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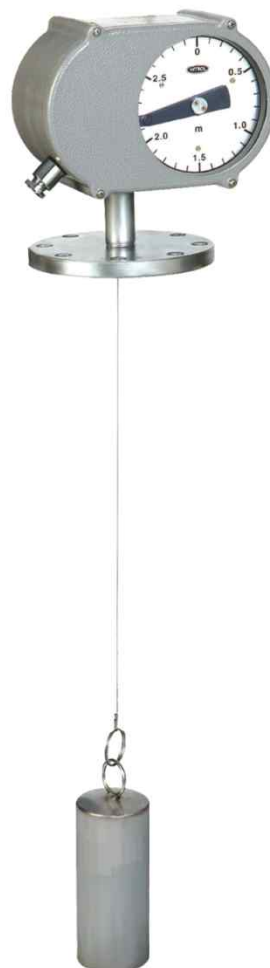


INSTRUCTION MANUAL

FLOAT TYPE LEVEL TRANSMITTER

HT-100F Series

HT-100FI Series



Doc. No.: HT100F_IM_Eng_Rev.3.1

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



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



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

**Overview and
and Features**

The HT-100F Series is a float-type level transmitter for continuously measuring the liquid level in a container with buoyancy. It is mainly used to measure liquid for purification, industrial water, sewage treatment plants, wastewater, and fuel tanks.

- Wire type for easy installation
- Local indication (indicator)
- Easy maintenance

