QDW90A-HF Corrosion-Resistant Pressure Transmitter

1 Product Definition

The QDW90A-HF and QDW90A-HF-PP are industrial corrosion-resistant pressure transmitters designed for automated measurement in environments with highly corrosive media. Featuring a ceramic dry-type piezoresistive sensing element at their core, these products utilize two different corrosion-resistant wetted materials—PTFE (polytetrafluoroethylene) and PP (polypropylene)—to linearly convert the physical pressure of the measured medium into a standard industrial electrical signal. This enables real-time pressure acquisition and remote transmission, supplying data to PLCs, DCSs, and data acquisition systems for monitoring, interlocking, and control. These two models are specifically designed to address the industry challenge where standard stainless steel pressure transmitters cannot withstand corrosion from acids, alkalis, and salt solutions—which often leads to diaphragm perforation and instrument failure. They are primarily used for gauge pressure measurement of liquids and certain corrosive gases, and are available in both field-mounted (non-display) and optional local digital display versions.

1.2 Working Principle

The pressure of the corrosive medium being measured acts on the surface of the corrosion-resistant isolation diaphragm. The pressure is transmitted to the ceramic piezoresistive sensing element, causing the internal resistance of the ceramic core to change in response to the pressure. The transmitter's internal signal conditioning circuit detects these resistance changes. After temperature compensation and linear correction, the signal is converted into a standardized 4–20 mA two-wire analog signal or an RS485-Modbus-RTU digital signal for output. The entire sensing chamber is designed without silicone oil, eliminating the risks of corrosion and contamination of the oil-filled medium, as well as medium penetration and leakage. As the medium pressure increases, the output signal value increases linearly in tandem; the downstream control system can read the signal and calculate the actual pressure value.

1.3 Core Value and FAQs

Q: Why do standard 316L stainless steel pressure transmitters frequently fail during field use?

A: Process media containing acids, alkalis, chloride ions, and oxidizing agents cause chemical corrosion of the stainless steel wetted parts, leading to diaphragm rupture and instrument failure. The QDW90A series features an all-plastic, corrosion-resistant wetted-part design that avoids the issue of chemical corrosion in metal materials.

Q: In high-temperature, highly corrosive environments, some corrosion-resistant instruments on the market experience zero-point drift or material swelling. How can this be addressed?

A: Select the QDW90A-HF PTFE model. PTFE is highly chemically inert and resistant to deformation and swelling at high temperatures. Combined with a temperature compensation algorithm, it ensures stable measurement in high-temperature, corrosive environments. The PP-material QDW90A-HF-PP model should not be used in high-temperature, highly oxidative, or organic solvent environments.

Q: For an environmental wastewater treatment project with a limited budget and media consisting only of dilute acids, alkalis, and brine, how can equipment costs be controlled?

A: Select the QDW90A-HF-PP polypropylene (PP) corrosion-resistant version, which meets the measurement requirements for weakly corrosive wastewater at room temperature and reduces equipment procurement costs compared to the PTFE version.

Q: How should we address measurement inaccuracies when dealing with viscous chemical liquids that are prone to crystallization and scaling?

A: Prioritize the QDW90A-HF PTFE version. The low-friction PTFE surface prevents crystallized materials from adhering, reducing zero-point drift caused by material buildup and lowering the frequency of on-site cleaning and maintenance.

Q: Is it necessary to choose an oil-filled diaphragm transmitter for corrosive conditions?

A: No. This series uses a dry ceramic, oil-free sensor element, which prevents cross-contamination between the isolating oil and the corrosive medium, thereby extending the instrument's service life.

1.4 Basic Understanding of Automation Control Instruments

1.4.1 The Importance of Product Selection for Reliability

Incorrect selection for corrosive environments can directly cause short-term instrument failure, leading to measurement errors, false interlock activations, equipment shutdowns, and even safety risks. Correctly distinguishing between the PTFE (polytetrafluoroethylene) version and the PP (polypropylene) version based on the chemical properties, temperature, and pressure range of the medium is the foundation for ensuring the long-term stable operation of the entire automation system.

2: Key Product Parameters & Specifications

2.1 Input Specifications

Pressure is measured as gauge pressure, and the device supports the measurement of negative and low pressures.

