

DPC 1-1 PRO

Installation & Operating Instruction

DPC 1-1 PRO For Single Phase Pumps up to 15A



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1 Safety

Following are the safety instructions which must be followed by the service partners or user while installing and operating. If ignored, physical injury or even death may happen. Read the safety instructions before handling the system.

WARNING

If these safety instructions are not observed, it may result in personal injury.

- Before carrying out any installation or maintenance operation, controller must be disconnected from the power supply.
- Don't open the cover while the pump is running.
- Don't put wire, metal bar filament etc. into the controller.

CAUTION

If these safety instructions are not observed, it may result in malfunction or damage of the equipment.

- All electrical connections must be carried out by a skilled and qualified personnel.
- Never connect AC power to output U, V, W terminals.
- Ensure the motor, controller and power specification match.



NOTE

(Notes or attention to ensure safe operation)

The manufacturer is not liable for malfunctioning if the product is not correctly installed or damaged, modified and/or put to run beyond the working range as given in this manual.

The manufacturer reserves the right to make any modifications to this product from time to time.

2 Introduction

DPC PRO is Digital Pump Controller, which is easy to use, programmable device for Single phase pump sets (Mono-blocks or submersible's - which require only running capacitor). It can be used to control the pumps having rated current up to 15 Ampere.

The controller has many operation modes for adapting to different pumping applications. Important features that distinguish the DPC Series Digital Pump Controllers from other controllers are the push button calibration for overload and the ability of dry run protection with or without float switches. It shows pump parameter, status and faults on LCD screen.

2.1 Application

DPC PRO is very useful in water and wastewater applications, be it water transfer, tank filling, tank emptying or even pressure boosting in Hydro-pneumatic applications. It is ideal choice in residential, industrial or institutional segments where water and energy conservation is of utmost importance.

Typical applications:

- Storm water
- Sewage
- Booster sets
- Rainwater reuse
- Irrigation
- Water supply

3 Features

- Built in DIP switch for multi auto mode applications in the same DPC panel
 1. Drainage via Float switch
 2. Water supply and Water transfer via Float switch
 3. Pressure Booster via Pressure Switch
- Dry run protection without Float switch
- Auto/manual switch with screen lock in AUTO mode
- Dynamic LCD screen for pump running and tank/pit level status
- Protect the pump against various faults
- One touch calibration for all parameter settings
- Ease of entering set points from HMI and LCD screen
- Pump accumulative running time
- Last five fault records
- RS 485 Communication (MODBUS RTU Protocol)
- Start and Stop the pump based on feedback received from liquid level or pressure level settings
- Pump shaft anti rust protection

3.1 Parameter and Specification

Following chart shows main technical parameters & specifications:

Main technical characteristics	
Control characteristic	Liquid Level Control/Pressure Control
Working Modes Application	Manual/Auto
Drainage Application	Using Float switch
Pressure Boosting	Using Pressure Switch
Water Transfer Application	Using Float switch
Main technical data	
Rated output	1.5 to 15A
Rated input voltage	220 V AC/ Single Phase/ 50 Hz
Trip response time of overload	5sec - 5min
Trip response time short circuit	Less than 0.1 sec
Trip response time of under/over voltage	Less than 5 sec
Trip response time of dry run	6 sec (default value; this can be adjusted)
Recovery time of overload	30 min (default value; this can be adjusted)
Recovery time of under/over voltage	5min
Recovery time of dry run	30 min (default value; this can be adjusted)
Trip voltage of over voltage	115% of rated input voltage
Trip voltage of under voltage	80% of rated input voltage
PROTECTIONS COVERED	Dry run (without float)
	Current Overload
	Under voltage
	Over voltage
	Pump stalled
	Short circuit
	Over Temperature
Pump shaft anti rust protection	
Other technical data	
Permissible ambient temperature	-5°C to +50°C
Degree of protection (panel)	IP 55
Install position	Vertical
Controller dimensions (L X W X H)	280 x 280 x 130mm

4 Installation

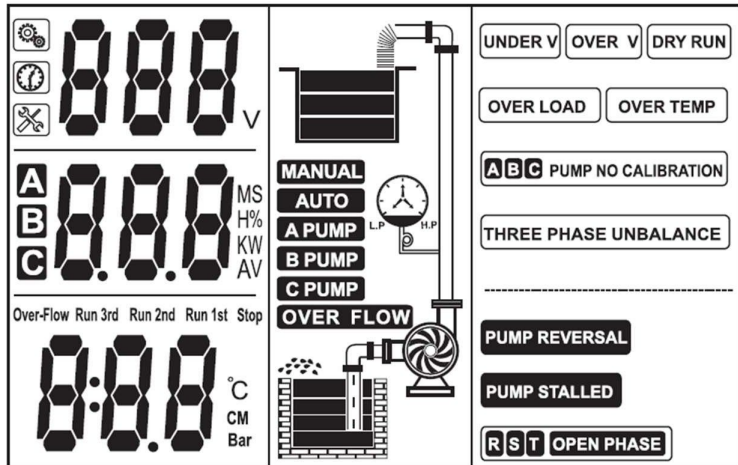
Please read this manual carefully before starting installation and operation. Any damage to the equipment caused due to failure to comply with the descriptions in this manual in installation or operation will be beyond the scope of the company's quality guarantee.

