

SELECTION CATALOGUE

■ Precision Manufacturing Accuracy Measurement

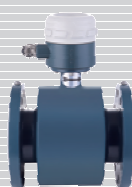


Electromagnetic Flowmeter

SE10/11/12/13/14

HART
FIELD COMMUNICATIONS PROTOCOL

PROFI
PROCESS FIELD BUS
BUS



SINIER

■ Sino-British Cooperation

- No moving parts in the pipe, nearly no extra pressure loss during the measurement.
- Results have nothing to do with the velocity, pressure, temperature, density, viscosity and other physical parameters of the fluid.
- Modifying measuring range on-site according to user's actual needs is available.
- Suitable to measure all kinds of conducting fluid, such as tap water, sewage, mud, beverage, chemical materials, viscous liquid and suspension liquid.
- Adopting SMD device and SMT technology, high circuit reliability, low power consumption.
- Adopting 16 Bit embedded microprocessor, fast operating rate, high accuracy, programmable low frequency rectangular wave excitation, to increase measurement stability.
- Digital processing, strong anti-jamming ability, measurement reliable, high accuracy, measuring range can reach 30:1.
- Low power consumption EMI switching power, suitable for large range of supply voltages, good EMC performance.
- Including three integrators, which can achieve forward, reserve and D-value results.
- Easy to operate, only connecting power after installing, no any other operations. Output standard signal, suitable for non-professional users.
- Five nonlinearity modification function of the sensor is provided.
- Function of automatic average flow operation, easy for calibration.
- Damping: range 1-50s
- Power-off protection, operation result of flowmeter and user's parameters won't disappear after power off, EEPROM can protect user's parameters and total value.
- Small signal removing function. Users can set lower limit of voltage and flow by display panel, removing interference of the small flow signal.
- Password locking function. After power on, five bit password should be input in order to set the parameters, preventing non-staff changing parameters.
- Many kinds of protection grade and installation method of the converters and sensors, and submersible grade IP68 is available.
- In large diameter pipelines, insertion type electromagnetic flowmeter is easy to install, without cutoff and on-site cutting hole with pressure, having absolute advantage in installation and price.
- Measurement of the insertion type electromagnetic flowmeter relate with the insertion depth only, so it has good generality and compatibility. One model can satisfy various kinds of pipeline measurement.
- SE10 series flowmeters are available to set the parameters via buletooth communication, providing mobile phone APP for Android operating system. And parameters can be wirelessly set up in a short distance (within 20m), to make it easier for on-site operation.

Working Principle

The principle of the electromagnetic flowmeter is based on Faraday's law of electromagnetic induction. A pair of detection electrodes is installed on the pipe wall, where the measurement pipe axis and magnetic field lines are vertical. When the conductive liquid moves along the measurement pipe, the conductive liquid cuts magnetic field lines and produces induced electromotive force, which can be measured by the two electrodes on the meter pipe. Signal voltage U_E is proportional to magnetic induction B , electrode space D , and average velocity V . Because B and D is constant, U_E is proportional to V . Formula used for calculating volume velocity shows U_E has a linear relation with volume flow.

Inductive signal voltage is transformed into indexing, analog and digital output signal in the converter.