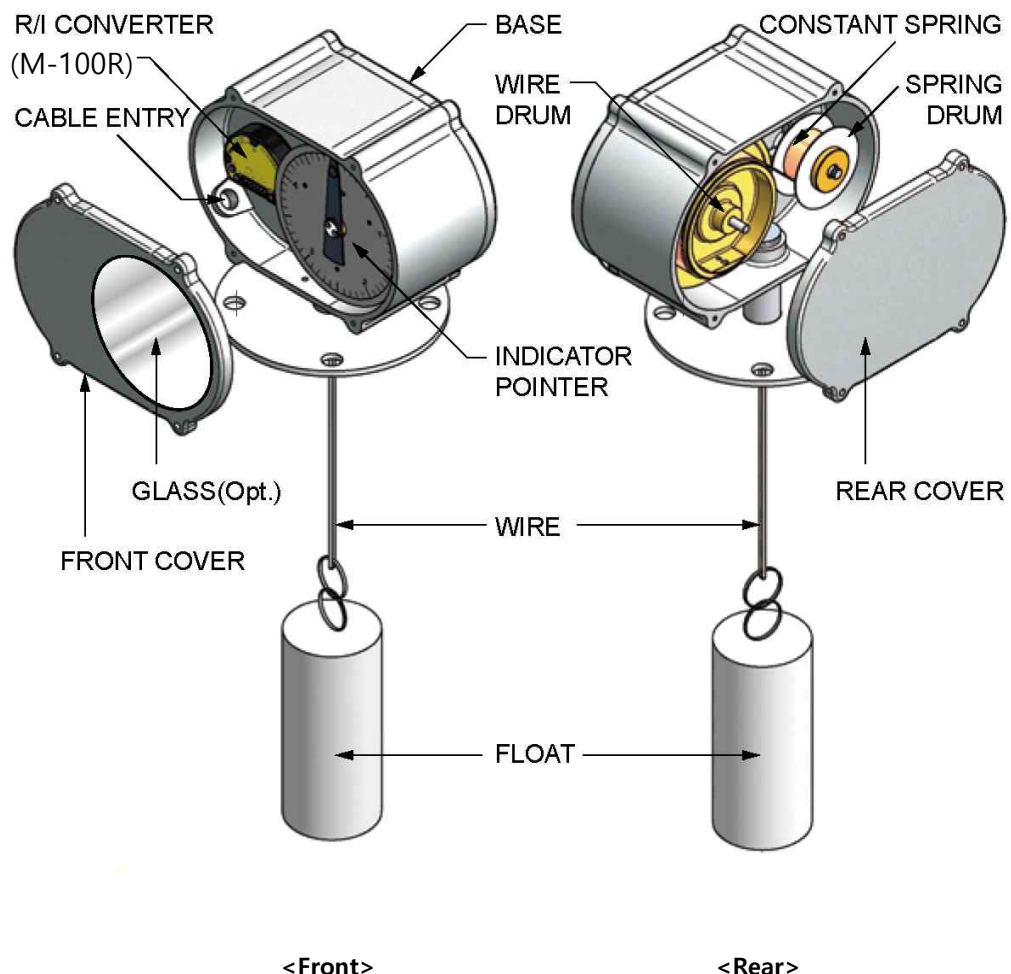
**Mechanism and
Components**

When the float, which is fabricated according to the specific gravity of the target to be measured, moves up and down along the liquid surface with buoyancy, the wire connected to the float is wound around the wire drum by the constant spring.

The rotation of the wire drum is transferred to the gear and, thus, triggers the indicator pointer.

The magnet in the indicator pointer triggers the reed switch to change the resistance value.

The changed resistance value is detected by the R/I converter(M-100R) in the housing and corresponding current value (DC 4-20mA) is continuously output. The HT-100FI has the local indicator pointer so that it can be checked on site.



Specifications

Model	HT-100F	HT-100FI
Mounting	Top, Flange	
Indicator	None	1-point dial
Ambient Temperature	-20°C ~ +60°C	
Process Temperature	Max. 80°C	
Process Pressure	ATM	
Range (m)	Max. 7.5m	
Power Source	DC 24V	None (Std.) / DC 24V (Opt.)
Output	DC 4~20mA (2-wire)	Display (Std.) / DC 4~20mA (2-wire) (Opt.)
Enclosure	Weather-proof (IP54)	
Wetted Parts Material	316L SS	
Process Connection	100A JIS 10K FF (Std.)	
Cable Entry	PF 1/2"(F)	
Accuracy	±2% of F.S.	

