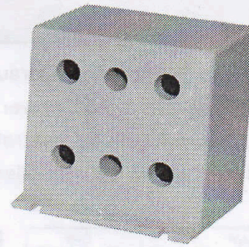
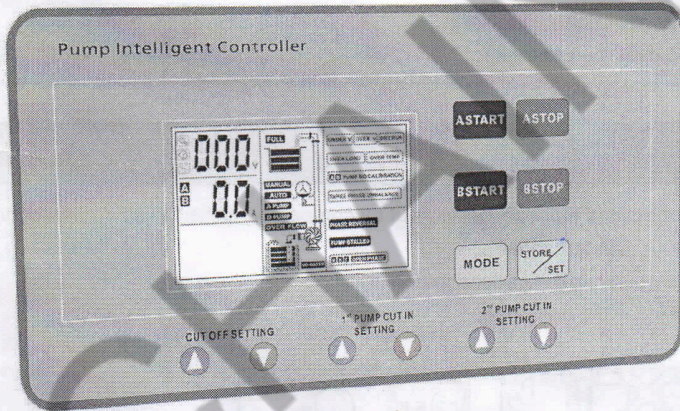


Smart Programmable Logic Controller For Duplex Pump

Installation & Operation Manual

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.



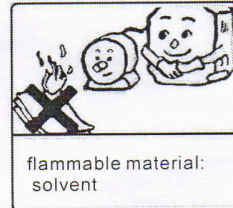
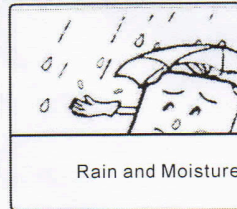
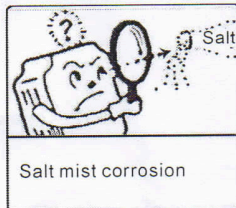
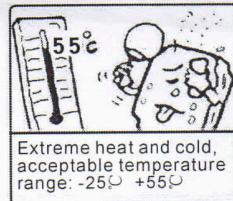
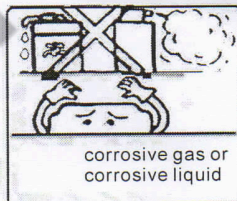
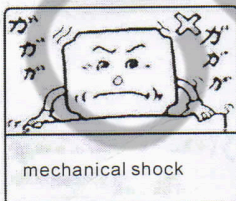
WARNING!!

- 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;



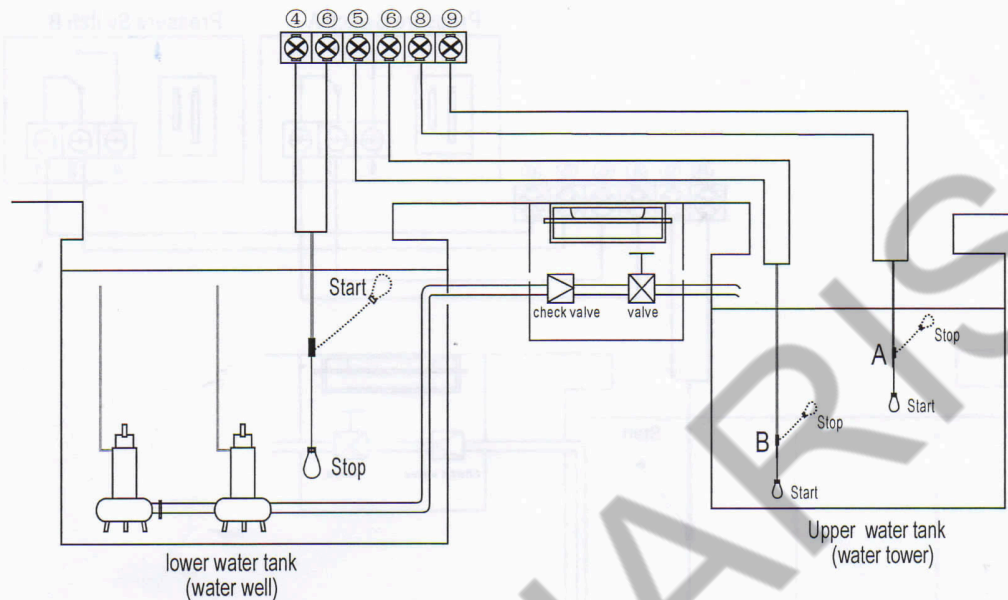
CAUTION

- 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;



