

Intelligent Pump Controller

Installation & Operation Manual

L932/S

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.



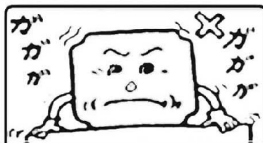
WARNING!!

- 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;



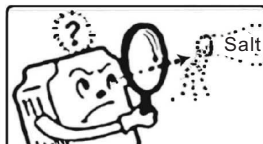
mechanical shock



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/S is an easy to use, programmable controlling & protection device for duplex sewage pump with direct start, three phase, 0.75KW-15KW (1HP-20HP)

1.1 Applications

Model L932/S is specially designed for sewage pumping system, by adopting level transmitter with 0.5-4.5V analog signal, pump user can easily set the different liquid depth for sewage pump operation and observe the dynamic liquid depth in the sump or sewage tank.

Typical usage scenarios include:

- Houses
- Holidays houses
- Industrial plants
- Flats
- Farms
- Construction site

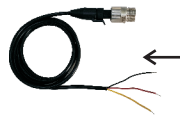
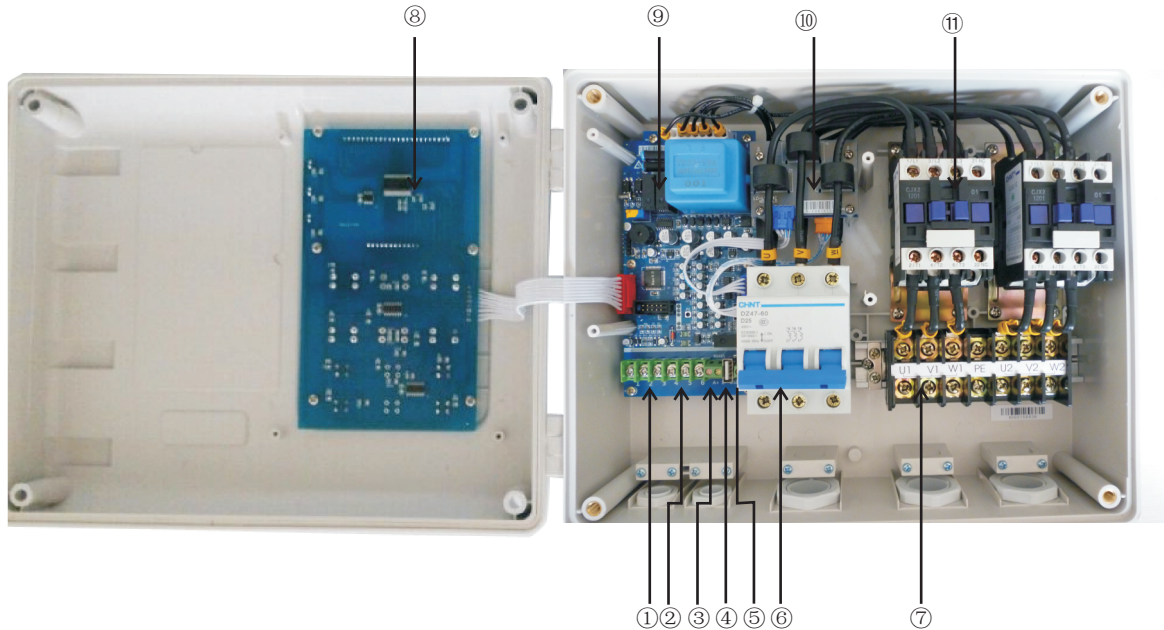
1.2 Technical parameter & features

- Double pumps control
 - main pump / standby pump automatically alternate
 - main pump / standby pump automatically switch malfunctions
 - standby pump participate running if required
- Present level transmitter with 0.5-4.5V analog signal
- Easily setting the different liquid depth for sewage pump operation and observing dynamic liquid depth in the sump or sewage tank.
- Eliminates the float switch or liquid sensor installed in the sump or sewage tank
- Auto / Manual switch
- Protect the pump against many faults
- Dynamic LCD displaying the real liquid depth
- Dynamic LCD displaying pump running information
- Pump accumulative running time displaying
- Pump last five fault record displaying
- Pump shaft anti rust
- Present remote monitor
- Present one dry contact point

The following charts shows main technical parameters of model L932/S

Main technical characteristic	
Control characteristic	Level control
Control method	Manual / Auto
Level control characteristic	Level transmitter
Main technical data	
Rated output power	0.75-15KW (1HP-20HP) refer to the nameplate
Rated input voltage	AC220V-AC415V /50HZ Three Phase 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	+15% of the rated input voltage
Trip voltage of under voltage	-20% of the 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	Horizontal
Unit dimensions (L x W x H)	31 x 22x 12cm
Unit weight (net)	3.6kg
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