Controller installation and wiring will need the following tools. You also can choose the right tools according to your own experience.



5 Controller components

5.1 LCD Screen



5.2 Function of keys present on the controller

Button	Definition & Function	Note & Remark
START	To start the pump under manual state	Under manual state pump is running, press START for 6 second, it will calibrate the pump.
STOP	To stop pump under manual state	Under manual state when pump is not running, press STOP for 6 second, it will erase calibration parameters of the pump.
MODE	To switch the DPC PRO between manual & auto mode	If the Auto lock is enabled, press and hold MODE and STORE/SET button together until a countdown timer stops. The controller will switch to AUTO to MANUAL MODE .
STORE/SET	Parameter Calibration	To store the pump parameters, start pump under manual state and press STORE

5.3 Meaning of the icons shown on LCD screen



The parameter configuration icon, when this icon appears, controller is in manual parameter adjustment mode.

Time displaying icon, when this icon appears, it mean controller is displaying some parameter of time, eg: pump dry run trip time(units: seconds)



Pump fault icon, when this icon appears, it means controller is displaying some fault condition

Network connection error icon, when this icon appears, it means there is no network connections or network connection error between pump controller and SC (slave controller) or computer



Network normal connection icon, when this icon appears, it means the network connection between pump controller and SC (slave controller) or computer is normal

Voltage



M

Minute

Second

S

H

Hour

Ampere

A

%

Percent

Pump running



Pump stopped



Low pressure or lack of pressure in the pipeline or pressure tank



High pressure or full of pressure in the pipeline or pressure tank



Pump A

A

5.4 DIP Switch Setting

Users can set the function switch to suit different applications. Before setting the function switch, the unit should be disconnected from the power supply. After completing the settings of dip switches, power may be applied to the unit. Following signs will be displayed in voltage displaying area on the LCD conforming to the following list.

S.NO.	DIP SWITCH	SYMBOL	APPLICATION
1			Applied for water supply by level control through float switch or liquid sensor
2			Applied for water supply by pressure control through pressure switch & pressure tank
3			Applied for drainage by liquid level control through float switch & liquid probe
4			Applied for Drainage by connection with level transmitter
5			Applied for Water supply by pressure transmitter

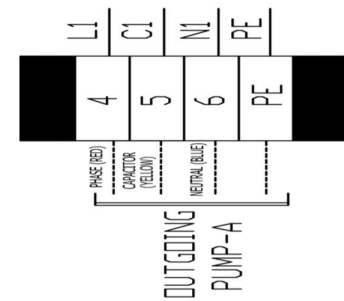
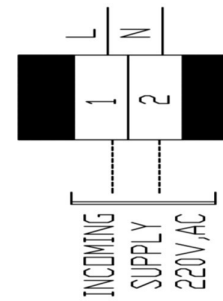
Note To change the DIP switch setting for application/function from the factory pre-set settings,

follow the below enlisted steps:

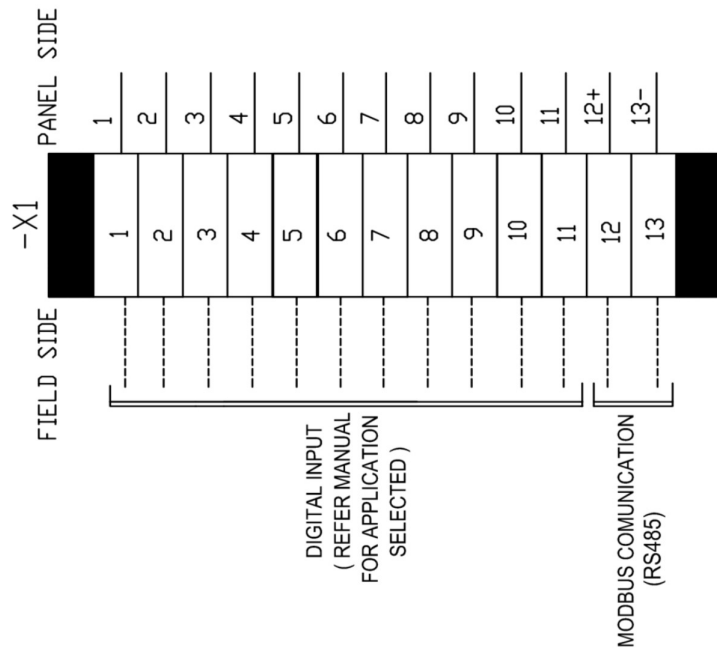
- Select the DIP switch setting for application/function that needs to be changed.
- Power on the panel
- Press and hold STOP button while powering up DPC panel
- Release STOP button till LCD displays 777

