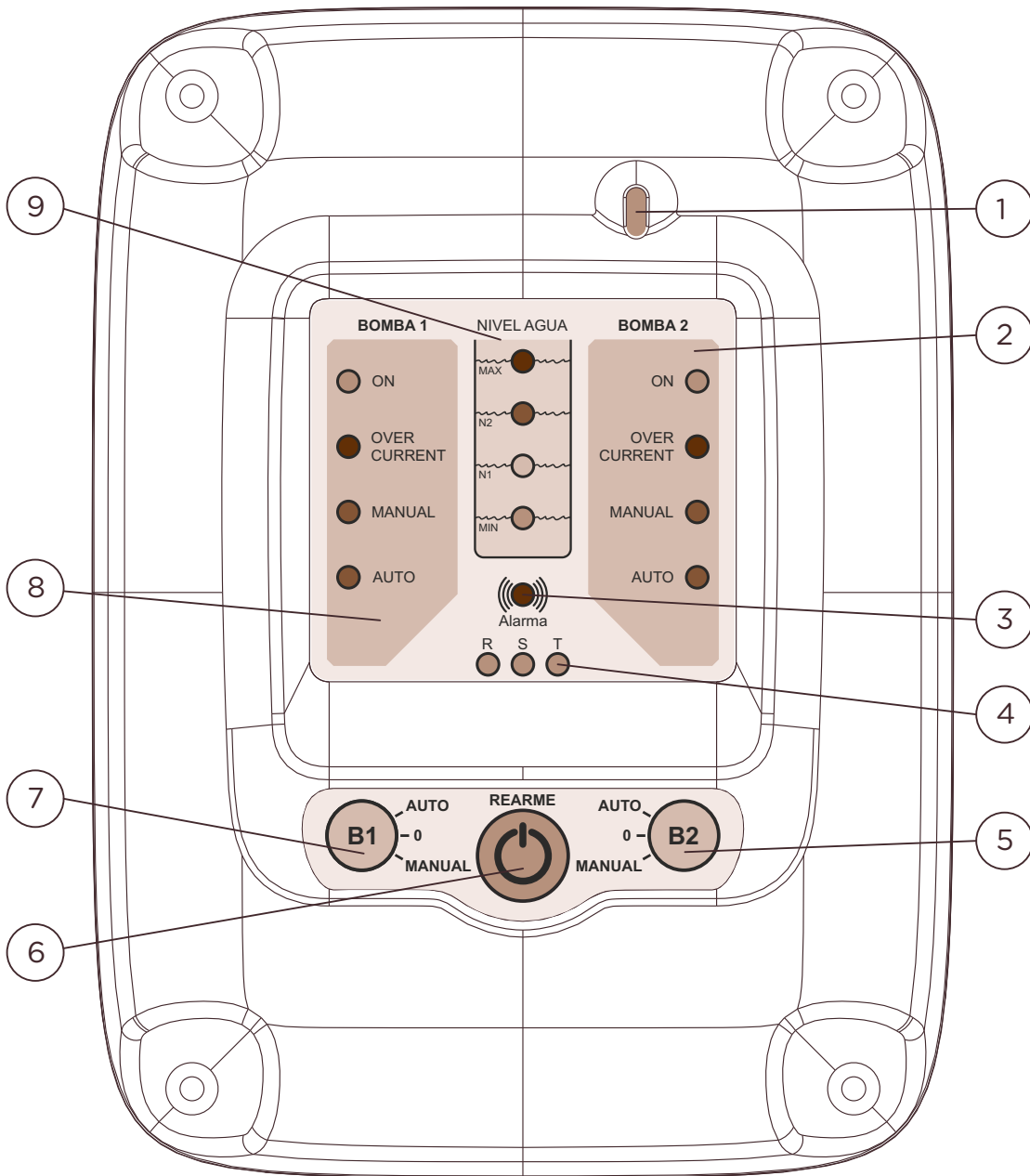
Terminals 14 and 15 act as a dry contact that supports 5A max.

This contact can be used to power a flashing lamp, a siren or a telecommunications device like SMINN GSM devices.



Water level sensors are connected to terminals 16 to 22. The controller assumes the sensors to be normally open contacts but it is possible to modify their type in the setup menu.