8 WIRING DIAGRAM FOR DIFFERENT APPLICATION

8.1 Water supply by liquid level control through float switch



1). Normal water demanding

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

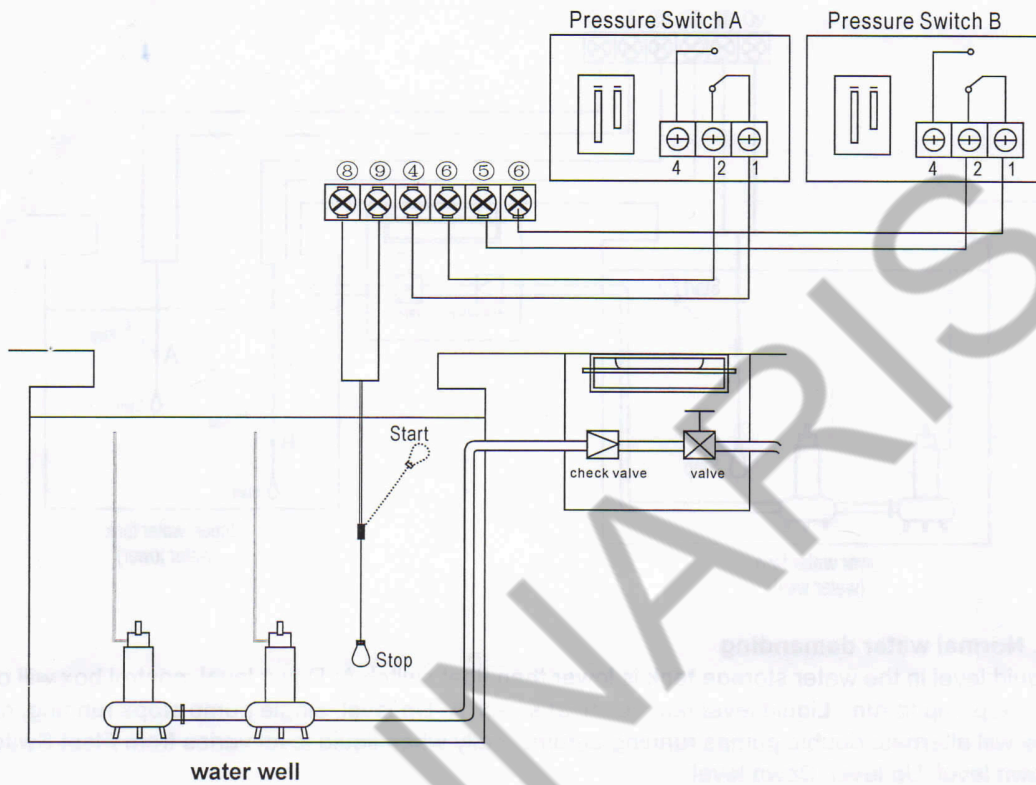
2). Extra water demanding:

When single pump is running, liquid level is still decreasing to Float Switch B: Down level, control box will order another pump to run simultaneously, until liquid level reaches 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	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

8.2 Booster by pressure control through pressure switch



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

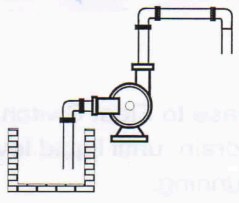
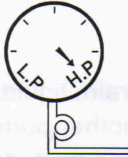
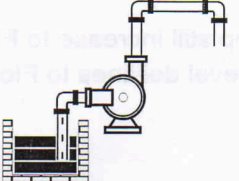

1). Normal pressure demanding

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

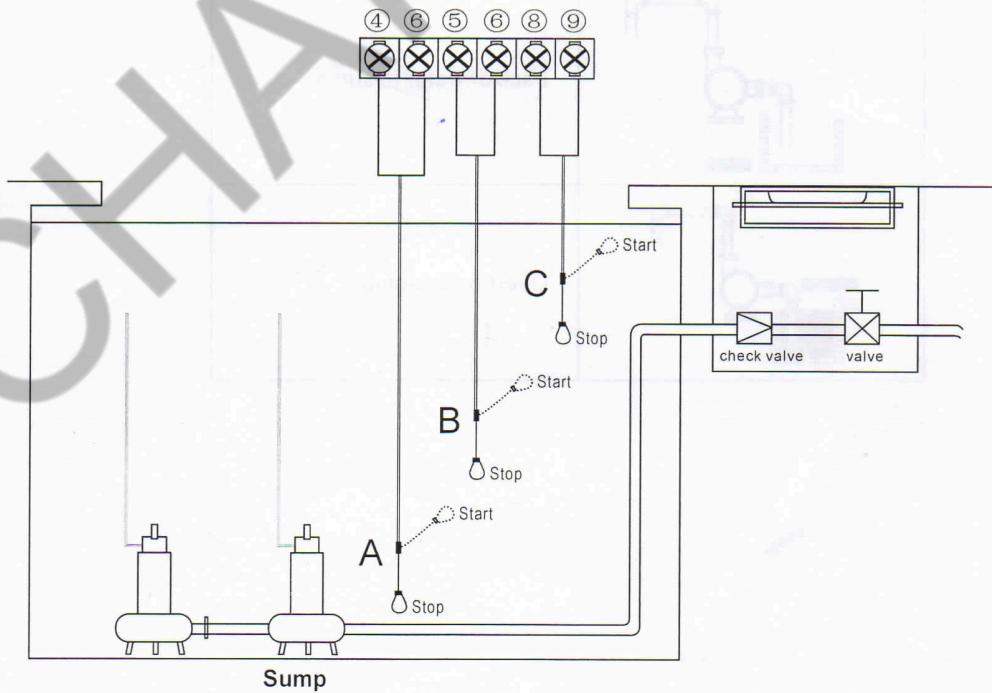
2). Extra pressure demanding

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	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

