

Authorized Distributor



Paddle Wheel Flow Meter





































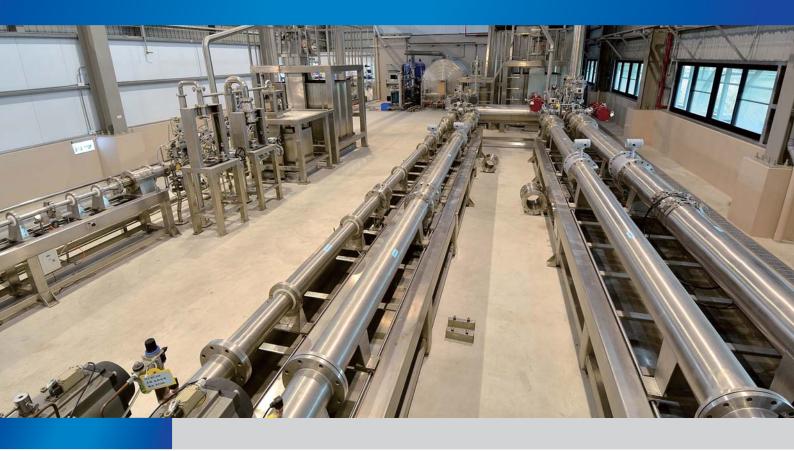




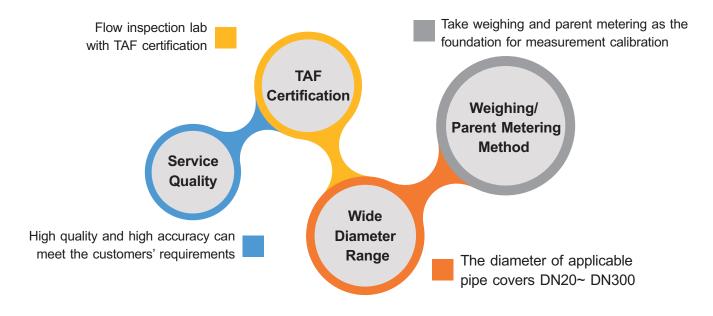




# FineTek Flow Lab



FineTek is the company who owns a Second Class flow test laboratory in Taiwan. With the most professional R&D team, FineTek develops various high precision flow meters and related parts. Moreover, FineTek is certificated and constantly validated by First Class accreditation organization, the Flow Laboratory of the National Measurement Laboratory, R.O.C (Center for Measurement Standards, ITRI), which is approved to guarantee the accuracy on the flow measurement in each delivery. The TAF flow laboratory of FineTek has been certificated and approved by Taiwan Accreditation Foundation (TAF) and conforms to the regulations of international organizations such as ILAC and APALC. It has the complete ability to conduct uncertainty testing and rating for flow test.



### EPR PADDLE WHEEL FLOW METER

#### **WORKING PRINCIPLE**

The Paddle Wheel Flow Meter measures the flow velocity by using the fluidic to drive the blade rotation, and calculates the flow rate based on the flow velocity. ERP1 series flow meter consists of flow transmitter and pipe fitting. The light and compact design allows the user to carry, install and operate it conveniently. The product is calibrated by professional flow test device, with the accuracy of K value reaching±3%. The measuring range is 0.3 ~10m/s, with high linearity. Display and non-display type are both available. The display type is built-in with accumulated flow storage device.

#### **FEATURES**

- Controlled by a microprocessor, with convenient operation and comprehensive functions.
- Power supply: 12-36 Vdc.
- Analog output: 4-20mA with 10% higher range as 4-21.6mA
- Simulated test output: 0-24 mA.
- Pulse output: Optical-coupling transistor output.
- Simulated frequency output: 0-300Hz
- Pure sensing non-display type is for convenient system integration
- LCM (Graphic 128x64 Dots) display type
- Built-in FRAM (Ferroelectric Random Access Memory) flash memory
- Easily separated from the sensor.
- LED indicator displays the alarm status.
- Upper limit settings of the analog output.
- Analog output flow rate and velocity filter settings: 0-40 segments.
- LED shows three back-lit modes, ON/OFF/In Operation.
- With RS485 communication.
- Parameter settings (K factor, pipe diameter, device ID, baudrate).
- Supports Traditional Chinese, Simplified Chinese, English, etc.

