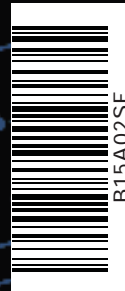


Cutler-Hammer, a part of Eaton Corporation, is a leader in the development and manufacturing of power distribution equipment, electrical control products, and advanced industrial automation solutions.

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## OPEN TRANSITION IQ TRANSFER FOR AUTOMATIC TRANSFER SWITCHES



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**Cutler-Hammer**  
Pittsburgh, Pennsylvania U.S.A.

Publication No. B.15A.02.S.E.  
August 1998  
Printed in U.S.A. / TSG 2519

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**INTRODUCTION**

The IQ Transfer is a programmable, microprocessor-based monitoring device designed for use in Cutler-Hammer Open Transition transfer switches (ATVI, BIVI, ATHI, BIHI) where rapid, reliable restoration of power in outage situations is essential. IQ Transfer features proprietary Cutler-Hammer designed Sure Chip microprocessor technology to provide superior precision and versatility in operation, programming and data access. In addition, the IQ Transfer's user-friendly front-panel interface simplifies routine operation, programming, data presentation and adjustment of settings. This unique combination of features makes IQ Transfer the most complete and technologically-advanced ATS logic package available today.

**CUTLER-HAMMER OPEN TRANSITION IQ TRANSFER FEATURES**

The IQ Transfer is a door-mounted, totally enclosed device that is customer-accessible from the front panel. Data access and programming operations are performed using the IQ Transfer's touch-sensitive function buttons in conjunction with an easy-to-read illuminated, alphanumeric LED display. Both the function buttons and the display window are part of the device's front panel. A built-in Help button provides user assistance in the form of message displays. The IQ Transfer is communications ready and compatible with all Cutler-Hammer IQ devices as well as the Cutler-Hammer IMPACC system-wide supervisory and control software. This permits monitoring and control of several transfer switches, locally or remotely, from a single point. IQ transfer is suitable for either new or existing Cutler-Hammer ATS applications.

**ADDITIONAL FEATURES**

- Applicable for use on any Low or Medium Voltage Application through 38 kV, 50 or 60Hz.
- True RMS three-phase voltage sensing on Normal, Emergency and Load.
- Frequency sensing on Normal and Emergency.
- Programmable set points stored in non-volatile memory.
- IMPACC Communication to Personal Computer either on-site or remote.
- Historical data on most recent transfers (up to 16 events) viewable at switch. Unlimited history storage (remote) available when used with IMPACC software.
- Wide range of user-selectable option combinations.
- Load Sequencing.
- Engine Start Contacts.
- Engine Test Switch with user-selectable Test Mode and Failsafe.
- Alarm Contact. (Multiple alarm functions available.)
- Pre-transfer Signal.
- Heart Beat Monitor (Flashing Green Automatic Light signifies that the IQ Transfer is operating properly).
- Instrumentation
  - Voltmeter (accuracy +/- 1%)
  - Reads Line-to-Line on Sources 1 and 2 and Load
  - Frequency Meter (40-80Hz, accuracy +/- .1Hz)
  - Source Available Time (Both Sources)
  - Source Connected Time (Both Sources)
  - Source Run Time

**BUTTON FUNCTIONS**

Three buttons provide easy access to all commonly used IQ Transfer functions.

When the preferred source is connected and the ATS is operating normally, the Automatic indicator light will be flashing and the display window will be blank.

Using the Display Select button, the operator can step through each of the six display families:

- Source 1
- Source 2
- Load
- History
- Time/Date
- Set Point

(NOTE: Stepping through the various display modes does not alter preset values or otherwise affect operation of the ATS.)

Once the desired display family is selected, the user may press the Step button to cycle through specific parameters or metered values shown in the display window.

**INITIAL PROGRAMMING**

Factory programming will load all customer specified functions and presets. At the customer's request, Cutler-Hammer will add, delete or adjust optional features.

