Mechanical Pressure Switch

I. Product Definition

The Qidian PS20-QD mechanical pressure switch is an automation component that uses a mechanical structure to monitor fluid pressure and perform switching control. Its core function is to detect pressure changes in media such as water, oil, and gas; when the pressure reaches a preset threshold, it drives the built-in contacts to switch the circuit on or off, thereby enabling start/stop, protection, and alarm control for equipment or systems. It operates independently without requiring an external power supply.

1: Pressure Threshold Trigger Control: Customizable pressure setpoints (e.g., pressure-up activation, pressure-down reset) enable automatic start/stop control of pumps, air compressors, and hydraulic systems.

2: Equipment Safety Protection: When system pressure exceeds normal limits (e.g., high or low pressure), the circuit is rapidly disconnected or reconnected to prevent equipment overload or damage from overpressure (e.g., low-pressure alarms in fire protection pipelines, high-pressure relief control in hydraulic systems).

3: Multi-medium Compatibility Monitoring: Suitable for various neutral or mildly corrosive media such as water, oil, and gas, enabling pressure status monitoring in applications including fire protection, water treatment, hydraulics and pneumatics, and industrial automation.

4: Contact Signal Output: Features 1 set of COM (common) terminal + NO (normally open) / NC (normally closed) contacts, allowing direct connection to control circuits without additional signal conversion modules, suitable for most low-voltage control scenarios.

5: High-Reliability Industrial-Grade Protection: IP65 protection rating ensures stable operation in humid, dusty, and splash-prone environments, making it suitable for harsh on-site conditions.

6: Maintenance-Free, Long-Life Design: Featuring a mechanical structure and piston-type sensor design, with gold-plated contacts, it can withstand ≥1 million switching cycles, reducing long-term maintenance costs.

II. Working Principle

The operating logic of the Qidian PS20-QD mechanical pressure switch can be summarized as a three-step process: "Pressure Sensing → Mechanical Linkage → Contact Switching." The entire process requires no electronic circuitry; operation is achieved through a purely mechanical structure. The principle is explained in simple terms as follows:

1. Pressure Sensing Stage: Medium pressure enters the switch through the front threaded port, acting on the stainless steel piston (or diaphragm) to generate an upward thrust.

2. Force Opposition and Linkage Stage: The piston's thrust opposes the force of a precision spring preset within the switch. When the pressure is below the set value, the spring force exceeds the medium's thrust, keeping the piston in its initial position; the microswitch contacts remain in their original state (normally closed contacts remain closed, normally open contacts remain open). When the pressure rises and reaches the set value, the medium's thrust overcomes the spring force, pushing the piston upward and driving the actuator rod to trigger the microswitch.

3. Contact Switching and Signal Output Phase: Once the microswitch is triggered, the contact states instantly reverse (normally closed contacts open, normally open contacts close), completing the circuit's on/off switching; when the pressure drops below the preset reset value, the spring force pushes the piston back to its original position, and the contacts return to their initial state, thereby achieving cyclic control.

Additional Note: The switch's set point can be adjusted by regulating the spring preload; different models correspond to different pressure ranges.

III. Core Value and Pain Point Solutions

3.1. Product Core Value

The Qidian PS20-QD mechanical pressure switch features a purely mechanical sensing structure design. It independently performs pressure monitoring and circuit control without requiring an external power supply, and is suitable for a variety of neutral and mildly corrosive media, including water, oil, and gas. The unit offers advantages such as a high protection rating, fast response time, long service life, convenient adjustment, and simple wiring and installation. It is widely applicable in scenarios such as water treatment, hydraulics and pneumatics, industrial automation, water supply boosting, and fire protection systems.

The product accurately detects changes in pipeline pressure and automatically triggers contact switching when pressure reaches a preset threshold, enabling functions such as automatic equipment start/stop, overpressure and underpressure safety protection, and pressure anomaly alarms; With a stable and reliable structure, it is dust-resistant, splash-proof, and oil-resistant, making it suitable for harsh industrial environments. The contacts feature an anti-oxidation treatment, ensuring high cycle counts and long-term operation without contact failure. Additionally, the pressure setpoint is freely adjustable, allowing a single unit to adapt to various operating conditions. This significantly reduces procurement and replacement costs, simplifies on-site installation and commissioning, and enables unattended automated system operation.

3.2. Key Customer Pain Points and Corresponding Solutions

Pain Point 1: System pressure is entirely managed through manual inspections, resulting in high manpower costs and an increased risk of safety incidents such as overpressure or underpressure due to human error

Solution: The PS20-QD mechanical pressure switch provides real-time online monitoring of pipeline pressure. When pressure reaches the set value, it automatically triggers on/off control without any manual intervention, enabling 24-hour unattended automated monitoring. This completely replaces manual patrols and monitoring, mitigates equipment damage and safety hazards caused by human error, and enhances the operational safety of the entire system.

Pain Point 2: Solutions using electronic pressure sensors paired with relays have high overall procurement costs, rely on external power sources, and become completely inoperable during power outages. Additionally, electronic components are susceptible to interference and have a relatively high failure rate.

Solution: This product features a purely mechanical design that operates normally without power. It functions reliably even during power outages or voltage fluctuations and is immune to electromagnetic interference. Its simple and durable structure results in a failure rate far lower than that of electronic sensor combinations. The lower unit cost also reduces additional expenses for future repairs and replacement parts.

Pain Point 3: Industrial environments are often dusty, humid, and subject to oil and water splashes. Conventional pressure switches have poor sealing, making them susceptible to water and dust ingress, corrosion, and aging, resulting in a short service life and frequent, time-consuming replacements.

Solution: The product features a high-grade protective design that effectively blocks dust ingress and withstands low-pressure water jets, making it suitable for harsh conditions such as workshops, outdoor settings, and hydraulic stations. Internally, it features stainless steel sensing components paired with high-quality sealing materials, while the housing is resistant to oil contamination, aging, and corrosion, significantly extending the product's service life and reducing downtime losses and maintenance workloads caused by frequent replacements.

Pain Point 4: The contacts of ordinary switches are prone to oxidation and erosion. Long-term use leads to poor contact and signal failure, causing equipment to start unexpectedly or shut down for no apparent reason, which affects the continuous operation of production lines.

