High-Temperature Submersible Level Transmitter

I. Product Definition

The QDY60B 2088 Stainless Steel High-Temperature Submersible Split-Type Level Transmitter is a hydrostatic level measurement instrument designed by Anhui Qidian Automation Technology Co., Ltd. specifically for complex operating conditions such as high temperatures, severe corrosion, and high viscosity. It is an upgraded industrial-grade version of the submersible level transmitter.

Based on the principle of hydrostatic pressure measurement, it uses a stainless steel probe immersed in the liquid to sense the pressure of the liquid column and convert the pressure signal into a standard electrical signal (4-20mA/RS485), enabling continuous online monitoring and remote control of liquid levels in containers such as storage tanks, reactors, and sewage tanks.

Core Features and Characteristics:

1. Specialized High-Temperature Design: Featuring a fully stainless steel capillary tube and heat sink structure, with a split-type layout separating the probe from the display/transmitter unit, it can be directly immersed in high-temperature liquids up to 150°C for measurement. This addresses the common issues of standard submersible transmitters—such as poor high-temperature resistance and susceptibility to damage—making it suitable for applications involving hot water, thermal oil, and high-temperature chemical solutions.

2. Industrial-Grade Protection and Corrosion Resistance: The probe, capillary tube, and heat sink connectors are all made of 304/316L stainless steel. Combined with fully sealed welding processes and an IP68 protection rating, the unit can operate while submerged in water, weak acids, and weak alkalis for extended periods, making it suitable for corrosive and humid environments in industries such as wastewater treatment, chemicals, food, and pharmaceuticals.

3. 2088 Explosion-Proof Housing: Utilizes a standard 2088 explosion-proof instrument housing with an LCD display, allowing for direct on-site reading of level values. The “EX” explosion-proof marking on the housing meets explosion-proof requirements for flammable and explosive conditions, making it suitable for high-risk industries such as petroleum and chemicals.

4. Split-Type Anti-Interference Design: The probe and transmitter unit are connected via a stainless steel capillary tube, allowing installation in a safe area away from high-temperature or corrosive media. This design prevents instrument damage caused by environmental factors and simplifies on-site installation and maintenance.

Wide Measurement Range and High Accuracy: Supports customization of a wide measurement range from 0–1 m to 0–100 m, with measurement accuracy up to Class 0.5. Features dual outputs—4–20 mA analog and RS485 digital—compatible with PLC and DCS systems, enabling remote monitoring and automated control.

5. High Stability and Maintenance-Free Operation: Equipped with a built-in high-stability diffused silicon pressure sensor, it is resistant to vibration and electromagnetic interference. It exhibits no zero-point drift over long-term use. The probe contains no moving mechanical parts and requires no periodic calibration or maintenance, significantly reducing operational and maintenance costs.

II. Working Principle

The core logic of this transmitter is the conversion process of “hydrostatic pressure → electrical signal → liquid level value”, which can be broken down as follows:

1. Pressure Sensing Stage: When the stainless steel probe is immersed in the liquid, the pressure sensor at the bottom of the probe directly bears the pressure of the liquid column above it. The deeper the liquid, the greater the weight of the liquid column, and the greater the pressure exerted on the sensor.

2. The pressure calculation formula is: $P = \rho \times g \times h$, where P is the liquid column pressure, ρ is the liquid density, g is the acceleration due to gravity, and h is the liquid depth (level height).

3. High-Temperature Isolation and Signal Transmission Stage: The pressure exerted on the probe is transmitted to the transmitter unit above via a sealed medium inside a stainless steel capillary tube. The heat sink structure in the middle isolates the heat from the high-temperature liquid, preventing damage to the electronic components of the transmitter unit due to high temperatures. This solves the problem that ordinary transmitters cannot directly measure high-temperature liquids.

4. Signal Conversion and Processing Stage: The diffused silicon pressure sensor inside the transmitter unit converts the pressure signal into a weak electrical signal. After processing through an amplification circuit and signal conditioning module, it is converted into a standard 4–20 mA current signal or an RS485 digital signal.

5. Output and Display Stage: The processed signal is split into two paths: one displays the current liquid level value directly on an LCD screen for easy on-site reading; the other is transmitted via cable to a PLC, DCS, or digital display instrument to enable remote monitoring, data logging, and automatic control (such as high/low liquid level alarms and pump start/stop control).

III. Core Value and Solutions to Pain Points

3.1 Overview of Core Value

The core value of this product lies in addressing the industry pain point that standard submersible level transmitters cannot adapt to high-temperature, corrosive, or high-risk explosion-proof environments. It provides a stable, accurate, and safe level measurement solution for complex industrial environments while reducing customers’ operational and maintenance costs as well as safety risks.

3.2 Pain Points and Solutions

Q: Why can’t standard submersible level transmitters measure high-temperature liquids?

A: Standard submersible transmitters feature an integrated probe and transmitter unit. When directly immersed in high-temperature liquids, heat is rapidly conducted to the electronic components, causing sensor drift, circuit burnout, and a significantly shortened service life.

Our Solution: A three-part design featuring a split-body structure, stainless steel capillary tube, and heat sink. The heat absorbed by the probe is isolated by the heat sink and cannot be conducted to the transmitter unit. This allows the product to be directly immersed in liquids up to 150°C for measurement, making it fully compatible with applications involving hot water, thermal oil, and high-temperature chemical solutions.

Q: Sewage and chemical liquids are corrosive. What should be done if ordinary transmitter probes are easily corroded and damaged?

A: Ordinary transmitter probes are typically made of standard stainless steel or plastic. Prolonged immersion in corrosive liquids can cause perforation and leakage, leading to measurement failure.

Our solution: The probe, capillary tube, and heat sink are all made of 304/316L stainless steel. Combined with fully sealed welding and an IP68 protection rating, the device can operate while submerged in water, weak acids, weak alkalis, and other media for extended periods, significantly extending service life and reducing replacement costs.

Q: What special requirements do flammable and explosive environments (such as the petroleum and chemical industries) place on level measurement instruments? Can standard transmitters meet these requirements?

A: Flammable and explosive environments require instruments to have explosion-proof certification to prevent safety incidents caused by electrical sparks. Standard non-explosion-proof transmitters cannot meet the safety standards for such scenarios.

Our Solution: We use a standard 2088 explosion-proof instrument housing with an “EX” explosion-proof marking, compliant with industrial explosion-proof standards. This ensures safe operation in flammable and explosive environments and meets the safety requirements of high-risk industries such as petroleum and chemicals.

Q: What should be done if the level transmitter is installed near high-temperature or corrosive media, making maintenance difficult and high-risk?
A: With integrated transmitters, the transmitter unit must be installed close to the liquid. High-temperature and corrosive environments can cause rapid instrument damage, and maintenance requires entering hazardous areas, posing safety risks.
Our solution: The probe and transmitter unit are designed as separate components. The transmitter unit can be installed in a safe area away from high-temperature or corrosive media, which not only prevents instrument damage caused by the environment but also reduces the difficulty of on-site installation and maintenance, ensuring the safety of operations and maintenance personnel.

