2088 Submersible Split-Type Level Transmitter

I. Product Definition

The QDY60A.11 2088 Submersible Split-Type Level Transmitter is an industrial-grade hydrostatic level measurement device independently developed by Anhui Qidian. It is specifically designed for continuous level monitoring in applications such as liquid storage tanks, reservoirs, and waterways. Through a combination of a "submersible stainless steel probe and a separate 2088 explosion-proof display unit," it achieves precise liquid level measurement, on-site display, and remote signal transmission, making it a core device for liquid level monitoring in industrial automation control systems.
Its core functions cover the following aspects:

1. Precise Liquid Level Measurement
Based on the hydrostatic pressure principle, it converts liquid level height into an electrical signal, with measurement accuracy up to 0.2% FS/0.5% FS, and supports full-range customization from 0–1 m to 0–100 m;
Suitable for water, oil, and mildly corrosive liquids (such as wastewater and acid/alkali solutions). The probe is made of 304/316L stainless steel, with optional anti-corrosion coatings available for highly corrosive media;
Features temperature compensation to eliminate the impact of ambient temperature fluctuations on measurement accuracy, ensuring stable measurement under all operating conditions.

2. Split-Type On-Site Digital Display
The 2088 explosion-proof display unit features a green backlit LCD screen, allowing direct on-site reading of liquid level, percentage, and pressure values (units: MPa or kPa selectable) without the need for additional instruments;
The display unit and probe are designed as separate components; the probe can be immersed in the liquid, while the display unit is installed in a safe area, preventing moisture, corrosion, and the effects of explosive atmospheres from affecting electrical components;
The explosion-proof housing complies with industrial explosion-proof standards and can be directly installed in flammable and explosive environments (such as chemical storage tank areas and gas stations).

3. Standard Industrial Signal Output
Standard 4-20mA current signal output allows direct connection to industrial control systems such as PLCs, DCSs, and digital displays for remote level monitoring and control;
Optional RS485/Modbus-RTU digital signal output supports multi-device networking and is compatible with Industrial Internet of Things (IIoT) applications;
Signal transmission range is long (4-20mA signal transmission distance can exceed 1,000 meters), with strong anti-interference capabilities, making it suitable for complex industrial environments.

4. High Protection and High Reliability Design
The submersible probe features an IP68 protection rating, allowing for long-term immersion in liquids, and is waterproof, dustproof, and resistant to immersion;
The vented cable features a venting structure that connects the probe to the atmosphere, eliminating the impact of atmospheric pressure changes on measurements;
The display unit has an IP65 protection rating, making it dustproof and resistant to water jets, suitable for installation in outdoor, humid, and dusty environments;
Impact- and vibration-resistant design, suitable for high-interference environments such as waterways and wastewater treatment plants.

5. Wide Range of Operating Conditions
Wide power supply range (default DC 12–36 V, typically DC 24 V), compatible with standard industrial power systems;
Wide operating temperature range: Probe medium temperature -40°C to 85°C (optional high-temperature version up to 125°C), display unit ambient temperature -20°C to 70°C;
Supports multiple installation methods: direct immersion, guide rod mounting, and flange mounting, suitable for various scenarios such as storage tanks, water basins, rivers, and deep wells.

II. Working Principle

1. Core Principle: Hydrostatic Level Measurement Principle
We can break down the operation of this transmitter into three steps, which can be simply understood as "converting liquid level height into pressure, then into an electrical signal, and finally into readable data":

Step 1: The probe detects the liquid's static pressure
The pressure sensor at the bottom of the submersible probe is subjected to pressure generated by the liquid above it. The magnitude of this pressure is directly proportional to the liquid level height, as shown by the formula:
$P = \rho \times g \times h$
P: Static pressure generated by the liquid
ρ: Liquid density (e.g., water has a density of 1000 kg/m³)
g: Acceleration due to gravity (a constant value, approximately 9.8 m/s²)
h: Liquid level height
Simply put: The higher the liquid level, the greater the pressure exerted on the probe; the lower the liquid level, the smaller the pressure. The probe uses an internal silicon piezoresistive element to convert this pressure into a weak electrical signal.

Step 2: Signal Transmission and Processing
The probe's electrical signal is transmitted via a vented cable to the separate 2088 display unit:
The vent holes in the cable connect the probe to the external atmosphere, eliminating the impact of atmospheric pressure changes on the measurement (for example, differences in atmospheric pressure between cloudy and sunny days can affect pressure readings; the vented structure offsets this error);
The signal conditioning circuitry inside the display unit amplifies, temperature-compensates, and linearizes the weak electrical signal, converting it into a standard industrial signal (such as 4–20 mA);
Simultaneously, the display unit's LCD screen directly displays the processed liquid level value, making it easy for on-site personnel to read.

Step 3: Signal Output and Remote Monitoring
The processed standard signal (4–20 mA or RS485) is transmitted to a PLC, DCS, or digital display control system, which can use the level signal to achieve:
Real-time remote level monitoring;
High/low level alarm control (e.g., automatically stopping the pump when a tank is full, or automatically replenishing water when the level is low);
Data logging and analysis (e.g., trends in storage tank liquid levels, river water level monitoring).

2. Summary of the Complete Workflow
Changes in liquid level → Probe detects changes in hydrostatic pressure → Converts to a weak electrical signal → Transmitted via cable to the indicator → Signal conditioning/temperature compensation in the indicator → On-site digital display + standard signal output → Integrated into the control system to enable monitoring and control

III. Core Value and Solutions to Pain Points

3.1 Overview of Core Product Value
1. Split-type design addresses installation challenges in harsh environments: The probe is immersed in the liquid, while the display unit is installed in a safe area, preventing damage to electrical components caused by moisture, corrosion, or explosive atmospheres;

2. On-site digital display + remote signal transmission for more convenient dual monitoring: Enables both direct on-site readings and remote signal transmission, suitable for unattended and centralized control scenarios;

3. High protection rating + wide operating conditions, suitable for the vast majority of industrial liquid level scenarios: Stable operation from clean water to wastewater, from ambient to low temperatures, and from indoor to outdoor environments;

4. High accuracy + anti-interference, resolving measurement errors in traditional liquid level measurement: Temperature compensation, linearization processing, and anti-interference cables ensure stable measurement in complex environments;

5. Low-cost and easy to install, reducing customer O&M costs: No complex mounting brackets required; ready to use immediately upon installation; simple maintenance with no need for frequent calibration.

3.2 Key Pain Points + Solutions

Pain Point 1: Challenges in Level Monitoring in Explosion-Proof Environments (Chemical Plants, Storage Tanks, Flammable and Explosive Scenarios)

Customer Issue: In explosion-proof environments such as flammable and explosive chemical storage tanks and oil storage areas, standard level instruments lack explosion-proof certification, posing safety risks. Additionally, the need for real-time level data monitoring on-site means that installing a separate digital display increases equipment costs and complicates installation procedures.

Product Solution: This product comes standard with a 2088-type explosion-proof display unit that complies with industrial explosion-proof standards and can be directly installed in various flammable and explosive hazardous environments; Featuring a split, independent design, the measurement probe is submerged directly in the liquid medium while the display unit is installed in a safe, visible area. Equipped with a high-definition backlit LCD screen, it enables real-time on-site level readings without requiring any external auxiliary instruments, effectively addressing both explosion-proof safety and on-site visualization needs.

Direct Benefits for Customers: Completely eliminates safety hazards associated with instrument use in explosion-proof environments, meeting factory safety and compliance requirements; eliminates the costs and labor associated with purchasing and installing additional digital displays, simplifies on-site equipment layout, and reduces equipment failure rates.

