JXK-18 Hall Current Transducer

I. Product Definition

The Qidian JXK-18 Blue-Housed Snap-On AC/DC Current Transmitter is a Hall-effect current signal acquisition and isolation transmitter specifically designed for high-current monitoring in industrial environments. As a high-end model in Anhui Qidian Automation Technology Co., Ltd.'s JXK series of current transmitters, it is primarily positioned as a three-terminal isolated busbar current monitoring solution that can be installed without power interruption.

Its core functions include: clamping onto copper busbars or busways via a clamp-on structure without contacting the circuit under test to accurately acquire AC/DC current signals; processing these signals through internal circuitry to output standard industrial signals (such as 4-20mA, 0-10V, or RS485); It simultaneously achieves triple electrical isolation between the measured circuit, the power supply circuit, and the signal output circuit, providing safe, stable, and linear current monitoring data to upper-level devices such as PLCs, DCS systems, and digital displays. It is widely used for online monitoring and protection of high-current circuits in power generation, chemical, metallurgical, and rail transit applications.

II. Working Principle

In simple terms, its operation can be divided into three steps: "Magnetic Field Capture → Signal Conversion → Isolated Transmission":

1. Magnetic Field Capture (Open-Closed Structure + Hall Effect): The copper busbar being measured passes through the transmitter's open-closed window; as current flows through the busbar, it generates a magnetic field around it. The high-permeability magnetic core inside the transmitter concentrates this magnetic field, which acts on the Hall element, causing it to generate a weak Hall voltage signal proportional to the magnitude of the current.

2. Signal Conversion (Conditioning and Amplification): The weak Hall voltage signal undergoes amplification, filtering, and linearization correction via internal precision circuits to eliminate environmental interference and temperature drift effects, thereby restoring an electrical signal that is fully linearly proportional to the primary current.

3. Three-Terminal Isolation and Transmitter Output: The processed signal utilizes optical isolation or magnetic isolation technology to achieve electrical isolation between the measured circuit, power supply circuit, and output circuit. It is ultimately converted into industrial-standard analog (4–20 mA/0–5 V/0–10 V) or digital (RS485) signals for transmission to the downstream control system.
The entire process requires no direct contact with the live conductors being measured. The clamp-on design allows for direct clamping onto busbars without the need to disconnect wires or shut off power, and the primary and secondary sides are completely electrically isolated, ensuring operational safety on-site.

III. Core Values

3.1 Overview of Core Values

1. Installation without power interruption, significantly reducing O&M risks and costs: The snap-on design allows for clamping onto busbars without power interruption, eliminating the need for production shutdowns or wire disconnection. This avoids the power-off retrofitting required by traditional through-hole transmitters, thereby reducing downtime losses in industrial production.

2. Three-point electrical isolation, reinforcing safety at industrial sites: Triple isolation of the primary side (measured circuit), power supply (power circuit), and output (signal circuit) withstands thousands of volts of isolation withstand voltage. This effectively blocks the transmission of high voltage, surges, and interference signals to downstream control systems, ensuring the safety of both equipment and personnel.

3. Full AC/DC compatibility, covering monitoring needs across multiple scenarios: Based on the Hall effect principle, it can simultaneously measure DC current, power-frequency AC current, and complex waveform currents. There is no need to distinguish between AC and DC models and reducing selection complexity and spare parts inventory.

4. Dedicated design for copper busbars, suitable for high-current busbar applications: The large rectangular cutout is specifically designed for copper busbars and bus ducts, accommodating high-current conductors of various specifications. This addresses the pain point where traditional circular-cut transmitters cannot be installed on copper busbars.

5. High-precision linear transmission ensures reliable monitoring data: Utilizing high-precision Hall elements and temperature compensation circuits, it achieves low-error, low-drift linear output, providing accurate data support for current monitoring, overload protection, and energy consumption metering.

3.2 Key Challenges and Solutions

Q1: Installing traditional current transmitters requires power shutdown and wire disconnection, leading to production line downtime and significant losses. Can the JXK-18 solve this problem?
A1: Yes. The JXK-18 features a split-type clamp-on design that requires no wire disconnection or power shutdown. Installation is completed by simply clamping the transmitter onto the live busbar, completely eliminating the need for production downtime during retrofitting. It is particularly suitable for continuous production scenarios where shutdowns are not feasible. A single installation can save hours to days of downtime, significantly reducing operational and maintenance costs.

Q2: High-current circuits in industrial environments are often accompanied by high-voltage surges and electromagnetic interference, which can easily damage downstream PLC/DCS equipment and even lead to safety incidents. How does the JXK-18 ensure system safety?
A2: The JXK-18 features a three-terminal electrical isolation design, achieving complete electrical isolation between the measured circuit, power supply circuit, and signal output circuit. With an isolation withstand voltage of over 2500 V AC, it effectively blocks the transmission of high voltage, surges, and interference signals. This not only protects downstream control systems from damage but also prevents operators from coming into contact with live circuits, ensuring compliance with industrial safety standards.

Q3: Many transmitters can only measure either AC or DC current. When dealing with complex circuits that include both AC and DC, users must purchase different models, which is cumbersome to manage. Does the JXK-18 support measurement in all scenarios?
A3: Yes. Based on the Hall effect principle, the JXK-18 can simultaneously measure DC current, power-frequency AC current, pulse current, and any waveform current. A single device can cover monitoring needs for multiple current types, eliminating the need to distinguish between AC and DC models, reducing selection complexity, and lowering spare parts inventory costs.

Q4: Traditional circular-hole transmitters cannot accommodate large-sized copper busbars, requiring either modification of the busbar or replacement of the transmitter—a costly and time-consuming process. Can the JXK-18 be installed directly on a copper busbar?
A4: Yes. The JXK-18 features a large rectangular cutout design, specifically tailored for industrial copper busbars. It can directly clamp conductors of various specifications without requiring modifications to the busbar or additional adapters, offering greater compatibility and easier installation.

Q5: On-site environments often involve significant temperature fluctuations and strong electromagnetic interference, causing many transmitters to suffer from large temperature drifts, poor linearity, and measurement inaccuracies. How does the JXK-18 ensure data accuracy?
A5: The JXK-18 utilizes high-precision Hall effect sensors and a built-in temperature compensation circuit, combined with an anti-interference shielding design, to achieve stable measurements with low temperature drift and high linearity. With an error rate of ≤±0.5%, it can continuously output precise and stable current signals even in industrial environments ranging from -10°C to 60°C, providing reliable data support for overload protection and energy consumption metering.

