

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

F O R

ELECTRODE LEVEL SENSOR



MODEL : F E



Revision 2011-10-18

Read and understand this manual for safe usage.

- This manual describes the product of standard specification. Read the other manual for the product of explosion-proof specification.
- This manual describes the handling, inspection and adjustment of the product whose model is mentioned on the cover page. Read and understand this manual before handling.
- Follow the additional document and/or direction, submitted by NOHKEN INC. and our distributor or agent, even if the terms are mentioned in this manual.
- Save this manual in a proper place being available to refer to immediately.
- The specification of product mentioned in this manual may not be satisfied by the condition of environment and usage. Check and consider carefully before using.
- Contact to sales office at NOHKEN INC. for any question or comment about this manual and product.

The following are the description of the terms in this manual.

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

	Indicates a prohibited matter. The explanation with this mark shall be followed.
	Indicates an instructed matter. The explanation with this mark shall be followed.



WARNING

This product is not explosion-proof construction. Do not install this product to the place where the flammable gas or vapor occurs. If installed, the flammable gas or vapor may be ignited, and serious disaster may occur. Use the product of explosion-proof construction in this case.



Do not modify or disassemble the product. Otherwise, the product and connected device may be malfunctioned, damaged, fired, or minor injury and electric shock may occur.
(Follow the additional document and/or direction, submitted by NOHKEN INC. and our distributor or agent.)



Turn off the power, before wiring and inspection.
Otherwise, electric leakage, fire caused by short circuit, and electric shock may occur.



Ensure the wire is properly connected. The product and connected device may be malfunctioned, damaged, fired, or minor injury and electric shock may occur by improper wiring.



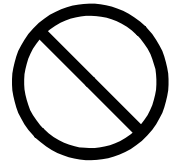
Turn off the power immediately, if the smoke, strange smell and sound occur. Do not use it until the problem is solved.





CAUTION

Avoid strong shock and rough handling to this product. The product may be damaged by strong shock such as dropping, falling, throwing, knocking, lugging, etc.



Follow the specification of operating temperature, operating pressure, switch rating, etc. Otherwise, the product and connected device may be malfunctioned, damaged, fired, or minor injury and electric shock may occur. Check the manual or specification sheet.



Operation test shall be done before practical usage. If the serious accident is expected to occur by malfunction of the product, the other operating principle of product shall be installed in parallel.



Check and deeply consider the chemical compatibility for the material of product in advance.



Hold the stem very close to the mounting point, when carrying, installing, and removing. If held by the terminal box, it may be taken off from the flange or plug, and the product may be damaged by dropping.



INTRODUCTION

- A) This manual specifies the specification of a general product.
If you order a special product, some details of specification may be different with the manual.
- B) We are glad to suggest and advise for Model selection and chemical resistance of material, but final decision has to be made by the customer.
- C) This manual has been prepared with close attention. Ask sales office at NOHKEN INC. for any question or comment about the contents of this manual.
- D) For replacement parts
The quality of product has frequently improved, so same spare parts may not be supplied. In this case, replacement parts or products may be supplied. Ask sales office at NOHKEN INC. for details.
- E) The contents of this manual are subject to change any time without notice due to the improvement of the product.

WARRANTY & DISCLAIMER

- A) NOHKEN INC. warrants this product against defect in design, material and workmanship for a period of 1(one) year from the date of original factory shipment.
- B) The warranty only covers the damage of products. The secondary and third kind disasters are not covered by NOHKEN INC.
- C) NOHKEN INC. shall not be liable for the following.
 - C-a) Do not follow the description and direction in this manual.
 - C-b) Damage due to improper installation, wiring, usage, maintenance, inspection, storing, etc.
 - C-c) Repair and modification are done by the person who is not an employee of NOHKEN INC. and our distributor or agent.
 - C-d) Improper parts are used and replaced.
 - C-e) The damage is occurred by the device or machine except our products.
 - C-f) Improper usage. (See "Purpose of use" in chapter 1 in this manual)
 - C-g) Force Majeure including, but not limited to, fire, earthquake, tsunami, lightning, riots, revolution, war, radioactive pollution, acts of God, acts of government or governmental authorities, compliance with law, regulation, and order.

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

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1. PURPOSE OF USE

Electrode Level Sensor FE is a level instrument used in purified water, industrial waste water, or other conductive liquids (*) without solid impurities to control water supply, drainage and other liquid levels. Do not use for any other purpose.

2. DESCRIPTION

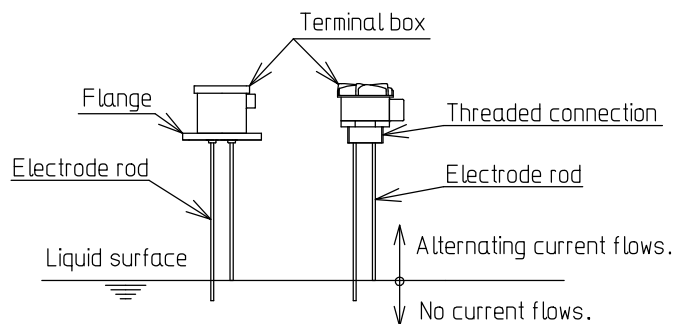
2.1 Description

Sensor is mounted using a flange(*) or a threaded connection(*). The electrode rod(*) is placed in the tank, and in combination with a relay unit (e.g. RE7000, RE7500), the sensor detects presence and absence of current flow between the electrode rods and gives an alarm output.

2.2 Principle of operation

The following description applies to when our relay unit RE7000 or RE7500 is used.

