启电 sensor Explosion-proof Pressure Transmitter

I. Product Definition

The QDW70A-D stainless steel explosion-proof diffused silicon pressure transmitter is an industrial-grade pressure measurement and signal transmission device developed by Anhui Qidian Automation Technology Co., Ltd. It is specifically designed for applications involving flammable and explosive media or environments, such as those found in the petroleum, chemical, gas, and pharmaceutical industries. Centered around a diffused silicon pressure sensing chip, it utilizes a fully sealed stainless steel structure, explosion-proof certified design, and signal conditioning circuits to accurately convert medium pressure signals into standard industrial electrical signals (such as 4–20 mA current signals or 0–10 V voltage signals). It can be directly connected to industrial control systems such as PLCs, DCSs, and digital displays to enable real-time pressure monitoring, data transmission, and remote control, serving as a core foundational unit in industrial automation pressure measurement and control systems.

Its core functions cover the following areas:

1. High-precision pressure measurement: Based on the diffused silicon piezoresistive effect, it enables continuous and precise measurement of pressure, differential pressure, gauge pressure, and absolute pressure for media such as gases, liquids, and steam. Measurement accuracy can reach up to 0.2% F.S., and it supports customization for a wide range of measurement ranges (e.g., 0–0.1 MPa to 0–100 MPa).

2. Standard Signal Transmission Output: Linearly converts pressure signals into internationally recognized industrial standard signals such as 4–20 mA, 0–5 V, and 0–10 V. Features strong anti-interference capabilities, is compatible with the vast majority of industrial control systems, and enables long-distance signal transmission.

3. Explosion-Proof Safety Protection: Features explosion-proof (flameproof or intrinsically safe) design and holds explosion-proof certification. It operates safely in hazardous explosive gas environments such as Ex d II C T6 Ga, preventing the device itself from becoming an ignition source and ensuring production safety in high-risk conditions.

4. Strong Environmental Adaptability: Featuring a fully stainless steel (304/316L) housing with IP65/IP67 protection ratings, it is waterproof, dustproof, and corrosion-resistant, making it suitable for harsh conditions such as humidity, dust, and corrosive media. Designed for wide-temperature operation, it supports an ambient temperature range of -40°C to 85°C, meeting the demands of both high- and low-temperature industrial environments.

5. Stable Anti-Interference Performance: Built-in electromagnetic interference (EMI) suppression circuits and temperature compensation modules resist electromagnetic interference and temperature drift in industrial environments, ensuring long-term stable and reliable measurement data and preventing control errors caused by data fluctuations.

6. Convenient Installation and Maintenance: Features standard threaded interfaces such as G1/4 and NPT 1/2, compatible with the vast majority of industrial pipelines; The modular design supports quick installation, removal, and calibration, reducing long-term maintenance costs.

II. Working Principle

The core working principle of the QDW70A-D stainless steel explosion-proof diffused silicon pressure transmitter is the complete process of "pressure signal acquisition → physical effect conversion → signal conditioning and amplification → standard signal output," which can be broken down as follows:

1. Pressure Signal Acquisition Stage

The pressure of the measured medium (gas / liquid / steam) is transmitted through the stainless steel isolation diaphragm (316L grade, corrosion- and impact-resistant) at the front end of the transmitter to the internal diffused silicon pressure sensing chip. The space between the isolation diaphragm and the chip is filled with a pressure-transmitting medium such as silicone oil, which not only protects the fragile sensing chip from corrosion and impact by the medium but also transmits the pressure to the chip uniformly and without loss.

2. Physical Effect Conversion Stage

The diffused silicon pressure sensing chip serves as the core "pressure-to-electrical signal converter." Four piezoresistive strain gauges are integrated within the chip, forming a Wheatstone bridge. When pressure is applied to the chip, the silicon crystal undergoes elastic deformation, causing the resistance values of the four strain gauges to change. The originally balanced Wheatstone bridge becomes unbalanced, outputting a weak voltage signal proportional to the magnitude of the pressure. This is the "piezoresistive effect" of diffused silicon, and it constitutes the core operating principle of the entire transmitter.

3. Signal Conditioning and Compensation Stage

The voltage signal output by the chip is very weak and is easily affected by temperature changes (temperature causes the resistance of the silicon crystal to drift, affecting measurement accuracy). The signal conditioning circuit inside the transmitter amplifies and filters the weak voltage signal. At the same time, through the built-in temperature compensation module, it eliminates errors caused by temperature drift and corrects the signal into a stable, linear standard electrical signal.

4. Explosion-Proof Isolation and Signal Output Stage

The conditioned signal undergoes electrical isolation via an explosion-proof isolation circuit, ensuring that electrical energy is not released to the outside in hazardous environments. Simultaneously, the signal is converted into a 4–20 mA current signal (the most commonly used signal type in industrial settings, offering extremely strong interference resistance and capable of transmission over hundreds of meters) or a voltage signal. This signal is then output via an aviation connector or cable interface to upper-level devices such as PLCs and digital displays, enabling real-time collection and monitoring of pressure data.

III. Core Value and Solutions to Pain Points

3.1 Overview of Core Value

The core value of the QDW70A-D stainless steel explosion-proof diffused silicon pressure transmitter lies in providing a "safe, reliable, accurate, stable, highly adaptable, and easy-to-maintain" integrated pressure measurement and control solution for high-risk, harsh industrial environments, helping customers address core issues such as safety hazards in flammable and explosive environments, data distortion under harsh conditions, equipment susceptibility to damage, and high maintenance costs, thereby ensuring the continuous, safe, and efficient operation of industrial production.

3.2 Key Pain Points and Product Solutions

Pain Point: In flammable and explosive environments, standard pressure transmitters pose safety risks and can easily trigger explosions.

Q: In scenarios such as oil, chemical, and gas stations where flammable and explosive gases or media are present, standard pressure transmitters lack explosion-proof design and may generate electrical sparks during operation. How can they be prevented from becoming ignition sources?

A: The QDW70A-D features a flameproof explosion-proof design and has passed explosion-proof certification. Its housing is constructed of a high-strength stainless steel sealed structure capable of withstanding internal explosion pressures and preventing the outward propagation of flames. The electrical circuit employs an intrinsically safe design that limits energy release, eliminating the generation of electrical sparks. It can operate safely in hazardous environments such as Ex d IIC T6 Ga, thereby eliminating explosion safety hazards at their source.

Challenge: Corrosive media / humid and dusty environments often lead to transmitter corrosion, water ingress, and short service life.

Q: In applications such as chemical processing and wastewater treatment, where media are highly corrosive, or in outdoor/underground conditions that are humid and dusty, standard transmitter enclosures are prone to corrosion and insufficient protection against water ingress, resulting in high replacement costs.

