

SMART CONTROL BOX DUO (SCBD & SCBD3)



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QUICK SET-UP GUIDE FOR SMART CONTROL BOX DUAL (SCBD & SCBD3)

1. Introduction

Observe the safety rules in this document. Safety measures are listed in this section.

1.1 About this document

The instructions and information in this manual form an integral part of the equipment and describe its safe and intended use while providing detailed information on the setup and configuration of the equipment. Please refer to the complete Owner's Manual for further information.



Read the manual carefully before installing and using the described equipment.



Keep this manual in the immediate vicinity of the installation with easy access.
A digital copy of this manual can be downloaded from the manufacturer's website franklinwater.eu.



Hand this manual to any subsequent owner or installer.

1.2 Warning notices and symbols

Warning notices and symbols	Meaning
	Direct/Immediate danger to life and/or health
	Possible danger to life and/or health.
	Important information. You should observe this information to ensure correct and safe operation. Possible danger of physical harm and/ or material damage may otherwise result.

1.3 Product overview

The Franklin Electric Smart Control Box (SCBD & SCBD3) is a user-friendly, simple and reliable pump control and protection device, which can be used in various pumping applications. Primarily designed to protect and control deep well submersible pumps, but also centrifugal, in-line, circulation and multistage pumps.

The SCB and SCB3 can be added to existing pumping applications replacing traditional 1ph 230V and 3ph 400V motor control boxes to increase the level of protection, provide extended functionality and control capabilities.

- Protects motor and pump from overload and dry-run
- Extends operation and system's lifetime with automated pump calibration
- Increases reliability
- Provide an indication of the motor current consumption and supply voltage
- Records operating hours and system errors

2. Safety

Observe the safety rules in this document. Safety measures are listed in this section.

2.1 Intended use

- The equipment described in this manual is intended for use with Franklin Electric submersible and industrial motors used in pumping applications such as water supply, irrigation, dewatering and pressure boosting.
- Non-Franklin Electric products may be used after prior verification by the user, provided that the specifications comply to those of the device described in this manual. Functionality and performance may be limited.
- Pump and motor must be correctly sized and in accordance with the equipment specifications.
- Submersible pumps and motors must be used under water only.
- The pumping system must fulfill the applicable directives, regulations and statutory provisions.



The Installation and maintenance of the equipment must be performed by qualified personnel who have undergone and completed appropriate training. Any execution of installation or maintenance performed by unqualified personnel must be carried out under the approval, responsibility and close monitoring of qualified personnel.



Failure to follow the instructions may result in damage to the equipment, the system in which it is installed and to property or persons with even fatal consequences.



Failure to comply with the instructions in this manual may lead to loss of warranty.



Keep out of the reach of children.

2.2 General safety instructions

The following safety instructions must be observed prior to putting the control gear into use:

- Mount the control box in an appropriate location, orientation and position.
- Do not modify the control equipment or its electrical or mechanical connections.
- Do not remove any part or parts of the control equipment.
- Never install any control equipment with a known defective motor.
- • Remove power before working on control equipment. Switching off the power is not sufficient.
- Make sure that nobody can switch on the power unexpectedly while work is being carried out.
- Never work on electrical systems during a thunderstorm.
- Commissioning or testing can only be performed by qualified professional staff (qualified electrical technician).
- Replace all protection and safety devices after completing work.
- Ensure that all electrical connections and safety devices have been checked and that all fuses and safety devices have been set correctly before switching on.
- Make sure that no danger zones are accessible (e.g. electrical connections).
- Read the pump manufacturer's commissioning instructions before switching on any control gear.

Repairs must only be carried out by authorized professional workshops. Use only original Franklin Electric spare parts.

2.3 Certification

The device described in this manual has the following certification: **CE**

3. Overview

3.1 Applications

The SMART CONTROL BOX (SCBD & SCBD3) is suitable for the following applications:

- Water transfer between storage tanks using liquid probes or float switches
- Water transfer using a 4–20 mA level transmitter for continuous level monitoring
- Pressure boosting systems with pressure switch and pressure tank
- Pressure boosting using a 4–20 mA pressure transmitter
- Sewage and wastewater lifting via liquid probes or float switches
- Sewage lifting using a 4–20 mA level transmitter
- Drainage pump control with piggyback float switch

3.2 Features

- Selectable application preset by DIP switch setting
- Dual pump control
 - Automatic alternation of main and standby pump
 - Automatic pump transfer in case of fault
 - Parallel dual pump operation
- Auto / Manual switch
- Protection features can be adjusted independently
- RS485 communication port
- 24 VDC audible & visual alarm with alarm test button
- Two potential free relay contacts
- Pump failure recording (Last 5 failures)
- Pump accumulative running time
- Dual pump operation can be enabled or disabled manually
- Adjustable pump start and stop delay time
- Keypad lock / unlock
- Long signal transmission distance (1500meters max)

3.3 Protection Functions

- Dry run protection with sensor free
- Pump stalled protection
- Overload protection
- Over voltage protection
- Under voltage protection
- Pump repeat start protection
- Pump shaft anti-lock protection
- Open phase protection for input & output power (SCBD3 only)
- Phase reversal protection for input power (SCBD3 only)
- Phase unbalance protection for input power (SCBD3 only)
- Over temperature protection (it requires pump with built in temperature sensor or PTC sensor)
- Pump leakage protection (it requires pump with built in leakage sensor)

3.4 Technical parameters:

Main technical characteristic	
Control characteristic	Dual pump control
	Pressure control
Control modes	Manual / Auto
Liquid level control characteristic	Level probe, float switch, 4-20mA level transmitter
Pressure control characteristic	Pressure switch (N/C), 4-20mA pressure transmitter
Main technical data	
Rated input voltage	Refer to the nameplate
Rated output power	Refer to the nameplate
Trip response time of overload	5sec - 5min (inverse time characteristic)
Trip response time of open phase	<2sec
Trip response time of pump stalled	<0.1sec
Trip response time of under voltage	<5sec
Trip response time of over voltage	<5sec
Trip response time of dry run	6sec (default)
Recovery time of overload	5min
Recovery time of under voltage	2min
Recovery time of over voltage	2min
Recovery time of dry run	30min (default)
Trip voltage of under voltage	80% of rated input voltage
Trip voltage of over voltage	115% of rated input voltage
Signal transmission distance	1500m max.
RS485 technical data	
Physics interface	RS485 modbus interface
Baud rate	1200bps/2400bps/4800bps/9600bps(default)
Protocol type	MODBUS protocol (RTU)
Main installation data	
Working temperature	-25°C - 55°C
Working humidity	20% - 90%RH
Degree of protection	IP65
Mounting type	Wall mounting
Controller dimensions (L x W x H)	342 x 253 x 130mm
Controller weight	3.3kg (approx)