The sensor operates in combination with a relay unit. When the electrode rods are not immersed in a conductive liquid, no current flows between the rods. When the level rises and the rods are immersed, current flows between the rods. This presence and absence of current flow is detected by the relay unit to open or close the contacts. Relay unit RE7000 and RE7500 supply low alternating current to prevent abrasion of rod due to electric corrosion(*), providing a long service life.

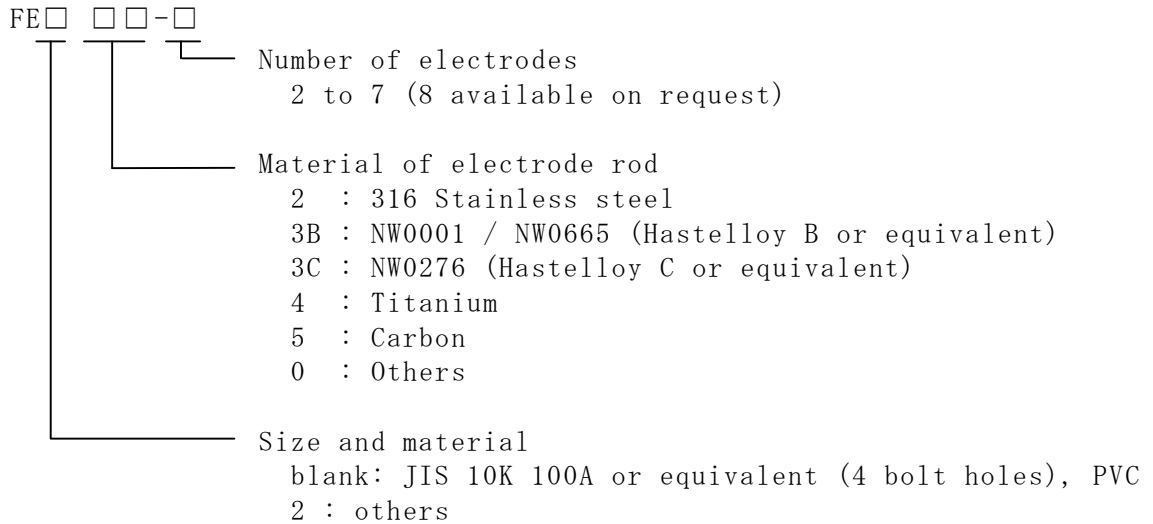


* Refer to 11. GLOSSARY.

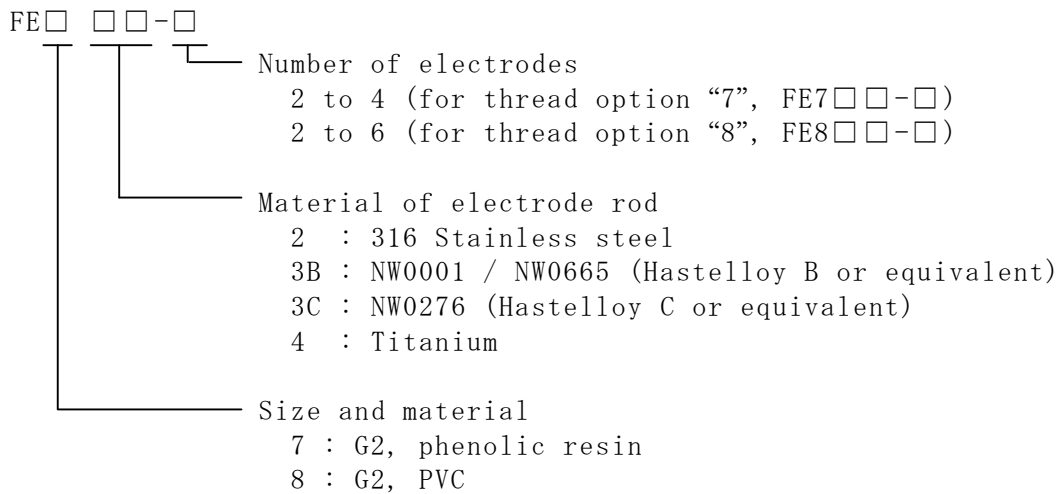
3. SPECIFICATIONS

3.1 Model numbering

3.1.1 Flanged model



3.1.2 Threaded model



3.2 Specification

3.2.1 Flanged model

Model	FE2	FE3B	FE3C	FE4	FE5
Working temperature	-20 to +50°C (no frost)				
Flange size	JIS 10K 100A or equivalent (with 4 bolt holes)				
Material					
Electrode rod	316SS	NW0001 / NW0665 *3	NW0276 *4	Titanium	Carbon
Connector	316SS	NW0665 *3	NW0276 *4	Titanium	*1
Locknut	316SS	NW0665 *3	NW0276 *4	Titanium	*1
Terminal box	ABS				
Insulation tube	Polyolefin(**)				*2
Mass	Approx. 1.6kg (without electrode rod, connector and locknut)				
Cable inlet	G 3/4 or equivalent				
Protection class(**)	IP45 (IP65 available on request)				

*1 No connector used. Factory assembled.

*2 No insulation tube used on electrode rod.

