

I N S T R U C T I O N   M A N U A L

F O R

RELAY UNIT

MODEL : R E



Revision   2014-05-01



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# MUST BE READ BEFORE USING

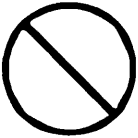




- This manual is for standard specifications. Read the other manuals for explosion-proof specifications.
- This manual describes the handling, inspection and adjustment of the sensor. Read and understand this manual before installation.
- Any documents and/or directions from Nohken and the agents aside from this manual shall be preceded.
- Save this manual to refer when you need.
- If you have any questions or comments about this manual and/or the sensor, ask Nohken's sales office.

Signal words in this manual means as follows:




 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 <b>NOTE</b>	Indicates exceptional cases and attention for handling of sensors.

	Indicates prohibition. The explanation with this manual should always be followed.
	Indicates directions. The explanation with this manual should always be followed.

▲ C A U T I O N S

<ul style="list-style-type: none"> <li>• Since this sensor is not an explosion-proof construction, do not use where flammable gas, explosive gas or the vapor exists. Otherwise, explosion the gases and/or the vapor may cause serious disasters. Use explosion-proof sensors at hazard areas.</li> </ul>	
<ul style="list-style-type: none"> <li>• Do not modify or disassemble the sensor. Otherwise, the sensor may be damaged,</li> </ul>	
<ul style="list-style-type: none"> <li>• Operating test shall be conducted before practical use. If malfunction occurs and the accident is predicted, the remedy shall be administrated by using another sensor with different operating principle in parallel.</li> </ul>	
<ul style="list-style-type: none"> <li>• To prevent from electric shocks such as lightning and the static electricity, provide conductor or the surge absorber. Otherwise, the sensor may cause malfunction, damage, ignition, electric shock and injury.</li> </ul>	
<ul style="list-style-type: none"> <li>• <u>When connecting inductive load or the lamp load to the relay output contact.</u> To prevent overvoltage and overcurrent, provide a protective circuit to the load. Otherwise, the contact may be damaged.</li> </ul>	

▲ N O T E S

<ul style="list-style-type: none"> <li>• Do not give strong shocks to the sensor. Dropping, throwing, striking and dragging the sensor, for example, are to cause strong shocks and damage the sensor.</li> </ul>	
<ul style="list-style-type: none"> <li>• The specifications such as ambient temperature, maximum voltage and the power rating shall meet the conditions. Otherwise, the sensor may cause malfunction, damage, ignition, electric shock and injury. Read and check the clause of specification in the manual or specification sheets.</li> </ul>	
<ul style="list-style-type: none"> <li>• Operating test shall be conducted before practical use. If malfunction occurs and the accident is predicted, the remedy shall be administrated by using another sensor with different operating principle in parallel.</li> </ul>	

⚠ N O T E S

• To prevent from electric shocks such as lightning and the static electricity, provide conductor or the surge absorber. Otherwise, the sensor may cause malfunction, damage, ignition, electric shock and injury.



• When connecting inductive load or the lamp load to the relay output contact.



To prevent overvoltage and overcurrent, provide a protective circuit to the load. Otherwise, the contact may be damaged.

## INTRODUCTION

- A. This manual specifies standard specifications of this product. Some specifications may be different from your product if you order the custom-made product.
- B. A variety of specifications are available to meet your process conditions, such as installation conditions, chemical compatibility, and so on. We are glad to offer suggestions to assist your decision.
- C. If you have any questions or comments for the contents of this manual, ask Nohken's sales office written on the front cover.
- D. Nohken Inc. pursues a policy of continuing improvement in design and performance of this product. We will supply the alternative parts or complete new products required to repair or replacement.
- E. Specifications are subject to change without any obligation on the part of the manufacturer.

