VNER

# ELECTROMAGNETIC FLOWMETER

MWDC-LDG SERIES

JIANGSU VNER ELECTRONIC TECHNOLOGY LTD

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## 1. PRODUCT DESCRIPTION

The intelligent electromagnetic flowmeter is a precision instrument that comprises two essential components, namely the sensor and the converter. It operates on the principles of Faraday's law of electromagnetic induction and is designed to measure the volume flow of conductive liquids. This instrument is capable of measuring the volume flow rate of strong corrosive liquids such as acids and alkalis, as well as uniform liquid-solid two-phase suspended liquids like slurry and pulp. It is a versatile device that finds wide-ranging applications in several industrial sectors, including petroleum, chemical, metallurgy, textile, paper, environmental protection, and food. Its utility extends to municipal management, water conservancy construction, river dredging, and other areas of flow measurement. In view of its precision and versatility, the intelligent electromagnetic flowmeter is a valuable tool for businesses and organizations seeking to optimize their processes and ensure the accuracy of their flow measurements.

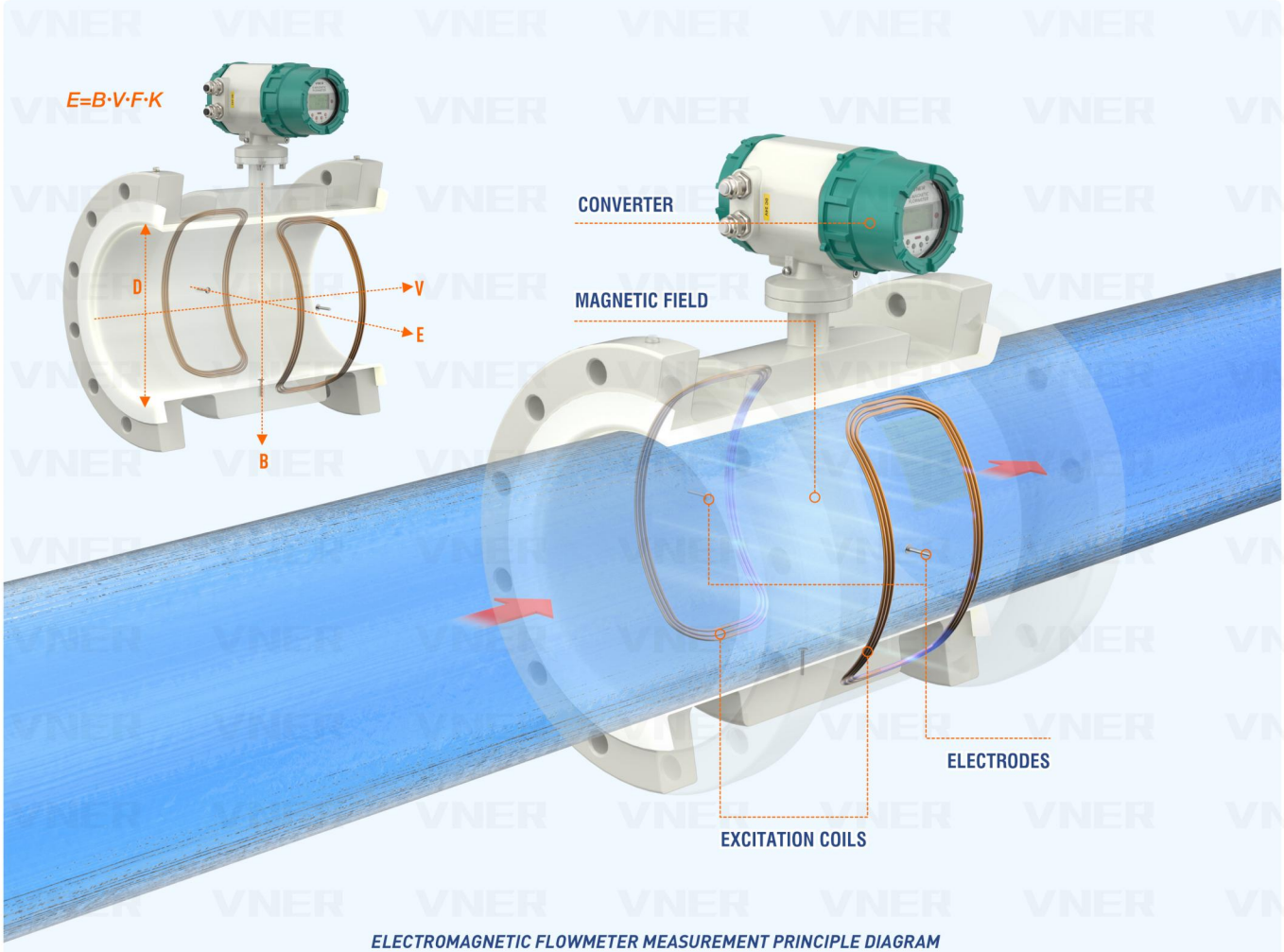
## 2. WORKING PRINCIPAL

The electromagnetic flowmeter uses Faraday's Law of electromagnetic induction to measure the process flow. When an electrically conductive fluid flows in the pipe, an electrode voltage E is induced between a pair of electrodes placed at right angles to the direction of magnetic field.

