

Shanghai Panda Machinery Group Co., LTD.



PANDA

Panda Smart Meter

Panda Smart Meter Selection Manual

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Smart Metering Solutions Provider

PANDA

Smart Metering Solutions Provider

Industry leader

T H E B E T T E R F U T U R E

Smart Metering

Better Future

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GROUP INTRODUCTION

Shanghai Panda Machinery(Group) Co.,Ltd is a high-tech enterprise in Shanghai, No.1 market shares of building pumps in China. President Xuecong, Chi founded the company in 1993.

Through 30 years development, We have been a leading group including from researching, manufacturing pumps, complete equipments, water meters, flow meters to intelligent management platform which is consist of raw water monitoring, water supply control, DMA, pipe GIS, Secondary water supply and Billing. We have been providing advanced smart watering solutions for thousands of water supply companies.

Also we take proud of that our high-tech products are servicing water supply and drainage, municipal infrastructure, HAVC, chemicals, electrics, mining, thermal energy efficiency monitoring fields etc.

GROUP CULTURE

Panda Values

Thanksgiving, Innovation and Efficiency

Panda Mission

Leading China's Wisdom Water

Panda Strategy

Leading technology ,Leading service

Panda Slogan

Tomorrow will be better!

Panda Personal Goal

Excel yourself and work miracles

Panda Vision

Building a Century Panda

GROUP ADVANTAGE

- 8 R&D Bases
- 35 Sales Companies
- 289 Representative Offices
- 360 Service Centers
- 792 R&D Technicians
- 3000 Skilled Staffs
- 2 National Standards
- 510 Patent Rights

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Panda PWM-S Residential Series

Stainless Steel Residential Ultrasonic Water Meter DN15-DN25

Features >>>



- Full Stainless Steel Body . Can Be Used For High-Quality Direct Drinking Water Metering
- Wide Range
 - Measuring Low Starting Flow, Reduce The Gap Between Production And Sales Effectively
- No Moving Parts, Accuracy Will Not Change After Long Term Working
- With Functions of Self-diagnosis, Flow Sensor Alarm, Temperature Sensor Alarm, Over Range Alarm and Battery Undervoltage Alarm
- Low Consumption Design, Battery Can Continuously Work For 8 Years
- With Optic Electric Interface, Hand-held Infrared Meter Reading Tool Can Read Directly
- Built-in Wireless LoRaWAN/NB-IoT
 - Upload Time Can Be Set According To User Specified Time, 48 Pcs of Historical Data Can Be Uploaded Every Day
- Integrated Multiple Intelligent Alarm Functions For Abnormal Water Consumption, Open Protocol Is More Suitable For Compatible Extension
- Bi-directional Measuring Forward And Reverse Flow
- According To Sanitary Standard For Drinking Water

Technical Specification >>>

Max. Working Pressure	1.6Mpa
Temperature Class	T30
Accuracy Class	ISO 4064, Accuracy Class 2
Body Material	Stainless Steel 304 (opt. SS316L)
Battery Life	8 Years (Consumption≤0.3mW)
Protection Class	IP68
Environmental Temperature	-40℃~+70℃, ≤100%RH
Pressure Loss	ΔP25
Climatic And Mechanical Environment	Class O
Electromagnetic Class	E2
Communication	Wired, M-bus, RS485, Wireless LoRaWAN, (opt.NB-IoT, 4G)
Display	9 digits multi-line LCD display. Can display cumulative flow (m ³ , L, GAL), instantaneous flow (m ³ /h, L/min, GPM), battery alarm, flow direction, output etc.
Connection	Thread
Flow Profile Sensitivity Class	U5/D3 ((U3/D0, U0/D0)
Data Storage	Can store 24 months of frozen data, data is permanently stored after power loss
Frequency	1-4 times/second

Remarks: LoRaWAN/NB-IoT signal becomes weak, repeated uploading will shorten battery life

Panda PWM-S Residential Series

Stainless Steel Residential Ultrasonic Water Meter DN15-DN25

Features >>>



- Full Stainless Steel Body. Can Be Used For High-Quality Direct Drinking Water Metering
- Integrated Meter And Valve, Fully Enclosed Structure, Anti-vandalism
- Wide Range
 - Measuring Low Starting Flow,Reduce The Gap Between Production And Sales Effectively
- No Moving Parts, Accuracy Will Not Change After Long Term Working
- With Functions of Self-diagnosis, Flow Sensor Alarm, Temperature Sensor Alarm, Over Range Alarm, Battery Undervoltage Alarm and Valve Error Alarm
- Low Consumption Design, Battery Can Continuously Work For 8 Years
- With Optic Electric Interface, Hand-held Infrared Meter Reading Tool Can Read Directly
- Built-in Wireless LoRaWAN/NB-IoT
 - Support Remote Valve Controlled By Revenue Platform System
- According To Sanitary Standard For Drinking Water
 - Upload Time Can Be Set Based On Request Of User; 48 Data Can Be Upload Per Day
- Multiple Intelligent Alarm Functions For Integrate Abnormal Water Volume, Open Protocol More Suitable For Compatible Expansion
- Accumulative Volume Unit Can Be "Liter" Or "Cubic Meter"

Technical Specification >>>

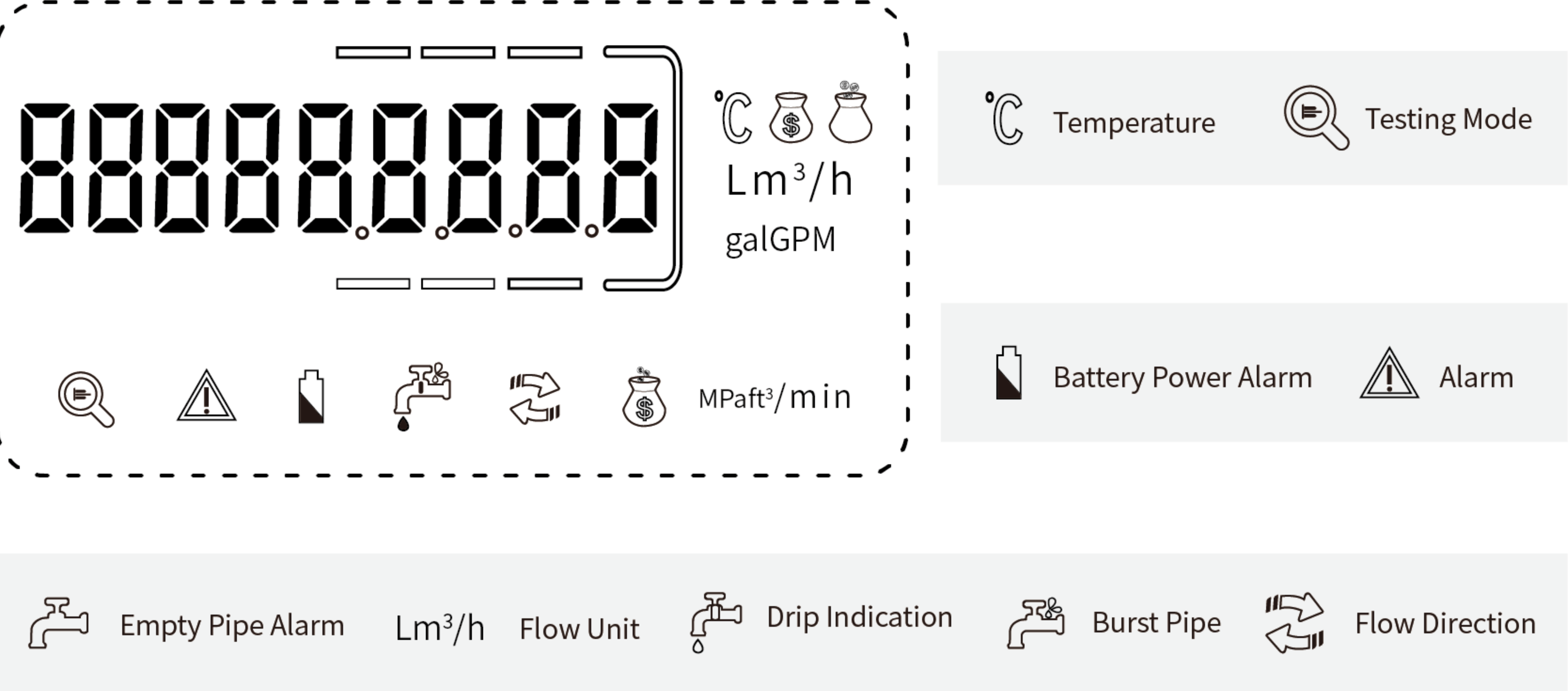
Max. Working Pressure	1.6Mpa
Temperature Class	T30
Accuracy Class	ISO 4064, Accuracy Class 2
Body Material	Stainless Steel 304 (opt. SS316L)
Battery Life	8 Years (Consumption≤0.3mW)
Protection Class	IP68
Environmental Temperature	-40℃~+70℃, ≤100%RH
Pressure Loss	ΔP25
Climatic And Mechanical Environment	Class O
Electromagnetic Class	E2
Communication	Wired, M-bus, RS485, Wireless LoRaWAN, (opt.NB-IoT, 4G)
Display	9 digits multi-line LCD display. Can display cumulative flow (m ³ , L, GAL), instantaneous flow (m ³ /h, L/min, GPM), battery alarm, flow direction, output etc.
Connection	Thread
Flow Profile Sensitivity Class	U5/D3 ((U3/D0, U0/D0)
Data Storage	Can store 24 months of frozen data, data is permanently stored after power loss
Frequency	1-4 times/second

Remarks: LoRaWAN/NB-IoT signal becomes weak, repeated uploading will shorten battery life

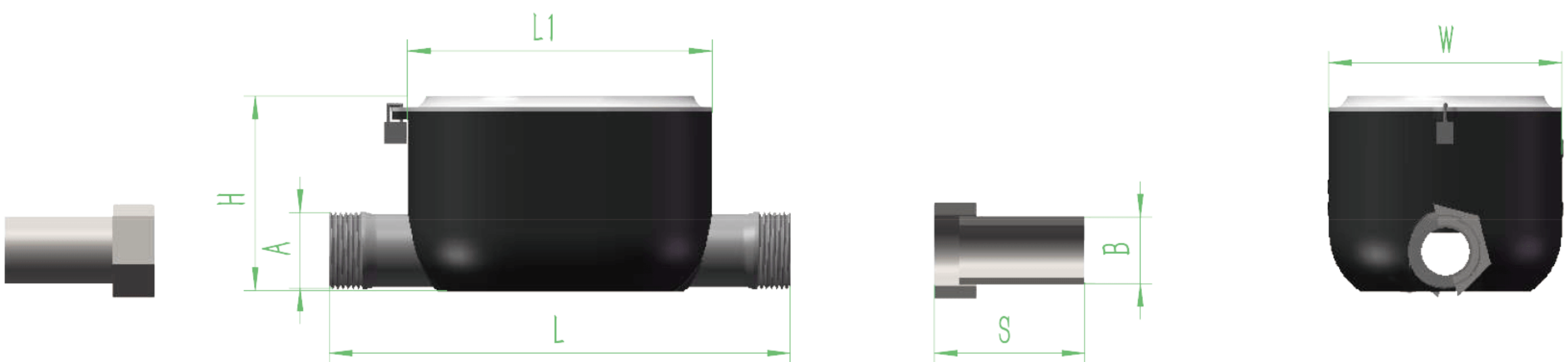
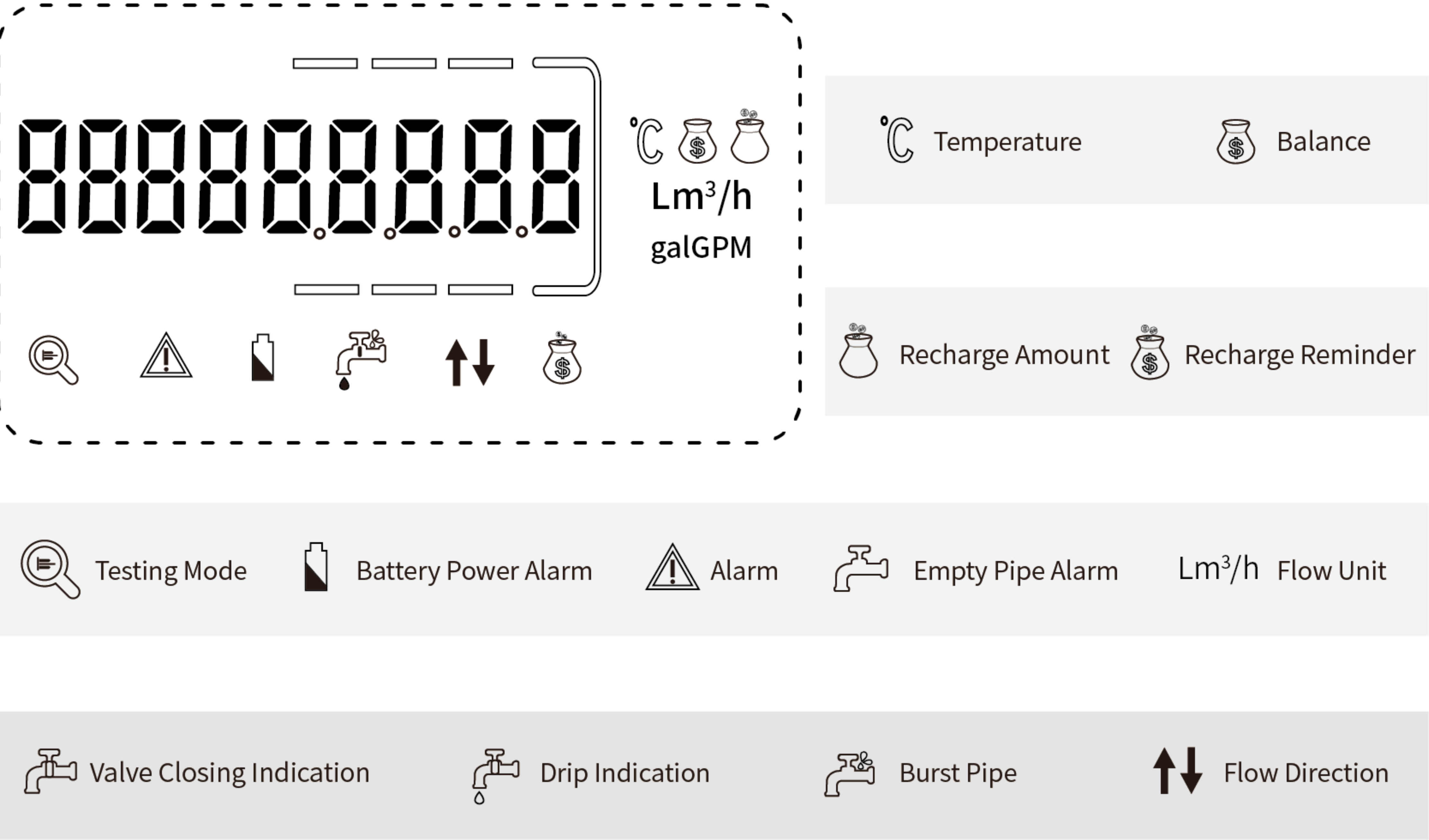
Panda PWM-S Residential Series

Stainless Steel Residential Ultrasonic Water Meter DN15-DN25

Residential Ultrasonic Water Meter Display Without Valve >>>



Residential Ultrasonic Water Meter Display With Valve >>>



Panda PWM-S Residential Series

Stainless Steel Residential Ultrasonic Water Meter DN15-DN25

Measuring Range and Dimensions >>>

Diameter	PWM-S (Without Valve Control)											
	DN15				DN20				DN25			
Overload Flow Q4 (m³/h)	3.125	3.125	3.125	3.125	5.0	5.0	5.0	5.0	7.875	7.875	7.875	7.875
Permanent Flow Q3 (m³/h)	2.5	2.5	2.5	2.5	4.0	4.0	4.0	4.0	6.3	6.3	6.3	6.3
Transitional Flow Q2 (m³/h)	0.040	0.025	0.020	0.016	0.064	0.040	0.032	0.026	0.101	0.063	0.050	0.040
Minimum Flow Q1 (m³/h)	0.025	0.016	0.013	0.010	0.040	0.025	0.020	0.016	0.063	0.039	0.032	0.025
R=Q3/Q1	100	160	200	250	100	160	200	250	100	160	200	250
L (mm)	165				195				225			
L1 (mm)	109				125				131			
H (mm)	69.5				73				73			
W (mm)	83.5				89.5				89.5			
Weight (kg)	0.7				0.95				1.15			
Length of Connection Accessories S (mm)	44.5				49.5				58.5			
Installation without Connection Accessories (A)	G¾B				G1B				G1¼B			
Installation with Connection Accessories (B)	R½				R¾				R1			

Panda PWM-S Residential Series

Stainless Steel Residential Ultrasonic Water Meter DN15-DN25

Measuring Range and Dimensions >>>

Diameter	PWM-S (With Valve Control)											
	DN15				DN20				DN25			
Overload Flow Q4 (m³/h)	3.125	3.125	3.125	3.125	5.0	5.0	5.0	5.0	7.875	7.875	7.875	7.875
Permanent Flow Q3 (m³/h)	2.5	2.5	2.5	2.5	4.0	4.0	4.0	4.0	6.3	6.3	6.3	6.3
Transitional Flow Q2 (m³/h)	0.040	0.025	0.020	0.016	0.064	0.040	0.032	0.026	0.101	0.063	0.050	0.040
Minimum Flow Q1 (m³/h)	0.025	0.016	0.013	0.010	0.040	0.025	0.020	0.016	0.063	0.039	0.032	0.025
R=Q3/Q1	100	160	200	250	100	160	200	250	100	160	200	250
L (mm)	165				195				225			
L1 (mm)	135				157				165			
H (mm)	82				90				96.5			
W (mm)	96				100				100			
Weight (kg)	0.85				1.15				1.35			
Length of Connection Accessories S (mm)	44.5				49.5				58.5			
Installation without Connection Accessories (A)	G¾B				G1B				G1¼B			
Installation with Connection Accessories (B)	R½				R¾				R1			

Panda PWM-S Residential Series

Stainless Steel Residential Ultrasonic Water Meter DN15-DN25

Model Selection >>>

PWM - S - 015 - 1 - 1 - 16 - L - 2 - 1 - N - N

Model
PWM-S Ultrasonic Water Meter

Pipe Size
015-DN15

Power Supply
1. Battery(Without Cover)
2. Battery(With Cover)

Body Material
1. Stainless Steel 304
2. Stainless Steel 316L

Pressure
16. 1.6MPa

Connection
L. Thread Connection

Range
1.R400
2.R250
3.R200
4.R160
5.R100

Product Type
N. Without Valve Controlled Function
1. With Valve Controlled Function (Only For Prepaid Type)

Optional
1. Built-in antenna
2. Separate antenna

Output
1. NB-IoT
2. M-bus
3. RS485
4. LoRaWAN
5. Others

For Example: PWM-S-015-1-1-16-L-2-1-N-N

Stands for: PWM-S Ultrasonic Water Meter, pipe size DN15, battery (without cover) power supply. stainless steel 304, pressure 1.6Mpa, thread connection, R250, M-BUS output, built-in antenna, without valve controlled function.

Panda High-Precision

Piston Water Meter Calibration Test Bench

Summary >>>

Panda high-precision piston water meter calibration test bench consists of a water source system, a piston system, a meter clamping pipeline, a flow regulating device, a standard device system, a commutator device, and a software control system. An electronic scale is used for real-time comparison with the piston. Automatic meter inspection, one-button operation; the pump group uses our Panda SRI vertical multi-stage centrifugal pump, and the device has a built-in heating and constant temperature system.



Features >>>

- Supports the verification and calibration of ultrasonic water meters, ultrasonic heat meters, and mechanical water meters.
- Supports automatic modification, addition, and editing of communication protocols.
- Supports the addition and customization of external control points such as valves.
- Different users and management levels can be added.
- The software supports the verification of the start-stop method, commutator method, and flow-time method.
- The software standard can select the mass method, standard meter method, and piston method.
- Supports self-verification of the commutator.
- The testing system supports pulse acquisition, image acquisition, M-BUS, and RS485/232 acquisition.
- Record management function, users can query, preview, print, and manage records, and can customize the format of verification records and verification certificates.

Number of meters tested:

- DN15 (165mm) 16 pcs
- DN20 (195mm) 14 pcs
- DN25 (225mm) 12 pcs

Panda PWM-S Series

Ultrasonic Water Meter DN32-DN40

Features >>>



- With Rectifier Function, Low Installation Requirement of Straight Pipe
- Single/dual channel optional
- Suitable for mass flow and tiny flow measurement and compatible with full-bore and reduced-bore ultrasonic water meters in the markets
- The Integrated Design Of Flow, Pressure And Wireless Reading Meets Monitoring Pipeline Requirements
- Configured With Remote Data Collector, Remotely Connect To Smart Metering Platform
- IP68 Protection Class, To Ensure Long Term Underwater Working
- Low Consumption Design, Double D Size Batteries Can Continuously Work For 10 Years
- Bi-directional Measuring Forward And Reverse Flow
- Data Storage Function Can Save 10 Years' Data Including Day, Month and Year
- 9 Digits Multi-line LCD Display. Can Display Cumulative Flow, Instantaneous Flow, Flow, Pressure, Temperature, Error Alarm, Flow Direction etc. At The Same Time
- Standard RS485(Modbus) And OCT Pulse, A Variety Options of NB-IoT GPRS etc.
- Stainless Steel 304 Pipe Which Is Tensile Molding Patent, Electrophoresis With Anti-Scaling
- According To Sanitary Standard For Drinking Water
- With Life Cycle Management Function, To Check Detailed Information At Any Time
- Pipe Length Can Be Customized As Customers' Requirements

Technical Specification >>>

Max. Working Pressure	1.6Mpa
Temperature Class	T30, T50, T70, T90 (Default T30)
Accuracy Class	ISO 4064, Accuracy Class 2
Body Material	Stainless Steel 304(opt. SS316L)
Battery Life	10 Years (Consumption≤0.3mW)
Protection Class	IP68
Environmental Temperature	-40℃~+70℃, ≤100%RH
Pressure Loss	ΔP10, ΔP16 (Based on different dynamic flow)
Climatic And Mechanical Environment	Class O
Electromagnetic Class	E2
Communication	RS485(baud rate is adjustable), Pulse, Opt. NB-IoT, 4G
Display	9 digits multi-line LCD display. Can display cumulative flow, instantaneous flow, flow rate, pressure, temperature, error alarm, flow direction etc. at the same time
RS485	Default baud rate 9600bps (opt. 2400bps, 4800bps), Modbus-RTU
Connection	Thread
Flow Profile Sensitivity Class	U5/D3
Data Storage	Store the data, including day, month, and year for 10 years The data can be permanently saved even powered off
Frequency	1-4 times/second

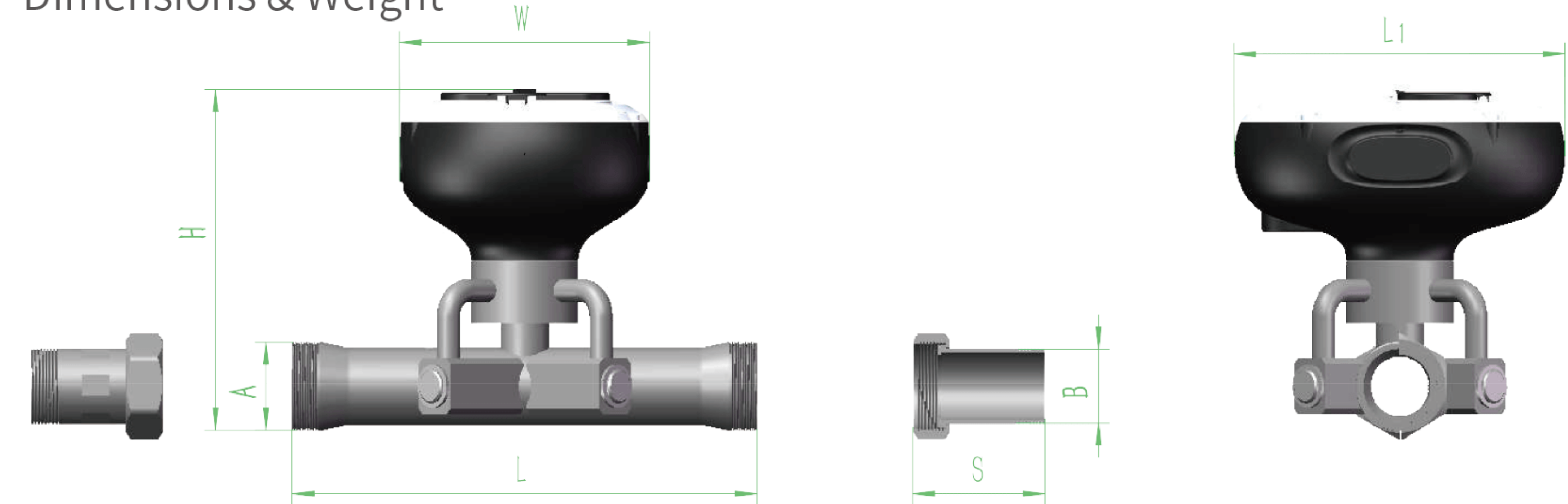
Panda PWM-S Series

Ultrasonic Water Meter DN32-DN40

· Measuring Range

Model		PWM-S					
Nominal Size	(mm)	32	40	32	40	32	40
	(inch)	1 ¼”	1 ½”	1 ¼”	1 ½”	1 ¼”	1 ½”
Overload Flow Q4(m³/h)		20	31.25	20	31.25	20	31.25
Permanent Flow Q3(m³/h)		16	25	16	25	16	25
Transitional Flow Q2(m³/h)		0.16	0.25	0.1024	0.16	0.051	0.08
Minimum Flow Q1(m³/h)		0.1	0.15625	0.064	0.1	0.032	0.05
R=Q3/Q1		160		250		500	
Q2/Q1		1.6					

· Dimensions & Weight



Model		PWM-S		
Nominal Diameter	(mm)	32	40 (Optimization)	40
Installation without connection accessories (A)		G1½B	G1¾B	G1¾B
Installation with connection accessories (B)		G1¼	G1½	G1½
L (mm)		260	300	245
L1 (mm)		185	185	185
H (mm)		201	206	206
W (mm)		140	140	140
Length of connection accessories (S)		60	61.5	61.5
Weight (kg)		3.8	4.3	3.8

Remarks: Other length of pipe can be customized

Panda PWM-S Series

Ultrasonic Water Meter DN32-DN40

Model Selection >>>

Model
PWM-S Ultrasonic Water Meter

Pipe Size
032-DN32
040-DN40

Power Supply
1. Battery
2. 24VDC+ Battery

Body Material
1. Stainless Steel 304
2. Stainless Steel 316L

Pressure
16. 1.6MPa
Others

Connection
L. Thread Connection
Q. Others

Meter Length&Channel
N Standard Length&Dual Channel
L Customized Length&Dual Channel
N1 Standard Length&Single Channel
L1 Customized Length&Single Channel

Optional Function
N. None
1. Pressure Measurement
2. Built-in Remote Reading Function
3. Pressure Measurement & Built-in Remote Reading Function
4. Remote Valve Control& With Pressure
5. Remote Valve Control& Without Pressure

Output
1. RS485+OCT Pulse (standard)
2. Others

Range
1. R500
2. R250
3. R160
4. R100
5. Others

PWM-S-040-1-1-16-L-1-1-1-N

For Example: PWM-S-040-1-1-16-L-1-1-1-N

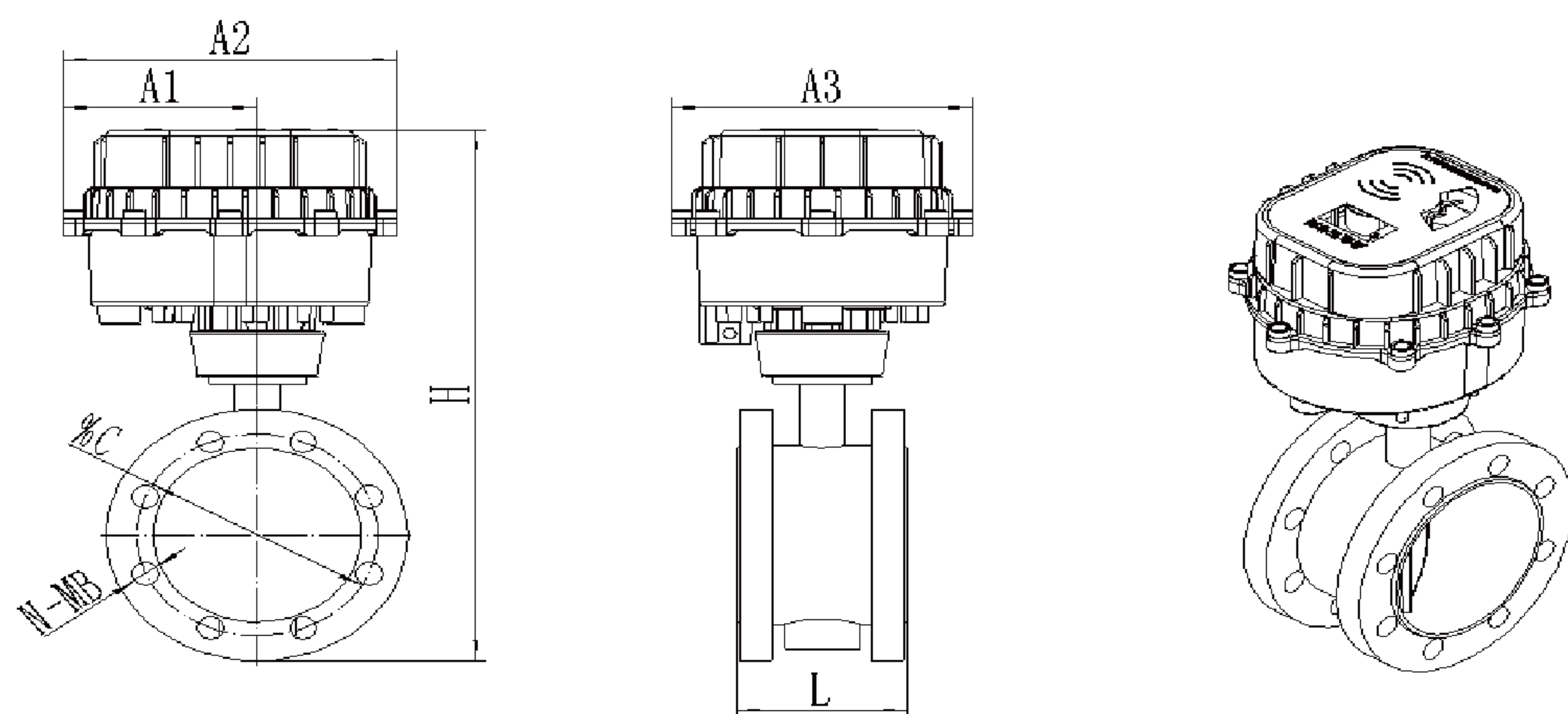
Stands for: PWM-S ultrasonic water meter, pipe size DN40, battery power supply, stainless steel 304, pressure 1.6Mpa, thread connection, R500, RS485 output, with pressure measurement function, standard length.

