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# INSTRUCTION MANUAL

Float Type Level Switch




HM-90S Series



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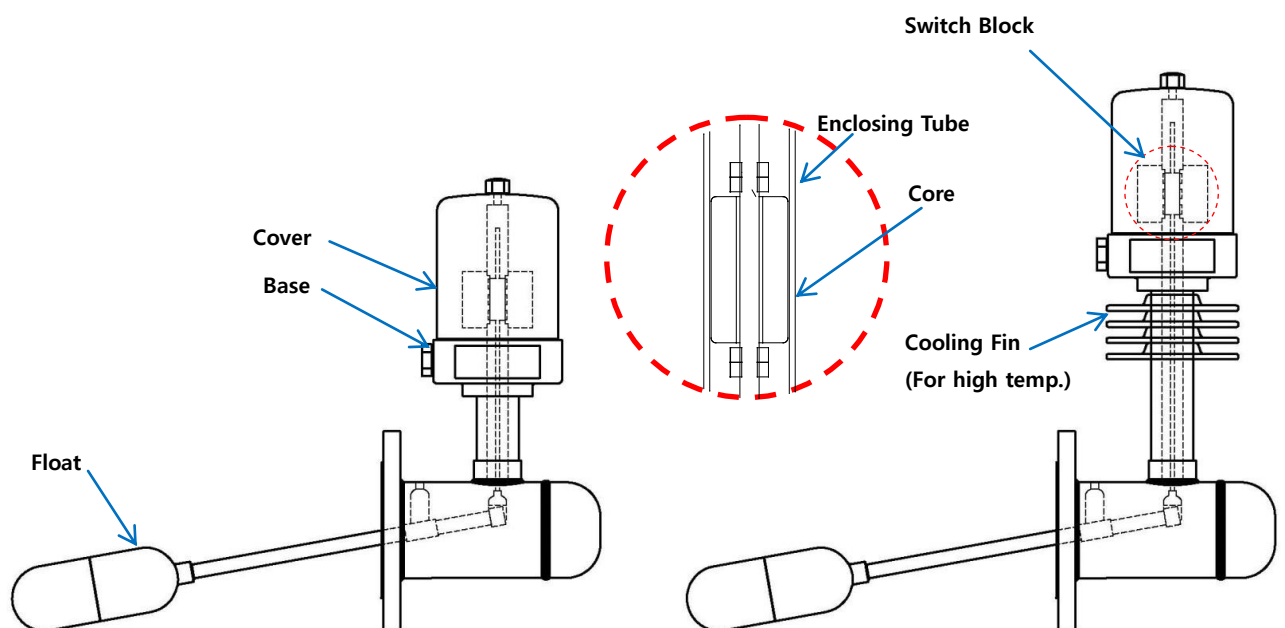
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**Overview**

HM-90S Series is a level switch with ON/OFF contact signals to detect upper and lower limits of vessel. It has a solid structure and high reliability. It is mainly used as a water level detector for boilers of power plants and refining equipment of petrochemical plants.

**Operating Principles**

When the level of the object to be measured rises, the float also rises due to buoyancy and, accordingly, the connected core also rises. When the core rises, a switch block magnet responds to the core so as to trigger the switch.

**Characteristics**

- Solid structure and long service life
- Current operation state display
- Customizable with special material (alloy)
- Ex-proof type available (HM-90S-Ex, HM-90SH-Ex)

## Specifications

### Weather-Proof

Model	HM-90S	HM-90SH
Process connection	80A JIS 10K RF, Others	80A JIS 10K RF, Others
Ambient Temperature	-20°C ~ +80°C	
Max. Process Temp.	-40°C to +120°C	-40°C to +200°C -40°C to +350°C -40°C to +500°C
Max. Process Pressure	Up to 20kg/cm <sup>2</sup> (300#)	Up to 20kg/cm <sup>2</sup> (300#)
Switch Type	Micro Switch	
Contact Form	SPDT, DPDT	
Enclosure	Weather-Proof (IP65)	
Material	Flange	C.S, 304 SS, 316L SS
	Chamber	C.S, 304 SS, 316L SS
	Float	316L SS
Housing; Cable Entry	C.S; PF 3/4"(F), AL.; PF 3/4"(F)	
Installation	Side	

