Installation & Operation Manual

Pump Controller(PCH32&12&32PLUS&12PLUS)

Ver: 1.0

1. OVERVIEW

The Pump Controller(PCH32&12&32PLUS&12PLUS) abbreviated to PCH is a programmable control panel that is used to protect and control pumps. Primarily deep well submersible pumps, but also centrifugal; in-line; circulation and multistage pumps. The PCH has max 7 general operating modes namely tank to tank; booster by pressure switch; drainage by sensor etc. The PCH 's protection features are dry run; overload; stalled pump; over voltage; under voltage; open phase, phase reversal and thermal control.

***： only plus controller have these terminals**

2. BUTTON & OPERATIONS

BUTTON	OPERATION IN AUTO TO MANUAL ,MANUAL TO AUTO
MODE	**[Parameter 012 set to OFF]** – Manual to Auto / Auto to Manual **[Parameter 012 set to ON]** – All buttons locked in Auto mode. To deactivate hold "STORE+MODE" for 5sec. controller will switch to manual mode.

BUTTON	OPERATION (IN MANUAL)
START	Pump should start if not running.
STOP	Pump should stop if running.
A STOP then MODE	Display shows last five failure records of A pump
B STOP then MODE	Display shows last five failure records of B pump
A STOP then STORE	Display shows accumulative running time of A pump
B STOP then STORE	Display shows accumulative running time of B pump
MODE then STORE	**Expert parameter setting （confidential ,only maintenance engineer can do setting)**
STORE	**User parameter setting**
To ensure pump and motor is protected it is essential to calibrate the controller parameters as soon as pump is running to operational standards. Perform calibration after each installation or maintenance operation.	
STORE	**Parameter calibration:** In Manual mode, after pump working in good condition, press the "STORE" button . The controller will make a "Di" sound. The controller should now be calibrated to the current spec of the motor. If it pump A running ,it is pump A calibrated , If it pump B running ,it is pump B calibrated , If Pump A and B running ,it pump A and B calibrated
STOP A	**Parameter erasing:** Ensure A pump has stopped running then hold "STOP" until the controller makes a "Di" sound. (*Hold for approximately 5-10 sec*). The controller should now be cleared of all calibrations.
STOP B	**Parameter erasing:** Ensure B pump has stopped running then hold "STOP" until the controller makes a "Di" sound. (*Hold for approximately 5-10 sec*). The controller should now be cleared of all calibrations.

3. SPECIFICATIONS

Main technical characteristics of controller		
Control functions	Double liquid level control	
	Pressure switch control	
	Temperature control	
Main technical data		
Rated output power	Refer to label on controller	
Rated input voltage	Refer to label on controller	
Liquid level transfer distance	≤200m	
Protection function	*Dry run*	*Pump stall*
	Overload	*Open phase*
	Under/Over voltage	*Phase reversal*
Main installation data		
Working temperature	-25°C – +55°C	
Working humidity	20% - 90% Relative Humidity	
Degree of protection	IP65	
Installation position	Vertical	
Unit dimensions (L x W x H)	345*140*305	
Unit weight (net)	3.8 kg	

4. APPLICATION SETTING

Pump users can set the function switch to meet different application requirement,

before setting the function switch, the controller should be disconnected from the power supply,

after complete the setting, apply power to controller and observe the application sign displayed on the LCD conforming to the following list.

Item	Function switch position	Applications/usages scenarios
000		Applied for irrigation/sewage/drainage with overflow alarm through float switch(N/C)/liquid probe,supporting duplex pump running together if extra water flow
010		Applied for sewage/drainage pump with piggy-back float switch
111		Applied for pressure boosting through pressure switch (N/C) & pressure tank,supporting duplex pump running together if more pressure demanding
101		Applied for water supply through float switch(N/C)/liquid probe,supporting duplex pump running together if more water demanding
011*		Applied for irrigation/sewage/drainage with overflow alarm through 4-20mA level transmitter,supporting duplex pump running together if extra water flow
001*		Applied for pressure boosting through 4-20mA pressure transmitter,supporting duplex pump running together if more pressure demanding

100*		Applied for water supply through 4-20mA level transmitter,supporting duplex pump running together if more water demanding
Item	Function switch position	Applications/usages scenarios
1*		Support to connect PT00 temperature sensor, it requires control panel with separate PT100 temperature sensor expansion module
0*		OTA/OTB terminal enable (default)

5. PARAMETER SETTINGS

PLEASE NOTE: Parameter settings should be adjusted after "Auto" calibration.
To access parameter settings the controller should be in manual mode and the pump should NOT be running.