#### **APPLICATIONS**

The Paddle Wheel Flow Meter is applicable to neutral or corrosive liquids that are non-granular or non-viscous. It connects with an analog output and pulse output signal to form a monitoring system, which can display instantaneous flow and accumulated flow. Moreover, it can form a control circuit to adjust the valve or operate the switch.

X The detected medium must not contain any iron filings, particles which will attached the rotary paddle wheel and affect the accuracy and also cause damage. If there is possibility to have iron filings, particles in the process or pump operation, please install the magnet screen filters (please consider the Pressure loss) on upstream side for the minimum distance 15 times of pipe diameter.

- Food industry
- Beverage industry
- Water treatment industry
- Pharmaceutical industry
- Dyeing industry
- Chemical industry
- Semi-conductor industry
- PCB wet process control



## **STANDARD SPECIFICATIONS**

## PVC Pipe material & PP Blade

1 VO 1 ipe iliateriai & i							
Model Type							
Specification	Intelligent All-in-one model	Flow transmitter model	Pulse output model				
Applicable pipe diameter	DN20 \ DN25	` DN40 ` DN50					
Pipe material	P\	/C					
Flow velocity range	0.3~	10m/s					
Accuracy	Under standard K Factor ±3% F.S. (I	Flow velocity 6~10m/s	reach ±0.5%)				
Repeatability	±0.	4%					
Measuring principle	Mag	Magnetic					
Viscosity range	300 cS	300 cSt, max.					
Impurity range	Must be nonmagnetic 1%, max.(Size of particles 0.5mm max.)						
Process temp.	-15°C~60°C(5°F~140°F)						
Ambient humidity	<80%,non-	condensing					
Installation method	Transmitte	er +T-fitting					
Process pressure	10-ba	r,Max.					
IP rating	IP66, the connector shall	be inserted and faste	ened				
Analog output	4~20r	mA	N/A				
impedance	1000Ω, at 2 700Ω, at 2 450Ω, at 1	1300 $\Omega$ , at 36Vdc 1000 $\Omega$ , at 30Vdc 700 $\Omega$ , at 24Vdc 450 $\Omega$ , at 18Vdc 200 $\Omega$ , at 12Vdc					
Pulse output	NPN, PN	P 200mA overcurrent	protection				
Frequency range	0~300	)Hz	N/A				
Display	LCM,128*64,Backlit N/A						
Power supply voltage	12~36Vd	c · ±10%					
Power consumption	<1.5VA						
Reverse protection of power supply	YES						
Communication port	RS48	5,Modbus	N/A				
Accumulated flow storage device	16K,FRAM NO						

