Corrosion-resistant Level Transmitter

1. Product Definition

The QDY60C-1 submersible corrosion-resistant level transmitter is an industrial-grade pressure-type level sensor specifically designed for liquid level measurement in highly corrosive environments. Its core function is to convert the liquid level height into a standard electrical signal (4–20 mA, 0–10 V, etc.), enabling real-time, continuous monitoring and remote transmission of liquid levels.

List of Core Features:

1. Submersible Continuous Level Measurement: By directly immersing the sensor in the liquid, it enables real-time, high-precision continuous monitoring of liquid levels in open or atmospheric-pressure vessels. It features no moving mechanical parts and a maintenance-free design.

2. Full Corrosion Resistance and Media Compatibility: Featuring a fully corrosion-resistant PTFE (polytetrafluoroethylene) housing and wetted parts, it is compatible with strong acids, strong alkalis, and highly corrosive chemical media (such as hydrochloric acid, sulfuric acid, and sodium hydroxide solutions), addressing the challenge that standard transmitters cannot withstand such corrosive environments.

3. Standard Industrial Signal Output: Supports 4–20 mA current signals and 0–5 V/0–10 V voltage signals, enabling direct integration with industrial control systems such as PLCs, DCSs, and digital display instruments for remote data acquisition and control.

4. Wide Temperature Range Adaptability: Operates stably in media temperatures ranging from -20°C to 80°C and in underwater environments with an IP68 protection rating, making it suitable for complex operating conditions such as outdoor settings, chemical storage tanks, and wastewater treatment ponds.

5. High Stability and Interference Resistance: Features built-in surge protection and electromagnetic interference (EMI) suppression circuits, ensuring stable signal output even in industrial environments with strong electromagnetic fields, with no data drift or distortion during transmission.

6. Anti-clogging and Anti-scaling Design: A specially designed pressure-conducting and anti-clogging structure minimizes the impact of viscous or crystallizing media on measurement accuracy, thereby extending the equipment's service life.

II. Working Principle

The core of the QDY60C-1 submersible corrosion-resistant level transmitter's working principle is the "pressure-to-level" conversion relationship, which can be simply understood as "calculating level using pressure":

1. Pressure Sensing Stage: Once the transmitter is submerged in the liquid, the pressure sensor at the bottom is subjected to the liquid's static pressure. The magnitude of this pressure is directly proportional to the liquid level height, as described by the formula $P = \rho gh$ (where ρ is the medium density, g is the acceleration due to gravity, and h is the liquid level height).

2. Signal Conversion Stage: The sensor converts the detected hydrostatic pressure into a weak electrical signal. This signal then passes through a built-in signal conditioning circuit for amplification, filtering, temperature compensation, and linearization, thereby eliminating errors caused by variations in temperature and medium density.

3. Standardized Output Stage: The processed signal is converted into an industry-standard 4–20 mA current signal (or 0–10 V voltage signal) and transmitted via a corrosion-resistant cable to the control system. The control system can directly calculate the real-time liquid level height based on the signal value, enabling remote monitoring and control.

The entire process involves no moving mechanical parts. Relying on the precise sensing of the pressure sensor and circuit processing, it achieves real-time, continuous level measurement. Meanwhile, the PTFE housing completely isolates the corrosive medium, protecting the internal electronic components from damage.

III. Core Value and Solutions to Pain Points

3.1 Overview of Core Value

The core value of the QDY60C-1 submersible corrosion-resistant level transmitter is to provide a ***"highly reliable, maintenance-free, high-precision, and fully adaptable" integrated solution** for level measurement in highly corrosive media. It addresses the four major pain points faced by users in the chemical, environmental protection, and pharmaceutical industries—"corrosion damage, measurement inaccuracy, frequent maintenance, and poor adaptability"—thereby reducing operational and maintenance costs and enhancing production stability.

3.2 Pain Points - Solutions - Benefits

1. Pain Point: In highly corrosive chemical media, the housings of conventional level transmitters are prone to corrosion, leading to frequent equipment failure and high maintenance costs. Solution: Utilizes a fully corrosion-resistant PTFE (polytetrafluoroethylene) housing and wetted parts that withstand corrosion from strong acids, strong alkalis, and strong oxidizing agents, enabling long-term stable operation in highly corrosive media.
Benefits: Equipment service life extended by 3–5 times, significantly reducing equipment replacement and maintenance costs

2. Pain Point: In open-top storage tanks, wastewater treatment tanks, and similar scenarios, traditional level gauges are complex to install, and mechanical components are prone to jamming and failure. Solution: Submersible direct installation requires no complex brackets or mechanical structures. With no moving parts and a clog- and scale-resistant design, it is suitable for viscous and crystallizing media
Benefits: Installation and commissioning time reduced by 80%; no jamming or malfunction issues; maintenance-free period extended to over 1 year

3. Pain Point: Level measurement data is easily affected by temperature changes and fluctuations in medium density, resulting in poor measurement accuracy and severe data drift
Solution: Built-in high-precision pressure sensor and temperature compensation circuit; linearized signal processing eliminates temperature and density errors; measurement accuracy up to ±0.5% FS
Benefits: Real-time, accurate level data prevents tank overflows and empty tank incidents caused by measurement errors, ensuring production safety

4. Challenge: Strong electromagnetic interference in industrial environments causes signal distortion during transmission, preventing the control system from reliably collecting data
Solution: Built-in anti-EMI and anti-surge circuits with standard industrial signal output (4–20 mA), offering long transmission distances and strong interference resistance
Benefits: Stable, distortion-free signal transmission; PLC/DCS can reliably collect data to enable remote automated control

5. Challenge: Significant variations in medium temperature, pressure, and installation methods across different operating conditions; standard transmitters lack adaptability, making selection difficult Solution: Wide temperature range (-20°C to 80°C), IP68 protection rating, and support for multiple standard signal outputs, suitable for various scenarios including open/atmospheric storage tanks, reactors, and sewage tanks
Benefits: A single model covers most highly corrosive liquid level measurement scenarios, simplifying selection and eliminating the need to replace equipment for different operating conditions

IV. Key Product Parameters & Specifications

4.1 Basic Electrical Parameters

Measurement Principle: Static pressure (piezo-resistive diffused silicon pressure sensor)
Measurement Range: 0–1 mH_2O to 0–10 mH_2O (customizable up to 0–30 mH_2O)
Measured Medium: Highly corrosive liquids compatible with PTFE (strong acids, strong alkalis, salt solutions, etc.)