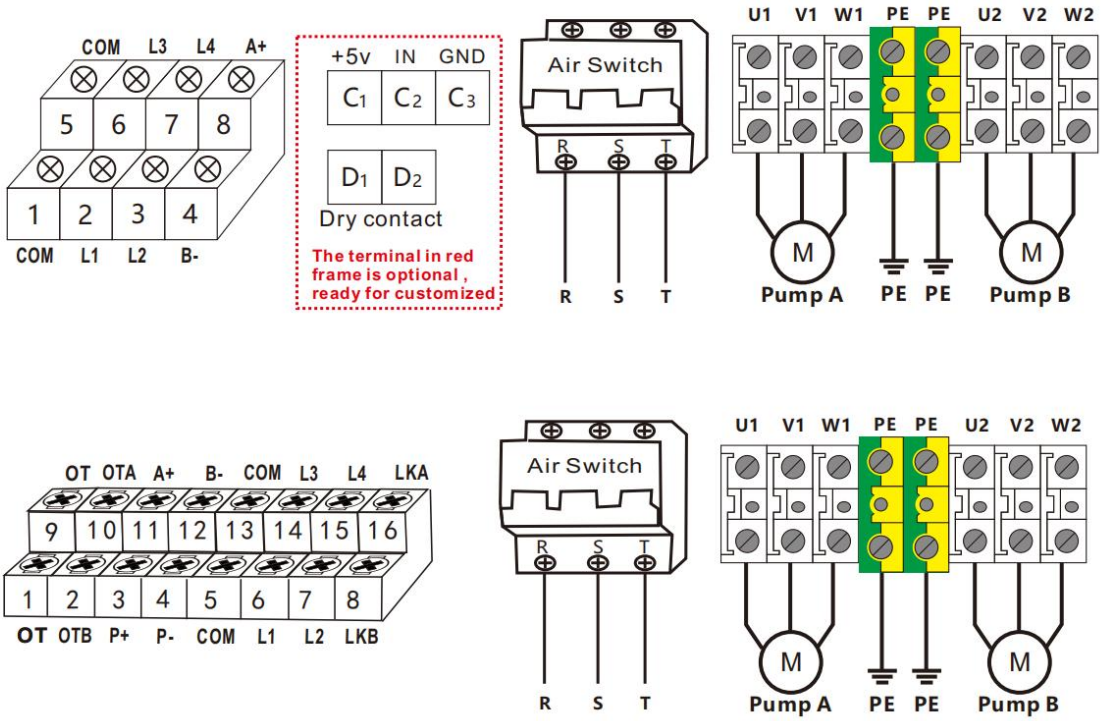
To change the value, press the "START A" or "STOP A" buttons respectively to increase or decrease the value.

To store all changes and exit the parameter menu hold the "MODE" button for 5 sec

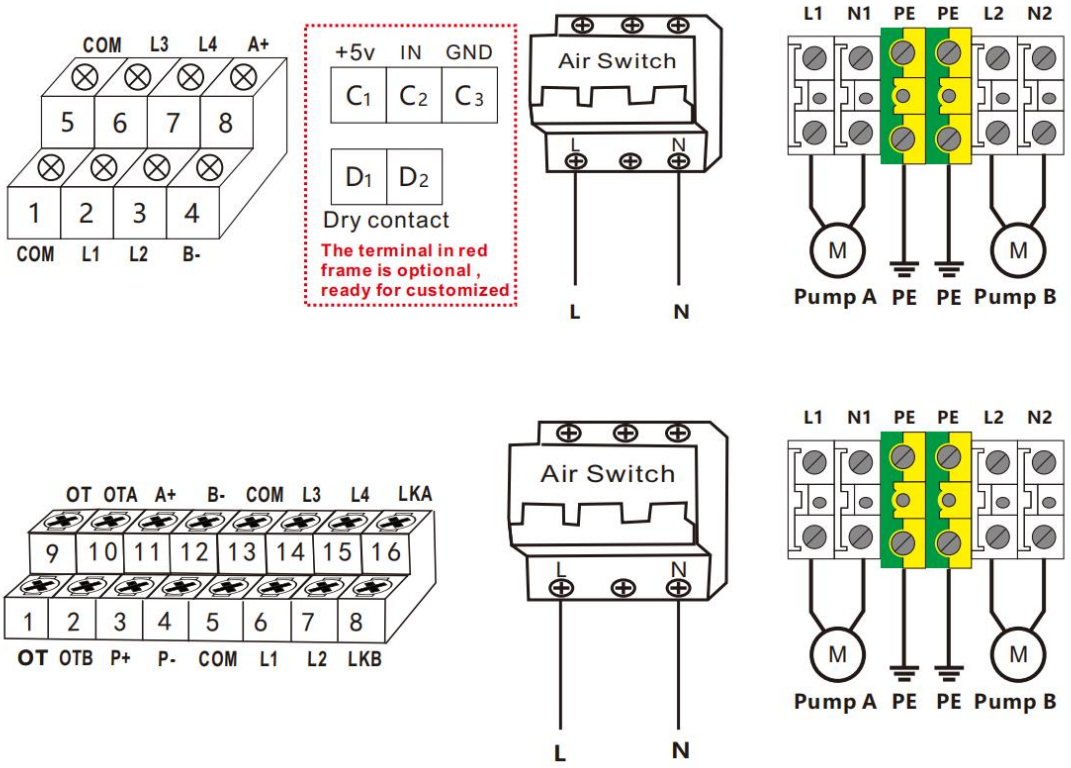
ITEM	Definition	Operation	
001-032	expert menu	In manual mode ,STORE+MODE for 3s , Firstly STORE then MODE	expert menu only for maintance or adjusting from engineer , it is confidential ,please do not open to end user .
016-032	user menu	In manual mode , Press:STORE button	it is open for end user .
Item	Default setting	Definition	Remark
001	3s	Ignoring time for protection	
002	OFF	Repeat start time setting	
003*	on	Over temp protection	
004	on	Phase reversal protection	
005	on	Open phase protection	
006	AB	Pump Able and Disable funtion	
007	AB	Pump A and Pump B Auto and manual set separately	
008	OFF	Pump makinig alternation after time setting over	OFF/0-254M
009	96H	Auto patrol time setting	
010	OFF	Delay time for pump start	
011	OFF	Delaty time for pump stop	
012	OFF	Button lock function Yes/NO,	
013	1	The controller ID	
014	04	RS 485 Speed,	01 on behalf of 1 200, 02 on behalf of 2400 , 03 on behalf of 4800, 04 on behalf of 9600
015	0	Parity Check	0= None parity; 1=Odd parity; 2=Even parity;
016	25A	The rated output power FOR Pump A	0.75-11KW=25A，15-22KW（50A）
017	25A	The rated output power FOR Pump B	0.75-11KW=25A，15-22KW（50A）
018	75%	The trip response ratio of dry running protection	
019	130%	The trip response ratio of over load protection	
020	180%	The trip response ratio of pump stalled protection	
021	20%	The trip response ratio of pump phase unbalance	
022	304V	Trip voltage of Under voltage protection	
023	437V	Trip voltage of Over voltage protection	
024	5S	Dry run protection trip response time	
025	45M	Recovery time for dry run protection ,unit is minute(M)	
026	04M	Recovery time for over load protection,	
027	04M	Recovery time for under/over voltage,three phase unbalanced	
028*	200CM/25Bar	Measure of transmitter	Available when Setting at 011/001/100
029*	as per order	Stop pump setting	Available when Setting at 011/001/100
030*	as per order	Start pump setting	Available when Setting at 011/001/100
031*	as per order	Two pump cut in settting	Available when Setting at 011/001/100
032*	as per order	overflow setting	Available when Setting at 011/001/100