# STANDARD SPECIFICATIONS

## SUS Pipe material & PVDF Blade

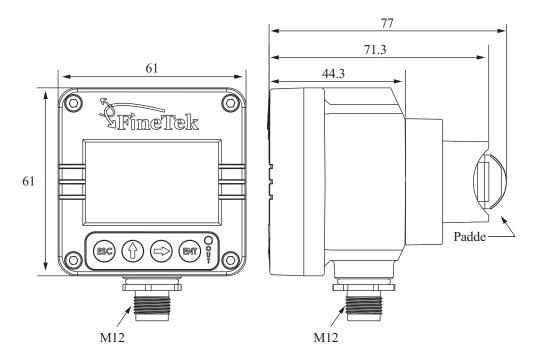
303 i ipe iliateriai & i	12. 2.440					
Model Type	FineTek					
Specification	Intelligent All-in-one model	Flow transmitter model	Pulse output model			
Applicable pipe diameter	DN20 \ DN25	` DN40 ` DN50				
Pipe material	SI	JS304 \ SUS316 \ SU	JS316L			
Flow velocity range	0.3~	10m/s				
Accuracy	Under standard K Factor ±3% F.S. (	Flow velocity 6~10m/s	s reach ±0.5%)			
Repeatability	±0.	4%				
Measuring principle	Magnetic					
Viscosity range	300 cS	300 cSt, max.				
Impurity range	Must be nonmagnetic 1%, max.(Size of particles 0.5mm max.)					
Process temp.	-15°C~100°C	-15°C~100°C (5°F~212°F)				
Ambient humidity	<80%,non-	condensing				
Installation method	Transmitte	er +T-fitting				
Process pressure	10-ba	r,Max.				
IP rating	IP66, the connector shall	be inserted and faste	ened			
Analog output	4~20r	mA	N/A			
impedance	1300 $\Omega$ , at 36Vdc 1000 $\Omega$ , at 30Vdc 700 $\Omega$ , at 24Vdc 450 $\Omega$ , at 18Vdc 200 $\Omega$ , at 12Vdc					
Pulse output	NPN, PN	P 200mA overcurrent	protection			
Frequency range	0~300	)Hz	N/A			
Display	LCM,128*64,Backlit	N	/A			
Power supply voltage	12~36Vd	lc · ±10%				
Power consumption	<1.5VA					
Reverse protection of power supply	YES					
Communication port	RS48	5,Modbus	N/A			
Accumulated flow storage device	16K,FRAM	N	0			

## **STANDARD SPECIFICATIONS**

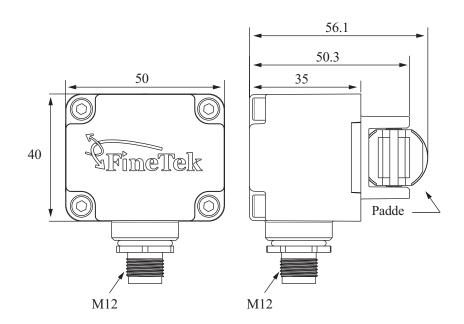
### SUS Pipe material & SUS316 Blade

Model Type		
Specification	Intelligent All-in-one model	
Applicable pipe diameter	DN25 \ DN40	
Pipe material	SUS304 · SUS316 · SUS316L	
Flow velocity range	0.5~8 m/s	
Accuracy	Under standard K Factor ±3% F.S.	
Repeatability	±0.4%	
Measuring principle	Magnetic	
Viscosity range	300 cSt, max.	
Impurity range	Must be nonmagnetic 1%, max. (Size of particles 0.5mm max.)	
Process temp.	-15°C~100°C (5°F~212°F)	
Ambient humidity	<80%,non-condensing	
Installation method	Transmitter +T-fitting	
Process pressure	10-bar,Max.	
IP rating	IP66, the connector shall be inserted and fastened	
Analog output	4~20mA	
impedance	1300 $\Omega$ , at 36Vdc 1000 $\Omega$ , at 30Vdc 700 $\Omega$ , at 24Vdc 450 $\Omega$ , at 18Vdc 200 $\Omega$ , at 12Vdc	
Pulse output	NPN, PNP 200mA overcurrent protection	
Frequency range	0~300Hz	
Display	LCM,128*64,Backlit	
Power supply voltage	12~36Vdc · ±10%	
Power consumption	<1.5VA	
Reverse protection of power supply	YES	
Communication port	RS485,Modbus	
Accumulated flow storage device	16K,FRAM	

## **INTELLIGENT ALL-IN-ONE MODEL**

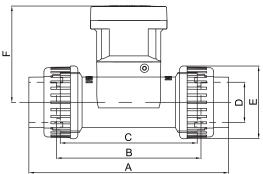


### FLOW TRANSMITTER MODEL & PULSE OUTPUT MODEL

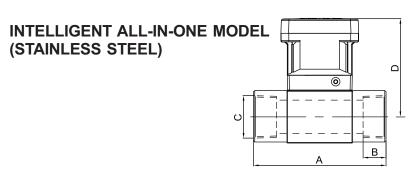


## INTELLIGENT ALL-IN-ONE MODEL

(ENGINEERING PLASTICS)

