QDYLZ100-NZ Seismic-Resistant Pressure Gauge

Core Product Perception

I. Product Definition
The QDYLZ100-NZ is a Φ100 dial-type axial-mounted, flanged, pointer-style shock-resistant pressure gauge manufactured by Anhui Qidian Automation Technology Co., Ltd. It features a fully sealed, oil-filled damping structure and a purely mechanical pointer display that requires no power supply. It is used for on-site measurement of gauge pressure and negative pressure (vacuum) in gaseous and liquid media.

Complete List of Core Functions:
1. On-site visual pressure indication: A large 100 mm dial provides direct pointer display of the internal pressure in pipes or equipment, allowing on-site personnel to read pressure values visually without the need for a power source or a higher-level system.

2. Shock-resistant damped measurement: The case is filled with damping silicone oil (glycerin is optional), which suppresses pointer oscillation caused by mechanical vibrations and pressure pulsations in the medium, ensuring stable readings even under high-vibration conditions such as those found in pumps, air compressors, and hydraulic equipment.

3. All-Stainless Steel Corrosion-Resistant Construction: The fittings, Bourdon tube, and movement are made of stainless steel, making the gauge suitable for water, oil, and mildly corrosive fluids. It is resistant to oxidation and rust, offering a broader range of compatible media compared to standard copper-fitting pressure gauges.

4. Axial Flanged Mounting: With axial cable exit at the rear and an integrated mounting flange, this design is ideal for flush mounting on control cabinet panels. It facilitates cabinet cutout installation and does not occupy radial space in the piping system.

5. Wide-range pressure measurement: Covers the range from negative pressure (vacuum) to high pressure, with customizable ranges (-0.1 MPa vacuum to 100 MPa), supporting hydraulic, water pressure, and pneumatic pressure monitoring.

6. Passive, safe measurement: Features a purely mechanical structure that requires no external power supply and contains no electrical components, making it naturally suitable for on-site monitoring in explosion-proof environments and eliminating the risk of electrical fires.

7. IP65-Rated Sealed Housing: The sealed metal housing is dustproof and splash-proof, withstanding on-site dust and condensation splashes to protect the internal precision mechanism from environmental corrosion.

8. Overload Buffering Protection: The Bourdon tube elastic element can withstand short-term overloads. Combined with a pressure-guiding buffering structure, it resists instantaneous pressure surges and reduces the likelihood of component damage.

Typical Applications: Hydraulic stations, air compressors, circulating water pump stations, chemical pipelines, pharmaceutical equipment, metallurgical hydraulic systems, thermal pipeline networks, and on-site pressure monitoring for construction machinery.

II. Working Principle
Layman's Explanation
The QDYLZ100-NZ is a Bourdon tube mechanical pressure gauge. Simply put: The pressure of the medium inside the pipeline enters the curved metal Bourdon tube within the gauge; the pressure causes the tube to expand slightly. This minute deformation is amplified by a gear-linkage mechanism, driving the dial pointer to rotate. The case is filled with damping oil, which absorbs vibrations and prevents the pointer from oscillating continuously, ensuring a stable reading. The entire process is purely mechanical and requires no electricity.

Complete Operating Process
1. Pressure Injection: The medium being measured (gas/liquid) enters the flat, hollow Bourdon tube inside the pressure gauge through the bottom threaded connection.

2. Elastic Deformation: The pressure of the medium acts on the inner wall of the Bourdon tube, causing the flat tube to tend to expand into a circular shape. This results in displacement at the free end of the originally curved Bourdon tube; the greater the pressure, the greater the displacement. When the pressure is removed, the Bourdon tube automatically returns to its original shape due to its elasticity.

3. Mechanical Transmission and Amplification: The tail end of the Bourdon tube is connected to a link rod, which drives a sector gear and a small center gear, amplifying the minute displacement of the Bourdon tube and converting it into the rotational motion of the pointer. A hairspring eliminates gear backlash and reduces return error.

4. Damping for Pointer Stabilization: The case is filled with silicone oil as a damping fluid, and the movement, gears, and pointer are all immersed in the oil. Vibration energy caused by on-site vibrations and medium pulsations is absorbed by the viscous resistance of the oil, suppressing high-frequency oscillations of the pointer and maintaining stable readings.

5. On-Site Reading: The pointer rests on the dial, directly corresponding to the pressure scale, allowing on-site personnel to read the pressure value; as pressure changes with operating conditions, the Bourdon tube continues to deform, and the pointer follows these real-time changes.

III. Core Value & Pain Points
Summary of Core Value:
1. Passive, power-free design with on-site visual monitoring: Featuring a purely mechanical structure, it requires no 24V power supply and allows pressure readings even after a power outage. It offers enhanced safety in explosion-proof areas and is ideal for scenarios requiring only on-site visual monitoring.

2. Stable readings in high-vibration environments: Internal oil-filled damping eliminates the industry-wide pain point of severe pointer oscillation caused by on-site vibrations from pumps and hydraulic units, which makes readings difficult to read, and extends the pressure gauge's service life.

3. Space-saving axial panel mounting with flange: Axial rear connectors combined with flange mounting make it suitable for flush-mounted installation in electrical distribution cabinets and instrument panels, ensuring a clean layout and facilitating centralized monitoring from the cabinet front.

4. Stainless Steel Construction for Corrosion Resistance: Wetted parts are made of stainless steel, providing rust protection and resistance to water, oils, and mildly corrosive media. Compared to standard copper pressure gauges, it supports a wider range of media.

5. Large, Easy-to-Read Dial and Simple Maintenance: A large Φ100 dial with clear markings allows for easy reading even from a distance; the simple structure minimizes potential failure points and reduces maintenance costs.

6. IP65 Protection: The sealed housing provides dust and splash protection, making it suitable for dusty and humid conditions in workshops and pump rooms.

