Hard Flat-diaphragm Pressure Transmitter

I. Product Definition

The QDW90A-YG strain-gauge hard flat-diaphragm pressure transmitter is an industrial-grade pressure measurement device independently developed and manufactured by Anhui Qidian Automation Technology Co., Ltd. It is specifically designed for applications involving special media such as high-viscosity, particulate-laden, crystallizing, highly corrosive, and sanitary-grade fluids. It serves as a core sensor component in industrial automation control systems, enabling the precise acquisition and standardized output of pressure signals.

Its core functions and positioning can be broken down into the following dimensions:

1. Precise Pressure Signal Acquisition: Utilizing a hard flat-diaphragm structure without pressure-tapping holes, the integrated flat diaphragm comes into direct contact with the measured medium, converting the medium's pressure (static/dynamic) into a strain electrical signal. The measurement range covers the low- to medium-high pressure ranges commonly used in industry, meeting the pressure measurement requirements for the vast majority of special media.

2. Standardized Signal Transmission and Output: Equipped with a built-in high-precision signal conditioning circuit, it amplifies, filters, and linearly compensates the acquired weak strain signal before converting it into standard industrial control signals (such as 4–20 mA current signals), enabling seamless integration with PLCs, DCS systems, digital displays, and host computers.

3. Robust Adaptability to Harsh Operating Conditions: The hard flat-diaphragm structure eliminates pressure-transmitting holes and dead corners, completely resolving the pain points of traditional transmitters—such as clogging, crystallization, and difficulty in cleaning. Additionally, it features IP65 protection, a wide operating temperature range, and resistance to vibration and shock, making it suitable for harsh operating conditions in industries such as chemicals, food, pharmaceuticals, papermaking, and coatings.

4. High Stability and High-Precision Measurement: Utilizing an imported strain-gauge pressure sensor core, combined with temperature compensation and zero/full-scale calibration processes, it achieves a measurement accuracy of 0.5% FS with extremely low long-term drift, ensuring stable and reliable pressure data acquisition in industrial environments over extended periods.

5. Versatile Installation Options: Equipped with standard external threaded connections (customizable sanitary clamps, flanges, and other connection methods), it is compatible with various industrial piping and tank installation scenarios; it also supports multiple electrical wiring options (Hirschmann connectors / direct wiring), accommodating different control cabinet wiring requirements.

II. Working Principle

The operational process of the QDW90A-YG strain-gauge hard flat-diaphragm pressure transmitter can be divided into four stages: pressure sensing, signal conversion, signal conditioning, and standardized output. A simplified explanation is as follows:

1. Pressure Sensing Stage: Direct Force on the Flat Diaphragm

The pressure of the measured medium (such as liquid, gas, or slurry pressure) acts directly on the integrated hard flat diaphragm at the front end of the transmitter. The diaphragm is made of high-strength stainless steel, with no pressure-transmitting holes or recesses. Pressure is uniformly transmitted to the strain gauge core behind the diaphragm, eliminating the risk of medium retention or blockage.

2. Signal Conversion Stage: Generation of Strain Electrical Signal

The strain core integrates strain resistors arranged in a Wheatstone bridge configuration. When pressure is transmitted to the core, it undergoes minute elastic deformation, causing the strain resistors to deform synchronously and resulting in a change in resistance. The Wheatstone bridge converts this change in resistance into a weak voltage signal (millivolt level) proportional to the pressure, completing the physical conversion from "pressure to electrical signal."

3. Signal Conditioning Stage: Signal Amplification and Compensation

Millivolt-level weak signals cannot be directly recognized by industrial control systems. Therefore, the transmitter incorporates high-precision signal conditioning circuits to amplify and filter the signal. Simultaneously, temperature compensation circuits offset the impact of ambient temperature changes on the core's measurement accuracy, followed by linearization calibration to eliminate nonlinear errors in the pressure-signal curve.

4. Standardized Output Stage: Generation of Industrial Standard Signals

The conditioned signal is converted by a dedicated transmission circuit into a standard signal commonly used in industrial control systems (typically a 4–20 mA current signal). In this signal, 4 mA corresponds to the lower limit of the measurement range, and 20 mA corresponds to the upper limit. The current signal offers strong resistance to interference during transmission and can be transmitted over long distances to PLCs, DCS systems, or digital display instruments, enabling real-time monitoring and control of pressure data.

III. Core Value and Solutions to Pain Points

3.1 Core Product Value

The QDW90A-YG strain-gauge hard flat-diaphragm pressure transmitter addresses the pain points of pressure measurement for special media in industrial environments by providing an integrated solution featuring "clog-resistant, corrosion-resistant, high-precision, easy-to-clean, and highly adaptable" characteristics. Its core value is reflected in the following aspects:

1. Anti-clogging and anti-crystallization, suitable for high-viscosity and particulate-containing media: The hard flat-diaphragm design without pressure-sensing ports completely eliminates the issue of slurries, coatings, and particulate-containing liquids blocking the ports. This eliminates the need for frequent disassembly and cleaning, significantly reducing maintenance costs.

2. Sanitary-grade compatibility meeting food and pharmaceutical industry requirements: The flat-diaphragm design with no dead corners allows for direct in-line cleaning (CIP) and sterilization (SIP), leaving no media residue and complying with sanitary production standards in the food and pharmaceutical industries.

3. High precision and stability ensure reliable industrial control: The strain-gauge sensor element, combined with temperature compensation and linear calibration, achieves a measurement accuracy of 0.5% FS. With low long-term drift, it prevents production control errors caused by data deviations.

4. Strong anti-interference and wide operating condition adaptability: IP65 protection rating, wide operating temperature range, and vibration- and shock-resistant design ensure long-term stable operation in harsh industrial environments characterized by humidity, dust, vibration, and temperature fluctuations.

5. Flexible Installation to Meet Diverse Scenarios: Supports multiple connection methods and electrical wiring options. Can be customized to fit on-site piping and tank structures, enabling rapid adaptation to installation scenarios across different industries and reducing the complexity of on-site modifications.

3.2 Key Challenges and Solutions

Q: The medium at my site is high-viscosity slurry or particulate-laden liquid. Traditional pressure transmitters get clogged after a short time, and frequent disassembly and cleaning are too cumbersome. What should I do?

