

## Magnetostrictive Level Transmitter

# PRODUCT INTRODUCTION

EG series Magnetostrictive Level Transmitter is built based on the principle of magnetic field interaction of two different directions, which sends out a signal to determine the exact level of the medium. Therefore, even if there is a power failure and reconnection is needed, it will not affect the previous setting parameters. So there is no reconfiguration involved.

As Magnetostrictive Level Transmitter gives direct signal output, additional output interface is not needed. Application is very accurate and reliable, it will reduce the malfunction of the product. Moreover, due to the durability of the sensing element, minimal maintenance is needed, thus replacement parts inventory is not needed.

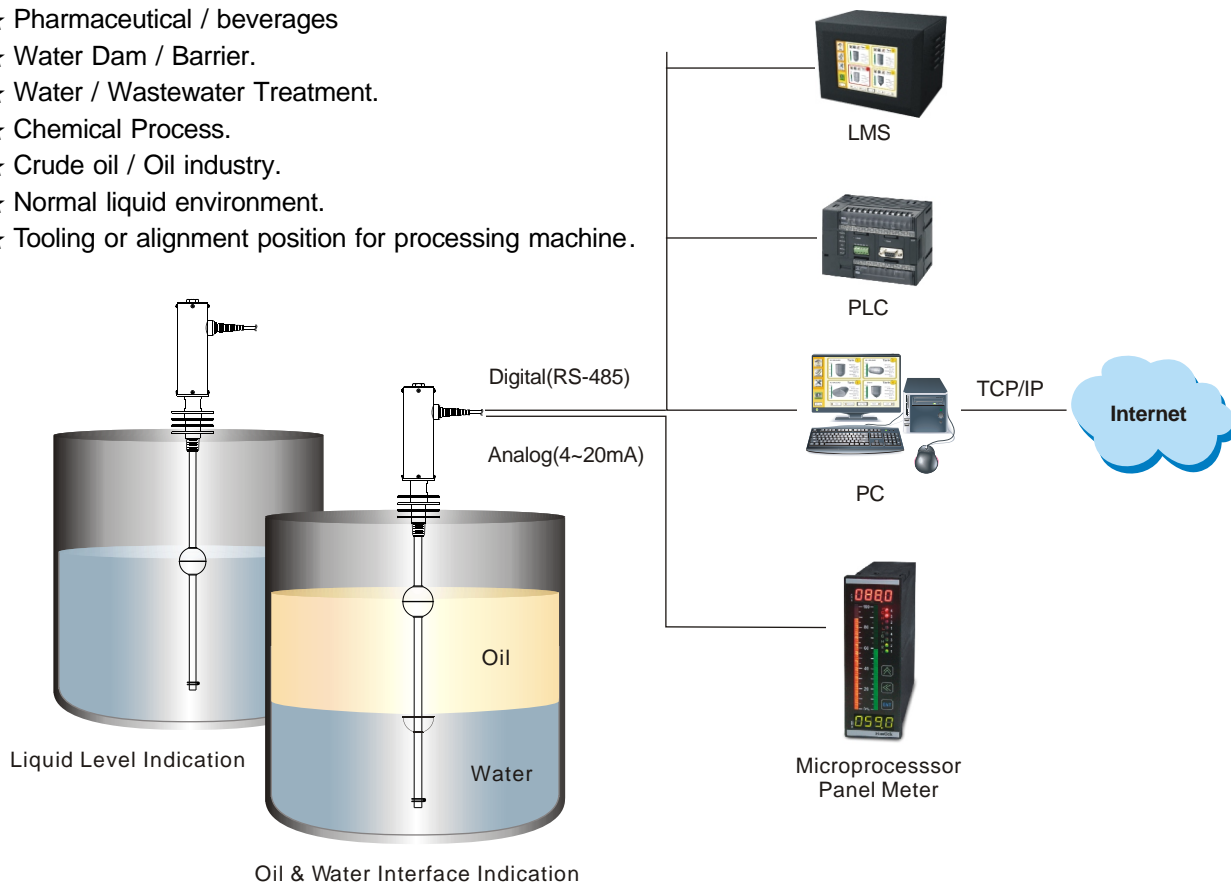
For PC networking, it enables long distance monitoring of one EG transmitter or multiple EG transmitters through RS485 ModBus communication.