# WARRANTY & DISCLAIMER

- A. Nohken Inc. warrants this product against defects in design, material and workmanship for a period of 1 (one) year from the date of original factory shipment.
- B. If defects occurs during the above-mentioned warranty period, Nohken will, at its option, replace or recondition the product without charge. This shall constitute the exclusive remedy for breach of warranty.
- C. Nohken Inc. makes no warranty with respect to:
  - C-a Failure not to comply with instructions of this manual.
  - C-b Failure or damage due to improper installation, wiring, operation, maintenance, inspection and storing.
  - C-c Product which has been in any way repaired, altered or tampered with by others.
  - C-d Product repaired or modified by using undesignated parts, subassemblies and materials.
  - C-e Direct incidental or consequential damages or losses or expenses resulting from any defective product or the use of any product.
  - C-f Objective of the sensor is clearly specified in chapter 1, PURPOSE OF USE.
  - C-g Inevitable accident such as acts of God, force majeure, radioactive contamination and so on.

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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MUST BE READ BEFORE USING  
WARRANTY & DISCLAIMER

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# 1. INTRODUCTION

This relay unit (model RE7□00 series) may be used with any NOHKEN's level sensor, such as Model FR, FQ, FG, FM and OL. this relay unit amplify contact ratings of NOHKEN's level sensor. This system will be used to control functions such as latching for pump or alarm setpoints.

# 2. SPECIFICATION

## 2.1 Model and Suffix Code

Relay unit

RE7□00

Code	Sensitivity
0	Standard
1	High sensitivity

## 2.2 Specifications

Model	RE7000	RE7100
Allowable temperature	0 to 50 °C	
Preservation temperature	-20 to 70 °C	
Allowable humidity	85% RH Max. (Get rid of dew)	
Operating display (Output)	LED (Red)	
Operating resistance	4 kΩ or less	50 kΩ or less
Reset resistance	15 kΩ or more	100 kΩ or more
Power source to sensor	8 V, 5 mA AC Max.	
Power supply	90 to 132 / 180 to 264 V AC, 50/60 Hz	
Power consumption	1.5 VA Max.	
Output signal	Relay contact (S. P. D. T.)	
Contact rating	Max.	240 V 5 A AC, 30 V 5 A DC (With resistive load)
	Min.	5 V 10 mA DC (With resistive load)
Wiring distance between sensor and relay unit	1 km Max.	100m Max.
Dimension	W50mm×H84mm×D109mm	
Installation method	Plug-in	
Socket	Option (OMRON made. Model 11PFA equivalent)	
Mass	Approx. 280g	

## 2.3 Operating Characteristics of Relay Unit

### 2.3.1 Relay actuating

#### (1) RE7000(Standard)

		SELECT. SW. mode	
		H. ON side	L. ON side
Operating resistance (Between E0 and E2)	4 kΩ or less	energize	de-energize
Reset resistance (Between E0 and E2)	15 kΩ or more	de-energize	energize

#### (2) RE7100(High sensitivity)

		SELECT. SW. mode	
		H. ON side	L. ON side
Operating resistance (Between E0 and E2)	50 kΩ or less	energize	de-energize
Reset resistance (Between E0 and E2)	100 kΩ or more	de-energize	energize

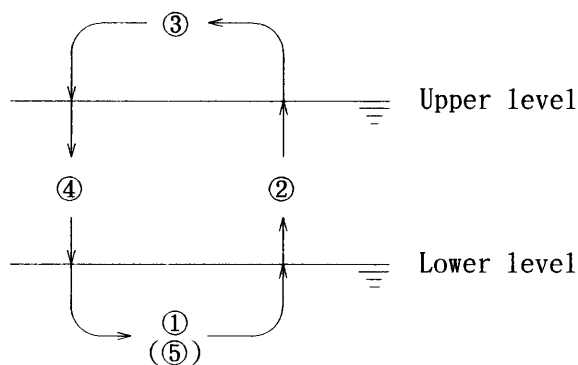
### 2.3.2 Relay actuating of latching

#### (1) RE7000(Standard)

	Operating/Reset resistance		SELECT. SW. mode	
	Between E0 and E1	Between E0 and E2	H. ON side	L. ON side
1	15 kΩ or more	15 kΩ or more	de-energize	energize
2	4 kΩ or less	15 kΩ or more	de-energize	energize
3	4 kΩ or less	4 kΩ or less	energize	de-energize
4	4 kΩ or less	15 kΩ or more	energize	de-energize
5	15 kΩ or more	15 kΩ or more	de-energize	energize