The QDW90A-HF (PTFE version) has a measurement range of -100 kPa to 2 MPa;

the QDW90A-HF-PP (PP version) has a measurement range of -100 kPa to 4 MPa.

The overload pressure for both models is 150% of full scale; the burst pressure depends on the measurement range. Prolonged operation exceeding the overload pressure is prohibited.

For wetted parts, the QDW90A-HF features PTFE (polytetrafluoroethylene) as the wetted material; the QDW90A-HF-PP features PP (polypropylene) as the wetted material.

Standard process connection threads are M20×1.5 and G1/2; custom flanges are available upon request.

2.2 Measurement Performance

Accuracy class: Class 0.5 (±0.5% FS); the QDW90A-HF is available in a high-precision Class 0.2 version.

The QDW90A-HF has a temperature compensation range of 0°C to 70°C; the medium's long-term operating temperature range is –20°C to 120°C.

The QDW90A-HF-PP has a temperature compensation range of 0°C to 60°C; the medium's long-term operating temperature range is –10°C to 80°C, though long-term operation at temperatures not exceeding 70°C is recommended.

Annual long-term stability: ±0.2% FS per year for the QDW90A-HF; ±0.3% FS per year for the QDW90A-HF-PP.

2.3 Output and Control

Analog output: 2-wire 4–20 mA; digital output: RS485 Modbus-RTU.

An optional local LCD digital display can be installed to enable on-site reading of pressure values.

No relay switching control output is provided; the device functions solely as a signal transmitter.

2.4 Communication and Power Supply

Standard power supply voltage: 12 V–24 V DC; typical operating voltage: 24 V DC.

Power consumption: The 4–20 mA two-wire version is loop-powered; the RS485 digital output version has a total power consumption of less than 1 W.

Electrical interfaces include optional HART connectors, aviation connectors, and waterproof straight-through cables.

An intrinsically safe version (Ex ia IIC T6) is available; explosion-proof models must be used with a corresponding certified safety barrier.

2.5 Construction and Environment
Protection rating: IP65.
Operating temperature range: QDW90A-HF: –20°C to +85°C; QDW90A-HF-PP: –10°C to +70°C.
Storage temperature range: –30°C to +90°C.
Housing materials include aluminum alloy and all-plastic corrosion-resistant options.
Installation is via direct threaded connection to process piping; wall-mounted installation using brackets is also supported.



Approximate total weight: Aluminum alloy housing: approx. 320 g; all-plastic housing: approx. 210 g.

Isolation Specifications: This product provides basic isolation between the signal side and the measurement ground, as well as electrical isolation between the sensing circuit and the housing, to reduce ground-loop interference in the field. It does not provide high-voltage electrical isolation.

3: Application-Specific Selection Guide

3.1 Key Selection Criteria
First, determine the signal type:
If the project system uses traditional PLC analog modules, select a 4–20 mA two-wire output; if bus networking is required for data acquisition from multiple devices, select an RS485–Modbus digital output.

Second, confirm the measurement range:
It is recommended that the actual process operating pressure fall within 30%–70% of the transmitter's full scale; avoid prolonged operation near full scale or at extremely low pressures.

Third, confirm the power supply method:
Ensure a stable 12–24 V DC power supply at the field site. For two-wire 4–20 mA circuits, verify the maximum loop load allowed by the downstream data acquisition module.

Fourth, confirm explosion-proof requirements:
In chemical explosion-hazard zones, the intrinsically safe version must be selected; standard non-explosion-proof models must not be used in such areas.

Fifth, confirm the installation environment: Determine the medium temperature and chemical composition to decide whether to use the PTFE (polytetrafluoroethylene) or PP (polypropylene) version.

3.2 Defining Measurement Requirements and Process Conditions
It is necessary to determine the composition of the process medium—whether it consists of dilute acids or bases, concentrated strong acids or strong bases, salt solutions, or organic solvents. The QDW90A-HF PTFE version is resistant to the vast majority of strong acids and strong bases, hypochlorites, and most organic solvents; the QDW90A-HF-PP model is suitable only for dilute acids and alkalis, brine, and wastewater at room temperature. Contact with concentrated nitric acid, strong oxidizing agents, and organic solvents such as benzene and ketones is strictly prohibited, as these media can cause the PP material to swell, crack, and fail.
Simultaneously verify the actual maximum operating temperature of the medium; if the medium temperature exceeds 80°C, only the QDW90A-HF PTFE model may be selected.

