KXT43I AC Current Transducer

I. Product Definition

This product is the Qidian KXT43I three-phase AC current transmitter with a blue housing, an industrial-grade field instrument that integrates current sampling, electrical isolation, signal conversion, and standardized output functions.

1. Core Functions: Through a built-in three-terminal isolation circuit, it performs high-precision sampling, isolation, and conversion of current signals from three-phase AC circuits (Phases A/B/C). It linearly converts AC current input signals ranging from 0 to 15 A (or extended range) into a standard industrial DC 4–20 mA analog output signal, thereby achieving electrical isolation and signal transmission between high-voltage field circuits and low-voltage control system circuits.

2. Application Scenarios: Widely used in three-phase AC power supply systems across industries such as petroleum, chemical, power, metallurgy, and water treatment. It is employed for current monitoring, overload protection, energy consumption metering, and data acquisition for PLC/DCS systems in equipment such as motors, pumps, and fans.

3. Key Features: Featuring a blue engineering plastic housing and a DIN-rail mounting design, this transmitter offers three-way isolation (mutual isolation between input, output, and power supply), wide-temperature compatibility, strong anti-interference capabilities, and long-term stable and reliable operation, meeting the high protection and stability requirements of industrial environments.

II. Working Principle

In simple terms, the working process of this transmitter can be broken down into the following four steps, achieving a complete closed-loop system of "high-voltage sampling → isolation protection → signal conversion → standard output":

1. Current Sampling Stage: The three-phase AC main circuit (phases A/B/C) passes through the three sampling ports on the top of the transmitter. The internal current sensing unit (based on the principle of electromagnetic induction) performs non-contact sampling of each phase's current to obtain the raw signals of the three-phase current.

2. Three-point isolation stage: The input high-voltage sampling signals, the 24V DC power supply, and the subsequent low-voltage signal output circuits are fully electrically isolated via internal isolation circuits. This cuts off the transmission path of high-voltage and interference signals from the main circuit to the control system, preventing high-voltage surges from damaging downstream equipment.

3. Signal Processing Stage: The isolated sampling signals are fed into a high-precision signal conditioning circuit for filtering, amplification, and linear correction, eliminating the influence of on-site interference signals and ensuring sampling accuracy.

4. Standard Signal Conversion and Output: The conditioned signal is fed into a conversion circuit, where it is converted into an industry-standard 4–20 mA current signal according to a preset linear ratio (e.g., AC 0–15 A corresponds to DC 4–20 mA). This signal is then output via terminals to control systems such as PLCs, DCSs, and digital displays, enabling real-time acquisition and monitoring of current data.

III. Core Value

Question 1: When high-voltage circuits at the site are directly connected to control systems, high-voltage crosstalk and equipment burnout are common. How can this be addressed?
Answer: This product features a built-in three-terminal isolation circuit, achieving complete electrical isolation between the input circuit, output circuit, and power supply circuit. It completely blocks the transmission path of high voltage, surges, and interference signals from the high-voltage circuit to the control system, preventing expensive equipment such as PLCs and DCS systems from being damaged by high-voltage surges and significantly enhancing system safety and stability.

Question 2: When directly acquiring three-phase current signals, strong electromagnetic interference at the site causes significant signal fluctuations and poor accuracy, making it impossible to meet metering and monitoring requirements. What should be done?
A: This product employs high-precision sampling and signal conditioning circuits to perform linear sampling and filtering of three-phase current signals. It converts AC current signals—which are prone to interference in the field—into stable, highly linear DC 4–20 mA standard signals, ensuring the accuracy and stability of data acquisition and meeting the precision requirements for energy consumption metering and equipment monitoring.

Question 3: Control system interfaces from different manufacturers are incompatible, making on-site signal transmission difficult. What should be done?
Answer: This product outputs the industry-standard 4–20 mA DC signal, which can be directly connected to the analog input interfaces of most PLCs, DCS systems, and digital display instruments without the need for additional signal conversion modules. Its strong adaptability resolves signal compatibility issues between multi-brand equipment.

Question 4: Abnormalities such as current imbalance and overloads in three-phase equipment cannot be monitored in real time, which can easily lead to equipment damage. What should be done?
A: This product performs synchronized, real-time sampling and conversion of three-phase currents. The output 4–20 mA signal can be directly connected to the control system, enabling real-time monitoring of three-phase currents, overload alarms, and fault diagnosis. It detects equipment abnormalities early, preventing equipment burnout and downtime caused by current imbalance or overload, thereby reducing operational and maintenance costs.

Question 5: Industrial field environments are complex. In conditions of high temperature, humidity, dust, and strong electromagnetic interference, standard transmitters are prone to failure. What can be done?
Answer: This product features a blue engineering plastic housing combined with a DIN-rail industrial-grade design. It offers wide temperature and voltage adaptability along with strong anti-interference performance, making it suitable for harsh field environments in industries such as petroleum, chemicals, and water treatment. It ensures stable and reliable long-term operation, reducing equipment failures and maintenance frequency.