#### (2) RE7100(High sensitivity)

	Operating/Reset resistance		SELECT. SW. mode	
	Between E0 and E1	Between E0 and E2	H. ON side	L. ON side
1	100 kΩ or more	100 kΩ or more	de-energize	energize
2	50 kΩ or less	100 kΩ or more	de-energize	energize
3	50 kΩ or less	50 kΩ or less	energize	de-energize
4	50 kΩ or less	100 kΩ or more	energize	de-energize
5	100 kΩ or more	100 kΩ or more	de-energize	energize





## 2.4 Dimensions

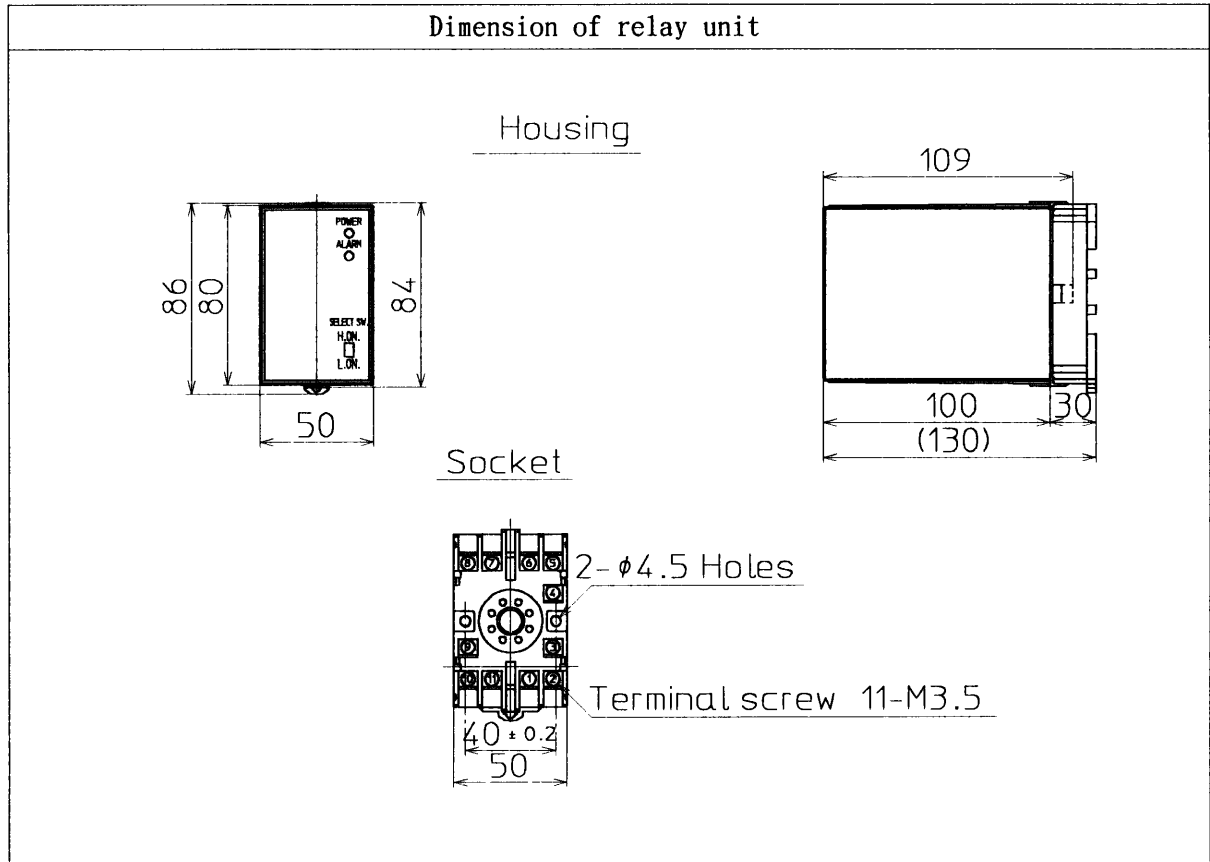


Fig. 1

## 3. PRINCIPLE OF OPERATION

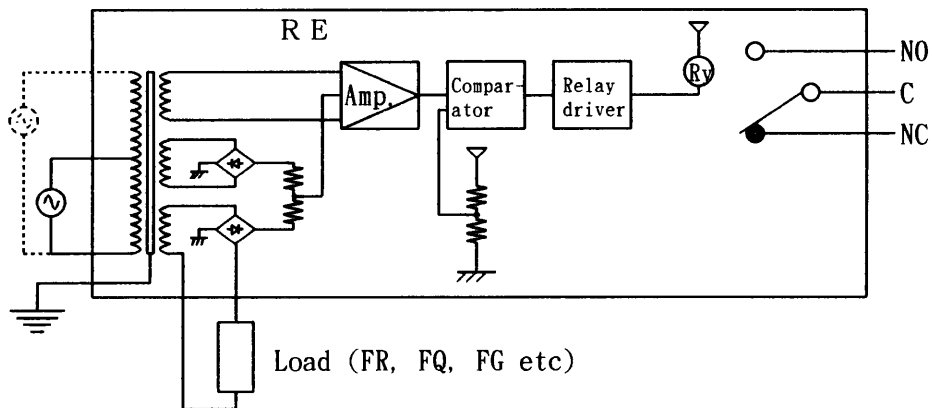


Fig. 2

This relay unit will output signal(relay contact) in accordance with "ON-OFF" actuation of connected load.

## 4. COMPONENT NAMES

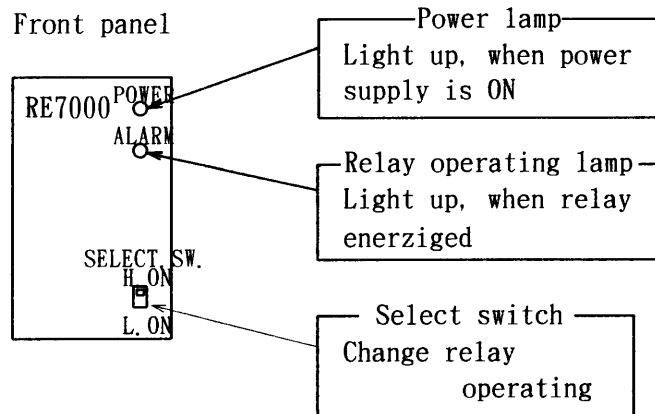


Fig. 3

## 5. INSTALLATION

### 5.1 Unpacking

This relay unit has been thoroughly inspected and carefully packed at the factory to prevent from damage during shipment. When unpacking, care must be taken not to damage the instrument with mechanical shock. After unpacking, visually check the instrument exterior for damage.

**NOTE** the following points:

- (1) Identify specifications by nameplate.
- (2) Do not provide hitting relay unit during unpacking.

### 5.2 Installation Location

This relay unit should be installed in an area where the following conditions:

- (1) Provide ample space for maintenance/inspection.
- (2) Low relative humidity and no exposure to moisture.
- (3) No corrosive gases. (Such as  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{Cl}_2$  etc)
- (4) No excessive vibration.

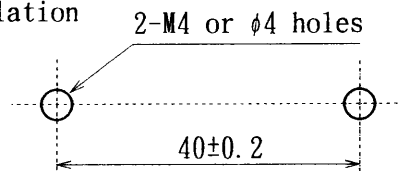
### 5.3 Installation of Relay Unit

This relay unit installation method depend on plug-in type. The socket(OMRON made, Model 11PFA equivalent) must be prepared to install the relay unit.

