

HITROL CO., LTD.

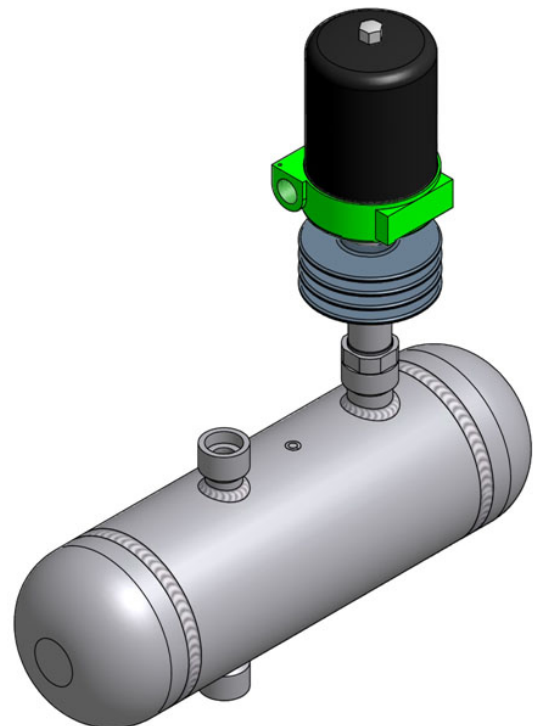
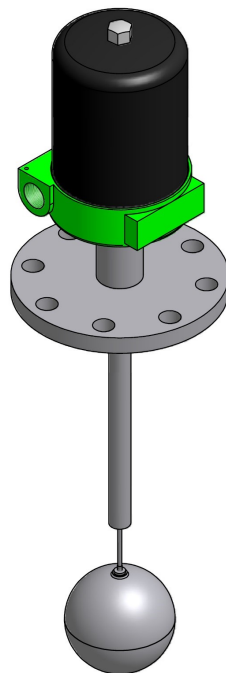
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INSTRUCTION MANUAL

Float Type Level Switch

HM-95 Series



Doc. no. : HM95_IM_Eng_Rev.2.2

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You shall be well-informed of the contents where **WARNING** is marked before carrying out the work.



You shall be careful where **CAUTION** is marked to carry out the work.



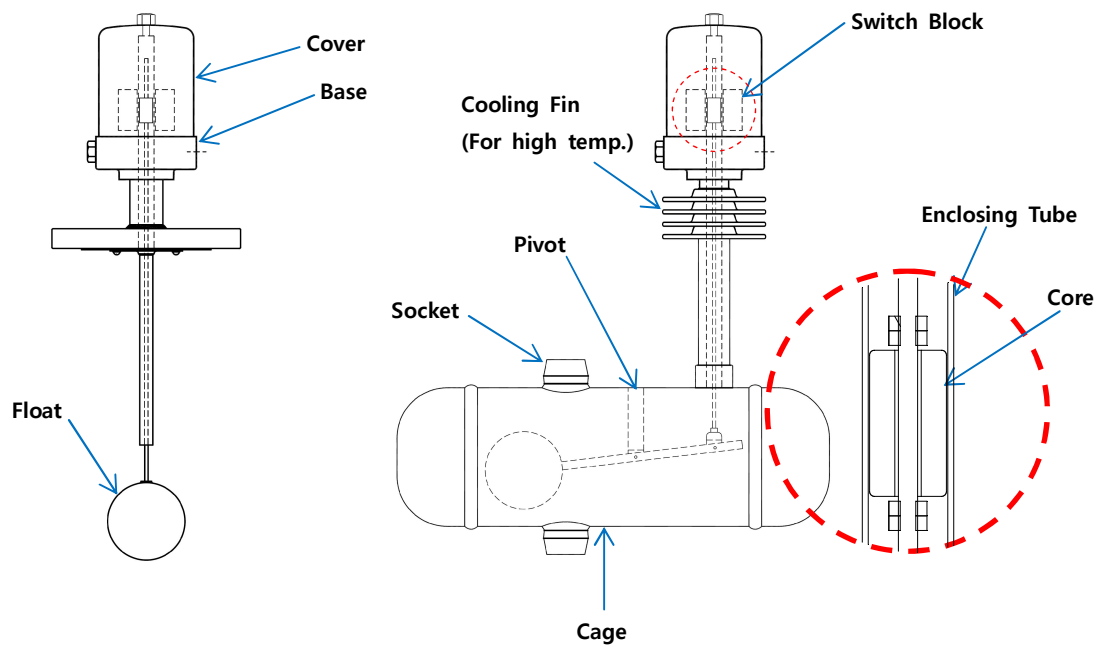
You shall be aware of where **NOTICE** is marked to carry out the work.

Overview HM-95 Series is a level detector used to detect high and low with ON and OFF contacts. With its solid structure and high reliability, it is designed to be used with high temperature and pressure. It is mainly used for boilers of power plants and refining equipment of petrochemical plants.

- Characteristics**
- Solid structure and long service life
 - Applicable in high temperature and pressure
 - Current operation state display
 - Customizable with special material (alloy)
 - Pressure-resistant and ex-proof type available
(HM-95-Ex, HM-95H-Ex, HM-95V-Ex, and HM-95VH-Ex)
 - ASME B31.1, ASME B31.3 (If chamber design is required.)

