

Installation & Operation Manual

L932

Ver.1.1



Conventions used in this manual

In the manual the following symbols will be used:



Generic danger Failure to comply with the safety regulations that follow can irreparably damage the controller or equipment.



Electric shock risk Failure to comply with the safety regulations that follow can cause death or serious personal injury.

WARNINGS

Read this manual carefully before any operation.
Please keep this manual for future use.



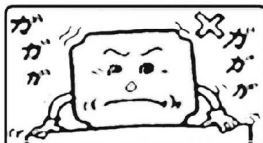
WARNING!!

- Before carrying out any installation or maintenance operation, controller must be disconnected from the power supply;
- Don't open the cover during running the controller;
- Don't put wire ,metal bar filaments etc into the controller;
- Don't splash water or other liquid over the controller;



CAUTION

- The electrical and hydraulic connections must be carried out by competent, skilled.qualified personnel;
- Never connect AC power to output uvw terminals;
- Ensure the motor, controller and power specifications matching;
- Don't install the controller in the following condition;



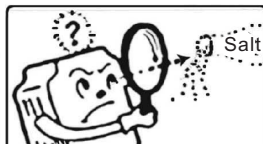
mechanical shock



corrosive gas or
corrosive liquid



Extreme heat and cold,
acceptable temperature
range: -25℃ +55℃



Salt mist corrosion



Rain and Moisture



flammable material:
solvent

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RESPONSIBILITY

The manufacturer is not liable for malfunctioning if the product has not correctly been installed, damaged, modified, and /or run outside the recommended work range or run outside the recommended work range or in contrast with other indications given in this manual.

The manufacturer declines all responsibility for possible errors in this operation manual, if due to misprints or errors in copying.

The manufacturer reserves the right to make any modifications to products that it may consider necessary or useful, without affecting the essential characteristics.

1 INTRODUCTION

Thank you for choosing our products, we will supply you with cordial and well-around service as well as ever.

Intelligent Pump Controller model L932 is an easy to use, programmable controlling & protection device for duplex pumps with direct start, three phase deep well submersible pump, centrifugal pump, pipeline pump etc with output power from 0.75KW to 15KW (1HP-20HP)

Model L932 has many operation modes by adopting different electric installations. An important feature that makes the difference between Model L932 and common On/Off pump control box is the probe / sensor free in the well. Our special design makes it a very reliable and sensitive protection against pump dry run without installation probe / sensor in the well.

1.1 Applications

Model L932 is useful in all cases we need to control and protect single pump managing its turn-on and turn off by different electric installations.

Typical usage scenarios include:

- | | |
|---|---------------------------------|
| -Houses | -Flats |
| -Holidays houses | -Farms |
| -Water supply from wells | -Rain water reuse |
| -Industrial plants | -Waste water tank / Sewage sink |
| -Irrigations of greenhouses, gardens, agriculture | |

1.2 Technical parameter & features

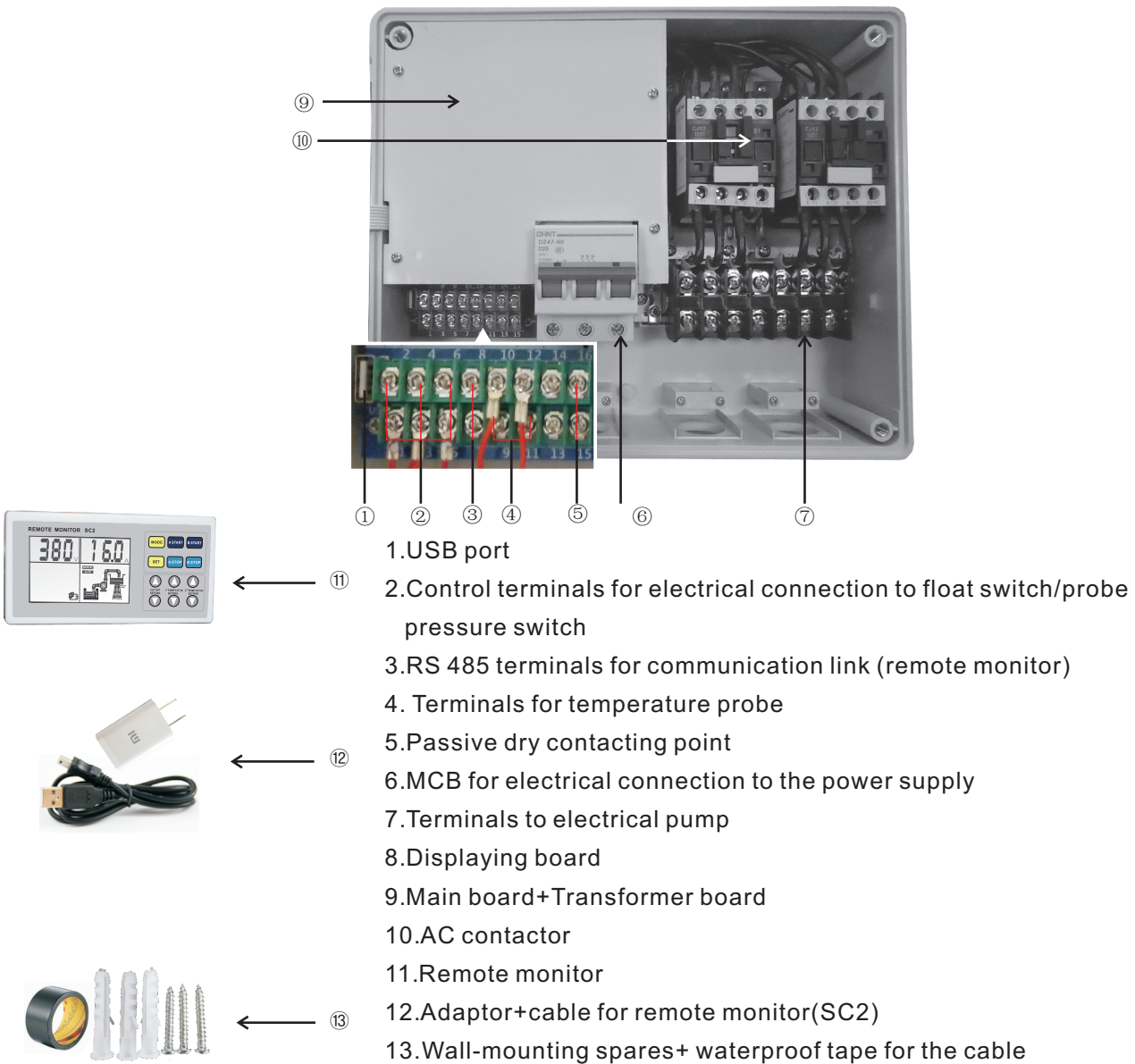
Main features:

- Built In function switch to apply different application
 - applied for water supply by liquid level control
 - applied for water supply by pressure control
 - applied for water drainage by liquid level control
- Double pumps control
 - main pump / standby pump automatically alternate
 - main pump / standby pump automatically switch against malfunctions
 - standby pump participate running if required
- Automatic stops the pump in the case of water shortage, protecting it from dry running without installing float switch or liquid probe in the well
- Auto / Manual Switch
- Protect the pump against many faults
- Dynamic LCD displays pump running information
- Pump accumulative running time displaying
- Pump last five fault record displaying
- Pump shaft anti rust
- RS485 communication
- Starts and stops the pumps in accordance with the different liquid level or pressure setting

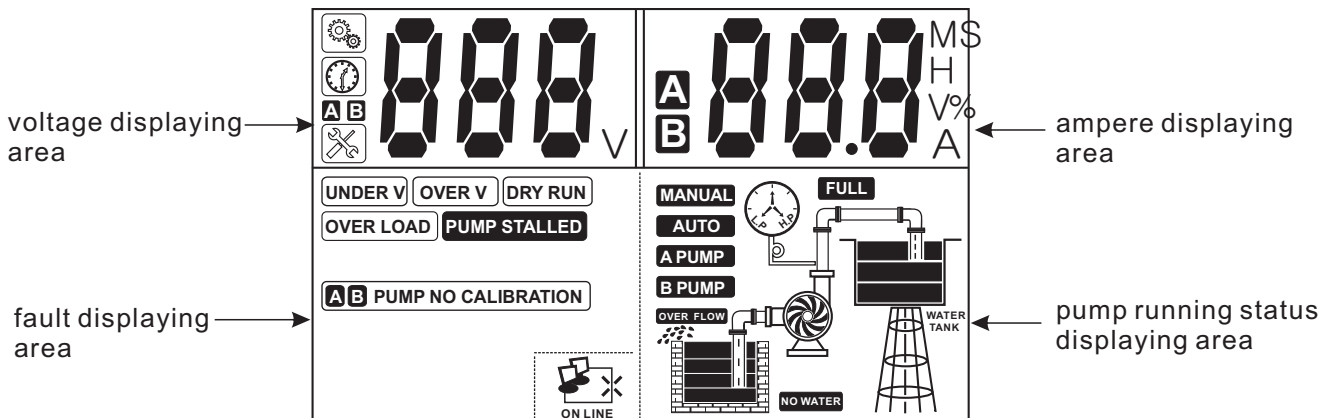
The following chart shows main technical parameters of Model L932