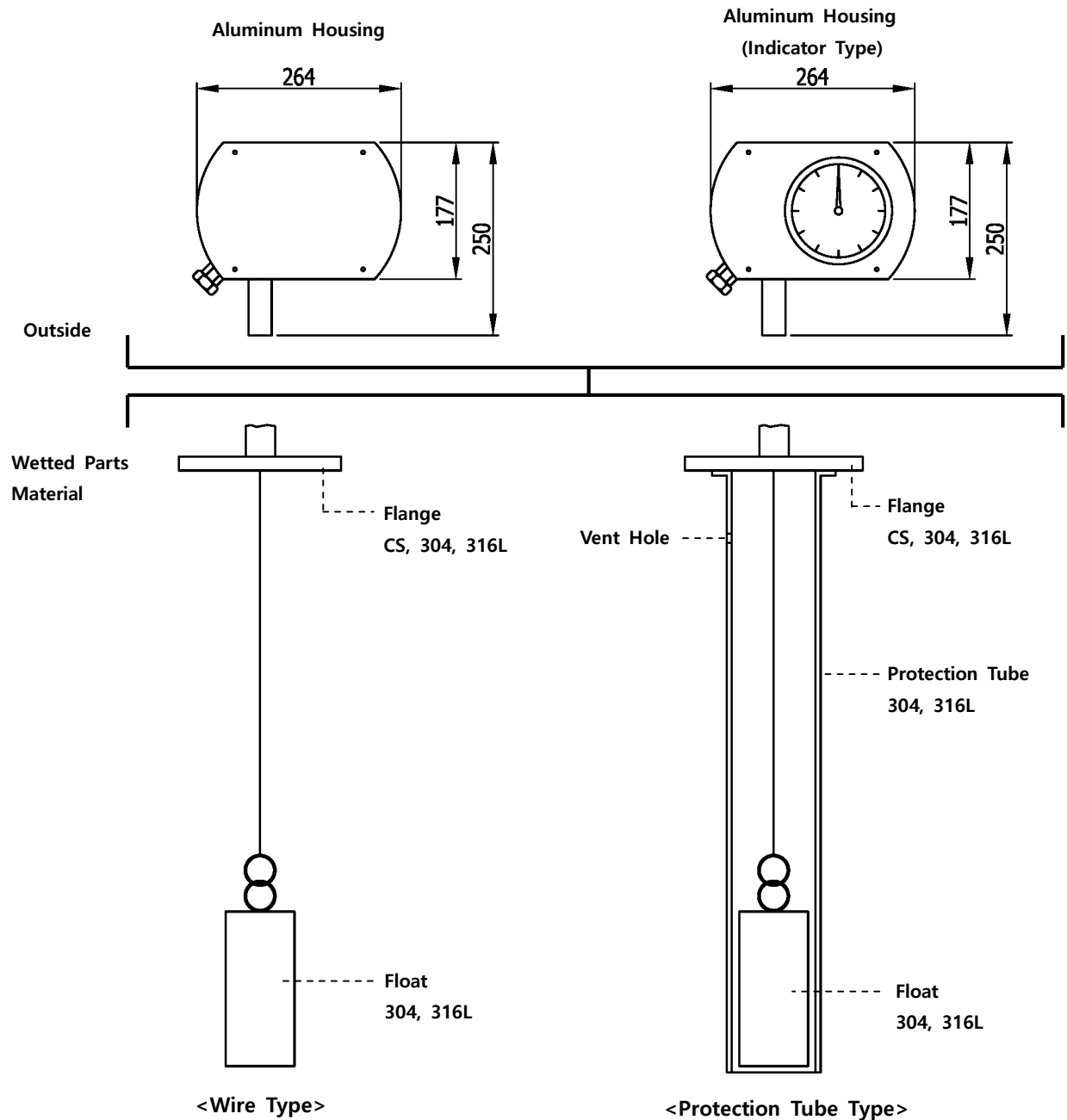
Specifications of the M-100R

Item	Specification	
Microprocessor	16Bit Microprocessor	
Current Loop Interface	2-Wire Loop Current	
Supply Voltage	+17V ~ +40V @ Typ.+24V	
Operating Voltage	+3.3V	
Output Current Accuracy	3.8mA ~ 20.5mA @ ±0.2% F.S	
Output Current Range	3.8mA ~ 20.5mA @ Alarm 3.6mA, 21mA [NAMUR NE43]	
Output Current Offset	<ul style="list-style-type: none"> ■ Zero: 3.9 ~ 4.1mA ■ Span: 19.9 ~ 20.1mA 	±0.1mA @ 0.01mA Step
Frame Ground	FG	
Damping Time	0.5 sec @ Fixed	
Self-Diagnosis	<ul style="list-style-type: none"> ■ Lower than Zero Level ■ Float deviation ■ Sensor Cable not wired 	3.6mA Output
	<ul style="list-style-type: none"> ■ Higher than Span Level 	21mA Output
Simulation Current Out	<ul style="list-style-type: none"> ■ 4mA @ 5 sec. ■ 12mA @ 5 sec. ■ 20mA @ 5 sec. 	
Status Indicator	Tri-Color LED (Green/Red/Orange)	
Zero / Span Set	Tact Switch	
Wire Connection	One-Touch Connector	AWG 16 ~ 26
Ambient Temperature	-40°C ~ +85°C	
Dimension	80mm x 65mm x 20mm	
Weight	54g	