Key Challenges and Solutions
Q1: The site houses water pumps, air compressors, and hydraulic stations, where equipment vibrates continuously. Do standard pressure gauges suffer from constant needle oscillation, making stable readings impossible? Is the movement prone to damage from prolonged vibration, leading to frequent gauge replacements?
A1: The QDYLZ100-NZ is filled with silicone oil damping fluid, which uses viscous damping to absorb vibration and shock, suppressing pointer jitter and ensuring stable readings. It also buffers pressure pulsations, reducing movement wear and significantly extending the instrument replacement cycle.

Q2: Do you need to arrange pressure gauges in a concentrated layout on the instrument panel? Do pressure gauges with radial connections protrude outward, taking up a lot of piping space and making installation and mounting difficult?
A2: The QDYLZ100-NZ features an axial flanged design with the connection port located at the rear of the gauge. It comes with a built-in mounting flange that allows for direct installation into cutouts in the cabinet. The dial lies flush against the cabinet door panel, saving radial space while providing an aesthetically pleasing installation that facilitates centralized inspection and monitoring.

Q3: Some sites are located in explosion-proof zones where on-site pressure measurement cannot use powered digital displays. Are there safety concerns regarding electrical components?
A3: This product features a purely mechanical, passive design with no internal circuit boards or power supply circuits, eliminating any electrical ignition sources. It is suitable for on-site pressure display in explosion-proof zones and meets on-site safety monitoring requirements.

Q4: The media include water and oils. Aren't ordinary copper-jointed pressure gauges prone to rust and corrosion, leading to leaks and inaccurate measurements?
A4: The QDYLZ100-NZ features all-stainless-steel wetted parts; both the Bourdon tube and fittings are made of stainless steel, providing corrosion resistance. It is suitable for water, hydraulic oil, and mildly corrosive media, reducing the risk of leaks caused by media corrosion.

Q5: The project only requires on-site personnel to monitor pressure; there is no need for remote transmission to a PLC. Wouldn't a digital pressure gauge be costly and require additional power wiring?
A5: The QDYLZ100-NZ requires no power supply or signal cables; it can perform on-site pressure monitoring simply by threading it onto the pipeline. This results in low procurement costs and eliminates the need for power wiring, making it suitable for scenarios involving purely on-site inspections.

Q6: The workshop pump room is dusty and subject to condensation and water splashes. Won't ordinary pressure gauges easily allow dust and water to enter, causing the mechanism to jam and fail?
A6: The product features a sealed metal housing with an IP65 protection rating, making it dustproof and splash-proof. Dust and condensation cannot enter the internal mechanism, ensuring long-term, stable operation in humid and dusty workshops.

Q7: Pipelines are subject to transient pressure surges. Won't the bourdon tube in a standard pressure gauge deform due to overpressure, rendering the gauge unusable?
A7: The bourdon tube is made of a high-strength stainless steel elastic element capable of withstanding short-term overloads. Combined with damping and cushioning mechanisms, this design reduces damage to the elastic element caused by transient pressure surges and enhances shock resistance.

Key Product Specifications & Detailed Specifications

I. Basic Electrical Parameters

Project	Specifications
Product Model	QDYLZ100-NZ
Product Type	Oil-filled, shock-resistant pressure gauge with mechanical bourdon tube
Measured Medium	Liquids, gases (non-crystalline, non-solidifying, and non-corrosive to wetted materials)
Measuring Range	-0.1 MPa to 0 (vacuum), 0 to 0.1 MPa to 0 to 100 MPa; customizable
Accuracy Class	Standard Class 1.6; Class 1.0 available upon special order
Temperature-Induced Error	≤0.4% FS/10°C (deviation from 20±5°C reference temperature)
Vibration Resistance Class	V.H.4 Class
Allowable Static Pressure Load	Continuous operation ≤ 75% of full scale; transient shock ≤ 1.2 times full scale
Material of Wetted Parts	Standard: SUS304 stainless steel; optional: SUS316L
Internal Damping Medium	Standard: silicone oil; optional: glycerin for low-temperature applications
Connection Thread	M20×1.5 (standard); customizable to G1/2, NPT1/2, etc.

II. Insulation Performance Parameters

Project	Specifications and Parameters
Electrical Isolation	No electrical isolation required
Dielectric Isolation	Sealed isolation via Bourdon tube
Pressure Relief Protection	Safety pressure relief structure on the back

III. Environmental Adaptation Parameters

Product	Specifications
Operating Temperature	-25°C to +70°C
Storage Temperature	-40°C to +80°C
Operating Relative Humidity	5% to 85% RH, non-condensing
Protection Rating	IP65
Explosion-Proof Rating	The unit itself does not have an explosion-proof certification; it features a purely mechanical, passive design and can be used for local indication in explosion-hazard areas.
Compatible Safety Barrier Models	This pressure gauge provides local display only; it has no electrical circuits and does not require a safety barrier. If simultaneous remote transmission to a DCS is required, an optional QD series isolated safety barrier should be installed on the pressure transmitter side.
Impact Resistance	It can withstand short-term pressure pulsations and meets vibration class V.H.4.

IV. Physical Parameters

Product	Specifications
Installation Method	Axial with front flange (rear-exit connector + panel flange), panel-mounted
Dimensions (L × W × H)	Dial outer diameter: Φ100 mm; flange outer diameter: Φ116 mm; total case thickness: 44 mm; connector length: 20 mm
Cutout Dimensions	Panel cutout: Φ102 mm
Weight	Approx. 0.6 kg
Housing Material	SUS304 stainless steel case; safety glass panel; aluminum alloy flange
Protection Details	Sealed with a case O-ring and internally oil-filled; rear pressure relief safety mechanism; anti-fog glass available as an option; fully sealed oil chamber prevents easy leakage of damping oil

Scenario-Based Selection Guide

I. Key Selection Criteria

1. Signal Type: The QDYLZ100-NZ is a purely mechanical pointer-type local-reading instrument that **does not provide remote electrical signal output** and supports only on-site visual pressure reading. If a project requires the pressure signal to be transmitted remotely to a PLC/DCS system, this pressure gauge cannot be used alone; it must be used in conjunction with a pressure transmitter.