8.3 Drainage by liquid level control through float switch



1). Normal liquid level in the sump

Liquid level reaches Float Switch A: Up Level , control box will order single pump to run; liquid level declines to Float Switch A:Down Level, single pump stop running;

Control box will alternate double pumps running automatically when the liquid level varies from Float Switch A: Up level- Down level.

2). Extra flowing in the sump

When single pump is running to drain, liquid level in the sump still increase to Float Switch B: Up Level, control box will order another pump to run simultaneously to drain, until liquid level declines to Float Switch A&B:Down Level, double pumps will not stop running.

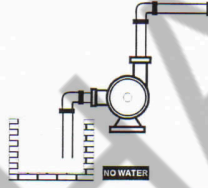
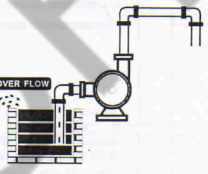
3). Overflow in the sump

When double pumps are running simultaneously, liquid level in the sump still increase to Float Switch C: Up level, control box will sound overflow alarm; When liquid level declines to Float Switch C Down Level, control box stop sounding overflow alarm

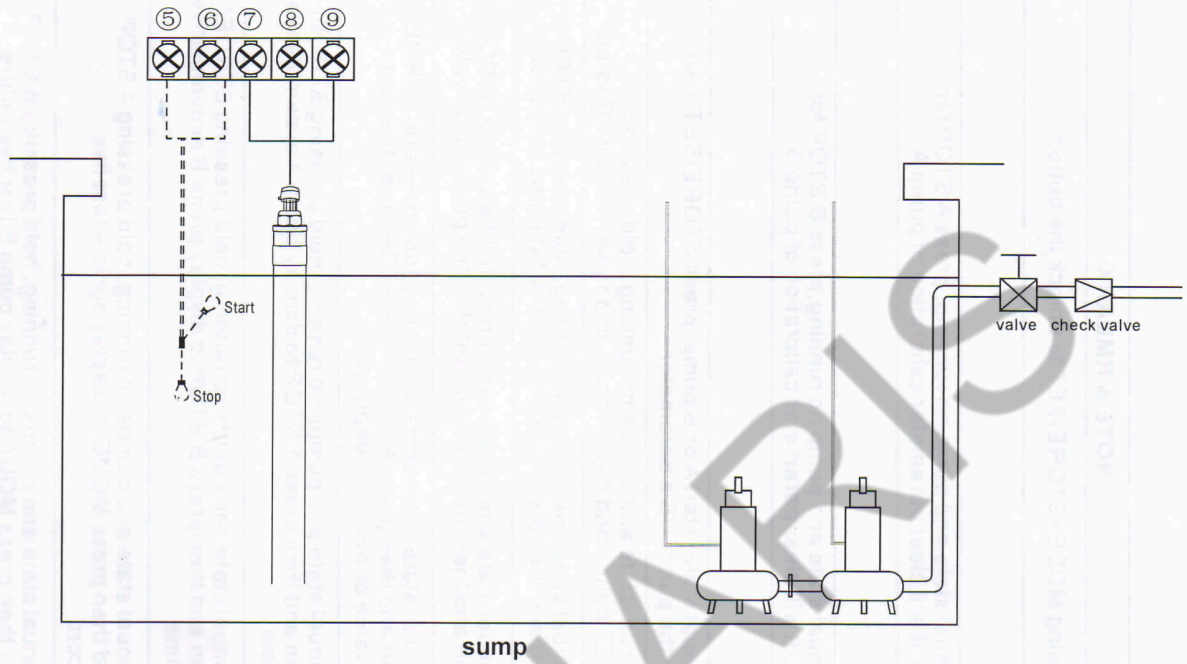
Auto Patrol (Antirust) function

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.