IV. Key Product Parameters & Specifications

4.1 Basic Electrical Parameters

Current Type: DC / AC / Pulsed Current / Arbitrary Waveform Current

Primary Current Measurement Range: DC 0–1000 A to DC 0–5000 A (customizable upon request to cover mainstream high-current busbar applications)

Secondary Output Signals: Standard industrial signals, including 4–20 mA, 0–5 V, 0–10 V, and RS485 (Modbus-RTU protocol); customizable upon request

Output Signal Accuracy: ±0.5% FS (Linearity error)

Linearity error: ≤±0.2% FS

Repeatability error: ≤±0.1% FS

Response time: ≤200 ms (standard model; high-speed model available upon request ≤10 ms)

Load capacity: Current output type 0–500 Ω; Voltage output type ≥2 kΩ; RS485 type standard Modbus load

Frequency Response: DC–10 kHz (covers DC and power-frequency AC; expandable to 20 kHz)

Zero Drift: ≤±0.1% FS/year (at ambient temperature)

Temperature Coefficient: ≤±50 ppm/°C (full temperature range)

4.2 Isolation Performance Parameters

Isolation Method: Three-terminal electrical isolation (complete isolation between primary test loop, secondary signal loop, and power supply loop)

Isolation Withstand Voltage: AC 2500V/1min (Primary-Secondary, Primary-Power Supply, Power Supply-Secondary; no breakdown or arcing)

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

Common-Mode Rejection Ratio (CMRR): ≥80dB

Differential-Mode Rejection Ratio (DMRR): ≥60dB

Immunity Level: Complies with GB/T 17626 standard, meets EMC Level 3 protection requirements for industrial environments

4.3 Power Supply & Power Consumption Parameters

Standard Supply Voltage: DC 24V (allowable fluctuation range: DC 18V–36V, compatible with industrial PLC/control system power distribution)

Optional Supply Voltage: DC 12V / DC 48V (supported by custom models)

Full-Load Power Consumption: ≤3W (typical power consumption at maximum range)

No-Load Power Consumption: ≤1.5W

Power Distribution Capability: No additional power distribution output; pure signal transmission design

Power Supply Ripple Suppression: ≤±0.5% FS (immunity to power supply ripple)

Power Supply Polarity Protection: Built-in reverse polarity protection circuit to prevent equipment damage from incorrect power connection

4.4 Environmental Adaptation Parameters

Operating Temperature Range: -10°C to +60°C (Standard Industrial Type; Wide Temperature Type can be extended to -40°C to +85°C)

Storage Temperature Range: -40°C to +85°C

Operating Humidity: 10% to 90% RH (non-condensing)

Protection Rating: IP30 (enclosure protection, suitable for installation inside control cabinets; outdoor models can be customized with IP65 protection rating)

Explosion-Proof Rating: No intrinsically safe explosion-proof certification; suitable only for non-explosive general industrial environments. For explosive environments, must be used with associated safety barriers (compatible with Zener-type / isolating-type safety barriers; model selection must comply with on-site explosion-proof standards)

Vibration Resistance: Complies with GB/T 2423.10 standard; 10–150 Hz, 0.75 mm amplitude, 2 hours without damage

Shock Resistance: Complies with GB/T 2423.5 standard; 100 m/s² (10g), 11 ms duration, half-sine wave shock without damage

4.5. Physical Parameters

Mounting Method: 35 mm standard DIN rail mounting; also supports screw mounting (mounting holes provided)

Weight: Approx. 350 g (excluding accessories; weight increases slightly with higher measurement ranges)

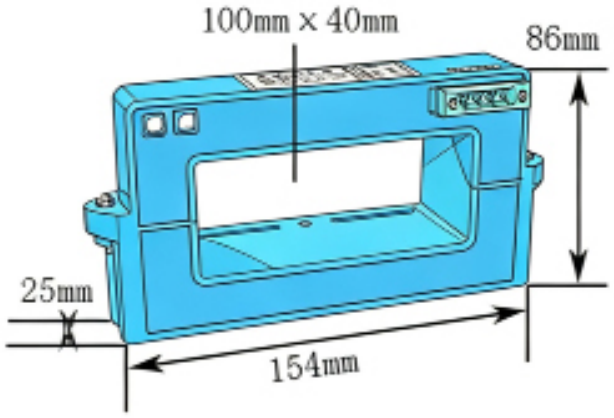
Housing Material and Protection Details:

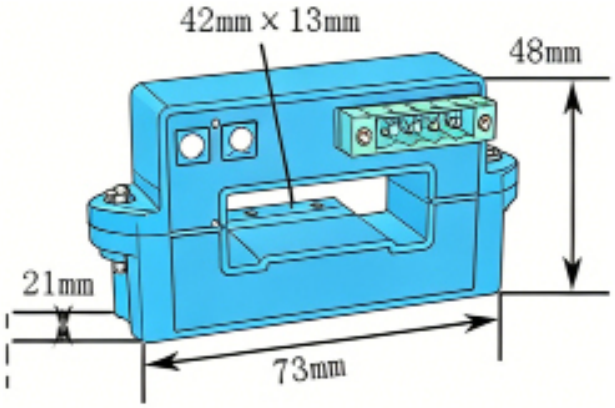
Main Housing: ABS engineering plastic (blue flame-retardant material, V-0 flame-retardant rating), featuring resistance to aging and corrosion

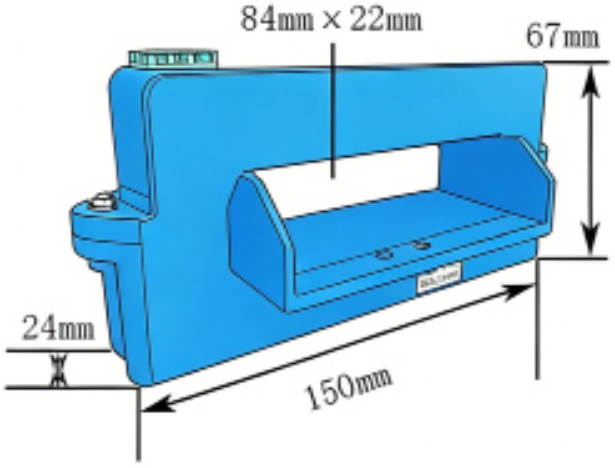
Hinged Magnetic Core Housing: High-strength engineering plastic with a built-in shielding layer to reduce the impact of external electromagnetic interference