A: The QDW90A-YG features an integrated hard flat-diaphragm design with no pressure-transmitting orifices. The measured medium acts directly on the flat diaphragm surface, eliminating pressure-transmitting orifices and dead zones. This fundamentally prevents slurry and particle blockages, eliminating the need for frequent disassembly and cleaning, and significantly reducing maintenance costs and downtime.

Q: I am a user in the food or pharmaceutical industry. My production process requires online cleaning and sterilization. The pressure ports of traditional transmitters can retain media, which does not comply with hygiene standards. What should I do?
A: The QDW90A-YG's hard flat-diaphragm structure has no recesses or dead zones. It can be cleaned directly via in-place cleaning (CIP) and sterilization (SIP) processes, leaving no media residue. This fully meets the sanitary production requirements of the food and pharmaceutical industries and eliminates the risk of cross-contamination.

Q: The ambient temperature at the site fluctuates significantly, causing large measurement deviations in standard pressure transmitters and affecting production control. What should I do?
A: The QDW90A-YG features a built-in high-precision temperature compensation circuit that offsets the impact of ambient temperature changes on the sensor's measurement accuracy. Combined with a linearization calibration process, it achieves a measurement accuracy of 0.5% FS, ensuring stable and reliable data even in wide temperature ranges and preventing production errors caused by measurement deviations.

Q: Industrial sites are subject to heavy vibration and shock, causing standard transmitters to fail prematurely. How can this be addressed?
A: The QDW90A-YG features a high-strength stainless steel housing and an integrated sensor element design, providing excellent resistance to vibration and shock. It is suitable for harsh industrial environments with pump and pipeline vibrations, ensuring long-term stable operation of equipment and reducing costs associated with failure and replacement.

Q: My site has unique pipe or tank interfaces, and standard transmitters' threads or flanges don't match, making retrofitting a hassle. What should I do?
A: The QDW90A-YG supports customization for various connection methods, including standard external threads, sanitary clamps, and flanges. It can be quickly adapted to actual on-site interface dimensions without requiring major modifications to pipes or tanks, thereby reducing on-site installation complexity and costs.

Q: The signal transmission distance is long, and standard voltage signals are prone to electromagnetic interference on-site, resulting in significant data fluctuations. What should I do?
A: The QDW90A-YG comes standard with an industry-standard 4–20 mA current signal output. Current signals offer strong resistance to interference during long-distance transmission and are less susceptible to on-site electromagnetic interference, ensuring stable signal transmission and accurate real-time data.

IV. Key Product Parameters & Specifications

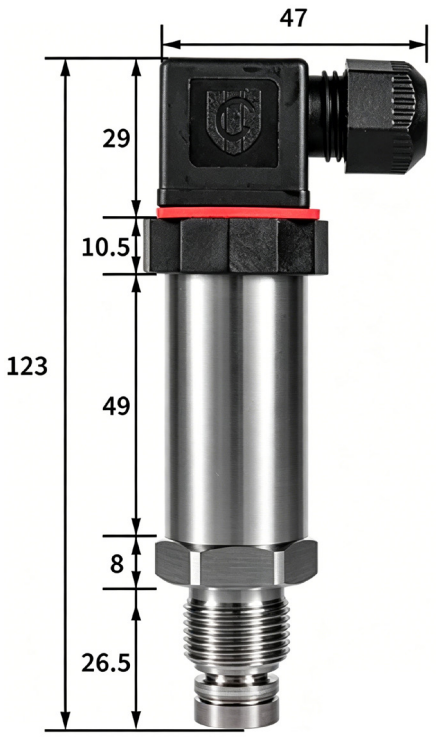
4.1 Basic Electrical Parameters
Measurement Type: Strain-gauge pressure measurement (rigid flat-diaphragm structure)
Pressure Range: Standard ranges from 0–0.1 MPa to 0–100 MPa (customizable for positive/negative pressure, absolute pressure, and gauge pressure ranges)
Measured Media: Liquids, gases, slurries, and media containing particles (compatible with high-viscosity, crystallizable, and corrosive media)
Output Signal: Standard 4–20 mA current signal (two-wire); optional 0–5 V/0–10 V/RS485 digital signals
Accuracy Class: 0.5% FS (standard); optional 0.25% FS and 0.1% FS high-precision versions
Non-linearity error: ≤±0.2% FS
Hysteresis error: ≤±0.1% FS
Repeatability error: ≤±0.1% FS
Temperature drift: ≤±0.02% FS/°C (within the -20°C to 85°C range)
Zero drift: ≤±0.1% FS/year
Response time: ≤10 ms (standard)
Insulation Resistance: ≥100 MΩ (DC 500 V, between terminals and housing)

4.2 Isolation Performance Parameters
Input-Output Isolation Voltage: DC 1000 V (standard); optional AC 1500 V isolation version
Isolation Method: Electrical isolation between signal circuits and housing, as well as power circuits, providing strong common-mode interference immunity
Common-Mode Rejection Ratio (CMRR): ≥80 dB
Differential Mode Rejection Ratio (DMRR): ≥60 dB
Electromagnetic Compatibility (EMC): Complies with GB/T 17626 standard; resistant to Electrostatic Discharge (ESD), Electrical Fast Transient (EFT), and Surge interference
Enclosure Grounding Mode: Grounded / Floating dual-mode, suitable for various on-site grounding environments

4.3 Power Supply & Power Consumption Parameters
Supply Voltage: Standard 24V DC (18–36V DC wide voltage range)
Power Consumption: ≤1.2W (at full load, during 4–20mA output)
Power Distribution Output: No additional power distribution output (two-wire 4–20mA signal, powered directly by the supply circuit)
Reverse Polarity Protection: Built-in reverse connection protection circuit; no risk of device damage if power supply polarity is reversed
Overvoltage Protection: Built-in transient suppression diodes at the input power terminal; withstands short-term overvoltage surges up to 40V DC

