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Magnetostrictive Level Transmitter

FineTek

Innovation · Quality · Sharing

INTRODUCTION

The FineTek magnetostrictive level transmitter identifies the level of liquids and solutions with high precision and reliability.

This versatile sensor is ideal for continuous level measurement of a wide range of liquids. Application ranges from petrochemical industries, marine and shipping to food and beverage production.

The sensor has a loop power supply and provides direct analog or digital output to the user interface.

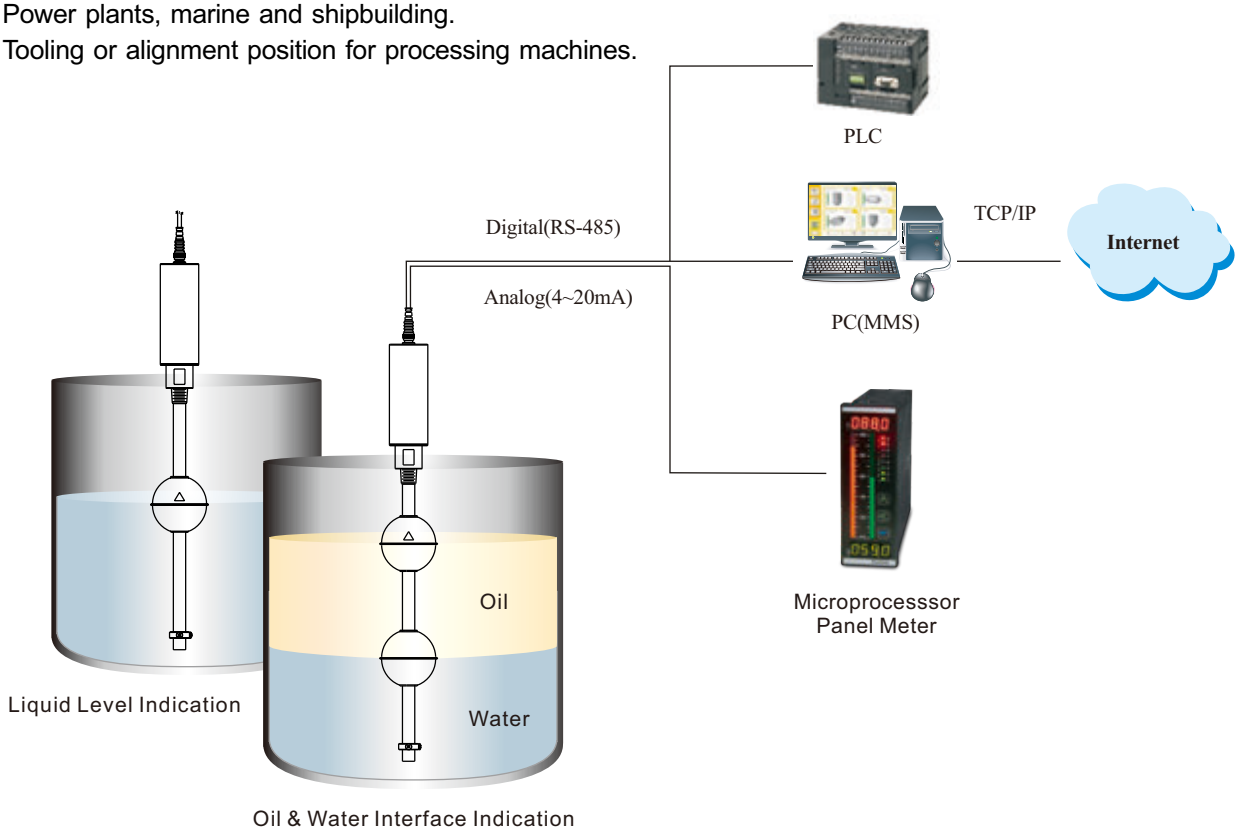
The FineTek magnetostrictive level sensor has proven itself due to its durability in a wide range of temperatures, pressures and operating conditions as well as its low maintenance nature.

FEATURES

- Absolute positioning output and no calibration requiredafter power failure.
- Stability and reliablity.
- Ease installation without calibration & maintenance.
- Prompt response time, high resolution & high accuracy.
- Durable structure, dust-proof, withstands high pressure.
- Oil/water dual level indication.
- The Max. operation temp. is 200°C.
- EG31, 32, 36, 37 adopted loop power structure for wire saving.
- Explosion-proof model available for hazardous environments.
- Housing of EG3 is IP67(Enclosure)/IP69K(Probe).
- Support HART / RS485 and 4~20mA / voltage output.

APPLICATION

- Liquefied natural gas.
- Crude oil, petroleum's and diesels.
- Chemical processing.
- Pharmaceutics and medication.
- Food and beverages, breweries.
- Dams, water barriers, wastewater treatment.
- Power plants, marine and shipbuilding.
- Tooling or alignment position for processing machines.



