Magnetostrictive Level Transmitter

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FineTek
Your Made-To-Order Solutions

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.

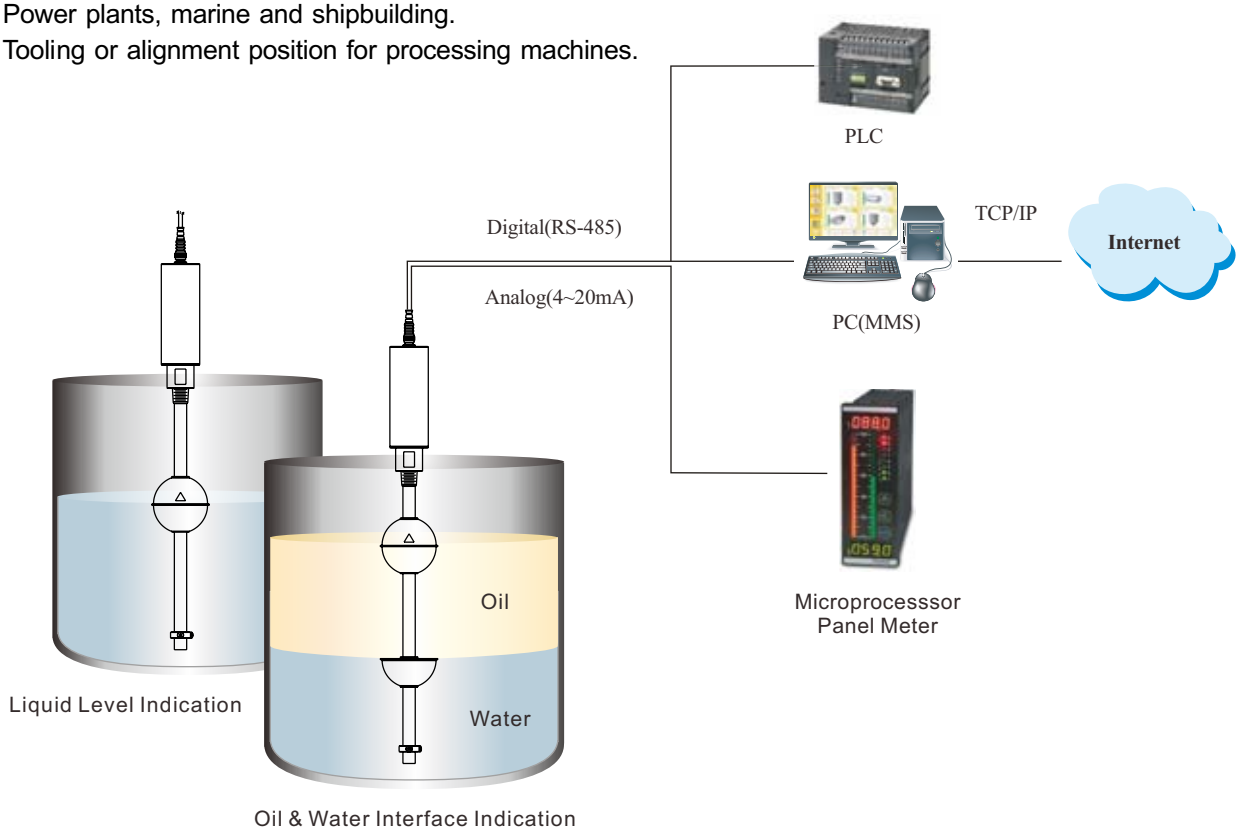
The FineTek magnetostrictive level sensor has proven itself due to its durability in a wide range of temperatures, pressures and operating conditions as well as its low maintenance nature.

FEATURES

- Absolute positioning output and no calibration required after 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.
- EG3 adopted loop power structure for wire saving.
- Explosion-proof model available for hazardous environments.
- Housing of EG3 is IP67(Enclosure)/IP69K(Probe).
- Support HART or RS485 or 4~20mA 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

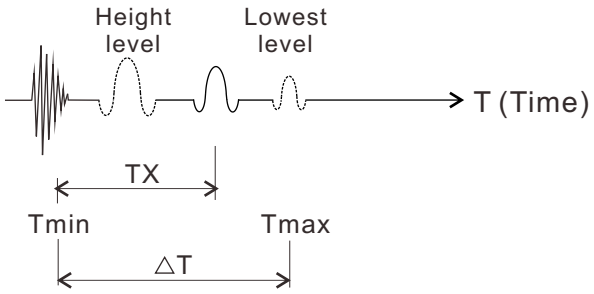
The sensor mainly consists of magnetorestrictive wires sealed in a stem/rod and a permanent magnet sealed into a float that can move up and down the stem.Electrical current travels along the wires in the stem creating an axial magnetic field. When the float's and stem's magnetic field intersect, a torsional 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.

