Digital Pressure Controller

I. Product Definition

The QD-YLK Smart Digital Electronic Pressure Controller (also known as a digital pressure switch) is an intelligent pressure measurement and control device primarily constructed from 304 stainless steel. Designed specifically for industrial automation applications, it integrates real-time pressure monitoring, digital display, automatic control upon exceeding limits, alarm output, and multi-unit conversion. It serves as an upgraded replacement for traditional mechanical pressure switches.

Summary of Core Functions:

1. High-Precision Pressure Monitoring and Display

Equipped with a built-in high-precision pressure sensor, it collects real-time medium pressure data and displays pressure values directly via a high-brightness red LED display. It supports one-touch switching between three pressure units—MPa, kg/cm², and kPa—addressing the issues of unclear readings and high error rates associated with traditional pressure gauges.

2. Intelligent Upper and Lower Limit Control

Users can customize upper (Limit) and lower (Lower limit) thresholds. When the medium pressure reaches the set threshold, the device automatically outputs a switching signal to enable automated control functions such as pump and valve start/stop, system protection, and alarm triggering. It supports dual-channel control logic.

3. Stable and Reliable Switching Output

Featuring an anti-interference circuit design, the switching signal output is stable and free from the contact bounce and sticking issues common in traditional mechanical switches, ensuring long-term stable operation in complex industrial environments.

4. Convenient Parameter Setup and Management

The panel is equipped with a SET UP button, up/down adjustment keys, and an ON/OFF power button. It supports one-touch parameter setup and long-press reset/clear functions. The simple operating logic allows even beginners to get started quickly.

5. Fully Protected 304 Stainless Steel Construction

Both the housing and wetted parts are made of 304 stainless steel, offering rust resistance, corrosion resistance, and impact resistance. It is compatible with various media such as water, gas, and oil, and is suitable for industrial environments characterized by humidity, high dust levels, and mild corrosion.

6. Visual Status Indicators

The panel features “Exports (Output), Limit (Upper Limit), Lower Limit, and Run” labels to intuitively display the device’s current operating status, allowing users to quickly assess system performance without additional troubleshooting.

II. Working Principle and Workflow

1. Simplified Working Principle

The core logic of the QD-YLK pressure controller is “Pressure Acquisition → Data Processing → Comparison and Judgment → Switch Output.” It can be understood as an “intelligent pressure safety device with a digital brain”:

The high-precision pressure sensor at the wetted end comes into real-time contact with the measured medium (water/gas/oil), converting the medium’s physical pressure signal into an electrical signal;

The device’s built-in microprocessor amplifies, filters, and calculates the electrical signal, converting it into standard pressure values displayed on the LED screen;

The microprocessor compares the real-time pressure value with the upper and lower pressure thresholds preset by the user;

When the pressure exceeds the set range (e.g., higher than the upper limit or lower than the lower limit), the device’s relay or electronic switch automatically activates, outputting a control signal to trigger the start/stop of external equipment or an alarm; when the pressure returns to the normal range, the device automatically resets to its initial state.

2. Complete Workflow

2.1 Power-On Initialization: After power is applied, the device automatically performs sensor self-tests and circuit initialization. The LED display lights up, and the device enters real-time pressure monitoring mode, displaying the current medium pressure value.

2.2 Parameter Settings (User Operation): The user presses the SET UP button to enter the settings interface, where they sequentially set the upper pressure limit, lower pressure limit, control hysteresis, and unit type. Values are adjusted using the up and down buttons. After configuration is complete, the parameters are saved, and the device exits setup mode.

2.3 Real-Time Monitoring and Comparison: The device continuously collects medium pressure data, displays the values in real time, and continuously compares them with the preset upper and lower limit thresholds.

2.4 Control Action Execution:

When the pressure reaches or exceeds the upper limit threshold, the device triggers an “upper limit control action,” such as stopping the pump or closing the valve, to prevent excessive pressure;

When the pressure drops to or below the lower limit threshold, the device triggers a “lower limit control action,” such as starting the pump or opening the valve, to replenish system pressure;

When pressure is within the normal range, the device remains in “Run” mode, does not execute control actions, and only continues monitoring.

2.5 Status Feedback and Alarms: The device provides real-time feedback on its operating status via panel indicators and switch signals. In the event of an anomaly, it can trigger external audible and visual alarm devices to alert the user to investigate the issue.

2.6 Power Off / Shutdown: Pressing the ON/OFF button or disconnecting the power supply stops the device. All parameters are automatically saved, eliminating the need for re-configuration upon the next power-up.

III. Core Value and Solutions to Pain Points

Core Value Overview

The core value of the QD-YLK pressure controller lies in its digital, intelligent measurement and control solution, which addresses the pain points of traditional mechanical pressure switches and pressure gauges—such as low accuracy, frequent failures, difficult calibration, and lack of feedback. It provides industrial systems with stable, reliable, and visual pressure control and protection, reducing operational and maintenance costs while enhancing system automation levels.

Pain Points and Solutions

Q: Traditional mechanical pressure switches have unclear readings and high error margins, making it impossible to accurately determine pressure status. How can this be addressed?

A: The QD-YLK uses an LED display to directly show real-time pressure values, supports switching between MPa, kg/cm², and kPa units, and features a built-in high-precision sensor. Its pressure measurement error is far lower than that of mechanical switches, providing clear and intuitive readings that eliminate the need for manual estimation and enable precise, visual pressure monitoring.

Q: Traditional mechanical switches are prone to contact bounce and sticking, leading to frequent pump and valve start-stops, control failures, and high equipment failure rates. What can be done?

A: The QD-YLK uses contactless electronic switch control, eliminating issues such as mechanical contact wear and bounce. The output signal is stable and reliable, effectively preventing pump and valve malfunctions and frequent start-stops, extending equipment lifespan, and reducing the risk of downtime due to failures.

Q: Traditional switches have complex parameter tuning processes that require specialized calibration tools, making them difficult for beginners to operate. How can this be addressed?

A: The QD-YLK is equipped with a SET UP button and up/down adjustment keys, allowing one-click access to the settings interface. Users can directly set upper and lower limit thresholds via the panel without additional calibration tools. With on-panel prompts, even beginners can quickly complete parameter configuration, significantly improving debugging efficiency.

Q: Traditional switches lack intuitive feedback on operating status, making it difficult to detect abnormalities in a timely manner and potentially leading to escalated system failures. How can this be

addressed?
A: The QD-YLK panel features “Exports, Limit, Lower Limit, Run” status indicators that display the device’s current operating mode in real time. When abnormal conditions trigger control actions, the system can activate external alarm devices. Users can quickly grasp the system status and address issues promptly without the need for additional troubleshooting.