Main technical characteristic	
Control characteristic	double liquid level control pressure control
Control method	Manual / Auto
Liquid level control characteristic	pulse electrode probe & float switch
Pressure control characteristic	pressure switch (n/c) & pressure tank
Main technical data	
Rated output power	0.75-4KW(1HP-5.5HP) 5.5-11KW (7.5HP-15HP) 15KW (20HP)
Rated input voltage	refer to the nameplate
Trip response time of over load	5sec-5min
Trip response time of open phase	<2sec
Trip response time of short circuit	<0.1sec
Trip response time of under / over voltage	<5sec
Trip response time of dry run	6sec
Recovery time of over load	30min
Recovery time of under / over voltage	5min
Recovery time of dry run	30min
Trip voltage of over voltage	115% of rated input voltage
Trip voltage of under voltage	80% of rated input voltage
Liquid level transfer distance	≤1000m
Protection function	Dry run Over load Transient surge Under voltage Over voltage Open phase Pump shaft rust protection Pump stalled Short circuit Over temp Three phase unbalance Phase reversal Repeated start
Main installation data	
Working temperature	-25℃ -- +55℃
Working humidity	20% - 90%RH
Degree of protection	IP54
Install position	Vertical
Unit dimensions (L x W x H)	30.2 x 24x 12cm
Unit weight (net)	2.8kg
RS485 technical data	
Physics Interface	RS485 Bus Interface: asynchronism semiduplex
Baud rate	1200 bps、2400 bps、4800 bps、9600bps Default: 9600bps
Protocol type	MODBUS Protocol (RTU)










1.3 Controller components



- 1.USB port
- 2.Control terminals for electrical connection to float switch/probe pressure switch
- 3.RS 485 terminals for communication link (remote monitor)
- 4. Terminals for temperature probe
- 5.Passive dry contacting point
- 6.MCB for electrical connection to the power supply
- 7.Terminals to electrical pump
- 8.Displaying board
- 9.Main board+Transformer board
- 10.AC contactor
- 11.Remote monitor
- 12.Adaptor+cable for remote monitor(SC2)
- 13.Wall-mounting spares+ waterproof tape for the cable

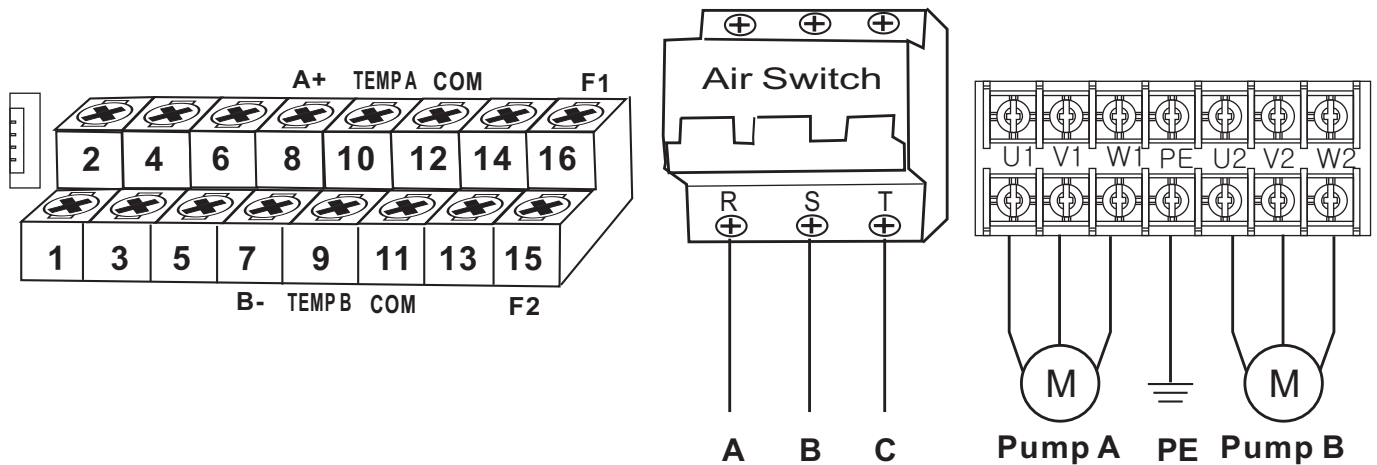


Meaning of the icons shown on the LCD

Icon	Meaning/Description
	pump parameter configuration icon, when this icon appears, pump control box is in parameter adjusting manual;
	time displaying icon, when this icon appears, it means pump control box is displaying some parameter of time, eg: pump accumulative running time (unit: hour); counting down etc
	pump fault icon, when this icon appears, it means pump control box is displaying some fault information;
 ON LINE	network connection error icon, when this icon appears, it means there is no network connections or network connection error between pump control box and SC(slave controller) or computer;
 ON LINE	network normal connection icon, when this icon appears, it means the network connection between pump control box and SC (slave controller) or computer is normal;
V	voltage
M	minute
S	second
H	hour
%	percent
A	ampere
	pump running
	pump stops running
	low pressure or lack of pressure in the pipeline or pressure tank
	high pressure or full of pressure in the pipeline or pressure tank
A	pump A
B	pump B

2 INSTALLATION

2.1 Electrical connection to the power supply line and electrical pump



DANGER Electric shock risk

Before carrying out any installation or maintenance operation, the L932 should be disconnected from the power supply and one should wait at least 2 minutes before opening the appliance.



Never connect AC power to output U1 V1 W1 U2 V2 W2 terminals.



Don't put wire, metal bar filaments etc into the controller.



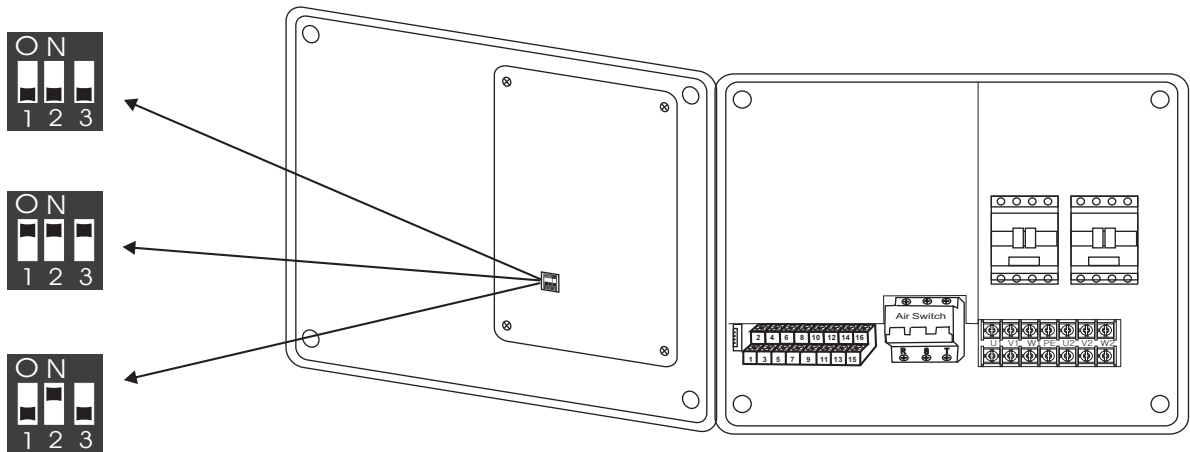
Ensure the motor, controller and power specifications matching.



The electrical and hydraulic connections must be carried out by competent, skilled, qualified personnel.

2.2 Function switch setting

Pump users can set the function switch to meet different application requirement, before setting the function switch, the L932 should be disconnected from the power supply, after complete the setting, apply power to L932 and observe the application sign displayed on the LCD conforming to the following list.



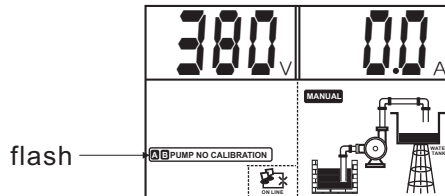
Item	Swit position	Messages & Graphic	Application
1			Applied for irrigation / sewage /drainage with overflow alarm, supporting duplex pump running together if extra water flowing
2			Applied for water supply by booster pumping system through pressure switch& pressure tank, supporting duplex pump running together if more pressure demanding
3			Applied for water supply by level control, supporting duplex pump running together if more water demanding

2.3 Parameter Calibration setting & erasing

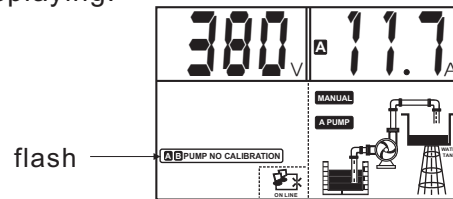
To achieve best level of protection of the pump, it is essential that parameter calibration must be done immediately after successful pump installation or pump maintenance.

Setting the parameter calibration(Pump A)

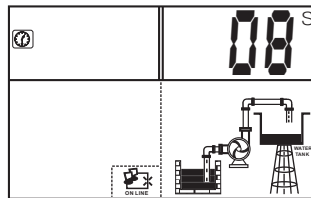
- Press the **MODE** key to switch to manual state, make sure the pump not running and LCD screen displaying:



- Press the **A START** key to run pump, confirm the pump and all pipe network in normal working state (including voltage, running ampere et); LCD screen displaying:

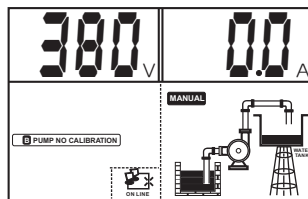


- Press the **STORE** key; The L932 makes a "Di" sound and starts countdown, LCD screen displaying:



- Pump A stops running and parameter calibration completed, LCD screen displaying:

Pump A is ready for running:



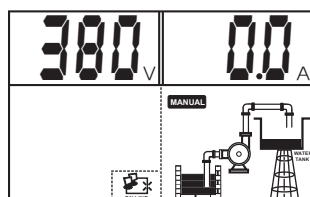
Note:Parameter calibration of pump B is same as pump A,just by pressing **B START button instead of **A START****

Erasing former parameter calibration

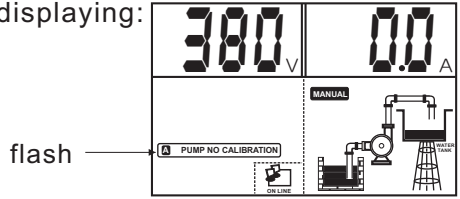
When pump is reinstalled after maintenance or new pump is installed, user must erase the former parameter calibration and a new calibration must be done.