Solution: The PS20-QD pressure switch is equipped with high-quality micro-switch contacts treated with anti-oxidation and wear-resistant processes. These contacts offer stable conductivity and withstand frequent on-off cycles. They resist oxidation and false connections even after long-term use, ensuring precise transmission of control signals. This eliminates equipment malfunctions and unexpected shutdowns caused by contact failures, guaranteeing stable and continuous equipment operation.

Challenge 5: Diverse on-site media types. Standard pressure switches are designed for a single medium, requiring the purchase of multiple models

to accommodate different pipeline conditions, which makes selection cumbersome and increases inventory costs.
Solution: The internal sensing and sealing structures of this unit have been professionally optimized for compatibility with various common industrial media, including water, hydraulic oil, and compressed air. A single product meets pressure control requirements across multiple pipeline scenarios, eliminating the need to purchase multiple models. This simplifies the selection process and reduces inventory and replacement procurement costs.

Pain Point 6: Different equipment and pipelines have varying trigger pressure requirements. Conventional pressure switches have fixed, non-adjustable pressure values, resulting in poor adaptability and requiring a rigid model match.
Solution: The product features a built-in adjustable spring mechanism that allows on-site adjustment of the actuation pressure and reset differential pressure. This enables flexible setting of trigger points to meet pressure requirements in various operating conditions, such as pump pressurization, hydraulic control, and fire protection pressure stabilization, offering exceptional adaptability. A single model can cover multiple pressure ranges and application scenarios.

Pain Point 7: Traditional pressure switches have messy wiring and complicated installation, requiring professional installation and time-consuming commissioning, which increases on-site labor costs
Solution: The product's terminal blocks are clearly labeled, with well-defined normally open, normally closed, and common terminals, and the wiring logic is simple and intuitive. The piping uses standard threaded connections that can be installed by simply screwing them in, eliminating the need for complex tools. Even novices can quickly complete installation and pressure calibration, saving on-site construction time and professional labor costs.

IV. Key Product Parameters & Specifications
4.1 Basic Electrical Parameters (Contact Switch Parameters)
Contact Configuration: 1 COM + 1 NO (Normally Open) + 1 NC (Normally Closed), Single Pole Double Throw (SPDT)
Contact Material: Gold-plated contacts, oxidation-resistant, low contact resistance, long service life
Maximum Switching Capacity (Resistive Load):
DC: ≤42V / 1A; ≤115V / 0.15A
AC: ≤42V / 3A; ≤125V / 3A; ≤250V / 0.5A
Minimum Load Current: 10mA / 5V (to ensure reliable contact)
Mechanical Life: ≥1 million operations
Dielectric Strength: 500VAC / 60s, no breakdown
Insulation Resistance: ≥100MΩ @ 500VDC
Contact Resistance: ≤50mΩ (initial)
Response Time: ≤10ms (purely mechanical operation)

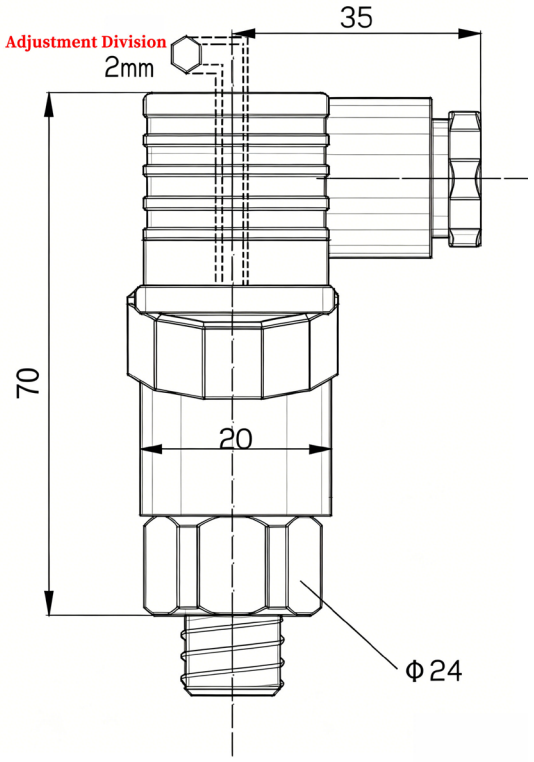
4.2, Isolation Performance Parameters (Mechanical Isolation / Electrical Isolation)
Electrical Isolation: Reinforced insulation isolation between contacts and housing, and pressure ports
Dielectric Withstand Voltage: 500 VAC / 1 minute (contacts–housing)
Insulation Resistance: ≥100 MΩ @ 500 VDC (contacts–housing)
Media isolation: Piston + NBR seals completely isolate the media from the electrical chamber, preventing oil, water, and gas leakage into the terminal compartment
Electric shock protection class: Class II (double insulation)
Note: This product is purely mechanical and does not feature "input/output isolation" via a signal isolator; the above parameters pertain to safety isolation, electrical insulation, and media isolation.

4.3 Power Supply & Power Consumption Parameters (Key Mechanical Feature: No Power Supply Required)
Operating Power Supply: None; purely mechanical structure; no external power supply required (neither 24 V DC nor 220 V AC is needed)
Standby Power Consumption: 0 W
Operating Power Consumption: 0W
Power Distribution Output: No power distribution output (does not provide auxiliary power such as 24V or 5V)
Applicable Control Voltage: Universal AC/DC; compatible with on-site 12/24/48/110/220V control circuits

4.4 Environmental Specifications
Suitable media: Water, hydraulic oil, compressed air, neutral gases/liquids (compatible with mildly corrosive media)
Media temperature: -20°C … +85°C (standard); optional -40°C … +160°C high-temperature version
Operating ambient temperature: -20°C … +85°C
Storage Temperature: -30°C … +90°C
Operating Humidity: 10% RH … 95% RH, non-condensing
Protection Rating: IP65 (dust-tight, protected against low-pressure water jets)
Explosion-proof rating: Non-explosion-proof; Custom explosion-proof models available (Ex d IIC T4–T6) (Compatible safety barrier models: e.g., MTL50xx, P+F KFD2 series)
Vibration resistance: 10g / 10–2000 Hz
Shock resistance: 50g / 11 ms