Panda PWM Series

Bulk Valve Controlled Ultrasonic Water Meter DN50-DN200



· Bulk valve controlled water meter valve size



Diameter	L	H	A1	A2	A3	ΦC	N-MB
DN50	108	410	130	225	200	165	4-M16
DN65	112	430	130	225	200	185	4-M16
DN80	114	452	130	225	200	200	8-M16
DN100	127	475	130	225	200	220	8-M16
DN125	140	503	130	225	200	250	8-M16
DN150	140	540	130	225	200	285	8-M20
DN200	152	582	130	225	200	340	12-M20

Panda PWM Series

Bulk Ultrasonic Water Meter DN50-DN300

Features >>>



- With Rectifier Function, Low Installation Requirement of Straight Pipe
- Wide Range
- Suitable For Mass Flow And Tiny Flow Measurement
- The Integrated Design Of Flow, Pressure, Wireless Reading Meets Monitoring Pipeline Requirement
- Configured With Remote Data Collector, Remotely Connect To Smart Metering Platform
- IP68 Protection Class, To Ensure Long Term Underwater Working
- Low Consumption Design, Double D Size Batteries Can Continuously Work For 10 Years
- Bi-directional Measuring Forward And Reverse Flow
- Data Storage Function Can Save 10 Years' Data Including Day, Month And Year 9 Digits Multi-line LCD Display. Can Display Cumulative Flow, Instantaneous Flow, Flow, Pressure, Temperature, Error Alarm, Flow Direction etc. At The Same Time.
- Standard RS485(Modbus) And OCT Pulse, A Variety Of Options, NB-IOT, GPRS etc.
- Stainless Steel 304 Pipe Which Is Tensile Molding Patent, Electrophoresis With Anti-scaling
- According To Sanitary Standard For Drinking Water
- With Life Cycle Management Function, To Check Detailed Information At Any Time
- Pipe Length Can Be Customized As Customers' Requirements.

Technical Specification >>>

Max. Working Pressure	1.6Mpa(DN50-DN150), 1.0Mpa(DN200-DN300)
Temperature Class	T30、T50、T70、T90 (Default T30)
Accuracy Class	ISO 4064, Accuracy Class 2
Body Material	Stainless Steel 304 (opt. SS316L)
Battery Life	10 Years(Consumption≤0.3mW)
Protection Class	IP68
Environmental Temperature	-40℃~+70℃, ≤100%RH
Pressure Loss	ΔP10, ΔP16 (Based on different dynamic flow)
Climatic And Mechanical Environment	Class O
Electromagnetic Class	E2
Communication	RS485(baud rate is adjustable); Pulse, Opt. NB-IoT、GPRS
Display	9 digits multi-line LCD display. Can display cumulative flow, instantaneous flow, flow rate, pressure, temperature, error alarm, flow direction etc. at the same time
RS485 Connection	Default baud rate 9600bps (opt. 2400bps, 4800bps), Modbus-RTU Flanges according to EN1092-1 (others customized)
Flow Profile Sensitivity Class	A: Full Bore (U5/D3) B: 20% Reduced Bore (U3/D0) C: Reduced Bore (U0/D0)
Data Storage	Store the data, including day, month, and year for 10 years. The data can be permanently saved even powered off
Frequency	1-4 times/second

Panda PWM Series

Bulk Ultrasonic Water Meter DN50-DN300

· Type B 20% Reduced Bore / Type A (A2/A4) Full Bore, Measuring Range R250

Model		PWM								
Nominal Size	(mm)	50	65	80	100	125	150	200	250	300
	(inch)	2	2.5	3	4	5	6	8	10	12
Overload Flow Q4 (m³/h)		78.75	125	200	312.5	312.5	500	787.5	1250	2000
Permanent Flow Q3 (m³/h)		63	100	160	250	250	400	630	1000	1600
Transitional Flow Q2 (m³/h)		0.403	0.640	1.024	1.600	1.600	2.560	4.032	6.400	10.240
Minimum Flow Q1 (m³/h)		0.252	0.400	0.640	1.000	1.000	1.600	2.520	4.000	6.400
R=Q3/Q1		250								
Q2/Q1		1.6								

· Type B 20% Reduced Bore / Type A (A2/A4) Full Bore, Measuring Range R500

Model		PWM								
Nominal Size	(mm)	50	65	80	100	125	150	200	250	300
	(inch)	2	2.5	3	4	5	6	8	10	12
Overload Flow Q4 (m³/h)		78.75	125	200	312.5	312.5	500	787.5	1250	2000
Permanent Flow Q3 (m³/h)		63	100	160	250	250	400	630	1000	1600
Transitional Flow Q2 (m³/h)		0.202	0.320	0.512	0.800	0.800	1.280	2.016	3.200	5.120
Minimum Flow Q1 (m³/h)		0.125	0.200	0.320	0.500	0.500	0.800	1.260	2.000	3.200
R=Q3/Q1		500								
Q2/Q1		1.6								

· Type B 20% Reduced Bore, Measuring Range R1000

Model		PWM								
Nominal Size	(mm)	50	65	80	100	125	150	200	250	300
	(inch)	2	2.5	3	4	5	6	8	10	12
Overload Flow Q4 (m³/h)		78.75	125	200	312.5	312.5	500	787.5	1250	2000
Permanent Flow Q3 (m³/h)		63	100	160	250	250	400	630	1000	1600
Transitional Flow Q2 (m³/h)		0.101	0.160	0.256	0.400	0.400	0.640	1.008	1.600	2.560
Minimum Flow Q1 (m³/h)		0.063	0.100	0.160	0.250	0.250	0.400	0.630	1.000	1.600
R=Q3/Q1		1000								
Q2/Q1		1.6								

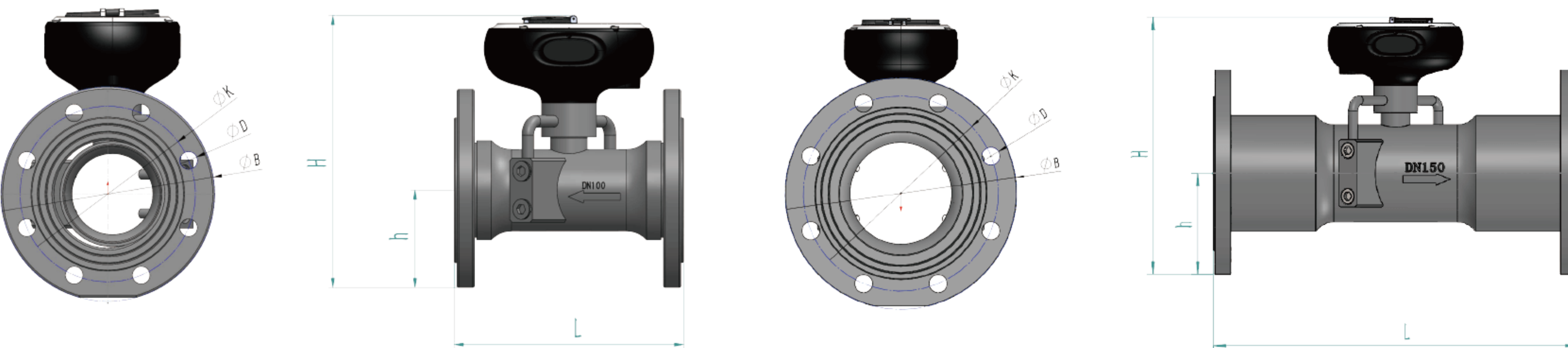
Panda PWM Series

Bulk Ultrasonic Water Meter DN50-DN300

· C Reduced Bore Measuring Range (R500)

Model		PWM			
Nominal Size	(mm)	50	65	80	100
	(inch)	2	2.5	3	4
Overload Flow Q4 (m³/h)		50	78.75	78.75	125
Permanent Flow Q3 (m³/h)		40	63	63	100
Transitional Flow Q2 (m³/h)		0.128	0.202	0.202	0.320
Minimum Flow Q1 (m³/h)		0.080	0.126	0.126	0.200
R=Q3/Q1		500			
Q2/Q1		1.6			

· Dimensions & Weight



Model		PWM								
Nominal Size	(mm)	50	65	80	100	125	150	200	250	300
	(inch)	2	2.5	3	4	5	6	8	10	12
L-Standard length (mm)		200	200	225	250	250	300	350	450	500
L-Custom length (mm)		280	/	370	370	/	500	500	/	/
B-Width (mm)		162	185	200	220	255	285	340	406	489
H-Height (mm)		258	277	293	307	334	364	409	458	512
h-Height (mm)		74	89	96	106	120	138	169	189	216
D×n		18×4	18×4	18×8	18×8	18×8	22×8	22×8	22×12	22×12
K (mm)		125	145	160	180	210	240	295	350	400
Pressure(MPa)		1.6	1.6	1.6	1.6	1.6	1.6	1.0	1.0	1.0
Weight (kg)		9	11.5	13	15	17	32	45	68	96

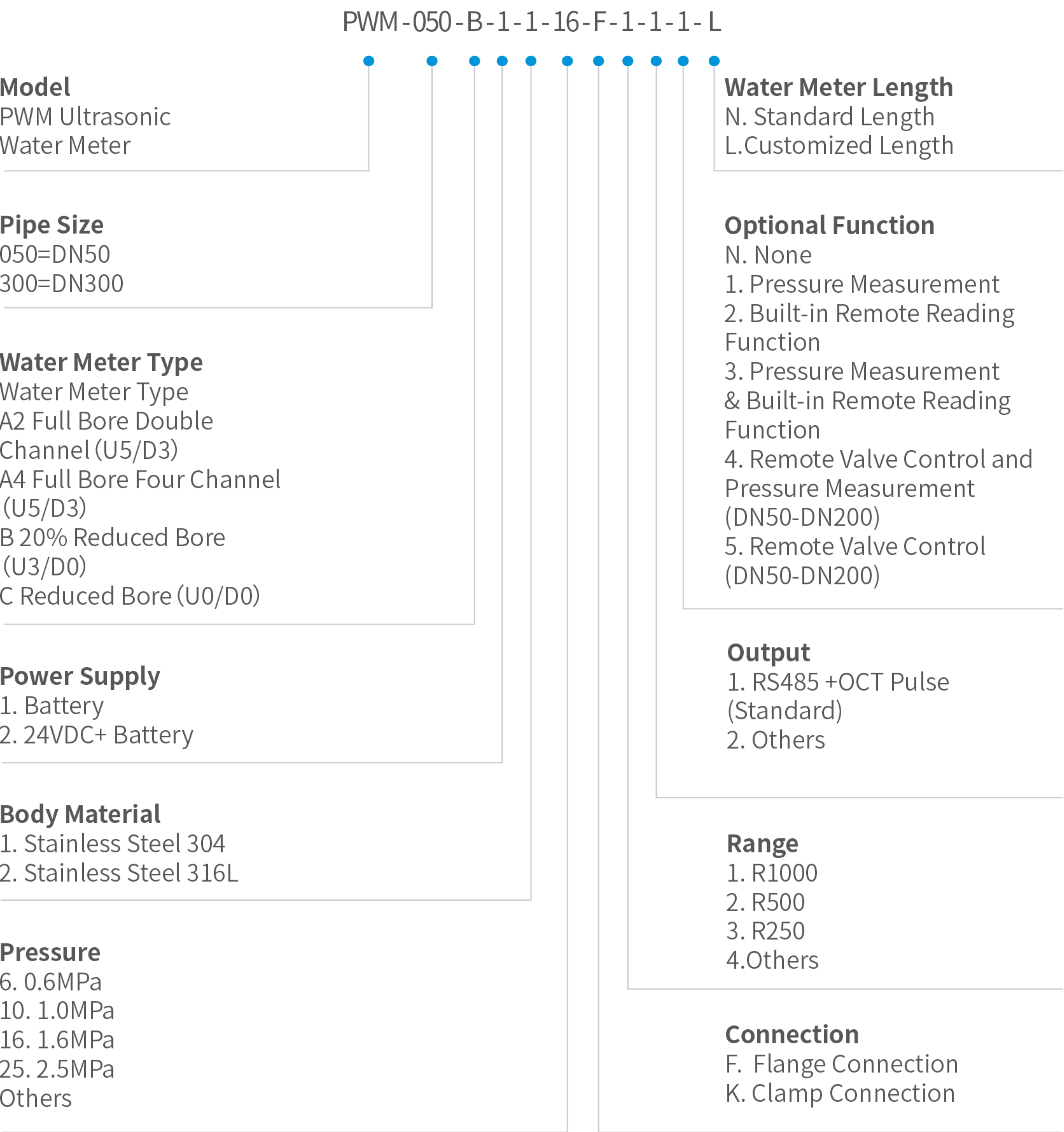
n:Bolt Hole Numbers K:Bolt Hole Diameter

Remarks: Other length of pipe can be customized

Panda PWM Series

Bulk Ultrasonic Water Meter DN50-DN300

Model Selection >>>



Panda PWM Series

Bulk Ultrasonic Water Meter DN350-DN600

Features >>>



- Full Bore Design, Without Pressure Loss
- Wide Range
- The Integrated Design Of Flow, Pressure, Wireless Reading Meets Monitoring Pipeline Requirement
- Configured With Remote Data Collector, Remotely Connect To Smart Metering Platform
- IP68 Protection Class, To Ensure Long Term Underwater Working
- Low Consumption Design, Double D Size Batteries Can Continuously Work For 10 Years
- Bi-directional Measuring Forward And Reverse Flow
- Data Storage Function Can Save 10 Years' Data Including Day, Month And Year
- 9 Digits Multi-line LCD Display. Can Display Cumulative Flow, Instantaneous Flow, Flow, Pressure, Temperature, Error Alarm, Flow Direction etc. At The Same Time.
- Standard RS485(Modbus) And OCT Pulse, A Variety Of Options, NB-IOT, GPRS etc.
- Stainless Steel 304 Pipe Which Is Tensile Molding Patent, Electrophoresis
- With Anti-scaling
- According To Sanitary Standard For Drinking Water

Technical Specification >>>

Max. Working Pressure	1.0Mpa
Temperature Class	T30, T50, T70, T90 (Default T30)
Accuracy Class	ISO 4064, Accuracy Class 2
Body Material	Stainless Steel 304 (opt. SS316L)
Battery Life	10 Years (Consumption≤0.3mW)
Protection Class	IP68
Environmental Temperature	-40℃~+70℃, ≤100%RH
Pressure Loss	ΔP10
Climatic And Mechanical Environment	Class O
Electromagnetic Class	E2
Communication	RS485(baud rate is adjustable), Pulse, Opt. NB-IoT, GPRS
Display	9 digits multi-line LCD display. Can display cumulative flow, instantaneous flow, flow rate, pressure, temperature, error alarm, flow direction etc. at the same time
RS485	Default baud rate 9600bps (opt. 2400bps, 4800bps), Modbus-RTU
Connection	Flanges according to EN1092-1 (others customized)
Flow Profile Sensitivity Class	U5/D3
Data Storage	Store the data, including day, month, and year for 10 years. The data can be permanently saved even powered off
Frequency	1-4 times/second

For Example: PWM-050-B-1-1-16-F-1-1-1-L

Stands for: PWM ultrasonic water meter, pipe size DN50, B 20% reduced bore water meter, battery power supply, stainless steel 304, pressure 1.6Mpa, flange connection, R1000, RS485 output, with pressure measurement function, customized length.

Panda PWM Series

Bulk Ultrasonic Water Meter DN350-DN600

· Measuring Range (R500)

Model		PWM			
Nominal Size	(mm)	350	400	500	600
	(inch)	14	16	20	24
Overload Flow Q4 (m³/h)		2000	3125	5000	7875
Permanent Flow Q3 (m³/h)		1600	2500	4000	6300
Transitional Flow Q2 (m³/h)		5.12	8.00	12.80	20.16
Minimum Flow Q1 (m³/h)		3.20	5.00	8.00	12.60
R=Q3/Q1		500			
Q2/Q1		1.6			

· Measuring Range (R400)

Model		PWM			
Nominal Size	(mm)	350	400	500	600
	(inch)	14	16	20	24
Overload Flow Q4 (m³/h)		2000	3125	5000	7875
Permanent Flow Q3 (m³/h)		1600	2500	4000	6300
Transitional Flow Q2 (m³/h)		6.40	10.00	16.00	25.20
Minimum Flow Q1 (m³/h)		4.00	6.25	10.00	15.75
R=Q3/Q1		315			
Q2/Q1		1.6			

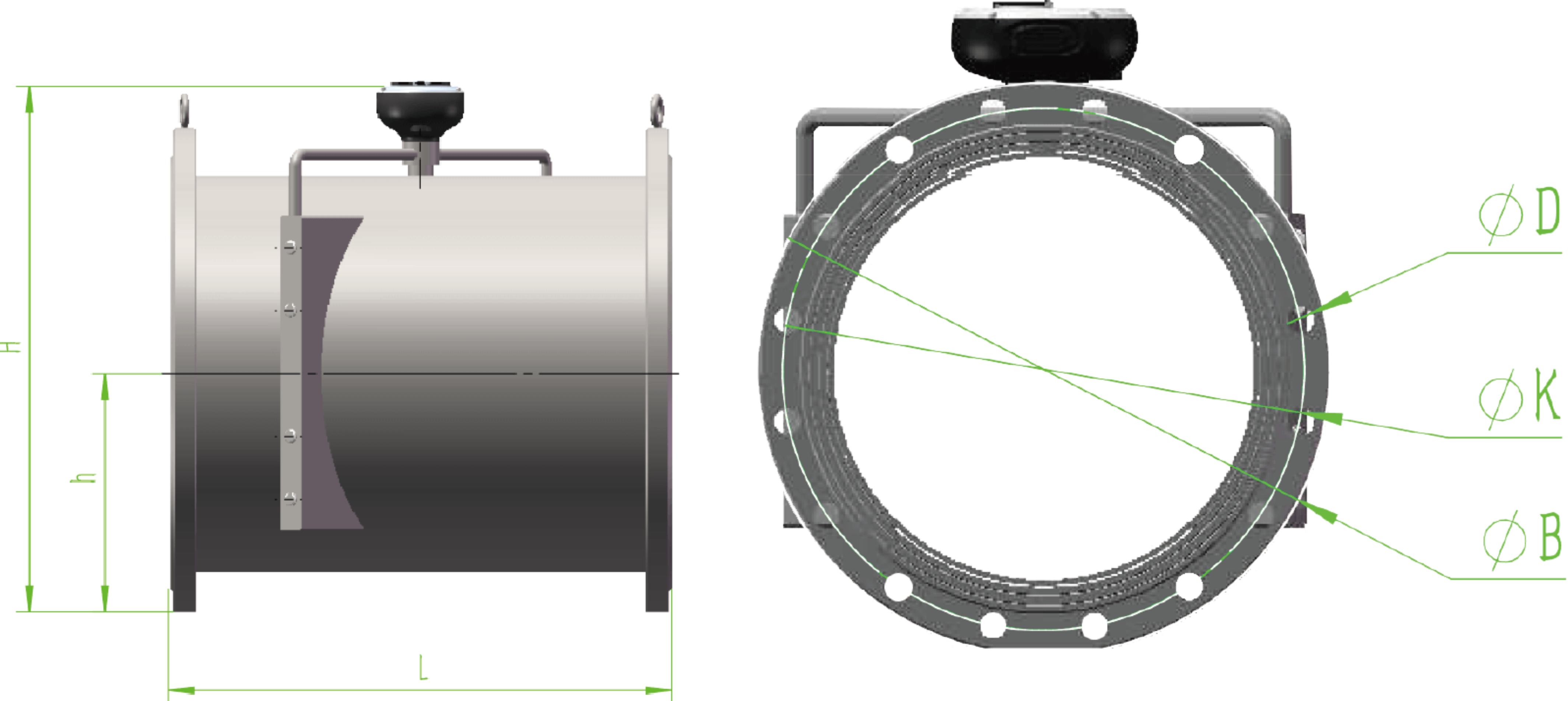
· Measuring Range (R250)

Model		PWM			
Nominal Size	(mm)	350	400	500	600
	(inch)	14	16	20	24
Overload Flow Q4 (m³/h)		2000	3125	5000	7875
Permanent Flow Q3 (m³/h)		1600	2500	4000	6300
Transitional Flow Q2 (m³/h)		10.24	16.00	25.60	40.32
Minimum Flow Q1 (m³/h)		6.40	10.00	16.00	25.20
R=Q3/Q1		250			
Q2/Q1		1.6			

Panda PWM Series

Bulk Ultrasonic Water Meter DN350-DN600

· Dimensions & Weight

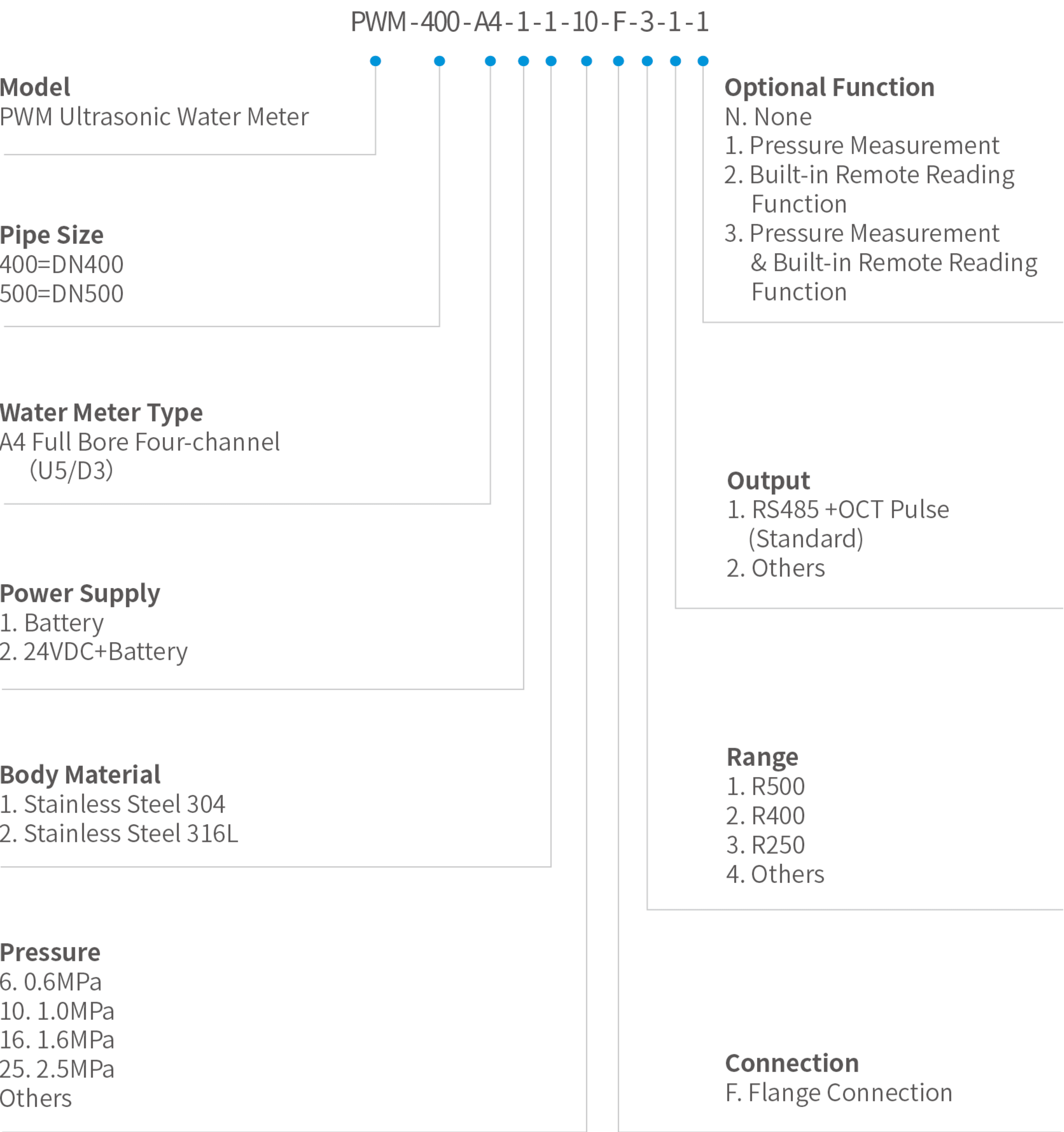


Model		PWM			
Nominal Size	(mm)	350	400	500	600
	(inch)	14	16	20	24
L-Length (mm)		500	600	600	800
B-Width (mm)		505	565	670	780
H-Height (mm)		593	648	743	853
h-height (mm)		245	275	328	378
D×n		22×16	26×16	26×20	30×20
K (mm)		460	515	620	725
Pressure (MPa)		1.0	1.0	1.0	1.0
Weight (kg)		112	138	169	220

Panda PWM Series

Bulk Ultrasonic Water Meter DN350-DN600

Model Selection >>>



For Example: PWM-400-A4-1-1-10-F-3-1-1

Stands for: PWM ultrasonic water meter, pipe size DN400, A4 Full Bore Four-channel water meter (U5/D3) , battery power supply, stainless steel 304, pressure1.0MPa, flange connection, R250, RS485 output, with pressure measurement function.