# DISPLAY



- 1. Power On led
- 2. Pump 2 status
- 3. Alarm buzzer
- 4. Phase status indicators
- 5. Pump 2 manual control

- 6. Rearm
- 7. Pump 1 manual control
- 8. Pump 1 status
- 9. Water level leds

**Note:** The rearm and manual control buttons only work when held pushed a few seconds to avoid accidental activation.

# 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.

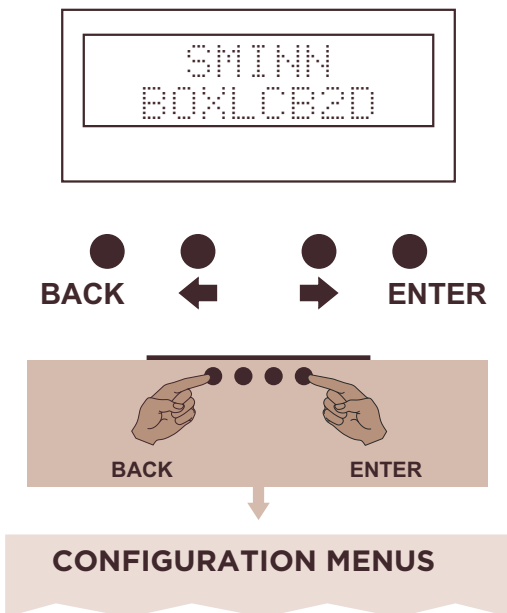
Press the BACK and ENTER keys simultaneously to access the configuration menu. The LCD backlight will power on.

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.



## CONFIGURATION MENUS

### OPTIONS

- PUMP 1 MODE
- PUMP 2 MODE
- MIN SENSOR MODE
- NIV1 SENSOR MODE
- NIV2 SENSOR MODE
- ALRM SENSOR MODE
- SIREN MODE
- B1 KEY LOCK
- B2 KEY LOCK
- REARM KEY LOCK
- R PHASE CHECK
- S PHASE CHECK
- T PHASE CHECK

### ADJUSTMENTS

- LEVEL ALARM TIME
- LEVEL BLOCK TIME
- SEQUENCE FAIL TIME
- SECURITY TIME
- SIREN TIME
- ALARM INTERVAL TIME
- OVERCURRENT LIMIT P1
- OVERCURRENT LIMIT P2
- UNDERCURRENT LIMIT P1
- UNDERCURRENT LIMIT P2

### MAINTENANCE

- VERSION
- P1 PARTIAL COUNTER
- P1 TOTAL COUNTER
- P2 PARTIAL COUNTER
- P2 TOTAL COUNTER
- CURRENTS
- INPUTS STATUS
- ACT. PUMP 1
- ACT. PUMP 2
- ACT. SIREN
- DEFAULT VALUES
- ENABLE PASSWORD
- CHANGE PASSWORD



# OPERATION

## NORMAL OPERATION

When all water level inputs are inactive both pumps are deactivated.

When the water level rises above the NIV1 sensor one of the pumps activates. The controller automatically alternates which pump to activate.

When the water level rises above the NIV2 sensor or the water level stays between NIV1 and NIV2 for the time set as security time, the second pump activates and both work together.

When the water level falls below MIN level, any active pump will be deactivated.

The ALARM water level does not impact the normal operation of the controller; it just activates the alarm state.

Optionally the pumps can be deactivated before reaching the MIN level via two different configurable protections:

### - Level lock protection:

if the water level stays stable for the configured time, the pumps will deactivate just in case there is a failure with the sensors.

### - Invalid Sequence lock:

if the sequence of states of sensors is wrong for the configured time, the pumps will deactivate just in case there is a failure with the sensors.

## ALARM STATE

The controller switches to alarm state if any of the following conditions is met:

- Any pump is disabled because of three overcurrent or undercurrent events in a short time.
- Water level reaches the alarm level.
- An invalid sequence is detected in the water level sensors.

- If any of the power phases is missing (can be disabled).
- If pumps are locked because of an invalid sequence.
- If pumps are locked because of the level lock protection.

The alarm output can be configured with the following modes:

- One activation pulse upon entering the alarm state. The output will not activate again until the controller leaves the alarm state and a new alarm is produced.
- Output is latched while the controller is in alarm state.
- Intermitent output while the controller is in alarm state.

All alarm sources are registered by the controller and are shown upon entering the menu.

