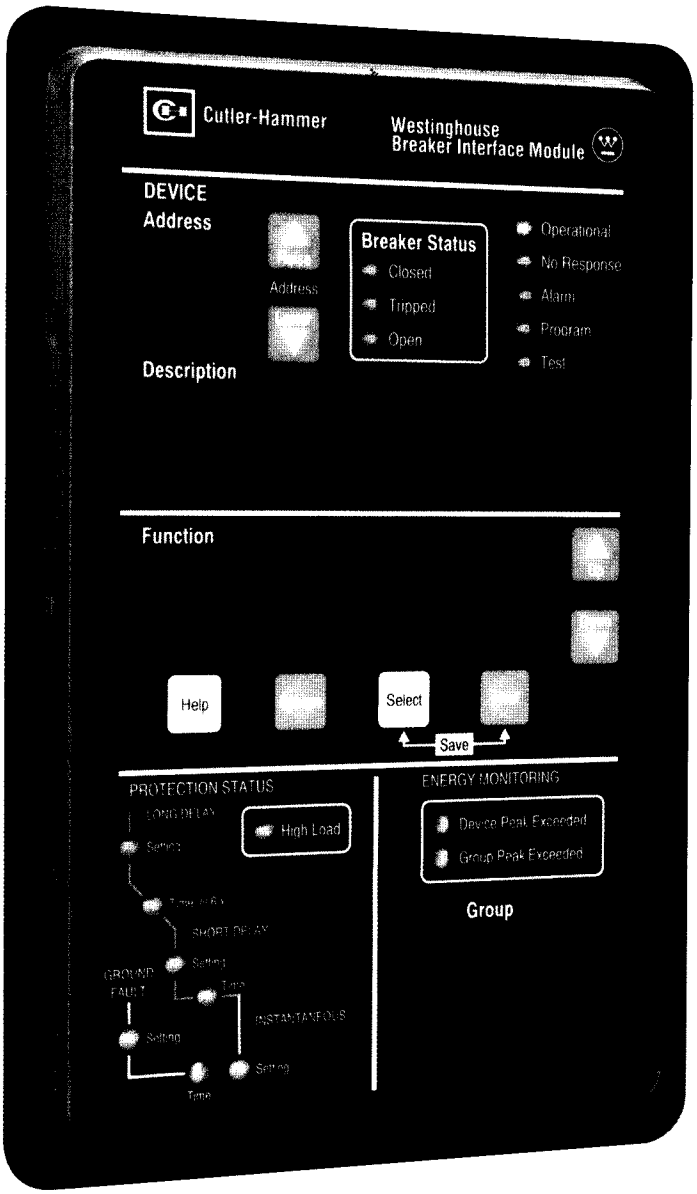
Instructions for Installation, Operation and Maintenance of Breaker Interface Module

(Compatible with Digitrip OPTIM and RMS 810/910 Trip Units and IQ Energy Sentinels)

PROTECTION AND COORDINATION

POWER QUALITY

ENERGY MONITORING



COMMUNICATIONS SYSTEMS

EATON

WARNING

IMPROPERLY INSTALLING OR MAINTAINING THESE PRODUCTS CAN RESULT IN DEATH, SERIOUS PERSONAL INJURY, OR PROPERTY DAMAGE.

READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE ATTEMPTING ANY UNPACKING, ASSEMBLY, OPERATION OR MAINTENANCE OF THE CIRCUIT BREAKERS.

INSTALLATION OR MAINTENANCE SHOULD BE ATTEMPTED ONLY BY QUALIFIED PERSONNEL. THIS INSTRUCTION BOOK SHOULD NOT BE CONSIDERED ALL INCLUSIVE REGARDING INSTALLATION OR MAINTENANCE PROCEDURES. IF FURTHER INFORMATION IS REQUIRED, YOU SHOULD CONTACT CUTLER-HAMMER.

WARNING

THE CIRCUIT BREAKERS DESCRIBED IN THIS BOOK ARE DESIGNED AND TESTED TO OPERATE WITHIN THEIR NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS MAY CAUSE THE EQUIPMENT TO FAIL, RESULTING IN DEATH, BODILY INJURY AND PROPERTY DAMAGE.

ALL SAFETY CODES, SAFETY STANDARDS AND/OR REGULATIONS AS THEY MAY BE APPLIED TO THIS TYPE OF EQUIPMENT MUST BE STRICTLY ADHERED TO.

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Cutler-Hammer

Power Distribution Components Division

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Pittsburgh, PA 15220

First Printing:
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All possible contingencies which may arise during installation, operation or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding his particular installation, operation or maintenance of particular equipment, contact a Cutler-Hammer representative.

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SECTION 1: INTRODUCTION

1-1 COMMON TERMS

Several commonly used terms or phrases are used throughout this manual. They are defined here to eliminate any confusion that might arise when reading the text.

IMPACC (Integrated Monitoring, Protection and Control Communications) – A family of communicating electrical power distribution protective devices, meters, motor control devices, communications networks and protocols and software packages to provide power distribution monitoring and control.

INCOM (Industrial Communications) – A noise immune communications system designed specifically for power distribution monitoring and control applications.

PONI (Product Operated Network Interface) – A plug-in communications module that enables network communications.

1-2 PRELIMINARY COMMENTS AND SAFETY PRECAUTIONS

This instructional manual is intended to present specific descriptive, operational, installation and maintenance information associated with the Breaker Interface Module only. The Breaker Interface Module is compatible with Digitrip OPTIM Trip Units, Digitrip RMS 810/910 Trip Units and IQ Energy Sentinels. For a general overview of the entire Digitrip OPTIM Trip Unit System and certain specific application possibilities, refer to Instruction Book 29C890 entitled "Instructional Overview for Use Of the Digitrip OPTIM Trip Unit System."

Detailed instructional material relative to the installation, use and maintenance of specific devices is included under separate cover by a manual dedicated to each device. A series of four manuals brings together the wide array of capabilities offered by the most advanced programmable trip unit system - Digitrip OPTIM. Refer to Appendix A for all instruction material references.

Please read and understand this manual and all other relevant manuals before proceeding with the installation and operation of any device included in the trip unit system. Pay particular attention to all WARNINGS and CAUTIONS. They are intended to help insure personnel safety and equipment protection. Refer to the WARNING and CAUTION in Paragraph 1-2.1 before proceeding to any other section in this manual or any other manual. If further information is required by the purchaser regarding a particular installation, application or maintenance activity, a Cutler-Hammer representative should be contacted.

1-2.1 SAFETY PRECAUTIONS

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

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.

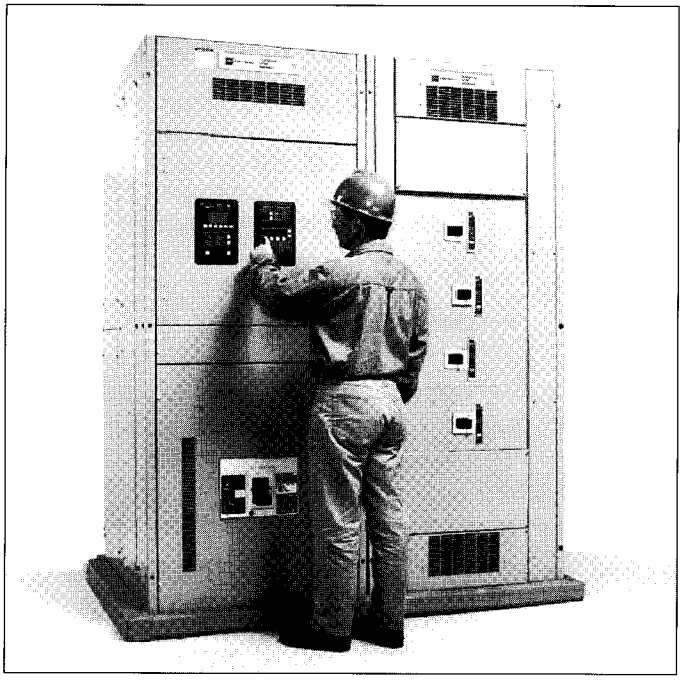


Figure 1-1 Breaker Interface Module in Service

1-3 PRODUCT OVERVIEW

The Breaker Interface Module is a comprehensive, multi-function, microprocessor-based operator interface that can be mounted locally at the device or at a remote location (Figure **1-1**). In conjunction with the OPTIM Trip Unit it accomplishes the functions of individually mounted devices, such as wired ammeters, ammeter switches, watthour meters, breaker indicating lights, alarm contacts, test equipment, and programming devices. The Breaker Interface Module can monitor up to 50 devices which includes circuit breakers equipped with Digitrip OPTIM or Digitrip RMS 810/910 Trip Units, IQ Energy Sentinels and Universal IQ Energy Sentinels. The number of devices being monitored, however, cannot exceed 50 total. Like the OPTIMizer Hand Held Programmer (I.B. 29C892), the Breaker Interface Module can be used to program and test OPTIM Trip Units.

The Breaker Interface Module will communicate to multiple trip units over a sub-network, as well as a personal computer on a main network. When communicating with trip units and energy devices, the Breaker Interface Module acts as the master device. When communications is from a computer through the Breaker Interface Module via a PONI, the computer assumes the role of the master device (Figure **1-2**).

The Breaker Interface Module provides the operator with all the feature capabilities of the Hand Held Programmer except for the following:

- Setting device address
- Setting BAUD rate

Notice: *A direct breaker connection via an OPTIMizer Hand Held Programmer will override an INCOM connection. This will cause a no response alarm on the Breaker Interface Module and a master network.*

1-4 FEATURES AND FUNCTIONS

An operator can use the Breaker Interface Module to:

- **Configure OPTIM Trip Unit**
  - Select breaker addresses
  - Select frequency (50/60 Hz)
  - Set security passwords
  - Change time-current setpoints
  - Select protection options
  - Select alarm levels
- **Display Information**
  - Breaker description/status
  - Time-current setpoints
  - Metered values
  - Trip event information
- **Test OPTIM Trip Unit Performance**
  - Phase and ground
  - Trip or no trip
- **Energy Monitoring**
  - Set addresses for group energy monitoring
  - Group energy readings
  - Configure alarms on demand exceeded
  - Indicate alarms via output contacts
- **Local and Remote Indication**
  - Remote indication/alarming
  - Breaker status indication
- **IMPACC Communications with**
  - Digitrip OPTIM Trip Units
  - Digitrip RMS 810/910 Trip Units
  - IQ Energy Sentinels and Universal IQ Energy Sentinels
  - Up to 50 devices total

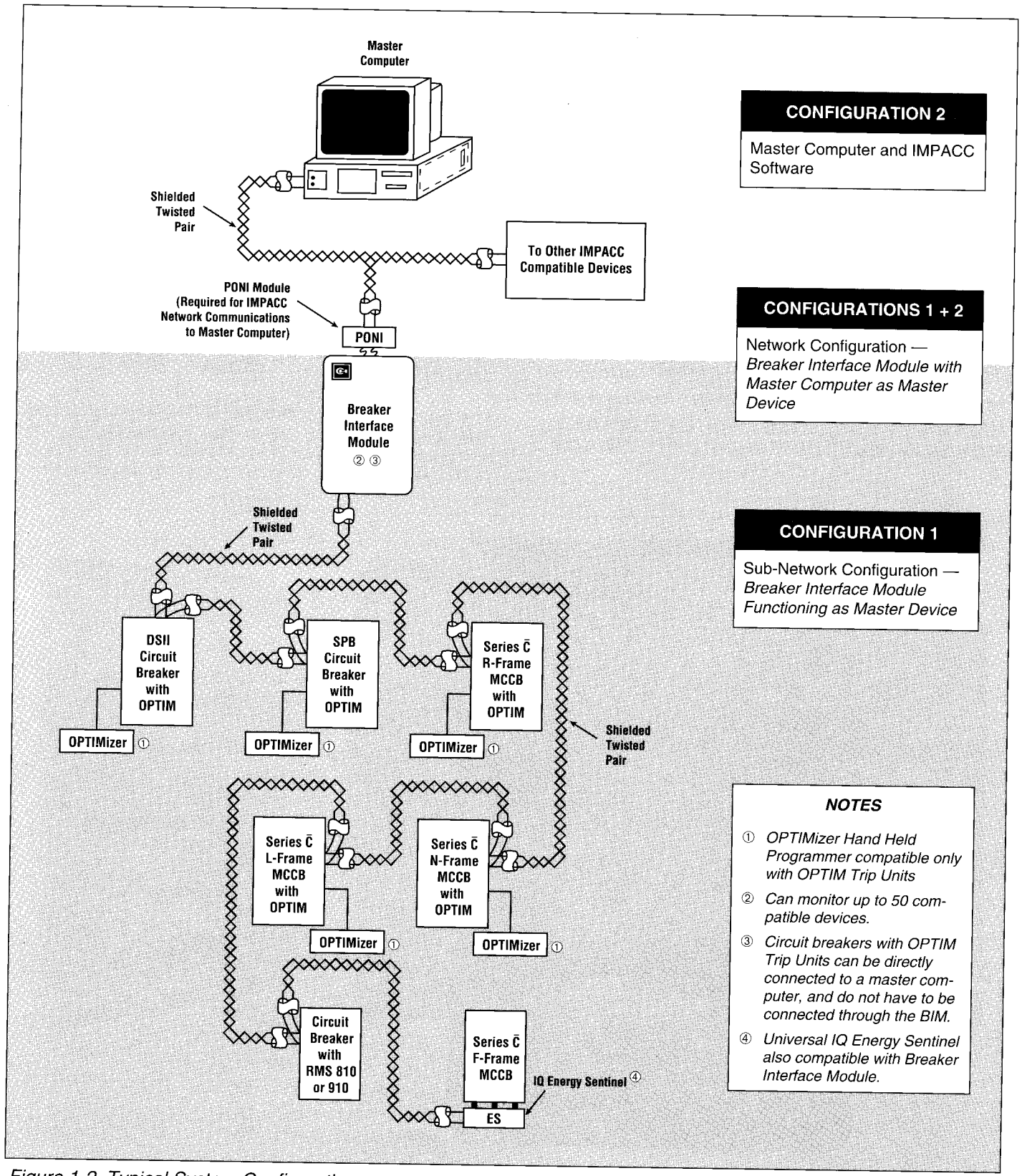


Figure 1-2 Typical System Configurations

SECTION 2: HARDWARE DESCRIPTION

2-1 GENERAL

The purpose of this section is to familiarize the reader with the Breaker Interface Module hardware, nomenclature, and list the device's specifications. The information presented is divided into the following four parts:

- Operator Panel
- Rear Access Area
- External Hardware
- Specification Summary

CAUTION

THIS IS A SOPHISTICATED PIECE OF ELECTRICAL EQUIPMENT. AS SUCH, IT SHOULD BE HANDLED CAREFULLY AT ALL TIMES TO AVOID POSSIBLE DEVICE DAMAGE.

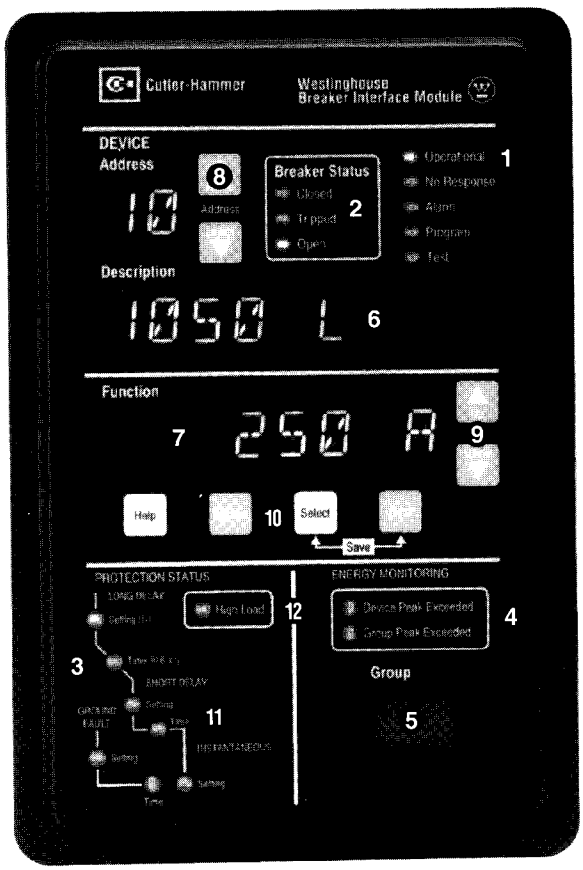
2-2 OPERATOR PANEL

The operator panel, normally accessible from the outside of a panel or door, provides a means for:

- Being alerted to specific conditions
- Receiving functional help
- Programming
- Parameter Monitoring/Selection

LEDs, Display Windows, Pushbuttons and a LED type Mimic Time-Current Curve make up the front accessible operator panel (Figure **2-1**). Each item is discussed in detail in Section 3.