4.4 Environmental Adaptation Parameters
Operating Temperature Range: -20°C to 85°C (standard); optional wide-temperature version: -40°C to 125°C
Medium Temperature Range: -20°C to 100°C (standard); optional -40°C to 150°C high-temperature version
Storage Temperature Range: -40°C to 125°C
Operating Humidity Range: 0% to 95% RH (non-condensing)
Protection Rating: IP65 (Hirschmann connector / direct wiring version, compliant with GB 4208 standard)
Explosion-proof rating: Optional Ex ia II C T4 Ga intrinsically safe certification (compatible with safety barrier models such as MTL5541, P+F KFD2-STC4-EX1, and other general-purpose intrinsically safe barriers)
Vibration resistance: 10–2000 Hz, amplitude 0.75 mm, acceleration 20 g, 2 hours in each of the X, Y, and Z directions without damage
Shock resistance: 100g, 11ms, half-sine wave shock; 3 shocks in each of the X, Y, and Z directions without damage
Corrosion resistance: Wetted parts made of 316L stainless steel, compatible with weak acids and alkalis; optional wetted parts made of Hastelloy or tantalum for highly corrosive media

4.5. Physical Parameters
Mounting Method: Direct threaded mounting (standard external thread); optional custom mounting methods include sanitary clamps, flanges, and quick-connect fittings
Standard Connection Thread: G1/2 (standard); optional thread specifications include M20×1.5, G1/4, NPT1/4, NPT1/2, etc.
Dimensions (Hirschmann connector standard version, units: mm):
Overall Length: 123 mm
Electrical Connector Width: 47 mm
Electrical Connector Height: 29 mm
Hex Nut Height: 10.5 mm
Stainless Steel Body Length: 49 mm
External Thread Length: 26.5 mm
Distance from Threaded Section to Hex Nut: 8 mm
Weight: Approx. 280 g (standard threaded version)
Housing Material:
Wetted Parts: 316L stainless steel (integrated hard flat diaphragm structure, no pressure-tapping holes)
Main Housing: 304 stainless steel
Electrical Connector: PA66 engineering plastic (Hirschmann connector) / rubber sleeve (direct wiring version)
Protection Details:
Stainless steel body surface is polished for corrosion resistance and easy cleaning
Electrical connectors feature built-in O-rings, providing IP65-rated dust and water resistance to prevent ingress of dust and moisture
Threaded ends come standard with fluorocarbon rubber O-rings (standard); optional EPDM and PTFE O-rings are available to accommodate different media and temperature conditions
The flat diaphragm surface is mirror-polished, eliminating dead corners for media residue and supporting in-place cleaning (CIP/SIP)



V. Application-Specific Selection Guide

5.1 Key Selection Criteria

When selecting a transmitter, carefully verify each of the following key criteria to prevent equipment failure or on-site malfunctions caused by parameter mismatches:

1. Signal Type Verification: Determine the transmitter's output signal based on the input interface type of the on-site control system. The standard model features a 4–20 mA two-wire current signal, compatible with the vast majority of PLCs, DCS systems, and digital display instruments. If the site requires integration with an RS485 Modbus bus system, please specify in advance to order a customized digital signal version. Voltage signals (0–5 V/0–10 V) are only suitable for short-distance transmission scenarios; the risk of signal attenuation must be evaluated as a priority.

2. Number of Channels: The QDW90A-YG is a single-channel pressure transmitter; a single unit supports only one pressure signal input. If pressure data from multiple measurement points needs to be collected simultaneously on-site, configure the corresponding number of transmitters based on the number of measurement points, or customize a multi-channel integrated acquisition module (development requirements must be discussed in advance).

3. Confirmation of Power Supply Method: The standard model uses a 24V DC two-wire power supply, directly powered by the control system or power distribution circuit. Verify that the on-site power supply voltage falls within the 18–36V DC wide-voltage range to prevent malfunctions caused by excessively high or low voltages. For special scenarios without 24 V DC power, a 12 V DC version can be customized; this must be specified in advance.

4. Confirmation of Explosion-Proof Requirements: In flammable and explosive environments such as chemical, petroleum, and pharmaceutical industries, versions with intrinsically safe explosion-proof certification must be selected and used in conjunction with the corresponding safety barrier model; for general indoor non-explosive environments, the standard model can be selected directly without the need for additional explosion-proof accessories.

5. Installation Environment Confirmation:

Thread Specifications: Confirm the thread size of the on-site pipe or tank connection. The standard model features a G1/2 male thread; non-standard threads such as M20×1.5, G1/4, and NPT1/4 can be customized;

6. Medium Conditions: For high-viscosity, particulate-laden, or crystallizing media, prioritize a hard flat diaphragm structure to prevent clogging of the pressure-taking orifices; for corrosive media, verify the wetted materials—options include 316L stainless steel, Hastelloy, and tantalum;

7. Environmental Protection: For humid, dusty, or outdoor environments, verify the protection rating. The standard IP65 rating meets the requirements of most industrial applications; for special high-humidity or immersion scenarios, a version with a higher protection rating must be customized.

8. Range and Accuracy Confirmation: Select an appropriate range based on the actual on-site pressure range. It is recommended that the actual operating pressure does not exceed 70% of the range to prevent equipment damage from overpressure. For standard industrial monitoring applications, 0.5% FS accuracy is sufficient; for high-precision control applications (such as pharmaceutical processes and precision chemical engineering), upgrade to the 0.25% FS or 0.1% FS versions.

5.2. Industry-Specific Selection Recommendations

1. Chemical Industry Applications: For pressure measurement requirements involving high-viscosity slurries, particulate-laden media, and highly corrosive liquids in the chemical industry, the standard QDW90A-YG hard flat-diaphragm model is recommended. 316L stainless steel is the preferred material for wetted parts; for highly corrosive media, wetted parts made of Hastelloy can be selected. For flammable and explosive chemical environments, select versions with intrinsically safe explosion-proof certification and use them in conjunction with corresponding safety barriers. The measurement range should be customized based on the actual pressure range of reactors and pipelines, accommodating various operating conditions within the 0–0.6 MPa to 0–100 MPa range.

2. Power Industry Applications: For pressure measurement of impurity-laden wastewater and corrosive slurries in water treatment systems, desulfurization, and denitrification systems within the power industry, the QDW90A-YG standard flat-diaphragm model is recommended. Its IP65 protection rating makes it suitable for outdoor or damp pump room environments; It requires a 4–20 mA signal output for direct integration into power plant DCS systems. The measurement range should be selected based on the pipeline pressure rating, and a surge-protected version is available upon request to withstand on-site electromagnetic interference and voltage fluctuations.

