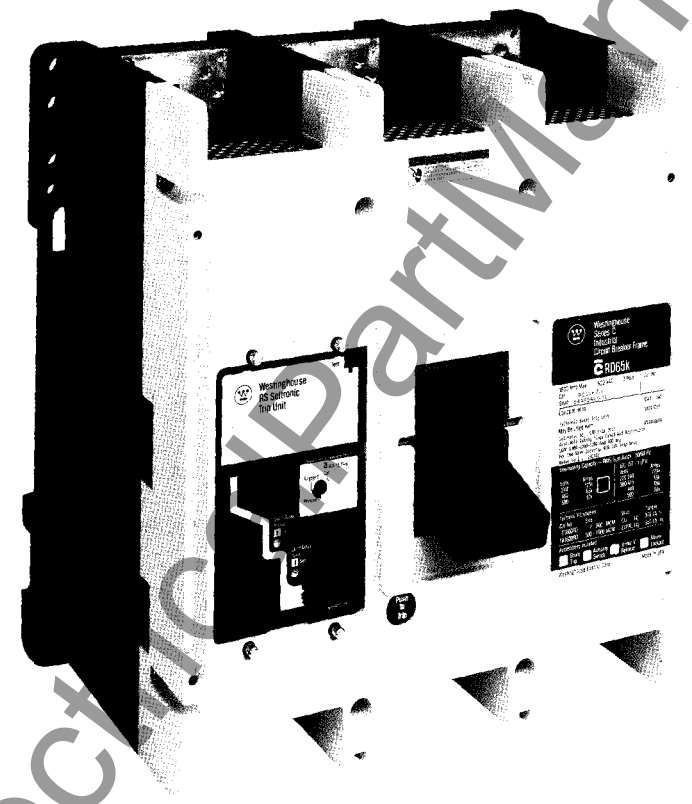
SERIES C™

R-Frame Molded Case Circuit Breakers



D Model 800 to 2000 Amperes with RS Trip Unit

Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

Series C Circuit Breakers

The new Series C line of molded case circuit breakers represents a significant step forward in circuit protection technology. It incorporates, in frame ratings 150A to 2000A, interrupting capacities as high as 100 kA at 480 Vac (200 kA at 240 Vac) in physical sizes normally associated with standard interrupting rating breakers. Series C circuit breakers, in most frame sizes, are physically and electrically interchangeable with the industrial line of molded case circuit breakers they replace.

There are two branches to the Series C line. The branch covering domestic applications complies with applicable UL, NEMA, and CSA standards, as well as being assigned interrupting ratings under IEC 157-1 or IEC 947-2. The world class branch complies with IEC 947-2. The domestic product line which complies with applicable UL/NEMA/CSA standards is composed of six frame ratings: 150A, 250A, 400A, 600A, 1200A, and 1600A/2000A. The six frame ratings of the IEC branch of the Series C line are 160A, 250A, 400A, 630A, 1250A, and 1600A/2000A and are physically interchangeable with the corresponding UL/NEMA/CSA frames.

Series C circuit breakers in the 150A through 630A frame sizes are available with thermal-magnetic trip units. Electronic trip units can be supplied in the 400A through 2000A frame sizes. The electronic trip units for the 400A, 600A, and 630A frames are field-interchangeable with the thermal-magnetic trip unit in the same frame size.

The 150A and 160A frame sizes of Series C circuit breakers are available in 1-, 2-, 3-, and 4-pole models. The 250A through 1250A frame sizes are available in 2-, 3-, and 4-pole models, and the 1600A and 2000A frame sizes are available in 3- and 4-pole models only.

A complete line of external as well as plug-in internal accessories is available for use with Series C circuit breakers.

Because of unique conductor configuration, the 100 kA (at 480 Vac) interrupting rating model of each Series C frame size is inherently current limiting. These models can, therefore, be used in series tested applications at the 100 kA level to protect specified, lower interrupting rating downstream circuit breakers. This current limiting action is achieved without the use of fuse-type current limiters or extra sets of contacts. The 65 kA (at 480 Vac) interrupting rating model of each Series C circuit breaker provides for simple, fully rated application on the 480 Vac secondary of unit substations up to 2500 kVA.

Series C Literature

A new format has been designed for the Series C circuit breaker literature. The literature is designed to provide each user with the needed information presented in the most usable form. The literature includes:

- Frame Books -provide basic descriptions, application data, technical data, dimensional data, and ordering information for each Series C circuit breaker and associated accessories
- Instruction Leaflets -provide installation, inspection, operation, and adjustment information for Series C circuit breakers and accessories
- Time/Current Curve Packets -provide full-size time/current characteristic curves for each Series C circuit breaker

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Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

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Section 1 – Introduction

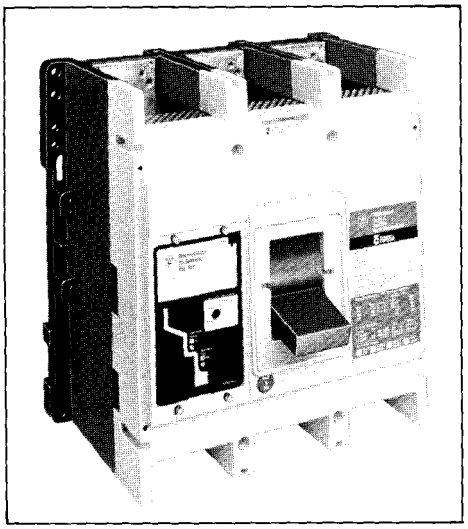


Figure 1-1. R-Frame Series C Circuit Breaker with RS Seltronic™ Trip Unit

1-1. General Information

R-Frame Circuit Breaker
The R-frame Series C circuit breaker with interchangeable electronic trip units (Figure 1-1) is available in two basic models: the domestic (D) and the world (W) models. In many applications, the R-frame circuit breaker is designed to physically and electrically replace the SPB Systems Pow-R-circuit breaker.

An innovative design of internal components allows applications to be extended to higher interrupting rating levels. In addition, the higher interrupting performance capabilities of the R-frame circuit breaker allow it to be applied in distribution systems requiring high performance capabilities. Each circuit breaker nameplate is color coded to provide easy identification of type and interrupting rating.

The IEC symbols identified in Table 1-1 are defined below:

U_e - Rated Operational Voltage
I_{cu} - Rated Ultimate Short-Circuit Breaking Capacity
I_{cs} - Rated Service Short-Circuit Breaking Capacity
I_{cw} - Rated Short-Time Withstand Current
U_{imp} - Rated Impulse Withstand Voltage

Above symbol denotes suitability for use as isolating device.

Utilization Category - Defines the intended application and is characterized by one or more of the following service conditions: current (expressed as multiple of rated current), voltage (expressed as multiple of rated operational voltage), power factor or time constant, short circuit performance, selectivity, and other service conditions as applicable. The R-frame is assigned a Category A rating. However, the 1600 ampere frame only has a rated short time withstand current (I_{cw}) of at least 12 times its operational current (1600A); and, therefore, qualifies for a Category B rating.

The R-frame circuit breaker is available in a 3-pole configuration to satisfy application requirements in most types of electrical distribution systems. A modular accessory concept permits wide flexibility in accessory installation. This frame book provides basic information about the R-frame circuit breaker, its trip units, and accessories.

1-2. R-Frame Circuit Breaker Types

R-frame circuit breakers are available in four types, the RD, RDC, RW, and RWC. Types RD and RDC (rated from 800A to 2000A) are 600 Vac devices listed in accordance with Underwriters' Laboratories, Inc. Standard UL489 and certified under Canadian Standards Association Standard C22.2 No.5.1 The RD and RDC also comply with International Electrotechnical Commission Recommendations IEC 947-2 but are 600 Vac maximum devices. Types RW and RWC (rated from 800A to 2000A) are 690 Vac devices and comply with International Electrotechnical Commission recommendations IEC 947-2. Table 1-1 gives the interrupting ratings for the different circuit breaker types.

Each circuit breaker rating is achieved by specific design features incorporated into the circuit breaker frame and the type of trip unit selected.

Electronic Trip Units
R-frame circuit breakers are available with the standard Type RS Seltronic analog trip unit or the optional Digitrip RMS Microprocessor type trip unit. For trip unit description and operation, refer to Section 3.

The trip units of the R-frame circuit breaker provide a degree of field interchangeability. With the RS Seltronic trip unit, there is interchangeability within the non-ground fault and ground fault trip unit groups but not between these groups of trip units. Therefore, an RS31600T trip unit can be upgraded in the field with an RS31600TA and an RS31600TG can be upgraded with an RS31600TAG. However, an RS31600T cannot be replaced in the field with an RS31600TG. These same limitations apply to the Digitrip family of trip units along with the added constraint of no field interchangeability among Digitrip RMS model types. For example, the Digitrip RMS 500 cannot be replaced in the field with a Digitrip RMS 600. Any replacement within and between the RS Seltronic and Digitrip RMS trip units can be performed at the Westinghouse manufacturing plant.

Table 1-1. R-Frame Circuit Breaker Interrupting Ratings

UL489 Interrupting Ratings

Circuit Breaker Type	Number of Poles	Interrupting Rating (RMS Sym. Amperes-kA)		
		Volts AC (50/60 Hz)		
		240	480	600
RD	3, 4	125	65	50
CRD⑥	3, 4	125	65	50
RDC	3, 4	200	100	65
CRDC⑥	3, 4	200	100	65

IEC 947-2 Interrupting Rating (Sym. Amperes kA)①②③④

Circuit Breaker Type	Number of Poles	U_e (Volts AC 50/60 Hz)					
		380		415		690	
		I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
RD	3, 4	65	33	65	33	⑤	⑤
RDC	3, 4	100	50	100	50	⑤	⑤
RW	3, 4	65	33	65	33	25	13
RWC	3, 4	100	50	100	50	35	18

① Interrupting ratings are subject to final test verification.
② Utilization Category A circuit breakers.
③ I_{cw} = 20 kA.
④ For definition of IEC symbols, refer to Part 1-1 (General Information) of Section 1.
⑤ Not applicable.
⑥ 100% Rated versions.

Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

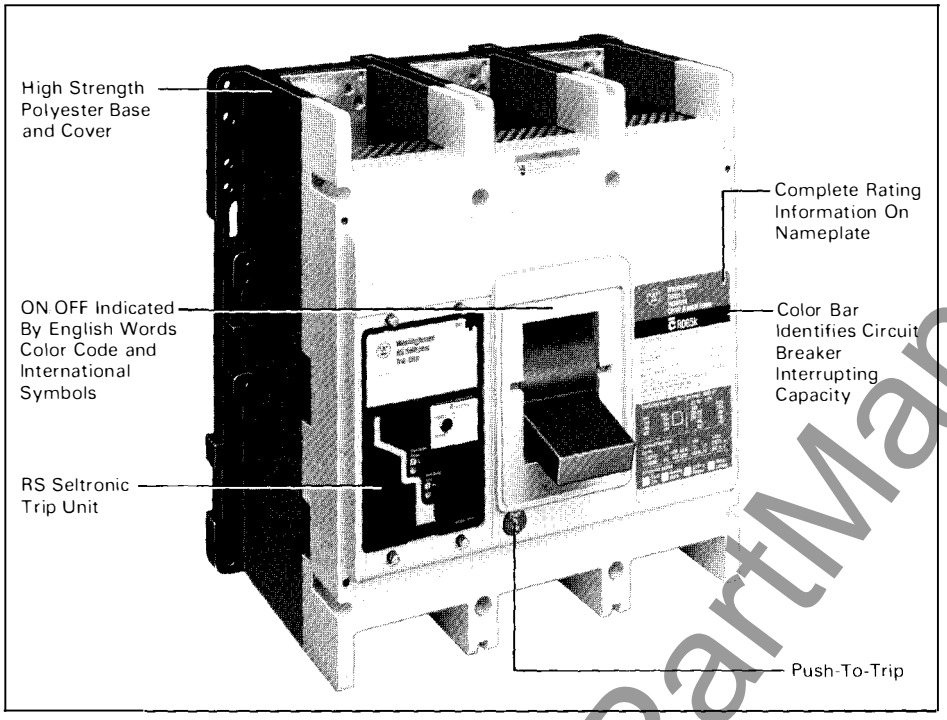


Figure 1-2. R-Frame Circuit Breaker Features

1-3. Features

The Series C circuit breaker line represents an entirely new approach to circuit breaker design. The R-frame circuit breaker (Figure 1-2) uses new design features that improve performance and extend application capabilities.

a. Performance
The R-frame circuit breaker provides higher interrupting ratings and improved operating characteristics compared to previous circuit breaker designs. The enhanced performance characteristics extend R-frame circuit breaker use to applications that previously required larger physical size circuit breakers.

b. Designs
Available RS Seltronic™ and Digitrip RMS trip unit functions are described in Tables 3-1 through 3-5 of Section 3.

c. Construction Details
The 3-pole configuration satisfies application requirements for most types of electrical distribution systems.

The compact frame size allows a high degree of space savings compared to previous circuit breakers designs.

A Push-to-Trip button provides a local means of manually exercising the trip mechanism.

High strength glass-polyester base and cover have excellent dielectric qualities and are inherently fungus proof.

