VNER

ELECTROMAGNETIC FLOWMETER

VNER VE801 SERIES

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DISCLAIMER

This manual has been meticulously reviewed and cross-referenced with the corresponding hardware and software to ensure accuracy. However, errors or omissions may still occur. Updates to technical specifications will be incorporated into subsequent revisions without prior notification.

Your feedback and suggestions are highly valued to help us enhance this document.

PURPOSE OF THIS MANUAL

This manual is designed to provide comprehensive guidance on the operation, installation, and maintenance of the VE801 Series electromagnetic flow meter. It serves as a reference for technicians, operators, and maintenance personnel to ensure optimal use and longevity of the instrument.

TABLE OF CONTENTS

BASIC SAFETY REQUIREMENTS

1. INSTRUMENT SAFETY STANDARDS

The **VE801 Series electromagnetic flow meter** complies with industry safety standards, including stringent testing under controlled conditions. To ensure safe operation, always adhere to the technical requirements outlined in this manual.

2. MODEL AND SPECIFICATIONS

Refer to the nameplate affixed to the transmitter housing for the model number and key specifications. Ensure all parameters align with your purchase order to avoid misapplication.

3. TRANSPORTATION AND STORAGE GUIDELINES

- Retain factory packaging until the instrument is installed at its designated location.
- Store in a clean, dry environment within specified temperature (-25°C to +65°C) and humidity (5%–90%, non-condensing) ranges.
- Avoid exposure to vibration or mechanical impact.

4. MAINTENANCE AND INSPECTION PROTOCOLS

- Use original packaging for returns or repairs to protect the instrument. Clearly document the reason for return.
- Ensure instruments are free of hazardous materials before shipping for maintenance. Thoroughly clean sensor openings and document any residual substances.
- Unauthorized modifications or use of non-approved parts void the warranty. Repairs should be conducted by certified personnel or at authorized facilities only.

OPERATIONAL PRECAUTIONS AND RISKS

1. RISKS DURING ELECTRICAL INSTALLATION

Electrical installations must be performed exclusively by trained and authorized personnel following the electrical connection diagrams provided in this manual.

- **Hazard Warning:** The instrument contains live circuits. To avoid electrical shock, ensure the power supply is disconnected before opening the protective housing
- cover.
- Installation and maintenance tasks should only be carried out by certified personnel, equipped with the proper tools and protective equipment.

2. RISKS DURING OPERATION AND USE

The VE801 Series Electromagnetic Flow Meter requires adherence to the following precautions:

- **High-Temperature Medium:** When measuring high-temperature Medium, the sensor surface may become extremely hot, posing a burn hazard. Appropriate warning labels and protective measures must be implemented.
- **Corrosive or Abrasive Medium:** Prolonged exposure to corrosive or abrasive substances can damage the sensor lining or electrodes, potentially causing medium leakage under pressure.
- **Seal Aging and Leakage:** Over time, flanges or process connector gaskets may degrade, increasing the risk of leakage. Regular inspections are essential to identify wear and prevent failure.
- **Depressurization Before Maintenance:** Always depressurize the system and ensure no hazardous residues remain in the instrument or piping before removal. Residual substances could pose risks during disassembly.
- **Pipeline Vibrations:** Monitor for pipeline vibrations that may loosen flange bolts or nuts. Periodically check and tighten connections as needed to maintain a secure seal.

- **User Responsibility:** Routine inspections should include:
  - Verifying pressure integrity of the equipment and lining.
  - Checking instrument functionality.
  - Ensuring seals are intact and free from wear.
  - Examining components for signs of corrosion or degradation.

3. SPECIFICATION LIMITATIONS

The VE801 Series must operate strictly within its specified parameters as indicated on the nameplate and in the user manual. Failure to adhere to these limits can compromise safety and performance:

- **Temperature Restrictions:** Do not exceed the specified operating temperature range for both the process medium and the ambient environment.
- **Ingress Protection:** Ensure the protection level meets EN60529 standards (IP65 or IP68) based on the installation environment.
- **Prohibited Components:** Avoid using graphite spacers or unapproved materials that may compromise performance or safety.

4. INSTRUMENT HANDLING GUIDELINES

Safe handling of the instrument is crucial to prevent damage or injury:

- Always use lifting straps securely to prevent slipping or accidental rotation during transport.
- Do not lift flange-type instruments by the junction box.
- Avoid using forklift tines directly on the instrument. If a forklift is necessary, ensure the instrument remains within its original protective packaging.
- Place the instrument on a stable and appropriate base during storage or installation.
- Never apply force directly to the instrument's housing, as this could damage internal components, including the coil.

5. PERMISSIBLE MEDIUM

The VE801 Series is designed for conductive fluids where the chemical and physical properties of the medium are compatible with the instrument's materials, including the signal electrode, ground electrode, liner, process connector, and ground ring.

- **Confirmed Medium:** Measurement is permissible if the medium's properties are verified based on technical specifications or user experience.
- **Unknown Fluids:** Fluids with unknown characteristics should only be measured after conducting thorough inspections and ensuring compatibility with the instrument.
- Always refer to the technical data on the nameplate to confirm the suitability of the medium.

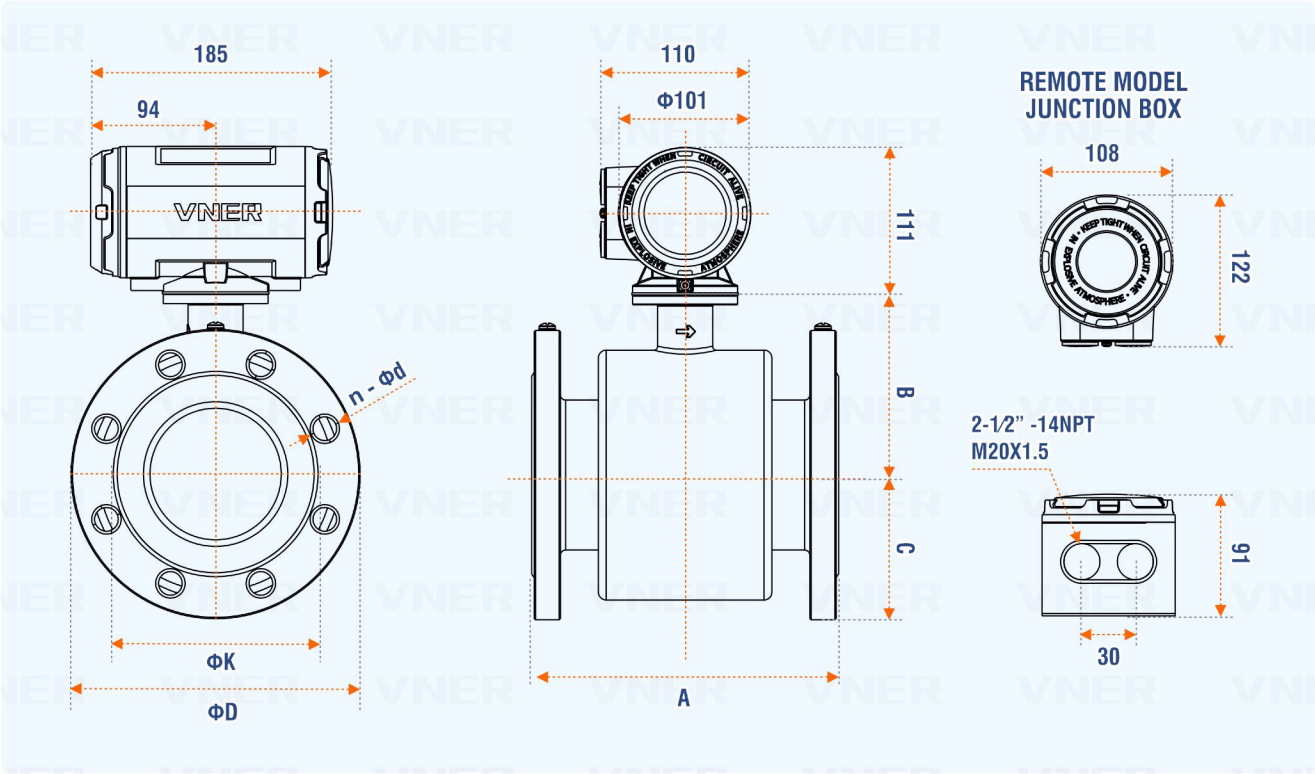
PRODUCT TECHNICAL PERFORMANCE INDICATORS

The **VE801 Series Electromagnetic Flow Meter** is a high-precision instrument designed for reliable and efficient measurement of conductive liquids. Below are its key technical specifications:

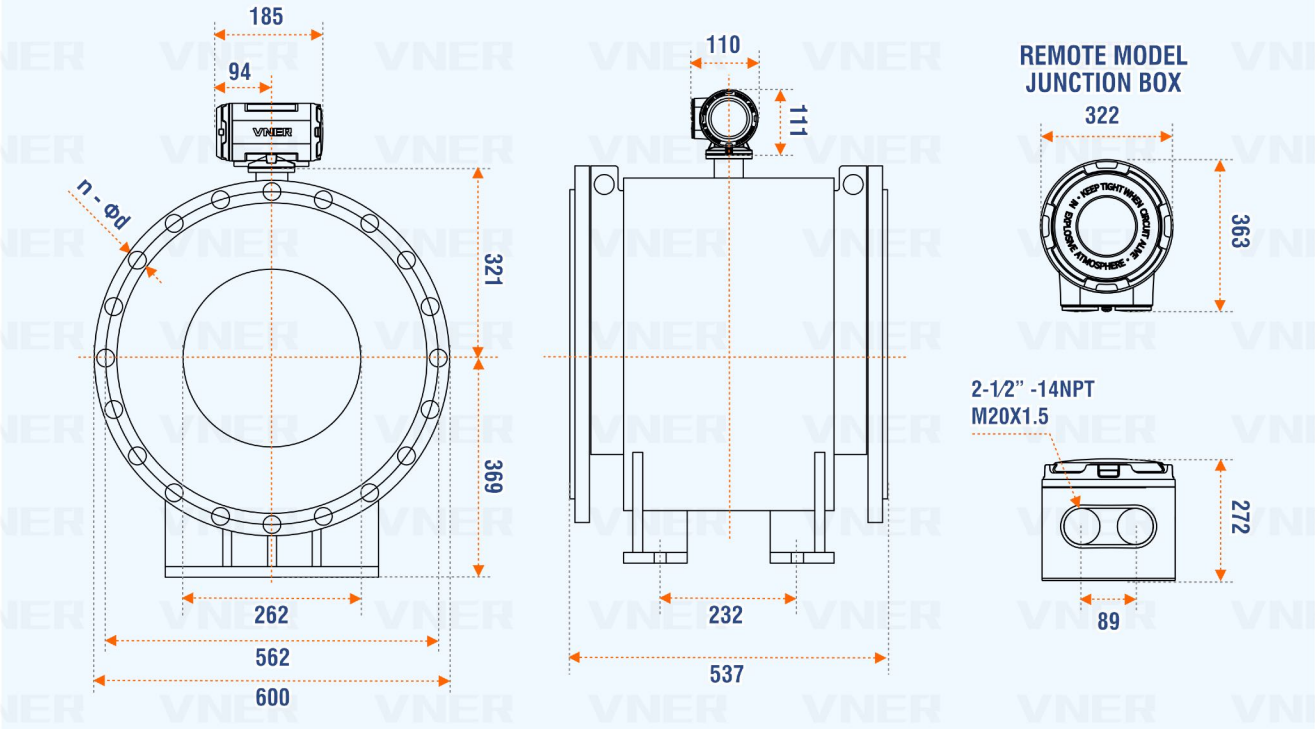
MODEL	VE801 SERIES
Measured Fluid	Conductive Fluid
Accuracy	±0.3%, ±0.5%
Repeatability	0.1% / 0.16%
Process Temperature Range	-40 ~ +200 °C
Fluid Conductivity	≥ 20μs / cm
Diameter Range	10~2000 mm
Operating Pressure	0.6MPa / 1.0MPa / 1.6MPa / 4.0MPa
Velocity Range	(0.3~ 10)m/s
Flow Direction	Bidirectional: Forward/Reverse
Electrode Material	SS 316L / Ha B / Ha C / Titanium / Tantalum / Tungsten Carbide
Lining Material	Polyurethane / CR / PTFE / F46 / PFA
Electrode Form	Standard Electrode
Number of Electrodes	Four Electrodes
Flange Material	Carbon steel / Stainless Steel
Installation form	Flange-Pipe-lined
Ingress Protection	IP65 / IP67 / IP68
Power Supply	220VAC / 24VDC
Signal Output	4~20mA / Frequency / Pulse
Communication Protocols	HART / MODBUS
Electrical Interface	1/2"-14NPT ,M20×1.5
Explosion-proof Type	None / Explosion-proof
Mounting Type	Integral / Remote
Ambient temperature	-25~60°C
Relative Humidity	5% ~90%