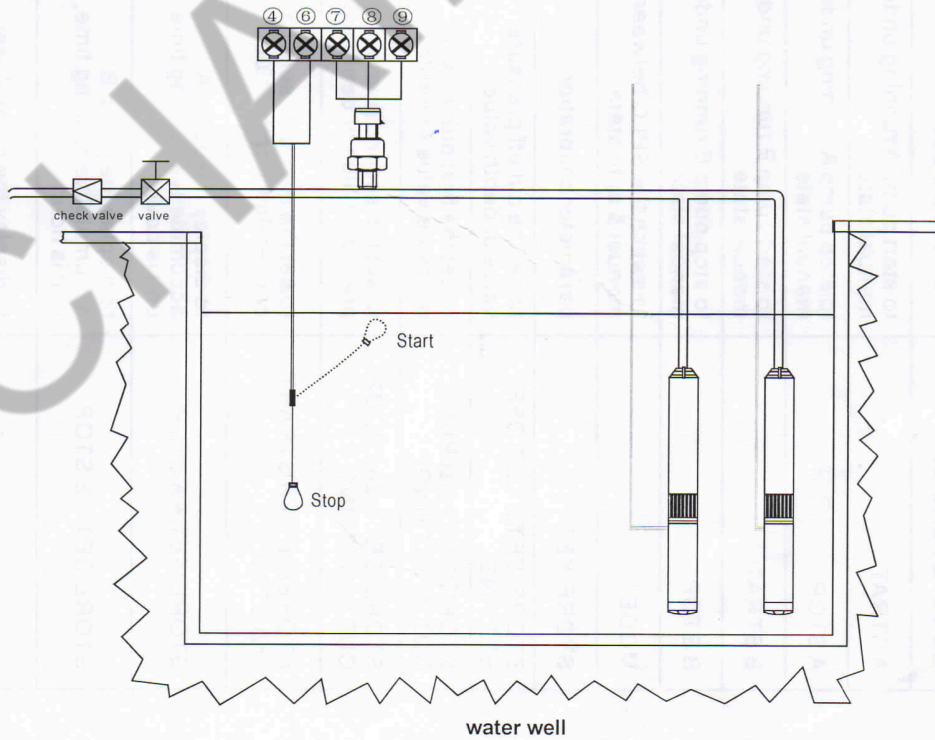
Auto Patrol can prevent pump rusty and impeller jammed owing to long time no running.

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

8.4 Drainage by liquid level transmitter



8.5 Booster by pressure control through pressure transmitter



9 Press button definition

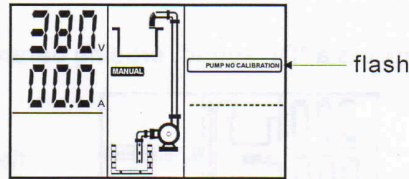
BUTTON	DEFINITION & FUNCTION	NOTE & RMEARK
MODE+STORE/SET	to unlock the button	Hold pressing MODE+STORE/SET to unlock the button
A STRAT	to start pump A running under manual state	
A STOP	to stop pump A running under manual state	under manual state and pump no running, press A STOP for 6seconds, it will clear parameter calibration of pump A
B STRAT	to start pump B running under manual state	
B STOP	to stop pump B running under manual state	under manual state and pump no running,press B STOP for 6seconds, it will clear parameter calibration of pump B
MODE	to switch the SPLC between manual & auto state	
STORE/SET	parameter calibration	under manual state, start A or B pump, press STORE/SET, it will memorize the pump A/B's parameter
STORE/SET + CUT OFF SETTING	to set the cut off pressure value or depth value	Under manual state and pumps no running, hold pressing STORE/SET button and then press Δ or ▽ to set this cut off value
STORE/SET + 1st PUMP CUT IN SETTING	to set the first pump cut in pressure value or depth value	Under manual state and pumps no running, hold pressing STORE/SET button and then press Δ or ▽ to set this 1st pump cut in value
STORE/SET + 2nd PUMP CUT IN SETTING	to set the second pump cut in pressure value or depth value	Under manual state and pumps no running,hold pressing STORE/SET button and then press Δ or ▽to set this 2nd pump cut in value
STORE/SET + A STRAT or A STOP	to set the over pressure value or over flow depth value	Under manual state and pumps no running,hold pressing STORE/SET button and then press A STRAT or A STOP to set the over pressure value or over flow depth value
STORE/SET + A STOP	to display the pump A accumulative running time, unit is hour	Under manual state and pumps no running, hold pressing STORE/SET button and then press A STOP to display pump A accumulative running time
STORE/SET + B STOP	to display the pump B accumulative running time, unit is hour	Under manual state and pumps no running, hold pressing STORE/SET button and then press B STOP to display pump B accumulative running time
A STOP + MODE	to display the pump A last five failure record	Under manual state and pumps no running, hold pressing A STOP button and then press MODE to display pump A last five failure record
B STOP + MODE	to display the pump B last five failure record	Under manual state and pumps no running, hold pressing B STOP button and then press MODE to display pump B last five failure record

10 Parameter Calibration setting & erasing

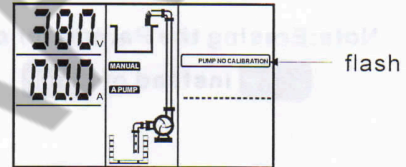
To achieve best level of protection of the pump, it is essential that parameter calibration must be done immediately after successful pump installation or pump maintenance.