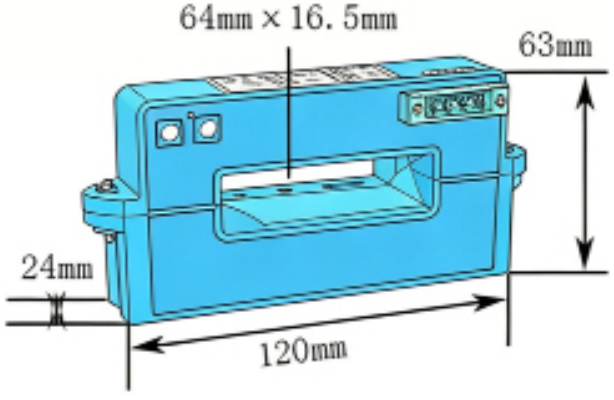
Terminal Blocks: Green plug-in terminals with gold-plated copper contacts for oxidation resistance and stable contact, compatible with wire gauges up to 1.5 mm²

Housing Protection Details: Dust-proof rubber gaskets are integrated into the seams to prevent dust ingress; the magnetic core hinge features a locking mechanism to prevent loosening due to on-site vibrations









V. Application-Specific Selection Guide

5.1 Key Selection Criteria

1. Signal Type: Prioritize compatibility with the input signal specifications of the backend PLC/DCS/digital display. The mainstream options are 4–20 mA current signals (high interference resistance, suitable for long-distance transmission) and voltage signals (0–5 V/0–10 V, suitable for short-distance transmission within control cabinets), and RS485 digital signals (supporting the Modbus-RTU protocol, suitable for multi-device networking and remote data acquisition scenarios). The selection should be based on the on-site wiring distance and the device interface type.

2. Number of Channels: The standard model features 1 input and 1 output (single-channel current acquisition, suitable for single-loop monitoring scenarios); the custom 1-input, 2-output model (one input, two isolated outputs, capable of simultaneously powering both the PLC and the digital display meter to avoid signal conversion losses) should be selected based on the number of devices requiring simultaneous power supply at the site.

3. Power Supply Method: The standard model operates on 24 VDC (the mainstream power supply specification in industrial settings, compatible with PLC control cabinet power modules); custom models are available in 12 VDC or 48 VDC (suitable for scenarios with special power supply specifications, such as rail transit and mobile equipment). The selection should be based on the on-site power system specifications; the standard 24 VDC model is recommended to reduce spare parts management costs.

4. Explosion-proof requirements: Standard general-purpose models are only suitable for non-explosion-proof industrial environments; if use in explosion-proof zones is required, select models compatible with Zener-type or isolating safety barriers. Direct use of general-purpose models in explosion-proof environments is strictly prohibited; selection must be based on matching the on-site explosion-proof rating with the appropriate safety barrier model.

5. Installation Environment: Standard IP30-rated models are suitable for installation inside control cabinets; for outdoor or dusty/humid environments, IP65-rated models must be customized; for wide-temperature environments (-40°C to +85°C), wide-temperature custom models must be selected; additionally, anti-interference reinforced versions must be chosen based on on-site vibration and interference levels.

6. Busbar Dimensions: Select a model with the appropriate cutout dimensions based on the actual width and thickness of the busbar being measured. The JXK-18 series supports various cutout sizes, including 42×13 mm, 64×16.5 mm, 84×22 mm, and 100×40 mm. Ensure the busbar can pass through the transmitter's cutout without obstruction to prevent equipment damage caused by forced installation.

7. Current Range: Select the range based on the rated and peak currents of the circuit under test. Standard ranges cover DC/AC 0–100 A to 0–5000 A. It is recommended to choose a model where the rated current is 60%–80% of the range to balance measurement accuracy and overload protection margin.

5.2. Recommended Selection for Industry Applications

1. Chemical Industry Applications: Chemical production sites are characterized by strong electromagnetic interference and highly corrosive environments. The JXK-18 standard three-terminal isolated model (AC 2500V isolation withstand voltage) is highly recommended. Select a signal type of 4–20 mA or RS485, and choose the cutout size based on the specifications of the copper busbars in the electrolytic cells or power cabinets. If used in explosion-proof zones, it must be paired with a compatible isolated safety barrier; an IP65-rated custom model is also available to withstand humid and dusty environments.

2. Power Industry Applications: For high-current busbar monitoring in power distribution rooms and substations, we recommend the JXK-18 model with a large cutout size (100×40 mm). The measurement range covers 0–3000 A to 0–5000 A. For signal types, prioritize the RS485 Modbus-RTU protocol version, which can be directly integrated into power monitoring systems. Additionally, select the wide-temperature model to accommodate temperature fluctuations in distribution rooms.

3. Metallurgical Industry Applications: For environments with strong electromagnetic interference and high vibration, such as electric arc furnaces and steel rolling mills, we recommend the JXK-18 Anti-Interference Enhanced Version. It features a built-in high-shielding core and anti-vibration structure, with measurement ranges ranging from 0–2000 A to 0–4000 A. with mounting hole specifications designed to accommodate large-cross-section copper busbars. Select the 4–20 mA current signal type for enhanced anti-interference capability, ensuring stable data transmission even in strong electromagnetic environments.

4. Pharmaceutical Industry Applications: For monitoring motor and equipment circuits within clean control cabinets in pharmaceutical production areas, we recommend the JXK-18 models with small to medium cutout sizes (42×13 mm/64×16.5 mm), with measurement ranges from 0–100 A to 0–500 A. Select a signal type of 0–10 V or 4–20 mA, suitable for short-distance transmission within clean control cabinets. Standard IP30 protection is sufficient to meet operational requirements, eliminating the need for additional customization of protection ratings.

5. Smart Manufacturing Scenarios: For power circuit monitoring in automated production lines and robotic workstations, we recommend the JXK-18 1-input, 2-output custom model. This unit collects current signals from one input while simultaneously outputting two isolated signals to a PLC and a local digital display. Mounting hole specifications should be selected based on the production line's copper busbar or busbar specifications. The RS485 signal type is preferred to meet data acquisition requirements for industrial internet platforms.