The eighteen LEDs on the operator panel will blink or be lit continuously, depending on their specific function. All



1. Operational Condition LEDs
2. Circuit Breaker Status LEDs
3. Protection Status LEDs
4. Energy Monitoring LEDs
5. Identification Display
6. Description Display
7. Function Display
8. Raise/Lower Pushbuttons
9. Up/Down Pushbuttons
10. Help/Escape/Select/Next Pushbuttons
11. Mimic Time-Current Curve
12. High Load LED

Figure 2-1 Breaker Interface Module Operator Panel

the LEDs when lit are red, except for the ***Operational*** LED which is green. LEDs are used to indicate a number of functions, operations and/or warnings.

Four LED type display windows are used to display an array of metered parameters, setpoints, messages and addresses in a number of different formats. The information is presented in the form of display screens for a variety of categories.

The operator panel contains eight membrane pushbuttons. Pushbuttons accomplish their function when pressed and then released. Certain pushbuttons will, however, continue to scroll if they are pressed and not released.

2-3 REAR ACCESS AREA

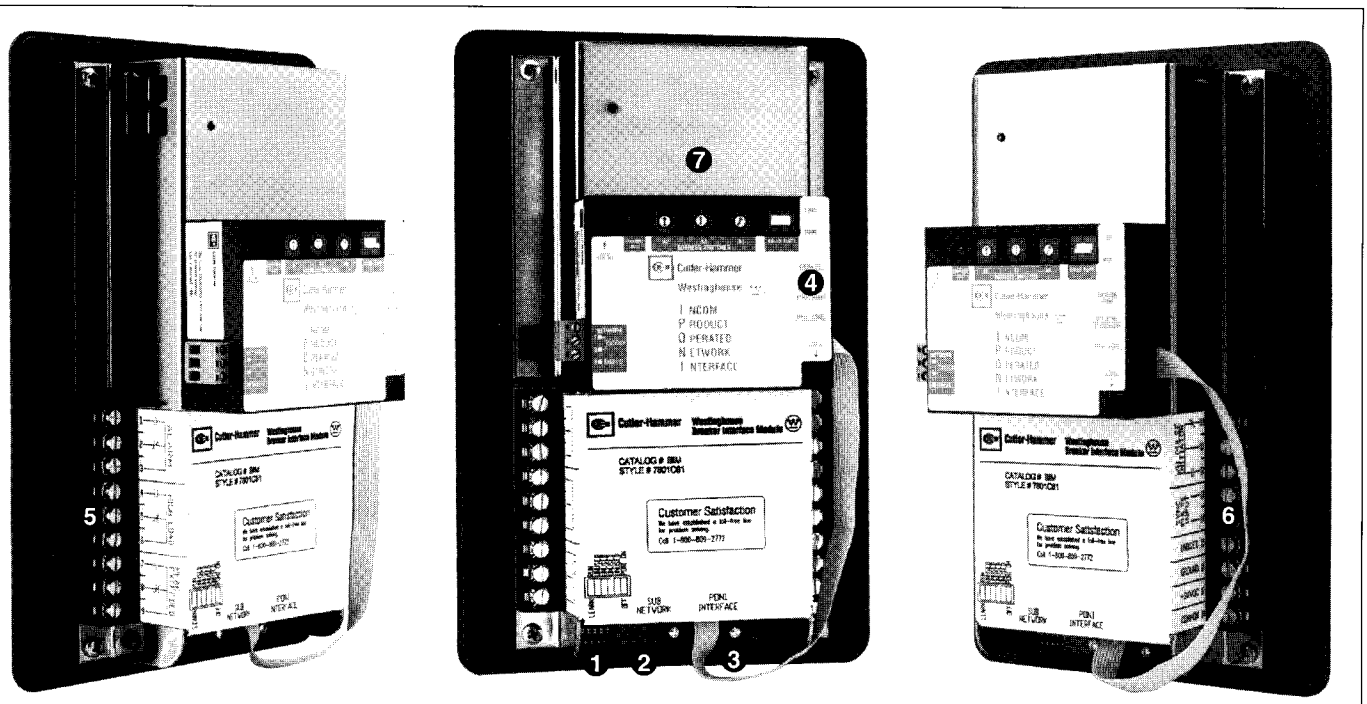
The rear access area of the Breaker Interface Module is normally accessible from the rear of an open panel door (Figure **2-2**). All wiring connections and DIP switch settings are made at the rear of the chassis. For the sake of uniform identification, the frame of reference when discussing the rear access area is facing the back of the Breaker Interface Module with the panel door open. The terminal block providing alarm connections, for example, is located on the left side of the chassis.

2-3.1 DIP SWITCHES

A set of six DIP switches numbered 1 through 6 is located in the bottom left portion of the rear access area (Figure **2-3**). Refer to Table **5.1** for exact switch settings. Their basic functions are as follows:

Switch 1: This switch puts the Breaker Interface Module in the **Learn** mode or the **Run** mode. DIP switch 1 is only in the **Learn** mode (down position) for the following instances:

- When power is applied to the Breaker Interface Module for the first time.
- When the Update feature in the System display menu is used to add new network devices.



❶ Dip Switches
❷ 3-Pin Sub-Network Connector
❸ PONI Interface Connector
❹ Communication Module (PONI)
❺ Terminals 1-9
❻ Terminals 10-18
❼ Mouniting Position for BIM Mounted Power Supply

Figure 2-2 Breaker Interface Module (Rear View)

In the down position, the Breaker Interface Module will search through the network for connected devices, learn their addresses/ descriptions, and store the information in non-volatile memory. Once the learning or updating processes have been completed, DIP switch 1 should be moved to the "Run" (up) position.

Switches 2, 3, 4 and 5: These switches are not used. They are intended for possible future enhancements and must be in the down position.

CAUTION

ONLY CONNECT OR DISCONNECT A COMMUNICATIONS MODULE (PONI) WITH DIP SWITCH 6 IN THE "OFF" (DOWN) POSITION. FAILURE TO DO SO CAN CAUSE PERMANENT DAMAGE TO THE PONI.

Switch 6: This switch is referred to as a PONI power switch. The switch is in the "On" (up) position only when a communication module (PONI) is being used for network communications via IMPACC. It is in the "Off" (down) position when the Breaker Interface Module is communicating on a sub-network only, or when a PONI is being connected or disconnected.

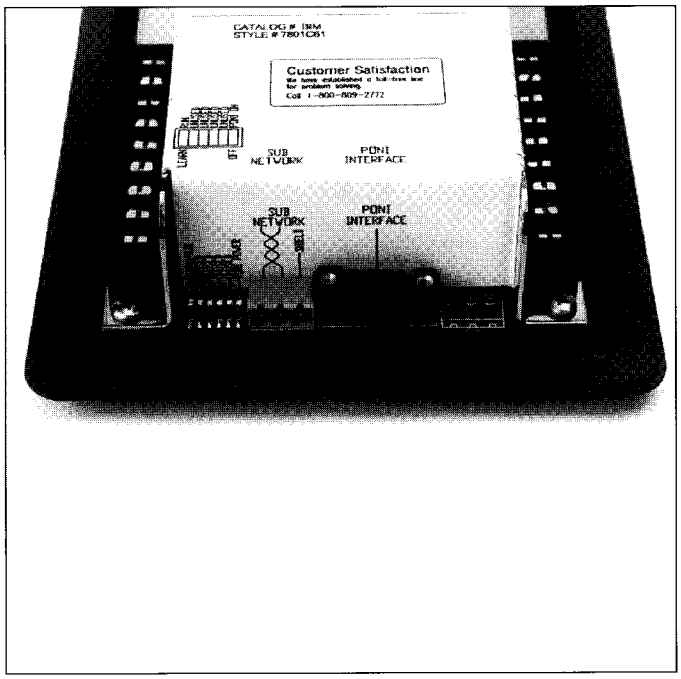
2-3.2 SUB-NETWORK CONNECTOR

A three pin, male connector, located next to the DIP switches, provides for a shielded twisted pair connection permitting the Breaker Interface Module to communicate with up to 50 total trip units and energy monitoring devices (Figure **2-3**). The Breaker Interface Module assumes the role of the network master on a sub-network (Figure **1-2**).

2-3.3 PONI INTERFACE CONNECTOR (NETWORK)

A port, located next to the sub-network connector, is provided that will accept the D-sub male connector of an optional and externally mounted communication module (PONI) (Figures **1-3, 2-3** and **2-4**). The PONI provides for a twisted pair connection permitting the Breaker Interface Module to communicate with a master computer (Paragraph 2-5).

Notice: *A direct breaker connection via an OPTIMizer Hand Held Programmer will override an INCOM connection. This will cause a no response alarm on the Breaker Interface Module and a master network.*



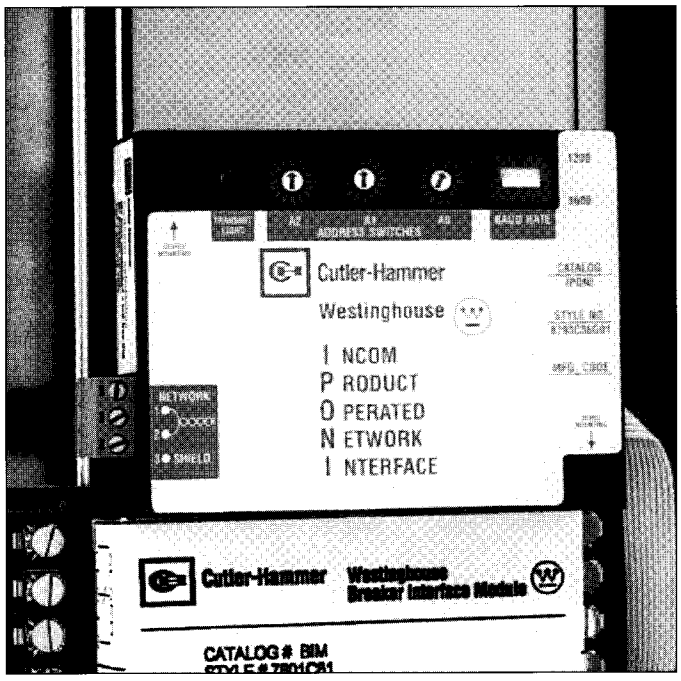


Figure 2-4 Communications Module (PONI) – Shown Mounted

2-3.4 LEFT REAR CHASSIS

A nine point terminal block, numbered 1 through 9, is mounted on the left rear chassis (Figures **2-5** and **5-5**). Three sets of dry Form C output contacts are provided for alarm connections.

- Contacts 1, 2 and 3 — Remote Alarm
- Contacts 4, 5 and 6 — High Load Alarm
- Contacts 7, 8 and 9 — Peak Demand Exceed Alarm

2-3.5 RIGHT REAR CHASSIS

A nine point terminal block, numbered 10 through 18 is mounted on the right rear chassis (Figures **2-6** and **5-5**).

- Contacts 10, 11 and 12 — Watt-hour Pulse Initiator Output
- Contacts 13 and 14 — Sync Pulse Input
- Contact 15 — Not Used
- Contacts 16, 17 and 18 — 30 Vdc Power/Ground

2-4 POWER SUPPLIES

Power for the Breaker Interface Module is supplied by a separate external source mounted in the switchboard or a power source mounted on the rear of the Breaker Interface Module at the factory. Refer to Table **2.1** for additional power supply information and style/catalog numbers for the two Breaker Interface Module models.

2-4.1 SWITCHBOARD MOUNTED POWER SUPPLY

A switchboard mounted power supply is appropriate for Series C L and N-Frame circuit breaker applications. Mount the selected power supply in the switchboard in accordance with the manufacturer's instructions. It should be a compatible 24-30 Vdc, 400 ma supply with a plus or minus 5% tolerance. The output of the separately mounted power supplies specified in Table **2.1** are capable of supplying power to any combination of 16 L-Frame and/or N-Frame circuit breakers and one Breaker Interface Module.

2-4.2 BREAKER INTERFACE MODULE MOUNTED POWER SUPPLY

A Breaker Interface Module mounted power supply is appropriate for Series C R-Frame, SPB Pow-R and DSII/DSLII circuit breaker applications. Circuit breakers of this type will supply power to the trip unit, and do not require an external power supply for this purpose. The

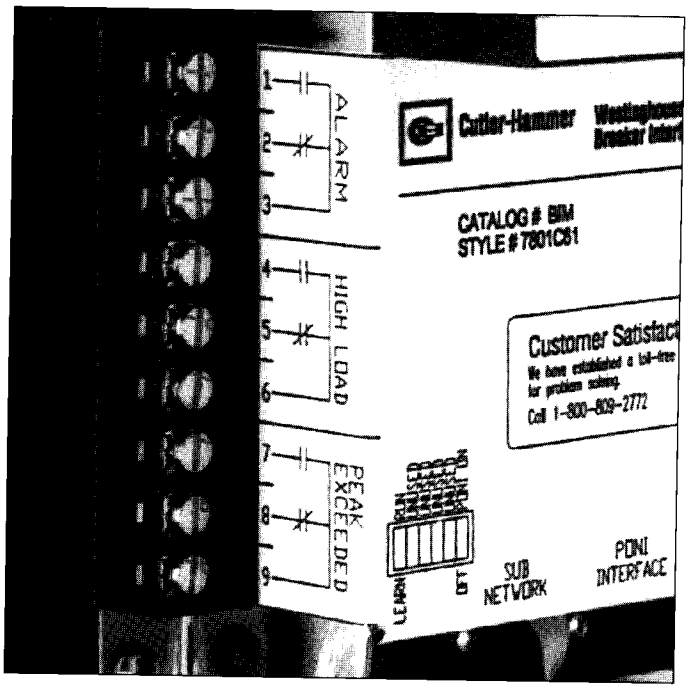


Figure 2-5 Breaker Interface Module Terminal Block (Contacts 1-9)

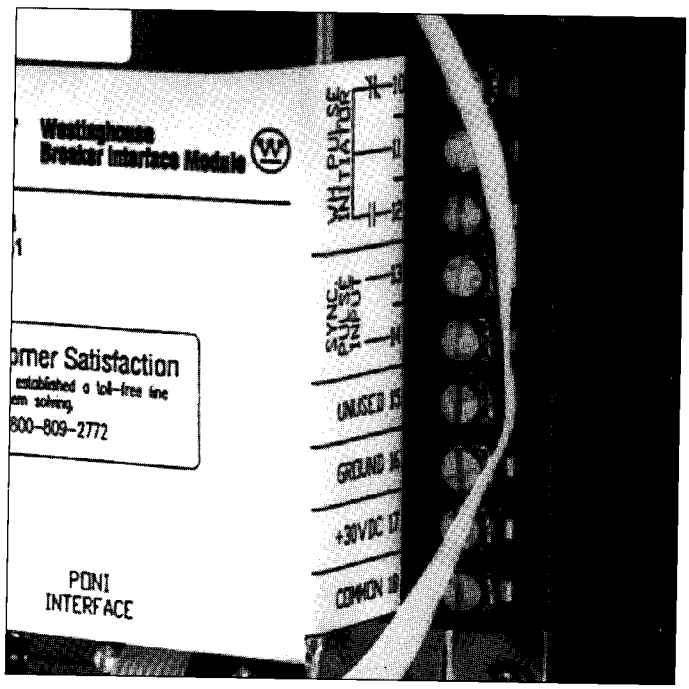


Figure 2-6 Breaker Interface Module Terminal Block (Contacts 10-18)

output of the power supply specified in Table **2.1** is capable of supplying power to one Breaker Interface Module only. The Breaker Interface Module mounted power supply is supplied from the factory already mounted on the rear of the Breaker Interface Module.

2-5 COMMUNICATION MODULE (PONI)

A PONI is required for communications between a Breaker Interface Module and a remote computer. Use of the PONI permits network communications with a remote computer functioning as the network master. The INCOM PONI, RS-232 PONI and PONI Modem can all be used with the Breaker Interface Module. A PONI is not required for connection of a Breaker Interface Module on a sub-network.

Refer to the instruction material supplied with the PONI for details. Refer to Section 4 for additional information concerning Breaker Interface Module communications.

2-6 SPECIFICATION SUMMARY

Refer to Table **2.1** for product specification details.

Models/Control Power

- BIM with Switchboard Mounted Power Supply — Style No. 7801C61G01, Catalog No. BIM
  - BIM Power Consumption — 12 VA
- Switchboard Mounted Power Supplies
  - (1) International Power Sources, 200 Butterfield Drive, Ashland, MA 01721, (508) 881-7434, PU200-16, 200W, 30 Vdc, Power Supply, PU110-16, 110W, 30 Vdc, Power Supply
  - (2) Farnell Advanced Power, 32111 Aurora Road, Solon, OH 44139, (216) 349-0755, NS075030/M 75W, 30 Vdc, Power Supply, NS055030/M 55W, 30 Vdc, Power Supply
- BIM with Power ① Supply Mounted — Style 7801C61G02, Catalog No. BIMPS
  - BIM plus Supply Power Consumption — 15 VA
  - Input Voltage — 100-240 Vac
  - Frequency — 50-60 Hz

Relay Output Contacts

- 10A Continuous @ 120/250 Vac Resistive Load
- 10A Continuous @ 30 Vdc Resistive Load
- 1/3 HP Continuous @ 250 Vac Inductive Load

Sync Pulse Inputs

- Dry Contact
- Pulse Width >5ms

Environment Conditions

- Operating Temperature — 0° to 70°C
- Storage Temperature — -30° to 85°C
- Operating Humidity (non-condensing) — 0 to 95% Relative Humidity

Sub-network Communications

- INCOM/IMPACC Compatible
- Sub-network Address Range 1 to 32 (hexadecimal)
- 1200 or 9600 Baud

Master Network Communications

- INCOM/IMPACC Compatible via field installed communications module (INCOM PONI, RS232 PONI, Modem PONI)
- 1200 or 9600 Baud

① BIM mounted power supply is supplied from the factory already mounted on the BIM.

