

Authorized Distributor



# Magnetostrictive Level Transmitter















































## 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.

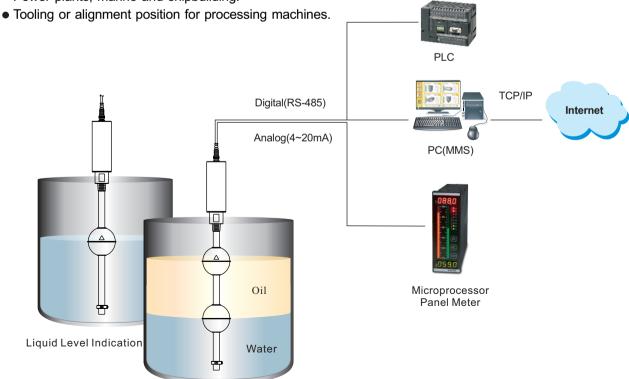
The FineTek magnetostrictive level sensor has proven itself due to its durability in a wide range of temperatures, pressures and operating conditions as well as its low maintenance nature.

#### **FFATURES**

- Absolute positioning output and no calibration requiredafter power failure.
- Stability and reliablity.
- Easy 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 195°C.
- EG36, 37, 60 adopted loop power structure for wire saving.
- Explosion-proof model available for hazardous environments.
- 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.



Oil & Water Interface Indication

## **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).

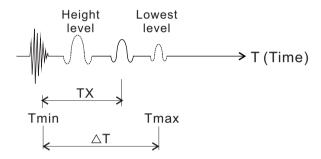
The sensor measures the liquid level (D) by calculating the elapsed time between torsional forces. Using velocity and time, distance can be calculated. This action is timely and continuous. A change in float position will be detected promptly via signal output.

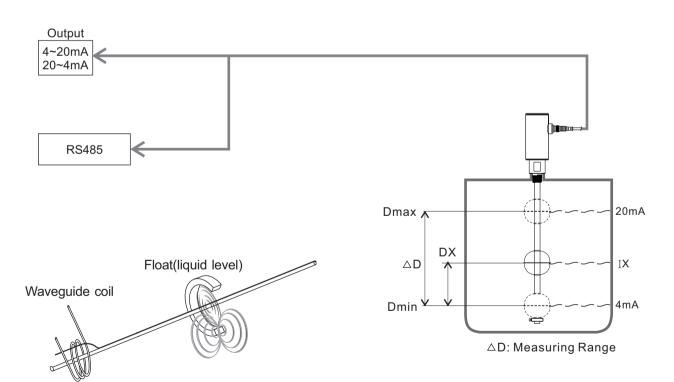
#### **CONVERSION FORMULA**

The relation of △D & 4~20mA output

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

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











M12  130  130  130  130  20  20
it: mm)  NEPSI Ex ia IIB T3~T6 Ga  ATEX ® II 1G Ex ia IIB T3~T6  ATEX ® II 1G Ex ia IIB T3~T6
ATEX © II 1G Ex ia IIB T3~T6  ATEX © II 1G Ex ia IIB T3~T6  del No.  EG374 (Anti-Corrosion Model)  EG371 (Single/dual Float Model)
zer No. 19374 (Anti-Corrosion Model) 19371 (Origie/ddai Float Model)
Two-wire loop power output, for acid/alkali corrosion liquids.  Two-wire loop power output, for single/dual level and interface measurement.
asuring range 50~2000mm 50~5500mm
<b>1-Linearity</b> $\pm 0.05\%$ F.S. or $\pm 1.0$ mm (whichever is greater) $\pm 0.05\%$ F.S. or $\pm 1.0$ mm (whichever is greater)
beatability ± 0.004% F.S. ± 0.004% F.S.
<b>np. coefficient</b> ± 100 ppm/°C ± 100 ppm/°C
eration pressure 5 bar(Max.) 30 bar(Max.)
bient temp40°C ~ 85°C -40°C ~ 85°C
eration temp20°C ~ 80°C -40°C ~ 125°C
np. accuracy ±1°C ±1°C
put 4~20mA / 2 Wire 4~20mA / 2 Wire
0/0.40\ 0.00 V/0.00\ 0.00 V/0.00\ 0.
(VS-18) $\div$ 0.02 VS=Supply voltage (VS-18) $\div$ 0.02 VS=Supply voltage
ital output RS485 / HART 7.3(option) RS485 / HART 7.3(option)
ital output RS485 / HART 7.3(option) RS485 / HART 7.3(option)  12~30V(4-wire), 18~30V(2-wire),  12~30V(4-wire), 18~30V(2-wire),
ital output         RS485 / HART 7.3(option)         RS485 / HART 7.3(option)           ver supply         12~30V(4-wire), 18~30V(2-wire), 18~28V(Exp Losion proof)         12~30V(4-wire), 18~30V(2-wire), 18~28V(Exp Losion proof)
RS485 / HART 7.3(option)   RS485 / HART 7.3(option)   RS485 / HART 7.3(option)