**The electrode voltage E is directly proportional to the average fluid velocity V.**

The sensor is designed to perceive induced electrode voltage E as an indication of flow and relay this signal to the converter. Upon receipt, the converter amplifies the signal, converts it into a digital format, and filters it to eliminate noise. The resulting data is processed digitally and displayed on a backlit dot-matrix LCD screen as instantaneous flow and cumulative flow. Furthermore, the converter boasts a 4-20mA output, an alarm output, and a frequency output. In addition, it is equipped with communication interfaces such as RS-485 and supports the HART and MODBUS protocols.

**E=B•V•F•K** E - Induced Electrode Voltage B - Magnetic Flux Density D - Inner Width Between Electrodes
K - Coefficients related to magnetic field distribution and axial length) V - Velocity




*ELECTROMAGNETIC FLOWMETER MEASUREMENT PRINCIPLE DIAGRAM*

## 3. PRODUCT FEATURES

- Accurate and reliable measurement unaffected by changes in fluid density, viscosity, temperature, pressure, and conductivity.
- Highly adaptable to slurry measurement with no flow blocking parts, no pressure loss, and reduced straight pipe section requirements.
- Excellent corrosion and wear resistance with reasonably selected electrodes and lining materials.
- Full digital volume processing, strong anti-interference ability, and high precision.
- Efficient and reliable Ultra-low EMI switching power supply.
- Fast operation speed with a 16-bit embedded microprocessor, low power consumption, and high circuit reliability with SMD devices and SMT technology.
- Accurate readings with no moving parts in the pipeline and no additional pressure loss in the measurement.
- Adaptable to different scenarios with online range modification.
- Convenient and user-friendly with a high-definition backlit LCD display, full Chinese menu operation, and various digital communication signal output options.
- It comes with RS485, RS232, Hart, and Modbus Profibus-DP digital communication signal output (optional).
- Troubleshooting and diagnosis made easy with a self-test and self-diagnosis function (optional).
- Efficient with hourly total recording function and internal power-down clock that can record 16 times the power-down time (optional).
- Highly convenient and user-friendly with an infrared handheld operator, 115KHZ communication rate and remote non-contact operation of all functions of the converter (optional).

## 4. TECHNICAL PARAMETERS

| TECHNICAL PARAMETERS | |
|---|---|
| Standard of Implementation | Electromagnetic Flowmeter ( JB / T9248-1999 ) |
| Nominal Diameter (Special specifications can be customized) | PTFE lining DN10 ~ DN600 |
| | Rubber Lining DN65 ~ DN2000 |
| Flow Direction | Bidirectional |
| Rangeability | 20:1 |
| Repeatability | ± 0.1% |
| Measurement Accuracy | ± 0.5% , ± 1% |
| Process Temperature | Standard Rubber lining: -20 ~ 60°C |
| | High-temperature rubber lining: -20 ~ 90°C |
| | Standard PTFE Lining: -30 ~ 120 °C |
| | High-temperature PTFE lining: -20 ~ 160°C |
| Nominal Pressure (Special specifications can be customized) | DN 10 ~ DN 50 ≤ 4.0 MPa |
| | DN 65 ~ DN300 ≤ 1.6 MPa |
| | DN350 ~ DN600 ≤ 1.0 MPa |
| | DN700 ~ DN 2000 ≤ 0.6 MPa |
| Flow Rate Range | 0.5 ~ 10 m/s |
| Conductivity Range | Measured Liquid Conductivity ≥ 5μs/cm |
| Signal Output | 4 - 20mA, Pulse/Frequency, Control Level |
| Communication Protocols | RS485, Modbus, HART, Profibus - DP |
| Power Supply | 220VAC, Tolerance 15% or 24 VDC, Ripple ≤ 5% |
| Straight Pipeline Requirement | Upstream ≥ 5DN , Downstream ≥ 2DN |
| Connection Spec | Flange ( GB / T9113.1 2000) |
| Explosion-Proof Rating | Exdb ib q II C T6 Gb |
| Ingress Protection Rating | IP65 , IP68 available upon request |
| Ambient Temperature | -20 ~ 60°C |
| Ambient Humidity | 5% ~ 95% |
| Total Power Consumption | less than 20W |

## 5. ELECTROMAGNETIC FLOW METER ORDERING INFORMATION

### 5.1 INSTRUMENT SELECTION

| BASE MODEL: MWDC-LDG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Nominal Diameter:** | | | | | | | | | |
| 10-2000mm | | | | | | | | | |
| **Transmitter Type：** | | | | | | | | | |
| Integral Model | S | | | | | | | | |
| Split Model | L | | | | | | | | |
| **Electrode Material:** | | | | | | | | | |
| Stainless Steel 316L | | M | | | | | | | |
| Titanium | | T | | | | | | | |
| Tantalum | | D | | | | | | | |
| Hastelloy B | | Hb | | | | | | | |
| Hastelloy C | | Hc | | | | | | | |
| Platinum | | P | | | | | | | |
| Tungsten carbide | | W | | | | | | | |
| **Signal Output:** | | | | | | | | | |
| Without | | | 0 | | | | | | |
| Pulse | | | 1 | | | | | | |
| Analog | | | 2 | | | | | | |
| **Lining Material:** | | | | | | | | | |
| Neoprene Rubber | | | | C | | | | | |
| Polyurethane Rubber | | | | U | | | | | |
| Polytetrafluoroethylene (PTFE) | | | | F | | | | | |
| Teflon | | | | E | | | | | |
| Tetrafluoroethylene-Perfluoro Alkoxy Vinyl Ether | | | | P | | | | | |
| **Power Supplly:** | | | | | | | | | |
| 220VAC | | | | | 0 | | | | |
| 24VDC | | | | | 1 | | | | |
| **Communication Protocol:** | | | | | | | | | |
| Without | | | | | | 0 | | | |
| RS485 | | | | | | 1 | | | |
| RS232 | | | | | | 2 | | | |
| Modbus | | | | | | 3 | | | |
| Hart | | | | | | 4 | | | |
| **Grounding Device:** | | | | | | | | | |
| Without | | | | | | | 0 | | |
| Grounding Ring | | | | | | | 1 | | |
| Grounding Electrode | | | | | | | 2 | | |
| **Pressure Rating:** | | | | | | | | | |
| 1.6MPa | | | | | | | | P1 | |
| 1.0MPa | | | | | | | | P2 | |
| 0.6MPa | | | | | | | | P3 | |
| Customization Available | | | | | | | | P-(n) | |
| **Explosion-Proof:** | | | | | | | | | |
| Without | | | | | | | | | N |
| Exd[ib]qII CT6 Gb | | | | | | | | | E |