Panda PWM-Plus Series

Smart Integrated Water Meter

Summary >>>

Smart integrated water meter utilizes transit-time principle. No need external power supply and suitable for various occasions without power supply. It effectively solves problems that water meters are often flooded, contaminated by silt, buried, and long time installation without water, covering a large area, long construction period, non-freezing, and easy to collapse etc. Its modular production, energy saving, environmental protection, recyclable use, quick installation, simple operation, widely applied in water supply and drainage, production monitoring, water balance test, energy-saving monitoring and other occasions.

Features >>>



- Multi-patent design, equipped with valve verification, more accurate measurement
- Integrated meter and valve, fully sealed structure
- Remote access is available by scanning code
- Built-in antenna, more stable remote transmission
- Convenient installation and construction
- Waterproof, dustproof and damage proof
- Long service life and recyclable
- Reduce civil construction and labor costs
- Modular production, energy conservation and environmental protection

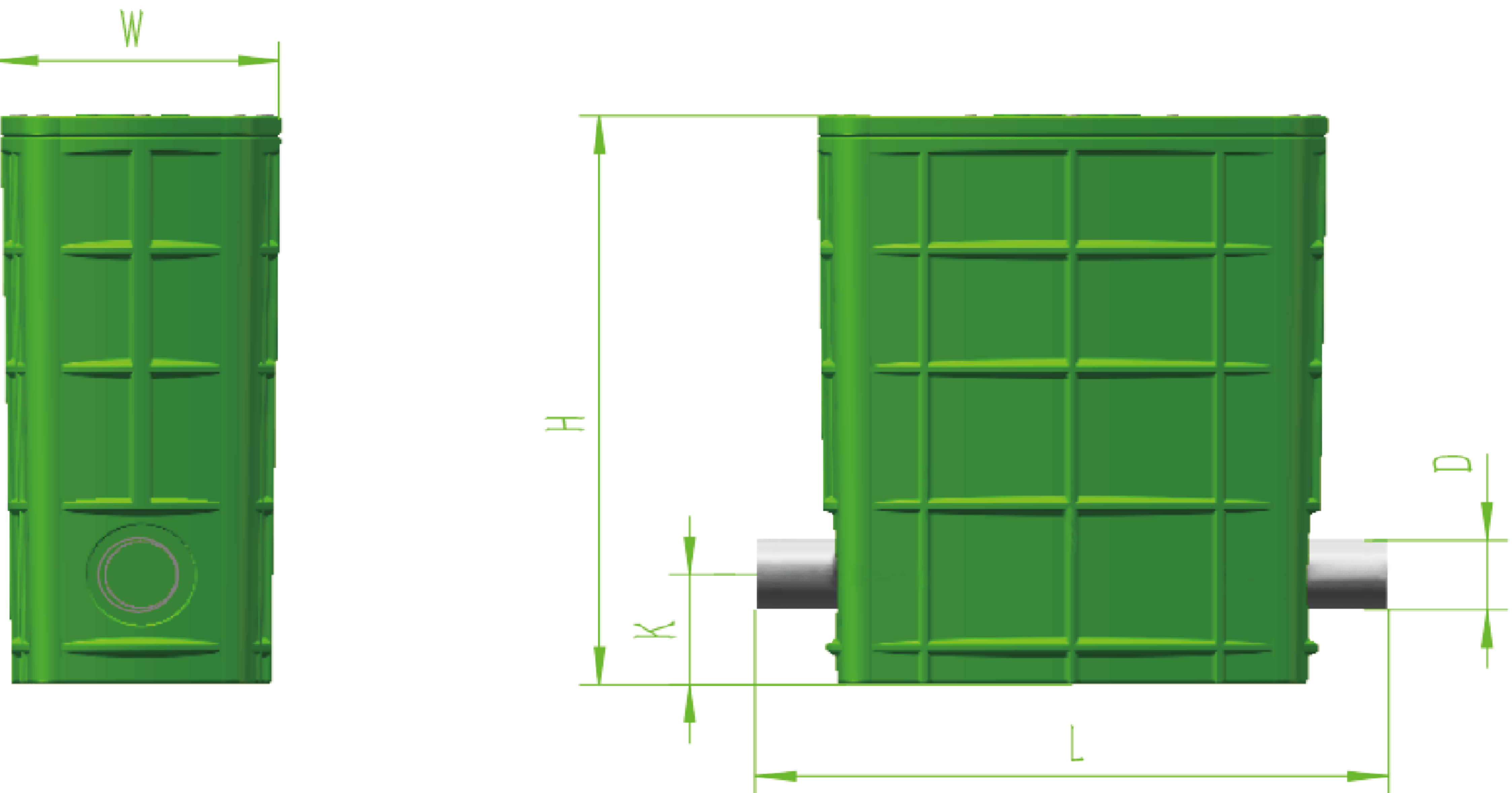
Technical Specification >>>

Box Material	PE, SMC
Temperature Class	T30, T50, T70, T90 (default T30)
Accessories Material	Pipes, valves and ultrasonic water meters are made of Stainless Steel SS304, Optional SS316L
Vertical Load-bearing	2t
Accuracy Class	ISO 4064, Accuracy class 2
Battery life	Water meter for 10 years, Data collector for 6 years (Upload every 24 hours)
Protection Class	IP68
Environmental Temperature	-40°C~+70°C, ≤100%RH
Pressure Loss	ΔP16、ΔP25(Based on different dynamic flow)
Climate And Mechanical Environment	Class O
Electromagnetic Class	E2
Communication	NB-IoT, 4G, Opt. RS485(baud rate adjustable), Pulse
Display	9 digits multi-line LCD display. Can display cumulative flow, instantaneous flow, flow rate,pressure, temperature, error alarm, flow direction, etc. at the same time
Data Storage	Store the latest 10 years' data including Day, Month and Year. The data can be permanently saved even powered off
Frequency	1-4 times / second
Connection	Std. Clamp Connection, Opt. Flange Connection

Panda PWM-Plus Series

Smart Integrated Water Meter

· Dimensions & Weight



Model		PWM-Plus			
Nominal Diameter	(mm)	50	65	80	100
	(inch)	2	2.5	3	4
L-standard length (mm)		644	644	644	644
W-width (mm)		285	285	285	285
H-height (mm)		622	622	622	622
K-pipe height (mm)		120	120	120	120
D-outer diameter of pipe (mm)		57	76	89	108
Pressure (MPa)		1.6	1.6	1.6	1.6

Panda PWM-Plus Series

Smart Integrated Water Meter

Model Selection >>>

Model PWM-Plus

Smart Integrated Water Meter

Pipe Size

050= DN50

100= DN100

Material (including pipes, valves and ultrasonic water meters)

1. Stainless Steel 304

2. Stainless Steel 316

3. Stainless Steel 316L

Power Supply

1. Battery

2. 24VDC+Battery

Pressure

6. 0.6MPa

10. 1.0MPa

16. 1.6MPa

Q. Others

PWM-Plus-050-1-1-16-K-2-1

Optional Function

N. None

1. Pressure Measurement

Output

1. RS485 +OCT Pulse (Standard)

2. 4G

3. NB-IoT

Connection

F. Flange Connection

K. Clamp Connection (Pressure is less than 1.6Mpa)

For Example: PWM-Plus-050-1-1-16-K-2-1

Stands for: PWM-Plus smart integrated water meter, the diameter is DN50,SS304 material, battery powered, 1.6Mpa pressure, clamp connection, 4G Wireless Remote Reading, with pressure measurement.

Panda PUTF-R Series

Water Resources Ultrasonic Flow Meter DN50-DN200

Summary >>>

The new type of flow meter is designed for water resource management, agricultural irrigation, garden management, etc. Based on the ultrasonic time difference method without mechanical rotating parts and without wear, also it is not affected by the magnetic fields with good stability and high reliability. By the way the meter adopts a clamp-on design with small size and flexible installation.

Features >>>



- Without mechanical rotating parts and without wear
- Clamp-on design, small size, easy installation
- IP68 protection class available for different condition
- Available for NB-IoT, GPRS/4G communication
- Option for with LCD display or without display
- Option for 24VDC or Solar power output

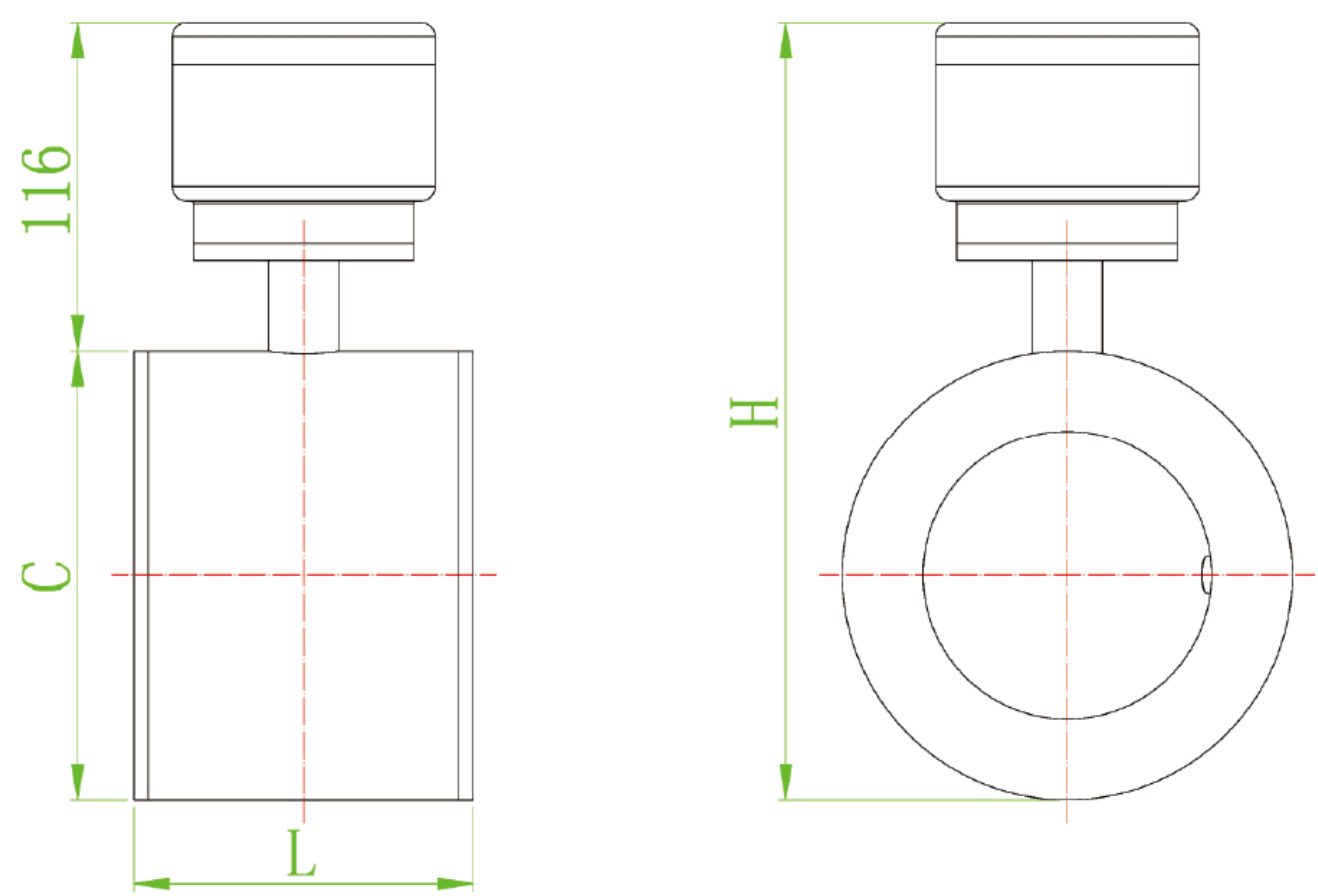
Technical Features >>>

Max Working Pressure	1.6MPa
Temperature Class	T30
Accuracy Class	Class 2
Body Material	SS304 stainless steel
Pressure Loss	NO
Flow Profile Sensitivity Class	U5/D3
Climatic and Mechanical Environment	O
Electromagnetic Class	E2
Environment Temperature	-40°C~70°C, ≤100%RH (other request)
Protection Class	IP68
Display	①With 9 digits multi-line LCD display, Can display cumulative flow, instantaneous flow, flow condition, etc ②Without Display
Communication	Option for RS485, Pulse, NB-IoT, 4G
Power output	Option for 24VDC or Solar power
Data Storage	Can store daily, monthly and annual data for 10 years, and can be permanently saved when power is off

Panda PUTF-R Series

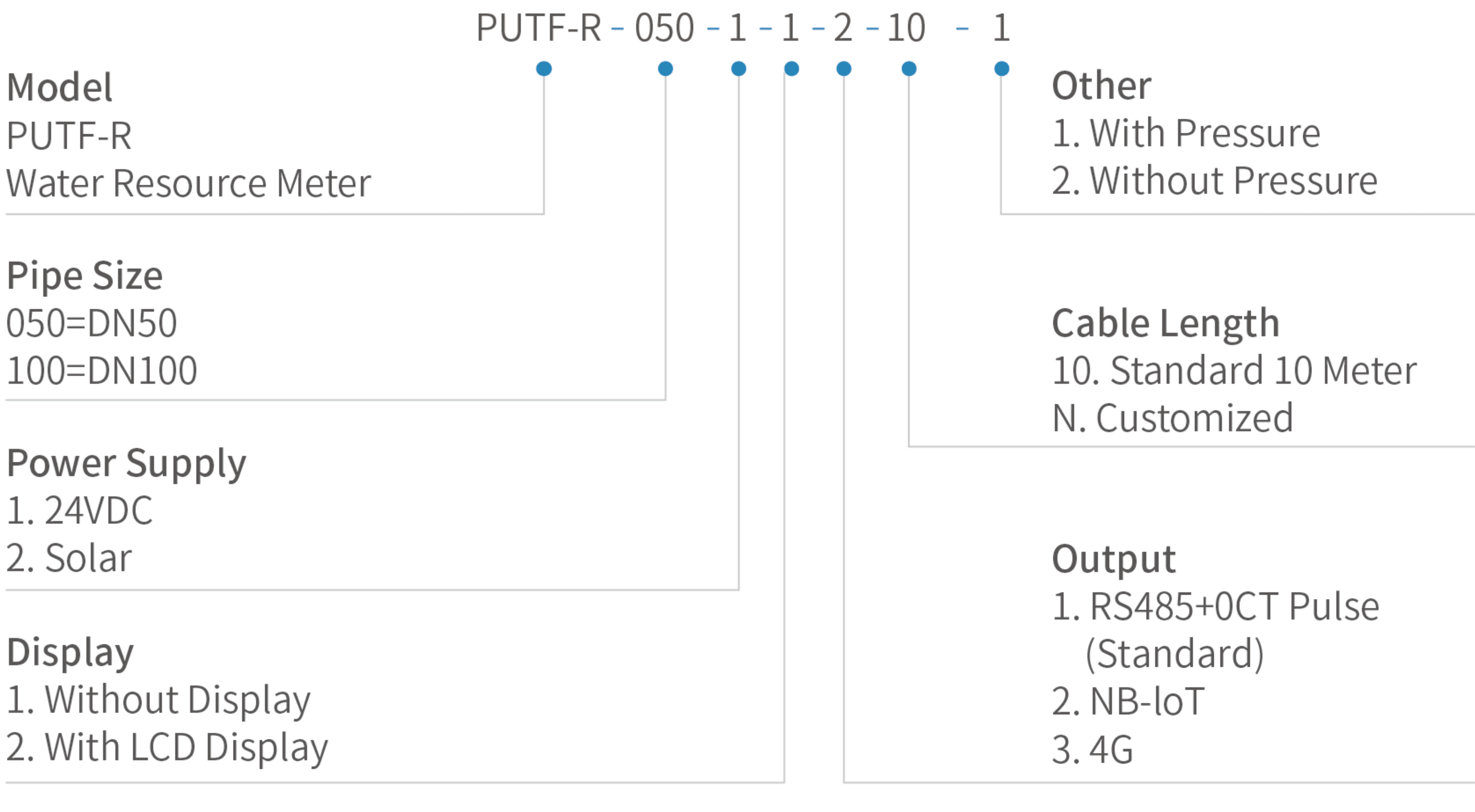
Water Resources Ultrasonic Flow Meter DN50-DN200

Installation Size >>>



Normal Diameter	(mm)	DN50	DN80	DN100	DN150	DN200
	(inch)	2	3	4	6	8
Pressure	(MPa)	1.6	1.6	1.6	1.6	1.6
Installation Size	L (mm)	120	120	120	150	180
	C (mm)	102	140	159	219	273
	H (mm)	218	256	275	335	389

Model Selection >>>



Model Selection: PUTF-R-050-1-1-2-10-1

Remark: PUTF-R Water resource meter, DN50 Diameter, 24VDC Power supply, without display, NB-IoT output, cable length standard 10 meters, optional pressure.

Panda PG20

GPRS/NB-IoT Wireless Remote Reading Device

Features >>>



- LCD Display Function, Real-time Data Updating
- Super Long Stand-by Time, The Battery Working Life Is 6 Years If Upload Twice one Day
- Adopt NB Communication Module, Transmit And Receive Data By Multiple Frequency Bands
- Reading Forward And Reverse Cumulative Flow, Instantaneous Flow, Pressure, Voltage etc.
- 3.6V Power Output Can Power Supply To Low-power Consumption Pressure Transmitter
- Built-in Large Data Logger Can Save 4 Months' Data
- With Power-off Memory Function, No Need To Reset Parameters After Powered off
- Automatically Transmitting And Resending Data Function
- Parameter Inquiry, Parameter Setting And Status Inquiry Can Be Carried Out Via Bluetooth

Technical Specification >>>

Power Supply	Built-in Lithium Battery (3.6V)
External Power Supply	External 3.6V power supply for meter communication parts, current≤80mA
Consumption Current	Stand-by 30uA, transferring peak 100mA
Working Life	2 years (reading in 15 minutes, transferring in 2 hours interval) 6 years (reading in 15 minutes, transferring in 12 hours interval)
Communication	Adopt NB communication module, by frequency band B1, B2, B3, B5, B8, B12, B13 and B17 to receive and send message, monthly data usage less than 10M
Data Logger Time	Data can be saved in the device for 4 months
Enclosure Material	Cast Aluminum
Protection Class	IP68
Operation Environment	-40°C~70°C, ≤100%RH
Climate Mechanical Environment	Class O
Electromagnetic Class	E2

Panda PG20-A

GPRS/4G Wireless Remote Reading Device

Features >>>



- It Has The Function Of Four-channel Analog Data Reading And 16-bit High Precision A/D Simultaneous Sampling.
- It Has The Function Of Two Channels Pulse Counting And Two Channels Switch Sampling.
- It Has One RS485 Interface, Specially Used For RS485 Instrument Communication.
- The Corresponding Parameters Can Be Set Through The USB Interface.
The Parameter Type, Range, Starting Point, Upper And Lower Alarm Threshold And Pulse Bottom Of The Data Can Be Collected.
- Configurable Station Number, Time, Communication Parameters Etc.
- Support Dynamic Domain Name And Fixed IP, Support Data Transfer UDP Or TCP Mode.
- Configurable Analog And Switching GSM Message Alarm Function.
- All Run Parameters Can Be Queried And Set Locally And Remotely.
- With Power-off Memory Function, No Need To Reset Parameters.
- After Powered Off.
- Large Capacity Eeprom, Can Save A Month Of Historical Data While Saving Once Per Minute.
- Communication Transceiver And Module Status Indicator
- Light Can Clearly Indicate The Working Status Of The Collector.

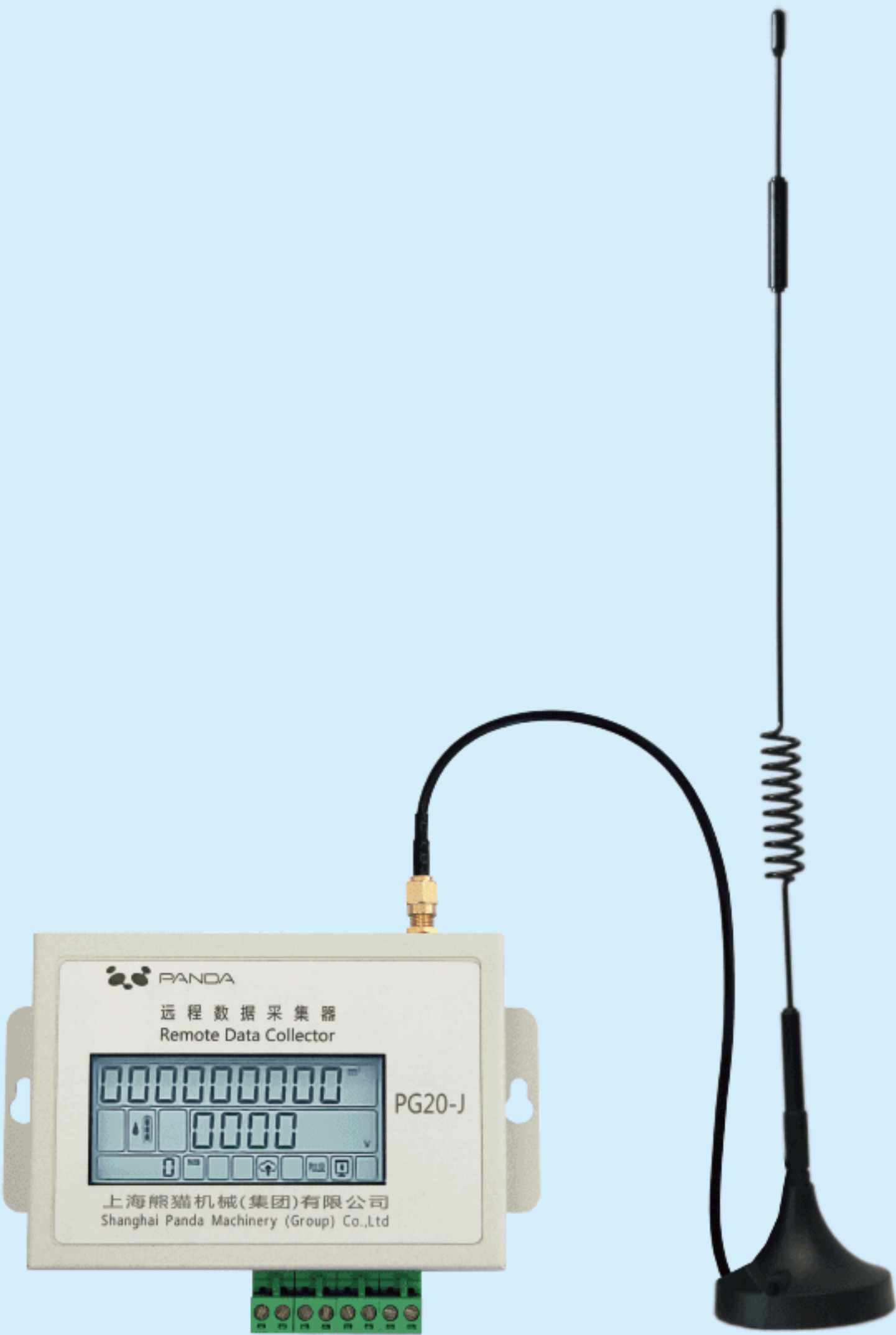
Technical Specification >>>

Power Supply	DC 9 ~ 24V
External Power Supply	24VDC output, 20mA drive capability (Designed to power two-wire sensors)
Communication	4G communication module, support NB-IoT
Data Logger Time	Data can be saved in the device for 1 month while saving every minute
Analog Input Impedance	250Ω, adopt 4~20mA, 0~5V direct current signal
Protection Class	IP65
Operation Environment	-40°C~+70°C, ≤100%RH
Climatic Mechanical Environment	Class O
Electromagnetic Class	E2

Panda PG20-J

GPRS Wireless Remote Reading Device

Features >>>



Equipped with 1 channel of analog quantity acquisition and 16-bit high-precision A/D sampling function.

It has 1 channel pulse quantity counting function and 1 channel switching quantity sampling function.

It has one RS485 interface and is compatible with collecting water meters and flow meters from common domestic manufacturers.

- The collector has an LCD display for easy viewing of parameters.
- Corresponding parameters can be set through the USB interface.
- Support dynamic domain name and fixed IP, support UDP or TCP method.