5.5 Controller Terminals

5.5.1 Power Terminal Connections



5.5.2 Control terminals connections

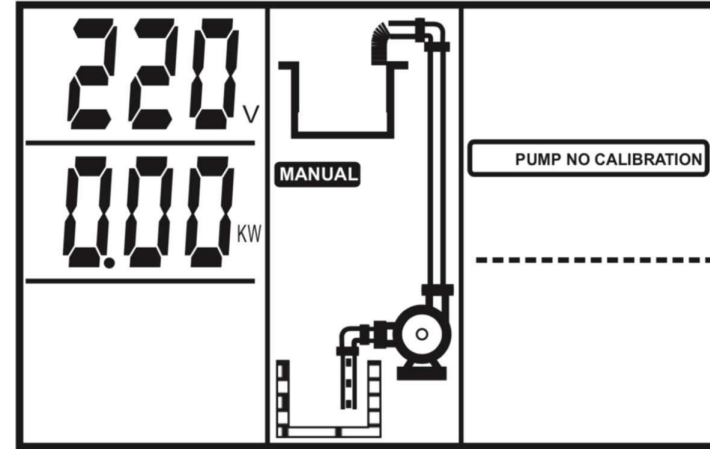


6 Parameter - Calibration and Erasing

6.1 Calibration

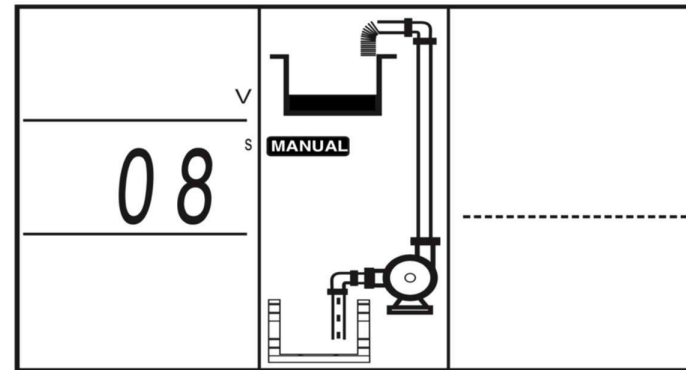
Setting of parameters (calibration of unit according to the connected load):

Press the AUTO/MANUAL key to switch to manual state, make sure the pump is not running, and LCD screen displays "Pump NO calibration". As shown below.



Now press the START key to run the pump, kindly ensure that the pump is lifting water and is drawing its rated current and voltage.

Press STORE/ SET key, the controller makes a "Beep" sound and starts countdown. LCD screen is shown below



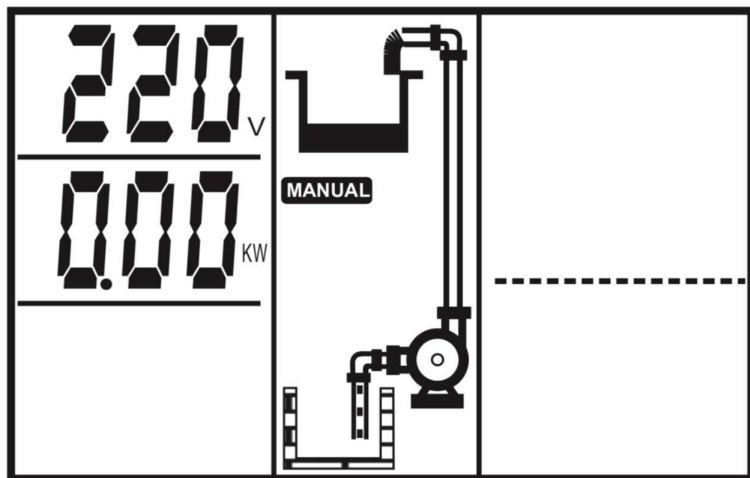
Pump stops running, and parameter calibration is completed. Now all the pump protection parameters have been calibrated and the pump is ready to be used in either AUTO or MANUAL mode, the LCD screen flashes the mode in which the pump is running.