- Applications**
- Feedwater heaters
 - Steam drums
 - Condensate drip Pot
 - Flash tank
 - Separators
 - Receivers
 - Accumulator

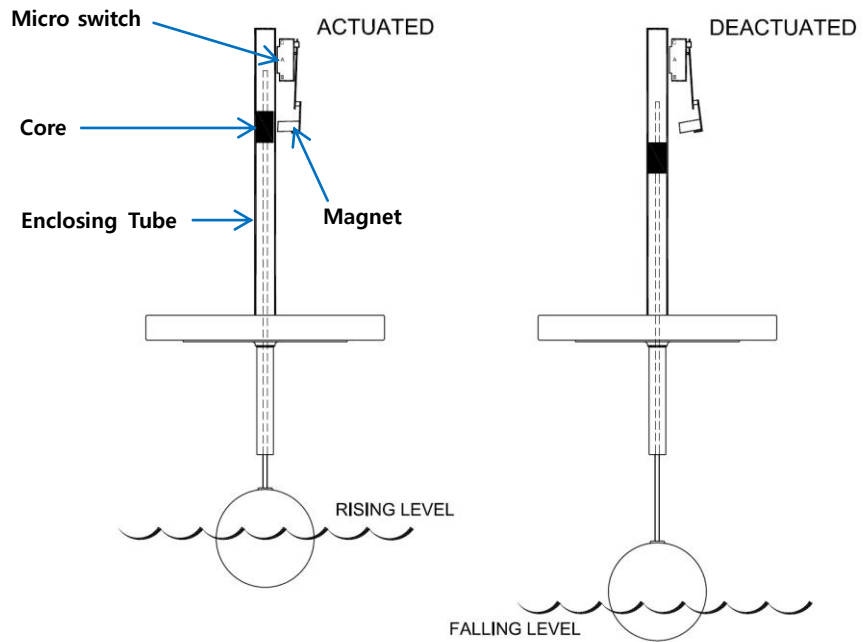
Operating Principles When the level of the object to be measured rises, the float also rises due to buoyancy and, accordingly, the connected core also rises. When the core rises, a switch block magnet responds to the core so as to trigger the switch.



Switch Action

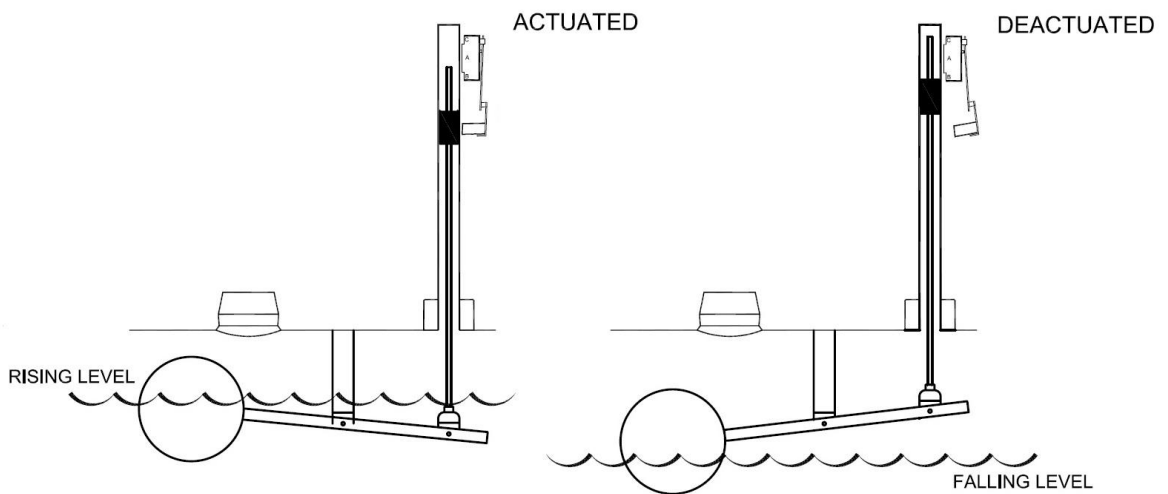
HM-95 Series

When the level of the object to be measured rises, the core also rises and switch block magnet responds to the core so as to trigger the switch.



HM-95V Series

When the level of the medium goes up, the core falls, and the switch block magnet responds to the core so as to trigger the switch.



Specifications

Weather-proof

Model	HM-95	HM-95H	HM-95V	HM-95VH
Process Connection	100A JIS 10K RF, Others		1" Socket, Others	
Ambient Temperature	-20°C to +80°C			
Max. Process Temp.	-40°C ~ +120°C	-40°C ~ +200°C -40°C ~ +350°C -40°C ~ +500°C	-40°C ~ +120°C	-40°C ~ +200°C -40°C ~ +350°C -40°C ~ +500°C
Max. Process Pressure	Up to 63 kg/cm ² (900#)		Up to 105 kg/cm ² (1500#)	
Switch Type	Micro Switch, Hermetical Sealed (Opt.)			
Contact Form	SPDT, DPDT			
Enclosure	Weatherproof (IP65)			
Material	Float	316L		
	Cage	Opt.	C.S, 304, 316 L, Others	
Housing; Cable Entry	C.S; PF 3/4" (F), AL.; PF 3/4" (F), Others			
Installation	Top		Top and Bottom, Side to Side	

