



EPD34 Electromagnetic Flow Meter Operation Manual



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1. Reading Labels

Thanks for purchasing FineTek's Product. This operation manual describes the product features, working principles, operation and maintenance methods. It makes the user fully understand how to use the product correctly, so as to prevent dangerous situations such as device damage or operator injury.

- Please read this operation manual completely and carefully before using the product.
- Please contact the company if this operation manual can't satisfy your demands.
- The content of the operation manual is updated based on the version upgrade, which will be uploaded to the website for the user to access.
- Please don't disassemble or repair the product on your own, as this will make you disqualified from availing of the warranty service. Please send the product back to the company for repair and calibration, or just contact the company.
- Explanation of warning signs:



Danger→ It indicates that wrong operation will cause death or major disasters.



Note→ It indicates that wrong operation will cause injury and device damage to some extent.



Electric shock→ It warns of possible electric shock.



Fire→ It warns of possible fire.



Prohibited→ It indicates the prohibited wrong behavior.

2. Product Warranty

2.1 New Product Warranty

- We don't charge for the inspection, part/s and repair for the product of the company that has a defect within 12 months from the delivery date and meets the warranty terms.
- If the product defect is not due to human error during its transportation, user may change to a new unit from the company within 7 days from delivery date.
- When the product needs to be sent back to the factory for repair, please send the whole set, and don't disassemble the parts. Moreover, please be sure it is completely packed to avoid damage and causing more loss and defect during the transportation.
- The warranty is not available for causes that fall under the following circumstances, for which the company shall charge for the inspection, part/s and repair according to the actual condition:
 - The product or its parts are beyond the warranty period.
 - Fault or damage is caused by not following the instruction and use environment described on the operation manual.
 - The product damage is caused by a force majeure factor (natural disasters, floods, fire, earthquakes, lightning, typhoon, etc.), human destruction (scratches, dropping, latch broken, tapping, cracks and punching), human error (using improper voltage, high-humidity, water leakage, stain, corrosion, loss, improper storage, etc.) and other abnormal factors.
 - The damage is caused by the customer or the 3rd party through the installation, addition, expansion, modification and repair of parts not authorized or certified by the company.
 - The volume label information is wrong or unclear, so the product serial number can't be confirmed.

2.2 Repair Warranty

A **6-month** warranty service is provided for the repaired part of the product, during which the same product can be repaired free of charge in case of the same fault.

2.3 Service Network

Company	Address	Telephone	Fax
Taipei Headquarters (Taiwan)	No.16, Tzuchiang St., Tucheng Industrial Park, New Taipei City 23678	+886 2-2269-6789	+886 2-2268-6682
Taichung Sales office (Taiwan)		+886 4-2465-2820	+886 4-2463-9926
Kaohsiung Sales office (Taiwan)		+886 7-333-6968	+886 7-536-8758
Shanghai Fine Auto Co., Ltd. (China)	No. 451, Duhui Road, Zhuangqiao Township, Minhang District, Shanghai City 201109	+86 021-64907260	+86 021-6490-7276
Beijing Sales office (China)	Room D921, Fuli Mogan Center, No. 6, Taiping Street, Xicheng District, Beijing City(100050)	+86 010-59361535	+86 010-59361512
Guangzhou Sales office (China)	Room 1605, 1606, Jinxiu Joint Business Building, No. 1, Tianhe Road, Yuexiu District, Guangzhou City (510075)	+86 020-38461387	+86 02038461397
Wuhan Sales office (China)	Room 2101-2102, Building B, Century Plaza, No. 14, Zhongnan Road, Wuchang District, Wuhan City	+86 27-87332314 +86 27-87332324	+86 027-87332341
Jinan Sales office (China)	Room 1222, 1223, Tianye International Plaza, No. 264, Quancheng Road, Lixia District, Jinan City (250011)	+86 531-83173652 +86 531-83173670	+86 31-83173670
Nanjing Sales office (China)	Room 1709, Everest Building, No. 19, Zhongyang Road, Gulou District, Nanjing City (210008)	+86 025-83176832 +86 025-83176833	+86 025-83176831
Chengdu Sales office (China)	Room 1509, Building 2, LANDMARK, No. 51, S 4 th Section, 2 nd Ring Road, Wuhou District, Chengdu City (610041)	+86 028-84087414 +86 028-85590364	+86 028-84087413
Shenyang Sales office (China)	Room 2501, Building B, 1 st Mall, No. 1-1, Jianshe Middle Road, Tiexi District, Shenyang District(110026)	+86 024-85611026	+86 024-85611053
Zhengzhou Sales office (China)	Room 1304, Wancheng Times Sqaure, No.9, Jianshe Road, Zhongyuan District. Zhenazhou Citv	+86 0371-55638443	+86 0371-55638440
Finetek Pte Ltd. (Singapore Branch)	60 Kaki Bukit Place #07-06, Eunos Techpark 2 Lobby B, Singapore 415979.415979	+65 6452-6340	+65 6734-1878
FineTeK GmbH (Germany Branch)	Frankfurter Str. 62, OG D-65428 Ruesselsehim, Germany	+49 (0)6142-17608-0	+49 (0)142-17608-20

3. Product Inspection

3.1 Check Content

- 1 flow meter
- 1 operation manual
- 1 product inspection sheet

3.2 Safety Inspection

- Please check whether the external package is deformed or damaged. Please remember to take a picture for evidence for compensation later.
- After unpacking, please check whether the content is deformed or damaged, or has any quality problem. Please remember to take a picture for evidence for compensation later.
- After unpacking, please check whether the content is consistent with the ordering info, and whether the quantity is right.
- Please contact the company within 7 days if any of the above situations occur (attach the picture together with your complaint). Otherwise, we won't compensate for, change or repair the product defect.

4. Summary

The company's electromagnetic flow meter adopts coil excitation, which is more stable than the traditional magnetism generation. After strict vibration and anti-noise test, it can work stably and is highly tolerant of complex environments in the industrial field, which also has a longer life span in practical application.

The electromagnetic flow meter has kept on evolving since its initial development, which is widely applied in monitoring various industrial fluid pipes, including power generation, water treatment, food, medication, shipping, dyeing & finishing, and semi-conductor process industries. With its simple working principle, the electromagnetic flow meter is widely applicable in various environments as long as the correct model is selected to match the fluid properties.

5. Product Features

- The measurement results is not affected by the change of liquid density, viscosity, temperature, pressure and conductivity.
- There are only two measurement points in the measuring tube without baffle and movable parts, so it won't cause pressure loss and jam.
- It can test the flow for the conducting fluid and the fluidic containing some solid granules.
- The straight tube section required for the installation just needs the upstream front 5D and downstream 2D of the flow meter without complicated pipeline design.
- The measurement turndown ratio can reach 3:100, which can achieve high accuracy especially for measuring small flow.
- It has a self-diagnosis function, which can automatically detect the excited signal, whether the measuring tube is empty and whether the electrode is stained or damaged.
- The lining can be common NBR(Nitrile), high-temperature or acid-proof & alkali-proof PTFE(Teflon)
- The maximum fluidic temperature permitted can reach 120°C(Teflon)
- The flow converter setting is simple, with powerful functionality.

6. Applicable Scope

- Conductivity: > 5 μ S/cm
- Fluid properties: Pure liquid and fluidic containing some solid granules.
- Application industries: Power generation, water treatment, food, medication, shipping, dying & finishing, and semi-conductor process

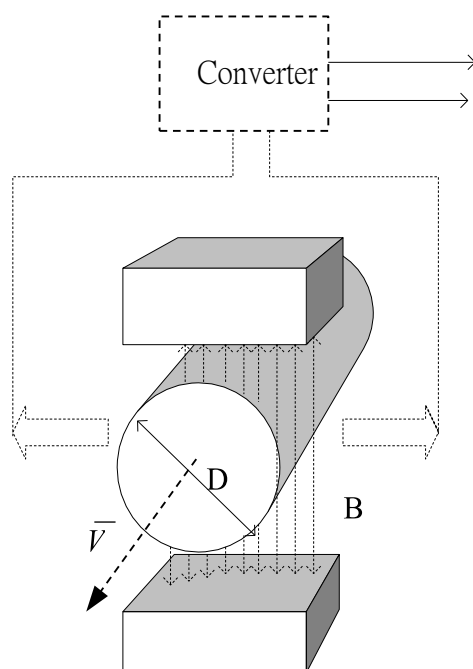
7. Environmental Condition

- Ambient environment: -40°C ~ 70°C
- Relative humidity: 5% ~ 95% of RH, without condensing water
- Atmospheric pressure: 86 ~ 106 KPa
- Power supply: 100~240Vac 50/60Hz

8. Working Principles

The working principle of the electromagnetic unit is based on the Faraday law of electromagnetic induction. When the conductor moves in the magnetic field, it will generate induced EMF on both sides of the conductor in the orthogonal direction of the magnetic field direction and the motion direction. The EMF is directly proportional to the motion speed of the conductor and the magnetic induction intensity.

As shown in <Figure 1>, the conducting fluidic passes through the insulating tube with the internal diameter of $D(m)$ at the average flowing speed $V(m/s)$ that is equipped with a pair of measuring electrodes. Moreover, the tube is in a magnetic field with uniform magnetic induction intensity of $B(T)$. In this case, the electrodes will induce the EMF (E) at the orthogonal direction of the magnetic field and the flowing direction. According to the law of electromagnetic induction, E can be written as Equation (1):



<Figure 1>

$$E = kB \cdot D \cdot V \quad (v) \quad \dots \dots \dots (1)$$

Wherein, k is the proportional coefficient.

The volume flow can be written as

$$q_v = \frac{\pi D^2}{4} V \quad (m^3/s) \quad \dots \dots \dots (2)$$

From Equation (1) and (2), we can get:

$$q_v = \frac{\pi D}{4k} \frac{E}{B} \quad (m^3/s) \quad \dots \dots \dots (3)$$

Thus, EMF can be represented as:

$$E = \frac{4kB}{\pi D} q_v(V) \quad \dots \dots \dots (4)$$

When B is a constant in Equation(3)

$$\frac{\pi D}{4k} \frac{1}{B} = A$$

Equation(3) can be modified as:

$$q_v = AE(m^3/s) \quad \dots \dots \dots (5)$$

It can be concluded that the flow q_v is directly proportional to the EMF E .

9. Technical Performance

9.1 Execution Standards

IEC 60068-2-3	EN 61326-1:2013
IEC 61326-1	EN 55011:2009/A/:2010
IEC 60092-504	ISO 4064-1
JIS B2220	JIS B7554-1997
ANSI B16.5	DIN 25 Series

