

Electromagnetic Flow Meter

Electromagnetic Flow Meter Operation Manual

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HARDWARE

1. GENERAL INFORMATION

This manual will assist you in installing, using and maintaining Electromagnetic Flow meter. It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedure.



Warning

For your safety, review the major warnings and cautions below before operating your equipment.

1. Use only fluids that are compatible with the housing material and wetted components of your Electromagnetic Flow Meter.
2. When handling hazardous liquids, always exercise appropriate safety precautions.
3. When measuring flammable liquids, observe precautions against fire or explosion.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. Handle the sensor carefully. Even small scratches or nicks can affect accuracy.
6. For best results, calibrate the meter at least 1 time per year.
7. Do not purge the flow meter with compressed air.
8. During Electromagnetic Flow Meter removal, liquid may spill. Follow the manufacturer's safety precautions for clean up of minor spills

1.1 Product Description

Electromagnetic flow meters are intended for fluid measurement in most industries including water, wastewater, food and beverage, pharmaceutical and chemical.

There are two basic components of electromagnetic flow meter: 1) The Detector, which includes the flow tube, isolating liner and measuring electrodes, and 2) The Converter, which is the electronic device responsible for signal processing, flow calculation, display and output signals.

The materials of construction of the wetted parts (liner and electrodes) should be appropriate for the specifications on the intended type of service. Review of the compatibilities consistent with the specifications is recommended.

Our's electromagnetic flow meters are factory tested and calibrated. A calibration certificate is included in the shipment of each meter.

1.2 Unpacking and Inspection

Upon receipt, examine your meter for visible damage. The meter is a precision measuring instrument and handled carefully. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact us.

Make sure the flow meter model meets your specific needs. For your future reference, it might be useful to record this information on nameplate in the manual in case it becomes unreadable on the meter.

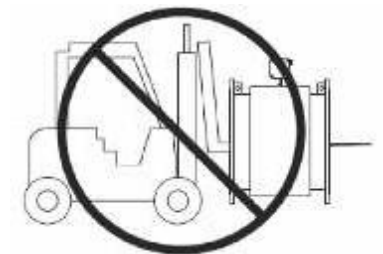
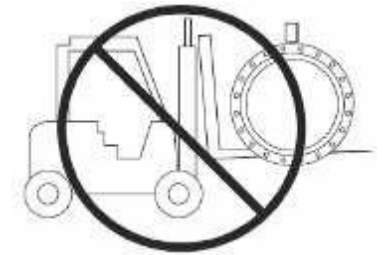
Transportation and Handling

Do not lift the detector from the Converter housing, the junction box or the connecting cable. Use lifting lugs for larger sizes is recommended. Very large meter sizes are packed and crated with the meter laying on its side for shipping safety and stability reasons. In order to lift the meter in vertical position, it's recommended to use a sling rigged method as shown below.



Warning: NEVER introduce the forklift, chains, wire slings or any other sharp object inside the flow tube for lifting or handling purpose. This could permanently damage the isolating liner and could render the meter inoperable.

If using a forklift, do not lift the detector from its body between the flanges. The housing could be accidentally dented and permanent damage could be caused to the internal coil assemblies.



2. TECHNICAL DATA

Measuring system

| | |
|----------------------------|--------------------------------|
| Measuring principle | Faraday's law |
| Application range | Electrically conductive fluids |
| Measured Value | |
| Primary measured value | Flow velocity |
| Secondary measured value | Volume flow |

Design

| | |
|-----------------------------|--|
| Features | Fully welded maintenance-free sensor |
| | Flange version with full bore flow tube |
| | Standard as well as higher pressure ratings |
| | Large diameter range from DN25...3000 with rugged liners approved for drinking water |
| Modular construction | Industry specific insertion lengths |
| | The measurement system consists of a flow sensor and a signal converter. It is available as compact and as remote version. |
| Compact version | With 511B converter: 110-240Vac Power |
| | With 521B converter: 18-36V DC Power |
| | With W800L/W800W: Battery Power |
| Remote version | In wall mount version with 211B converter (110-240Vac) or 221B converter (18-36V DC) |
| | With W800F converter: Battery Power |
| Measurement range | -12...+12 m/s (-40...+40 ft/s) |

Measuring Accuracy

| | |
|-----------------------------|--|
| Reference conditions | Flow conditions similar to EN 29104 |
| | Medium: Water |
| | Electrical conductivity: $\geq 300 \mu\text{s/cm}$ |
| | Temperature: +10...+30°C (+50°F... +86°F) |
| Flow Meter Accuracy | Inlet section: $\geq 5\text{DN}$ |
| | Operating pressure: 1 bar(14.5 psig) |
| | Standard: $\pm 0.5\%$ of rate |
| | Optional: $\pm 0.2\%$ of rate |

Operating conditions

| | |
|------------------------------------|---|
| Temperature | |
| Process temperature | Hard rubber liner: -5...+60°C or 90°C |
| | Polypropylene liner: -5...+90°C |
| | PTFE liner: -5...+120°C; PTA: 180°C |
| Ambient temperature (all versions) | Standard (with aluminum converter housing) |
| | -20...+60°C (Protect electronics against self-heating with ambient temperatures above 55) |
| Storage temperature | -20...+70°C |
| Pressure | |
| EN 1092-1 | DN2200...DN3000: PN2.5 |
| | DN1200...DN2000: PN 6 |
| | DN200...DN1000: PN10 |
| | DN65...DN150: PN 16 |
| | DN10...DN50: PN 40 |
| | Other pressures on request |
| ASME B16.5 | 1/2"...8": 150 lb RF |
| | Other pressures on request |
| JIS | 1/2"...8": 10 K |
| | Other pressures on request |
| Pressure drop | Negligible |

| Fluid | |
|------------------------------------|------------------------|
| Physical condition | Conductive liquids |
| Electrical conductivity | $\geq 5\mu\text{s/cm}$ |
| Permissible gas content (volume) | $\leq 5\%$ |
| Permissible solid content (volume) | $\leq 70\%$ |

Installation conditions

| | |
|----------------|--|
| Installation | Take care that flow sensor is always fully filled |
| | For detailed information see chapter "Cautions for Installation" |
| Flow direction | Forward and reverse |
| | Arrow on flow sensor indicates positive flow direction. |
| Inlet run | $\geq 5 \text{ DN}$ |
| Outlet run | $\geq 2 \text{ DN}$ |

Materials

| | |
|---------------------------------------|--|
| Sensor housing | Sheet steel, Polyurethane coated |
| | Other materials on request |
| Measuring tube | Austenitic stainless steel |
| Flanges | Carbon steel; Polyurethane coated |
| | Other materials on request |
| Liner | Standard |
| | DN10...40 : F46 |
| | DN50 ...300: PTFE or Hard Rubber |
| | DN300 ...2200 : Hard Rubber |
| Connection box (only remote versions) | Standard : Polyurethane coated die-cast aluminum |
| Measuring electrodes | Standard : Stainless steel 316L |
| | Option: Hastelloy C, Titanium, Tantalum |
| | Other materials on request |
| Grounding rings | Standard: Stainless steel |
| Grounding electrodes (option) | Same material as measuring electrodes |

Process connections

| Flange | |
|--------------------------|--|
| EN 1092-1 | DN10...300 in PN6...40 |
| ASME | 3/8"...120" in 150 lb RF |
| JIS | 10...1000 in 10...20K |
| Design of gasket surface | RF |
| | Other sizes or pressure ratings on request |

Flow Range

| Diameter | | Flow Rate (m ³ /h) | | |
|----------|--------|-------------------------------|------------|---------|
| | | V=0.3m/s | V=6m/s | V=10m/s |
| mm | Inch | Min | Calibrated | Max |
| 6 | 1/4" | 0.0306 | 0.611 | 1.018 |
| 10 | 3/8" | 0.0849 | 1.696 | 2.827 |
| 15 | 1/2" | 0.1909 | 3.817 | 6.362 |
| 20 | 3/4" | 0.3393 | 6.786 | 11.31 |
| 25 | 1" | 0.5301 | 10.60 | 17.67 |
| 32 | 1-1/4" | 0.8686 | 17.37 | 28.95 |
| 40 | 1-1/2" | 1.357 | 27.14 | 45.24 |
| 50 | 2" | 2.121 | 42.14 | 70.69 |
| 65 | 2-1/2" | 3.584 | 71.68 | 119.5 |
| 80 | 3" | 5.429 | 108.6 | 181.0 |
| 100 | 4" | 8.482 | 169.6 | 282.7 |
| 125 | 5" | 13.25 | 265.1 | 441.8 |
| 150 | 6" | 19.09 | 381.7 | 636.2 |
| 200 | 8" | 33.93 | 678.6 | 1131 |
| 250 | 10" | 53.01 | 1060 | 1767 |
| 300 | 12" | 76.34 | 1527 | 2545 |
| 350 | 14" | 103.9 | 2078 | 3465 |
| 400 | 16" | 135.7 | 2714 | 4524 |
| 450 | 18" | 171.8 | 3435 | 5726 |
| 500 | 20" | 212.1 | 4241 | 7069 |
| 600 | 24" | 305.4 | 6107 | 10179 |
| 700 | 28" | 415.6 | 8310 | 13850 |
| 800 | 32" | 542.9 | 10860 | 18100 |
| 900 | 36" | 662.8 | 13740 | 22900 |
| 1000 | 40" | 848.2 | 16962 | 28270 |