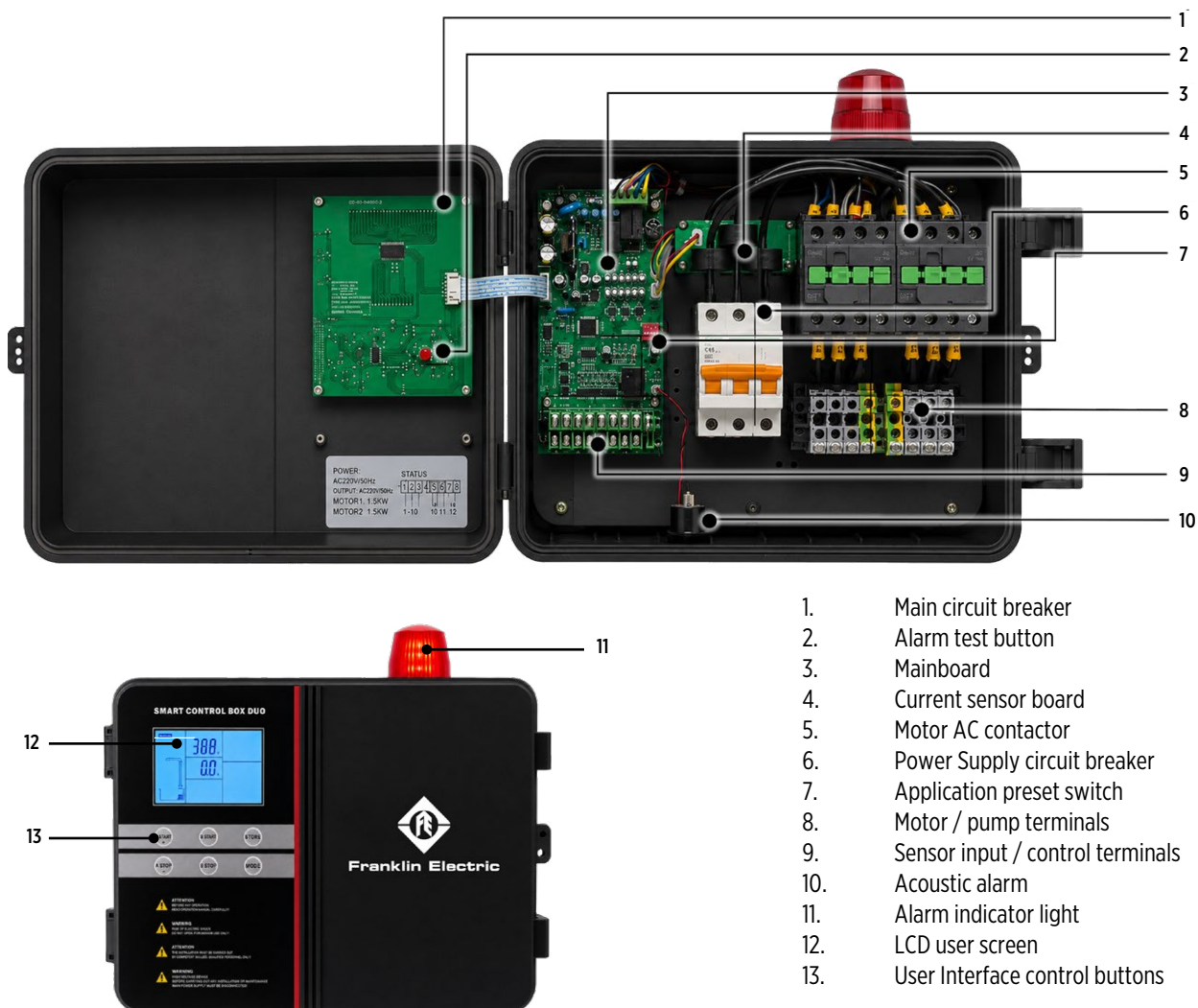
NOTE: controller weight will vary with different model and configuration

3.5 Models:

1- Modell 400 V - Doppelpumpe					
Type	Models	Description FE	kW	V _{IN} [V]	I _{MAX} [A]
SCBD22	284 634 6512	SCBD22-0.37-2.2-230-1PH-2PUMP	0,37 - 2,2	230	20

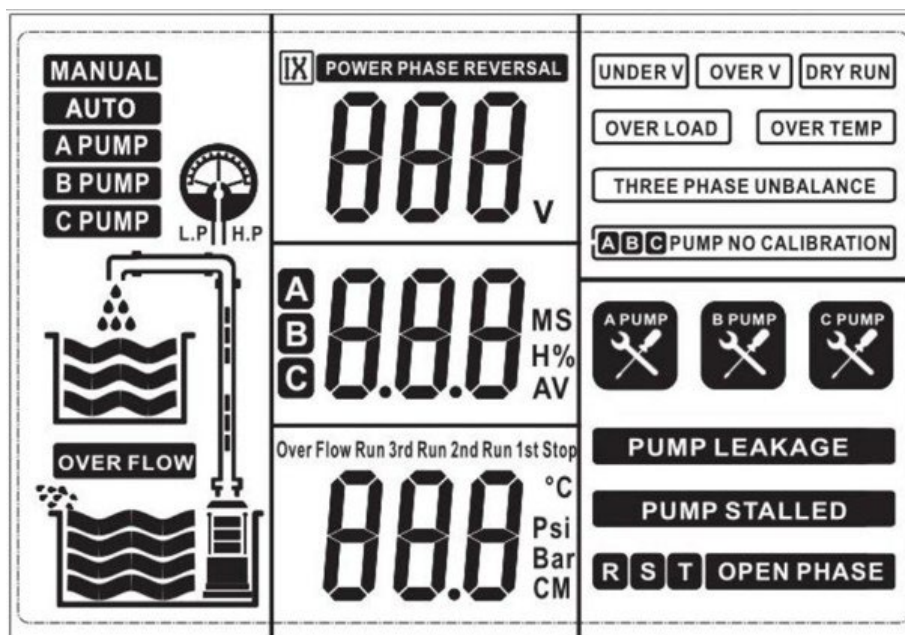
3- Modell 400 V - Doppelpumpe					
Type	Models	Description FE	kW	V _{IN} [V]	I _{MAX} [A]
SCBD340	288 520 6512	SCBD340-0.55-4.0-400-3PH-2PUMP	0,55 - 4,0	400	12
SCB375	288 521 6512	SCBD375-5.5-7.5-400-3PH-2PUMP	5,5 - 7,5	400	18
SCBD311	288 522 6512	SCBD311-11-400-3PH-2PUMP	11	400	25
SCBD315	288 523 6512	SCBD315-15-400-3PH-2PUMP	15	400	35

