JXK-14 Current Transducer

I. Product Definition

The Qidian JXK-14 is a through-hole AC current measurement and transmission module based on the Hall effect principle and designed specifically for industrial automation applications. It also serves as an "industrial-grade signal bridge" capable of isolated current acquisition and standardized signal conversion.

Based on the product images and industry-standard specifications, its core functions and features are as follows:

1. Current Acquisition and Transmission: Supports AC 0–50 A current signal input. Through internal Hall effect sensors and signal processing circuits, it converts non-standard high-voltage current signals into the DC 4–20 mA standard current signals commonly used in industrial control systems, thereby achieving safe isolation and signal adaptation between "high-voltage" and "low-voltage" circuits.
2. Electrical Isolation Protection: The input (high-voltage circuit) and output (control system circuit) are electrically isolated, effectively blocking high-voltage crosstalk and electromagnetic interference from impacting downstream devices such as PLCs and DCS systems, ensuring the safe and stable operation of the control system.
3. Suitable for Industrial Environments: Featuring a blue insulated housing and DIN rail mounting design, it is suitable for compact industrial environments such as power distribution cabinets and PLC control cabinets; powered by 24 V DC (industrial standard power supply), it can be directly connected to the automation system's power circuit without the need for additional custom power modules.
4. Standardized Output Compatibility: The 4–20 mA signal is a universal analog standard in industrial automation, allowing direct connection to PLCs, data acquisition modules, industrial instruments, and host monitoring systems without the need for additional signal conversion equipment.
5. Zero Insertion Loss Design: Utilizing a through-hole measurement structure, the wire under test passes directly through the transmitter's sampling port. This eliminates the need to interrupt the original circuit, ensuring the main circuit continues to function normally, and simplifies installation and maintenance.

II. Working Principle

The core working principle of the JXK-14 is based on the open-loop Hall effect. In simple terms, this involves "converting invisible current into an electrical signal that the control system can interpret." The entire process consists of four key steps:

1. Current Generates a Magnetic Field: When the measured AC current passes through the transmitter's sampling aperture, it generates an alternating magnetic field around the conductor that is proportional to the current's magnitude. This magnetic field is concentrated by the high-permeability magnetic core inside the transmitter.
2. Hall element detects the magnetic field: A Hall element is positioned in the air gap of the core. When the alternating magnetic field passes through the Hall element, a weak voltage signal (Hall voltage) proportional to the magnetic field strength—that is, the magnitude of the measured current—is generated across the element.
3. Signal amplification and processing: The weak Hall voltage is amplified, shaped, and temperature-compensated by an internal operational amplifier and filter circuit, eliminating the effects of interference signals and temperature drift to produce a stable current-to-signal conversion.
4. Conversion to Standard Signal Output: The processed signal is further converted into an industrial-standard 4–20 mA DC current signal output. When the measured current is 0 A, the output is 4 mA; when the measured current reaches the full-scale value of 50 A, the output is 20 mA. This linear relationship allows the signal to be directly recognized and acquired by control systems.

III. Core Values and Solutions to Pain Points

1. Solving the Problem of "Current Signals Cannot Be Directly Connected to Control Systems"

Q: Why can't high-voltage AC current from the field be directly connected to a PLC or control system?

A: AC current in industrial environments is a high-voltage signal, whereas the analog input modules of control systems such as PLCs and DCSs can only accept low-voltage, standard low-voltage signals (such as 4–20 mA). Directly connecting high-voltage current can burn out control modules and even cause safety incidents. The core value of the JXK-14 lies in its isolation and transmission capabilities, which convert high-voltage current into safe, standard low-voltage signals, allowing the control system to safely and directly acquire current data.

2. Addressing the Issues of "Data Lag and High Errors in Manual Meter Reading"

Q: Why does manual meter reading of current data fail to meet the needs of modern industry?

A: Manual meter reading suffers from data lag, high error rates, and the inability to provide real-time monitoring, making it impossible to promptly detect potential hazards such as equipment overloads or aging circuits. The JXK-14 enables real-time online collection and transmission of current data, which can be directly integrated into a host monitoring system. This facilitates 24/7 uninterrupted monitoring, provides early warnings of potential faults, and prevents production accidents caused by delayed data.

3. Addressing the Issue of "No Isolation Between High-Voltage Circuits and Control Systems, Resulting in Poor Interference Resistance"

Q: What risks are associated with connecting unisolated current signals to a control system?

A: Electromagnetic interference and surge voltages from high-voltage circuits can easily couple into the control system, causing PLC malfunctions, data fluctuations, or even equipment burnout. The JXK-14 features an electrically isolated design, with insulation between the input and output terminals. It offers a power frequency withstand voltage of over 3 kVAC, effectively blocking interference signals and enhancing the stability and reliability of the control system.

4. Solving the problem of "complex installation and maintenance requiring disconnection of the main circuit"

Q: Why is installation of traditional current transformers or detection modules so cumbersome?