Output Signal: Standard 2-wire: 4–20 mA DC (load ≤ 500 Ω)
Optional 3-wire: 0–5 V / 0–10 V DC
Accuracy Class: ±0.5% FS (Standard); ±0.25% FS (High-precision Custom)
Nonlinearity: ≤±0.2% FS
Hysteresis: ≤±0.1% FS
Repeatability: ≤±0.1% FS
Long-term stability: ≤±0.1% FS/year
Response time: ≤100 ms
Zero-point temperature drift: ≤±0.03% FS/°C
Full-scale temperature drift: ≤±0.02% FS/°C

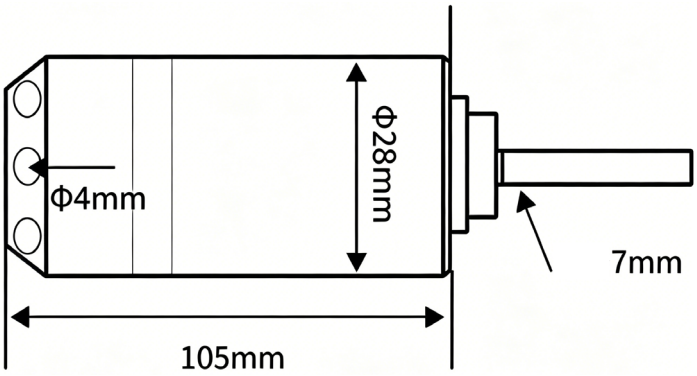
4.2 Isolation Performance Parameters
Media Isolation Method: PTFE fully encapsulated isolation structure; no direct contact between the sensor and corrosive media
Isolation Withstand Voltage: Between sensor chamber and housing: ≥500 V AC (1 min, no breakdown)
Insulation Resistance: Between housing and signal circuit: ≥100 MΩ (500 V DC)
Electromagnetic Compatibility: EMI/EMC resistant, compliant with GB/T 17626 standard, capable of withstanding strong electromagnetic interference in industrial environments
Surge Resistance: Built-in surge protection circuit, capable of withstanding ±2 kV surge impacts

4.3 Power Supply & Power Consumption Parameters
Supply Voltage: Recommended 24 V DC (Operating range: 12–36 V DC)
Full-Load Power Consumption: ≤0.5W (in 4–20mA output mode)
Power Distribution Output: No additional power distribution output; powered by a two-wire loop, no external power supply required
Reverse Polarity Protection: Built-in reverse polarity protection circuit to prevent equipment damage from incorrect polarity connection
Overvoltage Protection: Input overvoltage protection; withstands short-term surges up to 40V DC

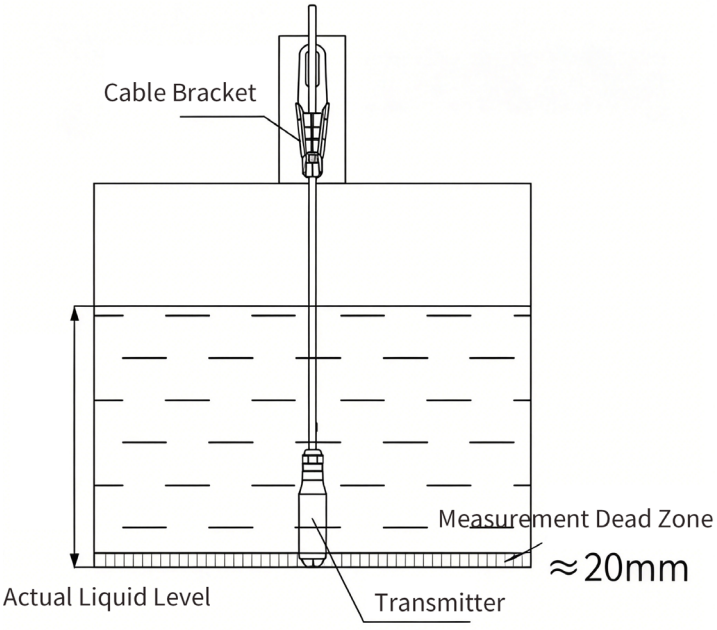
4.4 Environmental Specifications
Media Temperature: -20°C to +80°C (standard); high-temperature version available upon request: -40°C to +125°C
Ambient Temperature: -20°C to +60°C
Storage Temperature: -40°C to +85°C
Relative Humidity: 0–95% RH (non-condensing)
Protection Rating: IP68 (can be submerged in water for extended periods without risk of water ingress)
Explosion-Proof Rating: Intrinsically Safe (optional): Ex ia II C T4 Ga (compatible with safety barriers such as the Zener safety barrier Z787, etc.)
Corrosion Resistance: Compatible with strong acids (hydrochloric acid, sulfuric acid), strong alkalis (sodium hydroxide solution), salt solutions, and strong oxidizing agents

4.5. Physical Parameters
1. Installation Method
Standard submersible installation: Directly immersed in liquid, suspended or secured to the top of the vessel via cable
Optional accessories: Dedicated mounting bracket, wave-proof tube, cable clamps (to prevent swaying and tangling)
2. Dimensions (Probe Section)
Probe diameter: Φ28 mm
Probe length: 105 mm (excluding cable connector)
Cable Specifications: PTFE corrosion-resistant vented cable, standard length 5 m (customizable to 10/20/30 m), with vent tube (for atmospheric pressure equalization)
3. Weight
Probe Weight: Approx. 0.3 kg (excluding cable)
Total Weight with 5 m Cable: Approx. 0.7 kg
4. Housing Material and Protection Details
Probe Housing: PTFE (Polytetrafluoroethylene), fully encapsulated corrosion-resistant structure with no exposed metal parts
Wetted Parts: PTFE protective diaphragm + anti-clogging cover, no metal components susceptible to corrosion
Cable Material: PTFE sheath, resistant to acids and alkalis, aging, and corrosion; built-in vent tube (ensures communication between the backpressure chamber and the atmosphere to eliminate atmospheric pressure errors)
Sealing Process: Utilizes a fluorocarbon rubber O-ring + high-temperature sintered seal, IP68 protection rating, leak-free during long-term underwater use
Anti-scaling Design: The anti-clogging cover at the bottom of the probe features a special flow-guiding structure to reduce medium crystallization and the adhesion of viscous substances, thereby lowering maintenance frequency