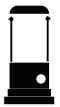
3.6 Component Overview:



NOTE: Component layout will vary with different model and configuration

3.7 Display Icon Reference:

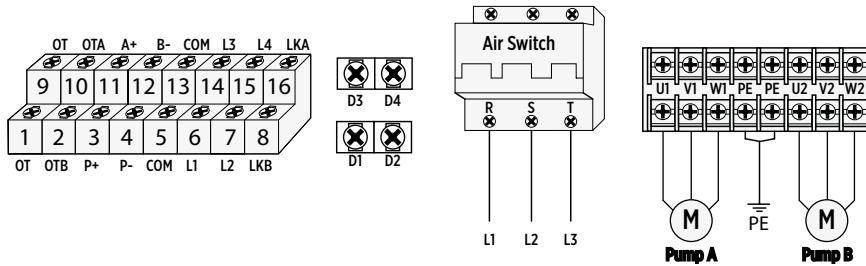


Main technical characteristic	
L.P	Low pressure or lack of pressure. This icon is shown when the pressure value is low and the pump is started.
H.P	High pressure. This icon is shown when the pressure value is high and the pump is stopped.
M	Minutes
S	Seconds
H	Hours
%	Percent
A	Motor current [A]
V	Motor voltage [V]
	Pump operating
	Pump stopped
	This icon indicates that the corresponding pump has stopped due to a fault
	Pump A / Pump B
Run 2nd Run 1st	1st = Pump A 2nd = Pump B The two icons indicate that the start value for the pressure or level transmitter is being configured for the corresponding pump
Over Flow	Indicates that the overflow or overpressure value of the level or pressure transmitter is being set
Stop	This icon will be illuminated when setting the stop value of the pressure or level transmitter

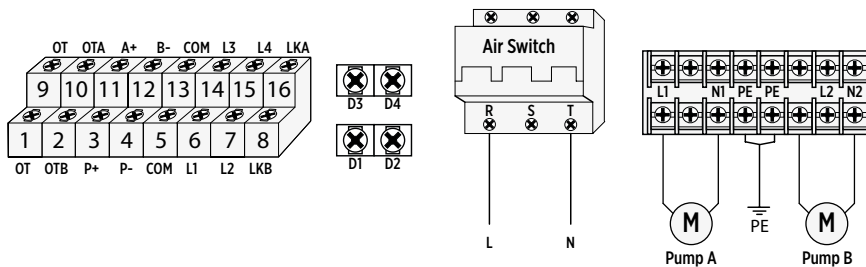
4. Installation

4.1 Power supply and motor wiring diagram

4.1.1 Three phase input power supply & output power wiring (model SCBD3)



4.1.2 Single phase input power supply & output power wiring (model SCBD)



WARNING:

- Danger electric shock risk!
- Before performing any installation or maintenance work, disconnect the controller from the main power supply and wait at least 2 minutes before opening the enclosure!
- Never connect AC main power supply to output U1/V1/W1 or U2/V2/W2 terminals!
- Never connect AC main power supply to output L1/N1 or L2/N2 terminals!



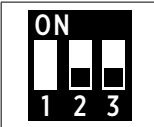
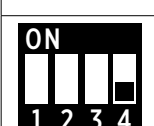
CAUTION:

- Ensure that the motor, pump, control box, and power supply specifications are compatible!

NOTE: The electrical connections must be carried out by authorized and qualified personnel!

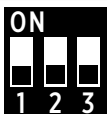
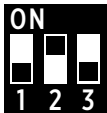
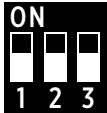
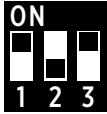
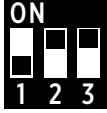
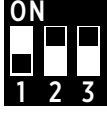
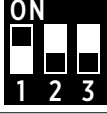
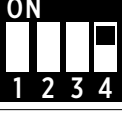
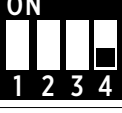
4.2 Function switch (DIP switch) setting

The user can adjust the DIP switch setting to adapt the pump to various application requirements

	Switches 1 to 3 are used to configure the control box for different application requirements
	Switch 4 is used to enable / disable over-temperature protection by external sensor input.

NOTE:

- Disconnect the control box from the main power supply before adjusting the DIP switches.
- After completing the settings, apply the main power supply to the controller and verify that the application icon displayed on the LCD screen corresponds to the configuration shown in the chart below.

Item	Function DIP switch position	Applications / scenarios
000		Suitable for irrigation, sewage, and drainage applications with overflow alarm via float switch (N.C.) or liquid level probe. Supports dual pump operation when additional flow is required.
010		Suitable for sewage and drainage pumps equipped with piggyback float switches.
111		Suitable for pressure boosting using a pressure switch (N.C.) and pressure tank. Supports dual pump operation when increased pressure is required.
101		Suitable for water supply applications using a float switch (N.C.) or liquid level probe. Supports dual pump operation when increased water flow is required.
011		Suitable for irrigation, sewage, and drainage applications with overflow alarm by a 4–20 mA level transducer. Supports dual pump operation when additional flow is required.
001		Suitable for pressure boosting using a 4–20 mA pressure transducer. Supports dual pump operation when increased pressure is required.
100		Suitable for water supply applications using a 4–20 mA level transducer. Supports dual pump operation when increased water flow is required.
1		Supports a PT100 temperature sensor. Required optional PT100 temperature sensor board (on request).
0		Supports connection of a PTC temperature sensor.

4.3 Parameter calibration setting & erasing

To ensure the highest level of pump protection, parameter calibration must be performed immediately after successful pump installation or after any maintenance activity.

4.3.1 Initial Automatic Parameter Calibration Procedure:

1. Press the MODE button to enter Manual mode. Verify that both pumps are stopped
2. Press the A START + button to start Pump A. Ensure that the input voltage and current match the pump nameplate and that the piping system is in normal operating condition
3. Press the STORE button. The control panel emits an acoustic signal, and the LCD screen starts a countdown
4. Pump A stops, and the control panel stores the parameters of Pump A. Parameter calibration is complete.