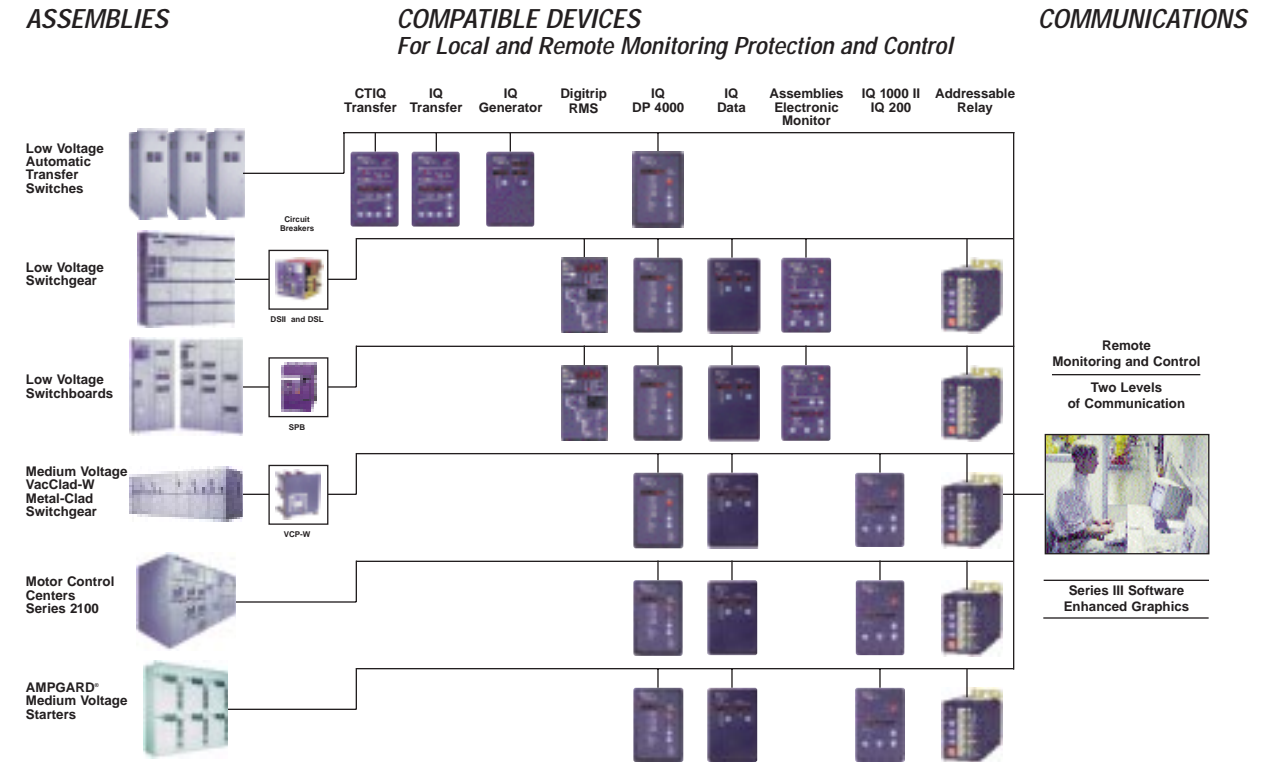
**CUSTOMER PROGRAMMING**

Customers may reprogram set points and other parameters to match their application, using the Program switch located on the rear of the unit. Once the programming mode has been activated and the Program light is flashing, the user may access Set Point settings by pressing the Display Select button until the Set Points LED is illuminated. Values for individual set points may then be altered by pressing the Increase or Decrease buttons. Once a parameter has been reset, the user advances to the next set point by pressing the Step button.