A: Traditional solutions often require disconnecting the measured conductor to connect the device, leading to production interruptions and high maintenance costs. The JXK-14 features a through-hole design with no insertion loss; the measured conductor simply passes through the sampling hole to complete installation. There is no need to disconnect the circuit, making installation convenient and ensuring the main circuit continues to operate normally. This makes it particularly suitable for retrofit projects and maintenance scenarios where production must continue.

5. Solving the Problem of "Incompatible Signals and Lack of Cross-Device Compatibility"

Q: Why are many field current signals incompatible with PLCs or instruments from different brands?

A: Control devices from different brands have varying requirements for input signal types and ranges. Non-standard signals require additional conversion modules, increasing costs and introducing potential failure points. The 4–20 mA signal output by the JXK-14 is a universal standard in industrial automation. Virtually all PLCs, data acquisition modules, and industrial instruments support this signal type, eliminating the need for additional adapters. Its strong compatibility reduces system integration complexity.

6. Solving the Problem of "Inaccurate Measurements and Data Distortion Caused by Temperature Drift"

Q: Why do many current measurement devices produce inaccurate data in industrial environments with significant temperature fluctuations?

A: Conventional Hall effect sensors are highly susceptible to temperature fluctuations, which cause output signal drift and compromise measurement accuracy. The JXK-14 features a built-in temperature compensation circuit that effectively offsets errors caused by temperature changes. This ensures measurement accuracy remains stable within 0.5% FS across industrial environments ranging from -20°C to 60°C, delivering reliable and accurate data that provides precise insights for energy consumption tracking and equipment protection.

IV. Key Product Parameters & Specifications

4.1 Basic Electrical Parameters

Product Model JXK-14 (Blue-Housed Through-Hole Hall-Effect AC Current Transmitter)

Input Signal Type AC Current (AC)

Input Range AC 0–50 A (Through-hole type, single-loop measurement)

Output Signal Type Direct Current (DC)

Output Range DC 4–20 mA (corresponding to an input of 0–50 A, linearly proportional output)
Output Load Capacity 0–500 Ω (standard load range for 4–20 mA signals)
Measurement Accuracy ±0.5% FS (Full-scale linear error)
Linearity error ≤0.2% FS
Repeatability error ≤0.1% FS
Frequency response 20–400 Hz (Suitable for power frequency and general industrial AC applications)
Ripple and noise ≤10 mVpp
Output update time ≤100 ms

4.2 Isolation Performance Parameters
Input-to-Output Isolation Withstand Voltage ≥3000 V AC / 1 min (Power frequency withstand voltage, no breakdown or flashover)
Input-to-Power Supply Isolation Withstand Voltage ≥2500 V AC / 1 min
Output-to-Power Supply Isolation Withstand Voltage ≥1500 V AC / 1 min
Insulation Resistance ≥100 MΩ @ 500 V DC
Isolation Method Electromagnetic isolation (dual isolation via Hall effect sensors and insulated housing)
Immunity Rating Complies with GB/T 17626 industrial electromagnetic compatibility standard; withstands ±2 kV surge interference

4.3 Power Supply & Power Consumption Parameters
Supply Voltage DC 24V (industrial standard supply, allowable fluctuation range: DC 18–30V)
Power Supply Method Two-wire / three-wire compatible (dual-mode: powered by 4–20mA output loop + independent power supply)
Full-Load Power Consumption ≤1.5W (Maximum power consumption when outputting 20mA under 24V DC supply)
No-Load Power Consumption ≤0.8W (Standby power consumption with no load)
Power Distribution Output No dedicated power distribution output terminals; power is supplied directly from the 24V DC power circuit
Reverse Polarity Protection Built-in reverse polarity protection circuit to prevent device damage caused by reversed polarity

4.4 Environmental Specifications
Operating Temperature -20°C to +60°C
Storage Temperature -40°C to +85°C
Operating Humidity 10% to 90% RH (non-condensing)
Storage Humidity 5% to 95% RH (non-condensing)
Protection Rating IP30 (dust-protected enclosure design, prevents ingress of solid foreign objects ≥2.5 mm in diameter)
Explosion-proof rating Non-explosion-proof (For explosion-hazardous environments, must be used with intrinsically safe barriers; compatible models include Zener-type or isolated intrinsically safe barriers; selection must be based on the on-site explosion-hazard zone classification)
Installation environment Installation inside indoor distribution cabinets or PLC control cabinets; free from corrosive gases and strong electromagnetic interference

