

Flanged Ultrasonic Water Meter

User manual



Revision: 2024.8.7

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I . Overview

The ultrasonic water meter is a new type of water meter based on the principle of the time difference between upstream and downstream flow of ultrasonic waves in water for flow measurement and display. The meter can be equipped with wired or wireless data communication interfaces to communicate with data collectors, concentrators, or network servers, forming a remote meter reading management system. Management departments can retrieve data from the meter as needed, facilitating statistical and management of water consumption for users.

The product complies with the standards of "GB/T 778 Measurement of Flow of Closed Conduit Full of Water for Drinking Cold and Hot Water Meters" and the verification procedures of "JJG 162-2019 Drinking Cold Water Meter."

II. Product Features

1. Dual channel measurement, high accuracy and good stability
2. Redundancy, even if one of the channels is blocked by foreign objects or malfunctions, the entire meter can still measure accurately
3. Self-diagnosis function: flow sensor failure alarm, temperature sensor open pr short circuit alarm, measurement over-range alarm, low battery voltage alarm.
4. Application of the company's patented flow measurement method (patent granted) and intelligent data error correction technology, ensuring high measurement accuracy and stability
5. High-definition wide-temperature 9-bit LCD display
6. Built-in lithium battery ensures operation over 6 years of use
7. Wired communication interface 485 MODBUS.
8. Optional power supply methods:
 - 1) Built in battery power (default configuration)
 - 2) External power supply (used in 485 configuration, voltage range: DC 12V)
9. Bidirectional flow measurement capability.
10. Optional pipe pressure monitoring function.

III. Technical Parameters

Main technical indicators

Cumulative volume resolution:	0.01m ³ (in use) 0.01L ³ (During verification)
Instantaneous flow rate resolution:	0.01m ³ /h (in use) 0.01 m ³ /h (During verificatioin)
LCD display digits:	9 digits
Battery life:	6 years
Accuracy class:	Level 2
Temperature class:	T30
Pressure class:	MAP16
Pressure loss class:	△p40
Environmental class:	O
Protection class:	IP68
Electromagnetic environment class:	E1

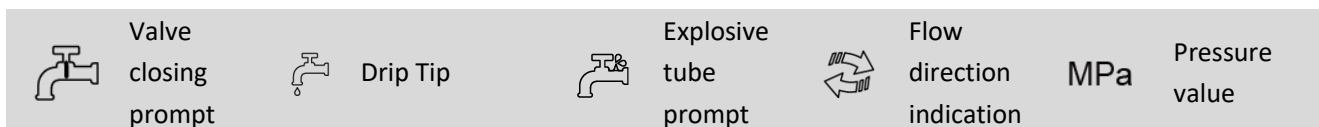
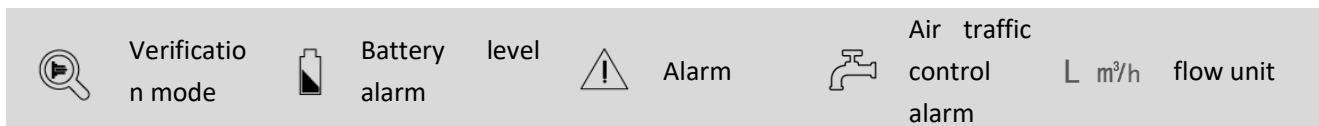
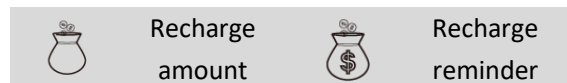
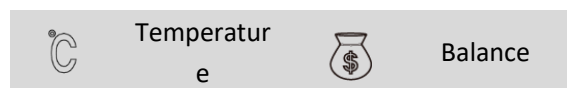
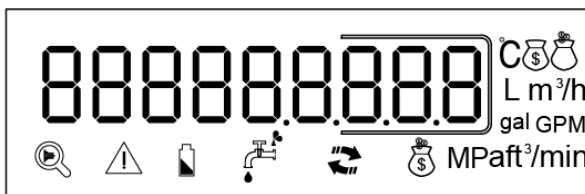
Installation method:	Horizontal or Vertical	
Upstream/downstream flow field sensitivity class:	U5/D3	
Flow range ratio (Q ₃ /Q ₁):	125、160、200、250、400 (Optional)	
When equipped with pressure monitoring function:		
Pressure measurement range:	(0~1.6) MPa	
Pressure resolution:	0.01 MPa	
Common flow rates:	DN50: 25 m ³ /h DN80: 63 m ³ /h DN125:160 m ³ /h DN200:400 m ³ /h DN300:1000 m ³ /h DN400:1600 m ³ /h	DN65: 40 m ³ /h DN100:100 m ³ /h DN150:250 m ³ /h DN250:630 m ³ /h DN350:1600 m ³ /h

Main components

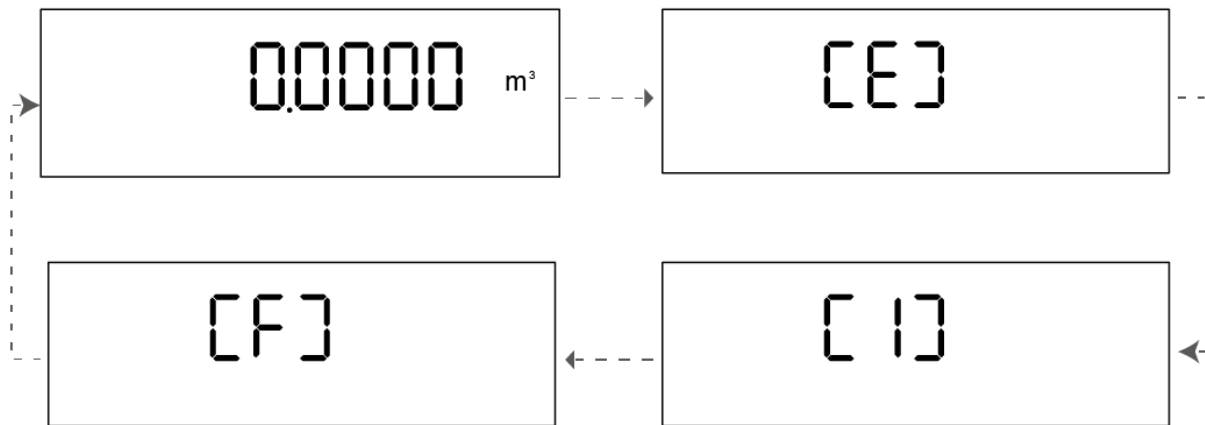
Component Name	Model specifications	Main material	Remarks
Measurement module	WM1058	/	/
Flow sensor	US-0039	Transducers: Piezoelectric ceramics	/
Flow tube section	DN50~DN150	Ductile iron	
Battery	ER26500	/	3.6V

IV. Instructions for use

This meter uses a digital and graphical LCD screen to present measurement parameters and operating status information to the user, as shown below:



You can use the accompanying magnetic rod to lightly touch the magnetic induction area of the meter head to switch between different function menus. Operation and display consist of four sets of menus:



Arrow example

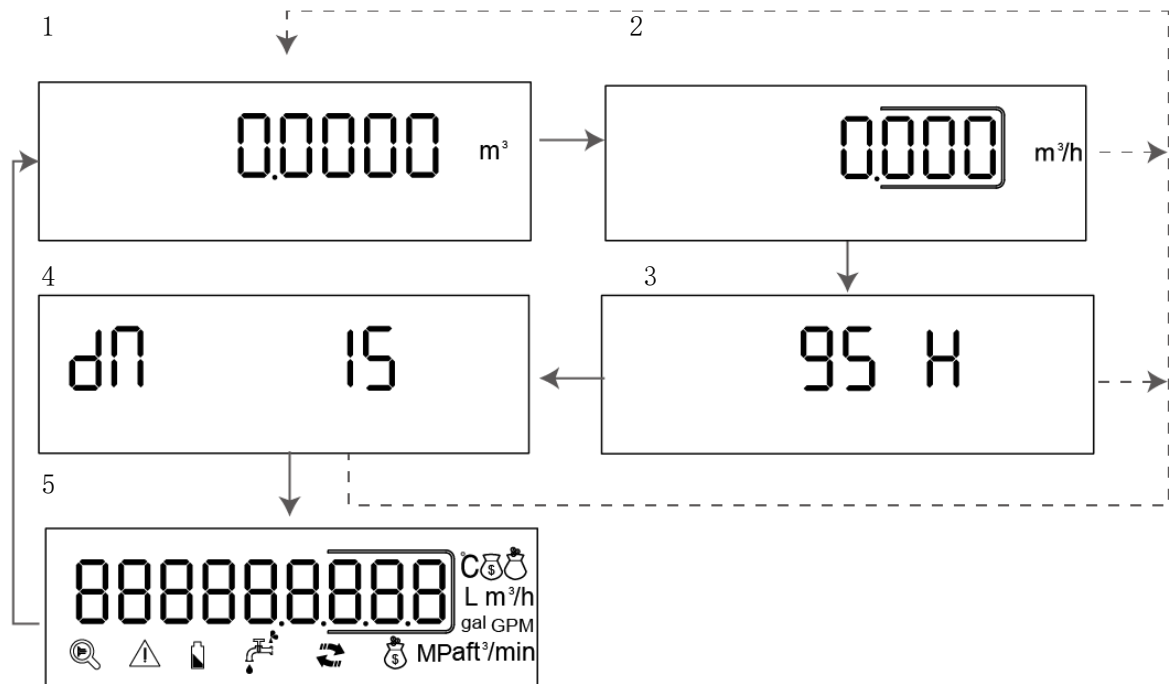
- > Long press: Indicates using a magnetic rod to contact the sensing area for more than 2 seconds (referred to as 'long press' below).
- > Short press: Indicates touching the induction area with magnetic rod after approximately 1 second (referred to as 'short press' below)