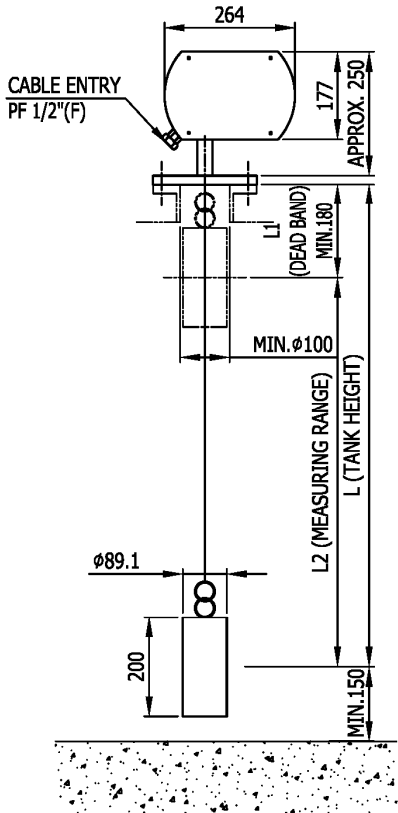
Float Application Table

Float Size		Spring Length MEAS. Range	S.G Range
Outer Diameter	Length		Min
89.1	200	5 m / ~3.5 m	0.7
		7.5 m / ~6 m	0.7
		10 m / ~7.5 m	0.8
76.3	250	5 m / ~3.5 m	0.7
		7.5 m / ~6 m	0.7
		10 m / ~7.5 m	0.8

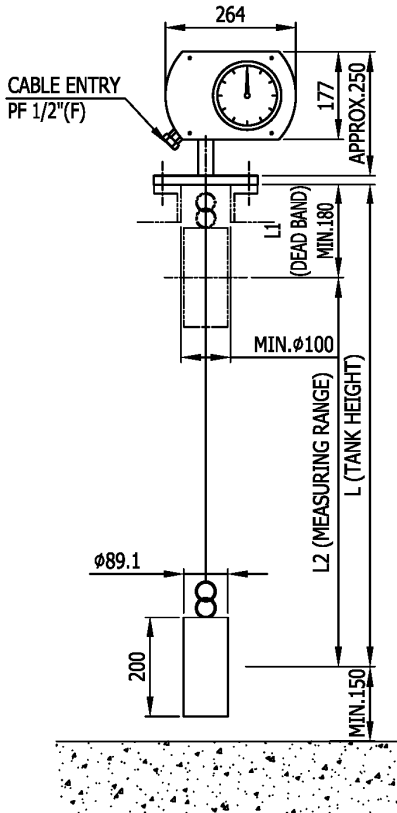
Components



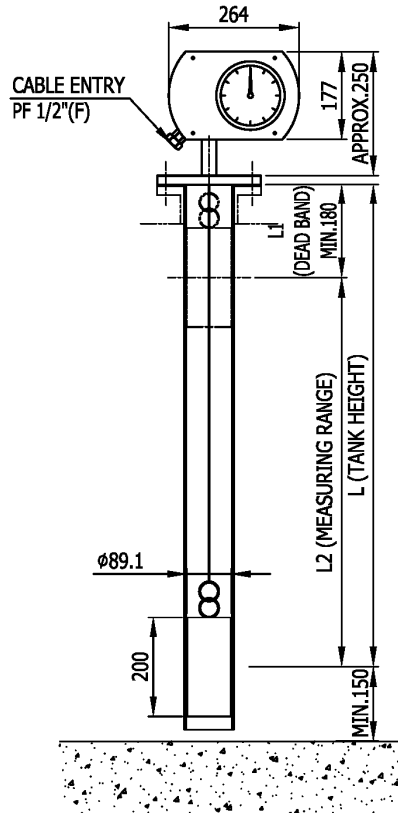
Dimensions



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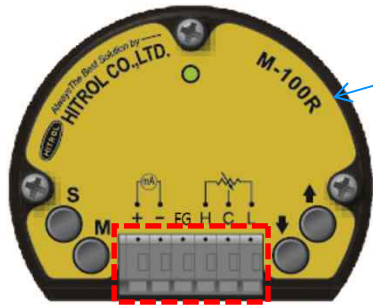


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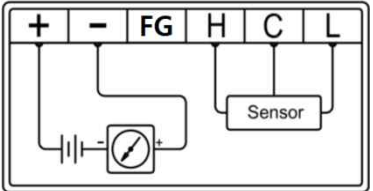
<HT-100FI Guide Type>