4.5. Physical Specifications
Mounting Method Standard 35mm DIN rail mounting (snap-on mounting, compatible with standard industrial control cabinet rails)
Housing Color Body: Blue; Terminal block: Green; Snap-fit positions: Red
Housing Material Flame-retardant ABS engineering plastic (insulating, weather-resistant, impact-resistant; flame-retardant rating: UL94-V0)
Dimensions Approx. 100 mm (L) × 70 mm (W) × 45 mm (H) (excluding protruding parts of the terminal block; total width of terminal block: approx. 90 mm)
Sampling Hole Diameter Approx. 12mm (for wires with a diameter ≤10mm)
Terminal Definitions Pin 9: IOUT+ (Current Output Positive); Pin 7: IOUT- (Current Output Negative); Pins 12/8: DC24V Power Supply Positive; Pins 11/10: DC24V Power Supply Negative / GND
Indicator Lights This model does not have a dedicated power or alarm indicator; operating status must be monitored via output signals or external circuits
Product Weight Approx. 120g (including terminal block, excluding rail clips)
Pin Definitions Pin 9: IOUT+ (Current Output Positive); Pin 7: IOUT- (Current Output Negative); Pins 12/8: DC24V Power Supply Positive; Pins 11/10: DC24V Power Supply Negative / GND
Indicators This model does not have a dedicated power or alarm indicator; operating status must be monitored via output signals or an external circuit
Product Weight Approx. 120g (including terminal block, excluding DIN rail clips)
Protection Details The housing features a one-piece molded design; the terminal block includes a screw-fastened anti-loosening mechanism to prevent loose connections; the edges of the sampling holes are rounded to prevent scratching the insulation of the tested wires

V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type Matching
First, confirm that the signal being measured on-site is AC current. The Qidian JXK-14 is a Hall-effect AC current transmitter, suitable only for AC current acquisition. It cannot be used for measuring other electrical quantities such as DC current, voltage, or power. Its output is a standard 4–20 mA DC analog signal, which must match the signal type of the downstream PLC, data acquisition module, or instrument.
2. Confirming the Number of Channels
The JXK-14 features a single-channel design with a 1-in-1-out configuration, meaning one AC current input and one standard current signal output. It is suitable for single-loop current monitoring scenarios. If simultaneous acquisition of multiple current signals is required, a multi-channel transmitter or a combination of multiple JXK-14 units must be selected.
3. Power Supply Compatibility
This product uses an industrial standard 24 V DC power supply with an allowable voltage fluctuation range of 18–30 V. When selecting the model, ensure the control cabinet has a stable 24 V DC power source. Direct 220 V AC power supply is not supported. No external power distribution is required. When wiring, pay attention to the positive and negative terminals to avoid reverse connection.
4. Determining Explosion-Proof Requirements
The JXK-14 model with a blue housing is a standard industrial non-explosion-proof type. It does not have explosion-proof certification and is only suitable for general-purpose, non-hazardous environments. It must not be used directly in flammable or explosive atmospheres, dusty environments, or high-risk chemical settings; it must be paired with an intrinsically safe barrier or a dedicated explosion-proof model must be selected.
5. Installation Environment Compatibility
The product uses a standard 35mm DIN rail for mounting. The housing is made of flame-retardant ABS material with an IP30 protection rating and is only suitable for installation inside indoor control cabinets or distribution panels. When selecting a model, ensure there is sufficient installation space and that the environment is free from strong corrosive gases, severe condensation, and excessive electromagnetic interference.

5.2. Recommended Selection for Industry Applications
1. Chemical Industry Applications
In non-explosion-proof areas of the chemical industry, such as standard workshops, power distribution monitoring, and pump operating current monitoring, the Qidian JXK-14 Hall-effect AC current transmitter can be selected to achieve isolated data acquisition and real-time monitoring of currents from motors, fans, and conveying equipment, thereby meeting the requirements for stable operation of chemical automation systems. However, this model is not recommended for hazardous areas such as explosion-proof reactors or hazardous chemical storage facilities; in such cases, a dedicated explosion-proof transmitter must be used.
2. Power Industry Applications
In the power industry, for low-voltage power distribution circuits, current monitoring in distribution panels, and operational monitoring of auxiliary equipment in small power stations, the JXK-14 can accurately acquire AC current signals and output a standard 4–20 mA signal for integration into power monitoring systems. Its high isolation performance effectively resists grid harmonics and electromagnetic interference, making it suitable for power operation and maintenance as well as energy consumption monitoring.
3. Metallurgy Industry Applications
For current monitoring of auxiliary fans, water pumps, dust removal

equipment, and similar applications in the metallurgy industry—where environmental interference is strong but there is no risk of flammability or explosiveness—the JXK-14 is a suitable choice. Its stable measurement accuracy and electrical isolation capabilities allow it to adapt to the complex electromagnetic environments of metallurgical sites, ensuring reliable collection of equipment operating currents. For workstations with high temperatures and strong radiation, an additional protective enclosure must be installed.

4. Pharmaceutical Industry Applications

In pharmaceutical cleanrooms, air handling units, mixing equipment, and water treatment systems—where the environment is relatively clean and non-corrosive—the JXK-14 features an attractive, sleek blue housing and a space-saving DIN-rail mounting design. It meets the data acquisition, equipment protection, and energy consumption monitoring needs of automated pharmaceutical production lines.