Question 6: Field wiring is complex, and signal transmission over long distances often results in severe signal attenuation, interference, and data distortion. How can this be addressed?
Answer: This product outputs a DC 4–20 mA current signal with exceptional anti-interference capabilities. It is resistant to on-site electromagnetic interference during transmission and exhibits minimal signal attenuation, meeting the demands of long-distance transmission in industrial environments and ensuring stable and reliable data transmission.

IV. Key Product Parameters & Specifications

4.1 Basic Electrical Parameters
Input Signal Specifications: Three-phase AC current; standard range is 0–50 A AC; expandable ranges support 0–5 A AC, 0–20 A AC, 0–50 A AC, 0–100 A AC, etc. (customization required)
Output Signal Specifications: Standard industrial signal DC 4–20 mA; optional DC 0–20 mA/0–5 V/0–10 V (custom models)
Input-Output Linearity Error: ≤±0.2% FS
Repeatability Error: ≤±0.1% FS
Temperature Drift Coefficient: ≤±50 ppm/°C
Response Time: ≤300 ms
Output Load Capacity: For 4–20 mA signals, maximum load resistance ≤500 Ω
Sampling Method: Three-phase independent sampling; current is collected synchronously for each phase and converted and output independently

4.2 Isolation Performance Parameters
Isolation Method: Three-terminal electrical isolation (complete isolation of input, output, and power supply circuits)
Isolation Withstand Voltage: Between input and output, input and power supply, and output and power supply—all support AC 2500V @ 1 min

without breakdown
Insulation Resistance: Insulation resistance between each isolated terminal ≥ 100 MΩ (under DC 500 V test conditions)
Common-Mode Rejection Ratio (CMRR): ≥ 100 dB, effectively suppressing strong electromagnetic common-mode interference in the field
Differential-Mode Rejection Ratio (DMRR): ≥ 80 dB, filtering high-frequency differential-mode interference signals

4.3 Power Supply & Power Consumption Parameters
Supply Voltage: Standard 24 V DC (compatible with common industrial PLC/cabinet power supplies); allowable supply voltage fluctuation range: 18–36 V DC
Full-Load Power Consumption: ≤1.5 W (24 V DC supply, at full-scale output)
Supply Ripple Suppression: Withstands supply ripple interference ≤10% without affecting output accuracy
Power Distribution Output: No additional power distribution output; supports signal output only

4.4 Environmental Adaptation Parameters
Operating Temperature Range: -20°C to +60°C, suitable for typical high and low temperature environments in industrial settings
Storage Temperature Range: -40°C to +85°C
Operating Humidity: 10% to 90% RH (non-condensing, non-corrosive gas environment)
Protection Rating: IP30 (enclosure protection against solid foreign objects; suitable for installation inside cabinets)
Explosion-proof rating: Non-explosion-proof type. For use in explosion-hazardous environments, an intrinsically safe barrier must be used (Zener barrier recommended), suitable for installation in flameproof or intrinsically safe explosion-proof enclosures
Electromagnetic interference (EMI) standards: Complies with GB/T 17626 industrial EMC standards, capable of withstanding field surges, static electricity, and radio frequency interference

4.5. Physical Specifications
Mounting Method: Standard 35mm DIN rail mounting, compatible with universal industrial cabinet rail slots; easy to install and remove
Housing Material: Blue flame-retardant engineering plastic housing with anti-aging, insulating, and flame-retardant properties, suitable for long-term use in industrial environments
Protection Details: The housing has no exposed conductive parts; the terminal block features insulated protection; the sampling port is designed as an insulated through-hole to prevent contact between high-voltage circuits and the housing
Dimensions: Length × Width × Height approximately 99mm × 65mm × 24mm (including terminal block)
Product Weight: Approx. 150g (excluding terminal blocks); lightweight design that does not increase rail load
Terminal Block Specifications: Features green plug-in terminal blocks with a pitch of 5.08mm, compatible with standard industrial wire gauges (0.5–2.5mm²)
Sampling Hole Dimensions: Three circular sampling holes, inner diameter approx. 8mm, suitable for wires with current ratings of AC 0–50A or lower

V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type Matching: First, confirm the input signal specifications of the downstream control system. This product's standard output is a 4–20 mA DC current signal, compatible with the vast majority of PLCs, DCSs, and digital displays. If the control system requires voltage-type inputs (e.g., 0–10 V or 0–5 V), a customized signal output solution must be requested in advance to avoid signal interface incompatibility.

2. Channel Count Matching: This product is a three-phase AC current transmitter featuring three independent channels for sampling and output, supporting simultaneous acquisition and transmission of A/B/C phase currents. Select the model based on the number of three-phase circuits at the site and whether phase-by-phase monitoring is required. If only single- or two-phase current monitoring is needed, choose the corresponding single-channel or dual-channel model to avoid functional redundancy.

3. Power Supply Compatibility: This product's standard power supply is 24 VDC, compatible with standard PLC power supply modules in industrial cabinets. If the on-site power supply is 220 VAC, you must request an auxiliary 220 VAC to 24 VDC power supply module or a custom wide-voltage power supply model in advance to prevent the device from malfunctioning due to power supply incompatibility.

