JXK-10-22-Z

True RMS Current Transmitter

Frequently Asked Questions (FAQ)

Closed-Loop Type | 22mm Aperture

Measurement Range: 10A ~ 1000A

Output: 4-20mA / 0-10V / RS485 / CAN

Dual Acquisition Mode: Total RMS (AC+DC) / AC-only

Document No.	JXK-FAQ-10-22-Z-V1.0
Revision	V1.0
Release Date	October 2026
Applicable Model	JXK-10-22-Z V2.6

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1. Product Overview

Q1: What is the JXK-10-22-Z True RMS Current Transmitter?

The JXK-10-22-Z is a closed-loop, hall-effect-based True RMS current transmitter designed for industrial current measurement applications. It converts large primary currents (10A to 1000A) into standardized process signals using a 22mm through-hole (window-type) design.

Key features include:

- True RMS measurement for accurate reading of distorted/non-sinusoidal waveforms
- Dual acquisition modes: Total RMS (AC+DC) and AC-only
- Multiple output options: 4-20mA, 0-10V, RS485, CAN
- High accuracy: 0.5% with 0.2% linearity
- Wide bandwidth: 0~5kHz
- Electrical isolation: 2.5kV DC, 1 minute
- DIN rail mounting with compact form factor
- Built-in protection: input overload, output overcurrent, power reverse polarity, overvoltage

Q2: What are the key technical specifications?

Primary specifications include:

- Installation: DIN standard rail (35mm)
- Power supply: DC24V (18-32V), AC220V (60-265V), DC12V
- Primary measurement range: 10~1000A
- Output: 0-5V, 0-10V, 0~20mA, 4~20mA, RS485, CAN, user-specified
- Linearity: 0.2% F.S
- Accuracy: 0.5% F.S
- Isolation voltage: DC 2.5kV, 1Min
- Temperature drift: ≤250ppm/℃
- Bandwidth: DC 0~5kHz
- Power consumption: ≤2W
- Response time: ≤200ms
- Operating temperature: -20℃ ~ 60℃
- Storage temperature: -25℃ ~ 85℃
- Aperture: 22mm
- Dimensions: 60mm(H) x 106mm(W) x 24mm(D)

2. Output Configuration

Q3: What output types are available and how are they configured?

The JXK-10-22-Z supports four output configurations, set via solder jumpers at the factory:

Output Type	Configuration Method	Notes
4-20mA (Default)	Factory default, no modification needed	Most widely used industrial standard
Voltage 0-10V	Solder 500 ohm resistor on R48 (1206)	For voltage-input PLC/DAQ systems
RS485 Communication	Remove R1, R2; solder RS485 module	Modbus RTU protocol, up to 256 nodes
CAN Communication	Remove R1, R2; solder CAN module	CAN-H/CAN-L differential pair

Note: Output configuration is set at factory and cannot be changed in the field. Please confirm your required output type when placing orders.

Q4: What is the terminal pin definition?

The JXK-10-22-Z uses a KF142R-5.08-4P terminal block with the following pinout:

Pin	Function
1	Power Supply Positive / AC Line (L)
2	Power Supply Negative / AC Neutral (N)
3	Signal Output Positive / Voltage Output Positive / RS485-B / CAN-L
4	Signal Output Negative / Voltage Output Negative / RS485-A / CAN-H

Important: Power supply must be connected strictly according to the wiring diagram. Reversing polarity will trigger the reverse polarity protection and may cause temporary malfunction.

3. Measurement Mode Selection

Q5: How do I switch between Total RMS and AC-only modes?

The JXK-10-22-Z features two acquisition modes that can be switched via the button on the right side of the control board:

Mode Switching Procedure:

- Press and hold the button on the right side of the control board for 3 seconds
- Observe the status LED indicator
- Single flash per second = Total RMS (AC+DC) mode
- Double flash per second = AC-only mode
- Mode change is confirmed when the LED pattern changes
- It is recommended to observe for at least 2 seconds to confirm the mode

Mode Selection Guide:

- Use Total RMS (AC+DC) when: measuring total effective value including DC component; factory default mode
- Use AC-only when: measuring only AC component; comparing with instruments that use AC measurement definition; removing DC mean value
- Note: Mode selection affects readings significantly. Always confirm the measurement mode matches your application requirement and the reference instrument definition.

LED Indication Pattern:

- Single flash: LED ON ~100ms, OFF ~900ms (period = 1 second)
- Double flash: LED ON ~100ms, OFF ~100ms, ON ~100ms, OFF ~700ms (period = 1 second)

4. Range Configuration

Q6: How is the measurement range configured?