The over-toggle operating mechanism design has increased air gap space between stationary and moving contacts when circuit breaker is in tripped position. The increased air gap provides greater arc impedance during contact opening, which allows higher interrupting ratings to be obtained in compact frame sizes.

The crossbar assembly has high dielectric qualities and ensures simultaneous operation of all moving contacts.

The positive-ON operating mechanism ensures that the operating handle indicates the ON position when the contacts are closed.

d. Internal Accessories
Modular plug-in accessory design simplifies factory installation for improved customer service and facilitates field installation where desired.

The internally mounted accessories include auxiliary switch, alarm (signal)/lockout switch, shunt trip, and undervoltage release mechanism. All of the internal accessories are mounted in an accessory mounting deck installed in the right pole. The standard accessory wiring configuration provides for pigtail leads exiting the right side of the frame (between cover and base) next to the accessory mounting deck. An optional configuration provides for a terminal block to be mounted to the base on the right side of the circuit breaker.

e. External Accessories
Cover design permits field installation of a key interlock, electrical operator, and slide plate handle mechanism without modifying the cover.

f. Markings
The Series C circuit breaker line features a new nameplate format which provides easy identification of circuit breaker type, rating, and operating status.

Nameplates are color coded for immediate rating identification. A color-coded bar identifies the type and the interrupting rating (kA) at the most common application voltage. The color code for the type RD circuit breakers is black.

Consolidated nameplate design provides complete identification and rating information in an easily readable and understandable format.

Circuit breaker status is clearly indicated by circuit breaker handle position and color-coded flags (red for ON, green for OFF, and white for TRIP). The on and off positions are identified in English words (ON and OFF) and international symbols (I and 0).

Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

g. Equipment Literature
A complete line of technical literature provides specification, ordering, application, and instructional information. This makes the circuit breaker easy to specify, purchase, and apply, saving time and minimizing application errors.

Dimensional data is in Imperial and metric units to satisfy user requirements.

h. Standards Compliance

- Australian Standard AS 2184, Moulded Case Circuit Breakers
- Canadian Standards Association Standard C22.2 No.5.1, Service Entrance and Branch Circuit Breakers
- International Electrotechnical Commission Recommendations IEC 947-2, Low-Voltage Switchgear and Control Gear, Part 2: Circuit Breakers
- Japanese Industrial Specification 8370, Molded Case Circuit Breakers
- National Electrical Manufacturers Association Standards Publication No. AB1 - 1986. Molded Case Circuit Breakers.
- South African Bureau of Standards Standard SABS 156, Standard Specification for Moulded Case Circuit Breakers
- Underwriters' Laboratories, Inc. Standard UL489, Molded Case Circuit Breakers and Circuit Breaker Enclosures, Including Marine Circuit Breakers.

Compliance with these standards satisfies most local and international codes, assuring user acceptability and simplifying application.

i. Federal Specification Classifications
Circuit breaker type RD equal or exceed W-C-375b requirements for class 24(a).

Series C Molded Case Circuit Breakers, R-Frame
Section 2 – Applications

2-1. Introduction

Application flexibility of the R-frame circuit breaker is enhanced by the higher interrupting ratings designed into the Series C line (Figure 2-1).

2-2. Switchboard Application

R-frame circuit breakers are used in distribution systems to provide main and feeder circuit protection. Circuit breakers are currently available for fixed mounting only.

2-3. Individual Enclosure Application

The R-frame circuit breaker can be applied in individual enclosures to meet specific installation requirements.

2-4. 100% Rated Devices

Standard rated devices, by NEC definition, are rated to carry 100% of their nameplate ampere rating for short periods of time (non-continuously) and 80% of their nameplate rating continuously, when enclosed in equipment.

Devices specifically designed to carry 100% of their nameplate ampere rating continuously when enclosed and tested in specific equipment are referred to as **100% rated devices.**

2-5. Special Applications

In mining and other applications, special versions of the R-frame circuit breaker provide safe equipment control and protection. For additional information, see separate frame books or refer to Westinghouse.

For all 3-phase Delta, grounded B-phase applications, reduced interrupting ratings will apply; refer to Westinghouse.

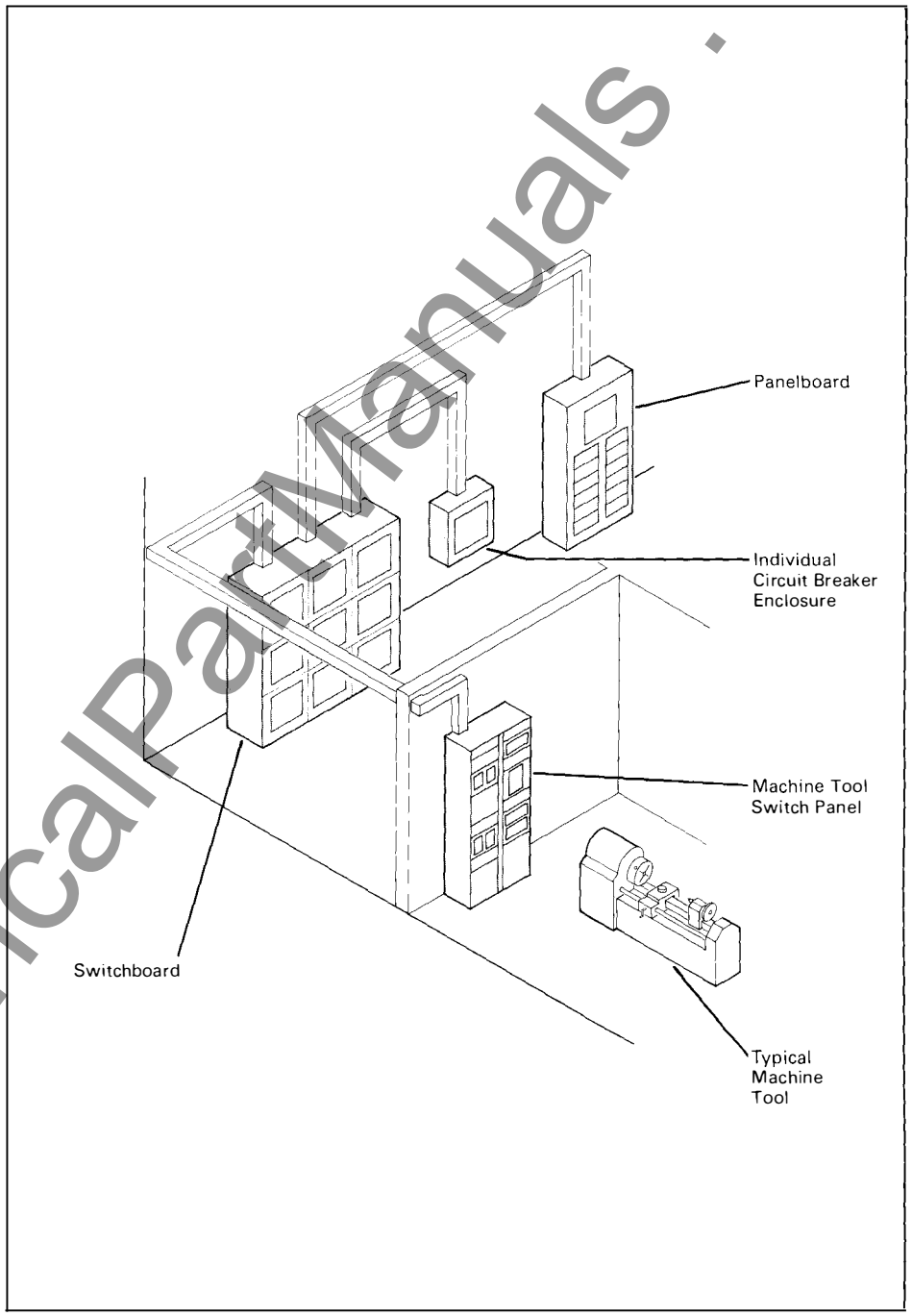


Figure 2-1. R-Frame Circuit Breaker Typical Applications

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

3-1. Physical Description

The R-frame circuit breaker consists of the following components mounted inside a molded glass-polyester case (Figure 3-1):

Operating mechanism

Arc extinguishers

Stationary contact assemblies

Moving contact assemblies

Trip unit.

3-2. Functional Description

The R-frame circuit breaker disconnects a load from an electrical supply when (1) the handle is operated, (2) an overcurrent or short circuit condition develops, (3) a manual trip is initiated locally with the Push-to-Trip button, (4) a shunt trip is remotely activated, or (5) an undervoltage release mechanism initiates a tripping operation remotely upon loss of monitored voltage. Circuit breaker operation is provided by a spring-loaded, independent, over-toggle operating mechanism that provides quick-make and quick-break, trip free operation.

In open air at 40°C, the circuit breaker will carry continuously a current equal to the ampere rating of the installed rating plug without exceeding a 50°C rise at the terminals. For ambient conditions above 40°C, derating of the circuit breaker frame should be considered to avoid exceeding a safe terminal temperature operating range. Consult Westinghouse for recommendations. For ambient temperatures below -5°C, special lubrication may be required for proper mechanical operation of the circuit breaker.

3-3. Component Description

The following paragraphs give the physical and functional descriptions of the circuit breaker components.

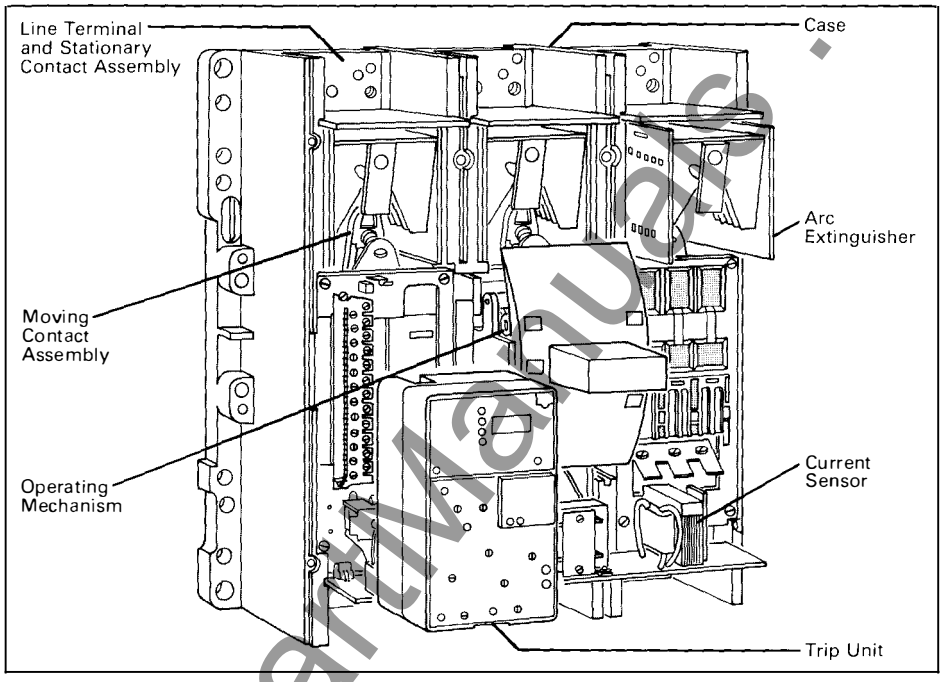


Figure 3-1. R-Frame Circuit Breaker Components

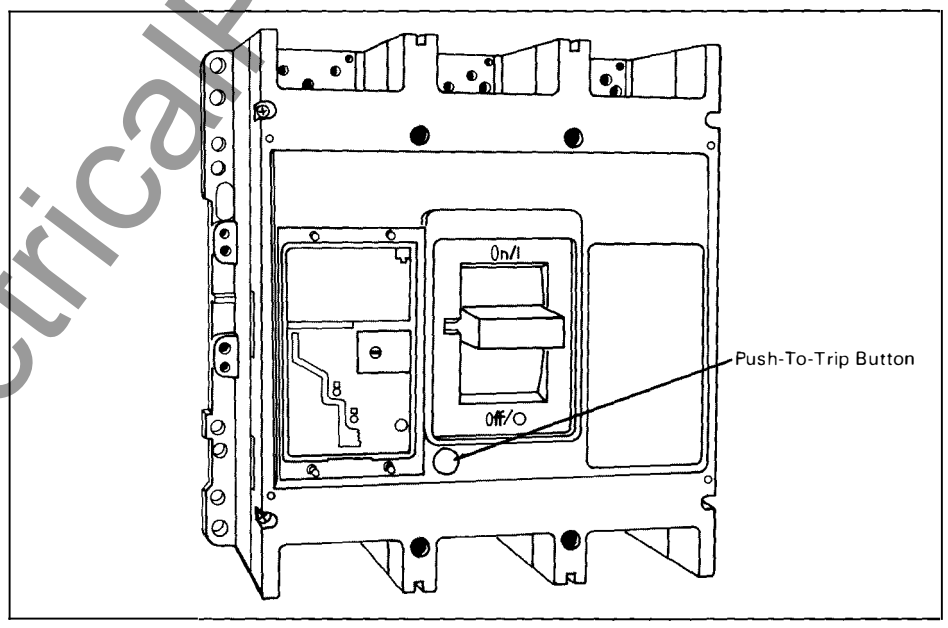


Figure 3-2. Molded Case

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Molded Case
The molded case (Figure 3-2) is a housing for electrically insulating the circuit breaker components and internal accessories. The case consists of a glass-polyester base and cover. The internal case molding forms cavities that isolate terminal areas, individual arc chambers, the operating mechanism, and internal accessories. Barriers isolate the operating mechanism from the accessory mounting cavity. Slots in the cover provide ventilation for the arc chambers.