Erasing the parameter calibration(Pump A)

- Press the **MODE** key to switch to manual state, make sure the pump not running and LCD screen displaying:



- Press the **A STOP** key and release till L932 makes a "Di" sound, L932 recover the default factory setting and LCD screen displaying:

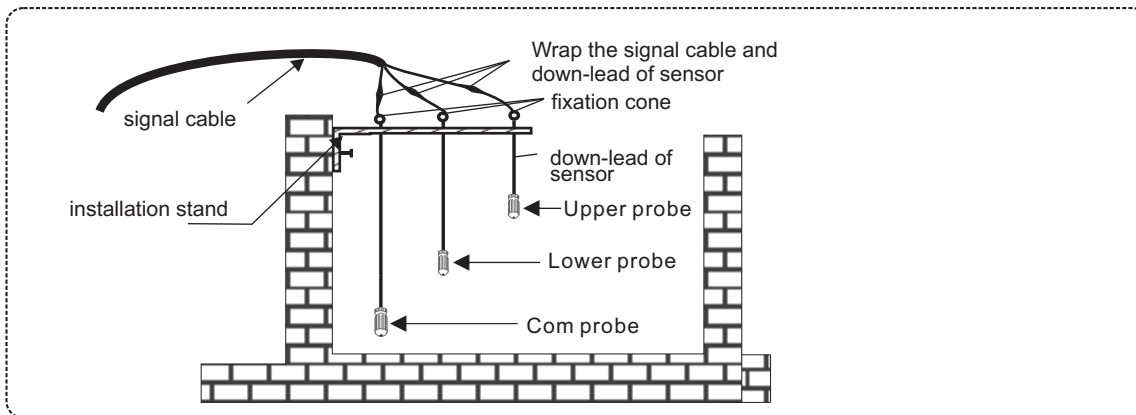


Note:Erasing the Parameter calibration of pump B is same as pump A, just by pressing **B STOP** button instead of **A STOP**

3 ELECTRICAL CONNECTION

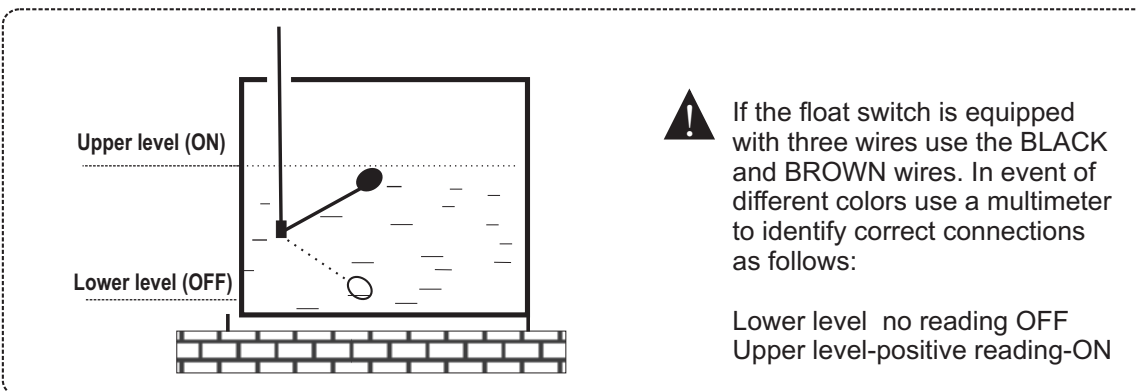
3.1 Installing liquid probe & float switch

Liquid probe installation



! In event of high risk of electric storms (lightning) or when liquid medium in well or tank or sump is very dirty it is recommended float switch is used.

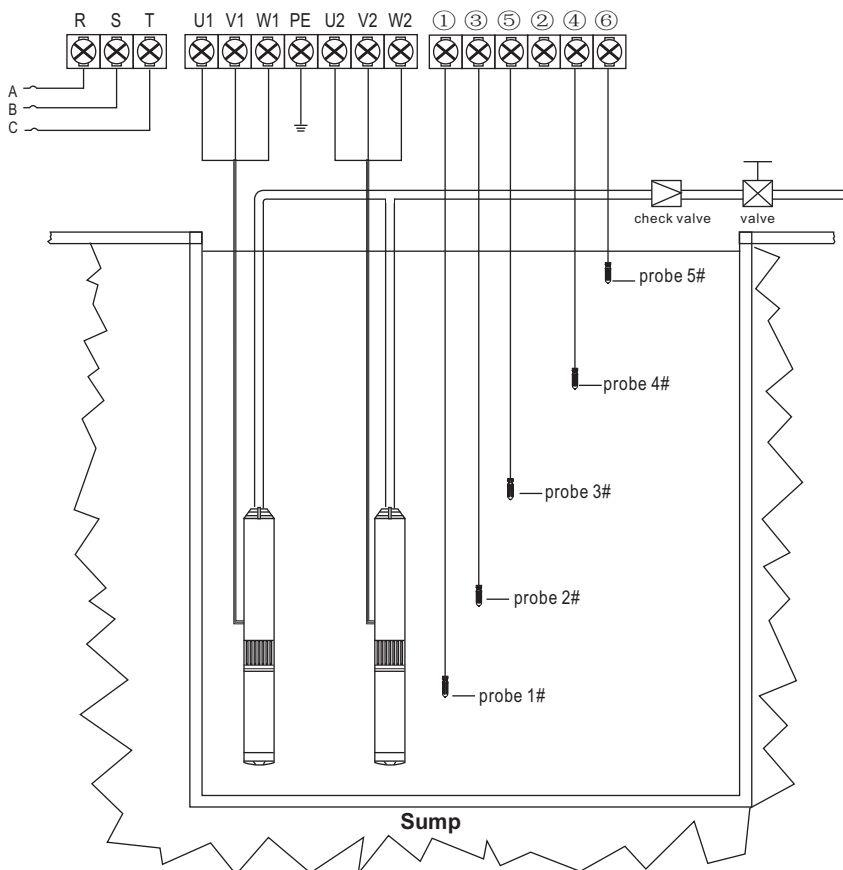
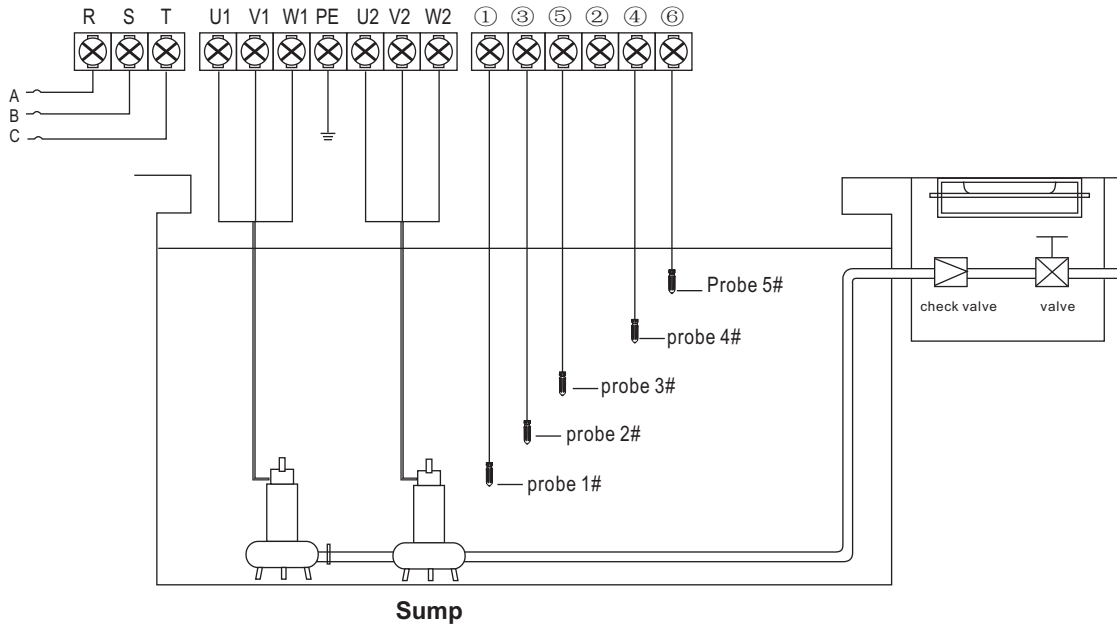
Float switch installation