5. Smart Manufacturing / Equipment Manufacturing Applications

In smart manufacturing scenarios such as automated production lines, CNC machine tools, robotic workstations, packaging equipment, and injection molding equipment, the JXK-14 enables rapid real-time monitoring of equipment operating current. This facilitates the identification of equipment load, no-load, and overload conditions. Compatible with PLC control systems, it enhances production line intelligence and fault prediction capabilities.

5.3 Common Selection Pitfalls

Pitfall 1: Ignoring Isolation Level Requirements

Some users focus solely on measurement functions while neglecting input/output electrical isolation, directly selecting products with low or no isolation. This can result in high-voltage current entering the control system and causing equipment damage. The JXK-14 features high-voltage isolation; when selecting a model, isolation parameters must be confirmed based on the on-site voltage level, and requirements must not be arbitrarily lowered.

Misconception 2: Selecting the Wrong Signal Range

If the actual on-site current exceeds the JXK-14's measurement range, or if the selected range is significantly larger than the actual current, measurement accuracy will be compromised, leading to data distortion and monitoring failure. Before selection, the maximum operating current of the circuit under test must be accurately calculated to ensure the product's range is appropriate.

Misconception 3: Neglecting Output Load Matching

Failure to calculate the input impedance of downstream PLCs, instruments, or data acquisition modules can cause the output load to exceed the transmitter's capacity, resulting in signal attenuation and data fluctuations. When selecting a model, verify that the load resistance falls within the product's permissible range to avoid operational issues caused by load mismatch.

Misconception 4: Selecting General-Purpose Models for Explosion-Hazardous Environments

In hazardous environments such as chemical, oil and gas, or dust explosion zones, directly using the standard non-explosion-proof JXK-14 model poses serious safety risks. The use of this product is strictly prohibited in such environments; specialized transmitters with explosion-proof certification must be selected and paired with safety barriers.

5.4 Customization Recommendations

1. Custom Signal Configuration

If the application requires non-4–20 mA outputs (e.g., 0–5 V, 0–10 V), special AC current ranges, or DC current measurement capabilities, the JXK-14's base architecture can be customized to meet non-standard data acquisition requirements.

2. Customization for Non-Standard Operating Conditions

For special operating conditions such as extreme high or low temperatures, high humidity, severe corrosion, or high protection ratings, the housing material, protection rating, and internal circuitry can be customized and upgraded to ensure the product is suitable for harsh environments.

3. Multi-Channel Integration Customization

For configurations such as 1-in-2-out, 2-in-2-out, or multi-channel integrated structures, multi-channel versions can be developed based on the JXK-14 to reduce installation space, simplify wiring, and enhance system integration.

4. Appearance and Interface Customization

Terminal interface types, lead-type outputs, different housing colors (other than the existing blue), and special dimensional configurations can be customized according to project requirements to meet the integrated design needs of complete equipment sets.

VI: Installation and Commissioning Guidelines

6.1 Pre-installation Preparation

1. Component Verification

After unpacking, verify that the product model is the JXK-14 blue-cased Hall-effect AC current transmitter. Inspect the exterior for damage or cracks and ensure the terminals are not deformed. Confirm that the main unit, DIN rail clips, and terminal screws are all present. Check that the measurement range and output signal match the project requirements.

2. Environmental Inspection

Confirm that the installation location is inside an indoor control cabinet or distribution panel, where the environment is dry, free of condensation, corrosive gases, and strong electromagnetic radiation sources; the ambient temperature is within the range of -20°C to +60°C; and the installation space provides sufficient room for DIN rail mounting and wiring. Avoid installing the unit in close proximity to high-interference equipment such as variable frequency drives or contactors.

3. Tool List

Prepare a Phillips screwdriver, wire strippers, a multimeter (current/voltage range), terminal blocks, DIN rail mounting brackets, and shielded cable; if calibration is required, additionally prepare a standard signal source or a standard ammeter.

4. Safety Precautions

Before installation, the main power supply and control circuit power must be disconnected; live wiring is strictly prohibited. Ensure the circuit under test poses no risk of high-voltage electric shock. Wiring personnel must have basic electrical training to prevent equipment damage caused by short circuits or reverse connections.

6.2 Standard Installation Steps

1. DIN Rail Mounting

Align the latches on the back of the JXK-14 with a standard 35mm DIN rail, press down, and push forward firmly to ensure the latches are fully engaged with no play. Install the unit in the upper-middle section of the control cabinet, away from areas exposed to direct airflow from cooling fans and areas prone to water accumulation or condensation.

2. Wiring Specifications

Power Terminals: Connect to a 24 V DC power supply. Strictly distinguish between positive and negative terminals; reverse connection is prohibited. Although the product includes reverse connection protection, prolonged reverse connection may still affect its service life.

