JXK-19 Leakage Current Transducer

I. Product Definition

The Anhui Qidian JXK-19-22 AC/DC Leakage Current Transmitter is a three-terminal isolated current transmission device based on the Hall effect principle, specifically designed for the precise acquisition and signal conversion of AC/DC currents and micro-leakage currents in industrial environments.

Core Measurement Capabilities: Supports non-contact measurement of DC current (e.g., 0–1 A), AC current, and milliamperes-level micro-leakage currents, meeting current monitoring requirements across various scenarios such as industrial automation, power monitoring, photovoltaic energy storage, and chemical processing.

Signal Conversion Function: Converts raw on-site current signals into standard analog signals commonly used in industrial control systems (such as 4–20 mA DC current signals), compatible with data acquisition requirements for PLCs, DCS systems, and industrial instruments.

Three-Point Isolation Protection: Achieves electrical isolation between the input, output, and power supply sides, effectively blocking the impact of on-site high-voltage interference, ground loops, and surge impacts on downstream control systems, thereby enhancing system stability and safety.

Industrial-Grade Design: Features a blue engineering plastic housing, supports standard 35mm DIN rail mounting, and operates on a common 24V DC industrial power supply. It offers industrial-grade characteristics such as low drift, high linearity, wide operating temperature range, and electromagnetic interference (EMI) resistance, making it suitable for complex industrial environments.

Integrated Design: Combines current sensing, signal conditioning, isolation amplification, and signal transmission into a single unit. No additional supporting circuits are required; it is ready to use immediately, reducing system integration complexity.

II. Working Principle

The core of this transmitter's operation is based on the Hall effect combined with three-terminal electrical isolation technology. The overall process can be divided into four steps, explained in simple terms as follows:

Non-contact Current Sensing (Signal Acquisition)
The current being measured passes through the transmitter's annular aperture, generating a magnetic field around it. The magnetic core inside the transmitter concentrates this magnetic field into the air gap, where the Hall element detects changes in magnetic field strength (the strength of the magnetic field is directly proportional to the magnitude of the measured current).

Hall Signal Conversion (Magnetic Field → Electrical Signal)
Under the influence of the magnetic field, the Hall element generates a weak voltage signal (Hall voltage). The magnitude of this signal corresponds exactly to the magnitude of the measured current, achieving a non-contact conversion from "current → magnetic field → electrical signal." This eliminates the need for direct contact with the measured circuit, ensuring safety and preventing interference with the original circuit's operation.

Signal Conditioning and Three-Port Isolation (Interference Suppression + Electrical Protection)
The weak Hall voltage signal is processed through internal amplification and filtering circuits. Simultaneously, isolation circuits provide electrical isolation between the input side (measured current side), output side (signal transmission side), and power supply side. This blocks the influence of strong electrical interference and ground potential differences from the field on downstream equipment, preventing interference signals from being directly transmitted to the control system.

Standard Signal Transmission (Output Adaptation)
The isolated and conditioned signal is converted into an industry-standard analog signal (such as 4–20 mA DC). This signal maintains a linear relationship with the magnitude of the measured current, allowing downstream PLCs, DCS systems, or instruments to directly read the signal for real-time current monitoring, data acquisition, and interlocked control.

III. Core Value and Solutions to Pain Points

Question 1: When monitoring current in industrial environments, directly connecting the circuit under test to the control system can lead to interference, ground loops, or even equipment damage. Can this product address these issues?
Answer: Yes, it can. The product's core advantage lies in its three-terminal electrical isolation design, which fully isolates the input, output, and power supply sides. The insulation withstand voltage between the input and output sides is ≥2 kV AC. This effectively blocks the impact of strong electrical interference, ground potential differences, and surge impacts on downstream PLC/DCS equipment, preventing damage to the control system caused by high-voltage currents. At the same time, it eliminates signal drift caused by ground loops, significantly enhancing system stability and safety.

Question 2: Traditional current sensors can only measure AC current, or they cannot accurately measure micro-leakage currents or DC currents. How should current monitoring be handled in industrial environments with mixed AC and DC scenarios?
Answer: Based on the Hall effect principle, this transmitter supports the precise measurement of AC current, DC current, pulse current, and milliamperes-level micro-leakage currents simultaneously. With a measurement range suitable for micro-current scenarios such as 0–1 A DC, it addresses the pain points of traditional sensors—namely, their inability to handle both AC and DC currents and their failure to accurately capture micro-leakage currents—thereby meeting the mixed AC/DC monitoring needs of applications in photovoltaics, chemical processing, and power generation.

Question 3: On-site current signals cannot be directly read by PLCs/DCS systems, requiring additional complex signal conversion circuits. This results in high system integration costs and cumbersome debugging. Can this product simplify the process?
Answer: It can significantly simplify the process. The product directly converts the measured current into standard industrial analog signals such as 4–20 mA DC, eliminating the need for additional signal conversion circuits. It interfaces directly with the analog input modules of PLCs, DCS systems, or industrial instruments, offering plug-and-play functionality. This reduces system integration complexity and commissioning costs while shortening project delivery cycles.