A: The QDW70A-D features a fully 304/316L stainless steel housing and isolation diaphragm, offering excellent corrosion resistance and compatibility with most weak to moderately corrosive media. It also supports IP65/IP67 protection ratings, providing waterproof and dustproof

capabilities that withstand the erosion of humid and dusty environments, significantly extending equipment lifespan and reducing replacement and maintenance costs.

Challenge: Strong electromagnetic interference and significant temperature fluctuations in industrial environments cause transmitter measurement data to drift and become distorted, affecting production control.
Q: In industrial settings, strong electromagnetic interference from equipment such as variable frequency drives and motors, combined with large fluctuations in ambient temperature, causes ordinary transmitters to be easily affected by interference and suffer from severe temperature drift, leading to erroneous PLC control actions?
A: The QDW70A-D features built-in electromagnetic interference (EMI) suppression circuits and a high-precision temperature compensation module. It effectively resists electromagnetic interference in industrial environments while eliminating measurement errors caused by temperature fluctuations. This ensures long-term data stability and excellent linearity, with a measurement accuracy of up to 0.2% F.S., thereby preventing production control errors caused by data fluctuations.

Pain Point: Inconsistent pipeline interface standards across different industrial systems result in poor transmitter compatibility and complicated installation.
Q: With diverse on-site pipe connections and control system signal types, standard transmitters have limited interfaces and fixed signal formats, making direct adaptation impossible and requiring additional modifications.
A: The QDW70A-D supports multiple thread specifications (e.g., G1/4, NPT1/2, M20×1.5), making it compatible with the vast majority of industrial pipelines; It also supports multiple standard signal outputs (4-20mA, 0-5V, 0-10V, RS485, etc.), allowing direct connection to mainstream industrial control systems such as PLCs, DCSs, and digital displays without requiring additional modifications, making installation and adaptation more convenient.

Pain Point: Calibration and maintenance are difficult after transmitter installation, and troubleshooting is time-consuming and labor-intensive, impacting production efficiency.
Q: Once installed on a pipeline, is the transmitter difficult to calibrate and disassemble for maintenance, with complex troubleshooting, and does downtime for maintenance affect production schedules?
A: The QDW70A-D features a modular design that supports quick on-site disassembly and installation, as well as on-site calibration of zero point and span, eliminating the need to return the unit to the factory. The transmitter offers stable long-term performance, a low failure rate, and extended maintenance intervals, reducing the frequency of downtime for maintenance and ensuring continuous production.

Pain Point: Conventional transmitters have a single measurement range, making them unsuitable for pressure measurement requirements across different operating conditions, and resulting in high selection costs.
Q: Pressure ranges vary significantly across different production stages. Since conventional transmitters have fixed ranges, multiple units with different ranges must be purchased, increasing procurement costs and inventory pressure?
A: The QDW70A-D supports wide-range customization, allowing for ranges from 0–0.1 MPa to 0–100 MPa tailored to specific operating conditions. It also supports various measurement types, including gauge pressure, absolute pressure, and differential pressure. A single unit can accommodate multiple operating conditions, thereby reducing procurement and inventory costs.

IV. Key Product Parameters & Specifications
(Note: The following parameters are for the standard configuration of the QDW70A-D stainless steel explosion-proof diffused silicon pressure transmitter. Customization is available based on customer requirements. These parameters are based on industrial-grade products in the same series and industry-standard explosion-proof pressure transmitters, and match the specifications in the product images you provided.)

4.1 Basic Electrical Parameters
Measurement Type: Gauge Pressure (G), Absolute Pressure (A), Vacuum (V), Differential Pressure (D) (customizable)
Measurement Range:
Standard Ranges: 0–0.1 MPa, 0–0.6 MPa, 0–1.0 MPa, 0–1.6 MPa, 0–2.5 MPa, 0–4.0 MPa, 0–6.0 MPa, 0–10 MPa, 0–16 MPa, 0–25 MPa, 0–40 MPa, 0–60 MPa, 0–100 MPa
Vacuum Range: –0.1–0 MPa, –0.1–0.1 MPa, –0.1–0.6 MPa (customizable)
Measured Media: Gases, liquids, steam (media compatible with 316L stainless steel)
Output Signal:
Standard Current Signal: 4–20 mA (two-wire)
Optional signals: 0–5 V, 0–10 V (3-wire), RS485 Modbus-RTU (digital signal)
Accuracy class: 0.2% F.S. (standard), optional 0.1% F.S., 0.5% F.S.
Non-linearity error: ≤±0.1% F.S.
Hysteresis error: ≤±0.1% F.S.
Repeatability: ≤±0.05% F.S.
Temperature Drift: ≤±0.01% F.S./°C (-20°C to 85°C)
Zero Adjustment Range: ±10% F.S.
Span Adjustment Range: ±20% F.S.
Response Time: ≤10 ms (standard configuration; faster response available)

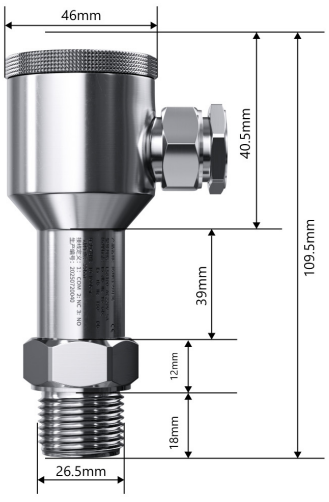
4.2 Isolation Performance Parameters
Electrical Isolation Method: Intrinsically safe / flameproof dual isolation design; electrical isolation between power supply and signal circuits
Isolation Withstand Voltage: ≥1500 V AC (1 minute, leakage current ≤1 mA)
Insulation Resistance: ≥100 MΩ (500 V DC, between housing and power supply / signal circuits)
Electromagnetic Immunity Levels:
Electrostatic Discharge (ESD) Immunity: ±8 kV (contact discharge) / ±15 kV (air discharge), compliant with GB/T 17626.2 standard
Radio Frequency Electromagnetic Field Radiation (RS) Immunity: 10 V/m, compliant with GB/T 17626.3 standard
Electrical Fast Transient Burst Immunity (EFT): ±2 kV, compliant with GB/T 17626.4 standard
Surge (Transient) Immunity: ±1 kV (line-to-line) / ±2 kV (line-to-ground), compliant with GB/T 17626.5 standard
Explosion-proof isolation circuit: Built-in intrinsically safe energy-limiting circuit that restricts output energy to ensure no spark discharge in hazardous environments
Signal transmission immunity: 4–20 mA current signal transmission with strong resistance to common-mode and differential-mode interference; transmission distance ≥1000 m

