FUJIDHARMA ELECTRIC
Connecting to smart world

FCWM - P2 series

Ultrasonic Water

User Manual

DN15 / DN20

PT. FUJI DHARMA ELECTRIC
Jl. Rawagelam I/10, Kawasan Industri Pulogadung Jakarta Timur
Ph. : 021-4600143 Fax. : 021-4610338
email : admin@fujidharma.co.id

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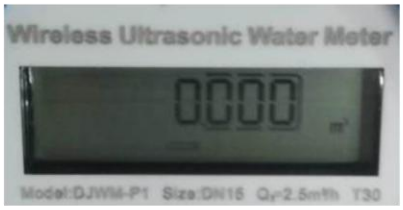
1. General descriptions

The FCWM - P2 series ultrasonic water meter is the newest developed by our company. It is an advanced and highly accurate ultrasonic water meter. With no moving parts, the FCWM - P2 is used for measurement of cold water consumption for residential applications.
The FCWM - P2 ultrasonic water measurement is based on the transit time method, and all measurements, references, readings, calculations and data communication is controlled by an advanced specially designed electronics circuit.
The FCWM - P2 presents an IP68 whole plastic casing, and with big and full information LCD, easy to read the data and see alarms.
The round shape is easy for installation, sealing and maintenance. All information is laser printed on plastic nameplate which can't be removed forever.

This ultrasonic water meter can be remote reading via wireless technology, such as wireless LoRa, LoRaWAN, and NB-IoT.
And it can be connected with a LoRa wireless valve-controlled electric valve also to be realized by remote controlled of valve switches through master station.



Features:

- ✓ Multi-flow caliber, small starting flow and high measurement accuracy;
- ✓ Built-in LoRaWAN module, low power design, measurement process is completed in meter;
- ✓ Installation without wiring, no external power supply required;
- ✓ Stable and reliable: Provides carrier-class reliability access, effectively supporting applications for Internet of Thing and smart city solutions;
- ✓ Based on LoRa wireless spread spectrum technology, it supports multi-band communication, at range 920~923 MHz;
- ✓ Long-distance transmission, non-complex environment, transmission distance>1000m;
- ✓ Low power consumption, large capacity lithium battery is used, and the service life is 8-10 years;
- ✓ IP68 waterproof design, three waterproof technology, to ensure that the water meter works properly in harsh environments;
- ✓ Working temperature 0-50 ℃;
- ✓ The water meter has built-in alarm output, reverse flow and other alarms, which is convenient for remote maintenance for the water company; the alarms for overload, small flow, and low voltage are available also.
- ✓ Reserved valve control interface, can be used as a prepaid water meter.

2. Product standard

ISO4064.1/2/3:2014 Standard for Drinking Cold Water Meters and Hot Water Meters

◆ Data Sheet for ultrasonic water meter---Flow parameter

Size	Range (Q3/Q1)	Permanent Q_3(m^3/h)	Demarcation Q_2(m^3/h)	Minimum Q_1(m^3/h)	Overload Q_4(m^3/h)
DN15	250	2.5	0.016	0.010	3.125
DN20	250	4.0	0.0256	0.016	5

