JXK-10 Current Transducer

I. Product Definition

The JXK-10 is a through-hole Hall-effect AC current transmitter developed by Anhui Qidian Automation Technology Co., Ltd. It is a specialized module for signal acquisition and isolation conversion in industrial field applications, designed specifically for high-precision monitoring of AC current and standardized signal output.

Its core functions can be broken down into the following points:

1. AC Current Acquisition and Sensing: Utilizing a through-hole structure, it performs non-contact, continuous, and real-time acquisition of AC currents within the 0–50 A range. This eliminates the need to disconnect the main circuit under test and does not interfere with the normal operation of the original circuit.

2. Signal Isolation and Interference Suppression: Utilizing Hall-effect magnetic balance isolation technology, it achieves electrical isolation between the primary side (high-voltage circuit) and the secondary side (low-voltage signal circuit), blocking the effects of common-mode interference, ground loops, and surge impacts on downstream equipment to ensure system stability and equipment safety.

3. Signal Standardization and Conversion: Converts the acquired non-standard AC current signal into a standard industrial 4–20 mA DC analog signal through linear conversion, making it compatible with the vast majority of industrial data acquisition and control devices, including PLCs, DCS systems, industrial control instruments, and digital displays.

4. Power Adaptation and Stable Output: Supports 24 V DC industrial standard power supply. The output signal maintains a strict linear relationship with the input current, meeting the stability requirements for long-term continuous operation in industrial environments.

5. Field Installation Adaptability: Features a DIN-rail mounting design with a protective blue engineering plastic housing. Compatible with standard 35 mm DIN rails, it can be directly installed inside electrical control cabinets and is suitable for various applications, including industrial automation, power monitoring, and motor protection.

II. Working Principle

The core of this transmitter is the Hall-effect magnetic balance closed-loop detection principle. The operation process can be broken down into four easy-to-understand steps:

1. Magnetic Field Sensing Stage: The AC conductor being measured passes through the central aperture of the transmitter. When AC current flows through the conductor, it generates an alternating magnetic field around the conductor that is proportional to the magnitude of the current. The Hall element inside the transmitter accurately captures this magnetic field signal.

2. Signal Amplification and Processing Stage: The weak magnetic field signal detected by the Hall element is amplified and processed by the internal circuitry, generating an electrical signal corresponding to the original magnetic field strength. Simultaneously, through a closed-loop feedback circuit, the original magnetic field is canceled out, ensuring the Hall element remains in a zero-flux state at all times, thereby significantly enhancing detection accuracy and linearity.

3. Isolation and Conversion Stage: The processed signal passes through an electrical isolation unit, achieving physical isolation between the primary side (high-voltage circuit) and the secondary side (low-voltage circuit), thereby preventing high-voltage interference from entering the downstream low-voltage system.

4. Standardized Output Stage: The isolated signal passes through a linear calibration circuit and is ultimately converted into a standard 4–20 mA DC current signal output. The current magnitude maintains a strict linear relationship with the input AC current (e.g., 0 A corresponds to 4 mA, and 50 A corresponds to 20 mA). Downstream equipment can directly read this signal to perform current monitoring and control.

III. Core Value and Solutions to Pain Points

3.1 Overview of Core Values

--High-precision, non-contact current monitoring: Enables continuous AC current measurement without interrupting the circuit under test, ensuring normal equipment operation. Hall-effect closed-loop technology guarantees measurement accuracy and linearity, meeting industrial-grade monitoring requirements.

--- Electrical Isolation and Interference Immunity: Completely isolates the primary high-voltage circuit from the secondary low-voltage circuit, resolving common industrial issues such as common-mode interference, ground loops, and surge impacts. This protects downstream precision equipment such as PLCs and instruments, reducing the risk of failure.

---Standardized Signal Conversion: Converts non-standard AC current into an industry-standard 4-20mA signal, ensuring compatibility with the vast majority of industrial data acquisition and control devices. This resolves signal interface mismatches between different devices and enhances system compatibility.

---High Stability and Ease of Use: Powered by a standard 24 VDC industrial supply, featuring DIN-rail mounting and a blue protective housing, this device is designed to withstand harsh industrial environments. It offers convenient installation and ensures long-term, continuous, and stable operation, thereby reducing maintenance costs.

3.2 Pain Points and Solutions

---Customer Pain Points: When collecting AC current in industrial settings, the main circuit of the device under test must be disconnected. This process is complex, disrupts normal equipment operation, and poses safety hazards.

--Solution: The JXK-10-N features a through-hole design. The measured wire passes directly through the center hole of the transmitter to enable non-contact data acquisition. There is no need to disconnect the main circuit, so equipment operation remains unaffected, ensuring safe and convenient operation.

---Customer Pain Point: Interference, ground loops, and surge impacts in high-voltage circuits at industrial sites frequently cause false alarms or damage to downstream low-voltage equipment such as PLCs and industrial control instruments, resulting in poor system stability.

--Solution: The transmitter incorporates a built-in Hall-effect electrical isolation unit, achieving complete electrical isolation between the primary and secondary sides. This blocks the transmission of interference signals, protects downstream precision equipment, and significantly enhances system operational stability.

---Customer Pain Points: Signal interfaces vary across different field devices, and the acquired AC current signals cannot be directly recognized or utilized by PLCs, DCSs, and other equipment, resulting in poor compatibility.

--Solution: The transmitter linearly converts the acquired AC current signal into the industry-standard 4-20mA DC signal, making it compatible with the vast majority of industrial data acquisition and control devices and resolving interface incompatibility issues.

---Customer Pain Points: Traditional current monitoring devices suffer from low measurement accuracy, poor linearity, and significant data fluctuations, failing to meet the precise data requirements of industrial control and energy consumption monitoring applications.

--Solution: Utilizing Hall-effect magnetic balance closed-loop detection technology, the device offers high measurement accuracy and excellent linearity. The output signal maintains a strict linear relationship with the input current, ensuring stable and reliable data that meets industrial-grade precision monitoring requirements.