Question 4: Industrial field environments are complex, with strong electromagnetic interference and significant temperature fluctuations. Many sensors are prone to signal drift and measurement inaccuracies. How stable is this product?
A: The product features an industrial-grade design with low temperature drift, high linearity, and strong resistance to electromagnetic interference. Its internal circuitry has been optimized for filtering and anti-interference, enabling stable operation in a wide temperature range of -10°C to +55°C. It offers high measurement accuracy and minimal signal drift, making it capable of withstanding complex electromagnetic and environmental conditions in industrial settings to ensure long-term, stable, and precise monitoring.

Question 5: Installation space on-site is limited, and traditional current sensors are complicated to install. How adaptable is this product for installation?
Answer: The product features a standard 35mm DIN rail mounting design. Its compact blue housing fits standard DIN rail mounting positions in industrial control cabinets, eliminating the need for custom mounting brackets. The terminal-style wiring design ensures simple and convenient connection, making it suitable for most industrial control cabinet installation scenarios. This effectively addresses the challenges of limited on-site space and complex installation.

IV. Key Product Parameters & Specifications

4.1 Basic Electrical Parameters

Input Signal Specifications

Measurement Type: Supports non-contact measurement of DC current, AC current, pulse current, and micro-leakage current; compatible with mixed AC/DC scenarios

Typical Measurement Range (using JXK-D19-22 as an example): DC 0–1 A (other DC/AC ranges can be customized according to customer requirements)

Input Method: Through-hole non-contact measurement; no direct electrical connection between the circuit under test and the transmitter

Through-hole Diameter: 22 mm (corresponds to the hole diameter specified in the model name JXK-19-22)

Accuracy Class: Class 0.5 (typical value)

Linearity Error: ≤±0.2% FS (Full Scale)

Repeatability error: ≤±0.1% FS

Temperature drift: ≤±500 ppm/°C (typical value)

Response time: ≤200 ms (typical value)

Bandwidth: DC to 5 kHz (DC / low-frequency AC signal measurement)

Overload capacity: Continuous operation at 2 times the rated input current; withstands 10 times the rated input current for 1 second without damage

Output Signal Specifications

Typical Output: DC 4–20 mA (industrial standard current signal); customizable to DC 0–20 mA, 0–5 V, 0–10 V, etc.

Output Load Capacity: Current output type ≤300 Ω (supports up to ≤500 Ω when powered by 24 V); voltage output type ≥1 kΩ

Output Ripple: ≤10 mVpp (voltage output) / ≤10 μApp (current output)

4.2 Isolation Performance Parameters

Three-terminal isolation architecture: Achieves complete electrical isolation between the input side (measured circuit), output side (signal transmission side), and power supply side (power supply circuit), with no common ground loop

Isolation Withstand Voltage: Between input and output, input and power supply, and output and power supply, all meet AC 2.5 kV/50 Hz/1 min (no breakdown, no arcing); typical specifications can reach AC 3 kV

Insulation Resistance: ≥100 MΩ (under DC 500 V test conditions)

Isolation Principle: Utilizes a combination of linear opto-isolation and magnetic isolation technologies to effectively block the conduction of ground loops, surges, and electromagnetic interference, preventing interference signals from entering the downstream control system

4.3 Power Supply & Power Consumption Parameters

Supply Voltage: Standard industrial-grade 24 V DC power supply; operating range: 18 V DC to 30 V DC; compatible with common industrial field power distribution systems

Power Supply Configuration: Single-power-supply design; no additional auxiliary power required

Full-Load Power Consumption: ≤1.5W (at 24V DC supply under rated load conditions)

Standby Power Consumption: ≤0.8W (under no-load conditions)

Power Supply Ripple Suppression: Ripple rejection ratio of ≥60dB for the 24V DC supply circuit, minimizing the impact of power supply interference on measurement accuracy

4.4 Environmental Specifications

Operating Temperature: -10°C to +55°C (industrial standard; wide-temperature version from -40°C to +85°C available upon request)

Storage Temperature: -20°C to +70°C

Operating Humidity: ≤95% RH (no condensation, no corrosive gases)

Protection Rating: IP20 (for indoor control cabinet installation; prevents finger contact with internal live parts; not waterproof or dustproof; must be installed within a control cabinet with a protection rating of ≥IP54)

Explosion-Proof Compatibility: Non-explosion-proof product. If used in hazardous explosion-prone environments such as chemical plants, it must be used in conjunction with an intrinsically safe safety barrier; compatible with standard intrinsically safe explosion-proof isolation barrier models

Electromagnetic Interference Resistance: Complies with GB/T 17626 standard; resistant to electrostatic discharge, radio frequency electromagnetic fields, and electrical fast transient pulse groups; suitable for industrial environments with strong electromagnetic interference

4.5. Physical Parameters

Mounting Method: Standard 35mm DIN rail mounting, compatible with universal industrial control cabinet rails; easy to install and remove, with a built-in snap-fit mounting mechanism

Dimensions

Overall Dimensions (L × W × H): Approx. 106mm × 24mm × 60mm

Mounting Hole Diameter: 22mm

Terminal Specifications: 4-position pluggable terminal blocks (2 power terminals + 2 signal output terminals), compatible with wire gauges of 0.5–1.5 mm²

Product Weight: Approx. 120g (excluding packaging); lightweight design meets rail mounting load requirements

