BSA-I AC Current Transducer

I. Product Definition

The Qidian BSA-I AC Current Transmitter with a white housing is a three-terminal isolated AC current measurement and transmission device designed specifically for industrial automation applications. Its core function is to accurately convert AC current signals from industrial sites into standardized electrical signals, while achieving electrical isolation between the input, output, and power supply to ensure signal transmission stability and equipment safety. Its specific core functions are as follows:

1. Signal Conversion: Receives AC current input signals (standard ranges: AC 0–1 A, 2 A, 5 A, 10 A; customization available) and linearly converts them into standard industrial signals such as 4–20 mA or 0–10 V, compatible with downstream control devices including PLCs, DCS systems, and display instruments;
2. Three-way Isolation: Achieves electrical isolation between the input, output, and power supply, with an isolation rating of 2000 V AC/1 min, effectively blocking the transmission of interference signals;
3. Precise Measurement: Accuracy class 0.2% FS, temperature drift as low as 0.02% FS/°C (-20°C to +55°C), and a response time of ≤400 ms, ensuring precise capture of weak currents and dynamic current changes;
4. Compatible Installation: Features a white housing design compatible with standard 35mm DIN rail mounting. Compact size (approx. 20mm wide) fits the space-constrained layout of industrial control cabinets;
5. Wide-range power supply: Supports AC 85–265 V wide-voltage power supply or DC 24 V power supply, suitable for various industrial field power supply scenarios;
6. Anti-interference design: Complies with the GB/T 18268.1 (IEC 61326-1) EMC standard, capable of withstanding electromagnetic interference in industrial environments to ensure signal transmission accuracy.

II. Working Principle

The Qidian BSA-I AC Current Transmitter is based on the core logic of electromagnetic induction combined with electronic signal processing. It achieves precise transmission through a four-step process of "acquisition – conversion – isolation – output," as detailed below:

1. Signal Acquisition: The built-in current transformer (CT) captures AC current signals from industrial circuits. Based on the principle of electromagnetic induction, it converts the primary-side AC current into a weak induced voltage signal on the secondary side. The transformer's turns ratio determines the product's range adaptability;
2. Signal Conditioning: The induced voltage signal is fed into the signal processing circuit, where it undergoes amplification (to boost the weak signal strength), filtering (to remove noise and interference from the industrial environment), and linearization calibration (to ensure a linear proportional relationship between input and output signals), thereby eliminating signal distortion and noise;
3. Three-Point Isolation: The conditioned signal is isolated from the input, output, and power supply via optocoupler or magnetic coupling technology. This blocks the transmission of high-voltage and strong interference signals from the field to downstream control equipment, while also preventing power supply interference from affecting the measurement signal;
4. Standardized Output: The isolated signal is converted by the output circuit into standardized signals such as 4–20 mA (the most common) or 0–10 V, which are then transmitted to PLCs, DCS systems, or display instruments to enable remote monitoring, display, and automated control of current data.

III. Core Values

3.1 Core Values and Customer Challenges Addressed

---Resolving non-standard signal transmission issues: AC current signals from industrial sites cannot be directly recognized by systems such as PLCs and DCSs. The BSA-I converts these signals into standard formats, eliminating the pain point of "system data acquisition failure due to signal incompatibility" and enabling precise data integration into automation systems;

--- Resolving measurement distortion caused by on-site interference: Industrial environments often involve strong electromagnetic interference and ground potential differences, which can easily lead to signal distortion and equipment damage. The three-terminal isolation design blocks the transmission of interference, ensuring measurement accuracy and equipment safety, and addressing the core pain point of "inaccurate data and equipment failures caused by interference";

---Solves installation compatibility issues: With a white housing and a 35mm DIN rail mounting design, it fits the compact layout of industrial control cabinets, replacing traditional bulky measurement devices and addressing the pain points of "insufficient cabinet space and installation difficulties";

---Solving multi-scenario power supply compatibility issues: Supports wide-range AC/DC power supply, adapting to power conditions in various industrial environments (such as power generation, chemical, and metallurgy), addressing the pain point of "inability to adapt to on-site conditions due to limited power supply options";

----Reducing long-term operational and maintenance costs: High-precision, high-stability design reduces the frequency of calibration and repairs, while anti-interference features lower the probability of equipment failure, addressing the pain point of "high operational costs and significant downtime losses caused by frequent maintenance."