Q: There is no remote monitoring system on-site. How can I quickly read the liquid level values?
A: Most standard submersible transmitters lack on-site display capabilities, requiring liquid levels to be read via backend instruments. This prevents on-site inspection personnel from directly accessing data, resulting in low efficiency.
Our product's solution: The transmitter unit is equipped with an LCD display that directly shows the current liquid level value, enabling on-site reading without relying on backend equipment. This facilitates on-site inspections and commissioning.

Q: What should be done if liquid level measurement accuracy is unstable, zero-point drift occurs, and frequent calibration is required?
A: Conventional transmitters have poor sensor stability and are highly susceptible to temperature and vibration. Long-term use leads to zero-point drift, requiring regular calibration and increasing operational and maintenance costs.
Our Solution: This product features a built-in high-stability diffused silicon pressure sensor that is resistant to vibration and electromagnetic interference. It exhibits no zero-point drift over time, eliminating the need for frequent calibration and maintenance. This significantly reduces operational costs and ensures the stability of measurement data.

IV. Key Product Parameters & Specifications

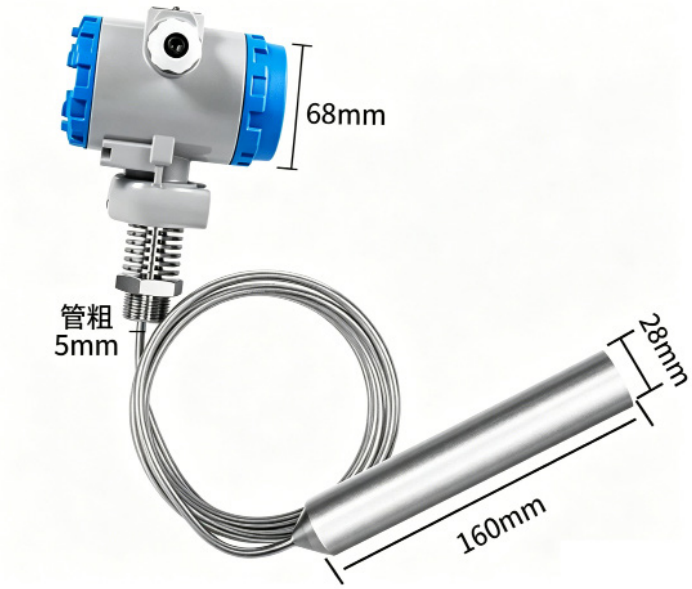
4.1 Basic Electrical Parameters
Measurement Range 0–1 m to 0–100 m (customizable; commonly used ranges: 0–5 m, 10 m, 20 m)
Accuracy Class Standard: 0.5% FS (1 m ≤ range < 10 m); High Accuracy: 0.2% FS (range ≥ 10m); Custom: 0.1% FS (range ≥ 10m)
Output Signal Analog: 4–20mA (2-wire), 0–5V, 1–5V, 0–10V (3-wire); Digital: RS485 (Modbus-RTU protocol)
Response Time ≤1 ms (to 90% FS)
Long-term Stability ±0.1% FS/year
Temperature Drift ±0.01% FS/°C (within temperature compensation range)
Overload Capacity 200% full scale
Zero/Full-scale Calibration Supports on-site button calibration and remote communication calibration

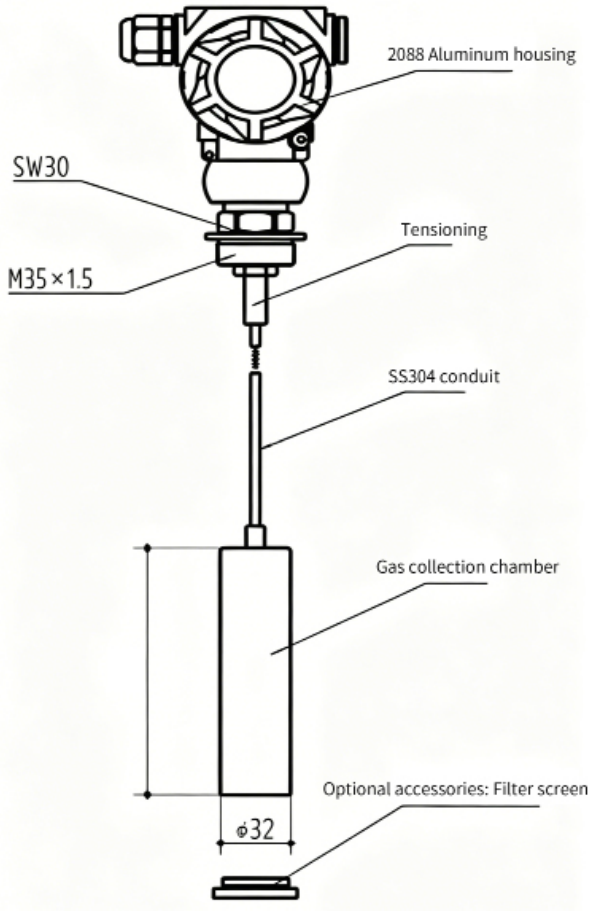
4.2 Isolation Performance Parameters
Isolation Method Diffused silicon isolation diaphragm (316L stainless steel) + stainless steel capillary isolation + heat sink insulation
Isolation Withstand Voltage Probe-to-transmitter unit isolation withstand voltage ≥500 V AC/1 min
Insulation Resistance ≥100 MΩ (500 V DC)
Immunity Electromagnetic interference immunity (compliant with IEC 801 standard), vibration immunity (10g, 20–2000 Hz)
Signal Isolation Analog/digital signals isolated from power supply to prevent ground loop interference

4.3 Power Supply & Power Consumption Parameters
Supply Voltage Standard: 24 V DC; Range: 10–32 V DC (2-wire)
Full-Load Power Consumption Current-type ≤0.6 W; Digital-type ≤0.3 W
Power Distribution Output No built-in power distribution; supports external 24 V DC safety barrier (intrinsically safe explosion-proof compatible)
Electrical Protection Reverse polarity protection, overload protection, short-circuit protection
Load Resistance 4–20 mA Output: 0–750 Ω

4.4 Environmental Adaptation Parameters
Medium Temperature –40°C to 150°C (operating range of high-temperature-resistant core)
Ambient Temperature –40°C to 85°C
Temperature Compensation Range –10°C to 70°C
Storage Temperature –40°C to 125°C
Relative Humidity 0–90% RH (non-condensing)
Protection Rating Probe: IP68 (long-term immersion); Transmitter Unit: IP65
Explosion-Proof Rating Exia II CT6 Ga (Intrinsically Safe), Compatible Safety Barrier Types: Zener-type / Isolation-type (e.g., MTL5042)
Vibration Resistance 10g (20–2000 Hz)