Wiring



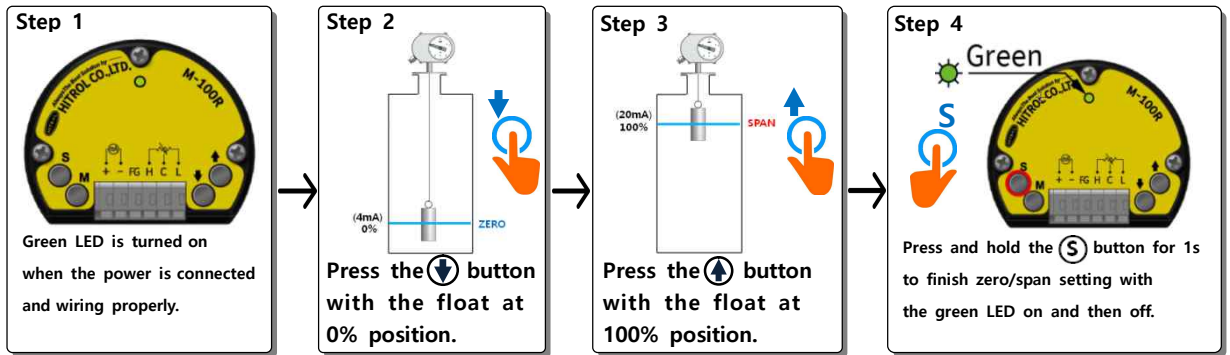
M-100R (R/I CONVERTER)

- + -: DC 24V(DC 4~20mA Loop)
 - FG: Frame Ground
 - H, C, L: Terminals between Sensor and M-100R
- * Cable Color: H – Red, C – White, L – Black



- Make sure to connect the power with correct polarity (+, -).
- The power supply must be between DC +17 and +40V.
- Do not connect the wire with the power connected.

Zero/Span Adjustment



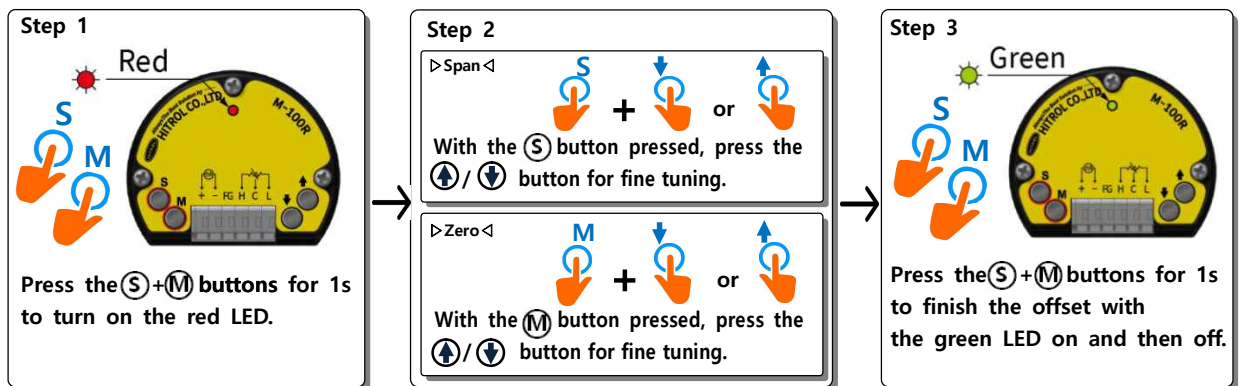
- ▷ Steps 2 and 3 can be interchanged.
- ▷ For the zero (0%) setting, proceed with Step 1 → Step 2 → Step 4.
- ▷ For the span (100%) setting, proceed with Step 1 → Step 3 → Step 4.



Caution: Incorrect setting may lead to an incorrect range setting with the orange LED on and then off.

■ Offset

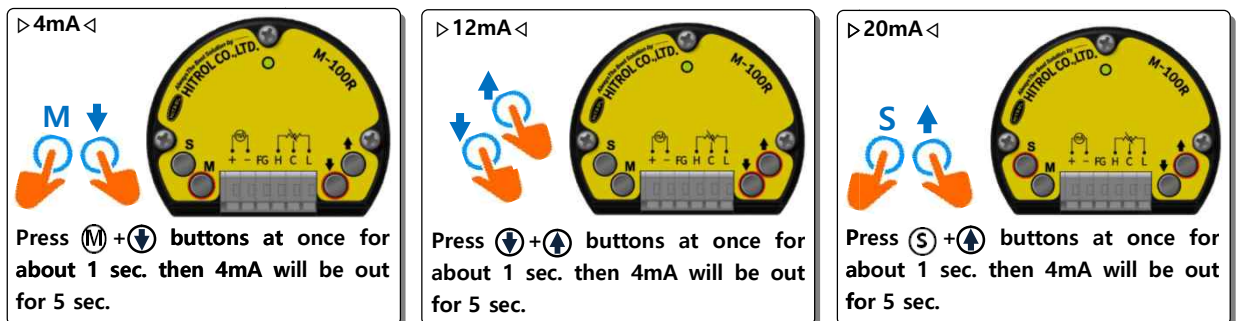
Adjust the error of measuring device or fine tuning of level.



