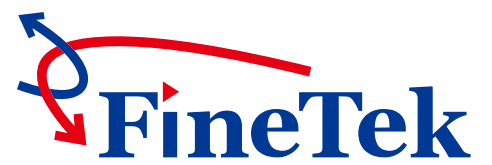




## RF Admittance Level Transmitter



[www.fine-tek.com](http://www.fine-tek.com)

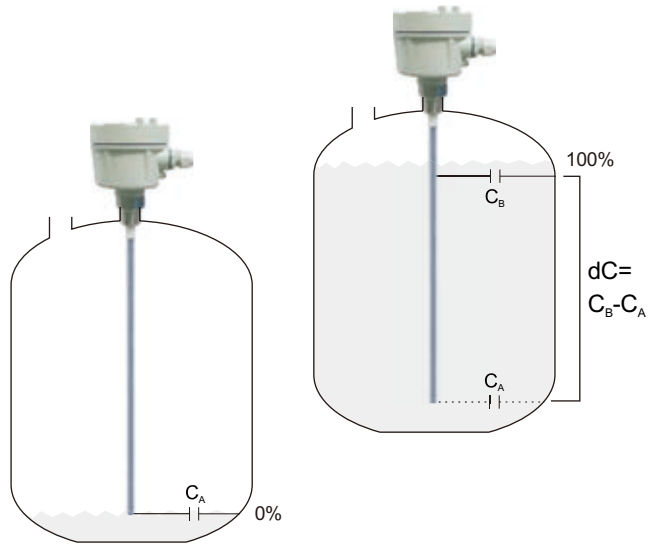


# PRODUCT INTRODUCTION

## PRINCIPLE

RF Admittance Level Transmitter utilizes the capacitance formed between the sensing probe and the reference probe or the metal vessel wall to calculate the level of the medium inside the vessel according to the capacitance theory that the capacitance and vessel are proportional increased.

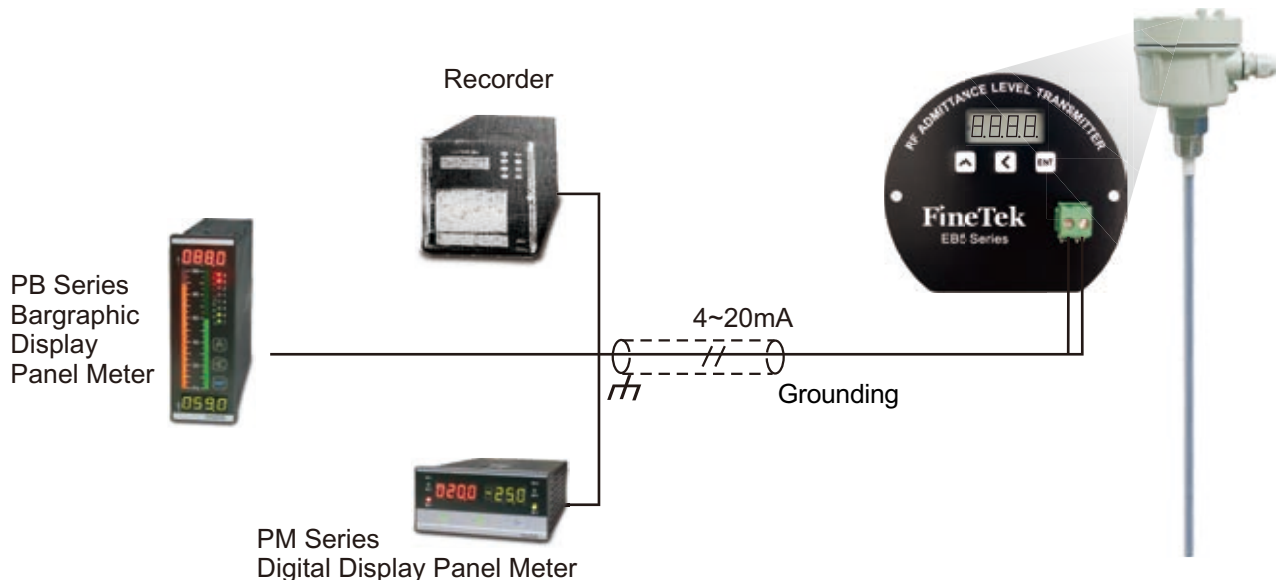
When the probe is surrounding by the air, little capacitance ( $C_A$ ) is measured by the equivalent capacitor, the capacitance increase gradually as computing media, the max. capacitance ( $C_B$ ) will be measured while the tank is full, the difference ( $dC$ ) between  $C_A$  and  $C_B$  is proportional to the level. (Recommend range  $dC = 25 \sim 2000 \text{ pF}$ )



## FEATURES

- 4~20mA 2 wire Loop power
- Low consumption of power (20mA Max)
- High accuracy of linearity ( $< \pm 1\% \text{ FS}$  or  $\pm 0.5\text{pF}$ )
- Temperature compensation, low temperature effect ( $\pm 0.2\% \text{ FS}/^\circ\text{C}$  or  $0.1\text{pF}/^\circ\text{C}$ )
- Easy calibration (Any 2 points for calibration)
- No blind distance, ideal for different tanks
- Suitable for high temperature, high pressure and corrosive environment
- LCD local display