6. Rail Transit Applications: For DC busbar monitoring in rail vehicles and distribution cabinets, the JXK-18 DC-specific wide-temperature model is recommended. A custom DC48V power supply option is available, with measurement ranges covering 0–1000A to 0–3000A. Mounting hole specifications are designed to fit rail-specific copper busbars. The device features strong vibration resistance and wide-temperature operation capabilities, making it suitable for the complex operating conditions encountered during rail vehicle operation.

5.3 Common Mistakes in Product Selection

Misconception 1: Ignoring Isolation Rating and Focusing Only on Signal Accuracy: Some users focus solely on measurement accuracy during selection, neglecting the three-terminal isolation rating. This allows high-voltage surges and interference signals from industrial environments to propagate to downstream PLC/DCS equipment, resulting in equipment damage or data anomalies. For the JXK-18 series, the standard model with 2500 V AC isolation withstand voltage must be prioritized; models with lower isolation ratings should not be selected solely for cost reasons.

Misconception 2: Selecting the wrong signal range, leading to insufficient accuracy or overload damage: Some users choose models with ranges that are too large or too small. An excessively large range results in insufficient accuracy for measuring small currents, while an excessively small range can cause equipment damage if the peak current of the measured circuit exceeds the range. When selecting a model, consider data such as rated current, peak current, and inrush current, and choose a model with a range of 1.2 to 1.5 times the peak current.

Misconception 3: Neglecting load matching, leading to abnormal signal transmission: Current-output signals (4–20 mA) have specific requirements for the load resistance of downstream equipment. If the load of the downstream device exceeds the transmitter's maximum load capacity, it can cause signal distortion or prevent normal transmission. Voltage-output signals are sensitive to transmission distance and are prone to interference over long distances. When selecting a model, choose the appropriate signal type based on the transmission distance and the load of the downstream equipment.

Misconception 4: Selecting general-purpose models for explosion-proof environments, creating safety hazards: Some users directly use general-purpose transmitters in explosion-proof zones without pairing them with safety barriers, violating explosion-proof safety regulations and creating safety risks. In explosion-proof environments, models compatible with safety barriers must be selected, and installation and wiring must strictly adhere to explosion-proof standards.

Misconception 5: Failure to verify busbar cutout dimensions, resulting in installation issues: Some users focus solely on the current range during selection without verifying whether the transmitter's cutout dimensions match the specifications of the busbar being measured. This leads to installation problems upon delivery. The JXK-18 series offers multiple cutout specifications; when selecting a model, it is essential to verify the actual width and thickness of the busbar and choose the model with the corresponding cutout dimensions.

Misconception 6: Mismatch between power supply type and on-site power source: Some users fail to verify the on-site power specifications and mistakenly select non-standard power supply models, resulting in the device being unable to receive power normally. In industrial settings, standard 24V DC models are the preferred choice. If special power supply specifications are required, the on-site power parameters must be confirmed in advance and the device customized accordingly.

5.4 Customization Recommendations

1. Custom Signal Solutions: For non-standard signal requirements, such as 0–20 mA, 0–1 mA, RS-232, CAN bus, and other specialized output signals, we can provide customized signal conditioning circuits that support custom signal ranges and protocols to meet the interface requirements of specialized industrial control systems.

2. Custom Solutions for Non-Standard Operating Conditions: For special environmental conditions, such as wide temperature ranges (-40°C to +85°C), high protection ratings (IP65/IP67), highly corrosive environments (custom anti-corrosion coatings), and high-vibration scenarios (custom ruggedized mounting structures), we offer non-standard custom models to meet the requirements of these specific operating conditions.

3. Multi-Channel Integrated Custom Solutions: To address the need for centralized monitoring of multiple current circuits, we offer customizable multi-channel integrated transmitters. These support simultaneous acquisition and isolated output of multiple current channels, enabling a single device to monitor multiple circuits. This reduces installation space requirements and wiring costs, making them suitable for multi-circuit scenarios such as distribution panels and bus ducts.

4. Custom Mounting Hole Size Solutions: For non-standard copper busbars or bus ducts, we offer models with custom mounting hole sizes to accommodate irregularly shaped busbars, multiple parallel busbars, and other special installation scenarios, ensuring unobstructed installation.

5. Customized Functionality Expansion: Alarm output functionality can be expanded to generate digital alarm signals when the measured current exceeds preset thresholds, meeting on-site overload protection and fault alarm requirements. Models with local display capabilities can also be customized, allowing current values to be viewed directly on-site without relying on backend equipment.

6. Protocol Customization Solutions: To meet data acquisition requirements for industrial internet and IoT platforms, models supporting industrial Ethernet protocols such as Profinet and EtherNet/IP can be customized. This enables direct communication between the transmitter and industrial internet platforms, making it suitable for smart manufacturing and Industry 4.0 scenarios.

VI. Installation and Commissioning Guidelines

6.1. Pre-installation Preparation

1. Checking Components: After unpacking, verify the main unit (blue-cased hinged transmitter), installation accessories (DIN rail clips, mounting screws), instruction manual, and certificate of conformity. Confirm that the model, measurement range, and cutout dimensions match the order, and ensure there are no cosmetic damage, terminal deformation, or other issues.

2. Environmental Inspection: Verify that the installation environment is a non-explosive area (if an explosive environment is required, prepare a matching safety barrier in advance). Ensure there are no highly corrosive gases or flammable/explosive dust. The operating environment temperature and humidity must be within the range of -10°C to +60°C and 10% to 90% RH (non-condensing). Install the device away from equipment with strong magnetic fields (such as variable frequency drives and contactors), and avoid direct sunlight and rain.

3. Tool List: Prepare a 35mm DIN rail, Phillips screwdriver, wire strippers, multimeter, electrical tape, cable ties, and a level; if on-site calibration is required, prepare a standard signal source or a standard ammeter.

4. Safety Precautions: Before installation, ensure the busbar circuit under test is in a safe state. If installation must be performed while the system is energized, it must be carried out by a licensed electrician wearing appropriate insulation protection; under no circumstances should live terminals be touched while the power is on. Disconnect all power circuits before wiring to avoid the risk of short circuits or electric shock.

6.2 Standard Installation Steps

1. Mounting the Rail: Install a standard 35mm DIN rail inside the control cabinet, ensuring it is level and securely fastened; snap the rail clips on the bottom of the transmitter into the rail. Press down until you hear a "click" to confirm proper installation. The unit can be slid left or right to adjust its position. If screw mounting is required, use the pre-drilled mounting holes on the device to secure it with screws.