## FEATURES

- ★ Absolute position output, no calibration required after power failure
- ★ Prompt response time
- ★ Very stable & reliable
- ★ Multi output selection
- ★ Easy installation & no regular maintenance required
- ★ High resolution & high accuracy
- ★ Durable structure, dust-proof, withstand high pressure
- ★ Oil / water dual level indication
- ★ IP65 protection rating, IP67 for EG3 series
- ★ Up to 200°C (max.) operation temperature for high temp requirement
- ★ EG3 is Loop power system, wiring cost saved and easy installation
- ★ EG37 Ex-proof type for using in hazardous areas

## APPLICATION

- ★ Liquefied Natural Gas medium.
- ★ Pharmaceutical / beverages
- ★ Water Dam / Barrier.
- ★ Water / Wastewater Treatment.
- ★ Chemical Process.
- ★ Crude oil / Oil industry.
- ★ Normal liquid environment.
- ★ Tooling or alignment position for processing machine.



# OPERATING PRINCIPLE

Magnetostrictive Level Transmitter measures the accurate medium (D) by calculating the time travel of signal formed by two different magnetic field. One magnetic field comes from the float ball, and the other comes from the current pulse given by the waveguide tube.

When the pulse signal is reversed back to the waveguide coil, the transmitter will calculate the float ball (liquid level) based on the time interval and travel speed the pulse signal between the two magnet field.

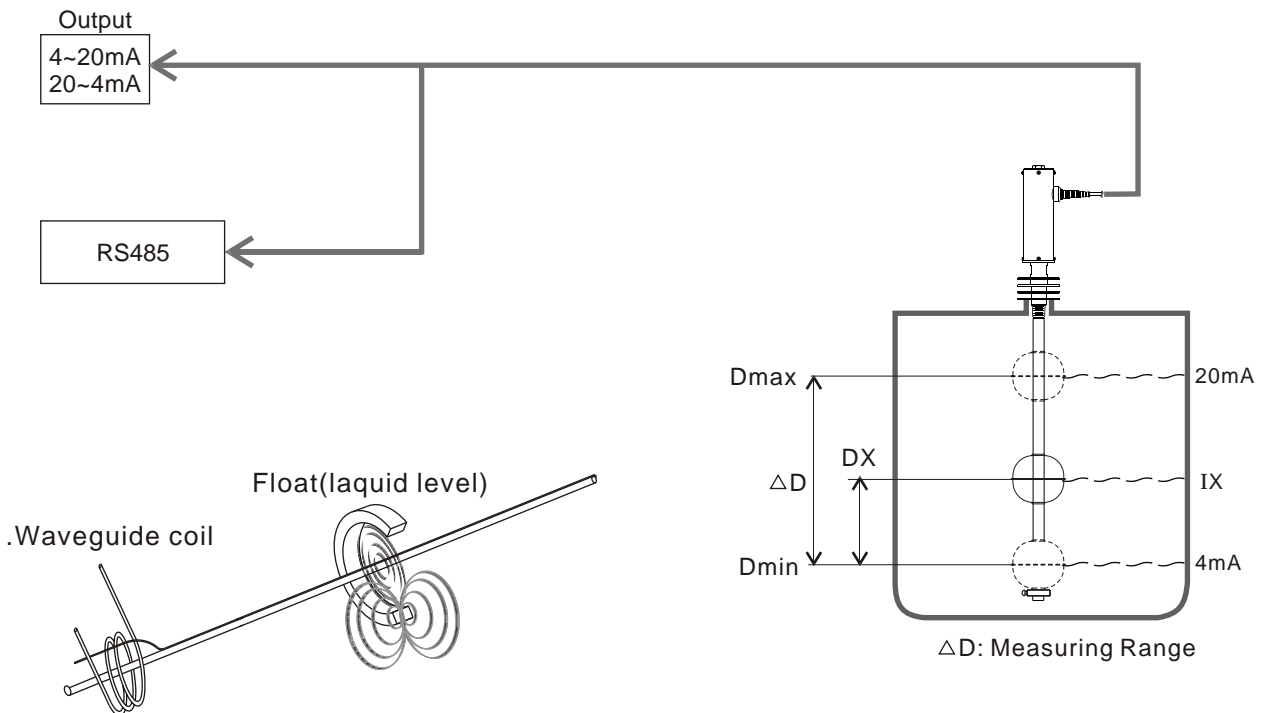
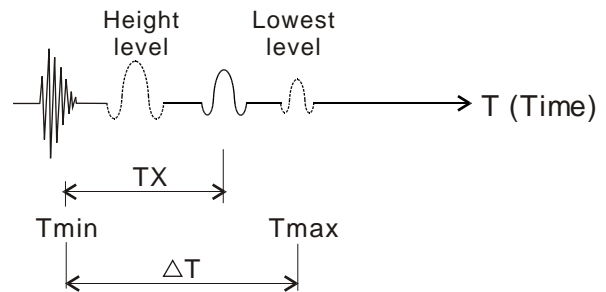
This action is continuous and timely. The change of float position will be detected promptly with absolute signal output.