4. Confirmation of Explosion-Proof Requirements: This product is a general-purpose, non-explosion-proof industrial model and is only suitable for non-explosion-hazardous areas. If used in explosion-hazardous areas such as chemical or pharmaceutical facilities, an intrinsically safe barrier must be installed, or a custom explosion-proof transmitter must be selected. The general-purpose model must not be used directly in explosion-hazardous areas.

5. Installation Environment Compatibility: Verify the installation environment's temperature, humidity, dust levels, and corrosion rating. The standard model operates within a temperature range of -20°C to +60°C and has an IP30 protection rating, suitable only for cabinet installation. For outdoor, high-humidity, high-dust, or corrosive environments, select a custom model with enhanced protection or install a sealed enclosure.

6. Input Range Matching: Select the appropriate range based on the actual maximum operating current of the on-site three-phase circuit. Prioritize selecting a range that is 1.2 to 1.5 times the actual maximum current to avoid equipment damage due to overload caused by an insufficient range, or insufficient accuracy for low-current signals caused by an excessively large range.

7. Isolation Rating Selection: Select the isolation voltage rating based on the voltage difference between the on-site high-voltage circuit and the control system, as well as the level of interference. The standard isolation voltage rating for this product is AC 2500V@1min. If high-frequency surges or strong electromagnetic interference are present on-site, a custom model with a higher isolation voltage rating must be selected to prevent interference crosstalk from damaging downstream equipment.

5.2 Industry Application Recommendations
1. Chemical Industry Applications: Three-phase motors and pumps in the chemical industry typically operate under continuous production conditions, where there is a certain level of electromagnetic interference and potential explosion risks. We recommend the standard KXT43I three-phase AC current transmitter, used in conjunction with an intrinsically safe barrier; Prioritize models with standard DC 4–20 mA output and an AC 0–15 A measurement range to meet the analog data acquisition requirements of chemical industry DCS systems, while ensuring the stability required for continuous on-site operation.

2. Power Industry Applications: Three-phase distribution panels and low-voltage motor circuits in the power industry demand high precision, stability, and isolation ratings for current sampling. We recommend the standard KXT43I three-phase AC current transmitter, prioritizing the high-precision model with ±0.2% FS accuracy and AC 2500V isolation withstand voltage. This configuration meets the current monitoring and overload protection requirements of PLCs and protective devices in the power industry, ensuring data acquisition accuracy and system safety.

3. Metallurgy Industry Applications: In the metallurgy industry, equipment such as fans and motors experiences significant fluctuations in operating current and is subject to strong on-site electromagnetic interference. we recommend the standard KXT43I three-phase AC current transmitter, with priority given to the enhanced anti-interference version (high common-mode rejection ratio) and the wide-temperature-range version. These are designed to withstand the harsh on-site conditions of the metallurgical industry and support customization for high-current ranges (e.g., AC 0–50 A or 0–100 A), meeting the sampling requirements of high-current circuits.

4. Pharmaceutical Industry Applications: Cleanrooms and process equipment in the pharmaceutical industry operate stably, with high demands for signal stability and fault-free operation. We recommend the standard KXT43I three-phase AC current transmitter, prioritizing models with standard DC 4–20 mA output and low temperature drift

specifications. These are designed to meet the precise data acquisition needs of pharmaceutical automation control systems, preventing signal fluctuations from affecting production process monitoring.

5. Smart Manufacturing Applications: Three-phase motors and conveying equipment in smart manufacturing production lines place high demands on signal response speed and compatibility with multiple devices. We recommend selecting the standard KXT43I three-phase AC current transmitter, giving priority to the fast-response model (response time ≤ 100 ms). This model supports rapid integration with PLCs and industrial PCs from multiple brands, meeting the requirements for automated production line monitoring and fault early warning.

5.3 Common Selection Pitfalls

Pitfall 1: Ignoring isolation ratings and directly selecting products with low isolation specifications: Some users focus solely on signal range while neglecting the need for isolation between high-voltage circuits on-site and the control system. They select transmitters with low isolation voltage ratings, resulting in high-voltage surges and interference signals from the field entering the control system. This can cause expensive equipment such as PLCs and DCS systems to burn out, leading to production downtime.

Misconception 2: Selecting the wrong signal range, resulting in either overload damage or insufficient accuracy: Some users choose transmitters with ranges that are too narrow; when the field current exceeds the transmitter's range, the equipment is overloaded and damaged. Alternatively, they select transmitters with ranges that are too wide, resulting in insufficient signal resolution under low-current conditions, which prevents precise current monitoring and fault early warning.

Misconception 3: Neglecting load matching leads to signal transmission distortion: Some users fail to verify the input load resistance of the downstream control system and directly select standard 4–20 mA output transmitters. When the load resistance exceeds the transmitter's maximum load capacity, signal attenuation and distortion occur, causing the data collected by the control system to deviate from the actual current and affecting the normal operation of monitoring and protection functions.