3. MODEL AND SELECTION

3.1 Standard Type

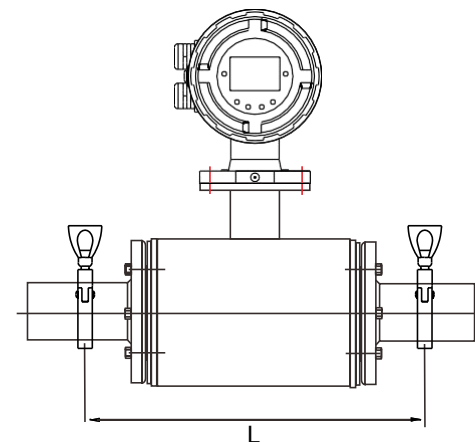
B series



Model Selection

| Model | Suffix Code | Description |
|--------------------|-------------|--|
| FET-1031 | | Electromagnetic Flowmeter |
| Type | B | B type |
| | T | T type(DN15- DN100 only) |
| Diameter | XXXX | Stand for diameter 0006: DN6; 0015: DN15 0100: DN100; 2200: DN2200 |
| | Structure | S |
| L | | Remote Type; 10 meters cable default |
| Electrode Material | M | SS316L |
| | T | Titanium |
| | D | Tantalum |
| | H | Hastelloy Alloy C |
| | P | Platinum-Iridium |
| Signal Output | 0 | No Output |
| | 1 | 4-20mA / Pulse |
| Liner Material | X | Hard Rubber |
| | P | Propylene Oxide |
| | F | PTFE |
| | A | PFA |
| Power Supply | -0 | 110-240Vac |
| | -1 | 24V DC (20-36V DC) |
| | -2 | Battery Power Supply |
| Communication | 0 | No Communication |
| | 1 | Modbus RS485 |
| | 2 | HART |
| | 3 | GPRS |
| | 4 | Profibus DP |
| Sensor Grounding | 0 | No Grounding |
| | 1 | Grounding Ring |
| | 2 | Grounding Electrode |
| Connection | DXX | D16: DIN PN16 Flange ; D25: DIN PN25 Flange... |
| | AXX | A15: ANSI150# Flange; A30: ANSI 300# Flange... |
| | JXX | J10: JIS 10K Flange; J20: JIS 20K Flange... |
| | XXX | On request |
| Body Material | CS | Carbon Steel |
| | S4 | Stainless Steel 304 |
| | S6 | Stainless Steel 316 |

3.2 Sanitary type



Length

DN10-DN25: L= 200mm
DN32-DN100: L= 300mm

Model Selection

| Model | Suffix Code | Description |
|--------------------|-------------|---|
| FET-1031 | | Sanitary Magnetic Flowmeter |
| Diameter | XXXX | Stand for diameter 0010: DN10 0100: DN100 |
| Structure | S | Compact Type with local display |
| | L | Remote Type;10 meters cable default |
| Electrode Material | M | SS316L |
| | T | Titanium |
| | D | Tantalum |
| | H | Hastelloy Alloy C |
| | P | Platinum-Iridium |
| Signal Output | 0 | No Output |
| | 1 | 4-20mA / Pulse |
| Liner Material | F | PTFE |
| | A | PFA |
| Power Supply | -0 | 110-240V AC |
| | -1 | 24V DC (20-36V DC) |
| | -2 | Battery Power Supply |
| Communication | 0 | No Communication |
| | 1 | Modbus RS485 |
| | 2 | HART |
| | 3 | GPRS |
| | 4 | Profibus DP |
| Sensor Grounding | 0 | No Grounding |
| | 1 | Grounding Ring |
| | 2 | Grounding Electrode |
| Connection | TRC | Tri-clamp for sanitary connection |
| Body Material | S4 | Stainless steel 304 |

3.3 Insertion type

Simple Type series



Ball Valve Type series



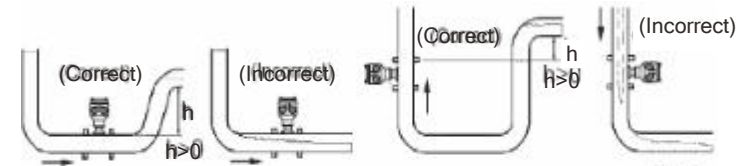
Model Selection

| Model | Suffix Code | Description |
|--------------------|-------------|---|
| FET-1031 | | Insertion Magnetic Flowmeter |
| Diameter | XXXX | Stand for diameter 0200: DN200 3000: DN3000 |
| Structure | S | Compact type with local display |
| | L | Remote type with 10 meters cable |
| Electrode Material | M | SS316L |
| | T | Titanium |
| | D | Tantalum |
| | H | Hastelloy Alloy C |
| | P | Platinum-Iridium |
| Signal output | 0 | No Output |
| | 1 | 4-20mA / Pulse |
| Power Supply | -0 | 110-240V AC |
| | -1 | 24V DC (20-36V DC) |
| | -2 | Battery Power Supply |
| Communication | 0 | No Communication |
| | 1 | Modbus Rs485 |
| | 2 | Hart |
| | 3 | GPRS |
| | 4 | Profibus DP |
| Connection | S | Simple Type |
| | B | Ball Valve Type |

4. CAUTIONS FOR INSTALLATION

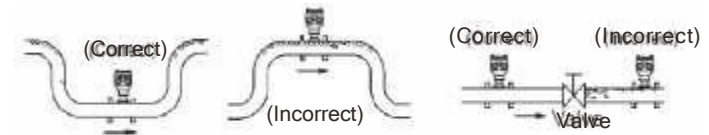
4.1 Mounting Positions

- ★ Pipes must be fully filled with liquids. It is essential that pipes remain fully filled at all times, otherwise flow rate indications may be affected and measurement errors may be caused.



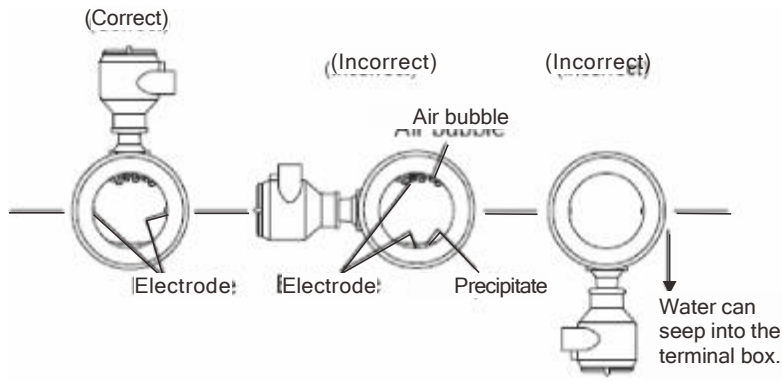
Mounting Positions

- ★ Avoid Air Bubbles. If air bubbles enter a measurement pipe, flow rate indications may be affected and measurement errors may be caused.



Avoiding Air Bubbles

- ★ If the electrodes are vertical to the ground, air bubbles near the top or precipitates at the bottom may cause measurement error. Ensure that the terminal box is mounted above the piping to prevent water from entering them.



