SECTION 1: INTRODUCTION/QUICK START

1-1 Preliminary Comments And Safety Precautions

This technical document is intended to cover most aspects associated with the installation, application, operation and maintenance of the IQ Analyzer. It is provided as a guide for authorized and qualified personnel in the selection and application of the IQ Analyzer. Please refer to the specific WARNING and CAUTION in Section 1-1.2 before proceeding. If further information is required regarding a particular installation, application or maintenance activity, a Cutler-Hammer representative should be contacted.

1-1.1 Warranty And Liability Information

NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OF MERCHANTABILITY, OR WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE, ARE MADE REGARDING THE INFORMATION, RECOMMENDATIONS AND DESCRIPTIONS CONTAINED HEREIN. In no event will Cutler-Hammer be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information and descriptions contained herein.

1-1.2 Safety Precautions

All safety codes, safety standards and/or regulations must be strictly observed in the installation, operation and maintenance of this device.

WARNING

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE IN REVERSE TYPE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO INSURE THAT PERSONNEL ARE ALERT TO WARNINGS, WHICH MAY APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE AS SHOWN BELOW.

CAUTION

COMPLETELY READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, OPERATION OR APPLICATION OF THE EQUIPMENT. IN ADDITION, ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. ANY WIRING INSTRUCTIONS PRESENTED IN THIS DOCUMENT MUST BE FOLLOWED PRECISELY. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE.

1-1.3 Factory Correspondence

Contact Power Management Applications Support at 1-800-809-2772 or 1-412-490-6714 for any questions regarding the operation or troubleshooting of the IQ Analyzer.

1-2 Product Overview

The IQ Analyzer is a micro-processor based electrical distribution system monitor. It provides extensive metering, trending, logging, power quality analysis, remote input monitoring, control relaying, analog input/outputs, and communications capabilities. IQ Analyzer is a compact, panel mounted device. It mounts in less than 7 by 11 inches of space and provides the functionality of dozens of individual meters, relays and recorders (Figure **1-1**).

IQ Analyzer:

- **NEW!** Partitions energy and demands into 4 TOU (Time Of Use) billing rates, according to 32 user programmable schedules.
- **NEW!** Logs 504 event timestamps and reasons
- **NEW!** Stores 4 independent trends with up to 24 items into 90000 bytes (8-cycle or 1-minute resolution). Applications include energy trends, motor starts, load profiling, sag/swell analysis, etc.
- Complies with numerous accuracy standards for revenue meters, including: ANSI C12.20 (0.5%), ANSI C12.16 (1%), IEC687 (0.5%), and Canada (0.5%).
- Displays true rms magnitudes and phase angles through the 50th harmonic (both even and odd).
- Accurately measures nonsinusoidal waveforms up to a 3.0 crest factor
- Monitors neutral and ground conductors in addition to 3 phases
- Simultaneously captures waveforms from all current and voltage inputs

A unique operator interface, which includes an LED backlit LCD display, easy to use “Meter Menu” screens and detailed “Analysis” screens, permits an operator to easily access a wealth of real time and recorded information. The display provides the flexibility of exhibiting large characters with high visibility and small characters for detailed descriptions. All programming can be accomplished through the faceplate or communications port (Figure **1-2**). The on-line Help feature provides useful information on device operation, programming and troubleshooting.

The IQ Analyzer directly monitors 3-phase lines to 600 Vac nominal without the need for external potential transformers. External potential transformers are only required above 600 Vac, even if the system is ungrounded.

IQ Analyzer is comprised of the **IQA-6400 Series** and **IQA-6600 Series** of system monitors. The IQA-6400 Series and IQA-6600 Series are similar in the features offered except that graphic and transient triggering abilities are also part of the IQA-6600 Series.

Six different IQ Analyzer configurations are available, three within the IQA-6400 Series and three within the IQA-6600 Series. Refer to Table **1.1** for specific style numbers.

IQA-6400 Series		IQA-6600 Series	
IQA6430:	Powered from three-phase lines	IQA6630:	Like IQA6430 except with graphic and transient triggering abilities
IQA6410:	Accepts separate source, single-phase 100-240 Vac 100-250Vdc control power	IQA6610:	Like IQA6410 except with graphic and transient triggering abilities
IQA6420:	Accepts 24-48 Vdc supply	IQA6620:	Like IQA6420 except with graphic and transient triggering abilities

Figure 1-1. IQ Analyzer (Front View)

