JXK-17 Current Transducer

I. Product Definition

The Qidian JXK-17 is a closed-loop Hall-effect AC/DC current transmitter featuring a blue engineering plastic housing and a through-hole design. It supports three-terminal electrical isolation (full isolation of input, output, power supply, and housing) and is a high-precision current signal acquisition and isolation transmitter specifically designed for industrial applications.

Core Features:

1. Wide-range current measurement: Supports AC, DC, and pulsating current measurement. Rated input current ranges include 0–500 A, 0–1000 A, 0–1500 A, and 0–2000 A, with custom specifications available upon request.

2. Signal Isolation and Transmission: Achieves electrical isolation between high-voltage primary circuits and low-voltage secondary circuits, linearly converting high-current signals into standard industrial signal outputs. Common specifications include DC 4–20 mA, 0–10 V, 0–5 V, and 1–5 V, compatible with mainstream control systems such as PLCs, DCSs, and industrial PCs.

3. Three-Terminal Full Isolation Protection: Achieves complete electrical isolation between the input circuit, output circuit, power supply circuit, and the housing, effectively blocking ground loops and surge interference to meet anti-interference requirements in complex industrial electromagnetic environments.

4. Wide-Frequency Response and High Precision: Utilizing closed-loop Hall magnetic balance technology, the device offers fast response, high linearity, and minimal temperature drift. It accurately captures AC, DC, and transient current signals, with measurement accuracy reaching Class 0.5 or higher.

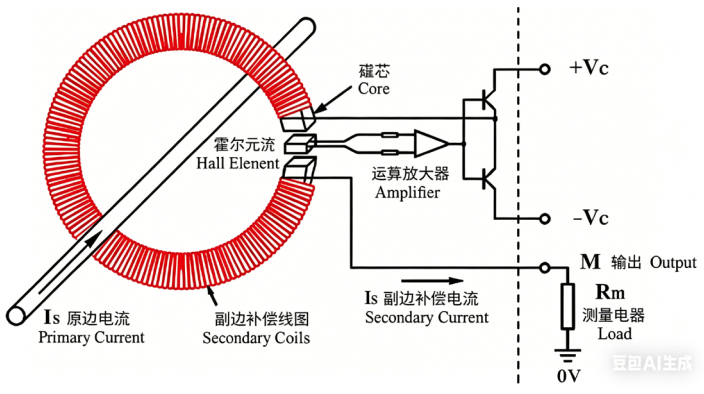
5. Non-Contact Measurement: Installed via a center-hole mounting method, it requires no cutting of the measured wires. There is no electrical connection between the primary and secondary sides, ensuring convenient installation without affecting the normal operation of the original system.

6. Industrial-Grade Environmental Adaptability: The blue engineering plastic housing offers insulation, dust resistance, and corrosion resistance. It supports a wide operating temperature range and is suitable for various applications, including industrial automation, power monitoring, new energy, and rail transit.

7. Compatibility with Multiple Power Supply Methods: By default, it supports the industrial standard 24V DC power supply; certain models support wide-voltage power supply to meet diverse on-site power requirements.

II. Working Principle

The JXK-17 employs a closed-loop Hall magnetic balance operating principle, which, in simple terms, is known as the “magnetic field zero-compensation method.” The entire process consists of four core steps:



1. Magnetic Field Generation: The current being measured (primary-side current) flows through the transmitter’s central magnetic ring. Based on the principle of electromagnetic induction, this generates a magnetic field within the magnetic core that is proportional to the magnitude of the current.

2. Hall Signal Detection: The Hall element located in the air gap of the magnetic core detects this magnetic field and outputs a weak voltage signal, the strength of which is proportional to the magnetic field strength.

3. Signal Amplification and Compensation: The amplifier circuit inside the transmitter amplifies the weak signal from the Hall element, driving the secondary compensation coil to generate a reverse magnetic field. This offsets the magnetic field produced by the primary current, causing the net magnetic flux within the core to approach zero (a state of “magnetic balance”).

4. Signal Conversion and Output: The current in the secondary compensation coil is strictly proportional to the measured current on the primary side. This current is converted into a standard voltage or current signal via a shunt resistor. After linearization by the signal conditioning circuit, standard industrial signals such as 4–20 mA or 0–10 V are output for acquisition by downstream control systems.

Simplified Summary of the Working Process:

Measured current → Generates a magnetic field → Hall element detects the magnetic field → Amplifies and drives the compensation coil to counteract the magnetic field → The compensation current is proportional to the measured current → Converted into a standard signal for output

III. Core Values

3.1 Overview of Core Values

High-Precision Measurement: Closed-loop magnetic balance technology ensures high linearity, minimal temperature drift, and accuracy up to Class 0.5. Prevents control inaccuracies and energy consumption measurement errors caused by measurement errors.

Electrical Isolation Protection: Full isolation of input, output, power supply, and housing for strong anti-interference capability Protects low-voltage downstream equipment (such as PLCs and industrial PCs) from high-voltage surges, enhancing system stability

AC/DC Compatibility: Supports measurement of AC, DC, and pulsating currents, suitable for a wide range of applications Eliminates the need to purchase multiple sets of equipment for different current types, reducing selection and maintenance costs

Non-Contact Installation: Through-hole design eliminates the need to cut the measured conductors Does not affect the operation of the original system; installation is convenient, reducing installation time and safety risks

Industrial-grade reliability: Blue insulated housing and wide-temperature design for harsh environments Reduces on-site failure rates, lowering equipment replacement and maintenance costs

Standard signal output: Compatible with common signals such as 4-20mA and 0-10V Directly interfaces with mainstream control systems without requiring additional signal conversion modules

3.2 Key Challenges and Solutions

1. Challenge: In industrial settings, high-voltage and low-voltage circuits are directly connected, leading to frequent ground loops and surge interference. This can easily damage control equipment such as PLCs, and effective isolation between devices cannot be achieved.