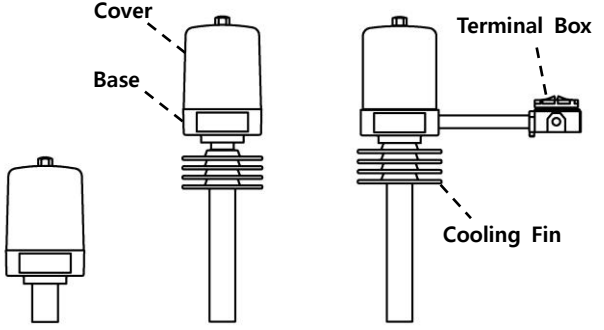
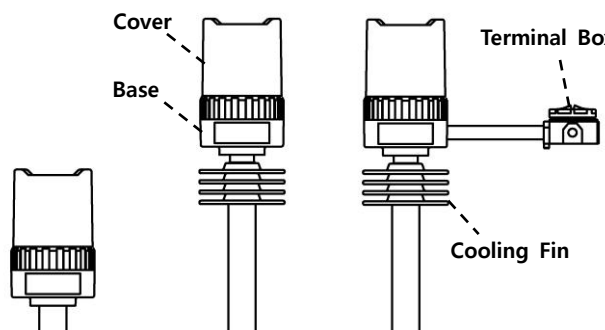
Ex-Proof

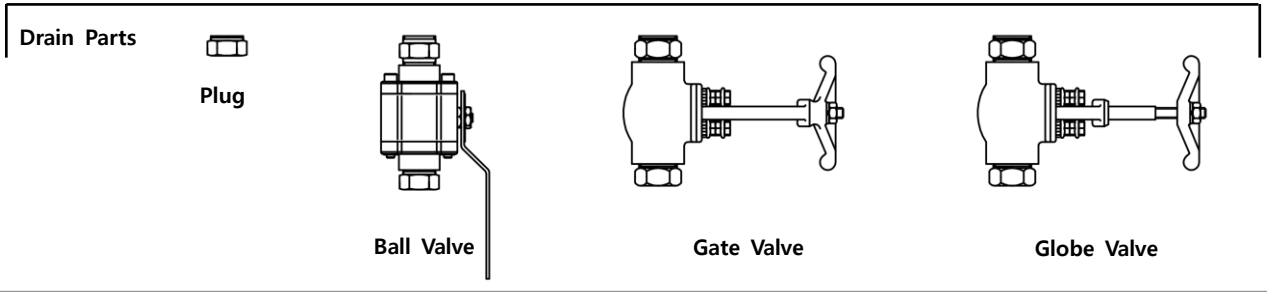
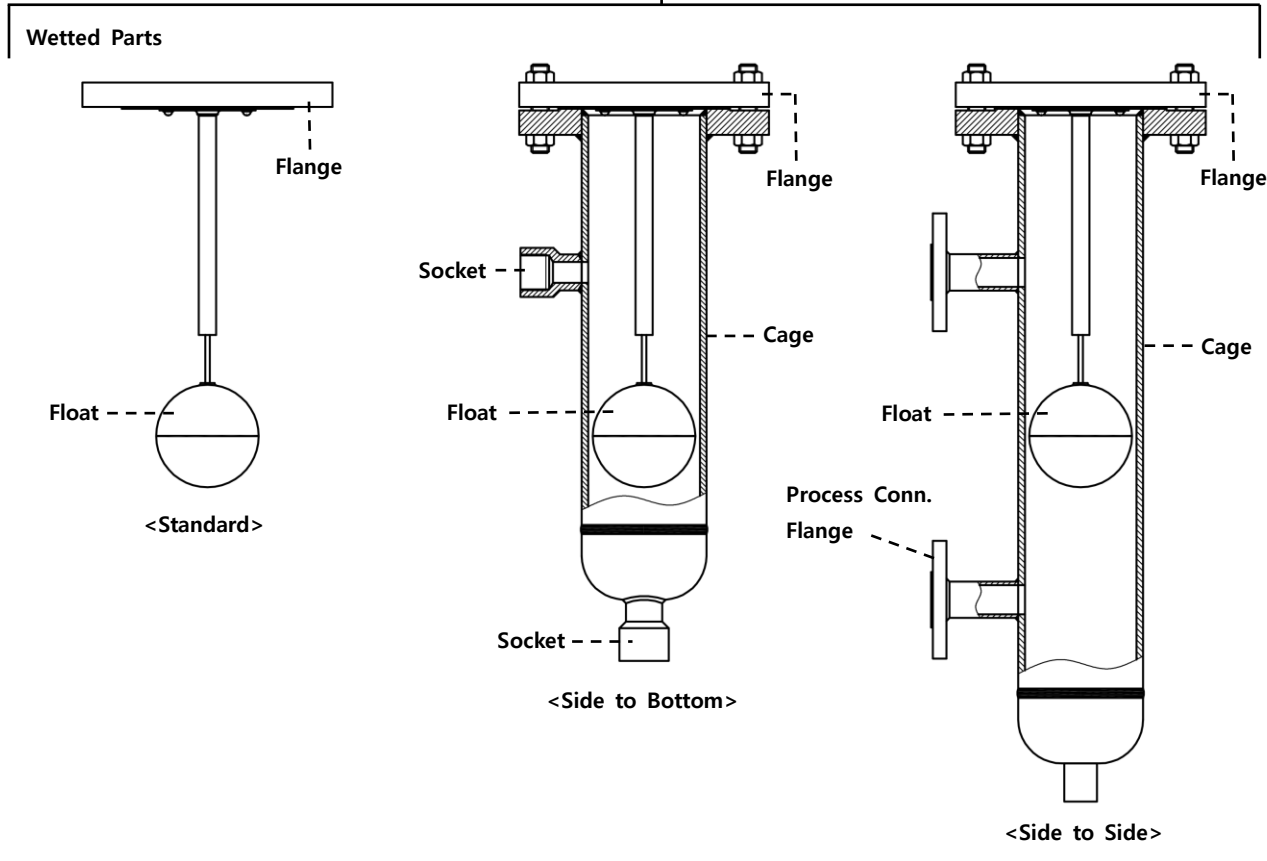
Model	HM-95-Ex	HM-95H-Ex	HM-95V-Ex	HM-95VH-Ex
Process Connection	100A JIS 10K RF, Others		1" Socket, Others	
Ambient Temperature	-20°C to +80°C			
Max. Process Temp.	-40°C ~ +120°C	-40°C ~ +200°C -40°C ~ +300°C -40°C ~ +350°C	-40°C ~ +120°C	-40°C ~ +200°C -40°C ~ +300°C -40°C ~ +350°C
Max. Process Pressure	Up to 63 kg/cm ² (900#)		Up to 105 kg/cm ² (1500#)	
Switch Type	Micro Switch, Hermetical Sealed (Opt.)			
Contact Form	SPDT, DPDT			
Enclosure	Ex-Proof (Ex d IIC T4, IP65)			
Material	Float	316L		
	Cage	Opt.	C.S, 304, 316 L, Others	
Housing; Cable Entry	AL.; PF 3/4" (F), Others			
Installation	Top		Top and Bottom, Side to Side	