*3 Hastelloy B or equivalent

*4 Hastelloy C or equivalent

3.2.2 Threaded model

Model	FE72	FE73B	FE73C	FE74
Working temperature	-20 to +60°C (no frost)			
Thread size	G 2			
Material				
Electrode rod	316SS	NW0001 / NW0665 *1	NW0276 *2	Titanium
Connector	316SS	NW0665 *1	NW0276 *2	Titanium
Locknut	316SS	NW0665 *1	NW0276 *2	Titanium
Terminal box	Phenolic resin			
Insulation tube	Polyolefin(**)			
Mass	Approx. 0.3kg (without electrode rod, connector and locknut)			
Cable inlet	G 3/4 or equivalent			
Protection class(*)	IP43			

*1 Hastelloy B or equivalent

*2 Hastelloy C or equivalent

** Refer to 11. GLOSSARY.

Model	FE82	FE83B	FE83C	FE84
Working temperature	-20 to +50°C (no frost)			
Thread size	G 2			
Material				
Electrode rod	316SS	NW0001 / NW0665 *1	NW0276 *2	Titanium
Connector	316SS	NW0665 *1	NW0276 *2	Titanium
Locknut	316SS	NW0665 *1	NW0276 *2	Titanium
Terminal box	PVC			
Insulation tube	Polyolefin(**)			
Mass	Approx. 0.4kg (without electrode rod, connector and locknut)			
Cable inlet	G 3/4 or equivalent			
Protection class(**)	IP43 (IP65 available on request)			

*1 Hastelloy B or equivalent

*2 Hastelloy C or equivalent

Notes:

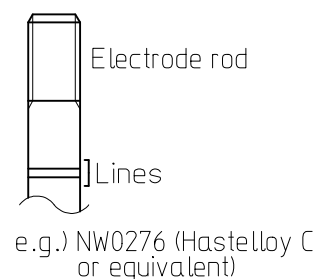
- High temperature model up to 250°C Max. is available on request in stainless steel flange (except for FE5). Terminal box is also provided in stainless steel in this model.
- Insulation tube material for high temperature model is as follows:

Working temperature	Insulation tube material
100°C Max.	Polyolefin
200°C Max.	FEP (**)
250°C Max.	PFA (**)

- L0 electrode and model FE5 are without insulation tube.

Note: Coding for electrode

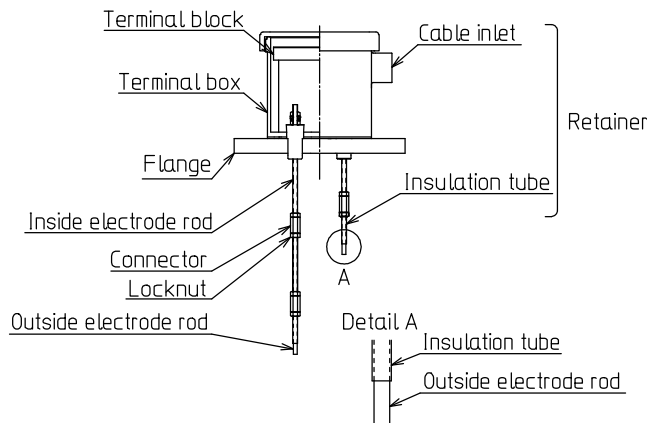
Code	Material	Number of lines
2	316 Stainless steel	0
3B	NW0001/NW0665 (Hastelloy B or equivalent)	3
3C	NW0276 (Hastelloy C or equivalent)	2
4	Titanium	1
5	Carbon	0



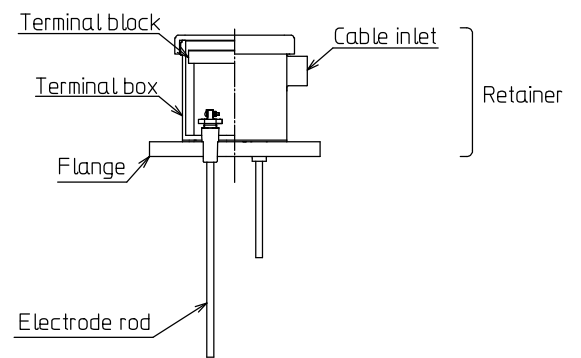
** Refer to 11. GLOSSARY.