4.5, Pressure Range & Performance Parameters (Core Mechanical Parameters)
Pressure Type: Gauge Pressure (G)
Standard Ranges (Optional):
0–5 bar, 0–10 bar, 0–20 bar, 0–50 bar, 0–100 bar, 0–200 bar
Example Model (Refer to the image you uploaded): PS20-050XG-14HR
Range: 0–50 bar
Setpoint: 35 bar (Factory Default)
Maximum Pressure Rating: 100 bar (2 times the range)
Setpoint Range: 10%–100% FS, continuously adjustable
Hysteresis: 10%–20% of setpoint (standard); optional 1%–5% for precision models
Repeatability: ≤±1% FS
Accuracy: ≤±3% of setpoint (at 25°C)

4.6 Physical Parameters (Installation, Dimensions, Materials, Weight)
1. Installation Method
Installation method: Plug-in type, external thread for direct installation on piping/valve body
Pressure connection: G1/4" external thread (standard); optional 1/4 NPT, G1/8"
Wiring Method: DIN43650 standard plug (plug-in type), terminals clearly labeled:
1 = COM (Common)
2 = NC (Normally Closed)
3 = NO (Normally Open)
2. Dimensions (L × W × H, including ports and plug)
Total Height (including pressure port + body + plug): Approx. 88 mm
Body width (diagonal measurement of hexagon): 24 mm
Pressure port length: Approx. 14 mm (G1/4 male thread)
Plug dimensions: Approx. 28 mm × 20 mm × 45 mm (L × W × H)
Recommended installation space: ≥100 mm (H) × 40 mm (W) × 40 mm (D)



3. Weight
Net weight: Approx. 180g (excluding cable)
Gross weight (including packaging): Approx. 250g
4. Housing Material and Protection Details
Housing Body: Reinforced engineering plastic (black), flame-retardant, oil-resistant, and anti-aging
Pressure Port: 304 stainless steel, rust-proof and corrosion-resistant
Piston / Pressure Sensor: 304 stainless steel piston + NBR seal
Seal Material: NBR (nitrile rubber), oil-resistant, water-resistant, and gas-resistant; Optional FKM (fluorocarbon rubber) for high-temperature resistance / corrosion resistance
Protection Details:
Terminal Chamber: O-ring sealed, IP65, resistant to water jets and dust ingress
Pressure Chamber: Dual metal + rubber seal, prevents media from entering the electrical components
Adjustment Area: Locking screw + protective cover, prevents accidental adjustment and water ingress

V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type: This product features a purely mechanical digital output, providing one set of COM + NO/NC contact signals. It is designed exclusively for digital control applications and does not support analog or digital signal output. When selecting this product, ensure that your system requires only on/off control and does not require continuous pressure monitoring.

2. Number of Channels: This product features a single-channel, single-contact design and supports only one pressure monitoring and control channel. If multi-point synchronous control is required, multiple independent switches must be configured; there is no multi-channel integrated model available.

3. Power Supply: The product features a purely mechanical structure and operates without an external power supply, making it suitable for environments without power sources, where power outages are a risk, or where electromagnetic interference is strong. If the system relies on active signal acquisition, additional relays or passive-to-active signal conversion modules must be provided.

4. Explosion-proof requirements: The standard model is non-explosion-proof and is only suitable for general industrial environments; for flammable and explosive environments such as chemical, oil, and gas industries, explosion-proof models (flameproof or intrinsically safe) must be customized in advance, and compatibility with the corresponding safety barrier model must be confirmed.

5. Installation Environment: The IP65 protection rating is suitable for standard environments with humidity, dust, and splashing water. For highly corrosive, underwater, or extreme high/low-temperature environments, verify that the sealing material (e.g., FKM fluorocarbon rubber) and temperature rating are compatible to avoid selection errors.

6. Pressure Range: Select a range based on 1.2 to 1.5 times the system's operating pressure (e.g., for a maximum operating pressure of 30 bar, a 0–50 bar range is recommended) to prevent damage from overpressure due to an insufficient range or insufficient control accuracy due to an excessive range.

7. Load Matching: Select contact specifications based on the control circuit's voltage and current ratings. Resistive loads must be kept within the rated current; inductive or capacitive loads require additional surge protection components to prevent contact burnout.

8. Medium Compatibility: Standard models are compatible with water, oil, and neutral gases; For acids, alkalis, or highly corrosive media, a custom stainless steel model with special sealing materials is required to prevent corrosion and failure of standard seals.

5.2. Selection Guidelines for Industry Applications
1. Selection Guidelines for the Chemical Industry
In the chemical industry, for pressure protection in low-pressure water supply and cooling circulation systems, the standard-range model PS20-QD-050 (0–50 bar) may be selected; For pipelines handling mildly corrosive media, the custom model with 316 stainless steel connections and FKM seals is recommended; For flammable and explosive chemical reactors and transfer pipelines, the explosion-proof custom model must be selected and used in conjunction with an intrinsically safe barrier to ensure operational safety and compliance.

2. Selection Guidelines for the Power Industry
For pressure monitoring in hydraulic oil systems and cooling water systems at thermal power plants, the standard PS20-QD-100 (0–100 bar) model can be selected for routine pressure protection in oil and water media; for fire suppression pressure stabilization systems in substations, the 0–10 bar range model is sufficient to meet low-pressure stabilization control requirements; For high-dust, humid outdoor power pump room environments, prioritize models with an IP65 protection rating to ensure stable operation without the need for additional protection.

3. Selection Guidelines for Metallurgical Industry Applications
For high-pressure pipeline protection in metallurgical hydraulic stations and lubrication systems, select the 0-200 bar high-range model, suitable for high-pressure hydraulic oil media; for high-temperature lubrication systems, high-temperature resistant models can be customized to accommodate media temperatures up to 120°C; in metallurgical workshops with heavy dust and oil contamination, the standard IP65-rated model can withstand on-site environmental interference without requiring additional modifications.