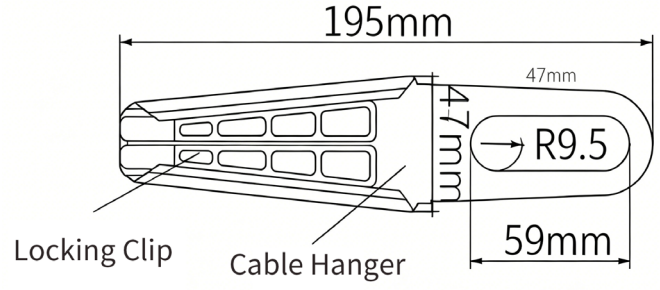
Product Size



Installation Type



Cable Bracket Installation

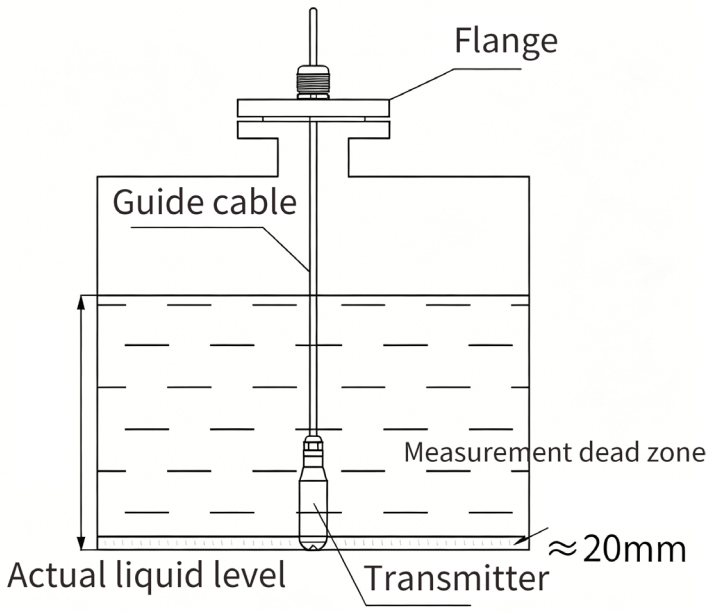


Locking Clip Material: Engineering Plastic

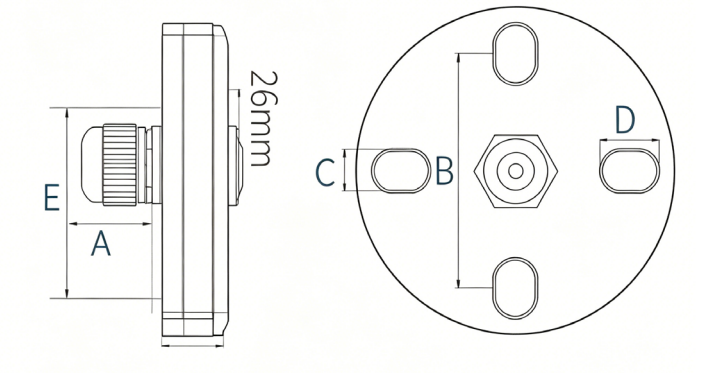
Cable Hanger Material: SS304

Weight: 110g

Cable Hanger Installation



Cable-mounted flange installation



Installation of Cable Clamping Flanges

Installation and Usage Precautions:

1. There is a chip inside the transmitter's pressure inlet; do not touch it with foreign objects.
2. Strictly follow the wiring instructions for electrical connections; incorrect wiring may damage the amplification circuit.
3. When installing the submersible level transmitter, do not use the wires to suspend any objects other than the product itself.
4. Clean the probe regularly to prevent blockage of the pressure inlet.
5. The cable is made of Teflon. During installation and use, avoid abrasion, punctures, or scratches to the cable. If such issues are present at the site, protective measures must be taken for the cable. If a malfunction occurs due to these issues, the manufacturer will charge for the cable during repairs.
6. If you encounter any issues during installation or use, please contact our company. If the product malfunctions, do not attempt to open it for repair on your own.

V. Application-Specific Selection Guide

5.1 Key Selection Criteria

1. Signal Type Selection

For conventional PLC/DCS systems in industrial environments, prioritize 4–20 mA two-wire current signals, as they offer long transmission distances, strong interference resistance, and compatibility with the vast majority of control systems;

If connecting to digital displays or single-loop controllers with a transmission distance of less than 50 m, 0–5 V or 0–10 V three-wire voltage signals may be selected. Note that voltage signals have weaker interference resistance and are not recommended in strong electromagnetic environments;

In explosion-proof environments, intrinsically safe (IS) certified signal types must be selected and paired with corresponding IS safety barriers; the direct use of general-purpose signal transmitters is prohibited.

2. Selecting the Number of Channels

For single-tank, single-level monitoring scenarios, a single-channel model is sufficient to meet requirements, offering lower costs and simpler wiring;

For centralized monitoring of multiple tanks or multiple level points within a single tank (e.g., high/low level alarms + continuous monitoring), select a model with a multi-channel acquisition module. This allows for centralized data transmission via a single bus, reducing wiring costs;

There are no models with built-in multi-channel transmitters; multi-channel requirements must be met using external acquisition devices to avoid selection errors.

3. Power Supply Selection

For standard industrial applications, we recommend 24V DC power supply, which is compatible with PLC/DCS system power sources and requires no additional power distribution equipment;

Two-wire 4-20mA models are loop-powered, requiring no additional power supply and offering simpler wiring; these are the preferred choice;

No models are available for direct AC220V power supply. If a DC24V power source is not available on-site, a separate DC24V switching power supply must be configured. Direct connection to AC220V power is strictly prohibited, as it will immediately destroy the device.

4. Selection Based on Explosion-Proof Requirements

In environments with flammable and explosive media, such as chemical, pharmaceutical, and oil and gas industries, the intrinsically safe model (Ex ia II C T4 Ga) must be selected and paired with an intrinsically safe barrier of the corresponding rating to meet on-site explosion-proof certification requirements;

For standard non-explosive environments, the general-purpose model may be selected; no additional explosion-proof accessories are required, resulting in lower costs;

The use of general-purpose transmitters is strictly prohibited in explosive environments, as this poses safety hazards and will fail on-site explosion-proof acceptance inspections.

5. Selection Based on Installation Environment

For atmospheric pressure vessels such as open storage tanks, sewage pits, and reactors, standard submersible installation is sufficient. These models feature an IP68 protection rating and can be submerged underwater for extended periods;

In environments with highly corrosive, viscous, or crystallizing media, ensure compatibility with the PTFE fully corrosion-resistant structure. A clog-proof cover can also be used to reduce the risk of scaling and blockages;

For high-temperature media ($>$ 80°C), select a custom high-temperature model to avoid excessive temperature drift and reduced service life in standard models;

For outdoor or humid environments, ensure cable connectors are waterproof and select models with surge protection to prevent equipment damage from lightning strikes or power surges.