INSTALLATION GUIDELINES

1. VE801 INSTRUMENT DIMENSIONS



DN10-DN450 PIPE-LINED ELECTROMAGNETIC FLOWMETER



DN500+ PIPE-LINED ELECTROMAGNETIC FLOWMETER

2. RATED PRESSURE AND SIZE TABLE (DN10–DN2000)

DN	RATED PRESSURE MPA	INSTRUMENT DIMENSIONS UNIT: MM A		B	C	E	F	ΦD	ΦK	n x Φd
10	4.0	150	±2	95	50			90	60	4×Φ14
15								95	65	4×Φ14
20								105	75	4×Φ14
25				100	55			115	85	4×Φ14
32				105	60			140	100	4×Φ18
40		200		110	65			150	110	4×Φ18
50				121	76			165	125	4×φ18
65				130	80			185	145	8×φ18
80				135	90			200	160	8×Φ18
100	1.6	250		145	100			220	180	8×Φ18
125				161	116			250	210	8×Φ18
150		300		171	126			285	240	8×Φ22
200		350		199	154			340	295	12×Φ22
250		400		224	179			405	355	12×Φ26
300		500	±3	249	204			460	410	12×Φ26
350				274	229			520	470	16×Φ26
400		600		305	260			580	525	16×Φ30
450	1.0			330	285			615	565	20×Φ26
500				360	403	300	240	670	620	20×Φ26
600			±5	410	453		270	780	725	20×Φ30
700		700		467	560	400	350	895	840	24×Φ30
800		800		517	610		400	1015	950	24×Φ33
900		900		567	660		470	1115	1050	28×Φ33
1000		1000		617	712		570	1230	1160	28×Φ36
1200	0.6	1200		719	814	600	710	1405	1340	32×Φ33
1400		1400		819	914		900	1630	1560	36×Φ36
1600		1600		919	1036	800	1040	1830	1760	40×Φ36
1800		1800		1021	1138		1180	2045	1970	44×Φ39
2000		2000		1121	1238		1350	2265	2180	48×Φ42

3. INSTALLATION REQUIREMENTS AND STEPS

■ General Installation Guidelines

To ensure optimal performance and longevity of the VE801 Electromagnetic Flow Meter, the following installation requirements must be strictly observed:

1. **Flow Direction:** The sensor must be installed with the flow direction matching the directional arrow marked on the sensor body.
2. **Mechanical Stress:** Avoid mechanical stresses such as torsion or bending on the instrument. Ensure the mating flange is axially aligned and parallel. Use
3. suitable gaskets during assembly. Never apply excessive force, violent impacts, or dragging, as these actions can damage the sealing surface or compromise
4. the instrument's integrity.

   Cable Connector Protection: The protective plug inside the cable connector must remain in place until wiring is performed.

   Grounding Requirements:

   1. Proper grounding is critical for accurate measurement due to the weak flow signal generated by the sensor.
   2. The sensor body, medium, and pipeline must all share the same potential. Grounding resistance should be less than 10 ohms.
   3. The flowmeter should be grounded independently to avoid interference from other ground wires. A dedicated grounding line is recommended for this purpose.
   4. Inadequate grounding can result in signal interference and disrupt normal operation.
5. **Protection During Pipe Work:** When welding or flame-cutting near the sensor, take appropriate isolation measures to prevent high-temperature damage to the sensor lining.

■ Installation Environment Selection

Choose the installation site carefully to ensure stable operation and avoid potential environmental impacts:

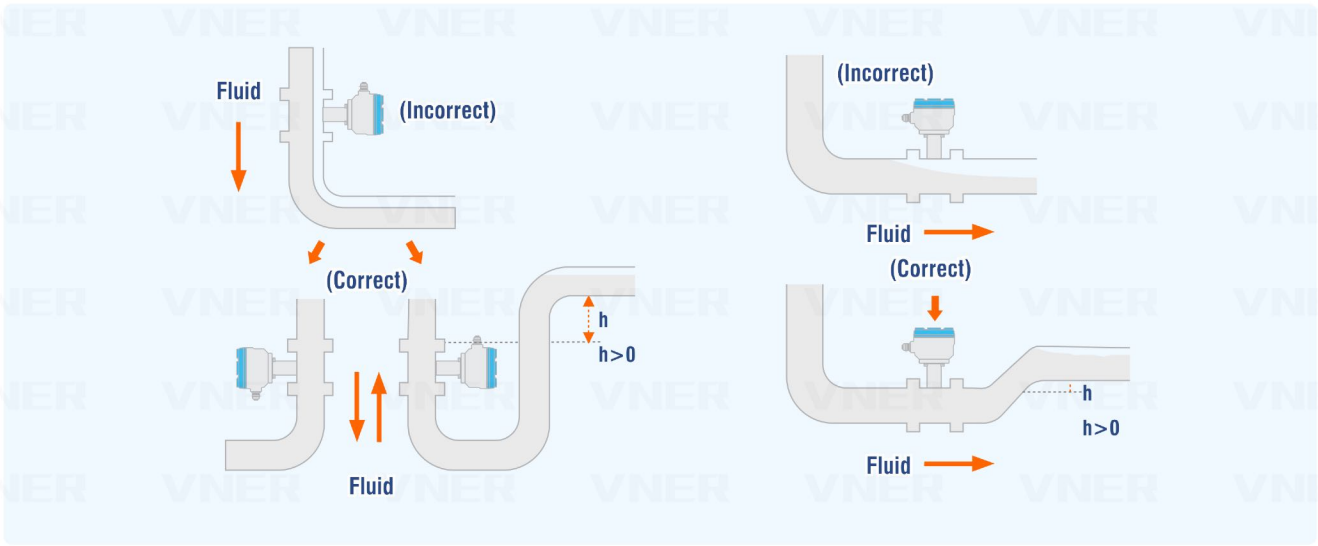
1. **Electromagnetic Interference:**
   1. Avoid proximity to ferromagnetic objects and devices generating strong electromagnetic fields, such as high-power motors, large transformers, and frequency converters. Such equipment can interfere with the sensor's magnetic field and current signals.
2. **Corrosive Gases:** Do not install the flowmeter in areas with strong corrosive gases, as they may degrade components over time.
3. **Mixed-Phase Fluids:** When measuring mixed-phase fluids, ensure installation in locations where phase separation is unlikely to occur.
4. **Ambient Temperature:**
   1. Maintain ambient temperatures within the range of -25°C to 60°C.
   2. Shield the instrument from direct sunlight whenever possible to prevent thermal stress.
5. **Vibration:**
   1. Install the sensor in an environment with minimal vibration.
   2. If vibrations are unavoidable, provide fixed supports for the pipes on both sides of the sensor to stabilize the installation.
6. **Humidity:** Ensure the relative humidity of the environment is between 5% and 90% (non-condensing).
7. **Water Exposure:** For installations in areas prone to rain or water immersion, use a flowmeter with an IP67 or IP68 ingress protection rating.

4. INSTALLATION LOCATION REQUIREMENTS AND STEPS

■ Full Pipe Requirements

To guarantee accurate measurement performance, the pipeline section containing the flow meter must remain fully filled with liquid at all times. The following guidelines are crucial for ensuring proper operation:

Pipeline Configuration Requirements for Optimal Measurement:



Flow Orientation:

The fluid should ideally flow **Upward** through the flow meter to ensure the pipeline remains filled. This configuration prevents the formation of air pockets that may disrupt measurement accuracy.

Downward Flow Considerations:

When the fluid flows **Downward**, ensure the pipeline segment below the flow meter is positioned **higher** than the flow meter itself. This design helps maintain a full pipeline and avoids partial filling caused by gravitational effects.

■ Avoid the Generation of Air Bubbles

Air bubbles in the measured liquid can significantly affect the accuracy of the electromagnetic flowmeter, particularly in two-phase flows involving both gas and liquid. Follow these recommendations to minimize bubble formation and ensure reliable measurement:

Installation and Operational Guidelines:

Minimizing Bubble Generation:

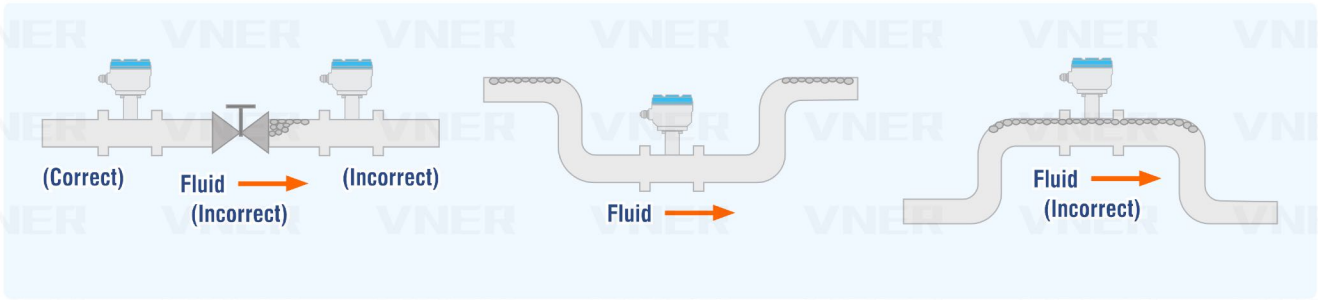
1. Take precautions to prevent the generation of bubbles during pipeline installation.
2. Ensure the pipeline design avoids abrupt pressure drops or flow turbulence that could lead to bubble formation.

Control Valve Placement:

Install the control valve Downstream of the flowmeter. This configuration reduces the likelihood of bubbles forming due to pressure drops as the liquid passes through the valve.

Pipeline Design:

Ensure smooth transitions in the pipeline to prevent sharp changes in flow velocity or pressure that could result in air entrainment.



■ Miscible Fluid

The VE801 Electromagnetic Flowmeter is specifically designed for the measurement of liquid-only media. Accurate measurement cannot be achieved when the medium is in a multiphase state.

Important Considerations:

Liquid-Only Media:

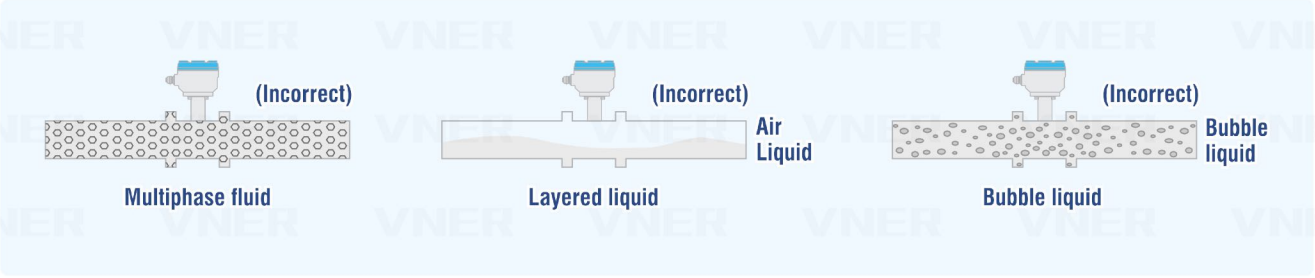
The flowmeter is engineered for conductive liquids and is unsuitable for applications involving gas-liquid or solid-liquid mixtures.

Multiphase Fluids:

If the measuring medium is in a mixed-phase state, such as containing gas bubbles or suspended solids, the electromagnetic flowmeter will be unable to provide accurate and reliable readings.