7.3 Power Supply & Power Consumption Parameters
Supply Voltage:
Standard Power Supply: 12–36 V DC (typical value: 24 V DC)
Intrinsically Safe Power Supply: Requires a safety barrier; intrinsically safe side supply voltage: 18–28 V DC (recommended: 24 V DC)
Full-Load Power Consumption:
4–20 mA Output: ≤0.5 W (24 V DC supply, 20 mA output)
Voltage / RS485 Output: ≤0.3W
Power Distribution Capability: No built-in power distribution (two-wire current signal, powered directly from the supply circuit)
Operating Current:
4–20mA Output: Quiescent current ≤4mA, full-scale current 20mA
Voltage Output: Quiescent current ≤10mA
Reverse Polarity Protection: Built-in reverse polarity protection circuit to prevent device damage caused by reversed power supply polarity
Overvoltage Protection: Built-in overvoltage protection circuit capable of withstanding up to 40V DC transient overvoltage (duration ≤1s)

4.4 Environmental Adaptation Parameters
Operating Temperature: -40°C to +85°C (standard), optional -60°C to +125°C (Wide-temperature customization)
Medium Temperature: -40°C to +125°C (standard), optional -60°C to +200°C (customized with heat dissipation device)
Storage Temperature: -55°C to +125°C
Operating Humidity: 10% to 95% RH (non-condensing)
Protection Rating: IP67 (standard, dustproof and resistant to brief immersion), optional IP68 (waterproof to a depth of ≥1 m, continuous immersion)
Explosion-Proof Rating:
Flameproof: Ex d IIC T6 Gb

Intrinsically Safe: Ex ia IIC T6 Ga (requires use with a safety barrier)
Explosion-Proof Certification: Complies with GB 3836.1, GB 3836.2, GB 3836.4
Compatible Safety Barrier Models:
Recommended Intrinsically Safe Safety Barriers: Zener-type safety barriers / Isolation-type safety barriers, with input parameters matching the intrinsically safe side: voltage ≤28V DC, current ≤100mA, power ≤1W, such as P+F and MTL series safety barriers (models can be customized to match the customer's on-site brand)
Vibration Resistance: 10–2000 Hz, 20g, triaxial vibration, no damage (complies with GB/T 2423.10 standard)
Shock Resistance: 100g, 11 ms, half-sine wave shock, triaxial, no damage (complies with GB/T 2423.5 standard)

4.5. Physical Parameters
Installation Method: Pipe threaded installation (standard); optional flange installation or sanitary clamp installation
Threaded Connection Specifications:
Standard Connection: G1/4 male thread (matches the specifications in the image you provided)
Optional connections: NPT 1/4, NPT 1/2, M20×1.5, G1/2, etc.
Dimensions (standard configuration, units: mm, refer to product images and scale):
Overall length: approx. 110 mm
Sensor body diameter: approx. 27 mm
Terminal diameter: approx. 46 mm
Threaded end length: approx. 18 mm
Note: Dimension diagram annotation logic (to match the product image you provided):
Left side is the measurement end: knurled anti-slip knob (diameter approx. 30mm, length approx. 25mm), with a 316L isolation diaphragm inside
Center is the signal conditioning body: diameter approx. 22mm, length approx. 50mm, with model number and parameter markings printed on the surface
Right side: Mounting threaded end: G1/4 male thread, length approx. 15mm, with a 22mm hex nut
Top: Explosion-proof terminal: Hex locking nut (approx. 14mm across), with built-in cable gland, IP67 protection
Weight: Approx. 480 g (standard configuration, stainless steel)
Housing Material and Protection Details:
Housing Body: 304 stainless steel (standard), optional 316L stainless steel (for highly corrosive environments)
Isolation Diaphragm: 316L stainless steel (acid and alkali resistant, corrosion resistant)
Pressure-transmitting medium: Silicone oil (standard), optional inert oil (food-grade / medical-grade applications)
Wiring seal: Explosion-proof cable gland, fluorocarbon rubber O-ring seal, waterproof and dustproof
Surface finish: Brushed stainless steel finish, fingerprint-resistant and corrosion-resistant, enhancing appearance and service life
Explosion-proof design: Integral explosion-proof sealed housing; metal flat-face seals at joint surfaces with a gap ≤0.1 mm to prevent flame propagation
Protection details: Fully sealed welding process with no external welds to prevent medium/moisture ingress; internally potted with epoxy resin to enhance shock resistance and moisture protection



V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type Selection
When selecting the QDW70A-D stainless steel explosion-proof diffused silicon pressure transmitter, prioritize matching the signal type to the downstream control system. For conventional PLC and DCS systems in industrial environments, the 4–20 mA two-wire current signal is recommended due to its long transmission distance and strong interference resistance; For applications requiring connection to analog voltage acquisition modules or small digital display instruments, 0-5V or 0-10V voltage signals are available; for intelligent scenarios involving remote networking and centralized bus monitoring of multiple devices, directly select the RS485 Modbus-RTU digital communication signal to facilitate networked coordination and remote data upload.

2. Selection Based on Number of Channels
This model is the standard single-channel pressure measurement version, supporting real-time monitoring of a single point of medium pressure only. For monitoring the pressure of a single point on a single pipeline or in a single tank, directly select the standard single-channel version. If there is a need for centralized pressure measurement at multiple points on-site, there is no need to purchase multiple individual transmitters; instead, consult us for a customized multi-channel integrated measurement and control solution.

3. Selection Based on Power Supply Method
For standard industrial applications, a wide-voltage 12–36 VDC power supply is recommended, with 24 VDC being the typical industrial standard, compatible with common on-site DC power modules. For explosion-proof intrinsically safe applications, an intrinsically safe isolation barrier must be used; the power supply circuit must strictly comply with intrinsically safe standards and must not be directly connected to a standard DC power source. Two-wire power supply requires no separate power distribution; it draws power from the loop itself, resulting in simple wiring and making it suitable for field installations with complex piping.

4. Selection Based on Explosion-Proof Requirements
For standard factory environments without flammable or explosive gases, dust, or media, the conventional non-explosion-proof version may be selected; In hazardous areas where explosive gas mixtures are present—such as petroleum, chemical, and gas storage tanks, hazardous chemical workshops, and underground environments—the QDW70A-D stainless steel explosion-proof model must be selected; Distinguish between flameproof and intrinsically safe types: in high-risk explosion-proof zones, prioritize intrinsically safe models paired with safety barriers; in general explosion-proof zones, flameproof models are sufficient to meet safety standards.