9.2 Basic Parameters and Performance Indicators

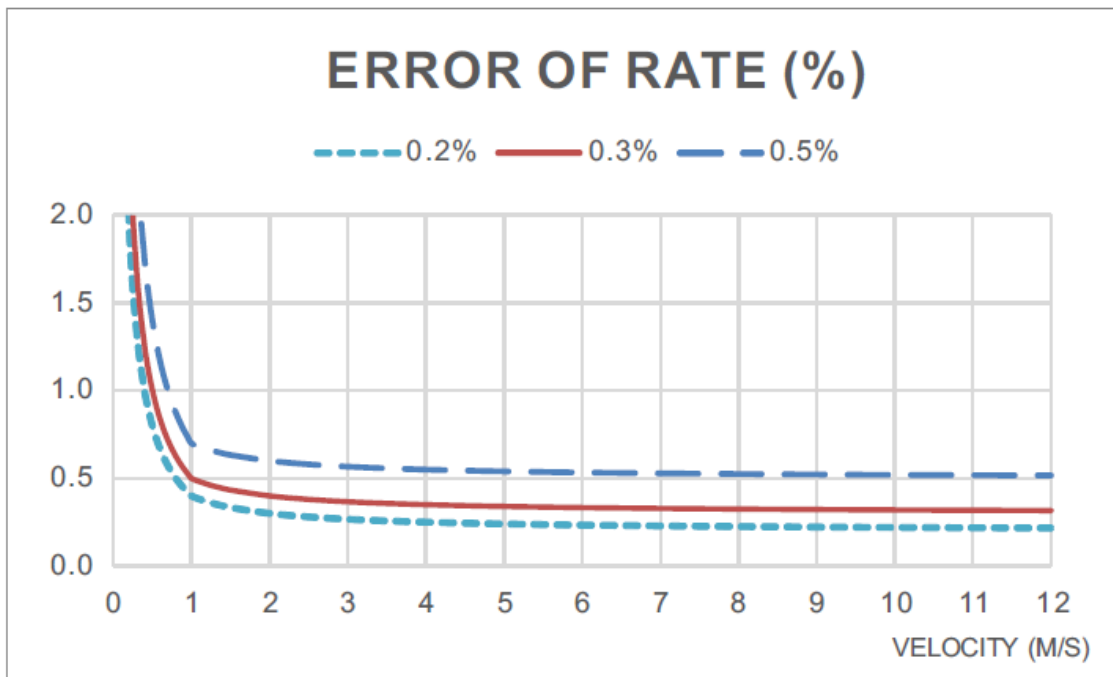
9.2.1 Technical Specification Table

Item	EPD34
Display	LCM 128* 64 pixel backlit type
Buttons	Tri-button operation
Communication interface	RS-485 (Modbus) (Optional support for ZigBee Pro wireless transmission)
Accuracy	±0.5% of reading@1m/s(0.2% optional)
Reproducibility	0.02 % F.S. @ 0.1~1.0m/s, 0.2% O.R. @ 1.0~10.0 m/s
Operation temperature of lining	<p>NBR : Temperature resistance<80℃, mainly applied in low-concentrated acid and alkane liquid. With excellent anti-abrasion property, it can be used to measure liquid with impurities. It is applicable to coal slurry, mud and industrial sewage.</p> <p>Neoprene : Temperature resistance <80℃, resistant to general low-concentrated acid and alkane. It is applicable to industrial sewage and tap water.</p> <p>PTFE: Temperature resistance <120℃. With stable chemical properties, it is mainly applied in strong corrosive medium such as concentrated acid and alkane or an environment with requirements for cleanliness. It is applicable to various liquids and chemical agents in food processing.</p>
Ambien temperature	-40~70℃
Fluidic conductivity	>5uS/cm
Measuring scope	0.1m/s~10m/s
Current output accuracy	0.1% of Pulse Output Accuracy Temperature coefficient (100ppm/℃)*Note 1
Current output mode	Proactive
Analog output	4~20mA
Maximum load of current output	<700Ω
Alarming current	3.6mA or 22mA
Frequency output scope	2~8KHz
Pulse width	Automatic (pulse width 50%)
Pulse mode	NPN transistor output 32vdc/200mA
Time constant	0~100s
Control output (DO)	NPN transistor output 32vdc/200mA;2-CH
Control input (DI)	Dry contact ON< 200Ω ; 1,000Ω< OFF ; 1-CH
Simulate output (AI)	4~20mA
Baud rate	1200~57600bps
Protection rating	IP67/NEMA 4X
Enclosure material	Aluminum alloy
Input power	AC100~240Vac
Power consumption	<10 W
Wire inlet specification	M20 x1.5*2 Female
signal power cable	< 100m *Note 2
Excitation mode	Pulse DC
Vibration regulation	IEC 60068-2-3
EMC regulation	IEC/EN 61326-1 Class A table 2

Note 1 : Combined with FineTek sensor

Note 2 : When the signal power cable is longer than 50m, the empty tube detection is unavailable.

9.2.2 Accuracy class & tolerance



9.2.3 Recommended Flow Range for Tube Diameters

Pipe diameter (mm)	Flow range (m ³ / h)	
	Flowing speed 0.1~1.0m/s	Flowing speed 1.0~10m/s
40	0.45~4.5	4.5~45.2
50	0.71~7.1	7.1~71
65	1.19~11.9	11.9~119
80	1.81~18.1	18.1~181
100	2.83~28.3	28.3~283
125	4.42~44.2	44.2~442
150	6.36~63.6	63.6~636
200	11.3~113	113~1130
250	17.7~177	177~1770
300	25.4~254	254~2540

9.2.4 Pressure resistance and inner diameter specification for various tube diameters

Nominal diameter		Specification of measurement tube	Inner diameter of measurement tube			
			NBR		PTFE	
mm	Inch	JIS	mm	Inch	mm	Inch
25	1	20K	-	-	-	-
32	1-1/4	20K	-	-	-	-
40	1-1/2	20K	-	-	38	1.50
50	2	10K	-	-	49	1.93
65	2-1/2	10K	-	-	64	2.52
80	3	10K	-	-	77	3.03
100	4	10K	-	-	102	4.02
125	5	10K	-	-	128	5.04
150	6	10K	-	-	151	5.94
200	8	10K	-	-	207	8.15
250	10	10K	-	-	256	10.08
300	12	10K	-	-	301	11.85

9.2.5 Lining Material

Lining material	Main properties	Application scope
PTFE	<ol style="list-style-type: none"> 1. Stable chemical properties, resistance to various acid, alkane, and salt solutions and various organic solvents. It is not tolerant to the corrosion of ClF_3, high-temperature OF_3 and high-speed liquid oxygen and ozone. 2. The anti-abrasion property is average. 	<ol style="list-style-type: none"> 1. $-20\sim 120^\circ\text{C}$ 2. Strong corrosive medium such as concentrated acid and alkane.
NBR	<ol style="list-style-type: none"> 1. Excellent flexibility, highly tearing force capability, good wear resistance 2. It is resistant to low concentrations of acid, alkali, salt solution; It is not tolerant the corrosion of oxidizing mediums. 	<ol style="list-style-type: none"> 1. $< 80^\circ\text{C}$ 2. Neutral-strong wearing mineral pulp, coal slurry and mud slurry
Neoprene	<ol style="list-style-type: none"> 1. Neutral wearing capability 2. It is resistant to low concentrations of acid, alkali, acid corrosion. 	<ol style="list-style-type: none"> 1. $< 80^\circ\text{C}$ 2. Water, Industrial water, Seawater

9.2.6 Electrode Material

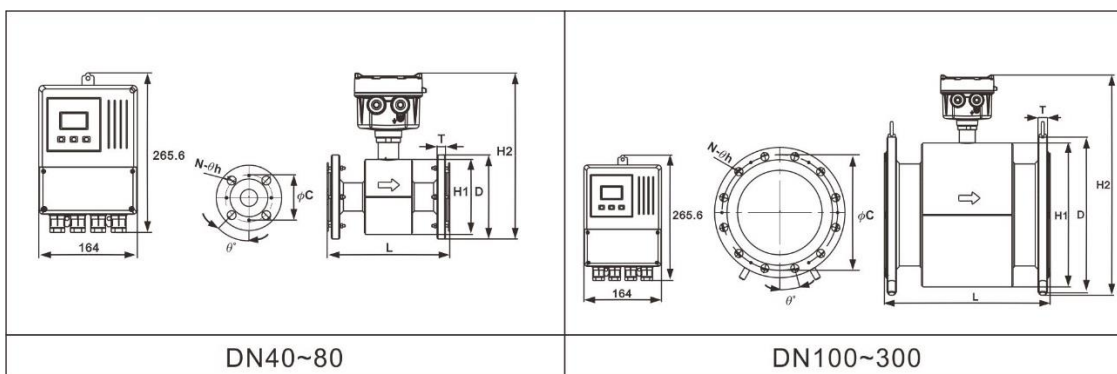
Electrode material	Anti-corrosion property
Stainless steel (316L)	It is applied in water, sewage and organic corrosive medium.
Hastelloy alloy	It is resistant to the corrosion of the medium mixture of oxidizing acid such as Nitric acid, mixed acid or Sulfuric acid. Moreover, it is resistant to the corrosion of the oxidizing salt such as Fe^{2+} 、 Cu^{2+} or other substances containing oxidants such as the salt solution of hypochlorous acid above the ambient temperature and sea water.
Titanium	It is resistant to the corrosion of sea water, various oxides, salt solution of hypochlorous acid, oxidating acid (including fuming Nitric acid) and organic acid and alkane. It is not resistant to the corrosion of pure reducing acid (such as Sulfuric acid and Hydrochloric acid). However, the anti-corrosion property will be greatly degraded if the acid contains some oxidants.
Tantalum	It has excellent corrosion resistance. Its characteristic is similar to glass. In addition to hydrofluoric acid , nitric acid , alkali, it could resist almost all chemical medium (including boiling hydrochloric acid, nitric acid and sulfuric acid below 175°C). It could not resist corrosion in alkali.

9.2.7 Housing Protection Rating(IP)

Transmitter:IP67

Sensor: IP67

10. Appearance and Dimension



10.1 JIS 10K & 20K

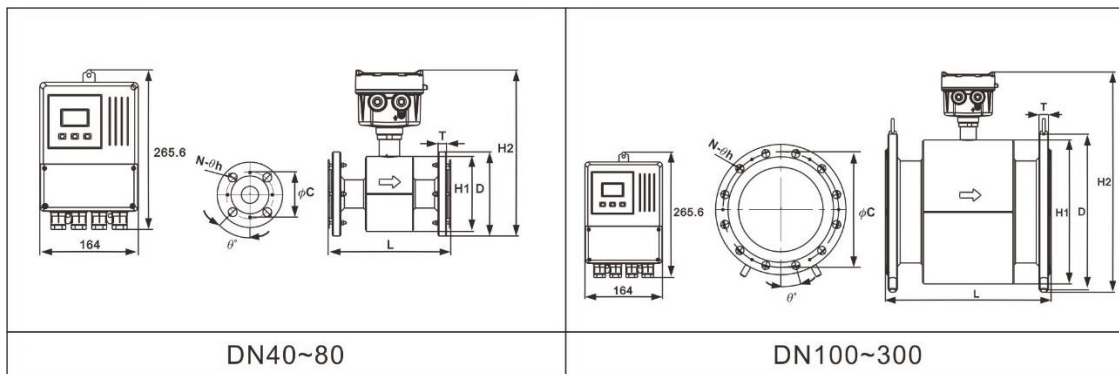
Connection specification		JIS 10K									
Nominal diameter(mm)		40	50	65	80	100	125	150	200	250	300
Lining material		PTFE									
Length	L	200	200	200	200	250	250	300	350	400	500
External diameter	φD	140	155	175	185	210	250	280	330	400	445
PCD	φC	105	120	140	150	175	210	240	290	355	400
Flange thickness	t	14	14	16	16	16	20	22	22	24	24
Inclined angle of screw hole	θ°	45	45	45	22.5	22.5	22.5	22.5	15	15	11.25
Diameter of screw hole	θh	19	19	19	19	19	19	23	23	25	25
Quantity of screw holes	N	4	4	4	8	8	8	8	12	12	16
Height of sensor casing	H1	125	125	145	145	195	195	270	305	365	406
Total height	H2	276	283	303.9	308.9	346.4	366.4	429	468	534	578
Weight (kg)	-	5.2	6.1	7.43	8.32	11.35	15.95	21.9	31.68	52.48	68.00

Connection specification		JIS 20K									
Nominal diameter(mm)		40	50	65	80	100	125	150	200	250	300
Lining material		PTFE									
Length	L	200	200	200	200	250	250	300	350	400	500
External diameter	φD	140	155	175	200	225	270	305	350	430	480
PCD	φC	105	120	140	160	185	225	260	305	380	430
Flange thickness	t	18	18	20	22	24	26	28	30	34	36
Inclined angle of screw hole	θ°	45	22.5	22.5	22.5	22.5	22.5	15	15	15	11.25
Diameter of screw hole	θh	19	19	23	23	23	25	25	25	27	27
Quantity of screw holes	N	4	8	8	8	8	8	12	12	12	16
Height of sensor casing	H1	125	125	145	145	195	195	270	305	365	406
Total height	H2	276	283.9	303.9	316.4	353.9	376.4	440	476	547	594
Weight (kg)	-	5.5	6.17	7.43	10.70	14.87	22.01	29.48	41.82	72.6	92.6

Remarks: For DN40~DN80, the lining protective ring is 2mm, so the total length of the flow meter shall be increased by 4mm. For DN100~DN200, the lining protective ring is 0.5mm, so the total length of the flow meter shall be increased by 1mm;

*1 : total height(H₂) tolerance is ±2mm

*2 : The weight is only for sensor casing, the meter weight 2.06 KGs is not included.