The socket for relay unit is option.

#### 5.5.1 Installation of Socket

- (1) Wall installation



- (2) Rail installation

Use the DIN rail(35 mm).

# 6. WIRING

## 6.1 Wiring Diagram for High or Low Level Alarm

- (1) High level alarm (SELECT.SW. : H.ON side)
  - (a) When the  $\mathcal{L}_1$  switch actuate, relay energize.
  - (b) When the  $\mathcal{L}_1$  switch de-actuate, relay de-energize.
- (2) Low level alarm (SELECT.SW. : L.ON side)
  - (a) When the  $\mathcal{L}_1$  switch actuate, relay de-energize.
  - (b) When the  $\mathcal{L}_1$  switch de-actuate, relay energize.

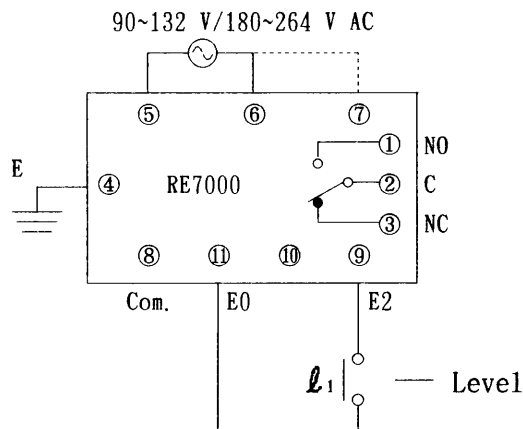


Fig. 4

## 6.2 Wiring Diagram for Latching

- (1) Outflow control (SELECT.SW. : H.on side)
  - (a) When the  $\mathcal{L}_1$  switch actuate as level falls, relay energize.
  - (b) When the  $\mathcal{L}_1$  switch de-actuate as level riseis, relay energize.
  - (c) When the  $\mathcal{L}_2$  switch de-actuate as level riseis, relay de-energize.
  - (d) When the  $\mathcal{L}_2$  switch actuate as level falls, relay de-energize.
- (2) Inflow control (SELECT.SW. : L.ON side)
  - (a) When the  $\mathcal{L}_2$  switch de-actuate as level falls, relay energize.
  - (b) When the  $\mathcal{L}_2$  switch actuate as level riseis, relay de-energize.
  - (c) When the  $\mathcal{L}_1$  switch actuate as level riseis, relay de-energize.
  - (d) When the  $\mathcal{L}_1$  switch de-actuate as level falls, relay energize.

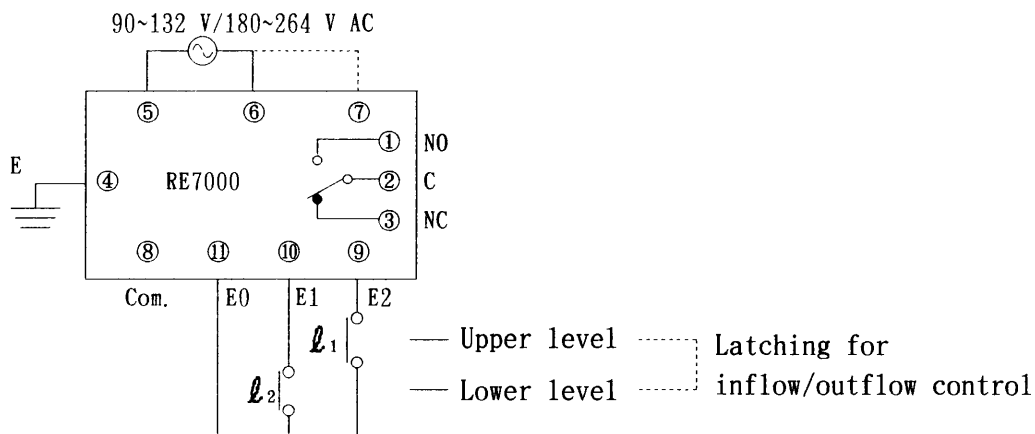


Fig. 5

**CAUTION** : To avoid malfunction, the E1 contact must be connected to lower switch. Actuation direction of switch must be set same direction.

