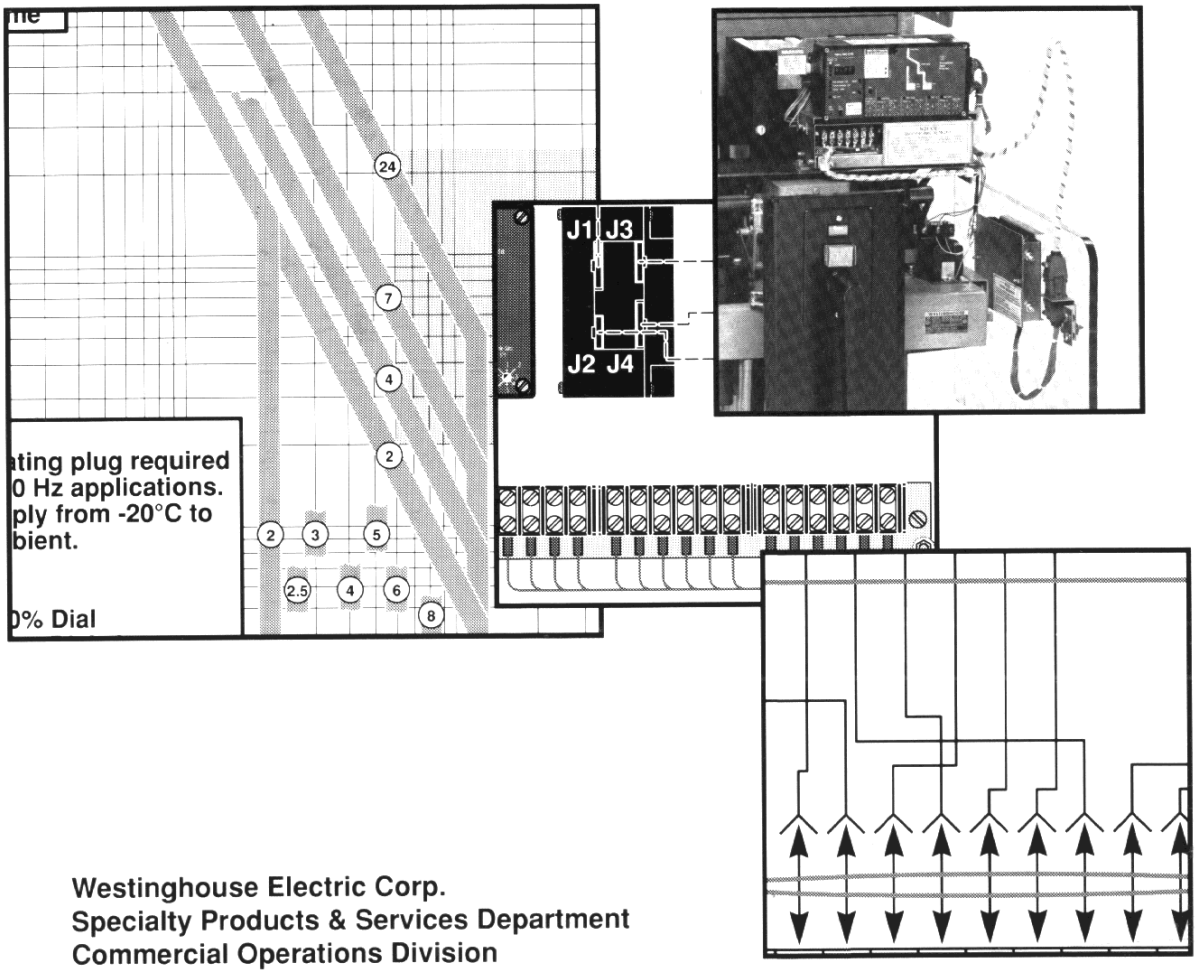
AD-33-855
July 1992

Instructions for the Application of Digitrip RMS Retrofit Kits on Power Circuit Breakers



Westinghouse Electric Corp.
Specialty Products & Services Department
Commercial Operations Division
Distribution & Control Business Unit
Five Parkway Center
Pittsburgh, PA 15220

Supersedes AD33-855 – July 1991

AD33-855

Instructions for the Application of Digitrip RMS Retrofit Kits on Power Circuit Breakers

Westinghouse Electric Corporation
Distribution and Control Business Unit
Five Parkway Center
Pittsburgh, Pennsylvania 15220

Table of Contents

Section 1 General Information and Safety Precautions

1-1. Safety Precautions
1-2. Introduction
1-3. Warranty Disclaimer and Liability Limitation

Section 2 Digitrip RMS Retrofit Kits, Rating Plugs, and Accessories

2-1. Digitrip RMS Retrofit Kits
2-2. Retrofit Kit Installation Requirements
2-3. Digitrip RMS Retrofit Kit Accessories

Section 3 The Digitrip RMS Trip System

3-1. Digitrip RMS Overcurrent Protection
3-2. Current Sensors (& Sensor Wiring Harness)
3-3. Auxiliary CT Module (& Aux CT Harness)
3-4. Digitrip RMS/R Trip Unit (& Power Relay Module, ATR)
3-5. Making Current Release (Discriminator)
3-6. Digitrip RMS Direct Trip Actuator (DTA) (& Auxiliary Switch Kit)
3-7. Digitrip RMS/R Rating Plug and Battery
3-8. External Harness With Plug
3-9. Potential Transfer Module (PTM)
3-10. Cell Harness Assembly

Section 4 Digitrip RMS 500 Basic Retrofits Kits *(Without Zone Interlocking)*

4-1. Digitrip RMS 500 Basic Retrofit Kit Selection & Content
4-2. Digitrip RMS 500 Basic Retrofit Kit Features

Section 5 Digitrip RMS 500 Retrofit Kits *(With Zone Interlocking)*

5-1. Digitrip RMS 500 Retrofit Kit (With Zone Interlocking) Selection & Content
5-2. Digitrip RMS 500 Retrofit Kit (With Zone Interlocking) Features

Section 6 Digitrip RMS 600 Retrofit Kits

6-1. Digitrip RMS 600 Retrofit Kit Selection & Content
6-2. Digitrip RMS 600 Retrofit Kit Features

Section 7 Digitrip RMS 700 & 800 Retrofit Kits

7-1. Digitrip RMS 700 & 800 Retrofit Kit Selection & Content
7-2. Digitrip RMS 700 & 800 Retrofit Kit Features

Table of Contents *(continued)*

Section 8 Testing, Checkout, and Settings

8-1. Dielectric and Meggar Testing
8-2. Testing the Digitrip RMS Trip System
8-3. Digitrip RMS Self Testing
8-4. Amptector Test Kit
8-5. Primary Injection Testing
8-6. Circuit Breaker Checkout and Bench Test
8-7. Setting Digitrip RMS INCOM Address (Digitrip RMS Models 700 and 800 Only)
8-8. Identification of Trip Unit, Breaker, and Switchgear Cell

Section 9 Operation

9-1. Breaker Insertion and Removal
9-2. Electrical Closing Via INCOM
9-3. In the Event of a Trip

Section 10 Digitrip RMS Retrofit Kit Switchgear Assembly Applications

10-1. Zone Interlocking
10-2. Remote Alarm Signals and the Power Relay Module (ATR)
10-3. Communications and INCOM

Section 11 Warranty and Service Information

11-1. Preventative Maintenance Program
11-2. Breaker Maintenance
11-3. Warranty Procedure
11-4. Digitrip RMS Trip Unit Warranty

Section 12 Detailed Wiring Information *(Common to all Digitrip RMS/R Kits)*

12-1. Sensor Harness and CT Harness Wiring
12-2. Auxiliary CT Harness Wiring

Section 13 References

List of Figures and Tables

Section 2 Digitrip RMS Retrofit Kits, Rating Plugs, and Accessories
Table 2-1 Digitrip Rating Plugs (50/60 Hz) and Their Coordination with Sensor Connections
Table 2-2 Digitrip RMS Retrofit Kit Accessories

Section 3 The Digitrip RMS Trip System
Figure 3-1 Digitrip Retrofit Systems
Figure 3-2 Digitrip RMS/R Long Time/Instantaneous Time-Current Curve (LI)
Figure 3-3 Digitrip RMS/R Long Time/Short Time Time-Current Curve (LS)
Figure 3-4 Digitrip RMS/R Ground Fault Protection Time-Current Curve (G)
Figure 3-5 Digitrip RMS Direct Trip Actuator (DTA)

Section 4 Digitrip RMS 500 Basic Retrofit Kits *(Without Zone Interlocking)*
Figure 4-1 Digitrip RMS 500 Basic Wiring
Figure 4-2 Digitrip RMS 500 Basic External Harness

Section 5 Digitrip RMS 500 Retrofit Kits *(With Zone Interlocking)*
Figure 5-1 Digitrip RMS 500 Wiring
Figure 5-2 Digitrip RMS 500 External Harness
Figure 5-3 Digitrip RMS 500 Cell Harness

Section 6 Digitrip RMS 600 Retrofit Kits
Figure 6-1 Digitrip RMS 600 Wiring
Figure 6-2 Digitrip RMS 600 External Harness
Figure 6-3 Digitrip RMS 600 Cell Harness

Section 7 Digitrip RMS 700 & 800 Retrofit Kits
Figure 7-1 Digitrip RMS 7/800 Wiring
Figure 7-2 Digitrip RMS 7/800 External Harness
Figure 7-3 Digitrip RMS 7/800 Cell Harness
Figure 7-4 Digitrip RMS 7/800 PT Module

Section 9 Operation
Table 9-1
Table 9-2

Section 10 Digitrip RMS Retrofit Kit Switchgear Assembly Applications
Figures10-1 to 10-5

Section 12 Detailed Wiring Information *(Common to all Digitrip RMS/R Kits)*
Figures 12-1 to 12-4

Section 1

General Information and Safety Precautions

1.1 Safety Precautions

The warnings included as part of the procedural steps in this manual are for personnel safety and protection of equipment from damage. An example of a typical warning is shown below to familiarize personnel with the style of presentation. In addition, the following warning applies throughout this manual. It should be read and understood before proceeding.

WARNING

Power circuit breakers are equipped with high speed, high energy operating mechanisms. The built-in interlocks and safety features are intended to provide safe and proper operating sequences. To provide maximum protection for personnel associated with the installation, operation and maintenance of these breakers, the following practices must be followed. Failure to do so may result in death, personal injury or property damage.

1. **Only qualified persons, as defined in the Electrical Code, who are familiar with the installation and maintenance of power circuit breakers and switchgear should perform any work associated with these breakers.**

2. **Completely read and understand these instructions before attempting any installation, operation, maintenance or modification of these breakers.**

3. **Always turn off and lock out the power source feeding the breaker prior to performing any installation, maintenance or modification of a breaker. Failure to do so could result in electrical shock, leading to death, personal injury or property damage.**

4. **Do not perform any maintenance, including breaker charging, closing, tripping or any other function which could cause significant movement of the breaker, while it is on the extension rails. Doing so may cause the breaker to slip from the rails and fall, with the potential to cause severe personal injury to those in the vicinity.**

5. **Do not work on a closed breaker or a breaker with closing springs charged. The breaker may trip open or the charging springs may discharge, causing crushing or cutting injuries.**

6. **Do not use the breaker by itself as the sole means of isolating a high voltage circuit. Remove the breaker to the disconnected position before working on the wiring or equipment downstream from the breaker. Follow all lockout and tagging rules of the National Electrical Code, and all other applicable codes, regulations and work rules.**

7. **Do not leave the breaker in an intermediate position in the cell. Always leave it in the Connected, Test, Disconnected or Withdrawn position. Failure to do so could lead to improper positioning of the circuit breaker and flashover, causing death, serious personal injury and/or property damage.**

8. **Do not defeat any safety interlock. Such interlocks are intended to protect personnel and equipment from damage due to flashover and exposed contacts. Defeating an interlock could lead to death, severe personal injury or property damage.**

9. **All wiring instructions must be followed precisely. Failure to do so could cause permanent equipment damage.**

1-2. Introduction

This application data is provided as a guide, for authorized and qualified personnel only, in the selection and application of Digitrip RMS Retrofit Kits on power circuit breakers.

The information, recommendations, descriptions and safety notations in this document are based on Westinghouse's experience and judgment with respect to retrofitting power circuit breakers. 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 this document. If further information is desired by the purchaser regarding a particular installation, operation or maintenance of his particular equipment, the local Westinghouse Electric Corporation representative should be contacted.

1-3. Warranty Disclamer and Liability Limitation

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

Section 2

Digitrip RMS Retrofit Kits, Rating Plugs, and Accessories

2-1. Digitrip RMS Retrofit Kits

Westinghouse Digitrip RMS Retrofit Kits are available for many types of major manufacturers of Power Circuit Breakers. The Digitrip RMS Retrofit Kits are structures according to the Digitrip RMS/R Trip Unit and the specific overcurrent protective features provided.

The product line begins with the Digitrip RMS 500 Basic Retrofit Kit series. True RMS sensing, basic overcurrent protection, and self-testing features are standard. The overcurrent protection provided is determined by the selected Long Time (L), Short Time (S), Instantaneous (I), and Ground Fault (G) trip functions.

The balance of the Retrofit Kits listed (Digitrip RMS 500, 600, 700, and 800 series), add increasing levels of features to those of the RMS 500 Basic Retrofit Kits and to each other. The features include zone interlocking, digital alphanumeric displays, remote alarm signals, INCOM communications, and energy monitoring capability.

Additional information on the features and content of each Digitrip RMS Retrofit Kit is provided in the Sections 4 through 7 of this application guide.

2-2. Retrofit Kit Installation Requirements

Digitrip RMS Retrofits Kits can be applied to many types of Power Circuit Breakers, provided the breakers are used on 50 to 60 Hz AC distribution systems. Retrofits for fixed-mounted or nondraw-out breakers should be referred to Westinghouse for evaluation.

WARNING

The design and content of the retrofit kit is on the following conditions, which must be addressed by the retrofit kit purchaser, prior to installation. Failure to address these conditions could result in failure of the equipment to operate properly, permanent equipment damage, and, in some instances, personal injury or death:

1. **The maximum rated rating plug is included in the kit.** One 60 Hz rating plug is provided, which does not exceed the breakers' maximum continuous current frame rating. If an alternate rating plug is required for the breaker retrofitted, it can be ordered separately. Table 2-1 provides a complete listing of all rating plugs, including those for 50 Hz application. Rating plugs must coordinate with the breaker sensor tap being used. Together they determine the breaker I_n (continuous current) rating.

2. **Retrofit kits shown with Ground Fault (G) Protection assume a 3-phase 3-wire grounded system.** If the retrofit is for a 4-wire grounded system, the customer must purchase the fourth sensor separately. Also, provisions must be made on the breaker to bring the fourth sensor wiring through the breaker secondary contacts. Secondary contacts and brackets, etc. are not included in the content of the kits.

3. **Digitrip RMS 600, 700, and 800 Retrofit Kits require an External (customer supplied) 120 Vac source** to power the trip unit information functions and alphanumeric digital displays, as applicable.

4. **The breaker must be in good mechanical and electrical operating condition.** Breakers that are not in good operating condition should be repaired, reconditioned, or refurbished in addition to being retrofitted. Refer to Section 11 for general guidelines on breaker preventative maintenance.

Table 2-1

Digitrip Rating Plugs (50 and 60 Hz) and Their Coordination with Sensor Connections

Sensor Ratio	60 Hz Rating Plug Catalog Number & I_n Rating		50 Hz Rating Plug Catalog Number & I_n Rating	
200:5	PR6A02A010	100 Amp	PR5A02A010	100 Amp
	PR6A02A020	200 Amp	PR5A02A020	200 Amp
300:5	PR6A03A020	200 Amp	PR5A03A020	200 Amp
	PR6A03A025	250 Amp	PR5A03A025	250 Amp
	PR6A03A030	300 Amp	PR5A03A030	300 Amp
400:5	PR6A04A020	200 Amp	PR5A04A020	200 Amp
	PR6A04A025	250 Amp	PR5A04A025	250 Amp
	PR6A04A030	300 Amp	PR5A04A030	300 Amp
	PR6A04A040	400 Amp	PR5A04A040	400 Amp
600:5	PR6A06A030	300 Amp	PR5A06A030	300 Amp
	PR6A06A040	400 Amp	PR5A06A040	400 Amp
	PR6A06A060	600 Amp	PR5A06A060	600 Amp
800:5	PR6A08A040	400 Amp	PR5A08A040	400 Amp
	PR6A08A060	600 Amp	PR5A08A060	600 Amp
	PR6A08A080	800 Amp	PR5A08A080	800 Amp
1200:5	PR6A12A060	600 Amp	PR5A12A060	600 Amp
	PR6A12A080	800 Amp	PR5A12A080	800 Amp
	PR6A12A100	1000 Amp	PR5A12A100	1000 Amp
	PR6A12A120	1200 Amp	PR5A12A120	1200 Amp
1600:5	PR6A16A080	800 Amp	PR5A16A080	800 Amp
	PR6A16A100	1000 Amp	PR5A16A100	1000 Amp
	PR6A16A120	1200 Amp	PR5A16A120	1200 Amp
	PR6A16A160	1600 Amp	PR5A16A160	1600 Amp
2000:5	PR6A20A100	1000 Amp	PR5A20A100	1000 Amp
	PR6A20A120	1200 Amp	PR5A20A120	1200 Amp
	PR6A20A160	1600 Amp	PR5A20A160	1600 Amp
	PR6A20A200	2000 Amp	PR5A20A200	2000 Amp
3000:5	PR6A30A160	1600 Amp	PR5A30A160	1600 Amp
	PR6A30A200	2000 Amp	PR5A30A200	2000 Amp
	PR6A30A250	2500 Amp	PR5A30A250	2500 Amp
	PR6A30A300	3000 Amp	PR5A30A300	3000 Amp
4000:5	PR6A40A200	2000 Amp	PR5A40A200	2000 Amp
	PR6A40A250	2500 Amp	PR5A40A250	2500 Amp
	PR6A40A300	3000 Amp	PR5A40A300	3000 Amp
	PR6A40A320	3200 Amp	PR5A40A320	3200 Amp
	PR6A40A400	4000 Amp	PR5A40A400	4000 Amp

NOTES:
1. Sensor tap ratio connected must correspond with the rating plug shown.
2. Breaker current rating shown is adjustable down to 50% of the value listed with Digitrip RMS/R Long Delay Pickup Setting.

2-3. Digitrip RMS Retrofit Kit accessories

Table 2-2 provides a listing of optional accessories that are useful in the installation, maintenance, and operation of your breaker equipped with a Digitrip RMS Retrofit Kit.

Table 2-2

Digitrip RMS Retrofit Kit Accessories

Accessory Description	Accessory Style or Catalog Number	Function
Auxiliary Power Module (APM)	PRTAAPM	Powers Digitrip RMS Trip Unit for testing.
Amptector Test Kit	140D481G02RR or G03	Tests Digitrip RMS Trip Units. Requires Adapter Harness.
Amptector Test Kit Adapter Harness*	6503C53G01 (Type1) or 6503C54G01 (Type 2) and 6503C55G01 (Breaker Mounted Test Plug)	Tests Digitrip RMS Trip Unit with Amptector Test Kit.
Zone Interlock Shorting Plug	6502C83G01	Plugs into RMS/R Trip Unit Plug J2. Shorts Out G_{IN} to G_{OUT} and S_{IN} to S_{OUT} during Trip Unit testing.
Lithium Battery 3.0 Volt	Varta Batteries, Inc. Model CR 1/3N 150 Clarabrook Road Elmsford, NY 10523 Duracell Model DL 1/3N South Broadway Tangtown, NY 10591 (914)-591-7000 Union Carbide Corp. Battery Products Div. Model 2L-76BP Eveready 39 Old Ridgebury Road Danbury, CT 06817-0001 (203)-794-7548	Powers Digitrip LED Mode of Trip Indicators (Back-up Power).

*See Section 8-4.

Section 3

The Digitrip RMS Trip System

3-1. Digitrip RMS Overcurrent Protection

The Digitrip RMS Retrofit Kit styles covered by this Application Guide are designed to replace the existing trip system employed on the breaker selected for retrofitting.

All Digitrip RMS Retrofit Kits provide basic overcurrent protection, which includes a selected combination of Long Time (L), Short Time (S), Instantaneous (I), and Ground Fault Time (G) Delay trip functions. Five major components comprise the Digitrip RMS Trip System; the Current Sensors, Auxiliary CT Module, Digitrip Trip Unit, Rating Plug, and the Direct Trip Actuator (DTA). These components are interconnected by use of the various wiring harnesses to make up the Digitrip RMS Trip System. Breaker interface diagrams for Digitrip RMS 500 through 800 are provided in Sections 4 through 7. These diagrams show the major Digitrip RMS components and their interconnections. Wiring diagrams for each of the wire harnesses are shown in Section 12.

Figure 3-1 shows the major components of the Digitrip retrofit system and their interconnections. The following describes the function and operation of each component.

3-2. Current Sensors

Three multi-tapped current sensors (one per phase) are located at the rear of the breaker. The sensors pass information to the Auxiliary CT Module and the trip unit on the primary current level passing through the breaker. All the energy required to power the Digitrip RMS Trip System is produced by the current sensors.

The current sensors are connected to a terminal block strip on the Auxiliary CT Module by the sensor wiring harness. The current sensor tap ratio connected, in concert with the rating plug, determines the I_n (continuous current) rating of the breaker. At rated primary current, the current sensors provide 5 ampere nominal current inputs to the Auxiliary CT Module.

3-3. Auxiliary CT Module

The Auxiliary CT Module encloses three auxiliary phase current transformers, which reduce the 5 amp nominal inputs from the current sensors to the millampere level required for the Digitrip RMS/R Trip Unit electronics. When ground fault (G) protection is selected, a ground auxiliary current transformer is also provided, which performs the same function.