Q: How does the JXK-17 address the impact of high-voltage interference on low-voltage control systems?

A: The JXK-17 employs a three-terminal fully isolated design, achieving complete electrical isolation between the primary-side high-voltage circuit under test, the secondary-side signal output circuit, the power supply circuit, and the device housing. This blocks the transmission paths of ground loops and electromagnetic interference, effectively preventing high-voltage surges and ground potential differences from impacting downstream devices such as PLCs and industrial PCs, thereby

significantly enhancing the stability and service life of the control system.

2. Pain Point: Traditional current transformers can only measure AC current and are incompatible with DC or pulsating current scenarios. Some equipment requires simultaneous monitoring of both AC and DC signals, making the procurement of multiple devices costly and maintenance complex.
Q: How does the JXK-17 address the challenge of monitoring both AC and DC currents?
A: Designed based on the Hall effect principle, the JXK-17 supports simultaneous measurement of AC, DC, and pulsating currents. A single unit can meet monitoring needs for multiple current types, eliminating the need to purchase specialized equipment for different scenarios. This simplifies the selection process and reduces equipment procurement and maintenance costs.

3. Pain Point: Installing current sensors requires cutting the wires being measured, which disrupts the normal operation of the original system. In some field locations, power cannot be shut off during installation, making the process difficult and posing high safety risks.
Q: How does the JXK-17 address the issue of having to cut the measured conductor during installation, which affects system operation?
A: The JXK-17 features a closed-loop through-hole design. Installation is completed by simply threading the measured conductor through the hole in the center of the transmitter. There is no need to cut the original conductor or shut down power for installation, so it does not affect the normal operation of the measured system. This significantly reduces installation difficulty and safety risks, making it particularly suitable for industrial sites where shutdowns for retrofitting are not possible.

4. Pain Point: Open-loop Hall sensors suffer from low accuracy and significant temperature drift. Measurement errors increase with temperature changes or prolonged operation, affecting the accuracy of system control and energy consumption statistics.
Q: How does the JXK-17 address the issues of insufficient measurement accuracy and poor stability in traditional sensors?
A: The JXK-17 employs closed-loop magnetic balancing technology. By using a compensation coil to generate a reverse magnetic field that offsets the magnetic field of the primary current, it brings the net magnetic flux within the core close to zero. This eliminates the effects of hysteresis and core nonlinearity, resulting in high measurement accuracy, excellent linearity, and minimal temperature drift. Even under wide temperature ranges and during prolonged operation, it maintains stable measurement accuracy, providing reliable data for system control and energy consumption statistics.

5. Challenge: The electromagnetic environment in industrial settings is complex, and the output signals of ordinary sensors are prone to interference, leading to misjudgments by control systems and data fluctuations that affect production stability.
Q: How does the JXK-17 address the issue of data fluctuations caused by signal interference in industrial environments?
A: The JXK-17 features excellent anti-interference performance. On one hand, its three-terminal fully isolated design blocks the transmission of interference; on the other hand, it employs closed-loop compensation technology to enhance signal stability. The standard industrial output signals (such as 4–20 mA) are highly resistant to interference and are not easily affected by the on-site electromagnetic environment. This enables the device to provide stable and accurate current data to the control system, thereby preventing malfunctions and production anomalies caused by data fluctuations.

IV. Key Product Parameters & Specifications

4.1 Basic Electrical Parameters
Measurement Type: Supports AC, DC, and pulsating current measurement; compatible with various current scenarios in industrial environments
Input Range: Standard ranges cover 0–50 A / 0–100 A / 0–200 A / 0–300 A / 0–500 A / 0–800 A / 0–1000 A / 0–1500 A / 0–2000 A; custom ranges available
Bore Diameter: Available in 12.5 mm / 20 mm / 35 mm / 45 mm / 55 mm / 72 mm / 75 mm to accommodate conductors of various diameters
Output signal: Standard industrial signal outputs, including DC 4–20 mA (2-wire / 3-wire), DC 0–20 mA, DC 0–5 V, DC 1–5 V, DC 0–10 V; supports custom RS485 digital output
Accuracy Class: Standard Class 0.5 (0.5% F.S.); high-precision custom versions available up to Class 0.2
Linearity Error: ≤0.2% F.S.
Repeatability Error: ≤0.1% F.S.
Response Time: ≤10 ms (Closed-loop magnetic balancing technology enables rapid capture of transient current changes)
Frequency response: DC to 20 kHz, covering power frequency and most industrial low-frequency AC applications
Temperature drift: ≤±100 ppm/°C (with full-temperature-range compensation to minimize the impact of temperature variations on measurement accuracy)
Output load capacity: Current output type (4–20 mA): ≤500 Ω; Voltage output type (0–10 V): ≥10 kΩ

4.2 Isolation Performance Parameters
Isolation Structure: Three-terminal fully isolated design, achieving complete electrical isolation between the primary input circuit, secondary output circuit, and power supply circuit; the housing is insulated from the internal circuitry
Isolation Withstand Voltage: Between input and output: AC 2500 V/50 Hz/1 min, no breakdown or flashover; Between input and power supply: AC 2500 V/50 Hz/1 min; Between output and power supply: AC 1500 V/50 Hz/1 min
Insulation Resistance: Insulation resistance between each isolated circuit ≥ 100 MΩ (under DC 500 V test conditions)
Interference immunity: Effectively suppresses ground loops, common-mode interference, and surge impacts, meeting the requirements for use in complex industrial electromagnetic environments