<sup>\*\*</sup> Must equipped with intrinsic safety barrier to form a standard intrinsically safe system (Ex ia), please refer to another catalog / brochure for TXX safety barrier.









Dimensions (Unit: mm)	NEPSI Ex ia IIB T3~T6 Ga ATEX ⊕ II 1G Ex ia IIB T3~T6	NEPSI Ex ia IIB T3~T6 Ga 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/°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 ~ 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 catalog / brochure for TXX safety barrier.



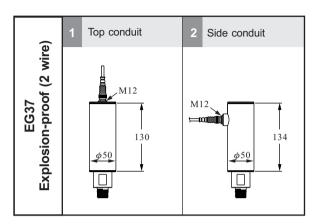
# EG50 (4 Wire)

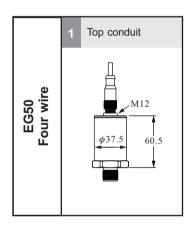
Dimensions (Unit: mm)	Measuring range  Upper blank distance 15  Upper blank distance 15			
Model No.	EG50			
Application	Four wire output			
Measuring range	50~1000mm			
Linearity	Range of more than 500mm, error ± 0.1% F.S Range of 500mm below the error of ± 500um			
Repeatability	±0.005% F.S.			
Temp. coefficient	±100 ppm/°C			
Operation pressure	30 bar(Max.)			
Ambient temp.	-40°C ~ 85°C			
Operation temp.	-40°C ~ 125°C			
Temp. accuracy	±0.5°C			
Output	4~20mA / 20~4mA			
Max load ( $\Omega$ )	(VS-18)÷0.02 VS=Supply voltage			
Digital output	RS485 (Option)			
Power supply	18~30V			
Housing material	SUS304 (SUS316 Option)			
Connection	M18x1.5			
Wetted material	SUS304(SUS316 Option)			
Enclosure	IP67 (Enclosure) / IP69K (Probe)			

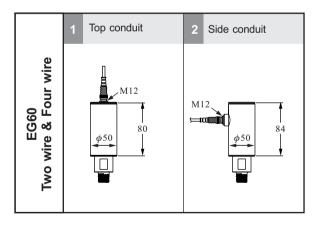
Dimensions (Unit: mm)	M12  80  30  20  Ordered length=L  Upper blank distance 15			
Model No.	EG60 Two wire	EG60 Four wire		
Application	Two wire loop Power output, comply with HART demand.	Four wire output		
Measuring range	50~5500mm 50~2500mm			
Linearity	(50~500mm),0.1mm (50~500mm),0.2mm (50~2000mm),1mm (2001~5500mm),0.05%F.S (500~2500mm),0.02%F (500~2500mm),0.05%F (500~2500mm),0.1%F.			
Repeatability	±0.002% F.S.			
Temp. coefficient	±100 ppm/°C			
Operation pressure	30 bar(	(Max.)		
Ambient temp.	-40°C~	- 85°C		
Operation temp.	$-40^{\circ}$ C ~ 125°C (Std. model) ,-	40~195°C (High temp. model)		
Temp. accuracy	±0.	5°C		
Output	4~20mA/ 20~4mA			
Max load ( $\Omega$ )	(VS-18)÷0.02 VS=Supply voltage $500Ω$			
Digital output	RS485, HART (Option)	RS485 (Option)		
Power supply	18~	30V		
Housing material	SUS304 (SUS	3316 Option)		
Connection	1/2"	PT		
Wetted material	sus	304		
Enclosure	IP67 (Enclosure) / IP69K (Probe)			