2. Snap-on Installation (Busbar Clamping): Loosen the locking screw on the left side of the transmitter, open the upper half of the magnetic core, insert the busbar to be measured into the rectangular opening in the device, ensuring the busbar is centered and not tilted. Then close the magnetic core and tighten the locking screw to ensure the contact surfaces of the magnetic core are fully flush, with no gaps or misalignment.

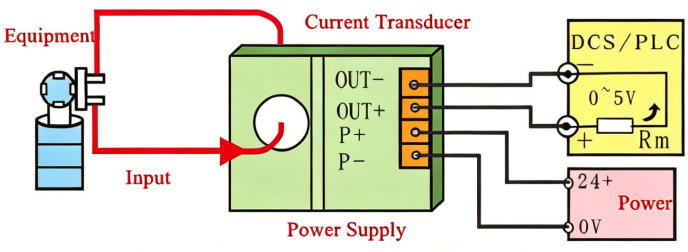
3. Wiring Specifications:
Power Terminals: 24 VDC power supply; distinguish between positive and negative terminals. Typically, connect "+" to the 24 VDC positive terminal and "-" to the 24 VDC negative terminal. Reverse connection is strictly prohibited. For models with power distribution functionality, wire the power distribution terminals as indicated in the manual.

4. Signal Output Terminals: Analog outputs such as 4–20 mA or 0–10 V. Distinguish between the positive and negative output terminals. For RS485 signals, distinguish between the A and B lines, and connect them to the corresponding input terminals of the downstream PLC, DCS, or digital display.

5. Three-Terminal Isolation Note: There is no electrical connection between the primary side (busbar circuit), power supply circuit, and signal circuit. It is strictly prohibited to short-circuit the ground wires of different circuits to avoid compromising isolation performance.

6. Grounding Requirements: The transmitter housing does not require mandatory grounding. However, if installed in an environment with strong electromagnetic interference, the device's grounding terminal may be connected to the control cabinet's protective ground (PE wire). The shielding layer of the shielded cable should be grounded at a single point (grounded only on the downstream equipment side; left floating on the transmitter side) to prevent ground loops from interfering with signal transmission.