4.3 Power Supply & Power Consumption Parameters
Standard supply voltage: DC 24V (standard power supply for industrial automation systems, compatible with PLC/DCS power supply circuits)
Wide-Voltage Supply Range: DC 18V–30V, compatible with on-site voltage fluctuations
Full-Load Power Consumption: ≤1.5W (low-power design to reduce the load on the on-site power supply)
Power Supply Ripple Suppression: Ripple rejection ratio of ≥60dB for the power supply circuit, preventing power fluctuations from affecting output signal stability
Power Distribution Output: No additional power distribution output; operates with a single DC 24V supply

4.4 Environmental Adaptation Parameters
Operating Temperature Range: -20°C to +70°C, suitable for typical industrial field environments; extended to -40°C to +85°C for wide-temperature custom versions
Storage Temperature Range: -25°C to +85°C
Operating Humidity Range: 10% RH to 90% RH (non-condensing, to prevent circuit short-circuits caused by humid environments)
Protection Rating: IP30 (enclosure protection, prevents ingress of solid foreign objects larger than 2.5 mm in diameter; suitable for indoor/enclosure installation scenarios)
Explosion-Proof Performance: Non-explosion-proof; for explosion-hazardous environments, must be used with intrinsically safe barriers; compatible with standard intrinsically safe explosion-proof systems
Vibration Resistance: 10–2000 Hz, acceleration 10g, 2 hours continuously in each of the X, Y, and Z axes, with no mechanical damage or performance degradation
Shock Resistance: Acceleration 30g, 11 ms continuously in each of the X, Y, and Z axes, with no mechanical damage or performance degradation

4.5. Physical Parameters
Mounting Method: Supports 35mm DIN rail mounting (standard industrial mounting method, suitable for control cabinet rails); also features pre-drilled screw holes for direct mounting on equipment panels or cabinet bodies
Dimensions (Reference): Length × Width × Height approximately 130 mm × 42.5 mm × 140 mm (specific dimensions may vary slightly depending on the mounting hole diameter; larger holes result in slightly larger overall dimensions)
Weight: Approximately 150 g to 250 g (varies with mounting hole specifications; larger holes result in slightly higher weight)
Indicator Definitions:

PWR Power Indicator: Green; remains lit when powered on, indicating normal power supply; if unlit, it indicates a power supply failure or an open circuit in the power supply
ALM Alarm Indicator: No built-in alarm indicator; abnormal conditions are indicated via output signal over-limit or PLC backend alarms (alarm indicators can be added to some custom models)
Housing Material: Blue flame-retardant engineering plastic (ABS+PC), featuring insulation, flame retardancy, and anti-aging properties; insulation strength ≥ AC 3750V; flame retardancy rating V-0
Protection Details: The housing is integrally injection-molded with no exposed metal parts to prevent electric shock risks; terminals use green plug-in connectors with an anti-loosening design, ensuring secure wiring and easy maintenance

V. Application-Specific Selection Guide

5.1 Key Selection Criteria

1. Signal Type: First, determine whether the current being measured is alternating current (AC), direct current (DC), or pulsating current. The JXK-17 series supports measurement of all these types by default. Additionally, confirm the signal reception requirements of the downstream control system and select the appropriate output specifications (e.g., 4–20 mA, 0–10 V, RS485) to avoid signal incompatibility.

2. Number of Channels: The JXK-17 series features a standard single-input, single-output design, meaning one current input corresponds to one standard signal output. If simultaneous acquisition of multiple current channels is required, you may install multiple units independently or contact us to customize a 1-in-2-out or multi-channel integrated model to avoid accuracy degradation caused by mixing expansion modules.

3. Power Supply: Standard models use a 24 V DC power supply, compatible with common industrial control cabinet power sources. If on-site voltage fluctuations (within the 18 V to 30 V range) are present, select the wide-voltage version. For special scenarios without DC power, consult us regarding custom passive or AC-powered models.

4. Explosion-proof requirements: The standard JXK-17 is a non-explosion-proof general-purpose model and is only suitable for non-hazardous areas. For explosion-proof environments such as chemical and petrochemical facilities, it must be used in conjunction with an intrinsically safe barrier or a custom intrinsically safe certified model. It is strictly prohibited to use the general-purpose model in explosion-hazardous areas without a safety barrier.

5. Installation Environment: For cabinet installation, standard models with an IP30 protection rating may be selected directly; for outdoor, humid, or dusty environments, customized models with an IP65 or higher protection rating must be selected. Additionally, the operating temperature range must be considered; for extremely low-temperature (below -40°C) or high-temperature (above +85°C) scenarios, wide-temperature versions must be selected.

6. Cable Entry Hole Diameter: Select the appropriate model based on the diameter of the cables to be routed to prevent issues such as cables being unable to pass through or excessive gaps affecting installation stability. For standard cable diameters, choose 12.5 mm or 20 mm hole diameters; for high-current, thick cables, select 35 mm or larger hole diameters.

5.2 Recommendations for Selecting Models Based on Industry Applications

1. For chemical industry applications, the JXK-17 series standard isolation models are recommended. When used with intrinsically safe barriers, they meet current monitoring requirements in explosion-proof zones. Select the IP30 protection rating for installation inside control cabinets. Prioritize models with 4–20 mA output to comply with the signal reception standards of mainstream DCS systems in the chemical industry, covering motor current monitoring scenarios for reactors, transfer pumps, and mixing equipment.

2. For power industry applications, we recommend the high-precision Class 0.2 version, paired with a 24V DC wide-voltage power supply model to accommodate power fluctuations in substations and distribution cabinets. Select specifications with a response time of ≤5 ms to quickly capture transient current changes in the power system, making it suitable for current monitoring and energy consumption metering of transformers, circuit breakers, power lines. Prioritize models with 0-10V or RS485 digital outputs to facilitate data acquisition and analysis by power monitoring systems.