5.2 Industry Application Selection Table

1. Chemical Industry Application Selection

Strong Acid/Strong Alkali Storage Tanks (Hydrochloric Acid, Sulfuric Acid, Sodium Hydroxide Solution): The standard corrosion-resistant model QDY60C-1 is recommended. Its PTFE full-enclosure design is suitable for highly corrosive media, and the 4–20 mA signal can be integrated into a DCS system to enable continuous level monitoring. For flammable and explosive media, select the intrinsically safe explosion-proof model and pair it with an intrinsically safe barrier.

Chemical Wastewater Treatment Tanks: The general-purpose corrosion-resistant model is recommended, suitable for corrosive ions in wastewater. With an IP68 protection rating, it can be submerged underwater long-term without requiring additional protection. If the wastewater contains viscous suspended solids, use it with an anti-clogging cover to reduce maintenance frequency.

2. Selection for Power Industry Applications

Power Plant Desulfurization and Denitrification Slurry Tanks: The corrosion-resistant model is recommended, suitable for the corrosive media in desulfurization slurry. Additionally, select a model with enhanced electromagnetic interference (EMI) resistance to prevent signal

distortion in the power plant's strong electromagnetic environment; prioritize the 4–20 mA signal for transmission to the power plant's DCS system.
Chemical Water Treatment Acid/Alkali Tanks: Standard corrosion-resistant models are recommended for acid and alkali media. The IP68 protection rating meets the requirements for long-term underwater operation; if explosion-proof protection is not required, general-purpose models can be selected to reduce costs.

3. Selection for Metallurgical Industry Applications
Metallurgical Pickling / Electroplating Tanks: Custom models are recommended to withstand highly acidic electroplating solutions. Verify the medium's temperature and concentration to select the appropriate corrosion-resistant rating. If strong electromagnetic interference is present on-site, choose models with enhanced EMC protection.
Wastewater Treatment Plant Sedimentation Tanks: We recommend the standard corrosion-resistant model, suitable for the corrosive nature of metallurgical wastewater. The IP68 protection rating meets the requirements for submerged installation, and the 4-20mA signal interfaces with the PLC system to enable level monitoring and linked sludge discharge control.

4. Application Selection for the Pharmaceutical Industry
Active Pharmaceutical Ingredient (API) Acid-Base Reactors: We recommend food-grade or pharmaceutical-grade custom models. Ensure the PTFE material complies with pharmaceutical hygiene standards and is suitable for weakly corrosive media. If the reactor is a sealed, atmospheric-pressure vessel, standard submersible installation is sufficient; for flammable or explosive environments, intrinsically safe models must be selected.
Pharmaceutical wastewater treatment tanks: We recommend general-purpose corrosion-resistant models, suitable for corrosive organic compounds in pharmaceutical wastewater. The IP68 protection rating allows for long-term underwater operation; if no explosion-proof requirements exist, the general-purpose model may be selected.

4. Selection for Smart Manufacturing Applications
Automated Production Line Storage Tanks: We recommend standard corrosion-resistant models, suitable for mildly corrosive media such as industrial cleaning solutions and coolants. The 4-20mA signal interfaces with automated control systems to enable level-based control. For centralized monitoring of multiple tanks, pair with a multi-channel data acquisition module to reduce wiring costs.
Small Laboratory Reaction Vessels: We recommend the small-range custom model, suitable for small laboratory storage tanks. The 0–5 V voltage signal connects to a digital display meter to achieve high-precision level monitoring. For applications without explosion-proof requirements, the standard model may be selected.

5.3 Common Selection Misconceptions
Misconception 1: Ignoring the isolation rating and directly using a standard transmitter instead of a corrosion-resistant model
Incorrect Practice: In highly corrosive environments, using standard stainless steel transmitters instead of PTFE corrosion-resistant models may seem cost-effective in the short term.
Consequences: The stainless steel housing corrodes and fails, leading to frequent equipment malfunctions, skyrocketing maintenance costs, and even the risk of media leakage.
Correct Selection: For highly corrosive media, the QDY60C-1 with a fully corrosion-resistant PTFE isolation structure must be selected. This ensures complete isolation between the sensor and the medium, preventing corrosion damage.

Misconception 2: Incorrect signal range selection; ranges that are too wide or too narrow affect accuracy and stability
Incorrect practice: For a storage tank with an actual liquid level height of 3 m, selecting a transmitter with a 0–10 m range results in a significant drop in measurement accuracy in the low-level range; or for a tank height of 10 m, selecting a 0–5 m range fails to cover the full liquid level monitoring requirements.
Consequences: When the range is too wide, signal resolution decreases and errors increase; when the range is too narrow, the transmitter produces no output once the liquid level exceeds the upper limit, making it impossible to monitor high-level conditions.
Correct Selection: Choose the range based on the tank's actual effective liquid level height. It is recommended to select a range of 1.2 to 1.5 times the actual liquid level height, allowing for a margin to avoid full-scale operation.

Misconception 3: Neglecting load matching, leading to unstable signal transmission
Incorrect practice: For a 4–20 mA two-wire transmitter, connecting multiple loads (digital display + PLC + recorder) to the output results in a total load resistance exceeding the transmitter's maximum load capacity, causing signal distortion and abnormal output.
Consequences: The transmitter's output current cannot reach full scale, preventing the control system from acquiring accurate level data and affecting production control.
Correct Selection: Ensure the total downstream load resistance is ≤ the transmitter's maximum load capacity (≤500 Ω). When connecting multiple loads in series, calculate the total resistance, or use an active isolation module to distribute the signal.

Misconception 4: Selecting General-Purpose Models for Explosion-Proof Applications, Ignoring Certification Requirements
Incorrect Practice: In chemical environments with flammable and explosive media, using general-purpose transmitters directly without selecting intrinsically safe models or installing safety barriers.
Consequences: Safety hazards exist; the system fails on-site explosion-proof acceptance testing; in severe cases, this may lead to safety incidents.
Correct Selection: In flammable and explosive environments, models with intrinsically safe certification must be selected and paired with safety barriers of the corresponding rating to meet on-site explosion-proof regulations.

5.4 Customization Recommendations
1. Custom Solutions for Special Signals
For applications requiring integration with specialized control systems, RS485 Modbus-RTU digital signal output can be customized to support multi-device bus communication and data acquisition for industrial IoT platforms.
For low-power applications, low-power models can be customized to support 12V DC power supply, reducing on-site power distribution requirements.
For scenarios with frequent liquid level fluctuations, high-response-speed models can be customized to reduce response time to ≤50 ms, meeting the demands of rapidly changing liquid level monitoring.