Mounting Orientation

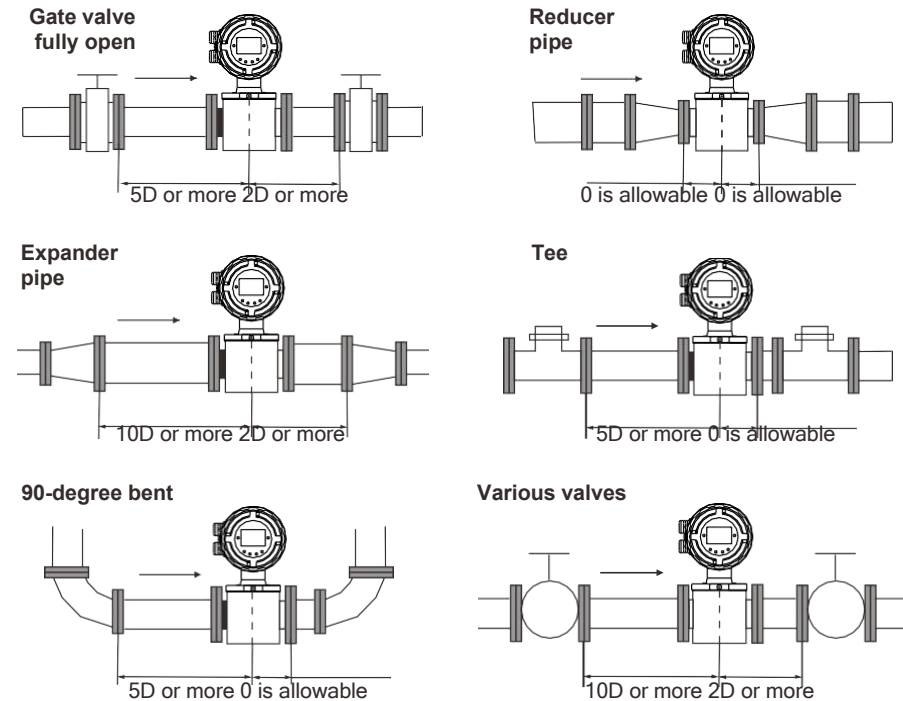
- ★ Avoid all pipe locations where the flow is pulsating, such as in the outlet side of piston or diaphragm pumps.
- ★ Avoid locations near equipment producing electrical interference such as electric motors, transformers, variable frequency, etc.
- ★ Install the meter with enough room for future access for maintenance purposes.
- ★ The magnetic meter isolating liner, whether if it is PTFE or Rubber, is not intended to be used as gasket material. Standard gaskets (not provided) should be installed to ensure a proper hydraulic seal. When installing the gaskets, make sure they are properly centered to avoid flow restriction or turbulence. Do not use graphite or any electrically conductive sealing compound to hold the gaskets in place during installation. This could affect the reading accuracy of the measuring signal.



Warning: Precaution for direct sunshine and rain when the meter is installed outside.

4.2 Required Lengths Of Straight Runs

For optimum accuracy performance, it is required to provide sufficient inlet and outlet straight pipe runs. An equivalent to 3 diameters of straight pipe is required on the inlet side, and 2 diameters on the outlet side. There are no special requirements for standard concentric pipe reducers. See diagram1 for required straight runs when there is altering device.



Note: D: Flowtube Size

Diagram 1. Required straight runs



Special Notice

When the meter contains removable coverplates, leave the coverplate installed unless accessory modules specify removal. Don't remove the coverplates when the meter is powered, or electrical shock and explosion hazard can be caused.

4.3 Grounding

In this section the term “grounding” will be defined as: the arrangement of process wetted metal materials (piping, ground rings, ground electrodes), cabling (ground straps, ground wires), and connections to stable references (often, but not always earth ground) required to achieve satisfactory operation of a magnetic flowmeter. As such, it applies to the instrumentation aspect of grounding, rather than to “safety grounding”.

Proper installation and grounding of magnetic flowmeter is important for accurate, reliable measurement performance. Stray AC or DC currents through the fluid or instrument can produce noise signals that may in turn interfere with the relatively low flow signals generated in today's modern pulsed DC magmeter.

Manufacturers provide a variety of elements (ground straps, ground electrodes, ground rings) and directions for the standard grounding of the magmeter.

Applications exist in which the user can not or should not make use of the traditional grounding connection to adjacent piping or to earth ground. These flow measurement applications are frequently encountered in electrolytic processes. In this case, the fluid passing through the magmeter flow tube may be at a potential significantly higher or lower than earth ground, and a connection to earth ground may be detrimental to the performance and even the reliability of the magmeter.

These applications are typically compounded by the use of non-conductive or lined pipe and may feature acid or caustic flows which may necessitate the use of expensive wetted electrodes and grounding materials such as titanium, platinum, or tantalum.

4.4 Connections

Use a gasket between the meter flange and mating flange. Determine the material of the gasket based on the operating conditions and type of fluid.

Note: Do not over tighten the flange bolts. This may cause the gasket to be compressed into the flow stream and may decrease the accuracy of the meter.

Installation Dimensions

See Figure 1, Figure 2 and Table 2 for detailed dimensions.

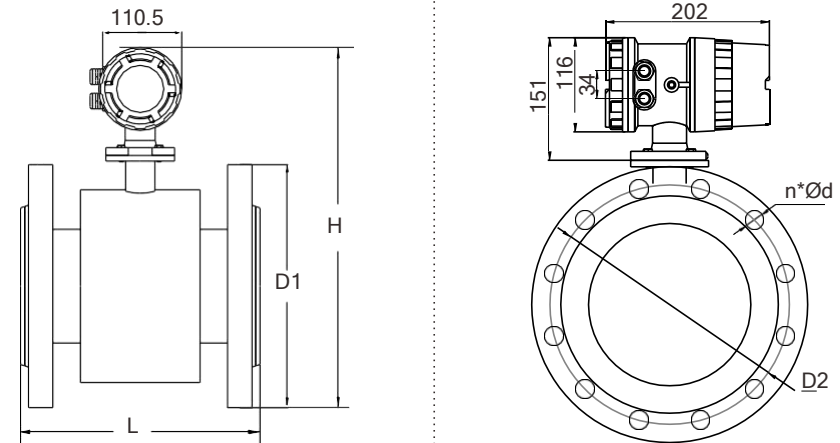


Figure 1 Drawings of Compact Electromagnetic Flow Meter

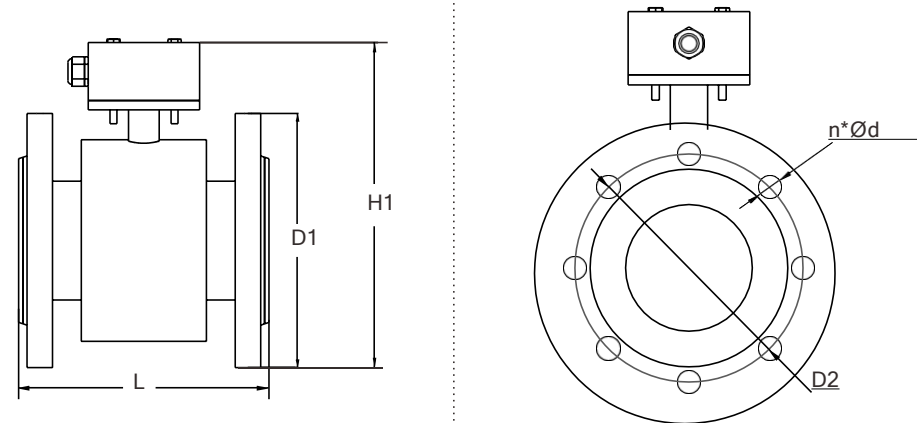


Figure 2 Drawings of Remote Electromagnetic Flow Meter

Table 1. Dimensions (DIN PN16, JIS 10K, ANSI 150#; Unit: mm)


| 2.1 Flange: DIN PN16 | | | | | | | | |
|----------------------|--------------|--------------|--------|---------|--------|---------|---------|--------------|
| Diameter DN | B Type L(mm) | T Type L(mm) | H (mm) | H1 (mm) | D (mm) | D1 (mm) | D2 (mm) | n × φ d (mm) |
| 10 | 160/120 | 120 | 360 | 220 | 90 | 60 | 41 | 4×14 |
| 15 | 160/120 | 200 | 360 | 220 | 95 | 65 | 45 | 4×14 |
| 20 | 160/120 | 200 | 360 | 220 | 105 | 75 | 58 | 4×14 |
| 25 | 200 | 200 | 360 | 220 | 115 | 85 | 68 | 4×14 |
| 32 | 200 | 200 | 370 | 235 | 140 | 100 | 78 | 4×18 |
| 40 | 200 | 200 | 370 | 235 | 150 | 110 | 88 | 4×18 |
| 50 | 200 | 200 | 385 | 242 | 165 | 125 | 102 | 4×18 |
| 65 | 250 | 200 | 400 | 256 | 185 | 145 | 122 | 4×18 |
| 80 | 250/200 | 200 | 415 | 275 | 200 | 160 | 138 | 8×18 |
| 100 | 250/200 | 250 | 435 | 295 | 220 | 180 | 158 | 8×18 |
| 125 | 250 | NA | 465 | 325 | 250 | 210 | 188 | 8×18 |
| 150 | 300 | NA | 497 | 355 | 285 | 240 | 212 | 8×22 |
| 200 | 350 | NA | 550 | 410 | 340 | 295 | 268 | 12×22 |
| 250 | 450 | NA | 610 | 488 | 405 | 355 | 320 | 12×22 |
| 300 | 500 | NA | 660 | 520 | 460 | 410 | 375 | 12×22 |

| 2.2 Flange: JIS 10K | | | | | | | | |
|---------------------|--------------|--------------|--------|---------|--------|---------|---------|--------------|
| Diameter DN | B Type L(mm) | T Type L(mm) | H (mm) | H1 (mm) | D (mm) | D1 (mm) | D2 (mm) | n × φ d (mm) |
| 10 | 160/120 | 120 | 360 | 220 | 90 | 64 | 46 | 4×15 |
| 15 | 160/120 | 200 | 360 | 220 | 95 | 70 | 52 | 4×15 |
| 20 | 160/120 | 200 | 360 | 220 | 100 | 75 | 58 | 4×15 |
| 25 | 200 | 200 | 360 | 220 | 125 | 90 | 70 | 4×19 |
| 32 | 200 | 200 | 370 | 235 | 135 | 100 | 76 | 4×19 |
| 40 | 200 | 200 | 370 | 235 | 140 | 105 | 85 | 4×19 |
| 50 | 200 | 200 | 385 | 242 | 155 | 120 | 100 | 4×19 |
| 65 | 250 | 200 | 400 | 256 | 175 | 140 | 120 | 4×19 |
| 80 | 250/200 | 200 | 415 | 275 | 185 | 150 | 130 | 8×19 |
| 100 | 250/200 | 250 | 435 | 295 | 210 | 175 | 155 | 8×19 |
| 125 | 250 | NA | 465 | 325 | 250 | 210 | 185 | 8×23 |
| 150 | 300 | NA | 497 | 355 | 280 | 240 | 215 | 8×23 |
| 200 | 350 | NA | 550 | 410 | 330 | 290 | 265 | 12×23 |
| 250 | 450 | NA | 610 | 488 | 400 | 355 | 325 | 12×25 |
| 300 | 500 | NA | 660 | 520 | 415 | 400 | 370 | 16×25 |