Misconception 4: Incorrectly selecting general-purpose models for explosion-proof environments, creating safety hazards: Some users directly use general-purpose transmitters in explosion-hazardous areas such as chemical and pharmaceutical facilities without installing safety barriers or selecting explosion-proof models. This poses a safety risk of explosions triggered by electrical sparks and fails to meet safety regulations for explosion-proof sites.

Misconception 5: Neglecting the installation environment and failing to select products with appropriate protection ratings: Some users directly use standard IP30-rated transmitters in outdoor, high-humidity, high-dust, or corrosive environments, leading to moisture ingress, dust accumulation, and corrosion. This causes premature failures, affecting equipment lifespan and system stability.

5.4 Customization Recommendations

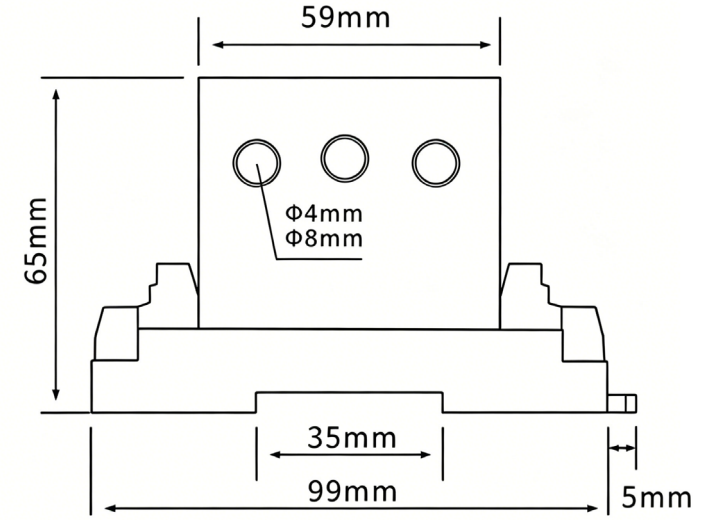
1. Custom Signal Solutions: If the downstream control system does not support DC 4–20 mA signals, customers may request custom non-standard output signals such as DC 0–20 mA, DC 0–5 V, or DC 0–10 V. Multi-signal output models can also be customized to simultaneously support both current and voltage signals, meeting the needs of simultaneous data acquisition across multiple systems.

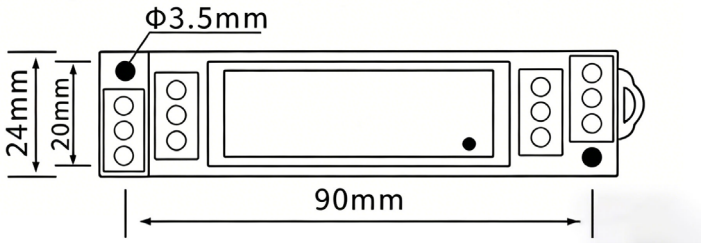
2. Custom Solutions for Non-Standard Operating Conditions: For special operating conditions such as high temperature, low temperature, high humidity, high dust, and strong corrosion, we offer wide-temperature models (-40°C to +85°C), models with enhanced protection ratings (IP65/IP67), and corrosion-resistant enclosures to adapt to various harsh field environments; For high-current circuits, extended-range models (e.g., AC 0–200 A/0–500 A) can be customized to meet the sampling requirements of high-current circuits.

3. Multi-Channel Integrated Customization Solutions: If multiple three-phase circuits are present on-site, customers can request a multi-channel integrated transmitter that consolidates the sampling functions of multiple three-phase circuits into a single device, thereby reducing installation space requirements, simplifying on-site wiring, and lowering system costs. Integrated DIN-rail mounting models are also available to accommodate cabinet installations where multiple devices are mounted together.

4. Custom Power Supply Solutions: For applications where a 24 V DC power supply is not available on-site, we offer customizable 220 V AC models and wide-voltage models (universal power supply: 85–265 V AC / 18–36 V DC) to accommodate various on-site power conditions. We also provide transmitters with power distribution outputs to supply auxiliary power to downstream sensors, thereby simplifying on-site power wiring.

5. Customized Functionality Expansion Solutions: Transmitters with alarm output functionality can be customized as needed. When three-phase current exceeds a preset threshold, the transmitter directly outputs a digital alarm signal to enable on-site local alarms. Transmitters with communication capabilities can also be customized to support the Modbus-RTU communication protocol, enabling remote data transmission and centralized monitoring.





VI. Installation and Commissioning Specifications

6.1 Pre-installation Preparation

1. Component Verification: After unpacking, inspect the unit's exterior to confirm it is a KXT43I three-phase AC current transmitter with a blue housing. Ensure the housing shows no damage, cracks, or burn marks; terminals must be intact with no oxidation or looseness; Verify that the product model, input range, output signal, and isolation specifications match the procurement requirements, ensuring no misdelivery of models or parameter discrepancies.

