Digitrip RMS and Digitrip OPTIM Trip Units Used with Series C® R-Frame Circuit Breakers

TABLE OF CONTENTS **PAGE**

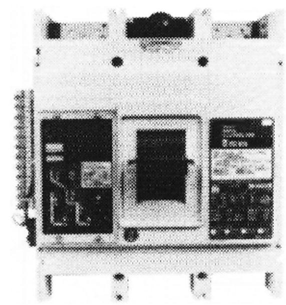

Fig. 1. View of Series C R-Frame Circuit Breaker Shown with Digitrip RMS 510 Trip Unit Installed

WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

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The user is cautioned to observe all recommendations, warnings and cautions relating to the safety of personnel and equipment, as well as all general and local health and safety laws, codes, and procedures.

The recommendations and information contained herein are based on Cutler-Hammer experience and judgment, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact Cutler-Hammer for further information or instructions.

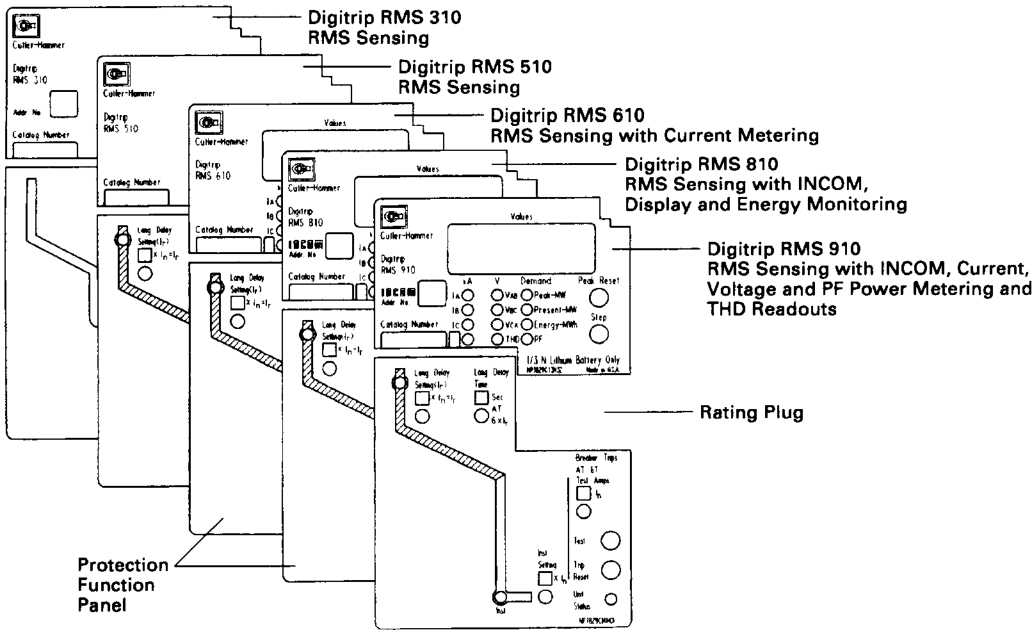


Fig. 2a View of Five Basic Models of the Digitrip RMS Trip Unit

1.0 SUPPLEMENTARY INFORMATION

The instructions contained in this book supplement the instructions for Series C R-Frame Circuit Breakers covered in I.L. 29C107 and Connection Diagram 290714.

2.0 DIGITRIP RMS AND DIGITRIP OPTIM TRIP UNITS

This instruction book specifically covers the application of Digitrip RMS and Digitrip OPTIM Trip Units installed in Series C R-Frame Circuit Breakers as illustrated in Fig. 1.

Digitrip RMS and Digitrip OPTIM Trip Units are ac devices that employ microprocessor-based technology that provides true rms current sensing means for proper correlation with thermal characteristics of conductors and equipment. The primary function of the Digitrip Trip Unit is circuit protection. This is achieved by analyzing the secondary current signals received from the circuit breaker current sensors and initiating trip signals to the circuit breaker shunt trip when pre-set current levels and time delay settings are exceeded.

In addition to the basic protection function, Digitrip RMS Trip Unit models 510, 610, 810, 910 and Digitrip OPTIM 750 and 1050, provide mode of trip information and integral test provisions.

The protection section of the Digitrip Trip Unit can be equipped with a maximum of five phase and two ground (time current) curve shaping adjustments. The exact

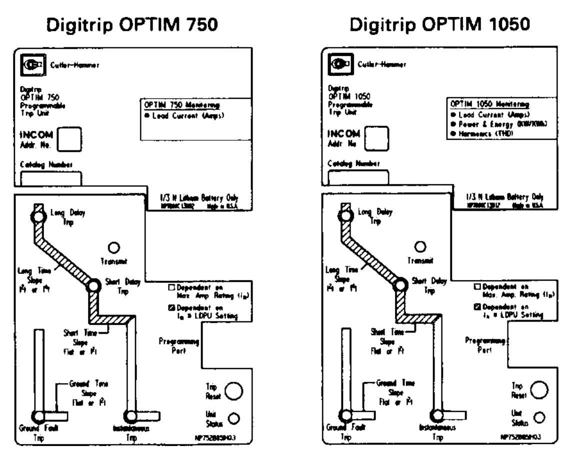


Fig. 2b View of the Two Basic Models of the Digitrip OPTIM Trip Unit

selection of the available protection function adjustments is optional to satisfy the protection needs of any specific installation. The short delay and ground fault pick-up adjustments can be set for either flat or I^2t response. A pictorial representation of the applicable time-current curve for the selected protection functions is provided on the face of the trip unit for user reference.

On the Digitrip Models 510, 610, 810, 910, 750 and 1050 red LEDs that are imbedded in the Time-Current curves depicted on the face of the trip unit provide mode of trip indication for ground fault, overload and short circuit trip operations.

Digitrip RMS Models 510, 610, 810, and 910 that are not equipped with an adjustable instantaneous trip element (LS and LSG) are provided with a making current release which is referred to as a DIScriminator. The DIScriminator is switch selectable to disable this function. In addition, on all models, a high-level instantaneous override circuit is provided to ensure rapid circuit clearing under abnormal fault current conditions. The override is set for 16,000A ±15%.

Digitrip RMS Trip Units are available in five basic models, as illustrated in Fig. 2a: 310, 510, 610, 810, and 910. Separate instruction leaflets referenced in Section 8.2 cover the basic functions and features of each model.

Digitrip OPTIM Trip Units are available in two models as illustrated in Fig. 2b: 750 and 1050. A separate related series of 3 instruction leaflets, referenced in Section 8.0, cover the two trip unit models, the hand held OPTIMizer and the panel mounted BIM (Breaker Interface Module).

This instruction book is arranged to describe the unique features of each type as they relate to their application in Series C R-Frame Circuit Breakers. Table 1 illustrates the available functions and features of each of the trip unit models.

3.0 RATING PLUGS

3.0.1 Digitrip RMS Plugs 510, 610, 810, 910

Rating Plugs, as illustrated in Figures 3.2 thru 3.4, determine the maximum continuous current rating of the circuit breaker. All protection function settings on the face of the trip unit are expressed in per unit multiples of the plug ampere rating (I_n). A fractional multiplier of the plug ampere rating is set by the long delay setting switch to further define the (I_r) continuous current rating for the long time and short time functions. See curve references in Section 8.3.

Available rating plugs are shown in Table 2b. Plugs must be selected to match the desired continuous current rating of the circuit breaker as well as the frame rating.

3.0.2 Digitrip RMS 310 – Plugs

This family of plugs is illustrated in Fig. 3.1. This plug design will not mechanically fit into the other Digitrip models. On the model 310 units the continous current rating (I_r) equals the rating plug ampere rating (I_n). The plug scaled by the short delay pickup or instantaneous switch settings provides short circuit protection levels. See curve references in Section 8.3. Available rating plugs are shown in Table 2a. Plugs must be selected to match the desired continuous current rating of the circuit breaker as well as frame rating.

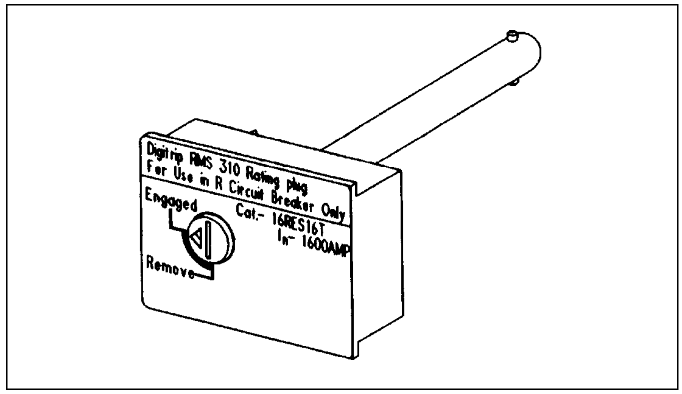


Fig. 3.1 Typical Rating Plug for Digitrip RMS 310

3.0.3 Digitrip RMS Plugs for OPTIM, 750 and 1050

The Digitrip OPTIM rating plugs are similar in construction to the plug family described in Section 3.0.1. The plugs are marked Digitrip RMS. The plug determines the maximum continuous current rating of the circuit breaker. The pickup settings are ultimally loaded via software into the trip unit in per unit but are displayed for user's ease as an ampere value. The Long Delay Current Setting (Long Delay Pickup) loaded in amperes via an external device is actually a fractional multiplier of the plug ampere rating (I_n) and in turn defines a (I_r) continuous current rating for the long time and short time functions. See curve references in Section 8.3. Available rating plugs are shown in Table 2c. Plugs must be selected to match the desired continuous current rating of the circuit breaker as well as frame rating.

3.0.4 Rating Plugs Battery

For all models except Digitrip 310, rating plugs are equipped with a back-up battery to maintain the mode of trip operation following a circuit breaker tripping operation when external control power is not available. The battery is a long-life lithium type, that is replaceable from the front of the trip unit, when required, without removing the rating plug. See Figs. 3.2 thru 3.4. Replacement types and instructions are provided in the Digitrip RMS Trip Unit instruction leaflet referred to in Section 8.2 of this book.

Following a trip operation and with no supplementary control power available, the battery will maintain the mode of trip LED for approximately 60 hours.