2. Number of Channels: This product is a single-channel pressure measurement instrument; a single unit monitors the pressure of only one pipeline or piece of equipment. For multi-point pressure monitoring, a separate QDYLZ100-NZ must be installed at each pressure measurement point.

3. Power Supply: The product features a passive mechanical structure and requires no external power source. It does not require a 24 V DC or 220 V AC power supply circuit, and no power cables need to be installed.

4. Explosion-Proof Requirements: The instrument body contains no electronic components and has no electrical ignition sources, allowing it to be used directly for local pressure display in explosion-proof areas. Note: This pressure gauge does not support remote signal transmission. If simultaneous remote acquisition of pressure signals is required, the pressure transmitter on the remote side must be equipped with an isolation safety barrier; the pressure gauge itself does not require a safety barrier.

5. Installation Environment: Confirm the on-site vibration level, ambient temperature and humidity, corrosive properties of the medium, and dust and condensation conditions. For environments with severe vibration or pressure pulsations, prioritize the QDYLZ100-NZ oil-filled shock-resistant model; for humid and dusty environments, select the IP65 version; when dealing with corrosive media, upgrade the wetted parts to SUS316L; for low-temperature conditions, use the glycerin-filled version; for standard operating conditions, use the silicone oil-filled version.

6. Range Matching: For stable pressure conditions, the operating pressure should be maintained within 1/3 to 2/3 of the upper limit of the measurement range; for pulsating or shock pressure conditions (e.g., from pumps or hydraulic equipment), the operating pressure should not exceed 1/2 of the upper limit of the measurement range, ensuring sufficient shock margin to prevent permanent deformation and damage to the bourdon tube.

7. Mounting Configuration: The QDYLZ100-NZ features an axial, flanged panel-mounted design, suitable for installation in control cabinets or equipment panels with cutouts; for applications where piping is directly exposed, a radial pressure gauge should be selected—this model is not recommended.

8. Media Compatibility: For clean water, compressed air, and hydraulic oil, select the standard SUS304 wetted version; for weak acids, weak alkalis, and mildly corrosive media, select the custom SUS316L wetted version; for viscous media or media containing solid particles, a diaphragm isolation device must be added.

II. Recommendations for Selection Based on Industry Applications

1. Chemical Industry: For general chemical pump rooms, circulating water pipelines, and jacketed heat exchange pipelines, where pressure is monitored centrally on instrument panel fronts, select the QDYLZ100-NZ standard version with 304 stainless steel wetted parts and silicone oil filling; for chemical pipelines containing weakly acidic or weakly alkaline media, select the custom version with 316L stainless steel wetted parts; For on-site pressure monitoring in explosion-proof workshops, use this pressure gauge directly without the need for a safety barrier; if remote signal transmission is required, install a separate pressure transmitter combined with a safety barrier.

2. Power Industry: For pressure monitoring of auxiliary equipment such as circulating water pumps, air compressors, and lubrication oil stations in power plants, with centralized installation on control cabinet panels, select the standard QDYLZ100-NZ model; where pump units experience continuous vibration, oil-filled damping suppresses pointer oscillation, and Class 1.6 accuracy is sufficient to meet equipment inspection requirements; for high-precision lubrication pressure monitoring applications, a Class 1.0 accuracy version can be customized.

3. Metallurgical Industry: Panel-mounted pressure monitoring for rolling mill hydraulic stations, dust collection fans, and cooling water pipelines. Due to high on-site vibration and pressure surges, the QDYLZ100-NZ silicone oil-filled shock-resistant version is selected. High-pressure hydraulic conditions require high-range specifications, while 304 stainless steel wetted parts resist corrosion from oil and cooling water. The axial flanged design allows for seamless integration into hydraulic control cabinet panels, facilitating on-site observation by inspection personnel.

4. Pharmaceutical Industry: For on-site pressure monitoring of chillers, air compressors, and purified water pipelines in cleanrooms, the QDYLZ100-NZ is selected; when in contact with media such as purified water, the wetted parts are upgraded to 316L stainless steel. In explosion-proof pharmaceutical areas where pressure is monitored only on-site, this passive pressure gauge is used directly. For cleanroom environments, anti-fog glass can be customized to prevent temperature-induced condensation from obscuring the scale.

5. Smart Manufacturing Industry: For hydraulic stations, air treatment cabinets, and integrated equipment control panels on automated production lines, where pressure monitoring points are centrally arranged, use the QDYLZ100-NZ axial, flanged, shock-resistant pressure gauge embedded in the equipment's operating panel. For multi-line, multi-point monitoring, install one gauge per pressure point exclusively for on-site visual inspection; for remote monitoring points, use pressure transmitters in conjunction with the gauges.

Other Scenarios: For monitoring on control panels in general pump rooms, air compressor stations, and HVAC control cabinets, use the QDYLZ100-NZ standard silicone oil version; for low-temperature outdoor cabinet monitoring scenarios, use the customized version with glycerin damping fluid.

III. Common Mistakes in Selection

1. Ignoring the corrosion level of the medium and focusing only on vibration and measurement range. If selection is based solely on vibration resistance while ignoring the corrosive properties of the medium being measured—such as using standard 304 stainless steel directly with acidic or alkaline media—it can lead to corrosion and perforation of the bourdon tube, resulting in medium leakage. For corrosive media, 316L wetted parts or diaphragm-type pressure gauges should be selected.