4. Selection Guidelines for Pharmaceutical Industry Applications
For pressure monitoring in pharmaceutical purified water and water-for-injection piping systems, select the sanitary-grade model with stainless steel interfaces and a dead-space-free design, suitable for installation in clean piping systems. For pressure stabilization control in low-pressure water supply systems, the 0-10 bar range model is sufficient to meet low-pressure start-stop control requirements. For installation in cleanrooms, the standard model's oil-resistant housing design allows for direct installation without requiring additional protective measures.

5. Smart Manufacturing Industry Application Selection Guide
For pressure protection in pneumatic systems on automated production lines, select the 0–10 bar range model to accommodate compressed air; for pressure control in hydraulic clamping fixtures and servo-hydraulic systems, choose the 0–50 bar range model, which allows flexible adjustment of setpoints based on clamping pressure requirements; for standard workshop operating conditions, the standard model's DIN connector wiring facilitates quick installation in automated control cabinets and simplifies commissioning.

5.3 Common Selection Pitfalls
Pitfall 1: Neglecting Protection and Isolation Ratings: Focusing solely on pressure range while ignoring dust, humidity, and oil contamination levels in the installation environment can cause IP65-rated models to fail rapidly in highly corrosive or underwater environments. Additionally, using standard models in high-voltage insulation scenarios without verifying the contact and housing insulation voltage ratings poses risks of electric shock and short circuits.

Misconception 2: Incorrect Selection of Pressure Range and Setpoint: Selecting models based solely on system operating pressure without allowing a safety margin of 1.2 to 1.5 times the pressure leads to either an insufficient range (resulting in damage from overpressure) or an excessively large range (where the setpoint falls at the lower limit, causing insufficient response accuracy, excessive hysteresis, and inability to achieve precise control).

Misconception 3: Neglecting Load-to-Contact Matching: Failing to distinguish between resistive and inductive loads, and directly using contacts to control high-power motors or solenoid valves, leading to contact erosion, sticking, and equipment malfunctions; simultaneously, failing to verify the voltage rating of the control circuit and using low-voltage contacts to control high-voltage circuits, which poses safety hazards.

Misconception 4: Selecting General-Purpose Models for Explosion-Proof Environments: In flammable and explosive environments, using

non-explosion-proof standard models without customizing explosion-proof versions or installing safety barriers creates safety hazards such as explosions and fires, and prevents the equipment from passing on-site safety inspections.

Misconception 5: Neglecting compatibility between the medium and sealing materials: In environments involving acids, alkalis, or highly corrosive media, using standard models with NBR seals leads to rapid corrosion, aging, and leakage of the seals, resulting in switch failure. In high-temperature media applications, failing to use high-temperature-resistant sealing materials causes seal deformation and pressure drift issues.

5.4 Customization Recommendations

1. Customization for Special Media and Non-Standard Operating Conditions: For highly corrosive media, 316L stainless steel pressure ports combined with FKM/FFKM perfluorinated seals can be customized to suit applications involving acids, alkalis, and organic solvents; for high- and low-temperature conditions, wide-temperature models (-40°C to 160°C) can be customized to accommodate special scenarios such as cold storage facilities and high-temperature steam pipelines; For food and pharmaceutical clean piping, sanitary chuck or quick-connect interface models can be customized to meet clean production requirements.

2. Customization for Special Pressure and Accuracy Requirements: For high-pressure applications, ultra-high-pressure models with a range of 0–400 bar are available; for precision control applications, low-hysteresis models are available, with hysteresis controlled within 1%–5% of the setpoint to meet high-precision pressure control needs; for special setpoint requirements, factory preset customization services are available, allowing the device to ship directly with the customer's specified pressure value, eliminating the need for on-site calibration.

3. Customized Structures for Multiple Scenarios: For installations with limited space, we offer models with extended or shortened threaded connections; for outdoor waterproof applications, we provide integrated wiring models with waterproof cables to replace standard DIN connectors and enhance the protection rating; for high-vibration environments, we offer vibration-resistant reinforced models with optimized internal structures and contact mounting methods to improve vibration resistance.

4. Customization for Explosion-Proof and Safety Applications: For chemical and oil/gas explosion-proof environments, explosion-proof models (flameproof or intrinsically safe) can be customized, complete with explosion-proof certification documentation and compatibility with corresponding safety barrier models; for high-voltage safety interlock applications, dual-contact redundant models can be customized to provide two independent signal outputs, enhancing the reliability of interlock control.

5. Customization for Bulk Orders and Special Installations: For bulk purchase scenarios, we offer services for customizing customer-specific model codes, packaging, and nameplates. For non-standard installation requirements, we can customize special structural variants—such as flange-mounted or horizontal-mount models—to integrate with customers' existing piping and equipment interfaces.

VI. Installation and Commissioning Specifications

6.1. Pre-installation Preparation

1. Verification of Components

After unpacking, verify that the following components are complete and in good condition:

PS20-QD Mechanical Pressure Switch Unit: 1 unit

Matching HARTING connector: 1 piece

Product Manual / Certificate of Conformity: 1 copy

No additional accessories are included. If custom gaskets or locknuts are provided, verify model compatibility simultaneously.

Inspect the switch body for dents or deformation, check that threaded connections are undamaged, and ensure the connector has no broken pins or oxidation. Verify that the nameplate parameters match the ordered model (range, set point, and media compatibility).

2. Environmental Check

Confirm that the installation pipeline pressure does not exceed the switch's maximum rated pressure (e.g., 30 bar for the 1–12 bar range model) and that the medium temperature is within the product's permissible range (-20°C to +85°C).

Ensure the installation location is free from highly corrosive gases and strong electromagnetic interference sources (such as high-power motors or variable frequency drives). Avoid direct exposure to sunlight or continuous rain.

Allow sufficient installation space to ensure unobstructed access for switch removal, installation, wiring, and future commissioning operations. It is recommended to leave a clearance of ≥100 mm in height and ≥40 mm on the sides.

3. Tool List

Open-end wrench / Socket wrench (matching the hex size of the pressure port; standard is 24 mm)

Phillips / Flathead screwdriver (for HART terminal blocks)

Teflon tape / sealant (for sealing pipe threads)

Multimeter (for contact continuity testing)

Pressure gauge (for on-site pressure verification; range must cover the switch's set point)

4. Safety Precautions

Pressure must be relieved from the piping and power must be disconnected before installation. Operating under pressure or with power connected is strictly prohibited.