Operating Mechanism
The operating mechanism provides a means of manually switching the moving contact position from open to closed and from closed to open. It also provides the mechanical means to open the contacts when trip conditions occur. The handle position indicates the contact status: closed, tripped, or open.

Manual Operation
Manual operation of the circuit breaker handle closes and opens the moving contact assembly. When the cradle is latched, the handle arm controls the crossbar rotation. When the handle arm is moved from one position to the other, the crossbar rotates and the moving contacts open or close. The link arrangement between the handle arm and the crossbar provides spring-loaded over-toggle operation.

3-4. Circuit Breaker Trip Operation

Arc Extinguishers
The arc extinguishers dissipate arcs that result when the circuit breaker interrupts current flow. Each arc extinguisher consists of a stack of uniformly spaced, U-shaped steel plates held together by two insulating side plates. When an interruption occurs and the contacts separate, the current flow through the ionized region between the contacts induces a magnetic field around the arc and arc extinguisher. The force drives the arc into the steel plates, deionizing the gas while dividing and cooling the arc.

Moving Contact Assembly
The moving contact assembly provides continuity between the line and load terminals when the circuit breaker is in the closed position. The crossbar and moving contact arm assembly rotate to close the contacts. After the contacts touch, the crossbar overtravels to provide a contact wiping action and create firm contact closure. A contact arm latch holds the moving contact arm in place. When the circuit breaker trips or is switched off, the moving contact assembly moves through the arc extinguisher away from the stationary contact.

Contact Blow-Apart
When current is flowing through the contacts of the R- frame circuit breaker, the positions of the line conductors and the moving contact arms with their flat coil-wound shunts induce opposing magnetic fields. During the tripping operation, under high fault conditions, the resulting opposing forces along the magnetic flux lines cause rapid contact blow-apart. The moving contacts pivot away rapidly from the stationary contacts.

Push-to-Trip Button
The Push-to-Trip button provides a manual means of tripping the circuit breaker. When the button is pressed, a plunger rotates the trip bar causing the circuit breaker to trip.

3-5. Trip Unit Description and Operation

General Description
All trip units are of the self-contained, factory-sealed, type using electronic sensing elements. All interrupting ratings of the R-frame family of circuit breakers will accept either the analog type RS Seltronic™ or Microprocessor Type Digitrip RMS trip unit which plugs into the trip unit mounting deck.

The Type RS Seltronic™ trip unit is available with protection functions and settings as shown in Tables 3-1 and 3-2. The Type Digitrip RMS trip unit is available in models 500, 600, 700 and 800 with protection functions and settings as shown in Tables 3-3 and 3-4. All Digitrip RMS models and associated features are shown in Table 3-5. The continuous ampere rating of the RS Seltronic and Digitrip RMS trip units is determined by the value of the installed rating plug. Both types of trip units are insensitive to ambient temperatures over a range of $-20°$ to $+55°C$.

Trip Unit Operation
The RS Seltronic™ or the Digitrip RMS trip unit (Figure 3-3), when installed, monitors current from current sensors mounted in the circuit breaker base. These current sensors are mounted internally on the circuit breaker main conductors. The current sensor secondary winding connections plug into the auxiliary current sensor printed circuit board (PCB). A plug-in connection is provided between the PCB and the terminal block on the trip unit deck. The trip unit plugs into the terminal blocks on the trip unit deck.

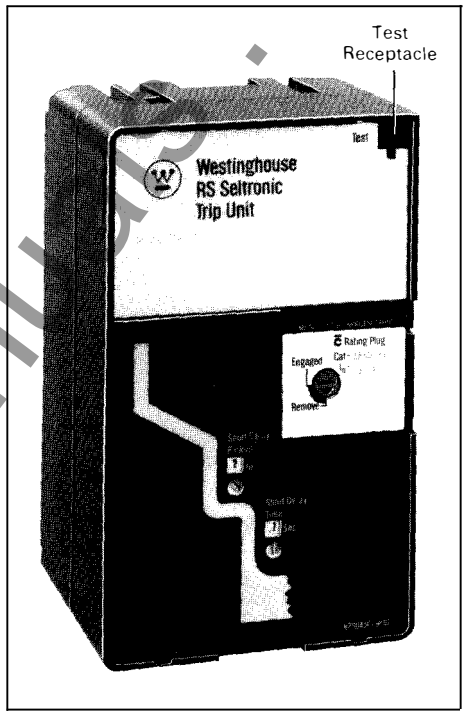


Figure 3-3. Type RS Seltronic™ Trip Unit

A field installed rating plug determines the continuous ampere rating of the trip unit. A mechanical interlock prevents latching and closing of the circuit breaker if the trip unit and rating plug are not installed. Under fault conditions, the trip unit will initiate a trip signal and energize the flux shunt trip. When the flux shunt trip operates, a plunger extends and rotates the trip bar. As the trip bar rotates, the latch releases and the circuit breaker trips.

3-6. Trip Unit Characteristics

Overload (Inverse Time) Trip
The trip unit initiates a trip of the circuit breaker within two hours for an overload of 135 percent, and in less time for higher overloads.

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Type RS Seltronic™ Trip Unit Short Delay/ Instantaneous Trip
For short circuit conditions that exceed the short delay pick-up settings, the trip unit initiates a trip after a prescribed delay by the I^2t ramp function for a trip unit with catalog number suffix T. A flat response time delay action is provided by a trip unit with catalog number suffix TA unless the instantaneous setting (I) is selected.

Type RS Seltronic™ Trip Unit Ground Fault Protection
For ground fault conditions that exceed pick-up and time delay settings, the trip unit initiates a trip signal. Time delay settings have a flat response.

Field Testing
Test points (Figure 3-3) are for functional field testing of the trip unit when connected to the test kit (Catalog number STK2).

Type Digitrip RMS Trip Unit Short Delay/ Ground Fault Trip
For short circuit conditions that exceed the short delay or ground fault pick-up settings, the trip unit initiates a trip signal. Either flat response or I^2t ramp settings may be selected. I^2t ramp settings are identified by the asterisk(*) in the setting viewing window.

Type Digitrip RMS Trip Unit Short Delay/ Ground Fault Protection
When selected, short delay/ground fault pick-up and time delay settings allow selective coordination with other circuit protective devices (Figure 3-4).

DC Application
Type RS Seltronic™ and Digitrip RMS trip units are suitable for AC application only.

Time/Current Curves
Time/Current curves for the RS Seltronic™ trip units are contained in Application Data 29-167D. Time/current curves for the Digitrip RMS trip units are contained in Application Data 29-167J.

Figure 3-4. Type Digitrip RMS Trip Unit (Model 600)

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Table 3-1. Type RS Seltronic™ (Electronic) Trip Unit Protection Functions

Protection Functions		Trip Unit Catalog Number Suffix			
		T	TA	TG	TAG
Long Time	Fixed Ampere Rating① with Fixed Long Delay	●	●	●	●
	Adjustable Ampere Setting with Fixed Long Delay②	●	●	●	●
Short Time	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp	●		●	
	Adjustable Short Time Delay③ with Adjustable Short Time Pick-up, or		●		●
	Adjustable Instantaneous Pick-up③		●		●
Instantaneous	Fixed Instantaneous (Override)④	●	●	●	●
Ground Fault	Adjustable Ground Fault Pick-up with Adjustable Ground Fault Time			●	●

① See Tables 3-2 and 5-7 for available fixed rating plugs.
② See Tables 3-2 and 5-7 for available adjustable rating plugs.
③ Using trip unit with adjustable short time delay (TA, TAG), instantaneous pick-up is achieved when the lowest time delay setting (I) is selected.
④ Instantaneous override setting fixed at frame withstand rating (20 kA).

Table 3-2. Type RS Seltronic™ (Electronic) Trip Unit Protection Functions and Rating Settings⑧

Trip Unit Maximum Rating Amperes (I_n)	Fixed Rating Plug Amperes (I_n)	Adjustable Rating Plug Amperes (I_n)	Adjustable Short Time Delay		
			Pick-up Setting Range ⑤	Time Delay	
				I^2T Ramp (Standard)	Independently Adjustable Time Setting (Optional)
1600	800 1000 1200 1250⑥ 1400 1600	800/1000/1200/1600 800/1000/1250/1600②	2 To 8	Fixed	I⑦ (No Intentional Delay) 100/200/300 m sec
2000	1000 1200 1250⑥ 1400 1600 2000	1000/1200/1600/2000 1000/1250/1600/2000②	2 To 8	Fixed	I⑦ (No Intentional Delay) 100/200/300 m sec

⑤ Multiple of the fixed rating plug value or setting of the adjustable rating plug.
⑥ For use with RW and RWC circuit breakers only.
⑦ Instantaneous pick-up occurs with short delay time adjustment set at I.
⑧ As an option, ground fault protection with pick-up settings adjustable to 200A, 400A, 600A, 800A, 1000A, and 1200A. Ground fault time delay settings adjustable to instantaneous (I), 150 ms, 300 ms, and 500 ms.

Table 3-3. Type Digitrip RMS (Microprocessor Based) Trip Unit Protection Functions⑨

Protection Functions		Protection Function Identifier					
		LI	LS	LSI	LIG	LSG	LSIG
Long Time	Long Delay Setting	●	●	●	●	●	●
	Adjustable Long Delay Time	●	●	●	●	●	●
Short Time	Adjustable Short Delay Pick-up		●	●		●	●
	Adjustable Short Delay Time		●	●		●	●
Instantaneous	Adjustable Instantaneous Pick-up	●		●	●		●
	Fixed Instantaneous (Override)⑩		●			●	
Ground Fault	Adjustable Ground Fault Pick-up				●	●	●
	Adjustable Ground Fault Time				●	●	●

⑨ See Tables 3-4 and 5-14 for available rating plugs.
⑩ Instantaneous override setting fixed at frame withstand rating (20 kA RMS).

Table 3-4. Type Digitrip RMS (Microprocessor Based) Trip Unit Protection Functions and Rating Settings⑮

Trip Unit Maximum Rating Amperes (I_n)	Fixed Rating Plug Amperes (I_n)⑪	Adjustable Long Delay (Standard)		Adjustable Short Delay (Optional)			Adjustable Instantaneous (Optional)
		Pick-up Range ⑫	Time Delay Range (Sec.)	Pick-up Range ⑬	Time Delay Setting (Sec.)		Pick-up Range ⑬
					Using I^2T Ramp	Using Flat Response	
1600	800 1000 1200 1250⑭ 1600	0.5-1.0	2 To 24 @ 6X Rating Plug Amperes	2 To 8	0.1 To 0.5	0.1 To 0.5	2 To 10
2000	1000 1200 1250⑭ 1600 2000	0.5-1.0	2 To 24 @ 6X Rating Plug Amperes	2 To 8	0.1 To 0.5	0.1 To 0.5	2 To 10

⑪ Rating plugs for the Digitrip RMS trip units are available in 50 Hz or 60 Hz versions. Adjustable rating plugs not available for Digitrip RMS trip units.
⑫ The adjustable long time pick-up adjustment permits a pick-up range of 50 to 100% of the rating plug value. A 1600A circuit breaker can provide 400A circuit protection when equipped with a Digitrip trip unit with adjustable long time pick-up adjustment set to 0.5 with an 800A rating plug. A 2000A circuit breaker can likewise provide 500A circuit protection.
⑬ Multiple of fixed rating plug amperes.
⑭ For use with RW and RWC circuit breakers only.
⑮ As an option, ground fault protection with pick-up settings at A, B, C, D, E, F, H and K. Values range from 200A to 1200A as a function of the installed rating plug. Ground fault time delay settings in seconds at 0.1, 0.2, 0.3, 0.4, 0.5 (flat response) and I^2T ramp settings at 0.1, 0.3, and 0.5. Ground fault protection has the ground fault zone interlocking function supplied as standard when ground fault protection is ordered.