10.2 ANSI 150Lbs & 300Lbs

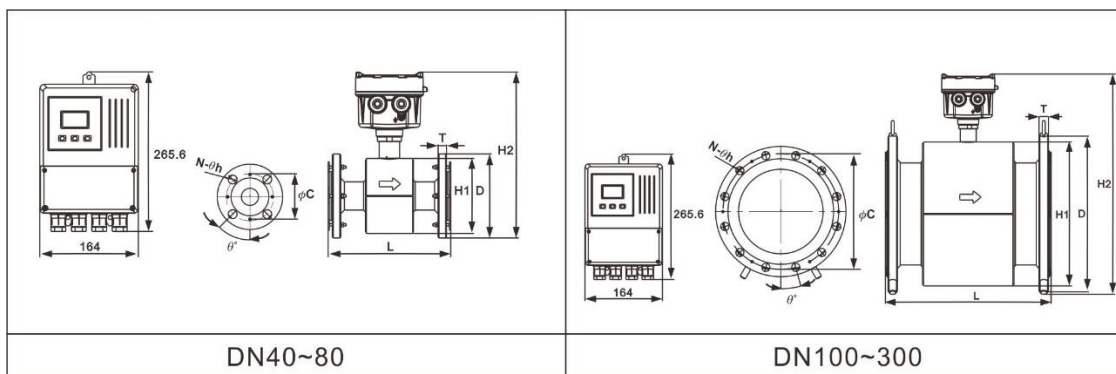
Connection specification		ANSI 150Lbs									
Nominal diameter(mm)		40	50	65	80	100	125	150	200	250	300
Lining material		PTFE									
Length	L	200	200	200	200	250	250	300	350	400	500
External diameter	ϕD	127	152	178	190	229	254	279.4	342.9	406.4	482.6
PCD	ϕC	98.4	120.	139.7	152.4	190.5	215.	241.3	298.4	361.9	431.8
Flange thickness	t	15.9	17.4	20.6	22.2	22.2	22.2	23.8	27.0	28.6	30.2
Inclined angle of screw hole	θ°	45	45	45	45	22.5	22.5	22.5	22.5	15.0	15
Diameter of screw	θh	15.9	19	19	19	19	22.2	22.2	22.2	25.4	25.4
Quantity of screw	N	4	4	4	4	8	8	8	8	12	12
Height of sensor	H1	125	125	145	145	195	195	265	305	365	406
Total height	H2	322	335	358	364	408	421	478	525	589	647
Weight (kg)	-	4.93	6.77	9.23	10.70	16.27	19.4	25.48	42.62	65.68	98

Connection specification		ANSI 300Lbs									
Nominal diameter(mm)		40	50	65	80	100	125	150	200	250	300
Lining material		PTFE									
Length	L	200	200	200	200	250	250	300	350	400	500
External diameter	ϕD	156	165	190	210	254	279	317.5	381	444.5	520.7
PCD	ϕC	114.3	127	149.2	168.3	200	235	269.9	330.2	387.35	450.85
Flange thickness	t	19.0	20.6	23.8	27.0	30.2	33.3	34.9	39.7	46.0	49.2
Inclined angle of screw hole	θ°	45	22.5	22.5	22.5	22.5	22.5	15.0	15.0	11.3	11.3
Diameter of screw	θh	22.2	19	22.2	22.2	22.2	22.2	22.2	25.4	28.6	31.8
Quantity of screw	N	4	8	8	8	8	8	12	12	16	16
Height of sensor	H1	125	125	145	145	195	195	265	305	365	406
Total height	H2	337	341	364	374	421	433	495	542	606	664
Weight (kg)	-	9.08	10.3	12.78	16.45	26.6	32.9	42.28	67.62	98.88	145

Remarks: For DN40~DN80, the lining protective ring is 2mm, so the total length of the flow meter shall be increased by 4mm. For DN100~DN200, the lining protective ring is 0.5mm, so the total length of the flow meter shall be increased by 1mm;

*1 : total height(H_2) tolerance is ± 2 mm

*2 : The weight is only for sensor casing, the meter weight 2.06 KGs is not included.



10.3 DIN PN40 & PN16 & PN10

Connection specification		DIN PN40				DIN PN16					
Nominal diameter(mm)		40	50	65	80	65	80	100	125	150	200
Lining material		PTFE									
Length	L	200	200	200	200	200	200	250	250	300	350
External diameter	ϕD	150	165	185	200	185	200	220	250	285	340
PCD	ϕC	110	125	145	160	145	160	180	210	240	295
Flange thickness	t	18	20	22	24	18	20	20	22	22	24
Inclined angle of screw hole	θ°	45	45	22.5	22.5	45	22.5	22.5	22.5	22.5	15
Diameter of screw	θh	18	18	18	18	18	18	18	18	22	22
Quantity of screw	N	4	4	8	8	4	8	8	8	8	12
Height of sensor	H1	125	125	145	145	145	145	195	195	265	305
Total height	H2	334	341	361	369	361	369	404	419	484	524
Weight (kg)	-	5.53	6.17	7.43	10.7	7.03	10.70	14.0	19.4	26.68	38.42

Connection specification		DIN PN10		
Nominal diameter(mm)		200	250	300
Lining material		PTFE		
Length	L	200	200	200
External diameter	ϕD	150	165	185
PCD	ϕC	110	125	145
Flange thickness	t	18	20	22
Inclined angle of screw hole	θ°	45	45	22.5
Diameter of screw	θh	18	18	18
Quantity of screw	N	4	4	8
Height of sensor	H1	125	125	145
Total height	H2	334	341	361
Weight (kg)	-	5.53	6.17	7.43

Remarks: For DN40~DN80, the lining protective ring is 2mm, so the total length of the flow meter shall be increased by 4mm. For DN100~DN200, the lining protective ring is 0.5mm, so the total length of the flow meter shall be increased by 1mm;

*1 : total height(H₂) tolerance is ± 2 mm

*2 : The weight is only for sensor casing, the meter weight 2.06 KGs is not included.

11. Installation

The design, test and power supply for the flow meter are based on the related regulations. User must strictly follow the instructions to guarantee the safe operation and normal working of the flow meter.

11.1 Conditions required to guarantee the measurement accuracy of the electromagnetic flow meter:

- The test liquid is conducting.
- The measuring pipe must be filled with liquid.
- The test liquid must be uniform, so as to prevent the non-uniform conductivity (which will result in serious interference). If you need to add some chemicals dynamically, it should be added in the downstream of the flow meter.
- The electromagnetic flow meter must be well grounded. Especially in the plastic pipe, the grounding ring must be installed in order to perform solid grounding.
- The straight tube section is required to be at least 5D at the flow meter inlet (internal diameter of the measuring pipe), and at least 2D at the flow meter outlet.
- The flow meter should be kept away from strong EMI, and it should not be installed near the large motors or transformers.

11.2 Safety Measures

To guarantee human and device safety, the instructions below must be followed:

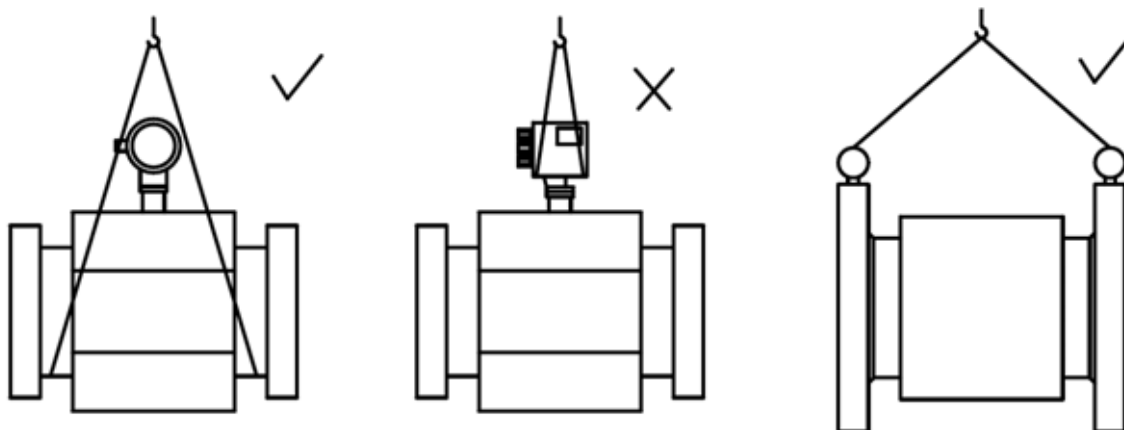
- Before selecting the location and installing the flow meter, the user should carefully read the related parts in this manual, and consider the safety requirements for the flow meter, related devices and machine body environment.
- The flow meter installation and repair must be performed by the personnel with some flow meter knowledge.
- The flow meter sensors and pipes must be correctly installed, and the sealing must be safe and reliable. The liquid pressure should not exceed the maximum working pressure described on the flow meter specification.
- Proper measures must be taken to prevent electrical shock accident.
- The handling equipment of the flow meter should meet the safety requirements.

11.3 Inspection before Installation

- Check whether the flange, lining, casing and outgoing line sleeve are damaged.
- Open the box cover to check whether the wiring printed circuit is loosened or damaged.
- Check whether the model number on the nameplate is consistent with the order information.

11.4 Handling

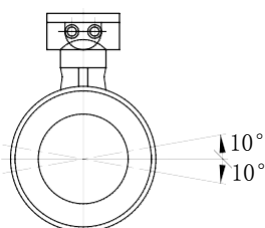
The flow meter must be handled with the correct handling method. The safety load and protection action of the handling equipment should meet the related regulations. The transmitter box (for integrated flow meter) or enclosure (for separated flow meter) must not be tied up to handle the flow meter.



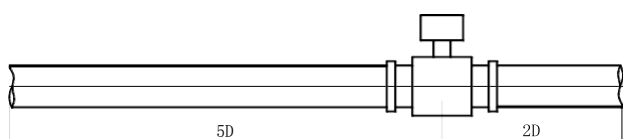
11.5 Correct Installation

It is very important to select the installation site and install the flow meter correctly. If any mistake is made during the installation, it will affect the measuring accuracy or the life span of the flow meter, or even cause damage. When selecting the installation site, please pay special attention to the following:

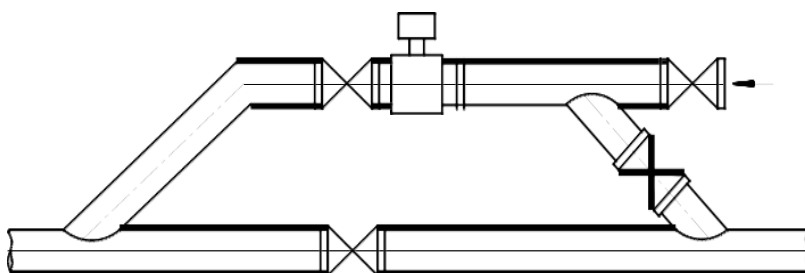
- a. The axis of the measuring electrode must be approximate to the horizontal direction (Generally, the angle from the level line is within 10° .)



- b. The measuring pipe must be filled with liquid.
- c. The flow meter must be equipped with the straight tube section in the length of at least $5 \times D$ at the front side (D is the internal diameter of the flow meter), and the straight tube section in the length of at least $2 \times D$ at the rear side (D is the internal diameter of the flow meter).



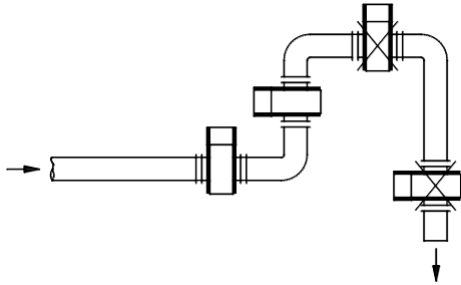
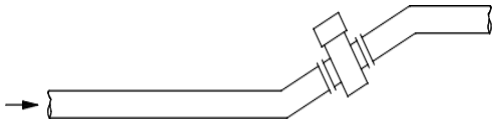
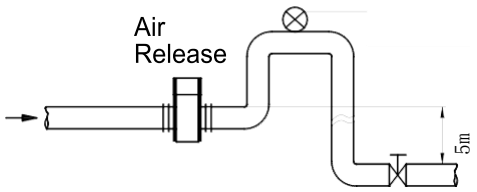
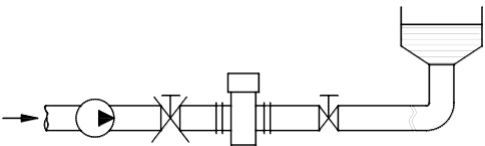
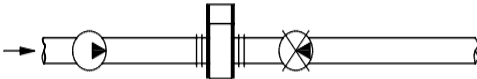
- d. The flowing direction of the fluidic is the same as the arrow direction on the flow meter.
- e. Please prevent the vacuum in the pipe, which will damage the lining of the flow meter.
- f. The flow meter must be free from strong electromagnetic field. The magnetic intensity of the flow meter installation site must be smaller than 400A/m.
(It should not be installed near large motors or transformers).
- g. There should be enough space left surrounding the flow meter for installation and repair.
- h. If the measuring pipe vibrates, a support frame should be set up on both sides of the flow meter.
- i. When measuring the mixture of different media, the distance between the mixing point and the flow meter must be $30 \times D$ at least (D is the internal diameter of the flow meter)).
- j. For convenient cleaning and maintenance of the flow meter, a bypass pipe must be installed.