Q: Traditional switches are prone to rust and corrosion, resulting in a short service life in humid environments or those with oily or mildly corrosive media. How can this be addressed?
A: Both the QD-YLK housing and wetted parts are made of 304 stainless steel, offering rust-proof, corrosion-resistant, and impact-resistant properties. It is compatible with various media such as water, gas, and oil, and can operate stably over the long term in humid, dusty, or mildly corrosive industrial environments, significantly enhancing equipment durability.

Q: Traditional switches have limited functionality, capable only of basic on/off control, and cannot meet the pressure control requirements of complex systems. What can be done?
A: The QD-YLK supports customizable upper and lower limit control logic, enabling various control modes such as “shutdown at high pressure, startup at low pressure” and “high-pressure alarm, low-pressure protection.” It meets the pressure control needs of diverse industrial systems—including water supply, gas supply, hydraulics, and pneumatics—and offers strong functional expandability.

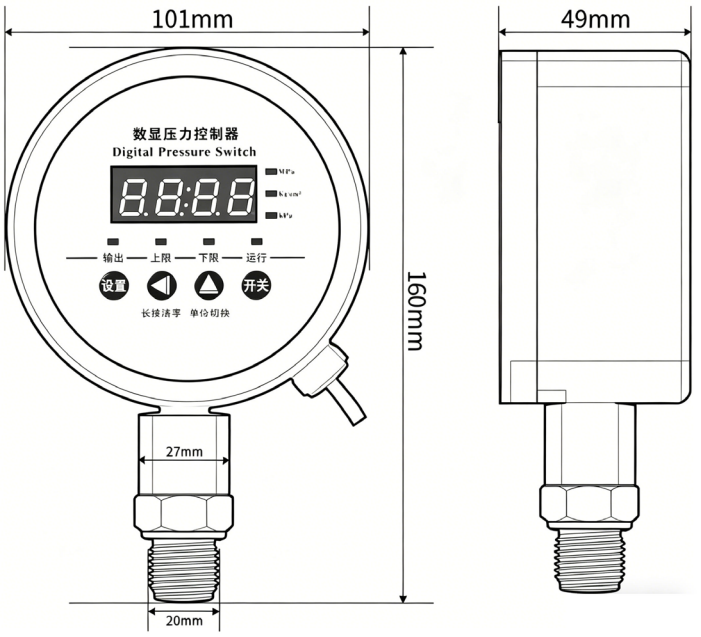
IV. Key Product Parameters & Specifications
4.1 Basic Electrical Parameters
Measurement Range: -0.1 MPa to 0 to 60 MPa (Available ranges: 0 to 1 MPa, 0 to 2.5 MPa, 0 to 6 MPa, 0 to 10 MPa, 0 to 25 MPa, 0 to 40 MPa, 0 to 60 MPa)
Pressure Type: Gauge Pressure (default), Absolute Pressure / Vacuum (customizable)
Measurement Accuracy: ±0.5% FS (High-Accuracy Model: ±0.25% FS)
Display Accuracy: ±0.1% FS
Display Type: 0.56-inch red 4-digit LED display
Display Range: -1999 to 9999; “EEEE” displayed when out of range
Sampling Rate: 3 times/second
Temperature Drift: ≤0.02% FS/°C (typical value 100 ppm/°C)
Long-term Stability: ≤0.2% FS/year
Digital Outputs: Two relay outputs (one each for upper and lower limits)
Contact Rating: AC 220 V, 3 A (resistive load)
Contact Type: Normally Open / Normally Closed (programmable)
Analog Output (Optional): 4–20 mA DC (load ≤ 500 Ω)
Electrical Protection: Short-circuit protection, reverse connection protection, electromagnetic interference (EMI) protection

4.2 Isolation Performance Parameters
Input/Output Isolation Voltage: ≥1500 V AC (1 minute, no breakdown)
Insulation Resistance:
Between contacts: ≥1000 MΩ (500 V DC)
Between contacts and housing: ≥1000 MΩ (500 V DC)
Isolation Method: Optical isolation + mechanical relay isolation (dual isolation)
Immunity Rating: Complies with GB/T 17626.6 (EMI) and GB/T 17626.4 (EFT) industrial standards

4.3 Power Supply & Power Consumption Parameters
Supply Voltage: DC 24 V ±2 V (typical); optional AC 85–260 V (wide-range AC version)
No-load current: ≤30mA (DC 24V)
Full-load power consumption: <3W
Feed-through output (power distribution): DC 24V/25mA (supports external two-wire sensors)
Wiring method: Terminal block (M3 screws), supports positive/negative reverse polarity protection

4.4 Environmental Adaptation Parameters
Operating temperature: -20°C to +60°C
Medium Temperature: -20°C to +80°C
Storage Temperature: -30°C to +80°C
Operating Humidity: ≤80% RH (non-condensing)
Protection Rating: IP65 (dustproof and splash-proof)
Explosion-Proof Rating: Intrinsically Safe Ex ia IIC T4 Ga (Compatible Safety Barrier: Qidian QD-ISO Series Isolated Safety Barrier)
Vibration resistance: ≤4 m/s² (frequency 10–100 Hz)
Suitable media: Water, gas, oil, mildly corrosive liquids (compatible with 304 stainless steel)

4.5. Physical Parameters
Mounting method: Radial mounting (standard); optional axial / panel mounting
Pressure port: 304 stainless steel, standard M20×1.5; Optional G1/2, G1/4, NPT 1/4
Electrical connection: M20×1.5 waterproof junction box (standard 1.5 m cable)
Dimensions (diameter × thickness):
Dial diameter: φ100 mm
Total thickness: 49 mm (including connector)
Connector length: 20 mm
Weight: Approx. 0.8 kg
Housing Material: 304 stainless steel (all-metal housing, corrosion-resistant, rust-proof, impact-resistant)
Protection Details:
Case: 304 stainless steel, brushed finish
Wetted Parts: 304 stainless steel (uncoated, acid and alkali resistant)
Seals: Fluorocarbon rubber (high-temperature resistant, oil-resistant, corrosion-resistant)
Glass Panel: Tempered glass (scratch-resistant, impact-resistant)



V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type
If only digital control is required (pump/valve start/stop, alarms): Prioritize models with pure relay outputs. These require no additional analog signals, resulting in lower costs and simpler commissioning.
Requires remote monitoring + control: Select a model with 4–20 mA analog output to transmit pressure data to a PLC or host computer, enabling data acquisition and remote monitoring.
Requires multi-signal feedback: Choose a hybrid model supporting both dual-channel relay and analog outputs to accommodate both local control and remote monitoring needs.