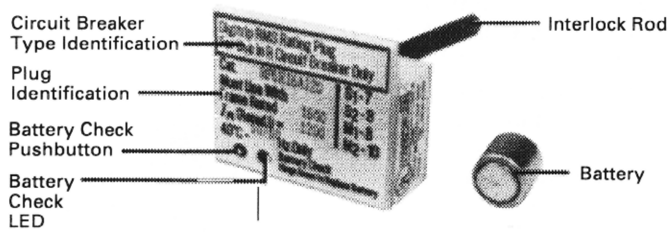


Fig. 3.2 *View with Hinged Cover Closed*

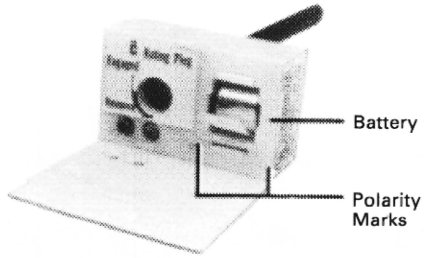


Fig. 3.3 *View with Hinged Cover Open and Battery Installed*

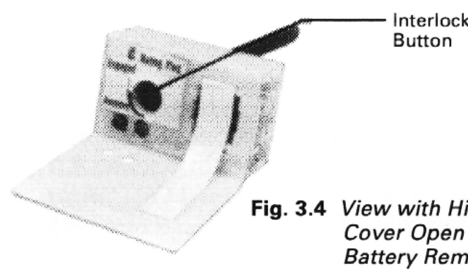


Fig. 3.4 *View with Hinged Cover Open and Battery Removed*

Fig. 3.2 thru 3.4 Typical Rating Plug for Digitrip RMS 510, 610, 810, 910 and Digitrip OPTIM 750, 1050

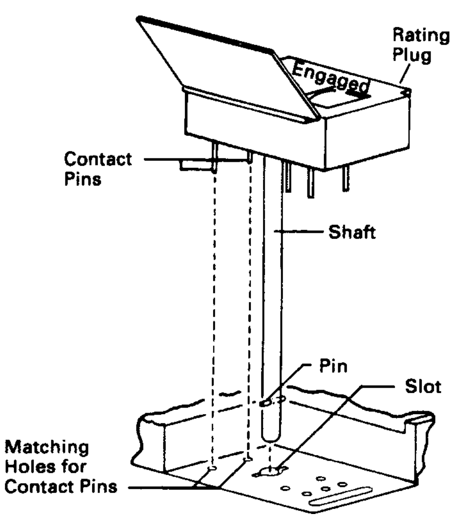


Fig. 3.5. Installation of Rating Plug

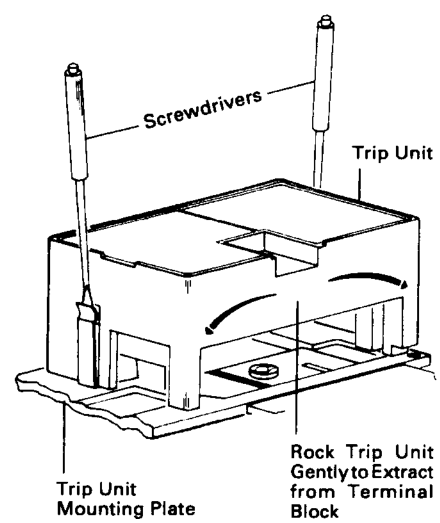


Fig. 3.6. Removal of Trip Unit

Note: The rating plug must be securely tightened in the trip unit before operating the circuit breaker.

3.1 Installation and Removal of Trip Components

Series C R-Frame circuit breakers are shipped with the trip unit installed. Make sure that the trip unit and the circuit breaker are suitable for the intended installation by comparing nameplate data with any existing equipment and system requirements. If both trip unit and circuit breaker are suitable, the circuit breaker requires only the installation of a rating plug to make it operational.

3.2 Installation of Rating Plug

Note: The rating plug mechanically interlocks with the circuit breaker frame. If the rating plug is not cor-

rectly installed, the circuit breaker cannot be reset or placed in the ON position.

Before the rating plug can be installed, the transparent trip unit cover must be removed from the circuit breaker.

To install the rating plug on Digitrip RMS Models 510, 610, 810, 910 and Digitrip OPTIM 750 and 1050, first flip the hinged cover open and align the arrow on the interlock button to point towards the REMOVE position.

a. Remove transparent trip unit cover after loosening the four thumbscrews.

b. Make sure arrow on rating plug interlock button is pointing at REMOVE. Adjust, if necessary, using a flatblade screwdriver.

c. Position the rating plug over the trip unit as shown in Fig. 3.5. The pin on the rating plug shaft must line up with the matching slot in the trip unit.

d. Push the rating plug in as far as it will go. The electrical contact pins will enter matching holes in the trip unit. A springiness will be felt when the rating plug bottoms in the trip unit.

e. Place a flatblade screwdriver in the slot in the interlock button. Press in approximately 1/16-inch and turn button 90° clockwise to the “ENGAGED” position.

Note: If unit is a Digitrip RMS 310, and an adjustable rating plug is installed, set rating plug switch marked A, B, C, D to the current rating desired.

f. After adjusting trip unit settings to the desired settings, close the rating plug’s hinged cover and reinstall trip unit transparent cover. Secure in position with four thumbscrews.

g. Circuit breaker can now be reset and switched to the ON and OFF positions.

WARNING

***BEFORE YOU FIT THE RATING PLUG INTO THE TRIP UNIT*, BE SURE TO *CHECK* THAT THE *BREAKER TYPE* AND FRAME RATING (OR *SENSOR RATING* IF APPLICABLE), *MATCH* THOSE PRINTED ON THE *RATING PLUG* COVER.**

INSTALLING A RATING PLUG THAT DOES NOT MATCH THE BREAKER TYPE AND FRAME RATING (OR SENSOR RATING, IF APPLICABLE), CAN PRODUCE SERIOUS MISCOORDINATION AND/OR FAILURE OF THE PROTECTION SYSTEM.

3.3 Trip Unit Removal

Use the following instructions to remove a Digitrip trip unit from a circuit breaker.

WARNING

THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. BEFORE REMOVING THE COVER OF AN R-FRAME CIRCUIT BREAKER MOUNTED IN AN ELECTRICAL SYSTEM, MAKE SURE THERE IS NO VOLTAGE AT LINE OR LOAD TERMINALS. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE NO VOLTAGE IS PRESENT.

a. Press the Push-to-Trip button in the circuit breaker cover to trip the circuit breaker.

b. Remove eight cover screws and circuit breaker cover.

c. Remove the rating plug. Flip the hinged cover open. Turn the interlock button counter clockwise to the REMOVE position. Rating plug will raise slightly. Grasp rating plug and pull out gently. Make sure pin in shaft lines up with slot in trip unit. Adjust position of interlock button as required to ensure a smooth withdrawal of the shaft.

d. Remove trip unit. Using two small flatblade screwdrivers, lift up on the spring clips located at each end of the trip unit (see Fig. 3.5).

e. With the screwdrivers in position, gently rock the trip unit from side to side until it works free from the circuit breaker.

3.4 Trip Unit Replacement

Make sure the trip unit to be installed is suitable for the intended installation by comparing the trip unit catalog number with the nameplate on the circuit breaker frame located to the right of the handle. Rejection pins are used in the circuit breaker frame to prevent the installation of an incorrect trip unit.

a. Remove any existing trip unit by following the procedures in paragraphs 3.3.a through e.

Note: The replacement trip unit should be installed before the circuit breaker cover is re-installed.

b. Position the replacement trip unit above the white terminal block to the left of the circuit breaker handle. Align the protruding circuit board with the mating slot in the white terminal block (see Fig. 3.7).

c. Carefully press the trip unit into place. A sharp click will be heard as the retaining springs click into position.

d. Install rating plug (see paragraphs 3.2.b through e).

e. Reinstall the circuit breaker cover.

4.0 DIGITRIP RMS MODEL CONSIDERATIONS

4.1 Digitrip RMS 310

The Digitrip RMS 310 Trip Assembly consists of a Digitrip RMS 310 Trip Unit as described in I.L. 29C883, 3 or 4 auxiliary current transformers and a stab-in trip unit terminal block as shown in Figs. 4 and 5.

The fourth auxiliary current transformer is supplied when the optional ground fault or neutral protection function is selected in the trip unit. Also, a side mounted 4-point terminal block is provided to pre-wire the mode of ground fault sensing used, i.e., residual or source ground. These connections are shown in Fig. 16.

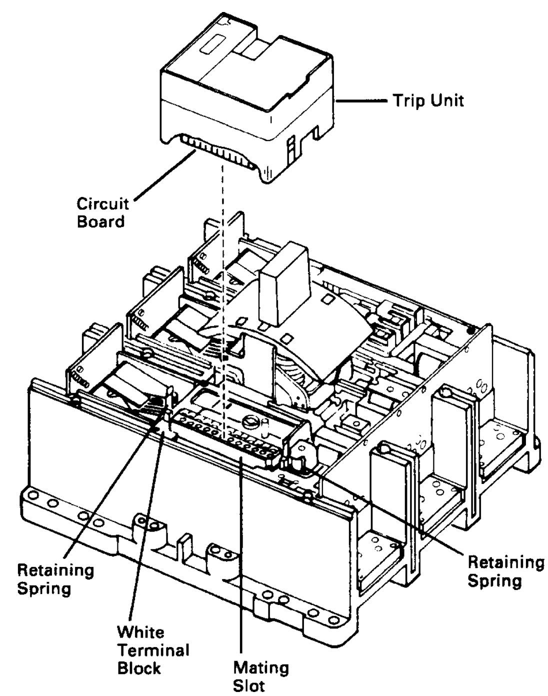


Fig. 3.7. Installation of Trip Unit

CAUTION

IN A DRAWOUT MOUNTED BREAKER TESTING OF A CIRCUIT BREAKER BY INIATING A TRIP OPERATION WHILE IN THE CELL “CONNECTED” POSITION BY THE EXTERNAL TEST KIT OR THE INTEGRAL TEST PROVISIONS IN THE DIGITRIP RMS TRIP UNIT IS NOT RECOMMENDED.

THE TRIPPING OPERATION OF THE CIRCUIT BREAKER WILL CAUSE DISRUPTION OF SERVICE AND POSSIBLY PERSONAL INJURY RESULTING FROM UNNECESSARY SWITCHING OF CONNECTED EQUIPMENT.

TESTING OF A CIRCUIT BREAKER SHOULD BE DONE ONLY IN THE “TEST,” “DISCONNECTED” OR “WITHDRAWN” CELL POSITIONS.

WHERE A CIRCUIT BREAKER TRIP OPERATION IS DESIRED FOR A FIXED MOUNTED CIRCUIT BREAKER, TESTING SHOULD BE CONDUCTED ONLY WHEN THE EQUIPMENT IN WHICH THE BREAKER IS MOUNTED IS COMPLETELY DE-ENERGIZED.