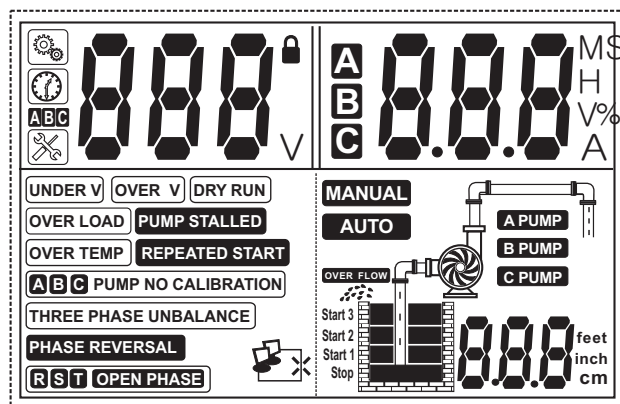
- 1. Control terminals for electrical connection to float switch
- 2. The terminals for Level transmitter
- 3. RS 485 terminals for communication link (remote monitor)
- 4. USB port
- 5. Passive dry contacting point
- 6. MCB for electrical connection to the power supply
- 7. Terminals to electrical pump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

voltage displaying area →








← ampere displaying area

fault displaying area →

← pump running status displaying area



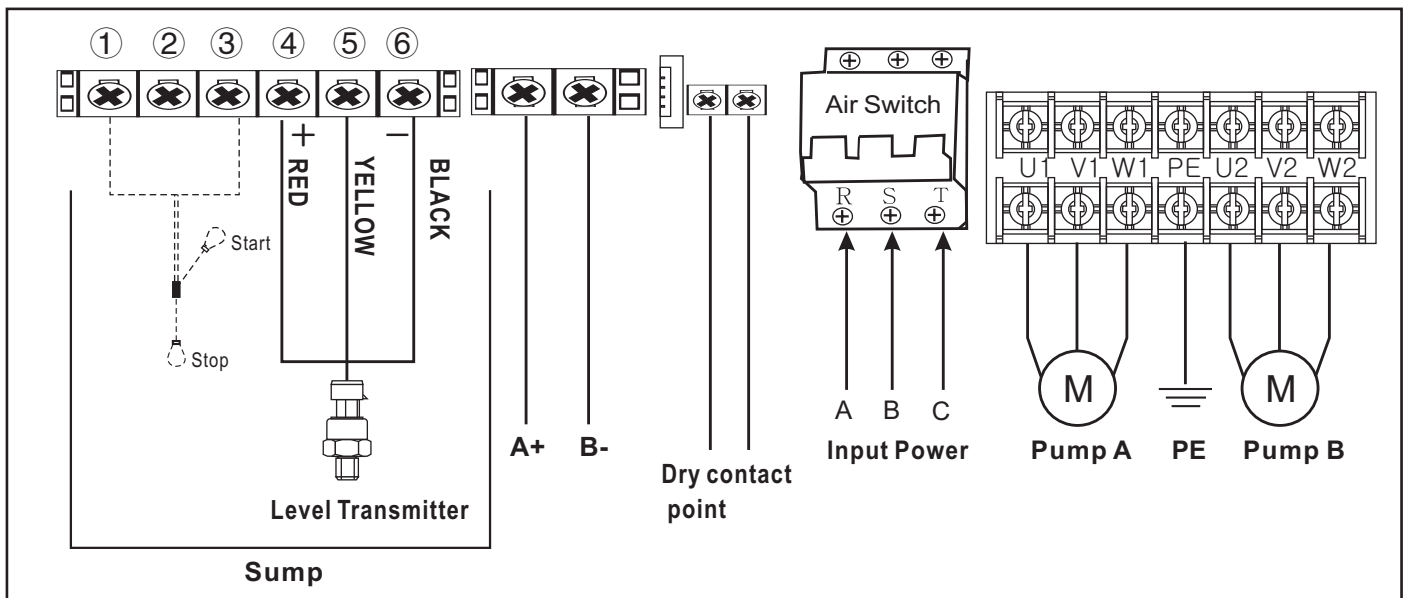
Meaning of the icons shown on the LCD

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
A	pump A
B	pump B
C	pump C

Icon	Meaning/Description
Stop	depth value for cut off setting
Start 1	depth value for 1 st pump cut in setting
Start 2	depth value for 2 nd pump cut in setting
Start 3	depth value for 3rd pump cut in setting
feet/inch/cm/m	depth unit