OPERATING PRINCIPLE

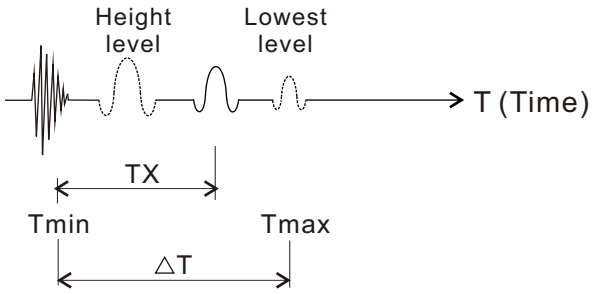
The sensor mainly consists of magnetorestrictive wires sealed in a stem/rod and a permanent magnet sealed into a float that can move up and down the stem.Electrical current travels along the wires in the stem creating an axial magnetic field. When the float's and stem's magnetic field intersect, a torsional force is created with different height levels (see right).
The sensor measures the liquid level (D) by calculating the elapsed time between torsional forces. Using velocity and time, distance can be calculated.This action is timely and continuous. A change in float position will be detected promptly via signal output.

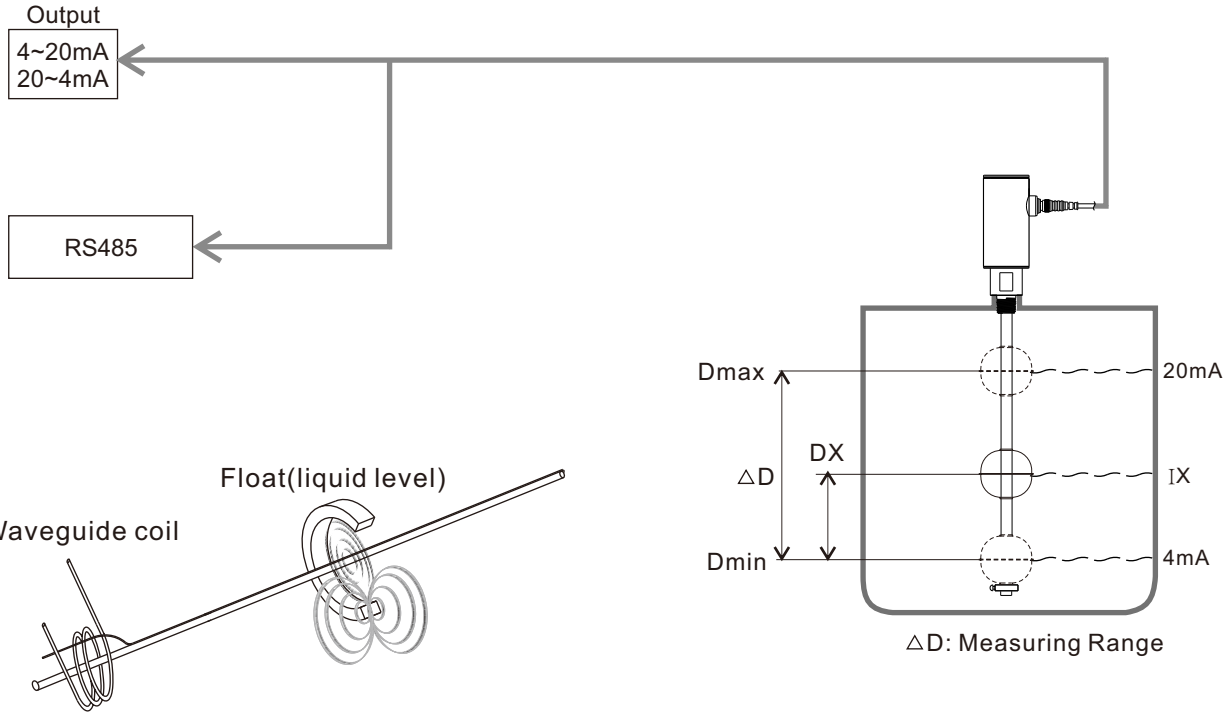
CONVERSION FORMULA

The relation of D & 4~20mA output

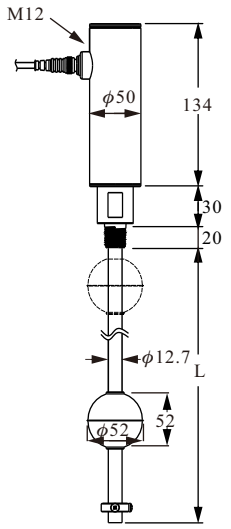
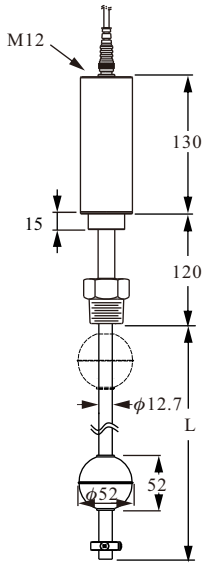
$$\frac{IX-4}{(20-4)mA} = \frac{DT-TX}{\triangle T} = \frac{DX}{\triangle D}$$