## CONVERSION FORMULA

The relation of D & 4~20mA output

$$\frac{IX-4}{(20-4)\text{mA}} = \frac{DT-TX}{\Delta T} = \frac{DX}{\Delta D}$$

$$\Rightarrow IX = \frac{16DX}{\Delta D} + 4\text{mA} \text{ (The relative current)}$$

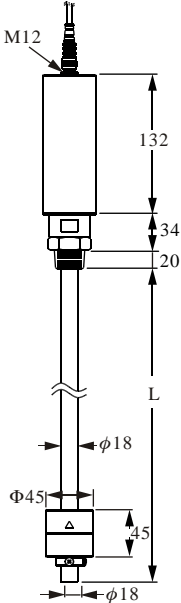
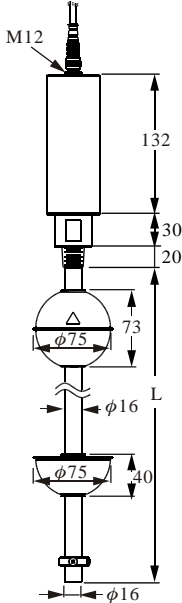


# SPECIFICATIONS STANDARD (2 Wire)

|                                 |  |  |
|---------------------------------|--|--|
| <b>Dimensions</b><br>(Unit: mm) |  |  |
| <b>Model No.</b>                | <b>EG311 (Standard Type)</b>                   | <b>EG31B(High Temp Type)</b>                   |
| <b>Measuring Range</b>          | 50~5500mm                                      | 50~5500mm                                      |
| <b>Non-Linearity</b>            | ± 0.05% F.S. or ± 1.0mm (whichever is greater) | ± 0.05% F.S. or ± 1.0mm (whichever is greater) |
| <b>Repeatability</b>            | ± 0.01% F.S. or ± 0.5mm (whichever is greater) | ± 0.01% F.S. or ± 0.5mm (whichever is greater) |
| <b>Temp. Coefficient</b>        | ± 100 ppm/°C                                   | ± 150 ppm/°C                                   |
| <b>Operation Pressure</b>       | 30 BAR(Max.)                                   | 30 BAR(Max.)                                   |
| <b>Ambient Temp.</b>            | -10°C ~ 55°C                                   | -10°C ~ 55°C                                   |
| <b>Operation Temp.</b>          | -30°C ~ 125°C                                  | -30°C ~ 200°C                                  |
| <b>Temp. Accuracy</b>           | ± 1.5°C  | ± 1.5°C  |
| <b>Output</b>                   | 4~20mA/ 2 Wire                                 | 4~20mA/ 2 Wire                                 |
| <b>Max Load</b>                 | 300W   | 300W   |
| <b>Digital Output</b>           | RS485  | RS485  |
| <b>Power Supply</b>             | Loop power 24Vdc ± 10%                         | Loop power 24Vdc ± 10%                         |
| <b>Housing Material</b>         | SUS304 (SUS316 option)                         | SUS304 (SUS316 option)                         |
| <b>Connection</b>               | 1/2"PT   | 1/2"PT   |
| <b>Wetted Material</b>          | SUS304   | SUS304   |
| <b>Enclosure</b>                | IP67 (IEC 60529 )                              | IP67 (IEC 60529 )                              |

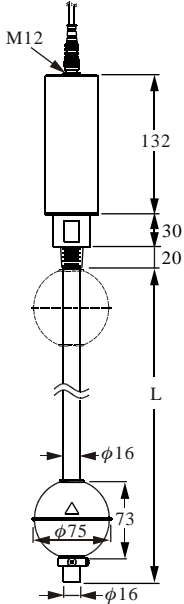
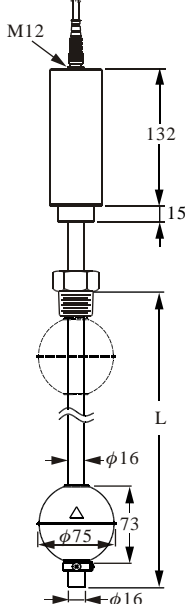
# EXPLOSION PROOF TYPE (2 Wire)