3. For metallurgical applications, we recommend the wide-temperature version of the JXK-17 model, which has an extended operating temperature range of -40°C to +85°C, making it suitable for the harsh, high-temperature, and dusty conditions of metallurgical sites. Select models with high current ranges (0–1000 A or 0–2000 A) paired with a custom IP65-rated enclosure for monitoring high currents in blast furnace fans, steel rolling equipment, and smelting motors. Prioritize models with 4–20 mA output for enhanced interference resistance, making them suitable for environments with strong electromagnetic interference at metallurgical sites.

4. For pharmaceutical industry applications, the JXK-17 model with standard accuracy class 0.5 is recommended. Select the standard 24V DC power supply version, suitable for installation inside clean control cabinets in pharmaceutical production areas. Prioritize specifications with a linearity error ≤0.2% to meet the precise current control requirements of pharmaceutical equipment. It can be used for current monitoring of granulators, tablet presses, and transfer pumps. Select an output signal of 4–20 mA or 0–5 V to integrate with pharmaceutical PLC control systems. Additionally, ensure the model features an insulated housing with no exposed metal parts to prevent safety hazards in cleanroom environments.

5. For smart manufacturing scenarios, the custom JXK-17 model with RS485 digital output is recommended. It supports the Modbus-RTU protocol, facilitating integration with industrial IoT platforms to enable remote current monitoring and data analysis. Select the fast-response specification (≤5 ms) to meet the real-time control requirements of automated production lines. It can be used for current monitoring of servo motors, variable frequency drives, robotic equipment. Multiple units can be installed independently based on production line layout to enable synchronized current data collection across multiple nodes. For power supply, prioritize the 24V DC wide-voltage version to accommodate the power environment of automated control cabinets.

5.3 Common Misconceptions in Product Selection

Misconception 1: Neglecting isolation rating selection. Some users focus solely on the measurement range while ignoring the three-terminal isolation rating of the input/output/ power supply. When there is a ground potential difference or surge interference between high-voltage and low-voltage circuits in industrial environments, models with low isolation ratings can easily cause downstream PLCs and industrial control computers to burn out. The standard models of the JXK-17 series feature 2500 V AC isolation withstand voltage, meeting the requirements of the vast majority of industrial scenarios; however, for special high-interference scenarios, it is necessary to verify whether the isolation rating meets the standards.

Misconception 2: Selecting the wrong signal range specification. Some users select models based solely on the equipment's rated current without considering the inrush current during startup, resulting in a range that is too small and causing signal saturation, which prevents monitoring of the inrush current. Others blindly choose models with excessively large ranges, leading to insufficient accuracy when measuring small currents. It is recommended to select a range corresponding to 1.2 to 1.5 times the equipment's rated current to allow for a margin of safety.

Misconception 3: Neglecting load matching. For current-output (4–20 mA) models, the input impedance of the downstream device must be verified. If the load impedance exceeds the model's rated value, it will cause excessive voltage drop in the output signal, resulting in signal deviation; For voltage-output models, if the input impedance of the downstream device is too low, it will also cause signal distortion. The JXK-17 series current-output models have a maximum load of 500 Ω, while the voltage-output models require a minimum input impedance of 10 kΩ; ensure compatibility with the parameters of the downstream equipment during selection.

Misconception 4: Selecting general-purpose models for explosion-proof environments. Some chemical and petrochemical users directly

select non-explosion-proof, general-purpose JXK-17 models for use in hazardous areas without pairing them with intrinsically safe barriers, creating serious safety hazards. General-purpose models lack explosion-proof certification and are strictly prohibited from direct use in hazardous areas such as Zone 0, Zone 1, and Zone 2. They must be used in conjunction with safety barriers of the corresponding rating or customized explosion-proof certified models must be selected.

5.4 Customization Recommendations

1. Customized Solutions for Special Signals: If non-standard output signals are required on-site—such as 0–20 mA, ±10 V, or RS485 Modbus-RTU protocol outputs—please contact us to customize the JXK-17 model to your specifications. We support custom output ranges and signal types, and can adjust output accuracy and linearity parameters as needed to meet the signal reception requirements of special control systems.

2. Custom Solutions for Non-Standard Operating Conditions: For non-standard operating conditions such as high temperature, low temperature, severe corrosion, or intense vibration, we can customize the JXK-17 model with a wide temperature range (-40°C to +85°C), an IP65 or higher protection rating enclosure, or a corrosion-resistant coated enclosure. We can also adjust the enclosure material and mounting method to suit the installation and operating environment of specific sites. If special mounting hole diameters or positions are required, we can customize them according to your drawings.

3. Multi-Channel Integrated Customization Solutions: For simultaneous current acquisition across multiple channels, we offer a multi-channel integrated JXK-17 model that combines multiple Hall-effect current transducer units within a single enclosure. This design supports 1-in-2-out and multi-in-multi-out configurations, reducing installation space and cabling costs. Additionally, signal isolation and data acquisition functions can be integrated as needed to accommodate multi-node current monitoring scenarios.

4. Special Power Supply and Functional Customization Solutions: For sites without DC power, AC-powered or passive-powered versions can be customized. If current over-limit alarm functionality is required, the JXK-17 model with relay alarm output can be customized to provide a digital signal when current exceeds limits, enabling fault early warning and interlock control for on-site equipment.

VI. Installation and Commissioning Guidelines

Qidian JXK-17 Blue Enclosure, Three-Terminal Isolated, Closed-Loop Hall-Effect AC/DC Current Transmitter

This text is presented as a list of specific steps, designed to be practical, standardized, and tailored to factory operations and maintenance as well as cabinet installation. It contains no tables and can be easily incorporated into the product manual.