6.2 Erasing

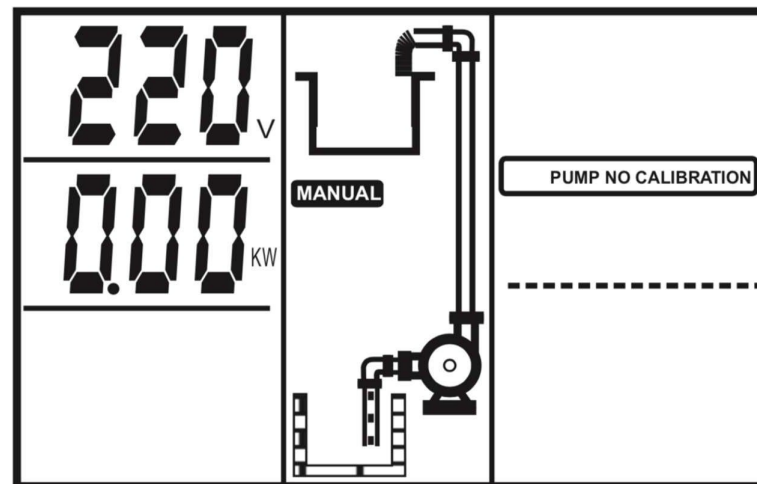
When the pump is reinstalled after maintenance or the new pump is installed, user must erase the former parameter calibration and a new calibration procedure must be done.

Steps to erase the calibrated parameters:

Press AUTO/MANUAL key to switch to MANUAL mode. Make sure that the pump is not running, and LCD screen appears as shown below:



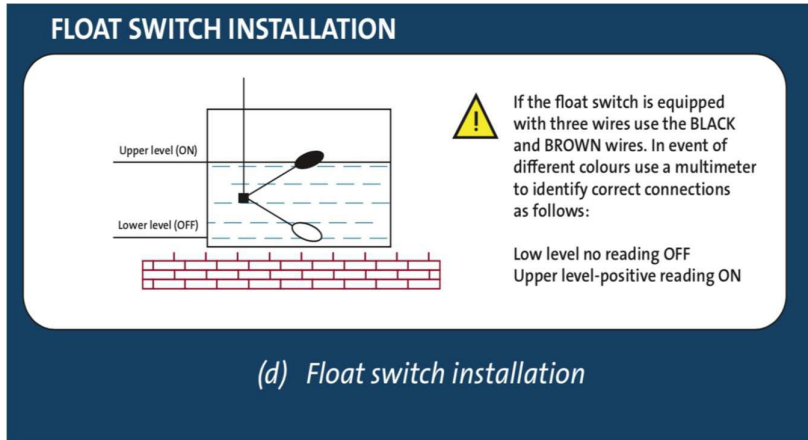
Press the STOP key and hold it until it makes a "beep" sound. Controller recovers the default factory settings and LCD screen appears as shown below:



The flashing No Calibration message reappears, and all pump protection parameters have been erased.

7 Connections - Control devices and applications

7.1 Installing liquid level Float Switch

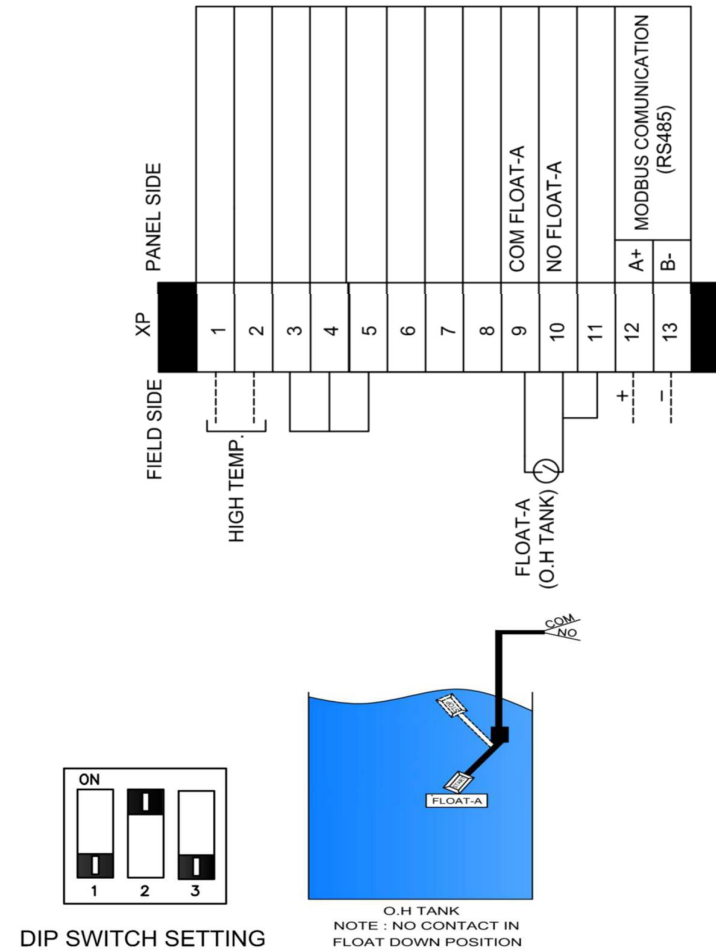


IMPORTANT NOTE: While installing Float switch, kindly ensure that the Float switch has reading of NO when float is down.

