

I N S T R U C T I O N M A N U A L

F O R

R E L A Y U N I T



M O D E L : R E 7 5 0 0



Issued 2015-04-08

Read and understand this manual for safe use.

- This manual applies to products for general purpose. For use in hazardous areas, select products approved for the area classification and see its associated manual.
- This manual contains important information on handling, inspection and adjustment of the model indicated on the cover page. Read and fully understand this manual before use.
- Follow instructions given by NOHKEN or its representative, since their instructions have higher priority than those in this manual.
- Keep this manual within easy access.
- Specifications in this manual may not be satisfied depending on application conditions. Check the conditions carefully before use.
- Contact our sales office for any questions or comments about this manual or the product.

The meaning of the terms and symbols used in this manual is as follows:

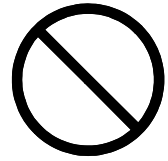
 WARNING	Indicates a potentially hazardous situation which, if necessary precautions are not observed, could result in death, serious injury or disaster.
 CAUTION	Indicates a hazardous situation which, if necessary precautions are not observed, may result in minor or moderate injury or damage to the device.

	Means prohibited actions. Always follow instructions with this mark.
	Means actions that must be taken. Always follow instructions with this mark.

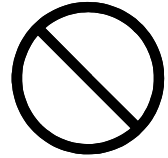


WARNING

This product is not designed for use in hazardous areas. Do not use it in a place where flammable gas or vapor is present. Failure to observe this may result in ignition of flammable gas or vapor, causing a disaster. In hazardous areas, select a product approved for the area classification.



Do not modify or disassemble the product. Failure to observe this may result in faulty operation, damaged product, human injury or electric shock. (Please note that instructions given by Nohken or its representative have higher priority than those in this manual.)



Disconnect power before wiring or inspection. Failure to observe this may result in ignition or electric shock due to leak or shortcircuit.



Ensure correct wiring. Wrong wiring may cause the product or connected equipment to malfunction, be damaged, or ignite, and may also result in electric shock or user injury.

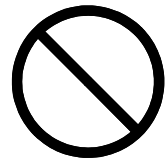


Disconnect power immediately in the event smoke, unusual smell or sound is sensed. Do not use the product until problems are solved.



CAUTION

Do not drop, knock off, throw, drag or give a strong shock to the product to avoid damage.



Always use the product within specified operating conditions. Failure to observe this may cause the product or connected equipment to malfunction, be damaged, or ignite, and may also result in electric shock or user injury.
See the instruction manual or spec sheets for specifications.



Test the product before actual use and ensure correct operation. Install a back-up device of a different technology if failure of the product is expected to result in a serious accident.



When connecting an inductive or lamp load

Provide a protective circuit before the load to avoid overvoltage or overcurrent. Otherwise the contacts may be damaged.



Provide an arrestor or a surge absorber to protect the product from a lightning or static electricity. Failure to observe this may cause the product or connected equipment to malfunction, be damaged, or ignite, and may also result in electric shock or user injury.



INTRODUCTION

- A) This manual applies to standard models. Information in this manual may not be applied to special models.
- B) We are willing to help customers to select a suitable model or provide information about chemical compatibility of materials used, but the final decision is to be made by the customer.
- C) We always welcome suggestions and comments about the manual. Please contact our sales office when you have questions or comments.
- D) For replacement parts:
The product quality is regularly reviewed and improved, so the same spare parts may not be available. In this case, replacement parts or products may be supplied. Please contact our sales office for detail.
- E) The contents of this manual are subject to change without prior notice in the course of further development.

WARRANTY & DISCLAIMER

- A) NOHKEN warrants this product against defect in design, material and workmanship for a period of one (1) year from the date of original factory shipment.
- B) NOHKEN does not assume any liability for consequential damages.
- C) NOHKEN does not assume any liability for damages resulting from:
 - C-a) not observing the instructions in this manual;
 - C-b) installation, wiring, operation, maintenance, inspection, or storing in a manner not outlined in this manual;
 - C-c) modifications or repairs done by an unauthorized person;
 - C-d) use or replacement with parts not provided by NOHKEN;
 - C-e) devices or machine from other manufacturer;
 - C-f) unintended use (see "Purpose of use" in chapter 1 in this manual);
 - C-g) force majeure including, but not limited to, fire, earthquake, tsunami, lightning, riots, commotion, war, radioactive pollution, acts of God, acts of government or governmental authorities, compliance with law, regulation, or order.