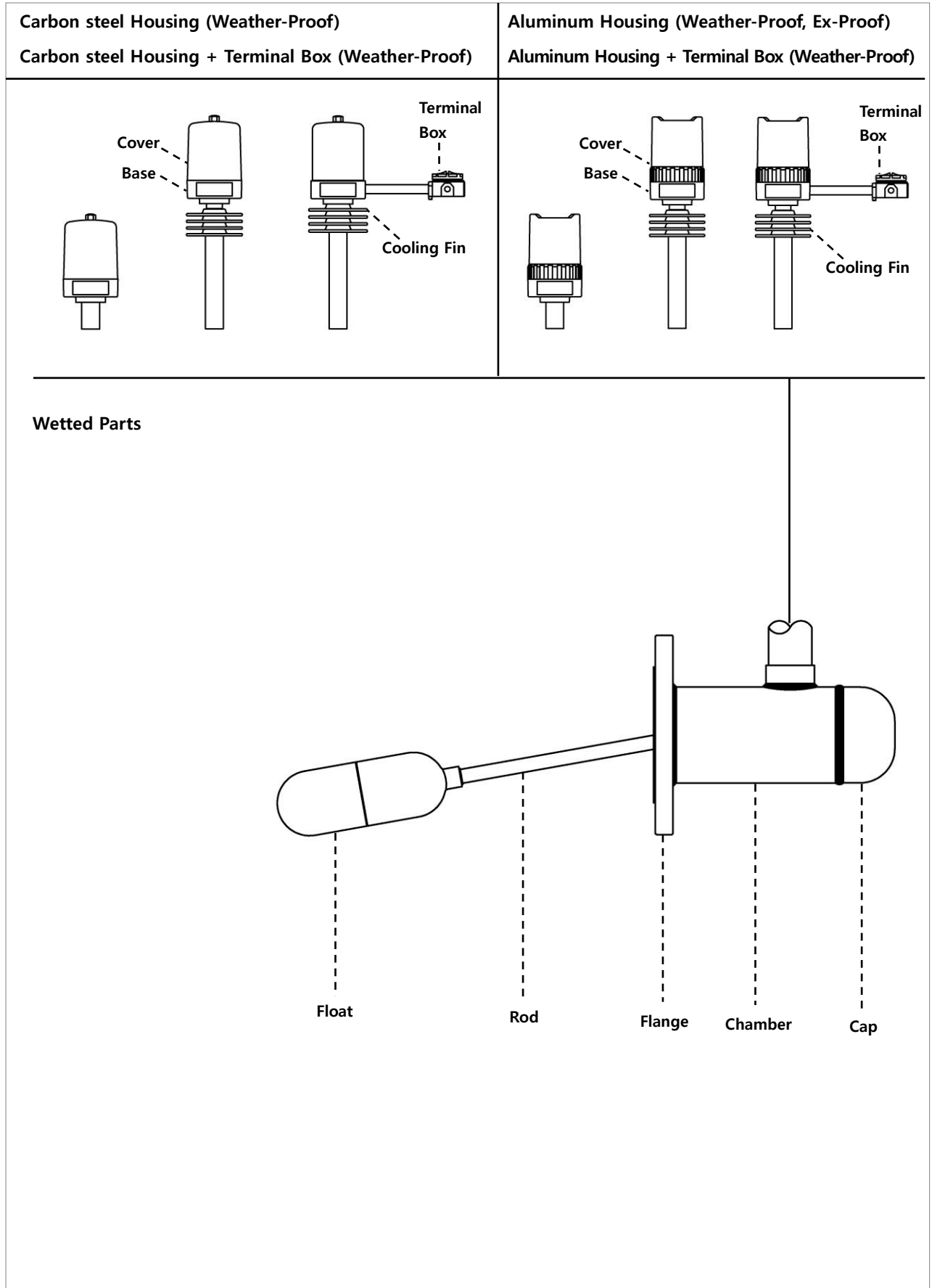
### Ex-Proof

Model	HM-90S-Ex	HM-90SH-Ex
Process connection	80A JIS 10K RF, Others	80A JIS 10K RF, Others
Ambient Temperature	-20°C to +80°C	
Max. Process Temp.	-40°C to +120°C	-40°C to +200°C -40°C to +350°C
Max. Process Pressure	Up to 20kg/cm <sup>2</sup> (300#)	Up to 20kg/cm <sup>2</sup> (300#)
Switch Type	Micro Switch	