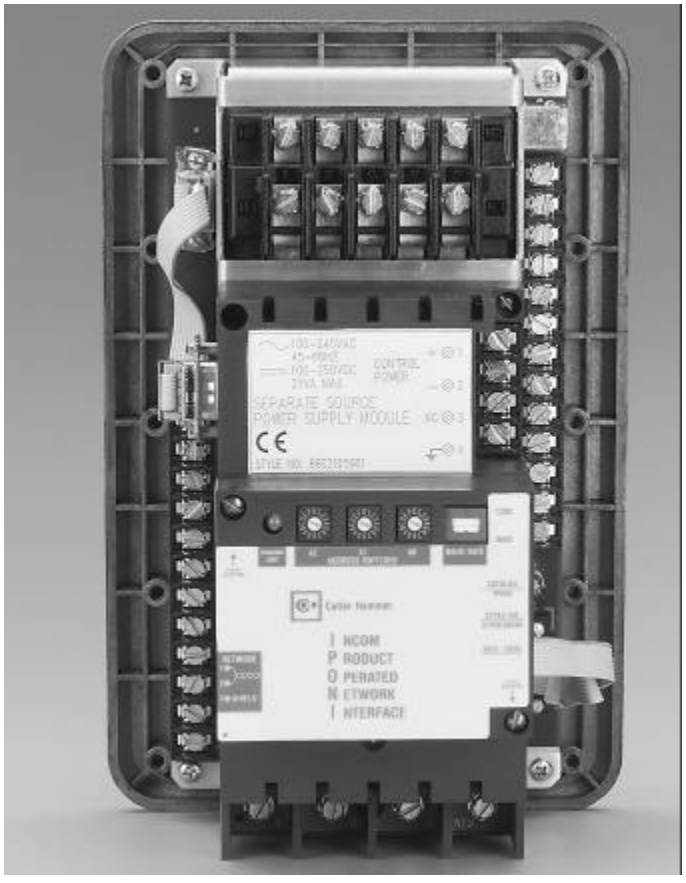

Figure 1-2. IQ Analyzer (Rear View) with optional IPONI (INCOM Product Operated Network Interface) Communication Module Installed

1-2.1 Comprehensive Information

The IQ Analyzer displays the most comprehensive list of metered parameters in its class. Multiple parameters, such as currents of phases A, B and C, are displayed simultaneously for more thorough real-time monitoring. Custom screens can be configured to cycle through 28 parameters, grouped into 4 custom screens. For example, one can group volts, amperes and power factor, for convenience, or to concurrently observe their relationships as conditions change. Regardless of selection, the custom screens provide hands-off operation.

1-2.2 Harmonic Distortion Analysis

Current and voltage distortion data are displayed by the IQ Analyzer and/or accessible through the communications port. This includes:

- % THD
- K-Factor
- Crest Factor
- CBEMA Factor
- Harmonic magnitudes through the 50th
- Harmonic phase angles through the 50th

A snapshot sample of this information may be activated by user commands, discrete inputs, programmable thresholds, or minimum/maximum updates to capture distortion data during conditions of interest. To help eliminate nuisance alarms, harmonic distortion information can be captured and relay outputs activated when THD exceeds a:

- Programmable percentage of fundamental

or

- Programmable magnitude, such as amperes, threshold

1-2.3 Extensive I/O And Communications Capabilities

One analog and three digital inputs are provided to interface with sensors and transducers. Three analog output and four relay contacts are furnished to share data with PLCs and control systems, and to actuate alarms and control relays. Terminals are captive clamp type and finger safe (Figure **2-2**). With the communications option, IQ Analyzer can be remotely monitored, controlled and programmed.

1-2.4 Disturbance Information

The 6600 Series Analyzer or with the communications option and PowerNet Suite software, a waveform analysis will construct waveforms of up to 56 cycles of all currents and voltages, including neutral and ground, to help troubleshoot undervoltage/ sag and overvoltage/swell conditions. For example, by programming a reset threshold, the duration of the voltage disturbance can also be indicated. The IQA6600 Series can also be set to trigger on sub-cycle voltage irregularities, based upon dv/dt and interruption.

1-2.5 High Accuracy

Precision electronic circuitry enables IQ Analyzer to comply with numerous accuracy standards for revenue meters, including: ANSI C12.20 (0.5%), ANSI C12.16 (1%), IEC687 (0.5%), and Industry Canada (0.5%). In addition, accuracy is maintained in applications with high distortion levels. This includes systems exhibiting a 3.0 Crest Factor, harmonics up to the 50th multiple of the fundamental, and frequency variations.

1-2.6 Operational Simplicity

The IQ Analyzer's "Meter Menu" makes commonly viewed parameters easy to access and understand. For additional information, the "Analysis" screens provide comprehensive data on harmonic distortion, current/ power demands, trending and event/alarms. IQ Analyzer also has a "Help" pushbutton to assist in programming, troubleshooting and operating the device.