6.1 Pre-Installation Preparation

1. Component Verification: Upon unpacking, verify that the main unit and blue housing are intact with no damage, and that the terminal blocks are secure with no looseness or cracks. Check that the product label's range, output signal, and power supply parameters match the order specifications. Confirm that the certificate of conformity, parameter label, and product identification are complete, with no missing parts, incorrect components, or specification discrepancies.

2. Environmental Inspection: Ensure the installation area is a dry, well-ventilated environment such as an indoor control cabinet or enclosed enclosure; avoid high-temperature heat sources, highly corrosive gases, areas with heavy dust, and areas prone to condensation; keep the unit away from strong interference sources such as variable frequency drives, high-power contactors, and high-frequency electromagnetic equipment to ensure long-term stable operation of the equipment.

3. Tool List: Prepare standard 35mm DIN rails, Phillips screwdrivers, insulated wire strippers, multimeters, electrical tape, cold-pressed terminal blocks, shielded signal cables, grounding copper wires, and other basic installation tools and materials. Use insulated tools throughout the entire process.

4. Safety Precautions: Before installation, the high-voltage circuit at the front end and the control power supply must be disconnected; strictly follow power-off procedures. It is strictly prohibited to disconnect, connect, or plug/unplug terminals while the system is energized. High-voltage primary circuits and low-voltage secondary circuits must be routed separately, maintaining safe wiring clearances. Operators must wear insulated protective gear and must not touch live conductors with bare hands to prevent electric shock and equipment damage.

6.2 Standard Installation Procedure

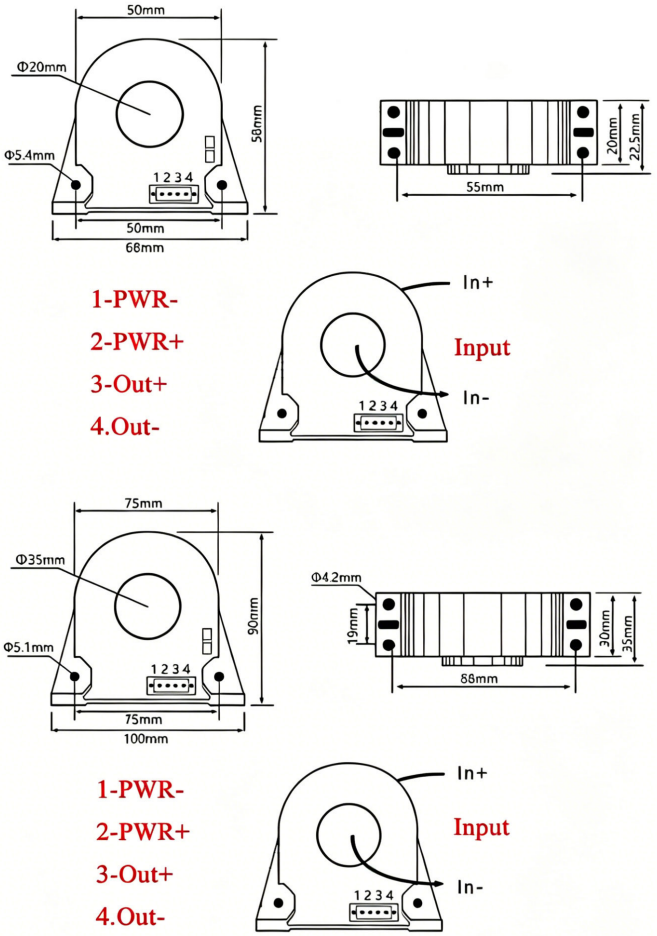
1. Mounting on DIN Rail: The device is designed for installation on a standard 35mm DIN rail. Align the latches on the back of the JXK-17 with the slots on the rail, then press down firmly from top to bottom. Ensure the latches are fully engaged and that the device is secure with no wobbling or lateral movement. For wall-mounted installation, use the pre-drilled mounting holes on the housing and securely tighten the mounting screws to ensure the unit is installed flat and firmly.

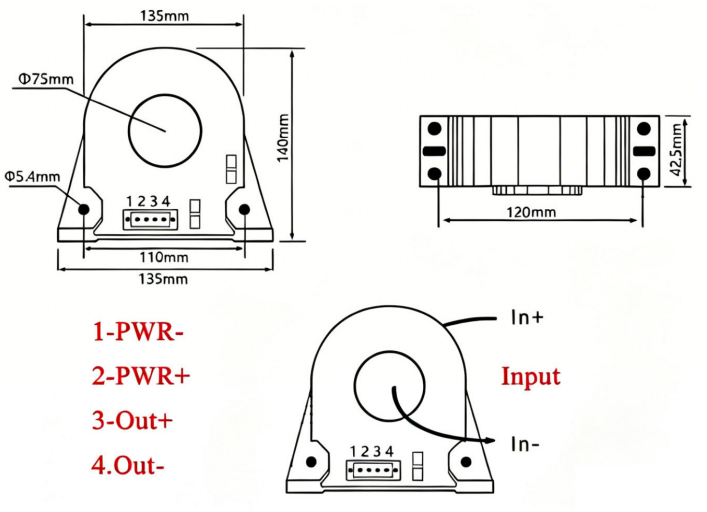
2. Wiring Specifications and Terminal Identification: Strictly distinguish between power terminals, input acquisition terminals, and signal output terminals; do not mix or misconnect them. Power terminals must be distinguished by positive and negative polarity. Input terminals are through-hole passive acquisition terminals that require no wiring. Output signal wires must strictly correspond to the receiving terminals on the PLC or 3DCS backend; For three-wire and two-wire signal outputs, route the wires according to the corresponding specifications; do not connect them in random order.

3. Terminal Wiring Procedures: Strip the wire insulation to an appropriate length; ensure the copper core is fully crimped into the terminal with no exposed copper strands, loose connections, or crimping defects; multi-strand copper wires must be crimped with cold-crimp terminals before insertion to prevent strand separation and short circuits.