## 5.2 REFERENCE TABLE

**Please refer to the table to determine the flow meter diameter.**

| | VELOCITY (M/S) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| DIAMETER (MM) | FLOW RATE ($M^3/H$) | | | | | | | | | | |
| 10 | 0.14 | 0.28 | 0.57 | 0.85 | 1.1 | 1.4 | 1.7 | 2.0 | 2.3 | 2.5 | 2.8 |
| 15 | 0.32 | 0.64 | 1.3 | 1.9 | 2.5 | 3.2 | 3.8 | 4.5 | 5.1 | 5.7 | 6.3 |
| 20 | 0.57 | 1.1 | 2.3 | 3.4 | 4.5 | 5.7 | 6.8 | 7.9 | 9.0 | 10 | 11 |
| 25 | 0.88 | 1.8 | 3.5 | 5.3 | 7.1 | 8.8 | 11 | 12 | 14 | 16 | 17.6 |
| 32 | 1.4 | 2.9 | 5.8 | 8.7 | 12 | 14 | 17 | 20 | 23 | 26 | 28.9 |
| 40 | 2.3 | 4.5 | 9.0 | 14 | 18 | 23 | 27 | 32 | 36 | 41 | 45.2 |
| 50 | 3.5 | 7.1 | 14 | 21 | 28 | 35 | 42 | 49 | 57 | 64 | 70 |
| 65 | 6.0 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 107 | 119 |
| 80 | 9.0 | 18 | 36 | 54 | 72 | 90 | 109 | 127 | 145 | 163 | 180 |
| 100 | 14 | 28 | 57 | 85 | 113 | 141 | 170 | 198 | 226 | 254 | 282 |
| 125 | 22 | 44 | 88 | 132 | 177 | 221 | 265 | 309 | 353 | 397 | 441 |
| 150 | 32 | 64 | 127 | 191 | 254 | 318 | 382 | 445 | 509 | 572 | 636 |
| 200 | 57 | 113 | 226 | 339 | 452 | 565 | 678 | 791 | 904 | 1017 | 1131 |
| 250 | 88 | 177 | 353 | 530 | 707 | 883 | 1060 | 1236 | 1413 | 1590 | 1767 |
| 300 | 127 | 254 | 509 | 763 | 1017 | 1272 | 1526 | 1780 | 2035 | 2289 | 2545 |
| 350 | 173 | 346 | 692 | 1039 | 1385 | 1731 | 2077 | 2423 | 2769 | 3116 | 3464 |
| 400 | 226 | 452 | 904 | 1356 | 1809 | 2261 | 2713 | 3165 | 3617 | 4069 | 4523 |
| 450 | 286 | 572 | 1145 | 1717 | 2289 | 2861 | 3434 | 4006 | 4578 | 5150 | 5725 |
| 500 | 353 | 707 | 1413 | 2120 | 2826 | 3533 | 4239 | 4946 | 5652 | 6359 | 7069 |
| 600 | 509 | 1017 | 2035 | 3052 | 4069 | 5087 | 6104 | 7122 | 8139 | 9156 | 10180 |
| 700 | 692 | 1385 | 2769 | 4154 | 5539 | 6924 | 8308 | 9693 | 11078 | 12463 | 13847 |
| 800 | 904 | 1809 | 3617 | 5426 | 7235 | 9043 | 10852 | 12660 | 14469 | 16278 | 18086 |
| 900 | 1145 | 2289 | 4578 | 6867 | 9156 | 11445 | 13734 | 16023 | 18312 | 20602 | 22891 |
| 1000 | 1413 | 2826 | 5652 | 8478 | 11304 | 14130 | 16956 | 19782 | 22608 | 25434 | 28260 |
| 1200 | 2035 | 4069 | 8139 | 12208 | 16278 | 20347 | 24417 | 28486 | 32556 | 36625 | 40694 |
| 1400 | 2769 | 5539 | 11078 | 16617 | 22156 | 27695 | 33234 | 38773 | 44312 | 49851 | 55390 |
| 1600 | 3617 | 7235 | 14469 | 21704 | 28938 | 36173 | 43407 | 50642 | 57876 | 65111 | 72346 |
| 1800 | 4578 | 9156 | 18312 | 27469 | 36625 | 45781 | 54937 | 64094 | 73250 | 82406 | 91562 |
| 2000 | 5652 | 11304 | 22608 | 33912 | 45216 | 56520 | 67824 | 79128 | 90432 | 101736 | 113040 |