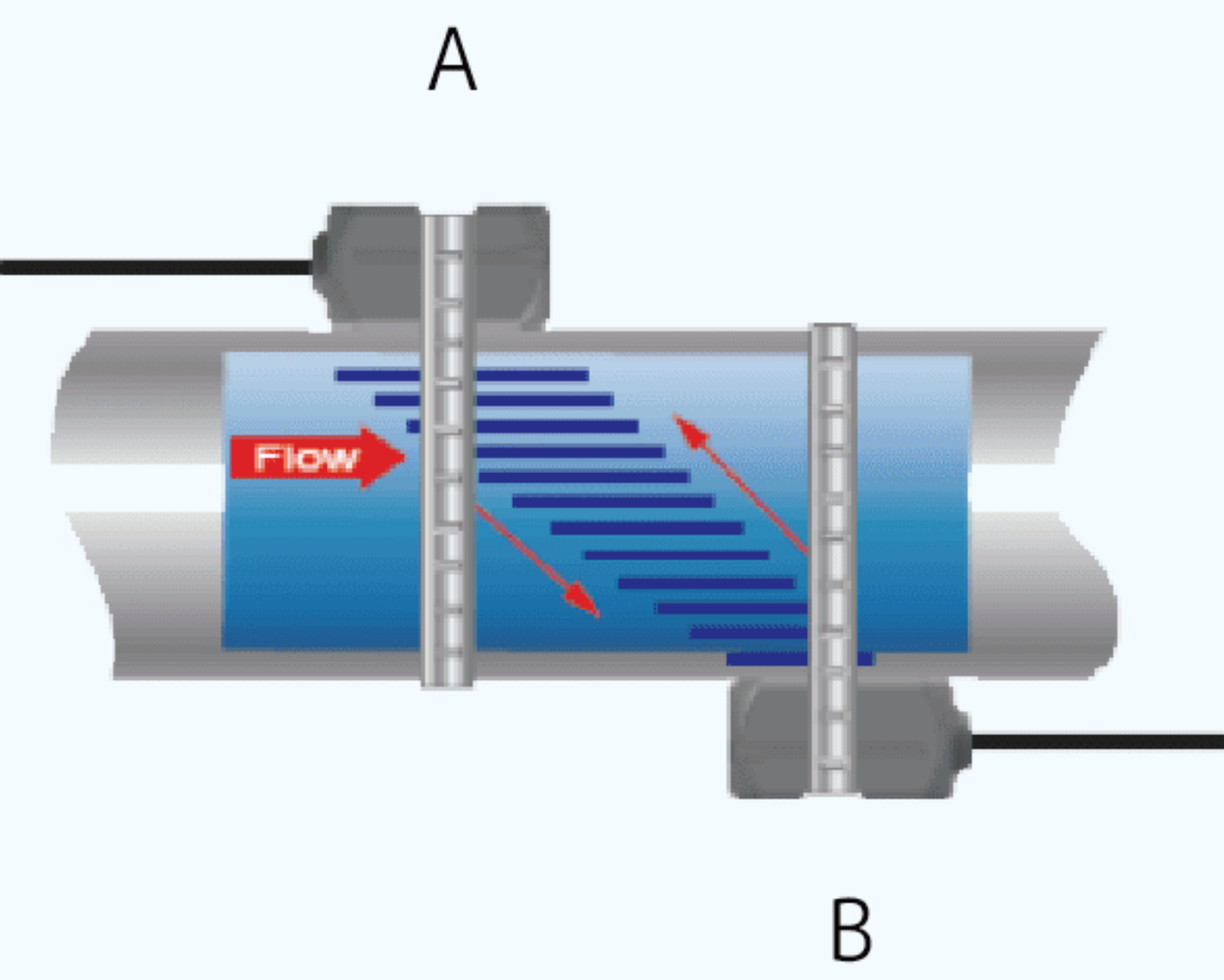
Technical Specification >>>

Power Supply	DC 9V~24V
External Power Supply	Has a 24VDC output and 20mA drive capability (designed to power second-wire sensors)
Communication	Adopt 4G full network module and support IoT card
Data Logger Time	Data is saved every minute, and one month historical data can be saved
Analog input impedance	25Ω, Can collect 4~20mA, 0~5V DC signals
Protection Class	IP65
Operation Environment	-40℃~+70℃, ≤100%RH
Climate Mechanical Environment	Class O
Electromagnetic Class	E2

Panda PUTF Series

Transmit-time Ultrasonic Flow Meter

Working Principle >>>



The diagram shows a cross-section of a pipe with flow direction indicated by a red arrow labeled 'FLOW'. Two transducers, labeled A and B, are clamped on the outside of the pipe. Transducer A is upstream of transducer B. Red arrows represent the ultrasonic signal path: one arrow goes from A to B (downstream), and another goes from B to A (upstream). The downstream path is shorter than the upstream path.

Transit-time ultrasonic flow meter utilizes the difference of ultrasonic sound forwarding and reversing flow rate to measure flow. Two transducers that function as both transmitter and receivers are clamped on outside of a closed pipe at a specific distance from each other. The transducer signal travels faster downstream than upstream. By measuring transit time Δt , the average flow velocity can be detained. The volume flow Q can be calculated out of the flow velocity V and pipe sectional area S .

Formula Description >>>

$$V = K \cdot (t_{BA} - t_{AB}) = K \cdot \Delta t \quad Q = S \times V$$

t_{AB} :travel time of downstream sound waves t_{BA} :travel time of upstream sound waves

V = Velocity Δt = Time difference K = Constant

Application >>>

Suitable for measuring clean liquid in fully filled pipe, also for liquid with tiny amounts of solids, air bubbles. Widely applied to many fields, for examples as below...



Panda PUTF201 Series

Clamp-on Transit-time Ultrasonic Flow Meter

Summary >>>

PUTF201 series clamp-on transit-time ultrasonic flow meter utilizes transit-time principle. The transducer is mounted outside surface of the pipe without flow stop or pipe cutting. It's very simple, convenient for installation, calibration and maintenance. Different sizes of transducers satisfy different measuring demand. Plus, select thermal energy measuring function to achieve completely energy analysis. It is widely applied in processing monitoring, water balance test, district heating balance test, energy efficiency monitoring as easy installation and simple operation advantages.



Technical Features >>>

- 6 Lines Display Velocity, Flow Rate, Volume And Meter Status
- Clamp-on Mounted, Unnecessary Pipe Cutting Or Processing Interruption
- Acceptable Fluid Temperature Range -40°C~260°C
- Built-in Data Storage Is Optional
- Selecting Temperature Sensor PT1000 To Achieve Thermal Energy Measurement Function
- Suitable For DN20-DN6000 Flow Measurement By Selecting Different Size Transducers
- Bi-directional Measurement, Widely Measuring Range

Panda PUTF201 Series

Clamp-on Transit-time Ultrasonic Flow Meter

Specification >>>

· Transmitter

Measuring Principle	Transit-Time
Velocity	0.01m/s - 12 m/s, Bi-directional Measurement
Resolution	0.25mm/s
Repeatability	0.10%
Accuracy	±1%R , ±0.5%R (flow rate >0.3m/s), ±0.003m/s (flow rate<0.3m/s)
Response Time	0.5s
Sensitivity	0.003m/s
Damping	0-99s(settable by user)
Suitable Fluid	Clean or tiny amounts of solids, air bubbles liquid, Turbidity <10000 ppm
Power Supply	AC:85-265V DC:24V/500mA
Installation	Wall Mounted
Protection Class	IP66
Operating Temperature	-40°C ~ +75°C
Enclosure Material	Fiberglass
Display	6 lines of color LCD display, can simultaneously display the flow rate, instantaneous flow, cumulative flow and meter running status
Measuring Unit	meter, ft, m3, liter, ft3, gallon, barrel etc.
Communication Output	4~20mA, OCT, Relay, RS485 (Modbus-RUT), Data Logger, GPRS
Energy Unit	Unit: GJ, Opt: KWh
Security	Keypad Lockout, System Lockout
Size	244*196*114mm
Weight	2.4kg

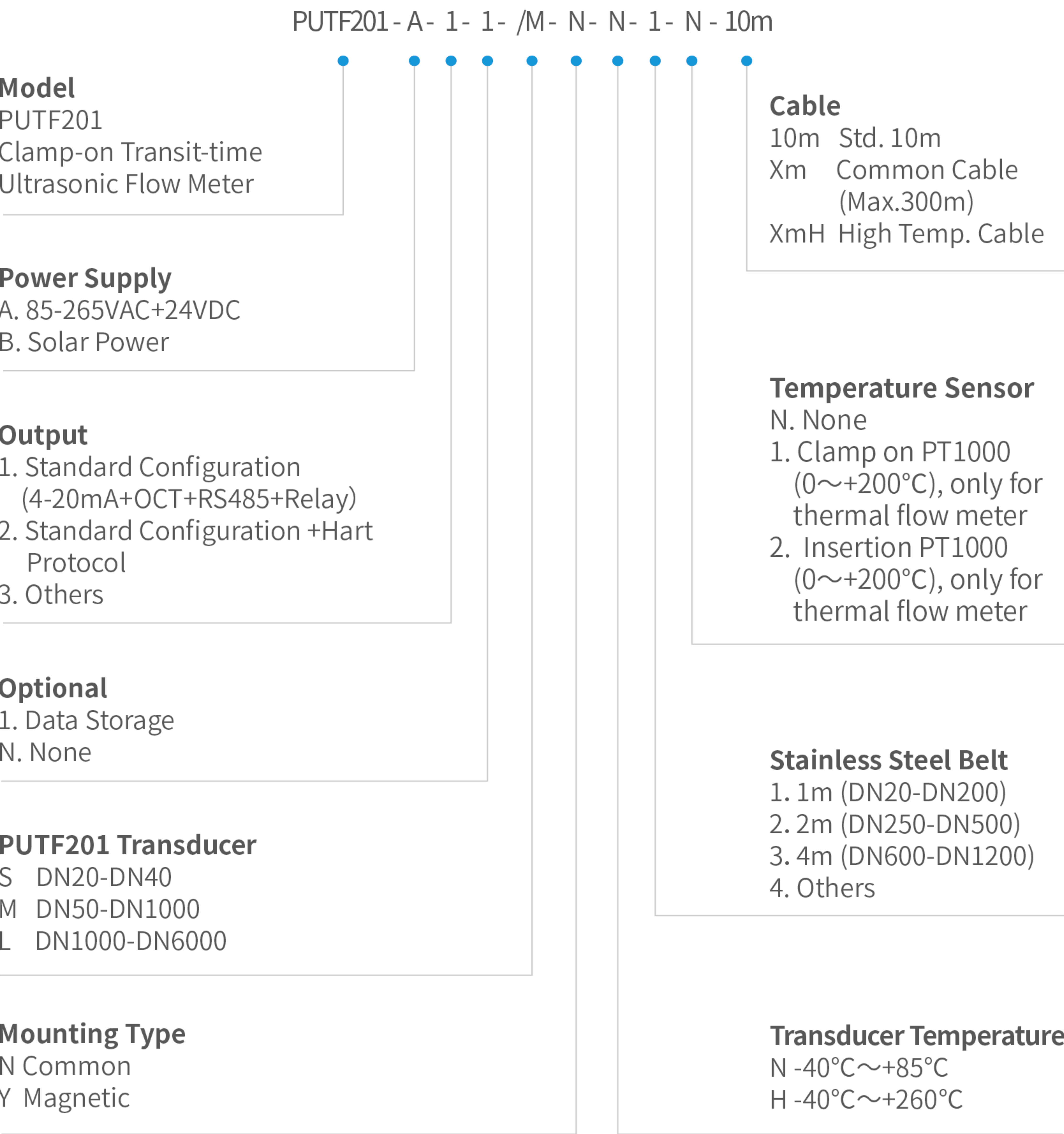
· Transducer

Protection Class	IP67
Fluid Temperature	Std. transducer : -40°C~85°C High Temp : -40°C~260°C
Pipe Size	20mm-6000mm
Transducer Size	S (20mm- 40mm) M (50mm-1000mm) L (1000mm-6000mm)
Transducer Material	Std.Aluminum alloy, High Temp.(PEEK)
Temperature Sensor	PT1000
Cable Length	Std. 10m (customized)

Panda PUTF201 Series

Clamp-on Transit-time Ultrasonic Flow Meter

Model Selection >>>



For Example: PUTF201-A-1-1-/M-N-N-1-N-10m

Stands for: PUTF201clamp-on ultrasonic flow meter, 220VAC power supply, 4-20mA, OCT, RS485 and relay output, with data storage, M transducer, common mounting type, normal temperature, stainless steel belt 1m, cable length 10m.

Panda PUTF202 Series

Insertion Transit-time Ultrasonic Flow Meter

Summary >>>

PUTF202 insertion transit-time ultrasonic flow meter utilizes transit-time principle. It effectively solves clamp-on flow meter cannot accurately measure while scaling pipe and non-conductive media. Insertion transducer with stop valve is unnecessary to stop flow or cut pipe for installation and maintenance. For unable directly drilling pipe or not smooth surface pipe, we mount hoops while installation. Plus, select thermal energy measuring function to achieve completely energy analysis. It is widely applied in processing monitoring, water balance test, district heating balance test, energy efficiency monitoring as easy installation and simple operation advantages.



Technical Features >>>

- 4 Lines Display Velocity, Flow Rate, Volume And Meter Status
- Installation Without Flow Stop, Unnecessary Pipe Cutting Or Processing Interruption
- Fluid Temperature Range -40°C~160°C
- Built-in Data Storage Is Optional
- Selecting Temperature Sensor PT1000 To Achieve Thermal Energy Measurement Function
- Suitable For DN65-DN6000 Flow Measurement
- Bi-directional Measurement, Widely Measuring Range

Panda PUTF202 Series

Insertion Transit-time Ultrasonic Flow Meter

Specification >>>

· Transmitter

Measuring Principle	Transit-Time
Velocity	0.01m/s - 12 m/s, Bi-directional Measurement
Resolution	0.25mm/s
Repeatability	0.10%
Accuracy	±1%R , ±0.5%R (flow rate >0.3m/s), ±0.003m/s (flow rate<0.3m/s)
Response Time	0.5s
Sensitivity	0.003m/s
Damping	0-99s(settable by user)
Suitable Fluid	Clean or tiny amounts of solids, air bubbles liquid, Turbidity<10000 ppm
Power Supply	AC:85-265V DC:24V/500mA
Installation	Wall Mounted
Protection Class	IP66
Operating Temperature	-40°C ~ +75°C
Enclosure Material	Fiberglass
Display	6 lines of color LCD display, can simultaneously display the flow rate, instantaneous flow, cumulative flow and meter running status
Measuring Unit	meter, ft, m3, liter, ft3, gallon, barrel etc.
Communication Output	4~20mA, OCT, Relay, RS485 (Modbus-RUT), Data Logger, GPRS
Energy Unit	Unit: GJ, Opt: KWh
Security	Keypad Lockout, System Lockout
Size	244*196*114mm
Weight	2.4kg

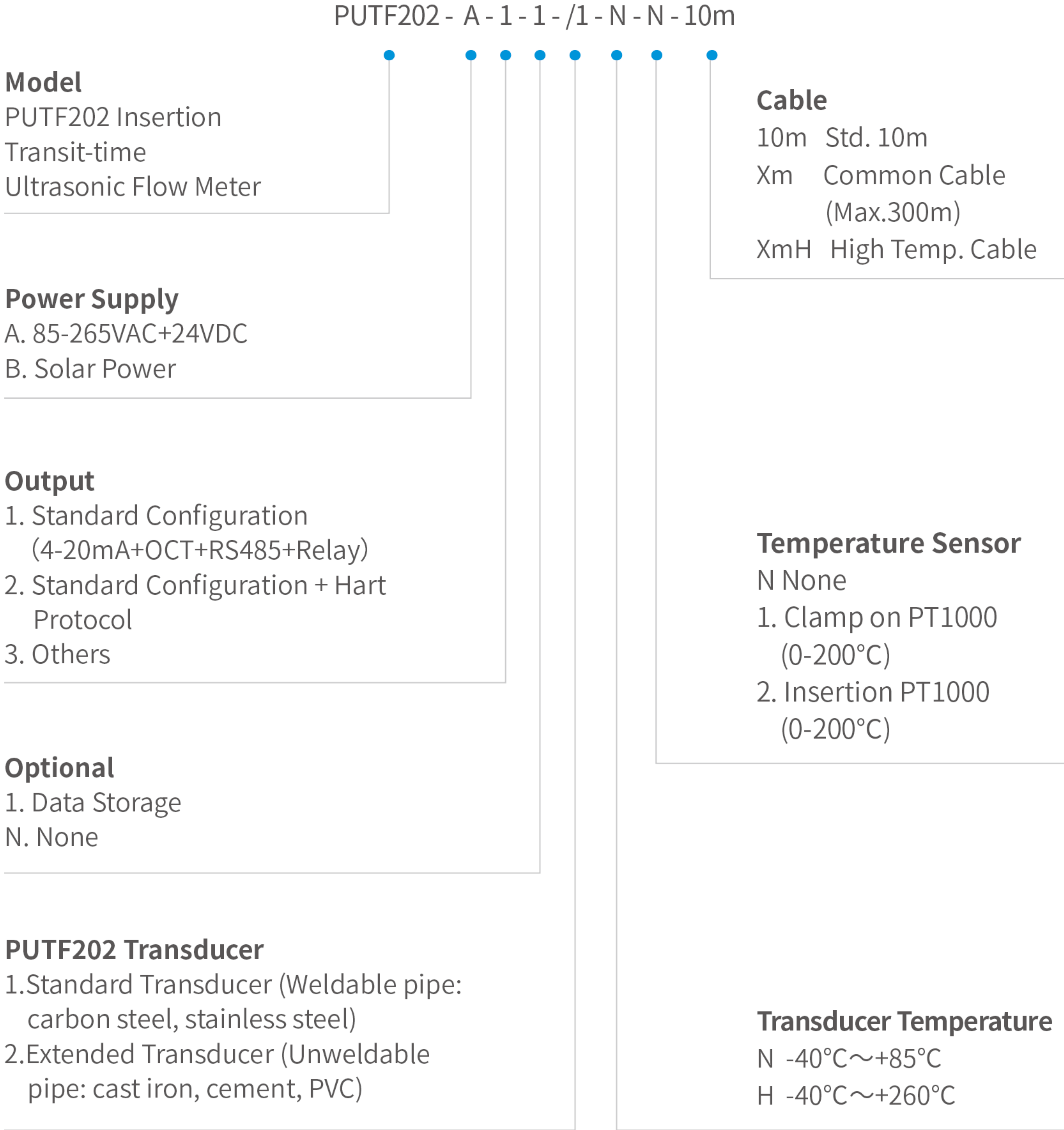
· Transducer

Protection Class	IP68
Fluid Temperature	Std. transducer : -40°C~85°C High Temp : -40°C~160°C
Pipe Size	65mm-6000mm
Transducer Size	Std. transducer Extended transducer
Transducer Material	Stainless Steel
Temperature Sensor	PT1000
Cable Length	Std. 10m (customized)

Panda PUTF202 Series

Insertion Transit-time Ultrasonic Flow Meter

Model Selection >>>



For Example: PUTF202-A-1-1/1-N-N-10m

Stands for: PUTF202 insertion ultrasonic flow meter, 220VAC+24VDC power supply, 4-20mA, OCT, RS485 and relay output, with data storage, standard Transduce for weldable pipe, normal temperature, cable length 10m.

Panda PUTF203 Series

Handheld Transit-time Ultrasonic Flow Meter

Summary >>>

PUTF203 handheld transit-time ultrasonic flow meter utilizes transit-time principle. The transducer is mounted outside surface of the pipe without flow stop or pipe cutting. It's very simple, convenient for installation, calibration and maintenance. Different sizes of transducers satisfy different measuring demand. Plus, select thermal energy measuring function to achieve completely energy analysis. As small size, easy to carry, simple installation, widely applied in mobile measuring, calibration, data comparison fields etc.



Features >>>

- Small Size, Easy To Carry And Simple Installation
- Built-in Chargeable Lithium Battery Can Continuously Work 14 Hours
- 4 Lines Display Velocity, Flow Rate, Volume And Meter Status
- Clamp-on Mounted, Unnecessary Pipe Cutting Or Processing Interruption
- Fluid Temperature Range -40°C~260°C
- Built-in Data Storage Is Optional
- Suitable For DN20-DN6000 Flow Measurement By Selecting Different Size Transducers
- Bi-directional Measurement, Widely Measuring Range

Panda PUTF203 Series

Handheld Transit-time Ultrasonic Flow Meter

Technical Specification >>>

· Transmitter

Measuring Principle	Transit-time
Velocity	0.01m/s - 12 m/s, Bi-directional Measurement
Resolution	0.25mm/s
Repeatability	0.10%
Accuracy	±1.0%R
Response Time	0.5s
Sensitivity	0.003m/s
Damping	0-99s (settable by user)
Suitable Fluid	Clean or tiny amounts of solids, air bubbles liquid , Turbidity <10000 ppm
Power Supply	AC: 85-265V, built-in chargeable lithium battery can continuously work 14 hours
Protection Class	IP65
Operating Temperature	-40°C ~ +75°C
Enclosure Material	ABS
Display	LCD 6-line display, showing flow rate, instantaneous flow, cumulative flow and instrument operating status, with backlight
Measuring Unit	meter, ft, m ³ , liter, ft ³ , gallon, barrel etc.
Communication Output	Data Logger
Security	Keypad Lockout, System Lockout
Size	212*100*36mm
Weight	0.5kg

· Transducer

Protection Class	IP67
Fluid Temperature	Std. transducer: -40°C~85°C High Temp: -40°C~260°C
Pipe Size	20mm-6000mm
Transducer Size	S (20mm-40mm) M (50mm-1000mm) L (1000mm-6000mm)
Transducer Material	Std. Aluminum alloy, High Temp.(PEEK)
Cable Length	Std. 5m (customized)

Panda PUTF203 Series

Handheld Transit-time Ultrasonic Flow Meter

Model Selection >>>

PUTF203 - A - 1 - /M - N - 2 - 5m

Model

PUTF203 Handheld
Transit-time Ultrasonic
Flow Meter

Power Supply

A. 85-265V AC+24VDC
(built-in chargeable battery)

Optional

1. Data Storage
N.None

PUTF203 Transducer

S	DN20-DN40
M	DN50-DN1000
L	DN1000-DN6000

Cable

5m	Std. 5m
Xm	Common Cable (max.300m)
XmH	High Temp. Cable

Stainless Steel Belt

1. 1m (DN20-DN200)
2. 2m (DN250-DN500)
4. 4m (DN600-DN1200)
5. Others

Transducer Temperature

N $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
H $-40^{\circ}\text{C} \sim +260^{\circ}\text{C}$

For Example:PUTF203- A-1/M-N-2-5m

Stands for: PUTF203 handheld transit-time ultrasonic flow meter, 85-265VAC power supply, data storage, M transducer, normal temperature, cable length 5m.

Panda PUTF205 Series

Portable Transit-time Ultrasonic Flow Meter

Summary >>>

PUTF205 portable transit-time ultrasonic flow meter utilizes transit-time principle. The transducer is mounted outside surface of the pipe without flow stop or pipe cutting. It's very simple, convenient for installation, calibration and maintenance. Different sizes of transducers satisfy different measuring demand. Plus, select thermal energy measuring function to achieve completely energy analysis. It is widely applied in processing monitoring, water balance test, district heating balance test, energy efficiency monitoring as easy installation and simple operation advantages.



Features >>>

- Built-in Chargeable Lithium Battery Can Continuously Work 50 Hours
- 4 Lines Display Velocity, Flow Rate, Volume And Meter Status
- Clamp-on Mounted, Unnecessary Pipe Cutting Or Processing Interruption
- Fluid Temperature Range -40°C~260°C
- Built-in Data Storage Is Optional
- Selecting Temperature Sensor PT1000 To Achieve Thermal Energy Measurement Function
- Suitable For DN20-DN6000 Flow Measurement By Selecting Different Size Transducers
- Bi-directional Measurement, Widely Measuring Range

Panda PUTF205 Series

Portable Transit-time Ultrasonic Flow Meter

Specification >>>

· Transmitter

Measuring Principle	Transit-time
Velocity	0.01m/s - 12 m/s,Bi-directional Measurement
Resolution	0.25mm/s
Repeatability	0.10%
Accuracy	±1.0%R、 ±0.5%R (velocity>0.3m/s) ; ±0.003m/s (velocity<0.3m/s)
Response Time	0.5s
Sensitivity	0.003m/s
Damping	0-99s (settable by user)
Suitable Fluid	Clean or tiny amounts of solids, air bubbles liquid , Turbidity <10000 ppm
Power Supply	AC: 85-265V AC(Built-in rechargeable battery)
Installation	Portable
Protection Class	IP66
Operating Temperature	-40°C ~ +75°C
Enclosure Material	ABS
Display	4X8 Chinese Or 4X16 English, Backlit
Measuring Unit	meter, ft, m3, liter, ft3, gallon, barrel etc.
Communication Output	4~20mA, OCT, RS485 (Modbus-RUT), Data Logger
Energy Unit	Unit: GJ, Opt: KWh
Security	Keypad Lockout, System Lockout
Size	270*246*175mm
Weight	3kg

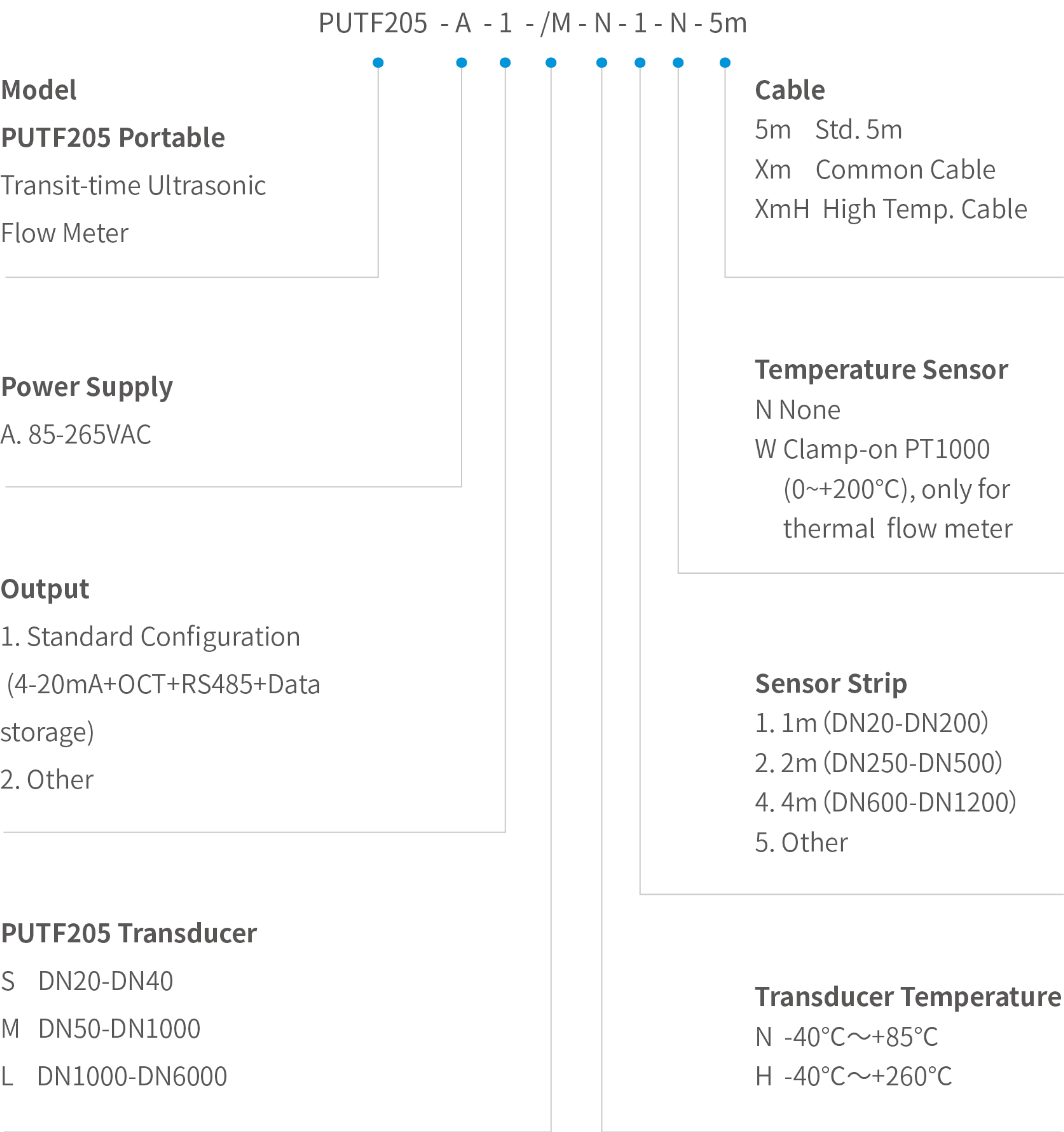
· Transducer

Protection Class	IP67
Fluid Temperature	Std. transducer : -40°C~85°C High Temp : -40°C~260°C
Pipe Size	20mm-6000mm
Transducer Size	S (20mm-40mm) M (50mm-1000mm) L (1000mm-6000mm)
Transducer Material	Std. Aluminum alloy, High Temp.(PEEK)
Cable Length	Std. 5 m (customized)

Panda PUTF205 Series

Portable Transit-time Ultrasonic Flow Meter

Model Selection >>>



PUTF205 Transducer

S DN20-DN40
M DN50-DN1000
L DN1000-DN6000

For Example: PUTF205-A-1/M-N-1-N-5m

Stands for: PUTF205 portable transit-time ultrasonic flow meter, 85-265VAC power supply, 4-20mA+OCT+RS485+Data storage output, M transducer, common transducer, stainless steel belt 1m, cable length 5m.