4. PART NAMES AND FUNCTIONS

4.1 Parts name



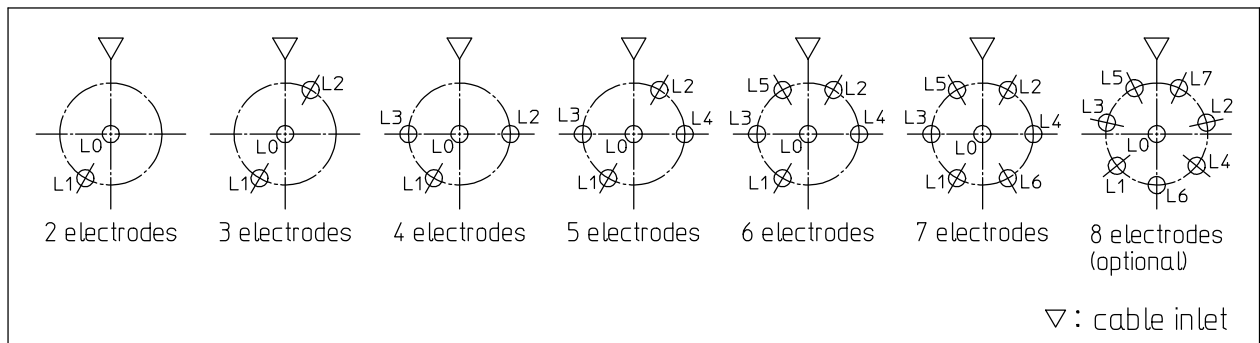
FE2, FE3B, FE3C, FE4



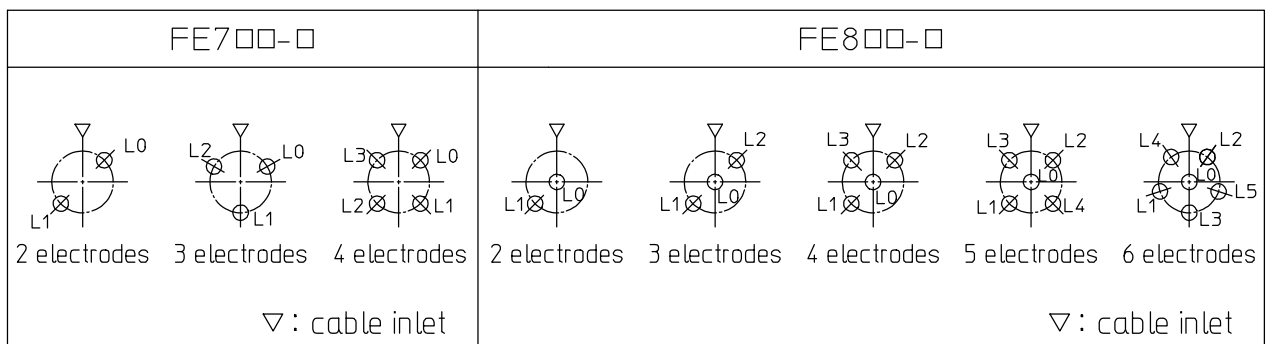
FE5

4.2 Electrode location

4.2.1 Flanged model

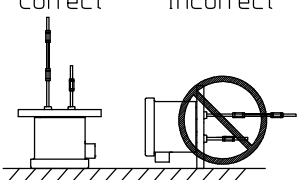
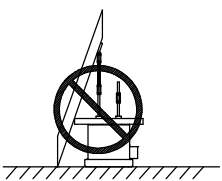
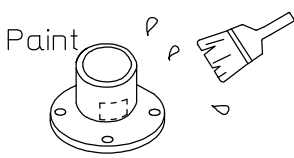

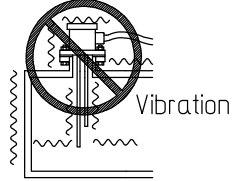
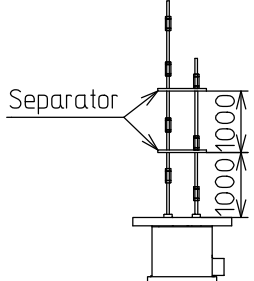
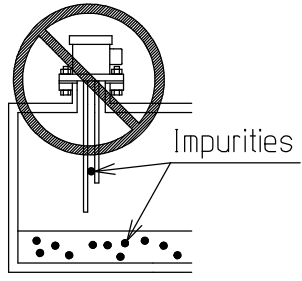


4.2.2 Threaded model



5. HANDLING NOTES

Observe instructions below when handling the sensor, or operation failure or user injury can result.

<p>5.1 When placing the sensor on a floor, stand it with the terminal box at the bottom. Laying it can result in bent electrode rods.</p>	<p>Correct Incorrect</p> 
<p>5.2 Do not place anything on the sensor, or excessive force can be applied to deform or damage the sensor.</p>	
<p>5.3 The nameplate contains maintenance and other important information. When painting the sensor, ensure such information is readable.</p>	<p>Paint</p> 
<p>5.4 Avoid storing or using the sensor in corrosive atmosphere (NH₃, SO₂, Cl₂). Such atmosphere can ingress into and corrode inside of terminal box, causing continuity or insulation failure.</p>	<p>Corrosive atmosphere</p> 
<p>5.5 Avoid storing or using the sensor in a place where vibration is expected. If such location is inevitable, remove the source of vibration or protect the sensor from receiving the vibration.</p>	<p>Vibration</p> 
<p>5.6 Use separators(*) at a 1000mm interval for electrode rods exceeding 1000mm. Use separators also for shorter electrode rods if they may contact each other due to liquid flow for example.</p>	<p>Separator</p> 
<p>5.7 Do not use the sensor on a tank under pressure. If inevitable, contact our sales office.</p>	
<p>5.8 Be careful of the operation level. It can differ due to liquid type or change in supplied voltage.</p>	
<p>5.9 Do not measure liquid with impurities to avoid operation failure due to buildup.</p>	<p>Impurities</p> 

* Refer to 11. GLOSSARY

6. INSTALLATION

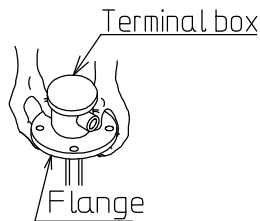
⚠ WARNING

This sensor is not of an explosion proof model. Never use it in areas where flammable or explosive gases or vapors are present. Failure to observe this can cause ignition to such gases and vapors, resulting in a disaster. Use an explosion proof model in a hazardous area.

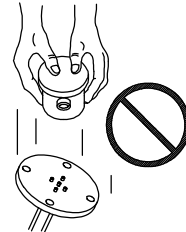
⚠ CAUTION

When carrying the flanged sensor, hold it by the flange. Holding it by the terminal box can cause the box to slip off from the flange and damage the sensor. The terminal box and threaded connection of threaded sensor are of uni-construction.