A 7 point terminal block strip is mounted on the front of the module. Terminals A through G terminate the inputs from the current sensors via the sensor wiring harness. Terminals OP and ON connect the trip signal outputs to the Direct Trip Actuator through the sensor wiring harness or DTA wiring harness. A 12 point female CT plug-in block is mounted on the right hand side of the module, which receives the male plug of the Auxiliary CT harness. The Auxiliary CT harness also has a 10 pin black plug, which plugs into the trip unit to connect the Auxiliary CT inputs to the trip unit and receives the trip unit signal outputs.

3-4. Digitrip RMS/R Trip Unit (and Power Relay Module, ATR)

The Digitrip RMS/R (Rms/R Retrofit) Trip Unit, Figure 3-1, is designed to permit flexibility in retrofit

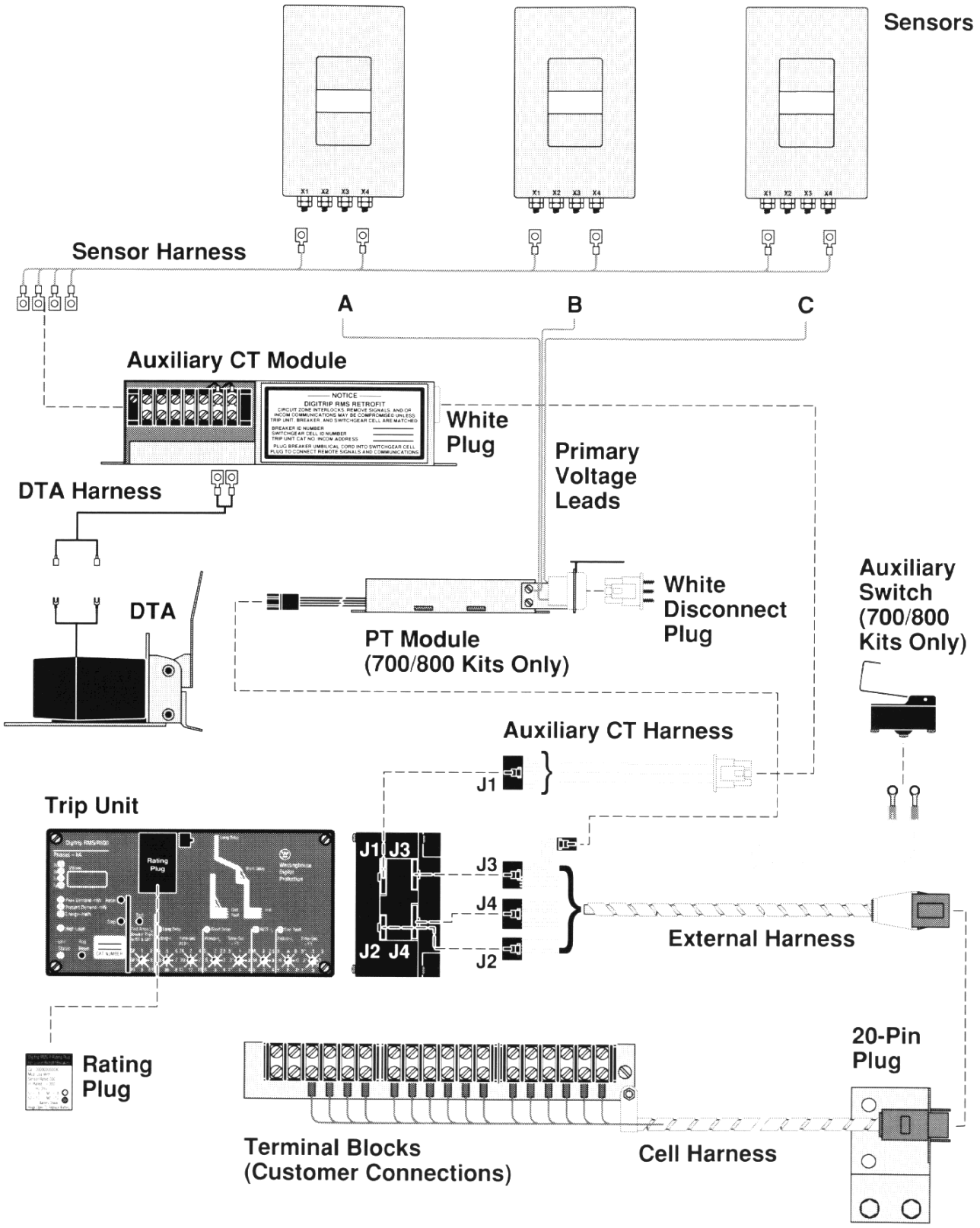


Figure 3-1 — Digitrip Retrofit System

applications. It is a physically repackaged version of the original Digitrip RMS Trip Unit that is used on Westinghouse DS and SPB Breakers. The RMS and RMS/R Trip Units have the same features and options and have identical characteristic curves, adjustments, and electrical performance.

The Digitrip RMS/R Trip Unit is a microprocessor based protective device that provides true RMS sensing means for proper correlation with thermal characteristics on conductors and equipment. Digitrip RMS/R Trip Units are available in four models, RMS/R 500, 600, 700, and 800. These models are available in horizontal or vertical labeling and display orientations.

The Trip Unit includes a female type receptacle, provided to accept a rating plug, which (in concert with the current sensors) determines the I_n (continuous current) rating of the breaker. Adjustable current protective settings are provided for the Long Time (L), Short Time (S), Instantaneous (I), and Ground Fault (G) trip functions selected. Short Time (S) and Ground Fault (G) Delays are equipped with an adjustable setting for a flat or an I^2t response. The adjustable settings are step-type, expressed in terms of the I_n (continuous current) rating of the breaker. LEDs provide mode of trip indications for the L, S, I, and G trip functions. Digitrip RMS/R Trip Units are equipped with multi-pin disconnect plug receptacles, which permit quick connections to the Auxiliary CT harness and (when supplied) the external harness.

The Power Relay Module (ATR) is provided in Digitrip RMS/R Trip Unit models 600 through 800 only. The ATR provides hard contact closures for remote indication of the following trip unit functions:

- High Load (HL) Alarm: The HL contact closes when the current passing through the breaker exceeds 85% of the trip unit long delay pickup setting continuously for more than 40 seconds.
- Long Delay (LD) Trip
- Short Circuit (SC) Trip
- Ground Fault (GF) Trip functions
- INCOM Remote Close (CC1 and CC2) Contact *(RMS/R 700 and 800 trip units only)*

All ATR contacts are rated 1 ampere at 120 Vac 1 ampere at 28 Vdc. These contacts are generally used for illuminating indicator lights or picking up slave relays local to or remote from the breaker/switchgear. A bridge rectifier circuit in the ATR serves to power up (as applicable) to the trip unit alphanumeric display and the INCOM communications logic, when a 120 Vac source is supplied to ATR terminals AC120 and ACCOM.

Digitrip RMS/R Trip Units are equipped with a receptacle to receive the Auxiliary Power Module (APM). The APM is used to supply power to the trip unit self-test system during circuit breaker testing. Adjustable test settings are provided which enable the unit to be tested with or without tripping the breaker.

Figures 3-2 through 3-4 provide the published Digitrip RMS Characteristics Curves for retrofit breakers. Also provided are the available trip unit settings for all trip functions.

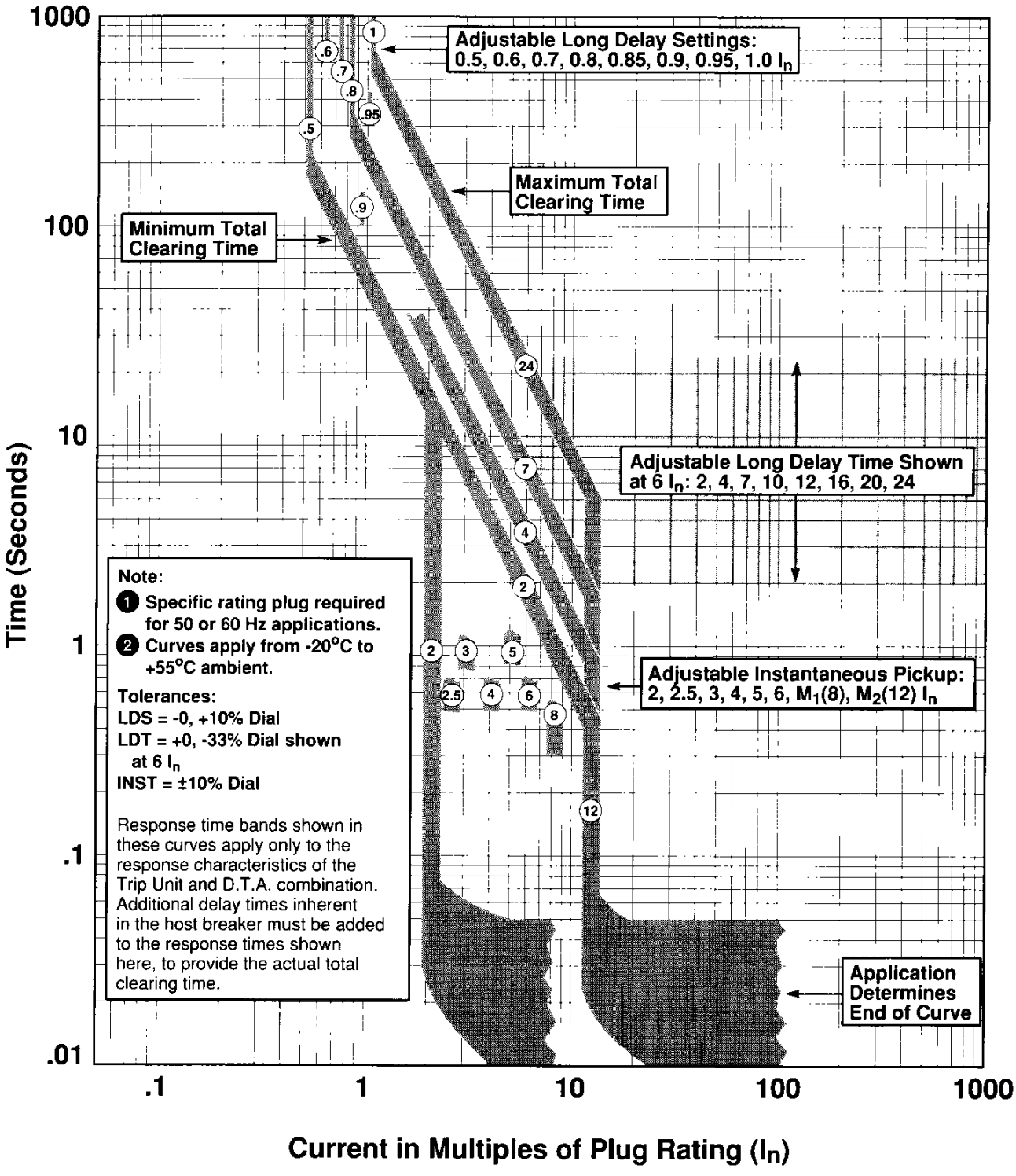


Figure 3-2 — Digitrip RMS/R Long Time/Instantaneous Time-Current Curve (LI)

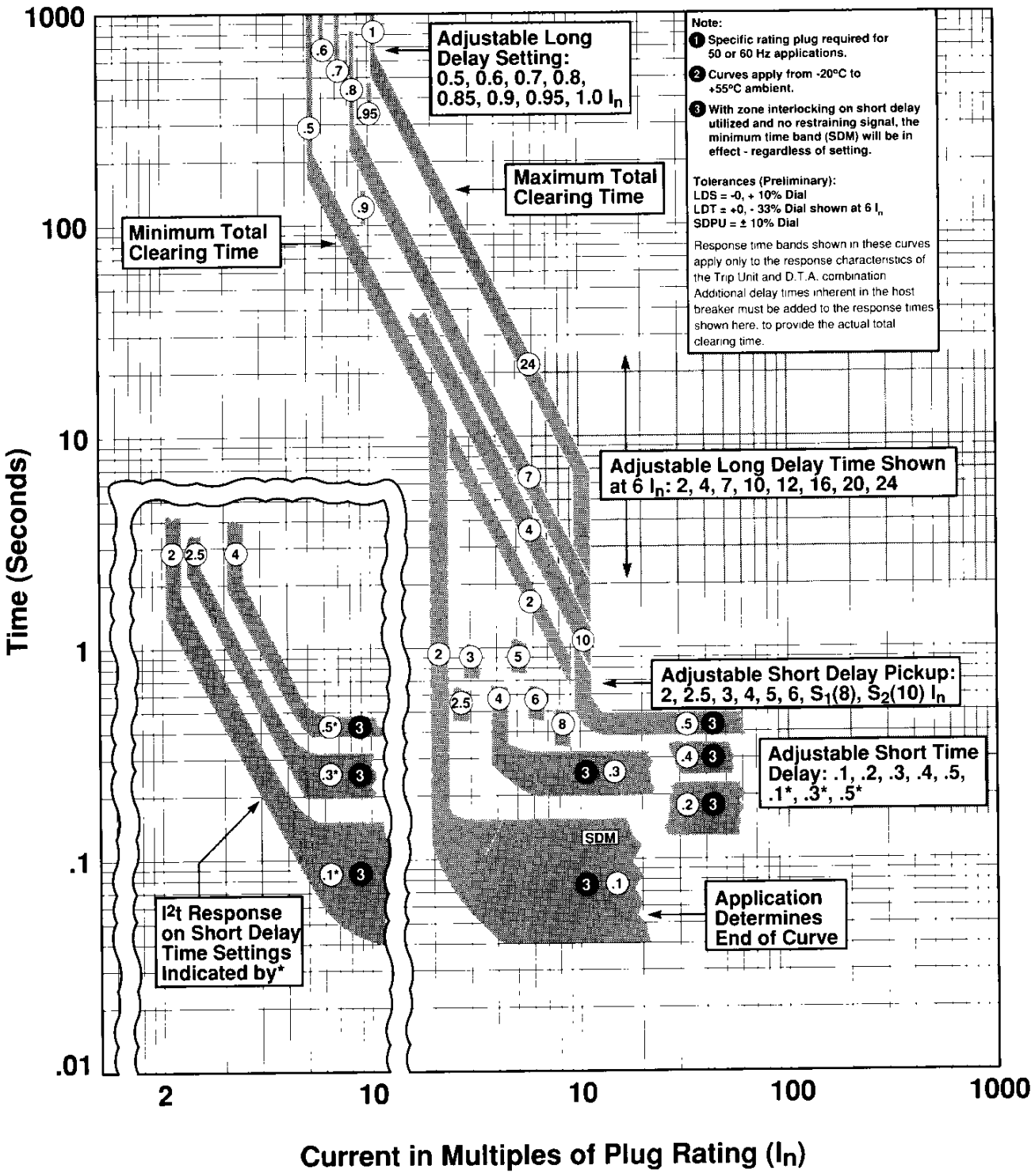


Figure 3-3 — Digitrip RMS/R Long Time/Short Time Time-Current Curve (LS)

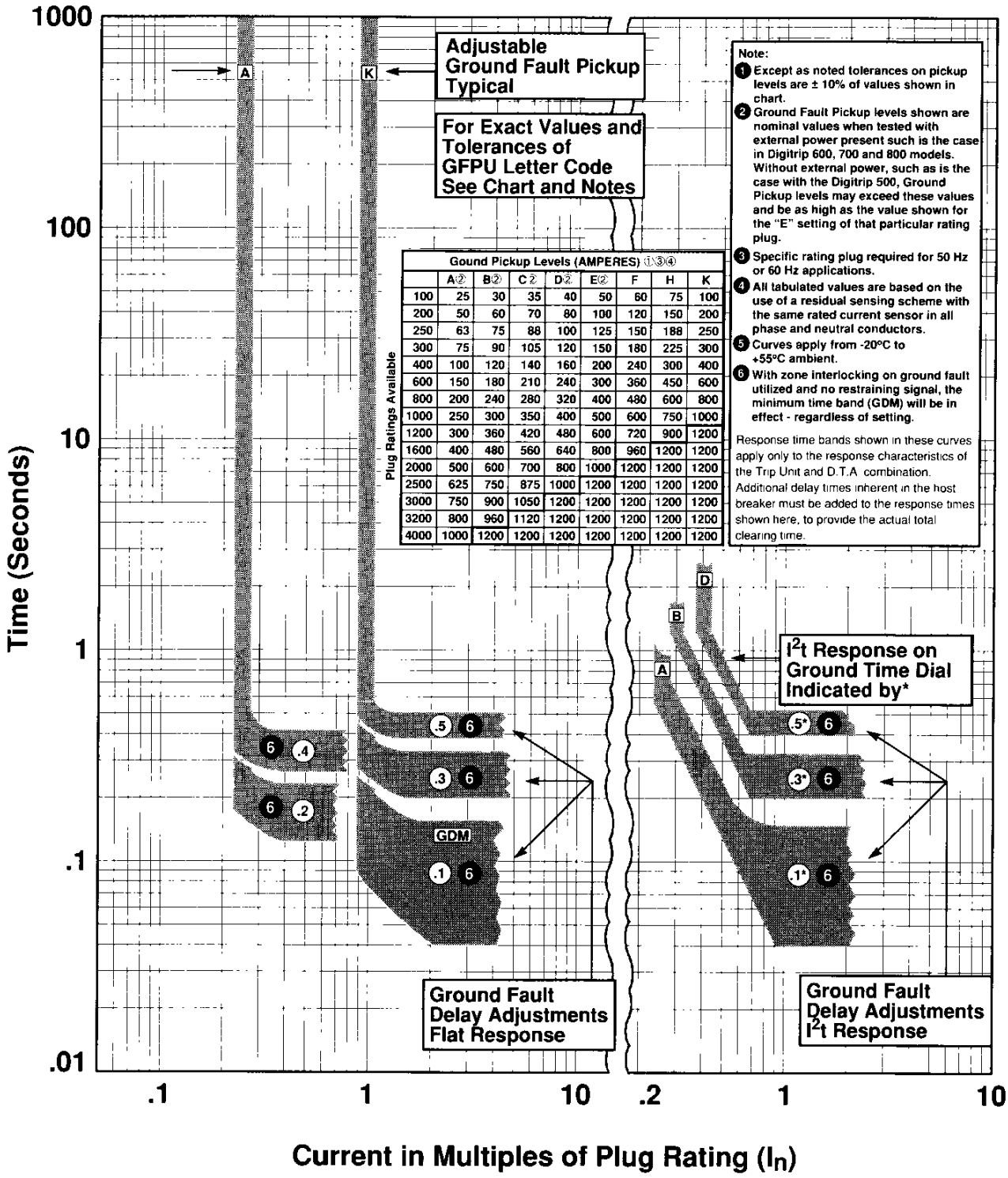


Figure 3-4 — Digitrip RMS/R Ground Fault Protection Time-Current Curve (G)

3-5. Making Current Release (Discriminator)

When the Digitrip RMS 500 Trip Unit is not equipped with an adjustable instantaneous protection setting, i.e., types LS or LSG, a making current release (or discriminator) circuit is provided. This circuit will prevent the circuit breaker from being closed and latched-in on a faulted circuit. The non-adjustable release is pre-set at eleven (11) times the installed rating plug ampere rating (I_n).

The making current release is armed only for the first ten (10) cycles following an initial circuit breaker closing operation with a load current exceeding approximately 20% of the circuit breaker frame or sensor rating. Should the load current through the circuit breaker drop to a value less than this, the release will re-arm. The release, once armed, will remain armed until the load

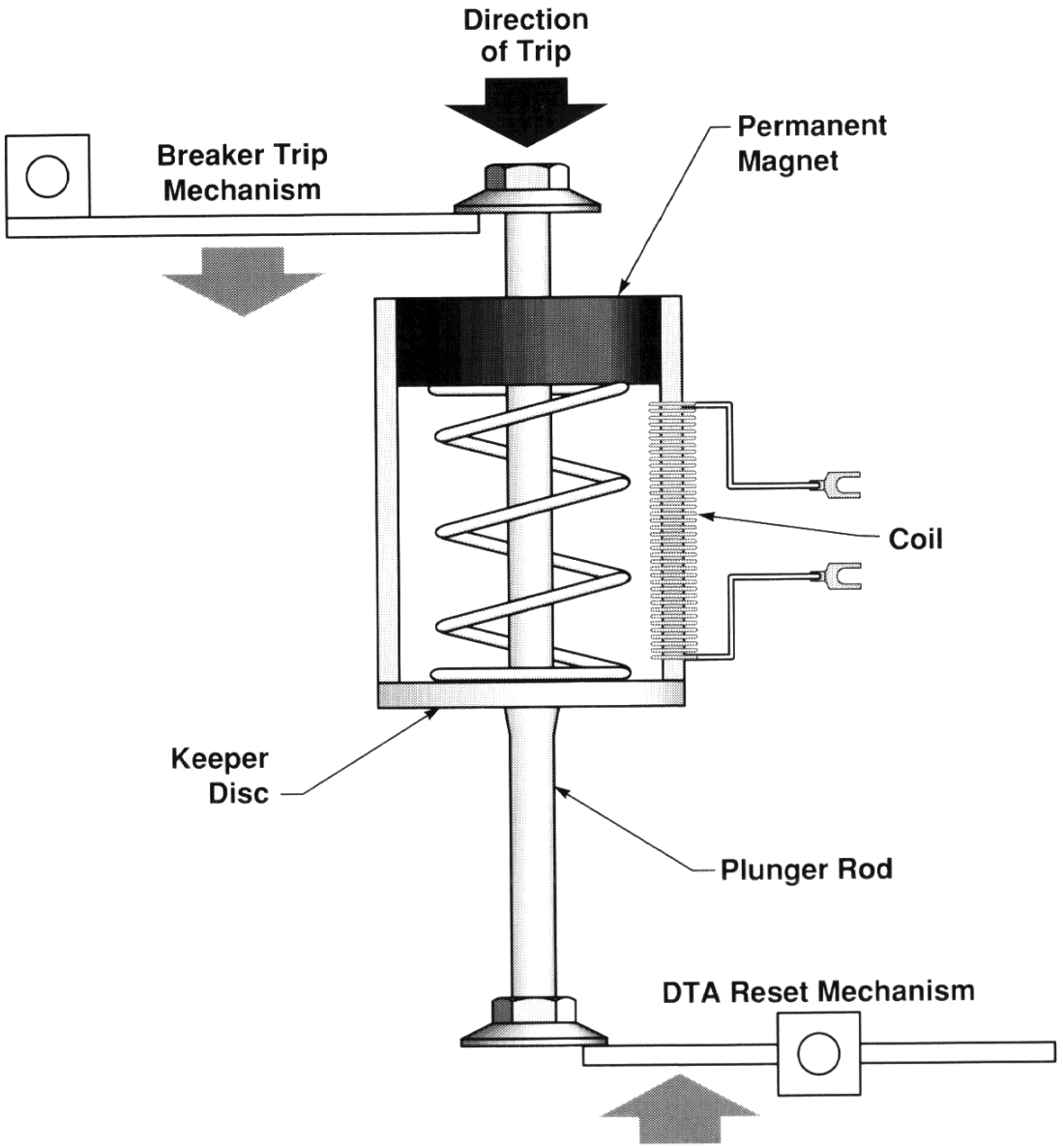


Figure 3-5 – Digitrip RMS Direct Actuator (DTA)

current passing through the circuit breaker exceeds approximately 20% for 10 cycles. Any trip operation initiated by the making current release will trip the circuit breaker instantaneously.