4.5. Physical Parameters
1. Mounting Methods
Probe: Direct immersion (equipped with a counterweight to prevent drift)
Transmitter unit: Wall-mounted / Pipe-mounted (fits 2-inch pipes, bracket-mounted)
Capillary tube: Custom lengths (standard 1 m, maximum 10 m), flexible routing
2. Dimensions (Unit: mm)





4. Housing Material and Protection Details
Probe 316L Stainless Steel Fully sealed welded construction, corrosion-resistant, leak-proof
Capillary Tube 304 Stainless Steel Pressure-resistant, high-temperature resistant, corrosion-resistant
Heat Sink 304 Stainless Steel Fin structure, prevents heat conduction
Transmitter Housing Cast Aluminum (2088 Explosion-Proof Housing) Impact-resistant, corrosion-resistant, with explosion-proof marking
Seals Fluorocarbon rubber High-temperature resistant (-20°C to 200°C), acid and alkali resistant
Cables Polyurethane (PU) High-temperature resistant, corrosion-resistant, tear-resistant

V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type Selection
The signal type should be determined based on the backend control system and transmission distance:
Analog signals (4–20 mA): Primarily compatible with traditional PLC and DCS systems; transmission distance ≤ 1000 m; strong interference resistance; a universal standard in industrial settings;
Digital Signals (RS485/Modbus-RTU): Suitable for smart industrial and remote monitoring scenarios; supports multi-device networking and transmission; transmission distance ≤ 1200 m; enables simultaneous collection of multiple parameters and remote calibration;
Voltage signals (0–5 V/0–10 V): Suitable only for small-scale control systems with short distances and low interference; transmission distance ≤ 100 m; not recommended for environments with strong electromagnetic interference or long-distance applications.

2. Channel Selection
This product is a single-channel level measurement device and must be configured based on the number of monitoring points at the site:
Single Monitoring Point Scenario: Directly use a single QDY60B transmitter to independently perform liquid level monitoring and signal output;
Multiple Monitoring Point Scenario: Can be paired with Qidian's multi-channel signal acquisition module to achieve centralized collection and remote transmission of signals from multiple transmitters, eliminating the need for additional controllers.

3. Power Supply Selection
Select based on on-site power supply conditions and explosion-proof requirements:
Standard 2-wire 24V DC Power Supply: The mainstream solution for industrial sites. Power and signal transmission share two cables, resulting in low wiring costs. Suitable for explosion-proof environments (intrinsically safe versions require a safety barrier);
3-wire Power Supply: Suitable for voltage signal output scenarios. Power, signal, and ground lines are independent. Used only for small devices without explosion-proof requirements;
Wide-Voltage Power Supply (10–32 V DC): Suitable for environments with significant fluctuations in on-site supply voltage, preventing instrument malfunctions caused by voltage instability.

4. Selection Based on Explosion-Proof Requirements
Select the appropriate model based on the explosion-proof rating of the on-site area:
Non-explosion-proof environments (general workshops, civilian liquid storage tanks): Use the general-purpose QDY60B transmitter; basic IP protection is sufficient;
Explosion-proof environments (petroleum, chemical, flammable and explosive media storage tanks): Select the intrinsically safe explosion-proof type (Exia II CT6 Ga), which must be used in conjunction with Zener barrier or isolated safety barriers to comply with industrial explosion-proof standards;
Flameproof environments: If a flameproof design is required, a custom flameproof 2088 housing can be provided to meet the Exd II CT4 explosion-proof rating.

5. Selection Based on Installation Environment
Configuration must be determined based on medium temperature, corrosion level, and installation space:
Medium temperature ≤ 80°C: Select the standard stainless steel probe + standard capillary tube; no additional heat dissipation upgrades are required;
Medium temperature 80–150°C: The high-temperature resistant version must be selected, which comes standard with a heat sink + stainless steel capillary tube to prevent heat conduction;
Highly Corrosive Media (Strong Acids / Strong Alkalis): Select a 316L stainless steel probe + perfluorinated seals to enhance corrosion resistance;
Tight Spaces / Deep Tank Installation: Customizable stainless steel capillary tubes of various lengths (1–10 m) to accommodate on-site installation distances;
Outdoor / humid environments: Select an IP68 probe + IP65 transmitter unit, and install a rain cover to prevent rain and condensation from damaging the instrument.

II. Selection Guidelines for Industry Applications
1. Chemical Industry Applications
For high-temperature, highly corrosive, and flammable/explosive conditions in the chemical industry, we recommend the intrinsically safe QDY60B transmitter. Equipped with a 316L stainless steel probe and a high-temperature heat dissipation structure, it is suitable for level monitoring of high-temperature chemical solutions in reactors and storage tanks. It must be used in conjunction with an isolated safety barrier to meet explosion-proof and safety regulations, effectively preventing instrument failures caused by corrosion, high temperatures, and electromagnetic interference.

2. Power Industry Applications
For level monitoring requirements in high-temperature, high-pressure vessels such as power plant boilers, deaerators, and condensers, we recommend the high-precision version of the QDY60B transmitter. Supporting Class 0.2 accuracy measurement, it is equipped with a high-temperature heat sink and a long-distance capillary tube, making it suitable for measuring the levels of high-temperature hot water and steam condensate. It reliably transmits signals to the power plant's DCS system, enabling continuous level monitoring and automatic control.

3. Metallurgy Industry Applications
For high-temperature cooling water tanks, pickling tanks, and similar operating conditions in the metallurgy industry, we recommend the reinforced corrosion-resistant QDY60B transmitter. Featuring a 316L stainless steel probe and fully sealed welding construction, it is suitable for corrosive environments involving high-temperature cooling water and pickling solutions. It also offers strong vibration resistance, withstanding equipment vibration interference in metallurgical settings to ensure stable and reliable measurement data.

4. Pharmaceutical Industry Applications
For pharmaceutical applications such as clean liquid storage tanks and reactors, we recommend the sanitary-grade custom QDY60B transmitter. The probe features a polished 316L stainless steel finish with no sanitary dead zones, making it suitable for level measurement of media such as water for injection and pharmaceutical solutions. It also supports IP68 protection, withstands cleaning and disinfection processes, and meets the clean production requirements of the pharmaceutical industry.

5. Smart Manufacturing Industry Applications
For automated control scenarios such as storage tanks and recirculating water tanks on smart manufacturing production lines, we recommend the RS485 digital QDY60B transmitter. It supports the Modbus-RTU protocol and can be integrated into industrial IoT platforms to enable remote collection, monitoring, and analysis of liquid level data, meeting the unmanned operation and intelligent control requirements of automated production lines.