Challenge 2: Measurement Failure Due to Corrosion and Contaminated Media (Sewage and Corrosive Liquid Applications)

Customer Issue: In applications such as wastewater treatment, mildly corrosive chemical liquids, and contaminated sewage, conventional level probes are made of inferior materials that are highly susceptible to corrosion by the medium and clogging by impurities in the water. This frequently leads to inaccurate measurements, data drift, and probe damage, necessitating frequent equipment replacement and resulting in extremely high operational and maintenance costs.

Product Solution: The product's probes are standard-equipped with high-quality stainless steel and support customization with 304/316L stainless steel options, making them suitable for clean water, wastewater, oils, and mildly acidic or alkaline corrosive media. The probes feature an anti-clogging structural design that prevents sediment and suspended solids in the water from accumulating and blocking the sensor surface; The entire probe achieves an IP68 ultra-high protection rating, allowing it to be continuously submerged in various liquid media over the long term. It is corrosion-resistant, silt-resistant, and immersion-resistant, making it suitable for complex media conditions.

Direct Benefits for Customers: Significantly reduces the likelihood of probe corrosion, clogging, and damage, greatly extending equipment service life; completely resolves measurement errors caused by medium interference, ensuring long-term stability of level data; reduces the frequency of equipment replacement and maintenance, significantly saving on long-term operational and maintenance costs for consumables and labor.

Challenge 3: Instrument Damage in Harsh Environments (Humidity, Dust, Outdoor Open-Air Settings)

Customer Issue: In environments such as outdoor water tanks, open-air storage tanks, dusty workshops, and damp underground pump rooms, standard level transmitters often have low overall protection ratings. Moisture and dust can easily penetrate the instrument, causing circuit short-circuits, component aging, and frequent equipment failures leading to downtime.

Product Solution: The product features a split-type protective design with dual protection standards for the probe and display unit. The submersible probe offers IP68 full waterproof protection, enabling long-term underwater operation without fear of immersion or water ingress. The display unit is equipped with an IP65 dust and water resistance rating, capable of withstanding outdoor rain, dust accumulation, and humid environments. The core electrical components are concentrated within the display unit, which offers superior protection, keeping them away from liquids and harsh media. This structural design effectively prevents environmental damage to the instrument.

Direct Benefits for Customers: The equipment adapts to various harsh industrial environments, offering resistance to aging and damage with an extremely low failure rate. There is no need for frequent shutdowns for maintenance, ensuring the 24/7 stable operation of the liquid level monitoring system. This enhances production continuity and reduces losses caused by production downtime due to equipment failures.

Challenge 4: Signal Interference and Data Instability Over Long Distances

Customer Issue: In scenarios such as large industrial sites, remote storage tanks, and deep river wells, the distance between the instrument and the central control PLC or DCS system is significant. Conventional level sensors have short signal transmission ranges and poor interference resistance, leading to issues such as signal interruptions, data fluctuations, and reading drift, which cause remote monitoring to fail.

Product Solution: The product comes standard with an industrial-grade 4-20mA current signal output, featuring exceptional resistance to electromagnetic interference. It effectively mitigates interference from factory equipment such as motors and variable frequency drives, ensuring stable signals without drift. It supports ultra-long-distance transmission, with a range exceeding 1,000 meters, making it fully compatible with long-distance cabling in large industrial facilities. Additionally, an optional RS485-Modbus digital signal interface is available, supporting multi-device networking and adapting to centralized industrial IoT management scenarios.

Direct Benefits for Customers: Completely resolves signal interference and data fluctuation issues during long-distance transmission, ensuring remote liquid level monitoring data is accurate, stable, and delay-free; supports centralized automated control in large-scale factories, enables device networking and coordination, and enhances the level of automated control within the facility.

Pain Point 5: The Challenges of Traditional Level Measurement Devices—Numerous Drawbacks and Poor Cost-Effectiveness

Customer Issue: Traditional float-type level gauges feature mechanical moving parts that are prone to jamming, seizing, and malfunction over time, requiring cumbersome maintenance. High-end radar and ultrasonic level instruments come with steep procurement costs, making them extremely cost-ineffective for small and medium-sized projects and increasing equipment investment budgets.

Product Solution: This product utilizes a hydrostatic measurement principle with no moving mechanical parts, eliminating issues such as sticking, jamming, or mechanical failure. Installation is extremely simple—simply submerge the device in the medium to begin operation, requiring no complex mounting brackets or professional commissioning. The purchase price is significantly lower than that of radar or ultrasonic level transmitters, while still offering high precision and stability, making it suitable for the vast majority of standard level measurement scenarios.

Direct Benefits for Customers: Completely eliminates mechanical failure issues, resulting in virtually zero maintenance costs and significantly reducing the workload associated with manual commissioning and maintenance; achieves high-precision, stable industrial-grade level monitoring at an extremely low equipment cost, substantially improving the cost-effectiveness of project equipment and saving on project budgets.

Challenge 6: Measurement Errors and System Malfunctions Caused by Temperature Fluctuations

Customer Issue: In outdoor industrial environments with significant seasonal temperature variations, frequent changes in ambient and medium temperatures occur. Conventional level sensors lack temperature compensation capabilities, leading to significant measurement deviations due to temperature fluctuations. This can easily trigger false alarms, erroneous pump starts/stops, and disrupted level control, thereby compromising production safety.

Product Solution: The product's core sensor chip incorporates a high-precision temperature compensation chip, while the display unit employs specialized signal conditioning algorithms. These enable real-time dynamic temperature compensation and data linearization based on ambient and medium temperatures, effectively eliminating measurement

errors caused by temperature fluctuations. The system achieves a measurement accuracy of up to 0.2% FS, ensuring stable and precise data across the entire temperature range and eliminating data drift.
Direct Benefits for Customers: Completely resolves measurement errors caused by temperature variations, prevents false alarms and operational errors in liquid level control systems, ensures precise and reliable automated equipment control, and mitigates production failures and safety hazards resulting from data inaccuracies.

Pain Point 7: Poor Adaptability to Multiple Scenarios and Cumbersome Selection Process
Customer Challenge: In diverse scenarios such as factory water tanks, deep wells, chemical storage tanks, oil storage tanks, and sewage tanks, the medium, measurement range, and installation conditions vary significantly. Conventional level gauges have fixed ranges and limited installation options, making them unsuitable for multi-scenario applications. This results in a cumbersome selection process and poor equipment versatility.
Product Solution: This product supports full-range customization, with measurement ranges spanning from 0–1 m to 0–100 m, making it suitable for various liquid level scenarios such as shallow water tanks, deep wells, and large storage tanks. Probe materials can be selected as needed to accommodate clean water, wastewater, oil, and mildly corrosive media. It supports multiple installation methods, including direct immersion, guide rod mounting, and flange installation, providing a one-stop solution for liquid level monitoring across all industries, including residential, industrial, chemical, and water conservancy.
Direct Benefits for Customers: A single device meets multiple liquid level measurement needs across a facility, eliminating the need for separate selection and procurement for different operating conditions and simplifying the selection process; the device offers high versatility, with universal spare parts and easy replacement, significantly reducing corporate costs for equipment procurement and spare parts inventory.