# **HOUSING OPTIONS**

# **Mapping Table Of Enclosure**







\* 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
A	S4	52x52x15	E>0.75	30	SUS 316	φ12.7
В	SD	52x52x15	E>0.9	30	SUS 316	φ12.7
→   C  -	SE	75x73x20.5	E>0.9	20	SUS 304 / 316	φ16
	A1	32x69x10.9	E>0.75	10	SUS 316 / 316L	φ8
A	AA	32x69x10.9	E>0.9	10	SUS 316 / 316L	φ8
В	<b>S</b> 3	45x55x15	E>0.7	12	SUS 316	φ12.7
→  c <del> -</del>	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	$\phi$ 18 (coating)
A	P3	48x45x18.5	E>0.6	5	PP in Black	$\phi$ 17.2 (coating)
l i i B	PC	48x45x18.5	E>0.9	5	PP in Black	$\phi$ 17.2 (coating)
→ C ←	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	<i>φ</i> 16
	NE	48x46x20	E>0.9	30	NBR in Black	<i>φ</i> 16

S.G(E):specific gravity

<sup>%</sup> Probe diameter must be smaller then float's hole diameter.

# **WIRING**

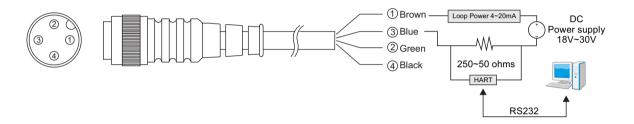
# When RS485(ModBus)is applied,Loop power only as power. EG37 / EG60 (2 wire):

1. Single / Double float +RS485

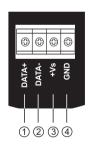
Loop Power 24Vdc±10%

① Brown Loop Power + (CH1)
② Blue Loop Power - (CH1)
② Green RS485 +
④ Black RS485 -

2. Single / Double float +HART



#### EG36:



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

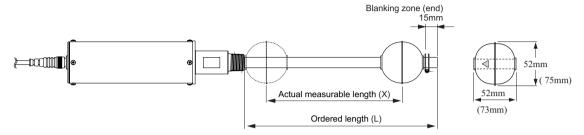
## **CUSTOMIZED STEM LENGTHS ARE AVAILABLE**

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

#### Below 2m, stem $\phi$ 12.7

(2m below)= Actual measurable length (X) =

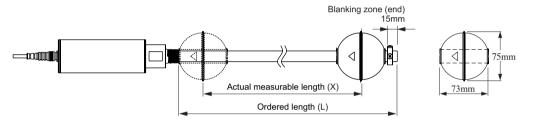
Ordered length (L) - Float length(52mm) - Blanking zone(15mm), adopted stem  $\phi$ 12.7



#### Above 2m,stem $\phi$ 16

(2m above)= Actual measurable length (X) =

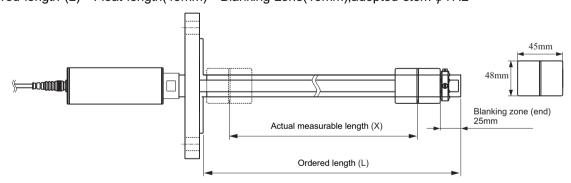
Ordered length (L) - Float length(73mm) - Blanking zone(15mm), adopted stem  $\phi$ 16