2. Environmental Inspection: Confirm that the installation area is a closed, dry environment such as an indoor cabinet or electrical control box; avoid areas with strong corrosive gases, heavy dust, standing water or condensation, and direct sunlight; keep the unit away from sources of strong electromagnetic interference such as variable frequency drives, high-power contactors, and high-frequency electric furnaces; Ambient temperature and humidity must remain within the product's rated operating range; direct installation of the bare unit in extremely harsh environments is prohibited.

3. Tool List: Prepare 35mm standard DIN rails, a Phillips-head insulated screwdriver, wire strippers, a multimeter, electrical tape, cold-pressed

terminal blocks, shielded twisted-pair cable, and yellow-green grounding wire to cover the entire installation, wiring, and power-on testing process.

4. Safety Precautions: Before installation, the three-phase high-voltage circuit at the front end and the low-voltage control power supply must be disconnected; strictly adhere to power-off procedures. Operators must wear insulated gloves and comply with low-voltage electrical safety regulations. Do not insert or remove terminals while the system is energized, and do not disassemble the equipment housing. Keep high-voltage and low-voltage wiring separate in distinct zones to eliminate the risk of cross-wiring and short circuits.

6.2 Standard Installation Procedure

1. Mounting the Rail: Select a standard 35mm industrial DIN rail and mount it horizontally on the rail beam inside the cabinet. Align the bottom latches of the KXT43I transmitter with the slots on the rail, then press down from top to bottom. The transmitter is securely installed once you hear the latches click into place. Gently shake the device to ensure it is not loose. For applications requiring long-term vibration resistance, additional rail mounting clips may be installed for reinforcement.

2. Wiring Classification Guidelines: Strictly separate the three terminal areas to ensure categorized wiring and the segregation of high-voltage and low-voltage circuits. Connect the power supply terminals exclusively to the DC power circuit; the input terminals correspond to the three-phase AC high-voltage line-tapping sampling points, while the output terminals connect to low-voltage data acquisition devices such as PLCs, DCS systems, and digital display instruments; all wires must be crimped onto cold-pressed terminals before insertion into the terminal sockets, and screws must be tightened to prevent loose connections, disconnection, or exposed bare wires.

3. Terminal Function Classification: Power terminals must distinguish between positive and negative poles to prevent reverse connection; the three-phase input features a through-hole sampling structure, requiring no additional wiring—simply thread the A, B, and C phase power cables through the corresponding three through-hole sampling ports on the device; analog output terminals must strictly distinguish between signal positive and signal negative poles, and connections must be made according to the control system's wiring definitions.

4. Grounding Requirements: The metal enclosure of the device must be reliably connected to the protective ground. The signal shielding layer uses a single-point grounding method, grounded uniformly on the control system side; the shielding layer on the transmitter side is left floating and not grounded. Multiple grounding points that could cause loop current interference are prohibited. The field power ground wire and the low-voltage signal ground wire must be completely separated and must not share the same grounding point.

6.3. Textual Explanation of Wiring Diagram + Wiring Specifications

1. Overall Wiring Layout: The KXT43I features a three-terminal isolated structure, divided into three independent zones: the power supply circuit, the three-phase input sampling circuit, and the analog output circuit. These zones are physically partitioned and electrically isolated throughout. High-voltage and low-voltage cables must be routed separately, maintaining a minimum spacing of 3 centimeters.

2. Power Terminal Wiring: Connect to an external standard 24 V DC power supply. Connect the positive terminal of the power supply to the device's positive power terminal, and the negative terminal to the negative power terminal. Mixing AC and DC power or connecting to overvoltage is strictly prohibited. The power circuit of the isolated model is independently isolated and does not require an additional series isolation module.

3. Three-Phase Input Wiring: This product features a through-hole current sensing design with no input terminals. Simply thread the three-phase AC power cables through the three independent through-holes in the device; the cables will pass through naturally without the need for stripping or wiring, ensuring the cable insulation remains intact.

4. Output Terminal Wiring: For 4–20 mA analog signal output, connect the output positive terminal to the positive terminal of the downstream data acquisition device's analog input, and connect the output negative terminal to the common negative terminal of the data acquisition device. Shielded twisted-pair cable must be used for long-distance transmission to reduce electromagnetic interference.

5. Shielding and Isolation Specifications: This is a three-terminal isolated model; the input, output, and power supply are fully electrically isolated, requiring no additional isolation devices. One end of the outer shielding mesh of the shielded cable must be crimped to a ground terminal and grounded at a single point on the low-voltage side of the control cabinet. The shielding layer at the transmitter end must be insulated; grounding at both ends is strictly prohibited.

6. Comparison of Correct and Incorrect Wiring Practices: Correct practices include routing high-voltage and low-voltage cables separately, ensuring terminals are securely crimped and tightened, grounding the shield at a single point, and connecting the power supply positive and negative terminals correctly. Incorrect practices include bundling high-voltage and low-voltage cables together, loose or poorly connected terminals, reversed power connections, grounding the shield at both ends, and using damaged or perforated high-voltage cables. These errors can directly cause signal distortion, equipment damage, and isolation failure.