6.3 Wiring Diagram and Specification Notes



Terminal Output

1. P−
2. P+
3. OUT+
4. OUT−

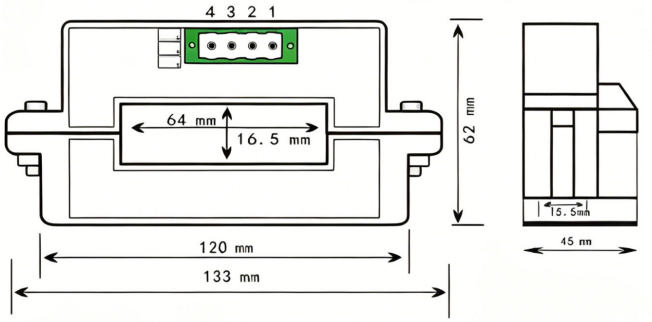
Wire Output

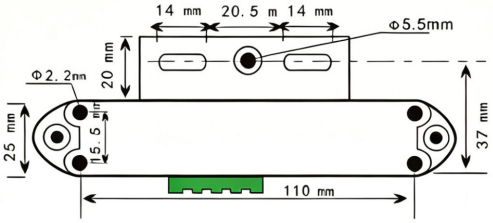
Black: P-

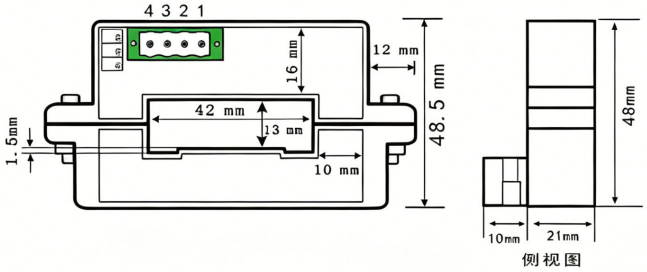
Red: P+

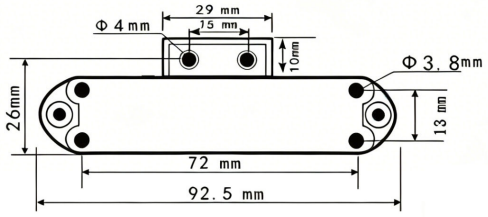
Blue: Out+

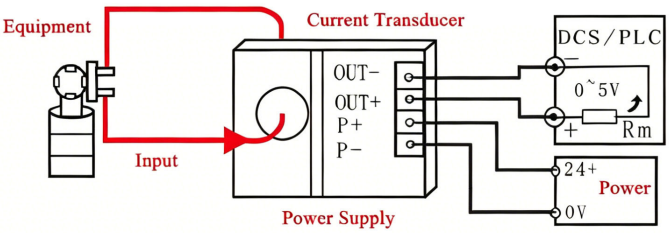
Yellow: Out-











Terminal Output

1. P−
2. P+
3. OUT+
4. OUT−

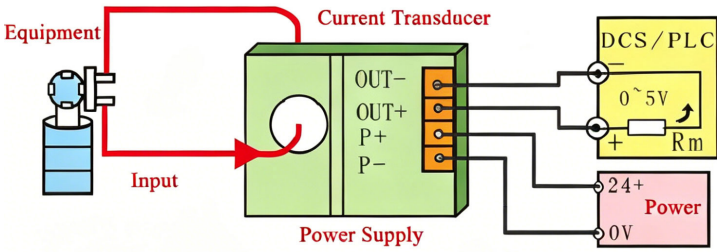
Wire Output

Black: P-

Red: P+

Blue: Out+

Yellow: Out-



Terminal Output

1. P−
2. P+
3. OUT+
4. OUT−

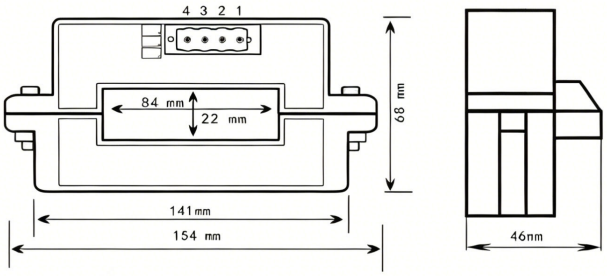
Wire Output

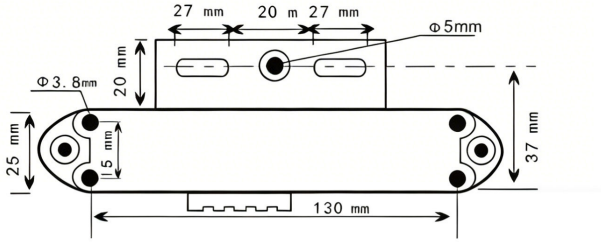
Black: P-

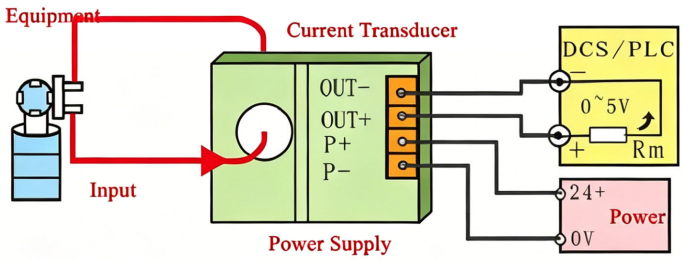
Red: P+

Blue: Out+

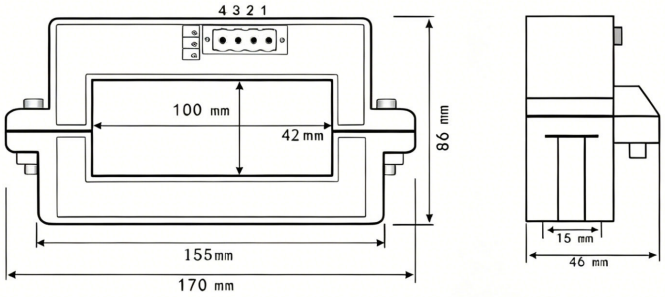
Yellow: Out-

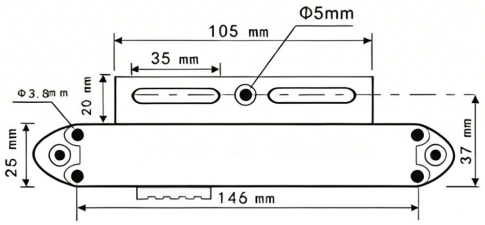






Terminal Output	Wire Output
1. P−	Black: P-
2. P+	Red: P+
3. OUT+	Blue: Out+
4. OUT−	Yellow: Out-





Common Wiring Mistakes and Correct Practices:
Mistake 1: Reversing the positive and negative power terminals will result in no power supply to the device and the indicator light remaining off. Prolonged reverse connection may damage the device; wiring must strictly follow the terminal markings.

Mistake 2: Running signal output cables and power cables through the same conduit introduces high-voltage interference, causing signal distortion. The correct practice is to run signal and power cables separately, maintaining a distance of at least 10 cm between them.

Error 3: Grounding both ends of the shielded cable creates ground loops, causing signal interference. The correct practice is to ground only one end at the rear device.

Error 4: If the copper busbar is not centered or the magnetic core is not securely locked, measurement errors will increase. The correct practice is to center the copper busbar and ensure the magnetic core is fully seated and locked.

6.4 Power-On Commissioning Procedure
No-Load Test: After completing the wiring, do not connect the current to the busbar under test. Instead, apply only the 24 VDC power supply and observe the status of the device's indicator lights: If the PWR power indicator remains lit, the power supply is normal; if the ALM alarm indicator is off, the device is fault-free. Use a multimeter to measure the voltage at the power terminals and confirm that it falls within the range of 18 VDC to 36 VDC.

Signal Verification: In a no-load state, use a multimeter to measure the output signal and confirm that the zero-point signal is normal (e.g., the no-load output for a 4–20 mA model should be 4 mA, and for a 0–10 V model, it should be 0 V). A standard signal source can be used to simulate the input current and verify whether the full-scale signal matches the set value (e.g., the full-scale value for a 4–20 mA model should be 20 mA).
Indicator Light Status Interpretation:
PWR light steady: Power supply is normal; PWR light flashing: Power supply voltage is out of range or unstable; PWR light off: Power circuit failure or device damage.

ALM indicator off: Device is operating normally; ALM indicator on: Current exceeds range, core not secured, or abnormal signal output; ALM indicator flashing: Internal device fault; power must be disconnected for inspection.

Accuracy Calibration Method: Connect a standard ammeter to the transmitter and measure the current under test simultaneously. Compare the readings from both devices. If the error exceeds ±0.5% FS, calibration can be performed using the two adjustment knobs on the transmitter (ZERO for zero-point adjustment and SPAN for range adjustment): First, adjust the ZERO knob so that the output signal is zero when the device is unloaded; then adjust the SPAN knob so that the output signal is at full scale when the current is at full scale. Repeat the calibration 2–3 times to ensure the error remains within the allowable range.

6.5 Installation Precautions
Never exceed the rated supply voltage: The standard model operates on a DC 24V supply (with a permissible voltage range of DC 18V to 36V). Never connect to a DC power source exceeding 48V or an AC power source, as this will directly burn out the internal circuitry.

Avoid Strong Electromagnetic Interference: Install the device away from sources of strong electromagnetic interference, such as variable frequency drives, contactors, and high-power motors. Signal cables must be routed separately from power cables; do not run them in the same conduit or cable tray to prevent signal distortion caused by electromagnetic interference.

Protection Measures for Humid Environments: When installing in humid or dusty environments, ensure the device's IP protection rating is appropriate. Check that there are no damages at the seams, and ensure proper insulation at the terminal connections to prevent moisture or dust from entering the device and causing short circuits or corrosion. Do not drill holes in or modify the device housing, as this will compromise its protective performance.

Do not force installation: If the busbar dimensions do not match the transmitter's mounting hole, do not force the device into place by squeezing or striking it, as this may damage the split-core magnet or internal components. Instead, replace the unit with a model that matches the mounting hole dimensions.

Do not disassemble the device while powered: The device contains precision electronic components. Do not open the housing or disassemble the core while the device is powered, as this may damage the device and pose an electric shock hazard.
Never use non-explosion-proof models in explosion-hazardous environments: Non-explosion-proof transmitters must never be installed directly in explosion-hazardous areas. If required, they must be used in conjunction with a safety barrier and installed strictly in accordance with explosion-proof regulations; failure to do so poses a safety hazard.