Setting the parameter calibration(Pump A)

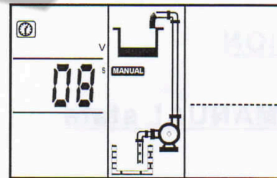
- Press the **MODE** to switch to manual state, make sure the pump not running and LCD screen displaying:



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

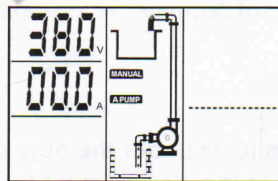


- Press the **STORE**; The controller makes a "Di" sound and starts countdown, LCD screen displaying:



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

Pump A is ready for running:



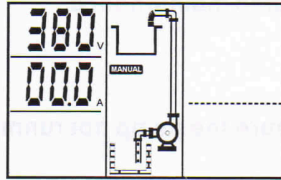
Note:Parameter calibration of pump B is same as pump A, just by pressing **B START** instead of **A START**

Erasing former parameter calibration

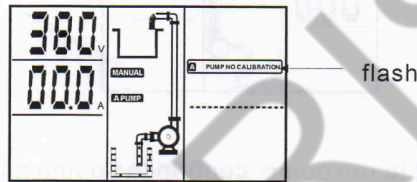
When pump is reinstalled after maintenance or new pump is installed, user must erase the former parameter calibration and a new calibration must be done.

Erasing the parameter calibration(Pump A)

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



- Press the **A STOP** and release till controller makes a "Di" sound, erasing parameter calibration completed and LCD screen displaying:



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

B STOP instead of **A STOP**

11 BASIC OPERATION

11.1 Switching to MANUAL state

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

Note: under manual state, the controller can not receive the signal from float switch or pressure switch.

11.2 Switching to AUTO state

Press the **MODE** to switch to auto state, controller is under the auto control state; under auto state, controllér 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** to switch to manual state and press **A STOP** / **B STOP** pump stops running;

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

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

11.3 Pump protection

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

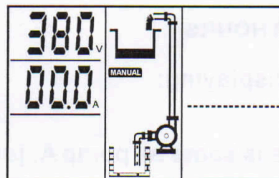
If pump stalled, open phase etc serious failures happened, pump user must check the pump and motor immediately and repair the pump.

11.4 Pump last five failure record displaying

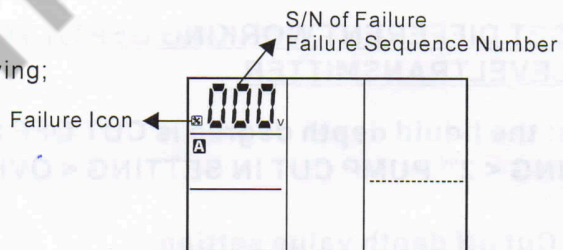
The controller can memorize the last five failures of pump, so it is very convenient for the pump users to analyse the pump running conditions.

Displaying the pump A last five failure record

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



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



THE LATEST FAILURE OF PUMP A IS PUMP STALLED

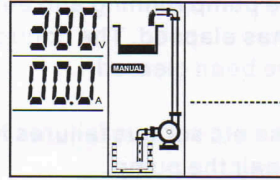
Note: displaying the pump B last five failure record is same as pump A, just by pressing **B STOP** instead of **A STOP**

11.5 Pump accumulative running time displaying

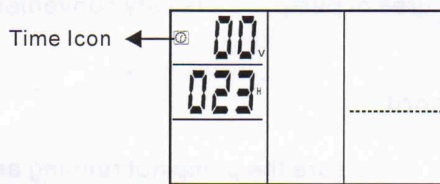
The controller can memorize how many hours of pump running, so it is very convenient for the pump users to analyse the pump running conditions and do maintenance

Displaying the pump accumulative running time

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



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



THE PUMP A HAS RUN FOR 23 HOURS

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

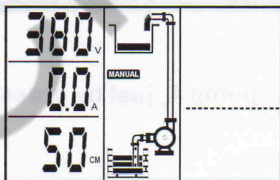
Note: displaying the pump B accumulative running time is same as pump A, just by pressing **B STOP** instead of **A STOP**

12 SET DIFFERENT WORKING DEPTH VALUE FOR DRAINAGE BY LIQUID LEVELTRANSMITTER

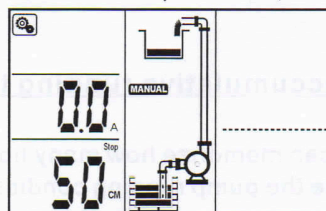
Note: the liquid depth degree is CUT OFF SETTING < 1ST PUMP CUT IN SETING < 2nd PUMP CUT IN SETTING < OVER FLOW