## WATER LEVEL SENSORS

Normally the water level sensors should activate and deactivate in sequence but there may be situations where one or more sensors fail and the controller sees an invalid sequence in its inputs.

As a general rule, the highest active level input has priority over the rest. In the cases in which only one incorrect sensor is active the controller assumes that sensor is damaged as it is easier that one sensor fails over three sensors.

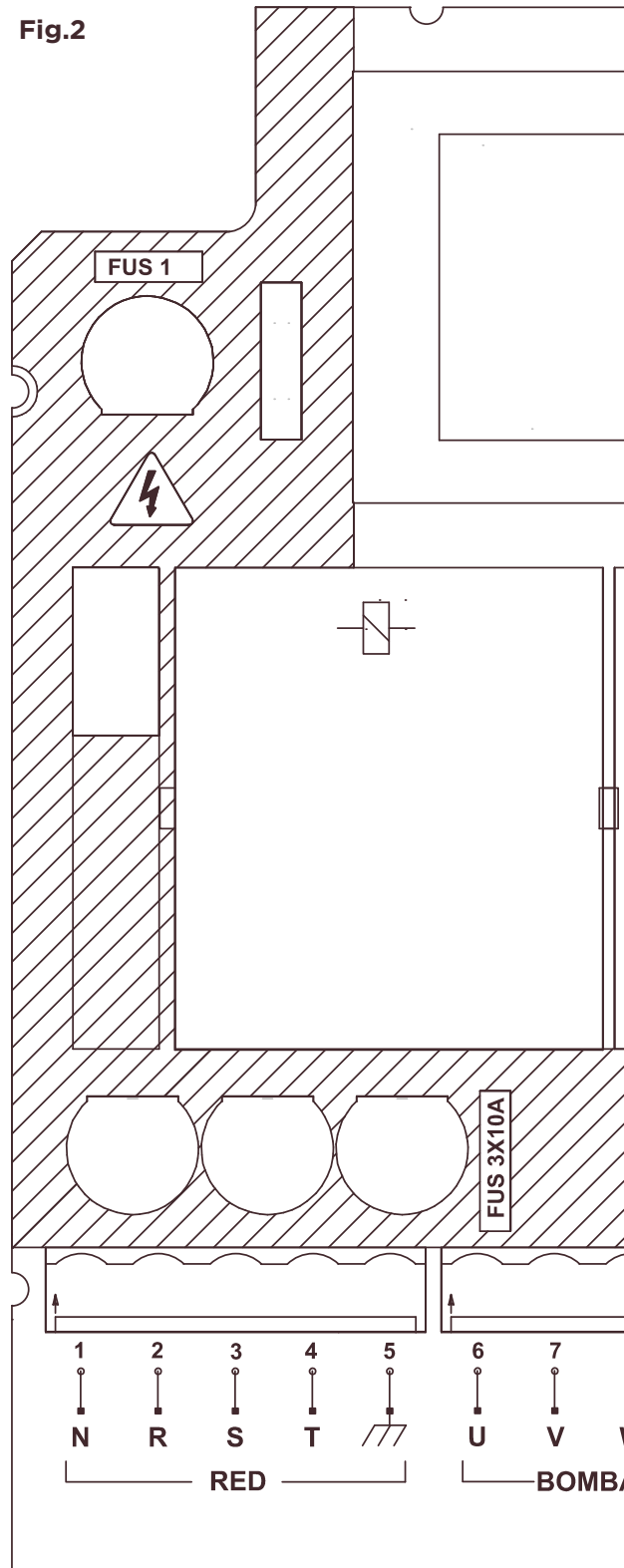
The following table shows the water level the controller assumes in exceptional cases:

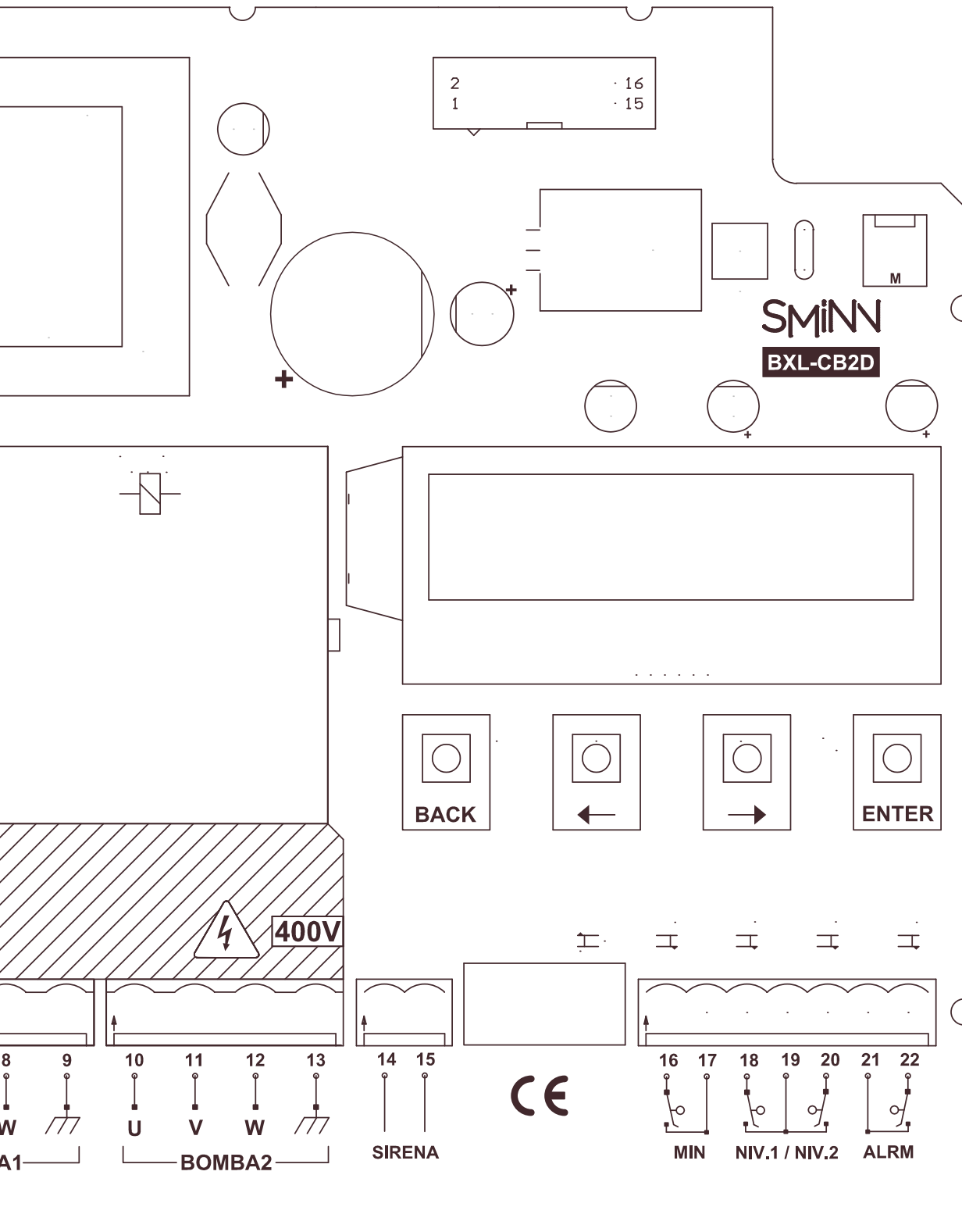
ALRM	NO	NO	YES	YES
NIV2	NO	YES	NO	NO
NIV1	YES	NO	NO	NO
MIN	NO	NO	NO	YES
LEVEL	< MIN	< MIN	< MIN	> MIN

# ELECTRICAL CONNECTIONS

1	Power Neutral 230VAC	RED
2	R Phase 400VAC	
3	S Phase 400VAC	
4	T Phase 400VAC	
5	Earth	
6	Motor U Phase	BOMBA 1
7	Motor V Phase	
8	Motor W Phase	
9	Motor Earth	
10	Motor U Phase	BOMBA 2
11	Motor V Phase	
12	Motor W Phase	
13	Motor Earth	
14	Dry relay contacts for external alarm device (flashing lamp, siren, GSM device...)	
15		
16	Minimum water level contact	
17	Minimum water level common	
18	Niv 1 water level contact	
19	Water level common	
20	Niv 2 water level contact	
21	Alarm water level common	
22	Alarm water level contact	

Fig.2





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DEUTSCH

NEDERLANDS

# CURRENTS AND PROTECTION

## ERROR MESSAGES

When any error occurs, the controller stores the error for the next time the configuration menu is entered. If there are errors to display the character 'E' will be displayed in the 4 corners of the screen. When entering the configuration menu the controller will display one by one the stored errors.