## APPLICATION EXAMPLE



# APPLICATION EXAMPLE

	EB5200	EB5201	EB52A0	EB52A1	EB5300	EB5301	EB53A0	EB53A1	EB5400	EB54A0
Conductive Tank	★	★	★	★	★	★	★	★	✗	✗
Non-Conductive Tank	▲	▲	▲	▲	✗	✗	✗	✗	★	★
Height of Vessel > 4m	✗	✗	✗	✗	★	★	★	★	✗	✗
Height of Vessel < 4m	★	★	★	★	—	—	—	—	★	★
Operation Temperature > 80°C (Not more than 200°C)	✗	★	✗	★	✗	★	✗	★	✗	✗
Dielectric Constant of Media>4	✗	✗	★	★	✗	✗	★	★	✗	★
Dielectric Constant of Media<4	★	★	—	—	★	★	—	—	★	—
Corrosive Media	✗	✗	★	★	✗	✗	★	★	✗	★
Agitator inside the vessel	▲	▲	▲	▲	✗	✗	✗	✗	—	—
★ Good    ▲ Pipe shield is suggested    ✗ Unsuitable    — Fair										

	EB5200	EB5201	EB52A0	EB52A1	EB5300	EB5301	EB53A0	EB53A1	EB5400	EB54A0
Aqueous Solution	✗	✗	★	★	✗	✗	★	★	✗	★
Oil Solution	▲	▲	✗	✗	✗	✗	✗	✗	✗	✗
Acid or Akali Solution	✗	✗	✗	✗	✗	✗	✗	✗	✗	★
Feed & Grain	★	★	✗	✗	★	★	✗	✗	✗	✗
Mining & Cement	★	★	✗	✗	★	★	✗	✗	✗	✗
★ Good    ▲ Pipe shield is suggested    ✗ Unsuitable										

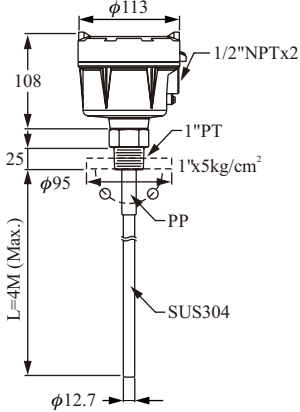
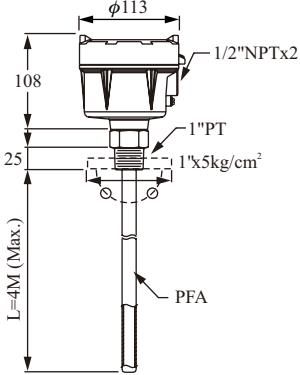
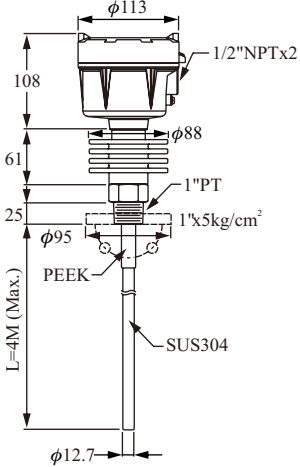
## DIELECTRIC CONSTANTS CHART

Material	Dielectric Constant	Material	Dielectric Constant	Material	Dielectric Constant	Material	Dielectric Constant
Air	1	Heavy Oil	2.6~3.0	Cement	4~6	Acetone	20~30
Gasoline	1.9	Grain	2.5~4.5	Butanol	11	Carbide Powder	25~30
Diesel	2.1	Corn	2.3~2.6	Ethanol	16~31	Sulfuric Acid	84
Edible Oil	2~4	Rice	3~8	Ammonia	21	Water	81

## WIRING AND CAUTION

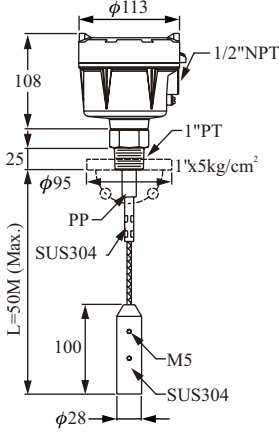
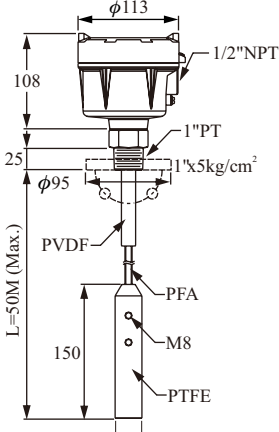
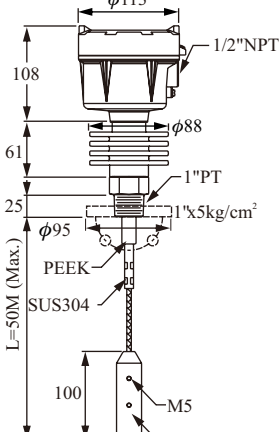
- After installation of the Admittance Level Transmitter on the top of tank, please make sure the cover of the transmitter is contacted with tank perfectly. Please avoid the grounding of panel meter to touch the tank wall.
- While the panel meter is not supplied with a power supply, please prepare a 24V power supply for use.
- The max cable length is depends on the max resistance .Maximum resistance is not to exceed  $(V_s-22) \times 50\Omega$  to ensure the accuracy of measurement.
- Make sure to separate the signal cable with other big power cables (such as pump, conveyor and solenoid valve)while wiring. Before turning on power, make sure all wirings are correct.
- Connect isolation cable with GND of power.
- If there is heater or other electric device in the application, contacting the cover of the transmitter and tank can decrease EMI.