Contact Form	SPDT, DPDT	
Enclosure	Ex-Proof (Ex d IIC T4, IP65)	
Material	Flange	C.S, 304 SS, 316L SS
	Chamber	C.S, 304 SS, 316L SS
	Float	316L SS
Housing; Cable Entry	AL.; PF 3/4"(F), Others	
Installation	Side	

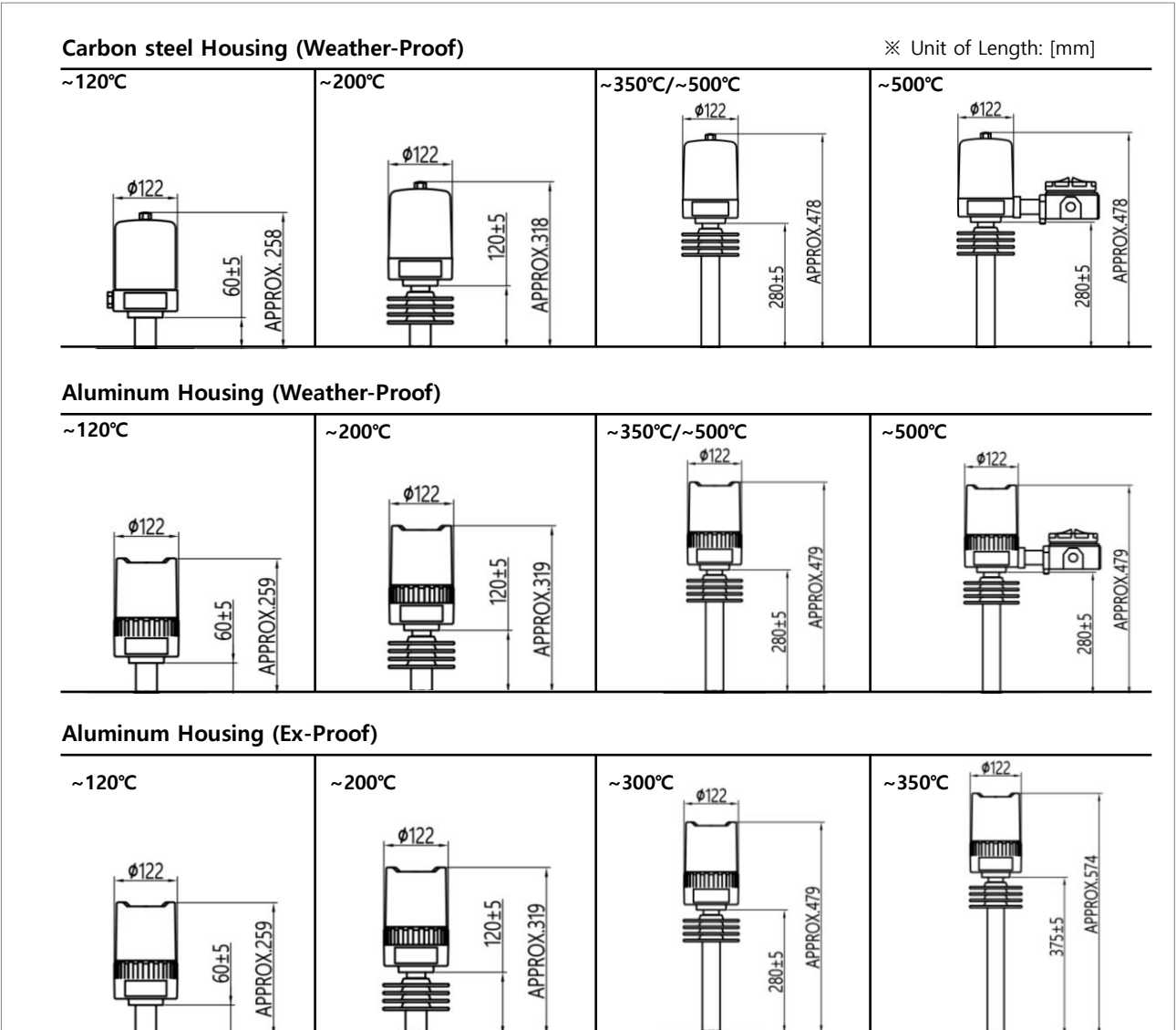
※ The housing is designed to avoid damage from dust or water, and if necessary, anti-corrosion housing (EPOXY Coated) can be selected.