2. Selecting the wrong pressure range—either too wide or with insufficient margin. If the range is too wide, the normal operating pressure will account for only a small portion of the full scale, resulting in significant reading errors. If the range is too narrow, sudden pressure surges from the medium may exceed the instrument's allowable overload limit, causing plastic deformation of the bourdon tube and permanent damage to the pressure gauge. Failure to allow sufficient margin in pulsating or shock conditions can significantly shorten the instrument's service life.

3. Confusion between on-site indication and remote data acquisition requirements, using this pressure gauge solely for remote monitoring. The QDYLZ100-NZ provides only on-site pointer display and has no electrical signal output. Some projects directly purchase this instrument only to discover later that pressure data cannot be uploaded to a PLC/DCS, resulting in the instrument being left idle and the need for secondary procurement.

4. Confusion regarding explosion-proof scenarios, mistakenly assuming that the pressure gauge requires a safety barrier. The QDYLZ100-NZ is a purely mechanical, passive instrument with no electrical circuits; therefore, a safety barrier is not required for local observation. Many specifiers blindly add safety barriers, resulting in unnecessary cost waste. Safety barriers are intended solely for use with remote electronic pressure transmitters.

5. Incorrect selection of installation configuration: axial flanged models are chosen for direct pipe mounting. The QDYLZ100-NZ features a panel-mounted axial flanged design; direct installation on pipes can lead to installation difficulties, stress-induced bending, and accelerated instrument damage. Radial pressure gauges should be selected for direct pipe pressure measurement applications.

6. Ignoring vibration levels: Using shock-resistant gauges in ordinary static conditions results in wasted costs; using standard non-oil-filled pressure gauges in high-vibration conditions causes the pointer to shake continuously, making readings impossible.

IV. Customization Recommendations

1. Customization for Special Signals and Media: For corrosive conditions involving weak acids, weak alkalis, seawater, etc., SUS316L bourdon tubes and fittings can be customized; in low-temperature environments, glycerin damping fluid can be substituted, while high-temperature applications should use specialized high-temperature damping oil; dual-scale dials can be customized to display both MPa and psi units, and specialized scale markings can also be provided; Special threaded connections, such as G1/2, NPT1/2, and other non-standard threads, can be customized.

2. Customization for Non-Standard Conditions: For viscous media or media containing solid particles, a diaphragm isolation assembly can be provided to prevent media from entering the Bourdon tube and causing blockages; for conditions with large temperature differentials prone to fogging, anti-fog glass can be customized; special measurement ranges, such as high-pressure or vacuum applications, can be customized individually; A limit pointer can be added to the gauge to mark the equipment's pressure safety threshold.

3. Multi-Measurement Point Integration Solutions: When multiple pressure monitoring points exist within the same control cabinet, multiple QDYLZ100-NZ units can be mounted side-by-side on the instrument panel. Using a unified model selection and measurement range specification facilitates standardized on-site inspections and spare parts management; If multiple measurement points require both local display and remote data transmission simultaneously, the "QDYLZ100-NZ local pointer gauge + pressure transmitter for remote transmission" combination solution is used to provide dual monitoring for a single measurement point.

4. Customized Support Services: For bulk orders, we offer customized nameplates and pre-calibration of measurement ranges; for export projects, we provide product test reports; we also supply complete installation kits—including pressure gauge buffer tubes, needle valves, gaskets, and other accessories—to reduce the workload associated with on-site procurement of parts.

Installation and Commissioning Specifications

I. Pre-Installation Preparation

1. Verification of Components

Unpack the unit and verify the model number (QDYLZ100-NZ), ensuring that the measurement range, accuracy class, and wetted materials (304/316L) match the order; Inspect the case for dents, the glass for cracks, and ensure the silicone oil level in the dial is normal; the pointer should return to zero under atmospheric pressure; check the accompanying parts: sealing gaskets, three-way valve/needle valve, and buffer tube (optional for pulsating pressure conditions); verify that the pressure relief port on the back is not blocked.

2. Environmental Inspection

Confirm that the installation location is a flush-mounted installation on the instrument cabinet door panel, with an ambient temperature range of -25°C to +70°C, humidity of 5%–85% RH, and no condensation; keep the instrument as far as possible from strong vibration sources such as pumps, motors, and variable frequency drives; if this is not possible, use flexible hoses to cushion and dampen vibrations; avoid areas exposed to direct sunlight, high-temperature radiation, or corrosive gas splashes; Allow sufficient maintenance space to facilitate observation of the dial and future removal or replacement.

3. Tool List

Adjustable wrench, fixed hex wrench (only for gripping the hex portion of the fitting), small flathead screwdriver (for zero-point adjustment), PTFE tape / PTFE gasket, pressure gauge calibration stand (optional), safety goggles, work gloves; pipeline purging tools.

4. Safety Precautions

1. Pipeline installation work must only be performed after the pipeline has been depressurized; it is strictly prohibited to install or remove pressure gauges while the system is under pressure. Wear appropriate protective equipment when handling high-pressure, toxic, or corrosive media.

2. Purge the pressure-taking lines thoroughly in advance; ensure that no welding slag or impurities from the pipeline enter the pressure gauge's bourdon tube to prevent blockages or needle jamming.

3. A condensation bend must be installed for high-temperature media; a buffer damping device must be installed at the inlet of pump or air compressor circuits with significant pressure pulsations.

4. The area in front of the pressure relief port on the back of the pressure gauge must remain unobstructed, with sufficient space reserved for safe pressure release; the relief port must not face the operator directly.