6. POWER WIRING DIAGRAMS

6.1 Three phase main input power supply & output power wiring (model PCH32 Plus/PCH32)



6.2 Single phase main input power supply & output power wiring (model PCH12 Plus/PCH12)



7. ELECTRICAL CONNECTION

according to different functions, electrical wiring terminal/port is divided into:

1. pump over temperature protection sensor wiring terminal;
2. pump leakage protection sensor wiring terminal;
3. dry contact (passive contact) point wiring terminals
4. 4-20mA transmitter wiring terminal;
5. RS485 communication terminal;
6. sensor terminal for different application/control logic;

pump over temperature protection sensor wiring terminal

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

pump leakage protection sensor wiring terminal

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

dry contact (passive contact) point wiring terminal

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

4-20mA transmitter wiring terminal

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

RS485 communication terminal

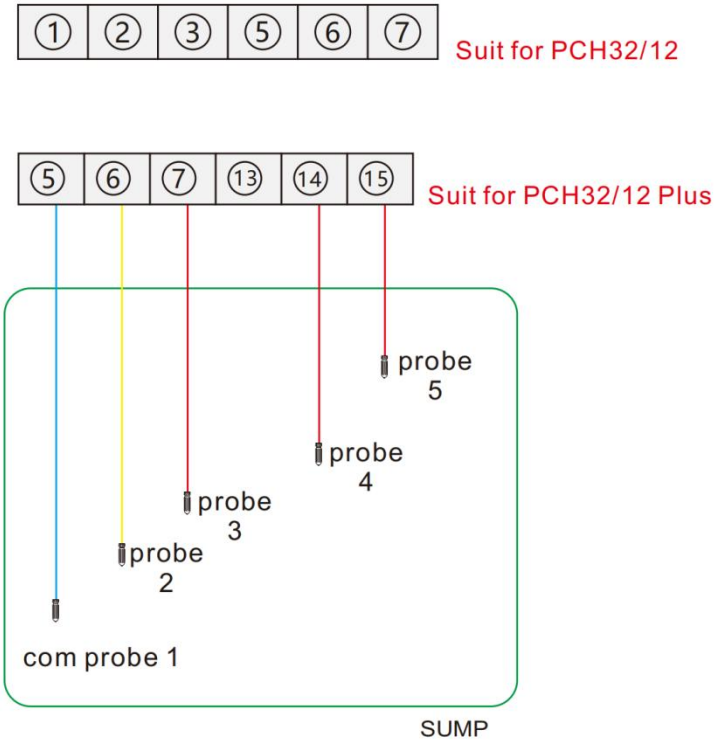
Terminal No	Definition
11(A+) + 12(B-)	RS 485
Remark:if for PCH32/12 Controller ,RS485 relating to Terminal 8(A+) + 4(B-)	