The possible errors are:

### OC PUMP 1 / 2

Overcurrent was detected operating the pump.

### UC PUMP 1 / 2

Undercurrent was detected operating the pump.

### ERROR PHASE R / S / T

The indicated power phase is disconnected or missing.

### ALARM LEVEL REACHED

The water level has reached the alarm level.

### ERROR SENSOR MIN

An incorrect sensor sequence was detected and it is possible the MIN sensor is damaged.

### ERROR SENSOR N1

An incorrect sensor sequence was detected and it is possible the N1 sensor is damaged.

### ERROR SENSOR N2

An incorrect sensor sequence was detected and it is possible the N2 sensor is damaged.

### ERROR SENSOR ALRM

An incorrect sensor sequence was detected and it is possible the ALRM sensor is damaged.

## CURRENT READINGS

The BXL-CB2D controller has an advanced current sensor that monitors the real-time current in one of the phases of each pump. The readings are used to implement two configurable securities.

### Current protections

The overcurrent protection acts like a magnetothermic protection: when the current is higher than configured the pump is stopped.

The controller will try to reactivate the pump after 15 seconds up to two times, completely disabling the pump if overcurrent still happens.

To reenable disabled pumps the rearm button must be used.

Alternatively, powering off and on the controller will also rearm the pumps.

The Overcurrent led in the cover will turn on if an overcurrent event happened recently and will slowly blink if the pump is disabled because of continued overcurrent.

The undercurrent protection is similar to overcurrent but it is applied when the current is lower than the configured value. A disabled pump because of undercurrent will be enabled with the rearm button and will also reactivate automatically if the water level changes.

## OPTIONS

	LCD TEXT	DEFAULT
<b>PUMP 1 / 2 MODE</b> Sets the operating mode of the pump. Available options are: Not used / Automatic / Manual	PUMP 1 MODE PUMP 2 MODE	AUTO
<b>MIN / N1 / N2 / ALRM WATER SENSOR MODE</b> Sets the polarity of the water level sensor (NO/NC).	MIN MODE N1 MODE N2 MODE ALARM MODE	NO
<b>SIREN MODE</b> Sets the operating mode of the alarm output between the following modes: LATCH / PULSE / INTERMITTENCE	SIREN MODE	PULSE
<b>B1 / B2 / REARM KEY BLOCK</b> Locks the corresponding control button	B1 KEY BLOCK B2 KEY BLOCK REARM K. BLOCK	NO
<b>CHECK PHASE R / S / T</b> Enables detection of presence of the power phase.	CHECK PHASE R CHECK PHASE S CHECK PHASE T	YES

## ADJUSTMENTS

	LCD TEXT	DEFAULT	VALUES
<b>LEVEL ALARM TIME</b> Time after which the alarm state is activated if the water level remains constant. The value 0 disables this behaviour.	LEVEL ALRM. T	120 min.	0-30.000 min.
<b>LEVEL BLOCK TIME</b> Time after which the pumps are forcefully stopped if the water level remains constant The value 0 disables this behaviour.	LEVEL BLCK. T	0 min.	0-30.000 min.
<b>INVALID SEQUENCE BLOCK TIME</b> Time after which the pumps are forcefully stopped if the water level input sequence remains invalid. The value 0 disables this behaviour.	SEQ. BLOCK T	0 min.	0-30.000 min.
<b>SECURITY TIME</b> Time after which both pumps are forcefully activated if the water level remains constant.	SECUR. T	120 min.	1-30.000 min.
<b>SIREN TIME</b> Sets the pulse or intermittence time for the siren output when an alarm is produced.	SIREN T	2 sec.	1-240 sec.
<b>ALARM INTERVAL TIME</b> Minimum elapsed time after the last alarm output activation to activate it again because of an alarm state.	ALARM INTER.	60 min.	0-30.000 min.
<b>PUMP 1 / 2 OVERCURRENT LIMIT</b> Sets the overcurrent limit for the pump.	P1 OC LIM P2 OC LIM	5.5 A	0-25 A
<b>PUMP 1 / 2 UNDERCURRENT LIMIT</b> Sets the undercurrent limit for the pump.	P1 UC LIM P2 UC LIM	0.5 A	0-25 A

## MAINTENANCE

Use the maintenance menu to check the pump work times, input status, set a password, activate manually the pumps or reset to default values.