2. Number of Channels
Single-channel control requirements (e.g., starting/stopping a single pump): Select a single-channel relay output model to meet basic control needs, offering better value for money.
Dual-channel independent control requirements (e.g., high-pressure shutdown and low-pressure startup with dual logic): Select a dual-channel relay output model, which allows separate upper and lower limit control logic settings to accommodate complex control scenarios.
Multi-channel expansion requirements: Choose a custom model supporting multi-channel signal interlocking to accommodate scenarios involving coordinated control of multiple devices.

3. Power Supply Method
Industrial DC power supply scenarios (inside PLC control cabinets): Prioritize models with 24V DC power supply, which are compatible with mainstream industrial DC systems and offer safe and convenient wiring.
Scenarios without on-site DC power: Select models with 85–260V AC wide-voltage power supply, which can be directly connected to mains power without the need for additional DC power modules.
Mobile devices / scenarios without external power: Opt for battery-powered models (low-power custom versions), suitable for field operations, mobile devices, and other environments without a fixed power source.

4. Explosion-proof requirements
General non-explosive environments (no flammable or explosive media): Select standard IP65-rated models, which meet requirements for conventional industrial environments.
Flammable and Explosive Media Scenarios (e.g., chemical plants, gas facilities): You must select the intrinsically safe explosion-proof model (Ex ia IIC T4 Ga) and pair it with a corresponding isolated safety barrier to meet explosion-proof regulations.
High-Dust / Flammable and Explosive Gas Scenarios: You can customize a flameproof enclosure model to suit high-level explosion-proof environments.

5. Installation Environment Considerations
Standard indoor installation (next to control cabinets, inside pump rooms): Select the standard radial mounting model; a 304 stainless steel housing with IP65 protection is sufficient.
Outdoor / humid and dusty environments: Select the IP67 upgraded protection model and use waterproof wiring accessories to prevent water and dust ingress.
High-vibration conditions (e.g., near pump outlets or compressors): Custom anti-vibration reinforced models are required, featuring optimized internal sensor and housing mounting structures to enhance vibration resistance.
High electromagnetic interference environments (e.g., near variable frequency drives or in high-voltage equipment rooms): Select models with enhanced EMI protection, utilizing optical isolation and anti-interference circuit design to prevent false signal triggers.

6. Media and Measurement Range Considerations
Clean water / air: Standard models with conventional measurement ranges are suitable; no special customization is required.
Weakly corrosive media (e.g., chemical wastewater, weak acid/alkali solutions): Ensure wetted parts are made of 304 stainless steel, and prioritize models with fluorocarbon rubber seals to enhance corrosion resistance.
High-pressure applications (e.g., hydraulic systems, high-pressure water supply): Select models with corresponding high-pressure ranges (up to 60 MPa) and ensure the pressure port thread specifications match the system piping.
Negative pressure / vacuum applications: Select models with dedicated negative pressure ranges (e.g., -0.1 to 0 MPa) to support monitoring and control in vacuum systems.

5.2. Model Selection Recommendations by Industry
1. Chemical Industry Applications: Intrinsically safe explosion-proof models with dual-channel relays and 4–20 mA analog output are recommended. Wetted parts are made of 304 stainless steel, suitable for weakly corrosive media and flammable/explosive environments. These models meet both on-site control and remote data acquisition requirements and, when used with isolated safety barriers, comply with chemical industry explosion-proof standards.

2. Power Industry Applications: We primarily recommend models with 24 V DC power supply and dual-channel relay outputs. These are suitable for pressure control in power plant circulating water and hydraulic oil systems, enabling dual-logic control for high-pressure shutdown and low-pressure startup. The enhanced anti-electromagnetic interference version is suitable for the strong electromagnetic environments of power plants, preventing signal malfunctions.

3. Metallurgy Industry Applications: We recommend models with IP67 protection and enhanced vibration resistance. These are suitable for harsh metallurgical environments characterized by high dust levels, intense vibration, and humidity. The stainless steel housing offers rust and impact resistance, ensuring long-term stable operation in applications such as blast furnace water supply and hydraulic systems.

4. Pharmaceutical Industry Applications: We recommend models featuring food-grade 304 stainless steel wetted parts and high precision (±0.25% FS). These are suitable for the clean environments of pharmaceutical purified water and water-for-injection systems. They support multi-unit switching, provide accurate and clear readings, and eliminate the risk of plating contamination, meeting the pharmaceutical industry's sanitary requirements.

5. Smart Manufacturing Applications: We recommend models with 4–20 mA analog output and dual relays. These are suitable for hydraulic and pneumatic systems in automated production lines, enabling real-time pressure data transmission to PLCs or host computers while automatically controlling equipment start/stop locally, meeting the automation and digitalization needs of smart manufacturing.

6. Water Supply and Drainage / Water Supply Industry Scenarios: We recommend models with AC 220V wide-voltage power supply and dual relays. These are suitable for municipal water supply and secondary water supply pump rooms, allowing direct connection to the mains power supply. They enable fully automatic control, including low-pressure startup during water shortages and high-pressure shutdown when full, with IP65 protection suitable for the damp and dusty environments of pump rooms.

5.3 Common Selection Misconceptions
Misconception 1: Ignoring isolation levels, leading to equipment damage from interference
Problem: In environments with strong electromagnetic interference (e.g., near variable frequency drives or in high-voltage equipment rooms), models without optical isolation are selected, resulting in signal false triggers and equipment damage.
Correct Approach: In such scenarios, models with dual isolation (optical isolation + mechanical relay isolation) must be selected. These models meet industrial-grade anti-interference standards to prevent electromagnetic interference from affecting equipment operation.

Misconception 2: Selecting the wrong signal range, leading to significant measurement errors or equipment damage
Problem: Selecting a low-pressure range model for high-pressure applications, resulting in sensor overload and damage; or operating at pressures close to the upper limit of the range, causing long-term operation at maximum capacity and shortening equipment lifespan.
Correct Approach: When selecting a model, ensure the actual operating pressure is between 30% and 70% of the range. For high-pressure applications, choose a model with the corresponding high-pressure range and allow for sufficient safety margin to prevent overload damage.