6.4 Power-On Commissioning Procedure

1. No-Load Test: After all wiring is complete, re-inspect all connections, terminal tightness, and grounding methods. Once you have confirmed there are no misconnections, short circuits, or exposed wires, first connect the DC 24V control power supply. Observe the equipment's operating status under no-load conditions; if the unit shows no overheating, unusual noises, or strange odors, it is considered normal.

2. Signal Verification: Do not start the three-phase load equipment; keep it in a no-load state. Use a multimeter to measure the current value at the output terminal. If the output signal remains at the lower limit reference value under no-load conditions, the zero-point signal is deemed normal. Gradually engage the three-phase load, increasing the operating current from low to high, while simultaneously monitoring the linear variation of the 4–20 mA output signal.

3. Operational Assessment: This KXT43I transmitter with a blue housing has no additional status indicator lights; operational status is determined based on the stability and linearity of the output signal. A stable signal with no fluctuations or drift indicates normal operation; frequent signal fluctuations, no output, or a signal locked at full scale indicate wiring or equipment abnormalities.

4. Calibration Method: Perform calibration by comparing the product's range ratio against the actual on-site rated current range; use a standard current source or actual on-site load current to compare the PLC's local display value with the actual on-site current value. If a slight deviation occurs, calibration can be completed by fine-tuning the zero point and range within the backend control system; the device itself does not require disassembly for adjustment.

6.5 Installation Precautions

1. Overvoltage Power Supply Strictly Prohibited: Use only standard DC 18V to 36V DC power supply; do not connect to AC 220V or high-voltage DC power sources. Overvoltage or incorrect voltage will directly burn out the internal isolation circuit and signal processing chip, causing permanent damage to the device.

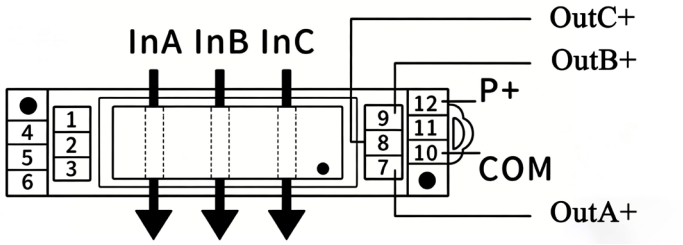
2. Avoid Installation in Areas with High-Voltage Interference: Do not install the device near variable frequency drives, high-power relays, or high-voltage contactors; do not run high- and low-voltage cables through the same conduit or cable tray. If high-interference equipment is located nearby, install isolation shields or increase the wiring distance to prevent signal distortion caused by common-mode interference.

3. Protective Measures for Humid Environments: Do not install the device in open-air, waterlogged, condensation-prone, or misty environments without a protective enclosure. In high-humidity, chemical vapor, or water treatment environments, the device must be used with a sealed protective enclosure to maintain ventilation and dryness inside the cabinet. Regularly inspect the insulation condition of the terminals

to prevent moisture-induced oxidation, which can lead to leakage and reduced isolation performance.

4. Do not modify or disassemble the device: Do not remove the blue housing, alter internal circuitry, or enlarge the cable entry port. Disassembly will damage the three-terminal isolation structure and insulation protection, resulting in the loss of isolation capability and voiding the product warranty.

5. Do not exceed the measurement range: The operating current at the site must not exceed the transmitter's rated input range. Prolonged overloading will cause the internal sensor unit to age, shortening the service life and reducing measurement accuracy and isolation stability.



VII. Recommendations for Daily Use and Operation & Maintenance

7.1 Key Points for Daily Inspections

1. Signal Stability Monitoring: Check the three-phase current data collected by the backend PLC/DCS system daily to confirm that the 4–20 mA output signal is stable with no sudden changes or abnormal drift. The trends in the three-phase data should synchronize with changes in the load of the on-site equipment, with no fixed full-scale values, no lower limit dead zones, and no frequent fluctuations.

2. Temperature and Humidity Monitoring: Check the temperature and humidity inside the transmitter cabinet weekly to ensure the operating environment remains within the range of -20°C to +60°C, with humidity controlled between 10% and 90% RH (non-condensing). Avoid high temperatures and high humidity, which can degrade equipment performance.

3. Visual Inspection of Appearance and Installation: Visually inspect the transmitter's blue housing for damage, discoloration, or burn marks; verify that the 35mm DIN rail mounting clips are secure, with no risk of loosening or detachment; ensure the terminal blocks show no signs of oxidation, discoloration, or dust accumulation, and that there is no abnormal heat generation or odor.

4. Load and Isolation Status Monitoring: Inspect the on-site three-phase load current monthly to confirm that the operating current does not exceed the transmitter's rated range; monitor the high-voltage circuits for abnormal surges or overvoltage to prevent impacts on the performance of the internal isolation circuits.

7.2. Regular Maintenance Plan

1. Cleaning Schedule: Clean the interior of the cabinet once every quarter. Use a dry, soft-bristled brush to remove dust and grease from the transmitter housing and terminal block surfaces. Do not use liquid cleaners or direct high-pressure air to rinse the equipment, to prevent liquid ingress into the device and cause short circuits.