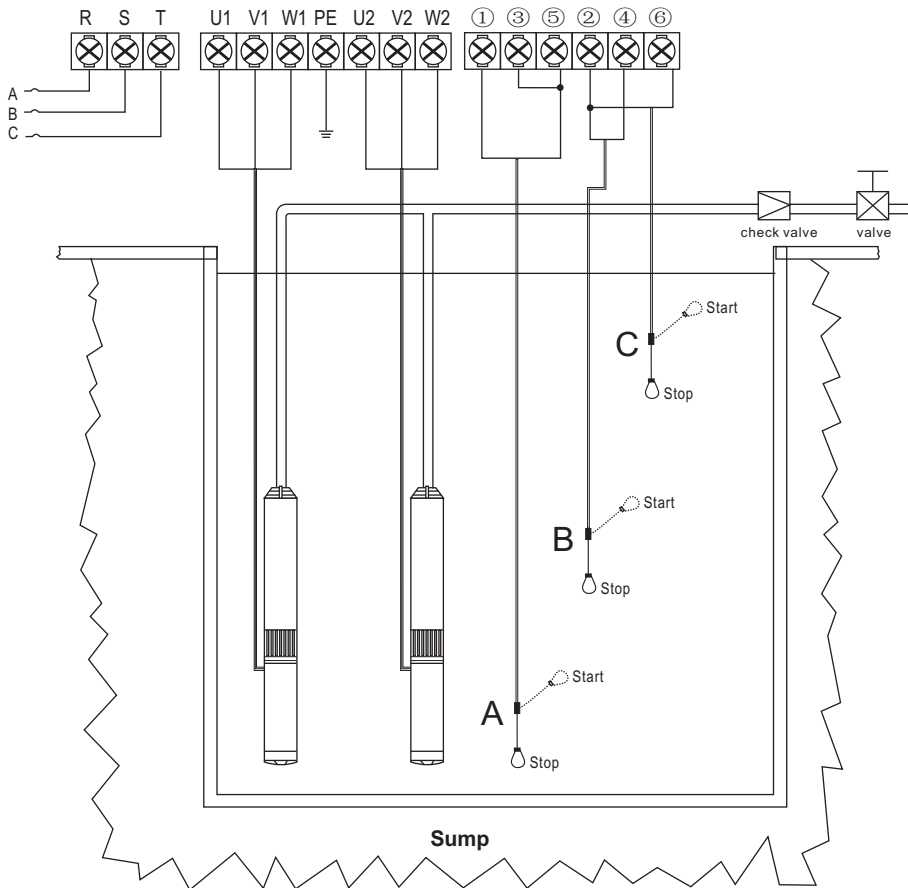
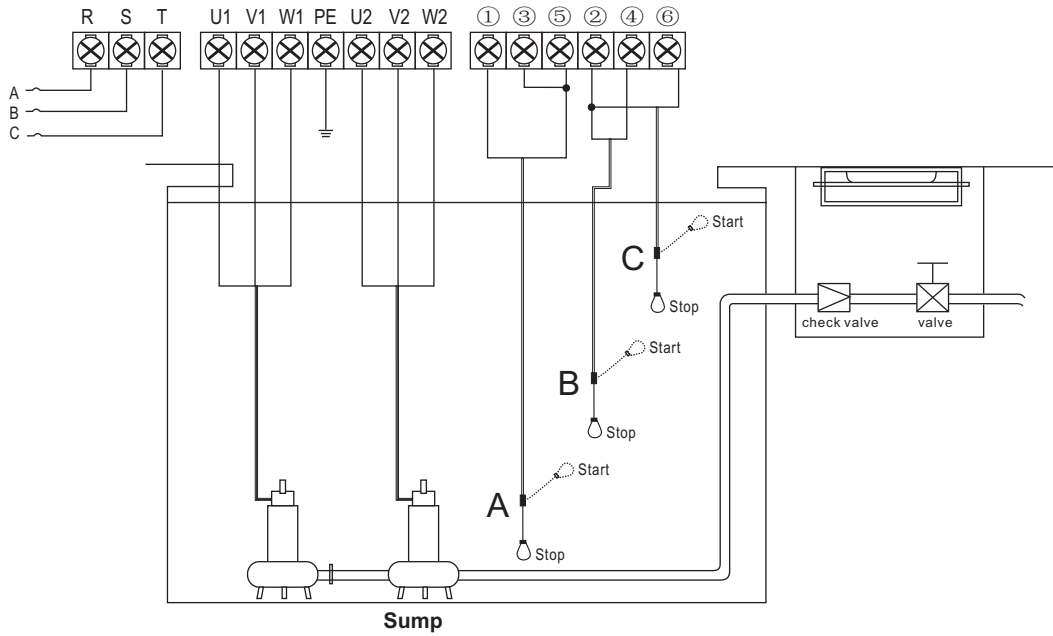


! DO NOT ENCASE SENSOR LEADS, FLOAT SWITCH WIRE OR SIGNAL CABLES IN METAL PIPES. USE PVC OR PE TUBING.

3.2 Electrical connection for different application

3.2.1 Irrigation / sewage / drainage





1). Normal liquid level in the sump

liquid level reaches Probe 3# (Float Switch A: Up Level), control box will order single pump to run; liquid level declines to Probe 2# (Float Switch A:Down Level), single pump stop running;

Control box will alternate double pumps running automatically when the liquid level varies from Probe 2# & Probe 3# (Float Switch A: Up level- Down level)

2). Extra flowing in the sump

when single pump is running to drainage, liquid level in the sump still increase to Probe 4# (Float Switch B: Up Level), control box will order another pump to run simultaneously to drainage, until liquid level declines to Probe 2# (Float Switch A&B:Down Level), double pumps will not stop running.

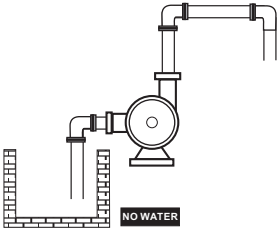
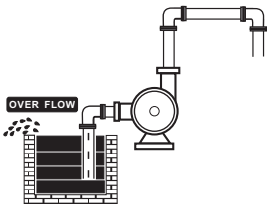
3). Overflow in the sump

when double pumps are running simultaneously, liquid level in the sump still increase to Probe 5# (Float Switch C: Up level), control box will sound warning alarm; When liquid level declines to Probe 5# (Float Switch C Down Level), control box stop sounding warning alarm

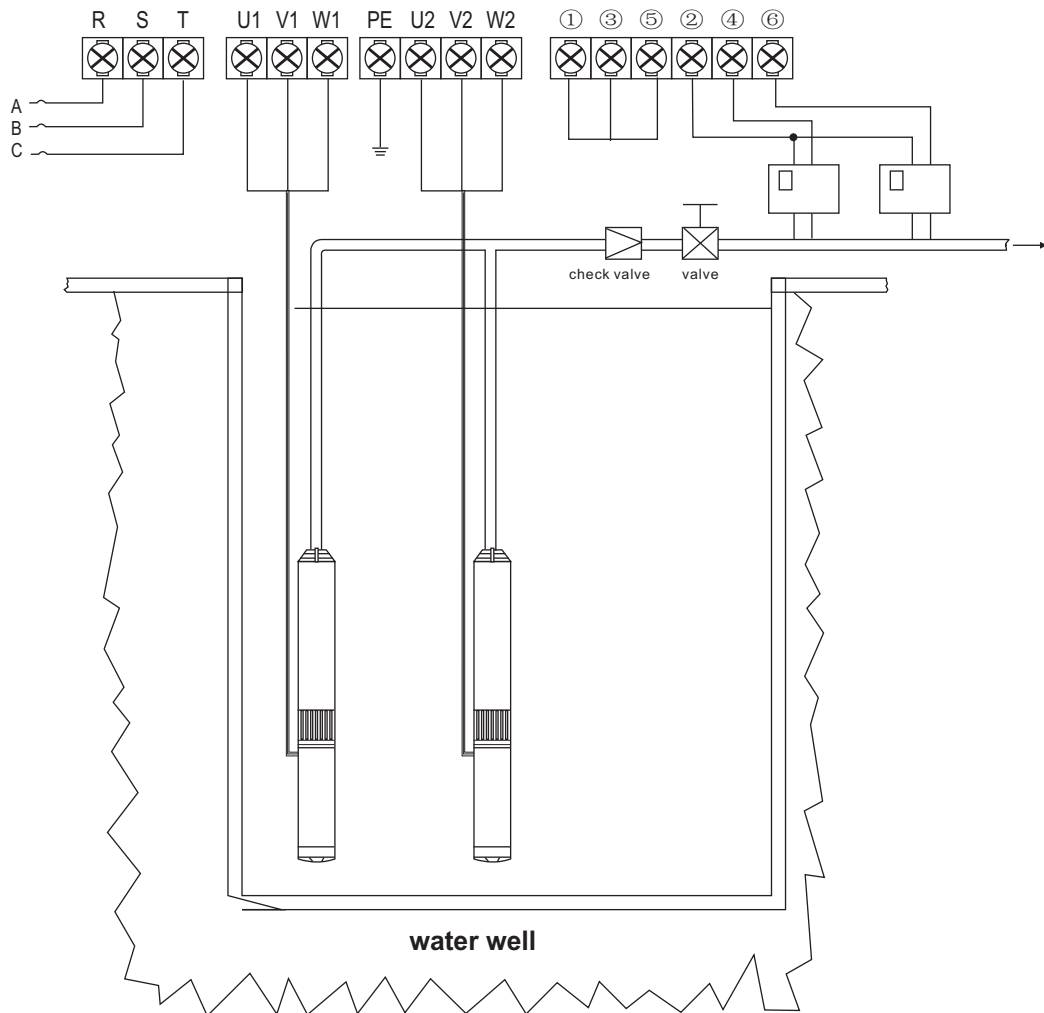
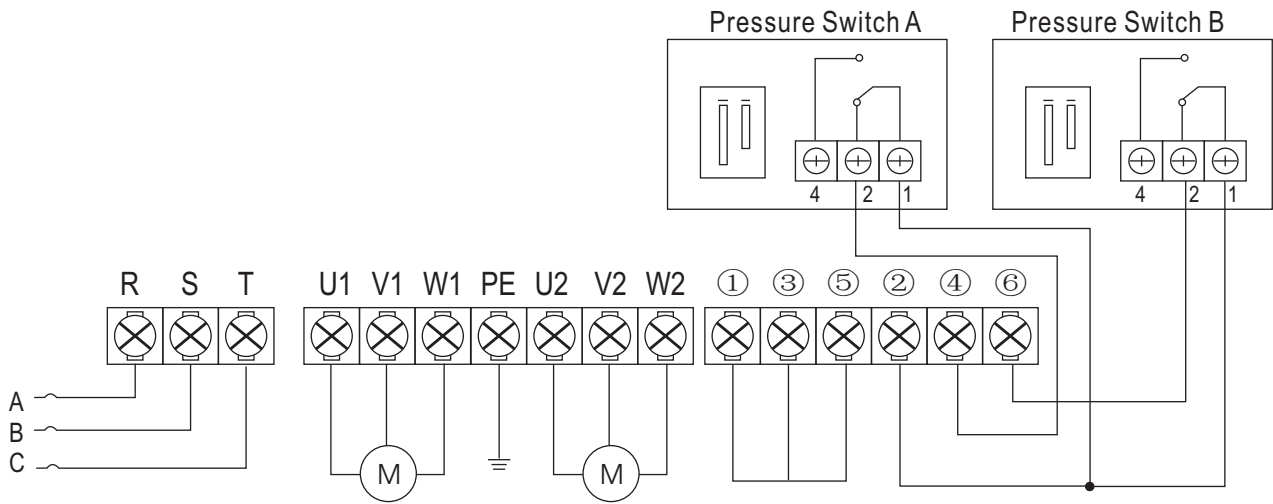
Auto Patrol (Antirust) function