Misconception 3: Neglecting load matching, leading to contact burnout
Symptoms: Insufficient relay contact capacity when directly driving high-power pumps or valves, causing the contacts to overheat and burn out, resulting in control failure.
Correct Approach: When selecting a model, verify the contact capacity (AC 220V, 3A resistive load). When driving high-power loads, use an AC contactor or intermediate relay to avoid direct drive.

Misconception 4: Selecting General-Purpose Models for Explosion-Hazardous Environments, Creating Safety Risks
Problem: In flammable and explosive environments such as chemical plants and gas facilities, non-explosion-proof general-purpose models are selected without safety barriers, creating explosion risks and violating industry standards.
Correct Approach: In such environments, intrinsically safe explosion-proof models must be selected and paired with corresponding isolated safety barriers. These must be certified for explosion protection to meet safety requirements for flammable and explosive conditions.

Misconception 5: Neglecting medium compatibility, leading to equipment corrosion and leakage
Incorrect practice: In environments with corrosive media, the material

of wetted parts was not verified, resulting in corrosion of these parts and causing issues such as leakage and measurement inaccuracies.
Correct practice: In environments with corrosive media, ensure that wetted parts are made of 304 stainless steel. Prioritize models with fluorocarbon rubber seals, and if necessary, customize higher-grade corrosion-resistant materials.

5.4 Customization Recommendations
1. Custom Signal Solutions
Application Scenarios: Non-standard signal outputs (e.g., RS485 Modbus communication, 0–10 V analog output) and multi-channel signal outputs.
Customization Solutions: Models with RS485 communication are available, enabling direct integration with industrial IoT platforms for remote monitoring and data upload; 0–10 V analog output or multi-channel independent signal output can also be customized to meet non-standard control system requirements.

2. Custom Solutions for Non-Standard Operating Conditions
Application Scenarios: Ultra-high/ultra-low pressure conditions, highly corrosive media, extreme high/low temperature environments, and high-vibration conditions.
Custom Solutions: Models with ultra-high-pressure ranges up to 60 MPa and specialized negative pressure models (-0.1 to 0 MPa) are available; wetted parts can be upgraded to 316L stainless steel to withstand highly corrosive media; The housing can be upgraded to IP67 protection or customized for high/low-temperature applications to withstand extreme environments ranging from -40°C to +120°C; vibration-resistant reinforced versions can also be customized with optimized internal structures to enhance vibration resistance.

3. Multi-Channel Integrated Customization Solutions
Application Scenarios: Coordinated control of multiple devices; pressure monitoring and control across multiple circuits.
Customization Solutions: Supports multi-channel integrated customization, enabling multi-channel pressure monitoring and independent control on a single device. It also supports multiple sets of parameter settings and interlocking logic, meeting the centralized control needs of multi-circuit systems while reducing the number of devices required and lowering wiring costs.

4. Special Installation and Appearance Customization Solutions
Application Scenarios: Non-standard threaded interfaces, panel mounting/axial mounting requirements, and custom enclosure protection ratings.
Customization Solutions: Supports customization of non-standard threaded interfaces (e.g., NPT, BSP) to accommodate special piping; also offers panel-mounted or axial-mounted models to suit various installation space requirements; enclosure protection ratings can be upgraded to IP67, or explosion-proof enclosures can be customized to meet high-level protection requirements.

VI. Installation and Commissioning Guidelines
6.1 Pre-installation Preparation
1. Verification of Components
After unpacking, verify that the product model, measurement range, and power supply specifications match the order. Inspect the 304 stainless steel housing, pressure ports, and terminal blocks to ensure they are intact and free of dents, deformation, or thread damage.
Confirm that all included accessories are present: including waterproof terminal blocks, fluororubber gaskets, and installation instructions. For custom models, verify specialized components such as safety barriers and communication cables.
Verify that the pressure port specifications (standard M20×1.5, or custom G1/2, NPT1/4) match the on-site pipe threads to avoid damaging the threads by forcing the installation.

2. Environmental Inspection
Ensure the installation location is free of strong electromagnetic interference sources (such as variable frequency drives or high-voltage motors). Maintain a distance of ≥1 m from high-voltage equipment; install shielding measures if necessary.
Verify that the ambient temperature and humidity meet the equipment's operating requirements (-20°C to +60°C, ≤80% RH without condensation). Avoid direct sunlight, rain exposure, and immersion in standing water.
In flammable or explosive environments, verify that the site has passed explosion-proof safety assessments and that the installation location of the accompanying isolated safety barrier complies with explosion-proof regulations.

3. Tool List
Basic Tools: Adjustable wrench, Allen wrench, wire strippers, Phillips screwdriver, electrical tape, multimeter.
Auxiliary Tools: Teflon tape / thread sealant (suitable for stainless steel threads), waterproof junction box, cable ties, spirit level.
Calibration Tools: Standard pressure gauge / pressure calibrator (accuracy class 0.2 or higher), for post-installation accuracy calibration.

4. Safety Precautions
Before installation, the medium in the on-site piping and the power supply must be shut off. Operating under pressure or with power connected is strictly prohibited to prevent medium leakage, electric shock, or equipment damage.
When installing stainless steel threaded connections, do not use pipe wrenches to directly turn the equipment housing. Instead, use a wrench to secure the hexagonal part of the fitting to avoid damaging the equipment body.
When installing in flammable or explosive environments, explosion-proof tools must be used. Striking or impacting the equipment is strictly prohibited to prevent sparks.

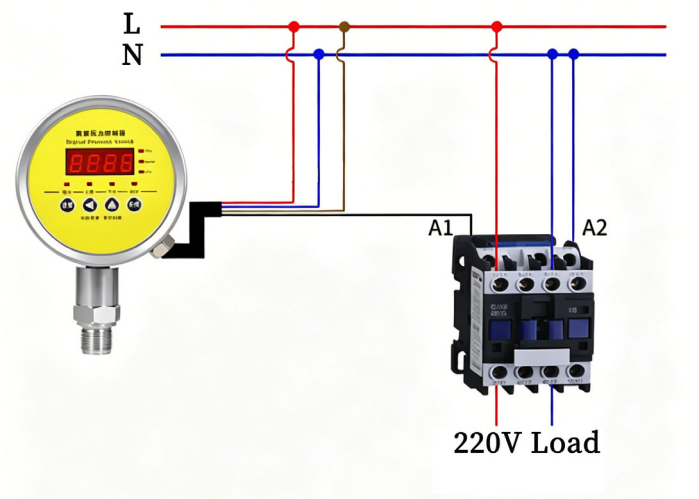
6.2 Standard Installation Steps
1. Mechanical Installation Steps
Piping Preparation: Clean welding slag and impurities from the piping at the installation location to prevent blockage of the pressure sensor's pressure-sensing ports.
Thread Sealing: Wrap PTFE tape evenly around the stainless steel external threads (or apply a small amount of high-temperature thread sealant), taking care to avoid the first 2–3 threads to prevent sealing material from entering the pressure-sensing ports and causing blockage.
Fixed Installation: Secure the hexagonal section of the device's connector with a wrench, then screw the device vertically into the pipeline interface. Control the tightening torque between 20–30 N·m to avoid damaging the threads or the sensor due to excessive force.
Installation Location: Prioritize locations with minimal vibration and no strong impacts. In high-vibration environments such as pump outlets or compressors, install a buffer pipe or vibration-damping brackets.