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

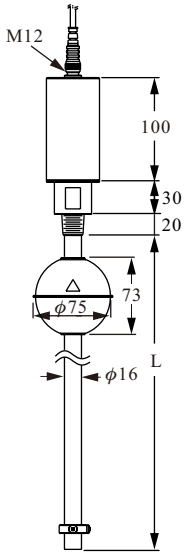
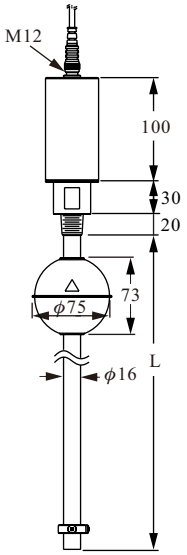




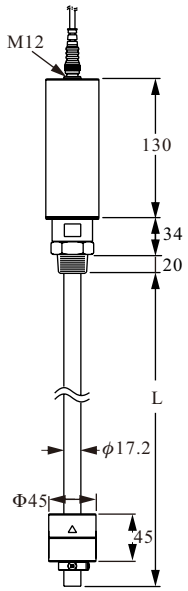
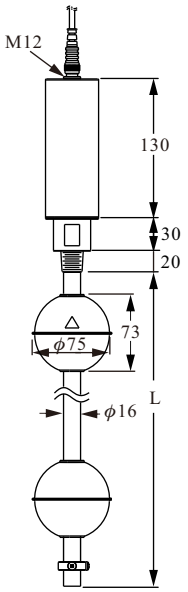
STANDARD MODEL (2 Wire)

Dimensions (Unit: mm)		
Model No.	**EG31 (Standard Model)**	**EG31 (High Temperature Model)**
Application	Two-wire loop power output, for Oil/Water interface, pharmaceutical and food grade level control.	Two-wire loop power output, high process environment application.
Measuring range	50~5500mm	50~5500mm
Non-Linearity	±0.05% F.S. or ±1.0mm (whichever is greater)	±0.05% F.S. or ±1.0mm (whichever is greater)
Repeatability	±0.004% F.S.	±0.004% F.S.
Temp. coefficient	±100 ppm/°C	±150 ppm/°C
Operation pressure	30 BAR(Max.)	30 BAR(Max.)
Ambient temp.	-40°C ~ 85°C	-40°C ~ 85°C
Operation temp.	-40°C ~ 125°C	-40°C ~ 200°C
Temp. accuracy	±1°C	±1°C
Output	4~20mA / 2 Wire	4~20mA / 2 Wire
Maximum load (Ω)	(VS-18)÷0.02 VS=Supply voltage	(VS-18)÷0.02 VS=Supply voltage
Digital output	RS485 / HART 7.3(option)	RS485 / HART 7.3(option)
Power supply	18~30V	18~30V
Housing material	SUS304 (SUS316 option)	SUS304 (SUS316 option)
Connection	1/2"PT	1/2"PT
Wetted material	SUS304	SUS304
Enclosure	IP67 (enclosure)/IP69K(probe)	IP67 (enclosure)/IP69K(probe)

HIGH ACCURACY MODEL (2 Wire/4 Wire)

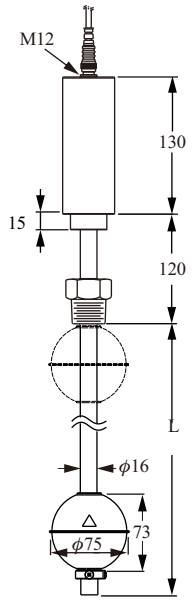
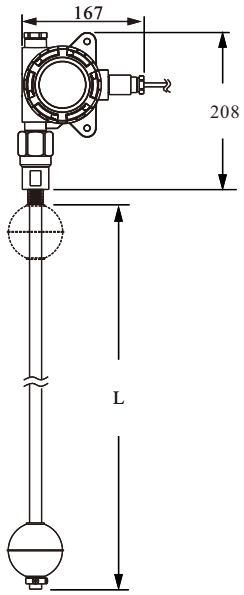
Dimensions (Unit: mm)		
Model No.	**EG32 (High Accuracy Model)**	**EG34 (High Accuracy Model)**
Application	Two-wire loop power output, comply with high accuracy & HART demands.	Four wire output,high speed active in low voltage 5V.
Measuring range	50~5500mm	50~5500mm
Non-Linearity	50~500mm@±100mm 501~2500mm@±0.02%F.S. 2501~5500mm@±0.04%F.S.	50~500mm@±100mm 501~2500mm@±0.02%F.S. 2501~5500mm@±0.04%F.S.
Repeatability	±0.002% F.S.	±0.002% F.S.
Temp. coefficient	±100 ppm/°C	±100 ppm/°C
Operation pressure	30 BAR(Max.)	30 BAR(Max.)
Ambient temp.	-40°C ~ 85°C	-40°C ~ 85°C
Operation temp.	-40°C ~ 125°C	-40°C ~ 125°C
Temp. accuracy	±1°C	±1°C
Output	4~20mA / 2 Wire	0~10V,10~0V,±10V,0~5V,5~0V,±5V 4~20mA,20~4mA,0~20mA,20~0mA
Maximum load (Ω)	(VS-18)÷0.02 VS=Supply voltage	(VS-5)÷0.02 VS=Supply voltage
Digital output	RS485,HART 7.3(option)	RS485
Power supply	18~30V	5~30V
Housing material	SUS304 (SUS316 option)	SUS304 (SUS316 option)
Connection	1/2"PT	1/2"PT
Wetted material	SUS304	SUS304
Enclosure	IP67 (enclosure)/IP69K(probe)	IP67 (enclosure)/IP69K(probe)