---Customer Pain Points: Industrial sites feature diverse power supply specifications and limited installation space, making equipment installation difficult and leaving devices vulnerable to environmental damage during long-term operation.

--Solution: Supports 24V DC industrial standard power supply and utilizes 35mm standard DIN rail mounting to fit within control cabinet spaces; the blue engineering plastic housing provides protection, adapts to typical industrial environments, ensures strong stability during long-term continuous operation, and reduces maintenance costs.

IV. Key Product Specifications

4.1. Basic Electrical Specifications

Input Specifications:

Measurement Type: Universal AC/DC Current

Standard Input Range (for this model): AC 0–50 A (Customizable extensions available: DC 0–50 A, AC/DC 0–10 A/100 A/200 A/500 A/600 A, and other specifications)

Mounting Hole Diameter: Φ22mm (compatible with standard power cables)

Input Frequency: DC 0 Hz / AC 50/60 Hz (compatible with industrial power frequencies)

Overload Capacity: 2 times rated current continuously; 10 times rated current for 1-second short-term surge without damage

Input Impedance: Non-contact measurement; imposes no additional impedance load on the measured circuit

Output Parameters

Standard Output Signal: DC 4–20 mA (linearly proportional to input current; 0 A corresponds to 4 mA, full scale corresponds to 20 mA)

Optional Output Signals: DC 0–5 V/0–10 V/RS485 (Modbus protocol, customizable)

Measurement Accuracy: ±0.5% FS (industrial-grade high precision; customizable to ±0.2% FS)

Linearity Error: ≤±0.2% FS

Repeatability Error: ≤±0.1% FS

Temperature Coefficient: ≤±50 ppm/°C (within the range of -10°C to +60°C)

Response Time: ≤250 ms (average value output) / ≤20 μs (instantaneous value output, depending on model configuration)

Load Capacity: When outputting DC 4–20 mA, maximum load resistance ≤ 500 Ω

Output Ripple: ≤ 10 mV (peak-to-peak)

Transmission Characteristics

Signal Transmission Method: Current-loop transmission (4–20 mA), strong anti-interference capability

Signal Transmission Distance: ≤ 1000 m (under standard shielded cable conditions)

4.2 Isolation Performance Parameters

Isolation Method: Hall-effect magnetic-balanced closed-loop electrical isolation (complete electrical isolation between the primary-side high-voltage circuit and the secondary-side low-voltage circuit)

Isolation Withstand Voltage: AC 2 kV (50 Hz, 1 min, no breakdown or flashover)

Insulation Resistance: ≥100 MΩ (between input, output, and power supply terminals under DC 500 V conditions)

Common-Mode Rejection Ratio (CMRR): ≥60 dB (effectively suppresses on-site common-mode interference and ground potential difference interference)

Ground Loop Isolation: Completely blocks ground loops between the primary and secondary sides, eliminating the impact of ground loops on downstream equipment

4.3. Power Supply & Power Consumption Parameters

Supply Voltage: DC 24V (Industrial standard power supply; allowable fluctuation range: DC 18V–30V)

Power Supply Configuration: 3-wire system (power positive, power ground, and signal negative share a common ground; compatible with industrial standards)

Full-Load Power Consumption: ≤1.5W (Under DC 24V supply conditions; operating current ≤62.5mA)

Reverse Polarity Protection: Built-in reverse polarity protection circuit to prevent equipment damage caused by wiring errors

Overvoltage Protection: Built-in overvoltage protection circuit; can withstand short-term overvoltage up to 35 V DC without damage

Power Distribution Output: No additional power distribution output; provides only signal conversion and isolation functions

4.4 Environmental Specifications

Operating Temperature: -10°C to +60°C (standard industrial environment; a wide-temperature version (-40°C to +85°C) is available upon request)

Storage Temperature: -25°C to +70°C

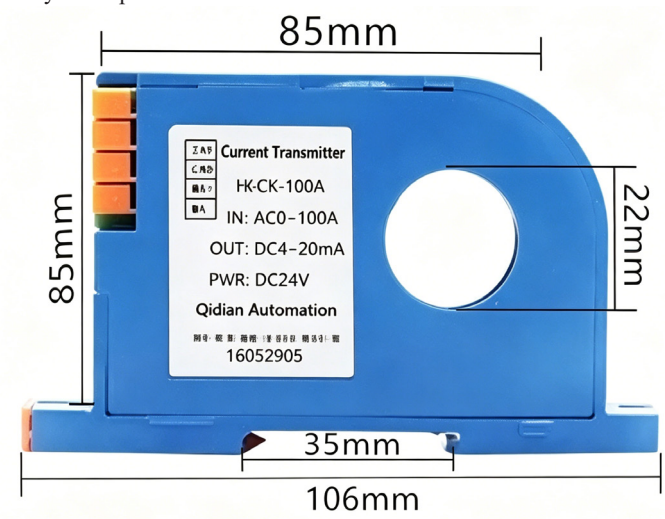
Operating Humidity: ≤90% RH (no condensation or dew formation)

Protection Rating: IP30 (enclosure protection against ingress of solid foreign objects larger than 2.5 mm in diameter; terminal area equipped with dust-proof covers)

Explosion-proof rating: Non-explosion-proof type, suitable for standard non-hazardous industrial environments; for explosion-proof applications, must be used in conjunction with an intrinsically safe barrier

EMC immunity: Complies with the GB/T 17626 industrial standard, providing immunity to surges (±2 kV), static electricity (±8 kV), and burst pulses (±2 kV), making it suitable for complex electromagnetic environments in industrial settings

4.5. Physical Specifications



Mounting Method: 35mm standard DIN rail mounting (compatible with G-type rails); also supports screw mounting (mounting holes provided on the bottom)

Dimensions (Reference Dimensions):

Total Length: 106mm

Total Width: 35mm (matches rail width)

Total Height: 85 mm

Mounting Hole Diameter: Φ22 mm

Terminal Area Width: 12 mm (orange-green dual-color pluggable terminals)

Weight: Approx. 150 g (excluding packaging)