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

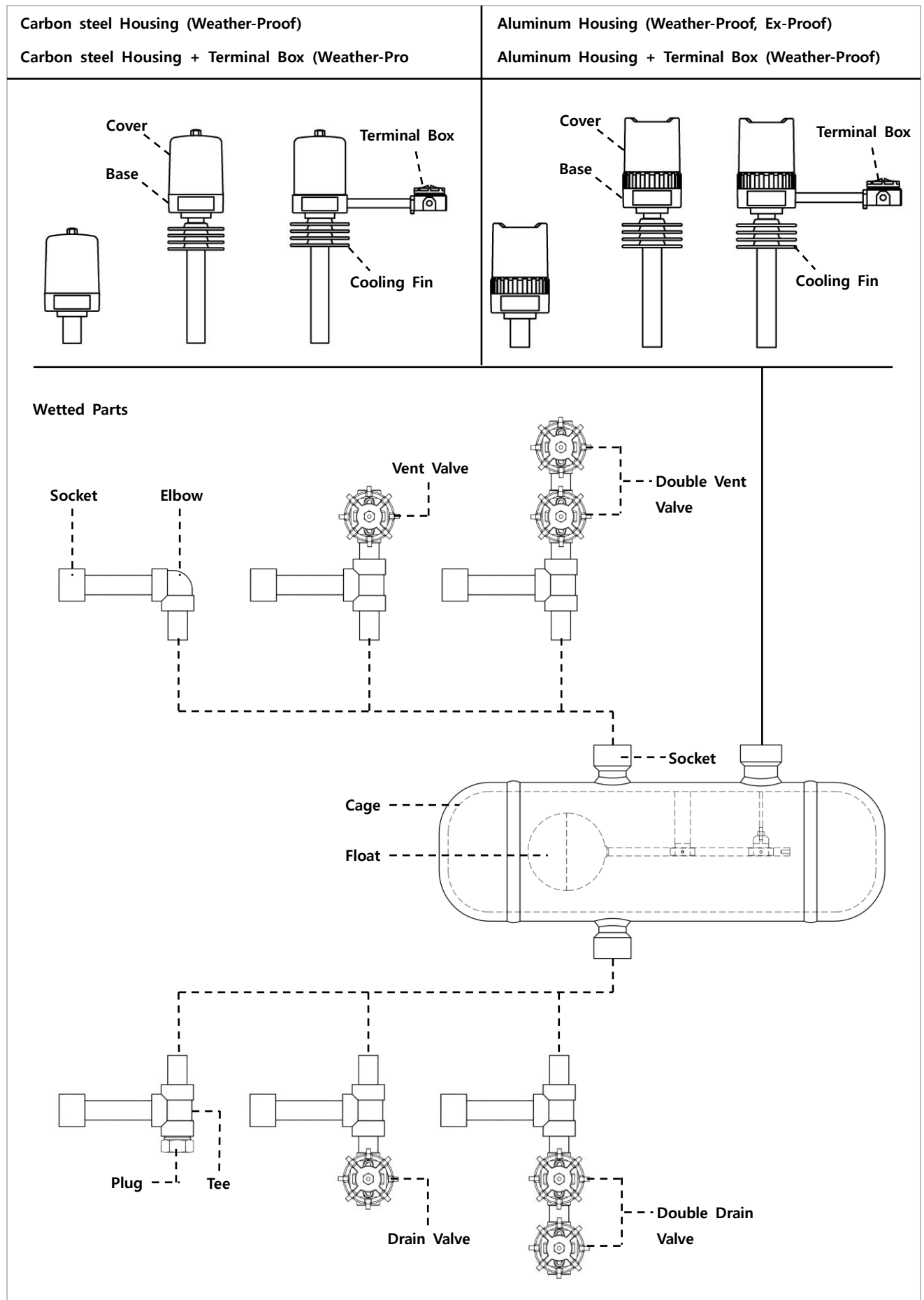
Product Components

HM-95 Series

Carbon steel Housing (Weather-Proof) Carbon steel Housing + Terminal Box (Weather-Proof)	Aluminum Housing (Weather-Proof, Ex-Proof) Aluminum Housing + Terminal Box (Weather-Proof)
<p>f)</p> 	