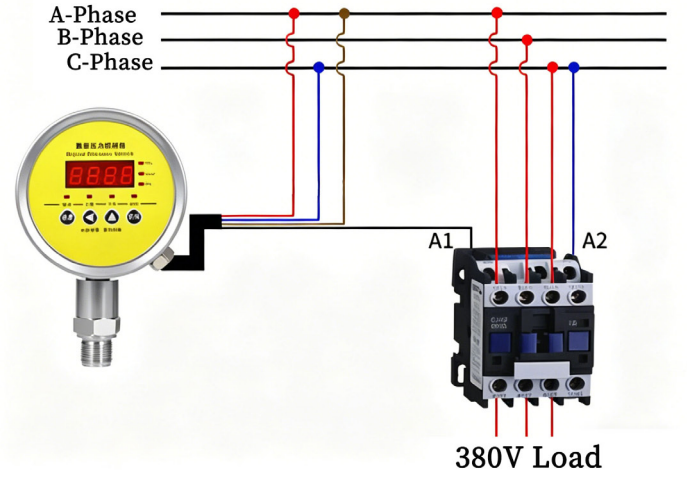
2. Wiring Specifications
Terminal Identification (using the standard model as an example):
Power Terminals: For the DC24V model, distinguish between "+24V" and "GND"; for the AC model, distinguish between "L (Live)" and "N (Neutral)". Reversing the connections is strictly prohibited (the device has built-in reverse connection protection, but prolonged reversal may affect its service life).
Relay Output Terminals: These are divided into "Upper Limit Output" and "Lower Limit Output," and include Normally Open (NO), Normally Closed (NC), and Common (COM) terminals. Select the appropriate terminals for wiring based on the control logic.
Analog Output Terminals (Optional Models): Distinguish between "+" and "-." Connect to the corresponding terminals on the PLC or data acquisition device, and ground the shielded wire at one end.
Wiring Instructions: Strip the wire insulation to a length of 5–7 mm. Insert the wire core fully into the terminal and tighten the screw to ensure reliable contact. For multi-strand wires, use cold-crimp terminals to prevent loose connections and oxidation.
Grounding Requirements: The metal housing of the device must be reliably grounded, with a grounding resistance ≤4Ω; the shielding layer of the shielded cable must be grounded at a single point on the control cabinet side only; grounding at both ends is prohibited to avoid creating loop current interference signals.

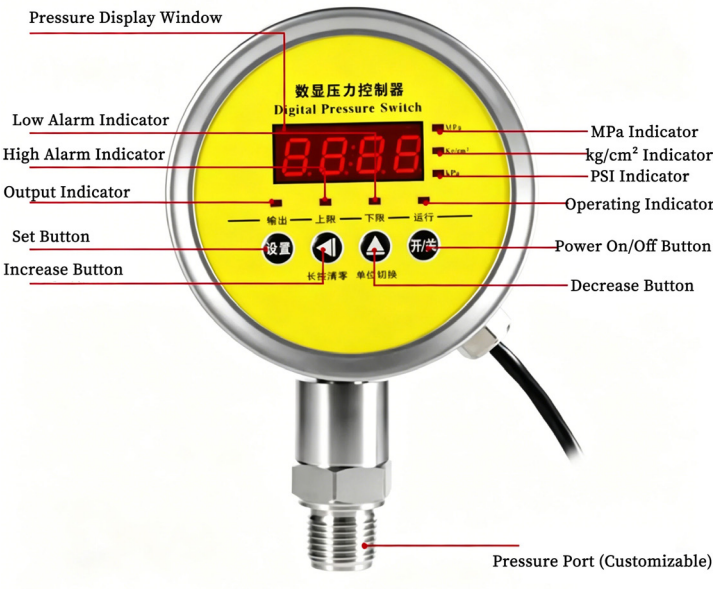
3. Additional Installation and Mounting Notes
Wall-Mount / Rail Mount: Use the optional mounting bracket or 35mm rail mounting hardware to secure the device to a control cabinet or field mounting bracket. Ensure the device is mounted vertically for easy reading and maintenance.
Waterproofing: When installing outdoors or in humid environments, waterproof cable glands must be installed at the wiring ports. Excess

cable should be coiled into a U-shape to prevent rainwater from flowing along the cable into the device.

6.3 Wiring Specifications







6.4 Power-On Commissioning Procedure

1. No-Load Test (No Media Pressure)

Before powering on, double-check that the wiring is correct and confirm that there is no pressure in the piping, then connect the power supply.

After the device is powered on, the LED display will light up and show the current pressure value (which should be close to 0 MPa with an error margin of ±0.01 MPa under no-pressure conditions). The “Run” indicator on the panel will illuminate, and the device will enter standby mode.

Press the SET UP button to enter the settings interface. Set the upper and lower pressure thresholds, switch the unit to the on-site standard (MPa/kg/cm²/kPa), and exit the settings mode after saving the parameters.

2. Signal Verification and Load Testing

Slowly introduce the medium into the pipeline. Use a standard pressure gauge to compare the device’s display value; the error should be within ±0.5% FS. If the deviation is too large, calibration is required.

Simulate a pressure-overlimit scenario:

When the pressure rises to the set upper limit, the “Limit” indicator on the panel lights up, the corresponding upper limit relay activates, and the load (such as a water pump contactor) should disconnect;

When the pressure drops to the set lower limit, the “Lower limit” indicator on the panel lights up, the corresponding lower limit relay activates, and the load should be engaged;

Observe whether the device operates stably, with no contact bounce or frequent start-stop cycles. Ensure the hysteresis is set appropriately to prevent oscillation.

