QD-CT Series Multi-Channel AC Current Acquisition Module User Manual

[IMAGE: High-quality studio render of the QD-CT-8 module mounted on a DIN rail, showing front panel LEDs and terminal blocks, clean white background, industrial product photography style, soft studio lighting] *(Prompt: High-quality studio render of an industrial electronic module mounted on a silver DIN rail, showing front panel LEDs and green terminal blocks, clean white background, industrial product photography style, soft studio lighting, photorealistic, 8k resolution)*

Revision History

Version	Date	Description	Author
1.0	2026-10-30	Initial Release	Technical Documentation Team

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1. Product Overview

1.1 General Description

The **QD-CT Series Multi-Channel AC Current Acquisition Module** is a high-precision industrial measurement device designed for the real-time monitoring of multiple AC current channels. Utilizing high-precision current transformers for isolated sensing and a dedicated true RMS measurement chip, the module ensures accurate RMS value measurement for any waveform current.

1.2 Available Models

The series offers four configurations to suit various application densities: * **QD-CT-4:** 4-Channel Acquisition Module * **QD-CT-8:** 8-Channel Acquisition Module * **QD-CT-12:** 12-Channel Acquisition Module * **QD-CT-16:** 16-Channel Acquisition Module

1.3 Key Features

- **Synchronous Sampling:** All channels are sampled simultaneously to ensure phase-coherent data.
- **Independent Channels:** Each channel operates independently with isolated sensing.
- **True RMS Measurement:** Dedicated chip ensures accuracy regardless of waveform distortion.
- **Direction-Independent Input:** Current through-hole input requires no polarity or direction alignment.

- **Robust Communication:** RS-485 bus interface with standard MODBUS-RTU protocol.
- **Easy Installation:** Standard DIN 35mm rail mounting for quick deployment.
- **High Stability:** Industrial-grade components for continuous operation in harsh environments.

1.4 Typical Applications

- Industrial power distribution monitoring
- Motor current analysis
- Energy management systems
- Multi-phase load balancing

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2. Safety Instructions

[IMAGE: Safety warning icon set including electrical shock, high temperature, and grounding symbols, flat vector style, yellow and black color scheme] *(Prompt: Safety warning icon set including electrical shock, high temperature, and grounding symbols, flat vector style, yellow and black color scheme, isolated on white background, clean lines)*

2.1 General Safety

> **WARNING:** Failure to follow these instructions may result in equipment damage, personal injury, or death.

1. **Qualified Personnel:** Installation, wiring, and maintenance must be performed by qualified electrical personnel familiar with industrial control equipment.
2. **Power Disconnection:** Always disconnect the power supply before wiring or performing any maintenance. Wait at least 5 minutes after power-off to allow internal capacitors to discharge.
3. **Voltage Verification:** Use a multimeter to verify that the power is off before touching any terminals.

2.2 Installation Safety

- **Environment:** Do not install the module in locations with excessive dust, corrosive gases, or conductive particles.
- **Clearance:** Maintain adequate ventilation space around the module. Do not block the DIN rail mounting area.
- **Grounding:** Ensure the system ground is properly connected to prevent electromagnetic interference and ensure safety.

2.3 Wiring Safety

- **Torque:** Tighten terminal screws to the specified torque to prevent overheating.
- **Wire Type:** Use copper conductors only. Ensure wire insulation is intact.
- **Isolation:** Although the module features three-terminal isolation, always treat primary current conductors as live and hazardous.

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3. Technical Specifications

3.1 Measurement Input Specifications

Parameter	Specification	Notes
Measurement Range	AC 0 ~ 50A	Per channel
Aperture (Hole Diameter)	10mm	Through-hole type
Frequency Range	20Hz ~ 1kHz	
Sampling Period	50ms	Synchronous across all channels
Input Connection	Through-hole	No direction/polarity required

3.2 Output & Accuracy Specifications

Parameter	Specification	Notes
Resolution	0.1A	
Basic Error	±0.5% FS	Full Scale
Response Time	500ms	
Measurement Method	True RMS	Dedicated hardware chip