In flammable or explosive environments, verify that the switch is a custom explosion-proof model, and follow the on-site hot work approval process.

Avoid striking the switch body forcefully during installation to prevent damage to the internal piston and microswitch.

Before commissioning, verify that the control circuit voltage matches the rated voltage of the contacts to prevent contact burnout due to overvoltage.

5.2 Standard Installation Steps

1. Pipe Installation and Securing

Select a vibration-free, impact-free horizontal or vertical pipe location for installation. Vertical installation is preferred (with threaded connections facing down and wiring terminals facing up) to minimize the impact of sediment buildup on piston movement.

Wrap Teflon tape around the pressure port threads (wind clockwise to avoid blocking the threaded holes), and use a wrench to slowly tighten the switch body. Do not directly tighten the black terminal box section to prevent loosening of internal components.

After installation, gently shake the switch body to ensure there is no looseness and no signs of leakage at the threaded seal.

2. Wiring Specifications

Terminal Definitions (Hirschmann Plug): 1=COM (Common), 2=NC (Normally Closed), 3=NO (Normally Open). Terminal numbers correspond to those on the switch body nameplate.

Wire Selection: Select wires compatible with the control circuit voltage. Recommended wire gauge: 0.5–1.5 mm². Keep the stripped length between 5–6 mm. Ensure crimping or soldering is secure and free of burrs.

Wiring Method: Select the contact connection based on control requirements. For low-voltage alarm control, connect COM + NC; for high-voltage shutdown control, connect COM + NO.

Hirschmann Connector Installation: Connect the wires to the corresponding terminals and tighten the screws. Secure the connector cover, ensuring the waterproof O-ring is properly seated, to achieve an IP65 protection rating.

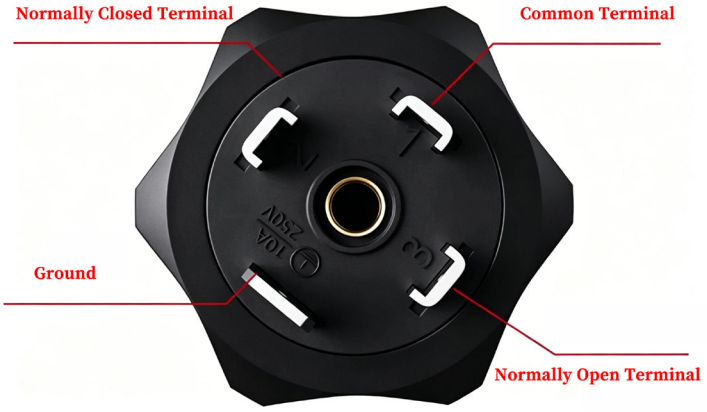
3. Grounding Requirements

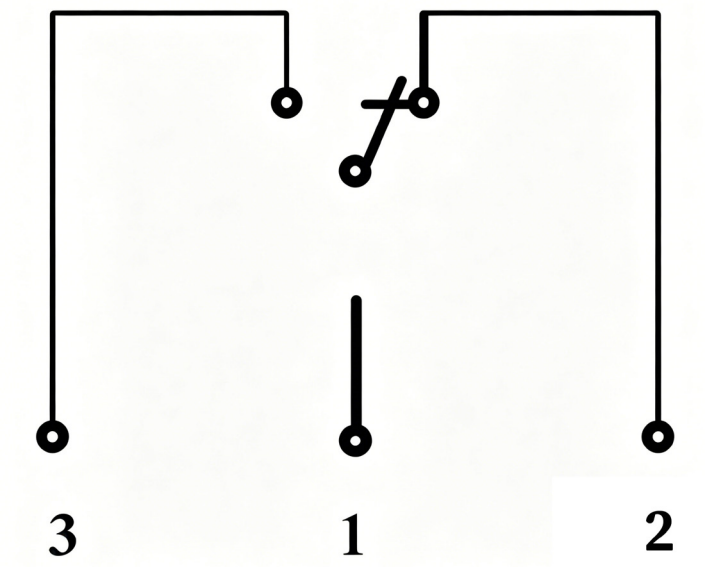
The metal housing of the switch itself does not require mandatory grounding. However, if installed in an environment with strong electromagnetic interference, the piping may be reliably grounded to reduce the impact of interference on contact signals.

The control circuit must have an independent ground with a ground resistance ≤4Ω. Avoid sharing the ground with the power circuit to prevent signal false triggering caused by ground potential differences.

6.3, Wiring Diagram Notes







1. Basic Control Wiring Specifications
Low-Pressure Alarm / Control Wiring (COM + NC)
Applicable Scenarios: Triggers an action when pressure falls below the set value (e.g., low-pressure pump startup, low pipeline pressure alarm)
Wiring Method: Connect one end of the control power supply to the COM terminal, and the NC terminal to the load (e.g., relay coil, alarm light). Connect the other end of the load to the other end of the control power supply to form a circuit
Key Notes: When normal pressure is above the set value, the NC contact opens, breaking the circuit; when pressure falls below the set value, the NC contact closes, completing the circuit and triggering the action
High-Pressure Shutdown / Alarm Wiring (COM+NO)
Applicable Scenarios: Triggers an action when pressure exceeds the set value (e.g., air compressor high-pressure shutdown, pipeline overpressure alarm)
Wiring Method: Connect one end of the control power supply to the COM terminal, connect the NO terminal to the load, and connect the other end of the load to the other end of the control power supply to form a circuit
Key Notes: When normal pressure is below the set value, the NO contact opens, and the circuit is open; when pressure exceeds the set value, the NO contact closes, the circuit is closed, and the action is triggered

2. Comparison of Common Wiring Errors and Correct Practices
Error 1: Connecting the power supply (e.g., the 220V motor main circuit) directly to the contact terminals, causing the contacts to burn out due to overcurrent. The correct practice is to have the contacts control only the relay coil, with the relay's main contacts controlling the power circuit

Error 2: Stripping the wire too long, with exposed burrs coming into contact with the metal housing of the connector, causing a short circuit. The correct procedure is to limit the stripped length to the range required for crimping the terminal, ensuring no excess copper wire is exposed.

