MINING PUMP CONTROL CABINET

USER MANUAL

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 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 of errors in copying.

The manufacturer reserves the right to change the contents of this operation manual without prior notice.

1. OVERVIEW

Mining pump control cabinet is a control unit for single pump with direct start for deep well submersible pump, centrifugal pump, sewage pump, boosting pump etc.

The controller has many operation modes by adopting different electrical installation and protect the pumps against many different pump fault.

1.1 Applications

Mining pump control cabinet is applied for controlling and protection against drainage pump in mining industry, managing its turn on and turn off according to the signal from paddle flow switch, if there is flow in the pipeline, the control cabinet will start the pump automatically, no flow, control cabinet will stop the pump operation automatically;

1.2 Technical parameters, features & protection function

Main features:

☑ Auto / Manual switch
☑ All protection function can be set enable or disable independently
☑ AC230V 100db motor driven siren, model MS-190
☑ DC24V audible & visual alarm with alarm test button
☑ Available ports for connecting paddle flow switch

☑ Pump last five faults record displaying
☑ Pump accumulative running time displaying
☑ Memory function when input power off & recovery
☑ Pump start delay time or stop delay time settable
☑ Key press button lock or unlock settable
☑ Emergency button

Protection functions:

☑ Dry run protection with sensor free
☑ Pump stalled protection
☑ Overload protection
☑ Over voltage protection
☑ Under voltage protection
☑ Pump repeat start protection
☑ Pump shaft anti rusty protection
☑ Open phase protection for input & output power

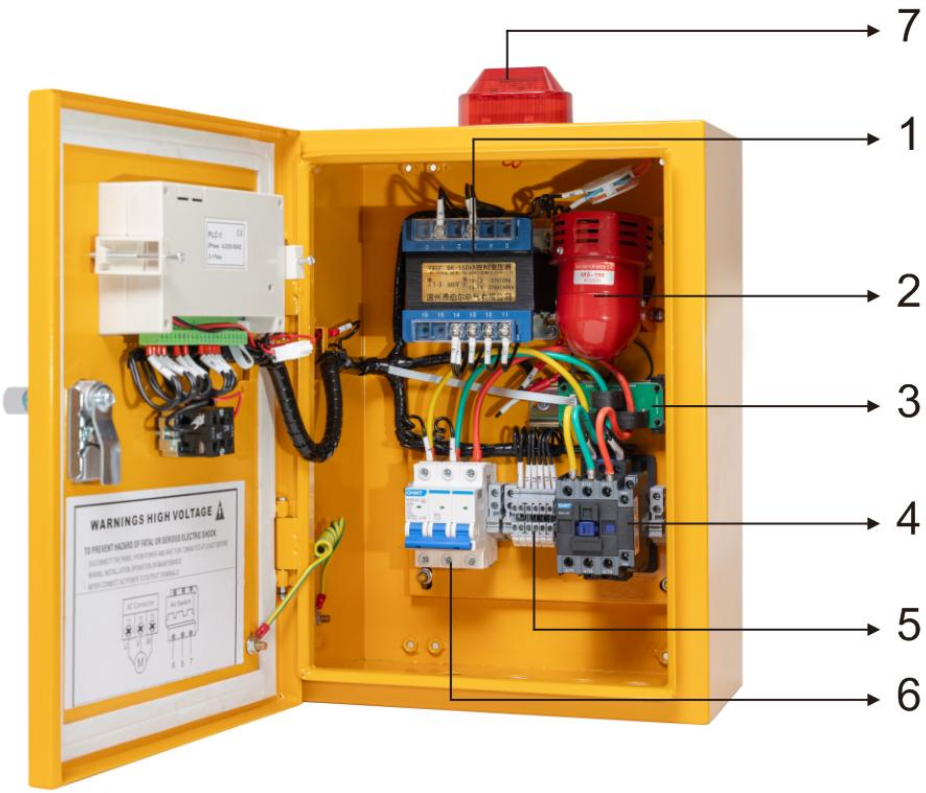
Technical parameters:

Main technical characteristic	
Control characteristic	Double liquid level control
	Pressure control
Control method	Manual / Auto
Liquid level control characteristic	Pulse electrode probe, float switch, paddle flow switch
Pressure control characteristic	Pressure switch (N/C)
Main technical data	
Rated input voltage	Refer to the nameplate
Rated output power	Refer to the nameplate
Trip response time of overload	5sec - 5min (inverse time characteristic)
Trip response time of open phase	<2sec
Trip response time of pump stalled	<0.1sec
Trip response time of under voltage	<5sec
Trip response time of over voltage	<5sec
Trip response time of dry run	6sec (default)
Recovery time of overload	5min
Recovery time of under voltage	2min
Recovery time of over voltage	2min
Recovery time of dry run	30min (default)
Trip voltage of under voltage	80% of rated input voltage
Trip voltage of over voltage	115% of rated input voltage
Signal transmission distance	1500m max
Main installation data	
Working temperature	-25℃ -- 55℃

Working humidity	20% -- 90%RH
Degree of protection	IP45
Mounting type	Wall mounting
Controller dimensions (L x W x H)	depending on different output power
Controller weight	depending on different output power

NOTE: controller weight will vary with different model and configuration.

1.3 Control cabinet structure chart

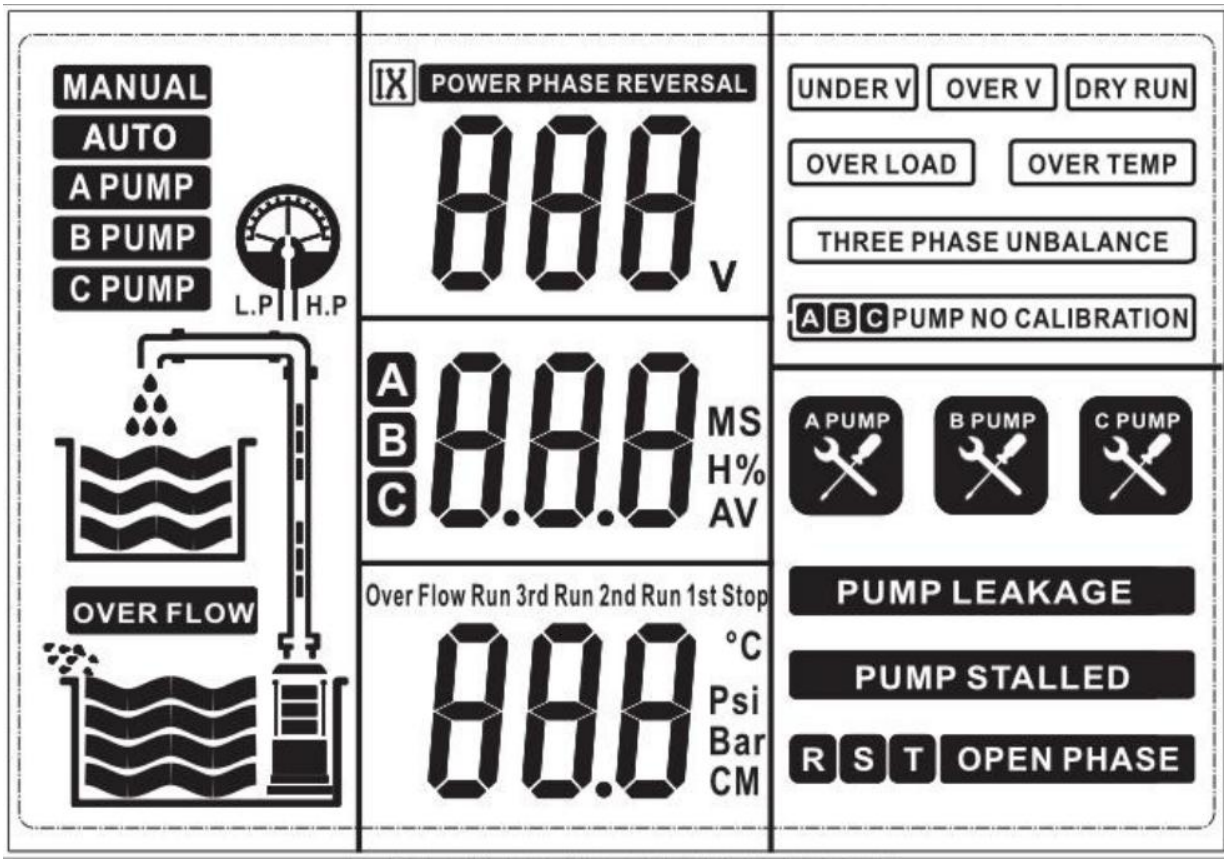


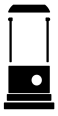
1. Transformer
2. Motor driven siren, model MS-190, AC230V, 100db
3. Current transformer board
4. AC contactor
5. Terminals for electrical connection to paddle flow switch
6. MCB
7. Flash alarm light

NOTE: control cabinet structure will vary with different model and configuration.