SECTION 3: OPERATOR PANEL

3-1 GENERAL

The operator panel, which is normally accessible from the outside of a panel or door, provides a means for being alerted to specific conditions, receiving functional help, programming, and parameter monitoring/selection (Figure **2-1**). For the purpose of familiarization, the panel is divided into four sub-sections and discussed individually:

- LEDs
- Display Windows
- Pushbuttons
- Mimic Time-Current Curve

NOTICE: *I_n and I_r as used in any OPTIM Trip Unit System document are defined as follows:*

- *I_n = Rating Plug Value*
- *I_r = Long Delay Setting*

3-2 LEDS

Eighteen LEDs are used to indicate a wide array of functions, operations and/or events. LEDs at the top of the Breaker Interface Module give a visual indication of the device's present operational condition and the status of the circuit breaker being communicated with at any given time (Figure **3-1**). LEDs in the lower half of the device are used to provide protection status and energy monitoring information (Figure **3-2**).

3-2.1 OPERATIONAL CONDITION LEDS

Operational LED

This LED blinks green when power is applied to the Breaker Interface Module and the device is functioning properly. If this LED is not on or is lit continuously, a problem is indicated. Refer to the Troubleshooting Guide (Table **6.1**) for additional information.

No Response LED

This LED can be in one of the three following states:

- Not lit if all identified devices on the system are communicating properly
- Lit red if the device identified in the display is not communicating
- Blinks red if the device identified in the display is communicating properly, but another identified system device is not communicating

Identification of the device or devices not responding is provided through the alarm menu.

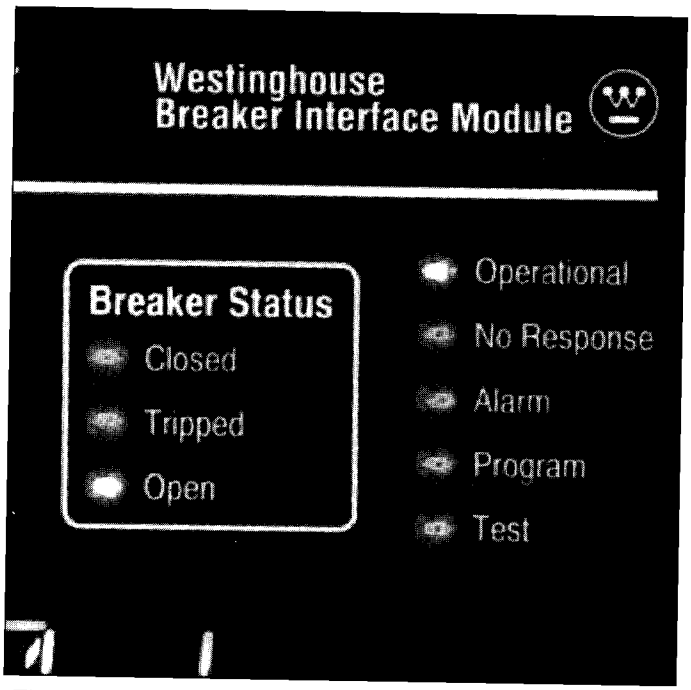


Figure 3-1 Operational and Circuit Breaker Status LEDs

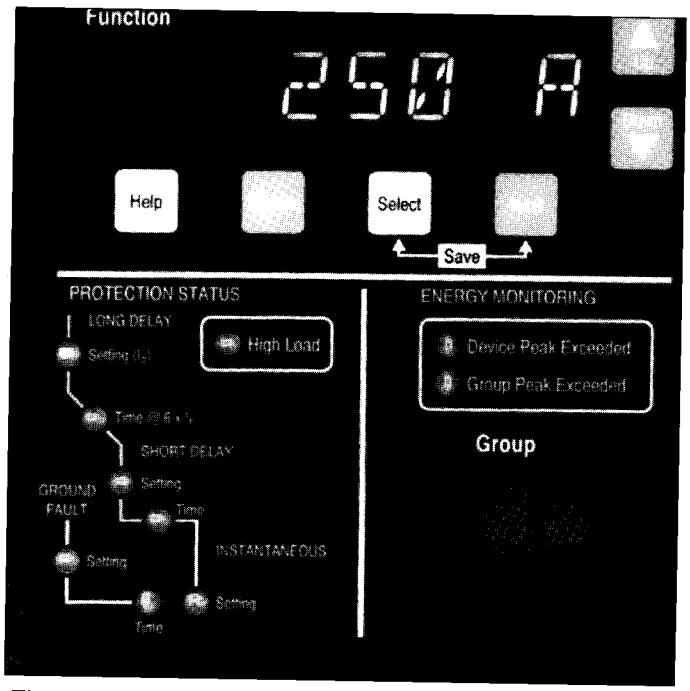


Figure 3-2 Protection Status and Energy Monitoring LEDs

During the initial power application and with DIP switch 1 in the "Learn Position" (Table **5.1** and Figure **5-5**), the Breaker Interface Module is able to query the entire system, learn the address and description of all the devices on the system, and store the information in memory.

Alarm LED

This LED is lit red to indicate that an alarm has occurred with respect to a device or devices known by the Breaker Interface Module to be on the system. Identification of the device or devices initiating the alarm is provided through the ***Alarms*** menu. The relay is energized when the LED is lit. If an alarm has not occurred, the LED is not lit.

Program LED

This LED is lit red to indicate that the ***Program*** mode has been selected for the device identified in the ***Description Display***. It continues to be lit until the ***Program*** mode is exited.

Test LED

This LED is lit red while a trip or no trip test is being performed. It indicates that the ***Test*** mode has been selected for the device identified in the ***Description Display***.

3-2.2 CIRCUIT BREAKER STATUS LEDS

Closed LED

This LED is lit red when the circuit breaker identified in the ***Description Display*** is closed.

Tripped LED

This LED is lit red when the circuit breaker identified in the ***Description Display*** is automatically tripped as a result of an overcurrent condition.

Open LED

This LED is lit red when the circuit breaker identified in the ***Description Display*** is opened as a result of:

- Manual operation
- Electrical operator
- Shunt trip or undervoltage release
- Communications command

High Load LED

This LED can serve as an advance warning of a possible trip condition. It is lit red when a selected level of load current for the circuit breaker identified in the ***Description Display*** is reached or exceeded. The selected level of load current is programmable from 50 to 100 percent of the long delay setting. It operates with an intentional delay of 40 seconds to ride through momentary conditions to avoid nuisance alarms. Whenever the load current drops below the programmed level, the LED turns off. The LED blinks red when viewing or programming the high load setting for the identified circuit breaker.

3-2.3 PROTECTION STATUS LEDS

Long Delay Setting LED

This LED is lit red if the circuit breaker identified in the ***Description Display*** trips on long delay. If the circuit breaker trips, the LED will remain lit until the trip unit is locally or remotely reset. The LED blinks red when viewing or programming the long delay setting, or when a long delay pickup occurs for the identified circuit breaker.

Long Delay Time LED

This LED blinks red when viewing or programming the long delay time setting, action or slope for the identified circuit breaker.

Short Delay Setting LED

This LED is lit red if the circuit breaker identified in the ***Description Display*** trips on short delay. If the circuit breaker trips, the LED remains lit until the trip unit is locally or remotely reset. The LED blinks red when viewing or programming the short delay setting for the identified circuit breaker.

Short Delay Time LED

This LED blinks red when viewing or programming the short delay time setting, action or slope for the identified circuit breaker.

Instantaneous Setting LED

This LED is lit red if the circuit breaker identified in the ***Description Display*** trips on instantaneous. If the circuit breaker trips, the LED remains lit until the trip unit is locally or remotely reset. The LED blinks red when viewing or programming the instantaneous setting or action for the identified circuit breaker.

Ground Fault Setting LED

This LED is lit red if the circuit breaker identified in the ***Description Display*** trips on a ground fault. If the circuit breaker trips, the LED will remain lit until the trip unit is locally or remotely reset. The LED blinks red when viewing or programming the ground fault setting for the identified circuit breaker. It is lit red during a ground alarm.

Ground Fault Time LED

This LED is lit continuous red if the circuit breaker identified in the ***Description Display*** trips on a ground fault. If the circuit breaker trips, the LED remains lit until the

Figure 3-3 Device Address Display

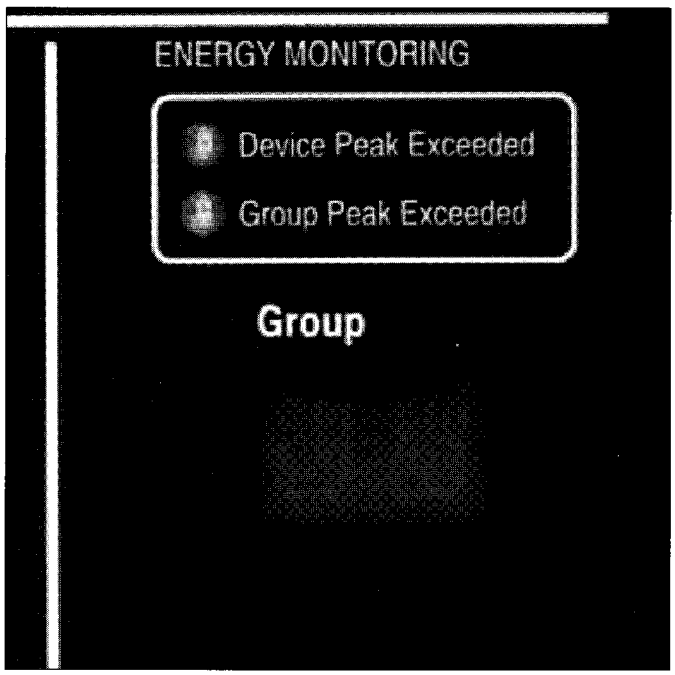


Figure 3-4 Group Display

trip unit is locally or remotely reset. The LED blinks red when viewing or programming the ground fault time setting, action or slope for the identified circuit breaker.

3-2.4 ENERGY MONITORING LEDS

Device Peak Exceeded LED

This LED is lit red if a programmed level of peak demand energy is exceeded by the device identified in the ***Description Display***. The LED blinks red when viewing or programming the peak demand energy level for the identified device.

Group Peak Exceeded LED

This LED is lit red if a programmed level of peak demand energy is exceeded by a specific group of devices identified in the ***Group Display***. The LED blinks red when viewing or programming the peak demand energy level for the identified group.

3-3 DISPLAY WINDOWS

Four different LED type displays provide a comprehensive array of data, setpoint information, messages and device identifications. Displays are one of three different types:

- Identification Display
- Description Display
- Function Display

3-3.1 IDENTIFICATION DISPLAY

Device Address Display

This two character display, located in the upper left portion of the Operator Panel, indicates an assigned address in a HEXADECIMAL format for a particular device (Figure **3-3**). It is a device unique address with choices of 0 through 9 and A through F used to distinguish one device from another on a network.

Group Display

This two character display, located in the lower right portion of the Operator Panel, indicates an assigned identification address for a group of monitored and individually addressed devices (Figure **3-4**). It identifies the group for which cumulative data is being displayed. When a group identification is displayed, the ***Device Address Display*** is blank and vice versa.

3-3.2 DESCRIPTION DISPLAY

This eight character display, located just above the ***Function Display***, describes the device that is associated with the address simultaneously displayed in the ***Device Address Display*** (Figure **3-5**). During the initial learning process performed by the Breaker Interface Module, descriptions are automatically assigned to devices. The user can, however, establish new descriptions that are more relevant to a particular installation. This is accomplished through the use of the "Set Description" feature of the ***System*** display menu.

3-3.3 FUNCTION DISPLAY

This eight character display, located just below the ***Description Display,*** displays all the menu options, help information and messages (Figure **3-5**). Nine general menu option screens can be presented via the ***Function Display*** (Figure **3-6**). Refer to Section 4 for specific details associated with each menu option.

3-4 PUSHBUTTONS

The operator panel contains eight blue or white membrane pushbuttons. All pushbuttons accomplish their function when pressed and then released. In addition, the ***Raise, Lower, Up*** and ***Down*** pushbuttons will continue to scroll if they are pressed and not released. Several operations, such as saving new information or deleting unwanted stored information, requires the simultaneous use of two different pushbuttons and is specifically addressed in this section.

3-4.1 RAISE AND LOWER PUSHBUTTONS

The ***Raise*** and ***Lower*** pushbuttons, located next to the ***Device Address Display,*** are used primarily to step up or down respectively through the assigned addresses of connected devices (Figure **3-7**). The addresses will scroll continuously through the addresses if either pushbutton is held depressed. In addition, the two pushbuttons perform similar functions on "Group" addresses displayed in the ***Group Display.***

The ***Raise*** and ***Lower*** pushbuttons are also used to delete a stored alarm event displayed in the ***Function Display*** by pressing and releasing both pushbuttons simultaneously.

3-4.2 UP AND DOWN PUSHBUTTONS

The ***Up*** and ***Down*** pushbuttons, located next to the ***Function Display,*** are used to step up or down respec-

Figure 3-5 Description and Function Displays

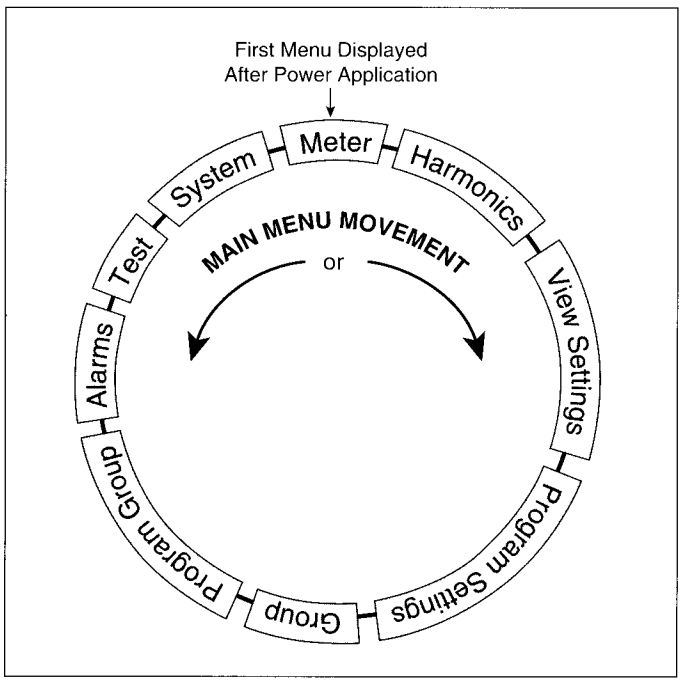


Figure 3-6 Main Menu Option Screens

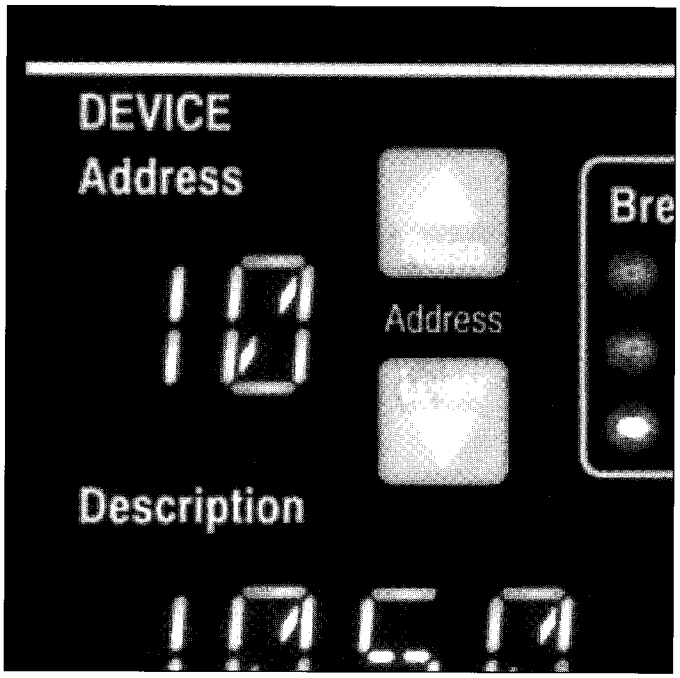


Figure 3-7 Raise and Lower Pushbuttons

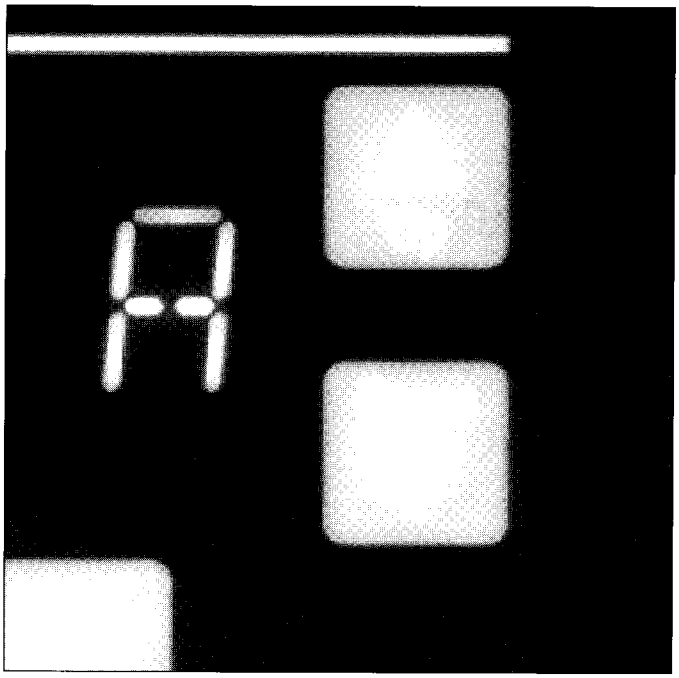


Figure 3-8 Pushbuttons Near Function Display

tively through the menu option screens (Figure **3-8**). If either pushbutton is held depressed, the menu option screens will scroll continuously with a momentary pause on each screen. Once a specific menu option screen is selected, each pushbutton can function in one of two different ways:

- Used to move from one selection to another within the selected menu option
- Used to change displayed programmed information or establish a protective password

If, for example, the ***Meter*** menu is selected, each pushbutton will be used to move from selection to selection within the ***Meter*** menu. If the ***Program Settings*** menu is selected, the two pushbuttons will be used to change a displayed programmed value to a new programmed value.