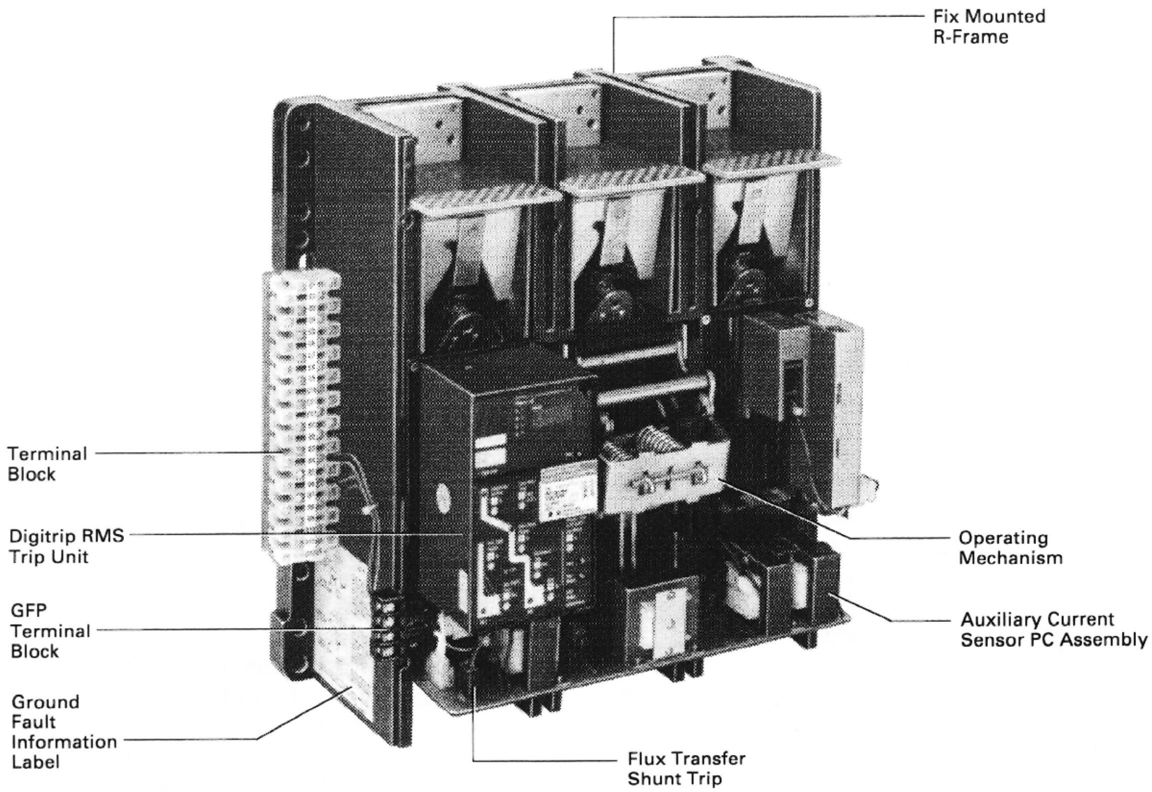


Fig. 4. View of 1600A, Type R-Frame Circuit Breaker with Front Cover Removed to Expose Digitrip RMS Trip Unit

4.2 Digitrip RMS 510

The Digitrip RMS 510 Trip Assembly consists of a Digitrip RMS 510 Trip Unit as described in I.L. 29-885, 3 or 4 auxiliary current transformers and a stab-in trip unit terminal block as shown in Figs. 4 and 5.

The fourth auxiliary current transformer is supplied when the optional ground fault protection function is selected in the trip unit. Also, a side mounted 4-point terminal block is provided to pre-wire the mode of ground fault sensing used, i.e., residual or source ground.

The trip unit contains a receptacle for use with an optional Auxiliary Power module (Cat. No. PRTAAPM). When this module is plugged in the trip unit and connected to a 120V, 50/60 Hz supply, the circuit breaker can be bench tested using the integral test panel. With the circuit breaker in the closed position, it can be “tripped” when the test selector switch is in either the “6T” or “GFT” positions.

4.3 Digitrip RMS 610

The Digitrip RMS 610 Trip Assembly consists of a Digitrip RMS 610 Trip Unit as described in I.L. 29-886, 3 or 4 auxiliary current transformers, a stab-in trip unit terminal block and a Power/Relay module mounted as illustrated in Figs. 4 and 5. The Digitrip RMS 610 Trip Unit is similar to a Digitrip RMS 510 Trip Unit with the addition of a four-digit display, three-phase (I_A, I_B, I_C) and one ground current (I_G) or one neutral current (I_D) green pointer LEDs along with a stepping push button as illustrated in Table 1. Signal contacts are provided for hard wiring three remote mode of trip indicators (long delay, short circuit, ground fault) and a High-Load remote alarm.

The ground current pointer LED and ground fault mode of trip signal contact are supplied only when the ground fault protection function is provided in the trip unit.

A 120V, 50/60 Hz 6 VA Power/Relay module is standard for operating the display and internally mounted signal relays. The relay contacts are each rated 120V, 1.0A. A 230V 50/60 Hz 6 VA power relay module is also available.

The Power/Relay module will maintain the cause of trip LEDs history and trip history as long as the control power supply is available. With loss of the control power supply, only the cause of trip LEDs will be maintained by the back-up battery located in the rating plug.

The High-Load message and remote alarm switch are pre-set at 85% of the value of the long delay setting. The High-Load relay operates and the LED turns “ON” when the 85% level is exceeded only after an approximate 40 second delay to ride through momentary High-Load conditions.

4.4 Digitrip RMS 810

The Digitrip RMS 810 Trip Assembly is similar to the Digitrip RMS 610 Trip Assembly with the addition of a four-digit display, three-phase (I_A, I_B, I_C) and one ground current (I_G) or one neutral current (I_D), green pointer LEDs along with a stepping push button, peak demand, present demand and energy consumed green pointer LEDs along with a peak demand reset push button as illustrated in Table 1. The Digitrip RMS 810 Trip Unit is described in I.L. 29-888.

The Trip Assembly provides for both local displays on the face of the trip unit and remote communications via an IMPACC communication network signal link as illustrated in Table 1.

In addition, if desired, an Assemblies Electronic Monitor (AEM) as described in I.L. 17-216, may also be installed to show the parameters in Table 1 covered under Note 2.

A communicating panel mounted device, the Breaker Interface Module (BIM), as described in I.L. 29C893 can be used to display metering and other transmittable data.

Interconnections for the IMPACC circuit must be connected as shown in I.L. 29-888 and wiring diagram using twisted pair (shielded) No. 18 AWG conductors.

The three-digit IMPACC address must be set on each trip unit per instructions given in I.L. 29-888. To insure that each circuit breaker in an assembly is properly located after the address is set, the breaker should be identified with its proper cell location and that reference along with the breaker IMPACC address marked on the face of the trip unit in the spaces provided.

In addition to the communication of the breaker data, the IMPACC module allows for remote tripping (via the flux shunt trip) and closing of the circuit breaker.

4.5 Digitrip RMS 910

The Digitrip RMS 910 Trip Assembly is similar to the Digitrip RMS 810. It is a communicating trip unit that provides all the functions described in Section 4.4 plus the addition of the following features both locally displayed and remotely communicated:

1. Phase-to-phase voltages - V_{AB}, V_{BC}, V_{CA}

2. System power factor - PF

3. Total harmonic distortion THD for I_A, I_B, I_C

The THD calculation also includes the individual harmonic currents up to the 27 harmonic as a percentage of the fundamental. Also included with the THD is provisions for waveform capture information via a host computer. Detailed information is provided in I.L. 29-889.

4.6 Digitrip OPTIM 750

The Digitrip OPTIM 750 is a programmable communicating microprocessor-based RMS current sensing trip unit. For the R-Frame breaker it is physically the same plug-in trip unit as all the other Digitrip models. There are two style offerings – Phase Protection with Ground Fault Trip (Cat. P76LSIG) and Phase Protection with Ground Fault Alarm (Cat. P77LSIA).

The front panel of the unit has 3 or 4 causes of trip LEDs and a telephone type receptacle for purposes of programming settings, testing and displaying phase currents via a separate hand-held unit called the OPTIMizer. There are up to 10 trip functions that can be programmed which includes both a 1^2t and 1^4t curve for the Long-Time slope. There are also typically ten times the number of setpoints compared to a front adjustable trip unit. All transmittable data as well as programming of the trip curve settings can also be communicated over a twisted pair cable via the breaker’s secondaries (terminals C11, C12) to either a host computer or a panel mounted Breaker Interface Module (BIM).

The breaker includes a Power/Relay module per Fig. 5 to provide power for the communications function and delay output for alarming.

Detail information on Digitrip OPTIM trip units is in I.L. 29C891.

4.7 Digitrip OPTIM 1050

The Digitrip OPTIM 1050 is a programmable communicating microprocessor-based RMS current sensing trip unit. For the R-Frame breaker it is physically the same plug-in unit as all the other Digitrip models. There are two style offerings–Phase Protection with Ground Fault Trip (Cat. P106LSIG) and Phase Protection with Ground Fault Alarm (Cat. P107LSIA).

The front panel of the unit has four cause of trip LEDs and a telephone type receptacle for programming settings, testing and displaying phase currents via a separate hand-held unit called the OPTIMizer. (The OPTIMizer is used primarily for initial setup of an individual breaker.) There are up to ten trip functions that can be programmed which includes both a 1^2t and a 1^4t curve for the Long-Time Slope. There is also typically ten times the number of setpoints compared to a front adjustable trip unit for each function.

All transmittable data as well as programming of the trip curve settings can also be communicated over a twisted pair wiring network via breaker's secondary terminals C11, C12 to either a host computer or a panel mounted Breaker Interface Module (BIM).

Harmonics information including total Harmonic Distortion, the individual harmonic currents involved up to the 27th harmonic and waveform capture for the three phase currents and the neutral is accessible via communications.

The Digitrip OPTIM 1050 will also provide Power and Energy Monitoring functions via communications. The breaker requires the PT Module (Fig. 5) to provide this functionality. Also included is a Power/Relay module to provide power for communication functions and relay outputs for alarming.

4.8 Reset Operation

Following overload, short circuit, or ground fault tripping events on Digitrip Types 610, 810, and 910, the Digitrip “Trip Reset” pushbutton must be depressed before the circuit breaker handle can be reset (trip/reclose feature).

The Digitrip RMS 310, 510 and Digitrip OPTIM 750 and 1050 in R-frame do not require a trip reset push-button operation to reset the breaker's mechanism. However, a trip reset push-button operation is required to clear cause of trip LED.

5.0 PRINCIPLE OF OPERATION

5.1 General

The circuit breaker is tripped automatically under fault current conditions by the combined action of three components:

1. The sensors which determine the current level.
2. The Digitrip RMS Trip Unit, which provides a tripping signal to the Flux Shunt Trip when current and time delay settings are exceeded.
3. The flux shunt trip which actually trips the circuit breaker.

Schematically, this may be represented as illustrated in Fig. 6. This arrangement provides a very flexible system covering a wide range of tripping characteristics. Not only is the Digitrip RMS Trip Unit adjustable, but selection of rating plugs provides a wide range of continuous current ratings.