The complete menu screen cycle is as follows:

- 1) Main Menu: Display interface for daily use
- 2) Fault Display Menu **【E】** : Records and displays the corresponding fault source and occurrence time
- 3) Information Menu **【I】** : Display meter address, communication parameters, and historical data information
- 4) Detection menu **【F】** : Used during verification

The meter defaults to a constantly displayed LCD and fixed cumulative flow interface. As shown in the figure above, a "long press" operation can switch among the above cycles; then, a "short press" operation can switch within this menu group to relevant display content. If there is no operation for more than 3 minutes, the LCD will automatically return to the main menu page (except when under the test menu [F]). It should be noted that as long as the display status is outside the test menu [F], if water flows through the meter, the flow value will automatically accumulate in the meter, and viewing menu content or key operations will not cause measurement data to be missed or undercounted. The cyclic operation of each menu is as follows:

1. Main menu Navigation



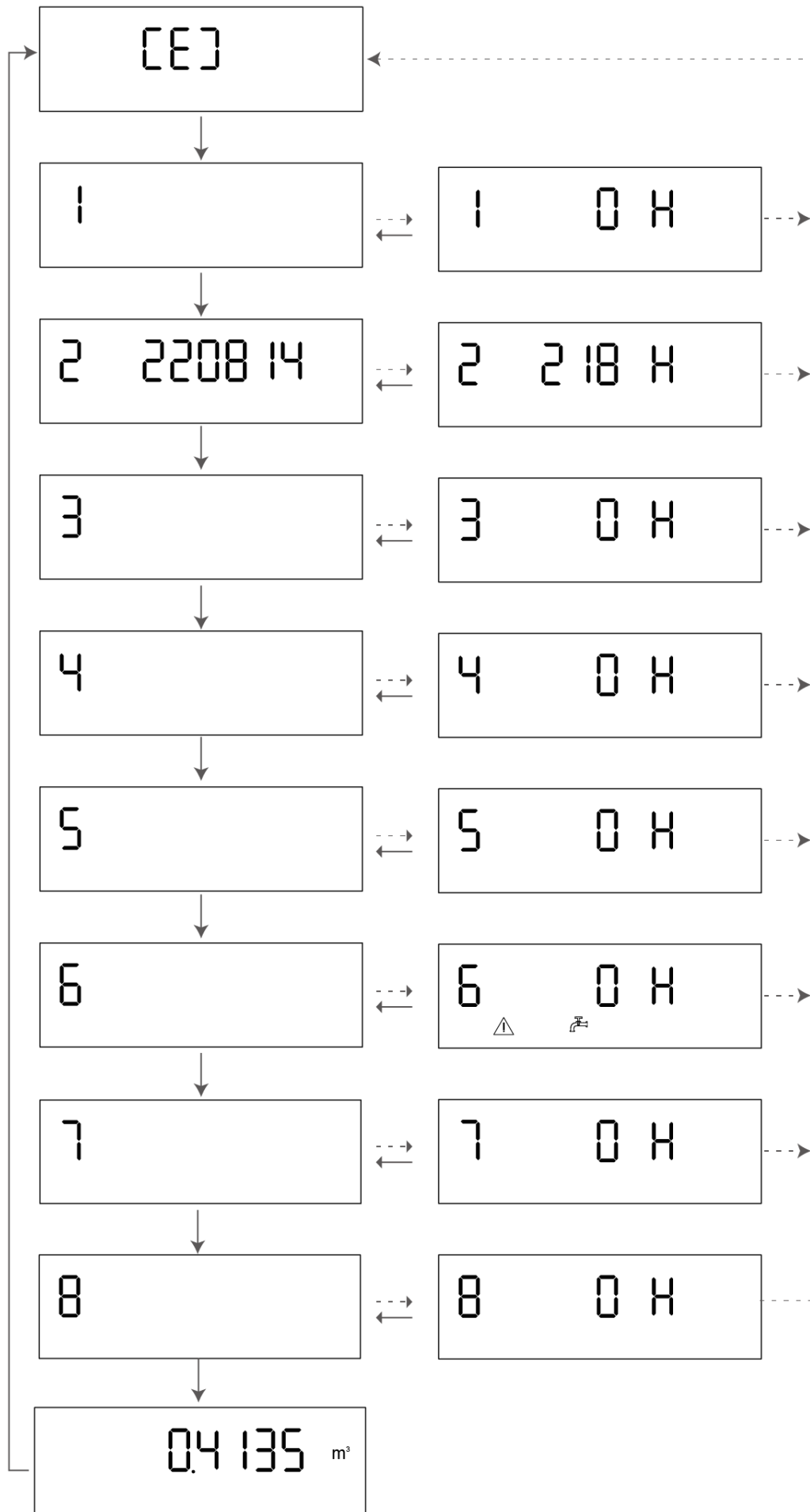
Note: In the above figure, the parameters corresponding to each menu in the order of the arrows are as follows:
1. Accumulated flow rate 2. instantaneous flow rate 3. accumulated working time (hours) 4. caliber specifications 5. full screen display

2. Fault display menu operation 【E】

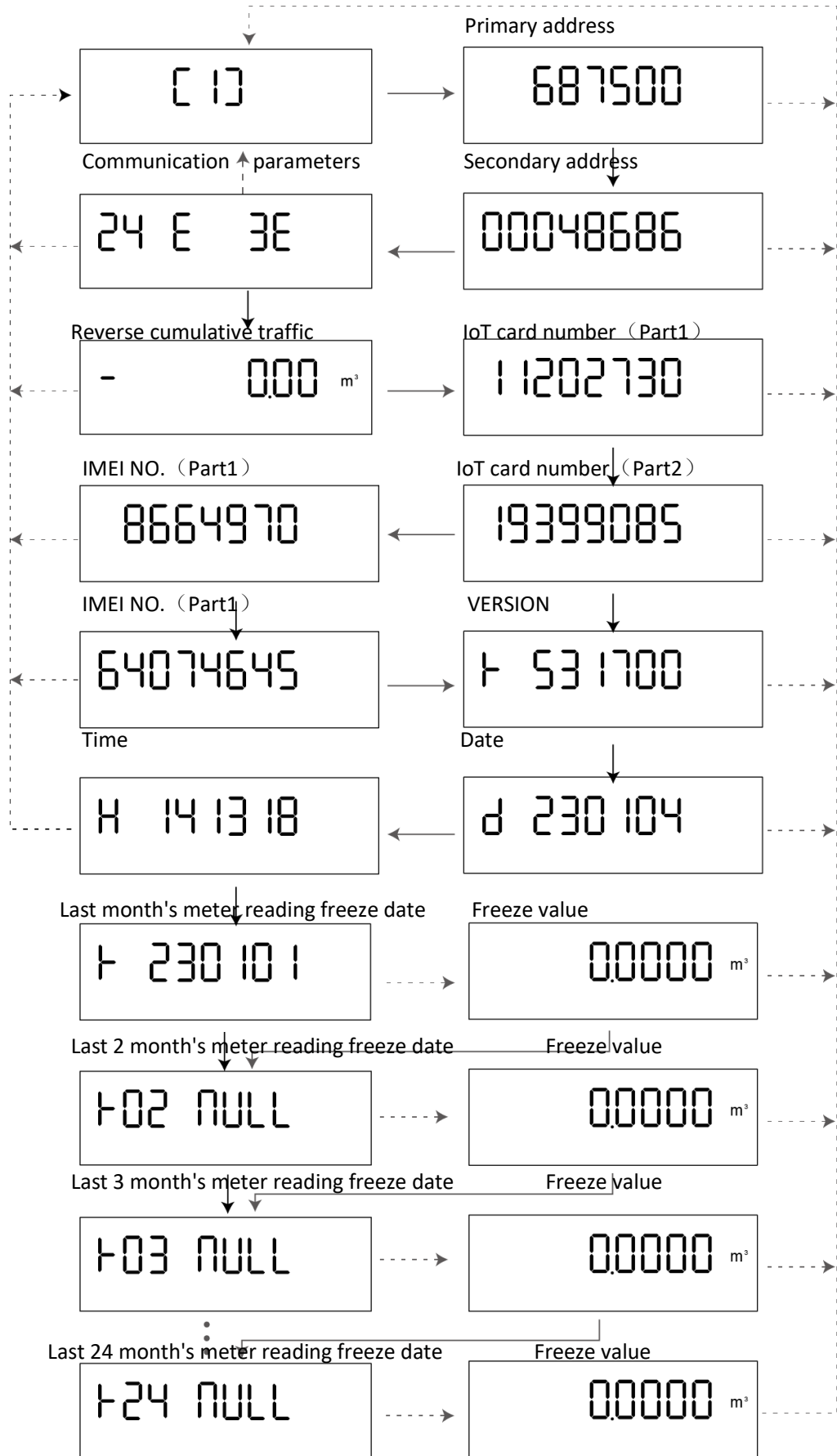
Codes 1-8 correspond to specific fault codes as follows:

1. Battery fault/Date of occurrence (year, month, day)
2. Empty pipe fault/ Date of occurrence (year, day)
3. Reverse flow fault/ Date of occurrence (year, day)
4. Overrange fault/Date of occurrence (Year Month Day)
5. Water temperature fault /Date of occurrence (Year Month Day)
6. Memory fault/Date of occurrence (Year Month Day)
7. Transducer failure/inlet side/Date of occurrence (year month day)
8. Transducer failure/outlet side/Date of occurrence (year month day)

Note: In the above fault display menu, a 'long press' operation can further display the duration of the fault (unit: hours)

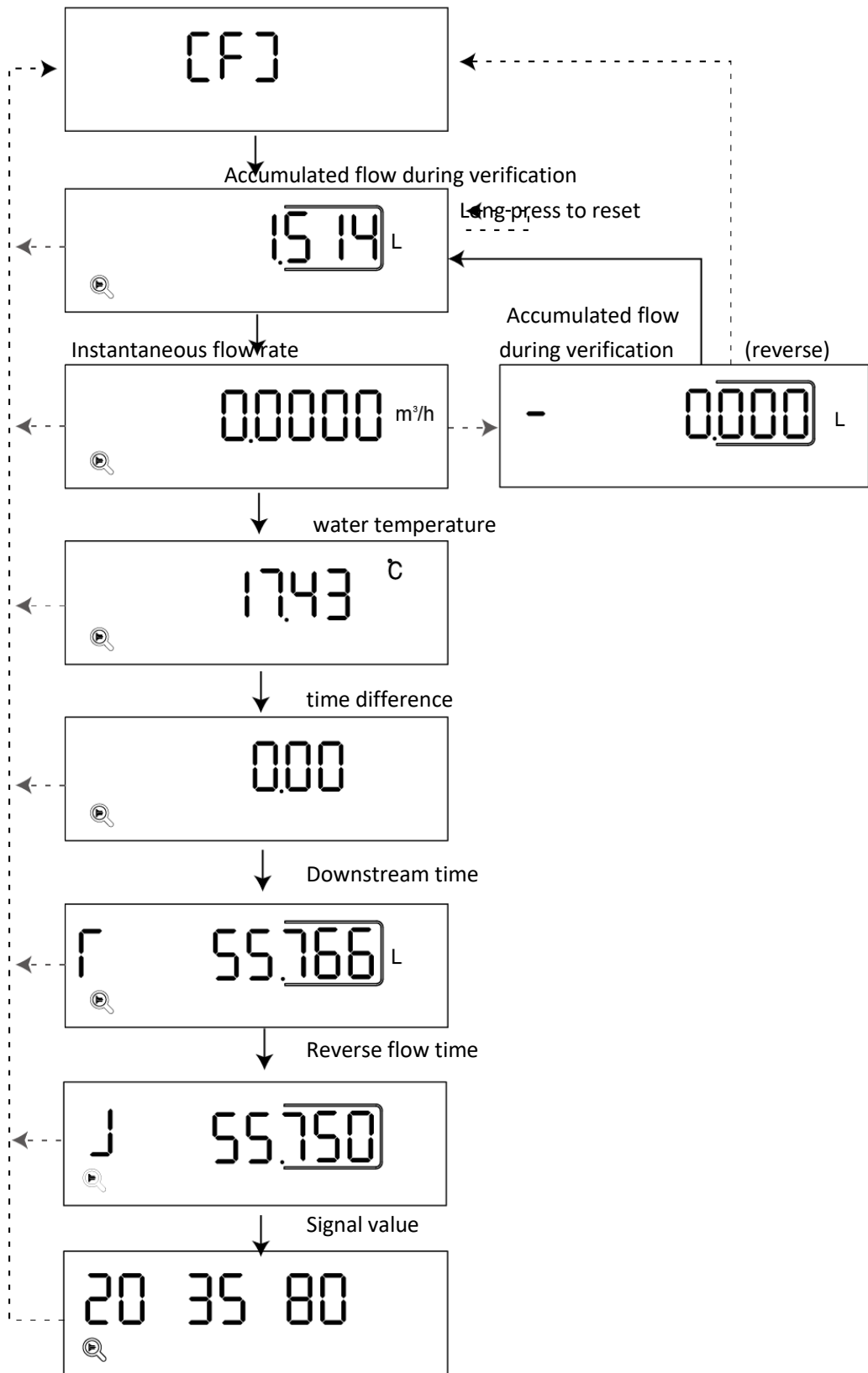


3. Information menu [1]



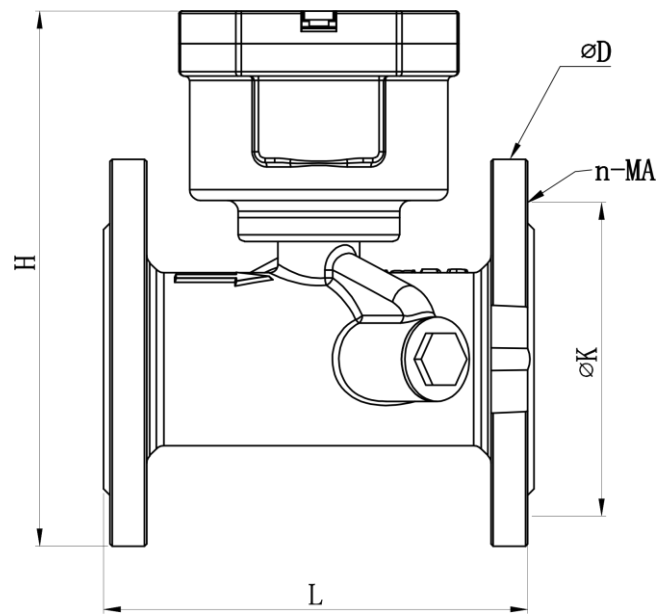
Note: If the meter reading freeze time is displayed as "NULL", it means that there is no historical data for that date.

4. Test menu 【F】



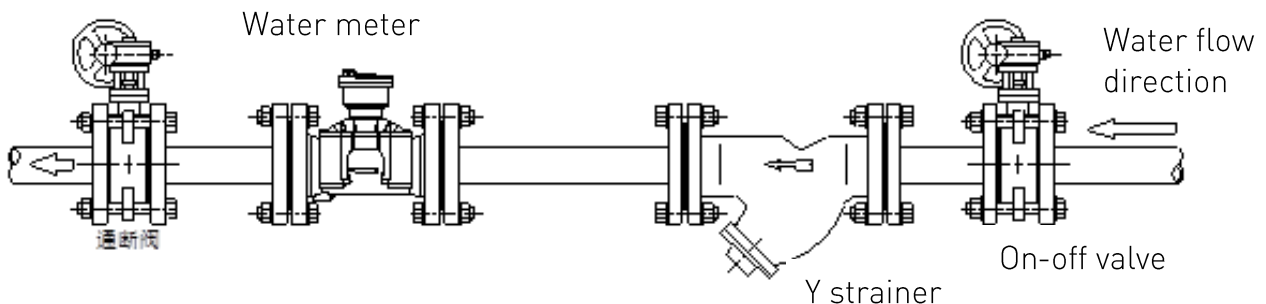
V. Installation And Usage Instructions

1. Installation Dimensions



SKU	L(mm)	D(mm)	H(mm)	K(mm)	N-Bolt(mm)
WMSUN050F	200	165	219	125	4-M16
WMSUN065F	200	185	231	145	4-M16
WMSUN080F	225	200	249	160	8-M16
WMSUN100F	248	220	258	180	8-M16
WMSUN150F	300	285	297	240	8-M20
WMSUN200F	350	340	445	295	12-M20
WMSUN250F	450	405	495	355	12-M24
WMSUN300F	500	460	555	410	12-M24
WMSUN350F	550	520	595	470	16-M24
WMSUN400F	600	580	650	525	16-M27

2. Installation Instructions



3. Pre-Installation Precautions

- (1) Before installing the ultrasonic water meter, thoroughly clean the pipeline to avoid damaging the meter by debris;
- (2) The ultrasonic water meter is a valuable and precise instrument. Handle with care to avoid damage. Do not directly pull the meter head or sensor wires. Keep away from high

temperature heat sources (such as electrical welding) to prevent battery explosions or damage to the meter.

- (3) Pay special attention to the installation location of the ultrasonic water meter. Avoid installing the meter at the top of the pipeline (where air bubbles may accumulate inside the pipe) or near bends (which may cause vortex flow). Keep the meter away from pumps and other equipment (which may cause pulsating flow).
- (4) Ensure that the upstream and downstream connection pipes of the ultrasonic water meter have the same diameter as the meter and do not reduce the diameter. (5) The direction indicated by the arrow on the surface of the ultrasonic water meter is the direction of water flow and cannot be reversed;
- (5) The direction indicated by the arrow on the meter body is the direction of water flow. Do not install the meter incorrectly.
- (6) It is recommended to install a filter of corresponding diameter in front of the ultrasonic water meter. A valve of corresponding diameter should be installed in front of the meter, and it should be separable from the meter body for future maintenance and repair.