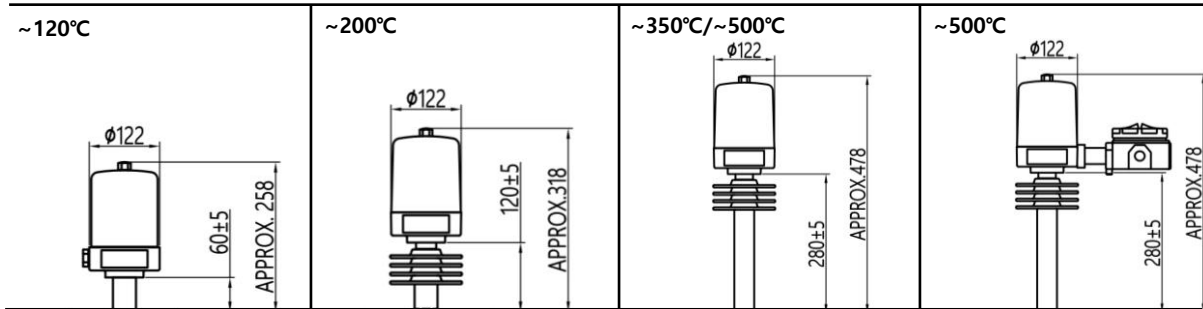
HM-95V Series



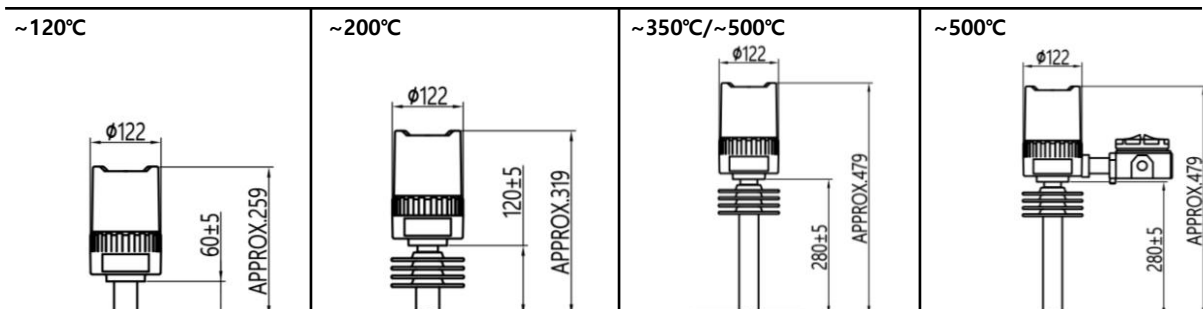
Dimensions & Technical Specifications

Carbon steel Housing (Weather-Proof)

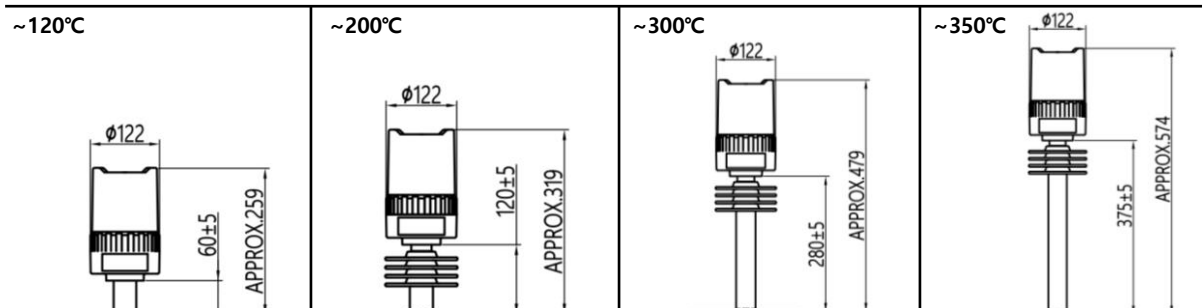
※ Unit of Length: [mm]



Aluminum Housing (Weather-Proo)



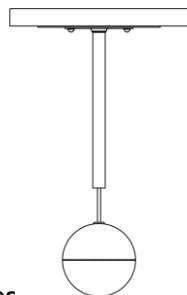
Aluminum Housing (Ex-Proof)



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

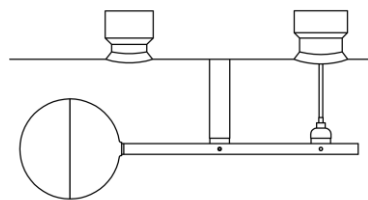
Float

※ Based on pressure of 10kgf/cm², temperature of 120°C, Standard length.