5. Selection Based on Installation Environment
For indoor environments that are dry, non-corrosive, and dust-free, the standard 304 stainless steel base model is sufficient; for humid outdoor settings, open-air piping, wastewater treatment, and environments with mild acid or alkali corrosion, the 316L stainless steel diaphragm and housing must be used; For high-dust, water-splash, and open-air outdoor environments, prioritize IP67 protection rating; for submerged or damp, enclosed underground shaft environments, a custom IP68 high-protection version is available; for extreme high or low-temperature conditions, confirm the medium and ambient temperatures in advance to select a wide-temperature version, avoiding temperature drift that could affect measurement accuracy.

5.2 Recommended Selection Guidelines by Industry
1. The chemical industry involves many flammable, explosive, and acid/alkali corrosive media. For pressure monitoring in pipelines, reactors, and storage tanks, prioritize the QDW70A-D stainless steel explosion-proof model. Its 316L corrosion-resistant material combined with an explosion-proof structure is suitable for measuring the pressure of various hazardous chemical gases and liquids. The standard 4-20mA signal can be seamlessly integrated into chemical DCS control systems, meeting the dual requirements of explosion-proof safety and corrosion resistance.

2. In the power industry, for pressure measurement and control in power plant water-steam cycles, boiler pipelines, and oil and gas transmission

pipelines—where on-site electromagnetic interference is strong and operating temperatures fluctuate widely—the QDW70A-D explosion-proof diffused silicon pressure transmitter is recommended. Featuring built-in electrical isolation and anti-interference design, it can withstand electromagnetic interference from variable frequency drives and high-power equipment, ensuring stable measurements and making it suitable for long-term continuous operation in power plant automation and control systems.

3. In the metallurgical industry, steel smelting and coking workshops are characterized by high temperatures, high dust levels, and strong vibrations. Additionally, some areas contain flammable and explosive fumes. The QDW70A-D stainless steel explosion-proof model is suitable for these conditions. Its shock- and impact-resistant structure and high protection rating allow it to withstand dusty and mechanically vibrating environments, while its explosion-proof design meets safety standards for hazardous chemical areas in coking plants, enabling precise monitoring of pipeline network and furnace pressure parameters.

4. Pharmaceutical Industry: Pharmaceutical production workshops, fermentation tanks, and purified water pipelines typically operate in clean environments, though some solvent workshops contain flammable and explosive vapor media. The QDW70A-D stainless steel explosion-proof model is recommended. Its all-stainless-steel sanitary-grade construction prevents media contamination, and its explosion-proof structure is suitable for hazardous areas with solvent vapors. It offers high measurement accuracy and complies with the pharmaceutical industry's automation monitoring and safety standards.

5. In the smart manufacturing industry—including automated production lines, fluid control equipment, smart piping networks, and new energy support equipment—remote networking and centralized collection of pressure signals are required. We recommend the QDW70A-D explosion-proof transmitter with RS485 communication, which supports multi-device bus networking and meets the digital and remote pressure monitoring and control needs of smart manufacturing facilities.

5.3 Common Selection Pitfalls

1. Neglecting isolation level selection: In ordinary operating conditions, low-isolation versions are arbitrarily selected; in environments with strong electromagnetic interference, models with electrical isolation and EMC protection are not chosen. This leads to fluctuating and erratic measurement data, affecting the logical judgment and automatic control of the PLC system.

2. Incorrect signal range selection: Fixed standard ranges are selected without reserving a reasonable margin based on actual on-site operating pressure. Selecting a range that is too large reduces measurement accuracy, while selecting a range that is too small results in over-range overload, damaging the sensor chip.

3. Neglecting load matching: When using voltage signals, the input impedance of the downstream instrument was not matched; for 4–20 mA signals, the transmission distance and maximum load resistance were not accounted for. This resulted in signal attenuation and transmission distortion, preventing normal data acquisition over long distances.

4. Incorrect selection of general-purpose models in explosion-proof environments: In flammable and explosive hazardous areas such as chemical, gas, and hazardous materials workshops, non-explosion-proof certified standard pressure transmitters are selected to save costs. This poses a major safety hazard of electric sparks igniting the medium and violates safety production regulations.

5.4 Customization Recommendations

1. Customized Signal Solutions: When standard 4–20 mA or 0–10 V signals are not compatible with on-site conditions, we can customize non-standard voltage ranges, special current ranges, or proprietary communication protocols to interface with legacy non-standard control systems or specialized measurement and control equipment.

2. Customization for Non-Standard Operating Conditions: For extreme environments such as high or low temperatures, severe corrosion from strong acids or alkalis, or high-pressure conditions exceeding standard ranges, we offer customized solutions including thickened 316L diaphragms, special alloy materials, extended temperature ranges, and ultra-high-pressure non-standard range versions. Additionally, we provide customized installation structures such as non-standard threaded connections, flange mounting, and sanitary clamp mounting.

3. Multi-channel integrated customization: For simultaneous pressure monitoring at multiple on-site locations, we offer customized multi-channel integrated data acquisition and transmission solutions. These integrate multi-channel pressure detection with centralized signal transmission and output, reducing redundant installation and wiring for individual devices while saving on-site installation space and procurement costs. These solutions are suitable for large-scale pipeline networks and centralized monitoring and control scenarios involving multiple tanks.

VI. Installation and Commissioning Specifications

6.1 Pre-installation Preparation

1. Verification of Accessories

Upon delivery, verify the completeness of the unit and all accompanying accessories one by one: Check that the QDW70A-D stainless steel explosion-proof pressure transmitter body has no visible dents or scratches, that the threads are not stripped, and that the housing seal is intact; Verify that the accompanying explosion-proof cable gland, waterproof O-ring, hex mounting nuts, sealing gaskets, user manual, explosion-proof certification, and factory calibration sheet are all present; confirm that the product model, range, output signal, and explosion-proof rating match the purchase order, ensuring no model errors or range discrepancies.

2. Environmental Inspection

The installation site must be inspected in advance to assess the operating environment: ensure the installation location is free from severe mechanical vibration and strong impacts; in flammable and explosive areas, verify that the location is within a compliant explosion-proof zone, and ensure that on-site wiring and piping comply with explosion-proof construction standards; Ambient temperature and humidity must fall within the product's rated operating range of -40°C to 85°C and 10% to 95% RH (non-condensing); keep the device away from strong electromagnetic radiation sources such as variable frequency drives, high-power motors, and high-voltage switchgear; in environments with corrosive media, verify on-site that the housing and diaphragm are made of 316L material suitable for the operating conditions; for outdoor installations, ensure the site is protected against rain and standing water.

3. Tool List

Prepare the following specialized tools for on-site installation: adjustable wrench, Allen wrench, wire strippers, crimp terminals, electrical tape, shielded cable, multimeter, standard pressure calibrator, spirit level, grounding copper wire, and explosion-proof sealant. Never use a wrench with an excessively wide jaw to forcefully tighten the transmitter housing, as this may damage the internal sensor structure and the sealed explosion-proof surfaces.