5.3 Common Selection Misconceptions
Misconception 1: Ignoring Isolation Ratings and Using Standard Models in High-Temperature/Corrosive Conditions
Many users focus solely on measurement range and accuracy during selection, neglecting isolation and protection ratings. Standard submersible transmitters lack heat-dissipating structures designed for high temperatures; immersing them directly in high-temperature liquids can

cause electronic components to burn out. Using 304 stainless steel probes in strong acid or strong alkali media can lead to corrosion and leakage, resulting in measurement failure.
Correct Approach: Select a transmitter with a heat-dissipating structure and materials appropriate for the medium's temperature and corrosion level. For high-temperature applications, a high-temperature model with a heat sink and stainless steel capillary tube must be used; for highly corrosive media, a 316L stainless steel probe should be selected.

Misconception 2: Incorrect Signal Range Selection—Measurement Errors Due to Range Being Too Wide or Too Narrow
Selecting a range that is too small can cause the instrument to overload and fail when the liquid level exceeds the upper limit; selecting a range that is too large can result in insufficient measurement accuracy at low liquid levels, failing to meet control requirements. For example, if the actual liquid level is 0–5 m but a transmitter with a 0–20 m range is selected, this will cause poor signal linearity in the low-level range, affecting control accuracy.
Correct Approach: Based on the actual maximum liquid level at the site, select a range that is 20%–30% higher than the actual liquid level. For example, if the actual liquid level is 0–5 m, choose a 0–6 m or 0–10 m range to balance measurement accuracy and overload protection.

Misconception 3: Neglecting load matching; excessive 4–20 mA signal transmission distance or excessive load
The transmission distance of a 4–20 mA signal is dependent on the load resistance. If the load resistance exceeds the transmitter's rated value (e.g., 750 Ω) or the transmission distance exceeds 1,000 m, signal attenuation and data distortion will occur, preventing the downstream instrument from receiving the signal properly.
Correct Approach: When selecting a transmitter, verify the input impedance of the downstream equipment and the transmission distance. If the transmission distance is too long, prioritize using RS485 digital signals or install a signal isolator to enhance signal stability.

Misconception 4: Selecting General-Purpose Models for Explosion-Proof Environments Instead of Models Compliant with Explosion-Proof Standards
Some users in flammable and explosive environments opt for general-purpose transmitters to reduce costs instead of intrinsically safe models. This poses safety hazards, violates on-site safety regulations, and will result in failure to pass acceptance inspections.
Correct Approach: In flammable and explosive environments, intrinsically safe transmitters must be used in conjunction with corresponding safety barriers to ensure the instrument's overall explosion-proof performance meets the Exia II CT6 Ga rating requirements.

5.4 Customization Recommendations
1. Custom Solutions for Special Signals
For non-standard signal requirements, we offer customization services:
Custom special output signals: such as Hart protocol and Profibus-DP protocol, compatible with imported PLC/DCS systems;
Custom multi-signal output: Simultaneous support for 4-20mA and RS485 dual-signal output to meet on-site requirements for connecting both local instruments and remote systems;
Custom signal isolation solutions: Built-in signal isolation modules to resolve ground loop interference issues on-site and enhance signal stability.

2. Custom Solutions for Non-Standard Operating Conditions
Custom services are available for special installation and media conditions:
Custom non-standard capillary tube lengths: Stainless steel capillary tubes can be customized to any length within the 1–10 m range to accommodate varying installation distances;
Custom probe materials: Such as Hastelloy or titanium alloy probes, suitable for highly corrosive or high-purity media conditions;
High-Temperature Upgrade Customization: We can customize ultra-high-temperature models rated up to 180°C to accommodate liquid measurement scenarios at higher temperatures;
Special Installation Method Customization: Such as flange mounting, threaded mounting, and sanitary quick-connect fittings to meet the installation requirements of various tanks.

3. Multi-Channel Integrated Customization Solutions
For scenarios with multiple monitoring points, we offer multi-channel integrated solutions:
When paired with Qidian's multi-channel signal acquisition module, these solutions enable centralized acquisition, conversion, and remote transmission of signals from multiple QDY60B transmitters, eliminating the need for additional controllers;
Customized integrated multi-channel level monitoring systems, comprising transmitters, acquisition modules, digital displays, and alarm devices, provide real-time level monitoring, high/low level alarms, and pump start/stop control, making them ideal for scenarios with multiple monitoring points such as large tank farms and chemical industrial parks.

VI. Installation and Commissioning Specifications
6.1 Pre-installation Preparation
1. Checking Components
After unpacking, take inventory of all standard components one by one to ensure nothing is missing and that there are no visible dents or damage:
QDY60B Split-Type Level Transmitter Assembly (2088 Digital Display Transmitter Head, Stainless Steel High-Temperature Probe, Stainless Steel Heat-Dissipating Capillary Tube Assembly)
Mounting brackets, wall-mount/pipe-mount hardware, and waterproof cable connectors
User manual, product certificate of conformity, and factory calibration data sheet
Matching waterproof sealing gaskets and counterweights (to prevent probe drift)
Verify that the model, measurement range, explosion-proof rating, and output signal match the order. Ensure there are no kinks or cracks at the probe welds or in the capillary tube, and that the display on the transmitter head is undamaged.

2. Environmental Inspection
Medium Conditions: Confirm that the temperature of the measured liquid does not exceed 150°C, and that there are no highly corrosive or highly abrasive impurities exceeding the instrument's tolerance. For high-temperature applications, ensure adequate heat dissipation space and avoid enclosed, stuffy environments.
Installation Space: The transmitter housing must be installed in a well-ventilated, dry location, away from direct high-temperature heat sources, severe vibration, and strong electromagnetic radiation (maintain a safe distance from variable frequency drives and high-power motors).
Explosion-Proof Environments: In flammable or explosive areas, verify the explosion-proof zone classification and install the appropriate isolation or Zener barrier in advance, reserving space for its installation.
Wiring Environment: Route cables away from power cable trays, high-temperature pipes, and low-lying areas prone to water accumulation. For outdoor installations, ensure protection against rain and sunlight.

3. Tool List
Phillips/flathead screwdrivers, Allen wrenches, wire strippers, terminal blocks, multimeter, electrical tape, cable ties, spirit level, grounding wire, waterproof cable connectors.
4. Safety Precautions
Power to the site must be disconnected before installation. Under no circumstances should wiring be performed or the instrument disassembled while energized.
In explosion-proof environments, strictly adhere to explosion-proof installation regulations. Do not disassemble the 2088 explosion-proof housing or modify the internal wiring configuration without authorization.
When lowering the probe into the tank, do so slowly to avoid impacting the tank bottom with hard objects or kinking the capillary tube. Do not pull the capillary tube violently.
When working in damp conditions or confined spaces inside the tank, ensure proper protective measures are in place to prevent electric shock and falls.
Signal cables and high-voltage power cables must be routed through separate conduits; it is strictly prohibited to run them in parallel within the same conduit or cable tray.