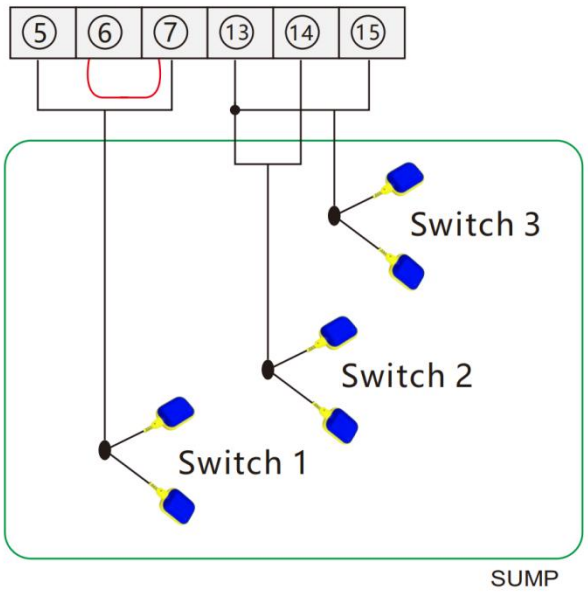
sensor terminal for different application/control logic

Terminal No	Definition
5(COM)/6(L1)/7(L2)/13(COM)/14(L3)/15(L4)	sensor terminal for different application/control logic
Remark:if for PCH32/12 Controller ,Sensor terminals it is 1(com)2(L1)3(L2),5(COM)6(L3)7(L4)	

