2.2kw Three Phase Control Box

Automatic Electric Controller designed especially for Deep Well Submersible Pumps

Model No. : M28-B 380v

Read before installation & operation

Italy New Technology

ISO 9001-2000

Contents

1. Suitable scales and model specifications

1.1 Suitable scales

The product is suitable to direct start the three phase electric motors under 15kw for drainage equipment, used for automatic control and motor and pump comprehensive protection. It has the characteristic of easy to operate, less labor intensive, safe, releasing the loss caused by equipment fault, reduction use of electricity and water. Correct use will remarkable increase profits.

1.2 Serials and specifications

Power	HP	1	1.5	2	3	4	5.5	7.5	10	12.5	15	17.5	20	25
	kw	0.75	1.1	1.5	2.2	3	4	5.5	7.5	9.2	11	13	15	18.5
Rated Current	A	2.4	3.2	4.0	5.6	7.6	10	13.2	18.5	21	25	29.2	33.5	38.2

2. Main functions

2.1 No need for adjustment to control water level, easy to install and easy to use.

2.2 Water level control pole lines are controlled by three lines, three poles as traditional similar products. Exchangeability to similar products both inside and outside the country is strong. It is also equipped with specialized 'level divider', which can save the usage of pole lines from ⅓ to ½ and increase its control reliability.

2.3 If using automatic position it also possesses 'phase failure' protection of motor. If there are any loose or broken lines of any phase it can automatically cut off the motor within two seconds and effectively prevent any damage to the motor or fault caused by lack of phase.

3. Main technical specifications

3.1 Suitable electric power: three phases three lines, alternate 415V ± 5%, 50Hz
3.2 Output: three phases three lines, alternate 415V ± 5%, 50Hz
3.3 Static power loss of the controller: <5W
3.4 Water level pole voltage: direct 12V
3.5 Allowed maximum resistance of pole line: 20 kΩ
3.6 Overload current protection: Motor overload current is reliable protected by heat relay and can be self locked cut off.

3.7 Lack of phase protection: self locked cut off after 2 second delay.

4. Installation

4.1 Ordinary installation.

4.1.1 The controller should be placed away from direct sun and rain, strong vibrations, tinder and explosive goods and it should have good ventilation.

4.1.2 Connect three phase power lines and motor lines according to instruction manual and connecting diagram. Note the power input side should install power isolate switch (air switch or knife switch).

4.1.3 Pole lines and power lines cannot be closely laid in parallel. If it is required to set in parallel, the distance between the lines must be bigger that 0.5m, in case of interfering pole signal by the electric field of power lines.

4.2 Liquid level automatic installation

4.2.1 When using water level automatic control, it is necessary to place water level pole conduct line and poles.

4.2.2 There is no strict requirement to the diameter of pole lines but the laying strength must be strong enough. The pole line under the water level can be replaced by metal water tube but the electric connection between the tube and pole line must be reliable.

4.2.3 If there is enough water in the well and no chance of the water level being below the inlet of the pump, there is no need to install well poles (which is short by conductor at the connector before leaving the factory. Otherwise the conductor should be removed).

4.2.4 Placement of poles.

a) Well low pole: It is the water level feedback signal pole. Usually use metal drainage tube connected to the shell of the pump to replace the pole. If the drainage tube is not metal the low pole must be placed under the water level.

b) Well middle pole: It is the automatic cut off signal pole when short of water (low water level). It is placed above the inlet of the pump but should not be too high in order to fully use the well water.

c) Well up pole: It is the reset to automatically start motor signal pole (upper water level). It should be placed under the highest level at low water season (otherwise the motor cannot automatically start when the level will not reach the level). At the same time, it should

be as far away from the middle pole as possible in order to reduce the start and cut off times of the pump.

d) Tower low pole: It is the water level feedback signal pole, usually placed at the bottom of the tower.

e) Tower middle pole: It is the automatic cut off signal pole when tower is short of water (low water level), usually placed below the middle place of tower.

f) Tower upper pole: It is the motor cut off signal pole when the tower is full of water (upper water level), placed below spill over port, above middle pole.

4.2.5 Note there is no short contact between the poles. Pole metal part should not contact metal tube or well wall.

4.2.6 Under the conditions below can or should the level of pole be adjusted:

a) For wells, the upper pole is mainly adjusted and should not be fastened so as to adjust when not sure of the highest level at low water season.

b) For tower, the middle pole is mainly adjusted. When its position is too high the pump will pump water too soon and the tower has enough water for peak water supply but the motor start and cut off too frequently (which will affect the life of the motor). When its position is too low, the motor start time can be reduced but the tower may not have enough water for peak water supply. Customer can adjust it according to real conditions.

5. Usage

5.1 Preparation before running controllers

a) Before starting the motor check carefully and make sure that the line connection has the right voltage of three phase power, no lack of phase and the application condition is satisfied.

b) Firstly use the move grade with lack phase protection.