2.3 Flange: ANSI 150#

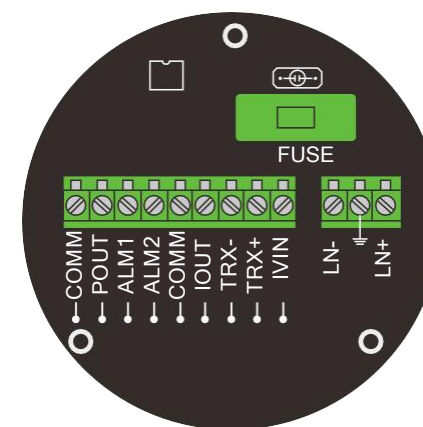
| Diameter DN | B Type L(mm) | T Type L(mm) | H (mm) | H1 (mm) | D (mm) | D1 (mm) | D2 (mm) | n × φ d (mm) |
|-------------|--------------|--------------|--------|---------|--------|---------|---------|--------------|
| 15 | 160/120 | 200 | 360 | 220 | 90 | 60 | 40 | 4×15 |
| 20 | 160/120 | 200 | 360 | 220 | 98 | 70 | 43 | 4×15 |
| 25 | 200 | 200 | 360 | 220 | 108 | 79.5 | 51 | 4×15 |
| 40 | 200 | 200 | 370 | 235 | 127 | 98.5 | 73 | 4×15 |
| 50 | 200 | 200 | 385 | 242 | 152 | 120.5 | 92 | 4×19 |
| 65 | 250 | 200 | 400 | 256 | 178 | 139.5 | 105 | 4×19 |
| 80 | 250/200 | 200 | 415 | 275 | 190 | 152.5 | 127 | 4×19 |
| 100 | 250/200 | 250 | 435 | 295 | 229 | 190.5 | 157 | 8×19 |
| 125 | 250 | NA | 465 | 325 | 254 | 216 | 186 | 8×23 |
| 150 | 300 | NA | 497 | 355 | 279 | 241.5 | 216 | 8×23 |
| 200 | 350 | NA | 550 | 410 | 343 | 298.5 | 270 | 8×23 |
| 250 | 450 | NA | 610 | 488 | 406 | 362 | 324 | 12×25 |
| 300 | 500 | NA | 660 | 520 | 483 | 432 | 381 | 12×25 |

5. ELECTRICAL WIRING

 **Warning: Electrical Hazard**
Disconnect power before beginning electrical wiring.

5.1 Terminal Configuration Diagram

5.1.1 Compact Converter (L-mag 511B: 110-240Vac; L-mag 521B: 18-24V DC)



Terminal Configuration

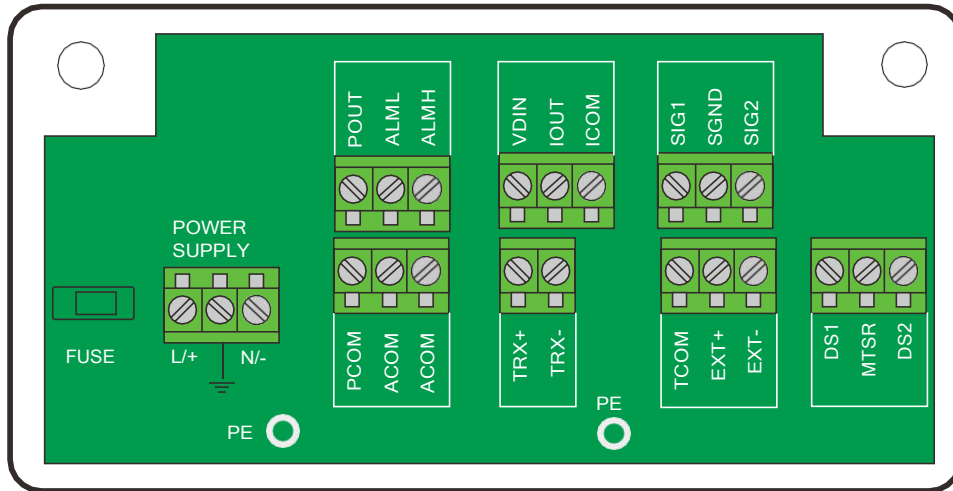
Terminal Wiring For Compact Converter

| | |
|-------------|---|
| POUT | Frequency(Pulse) Output for Bi-directional Flow |
| ALM1 | Alarm Output for Upper Limit |
| ALM2 | Alarm Output for Low Limit |
| COMM | Frequency, Pulse and Current Common (GND) |
| COMM | Frequency, Pulse and Current Common (GND) |
| IOUT | Current Output of Flow Rate |
| IVIN | 24VDC Power Supply for 2-wire 4-20mA Output |
| TRX+ | +Communication RS485(+) |
| TRX- | -Communication RS485(-) |
| LN+ | L: Live Wire of 110-240Vac; +: 24V DC + |
| LN- | N: Naught Wire of 110-240Vac; -: 24V DC - |

Note: Don't connect 110-240Vac Power on 521B converter which is DC Power Supply Type.

5.1.2 Remote Converter (L-mag 211B: 110-240Vac; L-mag 221B: 18-24V DC)

Terminal Configuration



Terminal Wiring for remote converter

| | | |
|--------------------------|-------|---|
| Pulse Output | POUT | Frequency(Pulse) Output for Bi-directional Flow |
| | PCOM | Pulse Output Ground |
| Alarm Output | ALMH | Alarm Output for Upper Limit |
| | ACOM | Alarm Output Ground |
| Alarm Output | ALML | Alarm Output for Low Limit |
| | ACOM | Alarm Output Ground |
| RS485(Function Optional) | TRX+ | Communication RS485+ |
| | TRX- | Communication RS485- |
| Analog Current Output | VDIN | 24VDC Power Supply for 2-wire 4-20mA Output |
| | IOUT | Analog Current Output |
| Power Supply | ICOM | Analog Current Output Ground |
| | L / + | L: Live Wire of 110-240Vac; +: 24V DC + |
| Signal from Sensor | N / - | N: Naught Wire of 110-240Vac; - : 24V DC - |
| | SIG1 | Signal 1 |
| | SGND | Signal Ground |
| | SIG2 | Signal 2 |
| | TCOM | Reserved |
| | EXT+ | Exciting Current+ |
| | EXT- | Exciting Current- |
| | DS1 | Shielded Exciting1 |
| | MTSR | Reserved |
| | DS2 | Shielded Exciting2 |

Note: Don't connect 110-240Vac Power on 221B converter which is DC Power Supply Type.

6. PROGRAMMING AND SETUP

This Flowmeter uses L-mag series converter, please refer to the software manual stated below on the operation.

Owner's manual – SOFTWARE

7.TROUBLESHOOTING

| Symptom | Probable Cause | Solution |
|----------------------------------|---|--|
| Measurement is not accurate | 1. Parameter wrong | Check the parameters (Transmitter, K-factor and size) |
| Flow rate indication is unstable | 2. Pipe is not fully filled | Check if meter is fully filled |
| | 1. Grounding issue | (1) Make sure meter is properly grounded to a good earth ground (2) Please use ground ring when the pipe is not conductive, such as PVC or other plastic pipe |
| | 2. Air | Make sure fluid does not contain air bubbles |
| | 3. Converter location outside electrical interference | Make sure converter is not too close to sources of electrical interference |
| No Display | 1. No power | Apply correct power |
| | 2. Incorrect power | Check power supply |
| | 3. Wiring connections | Check power input/output connections |
| | 4. Fuse blown | Replace fuse |

Limited Warranty Policy

We hereby provides a limited warranty against defects in materials and workmanship. This product includes a 1-year warranty. The warranty period shall begin on the date of the original new equipment purchase. Warrantor's obligation hereunder shall be limited to repairing defective workmanship or replacing or repairing any defective parts.