2. Custom Solutions for Non-Standard Operating Conditions
High-temperature media (> 80°C) scenarios: Customized high-temperature-resistant PTFE materials and internal circuitry are available to accommodate media temperatures ranging from -40°C to +125°C, resolving temperature drift issues in standard models;
High-viscosity / crystallization-prone media: Custom large-bore anti-clogging covers and anti-scaling coatings are available to reduce media adhesion and minimize the risk of blockages;
Extremely deep liquid level scenarios: Custom extended-cable models support liquid level measurement at depths exceeding 30m while optimizing signal transmission stability;
Special media adaptation scenarios: Custom PTFE grades or specialized anti-corrosion coatings can be selected based on media concentration and corrosiveness to withstand extreme corrosive conditions.

3. Multi-Channel Integrated Custom Solutions
Multi-tank centralized monitoring scenarios: Custom multi-channel data acquisition modules are available, with each module supporting 4–8 liquid level signal inputs. Data is transmitted via RS485 bus, reducing cabling costs;
Integrated Monitoring Systems: We offer integrated solutions comprising transmitters, data acquisition modules, and display terminals, suitable for small-scale wastewater treatment plants, chemical storage tank farms, and similar applications, enabling centralized data display and remote monitoring;
Multi-Channel Solutions for Explosion-Proof Environments: Custom-designed intrinsically safe multi-channel data acquisition modules, paired with intrinsically safe barriers, meet the requirements for centralized monitoring of multiple tanks in flammable and explosive environments.

VI. Installation and Commissioning Guidelines

Standardized procedures for on-site installation, wiring, and commissioning of the QDY60C-1 Submersible Corrosion-Resistant Level Transmitter. Step-by-step implementation ensures error-free installation and minimizes future malfunctions, making it fully compatible with on-site conditions in the chemical, environmental protection, pharmaceutical, and power industries.

6.1 Pre-installation Preparation

1. Verification of Accessories

Upon delivery, conduct a detailed inventory check to ensure all accessories are complete, undamaged, and present:

QDY60C-1 Submersible Corrosion-Resistant Level Transmitter main unit (including standard corrosion-resistant vented cable);

Dedicated anti-clogging protective cover and suspension mounting ring;

Product manual and factory calibration certificate;

Optional accessories: mounting bracket, explosion-proof sealing connector, intrinsically safe barrier, and shielded signal cable.

Visually inspect the probe's PTFE housing for cracks, deformation, or corrosion damage; check that the cable sheath has no abrasions or kinks; ensure the vent tube remains unobstructed and free from compression or blockages.

2. Environmental Inspection

Confirm that the on-site medium consists of highly corrosive acids or alkalis, and that operating temperature and liquid depth are within the product's rated parameters;

Installation vessels must be atmospheric open storage tanks, sewage tanks, or reaction tanks, with no conditions involving instantaneous high-pressure surges;

The installation area must be located away from sources of strong electromagnetic interference, such as high-power variable frequency drives, motors, and high-voltage switchgear;

For outdoor and humid environments, ensure the junction box location is not subject to prolonged rain exposure, and provide adequate waterproofing and shielding;

In explosion-proof areas, verify that the on-site explosion-proof rating matches the intrinsically safe transmitter, and reserve space for the installation of a safety barrier.

3. Tool List

Prepare the essential tools for on-site installation: multimeter, wire strippers, crimp terminals, electrical tape, cable ties, Allen wrenches, waterproof junction boxes, grounding wires, and cable clamps.

4. Safety Precautions

The on-site power supply must be disconnected before installation; live wiring, plugging, or unplugging of circuits is strictly prohibited;

When working with corrosive media, wear corrosion-resistant gloves and safety goggles to prevent skin contact with the medium;

In explosion-proof zones, strictly adhere to explosion-proof installation regulations; unauthorized modifications to wiring or replacement of non-explosion-proof components are strictly prohibited;

For installations on tank tops at heights, ensure fall protection is in place; when routing cables, avoid pulling, kinking, or cutting the sheath on sharp edges;

Do not perform disassembly, assembly, or maintenance operations under live, flammable, or explosive conditions.

6.2 Standard Installation Procedure

1. Suspended / Submersible Fixed Installation

Slowly lower the transmitter probe vertically into the liquid. Leave a gap of 10–20 cm between the bottom of the probe and the bottom of the tank or tank to prevent sludge or debris from blocking the sensing surface;

Secure the upper end of the cable to the edge of the tank or tank opening using a lifting ring or mounting bracket to prevent the probe from floating or swaying with the water flow;

Allow the cable to hang naturally; do not overstretch, bend, or crush it. Ensure the venting tube remains unobstructed throughout its entire length;

Route the cable neatly along walls or guardrails, securing it with cable ties. Run it parallel to power cables over long distances, keeping a safe distance.

2. Wiring Specifications (Power / Signal Terminal Separation)

This product primarily uses a two-wire 4-20mA system, with some custom models offering three-wire voltage output; strictly separate the power positive, power negative, and signal circuits; do not connect them incorrectly;

Two-wire system: Power and signal share two wires; there are no separate signal terminals, and the 4–20 mA signal is transmitted via the loop power supply;

Three-wire system: Three independent terminals for power positive, power negative, and signal output; connect strictly according to the labels to the instrument and PLC;

All wiring must use cold-pressed terminals; wire ends must have no exposed copper strands; wiring inside the junction box must be neat and must not compress the wire cores.

3. Grounding Requirements

The transmitter shield must be grounded at a single point, specifically at the PLC end in the control room. Double grounding at the field probe end is strictly prohibited to avoid loop current interference;

The equipment housing and mounting brackets must be reliably connected to the field protective ground, with a grounding resistance $\leq 4\Omega$;

In explosion-proof environments, the safety barrier housing must be grounded separately and must not be connected to the system's common ground or mixed with high-voltage ground wires.

6.3 Textual Specifications for Wiring Diagrams

1. Standard 2-Wire 4-20mA General Wiring

Terminal Definitions: Red wire connects to power supply + / Black wire connects to power supply - and serves as the signal loop

Wiring: DC 24V positive terminal → Transmitter red wire; Transmitter black wire → PLC analog input terminal → PLC internal circuit back to 24V negative terminal;

Shielding wire handling: One end of the shield is left floating (probe side), while the other end is connected to the control cabinet grounding busbar; do not connect to signal lines or power terminals.

2. Three-wire 0-5V/0-10V Dedicated Wiring

Terminal Definitions: Power Positive, Power Negative, Signal Output;

Power is supplied separately; the signal is output independently to a digital display meter or the PLC's voltage input terminal;

The signal line must be routed in a shielded cable and must not be installed in the same conduit or cable tray as power cables.