NEPSI PROOF No.GYB101836X Ex ia IIB T2~T6

|                                 |   |   |
|---------------------------------|---|---|
| <b>Dimensions</b><br>(Unit: mm) |  |  |
| <b>Model No.</b>                | <b>EG374 (Anti-Corrosion Type)</b>  | <b>EG371 (Double Float Type)</b>  |
| <b>Measuring Range</b>          | 50~5500mm   | 50~5500mm   |
| <b>Non-Linearity</b>            | ± 0.05% F.S. or ± 1.0mm (whichever is greater)                                    | ± 0.05% F.S. or ± 1.0mm (whichever is greater)                                      |
| <b>Repeatability</b>            | ± 0.01% F.S. or ± 0.5mm (whichever is greater)                                    | ± 0.01% F.S. or ± 0.5mm (whichever is greater)                                      |
| <b>Temp. Coefficient</b>        | ± 100 ppm/°C  | ± 150 ppm/°C  |
| <b>Operation Pressure</b>       | 5 BAR(Max.)   | 30 BAR(Max.)  |
| <b>Ambient Temp.</b>            | -10°C ~ 55°C  | -10°C ~ 55°C  |
| <b>Operation Temp.</b>          | -30°C ~ 80°C  | -30°C ~ 125°C   |
| <b>Temp. Accuracy</b>           | ± 1.5°C   | ± 1.5°C   |
| <b>Output</b>                   | 4~20mA/ 2 Wire  | 4~20mA/ 2 Wire  |
| <b>Max Load</b>                 | 300W  | 300W  |
| <b>Digital Output</b>           | RS485   | RS485   |
| <b>Power Supply</b>             | Loop power 24Vdc ± 10%  | Loop power 24Vdc ± 10%  |
| <b>Housing Material</b>         | SUS304 (SUS316 option)  | SUS304 (SUS316 option)  |
| <b>Connection</b>               | 3/4"PT  | 1/2"PT  |
| <b>Wetted Material</b>          | PP  | SUS304  |
| <b>Enclosure</b>                | IP67 (IEC 60529 )   | IP67 (IEC 60529 )   |

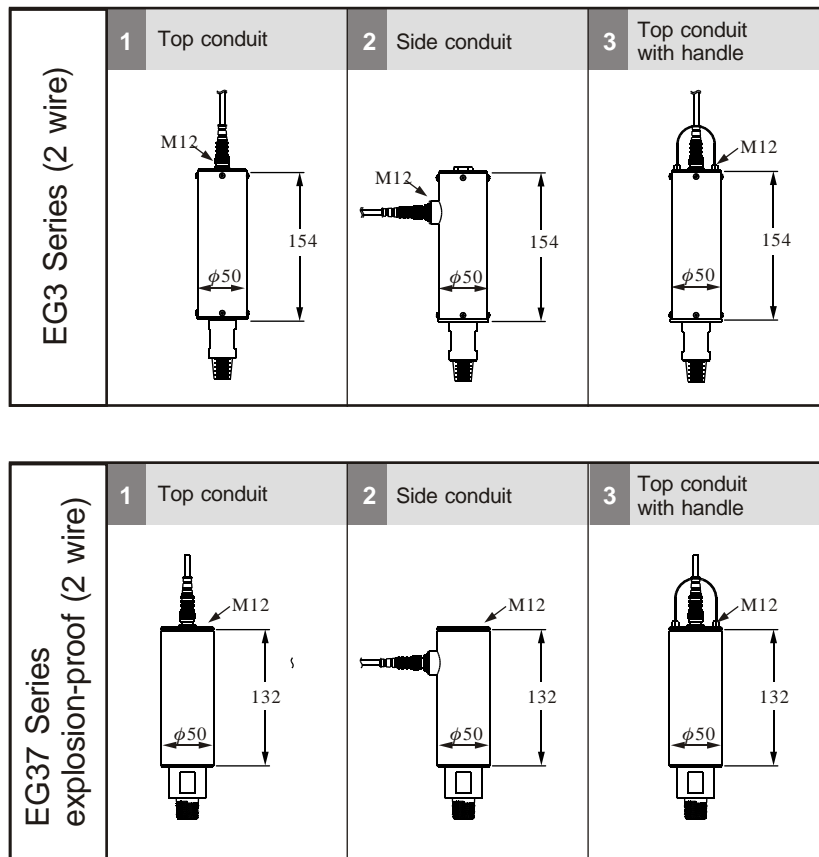
# EXPLOSION PROOF TYPE (2 Wire)