The automatic overload and short circuit tripping characteristics for a specific circuit breaker are determined by the ratings of the installed current sensors, rating plugs and the selected functional protection settings. Specific settings instructions are provided in the applicable trip unit instruction leaflet referenced in Section 8.2 of this instruction book.

When the functional protection settings are exceeded, the Digitrip RMS Trip Unit supplies a trip signal to the flux shunt trip. Thus all tripping operations initiated by the protection functions of the Digitrip RMS Trip Unit are performed by secondary control circuitry, with no mechanical or direct magnetic action between the primary current and the mechanical tripping parts of the breaker and with no external control power required.

5.2 Digitrip RMS Trip Assembly

The basic Digitrip RMS Trip Assembly, as illustrated in Figs. 1, 2 and 4, includes the following which could vary slightly depending upon the exact model of the Digitrip Trip Unit installed:

1. Digitrip RMS or Digitrip OPTIM Trip Unit
2. Rating Plug
3. Auxiliary Current Transformers – 3 or 4 depending upon whether or not ground fault or neutral protection is included. These are installed on back-mounted PC board.
4. Stab-in Terminal Block for Trip Unit
5. Power/Relay module (Digitrip RMS Trip Unit Models 610, 810, 910 and Models 750 and 1050.)

Table 1 – Digitrip RMS and Digitrip OPTIM Trip Unit Characteristics for R-Frame

	Trip Unit Characteristics	Digitrip RMS Type					Digitrip OPTIM	
		310	510	610	810	910	750	1050
	Instruction Leaflet Number	I.L. 29C883	I.L. 29-885	I.L. 29-886	I.L. 29-888	I.L. 29-889	I.L. 29C891	I.L. 29C891
Protection	Long Delay Setting	Fixed	X	X	X	X	X	X
	Long Delay Time		X	X	X	X	X	X
	Long Time Slope (I^2t or I^4t)						X	X
	Long Time Memory Unpowered	X	⑪	⑪	⑪	⑪	X	X
	Long Time Memory Powered	X	X	X	X	X	X	X
	Overtemperature	X	X	X	X	X	X	X
	Short Delay Pick-up	X	OPT.	OPT.	OPT.	OPT.	X	X
	Short Delay Time	X	OPT.	OPT.	OPT.	OPT.	X	X
	Flat/I^2t Response	X	X	X	X	X	X	X
	Zone Interlocking		①	①	①	①	①	①
	Instantaneous Pick-up	X	OPT.	OPT.	OPT.	OPT.	X	X
	DIScriminator Disable		⑩	⑩	⑩	⑩		
	Ground Fault Pick-up	OPT.	OPT.	OPT.	OPT.	OPT.	OPT.	OPT.
	Ground Fault Time	OPT.	OPT.	OPT.	OPT.	OPT.	OPT.	OPT.
	Ground Time Memory	X	X	X	X	X	X	X
	Zone Interlocking		①	①	①	①	①	①
	Ground Fault Alarm Only						OPT.	OPT.
	Neutral Protection	OPT.	OPT.	OPT.	OPT.	OPT.		
	Interchangeable Rating Plug	X	X	X	X	X	X	X
	Trip/Reclose Feature			X	X	X		
Local Trip Indicators	Mode of Trip LEDs		X	X	X	X	X	X
	Battery – for Mode of Trip LEDs		X	X	X	X	X	X
	Battery Status LED (Green)		X	X	X	X	X	X
	Battery Test Pushbutton		X	X	X	X	X	X
Remote Signals	Power/Relay Module			X	X	X	X	X
	Remote Signal Contacts							
	High Load Alarm			X	X	X	X	X
	Long Delay Trip			X	X	X	X	X
	Short Circuit Trip			X	X	X	X	X
	Ground Fault Trip	⑥		⑥	⑥	⑥	⑥	⑥
	Ground Fault Alarm						⑫	⑫
	Neutral Alarm			⑨	⑨	⑨	⑨	⑨
Test	Integral Test Provisions		X	X	X	X	⑬⑭	⑬⑭
	Trip Unit Status Indication LED		X	X	X	X	X	X
	Auxiliary Power Module		OPT.	OPT.	OPT.	OPT.		
	Test Kit (Catalog No. STK2)	X						
Current Metering	4 Digit Display			X	X	X		
	Ia Current			X	X	X	⑬⑭	⑬⑭
	Ib Current			X	X	X	⑬⑭	⑬⑭
	Ic Current			X	X	X	⑬⑭	⑬⑭
	Ig Ground Current and/or			⑥	⑥	⑥	⑬⑭	⑬⑭
	Id Neutral Current			⑨	⑨	⑨	⑬⑭	⑬⑭
	Display Stepping Pushbutton			X	X	X		
Harmonic Currents	Total Harmonic Distortion (THD) LED					X ⑭		⑬⑭
	Per Harmonic					X		⑬⑭
	Waveform Capture					④⑭		⑭
Voltage Metering	4 Digit Display					X		
	Phase to Phase [VAB] LED					X		
	Phase to Phase [VBC] LED					X		
	Phase to Phase [VCA] LED					X		
Energy Monitoring	Potential Transformer Module				X	X		X
	PTM Disconnect Plug for Dielectric Testing of Circuit Breaker				X	X		X
	Energy Monitoring: Parameters:							
	System Power Factor LED				④⑭	X		⑬⑭
	Peak Demand LED				X	X		⑬⑭
	Peak Demand Reset				③⑭	③⑭		⑬⑭
	Present Demand LED				X	X		⑬⑭
	Reverse Power Flow				③⑭	③⑭		⑬⑭
	"NPOW" Message				X	X		⑬⑭
	Energy Consumption LED				X	X		⑬⑭
	Forward Energy				⑭	⑭		⑬⑭
	Reverse Energy				⑭	⑭		⑬⑭
	Energy Reset				⑭	⑭		⑬⑭
Transmittable Data	IMPACC (Integrated Communications)				X	X	X	X
	Address Register				⑧	⑧	⑬	⑬
	Baud Rate Register				⑧	⑧	⑬	⑬
	Transmittable Parameters:							
	Individual Phase Currents				③	③	⑬⑭	④⑬⑭
	Ground Currents				③⑥	③⑥	⑬⑭	④⑬⑭
	Neutral Currents				④⑨	④⑨	⑬⑭	④⑬⑭
	Breaker Status:							
	High Load .... "HILD"				③⑭	③⑭	⑬⑭	⑭
	Open/Closed/Tripped				③⑭	③⑭	⑭	⑭
	Mode of Trip:							
	Override .... "ORID"				③⑭	③⑭	⑬⑭	⑬⑭
	Instantaneous....... "INST"				③⑭	③⑭	⑬⑭	⑬⑭
	DIScriminator....... "DISC"				③⑭	③⑭	⑬⑭	⑬⑭
	Short Delay......... "SDT"				③⑭	③⑭	⑬⑭	⑬⑭
	Ground Fault .... "GNDT"				③⑥⑭	③⑥⑭	⑬⑭	⑬⑭
	Long Delay .... "LDT"				③⑭	③⑭	⑬⑭	⑬⑭
	Overtemperature .... "TEMP"				④⑭	④⑭	⑬⑭	⑬⑭
	External Trip .... "EXTT"				④⑭	④⑭	⑬⑭	⑬⑭
	Information:							
	Protection Settings				⑭	⑭	⑭	⑭
	Time Stamp Trip Event				⑭	⑭	⑭	⑭
	Missing Rating Plug "PLUG"				③⑭	③⑭	⑭	⑭
	Test Pushbutton Response				③	③		
	Communications Failure				②⑤⑭	②⑤⑭	⑭	⑭
	Trip Event Counter				④	④	④⑬	④⑬
Control	Control							
	IMPACC Trip (Open) Command				④	④	④	④
	IMPACC Close Command				④⑦	④⑦	④⑦	④⑦
	IMPACC Trip Reset Command				④	④	④	④

OPT = Optional
① Use of zone interlocking is optional with breaker wiring modification.
② Remote location only unless optional AEMII Local monitor is used.
③ Local on face of trip unit. Remote via IMPACC to AEMII or direct to host computer.
④ Remote – direct to host computer via IMPACC.
⑤ On AEMII denoted by absence of response from addressed breaker.
⑥ Supplied only when trip unit is equipped with ground fault TRIP protection option.
⑦ Requires spring release or electrical operator option.
⑧ Configuration of address is programmed on face of unit with pushbuttons.
L = 1200 Baud, H = 9600 Baud.
⑨ Functional only when breaker has provisions for neutral protection.
⑩ Supplied if INST protection is omitted.
⑪ Field selectable via jumper.
⑫ Supplied only when trip unit is equipped with ground fault alarm protection option.
⑬ Via OPTIMizer – configuration of address, test and data display.
⑭ Via BIM (Breaker Interface Module) or direct to host computer.

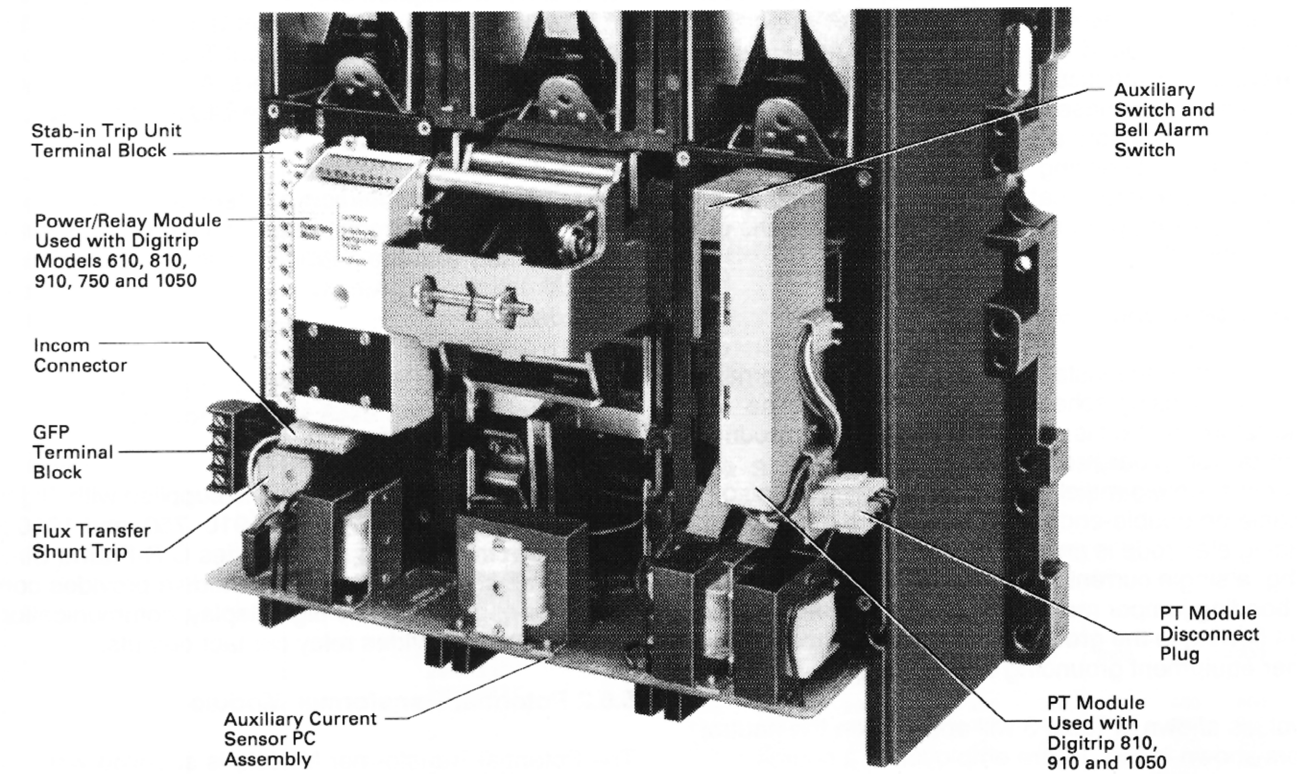


Fig. 5. View of 1600 A Circuit Breaker with Front Cover and Digitrip RMS Trip Unit Removed to Expose Power Relay Module and Stab-In Terminal Block

