

SECTION 7: TROUBLESHOOTING AND MAINTENANCE

7-1 Level of Repair

This manual is written with the assumption that only unit-level troubleshooting will be performed. If the cause of malfunction is traced to an IQ Analyzer, the unit should be replaced with a spare. The malfunctioning unit should then be returned to Cutler-Hammer for factory repairs.

7-2 Troubleshooting (Table 7.1)



WARNING

ALL MAINTENANCE PROCEDURES MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE IQ ANALYZER AND THE MANNER IN WHICH IT IS APPLIED. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN SERIOUS INJURY, DEATH AND/OR EQUIPMENT DAMAGE.

TROUBLESHOOTING PROCEDURES MAY INVOLVE WORKING IN EQUIPMENT AREAS WITH EXPOSED LIVE PARTS WHERE THE HAZARD OF A FATAL ELECTRIC SHOCK IS PRESENT. PERSONNEL MUST EXERCISE EXTREME CAUTION TO AVOID INJURY OR EVEN DEATH.

ALWAYS DISCONNECT AND LOCK OUT THE CURRENT SOURCE AND CONTROL POWER SUPPLY BEFORE TOUCHING THE COMPONENTS ON THE REAR OF THE IQ ANALYZER.

NOTICE

Keep in mind that when an IQ Analyzer is initially powered up for use on a specific system, the displayed "Meter Menu" values may not be what is anticipated for that system. This is because the unit has not yet had necessary pieces of system information programmed into non-volatile memory.

7-3 Replacement

Follow these procedural steps to replace the IQ Analyzer.

Step 1: Turn off control power at the main disconnect or isolation switch of the control power supply. If the switch is not located in view from the IQ Analyzer, lock it out to guard against other personnel accidentally turning it on.

Step 2: Verify that all "foreign" power sources wired to the IQ Analyzer are deenergized. These may also be present on the relay and input/output terminal block. Current transformer inputs must be temporarily shorted at a point prior to the IQ Analyzer's terminals before attempting to open these terminals on the IQ Analyzer.

Step 3: Before disconnecting any wires from the unit, make sure they are individually identified to assure that reconnection can be correctly performed. Make a sketch to help with the task of terminal and wire identification.

Step 4: If an optional ribbon cable connects with the Communications Port, carefully disconnect it.

Step 5: If the unit has its Power Module remotely located, carefully unplug the optional Extension Cable from the IQ Analyzer's chassis, not the Power Module.

Step 6: Remove wires by loosening or removing the screw terminal where there is a wire connection.



CAUTION

SUPPORT THE IQ ANALYZER FROM THE FRONT SIDE WHEN THE SCREWS ARE LOOSENED OR REMOVED IN STEP 7. WITHOUT SUCH SUPPORT, THE UNIT COULD FALL OR THE PANEL COULD BE DAMAGED.

Step 7: Remove the 6 mounting screws holding the unit against the door or panel. These are accessed from the rear of the unit.

Step 8: Carefully lay the screws aside for later use.

Step 9: Mount the replacement unit. Read paragraph 4-2.2 before attempting this.

Step 10: Reverse the procedure outlined in Steps 4 through 7.

Step 11: Using the sketch mentioned in Step 3, replace each wire at the correct terminal. Be sure that each is firmly tightened. Remove temporary shorts on incoming current transformers.

Step 12: Restore control power. Refer to paragraphs 4-4.2 entitled "Initial Power Application".