3. Indicator Status Interpretation

Normal Operation: The “Run” indicator remains lit, the LED display shows the real-time pressure value, and there are no alarm prompts.

Upper Limit Triggered: The “Limit” indicator lights up, the upper limit relay activates, and a control signal is output.

Lower Limit Triggered: The “Lower limit” indicator lights up, the lower limit relay activates, and a control signal is output.

Fault Indication: The LED display shows “EEEE,” indicating an out-of-range condition or sensor failure. Check whether the pipeline pressure exceeds the range, or restart the device to troubleshoot the fault.

4. Calibration Method

The device is pre-calibrated before shipment. If secondary calibration is required on-site, enter the device calibration mode (press and hold the SET UP button for 5 seconds).

Apply a standard pressure value (e.g., 50% of full scale), read the actual pressure using a standard pressure gauge, and enter the corresponding standard value into the device to complete zero and full-scale calibration.

After calibration is complete, exit calibration mode. Apply different pressure values for comparison to confirm that accuracy meets requirements; calibration data is automatically saved.

6.5 Installation Contraindications and Protective Measures

1. Strictly Prohibit Overvoltage Power Supply / Overpressure Operation

The supply voltage must not exceed ±10% of the device’s rated value. The DC24V model must not be connected to an AC220V power source, as this will directly burn out the device’s circuitry.

Pipe pressure must not exceed 1.2 times the upper limit of the device’s measurement range. Overpressure will cause permanent damage to the sensor and may even lead to safety incidents.

2. Avoid High-Voltage and Electromagnetic Interference

The device’s wiring cables must be laid separately from high-voltage cables, with a minimum distance of 30 cm between them. Avoid routing them in the same cable tray to prevent high-voltage interference with the signal.

The use of high-power electromagnetic equipment, such as walkie-talkies and arc welders, is strictly prohibited near the device. If necessary, a power filter may be installed at the device’s power input.

Protective Measures for Humid/Dusty Environments

When installing outdoors or in humid environments, IP67-rated waterproof cable glands must be used, and the junction box must be filled with waterproof sealant to prevent moisture from entering the device.

In high-dust environments, regularly clean the equipment housing and junction box to prevent dust accumulation from affecting heat dissipation or causing short circuits.

Protective Measures for High-Vibration Environments
In high-vibration environments such as pump outlets or compressors, install buffer elbows or vibration-damping brackets to reduce vibration transmission to the equipment body.
During installation, the equipment must be kept perpendicular to the piping to avoid subjecting the equipment body to additional mechanical stress, which could affect sensor accuracy and service life.

3. Media Compatibility Contraindications
In environments with corrosive media, direct installation without confirming material compatibility is strictly prohibited. 304 stainless steel wetted parts are not suitable for strong acids or alkalis; they must be upgraded to 316L material.
For media containing particulate impurities, a filter must be installed upstream of the equipment to prevent impurities from clogging the pressure-sensing ports and affecting measurement accuracy.

VII. Recommendations for Daily Use & Operation and Maintenance
7.1 Key Points for Daily Inspections
1. Equipment Status Inspection
Observe the pressure readings on the LED display window daily to confirm that the display is stable with no fluctuations and that there are no "EEEE" out-of-range or fault error messages. Verify that the readings match the on-site medium pressure and that there are no significant deviations.
Check the status of the panel indicator lights: Ensure the "Run / Output / Upper/Lower Limit Alarm" lights display normally, with no abnormal flashing or continuous illumination; the indicator status should correspond to the actual system pressure status.
Inspect the equipment's exterior: Ensure the 304 stainless steel housing shows no deformation, corrosion, or dents; check that the junction box and cable connectors are secure with no damage; and verify there are no signs of water leakage or condensation.

2. Signal Stability Monitoring
Observe the operating status of the relay control circuit daily to confirm that the contactor/load starts and stops normally when the pressure reaches the set threshold, with no frequent false tripping, chattering, or failure to operate.
For models with 4–20 mA analog output, compare the pressure data collected by the PLC/host computer with the device's local display values daily. The deviation must be within ±0.5% FS, with no data jumps or loss.
If signal abnormalities occur, record the pressure, supply voltage, and on-site environmental conditions at the time of the fault to facilitate subsequent troubleshooting.

3. Environmental Temperature and Humidity Monitoring
Check the ambient temperature at the equipment installation location daily to ensure it remains within the operating range of -20°C to +60°C. Avoid direct sunlight and high-temperature exposure to prevent equipment overheating, which could affect sensor accuracy.
In humid or condensation-prone environments, inspect the equipment's junction box and cable entry points daily to ensure there is no water seepage or condensation, and check the housing for signs of corrosion to prevent moisture from entering the internal circuitry.
For outdoor installations, conduct additional inspections after rainy weather to verify that waterproof connectors and cable sheaths are intact and free of water leakage.

4. Process Medium Inspection
Inspect the pipeline medium for impurities or crystallization, and ensure there is no risk of pressure tapping holes becoming blocked. If the medium contains particulate impurities, verify that the upstream filter is not clogged and that the pressure differential is normal.
Confirm that the pipeline is free from overpressure surges or water hammer effects, and that the equipment installation location is free from abnormal vibrations, to prevent sensor damage or accuracy drift caused by impact.

7.2. Regular Maintenance Plan
1. Cleaning Schedule and Methods
Routine Cleaning: Wipe the equipment housing and display window with a dry, soft cloth weekly to remove dust and grease. Do not use corrosive cleaning agents or direct high-pressure water jets to clean the equipment.
Deep Cleaning: Clean the equipment's junction box and cable connectors quarterly to remove dust buildup, preventing poor contact or short circuits; disassemble and clean the filter at the pressure port inlet monthly to remove impurities and prevent clogging.
Special Environments (High Dust / Grease / Humidity): Shorten the cleaning cycle to every 2 weeks, focusing on the junction box, cable entry points, and heat dissipation areas of the housing.

2. Wiring Tightness Inspection
Inspect the tightness of terminal blocks and cable connectors monthly to ensure screws are secure, wire cores are free of oxidation and loose connections, and multi-strand wire cores have no broken strands or exposed sections.
Inspect the equipment's grounding terminals and shielded cable grounding points quarterly to ensure reliable grounding, with no corrosion or looseness, and a grounding resistance of ≤4Ω.
Inspect the sealant in the explosion-proof junction boxes and cable sheaths of explosion-proof equipment once a year to ensure there is no aging or cracking and that the explosion-proof seal is intact.