Indicator Light Definition: This model does not feature separate PWR/ALM indicator lights; power and operational status are determined via rear-panel signal feedback

Housing Material and Protection Details:

Housing Material: Blue ABS engineering plastic (V-0 flame retardant rating, industrial-grade aging resistance)

Housing Protection: One-piece molded sealed structure; terminal section features a dust cover to prevent dust and moisture ingress

Terminal Type: Plug-in terminal blocks (orange-green color-coded for easy identification of power, ground, and signal polarity; designed to prevent incorrect insertion)

Mounting Clips: Elastic guide rail clips on the bottom for easy installation and removal; features an anti-loosening design suitable for long-term operation inside control cabinets

Surface Finish: Matte brushed finish, scratch-resistant and wear-resistant, with minimal fingerprint retention

V. Application-Specific Selection Guide

5.1 Key Selection Criteria

1. Signal Type

First, determine the type of measurement signal: If only AC current needs to be measured, select the JXK-10 AC-specific model; if both AC and DC currents or DC current alone need to be measured, select the JXK-10 universal model or DC-specific model to avoid measurement failures caused by incorrect selection.

Confirm the input signal range: Select based on the maximum current of the circuit under test, allowing for a margin of at least 20% (e.g., if the maximum circuit current is 40A, prioritize a 0-50A range) to prevent long-term full-scale operation from affecting device lifespan and accuracy.

Confirm the output signal type: If the backend is a PLC or industrial control instrument, prioritize the industrial-standard DC 4-20mA output; If the downstream device is a voltage acquisition unit, select a DC 0-5V or 0-10V output; for networked monitoring, choose a custom model with RS485 (Modbus) protocol.

2. Channel Configuration
Single-channel current monitoring: Select the standard 1-in-1-out model (single input, single output), suitable for the vast majority of basic data acquisition scenarios.
Dual-loop synchronous monitoring: Select the 1-input, 2-output model (single input, dual independent isolated outputs) to simultaneously provide signals to two sets of backend devices, avoiding accuracy loss caused by signal splitters.
Multi-loop centralized monitoring: If multiple current channels need to be acquired simultaneously, prioritize multi-channel integrated models or connect multiple single-channel devices in parallel to prevent signal crosstalk.

3. Power Supply Options
Standard Control Cabinet Applications: Select the 3-wire DC24V power supply model, which is compatible with industrial standard power sources and offers high stability; this is the standard configuration for this series.
Low-Power / Field Instrument Applications: To reduce wiring costs, choose the 2-wire power supply model (applicable only to DC4-20mA output), which is powered directly by the backend device, thereby minimizing power wiring.

4. Explosion-Proof and Safety Requirements
Conventional non-hazardous environments: The general-purpose model is sufficient; no additional explosion-proof configuration is required.
Explosion-hazardous environments such as chemical, oil, and gas facilities: The general-purpose model cannot be used directly; select an intrinsically safe certified model and use it with a corresponding explosion-proof safety barrier to ensure compliance with explosion-proof regulations.

5. Installation Environment Compatibility
Installation in conventional control cabinets: Select the 35mm standard DIN rail mounting model, which fits standard electrical cabinet rails for easy installation.
Special high-temperature or low-temperature environments: Select the wide-temperature model (-40°C to +85°C) to prevent accuracy drift or damage to standard models under extreme temperatures.
High-humidity or dusty environments: Prioritize models with an IP rating of IP30 or higher; for higher protection, custom versions with sealed enclosures are available.

5.2. Selection Guidelines for Industry Applications
1. Chemical Industry Applications
Core Requirements: Current monitoring for motors and pumps; must be corrosion-resistant and resistant to electromagnetic interference; explosion-proof compatibility is required in certain scenarios.
Recommended Configuration: Prioritize the JXK-10 Series AC/DC Universal Model (supports current acquisition for both AC and DC motors), with standard 4–20 mA DC output and 24 V DC three-wire power supply; In explosion-proof zones, pair with intrinsically safe barriers; choose the universal model + safety barrier combination, or a custom intrinsically safe certified model to ensure compliance with chemical industry explosion-proof standards.

2. Power Industry Scenarios
Core Requirements: Current monitoring for switchgear, transformers, and busbars; requires high precision, high isolation rating, and compatibility with power frequency signals.
Recommended Configuration: Select the JXK-10 series AC-specific models, available in AC 0-50A/100A/200A ranges, with isolation withstand voltage ≥2kV and DC 4-20mA output. These are compatible with power monitoring systems and relay protection devices. For certain applications, models with RS485 output can be selected for integration into power SCADA systems.

3. Metallurgy Industry Applications
Core Requirements: Current monitoring for high-power equipment such as electric furnaces, rolling mills, and fans, requiring resistance to strong electromagnetic interference and shock resistance.
Recommended Configuration: Select the JXK-10 series wide-temperature, anti-interference model. It is AC/DC universal, supports high current ranges (e.g., 0–600A), features a high isolation rating (≥2kV), and uses a three-wire power supply. It is suitable for the strong electromagnetic environments found in metallurgical sites and provides stable output signals without fluctuations.

4. Pharmaceutical Industry Applications
Core Requirements: Current monitoring of equipment in cleanrooms; requires low power consumption, no additional interference, and compatibility with cleanroom environments.
Recommended Configuration: Select the standard model of the JXK-10 series, with a measurement range of 0–50 A AC, 4–20 mA DC output, and a three-wire 24 V DC low-power supply. It emits no excess electromagnetic radiation and is suitable for installation inside control cabinets in pharmaceutical cleanrooms without affecting the operation of cleanroom equipment.

5. Smart Manufacturing / Automated Production Line Scenarios
Core Requirements: Current monitoring for servo motors and conveyor line equipment requires fast response, good linearity, and compatibility with PLC control.
Recommended Configuration: Select the JXK-10 Series Fast Response model, with a response time ≤20μs, AC/DC universal compatibility, DC 4–20mA or RS485 output, and three-wire power supply. It is suitable for closed-loop control in PLC and DCS systems, meeting the real-time monitoring requirements of production line equipment.