3-6. Digitrip RMS Direct Trip Actuator (DTA) (and Auxiliary Switch Kit)(see Figure 3-5)

The Digitrip RMS Direct Trip Actuator (DTA) receives an electrical trip pulse from the trip unit via the Auxiliary CT Module and provides the mechanical trip force to trip the breaker.

The DTA is made up of a permanent magnet, a disc held by the magnet, a rod acted on by a spring, a means for tripping the breaker, and a reset mechanism for mechanically resetting the actuator. The magnet cannot pull and reset the disc against the force of the spring acting on the rod, but it can overcome the spring force when the disc is in contact with the magnet pole piece.

A tripping pulse from the trip unit counteracts the effect of the permanent magnet, allowing the spring to separate the disc from the magnet pole piece and to actuate the trip mechanism. The trip mechanism strikes the breaker trip bar and trips the breaker. As the breaker opens, the breaker mechanism moves the DTA reset mechanism, which moves the disc to close the air gap between it and the magnet pole piece. The DTA is reset when the disc is held in contact with the magnet pole piece, against the spring force. If the DTA does not reset properly, the trip lever will hold the breaker in the trip free condition and the breaker will not be able to close.

RMS 700 and 800 Retrofit Kits include an Auxiliary Switch Kit, which usually mounts on or near the DTA. The Auxiliary Switch Kit consists of a microswitch with mounting hardware and brackets. The switch is used to provide the trip unit with information on the breaker position, i.e., open or closed. The status information is passed on through the INCOM network.

3-7. Digitrip RMS/R Rating Plug and Battery

The Digitrip RMS/R Rating Plug fits into the Digitrip RMS/R Trip Unit and determines the breaker I_n (continuous current) rating. The rating plug must be matched to the installed current sensor ratio and the distribution system frequency, i.e., 50 or 60 Hz. Each rating plug has fixed S_1 (8) and S_2 (10) values, which correspond to the trip unit maximum Short Delay Pickup settings and M_1 (8) and M_2 (12) values, which correspond to the trip unit maximum Instantaneous Pickup settings.

The rating plug is equipped with a long-life 3.0 Volt lithium type battery. The back-up battery is not required for the basic Digitrip RMS/R overcurrent protective circuit. It is used to maintain the trip unit mode of trip indication LEDs following a breaker tripping operation, when no external 120 Vac control power source (through the ATR) to the trip unit is applied. A new battery will maintain the mode of trip LED for approximately 60 hours when no external 120 Vac source is applied to the trip unit. The battery is replaced from the front, without having to remove the rating plug from the trip unit. Replacement battery types are listed under the Accessories section of this Application Guide.

If a rating plug is removed when the breaker is in the closed position, the breaker may trip. Therefore, the rating plug must be securely plugged in and the trip cover put back on the trip unit to assure that the rating plug stays in place.

3-8. External Harness

The external harness has multi-pin disconnect plugs that plug into the trip unit to extract zone interlocking, remote alarm, and INCOM communications signals, as applicable, from the trip unit and to connect the 120 Vac power required on RMS 600, 700, and 800 kits. The external harness also has a large 20 pin plug that plugs into the cell harness assembly which is mounted in the switchgear cell. The external harness provided with RMS 500 Basic Kits consists of just a small jumper plug that sends out the zone interlock signals on the trip unit.

3-9. Potential Transformer Module (PTM)

A Potential Transformer Module (PTM) is supplied with each RMS 700 and 800 kit. The PTM passes on circuit breaker primary voltage information to the trip unit for use in obtaining INCOM energy monitoring data. Three 600 volt leads are provided for the PTM primary connection to the breaker. The PTM secondary terminates to a 4 pin black male plug (PT1) to permit connection to the trip unit via the 4 pin female plug provided on the external wiring harness.

CAUTION

THE PTM PRIMARY DISCONNECT PLUG MUST BE DISCONNECTED WHEN DIELECTRIC TESTING OF THE BREAKER/SWITCHGEAR ASSEMBLY IS PERFORMED OR THE TRIP UNIT MAY BE DAMAGED. DO NOT DISCONNECT THE PTM PLUG WHEN THE BREAKER IS ENERGIZED OR IN THE CONNECTED POSITION. MOVE THE BREAKER TO THE TEST POSITION BEFORE PULLING THE PTM PLUG.

3-10. Cell Harness Assembly

The cell harness assembly is provided on all retrofit kits, except the RMS 500 Basic series. Its function is to extract the zone interlocking, remote alarm, and communications signals from the breaker by connection to the external wiring harness and provide terminations for external customer connections. Use of the assembly reduces the time required for retrofit. It eliminates the need to completely require the secondary contacts on the circuit breaker and in the switchgear to accommodate the added Digitrip RMS signals.

The assembly mounts in the breaker compartment of the switchgear on the right side sheet. The cell plug receives the breaker external harness plug, providing a disconnecting means of extracting the signals from the breaker. A wiring harness brings the signal to terminal blocks for customer external connections in the switchgear. Depending on the retrofit kit selected, up to 3 terminal blocks (TB1, TB2, and TB3) are provided.

Section 4

Digitrip RMS 500 Basic Retrofit Kits (Without Zone Interlocking)

4-1. Digitrip RMS 500 Basic Retrofit Kit Selection & Content

The Digitrip RMS 500 Basic Retrofit Kit series provides basic overcurrent protection only. The retrofit kits are available with the applicable Digitrip RMS/R 500 Trip Unit overcurrent trip functions, i.e. Long Time (L), Short Time (S), Instantaneous (I), & Ground Fault Time (G) Delays. The combinations available are LI, LS, LSI, LIG, LSG, LSIG.

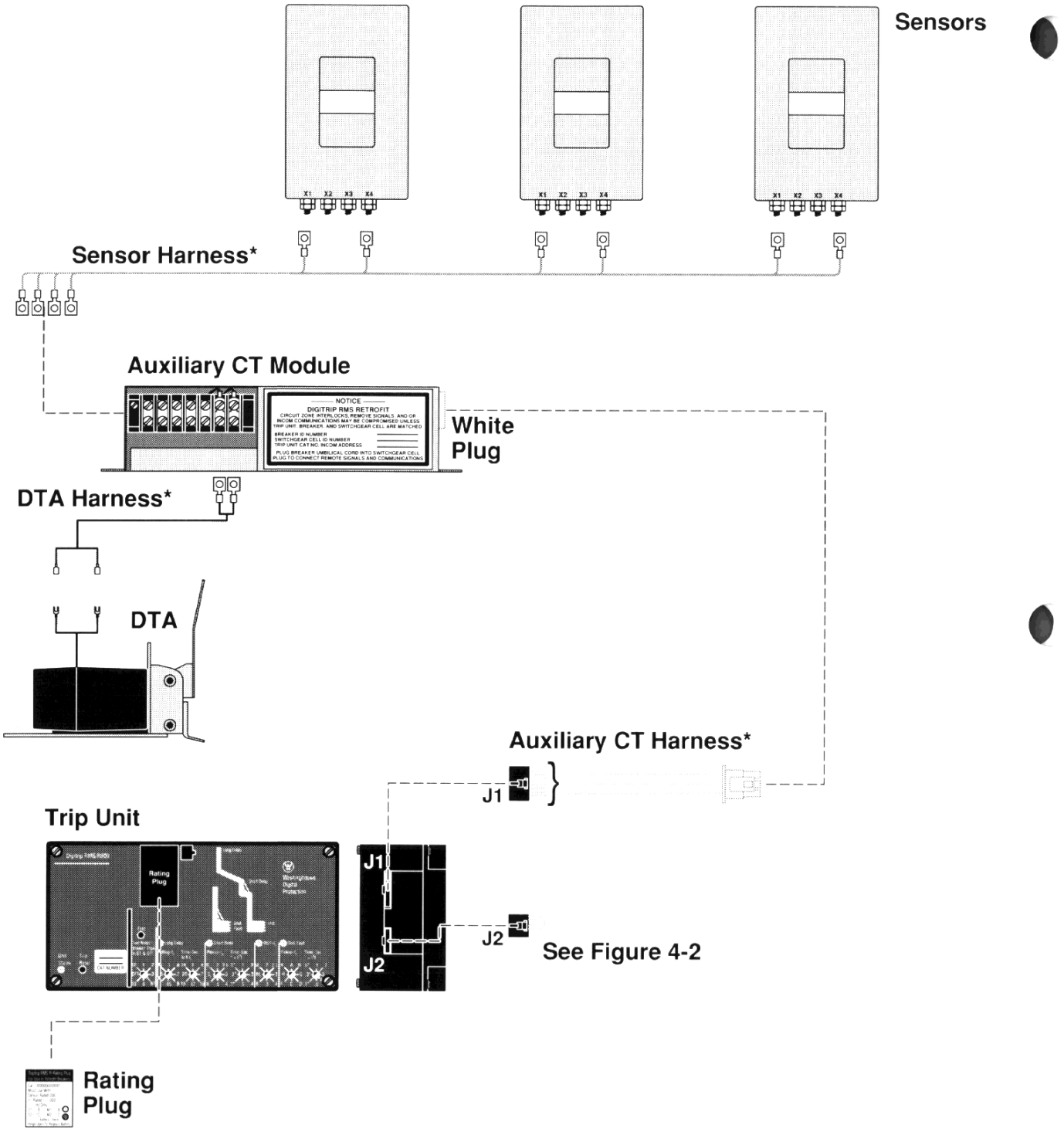
The complete Digitrip RMS 500 Basic Retrofit Kit is mounted on the breaker. Therefore, no switchgear cell modifications or wiring are required. Zone interlocking signals from the trip unit are not wired out from the breaker. The external harness provided consists of a small jumper plug that shorts out the zone interlock signals at the trip unit. Refer to Figure 4-1 for the retrofit kit wiring connections on the breaker.

4-2. Digitrip RMS 500 Basic Retrofit Kit Features

The Digitrip RMS/R 500 Trip Unit has the following features available for customer use, when applied in the Digitrip RMS 500 Basic Retrofit Kit:

1. Basic (L,S,I,G) overcurrent protection, as selected.
2. True RMS Sensing.
3. Integral Trip Unit Testing.
4. Unit Status Indicator.
5. Local Mode of Trip Indicators.
6. Selectable I^2t on Short Time and Ground Fault Time Delays when those options are selected.

The trip unit also includes provisions to accept the required rating plug. The rating plug is equipped with a battery to power the local mode of trip indicators.



***See Section 12 for detailed wiring connection diagrams**

Figure 4-1 — Digitrip RMS/R 500 Basic Wiring

RMS/R 500 BASIC
EXTERNAL HARNESS
STYLE NO. 6502C83G01

Plug J2 must be installed with zone interlock jumpers S_{IN}–S_{OUT} and G_{IN}–G_{OUT} or breaker will trip instantaneously on short time and ground fault delay functions.

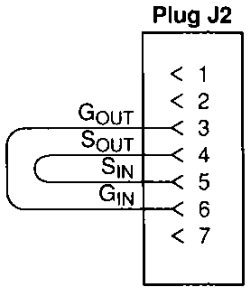


Figure 4-2 — Digitrip RMS/R 500 Basic External Harness

Section 5

Digitrip RMS 500 Retrofit Kits (With Zone Interlocking)

5-1. Digitrip RMS 500 Retrofit Kit (With Zone Interlocking) Selection and Content

The Digitrip RMS 500 Retrofit Kit series provides basic overcurrent protection plus zone interlock capability. The retrofit kits are available with the applicable Digitrip RMS/R 500 Trip Unit overcurrent trip functions, i.e. Long Time (L), Short Time (S), Instantaneous (I), & Ground Fault Time (G) Delays. The combinations available are LI, LS, LSI, LIG, LSG, LSIG.

Zone interlocking signals are extracted from the trip unit by the umbilical wiring harness with plug. The umbilical wiring harness includes a 20 pin plug, which connects to the cell harness assembly. All retrofit kit components are mounted on the breaker, except the cell harness assembly, which is mounted in the switchgear cell. Figures 4-1 through 4-3 provide the retrofit kit wiring connections on the breaker and the switchgear cell.

5-2. Digitrip RMS 500 Retrofit Kit (With Zone Interlocking) Features

The Digitrip RMS/R 500 Trip Unit has the following features available for customer use, when applied in the Digitrip RMS 500 Basic Retrofit Kit:

1. Basic (L,S,I,G) overcurrent protection, as selected.
2. True RMS Sensing.
3. Integral Trip Unit Testing.
4. Unit Status Indicator.
5. Local Mode of Trip Indicators.
6. Selectable I^2t on Short Time and Ground Fault Time Delays when those options are select ed.
7. Zone interlock capabilities of the breaker Short Time and Ground Fault Delay functions, when those options are selected.

The trip unit also includes provisions to accept the required rating plug. The rating plug is equipped with a battery to power the local mode of trip indicators.

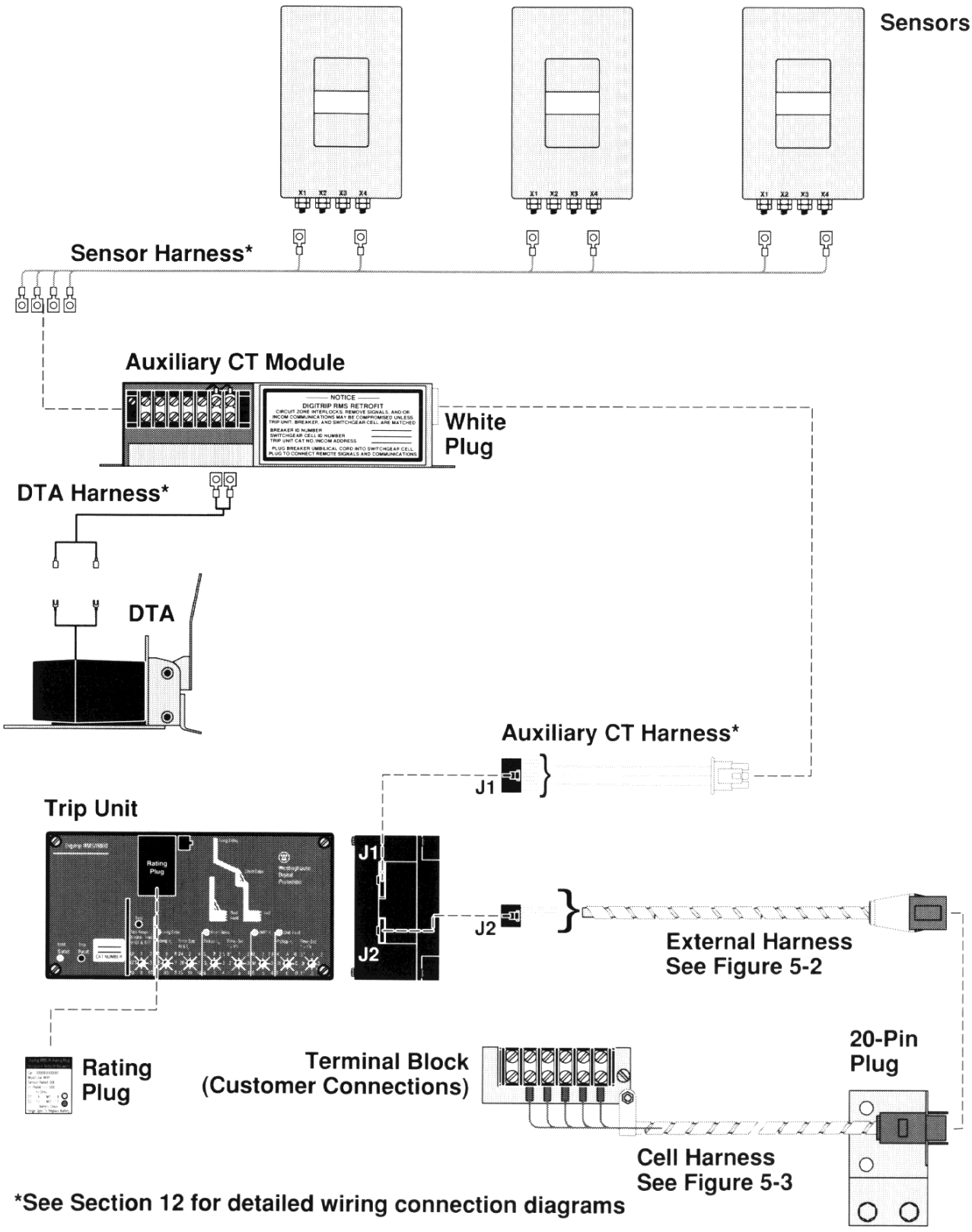


Figure 5-1 — Digitrip RMS/R 500 Wiring

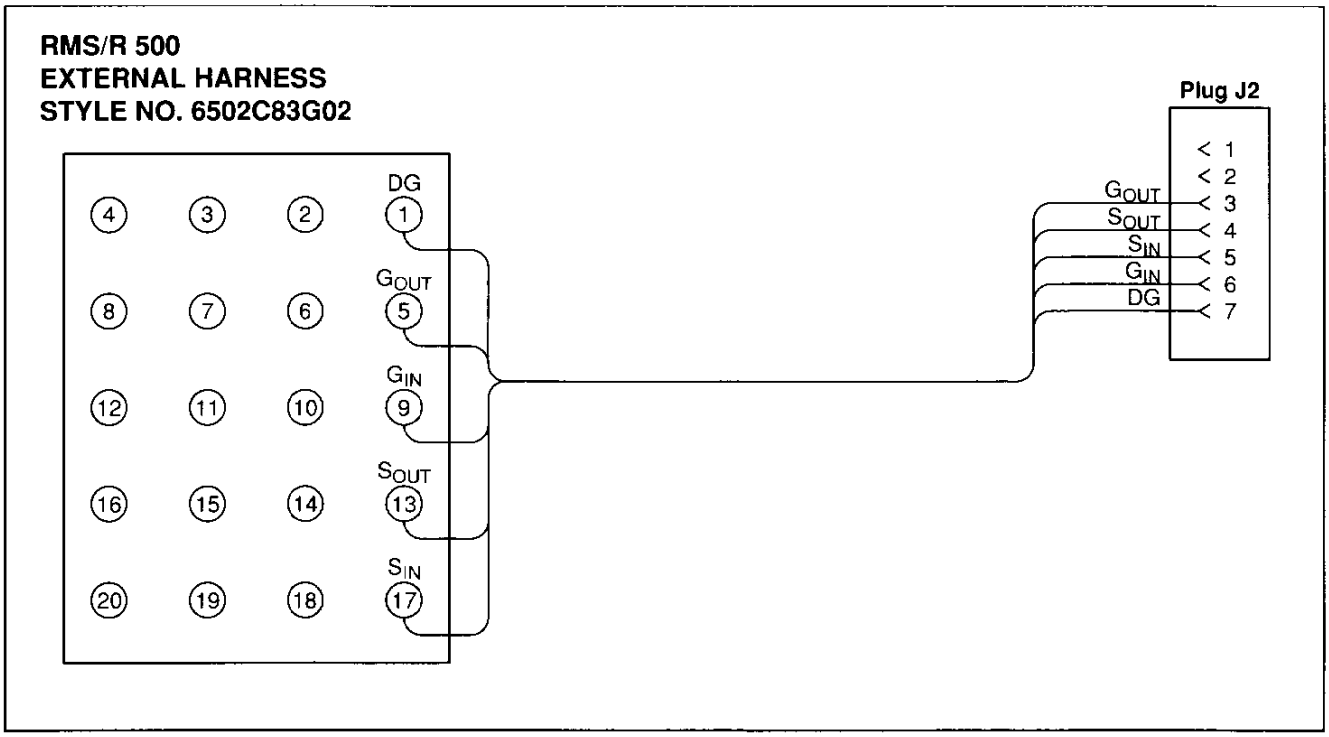
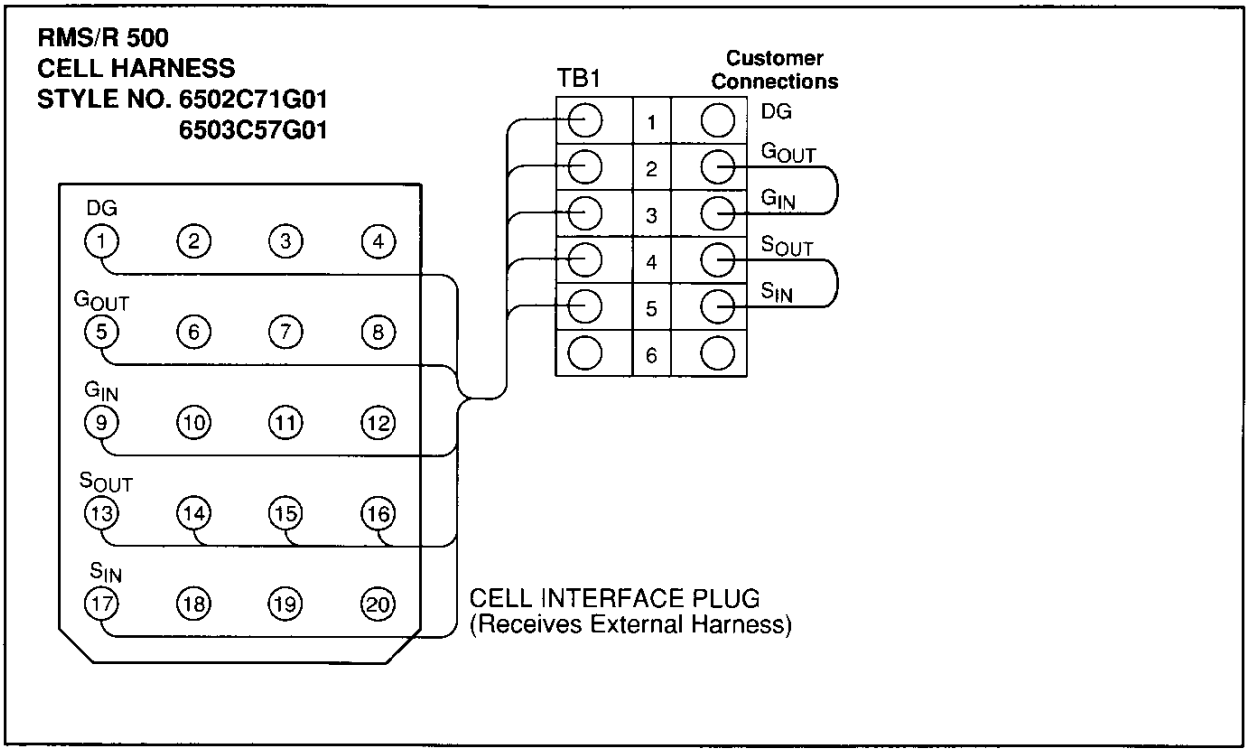