- k. When installing the flow meter of the PTFE lining, the bolt connecting two flanges should be fastened evenly. Otherwise, it will damage the PTFE lining. Please use the torque wrench as much as possible.
- l. The flow meter should be protected from strong vibration and great temperature change. In the meantime, damage of the corrosive liquid on the flow meter should be prevented.
- m. If the flow meter is installed at a position with direct sunlight, shielding facilities should be set up.
- n. When installing the sensor, the measuring pipe and the process pipe must be on the same axial line. For the sensor with the nominal diameter of DN50 or below, the axial line deviation should not exceed 2mm. For those of DN65~DN150, the axial line deviation should not exceed 3mm. For those of \geq DN200, the axial line deviation should not exceed 4mm.
- o. The shim installed between the flanges should have excellent anti-corrosion property. The shim should not intrude in the pipe, which will block the flowing fluidic
- p. Fasten the bolts and screws of the flow meter. The screw threads should be undamaged with good lubrication condition. The bolts with torque wrench must be fastened based on the flange size and torque.
- q. When welding or flame-cutting the pipes near the sensor, isolation measure must be conducted, so as to prevent the lining from heating. Moreover, the flow meter must be powered off, or it will damage the flow meter.

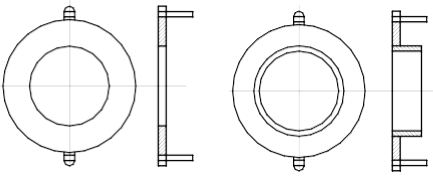
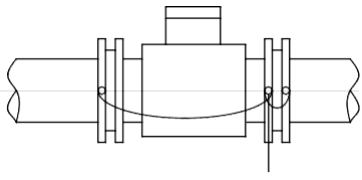
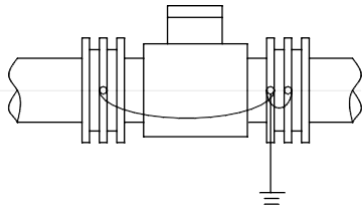
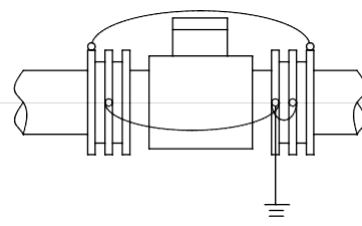
11.6 Notes for Installation on the Pipe

When installing the flow meter, one must follow the installation diagrams as shown below. This will ensure the flow meter can guarantee the pipe is always filled with the liquid: (The figures below are only typical cases, which don't include all feasible installation methods. The user may judge the installation position based on the actual condition.)

No.	Diagram	Description
1		<ul style="list-style-type: none"> ■ It should be installed at the lower point and the vertically upward point of the horizontal pipe. ■ Don't install it at the highest point and the vertically downward point of the pipe.
2		<ul style="list-style-type: none"> ■ It should be installed at the rising point of the pipe.
3		<ul style="list-style-type: none"> ■ If the pipe gap exceeds 5m, the air release valve should be installed at the downstream of the sensor. The downstream of the sensor should have some back pressure.
4		<ul style="list-style-type: none"> ■ The control valve and cut valve should be installed at the downstream of the sensor rather than the upstream.
5		<ul style="list-style-type: none"> ■ The sensor should be installed at the pump outlet rather than the inlet.

11.7 Grounding Requirements

The grounding of the electromagnetic flow meter is very important. If the grounding is poor, it won't work normally. The sensor and transmitter should be equipped with high-quality independent grounding wire (The section area of the copper core is 1.6mm²). The grounding resistance should be <math><10\Omega</math>.

	Diagram	Description
Grounding Ring		<ul style="list-style-type: none"> ■ The grounding ring is needed if the pipe connecting with the sensor is insulating. ■ The same material as the electrode should be chosen, to prevent corrosion by the liquid. ■ If the test medium is abrasive, the neck grounding ring should be selected.
Grounding Method		<ul style="list-style-type: none"> ■ It is for installing the flow meter on the metal pipe not coated with insulating layer.
		<ul style="list-style-type: none"> ■ When installing the flow meter on the plastic pipe or the pipe with insulating coating material, paints or lining, grounding rings on both ends of the sensor should be installed.
		<ul style="list-style-type: none"> ■ When installing the flow meter on the protective pipe of cathode, the pipe with the protection of electrolytic corrosion generally has insulating walls and external sides. Thus, during installation, the grounding ring and the flanges on the pipe should be insulating.

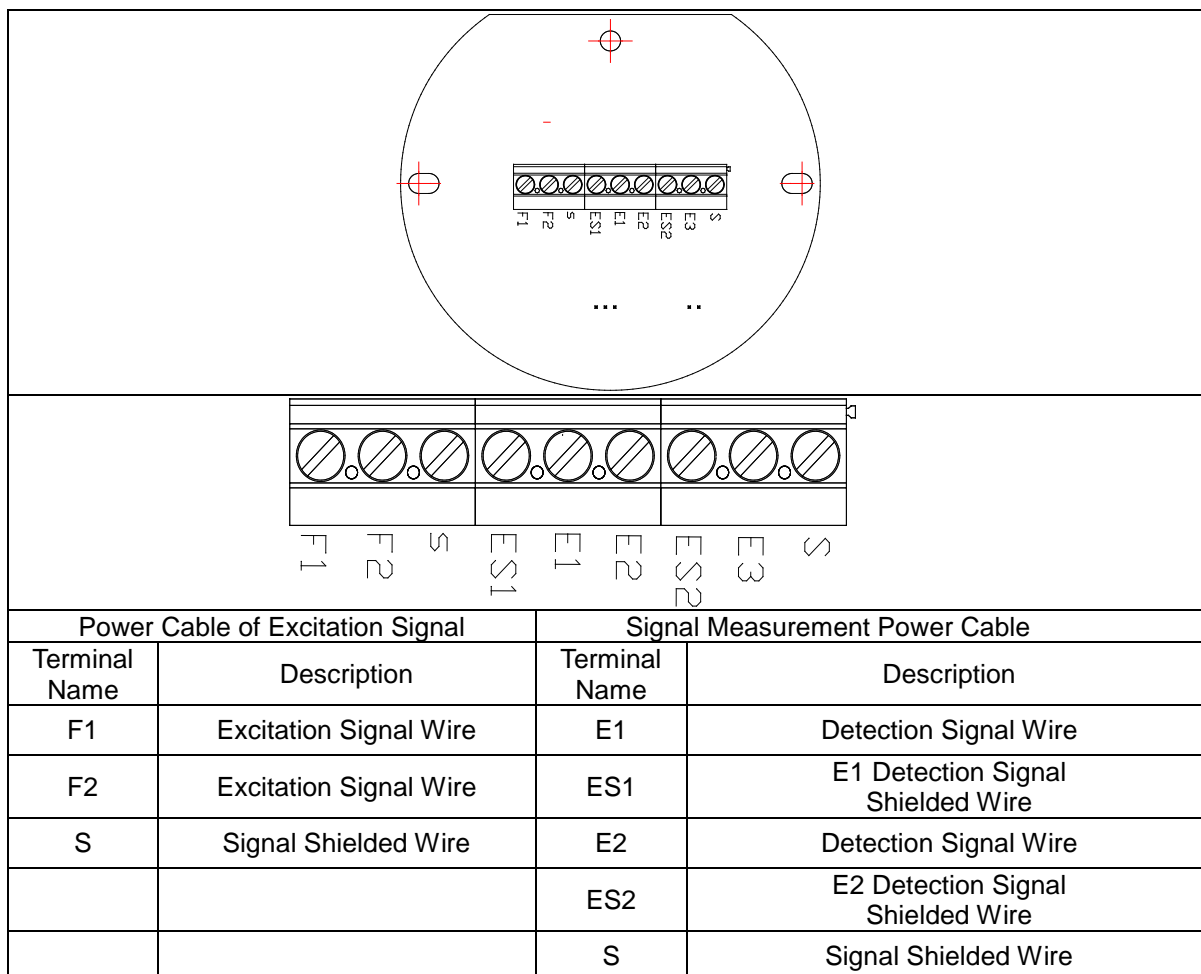
12. Wiring and Using

12.1 Wiring

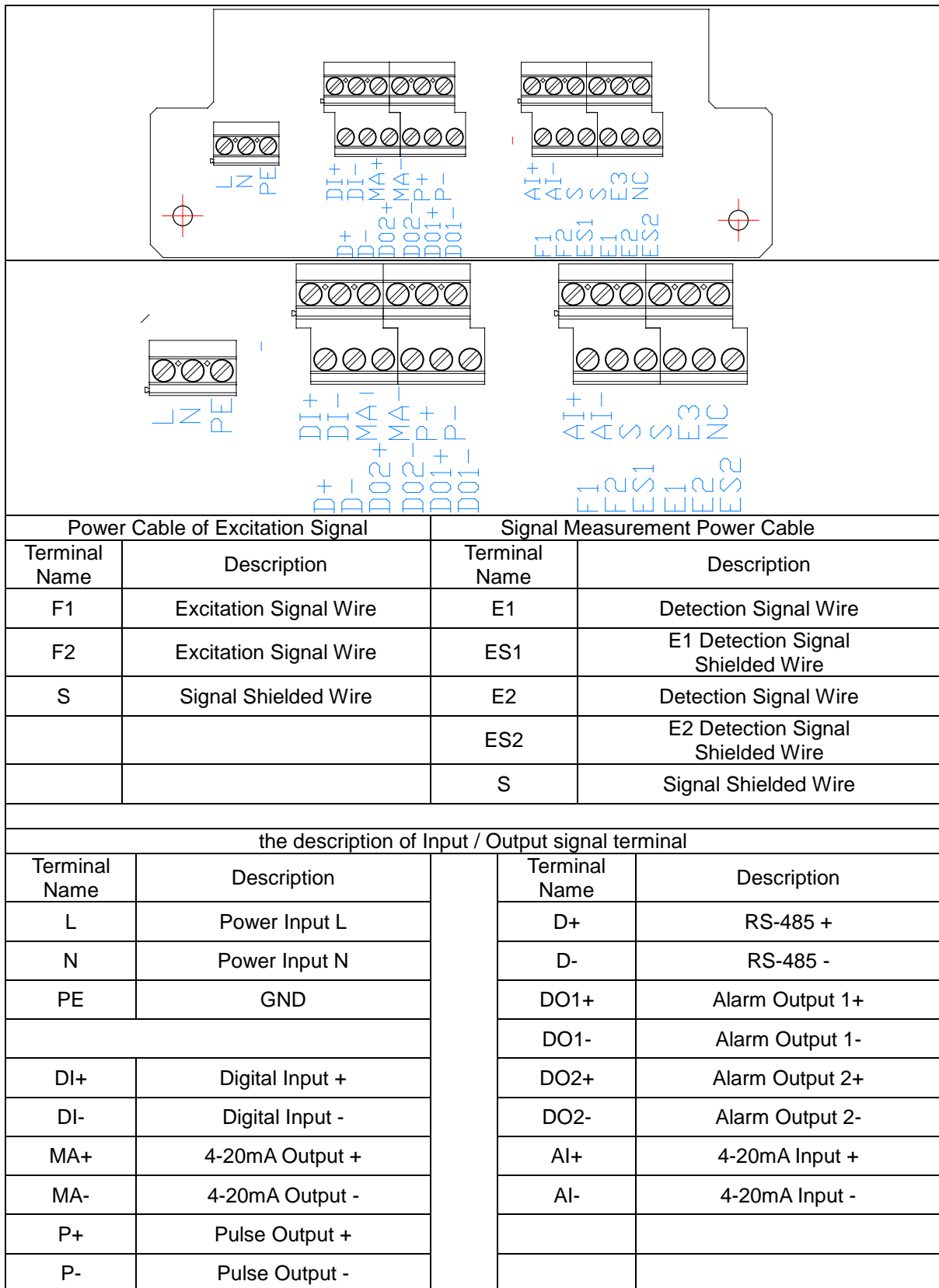
12.1.1 Notes for Wiring

- It is recommended to select 2-core insulation rubber cable, with the external diameter larger than 10mm.
- For AC power supply, L1 should be connected with “Live Wire”.
- The wiring for all terminal blocks should be clapped with the flathead terminal and insulated. This ensures that the power cable does not extrude into the terminal block.
- The total impedance of the output cable on the current output terminal should be no more than the value stated in the specification.
- The pulse or frequency output is generally NPN transistor output, which requires external power supply.
- After the wiring is finished, the ends of the cable outlet should be fixed, so as to guarantee water-proof performance.

