Crompton Integra Troubleshooting Guide

Crompton Integra Meters are highly advanced and versatile devices used in various industries for monitoring energy usage, data analysis and communication purposes. This guide provides an overview of common issues users may encounter and offers solutions.

Before diving into the troubleshooting process, it's important to ensure that you have a basic understanding of the Compton Integra system and its components. Familiarise yourself with the user manual and technical specifications to have a clear understanding of the device's capabilities and limitations. See final page for links to specific model data sheets.

Troubleshooting requires patience and a systematic approach. By following this guide, you'll have the knowledge to diagnose and resolve common issues with Compton Integra Meters.

1. **Meter is faulty, not working or not powering up**

   If your multi-function meter is not working or powering up there could be several reasons for this to occur. In some cases, the meter may need to be replaced.

   Here are some possible causes and actions:

   a. **Power Supply and Wiring Issues:** The meter may not be receiving power due to issues with the power supply, such as a blown fuse, tripped circuit breaker, or incorrect/damaged wiring or connections.
      i. **Check the power supply connections:** Ensure the correct voltage is present at the relevant meter terminals.
      ii. **Incorrect Power Supply Voltage:** If the applied voltage has exceeded the rated operational voltage of the unit, catastrophic damage is likely to have occurred.
      iii. **Incorrect Connections:** If voltage has been applied to the incorrect terminals on the unit, catastrophic damage is likely to have occurred.

   b. **Meter Failure:** The meter itself may have failed due to internal damage or component failure. This could be due to a manufacturing defect or damage caused by environmental factors as follows; Raise relevant concern with point of purchase and provide details of failure – Examples below.
      i. **Physical and Visible damage:** Assess cause and type of damage e.g.
         1. Damaged prior to arrival
         2. Damaged in storage
         3. Accidental damage when installing or once installed
      ii. **Firmware issues:** If the meter's firmware has become corrupted or damaged, this could cause it to fail. Reference the relevant error code on the meter display and raise with point of sale.

      iii. **Moisture, Heat and Vibration:** Assess installation environmental factors such as humidity and high/low temperatures – Refer to Environmental Specifications within the relevant Meter Data Sheets.
      iv. **External factors:** External factors such as lightning strikes, power surges, or other electrical disturbances can damage the meter or cause it to fail.

2. Meter is displaying incorrect data (V, kWh, Current etc)

To diagnose the cause of incorrect data readings, it is important to first check the wiring connections and perform a visual inspection of the meter for any signs of damage.

If there are no visible signs of damage, there are several reasons why a multi-function meter may display incorrect data:

a. **Wiring and Installation issues:** Incorrect or loose wiring connections can cause inaccurate readings on the meter.

i. **Voltage (V):**
   1. Ensure correct phase sequence is connected
   2. Ensure the correct voltage is present at the relevant meter terminals

ii. **Current (A):**
   1. Ensure correct phase sequence is connected.
   2. Check Current Transformer (CT) Orientation – CT P1 must face supply. Line = P1 / Load = P2.
   3. Ensure CT secondary cables (S1 and S2) are connected correctly with the correct polarity - S1 must be connected to the 'current in' terminal for the correct line/phase on the meter. The S2 terminal must be connected to the 'current out' terminal for the correct line/phase on the meter.
   4. Ensure secondary cable links/terminals are not shorted.
   5. If using a RJ12 Connection (Eg. DL1-01 or INT-1221) – Ensure the correct Crompton supplied cable has been used.

iii. **Power and Energy (kWh, kVAr, W, Wh etc):**
   1. All power and energy readings are calculated from Voltage and current Inputs – *Refer a. i. (Voltage) & a. ii. (Current) above*

iv. **Common Question – Why is my meter reading negative energy?**

CT meters, like other types of energy meters, measure the flow of electrical energy in a circuit. In a typical CT meter, there are two registers that keep track of the energy consumed: one for kWh (kilowatt-hours) and one for kVAr (kilovolt-ampere reactive hours).