Error 3: The Husman connector's protective cover is not securely fastened, and the rubber gasket is misaligned, allowing water and dust to enter. The correct procedure is to verify after wiring that the rubber gasket is not misaligned and that the protective cover is fully snapped into place.

6.4 Power-On Debugging Procedure
1. No-Load Test
Keep the pipeline depressurized. Use a multimeter set to continuity mode to test the contact status: When the pressure is 0, COM and NC should be connected, and COM and NO should be disconnected—this is the normal initial state.
If the initial state is abnormal, check whether the switch is installed at an angle, whether the piston is stuck, or whether the internal microswitch is damaged

2. Signal Verification
Slowly increase the pressure in the pipeline while observing the contact status: When the pressure reaches the set value, the multimeter should indicate that COM and NC are open, and COM and NO are closed.
Slowly reduce the pressure; when the pressure drops to the reset value (approximately 80% of the set value, standard deviation), the contacts should return to their initial state, with no sticking during the closing or opening process

3. Status Assessment and Accuracy Calibration
If the contact actuation pressure deviates significantly from the set value, adjust using the adjustment screw (2mm hex socket) on top of the switch.

4. Adjusting Spring Preload: Tighten clockwise to increase the set pressure; loosen counterclockwise to decrease the set pressure.
During calibration, use the on-site pressure gauge reading as the reference. Perform repeated pressure increase and decrease tests three times to confirm that the operating pressure error is within ±3% and that the hysteresis is stable with no fluctuations.
After commissioning, tighten the anti-loosening mechanism of the adjustment screw and replace the protective cap to prevent accidental adjustment.

6.5 Installation Contraindications and Protective Measures
1. Never operate under overpressure
Do not install or use in pipelines exceeding the valve's maximum rated

pressure,
as this may cause permanent deformation of the piston, damage to seals, or even media leakage
When selecting a model, allow a safety pressure margin of 1.2 to 1.5 times the rated pressure to prevent damage from overpressure caused by water hammer in the pipeline

2. Avoid Electrical Interference and Overload
Do not use the switch contacts to directly control high-power inductive or capacitive loads (such as high-power motors or solenoid valves). An intermediate relay must be used to prevent contact arcing and erosion.
Control circuits must be routed separately from power circuits, with a minimum distance of 20 cm, to avoid electromagnetic interference from devices such as variable frequency drives and motors.

3. Causing contact misoperation
Protective Measures for Humid/Harsh Environments
When installing outdoors or in humid environments, ensure the HARTING connector cover is securely fastened and that the waterproof O-ring shows no signs of aging or deformation. Install an additional waterproof junction box if necessary.
In environments with high levels of oil or dust, regularly clean oil and dust from the switch surface to prevent clogging of pressure ports or impaired heat dissipation. Do not rinse the switch body directly with water

4. Other Prohibitions
Do not weld or strike the switch body, or use a wrench to turn the junction box section, to prevent damage to internal components.
Do not install the switch at locations subject to turbulent flow, such as pipe elbows or tees, to avoid frequent piston actuation caused by medium impact, which may shorten service life.
For pipelines that will be idle for extended periods, depressurize the pipeline and keep it dry to prevent the medium from corroding the pressure ports and seals.

VII. Recommendations for Daily Use and Maintenance
7.1 Key Points for Daily Inspections
1. Inspection of Appearance and Installation Status
Conduct daily inspections to ensure the switch body shows no mechanical damage, threaded connections have no media leaks, hexagonal mounting points show no signs of loosening, and the protective covers of the terminal connectors are securely fastened with no signs of water or dust ingress.
Confirm that the installation location is free of oil stains and dust accumulation, that the valve body has not shifted due to pipeline vibration or impact, and that the installation space is unobstructed and well-ventilated.

2. Signal Stability Monitoring
Each time the system starts or stops, or when pressure changes, simultaneously check whether the contact operation is precise: when pressure reaches the set value, the circuit should switch on and off stably, without delay, stuttering, or false triggering.
For control circuits with indicator lights, observe whether the lights change state in sync with pressure changes, ensuring no abnormal conditions such as flickering, constant illumination, or constant extinction.
Regularly record the number of switch operations. When approaching the rated mechanical life (≥1 million cycles), prepare replacement parts in advance to avoid unexpected shutdowns due to failure.

3. Operating Parameter Monitoring
Verify daily that the pressure of the medium in the piping remains within the switch's operating range, with no overpressure surges or water hammer. Ensure the maximum working pressure does not exceed 80% of the range to prevent fatigue damage caused by prolonged high-pressure operation.
Monitor the medium temperature and ambient temperature to ensure they remain within the product's permissible range (standard model: -20°C to +85°C), preventing seal aging and spring performance degradation caused by overheating.
In humid or dusty environments, pay close attention to whether condensation or rust has formed at the wiring connections, and ensure there are no contact issues caused by corrosion or oxidation.

7.2 Regular Maintenance Plan
1. Cleaning Frequency and Methods
Standard Conditions (Indoor, Dry, Low Dust): Clean the switch surface quarterly. Wipe off oil and dust with a dry, soft cloth. Do not rinse directly with water or wipe with corrosive solvents to avoid damaging the housing and seals.
Harsh Conditions (Outdoor, Humid, High Dust/Oil): Clean once a month, focusing on removing impurities and oil residue from the threads of the pressure ports to prevent blockage of the piston clearance, which could cause sticking during operation.
During cleaning, simultaneously inspect the sealing condition of the pressure ports. If any signs of leakage are found, re-wrap with PTFE tape or replace the sealing gasket to prevent medium leakage from affecting system pressure.

2. Wiring Tightening and Contact Inspection
Inspect the HARTING connector terminals every six months: After powering down, open the protective cover, use a screwdriver to tighten the terminal screws, and check that the wires show no signs of oxidation, broken strands, or exposed burrs. Re-secure the protective cover and confirm that the waterproof O-ring has not aged or deformed.
Test contact status annually using a multimeter in the continuity mode: Test the contact's closed/open state at both 0 pressure and when the set pressure is reached. Verify that the switching logic between COM and NC, as well as between COM and NO, is normal, and that contact resistance has not increased significantly (≤50 mΩ).
If signs of burning or oxidation are found on the contacts, replace the switch promptly to prevent control circuit failures caused by prolonged use.