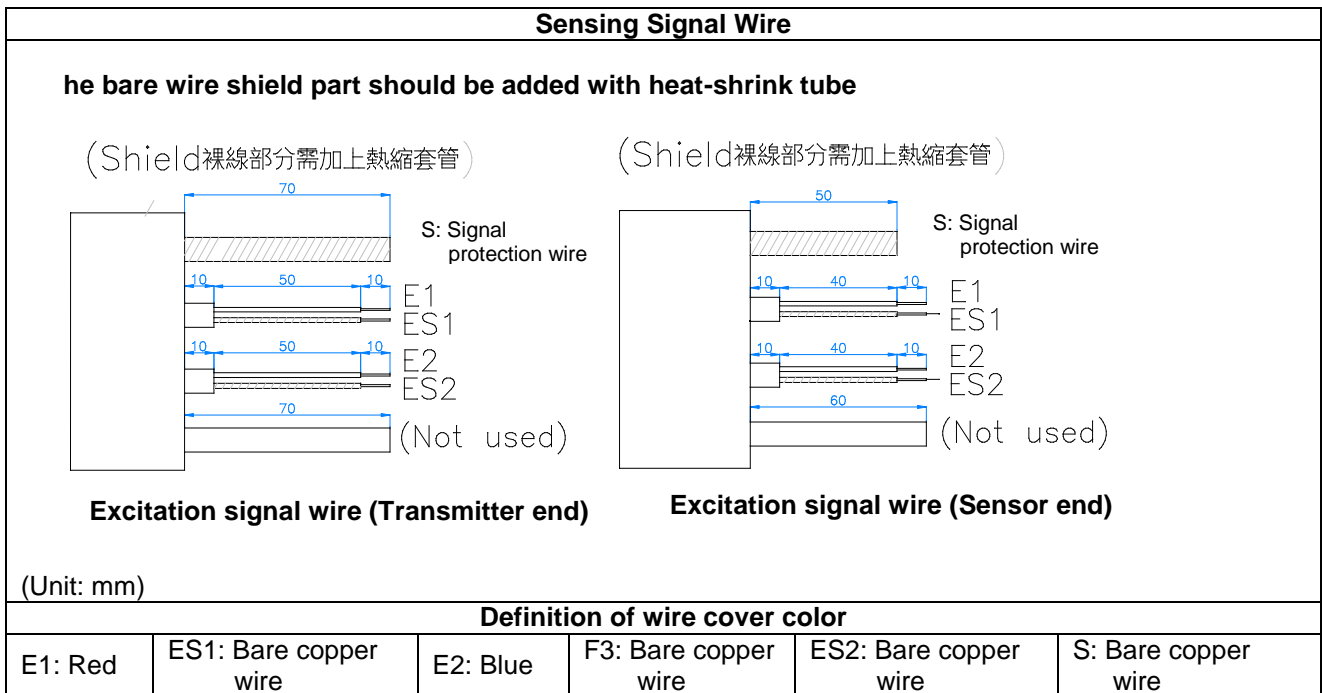
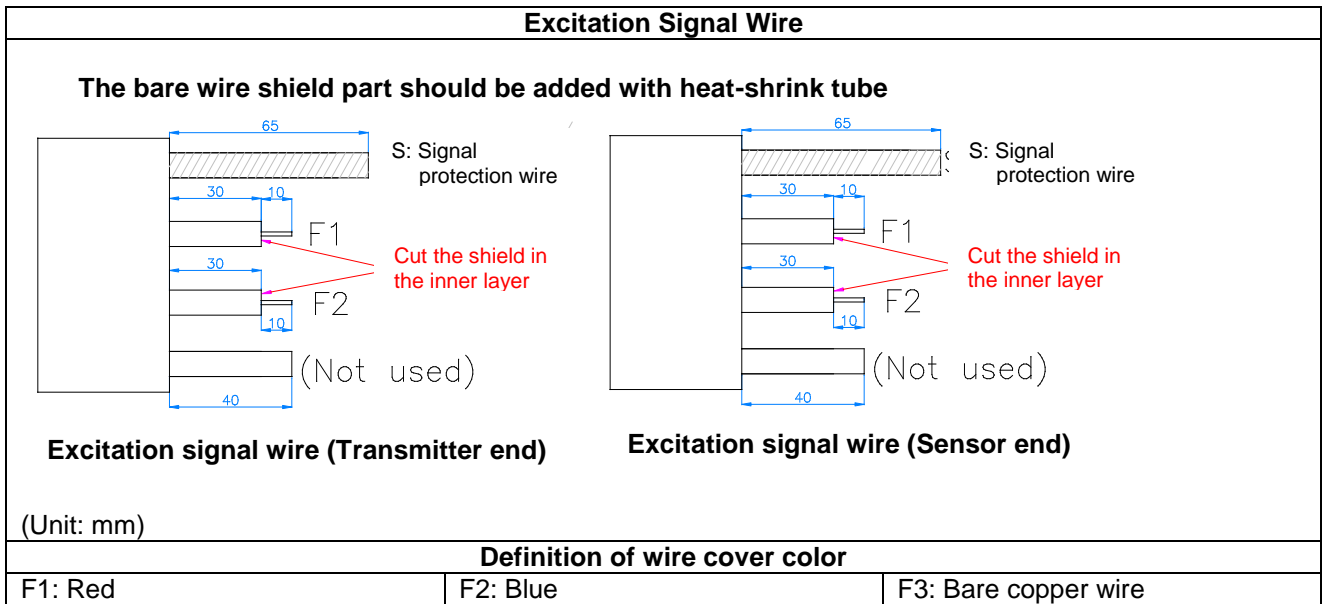
12.1.2 Diagram of Sensor Wiring Terminal



12.1.3 Diagram of Transmitter Wiring Terminal

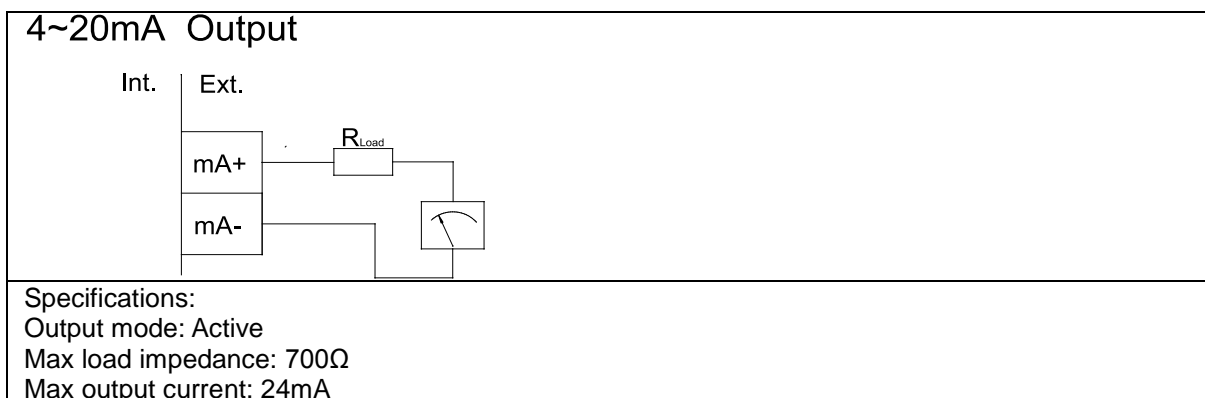


12.1.4 Signal Electrical Cable Wiring

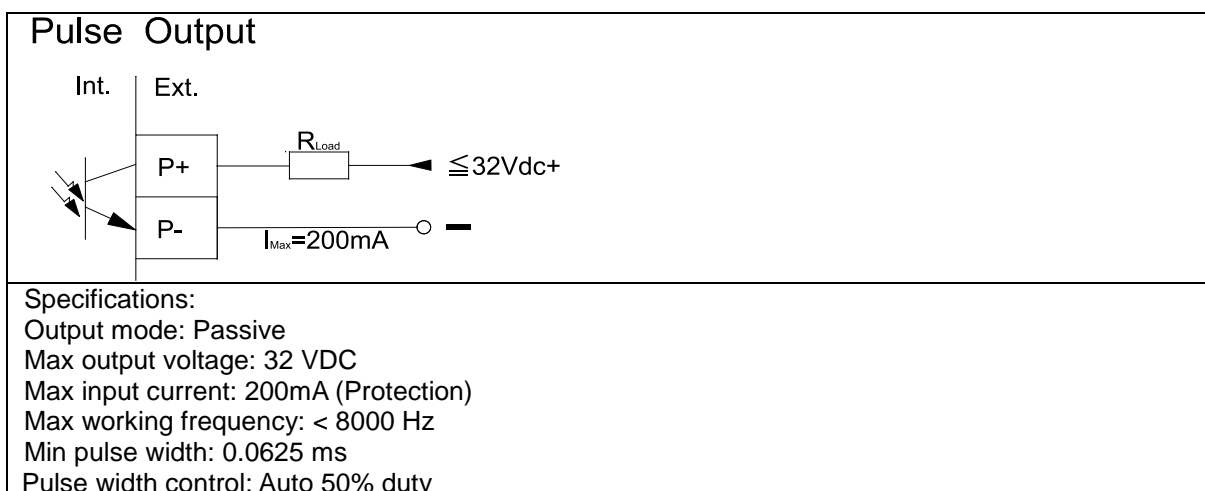


12.2 Input / Output Function Wiring

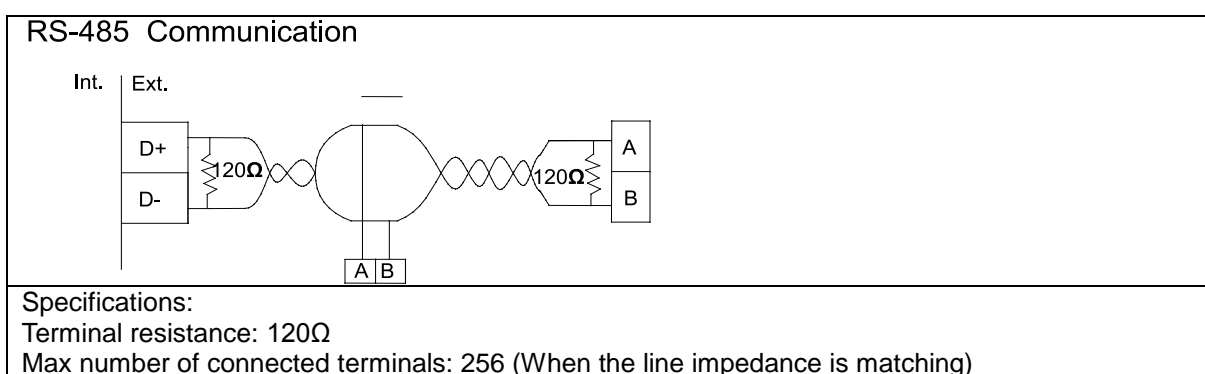
12.2.1 4-20mA Current output



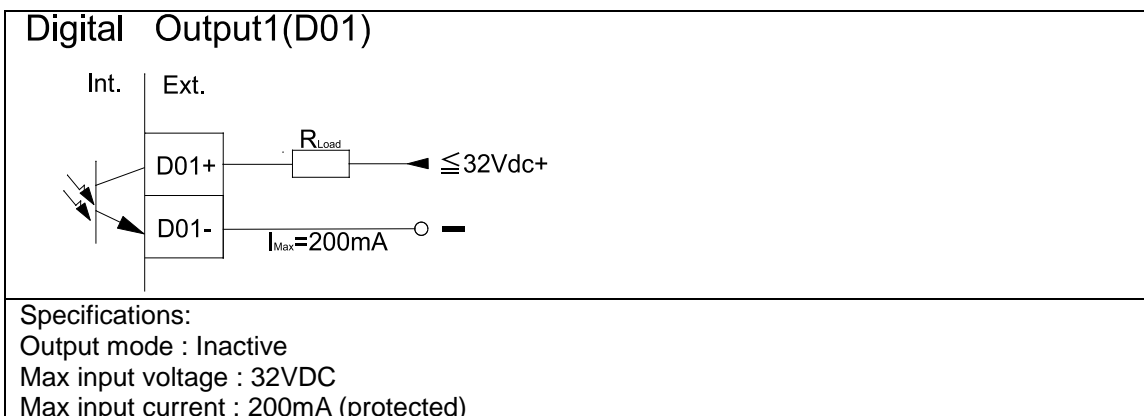
12.2.2 Pulse Output



12.2.3 RS-485 Communication



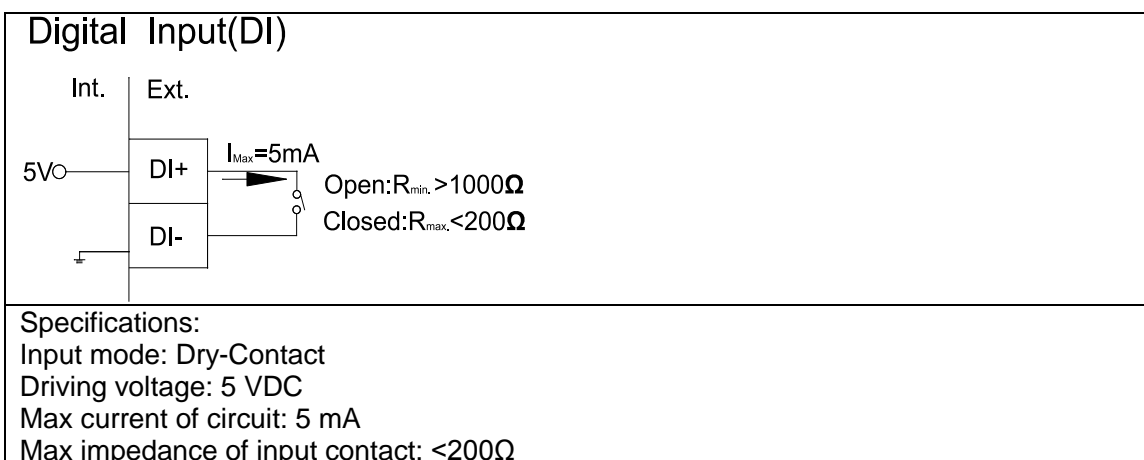
12.2.4 Digital output 1 (DO1)