THE TERMS OF WARRANTY AND DISCLAIMER IN NO WAY LIMIT YOUR LEGAL RIGHTS.

Table of Contents

1. PURPOSE OF USE	1
2. PRINCIPLE OF OPERATION	1
3. SPECIFICATIONS	2
3.1 Model	2
3.2 Specifications	2
3.2.1 Operation Characteristics	2
3.2.2 Electric Characteristics	2
3.2.3 Environmental	2
3.2.4 Others	2
3.3 Relay Operation	3
3.4 Outline Drawing	3
4. PARTS NAME AND FUNCTION	4
5. UNPACKING AND STORING	4
5.1 Unpacking	4
5.2 Storing	4
5.2.1 Conditions	4
5.2.2 Before Storing	4
6. INSTALLATION	5
6.1 Mounting the Socket	5
7. WIRING	6
7.1 Before Wiring	6
7.1.1 Tools	6
7.2 Wiring	6
7.3 Notes on Wiring	7
7.4 Mounting the Relay Unit	8
8. MAINTENANCE AND INSPECTION	9
8.1 Maintenance Procedure	9
8.2 Wiring	9
8.3 Mounting the Relay Unit	9
9. TROUBLESHOOTING	10

1. PURPOSE OF USE

RE7500 is a relay unit that operates in combination with our Electrode Level Sensor FE or point level sensors such as Magnetic Float Sensor FR. The signals the relay unit gives are used for high/low limit alarms and automatic pump control to trigger alarms or control solenoid valves. The unit also amplifies signals from point level sensors.

Do not use this product for any other purpose.

2. PRINCIPLE OF OPERATION

The relay unit is used in combination with electrode level sensors or point level sensors. Transformer applies alternating voltage to the sensors connected to the relay unit, and they give detection/non detection or on/off signals. The relay unit receives these signals, and actuates its relays.

The unit has two sensitivity options, “low” and “high”, and also the fail-safe functionality. The relay operation can be reversed.