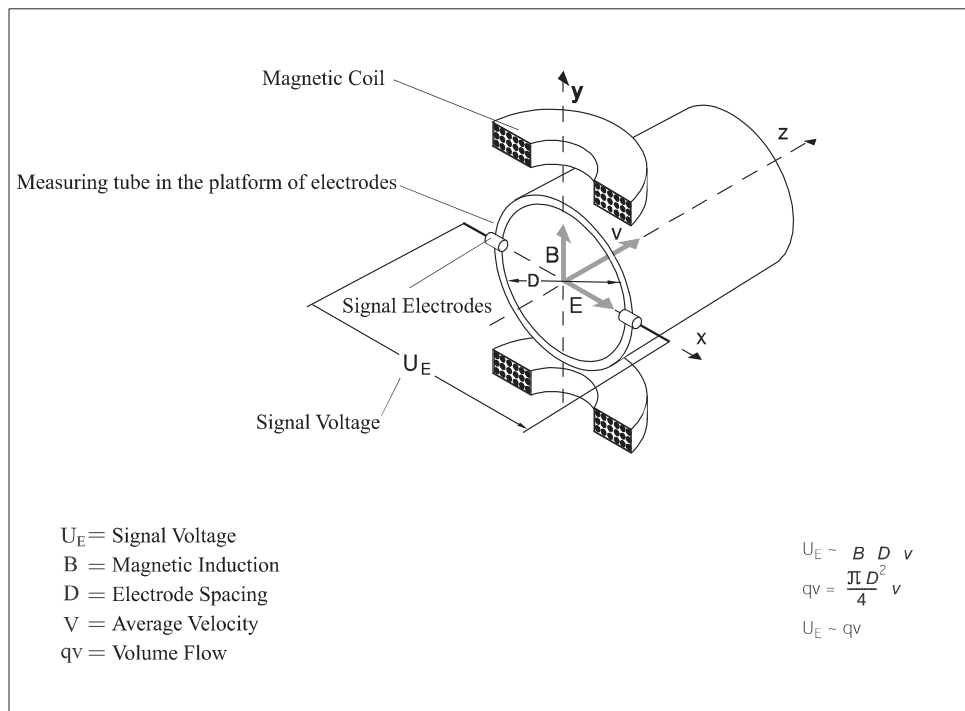


Diagram of Electromagnetic Flowmeter

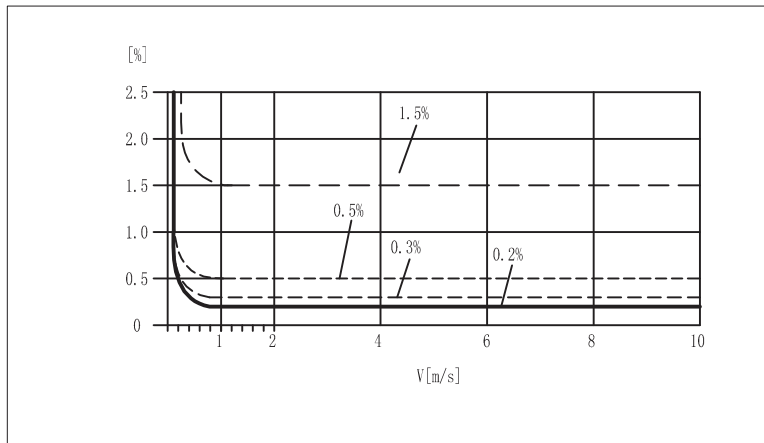
Standard Technical Specification

1. Normal Working Condition

Ambient Temperature: $-25 \sim +60^{\circ}\text{C}$
Relative Humidity: 5%~90%
Power Supply: 85~250V AC, 45~63Hz; 16~36V DC
Wasted Power: less than 20W

2. Accuracy

SE10A/SE10E: $\pm 0.5\%$; SE11: $\pm 0.2\% \pm 0.3\% \pm 0.5\%$; SE12E/SE13A: $\pm 0.5\%$;
SE14: $\pm 1.5\%$; SE14B/SE14C: $\pm 2.0\%$



Measurement Error

3. Output Variable

3.1 Analog Current Output

Load Resistant: when (0~10) mA, (0~1.5) k Ω ;
when (4~20) mA, (0~750) Ω .

Basic Error: $0.1\% \pm 10\mu A$.

3.2 Digital Frequency Output

Frequency Output Range: (1~5000) Hz;

Output Electric Isolation: photoelectric isolation, isolation voltage: >1000VDC;

Frequency Output Driver: field-effect tube output, max voltage is 36VDC, max load current is 250mA.