3. Metallurgical Industry Applications: For pressure measurement of impurity-laden cooling water in blast furnace coal injection, continuous casting mold cooling water, and rolling mill hydraulic systems, as well as hydraulic oil pressure measurement, the QDW90A-YG rigid flat-diaphragm anti-vibration version is recommended. It features strong shock and vibration resistance, making it suitable for the high-vibration conditions typical of metallurgical sites; Available in medium-to-high pressure ranges from 0–2.5 MPa to 0–40 MPa, with a 4–20 mA output signal for integration into on-site PLC control systems. High-temperature versions are also available for applications involving high-temperature media.

4. Pharmaceutical Industry Applications: For sanitary-grade pressure measurement of media in pharmaceutical batching tanks, reactors, and purified water pipelines, the QDW90A-YG hard flat-diaphragm sanitary-grade custom model is recommended. Its flat-diaphragm structure, free of dead corners, supports in-place cleaning (CIP/SIP). Wetted parts are made of 316L stainless steel, and sanitary flange connections can be customized to comply with GMP production standards; Select the measurement range based on process requirements, prioritizing the 0.25% FS high-precision version to ensure process control accuracy. For standard pharmaceutical workshops that do not require explosion-proof certification, the general-purpose model is suitable; for flammable and explosive workshops, the explosion-proof version must be selected.

5. Smart Manufacturing Applications: For pressure monitoring in automated production lines, hydraulic equipment, and pneumatic systems, the QDW90A-YG standard hard flat-diaphragm model is recommended. It is compatible with media such as hydraulic oil and compressed air. Depending on control system requirements, choose either the 4–20 mA current signal or RS485 digital signal version; Select the measurement range based on the equipment's rated pressure. For example, hydraulic

equipment commonly uses ranges of 0–16 MPa or 0–25 MPa, while pneumatic systems typically use ranges of 0–1 MPa or 0–1.6 MPa. The system supports networking multiple devices to connect to a host computer system, enabling centralized monitoring and control of pressure data.

5.3 Common Selection Pitfalls and Guidelines for Avoiding Them
Pitfall 1: Ignoring isolation levels, leading to equipment damage from interference
Some users focus solely on range and signal type during selection, neglecting the need for isolation in the on-site electromagnetic environment. In environments with strong electromagnetic interference (such as near variable frequency drives or arc welders), failing to select a transmitter with signal isolation can easily result in signal fluctuations and equipment damage. Solution: In environments with strong electromagnetic interference, select models with electrical isolation or install an additional signal isolator, and ensure the transmitter housing is properly grounded.

Misconception 2: Incorrect signal range selection, leading to equipment damage from overpressure or insufficient accuracy
Some users are overly conservative when selecting a range. Choosing a range that is too large results in actual operating pressure being less than 10% of the full scale, causing a significant drop in measurement accuracy; conversely, selecting a range that is too small allows on-site pressure fluctuations to exceed the range, leading to equipment damage. Recommendation: Keep the actual operating pressure within the 30%–70% range of the measurement range. If shock pressure is present on-site, select a version with overpressure protection or increase the measurement range margin.

Misconception 3: Neglecting load matching, leading to abnormal signal transmission
Transmitters with 4–20 mA signal output must be matched to the input load resistance of the control system. If the load resistance exceeds the transmitter's maximum load range, it will cause output signal distortion and prevent normal transmission. Recommendation: When selecting a model, verify the control system's input load resistance. The maximum load resistance for standard transmitters is 500 Ω; if this range is exceeded, a high-load version must be customized, or the on-site wiring configuration must be adjusted.

Misconception 4: Selecting General-Purpose Models for Explosion-Proof Environments, Creating Safety Hazards
In flammable and explosive environments (such as explosion-proof workshops in the petroleum, chemical, and pharmaceutical industries), using general-purpose transmitters without explosion-proof certification poses serious safety hazards and violates workplace safety regulations. Recommendation to Avoid Pitfalls: In explosion-proof environments, models with intrinsically safe certification must be selected and used in conjunction with the corresponding safety barrier. Installation and wiring must strictly adhere to explosion-proof regulations.

Misconception 5: Ignoring medium characteristics leads to incorrect selection of wetted materials or structures
For high-viscosity, particulate-laden, or crystallizing media, continuing to use traditional transmitters with pressure-tapping ports leads to frequent equipment blockages; for corrosive media, selecting standard stainless steel wetted parts results in equipment corrosion and damage. Recommendations to Avoid Pitfalls: In applications involving special media, the composition and characteristics of the medium must be clearly specified. Prioritize transmitters with a rigid flat-diaphragm structure. For corrosive media, select suitable wetted materials such as Hastelloy or tantalum.

5.4. Customization Options
1. Custom Signal Options: In addition to the standard 4–20 mA current signal, we support custom 0–5 V and 0–10 V voltage signals, RS485 Modbus digital signals, and HART protocol signals to meet the interface requirements of various control systems; For applications requiring multiple signal outputs (e.g., simultaneous 4-20mA and RS485 signals), a dual-output version can be customized to meet both local monitoring and remote transmission needs.

2. Custom Solutions for Non-Standard Operating Conditions:
High-Temperature Conditions: A wide-temperature version (-40°C to 150°C) can be customized for pressure measurement of high-temperature media;
Highly Corrosive Environments: Customizable wetted parts made of Hastelloy or tantalum to handle highly corrosive media such as strong acids and alkalis;
Sanitary Applications: Customizable connection methods including sanitary chucks and quick-connect fittings, featuring a dead-space-free design that complies with hygiene standards for the food and pharmaceutical industries;
Ultra-High-Pressure Applications: Customizable ultra-high-pressure range versions (0–160 MPa, 0–250 MPa) for applications such as hydraulic presses and high-pressure pipelines;
Special Mounting Methods: Customizable non-standard configurations including flange connections, threaded extension rods, and split-type installations to accommodate special piping and tank mounting scenarios.

3. Multi-Channel Integrated Custom Solutions: To meet the demand for centralized monitoring of multiple measurement points, multi-channel pressure acquisition modules can be customized. These integrate the signal acquisition functions of multiple QDW90A-YG transmitters and transmit data to the host system via RS485 or Ethernet interfaces, reducing on-site wiring complexity and enabling centralized management and analysis of pressure data. Additionally, integrated versions with display and alarm functions can be customized to enable local real-time monitoring and out-of-limit alarms.