VII. Recommendations for Daily Use and Maintenance

7.1 Key Points for Routine Inspections

1. Signal Stability Monitoring: Use a backend PLC, DCS, or digital display to monitor the transmitter's output signal in real time. Verify that the current and voltage values are stable, with no significant fluctuations or sudden jumps. If signal jumps or value drift occur, inspect the wiring, shielding, and grounding.

2. Temperature and Humidity Monitoring of the Transmitter Housing: During inspections, use an infrared thermometer to measure the temperature of the transmitter housing to ensure there is no abnormal heat generation (surface temperature not exceeding +60°C). Simultaneously, assess the installation environment to avoid exposing the device to high humidity or condensation, and prevent moisture from entering the interior.

3. Check for proper contact between the copper busbar and the magnetic core: Observe whether the transmitter's split-type magnetic core is in tight contact with the copper busbar, with no looseness or misalignment, and ensure the locking screws show no signs of loosening. This prevents increased measurement errors caused by gaps in the magnetic core.

4. Terminal Connection Inspection: Check that the device's terminal connections show no signs of looseness, oxidation, or corrosion, and that there are no unusual odors or burn marks. Ensure wires are not pulled or pinched to prevent signal abnormalities caused by poor contact.

7.2. Regular Maintenance Plan

1. Equipment Cleaning Schedule: Perform external cleaning once every quarter. Use a dry, soft-bristled brush or lint-free cloth to wipe dust and grease from the equipment housing and openings. Never rinse the equipment directly with water to prevent moisture from entering the terminals or internal circuits; in high-dust environments, cleaning frequency may be increased to once a month.

2. Wiring Tightness Inspection: Tighten the wiring screws on power and signal terminals every six months using a torque screwdriver to the specified torque to prevent loosening due to prolonged vibration. Simultaneously, inspect the shielding layer of shielded cables for damage or peeling, and ensure that ground connections are secure.

3. Accuracy Recalibration Recommendations: Perform an annual accuracy calibration by comparing the transmitter's measurement data with a standard ammeter. If the error exceeds ±0.5% FS, calibrate using the ZERO (zero point) and SPAN (range) adjustment knobs on the device to ensure measurement accuracy meets requirements.

4. Installation Status Verification: Inspect the DIN rail mounting or screw fastenings every six months to confirm that the transmitter is not loose or misaligned, and that the DIN rail clips show no signs of aging or breakage. Also, verify the relative position of the busbar and the transmitter's mounting holes to ensure there is no tilting or misalignment.

5. Inspection of Aging Components: Inspect the equipment housing, terminal blocks, and locking screws for signs of aging once a year. If cracks appear in the housing, oxidation occurs on the terminals, or screws become corroded, replace the parts or the entire device promptly to prevent compromising equipment stability.

7.3 Long-Term Maintenance Tips

1. Dust and Moisture Protection: When installing inside a control cabinet, a dust cover (non-sealed to ensure proper heat dissipation) may be added to the exterior of the equipment. In humid environments, desiccants may be placed inside the control cabinet, or an IP65-rated custom model may be selected to prevent dust and moisture from entering the equipment.

2. Anti-Interference Optimization Measures: Use two-core shielded cables for signal lines, and ground the shield only at the rear end (on the equipment side) to prevent ground loops. Run signal and power lines separately, maintaining a minimum distance of 10 cm. If necessary, install signal isolators to further reduce the impact of electromagnetic interference.

3. Protection in Extreme Environments: In high-temperature environments, ensure adequate ventilation inside the control cabinet and avoid direct sunlight on the equipment; In low-temperature environments, preheat the equipment in advance or select a wide-temperature custom model to prevent internal components from malfunctioning due to cold temperatures; in vibrating environments, reinforce the equipment installation to minimize the impact of vibrations.

4. Avoid Frequent Start-Stop Impacts: Although transmitters support continuous operation, frequent high-current surges in the measured loop should be avoided, as long-term overloading accelerates the aging of internal components; if frequent start-stop operations are required, appropriately shorten the calibration and maintenance cycles.

5. Spare Parts and Environmental Data Backup: Keep a spare transmitter of the same model on hand for critical circuits to prevent system downtime caused by equipment failure; simultaneously, regularly record the device's operating parameters and environmental data to establish an operations and maintenance log, facilitating fault tracing and maintenance optimization.

VIII. Troubleshooting & Emergency Response

8.1 List of Common Faults

1. The transmitter has no signal output, and downstream PLC/DCS equipment cannot acquire data
2. Output signal drift; values are unstable, exhibiting erratic fluctuations or gradual shifts
3. Signal measurement error is excessive; deviation from standard ammeter readings exceeds ±0.5% FS
4. The switch-type magnetic core fails to close or becomes loose after closing, preventing normal current signal acquisition
5. Severe signal interference, resulting in noise, increased error, and inability to perform normal measurement or control

8.2 Analysis of Fault Causes

1. Wiring errors: Reversed power supply polarity, incorrect signal terminal connections, or incorrect shield grounding
2. Power supply abnormalities: Power supply voltage outside the permissible range (DC 18V–36V), excessive power supply ripple, or poor contact in the power supply circuit
3. Signal overload: Measured current exceeds the transmitter's upper range limit, causing output saturation or triggering protection
4. Environmental Interference: Equipment installed near strong electromagnetic interference sources; signal and power cables routed in the same conduit; ground loop interference
5. Equipment Damage: Internal components damaged by overvoltage, overcurrent, or moisture corrosion; or loose magnetic core, poor contact
6. Magnetic Core Issues: Loose magnetic core locking screws; foreign objects on the magnetic core contact surface; aged or damaged magnetic core
7. Calibration issues: Long-term lack of calibration, incorrect calibration methods, or zero/span drift caused by temperature drift

8.3, Step-by-Step Troubleshooting

8.3.1 Troubleshooting and Repair for No Output Faults

1. Step 1: Check the power supply circuit. Use a multimeter to measure the voltage at the transmitter's power terminals to confirm it is within the DC 18V–36V range, ruling out open circuits or short circuits in the power supply circuit
2. Step 2: Verify the power connections. Ensure that P+ is connected to the positive terminal of the 24 V DC power supply and P- to the negative terminal, with no reversed connections. Also, check whether the terminals are loose or oxidized.
3. Step 3: Inspect the signal output circuit. Verify that the OUT+ and OUT- terminals are correctly wired and match the input terminals of the downstream equipment, ensuring there are no short circuits or open circuits.
4. Step 4: With the system unloaded, use a multimeter to directly measure the transmitter's output signal. Verify that the zero-point signal is normal to rule out faults in the downstream equipment's input channels.
5. Emergency Workaround: If it is confirmed that the transmitter has no output fault, temporarily replace it with a spare transmitter of the same model to quickly restore system operation. The faulty device should be sent for repair afterward.