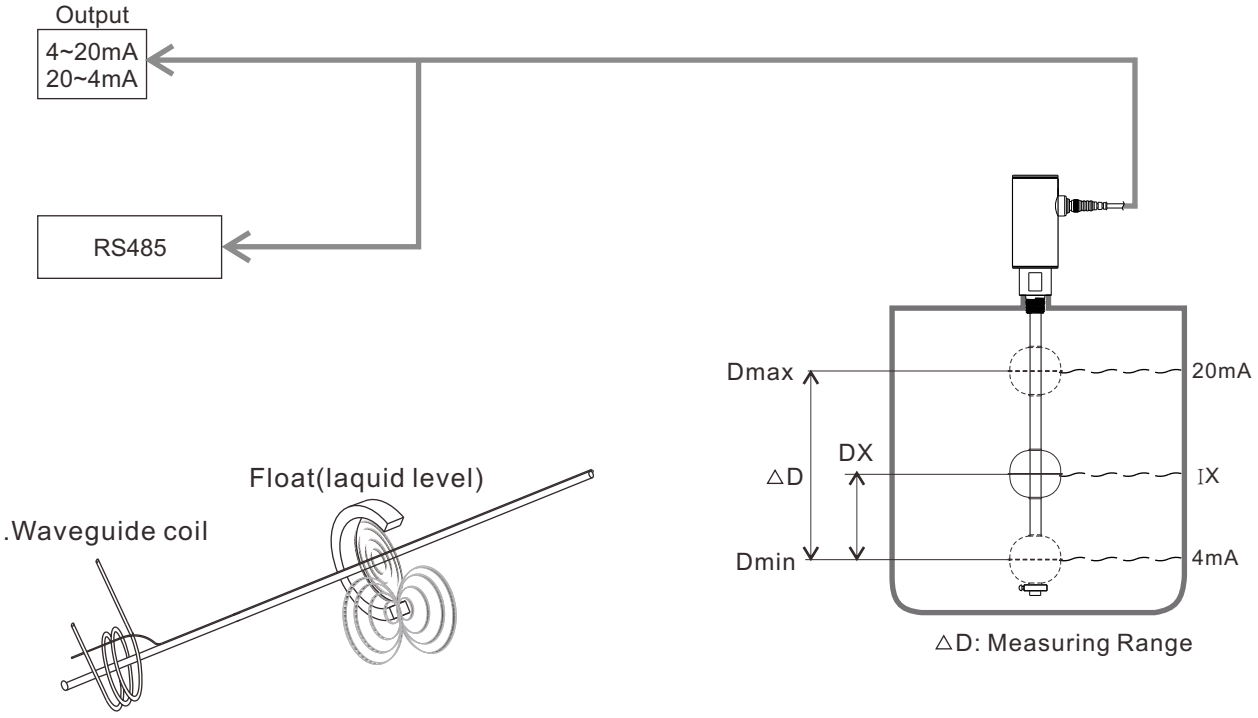
CONVERSION FORMULA

The relation of D & 4~20mA output

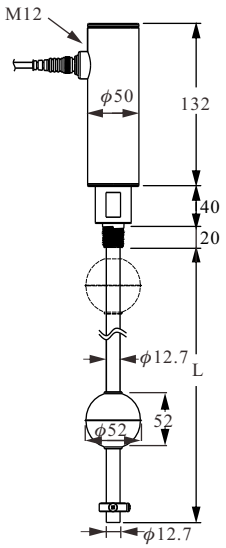
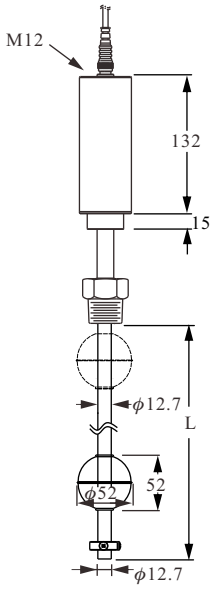
$$\frac{IX-4}{(20-4)mA} = \frac{DT-TX}{\triangle T} = \frac{DX}{\triangle D}$$