12.1 Cut off depth value setting

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



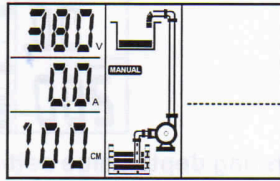
- hold pressing **STORE SET** and click **CUTOFF SETTING** to add or to decrease the cut off depth value;



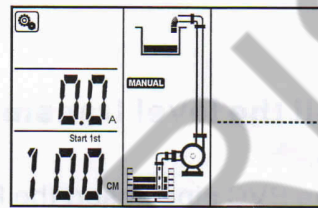
- loosen **STORE SET**, controller makes a DI sound, cut off depth value setting complete;

12.2 1ST Pump cut in depth value setting

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



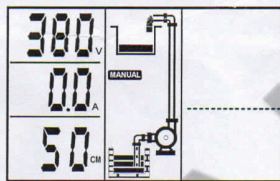
-hold pressing **STORE SET** and click **1st pump cut in setting** to add or to decrease the 1st pump cut in depth value;



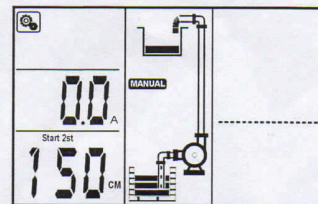
-loosen **STORE SET**, controller makes a DI sound, cut off depth value setting complete;

12.3 2nd Pump cut in depth value setting

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



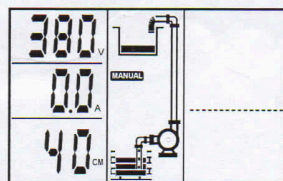
hold pressing **STORE SET** and click **2nd pump cut in setting** to add and to decrease the 2nd pump cut in depth value;



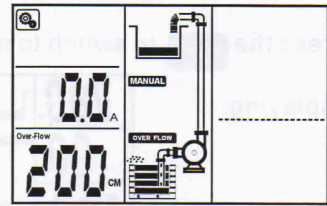
- loosen **STORE SET**, controller makes a DI sound, cut off depth value setting complete;

12.4 OVER FLOW alarm depth value setting

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



- hold pressing **STORE SET** and click **A START** to add or **B START** to decrease the over flow alarming depth value

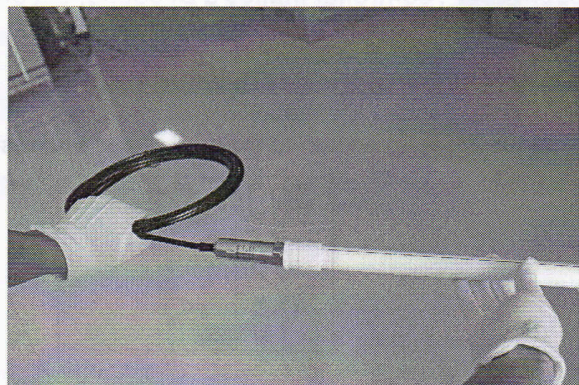
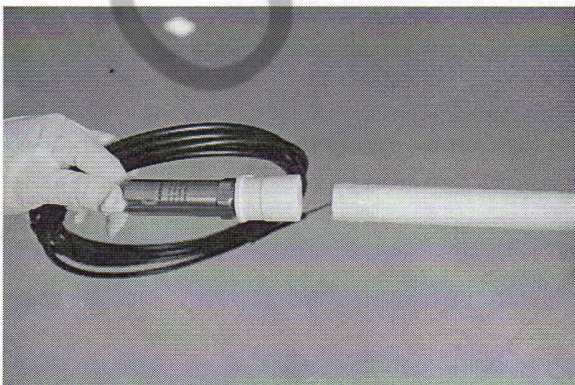
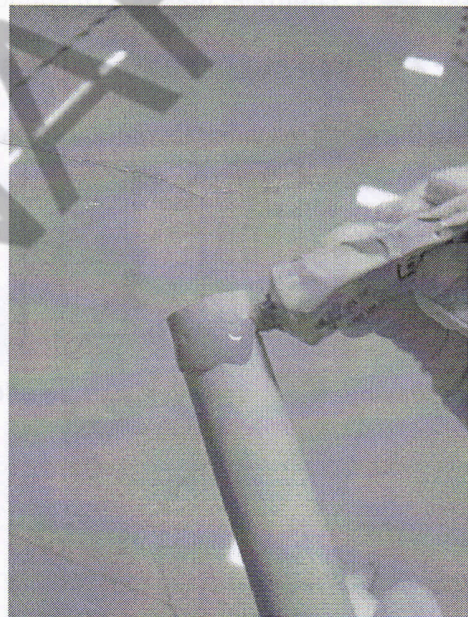
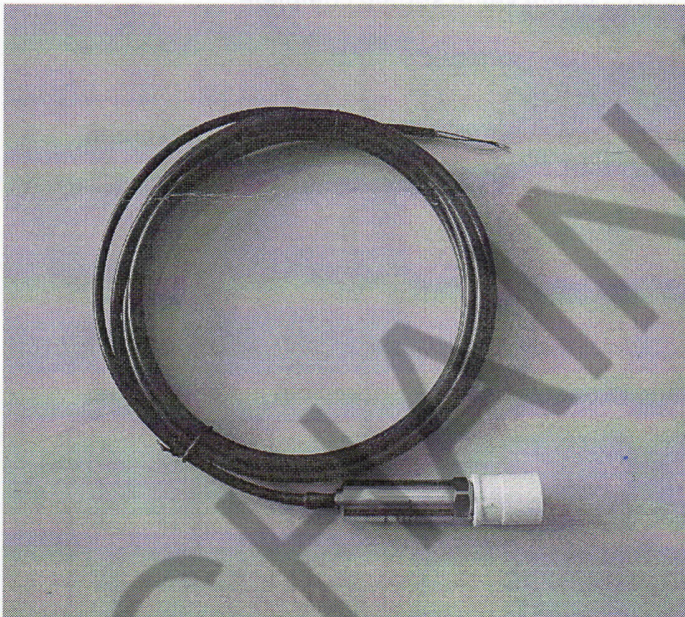