II. Standard Installation Procedures

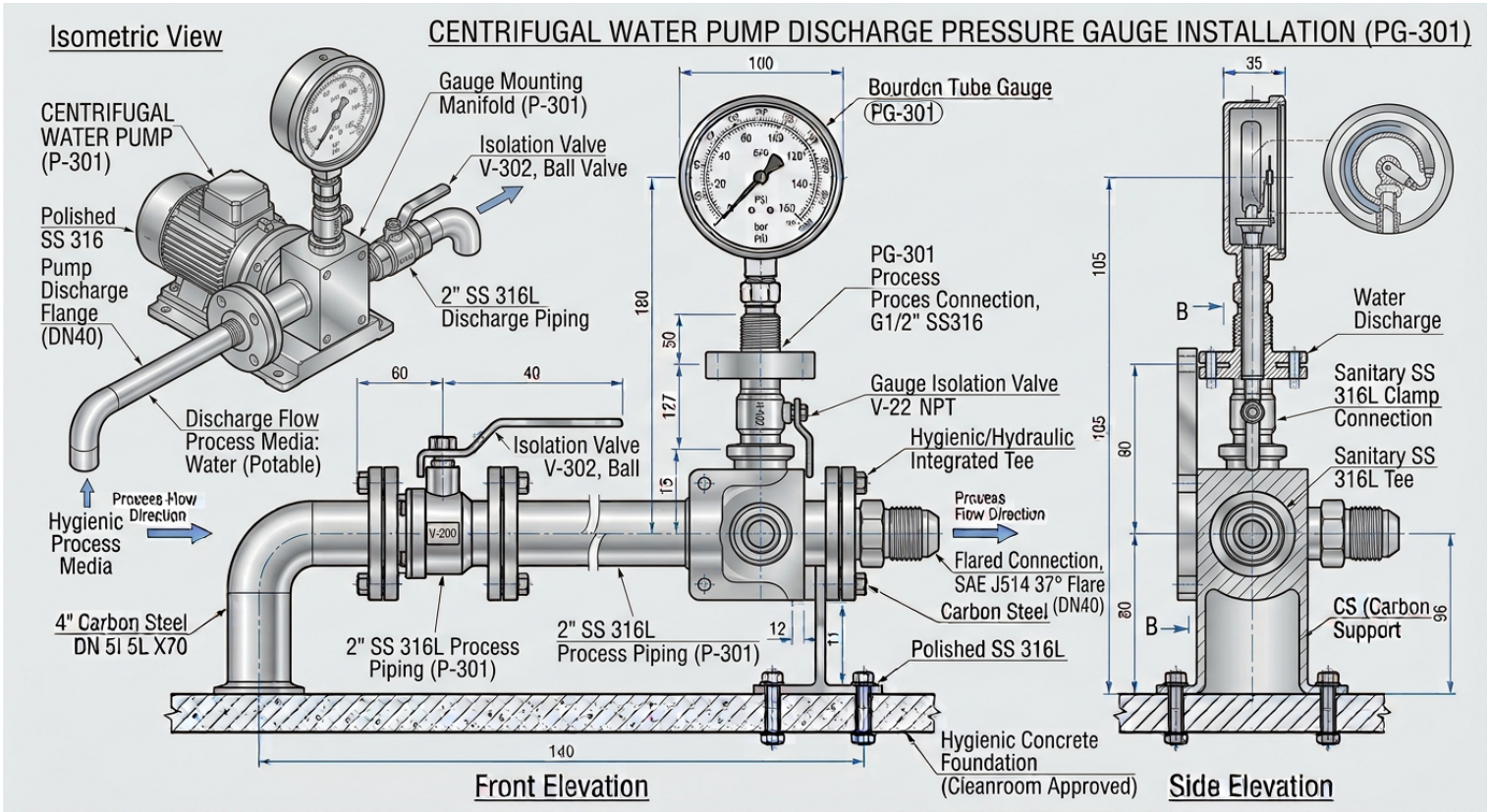
1. This product features an axial panel-mounted design with flanges; it requires no guide rails, electrical wiring, or grounding terminals.

2. Panel Cutout: Cut a Φ102 mm opening in the instrument cabinet panel. Insert the pressure gauge from the front of the panel, ensuring the rear flange is flush against the panel. Secure it using the flange mounting nuts, ensuring the dial faces the inspection personnel vertically.

3. Pressure-taking line connection: Connect the pressure-taking line to the M20×1.5 threaded fitting on the back of the pressure gauge. Tighten only by gripping the hexagonal part of the fitting with a wrench; do not rotate the gauge case directly to prevent internal movement of the mechanism, which could cause zero-point drift. Wrap the threads with PTFE tape, but do not push the tape into the root of the threads to prevent debris from blocking the pressure-taking channel; Install a sealing gasket to ensure a tight seal.

4. Installation of Associated Valves: It is recommended to install a three-way needle valve upstream of the pressure gauge to facilitate pressure relief, isolation, and on-site calibration; in pulsating pressure conditions, add a buffer pipe to reduce pressure surges.

Grounding Instructions: This product has a purely mechanical structure and does not require electrical grounding; the metal cabinet may be grounded for safety purposes, but this is solely for the safety of the cabinet and is unrelated to the pressure gauge's measurement function.



III. Explanation of the Wiring Diagram

> The QDYLZ100-NZ is a mechanical pressure gauge. **It has no electrical terminals, no power supply or input/output wiring, no shielded cables, and no power distribution circuits; therefore, no wiring diagram is required.**

> Comparison of Correct and Incorrect Pressure-Taking Line Connections:

> Correct: Connect after the pipeline has been depressurized; install a needle valve or shock absorber at the front end; ensure the threads are properly sealed; install the pressure gauge vertically; and ensure the pressure relief port on the back is unobstructed.

> Incorrect: Screwing the pressure gauge directly onto the line while it is under pressure; tightening by directly rotating the dial; connecting directly to highly pulsating pressure without a shock absorber; or having the pressure relief port obstructed by the cabinet.

IV. Commissioning and Calibration Procedure

1. No-load zero-point check: Completely depressurize the pipeline, vent to atmosphere, and observe whether the pointer aligns with the zero mark; if the

pointer is off, use a small flathead screwdriver to adjust the zero-point screw on the dial.

2. Slow pressure-rising test: Slowly open the upstream needle valve to gradually introduce medium pressure; do not fully open the valve at once to avoid pressure surges; Observe that the pointer rises smoothly, without sticking or sudden jumps.