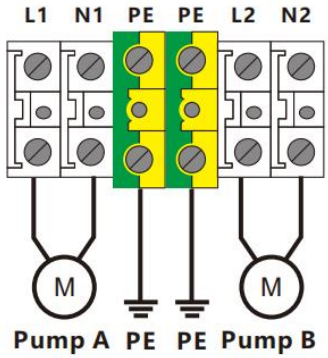
8. SENSOR WIRING DIAGRAMS

8.1Applied for irrigation/sewage/drainage



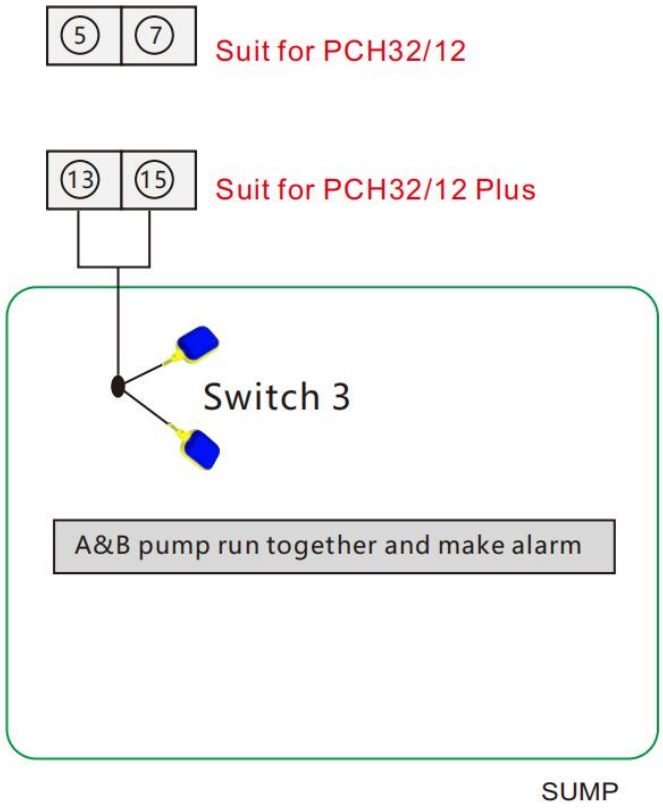


8.2Applied for sewage/drainage pump with piggy-back float switch

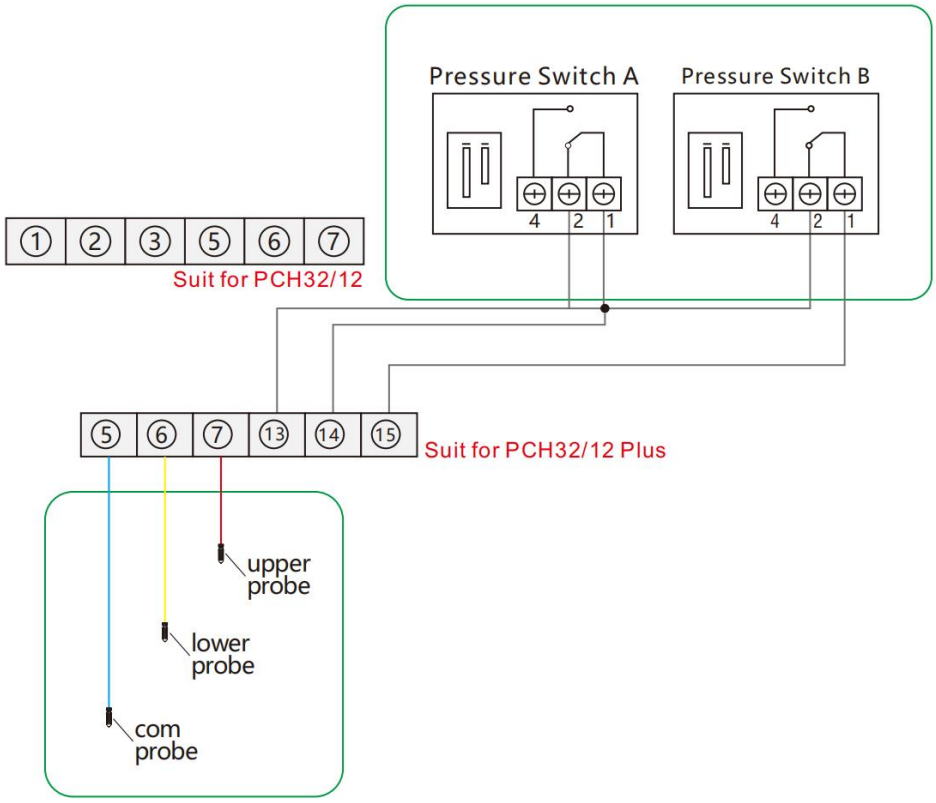


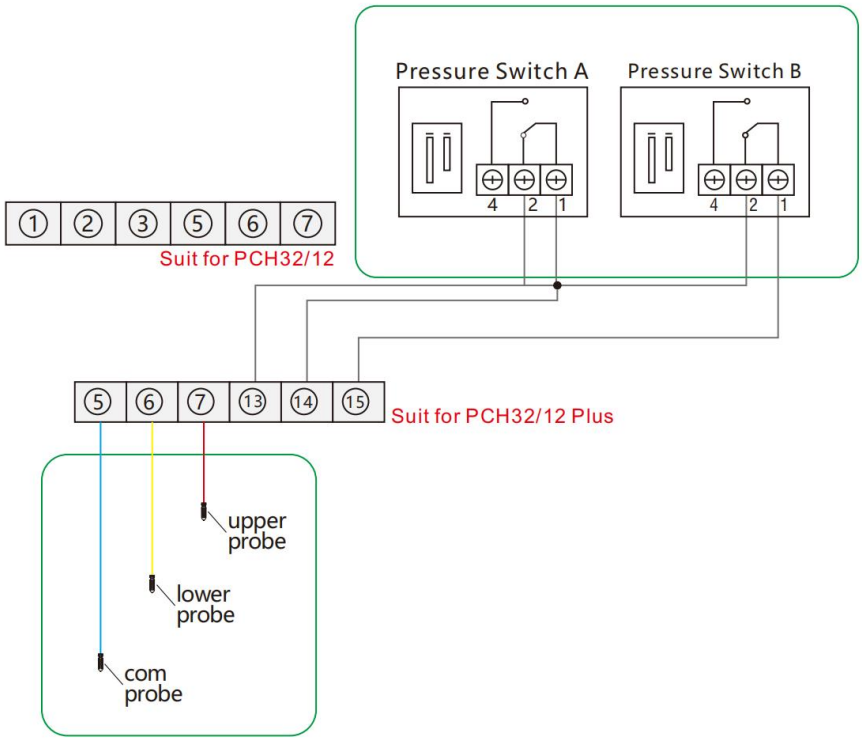
Pump A

Pump B

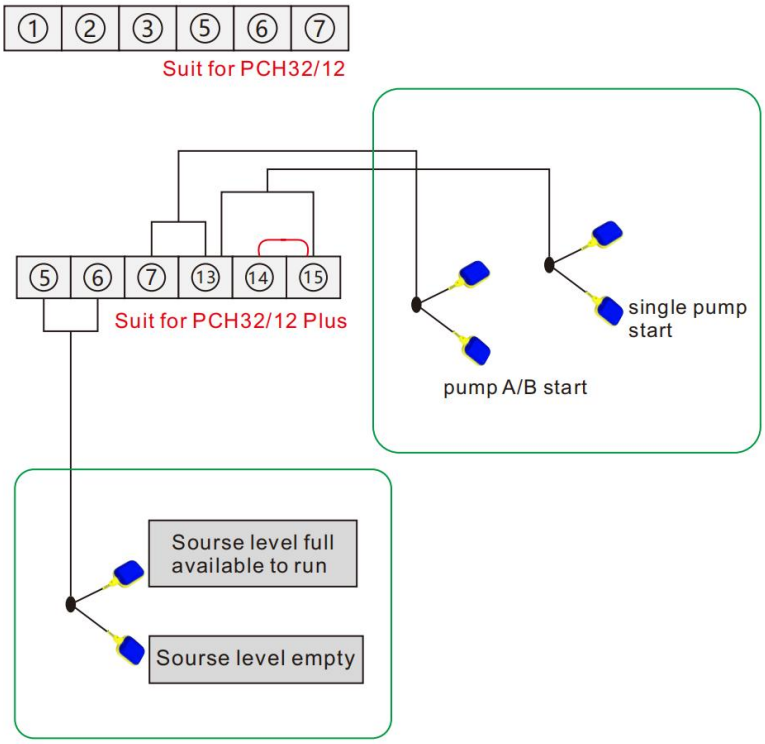