- ▷ Offset adjustment is available regardless of float position.

■ Simulation Current Out

When the check of correct output (4~20mA) between M-100R and PLC required, test it as below.



- ▷ After 5 seconds, it will be returned to actual float sensing mode.
- ▷ It can be tested regardless of the wiring of the sensor.

Maintenance

The HT-100F Series level transmitter requires inspection for the sensor, drive, and transmission sections. The sensor section has REED S/W; the drive section has the wire drum, spring drum, and spur gear; and the transmission section has the M-100R.

The service life of parts depends on the operation conditions, and regular inspection is required to keep the optimum operation conditions. Thus, users are advised to conduct regular inspection and maintenance at least every year. Exterior damages will be visually checked. The M-100R can be checked using a digital multimeter.

<Checking of the Sensor>

Disconnect the sensor wire from the H, C, and L terminals of the M-100R, and measure the resistance value of the sensor.

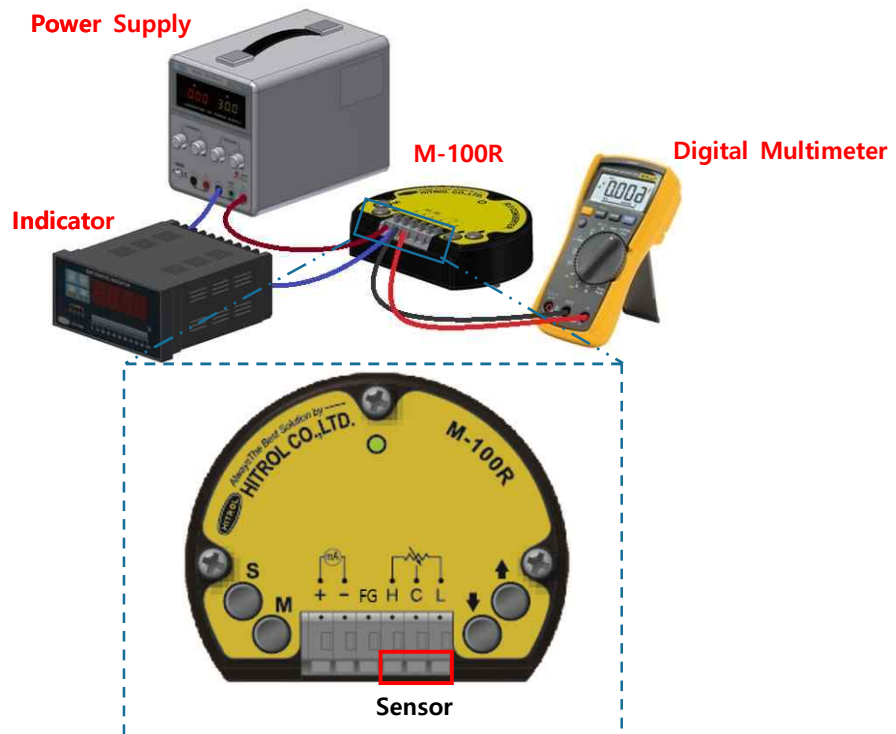
Low and Com	Resistance value of the current level
High and Com	Resistance value of the full level – Resistance value of the current level
High and Low	Resistance value of the full level