## 5.3 SELECTION OF LINING MATERIALS

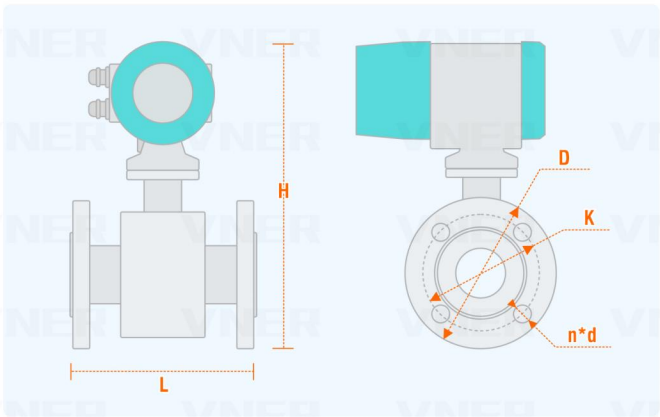
| LINING MATERIAL | LINING MATERIAL | SYMBOL | CHARACTERISTICS | MAX.PROCESS TEMPERATURE | APPLICABLE LIQUIDS | APPLICABLE SIZES |
|---|---|---|---|---|---|---|
| Rubber | Chloroprene Rubber | CR | Medium abrasion resistance, resistant to low concentrations of acids and alkaline salts in general | < 60 °C | Tap water, Industrial water, Seawater | DN50 ~ DN2000 |
| | Polyurethane Rubber | PU | Excellent abrasion resistance, poor resistance to acids and alkalis | < 60 °C | Pulp, mineral slurry and other slurries | DN25 ~ DN500 |
| Fluoroplastic | Polytetrafluoroethylene | F4 (PTFE) | Chemically very stable, resistant to boiling hydrochloric acid, sulphuric acid, aqua regia, concentrated alkalis | < 160 °C | Extremely Corrosive acid, alkali and salt liquids | DN25 ~ DN1600 |
| | Polytetrafluoroethylene Propylene (Teflon FEP) | F46 (FEP) | Chemical properties equal to F4 compressive, tensile strength superior to F4 | < 120 °C | Corrosive acid, alkali and salt liquids | DN10 ~ DN200 |
| | Copolymer of Tetrafluoroethylene and Perfluoroalkyl Vinyl Ether | PFA | Chemical properties equal to F46, compressive and tensile strength superior to F46 | < 180 °C | Corrosive acid, alkali and salt liquids | DN10 ~ DN300 |

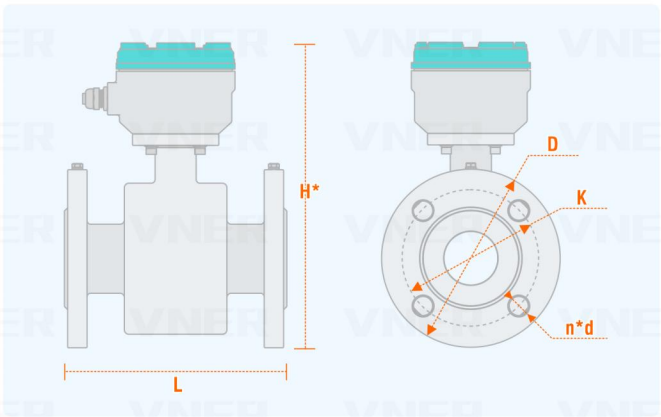
## 5.4 SELECTION OF ELETRODE AND GROUNDING RING MATERIALS

| MATERIAL | CORROSION RESISTANCE |
|---|---|
| Stainless Steel 316L | Applicable: 1. Domestic water, industrial water, raw water, well water, urban wastewater<br>2. Weak corrosive acid, alkali, salt solution |
| Hastelloy B | Applicable: 1. Hydrochloric acid (concentration less than 10%) and other non-oxidising acids<br>2. Sodium hydroxide (concentration less than 50%), all concentrations of sodium hydroxide alkaline solution<br>3. Phosphoric acid, organic acids<br>Not applicable: Nitric acid |
| Hastelloy C | Applicable: 1. Mixed acid and mixed solution of chromic acid and sulphuric acid<br>2. Oxidising salts such as Fe+++, Cu++, seawater<br>3. Phosphoric acid, organic acids<br>Not applicable: Hydrochloric acid |
| Titanium ( Ti ) | Applicable: 1. Salts, e.g.: (1) Chloride (chloride/magnesium/aluminium/calcium/ammonium/iron, etc.)<br>(2) sodium salt, potassium salt, ammonium salt, hypoaluminate, seawater<br>2. Concentration less than 50% potassium hydroxide, ammonium hydroxide, barium hydroxide alkaline solution<br>Not applicable: hydrochloric acid, sulfuric acid, phosphoric acid, hydrofluoric acid and other reducing acids |
| Tantalum ( Ta ) | Applicable: 1. Hydrochloric acid (concentration less than 40%), dilute sulfuric acid and concentrated sulfuric acid (excluding fuming sulfuric acid)<br>2. Chlorine dioxide, iron oxide, hypochlorite, sodium cyanide, acetic acid, etc.<br>3. Nitric acid (including fuming nitric acid) and other oxidising acids, aqua regia at a temperature of less than 80 °C |
| Platinum ( Pt ) | Applicable: Almost all acids, bases, salt solutions (including fuming sulfuric acid, fuming nitric acid)<br>Not applicable: Aqua regia, ammonium salt |
| Tungsten Carbide | Applicable: Pulp, sewage, resistant to solid particle interference<br>Not applicable: Inorganic acids, organic acids, chlorides |