6. Potential Transformer module with Dielectric Test Disconnect Plug (Digitrip RMS Trip Unit Models 810, 910 and 1050 only)

As shown in Figs. 1 and 4, the Digitrip RMS Trip Unit assembly mounts in the left-hand pole of a Series C R-Frame Circuit Breaker.

The Series C R-Frame Circuit Breaker is factory wired in accordance with the applicable pages of connection diagram I.L. 29C714. Any field installation or modification must be made in accordance with the applicable pages of this same document.

CAUTION

IMPROPER POLARITY CONNECTIONS ON THE FLUX SHUNT TRIP COIL WILL VOID OVERLOAD AND SHORT CIRCUIT PROTECTION WHICH COULD RESULT IN PERSONAL INJURY.

OBSERVE POLARITY MARKINGS ON THE SHUNT TRIP LEADS AND CONNECT PROPERLY WITH INSTRUCTIONS PROVIDED SHOULD ANY CHANGES BE MADE.

5.3 Flux Shunt Trip

The mechanical force required to initiate the tripping action of a type Series C R-Frame is provided by a special flux shunt trip. It is mounted, as shown in Fig. 4, on the trip unit mounting deck. It contains a permanent magnet assembly, moving and stationary core assemblies along with a spring and coil. The circuit breaker mechanism assembly contains a mechanism actuated reset lever and a rotating trip lever to actuate the tripping action of the circuit breaker.

When the Flux Shunt Trip is reset by the handle moved to reset position, the moving core assembly is held in readiness against the force of the compressed spring by the permanent magnet. When a tripping action is initiated, the Flux Shunt Trip coil receives a tripping pulse from the Digitrip RMS Trip Unit. This pulse overcomes the holding effect of the permanent magnet, and the moving core is released to trigger the tripping operation via the rotating trip bar.

5.4 GROUND FAULT PROTECTION

5.4.1 General

When the Digitrip RMS Trip Assembly includes ground fault protection, the distribution system characteristics, i.e., system grounding, number of sources, number and location of ground points, etc. must be considered as well as the manner and location in which the circuit breaker is applied to the system.

Two modes of sensing ground fault currents are generally used: residual and source ground. Series C R-Frame Circuit Breakers are internally prewired to accommodate both types. A side mounted 4-point terminal block, as shown in Fig. 4, is provided to revise connections required to accommodate each method. A nameplate is provided on the side of the circuit breaker that illustrates the required connections. Applicable connection variations are illustrated in Fig. 11.

If the system neutral is grounded, but no phase-to-neutral loads are used, the Digitrip RMS Trip Assembly includes all of the components necessary for ground fault protection.

5.4.2 Residual Sensing

The standard mode of ground fault sensing in Series C R-Frame Circuit Breakers is Residual Sensing. This mode utilizes one current sensor on each phase conductor and one on the neutral if 4-wire system. This mode of sensing vectorially sums the outputs of the three or four individual current sensors. As long as the vectorial sum is zero, then no ground fault exists. The neutral sensor must have characteristics which are identical to the three internally mounted phase current sensors. Available types of neutral sensors are illustrated in Fig. 14. Residual ground fault sensing means are adaptable to main and feeder breaker applications. Available ground fault pick-up settings employing Residual Sensing means are given in Table 3.

5.4.3 Source Ground Sensing

Depending upon the installation requirements, alternate ground fault sensing schemes may be dictated. The ground return method is most applicable where ground fault protection is desired only on the main circuit breaker in a simple radial system. This method is also applicable on double-ended systems where a mid-point grounding electrode is employed. For this mode of sensing, a single current sensor mounted on the equipment bonding jumper measures directly the total ground current flowing in the grounding electrode conductor and all other equipment grounding conductors.

The values shown in Table 3 will apply when the neutral sensors shown in Fig. 14 are employed in a source ground sensing scheme provided the neutral sensor is the same as the frame rating.

Note: Regardless of the mode of sensing employed, the polarity of the sensor connections is critical. Always observe the polarity markings on the installation drawings. To insure correct ground fault equipment performance, conduct field tests to comply with National Electrical Code requirements under Article 230-95(C).

5.4.4 Ground Fault Settings

The adjustment of the ground fault functional settings is illustrated in the applicable Digitrip RMS Trip Unit instruction leaflet referenced in Section 6 of this instruction book. The effect of these settings is illustrated in the ground fault Time-Current curves referenced in Section 6 of this instruction book. Applicable residual ground fault pick-up settings and current values are given in Table 3 as well as on the Time-Current curve.

5.5 Current Sensors

The three primary current sensors installed in the circuit breaker are located internally on the lower conducts which are normally on the load side of the main contacts.

The auxiliary current transformers are mounted as shown in Fig. 4. The ground fault auxiliary current transformer is supplied only when the ground fault protection function is supplied in the Digitrip RMS Trip Unit. The Neutral Auxiliary Current Transformer is supplied only with 4-pole breakers. A partial internal schematic is shown in Fig. 6 as well as in the residual diagram shown in Fig. 8.

The primary current sensors produce an output proportional to the load current and furnish the Digitrip RMS Trip Assembly with the intelligence and energy to trip the circuit breaker when functional protection settings are exceeded.

5.6 Digitrip RMS Accessories

5.6.1 Power/Relay Module

The Power/Relay Module which is supplied with Digitrip RMS Trip Unit Models 610, 810, 910, 750, and 1050 is mounted in the left pole of the Series C R-Frame Circuit Breaker as shown in Fig. 5. This module provides control power for operating the 4-digit display, communication circuitry and it provides relay contact outputs.

5.6.2 Potential Transformer Module

The Potential Transformer Module is supplied with Digitrip RMS Trip Unit Models 810, 910, and 1050. It is mounted in the right pole of the Series C R-Frame Circuit Breaker as shown in Fig. 5. This module provides voltage for computing the energy monitoring parameters. The PT modules primary is connecting to the circuit breaker's bottom end conductors. The potential disconnect plug is mounted on the right side of the Series C R-Frame Circuit Breaker.

5.6.3 Dielectric Testing

DIELECTRIC TESTING OF THE CIRCUIT BREAKER WITH THE DIELECTRIC DISCONNECT PLUG INSTALLED WILL DAMAGE THE POTENTIAL TRANSFORMER MODULE AND DIGITRIP RMS TRIP UNITS.

REMOVE THE PT MODULE DISCONNECT PLUG PRIOR TO DOING ANY DIELECTRIC TESTING OF THE CIRCUIT BREAKER. REPLACE THE PLUG AFTER ALL DIELECTRIC TESTING IS COMPLETED AND PRIOR TO CLOSING THE CIRCUIT BREAKER PER THE ESTABLISHED OPERATING PROCEDURES.

5.7 Connection Diagram

A complete master connection diagram for the Series C R-Frame Circuit Breaker employing a Digitrip RMS Trip Unit is given in I.L. 29-C714. Each circuit breaker shipped from the factory includes a copy of the pages from this document that are applicable to the equipment included in the breaker.

5.8 Trip Unit Settings Protection

To insure the non-tampering of selected protection settings, a sealable plexi-glass cover as shown in Fig. 15 is provided. The cover is held in place by four cover screws. The non-tamperability is insured by the insertion of a standard meter seal through the holes in two of the cover retention screws.

Table 2A – Catalog Numbers of Available Rating Plugs for Digitrip RMS 310 Trip Units

Rated Current (Amps I_n)	Frame Rating (Amps)	Catalog Number
800 1000 1200 1250 1400 1500 1600	1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T
1000 1200 1250 1400 1600 2000	2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T
1200 1250 1600 2000 2500	2500	25RES12T 25RES125T 25RES16T 25RES20T 25RES25T
1600, 1200, 1000, 800 1600, 1250, 1000, 800	1600	A16RES16T1 A16RES16T2
2000, 1600, 1200, 1000 2000, 1600, 1250, 1000	2000	A20RES20T1 A20RES20T2
2500, 2000, 1600, 1200 2500, 2000, 1600, 1250	2500	A25RES25T1 A25RES25T2

Table 2B – Catalog Numbers of Available Rating Plugs for Digitrip RMS 510, 610, 810, and 910 Trip Units

Rated Current (I_n)	Frame Rating	Catalog Number
800 1000 1200 1250 1600	1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
1000 1200 1250 1600 2000	2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
1600 2000 2500	2500	RP6R25A160 RP6R25A200 RP6R25A250

Table 2C – Catalog Numbers of Available Rating Plugs for Digitrip OPTIM 750 and 1050 Trip Units

Rated Current (I_n)	Frame Rating	Catalog Number
800	1600	ORPR16A080
1000		ORPR16A100
1200		ORPR16A120
1250		ORPR16A125
1600		ORPR16A160
1000	2000	ORPR20A100
1200		ORPR20A120
1250		ORPR20A125
1600		ORPR20A160
2000		ORPR20A200
1600	2500	ORPR25A160
2000		ORPR25A200
2500		ORPR25A250

Table 3 – Ground Fault Current Pick-up Settings Using Residual Sensing Mode

Trip Unit	Installed Rating Plug Amperes (I_n)	Pick-up (Dial) Setting Amperes ①							
		A②	B②	C②	D②	E②	F	H	K
310	Any	200 ±20%	400	600	800	1000	1200	1200	1200
510,	800	200	240	280	320	400	480	600	800
610,	1000	250	300	350	400	500	600	750	1000
810,	1200	300	360	420	480	600	720	900	1200
910	1600	400	480	560	640	800	960	1200	1200
⑤	2000	500	600	700	800	1000	1200	1200	1200
	2500	625	750	875	1000	1200	1200	1200	1200

① Except as noted, tolerances on pick-up levels are ±10% of values shown in chart.
② For testing purposes only; when using an external single phase current source to check low level ground fault settings, it is advisable to use the auxiliary power module (APM) or 510, 610, 810, 910 trip unit.
③ Rating plug is for 50 hz and 60 hz.
④ All tabulated values are based on the use of a residual sensing scheme with the same rated current sensor in all phase and neutral conductor.
⑤ Digitrip OPTIM has same ground ampere trip range for each plug value shown. The many settings are read out directly in amperes on the remote device or locally on the OPTIMizer.