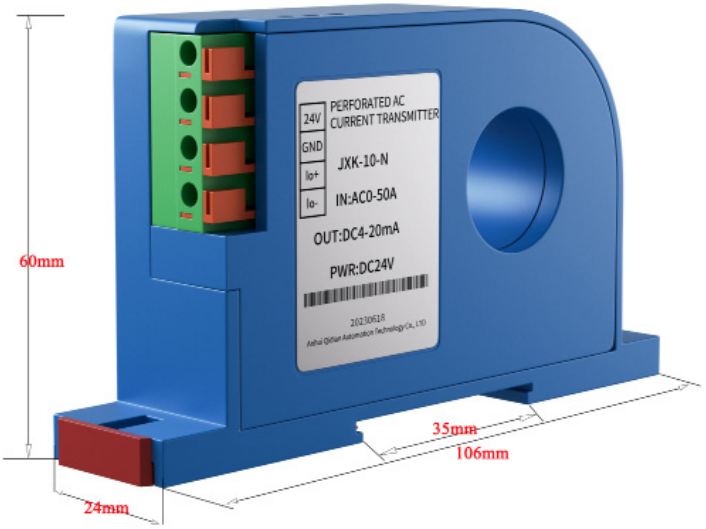
Housing Material and Protection Details

Housing Material: Blue flame-retardant ABS engineering plastic with V0-rated flame retardancy; resistant to aging and impact, suitable for long-term use in industrial environments

Enclosure Protection: Integrated sealed design; internal circuit boards are treated to resist moisture and salt spray; no exposed live parts, minimizing the impact of on-site humidity and dust on internal circuits

DIN Rail Clips: Features built-in red elastic clips on the bottom; securely locks onto a 35mm DIN rail after installation, preventing the device from falling off due to vibration





V. Application-Specific Selection Guide

This module focuses on the Qidian JXK-19-22 three-terminal isolated milliamperage AC/DC leakage current transmitter with a blue housing. It specifically addresses common issues such as selection difficulties, model mismatches, and incompatibility with operating conditions. By integrating device performance, operating conditions, and industry requirements, it provides clear, step-by-step selection guidance. The guide is presented entirely in text format, making it suitable for reference during manual consultation and customer selection.

5.1 Key Selection Criteria

1. Signal Type Selection: First, distinguish whether the monitored medium at the site is AC current, DC current, mixed AC/DC current, or microampere-level and milliampere-level leakage current scenarios. The JXK-19-22 supports universal AC/DC measurement across the full range and is suitable for high-precision acquisition of weak leakage currents. It can be directly used in scenarios such as leakage current monitoring, DC

and AC load current acquisition; for standard AC current monitoring, select the single-AC measurement model from the same series; for pure DC high-voltage low-current scenarios, prioritize this three-terminal isolated version.

2. Channel Selection: The JXK-19-22 features a standard single-channel (1-in, 1-out) configuration. For applications requiring independent monitoring of a single circuit, this model is the direct choice. For scenarios where a single device needs to simultaneously monitor multiple current channels or collect leakage data from multiple circuits, single-channel models are not suitable; instead, upgrade to a multi-channel combination transmitter to avoid stacking devices and occupying cabinet space.

3. Power Supply Selection: For standard industrial applications, uniformly select the JXK-19-22 version with a standard 24V DC power supply, which is compatible with standard power distribution systems in control cabinets and automation equipment. In scenarios where no DC regulated power supply is available on-site and only AC power is present, an external power conversion module must be used; do not connect the device directly to high-voltage AC power to ensure power stability and extend the device's service life.

4. Selection Based on Explosion-Proof Requirements: For standard indoor control cabinets and general applications without flammable or explosive media, the standard JXK-19-22 model may be used directly. In flammable and explosive environments such as chemical plants, oil and gas facilities, and hazardous chemical storage areas, the use of standard models is prohibited; intrinsically safe barriers must be used in conjunction with the device to meet on-site safety regulations.

5. Selection Based on Installation Environment: For standard temperature-controlled cabinets and dry, dust-free indoor environments, the standard blue-cased JXK-19-22 is fully suitable; for harsh environments with high humidity, high dust levels, or mildly corrosive gases, verify the cabinet's overall protection rating and ensure compatibility with the equipment's flame-retardant, moisture-resistant casing structure; for outdoor environments without protection, highly corrosive conditions, or scenarios with prolonged exposure to extreme temperature fluctuations, an additional protective enclosure must be installed to extend the equipment's operational lifespan.

5.2. Application Selection Guide for Industry Scenarios

1. In chemical industry applications—such as leakage current monitoring in production unit circuits, current acquisition in chemical DC control circuits, and low-voltage circuit inspection in water treatment chemical dosing systems—the Qidian JXK-19-22 three-terminal isolated leakage current transmitter is the preferred choice. Its high isolation performance effectively mitigates complex electromagnetic interference and ground potential differences common in chemical plant environments, while its millimeter-level precision ensures accurate detection of even minor equipment leakage hazards.

2. In the power industry, this model is recommended for applications such as low-voltage distribution cabinets, photovoltaic energy storage systems, monitoring of mixed AC/DC currents in substation auxiliary circuits, and leakage current early warning systems for cable lines. Its non-contact perforation measurement method does not damage existing circuits, and the three-terminal isolation structure ensures the safe and stable operation of power systems.

3. In the metallurgical industry, where production sites are characterized by high temperatures and strong electromagnetic interference, the JXK-19-22 is suitable for monitoring auxiliary circuit currents in smelting equipment and detecting leakage in variable-frequency devices. With its wide temperature tolerance and anti-electromagnetic interference design, the device can operate stably over the long term in the complex environments of metallurgical operations.