3.2 Core Pain Points and Solutions

Q: Can AC current signals from industrial sites not be directly connected to PLC/DCS systems, preventing the implementation of automated monitoring?

A: Provides standard industrial signal outputs such as 4-20mA and 0-10V, directly compatible with mainstream automation control equipment, enabling standardized transmission of current signals and system integration without the need for additional conversion devices.

Q: Do strong electromagnetic interference and ground potential differences at the site cause current measurement data distortion or even damage downstream control equipment?

A: Utilizes three-terminal isolation technology (isolating input, output, and power supply; isolation strength: 2000 V AC/1 min) to block the transmission of interference signals. This simultaneously protects downstream equipment from high voltages and strong interference at the site, ensuring measurement accuracy and equipment safety.

Q: Industrial control cabinets have limited space, and traditional current measurement devices are too bulky, making installation difficult?

A: Designed with a compact white housing compatible with 35mm standard DIN rails, each module is only approximately 20mm wide. This fits the compact layout of control cabinets, simplifies installation, and requires no additional cabinet modifications.

Q: Do different industrial sites have varying power supply types (AC 220V/DC 24V), making it difficult for equipment to adapt?

A: It supports wide-range AC 85–265V or DC 24V power supply, adapting to power conditions in various industrial sites such as power generation, chemical, and metallurgical plants, eliminating the need to replace power modules for different scenarios.

Q: Industrial environments are harsh, and equipment is prone to interference, leading to frequent failures and high maintenance costs?

A: Complies with EMC interference resistance standards. The built-in filter circuit effectively removes noise. Additionally, the design features high accuracy (0.2% FS) and low temperature drift (0.02% FS/°C), ensuring long-term stable operation, reducing the frequency of calibration and repairs, and lowering maintenance costs.

IV. Key Product Specifications

4.1. Basic Electrical Specifications

Input Signal Type: AC Current
Input Range (Standard): AC 0–1 A / 0–2 A / 0–5 A / 0–10 A
Input Frequency: 50 Hz/60 Hz (Power Frequency)
Output Signal Type: DC 4–20 mA (Standard) / 0–10 V / 0–20 mA
Accuracy Class: ±0.2% FS
Linearity: ≤±0.2% FS
Response Time: ≤400 ms
Load Capacity: (4–20 mA Output) ≤500 Ω

4.2 Isolation Performance Parameters

Isolation Type: Three-way isolation (input – output – power supply)
Isolation Voltage: 2000 V AC / 1 min
Insulation Resistance: ≥100 MΩ (500 V DC)
Common-Mode Rejection Ratio: ≥120 dB

4.3 Power Supply & Power Consumption Parameters
Power Supply Voltage Type: Dual-power supply compatible (AC/DC)
AC Input Range: AC 85–265 V
DC Input Range: DC 24 V (typical)
Full-Load Power Consumption: ≤3W
Rated Power Consumption: Approx. 2W

4.4 Environmental Parameters
Operating Temperature: -20°C to +55°C
Operating Humidity: 10% to 90% RH (non-condensing)
Storage Temperature: -40°C to +70°C
Storage Humidity: 5% to 95% RH (non-condensing)
Protection Rating: IP20
Explosion-Proof Rating: Non-explosion-proof
EMC Standard: Complies with GB/T 18268.1 (IEC 61326-1)

4.5. Physical Parameters
Appearance: White housing,
Mounting: 35mm standard DIN rail mounting
Dimensions: L × W × H = 100 mm × 22.5 mm × 110 mm (including terminal blocks)
Weight: Approx. 0.2 kg / unit
Indicator Definitions: PWR (Power Indicator): Green, steady light indicates normal power supply;
ALM (Alarm Indicator): Red, steady light indicates equipment failure / signal abnormality
Housing Material: Flame-retardant ABS engineering plastic
Terminal Blocks: Green plug-in terminals
Wiring Labels: Input side: AC Input (L/N/CT);
Output side: DC Output (+/-);
Power supply side: Power Supply (L/N/+/−)