2. Wiring Tightness Inspection: Conduct a tightening inspection of all terminal blocks every six months, focusing on the screws of the DC24V power supply terminals and signal output terminals to prevent loosening or loose connections caused by vibration and temperature changes during long-term operation. Simultaneously, inspect the core-tapping holes of the three-phase power cables to ensure the cable insulation is free from damage or deformation due to compression.

3. Accuracy Retest Recommendations: Conduct an annual accuracy retest of the transmitters using a standard current source or a known on-site load current. Compare the deviation between the transmitter's output signal and the data collected by the downstream control system to ensure that the linearity error remains within the range of ≤±0.2% FS. If the deviation exceeds the allowable range, fine-tune the zero point and span via the the downstream control system.

4. Isolation Performance Spot Checks: Conduct spot checks on the isolation withstand voltage of transmitters under critical operating conditions every 2 to 3 years to verify that the insulation performance between input and output, input and power supply, and output and power supply has not deteriorated, thereby ensuring the electrical isolation safety of the system.

7.3 Long-Term Maintenance Tips

1. Dust and Moisture Protection: Install dust filters inside the cabinet to reduce dust ingress. In high-humidity environments, place desiccants inside the cabinet or install a small dehumidifier to prevent condensation from forming on equipment terminals and the surface of the enclosure. Equipment that will be idle for an extended period should be stored in a sealed, dry, and well-ventilated environment to prevent moisture damage and aging.

2. Anti-Interference Optimization Measures: Ensure that the transmitter's signal output cables use shielded twisted-pair wiring throughout the entire run, with the shield grounded at a single point on the control system side only; route high- and low-voltage cables in separate channels or runs, maintaining a spacing of at least 3 cm to avoid routing them in the same conduit or channel; when installing near inverters or high-power equipment, install a metal isolation shield between the equipment and the transmitter to reduce the impact of electromagnetic interference.

3. Protection Against Extreme Environments: In high-temperature conditions, appropriately lower the ambient temperature inside the cabinet to prevent the equipment from operating continuously at temperatures above +50°C. In low-temperature conditions, verify the equipment's temperature compatibility in advance and install cabinet heating devices if necessary. For outdoor installations, use sealed enclosures with an IP65 or higher protection rating to prevent the ingress of rain and dust.

4. Overload and Surge Protection: Install appropriate surge protectors at the front end of the three-phase power circuit to reduce the impact of on-site overvoltage surges on the transmitter; avoid prolonged operation at full scale. Select equipment rated at approximately 80% of the rated current to allow for a margin of safety and extend the equipment's service life.

5. Regular Calibration and Backup: Establish equipment operation and maintenance records to document data from each inspection, maintenance, and accuracy retest; perform a complete signal linearity calibration on the transmitter every 2 years to ensure long-term operational accuracy stability; for equipment in critical operating conditions, keep a spare unit of the same model on hand to prevent production downtime caused by equipment failure.

VIII. Troubleshooting & Emergency Procedures

8.1. List of Common Faults

The transmitter has no output signal; the PLC/DCS cannot detect the 4–20 mA current signal

Signal drift or excessive deviation: Actual current is stable, but the output signal fluctuates continuously or deviates significantly from the true value over time

Output signal remains fixed at the lower limit (4 mA) or upper limit (20 mA) and does not vary with changes in the field current

Signal distortion due to interference: Field load is stable, but the signal fluctuates frequently, exhibits noise, and cannot be monitored normally

Abnormal heat generation at device terminals or housing, accompanied by an unusual odor or slight noise, posing a safety hazard

8.2 Analysis of Fault Causes

1. Wiring Errors: Reversed polarity of power supply terminals; reversed or loose connections at output signal terminals; shielding wire grounded at both ends; short circuits caused by mixed high-voltage and low-voltage circuits

2. Power Supply Abnormalities: DC24V supply voltage too low or too high; excessive power supply ripple; poor contact in the power supply circuit; blown power supply fuse

3. Signal Overload: The on-site three-phase current consistently exceeds the transmitter's rated range, or the load resistance on the output side exceeds the transmitter's maximum load capacity.

4. Environmental Interference: Strong electromagnetic interference (radiation from variable frequency drives or high-power equipment), co-installation of high- and low-voltage cables in the same conduit, excessive temperature or humidity inside the cabinet, or reduced insulation due to dust accumulation and contamination.