8. Programmable logic controller (PLC)
9. Emergency button

1.4 Meaning of LCD displaying icons

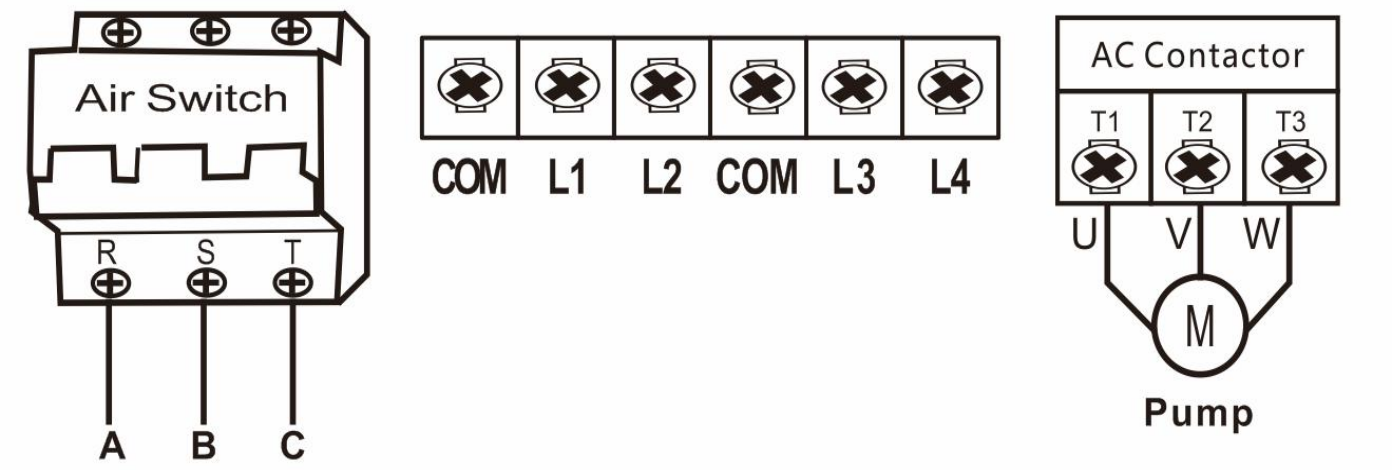


Icon	Meaning/Description
L.P	Low pressure or lack of pressure in the pipeline or pressure tank,this icon will be illuminated when the pressure value is low and pump will start
H.P	High pressure of full of pressure in the pipeline or pressure tank,this icon will be illuminated when the pressure value is high and pump will stop
M	Minute
S	Second
H	Hour
%	Percent
A	Ampere
V	Voltage
	Pump running
	Pump no running

	Pump fault icon, when this icon illuminating, it means corresponding pump stops because of fault occurs
	Pump A / Pump B / Pump C
	1st = Pump A 2nd = Pump B 3rd = Pump C these three icons will be illuminated respectively when setting the start value of the pressure or level transmitter for each corresponding pumps
	This icon will be illuminated when setting the overflow value or over pressure value of the level transmitter or pressure transmitter
	This icon will be illuminated when setting the stop value of the pressure or level transmitter

2. INSTALLATION

2.1 Electrical connection to the power supply line and pump



⚠ ***NOTE:*** *terminals for electrical connection to the pumps or input power will vary with different model and configuration.*

⚠ ***WARNING:*** *Danger electric shock risk!*

⚠ ***WARNING:*** *Before carrying out any installation or maintenance operation, the controller should be disconnected from the main power supply and should wait for at least 2minutes before opening the controller!*

⚠ ***WARNING:****Never connect AC main power supply to output U1/V1/W1 or U2/V2/W2 terminals!*

⚠ ***WARNING:****Never connect AC main power supply to output L1/N1 or L2/N2 terminals!*

⚠ ***CAUTION:****Don't put wire,metal bar/filaments etc into the controller!*

⚠ ***CAUTION:****Ensure the pump, controller and power specifications matching!*

⚠ ***NOTE:****The electrical and hydraulic connections must be carried out by competent, skilled, qualified personnel!*

2.2 Parameter calibration setting & erasing

Parameter calibration setting

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.