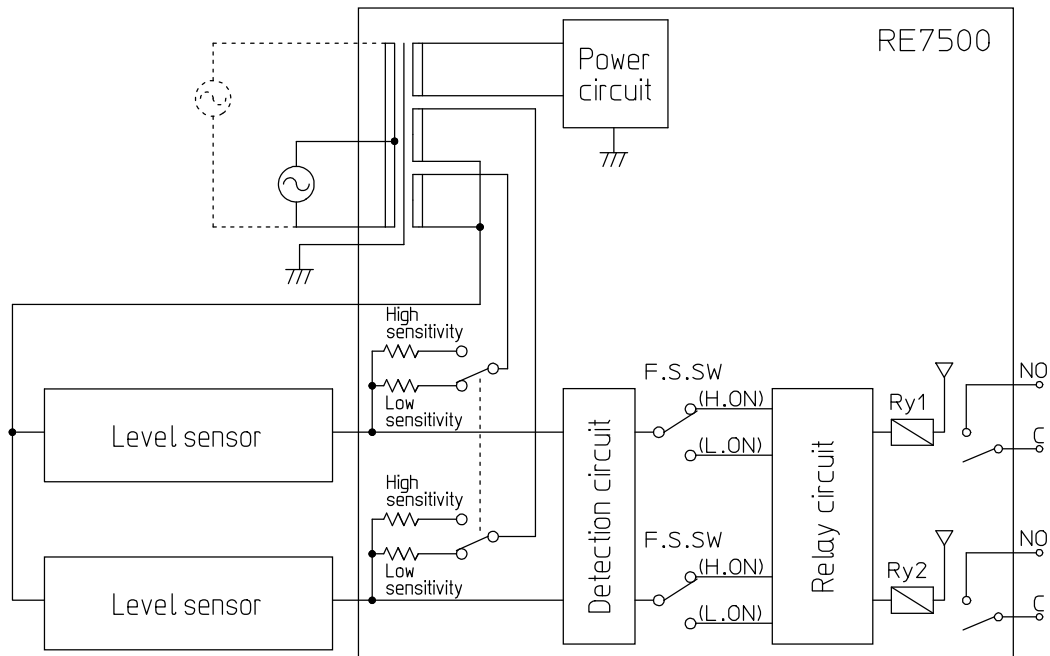


Fig.1: Internal circuits

3. SPECIFICATIONS

3.1 Model RE7500

3.2 Specifications

3.2.1 Operation Characteristics

- (1) Operation indication : Green LED lights up when power is supplied.
Red LED lights up when relay is energized.
- (2) Alarming : See “3.3 Relay Operation”.

3.2.2 Electric Characteristics

- (1) Power supply : 90 to 132/180 to 264V AC, 50/60 Hz
- (2) Power consumption : 2VA Max.
- (3) Power for sensor : 12V, 5mA AC Max.
- (4) Relay : Dry contact (SPST)
Energized/de-energized (selectable) at detection of signals
- (5) Ratings : 250V, 3A AC Max. (resistive), 30V, 3A DC (resistive)
5V, 10mA DC Min. (resistive)
- (6) Insulation resistance: 100M Ω Min. at 500V DC between power and input/output/earth terminal
- (7) Withstand voltage : 1500V AC for 1 minute between power and input/output/earth terminal

3.2.3 Environmental

- (1) Working temperature : -10 to +55°C
- (2) Store temperature : -20 to +70°C
- (3) Humidity : 85%RH Max. (no dew condensation)
- (4) Separation distance : 1km Max. for “low” sensitivity, 100m Max. for “high” sensitivity,
(when CVVS 1.25mm² is used to connect the level sensor and the relay unit)

3.2.4 Others

- (1) Material : ABS (case), polycarbonate (front panel)
- (2) Dimensions : 50mm (width) x 84mm (height) x 109mm (depth)
- (3) Mounting : Plug-in*
- (4) Socket : Optional (11PFA from OMRON or equivalent)
- (5) Mass : Approx. 280g

* Mounted by connecting the plug to a socket to make electric connection.

3.3 Relay Operation

Table 1: Relay operation

Sensitivity	Set/reset resistance	SELECT. SW.	
		H. ON (high alarm)	L. ON (low alarm)
Low (standard)	Set 3k Ω Max.	Energized	De-energized
	Reset 11k Ω Min.	De-energized	Energized
High	Set 30k Ω Max.	Energized	De-energized
	Reset 220k Ω Min.	De-energized	Energized

* Set/reset resistance values are same for E₁-E₀ and E₂-E₀

Sensitivity is selectable, and applied to both relays.

Sensitivity is factory set to “low” and SELECT SW to “H. ON”.

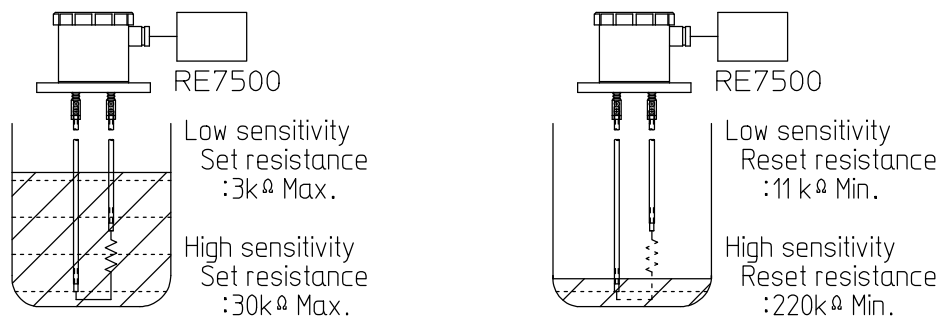


Fig. 2: Relay operation



CAUTION

When SELECT. SW. is set to “H. ON”, relay contacts are energized for a short period when power is supplied.