3. Reading Calibration: When conditions permit, connect an external standard pressure source and compare readings at the zero, 50% FS, and 75% FS points within the range; the error must meet the product's accuracy class. Affix a calibration label upon completion.

4. Damping and Pointer Observation: After the pressure has stabilized, observe the pointer. Under the damping effect of silicone oil, the pointer should stabilize and not continue to oscillate; if the pointer continues to oscillate violently, check the damping mechanism or for vibration transmission.

5. Leak Test: Maintain the pressure for a period of time and observe whether there is any medium leakage at the threaded joints or gasket locations. If leakage is detected, relieve the pressure and retighten the seals.

V. Installation Precautions

1. Do not start the instrument under overpressure conditions: Do not fully open the valve all at once, as instantaneous pressure surges can cause permanent deformation of the bourdon tube. The long-term operating pressure must not exceed 75% of the upper limit of the measurement range, and 60% under pulsating conditions. This instrument has no electrical power supply, so there is no risk of overpressure affecting the power supply.

2. Avoid Transmission of Severe Vibrations: Do not mount the instrument directly and rigidly to the pump body or air compressor housing. In environments with severe vibrations, use stainless steel flexible tubing in the pressure-taking section to isolate and dampen vibrations; otherwise, prolonged vibration may cause wear to the internal mechanism and silicone oil leakage.

3. Protective Measures for Humid Environments: Install a heater in the distribution cabinet to prevent condensation caused by temperature differences inside the cabinet; if the instrument glass fogs up, opt for a custom version with anti-fog glass; the instrument must not be subjected to prolonged immersion or spraying; in environments with high levels of external dust, keep the instrument cabinet door closed.

4. Other Prohibitions:

--- Do not directly measure high-temperature media exceeding the upper limit of the medium temperature; do not connect to steam without a condensation bend;

--- For viscous media or those containing solid particles, direct use without an isolation diaphragm is prohibited;

--- Do not open the meter case or release the damping silicone oil without authorization;

--- Do not tap the dial to forcibly reset the pointer.

Recommendations for Daily Use & Operations and Maintenance

I. Key Points for Routine Inspections

Inspection frequency is categorized by operating conditions: routine pump rooms and cleanrooms are inspected monthly; metallurgical facilities, hydraulic stations, and environments with high vibration and heavy oil contamination are inspected every two weeks; and safety monitoring points for critical units are inspected weekly.

1. Visual Inspection of Exterior: Check the stainless steel case for dents or deformation and the glass panel for cracks; observe the level of damping oil inside the dial—cloudy oil or a significant drop in level indicates a leak; check whether the pointer returns to zero under atmospheric pressure; check the dial for oil residue or dust buildup. Distinguish between silicone oil and glycerin versions; in low-temperature environments, pay special attention to whether glycerin models show signs of solidification or whitening.

2. Monitoring of Pressure Reading Stability: Compare the on-site pressure gauge readings with the equipment's operating conditions; observe whether the pointer moves smoothly, without persistent trembling, sticking, or jumping. Under conditions of strong pulsation, rely on the damping oil to stabilize the pointer; if the pointer continues to tremble violently, verify the condition of the front-end buffer device. For 316L wetted versions, pay special attention to any signs of corrosion or leakage on the medium side.

3. Environmental Temperature and Humidity Monitoring: Monitor the internal environment of the instrument cabinet. For silicone oil models, maintain the operating temperature between -25°C and +70°C; for glycerin models, maintain it between -5°C and +70°C. Keep the relative humidity between 5% and 85% RH, ensuring no condensation occurs. Conduct thorough inspections during seasonal transitions when temperature fluctuations are significant. If condensation occurs, promptly activate the cabinet's heating and dehumidification system to prevent fogging of the dial and corrosion of the internal mechanism.

4. Pressure-taking Fittings and Piping Inspection: Check threaded joints and gasket positions for media leaks; ensure pressure-taking tubes, needle valves, and buffer tubes are free of deformation and corrosion; verify that piping is unobstructed; pay special attention to the vibration-damping sections of hoses under vibrating conditions to check for fatigue cracks.

5. Installation and Mounting Inspection: Check that the panel flange lock nuts are tight and that the instruments do not wobble; ensure that the rear pressure relief port remains unobstructed and is not blocked by the cabinet or cables; the pressure relief port must not be directly facing inspection personnel.

6. Medium Operating Conditions Inspection: Confirm the actual operating pressure; under steady-state conditions, the pressure should not exceed 75% of the full scale range, and under pulsating or shock conditions, it should not exceed 60% of the full scale range; avoid prolonged operation near full scale to prevent plastic deformation of the bourdon tube.

II. Regular Maintenance Plan
> Before performing maintenance, the pressure-taking needle valve must be closed, the pressure-tapping lines must be depressurized, and operation may only proceed after confirming that there is no pressure present. When performing maintenance on media-carrying lines, wear the appropriate protective equipment. Distinguish between the standard 304 wetted parts model and the 316L corrosion-resistant model; maintenance procedures differ for silicone oil-damped and glycerin-damped versions.

1. Cleaning Frequency: Clean once every 6 months in standard indoor environments; clean once every 3 months in metallurgical or pump room environments with heavy dust or oil contamination. Use only a dry, lint-free soft cloth to wipe the case and glass surfaces; never use a high-pressure water jet to rinse directly, and do not use strongly corrosive cleaning agents; **Do not disassemble the case to clean the interior—opening the case will cause damping oil leakage and void the warranty**.

2. Fastener Inspection: Re-inspect and tighten the pressure gauge connection, panel mounting nuts, and front needle valve every six months; shorten this interval to three months in high-vibration environments. When tightening, grip only the hexagonal section of the pressure gauge connection; do not rotate the gauge body to prevent displacement of the internal mechanism. Replace aged gaskets promptly to prevent leaks. This instrument has no electrical wiring and therefore requires no wiring tightness checks.