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

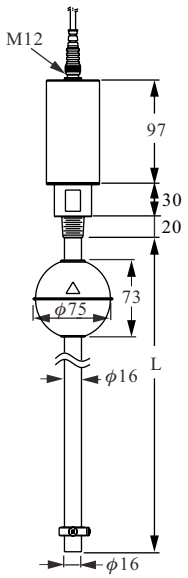
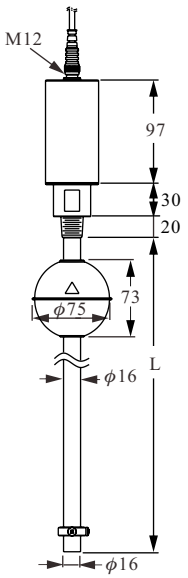




STANDARD (2 Wire) MODEL

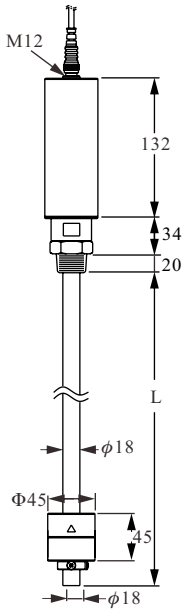
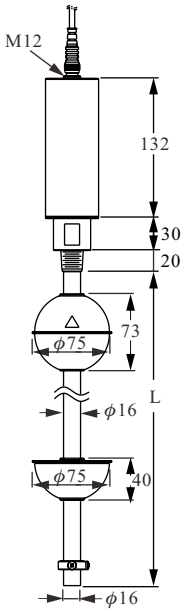
Dimensions (Unit: mm)		
Model No.	**EG311 (Standard Model)**	**EG31B(High Temperature Model)**
Suitable	Two-wire loop power output, for Oil/Water interface, pharmaceutical and food grade level control.	Two-wire loop power output, high process environment application.
Measuring range	50~5500mm	50~5500mm
Non-Linearity	±0.05% F.S. or ±1.0mm (whichever is greater)	±0.05% F.S. or ±1.0mm (whichever is greater)
Repeatability	±0.01% F.S. or ±0.5mm (whichever is greater)	±0.01% F.S. or ±0.5mm (whichever is greater)
Temp. coefficient	±100 ppm/°C	±150 ppm/°C
Operation pressure	30 BAR(Max.)	30 BAR(Max.)
Ambient temp.	-10°C ~ 55°C	-10°C ~ 55°C
Operation temp.	-30°C ~ 125°C	-30°C ~ 200°C
Temp. accuracy	±1.5°C	±1.5°C
Output	4~20mA/ 2 Wire	4~20mA/ 2 Wire
Maximum load	300Ω	300Ω
Digital output	RS485	RS485
Power supply	Loop power 24Vdc±10%	Loop power 24Vdc±10%
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)

STANDARD (2 Wire/4 Wire) MODEL

Dimensions (Unit: mm)		
Model No.	**EG32 (High accuracy Model)**	**EG34 (High accuracy Model)**
Suitable	Two-wire loop power output, comply with high accuracy & HART demands.	Four wire output,high speed active in low voltaye 5V.
Measuring range	25~5500mm	25~5500mm
Non-Linearity	25~500mm@±100μm 501~2500mm@±0.02%F.S. 2501~5500mm@±0.04%F.S.	25~500mm@±100μm 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,20~4mA	0~10V,10~0V,±10V,0~5V,5~0V,±5V 4~20mA,20~4mA,0~20mA,20~0mA
Maximum load	500Ω	500Ω
Digital output	RS485,HART(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)

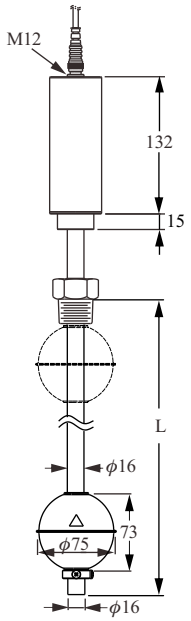
EXPLOSION PROOF TYPE (2 Wire) MODEL

NEPSI PROOF No.GYB101836X Ex ia IIB T2~T6

Dimensions (Unit: mm)		
Model No.	**EG374 (Anti-Corrosion Model)**	**EG371 (single/dual Float Model)**
Suitable	Two-wire loop power output, for acid/alkali corrosion liquids.	Two-wire loop power output, for single/dual level and interface measurement.
Measuring range	50~5500mm	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	±0.01% F.S. or ±0.5mm (whichever is greater)	±0.01% F.S. or ±0.5mm (whichever is greater)
Temp. coefficient	±100 ppm/°C	±150 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	300Ω	300Ω
Digital output	RS485	RS485
Power supply	Loop power 24Vdc±10%	Loop power 24Vdc±10%
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)

