NJBK5-5 Motor Controller

1. General

NJBK5-5 motor controller (hereinafter referred to as controller) is mainly used in circuits with a frequency of AC 50Hz/60Hz, a rated operational voltage of up to 220V and a rated control power of up to 2.2kW (current up to 20A) to control the direct start and stop of single-phase water pumps, provide overload and underload protection (pump runaway protection), and realize automatic liquid level control for civil water towers and reservoirs.

This product is not applicable to the liquid level control of oil, purified water, inflammable and explosive chemical liquids, corrosive liquids and high-density sewage.

Standards: IEC 60947-4-1

2. Type designation

N JBK 5 - □ / □ □

- N: Company code
- JBK: Motor controller
- 5: Design sequence No.
- □: 5: frame size code
- □: Rated operational current
- □: Rated control supply voltage

3. Operation conditions

3.1 Altitude: the altitude of the mounting location should not exceed 2000m;
3.2 Ambient tempeature: -5℃～+40℃, and the average temperature in 24h should not exceed +35℃；
3.3 Atmospheric conditions: The relative air humidity at the mounting location should not exceed 50% at the maximum temperature of +40℃. The relative humidity may be higher at lower temperatures. Special measures should be taken if condensation occurs on the product occasionally due to temperature variation。
3.4 Pollution degree: 3;
3.5 Mounting category: Ⅱ;
3.6 In places where there is no significant vibration or impact;
3.7 In non-explosive media that do not contain a sufficient amount of gas or dust to cause metal corrosion or insulation failure;
3.8 In places where rain and snow protection is provided;
3.9 The inclination from the vertical plane should not exceed 5°.

4. Technical data

4.1 Main data and technical characteristics

Model	Type	Conventional heating current (A)	Setting current range (A)	Rate power		Rated operational voltage (V)	Rated operational current (A)
				kW	HP		
NJBK5-5	2A~10A	20	2A~10A	0.25~1.1	1/3~1.5	AC220	AC-120
	4A~20A		4A~20A	0.55~2.2	3/4~3		

4.2 Rated control supply voltage Us: AC220V.
4.3 Rated control supply voltage fluctuation range: (85%~110%)Us.
4.4 Degree of protection of enclosure: IP20.
4.5 Operating characteristics
4.5.1 When overload protection is active, the red "Fault" indicator of the controller lights up permanently, and overload protection operates according to tripping class 10, see Table 2.
Table 2 Operating characteristics of overload protection

No.	Setting current multiple	Operation time	Starting conditions
1	1.05	No operation within 2h	Cold state start
2	1.2	Operation within 2h	Start after No.1
3	1.5	≤4min	Start after applying a 1.0 times setting current for 2h
4	7.2	4s<Tp≤10s	Cold state start

4.5.2 Operating characteristics of underload protection (pump runaway protection): When the actual operational current of the pump motor is less than 20%~100% of the rated current of the motor, the red "Fault" indicator of the controller flashes and, after a delay of 60s±10s, the controller stops operation.
4.5.3 Protection return characteristics: After the operation of the overload or underload protection (pump runaway protection) of the controller, the controller restarts automatically after a delay of 30min±3min.
4.5.4 Reset characteristics: power-off reset, the reset time ≤ 1min.
4.6 Down-lead distance of liquid level control electrode: 500m max.
4.7 Requirements for the liquid under control: general domestic water or high-conductivity sewage.
4.8 Mounting type: installation type.

5. Structure and principle

The controller consists of four parts, enclosure, base, sealing ring and main control panel. The enclosure has a "Force Start" button, which is used to start the pump motor forcibly to fill the pool when the highest water level has not been reached and becomes invalid when the highest water level has been reached. It also has a "Power" switch, which is used to switch on or off the power supply of the controller (position "I" is on, and position "0" is off).

There are three liquid level detection electrode wires in the controller, E1, E2 and E3, which should be connected and installed in high, medium and low positions in the pool under control by the user. When the water level in the pool is lower than position E3, the controller starts the pump motor to pump water and the yellow "Water Level" indicator on the controller panel flashes, until the water level in the pool reaches position E1. At this time, the yellow "Water Level" indicator on the controller panel lights up permanently and the pump stops pumping.

6. Installation and commissioning

6.1 Before installation, read the operating instructions carefully. Then, connect the wires in accordance with the connection diagram. During connection, the live wire and neutral wire of the controller power supply should be distinguished from each other, the three liquid level detection electrodes in the controller, E1, E2 and E3, should be installed in high, medium and low positions in the pool under control by the user, the terminals should be highly conductive.
6.2 Before the controller is put into use, overload setting must be carried out. Otherwise, overload protection will be inactive. Overload setting is accomplished by simply setting the current value on the overload dial of the controller to the rated current of the motor. The underload setting value can generally be 50% of the rated current. The user may also carry out underload setting after detecting the no-load current of the motor and calculating the percentage to the rated current.
6.3 After checking the connection and carrying out overload and underload setting, press the power switch on the controller panel to switch on the power supply and carry out relevant overload and underload tests. The controller may be used only if it operates normally. If a fault occurs, check the connection or the overload and underload setting.

7. Wiring diagram

Figure 1 Connection diagram

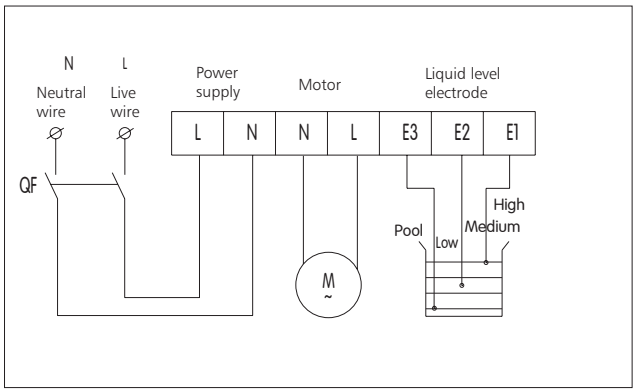
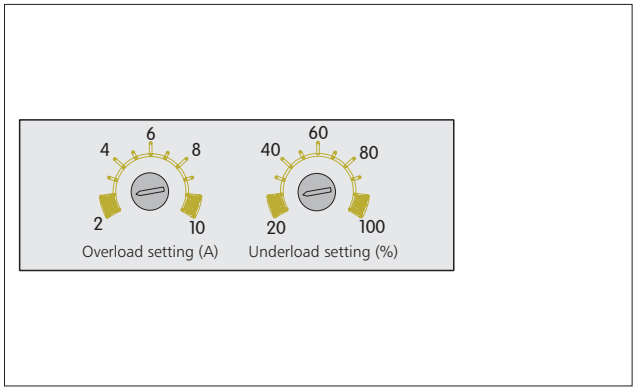


Figure 2 Schematic diagram of setting knob



8. Overall and mounting dimentions (mm)