3-4.3 HELP PUSHBUTTON

When the ***Help*** pushbutton, located under the ***Function Display,*** is pressed and released with the Breaker Interface Module in any operational mode, an English language message scrolls across the ***Function Display*** (Figure **3-8**). The messages relate to what is presently being viewed in the ***Function Display*** and are intended to assist the operator.

3-4.4 ESCAPE PUSHBUTTON

The ***Escape*** pushbutton, located under the ***Function Display,*** is used to move the ***Function Display*** back to the top menu option screen one step at a time (Figure **3-8**).

3-4.5 SELECT PUSHBUTTON

The ***Select*** pushbutton, located under the ***Func-tion Display,*** is used to select the menu option displayed in the ***Function Display*** or to enter a selected protective password (Figure **3-8**).

3-4.6 NEXT PUSHBUTTON

The ***Next*** pushbutton, located under the ***Function Display,*** is used in lieu of the ***Up*** and ***Down*** pushbuttons to move from one selection to another within the selected menu option any time the ***Up*** and ***Down*** pushbuttons are being used to make programmed information changes (Figure **3-8**).

3-4.7 SELECT/NEXT PUSHBUTTON COMBINATION

The simultaneous use of the ***Select*** and ***Next*** pushbut-

tons, as indicated under the pushbuttons with a white tie line, accomplish the following:

- Saves programmed settings
- Initiates a test
- Acknowledges an alarm and commits it to memory

3-5 MIMIC TIME-CURRENT CURVE

A LED type mimic time-current curve, located in the lower left portion of the operator panel under ***Protection Status,*** is used to identify what specific portion, if any, of the identified circuit breaker's characteristic curve is being affected by trip unit action or Breaker Interface Module operations (Figure **3-9**). The LEDs operate as described in paragraph 3-2.3 and provide critical information instantaneously after the automatic tripping of a circuit breaker. In addition, the mimic time-current curve supplements the information displayed in the ***Function Display*** during the viewing or programming processes.

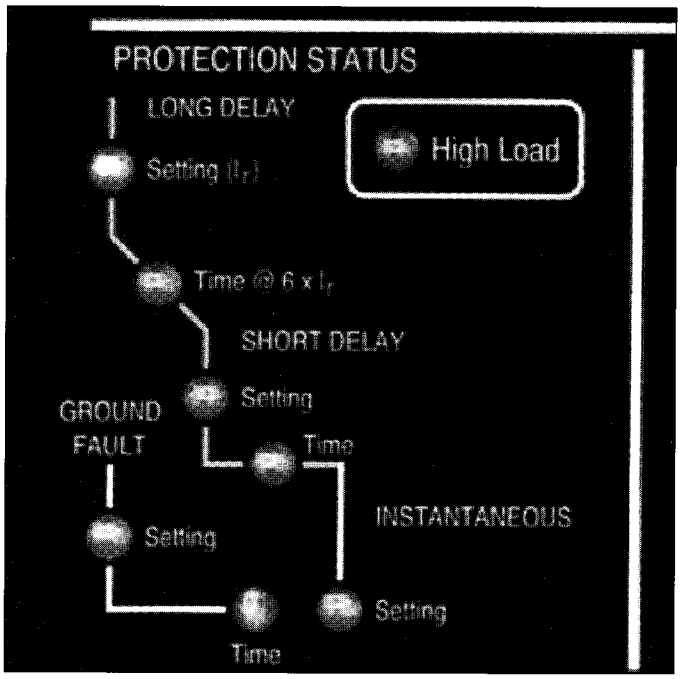


Figure 3-9 LED Type Mimic Time-Current Curve

SECTION 4: OPERATION

4-1 GENERAL

This section specifically describes the operation and functional use of the Breaker Interface Module. It is recommended that the operator review the material presented in Sections 2 and 3 prior to operating and using the Breaker Interface Module.

The Breaker Interface Module is a device used to access and program the capabilities of OPTIM 750, OPTIM 1050 Trip Units. It can also be used to access only Digitrip RMS 810 and Digitrip RMS 910 Trip Units. Specific details associated with each individual trip unit are covered in separate instruction manuals for the different trip units (Appendix A). Only the information required to properly and effectively utilize the Breaker Interface Module is presented in this manual.

Insure that the Breaker Interface Module has been properly installed and wired in keeping with the information presented in Section 5 before operating this device. It further assumes that all the devices to be monitored are connected and network and/or sub-network wiring is in place.

A Breaker Interface Module menu diagram provides an overall picture of this device's capabilities and the order in which the functional displays appear as the device is operated (Figure **4-1**). It is highly recommended that this menu diagram be reviewed before proceeding with the rest of this section. Such a review will greatly assist with the initial understanding. In addition, the menu diagram provides a good review for those already familiar with the Breaker Interface Module.

Section 4 covers the operation and use of the Breaker Interface Module. It is broken down into six general categories:

- Security Password
- Power Application
- Configure Trip Units
- Displayed Information
- Communications
- Test Trip Units

4-2 SECURITY PASSWORD

The Breaker Interface Module utilizes a password to restrict access to certain functional options. A valid password is required to access the following main menu options or specific options within a particular main menu option:

- *Program Settings*
- *Program Group*
- *Test*
- *System*
  Only - Set Date
  - Set Time
  - Update
  - Set Description
  - Set Password

The Breaker Interface Module is supplied with a factory programmed password of **10000**. If it is desirable to establish a new password, follow the procedure outlined in paragraph 4-2.1.

4-2.1 CHANGE SECURITY PASSWORD

Step 1: Use the ***Up*** or ***Down*** or ***Next*** pushbuttons to move to the ***System*** main menu.

Step 2: Use the ***Select*** pushbutton to enter the ***System*** main menu.

Step 3: Continue using the ***Down*** pushbutton to move to the ***Set Security Password*** display (Figure **4-2**).

Step 4: Press and release the ***Select*** pushbutton again. The display will ask for a protective password. Use the ***Up*** or ***Down*** pushbuttons to arrive at the present valid password. As previously mentioned, the factory programmed password is **10000**.

Step 5: Use the ***Select*** pushbutton to enter the valid password. Once the password is accepted, the far left character space in the password field begins to blink, and the existing password continues to be displayed. The blinking indicates which character is able to be changed. The choice of characters is a number from 0 to 9.

Step 6: Use the ***Up*** or ***Down*** pushbuttons to change individual characters and the ***Next*** pushbutton to move from one character to another.

Step 7: When the displayed password is acceptable, press and release the ***Select*** and ***Next*** pushbuttons simultaneously to enter the new password into memory. The ***Function Display*** will return to ***Set Password***.

Notice: *It is strongly suggested that a record be made of any new password and stored in a safe place. If a new password is programmed and*

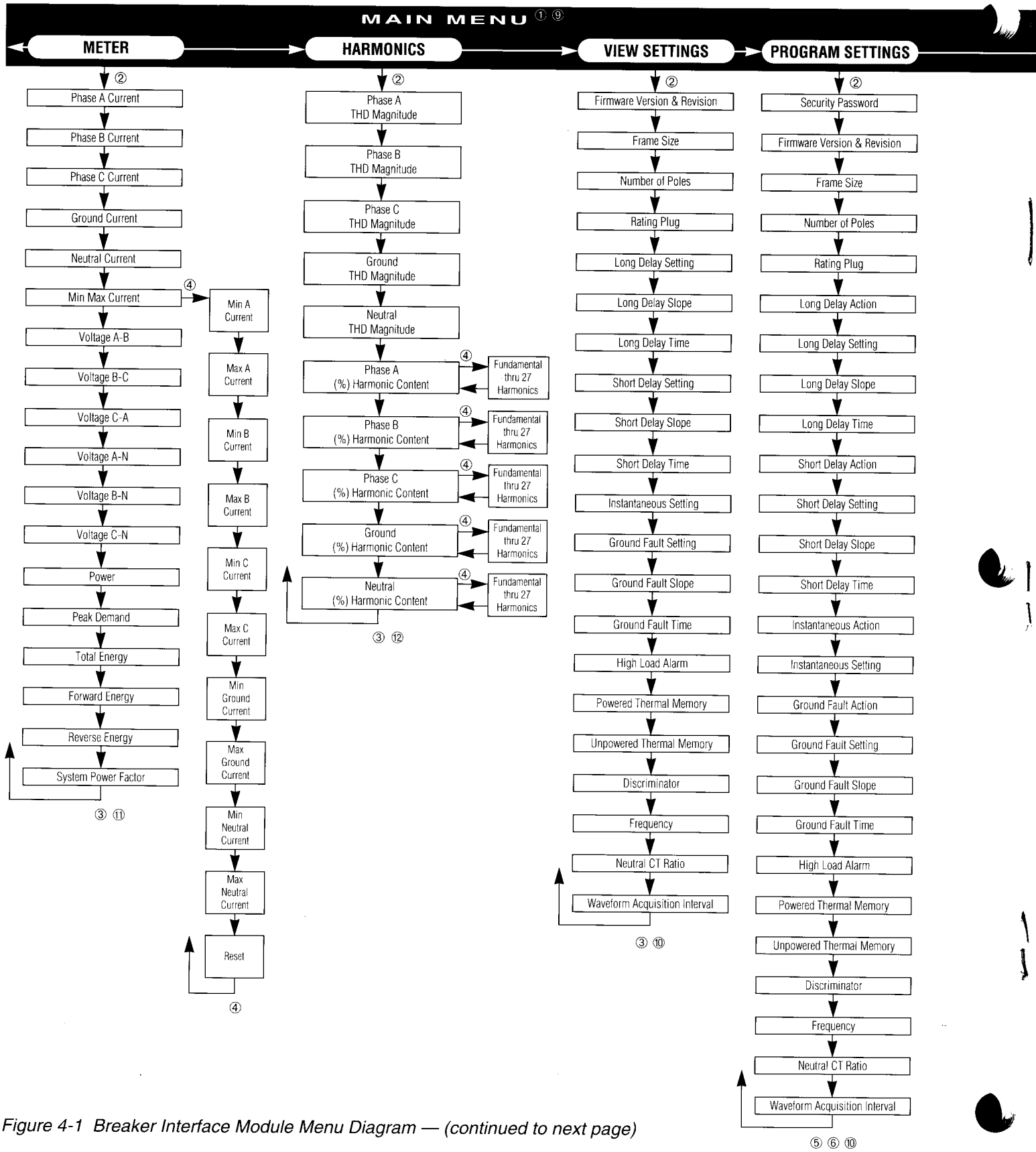
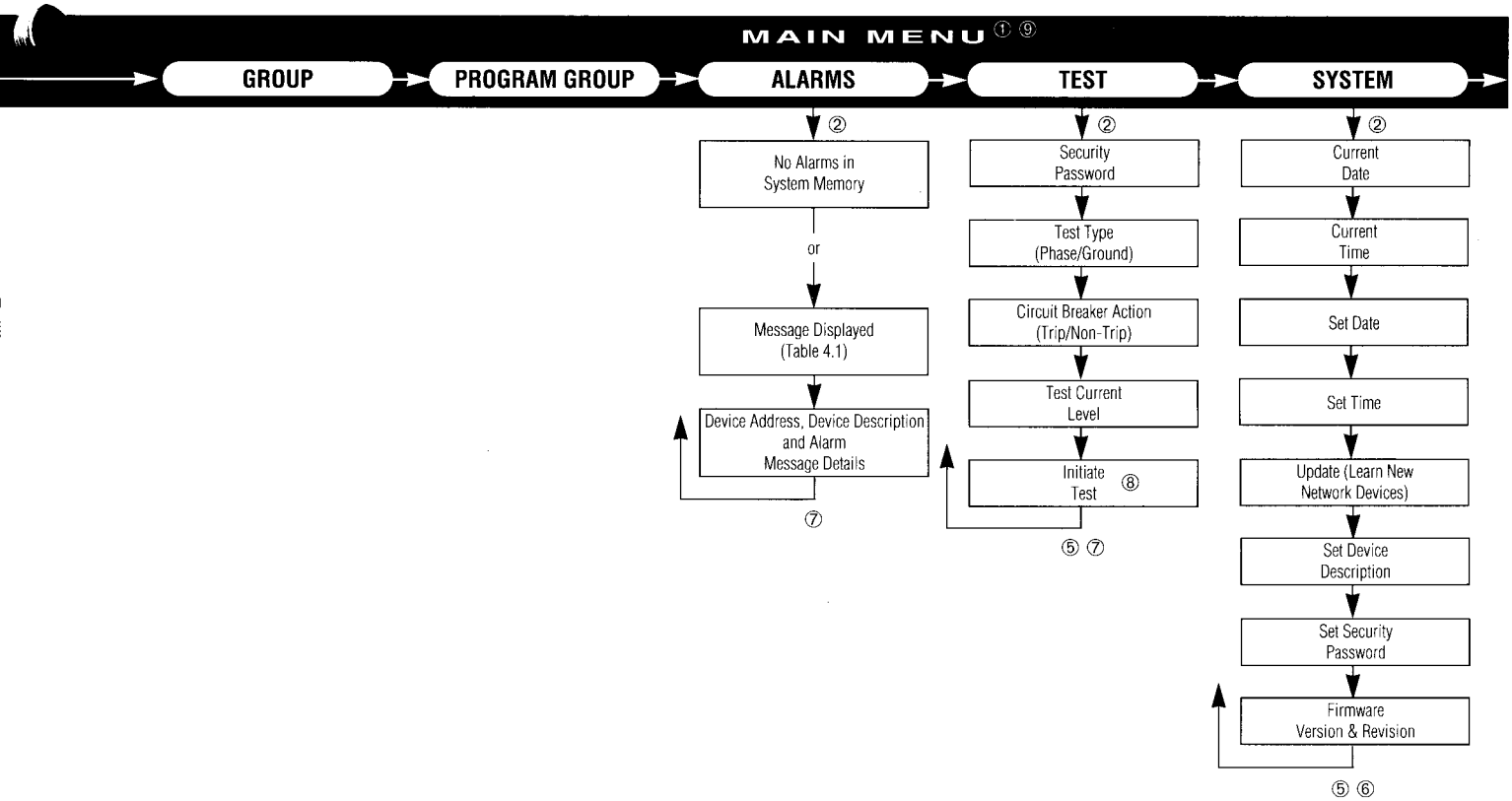


Figure 4-1 Breaker Interface Module Menu Diagram — (continued to next page)



① Use ***Up***, ***Down*** or ***Next Pushbuttons*** to move from one ***Main Menu*** item to another.

② Use ***Select Pushbutton*** to enter a specific ***Main Menu*** item.

③ Use ***Up, Down*** or ***Next Pushbuttons*** to move between categories within ***Main Menu*** item. Use ***Escape Pushbutton*** at any time to exit back to ***Main Menu*** item.

④ Use ***Select Pushbutton*** to enter the "Min Max Current" or "Fundamental through 27 Harmonics" categories. Use the ***Escape Pushbutton*** to exit to ***Meter Menu*** or ***Harmonics Menu*** item.