3. Isolated / Intrinsically Safe Wiring Specifications

Intrinsically safe models must be connected in series with an intrinsically safe barrier; the transmitter side connects to the intrinsically safe terminal of the barrier, while the control room side connects to the PLC and power supply;

The barrier must be powered by a separate 24V DC supply; direct connection to the explosion-proof field without passing through the barrier is strictly prohibited;

Intrinsically safe circuits must use dedicated shielded cables, and the physical separation from high-voltage power lines must be no less than 20 cm.

4. Comparison of Correct and Incorrect Wiring Practices

Incorrect Practices: Reversed polarity (positive and negative terminals swapped), shield grounded at both ends, high- and low-voltage lines routed in the same conduit, omission of safety barriers in intrinsically safe configurations, and exposed wire ends without crimped terminals;

Correct Practices: Strictly match terminals to color codes, ground the shield at a single point, route high- and low-voltage lines in separate cable trays, always include safety barriers in explosion-proof applications, and ensure all crimped terminals are insulated.

6.4 Power-On Commissioning Procedure

1. No-Load Test

After wiring is complete, double-check all circuits for incorrect connections, short circuits, or missing connections, and confirm proper grounding. Slowly apply the 24 V DC power supply and observe whether the device exhibits overheating, unusual odors, or abnormal noises; if none are present, the power supply is preliminarily deemed normal.

2. Signal Verification

With the liquid level at the lowest empty tank state, use a multimeter to measure the loop current and confirm the corresponding zero-point signal;
Manually simulate a full liquid level condition and observe whether the 4–20 mA signal responds linearly to changes in the measurement range;
If the signal remains stable throughout the process with no jumps or drift, the wiring and equipment are functioning normally.

3. Status Determination
This model has no external indicator lights; the values displayed on the backend PLC or digital display meter serve as the basis for judgment:
Fixed values with no change: Typically caused by a circuit break, reversed polarity, or a blocked vent hole;
Random fluctuations or large variations: Typically caused by incorrect shield grounding, high-voltage interference, or cables routed in the same conduit;
Exceeding the upper limit of the range: Probe is clogged or buried, or the selected range is too small.

4. Calibration Method
Use the actual on-site liquid level as the reference and compare it with the instrument's display value;
If there is a slight deviation, fine-tune the zero and full-scale points within the accompanying digital display or PLC program;
The transmitter is factory-calibrated to high precision; on-site disassembly and internal calibration are generally unnecessary. Do not disassemble the sealed structure to avoid compromising corrosion protection and IP68 rating.

6.5 Installation Prohibitions (Strictly Prohibited Operations)
1. Strictly prohibit overvoltage supply: Do not connect to a power source exceeding 36V DC; it is strictly prohibited to connect directly to 220V AC, as this will directly burn out the internal circuitry;

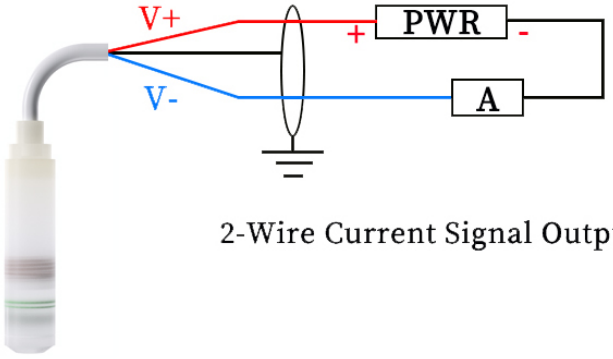
2. Avoid high-voltage interference: Do not run wiring in the same conduit or parallel to the same cable tray as variable frequency drives or motor power lines; wiring must be separated to maintain a safe distance;

3. Do not block the venting tube: The venting tube must remain unobstructed throughout its entire length. Blocking it prevents atmospheric pressure equalization, which can cause severe measurement drift and data inaccuracies;

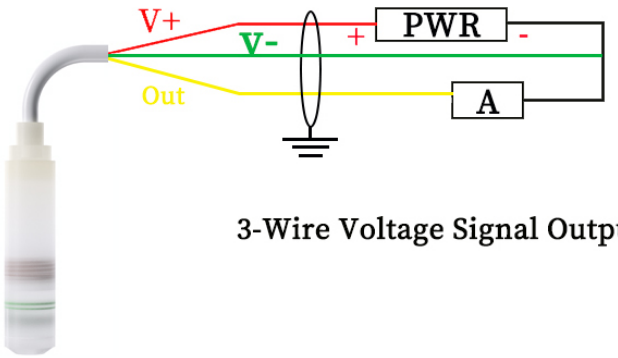
4. Precautions for humid/corrosive environments: Junction boxes and control cabinets must be properly sealed and waterproofed. Do not leave wiring exposed outdoors to prevent moisture and corrosive gases from entering and oxidizing the terminals;

5. Prohibited use beyond temperature and medium concentration limits: Do not exceed the rated medium temperature range. Do not use the device with highly concentrated, strongly corrosive media without prior confirmation of suitability;

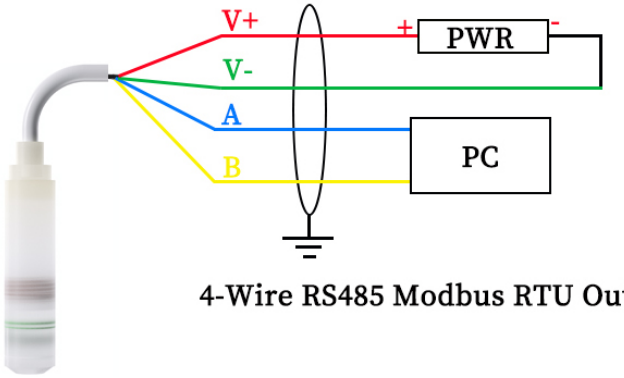
6. Prohibitions in explosion-proof areas: Do not use general-purpose, non-intrinsically safe models in explosion-proof environments. Do not short-circuit safety barriers or make unauthorized modifications to wiring or the device.



2-Wire Current Signal Output



3-Wire Voltage Signal Output



4-Wire RS485 Modbus RTU Output

VII. Recommendations for Daily Use & Operation and Maintenance
These guidelines apply to all models of the QDY60C-1 submersible corrosion-resistant level transmitter, including the standard, corrosion-resistant, and intrinsically safe versions. By establishing standardized inspection, periodic maintenance, and long-term upkeep procedures tailored to on-site conditions, these guidelines extend equipment service life, reduce drift-related failures, and lower the after-sales repair rate, fully complying with industrial on-site operation and maintenance management standards.