2 INSTALLATION

2.1 Electrical connection to the power supply line and electrical pump



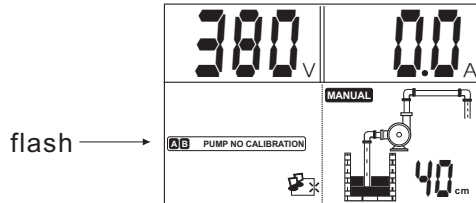
- ⚡ DANGER Electric shock risk**
Before carrying out any installation or maintenance operation, the L932/S should be disconnected from the power supply and one should wait at least 2 minutes before opening the appliance.
- ⚡ Never connect AC power to output U1 V1 W 1 U2 V2 W2 terminals.**
- ⚠ Don't put 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 Parameter Calibration setting & erasing

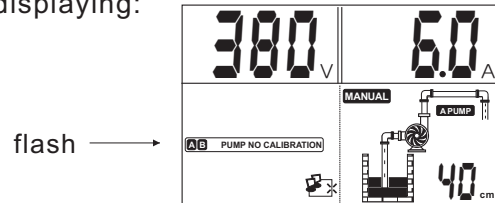
To achieve best level of protection of the pump, it is essential that parameter calibration must be done immediately after successful pump installation or pump maintenance.

Setting the parameter calibration(Pump A)

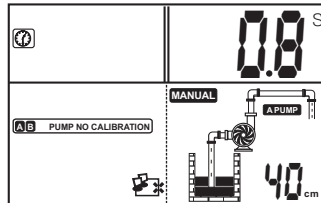
- Press the **MODE** key to switch to manual state, make sure the pump not running and LCD screen displaying:



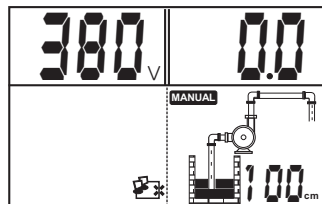
- Press the **A START** key to run pump, confirm the pump and all pipe network in normal working state (including voltage, running ampere et); LCD screen displaying:



- Press the **STORE SET** button; The L932/S 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:

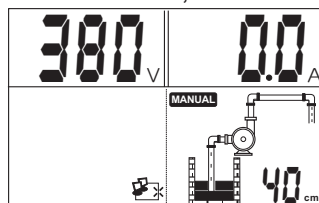
Note: Parameter calibration of pump B is same as pump A, just by pressing **B START button instead of **A START****

Erasing former parameter calibration

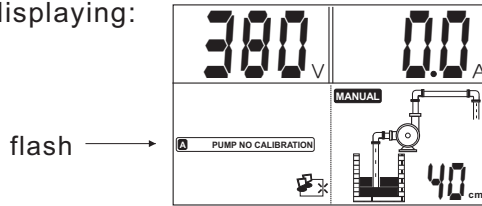
When pump is reinstalled after maintenance or new pump is installed, user must erase the former parameter calibration and a new calibration must be done.

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:



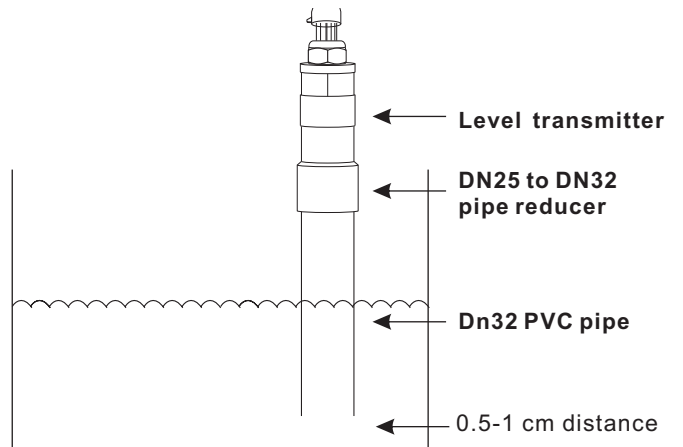
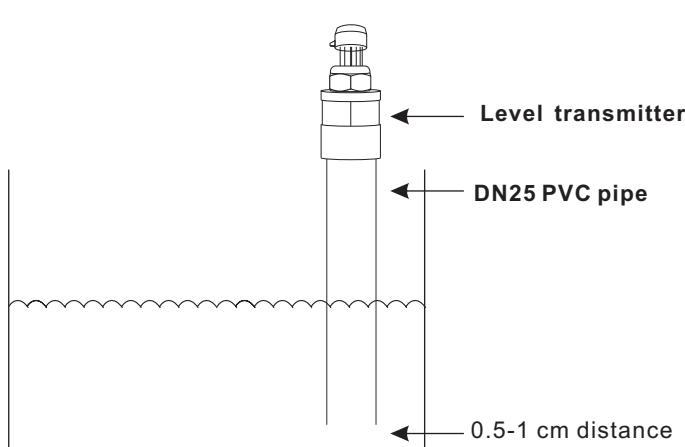
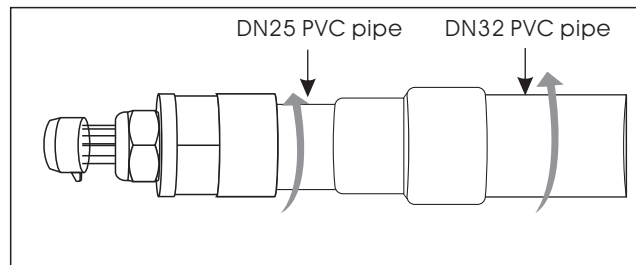
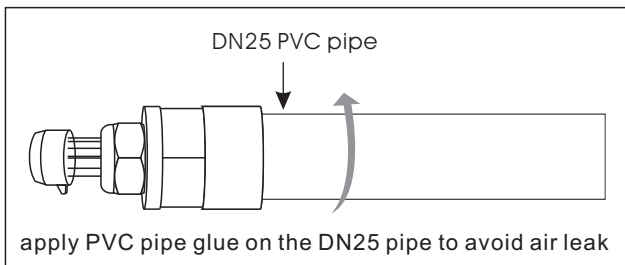
- Press the **A STOP** key and release till L932/S makes a "Di" sound, L932/S recover the default factory setting and LCD screen displaying:



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 Level transmitter and PVC pipeline



Installation notes:

- 1) The bottom of the PVC pipe and sewage pool keep 0.5-1 cm distance.
- 2) If in sewage pool the impurities or sludge thicker, users can use DN25 to DN32 pipe reducer connected to the large diameter PVC pipe, it can effectively prevent wrong pressure measurement if the sludge attached on the inner wall of the pipe

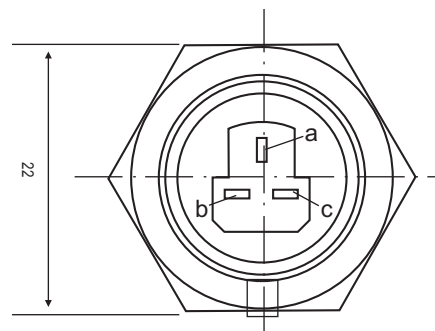
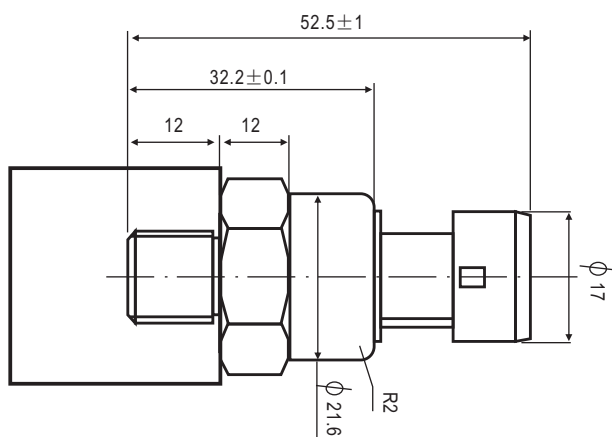
3.2 Installing level transmitter

Technical parameter

The following chart shows the main the technical parameters of pressure transmitter