3.3 Assessing On-Site Environmental Suitability
Determine whether the on-site environment is classified as an explosion-hazardous area; select intrinsically safe models for such areas;
Assess environmental humidity; ensure waterproof sealing of wiring ports in high-humidity or open-air outdoor conditions.
Assess whether electromagnetic interference from high-power inverters or high-power motors is present on-site; prioritize the use of shielded cables in cases of severe interference.

3.4 System Compatibility and Interface Matching
Confirm the input signal specifications of the control system and the cable length; for long-distance signal transmission, prioritize the use of shielded twisted-pair cable. Confirm the thread specifications of process interfaces; standard sizes include M20×1.5 and G1/2, while special flange interfaces require customization.

3.5 Installation Space and Maintenance Convenience
Reserve sufficient space at the installation location for disassembly and assembly operations. If direct on-site reading of pressure values is required, select an optional LCD digital display. Install the device in a location that avoids areas prone to medium crystallization and deposition, as well as direct impact of large solid particles on the diaphragm, to minimize future maintenance efforts.

3.6 Selection Based on Industry Applications
For chemical and fine chemical processes, chlor-alkali processes, high-temperature acid pickling tanks, and processes involving organic solvents—where the medium contains concentrated acids, concentrated alkalis, or strong oxidizing agents, and the medium temperature is high—select the QDW90A-HF PTFE corrosion-resistant model.

For pharmaceutical processes involving corrosive liquids and hazardous waste treatment processes where highly corrosive, high-temperature media are present, select the QDW90A-HF.

For wastewater treatment plants, electroplating cleaning tanks, and PCB cleaning processes—where the media consist of room-temperature dilute acids, alkalis, and saline wastewater, cost control is a priority, and there are no organic solvents or high-temperature conditions—select the QDW90A-HF-PP polypropylene corrosion-resistant model.

For wastewater treatment in metallurgical hydrometallurgy, select the QDW90A-HF-PP for weakly corrosive wastewater at ambient temperatures; for high-temperature, highly corrosive leaching processes in hydrometallurgy, select the QDW90A-HF.

For complete sets of environmental protection equipment in smart manufacturing, where the process medium consists of ambient-temperature wastewater, prioritize the QDW90A-HF-PP; if the equipment must accommodate multiple corrosive media and experience significant temperature fluctuations, select the QDW90A-HF.

For auxiliary water treatment in desulfurization and denitrification processes

in the power industry, select the QDW90A-HF-PP for ambient-temperature wastewater applications; for measuring high-temperature, highly corrosive slurries, select the QDW90A-HF.

3.7 Common Selection Misconceptions

The first misconception is neglecting the corrosion resistance rating of the material:

Directly selecting a PP model for applications involving strong oxidizing agents or organic solvents can cause rapid instrument failure.

The second misconception involves selecting the wrong pressure range:

If the range is too large and the actual process pressure is too low, measurement accuracy deteriorates; if the range is too small, process overpressure can damage the transmitter.

The third misconception is neglecting load matching: If the load on a 4–20 mA two-wire circuit exceeds the transmitter's maximum allowable load, signal distortion occurs.

The fourth misconception involves explosion-proof applications:

Selecting standard, general-purpose models instead of explosion-proof instruments for hazardous areas creates safety hazards.

The fifth misconception is ignoring medium temperature:

Long-term operation of the PP version in media exceeding 80°C causes material softening and zero-point drift.

3.8 Customization Recommendations

For special non-standard flange connections, special low-pressure ranges, special output protocols, or multi-channel integrated data acquisition solutions, provide the manufacturer with process conditions, medium parameters, pressure range, temperature, mounting interfaces, and system signal requirements for evaluation and customization. For media with unknown chemical compositions, it is recommended to provide a medium sample for material compatibility evaluation to confirm whether PTFE or PP is suitable for the operating conditions.