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Table 3-5. Digitrip RMS Trip Unit Model Features

	Digitrip RMS Type	500	600	700	800
	Instruction Leaflet No.	I.L. 29-851	I.L. 29-852	I.L. 29-853	I.L. 29-854
Protection	Long Delay Setting	X	X	X	X
	Long Delay Time	X	X	X	X
	Long Time Memory	X	X	X	X
	Short Delay Pick-up	OPT.	OPT.	OPT.	OPT.
	Short Delay Time	OPT.	OPT.	OPT.	OPT.
	Flat/I²T Response	X	X	X	X
	Zone Interlocking	①	①	①	①
	Instantaneous Pick-up	OPT.	OPT.	OPT.	OPT.
	Ground Fault Pick-up	OPT.	OPT.	OPT.	OPT.
	Ground Fault Time	OPT.	OPT.	OPT.	OPT.
	Flat/I²T Response	X	X	X	X
	Ground Time Memory	X	X	X	X
	Zone Interlocking	①	①	①	①
	Interchangeable Rating Plug	X	X	X	X
Local Trip Indication	Mode of Trip LEDs	X	X	X	X
	Battery – for Mode of Trip LEDs	X	X	X	X
	Battery Status LED	X	X	X	X
	Battery Test Pushbutton	X	X	X	X
Test	Integral Test Provisions	X	X	X	X
	Trip Unit Status Indication LED	X	X	X	X
	Auxiliary Power Module	OPT.	OPT.	OPT.	OPT.
Local Display On Trip Unit	Power/Relay Module		X	X	X
	4 Digit Display		X		X
	øA Current LED		X	②	X
	øB Current LED		X	②	X
	øC Current LED		X	②	X
	Gnd. Current LED		⑥	②⑥	⑥
	Display Stepping Pushbutton		X		X
	High Load LED		X		X
Remote Signals	Remote Signal Contacts:				
	Long Delay Trip		X	X	X
	Short Circuit Trip		X	X	X
	Ground Fault Trip		⑥	⑥	⑥
	High Load Alarm		X	X	X

	Digitrip RMS Type	500	600	700	800
	Instruction Leaflet No.	I.L. 29-851	I.L. 29-852	I.L. 29-853	I.L. 29-854
Energy Monitoring	Potential Transformer Module			X	X
	PTM Disconnect Plug for Dielectric Testing of Circuit Breaker			X	X
	Energy Monitoring: Parameters				
	Peak Demand			④	X
	Peak Demand Reset PB			④	X
	Present Demand			④	X
	Energy Consumption			④	X
Communications	INCOM (Integrated Communications)			X	X
	INCOM Address Register			X	X
Transmittable Data	Transmittable Parameters:				
	Individual Phase Currents			②	③
	Ground Currents			②⑥	③⑥
	Energy			④	③
	Breaker Status:				
	Open/Closed/Tripped			②	③
	Mode of Trip:				
	Override			②	③
	Instantaneous			②	③
	Discriminator			②	③
	Short Delay			②	③
	Ground Fault			②⑥	③⑥
	Long Delay			②	③
	Long Delay Pick-up				③
	Information:				
	External Trip Command (Over INCOM)			②	③
	Data Memory Test Failure (RAM)			②⑤	③
	Program Memory Test Failure (ROM)			②⑤	③
	Missing or Defective Rating Plug			④	③
	Reverse Power Flow			④	③
	Response to Depressing Test Pushbutton			④	③
	Communication Failure			②⑤	②⑤
Control	Breaker Command (Via INCOM):				
	Trip			X	X
	Close			OPT.⑦	OPT.⑦

OPT = Optional
① Use of zone interlocking is optional with breaker wiring modification.
② Remote location only unless optional AEM local monitor is used.
③ Local (on face of trip unit) or remote via INCOM.
④ Remote only.
⑤ On AEM denoted by absence of response from addressed breaker.
⑥ Supplied only when trip unit is equipped with ground fault protection option.
⑦ Requires electrical operator option.

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

4-1. General Information

A complete line of accessories is available for use with Series C circuit breakers. Internally mounted accessories are plug-in types for use only with the Series C R-frame circuit breaker. The following paragraphs describe each accessory and provide operation, rating, and specification information.

4-2. Line and Load Terminals

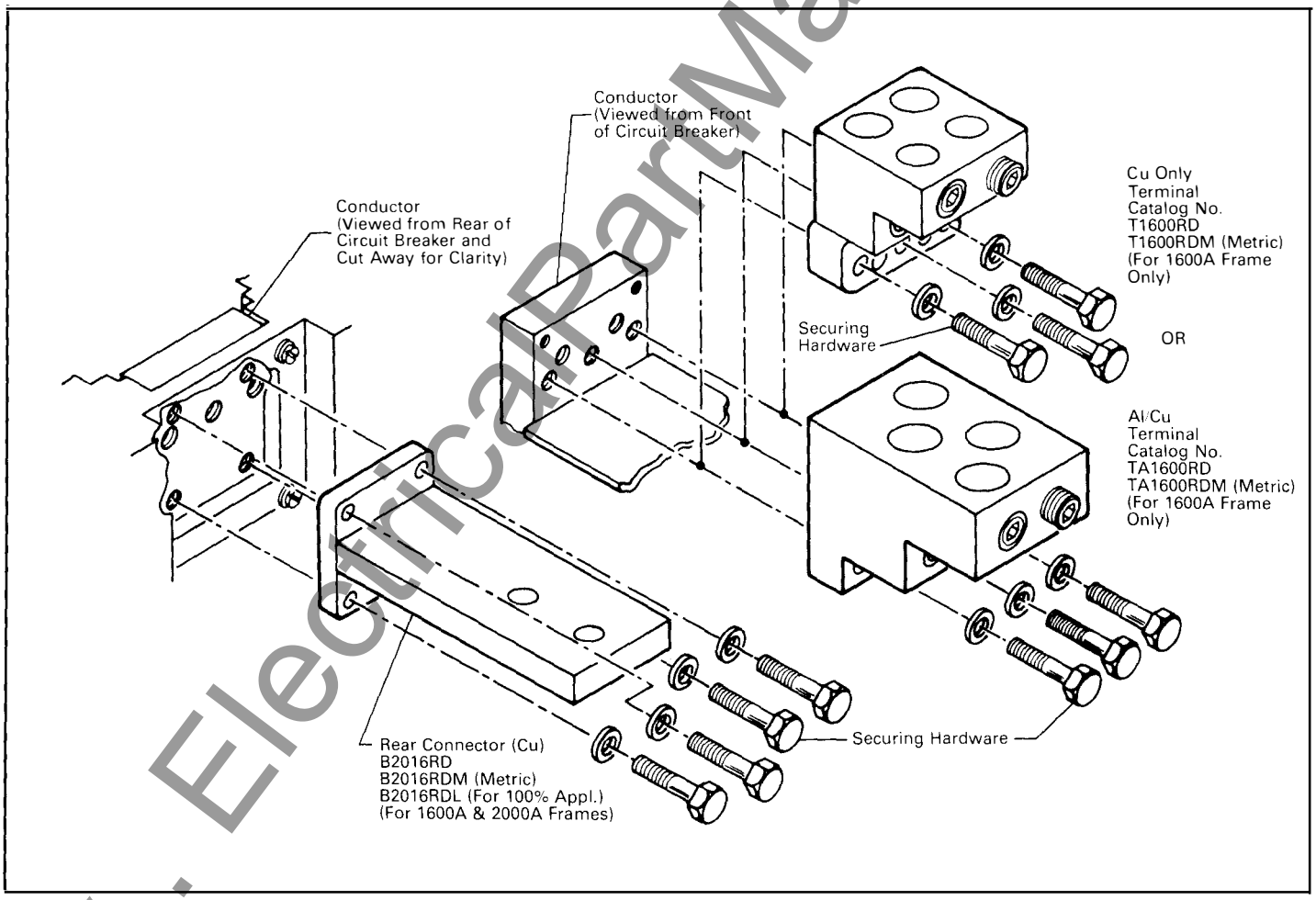
Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories, Inc. Standards UL486A and UL486B and CSA C22.2 No.65M. Unless otherwise specified, R-frame circuit breaker line and load terminals are shipped separately for field installation.

4-3. Internal Accessories

All internal accessories are of the plug-in type installed in an accessory deck mounted in the right-hand pole of the circuit breaker only. Internal accessories are listed for field installation under UL File E64983. The available plug-in internal accessories include the following:

- Alarm (Signal)/Lockout Switch
- Auxiliary Switch
- Shunt Trip
- Low Energy Shunt Trip
- Undervoltage Release Mechanism.

For external connections, 18 inch long pig-tail leads exit the right-side of the circuit breaker next to the accessory deck. An optional configuration includes a terminal block mounted on the right-side of the base. To identify allowable accessory installation combinations, see Figure 4-2.



Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

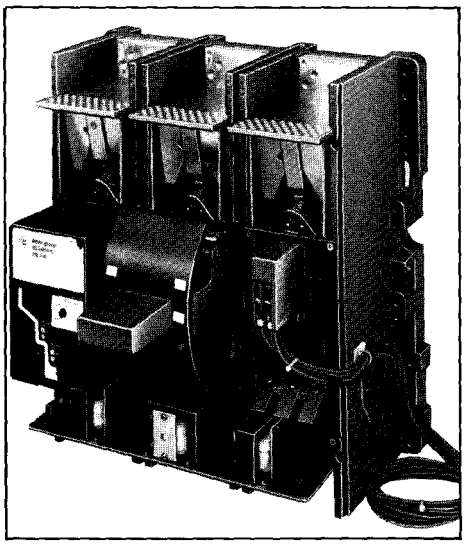
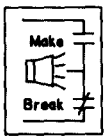
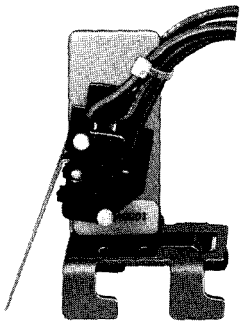


Figure 4-1. Typical Internal Plug-in Accessory Installed in R-frame Circuit Breaker

Alarm (Signal)/ Lockout Switch





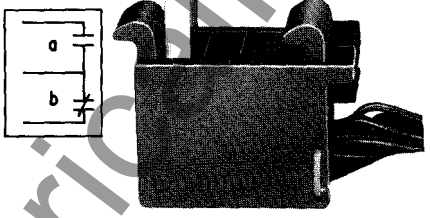
The alarm (signal)/lockout switch monitors circuit breaker trip status and provides remote signaling and interlocking capabilities when the circuit breaker trips. The alarm (signal)/lockout switch consists of one or two single pole double throw (SPDT) switches arranged in a plug-in module that mounts in retaining slots in the accessory panel. The SPDT switch contacts are identified as make and break contacts. When the circuit breaker trips, the make contact closes and the break contact opens. Table 4-1 provides electrical ratings data for the alarm (signal) /lockout switch.

Table 4-1. Alarm (Signal)/Lockout Switch Electrical Ratings Data ①②

Maximum Voltage	Freq.	Maximum Current Amps
600	50/60 Hz	6.0
125	DC	0.5●
250	DC	0.25●

① Endurance - 500 electrical operations plus 2500 mechanical operations
② Pigtail wire size - No. 18 AWG (0.82 mm^2). Leads are red, black, and blue.
③ Noninductive load

Auxiliary Switch



The auxiliary switch provides circuit breaker contact status information by monitoring the position of the contact arm assembly. The auxiliary switch is used for remote signaling and interlocking purposes, and consists of two or four SPDT switches arranged in a plug-in module that mounts in retaining slots in the accessory deck. Each SPDT switch has one ''a'' and one ''b'' contact. When the circuit breaker contacts are open, the ''a'' contact is open and the ''b'' contact is closed. Table 4-2 provides electrical ratings data for the auxiliary switch.

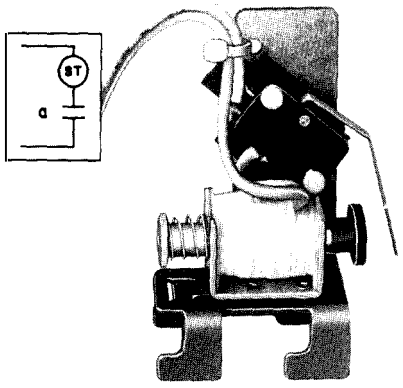
Table 4-2. Auxiliary Switch Electrical Ratings Data ④⑤

Maximum Voltage	Freq.	Maximum Current Amps
600	50/60 Hz	6.0
125	DC	0.5⑥
250	DC	0.25⑥

① Endurance - 500 electrical operations plus 2500 mechanical operations
② Pigtail wire size - No. 18 AWG (0.82 mm^2). Leads are red, black, and blue.
③ Noninductive load

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

Shunt Trip



The shunt trip provides remote tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch arranged in a plug-in module that mounts in retaining slots in the accessory panel. Table 4-3 also provides electrical ratings data for the shunt trip.

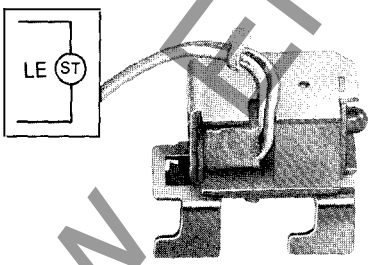
Table 4-3. Shunt Trip Electrical Ratings Data

- Approximate unlatching time of 6 milliseconds.
- Average circuit breaker contact total opening time approximately 62 milliseconds, at rated voltage.
- Endurance – 500 electrical operations.
- Shunt trip can be operated up to a maximum of six times per minute.
- Maximum operating voltage – 110% of maximum voltage range rating.
- Pigtail wire size – No. 18 AWG (0.82 mm²). Leads are yellow and white.