The JXK-10-22-Z uses a resistor-based range configuration method. By changing the resistance value of R8 (0805 package), the measurement range can be adjusted from 30A to 500A:

Customer Range	R8 Resistance (0805)	Notes
30A	330 kOhm	--
50A	200 kOhm	--

100A	100 kOhm	Default configuration
200A	39 kOhm	--
500A	10 kOhm	--
Custom range	Calculated via formula	Contact factory for custom

Range Change Formula: Rf(kOhm) = 10 x (911.8 / Range_A - 1)

Note: After modifying R8, re-calibration using the calibration host software (V2.4) is required. The factory performs 3-point calibration (zero / midpoint / full scale) plus AC/DC full-range verification before shipment.

5. Communication Issues

Q7: What causes RS485 communication instability and how to fix it?

RS485 communication instability is one of the most common issues in industrial environments. Below are the typical causes and solutions:

Common Causes:

- Improper wiring: Star topology, tree branching, or daisy-chain violations cause signal reflection
- Missing or incorrect terminal resistance: Without 120-ohm terminal resistors at both ends of the bus, signal reflections cause data corruption
- Poor cable quality: Non-shielded cables or cables longer than 1000m without repeaters
- Ground potential difference: Different ground potentials between devices introduce common-mode noise
- Baud rate mismatch: Communication parameters (baud rate, data bits, parity, stop bits) not matching between master and slave
- Electromagnetic interference: Nearby variable frequency drives (VFDs), motors, or high-power cables radiating noise
- Too many nodes: Exceeding the 32-node limit (standard) or loading capacity of the RS485 driver

Troubleshooting Steps:

- Step 1: Verify wiring topology -- ensure all devices are connected in a daisy-chain (hand-in-hand) configuration. Eliminate star branches.
- Step 2: Install 120-ohm terminal resistors at both ends of the RS485 bus (between A and B terminals)
- Step 3: Use shielded twisted-pair cable (impedance ~120 ohm). Connect shield at ONE end only (control room side) to avoid ground loops
- Step 4: Separate RS485 cables from power cables by at least 20cm. Never run them in the same conduit or cable tray
- Step 5: Verify communication parameters match: baud rate (default 9600), data bits (8), parity (None), stop bits (1) -- 9600,8,N,1
- Step 6: Assign unique node addresses to each device. Duplicate addresses cause data collisions
- Step 7: For long-distance or high-interference environments, add an isolated RS485 repeater or opto-isolated converter
- Step 8: Test with a portable serial terminal to isolate whether the issue is in wiring, configuration, or hardware

Recommended EMC Protection:

- Install RS485 isolated converters with TVS protection at both ends of the bus
- Use common-mode chokes on signal lines in high-interference areas
- Implement software-level CRC verification and retry mechanisms in the master controller

Q8: What should I do if CAN communication fails completely?

CAN communication failure can be caused by several factors. Follow this diagnostic sequence:

Diagnostic Checklist:

- Verify CAN module soldering: Ensure R1 and R2 are removed and the CAN module is properly soldered
- Check CAN-H and CAN-L wiring: CAN-H (pin 4) and CAN-L (pin 3) must not be reversed. Use a multimeter to verify continuity
- Verify termination resistors: CAN bus requires 120-ohm termination resistors at both ends. Check with multimeter (should read ~60 ohm across H-L with power off)

- Check power supply: CAN transceivers typically require 5V or 3.3V regulated supply. Measure voltage at the module pins
- Verify node addressing: Each CAN node must have a unique identifier. Check configuration software
- Check cable quality: Use twisted-pair cable with characteristic impedance of 120 ohms. Maximum cable length depends on baud rate (e.g., 40m at 1Mbps, 500m at 125kbps)
- Inspect for short circuits: CAN-H or CAN-L shorted to power, ground, or each other will disable the bus
- Test with a known-good node: Substitute a known-working CAN device to isolate whether the issue is with the transmitter or the network

Q9: Why does communication drop intermittently?

Intermittent communication dropouts are often caused by environmental or installation issues rather than hardware defects:

Likely Causes and Solutions:

- Loose connections: Check all terminal screws and connectors. Vibration in industrial environments can loosen connections over time
- Cable fatigue: Repeated flexing or bending at cable entry points can cause internal wire breakage. Use flexible cable and proper cable management
- Temperature-induced issues: Extreme temperatures can cause thermal expansion/contraction affecting connections. Verify operating temperature is within -20C to +60C
- Power supply ripple: Switching power supplies can introduce high-frequency ripple on the power line, affecting the communication circuit. Add LC filtering or use linear power supply
- Ground loops: Multiple ground connections creating circulating currents. Use isolated converters or float the ground connection
- Bus loading: Too many devices or excessive cable capacitance degrading signal quality. Reduce bus length or add repeaters

6. Parallel Operation

Q10: Can multiple JXK-10-22-Z units be connected in parallel?