Pain Point 8: The Challenge of High Overhead Costs from Dual On-Site and Remote Monitoring
Customer Issue: In scenarios such as unmanned pump stations, remote storage tanks, and water conservancy channels, there is a need for both on-site personnel to view liquid level data locally and for the central control room to monitor and manage remotely. Purchasing on-site digital displays and liquid level transmitters separately results in high cumulative procurement and installation costs, as well as complex wiring.
Product Solution: This product integrates both on-site digital display and remote signal transmission functions into a single unit. It features a built-in high-definition backlit LCD screen that displays real-time liquid level data, percentage, and pressure readings on-site. Simultaneously, it outputs standard industrial signals (4-20mA/RS485), enabling direct integration with central control systems, PLCs, and DCS. A single device thus achieves both on-site readings and remote centralized monitoring.
Direct Benefits for Customers: There is no need to purchase additional digital displays; a single unit replaces the functions of two separate devices, significantly reducing costs associated with equipment procurement, wiring, installation, and commissioning. The high level of integration and simplified wiring result in lower failure rates, making it ideal for unmanned, automated control environments.

IV. Key Product Parameters & Specifications
4.1 Basic Electrical Parameters
Measurement Principle: Diffused silicon hydrostatic level measurement
Measurement Range: 0–1 m, 0–2 m, 0–5 m, 0–10 m, 0–20 m; customizable up to 0–100 m
Measurement Accuracy: Standard 0.5% FS; high-precision option available at 0.2% FS
Non-linearity Error: ≤±0.1% FS
Hysteresis Error: ≤±0.1% FS
Repeatability Error: ≤±0.05% FS
Temperature Drift: ≤0.015% FS/°C
Output Signal: Standard 4–20 mA DC analog signal; optional RS485 Modbus-RTU digital signal
Load Capacity: Maximum load resistance for 4–20 mA output ≤600 Ω
Display: 2088-segment LCD backlit digital display, switchable between liquid level height, percentage, and pressure values
Response Time: ≤100 ms
Atmospheric Compensation: Built-in venting cable automatically compensates for atmospheric pressure changes, eliminating measurement reference errors caused by static pressure

4.2 Isolation Performance Parameters
Electrical Isolation Method: Optical isolation between signal circuits and the housing, as well as between signal circuits and the power supply
Isolation Withstand Voltage: Insulation withstand voltage between input, output, and power supply: AC 1500V for 1 minute without breakdown
Insulation Resistance: ≥100 MΩ (DC 500V)
Common-Mode Rejection Ratio: ≥60 dB
Interference Resistance Rating: Suitable for environments with strong electromagnetic interference from industrial variable-frequency drives and motor start/stop operations; signals exhibit no drift or spiking
Intrinsically Safe Isolation Compatibility: Can be used with industrial safety barriers to achieve intrinsically safe explosion-proof isolation; no signal attenuation in the isolated circuit
Signal Isolation Characteristics: Modular design ensures electrical independence; the probe's measurement end is electrically isolated from the 2088 meter's display end, eliminating ground loop interference

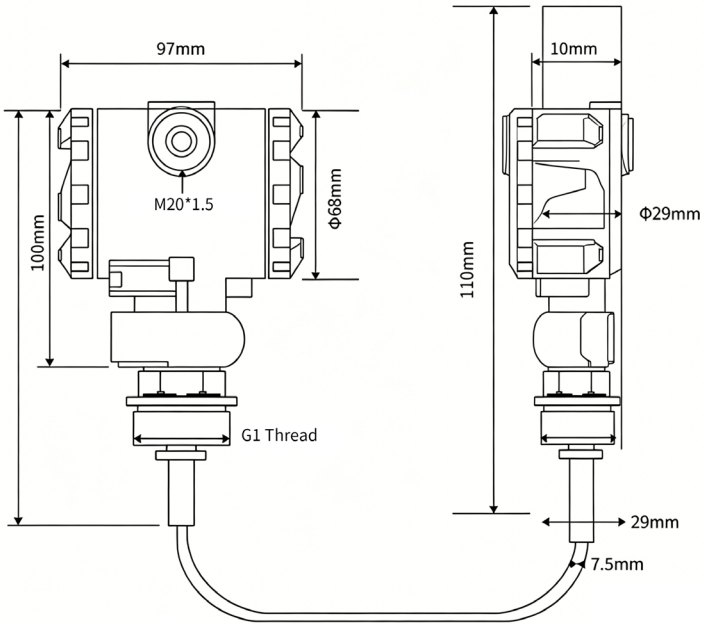
4.3 Power Supply & Power Consumption Parameters
Standard Supply Voltage: DC 24V (Common industrial power supply)
Wide Power Supply Range: DC 12V–36V, fully compatible
Polarity Protection: Supports reverse polarity protection; will not burn out the circuit
Full-Load Power Consumption: ≤1.2W
Standby Power Consumption: ≤0.8W
Power Distribution Output: No additional external power distribution output; pure measurement and transmission type; the entire unit draws power from a centralized on-site DC 24V supply
Power-up Time: ≤3s; enters normal measurement display mode

4.4 Environmental Adaptation Parameters
Medium Operating Temperature: -40°C to +85°C; optional high-temperature custom version up to 125°C
Instrument Operating Temperature: -20°C to +70°C
Storage Temperature: -45°C to +85°C
Operating Relative Humidity: 5% RH to 95% RH, non-condensing
Probe Protection Rating: IP68 (suitable for long-term full immersion in liquids; no water ingress during prolonged underwater operation)
Indicator Housing Protection Rating: IP65 (dust-proof, rain-proof, and resistant to water jets; suitable for outdoor and dusty workshop environments)
Explosion-Proof Rating: 2088 Explosion-Proof Indicator, Flameproof Type Ex d IIC T6 Ga
Compatible Safety Barrier Models: Standard configuration supports intrinsically safe Zener safety barriers and isolating safety barriers; can be directly integrated into chemical explosion-proof systems
Vibration Resistance: Complies with GB/T 13850 standard; operates normally in vibration environments from 10 to 1000 Hz
Altitude Compatibility: Can be used normally in high-altitude environments up to 4500 m

4.5. Physical Parameters
1. Installation Methods
Submersible direct immersion installation (standard)
Guide rod mounting
Flange mounting (custom flanges available)
Split-type wall-mounted / pipe-mounted: The 2088 display unit supports mounting on DIN rails, pipe walls, and walls
2. Dimensions
Overall dimensions of the 2088 display unit: Length 130 mm × Width 115 mm × Height 75 mm
Submersible Probe Diameter: Φ28mm (standard specification)
Probe Length: Standard 120mm, customizable upon request
Signal Cable: Standard 10m, extendable to meet on-site requirements
3. Total Weight
Standard Configuration (Head + 10m Cable + Probe): Approx. 1.1kg
4. Housing Material and Protection Details
2088 Display Unit Housing: Die-cast aluminum alloy explosion-proof housing with electrostatic powder coating for corrosion resistance
Probe Body Material: Standard 304 stainless steel; optional 316L stainless steel for corrosive media such as acids, alkalis, sewage, and oils

Pressure-sensing Diaphragm: 316L stainless steel diaphragm, resistant to oil contamination, mild corrosion, and media adhesion
Seal Material: High-temperature and corrosion-resistant fluororubber sealing gasket, resistant to aging and prolonged immersion in media
Vent Cable: Specialized breathable, waterproof cable with an inner venting structure and an outer oil-resistant, anti-aging sheath
Structural Protection Details: Fully sealed potting process protects internal circuits against moisture, condensation, and dust ingress; a split-type design isolates the liquid from the electrical meter head, significantly extending the overall service life





V. Application-Specific Selection Guide

5.1 Key Selection Criteria

1. Signal Type Selection

If the site uses a traditional PLC/DCS control system and requires direct connection to digital displays or secondary instruments, prioritize the standard 4–20 mA DC current signal version. This version is compatible with the vast majority of industrial sites, offers strong interference resistance, and ensures stable transmission;
If the site uses Industrial Internet of Things (IIoT), involves multi-device networking, requires integration with SCADA systems, or necessitates remote digital monitoring and control, prioritize the RS485 Modbus-RTU digital signal version. This supports bus-style connections for multiple devices, allows direct reading of level data and equipment status, and facilitates centralized data management;
For special scenarios requiring the HART protocol or 0-5V/0-10V voltage signals, please contact us for custom adaptation. By default, we recommend the two mainstream signal types: 4-20mA or RS485.