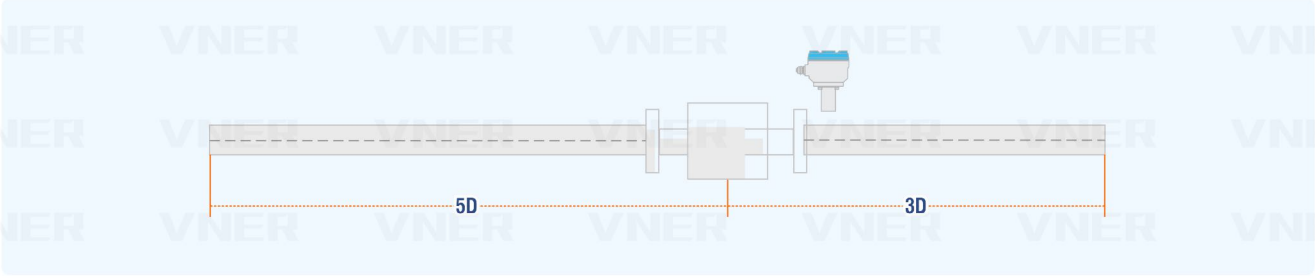
Application Guidelines:

1. Ensure that the measured medium is fully liquid and free from any phase separation or mixed-phase conditions during operation.
2. Evaluate the properties of the medium and its flow conditions before installation to confirm compatibility with the flowmeter specifications.



■ Requirements for Straight Pipe Length

The electromagnetic flowmeter has relatively low requirements for the length of the straight pipe sections before and after the meter. For 90° elbows, T-joints, reducers, fully open valves, and other flow resistance elements, there should be a straight pipe section of 5D from the electrode axis of the electromagnetic flowmeter (not the sensor's end face). For adjustable valves with different openings, the upstream straight pipe section should be 10D. Generally, the downstream straight pipe section only needs to be 3D to meet the requirements.



■ Maintaining Stable Conductivity

To ensure measurement accuracy, the measured medium's conductivity must remain stable. Avoid installing the flowmeter in locations where the fluid's conductivity is prone to significant fluctuations.

■ Chemical Injection Precautions:

Impact on Flow Readings:

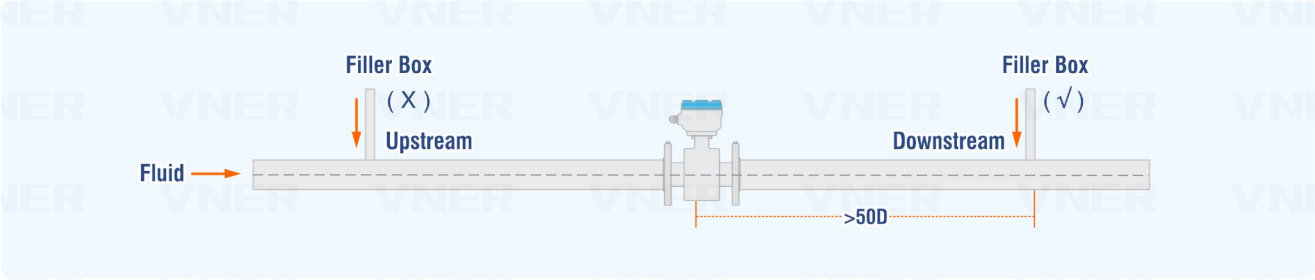
If chemicals are injected near or Upstream of the electromagnetic flowmeter, the sudden change in conductivity may affect the flow measurement display.

Recommended Installation Location:

To prevent such issues, it is advised to install the main chemical injection point on the Downstream side of the flowmeter.

Upstream Injection Considerations:

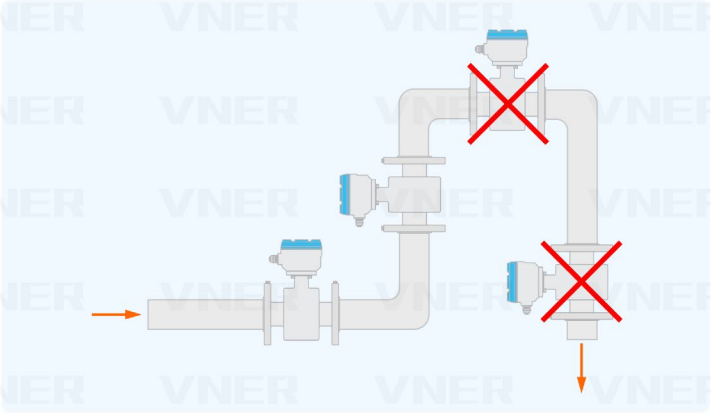
If chemical injection Upstream of the flowmeter is unavoidable, ensure the presence of a sufficiently long straight pipe section (approximately 50 times the pipe diameter, or 50D) to allow thorough mixing of the fluid before it reaches the flowmeter.

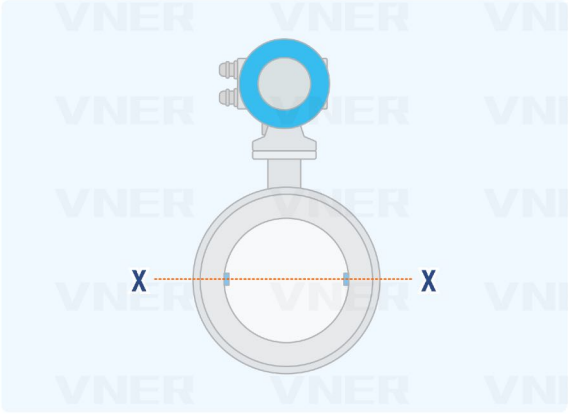


■ Installation Direction and Preventing Negative Pressure

The electromagnetic flowmeter can be installed horizontally, vertically, or at an incline on the pipeline:

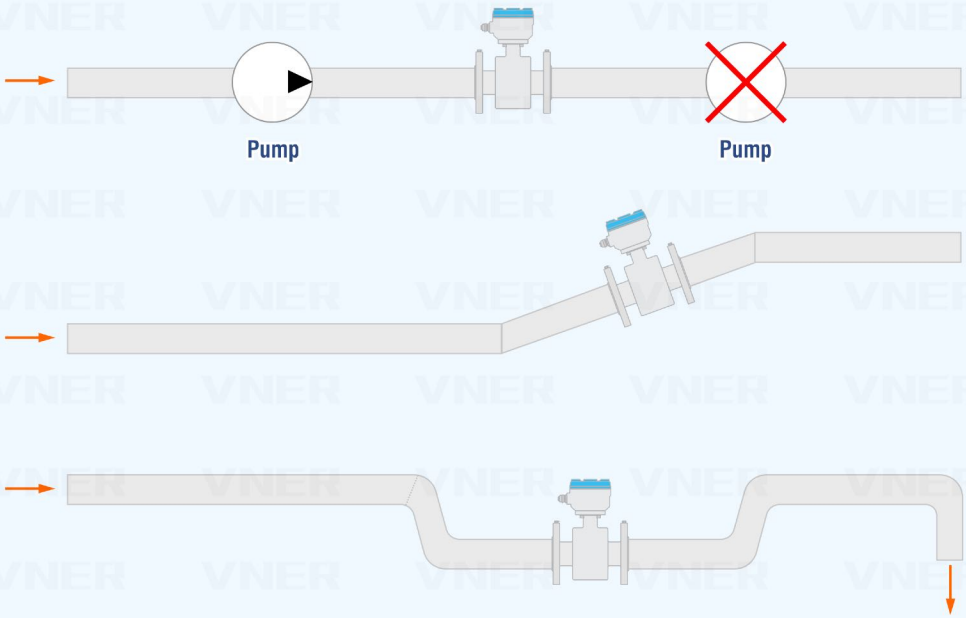
When installed horizontally, the electrode axis of the electromagnetic flowmeter must be horizontal. This prevents short-term insulation of the electrodes caused by air bubbles carried by the fluid and also prevents the electrodes from being covered by deposits in the fluid. The sensor should not be installed at the highest point in the pipeline to avoid gas accumulation.

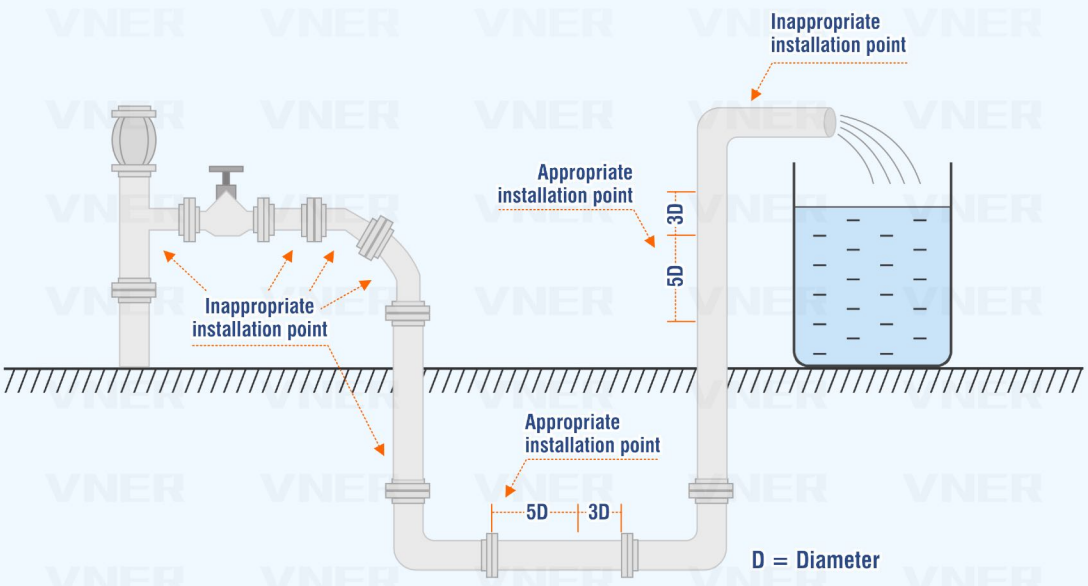




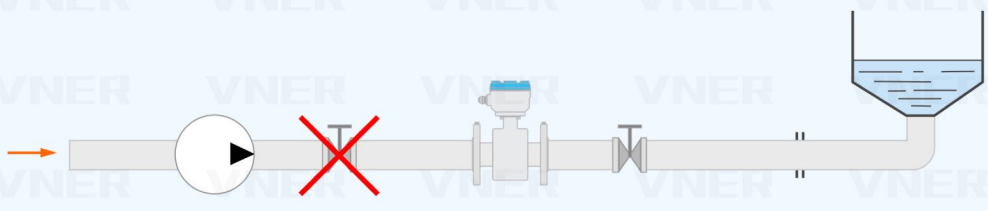
When installing vertically, the flow direction should be upwards. This ensures that when there is no flow or very low flow, heavier solid particles in the fluid will settle, while lighter fatty substances will rise, moving away from the sensor electrode area of the electromagnetic flowmeter. This setup helps prevent solid phase sedimentation and uneven abrasion of the sensor lining when measuring slurry, ore slurry, and other liquid-solid two-phase media, as shown in the figure.

The sensor's measurement pipeline must be fully filled with fluid and must have a certain amount of back pressure. To prevent the occurrence of negative pressure (which could damage the lining), the electromagnetic flowmeter should not be installed at the pump's inlet but rather at the pump's outlet. When installing on an inclined pipeline, it must be installed on the ascending section of the pipeline. When installed on an open discharge pipeline, it must be placed at a lower point in the pipeline.

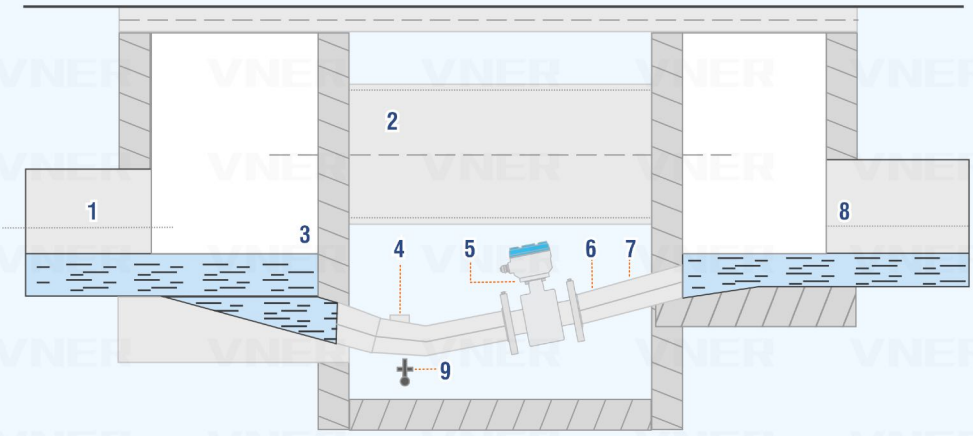




The control valve and shut-off valve should be installed downstream of the sensor, not upstream.