3.3 Communication Specifications

Parameter	Specification	Notes
Interface	RS-485	Half-duplex
Protocol	MODBUS-RTU	
Default Station Address	1	Range: 1-255
Default Baud Rate	9600 bps	Range: 0-8 (Configurable)
Default Parity	None	0=None, 1=Odd, 2=Even
Data Format	8 Data Bits, 1 Stop Bit	

3.4 Power Supply Specifications

Parameter	Specification	Notes
Rated Voltage	DC 24V	
Operating Range	DC 20V ~ 28V	
Max Ripple Voltage	5%	
Max Power Consumption	100mA	@ 24V

3.5 Isolation Specifications

Parameter	Specification	Notes
Isolation Type	Three-terminal Isolation	Power, Input, Output
Isolation Voltage	1.5KV (AC)	1 minute withstand

3.6 Environmental Specifications

Parameter	Specification	Notes
Operating Temperature	-10°C to +50°C	
Operating Humidity	35% ~ 85% RH	Non-condensing

3.7 Mechanical Specifications

Model	Dimensions (L x W x H)	Mounting
QD-CT-4	98mm x 92mm x 42mm	DIN 35mm Rail
QD-CT-8	148mm x 92mm x 42mm	DIN 35mm Rail
QD-CT-12	168mm x 92mm x 42mm	DIN 35mm Rail
QD-CT-16	198mm x 92mm x 42mm	DIN 35mm Rail

3.8 Protection & Indicators

Feature	Description
POW LED	Steady ON indicates normal power supply
RUN LED	Blinking indicates normal operation
RX LED	Blinks on communication receive
TX LED	Blinks on communication transmit
Reverse Polarity	Protected
Over-voltage	Protected

Chapter 4: Mechanical Installation

DIN Rail Mounting Procedure

The QD-CT Series Multi-Channel AC Current Acquisition Modules are designed for standard 35mm DIN rail mounting. Follow these steps to ensure a secure and compliant installation:

4. **Inspect the Rail:** Verify that the 35mm DIN rail is clean, free of debris, and properly grounded.
5. **Position the Module:** Align the rear mounting clip of the QD-CT module with the top edge of the DIN rail.
6. **Engage the Clip:** Press the module firmly against the rail until the bottom clip snaps securely into place.
7. **Verify Security:** Gently pull the module downward to confirm it is locked and will not dislodge during operation.

[IMAGE: A technical illustration showing the rear view of a QD-CT module being clipped onto a standard 35mm DIN rail, highlighting the top and bottom mounting clips. AI prompt: Technical line-art diagram of an industrial AC current acquisition module mounting on a 35mm DIN rail, showing the locking mechanism, clean white background, professional engineering style.]

Spacing Requirements

To maintain optimal thermal performance and prevent electromagnetic interference, observe the following spacing guidelines:

- **Vertical Spacing:** Maintain a minimum clearance of 20mm above and below the module for adequate airflow.
- **Horizontal Spacing:** Maintain a minimum clearance of 10mm between adjacent modules.
- **Enclosure Clearance:** Ensure at least 30mm of clearance from the enclosure walls and other heat-generating components.

EMC Considerations

Proper Electromagnetic Compatibility (EMC) practices are critical for the reliable operation of the QD-CT series:

- **Cable Routing:** Keep RS-485 communication cables and AC current input wires separated from high-voltage power lines and motor drives. Cross cables at a 90-degree angle if they must intersect.
- **Shielding:** Use shielded twisted-pair cables for the RS-485 bus. Ground the shield at one end only (preferably the control panel ground) to prevent ground loops.
- **Filtering:** Install ferrite beads on communication cables near the module terminals if operating in high-noise environments.

Storage Conditions

If the module is not immediately installed, store it under the following conditions to prevent degradation:

8. **Temperature:** -20°C to +60°C
9. **Humidity:** 10% to 90% RH, non-condensing
10. **Environment:** Store in the original anti-static packaging, away from direct sunlight, corrosive gases, and excessive vibration.

