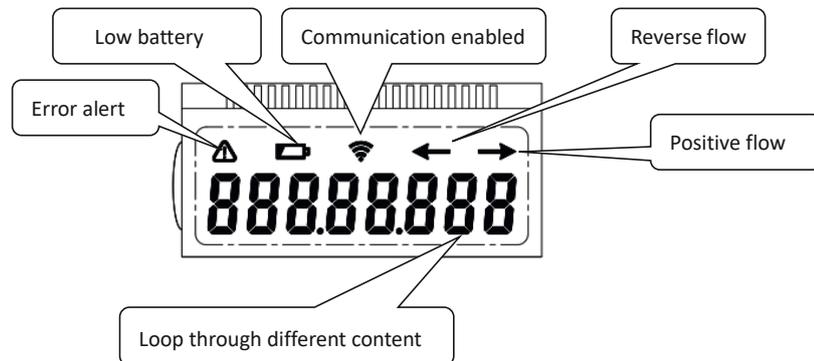




# WG-ElectronicFlow Instructions

## 1. Liquid crystal display content and mode

### 1.1 Identity and content



### 1.2 Display mode

The display mode is divided into storage mode and normal mode.

#### 1.2.1 Storage mode

The water meter is preset to storage mode when it leaves the factory. When the LCD displays "SLEEP", turn off the loop display and turn off the wireless data reporting. In the first test installation, it can be waked up by a traffic flow of more than 10L/h lasting for 2 minutes or by NFC setting to normal mode, the meter will enter installation mode. Communicate every 30 second and last 1 hour, after 1 hour automatic enter normal mode.

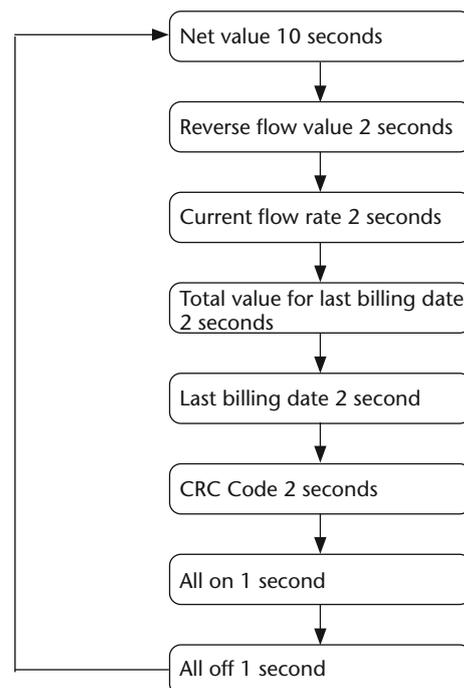
#### 1.2.2 Normal mode

The normal mode is divided into two types: measure mode and test mode.

##### 1.2.2.1 Measure mode

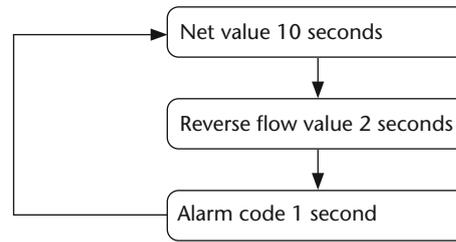
The measure mode is the normal metering flow usage of the end user. It displays 3 decimal places and is accurate to L bits. The maximum display can be 99999.999 m<sup>3</sup>.

The measure mode display cycle is divided into two cases: with alarm and without alarm. When there is no alarm, the display loop is as follows:



"←" and "→" are used to indicate the current flow direction. "→" indicates that the current display interface is the positive flow interface. "←" indicates that the current display interface is the reverse interface. The "←" and "→" indicator signs flicker to indicate the current traffic flow and indicate the corresponding flow direction.

When the system has an alarm, the display loop is as follows:



### 1.2.2.2 Test mode

This mode is used by the manufacturer to verify and calibrate the water meter. It shows only positive flow value and 5 decimal places. This is accurate to 10mL and does not perform loop display.

## 2. Wireless M-bus communication

### 2.1 Communication activation

The water meter is preset to storage mode when it leaves the factory. LCD display "SLEEP", wireless data reporting off. Activation data can be reported in either of the following ways:

- (1) Keep the water flow greater than 10L/h for more than 2 minutes;
- (2) Set the working mode of the water meter to "normal mode" through NFC.

After the communication is activated, the LCD goes into the circular display mode and "SLEEP" disappears automatic enter installation mode. Communicate every 30 second and last 1 hour, after 1 hour automatic enter normal mode.

### 2.2 Content of communication

The main contents of wireless communication are as follows:

No.	Content
1	Current date and time
2	Current net value
3	Error code
4	Last settlement date (long telegram)
5	Last settlement period net value (long telegram)
6	Last settlement period backward value
7	15 months net value records (long telegram)

Communication can choose short telegram and long telegram; long telegram includes 15 months records.

### 3. NFC interface

#### 3.1 Introduction to Chip

Based on the ISO/IEC 15693 protocol, the NFC chip supports all ISO/IEC 15693 modulations, codes, sub-carrier modes and rates. The user memory area enforces read and/or write protection at the RF interface through three 64-bit ciphers to prevent other types of software from reading in-table parameters and data. The NFC interface read and write parameters only need to be powered through the NFC read and write device. Therefore, even after the meter runs out of power, the last meter stored metering data can be read out.

#### 3.2 Reading and writing parameters

An Android phone or tablet with NFC function is required to access the parameters in the table through NFC interface. It reads and writes with the special APP software provided by the manufacturer.