# STANDARD TYPE

<b>Dimensions (unit:mm)</b>	 <p>Suitable for middle/ small tank Media : non-conductive material low moisture material</p>	 <p>Suitable for middle/big tank Media: Dielectric Constant &gt;4 Conductive Material</p>	 <p>Suitable for middle/ small tank Media : non-conductive material low moisture material</p>
<b>Model No.</b>	<b>EB5200 Rod Probe</b>	<b>EB52A0 Rod Coating Type</b>	<b>EB5201 Hi-Temp Rod Probe</b>
<b>Probe material</b>	SUS304	SUS304 with PFA Coating	SUS304
<b>Ambient temperature</b>	-40~85°C	-40~85°C	-40~85°C
	LCD monitor: -20~85°C	LCD monitor: -20~85°C	LCD monitor: -20~85°C
<b>Operating temperature</b>	-40~85°C	-40~85°C	-40~200°C
<b>Operation voltage</b>	18~30Vdc	18~30Vdc	18~30Vdc
<b>Analog output</b>	4~20mA(two wire)	4~20mA(two wire)	4~20mA(two wire)
<b>Digital output</b>	HART(option)	HART(option)	HART(option)
<b>Measuring range</b>	20~2000pF	20~2000pF	20~2000pF
<b>Accuracy</b>	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF
<b>Effect temp.</b>	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C
<b>Protection</b>	IP65	IP65	IP65
<b>Connection</b>	1"PT or 1"x5kg/cm² flange	1"PT or 1"x5kg/cm² flange	1"PT or 1"x5kg/cm² flange
<b>Weight</b>	Approx. 2.3kg(1m)	Approx. 2.3kg(1m)	Approx. 2.8kg(1m)
<b>Operating pressure</b>	40kg/cm²	32kg/cm²	40kg/cm²

Note :Hi-Temp Wire Coating Type is available, the model is EB52A1 with PFA Coating

# STANDARD TYPE

<b>Dimensions (unit:mm)</b>	 <p>Suitable for middle/ small tank Media : non-conductive material low moisture material</p>	 <p>Suitable for middle/big tank Media: Dielectric Constant &gt;4 Conductive Material</p>	 <p>Suitable for middle/ small tank Media : non-conductive material low moisture material</p>
<b>Model No.</b>	<b>EB5300 Cable Type</b>	<b>EB53A0 Cable Coating Type</b>	<b>EB5301 Hi-Temp Cable Type</b>
<b>Probe material</b>	SUS304	SUS304 with PFA Coating	SUS304
<b>Weight material</b>	SUS304	PTFE	SUS304
<b>Ambient temperature</b>	-40~85°C LCD monitor: -20~85°C	-40~85°C LCD monitor: -20~85°C	-40~85°C LCD monitor: -20~85°C
<b>Operating temperature</b>	-40~85°C	-40~85°C	-40~200°C
<b>Tensile strength</b>	2000Kgf	2000Kgf	2000Kgf
<b>Operation voltage</b>	18~30Vdc	18~30Vdc	18~30Vdc
<b>Analog output</b>	4 ~20mA(two wire)	4 ~20mA(two wire)	4 ~20mA(two wire)
<b>Digital output</b>	HART(option)	HART(option)	HART(option)
<b>Measuring range</b>	20~2000pF	20~2000pF	20~2000pF
<b>Accuracy</b>	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF
<b>Effect temp.</b>	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C
<b>Protection</b>	IP65	IP65	IP65
<b>Connection</b>	1"PT or 1"x5kg/cm <sup>2</sup> flange	1"PT or 1"x5kg/cm <sup>2</sup> flange	1"PT or 1"x5kg/cm <sup>2</sup> flange
<b>Weight</b>	Approx. 2.3kg(1m)	Approx. 2.3kg(1m)	Approx. 2.8kg(1m)
<b>Operating pressure</b>	40kg/cm <sup>2</sup>	32kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>