Installation of flow meters in measuring wells



1. Inlet
2. Overflow pipe
3. Inlet
4. Cleaning port
5. Flowmeter
6. Short pipe
7. Outlet
8. Drain outlet
9. Drain valve

5. CABLE INSTALLATION RECOMMENDATIONS

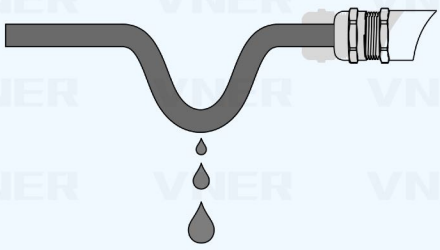
To meet the protection level requirements and ensure reliable operation, follow these cable installation guidelines:

Prevent Cable Knots:

Ensure that cables entering the flowmeter are installed without knots or sharp bends. Knotted cables can compromise the protection level and reduce the device's reliability.

Use a Drip Bend (U-Bend):

Create a **U-shaped drip bend** in the cable near the entry point. This design prevents water from flowing along the cable and entering the device, thereby safeguarding against moisture-related damage.



6. INSTALLATION OF THE REMOTE JUNCTION BOX AND CONVERTER

■ Surface Mounting Instructions

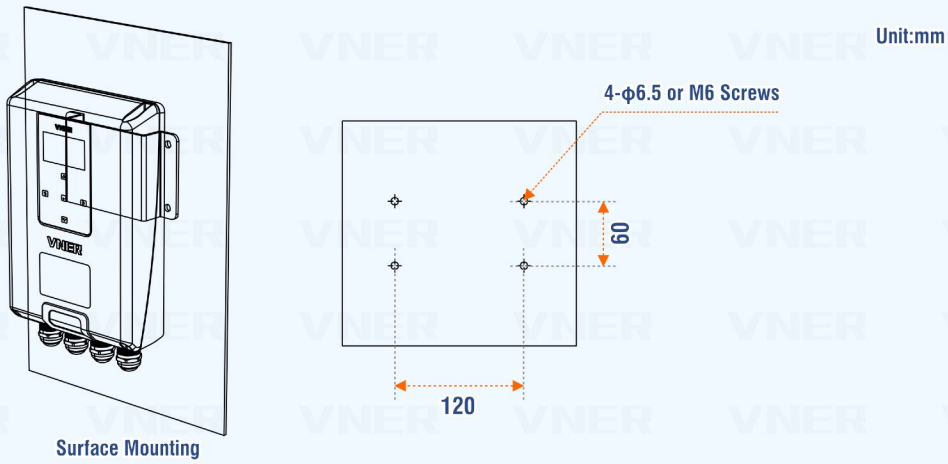
For secure surface mounting of the VE801 Electromagnetic Flowmeter, follow these steps:

Mounting Bracket Installation:

Use **M6 screws** to attach and secure the provided mounting bracket to the designated surface. Ensure that the screws are tightened firmly to prevent any movement or instability.

User-Supplied Screws:

Please note that the required **M6 screws** are not included with the flowmeter package and must be supplied by the user. Ensure the screws are of appropriate length and material to match the mounting surface and application environment.



■ **Surface Mounting Instructions**

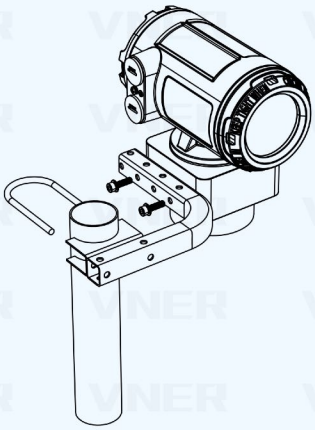
The split converter of the VE801 Electromagnetic Flowmeter can be mounted on a **φ63 pipe** either vertically or horizontally, depending on the installation site requirements. Follow the steps below for proper installation:

Securing the Converter to the Bracket:

Use **two screws** to attach the split converter securely to the mounting bracket. Ensure the screws are tightened to prevent any movement or misalignment during operation.

Attaching the Bracket to the Pipe:

Fix the mounting bracket to the **φ63 pipe** at the desired position. Ensure the bracket is properly secured and aligned for stable installation, whether in a vertical or horizontal orientation.



WIRING INSTRUCTIONS

Proper wiring is crucial to ensure the safe and effective operation of the VE801 Electromagnetic Flowmeter. Follow these guidelines to avoid potential issues:

■ **General Wiring Precautions** ⚠

Weather Considerations:

Avoid performing outdoor wiring tasks during wet weather conditions to prevent damage from condensate and to protect the insulation of the flowmeter's junction box.

Cable Separation:

Install the power cable and the output signal cable separately to minimize interference with the output signal.

Power Supply Safety:

Ensure the power supply is turned off before wiring. Live wiring is strictly prohibited. Carefully verify the power supply voltage to avoid malfunctions or damage to the flowmeter caused by incorrect voltage.

Sealing the Enclosure:

After completing the wiring, always tighten the back cover of the flowmeter to prevent moisture from entering and affecting the device's performance.

1. CONNECTING PORT OF THE INTEGRATED FLOWMETER

The VE801 flowmeter features a waterproof structure to ensure long-term durability and reliability. If a specific electrical connector is selected for the model, it will be pre-installed and delivered with the instrument.

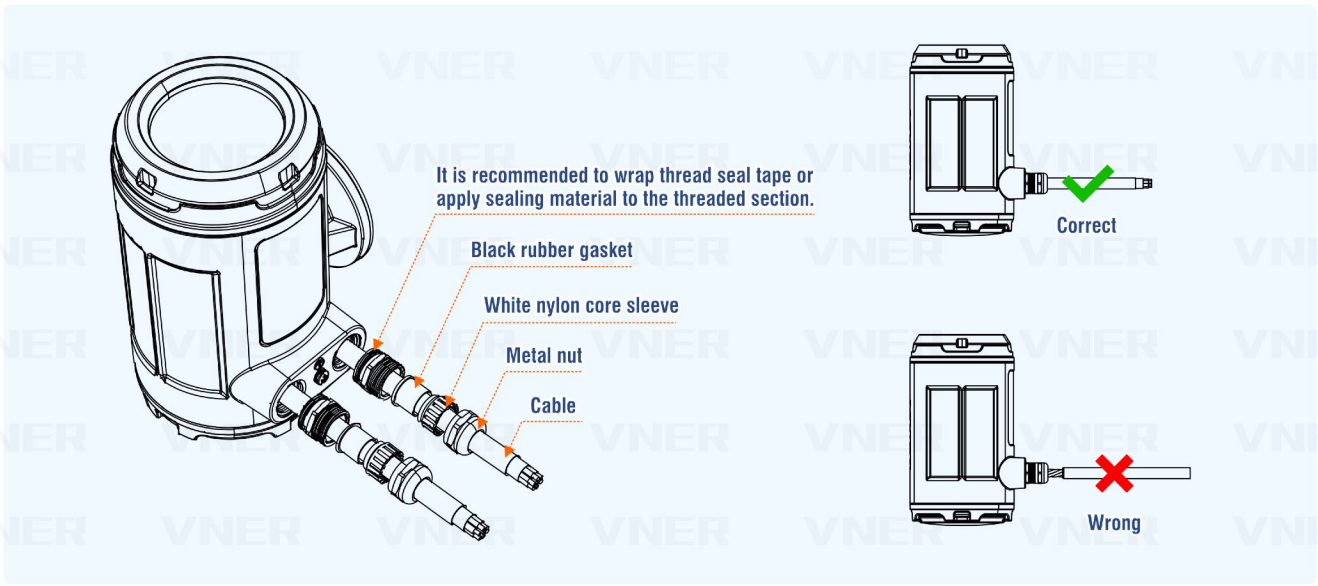
■ **Important Notes:**

Protective Covers:

The electrical joint is sealed with a plastic cover during shipment to protect the instrument from dust during transportation. Replace this cover with the designated electrical connector promptly after installation to prevent moisture ingress.

Securing Connectors:

After wiring, ensure that the electrical connector is securely tightened. This step is essential to prevent moisture from infiltrating the converter case and damaging the internal components.



2. WIRING STEPS FOR THE INTEGRATED FLOWMETER

The VE801 flowmeter features a waterproof structure to ensure long-term durability and reliability. If a specific electrical connector is selected for the model, it will be pre-installed and delivered with the instrument.

2.1 Opening the Cover and Terminal Definitions

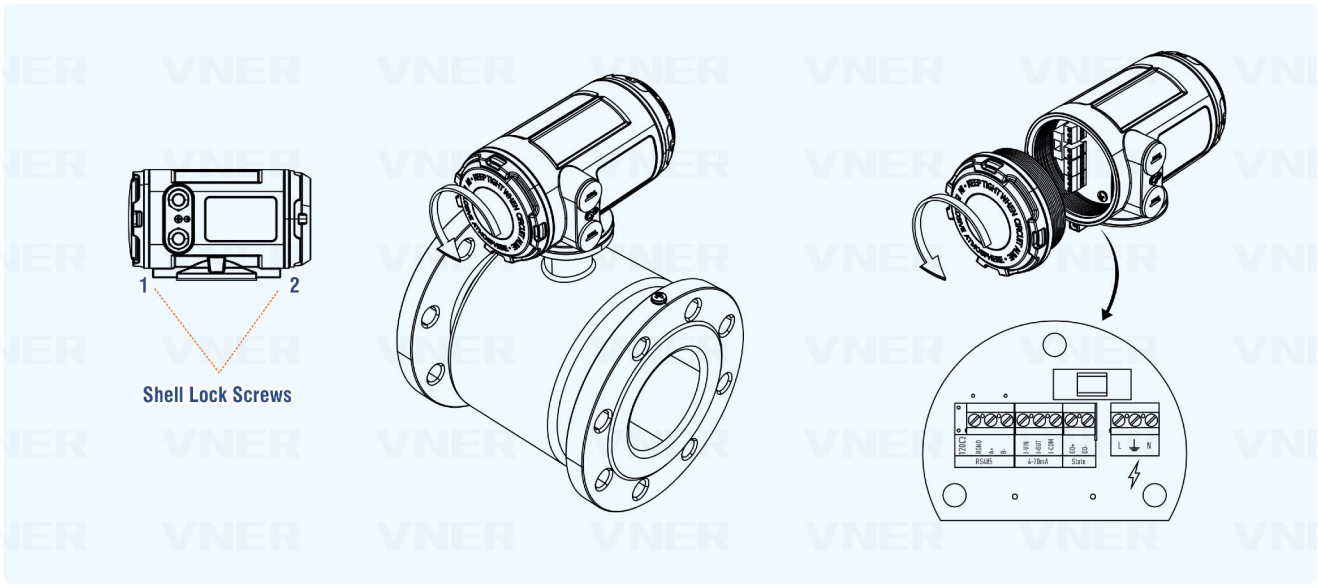
Loosening the Cover Lock:

Use a hexagon wrench to unscrew the cap lock screw in a counterclockwise direction. Ensure the screw is fully loosened to allow smooth removal of the cover.

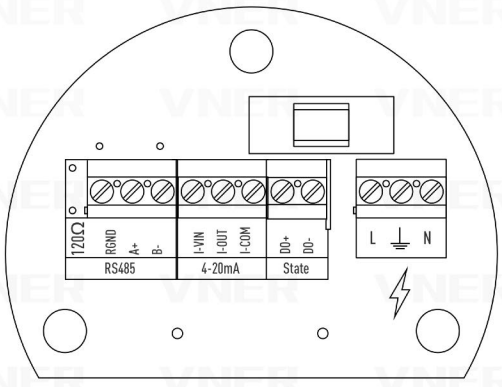
Removing the Shell Cover:

1. Hold the flowmeter securely with one hand. Rotate the shell cover in the direction indicated by the arrow (as shown in the diagram below) to open it.
2. Carefully remove the shell cover and place it in a safe area to avoid damage.

Note: Perform these steps with care to prevent any impact or stress on the instrument. Ensure the cover and terminal areas are kept clean and free from moisture or debris during the wiring process.