4. For electrical safety monitoring in pharmaceutical cleanrooms, automated production lines, and pure water systems, select the blue-cased JXK-19-22 compact DIN-rail mount model. Its simple installation and low-noise operation meet the requirements for organized equipment layout and electrical safety monitoring in cleanroom environments.

5. For real-time leakage and current monitoring in power supply circuits of automated production lines, robotic workstations, and custom automated equipment in the smart manufacturing industry, this transmitter is recommended as standard equipment. Its standard analog output seamlessly integrates with PLC and DCS control systems, meeting the requirements for systematic data acquisition and interlocking control in smart manufacturing.

5.3 Common Mistakes in Selection

1. Misconception of Ignoring Isolation Level: Most users focus solely on the measurement range during selection while neglecting electrical isolation parameters. Ordinary two-level isolation devices cannot withstand on-site ground loops or surge impacts, which can easily cause downstream PLCs and instruments to burn out. The JXK-19-22 comes standard with a three-terminal fully isolated design, making it an essential requirement for complex industrial interference environments; users should not blindly opt for low-isolation, simplified models.

2. Misjudging Signal Range: In leakage current and microcurrent monitoring scenarios, selecting standard current transmitters with large measurement ranges can lead to distorted data acquisition and insufficient accuracy for weak leakage signals, preventing timely detection of safety hazards. For milliamperes-level micro-leakage current applications, the JXK-19-22's small-range, high-precision version must be precisely matched to ensure measurement sensitivity and data accuracy.

3. Misconception of neglecting load matching: When selecting current-output transmitters, failing to account for the load resistance of downstream instruments and data acquisition modules can lead to signal attenuation and value drift if the load is too high. During selection, it is essential to confirm the load parameters of the downstream equipment in advance and ensure they match the standard load range of the JXK-19-22 to prevent abnormal signal transmission.

4. Misapplication of General-Purpose Models in Explosion-Proof Environments: Arbitrarily using standard general-purpose transmitters in hazardous chemical or explosion-proof zones violates safety production regulations and poses significant safety risks. For special explosion-proof operating conditions, compliant safety barriers must be integrated with the JXK-19-22; the direct use of general-purpose equipment in explosion-proof zones is strictly prohibited.

5.4 Customization Recommendations

1. Custom Signal Solutions: The standard model features a conventional 4–20 mA output. For applications requiring 0–5 V or 0–10 V voltage signals, bidirectional positive/negative current signals, or special non-standard measurement ranges, the JXK-19-22's hardware and software can be fine-tuned to customize specific input/output signal specifications, ensuring compatibility with niche control system integration needs.

2. Custom Solutions for Non-Standard Operating Conditions: For extremely harsh environments such as extreme cold, high temperatures, high salt fog, and strong corrosion, we can customize wide-temperature versions, reinforce the housing with moisture-proof and anti-corrosion coatings, and optimize the selection of internal components. For projects with limited cabinet space or special installation constraints, we can optimize the structural dimensions based on the original blue housing to accommodate non-standard installation layouts.

3. Multi-Channel Integrated Customization Solutions: For project scenarios requiring simultaneous monitoring of multiple AC and DC leakage currents from a single device, we can leverage the JXK-19-22 single-channel technical architecture to customize multi-channel integrated modular equipment. This approach features unified DIN-rail mounting, centralized power supply, and grouped signal outputs, thereby reducing the number of devices within the cabinet, simplifying wiring and installation, and lowering overall procurement and operational costs.

VI. Installation and Commissioning Specifications

6.1 Pre-installation Preparation

1. Component Verification

Upon delivery, verify that the product model is the Qidian JXK-19-22 blue-cased, three-terminal isolated milliamperage AC/DC leakage current transmitter. Check that the casing is intact with no cracks, the casing latches are secure, and the terminal blocks show no deformation or oxidation; Verify that the device's silkscreen parameters, measurement specifications, and isolation rating match the actual selection requirements. Ensure the entire unit is structurally sound with no dents or damage, and that all accessories are complete and present, to ensure compliance with operational requirements.

2. Environmental Inspection

The device is intended for installation and use exclusively within sealed indoor control cabinets, away from areas with corrosive gases, heavy dust, standing water or condensation, and oil mist contamination; keep it away from strong sources of electromagnetic interference such as variable frequency drives, high-power contactors, and high-frequency power equipment; the operating environment's temperature and humidity must fall within the product's rated operating range. Do not install the device outdoors without a protective enclosure or directly in enclosed flammable or explosive spaces to prevent accelerated aging and deterioration of insulation performance caused by harsh operating conditions.

3. Tool List

Keep the following tools on hand: a small Phillips screwdriver, wire strippers, insulating tape, cold-pressed terminal blocks, a digital multimeter, and standard 35mm DIN rails. During the commissioning phase, prepare a DC regulated power supply and signal testing instruments for circuit verification, power-on testing, and signal accuracy calibration to ensure smooth installation and commissioning operations.

4. Safety Precautions

All installation and wiring work must be performed with the power completely disconnected; work may only proceed after the cabinet's main power supply has been shut off. Personnel must wear appropriate insulation protection; it is strictly prohibited to disconnect, connect, or modify wiring while the system is energized. Strictly separate high-voltage power circuits from low-voltage signal circuits to prevent cross-connection or incorrect wiring between them. Verify that the on-site grounding system is intact and compliant; eliminate loose or missing ground connections to ensure personal safety and electrical safety of the equipment.