### 6.3 Wiring Diagram for Latching with High and Low Level Alarm

- (1) When the  $\ell_1$  switch actuate as level riseis, relay(No.3) energize.
- (2) When the  $\ell_4$  switch de-actuate as level falls, relay(No.1) energize.
- (3) Relay(No.2) may be used for control functions such as latching for pump control.

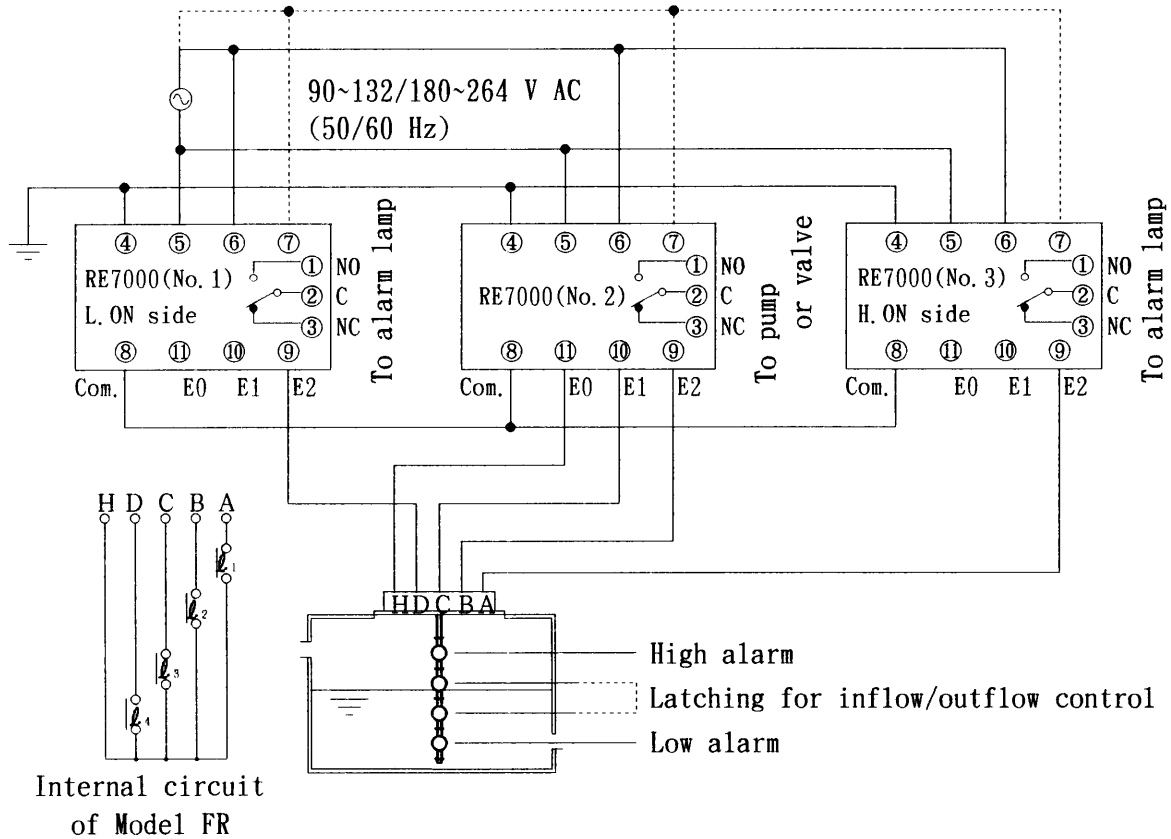


Fig. 6

**CAUTION** : Actuation direction of all switches must be "upper ON".

#### **WARNING**

Earth terminal '④' shall be grounded. If it is not grounded, you will get an electric shock.