Panda PUTF206 Series

Battery Powered Transit-time Multi-channel Insertion Ultrasonic Flow Meter

Summary >>>

Battery powered transit-time multi-channel insertion ultrasonic flow meter utilizes transit-time principle. No need external power supply and suitable for various occasions without power supply. It effectively solves problems that clamp-on flow meter can't accurately measure while scaling pipe and non-conductive media. Insertion transducer with stop valve is unnecessary to stop flow or cut pipe for installation and maintenance. For unable directly drilling pipe, need to mount hoops while installation. It is widely applied in water supply and drainage, production monitoring, energy-saving monitoring etc.as easy installation and simple operation advantages.



Features >>>

- Installation Without Flow Stop, Unnecessary Pipe Cutting Or Processing Interruption.
- LCD Display Velocity, Flow Rate And Volume
- Low Starting Flow, High Accuracy, Bi-directional Measurement
- Adopting Ultrasound Measuring, No Moving Parts Ensure Stable And Reliable Long-term Working
- Battery Powered, Low Consumption Design, Battery Can Continuously Work For 6 Years
- No Need External Power Supply, Suitable For Various Occasions Without Power Supply
- Fluid Temperature Range -40°C~160°C
- Configured With Wireless Remote Reading Device
- Suitable For DN65-DN6000 Flow Measurement
- With Self-diagnosis Function, Prompt Error Messages When Abnormal Conditions Occur To Ensure Safe Operation

Panda PUTF206 Series

Battery Powered Transit-time Multi-channel Insertion Ultrasonic Flow Meter

Technical Specification >>>

·Transmitter

Measuring Principle	Transit-time
Velocity	0.1m/s - 12m/s, Bi-directional Measurement
Resolution	0.25mm/s
Repeatability	0.10%
Accuracy	±1.0% R, ±0.5% R (flow rate>0.3 m/s);±0.003 m/s (flow rate<0.3 m/s)
Response Time	0.5s
Suitable Fluid	Clean or tiny amounts of solids, air bubbles liquid, Turbidity <10000 ppm
Power Supply	3.6V Battery
Protection Class	IP65
Environmental Temperature	-40°C ~ +75°C
Enclosure Material	Die-cast aluminum
Display	9 digits multi-line LCD display. Can display cumulative flow, instantaneous flow, flow rate, error alarm, flow direction etc. at the same time. meter, m³, liter
Measuring Unit	RS485 (baud rate adjustable), Pulse, NB-IoT, GPRS etc.
Communication Output	Store the latest 10 years' data including day, month and year.
Data Storage	Data can be permanently saved even powered off.
Size	199*109*72mm
Weight	1kg

·Transducer

Protection Class	IP68
Fluid Temperature	Std. transducer: -40°C~+85°C High temp: -40°C~+160°C
Pipe Size	65mm-6000mm
Transducer Type	Std. transducer Extended transducer
Transducer Material	Stainless Steel
Channel Type	Double channel, four-channel
Cable Length	Std. 10m(customized)

Panda PUTF206 Series

Battery Powered Transit-time Multi-channel Insertion Ultrasonic Flow Meter

Model Selection >>>

	PUTF206 - D - 1 - /1 - 2 - N - 10m					
Model PUTF206 Transit-time Ultrasonic Flow Meter						Cable 10m Std. 10m Xm Common Cable (Max. 30m) XmH High Temp. Cable
Power Supply D. Battery						
Output 1. Standard Configuration (RS485+OCT) 2. Others						Transducer Temperature N. -40°C~+85°C H. -40°C~+160°C
PUTF206 Transducer 1. Standard Transducer (Weldable pipe: carbon steel, stainless steel) 2. Extended Transducer (Unweldable pipe: cast iron, cement, PVC)						Sensor Strip 2. Double Channel 4. Four Channel

For Example:PUTF206-D-1-1-2-N-10m

Stands for:PUTF206 insertion ultrasonic flow meter, battery powered, OCT pulse and RS485 output, standard transducer for weldable pipe, double channels, normal temperature, cable length 10m.

Panda PUTF208 Series

Transit-time Multi-channel Insertion Ultrasonic Flow Meter

Summary >>>

The transit-time ultrasonic flow meter PUTF208 working with principle of transit-time. The transducer is insertion type. Insertion installation effectively solves the problem that the internal wall of the pipeline is scaling, the pipeline is old, and the pipeline non-sound-conducting materials cannot be effectively measured. The insertion transducer comes with a ball valve, and the installation and maintenance do not need to cut off the flow, break the pipe, which is convenient and fast. For special pipes which the material cannot be welded, the transducer can be mounted by installing a holding hoop. Heat and cooling metering optional. Quick installation, simple operation, widely used in production monitoring, water balance test, heat network balance test, energy-saving monitoring and other occasions.



Features >>>

- Online Installing, Unnecessary Pipe Cutting Or Processing Interruption.
- 4.3-inch TFT Color Display Screen, Display Velocity, Flow Rate, Volume And Meter Status.
- Digital Timing Technology, Minimum Resolution Is 45ps, Sampling Frequency Is 2hz.
- Single And Dual Channel Can Be Switched Arbitrarily. Appropriate Measurement Method Can Be Selected By Menu.
- Screen Display Adopts Multi-language Design And Languages Suitable For Different Countries.
- High Measuring Accuracy Suitable For Large Pipe Diameters And Complex Flow Regimes.
- Can Measure Carbon Steel, Cement, Cast Iron, Plastic Pipes.
- IP68 transducers Can Work Underwater For A Long Time.

Panda PUTF208 Series

Transit-time Multi-channel Insertion Ultrasonic Flow Meter

Technical Specification >>>

· Transmitter

Measuring Principle	Transit-time
Velocity	(0.01 - 12) m/s, Bi-directional measurement
Resolution	0.25mm/s
Repeatability	0.1%
Accuracy	±1.0%R
Response Time	0.5s
Sensitivity	0.003m/s
Damping	0-99s (settable by user)
Suitable Fluid	Clean or tiny amounts of solids, air bubbles liquid , Turbidity <10000 ppm
Power Supply	AC: (85-265) VDC: 24V/500mA
Protection Class	IP66
Operation Ambien Temperature	-40°C ~ +75°C
Enclosure Material	Fiberglass
Display	LCD 6-line display, showing flow rate, instantaneous flow, cumulative flow and instrument operating status, with backlight
Measure Unit	meter, ft, m³, liter, ft³ , gallon, barrel etc.
Communication Output	4~20mA, OCT, Relay, RS485 (Modbus-RUT), Data Logger ,GPRS
Energy Unit	Units: GJ, Opt: KWh
Security	Keypad lockout, system Lockout
Size	244*196*114mm
Weight	3kg

· Transducer

Protection Class	IP67
Fluid Temperature	Std. transducer: -40°C~+85°C High temperature transducer: -40°C~+160°C
Pipe Size	65mm-6000mm
Transducer Size	Insertion: Standard Transducer, Extended Transducer Clam-on: Medium Transducer (50mm-1000mm) Large Transducer (1000mm-6000mm)
Transducer Material	Insertion type: Stainless steel Clamp on type: Std. Aluminum alloy, High Temp.(PEEK)
Temperature Transducer	PT1000
Cable Length	Std. 10m(customized)

Panda PUTF208 Series

Transit-time Multi-channel Insertion Ultrasonic Flow Meter

Model Selection >>>

PUTF208 - A - 1 - 1 - /2 - H - 2 - 10m							
Model PUTF208 Transit-Time Multi-Channel Ultrasonic Flow Meter	•	•	•	•	•	•	Cable 10m Std. 10m Xm Common Cable (Max.300m) XmH High Temp. Cable
Power Supply A. 85-265VAC+24VDC B. Battery D. Solar Power							Transducer Steel Strip N. None 1.Clamp-on PT1000 (0-200°C) 2.Insertion PT1000 (0-200°C)
Output N. None 1. Standard (RS485+OCT Pulse)							Transducer Temperature N -40°C~+85°C H -40°C~+160°C (Insertion) H -40°C~+260°C (Clamp-on)
Transducer 1.Insertion Standard Transducer (Weldable pipe: carbon steel, stainless steel) 2.Insertion Extended Transducer (Unweldable pipe: cast iron, cemet, PVC) 3.Clamp-on M DN50-DN1000 4.Clamp-on L DN1000-DN6000							
Channel Number 2. Dual Channels 4. Four Channels							

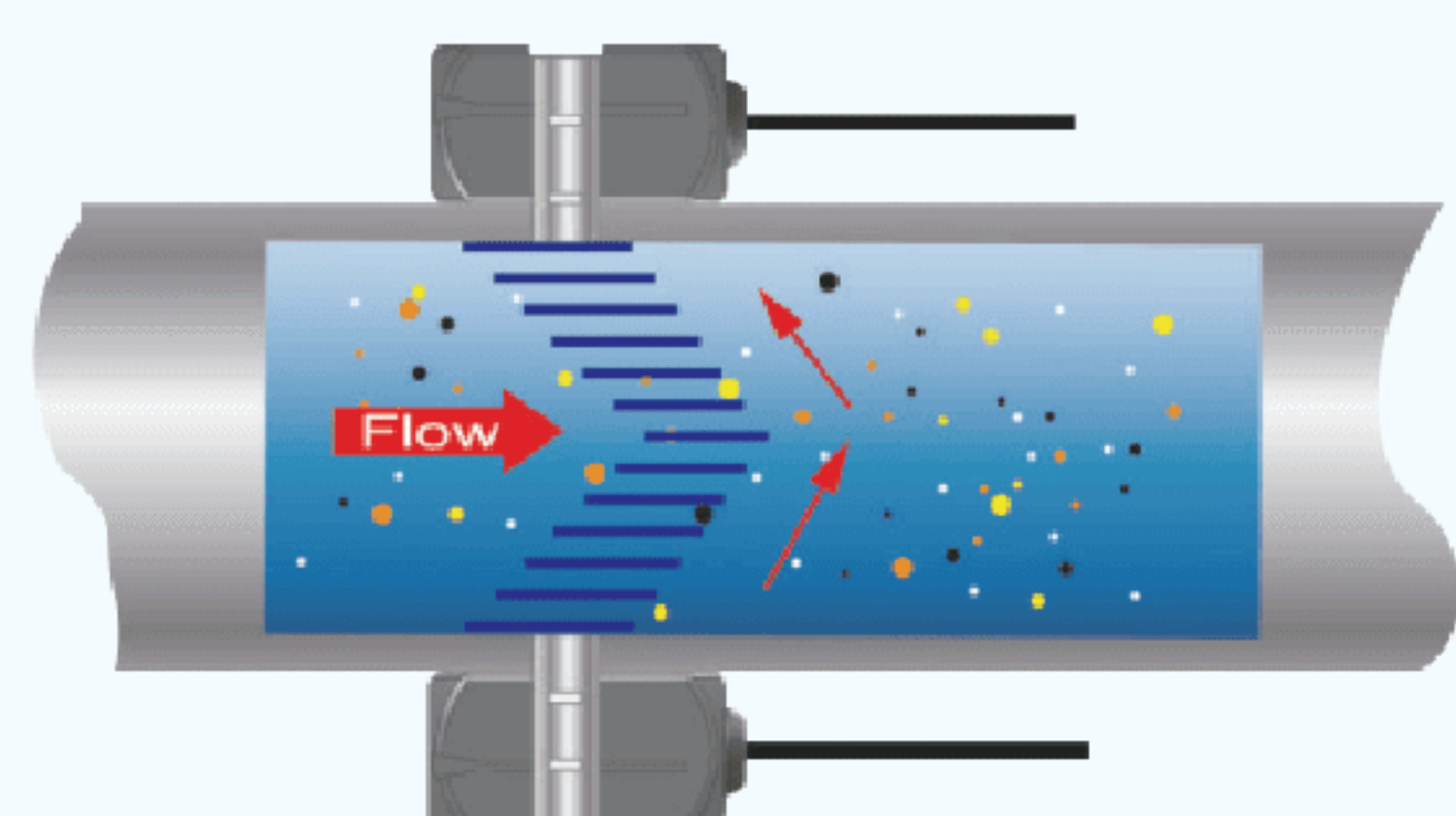
For Example:PUTF208-A-1-1/2-H-2-10m

Stands for:PUTF208 Transit-time Multi-channel Insertion Ultrasonic Flow Meter, 220VAC+24VDC power supply, basic configuration (4-20mA+OCT pulse +RS485+relay) Output;Standard transducer for pipe which can be welded, dual channel, transducer temperature-40~160°C, plug-in transducer PT1000, Pressure transducer pressure range 0-1.6MPa, cable length:10m

Panda PUDF Series

Doppler Ultrasonic Flow Meter

Working Principle >>>



Formula:

$$q_v = \frac{AC_1}{2K \cos \alpha} \frac{\Delta f}{f_1}$$

Doppler ultrasonic flow meter operates by transmitting an ultrasonic sound from its transmitting transducer, the sound will be reflected by useful sonic reflectors suspended within the liquid and recorded by the receiving transducer. Take clamp-on doppler ultrasonic flow meter as an example, the sound wave from a transmitting transducer goes through the pipe wall and into the moving liquid.

The sound wave is reflected by suspended particles or bubbles moving with the liquid and ultimately gathered by receiving transducer. A frequency shift (doppler effect) will occur that is directly proportional to the speed of the moving particles and bubbles. This shift in frequency is interpreted by the digital signal processor (DSP) and converted to a fluid velocity measurement. If the liquid is not moving, transmitting and receiving signal is equal, there is no frequency shift.

q_v =Volume flow, c_1 =sound velocity, α =signal angle, K =calibration factor, Δf =Doppler Shift, A =Profile Area, f_1 =frequency

Features >>>

- Excellent low flow rate measurement ability, low to 0.05m/s.
- A wide range of flow measurement, high flow rate can reach 12m/s.
- Signal Automatic Gain Adjustment.
- Regardless of clamp-on or insertion type unnecessary to cut pipe or stop flow.
- Simple Operation, only input inner diameter to realize flow measurement.
- Pulse Output Flow Rate, Total flow and Alarm.
- Suitable for measuring raw sewage in large size pipeline.

Application >>>

Widely applied in municipal sewage settlement, drainage pumping station, environmental Monitoring and measuring drainage, industrial effluent, residential waste water, slurry, paper slurries, oil-water mixture etc in coal, metallurgy, mining, refinery, chemical, paper mill, food fields.

Panda PUDF301 Series

Doppler Clamp-on Ultrasonic Flow Meter

Summary >>>

PUDF301 doppler clamp-on ultrasonic flow meter is designed for measuring liquid with suspended solids, air bubbles or sludge in a sealed closed pipeline. Non-invasive transducers are mounted outside surface of the pipe. It has advantage that measurement is not influenced by pipe scale or blockage. Simple installation and easy calibration as unnecessary pipe cutting or flow stop.



Features >>>

- Non-invasive Installation, Unnecessary pipe cutting or flow interruption
- Measuring Accuracy $\pm 0.5\% \sim \pm 2\% F.S$
- Signal Automatic Gain Adjustment
- Anti-interference Frequency Converter
- Simple Operation, Only Input Inner Diameter To Realize Flow Measurement
- 2*8 LCD Display Flow Rate, Volume, Velocity etc

Panda PUDF301 Series

Doppler Clamp-on Ultrasonic Flow Meter

Technical Specification >>>

· Transmitter

Measuring Principle	Doppler Ultrasonic
Velocity	0.05m/s - 12 m/s,Bi-directional measurement
Repeatability	0.4%
Accuracy	±0.5% ~ ±2.0% F.S.
Response Time	2-60 sec (Select by user)
Measuring Cycle	500 ms
Suitable Fluid	Liquid containing more than 100ppm of reflector (Suspended solids or air bubbles), reflector >100 micron
Power Supply	AC: 85-265V DC: 24V/500mA
Installation	Wall mounted
Protection Class	IP66
Operation Temperature	-40°C ~ +75°C
Enclosure Material	Fiberglass
Display	2*8 LCD, 8 digits flow rate,volume (resettable)
Measuring Unit	volume/mass/velocity: liter, m³, kg, meter, gallon etc. flow time unit: sec, min, hour, day. Volume Rate: E-2~E+6
Communication Output	4~20mA, Relay, OCT
Keypad	4 buttons
Size	244*196*114mm
Weight	2.4kg

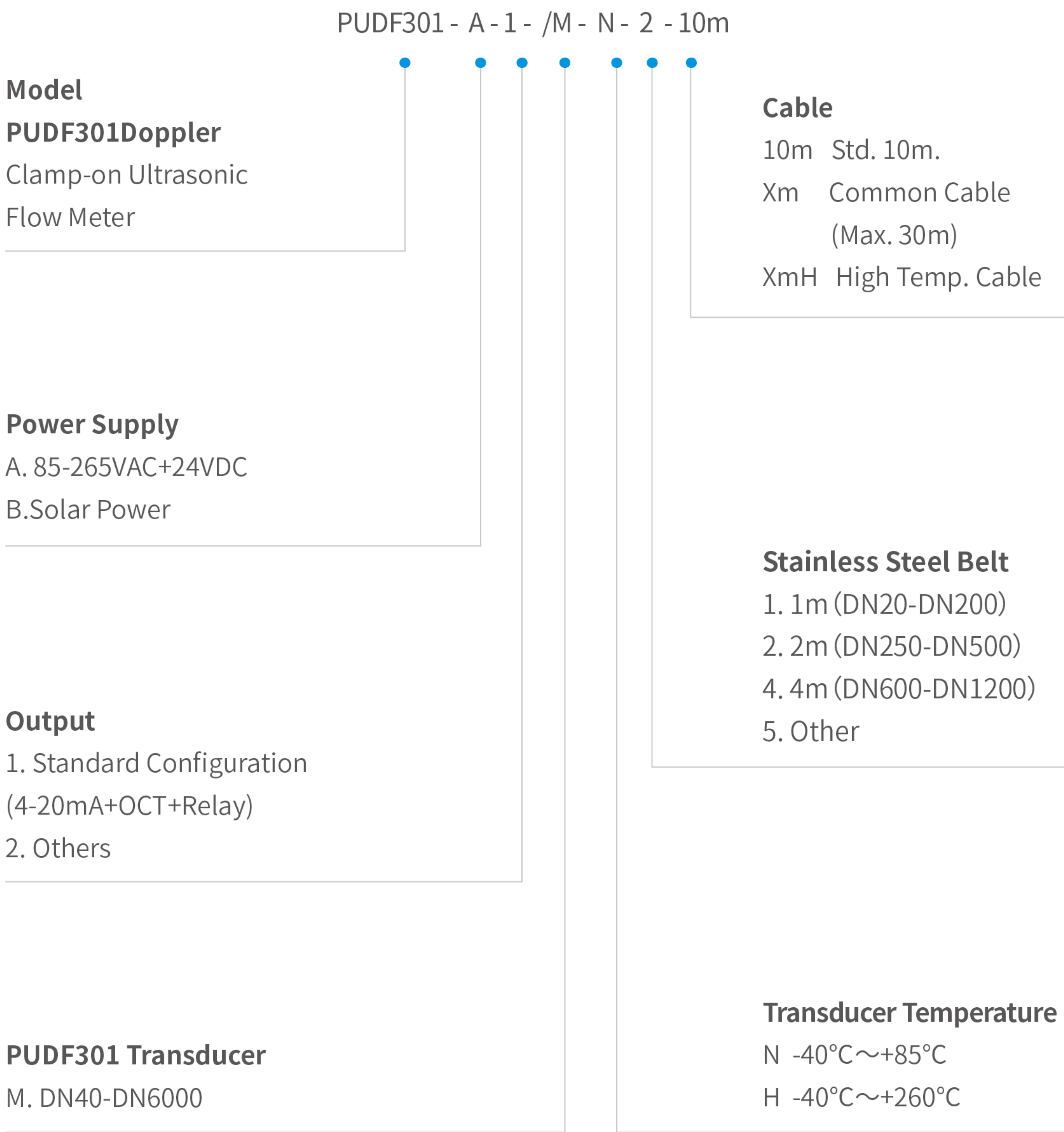
· Transducer

Protection Class	IP67
Fluid Temperature	Std.transducer: -40°C~85°C
	High Temp: -40°C~260°C
Pipe size	40mm-6000mm
Transducer Type	General standard
Transducer Material	Std. Aluminum alloy, High Temp.(PEEK)
Cable Length	Std. 10m (customized)

Panda PUDF301 Series

Doppler Clamp-on Ultrasonic Flow Meter

Model Selection >>>



For Example : PUDF301-A-1-1/M-N-2-10m

Stands for: PUDF301 Doppler Clamp-on Ultrasonic Flow Meter, 220VAC power supply, 4-20mA, OCT and relay output, standard Transducer, normal temperature, stainless steel belt 2m, cable length 10m.

Panda PUDF302 Series

Doppler Insertion Ultrasonic Flow Meter

Summary >>>

PUDF302 doppler insertion ultrasonic flow meter is designed for measuring liquid with suspended solids, air bubbles or sludge in a sealed closed pipeline. Insertion transducer can receive high signals and accurately measure in scale or non-acoustic pipes. It is simple installation without pipe cutting or flow interruption due to the transducer with stop ball valve. For unable directly drilling pipe or not smooth surface pipe, we mount hoops while installation.



Features >>>

- Suitable For All Common Pipelines, Including Scale, Cement, Cast Iron etc.
- Easy Installation, Without pipe cutting or flow interruption
- Measuring Accuracy $\pm 0.5\%$ to $\pm 2.0\%$ F.S
- Signal Automatic Gain Adjustment
- Anti-interference Frequency Converter
- Simple Operation, Only Set Inner Diameter To Realize Flow Measurement
- 2*8 LCD Display Flow Rate, Volume, Velocity etc.

Panda PUDF302 Series

Doppler Insertion Ultrasonic Flow Meter

Technical Specification >>>

· Transmitter

Measuring Principle	Doppler
Velocity	0.05m/s- 12 m/s, Bi-directional Measurement
Repeatability	0.4%
Accuracy	$\pm 0.5\% \sim \pm 2.0\%$ F.S
Response Time	2-60S, (Select by user)
Measuring Cycle	500 ms
Suitable Fluid	Liquid containing more than 100ppm of reflector (suspended solids or air bubbles), reflector > 100 micron
Power Supply	AC: 85-265V DC: 24V/500mA (Select by user)
Installation	Wall Mounted
Protection Class	IP66
Operation Temperature	$-40^{\circ}\text{C} \sim +75^{\circ}\text{C}$
Enclosure Material	Fiberglass
Display	2X8 LCD, 8 digits flow rate, volume (resettable)
Measuring Unit	Volume/mass/velocity: liter, m^3 , kg, meter, gallon etc Flow time unit: second, minute, hour, day. Volume Rate: E-2~E+6
Communication Output	4~20mA, OCT, Relay
Keypad	4 buttons
Size	244*196*114mm
Weight	2.4kg

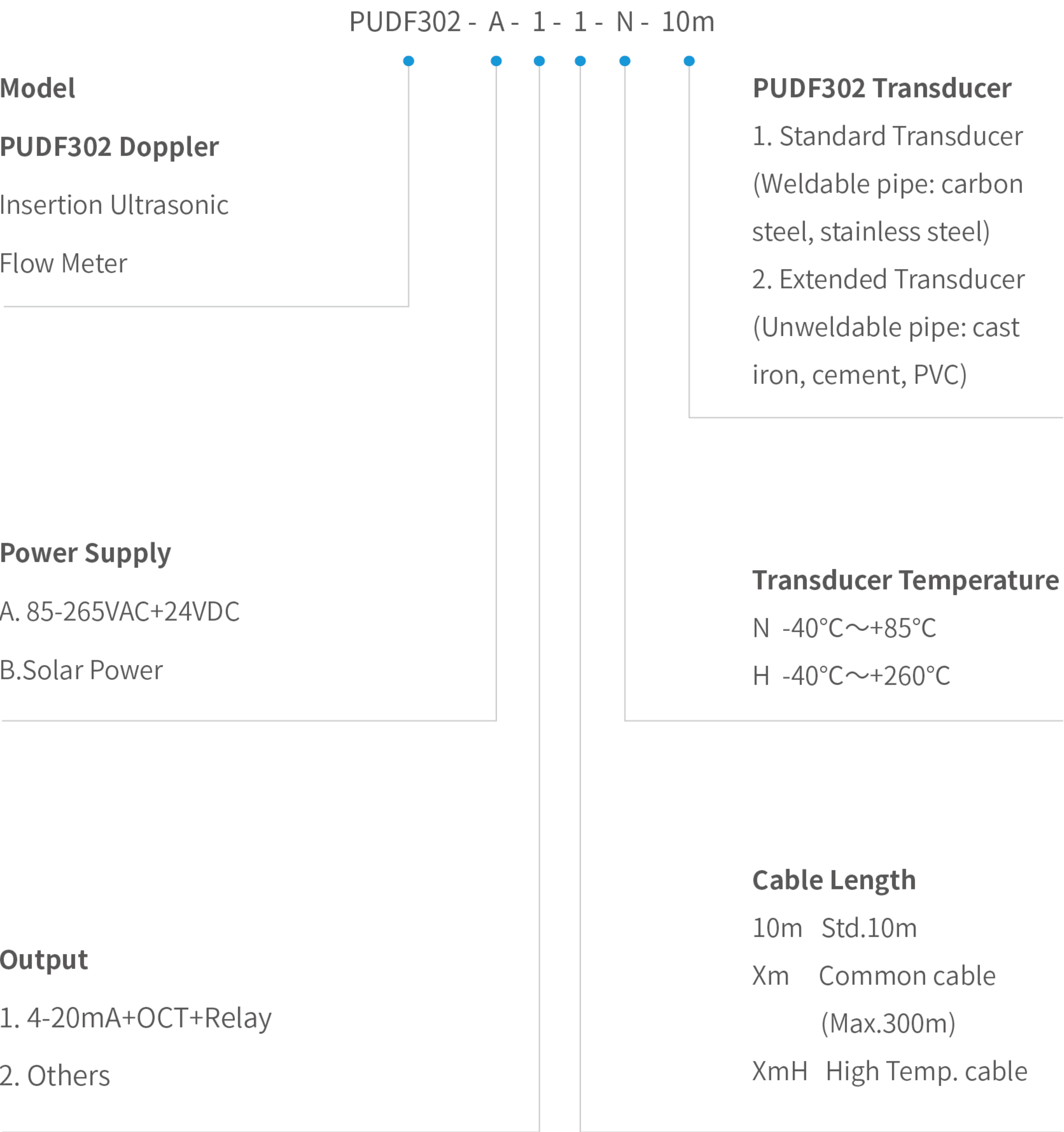
· Transducer

Protection Class	IP68
Fluid Temperature	Std. transducer: $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$ High Temp: $-40^{\circ}\text{C} \sim 160^{\circ}\text{C}$
Pipe size	65mm-6000mm
Transducer Type	Std. transducer Extended transducer
Transducer Material	Stainless steel
Cable Length	Std. 10m (customized)

Panda PUDF302 Series

Doppler Insertion Ultrasonic Flow Meter

Model Selection >>>



For Example:PUDF302-A-1-1-N-10m

Stands for:PUDF302 Doppler Insertion Ultrasonic Flow Meter, 220VAC+24VD power supply, 4-20mA+OCT+relay, standard transducer(weldable pipe), transducer temperature -40~85°C, cable length 10m.