Figure 5-2 — Digitrip RMS/R 500 External Harness



TERMINAL BLOCK POINT AND MARKING	DESCRIPTION
TB1-1 DG	Zone Interlock Digital Ground
TB1-2 G_{OUT}	Zone Interlock Ground Output
TB1-3 G_{IN}	Zone Interlock Ground Input
TB1-4 S_{OUT}	Zone Interlock Short Delay Output
TB1-5 S_{IN}	Zone Interlock Short Delay Input

NOTICE

1. Zone interlock jumpers S_{IN}-S_{OUT} and G_{IN}-G_{OUT} must be installed on TB1 or breaker will trip instantaneously on short time and ground fault delay functions. Remove jumpers ONLY if zone interlocking is required.
2. All wire terminations shown are furnished complete with retrofit kit wiring harness, except those indicated as customer connections.

Figure 5-3 — Digitrip RMS/R 500 Cell Harness

Section 6

Digitrip RMS 600 Retrofit Kits

6-1. Digitrip RMS 600 Retrofit Kit Selection and Content

The Digitrip RMS 600 Retrofit Kit series provides overcurrent protection, zone interlock capability and a local alphanumeric display. The retrofit kits are available with the applicable Digitrip RMS/R 500 Trip Unit overcurrent trip functions, i.e. Long Time (L), Short Time (S), Instantaneous (I), & Ground Fault Time (G) Delays. The combinations available are LI, LS, LSI, LIG, LSG, LSIG.

In addition to zone interlocking, the RMS 600 Trip Units include the Power Relay Module (ATR) which provides contact closures for remote indication and alarm. Zone interlocking and remote alarm signals are extracted from the trip unit by the external harness with plug. The umbilical wiring harness includes a 20 pin plug, which connects to the cell harness assembly.

An external 120 Vac control source is required to power up the Power Relay Module (ATR) remote signals, the local mode of trip indicators, and the trip unit alphanumeric digital display. Figures 6-1 through 6-3 provide the retrofit kit wiring connections on the breaker and in the switchgear cell. All retrofit kit components are mounted on the breaker, except the cell harness, assembly, which is mounted in the switchgear cell.

6-2. Digitrip RMS 600 Retrofit Kit Features

The Digitrip RMS 600 Trip Unit has the following features available for customer use, when applied in the Digitrip RMS 600 Retrofit Kit:

1. Basic (L,S,I,G) overcurrent protection, as selected.
2. True RMS Sensing.
3. Integral Trip Unit Testing.
4. Unit Status Indicator.
5. Local Mode of Trip Indicators.
6. Selectable I^2t on Short Time and Ground Fault Time Delays when those options are selected.
7. Zone Interlock capabilities of the breaker Short Time and Ground Fault Delay functions, when those options are selected.
8. Local Four Digit alphanumeric Display.
9. Remote Signal Contacts for high load and mode of trip indication.

The trip unit also includes provisions to accept the required rating plug. The rating plug is equipped with a battery to light the local mode of trip indicators if external 120 VAC control power is lost.

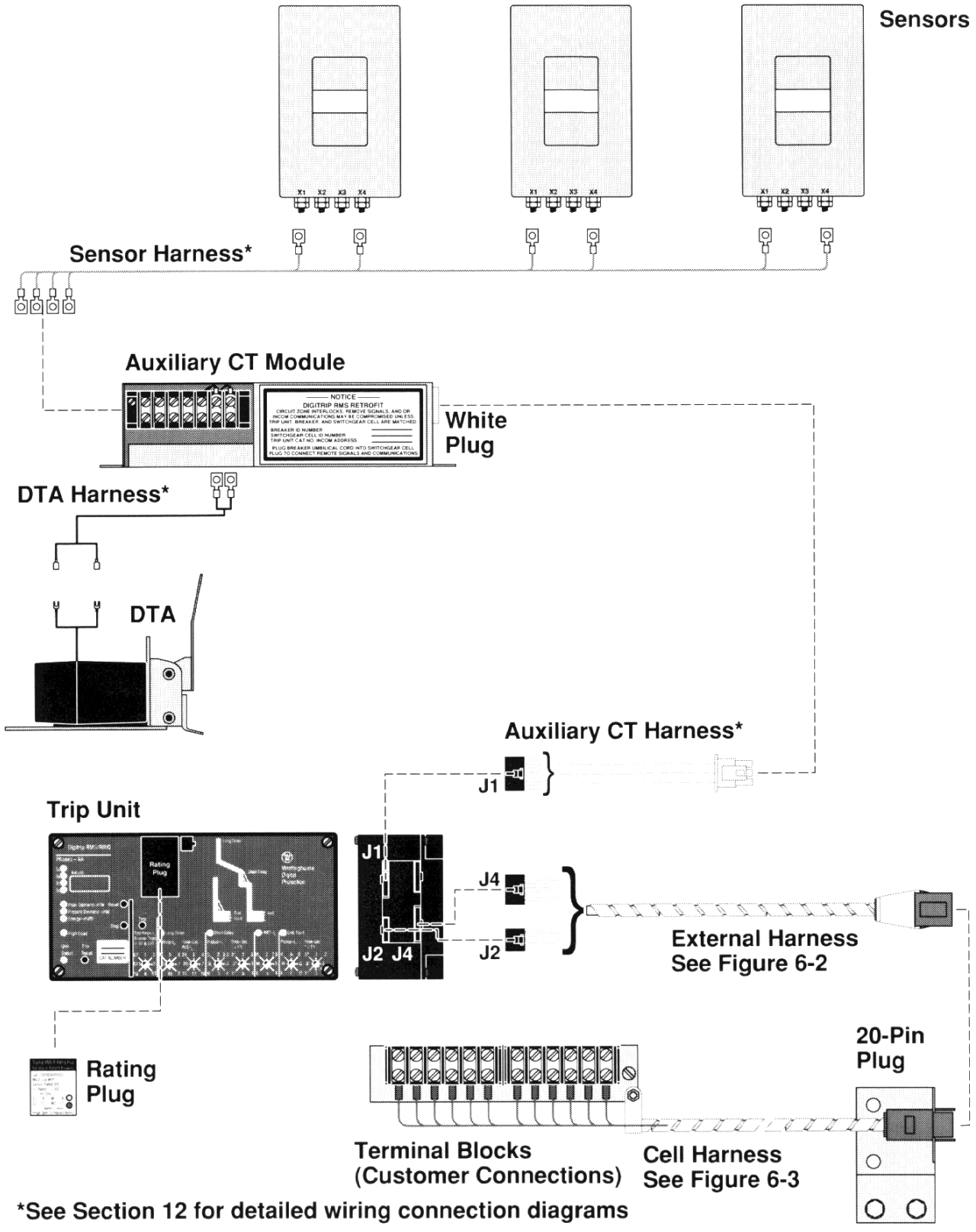


Figure 6-1 — Digitrip RMS/R 600 Wiring

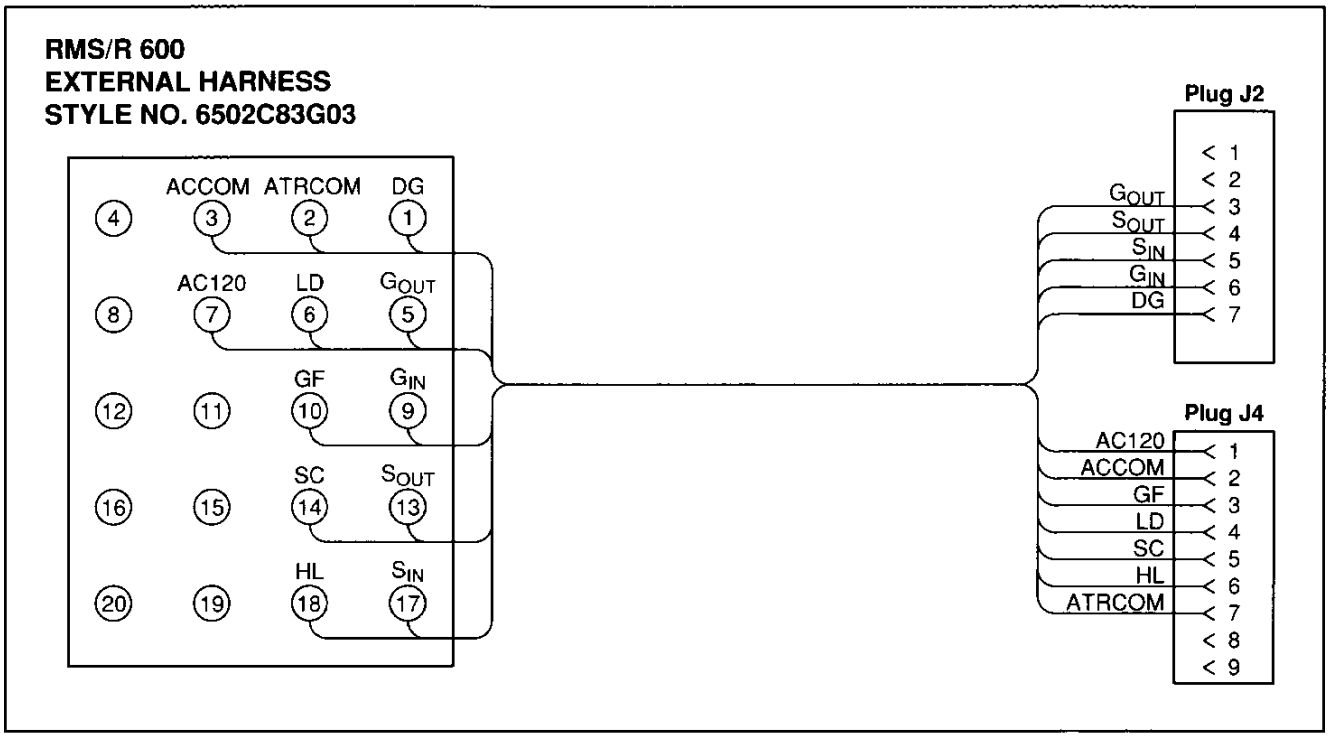
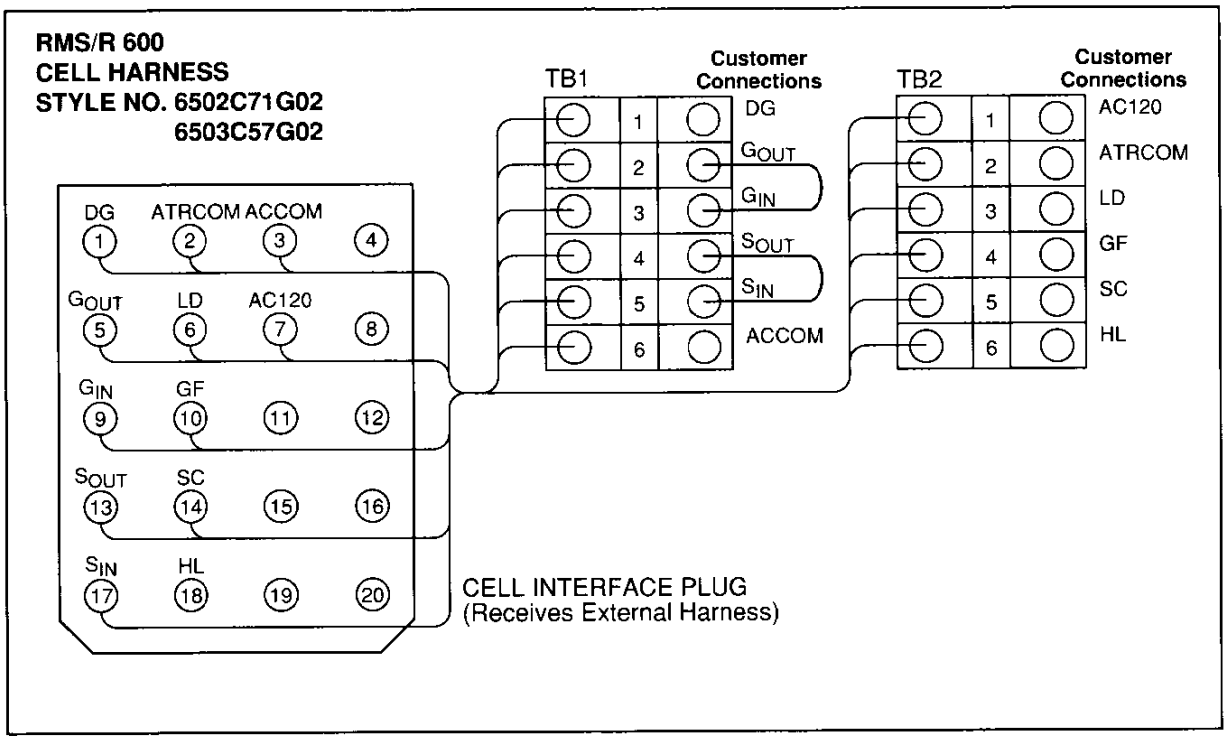


Figure 6-2 — Digitrip RMS/R 600 External Harness



TERMINAL BLOCK POINT AND MARKING		DESCRIPTION
TB1-1	DG	Zone Interlock Digital Ground
TB1-2	G_{OUT}	Zone Interlock Ground Output
TB1-3	G_{IN}	Zone Interlock Ground Input
TB1-4	S_{OUT}	Zone Interlock Short Delay Output
TB1-5	S_{IN}	Zone Interlock Short Delay Input
TB1-6	ACCOM	ATR 120VAC Input Common
TB2-1	AC120	ATR 120VAC Input Power
TB2-2	ATRCOM	ATR Alarm Contact Common
TB2-3	LD	ATR Long Delay Trip Alarm
TB2-4	GF	ATR Ground Fault Trip Alarm
TB2-5	SC	ATR Short Circuit Trip Alarm
TB2-6	HL	ATR High Load Alarm

NOTICE

1. Zone interlock jumpers S_{IN}-S_{OUT} and G_{IN}-G_{OUT} must be installed on TB1 or breaker will trip instantaneously on short time and ground fault delay functions. Remove jumpers ONLY if zone interlocking is required.
2. All wire terminations shown are furnished complete with retrofit kit wiring harness, except those indicated as customer connections.
3. ATR contacts are rated 1 ampere at 120VAC or 1 ampere at 28VDC.

Figure 6-3 — Digitrip RMS/R 600 Cell Harness

Section 7

Digitrip RMS 700 and 800 Retrofit Kits

7-1. Digitrip RMS 700 & 800 Retrofit Kit Selection & Content

The Digitrip RMS 700 and 800 Retrofit Kit series are the top of the line of retrofit kits. The retrofit kits are available with the applicable Digitrip RMS/R 500 Trip Unit overcurrent trip functions, i.e. Long Time (L), Short Time (S), Instantaneous (I), & Ground Fault Time (G) Delays. The combinations available are LI, LS, LSI, LIG, LSG, LSIG.

Digitrip RMS 700 & 800 Retrofit Kits feature Communications capability when applied with the Westinghouse Integrated Monitoring Protection and Control Communications (IMPACC) System. The RMS 700 & 800 Kits have essentially the same content, except the RMS 800 Trip Unit has a local alphanumeric display. The communication, zone interlocking, and remote alarm signals are extracted from the trip unit by a umbilical wiring harness with plug. The umbilical wiring harness includes a 20 pin plug, which connects to the cell harness assembly.

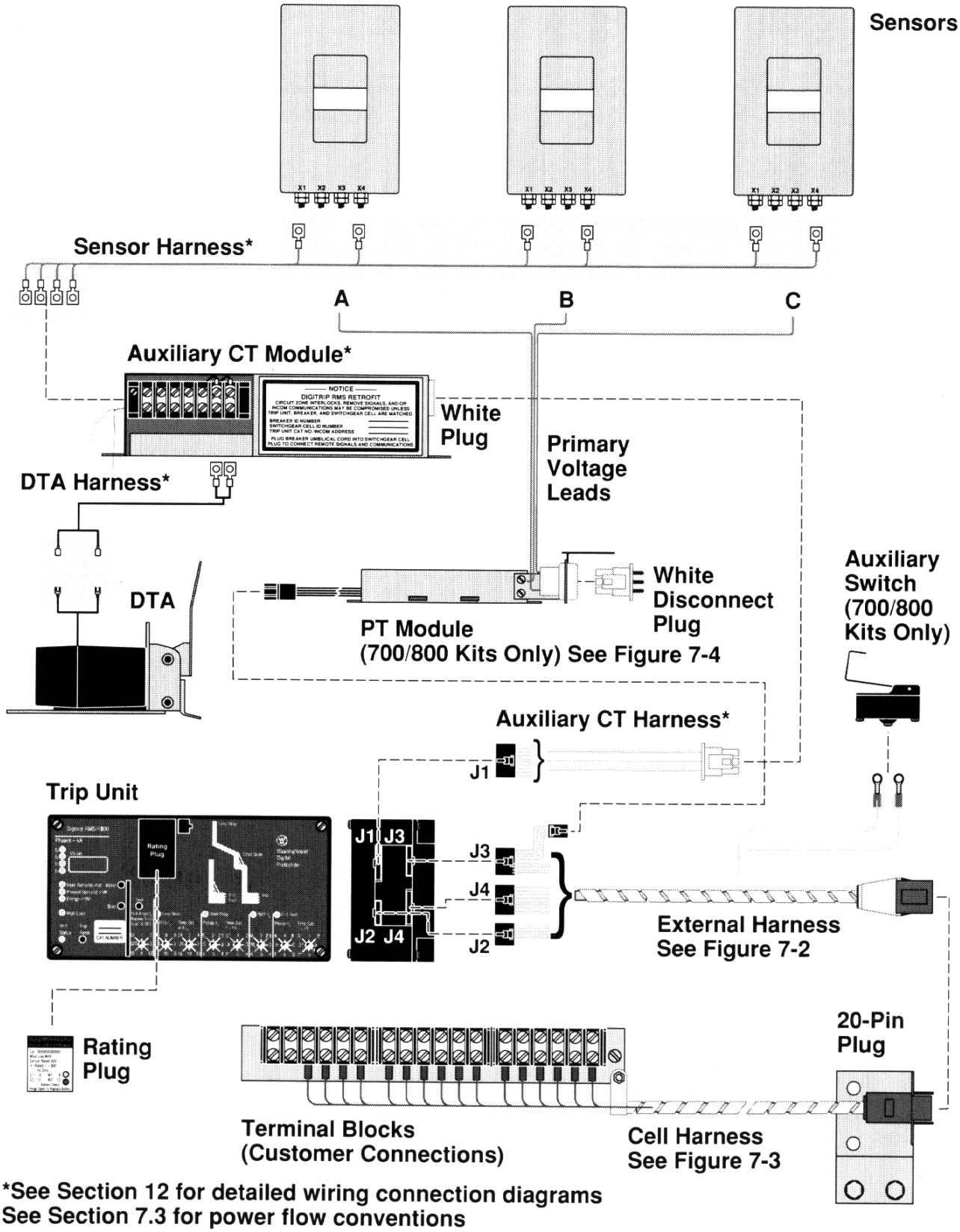
An external 120 Vac control source is required to power up the Power Relay Module (ATR) remote signals, the local mode of trip indicators, INCOM Communications, and the Digitrip RMS 800 Trip Unit alphanumeric digital display. A Potential Transformer Module (PTM) provides the distribution system voltage input to the trip unit. The PTM is provided with a disconnect plug which is to be disconnected in the event of breaker dielectric testing. Figures 7-1 through 7-4 provide the retrofit kit wiring connections on the breaker and in the switchgear cell. All retrofit kit components are mounted on the breaker, except the cell harness assembly.