- loosen **STORE SET**, controller makes a DI sound, over flow alarming depth value setting complete;

How to install the level transmitter and PVC pipe

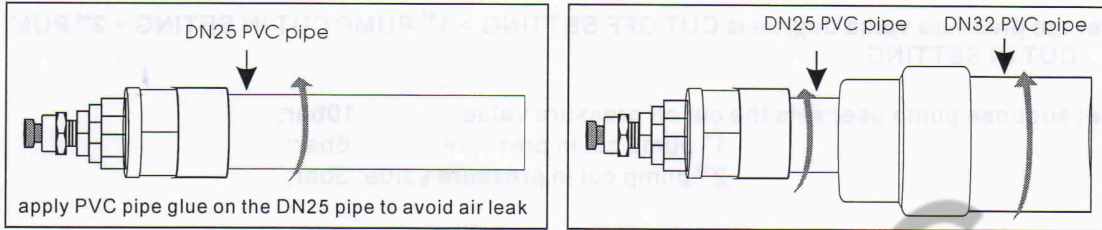
Step 1

Apply glue on the PVC pipe, insert the PVC pipe into the level transmitter



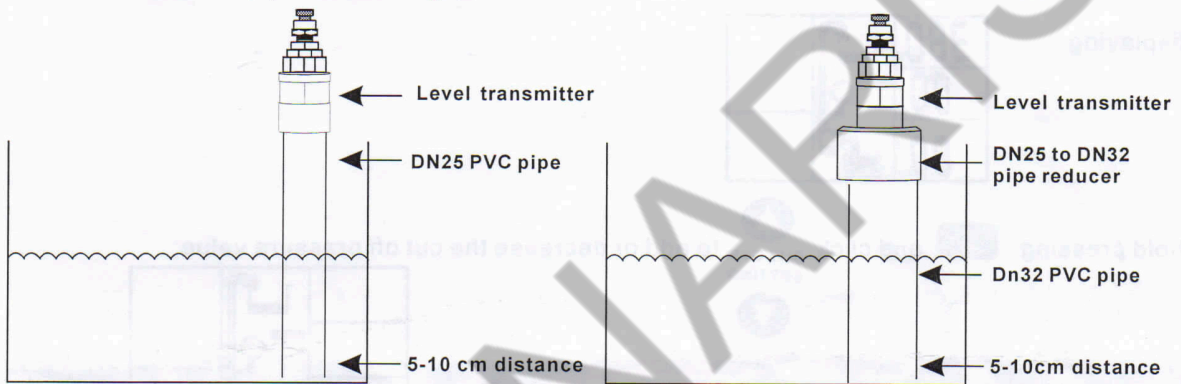
Step 2

Rotate the PVC pipe to make sure the inner wall of PVC pipe is covered with glue, so it can avoid air leakage



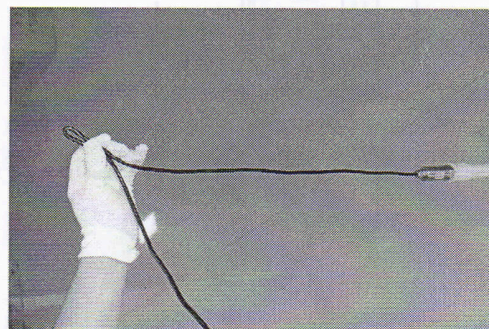
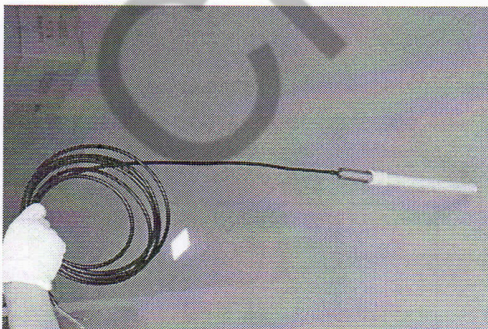
Step 3