2. Channel Selection

This product is a single-channel level measurement transmitter. A single unit supports only one level signal input, making it suitable for monitoring a single storage tank, a single water tank, or a single deep well;
If there is a need for centralized monitoring of multiple tanks or pools on-site, multiple independent transmitters can be networked and connected to the system via an RS485 bus, or a custom multi-channel centralized acquisition module can be used to enable a single host to collect data from multiple liquid level sources.

3. Power Supply Selection

The standard power supply in industrial environments is 24 V DC. This product supports a wide range of DC voltages from 12 V to 36 V. The 24 V DC version is recommended as it is compatible with the power distribution circuits of most PLCs and DCS systems, eliminating the need for an additional power supply module;
If DC power is unavailable on-site (e.g., remote river channels or off-grid outdoor locations), a custom DC 12V low-power version can be selected to integrate with solar power systems, enabling long-term operation with minimal power consumption;
Direct connection to AC 220V power is strictly prohibited. If AC power is required, an additional DC 24V switching power supply module must be configured to ensure stable power delivery.

4. Selection Based on Explosion-Proof Requirements

If the site is a flammable and explosive hazardous area (such as chemical storage tank areas, gas stations, oil and gas depots, or pulverized coal silos), the 2088 explosion-proof version must be selected. The product features an explosion-proof enclosure and holds explosion-proof certification, allowing direct installation in Zone 1 and Zone 2 hazardous environments; however, it must be used in conjunction with a corresponding explosion-proof safety barrier;
If the site is a standard non-explosive area (such as clean water tanks, non-explosive zones in wastewater treatment plants, or general industrial workshops), the general-purpose non-explosion-proof version can be selected to reduce equipment procurement costs;
For intrinsically safe applications, intrinsically safe probes can be customized to work with intrinsically safe barriers, meeting higher levels of explosion-proof compliance requirements.

5. Selection Based on Installation Environment

If the medium consists of conventional liquids such as clean water, wastewater, or oils, with no strong corrosion or high temperatures, the standard 304 stainless steel probe version with IP68 protection can be selected for immediate use;
If the medium consists of weak acids or alkalis, or corrosive liquids (such as chemical wastewater or pharmaceutical waste liquids), select the 316L stainless steel probe version, which offers superior corrosion resistance and extends the equipment's service life;
If the medium temperature exceeds 85°C (such as high-temperature wastewater or hot water storage tanks), select a custom high-temperature probe version compatible with medium temperatures ranging from -40°C to 125°C; simultaneously, verify the cable's high-temperature resistance rating;
If the installation environment is outdoors, in open areas, or in dusty conditions, ensure the display unit is installed in a location protected from rain, sunlight, and dust, or opt for a rainproof cover to shield the display unit from harsh environmental conditions.

6. Range Selection

The measurement range must be selected based on the actual liquid level height at the site. It is recommended that the actual liquid level height be within 30% to 80% of the transmitter's full scale range to avoid reduced measurement accuracy at low levels due to an excessively large range, or the inability to measure when the liquid level exceeds the range due to an excessively small range;
If the site experiences water level fluctuations or surge waves (e.g., in rivers or reservoirs), select a range that is 10%–20% higher than the

maximum liquid level to provide a safety margin and prevent probe damage due to overpressure.

5.2. Recommended Selection for Industry Applications

1. Chemical Industry Applications

Typical operating conditions: Chemical raw material storage tanks, acid/alkali waste liquid tanks, and reactor level monitoring, where the medium contains weakly corrosive substances and poses flammable and explosive risks;

Recommended Model: QDY60A.11 2088 Explosion-Proof Version, 316L stainless steel probe, 4–20 mA signal + optional RS485, to be used with explosion-proof safety barriers;

Advantages: The explosion-proof display meets the requirements for use in hazardous areas; the 316L probe resists medium corrosion; the split-type structure prevents electrical components from coming into contact with corrosive media, ensuring long-term stable operation.

2. Power Industry Applications

Typical operating conditions: Level monitoring in power plant fresh water tanks, circulating water tanks, condensate tanks, and wastewater treatment systems; strong on-site electromagnetic interference; 24 V DC power supply system;

Recommended model: QDY60A.11 2088 General-purpose / Explosion-proof version, 304 stainless steel probe, standard 4-20 mA signal;

Compatibility Advantages: The 4-20mA signal offers strong resistance to electromagnetic interference, making it suitable for high-interference environments such as power plant variable frequency drives and motor start-stop systems; the wide power supply range is compatible with power plant 24V DC distribution circuits; and the IP65-rated housing protects against the damp and dusty conditions typical of power plants.

3. Metallurgical Industry Applications

Typical operating conditions: Level monitoring in metallurgical wastewater tanks, cooling water tanks, and slurry tanks; media contains impurities and wastewater; harsh on-site environments with high dust levels;

Recommended model: QDY60A.11 2088 General-purpose version, 304 stainless steel anti-clogging probe, standard 4-20mA signal;

Advantages: The clog-resistant probe design reduces the risk of blockage by slurry and impurities; IP68-rated probes can withstand long-term immersion in wastewater; the separate display unit is installed in a safe area, preventing dust and moisture corrosion and reducing equipment failure rates.

4. Pharmaceutical Industry Applications

Typical operating conditions: Level monitoring in purified water storage tanks, water-for-injection tanks, and pharmaceutical wastewater tanks; media is clean or contains weakly corrosive substances; high requirements for hygiene standards and measurement accuracy;

Recommended Model: QDY60A.11 2088 General-Purpose Version, 316L stainless steel sanitary-grade probe, high-precision 0.2% FS version, with optional RS485 signal;

Compatibility Advantages: The 316L probe has no sanitary dead zones, making it suitable for pharmaceutical-grade clean media; high-precision measurement meets pharmaceutical process level control requirements; the split-type structure facilitates on-site cleaning and maintenance, preventing cross-contamination.

5. Smart Manufacturing / Industrial Automation Scenarios

Typical Applications: Level monitoring for water tanks on automated production lines, equipment cooling systems, and liquid material storage tanks; requires integration with PLC/DCS for automated control;

Recommended Model: QDY60A.11 2088 General-Purpose Version, standard with 4-20mA signal or RS485 Modbus signal;

Application Advantages: Standard industrial signals connect directly to automation control systems, supporting high/low level alarms and automatic water replenishment/drainage interlock control; the split-type digital display facilitates on-site commissioning and meets the centralized management requirements of smart manufacturing.

6. Water Treatment / Environmental Protection Industry Applications

Typical operating conditions: Clear water tanks in water treatment plants, equalization tanks in wastewater treatment plants, and river water level monitoring; media contains impurities and wastewater; wide measurement range;

Recommended model: QDY60A.11 2088 General Version, with a 304 stainless steel anti-clogging probe; available in custom wide-range versions (e.g., 0–10 m, 0–20 m);

Compatibility Advantages: The clog-resistant probe is suitable for silt and suspended solids in wastewater; the wide-range customization meets the level monitoring needs of rivers and large reservoirs; the IP68-rated probe can operate underwater for extended periods without frequent maintenance.

