

# MFE600E-S Electromagnetic Flowmeter



## Features

- The measurement accuracy will not be influenced by the fluid density, viscosity, temperature, pressure and electrical conductivity changes.
- Open flow without moving parts in measuring pipe, no pressure loss.
- Simple structure, easy installation, no high requirements for straight pipe section.
- No mechanical inertia, with good sensitivity, it can measure the transient pulsating flux, and has good linearity.
- Compact size, high-resolution LCD display, PEEK liner.
- Built-in measurement with signal output. Features temperature measurement and signal output.

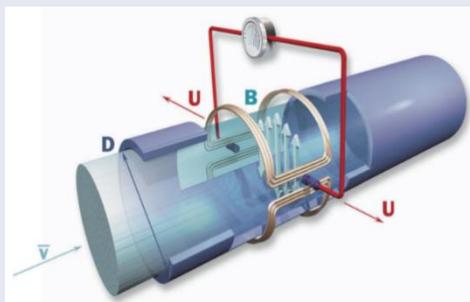


Figure 1 Operating principle

## Introduction

MFE600E-S Series Electromagnetic Flowmeter (hereinafter called Electromagnetic Flowmeter) is designed and manufactured with the most advanced domestic and abroad technology, featuring high accuracy, reliability, good stability and long service life.

We pay our attention to every detail in the process of the product structure design, material selection, manufacturing, assembly and factory testing etc. With a water tower up to 37m as pressure stabilizer for actual flow calibration, we have a professional production line for electromagnetic flowmeter, also we design and develop a series of software and hardware for electromagnetic flowmeter for mass production to ensure high quality in long term use. The product has backlight and wide temperature-ranged LCD display. With fully practical function, visual display, easy operation, it saves troubles front-site installation operation and maintenance. MFE600E-S can be widely used in industrial fields such as petroleum, chemical, metallurgy, water supply and drainage, steel, coal, paper, food, textile, environmental protection and other municipal administration, water conservancy construction field etc.

## Operating Principle

Electromagnetic flowmeters operate based on Faraday's law of electromagnetic induction. A pair of electrodes is installed on the pipe wall, where the axis of the meter tube is perpendicular to the magnetic field lines. When the conductive fluid flows along the pipe axis, it cuts through the magnetic field lines, generating an induced electromotive force, which is detected by the electrodes. The induced electromotive force is given by the formula:  $U = K \times B \times V \times D$ , where:

U: Induced electromotive force      K: Instrument constant  
B: Magnetic flux density              V: Average velocity  
D: Inner diameter of the meter tube

## Specifications

Diameter	Flange type: DN6~DN50
	Threaded type: DN6~DN50
	Clamping type: DN6~DN50
Accuracy	±0.5%FS
Electrode type	Standard fixed electrode
Structure type	Integrated type
Rated pressure	16 bar
Electrode material	316L, Ti, HB/HC
Lining material	PEEK special engineering plastic
Process connection material	Stainless steel 304, Stainless steel 316L
Protection class	IP65
Power supply	16V DC ~ 30V DC
Output type	Pulse, Current, Switch output
1 <sup>st</sup> Output signal	Flow pulse output
	Flow frequency output
	Frequency and temperature output
	Output the flow direction
	Flow limit alarm output
	Flow lower limit alarm output
2 <sup>nd</sup> Output signal	Current flow output
	Output voltage
	Temperature current output
	Output the flow direction
	Flow limit alarm output
	Flow lower limit alarm output
Electrical connection	M12×1
Display mode	LCD backlight display
Environmental temp.	-20°C~55°C
Storage temp.	-40°C~60°C
Relative humidity	5%~90%