Table 7.1 Troubleshooting Guide

Symptom	Probable Cause	Possible Solution(s)
All Operator Panel Indicator LEDs are off	<ul style="list-style-type: none"> Line voltage level is deficient. Separate source control power is deficient. ac line connections or optional external voltage transformers are not properly wired or installed. Blown or loose fuses. IQ Analyzer has malfunctioned. 	<ul style="list-style-type: none"> Locate cause of deficiency in ac line monitored. Locate cause of deficiency in the ac control power line. Verify that the ac line and/or potential transformers are wired as shown on the appropriate wiring plan drawing for the application in Section 4. Verify line voltage with multimeter. Check fuse(s) on affected phase(s) located just above the voltage inputs behind cover of power module (Figure 2-6). Reseat fuse(s). Replace, if necessary.^① If the problem persists, replace the unit. Replace the unit.
Voltage and current readings are incorrect and unstable	<ul style="list-style-type: none"> The case is not grounded 	<ul style="list-style-type: none"> Attach ground wire to either the power module or IQ Analyzer "Earth Ground" terminal.
One or more voltage Phases read incorrectly.	<ul style="list-style-type: none"> Blown or loose fuses. Incorrect voltage settings 	<ul style="list-style-type: none"> Verify line voltage with multimeter. Check fuse(s) on affected phase(s) located just above the voltage inputs behind cover of power module (Figure 2-6). Reseat fuse(s). Replace, if necessary.^① Verify correct settings programmed in the IQ Analyzer for system type, L-L voltage and PT rating.
One or more currents read incorrectly.	<ul style="list-style-type: none"> Incorrect current transformer ratio setting. 	<ul style="list-style-type: none"> Verify incoming current to IQ Analyzer with separate ammeter. Verify proper settings in the IQ Analyzer Check ct wiring and grounding on appropriate wiring plan drawing in Section 4.
Power parameters (Watt, var, VA, Power Factor) read incorrectly.	<ul style="list-style-type: none"> Phasing for voltage and current is mismatched. Current transformer polarity is reversed. 	<ul style="list-style-type: none"> Capture an event and compare phase angles of Va, Vb, Vc, Ia, Ib, Ic to detect possible mis-wiring. Verify connections per wiring diagrams. Reverse current transformer leads. Verify ground wiring per drawings in technical manual. Reverse current polarity via settings. Enter factory password (default=27116) and change CT POLARITY under CALIBRATION SETTINGS in programming mode.
Unit displays one or more of the following: HARDWARE FAILURE REGISTER FAILURE MULTIPLY FAILURE DIVIDE FAILURE LOGIC FAILURE ADD/SUBTRACT FAILURE INTERNAL RAM ERROR or EXTERNAL ROM ERROR	<ul style="list-style-type: none"> Ambient temperature has exceeded specified operating temperature of 70°C (158°F) Possible IQ Analyzer hardware failure. 	<ul style="list-style-type: none"> Reboot unit by momentarily removing power cable at connector J2. If the problem persists, replace the unit.

① Power Module Fuse: Buss KTK-R-3/4 or equivalent (3/4 amp).

Table 7.1 Troubleshooting Guide (continued from previous page)

Symptom	Probable Cause	Possible Solution(s)
Unit fails to be identified via the IMPACC Network	<ul style="list-style-type: none"> Older software (Series-III) does not know the new IQA6400/IQA6600 protocols and features. Software device configuration does not match the IQ Analyzer. In software, "IQ Analyzer" means IQA6000/IQA6200 while "IQ Analyzer DataLogger" means IQA6400/IQA6600 	<ul style="list-style-type: none"> Set IQ Analyzer for IQA6000/IQA6200 mode for backward compatibility. <p>Or</p> <ul style="list-style-type: none"> Upgrade PowerNet Software and set device configuration to IQ Analyzer DataLogger. Set the IQ Analyzer for IQA6400/IQA6600 communication mode.
Unit displays EEPROM ERROR	<ul style="list-style-type: none"> Unit powered down while saving settings. IQ Analyzer hardware error. 	<ul style="list-style-type: none"> Enter any setting in Program Mode to re-save settings in EEPROM. Reboot unit by momentarily removing power cable at connector J2. Replace the unit.
Unit displays HIGH NEUTRAL VOLTAGE	<ul style="list-style-type: none"> IQ Analyzer has detected a high voltage on the Neutral – Ground reading The neutral terminal is wired incorrectly. The case is not grounded 	<ul style="list-style-type: none"> Verify correct connection of the Neutral to the Power Module. Particularly check for reversal of phase C voltage with the Neutral. Verify proper grounding of the power system and the IQ Analyzer. Attach ground wire to either the power module or IQ Analyzer "Earth Ground" terminal. Check voltage with multimeter.
Unit displays REVERSE SEQUENCE	<ul style="list-style-type: none"> IQ Analyzer has detected phasing difference between programmed phasing setpoint and actual system parameters. Either: parameter is set incorrectly, unit is wired incorrectly, or actual reversal condition exists. 	<ul style="list-style-type: none"> Verify actual system phasing. Capture an event and compare phase angles of Va, Vb, Vc, Ia, Ib, Ic to detect possible mis-wiring. Verify IQ Analyzer setpoint matches actual system phasing. Verify IQ Analyzer connections. Check power system for cause of actual phase reversal condition.
Unit fails to capture Harmonic Data when manual capture is pressed.	<ul style="list-style-type: none"> All 7 waveform capture triggers are programmed and none are set for MANUAL CAPTURE. 	<ul style="list-style-type: none"> Enter program mode and set up an Event Trigger for MANUAL CAPTURE. Refer to Section 6 "Programming" and Figure 6-8.