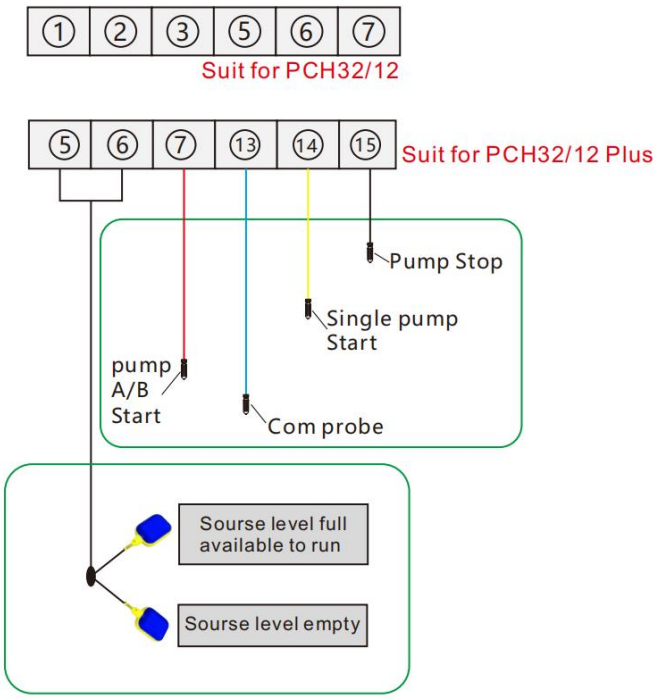
8.3Applied for pressure booster



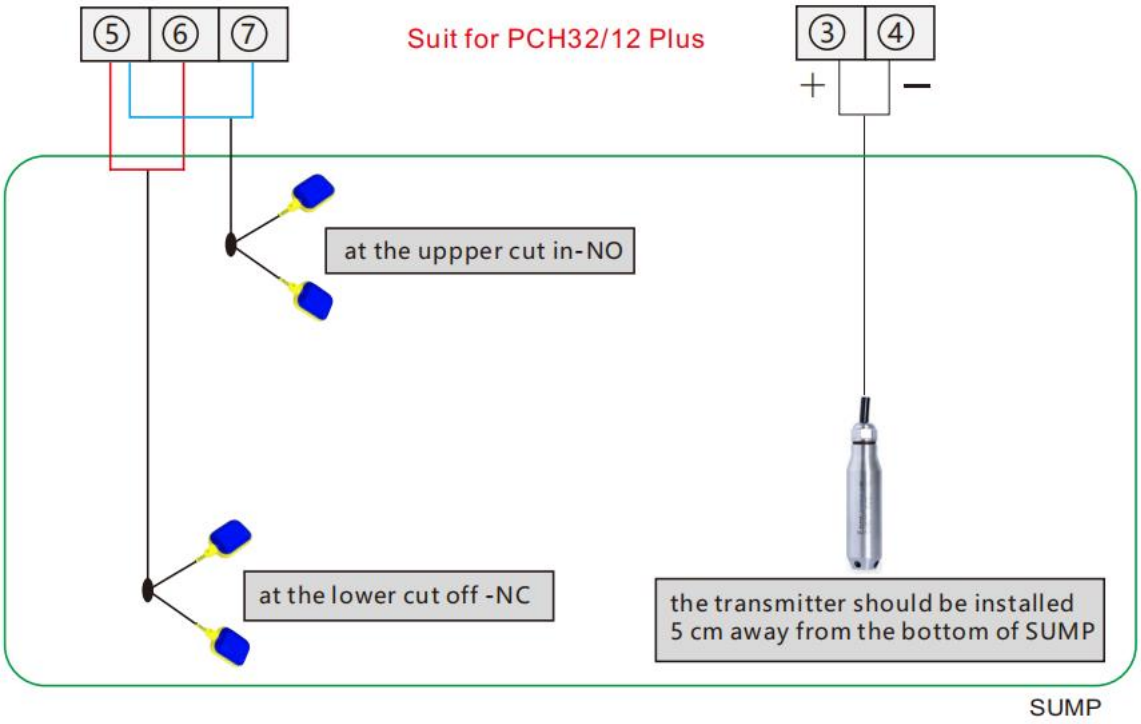


8.4 Applied for water supply





8.5Applied for irrigation/sewage/drainage with overflow alarm through 4-20mA level transmitter



Note: *user can choose the 4-20mA level transmitter with different measuring range according to depth of sewage tank*