**Product Components**

**HM-90S Series**



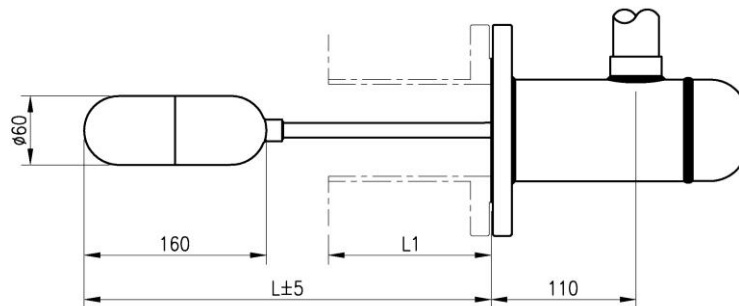
Dimensions & Technical Specifications



If the fluid temperature is over 200°C, heat resistance cables for high temperatures shall be applied.

Float

※ Based on pressure of 10kgf/cm<sup>2</sup>, temperature of 120°C, Standard length.



HM-90 Series

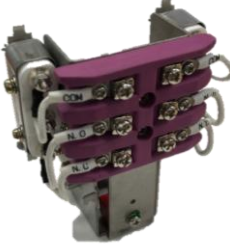

Std. Length L1 / L	Minimum Specific Gravity
150mm / 350mm	0.8



Some tolerances may occur with actual products.

**Switch Specification by Process Temperature**

Std. Type	Opt. Type	Process Temp.	Contact Rating
		~ 200°C	AC 250V, 15A DC 125V, 0.5A
		~ 350°C	AC 250V, 5A DC 125V, 0.5A

Std. Type	Opt. Type	Process Temp.	Contact Rating
	 + External Terminal Box	~ 500°C	AC 250V, 1A DC 125V, 0.4A

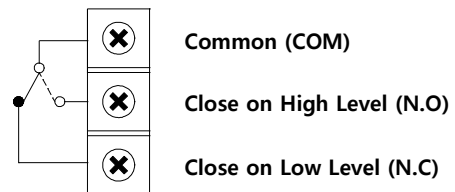


Specifications of Temperature and Contact Form (SPDT, DPDT) are optional.

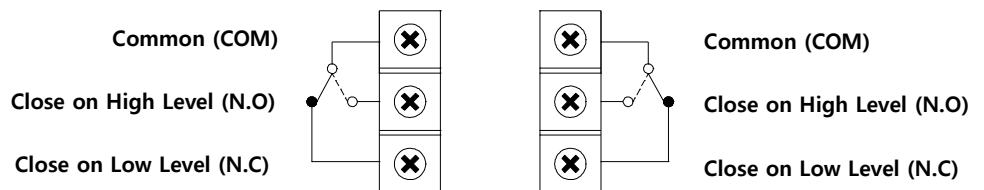
**Wiring**

- Open the cover and insert the cable into the inlet.
- Connect the cable with COM, N.O, N.C terminal of the switch block as necessary.