6.2 Standard Installation Steps
1. Transmitter Head Mounting
Supports both wall-mounted and pipe clamp mounting methods; can also

be mounted on a standard DIN rail.
Use a spirit level to align the transmitter, ensuring it is installed vertically to prevent tilting from affecting the stability of internal components and display readings.
Install at a height that allows for easy viewing of the display and convenient wiring and maintenance, and keep it away from areas with standing water or splashing water.
Tighten the mounting screws securely. In vibration-prone environments, install vibration-damping washers to reduce the transmission of equipment vibrations to the transmitter.

2. Probe and Capillary Tube Installation
Lower the liquid level probe vertically to the bottom of the storage tank or water tank. Use the standard weight to ensure the probe hangs vertically downward; do not place it horizontally, at an angle, or against the wall.
Install the stainless steel capillary tube with natural slack. Do not kink, bend sharply, crush, or step on it. Allow for a curved radius at bends to prevent obstruction of internal pressure transmission.
Keep the heat dissipation section exposed and ventilated; do not wrap it in insulation or seal it off to ensure effective heat dissipation at high temperatures.

3. Wiring Specifications (Power / Output Terminal Differentiation)
This product features a standard two-wire 4-20mA configuration, with some custom RS485 digital models available. Terminal definitions are strictly distinguished as follows:
Power Terminals: DC24V Positive, DC24V Negative
Signal Terminals: 4-20mA Signal Positive, Signal Negative; for RS485 models, distinguish between Line A and Line B
Ground Terminal: Dedicated protective ground terminal; must not be omitted or left floating
Basic Wiring Principles:
Use shielded twisted-pair cables for both power and signal lines, with wire gauge appropriate for the on-site transmission distance.
Crimp the wire ends onto cold-pressed terminals before connecting them to the terminal block to prevent loose connections, arcing, or loose contacts.
Tighten the waterproof cable gland at the cable entry point and secure the cable jacket to prevent moisture and dust from entering the enclosure.

4. Grounding Requirements
The protective grounding of the instrument housing must be reliably connected to the on-site grounding grid, with a grounding resistance ≤4Ω.
Single-end shield grounding: Ground the shield only at the transmitter end; leave the other end floating (ungrounded) to prevent ground loops from interfering with the measurement signal.
In explosion-proof environments or sites with strong interference, grounding must be strictly enforced; omitting grounding steps is prohibited.

6.3, Wiring Diagram Text Specifications
1. Standard Terminal Definitions
Power Positive: Connect to DC24V+
Power Negative: Connect to DC24V-, which also serves as the common negative for the 4-20mA signal
4-20mA Signal Output: Connect in series to the PLC analog input terminal or secondary instrument
RS485 Communication Terminals: Connect A and B to the communication bus; ensure polarity is not reversed
Shielded Cable: The shield must wrap around the cable; ground at a single point on the meter side, and leave it floating on the tank farm side

2. Specific Wiring Specifications for Power Distribution Type / Isolation Type
Standard Power Distribution Type: No external isolator is required; use a two-wire system with direct 24V DC power supply, and signals can be collected locally.
Explosion-proof Isolated Type: A series isolation barrier must be installed. Connect the transmitter to the intrinsically safe side and the PLC and power supply to the non-intrinsically safe side. Direct wiring across zones is strictly prohibited.
Signal Isolation Scenarios: When field interference from variable frequency drives or motors is present, install a signal isolator at the front end to isolate power and signals independently, preventing interference from entering the system.

3. Comparison of Correct and Incorrect Wiring
Correct: Shielded cable grounded at one end; power and signal lines routed in separate conduits; terminals crimped securely; waterproof connectors locked tight; reliable grounding.
Incorrect: Shielded cable grounded at both ends; power and signal lines routed in the same conduit; bare wire ends inserted directly into terminals; grounding omitted; safety barriers not installed in explosion-proof environments; positive and negative terminals reversed.

6.4 Power-On Commissioning Procedure
1. No-Load Test
After wiring is complete, re-inspect the terminal blocks, polarity, shield grounding, and explosion-proof configuration to ensure accuracy. Confirm there are no short circuits or loose connections before closing the circuit breaker to power on.
After power-up, observe whether the 2088 meter display lights up normally, with no black screen, garbled characters, or error messages, and verify that the instrument enters normal standby mode.

2. Signal Verification
Ensure the tank is empty (no-load level zero), and observe whether the on-site level reading returns to zero.
Use a multimeter to measure the 4–20 mA output current; the no-load value should correspond to the standard starting value of 4 mA, and the full-scale value should correspond to 20 mA when the tank is full.
For the RS485 model, connect to a host computer or debugging software; communication is considered normal if the connection is established, the address matches, and liquid level data can be read normally.

3. Indicator Light Status Assessment
Power indicator light is steady: Power supply is normal; the instrument is operating normally.
Indicator light is flashing: Communication transmission and reception are normal; data is being exchanged.
Indicator light is off / remains dark: Power supply interruption, reversed polarity, or internal power supply failure.
Indicator light is flashing rapidly: Range overflow, signal abnormality, or short circuit.

4. Calibration Methods
Zero-point calibration: With no liquid present, use the meter buttons to perform zero-point calibration to correct initial deviation.
Full-scale calibration: Fill to the actual maximum liquid level, set the full-scale value, and lock the range parameters.
After calibration, let the device stand for 10–20 minutes. If the readings show no drift or fluctuations, calibration is complete. Lock the parameters to prevent accidental changes.

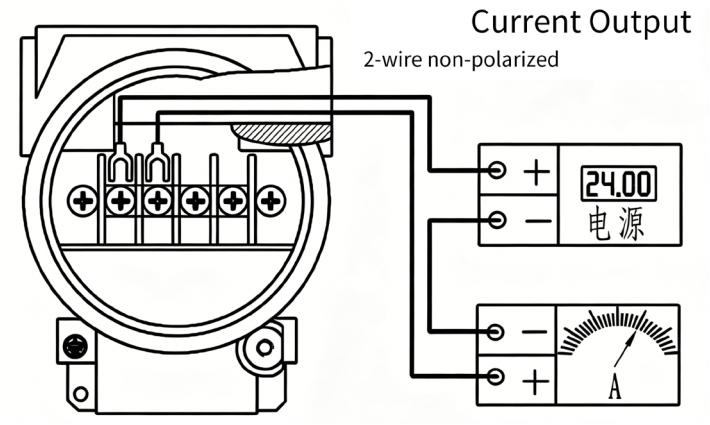
6.5 Installation Precautions
1. Never exceed the rated voltage
Strictly use the standard 10–32 V DC power supply. Do not connect to 220 V AC power or use voltages exceeding 32 V, as this will immediately burn out the internal circuitry and sensor.