In the event purchaser believes the product is defective, the product must be returned to us, transportation prepaid by Purchaser, within the appropriate warranty period relative to the product. If our's inspection determines the workmanship or materials are defective and the required maintenance has been performed and, has been properly installed and operated, the product will be either repaired or replaced, at our's sole determination, free of additional charge, and the goods will be returned, transportation paid by us, using a transportation method selected by us.

Prior to returning the product to us, Purchaser must obtain a Returned Material.

Authorization (RMA) Number from our' s Customer Service Department within 30 days after discovery a purported breach of warranty, but not later than the warranty period; otherwise, such claims shall be deemed waived.

If our' s inspection reveals the product to be free of defects in material and workmanship or such inspection reveals the goods were improperly used, improperly installed, and/or improperly selected for service intended, we will notify the purchaser in writing and will deliver the goods back to Purchaser upon receipt of Purchaser's written instructions and agreement to pay the cost of transportation. If Purchaser does not respond within thirty (30) days after notice from us, the goods will be disposed of in our's discretion.

We do not warrant the product to meet the requirements of any safety code or other jurisdiction, and Purchaser assumes all risk and liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

This warranty shall not apply to any our product or parts thereof, which have been repaired outside our's factory or altered in any way, or have been subject to misuse, negligence, or accident, or have not been operated in accordance with our's printed instructions or have been operated under conditions more severe than, or otherwise exceeding, those set in the specifications.

FOR NON-WARRANTYA repairs or calibrations, consult us for current repair/ calibration charges. Have the following information available BEFORE contacting us:

1. P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of the product.
3. Repair instructions and/or specific problems relative to the product.

SOFTWARE

1. Device Description

Magnetic flowmeters are designed exclusively to measure the flow and conductivity of electrically conductive, liquid media.

Your measuring device is supplied ready for operation. The factory settings for the operating data have been made in accordance with your order specifications.

The following versions are available:

- ◆ Compact version (the signal converter is mounted directly on the measuring sensor)

| Part Number | Power Supply |
|-------------|----------------|
| 511B | 110-240 V AC |
| 521B | 18-36V DC |
| W800L | Battery |
| W800W | Battery |
| W803C | Battery/24V DC |

- ◆ Remote version (electrical connection to the measuring sensor via field current and signal cable)

| Part Number | Power Supply |
|-------------|--------------|
| 211B | 110-240 V AC |
| 221B | 18-36V DC |
| W800F | Battery |

2. ELECTRICAL CONNECTION

2.1 Safety Instruction



DANGER!

All work the electrical connections may only be carried out when the power is disconnected. Take note of the voltage data on the nameplate!



DANGER!

Observe the national regulations for electrical installations!



WARNING!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.



INFORMATION!

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

2.2 Important notes on electrical connection



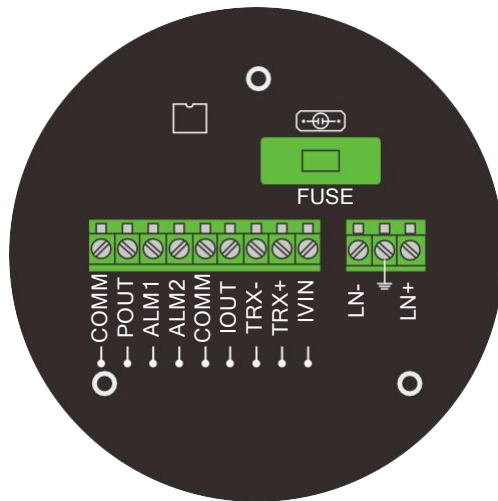
CAUTION!

- ◆ *Use suitable cable entries for the various electrical cables.*
- ◆ *The sensor and converter are configured together in the factory. For this reason, please connect the devices in pairs. Ensure that the sensor constant GK are identically set.*

2.3 Electrical Wiring

2.3.1 Electrical wiring for compact housing

Terminal Configuration



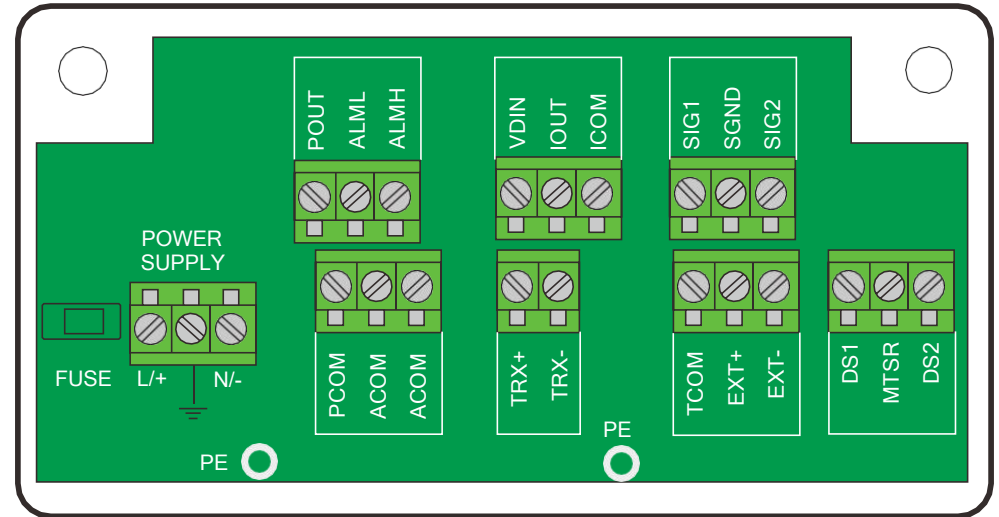
Terminal Wiring

| | |
|-------------|---|
| POUT | Frequency(Pulse) Output for Bi-directional Flow |
| ALM1 | Alarm Output for Upper Limit |
| ALM2 | Alarm Output for Low Limit |
| COMM | Frequency, Pulse and Current Common (GND) |
| COMM | Frequency, Pulse and Current Common (GND) |
| IOUT | Current Output of Flow Rate |
| IVIN | 24V DC Power Supply for 2-wire 4-20mA Output |
| TRX+ | +Communication RS485(+) |
| TRX- | -Communication RS485(-) |
| LN+ | L: Live Wire of 110-240Vac; +: 24V DC + |
| LN- | N: Naught Wire of 110-240Vac; - : 24V DC - |

Note: Don't connect 110-240Vac Power on 521B converter which is DC Power Supply Type.

2.3.2 Electrical wiring for Remote housing

Terminal Configuration



Terminal Wiring for remote converter

| | | |
|--------------------------|----------|---|
| Pulse Output | POUT | Frequency(Pulse) Output for Bi-directional Flow |
| | PCOM | Pulse Output Ground |
| Alarm Output | ALMH | Alarm Output for Upper Limit |
| | ACOM | Alarm Output Ground |
| Alarm Output | ALML | Alarm Output for Low Limit |
| | ACOM | Alarm Output Ground |
| RS485(Function Optional) | TRX+ | Communication RS485+ |
| | TRX- | Communication RS485- |
| Analog Current Output | VDIN | 24VDC Power Supply for 2-wire 4-20mA Output |
| | IOUT | Analog Current Output |
| Power Supply | ICOM | Analog Current Output Ground |
| | L / + | L: Live Wire of 110-240Vac; +: 24V DC + |
| Signal from Sensor | N / - | N: Naught Wire of 110-240Vac; -: 24V DC - |
| | SIG1 | Signal 1 |
| | SGND | Signal Ground |
| | SIG2 | Signal 2 |
| | TCOM | Reserved |
| | EXT+ | Exciting Current+ |
| | EXT- | Exciting Current- |
| | DS1 | Shielded Exciting1 |
| MTSR | Reserved | |
| | DS2 | Shielded Exciting2 |

Note: Don't connect 110-240Vac Power on 221B converter which is DC Power Supply Type.