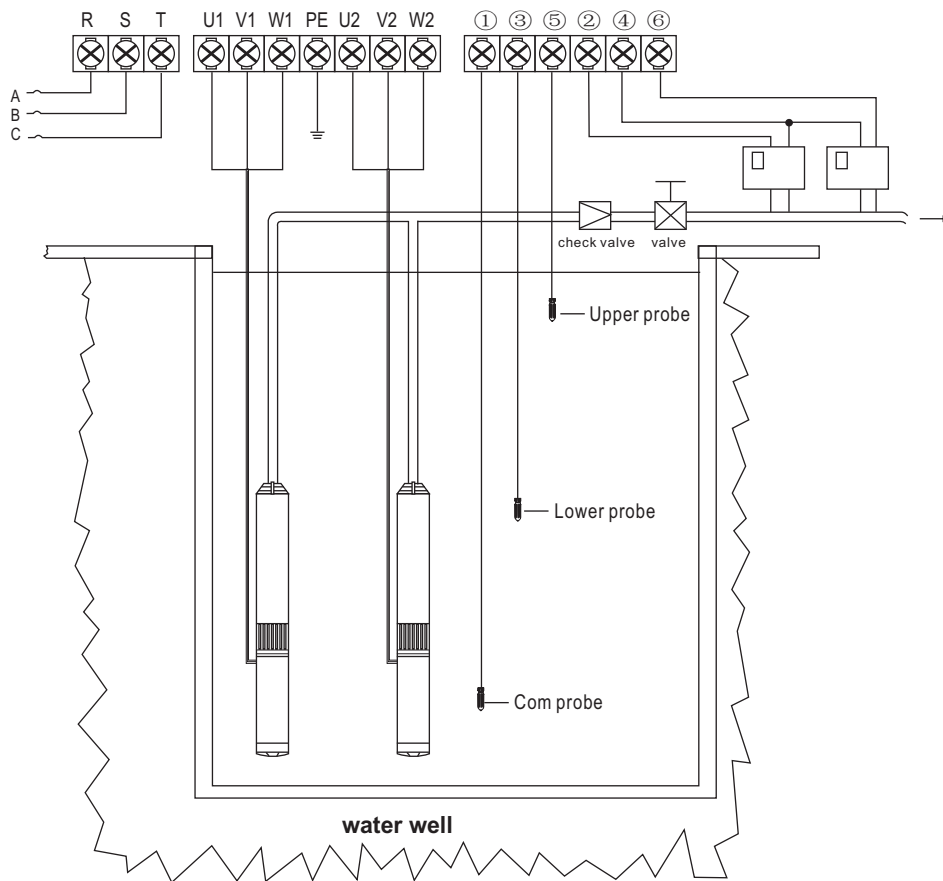
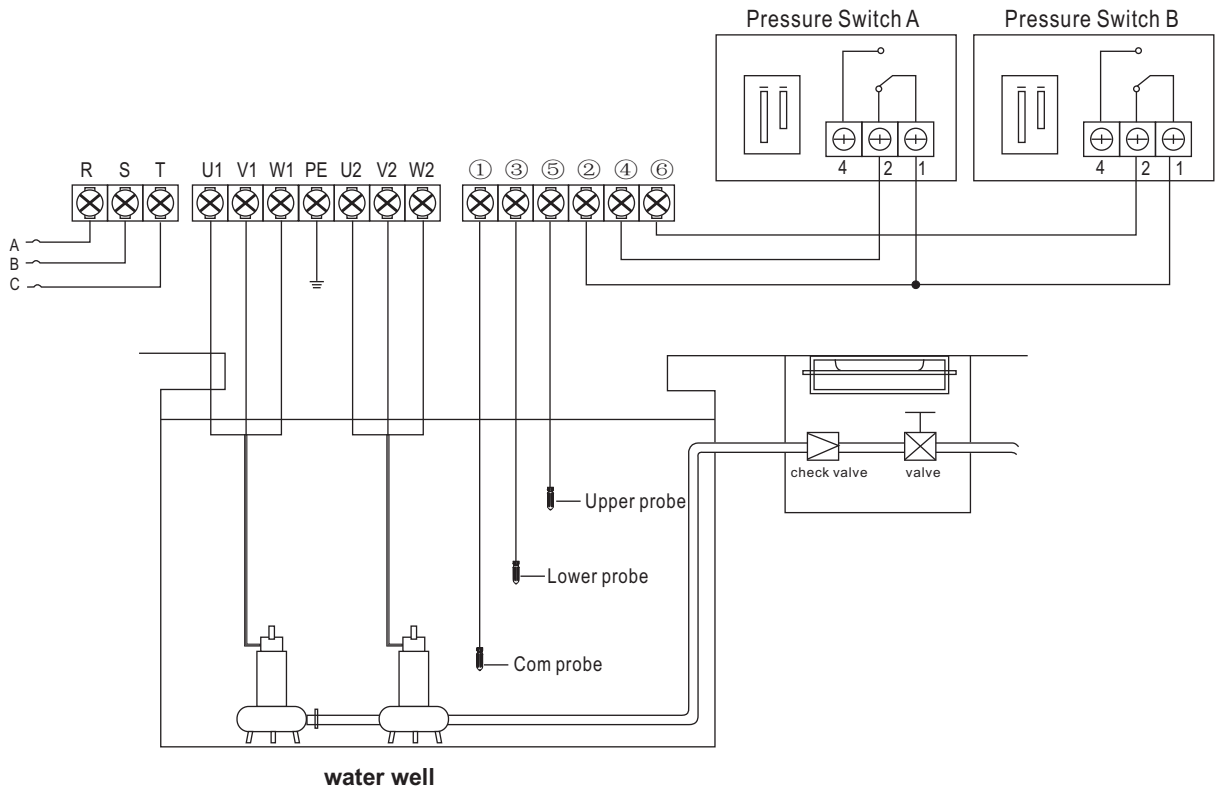
Under Auto state, if control box inspects double pumps not running for ten days, control device will order pump A to run for 3 seconds and stop, after 10seconds interval, control device will order pump B to run for 3 seconds and stop.

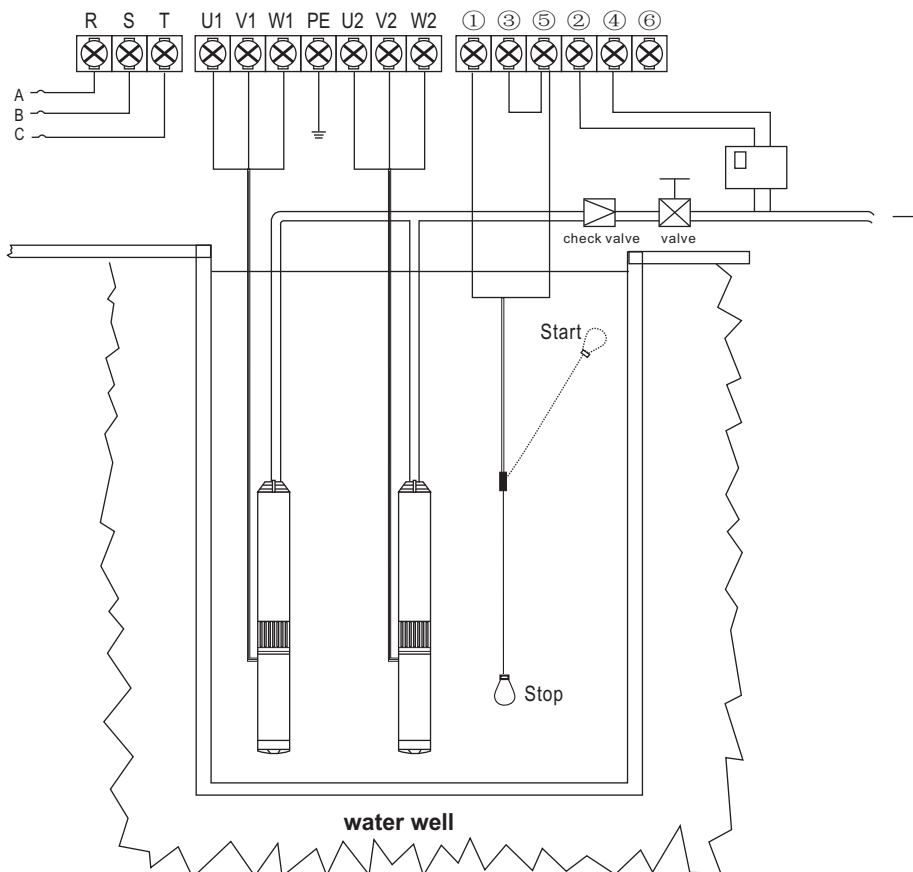
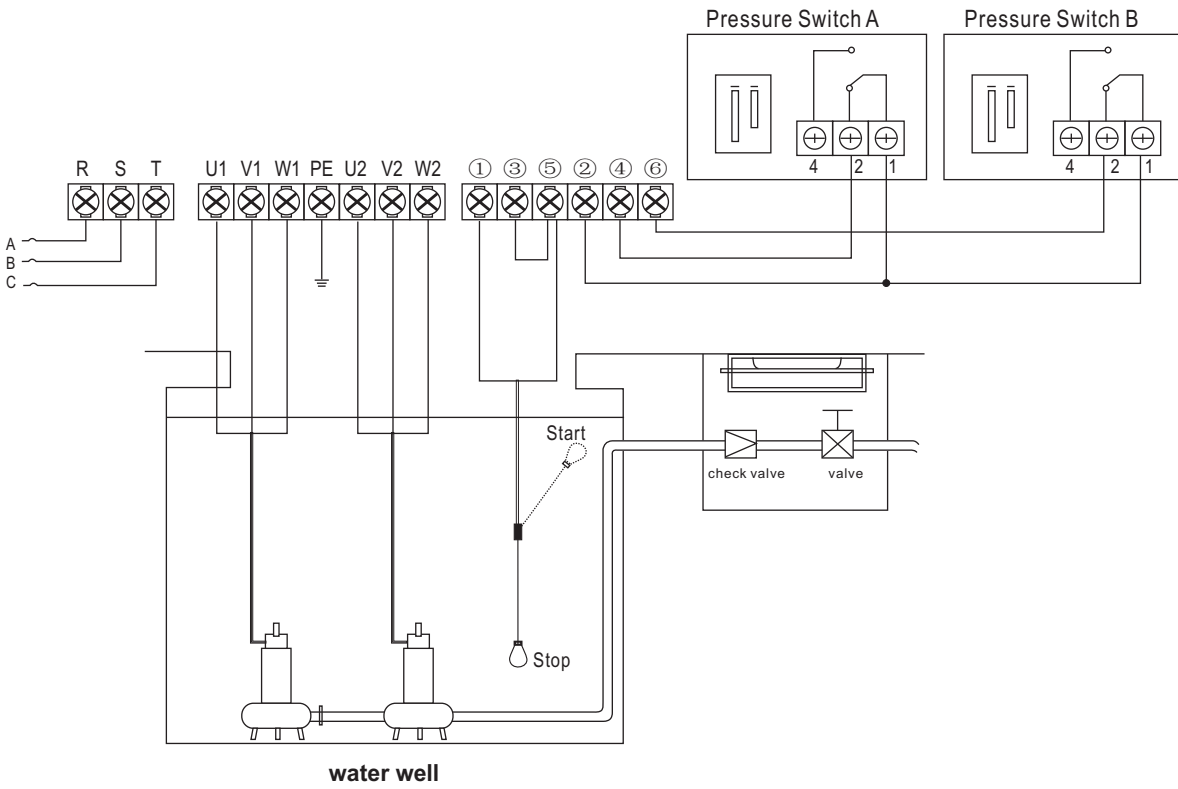
Auto Patrol can prevent pump rusty and impeller jammed owing to long time no running.