4. Safety Precautions

In explosion-proof zones, it is strictly prohibited to open the cover while the system is energized or to perform live wiring on-site; installation and wiring must only be carried out after power has been disconnected. Personnel must wear insulated protective gear and comply with safety operating procedures for chemical explosion-proof workshops. Welding and open-flame operations are prohibited in flammable and explosive environments. Before installation, verify that the on-site pipeline is free of residual pressure and high-temperature media to prevent injury from media spray during disassembly or assembly; grounding must be reliable to eliminate issues caused by loose or missing connections, such as static electricity or interference.

6.2 Standard Installation Steps

1. Pipe Thread Installation

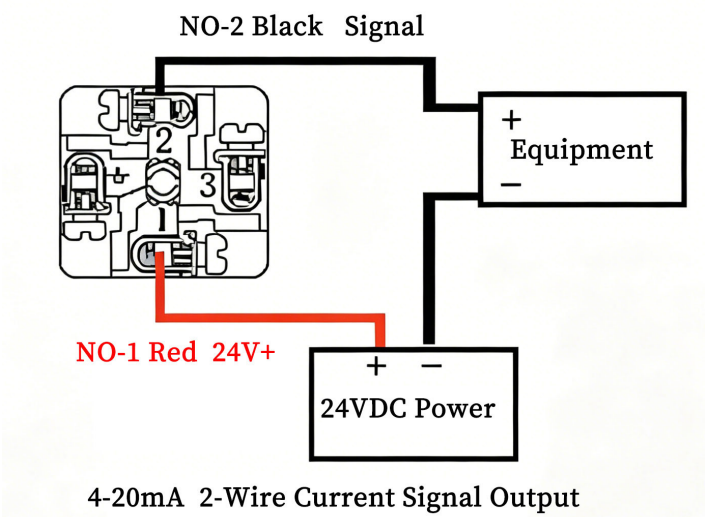
This model features direct external threaded pipe installation and does not require a mounting rail. First, prepare a pressure measurement port on the pipe to be tested, wrap it with PTFE tape or install a sealing gasket, then manually screw in the transmitter's threaded end. Use a wrench to gently tighten it with moderate force; do not use excessive force, as this may cause the diaphragm to deform under pressure. Install the unit vertically

or horizontally in the correct orientation; avoid prolonged use in an inverted position. Select a measurement location on a straight section of pipe in a smooth flow area, avoiding pipe bends, turbulent zones, and dead spots in the medium.

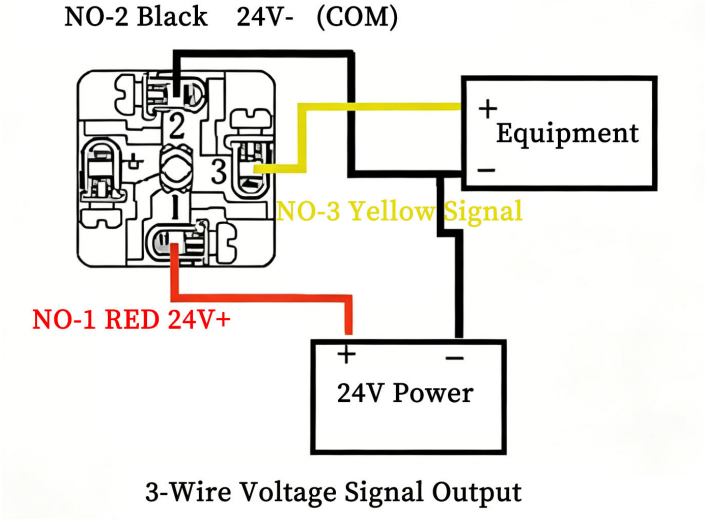
2. Wiring Specifications (Power / Output Terminal Differentiation)
The unit features an explosion-proof wiring compartment. Upon opening the cover, the internal terminals are clearly distinguished:
2-wire 4-20mA model: Only power + and signal terminals are shared; loop-powered with no separate input terminals;
3-wire voltage model: Separate power supply positive, power supply negative, and signal output positive terminals;
RS485 communication model: Additional A and B communication terminals are provided; strictly distinguish between positive/negative and differential signal lines.
All wiring must use crimp terminals; wire cores must not have exposed copper strands. Wiring inside the terminal compartment must be neat; cables must not be squeezed, and must not come into contact with internal circuit board components.

3. Grounding Requirements
The metal housing of the transmitter must be reliably grounded using a multi-strand copper grounding wire with a cross-sectional area of no less than 1.5 mm². Single-point grounding is sufficient; multiple-point series grounding is prohibited to avoid loop current interference. The outer shield of the shielded cable must be grounded at a single point, specifically on the control cabinet side; the shield at the transmitter end must remain floating and ungrounded. In explosion-proof areas, the grounding resistance must be less than 4 Ω to ensure compliance with anti-static, anti-interference, and explosion-proof safety regulations.

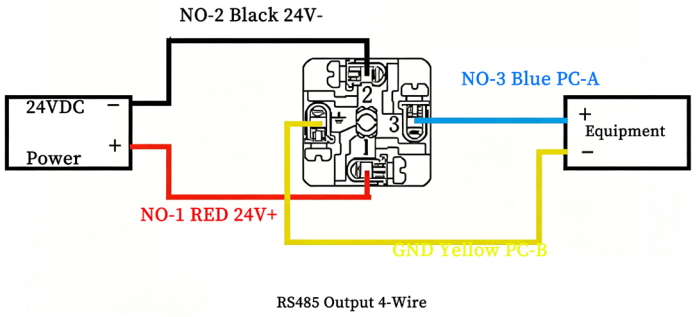
6.3, Labeling Standards for Wiring Diagrams



4-20mA 2-Wire Current Signal Output



3-Wire Voltage Signal Output



RS485 Output 4-Wire

2. Specifications for Shielded Cable Grounding
Connect the inner conductors of the shielded cable to the corresponding signal terminals. The outer metal shield must be grounded at a single point only at the PLC end of the central control cabinet. Inside the transmitter's wiring compartment, trim the shield and wrap it with insulating tape; ensure it does not touch the housing and must not be grounded locally to prevent interference from entering the measurement circuit.

3. Isolation-Type / Explosion-Proof Wiring Specifications
Intrinsically safe explosion-proof transmitters must be connected to an external isolation barrier. Direct connection of the transmitter's intrinsically safe side to 220V power is strictly prohibited; One end of the safety barrier connects to the field transmitter, and the other end connects to the analog module of the control room PLC. In intrinsically safe circuits, wiring must be routed through separate conduits and must not be installed in the same conduit as high-voltage cables; for flameproof-type transmitters, the wiring compartment must be properly sealed, cable glands must be tightly crimped, and no excess cable slack is allowed inside the compartment to ensure explosion-proof sealing performance.