4: Installation and Commissioning Specifications

4.1 Pre-installation Preparation

4.1.1 Check the accessories; unpack the unit and verify the model number on the nameplate to confirm whether the model is QDW90A-HF or QDW90A-HF-PP. Verify that the measurement range, output signal, and threaded connections match the purchase order. Take inventory of the fittings and O-rings, and inspect the liquid-contacting surfaces of the housing for any dents or damage.

4.1.2 Environmental Inspection: Verify that the medium temperature and ambient temperature at the installation location fall within the product's specified range. For explosion-proof applications, confirm that the zone classification matches the explosion-proof model.

4.1.3 Tool Checklist: Prepare appropriate wrenches, shielded twisted-pair cable, and a multimeter. For explosion-proof environments, prepare wiring tools that comply with explosion-proof regulations.

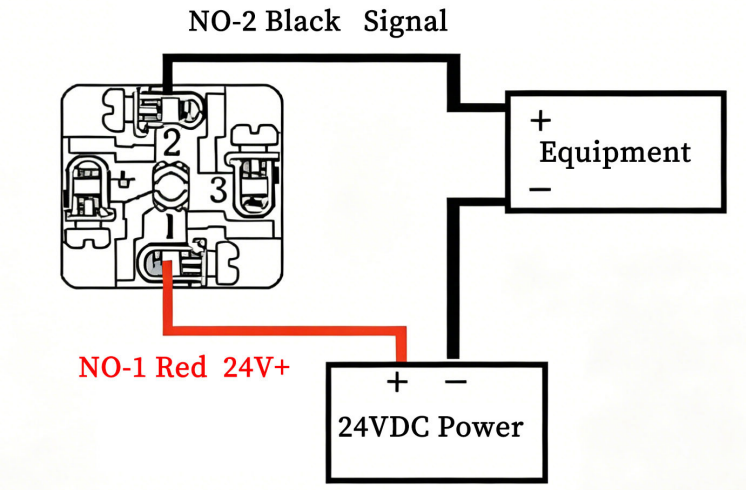
4.1.4 Safety Precautions: Be sure to relieve pressure before installation; ensure the process system is depressurized; do not disassemble or install the transmitter under pressure; wear appropriate personal protective equipment when working on pipelines carrying corrosive media.

4.2 Standard Installation Procedures

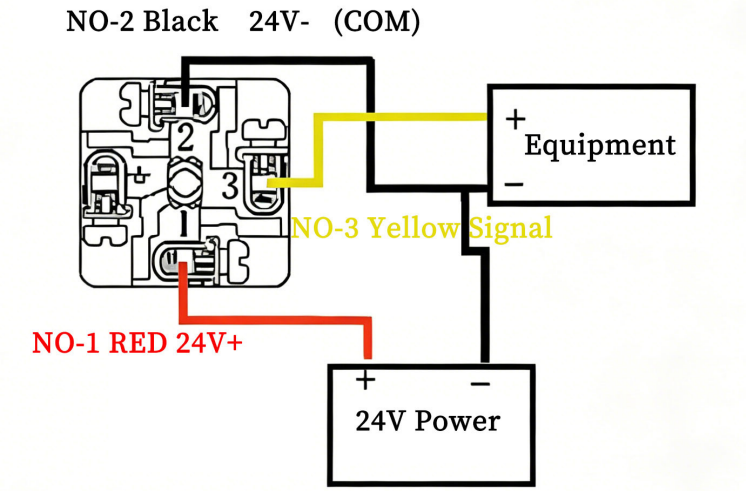
4.2.1 Direct Threaded Installation: Use a wrench to grip the transmitter's threaded section and tighten it; do not apply excessive force to the transmitter housing to prevent damage to internal components. During installation, ensure that the corrosion-resistant diaphragm is not struck by hard objects.

4.2.2 Wiring Specifications: Distinguish between the positive and negative power supply terminals. The 4–20 mA two-wire system has no separate input and output terminals; power and signal share the same two cables. For the RS485 version, distinguish between the A and B communication terminals.