Messages & Graphic	Description
	<p>Lack of water in sump</p>
	<p>Overflow in sump</p>

3.2.2 Water supply by booster pumping system through pressure switch & pressure tank







Note 1: suppose the pressure setting of Pressure Switch B is higher than Pressure A

Note 2: pressure switch with N/C (normal close) contacting point, no pressure, contacting point is ON; meet the pressure setting, contact point is OFF

Note 3: user can set the pressure value of the two pressure switches by themselves, but there must be pressure difference between pressure switch A&B

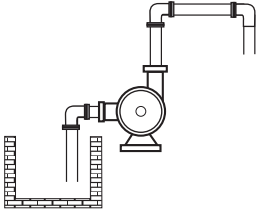
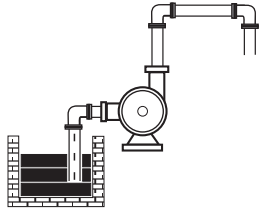
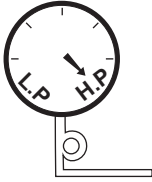
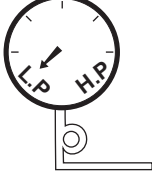
1). Normal pressure demanding

pressure in the pipeline is lower than the setting of pressure switch B, control box will order single pump to run; pressure in the pipeline reaches the setting of pressure switch B, single pump stops running; control box will alternate double pumps running automatically when pressure in the pipeline varies in the range of pressure switch B

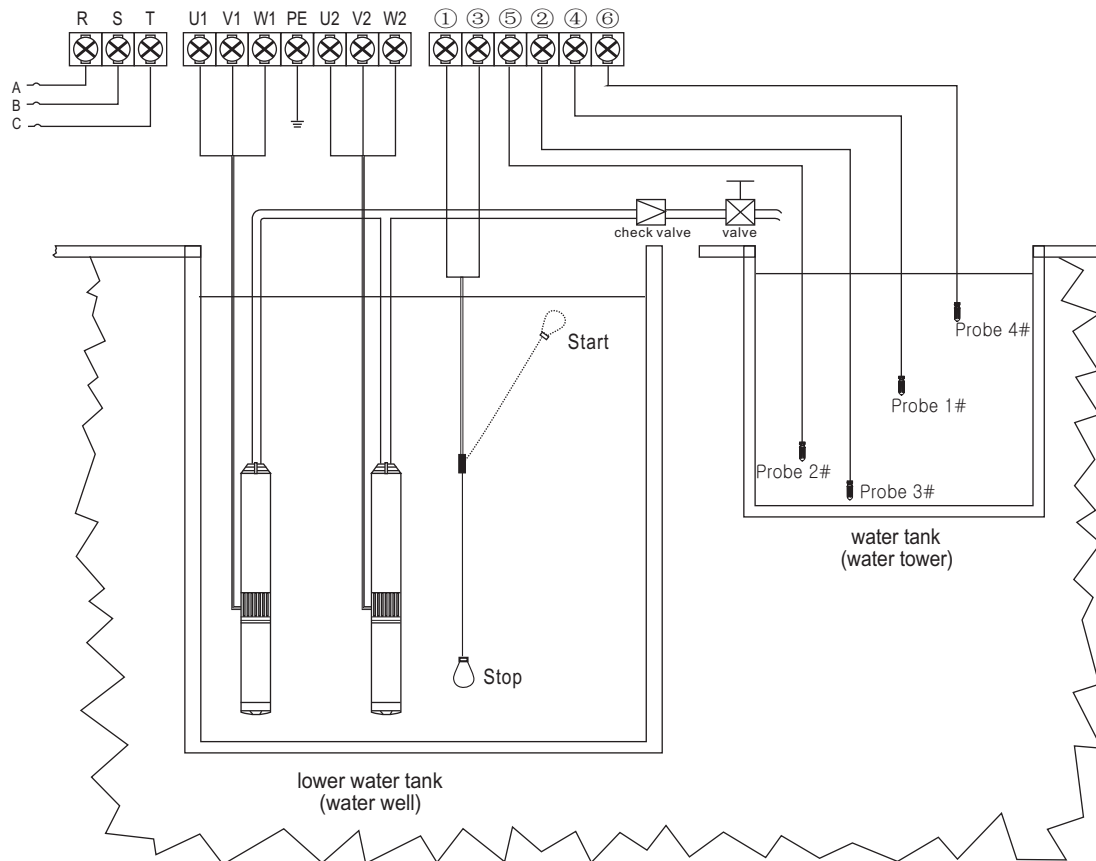
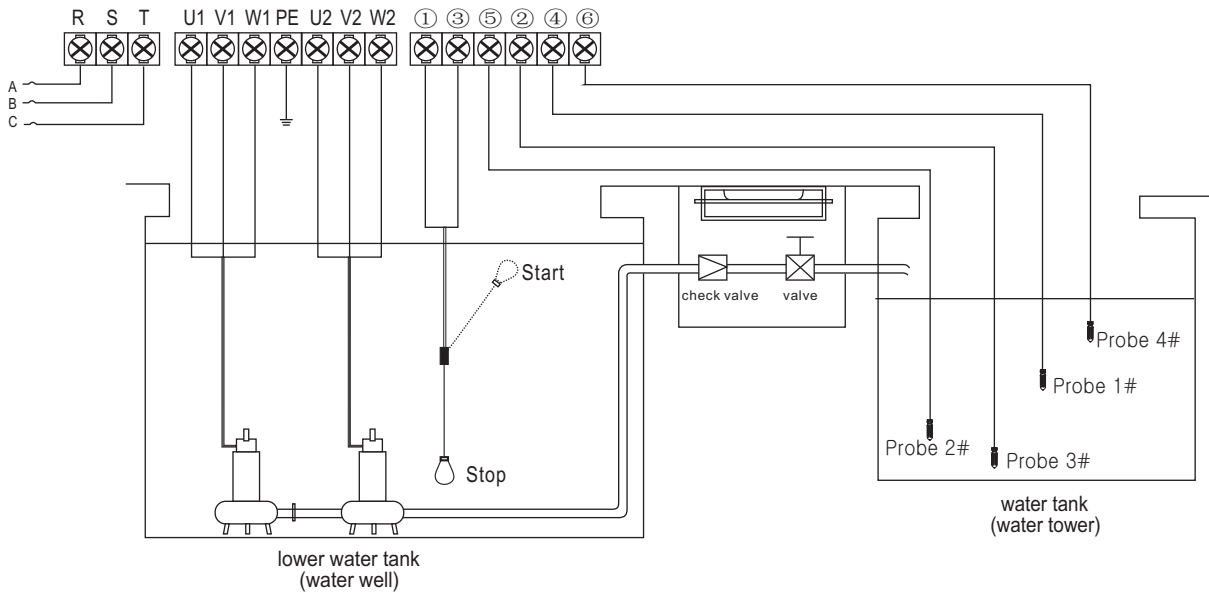
2). Extra pressure demanding