5.3 Common Selection Misconceptions and Pitfall Avoidance Guide

Misconception 1: Ignoring isolation levels and failing to account for ground loop interference

Symptoms: When multiple transmitters share a common ground, signal drift, data fluctuations, and unstable PLC data readings occur;

Solution: This product comes standard with electrical isolation for input, output, and power supply, with an isolation withstand voltage of 1500 V AC, effectively eliminating ground loop interference; if there are ground potential differences among multiple devices on-site, a version with isolation must be selected to prevent signal loop interference.

Misconception 2: Incorrect signal range selection—range is too large or too small

Symptoms: If the range is set too large, measurement accuracy is insufficient at low liquid levels, making it impossible to accurately detect small changes in liquid level; if the range is set too small, the actual liquid level exceeds the upper limit of the range, causing probe damage due to overvoltage or data overflow;

Solution: When selecting a model, choose the range based on the actual liquid level height and maximum fluctuation range at the site. It is recommended that the actual liquid level occupy 30% to 80% of the range, with a safety margin of 10% to 20% reserved to prevent equipment damage from overvoltage.

Misconception 3: Neglecting load matching leads to unstable 4–20 mA signal transmission

Symptoms: When the 4–20 mA signal is transmitted over long distances or multiple instruments are connected downstream, signal attenuation and data fluctuations occur, preventing the PLC from reading the signal normally;

Solution: This product's 4–20 mA signal has a maximum load resistance of ≤600 Ω. When selecting a model, calculate the total resistance of the downstream load (PLC input modules, digital displays, safety barriers, etc.) to ensure the total load does not exceed 600 Ω. If the transmission distance exceeds 500 meters, use shielded cable and ensure proper grounding to minimize signal attenuation.

Misconception 4: Selecting a general-purpose model for explosion-proof environments poses safety hazards

Problem Description: In hazardous areas such as chemical plants and oil/gas storage facilities, using general-purpose, non-explosion-proof transmitters violates safety regulations, creates safety hazards, and will fail explosion-proof certification;

Solution: In explosion-proof environments, you must select the 2088 explosion-proof version of this product and use it with the corresponding explosion-proof safety barrier. This ensures the equipment has explosion-proof certification, meets the requirements for use in hazardous areas, and complies with local safety regulations.

Misconception 5: Ignoring medium corrosiveness and selecting the wrong probe material

Problem: In corrosive media such as acids, alkalis, and chemical waste liquids, using a 304 stainless steel probe results in rapid corrosion, leading to measurement failure and equipment damage;

Solution: When selecting a probe, verify the medium's corrosiveness and temperature. For mildly corrosive media, 316L stainless steel probes are recommended; for highly corrosive media, probes with custom anti-corrosion coatings can be ordered to prevent equipment damage caused by material mismatch.

5.4 Recommendations for Customized Solutions

1. Custom Signal Solutions

To address non-standard signal requirements at the field site, we offer customizable versions supporting the HART protocol, 0-5V/0-10V

voltage signals, Profibus-DP, and other industrial bus signals to integrate with specialized control systems;
If simultaneous output of multiple signals is required (e.g., 4-20mA + RS485 dual signals), a dual-output version can be customized to meet both on-site digital display and remote system connectivity needs.

2. Custom Solutions for Non-Standard Operating Conditions
High-Temperature Applications: When the medium temperature exceeds 85°C, high-temperature probe versions can be customized to accommodate medium temperatures ranging from -40°C to 125°C, complete with high-temperature-resistant cables and protective housing;
Highly Corrosive Applications: For highly corrosive media such as strong acids, alkalis, and organic solvents, PTFE-coated corrosion-resistant probes and fluorinated membrane versions can be customized to enhance the equipment's corrosion resistance;
High-Pressure Conditions: For high-pressure scenarios such as deep water wells and high-pressure storage tanks, high-pressure range versions can be customized, supporting a maximum range of 0–1000 m water column to meet high-pressure measurement requirements;
Sanitary-Grade Conditions: To meet sanitary-grade requirements in the pharmaceutical and food industries, sanitary-grade chuck connections and polished probe versions can be customized to comply with GMP hygiene standards.

4. Multi-Channel Integrated Custom Solutions
Centralized Multi-Tank Monitoring: Customizable multi-channel level data acquisition modules allow a single host unit to connect to multiple submersible level probes, enabling centralized display and signal output for multiple tanks, thereby reducing the number of devices and cabling costs;
IoT Integration Solutions: Customizable split-type versions with LoRa/NB-IoT wireless transmission enable remote upload of level data without cabling, suitable for remote river channels, outdoor ponds, and other scenarios where cabling is impractical;
Explosion-Proof Integration Solution: For chemical industry explosion-proof applications, a combination of intrinsically safe probes and flameproof display units is available. Paired with explosion-proof safety barriers, this solution meets higher-level explosion-proof compliance requirements.

VI. Installation and Commissioning Specifications
6.1 Pre-installation Preparation
1. Verification of Accessories
After unpacking, verify that all accessories are included and ensure there are no missing or damaged items:
QDY60A.11 2088 Split-Type Level Transmitter (including probe, vent cable, and 2088 explosion-proof display unit) ×1
Mounting Bracket / Counterweight ×1
Waterproof Terminal Block, Shielded Cable (Standard) ×1 set
Product Certificate of Conformity, Calibration Certificate, Instruction Manual ×1
Explosion-Proof Sealing Fitting (for explosion-proof models) ×1 set

2. Environmental Check
Medium Environment: Confirm medium temperature (-40°C to 85°C; high-temperature version up to 125°C), corrosion resistance (compatible with 304/316L), and absence of strong impact surges;
Installation Space: Install the probe vertically, with a minimum distance of 50 mm from the tank bottom and 100 mm from the tank wall, away from inlet ports, agitators, and turbulent areas;
Display Unit Environment: Install the 2088 display unit in a dry, well-ventilated area free of strong corrosive gases; the explosion-proof model must comply with Zone 1/2 hazardous area installation requirements;
Electrical Environment: The installation area must be free of strong electromagnetic interference (away from variable frequency drives and large motors), with ground resistance ≤4Ω.

3. Tool List
Electrical tools: Multimeter, wire strippers, Phillips/flathead screwdrivers, electrical tape, crimping pliers;
Installation tools: Spirit level, cable ties, stainless steel clamps, M4/M5 screws (for securing the meter);
Explosion-proof specific: Explosion-proof flexible conduit, sealant (for explosion-proof environments).

4. Safety Precautions
Power must be disconnected in explosion-proof areas; strictly follow the GB3836 explosion-proof installation standards;
Wear a safety harness for high-altitude installation; obtain permits for confined space operations;
Verify that the power is disconnected before wiring; live wiring is strictly prohibited;
Do not step on, crush, or kink the gas-conducting cable; protect the internal gas conduit.