Table 1 Specification

## Outline Structure

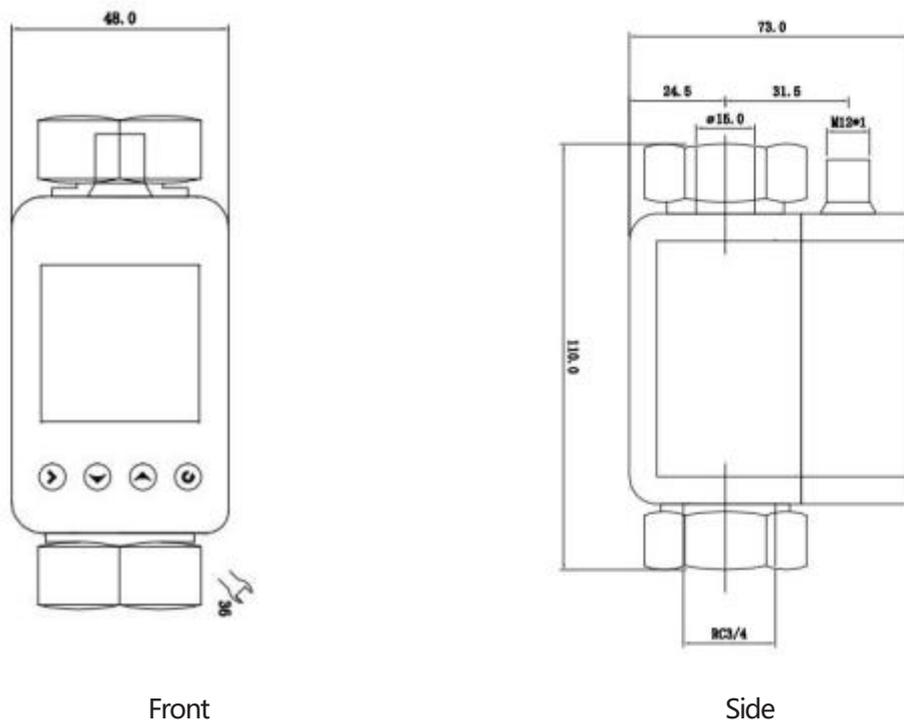
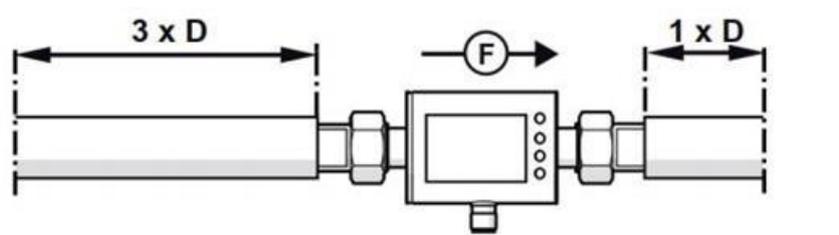


Figure 2

## Installation

It is recommended to install a separate section of inlet and outlet pipe to compensate for the interference caused by bending pipe, valve and reduced pipe diameter, as shown in Figure 3. Vertical pipes are recommended



to be installed before or inside the upward pipe. It is not recommended to install on or before a descending pipe. It is not recommended to install at the highest point of a piping system.