4. Common Installation Error Examples

1) If the reserved position for the meter on the welded flange is too large or if the flange is welded unevenly with an angle relative to the meter flange, do not forcibly tighten the bolts. Doing so may cause the meter body to break. The correct approach is to remove and reinstall (as shown in Figure A).

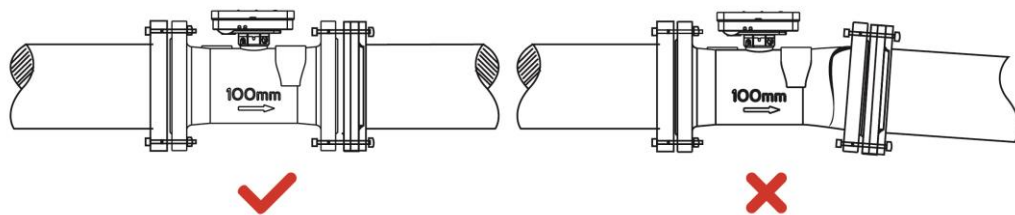


Figure (A)

2) When installing the meter horizontally, the integration instrument should be oriented upwards. If the integration instrument is oriented towards the side, the two transducers may not be on the same horizontal plane. Air may accumulate at the higher transducer, causing inaccurate or non-measurement of the meter (as shown in Figure B).

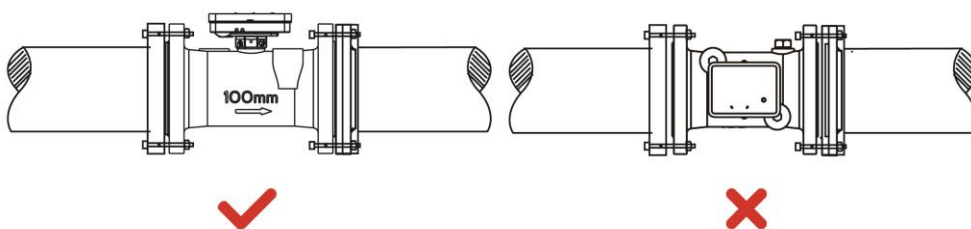


Figure (B)

3) When installing the meter vertically, it must be installed on a straight pipe where water flows upwards. Because the pipe at the higher position may accumulate air under the action of gravity, resulting in incomplete filling of water in the pipe, which may cause inaccurate measurement or non-measurement of the meter (as shown in Figure C).

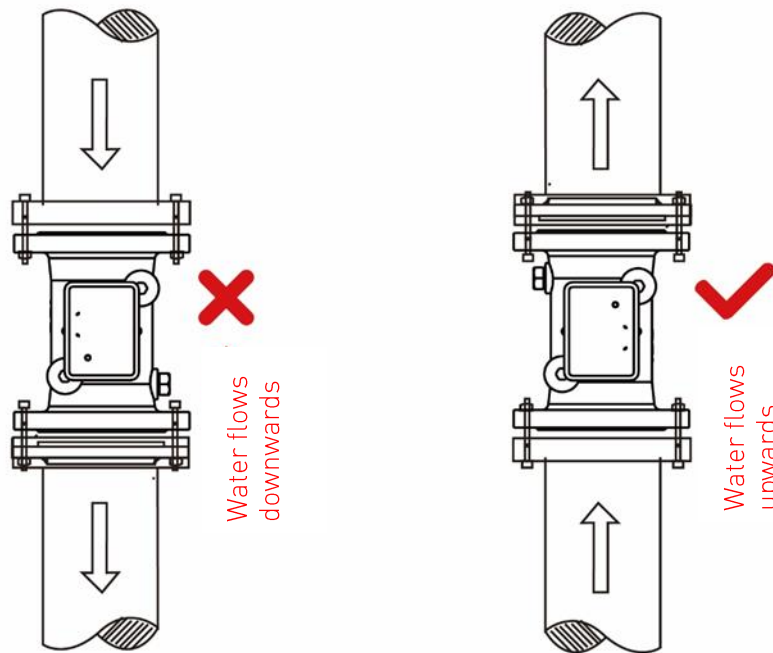


Figure (C)

4) When installed at a "U" bend, the meter should be installed at the lowest point, as air may accumulate at the higher points of the pipe, resulting in inaccurate measurement or non-measurement of the meter (as shown in Figure D).

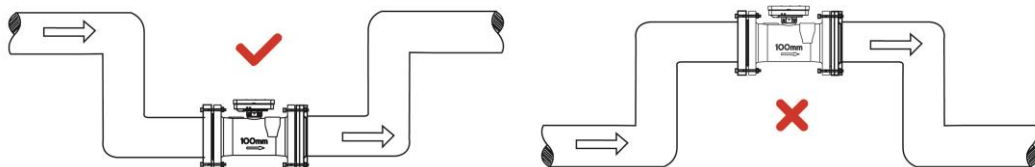


Figure (D)

5) When the meter is installed at a bend, ensure that the straight pipe distance in front of the meter is ≥ 5 times the pipe diameter, and the straight pipe distance behind the meter is ≥ 3 times the pipe diameter. Otherwise, it may cause inaccurate measurement of the meter (as shown in Figure E).

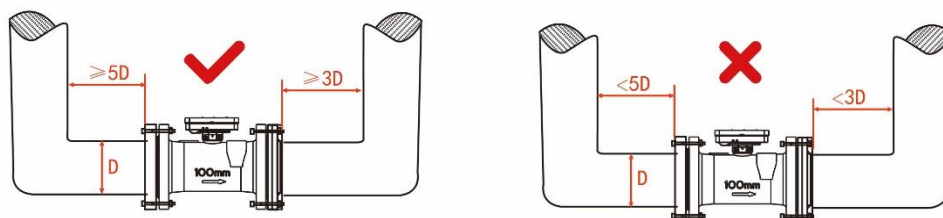


Figure (E)

6) When a valve or other object is installed in front of the meter, ensure that there is a distance of ≥ 5 times the diameter between the meter and the object. Otherwise, it may cause inaccurate measurement of the meter (as shown in Figure F).

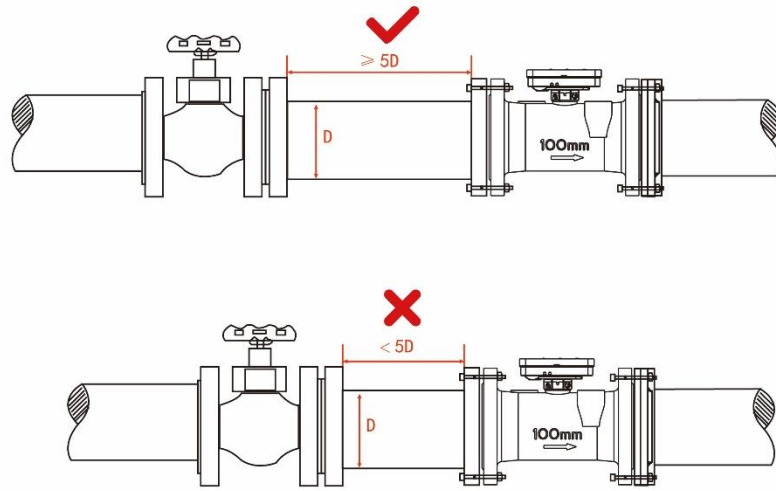


Figure (F)

5. Wiring Instructions

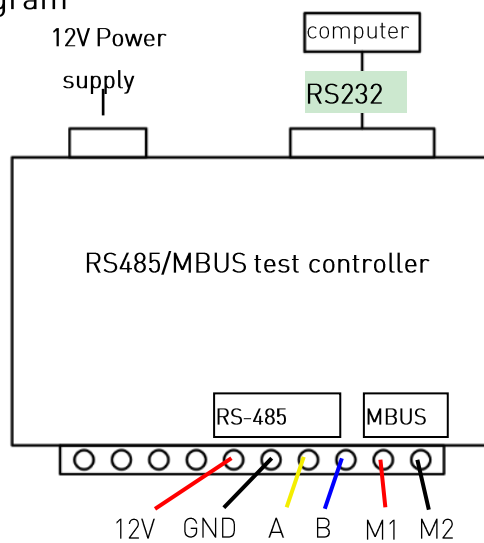
● Power Line

Default: Built-in lithium battery power supply, no additional power line required. External power supply mode (optional): Connect the red wire to the positive terminal and the black wire to the negative terminal of the power supply. Voltage: DC 12 V.

● Communication Line

M-BUS communication mode: Simply connect the two communication wires to the MBUS bus, no need to distinguish between positive and negative poles. 485 communication mode: There are four wires led out on the meter: A (yellow), B (green), ground (black), and power supply (red, DC 12V). Connect them accordingly (pay attention to polarity, incorrect connection may cause damage).

Wiring diagram



6. Routine Maintenance

- (1) Before using the ultrasonic water meter, thoroughly check its current status.
- (2) The lead seal on the ultrasonic water meter must not be damaged. If damaged, the manufacturer will no longer guarantee the quality and accuracy.
- (3) The ultrasonic water meter is powered by a built-in lithium battery, with a service life of up to 6 years. When the battery life is nearing its end, or if the data displayed on the LCD screen is unclear or shows a battery symbol (indicating low voltage), it should be replaced by specialized technicians to avoid affecting its normal operation.