3.3 Digital Pulse Output

Output Pulse Range: (0~100) pulse/s (if higher than upper limit, pulse will be lost);

Output Pulse Equivalent: (0.001~1.000)m³/cp;

(0.001~1.000)LTR/cp;

(0.001~1.000)USG/cp;

(0.001~1.000)UKG/cp;

Output Pulse width: set by software of users'

Output Electric Isolation: photoelectric isolation, isolation voltage: >1000VDC;

Pulse Output Driver: field-effect tube output, max voltage is 36VDC, max load current is 250mA.

3.4 Alarm Output

Alarm output interface: ALMH---- higher limit alarm; ALML--- lower limit alarm;

Output Electric Isolation: photoelectric isolation, isolation voltage: >1000VDC;

Alarm Output Driver: Darlington tube output, max voltage is 36VDC, max load current is 250mA.

3.5 Digital Communication Interface and Communication Protocol

MODBUS Interface: RTU format, physical interface: RS485, electric isolation: 1000V;

HART Interface: supporting standard HART protocol, having HART communicator, showing measuring values online, and modifying parameter.

Main technical parameter

| | SE10A | SE10E | SE11 | SE12E | SE13A | SE13E | SE14 | SE14B | SE14C |
|-------------------------|---|--|--|---|--|--|--|--|------------------------|
| Measuring fluid | Conductive fluid | | | | | | | | |
| Accuracy | ±0.5% | | ±0.2% ±0.3% ±0.5% | ±0.5% | | | ±1.5% | ±2.0% | |
| Repeatability | 0.16% | | 0.1% 0.16% | 0.16% | | | 0.5% | 0.66% | |
| Fluid temperature | (-25~180)℃ | | (-25~200)℃ | | (-25~200)℃ | | (-25~120)℃ | | |
| Conductivity | ≥5 μm/cm(softened water≥20 μm/cm) | | | | | | | | |
| Diameter range | (10~300)mm | (10~600)mm | | (3~2000)mm | | (10~125)mm | | (200~2000)mm | (100~1000)mm |
| Working pressure | 1.0MPa/1.6MPa/2.5MPa/4.0MPa /Class150/Class300 | | 0.6MPa/1.0MPa/1.6MPa /2.5MPa/ 4.0MPa/Other | | 1.0MPa | | 1.6MPa | 1.6MPa/2.5MPa | |
| Velocity range | (0.5~10)m/s | | | | | | (0.5~6)m/s | | |
| Direction of flow | Forward/ Backward | | | | | | | | |
| Electrode material | 316L/Hastelloy B /Hastelloy C | 316L/Hastelloy B /Hastelloy C /Ti/Ta | 316L/Hastelloy B /Hastelloy C/Ti /Ta/Pt/Tungsten Carbide/ Others | 316L /Hastelloy C /Ti | 316L/Hastelloy C/Ti | | 316L /Hastelloy C | 316L | |
| Lining material | Chloroprene Rubber /PTFE/F46 | | Chloroprene Rubber /PTFE/F46/PFA | | F46/PFA | | PTFE | PVDF | |
| Electrode form | Standard Electrode | | | | | | | | |
| Electrode numbers | Four Electrode | | | | Two Electrode | | | | |
| Measuring tube material | 304 SST | | | | | | 304 SST(Inserted rod) | | |
| Flange material | Carbon steel/ Stainless steel | | | | Stainless steel | | | | |
| Installation form | Flange | | | | Hoop/thread | | Flange /Online-plug | Flange/ Ball valve | |
| Protection grade | IP65/IP67/IP68 | | | | | | | | |
| Power supply | 24VDC | 220VAC / 24VDC | | | 24VDC | 220VAC / 24VDC | | | 24VDC |
| Signal output | (4~20)mA /Bluetooth | (4~20)mA/ Frequency/Pulse /Bluetooth | (4~20)mA/ Frequency/Pulse | (4~20)mA/Bluetooth | | (4~20)mA/ Frequency/Pulse /Bluetooth | (4~20)mA/ Frequency/Pulse | (4~20)mA/ Frequency/Pulse /Bluetooth | (4~20)mA /Bluetooth |
| Communication | HART Communication /Modbus Protocol | | HART Communication /Modbus Protocol /Profibus Protocol | Modbus Protocol/User -defined protocol | HART Communication /Modbus Protocol | | HART Communication /Modbus Protocol /Profibus Protocol | HART Communication /Modbus Protocol | |
| Electrical connection | 1/2-14NPT、M20*1.5 | | | | | | | | |
| Anti-explosion form | Non-anti-explosion / Explosion suppression | | | | | | | | |
| Structure form | Integrated type | Integrated type / Divided type | | | Integrated type | Integrated type / Divided type | | | Integrated type |
| Working condition | Ambient temperature(-25~60)℃ Humidity5%~90% | | | | | | | | |