3. Recommendations for Accuracy Re-testing
Normal operating conditions: Re-test equipment accuracy every six months using a standard pressure gauge or pressure calibrator (accuracy ≥ Class 0.2). Compare the displayed values at 0%, 50%, and 100% of the full scale range. If the deviation exceeds ±0.5% FS, calibration is required.
Harsh operating conditions (severe vibration, corrosion, impact): Re-test accuracy every 3 months to promptly detect sensor drift or damage.
Calibration method: Enter the equipment's calibration mode, use a standard calibrator as the reference, and complete zero-point and full-scale calibration. After calibration, compare readings at three or more pressure points to confirm that accuracy has returned to normal; calibration data is automatically saved.

4. Replacement Intervals for Wear Parts
Fluorocarbon rubber seals: Replace every 1–2 years to prevent leaks caused by aging; when the medium is oil or corrosive liquids, shorten the replacement interval to 1 year.
Cable sheaths and waterproof connectors: Inspect every 2 years; replace immediately if aging, cracking, or hardening occurs to prevent waterproofing failure.

7.3 Long-Term Maintenance Tips
1. Dust and Moisture Prevention Measures
High-dust environments: Install a transparent dust cover on the exterior of the equipment (ensuring display windows and ventilation holes remain unobstructed) and regularly clean dust from inside the cover; place desiccant inside the junction box to prevent condensation from humid air.
Damp / Outdoor Environments: Route connection cables in a U-shape to prevent rainwater from flowing along the cables into the junction box; apply waterproof sealant to the junction box and cable entry points to enhance the IP protection rating.
Equipment that will be out of service for an extended period should be stored in a dry, well-ventilated indoor environment with a relative humidity (RH) of ≤60% to prevent moisture damage and corrosion.

2. Anti-Interference Optimization Solutions
Cable Routing: Separate signal cables from power cables, maintaining a minimum distance of 30 cm; avoid routing them in the same cable tray. For shielded cables, ground the shield only at one end (on the control cabinet side); do not ground both ends to prevent loop current interference.
Power Supply Optimization: In environments with strong electromagnetic interference, install power filters on the equipment's power input to suppress grid interference. The power supply must be stable to avoid significant voltage fluctuations; a voltage regulator may be used.
Grounding Optimization: The equipment's metal casing and grounding terminals must be reliably connected to the PE protective ground, with a grounding resistance ≤4Ω. Regularly inspect the grounding busbar inside the control cabinet to ensure there is no corrosion or loosening.

3. Protection Techniques for Extreme Environments
High and Low Temperature Environments: In high-temperature environments (> 50°C), install sunshades and heat insulation devices

to avoid direct sunlight; in low-temperature environments (< -10°C), use custom-designed low-temperature equipment or install heat tracing systems to prevent media freezing and equipment condensation.
High-Vibration Environments: Install buffer elbows or vibration-damping brackets at the front of the equipment to reduce vibration transmission; when connecting the equipment body to piping, avoid additional mechanical stress and ensure vertical installation.
Corrosive Media Environments: Regularly inspect wetted parts and threaded connections for corrosion; if pitting or rust is detected, promptly replace seals and, if necessary, upgrade to 316L stainless steel wetted parts.

4. Maintenance During Long-Term Downtime
Before taking the equipment out of service, disconnect the power supply, relieve pressure from the piping system, and clean the equipment surface and pressure ports; seal the pressure ports with dust plugs to prevent contamination.
Store the equipment in an upright position to avoid crushing or impact damage, and keep it away from corrosive gases and liquids. Maintain an ambient temperature between -10°C and +40°C, with humidity ≤60% RH.
For equipment that has been out of service for more than 6 months, perform a power-on no-load test and accuracy re-calibration before reuse. Only put the equipment back into service after confirming it is functioning normally.

VIII. Troubleshooting & Emergency Procedures
8.1 List of Common Faults
No display / No response upon power-up
Display values fluctuate, signal drift, inaccurate readings
No output control (relay does not activate)
Misoperation / Frequent start-stop cycles (control logic malfunction)
Abnormal indicator lights (not lit / flashing / constantly lit)
Out-of-range alarm / Display shows “EEEE”
Analog output distortion / PLC cannot acquire signal (models with analog output)
Equipment housing is live / Severe signal interference

8.2 Causes of Faults and Step-by-Step Solutions
1. Fault: No display / No response upon power-up
Common causes: Abnormal supply voltage, reversed power supply polarity, loose terminal connections, or burned-out circuitry.
Troubleshooting Steps:
Use a multimeter to measure the supply voltage. Verify that the voltage for the DC24V model is between 21.6–26.4V and for the AC model between 85–260V to rule out power supply issues.
Inspect the power terminal connections to ensure positive/negative terminals and live/neutral wires are not reversed, that wire ends are fully inserted into terminals, screws are tightened, and there are no loose connections or oxidation.
Disconnect the power supply, unplug and reinsert the terminal connectors, then power on the unit again to test and rule out poor contact issues.
If the above steps are ineffective, it indicates that the internal circuitry has burned out. Stop using the device immediately and contact after-sales service for repair.
Emergency Procedure: If a spare unit is available on-site, directly replace it with a spare controller of the same model to restore system operation.

2. Fault: Display values fluctuate, signal drifts, and readings are inaccurate
Common Causes: Blocked pressure ports, fluctuations in medium pressure, strong electromagnetic interference, sensor drift, or lack of calibration.
Troubleshooting Steps:
Inspect the pressure ports. Remove the front-end filter (if present) and clean out debris and weld slag to eliminate abnormal pressure transmission caused by blockages.
Monitor the medium pressure in the piping. If water hammer or frequent fluctuations are present, install a buffer elbow upstream of the device to stabilize the pressure input.
Check for strong interference sources near the equipment, such as variable frequency drives or arc welders. Verify that signal cables are not routed in the same conduit as high-voltage power lines, and ensure the shielding wire is properly grounded at one end.
Compare the equipment’s display values with a standard pressure gauge or calibrator. If the deviation exceeds ±0.5% FS, enter the equipment’s calibration mode to perform zero-point and full-scale calibration.
If accuracy cannot be restored after calibration, this indicates sensor drift or damage, and the device must be replaced.
Emergency measures: Temporarily adjust the control hysteresis to reduce frequent start-stop cycles; replace or calibrate the device during scheduled maintenance.