3. Accuracy Retesting and Calibration Recommendations
Conduct an accuracy retest every six months: Connect the switch in parallel with a standard pressure gauge in the pipeline, slowly increase or decrease the pressure, record the actuation pressure and reset pressure, and compare them with the set value; the error must be controlled within ±3%.
If the actuation pressure deviation exceeds the allowable range, recalibrate the set value using the top adjustment screw. After calibration, tighten the anti-loosening mechanism to prevent set value drift caused by vibration during operation.
For switches in long-term operation (≥2 years), it is recommended to re-test the hysteresis annually. The hysteresis should remain stable within 10%–20% of the set value. If the hysteresis is too large, check whether the internal spring is fatigued or the piston is sticking.

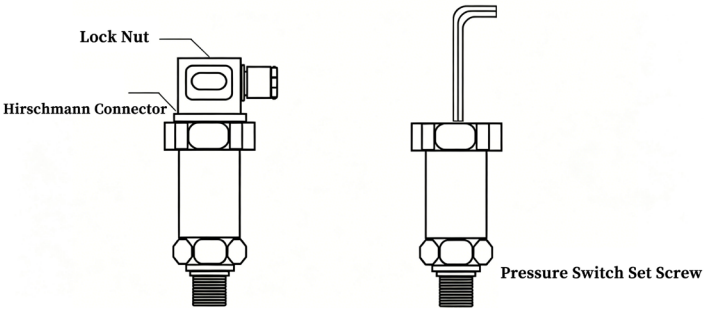
7.3 Long-Term Maintenance Tips
1. Optimizing Dust and Moisture Protection
When installed outdoors or in humid environments, an additional IP67 waterproof junction box can be installed to fully enclose the HARTING connector, preventing rainwater and condensation from entering the wiring compartment and enhancing the protection rating.
In workshops with high dust levels, a dust cover can be installed on the switch surface (without obstructing the pressure ports or heat dissipation) to reduce dust accumulation. Clean the dust cover regularly to prevent blockage of the pressure ports or impaired heat dissipation.
In humid environments, inject a small amount of waterproof sealant into the terminal block (seal only the terminal areas; do not allow contact with the contacts) to prevent short circuits and contact oxidation caused by condensation.

2. Interference Suppression and Load Optimization
Control circuits for the switch must be routed separately from power circuits. Maintain a distance of ≥20 cm from strong sources of electromagnetic interference, such as variable frequency drives and motors, to prevent false contact operation caused by electromagnetic interference.
When directly controlling inductive or capacitive loads, surge absorption components (such as RC snubber circuits or freewheeling diodes) must be connected in parallel across the load terminals to reduce arc erosion during contact switching and extend contact service life.
The control circuit voltage must be maintained within the rated voltage range of the contacts to prevent excessive voltage fluctuations from causing frequent contact operation and erosion.

3. Protective Measures for Extreme Environments
High-temperature media applications (>85°C): Replace FKM fluorocarbon rubber seals and regularly inspect them for aging to prevent deformation and leakage caused by high temperatures.
Low-temperature applications (<-20°C): Use custom low-temperature switches to prevent standard NBR seals from hardening and becoming brittle at low temperatures, which could compromise sealing performance.

4. Highly Corrosive Media Applications: Regularly inspect the 304 stainless steel housing and pressure ports. If corrosion spots appear, promptly replace the unit with a 316L stainless steel model to prevent housing damage and leakage caused by media corrosion.
For pipelines that will be idle for extended periods, depressurize the pipeline and drain the media to keep the valve dry, preventing seal corrosion and piston seizure caused by prolonged immersion in the media.





Step 1: Use a screwdriver to loosen the retaining nut on the protective Hosman connector and remove the Hosman connector.

Step 2: Refer to the diagram above and use the hex wrench provided to adjust the pressure switch set point (do not rotate the Hosman connector left or right when removing it, to avoid breaking the internal wiring). Turn clockwise to increase the pressure and counterclockwise to decrease it.

Step 3: The pressure setpoint is typically pre-set at the factory according to customer requirements, so on-site adjustment is not usually necessary. However, some customers may wish to set it themselves on-site. How do you adjust the pressure switch on-site? You can use the pressure gauge built into the equipment or system to reach the desired pressure. For example, if the alarm is set for 10 bar, you should adjust the pressure switch based on the reading displayed by the on-site pressure gauge. When the pressure switch is adjusted to the setpoint, it will emit an alarm signal, indicating that the adjustment is complete.

8 Troubleshooting & Emergency Procedures
8.1 List of Common Faults
No contact output: After the pipeline pressure reaches the set value, the switch contacts do not switch on or off, and the control circuit does not respond.
Actuation pressure drift: The actual actuation pressure of the switch deviates significantly from the set value, resulting in premature or delayed actuation.
Frequent false actuation of contacts: Under stable operating conditions with no pressure fluctuations, the contacts frequently switch on and off, causing the control circuit to repeatedly start and stop.
Stuck / Non-resetting Contacts: After pressure drops to the reset value, the contacts fail to return to their initial state; normally closed contacts remain open, and normally open contacts remain closed.
Leakage from Switch Body: Media leakage occurs at the pressure port threads or sealing areas, preventing the pipeline pressure from being maintained.
Abnormal Operation Due to External Interference: Electromagnetic or vibration interference causes unstable switch operation, resulting in intermittent control signals.

8.2 Analysis of Failure Causes
Wiring errors: Incorrect connection of HARTING plug-in terminals (e.g., connecting the load to the NC/NO terminals in reverse), loose wire crimping, short circuits caused by excessively long wire stripping, or direct connection of the control circuit load to the contacts resulting in overload burnout.
Operating Conditions and Installation-Related Causes: Pipeline overpressure shocks causing deformation of the piston or spring; media impurities blocking the piston's clearance; excessive vibration at the installation site causing loosening of internal components; or aging of seals leading to leakage.
Parameter and Accuracy-Related Causes: Improper calibration of setpoints; excessive hysteresis; or long-term operation causing spring fatigue and contact oxidation, resulting in poor contact and pressure drift.
Environmental Interference Causes: Strong electromagnetic interference (from inverters, motors) causing false signal triggers; condensation in the wiring compartment due to humid environments causing contact short circuits; dust accumulation blocking pressure ports and affecting pressure sensing.
Equipment Damage Causes: Micro-switch burnout, piston seizure, spring breakage, or switch failure due to housing corrosion or damaged threaded connections.