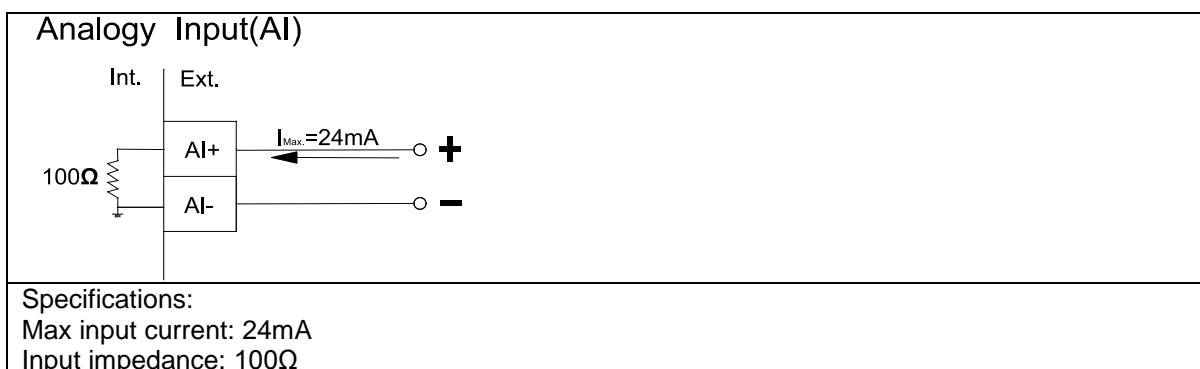
12.2.5 Digital output 1 (DO2)



12.2.6 Digital input (DI)



12.2.7 Analogy input (AI)

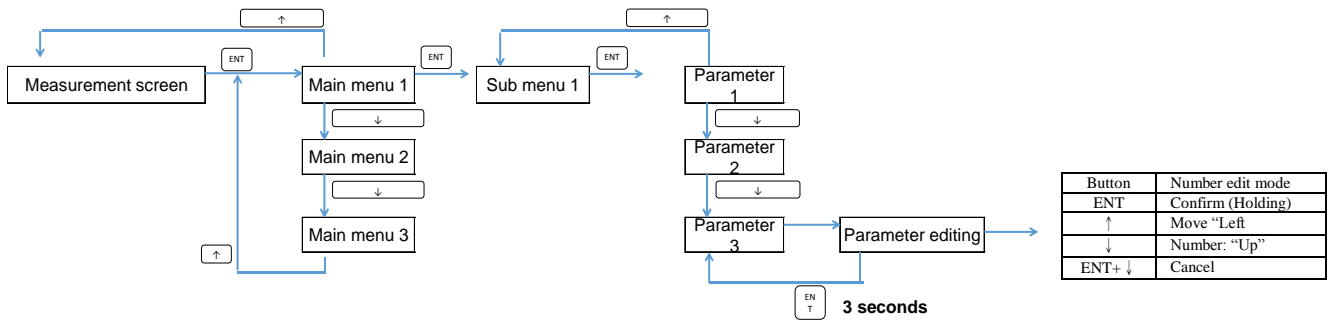


13. Inspection before Power-On

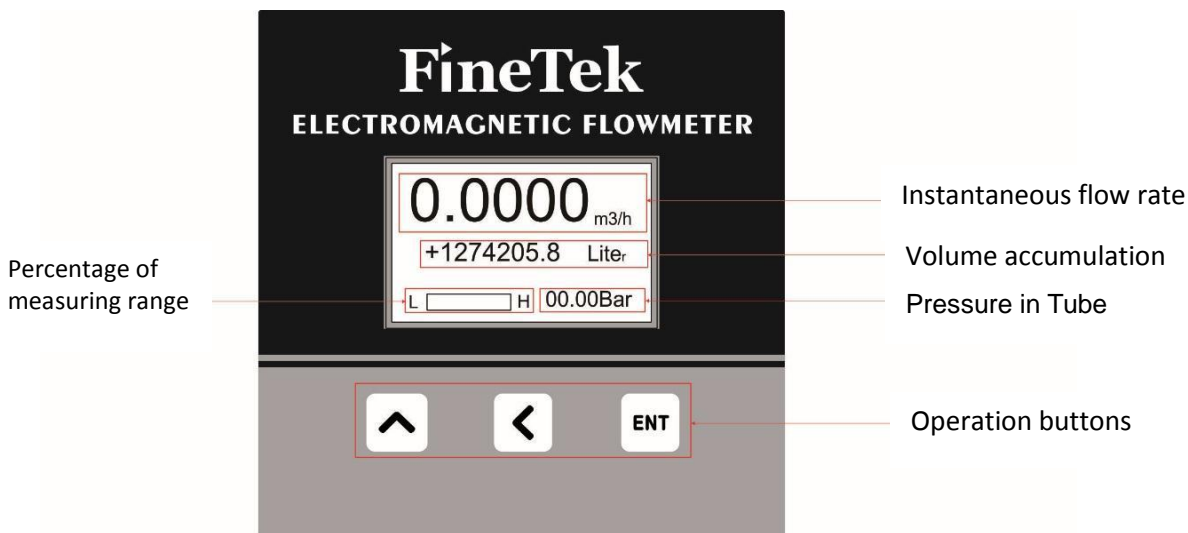
1. Check whether the flow meter is damaged during transportation and installation.
2. Check whether the voltage of the power supply is consistent with that specified on the nameplate.
3. Check whether the fuse used is of the correct current value.
4. Check whether the flow meter is grounded correctly.
5. Open the pipe valve to fill the pipeline system with liquid. One should pay attention to removing the leaked gas and residuals in the system.
6. Power on the flow meter to warm up for 10 minutes. Then it can work normally.

14. Parameter Functions

14.1 Procedure for Menu Setting



14.1.1 Functions of the Display Interface



14.1.2 Button Functions in Parameter Setting Status:

Button	Main Measuring Page	Menu Mode	Parameter Setting Page		
			Read Only	Number Edit Mode	List Edit Mode
ENT	Enter menu	Enter sub menu		Confirm button (Keep pressing)	Confirm button (Keep pressing)
<		Return to the previous page	Return to the previous page	"Left" button	Return to the previous page
^		Sub menu option 【Down】		Number: "Plus" button	Option: Next page
ENT+ <				Cancel	

14.2 Various Parameter Setting Ranges

Main Menu	Sub Menu	Unit	Default	Setting Range
Fast Set (0)	Device Tag Num (1.1)			The parameter is linking from standard menu
	Zero Adj.(2.1)			
	Flow Span (1.5)			
	Flow Unit (1.4)			
	Low cutoff (2.4)			
	Damping Time (3.1)			
	Pulse Out Unit (3.3)			
	Total Reset (1.9)			

Main Menu	Sub Menu	Unit	Default	Setting Range
Basic Set (1)	Device Tag Num (1.1)	none	00001	00001~65535
	Measure Type (1.2)	-	Water	Water
	Tube Size (1.3)	mm	actual	10,15,25,32,40,50,65,80,100
				125,150,200,250,300,350,400,450,500
	Flow Unit (1.4)	-	m ³ /h	L/(min,h),m ³ /(min,h),gal/(min,h), kg(min,h),Ton(min,h) (Flow rate* Liquid density = weight) "L/m","L/h","m3/m","m3/h","gal/m","gal/h"," kg/m" "kg/h","Ton/m","Ton/h","m3/d"
	Flow Span (1.5)	=Flow Rate Unit	(5m/s)* (Diameter/2) ² * pi*Unit of Flow	(0.1 ~ 10.0m/s)* (Diameter/2) ² * pi*Unit of Flow (000.00)
	Direction (1.6)	dir	Forward	Forward,Reverse
	Total Unit (1.7)	-	m ³	Liter,gal,m ³ ,kg,Ton
	Total Mode (1.8)	none	Forward	Forward,Reverse,Bi-direction
Total Reset (1.9)	none	Cancel	Cancel,Accept	

Main Menu	Sub Menu	Unit	Default	Setting Range
Advanced Set (2)	Zero Adj. (2.1)	m/s	actual	-0.5000~+0.5000
	K-Factor (2.2)	none	1.000	0.000~3.000
	Density (2.3)	g/cm ³	1.0000	0.0001~9.9999
	Low cutoff (2.4)	%	0.5	0.00~100.00
	Fwd. Init. (2.5)	=Total Unit	0	0~99999
	Rev. Init. (2.6)	=Total Unit	0	0~99999

Main Menu	Sub Menu	Unit	Default	Setting Range
I/O Signal Set (3)	Damping Time (3.1)	second	3	0~100
	Pulse Out Mode (3.2)	none	Pulse NO	Pulse NO, Pulse NC, Frequency
	Pulse Out Unit (3.3)	Unit/pulse	0.1 L	0.001~100(L,gal,m ³ ,g,kg,Ton) L/pulse,gal/pulse,m3/pulse,g/pulse,kg/pulse,Ton/pulse
	Max. Freq. (3.4)	kHz	2K	0.001~8K (00.000)
	Curr. Mode (3.5)	none	4-20	4-20,0-20
	4mA Fine-Tune (3.6)	count	0	-5000~5000
	20mA Fine-Tune (3.7)	count	0	-5000~5000
	Input1 Func. (3.8)	N/A	None	None, Total Reset
	Input1 Type (3.9)	N/A	NO	NO,NC

Main Menu	Sub Menu	Unit	Default	Setting Range
Alarm Set (4)	Max. Flow (4.1)	Flow Rate Unit	Max.	Max. Flow Rate
	Min. Flow (4.2)	Flow Rate Unit	min.	Min. Flow Rate
	Empty Tube Set (4.3)	N/A	Disable	Enable, Disable
	Output 1 Func. (4.4)	N/A	Max. Flow Rate	Max. Flow Rate, Min. Flow Rate, Empty Tube, System Alarm
	Output 1 Type (4.5)	N/A	NO	NO,NC
	Output 2 Func. (4.6)	N/A	Min. Flow Rate	Max. Flow Rate, Min. Flow Rate, Empty Tube, System Alarm
	Output 2 Type (4.7)	N/A	NO	NO,NC
	Curr. Func. (4.8)	N/A	None	Empty Tube, System Alarm
	Alarm Curr. (4.9)	mA	3.6	3.6,3.8,20.5,22

Main Menu	Sub Menu	Unit	Default	Setting Range
System Set(5)	Language(5.1)	N/A	English	English,Traditional Chinese, Simplified Chinese
	System Info.(5.2)	N/A	Actual	Normal, Empty
		m/s	Actual	N/A
		kΩ	Actual	N/A
		N/A	Actual	0000 0000 ~ FFFF FFFF
	Self-Test(5.3)	N/A	Cancel	Normal, Circuit Fail ,Excitation Fail, Amb. Temp, Electrode Coating
	Analogy Input(5.4)	N/A	0000	0~9999
		N/A	1000	0~9999
		N/A	Kpa	None, Kpa, Mpa, Psi, Bar, °C, °F,
		N/A	1	0~3
	ModBus Comm.(5.5)	N/A	1	1~255
		BPS	9600	1200,2400,4800,9600,19200,38400,57600
		N/A	8	8,9
		N/A	none	none,odd,even
Recovery Default(5.6)	N/A	Cancel	Cancel, Accept	

Main Menu	Sub Menu	Unit	Default	Setting Range
Simulation(6)	Flow Speed(6.1)	m/s	0	-10 ~ 10
	Flow Rate(6.2)	unit of flow	0	0~Max.
	Output Curr.(6.3)	mA	4mA	3.6~22
	Output Freq.(6.4)	Hz(pulse/sec)	2	2~8000
	Output1 Status(6.5)	N/A	OFF	ON/OFF
	Output2 Status(6.6)	N/A	OFF	ON/OFF
	Input1 Status(6.7)	N/A	Actual	ON/OFF
	Input Curr.(6.8)	N/A	Actual	0~24mA

Main Menu	Sub Menu	Unit	Default	Setting Range
Information(7)	F.W. Version(7.1)		actual	
	—			

15. Ordering Information

EPD 5 N J 2 0

Model _____

30: Standard type
34: Remote type¹

Pipe Diameter _____

040: 40mm 125: 125mm
050: 50mm 150: 150mm
065: 65mm 200: 200mm
080: 80mm 250: 250mm
100: 100mm 300: 300mm

Connection Specification _____

M: 5kg/cm² O: 150Lbs W: PN10
V: 7.5Kg/ cm² P:300Lbs X : PN16
N:10Kg/cm² Y : PN25
F:16Kg/cm² Z : PN40
G:20Kg/cm²

Casing and Flange Material _____

5: Carbon Steel

Lining Material _____

H:NBR R:Neoprene E: PTFE

Electrode Material _____

L: SUS316L
H: Hastelloy alloy C276
T: Titanium
A: Tantalum

Electrode Type _____

N: Normal Type

Power Supply and Signal Transmission _____

J2: Integrated Flow Meter, 100~240 Vac 50/60Hz, 4-20mA,pulse output,RS-485

Accuracy _____

F: 0.5%
C: 0.3%
A: 0.2%

Grounding Ring _____

-: None
0: SUS 304
L: SUS316L
H: Hastelloy alloy C276
T: Titanium

¹ Standard cable length for EPD34 remote type is 10M; 100M is Max.

