pay attention to personal safety when you install and use the product, and read the operation instructions carefully

Standard: IEC 60947-5-1

NJB1-YW

Floatless Relay

Operation Instructions

1 Main Purpose and Scope of Application

NJB1-YW floatless relays (hereinafter called the relay for short) are applied in AC 50Hz control circuits up to 380V rated voltage of control power supply as automatic liquid level control elements of civil water towers, elevated water tanks, under ground water tanks, etc. The control of automatic water supply or drainage may be achieved by a single operation of the function switch without modifying the user's connection conditions.

The products are not applicable for level control of liquids with poor conductivity, such as oil, purified water, and chemical liquids of flammable and explosive properties as well as sewage of high density.

The products are in compliance with requirements of Standard IEC60947-5-1.

2 Type and significations

NJB1- YW/□

- Rated voltage of control power supply
- Function code: floatless relay
- Design serial number
- Relay
- Enterprise code

3 Normal operating conditions and installation conditions

3.1 Normal Operating Conditions

3.1.1 Ambient air temperature

a) The upper limit of the ambient air temperature is +40℃, and

the mean value in 24 hours shall not go above +35℃.

b) The lower limit of the ambient air temperature is -5℃.

3.1.2 Altitude

The relay shall be installed at levels not over 2000m above the mean sea level.

3.1.3 Atmospheric Conditions

3.1.3.1 Humidity

When the maximum temperature is at +40℃, the relative air humidity of the installation site is not higher than 50%.In case of a lower temperature, a higher relative humidity is allowed. Special measures shall be taken against occasional condensation resulted from temperature changes.

3.1.3.2 Pollution Degree

The pollution degree is Degree 3.

3.2 Installation Conditions

3.2.1 Installation type: II.

3.2.2 Installation site

a) Installed at a site free of notable vibrations and impacts.

b) Installed at a site with medium free of explosion risks. And such medium is free of gases to cause corrosion of metals and damages of insulation system and free of heavy dust.

c) Installed in an area provided with rain and snow proofing facilities.

4 Major Technical Data

4.1 Rated voltage of control power supply: AC (50Hz) 36V, 110V, 220V and 380V.

4.2 Allowable fluctuation range of relay voltage: (85% ~ 110%) of rated voltage.

4.3 Agreed thermal current: 3A.

4.4 Fundamental parameters of the auxiliary circuit are given in Table 1.

Table 1 Fundamental Parameters of Auxiliary Circuit

Number of contacts	Utilization category	Rated operating voltage Ue,V	Rated operating current I e,A
1 set of changeover contacts	AC-15	220	0.75
		380	0.47

4.5 Fundamental parameters of liquid level detecting electrode and relay operation: see Table 2.

Table 2 Fundamental Parameters of Liquid Level Detecting Electrode and Relay Operation

Type	NJB1-YW
Electrode lead wire length	Maximum 100m
Output AC voltage of liquid level detecting electrode	9V
Operating resistance	5kΩ～100kΩ（subject to adjustment）
Resetting resistance	250kΩ
Operating delay time	0.1s~10s（subject to adjustment）
Operating delay error	The maximum nominal value of delay error is not bigger than ±20%.The minimum delay value is not bigger than 10% of the maximum nominal value.

4.6 Immunity to interference: see Table 3.

Table 3 Immunity to Interference

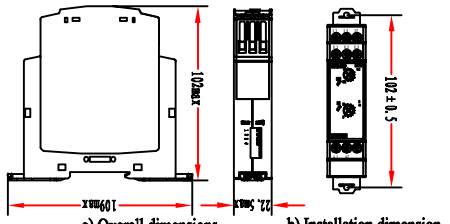
Items	Level of severity
Electrostatic discharge	Air discharge: ±8×(1±10%)kV
Radiated radio-frequency electromagnetic fields	Test electrical field intensity: 10×(1±10%) (V/m)
Electrical fast transients/bursts	2kV for power line ,lasting time:1min
Surges(impulse)	Open circuit test voltage: 2×(1±10%)kV