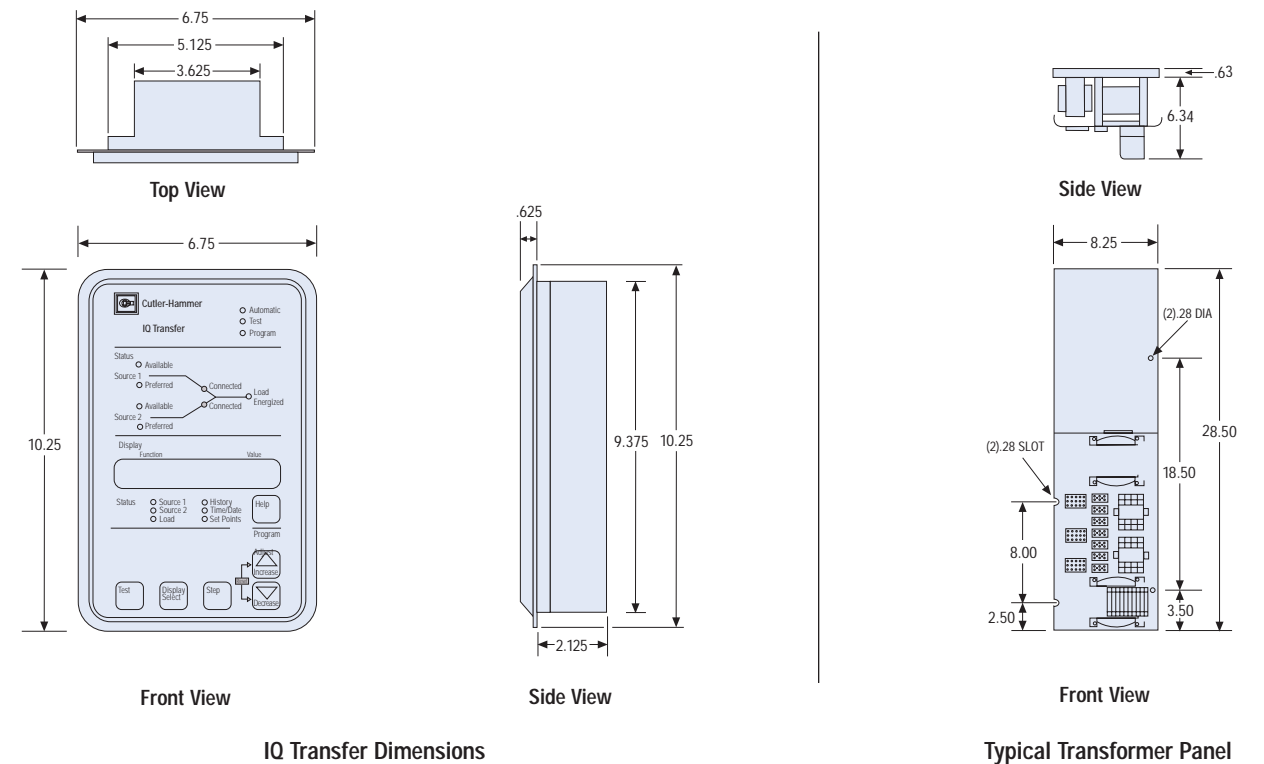
While the IQ Transfer is in the Program mode, the device continues to operate in accordance with the previously programmed set points and parameters. The unit is never off-line, and preset values do not change until programming has been completed.

Once reprogramming is complete, the user may return the Program switch to the Run position. At this point, all new values are stored in the IQ's non-volatile memory, and the unit returns to Automatic mode.

Using IMPACC, You Can Communicate With Your ATS and Other Electrical Distribution Assemblies



**IQ Transfer Dimensions**



Dimensions are approximate and should not be used for construction purposes.

## IQ Transfer and The IMPACC System

### IMPACC — INTEGRATED MONITORING PROTECTION AND CONTROL COMMUNICATIONS SYSTEM

Cutler-Hammer automatic transfer switches with IQ Transfer are ideally suited for the powerful Cutler-Hammer IMPACC System.

**IMPACC COMMUNICATIONS OPTION**  
IMPACC is a noise immune communications system that cost effectively and easily gathers information from metering, protection and control devices. IMPACC provides the capability to control devices and read, log and trend information over a single twisted pair of wire. IMPACC may be installed in new gear or retrofitted into existing equipment.

A variety of IMPACC compatible products can be added to all levels of a commercial or industrial electrical distribution system—from high-voltage substations down to switchboards, panelboards and even individual breakers and motor starters.

Communications wires can be extended up to 7,500 feet from the master control unit without repeaters...and as many as 1,000 compatible devices such as IQ Transfer, installed in various assemblies, can be on the IMPACC System.

Adding the communications option to the IQ Transfer allows it to be remotely monitored, controlled and programmed. Communications is achieved by mounting a small, addressable communications module, the "IPONI" card, to the back of the unit.