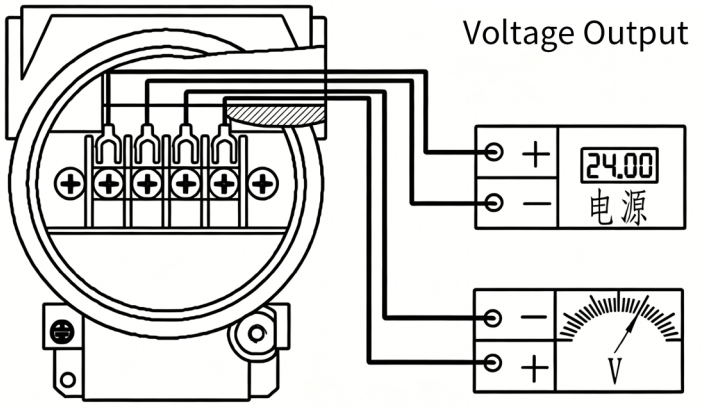
2. Avoid High-Voltage Interference
Transmitter signal cables must not be routed in the same conduit or cable tray as power lines from variable frequency drives, contactors, or high-power motors. Maintain a safety distance of at least 1 meter from high-power electrical equipment to prevent electromagnetic interference from causing level value drift or fluctuations.

3. Do Not Handle Capillary Tubes Roughly
Strictly avoid kinking, bending, stepping on, or crushing the stainless steel capillary tube with heavy objects to prevent blockage of the internal pressure medium, which could cause measurement failure.
Do Not Block Heat Dissipation in High-Temperature Conditions
The transmitter’s heat dissipation section must not be wrapped in insulation or enclosed; it must remain ventilated to allow heat dissipation. Failure to do so may result in high-temperature conduction damaging the electronic components of the transmitter head.

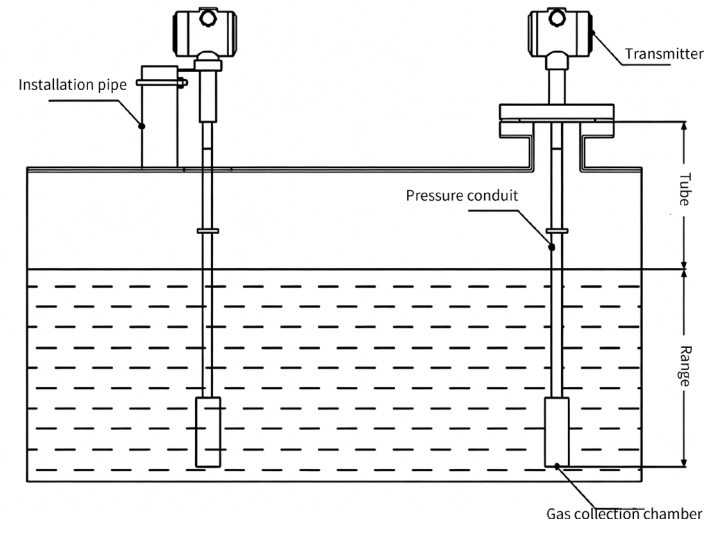
4. Protective Measures for Humid Outdoor Environments
In outdoor, open-air, or splash-prone environments, install a rain and sun shield over the transmitter head. Ensure the cable entry port is securely tightened with a waterproof gland and properly sealed. In environments with prolonged high humidity, regularly inspect the housing seal to prevent condensation and water ingress from causing malfunctions.

5. Prohibition of Unauthorized Modifications in Explosion-Proof Environments
It is strictly prohibited to drill holes in explosion-proof enclosures, alter internal wiring, or replace parts with non-original components. Doing so will invalidate the explosion-proof rating, create significant safety hazards, and result in failure to pass safety inspections.





Installation



VII. Recommendations for Daily Use and Maintenance
This module is tailored specifically for the Qidian QDY60B (2088 Stainless Steel High-Temperature Split-Type Level Transmitter). It focuses on three core principles—long-term stability, precise measurement, and fault prevention—and is designed to leverage the device's high-temperature resistance, stainless steel corrosion resistance, and split-type structure. It covers the full lifecycle of operation and maintenance, addressing both standard operating conditions and extreme environments (high temperatures, corrosion, and high humidity), thereby reducing failure rates and extending the equipment's service life.

7.1 Key Points for Daily Inspections (Performed daily/weekly; 5-minute quick check)
Inspection Focus: Monitor real-time operating status, environmental adaptability, and hardware integrity to identify latent faults early and prevent sudden shutdowns.

1. Signal Stability Monitoring
Daily: Check secondary instrument/PLC display values to confirm that the 4–20 mA current signal shows no jumps or drift (fluctuation range ≤ ±0.5% FS) and that RS485 communication has no packet loss or garbled data.
Compare the actual on-site liquid level with the instrument display; ensure there is no significant deviation. If signals remain unchanged or undergo sudden changes, prioritize investigating medium turbulence or bubble interference before flagging the abnormal trend.
Observe the transmitter indicator lights: the PWR light should be steady (power supply normal), the ALM light should show no alarm (no fault triggered), and the communication indicator lights on the separate display unit and probe should be flashing normally.

2. Temperature, Humidity, and Environmental Compatibility Check
High-temperature conditions (≤120°C): Inspect the probe surface weekly for coking or carbonization; ensure the display unit's ambient temperature is ≤60°C; avoid direct sunlight or high-temperature radiation (such as proximity to steam pipes).
Humidity and Corrosive Environments: Inspect the junction box and cable connectors for condensation or water ingress; ensure the 316L stainless steel housing is free of rust or oxidation. In environments with acidic or alkaline media, verify that the probe has no corrosion spots and that the welds are leak-free.
Installation Location Inspection: The probe should be suspended vertically, 50–100 mm above the tank or tank bottom, with no silt or debris covering the pressure tap; keep it away from inlets, outlets, and agitators to avoid measurement fluctuations caused by turbulent flow.

3. Hardware and Accessories Integrity Check
Cable Condition: No damage, aging, or signs of pulling; avoid prolonged exposure to direct sunlight for PU cables; for split-type signal cables, ensure no crushing or kinking, and that the shielding layer is not exposed.
Wiring and Sealing: Terminals are securely fastened with no looseness; the sealing gasket in the junction box shows no hardening or cracking, and the protection rating is maintained at IP67/IP68; in explosion-proof environments, ensure explosion-proof connectors are undamaged and properly sealed.
Mounting Brackets: The meter and probe must be securely fastened with no looseness or abnormal vibration noises; in high-temperature environments, brackets must show no deformation and welds must have no cracks.

7.2. Regular Maintenance Plan (Categorized by operating conditions, standardized implementation)
1. Cleaning Cycle (Customized by medium type, focusing on preventing clogging and corrosion)
Clean Water / Purified Water Conditions: Clean once every 3 months to remove surface dust and scale from the probe.
Wastewater / Slightly Contaminated Conditions: Clean once every 1–2 months, focusing on removing debris from the pressure tapping ports.
Slurry / Viscous Media (e.g., chemical slurries): Clean once every 2–4 weeks to prevent sludge buildup and blockage of the pressure tapping ports.
High-temperature oil contamination / crystallization conditions: Clean once a month to prevent oil residue from carbonizing or crystals from adhering to the diaphragm.