NOTE:

- Pump B parameter calibration is identical to Pump A calibration. Press the B START button and then the STORE button.

4.3.2 Pump Parameter Reset Procedure:

When a pump is reinstalled after maintenance or a new pump is installed, the previous calibration parameters must be cleared and a new parameter calibration must be performed.

Procedure for Erasing Pump A Calibration Parameters

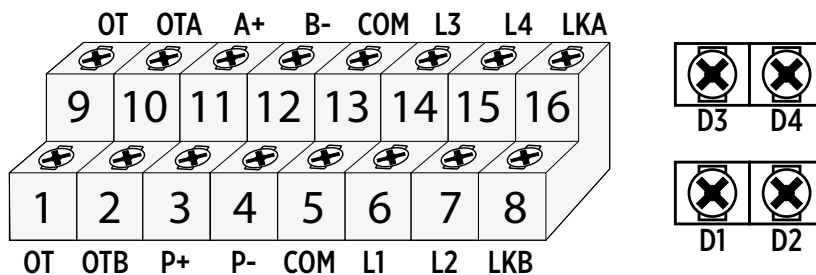
1. Press the MODE button to switch to Manual Mode. Ensure that the pumps are not in operation
2. Press and hold the A STOP button until the control box emits an acoustic signal, then release the button

NOTE:

- The procedure for erasing Pump B calibration parameters is the same as for Pump A. Press and hold the B STOP button

5. ELECTRICAL CONNECTION

5.1 Electrical terminals definition



Control terminal definition:

1. Pump over temperature protection sensor wiring terminal
2. Pump leakage protection sensor wiring terminal
3. Dry contact, potential free relay contact terminals
4. 4-20mA transducer wiring terminal
5. RS485 communication terminal
6. Digital sensor input terminal for pump control logic

Pump over temperature protection sensor wiring terminal

Terminal No	Definition
9(OT) + 10(OTA)	pump A over-temp protection sensor
1(OT) + 2(OTB)	pump B over-temp protection sensor

Pump leakage protection sensor wiring terminal

Terminal No	Definition
13(COM) + 16(LKA)	pump A leakage protection sensor
5(COM) + 8(LKB)	pump B leakage protection sensor

Dry contact, potential free relay wiring terminal

Terminal No	Definition
D1 + D2	dry contact for pump failure indication
D3 + D4	dry contact auto/manual status indication

4-20mA transducer wiring terminal

Terminal No	Definition
3(P+) + 4(P-)	4-20mA level/pressure transducer

RS485 communication terminal

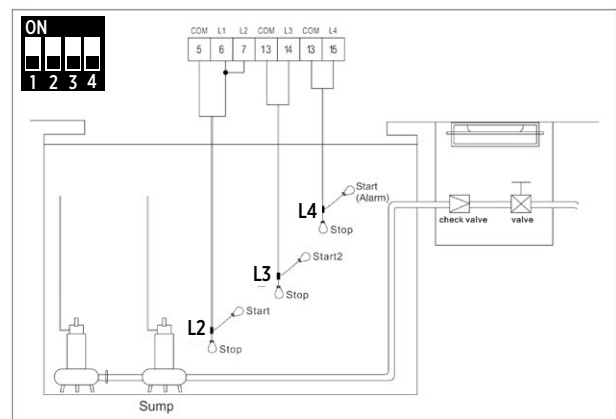
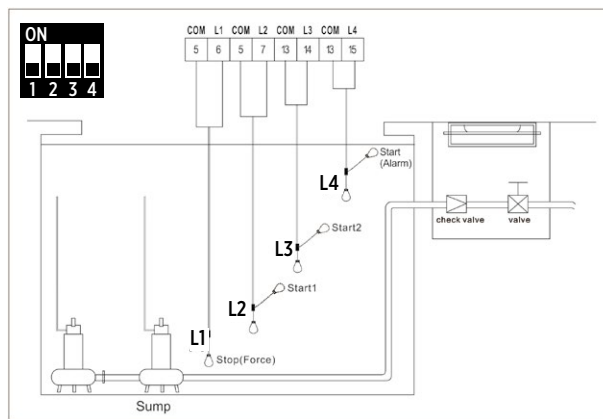
Terminal No	Definition
11(A+) + 12(B-)	Modbus RTU communication signal

Digital sensor input terminal for pump control logic

Terminal No	Definition
5(COM) / 6(L1) / 7(L2) / 13(COM) / 14(L3) / 15(L4)	sensor terminal for different pump applications/control logics

5.2 Pump control terminal wiring

5.2.1 Sewage lifting by liquid level control with level switches

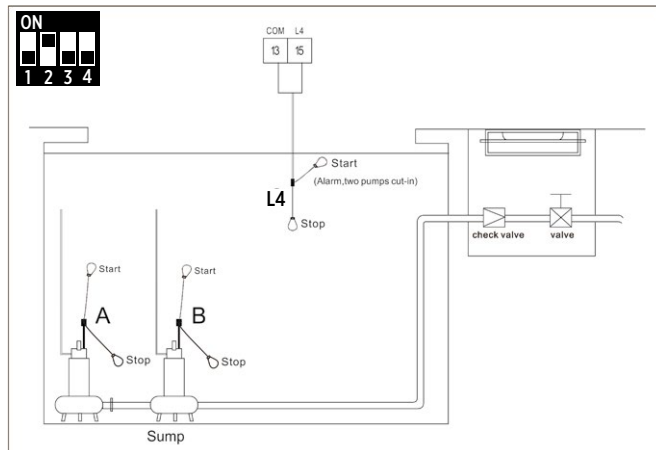


NOTE:

- Use level switches with N.C. (normally closed contacts). Circuit is closed if level switch is in high position.
- Dual pump operation with 4 level switches:** If the liquid level in the sewage tank increases to level switch L2 (high position) a single pump starts. If the liquid level continues to increase to level switch L3 (high position) the second pump starts. Both pumps are operating until liquid level decreases to level switch L1 (low position).
 - Controlled pump alternation:** If the liquid level rises to level switch L2 (high position), the control box will start a single pump. If the liquid level decreases to level switch L2 (low position) the control box will stop the operating pump. The control box automatically alternates between the two pumps as the liquid level cycles between the high and low position of level switch L2, ensuring equal wear and operating time.
 - Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.
 - Dual pump operation with 3 level switches:** If a single pump is operating and the liquid level increases to level switch L2 (high position), the control box will start a single pump. The second pump starts if the liquid level continues to increase to level switch L3 (high position). Both pumps are operating until the liquid level decreases to level switch L2 (low position).
 - Overflow in sewage tank:** When both pumps are operating and the liquid level reaches level switch L4 (high position), the control box activates the audible alarm and alarm indicator to warn of a high-level condition requiring immediate attention. The alarm is automatically reset when the liquid level drops to the lower position of level switch L4.
 - Auto patrol (Anti jam) function:** If both pumps remain inactive in Auto mode for 240 hours, the control box will automatically run each pump for 3 seconds to prevent impeller jamming and intake blockage.
 - Display Icons and Messages**