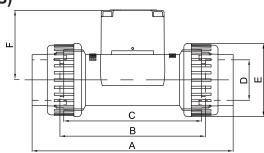


Diameter-DN (mm)	Pipe standards	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
20	DIN/ISO ASTM JIS CNS 4053-1	144	106	100	25 26.7 26.45 26	53	76.3
25	DIN/ISO ASTM JIS	159	115	109	32 33.4 32.55	58	76.7
40	DIN/ISO ASTM JIS	189	125	119	50 48.3 48.7	83	83.3
50	DIN/ISO ASTM JIS CNS 4053-1	216	140	130	63 60.3 60.8 60	103	90



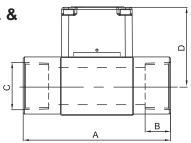
Diameter-DN (mm)	A (mm)	B (mm)	C (mm)	D (mm)
20	94	17 18.3 18.3	PF 3/4" PT 3/4" NPT 3/4"	77
25	104	23 18 18	PF 1" PT 1" NPT 1"	77
40	129	23 22 22	PF 1-1/2" PT 1-1/2" NPT 1-1/2"	83.4
50	148.5	27.5 24 24	PF 2" PT 2" NPT 2"	90

### FLOW TRANSMITTER MODEL & PULSE OUTPUT MODEL (ENGINEERING PLASTICS)



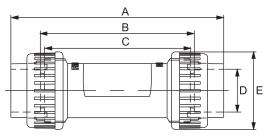
Diameter-DN (mm)	Pipe standards	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
20	DIN/ISO ASTM JIS CNS 4053-1	144	106	100	25 26.7 26.45 26	53	54.8
25	DIN/ISO ASTM JIS	159	115	109	32 33.4 32.55	58	55.2
40	DIN/ISO ASTM JIS	189	125	119	50 48.3 48.7	83	62
50	DIN/ISO ASTM JIS CNS 4053-1	216	140	130	63 60.3 60.8 60	103	68.5

FLOW TRANSMITTER MODEL & PULSE OUTPUT MODEL (STAINLESS STEEL)



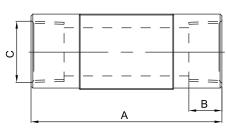
Diameter-DN (mm)	A (mm)	B (mm)	C (mm)	D (mm)
20	94	17 18.3 18.3	PF 3/4" PT 3/4" NPT 3/4"	55
25	104	23 18 18	PF 1" PT 1" NPT 1"	55.6
40	129	23 22 22	PF 1-1/2" PT 1-1/2" NPT 1-1/2"	62
50	148.5	27.5 24 24	PF 2" PT 2" NPT 2"	69

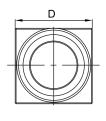
# T-FITTING(ENGINEERING PLASTICS)



Diameter-DN (mm)	Pipe standards	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
20	DIN/ISO ASTM JIS CNS 4053-1	144	106	100	25 26.7 26.45 26	53
25	DIN/ISO ASTM JIS	159	115	109	32 33.4 32.55	58
40	DIN/ISO ASTM JIS	189	125	119	50 48.3 48.7	83
50	DIN/ISO ASTM JIS CNS 4053-1	216	140	130	63 60.3 60.8 60	103

## **T-FITTING (STAINLESS STEEL)**





Diameter-DN (mm)	A (mm)	B (mm)	C (mm)	D (mm)
20	94	17 18.3 18.3	PF 3/4" PT 3/4" NPT 3/4"	42
25	104	23 18 18	PF 1" PT 1" NPT 1"	55.6
40	129	23 22 22	PF 1-1/2" PT 1-1/2" NPT 1-1/2"	62
50	148.5	27.5 24 24	PF 2" PT 2" NPT 2"	72