V. Application-Specific Selection Guide
5.1 Key Selection Criteria
1. Signal Type Selection
Prioritize selecting the AC current input type based on the signal being measured on-site. For the output signal, prioritize the industry-standard 4–20 mA analog signal. If connecting to a display instrument or data acquisition module, select the 0–10 V output to ensure full compatibility with downstream PLCs, DCS systems, and configuration software.
2. Channel Selection
For single-loop current monitoring, select the standard 1-input, 1-output configuration. If a single measurement point requires simultaneous connection to both a control system and a display instrument, or if redundant transmission is needed, choose the 1-input, 2-output dual-output model to avoid accuracy loss caused by signal splitting.
3. Power Supply Selection
When control cabinets are uniformly equipped with a 24V DC switching power supply, select the 24V DC version directly; when no DC power is available on-site and only AC mains power is provided, select the 85-265V AC wide-voltage version to ensure stable operation of the equipment.
4. Selection Based on Explosion-Proof Requirements
For standard workshops, electrical rooms, and environments free of flammable or explosive gases, select the standard white-cased BSA-I general-purpose model. In hazardous areas with flammable or explosive dust or gases, the device must be used in conjunction with a safety barrier or a custom explosion-proof model; direct use of the general-purpose model is prohibited.
5. Selection Based on Installation Environment
For installation inside standard industrial control cabinets, select the standard-size model with 35mm DIN rail mounting; for extremely compact spaces or densely arranged setups, choose the ultra-thin custom housing model; for outdoor or high-humidity, high-corrosion environments requiring enhanced protection ratings, the housing and sealing structure must be custom-designed.

5.2. Recommended Models for Industry Applications
1. Chemical Industry Applications
Chemical production sites are characterized by electromagnetic interference, high ground potential differences, and corrosive gases. We recommend the Qidian BSA-I three-terminal isolated AC current transmitter, which comes standard with 24 VDC power supply and 4–20 mA output. It meets the requirements for pipeline current monitoring and equipment operating current data acquisition, and its robust isolation design effectively safeguards the control system.
2. Power Industry Applications
For monitoring in substations, distribution rooms, and low-voltage distribution circuits, we recommend the BSA-I Standard Model. It supports a wide input voltage range of 85–265 VAC, making it suitable for utility power environments. Its three-terminal isolation protects against power grid surges and harmonic interference, making it ideal for current acquisition in distribution panels and energy consumption monitoring systems.
3. Metallurgy Industry Applications
Metallurgy sites are characterized by strong electromagnetic interference, a high density of high-current equipment, and significant fluctuations in ambient temperature. We recommend the BSA-I High-Precision Model, which ensures signal stability through high isolation voltage and high common-mode rejection ratio. It is suitable for current monitoring of high-power equipment such as rolling mills, fans, and pumps.
4. Pharmaceutical Industry Applications
Pharmaceutical production areas require high cleanliness standards, feature orderly equipment layouts, and have compact control cabinet spaces. We recommend the white-cased, DIN-rail mountable BSA-I model. Its clean appearance is easy to maintain, and the standard 4–20 mA output is compatible with current monitoring for automated production lines and equipment in cleanrooms.
5. Smart Manufacturing Industry Applications
For automated production lines, machine tools, and robotic workstations, we recommend the standard BSA-I model with 24 VDC power supply and 1 input/1 output configuration. Its compact size and easy installation allow for quick integration with PLCs to enable current overload detection and equipment operational status monitoring.

5.3 Common Selection Pitfalls
Pitfall 1: Ignoring Isolation Levels
Focusing solely on measurement accuracy while neglecting three-terminal isolation can lead to signal drift and data fluctuations in high-interference environments. In severe cases, this may cause the downstream control system to fail. When selecting a device, it is essential to ensure full isolation of the input, output, and power supply terminals.
Misconception 2: Selecting the Wrong Signal Range
If the actual current significantly exceeds the selected range, it can cause measurement saturation and data distortion; conversely, an excessively wide range may result in insufficient measurement accuracy for small currents. The appropriate range should be selected based on 1.2 to 1.5 times the actual current of the circuit being measured.
Misconception 3: Neglecting Load Matching
Failure to account for the resistance of the transmission line and the instrument's internal resistance can result in insufficient load-carrying capacity for the 4–20 mA output signal, leading to signal attenuation and inaccurate data acquisition. Before selection, ensure the total load does not exceed 500 Ω.
Misconception 4: Selecting General-Purpose Models for Explosion-Proof Environments
Using standard white-cased BSA-I models directly in flammable and explosive hazardous environments—without safety barriers or explosion-proof models—poses safety hazards and compliance risks. In such scenarios, explosion-proof solutions must be selected in accordance with regulations.