EXPLOSION PROOF (2 Wire) MODEL

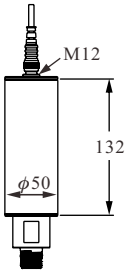
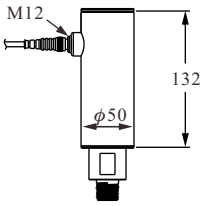
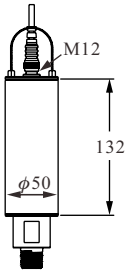
NEPSI PROOF No.GYB101836X Ex ia IIB T2~T6

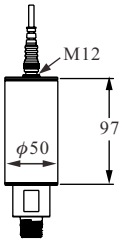
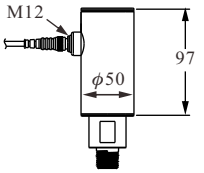
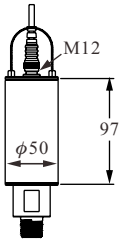
Dimensions (Unit: mm)	
Model No.	**EG37A (Ex-proof High Temp. Model)**
Suitable	Two-wire loop power output, explosion-proof model for hazadous environment.
Measuring range	50~5500mm
Non-Linearity	±0.05% F.S. or ±1.0mm (whichever is greater)
Repeatability	±0.01% F.S. or ±0.5mm (whichever is greater)
Temp. coefficient	±150 ppm/°C
Operation pressure	30 BAR(Max.)
Ambient temp.	-40°C ~ 85°C
Operation temp.	-40°C ~ 200°C
Temp. accuracy	±1°C
Output	4~20mA/ 2 Wire
Max load	300Ω
Digital output	RS485
Power supply	Loop power 24Vdc±10%
Housing material	SUS304 (SUS316 option)
Connection	1/2"PT
Wetted material	SUS304
Enclosure	IP67 (enclosure)/IP69K(probe)

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

HOUSING OPTIONS

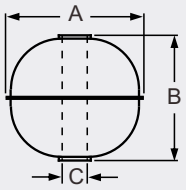
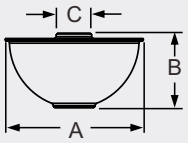
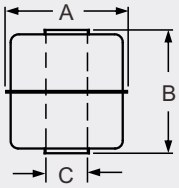
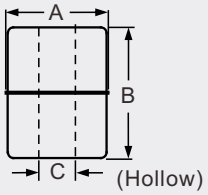
Mapping table of enclosure

EG31&EG37 explosion-proof (2 wire)	1 Top conduit	2 Side conduit	3 Top conduit of steel wire cable
			

EG32&EG34 high accuracy series	1 Top conduit	2 Side conduit	3 Top conduit of steel wire cable
			

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

FLOAT SPECIFICATIONS

Model	Model	Dimensions (ϕA x B x ϕC mm)	S.G.	Max. Pressure (kg/cm²)	**Material**	Tube Size
	**S5**	75x73x20.5	E>0.6	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
	**S0**	75x40x20.5	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)

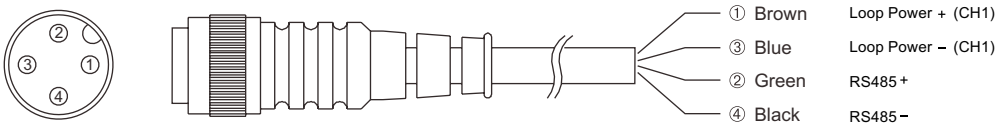
WIRING

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

EG31/EG37:

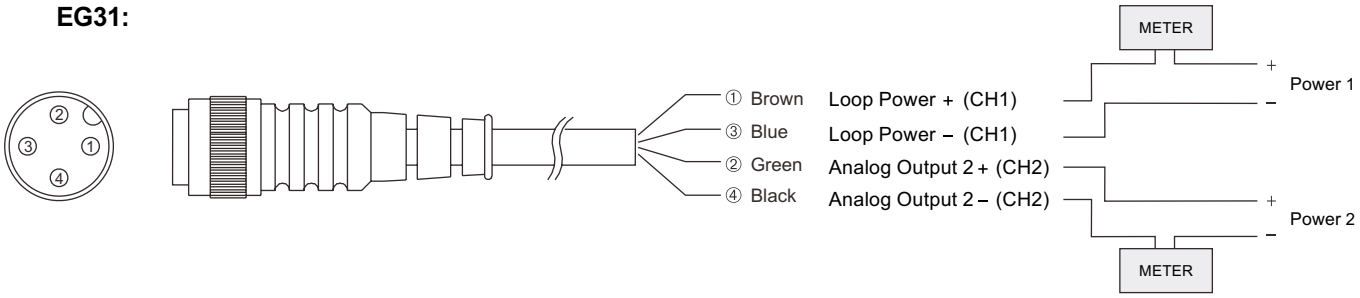
1. Single / Double float +RS485

Loop Power 24Vdc ± 10%

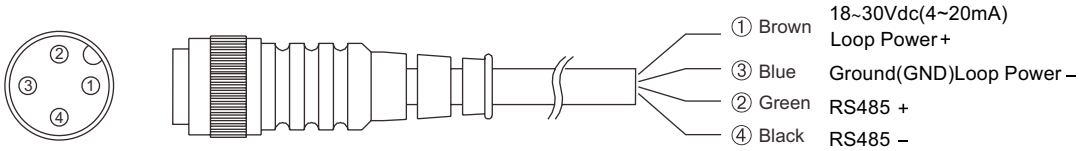


2. Double float + Dual current output
   If two sets loop power(4~20mA)is applied,two sets 24Vdc power supply and current meter are essential

EG31:

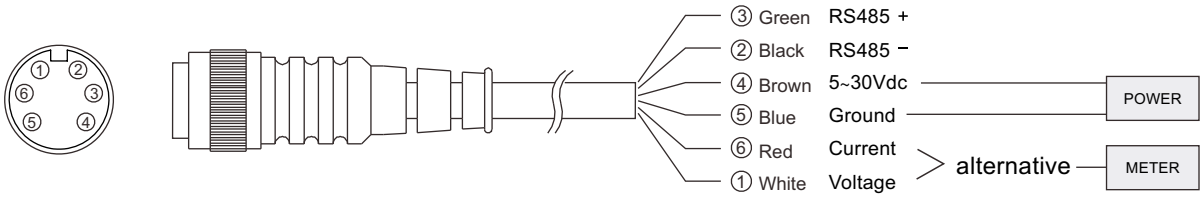


EG32:



※ The HART communication or RS485 is only alternative.

EG34:



※The voltage or current is only alternative.

CUSTOMIZED STEM LENGTHS ARE AVAILABLE

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

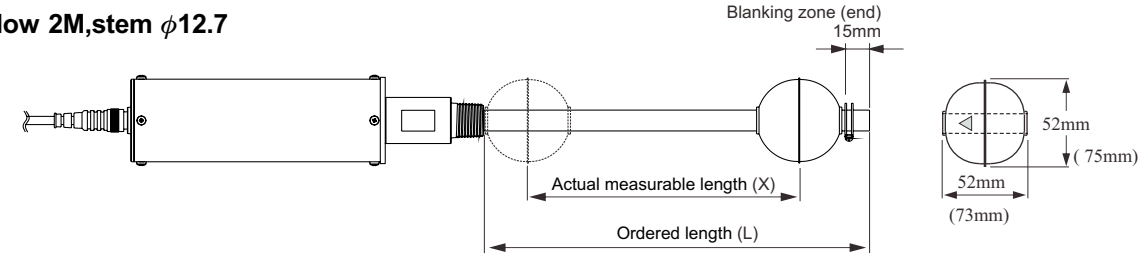
(2M below)= Actual measurable length (X) =Ordered length (L)-52mm-15mm,adopted stem ϕ12.7