4. Other Customization Services: We support customization of versions with digital display capabilities to enable real-time on-site pressure data visualization; versions with surge and lightning protection are available to accommodate outdoor and high-lightning-risk environments; and various wiring configurations—such as HART connectors, direct wiring, and aviation connectors—can be customized to meet different control cabinet wiring requirements.

VI. Installation and Commissioning Guidelines
6.1. Pre-installation Preparation
1. Verification of Components
After unpacking, verify the completeness of all standard components one by one to ensure the main unit, sealing gaskets, threaded installation seals, user manual, and certificate of conformity are present. For custom versions, additionally verify non-standard accessories such as sanitary chucks, adapter flanges, extended threaded rods, and explosion-proof accessories. Installation may proceed only if there are no missing parts, no visible dents or scratches, and no deformation or scratches on the diaphragm.

2. Environmental Inspection
The installation site must be well-ventilated and dry, free of strong corrosive gases and excessive dust accumulation. Avoid locations exposed to direct high-temperature heat sources, open areas subject to unprotected rain, and areas near pumps with strong vibrations. Ensure that the threads on pipe and tank connections are intact, with no stripped threads or cracks, and verify that the internal medium poses no risk of sudden high-pressure surges. For explosion-proof applications, confirm that the site's explosion-proof rating matches the product's explosion-proof version and complies with on-site explosion-proof zone regulations.

3. Tool List
Prepare an adjustable wrench, Allen wrench, Phillips screwdriver, multimeter, electrical tape, cable ties, shielded signal cable, grounding copper wire, PTFE tape, and a pressure calibrator. For wiring installation, ensure cable trays, cable clamps, and insulating sleeves are available to ensure neat wiring and reliable insulation.

4. Safety Precautions
Before installation, the main power supply to the on-site equipment must be disconnected, and it must be confirmed that the circuit is de-energized. The transmitter may only be installed or removed after the pipeline pressure has been fully relieved; installation or removal under pressure is strictly prohibited. In explosion-proof areas, strictly adhere to explosion-proof construction regulations; opening the cover while energized or modifying terminal connections without authorization is prohibited. For installations at heights, implement protective measures to prevent falls and avoid injury from falling tools. When wiring, distinguish between high-voltage and low-voltage circuits; mixing or misconnecting wires is strictly prohibited.

6.2 Standard Installation Procedure
1. Mounting the Transmitter Body
Clean any debris from the threaded surfaces of the pipe or tank connections. Apply an appropriate amount of PTFE tape or install the standard sealing gasket. Align the transmitter body with the connection, then manually screw it into place. Use a wrench to grip the hexagonal tightening point and tighten it moderately. Never directly tighten the instrument head or electrical connectors to prevent damage to the internal core or deformation of the diaphragm. Install the unit in a vertical or horizontal orientation with neat alignment to facilitate future maintenance and reading.

2. Wiring Specifications
This product uses a two-wire 4–20 mA standard configuration, with shared terminals for both the power supply and signal circuits:
Connect the power supply positive terminal to the transmitter's power supply terminal. Connect the power supply negative terminal and the

signal negative terminal (which share the same terminal) to the analog input terminal of the control system. There is no separate input terminal; as this is a passive pressure sensing structure, only power supply and signal output wiring are required. For the RS485 custom version, the A and B communication terminals are additionally distinguished; connect them strictly according to the labels to the host computer or PLC communication port.

3. Grounding Requirements
The transmitter's metal housing must be reliably grounded using a dedicated yellow-green copper grounding wire connected to the equipment's grounding busbar; the grounding resistance must not exceed 4Ω. The outer shield of shielded cables must be grounded at a single point; grounding at both ends is prohibited to prevent loop currents from introducing interference. In explosion-proof environments, grounding must be independently installed and separated from process equipment grounding to ensure interference immunity and explosion-proof safety.

3.. Wiring Diagram Text Specifications
1. Standard General-Purpose Wiring Specifications
DC 24V power supply positive terminal → Transmitter terminal +
DC 24V power supply negative terminal → Transmitter terminal -
Connect the transmitter terminal - to the negative terminal of the PLC/DCS analog input to form a two-wire closed-loop circuit for power supply and signal transmission.

2. Dedicated Wiring Specifications for Isolated Models
The isolated version features internal electrical isolation of power, signals, and the housing. External wiring still follows the two-wire method, but the housing ground terminal is connected separately to the system protective ground—not shared with the signal negative terminal—to enhance common-mode interference immunity.

3. Shielded Cable Grounding Procedure
Connect the inner signal conductor of the shielded cable to the signal terminal. Ground the outer shield at a single point only at the control cabinet end; leave the shield floating (ungrounded) on the transmitter side. This prevents interference drift and signal fluctuations caused by grounding at both ends.

4. Comparison of Common Wiring Practices (Correct vs. Incorrect)
Correct Wiring: Positive and negative terminals connected correctly in a two-wire system; shield grounded at a single point; housing grounded independently and reliably; power and signal cables routed in separate cable trays.
Incorrect Wiring: Positive and negative terminals reversed; shield grounded at both ends; power control cables and signal cables routed in the same conduit; no housing grounding; arbitrary shorting of terminals.

6.4 Power-On Commissioning Procedure
1. No-Load Test
After confirming that the installation is secure and the wiring is correct, slowly apply the 24 VDC operating power supply. Observe the device's operating status under no-medium pressure conditions; ensure there is no overheating, abnormal noise, or sparking/electrical leakage, and that the device is in a normal standby no-load state.

2. Signal Verification
Connect a multimeter in series with the 4–20 mA loop; the standard zero-point output under no-load conditions should be close to 4 mA. Connect a pressure calibrator to apply standard pressure in stages, verifying the 25%, 50%, 75%, and 100% points of the range. The corresponding current output should be linear and stable, with no sudden jumps or drift.

3. Indicator Light Status Assessment
When power is normally supplied, the power indicator light remains steady; when the signal is outputting normally without faults, the indicator light remains steady and on. If the indicator light flashes or flickers, this indicates loose wiring, unstable supply voltage, or excessive on-site interference. If the indicator light does not illuminate, check for a power supply open circuit, reversed polarity, or equipment damage.