5.4 Customization Recommendations
1. Custom Signal Configuration
For non-standard AC current inputs on-site, or when special output signals such as 0–5 V or 1–5 V are required, the measurement range and output type can be customized based on actual parameters to ensure full compatibility with on-site equipment.
2. Customization for Non-Standard Operating Conditions
For harsh operating conditions—such as temperatures outside the -20°C to +55°C range, high humidity, high salt fog, or strong vibrations—we can customize products with extended temperature ranges, enhanced protection, or anti-vibration reinforcement to extend service life.
3. Multi-Channel Integrated Customization
For simultaneous monitoring of multiple AC current channels, we offer customizable 2-channel or 4-channel integrated transmitters. This reduces installation space, centralizes power supply and wiring, and lowers overall costs and installation complexity.

4. Customization of Appearance and Markings

Based on the project requirements, we can retain the white housing while customizing the logo, model number, wiring labels, and other markings to meet branding needs for export and integrated equipment packages.

VI: Installation and Commissioning Guidelines

6.1 Pre-installation Preparation

1. Verification of Components

After unpacking, verify that the product model is the Qidian BSA-I white-cased three-terminal isolated AC current transmitter. Inspect the exterior for any dents, cracks, or deformation/missing terminals. Confirm that the certificate of conformity, manual, and wiring labels are complete. Verify that the current range, output signal, and supply voltage match the project requirements.

2. Environmental Inspection

Confirm that the installation location is inside an indoor control cabinet. The environment must be free of strong vibrations, corrosive gases, and flammable or explosive dust. The ambient temperature must be within the range of -20°C to +55°C, and humidity must not cause condensation. The installation location must be kept away from strong interference sources such as variable frequency drives, contactors, and high-current power cables.

3. Tool List

Prepare 35mm standard DIN rails, a Phillips screwdriver, wire strippers, crimping pliers, a multimeter, a current signal generator, electrical tape, and cable ties; if shielded cables are used, provide shield grounding terminals.

4. Safety Precautions

All on-site power must be disconnected before installation; live wiring is strictly prohibited. Wiring personnel must wear insulated gloves and comply with low-voltage electrical work regulations; Verify that the supply voltage matches the product's rated voltage to prevent incorrect connections from damaging the equipment; do not insert or remove terminals while the power is on.

6.2 Standard Installation Steps

1. Mounting the Rail

Align the white housing's bottom latches on the BSA-I transmitter with the 35mm standard DIN rail, press down evenly, and push forward firmly to ensure the latches are fully engaged with no play; When installing multiple units side-by-side, it is recommended to leave a 10–15 mm spacing to facilitate heat dissipation and wiring operations.

2. Wiring Guidelines

Strictly distinguish between the power supply terminal, AC current input terminal, and signal output terminal according to the product terminal markings; do not connect them incorrectly.

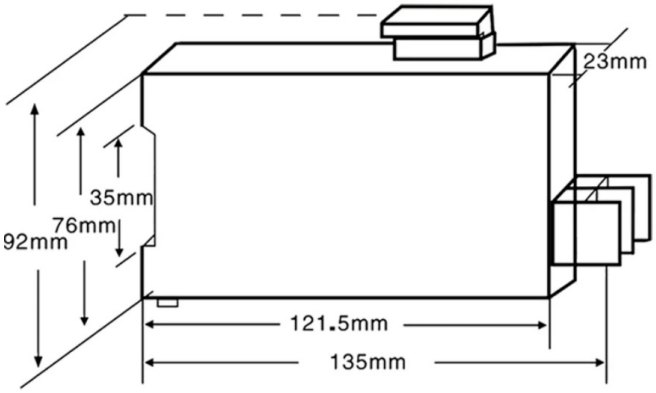
Power Terminals: Connect to a 24 V DC or 85–265 V AC power source; connect the positive and negative terminals to the corresponding marked terminals;

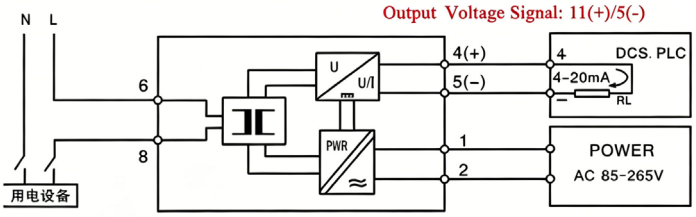
Input Terminals: Connect the measured AC current signal; connect in series without regard to polarity;

Output Terminals: Distinguish between positive and negative terminals according to the markings; for 4–20 mA output, connect the positive terminal to the positive terminal of the PLC or instrument's analog input, and the negative terminal to the common terminal.