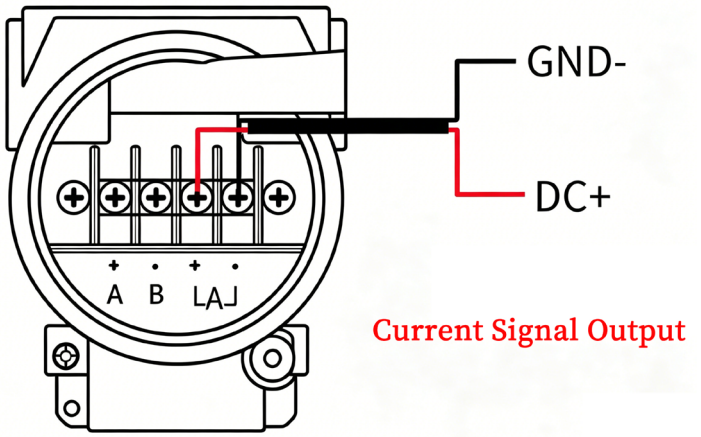
6.2 Standard Installation Steps
1. Mounting the Meter Head (2088 Housing)
Select a vertical wall or mounting bracket and secure the display unit with M4 screws, ensuring it remains level (calibrate with a spirit level) to prevent tilting;
Install the display unit at a height of 1.2–1.5 m above the ground to facilitate commissioning and monitoring;
For explosion-proof models, apply explosion-proof sealant to threaded connections to ensure flameproof sealing;
Position the cable entry downward to prevent rainwater and condensation from entering the junction box.

2. Probe Installation (Submersible Type)
Lower the probe vertically and slowly into the liquid; do not slam it down or let it rest on the bottom. Position it 50–100 mm above the tank bottom;
Secure it with a weight or bracket to prevent drifting or contact with the tank wall, and ensure the diaphragm does not come into contact with debris;
For sewage or media containing impurities, install a Φ45 mm protective sleeve (with holes in the tube wall) to prevent clogging;
Install a U-shaped drain bend in the vent cable to prevent condensation from flowing into the probe.

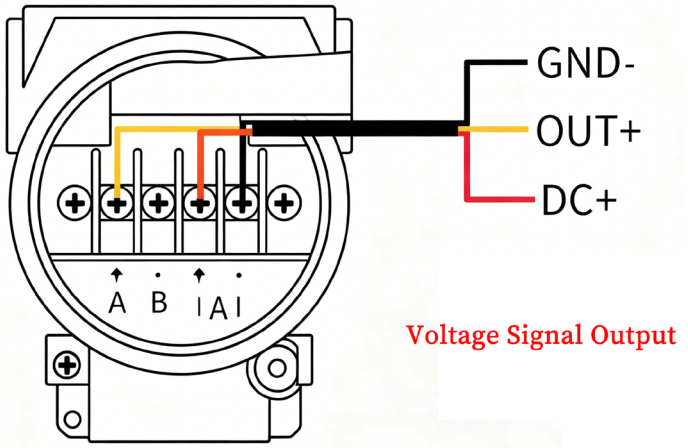
3. Wiring Specifications (Power / Signal / Ground)
Terminal Definitions (2088 Display Unit)
V+: Power supply positive terminal (DC 12–36 V, typically 24 V)
V-: Power supply negative terminal / Signal negative terminal
S+: Signal positive (4–20 mA/RS485)
GND: Ground terminal
SHIELD: Shield terminal
Wiring Procedure
Strip the shielded cable, leaving 3–5 cm of shield exposed, and strip 1 cm of the copper core;
Power connection: Connect the DC 24V positive terminal to V+, the negative terminal to V-, and tighten the terminals;
Signal Wiring: For 4–20 mA signals, connect S+ to PLC/AI+, and S– to PLC/AI–; for RS485 models, connect S+ to A and S– to B;
Grounding Wiring: Connect the GND terminal to the field grounding network (resistance ≤ 4 Ω), and ground the shield at a single point (control room side);
Explosion-proof version: Route the cable through explosion-proof flexible conduit; fill the sealing connector with explosion-proof sealant to ensure explosion-proof sealing.

4. Grounding Requirements
Equipment grounding: Reliably connect the meter's GND terminal to the on-site grounding grid; grounding resistance ≤ 4 Ω;
Shield grounding: Ground the signal cable shield only at a single point on the control room side to prevent ground loops;
Explosion-proof Grounding: Grounding in explosion-proof zones must comply with explosion-proof regulations; the cross-sectional area of the grounding busbar must be ≥16 mm².

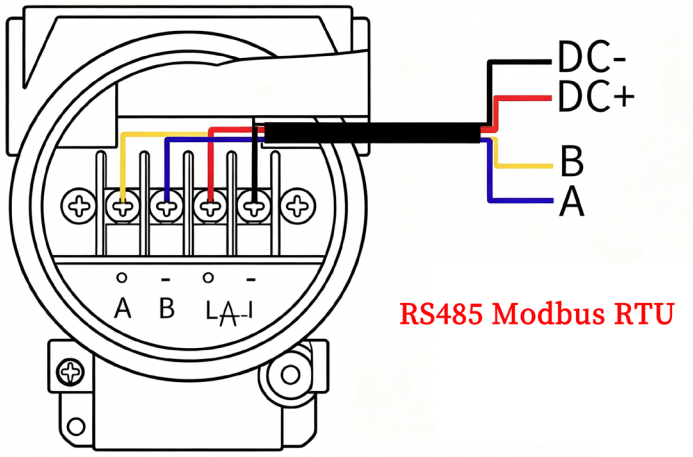
6.3, Wiring Diagram



Current Signal Output



Voltage Signal Output



RS485 Modbus RTU

4. Comparison of Common Wiring Practices (Correct vs. Incorrect) Table

Correct Practice Incorrect Practice Consequences

Shield grounded at one end Grounded at both ends Ground loop interference, signal drift

Power supply V+ connected to positive terminal Positive and negative terminals reversed Transmitter does not operate, no output

Explosion-proof connector properly sealed Inadequate seal Explosion-proof integrity compromised, safety hazard

Vent cable free of kinks Excessive bending Vent tube blocked, inaccurate measurement

6.4 Power-On Commissioning Procedure

1. No-Load Test (Empty Tank Condition)

After confirming correct wiring, apply power and allow the unit to warm up for 5–10 minutes;

Use a multimeter to measure the current between S+ and S–; the standard value should be 4 mA (zero point);

If the deviation exceeds ±0.1 mA, adjust the meter's zero-point potentiometer (ZERO) to 4 mA.

2. Signal Calibration

Slowly fill with water to 100% of the measurement range; the measured current should be 20 mA;

At 50% of the measurement range, the current should be 12 mA to verify linearity;

RS485 Model: Read level data via Modbus communication and compare it with the actual liquid level.

3. Indicator Status Interpretation (2088 Display)

PWR (Power Indicator): Steady = Power supply normal; Flashing = Voltage abnormality / Wiring error;

SIG (Signal Indicator): Steady = Signal normal; Flashing = Signal interference / Fault;

ALM (Alarm Indicator): Off = Normal; Constant = Out of range / Fault.

4. Calibration Methods

Zero Calibration: With the tank empty, press and hold the calibration button for 5 seconds; release after the indicator light flashes to automatically lock the 4mA zero point;

Span Calibration: At full scale, briefly press the calibration button; release after the indicator light flashes to lock the 20mA span;

Accuracy Verification: Repeat high and low liquid level tests 3 times; an error of ≤±0.2% FS is considered acceptable.

6.5 Installation Precautions

1. Never exceed the supply voltage: The supply voltage must not exceed DC 36V, otherwise the circuit board will be damaged; never connect to AC 220V; a dedicated DC 24V power supply is required.

2. Avoid high-voltage interference: Signal cables must be kept at least 300 mm away from power lines when running parallel; they must cross at right angles. Keep the device away from high-magnetic-field equipment such as variable frequency drives, large motors, and transformers.

3. Inadequate Protection in Humid Environments: The meter must not be installed outdoors without rain protection; the junction box must be properly sealed. In humid environments, regularly inspect the sealant to prevent water ingress.