2.2 The Definition of Terminals and Marks



RS485	RGND	Ground
	A	485-Terminal A
	B	485-Terminal B
AO	IOUT	Active (4~20)mA Current Output
	ICOM	IOUT: mA + / ICOM: mA -
	IVIN	Passive (4~20)mA Current Output
	IOUT	IVIN: mA + / IOUT: mA -
OUT	DO -	Switching Output Negative
	DO +	Switching Output Positive
POWER	N/24 -	Power Supply
	L/24+	(Voltage Differentiation)

3. WIRING STEPS FOR THE REMOTE FLOWMETER

3.1 Dedicated Signal Cable

The dedicated signal cable is specifically designed to ensure reliable data transmission and electromagnetic compatibility.

Key Features:

1. Shielding: Equipped with a high-quality shielding layer to prevent electromagnetic interference and maintain signal integrity.
2. Conductors: Made of premium materials for optimal conductivity and durability.
3. Insulation: Resistant to moisture, chemicals, and temperature variations to support long-term operation.

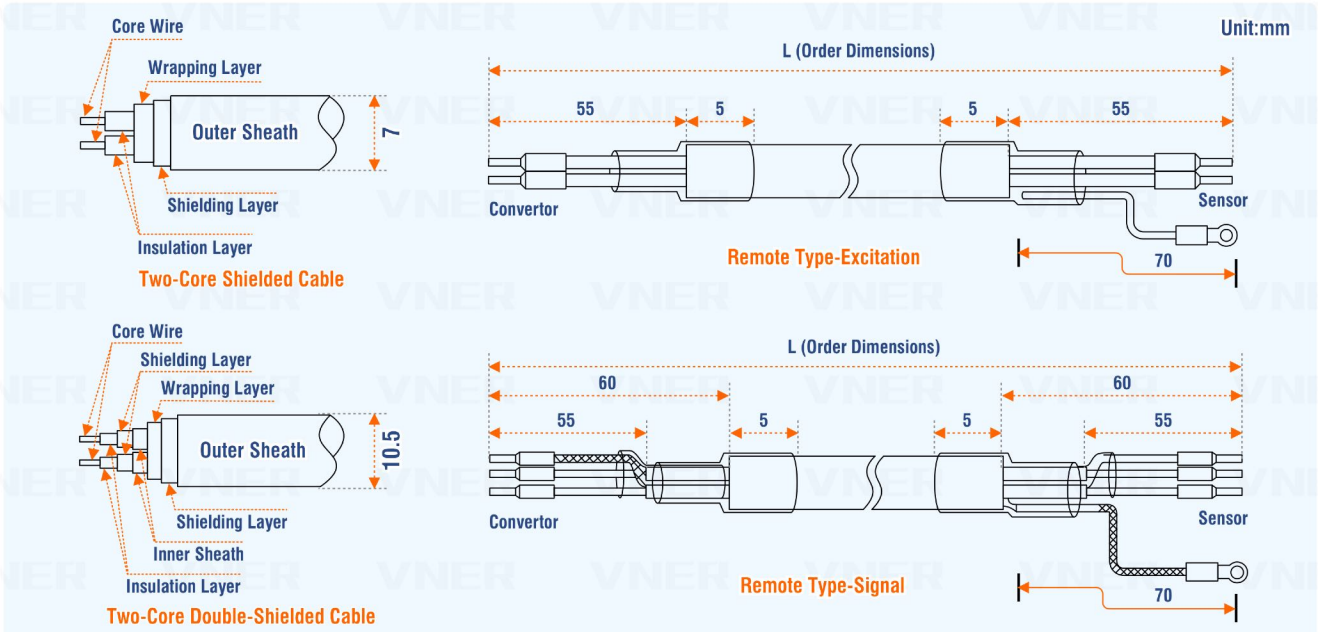
Connection Guidelines:

- Ensure the signal cable is connected securely to the designated terminals according to the wiring diagram in the user manual.
- Avoid sharp bends or excessive pulling during installation to prevent damage to the cable.
- Route the signal cable away from high-voltage lines and sources of strong electromagnetic interference, such as motors and transformers.
- For outdoor installations, use a drip loop (U-bend) to prevent water ingress.

Maintenance Notes:

- Inspect the cable regularly for wear or damage.
- Replace the cable immediately if the shielding layer or insulation is compromised.

Proper use of the dedicated signal cable ensures accurate measurement and optimal performance of the electromagnetic flowmeter.



Attention

- **Signal Transmission:**

  The flow measurement signal from the split-flow meter is transmitted through this cable. It is critical to ensure the integrity of the cable throughout its entire length to maintain accurate signal transmission.

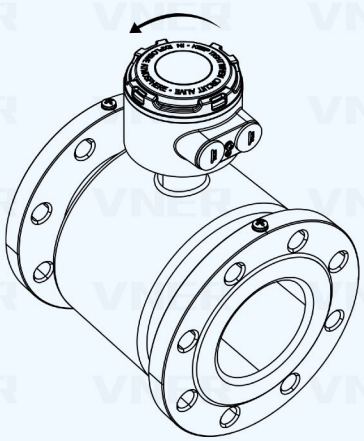
- **Cable Integrity:**

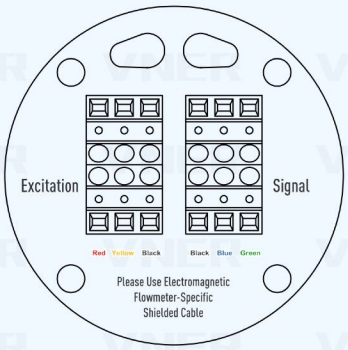
  The cable must not be damaged during the wiring process. Avoid improper connections, as these could disrupt signal transmission and lead to inaccurate readings or malfunction of the flowmeter.

- **No Unauthorized Extension::**

  The cable should never be extended or modified by unauthorized personnel. Extending the cable improperly may cause communication issues and prevent the flowmeter from functioning correctly, leading to unreliable measurements.

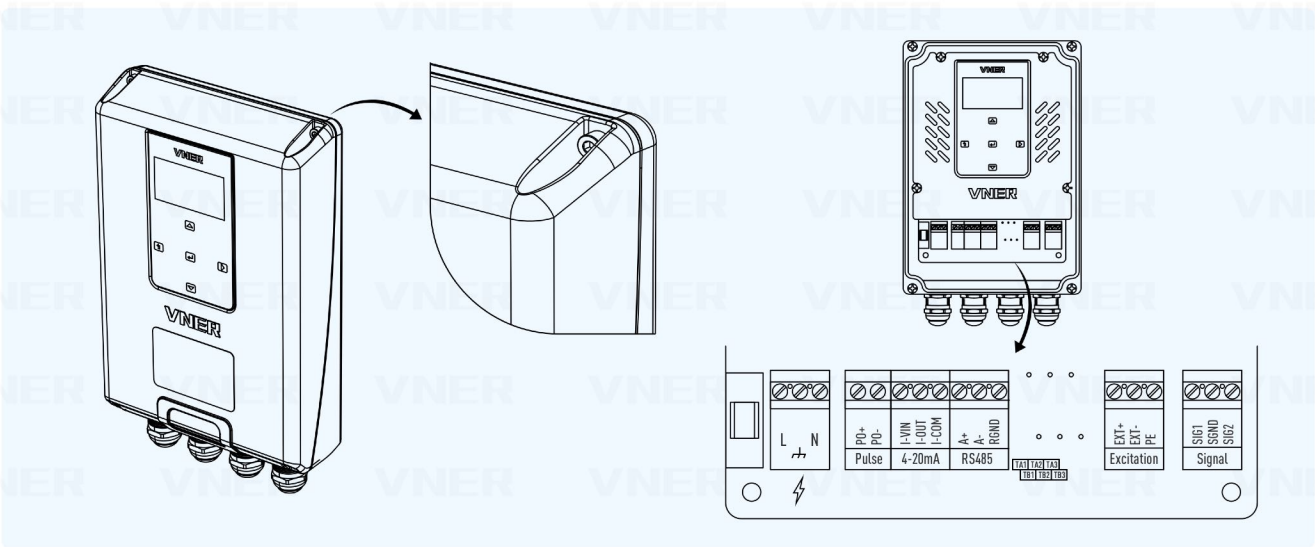
3.2 Opening the Cover and Terminal Definitions





TERMINAL MARK	DESCRIPTION
G	Signal Ground
S1	Signal 1
S2	Signal 2
EX+ EX-	Excitation Current Output
Red Yelow Black	Excitation Current Input (Connecting to split cable)
Black Bue Grcen	Signal Output (Connecting to split cable)

3.3 Opening the Cover and Terminal Definitions



EXT + (Red)	Excitation Current Output
EXT - (Yellow)	
SIG 1 (Blue)	Flow Signal Input
SGNG (Black)	
SIG 2 (Green)	
A +	485 Communication Terminal
B -	
RGND	
IOUT	Active (4~20)mA Current Output
ICOM	IOUT: mA + / ICOM: mA -
IVIN	Passive (4~20)mA Current Output
IOUT	IVIN: mA + / IOUT: mA -
PO+	Frequency Output / Pulse Output
PO-	
N/24+	Power Supply (Voltage Differentiation)
L/24-	

3.4 Connecting the Sensor and Converter

When connecting the split cable between the sensor and converter, follow these steps to ensure proper installation and signal integrity:

Preparation:

1. Verify that the sensor and converter are correctly positioned and that all necessary components (cable, connectors, tools) are available.
2. Ensure the power supply is turned off before connecting the cables to avoid electrical hazards.

Cable Routing:

1. Route the split cable along the pipeline or mounting structure, ensuring it is free from sharp bends or physical stress.
2. For outdoor installations, ensure the cable is protected from moisture by using drip loops (U-bends).

Securing the Connections:

1. Ensure the cable connections are tightly secured. Loose connections can lead to signal loss or errors in measurement.
2. Check for correct polarity, especially for power and signal terminals.

Testing:

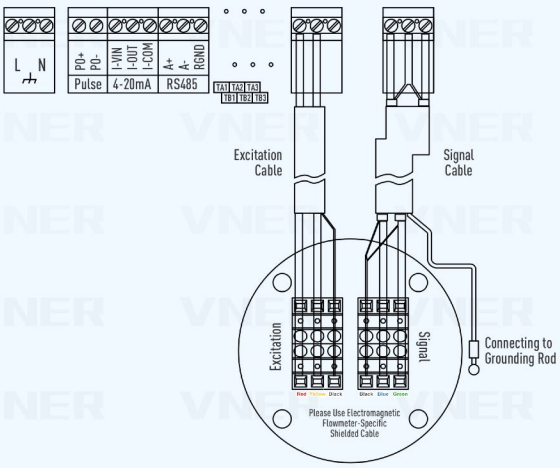
1. After completing the connections, double-check for any wiring mistakes or potential short circuits.
2. Power up the system and verify the operation of the flowmeter by observing the output signal.

Cable Protection:

1. If the cable runs through areas with potential mechanical stress, install protective conduits or clamps to avoid damage.
2. Keep the cable away from high-voltage lines or electromagnetic interference sources to prevent signal distortion.

Note: Ensure all connections are properly insulated and sealed to protect the system from moisture, dust, and other environmental factors that could affect performance.

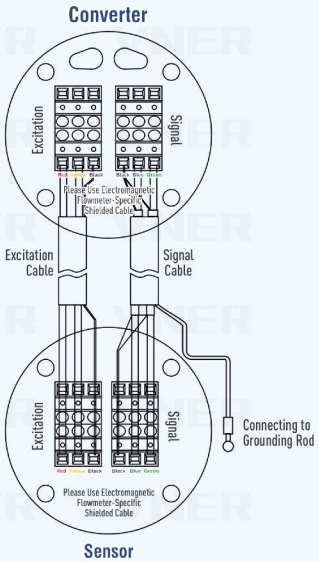
Remote Wall-mounted Converter



REMOTE WALL-MOUNTED TYPE

SENSOR		CONVERTER
Excitation	Red	EXT+
	Yellow	EXT-
	Black	Shielded Cable
Signal	Blue	SIG1
	Green	SIG2
	Black	SGND
Grounding Rod		Shielded Cable

Remote Wall-mounted Converter



REMOTE EXPLOSION-PROOF CONVERTER

SENSOR		CONVERTER	
Excitation	Red	Excitation	Red
	Yellow		Yellow
	Black		Black
Signal	Blue	Signal	Blue
	Green		Green
	Black		Black
Grounding Rod		Shielded Cable	

4. CONNECTING EXTERNAL INSTRUMENTS

To ensure proper functionality and accurate measurements, follow these steps to connect external instruments to the electromagnetic flowmeter.