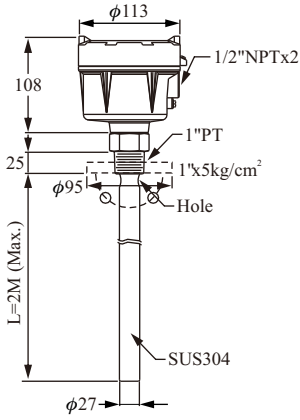
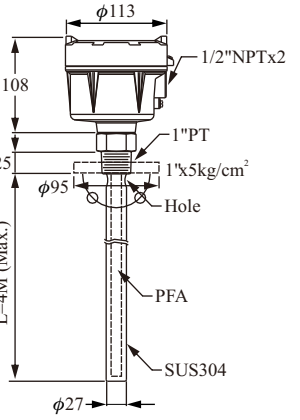
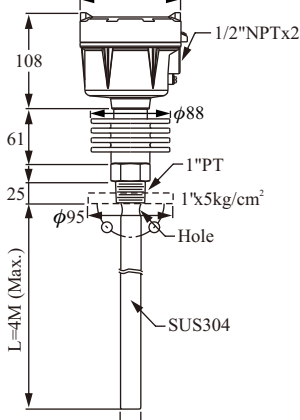
Note :Hi-Temp Wire Coating Type is available, the model is EB53A1 with PFA Coating

# STANDARD TYPE

Dimensions (unit:mm)	<p>Suitable for middle/ small non-conductive tank Media : non-conductive material low moisture material</p>	<p>Suitable for middle/ small non-conductive tank Media: Conductive Material</p>
	<p><b>Model No.</b></p> <p><b>EB5400 Two Rode Probe</b></p>	<p><b>EB54A0 Two Coating Rode Probe</b></p>
Probe material	SUS304	SUS304 with PP / PFA Coating
Ambient temperature	-40~85°C	-40~85°C
	LCD monitor: -20~85°C	LCD monitor: -20~85°C
Operating temperature	-40~85°C	-40~85°C
Operation voltage	18~30Vdc	18~30Vdc
Analog Output	4 ~20mA(two wire)	4 ~20mA(two wire)
Digital output	HART(option)	HART(option)
Measuring range	20~2000pF	20~2000pF
Accuracy	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF
Effect temp.	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C
Protection	IP65	IP65
Connection	2"x5kg/cm <sup>2</sup> flange	2"x5kg/cm <sup>2</sup> flange
Weight	Approx. 2.3kg(1m)	Approx. 2.3kg(1m)
Operating pressure	5kg/cm <sup>2</sup>	5kg/cm <sup>2</sup>