Catalog Suffix	Application Ratings		Electrical Operating Ratings					
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I_p (A)	I_{rms} at 0.250s (A)	I_{rms} at 0.033s (A)	VA	One Minute Dielectric Withstand Voltage (V)
03/03K	24	50/60	24	16.8	71.1		50.3	1210	1050
	24	DC	24	16.8		36.1		870	1050
05/05K	48-60	50/60	48	33.6	13.1		9.2	450	1170
			60		17.2		12.2	740	
08/08K	110/127	50/60	110	60	4.3		3.0	330	1500
			120		4.4		3.5	420	
			127		5.4		3.8	483	
11/11K①	208-240	50/60	110	60.5	4.2		3.0	330	1480
			120		4.5		3.2	390	
			127		4.6		3.3	430	
			208		7.9		5.6	1170	
			220		8.5		6.0	1370	
			240		8.7		6.1	1470	
14/14K	380-440	50/60	380	266.0	4.5		3.2	1220	1880
			415		5.0		3.6	1500	
			440		5.3		3.7	1640	
	220-250	DC	220	154.0		2.4		530	1500
			250			2.7		680	
18/18K	480-600	50/60	480	336.0	0.6		.4	200	2200
			525		0.7		.5	270	
			550		0.7		.5	280	
			600		0.8		.6	360	
23/23K	48-60	DC	48	33.6		9.8		470	1120
			60			11.6		700	
26/26K	110-125	DC	110	77.0		3.3		370	1250
			120			3.6		440	
			125			3.8		480	

① Suitable for use with Class 1 GFP devices; marking label supplied with accessory kit.

Low Energy Shunt Trip

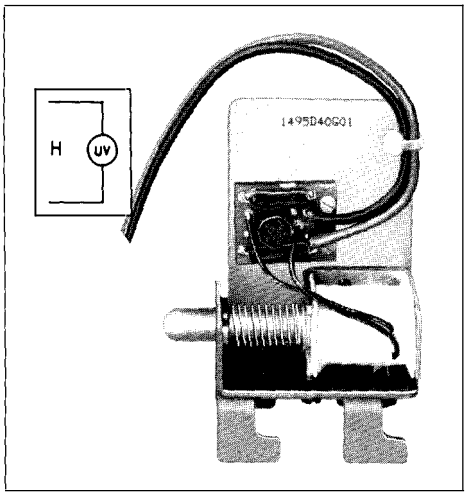


Low Energy Shunt Trip (LEST) devices are designed to operate from low energy output signals from dedicated current sensors typically applied in ground fault protection schemes. However, with a proper control voltage source, they may be applied in place of conventional trip devices for special applications. The LEST consists of an intermittent-rated solenoid and a plunger assembled to a plug-in module. The plug-in module is mounted in slots in the accessory mounting deck in the right pole of the circuit breaker. When the solenoid is energized, the plunger extends and presses against the trip bar tripping the circuit breaker. The trip bar resets the LEST when the trip signal is removed and the circuit breaker handle is moved to the reset (extreme off) position. The leads are yellow and white

The LEST is designed to trip the circuit breaker when a 100 microfarad capacitor charged to 28 Vdc is discharged through the solenoid.

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

Undervoltage Release Mechanism



The undervoltage release mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating. Tables 4-4a and 4-4b provide electrical ratings data for each operating voltage of the handle actuated reset undervoltage release mechanism.

Note: Undervoltage release mechanism accessories are not designed as circuit interlocks and are not recommended for use as such.

Handle Actuated Reset The undervoltage release mechanism consists of a continuous rated solenoid with a plunger mounted in a plug-in module. The trip bar resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (OFF) position. With no voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

Table 4-4a. AC Undervoltage Release Mechanism (Handle Reset) Ratings① ⑤

Catalog Suffix	Application Ratings	Electrical Operating Ratings					Approximate Operating Time (ms)			
	Voltage (V)	Supply Voltage (V)	Dropout Voltage (V) Min.	Dropout Voltage (V) Max.	Pickup Voltage (V) Max.	VA	Min.② UVR Response	Initiation③ Circuit Breaker Contact Separation	Maximum Circuit Breaker Contact Opening	Dielectric④ Withstand Voltage (V)
01/01K	9	9	3.2	6.3	7.7	3.9	5	46	77	1018
02/02K	12	12	4.2	8.4	10.2	2.3	5	46	77	1024
03/03K	24	24	8.4	16.8	20.4	3.1	5	46	77	1048
05/05K	48-60	48 60	21.0	33.6	40.8	3.4 6.0	5	46	77	1120
08/08K	110-127	110 120 127	44.5	77.0	93.5	3.3 3.6 3.8	5	46	77	1254
11/11K	208-240	208 220 240	84.0	145.6	176.8	4.2 6.6 7.2	5	46	77	1480
29/29K	380-500	380 415 440 480 500	168.0	266.0	323.0	3.8 8.3 8.8 9.6 10.0	5	46	77	1960

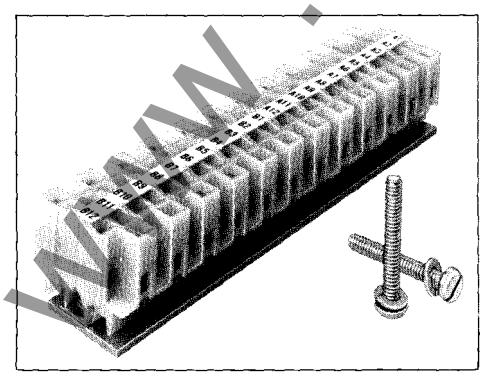
Table 4-4b. DC Undervoltage Release Mechanism (Handle Reset) Ratings● ⑤

Catalog Suffix	Application Ratings	Electrical Operating Ratings					Approximate Operating Time (ms)			
	Voltage (V)	Supply Voltage (V)	Dropout Voltage (V) Min.	Dropout Voltage (V) Max.	Pickup Voltage (V) Max.	VA	Min.② UVR Response	Initiation③ Circuit Breaker Contact Separation	Maximum Circuit Breaker Contact Opening	Dielectric④ Withstand Voltage (V)
20/20K	12	12	4.2	8.4	10.2	3.4	5	46	77	1024
21/21K	24	24	8.4	16.8	20.4	4.3	5	46	77	1048
23/23K	48-60	48 60	21.0	33.6	40.8	4.8 7.2	5	46	77	1120
26/26K	110-125	110 120 125	43.8	77.0	93.5	3.3 3.6 3.8	5	46	77	1250
28/28K	220-250	220 250	87.5	154.0	187.0	6.6 7.5	5	46	77	1500

① Endurance – 500 electrical operations plus 2500 mechanical operations.
② UVR will override a momentary voltage dip up to the response time shown.
③ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.
④ For 1 minute.
⑤ Pigtail wire size – No. 18 AWG (0.82 mm^2). Leads are orange and brown.

4-4. External Accessories

Accessory Terminal Block (for fixed mounted configuration)



Internal accessory wiring leads are normally supplied with pigtail leads (No. 18 AWG) that exit from the right-side of the circuit breaker. Where specified, fixed mounted accessory terminal blocks are available. A maximum of one 24 point terminal block can be installed on the right-side of the circuit breaker for the internal accessories. Terminal block ordering information is given in Table 5-13.

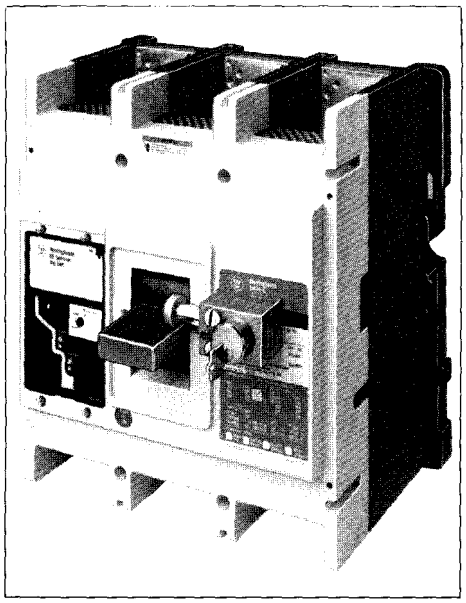
For convenience in determining the appropriate number of terminal block points required, refer to Table 4-5.

Table 4-5. Number of Control Wires For Each Internally Mounted Accessories

Type of Accessory	Number of Contacts Per Single Accessory	Required Number of Wires
Auxiliary Switch	2a/2b 4a/4b	6 12
Alarm (Signal)/ Lockout Switch	1m/1b 2m/2b	6 12
Shunt Trip	N/A	2
Undervoltage Release Mechanism	N/A	2

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

• Key Interlock

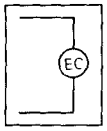


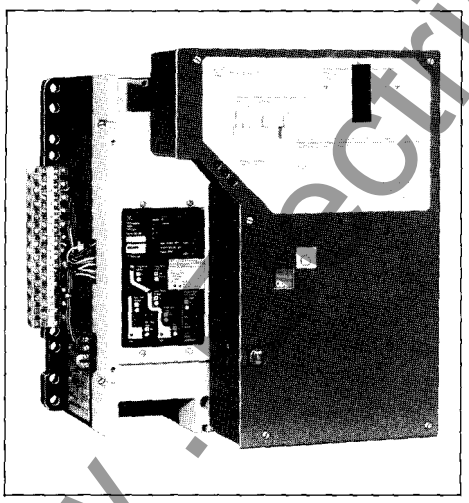
Lock and interlock accessories are used to deter undesired circuit breaker operation and establish interlocked control systems.

The key interlock is used to externally lock the circuit breaker handle in the OFF position. When the key interlock is locked, an extended deadbolt blocks movement of the circuit breaker handle. Uniquely coded keys are removable only with the deadbolt extended. Each coded key controls a group of circuit breakers for a given specific customer installation.

The key interlock assembly consists of a mounting kit and a customer supplied deadbolt lock. The mounting kit comprises a mounting plate, which is secured to the circuit breaker cover in the right-pole position; key interlock mounting screws; and, a wire seal. Specific mounting kits are required for individual key interlock types.

• Electrical (Motor) Operator





The motor operator allows the circuit breaker to be opened, closed, or reset remotely. It also has a lock-off capability and provisions for manual operation.

The motor operator contains a reversible motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches and relays are used to control the motor.

Since the motor operator is equipped with control relays, only a momentary control signal is required to close or open the circuit breaker. Once an operation is initiated, the control relays seal in and the motor operator completes its operation. The relays carry the motor current. The control momentary switches only provide the signal.

The motor operator is U.L. listed as a recognized component suitable for field installation on all type R-frame circuit breakers and molded case switches under UL File E64124.

From the point of energization of the closing mechanism at 85% voltage, the closing time is 30 cycles ±10%.

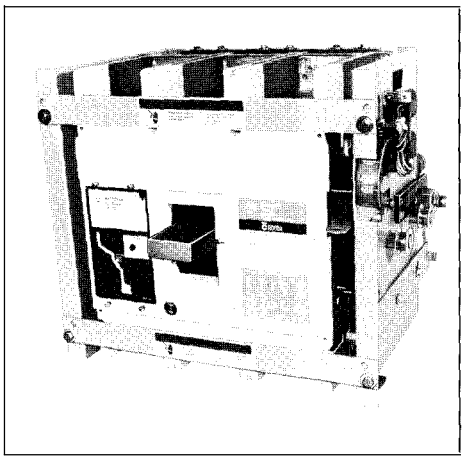
Table 4-6. Available Motor Operator Ratings and Operating Conditions①②③④

Rated Voltage (V)⑤	Frequency	Motor In-Rush Current (A)	Dielectric Withstand Voltage (V)
120	50/60 Hz	40	1000 VAC
240	50/60 Hz	27	1000 VAC
48	DC	53	1000 VAC

① Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
② Electric Operating time at rated voltage;
(a) To turn breaker ON – ½ second max.
(b) To turn breaker OFF – ½ second max.
③ Motor operating temperature; Class "A" temperature limits apply.
④ A minimum 1 KVA power source is recommended for motor operation.
⑤ Applied voltage should be no less than 85% or no more than 110% of rated.

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

- **Drawout Cassette**

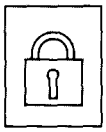


The drawout cassette is currently for use with the standard 3-pole 65 KA/480 VAC, 1600A and 2000A RD circuit breakers only. It consists of two separate components: the movable mechanism which is factory mounted to the circuit breaker frame (shown in figure) and the stationary mechanism which is housed in the cassette and shipped separately.

The drawout mechanism has four positions.

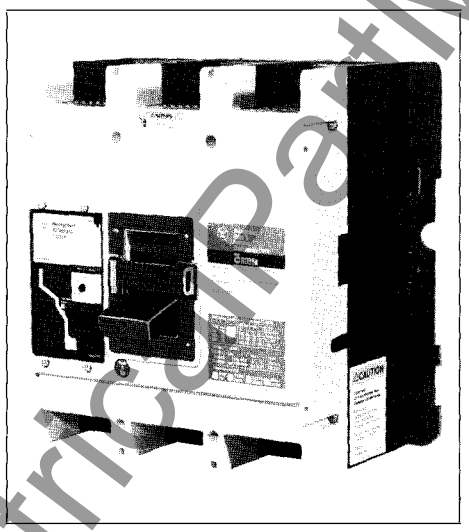
- Connected – The breaker is fully connected to the primary stabs and secondary contacts.
- Test – The breaker is not connected to the primary stabs but is connected to the secondary contacts.
- Disconnected – Both the primary stabs and the secondary contacts are disconnected.
- Withdraw – The breaker can be removed from the cassette.