Chapter 5: Wiring Guide

Terminal Definitions

All QD-CT models utilize a standardized terminal layout. Refer to the table below for accurate wiring:

Terminal No.	Label	Description
1	24V	DC Power Supply Positive (+24V)
2	0V	DC Power Supply Negative (GND)
3	A / 485+	RS-485 Communication Data Line A
4	B / 485-	RS-485 Communication Data Line B
5+	C1-Cn	AC Current Input Channels (C1 to C4/C8/C12/C16)

[IMAGE: A clear, color-coded wiring diagram showing the terminal block of a QD-CT-8 module, with wires connected to 24V, 0V, RS-485 A/B, and multiple current input channels. AI prompt: Professional industrial wiring diagram for an 8-channel AC current module, showing terminal connections for 24V power, RS485 communication, and current inputs, isometric view, photorealistic rendering.]

Wiring Specifications

- **Wire Type:** Use copper conductors with appropriate insulation for the operating environment.
- **Wire Gauge:** Recommended wire size is 18 AWG to 22 AWG (0.5mm^2 to 1.0mm^2) for all terminals.
- **Stripping Length:** Strip insulation to a length of 6mm to 8mm. Do not expose bare wire beyond the terminal block.
- **Torque:** Tighten terminal screws to a maximum torque of 0.4 N·m to avoid stripping the threads.

Grounding Requirements

- **Power Ground:** Connect terminal 2 (0V) to the system's clean signal ground.
- **RS-485 Shield:** Connect the communication cable shield to the panel ground. **WARNING:** Do not connect the RS-485 shield to terminal 2 (0V) to avoid ground loop interference.
- **DIN Rail Ground:** Ensure the DIN rail is bonded to the main protective earth (PE) of the control panel.

WARNING: Ensure all power is disconnected before wiring or modifying connections. Failure to follow this warning may result in electrical shock, equipment damage, or voiding of the product warranty. Verify the power supply voltage is within the 20-28V DC range before applying power.

Chapter 6: Communication Protocol

Default Communication Settings

Upon factory delivery, the module is configured with the following default parameters:

Parameter	Default Value
Protocol	MODBUS-RTU
Slave Address	1
Baud Rate	9600 bps
Parity	None
Data Bits	8
Stop Bits	1

Configuration Registers

The following registers are used to configure the communication parameters. All configuration registers are Read/Write.

Register Address	Parameter	Value Range	Description
0x0200	Slave Address	1 - 255	Sets the Modbus RTU slave address.
0x0201	Baud Rate	0 - 8	Sets the communication baud rate (see mapping below).
0x0202	Parity	0 - 2	Sets parity and stop bits (0=None, 1=Odd, 2=Even).

Baud Rate Mapping (Register 0x0201):

Value	Baud Rate
0	1200 bps
1	2400 bps
2	4800 bps
3	9600 bps (Default)
4	19200 bps
5	38400 bps
6	57600 bps
7	115200 bps
8	Reserved

Data Registers

Current measurement data is stored in read-only registers. The raw value must be multiplied by 0.1 to obtain the current in Amperes (Resolution: 0.1A).

Model	Register Range	Channels
QD-CT-4	0x0000 - 0x0003	C1 to C4
QD-CT-8	0x0000 - 0x0007	C1 to C8
QD-CT-12	0x0000 - 0x000B	C1 to C12
QD-CT-16	0x0000 - 0x000F	C1 to C16

Modbus Frame Example

Below is a byte-by-byte breakdown of a standard Modbus RTU request and response to read 4 channels starting from register 0x0000.

Request Frame (Master to Slave): `01 03 00 00 00 04 44 09`

Byte	Value	Description
1	01	Slave Address
2	03	Function Code (Read Holding Registers)
3-4	00 00	Starting Register Address (0x0000)
5-6	00 04	Quantity of Registers to Read (4)
7-8	44 09	CRC16 Checksum

Response Frame (Slave to Master): `01 03 08 00 00 00 00 00 00 00 00 6B 28`

Byte	Value	Description
1	01	Slave Address
2	03	Function Code
3	08	Byte Count (4 registers × 2 bytes = 8 bytes)
4-5	00 00	Channel 1 Raw Data (0 × 0.1 = 0.0A)
6-7	00 00	Channel 2 Raw Data (0 × 0.1 = 0.0A)
8-9	00 00	Channel 3 Raw Data (0 × 0.1 = 0.0A)
10-11	00 00	Channel 4 Raw Data (0 × 0.1 = 0.0A)
12-13	6B 28	CRC16 Checksum

Upper Computer Software Configuration

When using third-party SCADA or Modbus polling software:

1. **Connection Setup:** Select the correct COM port and set the serial parameters to match the module's configuration (Default: 9600, N, 8, 1).
2. **Device Addition:** Add a new Modbus RTU device using the configured Slave Address.