### EASY INSTALLATION

Installation is uncomplicated and devices are connected, daisy chain style, via twisted pair conductors. All assemblies and devices are standard Cutler-Hammer equipment when IMPACC compatible devices are ordered as part of an assembly. The assemblies (with compatible devices built in) are prewired, pretested, and delivered complete.

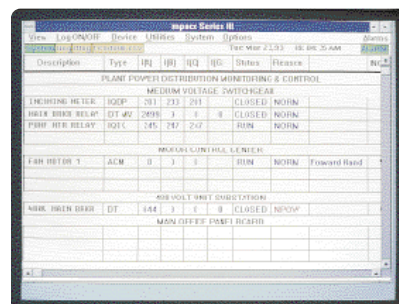
### CUTLER-HAMMER EXCLUSIVE

Cutler-Hammer's IMPACC System is the only one that can bring together central control of multiple transfer switches AND the rest of the electrical distribution system—all from a single point.

### FUNCTIONS AVAILABLE THROUGH COMMUNICATIONS:

- Monitoring and trending of displayed values and device status
- Retrieving historical event information, including diagnostic data at time of transfer
- Testing the device
- Mimic Bus Display

### SERIES III AND ENHANCED GRAPHICS



Example of Series III Screen on PC

### SERIES III

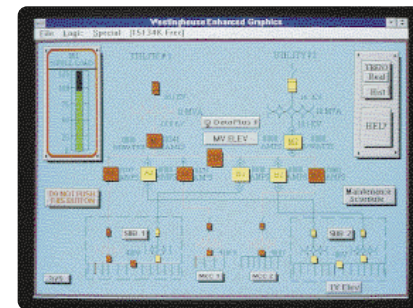
Series III software provides monitoring and recording of power system data as it is occurring. Series III is a Microsoft Windows-compatible application that features user-friendly, menu-driven screens with easy setup and operation. Other features include:

- System/device alarm logging and reporting
- Time/event historical data logging
- Data trending
- Information storage and retrieval by device event
- Hardware diagnostics
- Dedicated computer not required
- Security/password protection

Series III version 6.6 and higher support the IQ Transfer.

### ENHANCED GRAPHICS

Enhanced Graphics Software provides the capability to generate custom animated color graphics. For example, animated one line drawings of electrical power systems, flow diagrams of processes, equipment elevation views, and other graphical representations may be developed.



Example of Enhanced Graphics Screen

### IMPACC CONNECTIVITY

IMPACC makes communications easier by providing a wide range of interfaces to other vendors that make the centralization of power distribution information possible. An IMPACC System can easily be linked to building management systems, programmable logic controllers, and distributed control systems. This provides the capability to move data between and across different levels within an installation.

Interfaces have been developed with several vendors including Wonderware, Johnson Controls, Honeywell, Allen-Bradley, Bailey, Expert Edge, Fisher-Provox, Siemens, Foxboro, Iconics, Intellution, and Modicon.

IMPACC connectivity provides for maximum flexibility, meaning computers and PLCs; or multiple computers in various locations can communicate with each other.

Information from Series III can be exchanged via DDE with other Windows™ based programs such as Excel, Word, or any other DDE-compatible program. For higher performance, information can be shared via NET BIOS which connects Series III to Ethernet, Arcnet, or any other compatible network.

## IQ Transfer Front Panel Display and Button Functions

**PROGRAM**  
LED indicates unit is in programming mode. (NOTE: This mode is activated using the "Program" switch located on the rear of the unit.)

**TEST**  
Indicator light is on when unit is in test mode.

**AUTOMATIC**  
LED indicates that the ATS is operating normally and is in the automatic mode.

**SOURCE 1, SOURCE 2, AND LOAD**  
Standard LED lights show status of both Sources and Load.

**LED DISPLAY**  
Unit will provide LED readout showing actual metered values for Voltage, Frequency and Condition (including Normal, Undervoltage, Overvoltage, etc.).

**TEST BUTTON**  
Pressing this button twice initiates an engine test.

**DISPLAY SELECT**  
• Source 1  
• Source 2  
• Load  
• History  
• Time/Date  
• Set Points  
Button is discussed in Operation section.