8.3.2 Troubleshooting and Repair of Signal Drift/Instability

1. Step 1: Inspect the equipment installation. Ensure the split-core magnetically is fully closed, the locking screws are tightened, and the copper busbar is centered, with no gaps in the magnetic circuit caused by tilting or misalignment.
2. Step 2: Check the shielding wire grounding method. Ensure the shield is grounded at a single point on the downstream equipment side only, while the shield on the transmitter side is left floating to prevent ground loop interference.
3. Step 3: Inspect the routing of signal and power cables. Ensure they are routed separately with a minimum spacing of 10 cm, and that there is no crossing or co-routing within the same conduit.
4. Step 4: Check power supply ripple. Verify that the ripple is within the device's tolerance range. If necessary, install a filter module in the power supply circuit.
5. Step 5: Perform zero and span calibration. Recalibrate the device using the ZERO and SPAN adjustment knobs to eliminate temperature drift and error offset.
6. Emergency Workaround: If the interference issue cannot be resolved immediately on-site, temporarily replace the transmitter with a model featuring an RS485 digital signal. Digital signals offer stronger interference resistance and reduce the impact of drift.

8.3.3 Troubleshooting and Repair for Excessive Signal Measurement Error

1. Step 1: Verify that the transmitter's range matches the measured current. If the range is too large or too small, replace it with a model of the appropriate range to avoid errors caused by range mismatch.
2. Step 2: Inspect the busbar installation position. Ensure the busbar is centered through the core's opening, with no offset or tilt. Verify that the core is fully closed and locked, with no gaps.
3. Step 3: Perform accuracy calibration. Use a standard ammeter to measure the same current simultaneously with the transmitter. Adjust the ZERO (zero point) and SPAN (range) knobs until the error is within ±0.5% FS.
4. Step 4: Inspect the installation environment. Ensure the device is located away from strong sources of electromagnetic interference and that signal cables are properly shielded to eliminate errors caused by interference.
5. Step 5: Check whether the equipment is exposed to extreme temperature or humidity conditions. If conditions exceed the standard operating range, take protective measures or replace the unit with a wide-temperature custom model.
6. Emergency Alternative: If on-site calibration is not immediately possible, temporarily replace the unit with a calibrated spare transmitter to ensure measurement accuracy. The faulty unit should be calibrated or sent for repair afterward.

8.3.4 Troubleshooting and Repair for Failed Closure or Looseness of the Snap-on Magnetic Core

1. Step 1: Inspect the magnetic core contact surfaces to ensure they are free of dust, oil, or debris. Clean the surfaces with a dry, soft-bristled brush to ensure a tight seal.
2. Step 2: Inspect the magnetic core locking screws to ensure they are not stripped or broken. Tighten the screws clockwise to ensure the magnetic core is fully closed and secure.
3. Step 3: Check the size of the copper busbar. Verify that the busbar specifications match the transmitter's mounting hole. Ensure the busbar is not too thick, preventing the core from closing. If necessary, replace with a model that matches the mounting hole size.
4. Step 4: Inspect the magnetic core for signs of aging or damage. If the magnetic core is cracked or deformed, replace the magnetic core component or the entire unit
5. Emergency Workaround: If the magnetic core cannot close and no spare parts are available, temporarily secure it with electrical tape (ensuring insulation performance is not compromised) to maintain temporary operation of the equipment, and replace the faulty component as soon as possible

8.3.5 Troubleshooting and Repair of Interference and Distortion Faults

1. Step 1: Inspect the equipment installation location to ensure the transmitter is positioned away from strong electromagnetic interference sources such as inverters, contactors, and high-power motors. Adjust the installation location if necessary.
2. Step 2: Check the type of signal cable and ensure that a two-conductor shielded cable is used, with the shield grounded at one end. The signal cable must be routed separately from power cables, maintaining a minimum distance of 10 cm.
3. Step 3: Inspect the grounding system to ensure that the protective grounding connection in the equipment control cabinet is secure, with no multiple grounding points or poor grounding.
4. Step 4: Install a signal isolator or anti-interference module in the signal loop to further filter out interference and improve signal stability.
5. Emergency Workaround: If on-site interference is severe, temporarily replace the transmitter with a model featuring a three-terminal isolation enhancement design, or switch to RS485 digital signal output to reduce the impact of interference.

8.4. After-Sales Repair Guidelines

1. Criteria for Determining a Malfunction:
   - After completing all troubleshooting steps above, the device still has no output, exhibits abnormal signals, or has an irreparable magnetic core failure
   - The device shows physical damage such as cracked casing, burnt terminals, unusual odors, or abnormal noises
   - After calibration, the error still exceeds ±0.5% FS, failing to meet on-site measurement accuracy requirements
2. Repair Process:
   - Step 1: Record the device model, measurement range, installation location, fault symptoms, troubleshooting process, and relevant data
   - Step 2: Contact Anhui Qidian Automation Technology Co., Ltd. after-sales customer service and provide device information and fault records
   - Step 3: Follow customer service instructions to provide the device serial number and proof of purchase to confirm warranty coverage
   - Step 4: Depending on the fault, choose between returning the device for repair, on-site technical support, or replacement with a spare unit
3. Contact Information:
   - After-sales Technical Support Hotline: 19715617532
   - Corporate Email: sales008@qd-zdk.com
4. Warranty Coverage:
   - A standard 12-month warranty is provided from the date of manufacture. During the warranty period, faults not caused by human error will be repaired or replaced free of charge
   - Faults caused by human damage, force majeure (such as lightning strikes, floods, or fires), or use beyond specified operating conditions are not covered by the free warranty; paid repair services are available
   - Warranty services for custom models are subject to the terms of the contract signed by both parties and will be executed in accordance with the contract