### VERSION

Firmware version number.

### PUMP 1 PARTIAL TIME COUNTER

Shows the number of minutes the pump 1 has been working since last counter reset.

Pressing ENTER in this option will allow to reset the counter.

### PUMP 1 TOTAL COUNTER

Shows the total number of minutes the pump 1 has been working. This counter can only be reset by using the "DEFAULT VALUES" option.

### PUMP 2 PARTIAL TIME COUNTER

Shows the number of minutes the pump 2 has been working since last counter reset.

Pressing ENTER in this option will allow to reset the counter.

### PUMP 2 TOTAL COUNTER

Shows the total number of minutes the pump 2 has been working. This counter can only be reset by using the "DEFAULT VALUES" option.

### CURRENTS

Displays the current drawn by each motor (actual and maximum).

### INPUT STATUS

Shows in the display the status of all active inputs.

### ACTIVATE PUMP 1

Forces activation of pump 1 while the ENTER key is held pressed. Use to test the pump.

### ACTIVATE PUMP 2

Forces activation of pump 2 while the ENTER key is held pressed. Use to test the pump.

### SIREN

Forces the activation of the alarm output while the ENTER key is held pressed.

### DEFAULT VALUES

Sets the configuration to factory state.

### ENABLE PASSWORD

Enables the use of a 4 digit password to access the configuration menu. The default password is 1234.

### CHANGE PASSWORD

Allows to change the 4 digit password.

---

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

---

## 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.

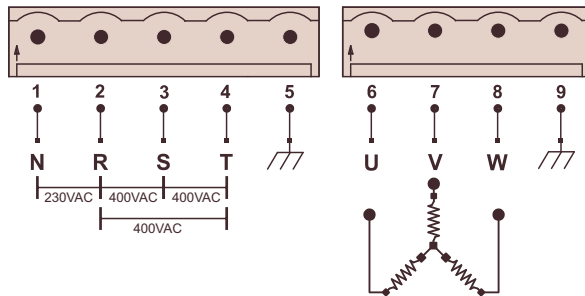


# TECHNICAL CHARACTERISTICS

Power supply	230VAC / 400VAC + Neutral
Maximum load	8A
Main fuses	10A
Water level sensor inputs	4 optocoupled with high isolation
Operation temperature	-20°C / 70°C
Case	ABS
Dimensions	L280 x W196 x H90 mm
Weight	1900g
Ingress protection	IP54 (IP65 witch cable glands)

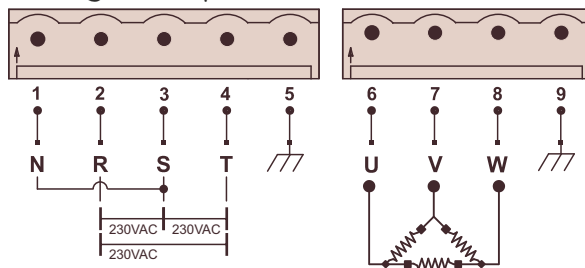
## WIRING DIAGRAMS

Wiring three-phase 400V



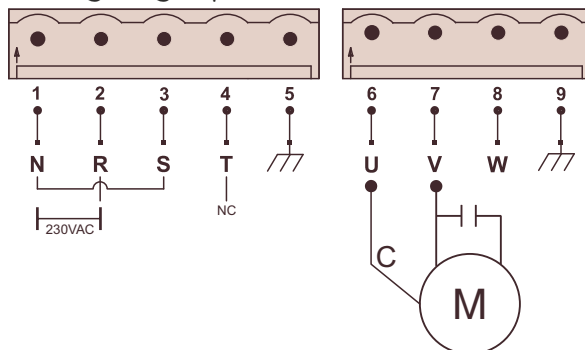
Three-phase 400VAC + Neutral  
Three-phase motor  
400VAC in star topology

Wiring three-phase 230V



Three-phase  
230VAC without Neutral  
Three-phase motor  
230VAC in delta topology

