QD-CT Series Multi-Channel AC Current Acquisition Module

Quick Start Guide

Revision History

Version	Date	Description
Rev A	2026-10-30	First release

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1. Package Check

Objective: Verify that all items are received without damage or missing components.

1.1 Inspect Packaging

- ☐ Check that the outer packaging is intact and free from visible damage
- ☐ Check for signs of water damage, crushing, or tampering

1.2 Check Package Contents

Verify that the following items are included in the package:

Item	Quantity	Description
QD-CT Module (main unit)	x1	Model as ordered (QD-CT-4/8/12/16)
Open-type Current Transformers	xN	Matching channel count, ratio 1000/1

Item	Quantity	Description
Certificate of Conformity	x1	Quality assurance document
Quick Start Guide	x1	This document

1.3 Verify Model Code

Check the model label on the product and confirm it matches your order:

Model	Channels	Typical Application
QD-CT-4	4 channels	Small distribution boxes, limited circuits
QD-CT-8	8 channels	Medium distribution boxes, general monitoring
QD-CT-12	12 channels	Large distribution boxes, building energy
QD-CT-16	16 channels	Data centers, high-density monitoring

1.4 Reporting Issues

If any items are missing or damaged:

- Do not install or use the product
- Contact your supplier immediately
- Provide your order number and photos of the damage
- Retain all packaging materials for inspection

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2. Safety Precautions

> **WARNING** — Read all safety instructions before installation or use. Failure to follow these instructions may result in electric shock, fire, or equipment damage.

2.1 General Safety

- **Power off before working:** Always disconnect power supply before installing, wiring, or servicing the module
- **Qualified personnel only:** Installation and wiring must be performed by qualified electricians or technicians
- **No hot-swapping:** Do not connect or disconnect terminals while the circuit is energized
- **ESD protection:** Handle the module with proper electrostatic discharge (ESD) precautions during installation
- **Follow local regulations:** Comply with all local electrical codes and safety regulations

2.2 Power Supply Warning

- **Voltage range:** Only supply DC 24V (20V ~ 28V) — do not exceed this range
- **Overvoltage hazard:** Supplying voltage outside the specified range may permanently damage the module
- **Polarity:** Observe correct polarity — Terminal 1 is +24V, Terminal 2 is 0V/GND

- **Power rating:** Maximum current consumption is 100mA (2.4W)

2.3 Environmental Warning

- **Operating temperature:** -10°C ~ +50°C — do not install in environments outside this range
- **Humidity:** 35% ~ 85% RH, non-condensing — do not install in condensing environments
- **Corrosive atmosphere:** Avoid installation in environments with strong corrosive gases
- **Altitude:** Standard rating up to 2000m; derating required above 2000m (up to 5000m)

2.4 Disposal

- This product complies with WEEE Directive 2012/19/EU
- Do not dispose of in regular household waste
- Return to manufacturer or authorized recycling center for proper disposal
- Remove and destroy any data storage components before disposal

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3. Product Overview & Indicator Definition

3.1 Product Description

The QD-CT Series is a family of multi-channel AC current acquisition modules designed for real-time measurement of multiple AC current circuits. The modules use precision open-type current transformers for signal isolation and sensing, with dedicated true RMS measurement chips for accurate current measurement. Each module features a standard RS-485 bus interface supporting Modbus-RTU protocol for seamless integration with PLCs, industrial control computers, gateways, or energy management platforms.

Key Specifications at a Glance:

Parameter	Value
Measurement Range	AC 0 ~ 50A
Transformer Ratio	1000/1
Aperture	10mm
Precision	±0.5% FS
Communication	RS-485, Modbus-RTU
Power Supply	DC 24V (20~28V)
Isolation	1.5kV triple isolation
Operating Temp	-10°C ~ +50°C
Mounting	DIN 35mm rail

3.2 LED Indicator Definition

LED	Name	Normal Status	Fault Status
POW	Power	Constant ON	OFF = No power / Power fault
RUN	Run	Flashing	OFF = Module fault / Not started

LED	Name	Normal Status	Fault Status
RX	Receive	Flashing when receiving data	—
TX	Transmit	Flashing when transmitting data	—

3.3 Button/Key Description

This product does not have local configuration buttons. All parameters are configured via:

- Modbus-RTU register commands (from PLC/SCADA/PC)
- Upper computer configuration software (via USB-RS485 cable)

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4. Mechanical Installation

4.1 Mounting Method

The QD-CT series modules use standard **35mm DIN rail mounting** (EN 60715), compatible with standard top-hat rails found in most industrial control cabinets.