4.1 Power Input

Power Supply Connection for Electromagnetic Flowmeter

The electromagnetic flowmeter can be powered using the following types of power sources:

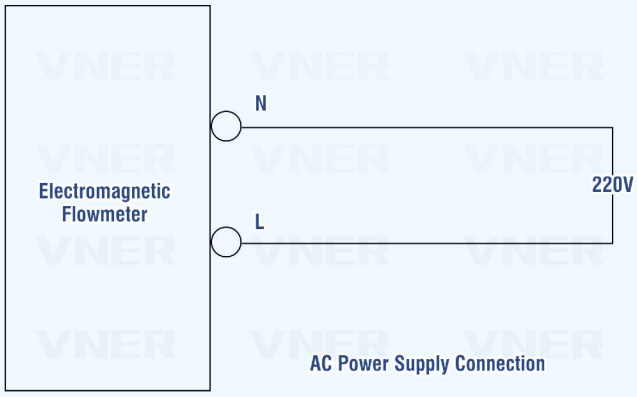
- **Single-phase AC Power: 85~264 VAC, 45~63 Hz**
- **DC Power: 16 VDC~36 VDC**

Wiring Instructions

When wiring the flowmeter, users should follow the provided wiring diagram to ensure correct and safe installation.

AC Power Supply Connection:

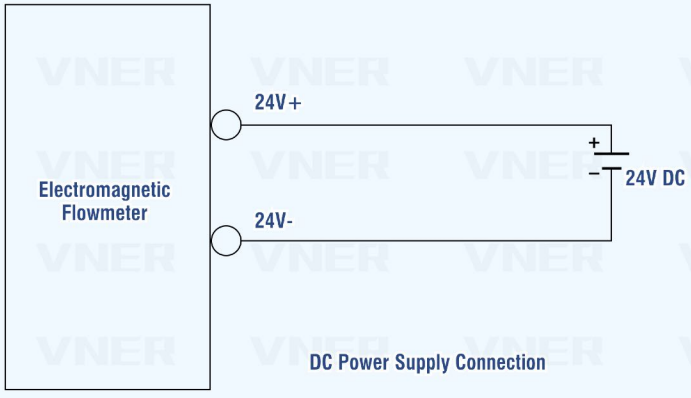
1. **Live (L)**: Connect to the **live wire** of the AC power supply.
2. **Neutral (N)**: Connect to the **neutral wire** of the AC power supply.
3. **Ground (PE)**: Connect to the **earth ground** for safety and to minimize electrical noise.



AC Power Supply Connection

DC Power Supply Connection:

1. **Positive (+)**: Connect to the **positive terminal** of the DC power supply.
2. **Negative (-)**: Connect to the **negative terminal** of the DC power supply.



DC Power Supply Connection

Important Notes:

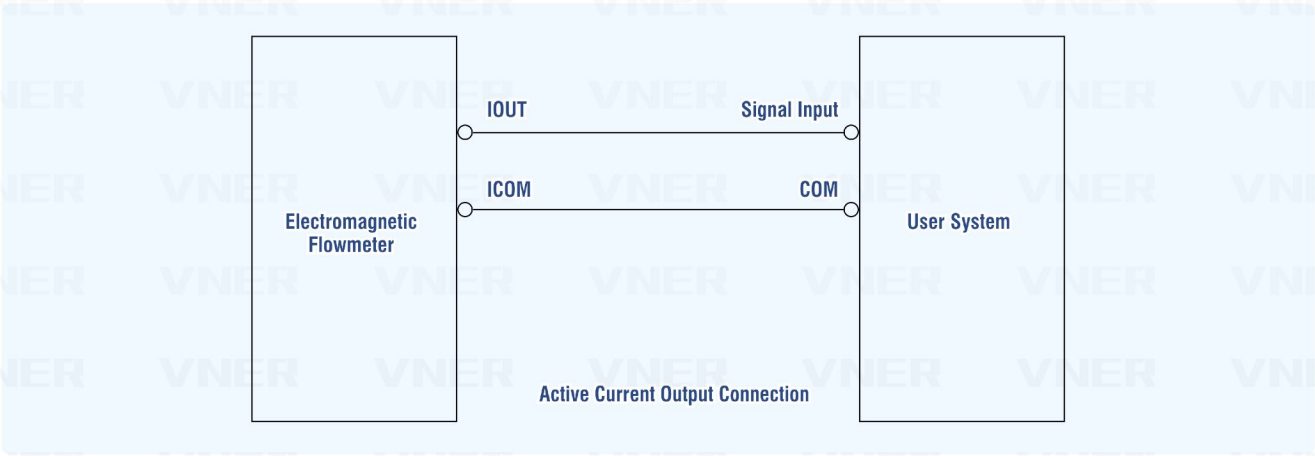
- **Voltage Rating:** Ensure that the voltage supplied falls within the specified range to prevent damage to the flowmeter. Using a power supply outside of the rated range can result in malfunction or even permanent damage.
- **Wiring Safety:** Always **disconnect the power supply** before wiring the system to prevent electric shock or damage.
- **Proper Grounding:** Ensure proper grounding of the power supply to reduce electromagnetic interference and improve signal accuracy.
- **Power Isolation:** If required, use an isolating transformer to protect the system from power surges or fluctuations.

Please refer to the specific wiring diagram in the user manual for detailed pin configuration and proper power connections to avoid any installation errors.

4.2 Current Output (4~20 mA)

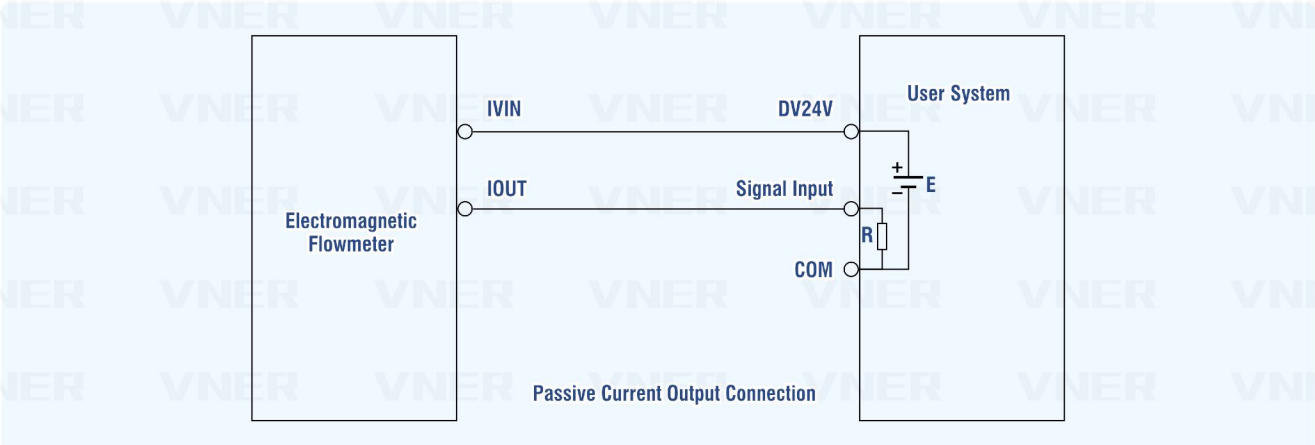
■ **Active Current Output:**

1. Connect the **IOUT (mA +)** terminal to the positive input of the external device.
2. Connect the **ICOM (mA -)** terminal to the negative input of the external device.



■ **Passive Current Output:**

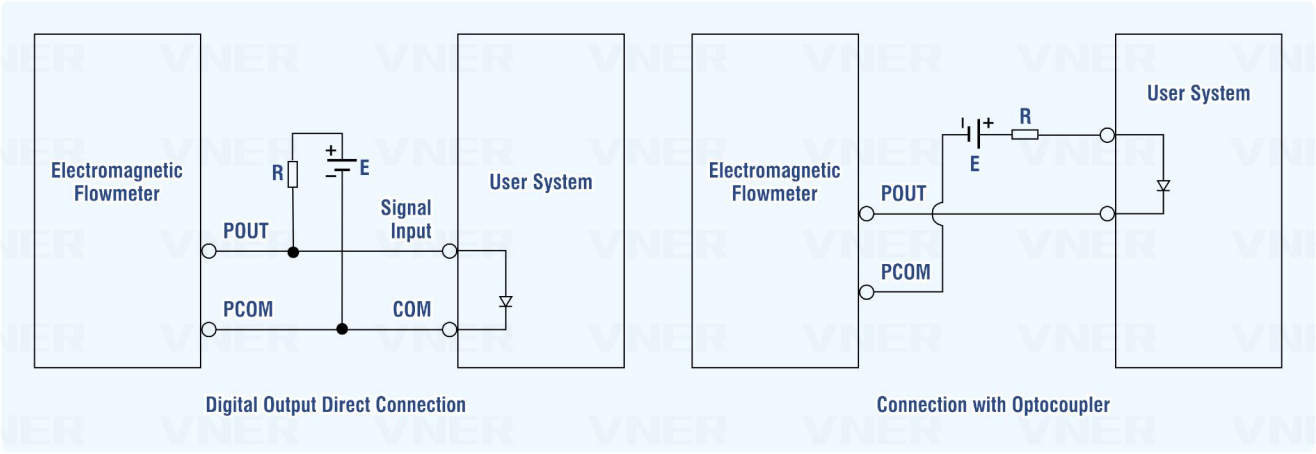
1. Connect the **IVIN (mA +)** terminal to the external power supply's positive terminal.
2. Connect the **IOUT (mA -)** terminal to the external load or device's input.



■ **Verify the external loop resistance complies with the flowmeter's specifications.**

4.3 Frequency/Pulse Output

POUT are transistor open collector. External load and power supply are therefor necessary. The examples of wiring are given below:



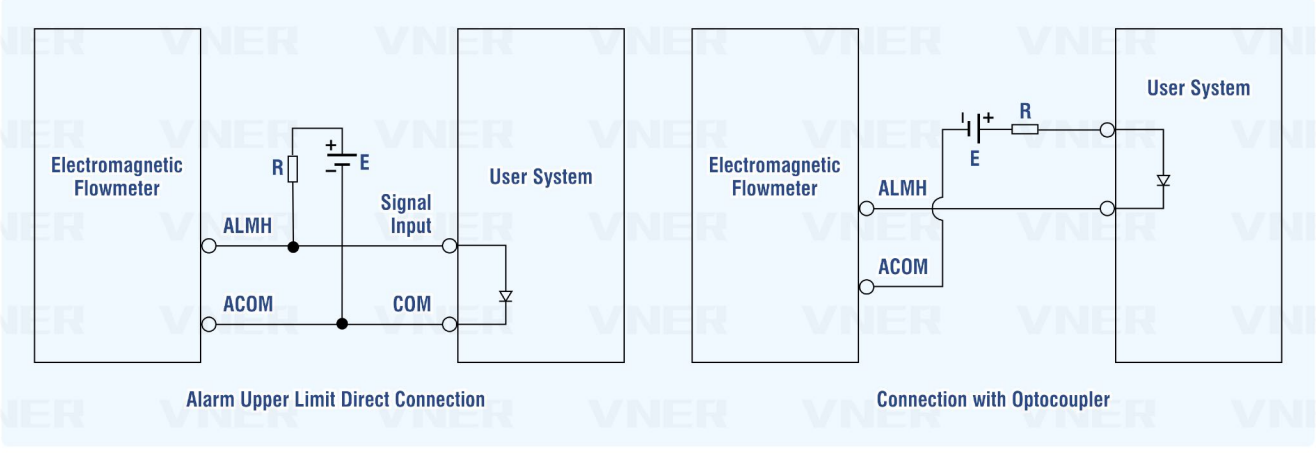
Generally, 10mA current is needed to drive an optocoupler. The load resistance R is around E/10mA. E ranges from 5 to 24V.

Digital Output Parameter List as Follow:

LINING MATERIAL	MEDIUM TEMPERATURE RANGE
Polyurethane	Temperature <65°C
Polyurethane+CeramicPieces	Temperature <65°C
ETFE	Temperature <150°C
Ceramic	Temperature <200°C
Neoprene Rubber	Temperature <65°C
PTFE	Temperature <150°C
F46	Temperature <180°C
PFA	Temperature <200°C

Alarm Upper Limit

Alarm upper limit is same with frequency output, which is transistor open collector output. External load and power supply 24 VDC are therefore necessary. The examples of wiring are given below.