3. Fault: No output control (relay does not actuate)
Common causes: Incorrect control logic settings, burnt-out relay contacts, excessive load current, or wiring errors.
Troubleshooting Steps:
Enter the device settings interface to verify the upper and lower limit thresholds and hysteresis settings, and confirm that the control logic (e.g., high-pressure shutdown / low-pressure startup) is configured correctly.
Inspect the wiring at the relay output terminals to ensure that the common terminal and normally open/normally closed terminals are connected correctly, with no reversed or loose connections.
Disconnect the load and use a multimeter set to the continuity test mode to check the relay contacts. When the pressure reaches the set threshold, the contacts should open and close normally; if they fail to do so, the contacts are burned out.
Check the load current. If it exceeds the contact rating (AC 220V 3A), use an AC contactor as an intermediary to avoid directly driving high-power loads.
Emergency Measures: Replace the relay terminals with a spare set, temporarily activate a backup control circuit, or directly replace the controller with a spare unit.

4. Fault: False Tripping / Frequent Start-Stop (Control Logic Disruption)
Common Causes: Hysteresis set too low, large pressure fluctuations, electromagnetic interference, unstable power supply voltage.
Troubleshooting Steps:
Enter the settings interface and appropriately increase the control hysteresis to prevent frequent start-stops caused by minor pressure fluctuations.
Check the piping for water hammer or pressure surges; install a buffer device to stabilize the pressure.
Verify that the shielding of the signal cables is properly grounded; install a power filter at the power supply end to suppress electromagnetic interference.
Measure the supply voltage to ensure there are no significant fluctuations; replace the power supply with a voltage regulator if necessary.
Emergency Measures: Temporarily adjust the hysteresis to a safe range to reduce false alarms; optimize the piping and power supply environment during scheduled maintenance.

5. Fault: Abnormal Indicator Light (Off / Flashing / Constant On)
Common Causes: Indicator light failure, abnormal control logic triggering, equipment circuit failure, unstable power supply.
Troubleshooting Steps:
Verify the current pressure value against the set threshold. If the pressure is normal but the alarm light remains on, this indicates a fault in the indicator light or control circuit.
Check if the supply voltage is stable; low voltage may cause the indicator light to flash.
Restart the device, restore factory settings, and reconfigure parameters to resolve software logic issues.
If the issue persists after restarting, this indicates a hardware failure; report for repair.
Emergency Procedure: Use the values displayed on the LED and the output actions as the basis for judgment; ignore the fault indicator and prioritize ensuring normal system control functions.

6. Fault: Over-range Alarm / Displaying “EEEE”
Common Causes: Medium pressure exceeds the upper limit of the device’s range, sensor damage, or pressure abnormalities caused by blocked pressure ports.
Troubleshooting Steps:
Immediately stop system operation, check the medium pressure in the piping, and confirm if overpressure is present. If overpressure is detected, relieve the pressure and adjust the system pressure to within the device’s measurement range.

7. Fault: Analog Output Distortion / PLC Cannot Acquire Signal (Models with Analog Output)
Common Causes: Incorrect wiring of analog output terminals, incorrect shield grounding, excessive load, or signal interference.
Troubleshooting Steps:
Check the wiring of the analog output terminals to ensure the "+/-" polarities are not reversed and that the wire connections are secure.
Verify that the settings on the PLC's analog input module match the device's output type (4–20 mA) and that the acquisition address is correct.
Check whether the shielding wire is grounded at only one end (on the control cabinet side) to prevent loop current interference caused by grounding at both ends.
Use a multimeter to measure the device's output current. When pressure is 0, the output should be 4 mA; at full scale, it should be 20 mA. A deviation exceeding ±0.1 mA indicates a fault in the device's analog circuit.
Emergency Procedure: Prioritize using the relay's digital control function to maintain system operation; troubleshoot the analog output fault during maintenance.

8. Fault: Equipment housing is live / Severe signal interference
Common causes: Equipment not reliably grounded, high-voltage leakage, incorrect shield grounding, power supply interference.
Troubleshooting steps:
Immediately disconnect power, inspect the equipment housing grounding terminal, and confirm that it is reliably connected to the PE protective ground with a grounding resistance ≤4Ω.
Check whether high-voltage cables are routed in the same conduit as the equipment signal cables; if there is a risk of leakage, they must be routed separately.
Check the shield grounding method to ensure it is grounded at a single point on the control cabinet side only, with the shield left floating at the device end.
Install a power filter at the device's power input to suppress power grid interference.
Emergency procedure: Disconnect the device's power supply, wrap exposed terminals with insulating tape, and temporarily install a grounding wire; rewire according to specifications during maintenance.

8.3 After-Sales Service Request Guidelines
1. Criteria for Determining a Malfunction (Circumstances Requiring Service)
No display appears when the device is powered on; the device remains unresponsive after ruling out power supply and wiring issues.
The display shows "EEEE" or an out-of-range alarm; the issue cannot be resolved after cleaning the pressure inlet and adjusting the pressure.
Relay contacts are burnt out, or analog output is distorted, preventing normal control or signal acquisition.
Accuracy deviation exceeds ±1% FS and cannot be corrected through calibration.
The device housing is corroded or cracked, or water ingress or moisture has caused a short circuit.
For explosion-proof models, the explosion-proof housing is damaged or the seal has failed, posing a safety hazard.

2. Repair Process
Record device information: Model (QD-YLK series), measurement range, power supply specifications, installation date, fault symptoms, and on-site environment (e.g., temperature, medium, interference conditions).
Contact after-sales support: Call the official Qidian Technology after-sales hotline or submit a repair request through the sales representative's designated channel.
Submit fault details: Provide the device model, fault symptoms, and on-site photos/videos to assist after-sales personnel with initial remote troubleshooting.
After-sales Assessment: After-sales personnel will assess the cause of the failure, provide remote guidance for repair, or determine whether the device needs to be returned to the factory for repair or replacement.
Return the Device (if required): Pack the device according to after-sales instructions, fill out the repair request form, mail it to the designated address, and await repair or replacement.

3. Warranty Coverage
The Qidian QD-YLK series pressure controllers come with a 12-month warranty from the date of manufacture. During the warranty period, free repair or replacement services are provided for equipment failures not caused by human error or force majeure.
The following situations are not covered by the warranty:
Equipment damage resulting from incorrect installation, overpressure use, or improper power supply.
Equipment damage caused by media corrosion, water ingress, or external impact.
Failures resulting from unauthorized disassembly, modification, or repair by third parties.
Normal wear and tear of consumable parts (seals, cable sheaths, waterproof connectors).
For equipment outside the warranty period, lifetime repair services are available, with charges limited to the cost of parts and labor.