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

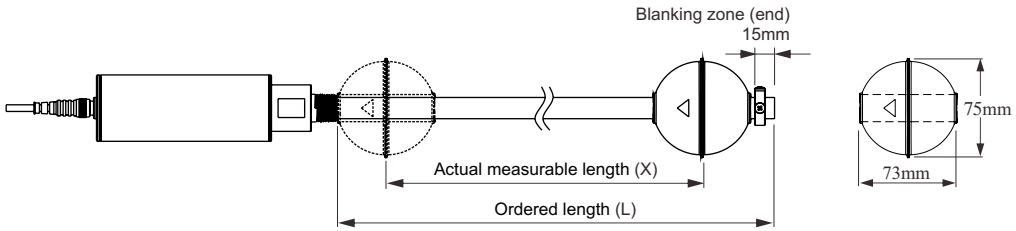
(2M below)= Ordered length (L)=Actual measurable length (X)+52mm-15mm,adopted stem ϕ12.7

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

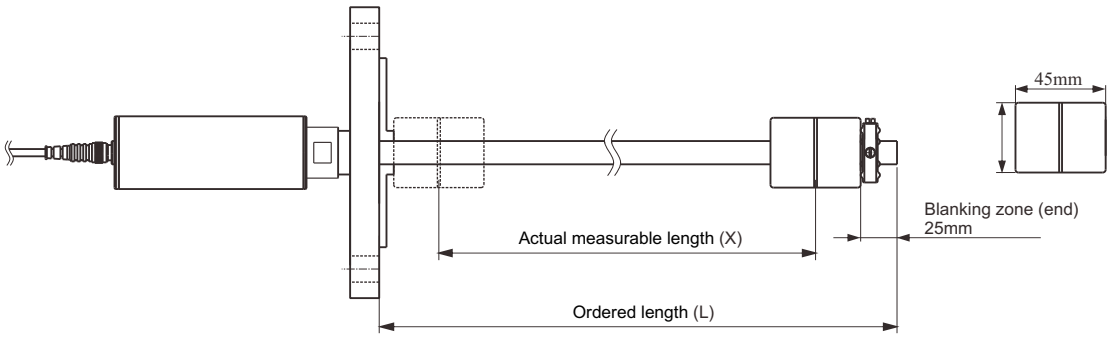
Below 2M,stem ϕ12.7



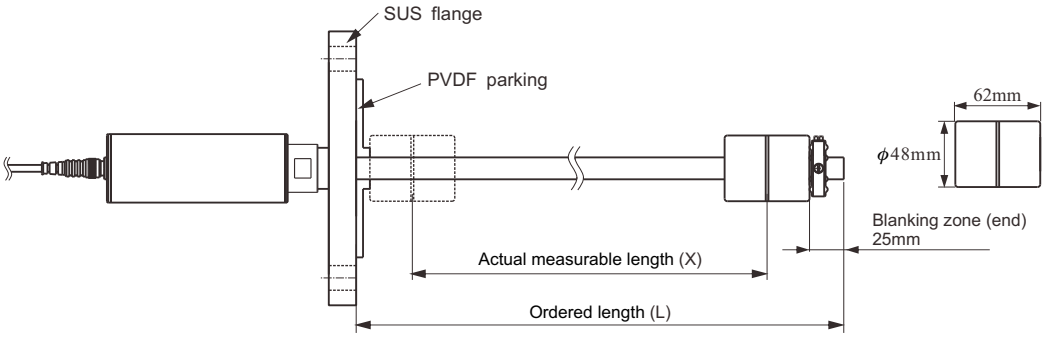
Above 2M,stem ϕ16



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



Below 2M,stem ϕ12.7,with PVDF coating to ϕ16



INSTALLATION

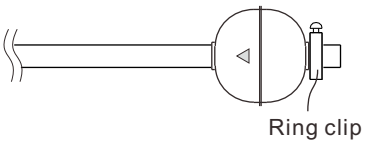
1. Loop Power 24Vdc ±10%
2. The product is calibrated before shipment and should be sufficient to meet user needs.
3. Do not bend the stem, put pressure on it or force it in any manner.
4. For best results, use the included float only.

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.

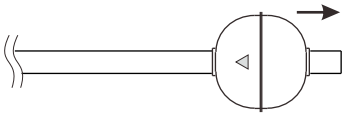
9. If the stem is bent and can not work, it needs to be returned to the factory for calibration.
11. Bubble wrap/foam packaging is necessary to ensure safety during transportation.
12. Unnecessary opening of housing may affect accuracy.