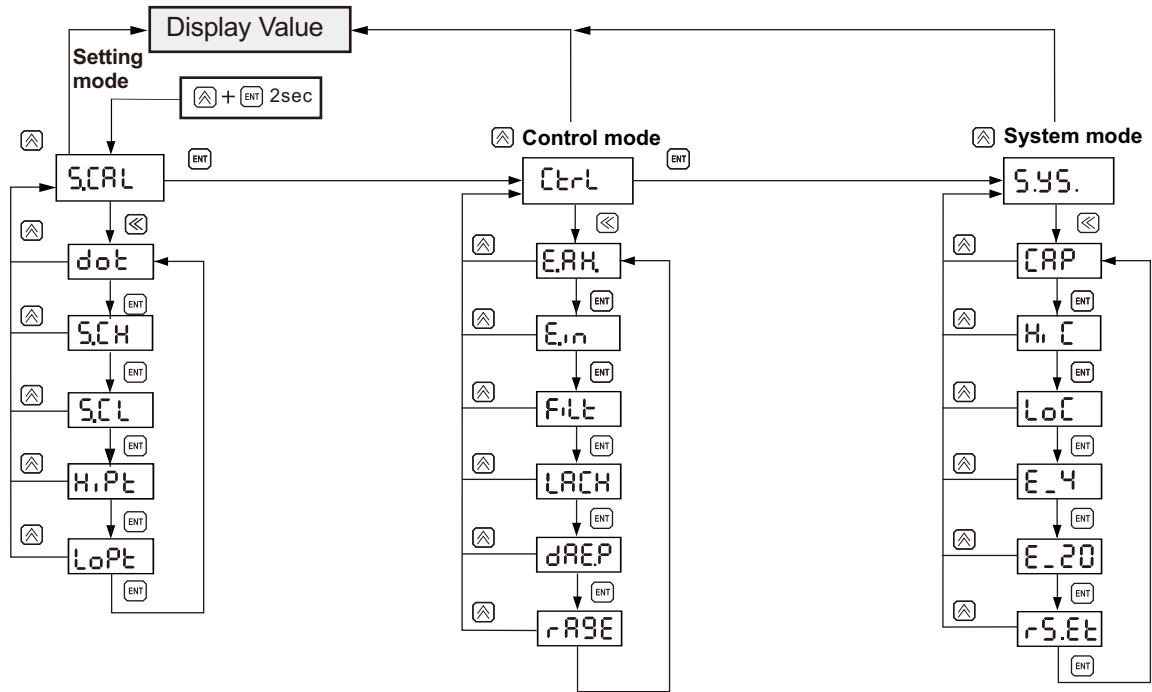
Note:Min. Connection is 2" flange

# STANDARD TYPE

<b>Dimensions (unit:mm)</b>	 <p>Suitable for middle/ small tank Media : non-conductive material low moisture material</p>	 <p>Suitable for middle/big tank Media: Dielectric Constant &gt;4 Conductive Material</p>	 <p>Suitable for middle/ small tank Media : non-conductive material low moisture material</p>
<b>Model No.</b>	<b>EB5500 Anti-wave tube Type</b>	<b>EB55A0 Anti-wave tube Type</b>	<b>EB5501 Hi-Temp Anti-wave tube Type</b>
<b>Probe material</b>	SUS304	SUS304 with PFA Coating	SUS304
<b>Ambient temperature</b>	-40~85°C	-40~85°C	-40~85°C
	LCD monitor: -20~85°C	LCD monitor: -20~85°C	LCD monitor: -20~85°C
<b>Operating temperature</b>	-40~85°C	-40~85°C	-40~200°C
<b>Operation voltage</b>	18~30Vdc	18~30Vdc	18~30Vdc
<b>Analog output</b>	4~20mA(two wire)	4~20mA(two wire)	4~20mA(two wire)
<b>Digital output</b>	HART(option)	HART(option)	HART(option)
<b>Measuring range</b>	20~2000pF	20~2000pF	20~2000pF
<b>Accuracy</b>	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF	± 1% FS or ± 0.5pF
<b>Effect temp.</b>	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C	< ± 0.2% FS/°C or 0.1pF/°C
<b>Protection</b>	IP65	IP65	IP65
<b>Connection</b>	1"PT or 1"x5kg/cm <sup>2</sup> flange	1"PT or 1"x5kg/cm <sup>2</sup> flange	1"PT or 1"x5kg/cm <sup>2</sup> flange
<b>Weight</b>	Approx. 2.3kg(1m)	Approx. 2.3kg(1m)	Approx. 2.8kg(1m)
<b>Operating pressure</b>	40kg/cm <sup>2</sup>	32kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>

Note :Hi-Temp Wire Coating Type is available, the model is EB55A1 with PFA Coating

# CALIBRATION & SETUP



A: A B: b C: C D: d E: E F: F G: 9 H: H I: I J: J  
 K: k L: L M: E N: n O: o P: P Q: 9 R: r S: S T: t  
 U: U V: u W: 3 X: H Y: y Z: 2

Main Menu	Sub-Menu	Range	Default	Description
SCAL	dot	0~3	1	Decimal point setting
	SCH	-1999~9999	100.0	20mA corresponding display value
	SCL	-1999~9999	0	4mA corresponding display value
	H.Pt	-1999~9999	100.0	Value for high point (Hipt).
	LoPt	-1999~9999	0	Value for low point (Lopt).
Ctrl	ERH	SAVE,RSET BACK	SAVE	Memory for max & mini value during operation. SAVE: Save value into Eeprom REST: Clean present value and memory BACK: Go back to sub-menu
	E.in	SAVE,RSET BACK	SAVE	
	FilT	Lo,MID,HI	LO	Software Filter
	LACH	ON, OFF	OFF	Output latch
	dREP	1~60sec	1	Reflash time
	rRGE	HI,Lo	HI	Measuring range
SYS.	CAP	0~9999		Capacity Value
	HiC	0~9999	2200	High point Capacity Value
	LoC	0~9999	200	Low point Capacity Value
	E_4	-1999~9999	0	4mA fine turn
	E_20	-1999~9999	0	20mA fine turn
	rS.Et			Load default

Note 1: The setting of Hipt, LoPt please refer to calibration procedures on the manual

Note 2: The output will latch when display is 110% or -10%

Note 3: Re-Calibration is necessary if measuring range is changed

# ORDER INFORMATION

EB 5 2 0 0 - HM 5 0 0 0

**ORDER NO.** \_\_\_\_\_

- 52: Rod Probe Type
- 53: Cable Type
- 54: Two Rod Probe Type
- 55: Anti-wave tube Type

**MATERIAL** \_\_\_\_\_

- Metal Probe**            0: SUS304    6: SUS316
- Plastic Coated Probe**    A: PFA

**TEMPERATURE RESISTANCE** \_\_\_\_\_

- 0: Standard (max.85°C)
- 1: Hi-Temp Type (max.200°C)