7.1 Key Points for Daily Inspections
1. Monitoring Level Signal Stability
Check real-time level values daily via PLC, DCS, or on-site digital displays to observe whether the signal is stable without sudden jumps or unexplained drift. If abnormalities occur—such as frequent fluctuations, erratic highs and lows, or fixed dead values—immediately investigate potential issues such as line interference, loose connections, or blocked vent tubes.
Continuously record changes in the level curve and compare them with historical data under the same operating conditions to proactively identify latent faults such as slow drift or aging-induced attenuation, thereby preventing sudden measurement failures.

2. Monitoring of On-Site Ambient Temperature and Humidity
Regularly monitor the transmitter's operating environment temperature and the temperature of the measured medium to ensure they remain within the product's rated range of -20°C to 80°C. Prohibit prolonged operation at temperatures exceeding the limits or under extreme low-temperature conditions.
Inspect the air humidity in the installation area to maintain an environment of 0–95% RH without condensation. In high-humidity, corrosive environments—such as chemical, pharmaceutical, and wastewater treatment facilities—pay special attention to checking whether junction boxes and cable connectors are damp, oxidized, or have water condensation.

3. Visual Inspection of Appearance and Installation Status
Periodically inspect the PTFE corrosion-resistant probe housing to ensure it is intact, free of cracks, deformation, or peeling due to chemical corrosion; check whether the probe has shifted position, sunk, or been buried by debris or sludge.
Inspect the corrosion-resistant cable for damage to the outer sheath,

kinks, compression, or aging; verify that cable clamps are secure and that the tank-mouth suspension structure is stable to prevent the probe from swinging with water flow and pulling on the cable.

4. Ventilation Tube Condition Inspection
Focus on ensuring the internal ventilation tube remains fully unobstructed throughout its length, with no kinks, flattening, blockages, or water ingress causing condensation. The ventilation tube is a critical component for balancing atmospheric pressure; any blockage will directly result in measurement inaccuracies and zero-point drift.

7.2. Regular Maintenance Plan
1. Cleaning Frequency Guidelines
General wastewater treatment and mildly corrosive conditions: Perform external cleaning once every 3 months;
Strongly acidic, strongly alkaline, highly corrosive, crystallization-prone, or highly viscous media conditions: Clean once every 1–2 months;
Gently rinse the PTFE surface of the probe and the anti-clogging cover with clean water to remove adhering dirt, crystallized deposits, and suspended solids; do not use hard objects to scrape or sharp tools to tap the surface, to avoid damaging the corrosion-resistant membrane and the housing structure.

2. Wiring Tightness Inspection Cycle
Conduct a comprehensive inspection of all terminal connections every six months:
Check the power terminals, signal terminals, and ground terminals inside the control cabinet and junction boxes for looseness, oxidation, or poor contact; retighten the terminal clamps and replace any wire ends that are aged, discolored, or severely oxidized.
Pay special attention to shield grounding points to ensure reliable single-point grounding, with no detachment or interference from multiple-point ground loops.
For intrinsically safe explosion-proof models, additionally inspect safety barrier wiring and the integrity of explosion-proof sealing joints to eliminate potential hazards such as looseness, air leaks, or loss of explosion protection.

3. Recommendations for Accuracy Retesting and Calibration
Standard operating conditions: Conduct on-site accuracy comparison retests every 6 months;
High-precision measurement requirements and critical continuous production conditions: Retest every 3 months;
Use the actual on-site liquid level as the reference and compare it with the instrument's display value. If a slight deviation occurs, perform only minor zero-point and full-scale adjustments at the PLC or secondary instrument end; do not disassemble the transmitter body without authorization to avoid damaging the corrosion-resistant seal, IP68 protection, and factory calibration accuracy.

7.3 Long-Term Maintenance Tips
1. Long-Term Dust and Moisture Protection
Ensure the junction box and control cabinet remain fully sealed at all times. Install waterproof and dustproof sealing gaskets. For outdoor applications, add rain and sun protection covers to prevent rain, fog, and corrosive gases from entering the terminal interior.
Store idle spare equipment in a dry, well-ventilated indoor environment. Maintain a storage temperature between -40°C and 85°C, away from corrosive gases (such as acids and alkalis) and dust accumulation. Before long-term storage, ensure cable ends are insulated and properly protected.

2. Anti-Interference Optimization and Maintenance
Ensure that shielded signal cables are always routed separately in daily operations; do not run them in close proximity to inverters, motors, or high-voltage power cables within the same conduit or cable tray. If on-site interference is significant, install signal isolation modules and optimize the grounding system to ensure grounding resistance is ≤4Ω.
Regularly clean dust and debris from the interior of control cabinets to prevent signal interference and leakage current drift caused by moisture accumulation on circuit boards.

3. Specialized Protection for Extreme Environments
High-temperature conditions: Avoid prolonged exposure to high-temperature steam or radiant heat sources. Install thermal insulation structures when necessary to ensure the medium temperature does not exceed the rated upper limit.
Highly corrosive conditions: Never substitute non-PTFE accessories. Maintain the integrity of the fully corrosion-resistant structure. Regularly inspect the housing for corrosion and aging to predict replacement cycles in advance.
Winter Outdoor Low-Temperature Conditions: Implement freeze and crack protection for cable joints to prevent outer sheath cracking and water ingress caused by low-temperature hardening and bending;
Explosion-Hazardous Conditions: Do not modify circuits or replace non-intrinsically safe components without authorization; regularly inspect the condition of explosion-proof seals and safety barriers to maintain on-site explosion-proof compliance.

VIII. Troubleshooting & Emergency Response
Applicable to all models of the QDY60C-1 submersible corrosion-resistant level transmitter, this document standardizes fault diagnosis, root cause analysis, step-by-step troubleshooting, emergency response procedures, and after-sales repair protocols. It helps on-site personnel quickly perform self-checks and resolve issues independently, thereby reducing downtime and minimizing production losses.

8.1 List of Common Faults
Transmitter outputs no signal; PLC/digital display shows no values
Level signal zero drift, gradual deviation, or data fluctuations despite no change in liquid level
Signal values jump, fluctuate frequently, fluctuate between high and low, or exhibit instability and distortion
Upper/lower limit alarms malfunction, trigger incorrectly, or fail to trigger when the liquid level reaches the set value
Inability to drive the load, signal fails to span the full range, or cannot reach the standard 4mA or 20mA values
Terminal oxidation or circuit leakage in humid or corrosive environments causing measurement anomalies
Values remain fixed after startup and do not change with actual liquid level fluctuations

8.2. Analysis of Fault Causes
1. Wiring-related causes
Reversed polarity, signal lines mixed with power lines, or shielding grounded at both ends causing loop current interference; loose terminals, exposed or oxidized wire ends, or loose wire connections; In intrinsically safe applications, failure to install a safety barrier or incorrect wiring of the safety barrier.