4.2 Installation Steps

1. **Prepare the DIN rail:** Ensure the 35mm standard DIN rail is securely mounted in the control cabinet
2. **Hook the module:** Align the module's top clip with the top of the DIN rail, then push down until it clicks into place
3. **Verify mounting:** Gently pull the module to confirm it is securely locked on the rail
4. **Make connections:** Connect power, communication, and CT wires according to the terminal diagram (see Chapter 5)
5. **Power on:** Apply DC 24V power and verify LED indicators (see Chapter 6)

4.3 Installation Requirements

- **Orientation:** Install vertically with terminal side facing down for optimal heat dissipation. **Do not install upside down.**
- **Heat dissipation:** Maintain minimum **5mm horizontal clearance** between adjacent modules for proper heat dissipation
- **EMC recommendations:**
  - Keep power cables and signal cables separated by at least 10cm
  - Avoid running signal cables parallel to high-current conductors
  - Use shielded twisted pair for RS-485 communication
- **Avoid interference sources:** Do not install near strong electromagnetic sources, high-temperature equipment, or areas with condensation risk

4.4 Removal

To remove the module:

1. Disconnect all wiring

2. Press the release clip at the bottom of the module
3. Pull the module away from the DIN rail

4.5 Dimensional Summary

Model	Length (mm)	Width (mm)	Height (mm)	Weight (approx.)
QD-CT-4	98	92	42	~120g
QD-CT-8	148	92	42	~180g
QD-CT-12	168	92	42	~230g
QD-CT-16	198	92	42	~280g

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5. Wiring

5.1 Terminal Definition

Terminal No.	Label	Function	Connection
1	24V	Power supply +	Connect to DC +24V
2	0V	Power supply -	Connect to DC 0V / GND
3	A	RS-485 +	Connect to 485+ bus line
4	B	RS-485 -	Connect to 485- bus line
5	C1	Channel 1 CT input	Transformer C1 output
6	C2	Channel 2 CT input	Transformer C2 output
...	...	...	... (continues for all channels)

Note: Terminal assignments for CT inputs (C1~Cn) depend on the model: - QD-CT-4: C1~C4 (Terminals 5~8) - QD-CT-8: C1~C8 (Terminals 5~12) - QD-CT-12: C1~C12 (Terminals 5~16) - QD-CT-16: C1~C16 (Terminals 5~20)

5.2 Wiring Diagram (Description)

Power Wiring: - Terminal 1 (24V) → DC power supply +24V - Terminal 2 (0V) → DC power supply 0V/GND - Use twisted pair cable, keep away from signal lines

Communication Wiring: - Terminal 3 (A) → RS-485+ bus line - Terminal 4 (B) → RS-485- bus line - Use shielded twisted pair, daisy-chain topology - Install 120Ω termination resistors at both ends of the RS-485 bus for long distances

CT (Current Transformer) Wiring: - Transformer secondary wires (S1/S2) connect to corresponding channel terminals (C1~Cn) - **Polarity does not matter** — wires can be connected in either direction - The conductor to be measured passes through the transformer aperture — **no direction requirement, single pass**

5.3 Wiring Specifications

Item	Specification

Item	Specification
Recommended cable type	Shielded twisted pair (for RS-485)
Recommended wire gauge	0.5mm² ~ 2.5mm² (22~14 AWG)
Stripped length	8~10mm
Tightening torque	0.5~0.8 N·m
Max communication distance	1200m (with proper termination)

5.4 Wiring Best Practices

- **Separate power and signal cables:** Route power cables and communication cables in separate cable trays or conduits
- **Shield grounding:** Ground the shield at **one end only** (master/end station end) to prevent ground loops
- **Bus topology:** Use daisy-chain topology for RS-485 bus, avoid star topology
- **Termination:** Install 120Ω termination resistors at both ends of the RS-485 bus when cable length exceeds 100m

5.5 ⚠ Critical Warnings

WARNING: - **NEVER** connect 220V AC mains power to signal or CT input terminals — this will destroy the module - Always power off before making or modifying wiring connections - Do not connect/disconnect CT wires under load - Ensure the conductor passes completely through the transformer aperture