## 6. INSTALLATION DIMENSIONS

### 6.1 ELECTROMAGNETIC FLOW METER DIMENSIONS



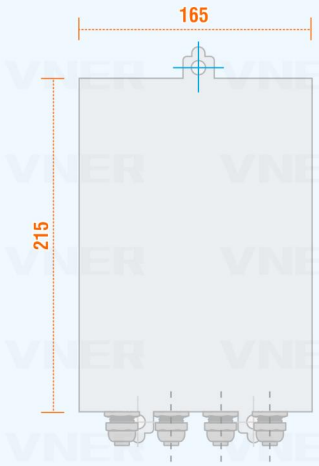




### 6.2 INTEGRAL TRANSMITTER INSTALLATION DIMENSIONS

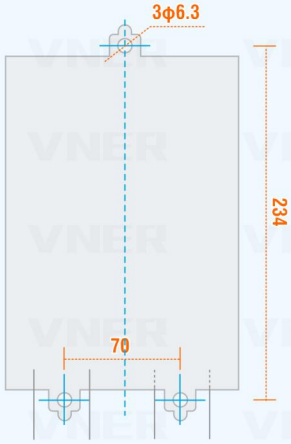
| NOMINAL DIAMETER | L (MM) | D (MM) | K (MM) | H (MM) | H* (MM) | n*d (MM) | PRESSURE RATING | SPECIAL PRESSURE RATING |
|---|---|---|---|---|---|---|---|---|
| 10 | 120 | 60 | 60 | 260 | 190 | 4*14 | | |
| 15 | 200 | 95 | 65 | 310 | 240 | 4*14 | | |
| 20 | 200 | 105 | 75 | 315 | 245 | 4*14 | | |
| 25 | 200 | 115 | 85 | 325 | 255 | 4*14 | 4MPa | Below 16MPa |
| 32 | 200 | 140 | 100 | 325 | 255 | 4*18 | | |
| 40 | 200 | 150 | 110 | 340 | 270 | 4*18 | | |
| 50 | 200 | 165 | 125 | 355 | 285 | 4*18 | | |
| 65 | 200 | 185 | 145 | 375 | 305 | 4*18 | | |
| 80 | 200 | 200 | 160 | 385 | 315 | 8*18 | | |
| 100 | 250 | 220 | 180 | 415 | 325 | 8*18 | | |
| 125 | 250 | 250 | 210 | 445 | 355 | 8*18 | | |
| 150 | 300 | 285 | 240 | 475 | 385 | 8*22 | 1.6MPa | 4.0MPa |
| 200 | 350 | 340 | 295 | 505 | 415 | 12*22 | | |
| 250 | 450 | 405 | 355 | 590 | 500 | 12*22 | | |
| 300 | 500 | 460 | 410 | 645 | 555 | 12*22 | | |
| 350 | 500 | 505 | 460 | 695 | 605 | 16*22 | | |
| 400 | 600 | 565 | 515 | 745 | 655 | 16*26 | | |
| 450 | 600 | 615 | 565 | 825 | 735 | 20*26 | 1.0MPa | 2.5MPa |
| 500 | 600 | 670 | 620 | 878 | 788 | 20*26 | | |
| 600 | 600 | 780 | 725 | 988 | 898 | 20*30 | | |
| 700 | 700 | 860 | 810 | 1095 | 1005 | 24*30 | | |
| 800 | 800 | 975 | 920 | 1208 | 1138 | 24*34 | | |
| 900 | 900 | 1075 | 1020 | 1310 | 1220 | 28*34 | | |
| 1000 | 1000 | 1175 | 1120 | 1413 | 1323 | 28*36 | | |
| 1200 | 1200 | 1405 | 1340 | 1525 | 1435 | 32*33 | 0.6MPa | 1.0MPa |
| 1400 | 1400 | 1630 | 1560 | 1735 | 1645 | 36*36 | | |
| 1600 | 1600 | 1830 | 1760 | 1965 | 1875 | 40*36 | | |
| 1800 | 1800 | 2045 | 1970 | 2155 | 2065 | 44*39 | | |
| 2000 | 2000 | 2265 | 2180 | 2365 | 2275 | 48*42 | | |

**Note:** H represents the height of the Integrated Transmitter.For remote model please consult manufacturer.

## 6.3 REMOTE TRANSMITTER INSTALLATION DIMENSIONS




TRANSMITTER EXTERNAL DIMENSIONS
165MM X 215MM X 70MM (WIDTH X HEIGHT X THICKNESS)

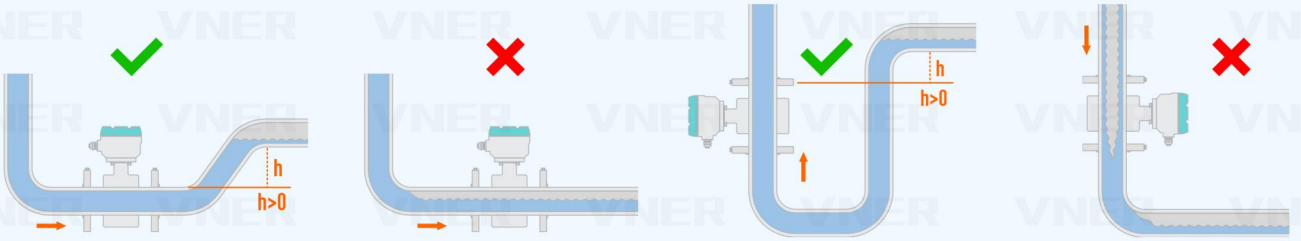



TRANSMITTER MOUNTING DIMENSIONS
(WALL-MOUNTED)