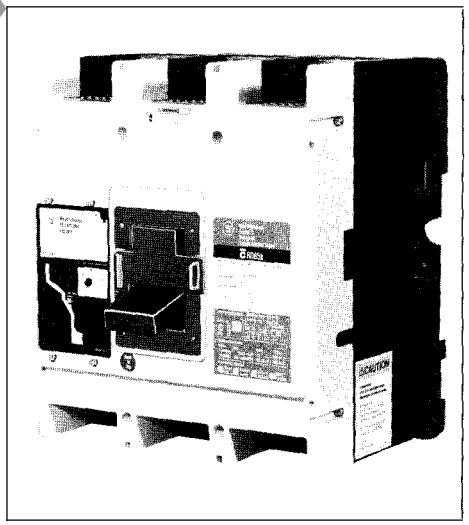
- **Padlockable Handle Lock Hasp**



The padlockable handle lock hasp is used to externally lock the circuit breaker handle. Safety is ensured since the trip-free circuit breaker mechanism is capable of tripping when the handle is locked in the on position. The lock hasp is Underwriters' Laboratories listed under File E7819.

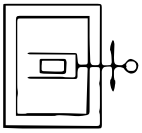
The lock hasp consists of a mounting plate and a lock plate. The two plates are connected by a hinge. When the lock plate is positioned to block the circuit breaker handle it may be secured by placing one or more padlock shackles through the hasp on the mounting plate. The lock hasp is designed to accept a maximum of three padlock shackles, each with a maximum diameter of ¼ inch.

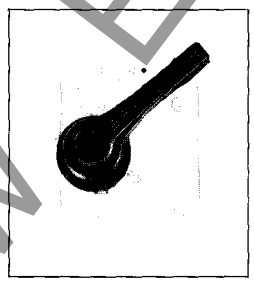




Two versions of the lock hasp are available: One permits the circuit breaker handle to be locked in both the on and off positions (see figure to left above). The second permits the circuit breaker handle to be locked in the off position only (see figure to right above).

- **Slide Plate Handle Mechanism**





The slide plate handle mechanism provides a means of externally operating a circuit breaker installed in a shallow depth enclosure. When applied to enclosures that are hinged on the right-hand side, the handle mechanism also functions as an enclosure locking device. The handle mechanism can be used in NEMA 1, and 12 enclosure applications; a special version can be used in NEMA 3, 4 and 5 enclosure applications. The handle mechanism will accept up to three padlock shackles each with a maximum diameter of 5/16 inch (7.94mm). The handle mechanism is an Underwriters' Laboratories, Inc. recognized component for panelboard accessories under UL File E56845.

4-5. Miscellaneous Accessories

Seltronic™ Portable Test Kit

The Seltonic™ portable test kit provides verification of performance of all ratings of Seltronic™ trip units installed in Series C circuit breakers. The test kit operates on 120-Volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker. Catalog No. STK2.

Molded Handle Extension

Use to manually operate circuit breaker "ON" and "OFF". Catalog No. HEX6.

4-6. Accessory Combinations

Different combinations of accessories can be supplied. Figure 4-2 shows the different accessories or combinations that can be used internally with R-frame circuit breakers. All internal accessories fit into an accessory mounting deck that is positioned in the right-hand pole in the circuit breaker. The key interlock external accessory is also positioned on the cover over the right-hand pole.

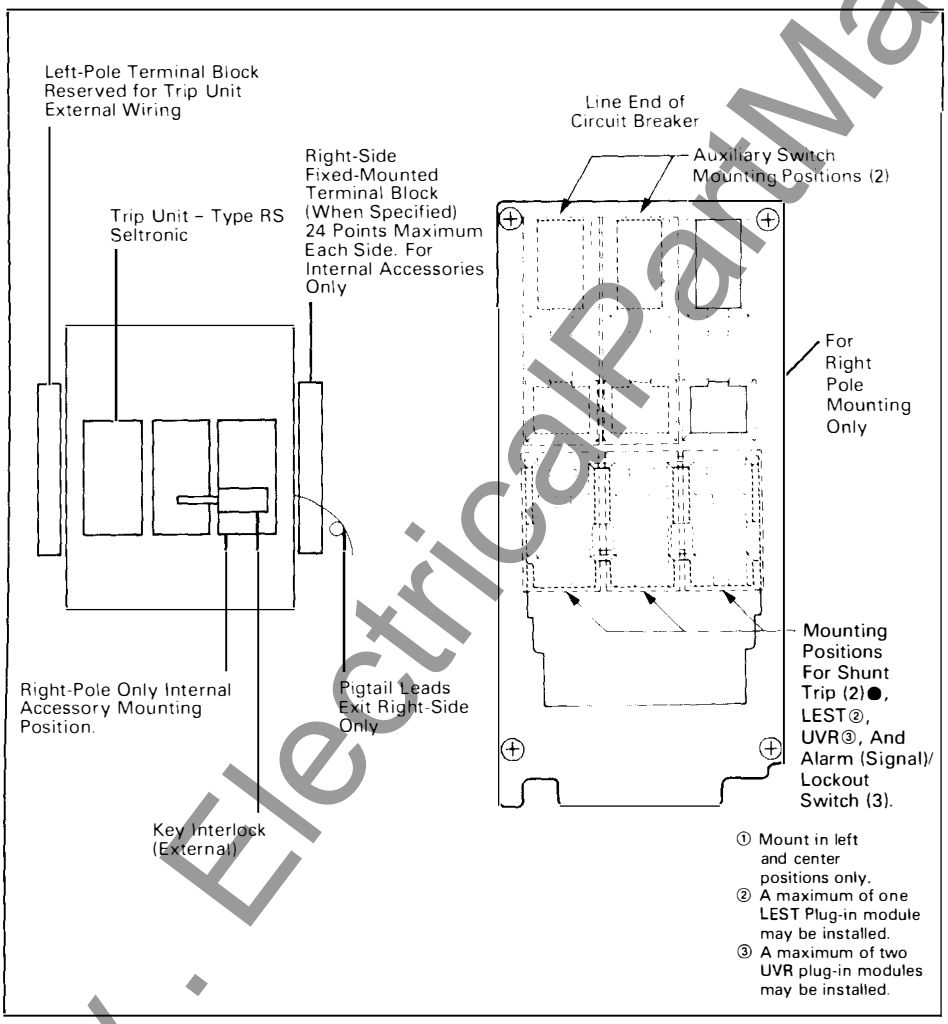


Figure 4-2. Accessory Mounting Locations

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

5-1. General Information

When ordering an R-frame circuit breaker use the catalog numbers given in Tables 5-1 through 5-14. Interrupting ratings can be found in Table **1-1**. List any accessories or modifications required together with the applicable catalog number. REFER TO WESTINGHOUSE FOR AVAILABILITY OF ALL CIRCUIT BREAKERS, MOLDED CASE SWITCHES, ACCESSORIES, AND MODIFICATIONS.

List Prices: see Price List 29-020. Discount Symbol CB-2.

5-2. Ordering Instructions - Circuit Breakers

Circuit breakers will be shipped from the factory with trip units installed. Rating plugs will be shipped separately when an RS trip unit is specified. However, rating plugs will be factory installed in all circuit breakers with Digitrip RMS trip units. Circuit breaker frame and trip unit catalog numbers are shown separately for ordering convenience only.

Order complete circuit breaker by specifying applicable frame with trip unit, rating plug, and accessories using the applicable catalog designations.

5-3. Ordering Instructions - Accessories

When ordering an accessory that is for installation by the customer, use the field installation kit catalog number.

5-4. Ordering Example

Customer Requirements
One UL listed molded case circuit breaker, 600 Vac per UL 489, as follows:

Item 1. 3-pole, 600V, 1600A, 60 Hz, with 65 kA interrupting capacity at 480 volts
Item 2. Electronic trip unit with adjustable short time pick-up and adjustable short time delay settings.

Type RS Seltronic™ Trip Unit Catalog Numbers ① ②

Example: RS31600T

RS	3	1600	T	
Trip Unit Type	Number of Poles	Maximum Trip Unit Ampere Rating	Suffix	
RS: Seltronic™	3, 4	1600 2000	T:	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp
			TA:	Adjustable Short Time Delay with Adjustable Short Time Pick-up or Adjustable Instantaneous Pick-up
			TG:	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp and Adjustable Ground Fault Pick-up with Adjustable Ground Fault Time
			TAG:	Adjustable Short Time Delay with Adjustable Short Time Pick-up or Adjustable Instantaneous Pick-up and Adjustable Ground Fault Pick-up with Adjustable Ground Fault Time

① Rating plug for Seltronic™ trip units must be ordered separately. Refer to Table 5-7.
② RS Seltronic™ trip units only are not warehouse items. Must be ordered from the factory.

Type Digitrip RMS Trip Unit Catalog Numbers ③ ④

Example: T51ALI

T	5	1	B	LI
RMS Trip Unit Prefix	Trip Unit Model	Protection Function Identifier	Trip Design Series	Protection Function
T	5 (=500) 6 (=600) 7 (=700) 8 (=800)	1 (=LI) 2 (=LSI) 3 (=LS) 4 (=LIG) 5 (=LSG) 6 (=LSIG)	B	LI LSI LS LIG LSG LSIG

③ Rating plug for Digitrip RMS trip units must be specified separately and is shipped installed in trip unit. Refer to Table 5-14.
④ Digitrip RMS trip units only are not warehouse items. Must be ordered from the factory.

Item 3. One 2a/2b auxiliary switch with pigtail leads
Item 4. One shunt trip, 120 volts, 50/60 Hz with pigtail leads
Item 5. Load side terminals for (4) 600 mcm copper conductors per phase.
Item 6. Fixed mounted, suitable for reverse feed application.

Ordering Steps
1. Refer to Table 1-1, select RD circuit breaker (This covers item 1 above, in part.)
2. Refer to Table 3-1,select Type RS Seltronic™ trip unit with suffix TA (this covers item 2 above, in part.)
3. Refer to Table 5-1, select Catalog No. RD316TAW. (This covers items 1, 2, and 6 above.)

ORDERING INFORMATION

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

Notes:
(a) Type RD circuit breakers with interchangeable rating plugs are suitable for reverse feed applications.
(b) A suffix TA trip unit with flat response short delay settings was selected. Depending on customer preferences, a suffix T trip unit with I^2t ramp curve configuration might have been acceptable.

4. Refer to Table 5-7, select rating plug Catalog No. 16RS16T.

5. Refer to Table 5-15, select (3) wiring terminals, Catalog No. T1600RD.

6. Refer to Table 5-17, select auxiliary switch Catalog No. A2X6RA.

7. Refer to Table 5-18, select shunt trip Catalog No. SNT6RA08.

Notes:
(c) Since selected accessory catalog references were non-kit types, each accessory will be factory installed. This will result in a longer lead time. If accessories had been ordered as kits, for field installation, shipment from the warehouse would have meant a much reduced lead time.
(d) When internal accessories are ordered for field installation, accessory mounting arrangements can be verified by referring to Figure 4-2.

Order Entry

Enter order by specifying as follows:

Item 1. Quantity (1) circuit breaker Catalog No. RD316TAW to include: one auxiliary switch Catalog No. A2X6RA and one shunt trip Catalog No. SNT6RA08.
Item 2. Quantity (1) 1600A rating plug Catalog No. 16RS16T.
Item 3. Quantity (3) wiring terminals Catalog No. T1600RD.

Note:
The rating plug (Item 2) and wiring terminals (Item 3) will be packaged separately from the circuit breaker.

5-5. Circuit Breakers

Catalog numbers for 3 and 4 pole circuit breakers with RS Seltronic analog trip units and Digitrip RMS (Models 500 & 600) microprocessor trip units are contained in this section. The RS Seltronic rating plug and Digitrip RMS rating plug catalog numbers are identified in Tables 5-7 and 5-14, respectively. For descriptions of trip units refer to Section 3 of frame book.