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6. Power On & First Startup

6.1 Pre-Power Checklist

Before applying power, verify:

- ☐ All wiring connections are correct and secure
- ☐ Power supply voltage is DC 24V (20~28V) with correct polarity
- ☐ RS-485 communication lines (A/B) are correctly connected
- ☐ CT transformers are properly connected to corresponding channel terminals
- ☐ No loose wires or exposed conductors
- ☐ Module is securely mounted on DIN rail

6.2 Power-On Procedure

1. **Double-check wiring:** Review all connections against the terminal diagram
2. **Apply power:** Connect the DC 24V power supply
3. **Observe indicators:** Watch the LED indicators during startup

6.3 Power-On Self-Test

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

1. **All LEDs illuminate briefly** (approximately 2 seconds) — this is normal
2. **POW LED** stays constantly ON — indicates power supply is normal
3. **RUN LED** begins flashing — indicates module is running normally
4. **RX/TX LEDs** flash intermittently — indicates communication activity

6.4 Normal Power-On Status

LED	Expected Status	Meaning
POW	Constant ON	Power supply normal
RUN	Flashing (approx. 1Hz)	Module running normally
RX	Flashing intermittently	Receiving data (normal)
TX	Flashing intermittently	Transmitting data (normal)

6.5 Wait Time

Allow approximately **5~10 seconds** for the module to complete initialization before attempting communication.

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7. Basic Configuration

7.1 Configuration Methods

This product supports two configuration methods:

Method	Description	Tools Required
Modbus Register	Configure via Modbus-RTU write commands	PLC / SCADA / PC with RS-485 adapter
Upper Computer Software	GUI-based configuration tool	PC with USB-RS485 cable

7.2 Modbus Register Configuration

7.2.1 Setting Communication Address

To change the device address (station ID):

1. Send a Modbus Write Single Register command (Function Code 06)
2. Register address: **0x0200** (decimal 512)
3. Write value: New address (1~255)
4. **Important:** After modifying the address, power cycle the device for the new address to take effect

Example: Set address to 5 - Send: `05 06 02 00 00 05 [CRC]` - Device responds: `05 06 02 00 00 05 [CRC]` - Power cycle device

7.2.2 Setting Baud Rate

To change the baud rate:

1. Send a Modbus Write Single Register command (Function Code 06)
2. Register address: **0x0201** (decimal 513)
3. Write value according to the baud rate table below
4. **Important:** After modifying baud rate, power cycle the device for the new baud rate to take effect

Baud Rate Configuration Table:

Register Value	Baud Rate	Note
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	Auto-detect	Auto-baud recognition

7.2.3 Setting Parity

To change parity setting:

1. Send Modbus Write Single Register command
2. Register address: **0x0202** (decimal 514)
3. Write value: 0=None (default), 1=Odd, 2=Even

7.3 Upper Computer Software Configuration

1. Connect the USB-RS485 cable between PC and the module (Terminals 3=A, 4=B)
2. Launch the configuration software on your PC
3. Select the correct COM port and set baud rate to match device (default 9600)
4. The software will scan and display connected devices
5. Modify parameters as needed (address, baud rate, etc.)
6. Click “Save” to write parameters to the device
7. Power cycle the device for changes to take effect

7.4 Factory Reset

To restore all parameters to factory defaults:

1. Send Modbus Write Single Register command to address **0x02FF** (decimal 767)
2. Write value: **0x5A** (decimal 90)

3. Power cycle the device

Default Factory Settings:

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

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8. Typical Test

8.1 Quick Function Verification

Perform this simple test to verify the module is functioning correctly:

Step 1: Prepare Test Equipment - Standard current source or known AC current source - Multimeter or data acquisition device - Known load (e.g., a resistive heater or lamp)

Step 2: Apply Known Input - Pass a conductor carrying a known AC current through the CT aperture - Ensure the current is within the measurement range (0~50A) - Record the actual current value using a reference meter

Step 3: Read Module Output - Using a Modbus master (PLC or PC), read the current data register - For Channel 1, read register **0x0000** (decimal address 0) - The register value is an unsigned integer with scale factor **0.1A** - Example: Register value = 2500 → Current = 2500 × 0.1A = **250.0A** (note: this exceeds 50A range, so typical values would be 0~500 for 0~50A)