5.3 Common Selection Pitfalls
Pitfall 1: Ignoring Isolation Rating and Focusing Only on Range and Output
Problem Manifestation: Selecting models with insufficient isolation voltage rating allows high-voltage interference from the industrial site to enter downstream PLCs and instruments, leading to false alarms, equipment damage, or even system failures.
Mitigation Recommendation: In high-interference environments such as chemical, power, and metallurgical industries, models with an isolation voltage rating of ≥2 kV must be selected. Prioritize verifying the input/ output/ power supply isolation parameters, rather than just the basic measurement range.

Misconception 2: Incorrect Signal Range Selection, Leading to Long-Term Full-Scale or Over-Range Operation
Problem: Selecting a range based solely on the circuit's rated current without allowing for a margin results in long-term full-scale operation, causing accuracy drift and reduced service life; or selecting a range that is too wide, resulting in insufficient accuracy at low current levels and significant data fluctuations.
Prevention Recommendation: Select a range based on 1.2 to 1.5 times the circuit's maximum operating current. For example, if the maximum circuit current is 40 A, prioritize a 0–50 A range to balance accuracy and service life.

Misconception 3: Neglecting load matching, resulting in abnormal output signals
Problem Symptoms: The input impedance of downstream PLCs or instruments is too high, exceeding the load capacity of the transmitter's 4–20 mA output, resulting in low or fluctuating output signals that cannot be properly acquired.
Prevention Recommendation: Verify the transmitter's output load capacity (for this series, the maximum load for 4–20 mA output is ≤500 Ω). The total impedance of downstream equipment must be less than the transmitter's maximum load. If the impedance is too high, install a signal isolator or reduce the cable length.

Misconception 4: Incorrectly selecting general-purpose models for explosion-proof environments, posing safety hazards
Problem Description: In hazardous environments such as chemical and oil & gas facilities, using standard-grade transmitters without pairing them with explosion-proof safety barriers violates explosion-proof regulations, creating safety hazards. Additionally, the equipment cannot function properly in explosion-proof zones.
Prevention Recommendation: Standard-grade transmitters must not be used directly in explosion-proof environments. Instead, intrinsically safe certified models should be selected, or standard-grade transmitters should be paired with corresponding explosion-proof safety barriers to ensure compliance with safety regulations for explosion-proof zones.

5.4 Customization Recommendations
1. Custom Solutions for Special Signals
Non-standard input ranges: Customizable AC/DC current ranges such as 0–1 A, 0–5 A, 0–600 A, and 0–1000 A are available to accommodate special

2. equipment's current acquisition requirements.
Special Output Signals: In addition to standard DC 4-20mA/0-5V/0-10V, non-standard outputs such as RS485 (Modbus-RTU protocol), 0-20mA, and 1-5V can be customized to accommodate special backend device interfaces.

3. Custom Solutions for Non-Standard Operating Conditions
Wide Temperature / Wide Voltage Support: Customizable versions are available for a wide operating temperature range of -40°C to +85°C, or for wide voltage power supply ranges of DC 12V/DC 36V, to accommodate special operating conditions involving high or low temperatures and non-standard power sources.
High Protection / Corrosion Resistance: Customizable versions with sealed enclosures meeting IP65 or higher protection ratings, or corrosion-resistant enclosure materials, to accommodate harsh environments such as high humidity, dust, and corrosion.

4. Multi-Channel Integrated Custom Solutions
Multi-Channel Integrated Modules: Customizable 2-channel, 4-channel, or 8-channel current transmitters. A single device simultaneously acquires multiple current signals, enabling integrated installation that saves control cabinet space and reduces wiring costs.
Mixed-Signal Integration: Customizable integrated modules for mixed current and voltage acquisition, simultaneously capturing loop current and voltage signals. Suitable for multi-parameter acquisition scenarios such as power quality monitoring and energy consumption analysis.

VI: Installation and Commissioning Guidelines
6.1 Pre-installation Preparation
1. Checking Accessories
--- Verify Product Model: Confirm that the device model, input/output range, and power supply specifications match the order requirements (e.g., JXK-10-N AC0-50A/DC4-20mA/DC24V).
--- Inspect the device's exterior: Ensure the blue ABS housing is undamaged, terminals are not deformed, and label information is clear and complete, with no physical damage caused by shipping.
--- Confirm all accessories are included: Verify that the 35mm DIN rail clips, terminal blocks (marked with orange and green), and mounting screws (if required for wall mounting) are present and complete, with no missing parts.
---Verify technical documentation: Ensure the product certificate of conformity, factory calibration report (accuracy and linearity data), and user manual are complete and readily available for subsequent commissioning and calibration.

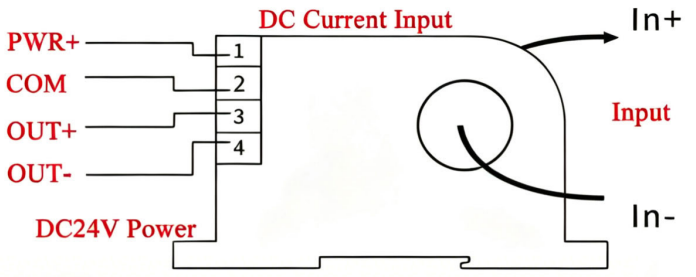
2. Environmental Inspection
---Installation location: Select an area inside the control cabinet with good ventilation, free from corrosive gases and strong electromagnetic interference (away from variable frequency drives, contactors, and power cables), and avoid direct sunlight and vibration sources.
---Ambient Temperature and Humidity: Ensure the on-site temperature is within the range of -10°C to +60°C, with humidity ≤90% RH and no condensation. If conditions exceed these limits, install temperature control or dehumidification equipment.
---Space Allowance: Reserve a clearance of ≥20 mm on all sides (left, right, top, and bottom) at the transmitter installation location to facilitate heat dissipation and future maintenance. Avoid installing the transmitter in close proximity to other heat-generating equipment.