3.4 Outline Drawing

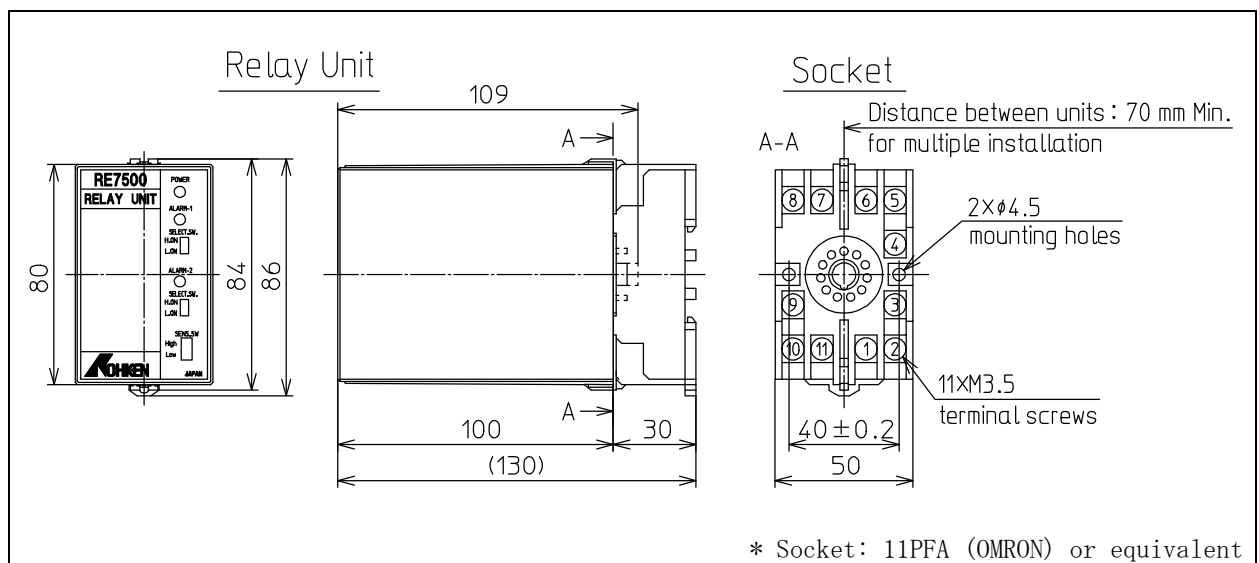


Fig. 3: Relay Unit RE7500 - dimensions

4. PARTS NAME AND FUNCTION

Fig. 4 shows the name and function of each part.