5. Equipment Damage: Internal isolation circuit breakdown, burned-out sampling unit, signal conditioning circuit failure, oxidation or burnout of terminal blocks

8.3 Step-by-Step Troubleshooting
Fault 1: Transmitter has no output signal
Troubleshooting Steps:
Disconnect the power supply, inspect the DC24V power supply circuit, confirm normal power output, and ensure terminals are not reversed or loose;
Check the wiring at the output signal terminals to ensure the signal positive and negative terminals correspond to the downstream data acquisition equipment, and that there are no open circuits or short circuits;
Check whether the on-site three-phase current is 0 (the output is 4 mA under no-load conditions, which is the normal lower limit; distinguish between "no signal" and "no-load signal");
If wiring and power supply are normal, replace with a spare transmitter of the same specification for testing to determine if the fault lies with the device itself.
Remedial Actions: Retighten terminals and correct wiring errors; replace a faulty power supply; if the fault is with the device itself, activate the spare unit.
Contingency Plan: Temporarily replace with a spare transmitter to prioritize the restoration of production monitoring; send the faulty device for repair.

Fault 2: Signal Drift / Excessive Deviation
Troubleshooting Steps:
Confirm that the on-site three-phase load is stable to rule out normal signal variations caused by load fluctuations;
Check the shielding wire grounding method to ensure single-point grounding only on the control system side, eliminating interference from multi-point ground loops;
Measure the output current with a multimeter and compare it with data collected on the PLC side to determine the source of the deviation;
Check the cabinet temperature and humidity to rule out performance drift caused by condensation or high temperatures.
Remedial Actions: Re-configure the shielded cable grounding; perform fine-tuning of the zero point and span on the PLC side; clean dust from the terminal blocks and improve the cabinet environment.
Contingency Plan: Temporarily correct the data deviation via the PLC side, while scheduling a shutdown period to calibrate or replace the transmitter.

Fault 3: Output signal locked at 4 mA/20 mA
Troubleshooting steps:
Verify the status of the three-phase load on-site; if the signal is locked at 4 mA, check whether the load is 0 or the input terminals are open-circuited; if locked at 20 mA, check whether the load exceeds the upper limit of the measurement range;
Check the load resistance on the output side to ensure it does not exceed the transmitter's maximum load capacity;
Investigate whether the high-voltage circuit has overcurrent or short-circuit conditions, causing the transmitter's sampling unit to lock into protection mode;
If the on-site load is normal, determine that the issue is an internal circuit fault in the device.
Remedial Actions: Restore normal load conditions or reduce load resistance; inspect and resolve high-voltage circuit faults; replace the device directly if it is faulty.
Contingency Plan: Replace with a spare transmitter to prevent affecting the equipment's overload protection function.

Fault 4: Signal Distortion Due to Interference
Troubleshooting Steps:
Check whether power and signal cables are routed through the same conduit or cable tray, and verify that the spacing meets standards;
Confirm that the shielded twisted-pair cable is undamaged and that the shield is properly grounded;
Check whether any new electromagnetic interference-generating equipment (such as variable frequency drives or high-frequency furnaces) has been added inside the cabinet;
Clean the terminal blocks and enclosure to eliminate interference caused by reduced insulation due to accumulated dirt.
Remedial Actions: Re-plan the cabling to separate high- and low-voltage circuits; replace damaged shielded cables; install a metal isolation shield between the interference source and the transmitter.
Contingency Plan: Temporarily reroute signal cables into a dedicated cable tray to reduce interference; schedule a system overhaul for later.

Fault 5: Abnormal Equipment Heating / Odor / Noise
Troubleshooting Steps:
Immediately cut off the power supply and stop equipment operation to prevent safety incidents;
Inspect terminal blocks for short circuits, loose connections, or burn marks;
Check three-phase power cables for damage or contact with the equipment housing;
Confirm whether the equipment has been operating beyond its rated range for an extended period, causing internal components to age or burn out.
Remedial Measures: Replace damaged terminal blocks and correct wiring errors; isolate damaged power cables; if the equipment itself is damaged, scrap it and replace it.
Emergency Plan: Immediately take the faulty equipment out of service, replace it with a backup unit, and resume operation only after identifying and eliminating safety hazards.

8.4. After-Sales Repair Guidelines
1. Criteria for Determining a Malfunction:
After following the troubleshooting steps above and ruling out wiring, power supply, load, and environmental factors, the malfunction persists;
The equipment exhibits physical damage such as a cracked housing, burnt terminals, unusual internal noises, or a burning odor;
Core performance metrics such as isolation voltage, sampling accuracy, and linearity exceed the product's specified range.
Repair Process:

2. Compile Equipment Information: Model (KXT43I), specifications (range, signal type, power supply), purchase date, on-site operating conditions, fault symptoms, and troubleshooting process;
Contact our after-sales support team to submit the equipment information and fault description;
Follow after-sales instructions to provide photos of the fault, test data, or return the faulty equipment for inspection and repair;
Await the after-sales inspection report to confirm the repair or replacement plan.
Contact Information: Submit repair requests through the sales engineer who handled the purchase, the official customer service hotline, or online customer service channels.

3. Warranty Coverage:
The standard warranty period for this product is 12 months from the date of shipment;
During the warranty period, free repair or replacement services are provided for equipment failures not caused by human error or improper use;
For equipment outside the warranty period, paid repair and replacement of parts services are available;
Damage caused by overvoltage, exceeding the measurement range, unauthorized disassembly or modification, or improper installation is not covered by the warranty.