4. Grounding Requirements: This product features a three-terminal isolated structure, and the equipment housing includes a designated grounding point. In industrial environments with strong interference or scenarios involving long-distance signal cabling, single-point reliable grounding must be implemented. The shielding layer must be grounded at only one end; grounding both ends simultaneously is prohibited to avoid creating loop currents that could interfere with measurement accuracy.

6.3. Textual Explanation of Wiring Diagram





6.4 Power-On Commissioning Procedure

1. No-Load Test: After all wiring is complete, double-check that all connections are correct, with no short circuits or misconnections. Once you have confirmed that there are no improper connections on-site, slowly apply the control power supply and connect the transmitter to the rated 24 VDC operating voltage. Power on the device under no-load conditions and observe its operating status.

2. Initial Signal Verification: With the device in no-load condition and no measured current present, use a multimeter to measure the signal at the output terminal; for current-output models, the no-load reading should correspond to the lower limit value (4–20 mA); for voltage-output models, the no-load reading should correspond to the lowest reference voltage. Verify that the zero-point output is normal, with no zero-point drift or abnormal signal fluctuations.

3. Indicator Status Assessment: This standard JXK-17 model with a blue housing is equipped with a power indicator light as standard. After power-up, a steady, continuous illumination of the power indicator light indicates normal power supply and that the module is ready for operation; if the indicator light does not illuminate, it indicates an abnormal power supply, an open circuit, or a module malfunction; there is no dedicated alarm indicator light; abnormal faults can be identified through signal anomalies detected by the backend system.

4. Load Signal Verification: Connect to the actual current measurement circuit and allow the device to enter normal data acquisition mode. Apply different percentages of the rated current sequentially to test the linearity of the output in stages. Observe that the output signal rises and falls linearly in sync with the current, with no sudden changes, no stuttering, and no significant fluctuations.

5. Accuracy Calibration Method: The device has undergone precise factory calibration and requires no secondary adjustment under normal operating conditions. If minor deviations occur due to on-site high-precision requirements, refer to the product's fine-tuning instructions to perform zero-point and full-scale adjustments under stable environmental conditions with constant temperature and humidity and no strong interference. Avoid excessive adjustment to prevent loss of linearity; save the parameters after calibration is complete.

6.5 Installation Precautions

1. Strictly prohibit overvoltage supply: Strictly limit the power supply range to DC 18V–30V. Do not connect to high-voltage AC power or DC power sources far exceeding the rated voltage. Prolonged operation under overvoltage or undervoltage conditions will accelerate circuit aging and may directly cause internal components to fail.

2. Avoid Strong Electrical Interference from Nearby Sources: Do not install the transmitter near variable frequency drives, high-power motors, high-voltage contactors, or high-frequency switching equipment. Do not run high- and low-voltage lines in the same cable tray or conduit to prevent electromagnetic interference from causing measurement inaccuracies or data fluctuations.

3. Protective Measures for Humid Environments: Prohibited from long-term use in open-air environments exposed to rain, standing water, or high condensation; enclosures in humid environments must be equipped with dehumidification devices and sealed; ensure the enclosure remains intact and undamaged to prevent liquids, moisture, and dust from seeping into the equipment through gaps, thereby preventing circuit boards from becoming damp, short-circuiting, or corroding.

4. Prohibition on Unauthorized Disassembly or Modification: Do not open the blue housing, alter internal circuits, or change terminal wiring definitions without authorization. Unauthorized modifications will damage the three-terminal isolation structure, compromise isolation protection, and immediately void the warranty.

5. Prohibition on Long-Term Overload Operation: The measured current must not exceed the product's rated upper limit for extended periods. Prolonged overload will cause core saturation, measurement inaccuracies, and shorten the device's service life.

VII. Recommendations for Daily Use and Maintenance

7.1 Key Points for Daily Inspections

1. Indicator Light Inspection: During daily inspections, check the status of the power indicator light. When powered on normally, the light should remain steady and illuminated. If the light is off, flashing, or exhibits abnormal brightness, immediately inspect the power supply circuit for open circuits, undervoltage, or reverse polarity issues, and verify that the DC 24V supply voltage is within the rated range of 18V to 30V.

2. Signal Stability Monitoring: Daily, use a PLC, DCS, or host system to verify that the transmitter's output signal remains stable within the corresponding measurement range. If abnormalities such as signal jumps, irregular fluctuations, zero-point drift, or output exceeding limits occur, inspect the site for strong electromagnetic interference, poor wiring connections, or load impedance mismatch.

3. Temperature and Humidity Monitoring: Record the ambient temperature and humidity of the installation area daily to ensure the equipment operates within a temperature range of -20°C to +70°C and a humidity range of 10% RH to 90% RH (non-condensing). If ambient temperatures are too high, humidity is excessive, or condensation occurs, promptly implement cooling and dehumidification measures to prevent internal circuitry from becoming damp or suffering heat-induced aging.

4. Visual Inspection: Check the blue housing daily to ensure it is intact, with no damage, cracks, or deformation. Verify that terminal connections are secure, free of oxidation, and free of dust accumulation. Ensure the housing is free of visible oil stains or moisture buildup, and that the installation position shows no displacement or looseness.

7.2 Periodic Maintenance Plan

1. Cleaning Frequency: In standard industrial environments, it is recommended to clean the equipment every 3 months; in dust-heavy metallurgical or chemical sites, cleaning is recommended monthly. When cleaning, use a dry, soft-bristled brush or lint-free cloth to gently wipe dust and oil residue from the housing and terminal surfaces. Do not use wet cloths or corrosive cleaning agents to prevent liquid from seeping into the equipment.