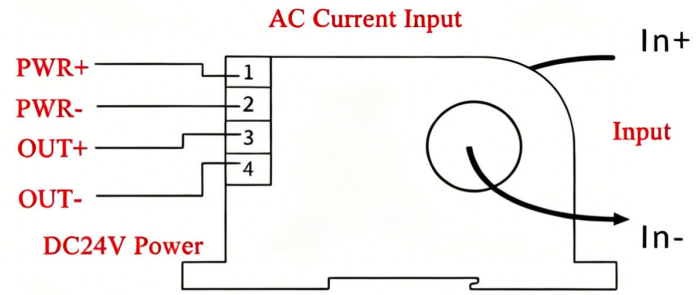
3. Tool List
---Electrical Tools: Phillips screwdriver (compatible with terminal screws), wire strippers, diagonal cutters, multimeter (DC voltage/current range), megohmmeter (optional, for insulation testing).
--- Auxiliary Materials: Shielded cable (for output signals only; RVVP 2×1.0mm² recommended), heat-shrink tubing, cable ties, grounding busbar.
--- Safety Equipment: Insulated gloves, voltage tester, to ensure safety during installation.

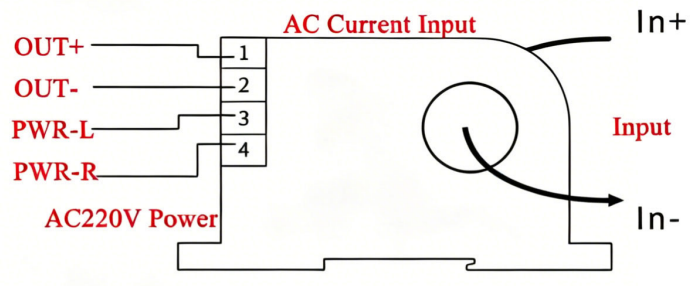
4. Safety Precautions
Before installation, the power supply to both the circuit under test and the transmitter's power supply circuit must be disconnected. Never connect wires while the circuit is live to prevent electric shock or equipment damage.
Never disassemble or modify standard transmitters in potentially explosive atmospheres. In explosive environments, installation must be performed by a licensed electrician in accordance with explosion-proof regulations.
Ensure that the wires in the main circuit under test have no exposed conductors and that the insulation is intact to avoid the risk of short circuits caused by the insulation being scraped during cable routing.

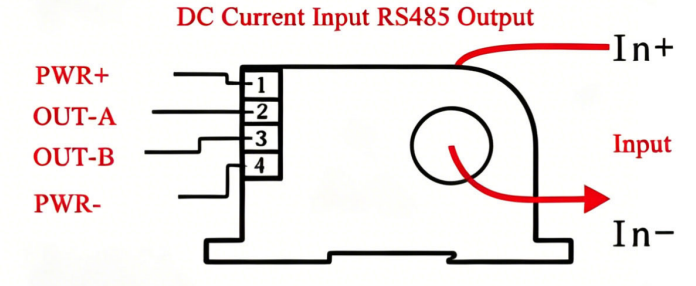
6.2 Standard Installation Steps
1. Mounting the DIN Rail
Secure a 35mm standard DIN rail inside the control cabinet, ensuring it is level, firmly fixed, and free of wobble.
Press the rail latches on the bottom of the transmitter and snap the device vertically into the rail. After hearing a "click," gently push the device to confirm it is securely locked in place with no looseness.
For wall-mounted installation, use the M3 screws through the pre-drilled holes on the bottom of the device to secure it to the control cabinet's back panel, ensuring the mounting surface is level.

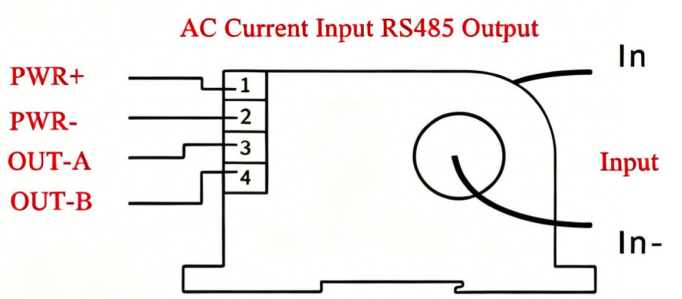
2. Grounding Requirements
The transmitter's power ground (GND) must be reliably connected to the control cabinet's protective ground, with a ground resistance ≤4Ω, to eliminate ground potential difference interference.
The shield of the output signal shielded cable must be grounded at one end only (grounded only on the rear side of the control cabinet near the

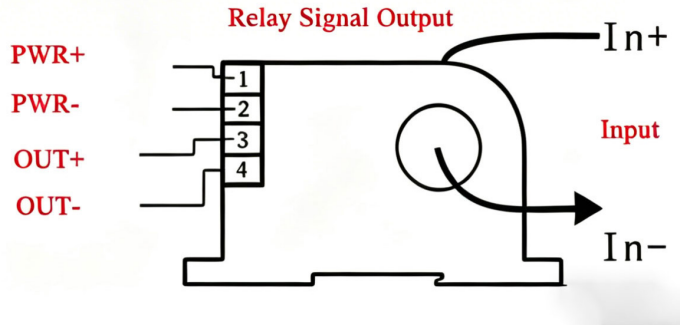












2. Comparison of Common Wiring Practices: Correct vs. Incorrect

☒ Correct: Power supply positive and negative terminals are clearly distinguished; the shielding wire is grounded at one end; cables are not crossed or exposed; terminal screws are tightened securely with no looseness.

☒ Error 1: Reversed power polarity (24V and GND connected in reverse). Although the device has built-in reverse polarity protection, prolonged reverse connection will shorten its lifespan; strict polarity distinction is required.

☒ Error 2: Using unshielded cables for the output signal, or grounding both ends of the shielded cable simultaneously, resulting in signal interference and significant data fluctuations.

☒ Error 3: Excessive load on the output circuit (total impedance of downstream equipment > 500Ω), exceeding the transmitter's load capacity and resulting in a low output signal.