HM-95 Series

Float Size	Minimum Specific Gravity
Ø90	0.8
Ø110	0.5



HM-95V Series

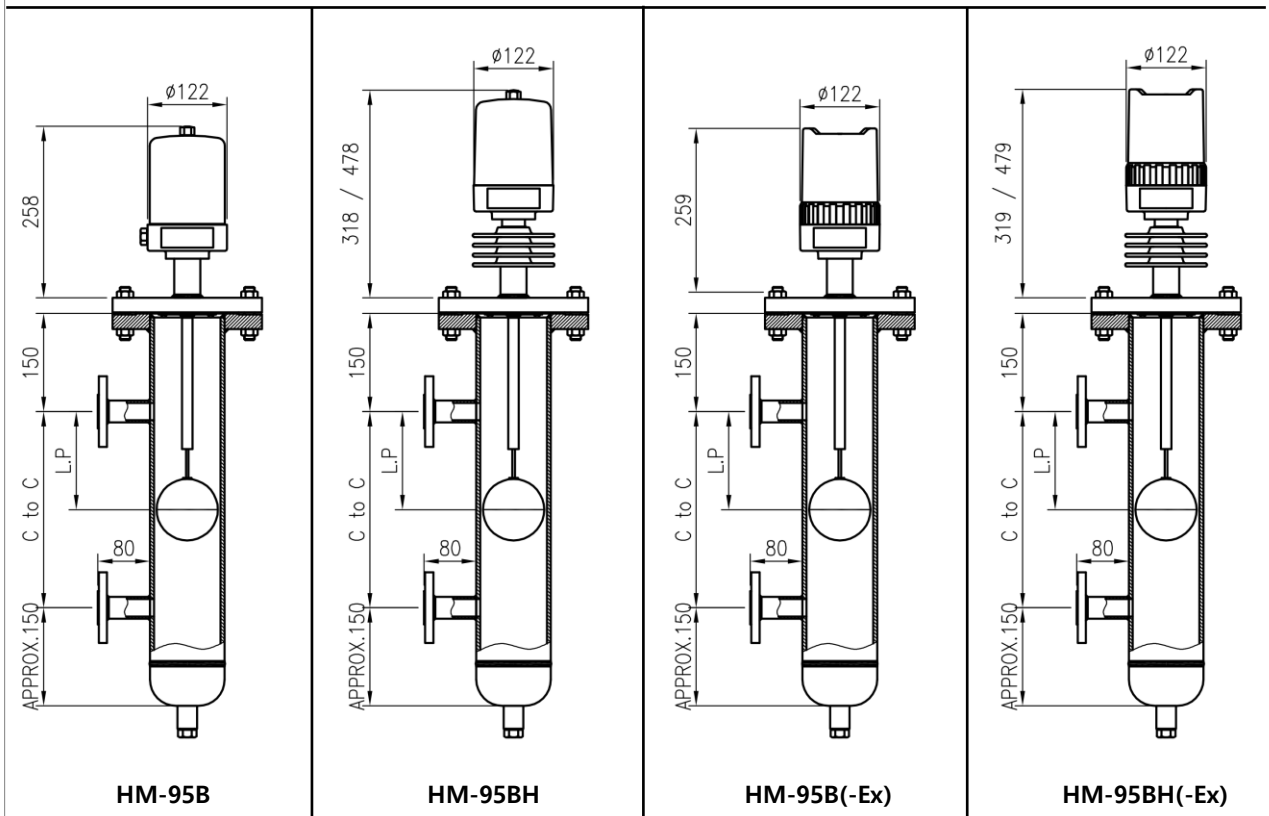
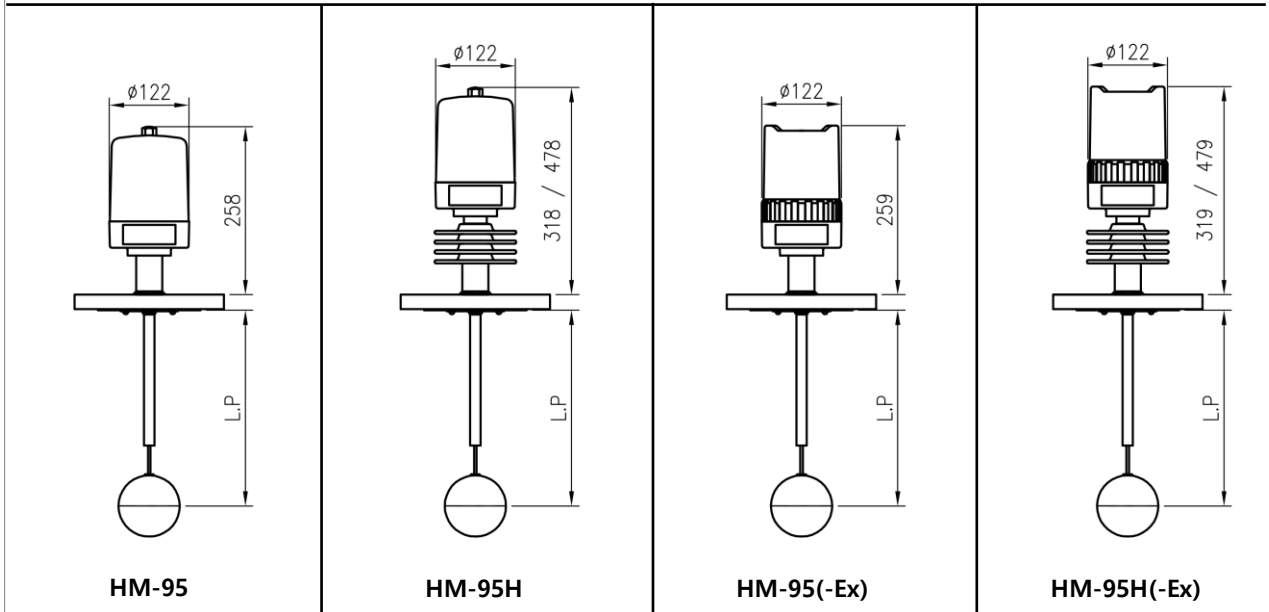
Float Size	Minimum Specific Gravity
Ø90	0.8



NOTICE Some tolerances may occur with actual products.