Procedure of pump parameter calibration setting:

1. press the MODE button to switch to manual state, make sure the pumps no running;

2. press the START + button to run pump, checking the input voltage, ampere matches the nameplate of pump, pumps and all pipe network in normal working state;

3. press the STORE/SET button, the control panel make a “Di” sound and LCD screen starts time countdown;

4. pump stops running and control panel memorized the parameter of pump, parameter calibration complete;

Parameter calibration erasing

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

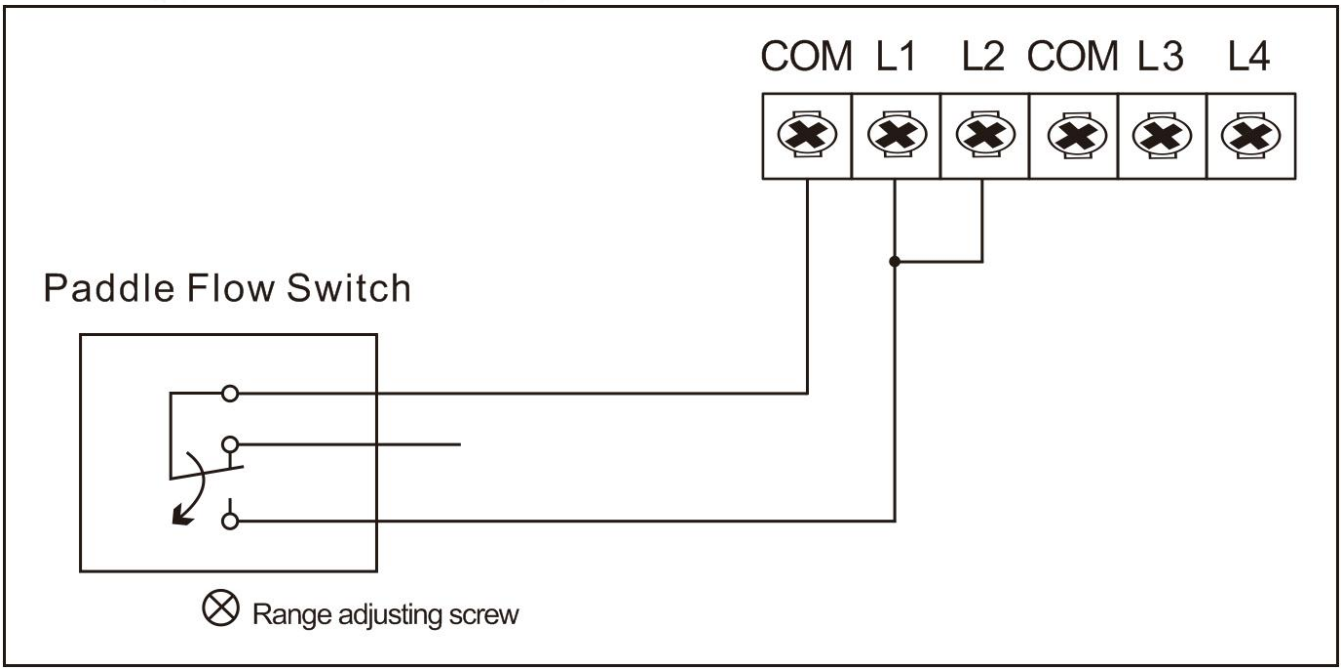
Procedure of pump parameter calibration erasing

1. press the MODE button to switch to manual state, make sure the pumps no running;

2. hold pressing the STOP - button and release till control panel makes a “Di” sound, pump parameter calibration erasing complete;

3. ELECTRICAL CONNECTION

3.1 Electrical terminals definition



Paddle flow switch wiring terminal

Terminal No	Definition
COM + L1 + L2	paddle flow switch

Float switch wiring terminal

Terminal No	Definition
COM + L4	float switch in main sewage tank
L3	blank

4. BASIC OPERATION

4.1 Switching to manual state

press the **MODE** button to switch to manual state, control panel is under manual control state; under manual state, press the **START +** button to run the pump; press the **STOP -** button to stop the pump operation;

if pump user switch to manual state, control panel will compulsory switch to auto state after 1 minute to prevent pump user forget to switch back to auto state, pump user can set this 1 minute according to their demanding.