NEPSI PROOF No.GYB101836X Ex ia IIB T2~T6

|   |   |   |
|---|---|---|
| <p><b>Dimensions</b><br/>(Unit: mm)</p> |  |  |
| <b>Model No.</b>                        | <b>EG371 (Ex-proof Type)</b>  | <b>EG37A (Ex-proof High Temp. Type)</b>   |
| <b>Measuring Range</b>                  | 50~5500mm   | 50~5500mm   |
| <b>Non-Linearity</b>                    | ± 0.05% F.S. or ± 1.0mm (whichever is greater)                                    | ± 0.05% F.S. or ± 1.0mm (whichever is greater)                                      |
| <b>Repeatability</b>                    | ± 0.01% F.S. or ± 0.5mm (whichever is greater)                                    | ± 0.01% F.S. or ± 0.5mm (whichever is greater)                                      |
| <b>Temp. Coefficient</b>                | ± 100 ppm/°C  | ± 150 ppm/°C  |
| <b>Operation Pressure</b>               | 30 BAR(Max.)  | 30 BAR(Max.)  |
| <b>Ambient Temp.</b>                    | -10°C ~ 55°C  | -10°C ~ 55°C  |
| <b>Operation Temp.</b>                  | -30°C ~ 125°C   | -30°C ~ 200°C   |
| <b>Temp. Accuracy</b>                   | ± 1.5°C   | ± 1.5°C   |
| <b>Output</b>                           | 4~20mA/ 2 Wire  | 4~20mA/ 2 Wire  |
| <b>Max Load</b>                         | 300W  | 300W  |
| <b>Digital Output</b>                   | RS485   | RS485   |
| <b>Power Supply</b>                     | Loop power 24Vdc ± 10%  | Loop power 24Vdc ± 10%  |
| <b>Housing Material</b>                 | SUS304 (SUS316 option)  | SUS304 (SUS316 option)  |
| <b>Connection</b>                       | 1/2"PT  | 1/2"PT  |
| <b>Wetted Material</b>                  | SUS304  | SUS304  |
| <b>Enclosure</b>                        | IP67 (IEC 60529 )   | IP67 (IEC 60529 )   |

※ Comply with safety barrier of Ex ia rating is essential for using in hazardous areas.

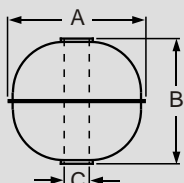
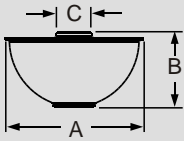
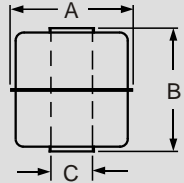
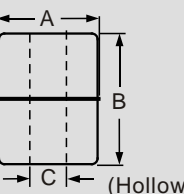
# HOUSING OPTION



※ Standard cable length 2M will be equipped.(Explosion proof type will not be equipped with cable)

# FLOAT SPECIFICATION



| Model   | Type | Dimensions<br>( $\phi A \times B \times \phi C$ mm) | S.G.   | Max. Pressure<br>(kg/cm <sup>2</sup> ) | Material      | Tube Size                |
|---|------|---|--------|--|---------------|--------------------------|
|    | S5   | 75x73x20.5  | E>0.6  | 30                                     | SUS 304 / 316 | $\phi 16$                |
|   | S4   | 52x52x15  | E>0.75 | 30                                     | SUS 316       | $\phi 12.7$              |
|   | SD   | 52x52x15  | E>0.9  | 30                                     | SUS 316       | $\phi 12.7$              |
|    | S0   | 75x40x20.5  | E>0.9  | 20                                     | SUS 304 / 316 | $\phi 16$                |
|   | S3   | 45x55x15  | E>0.7  | 12                                     | SUS 316       | $\phi 12.7$              |
|   | SC   | 45x55x15  | E>0.9  | 12                                     | SUS 316       | $\phi 12.7$              |
|  | F3   | 45x45x20  | E>0.55 | 5                                      | PP in Grey    | $\phi 18$<br>(coating)   |
|   | FC   | 45x45x20  | E>0.9  | 5                                      | PP in Grey    | $\phi 18$<br>(coating)   |
|   | P3   | 48x45x18.5  | E>0.6  | 5                                      | PP in Black   | $\phi 17.2$<br>(coating) |
|   | PC   | 48x45x18.5  | E>0.9  | 5                                      | PP in Black   | $\phi 17.2$<br>(coating) |