EXPLOSION PROOF MODEL (2 Wire)

Dimensions (Unit: mm)	 NEPSI Ex ia IIB T3~T6 ATEX Ⓔ II 1G Ex ia IIB T3~T6	 NEPSI Ex ia IIB T3~T6 ATEX Ⓔ II 1G Ex ia IIB T3~T6
Model No.	**EG374 (Anti-Corrosion Model)**	**EG371 (Single/dual Float Model)**
Application	Two-wire loop power output, for acid/alkali corrosion liquids.	Two-wire loop power output, for single/dual level and interface measurement.
Measuring range	50~2000mm	50~5500mm
Non-Linearity	±0.05% F.S. or ±1.0mm (whichever is greater)	±0.05% F.S. or ±1.0mm (whichever is greater)
Repeatability	±0.004% F.S.	±0.004% F.S.
Temp. coefficient	±100 ppm/°C	±100 ppm/°C
Operation pressure	5 BAR(Max.)	30 BAR(Max.)
Ambient temp.	-40°C ~ 85°C	-40°C ~ 85°C
Operation temp.	-20°C ~ 80°C	-40°C ~ 125°C
Temp. accuracy	±1°C	±1°C
Output	4~20mA / 2 Wire	4~20mA / 2 Wire
Max load (Ω)	(VS-18)÷0.02 VS=Supply voltage	(VS-18)÷0.02 VS=Supply voltage
Digital output	RS485 / HART 7.3(option)	RS485 / HART 7.3(option)
Power supply	12~30V(4-wire),18~30V(2-wire), 18~28V(Exp Losion proof)	12~30V(4-wire) ,16~30V(2-wire), 16~28V(Exp Losion proof)
Housing material	SUS304 (SUS316 option)	SUS304 (SUS316 option)
Connection	3/4"PT	1/2"PT
Wetted material	PP	SUS304
Enclosure	IP67 (enclosure) / IP69K(probe)	IP67 (enclosure) / IP69K(probe)

※ Must equipped with intrinsic safety barrier to form a standard intrinsically safe system (Ex ia), please refer to another DM/brochure for TXX safety barrier.

EXPLOSION PROOF MODEL (2 Wire)

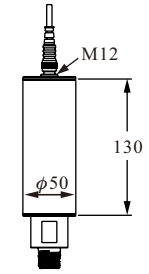
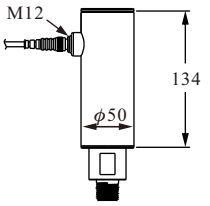
Dimensions (Unit: mm)	 **NEPSI Ex ia IIB T2~T6** **ATEX ⓔ II 1G Ex ia IIB T3~T6**	 **NEPSI Ex ia IIB T3~T6Ga** **ATEX ⓔ II 1G Ex ia IIB T3~T6**
Model No.	**EG37A (Ex-proof High Temp. Model)**	**EG36 (Diaplay Model)**
Application	Two-wire loop power output, explosion-proof model for hazadous environment.	Two-wire loop power output, explosion-proof model with diaplay for hazadous environment.
Measuring range	50~5500mm	50~5500mm
Non-Linearity	±0.05% F.S. or ±1.0mm (whichever is greater)	50mm~4000mm ± 1mm 4000mm~5500mm ± 0.025% F.S.
Repeatability	±0.004% F.S.	±0.004% F.S.
Temp. coefficient	±150 ppm/℃	±100 ppm/°C
Operation pressure	30 BAR(Max.)	30 BAR(Max.)
Ambient temp.	-40°C ~ 85°C	-40°C ~ 85°C
Operation temp.	-40°C ~ 195°C	-40°C ~ 125°C
Temp. accuracy	±1°C	±1°C
Output	4~20mA / 2 Wire	4~20mA / 2 Wire
Max load (Ω)	(VS-18)÷0.02 VS=Supply voltage	(VS-16)÷0.02 VS=Supply voltage
Digital output	RS485/HART 7.3(option)	RS485/HART 7.3(option)
Power supply	12~30V(4-wire),18~30V(2-wire), 18~28V(Exp Losion proof)	12~30V(4-wire) ,16~30V(2-wire), 16~28V(Exp Losion proof)
Housing material	SUS304 (SUS316 option)	Aluminum
Connection	1/2"PT	1/2"PT
Wetted material	SUS304	SUS304
Enclosure	IP67 (enclosure) / IP69K(probe)	IP67 (enclosure) / IP69K(probe)

※ Must equipped with intrinsic safety barrier to form a standard intrinsically safe system (Ex ia), please refer to another DM/brochure for TXX safety barrier.