7-2. Digitrip RMS 700 & 800 Retrofit Kit Features

Digitrip RMS 700 & 800 Trip Units have the following features available for customer use, when applied in Digitrip RMS Retrofit Kits:

1. Basic (L,S,I,G) overcurrent protection, as selected.
2. True RMS Sensing.
3. Integral Trip Unit Testing.
4. Unit Status Indicator.
5. Local Mode of Trip Indicators.
6. Selectable I^2t on Short Time and Ground Fault Time Delays when those options are selected.
7. Zone Interlock capabilities of the breaker Short Time and Ground Fault Delay functions, when those options are selected.
8. Local Four Digit alphanumeric Display (Digitrip RMS 800 only).
9. Remote Signal Contacts for high load and mode of trip indication.
10. Communications when applied with the Westinghouse IMPACC System.
11. Energy Monitoring Capability.

The trip unit also includes provisions to accept the required rating plug. The rating plug is equipped with a battery to light the local mode of trip indicators if the external 120 VAC control power is lost.



*See Section 12 for detailed wiring connection diagrams
See Section 7.3 for power flow conventions

Figure 7-1 — Digitrip RMS/R 7/800 Wiring

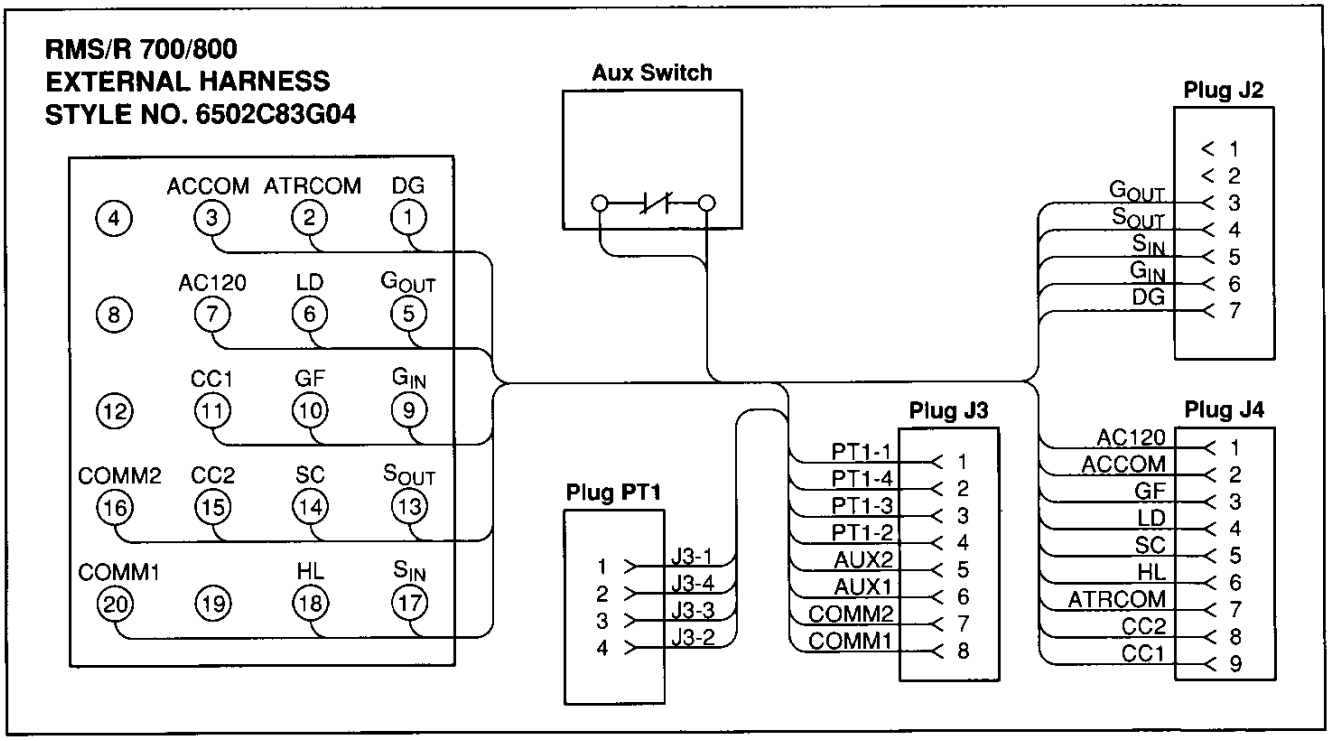
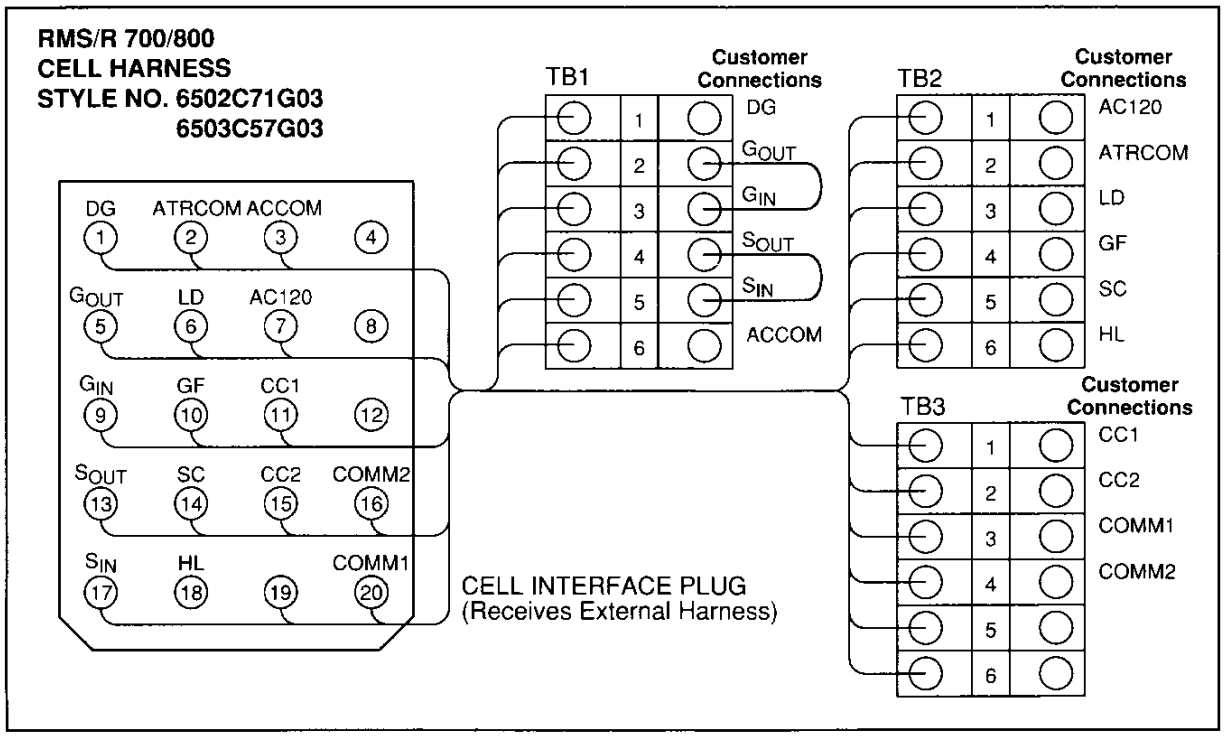


Figure 7-2 — Digitrip RMS/R 7/800 External Harness



TERMINAL BLOCK POINT AND MARKING		DESCRIPTION
TB1-1	DG	Zone Interlock Digital Ground
TB1-2	G_{OUT}	Zone Interlock Ground Output
TB1-3	G_{IN}	Zone Interlock Ground Input
TB1-4	S_{OUT}	Zone Interlock Short Delay Output
TB1-5	S_{IN}	Zone Interlock Short Delay Input
TB1-6	ACCOM	ATR 120VAC Input Common
TB2-1	AC120	ATR 120VAC Input Power
TB2-2	ATRCOM	ATR Alarm Contact Common*
TB2-3	LD	ATR Long Delay Trip Alarm*
TB2-4	GF	ATR Ground Fault Trip Alarm*
TB2-5	SC	ATR Short Circuit Trip Alarm*
TB2-6	HL	ATR High Load Alarm*
TB3-1	CC1	INCOM Contact Output to Breaker Remote Close Contact*
TB3-2	CC2	INCOM Contact Output to Breaker Remote Close Contact*
TB3-3	COMM1	INCOM Twisted Pair Connection
TB3-4	COMM2	INCOM Twisted Pair Connection
TB3-5		Free Terminal for Twisted Pair Shield, Etc.
TB3-6		Free Terminal for Twisted Pair Shield, Etc.

NOTICE

1. Zone interlock jumpers S_{IN}-S_{OUT} and G_{IN}-G_{OUT} must be installed on TB1 or breaker will trip instantaneously on short time and ground fault delay functions. Remove jumpers ONLY if zone interlocking is required.
2. All wire terminations shown are furnished complete with retrofit kit wiring harness, except those indicated as customer connections.

* ATR contacts are rated 1 ampere at 120VAC or 1 ampere at 28VDC.

Figure 7-3 — Digitrip RMS/R 7/800 Cell Harness

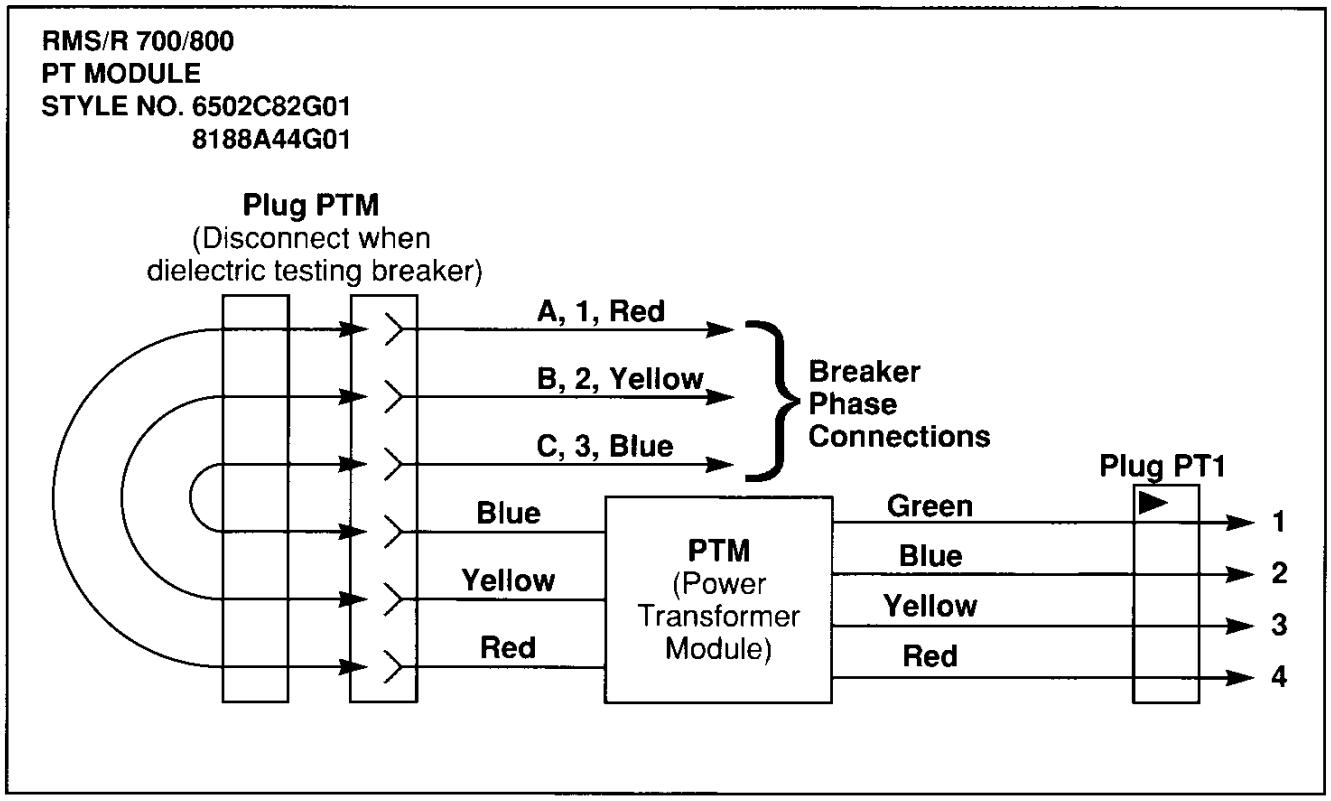


Figure 7-4 — Digitrip RMS/R 7/800 PT Module

7-3. Power Flow Convention

For RMS/R 700 and 800 kits, proper power flow conventions must be maintained as follows to assure the trip unit reads positive power. The factors which affect this are the direction of power flow, the location of the sensors (top or bottom), and the polarity of the sensor connections.

The following table should be consulted to determine the proper arrangement to allow the trip unit to read power properly. In all cases shown the current sensors are mounted with the sensor nameplates facing out, so that they can be read with the sensor installed on the breaker.

POWER FLOW	SENSOR MOUNTING	SENSOR POLARITY
TOP TO BOTTOM	TOP	COMMON AWAY FROM DOT
TOP TO BOTTOM	BOTTOM	COMMON ON DOT
BOTTOM TO TOP	TOP	COMMON ON DOT
BOTTOM TO TOP	BOTTOM	COMMON AWAY FROM DOT

In describing the sensor polarity, the "common" is the green wire, and the "dot" is the polarity mark usually near the X1 terminal on the sensor.

7-4 INCOM Communications Wiring Checkout

The trip unit, umbilical cord, and cell harness wiring for INCOM communications can be confirmed as follows:

1. Remove customer twisted-pair connections COMM1, COMM2 (TB3-3, TB3-4).
2. Remove external 120 Vac power.
3. Connect ohm-meter to TB3-3, TB3-4.
4. Keep the umbilical cord connected.
5. The ohm-meter should read approximately 470K ohms.
6. If (5) is OK, then the wiring is confirmed.
   Remove ohm-meter and replace wiring removed in steps (1) and (2).

Section 8

Testing Retrofitted Breakers

8-1. Dielectric and Meggar Testing

WARNING

Refer to Section 1 entitled "General Information and Safety Precautions" and review all the directions set forth in that section, prior to starting any testing procedure. Failure to follow the safe practices recommended in Section 1 could result in personal injury, death and/or equipment damage. Testing should only be carried out by personnel familiar with the hazards associated with working on power circuit breakers and switchgear assemblies.

CAUTION

TO AVOID POSSIBLE DAMAGE TO TRIP UNIT, PERFORM THE FOLLOWING TWO STEPS BEFORE APPLYING MORE THAN 635 VOLTS TO A BREAKER RETROFITTED WITH A DIGITRIP RMS TRIP SYSTEM:

1. DISCONNECT THE BREAKER UMBILICAL PLUG, WHICH CONNECTS TO THE EXTERNAL BREAKER CELL WIRING. (ALL KITS EXCEPT RMS 500 BASIC MODEL).

2. DISCONNECT POTENTIAL TRANSFORMER MODULE PLUG PTM, WHICH DISCONNECTS THE BREAKER PRIMARY VOLTAGE FROM THE TRIP UNIT. (RMS 700 AND 800 TRIP UNIT MODELS ONLY).

8-2. Testing the Digitrip RMS Trip System

The Digitrip RMS overcurrent trip system may be tested by using one of three possible methods, including the Digitrip Self Test, the Amptector Test Kit (with the use of an Amptector Test Kit Adapter Harness), and primary injection testing (e.g. Multi-Amp or EIL).

GENERAL NOTES ON TESTING:

1. Digitrip RMS has a memory circuit that simulates the time required to cool down overloaded conductors. When performing repeated Long Delay Trip tests, the results may be erroneous as the memory circuit must discharge prior to the next test. The memory circuit can be discharged by disconnecting the external power source (Auxiliary Power Module or 120 Vac input through the external harness) to the trip unit between tests or by waiting several minutes between tests.

2. Due to Digitrip RMS Zone Interlocking capability, the Short Delay and Ground Fault Time trip functions will trip instantaneously, unless Digitrip RMS/R 500 basic external

harness plug is placed into trip unit plug J2 to short G_{IN} to G_{OUT} and S_{IN} to S_{OUT}, see Figure 4-1. If a 500 basic external harness is not available and the kit is furnished with a 500, 600 or 700/800 external harness, G_{IN} to G_{OUT} and S_{IN} to S_{OUT} can be shorted by plugging the breaker external harness into the cell plug of the cell harness assembly, see Figure 5-2, 6-2, or 7-2.

8-3. Digitrip RMS Self Testing System

WARNING

Use of the Digitrip RMS Self Test System while the breaker is in the "connected" position in the switchgear cell compartment is not recommended. The tripping action of the circuit breaker will cause disruption of service caused by unnecessary switching of connected equipment.

Testing should only be performed when the breaker is levered to the "test", "disconnected" or "removed" positions. Failure to comply with these recommendations could result in injury, death and/or equipment damage.

All Digitrip RMS and RMS/R Trip Units are equipped with self testing capability as standard. The self testing system requires one of two external power sources to operate:

- *Auxiliary Power Module (APM, Catalog Number PRTAAPM):* an optional accessory used to power the self testing system. The APM plugs into the trip unit test port, providing power from a 120 Vac 50/60 Hz circuit.

- *External 120 Vac Source:* The self test system for RMS 600, 700, & 800 retrofits can be powered by an external 120 Vac source applied to the trip unit through the breaker external harness. When 120 Vac source is supplied to terminals "AC120" and "ACCOM" of the cell harness assembly and the breaker external harness is plugged into the cell plug, the self test circuit is powered.

Once the self test system is powered as described above, the trip unit can be enabled to simulate set test conditions. The test amp settings are 1, 2, 3, 6T, 8, 10, GFT and GF I_n ratings. The trip unit will trip the breaker when the 6T and GFT settings are selected. The test is started by pushing the TEST push-button. The trip unit will test itself based on the test and time overcurrent settings selected, lighting the mode of trip LEDs. For RMS 600 and 800 trip units the alphanumeric digital display will register the elapsed time of the test until the "trip" and then register the cause of trip coded message on the alphanumeric digital display. The test amps can then be viewed by depressing the STEP push-button.

Be sure to push the TRIP RESET push-button to reset the trip unit and the LEDs when testing is complete, or you may run down the rating plug battery.

8-4. Testing Digitrip with the Amptector Test Kit

WARNING

Do not use the Amptector Test Kit to test Digitrip RMS while the breaker is in the "connected" position in the switchgear cell compartment. Testing should only be performed when the breaker is levered to the "test", "disconnected" or "removed" positions. Failure to comply with these recommendations could result in personnel injury, death and/or equipment damage.

CAUTION

POSSIBLE DAMAGE TO THE DIGITRIP MAY RESULT FROM THE USE OF STYLES 140D481G01R OR G02 AMPTECTOR TEST KITS. USE ONLY AMPTECTOR TEST KIT WITH STYLES 140E481G02R, 140D481G02RR, OR 140D481G03 FOR TESTING THE DIGITRIP TRIP UNIT.

Digitrip RMS/R Trip Units can be tested over a partial range using either style 140D481G02R, 140D481G02RR or 140D481G03 Amptector Test Kit and an optional test kit adapter harness. The available adapter harnesses are listed in Table 2-2 and are described as follows:

- *Amptector Test Kit Adapter Harness Type 1*: includes a receptacle for receiving the test kit banana plug and a set of 7 color-coded spade type terminals for connecting to the auxiliary CT module terminal block terminals A through ON. This harness must be manually connected to each breaker during the test and then removed afterward.

- *Amptector Test Kit Adapter Harness Type 2*: includes a receptacle for receiving the test kit banana plug and a multi-pin male plug to provide quick connection to the breaker mounted test plug. The breaker mounted test plug is an optional accessory, sold as a kit (see Figure 1-3) for permanent mounting on each breaker. It includes a female multi-pin plug with a set of 7 color-coded spade type terminals, which connect to auxiliary CT module terminal block terminals A through ON. During testing, Adapter Harness Type 2 is plugged into the breaker mounted test plug and then removed afterward.

NOTICE

The Amptector Test Kit produces a maximum of 30 to 35 amperes when connected to the test kit adapter harness. The test kit outputs are limited to 6-7 times the Rating Plug I_n rating. This restricts the test range for Short Delay and Instantaneous Testing, but still provides for testing the Long Delay Pickup and Long Delay Time trip functions.

When testing with the Amptector Test Kit, an external power source to the trip unit is required if the alphanumeric digital display or the communications features are to be checked. Use either the Auxiliary Power Module (APM) or the 120 Vac input through the breaker umbilical cord (RMS 600, 700, or 800 only) as discussed above. Additional information for testing Digitrip RMS with the Amptector test kit is listed in the REFERENCES section of this document.