Panda PUDF305 Series

Doppler Portable Ultrasonic Flow Meter

Summary >>>

PUDF305 doppler portable ultrasonic flow meter is designed for measuring liquid with suspended solids, air bubbles or sludge in a sealed closed pipeline. Non-invasive transducers are mounted outside surface of the pipe. It has advantage that measurement is not influenced by pipe scale or blockage. It's simple to install and calibrate due to unnecessary pipe cutting or flow stop.



Features >>>

- Chargeable Lithium Battery Can Continuously Work For 50 Hours
- Non-invasive Installation, Unnecessary pipe cutting or flow interruption, Acceptable Media
- Temperature Up To 260°C
- Measuring Accuracy $\pm 0.5\%$ to $\pm 2.0\%$ F.S
- Signal Automatic Gain Adjustment
- Anti-interference to Frequency Converter
- Simple Operation, Only Set Inner Diameter To Realize Flow Measurement
- 2*8 LCD Display Flow Rate, Volume, Velocity etc.

Panda PUDF305 Series

Doppler Portable Ultrasonic Flow Meter

Technical Specification >>>

· Transmitter

Measuring Principle	Doppler
Velocity	0.05- 12 m/s, Bi-directional Measurement
Repeatability	0.4%
Accuracy	±0.5% - 2.0% F.S.
Response Time	2-60s (Select by user)
Measuring Cycle	500 ms
Suitable Fluid	Liquid containing more than 100ppm of reflector (suspended solids or air bubbles), reflector > 100 micron
Power Supply	AC: 85-265V Built-in lithium battery can continuously work for 50 hours
Installation	Portable
Protection Class	IP65
Operation Temperature	-40°C ~ +75°C
Enclosure Material	ABS
Display	2X8 LCD, 8 digits flow rate, volume (resettable)
Measuring Unit	Volume/mass/velocity: liter,m³, kg, meter, gallon etc Flow time unit: second, minute, hour, day. Volume Rate: E-2~E+6
Communication Output	4~20mA,OCT
Keypad	6 buttons
Size	270*246*175mm
Weight	3kg

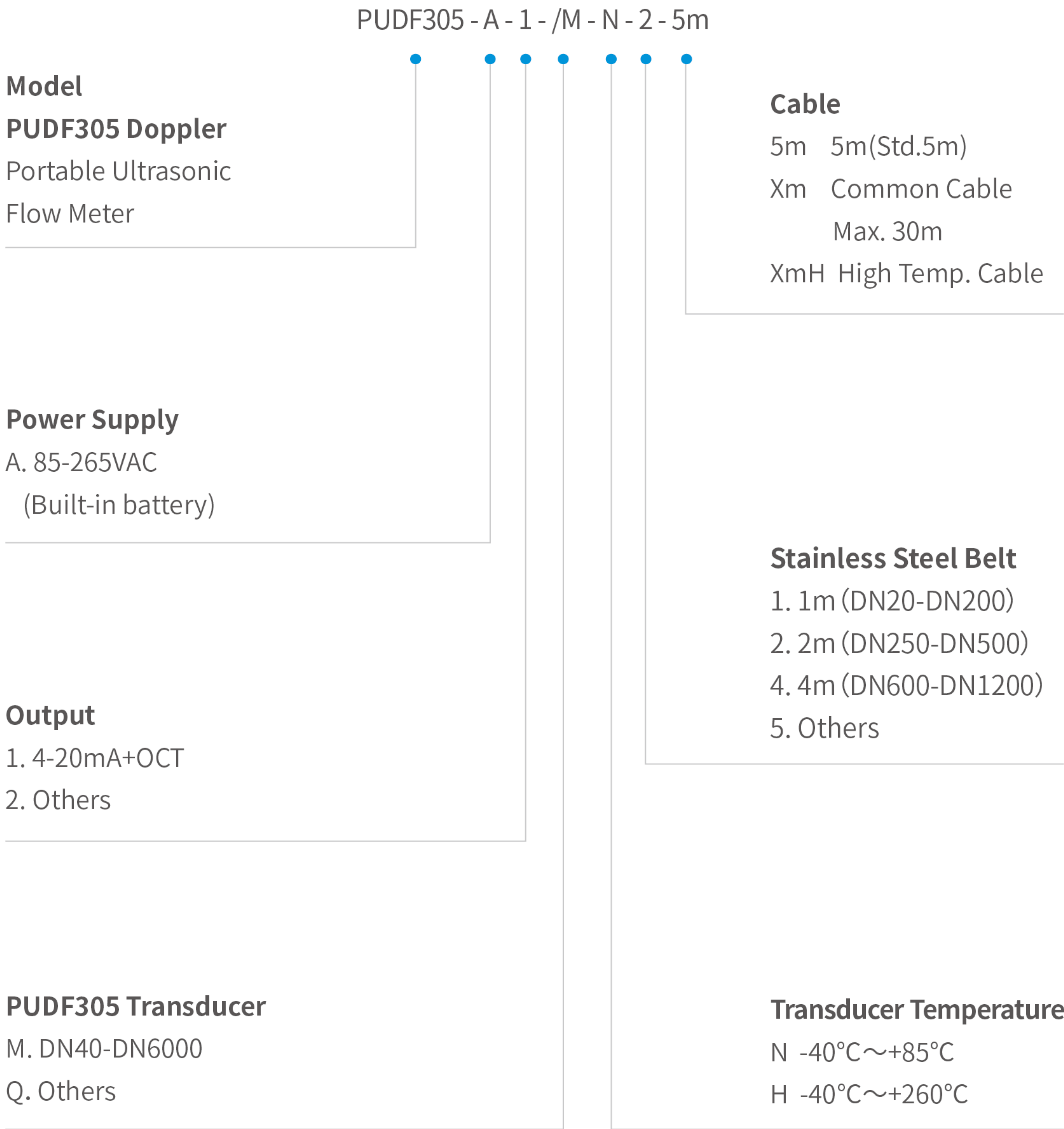
· Transducer

Protection Class	IP65
Std. transducer	-40°C~85°C
Fluid Temperature	
High Temp	-40°C~260°C
Process size	40~600mm
Transducer Type	General type
Transducer Material	Standard material, High Temp.(PEEK)
Stainless steel	Standard (optional)

Panda PUDF305 Series

Doppler Portable Ultrasonic Flow Meter

Model Selection >>>



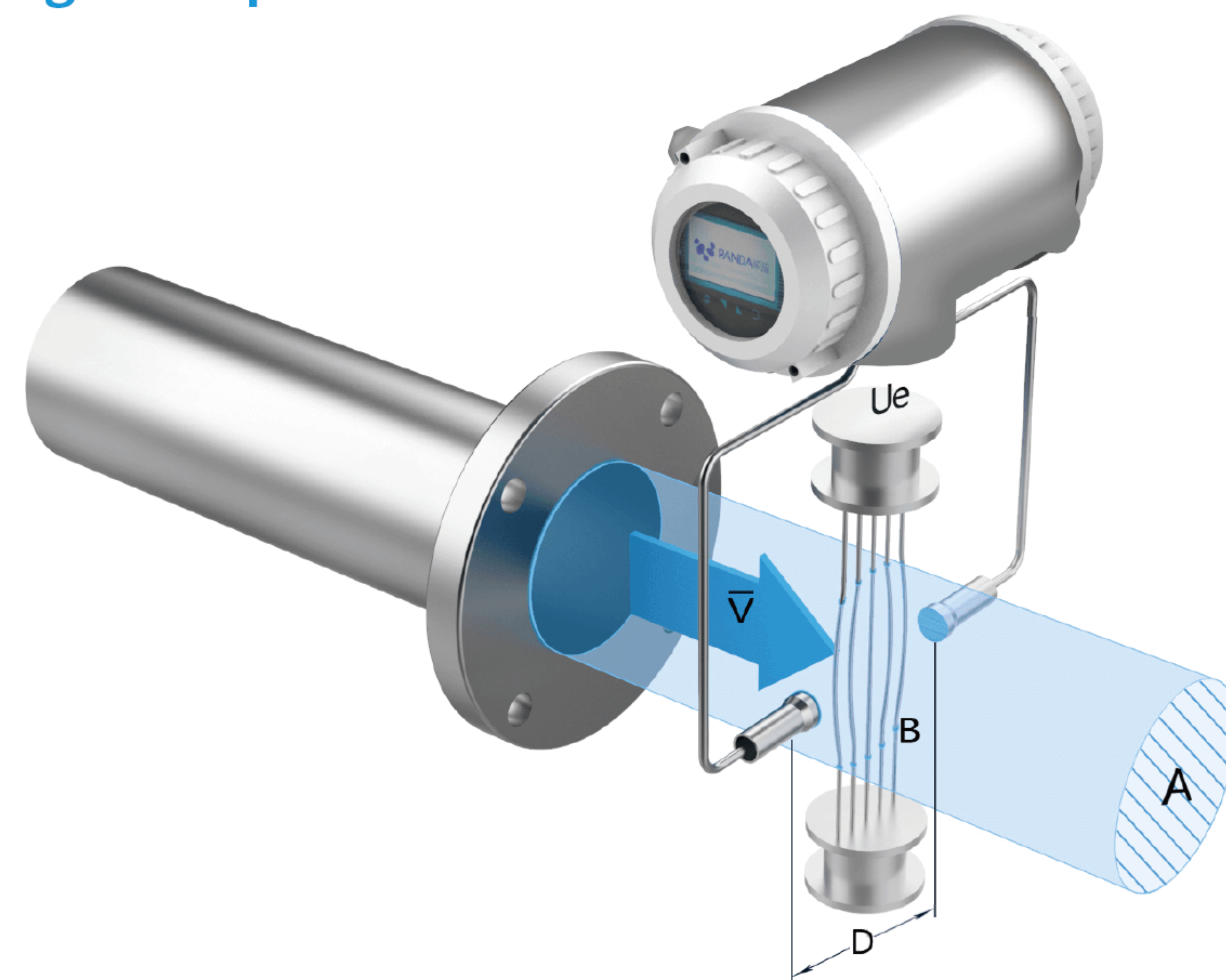
For Example: PUDF305-A-1/M-N-2-5m

Stands for: PUDF305 Doppler Portable Ultrasonic Flow Meter, 220VAC power supply, 4-20mA+OCT, standard transducer, transducer temperature is -40~85°C, stainless steel belt 2m, cable length 5m.

Panda PMF Series

Electromagnetic Flow Meter

Working Principle >>>



Electromagnetic flow meter principle is based on Faraday’ s Law of Electromagnetic Induction. Faraday’ s Law states that electromotive force will be induced in a conductor (water or other conductive liquid) when it passes through a magnetic field(generated by the meter),and the induced electromotive force will be directly proportional to the velocity of the conductor. A pair of electrode is mounted in a tube (inner diameter D(m)with the magnetic flux density B(T). When conductive fluid pass through the tube with average velocity V(m/s),then the electrode generate the electromotive force (U).

$$U = KB \cdot D \cdot V$$
 K: proportional coefficient

Summary >>>

PMF series is highly accurate and stable electromagnetic flow meter. It’ s widely applied in petrochemical, metallurgy, mining, water supply and drainage, paper-making, food, textile, irrigation, agriculture, municipal environmental protection and other fields.

Panda PMF Series

Electromagnetic Flow Meter



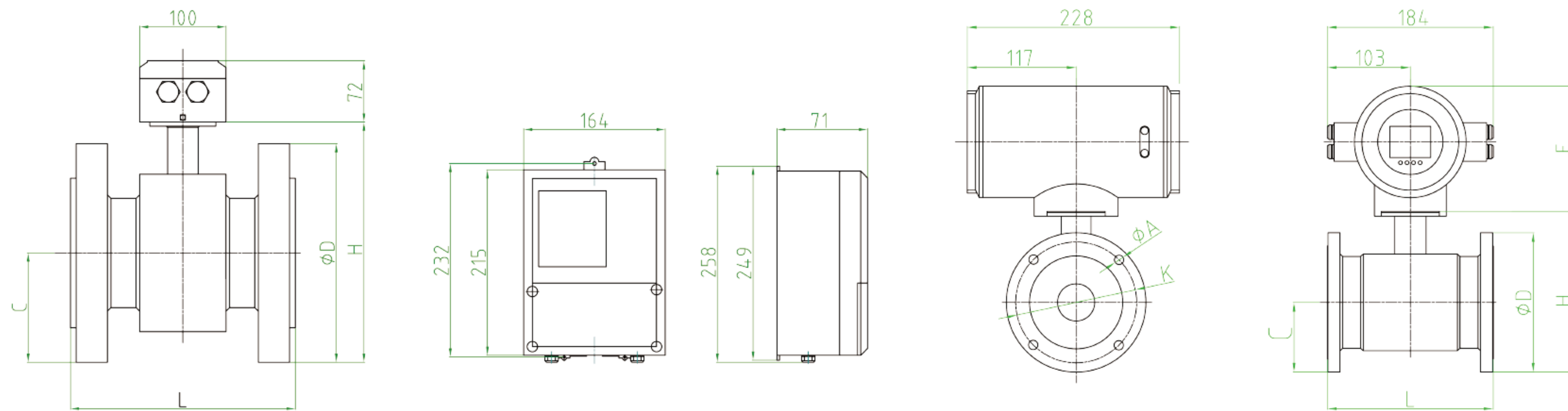
Technical Features >>>

- High Accuracy $\pm 0.5\%$, Satisfied For Billing System
- IP68 Protection Class, Sealed Sensor Ensures Long Term Under Water Working
- Chinese And English Menu, Convenient And Easy To Operate.
- Advanced Ground Electrode Structure Eliminates The Influence Of Electrical Noise

Specification >>>

Nominal Diameter	DN15~DN2000
Electrode Material	316L, Hb, Hc, Ti, Ta, Pt
Power Supply	AC: 90 VAC~260 VAC/47 Hz~63 Hz, power consumption $\leq 20VA$; DC: 16 VDC~36 VDC, power consumption $\leq 16VA \pm 0.5\%R, \pm 1.0\%R$
Lining Material	CR, PU, FVMQ, F4/PTFE, F46/PFA
Electrical Conductivity	$\geq 5\mu S/cm$
Accuracy Class	$\pm 0.5\%R, \pm 1.0\%R$
Velocity	0.05m/s~12m/s
Fluid Temperature	-40°C ~ +70°C
Pressure	0.6MPa~1.6MPa(depend on pipe size)
Type	Integrated or Separated
Enclosure Material	Carbon steel, Stainless steel 304 or 316
Installation	Flange connection

Electromagnetic Flow Meter



Diameter		Pressure (Mpa)	Mounting Size (mm)			Bolt Hole Diameter (mm) K	Bolt Diameter (mm) A	Holes n	Flange Outside Diameter (mm) D
mm	in		L	C	H				
15	1/2"	1.6	200	48	149	65	14	4	95
20	3/4"		200	53	154	75	14	4	105
25	1"		200	58	159	85	14	4	115
32	1 1/4"		200	70	172	100	18	4	140
40	1 1/2"		200	75	189	110	18	4	150
50	2"		200	83	197	125	18	4	165
65	2 1/2"		200	93	220	145	18	8	185
80	3"		200	100	227	160	18	8	200
100	4"		250	118	257	180	18	8	235
125	5"		250	135	289	210	18	8	270
150	6"		300	150	318	240	22	8	300
200	8"		1.0	350	170	379	295	22	8
250	10"	450		203	429	350	22	12	395
300	12"	500		230	482	400	22	12	445
350	14"	550		260	534	460	22	16	505
400	16"	600		290	594	515	26	16	565
450	18"	600		320	649	565	26	20	615
500	20"	600		358	697	620	26	20	670
600	24"	600		420	799	725	30	20	780
700	28"	700		448	909	840	30	24	895
800	32"	800		508	1019	950	33	24	1015
900	36"	900		558	1119	1050	33	28	1115
1000	40"	0.6		1000	615	1199	1120	33	28
1200	48"		1200	728	1419	1340	33	32	1405
1400	56"		1400	815	1700	1560	35	36	1630
1600	64"		1600	915	1990	1760	35	40	1830
1800	72"		1800	1023	2110	1970	39	44	2045
2000	80"		2000	1133	2320	2180	42	48	2265

Electromagnetic Flow Meter

Model Selection >>>

PMF-050-1-1-2-16-4-1-1-0-1-2-1-N

Lining Material

1. Neoprene (CR) ($\leq 80^{\circ}\text{C}$)
2. Polyurethane (PU) ($\leq 80^{\circ}\text{C}$)
3. FVMQ ($\leq 80^{\circ}\text{C}$)
4. F4/PTFE ($\leq 120^{\circ}\text{C}$)
5. F46/PFA ($\leq 120^{\circ}\text{C}$)

Media Temperature

1. $\leq 80^{\circ}\text{C}$
2. $\leq 120^{\circ}\text{C}$

Stand for: PMF Electromagnetic flow meter, Diameter is DN50, clean water, integrated, 24 VDC power supply, pressure is 1.6Mpa, lining material is F4/PTFE, media temperature is lower than 80°C, Electrode material is stainless steel 316L, 4-20mA+PULSE+RS485, grounding electrode + flange grounding protection, cable length is 10m, accuracy is 0.5.

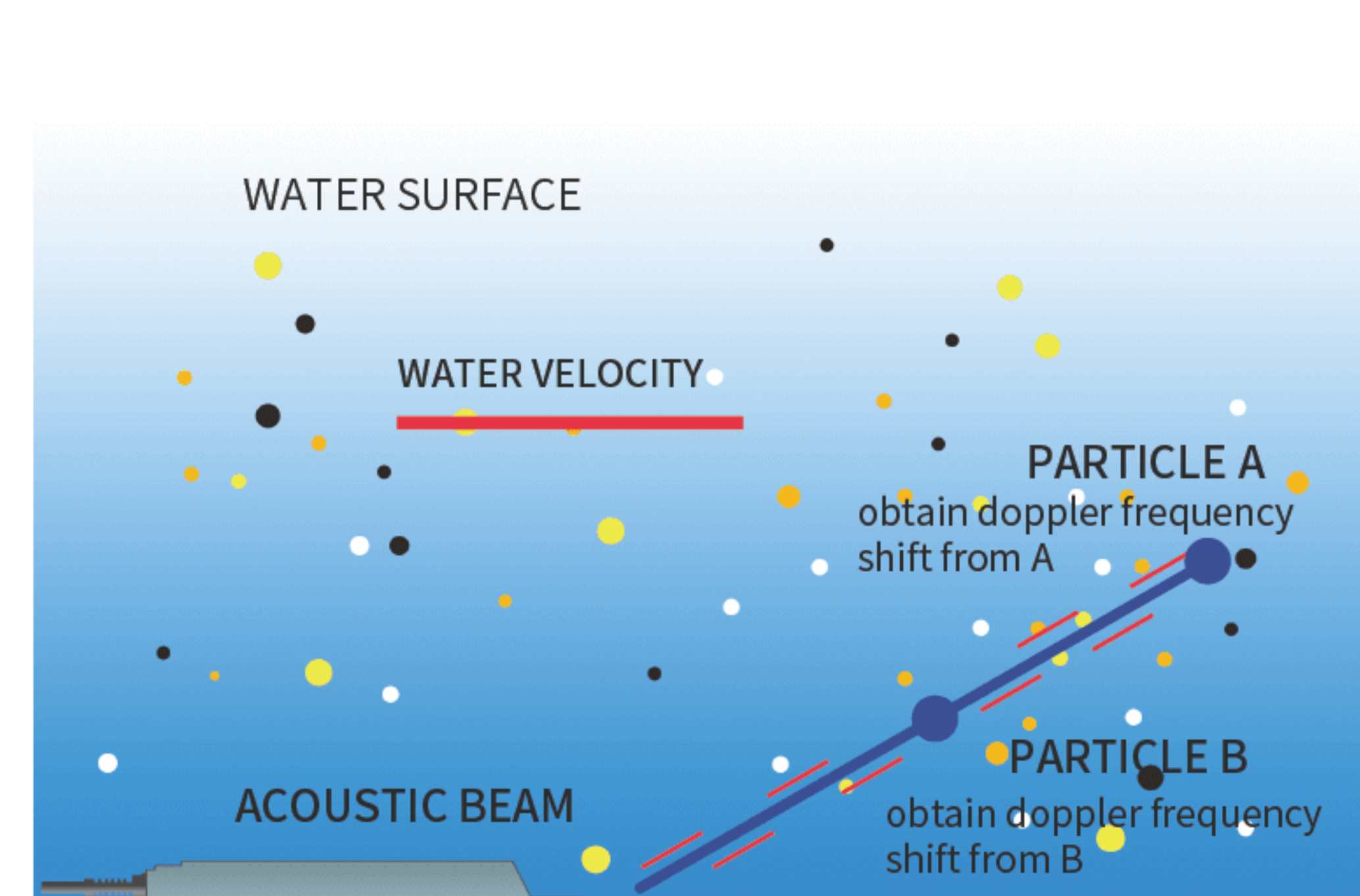
Panda POF Series

Partially Filled Pipe & Open Channel Flow Meter

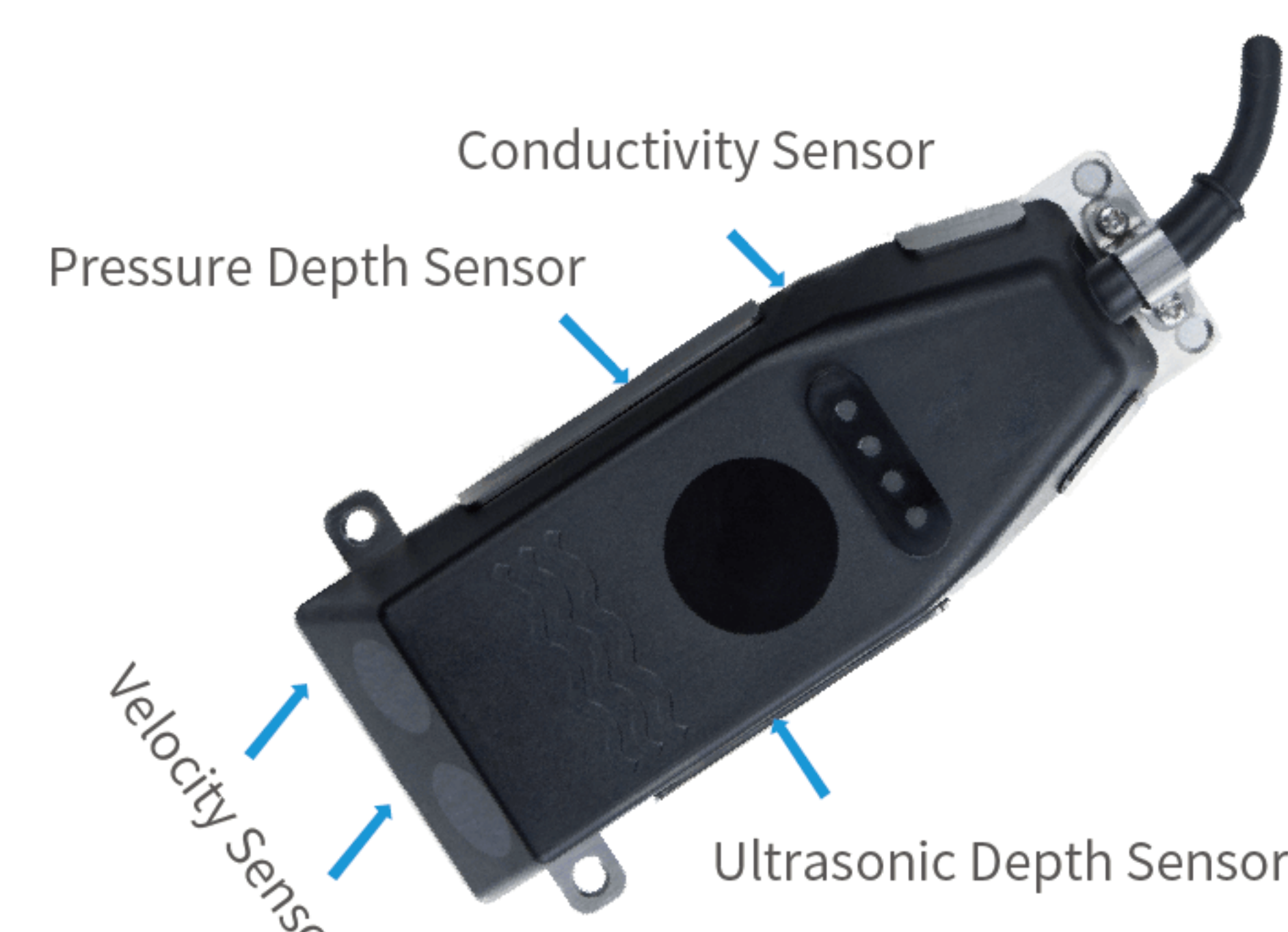
Working Principle >>>

· Velocity Measurement

Utilizes doppler ultrasonic principle: any moving liquid in pipeline has discontinuous turbulence. Turbulence may be caused by particles, air bubbles or turbulent surface. The turbulence makes the reflected acoustic wave occur doppler frequency shift Δf . The doppler frequency shift Δf is a function of velocity. So it is not suitable for pure water without any air. Also if too many particles or air bubbles, the acoustic wave and pipe sectional area will be influenced.



· velocity working principle figure



· depth working principle figure

· Depth Measurement

Pressure sensor is mounted at the bottom of or near water area to measure the fluid pressure, referring to the power signal cable hole atmosphere pressure and then liquid depth can be calculated by the pressure. At the same time pressure sensor is designed in special shapes, in order to reduce the influence of velocity. but it's worthy to pay attention when velocity $> 2\text{m/sec}$.