2.4 Description of outputs

2.4.1 Digital Frequency Output

| | |
|---------------------------|--|
| Frequency Output Range | 1 to 5000 Hz |
| Output Electric isolate | Photoelectric isolate > 1000V |
| Frequency Output Capacity | Field-effect transistors Output Maximum Voltage: 36V DC Maximum Current: 250 mA |

2.4.2 Digital Pulse Output

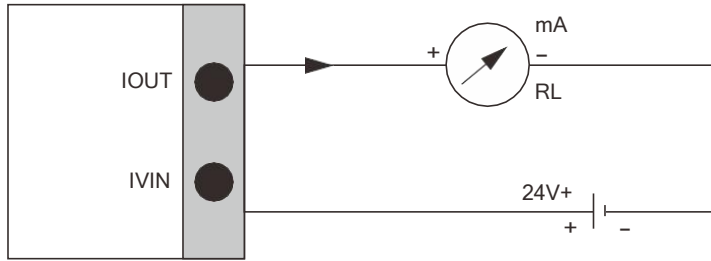
| | |
|-----------------------|---|
| Pulse Output Range | 1 to 100 Pulse/s |
| Pulse Output Value | 0.001- 1.000m3/cp; 0.001-1.000 Liter/cp |
| Pulse Output Capacity | Field-effect transistors Output Maximum Voltage: 36V DC Maximum Current: 250mA |

2.4.3 Alarm output

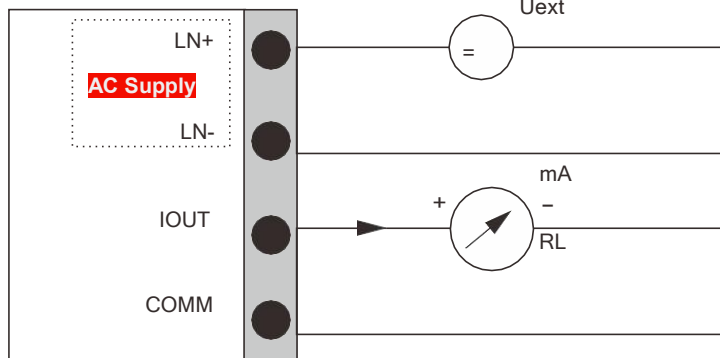
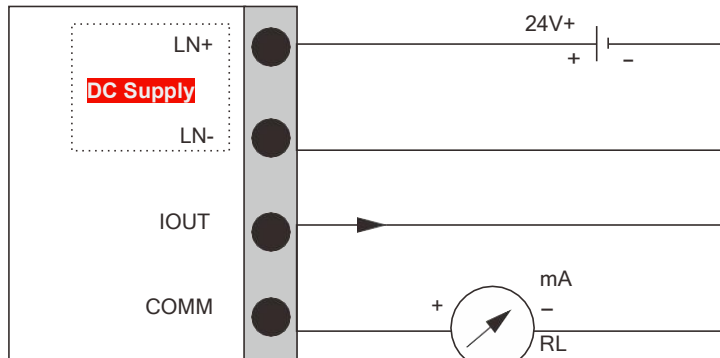
| | |
|-----------------------|--|
| Alarm Output Junction | ALMH: Upper Limit; ALML: Lower Limit |
| Alarm Output Capacity | Field-effect transistors Output Maximum Voltage: 36V DC Maximum Current: 250 mA |

2.5 Connection Diagrams Of Outputs

2.5.1 Current output(On special request)

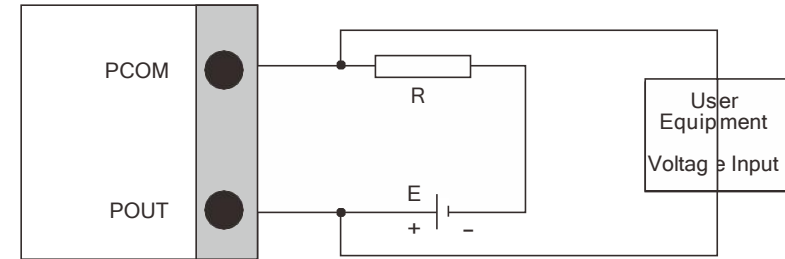


Current Output -Two Wire Connection

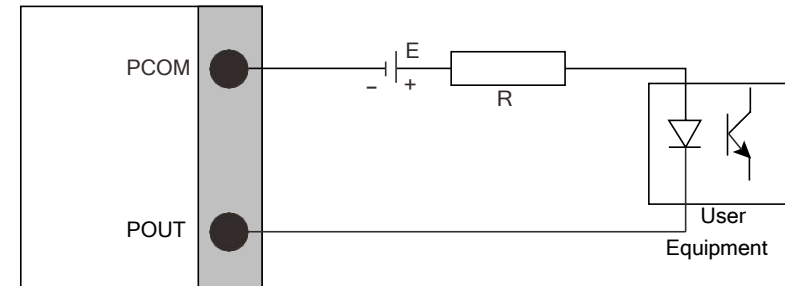


Current Output -Four Wire Connection(Isolated)

2.5.2 Digital Voltage Output

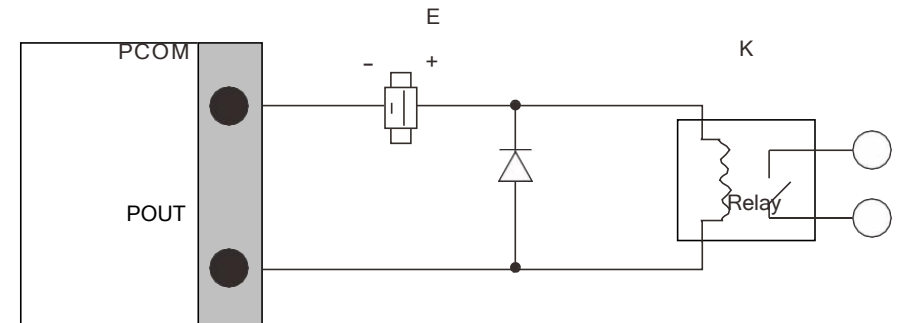


2.5.3 Digital Output To Photoelectricity Coupling



Generally, photoelectricity coupling current is about 10mA. When $E/R=10\text{mA}$, $E=5\sim 24\text{V}$.

2.5.4 Digital Output To Relay



Digital Output To Relay

Generally, E (Voltage) of the relay is 12V or 24V; D is extended diode, most middle relays have this diode inside. If not, user should connect one outside.

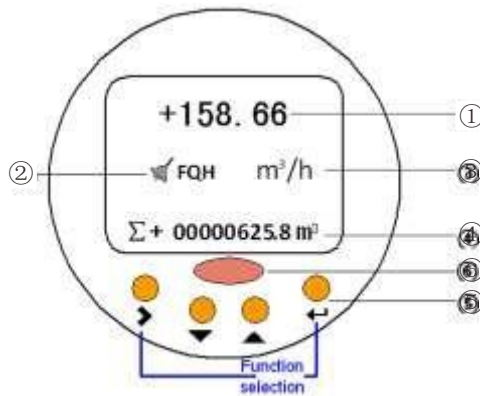
Table of digital output parameter: POUT

| Parameter | Test Condition | Mini | Typical | Max | Unit |
|--------------|----------------------|------|---------|------|------|
| Voltage | IC=100 mA | 3 | 24 | 36 | V |
| Current | Vol=1.4V | 0 | 300 | 350 | mA |
| Frequency | IC=100 mA Vcc=24V | 0 | 5000 | 7500 | Hz |
| High Voltage | IC=100 mA | Vcc | Vcc | Vcc | V |
| Low Voltage | IC=100 mA | 0.9 | 1.0 | 1.4 | V |

3. OPERATION AND SETUP

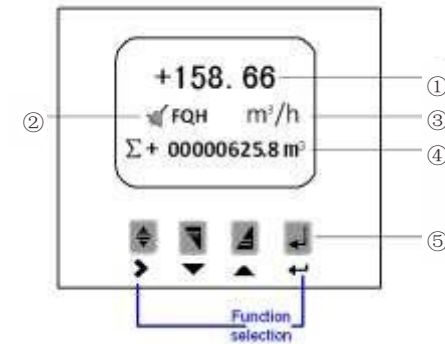
3.1 Display and Keys

3.1.1 Compact Type



| | |
|---|---|
| ① | Flow Rate |
| ② | Alarm Symbol and Message: FQH; FQL; FGP; SYS |
| ③ | Flow Rate Unit |
| ④ | Flow Velocity; Percentage; Positive, Negative or Net Total (Switchable) |
| ⑤ | Keys (See table below for function and representation in text) |
| ⑥ | Infrared Sensor (not present in all signal converter versions) |



3.1.2 Remote Type









| | |
|---|---|
| ① | Flow Rate |
| ② | Alarm Symbol and Message: FQH; FQL; FGP; SYS |
| ③ | Flow Rate Unit |
| ④ | Flow Velocity; Percentage; Positive, Negative or Net Total (Switchable) |
| ⑤ | Keys (See table below for function and representation in text) |

| Key | Measuring mode | Menu mode | Sub-menu or Parameter and Function mode | Parameter and data mode |
|---|--|--|--|---|
| ➡ + ⬅ | Function Selection (1)Parameters Set (2)Clr Total Rec: Reset Totaliser (3)Fact Modif Rec: check the modification record | | | |
| ⬅ (Enter Key) | Enter the function selection | Return to the measuring mode but prompt whether the data should be saved | Press 1 time, return to menu mode, data saved | Return to sub- menu or function, data saved |
| At any modes, Press and hold "Enter" for 3 seconds to return to measuring mode | | | | |
| ▼ or ▲ | Switch between display pages: Flow velocity, Percentage, Positive Total, Negative Total, NetTotal | Select menu | Select sub- menu or function | Use cursor highlighted to change number, unit, setting and to move the decimal point |
| ➡ + ▲ or ➡ + ▼ | Adjust LCD Contrast | | | For numerical values, move cursor one position to the right or left |
| It returns to the measuring mode automatically after 3 minutes without any action under parameter setting mode. | | | | |

3.2 Function Selection Menu

At measuring mode, press  +  can lead to function selection menu including three sub-menu.

| Key (Measuring mode) | Function Selection | Description |
|---|--------------------|---|
|  +  | (1) Parameters Set | Choose this menu and one page with password protect can be displayed. Input the correct password and press  +  to enter the parameters set. |
| | (2) Clr Total Rec | Choose this menu and one page with password protect can be displayed. Input the correct password and press  +  to perform the total flow reset. <i>Note: factory default password is "10000"; change this password when get the flowmeter to avoid unintended reset on total flow.</i> |
| | (3) Fact Modif Rec | Track the modification record on factor |

3.3 Parameters Set






Press  +  , it leads to function selection menu and the first menu is "Parameters Set", press  to confirm the enter "Parameters Set". Input the pssword, and press  +  There are total 54 menus in "Parameters Set" and users can access and modify these menus depending on the input password grade. See table in next page for more information on password grade.