Note: For more details, pls refer to the order information lists.

Diameter, Nominal Pressure and Flow Range

Instantaneous volume flow is function of velocity and diameter of sensor. Instantaneous velocity chart shows flow range of every diameter which can measure, and several suitable specifications of given flow.

| Diameter DN | Pressure MPa | Min flow 0.5m/s | Max flow 10m/s |
|----------------|-----------------|-----------------------|-------------------------|
| 3 | 4.0 | 0.2L/min | 4L/min |
| 4 | 4.0 | 0.4L/min | 8L/min |
| 6 | 4.0 | 1.0L/min | 20L/min |
| 8 | 4.0 | 1.5L/min | 30L/min |
| 10 | 4.0 | 2.25L/min | 45L/min |
| 15 | 4.0 | 5.0L/min | 100L/min |
| 20 | 4.0 | 7.5L/min | 150L/min |
| 25 | 4.0 | 10L/min | 200L/min |
| 32 | 4.0 | 20L/min | 400L/min |
| 40 | 4.0 | 30L/min | 600L/min |
| 50 | 4.0 | 3m ³ /h | 60m ³ /h |
| 65 | 4.0 | 6m ³ /h | 120m ³ /h |
| 80 | 4.0 | 9m ³ /h | 180m ³ /h |
| 100 | 1.6 | 12m ³ /h | 240m ³ /h |
| 125 | 1.6 | 21m ³ /h | 420m ³ /h |
| 150 | 1.6 | 30m ³ /h | 600m ³ /h |
| 200 | 1.6 | 54m ³ /h | 1080m ³ /h |
| 250 | 1.6 | 90m ³ /h | 1800m ³ /h |
| 300 | 1.6 | 120m ³ /h | 2400m ³ /h |
| 350 | 1.6 | 165m ³ /h | 3300m ³ /h |
| 400 | 1.6 | 225m ³ /h | 4500m ³ /h |
| 450 | 1.0 | 286m ³ /h | 5700m ³ /h |
| 500 | 1.0 | 330m ³ /h | 6600m ³ /h |
| 600 | 1.0 | 480m ³ /h | 9600m ³ /h |
| 700 | 1.0 | 660m ³ /h | 13200m ³ /h |
| 800 | 1.0 | 900m ³ /h | 18000m ³ /h |
| 900 | 1.0 | 1200m ³ /h | 24000m ³ /h |
| 1000 | 1.0 | 1350m ³ /h | 27000m ³ /h |
| 1200 | 0.6 | 2100m ³ /h | 42000m ³ /h |
| 1400 | 0.6 | 2700m ³ /h | 54000m ³ /h |
| 1600 | 0.6 | 3600m ³ /h | 72000m ³ /h |
| 1800 | 0.6 | 4500m ³ /h | 90000m ³ /h |
| 2000 | 0.6 | 5700m ³ /h | 114000m ³ /h |