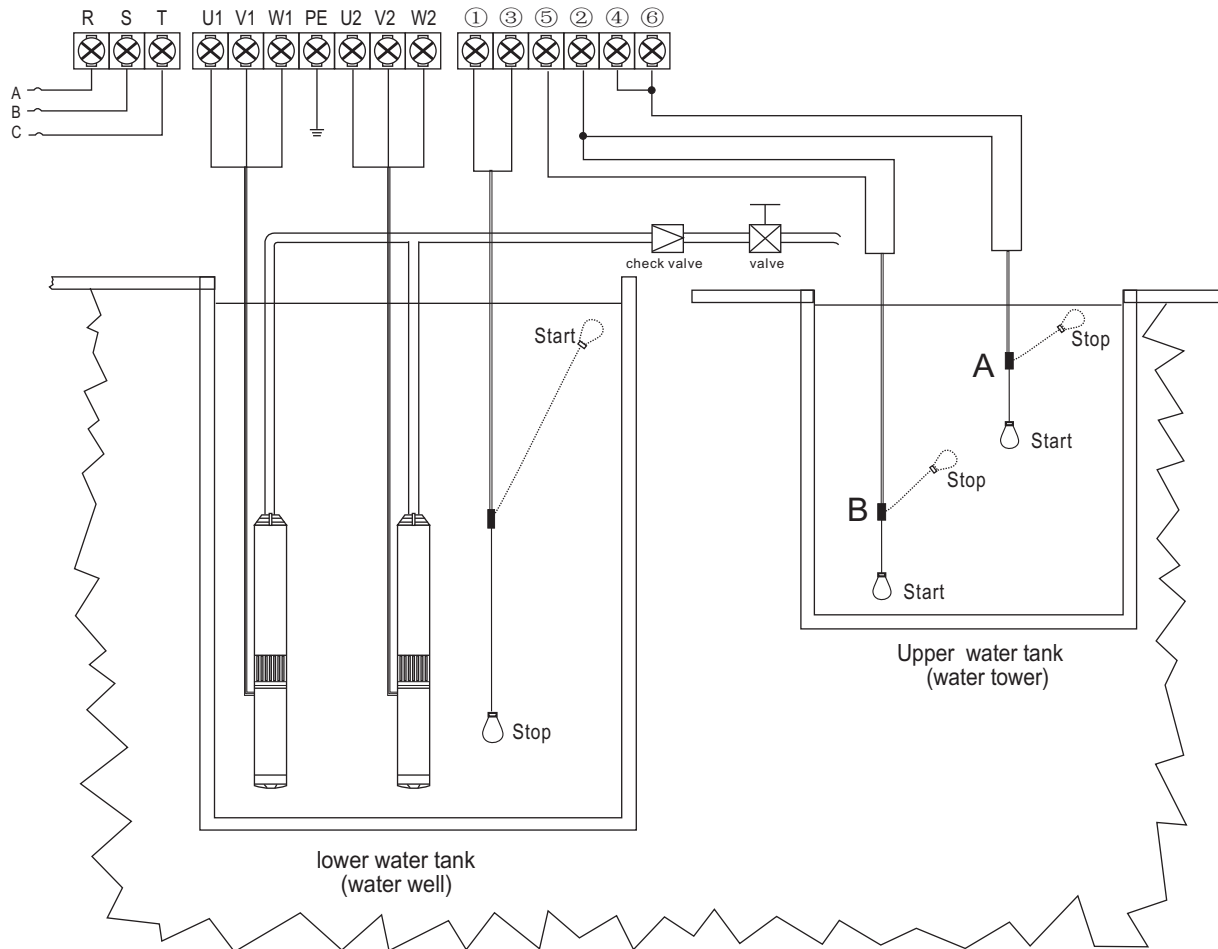
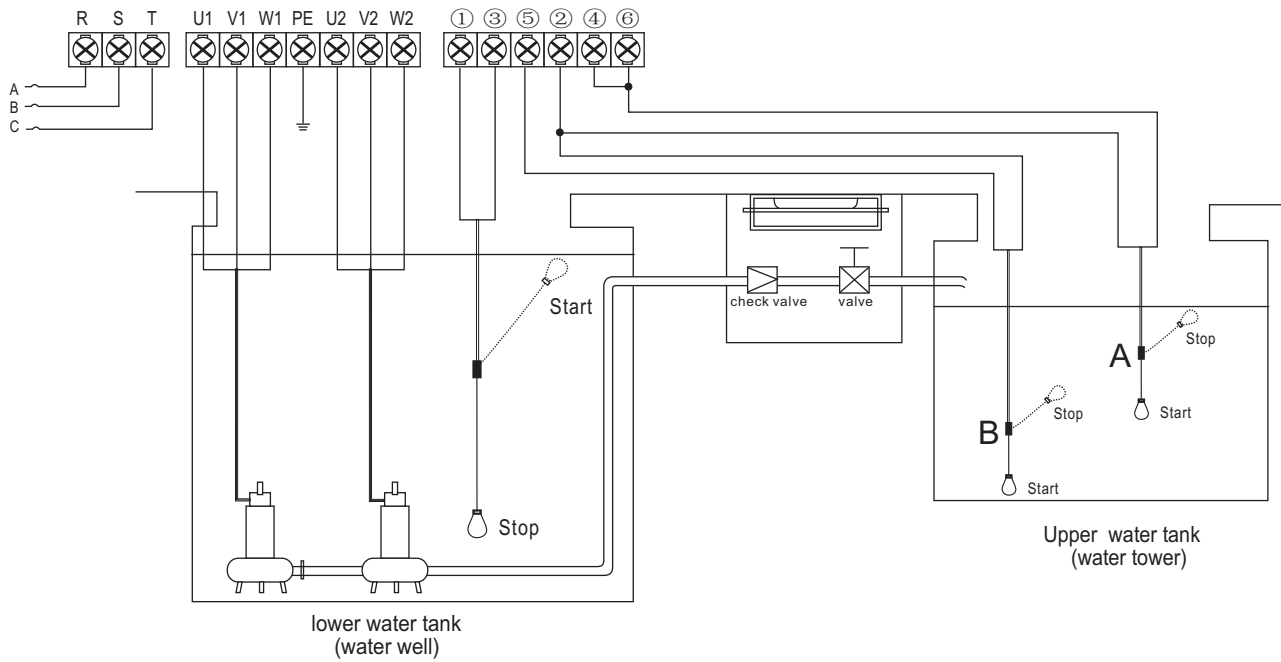
single pump is running, pressure in the pipeline still decrease to the setting of pressure switch A, control box will order another pump to run simultaneously, till pressure in the pipeline reaches the setting of pressure switch B, double pumps will not stop running;

3). Meaning of the messages & graphic shown on the LCD screen

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

3.2.3 Water supply by level control





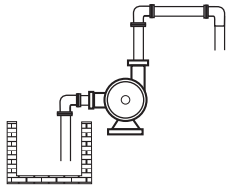
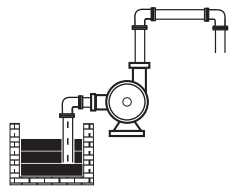
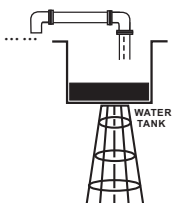
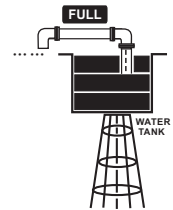
1). Normal water demanding

liquid level in the water storage tank is lower than Probe 1 # (float switch A: Down level), control box will order single pump to run; Liquid level reaches probe 4 # (float switch A: Up level), single pump stops running; control box will alternate double pumps running automatically when liquid level varies from Probe 1# & Probe 4#, (Float Switch A: Down level Up level Down level)

2). Extra water demanding:

when single pump is running, liquid level is still decreasing to Probe 2# (Float Switch B: Down level), control box will order another pump to run simultaneously, until liquid level reaches Probe 4# (Float Switch A & B: Up level), double pumps will not stop running;

3). Meaning of the messages & graphic shown on the LCD screen

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

4 BASIC OPERATION

4.1 Switching to MANULA mode

Press the **MODE** key to switch to manual state, L932 is under the manual control state; under manual state, press the **A START** / **B START** key to run pump; press the **A STOP** / **B STOP** key to stop pump running;

Note: under manual state, the L932 can not receive the signal from liquid level probe or pressure switch.

4.2 Switching to AUTO mode

Press the **MODE** key to switch to auto state, L932 is under the auto control state; under auto state, L932 will run or stop the pump according to the signal from liquid level probe or pressure switch.

Note: under auto state, if the pump is running and pump user wants to stop pump running compulsory, press the **MODE** key to switch to manual state and pump stops running;

Note: under auto state, if the input power being cut off and recovery power again, the L932 will enter operation state after 10seconds countdown;

Note: no matter the L932 is under auto or manual state, if the input power being cut off and recovery power again, the L932 will resume its operation state same as the operation state before power being cut off;

4.3 Pump protection

During pump running, if dry run, over load, under voltage, etc failures happened, the L932 will immediately shut down the pump running and automatically execute a check for restarting conditions after a built in time delay has elapsed. The L932 will not recover automatically until all the abnormal situation(s) have been cleared.

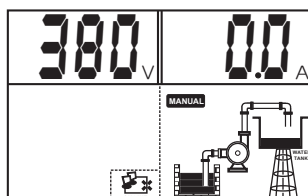
If pump stalled, open phase etc serious failures happened, pump user must check the pump and motor immediately and repair the pump.

4.4 Pump last five failure record displaying

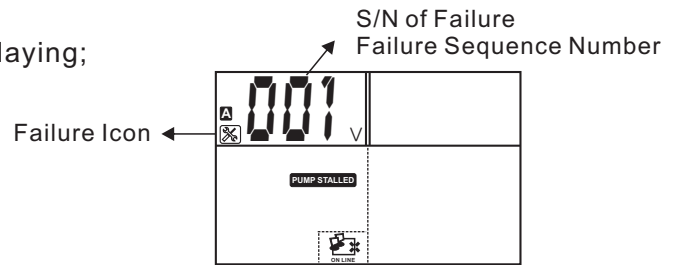
The L932 can memorize the last five failures of pump, so it is very convenient for the pump users to analyse the pump running conditions.