8.3 Step-by-Step Troubleshooting
Fault 1: No contact output
Troubleshooting steps:
After powering down, open the HARTING connector and check whether the terminal wiring is correct (COM, NC, and NO correspond to the load circuit), and whether the wires are securely crimped with no oxidation or broken strands.
Use a multimeter in continuity mode to test the static contact status: Under depressurized conditions, COM and NC should be connected, while COM and NO should be disconnected. If the status is abnormal, the contacts are damaged.
Slowly pressurize the line while simultaneously testing the contact status. If no switching occurs after reaching the set value, check whether the pressure port is blocked or the piston is stuck.
Remedial Actions:
Wiring Error: Rewire according to terminal markings, tighten terminal screws, and replace oxidized wires.
Stuck/Damaged Contacts: Replace the microswitch or the entire switch.
Clogged Pressure Port: Disassemble the switch, clean debris from the threaded port, and reinstall with fresh Teflon tape.
Emergency Procedure: If a spare switch is available on-site, replace and install it immediately; if no spare parts are available, temporarily control the pipeline pressure using a manual valve and replace the switch after shutdown.

Fault 2: Actuation Pressure Drift
Troubleshooting Steps:
Connect the switch in parallel with a standard pressure gauge to the pipeline. Slowly increase the pressure and record the deviation between the actuation pressure and the set value to determine if it exceeds the ±3% error range.
Check whether the adjustment screw on top of the switch is loose, causing the set point to drift.
Check whether the medium contains impurities, causing the piston to stick, or whether the spring has lost elasticity due to fatigue from prolonged high-pressure operation.
Remedial Actions:
Set Point Drift: Recalibrate the set point using the adjustment screw; turn clockwise to increase pressure and counterclockwise to decrease pressure. After calibration, tighten the anti-loosening mechanism.
Piston Sticking: Disassemble the switch, clean the piston and seals, and replace aged NBR seals.
Spring Fatigue: Replace the switch to avoid prolonged operation beyond the rated range.

Emergency Solution: Temporarily adjust the set point to the actual operating pressure under current conditions to maintain system operation; replace the switch after shutdown.

Fault 3: Frequent False Trips of Contacts
Troubleshooting Steps:
Check the piping for water hammer or excessive pressure fluctuations that may cause frequent switch activation.
Check whether the control circuit shares wiring with the power circuit; electromagnetic interference may cause contact misoperation.
Check for contact oxidation or poor contact, which may cause intermittent circuit breaks.
Remedial Measures:
Pressure Fluctuations: Install a buffer in the piping to stabilize pressure and reduce impact.
Electromagnetic Interference: Separate the control circuit from the power circuit with a minimum distance of 20 cm, or install shielded wiring.
Contact Oxidation: Clean the contacts or replace the switch.
Contingency Plan: Temporarily increase the pressure differential between the setpoint and reset values to reduce frequent actuation; or install a delay relay in the control circuit to filter out false trigger signals.

Fault 4: Contact Sticking / Failure to Reset
Troubleshooting Steps:
After powering down, use a multimeter to test the contact status. If the COM and NC/NO remain conductive regardless of pressure changes, the contacts are stuck.
Check whether contact arcing and erosion caused by control circuit overload (e.g., directly controlling high-power inductive loads) has led to sticking.
Check whether the piston is seized, preventing the microswitch from resetting.
Remedial Actions:
Stuck contacts: Replace the switch; use an intermediate relay to control the load during subsequent operation.
Seized piston: Disassemble and clean the piston, replace the seals, or replace the switch directly.
Emergency Procedure: Immediately shut down the machine and replace the switch. Do not continue operation, as this may cause the control circuit to malfunction and result in equipment damage.

Fault 5: Leakage from the Switch Housing
Troubleshooting Steps:
Check for leaks at the pressure port threads, verify if the PTFE tape has failed, or if the threads are damaged.
Inspect the sealing areas of the switch housing for media leakage; determine if it is caused by aged internal seals or corrosion/damage to the housing.
Remedial Actions:
Thread Leakage: Disassemble the switch, reapply PTFE tape, and tighten the assembly.
Aged Seals: Replace the seals; if the housing is damaged, replace the switch directly.
Emergency Procedure: Temporarily reduce the operating pressure of the pipeline to minimize leakage. Replace the switch after shutdown; do not operate under excessive pressure.

8.4 After-Sales Repair Guidelines
1. Failure Determination Criteria (Repair or replacement is recommended if any of the following conditions apply)
The contacts produce absolutely no output, and after ruling out wiring or blockage issues, it is confirmed that the internal microswitch is damaged.
The operating pressure deviation exceeds ±5% and cannot be corrected by adjusting the calibration screw.
Media leakage from the switch body that cannot be resolved by reinstallation.
Damaged housing, damaged threaded connections, or corrosion-induced perforations.
Mechanical life exceeds 1 million cycles, with obvious contact burnout or poor contact.

2. Repair Request Process
Contact Qidian Customer Service and provide the product model (e.g., PS20-QD-XXX), serial number, date of purchase, installation conditions, and a description of the fault symptoms.
Customer service will make an initial assessment of the cause and provide remote troubleshooting guidance; if the issue cannot be resolved, they will verify whether the product is still under warranty.
For non-human-induced damage within the warranty period, you may request free repair or replacement; for issues outside the warranty period, paid repair or replacement options will be provided.
Return the faulty device according to customer service instructions; the repaired unit will be shipped back, or a new device will be sent directly.

3. Warranty Coverage
Standard Warranty Period: Within 12 months from the date of purchase, the product is eligible for free repair or replacement if non-human-induced quality issues arise under normal operating conditions.

4. Exclusions from Warranty Coverage: Damage caused by human factors (such as overpressure, impact, or welding), improper installation, corrosion from corrosive media, or natural disasters is not covered under the free warranty.