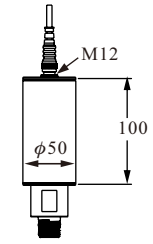
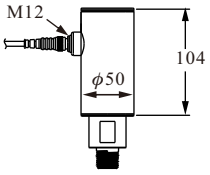
HOUSING OPTIONS

Mapping table of enclosure

EG31&EG37 explosion-proof (2 wire)

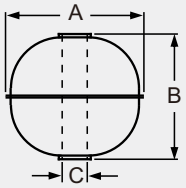
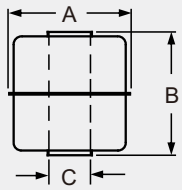
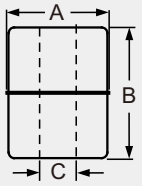
1 Top conduit	2 Side conduit
	

EG32&EG34 high accuracy series

1 Top conduit	2 Side conduit
	

※ **Standard model cable length is 2m.**

FLOAT SPECIFICATIONS

Model	Model Number	Dimensions (ϕA x B x ϕC mm)	S.G.	Max. Pressure (kg/cm²)	Material	Stem Size
	**S5**	75x73x20.5	E>0.7	30	SUS 304 / 316	ϕ16
	S4	52x52x15	E>0.75	30	SUS 316	ϕ12.7
	SD	52x52x15	E>0.9	30	SUS 316	ϕ12.7
	SE	75x73x20.5	E>0.9	20	SUS 304 / 316	ϕ16
	**S3**	45x55x15	E>0.7	12	SUS 316	ϕ12.7
	SC	45x55x15	E>0.9	12	SUS 316	ϕ12.7
	**F3**	45x45x20	E>0.65	5	PP in Grey	ϕ18 (coating)
	FC	45x45x20	E>0.9	5	PP in Grey	ϕ18 (coating)
	P3	48x45x18.5	E>0.6	5	PP in Black	ϕ17.2 (coating)
	PC	48x45x18.5	E>0.9	5	PP in Black	ϕ17.2 (coating)
	NB	48x46x15.6	E>0.5	30	NBR in Black	ϕ12.7
	ND	48x46x15.6	E>0.9	30	NBR in Black	ϕ12.7
	NC	48x46x20	E>0.5	30	NBR in Black	ϕ16
	NE	48x46x20	E>0.9	30	NBR in Black	ϕ16

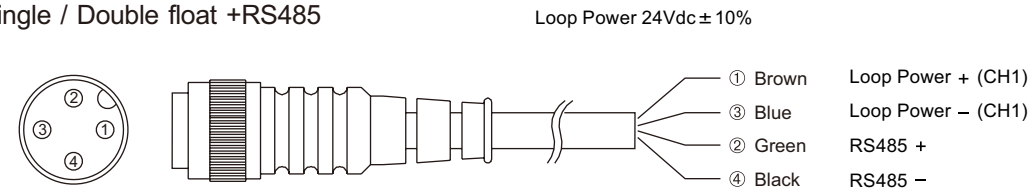
※ S.G(E):specific gravity

WIRING

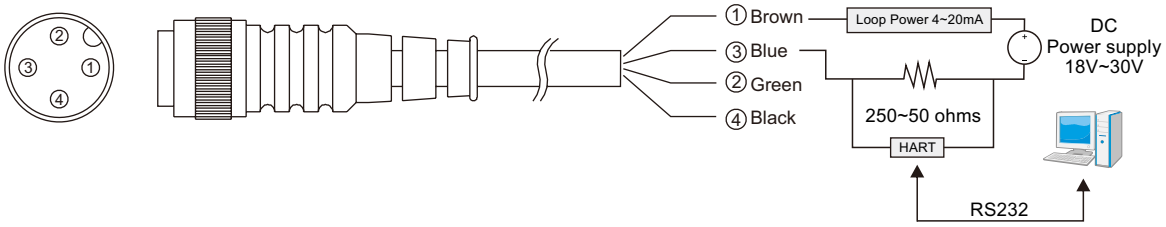
When RS485(ModBus)is applied,Loop power only as power.