**COMMUNICATION** \_\_\_\_\_

- : None
- H: HART

**CONNECTING** \_\_\_\_\_

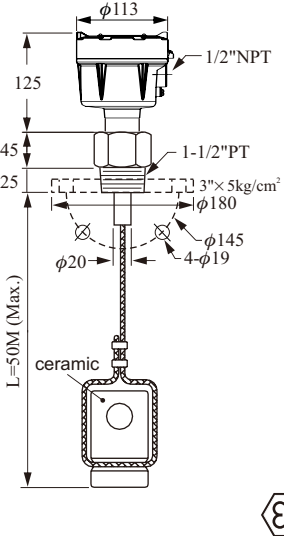
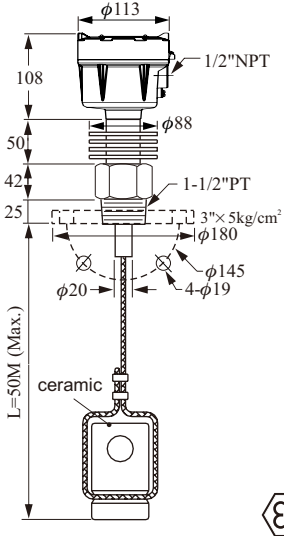
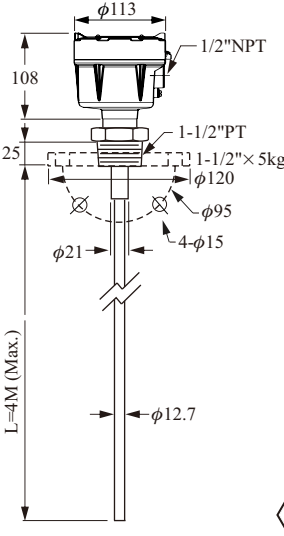
Dimension	Specification	
D --- 1"	M --- 5kg/cm <sup>2</sup>	Q --- PT
E --- 1-1/2"	N --- 10kg/cm <sup>2</sup>	R --- PF(G)
F --- 2"	O --- 150 Lbs	T --- BSP
G --- 2-1/2"	P --- 300 Lbs	U --- NPT
H --- 3"	W--- PN10	V --- GAS
I --- 4"	X --- PN16	S --- others
J --- 5"	Y --- PN25	
K --- 6"	Z --- PN40	
S --- others		

**PROBE LENGTH (Unit: mm)** \_\_\_\_\_

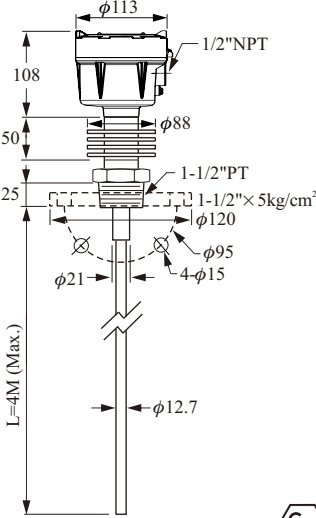
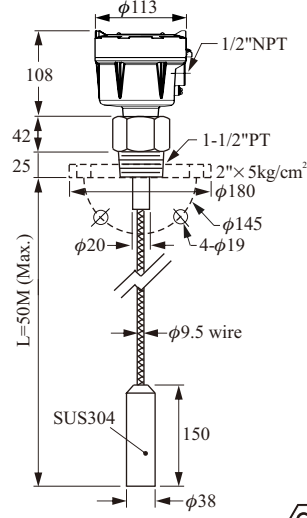
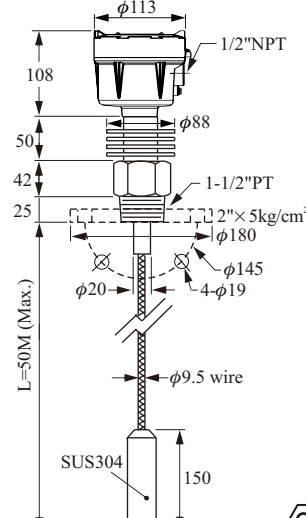
- 0500:** below 500mm
  - 1000:** 501~1000mm
  - 1500:** 1001~1500mm
  - ⋮
  - ⋮
- ※ 500mm per Unit
  - ※ Use English letter as first code for probe length over 10m.  
A150 represents 15m, A200 represents 20m

\* Tolerance of the total product length is ±5mm  
 \* Characteristics, specifications and dimensions are subject to change without notice.  
 \* Please contact your nearest distributing office for further informations.

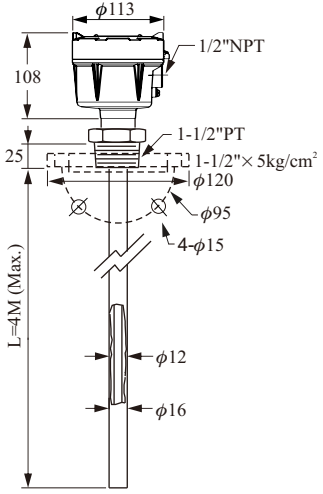
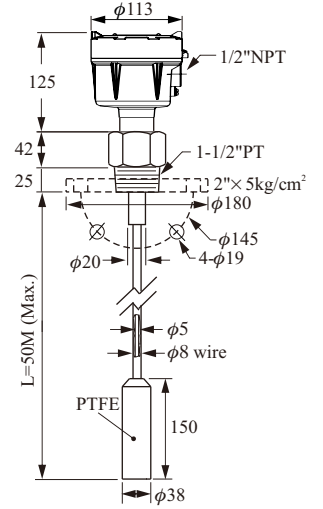
# EXPLOSION PROOF TYPE