5.2 Manual control

When starting the motor for the first time, treat it in two cases:

a) For pump motors with limited position stops in reverse rotation (such as long shaft deep well pump), turn main instruction switch to manual position once. Turn it back to stop position immediately. Look at the pump rotation direction at the same time. If it is jammed without rotation then it is in reverse rotation. Exchanging any two power lines will let the pump turn correctly.

b) For pump motors without limited position stops at reverse rotation (such as deep well submersible pump), start the motor twice looking at the motor rotation direction separately. When the drained water amount is larger and the electric current is smaller it is turning in the right direction. Otherwise it is turning in the reverse direction.

c) In order to prevent motor run under long time overload current causing burnout, observe the motor's running current when it operates stable under full load as follow methods:
   - If the current is within the allowed scope adjust the overload current protection heat relay slowly until it stops the motor. Then turn the heat relay slightly in the reverse direction. Reset it and restart the motor. You may need to do this step several times.
   - If the current to too large, check the reason and treat it based on the fault overview table. Then adjust heat relay again.

5.3 Liquid level control

After installing the poles and pole lines the controller should be at the 'automatic' position to start the motor. The start and stop of the pump motor is controlled by the signal feedback by water level poles and usually without any other operation. The automatic control function can be checked at this stage by simulating the water level up and down.

6. Notify items

6.1 Carefully read this instruction manual before using the controller.

6.2 Operators should possess electrical and mechanical knowledge. Install and use the controller under electrical safe operation specifications.

6.3 High level cells should have good thunder and lightning protection apparatus.

6.4 When there are strong thunder storms around, it is better to stop use and cut off the power supply to protect the controller from damage.

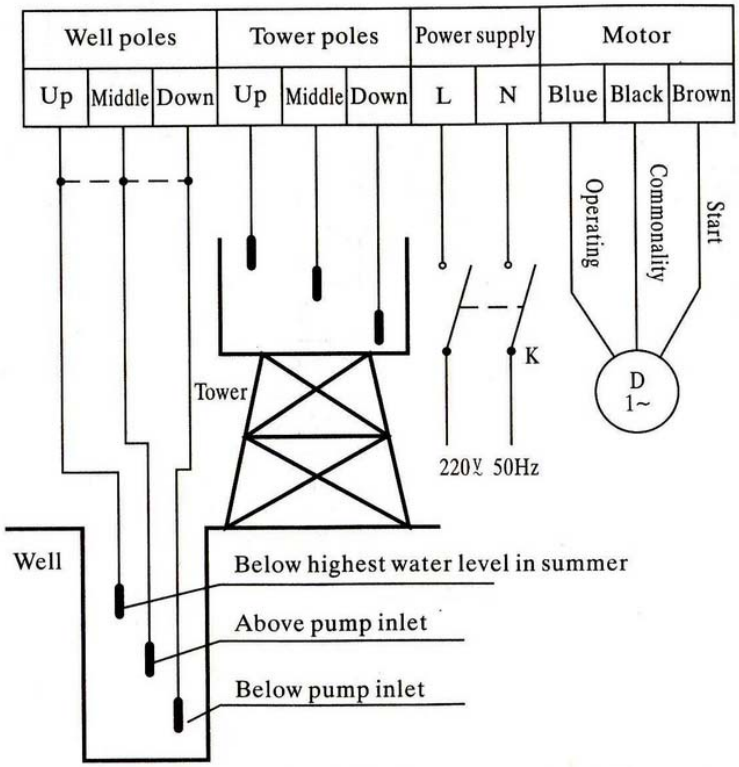
6.5 When the motor is automatically stopped by faulty device do not start the motor again before the fault is treated to prevent worse damage or burning out the motor.

7. Overview of ordinary faults

Fault phenomenon	Producing reason	Dealing method
'Fault light' is bright	1. Pump draining height is larger that used 2. Power voltage is too low 3. Power line too long and too thin causing too much reduction in voltage 4. Foreign body exists in pump wheel causing the wheel to jam the pump 5. Short circuit of motor line due to carelessness 6. Short circuit caused by line breakage Motor already damaged	1. Change pump or turn the outlet valve down 2. Improve power supply 3. Enlarge the diameter of the power line 4. Clean pump and clean the well if possible 5. Check and connect motor line again 6. Change new motor line 7. Repair or change motor
'Lack phase light' is bright	1. One power line is broken or loose 2. Power line fuse loose or burnt 3. One motor line is broken or loose 4. Line inside motor is broken 5. Controller's alter relay contacting point is burnt 6. Controller's first loop line is broken of loose 7. Current sensor is damaged 8. Circuit board is damaged	1. Connect power line 2. Connect power fuse 3. Connect motor line 4. Repair motor 5. Change new alter relay 6. Connect controller's first loop 7. Change current sensor 8. Change circuit board
Motor is running without draining water	1. Pump rotates in reverse 2. Connection between motor and pump is broken 3. Draining tube inside	1. Exchange any two power lines 2. Repair or change the connection 3. Connect the draining tube