☒ Error 4: When the main circuit wires pass through the transmitter, they are not centered or are exposed, causing measurement errors or safety hazards.

6.4 Power-On Debugging Procedure

1. No-Load Test

After confirming that all wiring is correct, do not connect the power supply to the main circuit under test; instead, apply only a 24 V DC power supply to the transmitter.

Use a multimeter set to the DC voltage range to measure the voltage at the transmitter's power terminals. Verify that the voltage is within the range of 18 V to 30 V DC to confirm normal power supply.

Connect a multimeter in series with the output circuit using the DC current setting. With no current in the measured circuit, the transmitter's output should be approximately 4 mA (error ≤ ±0.1 mA), confirming that the no-load signal is normal.

2. Signal Calibration

Turn on the power to the main circuit under test to bring the equipment into normal operating condition. Read the current signal output by the transmitter and compare it with the display value on the downstream PLC or instrument.

When the current in the measured circuit is at full scale (e.g., AC 50 A), the transmitter output should be 20 mA (error ≤ ±0.1 mA); at half scale (AC 25 A), the output should be 12 mA, with a linearity error of ≤ ±0.2% FS.

If the signal deviation is excessive, check for loose connections or incorrect shield grounding, or recalibrate the device (some models support zero/span adjustment; follow the manual).

3. Indicator Status Assessment

This JXK-10-N model does not have a dedicated PWR/ALM indicator; assess its status as follows:

Power Supply Normal: The multimeter measures a normal voltage between the output terminals; the no-load output is stable at 4 mA with no significant fluctuations.

Abnormal Operation: If the output signal remains constant at 4 mA (even when there is current in the measured circuit), it may be due to the test leads not being inserted into the terminals or a transmitter malfunction; if the output signal remains constant at 20 mA, it may be due to a short circuit in the load or an internal transmitter fault; power must be disconnected for inspection.

4. Calibration Methods

Zero Calibration: Disconnect the current from the main circuit under test, and adjust the transmitter's zero potentiometer (if present) to stabilize the output current at 4.00 mA ± 0.05 mA.

Full-scale calibration: Ensure the current in the measured circuit reaches full scale, then adjust the transmitter's full-scale potentiometer (if available) until the output current stabilizes at 20.00 mA ± 0.05 mA.

Linearity verification: Test the output signal at 25%, 50%, and 75% of the full scale. The deviation must be ≤ ±0.5% FS to ensure linearity meets specifications.

6.5 Installation Precautions

---Never exceed the rated supply voltage: The transmitter is rated for a DC 24 V supply with an allowable voltage range of DC 18 V to 30 V. Never connect it to AC 220 V or DC 36 V or higher, as this will immediately destroy the device.

---Avoid Strong Electromagnetic Interference: The transmitter must be installed away from sources of strong electromagnetic interference, such as variable frequency drives, contactors, and power cables, at a minimum distance of ≥30 cm. Output signal cables must be routed separately from power cables, with a minimum spacing of ≥15 cm.

---Protection against humid environments: Never install the transmitter in environments with condensation or standing water. If use in high-humidity environments is necessary, install a sealed waterproof enclosure or select a custom model with an IP65 or higher protection rating.

---Strictly Prohibit Overload Surges: If the current in the measured circuit consistently exceeds 1.5 times the transmitter's rated range, it may cause accuracy drift or damage to the device. Select a model based on the principle of allowing for a safety margin.

---Strictly Prohibit Live Wiring/Disassembly: All circuit power must be disconnected before performing any wiring or disassembly operations to prevent electric shock or equipment damage due to short circuits.

VII: Recommendations for Daily Use and Maintenance

7.1 Key Points for Routine Inspections

1. Inspection of Equipment Appearance and Operating Status

Check that the blue housing is free of damage, deformation, or accumulated dust and oil; ensure the terminal area shows no signs of oxidation or corrosion; and verify that label information is clear and legible.

This model does not have independent PWR/ALM indicator lights; operating status must be determined indirectly via signal data from the backend PLC or instrument. Observe whether the output signal remains stable within the normal range (e.g., ensure the 4–20 mA signal does not exhibit sustained low or high readings, or fluctuations).

Confirm that the transmitter is securely installed, with no looseness in the rail clips, and no risk of displacement or terminal disconnection due to vibration.

2. Signal Stability Monitoring

Daily, review the current waveforms from the downstream data acquisition equipment to confirm that the signal shows no abnormal fluctuations, glitches, or disconnections; the fluctuation range must be ≤±0.5% FS.

Compare the transmitter output value with the actual field measurement (e.g., clamp meter reading) for the same circuit; the deviation must be within ±0.5% FS, with no sustained drift.

Inspect signal cables for damage or compression, and ensure the shielding layer is intact to prevent signal interference or transmission interruptions caused by cable issues.

3. Environmental Temperature and Humidity Monitoring

Confirm that the installation environment temperature is within the range of -10°C to +60°C, with no localized overheating (e.g., near inverters or heaters) or sudden temperature fluctuations, to prevent accuracy drift caused by high temperatures or abnormal equipment startup caused by low temperatures.

Ensure that the humidity inside the control cabinet is ≤90% RH, with no condensation or standing water, and no signs of moisture in the terminal area, to prevent short circuits or reduced insulation.
Ensure that the control cabinet is well-ventilated and that dust accumulation does not block heat dissipation channels, to prevent the equipment from operating for extended periods in a sealed, high-temperature environment.