4. Accuracy Calibration Method
Zero Point Deviation: Under no-load conditions, fine-tune the zero-point potentiometer to correct the output to the standard 4 mA;
Full-Scale Deviation: Apply the rated full-scale pressure and fine-tune the full-scale potentiometer to calibrate the output to 20 mA;
After calibration, perform repeated multi-point retests to ensure that the full-range linear accuracy meets the 0.5% FS standard. Once calibration is complete, seal the adjustment knobs to prevent accidental changes in the field.

6.5 Installation Precautions
1. Never exceed the rated supply voltage. Prolonged operation at voltages exceeding 36 V DC will burn out the internal conditioning circuitry and sensor element, causing permanent damage.

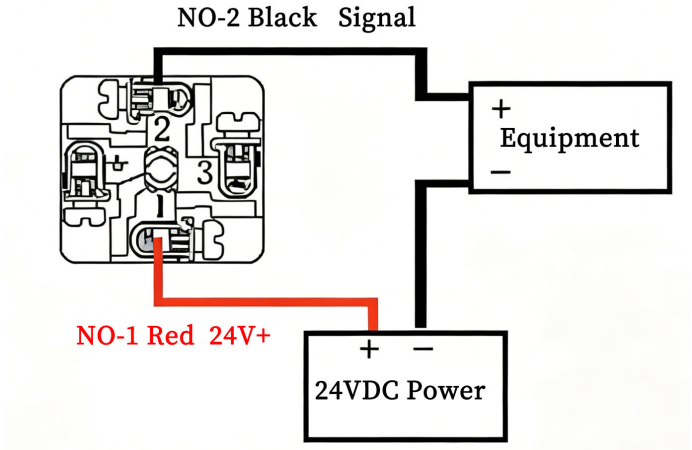
2. Never force installation under pressure exceeding operating conditions. Instantaneous overpressure shocks can cause deformation of the hard-sealed diaphragm, measurement inaccuracies, or even render the device inoperable.

3. Avoid routing the instrument in the same conduit or cable tray as high-voltage circuits such as those from variable frequency drives, contactors, or high-power motors to prevent signal drift or value fluctuations caused by electromagnetic interference.

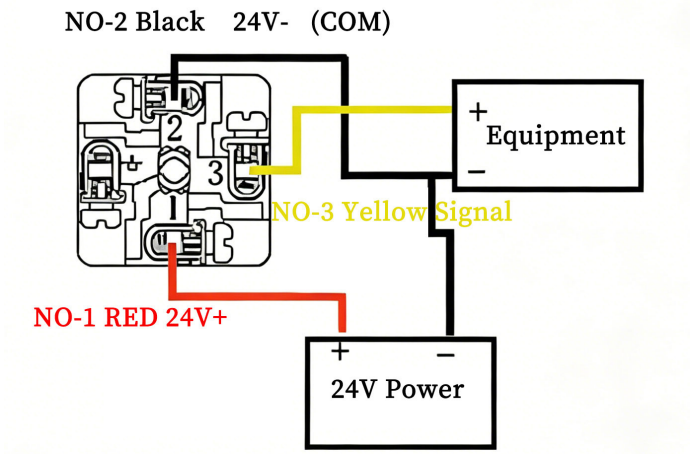
4. In humid, outdoor, or open-air environments, ensure that the sealing rings on electrical connectors are intact and implement proper waterproofing and rain protection. Do not install the instrument in a manner that exposes it to direct rain or immersion in standing water.

5. Do not disassemble the meter head or remove the diaphragm structure without authorization, as this will compromise the seal and explosion-proof performance and void the product warranty.

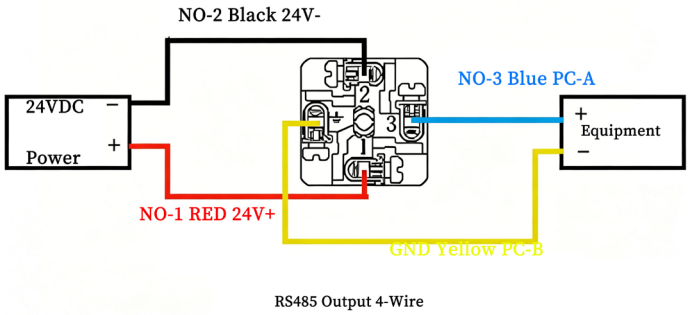
6. During installation, do not grip the meter head's plastic components or forcefully twist the electrical outlet port, as this may cause internal wiring to break, compromise the seal, and allow water ingress.



4-20mA 2-Wire Current Signal Output



3-Wire Voltage Signal Output



RS485 Output 4-Wire

VII. Recommendations for Daily Use & Operation and Maintenance

7.1 Key Points for Daily Inspections

1. Visual Inspection of Equipment

Conduct daily visual inspections of the transmitter's overall appearance. Check the housing for rust, deformation, or cracks; verify that the O-rings on electrical connectors are intact and not loose; and inspect the cable exit points for signs of aging, cracking, or water ingress and condensation. Ensure the measuring surface of the hard flat diaphragm remains clean, free of debris, and without scratches or dents. If any diaphragm deformation or corrosion spots are detected, record them immediately and follow up.

2. Signal Stability Monitoring

Monitor pressure readings in real time on the central control PLC, DCS, or on-site digital display instruments. Observe whether the data is stable, without frequent fluctuations, unexplained drifts, or step-like variations; If abnormalities occur, such as fluctuating readings, fixed-point shifts, or a baseline reading under no-load conditions, immediately investigate wiring, grounding, and on-site electromagnetic interference to prevent disruption to process control.

3. Temperature and Humidity Monitoring

Continuously monitor whether the ambient temperature at the installation site and the actual temperature of the medium remain within the product's rated operating range, and prevent prolonged operation at extremely high or low temperatures; Inspect the air humidity in the installation area; in high-humidity environments, pay close attention to whether condensation or moisture has formed inside the junction box to prevent faults caused by circuit oxidation or reduced insulation.

4. Visual Inspection of Operating Status

Check the status of the power supply indicator light; under normal operating conditions, the light should remain steadily lit. If the light flickers, goes out, or varies in brightness, this indicates unstable power supply, loose connections, or internal circuit abnormalities; shut down the system immediately for troubleshooting.