Input Terminals: This product features a through-hole AC current input with no electrical input terminals. Simply thread the AC measurement wire through the center hole of the transmitter to form a loop (one wire in, one wire out); there is no need to cut the wire.

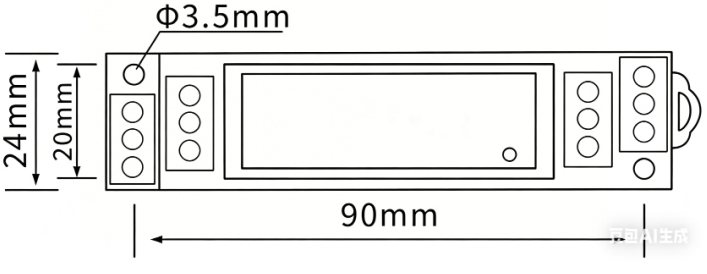
Output Terminals: The output is a standard 4–20 mA current signal. Connect it to the corresponding analog input terminals of a PLC, instrument, or data acquisition module according to the labeling. Distinguish between positive and negative terminals; do not short-circuit them to the power supply terminals.

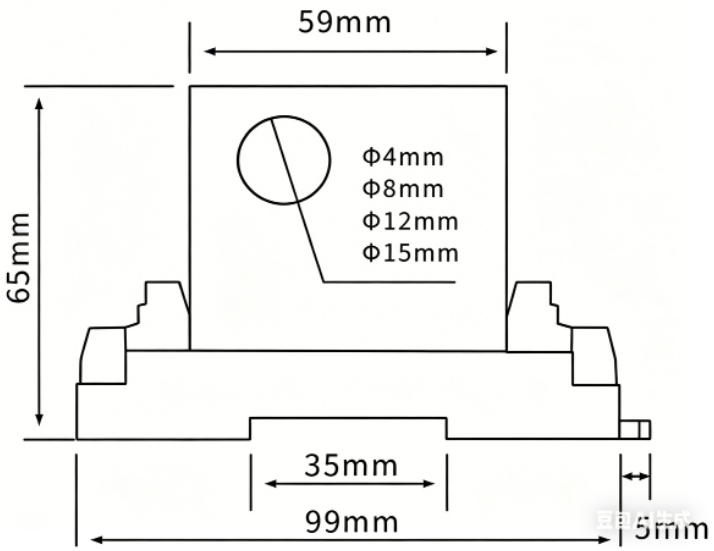
Shielded Cable: It is recommended to use shielded twisted-pair cable for transmission. Ground the shield at a single point to avoid loop current interference caused by multiple grounding points.

3. Grounding Requirements

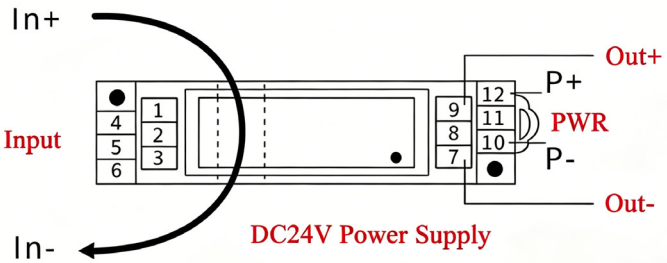
The transmitter housing does not require separate grounding. If the system has a common ground terminal, the negative terminal of the control loop may be connected to the system's protective ground at a single point. Mixing the grounding of high-voltage circuits with that of low-voltage signal circuits is strictly prohibited.