7.2 Working application and connections for panel terminals

7.2.1 Water Transfer

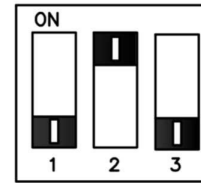
7.2.1.1 Water supply to OH tank using 1 float switch in OH tank



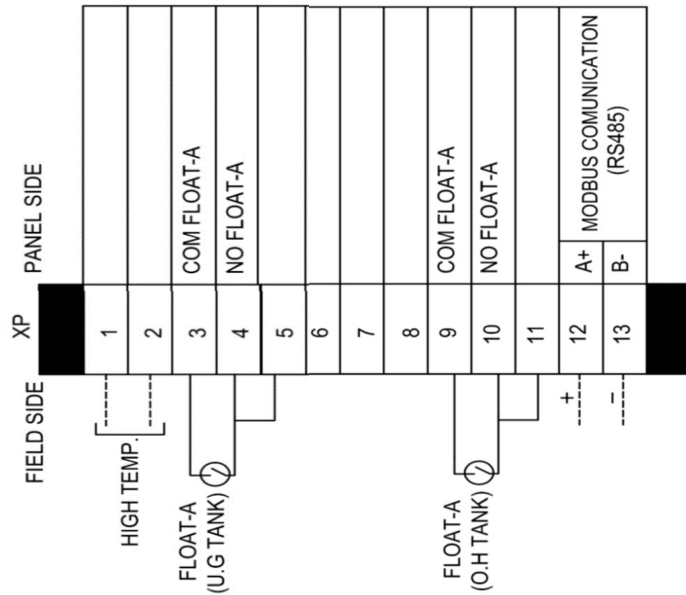
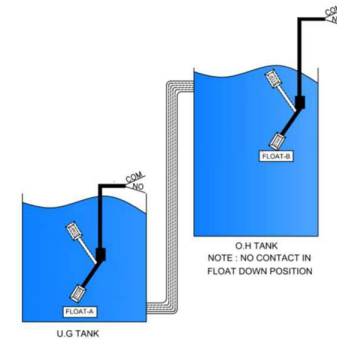
Start Condition: If the water level in OH tank falls and the Float switch in the OH tank is in down position, the pump starts. LCD screen displays RUN indicating pump is running.

Stop Condition: If the water level in OH tank rises and the float switch in OH tank is in UP position, the pump stops. LCD screen displays FULL, indicating OH tank is full.

7.2.1.2 Water transfer from ug tank to OH tank using 1 float switch in UG tank and 1 float switch in OH tank



DIP SWITCH SETTING

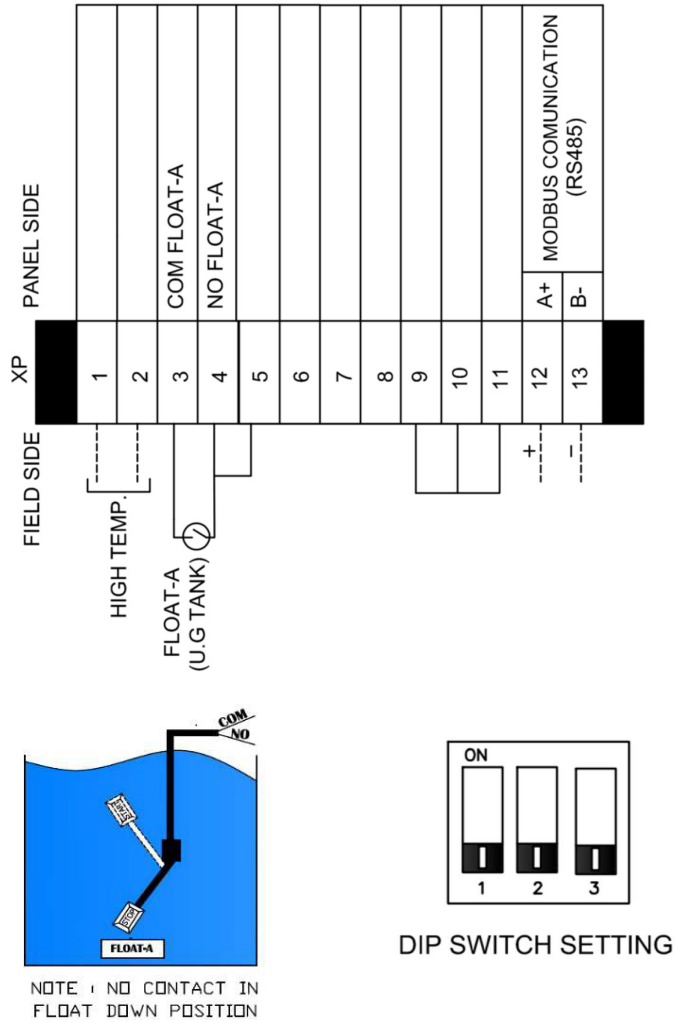


Start Condition: If the water level in OH tank falls and the float switch in the OH tank is in down position and the water level in UG tank is high and the float switch in UG tank is in UP position the pump starts. LCD screen displays RUN indicating pump is running.