Correct



Incorrect



6.1 Unpacking

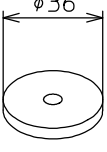
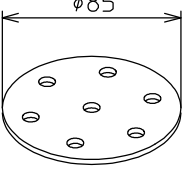
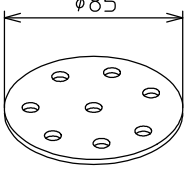
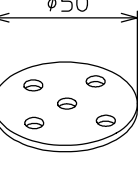

<p>6.1.1 Electrode retainer(*) and outside electrode rod(*) are packed separately in the package. Take out the sensor holding by the flange or the threaded connection. Holding by other places can bend the inside electrode rod(*).</p>	
<p>6.1.2 Do not drop, fell, throw, drag or give strong shock to the sensor to avoid damaging it.</p>	
<p>6.1.3 Ensure identical manufacturing number (M. No. on the nameplate) on the retainer and the electrode set. If different, contact our sales office.</p>	<p>Nameplate</p> <p>Nameplate</p> <p>Electrode set (outside electrode ,connector ,locknut)</p>
<p>6.1.4 Check for lack of components such as outside electrode rods, connectors, and locknuts. If lacking, contact our sales office.</p>	
<p>6.1.5 Check against nameplate to ensure the sensor is as ordered. If not, please contact our sales office.</p>	
<p>6.1.6 Check the sensor for damage. If any, it may have been caused during transportation. Please contact our sales office.</p>	

* Refer to 11. GLOSSARY

6.2 Separator

For electrode rods of 1000mm or longer, use a separator to avoid rods from contacting each other. For shorter rods, use separators if rods may contact due to liquid flow for example.

The separator is typically placed on the connector. If it is to be placed at a different position, and for model FE5 sensors, use a stopper. See section 6.2.1 for more detail.

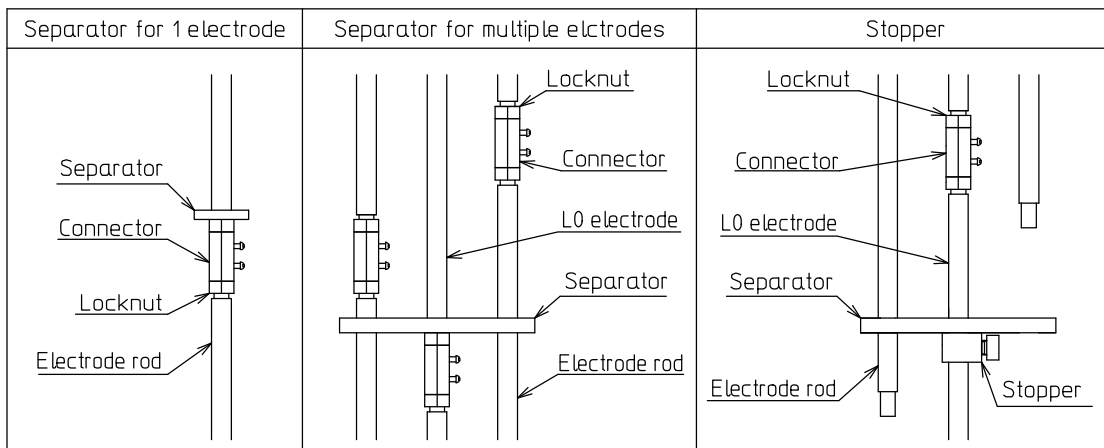
Separator				Stopper
For flanged model with 1 electrode	For flanged model with 2 to 7 electrodes	For flanged model with 8 electrodes	For threaded model	
				

6.2.1 Mounting the separator

Insert the electrode rods to the separator before assembling the sensor.

Place the separator for one electrode on the connector, and the separator for multiple electrodes on the connector of L0 electrode.

For model FE5 sensor or when you want to place it on a different position, place a stopper on the L0 rod and the separator on the stopper.



6.3 Assembling the sensor (except FE5)

Follow the steps below in assembling the sensor

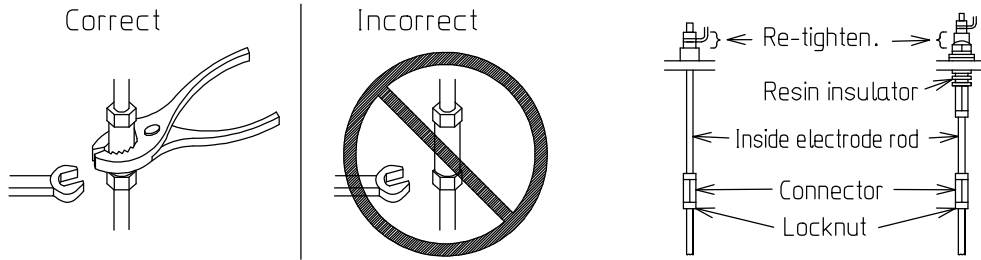
6.3.1 Procedure

The specified rod length is achieved by connecting the outside electrode rod to the retainer.

- (1) Take out the outside electrode rod.
- (2) Connect the outside electrode rod to the inside electrode rod on the retainer to meet the specified length, using the connector and locknut. The inside electrode rod has a tape with a number (0, 1, 2 ... 7). Start from the L0 electrode (No.0) and proceed in order.
- (3) L0 electrode and 10mm from end of the outside electrode rods with an electrode number (0, 1, 2...7) are without insulation tube. Connect rods so that the portion without insulation tube comes to the bottom end.
- (4) When cutting the rod to a desired length, remove insulation tube completely of the rod to be L0 electrode and 10mm from the electrode end.
- (5) Rod assembly procedures are different depending on the rod material. See the following paragraphs for detail.

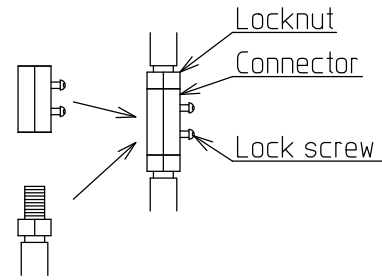
⚠ CAUTION

When tightening the locknut, fix the connector with a tool (10mm A/F) so that the already fixed electrode rods are not rotated along. If they are rotated, re-tighten connector, locknut, and two nuts fixing the cable rugs of inside electrode rods, and if stainless steel flange is used, the resin insulator(*). When left loose, the electrode rods can come off.