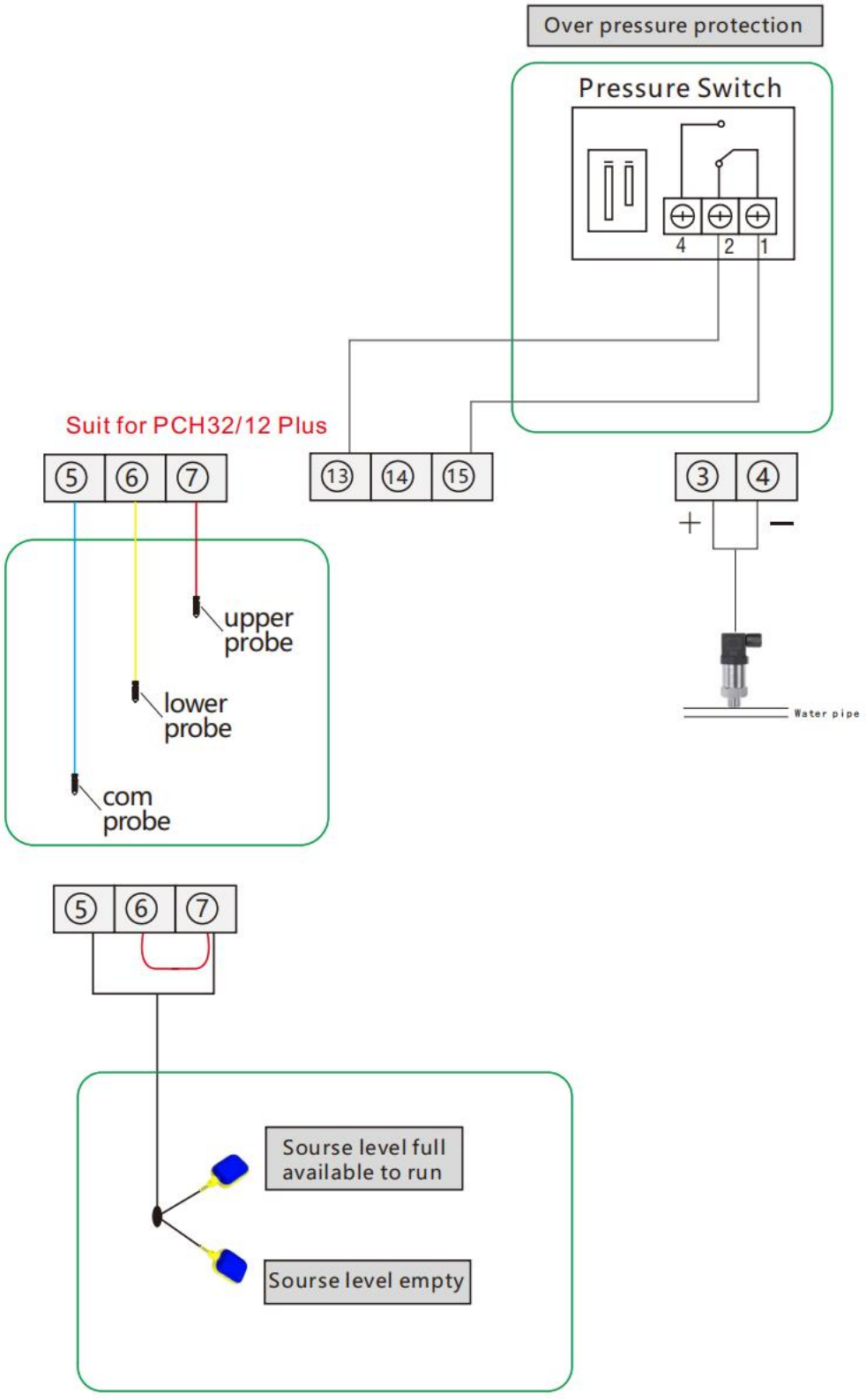
Note: *to maintain the working performance of sewage lifting application by 4-20mA level transmitter, user must enter into the parameter setting manual to set five different working liquid level depth value, including:*

1) Level transmitter full measuring range
2) Pumps cut off liquid level depth value
3) 1st pump cut in liquid level depth value
4) 2nd pump cut in liquid level depth value
5) Over flow alarm liquid level depth value

Note: *the liquid level depth value sequence is measuring range > over flow alarm depth value > 2nd pump cut in depth value > 1st pump cut in depth value > pumps cut off depth value*

Eg: *full measuring range: 200cm*
pumps cut off depth value: 20cm
1st pump cut in depth value: 40cm
2nd pump cut in depth value: 100cm
over flow alarm depth value: 150cm

8.6Applied for pressure boosting through 4-20mA pressure transmitter



⚠ ***Note:*** *user can choose the 4-20mA pressure transmitter with different measuring range;*