2. Terminal Tightness Inspection: It is recommended to inspect the tightness of the terminal connections every 6 months. With the power off, use a screwdriver to tighten the wiring screws on the power and signal output terminals one by one to prevent loose or faulty connections caused by on-site vibrations, which could lead to signal abnormalities or power supply failures. At the same time, check that the shielding wire grounding is secure, with no oxidation or detachment.

3. Recommendations for Accuracy Retesting: Under normal operating conditions, it is recommended to perform an accuracy retest every 12 months; for high-precision measurement applications (such as in the power and pharmaceutical industries), retesting is recommended every 6 months. During recalibration, use a standard current source and a high-precision multimeter to measure the output signal under three conditions: no-load, 50% of full scale, and 100% of full scale. Compare the error between the standard value and the measured value; if the error exceeds

the tolerance range of the accuracy class, perform zero and full-scale calibration according to specifications.

4. Installation Inspection: Inspect the device's rail or wall mounting every 12 months to ensure that the mounting clips are secure, the mounting screws are not stripped, and the device has not shifted or tilted. At the same time, check whether the side-entry cable is rubbing against the transmitter housing to prevent long-term wear from damaging the cable insulation.

7.3 Long-Term Maintenance Tips
1. Dust and Moisture Protection: When installed inside a control cabinet, ensure the cabinet doors are tightly closed and regularly clean the fan filters to prevent dust and moisture from entering the cabinet. In humid or dusty environments, install an additional waterproof and dustproof protective cover, or select a custom enclosure with an IP65 or higher protection rating to prevent dust accumulation and condensation from corroding the circuit boards.

2. Methods for Optimizing Interference Resistance: Maintain an installation distance of at least 30 cm between the transmitter and strong interference sources such as variable frequency drives and high-power motors; use shielded twisted-pair cables for signal output, grounding the shield only at the transmitter end to avoid loop current interference caused by grounding both ends; route high- and low-voltage circuits separately; do not run them in parallel within the same conduit or channel to reduce electromagnetic coupling interference.

3. Protection Against Extreme Environments: In high-temperature environments, install cooling fans or air conditioning in the installation area to prevent the equipment from being exposed to temperatures above +70°C for extended periods. In low-temperature environments, select wide-temperature-range equipment and, if necessary, install thermal insulation or heat tracing to prevent internal circuit malfunctions caused by low temperatures. In highly corrosive environments, use custom-made corrosion-resistant coated enclosures to prevent corrosive gases from damaging the enclosure and terminals.

4. Power Supply Stability Maintenance: Regularly inspect the ripple and stability of the 24 VDC power supply to prevent excessive voltage fluctuations or high ripple from affecting device operation. Install power filters in the power supply circuit to suppress interference and ensure stable power delivery to the transmitter.

5. Avoid Overload and Surge: Regularly monitor whether the measured current consistently exceeds the device's rated range to prevent prolonged overload operation, which can lead to core saturation and reduced measurement accuracy. For applications involving large surge currents, select a model with a range capacity 1.5 times greater than the required measurement range to minimize the impact of surge currents on the device.

VIII: Troubleshooting & Emergency Response
8.1 List of Common Faults
1. No Output Fault: After the transmitter is powered on, the downstream PLC or DCS system cannot acquire the output signal; current-output models show no 4–20 mA current, voltage-output models show no 0–10 V voltage, and there is no change in any values.

2. Signal Drift: The transmitter's output signal exhibits irregular shifts due to changes in ambient temperature or load, causing the zero or full-scale values to persistently deviate from standard values and exceed the permissible accuracy range.

3. Indicator Light Malfunction: The power indicator light does not illuminate, flickers erratically, or fluctuates in brightness; it cannot remain steadily lit, and the device provides no feedback on its operational status.

4. Interference and Distortion Fault: The output signal exhibits periodic fluctuations, noise interference, or erratic jumps; the data curve appears jagged and fails to stably track changes in the measured current.

5. Output Out-of-Range Fault: The output signal consistently exceeds the upper or lower limits of the rated range; for example, a 4–20 mA signal signal remains persistently below 3.8 mA or above 20.5 mA, and this condition is unrelated to the measured current.

8.2 Analysis of Failure Causes
1. Wiring-related causes: Reversed polarity of the power supply, reversed polarity of signal output lines, loose or faulty terminal connections, shielding wires grounded at both ends or not grounded at all, or interference caused by high- and low-voltage lines running together.

2. Power Supply Abnormalities: DC 24V supply voltage below 18V or above 30V; excessive ripple in the power supply circuit; power adapter failure; or insufficient load capacity due to excessive voltage drop in the power supply line.

3. Signal Overload Causes: Measured current consistently exceeds the transmitter's rated range; downstream load impedance exceeds the transmitter's rated range (e.g., 4–20 mA output connected to a load exceeding 500 Ω); short circuit or open circuit in the output line.

4. Environmental interference causes: Installation location is near strong electromagnetic interference sources such as variable frequency drives or high-power motors; ground potential differences exist at the site; ambient temperature and humidity exceed the device's rated range, causing internal components to malfunction.

5. Equipment damage causes: Aging or damaged internal circuit components; core saturation; Hall element failure; moisture ingress and corrosion due to a damaged blue housing; circuits burned out by static electricity or surge impacts.