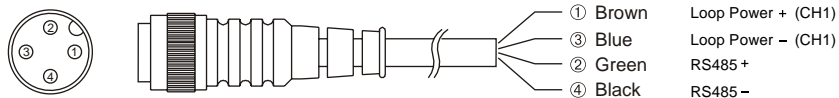


# WIRING INSTRUCTION

## WIRING INSTRUCTION (EG3)

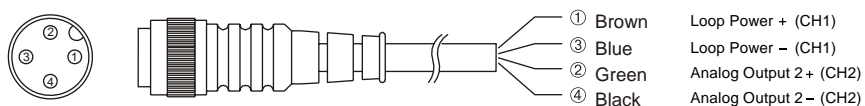
1. Single / Double float +RS485

Loop Power 24Vdc± 10%



2. Double float + Dual current output

Loop Power 24Vdc± 10%



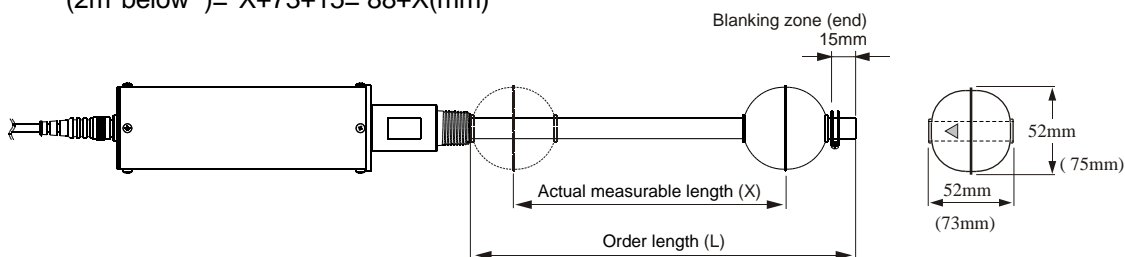
### MEASURING RANGE & STEM LENGTH TO BE ORDERED:

Please refer below diagram for actual length of stem and the measurable length of the stem:

**EG3:** Order length (L)= Actual measurable length (X)+Length of float+Blanking zone (end)

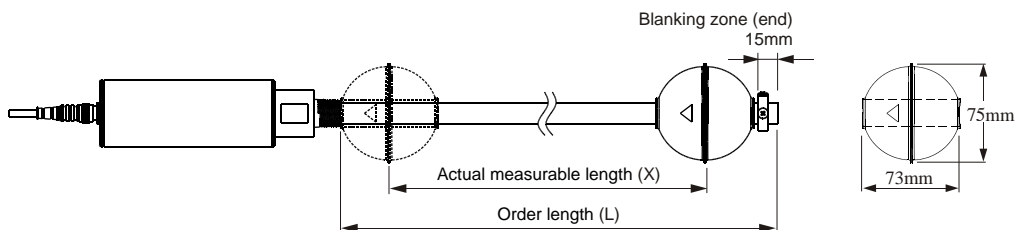
$$(2m \text{ above}) = X + 52 + 15 = 67 + X(\text{mm})$$

$$(2m \text{ below}) = X + 73 + 15 = 88 + X(\text{mm})$$



**EG37:** Order length (L)= Actual measurable length (X)+Length of float+Blanking zone (end)

$$= X + 73 + 15 = 88 + X(\text{mm})$$

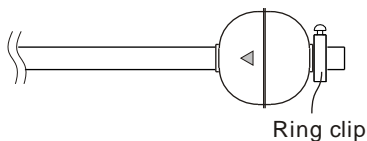


# INSTALLATION RECOMMENDATION

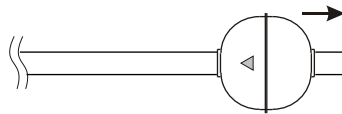
1. Loop Power 24Vdc  $\pm$  10% (EG3 series)
2. The product is calibrated before shipment. It is not recommended to change measuring range by users.
3. If the float is taken off, please re-install the float by the same direction (mark on the float has to be toward the product enclosure).
4. Please do not bend the stem to ensure measurement accuracy and performance.
5. Please do not change magnetic float to avoid effect on measurement accuracy.
6. User can install the product directly without having to take off the float, when connection hole at site is bigger than float diameter.
7. Please take off the float before installation, when connection hole at site is smaller than float diameter. Please install the float by specific direction (mark on the float has to be toward the product enclosure).
8. The stopper has to be fixed well on the stem score.
9. Please do not drop the magnetic float, to avoid magnet breakage inside the float.
10. Do not pressure the product with heavy weight, to bend the stem. If the stem is bent and can not work, please send back to us for calibration.
11. Package by bubble bag or foam is necessary to ensure safety during transportation.
12. Please do not open the product enclosure to assure measurement accuracy.