<Checking of the Drive>

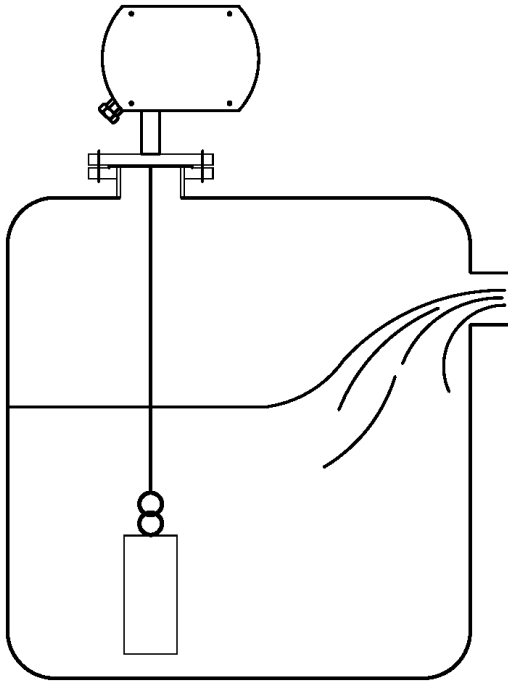
1. Remove the front cover to see the gear operation.
2. Remove the rear cover to check the wire and measuring tape for any damage.



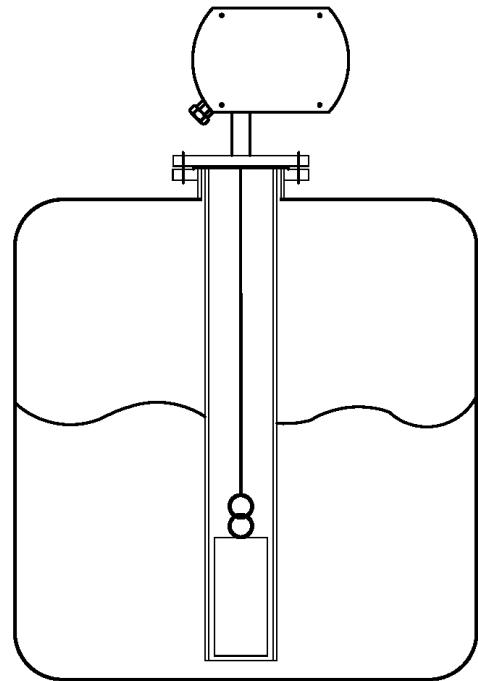
After checking the sensor parts, the wrong connection of H, C, and L is the cause of the product failure.