8-5. Primary Injection Testing

Primary injection testing is a useful alternative to the secondary injection methods described above. Primary injection verifies the complete breaker overcurrent protection system, including the current sensors, rating plug, trip unit, and the interconnecting wiring. It involves the use of a tester, e.g. Multi-Amp Tester or EIL, to inject single phase primary current through the breaker to test the Digitrip RMS overcurrent trip system.

When testing breakers equipped with Ground Fault (G) protection, Auxiliary CT Module Terminals G and N can be shorted together with a suitable jumper to temporary defeat the ground fault trip function. This will enable the breaker to be tested in the Long Delay portion of the curve without tripping on ground fault. The jumper must be removed after testing to reinstate the ground fault protection on the breaker.

When testing on breakers with current limiters, the current limiters should be removed and replaced by copper shorting bars during testing. Failure to do so could result in compromising the expected performance of the current limiters. The current limiters must be reinstalled after testing is completed.

When testing, an external power source to the trip unit is required if the alphanumeric digital display or the communications features are to be checked. Use either the Auxiliary Power Module (APM) or the 120 Vac input through the breaker umbilical cord (RMS 600, 700, or 800 only) as discussed above.

8-6. Circuit Breaker Checkout and Bench Test

Before the breaker is returned to the switchgear for placement into service, the retrofit kit installation must be checked out and tested. Check all breaker retrofit wiring paths to be sure that they are properly routed and free from potential interference with breaker moving parts. Confirm all wiring harness terminations are secure.

Perform several breaker manual close and overcurrent trip operations. This test can be performed using any of the above described test methods. An effective installation checkout and test procedures should include the following:

1. Select and set the proper user-determined overcurrent trip settings for the Digitrip RMS Trip Unit. Verify the trip unit is in calibration by selecting and testing several trip points (as applicable) on the Long Delay, Short Delay, Instantaneous, and Ground Fault Time portions of the Digitrip RMS trip curve. Record the trip unit settings for permanent record and future reference.

NOTES ON TESTING

- Due to the Digitrip RMS Zone Interlocking functions, the Short Delay and Ground Fault Time trip functions will trip instantaneously, unless Digitrip RMS Terminal S_{IN} is shorted to S_{OUT} and G_{IN} to G_{OUT}.

- Digitrip RMS has a memory circuit that simulates the time required to cool down of overloaded conductors. When performing repeated Long Delay Testing, the results may be erroneous as the memory circuit must discharge prior to the next test. The memory circuit can be discharged by disconnecting the power source (APM or 120 Vac input) to the trip unit between tests or by waiting several minutes between tests.

2. Verify the DTA properly resets. The breaker will not close unless the DTA resets.

3. For breakers equipped with OTS Switches, confirm the proper operation of the OTS switch. When the breaker trips on an overcurrent condition, the OTS switch must latch and its contacts change state. If not, adjust the OTS switch as detailed in OTS SWITCH ADJUSTMENT PROCEDURE. Manually reset the OTS switch after each trip through the push-button on the breaker faceplate or electrically, if applicable, by energizing the OTS reset coil.

Before returning the breaker to the switchgear after the breaker bench testing has been completed, lever the breaker element levering mechanism from the "TEST" position to the "DISCONNECT" position. Confirm the breaker position indicator read "OPEN" and the spring charged indicator reads "DISCHARGED".

8-7. Setting Digitrip RMS INCOM Address (Digitrip RMS Models 700 and 800 Only)

NOTICE

Setting Digitrip RMS INCOM address provides the trip unit a unique identification for communications. INCOM Communications may be compromised unless trip unit, breaker, and switchgear cell are matched.

Each Digitrip RMS Model 700 and 800 Trip Unit has three dip switches that must be set to provide the trip unit with a unique address for INCOM Communications. The rating plug

must be removed from the trip unit to obtain access to the dip switches. Each dip switch can be set with a small blade screwdriver from 0-9. The three switches have a sequence convention of top to bottom for a left to right address.

8-8. Identification of Trip Unit, Breaker, and Switchgear Cell

Your Digitrip RMS Retrofit Kit includes identification labels for the Digitrip RMS Trip Unit, the breaker element faceplate, and the inside of the switchgear cell door. It is important to identify all three, especially when the trip unit has an INCOM address (Models 700 and 800 only).

Section 9

Operation

WARNING

Refer to Section 1 entitled "General Information and Safety Precautions" and review all the directions set forth in that section, prior to starting any testing procedure. Failure to follow the safe practices recommended in Section 1 could result in personal injury, death and/or equipment damage. Operation of this equipment should only be carried out by personnel familiar with the hazards associated with working on power circuit breakers and switchgear assemblies.

The information presented for the operation of Digitrip RMS Retrofitted power circuit breakers and switchgear supplements the content of the original equipment instruction manuals. Further, the information described supplements any established procedures in practice at the customer location.

WARNING

Breaker and switchgear cell retrofit installations must be checked and tested prior to placing the equipment in operation. Section 8 provides information on recommended testing and checkout procedures. Failure to follow such procedures could result in personal injury, death and/or equipment damage.

9-1 Breaker Insertion in Switchgear Cell and Power Up

WARNING

Prior to inserting the breaker into the cell, be sure the breaker is in the open position and the trip unit adjustable settings are correct. Additionally, be sure the trip unit, breaker and switchgear cell all match for their intended application. Failure to do so could result in personal injury, death and/or equipment damage.

Rack the breaker to the CONNECT position in the switchgear cell. RMS 500 Basic retrofitted breakers include no external harness and are ready to be closed. For RMS 500 Zone, 600, 700, & 800 retrofitted breakers, plug the external harness into the cell harness assembly and then close the breaker. The external harness connects the external trip unit signals. For RMS 600, 700, & 800 retrofitted breakers, the trip unit green Status LED will begin to blink when the plug is connected, indicating the trip unit is operational and the 120 Vac external source is on. For RMS 500 Basic and RMS 500 Zone retrofitted breakers, the trip unit green Status LED will begin to blink when the breaker is closed and primary current of at least 25% of the sensor tap selected begins to flow.

NOTICE

Digitrip RMS overcurrent protection is maintained, even when the breaker external harness plug is not plugged into the cell harness plug. The Digitrip RMS overcurrent trip system is internally powered by the primary phase currents passing through the current sensors.

9-2. Information Available to Operator While Breaker is in Service

Table 9-1 lists the available information provided by Digitrip RMS Trip Units while the breaker is in service.

Table9-1

Data available local to or remote from the Digitrip RMS Trip Unit during operation.	RMS 500	RMS 600	RMS 700	RMS 800
Unit Status Green LED flashes to indicate normal operation of trip unit.	X	X	X	X
Long Delay Red LED flashes when breaker is in Long Delay Pickup and timing out to trip.	X	X	X	X
High Load Red LED lights when current level stays within 85% of Long Delay Pickup for 40 seconds.		X		X
ATR High Load contact closes for remote indication when current level stays within 85% of Long Delay Pickup for 40 seconds.		X	X	X
Alphanumeric Digital Display, showing:				
LDPU (Flashing) when breaker in Long Delay Pickup		X		X
Individual phase currents (reading in amps X 1000)		X		X
Ground current (reading in amps X 1000)		X		X
Peak Demand (Mega Watts)				X
Present Demand (Mega Watts)				X
Energy (Mega Watt Hours)				X
Depress STEP push-button to view selected field		X		X
Depress RESET push-button to reset peak demand				X
Communications Data Available for remote use at master PC, including:				
Trip Unit INCOM Address (set at trip unit)			X	X
Breaker Status (open or closed)			X	X
Reason for Status (normal, LDPU alarm, or other)			X	X
Breaker Rating Plug Installed			X	X
High Load Indication			X	X
Individual phase current levels (amps)			X	X
Ground current levels (amps)			X	X
Peak Demand (Mega Watts)			X	X
Present Demand (Mega Watts)			X	X
Energy (Mega Watt Hours)			X	X

9-3. Information Available in The Event of a Trip

In the event of a trip, the Digitrip RMS Trip Unit provides information as summarized in Table 9-2 for operator use.

Table 9-2

Data available local to or remote from the Digitrip RMS Trip Unit after a trip.	**RMS 500**	**RMS 600**	**RMS 700**	**RMS 800**
Red LEDs light to provide trip indication of:				
Long Delay Trip	X	X	X	X
Short Delay Trip	X	X	X	X
Instantaneous Trip	X	X	X	X
Ground Fault Trip	X	X	X	X
Discriminator/Override Trip (LS and LSG only)	X	X	X	X
Alphanumeric Digital Display shows:				
LDT (Coded message for Long Delay Trip)		X		X
SDT (Coded message for Short Delay Trip)		X		X
INST (Coded message for Instantaneous Trip)		X		X
GNDT (Coded message for Ground Fault Trip)		X		X
DISC (Coded message for Discriminator Trip)		X		X
EXTT (Coded message for External trip via INCOM)				X
Phase currents at trip (reading in amps X 1000)		X		X
Ground current at trip (reading in amps X 1000)		X		X
Peak Demand (Mega Watts) at trip				X
Present Demand (Mega Watts)				X
Energy (Mega Watt Hours) at trip				X
Depress STEP push-button to delete coded message and view stored data as selected.		X		X
ATR contacts close for remote indication of:				
Long Delay Trip		X	X	X
Short Circuit Trip		X	X	X
Ground Fault Trip		X	X	X

Table 9-2 (con't)

Data available local to or remote from the Digitrip RMS Trip Unit after a trip.	RMS 500	RMS 600	RMS 700	RMS 800
Communications data available for remote use at master PC:				
Device Address (set at trip unit)			X	X
Breaker Status (Trip)			X	X
Reason for Status:			X	X
LDT (Coded message for Long Delay Trip)			X	X
SDT (Coded message for Short Delay Trip)			X	X
INST (Coded message for Instantaneous Trip)			X	X
GNDT (Coded message for Ground Fault Trip)			X	X
DISC (Coded message for Discriminator Trip)			X	X
EXTT (Coded message for External trip via INCOM)			X	X
Phase currents at trip (reading times 1000)			X	X
Ground current at trip (reading times 1000)			X	X
Peak Demand (Mega Watts) at trip			X	X
Present Demand (Mega Watts)			X	X
Energy (Mega Watt Hours) at trip			X	X

9-4. Resetting The Trip Unit After a Trip

Following an overcurrent trip, the trip unit is reset by depressing the TRIP RESET push-button. The trip unit should be reset before the breaker is closed.

The RMS 500 retrofit trip unit mode of trip LEDs are powered by the rating plug battery. The breaker can be closed without resetting the trip unit, however the LED will remain lit until the trip unit TRIP RESET push-button is depressed. Resetting the trip unit in a timely manner saves on battery life. In new condition the battery will power the LED for approximately 60 hours.

The RMS 600, 700, & 800 retrofits have provisions for an external 120 Vac source connected through the external harness. If the 120 Vac source is on, the breaker will be held in the trip free condition (cannot be closed) by the Direct Trip Actuator (DTA) until the trip unit TRIP RESET push-button is depressed. The trip unit mode of trip LEDs are powered by the external 120 Vac source, and backed up by the battery in the rating plug.If the external 120 Vac source to the trip unit is lost, the trip unit acts as described for the RMS 500.

The RMS 700 and 800 retrofits have communications capability, which permit opening and (for electrically operated breakers) closing via INCOM. In the event of an overcurrent trip, the trip unit will act as described, requiring local resetting of the trip unit before the breaker can be closed. However, if the breaker is tripped remotely via INCOM (alphanumeric coded message EXTT), it can be closed via INCOM without local resetting at the trip unit.

9-5. Removing The Breaker From The CONNECT Position

RMS 500 Basic retrofitted breakers include no external harness and require no special procedures (other than those normally observed) for removing the breaker from the CONNECT position in the switchgear cell.

RMS 500 Zone, 600, 700, & 800 Retrofitted are equipped with the external harness. Care must be observed to disconnect the external harness plug from the switchgear cell harness assembly, when removing the breaker from the CONNECT position.

NOTE

If the cell terminal block, wiring harness, and plug assembly is properly positioned in the switchgear cell with respect to the breaker, the breaker can be withdrawn to the TEST position with the external harness plugged in. However, to withdraw the breaker completely from the cell, the external harness must be disconnected.

CAUTION

FAILURE TO DISCONNECT THE EXTERNAL HARNESS FROM THE CELL HARNESS ASSEMBLY IN THE SWITCHGEAR CELL COULD CAUSE PHYSICAL DAMAGE TO THE EQUIPMENT.

Digitrip RMS Trip Units provided without instantaneous protection, i.e. LS or LSG, are equipped with a nonadjustable discriminator and instantaneous override circuit. The discriminator circuit prevents the circuit breaker from being closed and latched-in on a fault. The nonadjustable release is preset at 11 times the installed rating plug I_n rating. When the breaker trips due to the Discriminator/Override, the Discriminator/Overrride red LED will light.

Section 10

Digitrip RMS Retrofit Switchgear Assembly Applications

10-1. Zone Interlocking

All Digitrip RMS Trip Units include provisions for zone interlock connection of the trip unit short time (S) and ground fault (G) delay protective functions. If zone interlocking is not required, it must be defeated by shorting out the appropriate terminals.

NOTICE

Digitrip RMS Zone Interlocking will trip the breaker instantaneously on short time (S) or ground fault (G) delay trip functions unless it is defeated as described herein.

For RMS 500 Basic Retrofit Kits, zone interlock functions are not wired out from the trip unit. The external harness provided consists of a small jumper plug that shorts out the zone interlock signals at the trip unit.

For RMS 500 Zone, 600, 700, and 800 Retrofit Kits, zone interlock functions are extracted from trip unit plug J2 by the breaker external harness as shown in Figure 5-1. The breaker external harness plugs into the cell harness assembly. The terminal cell harness includes provisions for external wiring connections as shown in Figure 5-2. Shorting jumpers (S_{IN}-S_{OUT} and G_{IN}-G_{OUT}) are provided at the terminal block assembly to defeat the zone interlock functions. These jumpers can be removed and selective zone interlocking schemes applied. Typical connection schemes for multiple circuit breakers are shown in Figure 10-1 and 10-2.

10-2. The Power Relay Module (ATR)

RMS 600, 700, and 800 Retrofit Kits include the power relay module (ATR), which is mounted integral to the RMS/R trip unit. The ATR input and output signals are extracted from the trip unit plug J4 through the external harness as shown in Figure 6-1. The breaker external harness plugs to the cell harness assembly, which includes provisions for external wiring connections as shown in Figure 6-2. Figure 10-3 shows typical ATR 120 Vac source input and dry contact alarm output connections for remote alarm indication.

NOTICE

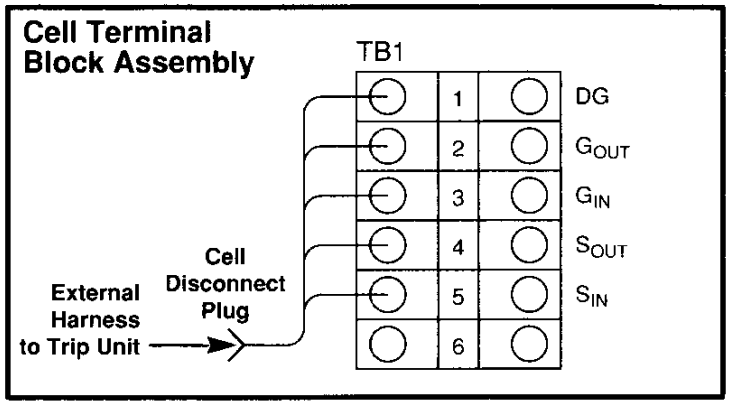
ATR contacts are rated 1 amp at 120 Vac or 24 Vdc. Control voltages and currents that exceed these values will require the use of an external interposing relay.

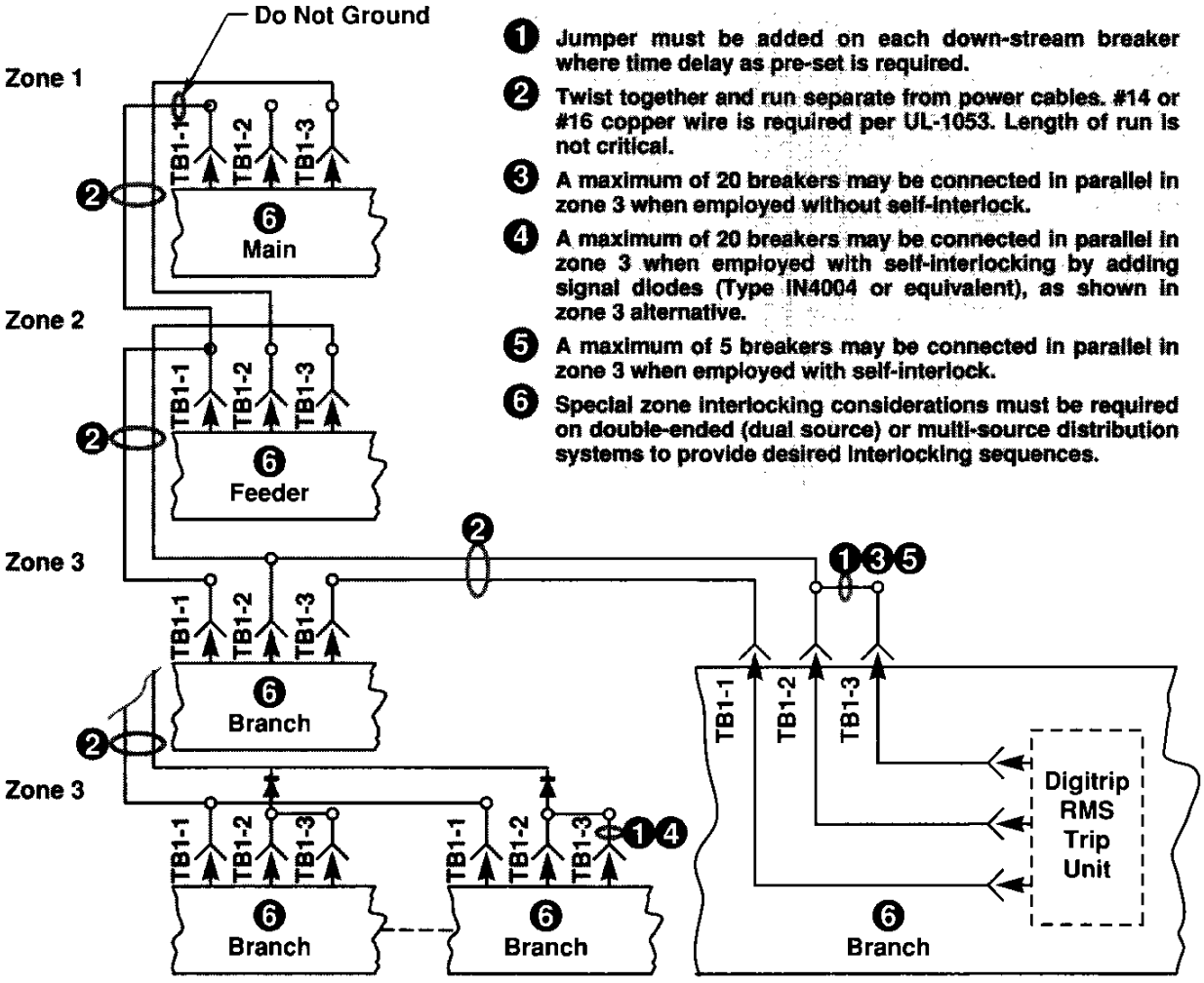
RMS 700 & 800 Retrofit Kits also include an operational contact across ATR terminals CC1 and CC2 for use in remote closing of electrically operated breakers via communications. When a close command is initiated by the communications system, the CC1-CC2 contact will close for approximately 1 second. See Figure 10-7 for typical applications.