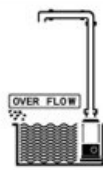
Messages & Graphic	Description
	Lack of water in sump
	Overflow in sump

5.2.2 Sewage lifting by level control with pump float switches

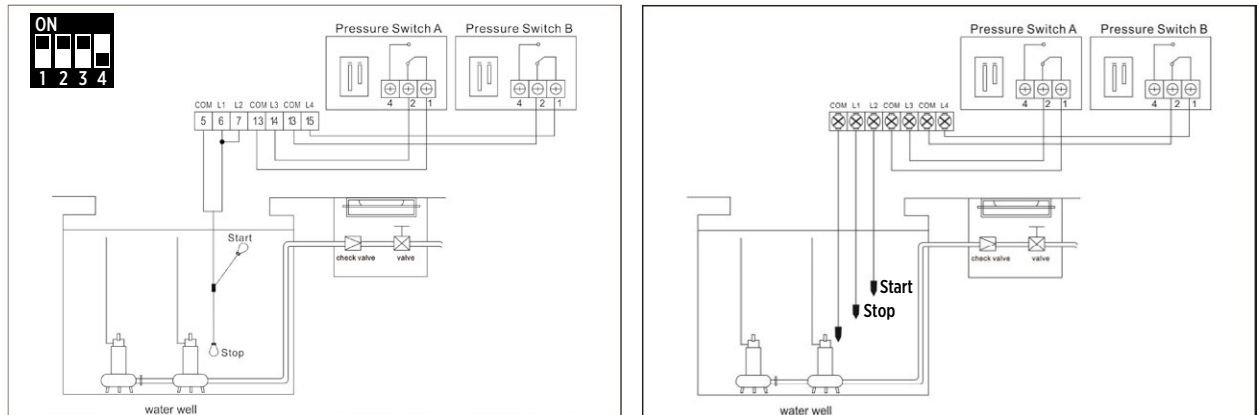


NOTE:

- Use level switches with N.C. (normally closed contacts). Circuit is closed if level switch is in high position.
1. **Dual pump operation with integrated float switches:** If the liquid level increases to float switch A/B (high position) a single pump starts. If the liquid level reaches level switch L4 (high position), the control box activates the audible alarm and alarm indicator to warn of a high-level condition requiring immediate attention. Both pumps continue to operate if the overflow alarm is active and level switch L4 in high position.
 2. **Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.
 3. **Overflow alarm:** Both pumps continue to operate if the overflow alarm is active (level switch L4 in high position). The alarm is automatically reset when the liquid level decreases to the lower position of level switch L4, but the pumps continue to operate until liquid level decreased to float switches A/B (low position).
 4. **Auto patrol (Anti jam) function:** If both pumps remain inactive in Auto mode for 240 hours, the control box will automatically run each pump for 3 seconds to prevent impeller jamming and intake blockage.
 5. **Display Icons and Messages**

Messages & Graphic	Description
	Lack of water in sump
	Overflow in sump

5.2.3 Pressure boosting by level and pressure switch

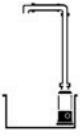
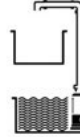


NOTE:

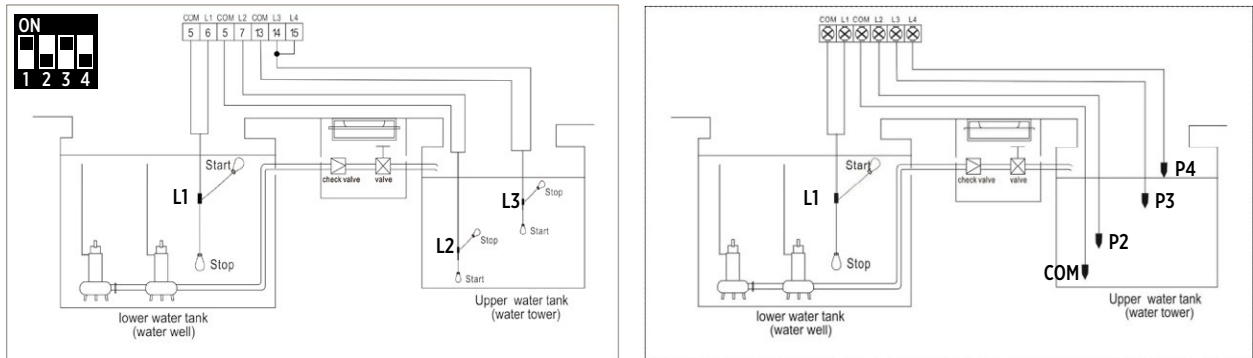
- Use pressure switches with normally closed (N.C.) contacts. Contacts are closed at zero pressure and open when pressure setpoint is reached.
- The pressure set point value of both pressure switches must be different.
- Pressure setpoint value of pressure switch B must be higher than set point of pressure switch A

1. **Dual pump operation with pressure switches:** If the water pressure decreases below the setpoint of pressure switch B, the control box starts one pump. If the pressure continues to decrease below the setpoint of pressure switch A, while the first pump is running, the second pump starts. Both pumps continue to operate until the water pressure increases to the setpoint of pressure switch B.
2. **Controlled pump alternation:** If water pressure decreases below the setpoint of pressure switch B, the control box starts one pump and continues to operate until water pressure reaches the setpoint of pressure switch B again or if water level is low. The control box automatically alternates between the two pumps each cycle, ensuring equal wear and operating time.
3. **Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.