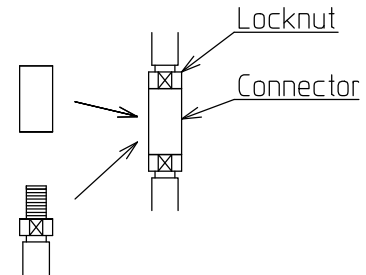
(a) 316 stainless steel electrode rods

1. Loosen lock screws.
2. Screw in the rods to the connector so that they meet in the center.
3. Tighten the locknut securely with a tool (10mm A/F).
4. Tighten the two lock screws to secure the rods.



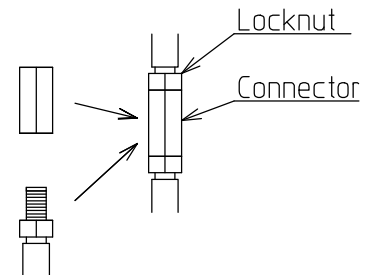
(b) Hastelloy (equivalent) electrode rods

1. Screw in the rods to the connector so that they meet in the center.
2. Tighten the locknut securely with a tool (10mm A/F).



(c) Titanium electrode rods

1. Screw in the rods to the connector so that they meet in the center.
2. Tighten the locknut securely with a tool (10mm A/F).



* Refer to 11. GLOSSARY.

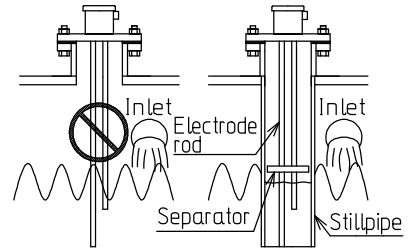
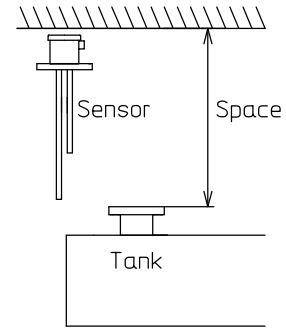
6.4 Mounting the sensor

6.4.1 Mounting location

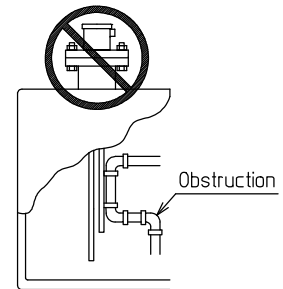
Ensure ample space around and above the mounting point for easy handling and maintenance. Note the space above the tank must be at least as high as the overall length of the sensor. This must be ensured after mounting the sensor for when maintenance is required.

When mounting, observe the following instructions. Failure to do so can result in operation failure.

- (1) Avoid the vicinity of liquid outlet, agitator or a place where flow or turbulence is excessive. Such places can cause electrode rods to contact each other and result in operation failure. If such a location is inevitable, provide a stillpipe(*) or separator.



- (2) Mount the sensor in a location without obstruction such as a pipe, or the electrode rods may contact the obstruction to cause operation failure.



6.4.2 Mounting the sensor

- (1) Flange mounting

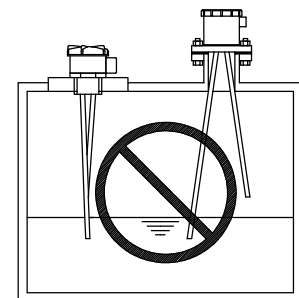
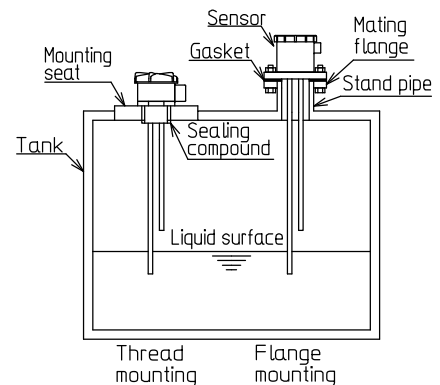
Fit the sensor flange to the mating flange of the tank, and secure them using a proper tool and bolts according to the applicable standard. Mount the sensor vertically.

Ensure that the electrode rods are not in contact with each other or the tank wall, otherwise operation failure can result.

- (2) Thread mounting

Secure the sensor to the mounting seat using a proper tool.

Ensure that the electrode rods are not in contact with each other or the tank wall, otherwise operation failure can result.




* Refer to 11. GLOSSARY.

7. WIRING

7.1 Before wiring

7.1.1 Disconnect power.



WARNING

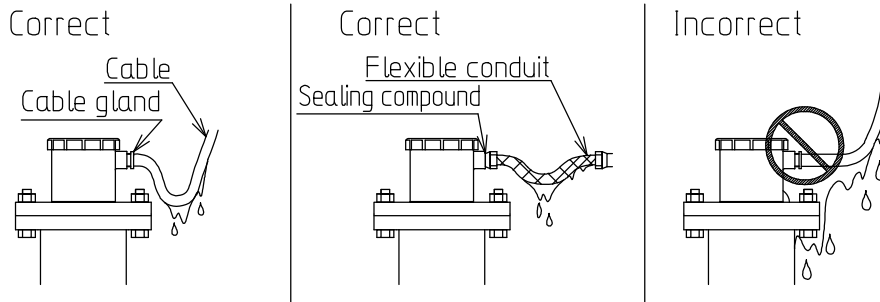
Disconnect power before wiring, or electric shock, leakage, ignition due to short circuit can result.