· Flow Calculator

fluid flow formula : $Q=V \cdot S$

V—liquid velocity, S—liquid sectional area

S function of liquid height and pipe inner diameter or open channel width, $S=f(D \cdot h)$

D—width(pipe inner or channel)

h—height

Panda POF Series

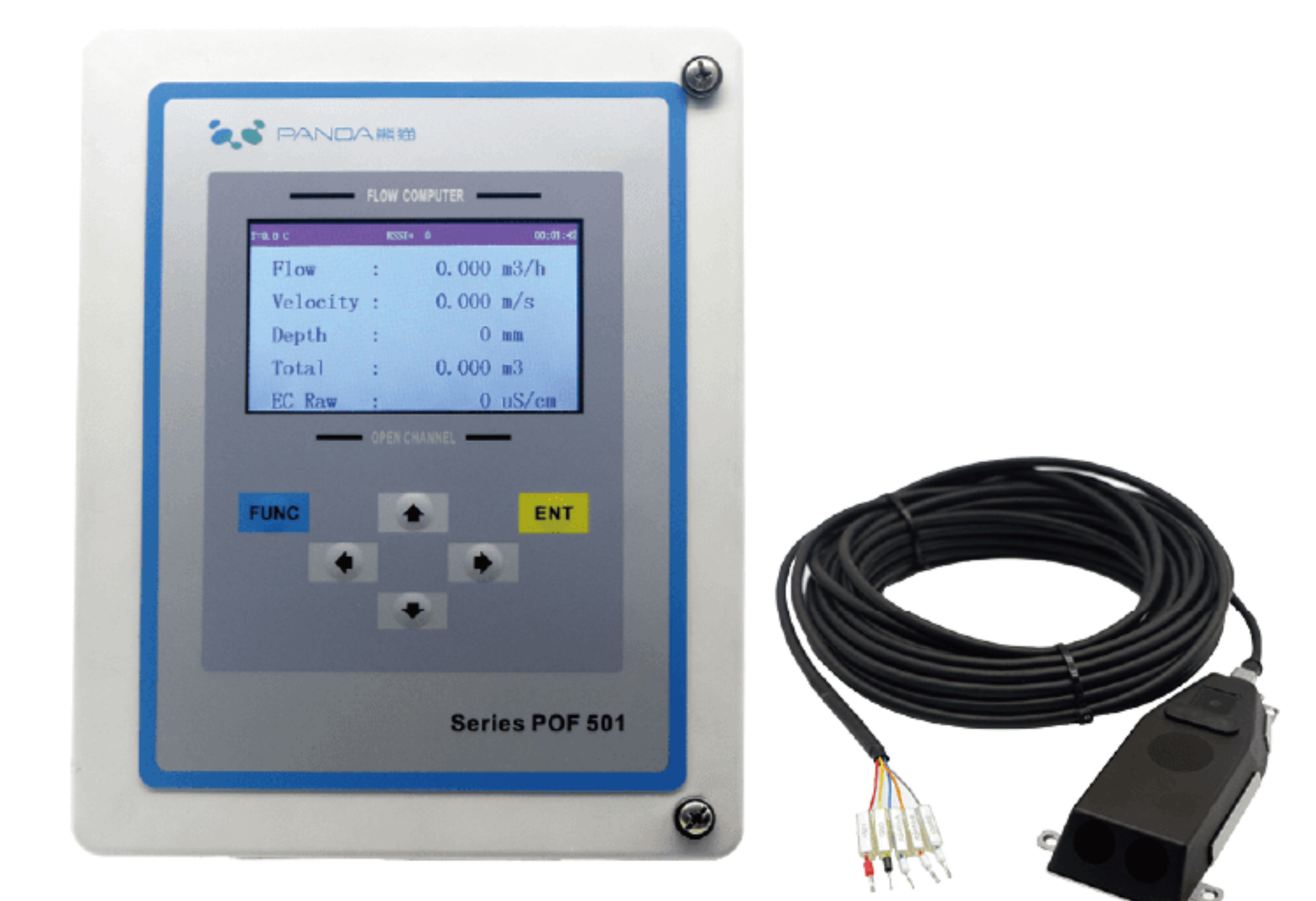
Partially Filled Pipe & Open Channel Flow Meter

Summary >>>

POF series flow meter is designed to measure velocity and flow for partially filled pipe and open channel stream or river. It utilizes Doppler ultrasonic theory to measure fluid velocity. According to pressure sensor, the flow depth and sectional area can be obtained, finally the flow can be calculated. POF transducer has the functions of conductivity test, temperature compensation, and coordinate correction. It is widely applied in measuring sewage, waste water, industrial effluents, stream, open channel, residential water, river etc. Also it is applied in monitoring sponge city, urban black odor water and river & tide research.



Portable Model



Wall-mounted Model

Features >>>

- The Meter Can Programme And Measure Any Shapes Of Open Channel & Partial Filled Pipe
- By 20 Coordinate Points
- Velocity Range 0.02-12m/s, Accuracy $\pm 1.0\%$
- Bi-directional Measuring Velocity, Positive Flow And Negative Flow
- Depth Measurement By Pressure Sensor And Ultrasonic Sensor, Accuracy $\pm 0.1\%$
- Built-in Coordinate Correction Function
- Standard 4-20mA, RS485/MODBUS Output, Opt.GPRS
- Available Configure Data Logger With SD Card

Panda POF Series

Partially Filled Pipe & Open Channel Flow Meter

Measuring following datas:

Velocity, Flow, Depth (Ultrasonic), Depth (Pressure), Temperature, Electrical Conductivity (EC)

· Sensor Specification

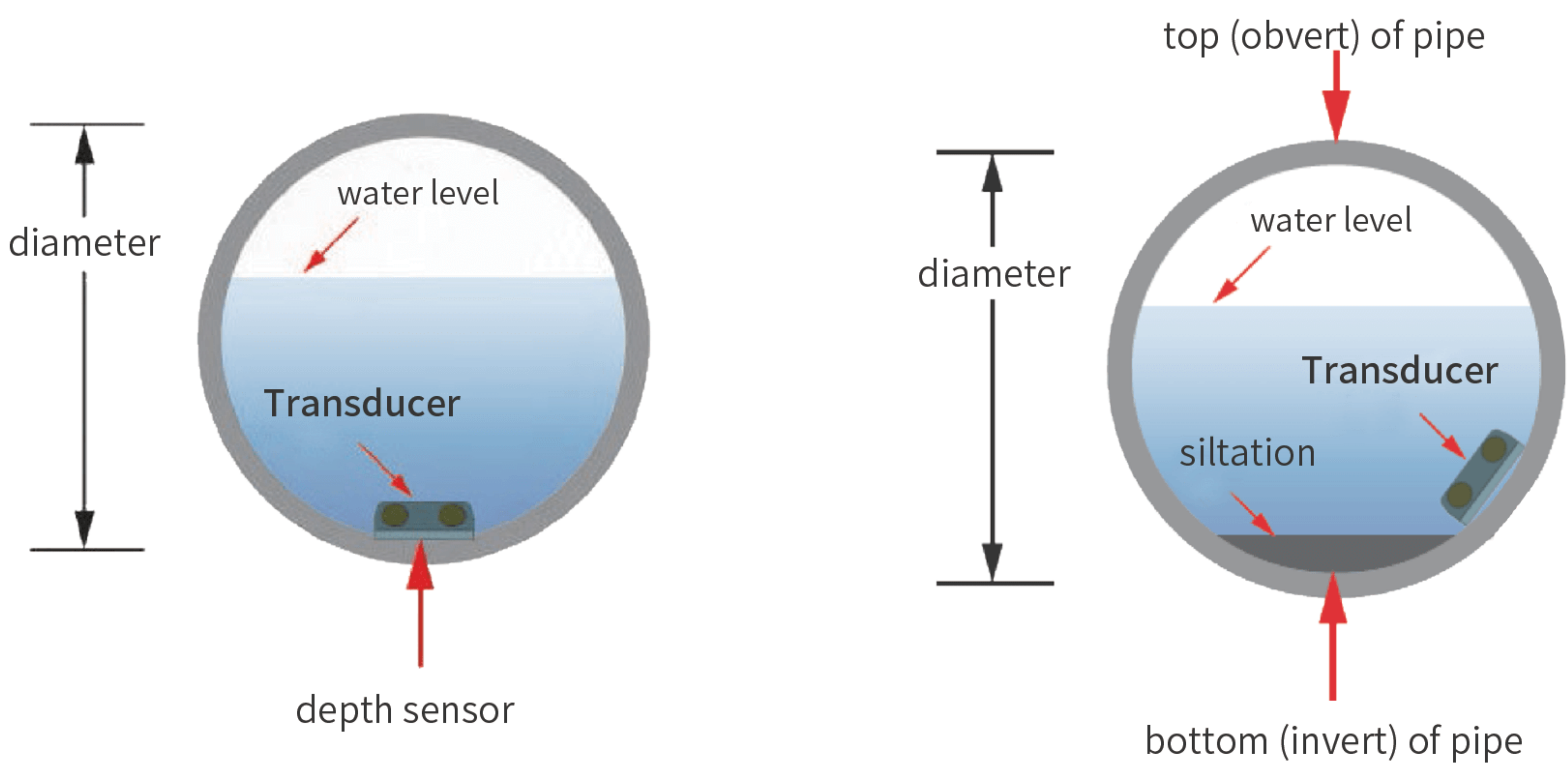
Flow Rate	Range	20mm/s-12m/s Bi-directional Measuring, Default 20mm/s to 1.6m/s signal-directional measurement
	Accuracy	±1.0% typical
	Resolution	1mm/s
Ultrasonic Depth	Range	20mm to 5000mm (5m)
	Accuracy	±1.0%
	Resolution	1mm
Pressure level	Range	0mm to 10000mm (10m)
	Accuracy	±1.0%
	Resolution	1mm
Temperature	Range	0 ~ 60°C
	Accuracy	±0.5°C
	Resolution	0.1°C
Conductivity	Range	0 to 200,000 us/cm
	Accuracy	± 1.0% typical
	Resolution	±1us/cm
Tilt	Range	±70° Vertical and horizontal axis
	Accuracy	±1° angles less than 45°
Communication	SDI-12	SDI-12 v1.3 Max.cable 50m
	Modbus	Modbus RTU Max.cable 500m
Display	Display	Velocity, flow, depth
	Application	Pipe, open channel, natural stream
Environment	Operation Temp	0°C ~60°C (water temperature)
	Storage Temp	-40°C ~75°C
	Protection Class	IP68
Others	Cable	Standard 15m, Max.500m
	Material	Epoxide resin sealed enclosure, stainless steel mounting fixture
	Size	135mm x 50mm x 20mm (LxWxH)
	Weight	1kg (with 15m cables)

· Calculator Specification

Installation	Wall mounted, Portable
Power Supply	AC: 85-265V DC: 12-28V
Protection Class	IP66
Operation Temp	-40°C ~75°C
Display	4.5 inch LCD
Output	Pulse, 4-20mA (flow rate, level) , RS485(Modbus) Opt. Data logger, GPRS
Weight	2.4kg
Data Logger	8GB
Application	Partial filled pipe: 150mm-6000mm Open channel: channel width >200mm

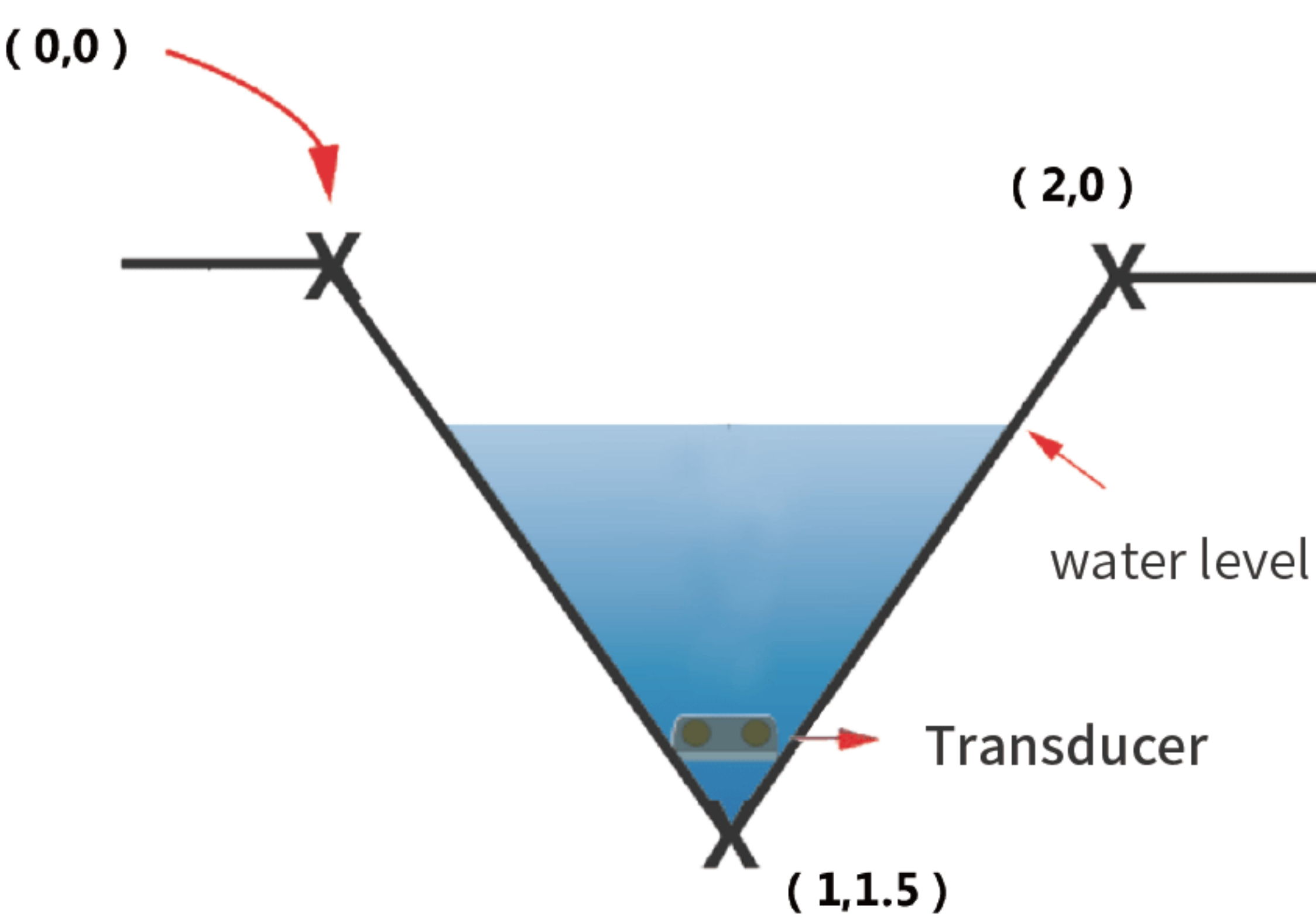
Panda POF Series

Partially Filled Pipe & Open Channel Flow Meter

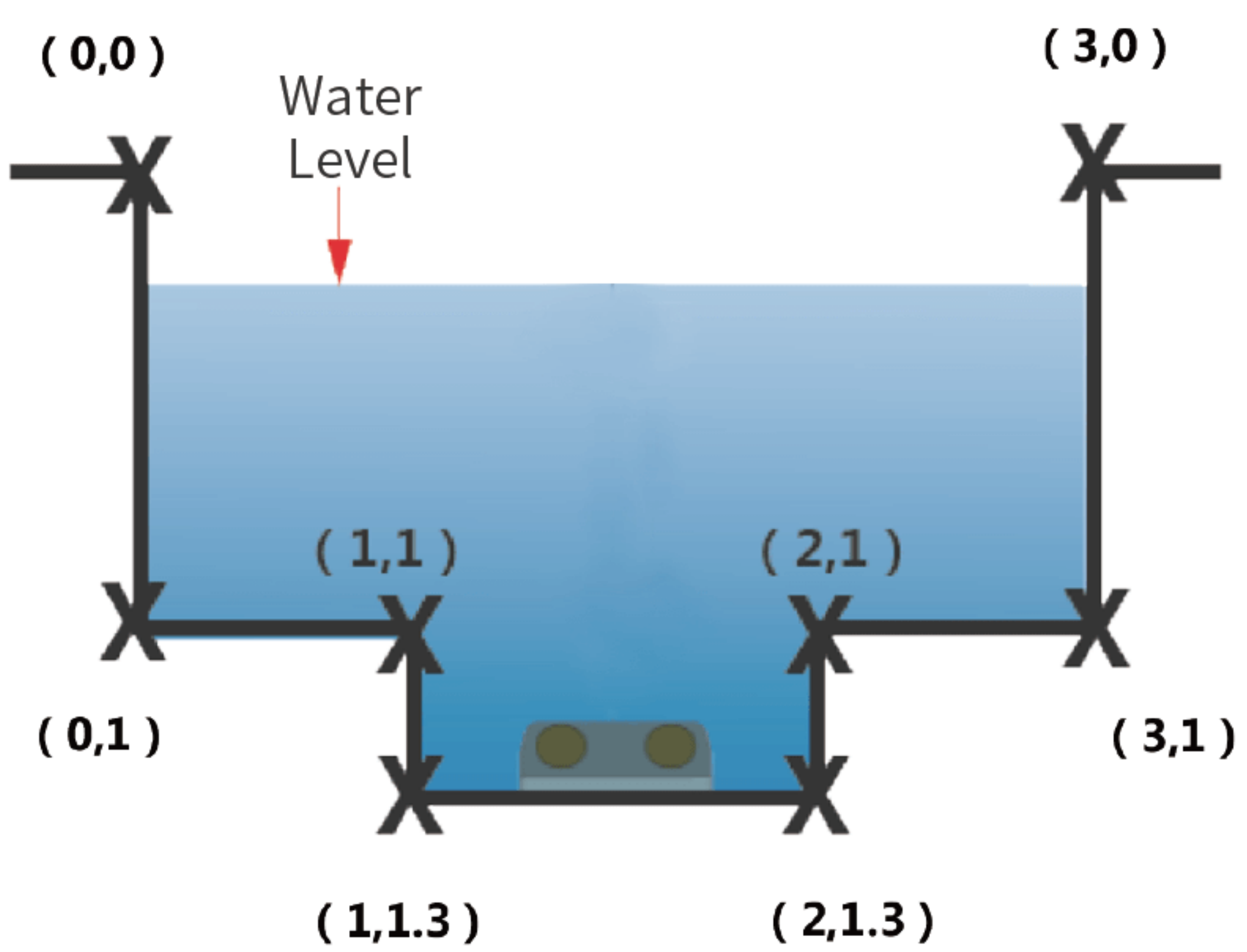


Partial Filled Pipe

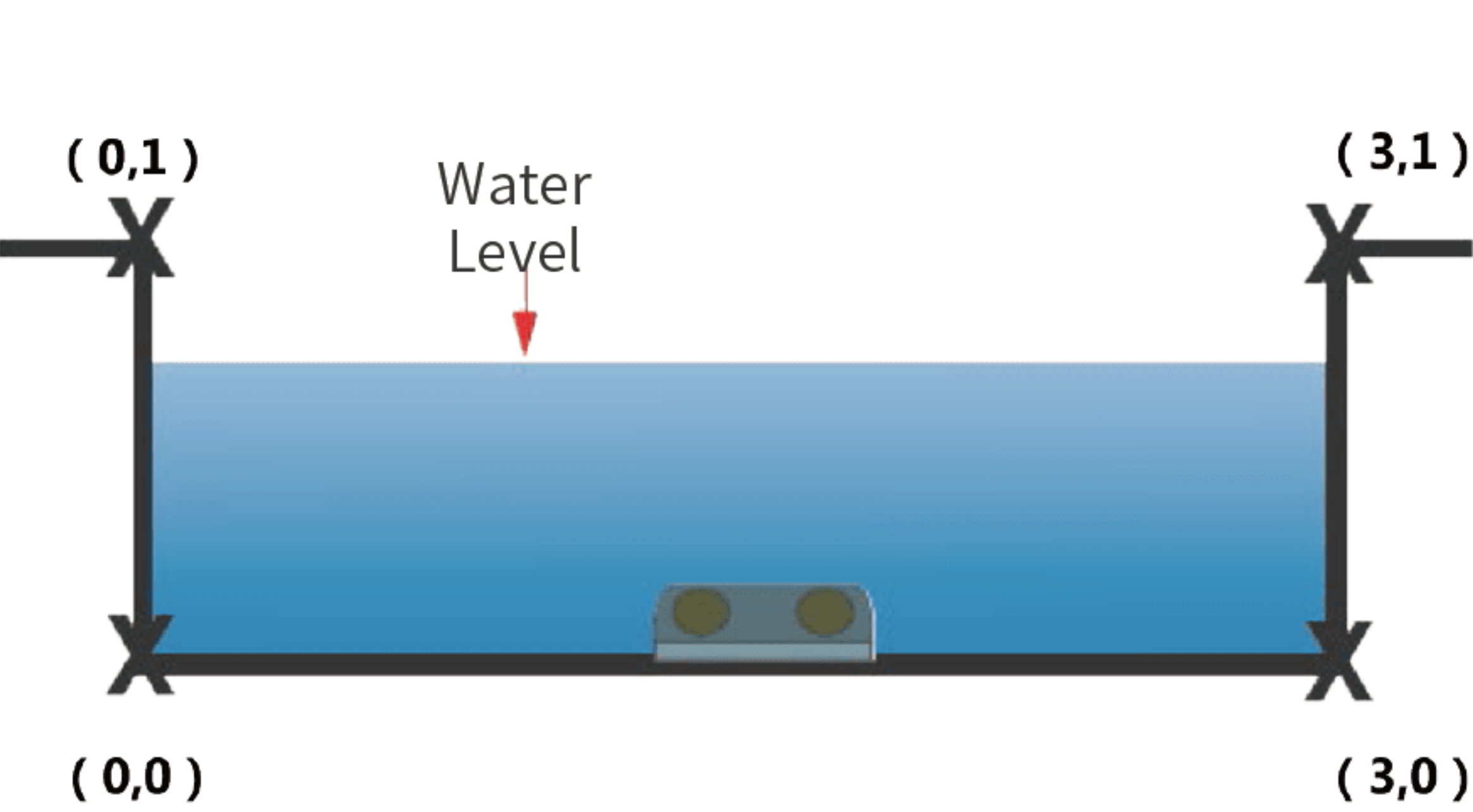
Pipe with siltation on button



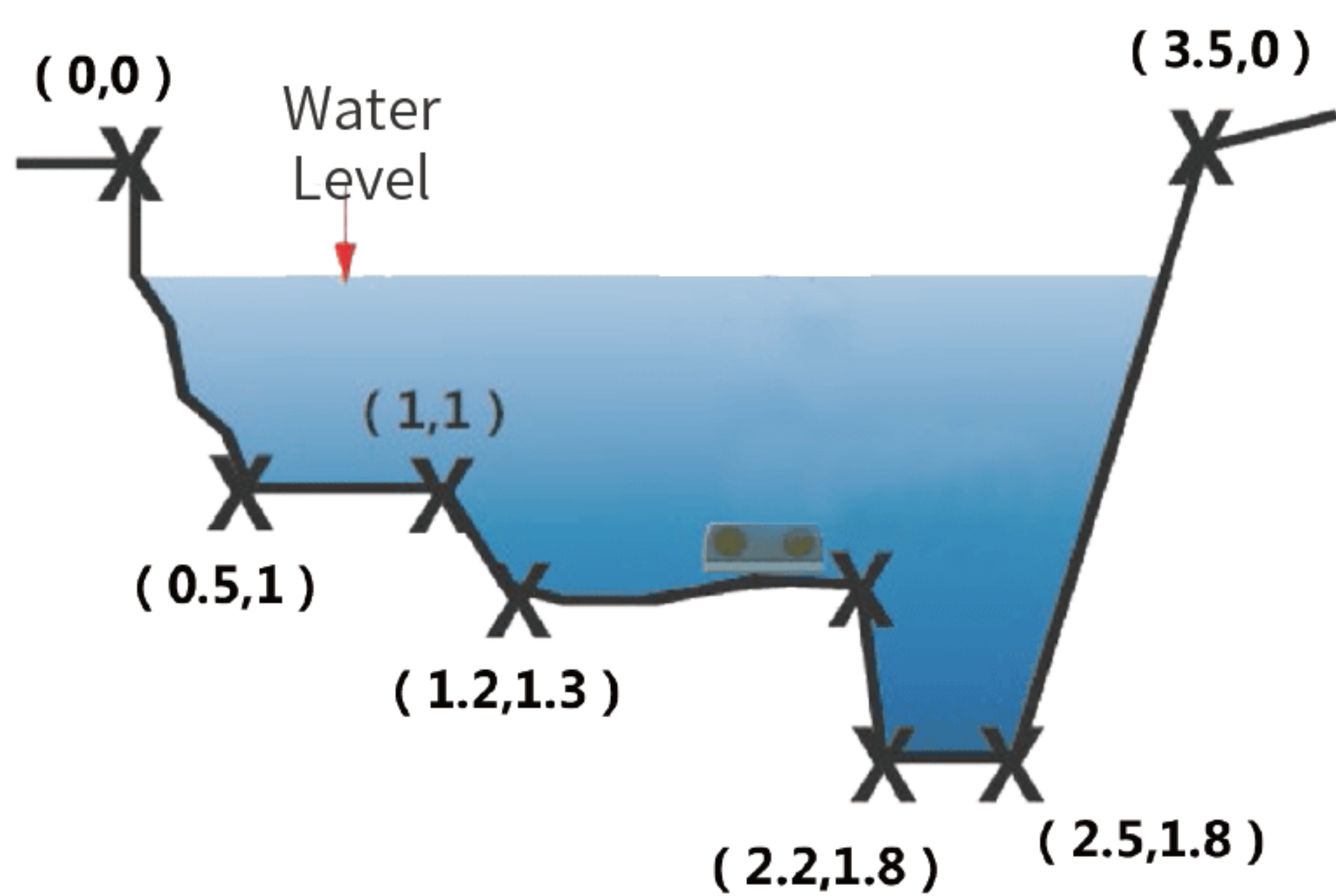
V-Notch Shape Channel



Polygonal Channel



Rectangular Channel



Irregular Shaped Channel

Panda POF Series

Partially Filled Pipe & Open Channel Flow Meter

Model Selection >>>

POF - 501 - A - C - 2H - 15						
Model	POF Doppler Partially Filled Pipe & Open Channel Flow Meter					
Mounting Type			Cable Length	Level Range	Output	
Power Supply			15m Std. 15m Xm Others	2H. 0 to 2m 5H. 0 to 5m	N. None C. 4-20mA F. RS485 D. Data Storage	

For Example:POF-501-A-C-2H-15

Stands for:Wall mounted doppler partially filled pipe & open channel flow meter, 85-265VAC power supply, 4-20mA, 2m level range, cable length is 15m.

Panda POF Series

Weir Type Open Channel Flow Meter

Summary >>>

The series ultrasonic open channel flow meter is non-contact instrument, It utilizes the principle of sound wave reflection to measure the liquid level in the weir and obtains the water flow through the weir by calculation.



Transmitter and Transducer



Parshall Flume

Technical Features >>>

- High Measurement Accuracy
- Anti-interference Color Touch Screen, Multi-line Parameters Display
- Transducer Is IP68 Protection Class
- Different Communication Output, Data Remote Transmission
- ISO Standard: Parshall Flume, Rectangular Weir, Triangular Weir, Customized Weir
- Different Level Range Transducer Is Optional
- Fully Sealed Structure Probe, Strong Corrosion Resistance
- Low blind area, high sensitivity, high stability, and strong anti-interference ability
- Support Custom Mathematical Formula Flow Relationship
- English Version Is Optional
- Built-in Data Real-time Curve And Data Storage Function, Data Can Be Exported(Optional)

Panda POF Series

Weir Type Open Channel Flow Meter

Specification >>>

· Transmitter

Level Resolution	1mm
Weir Type	Parshall Flume NO. 1~25,90°Triangular Weir, Rectangular Weir(25/50/75/100cm)
Display	5寸800*480 TFT 65k Color Touch Screen
Level Error	1mm or 0.2% of Full Range(Take Max.Value, Clam Water)
Instantaneous Flow	0.000~999999 L/s,m³/h or m³/min
Max.Cumulative Flow	99999999.9 m³/h
Analog Signal Output	Isolated DC 4~20mA current, corresponding to the instantaneous flow or level can be set
Load Resistance	0~5000
Communication Output	Support Two RS485 Serial Communication, Standard MODBUS-RTU Protocol
Relay Output	Upper and Lower Limit Alarm and Control (Instantaneous Flow and Water Level)
Alarm	High, Low, Pulse Output and Fault Alarm
Relay Mode	Normally Open(The software can be set to the normally closed status, and the power will be disconnected)
Relay Quantity	2 Pieces
Relay Power	5A 250VAC/30VDC
Power Supply	Dual Power DC:DC9~26V AC:220V(±20%)0.1A
Power Consumption	≤4w(Maximum screen brightness and all loads are fully working)
Measurement	1 Second(Adjustable)
Data Export	MicroSD Card (Optional Function)
Environment Temp	-20°C~+70°C
Enclosure Material	ABS
Protection Class	IP67
Cable Gland	PG9/PG11/PG13.5
Parameter Set By	Touch Screen
Installation	Wall Mounted

· Transducer

Range	4m, 6m
Blind Area	(From Probe Emitting Surface) 4m: 0.20m, 6m: 0.25m
Environment Temp	ABS/PVC Probe: -40°C~+75°C PTFE/PVDF Probe: -40°C~+100°C
Enclosure Material	ABS/PVC/PTFE/PVDF
Protection Class	IP68
Anti-Pressure	4m/6m/8m/10m Probe: 0.07MP~0.3 MP (abs.) 12m/20m/30m Probe: 0.07MP~0.2 MP (abs.)
Cable Length	Std.10m (Customized)
Emit Angle	5° (3db)/12m Probe 8° (3db)/Other Range Probe
Lengthen Probe	20cm or others (Optional For Cold Area)
Installation	Thread, Flange or Mounting Fixture

Panda POF Series

Weir Type Open Channel Flow Meter

Model Selection >>>

POF502 - A - F - 10 - 4F					
Model POF502 Weir Type Open Channel Flow Meter					Level Range 4H:4m 6H:6m
Power Supply A 85-265VAC+24VDC D Solar Power					
Output C:4-20mA F:RS485 D: Data Storage					Cable Length 10: Std.10m N: Others

For Example: POF502-A-F-10-4H

Stands For: POF502 Weir Type Open Channel Flow Meter, 220VAC+24VDC Power Supply, RS485 Output, Cable Length is 10m, Level Range is 4m.