4. Display Icons and Messages

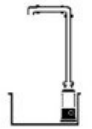
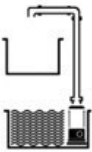
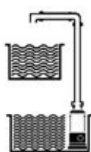
Messages & Graphic	Description	Messages & Graphic	Description
	Lack of water in water well		Full of pressure in pipeline or pressure tank
	Full of water in water well		Lack of pressure in pipeline or pressure tank

5.2.4 Water transfer by level switches and probes

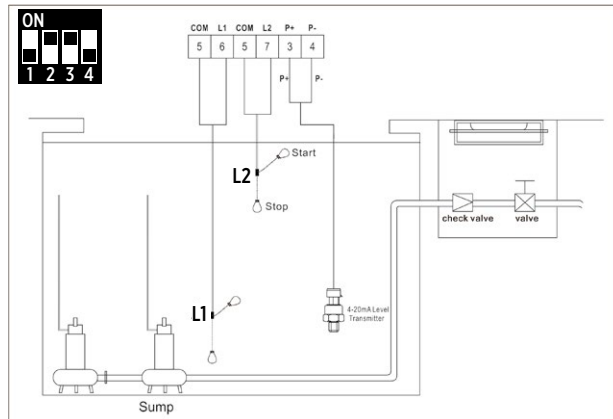


NOTE:

- Use level switches with N.C. (normally closed contacts). Circuit is closed if level switch is in high position.
- Dual pump operation with level switches / probes:** If the water level in the upper water tank decreases to Level Switch L3 (low position / Level Probe P3), the control box starts one pump. If the water level continues to fall below Level Switch L2 (low position) or level probe P2, while one pump is operating, the control box starts the second pump. Both pumps then operate in parallel until the water level increases to Level Switch L3 (high position) or Level Probe P4.
 - Controlled pump alternation with 3 level switches:** If water level in the lower tank is sufficient (level switch L1 high position) and water level in upper tank is below level switch L3 (down position), the control box starts one pump. The pump continues to operate until the water level reaches level switch L3 (high position) again or water level in the lower tank is below level switch L1 (low position). The control box automatically alternates between the two pumps each cycle, ensuring equal wear and operating time.
 - Controlled pump alternation with 1 level switch and 4 level probes:** If water level in the lower tank is sufficient (level switch L1 high position) and water level in upper tank is below level probe P3, the control box starts one pump. The pump continues to operate until the water level reaches level probe P4 again or water level in the lower tank is below level switch L1 (lower position). The control box automatically alternates between the two pumps each cycle, ensuring equal wear and operating time.
 - Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.
 - Display Icons and Message**

Messages & Graphic	Description	Messages & Graphic	Description
	Lack of water in water well		Full of water in water well
	Lack of water in water tank		Full of water in water tank

5.2.5 Sewage lifting by liquid level control with 4-20mA level transducer



NOTE:

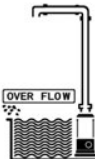
- Select a 4-20 mA level transducer with an appropriate measuring range based on the depth of the sewage tank.
- To ensure reliable and efficient operation of the sewage lifting system, the user must configure five liquid level setpoints in the parameter settings menu when using a 4-20 mA level transducer. These setpoints include:
 1. Level transducer full measuring range
 2. Over flow alarm liquid level depth value
 3. 2nd pump cut-in liquid level depth value
 4. 1st pump cut-in liquid level depth value
 5. Pumps cut-off liquid level depth value
- The liquid level depth value sequence is measuring range > over flow alarm depth value > 2nd pump cut-in depth value > 1st pump cut-in depth value > pumps cut-off depth value.

Eg: Full measuring range: 200 cm
 Over flow alarm depth value: 150 cm
 2nd pump cut-in depth value: 100 cm
 1st pump cut-in depth value: 40 cm
 Pumps cut-off depth value: 20 cm

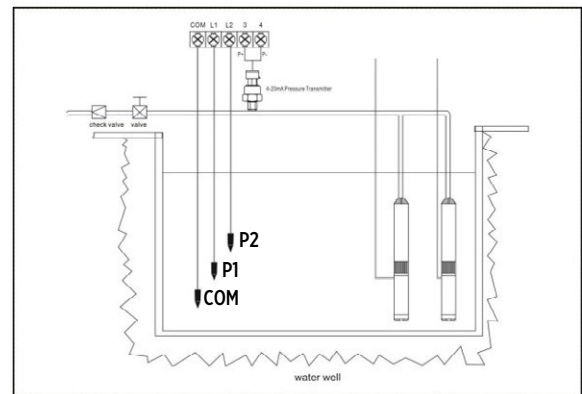
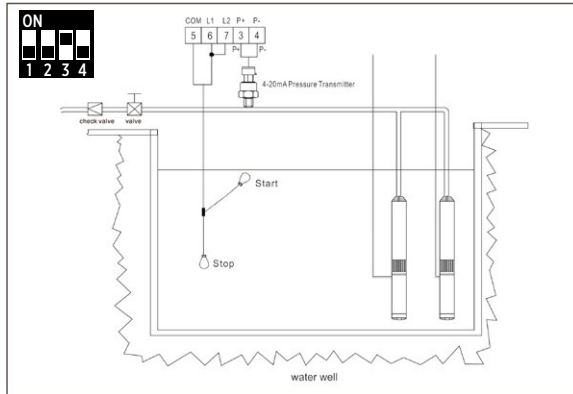
1. **Dual pump operation with level transducer:** If the liquid level increases to 40 cm, the control box starts one pump. As the water level continues to increase to 100 cm while the first pump is operating, the second pump starts. Both pumps continue to operate until the water level decreases below 20cm again.
2. **Controlled pump alternation:** As the liquid level cycles between the pumps cut-off depth value (20 cm) and 1st pump cut-in depth value (40 cm), the control box is operating a single pump. Each cycle the control box automatically alternates between both pumps ensuring consistent wear and balanced operating time.
3. **Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.
4. **Overflow alarm:** If both pumps are operating simultaneously and the liquid level continues to rise to 150 cm, the control box activates the audible alarm and illuminates the alarm indicator to signal a high-level alarm condition and prompt immediate corrective action. Once the liquid level falls below 150 cm, the control box automatically disables the alarm and turns off the alarm indicator. Both pumps will continue to operate until the liquid level decreases to 20 cm.
5. **Auto patrol (Anti jam) function:** If both pumps remain inactive in Auto mode for 240 hours, the control box will automatically run each pump for 3 seconds to prevent impeller jamming and intake blockage.
6. **Level transducer backup:** Level switches L1 and L2 serve as backup system in the event of a 4-20 mA level transducer failure. Installing back-up level switches is optional and may be selected by the user according to the application requirements. If the 4-20 mA level transducer fails and level switch L2 is active (high position), the control box automatically forces both pumps to operate simultaneously. In parallel, the audible alarm and alarm indicator are active to signal a high-level alarm condition and prompt immediate corrective action. If liquid level decreases to level switch L1 (low position), the control box automatically stops both pumps and cancels the forced dual-pump operation.