Negative readings in a CT meter for kWh and kVAr can occur due to a few different reasons:

1. Reverse power flow: If there is power being exported from the circuit (i.e., energy is flowing back into the electrical grid), the meter will record export values for kWh and kVAr. This can happen, for example, if you have solar panels or wind turbines that generate electricity and feed it back into the grid – *Refer a. i. (Voltage) & a. ii. (Current) above*
2. Incorrect installation: If the CT meter is installed improperly, it may not measure the energy flow correctly, leading to incorrect readings. For example, if the current transformers (CT's) are installed in the wrong orientation, or if the polarity of the CT's is reversed, this can cause the meter to register export values – *Refer a. i. (Voltage) & a. ii. (Current) above*

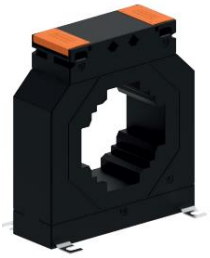
b. **<u>Meter settings:</u>** Incorrect meter settings can cause the meter to display incorrect readings.

i. **System Type:**
   1. Must match the installation type – E.g. Three Phase, Four Wire System = 3P4W

ii. **Voltage (V):**
   1. If using a Voltage Transformer (VT/PT) ensure correct Primary and Secondary Voltage settings match the marked VT Ratio
   2. If NOT using a VT ensure the voltage setting matches the supply voltage in a 1:1 Ratio – E.g. If Standard 230VAC Supply = Pri 277.0 V and Sec 277.0 V

iii. **Current (A):**
   1. Set primary current to match the primary rated current of the installed Current Transformer (CT) – E.g. 630/5A CT = Pri 0630 A
   2. Set secondary current to match the secondary rated current of the installed CT – E.g. 630/5A CT = Sec 5 A

iv. **Power and Energy (kWh, kVAr, W, Wh etc):**
   1. Derived/Calculated from Voltage and Current Inputs – *Refer b. ii. (Voltage) and b. iii. (Current) above*
   2. CT Direction (as applicable) - This relates to the direction of the primary conductors. This is used to ensure correct flow of current from P1-P2 on each phase – Check Current Transformer (CT) Orientation – CT P1 must face supply. Line = P1 / Load = P2
   3. For a standard 1A or 5A CT installed incorrectly with current flowing P2-P1 - Forward/Reverse setting for direction of current flow can be changed to rectify
   4. For a DL3N1 (RJ12 connected) CT refer to the DL3N1 installation guide and ensure P1-P2 current flow
   5. Check Current Transformer (CT) Orientation – CT P1 must face supply. Line = P1 / Load = P2
   6. TOP/BOT setting can be changed to suit wiring installation



3. <u>Displayed Value Fault Finding:</u>

This section is to be used once the above Wiring and Installation Issues and Meter Settings have all been verified to be correct. Follow the below points to validate/resolve any further meter value issues.

a. **Voltage (V):**
   i. Using a Fluke tester verify the voltage reading at point of supply – Record Result
   ii. Using a Fluke tester verify the voltage reading at the relevant meter terminals – Record Result
      1. If readings are not the same; No metering issue present - *Fault find installation*
      2. If readings are the same; continue
   iii. Check the displayed Voltage on the meter display – Record Result

1. If readings are not the same as values recorded at point of supply and meter terminals (point i & ii above); contact your point of purchase for warranty evaluation (potential meter fault).
2. If readings are the same; No metering issue present.

b. **Current (A):**

i. Using a Fluke tester verify the actual load on the primary cables (on each individual phase) – Record Results per phase

1. If reading is the same as meter displayed values; No metering issue present
2. If reading is not the same; continue

ii. Using a Fluke tester verify the actual load on the Current Transformer (CT) secondary cables (ideally at meter terminals) – Record Results per phase

1. Divide the CT Primary Current Rating by the CT Secondary Current.
   Example: CT Rating is 160/5A
   a. *160/5 = 32*
   b. *32 = Secondary Multiplier*
2. Multiply measured secondary current by the secondary multiplier.
   Example: Measured current = 3A
   a. *3 x 32 = 96A*
   b. *96A = Calculated Value*
3. If calculated value is the same as meter displayed value and primary measured value; No metering issue present
4. If calculated value is not the same as meter displayed value or primary measured value (point i.); contact your point of purchase for warranty evaluation (potential meter or CT fault)

c. **Power and Energy (kWh, kVAr, W, Wh etc) –**

All Power and Energy values are Derived/Calculated from Voltage and Current Inputs – *Refer a and b above*

Common Questions for Power and Energy Readings:

i. **Why are my energy readings so low?**
In the case of high energy turnover where kWh/kVArh exceed the meter count limit - Meter will reset count to 0

ii. **Ultra-low loads; no energy displayed?**
The load is too low for the meter to read accurately. E.g. 5A actual load vs 800/5A CT Installed

1. Either: change the CT to lower/more accurate Primary *or*
2. Enable Low Power Threshold in Energy Settings for testing purposes (only applicable to select meters)

4. Communications are not working

To troubleshoot Modbus RTU over RS485 communication issues, it is important to first identify the root cause of the problem. This can involve checking the wiring, addressing, and timing settings, as well as ensuring that all devices are compatible and properly configured.