Stop Condition: If the water level in OH tank rises and the float switch in OH tank is UP position, the pump stops. LCD screen displays FULL, indicating OH tank is full.

7.2.2 Drainage

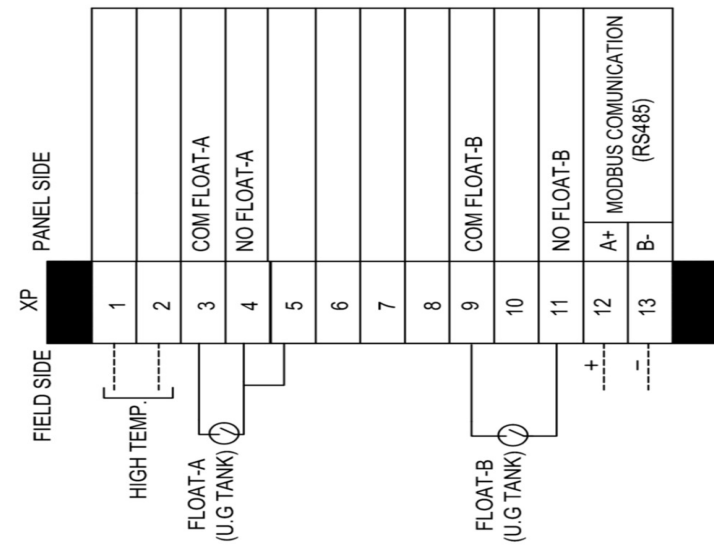
7.2.2.1 Using 1 Float Switch

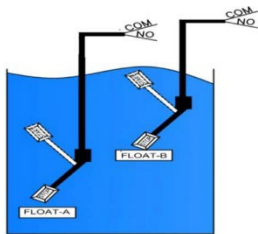


Start Condition: If the water level in the pit/ tank rises and the float switch is in UP position, the pump starts. LCD screen display RUN indicating pump is running.

Stop Condition: If the water level in the pit/ tank decreases and the float switch is in Down position, the pump stops. LCD screen displays NO WATER, indicating there is no liquid level in pit/tank.

7.2.2.2 Using 2 Float Switch





U.G TANK
NOTE : NO CONTACT IN
FLOAT DOWN POSITION



DIP SWITCH SETTING

Start Condition: If the water level in the pit/ tank rises and the float switch A is in UP position, the pump starts. LCD screen displays RUN indicating the pump is running.

Stop Condition: If the water level in the pit/ tank decreases and the float switch A is in Down position, the pump stops. LCD screen displays NO WATER, indicating there is no liquid level in pit/tank.

Alarm condition: If the water level in the pit/tank rises even further despite pump running and float switch Bis in UP position there is an audio-visual alarm. LCD screen displays OVERFLOW indicating that the liquid level in the pit/tank has reached Overflow level.

7.2.3 Pressure Boosting

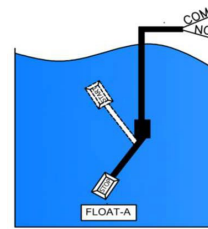
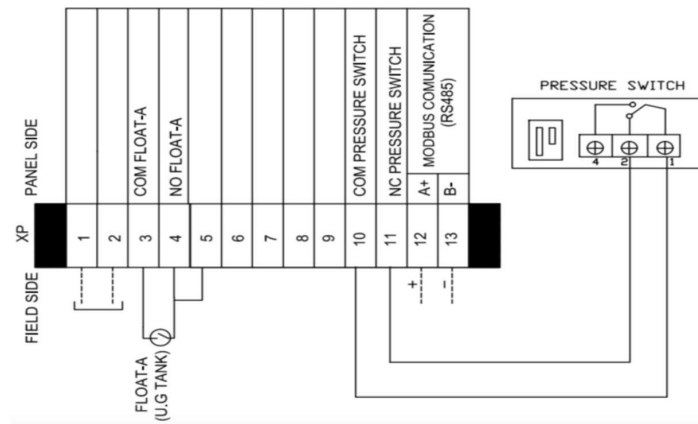
7.2.3.1 Using one float switch and one pressure switch

Start condition: If the water level in the source tank is high and the float switch in the source tank is in UP position and the pressure in the line is below Cut in pressure setting on the pressure switch the pump starts. LCD screen flashes run indicating pump is running

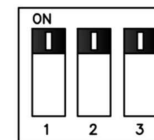
Stop Condition:

If the water level in the source tank is low and the float switch in the source tank is in down position, the pump stops. LCD screen displays NO WATER, indicating that there is no water in the source tank and can lead to a dry run situation.