Step 4: Verify Accuracy - Compare the module reading with the reference meter reading - Acceptable error: within ±0.5% of full scale (±0.25A for 50A range) - If readings are significantly off, check: - CT is properly seated on the conductor - CT wiring is connected to correct terminals - CT ratio matches module configuration (default 1000/1)

8.2 Communication Test

1. Connect PC to module via RS-485 adapter
2. Set PC serial port to: 9600 bps, 8 data bits, no parity, 1 stop bit
3. Send Modbus read command: `01 03 00 00 00 04 44 09` (read 4 registers from address 1)
4. Expected response (if 4 channels present and no current): `01 03 08 00 00 00 00 00 00 00 00 [CRC]`
5. Apply known current and verify register values change proportionally

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9. Quick Troubleshooting

Symptom	Likely Cause	Solution

Symptom	Likely Cause	Solution
POW LED off (no power)	Power supply not connected or faulty; wrong voltage; loose terminal	Check DC 24V supply at Terminals 1&2; verify polarity; check terminal tightness
RUN LED not flashing	Module fault or startup failure; power supply out of range	Power cycle the device; verify supply voltage is 20~28V DC; if persists, contact technical support
No communication	Wrong address/baud rate; A/B wiring reversed; bus overloaded	Verify Modbus address matches master config; check A/B wiring; verify 120Ω termination resistors; power cycle
Signal fluctuation / instability	Poor connection; EMI interference; shield not grounded	Check all terminal connections; use shielded cable; verify shield grounded at one end only; separate from power cables
Wrong readings / No output	CT not connected properly; conductor not passed through aperture; CT mismatch	Verify CT wires connected to correct channel terminals; ensure conductor passes completely through transformer aperture; use only manufacturer-supplied CTs
Fault LED constant on	Overload condition; CT open circuit; hardware fault	Check if current exceeds measurement range; verify CT connections; power cycle; if persists, contact technical support

Note: For complex troubleshooting issues not covered above, please refer to the full Datasheet or contact our technical support team.

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10. Technical Support

10.1 Contact Information

Item	Details
Company Name	[Company Name — To Be Confirmed]
Website	[Website — To Be Confirmed]
Email	[Email — To Be Confirmed]

Item	Details
Sales Hotline	[Phone — To Be Confirmed]
Technical Support	[Support Email/Phone — To Be Confirmed]

10.2 Providing Problem Reports

When contacting technical support, please provide the following information to help us resolve your issue quickly:

1. **Product model** (e.g., QD-CT-8)
2. **Firmware version** (if available)
3. **Description of the issue** (what happens, when it happens)
4. **Photos of wiring connections**
5. **Modbus register readings** (if applicable)
6. **System configuration** (PLC model, gateway model, etc.)

10.3 Disclaimer

Full technical data, Modbus register map, and complete specifications are available in the official QD-CT Series Datasheet. This Quick Start Guide covers only the essential information for initial setup and basic operation. For advanced configuration and detailed specifications, please refer to the Datasheet.

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11. Appendix

Appendix A: Terminal Pinout Quick Reference

Terminal	Label	Function	Wire Color Recommendation
1	24V	Power +24V	Red
2	0V	Power 0V/GND	Black
3	A	RS-485+	Green
4	B	RS-485-	White
5+	C1~Cn	Channel CT inputs	Yellow (per channel)

Appendix B: Default Factory Settings

Parameter	Default Value
Station Address (ID)	1
Baud Rate	9600 bps
Data Bits	8
Parity	None
Stop Bits	1
CT Ratio	1000/1
Measurement Range	AC 0~50A

Parameter	Default Value
Resolution	0.1A
Output Data Format	Unsigned Integer (0.1A/count)

Appendix C: Common Modbus Commands Reference

Command	Function Code	Example (Address=1, Read 4 registers)
Read Current Data	03 (Read Holding Registers)	`01 03 00 00 00 04 44 09`
Set Address	06 (Write Single Register)	`01 06 02 00 00 05 [CRC]`
Set Baud Rate	06 (Write Single Register)	`01 06 02 01 00 03 [CRC]`
Factory Reset	06 (Write Single Register)	`01 06 02 FF 00 5A [CRC]`

Note: [CRC] represents the CRC-16 checksum calculated over the preceding bytes.

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