3. Recommendations for Accuracy Recalibration: For safety interlocks and process performance monitoring points, **calibrate accuracy once a year**; for routine equipment inspection and monitoring scenarios, calibration may be performed once every 1–2 years; for pressure monitoring involving special equipment, follow the calibration cycle specified by local special equipment regulations. Use a standard pressure calibration bench to calibrate the three key points in sequence: zero, 50% FS, and 75% FS; Upon completion of calibration, fill out the calibration record and affix the calibration label. For the glycerin-filled low-temperature model, pay attention to the ambient temperature before calibration, as increased glycerin viscosity at low temperatures may affect readings.

4. Damping Oil Inspection: Observe the condition of the damping oil during each calibration. If the oil appears blackened, contains a large number of bubbles, or the liquid level has dropped, this indicates a seal failure. The unit must be returned to the factory for repair; oil cannot be replenished on-site.

5. Spare Parts Inventory Management: Establish an instrument inventory ledger to record the model, range, wetted materials, damping medium, installation location, and all previous inspection and calibration records. Keep a spare QDYLZ100-NZ pressure gauge on hand for critical units to facilitate quick replacement.

III. Long-Term Maintenance Tips
1. Dust and Moisture Protection: Keep instrument cabinet doors closed to minimize dust ingress; install temperature-controlled heaters in areas prone to condensation due to large temperature differentials; insulate pressure-taking lines to prevent medium condensation; in operating conditions where the instrument glass is prone to fogging, opt for custom anti-fog glass versions. When instruments are removed for long-term storage, place them in a dry environment with a storage temperature range of -40°C to +80°C, away from corrosive gases.

2. Vibration Damping Optimization: At high-vibration points such as pumps and air compressors, use stainless steel flexible hoses to isolate and dampen vibrations in the pressure-taking section, avoiding rigid connections; install buffer tubes or dampers at the instrument inlet to reduce the impact of medium pulsations; regularly inspect flexible hoses for fatigue, and replace them immediately if cracks appear. This product contains no electronic circuits, so there is no electromagnetic interference, and no shielding is required.

3. Protection in Extreme Environments: For high-temperature media piping, a condensation bend must be installed to prevent direct contact between the high-temperature medium and the pressure gauge's Bourdon tube; in low-temperature environments, select the glycerin-filled version to prevent silicone oil's increased viscosity at low temperatures from affecting readings; for corrosive media, use the 316L wetted parts version, and in severely corrosive conditions, install a diaphragm isolation device; in high-pressure conditions, ensure sufficient safety release space is reserved at the rear pressure relief port.

4. Operating Conditions Management: Whenever possible, maintain normal operating pressure within the 30%–75% range of the full scale, and limit pulsation and shock conditions to 30%–60% of the full scale to preserve the elastic properties of the Bourdon tube; avoid frequent and severe pressure shocks; for pipelines carrying media containing impurities, periodically purge the pressure-transmitting lines to prevent solid particles from entering the Bourdon tube and causing blockages or needle jamming.

5. Operation and Maintenance Prohibitions: Do not disassemble or reassemble the pressure gauge while it is under pressure; do not tap the case to adjust the pointer; do not open the case to add oil without authorization; do not operate the gauge beyond its full scale range for extended periods; do not use the gauge directly in conditions where the medium temperature exceeds the upper limit specified for the instrument; when pressurizing for calibration, increase the pressure slowly; do not apply rapid pressure surges.

Troubleshooting & Emergency Response

I. List of Common Malfunctions
1. Pointer Does Not Move (No change in pointer after pressurization, corresponding to "No Output"): When the pipeline is pressurized, the pressure gauge pointer remains stationary and does not follow changes in pressure; after depressurization, the pointer fails to return to zero.

2. Reading Drift / Error Beyond Tolerance (corresponding to "Signal Drift"): The deviation between the pressure gauge reading and the standard pressure source exceeds the accuracy class; the reading slowly drifts under the same stable operating conditions; the zero point shifts after depressurization.

3. Pointer Jitter or Jamming (corresponding to interference distortion): The pointer continues to oscillate or jump when the pressure is stable; during operation, the pointer gets stuck at a specific scale mark and cannot move.

4. Overpressure Failure (corresponding to alarm triggering): An instantaneous pressure surge exceeds the instrument's range, causing the pointer to hit the

full-scale limit; after depressurization, the pointer fails to return to zero.

5. Oil leakage: Damping oil is observed seeping from the case; the oil level inside the dial has dropped; the oil appears cloudy and foamy.

II. Analysis of Failure Causes
> This product has no electrical circuitry; therefore, wiring errors and power supply abnormalities are not possible.

1. Pressure-transmitting line failure: Blockage in the pressure-transmitting line, closed needle valve, or welding slag and impurities in the line causing the Bourdon tube to become jammed; leakage in the pressure-transmitting line preventing normal pressure transmission to the instrument.

2. Pressure Overload Impact: Water hammer in the pipeline or start-stop pressure surges exceed the instrument's allowable overload limit, causing plastic deformation of the Bourdon tube.

3. Vibration and Operating Conditions: Rigid connections allow continuous transmission of pump/unit vibrations; excessive medium pulsation without a buffer device; wear on the movement gears.

4. Environmental Factors: Condensation caused by large temperature differentials; media corrosion resulting in bourdon tube perforation; glycerin damping fluid solidification under low-temperature conditions.

5. Damage to the Gauge Body: Internal gears jammed; hairspring failure; seal damage causing oil leakage; internal movement of the mechanism due to rotation of the case during installation.