If the pressure in the line is equal to or above the Cut-out pressure setting on the pressure switch installed, the pump stops. LCD screen displays "FULL", that indicates that there is no demand of water.



U.G TANK
NOTE : NO CONTACT IN
FLOAT DOWN POSITION

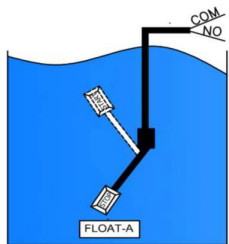
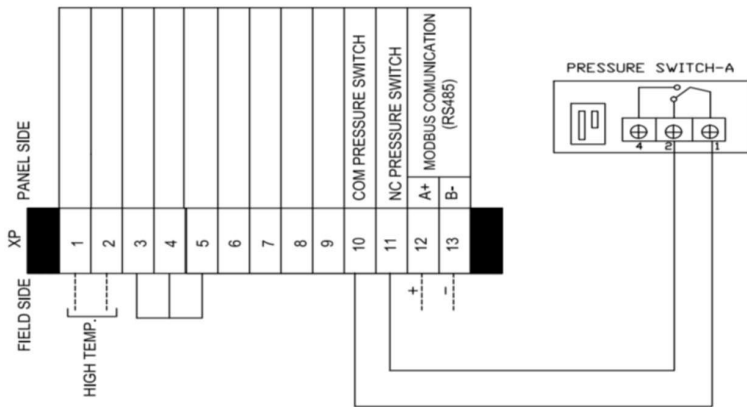


DIP SWITCH SETTING

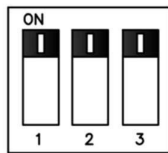
Using 1 Pressure Switch

Start Condition: If the pressure in the line is below the set cut in pressure on the pressure switch the pump starts. LCD screen displays RUN Indicating pump is running.

Stop Condition: If the pressure in the line is equal to or above the set cut-out pressure, the pump stops. LCD screen displays FULL, that indicates that there is no demand of water



U.G TANK
NOTE : NO CONTACT IN
FLOAT DOWN POSITION

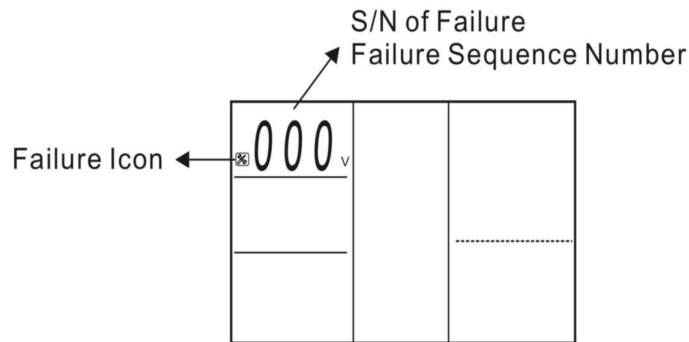


DIP SWITCH SETTING

8 Basic Operation

8.1 Manual mode

Press the key MODE to switch to manual mode. The controller switched to manual mode. Now press the START key to run pump and press the STOP key to stop the pump.



Note: If the controller is under AUTO lock, then when you are in AUTO mode, press the MODE and STORE button together and hold until the countdown timer starts.

8.2 Auto Mode

Press the MODE key to switch to Auto mode.

Once the controller is in Auto mode, controller will run or stop the pump according to signal received from liquid level probe or pressure switch.

Note: If the pump is running in auto mode and user wants to stop the pump, press the mode key switch to manual mode and then press STOP key to stop the pump.

Note: If the power is being cut off, after recovering the input supply the controller will resume its operation state which was before power cut after 10 seconds of countdown

8.3 Pump Protection

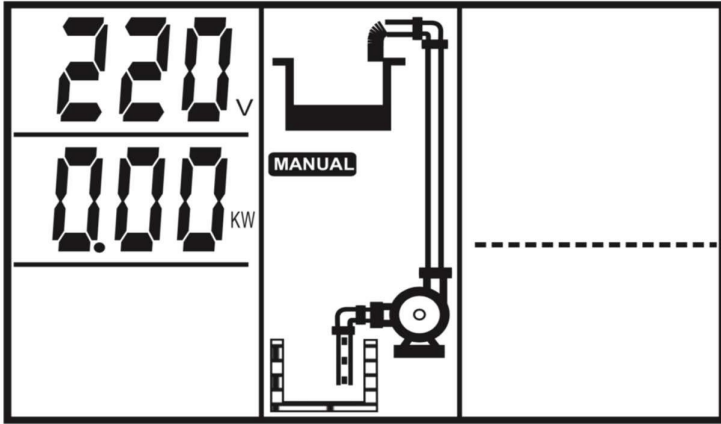
If any failure such as dry run, overload or under voltage occurs, the controller will immediately shut down the pump, display the respective fault on the LCD screen and automatically execute a check or restarting conditions after a built-in time delay has elapsed (re-attempt time are different for different faults).