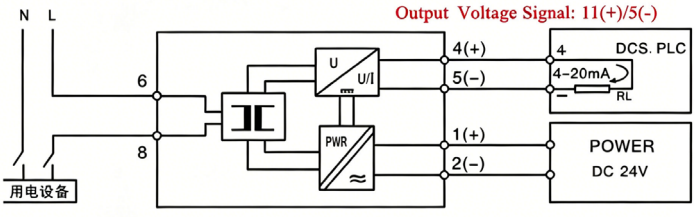
3. Grounding Requirements

The housing of the three-terminal isolated transmitter does not require forced grounding; the shield of the shielded cable must be grounded at a single point. It is recommended to ground it at a single point on the instrument side in the control room. Grounding at both ends to form a ground loop and introduce interference is strictly prohibited; the control cabinet must be reliably grounded, with a grounding resistance ≤4Ω.

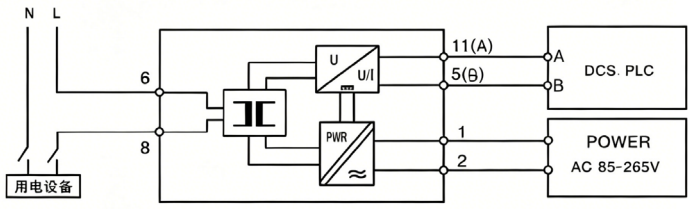




1 In 1 Out (AC220V Supply)



1 In 1 Out (DC24V Supply)



1 In 1 Out (AC220V Supply)

RS485 Output

6.3 Wiring Diagram

1. Standard Wiring Configuration

Power Supply Side: DC24V+ → Power Supply Positive Terminal; DC24V– → Power Supply Negative Terminal

Input Side: AC Current Loop → Transmitter Current Input Terminal

Output Side: Transmitter Output + → PLC / Data Acquisition Module / Instrument Signal +; Output– → System Common Ground (GND)

2. Shield Grounding Procedure

Use shielded twisted-pair cable for signal transmission. Ground the shield at a single point at the control room instrument end; at the field end, leave the shield floating and insulated, ensuring it does not contact equipment enclosures or cable trays to prevent common-mode interference.

3. Specifications for Isolated Models

The BSA-I features a three-terminal isolated structure, with the input, output, and power supply completely independent of one another. When wiring, there is no need to consider common ground issues; it can be directly connected to systems with different potentials without requiring additional isolators.

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

Correct: Power, input, and output lines are routed separately; high-voltage and low-voltage circuits are kept apart; the shield is grounded at a single point.

Incorrect: Power lines and signal lines are bundled together; the shield is grounded at both ends; the output polarity is reversed; the power supply is connected with overvoltage.

6.4 Power-On and Commissioning Procedure

1. No-Load Test

After completing the wiring and verifying that it is correct, apply power. Observe the PWR power indicator; a steady green light indicates normal power supply. If the indicator does not light up, immediately disconnect the power and check the supply voltage, wiring polarity, and fuses.

2. Signal Calibration

Apply a standard AC current signal and use a multimeter to measure the output signal:

When the input current is 0, the output should be approximately 4 mA;

When the rated full-scale current is applied, the output should be close to 20 mA;

The linear response at intermediate points should be normal, with no sudden changes or drift.

3. Indicator Status Assessment

PWR green steady: Power supply normal;

PWR off: Power supply failure or wiring error;

No ALM alarm indicator: This standard model does not have an alarm

indicator;
operating status is determined by the stability of the output signal.
4. Calibration Method
If a slight deviation occurs, use a small screwdriver to fine-tune the internal calibration potentiometer; zero corresponds to 4 mA, and full scale corresponds to 20 mA. Calibration must be performed at room temperature. After calibration, seal the calibration port to prevent dust from entering.