7. Common Fault Analysis And Troubleshooting

Code	Error type	Error cause	Troubleshooting
1	Battery malfunction	Low battery voltage or poor connection	Check the connection plug and replace the battery
2	Empty pipe fault	No water in the pipe section or water not filling the pipe section	Fill the pipe section with water and remove air bubbles
3	Reverse flow fault	Inlet and outlet end of the pipe section are reversed	Install according to the indicated water flow direction
4	Overrange	Current instantaneous flow rate is too high	Reduce flow rate or replace with a meter of corresponding range
5	EE malfunction	EEPROM memory fault	Contact manufacturer's technical personnel
6	sensor	Ultrasonic sensor malfunction	Contact manufacturer's technical personnel

VI. Packing List

Number	Name	Unit	Qty
1	Ultrasonic water meter	Pc	1
2	Installation accessories (Sealing gasket clamp net)	Set	1
3	Product manual	Pc	1
4	Product Qualification Certificate	Pc	1

VII. Transportation And Storage

1. Handle with care during transportation to avoid severe impact.
2. Storage environment temperature: (-25 ~ 55) °C, relative humidity <80%, avoid strong electromagnetic field and direct sunlight.
3. Stored products should be at least 30cm above the ground, at least 1m away from walls, and at least 2m away from heating equipment.
4. The warehouse should be kept dry and free of corrosive substances, gases, and dangerous goods.

VIII. Warranty Terms

The ultrasonic water meter is default covered by a one-year free warranty from the date of shipment. However, the following damages are not covered by the warranty:

- The lead seal (seal) of the ultrasonic water meter is opened or damaged.
- Any part of the ultrasonic water meter is intentionally damaged.
- Damage caused by conditions beyond the specification parameters or chemical contamination.
- Failure to clean the pipeline or excessive impurities in the pipeline before installation, resulting in damage to the flow sensor.
- Malfunction and damage caused by not selecting the appropriate product model specifications.
- Incorrect installation
- Abnormal usage environment

Note: Please read this document carefully before using the product. We recommend that you frequently contact us for the latest information, as our products are constantly being updated and improved.

法兰式超声水表

使用说明书



修改时间：2024.8.7

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一、概述

超声水表是基于超声波在水中传播时，顺流和逆流的时间差原理进行流量测量和显示的新型水表。仪表可配备有线或无线的数据通信接口，与采集器、集中器或网络服务器通信，组成远程抄表管理系统，管理部门可按需抄取表中数据，方便对用户水量的统计和管理。

产品执行《GB/T 778 封闭满管道中水流量的测量 饮用冷水水表和热水水表》标准以及《JJG 162-2019 饮用冷水水表》检定规程。

二、产品特点

- 1、双通道测量，准确性高，稳定性好
- 2、具有冗余性，即使其中一个通道被异物阻挡或发生异常，整表仍能正常计量
- 3、具有自诊断功能：流量传感器故障报警、温度传感器断路和短路报警、测量超量程报警、电池欠压报警、
- 4、应用了本公司专利的流量测量方法（已获得发明专利授权）和智能数据纠错技术，测量准确度和稳定性高
- 5、高清晰度宽温度型 9 位 LCD 显示
- 6、内置锂电池供电可确保使用 6 年以上
- 7、有线通信接口 485 MODBUS
- 8、可选择的供电方式：
 - 1) 内置电池供电（默认配置）
 - 2) 外供电（485 配置时采用，电压：DC12V）
- 9、可计反向流
- 10、可选配管道压力监测功能

三、技术参数

主要技术指标

累积体积分辨力	0.01m ³ （使用时） 0.01L（检定时）
瞬时流量分辨力	0.01 m ³ /h（使用时） 0.01 m ³ /h（检定时）
液晶显示屏位数	9 位
电池使用寿命	6 年
准确度等级	2 级
温度等级	T30
压力等级	MAP16
压力损失等级	△p40
环境等级	O 级
防护等级	IP68
电磁环境等级	E1
安装方式	水平或垂直
上/下游流场敏感度等级	U5/D3
量程比（Q ₃ /Q ₁ ）	125、160、200、250、400 可选
选配压力监测功能时	
压力测量范围	（0~1.6）MPa
压力分辨力	0.01 MPa
常用流量 Q ₃	DN50: 25 m ³ /h DN65: 40 m ³ /h DN80: 63 m ³ /h DN100:100 m ³ /h DN125:160 m ³ /h DN150:250 m ³ /h DN200:400 m ³ /h DN250:630 m ³ /h DN300:1000 m ³ /h DN350:1600 m ³ /h DN400:1600 m ³ /h

主要零部件

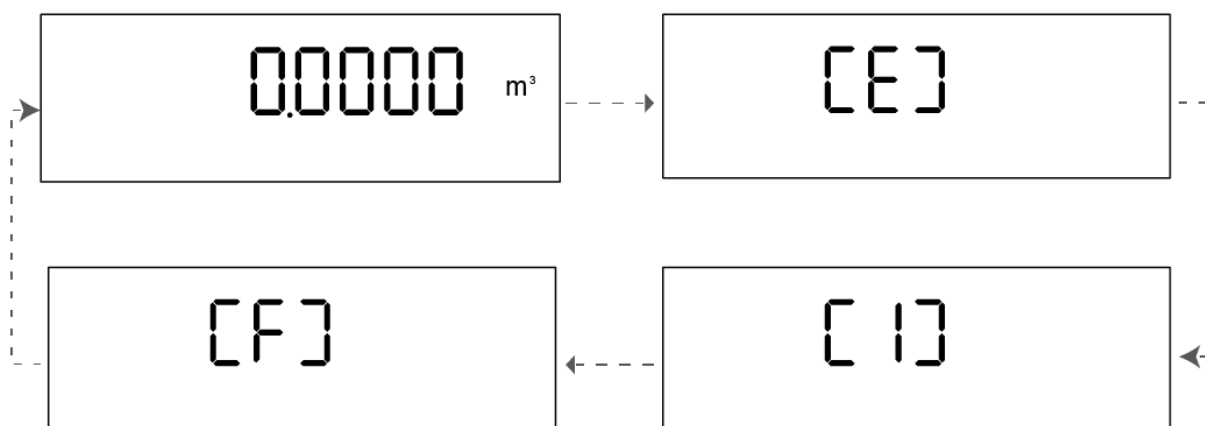
零（部）件名称	型号规格	主体材料	备注
测量模块	WM1058	/	/
流量传感器	US-0039	换能器：压电陶瓷	/
流量管段	DN50~DN150	球墨铸铁	
电池	ER26500	/	3.6V

四、使用方法

本表采用数字与图形的 LCD 屏，将测量参数以及工作状态信息呈现给用户，如下所示：



可使用配套的磁棒轻触表头的磁感应区域切换不同的功能菜单。操作与显示由 4 组菜单组成：



箭头示例

-----> 表示用磁棒接触感应区域大于 2 秒（等同于长按，下文以“**长按**”代替）
 ——> 表示用磁棒接触感应区域大约 1 秒（等同于短按，下文以“**短按**”代替）
 完整的菜单画面循环依次为：

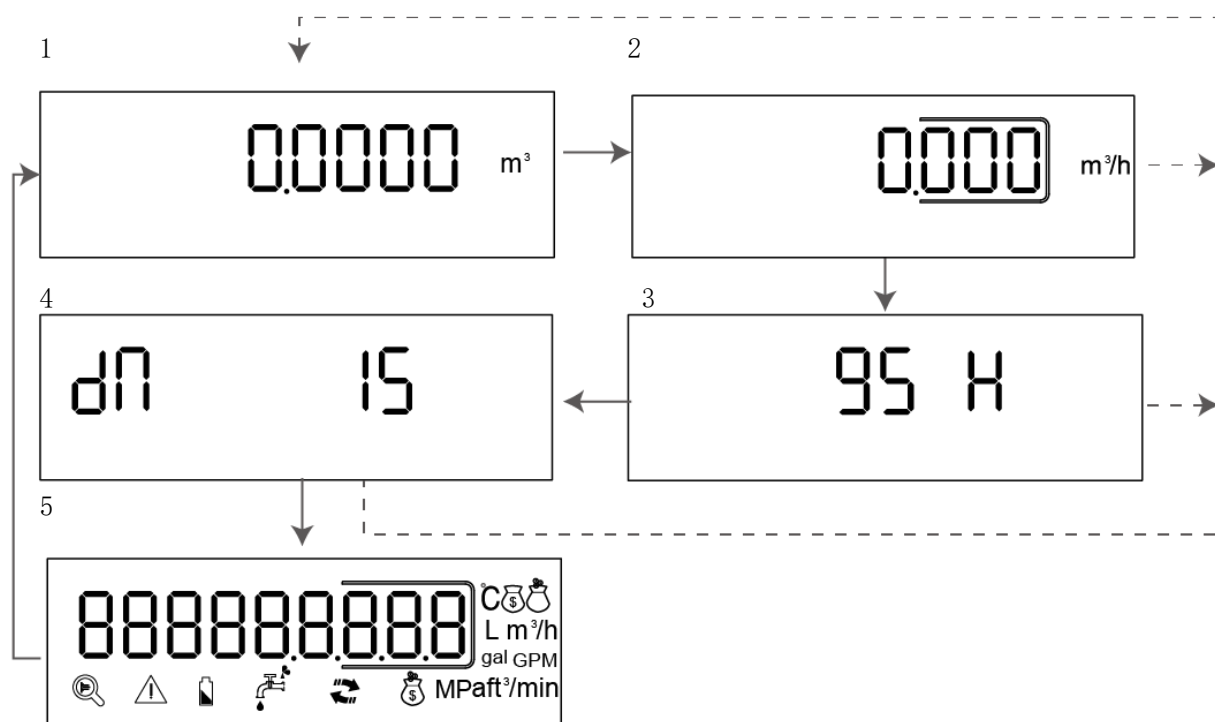
- 1) 主菜单：即日常使用时的显示界面
- 2) 故障显示菜单【E】：记录和显示对应的故障源和发生时间
- 3) 信息菜单【I】：显示表地址、通信参数以及历史数据的信息
- 4) 检测菜单【F】：检定时使用