4. Probe Contacting the Tank Bottom or Walls: The probe must not come into direct contact with the tank bottom or walls to avoid diaphragm damage or blockage by impurities, which can lead to measurement errors or failure.

5. Excessive bending of the gas-conducting cable: A bending radius less than 10 times the cable diameter, kinks, or being stepped on can block the internal gas conduit, causing level drift or full-scale failure.

6. Incorrect installation in explosion-proof environments: Non-explosion-proof models must never be used in explosion-proof zones; failure to seal explosion-proof connectors or poor grounding will result in loss of explosion protection.

VII. Recommendations for Daily Use & Operation and Maintenance

7.1 Key Points for Daily Inspections

1. Visual Inspection of Equipment Operating Status

Conduct daily on-site checks to verify that the LCD display on the 2088 meter is functioning normally, with no black screens, distorted displays, frozen readings, or erratic fluctuations. Observe whether the power indicator and operational indicator lights correspond to normal operating conditions, ensuring there is no abnormal flashing or a continuously lit alarm status.

2. Signal Stability Monitoring

Monitor liquid level readings in real-time from the central control room or PLC backend. Observe whether the data is stable without frequent fluctuations or unexplained ups and downs. Record the 4–20 mA current signal or RS485 communication data; if intermittent disconnections or sudden value changes occur, promptly investigate wiring and interference issues.

3. Environmental Temperature and Humidity Monitoring
Periodically check the ambient temperature and humidity in the area where the transmitters are installed to ensure there is no exposure to high temperatures, no condensation or frost, and no high-humidity, stuffy, or enclosed spaces. On the medium side, monitor whether the liquid temperature consistently exceeds the equipment's rated operating temperature to prevent prolonged overheating, which can accelerate component aging.

4. Visual Inspection of Probes and Cables
Check submersible probes for tilting, contact with walls, settling at the bottom, or entanglement with debris. Inspect gas-carrying cables for crushing, kinking, damage, aging, or cracking. Verify that cable routing is not crushed by heavy objects or exposed to corrosive liquids.

5. Inspection of Seals and Protective Measures
Check whether the terminal box of the 2088 transmitter, explosion-proof sealing joints, and cable entry seals are intact, and inspect for water ingress, seepage, dust accumulation, or corrosion and oxidation. For explosion-proof models, pay special attention to ensuring the explosion-proof housing is undamaged, screws are tight, and sealing surfaces show no signs of aging or cracking.

7.2. Regular Maintenance Plan
1. Cleaning Frequency Guidelines
Clean water and purified water environments: Rinse the probe surface and pressure-sensing diaphragm with clean water every 3 months to remove surface deposits;
Sewage, environments containing suspended silt or sand, and chemical wastewater environments: Clean the probe surface monthly to remove accumulated silt and floating debris, preventing diaphragm blockage that could affect measurement accuracy;
2088 Display Unit Housing and Screen: Clean surface dust and oil stains every 2 months to maintain heat dissipation and visual clarity; do not directly rinse the interior of the junction box with water.

2. Wiring Tightness Inspection Schedule
Conduct a comprehensive inspection of all terminal blocks every six months. Tighten the power, signal, ground, and shielding terminals one by one. Check for oxidation, looseness, loose connections, or discoloration due to overheating, and promptly re-crimp or replace aged wire ends. In explosion-proof environments, simultaneously inspect the tightness and sealing of explosion-proof flexible conduits and sealing joints.

3. Recommendations for Accuracy Retesting and Calibration
Standard operating conditions: Perform zero-point and full-scale accuracy retests every 6 months. Verify the 4–20 mA output and on-site display values against the actual liquid level. If the error exceeds the allowable range, perform zero-point and span fine-tuning calibration promptly;
High-precision process, pharmaceutical, and chemical automation applications: Conduct accuracy re-tests every 3 months and retain calibration records to ensure process control stability;
After the equipment has been exposed to thunderstorms, power outages, or strong interference, an additional temporary re-check of accuracy and signal stability is required.
Regular Inspection of Grounding and Shielding Systems
Inspect the equipment's grounding resistance and shield grounding status once a year to ensure grounding resistance ≤4Ω; verify that the shield has no incorrect multi-point grounding or broken/disconnected wires to prevent signal drift caused by ground loops.

7.3 Long-Term Maintenance Tips
1. Dust and Moisture Protection for Long-Term Maintenance
Install the 2088 display unit in a well-ventilated, rain-protected, and shaded location; in outdoor environments, install a dedicated rain and dust-proof cover; seal unused ports on the junction box with sealing plugs to prevent dust and moisture from entering the internal circuitry; During prolonged periods of inactivity, keep the device powered on in standby mode with mild preheating to prevent internal condensation and moisture accumulation; probes that are submerged in liquid long-term do not need to be removed; maintaining normal submersion can reduce diaphragm oxidation and aging.

2. Long-Term Settings for Interference Mitigation
Route signal shielded cables separately throughout the entire installation, maintaining a safe distance from high-voltage power lines; do not bundle them in parallel or run them in the same cable tray. Install filters and grounding measures for high-interference equipment on-site, such as variable frequency drives, large motors, and contactors. When networking multiple transmitters via RS485, ensure proper configuration of terminating resistors to reduce communication interference and data packet loss.
Model-Specific Maintenance Guidelines
Standard Model: Focus on dust and water protection, as well as preventing cable aging; regular cleaning of the probe ensures long-term, stable operation.
2088 Explosion-Proof Model: Do not disassemble the explosion-proof housing without authorization; maintenance and repairs must be performed with the power disconnected; replace aging seals promptly to maintain explosion-proof integrity.
316L Corrosion-Resistant Model: Avoid prolonged contact with strong acids or alkalis exceeding specified limits. Regularly inspect the probe surface for corrosion; if pitting is detected, replace the probe promptly to prevent leakage and damage to the internal core.

3. Special Protection for Extreme Environments
High-Temperature Environments: Avoid prolonged direct sunlight on the meter head. For high-temperature media conditions, use custom high-temperature probes and heat-resistant cables;
Low-Temperature and Freezing Environments: Ensure proper insulation and protection of the instrument head to prevent LCD screen cracking due to freezing and abnormal circuit operation at low temperatures;
Highly Corrosive Industrial Environments: Regularly inspect the powder-coated housing and the probe surface for corrosion. If paint peeling or rust is detected, apply anti-corrosion treatment promptly;
Outdoor Areas Prone to Thunderstorms: Ensure the equipment is reliably grounded. If necessary, install signal and power surge protection modules to prevent damage to the transmitter caused by lightning surges.

VIII. Troubleshooting & Emergency Response
8.1 List of Common Faults
The transmitter has no output signal; the PLC and secondary instruments show no readings.
The level signal drifts; readings fluctuate constantly; levels are unstable, fluctuating between high and low.
Abnormal power indicator on the 2088 display unit: not lit, flashing, or constantly lit (alarm)
High/low level alarms trigger without cause; frequent alarms occur despite no actual level changes
Strong on-site interference causing data distortion, inaccurate readings, or communication disconnections
Display unit shows readings but no 4-20mA/RS485 remote signal output
Level locked at full scale; readings do not follow actual level changes
Accuracy deteriorates after a period of operation, with measurement errors gradually increasing

8.2 Comprehensive Analysis of Failure Causes
1. Wiring-related causes
Reversed power supply polarity, incorrect signal line terminal connections, shield grounded at both ends or not grounded, loose or faulty terminal connections, or exposed wiring causing short circuits.