⑤ Use ***Next Pushbutton*** to move between categories within ***Main Menu*** item. Use ***Up*** or ***Down Pushbuttons*** to make changes to specific programmable categories.

⑥ Use ***Escape Pushbutton*** to exit ***Main Menu*** item without saving changes. Use ***Select*** and ***Next Pushbuttons*** simultaneously to save category changes and exit to ***Main Menu*** item.

⑦ Use ***Raise*** and ***Lower Pushbuttons*** simultaneously to remove displayed alarm message from memory. Use ***Escape Pushbutton*** to exit to ***Main Menu*** item.

⑧ Use ***Select*** and ***Next Pushbuttons*** simultaneously to reset all minimum and maximum currents or initiate test.

⑨ Use ***Help Pushbutton*** anytime for brief message on displayed selection.

⑩ Some entries in ***View Settings*** may not be visible due to other settings.

⑪ Only the metered values supported by the addressed device will be displayed.

⑫ Only the harmonic information supported by the addressed device will be displayed.

(continued from previous page)

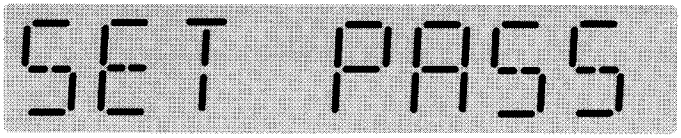


Figure 4-2 Set Password Display

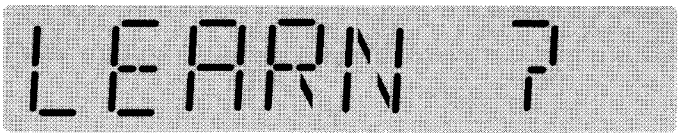


Figure 4-3 Learn Display

forgotten or lost at a later date, the Breaker Interface Module will have to be reprogrammed by Cutler-Hammer. Contact the Advanced Product Support Center at 1-800-542-7883 for assistance.

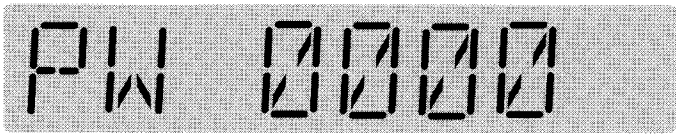


Figure 4-4 Set Password Display

4-3 POWER APPLICATION

Notice: *Prior to applying power to the Breaker Interface Module, be certain that all DIP switches are correctly set as described in Paragraph 2-3.1 and Table **5.1**. Of special significance are the Learn and Run modes as established by the position of DIP Switch 1. Device addresses and descriptions must be learned if this is the first time power is being applied to the Breaker Interface Module or is being updated because new devices have been added to an existing system.*

When applying power to the Breaker Interface Module, it is important to know whether or not this is the initial application of power to the device. If this is not the initial power application and no new devices have been added to the system, power can be applied without any further actions. The Breaker Interface Module, having been previously configured, will immediately begin to function as intended. The ***Operational*** LED will blink green, a device address and description will be displayed, and ***Meter*** will appear in the ***Function Display***.

If this is the **first time** power is being applied to the Breaker Interface Module or **new devices** have been added to an existing system, additional steps must be taken to insure that the Breaker Interface Module functions properly. These steps follow under the headings **Run** mode and **Learn** mode.

4-3.1 RUN MODE

The Breaker Interface Module should always be in the **Run** mode except for the instances described in the next section under **Learn** mode. The **Run** mode is determined by the position of DIP switch 1, which is the up position for the **Run** mode.

4-3.2 LEARN MODE

If this is the **first time** for power application to the Breaker Interface Module, steps 1 through 7 should be followed to insure that the Breaker Interface Module has all the correct device addresses and descriptions in memory:

Step 1: Make certain that all DIP switches are in the correct position and apply power to the Breaker Interface Module. The ***Operational*** LED will blink green and Cutler-Hammer will be momentarily displayed.

Step 2: The word ***Learn*** followed by a question mark ***(?)*** will appear in the ***Function Dis-play*** (Figure **4-3**). Press and release the ***Select*** pushbutton to make the Breaker Interface Module begin the learning process.

Step 3: The next display will ask for the entry of a valid password (Figure **4-4**). Keep in mind that the factory programmed password is **10000**.

Step 4: The far left character of the five character password, zero in this instance, will be blinking. The blinking indicates which digit is available for change. Use the ***Up*** pushbutton to change the zero to one. The valid password of 10000 is now displayed.

Step 5: Press and release the ***Select*** pushbutton to enter the displayed password. Upon entry of a valid password, the word ***Learning*** begins blinking in the ***Function Display***. This indicates the Breaker Interface Module is polling the system for the address and description of all connected devices. At the same time,

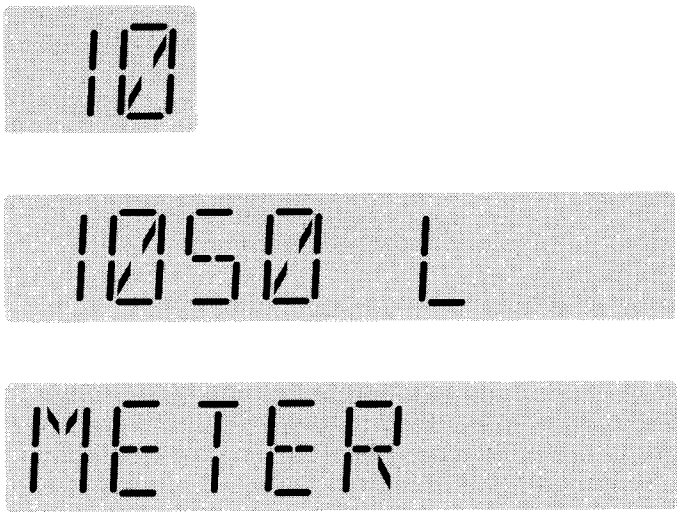


Figure 4-5 Typical Breaker Interface Module Displays

device addresses will appear in the ***Device Address Display***.

Step 6: When the learning process is complete, the lowest device address will appear in the ***Device Address Display,*** the device description will appear in the ***Description Display,*** and ***Meter*** will appear in the ***Function Display*** (Figure **4-5**).

Step 7: The learning process is now complete and DIP switch 1 should be moved to the up position (**Run** mode). The switch remains in this position until new devices are added to the system.

If this is **not the first time** for power application to the Breaker Interface Module but address and description updating must be performed because new devices have been added to the system, steps 1 and 2 should be followed:

Step 1: Set DIP switch 1 to the **Learn** mode (down position).

Step 2: Use the ***Update*** feature of the ***System*** display menu to add the new addresses and descriptions without losing previously stored addresses and descriptions. Refer to Paragraph 4-4.2 for specific instructions.

Notice: *If the user prefers to have device descriptions other than those automatically assigned during the* **Learn** mode*, use of the* ***Set Device Description*** *feature of the* ***System*** *display menu permits this change. Refer to Paragraph 4-4.3 for additional setup information.*

4-4 CONFIGURE

Notice: *The OPTIMizer Hand Held Programmer should be used to establish unique device addresses and the Baud Rate before configuring the trip unit. Refer to Instruction Book 29C892 covering the OPTIMizer Hand Held Programmer for details.*

The Breaker Interface Module is used to establish specific system functions and program protective, coordination and alarm features.

First check and set or perform, if required, the following system functions found under the ***System*** menu:

- Set Date
- Set Time
- Update
- *Set Description*
- *Set Password*

Once system functions are established, the protective, coordination and alarm features are programmed as required. The general features to be programmed are:

- Time-current setpoints
- Protection options
- Alarm levels

Trip unit configuration and/or the configuration of groups of devices take place within three different menus:

- *Program Settings*
- *Program Group*
- *Alarms*

The Breaker Interface Module, as just outlined, permits the programming of individual trip units and groups of individual devices. The group programming capability is especially helpful when the cumulative information of a group of devices is required. It eliminates the need to collect and record individually monitored values. Refer to the Breaker Interface Module menu diagram (Figure **4-1**) to review all the programmable features included in these menus.

The Programming associated with each menu is addressed in this section to facilitate the programming process. This information is not, however, intended to cover in detail all the available trip unit protective functions, settings and coordination possibilities. For specific

details on the capabilities of individual trip units, refer to Instruction Book 29C891 covering OPTIM Trip Units.

4-4.1 SETTING DATE AND TIME

The present date and time are displayed first under the ***System*** display menu. If, for any reason, the displayed date and/or time must be altered, the programmable ***Set Time*** and ***Set Date*** features are available for this purpose. Procedural steps to accomplish these changes follow:

Step 1: Use the ***Up*** or ***Down*** pushbuttons to move to the ***System*** display menu.

Step 2: Use the ***Select*** pushbutton to enter the ***System*** display menu. The present date will be the first display (Figure **4-6**).

Step 3: Continue using the ***Down*** or ***Next*** pushbutton to move to the ***Set Date*** display (Figure **4-7**).

Step 4: To enter ***Set Date,*** press and release the ***Select*** pushbutton. The display will ask for a protective password. Use the ***Up*** or ***Down*** pushbuttons to arrive at a valid password. As previously mentioned, the factory programmed password is **10000**.

Step 5: Use the ***Select*** pushbutton to enter the valid password. Once the password is accepted, the present date first viewed in Figure **4-6** will be displayed with the two character month blinking. The blinking indicates which characters are able to be changed. Use the ***Up*** or ***Down*** pushbuttons to make the changes.

Step 6: Once any required change is made to the month, use the ***Next*** pushbutton to move to the day and year for any necessary changes.

Step 7: When the displayed date is correct, press and release the ***Select*** and ***Next*** pushbuttons simultaneously to enter the new date into memory.

Step 8: Use the ***Down*** pushbutton to move to the ***Set Time*** display if a change in the time is required. To alter the present programmed time, the procedure is the same as just described in the previous steps for changing the date.

Step 9: Use the ***Escape*** pushbutton to return to the ***System*** display menu.

4-4.2 UPDATING FOR ADDED DEVICES

As outlined in Paragraph 2-3.1, DIP switch 1 in the down position puts the Breaker Interface Module in the **Learn** mode. In this position, a newly installed Breaker Interface Module is capable of learning the addresses and descriptions of all system devices. If new devices are added to an existing system at a future time, an Update feature is provided as part of the ***System*** display menu to permit the learning of new device addresses and descriptions. Use of this feature will not only learn and store the new information, it protects already stored addresses and descriptions from any inadvertent changes. To use the ***Update*** feature, refer to the following steps:

Step 1: Move DIP switch 1 to the down position (**Learn** mode).

Step 2: Use the ***Up*** or ***Down*** pushbuttons to move to the ***System*** display menu.

Step 3: Use the ***Select*** pushbutton to enter the ***System*** display menu. The present date will be the first display (Figure **4-6**).

Step 4: Continue using the ***Down*** or ***Next*** pushbuttons to move to the ***Update*** display. To enter ***Update,*** press and release the ***Select*** pushbutton. ***Learn ?*** will appear in the ***Function Display*** (Figure **4-3**).

Step 5: Press and release the ***Select*** pushbutton again. The display will ask for a protective password. Use the ***Up*** or ***Down*** pushbuttons to arrive at a

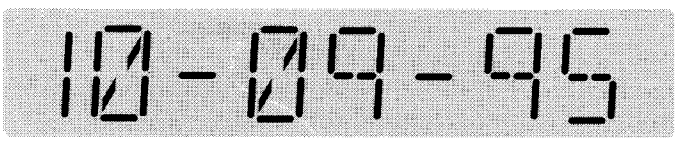


Figure 4-6 Typical Present Date Display

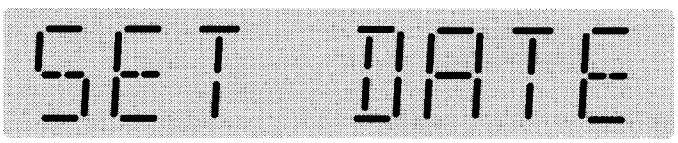


Figure 4-7 Set Date Display

valid password. As previously mentioned, the factory programmed password is **10000**.

Step 6: Use the ***Select*** pushbutton to enter the valid password. Once the password is accepted, the Breaker Interface Module begins the learning process as indicated by the blinking word ***Learning*** in the ***Function Display***.

Step 7: When the learning process is completed, System will again appear in the ***Function Display***.

Step 8: **Return DIP switch 1 to the up position (Run mode).**

4-4.3 CHANGE DEVICE DESCRIPTIONS

If device descriptions automatically assigned during the learning process are not meaningful enough for a particular system, a ***Set Description*** feature is provided as part of the ***System*** display menu to permit changing existing device descriptions to new descriptions. Proceed with the following steps to make any desired changes:

Step 1: Check to be certain that the address appearing in the ***Device Address Display*** is the address of the device requiring a description change.

Step 2: Use the ***Up*** or ***Down*** pushbuttons to move to the ***System*** display menu.

Step 3: Use the ***Select*** pushbutton to enter the ***System*** display menu.

Step 4: Continue using the ***Down*** or ***Next*** pushbuttons to move to the ***Set Description*** display (Figure **4-8**).

Step 5: Press and release the ***Select*** pushbutton again. The display will ask for a protective password. Use the ***Up*** or ***Down*** pushbuttons to arrive at a valid password. As previously mentioned, the factory programmed password is **10000**.

Step 6: Use the ***Select*** pushbutton to enter the valid password. Once the password is accepted, the far left character in the ***Description Display*** begins blinking (Figure **4-9**). The blinking indicates which character is able to be changed. The description can be up to 8 characters in length. The choice of characters can be a blank space, a number from 0 to 9, or a letter from A to Z.

Step 7: Use the ***Up*** or ***Down*** pushbuttons to change individual characters and the ***Next*** pushbutton to move from one character to another.

Step 8: When the displayed description is acceptable, press and release the ***Select*** and ***Next*** pushbuttons simultaneously to enter the new description into memory. The new description appears in the ***Description Display*** and ***Set Description*** again appears in the ***Function Display*** (Figure **4-10**).

4-4.4 PROGRAM SETTINGS MENU

Viewing already programmed settings without being able to alter the settings is made possible by the ***View Settings*** menu. This menu is discussed in detail in Paragraph 4-5 entitled "Displayed Information." The information displayed in the ***View Settings*** menu is established by the settings programmed here in the ***Program Settings*** menu.

Programming Reminders

Keep in mind that the setting possibilities shown in Figure **4-1** for the ***Program Settings*** menu are all of the possibilities within the Digitrip Family of Trip Units. If a particular trip unit does not support a particular feature,

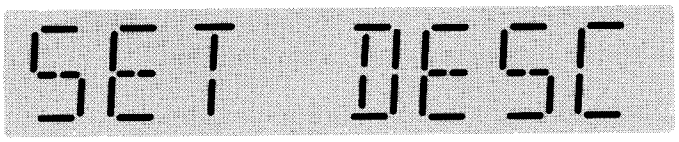


Figure 4-8 Set Description Display

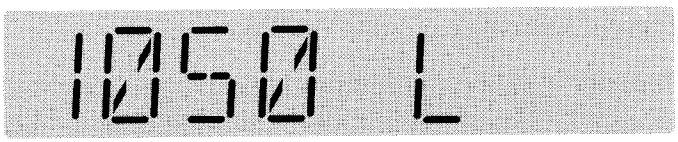


Figure 4-9 Typical Existing Description Example

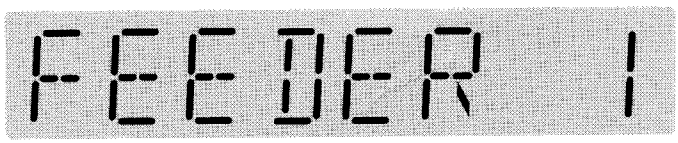


Figure 4-10 Typical New Description Example

that feature will not be displayed as the operator moves through the menu.

The ***Program Settings*** menu is Password Protected. The operator must know a valid password to proceed. The factory programmed password is **10000**. This may have been altered. Refer to Paragraph 4-2.

A trip unit will continue to provide protection in keeping with its presently programmed settings until new settings are programmed, entered and accepted.

Programmed settings can only be saved as a group through the simultaneous use of the ***Select*** and ***Next*** pushbuttons, not as individual settings.

In addition to using the ***Help*** pushbutton to define a particular display during programming, it should be noted that the ***LED*** type mimic time-current curve helps to further identify what is being viewed in the ***Function Display***. When the long delay setting is being programmed for example, the programmed setting value in terms of the number of amperes only appears in the display. The long delay setting LED, however, is lit to indicate the particular function.

Several of the settings included within the ***Program Settings*** menu are included for information purposes and are not programmable through the Breaker Interface Module. They are:

- *Circuit Breaker Frame Size*
- *Number of Poles*
- *Rating Plug Size*
- *Device Firmware Version and Revision*

These settings are automatically established during communications between the Breaker Interface Module and the trip unit.

Any operator associated with programming will quickly discover that programming through the Breaker Interface Module is a matter of simple, repetitive steps:

Step 1: Check to be certain that the address and description being displayed are correct.