## INSTALLATION METHOD IF THE FLOAT HAS TO BE TAKEN OFF BEFORE INSTALLATION:

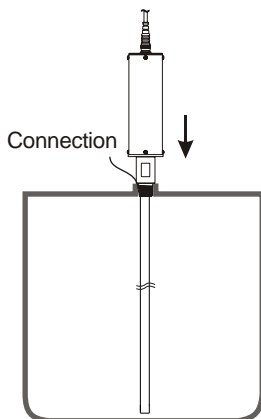
Step 1:  
Loose the stopper at stem end



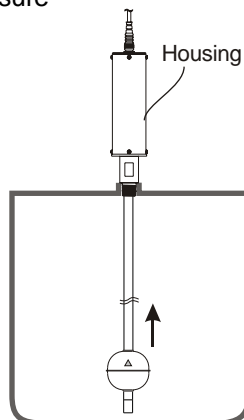
Step 2:  
Take off the float



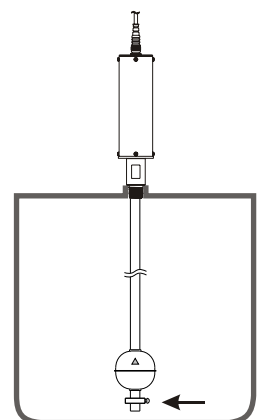
Step 3:  
Install the product itself into the tank, and screw the connection well



Step 4:  
Put back the float onto the stem by specific direction mark on the float has to be toward product enclosure



Step 5:  
Screw the stopper well on the stem score



# ORDER INFORMATION (2 Wire)

EG 3 **7** **1** **BQ**   -     -

**Model** \_\_\_\_\_

1: Standard      7: Intrinsically Safe

**Housing** \_\_\_\_\_

Standard (-20~125°C)      High Temp. (-20~200°C)  
 1: Top conduit      A: Top conduit  
 2: Side conduit      B: Side conduit  
 3: Top conduit of steel wire cable      C: Top conduit with handle

Anti-corrosion (-20~80°C)      (※options 4, 5, 6 only for EG37)  
 4: Top conduit with coated  
 5: Side conduit with coated  
 6: Top conduit of steel wire cable with coated

**Connection BQ:** 1/2"PT (std.) \_\_\_\_\_

|                 |              |                          |           |            |
|-----------------|--------------|--------------------------|-----------|------------|
| 3---1-1/4"(32A) | I---4"(100A) | M---5kg/cm <sup>2</sup>  | W---PN 10 | Q---PT     |
| B---1/2"(15A)   | J---5"(125A) | N---10kg/cm <sup>2</sup> | X---PN 16 | R---PF     |
| C---3/4"(20A)   | K---6"(150A) | O---150 Lbs              | Y---PN 25 | T---BSP    |
| D---1"(25A)     | S---Others   | P---300 Lbs              | Z---PN 40 | U---NPT    |
| E---1-1/2"(40A) |              |                          |           | V---GAS    |
| F---2"(50A)     |              |                          |           | S---Others |
| G---2-1/2"(65A) |              |                          |           |            |
| H---3"(80A)     |              |                          |           |            |

※ If installing directly(without removing float), the dimension of connection must be bigger than the float diameter.

**Float 1** \_\_\_\_\_ Please see chart below

**Float 2** \_\_\_\_\_ Please see chart below

| Code | Dimension     | Material   | S.G. |
|------|---------------|------------|------|
| S5   | φ75x73xID20.5 | SUS304/316 | 0.6  |
| S0   | φ75x40xID20.5 | SUS304/316 | 0.9  |
| S4   | φ52x52xID15   | SUS316     | 0.75 |
| SD   | φ52x52xID15   | SUS316     | 0.9  |
| S3   | φ45x55xID15   | SUS316     | 0.7  |
| SC   | φ45x55xID15   | SUS316     | 0.9  |

| Code | Dimension             | Material | S.G. |
|------|-----------------------|----------|------|
| F3   | φ45x45xID20           | PP/Grey  | 0.55 |
| FC   | φ45x45xID20           | PP/Grey  | 0.9  |
| P3   | φ48x45xID18.5         | PP/Black | 0.6  |
| PC   | φ48x45xID18.5         | PP/Black | 0.9  |
| SS   | Special Specification |          |      |
| 00   | No Float              |          |      |

※ Probe diameter must be smaller than inside diameter of the float.

**Analog Output 1 & Direction** \_\_\_\_\_

A: 4~20mA (Bottom~Top)      B: 4~20mA (Top~Bottom)

※ 4~20mA output direction can be selected.

**Analog Output 2 for Type** \_\_\_\_\_

A: 4~20mA      ※When A is chosen, extra +24V power supply is required, which is different from the loop power.

B: RS485

C: Rs485 + Thermal sensor      ※ Thermal sensor, be embedded in bottom of probe.

0: None

**Probe** \_\_\_\_\_

S: SUS304: φ12.7, If coated PP, φ17.2

L: SUS304: φ16, If coated PP, φ18.0

C: SUS316: φ12.7

D: SUS316: φ16

E: SUS316L: φ12.7

F: SUS316L: φ16

※ If measuring range over 2000mm, stem φ16 is recommended, to reduce risks during installation and transportation.