3. **Tag Mapping:** Create data tags pointing to registers 0x0000 through 0x000F (depending on the model).
4. **Scaling:** Apply a linear scaling factor of 0.1 to all current data tags to convert raw values to Amperes.
5. **Polling Interval:** Set the polling interval to a minimum of 500ms to align with the module's response time.

Chapter 7: Parameter Configuration

Modbus Register Configuration Steps

To modify communication parameters via Modbus:

1. **Write to Register:** Use Modbus Function Code 06 (Write Single Register) or 16 (Write Multiple Registers) to update the desired configuration register (0x0200, 0x0201, or 0x0202).
2. **Verify Write:** Read back the register to confirm the new value was accepted.
3. **Power Cycle: IMPORTANT:** Communication parameter changes (Address, Baud Rate, Parity) require a power cycle to take effect. Disconnect and reconnect the 24V power supply.
4. **Reconnect:** Update your master software with the new communication settings and re-establish the connection.

Upper Computer Software Configuration Steps

If using the manufacturer's configuration utility:

1. Connect to the module using the current default settings.
2. Navigate to the "Communication Settings" tab.
3. Select the new Address, Baud Rate, and Parity from the dropdown menus.
4. Click "Write to Device".
5. The software will prompt you to power cycle the module. Follow the prompt.
6. Update the software's connection settings and click "Reconnect".

Factory Reset Procedure

To restore the module to its original factory default settings:

1. Write the value `0xFFFF` to register `0x02FF`.
2. Power cycle the module.
3. The module will revert to: Address 1, Baud Rate 9600, Parity None.

Default Factory Settings Summary

Parameter	Default Value
Slave Address	1
Baud Rate	9600 bps
Parity	None
Data Bits	8

Parameter	Default Value
Stop Bits	1
Current Resolution	0.1A

Chapter 8: Operation & Commissioning

Power-On Sequence

To ensure proper initialization, follow this power-on sequence:

1. Verify all wiring is correct and terminal screws are properly tightened.
2. Ensure the RS-485 bus is properly terminated and idle.
3. Apply DC 24V power to terminals 1 (24V) and 2 (0V).
4. Allow 500ms for the module's internal self-test and stabilization.
5. Begin Modbus communication after the RUN LED begins blinking.

Self-Test Procedure

Upon power-up, the module performs an automatic self-test:

1. **Power Check:** Validates input voltage is within 20-28V DC.
2. **Memory Check:** Verifies configuration registers are intact.
3. **ADC Check:** Validates the analog-to-digital converter is operational.
4. **Communication Check:** Initializes the RS-485 transceiver.

If the self-test fails, the RUN LED will remain OFF or stay solidly ON (non-blinking). Power cycle the module. If the issue persists, the unit may be defective.

Normal Status Indicators

During normal operation, the LED indicators should display the following status:

LED	Normal Status	Description
POW	Steady ON	24V DC power is present and within range.
RUN	Blinking	Module is operating normally and sampling data.
RX	Flashing	Receiving valid Modbus requests.
TX	Flashing	Transmitting Modbus responses.

LED Status Reference Table

Use this table for troubleshooting abnormal LED behavior:

LED	Status	Possible Cause	Action
POW	OFF	No power or voltage < 20V	Check power supply and wiring.
POW	Flickering	Voltage ripple > 5% or loose connection	Check power supply quality and terminal

LED	Status	Possible Cause	Action
			tightness.
RUN	Steady ON	Self-test failure or firmware error	Power cycle. If persistent, replace module.
RUN	OFF	No power or critical hardware fault	Verify POW LED. If POW is ON, replace module.
RX	OFF	No communication received	Check wiring, address, and baud rate.
TX	OFF	No communication sent	Check master request and module configuration.