Table. Description of Password Grade

| Password Grade | Password | Login Privileges | Menu Access |
|----------------|--|------------------|--|
| Grade 1 | 00521 | Read Only | Menu 1 to 54 |
| Grade2 | 03210 | Read and Edit | Read: Menu 1 to 54 Edit: Menu 1 to 24 |
| Grade3 | 06108 | Read and Edit | Read: Menu 1 to 54 Edit: Menu 1 to 25 |
| Grade4 | 07206 | Read and Edit | Read: Menu 1 to 54 Edit: Menu 1 to 38 |
| Grade5 | Please consult your local representative | Read and Edit | Read: Menu 1 to 54 Edit: Menu 1 to 52 |

Specific Menu- Parameters Set

| Menu | Parameter Name | Setting Method | Grades | Range |
|------|----------------|------------------|--------|--|
| M1 | Language | Select Parameter | 2 | English |
| M2 | Comm Address | Input Value | 2 | 0~99 |
| M3 | Baud Rate | Select Parameter | 2 | 600~14400 |
| M4 | Snsr Size | Select Parameter | 2 | 3~3000 |
| M5 | Flow Unit | Select Parameter | 2 | L/h, L/m, L/s, m ³ /h, m ³ /m, m ³ /s |
| M6 | Flow Range | Input Value | 2 | 0~99999 |
| M7 | Flow Rspns | Select Parameter | 2 | 1~50 |
| M8 | Flow Direct | Select Parameter | 2 | Rlus/Reverse |
| M9 | Flow Zero | Input Value | 2 | 0~±9999 |
| M10 | Flow Cutoff | Input Value | 2 | 0~599.99% |
| M11 | Cutoff Ena | Select Parameter | 2 | Enable/Disable |
| M12 | Total Unit | Select Parameter | 2 | 0.001m ³ ~1m ³ , 0.001L~1L |
| M13 | SegmaN Ena | Select Parameter | 2 | Enable/Disable |
| M14 | Analog Type | Select Parameter | 2 | 0~10mA/4~20mA |
| M15 | Pulse type | Select Parameter | 2 | Freque / Pulse |
| M16 | Pulse Fact | Select Parameter | 2 | 0.001m ³ ~1m ³ , 0.001L~1L |
| M17 | Freque Max | Select Parameter | 2 | 1~5999HZ |
| M18 | Mtsnsr Ena | Select Parameter | 2 | Enable/Disable |
| M19 | Mtsnsr Trip | Input Value | 2 | 59999% |
| M20 | Alm Hi Ena | Slect Parameter | 2 | Enable/Disable |
| M21 | Alm Hi Val | Input Value | 2 | 000. 0~599. 99% |
| M22 | Alm Lo Ena | Select Parameter | 2 | Enable/Disable |
| M23 | Alm Lo Val | Input Value | 2 | 000. 0-599. 99% |
| M24 | Sys Alm Ena | Select Parameter | 2 | Enable/Disable |
| M25 | Clr Sum Key | Input Value | 3 | 0-99999 |
| M26 | Snsr Code 1 | User set | 4 | Finished Y M |
| M27 | Snsr Code 2 | User set | 4 | Product Number |

| Menu | Parameter Name | Setting Method | Grades | Range |
|------|----------------|------------------|--------|---------------------|
| M28 | Field Type | Select Parameter | 4 | Type1,2,3 |
| M29 | Sensor Fact | Input Value | 4 | 0.0000-5.9999 |
| M30 | Line Crc Ena | Select Parameter | 4 | Enable/Disable |
| M31 | Lineary CRC 1 | User Set | 4 | Set Velocity |
| M32 | Lineary Fact 1 | User Set | 4 | 0.0000-1.9999 |
| M33 | Lineary CRC 2 | User Set | 4 | Set Velocity |
| M34 | Lineary Fact 2 | User Set | 4 | 0.0000-1.9999 |
| M35 | Lineary CRC 3 | User Set | 4 | Set Velocity |
| M36 | Lineary Fact 3 | User Set | 4 | 0.0000-1.9999 |
| M37 | Lineary CRC 4 | User Set | 4 | Set Velocity |
| M38 | Lineary Fact 4 | User Set | 4 | 0.0000-1.9999 |
| M39 | FwdTotal Lo | Correctable | 5 | 00000-99999 |
| M40 | FwdTotal Hi | Correctable | 5 | 00000~9999 |
| M41 | RevTotal Lo | Correctable | 5 | 00000~99999 |
| M42 | RevTotal Hi | Correctable | 5 | 00000~9999 |
| M43 | PlsntLmtEna | Select Parameter | 5 | Enable/Disable |
| M44 | PlsntLmtVal | Select Parameter | 5 | 0.010-0.800m/s |
| M45 | Plsnt Delay | Select Parameter | 5 | 400-2500ms |
| M46 | PassWord 1 | User Correct | 5 | 00000-99999 |
| M47 | PassWord 2 | User Correct | 5 | 00000-99999 |
| M48 | PassWord 3 | User Correct | 5 | 00000-99999 |
| M49 | PassWord 4 | User Correct | 5 | 00000-99999 |
| M50 | Analog Zero | Input Value | 5 | 0.0000-1.9999 |
| M51 | Anlg Range | Input Value | 5 | 0.0000-3.9999 |
| M52 | Meter Fact | Input Value | 5 | 0.0000-5.9999 |
| M53 | MeterCode 1 | Factory Set | 6 | Production Date:Y/M |
| M54 | MeterCode 2 | Factory Set | 6 | Product Serial No |

3.4 Parameter Function Table

| No. | Function | Settings/Descriptions |
|--|-------------|---|
| language | | |
| M1 | Language | English / Chinese Language selection depends on the device version. |
| RS485 Communication | | |
| M2 | Comm Addr | Value: Integer 01 to 99 Device Address for RS485 (Not Present in all converter) |
| M3 | Baud Rate | Selectable: 600,1200, 2400, 4800, 9600, 19200 |
| Sensor Diameter | | |
| M4 | Sensor Size | Select the sensor size (See the nameplate) |
| Flow Parameter:Unit,Range,Response Time,Direction,Zero Calibration,Small Flow Cutoff | | |
| M5 | Flow Unit | Selectable: L/h(liter/hour), L/m(liter/minute), L/s(liter/second)m ³ /h (cubic meter/hour), m ³ /m(cubic meter/min), m ³ /s(cubic meter/second) |
| M6 | Flow Range | Value: 0-99999 (This parameter represents the Max,Flow Rate of flowmeter) Change this value will affect other parameter (M10) and current output value. |
| M7 | Flow Rspns | Damping time / Time constant, default value: 3 second Set large value can enhance the stability of flow display and output digital, which is suitable for accumulative total from pulse output; the small value means fast respond rate, which is suitable for production control. |
| M8 | Flow Direct | Selectable:Plus/Reverse Define polarity of flow direction. Plus/Forwards(according to the arrow on the measuring sensor) or Reverse/Backwards(in the opposite direction to the arrow) |
| M9 | Flow Zero | Zero Calibration First row - small words: FS-new zero calibration value Second row - large words: zero point correction value To ensure the flowmeter's accuracy, FS should be 0. Change the value at second row to make sure FS is 0. Note: ONLY perform "Flow Zero" when the pipe is full filled static fluid. |
| M10 | Flow Cutoff | Sets output value of all outputs to "0": (Low flow cutoff) For example: Flow Cutoff value = 20% Then the Min. Flow rate = 20% of Max. Flow rate (the value in M6) Note: this function is ONLY effective if M11 (SegmaN Ena) is Enable. |
| M11 | Cutoff Ena | Selectable: Enable / Disable The switch on M10(Flow Cutoff) |
| M12 | Total Unit | Selectable: 0.001m ³ , 0.01m ³ , 0.1m ³ , 1m ³ , 0.001L, 0.01L, 0.1L, 1L 9Digitals, this parameter can control the resolution for accumulative flow. |