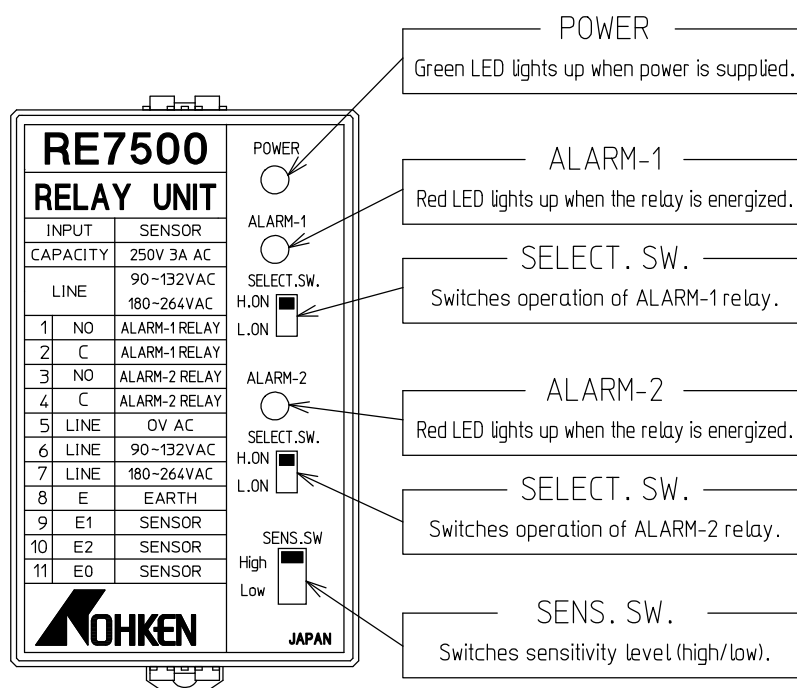


Fig. 4: Front panel

5. UNPACKING AND STORING

5.1 Unpacking

- (1) Open the packaging and take out the relay unit, and also the socket if you have ordered one.
- (2) Check against the nameplate that the sensor is what you have ordered. If not, please contact our sales office.
- (3) Check for damage. If found, it may have been caused during transport. Please contact our sales office.
- (4) Do not drop, throw, crush or give a strong shock to the relay unit to avoid damage.

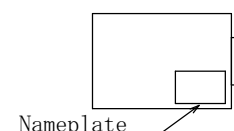


Fig. 5

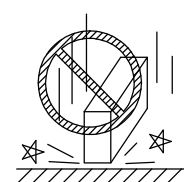


Fig. 6

5.2 Storing

Store the unit under the following conditions before installation, or after removing from the tank. Failure to do so may result in damage or faulty operation.

5.2.1 Conditions

- (1) Temperature: -20 to +70°C
- (2) Humidity: 85%RH Max. (no dew condensation)
- (3) Atmosphere: not corrosive (without NH₃, SO₂, or Cl₂)
- (4) Vibration: not excessive

5.2.2 Before Storing

- (1) Wrap the unit with polyethylene sheet and seal it to protect the unit from moisture or dust.
- (2) If the unit is stored where temperature changes enormously, enclose desiccant such as silica gel in the polyethylene sheet.

6. INSTALLATION



CAUTION

The relay unit is not of drip-proof design. Always mount it indoors or in a cabinet and within the specifications.

Do not drop, throw or damage when taking it out of the packaging.

When mounting, do not drop, throw, crush or give a strong shock to the relay unit to avoid damage.

6.1 Mounting the Socket

Relay unit is mounted using an 11 pin plug onto a socket. The socket has to be 11PFA from OMRON or an equivalent product. Sockets have to be purchased from a third party or ordered with Nohken separately from the relay unit.

(1) Mounting on the wall

Drill holes and mount the relay unit. See Fig. 7.

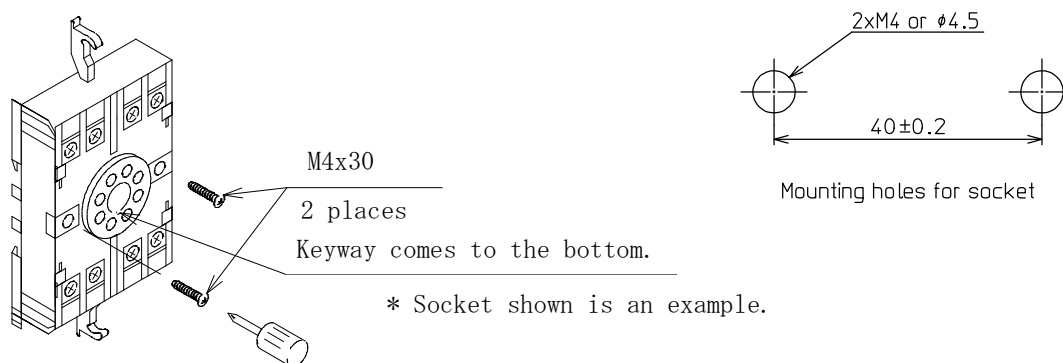


Fig. 7: Mounting holes for the socket

(2) Mounting on a rail

Use a DIN rail* (35mm).