4. Comparison of Correct and Incorrect Wiring
Correct: Wire cores are securely crimped to terminals with no exposed wires; wiring is zone-separated; shielding is grounded at a single point; explosion-proof enclosures are sealed and locked; wiring is performed with power off;
Incorrect: Exposed wire cores touching the enclosure; high- and low-voltage cables routed in the same conduit; shielding grounded at both ends; wiring performed with the cover open while power is on; positive and negative terminals reversed; loose or faulty terminal connections.

6.4 Power-On Commissioning Procedure
1. No-Load Test
After installation and wiring are complete, do not apply medium pressure; keep the transmitter in a no-load, atmospheric pressure state. Verify that the wiring is correct, grounding is reliable, and the explosion-proof cover is securely locked before applying the 24V DC power supply. Observe whether the entire unit powers up normally, with no overheating, abnormal noises, or tripping.

2. Signal Calibration
Use a multimeter to measure the 4–20 mA loop or the voltage output. Under normal pressure, verify that the zero-point output matches the standard initial value, with a stable 4 mA or 0 V reference showing no drift. Connect a standard pressure calibrator and apply standard pressures at 25%, 50%, 75%, and 100% of the full scale range in sequence. Record the corresponding output signals and observe whether the linearity remains stable.

3. Indicator Status Interpretation
Normal Power-On: The power indicator remains steadily lit in green, indicating normal power supply and no circuit faults;
Signal Abnormality: The indicator flashes, indicating loose connections, overload, circuit short-circuit, or severe electromagnetic interference;
For explosion-proof intrinsically safe models, abnormal flashing of the indicator requires immediate power disconnection to check for safety barrier compatibility and improper wiring.

4. Accuracy Calibration Method
On-site one-button zero calibration is supported: Under normal pressure, press and hold the calibration button for 3–5 seconds to automatically calibrate the zero point; range deviation can be fine-tuned via the internal potentiometer or upper-level computer parameters; after calibration,

reapply pressure and retest to ensure full-scale error is within the accuracy class range. Once calibration is complete, securely lock the explosion-proof terminal cover; it is strictly prohibited to put the device into service without sealing it after debugging.

6.5 Installation Prohibitions

1. Never operate the transmitter beyond its rated pressure or measurement range. The actual working pressure in the pipeline must not exceed the transmitter's rated range. Prolonged overpressure will directly damage the diffused silicon sensing diaphragm, causing permanent failure.

2. Never exceed the rated supply voltage. The rated supply voltage is 12–36 VDC. Do not connect to 220 V AC power, and do not use voltages exceeding 36 V to avoid burning out the circuitry and causing explosion-proof safety risks.

3. Avoid running wiring in close proximity to variable frequency drives, motors, or high-voltage lines. High-voltage and low-voltage circuits must be routed through separate conduits, maintaining a distance of at least 30 cm to prevent measurement data fluctuations or drift caused by high-voltage interference.

4. In damp, rainy, or underground shaft environments, ensure the wiring compartment is properly sealed. Tighten the explosion-proof cable connectors and install all waterproof sealing rings. Do not allow cables to be exposed to water to prevent moisture damage, corrosion, or short circuits on internal circuit boards.

5. Do not use excessive force during installation or removal, or pry open the explosion-proof sealing surfaces of the housing. Impact or scratches to the explosion-proof sealing surfaces will compromise explosion-proof performance. Unauthorized grinding or modification of the housing structure is strictly prohibited.

VII. Recommendations for Daily Use & Operation and Maintenance

7.1 Key Points for Daily Inspections

1. Visual Inspection and Operational Condition Check

Inspect the transmitter housing daily for corrosion, deformation, or impact damage. Verify that the sealing cap of the explosion-proof terminal compartment and the cable glands are securely fastened with no looseness, and that the O-rings show no signs of aging or detachment, ensuring that the IP67 and explosion-proof protection ratings remain intact.

Check the installation threads and pipe connections for media leaks or rust. Ensure the pressure measurement ports are free of blockages and scale, and that the diaphragm surface is free of oil, crystallization, or mechanical damage.

Observe the on-site environment to ensure there is no standing water, dripping water, or dust accumulation around the transmitter. Verify that there is no severe vibration or strong electromagnetic interference sources nearby, and that the installation location is free of abnormally high or low temperatures or corrosive gas leaks.

2. Signal Stability Monitoring

Daily review of real-time pressure data on the PLC/DCS/digital display to confirm stable signal output with no jumps, drifts, or signal interruptions. Compare data against process conditions to verify reasonableness and absence of abnormal deviations.

For 4-20mA current signal applications, periodically measure loop current with a multimeter to confirm linear correspondence between signal and pressure values, with no signal attenuation or zero/full-scale offset.

For RS485 communication models, check the bus communication status to ensure there are no packet losses or communication interruptions. In multi-device networks, verify there are no address conflicts or data garbling caused by signal interference.

3. Temperature and Humidity Monitoring

Record the ambient temperature at the transmitter installation location to ensure it remains within the operating range of -40°C to +85°C. Ensure the medium temperature does not exceed the product's rated value to prevent silicone oil pressure transmission medium aging due to high temperatures or measurement errors caused by low temperatures.

In humid environments, periodically inspect the interior of the transmitter's terminal chamber for condensation or moisture. Ensure there are no signs of water seepage at the explosion-proof cable joints to prevent moisture intrusion and damage to internal circuits.

7.2. Regular Maintenance Plan

1. Cleaning Frequency and Methods

Monthly Cleaning: Wipe dust and grease from the transmitter housing surface with a dry, soft cloth. Do not rinse the housing directly with water to avoid damaging the sealing structure; If dust accumulates on the exterior of the explosion-proof terminal chamber, gently brush it away. Never scrape the explosion-proof joint surfaces with hard objects.

Quarterly Deep Cleaning: Disassemble the pressure measurement port (after depressurizing and shutting down the system). Rinse the pipe connections and diaphragm surface with a non-corrosive cleaner to remove medium crystallization and dirt, preventing blockages or interference with pressure transmission. After cleaning, reapply PTFE tape and securely reseal the assembly.

Precautions: Never use strong acids, strong alkalis, or organic solvents to wipe the 316L diaphragm to prevent corrosion damage; do not pry or strike the diaphragm during cleaning to prevent deformation that could cause measurement failure.