7.1.2 Remove cover of the terminal box. If working on multiple sensors, ensure the cover will be replaced on its original sensor. This is because the sensor spec (rod length) is written on back of the cover.

7.2 Cable inlet

Cable can be connected directly to the terminal box or via a cable gland. In both cases, ensure water does not enter to the terminal box via cable. Secure the cable using sealing compound when a conduit is used and by tightening the gland with a proper tool when a cable gland is used, to prevent entry of dust, debris or rain water to the terminal box.

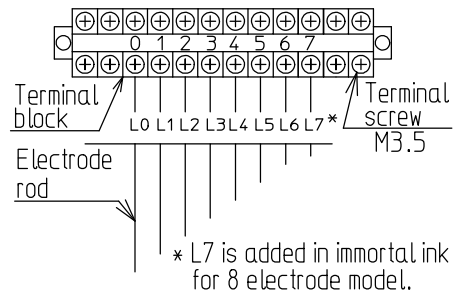
If water or moisture can enter from inside the conduit, putty the inside.



7.3 Wiring

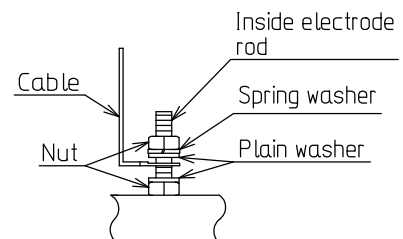
7.3.1 Flanged sensor

Connect cable to terminals. Secure screws with a tool. The terminal screws are of M3.5. Use a cable lug of R1.25-3 or an equivalent size.



7.3.2 Threaded sensor

Threaded sensors are without a terminal block. Wire directly to the inside electrode rod. The rod is fixed with two M6 hexagon nuts. Secure the cable or cable lug between the nuts. Ensure the nuts are fixed using a tool. Use a cable lug of R2-6 or an equivalent size.



7.4 Operation check

Before actual use, power the sensor and check operation using a tank with the liquid to be measured.

If the sensor does not work as it should, verify that the wiring connections are correct, or read this manual again. Contact our sales office if necessary.

7.5 Fitting the cover

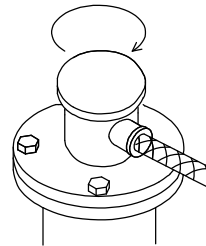
Remove, if any, dust or debris from the terminal box and fit the cover on it. Metal debris inside the box can cause short circuit.

If working on multiple sensors, ensure the cover is replaced on its original sensor.

If screws are used to secure the cover, use a tool. If the cover is threaded, ensure the cover is tightened until it comes to a halt. In both cases, if the cover is loose, rain water or dust can enter to the box to cause corrosion or short circuit, resulting in operation failure.



Tighten securely.



8. MAINTENANCE AND INSPECTION

The sensor has to be removed from the tank for maintenance.

Read 5 Handling Notes beforehand. Ensure ample space for maintenance.

8.1 Removing the sensor

8.1.1 Disconnect power to the sensor.

WARNING

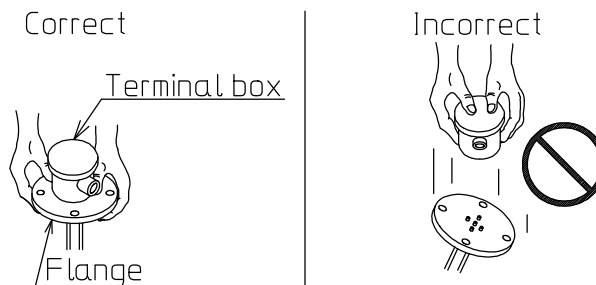
Disconnect power before maintenance, or electric shock, leakage, ignition due to short circuit can result.

8.1.2 Remove cover from the terminal box, and disconnect cable. Remove the conduit, if used, from the terminal box.

CAUTION

When carrying, mounting or removing the sensor, hold it by flange. Do not hold by the terminal box, or it can be separated to cause the sensor to drop (flanged sensor only).

The terminal box and threaded connection of threaded sensor are of uni-construction.



8.1.3 Remove flange bolts or untighten thread.

Hold by flange or threaded connection to remove the sensor from the tank.

8.1.4 Put the sensor on a flat place.

8.2 Maintenance procedure

Perform maintenance and inspection once or twice a year. More frequent maintenance will be required depending on operating conditions such as frequency of use, liquid type, temperature and pressure.

8.2.1 Check for damage which may impair performance and repair or replace the damaged components if any.

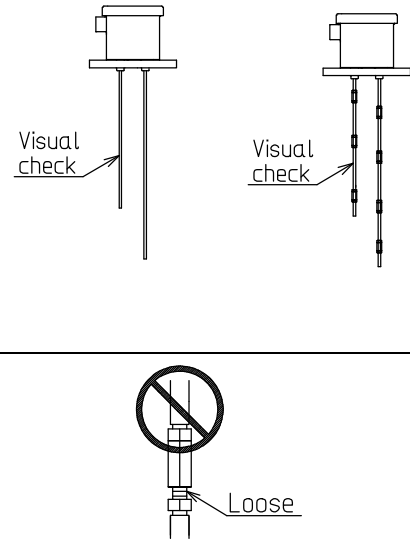
8.2.2 Check for buildup on electrode rods and clean it if any.

8.2.3 Check for corrosion on electrode rods and replace if corroded.

8.2.4 Ensure that the electrode rods are not in contact with each other and correct if they are.

8.2.5 Check for bent electrode rods and replace if any.

8.2.6 Ensure with a tool that the connectors are secured. If loose, refer to section 6.3 and re-tighten.



8.3 Mounting

Refer to 6.4 Mounting the sensor.