NOTE: If level switch L1 is used, please use normally closed (N.C.) contact.

7. Display Icons and Messages

Messages & Graphic	Description
	Lack of water in sump
	Overflow in sump

5.2.6 Pressure boosting with 4-20 mA pressure transducer



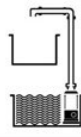
NOTE:

- Select a 4-20 mA pressure transducer with appropriate measuring range based on the depth of the water tank. Use level switch with N.C. (normally closed contacts). Circuit is closed if level switch is in up position.
- To ensure reliable and efficient operation of the pressure boosting system, the user must configure five pressure setpoints in the parameter settings menu when using a 4-20 mA pressure transducer. These set points include:
 - Pressure transducer full measuring range
 - Over pressure alarm value
 - Pumps cut-off pressure value
 - 1st pump cut-in pressure value
 - 2nd pump cut-in pressure value
- The pressure value sequence is **measuring range > over pressure value > pumps cut-off pressure value > 1st pump cut-in pressure value > 2nd pump cut-in pressure value**:

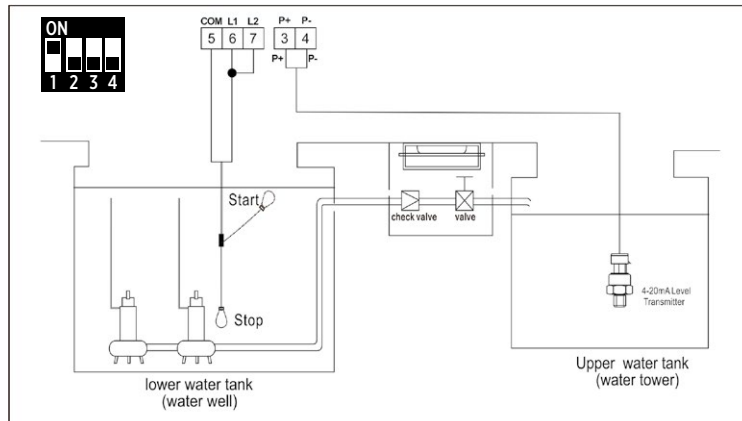
Eg:

Full measuring range:	25 bar
Over pressure alarm depth value:	22 bar
Pumps cut off pressure value:	10 bar
1st pump cut in pressure:	8 bar
2nd pump cut in pressure value:	4 bar

- Dual pump operation with pressure transducers:** If the water pressure decreases below 1st pump cut-in pressure (8 bar) the control box will start one pump and continue to operate until the water pressure reaches pumps cut-off pressure (10 bar). If the water pressure continues to decrease below 2nd pump cut-in pressure (4 bar), while the first pump is operating, the control box starts the second pump and continues to operate both pumps until pumps cut-off pressure value (10 bar) is reached. The control box stops both pumps if the water level decreases to level switch L1 (low position) / level probe P1.
- Controlled pump alternation:** As the water pressure value cycles between 1st pump cut-in pressure (8 bar) and pumps cut-off pressure (10 bar), the control box is operating a single pump. Each cycle the control box automatically alternates between both pumps ensuring consistent wear and balanced operating time.
- Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.
- Over pressure alarm:** If the water pressure increases to the over pressure alarm value (22 bar), the control box activates the audible alarm and illuminates the alarm indicator to signal that immediate corrective action is required. Both pumps are disconnected in case of an over pressure alarm.
- Display Icons and Messages:**

Messages & Graphic	Description	Messages & Graphic	Description
	Lack of water in water well		Full of pressure in pipeline or pressure tank
	Full of water in water well		Lack of pressure in pipeline or pressure tank

5.2.7 Water transfer with 4-20 mA level transducer



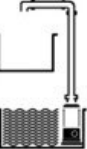
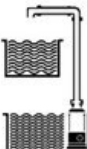
NOTE:

- Use level switch with N.C. (normally closed contacts). Circuit is closed if level switch is in up position. Select a 4-20 mA level transducer with appropriate measuring range based on the depth of the water tank.
- To ensure reliable and efficient operation of the lifting system, the user must configure five pressure setpoints in the parameter settings menu when using a 4-20 mA pressure transducer. These set points include:
 - Level transducer full measuring range
 - Over flow alarm liquid level depth value
 - 2nd pump cut-in liquid level depth value
 - 1st pump cut-in liquid level depth value
 - Pumps cut-off liquid level depth value
- The liquid level depth value sequence is measuring range > over flow alarm depth value > pumps cut-off depth value > 1st pump cut-in depth value > 2nd pump cut-in depth value:

Eg:

Full measuring range:	200 cm
Over flow alarm depth value:	150 cm
Pumps cut off depth value:	100 cm
1st pump cut in depth value:	40 cm
2nd pump cut in depth value:	20 cm

- Dual pump operation with level transducer:** If the water level in the upper water tank (water tower) decreases below 1st pump cut-in depth value (40 cm), the control box starts the first pump and continues to operate until pump cut-off depth value (100 cm) is reached. If the water level decreases below 2nd pump cut-in depth value (20cm), while the first pump is operating, the control box starts the second pump and continues to operate both pumps until the water level increases to pump-off depth value (100 cm).
- Controlled pump alternation:** As the water level cycles between 1st pump cut-in depth value (40 cm) and pumps cut-off depth value (100 cm), the control box is operating a single pump. Each cycle the control box automatically alternates between both pumps ensuring consistent wear and balanced operating time.
- Automatic pump transfer in case of fault:** If the operating pump fails during operation, the control box automatically switches to the standby pump to maintain continuous system operation.
- Overflow alarm:** If both pumps are operating simultaneously and the liquid level continues to rise to 150 cm, the control box activates the audible alarm and illuminates the alarm indicator to signal a high-level alarm condition and prompt immediate corrective action. Once the water level decreases below 150 cm, the control box automatically disables the alarm and turns off the alarm indicator. Both pumps will continue to operate until the water level decreases to 20 cm.
- Display Icons and Messages:**

Messages & Graphic	Description	Messages & Graphic	Description
	Lack of water in water well		Full of water in water well
	Lack of water in water tank		Full of water in water tank

6. FUNCTION OVERVIEW AND KEYPAD OPERATIONS

6.1 Manual Mode Operation

Press the MODE button to enable the Manual Mode. To start a pump, press A START (+) or B START, depending on which pump you want to operate. To stop a pump, press A STOP (-) or B STOP, corresponding to the pump currently in operation.