The controller will not recover automatically until all the abnormal conditions have been cleared.

If serious faults such as pump stalled or open phase occurs, the user must check the pump and motor or supply voltage before re-starting the controller.

8.4 Last five fault records

The controller can memorize the last five failures of pump, so it is very convenient for the pump users to analyse the pump running conditions and fault trend. Press the MODE key to switch to manual state, make sure pump is not running and LCD screen displays as below



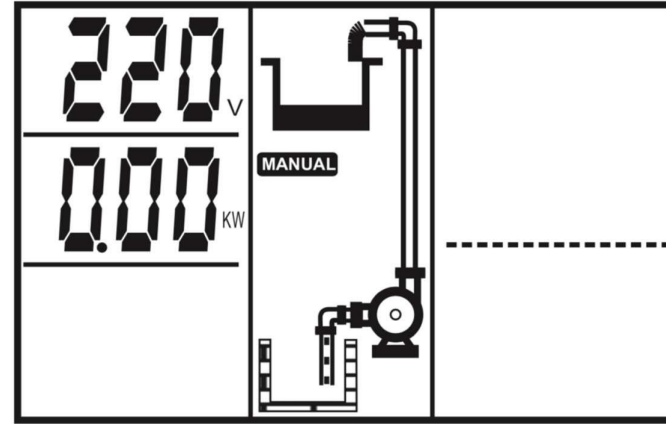
Press and hold the STOP key and MODE key together, the controller makes a "beep" sound, and will display the pump failure record
 Press MODE key to move to next fault.

Press STOP to exit the failure record displaying.

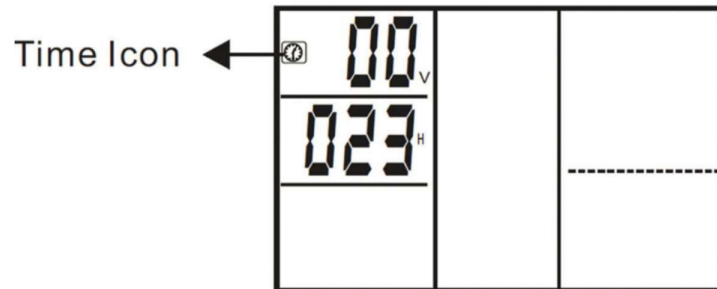
8.4.1 Display run hour of Pump

The controller can memorize hours the pump has run, so it is very convenient for the pump users to analyse the pump running conditions and perform maintenance.

Press the MODE key to switch to manual state, make sure that the pump is not running, and LCD screen displays as shown below:



Press and hold STOP key and STORE/SET key together, the controller makes a "beep" sound and displays pump running time in hours.



THE PUMP HAS RUN FOR 23 HOURS

Press the STOP key to exit the run hour

9 Troubleshooting

Fault Message	Possible cause	Solutions
Flashing of "UNDER V"	The actual running voltage is lower than the calibrated voltage, pump is in under voltage protection state.	Controller will attempt to restart the pump every 5 minutes until the line voltage is restored to normal.
		Report Low Line Voltage to the power supply company
Flashing of "OVERV"	The actual running voltage is higher than the calibrated voltage, pump is in over voltage protection state.	Report high line voltage to the power supply company
		Controller will attempt to restart the pump every 5 minutes until line voltage is restored to normal
Flashing of PUMP STALLED	Pump motor running ampere was greater than the normal running ampere (calibrated ampere) by more than 200%	Cut off supply & repair or replace pump immediately.
Flashing of OVERLOAD	The actual running ampere is higher than the calibrated running ampere, pump is in overload protection state	Controller will attempt to restart the pump every 30 minutes until running ampere is restored to normal.
	Pump impeller is jammed, or pump is drawing more current than its rated	Check pump impeller or bearing or contact pump dealer.
Flashing of Pump "NO Calibration"	Parameter calibration not completed	Refer to parameter calibration setting

Fault Message	Possible cause	Solutions
Flashing of "DRY RUN"	Liquid level in the well/ sump is below the pump intake, pump stops running	Controller will attempt to restart the pump every 30 minutes until liquid level is above the pump intake.
Flashing of "Repeated Start"	Pump starts more than 5 times per minute	The most common cause for rapid cycle condition is waterlogged tank. Check for a ruptured bladder in the water tank. Check the air volume control or sniffer valve for proper operation. Check the setting on the Pressure Switch and examine for defects. Cut off the power supply & repair the water tank, pressure switch or valve.
Flashing of "Over Temp"	The temperature in pump motor winding is high and the contacting point of thermal switch is in open circuit state.	Wait for the temperature in pump motor winding to cool down, the contacting point of the thermal switch is close circuit state.