Step 2: Use the ***Up*** or ***Down*** pushbuttons to move to the ***Program Settings*** display menu (Figure **4-11**).

Step 3: Use the ***Select*** pushbutton to enter the ***Program Settings*** display menu. The display will ask for a security password. Use the ***Up*** or ***Down*** pushbuttons to arrive at a valid password. As previously mentioned, the factory programmed password is **10000**.

Step 4: Use the ***Select*** pushbutton to enter the valid password. Once the password is accepted, the frame size will appear in the ***Function Display*** (Figure **4-12**).

Step 5: Use the ***Next*** pushbutton to move from programmable feature to programmable feature. Keep in mind that once a feature is passed by, there is no pushbutton that will move the display back. If the operator wants to visit a setting already passed in the display, it will require continued forward scrolling.

Step 6: Use the ***Up*** or ***Down*** pushbuttons to move through all the possible choices within a particular setting until the required setting is displayed.

Step 7: Once all the settings are set as required, use the ***Select*** and ***Next*** pushbuttons simultaneously to save and establish the new settings. When the pushbuttons are pressed and released simultaneously, ***Wait*** appears in the ***Function Display*** until the process is complete. Once complete, an ***Accepted*** or ***Rejected*** message will be displayed. The ***Accepted*** or ***Rejected*** message remains displayed until cleared by the use of any pushbutton. Once cleared, the ***Program Settings*** display appears.

4-4.5 PROGRAM GROUP MENU

Program Group menu entry is a password protected area that will allow the user to define up to 8 groups for energy monitoring purposes. Any energy monitoring device that is on the sub-network (i.e. OPTIM 1050, Digitrip 810/910, or Energy Sentinels) can be included in one or more groups for the purpose of collective moni-

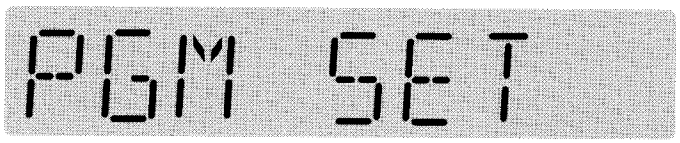


Figure 4-11 Program Settings Display

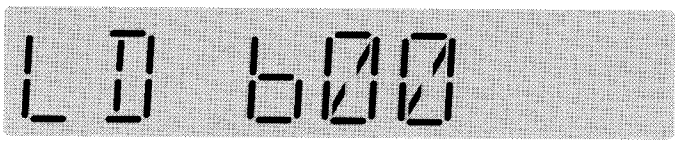


Figure 4-12 Typical Frame Size Display

toring of power and energy parameters. The user can define these 8 groups by selecting which group they will be working with, then including or excluding each of the energy monitoring devices.

After the groups are defined, the collective energy and power can be viewed by the user upon entering the Group Menu entry.

4-4.6 ALARMS MENU

When an alarm has occurred with respect to a device or devices know by the Breaker Interface Module to be on the system, the ***Alarm*** LED is lit red. At the same time, information relevant to the event is stored in memory. The ***Alarms*** menu provides a means for accessing information pertaining to a particular alarm or all of the alarms in memory. The ***Alarm*** LED remains lit until the stored information for all alarms is cleared.

Seven possible "Alarm Messages" can appear in the ***Function Display*** while in the ***Alarms*** menu. The "Alarm Message" blinks when displayed in the ***Function Display***. The explanatory information associated with each "Alarm Message" scrolls across the ***Function Display***. Refer to Table **4.1** for the possible "Alarm Messages" and the specific explanatory information provided for each message.

When the ***Alarms*** menu is accessed, a ***No Alarms*** message is displayed if no alarm is stored in memory (Figure **4-13**). If one or more alarms are stored in memory, the device address, device description, and alarm message associated with the most recent alarm are displayed when the ***Alarms*** menu is accessed. Use of the ***Up*** or ***Down*** pushbuttons will access other older stored alarms. Procedural steps to move through the ***Alarms*** menu for a typical alarm occurrence are as follows:

Step 1: Use the ***Up*** or ***Down*** pushbuttons to move to the ***Alarms*** menu (Figure **4-14**).

Step 2: Use the ***Select*** pushbutton to enter the ***Alarms*** menu. The device address, description and alarm message are displayed for the most recent alarm (Figure **4-15**).

Step 3: When the ***Select*** pushbutton is used, a message scrolls across the ***Function Display*** providing further information on the "Alarm Message." For example, ***Short Delay Trip, Magnitude of IA, IB, IC, IG and IN, Date and Time of Occurrence***. When the message is completed, ***Tripped*** is once again displayed.

Step 4: Simultaneous use of the ***Raise*** and ***Lower*** pushbuttons will clear that particular alarm message. If this action is not taken, the message will continue to be stored in memory. The simultaneous use of the same pushbuttons held depressed will clear all alarm messages from memory, and would be indicated by the ***Alarm*** LED no longer being illuminated.

Step 5: Use the ***Up*** or ***Down*** pushbuttons to access older stored "Alarm Messages." They would also be identified in a manner similar to Figure **4-13**.

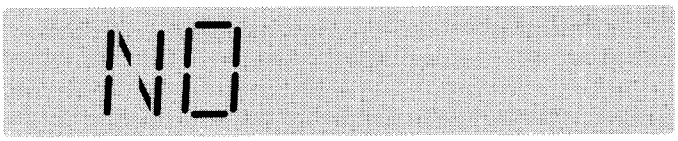


Figure 4-13 No Alarms Display

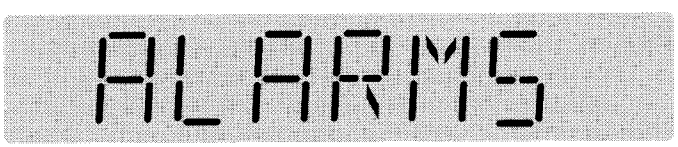
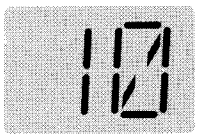
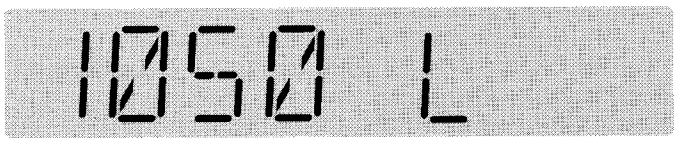


Figure 4-14 Alarms Menu Display





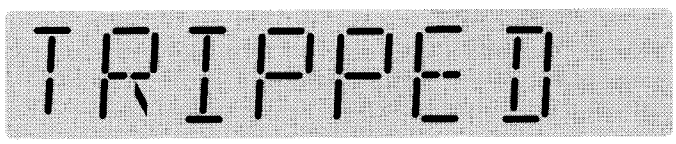


Figure 4-15 Typical Alarms Menu Display

Table 4.1 Alarms Menu Messages

Displayed Message	Explanatory Information Provided
LDPU	Long Delay Pickup, Date and Time of Occurrence
TRIPPED	(1) Long Delay Trip, Magnitude of Associated Currents, Date/Time of Occurrence (2) Short Delay Trip, Magnitude of Associated Currents, Date/Time of Occurrence (3) Instantaneous Trip, Magnitude of Associated Currents, Date/Time of Occurrence (4) Ground Fault Trip, Magnitude of Associated Currents, Date/Time of Occurrence (5) Discriminator, Date/Time of Occurrence (6) Over Temperature, Date/Time of Occurrence (7) Override, Date/Time of Occurrence (8) Plug, Date/Time of Occurrence
NO RESP	No Response, Date/Time of Occurrence
NEUT CUR	Neutral Overcurrent Alarm, Date/Time of Occurrence
GND CUR	Ground Overcurrent Alarm, Date/Time of Occurrence
BAD FRM	Bad Frame Size, Date/Time of Occurrence
EEROM	EEROM Error Detected, Date/Time of Occurrence

Step 6: When finished viewing alarm information, use the ***Escape*** pushbutton and the ***Function Display*** returns to the ***Alarms*** menu (Figure **4-14**).

4-5 DISPLAYED INFORMATION

The Breaker Interface Module displays a comprehensive list of metered parameters and provides a large number of visual LED indications. For specific information concerning the LED indications, refer to Paragraph 3-2.

A wide variety of parameters and conditions are accessible via the operator panel of the Breaker Interface Module. Refer to the Breaker Interface Module menu diagram (Figure **4-1**) to review the types of displayed information available. Figure **4-1** provides all the possibilities for parameter display. If a particular trip unit does not support a particular parameter, it will not be displayed.

It should be noted that displayed information is available under four different menus, although actual metered parameters are provided by only two of the four as indicated:

- ***Meter*** menu (metered parameters)
- ***Harmonics*** menu (metered parameters)
- ***View Settings*** menu (actual trip unit settings)
- ***Group*** menu (group metered parameters)

The following steps are used to view displayed information in any of the four outlined menus:

Step 1: Check to be certain that the address and description being displayed are correct.

Step 2: Use the ***Up*** or ***Down*** pushbuttons to move to the desired menu, ***Meter*** menu for example.

Step 3: Use the ***Select*** pushbutton to enter the selected menu and the first displayed parameter will appear in the ***Function Display***. In the case of the ***Meter*** menu, the display would be ***Phase A Current*** (Figure **4-16**).

Step 4: Use the ***Up*** or ***Down*** or ***Next*** pushbuttons to move from one parameter to another.

Step 5: When finished viewing parameters in a particular menu, use the ***Escape*** pushbutton to exit

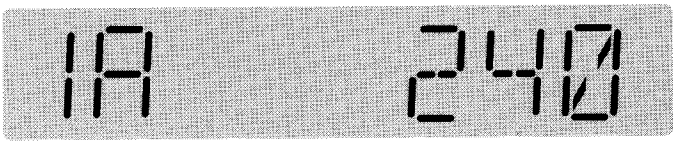


Figure 4-16 Typical Meter Menu Display

that menu. The ***Function Display*** will return to the original menu heading, ***Meter*** menu for this example.

Step 6: To view the same settings for another device, use the ***Address Raise*** or ***Lower*** pushbuttons to scroll to the desired device (Figure **4-17**).

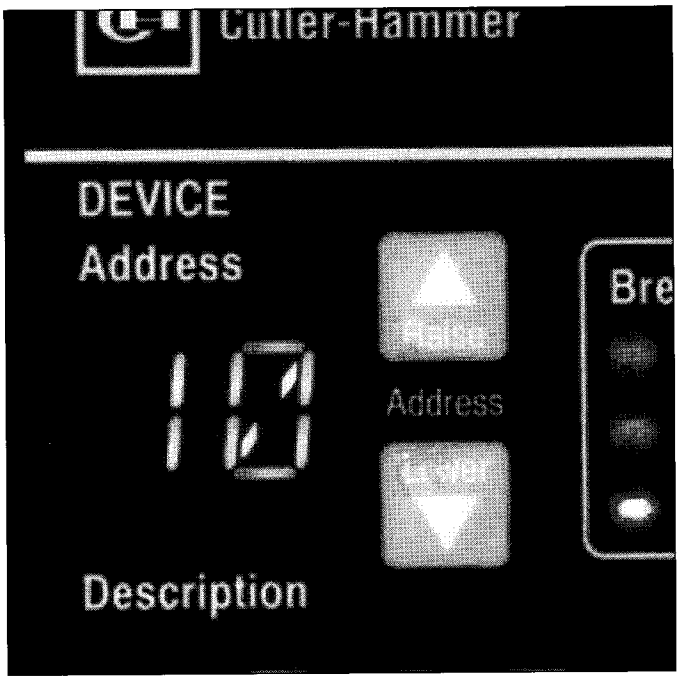


Figure 4-17 "Address" Raise and Lower Pushbuttons

4-6 COMMUNICATIONS

The Breaker Interface Module can communicate over a network and/or a sub-network. All programming, configurations, advanced warnings, diagnostics, monitoring and control functions are accessible in either or both manners (Figures **1-2** and **1-3**).

4-6.1 SUB-NETWORK COMMUNICATIONS

Communications from the Breaker Interface Module to trip units and energy monitoring devices is available through a three pin male connector (Paragraph 2-3.2). Through this connection, the Breaker Interface Module is able to communicate with up to 50 total devices. The Breaker Interface Module assumes the role of the network master on the sub-network with all connected devices slave to the Breaker Interface Module. From this connection, the Breaker Interface Module is able to poll devices on the sub-network to obtain and place in memory up to date information. If the Breaker Interface Module is also part of a Master Network, collected information can be sent to the Master Network.

4-6.2 MAIN NETWORK COMMUNICATIONS

The Breaker Interface Module is an IMPACC compatible device. As such, it can be used to remotely monitor, control and program connected devices on a sub-network. Main network communications is available through the use of a PONI Communication Module (Paragraphs 2-3.3 and 2-4). In this situation, the Breaker Interface Module assumes the role of a slave device on the network. The Breaker Interface Module responds to all supported pass through commands intended for devices on the sub-network.

IMPACC is a noise immune communications system that permits communications from the Breaker Interface Module to a master computer via a high frequency carrier signal over a shielded twisted pair of conductors (Figure **5-3**). The shielded twisted pair of conductors can extend up to 7500 feet without the use of repeaters. Communications between IMPACC compatible devices, such as the Breaker Interface Module, and the master computer is made possible by the PONI Module.

Functions available remotely through the communications option are:

- Monitoring and trending of displayed values and device status
- Initiation of a Harmonic Analysis and retrieval of waveform analysis information
- Retrieval of event information
- Activation of relay output contacts
- Device Programming

For an overview of IMPACC capabilities including the use of Series III Software, Analysis Functions and Enhanced Graphics capabilities, refer to Instruction Book 29C890 entitled "Instructional Overview for Use of the Digitrip OPTIM Trip Unit System."

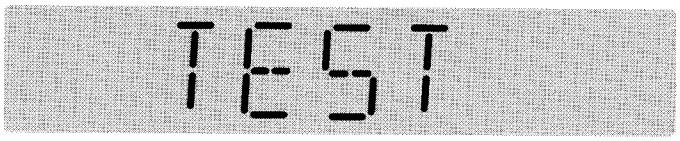


Figure 4-18 Test Display

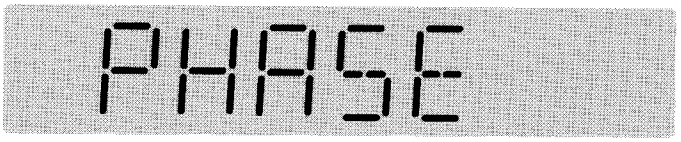


Figure 4-19 Phase Test Display

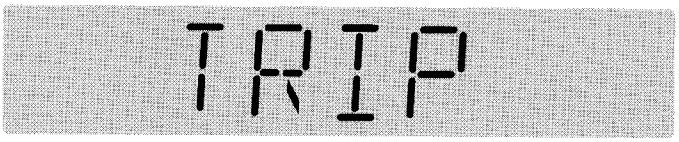


Figure 4-20 Trip Test Display

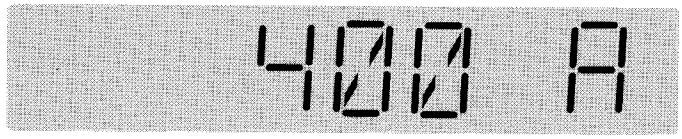


Figure 4-21 Typical Test Current Display

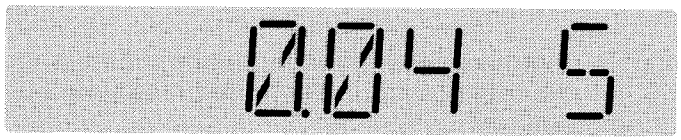


Figure 4-22 Typical Test Time in Seconds Display

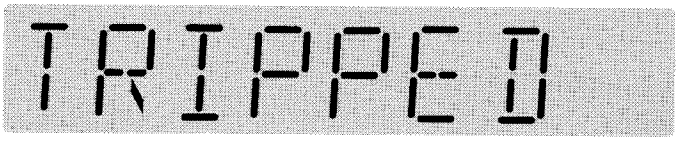


Figure 4-23 Tripped Alarm Display

4-7 TEST TRIP UNITS

Digitrip OPTIM 750 and 1050 Trip Units contain a test capability. One of the means for performing tests is through the use of the Breaker Interface Module. The intent is to permit the periodic performance of tests that verify the functional performance of the trip unit. Two types of test are possible through the use of the Breaker Interface Module, the "Non-Trip" and the "Trip" tests.

Proceed with the following steps to perform a "Trip" or a "Non-Trip" test:

Step 1: Use the ***Up*** or ***Down*** pushbuttons to move to the ***Test*** display menu (Figure **4-18**).

Step 2: Use the ***Select*** pushbutton to enter the ***Test*** menu. The display will ask for a security password. Use the ***Up*** or ***Down*** pushbuttons to arrive at a valid password. As previously mentioned, the factory programmed password is **10000**.