The answer depends on the output type:

Current Output (4-20mA):

- Yes, multiple transmitters can share a common 24VDC power supply
- Each transmitter operates independently on the same power bus
- However, each transmitter requires its own separate signal output line to the PLC/DAQ input
- Maximum number of units on one power supply depends on the supply current capacity (each unit draws <=2W, approximately 80mA at 24V)
- Example: A 5A power supply can theoretically power up to 62 units (5A / 0.08A = 62.5), but derate to 80% for reliability = ~50 units

Voltage Output (0-10V):

- No, voltage outputs should NOT be directly paralleled. Connecting multiple voltage outputs together will cause loading effects and measurement errors
- Each voltage-output transmitter must have its own dedicated signal line to the input device
- If signal distribution is needed, use a signal isolator/distributor module

RS485/CAN Digital Output:

- Yes, multiple units can share the same RS485 bus (up to 32 standard nodes, expandable to 256 with repeaters)
- Each unit must have a unique RS485 node address
- CAN bus naturally supports multiple nodes (up to 110 nodes) with built-in arbitration
- All units share the same power supply rails, but each has its own dedicated communication pair

Important Notes:

- The JXK-10-22-Z features electrical isolation (2.5kV) between input, output, and power. This means multiple isolated units CAN safely share a common power supply without ground loop issues

- When paralleling on a common power bus, ensure the power supply has adequate current margin (recommend 20% derating)
- For analog output types, use individual shielded cables for each signal line to minimize crosstalk
- Never connect outputs of different transmitters together -- always maintain separate signal paths

7. EMC Interference Solutions

Q11: How to solve EMC interference problems in industrial environments?

Electromagnetic compatibility (EMC) is critical for reliable operation in industrial settings. The JXK-10-22-Z is designed with built-in EMC protection, but proper installation practices are essential:

Built-in EMC Features:

- Electrical isolation: 2.5kV DC isolation between input, output, and power eliminates ground loop interference
- Wide bandwidth (0~5kHz): Designed to handle harmonic-rich waveforms from VFDs and switching power supplies
- True RMS processing: Accurately measures distorted waveforms that average-responding instruments cannot handle
- Built-in protection circuits: Overvoltage, overcurrent, and reverse polarity protection against electrical transients

Installation EMC Best Practices:

- Cable selection: Always use shielded twisted-pair cable for signal lines. Use double-shielded cable in high-interference areas
- Shield grounding: Connect cable shield at ONE end only (control room side) for analog signals. For digital communication (RS485), follow the same single-point grounding principle
- Separation from power cables: Maintain minimum 20cm separation between signal cables and power cables. Never run them in the same conduit or cable tray
- Power supply filtering: Install line filters or ferrite cores on power input lines near VFDs or switching power supplies
- Enclosure grounding: Ensure the DIN rail and cabinet are properly grounded. Metal cabinets provide natural RF shielding (Faraday cage effect)
- Avoid hot spots: Install transmitters away from VFD output terminals, motor leads, welding equipment, and high-frequency heaters

Advanced EMC Remediation (if interference persists):

- Install isolated signal conditioners between the transmitter and PLC input
- Add common-mode chokes on both power and signal lines
- Use fiber optic isolators for critical signals in extremely noisy environments
- Implement software filtering (moving average, median filter) in the PLC/SCADA program
- Consider installing a dedicated isolated power supply for the transmitter
- Add TVS diodes or varistors at signal input terminals for surge protection

EMC Standards Compliance:

- The JXK-10-22-Z is designed to meet general industrial EMC requirements
- For specific EMC certification (CE, FCC, etc.), please contact our sales team with your target market requirements
- Recommended EMC standards for reference: IEC 61326 (industrial measurement and control equipment), IEC 61000-4 series (EMC test methods)

8. PLC Compatibility

Q12: Which PLCs are compatible with the JXK-10-22-Z?