**SET POINTS**  
Selecting this LED permits the user to display existing programmed values.

**STEP BUTTON**  
Shows multiple variables under each display select function.

**HISTORY**  
By pressing the Display Select button to light the History LED and the Step button to rotate thru available data, historical or cumulative values for Available Time (Both Sources), Connected Time (Both Sources), Number of Transfers and Date/Time Reason for last 16 Transfers are displayed.

**HELP**  
Pressing the Help button in any function mode will bring up display messages, explanations and prompts to assist the operator.

**TIME/DATE**  
Displays real-time clock. Clock can be easily set in this mode using the Increase and Decrease buttons.

**INCREASE/DECREASE**  
A detailed explanation of these buttons can be found in the Operation Section.

## Operation

### DEFINITIONS

#### Open Transition/Time Delay Neutral:

Time Delay Neutral is a feature that will provide a pre-set time delay in the neutral position allowing the voltage on the load to decay. This is an open transition that prevents in-rush currents from exceeding normal starting currents when transferring motor loads.  
(Option 32A)

#### Open Transition/Delayed with Load Voltage Decay:

Load voltage decay transfer is a feature that, after opening the switch from the original source, holds in the neutral position until the voltage on the load is less than 30% of rated voltage. This is an open transition that prevents in-rush currents from exceeding normal starting currents in the case where motor loads are being transferred.  
(Option 32B)

#### Open Transition/In-Phase Monitor:

In-Phase monitor is a feature that will allow a transfer between two sources only when the phase difference between the two sources is near zero. This is an open transition transfer that prevents in-rush currents from exceeding normal starting currents in the case where motor loads are being transferred.  
(Option 32C and 32D)

### SWITCH OPERATION

In the event of a power failure, the IQ Transfer will automatically become active. Once the alternate source becomes available, the IQ Transfer will display the status of timers, and initiate a transfer.

## Programming and Options

### IN-PHASE OPEN TRANSITION OPERATION MODES

#### OPTION 32C

##### In-Phase Monitor/Load Voltage Decay

IQ Transfer controllers equipped with Option 32C execute the following sequence of operations upon receipt of a request for transfer:

*The controller waits (for a pre-selected time frame) for synchronization of voltage and frequency. If achieved, an open transition in-phase transfer occurs. Failure to synchronize results in the controller automatically defaulting to an open transition Load Voltage Decay mode of operation, resulting in an assured transfer. If the back-up default mode is not desired, it may be effectively deactivated via a field programming change to the IQ Transfer controller.*

STANDARD FEATURES	CUSTOMER ADJUSTMENTS
In-Phase Transition Frequency Difference (hertz)	0.0 to 3.0 Hz
In-Phase Transition Synchronization Timer	1 to 60 minutes
Load Voltage Decay Threshold	0.0 to 30% of nominal voltage

#### OPTION 32D

##### In-Phase Monitor/Time Delay Neutral

IQ Transfer controllers equipped with Option 32C execute the following sequence of operations upon receipt of a request for transfer:

*The controller waits (for a pre-selected time frame) for synchronization of voltage and frequency. If achieved, an open transition in-phase transfer occurs. Failure to synchronize results in the controller automatically defaulting to an open transition Time Delay Neutral mode of operation, resulting in an assured transfer. If the back-up default mode is not desired it may be effectively deactivated via a programming change to the IQ Transfer controller.*

STANDARD FEATURES	CUSTOMER ADJUSTMENTS
In-Phase Transition Frequency Difference (hertz)	0.0 to 3.0 Hz
In-Phase Transition Synchronization Timer	1 to 60 minutes
Time Delay Neutral Timer	0.0 to 2 minutes

## Standard and Optional Features

### QUICK SUMMARY OF IQ TRANSFER FACTORY OPTIONS AND CUSTOMER ADJUSTMENTS

The following charts illustrate standard features of an IQ Transfer unit as well as factory installed optional features.