10-3. Communications and INCOM

RMS 700 & 800 Retrofit Kits include communications capability when used with the Westinghouse Integrated Monitoring Protection and Control Communications (IMPACC) System. Each RMS/R

Legend:
TB1-1 DG – Digital Ground
TB1-2 G_{OUT} – Ground Out
TB1-3 G_{IN} – Ground In



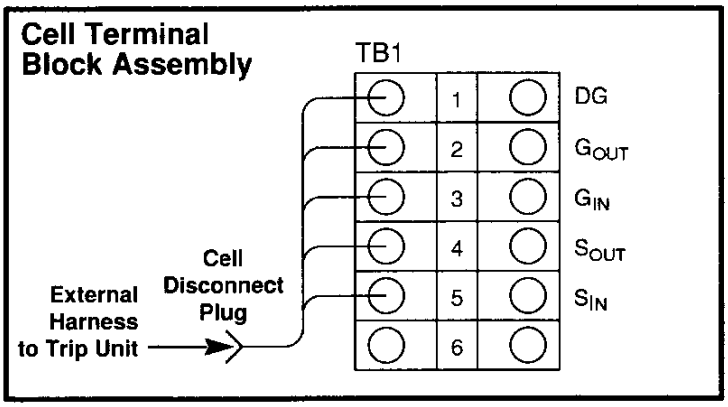


1. **Jumper must be added on each down-stream breaker where time delay as pre-set is required.**
2. **Twist together and run separate from power cables. #14 or #16 copper wire is required per UL-1053. Length of run is not critical.**
3. **A maximum of 20 breakers may be connected in parallel in zone 3 when employed without self-interlock.**
4. **A maximum of 20 breakers may be connected in parallel in zone 3 when employed with self-interlocking by adding signal diodes (Type IN4004 or equivalent), as shown in zone 3 alternative.**
5. **A maximum of 5 breakers may be connected in parallel in zone 3 when employed with self-interlock.**
6. **Special zone interlocking considerations must be required on double-ended (dual source) or multi-source distribution systems to provide desired interlocking sequences.**

Figure 10-1

Legend:
TB1-1 DG
TB1-2 G_{OUT}
TB1-3 G_{IN}

Legend:
TB1-1 DG – Digital Ground
TB1-4 S_{OUT} – Short Delay Out
TB1-5 S_{IN} – Short Delay In



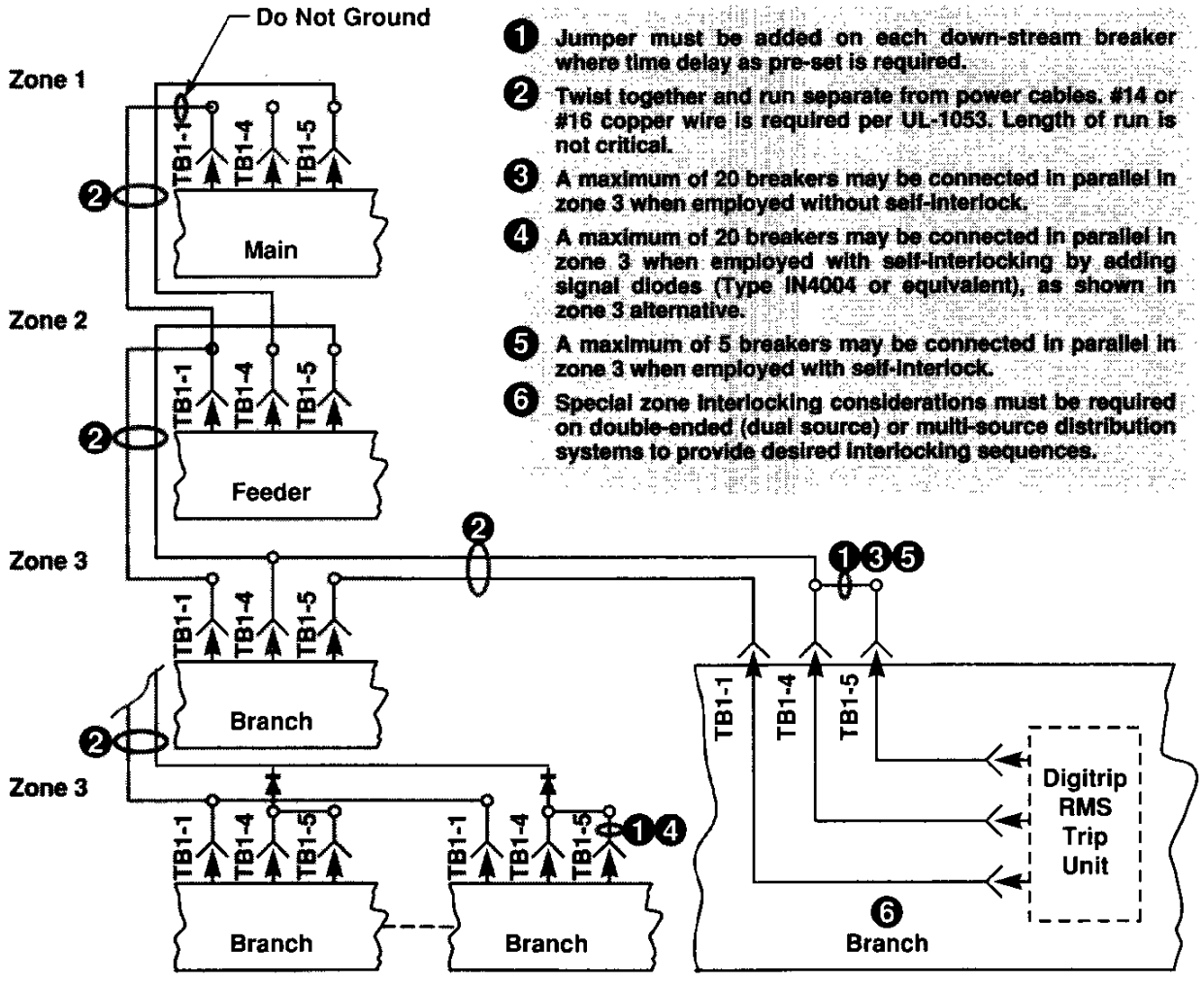


Figure 10-2

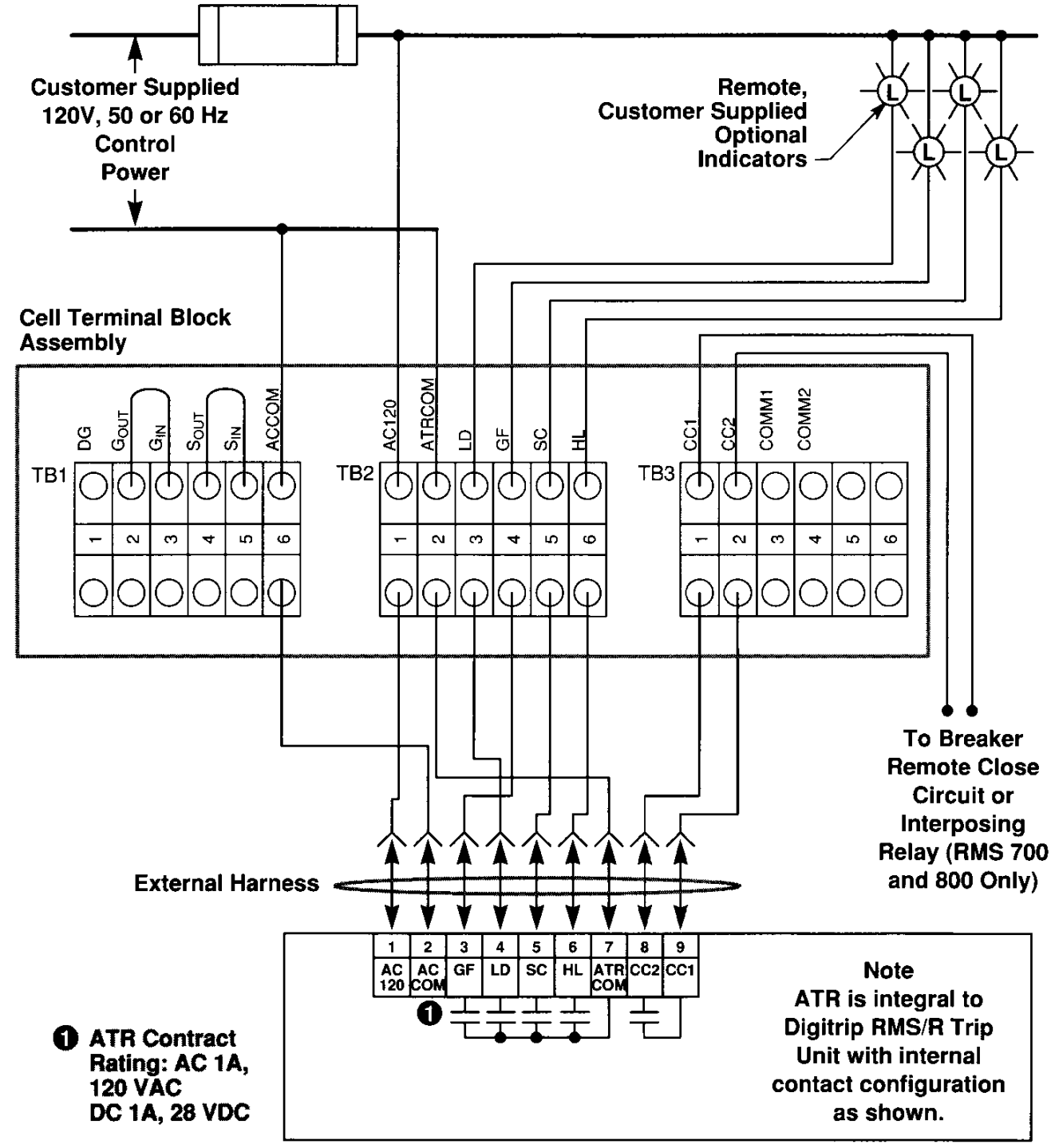

Customer Supplied
120V, 50 or 60 Hz
Control
Power
Remote,
Customer Supplied
Optional
Indicators
L
Cell Terminal Block
Assembly
TB1
DG
GOUT
GIN
SOUT
SIN
ACCOM
TB2
AC120
ATRCOM
LD
GF
SC
HL
TB3
CC1
CC2
COMM1
COMM2
1
2
3
4
5
6
To Breaker
Remote Close
Circuit or
Interposing
Relay (RMS 700
and 800 Only)
External Harness
1
2
3
4
5
6
7
8
9
AC
120
AC
COM
GF
LD
SC
HL
ATR
COM
CC2
CC1
1
Note
ATR is integral to
Digitrip RMS/R Trip
Unit with internal
contact configuration
as shown.
1 ATR Contract
Rating: AC 1A,
120 VAC
DC 1A, 28 VDC

Figure 10-3

trip unit includes an Integrated Communications (INCOM) Chip that permits the extraction of trip unit data and the implementation of breaker close and trip commands from a remote master computer. Communications is accomplished from the trip unit to the master computer via radio frequency signal over a twisted pair communications network. The communication signals (COMM1 and COMM2) are extracted from trip unit plug J3 through the external harness as shown in Figure 7-1 and 7-2. The breaker external harness plugs to the cell harness assembly, which includes provisions for external wiring connections as shown in Figure 7-3.

Typical INCOM network communication schemes are shown in Figures 10-4 through 10-6. For a simple pre-engineered network system, the following rules apply:

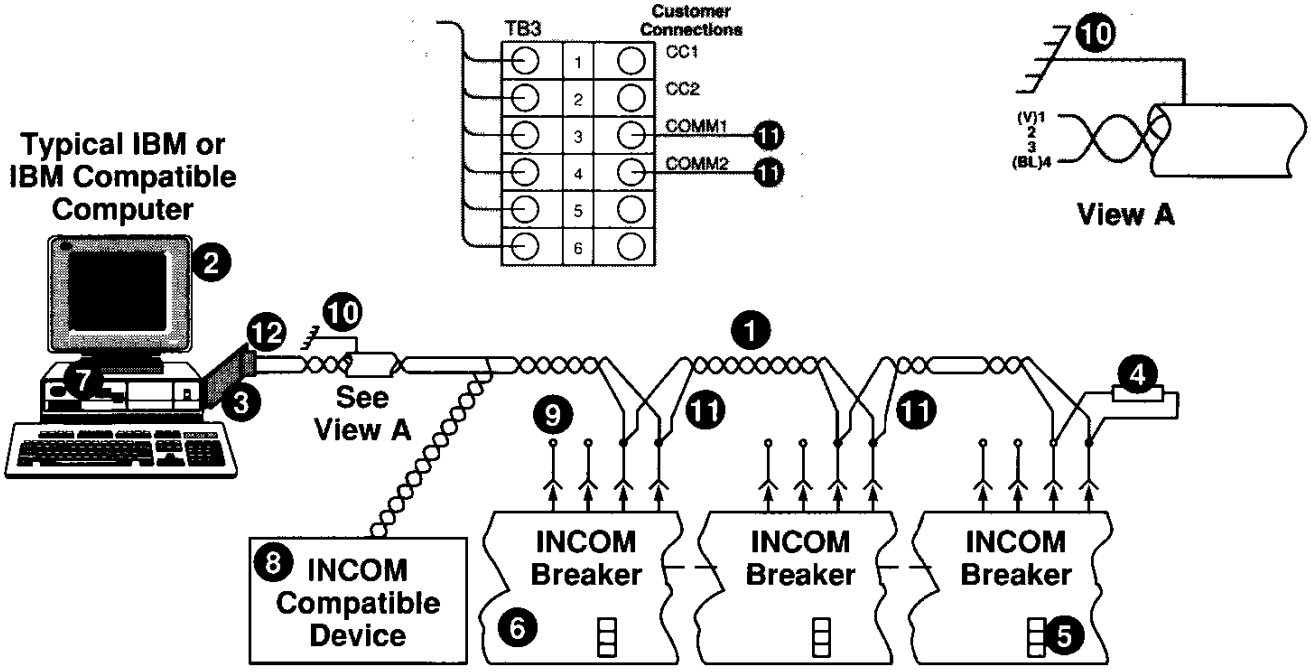
Rule 1: Up to 5 "main runs" may be connected to the system master computer. Each run may be a maximum of 7500 feet in length from the computer to the farthest addressable device.

Rule 2: A 150 Ohm, 0.50 Watt "end-of-line" resistor must be placed at the end of each main run at the farthest addressable device. This resistor properly balances the network impedance to reduce the potential for standing waves. For RMS 700 and 800 Digitrip Retrofit Kits, this resister is attached to TB3-3 (COMM1) and TB3-4 (COMM2) of the cell harness terminal blocks. See Figure 7-3)

Rule 3: An unlimited number of "tees" (maximum length 200 feet) can be added to each "main run." No "end-of-line" resistor is required at the end of the "tee". "Tees" must be connected in parallel to the "main run."

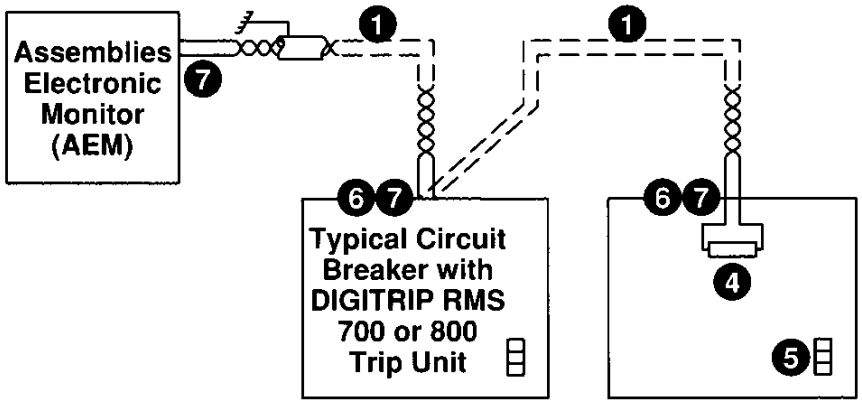
Rule 4: If a "main run" or "tee" terminates at its end to an Assemblies Electronic Monitor (AEM) equipped with a Time Stamp Filter (TSF), the communications network can be extended another 7500 feet. The AEM can accommodate a maximum of 40 Digitrip RMS 700 or 800 Trip Units and 8 IQ Data Plus II devices. An "end-of-line" resistor is required at the farthest device on the extended line.

Rule 5: Use of #18 AWG shielded cable is recommended where radio frequency interference of INCOM with other circuits is possible. The cable shielding serves to prevent the INCOM signals from such interference.



1. For network interconnections use twisted pair conductors (no. 18 AWG shielded preferred).
2. For the master device, use an IBM or equivalent (compatible) personal computer.
3. A Westinghouse CONI (Computer Operated Network Interface) card must be inserted into the computer frame.
4. A 150 ohm (1/2 watt) carbon composition resistor must be installed on the most remote circuit breaker cell harness terminals, as shown, where distance from master exceeds 500 feet.
5. A 3-digit INCOM address must be present on each trip unit. Each INCOM address must be unique in the system. For instructions, refer to I.L. 29-853 or I.L. 29-854.
6. For Retrofit kits, all connections at the cell terminal block assembly.
7. For application software, contact Westinghouse.
8. Can be connected to other INCOM compatible devices. See I.L. 29-853 and I.L. 29-854.
9. 120 VAC incoming power connections at terminals "AC120" and "ACCOM".
10. Ground shielding as shown.
11. Where devices are daisy chained, interconnect shielding, INCOM connections at "COMM1" and "COMM2".
12. Modular telephone connector, type RJ11, supplied by user.

Figure 10-4



1. **For network interconnections use twisted pair conductors (no. 18 AWG shielded preferred).**
2. **For the master device, use an IBM or equivalent (compatible) personal computer.**
3. **A Westinghouse CONI (Computer Operated Network Interface) card must be inserted into the computer frame.**
4. **A 150 ohm (1/2 watt) carbon composition resistor must be installed on the most remote circuit breaker cell harness terminals.**
5. **A 3-digit INCOM address must be present on each trip unit. Each INCOM address must be unique in the system. For instructions, refer to I.L. 29-853 or I.L. 29-854.**
6. **Refer to circuit breaker connection diagrams referenced in Figure 10-4 for actual connection.**
7. **Ground shielding as shown. Where devices are daisy chained, interconnect shielding.**
8. **Modular telephone connector type RJ11, supplied by user and wired per View A as required by CONI card.**

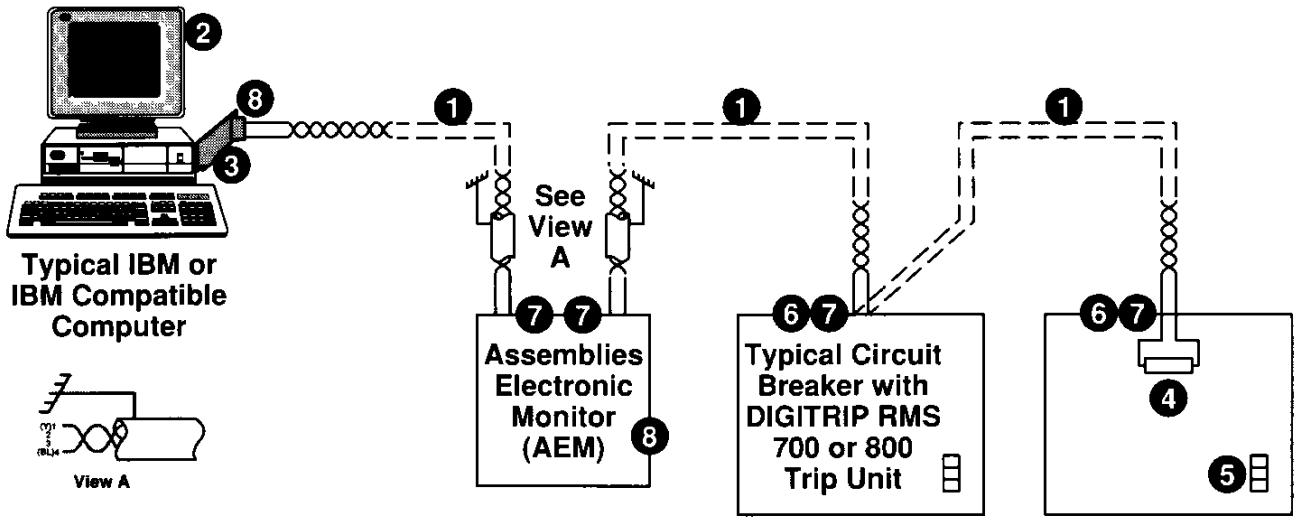
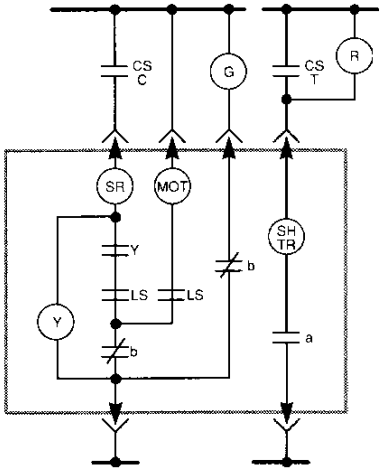
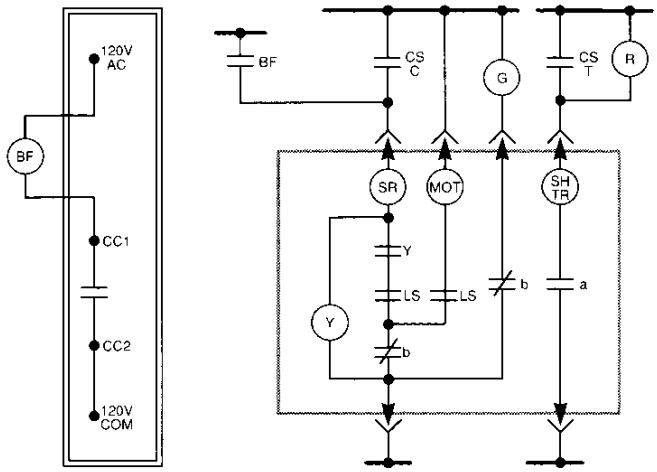


Figure 10-5 (top) and 10-6 (bottom)

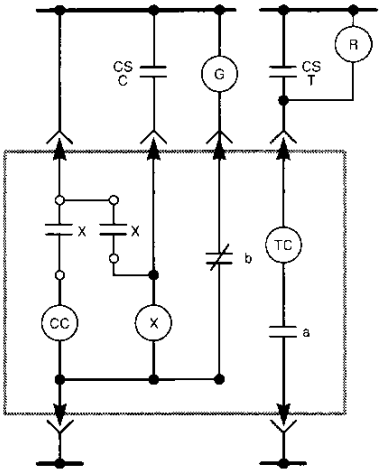


A. *Typical Control Schematic Without CC1/CC2 Modification*

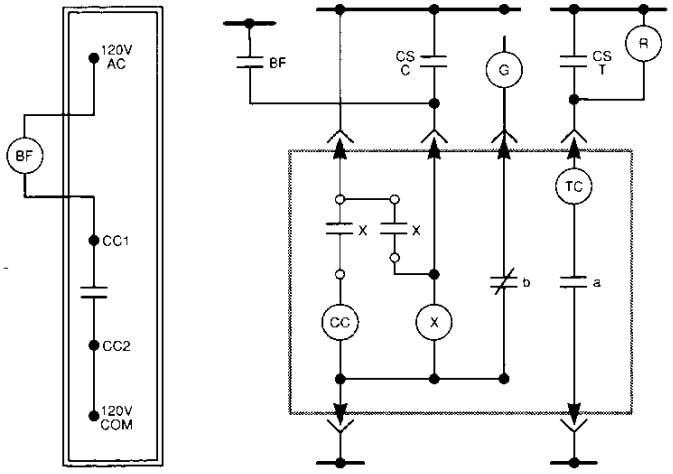


Cell terminal block assy. 6502C71G03 or 6503C57G03 Note: Mount "BF" relay or equivalent, in cell near cell terminal block assy.