First Startup Checklist

Complete this checklist before placing the system into full production:

1. Mechanical installation on DIN rail is secure.
1. All wiring matches the terminal definition diagram.
1. RS-485 shielding is properly grounded.
1. Power supply measures between 20-28V DC.
1. POW LED is steadily ON.
1. RUN LED is blinking.
1. Modbus communication is established with correct address and baud rate.
1. Current readings on all active channels are within expected range (±0.5%FS accuracy).
1. Upper computer software tags are correctly scaled (× 0.1).

Chapter 9: Testing & Verification

Functional Test Procedure

Before integrating the QD-CT Series Multi-Channel AC Current Acquisition Module into your control system, perform the following functional tests to ensure proper operation:

11. **Power-On Self-Test:** Apply DC 24V power to terminals 1 and 2. Verify that the POW LED illuminates steadily and the RUN LED begins blinking within 2 seconds.
12. **Input Signal Verification:** Connect a calibrated AC current source (0–50A) to one of the channel inputs (Terminal 5+). Gradually increase the current and verify that the measured value corresponds to the applied current within the ±0.5% FS tolerance.
13. **Communication Link Test:** Connect an RS-485 interface to terminals 3 and 4. Use a Modbus master tool to read registers 0x0000 through 0x000F. Confirm that valid data is returned and matches the expected current values (raw value × 0.1 = Amperes).
14. **Multi-Channel Validation:** Repeat the input signal verification for each active channel to ensure all channels are functioning independently and accurately.

[IMAGE: Functional test setup diagram showing power supply, AC current source, QD-CT module, and RS-485 test tool connections]

Modbus Communication Test

To validate Modbus-RTU communication, use the following verified command sequence:

- **Send Command:** `01 03 00 00 00 04 44 09`
- **Expected Response:** `01 03 08 00 00 00 00 00 00 00 00 6B 28`

This command reads four registers starting at address 0x0000 from device address 01. A correct response confirms that the module is properly configured with default settings (Addr=1, Baud=9600, No Parity, 8N1) and is responding to queries.

Acceptance Criteria Table

Test Item	Acceptance Criteria	Pass/Fail
Power Indicator	POW LED steady ON at 24V DC	☐
Run Indicator	RUN LED blinking at ~1Hz	☐
Current Accuracy	Reading within ±0.5% FS (±0.25A at 50A)	☐
Modbus Response	Valid response to read command	☐
Channel Isolation	No cross-channel interference at 1.5KV	☐
Response Time	Data update within 500ms of input change	☐

Chapter 10: Troubleshooting

Fault Classification System

Faults are classified into four categories to streamline diagnosis:

- **Class A:** Power-related issues
- **Class B:** Input signal/sensor issues
- **Class C:** Output/Communication issues
- **Class D:** System/Firmware issues

Indicator Status Reference

LED	State	Meaning
POW	Steady ON	Normal power supply (20–28V DC)
POW	OFF	No power or voltage below 20V
POW	Flickering	Unstable power or ripple >5%
RUN	Blinking (~1Hz)	Normal operation
RUN	Steady ON	Firmware error or watchdog timeout
RUN	OFF	No power or hardware failure
RX	Blinking	Receiving valid Modbus data

LED	State	Meaning
RX	OFF	No incoming communication
TX	Blinking	Transmitting Modbus response
TX	OFF	No outgoing communication

Fault Diagnosis Tables

Class A: Power Issues

Phenomenon	Probable Cause	Solution	Class
POW LED OFF	No voltage at terminals	Check wiring and power supply output	A
POW LED OFF	Voltage below 20V DC	Replace or adjust power supply	A
POW LED Flickering	Excessive ripple (>5%)	Add filtering capacitor or replace PSU	A
Module overheats	Ambient temp >50°C	Improve ventilation or relocate module	A

Class B: Input Side Issues

Phenomenon	Probable Cause	Solution	Class
Reading = 0.0A	No current flowing	Verify load and CT orientation	B
Reading = 0.0A	Open circuit in CT wire	Check continuity of input wiring	B
Erratic readings	EMI/Noise interference	Shield CT wires; increase distance from VFDs	B
Reading saturated	Current >50A	Verify load; check for short circuit	B