6.5 Installation Precautions
---Never connect the device to a power supply voltage outside the product's specified range. Never connect an AC power source to the DC terminals to prevent instantaneous module breakdown.
---Never run the transmitter signal cables in the same conduit as high-voltage power cables or variable frequency drive cables to avoid data drift caused by strong electromagnetic interference.
---Never install the device directly in open-air, rain-exposed, condensation-prone, or high-humidity environments. If no protective enclosure is available, the device must be placed inside a sealed control cabinet; install a dehumidifier if necessary.
---Never apply high currents exceeding the rated range to prevent long-term overloads that may cause accuracy degradation or damage to internal transformers.
---Never disconnect terminals or short-circuit inputs and outputs while the device is powered on to prevent damage to the transmitter and downstream equipment.
---Never use the device directly in flammable or explosive environments without explosion-proof treatment; it must be equipped with a safety barrier or a custom explosion-proof model must be selected.

7: Recommendations for Daily Use & Maintenance
7.1 Key Points for Daily Inspections
1. Observation of Indicator Light Status
During daily inspections, prioritize checking the status of the power indicator light (PWR): For models powered by DC24V or AC85-265V, the power indicator light must remain solid green. If the light flashes or goes out, immediately check whether the supply circuit voltage is stable and whether the terminal connections are loose to eliminate potential power supply issues; The standard version of this model does not have an alarm indicator; therefore, you must rely on the signal status from the backend DCS/PLC to determine whether the device is operating normally.
2. Monitoring Signal Stability
Daily, review the current signal curves collected by the DCS, PLC, or display instruments, paying close attention to any irregular fluctuations, value drift, or output saturation. If signal fluctuations exceed ±0.5% FS, investigate whether there is strong electromagnetic interference, poor wiring contact, or abnormal load matching, and promptly identify the root cause of the signal abnormality.
3. On-Site Temperature and Humidity Monitoring
During routine inspections, simultaneously monitor the internal environment of the control cabinet where the transmitters are installed: the operating temperature must be maintained between -20°C and +55°C to prevent accelerated aging of internal components due to high temperatures; ambient humidity must be controlled between 10% and 90% RH (non-condensing) to prevent condensation from causing terminal short circuits or circuit board corrosion. If humidity exceeds the specified limits, promptly activate dehumidification equipment or improve ventilation conditions.

7.2. Regular Maintenance Plan
1. Equipment Cleaning Schedule and Procedures
--- Basic Cleaning: Perform surface cleaning once every quarter. Use a dry, soft cloth to wipe down the white housing and terminal blocks, removing dust and grease to prevent dust buildup from affecting heat dissipation. Do not use wet cloths, alcohol, or corrosive cleaning agents to prevent discoloration of the housing and oxidation of the terminals.
--- Deep Dust Removal: For transmitters installed in dusty metallurgical or chemical workshops, disassemble the mounting rail once a year to perform internal dust removal. Focus on cleaning dust from terminal gaps and heat dissipation vents to prevent dust accumulation from causing a decline in insulation performance.
2. Wiring Tightness Inspection
--- Perform a tightening operation on all terminal blocks every six months: Use a screwdriver to tighten the screws on the power, input, and output terminals to the standard torque (0.5–0.8 N·m). Check whether the shielding wire ground terminal and rail clips are loose. Pay special attention to inspecting power and signal lines for loose connections or oxidation to prevent signal interruptions or equipment damage caused by poor contact.
3. Recommendations for Accuracy Retesting and Calibration
---Retest Interval: Under normal operating conditions, perform an accuracy retest once every 12 months. In harsh environments such as metallurgy and chemical processing, it is recommended to retest every 6 months.
---Verification Method: Use a standard AC signal generator to input signals at 0%, 50%, and 100% of the rated range. Measure the corresponding output signals with a multimeter. If the deviation exceeds ±0.2% FS, fine-tune the internal calibration potentiometer according to the instructions in the manual. After calibration, maintain records and markings to ensure measurement accuracy meets process requirements.