Displaying the pump A last five failure record

- Press the **MODE** key to switch to manual state, make sure the pump not running and LCD screen displaying:



- Hold pressing **A STOP** key and press **MODE** key, the L932 makes a "Di" sound, the L932 displays pump failure record;
- Press **A STOP** key to quit the failure record displaying;



THE LATEST FAILURE OF PUMP A IS PUMP STALLED

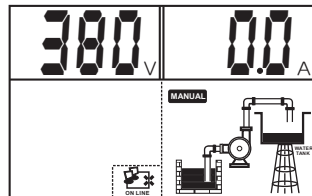
Note: displaying the pump B last five failure record is same as pump A, just by pressing **B STOP** button instead of **A STOP**

4.5 Pump accumulative running time displaying

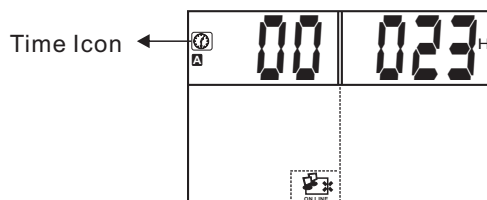
The L932 can memorize how many hours of pump running, so it is very convenient for the pump users to analyse the pump running conditions and do maintenance

Displaying the pump accumulative running time

- Press the **MODE** key to switch to manual state, make sure the pump not running and LCD screen displaying:



- Hold pressing **STORE** key and press **A STOP** key, the L932 makes a "Di" sound, the L932 displays pump failure record;

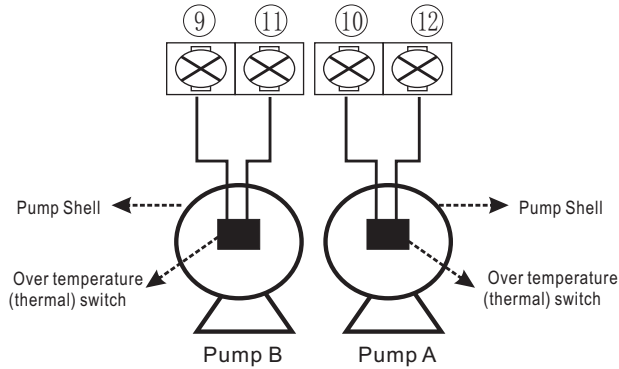


THE PUMPA HAS RUN FOR 23 HOURS

- Press **A STOP** key to quit the accumulative running time displaying;

Note: displaying the pump B accumulative running time is same as pump A, just by pressing **B STOP** button instead of **A STOP**

5 ELECTRICAL CONNECTION FOR PUMP MOTOR WINDING OVER TEMPERATURE PROTECTION



Noted 1: to realize the pump motor winding over temperature protection, it requires there must be over-temp switch embedded in the pump motor winding;

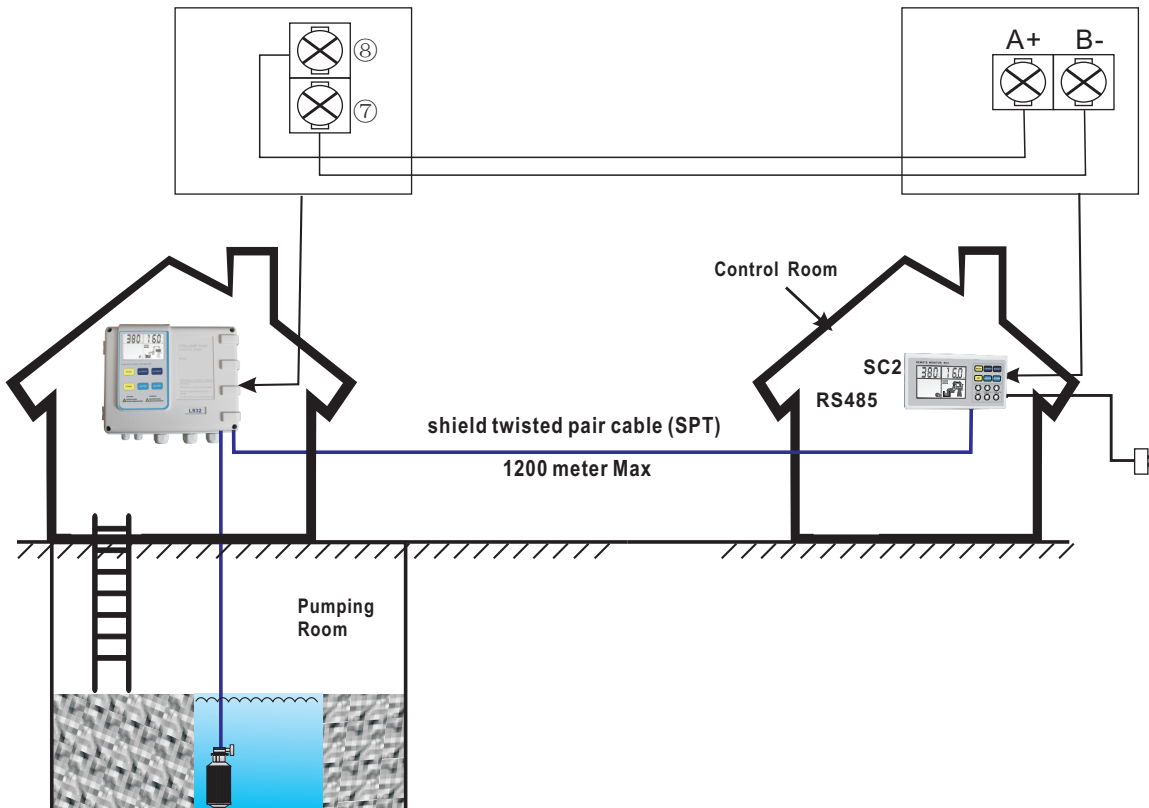
Note 2: the over-temp switch with N/C (normal close) contacting point;

Note 3: if the pump without over-temp switch, please use jumper to connect terminal 9 & 11, terminal 10, 12 separately;

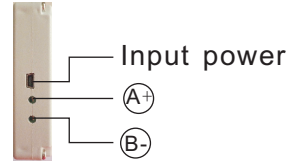
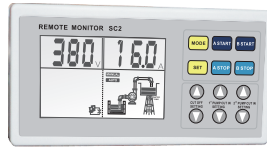
6 COMMUNICATION LINK

Model L932 has communication interface, To adopting simple peripheral equipment (Slave Controller), pump users can realize long distance monitoring function.

This function is applied for L932 installed in the basement, pumping room etc, but pump users require to monitor and control the pump on the ground or in the control room.



6.1 Basic Function



Slave Controller, model SC2 with communication interface can realize long distance monitoring function. In the control room, pump users can realize all functions of L932 (Master Controller) through SC2, including:

voltage & ampere displaying, pump fault displaying, auto / manual switch, pump start/ stop switch, pump running status displaying etc

6.2 Special Application

As adopting communication interface, the wire communication distance is less than 1200metres. For those installation environment which require long distance communication, say: mine, water tower, across railway, road and bridge etc, users can adopt RS485 extender, wireless communication or GSM system.

Please contact the manufacturer for more information.


6.3 Technical parameter

The following chart shows main technical parameters of communication link between L932 & Slave Controller (SC)

Main technical data	
Physics Interface	RS485 Bus Interface: asynchronism semiduplex
Data format	1start bit 8data bit, 1stop bit, no verify 1start bit 8data bit, 2stop bit, no verify Default: 1start bit 8data bit, 1stop bit, no verify
Baud rate	1200 bps、 2400 bps、 4800 bps、 9600bps Default: 9600bps
Communication address	Setting range of controller address: 1-126 127: broadcast address, Host computer broadcasting, Slave machine responson forbidden
Protocol type	MODBUS Protocol (RTU)
Rated input voltage for SC	AC220V/50Hz, Single phase
Main installation data	
wire communication distance	1200meters max by shield twisted pair cable (STP) for RS485 & CAN 5000meters max by STP and RS485 extender
STP	STP-120Ù one pair 20AWG for RS485 & CAN
RS485 extender	5000meters (9600bps)

7 TROUBLE SHOOTING GUIDE

Fault Message	Possible Cause	Solutions
flashing of UNDER V	the real running voltage is lower than the calibrated voltage, pump is in under voltage protection state	report low line voltage to the powersupply company
		L932 will attempt to restart the pump every 5minutes until line voltage is restored to normal
flashing of OVER V	the real running voltage is higher than the calibrated voltage, pump is in over voltage protection state	report high line voltage to the power supply company
		L932 will attempt to restart the pump every 5minutes until line voltage is restored to normal
flashing of PUMP STALLED	pump motor running ampere increasing was greater than the normal running ampere (calibrated ampere) by more than 200%	cut off power supply & repair or replace pump immediately
flashing of OVER LOAD	the real running ampere is higher than the calibrated running ampere, pump is in over load protection state	L932 will attempt to restart the pump every 30minutes until running ampere is restored to normal
	pump impeller is jammed / pump motor dragging / pump bearing broken	check pump impeller or bearing
flashing of OPEN PHASE	power supply lose phase	report to the power supply company
	controller inlet wire or pump cable broken	repair inlet wire or pump cable
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	L932 will attempt to restart the pump every 30minutes until liquid level above the pump intake
flashing of THREE PHASE UNBALANCE	the real voltage (ampere) between three phase (R/S/T) is not same and the difference is more than $\pm 15\%$	<p>report to the power supply company</p> <p>L932 will attempt to restart the pump every 5minutes until the voltage (ampere) between three phase s restored to normal</p>
flashing of PHASE REVERSAL	sequence of the three phase input voltage (R/S/T) error	change the sequence of the three phase (R/S/T)
flashing of REPEATED START	pump starts more than 5times per minutes	<p>The most common cause for the rapid cycle condition is a waterlogged tank.</p> <p>Check for a ruptured bladder in the water tank. Check the air volume control or snifter valve for proper operation.</p> <p>Check the setting on the pressure switch and examine for defects.</p> <p>Cut off the power supply & repair the water tank, pressure switch or valve</p>
flashing of OVER TEMP	The temperature in pump motor winding is high and the contacting point of the thermal switch is in open circuit state	Waiting the temperature in pump motor winding cooling down, the contacting point of the thermal switch is close circuit state
	no communication link between SC / computer and L932	connecting the L932 to SC / computer to realize long distance monitoring