#### Below 2m,stem $\phi$ 12.7,with PP coating to $\phi$ 17.2

(2m below)= Actual measurable length (X) =

Ordered length (L) - Float length(45mm) - Blanking zone(15mm), adopted stem  $\phi$ 17.2



## **INSTALLATION**

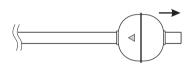
- 1. Loop power 24Vdc ±10%
- 2. The product is calibrated before shipment and should be sufficient to meet user needs.
- 3. Do not bend the stem, put pressure on it or force it in any manner.
- 4. For best results, use the included float only.
- 5. When the mounting hole is large enough, guide the stem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

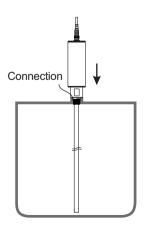
Step 1: Loosen the stopper at stem end

Ring clip

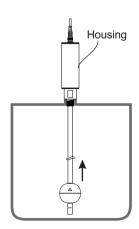
Step 2: Take off the float



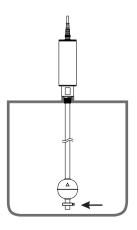
Step 3: Install the sensor onto the tank, and tighten the connection



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

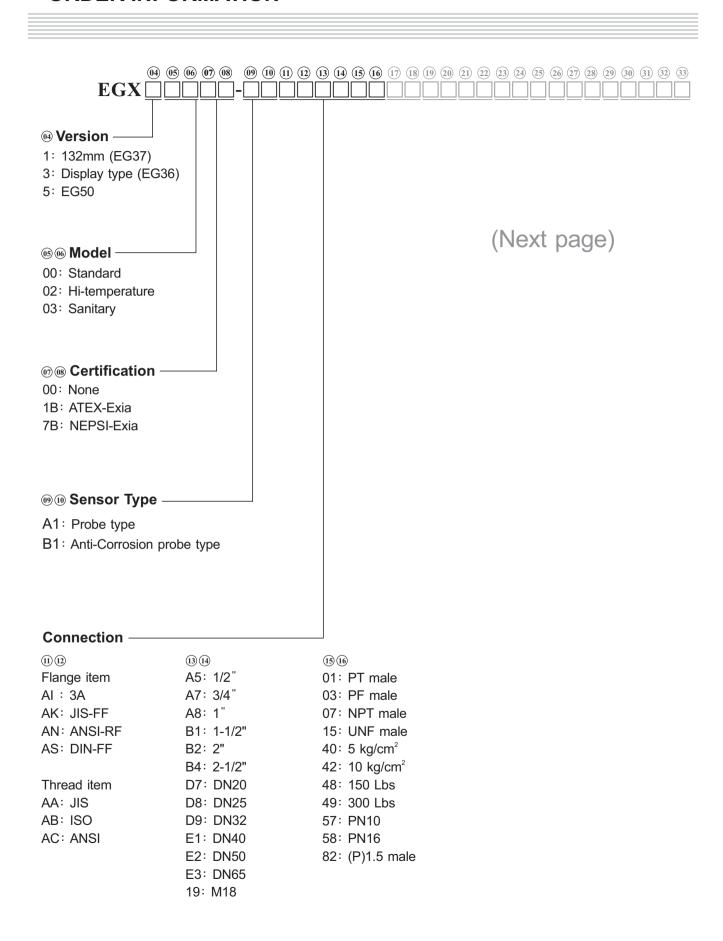