4.1.1 How to set the 1minute time

pump user can enter into expert's menu to set this 1 minute, in parameter item 04 is the time value;

How to enter into expert's menu:

under manual state and no pumps running, hold pressing **STORE/SET** button firstly and then press **MODE** button to enter into expert's menu. parameter item 04 is the time value setting, pump user can press **START +** button or **STOP -** button to set the time

⚠ ***Note:*** *under manual state, the control panel can not receive the signal from float switch, paddle flow switch*

4.2 Switching to auto state

press the MODE to switch to auto state, control panel is under auto control state; under auto state, control panel will start or stop the pump according to the signal of paddle flow switch, if there is water flow in the pipeline, paddle flow switch be activated and control panel will start the pump; if there is no water flow or valve closed, control panel will stop pump running;

⚠ ***Note:*** *under auto state, if the pump is running and user wants to stop the pump running compulsory, press the MODE to switch to manual state and press STOP - button to stop corresponding pump operation;*

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

⚠ ***Note:*** *under auto state, if the input power being cut off and recovery power again, the control panel will enter auto operation state after 10seconds counting down;*

4.3 Pump protection

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

if pump stalled, open phase etc serious failures occur, control panel will immediately shut down the pump operation and not recover, user must check the pump and motor, only after clearing the failure, control panel can run the pump again;

4.4 Pump last five failure record displaying

the control panel can memorize the last five failures which lead to pump operation stop,it is convenient for the user to analyse the pump running conditions.

Procedure of pump last five failure record displaying:

1. press the MODE to switch to manual state, make sure the pumps no running;
2. hold pressing the STOP - and then press MODE, the control panel make a “Di” sound and displays pump A last five failure record;
3. press the STOP - to quit pump failure record displaying;

4.5 Pump accumulative running time displaying

the control panel can memorize how many hours of pump running, it is convenient for the user to analyse the pump running conditions and have pump maintenance;

Procedure of pump accumulative running time displaying:

1. press the MODE to switch to manual state, make sure the pumps no running;
2. holding pressing the STORE/SET and then press STOP -, the control panel make a “Di” sound and displays pump accumulative running hours;
3. press the STOP - to quit pump accumulative running time displaying;

4.6 Motor driven siren

the motor driven siren will be only activated when the pump has failure: dry run, overload, under/over voltage voltage, pump stalled; it will not be activated by the paddle flow switch or float switch;

4.7 Flashing alarm light

the flashing alarm light will be only activated when the pump has failure: dry run, overload, under/over voltage voltage, pump stalled; it will not be activated by the paddle flow switch or float switch;

5. KEY PRESS BUTTON BEFINITION

BUTTON	DEFINITION & FUNCTION	NOTE & REMARK
MODE	1. to switch panel between auto or manual state 2. to choose the parameter item in parameter menu	
START +	1. to start pump under manual state 2. menu value increase, like +	
STOP -	1. to stop pump under manual state 2. menu value decrease, like - 3. to clear parameter calibration of pump	under manual state and no pumps running, press STOP - for 6seconds, control panel will erase parameter calibration of pump
STORE	1. to store the parameter 2. to enter into user's parameter menu	under manual state, press A START + or B START to run pump A or B,press STORE, controller will memorize pump A or B parameter; under manual state and no pumps running, holding pressing STORE/SET to enter into user's parameter menu;
STORE + MODE	to enter into expert's menu	under manual state and no pumps running, hold pressing STORE/SET firstly and then press MODE to enter into expert's menu
MODE + STORE	to unlock the key press button	under auto state, if the key press button locked, hold pressing MODE firstly and then press STORE/SET to unlock the key press button
STORE + STOP -	to display the pump accumulative running time	under manual state and no pumps running, hold pressing STORE/SET and then press STOP - to display pump accumulative running time
STOP - + MODE	to display the pump last five failure record	under manual state and no pumps running, hold pressing STOP and then press MODE to display pump A last five failure recorder

6. 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

Fault Message	Possible Cause	Solutions
DRY RUN	the water well is lack of water	controller will attempt to restart the pump every 30 minutes until water well is full of water
	improper parameter calibration is done	erase the last parameter calibration and re-calibrate
	the pump inlet or impeller is jammed	check the inlet or impeller and clean the blockages
OVER TEMP	the temperature in pump motor winding is high and contacting point of thermal switch is in open circuit state	waiting the temperature in pump motor winding cooling down, the contacting point of therm switch is in close circuit state