本仪表默认 LCD 常显，且固定显示累积流量界面。如上图所示，“长按”操作可在上述循环中切换；再由“短按”操作在本组菜单中切换定位至相关显示内容。超过 3 分钟不操作，LCD 自动回到主菜单页面（处于检测菜单【F】下时除外）。

需指出的是，只要处于检测菜单【F】之外的显示状态下，如果水表中有水流过，流量值将自动累积到表中，并不会因为查看菜单内容或者按键操作而造成测量数据的漏计、少计。

以下为各个菜单的循环操作图：

1. 主菜单



注：上图中，各菜单依箭头顺序分别对应的参数如下：

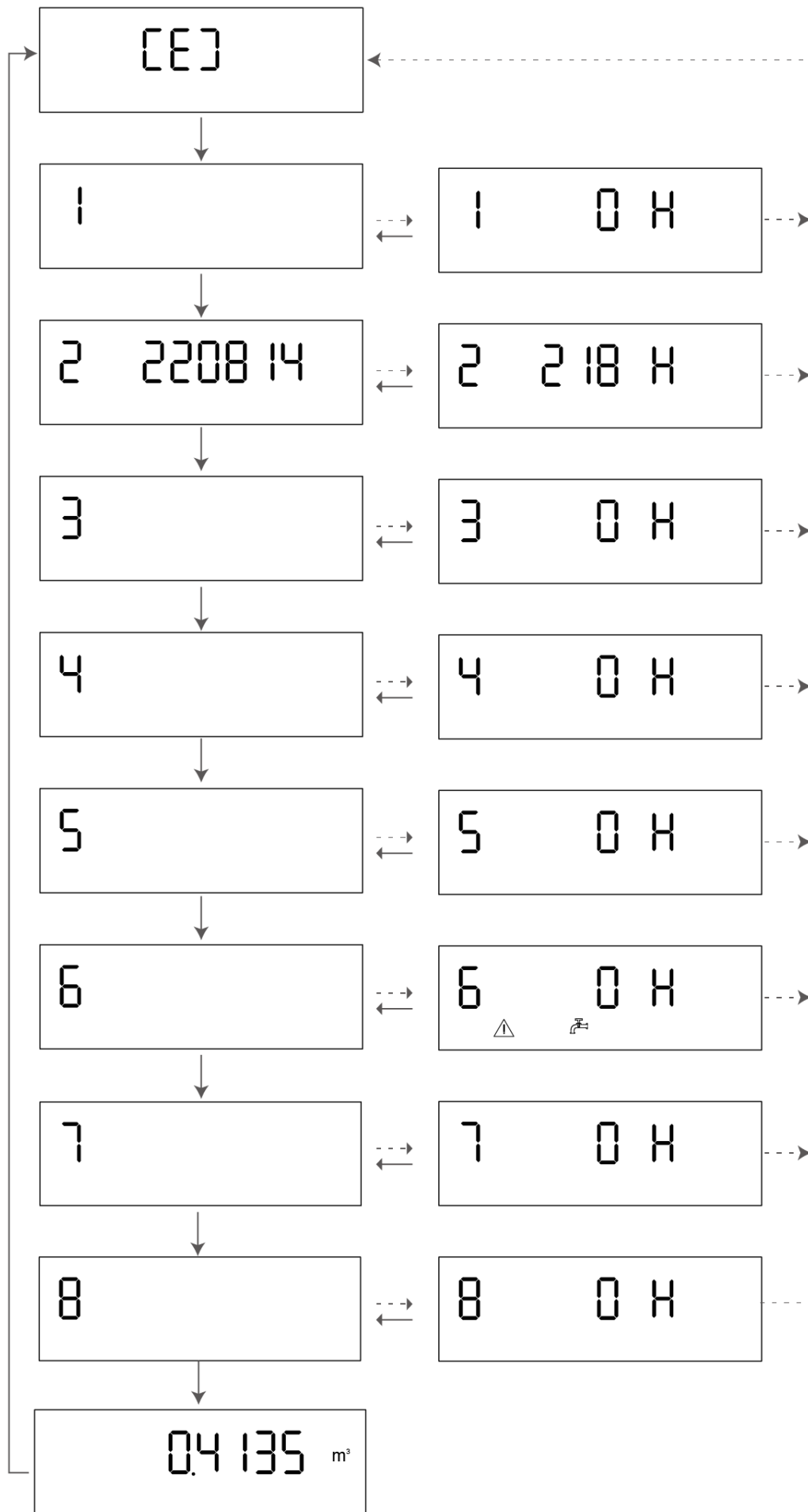
- 1、累积流量 2、瞬时流量 3、累积工作时间（小时） 4、口径规格 5、全屏显示

2. 故障显示菜单【E】

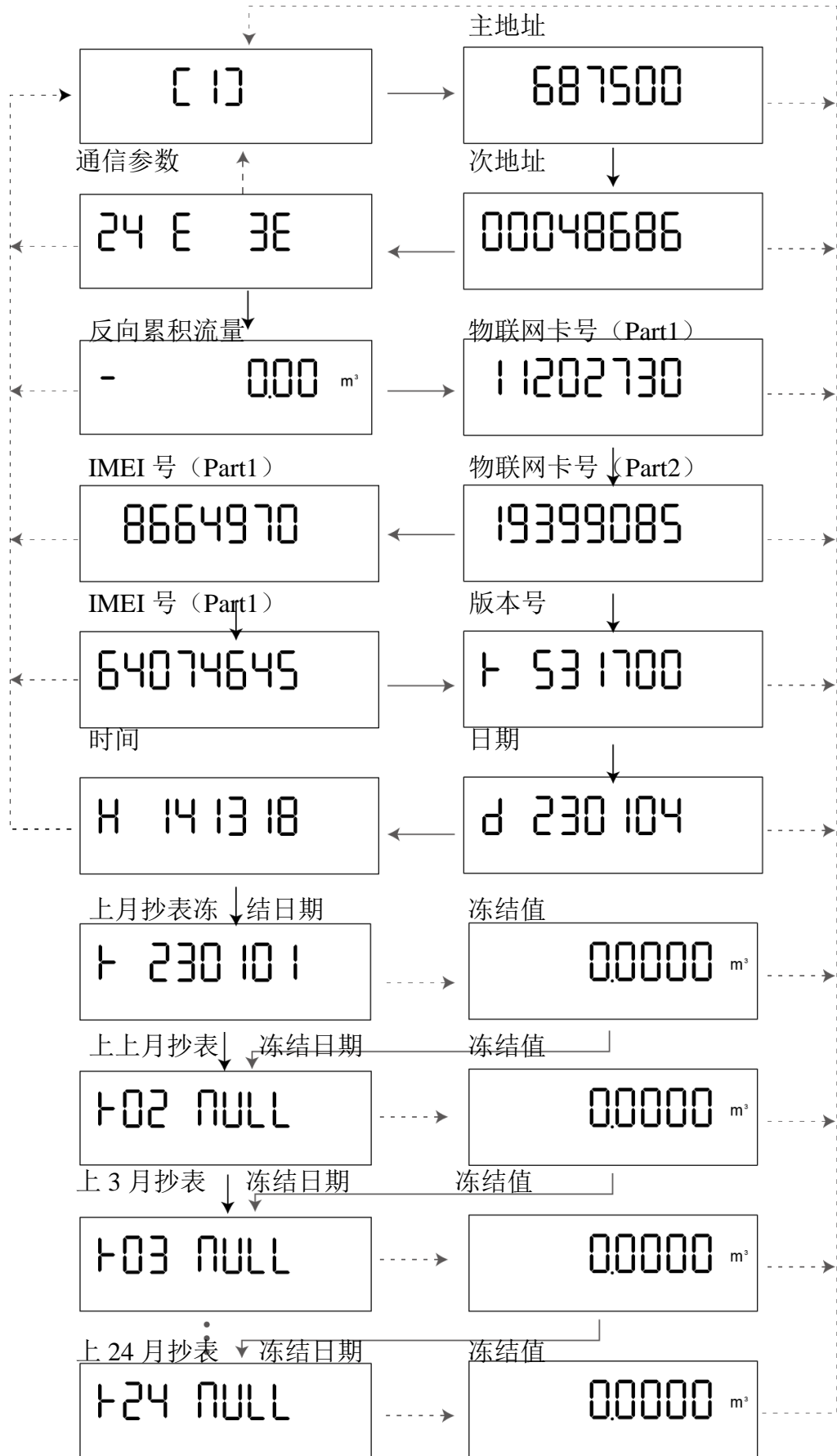
注：图中编号 1~8 为故障码，对应如下：

- 1、电池故障 / 发生日期(年月日) 2、空管故障 / 发生日期(年月日) 3、逆流故障 / 发生日期(年月日)
 4、超量程 / 发生日期(年月日) 5、水温故障 / 发生日期(年月日) 6、存储器故障 / 发生日期(年月日)
 7、换能器故障 / 进水端 发生日期(年月日) 8、换能器故障 / 出水端 发生日期(年月日)