2. Wiring Tightness Inspection

Quarterly Inspection: With the power off, open the explosion-proof terminal box and inspect whether the internal terminal connections are secure; ensure the wire cores show no looseness, oxidation, or discoloration, and that the crimped terminals have no loose connections or detachment; retighten the terminal screws to prevent wiring loosening due to vibration.

Grounding and Shielding Inspection: Verify that the protective grounding wire is securely connected and that the grounding resistance is $\leq 4\Omega$; ensure the shielding layer of the shielded cable is undamaged, with proper single-end grounding, and no instances of double-end grounding or shield-to-housing contact to prevent interference.

Cable and Connector Inspection: Inspect the external cable for damage, aging, or deformation caused by compression. Ensure the rubber O-rings on the explosion-proof cable's sealed connectors show no signs of aging or cracking. Retighten the connector nuts to ensure a leak-free seal.

3. Recommendations for Accuracy Recalibration

Semi-annual / Annual Accuracy Calibration: Use a standard pressure calibrator to calibrate the transmitter's zero point, span, and linearity. Recalibrated accuracy must meet the product's rated accuracy class (e.g., 0.2% F.S.). If the error exceeds the specified range, recalibration is required.

Calibration Method: Calibrate the zero output at atmospheric pressure; apply full-scale standard pressure to calibrate the full-scale output; re-test linearity at intermediate points (25%, 50%, 75% of full scale) to ensure that full-scale error remains within the permissible range; after calibration, securely tighten the explosion-proof terminal cover and maintain calibration records.

Re-calibration for Special Operating Conditions: In highly corrosive, high-temperature, or environments with frequent pressure fluctuations, it is recommended to re-calibrate accuracy every 3 months; in flammable and explosive hazardous areas, calibration must be performed in a safe zone; opening the cover for debugging while the device is energized is strictly prohibited.

7.3 Long-Term Maintenance Tips

1. Dust and Moisture Protection Optimization

In outdoor, dusty, or humid environments, install a dedicated waterproof and dustproof protective cover over the transmitter to prevent direct exposure to water, sunlight, and dust accumulation. For outdoor installations, prioritize models with an IP68 protection rating or install rain shields.

After each inspection of the explosion-proof terminal chamber, replace any aged O-rings and apply a small amount of silicone grease to enhance sealing performance. When tightening the explosion-proof cover, tighten the screws evenly in a diagonal sequence to ensure the sealing surfaces are flush with no gaps.

In humid or condensation-prone environments, place desiccant inside the terminal chamber (provided it does not compromise the explosion-proof seal) or select a custom potted moisture-proof version to prevent moisture from entering the circuit board.

2. Anti-Interference Optimization
Run the transmitter cable through a separate metal conduit, maintaining a distance of at least 30 cm from high-voltage cables, variable frequency drives, motors, and other equipment. Avoid routing cables through the same conduit to minimize electromagnetic interference and ensure signal stability.
The outer shield of the shielded cable should be grounded at a single point on the central control cabinet side only. At the transmitter end, wrap the shield with insulating tape; do not allow it to touch the housing or be grounded locally to prevent ground loop interference.
In environments with strong electromagnetic interference, install a power filter in the transmitter's power supply circuit or select a custom version with a higher EMC protection rating to enhance interference resistance.

3. Protection in Extreme Environments
High-Temperature Conditions: When the medium temperature exceeds 125°C, a heat dissipation device must be installed, or a custom version with a heat sink must be selected to prevent high-temperature conduction from damaging internal circuits; regularly inspect the heat sink surface to ensure it is free of dust buildup and blockages, thereby ensuring effective heat dissipation.
Low-Temperature Conditions: When the ambient temperature is below -20°C, a wide-temperature custom version may be selected, or a heat-tracing insulation sleeve may be installed to prevent silicone oil from solidifying due to low temperatures and to avoid increased measurement errors; When installing the insulation sleeve, avoid compressing the diaphragm and the wiring compartment.
Highly Corrosive Conditions: Select a custom version with a 316L all-stainless-steel or Hastelloy diaphragm. Regularly inspect the housing and diaphragm surface for corrosion; if pitting or discoloration occurs, promptly replace the transmitter with one made of a more corrosion-resistant material.
Vibration Conditions: Install anti-vibration mounts or shock absorbers during installation to prevent pipeline vibrations from being directly transmitted to the transmitter. Periodically check the installation threads for looseness and, if necessary, install anti-loosening washers to prevent equipment detachment or internal component damage caused by prolonged vibration.

VIII. Troubleshooting & Emergency Response
8.1. List of Common Faults
No output signal from the transmitter; no data displayed on the PLC or digital display
Signal drift or data fluctuations; output values continue to fluctuate or slowly drift even when pressure is stable
Abnormal indicator lights (no power indicator, flashing indicator lights, alarm light remains on)
System alarms triggered (out-of-range alarm, loop fault alarm, communication interruption alarm)
Signal interference or distortion (erratic data, data inconsistent with actual operating conditions, communication packet loss)

8.2. Analysis of Fault Causes
No output signal: Wiring errors (reversed polarity, loose terminals), power supply issues (insufficient voltage / no power), circuit open/short circuit, internal circuit burnout, diaphragm damage due to overpressure
Signal Drift / Data Fluctuations: Poor wiring connections, improper grounding/shielding, electromagnetic interference, uncompensated temperature drift, contaminated/clogged diaphragm, aging internal components
Abnormal Indicator Lights: Abnormal supply voltage, circuit overload/short circuit, internal circuit failure, moisture ingress in explosion-proof chamber, damage to indicator lights themselves
Alarm Triggering: Pressure out of range, signal loop failure, safety barrier intrinsic safety parameter mismatch, communication address conflict, system false alarm
Interference and Distortion: Co-routing of high- and low-voltage lines, incorrect shield grounding, strong electromagnetic interference from inverters/motors, poor grounding, signal attenuation due to excessively long lines

8.3, Step-by-Step Troubleshooting
1. Fault: Transmitter has no output signal
Troubleshooting Steps:
First, disconnect power and verify terminals according to the wiring diagram:
Two-wire model: Pin 1 (red) connects to 24V+, Pin 2 (black) connects to instrument +/24V-. Check for circuit breaks or reversed polarity
Three-wire model: Confirm correct wiring for Pin 1 (24V+), Pin 2 (24V-common terminal), and Pin 3 (signal terminal)
RS485 Model: Check that the A/B lines and power supply lines are not reversed or loosely connected.
After powering on, use a multimeter to measure: Whether the input voltage at the power terminals is 12–36 V DC (typically 24 V DC). If there is no voltage, troubleshoot the power module or wiring.
Measure the loop current: For the two-wire model, if there is no current, check for a short circuit in the wiring or whether the transmitter is burned out.
If power supply is normal but there is still no output, check whether the diaphragm has been deformed or damaged due to overpressure, or whether water has entered the explosion-proof chamber and corroded the circuit board
Remedial Measures:
Correct wiring errors, re-crimp terminals, and ensure there are no loose connections or exposed wires
Replace the faulty power supply module and restore rated power supply
If the diaphragm or circuit board is damaged, shut down the equipment and contact after-sales service for replacement or repair
Emergency Plan: Replace with a spare transmitter of the same model to quickly resume production; send the faulty unit for repair.