² The accuracy is 0.5% with NBR lining material

16. Transportation and Storage

To prevent the flow meter from damage during the transportation, please keep the packaging condition as how it was when it was shipped from the factory before arriving at the installation site. The storage conditions should meet the following:

- Appropriate rainproof and damp-proof treatment must be conducted .
- Vibration must be reduced and collision with other objects must be prevented during its transportation.
- The storage temperature must be in the range of -20~70°C
- The humidity should be lower than 80%
- To store the used sensors, clean the tested medium attached on the lining and the electrode, and avoid oxidation by not exposing it to too much air for a long time.
- Outdoor storage may degrade the performance of the flow meter.

17. Fault Inspection and Repair

When fault occurs to the flow meter or it fails to meet the accuracy requirements, please try to fix it by referring to the table below.

Fault	Inspection	Solution
Can't achieve the accuracy	<ul style="list-style-type: none"> Whether the zero point of the flow meter floats 	<ul style="list-style-type: none"> The casing of the flow meter is grounded correctly. For the plastic pipe, check whether the grounding ring is corroded. Perform zero point calibration. Please refer to
	<ul style="list-style-type: none"> Whether the pipe is filled with liquid 	<ul style="list-style-type: none"> Change the installation location to make the pipe be filled with
	<ul style="list-style-type: none"> Whether the flow meter works near the upper/lower limit of the flow rate 	<ul style="list-style-type: none"> Reduce/increase the flow rate to keep the flowing speed within 1m/s~10m/s.
	<ul style="list-style-type: none"> Whether the setting of measuring range is correct 	<ul style="list-style-type: none"> Make sure the measuring range of the flow meter is the same as that defined on the device used to receive the signals sent from the flow meter.
	<ul style="list-style-type: none"> Whether the output connection of the flow meter is correct 	<ul style="list-style-type: none"> Re-connect to ensure smooth line.
	<ul style="list-style-type: none"> Whether the grounding between the flow meter and the pipe is good 	<ul style="list-style-type: none"> Perform grounding for flow meter correctly, and the grounding impedance should not be higher than 10Ω.
	<ul style="list-style-type: none"> Whether the coefficient value of the sensor shown on menu 28 is consistent with that stated on the 	<ul style="list-style-type: none"> The coefficient value might have been modified by others. Please restore the settings.
No screen displayed when startup	<ul style="list-style-type: none"> Whether the power supply, switch, fuse and other power devices of the flow meter are normal 	<ul style="list-style-type: none"> Fix the problem, so that the flow meter can be supplied with power correctly. The flow meter might be damaged.
Communication failed	<ul style="list-style-type: none"> Whether the model is integrated with RS-485 communication function 	<ul style="list-style-type: none"> Check whether RS-485 converter can work normally. Contact the vendor.
No pulse output	<ul style="list-style-type: none"> Whether the external power supply 12VDC is equipped for the output end. 	<ul style="list-style-type: none"> If the factory specification is without source NPN output, add an external power supply.

18. MODBUS Communication Protocol

Address(Hex)	Address(Dec)	Variable Name	Data Type	Unit	Range	Definition	Authority
0x1000	4096	gt_modbus_slave_fine_tek_id[0]	UINT8	N/A		"FI"	Read only(Header)
0x1001	4097	gt_modbus_slave_fine_tek_id[2]	UINT8	N/A		"NE"	Read only(Header)
0x1002	4098	gt_modbus_slave_fine_tek_id[4]	UINT8	N/A		"-T"	Read only(Header)
0x1003	4099	gt_modbus_slave_fine_tek_id[6]	UINT8	N/A		"EK"	Read only(Header)
0x1004	4100	PFC_PRODUCT_TYPE	UINT16	N/A		"FM"	Read only(Header)
0x1005	4101	PFC_PRODUCT_NUMBER	UINT16	N/A		0x0001	Read only(Header)
0x1006	4102	PFC_PRODUCT_VERSION	UINT16	N/A		0x0001	Read only(Header)

0x1010	Measuring Status		Data Type	Unit	Range	Definition	Authority
0x1010	4112	PFC_FlowTotal_FRAM_FWD_VAL-High	FLOAT64	m ³		Forward accumulated flow capacity	Read only
0x1011	4113	PFC_FlowTotal_FRAM_FWD_VAL+1					Read only
0x1012	4114	PFC_FlowTotal_FRAM_FWD_VAL+2					Read only
0x1013	4115	PFC_FlowTotal_FRAM_FWD_VAL-Low					Read only
0x1014	4116	PFC_FlowTotal_FRAM_REV_VAL-High	FLOAT64	m ³		Backward accumulated flow capacity	Read only
0x1015	4117	PFC_FlowTotal_FRAM_REV_VAL+1					Read only
0x1016	4118	PFC_FlowTotal_FRAM_REV_VAL+2					Read only
0x1017	4119	PFC_FlowTotal_FRAM_REV_VAL-Low					Read only
0x1018	4120	PFC_FlowTotal_FRAM_BI_DIR_VAL-High	FLOAT64	m ³		Two-way accumulated flow capacity	Read only
0x1019	4121	PFC_FlowTotal_FRAM_BI_DIR_VAL+1					Read only
0x101A	4122	PFC_FlowTotal_FRAM_BI_DIR_VAL+2					Read only
0x101B	4123	PFC_FlowTotal_FRAM_BI_DIR_VAL-Low					Read only
0x101C	4124	PFC_FlowRate_Main_Val-High	FLOAT64	Rate Unit		Instant flow rate value	Read only
0x101D	4125	PFC_FlowRate_Main_Val+1					Read only
0x101E	4126	PFC_FlowRate_Main_Val+2					Read only
0x101F	4127	PFC_FlowRate_Main_Val-Low					Read only
0x1020	4128	gb_pfc_flowrate_rawdata_m_s-High	FLOAT64	m/s		\Setting\ Information\ Actual flow rate	Read only
0x1021	4129	gb_pfc_flowrate_rawdata_m_s+1					Read only
0x1022	4130	gb_pfc_flowrate_rawdata_m_s+2					Read only
0x1023	4131	gb_pfc_flowrate_rawdata_m_s-Low					Read only
0x1024	4132	gf_pfc_current_out_value-High	FLOAT32	mA		Output current value	Read only
0x1025	4133	gf_pfc_current_out_value-Low					Read only
0x1026	4134	PFC_SIMULATION_INPUT_CURR-High	FLOAT32	mA		lutput current value	Read only
0x1027	4135	PFC_SIMULATION_INPUT_CURR-Low					Read only
0x1028	4136	gb_pfc_liquid_resistance-High	FLOAT32	KΩ		\Setting\ Information\ Liquid resistance value	Read only
0x1029	4137	gb_pfc_liquid_resistance-Low					Read only

0x1040	System status		Data Type	Unit	Range	Definition	Authority
0x1040	4160	PFC_TEMPERATURE_BOARD_NOW-High	FLOAT32	°C		PCB temp.	Read only
0x1041	4161	PFC_TEMPERATURE_BOARD_NOW-Low					Read only
0x1042	4162	PFC_SELF_TEST_TUBE_STATUS	UINT16	N/A	0: Normal 1: Empty	\Setting\ Information\ Status of pipe	Read only
0x1043	4163	pfc_system_status_code_value-High	UINT32	N/A		\Setting\ Information\ system status code	Read only
0x1044	4164	pfc_system_status_code_value-Low					Read only

0x1050	Parameter setting- System information		Data Type	Unit	Range	Definition	Authority
0x1050	4176	PFC_PRODUCT_VERSION	UINT16	N/A		Version of firmware (Master)	Read only

0x1055	Parameter setting- Basic setting		Data Type	Unit	Range	Definition	Authority
0x1055	4181	PFC_BASIC_SET_DEVICE_TAG_NUM	UINT16	N/A	00001~65535(Default:1)	Basic setting/ ID number	Read /Write
0x1056	4182	PFC_BASIC_SET_MEASURE_TYPE		N/A	0:Water 1:none	Measured object	Read /Write
0x1057	4183	PFC_BASIC_SET_TUBE_SIZE-High	FLOAT32	10~100mm	Line size divided by 1000	Basic setting/ Connection size	Read /Write
0x1058	4184	PFC_BASIC_SET_TUBE_SIZE-Low		125~500mm	e.g.: DN80= 80/1000=0.08		
0x1059	4185	PFC_BASIC_SET_FLOW_RATE_UNIT	UINT16	N/A	0:L/m 1:L/h 2:m3/m 3:m3/h 4:gal/m 5:gal/h 6:kg/m 7:kg/h 8:T/m 9:T/h 10:m3/d	Basic setting/Instant flow rate unit	Read /Write
0x105A	4186	PFC_BASIC_SET_FLOW_SPAN-High	FLOAT64	m ³ /s	+Line size(m) ² *0.0785 ~ Line size(m) ² *7.85	Basic setting/Measuring range of full pipe	Read /Write
0x105B	4187	PFC_BASIC_SET_FLOW_SPAN+1					Read /Write
0x105C	4188	PFC_BASIC_SET_FLOW_SPAN+2					Read /Write
0x105D	4189	PFC_BASIC_SET_FLOW_SPAN-Low					Read /Write
0x105E	4190	PFC_BASIC_SET_FLOW_DIR	UINT16	N/A	0: Forward 1: Backward	Basic setting/Flow direction	Read /Write
0x105F	4191	PFC_BASIC_SET_FLOW_TOTAL_UNIT	UINT16	N/A	0:Liter1:gal2:m33:kg4:Ton	Basic setting/ Accumulated flow capacity unit	Read /Write
0x1060	4192	PFC_BASIC_SET_TOTAL_MODE	UINT16	N/A	0: Forward 1: Backward 2: Two-way	Basic setting/ Accumulated flow capacity mode	Read /Write
0x1061	4193	PFC_BASIC_SET_TOTAL_RESET	UINT16	N/A	0: Cancel 1: Confirm	Basic setting/ Reset accumulated flow capacity	Read /Write