2. Power Supply Issues
Supply voltage below 12 V DC or above 36 V DC; excessive power supply ripple; insufficient switching power supply capacity; excessive circuit voltage drop causing undervoltage.

3. Signal Load Issues
Too many instruments connected downstream; total load resistance exceeds the transmitter's maximum allowable load; signal attenuation due to excessively long unshielded cables.

4. Environmental Interference Causes
Runs in the same cable tray as power cables; proximity to variable frequency drives (VFDs), large motors, or contactors; significant ground potential differences at the site; or moisture and condensation causing line leakage.

5. Installation-Related Causes
Kinks or compression in the venting cable; blockage in the venting tube; the probe touching the bottom of the tank or being wrapped in debris; or the pressure-sensing diaphragm being blocked by sediment or sand in the medium.

5. Equipment-Related Causes
Aging or damage to the sensing element; moisture or corrosion in the internal circuitry; failure of components in the meter head; or permanent drift caused by prolonged exposure to excessive temperature or pressure.

8.3 Step-by-Step Troubleshooting and Solutions
1. Issue 1: No output from the device; no signal on the backend
Troubleshooting Steps
Visually inspect the power connections to ensure positive and negative terminals are not reversed and that terminals are secure;
Use a multimeter to measure the supply voltage and confirm it is within the normal range of 12–36 V DC;
Check whether the signal terminals S+ and S– are misconnected, have loose connections, or are broken;
Check if the 2088 display unit shows an LCD reading; if no display is present, prioritize checking the power supply.
Resolution
Re-tighten the terminal blocks and correct the connections for power and signal lines; replace the faulty switching power supply; reconnect any broken wires and ensure proper insulation; restart the device after power is restored to resume output.
Contingency Plan
Temporarily replace the transmitter with a spare unit of the same model in the circuit to ensure uninterrupted production line operation.

2. Fault 2: Signal Drift and Unstable Value Fluctuations
Troubleshooting Steps
Check whether the shielded cable is grounded at both ends; change to single-ended grounding at the control room;
Ensure signal lines are kept at a safe distance from high-voltage power lines; avoid running them in close proximity;
Check whether the on-site ground resistance exceeds standards, indicating ground loop interference;
Check whether the probe is entangled with debris or if the diaphragm is clogged with silt.
Resolution Measures
Modify the shield grounding method; rearrange the wiring to keep it away from variable frequency drives and high-power motors; optimize the on-site grounding system; remove the probe to clean the pressure-sensing diaphragm and remove any adhering debris.
Contingency Plan
Temporarily configure digital filtering and smoothing in the control system to stabilize readings temporarily; perform a thorough overhaul of the wiring and grounding during the next scheduled shutdown window.

3. Fault 3: Abnormal indicator lights, screen does not light up / flickers
Troubleshooting Steps
PWR power indicator does not light up: Focus on checking the external power supply, circuit breaker, and circuit breaks;
Power indicator flashing: Low voltage, insufficient power supply capacity, or poor circuit contact;
ALM alarm indicator constantly lit: Out-of-range measurement, probe overloaded due to pressure, or internal circuit malfunction.
Resolution Measures
Replace with a stable 24V DC power supply; tighten all power supply connections; verify if the liquid level exceeds the transmitter's rated range; if out-of-range, replace with a wide-range model; for internal circuit failures, contact after-sales service directly for repair.

4. Fault 4: No actual liquid level changes, frequent false alarm triggers
Troubleshooting Steps
Check if the alarm threshold settings are too close together or if the sensitivity is set too high;
Check if the signal is experiencing false fluctuations due to electromagnetic interference;
Check if the probe is installed in an area with turbulent water flow or subject to wave surges.
Resolution Measures
Re-calibrate the high and low liquid level alarm thresholds and hysteresis parameters; add shielding and isolation to the wiring; relocate and securely mount the probe in a calm, turbulence-free area; optimize anti-interference grounding.

5. Issue 5: Severe interference causing data distortion and communication disconnections
Troubleshooting Steps
Confirm whether the cable is routed in the same conduit or tray as power cables;
Check if the RS485 bus lacks terminating resistors or has excessively long branches;
The on-site frequency converter lacks filtering and grounding, resulting in severe interference radiation.
Resolution
Route high- and low-voltage lines in separate channels; install terminating resistors at both ends of the RS485 bus; add ferrite cores, grounding, and filtering measures to interference-prone equipment; use shielded twisted-pair cables throughout the signal lines.

6. Fault 6: Local display is present, but no 4-20mA/RS485 output via remote communication
Troubleshooting Steps
Normal local display indicates that the probe and power supply are functioning properly; the fault lies in the output circuit;
Check for loose output terminals, broken signal wires, or damage to the downstream module.
Resolution
Re-crimp signal terminals and replace signal cables; inspect the PLC input module for damage and switch to a backup channel if necessary.

7. Fault 7: Level reading locked at full scale; value does not decrease as liquid level drops
Troubleshooting Steps
The vent cable has been kinked or crushed, causing the internal vent tube to become blocked;
The probe diaphragm is completely blocked by silt or oil, preventing normal pressure release.
Resolution
Straighten the vent cable; avoid kinking or crushing it. Remove the probe, clean the diaphragm, and clear the sensing surface. If the cable is damaged or aged, replace it directly with a dedicated vented shielded cable.

8. Fault 8: Accuracy deteriorates and error increases after prolonged use
Troubleshooting Steps
Environmental temperature and humidity have exceeded limits for an extended period, causing condensation and moisture inside the meter;
Probe corrosion or diaphragm aging;
Zero and full-scale calibration has not been performed for an extended period.
Solutions
Ensure the meter head is properly sealed against dust and moisture; replace the probe with a 316L corrosion-resistant model if severe corrosion is present; re-calibrate the zero point and full scale to restore measurement accuracy.

8.4. After-Sales Service Request Guidelines
1. Criteria for Determining Faults and Requesting Service
If any of the following situations occur and cannot be resolved on-site, official after-sales support must be requested:
Power supply is normal and wiring is correct, but the meter head screen remains blank with no display;
No operational abnormalities, yet values continue to drift significantly and corrective measures are ineffective;
Equipment has been struck by lightning, exposed to water, burned out, or physically damaged;
Sensor core is damaged, measurement is completely failed, or errors remain beyond acceptable limits despite repeated calibration;
Explosion-proof housing is damaged or seals have failed, rendering the device unable to meet explosion-proof safety requirements.

2. Standard Repair Procedure
Record the equipment model: QDY60A.11 2088 Submersible Split-Type Level Transmitter, measurement range, output signal, and installation conditions;
Take photos of the on-site wiring, display, and fault symptoms;
Document the time of the fault occurrence, on-site environment, and troubleshooting steps already taken;
Contact the manufacturer’s after-sales service, providing the model, operating conditions, fault description, and photos;
Technical personnel will provide remote troubleshooting guidance; if remote repair is not possible, the unit will be arranged for return-to-factory repair or replacement.

3. Warranty Coverage
Under normal operating conditions and excluding human-caused damage, the entire unit is covered by a one-year warranty;
During the warranty period, circuit failures, sensor element failures, and manufacturing defects will be repaired or replaced free of charge;
Damage resulting from disassembly, unauthorized modifications, overvoltage, physical impact, severe corrosion, misuse, or lightning strikes is not covered by the free warranty; paid repair services are available.

4. Daily After-Sales Recommendations
Retain the product model label, serial number, and calibration parameters;
Keep a spare unit of the same model on-site to ensure rapid replacement in case of sudden failure, maintaining uninterrupted production operations.