## 6.4 MOUNTING POSITION

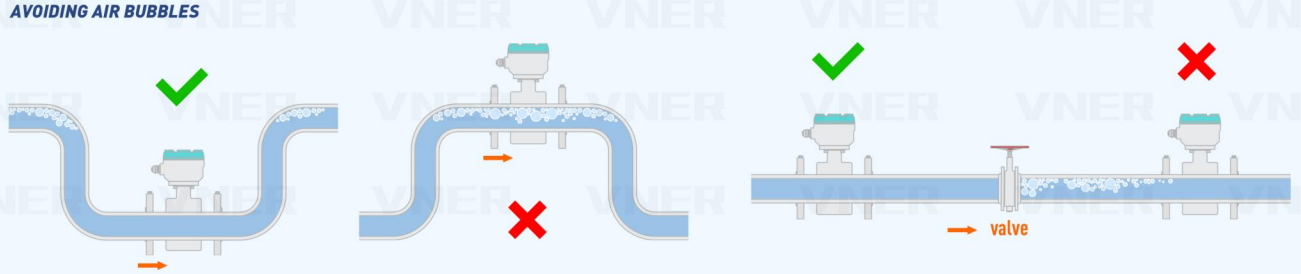
To ensure precise flow measurement, it is imperative to maintain a continuous flow of liquid in the measurement pipe. Any interruption in the flow can adversely impact the measuring result and cause measurement errors. To avoid such inaccuracies, the pipework must be designed such that the flow measurement pipe is consistently filled with fluid. Vertical mounting of the pipe is recommended for fluids that contain abrasives or are diverted. When employing vertical mounting, it is essential to ensure that the fluid flows from bottom to top to ensure that the pipeline is always filled with fluid.

MOUNTING POSITION



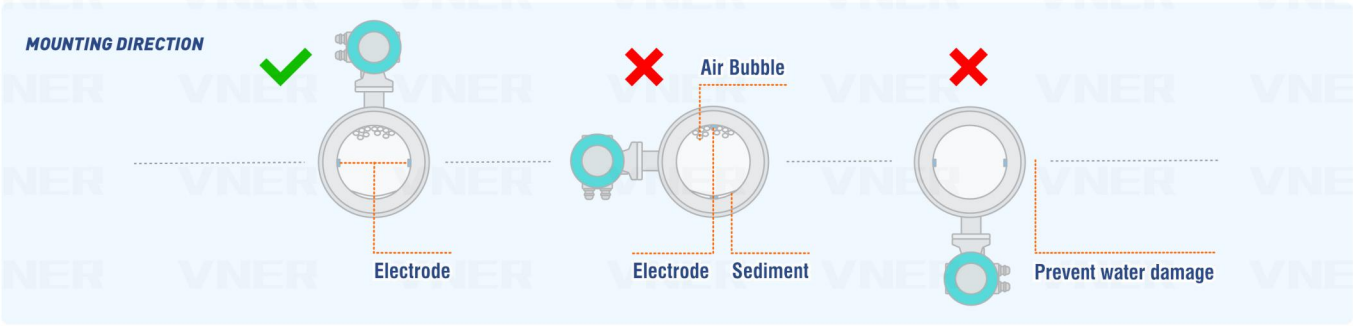

In addition to this, the presence of air bubbles in the fluid can also impact the flow measurement and lead to measurement errors. To prevent such errors, the piping must be designed to prevent the accumulation of air bubbles in the flow measurement tube. If there is a valve near the flow tube, it is advisable to position the tube upstream of the valve to avoid air bubbles caused by pressure reduction.

AVOIDING AIR BUBBLES



## 6.5 MOUNTING DIRECTION

When electrodes are placed perpendicular to the ground, the measurement results may be erroneous due to the presence of air bubbles at the top or sediment at the bottom. To avoid such inaccuracies, it is recommended to install the transmitter at the top of the piping system. This will prevent water from entering the system and ensure accurate measurements.

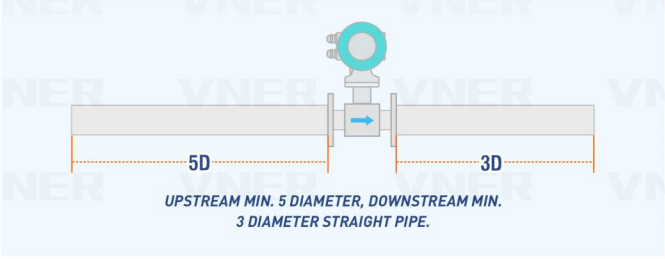


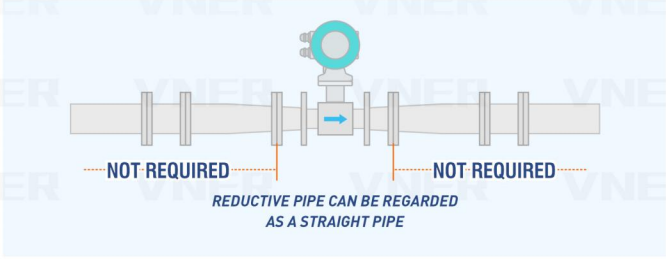

## 6.6 STRAIGHT PIPELINE REQUIREMENTS

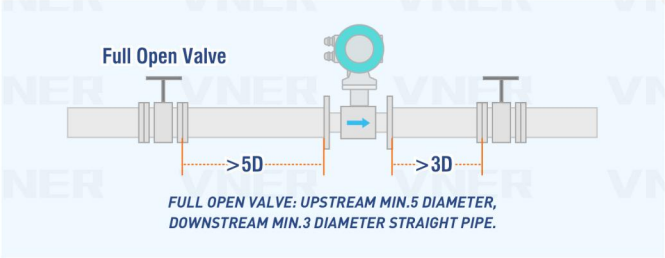
Avoid installing any objects near the flow tube that may interfere with its magnetic field, induce signal voltage, or disrupt its flow field distribution.