### **SELECTING FLOW AND PIPE DIAMETER**

#### **Plastic Blade**

Material	Pipe diameter	Flow Range (m³/h)			
Waterial	(mm)	Flow velocity 0.3m/s (min)	Flow velocity 10m/s (max)		
	20	0.34	11.31		
PVC Pipe material &	25	0.53	17.67		
PP Blade	40	1.35	45.23		
	50	2.12	70.68		
	20	0.34	11.31		
SUS Pipe material & PVDF Blade	25	0.53	17.67		
	40	1.35	45.23		
	50	2.12	70.68		

#### Stainless Blade

Material	Pipe diameter	Flow Range (m³/h)			
	(mm)	Flow velocity 0.5m/s (min)	Flow velocity 8m/s (max)		
SUS Pipe material &	25	0.89	14.13		
SUS316 Blade	40	2.27	36.18		

### RELATIONSHIP BETWEEN K VALUE AND FITTING DIAMETER:

### Intelligent All-in-One Model

Material	Connection &	K Factor (Pulse/Liter)				
Waterial	Standard Type	DN20	DN25	DN40	DN50	
	DIN/ISO	70	49	17	9.2	
PVC Pipe material & PP Blade	ASTM	70	49	17	9.2	
l i Biddo	JIS	70	49	17	9.2	
	CNS 4053-1	70			9.2	
0110 51	Thread PF	70	49	17	9.2	
SUS Pipe material & PVDF Blade	Thread PT	70	49	17	9.2	
. vs. slade	Thread NPT	70	49	17	9.2	
0110 5	Thread PF		58	16.25	8.8	
SUS Pipe material & SUS316 Blade	Thread PT		58	16.25	8.8	
	Thread NPT		58	16.25	8.8	

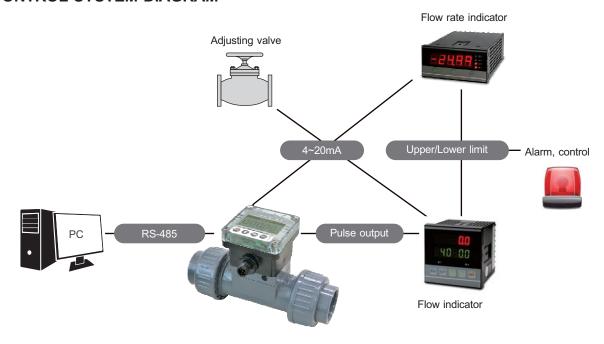
X US: GL (Gallon) K factor = Pulse/Liter × 3.785; UK: GL (Gallon) K factor = Pulse/Liter × 4.546.

### Flow transmitter type & Pulse Output type

Material	Connection &	K Factor (Pulse/Liter)							
Matorial	Standard Type	DN20	DN25	DN40	DN50				
PVC Pipe material & PP Blade	DIN/ISO	56.5	30	8.3	5.92				
	ASTM	56.5	30	8.3	5.92				
	JIS	56.5	30	8.3	5.92				
	CNS 4053-1	56.5		5.92					
SUS Pipe material & PVDF Blade	Thread PF	56.5	30	8.3	5.92				
	Thread PT	56.5	56.5 30		5.92				
	Thread NPT	56.5	30	8.3	5.92				

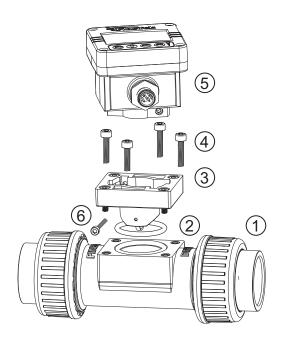
X US: GL (Gallon) K factor = Pulse/Liter × 3.785; UK: GL (Gallon) K factor = Pulse/Liter × 4.546.