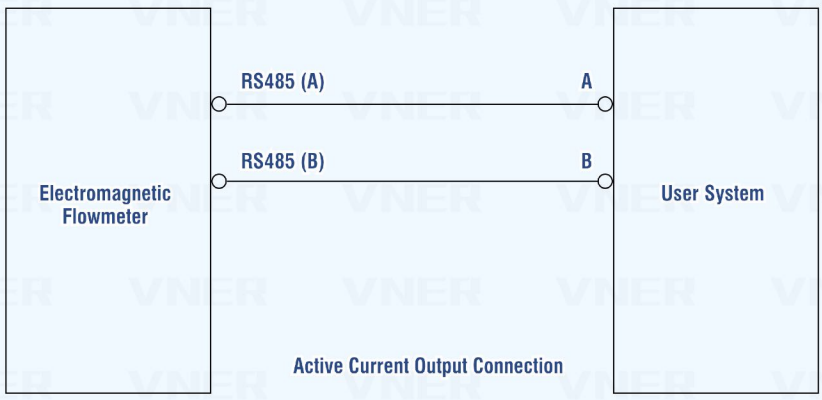
Generally, 10mA current is needed to drive an optocoupler. The load resistance R is around E/10mA. E ranges from 5 to 24V.

Alarm Lower Limit

Alarm lower limit is same with alarm upper Limit.

4.3 RS485 Communication

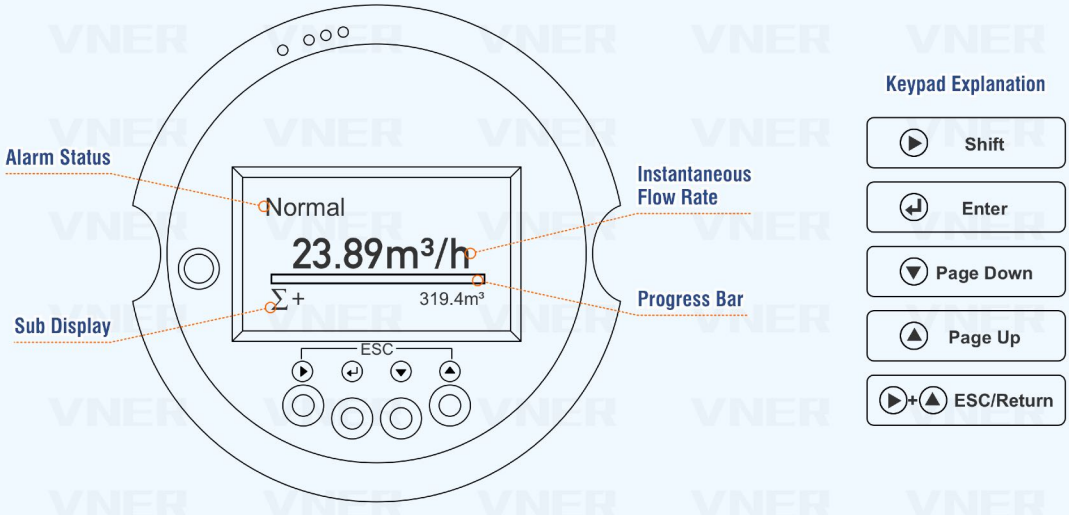
The RS485 communication interface is embedded in the converter. In order to remove the signal reflection from the cable lines, parallel connect a 120Ω terminal resistance with the cable A, B of the RS 485 output. Choose according to the Jumper J1. Access to the terminal resistance when J1 short circuit. The example of wiring is given below.



OPERATION INSTRUCTIONS

1. USER INTERFACE OVERVIEW

1.1 Integrated Type Keypad and Display



Shift: Shift right in the screen of number.

Enter: In display status, press this key, you can enter into parameter setting status; in parameter setting status, press this key into the sub-menu, and press this key to exit the sub-menu.

Down: In parameter setting status, press this key, screen can display the next content circularly, and press this key can decrease the numbers.

Up: In parameter setting status, press this key, screen can display the upper content circularly, and press this key can increase the numbers.

ESC: Under the menu interface, press this button means retur to the upper menu.

Press " Up" or " Down" repeatedly, the third line can show the following content:

FLS	0.000m/s	It displays the instaneous flow rate.
FQP	0.0%	It displays the percentage of instaneous flow rate.
EPT	0	It displays the percentage of empty value.
∑+	00000 m³	It displays the forward totalized flow.
∑-	00000 m³	It displays the reverse totalized flow.
∑D	0 m³	he difference between the forward & reverse totalized flow.

Press Key Operation Instructions:

1. After power on, press [ENTER], the screen will show parameter setting password [000521].

2. Enter the password.

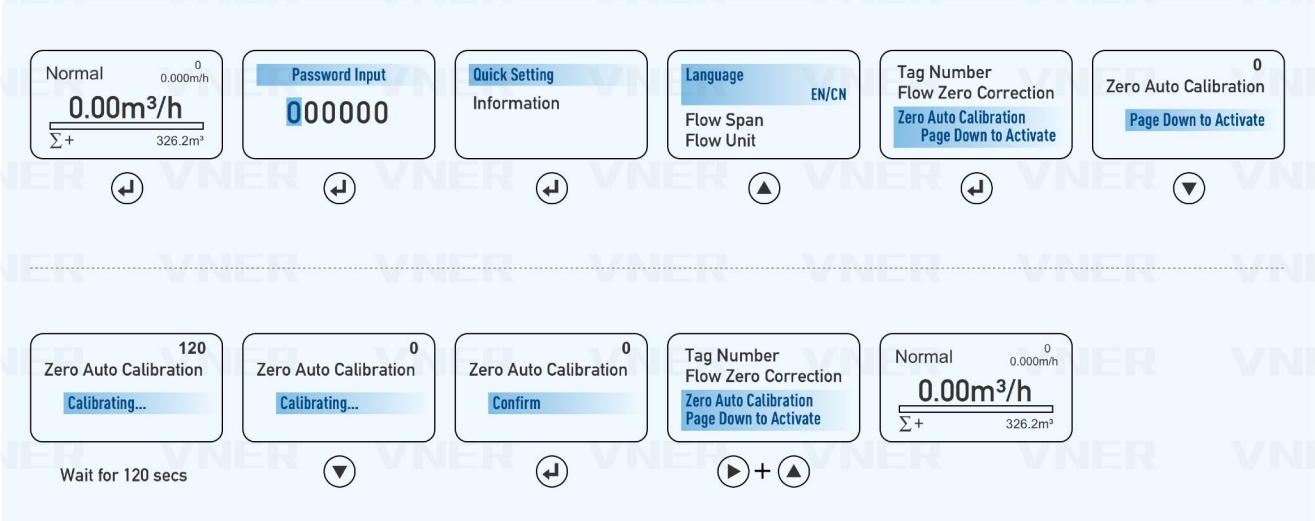
3. Press [ENTER], it will enter into the main menu interface.

4. Press [UP] or [DOWN],choose the menu that need to setup, press [ENTER], and press [UP] or [DOWN], choose the required parameter values, press [ENTER] to exit the menu.

5. Press [UP] or [DOWN], choose the next menu that need to setup. After the setup, press [ENTER] for three seconds to exit the parameter setting. And press ESC [SHIFT+UP], return to the previous menu.

2. PARAMETER SETTINGS AND ADJUSTMENTS

2.1 Zero-Point Setting Example



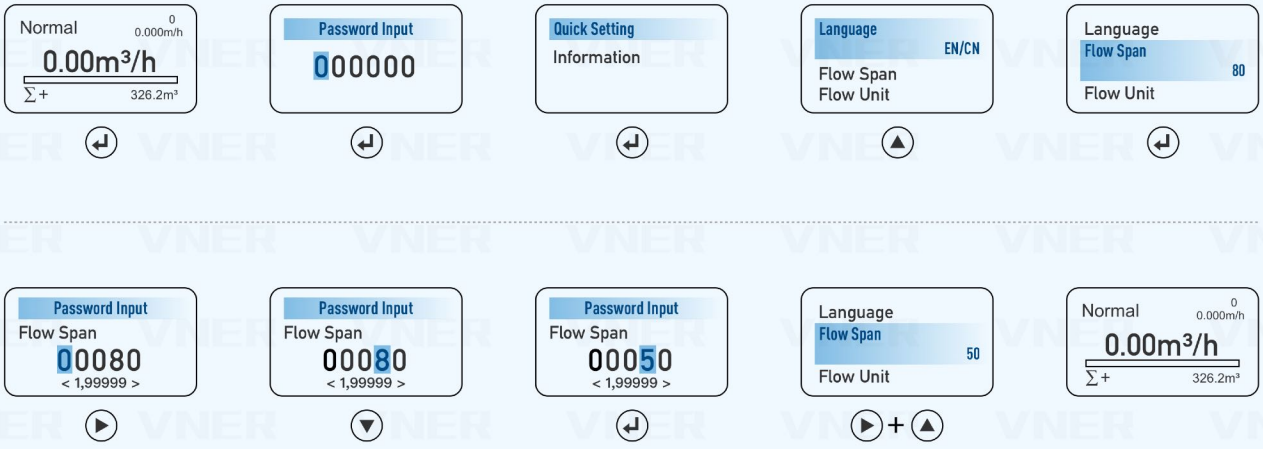
Important Notice:

Before performing the zero-point calibration, **ensure that the pipeline is fully filled with the medium and the fluid is in a stationary state.**

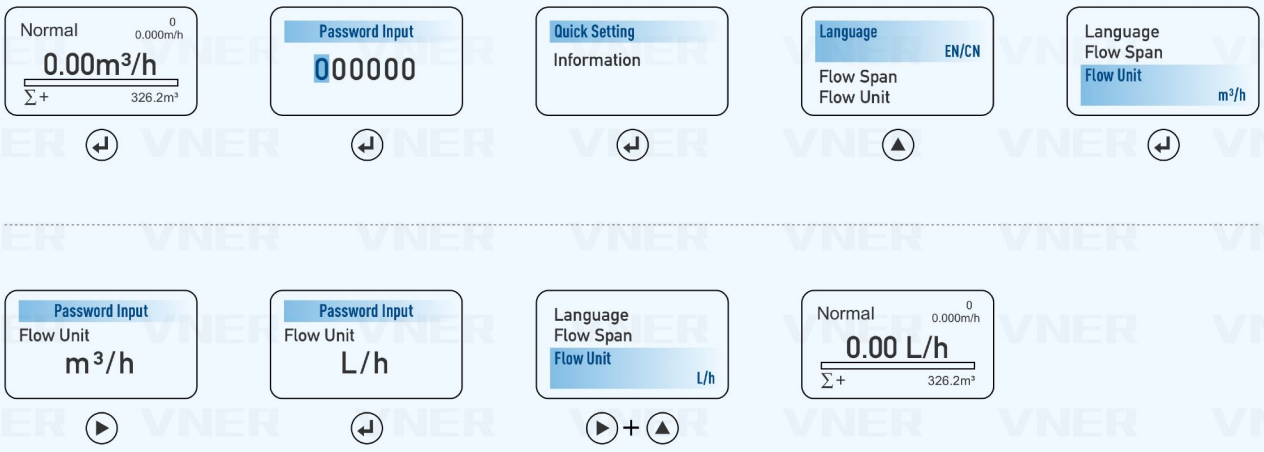
- **Full Pipe Condition:** The flowmeter will only provide accurate measurements if the pipeline is completely filled with the medium. Any air pockets or incomplete filling may cause measurement errors.
- **Stable Fluid State:** The fluid should be in a stationary, non-turbulent state to ensure accurate calibration. Flow fluctuations or disturbances during zero-point adjustment may lead to incorrect calibration, impacting measurement precision.

It is essential to meet these conditions before starting the calibration process to achieve the best performance from the flowmeter.