Table 5-1. Types RD, RDC, CRD, and CRDC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 600 Vac, 1600 Amps

Complete Circuit Breaker① without Rating Plug and Terminals		Seltronic Trip Unit Only②
Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame⑩	
65 KA@ 480 Vac		
RD316TW	CRD316TW	RS31600T
RD316TAW	CRD316TAW	RS31600TA
RD316TGW③④	CRD316TGW③④	RS31600TG
RD316TAGW③④	CRD316TAGW③④	RS31600TAG
RD316TGRW③④⑤	CRD316TGRW③④⑤	RS31600TG
RD316TAGRW③④⑤	CRD316TAGRW③④⑤	RS31600TAG
100 KA@ 480 Vac		
RDC316TW	CRDC316TW	RS31600T
RDC316TAW	CRDC316TAW	RS31600TA
RDC316TGW③④	CRDC316TGW③④	RS31600TG
RDC316TAGW③④	CRDC316TAGW③④	RS31600TAG
RDC316TGRW③④⑤	CRDC316TGRW③④⑤	RS31600TG
RDC316TAGRW③④⑤	CRDC316TAGRW③④⑤	RS31600TAG

Table 5-2. Types RD, RDC, CRD, and CRDC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 600 Vac, 2000 Amps

Complete Circuit Breaker① without Rating Plug and Terminals		Seltronic Trip Unit Only②
Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame⑩	
65 KA@ 480 Vac		
RD320TW	CRDC320TW	RS32000T
RD320TAW	CRDC320TAW	RS32000TA
RD320TGW③④	CRDC320TGW③④	RS32000TG
RD320TAGW③④	CRDC320TAGW③④	RS32000TAG
RD320TGRW③④⑤	CRDC320TGRW③④⑤	RS32000TG
RD320TAGRW③④⑤	CRDC320TAGRW③④⑤	RS32000TAG
100 KA@ 480 Vac		
RDC320TW	CRDC320TW	RS32000T
RDC320TAW	CRDC320TAW	RS32000TA
RDC320TGW③④	CRDC320TGW③④	RS32000TG
RDC320TAGW③④	CRDC320TAGW③④	RS32000TAG
RDC320TGRW③④⑤	CRDC320TGRW③④⑤	RS32000TG
RDC320TAGRW③④⑤	CRDC320TAGRW③④⑤	RS32000TAG

Table 5-3. Types RW and RWC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 690 Vac, 1600 Amps

Complete Circuit Breaker① without Rating Plug and Terminals		Seltronic Trip Unit Only②
65 KA@ 480 Vac	100 KA@ 480 Vac	
RW316TW	RWC316TW	RS31600T
RW316TAW	RWC316TAW	RS31600TA
RW316TGW③④	RWC316TGW③④	RS31600TG
RW316TAGW③④	RWC316TAGW③④	RS31600TAG
RW316TGRW③④⑤	RWC316TGRW③④⑤	RS31600TG
RW316TAGRW③④⑤	RWC316TAGRW③④⑤	RS31600TAG

Table 5-4. Types RW and RWC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 690 Vac, 2000 Amps

Complete Circuit Breaker① without Rating Plug and Wiring Terminals		Seltronic Trip Unit Only②
65 KA@ 415 Vac	100 KA@ 415 Vac	
RW320TW	RWC320TW	RS32000T
RW320TAW	RWC320TAW	RS32000TA
RW320TGW③④	RWC320TGW③④	RS32000TG
RW320TAGW③④	RWC320TAGW③④	RS32000TAG
RW320TGRW③④⑤	RWC320TGRW③④⑤	RS32000TG
RW320TAGRW③④⑤	RWC320TAGRW③④⑤	RS32000TAG

Table 5-5. Types RD and RDC Circuit Breaker Catalog Numbers, 4-Pole, 600 Vac, 1600 Amps and 2000 Amps

1600 Amp Complete Circuit Breaker① without Rating Plug and Terminals	2000 Amp Complete Circuit Breaker① without Rating Plug and Terminals
RD416TW⑥	RD420TW⑥
RD416TAW⑥	RD420TAW⑥
RD416TEW⑦	RD420TEW⑦
RD416TAEW⑦	RD420TAEW⑦
RDC416TW⑥	RDC420TW⑥
RDC416TAW⑥	RDC420TAW⑥
RDC416TEW⑦	RDC420TEW⑦
RDC416TAEW⑦	RDC420TAEW⑦

Table 5-6. Types RW and RWC Circuit Breaker Catalog Numbers, 4-Pole, 690 Vac, 1600 Amps and 2000 Amps

1600 Amp Complete Circuit Breaker① without Rating Plug and Terminals	2000 Amp Complete Circuit Breaker① without Rating Plug and Terminals
RW416TW⑥	RW420TW⑥
RW416TAW⑥	RW420TAW⑥
RW416TEW⑦	RW420TEW⑦
RW416TAEW⑦	RW420TAEW⑦
RWC416TW⑥	RWC420TW⑥
RWC416TAW⑥	RWC420TAW⑥
RWC416TEW⑦	RWC420TEW⑦
RWC416TAEW⑦	RWC420TAEW⑦

Table 5-7. Type RS Seltronic Interchangeable Rating Plugs for 3- and 4-Pole 1600 and 2000 Amp Trip Units⑨

Trip Unit Maximum Continuous Ampere Rating at 40 C	Rating Plug Ampere Rating	Rating Plug Catalog Number
1600	800	16RS08T
	1000	16RS10T
	1200	16RS12T
	1250⑧	16RS125T⑧
	1400	16RS14T
	1500	16RS15T
	1600	16RS16T
	800/1000/1200/1600	A16RS16T1
	800/1000/1250/1600⑨	A16RS16T2⑧
2000	1000	20RS10T
	1200	20RS12T
	1250⑥	20RS125T⑧
	1400	20RS14T
	1600	20RS16T
	2000	20RS20T
	1000/1200/1600/2000	A20RS20T1
	1000/1250/1600/2000⑧	A20RS20T2⑧

① Consists of circuit breaker frame and Seltronic ™ trip unit.
② Seltronic ™ trip unit may be ordered separately for field installation if identical to currently installed trip unit. If desired replacement trip unit is different from installed trip unit, refer to section 1, paragraph 1-2 and contact Westinghouse before ordering. Refer to Table 3-1 for trip unit model identification.
③ Frame equipped with auxiliary current sensors for ground fault application.
④ Supplied with neutral sensor Catalog No. NS16RD (1600A sensor) or NS20RD (2000A sensor) for use with ground fault protection function. Shipped in carton with circuit breaker.
⑤ Frame equipped with Power Relay Module to provide contact closure for remote ground fault indication.
⑥ Unprotected 4th pole.
⑦ Protected 4th pole.
⑧ For use with Type RW and RWC circuit breakers only.
⑨ Rating plug is packaged and shipped separately from circuit breaker.
⑩ Quantity of 6 B2016RDL rear connectors included in carton with breaker.

ORDERING INFORMATION

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

Table 5-8. Types RD and CRD Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 1600 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	65 KA@ 480 Vac		
500	RD316T51W	CRD316T51W	T51BLI
	RD316T52W	CRD316T52W	T52BLSI
	RD316T53W	CRD316T53W	T53BLS
	RD316T54W③⑤⑥	CRD316T54W③⑤⑥	T54BLIG
	RD316T55W③⑤⑥	CRD316T55W③⑤⑥	T55BLSG
	RD316T56W③⑤⑥	CRD316T56W③⑤⑥	T56BLSIG
600	RD316T61W④	CRD316T61W④	T61BLI
	RD316T62W④	CRD316T62W④	T62BLSI
	RD316T63W④	CRD316T63W④	T63BLS
	RD316T64W④⑤⑥	CRD316T64W④⑤⑤	T64BLIG
	RD316T65W④⑤⑥	CRD316T65W④⑤⑥	T65BLSG
	RD316T66W④⑤⑥	CRD316T66W④⑤⑥	T66BLSIG

Table 5-9. Types RDC and CRDC Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 1600 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	100 KA@ 480 Vac		
500	RDC316T51W	CRDC316T51W	T51BLI
	RDC316T52W	CRDC316T52W	T52BLSI
	RDC316T53W	CRDC316T53W	T53BLS
	RDC316T54W③⑤⑥	CRDC316T54W③⑤⑥	T54BLIG
	RDC316T55W③⑤⑥	CRDC316T55W③⑤⑥	T55BLSG
	RDC316T56W③⑤⑥	CRDC316T56W③⑤⑥	T56BLSIG
600	RDC316T61W④	CRDC316T61W④	T61BLI
	RDC316T62W④	CRDC316T62W④	T62BLSI
	RDC316T63W④	CRDC316T63W④	T63BLS
	RDC316T64W④⑤⑥	CRDC316T64W④⑤⑥	T64BLIG
	RDC316T65W④⑤⑥	CRDC316T65W④⑤⑥	T65BLSG
	RDC316T66W④⑤⑥	CRDC316T66W④⑤⑥	T66BLSIG

Table 5-10. Types RD and CRD Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	65 KA@ 480 Vac		
500	RD320T51W	CRD320T51W	T51BLI
	RD320T52W	CRD320T52W	T52BLSI
	RD320T53W	CRD320T53W	T53BLS
	RD320T54W③⑤⑥	CRD320T54W③⑤⑥	T54BLIG
	RD320T55W③⑤⑥	CRD320T55W③⑤⑥	T55BLSG
	RD320T56W③⑤⑥	CRD320T56W③⑤⑥	T56BLSIG
600	RD320T61W④	CRD320T61W④	T61BLI
	RD320T62W④	CRD320T62W④	T62BLSI
	RD320T63W④	CRD320T63W④	T63BLS
	RD320T64W④⑤⑥	CRD320T64W④⑤⑥	T64BLIG
	RD320T65W④⑤⑥	CRD320T65W④⑤⑥	T65BLSG
	RD320T66W④⑤⑥	CRD320T66W④⑤⑥	T66BLSIG

Table 5-11. Types RDC and CRDC Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	100 KA@ 480 Vac		
500	RDC320T51W	CRDC320T51W	T51BLI
	RDC320T52W	CRDC320T52W	T52BLSI
	RDC320T53W	CRDC320T53W	T53BLS
	RDC320T54W③⑤⑥	CRDC320T54W③⑤⑥	T54BLIG
	RDC320T55W③⑤⑥	CRDC320T55W③⑤⑥	T55BLSG
	RDC320T56W③⑤⑥	CRDC320T56W③⑤⑥	T56BLSIG
600	RDC320T61W④	CRDC320T61W④	T61BLI
	RDC320T62W④	CRDC320T62W④	T62BLSI
	RDC320T63W④	CRDC320T63W④	T63BLS
	RDC320T64W④⑤⑥	CRDC320T64W④⑤⑥	T64BLIG
	RDC320T65W④⑤⑥	CRDC320T65W④⑤⑥	T65BLSG
	RDC320T66W④⑤⑥	CRDC320T66W④⑤⑥	T66BLSIG

Table 5-12. Type RW Circuit Breaker with Digitrip RMS Catalog Numbers, 3-Pole, 690 Vac, 1600 Amps and 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	1600 Amps	2000 Amps	
	65 KA@ 415 Vac		
500	RW316T51W	RW320T51W	T51BLI
	RW316T52W	RW320T52W	T52BLSI
	RW316T53W	RW320T53W	T53BLS
	RW316T54W③⑤⑥	RW320T54W③⑤⑥	T54BLIG
	RW316T55W③⑤⑥	RW320T55W③⑤⑥	T55BLSG
	RW316T56W③⑤⑥	RW320T56W③⑤⑥	T56BLSIG
600	RW316T61W④	RW320T61W④	T61BLI
	RW316T62W④	RW320T62W④	T62BLSI
	RW316T63W④	RW320T63W④	T63BLS
	RW316T64W④⑤⑥	RW320T64W④⑤⑥	T64BLIG
	RW316T65W④⑤⑥	RW320T65W④⑤⑥	T65BLSG
	RW316T66W④⑤⑥	RW320T66W④⑤⑥	T66BLSIG

Table 5-13. Type RWC Circuit Breaker with Digitrip RMS Catalog Numbers, 3-Pole, 690 Vac, 1600 Amps and 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	1600 Amps	2000 Amps	
	100 KA@ 415 Vac		
500	RWC316T51W	RWC320T51W	T51BLI
	RWC316T52W	RWC320T52W	T52BLSI
	RWC316T53W	RWC320T53W	T53BLS
	RWC316T54W③⑤⑥	RWC320T54W③⑤⑥	T54BLIG
	RWC316T55W③⑤⑥	RWC320T55W③⑤⑥	T55BLSG
	RWC316T56W③⑤⑥	RWC320T56W③⑤⑥	T56BLSIG
600	RWC316T61W④	RWC320T61W④	T61BLI
	RWC316T62W④	RWC320T62W④	T62BLSI
	RWC316T63W④	RWC320T63W④	T63BLS
	RWC316T64W④⑤⑥	RWC320T64W④⑤⑥	T64BLIG
	RWC316T65W④⑤⑥	RWC320T65W④⑤⑥	T65BLSG
	RWC316T66W④⑤⑥	RWC320T66W④⑤⑥	T66BLSIG

Table 5-14. Type Digitrip RMS Interchangeable Rating Plugs for 3-Pole Trip Units⑦

Trip Unit Maximum Continuous Ampere Rating @ 40°C	Fixed Rating Plug Ampere Rating	Frequency (Hz)	Rating Plug Catalog Number
1600	800	60	PD6R16A080
	1000		PD6R16A100
	1200		PD6R16A120
	1600		PD6R16A160
	800	50	PD5R16A080
	1000		PD5R16A100
	1250		PD5R16A125
	1600		PD5R16A160
2000	1000	60	PD6R20A100
	1200		PD6R20A120
	1600		PD6R20A160
	2000		PD6R20A200
	1000	50	PD5R20A100
	1250		PD5R20A125
	1600		PD5R20A160
	2000		PD5R20A200

① Consists of circuit breaker frame and Digitrip RMS trip unit.
② Digitrip RMS trip unit may be ordered separately for field installation if identical to currently installed trip unit. If desired replacement trip unit is different from installed trip unit refer to Section 1, Paragraph 1-2 and contact Westinghouse before ordering. Refer to Table 3-3 for trip unit model identification.
③ Frame equipped with power relay module with Automatic Trip Relay (ATR) contacts for remote ground fault indication.
④ Frame equipped with power relay module with ATR contacts for remote phase and/or ground fault indication.
⑤ Frame equipped with auxiliary current sensors for ground fault application.
⑥ Supplied with neutral sensor Catalog No. NS16RD (1600A sensor) or NS20RD (2000A sensor) for use with ground fault protection function. Neutral sensor is shipped in carton with circuit breaker.
⑦ Rating plug shipped installed in circuit breaker Digitrip RMS trip unit.