EG31/EG32/EG37:

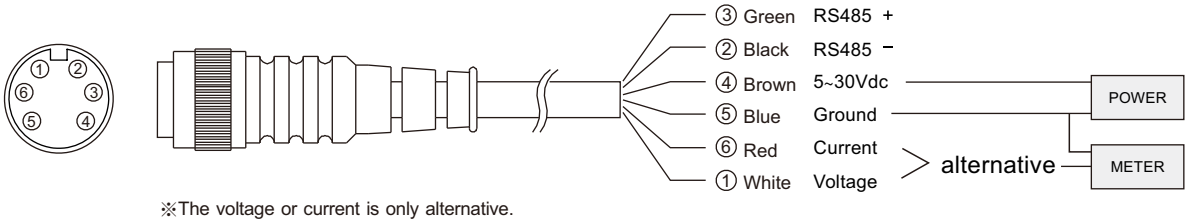
1. Single / Double float +RS485



2. Single / Double float +HART

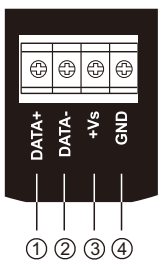


EG34:



※The voltage or current is only alternative.

EG36:



① D+: RS485 +
② D–: RS485 –
③ V+: Loop Power +
④ V–: Loop Power –

FineTek

CUSTOMIZED STEM LENGTHS ARE AVAILABLE

Note the difference between ordered length and actual measurable stem length below.

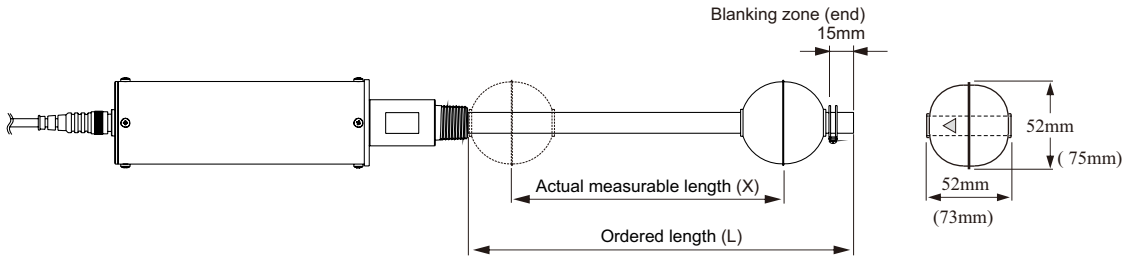
(2m below)= Actual measurable length (X) =Ordered length (L)-52mm-15mm,adopted stem ϕ12.7

(2m above)= Actual measurable length (X) =Ordered length (L)-73mm-15mm,adopted stem ϕ16

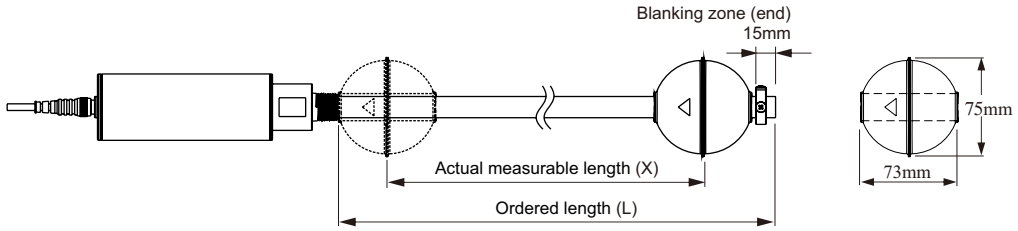
(2m below)= Ordered length (L)=Actual measurable length (X)+52mm-15mm,adopted stem ϕ12.7

(2m above)= Ordered length (L)=Actual measurable length (X)+73mm-15mm,adopted stem ϕ16

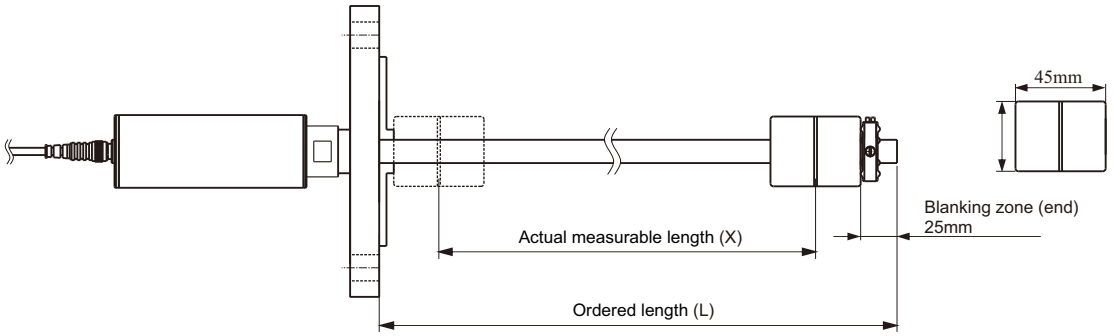
Below 2m,stem ϕ12.7



Above 2m,stem ϕ16



Below 2m,stem ϕ12.7,with PP coating to ϕ17.2



INSTALLATION

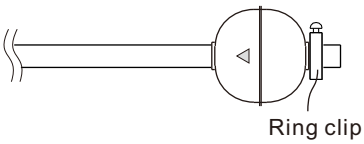
1. Loop power 24Vdc ±10%
2. The product is calibrated before shipment and should be sufficient to meet user needs.
3. Do not bend the stem, put pressure on it or force it in any manner.
4. For best results, use the included float only.