0x1070	Parameter setting- Advanced setting	Data Type	Unit	Range	Definition	Authority
0x1070	4208 PFC_BASIC_SET_ZERO_ADJ-High	FLOAT64	m/s	-0.5000~+0.5000	Basic setting/ Zero point setting	Read /Write
0x1071	4209 PFC_BASIC_SET_ZERO_ADJ+1					Read /Write
0x1072	4210 PFC_BASIC_SET_ZERO_ADJ+2					Read /Write
0x1073	4211 PFC_BASIC_SET_ZERO_ADJ-Low					Read /Write
0x1074	4212 PFC_BASIC_SET_K_FACTOR-High	FLOAT64	N/A	+0.0000~+3.0000 (Default:1.0)	Basic setting/ K Factor setting	Read /Write
0x1075	4213 PFC_BASIC_SET_K_FACTOR+1					Read /Write
0x1076	4214 PFC_BASIC_SET_K_FACTOR+2					Read /Write
0x1077	4215 PFC_BASIC_SET_K_FACTOR-Low					Read /Write
0x1078	4216 PFC_ADVANCED_SET_DENSITY-High	FLOAT64	g/cm ³	+0.0001~+9.9999 (Default:1.0)	Basic setting/ Density	Read /Write
0x1079	4217 PFC_ADVANCED_SET_DENSITY+1					Read /Write
0x107A	4218 PFC_ADVANCED_SET_DENSITY+2					Read /Write
0x107B	4219 PFC_ADVANCED_SET_DENSITY-Low					Read /Write
0x107C	4220 PFC_BASIC_SET_LOW_FLOW_CUTOFF-High	FLOAT64	%	+0.0000~+100.00 (Default:0.5)	Basic setting/ Low rate shield	Read /Write
0x107D	4221 PFC_BASIC_SET_LOW_FLOW_CUTOFF+1					Read /Write
0x107E	4222 PFC_BASIC_SET_LOW_FLOW_CUTOFF+2					Read /Write
0x107F	4223 PFC_BASIC_SET_LOW_FLOW_CUTOFF-Low					Read /Write
0x1080	4224 PFC_ADVANCED_SET_FWD_TOTAL_INIT-High	FLOAT64	m ³	0~99999	Advanced setting/ Forward accumulated flow ratestart value	Read /Write
0x1081	4225 PFC_ADVANCED_SET_FWD_TOTAL_INIT+1					Read /Write
0x1082	4226 PFC_ADVANCED_SET_FWD_TOTAL_INIT+2					Read /Write
0x1083	4227 PFC_ADVANCED_SET_FWD_TOTAL_INIT-Low					Read /Write
0x1084	4228 PFC_ADVANCED_SET_REV_TOTAL_INIT-High	FLOAT64	m ³	0~99999	Advanced setting/ Backward accumulated flow ratestart value	Read /Write
0x1085	4229 PFC_ADVANCED_SET_REV_TOTAL_INIT+1					Read /Write
0x1086	4230 PFC_ADVANCED_SET_REV_TOTAL_INIT+2					Read /Write
0x1087	4231 PFC_ADVANCED_SET_REV_TOTAL_INIT-Low					Read /Write
0x1088	4232	UINT16	N/A	0~1	Zero point auto calibration ON/OFF	Read /Write

0x1090	Parameter setting- Output/Input signal setting		Data Type	Unit	Range	Definition	Authority
0x1090	4240	PFC_IO_SIGNAL_SET_DAMPING_TIME	UINT16	Second	000~+100(Default:3)	Output/Input signal setting/ Input signal average time	Read /Write
0x1091	4241	PFC_IO_SIGNAL_SET_PULSE_OUTPUT_MODE	UINT16	N/A	0:NO 1:NC 2: Frequency output	Pluse output mode	Read /Write
0x1092	4242	PFC_IO_SIGNAL_SET_PULSE_OUTPUT_UNIT-High	FLOAT64	Liter	+0.0010~+99.999 (Default:0.01)	Pluse unit setting	Read /Write
0x1093	4243	PFC_IO_SIGNAL_SET_PULSE_OUTPUT_UNIT+1					Read /Write
0x1094	4244	PFC_IO_SIGNAL_SET_PULSE_OUTPUT_UNIT+2					Read /Write
0x1095	4245	PFC_IO_SIGNAL_SET_PULSE_OUTPUT_UNIT-Low					Read /Write
0x1096	4246	PFC_IO_SIGNAL_SET_MAX_FREQ-High	FLOAT64	Hz	+0.0010~8.000 (Default:2.0)	Frequency setting	Read /Write
0x1097	4247	PFC_IO_SIGNAL_SET_MAX_FREQ+1					Read /Write
0x1098	4248	PFC_IO_SIGNAL_SET_MAX_FREQ+2					Read /Write
0x1099	4249	PFC_IO_SIGNAL_SET_MAX_FREQ-Low					Read /Write
0x109A	4250	PFC_IO_SIGNAL_SET_OUTPUT_CURR_MODE	UINT16	mA	0: 4-20mA 1: 0-20mA	Current output mode	Read /Write
0x109B	4251	PFC_IO_SIGNAL_SET_4MA_FINE_TUNE	INT16	Count	-5000.0~+5000.0 (Default:0)	4mA output adjustment	Read /Write
0x109C	4252	PFC_IO_SIGNAL_SET_20MA_FINE_TUNE	INT16	Count	-5000.0~+5000.0 (Default:0)	20mA output adjustment	Read /Write
0x109D	4253	PFC_IO_SIGNAL_SET_DIGITAL_1_IN_FUNC	UINT16	N/A	0: none 1: Reset	Input1 contact function	Read /Write
0x109E	4254	PFC_IO_SIGNAL_SET_DIGITAL_1_IN_TYPE	UINT16	N/A	0:NO 1:NC	Input1 contact form	Read /Write

0x10A5	Parameter setting- Alarm setting		Data Type	Unit	Range	Definition	Authority
0x10A5	4261	PFC_ALARM_SET_MAX_FLOW_RATE-High	FLOAT64	m ³ /s	+0.0000 ~ Line size(m) ² *7.85	Max. flow rate	Read /Write
0x10A6	4262	PFC_ALARM_SET_MAX_FLOW_RATE+1					Read /Write
0x10A7	4263	PFC_ALARM_SET_MAX_FLOW_RATE+2					Read /Write
0x10A8	4264	PFC_ALARM_SET_MAX_FLOW_RATE-Low					Read /Write
0x10A9	4265	PFC_ALARM_SET_MIN_FLOW_RATE-High	FLOAT64	m ³ /s	+0.0000 ~ Line size(m) ² *7.85	Min. flow rate	Read /Write
0x10AA	4266	PFC_ALARM_SET_MIN_FLOW_RATE+1					Read /Write
0x10AB	4267	PFC_ALARM_SET_MIN_FLOW_RATE+2					Read /Write
0x10AC	4268	PFC_ALARM_SET_MIN_FLOW_RATE-Low					Read /Write
0x10AD	4269	PFC_ALARM_SET_EMPTY_TUBE_DETECT	UINT16	N/A	0: Off 1: On	Empty pipe detection	Read /Write
0x10AE	4270	PFC_ALARM_SET_ALARM_1_FUNC	UINT16	N/A	0: None 1: Max. flow rate 2: Min. flow rate 3: Empty alarm 4: System error	Output 1 contact function	Read /Write
0x10AF	4271	PFC_ALARM_SET_ALARM_1_TYPE	UINT16	N/A	0:NO 1:NC	Output1 contact form	Read /Write
0x10B0	4272	PFC_ALARM_SET_ALARM_2_FUNC	UINT16	N/A	0: None 1: Max. flow rate 2: Min. flow rate 3: Empty alarm 4: System error	Output 2 contact function	Read /Write
0x10B1	4273	PFC_ALARM_SET_ALARM_2_TYPE	UINT16	N/A	0:NO 1:NC	Output2 contact form	Read /Write
0x10B2	4274	PFC_ALARM_SET_CURR_FUNC	UINT16	N/A	0: none 1: Empty alarm 2: System error	Alarm current function	Read /Write
0x10B3	4275	PFC_ALARM_SET_ALARM_CURR_VAL	UINT16	mA	0:3.6 1:3.8 2:20.5 3:22	Alarm current setting	Read /Write

0x10B9	Parameter setting- System setting		Data Type	Unit	Range	Definition	Authority
0x10B9	4281	PFC_SYSTEM_SET_LANGUAGE	UINT16	N/A	0: English 1: Chinese (Traditional) 2: Chinese (Simple)	Language	Read /Write
0x10BA	4282	PFC_SYSTEM_SET_ANALOGY_INPUT_4MA INFO-High	FLOAT32	N/A	0~9999	Analog setting/ 4 mA Value	Read /Write
0x10BB	4283	PFC_SYSTEM_SET_ANALOGY_INPUT_4MA INFO-Low					
0x10BC	4284	PFC_SYSTEM_SET_ANALOGY_INPUT_20M A_INFO-High	FLOAT32	N/A	0~9999	Analog setting/ 20 mA Value	Read /Write
0x10BD	4285	PFC_SYSTEM_SET_ANALOGY_INPUT_20M A_INFO-Low					
0x10BE	4286	PFC_SYSTEM_SET_ANALOGY_INPUT_4_2 0MA_UNIT	UINT16	N/A	0:None 1:Kpa 2:Mpa 3:Psi 4:Bar 5:°C 6:°F	4~20 mA input unit	Read /Write
0x10BF	4287	PFC_SYSTEM_SET_ANALOGY_INPUT_DOT	UINT16	N/A	0~3	Decimal digits	Read /Write
0x10C0	4288	PFC_IO_SIGNAL_SET_MODBUS_COMM_ID	UINT16	N/A	0 ~ 255	Modbus ID	Read /Write
0x10C1	4289	PFC_IO_SIGNAL_SET_MODBUS_COMM_B AUDRATE-High	UINT32	BPS	1200 :1200bps 2400 :2400bps 4800 :4800bps 9600 :9600bps 19200 :19200bps 38400 :38400bps 57600 :57600bps	BaudRate	Read /Write
0x10C2	4290	PFC_IO_SIGNAL_SET_MODBUS_COMM_B AUDRATE-Low					
0x10C3	4291	PFC_IO_SIGNAL_SET_MODBUS_COMM_D ATA_BITS	UINT16	N/A	0x0000:8 0x1000:9	Data bit	Read /Write
0x10C4	4292	PFC_IO_SIGNAL_SET_MODBUS_COMM_ST OP_BITS	UINT16	N/A	0x0000:1 0x2000:2	Stop bit	Read /Write
0x10C5	4293	PFC_IO_SIGNAL_SET_MODBUS_COMM_P ARITY	UINT16	N/A	0x0000:None 0x0400:even parity 0x0600:uneven parity	Parity	Read /Write
0x10C6	4294	PFC_LOAD_DEFAULT_SETTING	UINT16		0: Cancel 1: Confirm	Default value	Read /Write

0x10C9	Parameter setting- Analog Simulation		Data Type	Unit	Range	Definition	Authority
0x10C9	4297	PFC_SIMULATION_FUNC_STATE	UINT16	N/A	0:None 1: Flow rate 2: Flow capacity 3: Current output 4: Frequency output 5: Output1 status 6: Output2 status	Simulation fuction select	Read /Write
0x10CA	4298	PFC_SIMULATION_FLOW_SPEED-High	FLOAT64	m/s	-10.000~10.000	Simulation of flow rate	Read /Write
0x10CB	4299	PFC_SIMULATION_FLOW_SPEED+1					Read /Write
0x10CC	4300	PFC_SIMULATION_FLOW_SPEED+2					Read /Write
0x10CD	4301	PFC_SIMULATION_FLOW_SPEED-Low					Read /Write
0x10CE	4302	PFC_SIMULATION_FLOW_RATE-High	FLOAT642	Rate Unit	+0.0000 ~ \square 徑(m) ² *7.85	Simulation of flow capacity	Read /Write
0x10CF	4303	PFC_SIMULATION_FLOW_RATE+1					Read /Write
0x10D0	4304	PFC_SIMULATION_FLOW_RATE+2					Read /Write
0x10D1	4305	PFC_SIMULATION_FLOW_RATE-Low					Read /Write
0x10D2	4306	PFC_SIMULATION_OUTPUT_CURR-High	FLOAT32	mA	3.6~22	Simulation of current output	Read /Write
0x10D3	4307	PFC_SIMULATION_OUTPUT_CURR-Low					Read /Write
0x10D4	4308	PFC_SIMULATION_OUTPUT_FREQ	UINT16	Khz	0.002~8Khz	Simulation of frequency output	Read /Write
0x10D5	4309	PFC_SIMULATION_OUTPUT_1_STATUS	UINT16	N/A	0: OPEN 1: CLOSED	Simulation of output1 status	Read /Write
0x10D6	4310	PFC_SIMULATION_OUTPUT_2_STATUS	UINT16	N/A	0: OPEN 1: CLOSED	Simulation of output2 status	Read /Write

0x10DE	System specific setting		Data Type	Unit	Range	Definition	Authority
0x10DE	4318	PFC_SAVE_SYSTEM_VAR_TO_EEPROM	UINT16	N/A	0: none 1: Input	Input USER EEPROM	Read /Write
0x10DF	4319	PFC_ENG_MODE_SAVE_SETTING	UINT16	N/A	0: none 1: Input	Input FACTORY; Set EEPROM	Read /Write
0x10E0	4320	pfc_auto_set_excition_freq_flag	UINT16	N/A	0: Off 1: On	Auto input excitation frequency according to frequency and pipe size	Read /Write