Removing the float

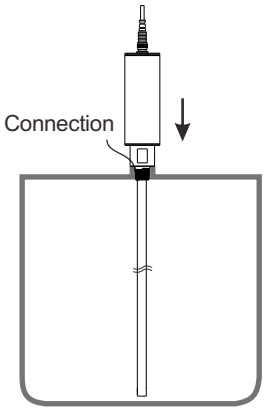
Step 1:
Loosen the stopper at stem end



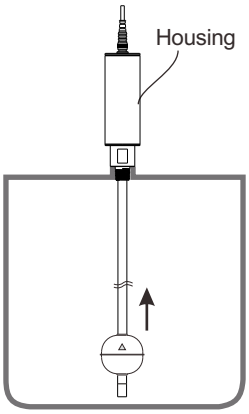
Step 2:
Take off the float



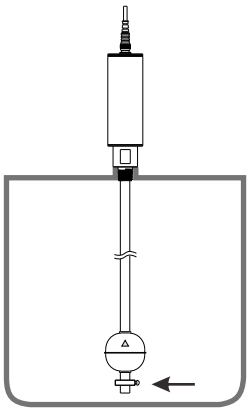
Step 3:
Install the sensor ontoAssemble the tank, and tighten the connection



Step 4:
Assemble the float onto the stem the tank, and tighten the connectionthe housing



Step 5:
Firmly fasten the stopper



HOW TO ORDER (2 Wire)

E G 3 7 1 B Q □□ — □□ □□ — □ □□

Model

1: Standard 7: Explosion Proof

Housing

Standard (-20~125°C)
1: Top conduit
2: Side conduit
3: Top conduit of steel wire cable

High Temp. (-20~200°C)
A: Top conduit
B: Side conduit
C: Top conduit with handle

Anti-corrosion (-20~80°C)
4: Top conduit with coated
5: Side conduit with coated
6: Top conduit of steel wire cable with coated

(※options 4, 5, 6 only for EG37)

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

3---1-1/4"(32A)	I---4"(100A)	M---5kg/cm^2	W---PN 10	Q---PT
B---1/2"(15A)	J---5"(125A)	N---10kg/cm^2	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	0.65
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 float's hole diameter.

Analog Output 1 & Direction

A: 4~20mA (Bottom~Top) B: 20~4mA (Top~Bottom) 0: None

※ 4~20mA output direction can be selected.

Analog Output 2 for Type

A: 4~20mA ※ When A is chosen, an additional 24V power supply is required (not loop power).
B: RS485
C: Rs485 + Thermal sensor ※ Thermal sensors are embedded at the bottom of the probe.
0 : None

Probe

S: SUS304: ϕ12.7 C: SUS316: ϕ12.7 E: SUS316L: ϕ12.7
L : SUS304: ϕ16 D: SUS316: ϕ16 F: SUS316L: ϕ16

※ If the measuring range is over 2000mm, a stem ϕ16 is recommended to reduce risk of damage during installation and transportation.

※ For PP coating,stem S.C.E is recommended (after PP coating,stem is up to ϕ17.2)

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)

HOW TO ORDER

E G 3 2 [1] [B Q] [ ][ ] — 0 0 [ ][ ] — [ ] [ ][ ]

Housing

Standard
- 1: Top conduit
- 2: Side conduit

Anti-corrosion
- 4: Top conduit with coated
- 5: Side conduit with coated

High Temp.
- A: Top conduit
- B: Side conduit

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

3---1-1/4"(32A)	I---4"(100A)	M---5kg/cm^2	W---PN 10	Q---PT
B---1/2"(15A)	J---5"(125A)	N---10kg/cm^2	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

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	0.65
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 float's hole diameter.

Analog Output(Bottom~Top)

A: 4~20mA B: 20~4mA 0: None

Digital Output

0: None B:RS485 C:RS485+Thermal sensor
H:HART T:HART+PT100

Probe

S: SUS304: ϕ12.7 C: SUS316: ϕ12.7 E: SUS316L: ϕ12.7
L : SUS304: ϕ16 D: SUS316: ϕ16 F: SUS316L: ϕ16

※ If the measuring range is over 2000mm, a stem ϕ16 is recommended to reduce risk of damage during installation and transportation.

※ For PP coating,stem S.C.E is recommended (after PP coating,stem is up to ϕ17.2)

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Ex: 500mm (measurement) + (73mm (S5 float height) +15mm) = 588mm (Probe length)

HOW TO ORDER

E G 3 4 [1] [B Q] [ ][ ] — 0 0 [ ][ ] — [ ] [ ][ ]

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F---2"(50A)				S---Others
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PC	ϕ48x45xID18.5	PP/Black	0.9
SS	Special Specification		
00	No Float		

※ Probe diameter must be smaller than float's hole diameter.