2. Cleaning Procedure (Take strict precautions to avoid damaging the pressure-sensing diaphragm, the core sensitive component of the QDY60B)
Disconnect power before removing the probe. Use a soft-bristle brush and clean water to rinse off surface dirt; for stubborn stains, soak in a neutral detergent for 5–10 minutes, then gently wipe with a soft cloth.
Pressure port cleaning: Fill the port halfway with trichloroethylene or alcohol, soak for 5 minutes, then gently shake; repeat 2–3 times; Never use metal tools or hard objects to scrape or poke the surface, as this may deform or damage the diaphragm.
High-temperature coking cleaning: Soak in a specialized high-temperature cleaner, then wipe with a soft cloth; do not scrape off forcefully. After cleaning, rinse with clean water, let dry completely, and then reinstall.
Cable and connector cleaning: Wipe the cable surface with a dry cloth. Inspect the sealing gasket; replace if aged. Retighten the connector to ensure a watertight seal.

3. Wiring and Fastening Inspection (Once every 6 months; to prevent loosening and poor contact)
After powering down, open the junction box and inspect the power and signal terminals to ensure they are secure with no loosening, oxidation, or corrosion; check that the wiring terminals of the split-type meter and probe show no signs of corrosion or burn marks.
Shielded cable handling: Ensure the shield is grounded at one end only, with no short circuits or poor grounding; Ensure cable conduit seals are intact, with no ingress of rainwater or dust.
Grounding system inspection: Transmitter and display unit grounding resistance ≤4Ω; ensure no loose connections or broken wires to prevent static buildup from interfering with signals.

4. Accuracy Retest and Calibration (Once every 6–12 months; reduce to 6 months for high-temperature or corrosive environments)
Zero Calibration: With the probe suspended (no medium pressure), adjust the meter's zero potentiometer or use software settings to ensure the output is 4 mA.
Span Calibration: Place the probe in a known standard liquid level (e.g., a calibration tank) corresponding to full-scale pressure, and adjust to 20 mA; in high-temperature conditions, calibration must be performed at operating temperature to compensate for temperature drift.
Linearity Verification: Select 3–5 intermediate liquid level points for testing; error ≤ ±0.1% FS. Record data after calibration and retain the calibration report.
Signal Verification: Measure the 4–20 mA current with a multimeter and compare it with the secondary instrument; recalibrate if the deviation exceeds ±0.5%.

7.3 Long-Term Maintenance Tips (Suitable for the QDY60B's high-temperature and split-type design to extend service life)
1. Dust and Moisture Protection (Focus on preventing water ingress and condensation, suitable for high-humidity and outdoor environments)
Instrument Housing Protection: Install a rain cover to prevent direct exposure to rain; in high-temperature outdoor environments, add a sunshade to prevent electronic components from aging due to prolonged exposure to sunlight.
Moisture Protection for Junction Boxes: Replace sealing gaskets regularly and place desiccant inside; in environments with severe condensation, use waterproof junction boxes to prevent moisture intrusion and short circuits.
Cable Protection: Route outdoor cables through flame-retardant PVC conduits and ensure waterproof sealing at joints; in high-temperature environments, keep cables away from heat sources to prevent insulation aging and damage.

2. Interference Mitigation Optimization (Focus on preventing electromagnetic interference in split-type structures to ensure signal stability)
Wiring Standards: Maintain a distance of ≥30 cm between signal cables and high-voltage cables (e.g., power lines), and avoid parallel routing; when crossing, use perpendicular crossings to reduce electromagnetic coupling interference.
Shield Grounding: Ground the shield at one end and leave the other end floating to prevent ground loop interference; ensure the shield of split-type signal cables is continuous throughout, with no damage or breaks.
Filter Protection: Install EMI filters on the power supply side to suppress grid voltage fluctuations; in strong electromagnetic environments (e.g., near variable frequency drives), use isolated signal converters to block interference signals.

3. Specialized Protection for Extreme Environments (Suitable for High-Temperature, Corrosive, and Vibration Scenarios)
High-Temperature Environments (≤120°C): Select probes made of 316L stainless steel to prevent high-temperature oxidation; position the display unit away from heat sources, with ambient temperatures ≤60°C, and install heat sinks if necessary.
Corrosive Environments (Acids, Alkalis / Salt Spray): Regularly inspect the probe surface; repair minor corrosion with a specialized anti-corrosion coating; replace the probe in cases of severe corrosion, giving priority to PTFE-coated models.
Vibration Environments (e.g., near mixing tanks or pumps): Install vibration-damping brackets on the probe and display unit; allow slack in the cable to prevent breakage from vibration-induced pulling; regularly inspect mounting bolts to prevent loosening.
Explosion-Proof Environments: Strictly adhere to explosion-proof regulations; regularly inspect explosion-proof connectors and seals for damage or aging; perform maintenance with power disconnected; never open the cover while the unit is energized.

4. Long-Term Storage and Maintenance (Protection during equipment downtime to prevent damage)
Clean the probe surface and store it after drying to prevent rust caused by damp environments; seal pressure tapping ports to keep them dust-free and prevent debris from entering.
Organize and coil the cable to avoid kinks or crushing; store in a dry, well-ventilated area away from high temperatures and corrosive media.
Disconnect the power supply to the meter, replace the internal desiccant with a new one, and seal the terminal box to prevent moisture ingress; if idle for an extended period (over 6 months), recalibrate the accuracy before reuse.

VIII. Troubleshooting & Emergency Response
Precise fault localization and standardized procedures enable on-site self-diagnosis and repair, reducing downtime and minimizing production losses. Designed with dedicated fault logic tailored for split-type structures, 2088 explosion-proof enclosures, and high-temperature-resistant stainless steel probes.

8.1 List of Common Faults
The instrument has no output signal, and the downstream PLC or secondary instrument displays no values
Level signal drift, value jumps, or unstable fluctuations
Abnormal power/status indicator (not lit, constantly lit, or rapid flashing indicating an error)
Instrument triggers an alarm, and the ALM alarm light remains constantly lit
Signal interference or distortion, erratic value fluctuations, or severe discrepancy with actual liquid level
Full-scale level does not reach 20 mA, or empty-scale level does not return to zero at 4 mA
Gradual value drift after prolonged use in high-temperature environments
RS485 communication failure; unable to read device address or data

8.2. Analysis of Fault Causes
1. Wiring-related faults
Reversed polarity, loose or faulty terminal connections, shielding wire grounded at both ends, high- and low-voltage wiring in the same conduit, damaged or broken shielding layer.

2. Power Supply Faults
Supply voltage below 10 VDC or above 32 VDC; significant power supply fluctuations; power supply short circuit; power distribution load exceeds limits.

3. Signal-Related Faults
Inappropriate range selection, load resistance exceeding specifications, signal overload or out-of-range, reversed polarity of communication lines A/B.