6.2 Standard Installation Procedure

1. Mounting the Rail

Pre-install standard 35mm industrial DIN rails inside the control cabinet to ensure they are securely fastened without any wobble. Align the upper slot on the JXK-19-22 transmitter with the top edge of the rail and snap it into place. Press the device vertically downward to ensure the bottom latches fully engage and lock onto the rail, securing the device firmly without any looseness or misalignment. For future removal, simply release the bottom spring-loaded latch to detach the unit. The overall installation structure is simple and accommodates the need for neat and orderly arrangement within the cabinet.

2. Wiring Specifications

Strictly distinguish between power supply terminals and signal output terminals. Connect wires according to the silk-screen markings on the housing to prevent reverse connections, incorrect connections, or loose connections.

The device operates on a DC power supply. Connect the positive terminal of the 24V DC power source to the positive power terminal, and the negative terminal to the negative power terminal. Ensure connections are secure and free of looseness; This product features a through-hole, non-contact measurement design. The AC or DC cables being measured pass directly through the 22mm through-hole in the center of the device, eliminating the need for connections to the internal circuitry and requiring no modifications to the original main circuit. The analog output terminals must be connected one-to-one to downstream data acquisition devices such as PLCs, DCS systems, and industrial secondary instruments. Strictly distinguish between signal positive and negative terminals, and ensure wiring is performed according to the one-to-one standard.

3. Grounding Requirements

The device features an insulated blue engineering plastic housing and does not require separate grounding of the housing. Shielded twisted-pair cables are recommended for rear-end signal transmission; the shielding layer must be grounded at a single point, specifically at the common grounding busbar in the control cabinet. Grounding at both ends is strictly prohibited to prevent ground loop currents from interfering with measurement accuracy. Power and signal grounding busbars within the cabinet must be separated and maintained as independent circuits to fully preserve the product's three-terminal isolation protection.

6.3 Wiring Diagram Specifications

1. General Terminal Definitions

The terminals on the JXK-19-22 unit are divided into a power supply terminal group and an analog output terminal group. The terminal markings on the housing surface are clear, with positive and negative terminals and circuit designations clearly labeled, facilitating rapid on-site identification of wiring circuits and reducing the likelihood of wiring errors.

2. Dedicated Wiring Specifications for Isolated Models

This unit features a three-terminal isolation architecture, with the power supply side, measured input side, and signal output side completely electrically isolated from one another. The circuits are independent and do not share a common ground. The power supply circuit uses an independent DC regulated power supply and does not share the power supply circuit with high-power drive equipment. The signal output circuit is routed separately using shielded cables throughout, maintaining a reasonable distance from high-voltage power cables to reduce electromagnetic coupling interference.

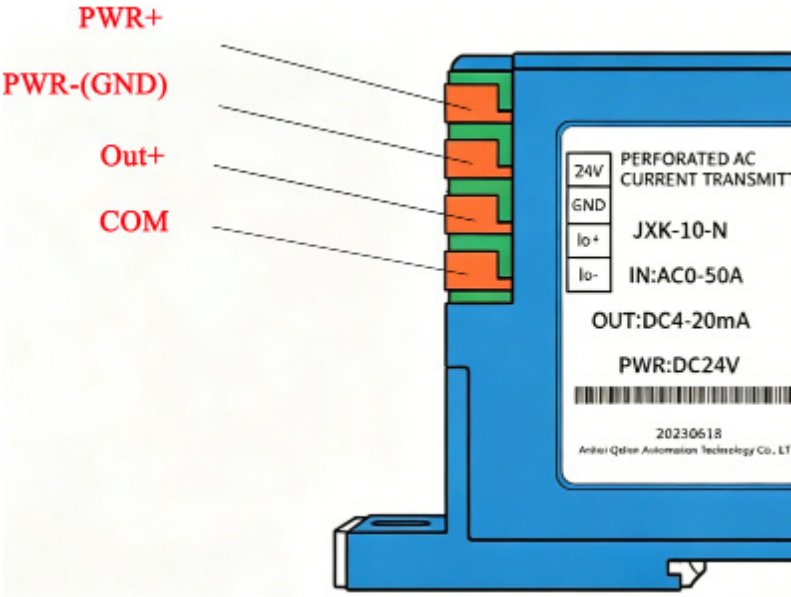
3. Shield Grounding Procedures

For the outer shield of shielded twisted-pair signal cables, fixed grounding is performed only at the control cabinet grounding terminal. The shield at the transmitter end is completely wrapped and isolated with insulating tape; it is neither grounded nor exposed. This approach prevents signal drift and value fluctuations caused by multiple grounding points at the circuit level.

4. Comparison of Correct and Incorrect Wiring Practices

Standard Correct Wiring: Precise alignment of power supply positive and negative terminals; output signal polarity matched to downstream equipment; test cables routed through independent conduits; shielded cables grounded at a single point; high- and low-voltage cables routed in separate cable trays.

Typical Incorrect Wiring Practices: Reversed power supply polarity, high- and low-voltage cables laid in parallel within the same conduit, shielding grounded at both ends, arbitrary short-circuiting of output terminals, and unauthorized parallel modifications to the measured loop circuit. These violations can damage internal isolation circuits, cause measurement inaccuracies and signal distortion, and in severe cases, directly result in equipment failure.