2. Fault: Signal Drift, Data Fluctuations
Troubleshooting Steps:
Check on-site conditions: Verify that pipeline pressure does not fluctuate frequently and that the pressure measurement port is not blocked by crystallized medium.
Check wiring and grounding: Check for loose terminals, single-ended shield grounding, and ensure grounding resistance is ≤4Ω.
Identify sources of interference: Check whether the transmitter cable is routed in the same conduit as high-voltage power lines or variable frequency drives, and whether the distance is too close.
Test with a standard pressure calibrator: Compare the transmitter output with the standard pressure value to determine whether the issue is caused by temperature drift, linearity error, or interference.
Remedial actions:
Clean crystallization and dirt from the pressure ports, clear blockages, and restore normal pressure transmission.
Re-tighten terminals, correct the shield grounding method, and avoid grounding at both ends
Adjust cable routing to maintain a distance of at least 30 cm from high-voltage equipment; install a power filter if necessary
Recalibrate zero point and span to eliminate temperature drift error
Contingency plan: Temporarily set filter parameters on the instrument to mitigate data fluctuations; thoroughly investigate the root cause during the next shutdown window

3. Fault: Abnormal indicator lights (no indication / flashing / alarm)
Troubleshooting steps:
No power indicator: Measure the voltage at the power terminals to confirm normal power supply; check if the indicator light is damaged
Flashing indicator light: Measure the loop current for overload; check for short circuits in the wiring and moisture in the transmitter
Alarm light stays on: Verify system alarm messages; check for out-of-range conditions, mismatched safety barrier parameters, or communication failures
Remedial Actions:
If power supply is abnormal, restore rated voltage. If the indicator light is damaged but does not affect functionality, continue using the device and replace it during the next shutdown.
If there is a circuit short circuit or moisture ingress, disconnect power, check if water has entered the terminal compartment, dry it thoroughly, reseal it, and eliminate the short circuit point.
If an out-of-range alarm occurs, reduce pipeline pressure; if safety barriers are mismatched, replace them with compatible models
Contingency Plan: If the indicator light is faulty but the transmitter output is normal, monitor data via the instrument interface; this will not affect production operations. If the fault is internal to the device, replace it with

a spare unit.

4. Fault: System Alarm Triggered
Troubleshooting Steps:
Over-range alarm: Check whether the actual pipeline pressure exceeds the transmitter's rated range, and verify that the range setting is correct
Loop fault alarm: Check for open circuits or short circuits in the wiring, loose terminal connections, or a faulty instrument input module
Communication interruption alarm (RS485 model): Check for reversed A/B wires, address conflicts, or incorrect bus terminator resistor settings
Remedial actions:
For out-of-range conditions, adjust the process pressure or replace the transmitter with one of a higher range
For loop faults, re-crimp the terminals, replace faulty wiring, and repair the instrument module
For communication faults: Verify the polarity of the A/B wires, modify the device address, and configure the correct terminating resistor
Contingency plan: Temporarily disable the alarm signal to prioritize production operations; address the issue thoroughly during a shutdown. In over-range conditions, relieve pressure first to prevent equipment damage

5. Fault: Signal Interference and Distortion
Troubleshooting steps:
Check wiring: Are cables running in close proximity to high-voltage cables, variable frequency drives, or high-voltage lines?
Shielding and Grounding: Check for damaged shielding or incorrect grounding (single-ended grounding)
Power Quality: Check for excessive ripple or voltage fluctuations in the power supply
Instrument End: Verify input impedance matching; check if excessive cable length is causing signal attenuation
Remedial Actions:
Route cables separately through metal conduits, keeping them away from high-voltage equipment to increase isolation distance
Replace cables with damaged shielding and correct the shield grounding method (Ground only on the control cabinet side)
Install a power filter to stabilize power quality and reduce ripple interference
If the cable is too long, lower the input impedance at the instrument end, or replace with a version featuring RS485 digital signaling
Contingency Plan: Add signal filtering settings at the instrument end to temporarily mitigate interference; optimize cabling and grounding during a system shutdown

8.4. After-Sales Service Request Guidelines
1. Criteria for Determining Malfunctions
The following situations are deemed equipment malfunctions; contact after-sales service to report the issue:
Power supply is normal and wiring is correct, but the transmitter has no output whatsoever; a multimeter shows no loop current or signal
The diaphragm is visibly deformed, corroded, or leaking; the pressure measurement port is damaged, preventing normal pressure transmission
The circuit board is burned out or corroded due to water ingress; the indicator light is off and cannot be restored
Accuracy continues to exceed the rated error range (e.g., 0.2% F.S.) even after calibration, and cannot be corrected
Damage to the explosion-proof housing or sealing surfaces, resulting in loss of explosion-proof performance and posing a safety hazard

2. Repair Process
On-site Preliminary Troubleshooting: Rule out external issues such as wiring, power supply, and interference, and confirm that the fault lies with the device itself
Collect fault information: Equipment model (QDW70A-D), measurement range, output signal type, installation conditions, fault symptoms, photos/videos
Contact After-Sales Service: Submit a repair request via the official after-sales phone number or email, providing the device serial number and purchase information
After-Sales Assessment: Technical staff will provide remote troubleshooting guidance; if the issue cannot be resolved, a repair or replacement plan will be confirmed
Return the Device to the Factory: Pack the device according to instructions and ship it to the designated after-sales address, including a fault description form
Repair/Replacement: The factory will inspect, repair, or replace the device; upon completion, it will be returned to the customer along with a repair report

3. Contact Information
After-sales Hotline: 19715617532
After-sales Email: sales008@qd-zdk.com

4. Warranty Coverage
Warranty Period: Within 12 months from the date of shipment. Free repair or replacement for equipment failures caused by non-human factors or non-external damage
Warranty Coverage: Internal circuit failures, sensor chip failures, factory calibration errors exceeding tolerance limits, and other non-human-induced issues
Warranty Exclusions: Damage caused by overpressure or overheating, burnout due to incorrect wiring, unauthorized disassembly or modification, corrosion or physical damage, and damage resulting from force majeure are not covered by the warranty.
I can compile this entire set of 7 modules into a single comprehensive product manual, formatted to fit your website's product detail page. Would you like me to merge them into a single document for you?