4. Environmental Interference-Related Faults
Proximity to variable frequency drives (VFDs) or high-power motors,

strong electromagnetic radiation, ground loop interference, bubbles or turbulent flow in the tank medium impacting the probe.

5. Operating Conditions and Installation-Related Faults
Probe buried in sludge or debris; kinked or bent capillary tube; blocked heat dissipation; increased temperature drift due to prolonged high temperatures.

6. Equipment Damage-Related Faults
Corrosion or damage to the pressure-sensing diaphragm; aging or moisture-damaged internal circuitry; water ingress or condensation in the 2088 housing; permanent zero-point drift of the sensor.

8.3 Step-by-Step Troubleshooting
1. Fault 1: Instrument has no output, no signal, and no display
Troubleshooting Steps
① First, verify that the on-site power supply is normal and measure whether the terminal voltage is within the 10–32 VDC range;
② Check whether the power supply positive and negative terminals are reversed and whether the terminals are loose or oxidized;
③ Inspect the cable for breaks and check whether water has entered the waterproof connector, causing corrosion of the terminals;
④ For split-type models, check if the capillary tube is severely kinked or if pressure transmission is interrupted;
⑤ Check if the downstream PLC analog module is damaged or if any channels are burnt out.
Repair Measures
Correct the positive and negative terminal connections, tighten the terminals, and replace damaged cables; remove condensation and water from the junction box and reseal it; if the capillary tube is permanently kinked and cannot be restored, replace the entire capillary tube assembly.
Emergency Workaround
Temporarily switch to a backup instrument channel and activate a spare QDY60B transmitter with the same measurement range for temporary use, ensuring continuous production line operation is not affected.

2. Fault 2: Signal Drift, Slow Value Shift, and Zero Point Inaccuracy
Troubleshooting Steps
① Check whether the pressure-sensing diaphragm of the probe is covered by silt, impurities, or scale;
② Verify whether the ambient temperature has been consistently exceeding the instrument's tolerance range, and whether heat dissipation is obstructed;
③ Check whether prolonged vibration has caused internal parameter drift;
④ Confirm whether zero-point and full-scale calibrations have been performed regularly.
Remedial Actions
Disconnect power and remove the probe; gently clean scale and debris from the diaphragm surface with neutral water; Clear any obstructions around the meter head to ensure proper heat dissipation and ventilation; perform zero-point and full-scale calibration again, then lock the parameters.
Emergency Workaround
Temporarily lock the current stable reading as a process reference; perform cleaning and precise calibration during the next scheduled shutdown window.

3. Fault 3: Abnormal Indicator Light Status
Troubleshooting Steps
Power light is off: No power supply, open circuit, or damaged internal power board;
Power indicator is constantly on but no communication: Wiring is normal, instrument is operating normally, but downstream communication parameters do not match;
Alarm indicator is constantly on / flashing rapidly: Out-of-range, temperature limit exceeded, hardware failure, or short circuit.
Remedial Actions
Restore stable power supply and check for circuit breaks; re-configure RS485 address and baud rate; in cases of out-of-range conditions, replace with a transmitter of appropriate range to avoid long-term overload.
Emergency Workaround
Disable alarm notifications; conduct manual on-site inspections to read measurements and maintain basic liquid level monitoring.

4. Fault 4: Instrument alarm triggered; ALM alarm remains on
Troubleshooting Steps
① Verify whether the actual liquid level exceeds the upper or lower limits of the set range;
② Check whether the medium temperature exceeds the 150°C high-temperature limit;
③ Check for short circuits in the wiring or signal circuit overload;
④ For explosion-proof models, check if the safety barrier is improperly matched.
Remedial Actions
Replace with a model suitable for a wider measurement range; reduce the medium's operating temperature or upgrade to a custom high-temperature model; resolve the short circuit fault and re-match the isolation safety barrier model.
Emergency Workaround
Temporarily monitor the liquid level manually on-site, disable automatic interlocks, and avoid unintended shutdowns.

5. Fault 5: Signal interference and distortion, erratic readings, or fluctuating levels
Troubleshooting Steps
① Check whether signal cables are routed in the same conduit as high-voltage power cables or VFD cables;
② Check whether shielded cables are grounded at both ends, causing ground loops;
③ Check whether the probe is located near the inlet or agitator, where it is exposed to liquid turbulence or bubble impact;
④ Check whether there is a reliable ground connection on-site or if ground resistance is too high.
Remedial Measures
Route high-voltage and low-voltage cables in separate conduits or channels, maintaining a distance of at least 30 cm; change the shielding wire to single-ended grounding; move the probe to a stable area free of turbulence; re-establish reliable grounding, keeping the grounding resistance within 4 Ω; install a signal isolator in high-interference environments.
Emergency Workaround
Temporarily apply digital filtering and smoothing in the backend software to suppress value fluctuations and ensure stable process control.

6. Fault 6: Empty level does not return to zero; full level does not reach 20 mA
Troubleshooting Steps
① Zero drift caused by long-term use;
② Measurement range settings do not match the actual tank height;
③ Slight scaling on the diaphragm causing pressure sensing deviation.
Remedial Measures
Perform zero-point and full-scale calibration on-site; re-verify and adjust the measurement range parameters; Clean the pressure-sensing diaphragm of the probe.

8.4. After-Sales Repair Guidelines
1. Failure Determination Criteria (Report for repair immediately if any of the following conditions apply)
The unit appears intact, wiring and power supply are normal, yet there is still no output or display for an extended period;
After cleaning, calibrating, and checking the wiring, the readings still drift severely and cannot be corrected;
Water ingress or condensation inside the meter, corrosion or perforation of the housing, or obvious damage to the diaphragm;
The capillary tube is broken, pressure transmission has failed, and on-site repair is not possible;
The explosion-proof housing has been damaged without authorization, the internal circuitry is burned out, or the indicator lights are completely non-functional.

2. Required Information for Service Requests
Please prepare and provide the following in advance: Product model QDY60B, measurement range specifications, output signal type, purchase date, on-site operating conditions (medium temperature / corrosion type / installation environment), description of the fault symptoms, and photos of the on-site wiring.

3. Repair Process

First, shut down the power on-site to prevent the fault from worsening;

Compile the model, parameters, fault symptoms, and on-site photos;

Contact Anhui Qidian Automation's after-sales service to submit the information for record;

Follow the customer service representative's remote guidance for a secondary troubleshooting; if the issue cannot be resolved, proceed with the return for repair or replacement process;

Return the faulty product according to the instructions, register a work order, and await repair or replacement.

4. Warranty Coverage

Under normal operating conditions and excluding human-caused damage, the entire unit is covered by a one-year warranty;

Warranty coverage includes: circuit failures, natural sensor failure, and performance deviations from factory specifications;

Exclusions from warranty coverage: unauthorized disassembly or modification, burnout due to incorrect wiring, intentional bending or damage to capillary tubes, damage caused by using unsuitable materials in highly corrosive environments, and damage resulting from improper use involving excessive temperature or pressure.