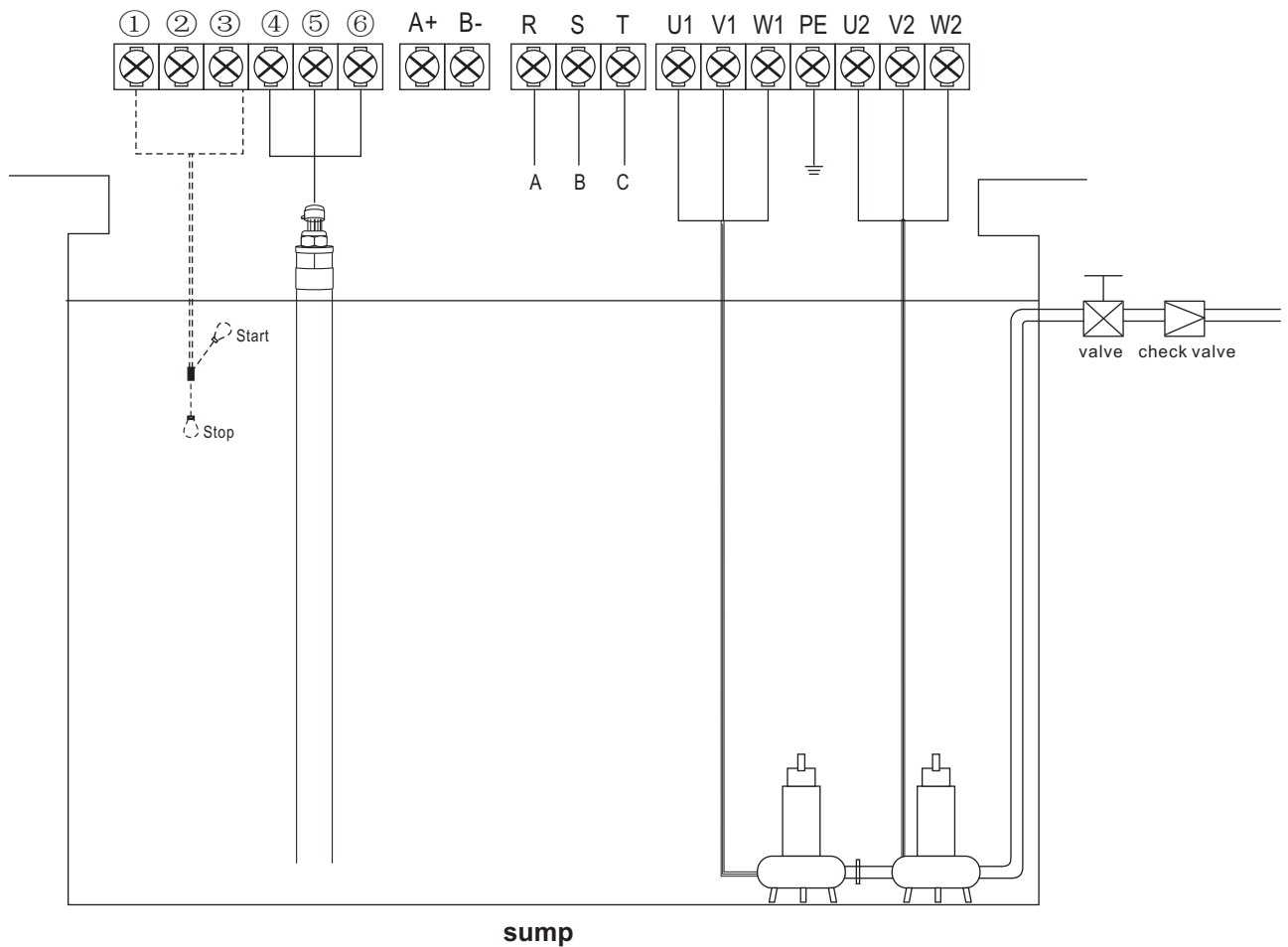
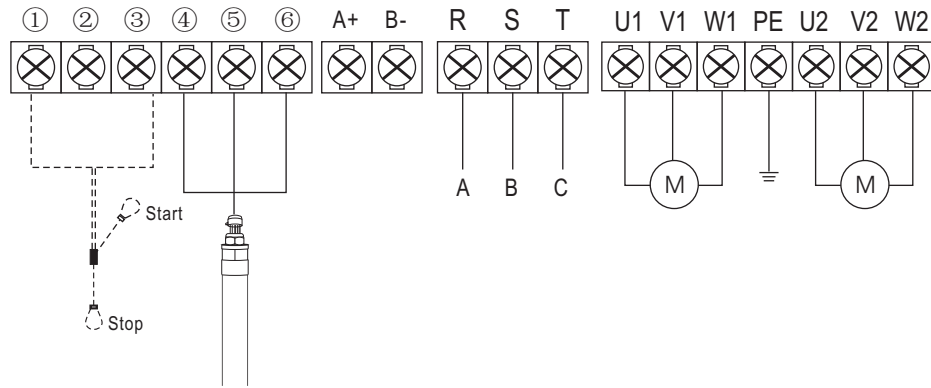
Main technical data	Value
Measure Range	0-2 meter depth for more depth range, please contact manufacturer
Power Supply	5 ± 0.5 VDC
Output Signal	0.5-4.5V
Accuracy	$\pm 2\%$ FS (-10°C-100°C)
Overload Pressure	$2 \times$ RP (rated pressure)
Broken Pressure	$3 \times$ RP (rated pressure)
Insulation	$\geq 10M\Omega @ 50V$
Response Time	< 10 ms
Wires	Three-wire
Elec. connector	Packard
Pressure Port	G1/2
Shell Protection	IP65