		the well is loose	
The amount of water output is unstable		1. Pump drainage amount is too large and lack of water 2. Pump not placed deep enough causing a lack of water 3. Well moves water level lower that pump inlet	1. Change to a pump with suitable drainage amount 2. Lower the pump height in the well 3. Change to a smaller pump or turn outlet valve down
Manual position is not working properly	Cannot start	1. No power supply 2. Circuit line inside controller is loose 3. Relay coil is broken 4. Circuit board damaged	1. Check three phase power supply 2. Check and connect circuit line inside the controller 3. Change the relay coil 4. Replace circuit board
	Cannot stop	1. Contacting point of alter relay is burnt together 2. Contacting point of sensing relay in board is burnt together	1. Change alter relay (or contacting point) 2. Replace circuit board
Auto position is not working properly	Cannot automatically start	1. When no well poles, well poles at connecting side not short 2. Well poles broken or loose 3. Tower poles shortage or upper, middle pole contacted to wall 4. Well upper pole too high, water cannot reach 5. Circuit board damaged	1. Connect pole short line 2. Check and connect well pole line 3. Check and solve short circuit problem, hang pole in air 4. Lower well upper pole height 5. Repair or replace board
	Cannot automatically stop	1. Tower pole line is broken or loose 2. Short circuit between well poles or upper pole or middle pole contacting earth 3. Circuit board damaged	1. Check and connect tower pole line 2. Check and change pole lines, place pole right 3. Change board or repair board

8. Connecting Diagram



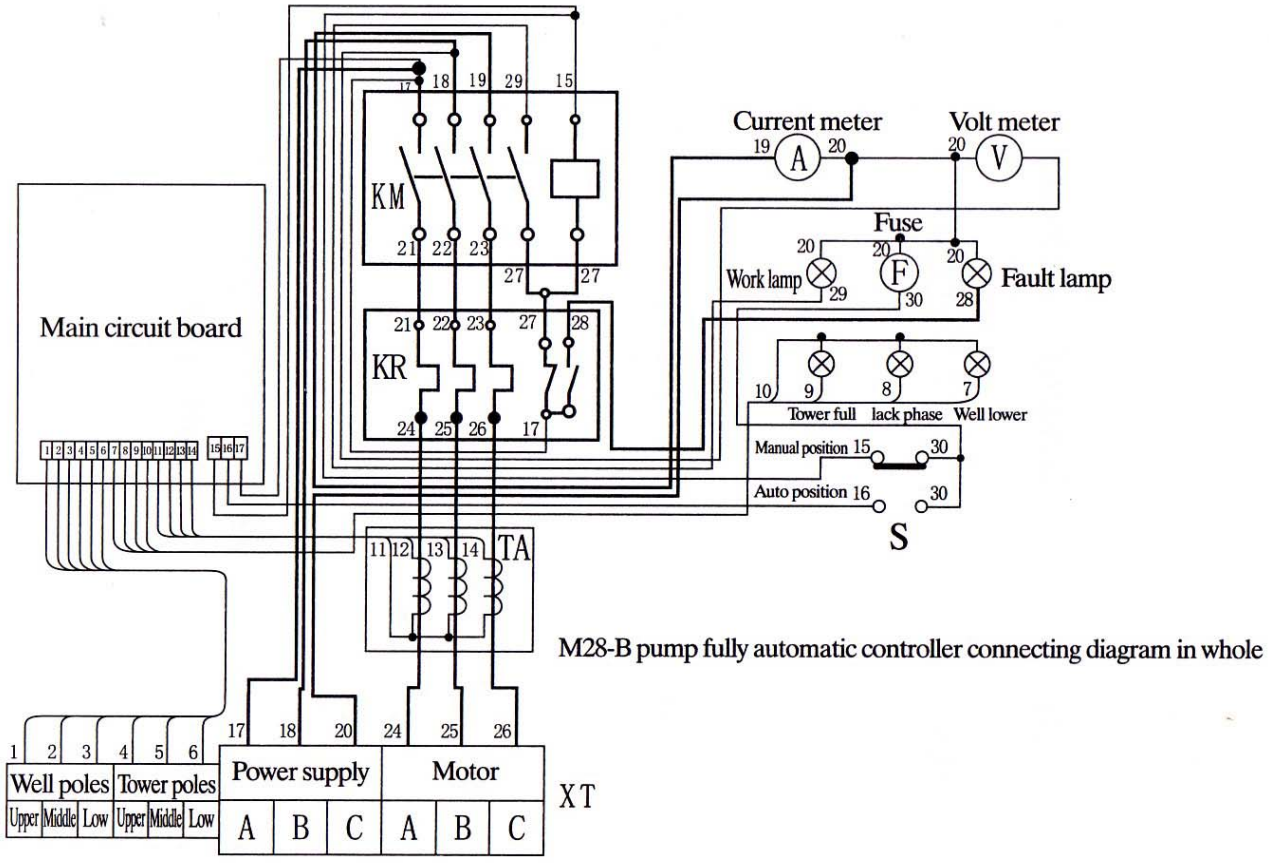
Notes:
The conducting line in dash has been connected before leaving factory. When lack of water and need well poles, remove this line.

Installation connecting diagram

X Connecting point

K Knife switch

D Motor



M28-B pump fully automatic controller connecting diagram in whole