| No. | Function | Settings/Descriptions |
|----------|-------------|--|
| Outputs: | | |
| M13 | SegmaN Ena | The switch to control outputs of reverse Flow: current or pulse output. |
| | | The output function is ONLY effective for reverse flow if M13 is Enable. For example, M13 = "Disable", then there is still no output even though there is reverse flow rate in pipe. Note: this switch can't control output of Plus Flow Rate. |
| M14 | Analog Type | Selectable: 4-20mA / 0-10mA |
| | | Select the correct current output mode base on user's application. |
| M15 | Pulse Type | Selectable: Freque (Frequency) / Pulse Freque: Frequency Output Pulse: Scaled Pulse Output |
| M16 | Pulse Fact | Selectable: 0.001L, 0.01L, 0.1L, 1L; 0.001 m ³ , 0.01 m ³ , 0.1 m ³ , 1 m ³ |
| | | The scaled pulse output value for each pulse, ONLY effective if M15 is selected as "Pulse". For example, M16="0.1L", it means each pulse is 0.1L Max. Pulse Output: 100Pulses/Second. |
| M17 | Freque Max | Value: 1-5000Hz Max. Frequency is corresponding to M6 (Flow range). |
| Alarms: | | |
| M18 | Mtsnsr Ena | Selectable: Enable / Disable Empty Pipe Detect is ONLY valid if M18 (Mtsnsr Ena) = Enable. |
| M19 | Mtsnsr Trip | First row: measured conductivity value (V1) Second row: the value (V2) which can trigger the Empty Pipe Alarm. Generally, set V2 as three to five times of V1. Flow indication, pulse output and current output "=0" when pipe empty Note: perform this parameter set when the pipe is full filled with fluid. |
| M20 | Alm Hi Ena | Selectable: Enable / Disable Upper Flow Limit Alarm is ONLY valid if M20 (Alm Hi Ena) = Enable |
| M21 | Alm Hi Val | Value: 0% - 199.9% (The value to trigger the Upper Flow Limit Alarm) |
| | | Upper Flow Limit Alarm is ONLY triggered when M20= Enable and Flow rate > M21*M6 |
| M22 | Alm Lo Ena | Selectable: Enable / Disable Low Flow Limit Alarm is ONLY valid if M22 (Alm Lo Ena) = Enable |
| M23 | Alm Lo Val | Value: 0% - 199.9% (The value to trigger the Low Flow Limit Alarm) |
| | | Low Flow Limit Alarm is ONLY triggered |
| M24 | Sys Alm Ena | When M22= Enable and Flow rate < M10*M6 |
| | | Selectable: Enable / Disable System Exciting Alarm is ONLY valid if M24 = Enable |

| No. | Function | Settings/Descriptions |
|---|----------------|---|
| Reset Totaliser Password: | | |
| M25 | Clr Sum Key | The password is used to reset the totalizer. Note: please set M25 "Clr Sum Key" first, and use this password to perform reset according to Section 3.29 (Page 51) |
| Sensor: | | |
| M26 | Snsr Code1 | User can set sensor production date in M26 to track whether the Sensor Factor is correct |
| M27 | Snsr Code2 | Sensor Serial Number |
| M28 | Field Type | Selectable: 1/16; 1/20; 1/25 |
| | | Three types of Exciting frequency. Usually use 1/16 for small size sensor, and others two for large size sensor. |
| M29 | Sensor Fact | Input Measuring Sensor Constant: GK User can get this factor from the calibration certificate. |
| Linearity Correction: | | |
| M30 | Line Crc Ena | Selectable: Enable / Disable |
| | | This parameter is used to control the linearity correction function. Enable: use the linearity correction; Disable: linearity correction is not used even M31 to M38 are set. |
| M31 | Lineary CRC 1 | Correction Point 1: the velocity of point 1 |
| M32 | Lineary Fact 1 | Linearity Fact 1: the correction factor for point 1 |
| M33 | Lineary CRC2 | Correction Point 2: the velocity of point 2 |
| M34 | Lineary Fact 2 | Linearity Fact 2: the correction factor for point 2 |
| M35 | Lineary CRC3 | Correction Point 3: the velocity of point 3 |
| M36 | Lineary Fact 3 | Linearity Fact 3: the correction factor for point 3 |
| M37 | Lineary CRC4 | Correction Point 4: the velocity of point 4 |
| M38 | Lineary Fact4 | Linearity Fact 4: the correction factor for point 4 |
| Set Value for Total Flow: For flowmeter maintenance or replacement, maybe the previous total flow should be set. And change M39 to M42 can accomplish this function. | | |
| M39 | FwdTotal Lo | Set Value: 00000 - 99999 |
| | | Low Bbyte of Positive Total Flow |

| No. | Function | Settings/Descriptions |
|--|-------------|--|
| M40 | FwdTotal Hi | Set Value: 0000 - 9999 |
| | | High Byte of Positive Total Flow |
| M41 | RevTotal Lo | Set Value: 00000 - 99999 |
| | | Low Byte of Negative Total Flow |
| M42 | RevTotal Hi | Set Value: 0000 - 9999 |
| | | High Byte of Negative Total Flow |
| Peak Suppression Function: | | |
| M43 | PlsntLmtEna | The switch for Peak Suppression Enable: Peak Suppression ON; Disable: Peak Suppression OFF. For paper pulp, slurry and other serosity, "Peak Interference" can occur when the solid grain scrubs or strikes the electrodes. Peak suppression arithmetic can restrain this interference via the setting of M43, M44 and M45. |
| M44 | PlsntLmtVal | This parameter determines the change rate of Peak Interference, based on the percent of flow velocity; ten grades: 0.010m/s (Grade 1), 0.020m/s, 0.030m/s, 0.050m/s, 0.080m/s, 0.100m/s, 0.200m/s, 0.300m/s, 0.500m/s, 0.800m/s (Grade 10) The sensitivity of Peak Suppression is highest for Grade 1. |
| M45 | Plsnt Delay | This parameter can determine the width of time to restrain Peak Interference and the unit is ms. |
| | | If the duration of one signal is less than the value in M45, this signal can be determined as Peak Interference and will be suppressed; otherwise it will be determined as normal signal. |
| Password Management: | | |
| M46 | PassWord 1 | M46 to M49 can be changed using Grade 5 Password to enter parameter setting. |
| M47 | PassWord 2 | |
| M48 | PassWord 3 | |
| M49 | PassWord 4 | |
| Factory Use ONLY: Zero point calibration or Full scale calibration | | |
| M50 | Analog Zero | Zero Point Calibration for current output to make sure the Zero point is 0 mA/ 4 mA. |
| M51 | Anlg Range | Full scale calibration for current output to make sure the Full Scale is 10mA or 20mA. |
| M52 | Meter Fact | Factory Use ONLY. |
| M53 | MeterCode 1 | Converter Production Date |
| M54 | MeterCode 2 | Converter Serial Number |

4. INFRARED INTERFACE

Note: the infrared interface is optional with extra charge. Infrared interface can read and write writing all parameters with IR interface (option) without opening the front cover.

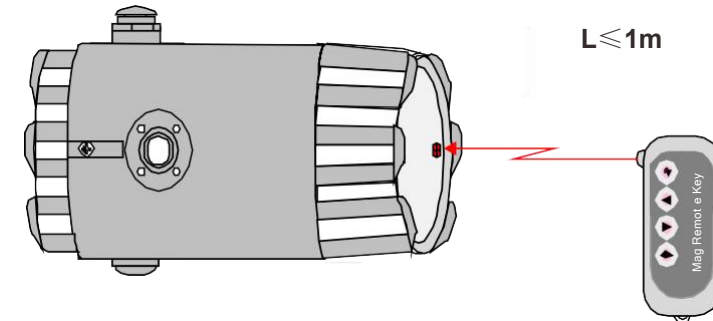



Fig 4.1 Infrared Interface for operating converter without opening the front cover

5. ALARM INFORMATION

Converters have self-diagnose function. This information  displays at the left of LCD. The explanations of Alarm are asbelow:

FQH: Upper Flow Limit Alarm

FQL: Low Flow Limit Alarm

FGP: Empty Pipe Alarm SYS:

System Excitation Alarm

6. TROUBLESHOOTING

| Symptom | Probable Cause | Solution |
|----------------------------------|---|--|
| No Display | 1. No power | Apply correct power |
| | 2. Fuse blown | Replace a fuse with same parameter |
| | 3. Contrast of LCD is too low | Increase the contrast |
| Empty Pipe Alarm | 1. Fluid is not full filled the pipe | Increase the flow rate |
| | 2. Electrode was polluted | Clean the electrode if voltage of DS1 and DS2>1V |
| | 3. Fluid's conductivity is too small | If connect three terminals SIG 1, SIG 2, SGND and the alarm disappears, which means the fluid's conductivity is small. Replace other kind of flowmeter |
| Flow rate indication is unstable | 1. Grounding issue | Make sure meter is properly grounded to a good earth ground |
| | 2. Air | Make sure fluid does not contain air bubbles |
| | 3. Converter location-outside electrical interference | Make sure Converter is not too close to sources of electrical interference |