HM-95 Series

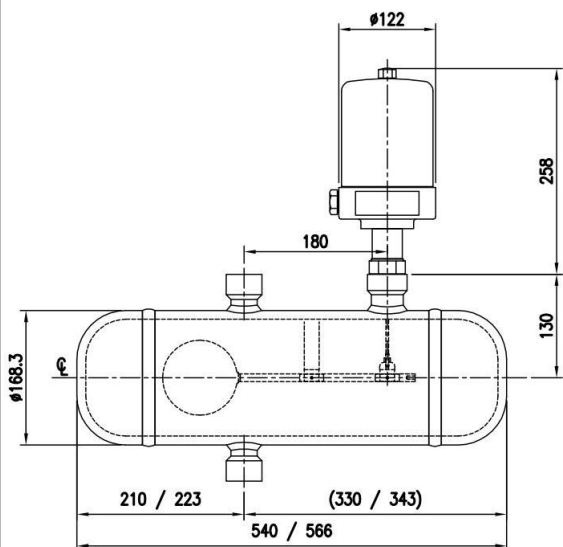
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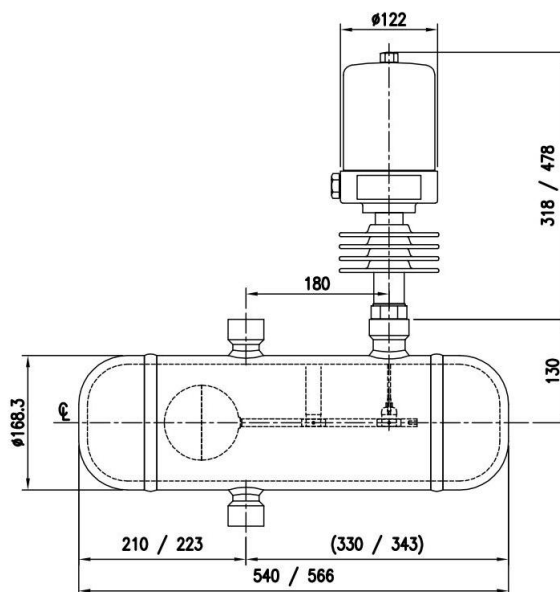
NOTICE Some tolerances may occur with actual products.

HM-95V Serie

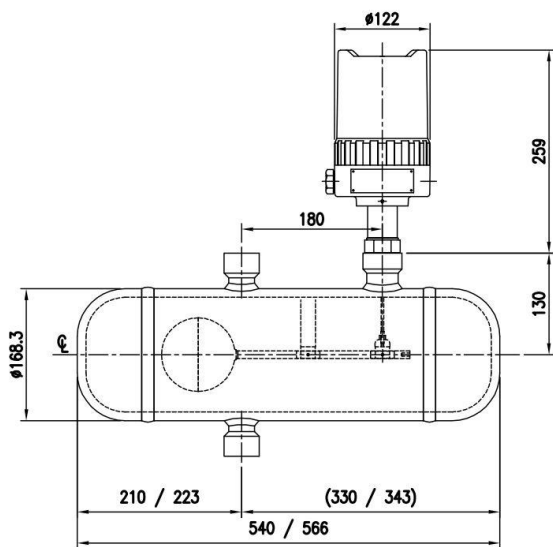
※ Unit of Length: [mm]



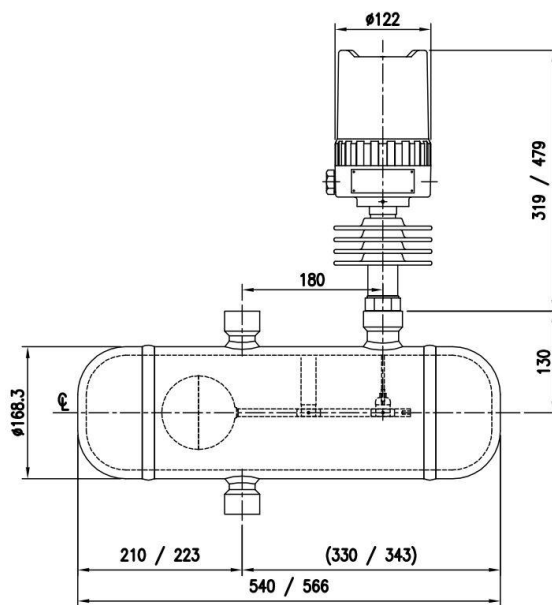
HM-95V



HM-95VH



HM-95V(-Ex)






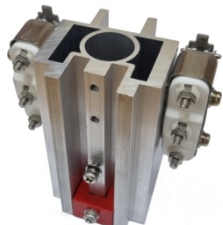
HM-95VH(-Ex)



NOTICE 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

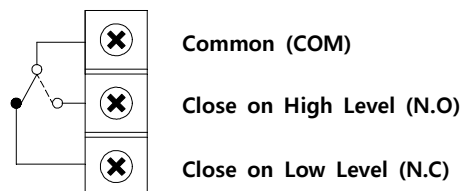
 **Specifications of Temperature and Contact Form (SPDT, DPDT) are optional.**

Wiring

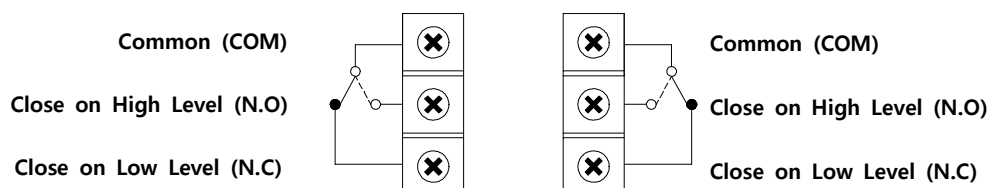
- Open the cover and insert the cable into the inlet.
- Connect the cable with COM, N.O, N.C terminal of the switch block as necessary.