7.3 Long-Term Maintenance Tips
1. Dust and Moisture Protection Measures
--- Dust Protection: In environments with high dust concentrations, install dust filters inside the control cabinet or use custom transmitters with sealed terminals to prevent dust from entering the equipment. During prolonged downtime, cover the transmitter with a dust cover to reduce dust accumulation.
--- Moisture Protection: Install desiccants or dehumidification modules inside control cabinets to prevent condensation caused by temperature differences. For equipment in coastal or high-humidity areas, apply moisture-resistant insulating compound to terminal blocks to prevent oxidation and short circuits, thereby extending the equipment's service life.
2. Anti-Interference Optimization Solutions
--- Wiring Optimization: Regularly verify that signal cables maintain a distance of at least 30 cm from power cables. Use shielded twisted-pair signal cables with single-ended grounding to prevent ground loops caused by dual-ended grounding. If on-site interference is severe, install signal isolators in the output circuit to further filter out interference signals.
--- Grounding Optimization: Inspect the control cabinet grounding system annually to ensure grounding resistance is ≤4Ω, thereby preventing interference caused by ground potential differences. Transmitter enclosures do not require mandatory grounding, but should not share a grounding busbar with high-voltage equipment.
3. Long-Term Protection in Extreme Environments
---High-Temperature Environments: During summer heat, check the operating status of the control cabinet's cooling fans and install additional cooling modules if necessary to prevent transmitters from operating continuously in environments exceeding 55°C. If ambient temperatures consistently exceed limits, replace the transmitters with custom wide-temperature models.
-- - Low-Temperature Environments: During cold winter months, check the equipment terminals for frost buildup to prevent performance degradation of electronic components due to low temperatures; in low-temperature operating conditions, select custom models with low-temperature reinforcement to ensure stable equipment operation.
--- Corrosive Environments: In environments with corrosive gases, such as chemical and pharmaceutical facilities, customize enclosures with anti-corrosion coatings or install transmitters in sealed, corrosion-resistant control cabinets; regularly inspect enclosures for corrosion or damage and replace protective components promptly.

VIII: Troubleshooting & Emergency Procedures
8.1 List of Common Faults
--- No output signal (output is 0 or remains constant at a fixed value, not varying with the input current)
--- Output signal drift/fluctuation (signal fluctuates erratically, with deviations exceeding ±0.5% FS)
--- Abnormal power indicator (does not light up / flashes / brightness fluctuates)
--- Signal Interference and Distortion (Curve contains excessive noise, frequent value fluctuations, and does not match actual current)
--- Output Saturation (Remains at 20 mA or full scale, fails to decrease as current drops)

8.2, Analysis of Fault Causes
--- Wiring errors: Reversed connection of power terminals to input/output

terminals, reversed output polarity, or incorrect shield grounding causing loop abnormalities
---Power Supply Abnormalities: Supply voltage exceeds the device's rated range; poor power connections; voltage drop in the power circuit
---Signal Overload / Out-of-Range: Input current exceeds the transmitter's rated range, causing internal transformers or signal processing circuits to saturate
-- - Environmental Interference: Signal cables routed in the same conduit as high-voltage cables; proximity to strong interference sources such as inverters or contactors; ground loops caused by ground potential differences
--- Equipment Damage: Internal circuits burned out by surge impacts; terminal oxidation or corrosion; component aging and failure due to prolonged exposure to high temperatures or humidity