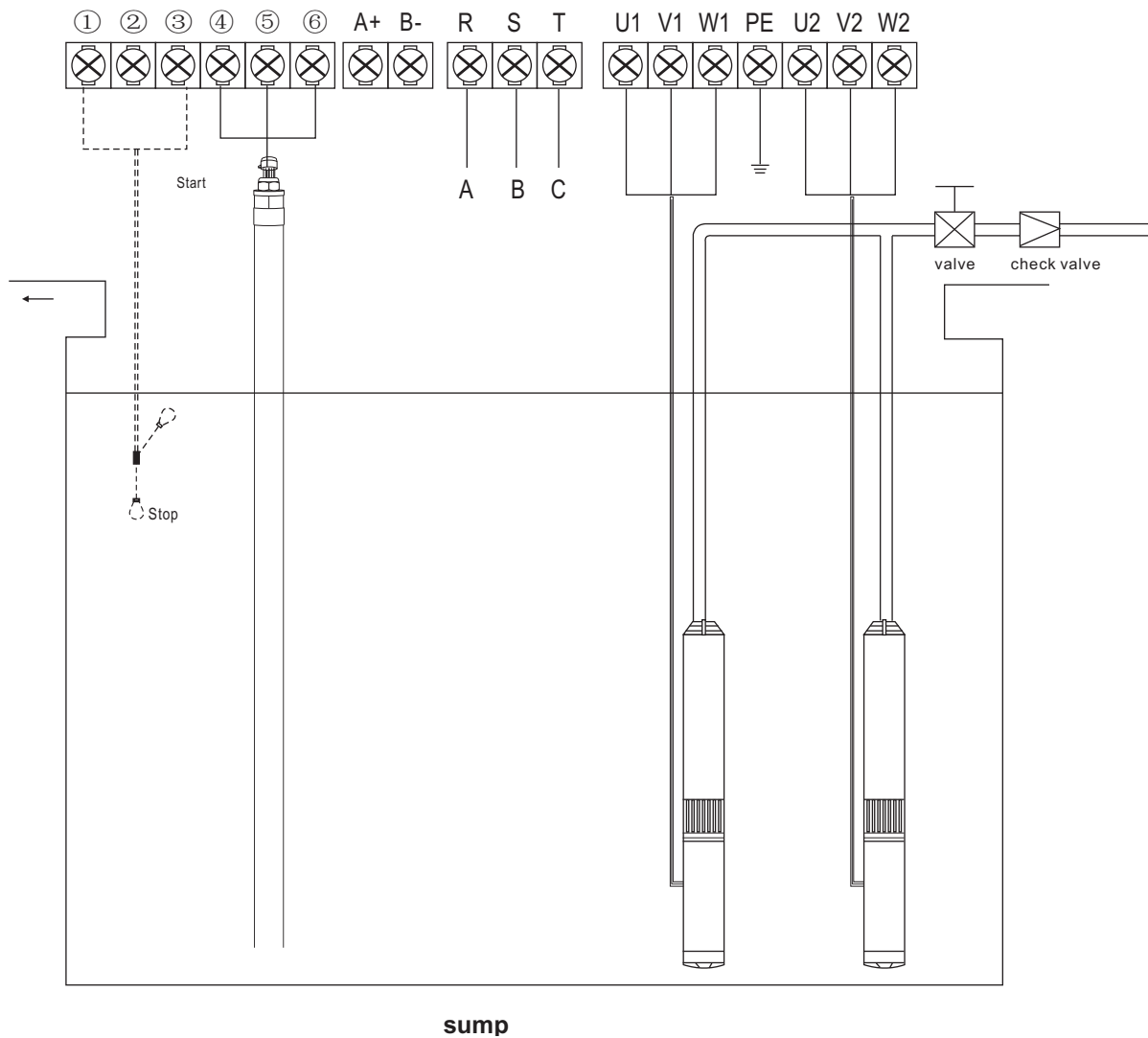
Dimension & Pin definition



Pin definition		
a	VOUT	Yellow color wire
b	VCC	Red color wire
c	GND	Black color wire

3.3 Electrical connection for sewage pumping system





NOTE: in case of level transmitter fault, user can use a backup float switch, when the back up float switch is in up level position, controller will order two pumps to drainage.

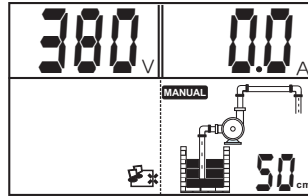
Float Switch not included-optional extra

4.SET DIFFERENT WORKING PRESSURE VALUE

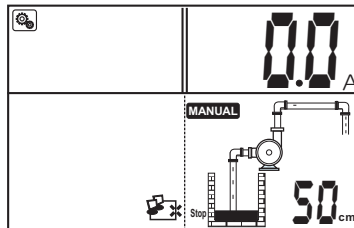
Note: the liquid depth degree is CUT OFF SETTING < 1ST PUMP CUT IN SETTING < 2ND PUMP CUT IN SETTING < OVER FLOW

4.1 Cut off depth value setting

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



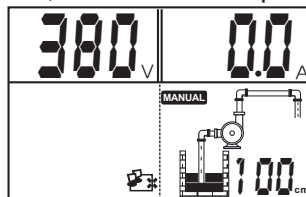
-hold pressing **STORE SET** key and click **CUTOFF SETTING** to add or to decrease the cut off depth value;



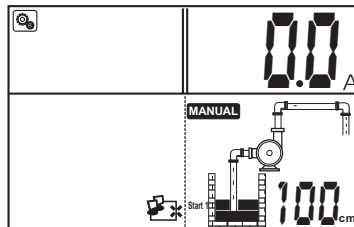
-loosen **STORE SET** key, controller makes a DI sound, cut off depth value setting complete;