8.4 Wiring

Refer to 7 Wiring.

8.5 List of replacement components

Component	When to replace
Electrode rod	Corrosion or bend that may impair performance is observed.
Terminal block	Corrosion or damage has impaired performance.
Separate	Corrosion or damage has impaired performance.

8.6 Replacing electrode rod

Read 5 Handling Notes beforehand. Ensure ample space for maintenance.

8.6.1 Removing the sensor

Remove the sensor following instructions in 8.1 Removing the sensor.

8.6.2 Replacing outside electrode rod

- (1) Fixing the connector using a tool (10mm A/F), loosen the lower locknut to remove the rod from connector.
- (2) Mount a new rod following instructions in 6.3 Assembling the sensor.

8.6.3 Replacing inside electrode rod

Contact our sales office.


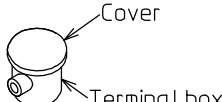
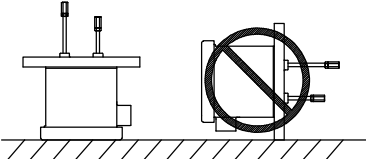
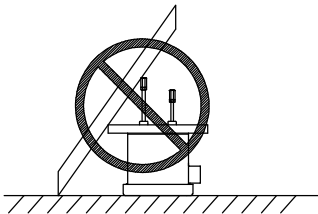
9. STORING

Observe instructions below when storing the sensor after delivery before use, or after removing from the tank. Failure to observe can result in operation failure.

9.1 Store the sensor in the following conditions.

- Temperature: -20 to +50°C
- Humidity: 85%RH Max. (no due condensation)
- Atmosphere: not corrosive (without NH₃, SO₂, or Cl₂)
- No vibration

9.2 Protect sensors from rain or other water. The terminal box can become drip proof only when it is mounted on the tank and wiring is complete. In other conditions, it can allow water entry.

<p>9.3 Separate the retainer and the electrode rod to store. (not applied to FE5)</p>	 <p>Retainer Electrode rods</p>
<p>9.4 Store with cover on the terminal box to prevent dust from entering.</p>	 <p>Cover Terminal box</p>
<p>9.5 Place the retainer so that the terminal box cover comes to the bottom. Laying it can bend the inside electrode rods.</p> <p>Note that FE5 sensors has only one electrode rod and thus standing or laying it can cause the sensor to fall or the rod to bend. Store the FE5 as in the delivered state.</p>	
<p>9.6 Do not place anything on the sensor, or excessive force can be applied to deform or damage the sensor.</p>	

Note:

Wrap the sensor with polyethylene sheet and seal it to protect from moisture and dust. If the sensor is stored where temperature change is enormous or humidity is high, enclose desiccant such as silica gel in the polyethylene sheet.

10. TROUBLESHOOTING

⚠ CAUTION

In the event of trouble, perform the following and nothing else. If you have any question, please contact our sales office.
The chart below applies to when our relay unit is used in combination with the sensor.

Trouble	Possible cause	Corrective action	Reference
No output even when the liquid reaches the specified level.	Loose or wrong wiring	Wire correctly.	7. Wiring
	Faulty connection of electrode rod	Connect correctly.	6.3.1 Assembling the sensor
	Electrode rod corroded	Replace the rod.	8.6 Replacing outside electrode rod
Output given even when the liquid does not reach the specified level.	Loose or wrong wiring	Wire correctly.	7. Wiring
	Electrode rods are in contact with each other.	Use a separator.	6.2.1 Mounting the separator
	Electrode rod is in contact with tank wall.		
	Buildup on the electrode rod	Remove the buildup.	

11. GLOSSARY

Terms used in this manual are defined in the chart below. This chart excludes the terms which have already been defined earlier in this manual.

FEP	Fluorinate ethylene propylene, a copolymer of hexafluoropropylene and tetrafluoroethylene. Provides the same level of chemical resistance as fluorine resin, but less heat resistant.
Outside electrode rod	Metal rod connected to inside electrode rod.
Separator	Disk shaped component that keeps electrode rods at an interval.
Resin insulator	Fluorine resin component that insulate inside electrode rod and stainless steel flange.
Electrode rod	Metal rod comprised of inside electrode rod, outside electrode rod, connector and locknuts.
Retainer	Component comprised of terminal box, flange (threaded connection), inside electrode rod, connector and locknuts.
Electric corrosion	To corrode due to current flow.
Conductive liquid	Liquid that conveys electricity
Inside electrode rod	Metal rods sticking out of flange
NW0001/NW0665	Hastelloy B or equivalent. (Hastelloy B is a registered trademark of Mitsubishi Material Corporation.)
NW0276	Hastelloy C or equivalent. (Hastelloy C is a registered trademark of Mitsubishi Material Corporation.)
PFA	Perfluoroalkoxy copolymer resin that has the same level of chemical resistance as fluorine resin.
Threaded connection	Threaded component used to mount the sensor on a tank.
Flange	Component to mount the sensor on a tank using bolts and nuts.
Stillpipe	Pipe to protect the sensor from excessive turbulence or flow to prevent faulty operation.
Protection class	Degree of protection provided against the intrusion of solid object (including body parts) and water. Specified by IEC (IEC 529).
Polyolefin	Copolymer such as ethylene and propylene, or ethylene and vinyl acetate. Main component is polyethylene, but including additives such as plasticizer, polyolefin is less resistant to chemical than pure polyethylene resin.

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