### **CONTROL SYSTEM DIAGRAM**



### TRANSMITTER INSTALLATION

#### INTELLIGENT ALL-IN-ONE MODEL



#### Installation steps

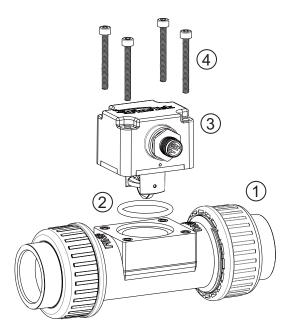
- 1. T-fitting of flow meter.
- 2. Place the O-shaped ring in the sealing tank, and unfold it naturally.
- 3. Make the blade holder face downward and go through the hole and O-shaped ring. Level and align it.
- 4. Fasten and align the 4 screws evenly with the \*Fastening torque:
  - Plastic Blade = 8~10kgf-cm(0.784~0.98N.m) Stainless Blade = 10~12kgf-cm(0.98~1.176N.m)
- 5. Point the M12 connector of the display towards you, and insert it into the slot. Level it horizontally and rotate it clockwise to the edge for alignment.
- 6. Fasten the 2 fixing screws.

  \*Fastening torque=6~8kgf-cm(0.588~0.784N.m)

\*Note: The above steps are for whole machine installation. To install the header only, please perform steps 5~6.

Please apply the fastening torque on the screws as required.

#### FLOW TRANSMITTER MODEL & PULSE OUTPUT MODEL



#### Installation steps

- 1. T-fitting of flow meter.
- 2. Place the O-shaped ring in the sealing tank, and unfold it naturally.
- 3. Make the blade of the transmitter face downward and go through the hole and O-shaped ring. Level and align it.
- 4. Fasten and align the 4 screws evenly.
  - \*Fastening torque:

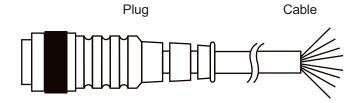
Plastic Blade = 8~10kgf-cm(0.784~0.98N.m) Stainless Blade = 10~12kgf-cm(0.98~1.176N.m)

\*Note: Please apply the fastening torque on the screws as required.

### **M12 CONNECTOR**

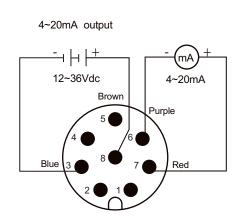


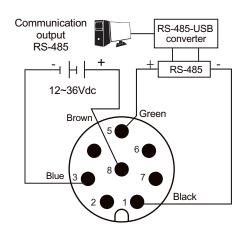




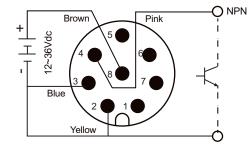
M12 Socket Pin No.	Function	Cable Color
1	Communication output RS485 -	Black
2	Pulse output Pulse -	Yellow
3	Power supply input DC 0V -	Blue
4	Pulse output Pulse +	Pink
5	Communication output RS485 +	Green
6	Analog output 4~20mA -	Purple
7	Analog output 4~20mA +	Red
8	Power supply input DC12~36V +	Brown

### **WIRING**

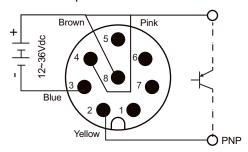




### Pulse output NPN



### Pulse output PNP



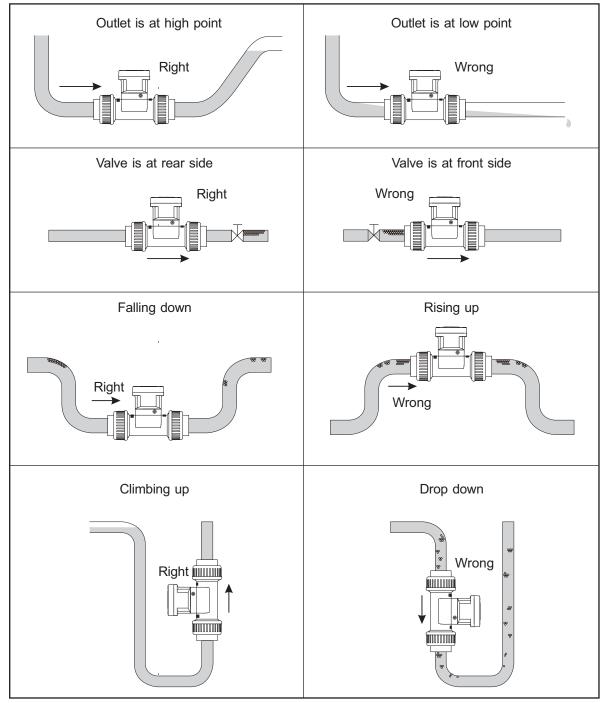
## REQUIREMENTS FOR STRAIGHT PIPE SECTION