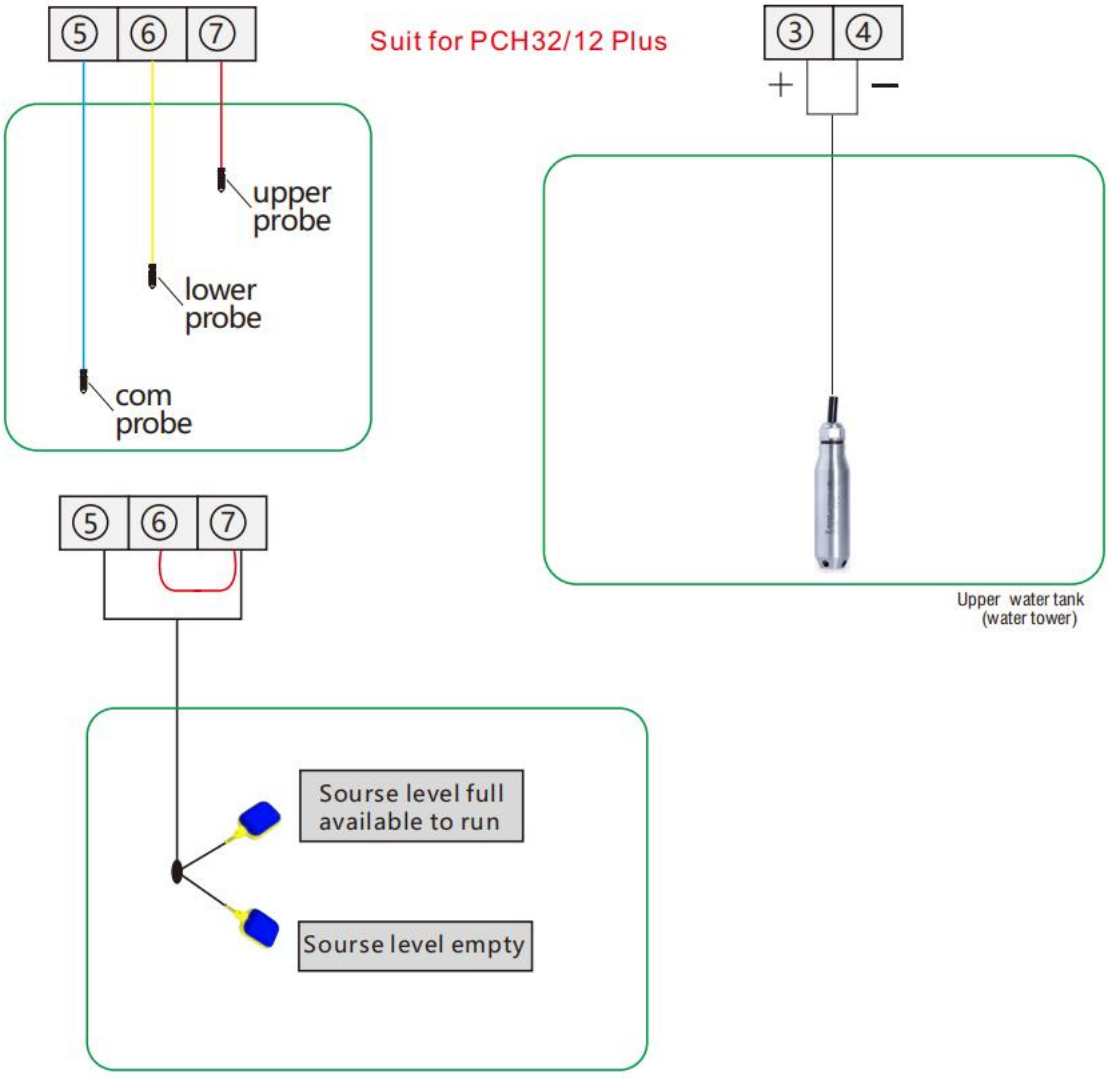
⚠ ***Note:*** *to maintain the working performance of booster application by 4-20mA pressure transmitter, user must enter into the parameter setting manual to set five different working pressure value, including:*

1) Pressure transmitter full measuring range
2) Pumps cut off pressure value
3) 1st pump cut in pressure value
4) 2nd pump cut in pressure value
5) Over pressure alarm value

⚠ ***Note:*** *the pressure value sequence is measuring range > over pressure value > pumps cut off pressure value > 1st pump cut in pressure value > 2nd pump cut in pressure value*

Eg: *full measuring range: 25bar*
pumps cut off pressure value: 10bar
1st pump cut in pressure: 8bar
2nd pump cut in pressure value: 4bar
over pressure alarm value: 22bar

8.7Applied for water supply through 4-20mA level transmitter



⚠ ***Note:*** *user can choose the 4-20mA level transmitter with different measuring range according to depth of water tower*

⚠ ***Note:*** *to maintain the working performance of water supply application by 4-20mA level transmitter, user must enter into the parameter setting manual to set five different working liquid level depth value, including:*

1) Level transmitter full measuring range
2) Pumps cut off liquid level depth value
3) 1st pump cut in liquid level depth value
4) 2nd pump cut in liquid level depth value
5) Over flow alarm liquid level depth value

⚠ ***Note:*** *the liquid level depth value sequence is measuring range > over flow alarm depth value > 2nd pump cut in depth value > 1st pump cut in depth value > pumps cut off depth value*

Eg: *full measuring range: 200cm*
pumps cut off depth value: 100cm
1st pump cut in depth value: 40cm
2nd pump cut in depth value: 20cm
over flow alarm depth value: 150cm

TROUBLE SHOOTING GUIDE

Fault Message	Possible Cause	Solutions
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 power supply company
		controller will attempt to restart the pump every 5 minutes till line voltage is restored to normal
OVER V	the real running voltage is higher than the calibrated voltage, pump is in under voltage protection state	report high line voltage to the power supply company
		controller will attempt to restart the pump every 5 minutes until line voltage is restored to normal
PUMP STALLED	pump motor running ampere increasing exceeds the normal running ampere(calibrated ampere) by more than 175%	cut off power supply & repair or replace pump
	pump impeller / motor bearing broken or jammed	check and repair the impeller or motor bearing
	pump output power is higher than the controller output power	choose the suitable pump which matches with the controller
OVER LOAD	pump motor running ampere increasing exceeds the normal running ampere(calibrated ampere) by more than 135%	cut off power supply & repair or replace pump
	pump impeller / motor bearing broken or jammed	check and repair the impeller or motor bearing
	pump output power is higher than the controller output power	choose the suitable pump which matches with the controller
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
THREE PHASE UNBLANCE	the real voltage (ampere) between three phase(R/S/T) is not same and the difference is more than ± 15%	report to the power supply company
		controller will attempt to restart the pump every 5 minutes until the voltage(ampere) between three phase restored to normal
POWER PHASE REVERSAL	sequence of three phase of input power (R/S/T) error	report to the power supply company
		change the sequence of the three phase
PUMP NO CALIBRATION	parameter calibration not completed	refer to the parameter calibration setting