The JXK-10-22-Z is designed to be universally compatible with major PLC brands through its standard output formats. Below is a compatibility reference:

Analog Input Compatibility (4-20mA / 0-10V):

PLC Brand	Series/Model	Input Module	Notes
Siemens	S7-300/400/1200/1500	AI 0-20mA / AI 0-10V	Standard 4-20mA input;

		modules	configure scaling in PLC program
Allen-Bradley / Rockwell	ControlLogix / CompactLogix / PLC-5	1756-IF8 / 1769-IF4 / 1771-IF4	Standard analog input; verify input range configuration
Mitsubishi	FX3U/FX5U/FXQN	FX3U-4AD / FX2N-4AD	Supports 4-20mA/0-10V; configure D register range
Delta	DVP-S2/SE/SS2	AS14/AD14 modules	Wide range analog input; auto-detects signal type
Omron	CJ/CP/CJ1/NS series	CXAD201/C600-AD211	Programmable input type; set to current or voltage mode
Schneider Electric	M340/M580/TM5	TM5AI21/TM5AI42	Universal input; configure via SoMove software
GE/Fanuc	Series 90-30/70	IC693ADM302	Standard analog input; verify jumper settings
Yokogawa	CENTUM VP/CS3000	YD515/YD517	High-precision analog input; supports breakdown alarm
Honeywell	TPS/Experion	UDC3000/UDC3200	Universal input; supports multiple signal types
Fuji	FX5N/FX3U	FX5N-4AD	Compact analog input; easy configuration

RS485/Modbus RTU Compatibility:

- The JXK-10-22-Z RS485 output uses standard Modbus RTU protocol
- Compatible with any PLC or SCADA system that supports Modbus RTU master function
- Common compatible systems: Siemens S7 (via CP card or built-in RS485), Allen-Bradley (via RSLogix Modbus driver), Mitsubishi (via RS instruction), Schneider (via Modbus driver), Ignition SCADA, WinCC, Wonderware, etc.
- Default communication parameters: 9600 baud, 8 data bits, No parity, 1 stop bit (8N1)
- Note: RS485 terminal resistor (120 ohm) is NOT installed by default. Contact factory to request pre-installed terminal resistors

CAN Bus Compatibility:

- The JXK-10-22-Z CAN output uses standard CAN bus protocol (ISO 11898)
- Compatible with PLCs and industrial controllers with native CAN input, or via CAN-to-Ethernet/CAN-to-RS485 gateways
- Common compatible platforms: Beckhoff (CX series with CAN port), Siemens (via CANopen gateway), industrial PCs with CAN interface cards

9. Protection Features

Q13: What protection features are built into the JXK-10-22-Z?

The JXK-10-22-Z incorporates comprehensive protection circuits to ensure reliable operation and equipment safety:

- Input Overload Protection: Protects the hall sensor and signal conditioning circuit from excessive primary current
- Output Overcurrent Limit Protection: Limits output current to safe levels, protecting downstream equipment
- Output Short-Circuit Protection: The transmitter can withstand prolonged output short-circuit without damage
- Power Supply Overvoltage Protection: Protects against power supply voltage spikes and transients

- Power Supply Reverse Polarity Protection: Prevents damage from incorrect power supply connection (P+ and P- reversed)
- Electrical Isolation: 2.5kV DC isolation (1 minute test) between input, output, and power provides galvanic isolation, protecting against ground faults and common-mode voltages

Note: While the transmitter has built-in protection, it is still recommended to follow proper electrical installation practices and avoid intentional abuse of protection features.

10. Calibration Procedure

Q14: How is the JXK-10-22-Z calibrated?

The JXK-10-22-Z undergoes a rigorous 5-stage calibration process at the factory:

Factory Calibration Process:

- Stage 1 - Preparation: Visual and soldering inspection, communication connection verification, status LED normal flashing check
- Stage 2 - Input Calibration: Three-point calibration (zero point / midpoint / full scale), ADC values stabilized
- Stage 3 - Output Calibration: 4mA low point / 20mA full scale, measured with precision multimeter and written to memory
- Stage 4 - Parameter Storage: Parameters stored, power cycle verification -- read back values match pre-power-off values
- Stage 5 - AC/DC Full-Range Verification: 25% / 50% / 75% / 100% full range, no step jumps, no periodic fluctuations

Field Calibration (if needed):

- Range changes require R8 resistor replacement followed by calibration host software (V2.4) re-calibration
- Contact our technical support team for calibration software and detailed calibration procedures
- Recommended calibration interval: 1 year (or as required by your quality management system)

11. Environmental Conditions

Q15: What are the environmental operating conditions?

The JXK-10-22-Z is designed for industrial environments:

- Operating temperature: -20C to +60C
- Storage temperature: -25C to +85C
- Humidity: Non-condensing (typical industrial environment)
- Installation environment: No conductive dust, no corrosive gases, no severe impact or vibration
- Altitude: Typical industrial altitude (up to 2000m without derating)
- Pollution degree: Degree 2 (typical industrial environment)

Important:

- Do not install in explosive atmospheres unless specifically ordered with ATEX/FM certification
- Avoid direct sunlight and heat sources
- Ensure adequate ventilation for heat dissipation when installing multiple units in enclosed cabinets
- When installing multiple units in a row, maintain minimum spacing of 10mm for heat dissipation

12. Isolation Specifications

Q16: What are the isolation specifications?