**NOTE** the following points:

- (1) Do not connect the plural relay unit to identical switch. Otherwise, the relay unit may be malfunction. (See Fig. 7)

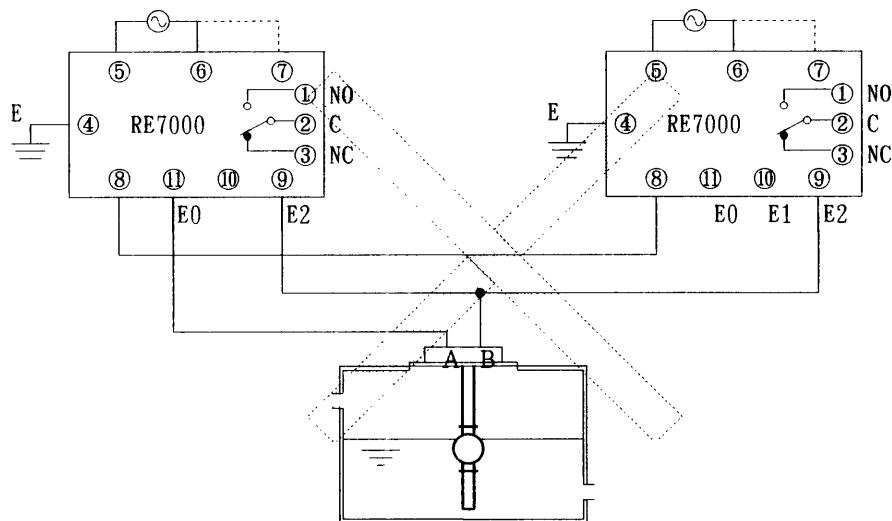


Fig. 7

- (2) Power supply must be connected in phase. (See Fig. 8)

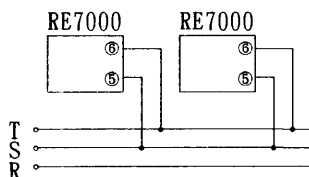


Fig. 8

- (3) To avoid malfunction, the wiring distance should be used within specifications. (Refer to 「2. SPECIFICATIONS」) If the wiring distance exceed specifications, the relay unit may be malfunction by stray capacitance between cables or noise.

## 7. TECHNICAL NOTE

- (1) Inside of relay unit shall be kept free from rain, splashing water, liquid, dust, dirt, metallic substances, and any other foreign matter.
- (2) This products must be stored in a dry, warm place where condensation of humidity will not occur.

## 8. INSPECTION/MAINTENANCE

The following annual servicing tasks should be carried out on the sensor and relay unit.

- (1) Remove the sensor from tank carefully.
- (2) Ensure there is no damage.
- (3) If sediment or other foreign matters are stained on sensor, clean the sensor.
- (4) Make contact between E0 and E2, and check the relay unit operation.
- (5) Spare parts should be ordered from NOHKEN Inc. whose address appears on the title page.

## 9. TROUBLESHOOTING

Use the following chart to troubleshoot a malfunctioning.

Problems	Possible causes	Remedies
Relay unit de-energize with level change	Miswiring between sensor and relay unit	Ensure the wiring correctly
	Set for improper select switch (SELECT. SW.) mode of relay unit	Change the select switch mode(H ON/L ON).
Relay unit energize with level change	Miswiring between sensor and relay unit	Ensure the wiring correctly
	Set for improper select switch (SELECT. SW.) mode of relay unit	Change the select switch mode(H ON/L ON).
	Affection by stray capacitance	Re-wire as short as possible
Relay chatter	Miswiring between sensor and relay unit	Ensure the wiring correctly

If above remedies are unsuccessful, ask NOHKEN Inc. to repair and replace.

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