5. Operating Load Inspection

Verify the actual operating pressure on-site. The long-term operating pressure must not exceed the upper limit of the product's rated range; prolonged operation at full scale or beyond the rated range is strictly prohibited. In operating conditions with intermittent water hammer or pressure surges, pay close attention to instantaneous pressure peaks and implement buffer protection measures in advance.

7.2 Periodic Maintenance Plan

1. Routine Cleaning Schedule

In standard industrial environments, perform surface cleaning every 3 months; in environments with heavy dust, high humidity, or chemical corrosion, clean monthly; in food and pharmaceutical sanitary-grade applications, clean in conjunction with the production line's CIP/SIP cycles to ensure the hard flat membrane surface remains free of media scaling and material residue. Use a soft cloth for cleaning; never scrape the flat membrane mirror surface with hard objects.

2. Wiring Tightness Inspection

Every six months, inspect and retighten the transmitter's terminal blocks, grounding terminals, and shielding cable connectors; check for loose terminals, oxidation/blackening, or exposed wire cores. Re-crimp loose terminals and treat oxidized contacts with rust removal and anti-oxidation agents to prevent signal interruption or drift caused by poor contact.

3. Inspection of Seals and Protective Components

Every six months, inspect the electrical connector O-rings, threaded sealing gaskets, and cable entry protective sleeves for signs of aging. Immediately replace any components that have hardened, cracked, or deformed to ensure the IP65 protection rating remains effective and prevent moisture and dust from entering the internal circuitry.

4. Recommendations for Accuracy Retesting and Calibration

Under standard industrial conditions, perform accuracy re-measurement and zero-point and full-scale calibration every 6 to 12 months; for precision chemical, pharmaceutical, and critical metering control points, calibrate every 3 months. Use a standard pressure calibrator to verify the zero-point and 25%, 50%, 75%, and 100% range outputs at each point. If errors exceed tolerances, perform fine-tuning and calibration promptly, and maintain detailed maintenance records.

5. Installation Tightness Inspection

Annually inspect the tightness of the transmitter's threaded connections. At locations with significant pipeline vibration, conduct a thorough inspection for looseness or leaks. If necessary, install anti-loosening washers or reinforce the mounting brackets to prevent long-term vibration from causing joint loosening or diaphragm displacement.

7.3 Long-Term Maintenance Tips

1. Long-Term Dust and Moisture Protection

Equipment that is idle or on standby for extended periods should be stored in a dry, well-ventilated indoor environment and covered with a dust-proof protective cover; avoid outdoor storage. For equipment in operation at the site, ensure the junction box remains fully sealed, and seal the cable entry points with sealant. During periods of high humidity or the rainy season, place desiccant inside the junction box to prevent condensation from corroding the circuit boards.

2. Optimized Maintenance for Interference Resistance

Use shielded twisted-pair cables for the entire signal line. Strictly adhere to single-point grounding specifications; do not ground the shield at both ends. Ensure the transmitter housing is reliably and independently grounded, with grounding resistance controlled within 4Ω. Route signal cables in separate conduits or ducts from high-voltage power lines (such as those for inverters, motors, and contactors), maintaining safe clearances and avoiding parallel routing to minimize electromagnetic interference at the source.

3. Specialized Protection for Extreme Environments

In high-temperature conditions, keep equipment away from direct heat sources such as boilers and furnaces; install heat-insulating brackets or heat-dissipating buffer structures when necessary; For low-temperature outdoor conditions, implement insulation and anti-freeze protection to prevent media from freezing and exerting pressure on the diaphragm; For highly corrosive conditions, regularly inspect corrosion at wetted parts and periodically assess whether to upgrade to Hastelloy or tantalum diaphragm versions; For outdoor conditions exposed to rain or dust, install an outdoor protective enclosure to extend the service life of the entire unit.

4. Best Practices for Extended Service Life

Do not disassemble the meter head or remove the diaphragm structure without authorization, and do not arbitrarily adjust internal potentiometers; when disassembling or relocating equipment, ensure the system is depressurized and de-energized first; disassembly or installation under pressure or while energized is strictly prohibited; for measurement points not in use for extended periods, promptly disconnect power and seal the threaded ports to prevent debris from entering and damaging the flat diaphragm measurement surface.

VIII. Troubleshooting & Emergency Response

8.1 List of Common Faults

The transmitter has no output signal; the central control instruments and PLC display no values.

Signal zero drift; values persistently deviate; a baseline reading is present under no-load conditions; unable to zero.

Measured values fluctuate erratically; large fluctuations; irregular jumps; signal distortion.

Power indicator light does not illuminate; remains off; flashes frequently; brightness is unstable.
System frequently triggers pressure over-limit alarms or false alarms
Measurement error significantly increases after temperature changes; severe temperature drift
Measurement values deviate beyond acceptable limits when compared to a standard gauge under the same operating conditions
Moisture and condensation cause intermittent signal loss; signal is on and off intermittently

8.2. Analysis of Fault Causes
1. Wiring Errors
Reversed polarity, loose or loose connections at terminals, both ends of the shielding wire grounded, high- and low-voltage cables routed in the same cable tray, signal lines running parallel to power lines causing interference, and poor contact due to oxidation of terminal blocks.

2. Power Supply Abnormalities
Supply voltage below 18 V DC or above 36 V DC; excessive power supply ripple; overloaded power distribution; excessive circuit voltage drop; unstable power supply module; transient overvoltage spikes.

3. Signal Overload and Impedance Mismatch
Input load resistance of the downstream PLC/DCS exceeds the transmitter's permissible range; range selection is too large or too small; actual pressure exceeds the measurement range; long-term overloading causes micro-deformation of the sensing element.

4. Environmental Interference
Strong electromagnetic interference from on-site variable frequency drives, high-power motors, or arc welders; installation location too close to vibration sources; High temperature and humidity, dust and corrosion, exposure to rain and water ingress; poor grounding, lack of independent protective grounding.

5. Equipment Body Damage
Hard flat diaphragm scratched or deformed by impact with hard objects; internal conditioning circuit burned out due to moisture; sensor element aging, zero-point temperature drift failure; seal failure leading to water ingress and condensation; unauthorized disassembly and modification of internal components causing parameter disruption.