5. When the mounting hole is large enough, guide the stem and float through the hole to install.
6. If the hole is NOT large enough, remove float, install the stem and assemble float from inside the container.
7. When assembling the float onto the stem, the float's direction mark should face the housing.
8. Ensure the float stopper is fixed firmly.

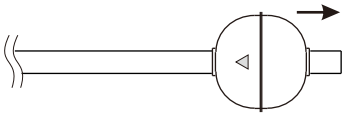
9. If the stem is bent and can not work, it needs to be returned to the factory for calibration.
11. Bubble wrap/foam packaging is necessary to ensure safety during transportation.
12. Unnecessary opening of housing may affect accuracy.

Removing the float

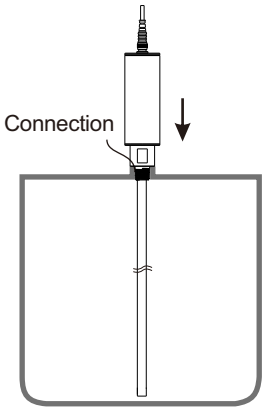
Step 1:
Loosen the stopper at stem end



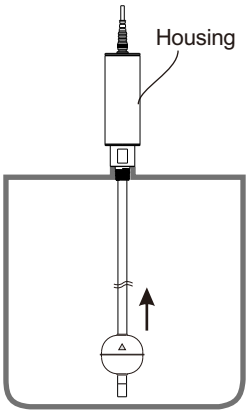
Step 2:
Take off the float



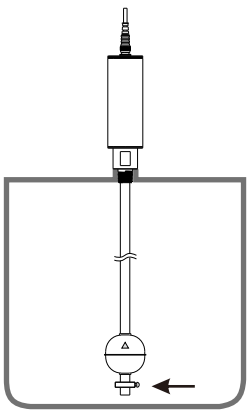
Step 3:
Install the sensor onto the tank, and tighten the connection



Step 4:
Assemble the float onto the stem and tighten the connection the housing. Note the direction of float



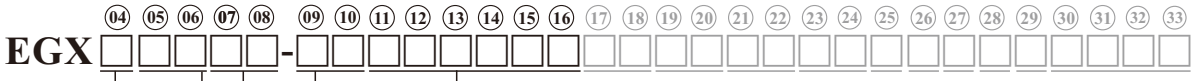
Step 5:
Firmly fasten the stopper



MODEL NUMBER / ORDER CODE COMPARISON TABLE

Model Number	Order Code
EG31 Standand Type	EGX10000-A1
EG31 High Temperature Type	EGX10200-A1
EG32/34 High Accuracy Type	EGX20000-A1
EG32/34 High Accuracy & Temperature Type	EGX20200-A1
EG374 Anti-Corrosion Type	EGX1001B-B1
EG371 Ex- Proof Type	EGX1001B-A1
EG37A Ex- Proof High Temperature Type	EGX1021B-A1
EG36 Display Type	EGX3001B-A1
EG36 High Temperature DisplayType	EGX3021B-A1

ORDER INFORMATION



④ Version

1：132mm (EG31/EG37)
2：97mm (EG32/EG34)
3：Display type (EG36)

(Next page)

⑤⑥ Model

00：Standard
02：Hi-temperature

⑦⑧ Certification

00：None
1B：ATEX-Exia
7B：NEPSI-Exia

⑨⑩ Sensor Type

A1：Probe type
B1：Anti-Corrosion probe type

Connection

⑪⑫

Flange item
AI ：3A
AK：JIS-FF
AN：ANSI-RF
AS：DIN-FF

Thread item
AC：ANSI
AA：JIS

⑬⑭

A5：1/2"
A7：3/4"
A8：1"
B1：1-1/2"
B2：2"
B4：2-1/2"
D7：DN20
D8：DN25
D9：DN32
E1：DN40
E2：DN50
E3：DN65

⑮⑯

01：PT male
03：PF male
07：NPT male
40：5 kg/cm^2
42：10 kg/cm^2
48：150 Lbs
49：300 Lbs
57：PN10
58：PN16

⑰⑱ **Probe diameter**

1G：ϕ9.5mm
2A：ϕ12.7mm
2C：ϕ16.0mm
2D：ϕ17.2mm

(Next page)