Table 7.1 Troubleshooting Guide (continued from previous page)

Symptom	Probable Cause	Possible Solution(s)
Analog outputs fail to operate.	<ul style="list-style-type: none"> Analog outputs not set up in Program mode. Output transistor is damaged. The transistor is rated for 60V and is protected for ESD; however, capacitive discharge from the installation of field wiring can cause permanent damage. The load wiring should be grounded at the Analyzer before connecting to the analog output terminal. 	<ul style="list-style-type: none"> Check input/output fuse beside Communications connector, and replace if needed. [ⓐ] Program setpoints to enable analog output proportional to desired parameter. Refer to Section 6 "Programming" and Figure 6-6. Replace the unit.
Unit fails to communicate over IMPACC network.	<ul style="list-style-type: none"> Wrong or conflicting address set on PONI. Communications wiring errors. PONI failure. 	<ul style="list-style-type: none"> Check that PONI has a unique address on the system and that software is addressing proper unit. Verify wiring is in conformance to IMPACC Wiring Rules. Refer to Figure 4-6.
Unit fails to detect contact closure on Discrete Contact Inputs.	<ul style="list-style-type: none"> Discrete Inputs not properly configured. Improper wiring or faulty external device providing contact closure. Contacts welded. 	<ul style="list-style-type: none"> Check IQ Analyzer setpoints. Verify that external contact actually closes and that impedance is essentially zero when contact is closed. Also, verify wiring to Discrete Contact inputs per IL drawings.
Unit setpoints unchanged upon exiting program mode.	<ul style="list-style-type: none"> Unit was in View-Only mode using View-Only password (00000). 	<ul style="list-style-type: none"> Re-enter program setpoints using the proper program password which is either the one the customer has established or which is still the default password(s) set by the factory for initial power-up (44444 or 10000).

7-4 Maintenance and Care

The IQ Analyzer is designed to be a self contained and maintenance free unit. The printed circuit boards are calibrated and conformally coated at the factory. They are intended for service by factory trained personnel only.

The IQ Analyzer should be stored in an environment that does not exceed the storage temperature range of -30°C to +85°C. The environment should also be free of excess humidity. If possible, the device should be stored in its original packing material and container.

Never clean the rear of the IQ Analyzer with power applied. Clean the rear with a clean dry cloth. Clean the face with a dry cloth or damp cloth with water or mild detergent.

7-5 Calibration

IQ Analyzer is permanently calibrated at the factory with no need for further calibration in the field.

7-6 Return Procedure

The Troubleshooting Guide (Table 7.1) is intended for service personnel to identify whether a problem being observed is external or internal to the unit. For assistance with this determination, contact the Advanced Product Support Center at 1-800-809-2772 or 1-412-490-6714. If a problem is identified to be internal, the unit should be returned to the factory for repair or replacement. To have a unit returned, contact your local Cutler-Hammer authorized distributor.

7-7 Replacement Parts

Refer to Table 1.1 for a list of available parts and accessories for the IQ Analyzer. For ordering information, contact your local Cutler-Hammer authorized distributor.

7-8 Technical Assistance

For information, technical assistance or referral to a local authorized distributor, contact the Advanced Product Support Center at 1-800-809-2772 or 1-412-490-6714.