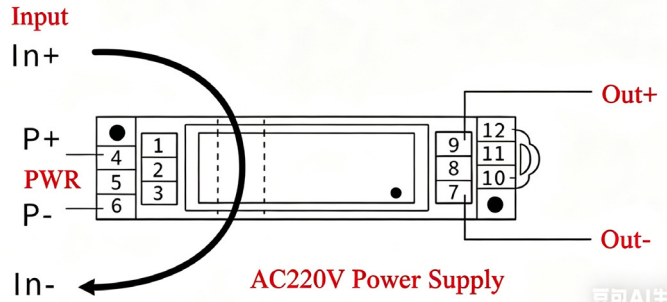
6.3, Wiring Diagram Notes



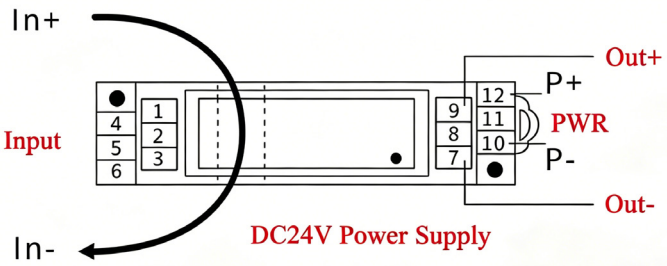


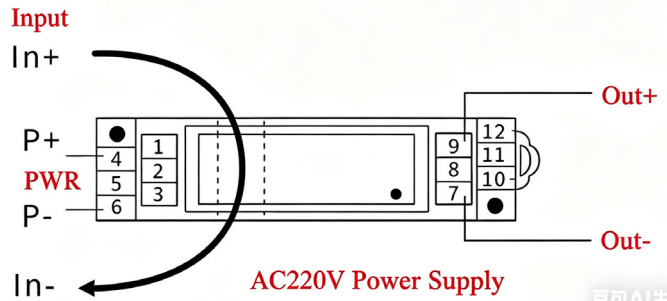
Analog Signal Output



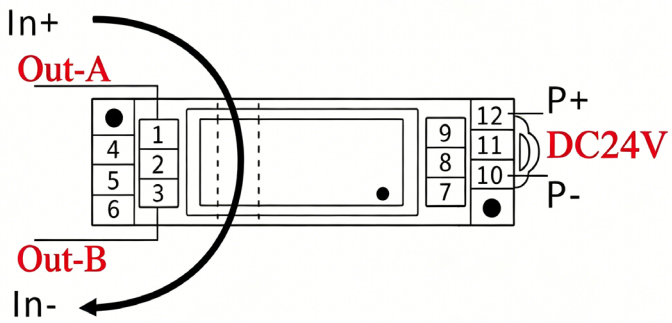


2-Wire Signal Output

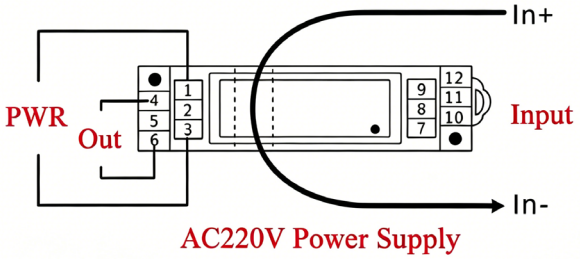


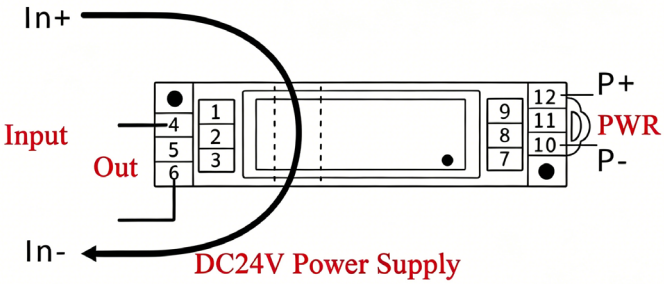


RS485 Output



Relay Signal Output





6.4 Power-On Testing Procedure

1. No-Load Test

Connect the DC 24V power supply and verify that there is no smoke, no unusual odors, and no overheating. Measure the output terminals with a multimeter; when there is no input current, the reading should be approximately 4 mA.

2. Signal Verification

Apply a known standard AC current and observe whether the output current corresponds linearly:

0 A input → Output approximately 4 mA

Full-scale current → Output approximately 20 mA

An error within ±0.5% FS is considered normal.

3. Indicator Status Assessment

The JXK-14 model with a blue housing does not have a power indicator or alarm indicator; its operational status is determined by the stability of the output signal.

4. Calibration Method

This product is factory-calibrated and generally requires no on-site adjustment. If any deviation occurs, return the unit to the manufacturer for calibration using professional equipment. Users are not permitted to open the unit and adjust it themselves.

6.5 Installation Precautions

--- Never exceed a DC supply voltage of 30V; overvoltage will directly burn out the internal circuitry.

--- Never short-circuit the output terminals to the power supply; this may damage the transmitter module.

--- Avoid running signal cables parallel to high-voltage power cables over long distances to prevent data fluctuations caused by electromagnetic interference.

--- Do not use directly in flammable or explosive environments; this product is not explosion-proof.

--- In damp, condensing, or outdoor environments, a protective enclosure must be installed; failure to do so may result in reduced insulation and equipment damage.
--- Do not arbitrarily disassemble the housing or damage the magnetic core; doing so will cause measurement failure and void the warranty.

7. Recommendations for Daily Use and Maintenance

7.1 Key Points for Routine Inspections

1. Observation of Equipment Indicator Lights and Operating Status

The JXK-14 model with a blue housing does not have a dedicated power or alarm indicator light. During inspections, focus on the data collected by the backend PLC or instrument: During normal operation, with no input current, the output should remain stable at 4 mA; with full-scale input current, the output should remain stable at 20 mA. There should be no frequent fluctuations or data loss. If data resets to zero, locks at a specific value, or fluctuates by more than ±10%, promptly investigate the device status and wiring.

2. Signal Stability Monitoring

Periodically review the transmitter output curve via the host computer or PLC backend to confirm that the signal shows no periodic fluctuations, abnormal spikes, or communication interruptions. Compare the current transformer readings on the same circuit with the converted values from the transmitter. If the deviation exceeds ±1% FS, record the issue and investigate the cause to prevent data distortion due to interference or equipment aging.