HM-95 Series

■ SPDT Wiring

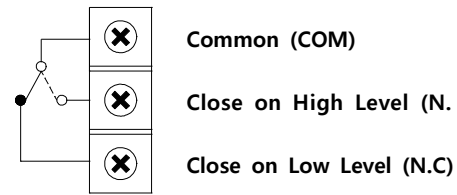


■ DPDT Wiring

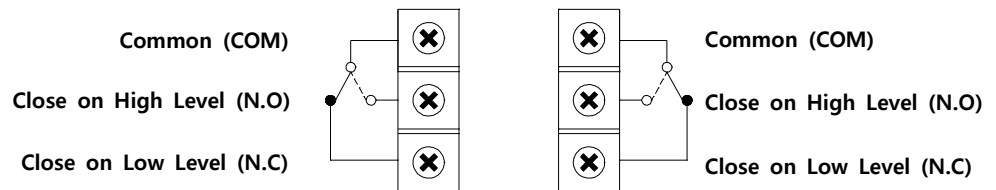


HM-95V Series

■ SPDT Wiring

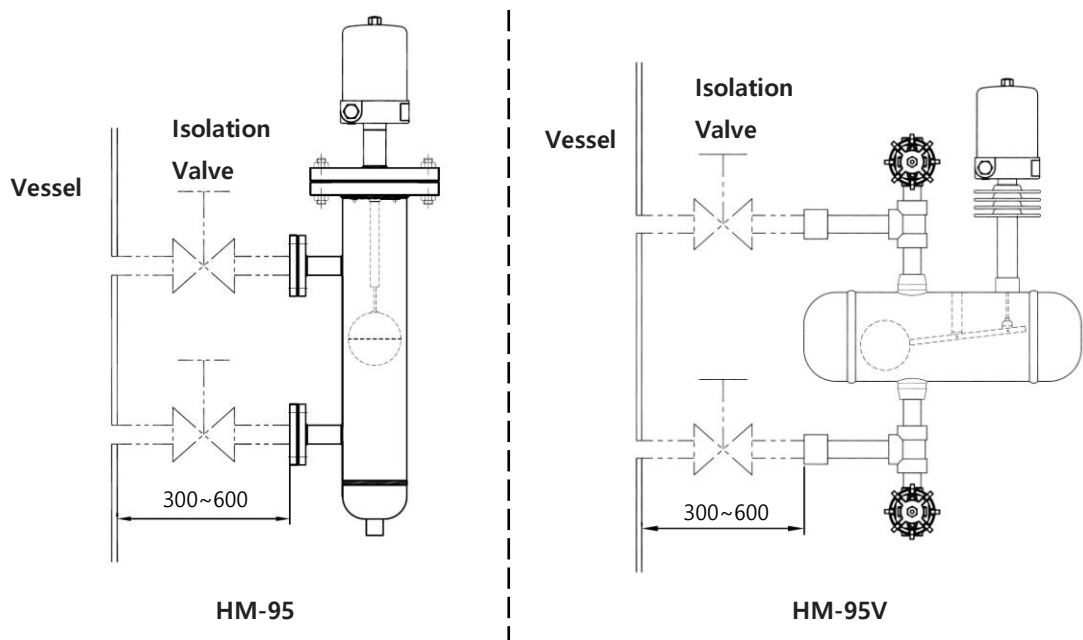


■ DPDT Wiring

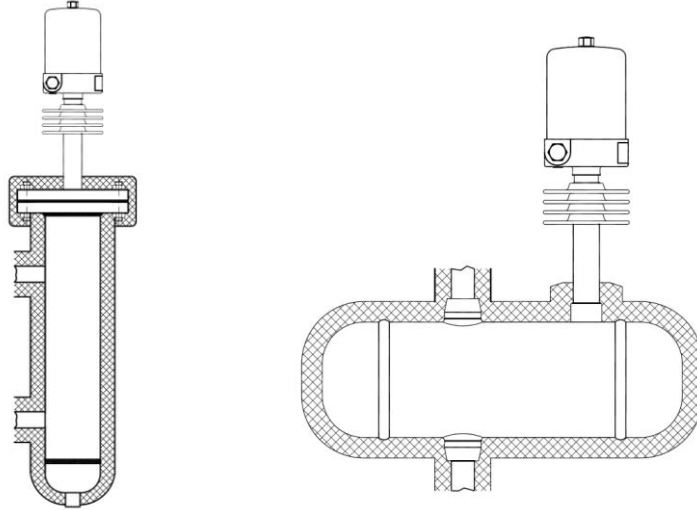


Installation

- Default connection is Top type, but it is customizable to Side to Side or Side to Bottom.
- 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.



- If the temperature of object to be measured exceeds 350°C, an ex-proof product (HM-95-Ex and HM-95V-Ex) is not applicable.
- If the temperature of object to be measured exceeds 120°C, use a high-temperature product (HM-95H(-Ex), HM-95VH(-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 pressure, 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 4mm² (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.

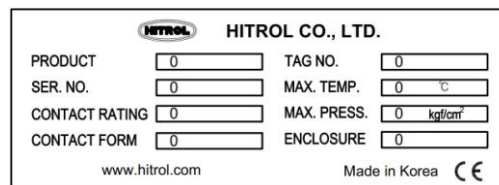
■ Disposal of Product

- 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.

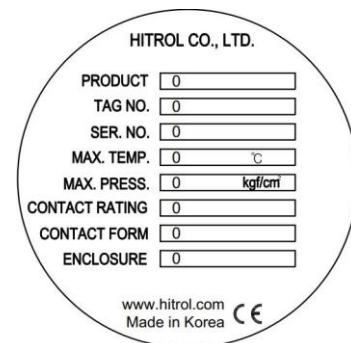
Marking

■ 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 products.



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



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



**Ex-Proof Version
(Certification 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

ADDRESS: HITROL CO., LTD 141, Palhakgol-gil, Jori-eup, Paju-si, Gyeonggi-do, Korea

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