How to install the pipe in the sewage tank



Installation notes:

- 1) The bottom of the PVC pipe and sewage pool keep 5-10 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) do not bend the hose during the pipe installation



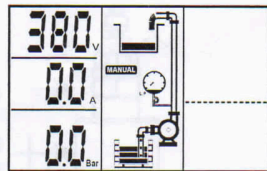
13 SET DIFFERENT WORKING PRESSURE VALUE FOR BOOSTER BY PRESSURE TRANSMITTER

Note: the pressure value degree is CUT OFF SETTING > 1ST PUMP CUT IN SETING > 2ND PUMP CUT IN SETTING

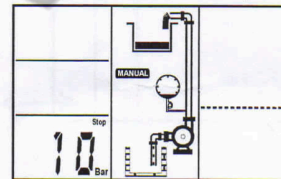
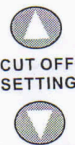
Note: suppose pump user sets the cut off pressure value: 10bar;
 1st pump cut in pressure: 6bar;
 2nd pump cut in pressure value: 3bar;

13.1 Cut off pressure value setting

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



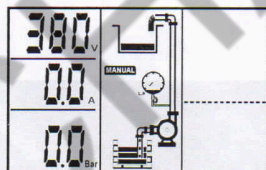
-hold pressing **STORE SET** and click **CUT OFF SETTING**



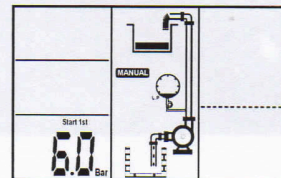
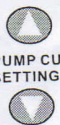
-loosen **STORE SET**, controller makes a DI sound, cut off pressure value setting complete;

13.2 1ST Pump cut in pressure value setting

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



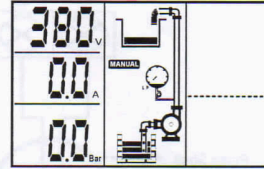
-hold pressing **STORE SET** and click **1ST PUMP CUT IN SETTING**



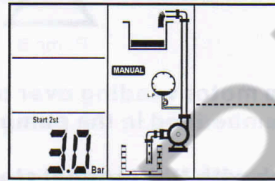
-loosen **STORE SET**, controller makes a DI sound, cut off pressure value setting complete;

13.3 2nd Pump cut in pressure value setting

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



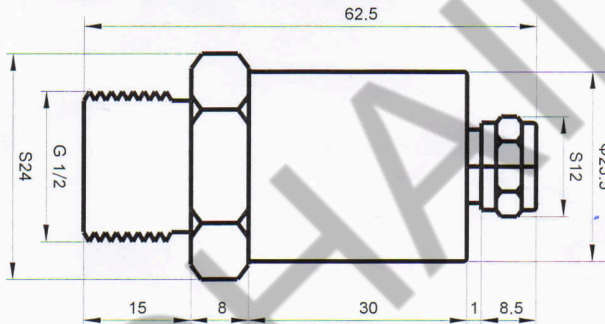
hold pressing **STORE SET** and click **2nd PUMP CUT IN SETTING** to add or decrease the 2nd pump cut in pressure value;



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

How to install the pressure transmitter

Dimension & Pin definition

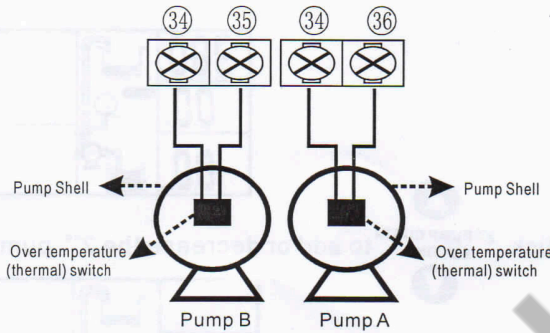


Pin definition		
a	VOUT	Yellow color wire
b	VCC	Red color wire
c	GND	Black color wire

Installation steps

1. Twine 6-10 layers PTFE tape on the pressure transmitter
2. Fix the pressure transmitter on the pipe network
3. Connect the red, yellow and black wire of transmitter to sensor terminal number 7,8,9
4. Pay attention to the leak-proof treatment
5. Keep the 3 wires against from twining

14 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 34 & 35, terminal 34, 36 separately;