7.2. Regular Maintenance Schedule
1. Equipment Cleaning Frequency and Methods
Standard industrial environments: Clean once every 3 months. Use a dry, soft-bristled brush or compressed air (pressure ≤ 0.3 MPa) to remove dust and oil residue from the housing surface and terminal areas. Do not rinse the equipment directly with water.
High-dust / Metallurgical / Chemical Environments: Clean once every month, focusing on removing dust buildup in terminal gaps and perforated areas to prevent compromised insulation performance.
Disconnect the transmitter's power supply before cleaning. Cleaning while the device is energized is strictly prohibited to prevent electric shock or equipment short circuits.
2. Terminal Tightness Inspection
Conduct a tightening inspection of all terminal connections every 6 months. Use a screwdriver to tighten terminal screws to the standard torque to prevent loose connections caused by vibration, which could lead to unstable signals or equipment damage.
Inspect the ferrules and terminals of power and signal cables for oxidation or discoloration. If oxidation is found, replace the terminals and re-crimp them promptly to prevent increased contact resistance from affecting power supply and signal transmission.
Verify that the shielding of shielded cables is reliably grounded, with no loose connections at the grounding point and no risk of ground loops.
3. Recommendations for Accuracy Retesting
Conduct an annual accuracy retest using a standard current source or a high-precision clamp-on ammeter. Test the transmitter's output signal at five range points: 0%, 25%, 50%, 75%, and 100%. The deviation must be ≤±0.5% FS.
If the deviation exceeds this range, calibrate the transmitter using its zero/full-scale adjustment potentiometers (if available). Retest after calibration to ensure that linearity and accuracy meet specifications.
If the deviation continues to increase after calibration, investigate whether the device has been damaged due to overload surges, environmental corrosion, or component aging, and replace the device promptly.

7.3 Long-Term Maintenance Tips
1. Optimizing Dust and Moisture Protection
When installing in high-dust environments, a transparent dust cover (with ventilation holes) can be fitted over the transmitter to reduce dust accumulation; dust-proof terminal covers can be installed over the terminal area to prevent dust and moisture from entering.
In humid or condensation-prone environments, install a dehumidifier or desiccant inside the control cabinet to maintain a dry environment; alternatively, choose a custom transmitter with an IP65 or higher protection rating, or install a waterproof enclosure around the equipment.
Avoid installing the transmitter near air conditioning vents, pipe connections, or other locations prone to condensation to prevent moisture from coming into direct contact with the equipment housing and terminals.
2. Measures to Optimize Interference Resistance
Shielded twisted-pair cables (e.g., RVVP 2×1.0mm²) must be used for signal transmission. The shielding layer should be grounded at only one end (on the receiving device side), while the transmitter side should remain floating to prevent ground loops.
Signal cables must be routed separately from power cables and inverter cables, maintaining a minimum distance of 15 cm. When crossing, use a perpendicular crossing method to reduce electromagnetic coupling interference; if parallel routing is necessary, maintain a minimum distance of 30 cm.
If on-site interference is severe, install a power filter at the transmitter's power input or a signal isolator in the output signal loop to further suppress interference and stabilize the output signal.
3. Protection Against Extreme Environments
High-Temperature Environments: Prioritize wide-temperature transmitters (-40°C to +85°C). Install cooling fans or air conditioning in the control cabinet to prevent the equipment from operating continuously in environments above 60°C, thereby preventing accelerated component aging.
Low-Temperature Environments: In environments below -10°C, install a temperature-controlled heating device to prevent startup failures and accuracy drift caused by low temperatures; simultaneously ensure that cable materials are low-temperature resistant to prevent cable hardening and cracking.
Highly Corrosive / Chemical Environments: Select custom transmitters with corrosion-resistant housing materials, or install corrosion-resistant sealed enclosures around the equipment. Regularly inspect the housing and terminals for corrosion, and replace them promptly if issues are detected.

VIII: Troubleshooting & Emergency Procedures
8.1 List of Common Faults
No Output Signal: After powering on the transmitter, no signal data is received by the downstream PLC or instrument, and a multimeter reading shows an output of 0 mA.
Signal Drift: The output current value slowly deviates from the normal range (e.g., a value that has been stable at 4 mA for a long time suddenly changes to 4.5 mA, or fluctuates irregularly over time).
Abnormal Indicator Lights:
Models with PWR/ALM indicators: The power indicator is off, and the alarm indicator is constantly on or flashing.
Models without indicators: A multimeter test confirms normal power supply but abnormal signal, indicating a status anomaly.
Alarm Triggered: The device enters an alarm state, and the output signal locks (e.g., locked at 4 mA or 20 mA), unable to follow actual current changes.
Interference and Distortion: The output signal fluctuates violently, exhibiting obvious glitches, sawtooth waveforms, or severe data jumps (e.g., jumping from 50A to 30A).
Reverse Polarity / Overvoltage Protection Triggered: The power supply positive and negative terminals are reversed, or the device is accidentally connected to high voltage; the device fails to start, with no obvious burn marks on the housing but complete functional failure.

8.2 Analysis of Fault Causes
Wiring Errors: Reversed polarity of the power supply (24V and GND), reversed signal output terminals (Io+/Io-), shielding wire not grounded at a single point, input wires not routed through the center hole, or loose connections.
Power Supply Abnormalities: DC 24V supply voltage too low (<18V) or too high (>30V); power cable gauge too thin causing excessive voltage drop; power module failure; poor contact in the power supply circuit.
Signal Overload / Out-of-Range: Measured current consistently far exceeds the transmitter's rated range; output load resistance is too high (>500Ω), causing the signal to be insufficient; poor contact between input wires and the mounting holes.
Environmental Interference: Proximity to strong electromagnetic interference sources such as variable frequency drives or contactors; signal cables routed in the same conduit or parallel to power cables; ambient temperature and humidity exceeding the operating range (>60°C or condensation).
Physical Damage: Long-term overload operation causing internal component aging; lightning strikes or surges damaging internal isolation circuits; mechanical impact causing internal components to become loose; corrosive environments leading to circuit board corrosion.