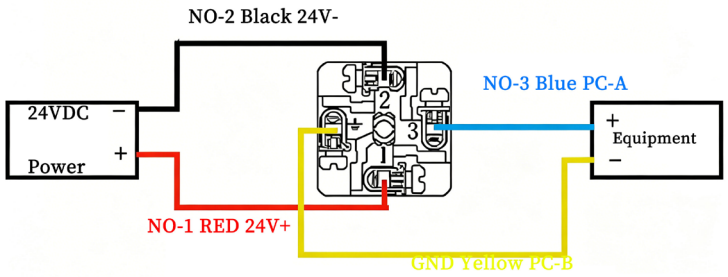
4.2.3 Grounding Requirements: Ground the shield of the shielded cable at a single point on one side of the control system cabinet; leave the shield on the transmitter side floating (ungrounded) to avoid ground loop interference. For explosion-proof models, strictly adhere to intrinsically safe wiring specifications and install a certified safety barrier in series with the circuit.



4-20mA 2-Wire Current Signal Output



3-Wire Voltage Signal Output



RS485 Output 4-Wire

4.3 Key Installation Points

4.3.1 Install the transmitter on the side or above the pressure tapping port whenever possible to prevent solid particles in the medium from settling and accumulating on the surface of the corrosion-resistant diaphragm;

4.3.2 When measuring liquid media, ensure proper venting to prevent gas accumulation, which can cause measurement errors.

4.3.3 Do not install the transmitter in locations subject to severe vibration, as prolonged exposure to strong vibrations will shorten the instrument's service life.

4.3.4 Tighten electrical connectors to ensure IP65 protection, and provide waterproof and kink-resistant protection for the cables.

4.4 Commissioning and Acceptance

4.4.1 Power-on commissioning procedure: After completing the wiring and confirming there are no short circuits, apply power. Under no-load, zero-pressure conditions, use a multimeter to read the output signal; the 4–20 mA output should be 4 mA at zero pressure;

4.4.2 Apply a standard calibration pressure and read the output signal to verify signal linearity. For models with a digital display, verify that the pressure value shown on the display matches the standard pressure.

4.4.3 Observe the status of the indicator lights; the power supply indicator light should remain on when power is normal. For models with RS485 communication, monitor the communication status indicator light during communication.

4.4.4 Accuracy Calibration Method: Use a standard pressure source to calibrate at two points—zero and full scale. If zero drift occurs on-site, perform a zero-point reset; do not apply pressure beyond the full-scale range for calibration.

4.4.5 Acceptance Criteria: The output errors at zero pressure and full scale must fall within the product's specified accuracy range; communication read/write functions must operate normally, with no abnormal signal fluctuations.

4.5 Installation Precautions

4.5.1 Never exceed the specified supply voltage; direct connection to a 220 V AC power source is not permitted;

4.5.2 Keep the device away from sources of strong electrical interference, such as high-power variable frequency drives and contactors;

4.5.3 In damp outdoor environments, ensure wiring connections are properly sealed; cables must not be submerged in water;

4.5.4 Do not puncture or strike the PTFE and PP corrosion-resistant isolation diaphragms with hard objects;

4.5.5 Transmitters made of PP material must not be operated continuously under conditions where the medium temperature exceeds 80°C;

4.5.6 In explosion-proof areas, do not remove the sealing structure of the explosion-proof enclosure.

5: Recommendations for Daily Use & Operation and Maintenance

5.1 Key Points for Routine Inspections

Regularly monitor the pressure signals read by the system to ensure they remain stable and free of erratic fluctuations.

Check the transmitter housing for corrosion or leaks, and inspect the wiring terminals for water ingress or oxidation.

Record the ambient temperature at the site and the operating temperature of the process medium.

For the QDW90A-HF-PP model, closely monitor the medium temperature to prevent over-temperature operation.

5.2 Periodic Maintenance Plan

Cleaning Cycle: Depending on the extent of scale buildup in the medium, clean the corrosion-resistant diaphragm area every 3–12 months using a gentle rinse.

Do not scrape the diaphragm with hard tools. Tighten the terminal blocks every six months and check the wiring for looseness or oxidation.

It is recommended to perform an annual accuracy re-test using standard pressure calibration equipment to verify measurement accuracy.

Note: The QDW90A-HF-PP model is made of PP material and must not come into contact with strong organic solvents or cleaning agents during cleaning.

5.3 Preventive Maintenance and Long-Term Care Tips

Ensure the housing is protected from dust and moisture, and periodically inspect the sealing rings at the wiring ports for signs of aging.

Route cables away from high-voltage power cables to reduce electromagnetic interference.