⑲⑳ **Probe material**

MA: SUS 304
MB: SUS 316
MC: SUS 316L
18: PP

㉑㉒ **Float 1**

00: None
S3: 45*55*15(S.G>0.7)
SC: 45*55*15(S.G>0.9)
S4: 52*52*15(S.G>0.75)
SD: 52*52*15(S.G>0.9)
NB: 48*46*15.6(S.G>0.5)
ND: 48*46*15.6(S.G>0.9)
F3: 45*45*20(S.G>0.65)
FC: 45*45*20(S.G>0.9)
P3: 48*45*18.5(S.G>0.6)
PC: 48*45*18.5(S.G>0.9)
NC: 48*46*20(S.G>0.5)
NE: 48*46*20(S.G>0.9)
S5: 75*73*20(S.G>0.7)
SE: 75*73*20.5(S.G>0.9)
A1: 32*69*10.9(S.G>0.75)
AA: 32*69*10.9(S.G>0.9)

㉓㉔ **Float 2**

00: None
SC: 45*55*15(E>0.9)
SD: 52*52*15(E>0.9)
FC: 45*45*20(E>0.9)
PC: 48*45*18.5(E>0.9)
ND: 48*46*15.6(E>0.9)
NE: 48*46*20(EE>0.9)
SE: 75*73*20.5(E>0.9)
AA: 32*69*10.9(E>0.9)

㉕ Digital output 1

0：None
A：4~20mA
B：20~4mA
C：0mA-20mA
D：20mA-0mA
E：0V-5V
F：5V-0V
G：0V-10V
H：10V-0V
I：-5V-5V
J： -10V-10V

㉖ Digital output 2

0：None
B：RS-485
C：RS485 (RS485 with temperture x 1pcs)
D：RS485 (RS485 with temperture x 5pcs)
E：HART
F：HART 7.3 with temperture sensor x 1pcs)
H：4~20mA
I ：20~4mA

㉗ Housing

A：Top conduit
B：Side conduit

㉘ Response time

A：16 Hz
B：500 Hz

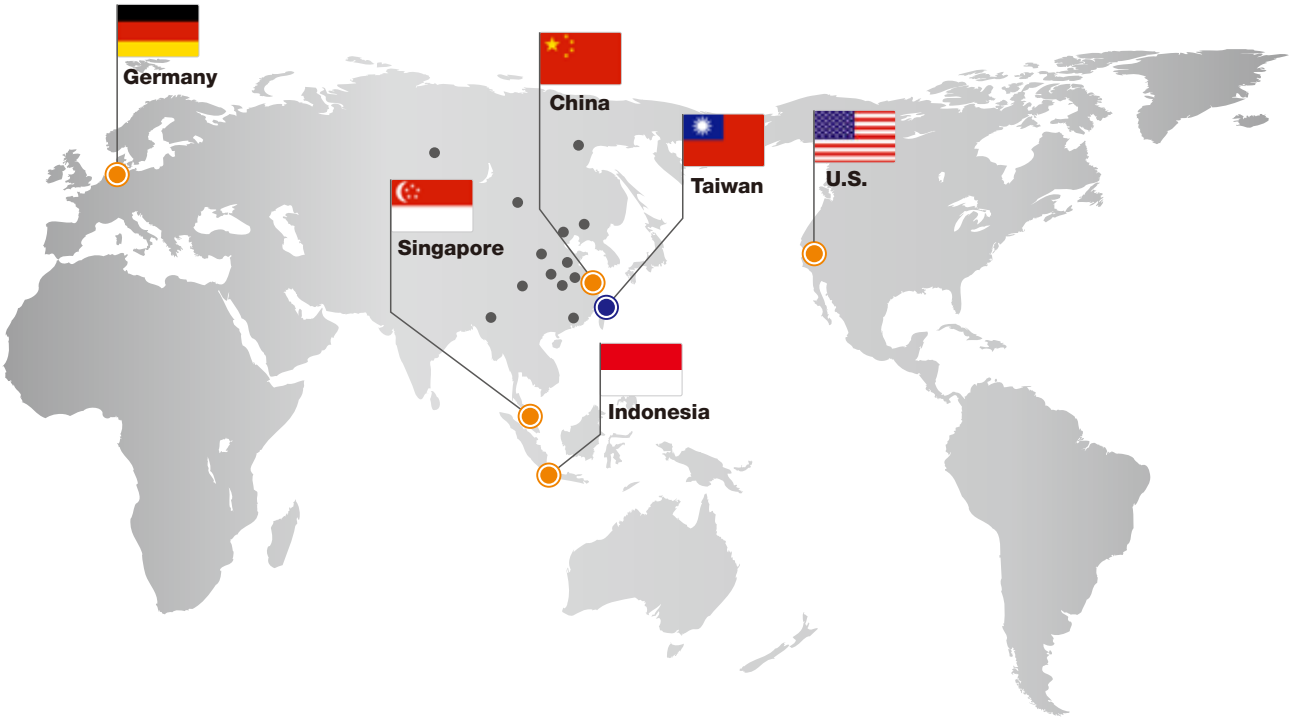
㉙ Material and surface roughness

0：None
A：Ra < 0.3
B：Ra < 0.5
C：Ra < 0.8

㉚㉛㉜㉝ Length

Code	Probe Length
0050~5500	50~5500mm

Global Network



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