STANDARD FEATURES	FEATURE NUMBER	CUSTOMER ADJUSTMENTS
Voltmeter for Source 1		
Voltmeter for Source 2		
Voltmeter for Load		
Frequency Meter for Source 1		
Frequency Meter for Source 2		
Undervoltage Sensing on Source 1		1 Phase or 3 Phase - Depending on System Voltage Dropout Voltage-90% of nominal to 50% of nominal Pickup Voltage-100% of nominal to (Dropout + 2%)
Undervoltage Sensing on Source 2	5J	1 Phase or 3 Phase - Depending on System Voltage Dropout Voltage-90% of nominal to 50% of nominal Pickup Voltage-100% of nominal to (Dropout + 2%)
Underfrequency Sensing on Source 2	5J	Dropout Frequency - 100% of nominal to 90% of nominal Pickup Frequency (Dropout + 1 Hz.)
Time Delay Normal to Emergency	1	Adjustable 0-1800 Seconds
Time Delay Emergency to Normal	3	Adjustable 0-1800 Seconds
Time Delay Engine Start	2	Adjustable 0-120 Seconds
Time Delay Engine Cooldown	4	Adjustable 0-1800 Seconds
System Selection		Utility/Generator or Dual Utility or Dual Generator
Position Indicators	12C, 12D	
Source Availability Indicators	12G, 12H	
Preferred Source Indicator		
Load Energized Indication		
History		
<ul style="list-style-type: none"> <li>• Source Availability Time</li> <li>• Source Run Time</li> <li>• Source Connected Time</li> <li>• Load Energized Time</li> <li>• Number of Transfers</li> <li>• Date, Time, and Reason for last 16 Transfers</li> </ul>		
Viewable Setpoints		
IMPACC Capability		Communications via IMPACC on Personal Computer
Real Time Clock		Set Time and Date
Programmable Engine Test	6	Run Engine Only or Load Test
Remote Alarm Contact		
Auxiliary Relay Contacts	14C, 14D	
OPTIONAL FEATURES	FEATURE NUMBER	CUSTOMER ADJUSTMENTS
Overvoltage Sensing on Source 1	26C	Dropout Voltage-120% of nominal to 105% Pickup Voltage-95% of nominal to (Dropout-2%)
Overvoltage Sensing on Source 2	5E	Dropout Voltage-120% of nominal to 105% Pickup Voltage-95% of nominal to (Dropout-2%)
Underfrequency Sensing on Source 1	26E	Dropout Frequency-100% of nominal to 90% of nominal Pickup Frequency-110% of nominal to (Dropout + 1 Hz.)
Overfrequency Sensing on Source 1	26F	Dropout Frequency-120% of nominal to 100% of nominal Pickup Frequency-90% of nominal to (Dropout-2%)
Overfrequency Sensing on Source 2 (Also includes Overvoltage Sensing on Source 2)	5K	Dropout Frequency-120% of nominal to 100% of nominal Pickup Frequency-90% of nominal to (Dropout-2%)
Time Delay Bypass Pushbutton	8C or 8D	
Manual Return to Source 1	29E	
Delayed Transition		
Time Delay Neutral	32A	0-120 Seconds
Load Voltage Decay	32B	0-30% of Nominal Voltage
In-Phase Monitor/Load Voltage Decay	32C	Inphase Frequency Difference - 0.0 to 3.0 Hz Inphase Synchronization Timer - 1 to 60 minutes Load Voltage Decay - 0 to 30% of Nominal Voltage
In-Phase Monitor/Time Delay Neutral Timer	32D	Inphase Frequency Difference - 0.0 to 3.0 Hz Inphase Synchronization Timer - 1 to 60 minutes Delayed Transition Timer - 0-120 seconds Selectable-Source 1 or Source 2 or None
Preferred Source Selection	10B or 10D	
Maintenance Selector Switch	9	
Plant Exerciser W/ Real Time Clock	23J	Set Mode (Load or No-Load Test) with Fail Safe and Time and Day of Exercise
Interruptible Rate (Area Protection)	26D	
Inhibit to Emergency	36	
Load Sequencing	45	Up to 10 Devices
Pre-transfer Signal	35	Time Delay Initiated or Confirmation Initiated (up to 10 Devices)
Phase Rotation (Contact Factory for availability.)	5H or 26H	