III. Step-by-Step Solutions (Corresponding to Troubleshooting Steps, Repair Measures, and Emergency Workarounds)
Fault 1: The pointer does not move after pressurization, and the pointer does not return to zero after depressurization
Troubleshooting Steps:
 Close the needle valve at the front end of the pressure gauge and depressurize the pressure-transmitting line; confirm the valve status and check whether the needle valve was accidentally closed.
 Before disassembling the pressure gauge, confirm that the pipeline is completely depressurized; check the pressure-transmitting line and fittings for blockages; clean any debris from the lines.
 Observe the pointer under atmospheric pressure and attempt to make slight adjustments to the zero-point screw. If the pointer remains completely stationary, this indicates that the internal bourdon tube is blocked or the movement is jammed.

Repair Measures: Blockages in the pressure-conducting tubing can be cleared by purging; if debris has entered the instrument and caused the pointer to jam, on-site repair is not possible, and the instrument must be returned to the factory.
Emergency Workaround: Remove the faulty gauge and temporarily replace it with a spare QDYLZ100-NZ pressure gauge; For emergency monitoring, temporarily install a buffer tube and a needle valve to ensure pressure observation at the measurement point.

Fault 2: Indication drift; measurement error exceeds the accuracy class
Troubleshooting Steps:
 Depressurize the pipeline and check for zero-point drift; use a small flathead screwdriver to adjust the zero point.
 Connect to an external standard pressure calibration bench and compare readings at multiple points; check for prolonged exposure to overpressure or pressure surges.
 Verify whether the medium is corrosive and inspect the connections for leaks.

Remedial Measures: A simple zero-point offset can be corrected on-site; however, if the Bourdon tube has undergone plastic deformation or has been perforated due to corrosion, on-site repair is not possible, and the instrument must be returned to the factory for repair or replacement.
Emergency Workaround: For critical process measurement points, directly replace the pressure gauge with a spare unit and send the faulty instrument for inspection.

Fault 3: Continuous needle oscillation, jumping, or sticking
Troubleshooting Steps:
 Confirm the pressure conditions to determine whether the issue is caused by medium pulsation or equipment vibration transmission.
 Check the installation method: Verify if there is a rigid connection or if vibration-damping hoses or buffer tubes are missing.
 Inspect the damping oil in the dial; if the oil is missing or contains a large number of air bubbles, the damping mechanism has failed.

Remedial Measures: Install a buffer pipe for pulsating pressure; add a stainless steel vibration-damping hose to rigid piping; oil leakage must be addressed by returning the unit to the manufacturer.
Emergency Workaround: Temporarily reduce the pump's output pressure to minimize pulsation; replace the pressure gauge with a spare as soon as possible.

Fault 4: Overpressure surge; pointer strikes the full-scale limit
Troubleshooting Steps:
 Relieve pressure and observe whether the pointer returns to zero.
 If the pointer does not return to zero after depressurization, it indicates that the Bourdon tube has undergone permanent deformation.

Remedial Measures: Plastic deformation of the Bourdon tube is irreparable; replace the pressure gauge immediately. Install a buffer device in the upstream piping to prevent further impact.
Emergency Workaround: Replace with a QDYLZ100-NZ model with a higher capacity range, and install a buffer tube to protect the new gauge.

Fault 5: Oil leakage from the case, dropping oil level
Troubleshooting steps:
Visually inspect the case and glass area for silicone oil seepage and check for a drop in the oil level inside the dial.

Remedial measures: The seal has failed; oil cannot be replenished on-site. The instrument must be returned to the factory for repair or replacement.
Emergency workaround: Stop using the leaking instrument and immediately replace it with a spare pressure gauge to prevent the risk of medium leakage.

General Troubleshooting Sequence: Depressurize → Inspect valves and pressure-taking lines → Check zero point → Verify vibration/shock conditions → Determine if the gauge body is damaged. **All disassembly operations must be preceded by depressurization**.

IV. After-Sales Repair Guidelines

1. Criteria for Determining Malfunctions (If any one of the following applies, the instrument is deemed to have a hardware malfunction, and a repair request should be submitted)
1. The pressure-sensing tubing is unobstructed and the pressure is normal, yet the pointer is stuck and cannot be reset to zero;
2. The pressure calibration reading consistently falls outside the tolerance range, and zero adjustment fails to correct the issue;
3. The case is leaking, and damping oil is escaping;
4. Overpressure has caused permanent deformation of the bourdon tube, and the pointer stop cannot be reset;
5. Internal movement is damaged, and the gears are jammed.

>> Note: Damage caused by blocked pressure supply lines, accidental valve closure, incorrect range selection, improper installation, on-site water hammer, or medium corrosion is not considered a manufacturing defect and is not covered by the free warranty.

2. Repair Process
1. Collect basic information: Product model QDYLZ100-NZ, range, wetted materials (304/316L), damping medium (silicone oil / glycerin), serial number, on-site operating conditions, fault symptoms, and calibration records.
2. Take and save photos: Photos of the pressure gauge nameplate, the faulty dial, and the on-site installation piping.
3. Contact technical support to submit a description of the fault and the collected materials; a technician will provide remote assistance to troubleshoot the issue. Once it is confirmed that on-site repair is not possible, obtain the return address.
4. Remove the instrument from its packaging and mail it back, including a note describing the fault inside the package;
5. After factory inspection is complete, the instrument will be repaired or replaced and returned; upon receipt, reinstall and put it back into service after depressurizing the system.

3. Warranty Coverage
Warranty Period: 12 months from the date of manufacture.
Warranty Coverage: Free repair or replacement for manufacturing defects in the product's components resulting in hardware failure under proper installation and rated operating conditions.

Exclusions from Free Warranty:
--- Damage to the movement caused by disassembly or assembly under pressure, or by rotating the meter case during installation;
--- Damage caused by overpressure, water hammer, medium corrosion, or blockage by impurities;
--- Unauthorized opening of the meter case, intentional draining of oil, or striking the dial;
--- Impact from external forces or broken glass;
--- Meters beyond the warranty period.