Step 3: Use the ***Select*** pushbutton to enter the valid password. Once the password is accepted, ***Phase*** will appear in the ***Function Display*** (Figure **4-19**). A choice is now offered between a ***Phase*** or a ***Ground*** test.

Step 4: Use the ***Up*** or ***Down*** pushbuttons to display the type of test desired, ***Phase*** or ***Ground***.

Step 5: Once ***Phase*** or ***Ground*** has been selected and is correctly displayed, use the ***Next*** pushbutton and ***Trip*** will be displayed (Figure **4-20**). A choice is now offered between a ***Trip*** or a ***Non-Trip*** test.

Step 6: Use the ***Up*** or ***Down*** pushbuttons to display the type of test desired, ***Trip*** or a ***Non-Trip***.

Step 7: Once ***Trip*** or a ***Non-Trip*** has been selected and is correctly displayed, use the ***Next*** pushbutton and the magnitude of the test current in amperes is displayed (Figure **4-21**).

Step 8: Use the ***Up*** or ***Down*** pushbuttons to arrive at the desired magnitude of test current.

Step 9: Once the desired magnitude of test current is displayed, use the ***Select*** and ***Next*** pushbuttons simultaneously to activate the test. The test will be performed as programmed and the test time in seconds will be displayed (Figure **4-22**). Testing is now completed. It should be noted that the mimic time-current curve will appropriately indicate the test, the ***Alarm LED*** will be lit red, and the ***Cause of the Trip LED*** on the trip unit will be lit red.

Step 10: Use the ***Escape*** pushbutton and ***Tripped*** will appear in the ***Function Display*** blinking (Figure **4-23**). This indicates that alarm infor-

mation is stored in memory for the test just concluded.

Step 11: Use the ***Select*** pushbutton and the following tripped information for the just completed test will scroll across the ***Function Display:***

- Protective function causing the trip
- Magnitude of trip current for each phase, ground and neutral, as appropriate
  - Date of the trip
- Time of the trip

Once the information is complete, ***Tripped*** is once again displayed. Keep in mind that this alarm can be cleared through the simultaneous use of the ***Raise*** and ***Lower*** pushbuttons.

Step 12: Use the ***Escape*** pushbutton and ***Function Display*** returns to ***Test***.

Notice: *Basic protection functions are not affected during the performance of testing procedures.*

Testing will not be permitted to proceed if there is greater than 0.4 per unit of current flowing on a phase circuit or 0.2 per unit of current on a ground circuit. The maximum permitted current value can be determined by multiplying the appropriate per unit value (0.4 or 0.2) times the ampere rating of the installed rating plug.

SECTION 5: INSTALLATION, STARTUP AND TESTING

5-1 INTRODUCTION

This section describes mounting, wiring, startup and miscellaneous testing details associated with the Breaker Interface Module. Earlier sections, especially Sections 1 and 2, should be reviewed prior to installing the Breaker Interface Module.

WARNING

INSURE THAT ANY INCOMING AC POWER SOURCES ARE TURNED OFF AND LOCKED OUT BEFORE PERFORMING ANY WORK ON THE BREAKER INTERFACE MODULE OR ITS ASSOCIATED EQUIPMENT. FAILURE TO OBSERVE THIS PRACTICE COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.

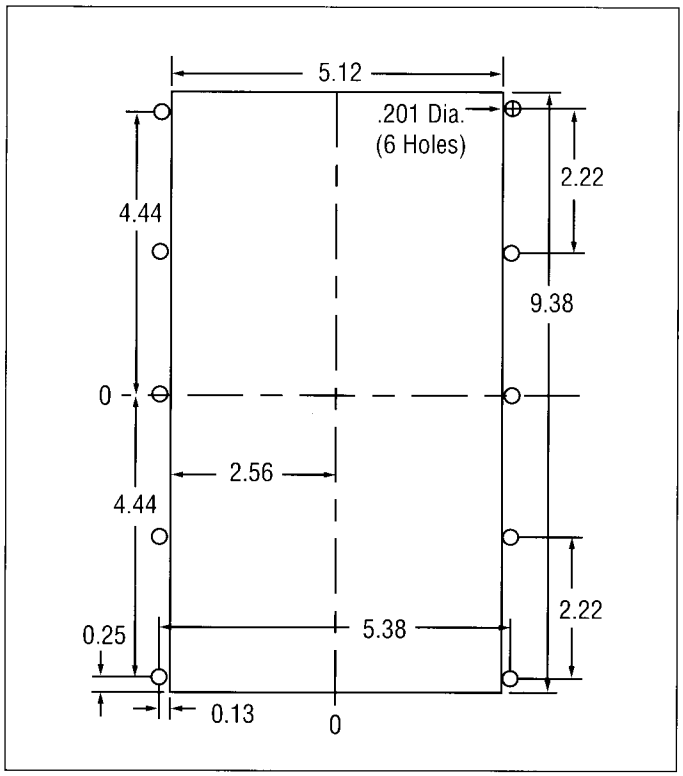


Figure 5-1 Cutout Dimensions and Drilling Pattern (inches)

5-2 PANEL PREPARATION

Panel preparation and mounting of the Breaker Interface Module is described for a standard flush mounted installation.

5-2.1 CUTOUT

Since the Breaker Interface Module is typically mounted on an enclosure door, it is necessary to prepare a cutout in which it will be placed. The dimensions for this cutout along with mounting hole locations are shown in Figure **5-1**. Note that the Breaker Interface Module has ten mounting holes. Normally the top, bottom and center holes are used for a standard installation. If the installation is to be in a NEMA 3R or 4 enclosure, additional mounting holes are provided so that uniform pressure can be maintained on a gasket all the way around the unit.

Before actually cutting the panel, be sure that the required 3-dimensional clearances for the device's chassis allow mounting in the desired location. Breaker Interface Module dimensions with and without a Communication Module (PONI) are shown in Figure **5-2**.

It is necessary to hold the tolerance shown when making the cutouts and placing the holes for the mounting screws. In particular, the horizontal dimensions between the center of the mounting holes and the vertical edge of the cutout must be within 0 and +0.050 inch (0.13 cm).

5-2.2 MOUNTING

Do not use a tap on the face of the Breaker Interface Module since this will remove excessive plastic from the holes. This will result in less threaded material to secure the unit to its mounting panel.

Place the Breaker Interface Module through the cutout in the panel. Be sure the Operator Panel faces outward. Use the #10 x 0.375 inch Hilo Pan Head screws included with the unit to mount it on a single-thickness panel. Be sure to start the screws from INSIDE THE PANEL, so they go through the metal first.

5-2.3 MISCELLANEOUS MOUNTING DETAILS

When field installing a Communications Module (PONI), carefully follow all the installation instructions supplied with the PONI. In addition, be certain that ***DIP Switch 6*** is set as specified in Table **5.1**.

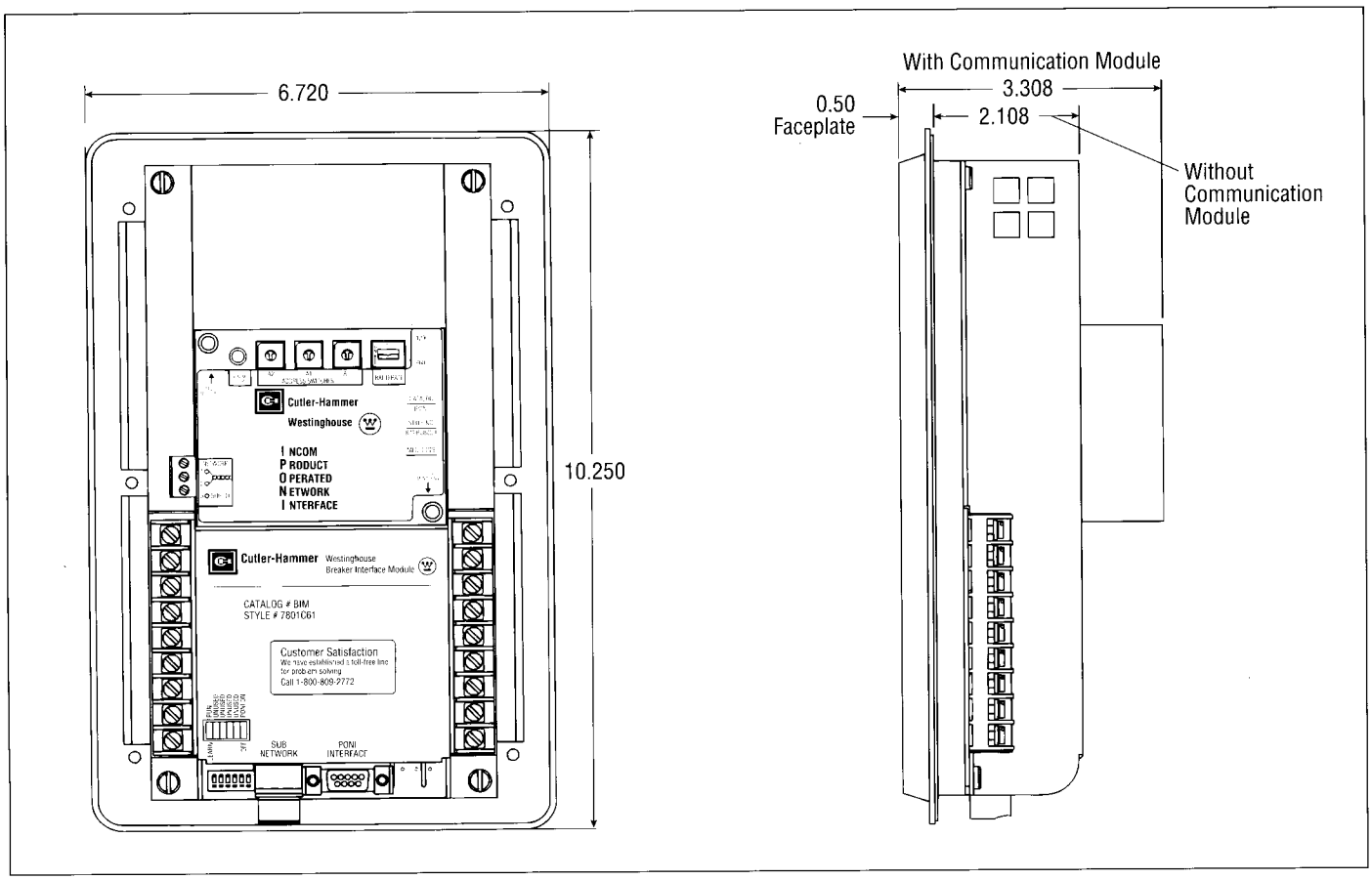


Figure 5-2 *Breaker Interface Module Dimensions (inches)*

5-3 WIRING

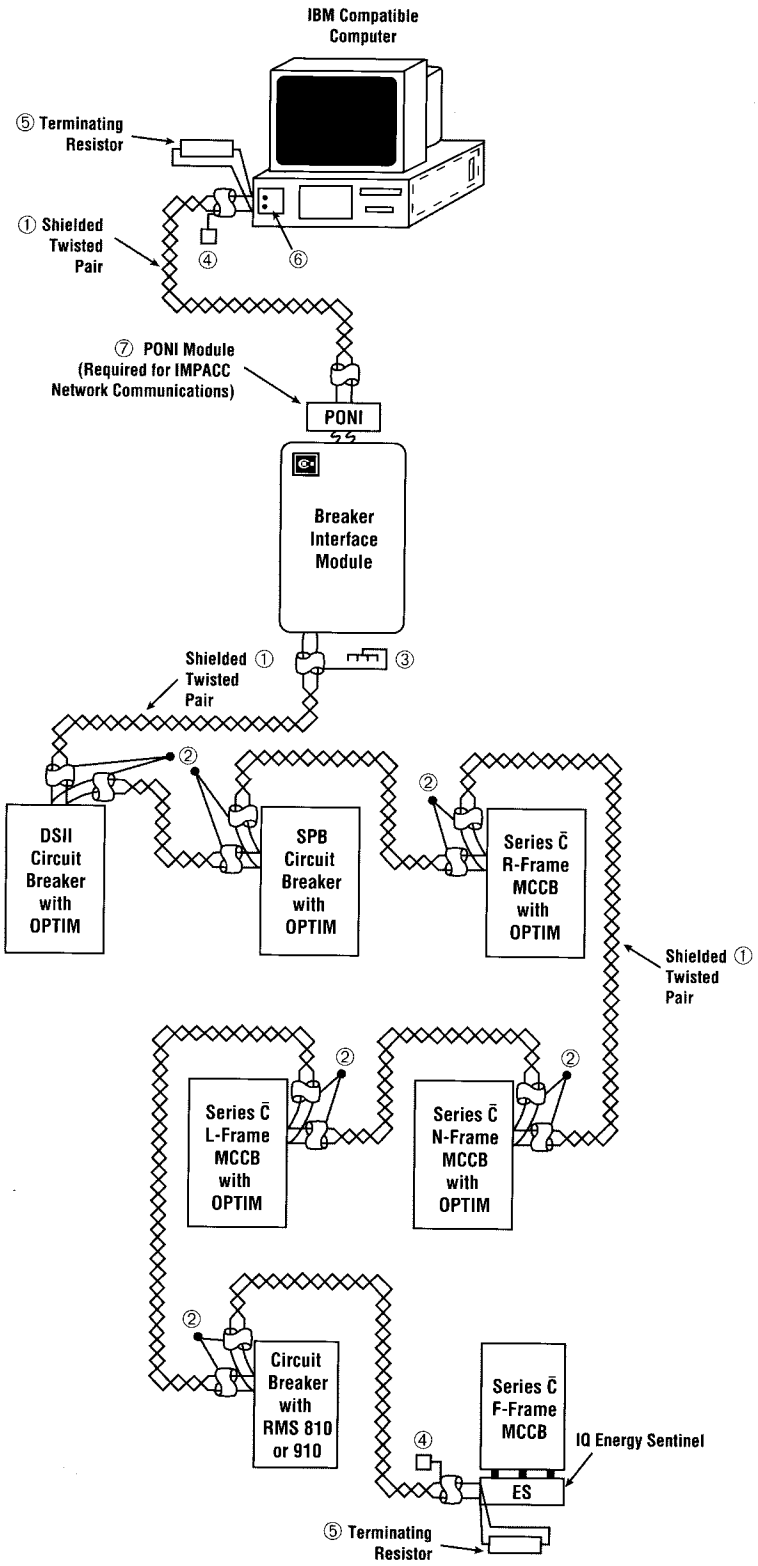
Wiring of the Breaker Interface Module should follow a suitable wiring plan drawing. The phrase "wiring plan drawing" refers to the drawing or drawings made for the specific application. It describes all electrical connections between the Breaker Interface Module and external equipment. This drawing is the responsibility of the user or OEM. A network wiring diagram can also be helpful for sub-network and network systems (Figure **5-3**). The Breaker Interface Module rear connections/DIP switch diagram (Figure **5-4**) will assist with the creation of a wiring plan drawing.

The following general considerations should be complied with during the wiring process:

1. All wiring must conform to applicable Federal, State and Local codes.
2. Wires to the terminal blocks must not be larger than AWG No. 14. Larger wire will not connect properly to the terminal blocks.
3. Terminal blocks have No. 6-32 sems pressure saddle screws.
4. Wiring diagram relay contacts are shown in their de-energized position.
5. The Breaker Interface Module chassis must be connected to ground. A good low impedance chassis ground is essential for proper functioning.

5-4 INITIAL STARTUP

This information is intended to be used when first applying control power to the Breaker Interface Module.



① For network interconnection cable, use Belden 9463 or Cutler-Hammer IMPCABLE.

② When interconnecting devices, tie shield drain wires together for shield path continuity.

③ Connect the shield path to a solid earth ground at one point only.

④ On last device in network, tape shield drain wire back upon cable.

⑤ Use a 1/2 watt carbon or metal film resistor at each end of the network as an end of line termination resistor (EOLTR). EOLTR should be 100 ohms for 9600 baud communication rate networks or 150 ohms for 1200 baud communication rate networks.

⑥ Network interconnection to computer requires use of an IMPACC master (CONI or MINT).

⑦ Devices without built-in communications require network interface module (PONI).

For detailed network wiring specifications, call the automatic fax retrieval system (FRED) at 412/494-3745 and request document 17513 or contact the Advanced Products Support Center. Refer to the paragraph entitled "Technical Assistance" in this document.