4.2 1ST Pump cut in depth value setting

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



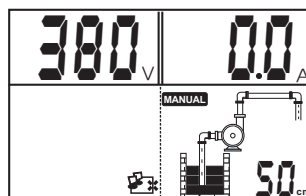
-hold pressing **STORE SET** key and click **1st pump cut in setting** to add or to decrease the 1st pump cut in depth value;





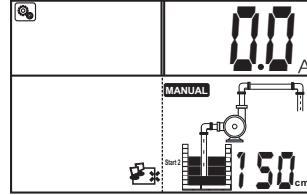
-loosen **STORE SET** key, controller makes a DI sound, cut off depth value setting complete;


4.3 2ND Pump cut in depth value setting

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



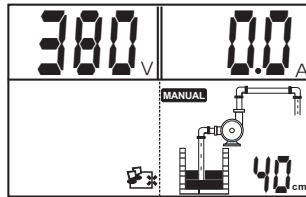
hold pressing  key and click  to add and to decrease the 2nd pump cut in depth value;






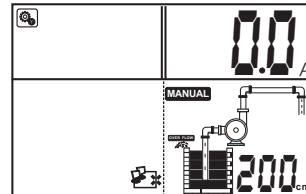
- loosen  key, controller makes a DI sound, cut off depth value setting complete;


4.4 OVER FLOW alarm depth value setting

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








- hold pressing  key and click  key to add or  to decrease the over flow alarming depth value



- loosen  key, controller makes a DI sound, over flow alarming depth value setting complete;


5 BASIC OPERATION


5.1 Switching to MANUAL mode

Press the  key to switch to manual state, L932/S is under the manual control state; under manual state, press  /  key to run A/B pump; press  /  key to stop A/B pump;

Note: under manual state, the L932/S can not receive the signal from level transmitter;

5.2 Switching to AUTO mode

Press the  key to switch to auto state, L932/S is under the auto control state; L932/S will run or stop the pumps according to the depth value setting;

Note: under auto state, if the pump is running and pump user wants to stop pump running compulsory, press the  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/S will enter operation state after 10seconds countdown;

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

5.2.1 AUTO mode working logic description

Note: suppose pump user sets the cut off liquid depth value: 20CM;

1st pump cut in liquid depth value: 60CM;

2nd pump cut in liquid depth value: 80CM;

Over flow alarming liquid depth value: 120CM;

1). Normal liquid depth in sewage tank

If liquid depth in the sewage tank is 60cm, controller will order single pump to run, when depth value drops to 20cm, single pump stops running; controller will alternate dual pumps running automatically when liquid depth value varies from 20cm to 60cm;

2). Deep liquid depth in sewage tank

when single pump is running to drainage, liquid level in the sewage tank still rising to 80cm, controller will order another pump to run simultaneously to drainage, until liquid depth drops to 20cm, double pumps will not stop running;

3). Over flow alarming in sewage tank

when double pumps are running simultaneously, liquid level in the sewage tank still rising to 120cm, controller will sound warning alarm;

5.3 Auto Patrol (Pump Shaft Antirust) Function

Under auto state, if controller inspects double pumps not running for 10days, controller will order double pumps to run for 3seconds.

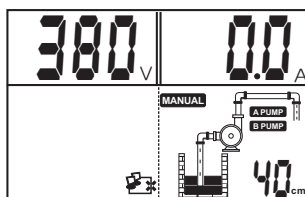
Auto patrol can prevent pump rusty and impeller jammed owing to long time no operation.

5.4 Pump last five failure record displaying

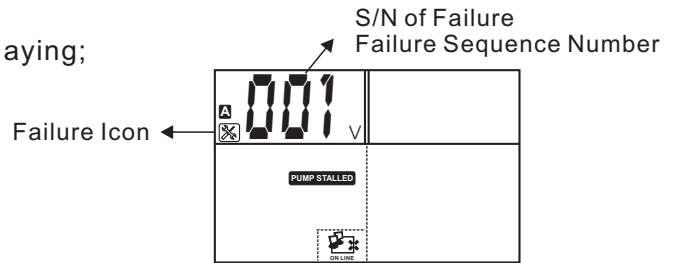
The L932/S can memorize the last five failures of pump, so it is very convenient for the pump users to analyse the pump running conditions.