在相应的故障显示菜单进行“长按”操作，可进一步查看该故障的持续时间（单位：h）

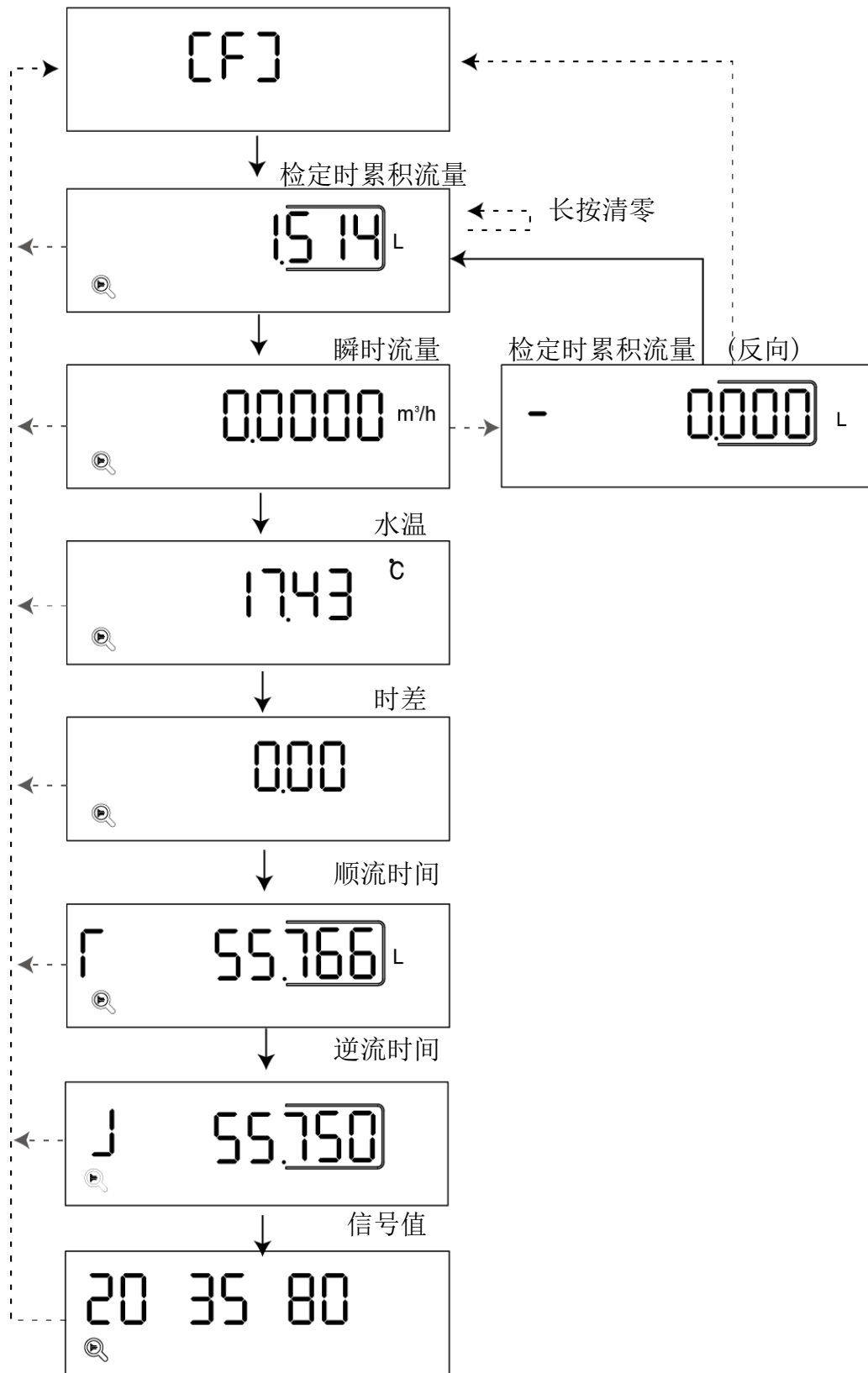


3. 信息菜单【I】



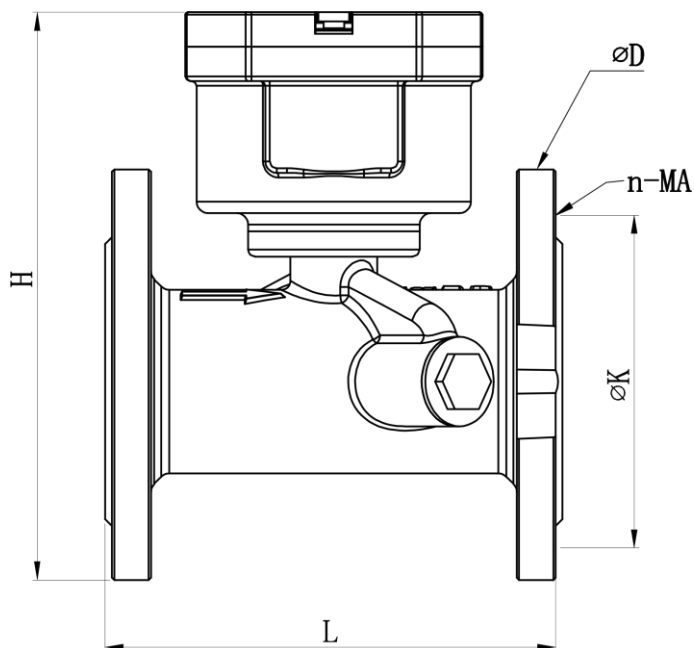
注：若抄表冻结时间显示为“NULL”，表示该日期没有历史数据

4. 检测菜单【F】



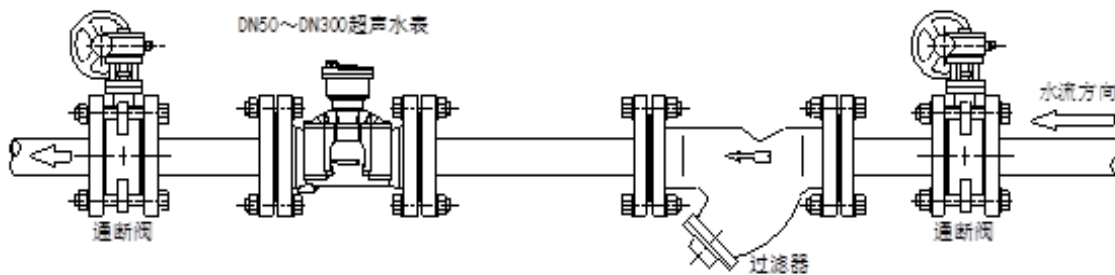
五、安装使用说明

1. 安装尺寸



SKU	L(mm)	D(mm)	H(mm)	K(mm)	N-Bolt(mm)
WMSUN050F	200	165	219	125	4-M16
WMSUN065F	200	185	231	145	4-M16
WMSUN080F	225	200	249	160	8-M16
WMSUN100F	248	220	258	180	8-M16
WMSUN150F	300	285	297	240	8-M20
WMSUN200F	350	340	445	295	12-M20
WMSUN250F	450	405	495	355	12-M24
WMSUN300F	500	460	555	410	12-M24
WMSUN350F	550	520	595	470	16-M24
WMSUN400F	600	580	650	525	16-M27

2. 安装示意图



3. 安装前的注意事项

- (1) 安装超声水表前必须彻底清洗管道，避免碎片损坏水表；
- (2) 超声水表属于比较贵重精密仪表，拿起放下时必须小心，禁止直接提拽表头或传感器线；严禁靠近较高温度热源（如电气焊，防止电池爆炸伤人以及损坏仪表）；

- (3) 超声水表安装位置应特别注意，应避免水表安装在管道的上端（会有气泡在管段内），避免安装在靠近弯头处（会产生旋涡流），应远离泵等设备（会引起脉动流）；
- (4) 超声水表的上游和下游处的连接管道应与水表口径大小一致，不能缩径；
- (5) 超声水表的表体上箭头所指的方向为水流方向，不得装反；
- (6) 建议超声水表的前端装有相应口径的过滤器；表前装有相应口径的阀门且其能够与表体分离，便于今后的维护和维修。

4. 常见的错误安装示例

1)、如果焊接管道上法兰时，焊接预留给表的位置过大，或法兰焊接的不平与表的法兰有一个角度，此时切勿强行打紧螺栓，否则极有可能会造成表体断裂，正确做法应取下重新安装，如图 A 所示）。