Figure 5-3 Typical Network Wiring Diagram

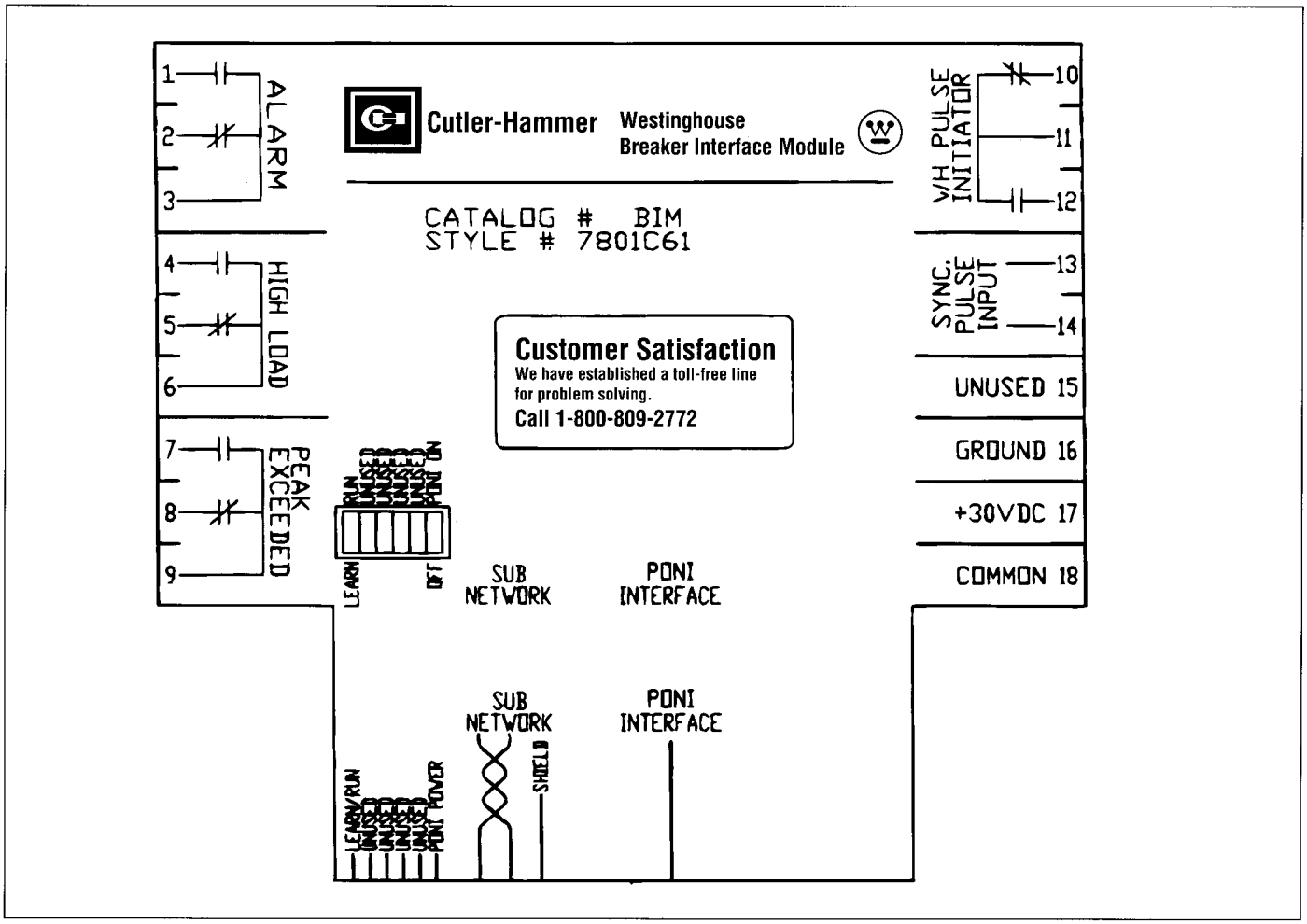


Figure 5-4 Connections and DIP Switch Rear Label Diagram

5-4.1 BEFORE POWER APPLICATION

WARNING

STARTUP PROCEDURES MUST BE PERFORMED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE IQ ANALYZER AND ITS ASSOCIATED ELECTRICAL AND/OR MECHANICAL EQUIPMENT. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN PERSONAL INJURY, DEATH AND/OR EQUIPMENT DAMAGE.

After all installation wiring is complete and before power is applied to the Breaker Interface Module, perform the following:

a. Verify that all wiring is correct as shown on the wiring plan drawing and in keeping with the rear connections and DIP switch diagram (Figure **5-4**).

b. If a field installed PONI Communications Module is to be used, connect it to the Breaker Interface Module with DIP switch 6 in the "Off" (down) position.

c. Always check to be certain that all DIP switches on the back of the unit are set in keeping with Table **5.1**.

5-4.2 INITIAL POWER APPLICATION

a. Apply control power to the Breaker Interface Module using a compatible 30 Vdc, 400 ma assembly mounted power supply or a Breaker Interface Module

Table 5.1 Operational DIP Switch Settings

Switch	UP Position	Down Position
1	Run Mode - Normal switch position once the Breaker Interface Module has learned the identity of connected devices.	Learn Mode - Switch position during initial power application to the Breaker Interface Module or during the use of the ***Update*** feature of the ***System*** display menu.
2, 3, 4 and 5	Unused	Unused
6	Switch position when a PONI is used to communicate over an IMPACC network. ("On" position)	Switch position when PONI is not being used for communications, or when PONI is being installed or removed from the Breaker Interface Module. ("Off" position)
Note: *Refer to Paragraph 2-3.1 for additional information.*		

mounted power supply. Refer to Table **2.1** for exact power supply information and requirements.

b. The ***Operational*** LED will blink green indicating a good operational status and Cutler-Hammer will be briefly displayed. If the ***Operational*** LED is not lit or is on continuously, a problem is indicated. Remove power from the Breaker Interface Module and refer to the Troubleshooting Guide (Table **6.1**).

c. To proceed beyond this point, refer to operational instructions presented in Section 4 to configure and setup particular devices.

SECTION 6: TROUBLESHOOTING AND MAINTENANCE

6-1 LEVEL OF REPAIR

This manual is written based on the assumption that only unit-level troubleshooting will be performed. If the cause of a malfunction is traced to a Breaker Interface Module, the device should be replaced. The malfunctioning device should be returned to Cutler-Hammer.

6-2 TROUBLESHOOTING

Refer to Table **6.1** for troubleshooting guidelines.

6-3 REPLACEMENT

Follow these procedural steps to replace the Breaker Interface Module.

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 Breaker Interface Module, lock it out to guard against other personnel accidentally turning it on.

Step 2: Verify that all power sources wired to the Breaker Interface Module are deenergized. These may also be present on the relay and input/output terminal block.

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

CAUTION

SUPPORT THE BREAKER INTERFACE MODULE FROM THE FRONT SIDE WHEN THE SCREWS ARE LOOSENED OR REMOVED IN STEP 6. WITHOUT SUCH SUPPORT, THE UNIT COULD FALL OR THE PANEL COULD BE DAMAGED.

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

Step 7: Carefully lay the screws aside for later use.

Step 8: Mount the replacement unit. Read paragraph 5-2.2 before attempting this.

Step 9: Reverse the procedure just outlined in Steps 4 through 6.

Step 10: 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 11: Restore control power. Refer to paragraphs 5-4.2 entitled "Initial Power Application."

6-4 MAINTENANCE AND CARE

The Breaker Interface Module is designed to be a self contained and maintenance free device.

The Breaker Interface Module 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. Store the device in its original packing material.

6-5 RETURN PROCEDURE

The Troubleshooting Guide (Table **6.1**) is intended for service personnel to identify whether a problem being observed is external or internal to the device. If a problem is determined to be internal, the device should be returned to the factory for replacement. To have a Breaker Interface Module returned, contact your local Cutler-Hammer authorized distributor.

6-6 TECHNICAL ASSISTANCE

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

Table 6.1 Troubleshooting Guide (Continued on next page)

Symptom	Probable Cause	Possible Solution(s)	Reference
All Operator Panel LEDs are off	Control Power is deficient or absent	Verify Control Power is connected properly	Section 5-4.2
	DIP switches are set incorrectly	Verify DIP switch settings	Section 2-3.1, Table 5.1
	Unit is malfunctioning	Replace the unit	Section 6-3
Operational LED is not blinking green	Unit is malfunctioning	Replace the unit	Section 6-3
	DIP switches are set incorrectly	Verify DIP switch settings	Section 2-3.1, Table 5.1
Displays are not showing valid messages	DIP switches are set incorrectly	Verify DIP switch settings	Section 2-3.1, Table 5.1
"NO DEVICES FOUND" is displayed after "LEARN" was performed	Break in the Subnetwork Communications Wiring	Ensure subnetwork wiring is correct	Figure 1-2
	Devices on subnetwork are out of BIM address range	Use OPTIMizer to reprogram OPTIM breaker address	I.B. 29C892, Section 3-5
		Change the Digitrip 810/910 Address with the front panel controls	I.L 29-888 Digitrip 810 Trip Unit or I.L. 29-889 Digitrip 910 Trip Unit
		Reset the IQ Energy Sentinel Address by changing the DIP switches on the front of the unit	I.L. 17537, F Frame Energy Sentinel I.L. 17538, J Frame Energy Sentinel I.L. 17539, K Frame Energy Sentinel I.L. 17540, Univ. Energy Sentinel Internal I.L. 17541, Univ. Energy Sentinel External
Some devices on subnetwork were not found by BIM	Break in subnetwork communications wiring to those devices	Ensure subnetwork wiring to those devices is correct	Figure 1-2
	Device on subnetwork is at a different BAUD Rate Note: IQ Energy Sentinels operate at 9600 BAUD ONLY	Use OPTIMizer to reprogram OPTIM BAUD Rates	I.B. 29C892, Section 3-5
		Change Digitrip 810/910 BAUD Rate with front panel controls	I.L. 29-888 Digitrip 810 Trip Unit or I.L. 29-889 Digitrip 910 Trip Unit
	Devices on subnetwork are out of BIM address range	Use OPTIMizer to reprogram OPTIM breaker addresses	I.B. 29C892, Section 3-5
		Change the Digitrip 810/910 Address with the front panel controls	I.L. 29-888 Digitrip 810 Trip Unit or I.L. 29-889 Digitrip 910 Trip Unit
		Reset the IQ Energy Sentinel Address by changing the DIP switches on the front of the unit	I.L. 17537, F Frame Energy Sentinel I.L. 17538, J Frame Energy Sentinel I.L. 17539, K Frame Energy Sentinel I.L. 17540, Univ. Energy Sentinel Internal I.L. 17541, Univ. Energy Sentinel External

Table 6.1 Troubleshooting Guide (Continued from previous page)

Symptom	Probable Cause	Possible Solution(s)	Reference
NO RESPONSE LED is on solid or blinking	One or more subnetwork devices are not responding	Ensure subnetwork wiring to that device is correct. Verify the unit is powered and operational	Figure 1-2
Alarm LED is on solid, Alarm relay is energized	One or more of the subnetwork devices is in an alarm mode	Use ALARMS menu to determine the source of the alarm. Acknowledge or delete the alarm	Section 4-4.6
High Load LED is on solid, High Load relay is energized	One or more of the subnetwork devices is in high load	Use ALARMS menu to determine the source of the alarm. Acknowledge or delete the alarm	Section 4-4.6
Master Network Communications is not occurring	PONI Communications module is not installed	Install a PONI Communications Module	Section 2-5, Figure 2-4
	PONI Communications module does not have power applied	Apply power to PONI using DIP switch	Section 2-3.1, Table 5.1
	PONI Communications module is configured improperly. Wrong address or baud rate	Configure PONI to match communications method for existing network	I.L. 17547, IPONI I.L. 17361, BPONI I.L. 17203, Modem PONI I.L. 17202, RS-232 PONI
	PONI failure	Replace the PONI	Section 2-5, Figure 2-4
Cannot capture harmonic information from device on subnetwork	Harmonics are not supported for that device. Digitrip 810 and Digitrip OPTIM 750 devices do not support harmonics	Analyze harmonics on breakers that support harmonic capture	Section 4-5
User does not know the password	Requires technical assistance	Contact Advanced Product Support Center	Section 6-6
"REJECTED" message is displayed after setpoints were programmed	Communications error	Retry the Downioad Operation	Section 4-4.4

APPENDIX A - INSTRUCTIONAL REFERENCES

A list of instructional references is provided in Table **A.1** to identify instructional documents that could be of assistance.

Table A.1 Instructional References (continued on next page)

DOCUMENT DESCRIPTION	DOCUMENT NUMBER
Circuit Breakers	
Series C L-Frame Frame Book	IL 29-120L
Series C N-Frame Frame Book	IL 29-120N
Series C R-Frame Frame Book	IL 29-120R
Series C R-Frame Supplement	IL 29C713
SPB Systems Pow-R Breaker Supplement	IL 29849
DSII/DSLII Breaker Supplement	IL 8700C39
Digitrip OPTIM Trip Unit System	
OPTIM Trip Unit System Overview	IB 29C890
OPTIM Trip Units	IB 29C891
OPTIMizer Hand Held Programmer	IB 29C892
Breaker Interface Module	IB 29C893
Digitrip RMS Trip Units	
Digitrip RMS 810	IL 29-888
Digitrip RMS 910	IL 29-889
Digitrip OPTIM Wiring Diagrams	
Series C L-Frame Wiring	IL 29C894
Series C N-Frame Wiring	IL 29C894
Series C R-Frame Wiring	IL 29C714
SPB Systems Pow-R Wiring	IL 15545
DSII/DSLII Wiring	IL 1A33600
Energy Monitoring Devices	
IQ Energy Sentinel	
Series C F-Frame	IL 17537
Series C J-Frame	IL 17538
Series C K-Frame	IL 17539
Universal IQ Energy Sentinel	
Internal	IL 17540
External	IL 17541
Communication Devices	
Communications Module (PONI)	
INCOM PONI	IL 17547
RS-232 PONI	IL 17202
Modem PONI	IL 17203
Buffered PONI	IL 17361
CONI	IL 17436
IMPACC Wiring Spec.	IL 17513

Table A.1 Instructional References (continued from previous page)

DOCUMENT DESCRIPTION	DOCUMENT NUMBER
Accessories	
Potential Transformer Module (L and N-Frame)	29C126
Ground Fault Indicator	1259C14G01
Digitrip OPTIM Time-Current Curves	
Series C̄ L-Frame Curves	
I^2t Long & Short Delay Phase	SC-6323-96
I^2t Long & Flat Short Delay Phase	SC-6324-96
I^4t Long & Flat Short Delay Phase	SC-6325-96
600A Instantaneous & Override Phase	SC-6326-96
400A Instantaneous & Override Phase	SC-6327-96
250A Instantaneous & Override Phase	SC-6328-96
125A Instantaneous & Override Phase	SC-6329-96
Ground Fault Protection	SC-6330-96
Series C̄ N-Frame Curves	
I^2t Long & Short Delay Phase	SC-6331-96
I^2t Long & Flat Short Delay Phase	SC-6332-96
I^4t Long & Flat Short Delay Phase	SC-6333-96
Instantaneous & Override Phase	SC-6334-96
Ground Fault Protection	SC-6335-96
Series C̄ R-Frame Curves	
1600/2000A I^2t Long & Short Delay Phase	SC-6336-96
1600/2000A I^2t Long & Flat Short Delay Phase	SC-6337-96
1600/2000A I^4t Long & Flat Short Delay Phase	SC-6338-96
2500A I^2t Long & Short Delay Phase	SC-6339-96
2500A I^2t Long & Flat Short Delay Phase	SC-6340-96
2500A I^4t Long & Flat Short Delay Phase	SC-6341-96
1600A Instantaneous & Override Phase	SC-6342-96
2000A Instantaneous & Override Phase	SC-6343-96
2500A Instantaneous & Override Phase	SC-6344-96
1600A Ground Fault Protection	SC-6345-96
2000A Ground Fault Protection	SC-6346-96
2500A Ground Fault Protection	SC-6347-96
SPB Systems Pow-R Curves	
400-1200A I^2t Long & Short Delay Phase	SC-6348-96
400-1200A I^2t Long & Flat Short Delay Phase	SC-6349-96
400-1200A I^4t Long & Flat Short Delay Phase	SC-6350-96
1600-3000A I^2t Long & Short Delay Phase	SC-6351-96
1600-3000A I^2t Long & Flat Short Delay Phase	SC-6352-96
1600-3000A I^4t Long & Flat Short Delay Phase	SC-6353-96
4000-5000A I^2t Long & Short Delay Phase	SC-6354-96
4000-5000A I^2t Long & Flat Short Delay Phase	SC-6355-96
4000-5000A I^4t Long & Flat Short Delay Phase	SC-6356-96
400-1200A Instantaneous & Override Phase	SC-6357-96
1600-3000A Instantaneous & Override Phase	SC-6358-96
4000-5000A Instantaneous & Override Phase	SC-6359-96
Ground Fault Protection	SC-6360-96
DSII/DSLII Curves	
400-1200A I^2t Long & Short Delay Phase	SC-6275-95
400-1200A I^2t Long & Flat Short Delay Phase	SC-6276-95
400-1200A I^4t Long & Flat Short Delay Phase	SC-6277-95
1600-5000A I^2t Long & Short Delay Phase	SC-6278-95
1600-5000A I^2t Long & Flat Short Delay Phase	SC-6279-95
1600-5000A I^4t Long & Flat Short Delay Phase	SC-6280-95
400-1200A Instantaneous & Override Phase	SC-6281-96
1600-5000A Instantaneous & Override Phase	SC-6282-96
Ground Fault Protection	SC-6283-96

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