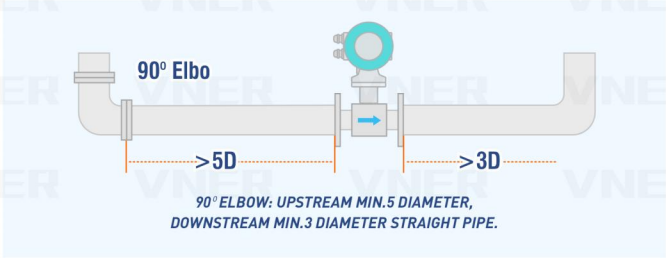
Require a straight pipe section of 5D upstream and 3D downstream, and increase the length of straight pipe section if elbows, valves, or other flow-disturbing components are present.

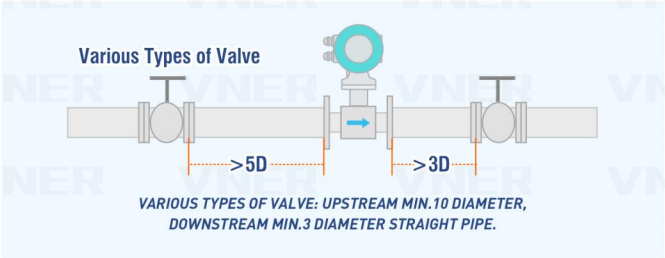
Install a valve at the downstream end of the flow measurement tube to prevent flow fluctuations and inaccurate measurements caused by an empty tube. Ensure the valve is correctly installed and calibrated according to the manufacturer's instructions and industry standards.

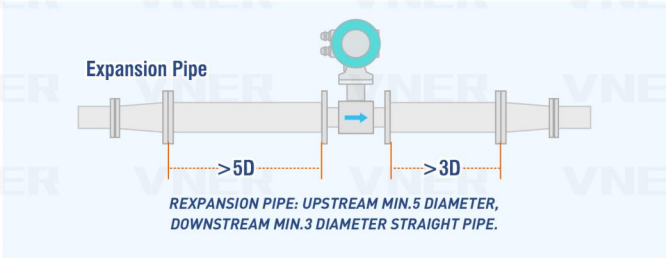



- Maintain stable fluid conductivity

Avoid installing the flowmeter in a location where the fluid conductivity is not uniform. If chemicals are injected near the upstream end of the electromagnetic flowmeter, the flow rate display may be affected. To avoid this, it is recommended that the injection of chemicals be rerouted to the downstream end of the flowmeter. If injection must be made from the upstream end, use a straight section of pipe long enough (approx 50D) to ensure that the fluid is well mixed with the chemical.

### 6.7 ADDITIONAL INFORMATION

To ensure reliable and stable operation of the flowmeter, it is essential to pay attention to the following installation requirements:

- Avoid installing the flowmeter near magnetic objects or equipment with strong electromagnetic fields, such as large motors or transformers, as these could affect the sensor's magnetic field and flow signal.
- Install the flowmeter in a dry and well-ventilated location to avoid accumulation of moisture.
- Avoid exposing the flowmeter to direct sunlight or rain, and make sure that the ambient temperature does not exceed 60°C and the relative humidity does not exceed 95%.
- Choose a location that is easy to maintain and allows easy movement of the flowmeter.
- Always install the flowmeter at the back end of the pump, and never on the suction side. Install the valve on the downstream side of the flow.