Other technical data

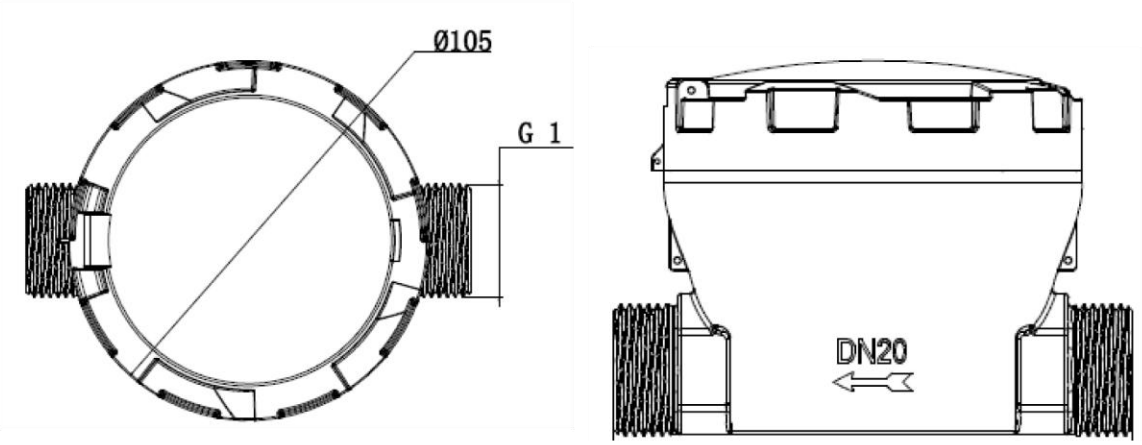
Item		Parameter	
Size		**DN15**	**DN20**
Length		**110**	**130**
Q $_3$(m^3/h)		**2.5**	**4.0**
Range (R=Q3/Q1)		**R250**	**R250**
Q start(L/h)		3	2
Pressure Loss		ΔP63	ΔP63
Accuracy		Class 2	Class 2
Max working pressure		1.6MPa	1.6MPa
Working Environment		+5℃ ~ +55℃, ≤100%RH	+5℃ ~ +55℃, ≤100%RH
Temp. class		T30/T50, default T30	T30/T50, default T30
Sensitivity to irregularity in the upstream velocity field classes		U5 (>5D)	U5 (>5D)
Sensitivity to irregularity in the downstream velocity field classes		D3(>3D)	D3(>3D)
Electromagnetic Compatibility		E1	E1
Display		LCD 8 digitals + symbols	
Content		Instantaneous flow rate (m^3/h), Accumulated flow quantity (m^3)	
Range		Accumulated flow quantity: 0m^3 ~ + 99999.999m^3	
Data Communication	Optical (IR)	Baud rate 2400bps,based on CJ/T 188 self-defined protocol	
	LoRa wireless	920~923 MHz, distance>300m, Baud rate 9600bps	
Power supply		Battery DC3.6V (continuous working above 6 years)	
Power consumption		< 0.2mW	< 0.2mW
Protection level		IP68	
Storage		-25℃ ~ +55℃	
Installation position		In-pipe	

Key parameter of LoRa/LoRaWAN wireless module for meter

Performance	Technical data
Quiescent dissipation	< 25uA
Transmitting power	< 50mW
Frequency	920~923 MHz
Transmission distance (Maximum in open environment)	> 300m
Baud rate	9600bps
Emission current	< 100mA
Receiving current	< 14mA
Wireless working mode	Timed wake-up

3. Dimensions

Diameter (mm)	DN15	DN20
Thread	G3/4B	G1B
L1(mm)	110mm	130mm
H(mm)	93mm	95mm
W(mm)	105mm	105mm



Product accessories

Coupling 2pcs, Connecting nuts 2pcs, Seal ring 2pcs, One instruction manual, One packing list

4. Annex

About the LoraWAN module built-in the smart ultrasonic water meter

✓ **Application:** Remote automatic meter reading and data uplink to the server via LoRaWAN wireless.

Electrical parameters:

Please refer electrical parameters as below table:

No.	Project	parameters				Note
		MIN	Typical	MAX	unit	
1	Power	+2.7	+3.6	+3.7	V	ER18505 or ER26500
2	Battery under voltage point	3.1		3.4	V	
3	Static operating current	9		20	uA	
4	Operating current during communication		15		mA	
5	Continuous working time	6			year	ER18500 battery, upload 2 times a day data
6	Communication distance	500		5000	m	Related to the operating environment
7	Operating temperature	0		50	℃	
8	Storage temperature	– 20		60	℃	
9	Humidity		85%			
10	Frequency	920	923	923	MHz	Support global LoRaWAN frequency plan EU868\IN865\AS923\AU915 and so on
11	Transmit power			20	dBm	130mA @868MHz
				20	dBm	130mA @923MHz
12	Receiving sensitivity			-137	dBm	@923MHz, SF12, BW125kHz

Power consumption

	Current consumption	Current		Duration		Annual power consumption(Ah)
		Value	Unit			
1	Main board static working current	20	uA			0.2
2	LoRaWAN module sleep current	20	uA			0.2
3	LoRaWAN transmit data current	120	mA	100	ms/per	0.03~0.12
4	MCU wake-up current	300	uA	1	ms/per	0.0053
5	Battery self-loss					0.1
6	Total					0.535~0.625

Note :

Based on different signal transmission parameters, the power consumption of a single report data is different.

Power consumption of at different rates

	Signal transmission parameter	Single power consumption				Annual electricity consumption(mAh)
		MIN	Average	MAX	Unit	
1	SF10/125KHz	42	84	126	uAh	0.042~0.0126
2	SF11/125KHz	90	180	270	uAh	0.090~0.270
3	SF12/125KHz	150	300	450	uAh	0.150~0.450

The water meter is calculated by the average power consumption, and the total power consumption is 3.21~3.75Ah for six years.