To verify the meter communications are working correctly and confirm meter is not faulty:

Connect the meter directly to a PC (via RS485 to USB – E.g. Moxa UPORT) and use independent Modbus software to verify the meter is communicating.

1. Download Free Crompton Integra Configurator (RS485 software) available here
2. If meter is communicating directly with PC; No meter fault. See below typical issues.
3. If meter is NOT communicating directly with PC; Contact point of purchase for warranty evaluation.

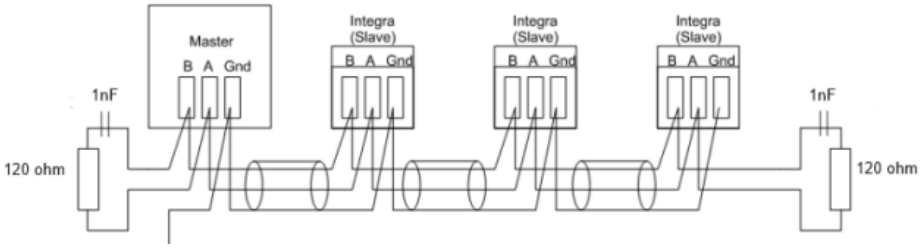
Some typical issues that can arise with Modbus RS485 communication include:

a. **Communication errors:**

Communication errors can occur due to a variety of reasons, such as poor cable connections, electrical noise, incorrect termination of the RS485 network, or incorrect settings of the Modbus devices. These errors can cause data corruption or loss of communication.

i. **Confirm communication cable connections are correct: E.g.**

1. ***+/- Connections Correct***
2. ***No T-Junctions in Daisy Chain***



b. **Addressing issues:**

Modbus devices are typically addressed using a unique slave address. If two or more devices have the same address, or if the master device sends a request to the wrong address, communication problems can occur.

i. **Confirm all devices are correctly addressed**

ii. **Confirm no more than 32 devices are connected to the master node**

c. **Timing issues:**

Timing issues can arise when there is a delay in the response of the slave device, or if the master device sends a request before the slave device is ready to respond. These issues can cause timeouts or errors in the communication.

d. **Interference from other devices:**

RS485 networks can be susceptible to interference from other electrical devices or networks, which can cause data corruption or loss of communication.

e. **Incompatible devices:**

Incompatibilities between devices, such as different baud rates or data formats, can cause communication problems.

Data Sheets:

Part Number	Description	Datasheets
Ri3-01	Integra 1222 Digital Meter self-powered	Download
INT-1222-S-010	Integra 1222 Digital Meter self-powered	Download
INT-1222-M-010	Integra 1222 Digital Meter AUX powered	Download
INT-1221-S-010	Integra 1221 Digital Meter with RJ12 connection	Download
SL1-01	Integra Single Load Meter	Download
DL1-01	Integra Dual Load Meter	Download
TL1-01	Integra Tri Load Meter System	Download
INT-2170-M-01	Integra 2170 Power Quality Meter	Download
INT-2270-M-01	Integra 2270 Power Quality Meter	Download
INT-1422-M-000	INTEGRA 1422 100-550V AC/DC	Download
INT-1422-L-000	INTEGRA 1422 12 - 60V AC/DC	Download

Installation and User Guides:

Part Number	Description	Datasheets
DL3N1 - CT	DL3N1 CT to suite INT-1221, SL1-01, DL1-01, TL1-01	Download
Ri3-01	Integra 1222 Digital Meter self-powered	Download
INT-1222-S-010	Integra 1222 Digital Meter self-powered	Download
INT-1222-M-010	Integra 1222 Digital Meter AUX powered	Download
INT-1221-S-010	Integra 1221 Digital Meter with RJ12 connection	Download
SL1-01	Integra Single Load Meter	Download
DL1-01	Integra Dual Load Meter	Download
TL1-01	Integra Tri Load Meter System	Download
INT-2170-M-01	Integra 2170 Power Quality Meter	Download – Setup Download – Install
INT-2270-M-01	Integra 2270 Power Quality Meter	Download – Setup Download – Install
INT-1422-M-000	INTEGRA 1422 100-550V AC/DC	Download
INT-1422-L-000	INTEGRA 1422 12 - 60V AC/DC	Download

Communication Guides:

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INT-2270-M-01	Integra 2270 Power Quality Meter	Download
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