The straight pipe must be long enough on the upstream side and downstream side where the flow meter is installed. This can obtain an evenly distributed and stable flow field so as to guarantee the measuring accuracy. When installing the flow meter, please choose optimal distance based on the pipe dimension and field environment. Generally, the longer the section of the straight pipe is, the better. The table below lists the minimum distance based on the times of D(D=pipe diameter).

Туре	Length of Straight Pipe on the Upstream Side	Length of Straight Pipe on the Downstream Side
Regulating valve	≥50D Flow	Flow ≥5D
Keep the two elbow pipes close	There are two 90° elbow pipes on the upstream, with the distance shorter than three times the T-fitting length	There are two 90° elbow pipes on the downstream, with the distance shorter than three times the T-fitting length  Flow  ≥5D
Dual elbow pipes	≥25D Flow	Flow ≥5D
Single elbow pipe	≥20D Flow	Flow ≥5D
Diverging pipe	≥18D Flow	Flow ≥5D
Convergin pipe	≥15D Flow	Flow ≥5D

## **INSTALLATION REQUIREMENTS**

- 1. The flow meter must be in horizontal or vertical pipe.
- 2. Ensure the flow meter to keep a full pipe.
- 3. No air bulb or hole should be generated when getting close to the T-fitting area of the flow meter during the measurement. It will affect the accuracy of the flow measurement.



\*Note: When installing the flow meter on the horizontal pipe, the sensor blade must face downward. Appropriate material should be selected, and the specifications on pressure and temperature should be followed. Moreover, appropriate pipe diameter should be chosen based on the flow/velocity/diameter.

## **ORDER INFORMATION**

				<b>(19)</b>	10 (	11) (12	) (13)	14)	15	<u>16</u> <u>17</u>	18	19	20	(	22
		EPR10	0 0 0	) -										$\mathbf{A}[$	_
(9) (i) (ii) Pipe diamete	er ————————————————————————————————————														
020: DN20(3/4")															
025: DN25(1") 040: DN40(1-1/2")															
050: DN50(2")															
, ,															
Display model —															
A: Without display (Flo	ow transmitter mode	el & pulse out	tput mod	el)											
B: LCM display (Intellig				,											
13 14 Pipe diameter															
MA: SUS 304															
MB: SUS 316															
MC: SUS 316L 23: PVC															
23.1 VO															
(§ (l) T-fitting standa	and ———														
(When the pipe n	material is SUS, ple	ase choose "	00")												
00: None		_													
AA: JIS		1													
AB: ISO AC: ASTM		(Only ava	ailable fo	r PVC	)(Pi	ne m	natei	rial)							
AD: DIN		(51) 3			Λ	ρυ		,							
BA:CNS(Pipe diameter	er 020, 040 only)	J													
1) ® T-fitting standa		• •	00"												
(When the pipe n 00: None	material is PVC, ple	ase choose "	00")												
02: PT female	1														
04: PF female	Only available fo	r SUS)(Pipe r	material)												
08: NPT female															
Blade material															
18: PP (60°C)															
24: PVDF (100°C)															
MB: SUS 316 (100°C)															
@ Output															
② Output ——————————————————————————————————	DND NDN 000 A/L	atalliaant all !:		-dal 0			. n.c.::	.:44-		I					_
A: 4~20mA, RS-485, F	-NP NPN 200MA(II	ntenigent all-ir	1-one mo	odel &	F10	w tra	ınsm	iitte	r m	iodel)	)				

B: PNP NPN 200mA (Pulse output model)

## **APPLICATION DEMO**