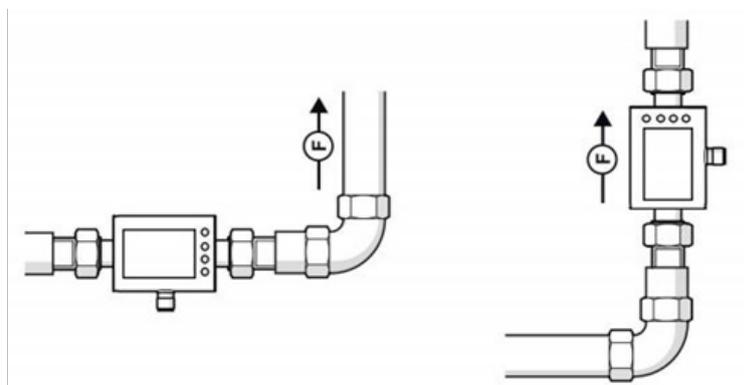


Figure 3

## Electrical Connection

Be sure to disconnect the power before connecting the device

### Wire Definition

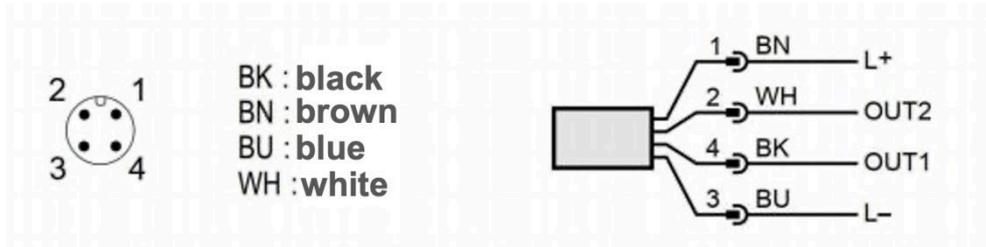


Figure 5

	L+	24V+
2	OUT2	OUTPUT2
3	OUT1	OUTPUT1
4	L-	24V-

Table 2

### Switch signal

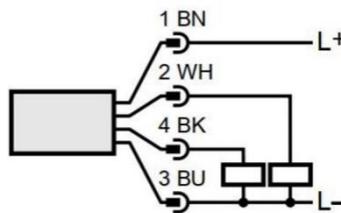


Figure 6 PNP output

The switching outputs are all active outputs! When set to PNP output, the output is connected to L+ when closed; When set to NPN output, the output is connected to L- when closed.

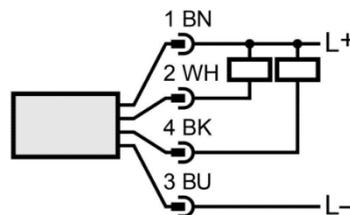


Figure 7 NPN output

Flow direction	Positive flow (disconnect)	Negative flow (close)
Upper limit alarm	No alarm (disconnect)	Upper limit alarm (close)
Lower limit alarm	No alarm (disconnect)	Lower limit alarm (close)

Table 3 Switch signal true value

## Analog signal

The analog outputs include current output (4-20mA) and voltage output (0-10V), both of which are active outputs.

## LCD Display and Instruction

### LCD and Panel Definitions

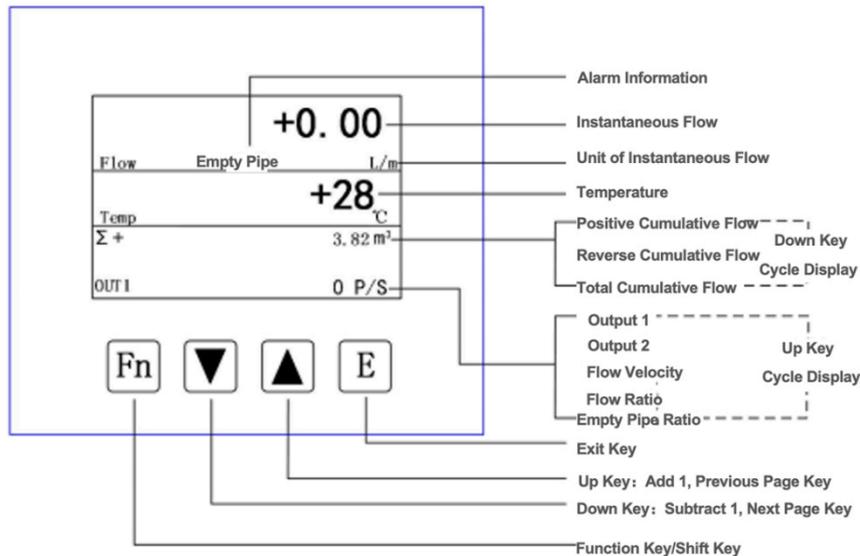


Figure 8 LCD and panel buttons

The device starts to measure automatically after powered-on, realizes various measurement functions and displays the corresponding measurement data. The parameters can be set and displayed by operating the 4 panel buttons.

The direction of the LCD can be selected through the menu "Basic Settings → Display Direction". Four different directions can be selected.