##### 3.2.1 Current data

The screenshot shows an application interface for NFC communication. At the top, there are fields for 'Chip' and 'UID:'. Below this, there are three tabs: 'current data' (highlighted in green), 'Parameter Settings', and 'historical'. Under the 'current data' tab, there is a 'Meter SN' section with a checkbox for 'enable Meter SN automatically increment'. Below this is an NFC icon and a text input field with 'SET' and 'QUERY' buttons. Further down, there are sections for 'Volume forward(L)', 'Volume backward(L)', and 'Software Version', each with a text input field and 'SET' or 'QUERY' buttons. At the bottom, there is a 'Use system time' checkbox (checked), a 'Time' field showing '2023 - 09 - 05 10 : 25 : 34', a 'Wireless operating mode' dropdown menu set to '0-T1', and a 'Storage mode' dropdown menu set to 'Normal m...'. There are 'SET' and 'QUERY' buttons at the very bottom.

The main things that can be read/written via NFC interface are as follows:

Parameter names	Explanation
Water meter No	The number of the water meter at the factory, 8 digits
Positive cumulative flow	Current positive cumulative flow
Reverse cumulative flow	Current reverse cumulative flow
Software version number	Embedded software version currently in use
Time on meter	Date and time inside the meter
Wireless operation mode	Wireless communication mode, T1, C1 optional
Working mode of water meter	Sleep mode or normal mode is optional
Date of settlement	Setting the settlement date, setting the range from 1 to 31. If set to 31, the month with less than 31 days will be automatically changed to the last day of the current month
Period of communication	Start and end time of communication within a day, set from 0 to 24
Communication reporting interval	From 1 to 60 minutes, 0 is closed reporting

### 3.2.2 Parameter Setting

Chip
UID:

Parameter Settings
historical record

Settlement Date – Month(1-12)

Settlement Date – Day(1-31)

Pulse equivalency(L)

SET
QUERY

AES key

SET
QUERY

Low flow duration(min)

Low flow alarm threshold(L)

SET
QUERY

The main things that can be read/written via NFC interface are as follows:

Parameter names	Explanation
Billing date Month	Setting the invoice date Month, setting the range from 1-12 month
Billing date Day	Setting the invoice date Day, setting the range from 1 to 31.
Pulse equivalent	The flow rate represented by each pulse (per revolution)
AES-KEY	The 16-byte AES key can be set by the NFC
Low flow alarm time threshold	Traffic below the Low Flow alarm traffic threshold and for a duration greater than the low flow alarm time threshold will trigger a persistent low flow (leakage) alarm
Low flow alarm traffic threshold	
High flow alarm time threshold	A sustained high flow (burst) alarm will be triggered if the flow is higher than the high Flow alarm Flow Threshold and the duration is greater than the high flow alarm time threshold
High flow alarm traffic threshold	
Countercurrent alarm time threshold	Reverse traffic higher than the "counterflow alarm traffic threshold" and the duration greater than the "counterflow alarm time threshold" will trigger a continuous counterflow alarm
Countercurrent alarm traffic threshold	
Telegram chooses	Short or long telegram

Water meter type	Cold (07) or warm water (06) meter
Water meter operation mode	The measure mode and test mode are optional. The measure mode is the normal measure mode used by the end user. The test mode is the mode used by the water meter manufacturer when calibrating the water meter. The water meter starts timing after switching to test mode, and automatically switches to measure mode 2 hours later, and the cumulative amount generated in test mode is also normally accumulated to the cumulative amount of the water meter
AES encryption switch	Enable/disable AES encryption, disable AES encryption is sent in plain code Close = data transfer without AES-Key Enable = data transfer with AES-Key

### 3.2.3 History record

The history interface can read the 15-month history records stored in the table, which is 0 when there is no record. The interface is as follows:

Chip ST25DV04K-I UID: E002240319101F32

is **historical record** Factory configuration

Serial number	Total volume
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0

Querying historical data

### 3.2.4 Factory configuration

The factory configuration integrates some parameters that need to be configured before delivery into one screen. In addition, the parameters can be configured in one-click read/write mode, facilitating factory setting and maintenance.

### 3.3 Accounts

The software is divided into different login accounts with different permissions, as follows:

- Consumer:** End user, password 000000, read only It is used only for viewing purposes;
- Installer:** Used by the water meter installer, it can set some parameters. Passwords are invisible;
- Manufacturer:** Used by the water meter manufacturer, the metering parameters can be set. And the water meter program can be upgraded. The password is not visible.

#### 4. Fault (abnormal state) detection

Currently, there are six kinds of faults that can be detected, including low battery power, continuous high flow (tube burst), continuous low flow (leakage), continuous counter flow, sensor fault, and NFC encryption fault.

The fault code is as follows:

Fault name	Fault Code (HEX)	Processing method
Low battery power	0x0001	Replacement of equipment
Sustained high flow (burst)	0x0002	Check the pipe line for pipe burst phenomenon
Sustained low flow (leakage)	0x0004	Check the pipe line for leakage
Sensor failure	0x0008	Replacement of equipment
Continuous reverse flow	0x0010	Check the meter installation direction or flow direction
NFC encryption failure	0x0020	Reset table data, password

#### 5. Program upgrade

The NCF interface is used to upgrade the program, and the terminal does not need to connect or open the cover when upgrading. The update iteration of the program can be carried out without loss. In case of communication failure in the process of program upgrade, breakpoint retransmission is supported. When restarting an upgrade, there is no need to roll back from where you left off. This improves upgrade efficiency and saves energy consumption.

Legitimate authentication is required for program upgrades. Illegal users cannot upgrade the terminal.

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