Analog Output(Bottom~Top)

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

Digital Output

- 0: None
- B:RS485
- C:RS485+Thermal sensor

Probe

S: SUS304: ϕ12.7	C: SUS316: ϕ12.7	E: SUS316L: ϕ12.7
L : SUS304: ϕ16	D: SUS316: ϕ16	F: SUS316L: ϕ16

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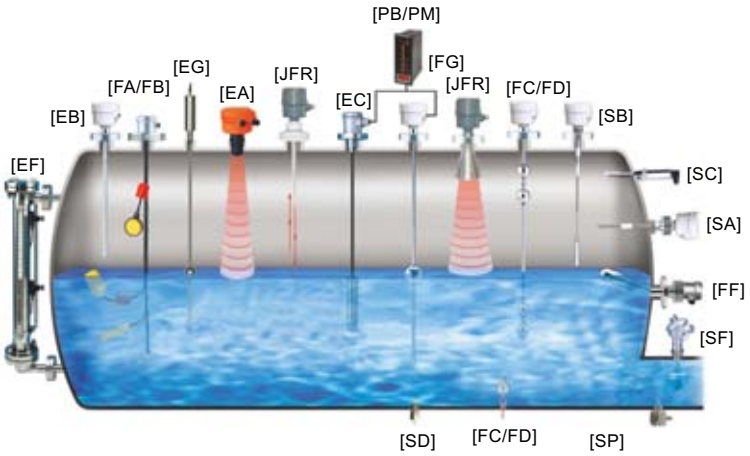
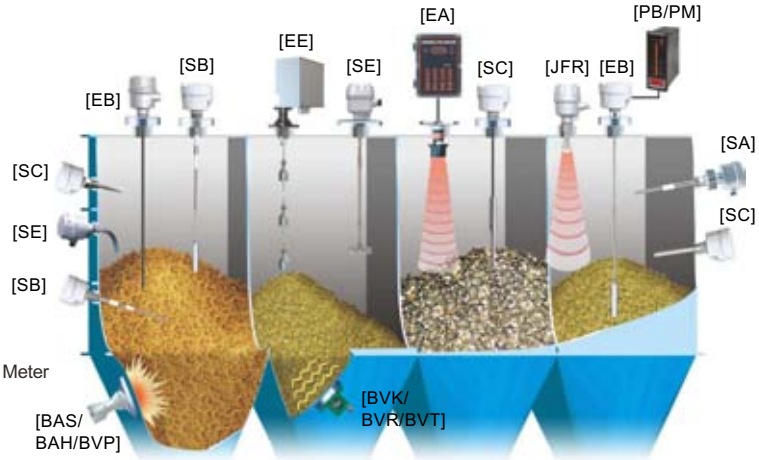
Ex: 500mm (measurement) + (73mm (S5 float height) +15mm) = 588mm (Probe length)

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
[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





FineTek Co., Ltd.
No.16, Tzuchiang St., Tucheng Industrial Park, New Taipei City 236, Taiwan.
TEL: 886 2 2269 6789 FAX: 886 2 2268 6682
Email: info@fine-tek.com http://www.fine-tek.com

Fine automation (ShangHai) Co., Ltd.
No.451 DuHui Rd, MinHang District, Shanghai, China 201109
TEL: 86 21 6490 7260 FAX: 86 21 6490 7276
Email: info.sh@fine-tek.com http://www.fineautomation.com.cn

FineTek Pte Ltd.
No. 60 Kaki Bukit Place, #07-06 Eunos Techpark 2
Lobby B, Singapore 415979
TEL: 65 6452 6340 FAX: 65 6734 1878
Email: info.sg@fine-tek.com

FineTeK GmbH
Frankfurter Str. 62, OG D-65428 Ruesselsehim, Germany
TEL: 49 6142 17608 0 FAX: 49 6142 17608 20
Email: info@fine-tek.de

Aplus Finetek Sensor inc.
355 S. Lemon Ave, Suite D, Walnut, CA 91789
TEL: 1 909 598 2488 FAX: 1 909 598 3188
Email: peter.wu@aplusfine.com http://www.aplusfine.com

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