Model Selection (For Parshall Flume) >>>

POF503 - S - 01			
Model POF503 Parshall Flume			Level Range 01:0.025m 02:0.051m 03:0.076m 04:0.152m 05:0.228m
Material S:Stainless Steel G: Fiberglass			

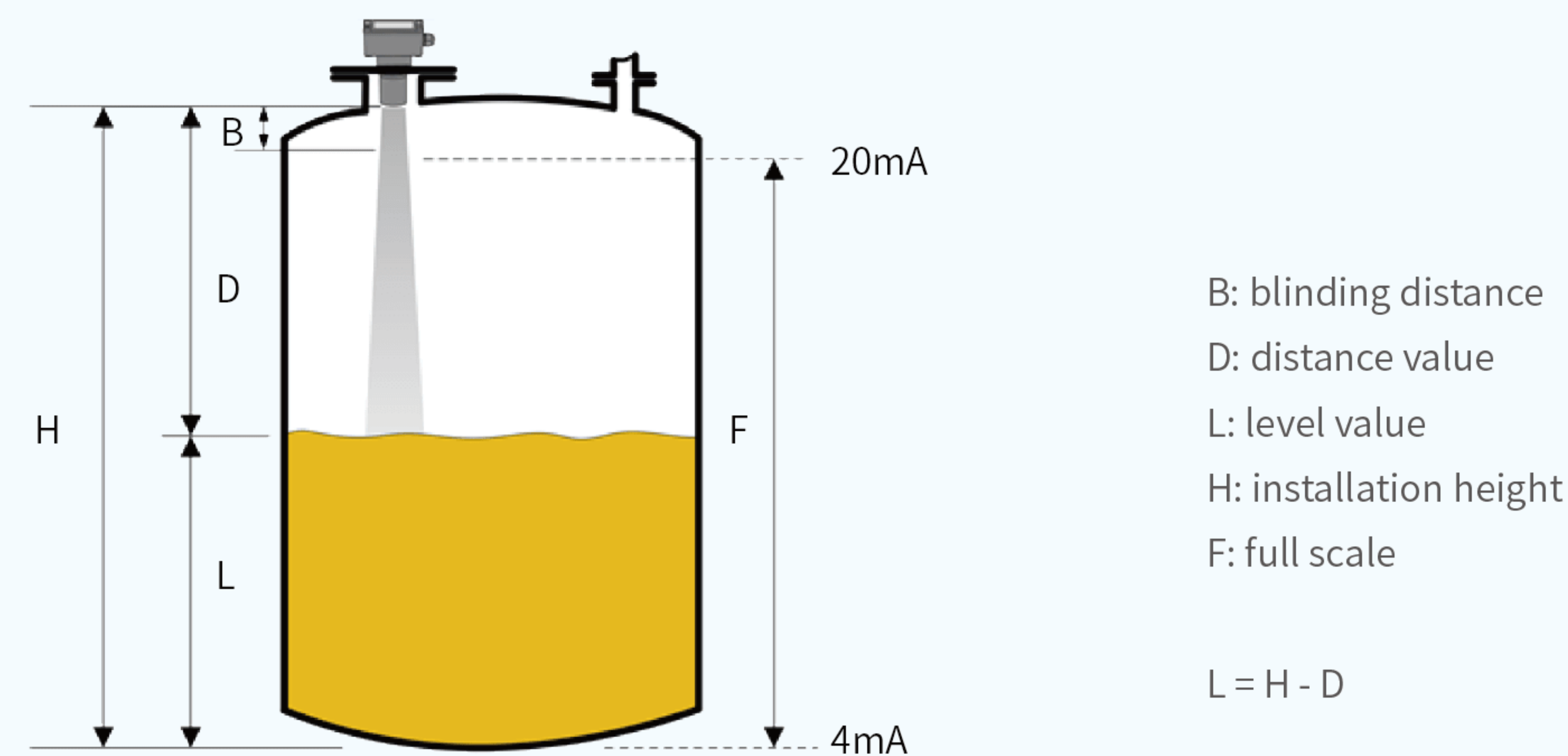
For Example: POF503-S-01

Stands For: A Separate Parshall Flume, Material is Stainless Steel, Throat Width is 0.025m.

Panda PUL Series

Ultrasonic Level Meter

Working Principle >>>



Ultrasonic level meter emit ultrasonic wave by sensor, and the wave are received by the same sensor after it is reflected from the liquid surface. According to the propagation time t , the distance D between sensor and liquid level can be calculated by the propagation time t and acoustic velocity V . The level L is equal mounted height H minus distance D .

As following:

$$L = H - D \quad D = V \cdot t / 2$$

Remark: L:level D: distance value V:velocity t:time

Technical Features >>>

- Full Sealed Structure,ip68 Protection Class, strong Corrosion Resistance
- Low Blinding Zone, high Sensitivity, super Anti-interference.
- Rs485 Communication Interface, standard Modbus Protocol
- Strong Acoustic Wave Ensure Reliable And Stable Measurement
- Hart Output Is Optional, according To Hart7.0 Version
- Simple To Set Hart Parameter By Keypad
- The Big Show Window Of Lcd Is Easy To Debug And Obverse
- Over Voltage Over Current Protection, thunder And Lightning Protection
- Intelligent Signal Processing Technology, suitable For Various Of Working Condition
- Complete Plastic Probe Is Acid And Alkali Resisting,suitable For Harsh Environment

Panda PUL Series

Ultrasonic Level Meter

Summary >>>

Non-invasive ultrasonic level meter utilizes ultrasonic signal reflection theory to measure liquid or solid level. Transmitter is whole full sealed plastic structure. It is widely applied in metallurgy, chemical, electricity, oil, mining etc.

Blinding zone: the transmitting and reversing wave will overlap when the probe is closed to the liquid surface. So the level meter cannot work within a certain distance. This distance is defined as blinding zone.



Specification >>>

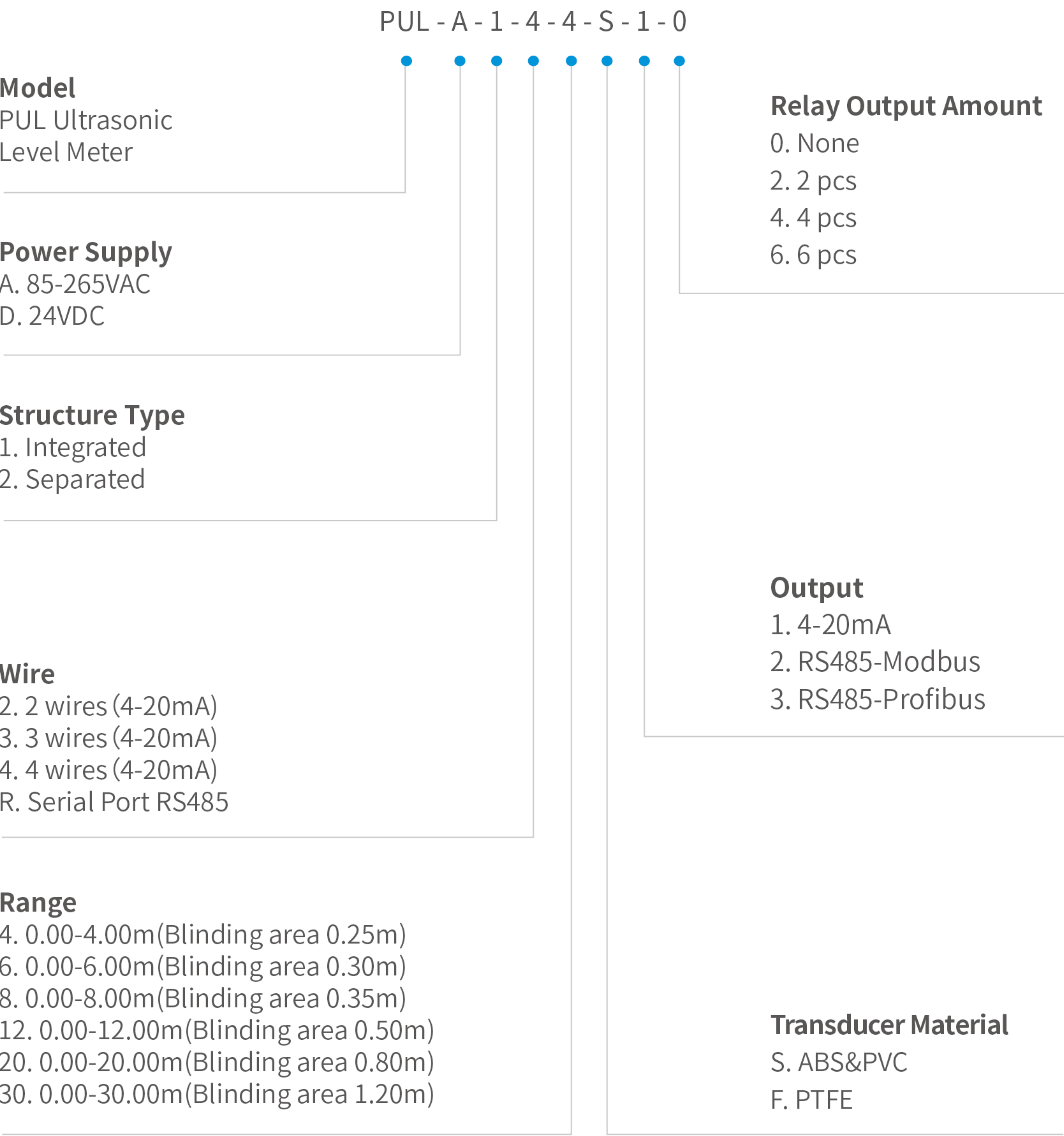
· Transmitter

Measuring Principle	Ultrasonic
Resolution	1mm
Accuracy	0.2% (Full span)
Communication	RS485 series, standard MODBUS protocol
Power Supply	AC: 85-265V DC: 24V (select by user)
Measuring Cycle	1second (adjustable)
Range	4m 0.00-4.00m (blinding zone 0.25m)
	6m 0.00-6.00m (blinding zone 0.30m)
	8m 0.00-8.00m (blinding zone 0.35m)
	12m 0.00-12.00m (blinding zone 0.50m)
	20m 0.00-20.00m (blinding zone 0.80m)
	30m 0.00-30.00m (blinding zone 1.20m)
Above data is effective for liquid measurement. The effective measuring distance will be reduced to2/3-1/2 when media is solids.	
Temperature Range	-40°C ~ +75°C
Protection Class	IP68
Enclosure Material	ABS/PVC/PTFE/PVDF
Probe Anti-pressure	0.1Mpa
Probe Cable	Standard 10m(Max.30m), opt. separated
Emit Angle	10°(3db)
Installation	Thread or flange

Panda PUL Series

Ultrasonic Level Meter

Model Selection >>>



For Example:PUL-A-1-4-4-S-1-0

Stands for:PUL Ultrasonic Level Meter, 220VAC Power supply, integrated, four wires,range is 0.00-4.00m(blinding area 0.25m), transducer material is ABS&PVC, 4-20mA, without relay output.

Ultrasonic Level Meter PUL-S

Ultrasonic Level Meter For Water Tank

Features >>>



- IP68 Protection class, High corrosion resistance .
- Low blind area, high sensitivity, and strong anti-interference ability.
- Intelligent signal processing, 4-20mA/RS485 output optional.
- Powerful sound wave emission and reliable level measurement.
- Support Bluetooth connection to Android mobile app for on-site debugging.
- All-plastic probe, acid and alkali resistant, suitable for harsh environments.
- Optional two-wire and four-wire transmitters, simple structure.

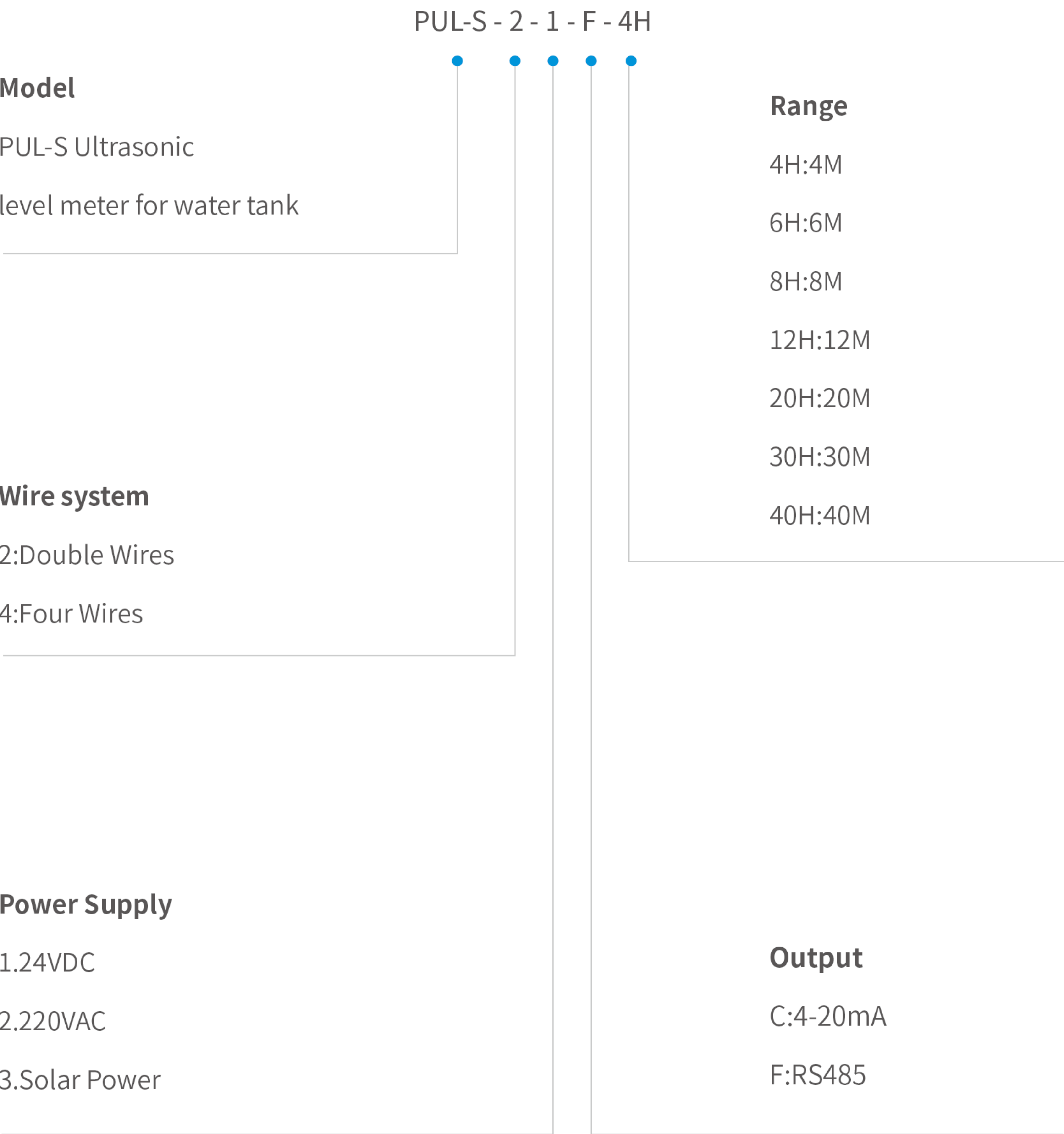
Technical Features >>>

Accuracy	0.3% of nominal range (in air, on a stationary surface, with standard signal strength)		
Power Output	DC4~20mA((corresponding to the level value)		
Output Load	0~500Ω		
Output Resolution	0.03% of actual range		
Temperature Difference Range	-35℃~+75℃		
Temperature Compensation	Full range automatic		
Pressure Difference Range	-0.04MP~+0.2 MP		
Detection Schedule	1.5S		
Sound Beam Angle	8°(3db)		
Power Supply	DC24V(±10%),30mA		
Cable Diameter	F6mm		
Probe lead cable	Standard length 10 meter (available for customized)		
Probe housing material	ABS/PVC/PTFE/PVDF		
Electronic Unit Housing Material	ABS Plastic		
Protection Class	IP68		
Installation	Thread, Flange or Bracket		
Range(m)	Calmer Liquids, Flat Solids:		
	4.00m、6.00m、8.00m、12.00m、20.00m、30.00m、40.00m		
	Violent Fluctuations, Volatile Liquids:		
Blind Area	3.00m、4.00m、6.00m、8.00m、12.00m、20.00m、30.00m		
	4m:0.25m	8m:0.35m	20m:0.80m
	6m:0.30m	12m:0.50m	30m:1.20m
(The above data are for PVC/ABS probes. For PTFE/PVDF probes, add 0.05m to the above data.)			

Ultrasonic Level Meter PUL-S

Ultrasonic Level Meter For Water Tank

Model Selection >>>



For Example:PUL-S-2-1-F-4H

Stands for:PUL-S Ultrasonic level meter for water tank, Double wire, 24V Power supply, RS485 Output, Range 4 Meter.

Panda PHM Series

Ultrasonic Heat Meter DN15-DN40

Features >>>



- No Moving Parts, No Wear
- Heat/Cold Measurement.
- With Self-Diagnosis Function: Flow Sensor Fault Alarm, Temperature Sensor Open Circuit And Short Circuit Alarm, Measurement.
- Over-range Alarm, Battery Under-Voltage Alarm.
- The Application Of Intelligent Data Error Correction Technology, High Measurement Accuracy and Stability.
- Powered by Built-In Lithium Battery and Can Working More Than (6+1) Years.
- With an Optic Interface. It Supports On-Site Reading by Handheld Infrared Meter Reading Tools.
- Low Power Consumption (Static Power Consumption Less Than 6uA).
- High-Definition Wide-Temperature LCD Display.
- Built-In M-bus Communication Module, Optional NB-IoT, RS485 Remote Communication Output.

Application: Suitable for heat (cold) metering in unit residential buildings, meeting heating companies’ needs for accurate metering and settlement of end users and customers’ needs for big data.

Technical Specification >>>

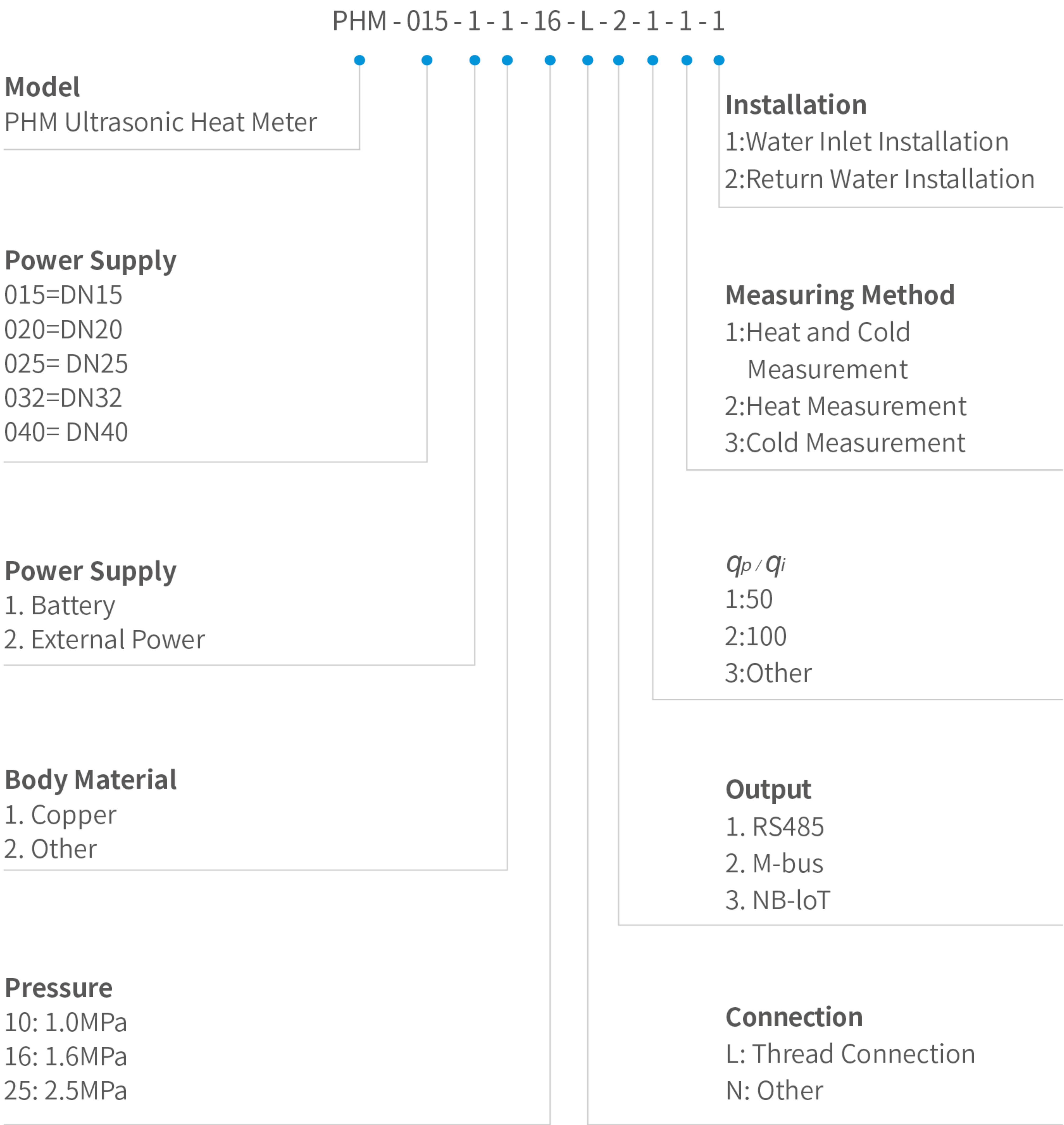
Accuracy Class	Class 2
Temperature Range	(4~95)°C
Temperature Difference Range	(2~75)K
Heat And Cold Metering Switching Temperature	25°C
Maximum Permissible Working Pressure	1.6MPa
Allowable Pressure Loss	≤25kPa
Environment Category	Type B
Nominal Diameter	DN15~DN40
Permanent Flow Q_p	DN15:1.5 m³/h DN20:2.5m³/h DN25:3.5m³/h DN32:6.0m³/h DN40:10m³/h
Q_p / Q_i	R50(Standard), R100(Option)
Q_S / Q_P	2

Nominal Diameter DN	Size				Meter Thread Dimensions		Connect Tube Dimensions			Temperature Measurement Accessories	
	Length L (mm)	Width M (mm)	Height H (mm)	Weight (kg)	M Meter Thread	Thread Length L (mm)	Connect Tube Length L (mm)	M Connect Tube Thread	Thread Length L (mm)	Way of Installation	Length (mm)
15	110	75	100	0.5	G ¾B	12	43	R½	15	Temperature Measurement Tee (Ball Valve)	60
20	130	75	120	0.7	G1B	14	50	R¾	16		60
25	160	75	135	0.86	G1 ¼B	16	58	R1	18		60
32	180	75	155	1.1	G1 ½B	18	58	R1 ¼	20		65
40	200	75	170	1.3	G2B	18	59	R1 ½	22		65

Panda PHM Series

Ultrasonic Heat Meter DN15-DN40

Model Selection >>>



For Example: PHM-015-1-1-16-L-2-1-1-1

Stands for: PHM Ultrasonic Heat Meter, pipe size DN15 , Battery Supply, Copper tube material, Pressure 1.6MPa, Thread Connection, M-bus output, q_p / q_i 50, heat and cold dual metering, water installation.

Panda PHM Series

Ultrasonic Heat Meter DN50-DN400

Features >>>



- Ultra-Low Power Consumption (Less Than 6uA at Rest)
- Flow Sensor Fault Alarm, Temperature Sensor Fault Alarm, Battery Under Voltage Alarm
- Intelligent Data Error Correction, High Stability
- Built-In Lithium Battery Power Supply, Service Life of More Than 10 Years
- High Definition LCD Display Interface
- Default RS485, Optional NB-IoT Remote Communication Output
- Both Heat and Cold Measurement

Application: Suitable for public buildings, building heat measurement, heat exchange station measurement, central heating (cooling) system heat measurement, a variety of heat distribution method of total measurement.

Technical Specification >>>

Accuracy Class	Class 2
Temperature Range	(4~95)°C
Temperature Difference Range	(2~75)K
Heat And Cold Metering Switching Temperature	25°C
Maximum Permissible Working Pressure	1.6MPa
Pressure Loss Is Allowed	≤25kPa
Environment Category	Type B
Nominal Diameter	DN50~DN400
Permanent Flow q_p	Diameter DN50 DN65 DN80 DN100 DN125 DN150 DN200 DN250 DN300 DN350 DN400 Flowing 15 25 40 60 100 150 250 400 600 800 1000
q_p / q_i	R50(Standard), R100(Optional)
q_s / q_p	2

Installation Dimensions >>>

Nominal Diameter DN	Meter Body Length L (mm)	Flange Connection			Flange Thickness C (mm)
		Flange Outer Diameter D2 (mm)	Threaded Hole Center Diameter D1 (mm)	Connecting Bolt	
50	200	165	125	4*M16	20
65	200	185	145	4*M16	20
80	225	200	160	8*M16	20
100	250	220	180	8*M16	22
125	250	250	210	8*M16	22
150	300	280	240	8*M20	24
200	345	335	295	12*M20	24
250	445	405	355	12*M24	26
300	500	460	410	12*M24	28
350	500	520	470	16*M24	28
400	500	580	525	16*M27	28

Panda PHM Series

Ultrasonic Heat Meter DN50-DN400

Model Selection >>>

Example Model Selection
PHM Ultrasonic Heat Meter

Power Supply

050= DN50
065= DN65
080= DN80
0100=DN100
XXX: etc

Power Supply

1.Battery
2:External Power

Body Material

1:Stainless Steel
2:Other

Pressure

10:1.0MPa
16:1.6MPa
25:2.5MPa

For Example:PHM-050-1-1-16-F-2-1-1-2

Stands for:PHM ultrasonic heat meter, Pipe size DN50 , battery supply, stainless steel pipe , pressure 1.6MPa, flange connection, M-bus output, q_p / q_i 25, heat and cold dual measurement, water return installation.

PHM - 050 - 1 - 1 - 10 - F - 2 - 1 - 1 - 2

Installation

1:Water Inlet Installation
2:Return Water Installation

Measuring Method

1:Heat and Cold Measurement
2:Heat Measurement
3:Cold Measurement

q_p / q_i

1:25
2:50
3:Others

Output

1.RS485
2.M-bus
3.NB-IoT

Connection

F: Flange
N:other

Smart Meter Qualification (Partial)