8.3 Step-by-Step Troubleshooting
1. No output signal from the device
Troubleshooting steps:
① First, check the status of the power indicator light. If it is not lit, check the supply circuit voltage, wiring polarity, and fuses first;
② Check whether the input current circuit is conductive and whether the secondary side of the current transformer is open;
③ Use a multimeter to measure the output terminals to confirm there are no short circuits or open circuits;
④ If all of the above are normal, replace the transmitter with the same model for testing to determine if the fault lies with the device itself.
Remedial Actions:
Wiring Error: Rewire according to terminal labels, distinguishing between power supply, input, and output circuits; cross-wiring is strictly prohibited;
Power Supply Abnormality: Replace with a stable power supply; ensure that the DC 24V supply fluctuation does not exceed ±10%, and that the AC 85–265V supply is free of surges;
Contingency Plan: Temporarily replace the transmitter with a spare unit on-site while simultaneously sending the faulty device for repair to avoid downtime losses.
2. Output Signal Drift / Jitter
Troubleshooting Steps:
① Observe the DCS/PLC acquisition curves to determine if the jitter occurs in sync with the startup or shutdown of high-power equipment on-site;
② Check whether signal cables are laid parallel to power cables and whether the shielding is grounded at both ends;
③ Re-measure the supply voltage to ensure stability and investigate excessive power supply ripple;
④ Apply a stable current from a standard signal source to determine if the drift originates from the transmitter itself.
Remedial Actions:
Interference Issues: Replace signal cables with shielded twisted-pair cables, ground only at the control room end, and maintain a distance of at least 30 cm from power lines;
Power Supply Ripple: Install a power filter and replace the switching power supply with one that has lower ripple;
Accuracy Deviation: Fine-tune the zero and full-scale potentiometers according to the calibration procedure; if the deviation exceeds the tolerance, send the unit to the factory for calibration.
3. Abnormal Power Indicator Light
Troubleshooting Steps:
① Use a multimeter to measure the voltage at the power terminals and confirm that it is within the device’s rated supply range;
② Check whether the power terminals are loose or oxidized, and retighten the connections;
③ If the power supply is normal but the indicator light does not illuminate and there is no output, determine that the internal power circuit of the device is damaged.
Remedial Measures:
Loose connections: Re-tighten the terminals and clean oxidized contact surfaces;
Abnormal voltage: Replace with a power supply that meets specifications; avoid overvoltage or undervoltage operation;
Emergency plan: Replace with a backup device; do not continue to power the faulty device to prevent further damage.
4. Signal Interference and Distortion
Troubleshooting Steps:
① Check whether the signal cables run near strong interference sources such as inverters or contactors;
② Verify that the shielding is properly grounded and ensure there is no double grounding;
③ Check whether the grounding resistance of the control cabinet exceeds the standard and whether multiple devices sharing a common grounding busbar is causing a ground potential difference.
Remedial Measures:
Wiring Optimization: Rewire the system, route signal cables through separate conduits, and keep them away from high-voltage equipment;
Grounding Correction: Ground the shield at a single point; ensure the control cabinet has a dedicated ground connection with grounding resistance ≤4Ω;
Interference Mitigation Upgrade: Install signal isolators in the output circuit to enhance interference resistance.
5. Output Signal Saturation
Troubleshooting Steps:
① Measure the actual current at the site to confirm whether it exceeds the transmitter’s rated range;
② Check the input circuit for short circuits that may cause abnormally high current;
③ If the current is within range but the output is saturated, determine that the internal circuitry is damaged.
Remedial Actions:
Out-of-range issue: Replace the transmitter with one of a higher range, or adjust the on-site current loop;
Loop short circuit: Troubleshoot faults in electrical equipment; repair the short circuit point and then retest after powering on;
Equipment damage: Replace the equipment immediately; do not continue using it to avoid damaging downstream PLCs or instruments.

8.4. After-Sales Repair Guidelines
1. Criteria for Determining Malfunctions
The power supply is normal and the wiring is correct, but the device has no output or the output deviation exceeds ±0.5% FS;
After ruling out environmental interference and load matching issues, the signal continues to drift or fluctuate and cannot be resolved;
After the device is subjected to surges or overvoltage, the indicator light does not illuminate and there is no signal output;
The device housing or terminals show signs of burning, deformation, or damage to internal components.
2. Repair Process
 Prepare device information: Model (BSA-I), serial number, installation date, and on-site conditions (power supply method, measurement range, load conditions);
 Take photos/videos of the fault: device exterior, wiring status, DCS/PLC acquisition curves;
 Contact after-sales channels: Submit a repair request through official customer service, authorized dealers, or project liaison engineers;
 Cooperate with troubleshooting: Provide on-site test data and complete preliminary troubleshooting according to technical guidance;
 Return for repair/replacement: Once the device is determined to be faulty, return it for repair or request a replacement unit according to the procedure.
3. Contact Information
Official after-sales phone number / email (subject to actual published information), or contact the corresponding sales representative at Anhui Qidian Automation Technology Co., Ltd. for technical support.
Warranty Coverage
Warranty Period: 12 months from the date of shipment. Equipment failures not caused by human error or force majeure will be repaired or replaced free of charge;
Exclusions from Warranty: Damage resulting from incorrect wiring, overpressure or over-range operation, unauthorized disassembly or modification, or failure to follow protective measures in harsh operating conditions is not covered by the free warranty;
Post-Warranty Services: Paid repair and calibration services are available; specific costs will be assessed based on the nature of the fault.