8.3 Step-by-Step Troubleshooting
1. Troubleshooting and Resolving No Output Faults
Step 1: Disconnect power and inspect the wiring. Verify that the polarities of the power terminals (DC+ and DC-) are not reversed, that the signal output lines (Out+ and Out-) are correctly connected to the input terminals of the downstream equipment, and that the terminal screws are tightened with no loose connections.
Step 2: Apply power and use a multimeter to measure the voltage at the power supply terminals. Verify that the DC 24V supply is stable within the 18V–30V range, with no under-voltage or over-voltage issues; check the power supply circuit for open circuits or excessive voltage drops.
Step 3: Measure the voltage and current at the output terminals under no-load conditions. If there is still no output, disconnect the downstream load and measure the transmitter's output directly to determine whether a short circuit or open circuit in the downstream load is preventing signal transmission.
Remedial Actions: Re-wire according to specifications, replace the faulty power adapter, and address any voltage drop issues in the circuit; if it is confirmed that the device itself has no output, implement the emergency contingency plan.
Emergency Alternative Plan: Temporarily replace with a spare JXK-17 transmitter, wire and commission it according to standard procedures to restore the system's current monitoring function, and replace it with the faulty unit once it has been inspected and repaired.

2. Troubleshooting and Resolving Signal Drift
Step 1: Check the ambient temperature and humidity to ensure the device is operating within the -20°C to +70°C range in a non-condensing environment, avoiding high or low temperatures or condensation that could increase component temperature drift.
Step 2: Re-measure the output signal. Take readings under no-load, 50% range, and 100% range conditions, and compare them with standard values to determine whether the drift is linear or random.
Step 3: Check for loose terminal connections and ensure the shielding wire is properly grounded to rule out signal fluctuations caused by poor contact or incorrect grounding.
Remedial Actions: Adjust the equipment installation environment by installing cooling or dehumidification devices; if the drift is linear, perform zero and full-scale calibration according to specifications; if it is random drift, identify and eliminate on-site interference sources.
Emergency Workaround: If the drift cannot be calibrated on-site, temporarily replace the transmitter with a spare unit and return the faulty device to the manufacturer for professional calibration or repair.

3. Troubleshooting and Resolving Indicator Light Malfunctions
Step 1: Inspect the power supply circuit to ensure the DC 24V supply voltage is normal, with no issues such as undervoltage, overvoltage, or excessive ripple, and verify that the power adapter is functioning properly.
Step 2: Check whether the power terminals are loose or oxidized, which could cause poor electrical contact and prevent the indicator light from staying on steadily.
Step 3: If the power supply is normal but the indicator light does not illuminate, disconnect the device from power and then reconnect it. Observe whether the indicator light returns to a steady-on state to rule out temporary circuit abnormalities.
Remedial Actions: Replace the faulty power adapter; tighten or replace oxidized terminal connectors. If the indicator light remains abnormal, determine that there is a fault in the device's internal circuitry.
Emergency Workaround: Temporarily replace the device with a spare transmitter and resume using the original device after the faulty unit has been repaired.

4. Troubleshooting and Resolving Interference and Distortion Issues
Step 1: Inspect the device's installation location to ensure it is at least 30 cm away from strong interference sources such as variable frequency drives and high-power motors, and that there are no installations in close proximity.
Step 2: Inspect the signal output cables to ensure shielded twisted-pair cables are used, with the shield grounded at only one end (at the transmitter end), and no issues with dual-end grounding or ungrounded shields; ensure power and signal lines are routed separately and do not run parallel in the same conduit or cable tray.
Step 3: Check for ground potential differences at the site; install an isolation power module in the transmitter's power supply circuit to eliminate ground loop interference.
Remedial Measures: Relocate the installation away from interference sources, standardize the grounding method for shielded cables, and install power filters or isolation modules to suppress interference.
Emergency Workaround: If on-site interference cannot be quickly eliminated, temporarily replace the transmitter with a wide-temperature version or an isolation-enhanced JXK-17 model with stronger anti-interference capabilities. Reinstall the original equipment once on-site rectifications are complete.

5. Troubleshooting and Resolution for Output Overrange Faults
Step 1: Check whether the measured current exceeds the transmitter's rated range. If the transmitter is consistently overloaded, replace it with a model with a larger range or adjust the equipment operating conditions to avoid prolonged operation beyond the rated current.
Step 2: Check the load impedance at the output end. Ensure that the load impedance for current-output transmitters is $\leq 500\Omega$ and for voltage-output transmitters is $\geq 10k\Omega$ to prevent signal overrange caused by load impedance mismatch.
Step 3: Check the output circuit for short circuits or open circuits. A short circuit in a current-output type will cause abnormal output current, while an open circuit in a voltage-output type will cause abnormal output voltage.
Remedial Actions: Replace the transmitter with one of the appropriate range, adjust the downstream load impedance, and repair any short circuits or open circuits in the output circuit.
Temporary Workaround: If the transmitter cannot be replaced immediately, temporarily adjust the system's acquisition range parameters; restore the original parameter settings after the equipment is replaced.

8.4 After-Sales Repair Guidelines
1. Criteria for Determining a Malfunction: After completing all the troubleshooting steps above and confirming that the wiring, power supply, load, and environment are all in order, but the device still exhibits faults such as no output, signal deviation exceeding the accuracy grade, indicator lights not illuminating, or output exceeding limits, the issue can be determined to be a device malfunction, and you should contact after-sales service for repair.

2. Repair Process: First, compile the equipment model (JXK-17), measurement range specifications, installation and operating environment, a description of the fault symptoms, and on-site troubleshooting records. Then, contact Qidian Automation's after-sales customer service to submit this information. A technical support representative will provide remote assistance for a secondary troubleshooting assessment. If on-site repair is confirmed to be impossible, follow the procedure to request return-to-factory repair or replacement.

3. Contact Information: You may contact after-sales customer service through the Qidian Automation official website, service hotline, or distributor channels to obtain technical support and repair services.

4. Warranty Coverage: The JXK-17 series products come with a standard warranty. During the warranty period, equipment failures not caused by human damage or improper use are eligible for free repair or replacement. For equipment damaged by human error, unauthorized disassembly or modification, improper use (such as exceeding pressure limits), or equipment outside the warranty period, paid repair services will be provided.