In high-vibration environments, install shock-absorbing mounts to minimize vibration transmission.

If crystallization occurs in the process, install a purging system to reduce the buildup of crystals on the corrosion-resistant diaphragm surface.

For PP-version transmitters, periodically review the chemical composition of the process medium to ensure that no strong oxidizing or organic media are introduced.

During prolonged shutdowns, it is recommended to remove the transmitter from the process piping, clean the wetted diaphragm, and store it in a dry environment at room temperature.

6: Troubleshooting & Emergency Response

6.1 Basic Principles for Troubleshooting

When a fault occurs, first turn off the power before troubleshooting. Identify the source of the fault to determine whether it originates from the power supply, cable connections, the control system, or damage to the transmitter itself.

In explosion-hazardous areas, strictly adhere to explosion-proof safety operating procedures when troubleshooting. Opening the cover while the unit is energized is permitted only for non-explosion-proof standard models. Do not disassemble the transmitter yourself; doing so will void the product warranty.

6.2 Quick Reference Table for Typical Faults

Fault Symptom 1: The transmitter has no output signal.

Possible Causes: Reversed positive and negative terminals, broken cable, insufficient or absent power supply, excessive loop load, or a fault in the explosion-proof system's safety barrier.

Troubleshooting Steps: Use a multimeter to measure the voltage at the transmitter's power supply terminal and confirm that the DC 12–24 V voltage is normal; Check the cable for continuity and verify the terminal connections; for the 4–20 mA loop, check whether the downstream load exceeds specifications; for the explosion-proof system, check the status of the safety barrier. Correct the wiring, replace the cable, adjust the power supply, and resolve the safety barrier fault.

Fault Symptom 2: The measurement signal drifts continuously, and the zero point keeps shifting.

Possible Causes: Process medium crystallization adhering to the corrosion-resistant diaphragm; medium temperature exceeding the product's permissible specifications; excessive on-site vibration; medium corrosion damaging the wetted diaphragm; zero point requires recalibration.

Troubleshooting Steps: Verify that the medium temperature is within limits; disassemble and clean crystallization from the diaphragm; check for vibration at the installation location; perform zero-point calibration; if drift persists after cleaning and calibration, the diaphragm is likely corroded and damaged by the medium, and the transmitter must be replaced.

Fault Symptom 3: Signal values fluctuate erratically; interference and distortion.

Possible Causes: Shielded cables were not used, or the shield grounding method is incorrect; cables are routed parallel to power cables, causing strong electromagnetic interference; loose terminal connections.

Troubleshooting Steps: Verify that the shielded cable is grounded at one end; reroute the cable away from power cables; tighten the terminal blocks.

Fault Symptom 4: Unable to read or write via RS485 communication.

Possible Causes: A/B wiring reversed; incorrect communication address or baud rate settings; missing bus terminating resistor; insufficient power supply.

Troubleshoot and verify communication wiring and parameter settings; add a

terminating resistor; confirm the supply voltage.

Fault Symptom 5: Abnormal black screen on the digital display.
Possible Causes: Insufficient power supply; damaged digital display. Verify the power supply; if the power supply is normal, determine that the display is faulty.

6.3 Precautions for Emergency Handling

In urgent production situations, if conditions permit, switch to a spare transmitter to temporarily replace the faulty instrument, and remove the faulty instrument for inspection. If corrosion or damage to the diaphragm is suspected, take safety precautions against leakage of corrosive media during disassembly.

6.4 After-Sales Repair Guidelines

Fault Determination Criteria: If the fault persists after completing wiring, power supply checks, and external environmental inspections, and a fault in the transmitter body is confirmed, a repair request may be submitted.
Information Required for Repair Request: Complete product model (specify either QDW90A-HF or QDW90A-HF-PP), product serial number, on-site process conditions (medium composition, temperature, and measurement range), description of the fault symptoms, and on-site photographs.
Warranty Coverage: Under conditions of proper product selection, compliant installation, and use, the product warranty period shall be enforced in accordance with the manufacturer's terms; issues resulting from incorrect product selection, incompatible media materials, excessive temperature or pressure, or damage caused by physical impact are not covered by the warranty.
Contact the manufacturer's technical support to complete a repair assessment.