3. Monitoring of Installation Environment Temperature and Humidity

During routine inspections, simultaneously check the environment inside the control cabinet: the temperature must be maintained between -20°C and +60°C, avoiding high-temperature environments exceeding +60°C; humidity must be controlled below 90% RH, with no condensation or water accumulation. If condensation is severe or the temperature is excessively high inside the control cabinet, promptly activate cooling fans and dehumidification devices to prevent reduced equipment insulation or circuit damage.

7.2. Regular Maintenance Plan

1. Equipment Cleaning Frequency and Methods

It is recommended to perform cleaning and maintenance once every quarter. Use a dry, soft-bristled brush to gently remove dust from the transmitter housing and terminal blocks. Do not use damp cloths or organic solvents for wiping. If the site has high dust levels, shorten the cleaning cycle to once a month to prevent dust accumulation from causing poor terminal contact or obstructing heat dissipation.

2. Wiring Tightness Inspection

Conduct a tightening inspection of the power terminals and output signal terminals every six months: After powering down, use a screwdriver to tighten each terminal screw one by one to prevent loose or intermittent connections caused by vibration. Simultaneously, check that the shielding wire ground connection is secure, free of oxidation, and without breaks to prevent the introduction of interference signals.

3. Recommendations for Accuracy Verification

It is recommended to perform an annual accuracy verification using a standard signal source or standard ammeter. Input currents of 0 A, 25 A, and 50 A (full scale) respectively, and measure the corresponding output current values. A deviation within ±0.5% FS is considered normal. If the deviation exceeds this range, contact the manufacturer for calibration. Users are strictly prohibited from opening the unit to adjust internal components.

7.3 Long-Term Maintenance Tips

1. Dust and Moisture Protection

When installing the equipment inside a control cabinet, install dust covers or sealed baffles around the equipment to prevent dust and corrosive gases from coming into contact with it. In humid or condensation-prone environments, install additional dehumidification modules or moisture-proof cabinets. Wrap the terminal blocks on the enclosure with waterproof insulating sleeves to prevent moisture from entering the terminals and causing short circuits.

2. Interference Mitigation Measures

The power supply and output signal cables for transmitters should be routed separately from high-voltage power cables, maintaining a minimum distance of 30 cm. Use shielded twisted-pair cables, with the shield grounded at a single point on the control cabinet side to avoid loop current interference caused by multiple grounding points. Keep the equipment away from strong electromagnetic radiation sources such as variable frequency drives, contactors, and motors; install a metal shielding enclosure if necessary.

3. Protection Solutions for Extreme Environments

High-temperature environments: Install cooling fans or air conditioning inside the control cabinet to ensure the equipment's operating temperature does not exceed +60°C, thereby preventing prolonged high temperatures from accelerating the aging of electronic components.

Low-Temperature Environments: When the ambient temperature falls below -10°C, install heating modules inside the control cabinet to prevent internal circuits from malfunctioning due to low temperatures.

Highly Corrosive Environments: Replace the enclosure with a corrosion-resistant model or install a corrosion-resistant protective box. Regularly inspect the enclosure for corrosion or damage, and replace protective components promptly.

VIII: Troubleshooting & Emergency Response

8.1. List of Common Faults

No output signal: The downstream PLC/instrument cannot receive the 4–20 mA signal at all, or the signal remains at 0 mA

Signal Drift / Inaccuracy: Output value deviates significantly from actual current, or continuously shifts with changes in temperature or load

Interference, Distortion, or Jitter: Signal fluctuates frequently, exhibits spike noise, or values fluctuate erratically between high and low

Full-Scale Output (Fixed at 20 mA): Output remains at 20 mA even when no current is input; cannot return to zero

Fixed 4mA Output (Dead Zone): The input current changes, but the output remains at 4mA without variation

Note: This model has no independent indicator lights and does not have faults related to "indicator light abnormalities or alarm triggers"; all statuses are determined by the output signal.

8.2, Analysis of Fault Causes

Wiring errors: Reversed power supply polarity, reversed output terminals, shielding wire grounded at both ends, or mixed connection of high-voltage and low-voltage cables

Power supply abnormalities: Insufficient or excessive DC 24V supply voltage, excessive power supply ripple, or poor contact in the power supply circuit

Signal overload or out-of-range: Measured current exceeds the transmitter's 0–50 A range limit, or the output load resistance exceeds the permissible range

Environmental Interference: Installation in close proximity to strong interference sources such as inverters, contactors, or motors; signal lines laid parallel to power lines; on-site electromagnetic radiation exceeding standards

Equipment Damage: Failure of internal Hall effect sensors; burned-out circuit components; damaged terminal blocks; insulation breakdown caused by water ingress or condensation in the housing

8.3. Step-by-Step Troubleshooting

1. Fault: No output signal (no 4–20 mA output)

Troubleshooting Steps:

 Power off and check wiring: Verify that the DC 24 V power supply positive and negative terminals are connected correctly (terminals 12/8 are +, 11/10 are -), and that the output IOUT+ (terminal 9) and IOUT- (terminal 7) are not reversed or loose.