Wiring single-phase 230V

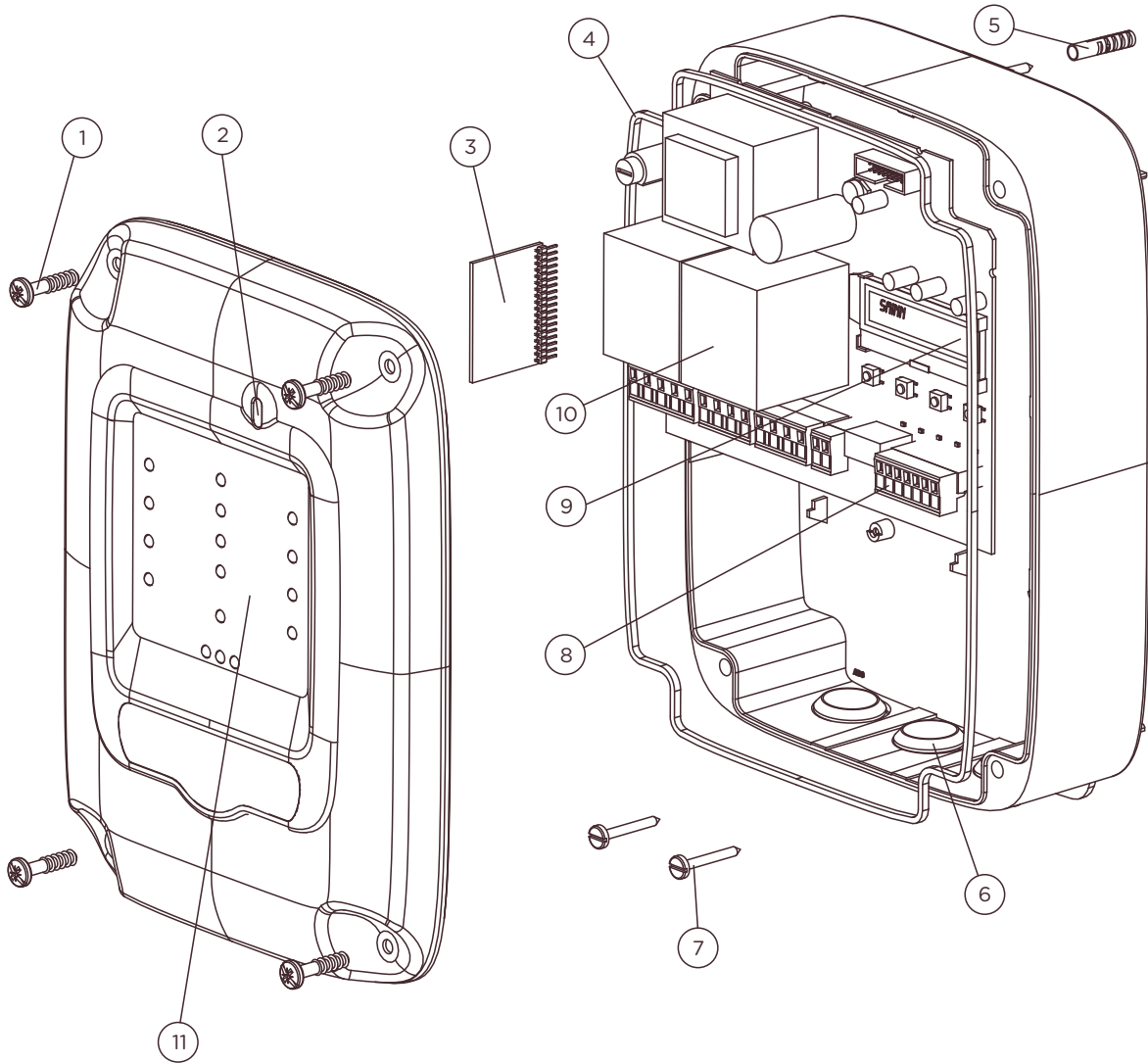


Single-phase 230VAC  
Single-phase motor 230VAC



# BXL-CB2D EXPLOSION

Fig3



- 1. Captive screws
- 2. Power status LED
- 3. Phase detector card
- 4. Vacuum rubber gasket
- 5. External fixing with just three screws
- 6. Access ports for 16/24mm tubes

- 7. Wall screws
- 8. Plug-in terminal blocks
- 9. Display
- 10. Contactors
- 11. Cover with status leds

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