6.4 Power-On Commissioning Procedure

1. No-Load Test

After all wiring is complete, check each circuit individually to verify the tightness of connections, the clamping status of terminals, and the correspondence of circuits. Once confirmed, apply the control power supply uniformly; connect the equipment to its rated 24 V DC operating voltage. If the equipment powers up smoothly and the entire unit exhibits no abnormal heating, odors, or unusual electrical noises, the no-load operation is considered normal.

2. Signal Verification

With the test cable in a no-load, zero-current state, use a measuring instrument to read the output analog signal and verify that the zero-point output value meets the factory standard parameters. Gradually apply actual operating loads, applying AC and DC currents of varying magnitudes and micro-leakage currents in stages. Record the output signal values sequentially to verify that the input current and the transmitter's output signal exhibit a stable linear relationship, ensuring continuous and reliable data acquisition.

3. Operational Status Assessment

After the device is powered on and stabilized, it operates smoothly with internal circuits functioning normally. If issues such as abnormal supply voltage, circuit breaks, or reversed connections occur, they will manifest directly as abnormal output signals, fixed values, or no data changes. These issues can be quickly diagnosed by checking the supply voltage and re-inspecting the wiring.

4. Calibration Method

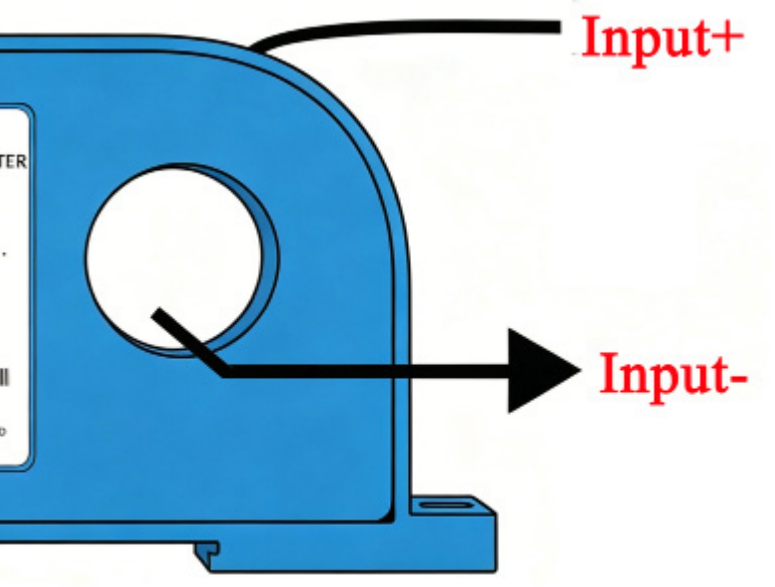
The product undergoes full-range precision calibration and linearity verification prior to shipment; no on-site recalibration is required under standard industrial conditions. If minor value deviations occur in complex electromagnetic environments, prioritize correction through parameter compensation in the downstream control system. Do not disassemble the device housing, modify internal circuits, or adjust components without authorization to avoid damaging the isolation structure or factory calibration parameters, which could compromise overall accuracy and service life.

6.5 Installation Prohibitions

1. Strictly Prohibit Overvoltage Power Supply

The standard operating voltage range for the device is DC 18V to DC 30V, compatible with standard industrial DC 24V power distribution. Connecting to AC high-voltage power, high-voltage DC, or non-standard high-voltage power sources is strictly prohibited. Additionally, avoid prolonged operation under low voltage or undervoltage conditions. Overvoltage or incorrect voltage supply will cause internal isolation modules and signal processing circuits to break down, resulting in irreversible damage.

2. Avoid High-Voltage Interference



Low-voltage signal lines must not be laid in close proximity to or mixed in the same cable tray with variable frequency drives, motor power lines, or high-voltage cables. In industrial environments with high interference, shielded twisted-pair cables must be used throughout for signal transmission. Route cables appropriately to minimize electromagnetic radiation interference with weak leakage current measurements.

3. Protective Measures for Humid Environments

In high-humidity, condensation-prone, or moisture-heavy environments, control cabinets must be equipped with sealing, dehumidification, and ventilation devices to prevent moisture from entering equipment terminals and internal circuits. Reserve sufficient space around the equipment for heat dissipation; do not completely enclose or seal the equipment, and do not stack objects that obstruct airflow. Ensure natural ventilation and heat dissipation to prevent moisture-induced deterioration of insulation performance, which can lead to measurement anomalies and safety hazards.

VII. Recommendations for Daily Use and Maintenance

7.1 Key Points for Daily Inspections

1. Monitoring Signal Stability

Check the continuity and stability of the transmitter's output signal daily via the backend PLC/DCS or monitoring system to ensure there are no abnormal spikes, fixed lockups, or persistent drifts in the readings. If signal fluctuations exceed the normal range, investigate potential issues such as line interference, loose connections, or abnormal loads, and address them promptly to prevent disruption to the system's control logic.

2. Temperature and Humidity Monitoring

Regularly check the temperature and humidity conditions inside the installation cabinet to ensure that the ambient temperature and humidity around the equipment remain within the rated operating range. In high-humidity environments, pay close attention to the terminal areas of the equipment for signs of condensation or oxidation. Promptly activate the cabinet's dehumidification and ventilation systems to prevent moisture from causing a decline in insulation performance or measurement anomalies.