8.3 Step-by-Step Troubleshooting
1. Fault: No output signal, completely no reading
Troubleshooting Steps
① First, confirm that power is disconnected at the site; check whether terminal connections are loose or wires are broken;
② Use a multimeter to measure the supply voltage and confirm it is within the normal range of 18–36 V DC;
③ Verify whether the positive and negative terminals of the two-wire system are reversed, and swap them to correct the connection;
④ Check whether the downstream instruments or PLC channels are damaged, and whether the channel addresses are configured incorrectly;
⑤ Disassemble the electrical connectors to inspect for water ingress, oxidation, or burn marks inside.
Remedial Actions
Re-tighten terminals, replace damaged signal wires, and correct positive and negative polarity connections; if the power supply is abnormal, replace the power supply module; if a channel is damaged, switch to a backup analog channel.
Emergency Workaround
Temporarily replace with a spare QDW90A-YG transmitter of the same model, quickly swap the interfaces and wiring to resume production, and send the faulty unit offline for inspection.

2. Fault: Signal drift, failure to return to zero under no-load conditions, persistent value deviation
Troubleshooting Steps
① Fully depressurize and let the unit stand; observe whether the zero point returns on its own;
② Check for installation misalignment or stress from the piping being transmitted to the diaphragm;
③ Check for sudden changes in ambient temperature that may cause temperature drift;
④ Confirm whether long-term out-of-range operation has caused elastic fatigue in the sensor element;
⑤ Check for poor grounding or incorrect shielding wire connections.
Remedial Actions
Reinstall according to specifications and eliminate mechanical stress from the piping; recalibrate the zero point; optimize single-point grounding and organize shielding wire routing; return the unit to the factory for calibration if the deviation is severe.
Emergency Workaround
Temporarily fine-tune the zero-point compensation on-site and replace with a spare unit during a scheduled shutdown window.

3. Fault: Value Jitter, Large Fluctuations, Interference, and Distortion
Troubleshooting Steps
① Check whether signal cables are routed in the same conduit or cable tray as the inverter or motor power cables;
② Check whether the shielding layer is grounded at both ends, creating loop current interference;
③ Measure whether the ground resistance exceeds the standard and whether the enclosure is reliably grounded;
④ Check whether there is frequent start-stop operation of high-power equipment or welding work on-site.
Remedial Measures
Route signal cables through separate low-voltage cable trays, maintaining a safe distance from high-voltage lines; ground the shielding wire to a single point within the control cabinet; re-establish an independent protective ground for the equipment; temporarily isolate the signal circuit during on-site welding operations.
Emergency Workaround
Temporarily install an external signal isolator to filter out interference and stabilize the display readings.

4. Fault: Abnormal Indicator Lights (Not Lit / Flashing / Flickering)
Troubleshooting Steps
① Check if the supply voltage is too low or highly fluctuating;
② Inspect terminal blocks for loose connections or oxidation;
③ Check for moisture or condensation inside electrical connectors;
④ Investigate whether a momentary overvoltage has caused circuit breakdown.
Remedial Measures
Replace with a stable DC power supply; sand down oxidized terminals and re-crimp wires; seal junction boxes to prevent moisture ingress; return the unit to the factory for repair if the circuit is damaged.
Emergency Workaround
If no spare unit is available, temporarily ensure a stable power supply and tighten the wiring to maintain basic measurement functionality.

5. Fault: Frequent False Alarms Due to Pressure Exceeding Limits
Troubleshooting Steps
① Determine whether the issue stems from actual process pressure fluctuations or abnormal transmitter signals;
② Verify that the range settings and alarm threshold parameters are not set improperly;
③ Investigate whether interference, transients, or drift are causing false high readings;
④ Check whether scaling or deposits on the flat diaphragm surface are affecting sensing.
Remedial Actions
Re-calibrate the system alarm thresholds; clean scaling and debris from the flat diaphragm surface; resolve electromagnetic interference and grounding issues; calibrate the transmitter accuracy.
Emergency Workaround
Temporarily adjust the alarm thresholds appropriately to ensure uninterrupted production line operation, followed by a thorough investigation and rectification afterward.

6. Fault: Significant temperature drift; temperature variation error clearly exceeds limits
Troubleshooting Steps
① Verify whether a standard version unsuitable for wide-temperature conditions was selected;
② Check if the installation location is exposed to direct radiation from high-temperature heat sources;

③ Determine if the device has undergone long-term aging without calibration.
Remedial Measures
Move away from heat sources and add thermal insulation; perform annual accuracy retesting and temperature compensation calibration; replace with a custom wide-temperature version for harsh temperature zones.

8.4 After-Sales Repair Guidelines
1. Criteria for Determining a Malfunction (Meet any one of the following to request repair)
No output or inability to zero the device after thoroughly checking wiring, power supply, and cabling;
Deformation, scratches, or damage to the hard-coated film caused by external impact;
Water ingress, burn damage, blackened circuit boards, or obvious physical damage;
Severe accuracy deviation that cannot be corrected through on-site calibration;
Frequent malfunctions or intermittent failures that persist even after ruling out environmental and wiring issues.

2. Repair Process
Record the equipment model: QDW90A-YG, installation conditions, medium type, and fault symptoms;
Take photos of the equipment’s exterior, terminal blocks, and on-site installation environment;
Contact the manufacturer’s after-sales service, providing the model, purchase date, fault description, and on-site photos;
Remove the faulty equipment as instructed, pack it securely, and return it for inspection and repair;
After repair, parameters will be recalibrated, and the unit will be returned in its original condition, ready for immediate installation and use.

3. Warranty Coverage
Under normal operating conditions and excluding human-caused damage, free repair and calibration are provided within the warranty period;
Material corrosion, natural aging, and normal failures of circuit components are covered under warranty;
Damage resulting from accidental impact, unauthorized disassembly, forced installation under pressure, improper use involving overpressure or overheating, or unauthorized modification of wiring is not covered by the free warranty; however, paid repair services are available.

4. Usage Guidelines
When troubleshooting any issues, always follow the principle of first disconnecting power, then relieving pressure, and finally disassembling the unit. In explosion-proof environments, it is strictly prohibited to open the cover while the unit is energized or to modify the wiring without authorization, to avoid safety hazards and voiding the warranty.