NOTICE

THE PROVISION FOR ZONE INTERLOCKING IS STANDARD ON ALL SERIES C R-FRAME BREAKERS EQUIPPED WITH DIGITRIP RMS 510, 610, 810, 910 AND DIGITRIP OPTIM 750 AND 1050 AND HAVING EITHER A SHORT TIME OR GROUND FAULT FUNCTION. APPROPRIATE JUMPERS MUST BE ADDED ON THE BREAKER IF ZONE INTERLOCKING IS NOT DESIRED OR WHEN THE CIRCUIT BREAKER IS REMOVED FROM THE CELL FOR TESTING. (REFER TO INSTRUCTION LEAFLET 29C709, SHEETS 24, 25, AND 26 FOR CONNECTION DIAGRAMS.)

6.0 TESTING

6.1 Functional Field Testing

A functional level test of a major portion of the Digitrip's electronic circuitry and breaker's mechanical trip assembly can be verified using the trip unit's test receptacle. The testing can verify the desired trip settings by performing long delay, short delay and ground fault functional tests. Listed below are the Digitrip model and associated test kit/auxiliary power module requirements.

Model	Test Kit
Digitrip RMS 310	STK2 Test Kit
Digitrip RMS 510, 610, 810, 910	Auxiliary Power Module Cat. PRTAAPM
Digitrip OPTIM	OPTIMizer Cat. OPTIMIZER and Auxiliary Power Module Cat. PRTAAPM or BIM

6.2 Performance Testing for Ground Fault Trip Units

6.2.1 Code Requirements

The National Electrical Code under Article 230-95-C requires that any ground-fault protection system be performance tested when first installed. The test shall be conducted in accordance with approved instructions provided with the equipment. A written record of this test shall be made and shall be available to the authority having inspection jurisdiction.

6.2.2 Standards Requirements

As a follow-up to the basic performance requirements stipulated by the N.E.C. as stated above, UL Standard No. 1053 requires that certain minimum instruction must accompany each ground fault protection system. These following statements plus a copy of the test record form illustrated in Fig. 8 are shipped with each Digitrip RMS Trip Unit.

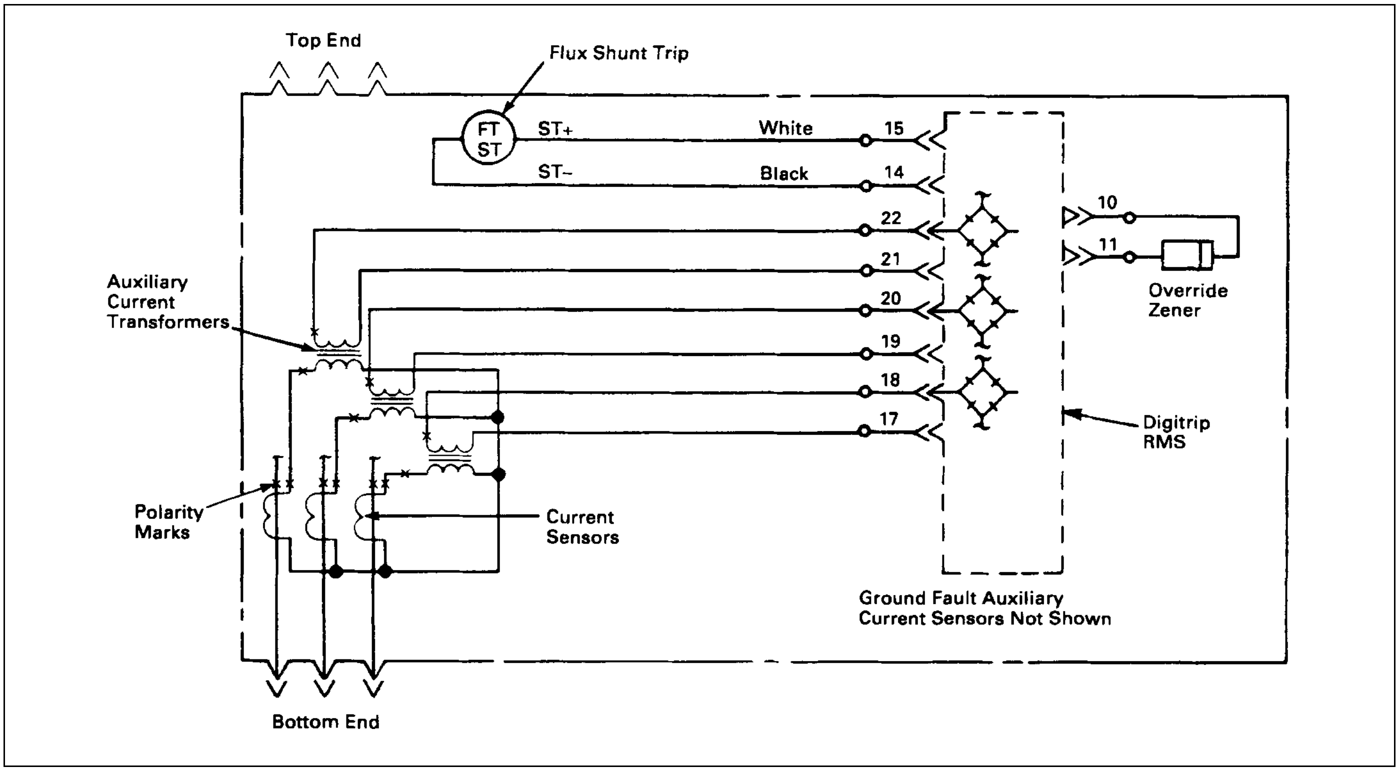


Fig. 6. Partial Internal Connections of an RD Breaker

6.2.3 General Test Instructions

The interconnected system shall be evaluated in accordance with the equipment assembler's detailed instructions by qualified personnel.

The polarity of the neutral sensor connections (if used) must agree with equipment assembler's detailed instructions to avoid improper operations following apparently correct simulated test operations. Where a question exists, consult the specifying engineer and/or equipment assembler.

The grounding points of the system shall be verified to determine that ground paths do not exist that would bypass the sensors. The use of high-voltage testers and resistance bridges may be used.

WARNING

THERE IS A HAZARD OF ELECTRICAL SHOCK OR BURN WHENEVER WORKING IN OR AROUND ELECTRICAL EQUIPMENT. ALWAYS TURN OFF POWER SUPPLYING BREAKER BEFORE CONDUCTING TESTS.

Using a low voltage (0 to 24-volt), high current, ac source, apply a test current of 125% of the Digitrip RMS Ground Fault Trip Unit pick-up setting through one phase of the circuit breaker, as shown in Fig. 7-1. This should cause the breaker to trip in less than 1 second, and if an alarm indicator is supplied, it should operate. Reset the breaker and the alarm indicator. Repeat the test on the other two phases.

If the system is a 4-wire system with a neutral current sensor, apply the same current as described above through one phase of the breaker, returning through the neutral sensor, as shown in Fig. 7-2. The breaker should not trip, and the alarm indicator, if supplied, should not operate. Repeat the test on the other two phases.

If the system is a 3-wire system with no neutral current sensor, apply the same current as described above through any two phases of the breaker, with the connections exactly as shown in Fig. 7-3. The breaker should not trip, and the alarm indicator, if supplied, should not operate. Repeat the test using the other two combinations of breaker phases.

CAUTION

FIELD TESTING SHOULD BE USED FOR FUNCTIONAL TESTING AND NOT FIELD CALIBRATION OF THE DIGITRIP GROUND FAULT TRIP UNIT.

ANY TEMPORARY CONNECTION MADE FOR THE PURPOSE OF CONDUCTING TESTS SHOULD BE RESTORED TO PROPER OPERATING CONDITONS BEFORE RETURNING THE BREAKER TO SERVICE.

The results of the test are to be recorded on the test form provided (Fig. 8).

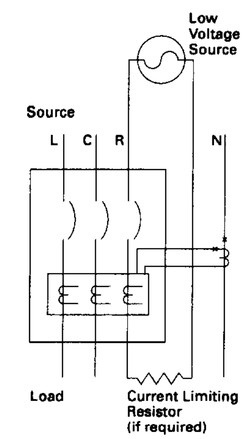


Fig. 7-1. Connections for Ground Fault Trip Test

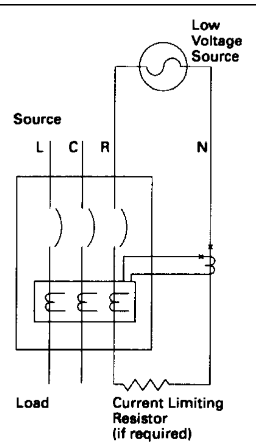


Fig. 7-2. Connections for Ground Fault No-Trip Test, with a Four-Wire System

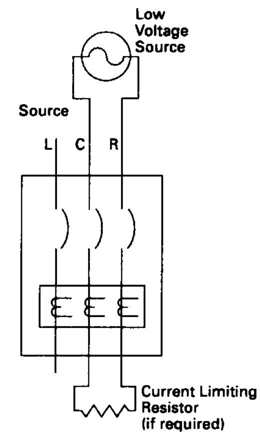


Fig. 7-3. Connections for Ground Fault No-Trip Test, with a Three-Wire System

7.0 RECORD KEEPING

For convenience, Figures 8 and 9 can be used for record keeping. This record should be filled in giving the indicated reference information and initial time/current trip function settings. If desirable, a copy could be made and attached to the interior of the breaker cell door or other visible location. Figure 10 provides a place for recording test data and actual trip values.

Ideally, sheets of this type should be used and maintained by those personnel in the user's organization that have the responsibility for protection equipment.

8.0 REFERENCES

8.1 Type Series C R-Frame

I.L. 29C107 R-Frame Series C Circuit Breaker

I.L. 29C714 Master Connection Diagram for Series C R-Frame Circuit Breaker with Digitrip RMS

GROUND FAULT TEST RECORD FORM

Ground Fault Test Record should be Retained by Those in Charge of the Building's Electrical Installation in order to be available to the Authority having Jurisdiction.