3. Installation Status Inspection

Visually inspect whether the transmitter's rail clips are secure, with no loosening or displacement; check that the housing is intact with no cracks, no significant dust accumulation, and no oil residue. Keep the equipment's exterior clean to prevent dust buildup from affecting heat dissipation and insulation performance.

7.2. Regular Maintenance Plan

1. Cleaning Frequency and Methods

In standard indoor environments, perform exterior cleaning once per quarter; in environments with high levels of dust or oil contamination, clean every 1–2 months. When cleaning, use a dry, soft-bristled brush to gently sweep away dust from the housing and terminal areas. Never wipe the device body directly with water, alcohol, or corrosive solvents to prevent liquid from entering the internal circuitry.

2. Wiring Tightness Inspection

Conduct a tightening inspection of all transmitter terminals every six months, including power supply terminals and signal output terminals. Pay particular attention to checking for wire oxidation and loose crimped terminals to prevent loose connections caused by vibration or temperature changes, which could lead to unstable power supply or abnormal signal transmission.

3. Recommendations for Accuracy Retesting

The device is factory-calibrated; under normal operating conditions, perform an accuracy retest once a year. Use a standard current source to apply AC and DC currents across different ranges to verify the deviation between the transmitter's output signal and the theoretical value. If the deviation exceeds the allowable range, prioritize correction through parameter compensation in the downstream system; do not disassemble the device or adjust internal components without authorization.

7.3 Long-Term Maintenance Tips

1. Dust and Moisture Protection

Transmitters that are idle for extended periods or kept in reserve should

be stored in a dry, well-ventilated, and dust-free environment with intact packaging to prevent moisture absorption. For equipment installed in cabinets, desiccants may be placed inside the cabinet, and the integrity of the cabinet door gaskets should be checked regularly to minimize the ingress of dust and moisture.

2. Measures to Optimize Interference Resistance
Use shielded twisted-pair cables throughout the signal transmission lines, with the shield grounded at one end; maintain a safe distance between signal cables and power cables, and avoid laying them in parallel within the same cable tray; regularly inspect the grounding system inside the cabinet to ensure that the grounding bars for high-voltage and low-voltage circuits are separated, eliminate ground loop interference, and ensure the stable performance of three-terminal isolation.

3. Protection Against Extreme Environments
In high-temperature environments, ensure adequate ventilation and heat dissipation within the cabinet to prevent equipment from being exposed to high temperatures in enclosed spaces for extended periods. In low-temperature environments, inspect equipment and wiring in advance for potential condensation risks and install temperature-controlled heating devices if necessary. In environments with highly corrosive gases, install protective enclosures on the exterior of the equipment to delay aging and corrosion of the casing.

VIII. Troubleshooting & Emergency Response
8.1. List of Common Faults
No output signal after powering on the device; no data feedback from the downstream data acquisition system
Measurement data exhibits persistent drift and fluctuates back and forth, failing to stabilize over time
Signals are distorted and chaotic due to the on-site electromagnetic environment, causing acquisition values to fluctuate erratically
Output values remain fixed over time, stuck at zero or at full scale
Measurement errors gradually increase after prolonged operation, and accuracy fails to meet operational requirements
Severe signal attenuation after load connection; insufficient load-carrying capacity leads to abnormal data acquisition

8.2. Analysis of Fault Causes
1. Wiring errors: Reversed power supply polarity, reversed signal output polarity, improper shielding cable grounding, unreasonable cable routing through equipment, loose or faulty terminal connections.

2. Power Supply Abnormalities: Operating voltage exceeds the device's permissible range; excessive ripple in the power supply; poor voltage regulation of the DC power supply; aging or poor contact in the power return circuit.

3. Signal Overload: Actual measured current exceeds the device's rated measurement range; excessive load resistance in the downstream acquisition circuit; transient surge currents in the signal loop.

4. Environmental Interference: High-frequency interference generated by adjacent variable-frequency drives or high-power equipment; mixed routing of high- and low-voltage cables; reduced insulation due to moisture, condensation, or dust accumulation inside the cabinet.

5. Equipment Damage: Long-term exposure to harsh operating conditions leading to aging of internal sampling circuits and isolation modules; oxidation and corrosion of terminals; permanent damage to internal components caused by improper overvoltage operation.

8.3 Step-by-Step Troubleshooting
Fault 1: The device has no output signal, and there is no data feedback from the downstream end
Troubleshooting Steps
Use a multimeter to measure the voltage at both ends of the power supply to confirm that the power supply specifications meet the device's requirements; check the wiring sequence and polarity of the power supply circuit and signal output circuit item by item to identify any incorrect connections, missing connections, or broken wires; Inspect the layout of the through-hole measurement circuit to ensure the cable under test passes completely through the central hole; disconnect the downstream load and test the device's native output independently to determine whether the issue lies with the device itself or an external load.
Remedial Actions
If voltage is abnormal, replace with a stable DC regulated power supply and reorganize the power supply lines; correct incorrect wiring, tighten all terminal connections, and eliminate loose or intermittent connections; Clean oxidized or corroded terminals and replace aged or damaged cables; if there is still no output under no-load conditions, determine it as a hardware failure and cease operation of the faulty device.
Emergency Workaround
Keep a spare transmitter of the same specifications on-site; quickly disassemble and replace the faulty device to rapidly restore on-site current monitoring and data collection; take the faulty device offline and send it for centralized inspection.