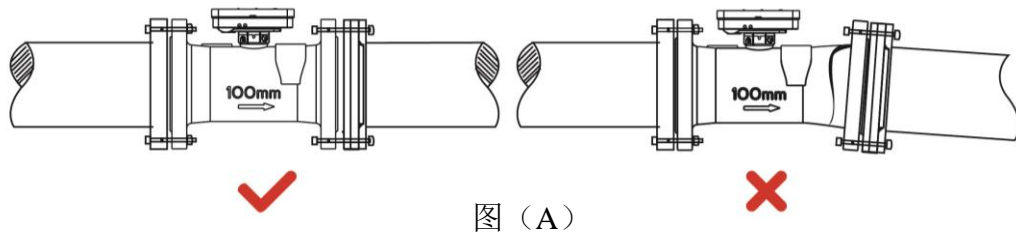


图 (A)

2)、当表水平安装时，积分仪的方向应朝上，若积分仪方向朝侧面，会造成两个换能器不在一个水平面上，而在高处的那个换能器处可能会聚集空气造成表计量不准或不计量（如图 B 所示）。

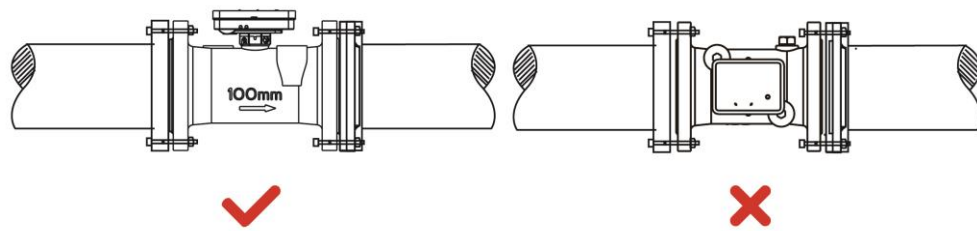


图 (B)

3)、当表垂直安装时，一定要安装在水流向上的直管道上，因为水流朝下的管道受地心的引力作用下会造成管道内水无法充满的现象，此时会导致表计量不准甚至造成不计量（如图 C 所示）。

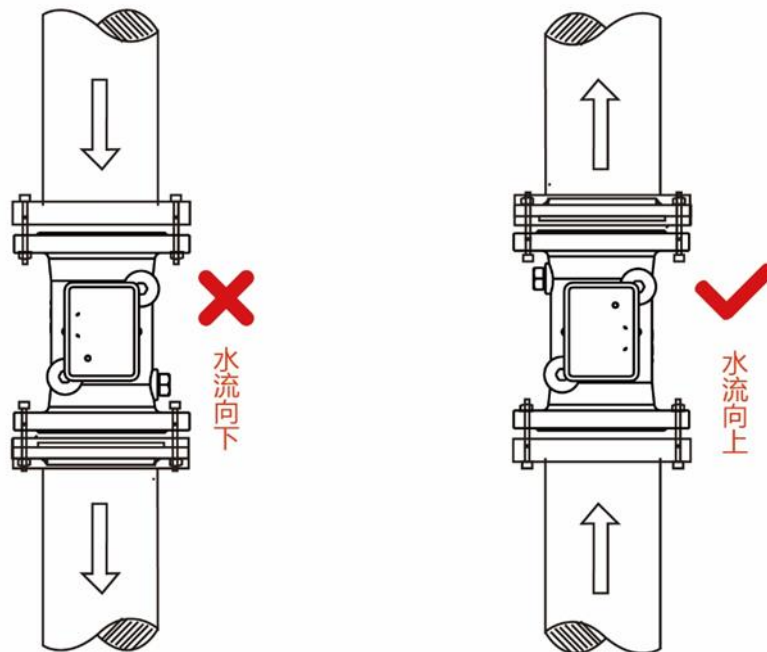


图 (C)

4)、当安装在“U”型管处时, 请将表安装在最低处, 因为管道在高处的地方可能会聚集空气, 造成表计量不准或不计量 (如图 D 所示)。

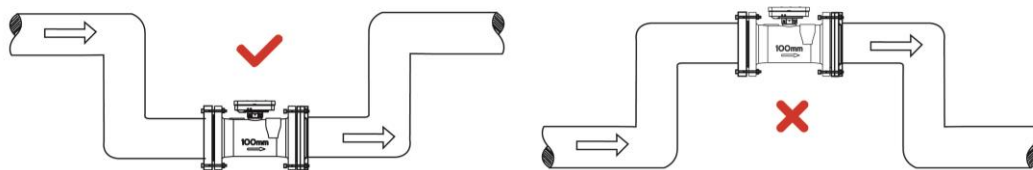


图 (D)

5)、当表安装在弯管处时, 必须保证前直管距离 ≥ 5 倍管径、后直管 ≥ 3 倍管径, 否则有可能会造成表计量不准 (如图 E 所示)。

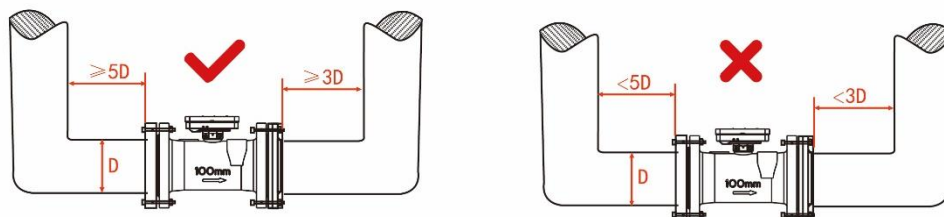


图 (E)

6)、当表前安装阀门或其他物件时, 必须保证表和此物件之间留有 ≥ 5 倍直径的距离, 否则可能会造成表计量不准; (如图 F 所示)

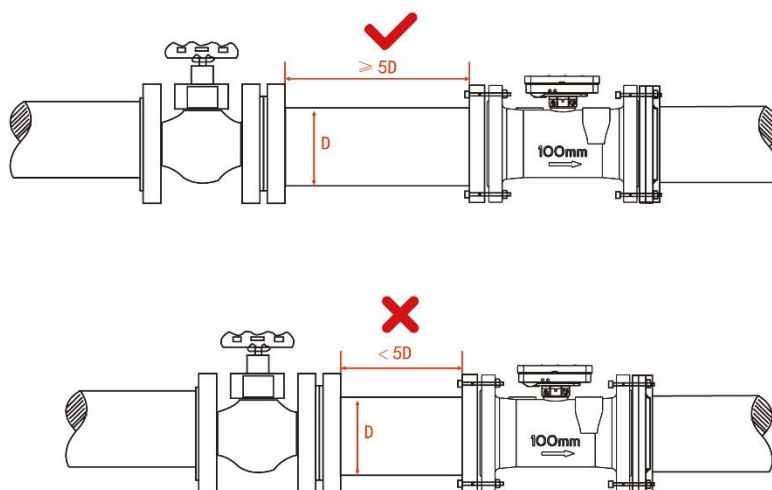


图 (F)

5. 接线方式

● 电源线

默认为内置锂电池供电, 无需额外电源线

外供电模式 (可选), 红色导线连电源正极, 黑色连电源负极, 电压 DC12V;

● 通讯线

MODBUS 通讯模式: 直接将两根通讯线连接至 MODBUS 总线即可, 无需区分正负极;

485 通讯模式: 表上引出有 4 根导线分别为: A (黄)、B (绿)、地 (黑)、电源 (红, DC 12V), 对应接好 (注意区分极性, 接错可能烧毁);

6. 日常维护

- (1) 超声水表使用前必须对当前状态进行检查；
- (2) 超声水表上的铅封不能损坏，如果损坏生产厂商将不再承担质量和准确度保证；
- (3) 超声水表使用内置的锂电池供电，运行时间可达 6 年。当电池寿命将近或虽不到 6 年但液晶屏显示的数据不清晰或显示电池符号（提示电压不足），即应由专门技术人员更换电池，以免影响其正常工作；

7. 常见故障分析及排除

编号	错误类型	错误原因	处理方法
1	电池故障	电池欠压或连接不良	检查连接插头、更换电池
2	空管故障	管段内无水或水没有充满管段	管段内充满水，并排除气泡
3	逆流故障	管段进水端与出水端装反	按照标示的水流方向安装
4	超量程	当前瞬时流量过高	降低流量或更换对应量程的表
5	EE 故障	EE 存储器失效	联系厂家技术人员
6	传感器	超声传感器故障	联系厂家技术人员

六、装箱清单

序号	名称	单位	数量
1	超声水表	只	1
2	安装附件（密封垫夹网）	套	1
3	产品说明书	份	1
4	产品合格证	份	1

七、运输与储存

1. 仪表运输过程中需小心轻放，避免剧烈冲击。
2. 储存环境温度（-25~55）℃，相对湿度小于 80%，防止强电磁场作用和阳光直射。
3. 码存的产品离地面至少 30cm，距离四壁至少 1m，离采暖设备不少于 2m。
4. 仓库保持干燥，没有腐蚀性物品、气体及危险品。

八、保修条款

超声水表自发货之日起**默认整机一年内免费保修**。但下列情况导致的损坏则不予保修：

- 1) 超声水表的封印标志(铅封)被开启、破坏；
- 2) 超声水表的任意部件被人为破坏；
- 3) 超声水表被用于超出规格参数以外的条件下或遭受化学污染导致的损坏；
- 4) 安装前未清理管道或管道内杂质过多，导致流量传感器损坏；
- 5) 因未选用适合的产品型号规格而造成的故障和损害。

注意：

建议您在产品使用前仔细阅读本资料。

希望您经常和我们联系，索取最新资料，因为我们的产品在不断更新和完善。