Class C: Output/Communication Issues

Phenomenon	Probable Cause	Solution	Class
No Modbus response	Wrong baud rate/parity	Verify settings match (9600, 8N1)	C
No Modbus response	Address mismatch	Confirm device address (default: 1)	C
Intermittent response	Poor RS-485 termination	Add 120Ω termination resistor at bus ends	C
CRC Error	Wiring noise or loose connection	Check A/B polarity; shield cable	C

Class D: System/Firmware Issues

Phenomenon	Probable Cause	Solution	Class

Phenomenon	Probable Cause	Solution	Class
RUN LED steady ON	Watchdog timeout	Power cycle module	D
RUN LED steady ON	Corrupted configuration	Restore factory defaults via 0x0200–0x0202	D
Invalid register values	Firmware bug	Contact support for firmware update	D

Chapter 11: Maintenance & Care

Calibration Schedule

The QD-CT Series modules are factory-calibrated and do not require routine field calibration under normal operating conditions. However, for critical applications:

15. **Recommended recalibration interval:** Every 24 months
16. **Recalibration trigger:** If measurement deviation exceeds ±0.5% FS
17. **Calibration method:** Must be performed by authorized service center using NIST-traceable standards

Cleaning Procedures

- **Frequency:** Every 6 months or as needed based on environment
- **Method:** Use compressed air to remove dust from ventilation slots and terminal blocks
- **Prohibited:** Do not use solvents, water, or abrasive materials
- **Safety:** Always disconnect power before cleaning

Environmental Considerations for Long-Term Use

- Maintain ambient temperature between -10°C and 50°C
- Ensure relative humidity stays within 35%–85% RH (non-condensing)
- Avoid prolonged exposure to corrosive gases or conductive dust
- Provide minimum 10mm clearance on all sides for airflow

Product Lifespan & Spare Parts

2. **Expected operational lifespan:** 10+ years under specified conditions
3. **Recommended spare parts:** Keep one spare module per 10 installed units for critical systems
4. **Component replacement:** Modules are not field-repairable; replace entire unit if faulty

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Chapter 12: RMA & Warranty

Warranty Terms

5. **Coverage:** 24 months from date of shipment against manufacturing defects
6. **Scope:** Covers hardware failures under normal use and specified environmental conditions

7. **Exclusions:** Damage from misuse, overvoltage, unauthorized modification, or environmental abuse

RMA Conditions

An RMA (Return Merchandise Authorization) is required for all returns. Units must be: - Physically undamaged (no cracked enclosures or burnt components) - Accompanied by original purchase proof - Returned within warranty period

Non-Warranty Items

8. Damage from lightning or power surges
9. Water or chemical exposure
10. Incorrect wiring or voltage application
11. Modifications or repairs by unauthorized personnel

RMA Submission Requirements

12. Complete RMA form with serial number, purchase date, and fault description
13. Include test results or error logs demonstrating the issue
14. Obtain RMA number before shipping
15. Package in anti-static bag with original packaging if available

Return Shipping Guidelines

16. Ship prepaid to authorized service center
17. Include copy of RMA approval inside package
18. Mark RMA number on exterior shipping label
19. Insure shipment for full replacement value

Chapter 13: Frequently Asked Questions

Pre-Sales FAQ

Q: How do I select the correct QD-CT model? A: Choose based on channel count needed: QD-CT-4 (4ch), QD-CT-8 (8ch), QD-CT-12 (12ch), or QD-CT-16 (16ch). All models share identical electrical specifications.

Q: Is the module compatible with my existing Modbus system? A: Yes. The QD-CT Series uses standard Modbus-RTU over RS-485 with configurable address, baud rate, and parity. Default settings are Addr=1, 9600 baud, 8N1.

Q: What certifications does this product hold? A: The QD-CT Series features 1.5KV three-terminal isolation and is designed for industrial environments. Contact sales for specific certification documentation.

In-Sales FAQ

Q: How do I configure a non-default Modbus address? A: Write the desired address (1–255) to register 0x0200. The module will restart with the new address.

Q: What is the maximum wire length for RS-485? A: Up to 1200m at 9600 baud with proper shielding and termination. Use 120Ω termination resistors at both ends of the bus.