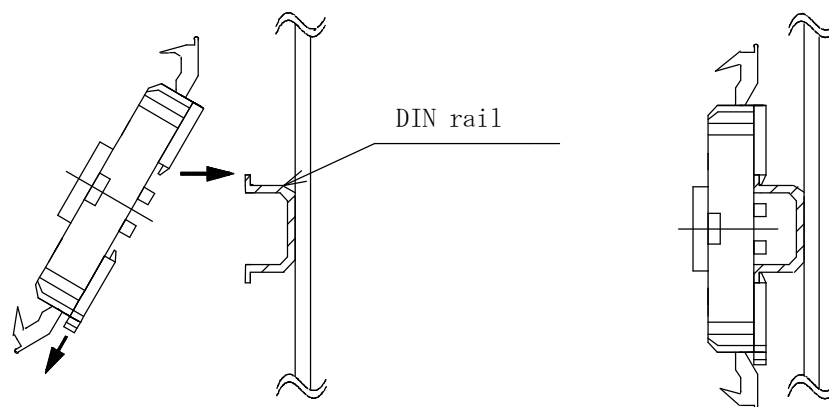


Fig. 8: Mounting on a DIN rail

* Mounting rail according to DIN.

7. WIRING

7.1 Before Wiring

7.1.1 Tools

- Middle sized Phillips screwdriver



CAUTION

Disconnect power before wiring. Otherwise electric shock or ignition may result.

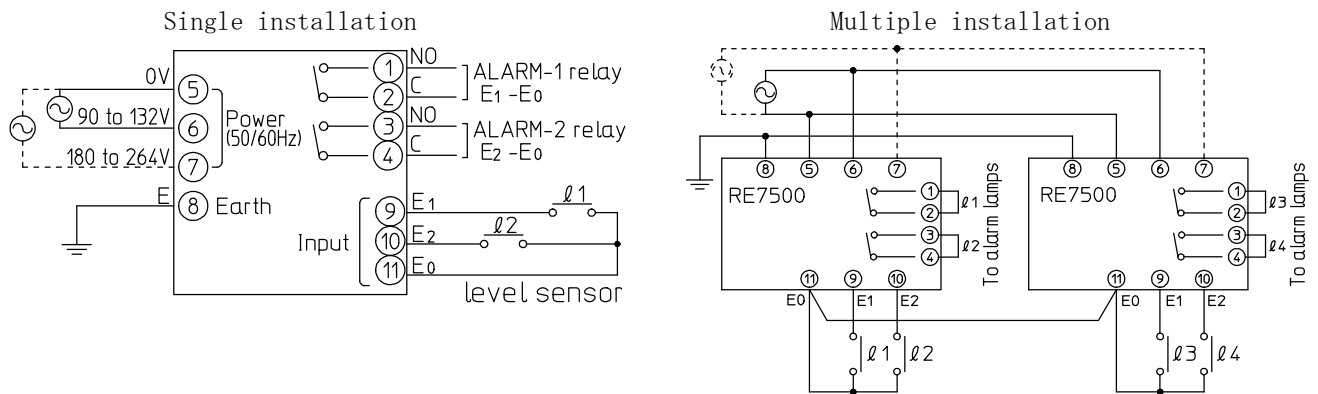
7.2 Wiring



WARNING

The relay unit is not of the explosion proof model. Never use it in areas where flammable or explosive gases or vapors are expected to be generated. Otherwise the unit may ignite the surrounding gases or vapors and a disaster may result.

The relay unit, connected to our point level sensors, is suitable for various applications including high/low alarming, automatic pump control, and fill/discharge control.



Sensitivity (SENS. SW)	Set/reset resistance	SELECT. SW.	
		H. ON (high alarm)	L. ON (low alarm)
Low	Set 3k Ω Max.	Energized	De-energized
	Reset 11k Ω Min.	De-energized	Energized
High	Set 30k Ω Max.	Energized	De-energized
	Reset 220k Ω Min.	De-energized	Energized

* Set/reset resistance values are same for E₁-E₀ and E₂-E₀

Fig. 9: Wiring and relay operation

* SENS.SW. is factory set to “low” and SELECT SW to “H. ON”.