NOTICE

This manual is accurate to firmware version 2.00. Cutler-Hammer reserves the right to add and/or change features.

1-3 Quick Start

This section is intended to provide an operator with enough basic information to put the IQ Analyzer into service quickly, without reviewing all of the instructions presented in this book. Even if the Quick Start approach is successful, it is strongly recommended that the entire book be reviewed. Taking full advantage of the wide array of features offered by the IQ Analyzer cannot be fully realized by using only the Quick Start approach.

This manual contains the following numbered sections:

1. **Introduction/Quick Start.**

2. **Hardware Description.** Itemizes the operator panel, rear access area, external hardware, and specifications

3. **Operator Panel.** Describes the function of LEDs, display window, and pushbuttons.

4. **Installation.** Describes the mounting, wiring, initial startup, and steps necessary to perform basic metering.

5. **Operation.** Describes the functional details of operation. These include: Meter Menu, help, programmed settings, general setup, inputs and outputs, analysis screens, reset screens, and communications.

6. **Programming.** Describes the entry of programmable settings. This includes the common programming procedures of entering the password, moving through the levels of screens, and a detailed example. Also included are the Screens Trees, which diagram the categories of settings.

7. **Troubleshooting and Maintenance.** Provides a troubleshooting matrix of symptoms, probable causes, and solutions. Also described are the steps for removal, return, and replacement of the unit. For further assistance contact the Power Management Applications Support (PMAS) at 1-800-809-2772.

In addition, an Appendix and Glossary are also provided as follows:

Appendix. Startup Setting Sheets. Provides a summary of settings and a place to logically record programming details

Glossary. Provides a reference for terms and phrases as used throughout this publication.

1-3.1 Quick Start Steps

Step 1: Review the Introductory Comments and Safety, paragraph 1-1.

Step 2: Mount the IQ Analyzer as described in paragraph 4-2.

Step 3: Wire the IQ Analyzer as described in paragraph 4-3 using diagrams of Figures 4-9 to 4-34 as a reference.

Step 4: Follow the Initial Startup procedures of paragraph 4-4 to apply power and setup basic metering.

Step 5: Examine the metered values for consistent currents, voltages, and power. As necessary, refer to the Troubleshooting Guide, Table 7.1.

NOTICE

The IQ Analyzer itself can help the diagnosis of possible miswiring. Manually create an event with the F3 (HARM) and F4 (NEW) soft-keys. In the Power Factor category of the Meter Menu, examine the Fundamental Phase Angles of VA, VB, VC, IA, IB, and IC. In a positive sequenced system, one expects the phase angles of VA, VB, and VC to be 0° -120° and +120°, respectively.

Table 1.1 IQ Analyzer Order Information ①

Device Description	Catalog Number	Style Number
IQ Analyzer with self-powered three phase power module	IQA6430	66C2045G01
IQ Analyzer with separate source power module	IQA6410	66C2045G02
IQ Analyzer with dc power module	IQA6420	66C2045G05
Self-powered, graphic displays and transient triggering	IQA6630	66C2045G03
Separate Source, graphic displays and transient triggering	IQA6610	66C2045G04
dc power module, graphic displays and transient triggering	IQA6620	66C2045G06
IQ Mounting Flange	IQFLANGE	5743B02G01
IQ Analyzer 36 inch extension cable	IQACABLE	2107A55G02
IQ Analyzer 45 inch extension cable	IQA45CABLE	2107A55G03
Self-powered three phase power module only	IQM3PPM	66C2113G01
Separate source power module only	IQMSSPM	66C2105G01
dc source power module only	IQMDCPM	66C2065G01
Communication modules		
INCOM Product Operated Network Interface	IPONI	8793C36G01
Ethernet Product Operated Network Interface (10Base-T only)	EPONI	-
Ethernet Product Operated Network Interface (10Base-& 10Base-FL)	EPONIF	-
Software Support:		
PowerNet Suite (Client/Server)	PNEG100	-
PowerNet Suite (Client)	PNEGC	-
IQ Auxiliary Power Supply (for pre-installation setup)	IQDPAUXPS	-
Portable IQ Analyzer	IQA6610 PORT	4013115G02

① An IQ Analyzer is supplied with a power module and a manual as standard. A communications module (IPONI, EPONI, or EPONIF), potential transformers and current transformers are not supplied with the IQ Analyzer.

ORDERING NOTE:
IQA3PPM and IQASSPM are no longer compatible with the new IQA6400/6600 Series (66D2045).
Order IQM3PPM, IQMSSPM, or IQMDCPM.
The IQA3PPM and IQASSPM modules are replacements for use on the IQA6000/6200 Series (2D82302)

This page left blank intentionally.