<p><b>Dimensions</b> (unit:mm)</p>	 <p>Suitable for non-conductive material and big tank.</p>	 <p>Suitable for non-conductive material and big tank.</p>	 <p>Suitable for non-conductive material and middle-size tank.</p>
<b>Model No.</b>	<b>EB1710 Wire Probe</b>	<b>EB1711 Hi-Temp Wire Probe</b>	<b>EB1720 Rod Probe</b>
<b>Probe material</b>	SUS304	SUS304	SUS304/316
<b>Weight material</b>	CERAMIC	CERAMIC	——
<b>Ambient temperature</b>	-20~70°C	-20~70°C	-20~70°C
<b>Operating temperature</b>	-40~80°C	-40~200°C	-40~80°C
<b>Tensile strength</b>	2000Kgf	2000Kgf	——
<b>Operation voltage</b>	12~36Vdc	12~36Vdc	12~36Vdc
<b>Output current</b>	4 ~20mA(two wire)	4 ~20mA(two wire)	4 ~20mA(two wire)
<b>Measuring range</b>	0~5000pF	0~5000pF	0~5000pF
<b>Accuracy</b>	± 1%FS (25°C)	± 1%FS (25°C)	± 1%FS (25°C)
<b>Protection</b>	IP65	IP65	IP65
<b>Connection</b>	3"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw	3"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw	1-1/2"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw
<b>Weight</b>	Approx. 3.7kg(1M)	Approx. 4.2kg(1M)	Approx. 2.3kg(1M)
<b>Operating pressure</b>	40kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>

# EXPLOSION PROOF TYPE

<p><b>Dimensions</b> (unit:mm)</p>	 <p>Suitable for non-conductive material and middle-size tank.</p>	 <p>Suitable for non-conductive material and big tank.</p>	 <p>Suitable for non-conductive material and big tank.</p>
<b>Model No.</b>	<b>EB1721 Hi-Temp Rod Probe</b>	<b>EB1730 Wire Probe</b>	<b>EB1731 Hi-Temp Wire Probe</b>
<b>Probe material</b>	SUS304/316	SUS304	SUS304
<b>Weight material</b>	—	SUS304	SUS304
<b>Ambient temperature</b>	-20~70°C	-20~70°C	-20~70°C
<b>Operating temperature</b>	-40~200°C	-40~80°C	-40~200°C
<b>Tensile strength</b>	—	2000Kgf	2000Kgf
<b>Operation voltage</b>	12~36Vdc	12~36Vdc	12~36Vdc
<b>Output current</b>	4 ~20mA(two wire)	4 ~20mA(two wire)	4 ~20mA(two wire)
<b>Measuring range</b>	0~5000pF	0~5000pF	0~5000pF
<b>Accuracy</b>	± 1%FS (25°C)	± 1%FS (25°C)	± 1%FS (25°C)
<b>Protection</b>	IP65	IP65	IP65
<b>Connection</b>	1-1/2"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw	2"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw	2"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw
<b>Weight</b>	Approx. 2.8kg(1M)	Approx. 2.3kg(1M)	Approx. 2.8kg(1M)
<b>Operating pressure</b>	40kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>

# EXPLOSION PROOF TYPE

<b>Dimensions</b> (unit:mm)	 <p>EB1740 --- PVDF Coating <math>\text{Ex}</math>                  EB1742 --- PP Coating                  EB1743 --- FEP Coating                  Suitable for conductive/ corrosive material and middle-size tank.</p>	 <p>EB1752 --- PP Coating <math>\text{Ex}</math>                  EB1753 --- FEP Coating <math>\text{Ex}</math>                  Suitable for conductive/ corrosive material and big tank.(weight can not be fixed at the bottom of tank)</p>
<b>Model No.</b>	<b>EB1740/42/43 Anti-Corrosion</b>	<b>EB1752/53 Anti-Corrosion Wire Probe</b>
<b>Probe material</b>	SUS304+Coating	SUS304+Coating
<b>Weight material</b>	————	SUS304+PTFE
<b>Ambient temperature</b>	-20~70°C	-20~70°C
<b>Operating temperature</b>	-40~80°C	-40~80°C
<b>Tensile strength</b>	————	2000Kgf
<b>Operation voltage</b>	12~36Vdc	12~36Vdc
<b>Output current</b>	4 ~20mA(two wire)	4 ~20mA(two wire)
<b>Measuring range</b>	0~5000pF	0~5000pF
<b>Accuracy</b>	± 1%FS (25°C)	± 1%FS (25°C)
<b>Protection</b>	IP65	IP65
<b>Connection</b>	1-1/2"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw	2"x5kg/cm <sup>2</sup> flange or 1-1/2"PT screw
<b>Weight</b>	Approx. 2.3kg(1M)	Approx. 2.3kg(1M)
<b>Operating pressure</b>	40kg/cm <sup>2</sup>	40kg/cm <sup>2</sup>