Use Fig. 9 to wire and change the settings for your application.



CAUTION

Properly ground the earth terminal (#8). (Grounding resistance: 100Ω Max.)
Otherwise leak or shortcircuit may result in electric shock.

- (1) Contact ratings are as shown below. Do not exceed the ratings, or the contacts may burn out or weld together.

When switching a large load such as a motor, provide a suitable relay between the load and the relay unit.

Contact ratings: 240V, 3A AC Max. (resistive)
30V, 3A DC Max. (resistive)
5V, 10mA DC Min. (resistive)

- (2) When switching inductive loads, protect the contacts*.

* Contact protection

To protect relay contacts from counter electromotive force caused by inductive loads, for example. Devices such as diodes, zener diodes, and varistors are used.



CAUTION

When connecting an inductive load or a lamp load to the output of the relay unit, use a protection circuit on the load to prevent peak values from exceeding the ratings of the relay unit. Otherwise the relay unit will be damaged.

- (3) Do not connect more than 1 relay unit to the same contact.
Faulty operation may result regardless of level.

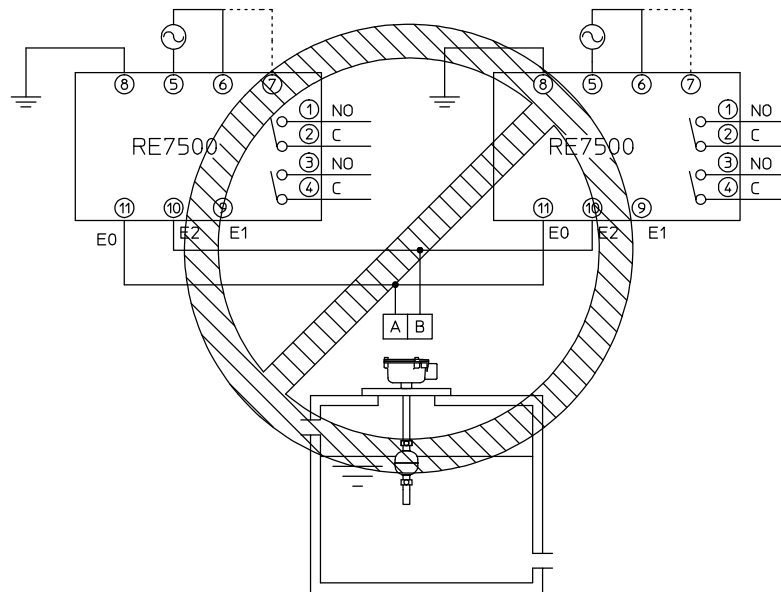


Fig. 10: Prohibited wiring

- (4) For multiple installation, synchronize the power phase.
Otherwise faulty operation may result.
- (5) Keep the distance between the level sensor and the relay unit as short as possible. Always observe the maximum separation distance. If the two devices are placed too far apart, faulty operation may result due to noise or stray capacitance on cable.

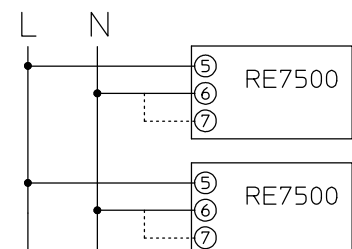


Fig. 11: Phase synchronization

7.4 Mounting the Relay Unit



CAUTION

When connecting the relay unit to OMRON socket 11PFA, secure the relay unit with a clip on the socket. Otherwise the relay unit may come off and be damaged.

Before mounting the relay unit, ensure wiring is complete and correctly done, and the power is NOT supplied. Mounting with incorrect wiring or power supplied may damage the unit.

- (1) Connect the relay unit to the socket.
- (2) Secure the unit with a clip on the socket. (When 11PFA is used.)