■ SPDT Wiring

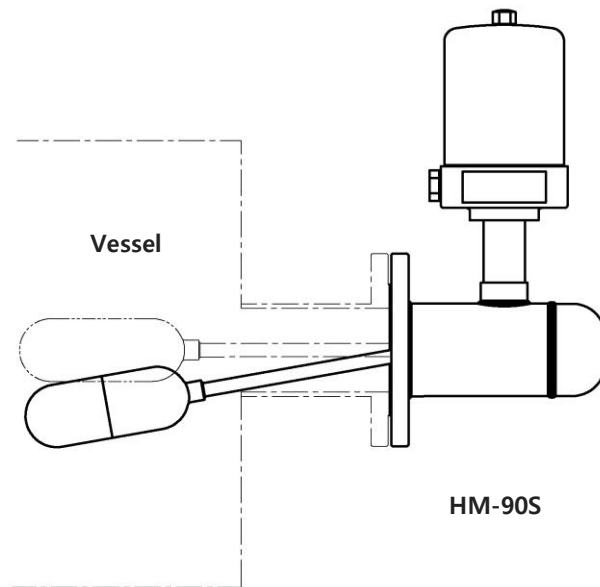


■ DPDT Wiring

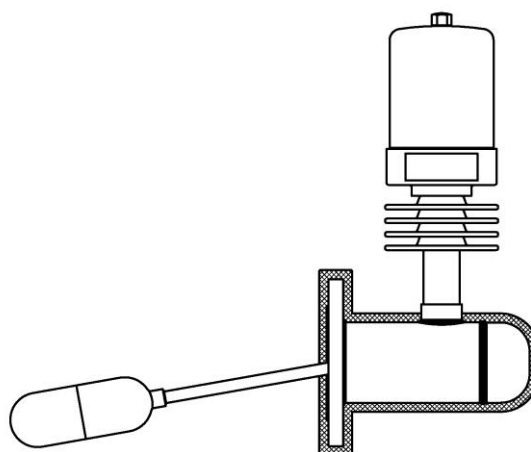


**Installation**

- Default connection is a side type.
- According to the dimensions of the drawing, the connection and main unit shall be leveled.  
Also, it is recommended to install a bracket to support the product if necessary.
- When installing, the nozzle length shall be checked before installing the product.



- If the temperature of object to be measured exceeds 350°C, an ex-proof product (HM-90S(H)-Ex) is not applicable.
- If the temperature of object to be measured exceeds 120°C, use a high-temperature product (HM-90SH, HM-90SH-Ex) and insulate the main unit and connection, as shown below.



**Do not insulate the housing and cooling fin.**



**Maintenance** Regular inspection helps in using the product in the optimal condition. As such, it is recommended to conduct annual inspection and maintenance.

■ **Cage**

The cage is designed to endure high temperature, and its safety is confirmed with nondestructive and water-pressure tests. However, corrosion can lead to leakage in a harsh working environment. As such, regular visual inspection and test are required.

■ **Housing**

Check the sealing of the housing cover and wire inlet to prevent dust or rain from penetrating. Also, replace the sealing if it is old or damaged.

Exposure to excessive heat or humidity may damage the wire inlet insulation. It may lead to short circuit, so check the wiring and replace it if necessary in advance.

If the terminal is not tightened, vibration may cause it to loosen.

Prepare a spare switch block so that the process can continue even if there is a problem with the switch block.

The product can be removed from the vessel to check the contact of level switch using liquid (e.g., water) and then reconfigure it.

**For maintenance, check the presence of measure object in the tank and remove it.**



**Learn how to adjust the switch block first, and contact the headquarters or dealership for any replacement required.**

**Failure Check** If there is a problem with operation, check the following first.

- Remove the cover and check if the output of the micro switch works fine.

Connect a tester to COM and N.O or N.C to check the output, and if there is a problem, replace the micro switch.

- After checking the micro switch, remove the product from the vessel and move the float up and down to see if the switch block magnet responds to the core.

- Recheck if the float and level of object to be measured are leveled.