# ORDER INFORMATION

EB 1 7 1 0 HM 5 0 0 0

**ORDER NO.** \_\_\_\_\_

- 1710 --- Wire Probe Type
- 1711 --- Hi-Temp Wire Probe Type
- 1720 --- Rod Type
- 1721 --- Hi-Temp Rod Probe Type
- 1730 --- Wire Probe Type
- 1731 --- Hi-Temp Wire ProbeType
- 174□ --- Anti-Corrosion (1740: PVDF 1742: PP 1743: FEP)
- 175□ --- Anti-Corrosion with Wire-probe weight  
(1752: PP 1753: FEP)

**CONNECTING** \_\_\_\_\_

Dimension	Specification
D --- 1"	M --- 5kg/cm <sup>2</sup> U --- NPT
E --- 1-1/2"	N --- 10kg/cm <sup>2</sup> V --- GAS
F --- 2"	O --- 150 Lbs S --- others
G --- 2-1/2"	P --- 300 Lbs
H --- 3"	W--- PN10
I --- 4"	X --- PN16
J --- 5"	Y --- PN25
K --- 6"	Z --- PN40
S --- others	Q --- PT
	R --- PF(G)
	T --- BSP

**PROBE LENGTH (UNIT: mm)** \_\_\_\_\_

- 0500:** below 500mm
  - 1000:** 501~1000mm
  - 1500:** 1001~1500mm
  - ⋮
  - ⋮
- ※ 500mm per Unit
  - ※ Use English letter as first code for probe length over 10m.  
A150 represents 15m, A200 represents 20m

\* Tolerance of the total product length is ±5mm  
 \* Characteristics, specifications and dimensions are subject to change without notice.  
 \* Please contact your nearest distributing office for further informations.

# INSTALLATION

1. Please choose Two Rod Probe type for non conductive tank (Fig.1), or install a concentric circles metal pipe shield with vent hole at the top outside the probe (Fig. 2)
2. The rod or wire probe should be parallel to the tank wall. To prevent material from sticking between the probe and tank wall, the probe shouldn't be too close to the tank wall.
3. If the container is irregular-shaped, such as a cylindrical, and the medium is liquid with low viscosity, the rod should be placed inside a concentric circles metal pipe shield with vent hole at the top.(Fig. 2)
4. Coating Probe type is necessary for conductive media (eg. Water...) , as the bare electrode can't operation normally in conductive media.
5. During the installation, the process connection should be grounded. An installation without proper grounding will not guarantee normal operation of the device later on.
6. For non-conductive medium of powder or granules in big tank, the wire probe should be fixed to the bottom of tank
7. When all electrical connections inside of Admittance Level Transmitter housing are finished, the housing cover and the conduit opening should be sealed and tightened to prevent moisture from soaking in.
8. If an agitator is in place (see fig. 4), a pipe shield outside the probe is recommended.

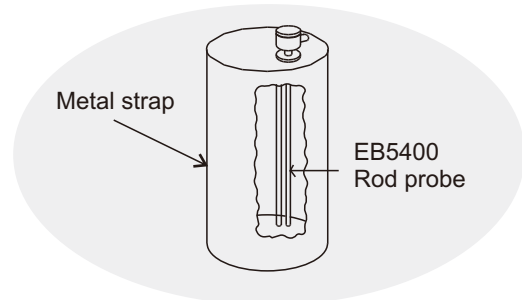


Fig. 1

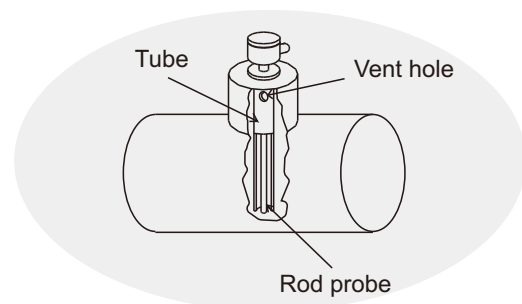


Fig. 2

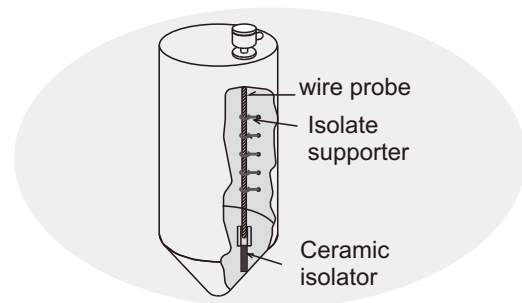


Fig. 3

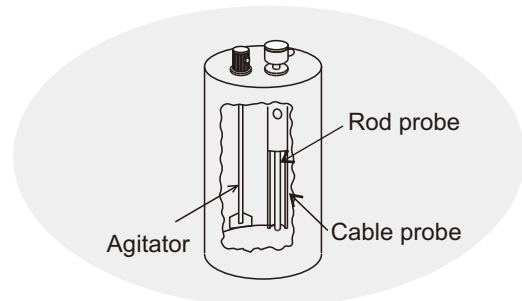


Fig. 4