2. Power Supply Issues
Supply voltage below 12 V DC or above 36 V DC; high power supply ripple or unstable voltage regulation; loop load resistance exceeds specifications, surpassing the transmitter's allowable load range; reverse polarity of the power supply or damage to internal circuits caused by transient surges.

3. Signal Overload and Operational Mismatch Causes
Selected measurement range is too small, with actual liquid level exceeding the measurement range; Probe is buried or obstructed by sludge, crystallization, or debris; Built-in vent tube is kinked, crushed, or blocked, preventing atmospheric pressure equalization and causing severe drift.

4. Causes of Environmental Interference
Cabling running parallel to variable frequency drives, high-power motors, or high-voltage cables in the same cable tray, resulting in strong electromagnetic interference; improper on-site grounding or excessive grounding resistance; high humidity, condensation, or corrosive gases entering the terminal box, causing electrical leakage.

5. Causes of Equipment Damage
Long-term overheating and erosion of sealing structures by highly corrosive media; prolonged overloading and surges leading to sensor element aging; permanent damage caused by moisture, water ingress, or corrosion in internal circuits.

8.3 Step-by-Step Troubleshooting (Systematic Inspection and Repair for Each Fault)

Fault 1: No Output from the Device, No Display on the Instrument

First, use a multimeter to measure the supply voltage and confirm it is within the normal range of 12–36 V DC;

Check whether the positive and negative terminals of the power supply are reversed, and reconnect the wires according to the color-coding specifications;

Inspect the wiring section by section for breaks, frayed insulation, or loose terminals, and re-crimp and secure the terminals;

Check the total load resistance of the loop; if it exceeds 500Ω, reduce the series load or install a signal isolator;

For explosion-proof models, check whether the safety barrier is damaged or the loop is open, and replace it with a qualified safety barrier;

If all the above checks are normal but there is still no output, determine that the device itself is faulty and proceed with the after-sales repair process.

Fault 2: Signal drift, zero point drift

Check whether the transmitter's venting tube is kinked, crushed, filled with water, or blocked; straighten the tubing to ensure it is unobstructed throughout;

Lift the probe away from the liquid surface and perform a zero-point reset comparison to confirm whether it is physical drift;

Check whether the installation location is buried by silt or sediment; clean the probe's anti-clogging cover and sensing surface;

Verify whether the ambient temperature and humidity exceed the rated range; implement measures to improve ventilation, reduce temperature, and prevent moisture;

Re-establish proper single-end grounding of the shielding layer; eliminate dual-end grounding to remove loop current interference;

Perform micro-zero and full-scale calibration on the secondary instrument or PLC; do not disassemble the unit for calibration without authorization.

Fault 3: Signal Fluctuations, Jumps, Interference, or Distortion

Immediately route signal shielding cables separately from high-voltage power lines in different cable trays or conduits, maintaining a safe distance;

Check whether the control cabinet grounding is reliable, ensuring grounding resistance ≤4Ω, and eliminate false or floating grounds;

Clean dust, condensation, and moisture from inside the control cabinet, and ensure junction boxes are sealed and waterproof;

Install signal isolators and surge protection modules to mitigate electromagnetic interference in industrial environments;

Tighten all terminal blocks to eliminate loose connections and poor contact due to oxidation.

Fault 4: False or Missing Level Alarms

Verify the upper and lower limit alarm parameters within the instrument and correct the threshold logic;

Troubleshoot signal fluctuations and interference by ensuring proper shielding, grounding, and wiring isolation;

Verify that the transmitter's measurement range matches the actual tank height; if not, select and replace the transmitter;

Clean debris from the probe to prevent false level signals caused by partial obstruction.

Fault 5: Signal range not fully utilized; unable to reach 20 mA

Calculate the total load resistance of the circuit; remove excess series-connected instruments and recorders to keep the load within the rated range;

Check if the supply voltage is too low; replace with a stable 24V DC regulated power supply;

Check if the cable gauge is too thin or the transmission distance is too long; replace with a thicker shielded cable;

Perform a full-scale calibration; if the target is still not met, determine that the sensing element has aged and request a replacement from after-sales service.

Emergency Workaround

When a sudden on-site failure cannot be repaired immediately:

Temporarily switch to manual level inspection and recording to ensure uninterrupted monitoring of the production process;

Install a spare unit of the same model (QDY60C-1) as a direct replacement, using the original wiring and measurement range parameters for immediate operation;

In multi-tank monitoring scenarios, temporarily switch to a spare channel without affecting the automation of the entire production line.

8.4. After-Sales Repair Guidelines

1. Criteria for Determining Faults and Reporting Repairs

If any of the following conditions occur, do not attempt to disassemble the unit yourself; instead, directly request after-sales repair:

All power supply, wiring, cabling, and grounding checks are normal, yet there is still no output or persistent severe drift;

The probe's PTFE housing is damaged, has water ingress, internal corrosion, or physical deformation;

Circuit burnout or complete equipment failure caused by lightning strikes, surges, or overvoltage;

Severe accuracy deviation that cannot be calibrated or restored on-site;

Explosion-proof models have lost their explosion-proof rating or have damaged seals, posing safety hazards.

2. Repair Process

Record the product model: QDY60C-1, measurement range, output signal, operating medium, and temperature;

Clearly describe the fault symptoms, time of occurrence, and troubleshooting steps already taken on-site;

Provide photos of the installation site, wiring configuration, and model numbers of associated instruments;

Contact the manufacturer's after-sales service; after submitting the information, await remote technical guidance or return the unit for factory repair/replacement.

3. Warranty Coverage

The product is covered by standard warranty service when installed and used in accordance with specifications under normal operating conditions;

During the warranty period, free repair or replacement is available for non-human-induced damage and non-violation of operating conditions;

Human-induced disassembly, unauthorized modification, improper use involving overpressure or overtemperature, damage from external forces, or incorrect model selection due to corrosive conditions are not covered by the free warranty; paid repair services are available.

4. Reiteration of Usage Prohibitions (to Reduce Recurrence of Faults)

Do not use a power supply exceeding 36V DC; do not connect directly to 220V AC; do not block ventilation or air ducts; do not ground both ends of the shielding layer; do not run high-voltage and low-voltage cables in the same conduit; do not disassemble the unit without authorization, as this may damage the anti-corrosion seals and the IP68 protective structure.