8.3 Step-by-Step Troubleshooting
1. Symptom: No output signal
Troubleshooting steps:
With the power off, check the wiring: Verify the terminal definitions and confirm that the 24V terminal is connected to the positive terminal, the GND terminal is connected to the negative terminal, and the Io+/Io- terminals are connected correctly.
Measure Supply Voltage: After powering on, use a multimeter to measure the voltage between the GND and 24V terminals; the voltage should be between 18V and 30V to rule out a power supply failure.
Check Input Hole: Ensure the test wire is centered and passes through the center hole; failure to do so will result in no signal.
Remedial Actions:
Reconnect the positive and negative terminals and tighten any loose terminals; ensure the wire passes through the center hole; replace the

faulty power supply module.
Emergency Workaround:
Temporarily replace the unit with a spare transmitter of the same specifications and send the faulty device for repair; if no spare is available, temporarily use a parallel circuit to shunt the load (requires operation by a licensed electrician).
2. Symptom: Signal Drift
Troubleshooting Steps:
Compare environmental data: Check whether the on-site temperature has risen or fallen sharply, and whether humidity levels are out of range.
Check cable connections: Gently shake the signal cables and observe whether the output changes with the movement to check for loose connections.
Retest accuracy: Use a standard source to test at 0%, 50%, and 100% of the full scale range to determine whether the drift originates from the device or an external source.
Remedial Actions:
Improve environmental cooling / dehumidification; re-crimp signal cables; perform zero-point / full-scale calibration on the device; clean oxidation from terminals.
Emergency Workaround:
Temporarily replace the transmitter on circuits with severe drift, prioritizing the operation of core equipment; return the drifting device to the factory for repair.
3. Fault Symptom: Abnormal Indicator Lights
Troubleshooting Steps:
Power indicator light is off: First, measure whether the supply voltage is normal; check the power circuit.
Alarm light remains on: Check for out-of-range operation or a short circuit in the load.
No indicator light or abnormal indicator light: Follow the “No Output / Signal Abnormal” procedure to troubleshoot power supply and signal issues.
Remedial Actions:
Restore normal power supply; adjust the measured current to within the range; replace the short-circuited load; resolve poor contact issues at the terminals.
Emergency Workaround:
Replace the power supply module; limit the loop current to stay within the range; replace the faulty load equipment.
4. Fault Symptom: Alarm Triggered
Troubleshooting Steps:
Confirm if out of range: Measure the actual current to verify if it exceeds the transmitter’s upper limit.
Troubleshoot load faults: Measure the output circuit load to confirm if there is a short circuit or overload.
Check device model: Confirm if a non-alarm-type device was selected by mistake.
Remedial Actions:
Replace the transmitter with one having a higher current range; repair the short-circuited load; replace the transmitter with one matching the range.
Emergency Workarounds:
Temporarily install a current-limiting device in series to restrict current; replace with a spare transmitter with a matching range.
5. Fault Symptom: Interference-induced Distortion
Troubleshooting Steps:
Check Wiring: Verify that signal cables are not running parallel to or in the same conduit as power cables, and that the separation distance is ≥15 cm.
Check Shield Grounding: Confirm that the shield is grounded at one end only (connected to the PLC side) and not grounded at both ends.
Interference Source Identification: Turn off nearby inverters / contactors and observe whether the signal recovers.
Remedial Actions:
Reroute wiring to separate high-voltage power lines from signal lines; ensure proper single-ended shield grounding; install a filter at the power supply end.
Temporary Workarounds:
Temporarily replace unshielded cables with shielded cables; install a signal isolator in the signal loop; relocate the source of interference.
6. Fault Symptom: Reverse Polarity / Overvoltage Protection Triggered
Troubleshooting Steps:
Measure terminals after powering down: Verify whether the power supply positive and negative terminals are reversed or if high voltage is present.
Visual Inspection: Check for obvious damage such as scorching or unusual odors.
Remedial Actions:
Correct the wiring polarity; replace the high-voltage power supply with a 24 VDC unit; replace damaged equipment immediately.
Temporary Workarounds:
Replace with a spare transmitter; install a fuse and reverse polarity protection module at the power supply end to prevent further damage.

8.4. After-Sales Service Request Guidelines
1. Criteria for Determining Malfunctions (Conditions for Requesting Service)
If any of the following conditions occur, it is determined to be a device malfunction, and you must contact after-sales service:
After checking the wiring, power supply, and environment, there is still no signal output or the signal is abnormal, and the device shows obvious physical damage (burn marks, deformation).
If, within the calibration cycle (1 year), the accuracy re-test deviation exceeds ±1.0% FS and cannot be corrected through on-site calibration.
If the transmitter suddenly triggers an alarm under normal operating conditions and the alarm cannot be cleared, or if internal components show signs of aging or corrosion.
If the device fails to function due to non-human factors (such as lightning strikes or accidental high-voltage connection) while still under warranty.
2. Repair Process (Standard Steps)
Prepare repair documentation: Record the device model (e.g., JXK-10-N), serial number (factory label), fault symptoms, and on-site environment (temperature, humidity, and sources of interference).
Contact After-Sales Support: Submit a repair request via the official phone number, WeChat, or email, providing a clear description of the fault and supporting photos.
Initial After-Sales Inspection: After-sales personnel will provide remote guidance for a final troubleshooting check (e.g., voltage measurement, wiring verification) to confirm the cause of the fault.
Shipping / On-site Repair:
Within Warranty Period: Free replacement/repair; the user is responsible for return shipping costs.
Outside Warranty Period: A repair quote will be provided; the user must confirm before shipping the unit for repair.
Major Malfunctions: After-sales staff will arrange an on-site inspection (advance appointment required).
3. Warranty Coverage and Duration
Warranty Period: 12 months from the date of manufacture (as indicated on the product label).
Warranty Coverage: Component failures not caused by human error, accuracy drift, and normal wear and tear of the housing (excluding damage from impact).
Exclusions:
Damage caused by incorrect high-voltage connections (e.g., AC 220V) or reverse polarity.
Deterioration resulting from operation at over 1.5 times the rated current.
Damage caused by force majeure, such as lightning strikes, floods, or fires.
Failures resulting from unauthorized disassembly or modification of the equipment.
4. Contact Information (Example)
Official After-Sales Service Hotline: 19715617532
After-Sales WeChat Customer Service: Qidian-Auto (Note: JXK Transmitter Repair Request)
Technical Support Email: sales008@qd-zdk.com
Information Required for Repair Requests: Equipment model, serial number, photos of the malfunction, and photos of the on-site wiring