Test Date	Circuit Breaker Number	Results	Tested By:

Fig. 8. Typical Performance Test Record Form

DIGITRIP TRIP FUNCTION SETTINGS				
Circuit No./Address		Breaker Shop Order Reference		
PER UNIT MULTIPLIERS				
Rating Plug Amperes (I_n)		I_r Continuous Ampere Rating = LDS x I_n		
Trip Function	Per Unit Setting	Multi	Ampere Equivalent Setting	Time Delay
Inst.		I_n		X
Long Delay		I_n		Sec.
Short Delay		I_r		Sec.
Ground Fault		I_n		Sec.
Date ______			By ______	

Fig. 9. Typical Trip Function Record Nameplate

8.2 Digitrip RMS Trip Units

I.L. 29C883 Instructions for Digitrip RMS 310 Trip Unit
I.L. 29-885 Instructions for Digitrip RMS 510 Trip Unit
I.L. 29-886 Instructions for Digitrip RMS 610 Trip Unit
I.L. 29-888 Instructions for Digitrip RMS 810 Trip Unit
I.L. 29-889 Instructions for Digitrip RMS 910 Trip Unit
I.L. 29-891 Instructions for Digitrip OPTIM 750 and 1050

8.3 Time Current Curves

Application Data 29-167R

RD-RDC/310 1^2t Shape SC-5629-93
RD-RDC/310 Flat Response SC-5630-93
RD-RDC/310 Ground SC-5631-93
RD-RDC/510, 610, 810, 910 Instantaneous SC-5626-93
RD-RDC/510, 610, 810, 910 Long Delay/Short Delay SC-5627-93
RD-RDC/510, 610, 810, 910 Ground SC-5628-93
R Digitrip OPTIM Trip Units SC-6336-96 thru SC-6347-96

DIGITRIP AUTOMATIC TRIP OPERATION RECORD				
Circuit No./Address		Breaker Shop Order Reference		
Trip Function	Settings Reference			
	Orig. 0	Rev. 1	Rev. 2	Rev. 3
Instantaneous				
Long Delay Setting				
Long Delay Time				
Short Delay Setting				
Short Delay Time				
Ground Fault Setting				
Ground Fault Time				

Date of Trip	Trip Mode Indicator	Trip Value Shown	Setting Ref.	Setting Change Made	Investigated By

Fig. 10. Automatic Trip Operation Record

8.4 Miscellaneous

I.L. 17-216 Assemblies Electronic Monitor (AEM)
I.B. 29C893 Breaker Interface Module (BIM)

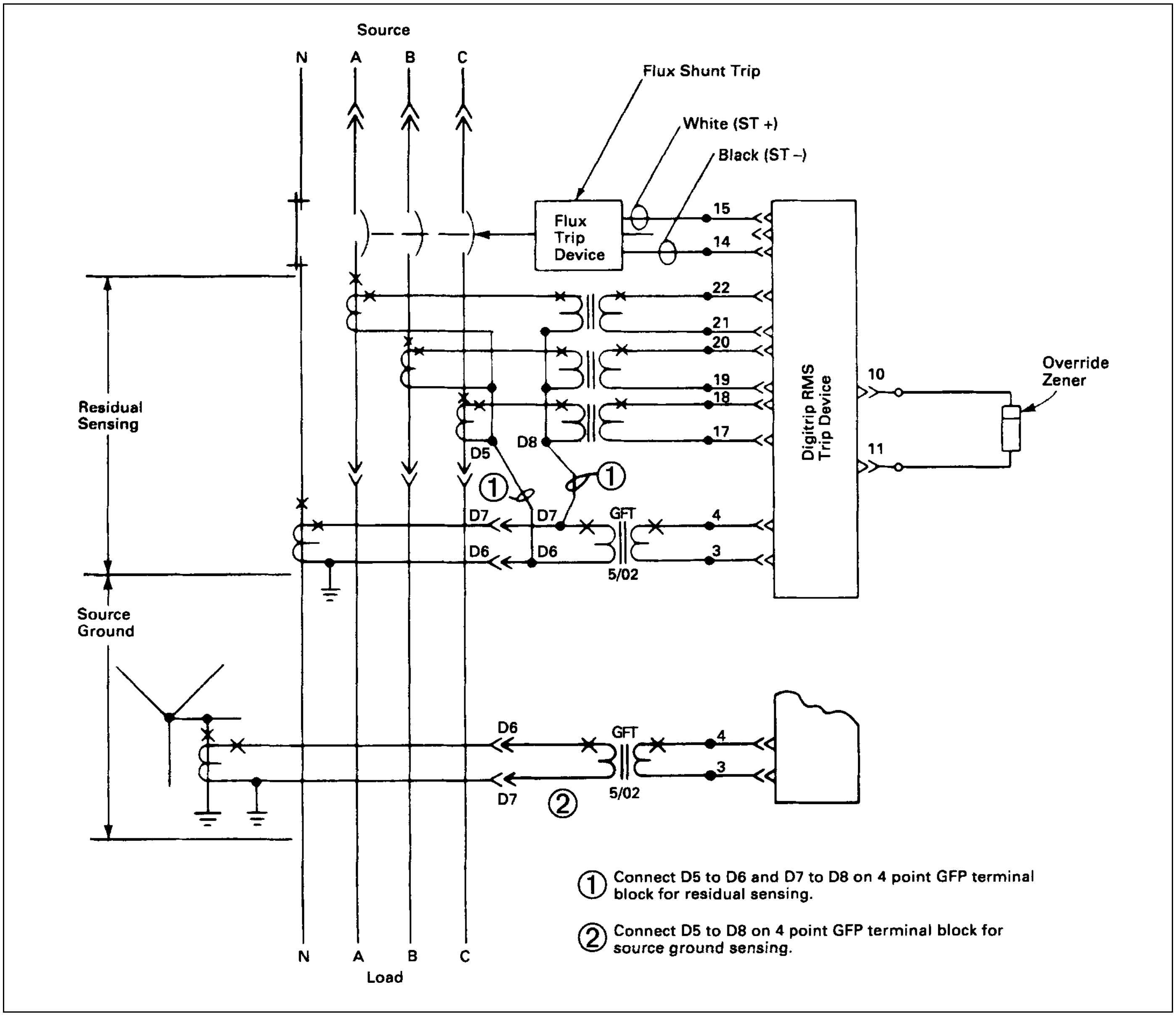
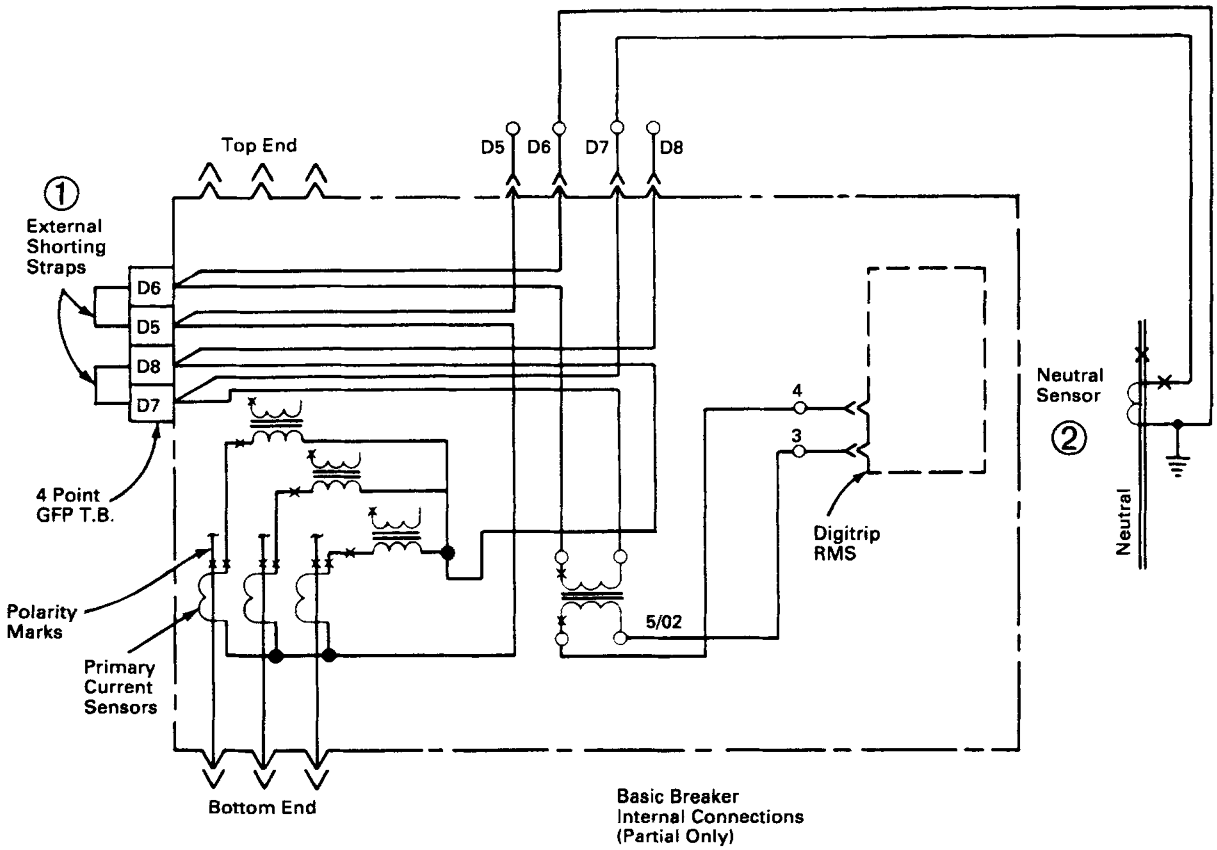


Fig. 11. Master Connection Diagram – Ground Fault 3-Pole Breaker



① External shorting straps must be in place during testing and operating conditions per instruction N.P. on side of breaker.

② Connect neutral sensor so that polarity relationship towards source in identical for phase and neutral sensors.