The JXK-10-22-Z provides full electrical isolation:

- Isolation voltage: DC 2.5kV, tested for 1 minute

- Isolation between: Primary input (hall sensor) / Signal output / Power supply -- all mutually isolated
- This triple isolation ensures:
- - Elimination of ground loop interference
- - Protection of downstream control equipment from high-voltage transients
- - Safety isolation for personnel working with secondary circuits
- - Independent operation of multiple transmitters on shared power buses without interference

13. Grounding & Shielding Best Practices

Q17: What are the recommended grounding and shielding practices?

Proper grounding and shielding are critical for optimal EMC performance:

Grounding Recommendations:

- Use a single-point grounding scheme for analog signal cables
- Connect cable shields at the control room/consumer end only (not at the transmitter end)
- Ensure the DIN rail and cabinet are properly connected to the plant grounding system
- Use a dedicated grounding electrode with resistance <= 4 ohms
- Avoid creating ground loops by connecting shields at multiple points

Shielding Recommendations:

- Use shielded twisted-pair cable for all signal and communication lines
- Ensure 360-degree shield contact at cable entry points (use shielded connectors or braid sleeves)
- For high-interference areas, use double-shielded cable (inner shield single-point grounded, outer shield double-point grounded)
- Keep shield braid coverage >= 85% for effective high-frequency shielding
- Never use unshielded cable for analog signal transmission in industrial environments

14. Troubleshooting Output Signal Issues

Q18: What should I do if the output signal is unstable or reading incorrectly?

Follow this systematic troubleshooting approach:

Step-by-Step Diagnostic:

- Step 1: Verify power supply voltage -- measure at the transmitter terminals (should be within specified range: 18-28VDC for DC24V model)
- Step 2: Check primary current input -- verify the current being measured is within the transmitter range and the cable passes cleanly through the 22mm aperture
- Step 3: Measure output signal directly at the transmitter terminals using a multimeter -- this eliminates cable issues as a variable
- Step 4: If output is stable at transmitter but unstable at PLC end -- the issue is in the cable or at the PLC input side
- Step 5: Check for ground loops -- temporarily disconnect the shield connection at one end
- Step 6: Verify PLC input configuration -- ensure the input range matches the transmitter output (4-20mA vs 0-10V)
- Step 7: Check for nearby interference sources -- temporarily move cables or turn off nearby VFDs to isolate interference
- Step 8: If all else fails, substitute with a known-good transmitter to determine if the issue is with the unit itself

Common Symptoms and Quick Fixes:

Symptom	Likely Cause	Quick Fix
Output reads zero	No power / reversed polarity / open circuit	Check power connections and polarity

Output reads high	Range mismatch / calibration drift	Verify range setting and recalibrate
Output fluctuates	EMI / ground loop / loose connection	Check shielding, grounding, and connections
Output saturated at max	Overrange input / faulty transmitter	Check primary current and substitute unit
Output drifts with temperature	Temperature compensation issue	Check operating temperature range; contact support

15. Contact & Technical Support

Q19: What if my question is not covered in this FAQ?

We provide comprehensive technical support to ensure your successful deployment of the JXK-10-22-Z. If your question is not addressed in this document, please contact us through the following channels:

Support Channels:

Channel	Details	Response Time
Technical Support Email	sales008@qd-zdk.com	Within 24 hours (business days)
Sales Inquiry	sales008@qd-zdk.com	Within 4 business hours
Emergency Hotline	+86-197-1561-7532	Within 2 hours (urgent issues)
Remote Diagnostic	TeamViewer / AnyDesk support available	Schedule via email
RMA / Return Service	Contact sales for RMA number before shipping	5-7 business days turnaround

Information to Provide When Contacting Support:

- Product model and serial number
- Output type configuration (4-20mA / 0-10V / RS485 / CAN)
- Measurement range (e.g., 100A)
- Power supply voltage being used
- Detailed description of the issue or question
- Steps already taken to troubleshoot
- Photos of installation and wiring (if applicable)
- Environmental conditions at installation site
- Readings from reference instruments (if available)
- PLC/controller model being used (for compatibility questions)

Warranty Information:

- Standard warranty: 12 months from date of shipment
- Warranty covers manufacturing defects and component failures under normal use
- Warranty does not cover damage from misuse, unauthorized modification, or operation outside specified limits
- Extended warranty and service agreements available -- contact sales for details

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