- Recheck if the float is positioned on top of the object to be measured.

**Precautions for Removal**

- Check the level and presence of measure object in the tank before removing it.
- Wear gloves when removing it, to prevent a burn.
- Make sure that any O-ring or gasket is not damaged while opening or closing the cover of product.
- Unlock the lock key before removing the cover.
- Disconnect the cable before removing the snap switch.



**If there is explosive gas atmosphere, do not open the cover.**

- Precautions for Transportation and Assembly**
- Pay special attention to prevent any impact on the device during transportation or assembly.
  - Pay attention to prevent any damage to any packing when transporting or mounting the machine to the vessel.



**Make sure that it is not subject to any high impact when moving the product.**

- Precautions for Installation**
- Use the same standard flange or screw.
  - Make sure to insert washers between bolts and nuts to prevent loosening.
  - Make sure to insert gaskets between flanges. (Select the gaskets in consideration of temperature of content and pressure of vessel.)
  - Install an Ex-proof product only in an Ex-proof zone.

- Precautions for Grounding**
- External ground is located on top of cable entry, and the grounding wire to connect external ground must be 4mm<sup>2</sup> (4mmSQ). (Internal ground is connected before shipment.)



**Make sure to insert a washer if the terminal lug is removed from the ground terminal and then re-connected. (Loosening prevention)**

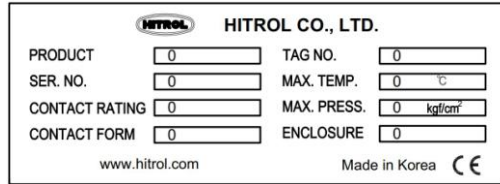
- Precautions for Inserted External Wire (Ex-proof)**
- Use the cable gland connection or metal pipe line lead-in on the wire inlet, and use a product with equivalent Ex-proof certificate to connect it with the external line lead-in method.
  - For non-use external wire inlet, use a closed plug that passes safety certificate above equivalent performance with the product.

- Safety and Environment**
- Precautions for Use
    - Make sure to connect the product and vessel using required tools for sure.
    - Keep the lock key safe and make sure that it is locked.
    - Do not apply high impact to the product.
  - Precautions for Wiring
    - Make sure to wire contacts correctly.
    - Pay attention to prevent electric shock.
  - Disposal of Product
    - Remove the snap switch of switch block from the housing before disposing a product.
    - No part (ex. Mercury Switch) has influence on the environment, so no special attention is required.

**Marking**

■ Product Identification

The product identification mark is attached onto the housing and shows the product name, serial number, working temperature, working pressure, and matters regarding output. The serial number is a unique manufacturing number for the identification of



**Weather-Proof Version  
(C.S + Aluminum Housing)**



**Weather-Proof Version  
(Aluminum Housing)**



**Ex-Proof Version  
(Certificate No.: 09-AV2BO-0097)**

**User Training**

Understand the aforementioned and do not exceed 120°C and 500°C respectively for the liquid in the general and high-temperature vessels to use the product. In addition, make sure that the ambient temperature of housing is kept at -20 - +80°C. (However, Ex-Proof product is limited to a maximum temperature of 350°C for the liquid in the container.) Make sure to use high-temperature cables with high-temperature products. (To prevent damage to the cable). An Ex-proof product is a pressure-resistant and Ex-proof type, so never open the cover during operation. Ex-proof products are designed according to Article 34 of the Industrial Safety and Health Act and Article 58.4 of the Enforcement Rules of the same Act.



**Do not apply a Non-ex-proof product in an Ex-proof zone.**

**An ex-proof product can be used where the environment and liquid inside the containers are of zone 1 and 2.**

**Warranty  
and Contact**

■ **Warranty and Service**

This product is subject to the warranty for 2 years of shipment and unpaid service will be provided for any damage found under normal operating conditions. If it is not about the failure of product, the service charge will be payable.

You can request A/S at our website or by contacting our headquarters.

■ **Headquarters . Factory . Laboratory Contact Number**

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