4.7 Degree of protection provided by enclosure: IP20.

4.8 Mechanical durability: $>10^6$ times.

4.9 Electrical durability: $>10^5$ times.

4.10 Overall dimensions and installation dimension are provided in Figure 1.



a) Overall dimensions b) Installation dimension

Figure 1 Overall Dimensions and Installation Dimension of NJB1-YW Floatless Relay

4.11 Connection diagram and operating time sequence diagram: see Figure 2 through Figure 3.

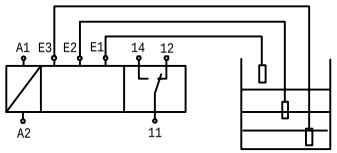


Figure 2 Connection Diagram of NJB1-YW Floatless Relay

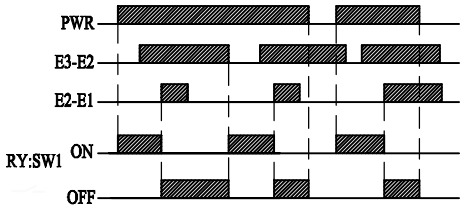


Figure 3 Operating Time Sequence Diagram of NJB1-YW Floatless Relay

5 Structural Principle

5.1 The relay consists of liquid level detecting electrodes (conductors), a signal processing circuit and an output control relay. After the power supply has been made, the signal processing circuit determines the

current position of the liquid level on the basis of the level signals provided by the three electrodes, and actuates the output control relay to make or break the electric circuits of water supply or drainage, thus achieving automatic control of water level.

5.2 The operating sensitivity (5kΩ ~ 100kΩ) of NJB1-YW floatless relay and response time of the relay (0.1s ~ 10s) are set by means of knob turning. Before using the relay, a user may respectively turn the two knobs located in the relay's panel to determine such data.

5.3 The function switch on the product is intended to control opening or closing of the small electromagnetic relay inside the product in the case of the same liquid level, so as to achieve water supply or drainage control without modifying the connection mode. The detailed control method is: if the function switch is at "OFF" position, the relay's normally open contacts close when the liquid tank is full. If the function switch is at "ON" position, the relay's normally open contacts open when the liquid tank is full.

Note: The relay's connection terminal 11, 12 and 14 are a group of output contacts of the small electromagnetic relay inside it, among them, 11 ~ 12 are normally closed contacts, and 11 ~ 14 are normally open contacts.

6 Installation, Operation and Items of Notice

6.1 The connection shall be performed correctly in accordance with the connection diagram, and no contact current shall be allowed to be above the rated operating current.

6.2 The relay is provided with three copper conductors of good conductive property, with bare metal proportion not shorter than

5cm peeled at ends of such conductors as detecting electrodes. The distance between the three electrodes shall be no bigger than 5cm. In case the controlled liquid level tank is a metal tank, its casing shall be earthed.

6.3 For different liquids and distances between electrode lead wires, the knob sensitivity on the relay's panel may be turned to achieve reliable control. When using it, firstly turn the sensitivity to 5kΩ. After correctly connecting in accordance with the connection diagram, switch on the power supply, then insert all three electrodes into the liquid. If the relay does not operate, turn the knob sensitivity clockwise till the relay operates.

6.4 The delay response of the relay is primarily intended to prevent frequent startup and stop of water pumps in case of big liquid level fluctuations. When using such function, the knob delay shall be turned to the minimum position. In case the liquid level fluctuation is big, it may be turned within the range of 1s ~ 10s on the ground of actual conditions. In normal cases, it shall be turned at 2s ~ 3s.

6.5 In case of unreliable control conditions, the user shall check the three liquid level detecting copper conductors, and remove rust on the bare metal at the conductor ends, or peel the conductors again.

Please reserve the operation instructions.

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