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/S makes a "Di" sound, pause the **MODE** key L932/S displays pump failure record sequentially.
- Press **A STOP** key to quit the failure record displaying;



THE LATEST FAILURE OF PUMP A IS PUMP STALLED

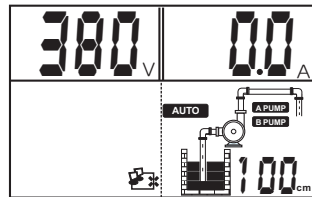
Note: displaying the pump B last five failure record is same as pump A, just by pressing **B STOP** button instead of **A STOP**

5.5 Pump accumulative running time displaying

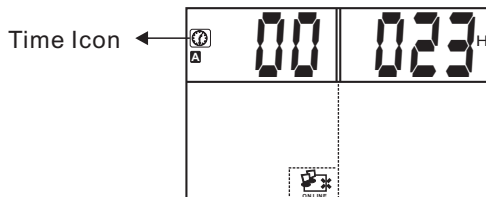
The L932/S can memorize how many hours of pump running, so it is very convenient for the pump users to analyse the pump running conditions and do maintenance

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 **MODE** button and press **A STOP** key, the L932/S makes a "Di" sound, the L932/S displays pump accumulative running time record;



THE PUMP A HAS RUN FOR 23 HOURS

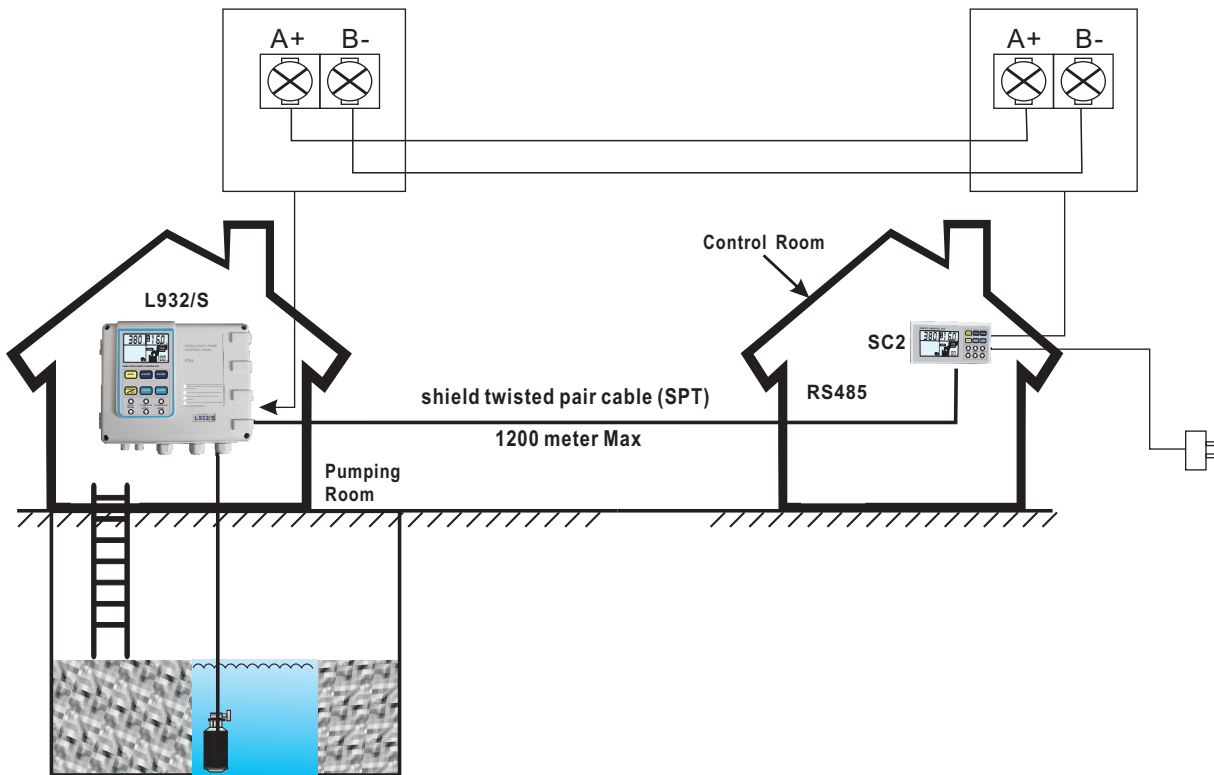
- Press **A STOP** key to quit the accumulative running time displaying;

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

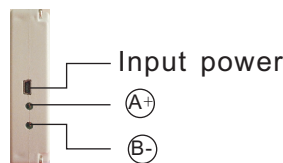
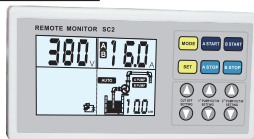
6 COMMUNICATION LINK

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

This function is applied for L932/S 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/S (Master Controller) through SC2.

Note: Slave controller does not support the parameter calibration and adjusting.

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/S & 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-120 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/S 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/S 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/S 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/S 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/S 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. Check for a ruptured bladder in the water tank. Check the air volume control or snifter valve for proper operation. 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>
	no communication link between SC / computer and L932/S	connecting the L932/S to SC / computer to realize long distance monitoring