### Button Functions

The flowmeter has four buttons: Up, Down, Function/Shift and Exit.

Up key: Add 1 to the number at the cursor, cycle through the upper line of the screen.

Down key: The number at the cursor minus 1, cycle through the lower line of the screen.

Function/Shift Keys: In the parameter editing interface, shift the cursor to the right. In non-parameter editing interface, enter the lower submenu.

Exit key: In parameter editing interface, choose whether to save the parameter or exit directly (there must be addition, subtraction or shift operation, otherwise, it will return to the upper submenu directly). In the non-parameter editing interface, return to the upper submenu;

In the parameter editing, use the function keys/shift keys to shift, use the up/down keys to add/subtract, and use the exit key to choose to save the parameter or exit directly without saving.

## Password

The instrument is designed with 3 levels of passwords. Level 1 password can modify the password value of this level; Level 2 password can modify the password of this level and view the password value of level 1; Level 3 password can modify the password of this level and view the password value of level 1 and level 2. The factory values of level 1 and level 2 are "10000" and "40000" respectively.

After entering the menu with the password, you can operate the corresponding password level, the exit key can return to the main screen, and you can directly enter the menu without the password within 5 minutes (enter any password in the password input screen, press the exit key and then press the function key to directly enter the menu).

## Device Menu

Table 4

Menu level 1	Menu level 2	Mene level 3
Basic setting	Range	Setting. Range unit could be set separately
	Flow unit	L/h, L/m, L/s, m3/h, m3/m, m3/s, t/h, t/m, t/s, kg/h, kg/m, kg/s, GPH, GPM, GPS
	Flow Decimal Digit Settings	Automatic, manual. Manual setting can set the instantaneous flow rate to 0~3 decimal points
	Unit of accumulation of volume	0.001m3, 0.01m3, 0.1m3, 1m3, 0.001L, 0.01L, 0.1L, 1L, 1t, 1kg, GAL
	Damping time	0-99s
	Fluid density	Setting. When flow units or flow accumulation units include kg or t, the current volumetric flow rate multiplied by the density is the mass flow rate.
	Small signal cut off point	Setting. When the flow percentage is less than or equal to the small signal cutoff point, the flow is cut off and displayed as "0" .
	Reverse measurement	Allowed, prohibited
	Reverse output	Allowed, prohibited
	Empty pipe alarm	Allowed, prohibited
	Empty pipe threshold	Setting
	Upper limit alarm	Allowed, prohibited
	Upper limit	Setting
	Lower limit alarm	Allowed, prohibited
Lower limit	Setting	

Basic setting	Steady flow	Allowed, prohibited
	Steady flow coefficient	Setting
	Peak suppressor	Allowed, prohibited
	Peak suppressor threshold	Setting
	Peak suppressor time	Setting
	Password setting	Setting Level 1, Level 2 and Level 3 password
	Password display	Display Level 1, Level 2 and Level 3 password
	Flow direction	0-3, represent four directions
	Display Contrast	Setting
	Temp. Damping time	0-63s
	Software version	Read-only
Calibrate device	Diameter	6mm-50mm
	Sensor coefficient	Setting
	Flow zero correction	Setting
	Automatic zero correction	Allowed, prohibited
	Zero correction time	Setting
	Excitation frequency	1/2, 1/4, 1/8, 1/16 power frequency
	Normalization coefficient	Setting
	Segment correction	Setting
	Measurement direction	Forward, reverse
	Forward total preset	Setting
	Reverse total preset	Setting
	Temp. zero point	Setting
	Temp. full scale	Setting
	Diagnostics	
Output setting	Output 1	Refer to electrical connection
	Output 2	Refer to electrical connection
	Output polarity	PNP, NPN. Set the polarity of the switch output
	Pulse unit	The unit is L, available between 0.001L-10000.000L
	Pulse width setting	Automatic or manual mode can be selected, and manual mode can be set.
	Frequency output range	0-10000Hz
	Temp. range upper limit	Setting
	Temp. range lower limit	Setting
	Current zero point	Adjust current output zero point
	Current full scale	Adjust current output full scale