After-Sales FAQ

Q: My module stopped responding. What should I do first? A: Check POW and RUN LEDs. If both are off, verify power supply. If POW is on but no communication, check RS-485 wiring and settings. Refer to Chapter 10 Troubleshooting.

Q: How do I initiate a repair? A: Submit an RMA request through our support portal with serial number and fault description. Do not return units without RMA authorization.

Long-Term Usage FAQ

Q: Does the module need periodic calibration? A: Factory calibration is stable for 24+ months. Recalibrate only if accuracy drifts beyond ±0.5% FS or per your quality management requirements.

Q: What is the expected lifespan? A: 10+ years under specified environmental conditions. Electrolytic capacitors are the primary aging component; operate within temperature limits to maximize life.

Chapter 14: Appendix

Factory Default Settings Summary

Parameter	Default Value	Register
Modbus Address	1	0x0200
Baud Rate	9600	0x0201
Parity	None	0x0202
Data Bits	8	Fixed
Stop Bits	1	Fixed

Terminal Pin Quick Reference

Pin	Function	Notes
1	24V DC+	Power input (20–28V)
2	0V DC-	Power ground
3	A / 485+	RS-485 positive
4	B / 485-	RS-485 negative
5+	Channel Inputs	AC current input (10mm aperture)

Note: Terminal layout is identical across QD-CT-4, QD-CT-8, QD-CT-12, and QD-CT-16 models.

Modbus Command Reference

Function	Code	Description
Read Holding Registers	0x03	Read data registers 0x0000–0x000F
Write Single Register	0x06	Configure address/baud/parity

Error Code Table

Code	Description	Action
0x01	Illegal Function	Verify function code
0x02	Illegal Data Address	Check register address range
0x03	Illegal Data Value	Validate parameter value
0x04	Slave Device Failure	Power cycle; contact support if persistent

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Chapter 15: Contact & Support

Company Information

[Company Name Placeholder] [Company Address Placeholder] [Company Website Placeholder]

Technical Support Channels

20. **Email:** sales008@qd-zdk.com
21. **Phone:** +86 19715617532 (Mon–Fri, 8AM–6PM EST)
22. **Online Portal:** https://support.[company-domain].com
23. **Response Time:** Within 24 business hours

Problem Reporting Template

When contacting support, please include: 1. **Product Model:** (e.g., QD-CT-8) 2. **Serial Number:** (located on side label) 3. **Firmware Version:** (Read registers 0xF600 and 0xF601) 4. **Symptom Description:** Detailed explanation of the issue 5. **Steps Already Taken:** Troubleshooting performed 6. **Environment Details:** Ambient temp, load type, wiring diagram if relevant 7. **Modbus Capture:** Hex dump of failed transaction if communication-related

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SEO Optimization Summary

Target Keywords List

24. Multi-channel AC current acquisition module
25. QD-CT series current sensor
26. RS-485 Modbus current monitor
27. DIN rail AC current transducer

28. Industrial current measurement module
29. 4-channel 8-channel 12-channel 16-channel current sensor
30. Modbus-RTU current acquisition

Meta Description

"QD-CT Series Multi-Channel AC Current Acquisition Modules: 4/8/12/16-channel RS-485 Modbus-RTU current sensors with 0.1A resolution, 1.5KV isolation, and DIN rail mounting. Complete user manual, troubleshooting, and technical specifications."

URL Slug Suggestion

`/products/qd-ct-series/user-manual-part-3-testing-troubleshooting-maintenance`

On-Page SEO Checklist

31. H1/H2/H3 hierarchy includes primary keywords
32. Product model numbers mentioned in headings and body
33. Technical specifications presented in tables for featured snippet potential
34. Internal links to Part 1 and Part 2 of manual
35. Alt text placeholders defined for all images
36. FAQ section structured for schema markup
37. Meta description under 160 characters with CTA keywords

Google Search Console Submission Guide

38. Verify domain ownership in Google Search Console
39. Submit XML sitemap including this manual page
40. Use URL Inspection tool to request indexing after publication
41. Monitor Performance report for keyword impressions and clicks
42. Check Coverage report for crawl errors on manual pages