## 7. LIST OF CORROSION-RESISTANT MATERIALS FOR ELECTRODES AND LININGS ( REFERENCE ONLY)

| MATERIAL DESCRIPTION | CONCENTRATION % | TEMPERATURE °C | STAINLESS STEEL | HASTELLOY C | TITANIUM ( TI ) | TANTALUM ( TA ) | PLATINUM ( PT ) | POLYTETRAFLUOROETHYLENE ( PTEF ) | PFA | POLYURETHANE RUBBER | CHLOROPRENE RUBBER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetic acid | 5~10 | R~S | A | A | A | A | A | A | A | N | A |
| | Over 50 | R~S | N | A | A | A | A | A | A | N | N |
| | S | R~S | N | A | A | X | A | A | A | | N |
| Aluminium chloride | 10 | Below 100 | N | N | A | B | A | A | | | A(M) |
| | 25~100 | Below 100 | N | N | N | B | A | A | | | A(M) |
| Ammonia | 10 | R | A | A | A | X | A | A | | | |
| | 10 ~ 100 | Below S | B | A | A | N | A | A | A | | A(M) |
| Bauxite slurry | | | A | A | | A | A | B | A | A | B |
| Beer | | | A | A | | A | A | A | | | |
| Black liquor | | | B | | | A | A | A | | N | N |
| Brine | | R~S | B | A | A | X | A | A | | N | A(M) |
| Citric acid | 5~25 | R~S | A | A | A | X | A | A | | | A(M) |
| | 50 | R | A | A | A | X | A | A | | | A |
| | 50 | S | A | A | B | X | A | A | | B | A(M) |
| Slurry | | | N | B | | A | A | A | | A | A |
| Coal+water sluyr | | | A | A | | A | A | B | | A(M) | A |
| Copper sulfate | 5~50 | R~S | B | B | B | A | A | A | | A(M) | A(M) |
| | 50 ~ Sat | R~S | B | B | B | X | A | A | | N | A(M) |
| Dairy products | | | A | A | | A | A | B | | N | N |
| Dynes | | | A | A | | A | A | A | | | N |
| Fatty acid | 100 | R | A | A | A | X | A | A | | | B |
| | 100 | S | B | A | A | X | A | A | | | N |
| | 100 | 135 | A | A | A | X | A | A | | | B(M) |
| | 100 | 315 | A | B | A | X | A | A | | | |
| Hydrochloric acid | 0.5~5 | R | N | X | A | A | A | A | A | | B |
| | 10 ~ 20 | R | N | B | A | A | X | A | A | | B |
| | 37 | R | B | N | N | A | X | A | A | | B |
| | 10 | 50 | N | B | N | A | A | A | A | | B |
| | 5 | 60 | N | N | A | A | A | A | A | | B |
| | 0.5 ~ 5 | S | N | N | A | X | A | A | A | | N |
| | 10 ~ 37 | S | N | N | N | X | X | A | A | | N |
| Glucose syrup | | | A | A | | A | A | A | A | A | A |
| Green liquid | | | A | A | | A | A | A | A | | N |

| MATERIAL DESCRIPTION | CONCENTRATION % | TEMPERATURE ℃ | STAINLESS STEEL | HASTELLOY C | TITANIUM ( TI ) | TANTALUM ( TA ) | PLATINUM ( PT ) | POLYTETRAFLUOROETHYLENE ( PTEF ) | PFA | POLYURETHANE RUBBER | CHLOROPRENE RUBBER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lime slurry | | | N | B | | A | A | A | | | A |
| Lime stone slurry | | | N | B | | A | A | A | | A | A |
| Magnesium hydroxide | 100 | | N | N | | N | A | A | A | | |
| Molasses | | | A | A | | A | A | | A | N | A |
| Mud drilling | | | A | A | | A | A | | N | A | A |
| Nickel sulfate | | 80 | N | N | X | A | A | A | | | A(M) |
| Nitric acid | 7~65 | R | X | X | X | A | A | A | A | | B |
| | 7~65 | S | X | N | X | A | A | A | A | | N |
| | 100 | R | N | | X | A | A | A | A | | N |
| | 100 | 50 ~ S | | | A | A | A | A | A | | N |
| Paper stock | | R~S | B | A | X | A | A | A | | | N |
| Phosphoric acid | 1~ 30 | R | X | X | B | A | A | A | A | | A |
| | 45~ Sat | R | B | X | N | A | A | A | A | | A |
| | 80~ Sat | 140~150 | N | N | | A | A | A | A | | A(M) |
| Potassium hydroxide | 10~ 20 | R | A | X | N | N | A | A | A | | A |
| | 20~ 50 | R | B | X | | N | A | A | A | | A |
| | 10~ 50 | S | B | X | A | N | A | A | A | | A |
| Sewage(Raw) | | | | A | A | A | A | A | | A | A |
| Sea water | | R | B | A | A | A | A | A | | | N |
| Sludge | | | A | A | A | A | A | A | | N | B |
| Sodium bicarbonate | 10~ 20 | R~S | A | A | B | A | A | A | | | A(M) |
| | To 100 | R~S | N | N | A | A | A | A | A | | A(M) |
| Sodium hydroxide | 10~ 20 | R | A | N | A | N | A | A | A | | A |
| | 34~ 50 | R | B | N | A | N | A | A | A | | A |
| | 10~ 20 | ~ 150 | N | N | B | N | A | A | A | | A(M) |
| | 30~50 | 70 ~ 150 | N | N | B | N | A | A | A | | A(M) |
| | 50 | 180 | N | N | B | N | A | A | A | | A(M) |
| | 60~ 100 | ~ 150 | N | N | X | N | A | A | A | | A(M) |
| Sulfuric acid | 2~5 | R | N | X | X | A | A | A | A | | A |
| | 10 | R | N | X | B | A | A | A | A | | N |
| | 25~ 60 | R | N | X | N | A | A | A | A | | N |
| | 70~ 85 | R | N | X | N | A | A | A | AA | | N |
| | 90~ 96 | R | X | X | X | A | A | A | A | | N |
| | 2~5 | 150 | N | N | N | N | A | A | A | | A(M) |
| | 5~ 60 | 180 | N | N | N | N | A | A | A | | N |
| | 77~ 96 | 150 | N | N | | N | A | A | A | | N |
| Urea | 50 | | A | A | | | A | A | | N | N |
| Uric acid | | R | A | A | | X | A | A | | | A |
| White liquid | | | N | N | | A | A | A | | | B |

**Symbol Interpretation:**

A - Applicable

B - Proceed with caution, consult manufacturer

N - Not applicable

X - Corrosion-resistant, but not recommended

Blank - No data available

R - Ambient Temperature

S - Boiling point

Sat - Saturated

( M ) - Maximum temperature resistance of the lining

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## JIANGSU VNER ELECTRONIC TECHNOLOGY LTD

We adapt to local regulations, we strive to deliver quality solutions and we are constantly trying to reduce our environmental impact.



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