Output setting	Voltage zero point	Adjust voltage output zero point
	Voltage full scale	Adjust voltage output full scale
	Current output test	Simulation current output
	Frequency output test	Simulation frequency output
	Pulse output test	Simulation pulse output
	Voltage output test	Simulation voltage output
Reset accumulated volume		Password required

## Description of menus with different levels

### Basic setting

Device range: Device range setting means that the upper flow value is determined and the lower flow value of the instrument will be automatically set to "0". Therefore, the instrument range setting determines the range of the instrument, and also determines the correspondence between the instrument percentage display, the instrument frequency output, the instrument current output and the flow rate:

Percentage flow = (flow measurement / meter range) \* 100 %

Frequency output value = flow percentage value \* frequency output range

Current output value = flow percentage value \* 16mA + 4mA

The instrument pulse output value is not affected by the instrument range setting.

### Output setting

Temp. range upper and lower setting: The upper limit and lower limit of the temperature range define the temperature measurement range, thereby establishing the correspondence between temperature percentage, temperature frequency output, temperature current output, and temperature:

Temperature percentage value = (Temperature value - Lower limit of temperature range) / (Upper limit of temperature range - Lower limit of temperature range) \* 100%

Temperature frequency output value = Temperature percentage value \* Frequency output range

Temperature current output value = Temperature percentage value \* 16mA + 4mA

### Current output test

When you enter a current setting value, the screen will flash. At this point, the current output will be forced to the set value. Press any key to exit test mode.

### Frequency output test

When you enter a frequency setting value, the screen will flash. At this point, the frequency output will be forced to the set value. Press any key to exit test mode.

### Pulse output test

When you enter a pulse width setting value and save it, the screen will enter a flashing state. At this point, the frequency output will be forced to output one pulse per second, with a pulse width equal to the current setting value. Press any key to exit the test state.

### Voltage output test

When you enter a voltage setting value and save it, the screen will flash. At this point, the voltage output will be forced to the set value. Press any key to exit test mode.

## Diameter and flow rate

Diameter	Flow rate
DN15	0.05 - 25 L/min
DN20	0.1- 50 L/min
DN25	0.2 – 70 L/min
DN32	5 – 300 L/min
DN40	5 – 600 L/min
DN50	5 – 900 L/min

Table 5

## Diameter and installation thread

Diameter	Thread
DN15	G1/2
DN20	G3/4
DN25	G1
DN32	G1-1/2
DN40	G2
DN50	G2

Table 6

## Order guide

Parameter description	Code	Details
MFE600-E	MFE600-E	Electromagnetic flowmeter
Type	S	S model
Diameter	010	DN10
Diameter	015	DN15
	020	DN20
	025	DN25
	032	DN32
	040	DN40
	050	DN50
Pressure rating	P2	1.6MPa
Process Connection	F	Flange connection
	L	Thread connection
	K	Clamp connection
Connection Material	2	304 stainless steel
	3	316L stainless steel
Electrode Type	D	Standard fixed type
Electrode Material	1	316L stainless steel
Electrode Material Lining Material	2	Harris C (HC)
	3	Harris B (HB)
	4	Titanium (Ti)
	K	PEEK
Temperature Range	2	≤120°C
Grounding	1	With grounding electrode/without grounding ring
Protection Class	1	IP65
	2	IP67
Display Type	1	Integrated
Accuracy	B	0.5
Housing Material	2	304 stainless steel
	3	316L stainless steel
Connection	M	M20×1.5
	G	G1/2
Output Signal	1	4-20mA/frequency pulse
	4	4-20mA/frequency pulse + RS485
Power Supply Voltage	3	24V DC
Option	E	English menu, label and certificate of conformity

Dtsinstruments.com  
Carrer Narcís Monturiol 11, Pol. Ind. Bufalvent  
08243 - Manresa (Barcelona, España)  
info@dtsinstruments.com  
Tel. 931 31 31 06