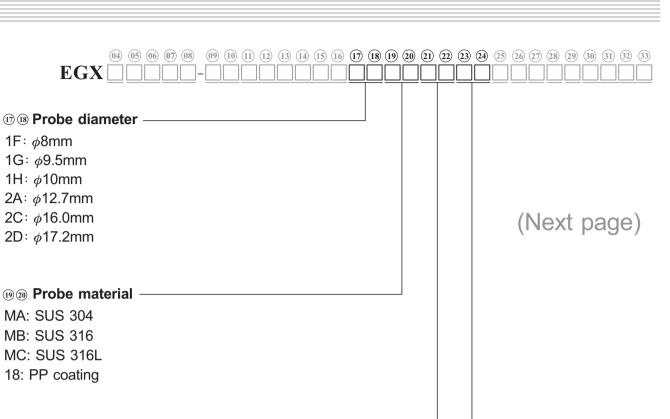
Step 5: Firmly fasten the stopper



# MODEL NUMBER / ORDER CODE COMPARISON TABLE

Model Number	Order Code
Woder Number	Order Code
EG374 Anti-Corrosion type	EGX1001B-B1
EG371 Ex- Proof type	EGX1001B-A1
EG37A Ex- Proof	EGX1021B-A1
High temperature type	EGA 102 IB-A1
EG36 Display type	EGX3001B-A1
EG36 High temperature display type	EGX3021B-A1
EG50	EGX5 DDDD-DD
EG60	EGX6 🗆 🗆 🗆 - 🗆 🗆





#### 21) 22 Float 1 -

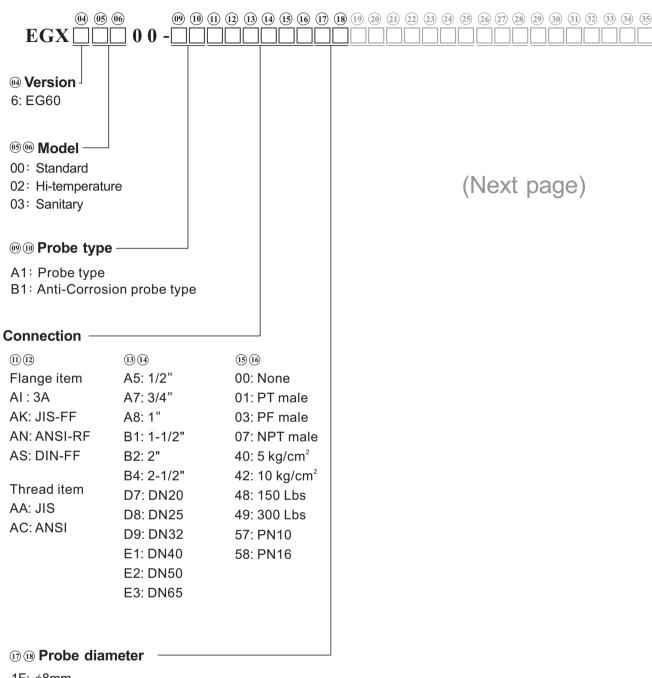
Code	Dimension	Material	S.G
00	None	None	None
S3	45*55*15	SUS316	E>0.7
SC	45*55*15	SUS316	E>0.9
S4	52*52*15	SUS316	E>0.75
SD	52*52*15	SUS316	E>0.9
NB	48*46*15.6	NBR Black	E>0.5
ND	48*46*15.6	NBR Black	E>0.9
F3	45*45*20	PP Gray	E>0.65
FC	45*45*20	PP Gray	E>0.9
P3	48*45*18.5	PP Black	E>0.6
PC	48*45*18.5	PP Black	E>0.9
NC	48*46*20	NBR Black	E>0.5
NE	48*46*20	NBR Black	E>0.9
S5	75*73*20	SUS304/316	E>0.7
SE	75*73*20.5	SUS304/316	E>0.9
A1	32*69*10.9	SUS316/316L	E>0.75
AA	32*69*10.9	SUS316/316L	E>0.9
B1	32.8*8*13.5	Aluminum	None