2.2 Flow Span Setting Example



2.3 Flow Unit Setting Example



3. FUNCTIONS AND PARAMETERS CHECKLIST

SETUP	MENU DISPLAY	SETTING METHOD	VALUE RANGE
Basic Setting	Language	Select	Chinese, English
	Flow Unit	Select	L/h, L/min, L/s, m^3/h, m^3/min, m^3/s
	Flow Span	Date setting	0 ~ 99999
	Flow Dir	Select	Forward, Reverse
	Invert Output	Select	Enable, Disable
	Total Unit	Select	$0.001m^3$~$1m^3$, 0.001L~1L
	Flow Damping	Select	(1~50) s
	Low Flow Cutoff	Date setting	0~100.00%
	Pulse Output	Select	Freq./Pulse
	Value Per Pulse	Select	(0.001-1) m^3/cp, (0.001-1) L/cp
	Pulse Width	Select	(4~400) ms
	Max Pulse	Select	(1~6000) Hz
	Flow Zero	Date setting	0001~9999
	Backlight Time	Select	15~300s, Always on
	MBS Addr	Date setting	001~247
	MBS Baud rate	Select	(300~38400) bps
	Tag	Factory setting	0001-9999
Advanced Setting	Nominal Size	Select	3~3000 mm
	Cutoff Visible	Select	Enable, Disable
	Sensor Coef	Date setting	0~5.9999
	ALM-EMP Pipe	Select	Enable, Disable
	LMT Empty Pipe	Date setting	0~599.99%
	ALM-Flow H	Select	Enable, Disable
	LMT High Alarm	Date setting	0~599.99%
	ALM-Flow L	Select	Enable, Disable
	LMT Low Alarm	Date setting	0~599.99%
	ALM-Exct	Select	Enable, Disable
	Foward Total	Can modify	0~999999999
	Reverse Total	Can modify	0~999999999

3.1 Parameter Settings Instruction

➢ **Language**

The flowmeter adopts Chinese and English languages, users can select the operation by themselves.

➢ **Flow Unit**

When selecting flow display unit in setting parameters of instrument flow range, flow display units includes L/h, L/min, L/s, m^3/h, m^3/min, m^3/s, the user can select the appropriate flow units according to process requirements and use habits.

➢ **Flow Span**

Press [ENTER] to enter setup, enter the value to be set, and press [ENTER] to return.

Instrument range setting is to determine the max flow value, then the min flow value is automatically set to "0". Therefore, the flowmeter range setting determines the instrument flow range, and the instrument percentage display, meter frequency output, and correspondence between the current output and flow of the meter.

Percentage display value of meter = (flow measurement value/meter flow range)* 100%

Meter frequency output value =(flow measur. value/meter flow range) * frequency full scale value

Instrument current out put value =(flow measur. value/meter flow range) * Current Range + Current zero

➢ **Flow Dir**

Press [ENTER] to enter setting, press [UP] and [DOWN] can choose forward or reverse cyclically, press [ENTER] to return. If the flow direction is forward, but the instrument shows reverse, it should be set the flow direction to be reverse.

➢ **Invert Output**

Press [ENTER] to enter setting, press [UP] and [DOWN] can choose permit or forbid cyclically, press [ENTER] to return.

➢ **Total Unit**

Press [ENTER] to enter setting, press [UP]and [DOWN] can choose $1m^3$, $0.1m^3$, $0.01m^3$, $0.001m^3$ or 1L, 0.1L, 0.01L, 0.001L cyclically, press [ENTER] to return Cumulative flow cab be easily read out over time, the cumulative flow of meter is displayed as nine counter.

➢ **Flow Damping**

To measure the increase the damping time can improve the stability of the flow and output signal of the flow meter, the setting of measuring damping time adopts the selection method, the user can select an appropriate damping time.

➢ **Low Flow Cutoff**

The low flow cutoff point setting is to use a percentage of the flow range to indicate.

➢ **Pulse Output**

There are frequency and pulse output optional, frequency output is continuous square wave, pulse output is square wave and pulse train. Frequency output is normally used for measuring instantaneous flow or short time total flow. Pulse output is used to measure volume unit directly of total flow and calibration for a long time by choosing pulse unit equivalent.

➢ **Value Per Pulse**

Press [ENTER] to enter setting, press [UP] and [DOWN] can choose $1m^3/cp$, $0.1m^3/cp$, $0.01m^3/cp$, 0.001m/cp or 1L/cp, 0.1L/cp, 0.01L/cp, 0.001L/cp cyclically, press [ENTER] to return. In the same situation of the flow,if the pulse equivalent is small,the frequency of output pulse is high,the cumulative flow error is small. Meter maximum output is 5000cp/s pulse frequency. For mechanical electromagnetic flowmeter counter maximum frequency is up to 25 times/s. The maximum pulse width of pulse output is 20ms, automatically converted to a square wave at high frequencies.

➢ **Pulse Width**

Can choose 4-400ms pulse width time.

➢ **Pulse Width**

Can choose 4-400ms pulse width time.

➢ **Max Pulse**

The frequency output corresponding the max flow range (100%of the flow), the upper limit of the frequency can choose random between 1-6000Hz.

➢ **Flow Zero**

Press [ENTER] to enter setting, input the setting data when the fluid is stationary, and the first line of the screen will display **FS = ± 0000**, press [ENTER] to return.

In the situation of flow zero, we should ensure full fluid of measuring tube of the flow meter and it is in a stationary state, the flow zero value is the matching constant value of sensor, which should be credited to record sheet and signage of sensor, sensor zero value is represented by the flow rate, in mm/s.

➢ **Backlight Time**

Press [ENTER] to enter setting.,press [UP] and [DOWN] can choose the time to be set 15~300s cyclically, press [ENTER] to return.

➢ **MBS Addr**

In the situation of multi-machine communication, this communication address of this meter, the optional range is 1 to 247. Factory default value is 01.

➢ **MBS Baud rate**

In the situation of the meter and PC communication, the baud rate range is 300bps to 38400bps. Factory default value is 9600bps.

➢ **Tag**

Equipment factory number is set by the manufacturer at the factory. Equipment digit number consists of four digits, ranging from 0 to 9999.

➢ **Nominal Size**

It can be in the form of checking sheet to choose matching electromagnetic flowmeter, the nominal diameter is 3 ~ 3000mm.

➢ **Cutoff Visible**

Press [ENTER] to enter setting, press [UP] and [DOWN] can choose permit or forbid cyclically, press [ENTER] to return.

➢ **Sensor Coef**

Sensor coefficient refers to the sensor check value of matching instrument, which has been already completing setting at the factory, not allowing users to change.

➢ **ALM-EMP Pipe**

The instrument has the function of empty pipe detection, if users choose empty pipe alarm is enable, when it is empty pipe status, the instrument analog output and digital output is zero, and the display also showing zero flow value if users choose empty pipe alarm is forbidden, the instrument will not detect empty pipe status.

➢ **LMT Empty Pipe**

Different fluids have different electrical conductivity (resistance value), empty pipe detection is realized by detecting the ratio of electrodes resistance between the measured conductive liquid and the experimental conductive liquid (The relative conductivity of the liquid), to check if it is over the threshold valve. If it exceeds threshold value, which means that measured fluid conductivity is much lower than the conductivity of experimental liquid equivalent to the empty tube.

➢ **ALM-Flow H**

Press "[ENTER]"to enter setting, press [UP] and [DOWN] can choose permit or forbid cyclically, press [ENTER] to return.

➢ **LMT High Alarm**

LMT high alarm is calculated by range percentage, it adopts numerical parameters setting mode, it can set alarm value, the range can be 0%~599.99%

➤ **ALM-Flow L**

Press [ENTER] to enter setting, press [UP] and [DOWN] can choose permit or forbid cyclically, press [ENTER] to return.

➤ **LMT Low Alarm**

LMT low alarm is calculated by range percentage it adopts numerical parameters setting mode, it can set alarm value, the range can be 0%~599.99%

➤ **ALM-Exct**

Press [ENTER] to enter setting, press [UP] and [DOWN] can choose permit or forbid cyclically, press [ENTER] to return.

➤ **Forward Total**

Total flow high/low setting can change the high/low numerical of the forward total flow, it is mainly used for instruments repair and replacement. Users can change the valve according to situation (0-9999999).

➤ **Reverse Total**

Total flow high/low setting can change the high/low numerical of the reverse total flow, it is mainly used for instruments repair and replacement. Users can change the valve according to situation (0-9999999).

TROUBLESHOOTING

TROUBLE	SOLUTIONS
No display	a. Check the connection of power supply.
	b. Check fuse.
	c. Check the voltage of power supply.
	d. Check if the LCD contrast can be adjusted. Adjust it if possible.
	e. If a) to d) are OK, contact manufacturer and return it to factory for inspection.
Coil Alarm	a. Check if terminal EX1 and EX2 are open.
	b. Check if coil resistance is less than 60Ω.
	c. Replace converter if a) & b) are OK.
Empty Pipe Alarm and Electrodes Alarm	a. Check if the sensor pipe is filled with fluid.
	b. Check the connection of signal wiring.
	c. Connect the terminal SIG1,SIG2 and SIG GND.If the alarm display disappears,it is confirmed the converter is normal. The alarm may be caused by the bubble in the fluid.
	d. For electrodes alarm, measure the resistance between two electrodes with a multi-meter. The reading should be between 3 to 50kΩ.Otherwise,the electrodes are contaminated or covered.
High Alarm	Increase the flow range.
Low Alarm	Reduce the flow range.
Inaccurate Measurement	a. Check if the sensor pipe is filled with the fluid to be measured.
	b. Check the wiring.
	d. Check if the sensor factor and flow zero are the same as those on the calibration sheet.

TOP-GRADE MEASURING CAPABILITIES

- Nominal Diameter Range: DN 10 - DN 300
- Accuracy Grade: ±0.3%, ±0.5%
- Advanced Circuit Technology: Features high reliability and low power consumption, ensuring stable performance over time.
- Full-Bore Design: No moving parts, no wear, and no pressure loss, resulting in a long service life.
- Versatile Output Modes: Offers multiple output options with precise and stable measurement signals.

PRODUCT DESCRIPTION		MODEL																		
ElectromagneticFlowmeter		VE801-																		
Nominal Diameter	Default Pressure Rating	Code																		
DN 10	4.0 MPa	010																		
DN 15	4.0 MPa	015																		
DN 20	4.0 MPa	020																		
DN 25	4.0 MPa	025																		
DN 32	4.0 MPa	032																		
DN 40	4.0 MPa	040																		
DN 50	4.0 MPa	050																		
DN 65	4.0 MPa	065																		
DN 80	4.0 MPa	080																		
DN 100	1.6 MPa	100																		
DN 125	1.6 MPa	125																		
DN 150	1.6 MPa	150																		
DN 200	1.6 MPa	200																		
DN 250	1.6 MPa	250																		
DN 300	1.6 MPa	300																		
Customized Nominal Pressure																				
1.0 MPa			C																	
1.6 MPa			D																	
2.5 MPa			E																	
4.0 MPa			F																	
6.3 MPa			G																	
CLASS 150			I																	
CLASS 300			J																	
Optional			Z																	
Lining Material																				
Neoprene Rubber				H																
PTFE				T																
PFA				P																
F46				R																
Optional				Z																
Electrode Material																				
SS 316L					E															
Hastelloy C					O															
Titanium					I															
Tantalum					Q															
Optional					Z															
Meter Body + Process Connection Material																				
Carbon Steel						1														
SS 304						2														
SS 316L						3														

PRODUCT DESCRIPTION	MODEL
Mounting Type	
Integral	T
Remote	R
Signal output + Communication	
4-20mA + Pulse	01
4-20mA + HART	02
4-20mA + Modbus	03
4-20mA + HART + Modbus	04
Power Supply	
220VAC	G
24VDC	K
Ingress Protection	
IP 65	0
IP 67	1
IP 68	2
Explosion-proof	
None	0
ExdeiaIICT3-T6	E
Electrical Interface	
1/2-14 NPT	0
M20*1.5	1
Optional Accessories (Multiple Choice)	
Mating Flange	
Carbon Steel Flange	/A1
SS 304 Flange	/A2
SS 316L Flange	/A3
Fastening Bolts	
Carbon Steel Bolts	/B1
SS 304 Bolts	/B2
SS 316L Bolts	/B3
Gasket	
Rubber	/C1
PTFE	/C2
Metallic	/C3
Remote Model Connection Cable	
3m	/R03
Customized: Maximum 50 m	/RXX
Grounding Ring	
SS 304	/D1
SS 316L	/D2
Titanium	/D3
Tantalum	/D4
Optional	/D5
Calibration Report	
Designated Third-party Report	/E1
CNAS Calibration Report	/E2
Gland	
Nickel-plated Brass Gland	/F1
SS 304	/F2

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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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