B. *CC1/CC2 Modification to a Typical Control Schematic (Stored Energy)*



C. *Typical Control Schematic Without CC1/CC2 Modification*



Cell terminal block assy. 6502C71G03 or 6503C57G03 Note: Mount "BF" relay or equivalent, in cell near cell terminal block assy.

D. *CC1/CC2 Modification to a Typical Control Schematic (Solenoid)*

Figure 10-7 A, B, C, D

Section 11

Maintenance, Warranty, and Service Information

11-1. Preventative Maintenance Program

A periodic maintenance program is essential to assure breaker and switchgear reliability and integrity. Periodic maintenance, including testing, inspection, adjustment, and repair should be performed on both the circuit breaker and the switchgear assembly. For normal operating conditions, a minimum periodic interval of 12 months is recommended. However, additional factors, such as equipment age, state of repair, general condition, local operating environment, number of annual cycles, etc. must be considered in determining an effective maintenance interval.

11-2.Breaker Maintenance

Installation of a Digitrip RMS Retrofit Kit on an existing circuit breaker does not alleviate the user from maintaining the circuit breaker in good operating condition. The Digitrip RMS Trip System will greatly enhance the capability of the circuit breaker to reliably and accurately detect and initiate a trip in the event of an overcurrent condition or fault. However, the ability of the breaker to trip and clear the fault is directly dependent on the operating condition of the breaker.

The user should continue to follow the applicable instructions and procedures provided by the breaker manufacturer and incorporate them into a periodic preventative maintenance program. The following items are not all inclusive, but should be an integral part of such a program:

1. Cleanliness: Breaker moving parts, insulation, and current carrying parts should be kept clean from dust, dirt, and sludge.

2. Lubrication: The breaker operating mechanism should open (trip) and close properly and not stick, bind, or jam. The breaker should be lubricated as required according to the manufacturers recommendations.

3. Contact Condition and Adjustment: Breaker moving and stationary arcing and main contacts should be in proper adjustment, in good condition, and free from burning and pitting. Breaker primary and secondary disconnecting contacts should be in good condition.

4. General Condition and Repair: Breaker hardware should be tight and retaining rings intact. Worn out parts should be replaced or repaired. Electrical connections and wire insulation should be sound and free from evidence of overheating.

5. Digitrip RMS Trip System: Section 8 provides recommended testing procedures for the Digitrip RMS Trip System.

11-3.Warranty Procedure

Digitrip RMS Retrofit Kits include a limited warranty for components for 1 year from the date of shipment. In the event of a warranty problem with a retrofit kit component, contact Westinghouse by the channel through which the retrofit kit was purchased. Contact the Westinghouse retrofit kit distributor, representative, or installer (as applicable) and provide the following information:

1. Original order number by which the kit component was purchased.
2. Part description.
3. Part catalog and/or style number.
4. Complete description of the problem.

If the problem is covered under warranty, instructions will be provided for obtaining a component replacement or for returning the component for repair.

11-4. Digitrip RMS Trip Unit Warranty

Digitrip RMS Trip Units are factory sealed and are not field serviceable. Breaking the factory seal, opening the trip unit, and tampering with it's internal components will void any warranty. In the event of a problem with the trip unit, contact your local Westinghouse representative per the instructions provided in section 11.3 above.

Section 12

Detailed Wiring Common to all Digitrip RMS/R Kits

12.1. Sensor Harness and CT Harness Wiring

To cover both 3 and 4 wire system applications, the Sensor Harness includes two wires to permit the 4th wire connection. These two wires (one tan and one green) are readily identifiable; they are the longest two wires that protrude from the sensor end of the harness. Determine the applicable wiring diagram (Figure 12-1, 12-2, 12-3, 12-4) for your application, and perform the following:

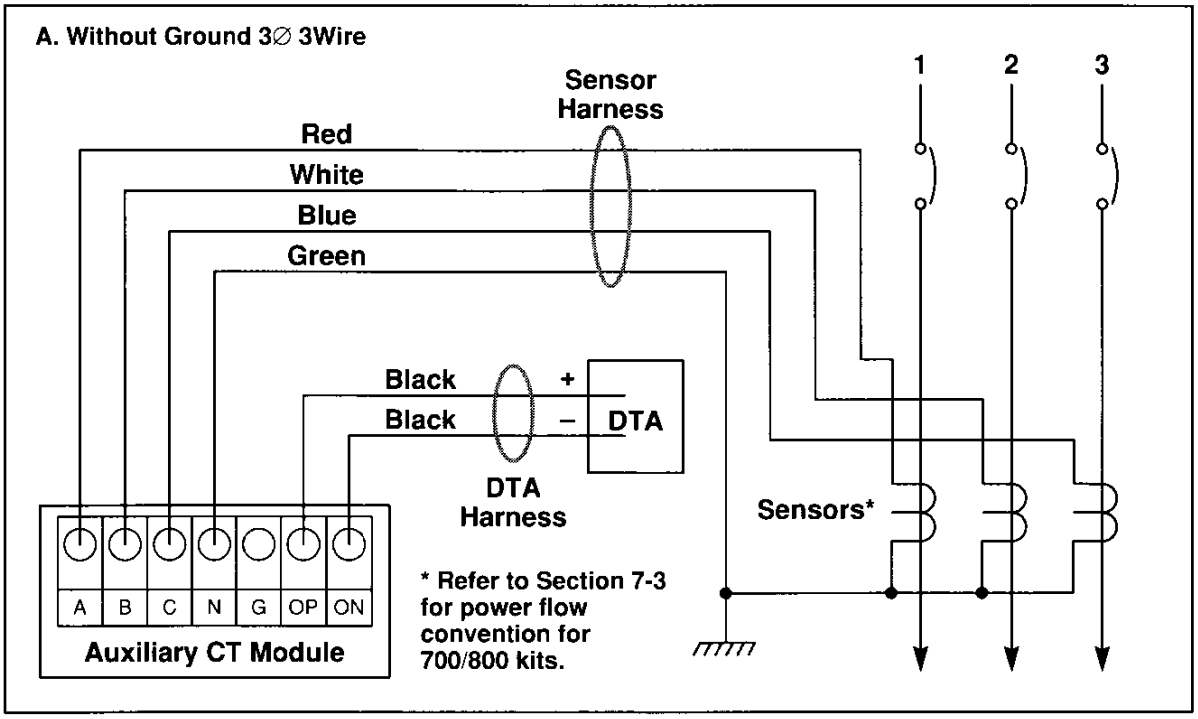
1. If the retrofit is for a 3-wire system (Figure 12-1 or 12-2) the wires provided for the fourth wire connection are not needed. Remove the terminals from the long ends of the green and tan wires, then use an ohmeter to confirm the other ends and remove them by sliding them out of the harness.

2. If the retrofit is for a 4-wire system (Figure 12-3 or 12-4) the green and tan wires provided for the fourth connection are required for connection to an open set of breaker secondary contacts.

Note: For 4-wire grounded systems, the breaker and cell secondary contacts (if required) and the 4th sensor for the switchgear neutral are not included in the kit contents. These items must be ordered separately from the kits.

12.2. Auxiliary CT Harness Wiring

Figure 12-5 shows the detailed wiring connections for the auxiliary CT Harness.



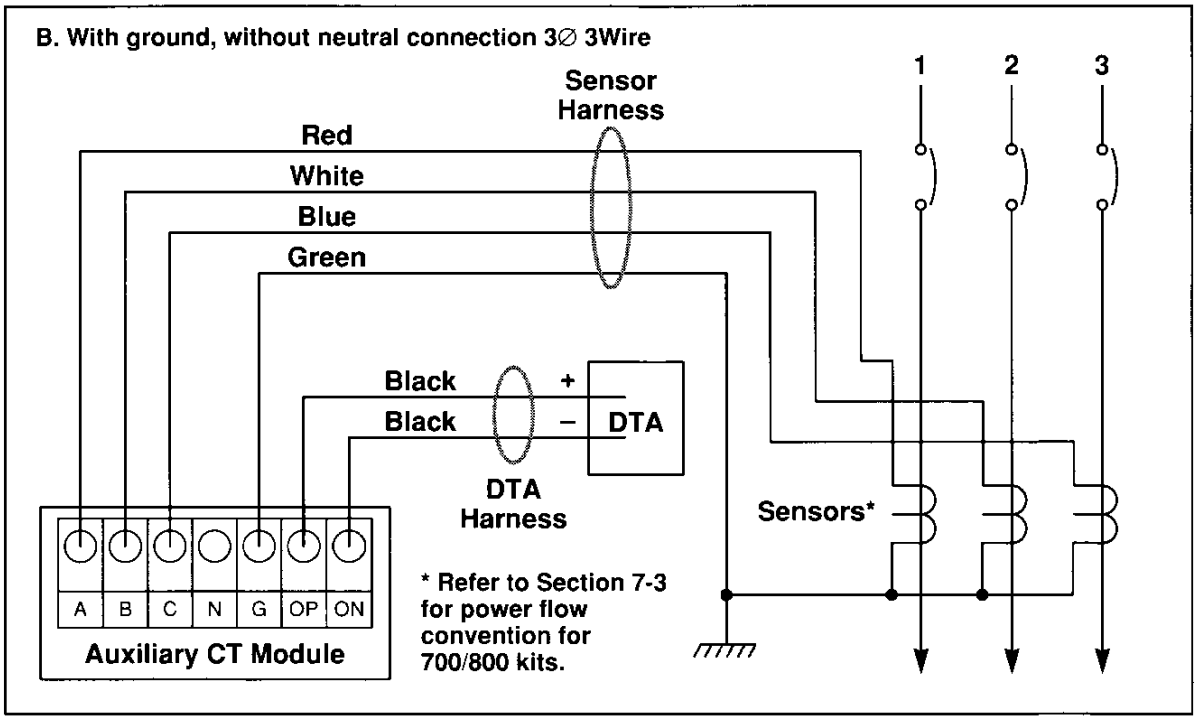
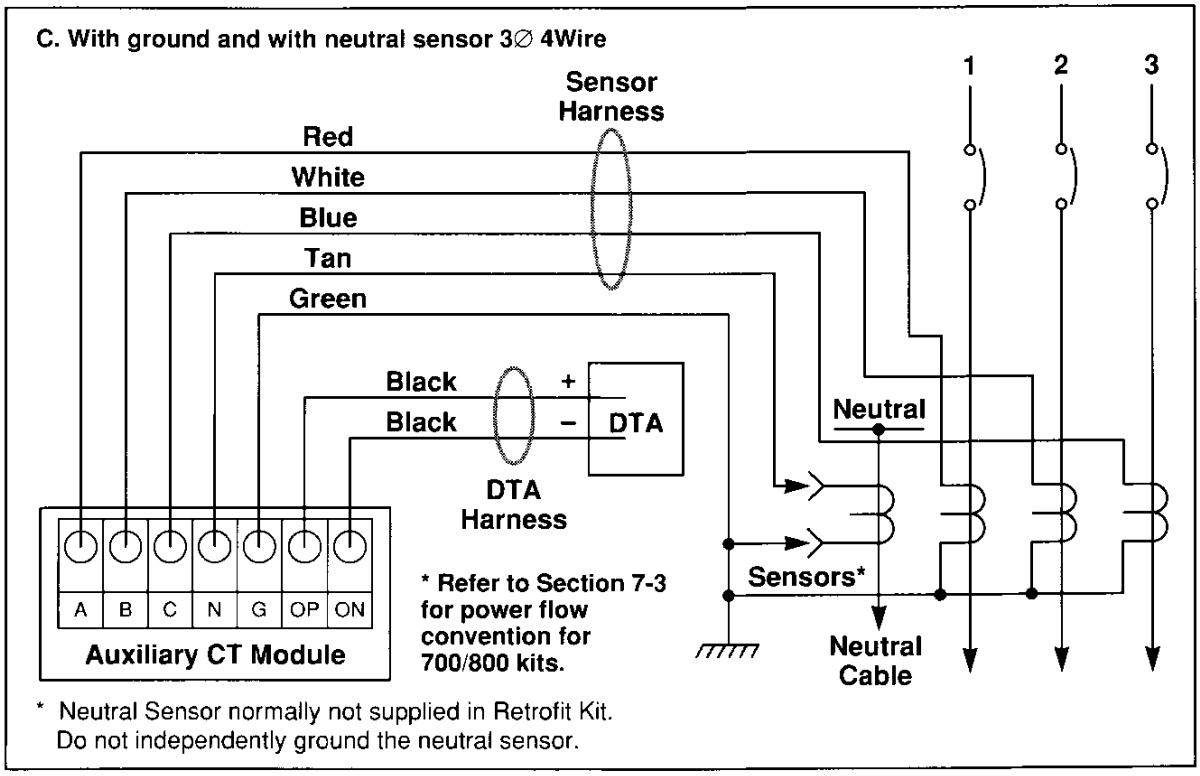


Figure 12-1 (top) and 12-2 (bottom)



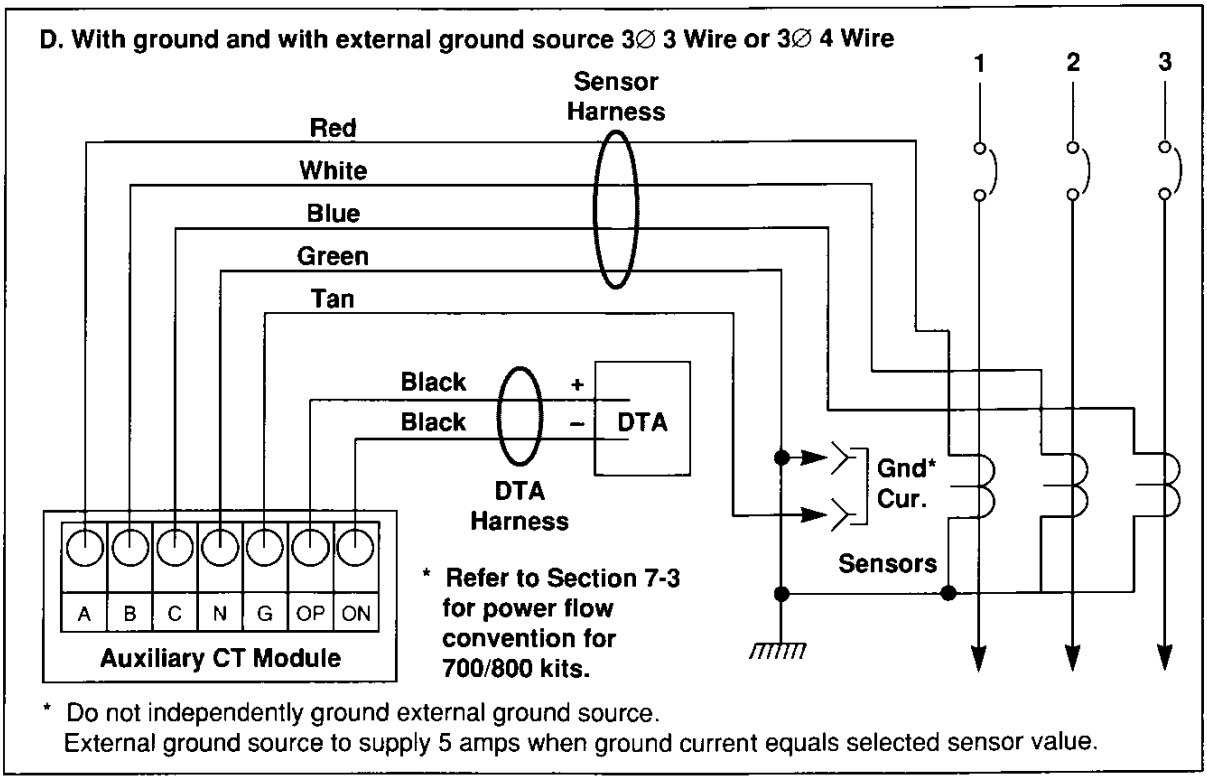


Figure 12-3 (top) and 12-4 (bottom)

AUX. CT HARNESS
EXTERNAL HARNESS
STYLE NO. 6502C84G01
6502C84G02

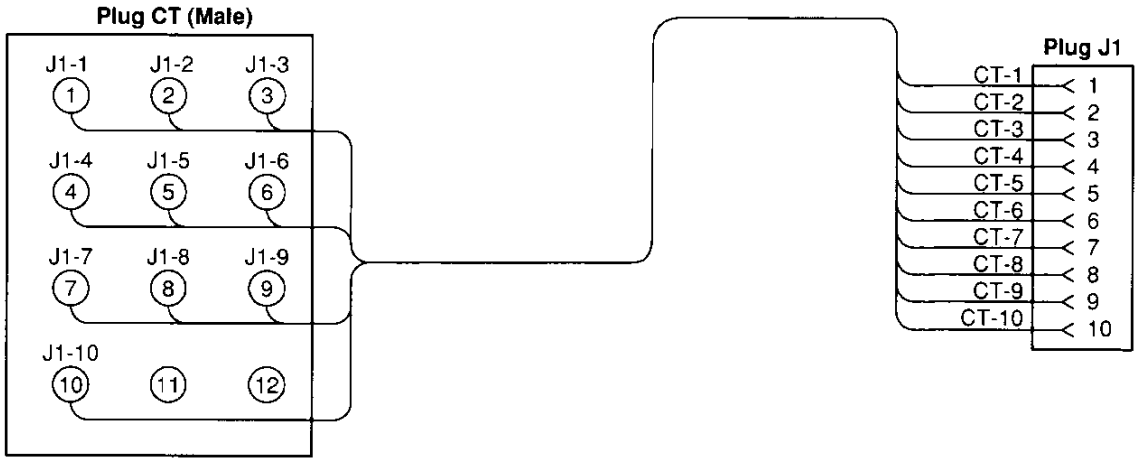


Figure 12-5 Auxiliary CT Harness

Section 13

References

The listed documents are available reference applicable to your Digitrip RMS Retrofit Kit installation.

- I.L. 29-851 Instructions for Digitrip RMS 500 Trip Units
- I.L. 29-852 Instructions for Digitrip RMS 600 Trip Units
- I.L. 29-853 Instructions for Digitrip RMS 700 Trip Units
- I.L. 29-854 Instructions for Digitrip RMS 800 Trip Units

The instruction leaflets listed for Digitrip RMS Trip Units provide useful descriptive information that is also applicable to the Digitrip RMS/R.

This application data is used in conjunction with the installation literature for your particular breaker application. A wide variety of kits are available and new breaker applications are an ongoing development effort. Contact Westinghouse for the latest available retrofit kits.

Westinghouse wishes to thank you for purchasing the Digitrip Retrofit System. Digitrip Retrofit Kits are designed and manufactured in America with pride. All the components are engineered to fit the existing Circuit Breaker with little or no modifications to the existing Breaker. However due to the wide variety and vintage of Breakers in use today, an occasional problem may arise. Please contact us with any questions, comments or concerns.

Westinghouse Electric Corp.
Distribution & Control Business Unit
Five Parkway Center
Pittsburgh, PA 15220

Fax: (412) 937-6770
WIN: 227-6770
Phone: (412) 937-6426
(412) 937-6727
(412) 937-6708
(412) 937-6725

Cutler-Hammer

Westinghouse &
Cutler-Hammer Products
Five Parkway Center
Pittsburgh, Pennsylvania, USA 15220

SL33-855-5

Supplement to AD33-855 For use with Digitrip 510, 610, 810, 910 Retrofit Kits

June 1997

There are three things to keep in mind with Digitrip 510, 610, 810 or 910 kits.

1. Dependent Curves

The Long Delay Time and Short Delay Pickup settings are defined in multiples of the Long Delay Pickup setting. Refer to the curves in Section 3 of AD-33-855 (September 1993):

To use Figures 3-2, 3-3, or 3-4 with Digitrip 510, 610, 810 or 910 trip units,

Figure 3-2,(Page 12):
Disregard Long Delay Settings and Long Delay Time Settings. (Use Figure 3-3)
Instantaneous Pickup and Time are accurate as is.

Figure 3-3,(Page 13):
The Long Delay Setting chosen defines Ir (Ir = Long Delay Setting x In)
Change the horizontal axis to be "Current in Multiples of Ir".
Long Delay Times are defined at 6xIr.
Short Delay Pickups defined in multiples of Ir.

Figure 3-4,(Page 14):
Ground Fault Pickups and Times are accurate as is.

2. Rating Plugs

The rating plugs for the 510, 610, 810 and 910 trip units are not interchangeable with the rating plugs for the 500, 600, 700 and 800 trip units. Refer to Catalog 26-000 (June 1992), page 99:

To change a rating plug from a 500/600/700/800 series plug to a 510/610/710/810 series plug,

SPB Rating Plugs:
Change the first two characters of the Catalog Number from "PD" to "RP". The rest of the characters do not change.
Change the first seven characters of the Style Number from "2613D09" to "3D86737". The rest of the characters do not change.

DS Rating Plugs:
Change the first two characters of the Catalog Number from "PD" to "RP". The rest of the characters do not change.
Change the first seven characters of the Style Number from "2613D10" to "3D86734". The rest of the characters do not change.

Retrofit Rating Plugs:
Change the first two characters of the Catalog Number from "PR" to "RP". The rest of the characters do not change.
Change the first seven characters of the Style Number from "3D86709" to "3D86766". The rest of the characters do not change.

3. IMPACC Communications (Section 7-4)

Step 5: The ohm-meter should read 0-2 ohms. (instead of 470 K Ohms)