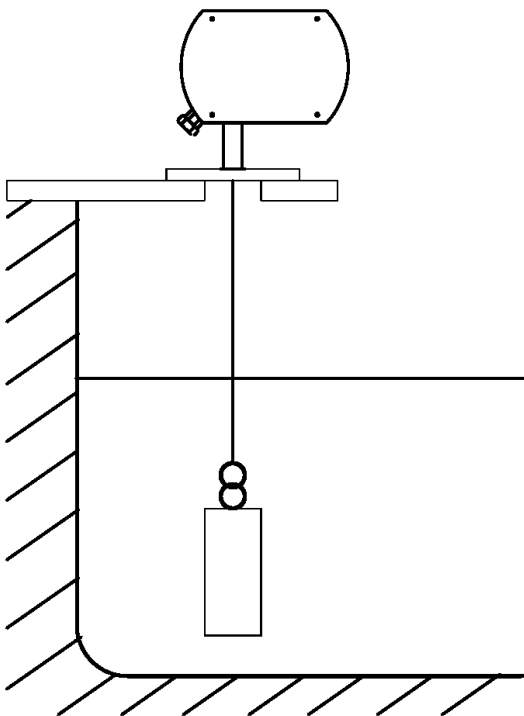
**Attachment and
Cautions**



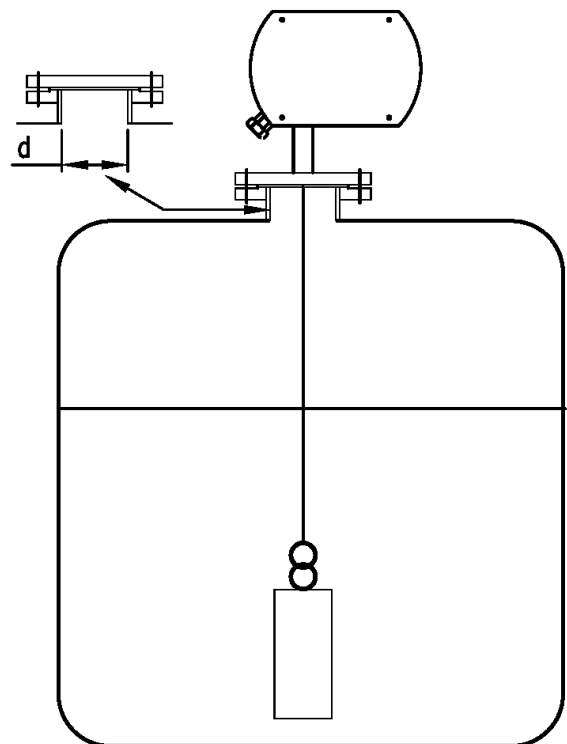
If it is installed on the inlet, install a guide, or make it distant from the inlet to prevent malfunction.



When there is flow or sloshing in the measured object or there is agitator around the sensor, the protective tube type must be used.



Install it on the concrete wall as shown above.



"d" diameter requires a larger diameter than float and straight piping.

- Removal**
- Check the level and presence of liquid in the tank before removing it.
- Cautions**
- Disconnect the power first.

- Cautions for Installation**
- Connect flanges with same dimensions.
 - Make sure to insert washers between bolts and nuts to prevent loosening.
 - Make sure to insert gaskets between flanges.
 - Make sure to install the product and to cover it before supplying power.
 - Do not use it for any corrosive gas.



Make sure it is not subject to any impact when moving it.


- Cautions for the Inserted External Wire**
- Use the cable gland connection or metal pipe wiring for the inlet of wires.

- Safety and Environment**
- Cautions
 - Make sure to connect the product and container using the required tools.
 - Do not apply large impact to the product.
 - Disposal
 - To dispose a waste product, separate the AMP and body first. It does not contain any part that is harmful to the environment (e.g., mercury switch).

Marking

- Product Identification

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

		HITROL CO., LTD.	
PRODUCT	<input type="text" value="0"/>	SER. NO.	<input type="text" value="0"/>
TAG. NO.	<input type="text" value="0"/>		
MAX. TEMP.	<input type="text" value="0"/> °C	MAX. PRESS.	<input type="text" value="0"/> kgf/cm ²
POWER	<input type="text" value="0"/>	OUTPUT SIGNAL	<input type="text" value="0"/>
RANGE / LENGTH	<input type="text" value="0"/>		
CABLE ENTRY	<input type="text" value="0"/>		
AMBIENT TEMP.	<input type="text" value="0"/> °C		
ENCLOSURE	<input type="text" value="0"/>		
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Failure Mode & Actions

When the output current is below 4mA,

Cause	Check Point
Incorrect zero measurement range setting	Reset
Offset applied	Offset default
Loss of buoyancy or damage to the float	Replace the float
Damaged diode of the M-100R	Replace the M-100R

When the output current is above 20mA,

Cause	Check Point
Incorrect span measurement range setting	Reset
Offset applied	Offset default
Open low cable of sensor	Reconnect the sensor

Output Current Holding Phenomenon

Damaged diode of the M-100R	Replace the M-100R
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Cause	Check Point
When the resistor of the sensor is seriously damaged, resulting in a short circuit with the pointer positioned on it	Replace the sensor PCB. (If the float is out of the position, the output will sharply rise or drop, leading to measurement error.)
When the resistor of the sensor is seriously damaged, resulting in an open circuit with the pointer positioned on it	Replace the sensor PCB. (If the float is out of the position, the output will sharply rise or drop, leading to measurement error.)
When the wire is not wound	Check if any foreign subsidence is in the wire drum or if the spring is damaged.

Output Hunting Phenomenon

Cause	Check Point
Temporary over-measurement (approximately 10%) and noise output shape due to over-current caused when a diode of the M-100R is damaged	Replace the M-100R

■ 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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Warranty and Contact