Fault 2: Signal drift; persistent and unstable fluctuations in values
Troubleshooting Steps
Inspect the routing of shielded signal cables and verify the grounding procedures; check whether signal cables are routed in close proximity to power cables or variable frequency drive (VFD) lines; test the purity of the power supply to identify voltage fluctuations and high-frequency ripple interference; inspect the humidity and dust accumulation inside the control cabinet to confirm that the insulation environment meets standards.
Remedial Actions
Strictly enforce the single-point grounding standard for shielded cables to eliminate loop current interference caused by multi-point grounding; redesign the internal cabling layout to separate high- and low-voltage circuits and increase isolation distances; replace the power supply with a low-ripple industrial-grade unit to optimize power quality; enhance cabinet sealing and implement dehumidification and dust removal measures to improve the operational microenvironment.
Emergency Workaround
Temporarily enable digital filtering and data averaging algorithms in the backend system to mitigate interference from fluctuations; temporarily add signal isolation adapters to enhance interference resistance while awaiting a system downtime window for a complete circuit overhaul.

Fault 3: Signal Distortion, Random Value Fluctuations
Troubleshooting Steps
Confirm whether the circuit under test is subject to complex operating conditions such as high-frequency pulses or transient current spikes; inspect the tightness of terminal crimping to prevent unstable contact resistance; investigate the impact of electromagnetic radiation caused by the startup and shutdown of nearby high-power electrical equipment; verify whether the ambient temperature of the equipment's operating environment has been consistently high.
Remedial Measures
Install buffer filter components in the front-end power circuit to attenuate transient interference; re-crimp all terminal blocks to optimize circuit contact performance; reposition the equipment away from strong interference sources; ensure adequate cabinet ventilation and heat dissipation to minimize the impact of high temperatures on circuit stability.
Emergency Workaround
Temporarily shorten the signal transmission line to reduce the range of interference coupling; simplify intermediate connection points to reduce signal transmission loss and ensure basic monitoring functionality.

Fault 4: Output value is stuck or remains constant
Troubleshooting Steps
Measure the actual load current to confirm whether it exceeds the device's measurement range; measure the load resistance at the output end to determine if it exceeds the device's drive capacity; check the signal output circuit for potential short circuits or open circuits; investigate whether internal circuit protection has been triggered due to prolonged operation beyond the rated conditions.
Remedial Actions
If the measurement range is mismatched, replace the transmitter with one of the appropriate specifications to match the actual current range at the site; properly match the load parameters of the downstream data acquisition module to reduce the external resistance load; repair damaged circuits to eliminate short circuits and open circuits; ensure proper power supply to the device to prevent prolonged under-voltage or over-voltage

operation.
Emergency Workaround
Temporarily switch to a backup monitoring circuit for data acquisition to ensure uninterrupted production line monitoring, and replace the device with a compatible model at the earliest opportunity.

Fault 5: Decline in long-term accuracy; measurement deviations exceed limits
Troubleshooting Steps
Perform multi-point re-measurements across the full range using a standard signal source to quantify the error range; inspect the equipment housing and interior for dust accumulation and moisture; re-examine the tightness of guide rail fasteners and wiring connections in environments subject to prolonged vibration; assess performance degradation caused by long-term aging and environmental corrosion.
Remedial Measures
Apply linear compensation and zero-point correction using backend control system parameters to account for on-site deviations; regularly clean the equipment exterior and terminal areas to maintain dryness and cleanliness; reinforce guide rail mounting clips and terminal connections to minimize the impact of equipment vibration; directly replace equipment with severe corrosion or aging.
Emergency Alternative Plan
Use system calibration compensation as a temporary measure to maintain data accuracy, and incorporate the equipment into a regular spare parts replacement schedule.

8.4 After-Sales Repair Guidelines
1. Criteria for Determining a Malfunction
If the equipment fails to collect data or output signals normally despite normal power supply, proper wiring, compliant environmental conditions, and appropriate load matching; if measurement deviations exceed reasonable limits and cannot be corrected through system compensation; or if safety hazards such as damaged casings, burnt terminals, or carbonized wiring are present; and if the malfunction persists after a thorough, item-by-item troubleshooting process, the issue may be determined as a hardware failure requiring submission of an after-sales repair request.

2. Repair Process
Compile the equipment’s full model number, purchase batch, on-site industry, operating environment, fault symptoms, and completed troubleshooting steps; contact the manufacturer’s after-sales technical team to cooperate with remote troubleshooting, parameter verification, and solution guidance; if the issue cannot be resolved remotely, return the unit for inspection according to the standard repair return process, or request on-site technical support services.

3. Contact Information
Anhui Qidian Automation Technology Co., Ltd. Additional routine communication channels, such as dedicated after-sales hotlines, WeChat, and official email addresses, may be provided as needed to ensure rapid response to technical issues.

4. Warranty Coverage
Products are covered by a standard warranty period starting from the date of manufacture. During the warranty period, provided the equipment is installed and used in accordance with specifications, free repairs, replacement of parts, and technical support will be provided, provided there is no damage caused by external forces, and the equipment has not been used beyond its rated pressure or capacity. For damage caused by human error, unauthorized disassembly or modification, misuse under harsh or non-standard operating conditions, or equipment beyond the warranty period, paid repair and replacement of parts services will be provided.