#### 23 24 Float 2 -

Code	Dimension	Material	S.G
00	None	None	None
SC	45*55*15	SUS316	E>0.9
SD	52*52*15	SUS316	E>0.9
ND	48*46*15.6	NBR Black	E>0.9
FC	45*45*20	PP Gray	E>0.9
PC	48*45*18.5	PP Black	E>0.9
NE	48*46*20	NBR Black	E>0.9
SE	75*73*20.5	SUS304/316	E>0.9
AA	32*69*10.9	SUS316/316L	E>0.9

(4) (15) (6) (97) (18) (19) (11) (12) (13) (14) (15) (16) (17) (18) (19) (21) (21) (22) (23) (24) (25) (26) (27)	27) (2	8) (29	30)	(31)	(32) (3
EGX	ĺ	ĺĽ		$\check{\square}$	ĎÙ
TT	Π				
s Analog output					
0: None					
A: 4~20mA					
B: 20~4mA					
L:4~20mA x 2 sets(EG50 only)					
M:20~4mA x 2 sets(EG50 only)					
Digital output					
0: None					
B: RS-485					
C: RS485 (RS485 with temperature x 1pcs) E: HART					
F: HART 7.3 with temperature sensor x 1pcs					
World RS485 can be seleted for EG50.					
A Only No-100 can be colored for Ecoc.					
② Housing ————————————————————————————————————	]				
A: Top conduit					
B: Side conduit					
® Response time					
A: 16 Hz (EG36 , EG37) C: <1KHz (EG5)					
Material and surface roughness ———————————————————————————————————					
0: None					
A: Ra < 0.3					
B: Ra < 0.5					
C: Ra < 0.8					
(9) (3) (3) 3) Length ————————————————————————————————————	—				
Code Probe Length					
0050~5500 50~5500mm					

※ Max. probe length for EG5 is 1000m.



1F: *φ*8mm 2A: *φ*12.7mm 2D: *φ*17.2mm

\* PT100 is not available for dia.8 mm probe

- Suggested max. length for dia.8mm probe is less than 1000mm, to prevent risks on installation and transportation.
- Suggested min. dia.17.2mm probe if for more than 2000mm measuring range, to prevent risks on installation and transportation.
- \* Diameter for PP coated probe is 17.2mm, suggested the measuring range to be less than 2000mm



#### 19 20 Probe material

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

(Next page)

#### 21)22 Float 1

Code	Dimension	Material	S.G
00	None	None	None
S3	45*55*15	SUS316	E>0.7
SC	45*55*15	SUS316	E>0.9
S4	52*52*15	SUS316	E>0.75
SD	52*52*15	SUS316	E>0.9
NB	48*46*15.6	NBR Black	E>0.5
ND	48*46*15.6	NBR Black	E>0.9
F3	45*45*20	PP Gray	E>0.65
FC	45*45*20	PP Gray	E>0.9
P3	48*45*18.5	PP Black	E>0.6
PC	48*45*18.5	PP Black	E>0.9
NC	48*46*20	NBR Black	E>0.5
NE	48*46*20	NBR Black	E>0.9
S5	75*73*20	SUS304/316	E>0.7
SE	75*73*20.5	SUS304/316	E>0.9
A1	32*69*10.9	SUS316/316L	E>0.75
AA	32*69*10.9	SUS316/316L	E>0.9
B1	32.8*8*13.5	Aluminum	None

#### 33 4 Float 2 —

Code	Dimension	Material	S.G
00	None	None	None
SC	45*55*15	SUS316	E>0.9
SD	52*52*15	SUS316	E>0.9
ND	48*46*15.6	NBR Black	E>0.9
FC	45*45*20	PP Gray	E>0.9
PC	48*45*18.5	PP Black	E>0.9
NE	48*46*20	NBR Black	E>0.9
SE	75*73*20.5	SUS304/316	E>0.9
AA	32*69*10.9	SUS316/316L	E>0.9

25 Input -

A: 2 wire B: 4 wire