**Measuring Range** \_\_\_\_\_

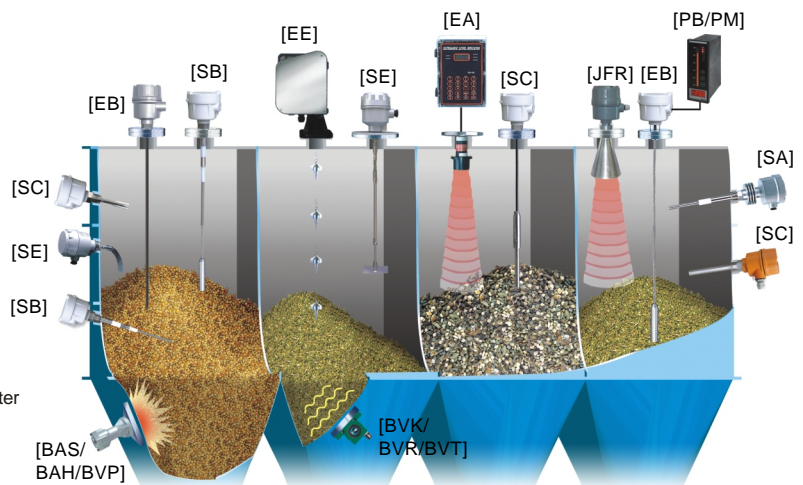
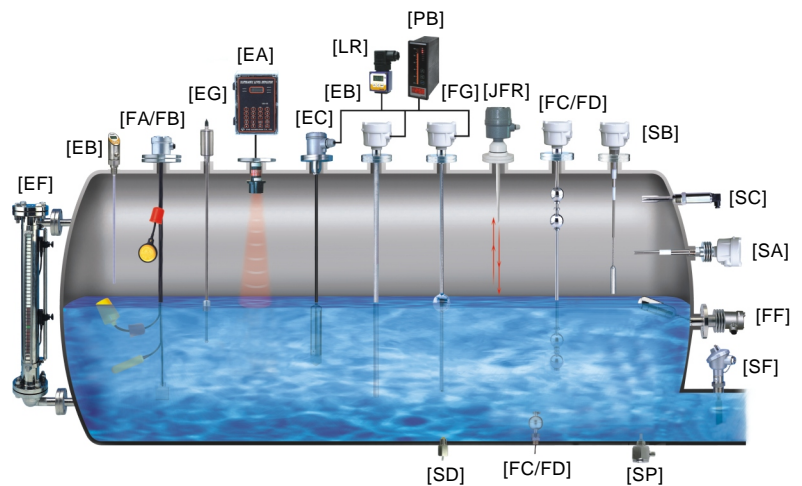
05: 50~500mm      10: 510~1000mm      15: 1010~1500mm      20: 1510~2000mm  
 25: 2010~2500mm      30: 2510~3000mm      35: 3010~3500mm      40: 3510~4000mm  
 45: 4010~4500mm      50: 4510~5000mm      55: 5010~5500mm

※ Probe length=Measuring range+(Single Float Height+15mm)

Ex: 500mm(Measurement)+(73mm(S5 Float Height)+15mm)=588mm(Probe length)

# EXAMPLES-OF-TANK-MOUNTING

- [FC/FD] Mini Float/Magnetic Float Level Switch
- [FG] Magnetic Float Level Transmitter
- [FF] Side Mounting Float Switch
- [FA/FB] Cable Float Level Switch
- [SP] Thermal Dispersion Flow Switch
- [SF] Paddle Flow Switch
- [SD] Optical Level Switch
- [SE] Rotary Paddle Level Switch
- [SA] Capacitance Level Switch
- [EC] Pressure Level Transmitter
- [LR] Loop Power Indicator
- [SC] Vibrating Probe Level Switch
- [SC] Tuning Fork Level Switch
- [EB] RF-Capacitance Level Transmitter
- [SB] RF-Capacitance / Admittance Level Switch
- [EG] Magnetostrictive Level Transmitter
- [EF] By-Pass Level Transmitter
- [MEF] Mini By-Pass Level Transmitter
- [EA] Ultrasonic Level Transmitter
- [JFR] FMCW Radar Level Transmitter
- [EE] Electromechanical Level Measuring System
- [ED] Speed Monitor
- [SRT/SRS] Conveyer Belt Misalignment Switch & Safety Cable Pull Switch
- [PB/PM] Microprocessor Based Bargraphic Display Scaling Meter
- [BRD/AE] Valve and Controller for Dust Collector System
- [BAS/BAH/BVP] Air Hammer
- [BVK/BVR/BVT] Pneumatic Vibrator



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