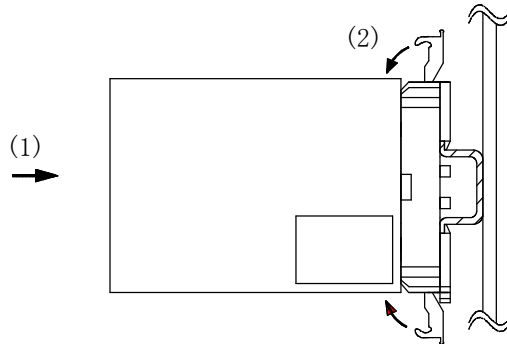


Fig. 12: Mounting on the socket



CAUTION

Turn off power before disconnecting the relay unit from the socket. Otherwise electric shock, leak or ignition due to shortcircuit may result.

8. MAINTENANCE AND INSPECTION

Maintenance is performed on the relay unit only and while it is in operation. Take measures so that the connected devices do not cause problems, for example when the following cases has to be avoided: disconnecting power to the relay unit turns off other devices; energized relay starts a connected motor.

8.1 Maintenance Procedure

Perform maintenance every half or one year. More frequent maintenance will be required depending on frequency of use, material type, temperature, pressure or other application conditions.

- (1) Check the unit for visible damage that may impair performance. If found, repair or replace.
- (2) Supply power. Shortcircuit (open when set to L.ON) the terminals 11 & 9, and 10 & 9, and measure the contact resistance.
If the value is larger than a few ohms and the switch operation is incorrect, repair or replace the unit.
- (3) Check the connected level sensors and clean or replace if it has buildup, corrosion, bent or other problems that impair performance.

8.2 Wiring

See “7.2 Wiring”.

8.3 Mounting the Relay Unit

See “7.4 Mounting the Relay Unit”.

9. TROUBLESHOOTING



CAUTION

In the event of trouble, perform the following and nothing else. Contact our sales office for any question.

Table 2: Troubleshooting

Trouble	Possible cause	Corrective action
Level has exceeded the set point, but no alarm is given.	Incorrect wiring on relay unit.	- Correct wiring. (p.6 “7.2 Wiring”) - Tighten loose wiring. Replace broken cable.
	Unsuitable sensitivity setting	- Set sensitivity to “high” . (p.3 “3.3 Relay Operation”)
	Incorrect SELECT SW. setting	- Correct the setting. (p.3 “3.3 Relay Operation”)
	Contact failure of internal relay	- Repair or replace if contact resistance exceeds a few ohms and operation is faulty.
	Connected level sensors are damaged/broken or in error due to buildup or other causes.	- Eliminate the causes of faulty operation. - Repair or replace if damaged or broken.
	Damaged/broken relay unit	- Repair or replace the relay unit.
Level has not reached the set point, but alarm is given.	Incorrect wiring on relay unit.	- Correct wiring. (p.6 “7.2 Wiring”) - Tighten loose wiring. Replace broken cable.
	Unsuitable sensitivity setting	- Set sensitivity to “high” . (p.3 “3.3 Relay Operation”)
	Incorrect SELECT SW. setting	- Correct the setting. (p.3 “3.3 Relay Operation”)
	Connected level sensors are damaged/broken or in error due to buildup or other causes.	- Eliminate the causes of faulty operation. - Repair or replace if damaged or broken.
	Damaged/broken relay unit	- Repair or replace the relay unit.

NOHKEN INC.

HEAD OFFICE : 15-29, Hiroshiba-cho, Suita-city, Osaka 564-0052, Japan.
TEL:06-6386-8141 FAX:06-6386-8140

TOKYO BRANCH OFFICE : 67, Kandasakumagashi, Chiyoda-ku, Tokyo 101-0026, Japan.
TEL:03-5835-3311 FAX:03-5835-3316

NAGOYA OFFICE : 3-10-17, Uchiyama, Chikusa-ku, Nagoya-city, Aichi 464-0075, Japan.
TEL:052-731-5751 FAX:052-731-5780

KYUSHU OFFICE : 14-1, 2-chome, Asano, Kokurakita-ku, Kitakyushu-city, Fukuoka 802-0001, Japan.
TEL:093-521-9830 FAX:093-521-9834