NOTE:

- In Manual Mode, the control box operates independently from any external sensor inputs (e.g level switches, transducers)

6.2 Auto Mode Operation

Press the MODE button to enable Auto Mode. When Auto Mode is active, the control panel automatically starts and stops the pumps based on input signals from connected external sensors ensuring operation according to system requirements.

NOTE:

- While operating in Auto Mode, a running pump can be stopped manually by pressing the MODE button to switch the controller to Manual Mode. Press A STOP or B STOP to stop Pump A or Pump B, respectively.

6.3 Pump protection

During pump operation, if a fault such as dry running, overload, undervoltage, or overvoltage occurs, the control box immediately stops the affected pump and initiates a restart sequence after a built-in time delay. Automatic restart will only occur once all fault conditions have been cleared and normal operating conditions have been restored.

In the event of a critical fault, such as pump stall, phase loss (open phase), or other severe motor faults, the control panel immediately shuts down the pump and locks out automatic restart. The user must inspect and rectify the cause of the fault before the pump can be returned to service. Once the fault has been cleared, the pump can be restarted.

6.4 Pump last five failure record displaying

The control box can memorize the last five failures which lead to pump operation stop.

Procedure of pump A last five failure record displaying:

1. Press the MODE button to switch the control box to Manual Mode and ensure that both pumps are stopped.
2. Press and hold A STOP (-), then press the MODE button. The control box will emit an acoustic signal and display the last five fault records for Pump A.
3. Press A STOP (-) again to exit the Pump A fault history display.

NOTE:

- The procedure for displaying the last five fault records of Pump B is identical to that for Pump A, except that B STOP is used instead of A STOP.

6.5 Pump accumulative running time displaying

The control box records the total operating hours of each pump, providing users with valuable information for monitoring pump performance, analyzing operating conditions, and scheduling preventive maintenance.

Procedure of pump A accumulative running time displaying:

1. Press the MODE button to switch the control box to Manual Mode, and ensure that both pumps are stopped.
2. Press and hold the STORE/SET button, then press A STOP (-). The control box will emit an acoustic signal and display the accumulated running hours of Pump A.
3. Press A STOP (-) again to exit the Pump A running hours display.

NOTE:

- The procedure for displaying the total running hours of Pump B is identical to that for Pump A, except that B STOP is used instead of A STOP.

7. BUTTON OPERATION AND FUNCTION GUIDE

BUTTON	DEFINITION & FUNCTION	NOTE & REMARK
MODE	1. To switch between Auto and Manual Mode 2. To transfer between parameters in the parameter menu	
A START +	1. To start pump A in Manual Mode 2. Parameter value increase	
A STOP -	1. To stop pump A in Manual Mode 2. Parameter value decrease 3. to clear parameter settings of pump A	To erase the parameter settings for pump A, press and hold A STOP- for 6 seconds
B START	To start pump B in Manual Mode	
B STOP	1. to stop pump B in Manual Mode 2. to clear parameter settings of pump B	To erase the parameter settings for pump B, press and hold B STOP for 6 seconds
STORE	1. Automatic pump calibration 2. To enter parameter settings menu	In Manual Mode, press A START + or B START to start pump A or B. While a pump is operating, press STORE to enable automatic pump calibration. Without pumps operating, press and hold STORE to enter parameter settings menu
STORE + MODE	To enter advanced parameter settings menu	In Manual Mode without operating pumps, press and hold STORE and MODE to enter advanced parameter settings menu
MODE + STORE	User Display button lock	In Auto Mode, press and hold MODE then press STORE to lock the user display buttons. Repeat to unlock the user display buttons again
STORE + A STOP -	Display pump A accumulative operating time (hrs)	In Manual Mode without operating pumps, press and hold STORE and then press A STOP- to display pump A accumulative operating time
STORE + B STOP	Display pump B accumulative operating time (hrs)	In Manual Mode without operating pumps, press and hold STORE and then press B STOP to display pump B accumulative operating time
A STOP - + MODE	Display pump A last five failure records	In Manual Mode without operating pumps, press and hold A STOP and then press MODE to display pump A last five failure records
B STOP + MODE	Display pump B last five failure records	In Manual Mode without operating pumps, press and hold B STOP and then press MODE to display pump B last five failure records

8. TROUBLE SHOOTING GUIDE

Fault Message	Possible Cause	Solutions
UNDER V	Input line voltage is lower than the limits. Supply voltage is too low. Defective line fuse or circuit breaker.	Do a check of the supply voltage. The SCB will attempt to restart the motor every 5 minutes.
OVER V	Input line voltage is higher than the limits. Input voltage surges. Start / Stop sequence too fast.	Do a check of the supply voltage. The SCB will attempt to restart the motor every 5 minutes.
PUMP STALLED	Motor current exceeds nominal current value by 175%. Blocked pump shaft.	Do a motor and pump check
	Broken pump impeller / jammed rotor shaft	Check and replace any damaged mechanical parts
	Motor power consumption exceeds control box limit	Check control box matches motor and pump
OVER LOAD	Motor current exceeds nominal current value by 135% during operation.	Do a motor and pump check
	Broken pump impeller / jammed rotor shaft	Check and replace any damaged mechanical parts
	Motor power consumption exceeds control box limit	Check control box matches motor and pump
OPEN PHASE	An input phase is missing.	Check all line phase
	Damage supply cable / tripped fuse	Check power supply value and any fuse / circuit breaker
THREE PHASE UNBALANCE	Voltage difference between input phases (L1;L2;L3) is greater than $\pm 15\%$	Do a check of the power supply
		The SCBD will attempt to restart the motor every 5 minutes
POWER PHASE REVERSAL	Input line phase sequence (L1; L2; L3) is not correct	Do a check of the power supply
		Check wiring and phase sequence – swap 2 phases
PUMP NO CALIBRATION	Automatic motor tuning / parameter calibration has not been completed	Perform automatic motor / pump calibration
DRY RUN	Weak water supply / dry well	The SCBD will attempt to restart the motor after 30 minutes until water supply is restored
	Motor parameter settings are not correct	Erase parameter settings and perform motor calibration
	Pump inlet blocked	Check pump and pump inlet
OVER TEMP	Motor temperature is too high – dry contacts OTA / OTB are open	Check motor and pump operation. Check motor current. Dry contacts OTA / OTB are closed.







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