 Power On and Measure Supply: Use a multimeter to measure the voltage at the power supply terminals. Verify that the voltage is stable between 18–30 V DC with no voltage drop.

 Measure the output circuit: Disconnect the load and use the current range on a multimeter to directly measure the current at the transmitter's output terminals. If there is still no current, determine that the issue is a power supply failure or an internal circuit fault.

 Emergency workaround: If the device is damaged, temporarily replace it with a spare transmitter, or use manual meter reading for a short period to maintain data monitoring and avoid production downtime.

2. Fault: Signal Drift / Inaccurate Measurement

Troubleshooting Steps:

 Verify Range Matching: Ensure the measured current does not exceed the 0–50 A range. If the current consistently approaches full scale, replace the transmitter with a higher-capacity model.

 Check Ambient Temperature: Ensure the temperature inside the control

cabinet is within the range of -20°C to +60°C to prevent temperature drift caused by extreme temperatures.
③ Verification Accuracy: Measure the current under test using a standard ammeter and compare it with the transmitter's converted value. If the deviation exceeds ±0.5% FS, contact the manufacturer for calibration.
④ Optimize Wiring: Check whether the shielded cable is grounded at a single point to avoid data deviations caused by interference introduced by multiple grounding points.
3. Fault: Signal Interference/Distortion / Frequent Fluctuations
Troubleshooting Steps:
① Cable Rerouting: Route the transmitter signal cables separately from high-voltage power cables, maintaining a distance of ≥30 cm, and avoid bundling them together; replace with shielded twisted-pair cable, with the shield grounded at a single point on the control cabinet side only.
② Move Away from Interference Sources: Relocate the transmitter away from inverters, contactors, and high-frequency motors, or install a metal shielding enclosure.
③ Check Power Supply Quality: Verify that the DC24V power supply ripple is ≤100mVpp; install a power filter if necessary.
④ Tighten Terminals: After powering down, retighten all terminal connections to eliminate signal fluctuations caused by loose connections.
4. Fault: Full-scale output (fixed at 20 mA)
Troubleshooting steps:
① Verify the measured current: Use a clamp meter to measure the current in the circuit under test and confirm whether it exceeds the transmitter's upper range limit. If overloaded, troubleshoot the load equipment.
② Check the output circuit: Verify that there is no short circuit at the output terminals, that the load resistance is within the permissible range of 0–500 Ω, and that the load does not exceed the device's capacity.
③ Power cycle: Disconnect the power supply for 10 seconds, then reconnect it. Observe whether the signal returns to normal to rule out lockup caused by transient interference.
④ Determine device failure: If there is no overload and the power cycle is ineffective, the issue is determined to be internal circuit damage, and the device must be replaced.
5. Fault: Output remains fixed at 4 mA (no variation)
Troubleshooting steps:
① Check the input circuit: Verify that the test leads have been correctly threaded through the transmitter's sampling port and that there are no breaks or open circuits.
② Verify the output load: Confirm that the input impedance of the downstream PLC or instrument does not exceed the transmitter's load range and that the signal is not being pulled low.
③ Check the supply voltage: Confirm that the 24 V DC power supply is stable and that the transmitter is not malfunctioning due to undervoltage.
④ Determine if the device is faulty: If all of the above are normal, the fault is attributed to a failure of the Hall effect sensor or the signal processing circuit, and the device must be replaced.

8.4. After-Sales Repair Guidelines
1. Criteria for Determining a Malfunction
The following situations are classified as non-field issues and require a repair request:
The malfunction persists after following the troubleshooting steps above
The transmitter has no power supply damage or wiring errors, but there is no output at all or the output is abnormal
The accuracy deviation exceeds ±0.5% FS and cannot be corrected through on-site calibration
The housing shows no obvious damage, but the device is completely inoperative
2. Repair Process
Gather device information: Model JXK-14, product serial number, installation date, fault symptoms, and on-site troubleshooting records
Contact After-Sales Support: Submit a repair request via the official customer service hotline or email, providing a complete description of the fault and on-site photos
Initial Consultation: An after-sales engineer will assist with remote troubleshooting to determine if the issue can be resolved on-site
Repair or Replacement: If the issue is determined to be a device quality problem, proceed with repair or replacement according to the warranty process
3. Warranty Coverage
Warranty Period: 12 months from the date of purchase. Free repair or replacement for equipment failures caused by non-human factors under normal usage conditions
Exclusions: Damage caused by human wiring errors, overvoltage, water ingress and corrosion, violent disassembly, or use under non-specified operating conditions