Fig. 12. Master Connection Diagram Ground Fault External Connections 3-Phase, 4W., Residual – 3-Pole Breaker

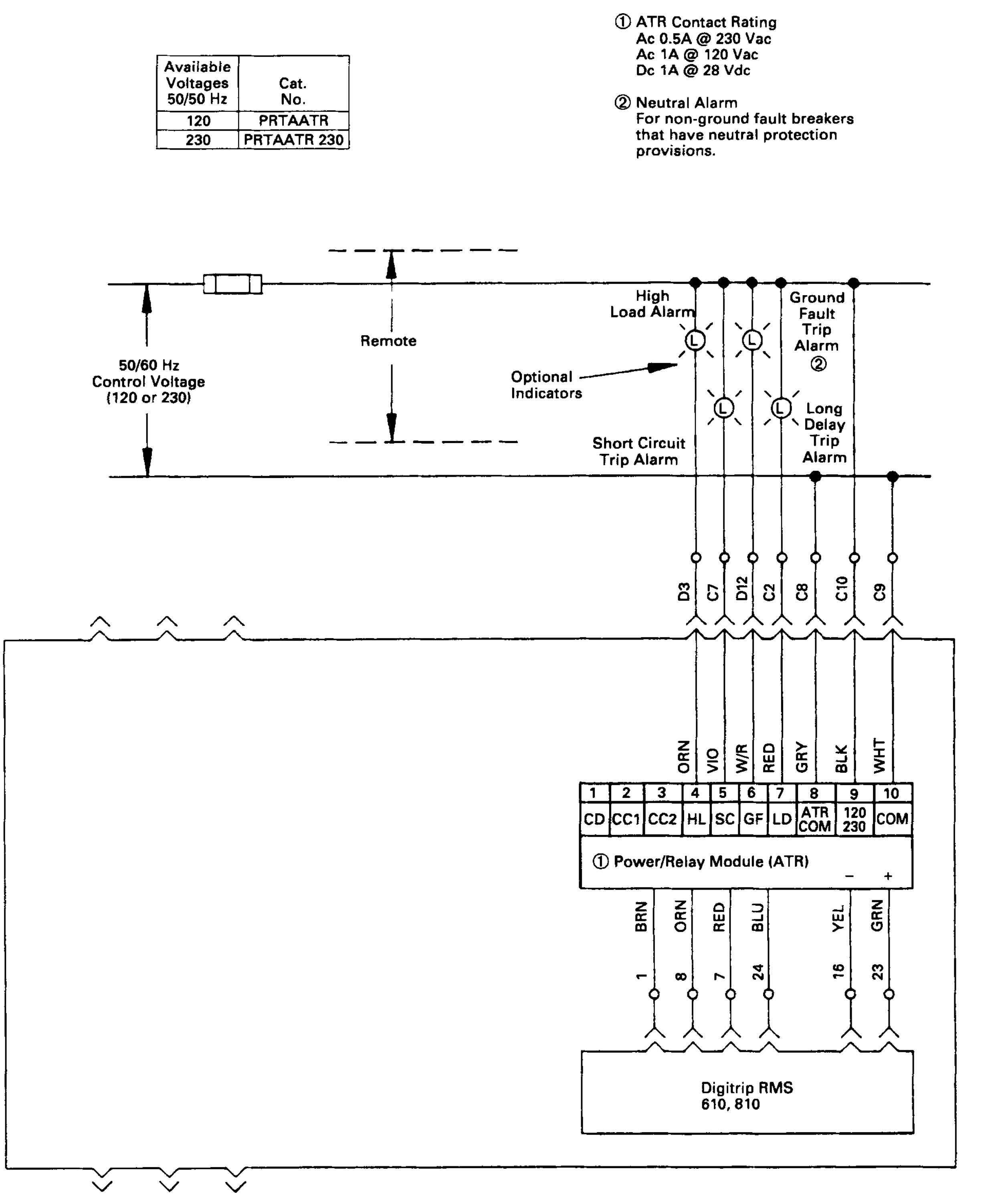
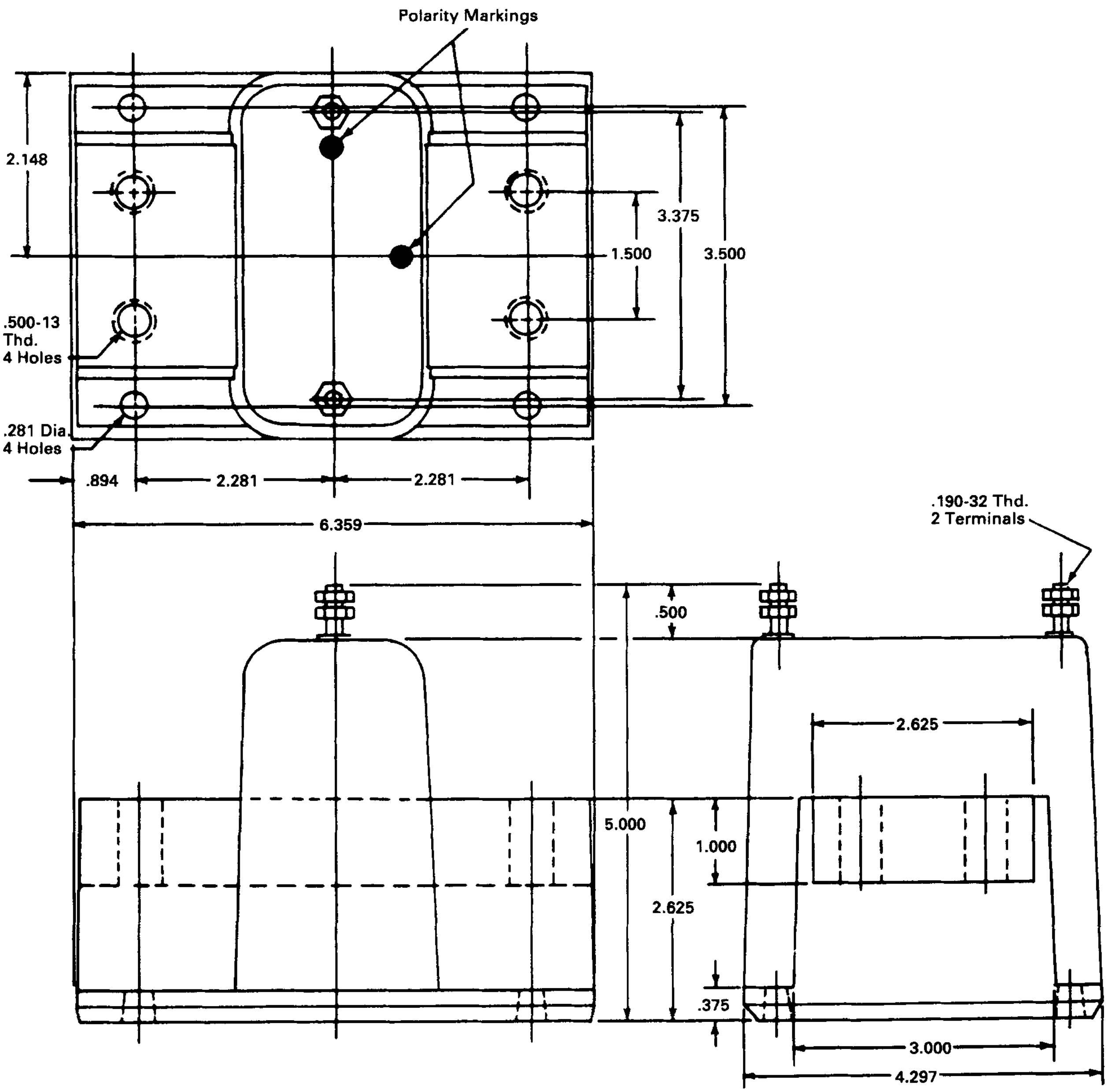


Fig. 13. RD Master Connection Diagram Remote Alarms for use with Digitrip RMS Types 310 (GF only), 610, 810, 910 and Digitrip OPTIM 750 and 1050



Sensor Rating Amperes	Style Number
1600/5	6605C15G01
2000/5	6605C15G02
2500/5	6605C15G03

Fig. 14. Neutral Current Sensor

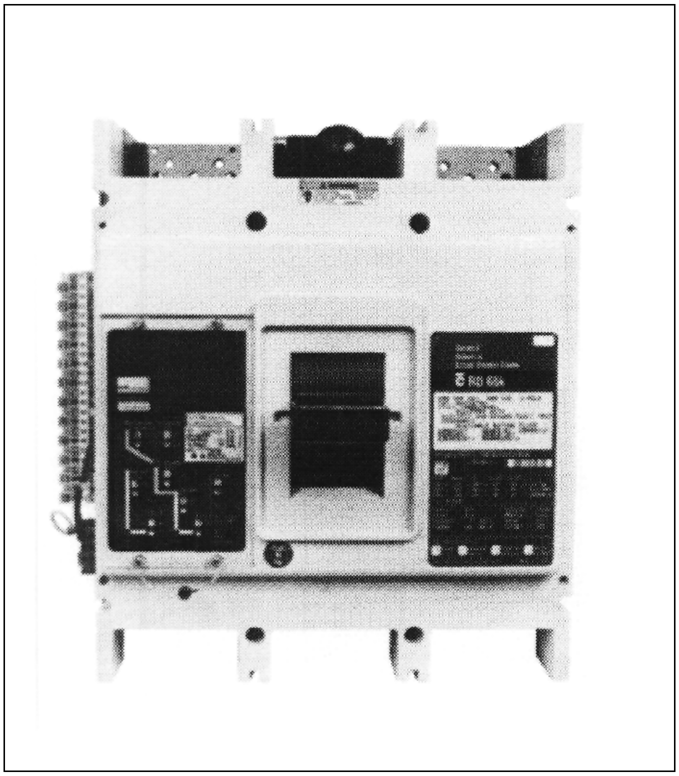


Fig. 15. View of Installed Digitrip RMS Trip Unit with Sealed Cover

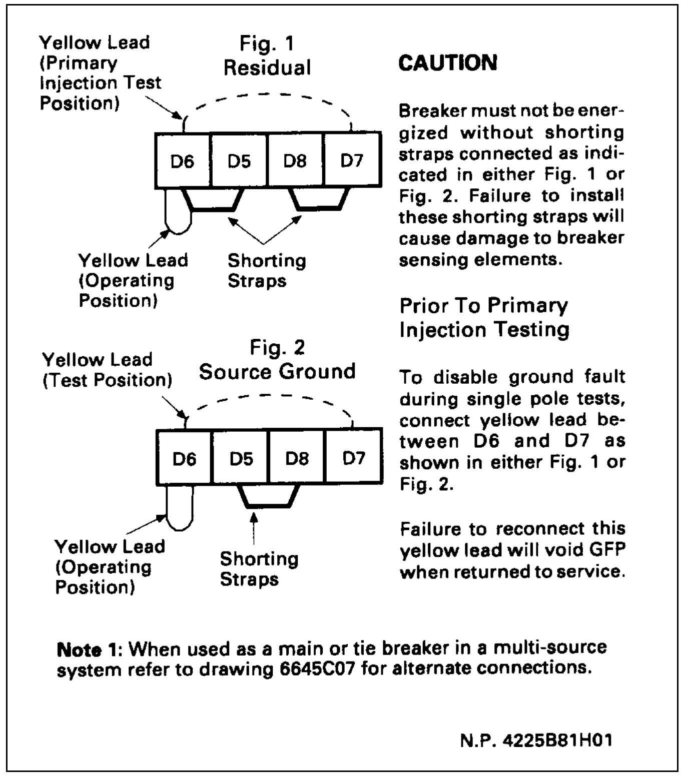


Fig. 16. Jumper Connections

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

Style No. 6905C99H03 Effective July 1998
Printed in U.S.A./CCI