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

5-6. Accessories

Accessory catalog numbers are identified in Tables 5-3 through 5-9. All mounting hardware is supplied unless otherwise noted.

Termination Accessories

Line and Load Terminals

R-frame circuit breakers have Cu/Al terminals as standard and Cu only terminals as an option. Specify if factory installation is required.

Table 5-15. Line and Load Terminal Catalog Numbers

	Catalog Number	Max Breaker Amps	Terminal Body Material	Wire Type	Hardware	AWG/MCM Wire Range/No. Conductors	Metric Wire Range mm^2	Torque Values lb-in (N·m)	
								Wire Lug	Mtg Hdwe
Wire Terminals	TA1600RD	1600	Aluminum	Cu/Al	English	500-1000 (4)	300-500	550 (62)	480 (54)
	TA1600RDM	1600	Aluminum	Cu/Al	Metric	500-1000 (4)	300-500	375 (42)	480 (54)
	T1600RD	1600	Copper	Cu	English	1-600 (4)	50-300	550 (62)	480 (54)
	T1600RDM	1600	Copper	Cu	Metric	1-600 (4)	50-300	375 (42)	480 (54)
Rear Connectors	B2016RD	2000	Copper		English				360 (41)
	B2016RDL⑩	2000	Copper		English				360 (41)
	B2016RDM	2000	Copper		Metric				360 (41)

Note: TA1600RDM, T1600RDM and B2016RDM are for use on Type RW and RWC circuit breakers only.

⑩ For use with 100% rated 1600A and 2000A frame. **Do not order separately unless for replacement purposes.** Is included in breaker carton when 100% rated device is ordered.

Internal Accessories

All internal accessories are installed in an accessory panel and mounted in the right-hand pole of the circuit breaker only.

Table 5-16. Alarm (Signal)/Lockout Switch

Number of Contacts (Make & Break)	Connection Type (Factory Installed)	Field Installation Kits①
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Numbers②③	Catalog Numbers②③
1	A1L6RA	A1L6RPK
2	A2L6RA	A2L6RPK

① Listed with Underwriters Laboratories, Inc. for field installation under E64983.
② A maximum of three ASL plug-in modules may be installed in a circuit breaker.
③ Refer to Figure 4-2 of Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-17. Auxiliary Switch

Number of Contacts (a & b)	Connection Type (Factory Installed)	Field Installation Kits●
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number⑤⑥	Catalog Number⑤⑥
2	A2X6RA	A2X6RPK
4	A4X6RA	A4X6RPK

④ Listed with Underwriters Laboratories, Inc. for field installation under E64983.
⑤ A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker.
⑥ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-18. Shunt Trip

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific Ac or Dc voltages within the voltage range shown. Specific application ratings are shown in Table 4-3. Performance data is shown applicable circuit breaker accessory nameplate.

Voltage Rating (Ac Freq = 50/60 Hz)	Connection Type (Factory Installed)	Field Installation Kits●
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number⑥⑨	Catalog Number⑥⑥
24 Vac or 24 Vdc	SNT6RA03	SNT6P03K
48-60 Vac	SNT6RA05	SNT6P05K
110-127 Vac	SNT6RA08	SNT6P08K
208-240 Vac	SNT6RA11	SNT6P11K
380-440 Vac or 220-250 Vdc	SNT6RA14	SNT6P14K
480-600 Vac	SNT6RA18	SNT6P18K
48-60 Vdc	SNT6RA23	SNT6P23K
110-125 Vdc	SNT6RA26	SNT6P26K

● Listed with Underwriters Laboratories, Inc. for field installation under E64983.
⑧ A maximum of three shunt trip plug-in modules may be installed in a circuit breaker.
⑨ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-19. Low Energy Shunt Trip (LEST)

Specific application information is contained in Section 4.

Connection Type (Factory Installed)	Field Installation Kit
18-inch Pigtail Leads	Pigtail Leads
Catalog Number	Catalog Number
LST6RA	LST6RPK

ORDERING INFORMATION

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

Table 5-20. Undervoltage Release Mechanism (Handle Activated Reset)

Select handle reset undervoltage release mechanism catalog number for the voltage within the indicated voltage range. Undervoltage release mechanism coils are designed to be applied at specific Ac or Dc voltages within the voltage range shown. Specific application ratings are shown in Tables 4-4 and 4-5. Performance data is shown on applicable circuit breaker accessory nameplates.

Voltage Rating (Ac Freq = 50/60 Hz)	Connection Type (Factory Installed)	Field Installation Kits①
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number②③	Catalog Number②③
9 Vac	UVH6RA01	UVH6RP01K
12 Vac	UVH6RA02	UVH6RP02K
24 Vac	UVH6RA03	UVH6RP03K
48-60 Vac	UVH6RA05	UVH6RP05K
110-127 Vac	UVH6RA08	UVH6RP08K
208-240 Vac	UVH6RA11	UVH6RP11K
380-500 Vac	UVH6RA29	UVH6RP29K
12 Vdc	UVH6RA20	UVH6RP20K
24 Vdc	UVH6RA21	UVH6RP21K
48-60 Vdc	UVH6RA23	UVH6RP23K
110-125 Vdc	UVH6RA26	UVH6RP26K
220-250 Vdc	UVH6RA28	UVH6RP28K

① Listed with Underwriters Laboratories, Inc. for field installation under E64983.
② A maximum of two UVR plug-in modules may be installed in a circuit breaker.
③ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

External Accessories

Table 5-21. Fixed Mounted Circuit Breaker Terminal Block④

Catalog Number

TBRD	Factory Installed
TBRDK	Field Mounting Kit

④ One 24 point accessory terminal block provided with circuit breaker when ordered factory installed or shipped from warehouse as separate item when ordered for field installation. See RS Seltronic master connection diagram (IL 29C708) and Digitrip RMS master connection diagram (IL 29C709).

Table 5-22. Key Interlock Mounting Kit⑤

Key interlock mounting kits are for field installation only. Select mounting kit catalog numbers to match type of lock used. Key interlocks are supplied by customer.

Lock Manufacturer	Lock Type	Bolt Projection in Withdrawn Position	Kit Cat. No.
Superior	B-4003-1	1 inch	KYK6
Kirk	F	1 inch	KYK6
Federal Pioneer	VK	1 inch	KYK6
Square D	SF	1 inch	KYK6
Castell	K or QK	1 inch	CTK6

⑤ Listed with Underwriters Laboratories, Inc. for field installation under E64983.

Table 5-23. Electrical (Motor) Operator

Operating Voltage	Frequency	Catalog Numbers Terminal Blocks	
		Factory Installed	Field Installation Kits
120	50/60 Hz	EOP6T08	EOP6T08K
240	50/60 Hz	EOP6T11	EOP6T11K
48	Dc	EOP6T21	EOP6T21K

RD Drawout Cassette
(For 65 KA/480 Vac version only)

Movable Mechanism
Catalog Number: RD20DOM

Stationary Mechanism
Catalog Numbers: RD20DOS (without shutters)
RD20DOSS (with shutters)

Note: Movable mechanism is ordered with RD circuit breaker and is shipped mounted to circuit breaker frame. Stationary mechanism is ordered separately from W34.

Padlockable Handle Lock Hasp

Lock on/off – Catalog Number: HLK6

Lock off (only) – Catalog Number: HLK6OFF

Note: The padlockable handle lock hasps are factory installed only.

Slide Plate Handle Mechanism

Style Numbers: 505C294G03 (w/o provisions for Kirk key)
505C294G04 (with provisions for Kirk key)

Miscellaneous Accessories

Seltronic™ Portable Test Kit
Catalog Number: STK 2

For verification of performance of Seltronic™ trip units.

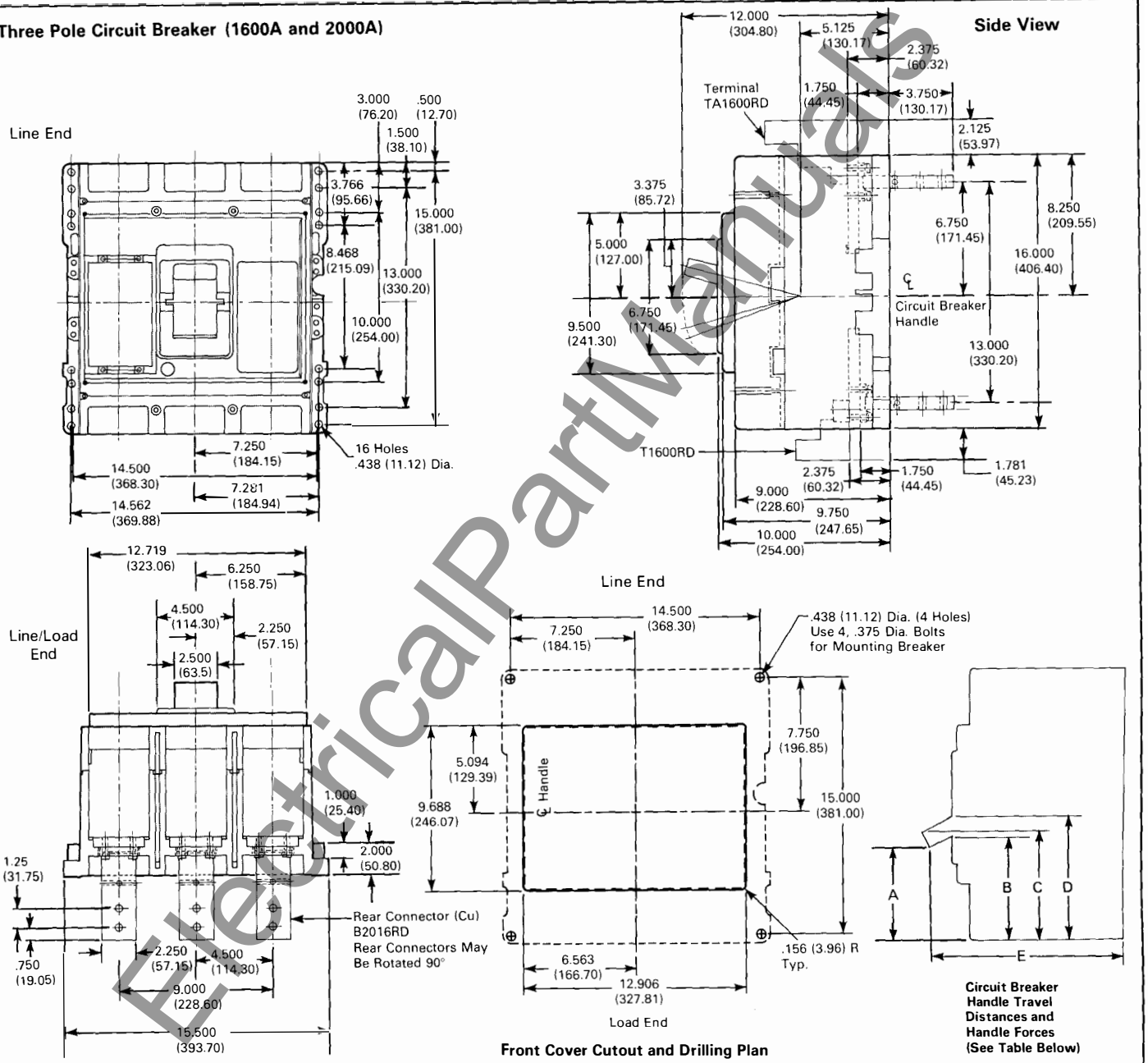
Molded Handle Extension
Catalog Number: HEX6
Style number: 315C882G01 Included in shipping carton with every R-frame circuit breaker.

ORDERING INFORMATION

Series C Molded Case Circuit Breakers, R-Frame
Section 6 – Dimensional Data

Dimensions in Inches and (Millimeters)
Not to be used for construction purposes unless approved.

Three Pole Circuit Breaker (1600A and 2000A)



Front Cover Cutout and Drilling Plan

Circuit Breaker Handle Travel Distances and Handle Forces (See Table Below)

	A	B	C	D	E	Handle① Force
ON	9.08 (230.63)	8.55 (217.17)	9.77 (248.16)	9.57 (243.08)	11.86 (301.24)	192 Pounds (87.10 Kilograms)
TRIPPED	7.29 (185.17)	7.26 (184.40)	8.23 (209.04)	8.25 (209.55)	12.00 (304.80)	—
OFF	5.53 (140.46)	5.94 (150.88)	6.70 (170.18)	6.96 (176.78)	11.62 (295.15)	144 Pounds (65.33 Kilograms)
RESET	4.98 (126.49)	5.46 (138.68)	6.18 (156.97)	6.50 (165.10)	11.40 (289.56)	102 Pounds (46.27 Kilograms)

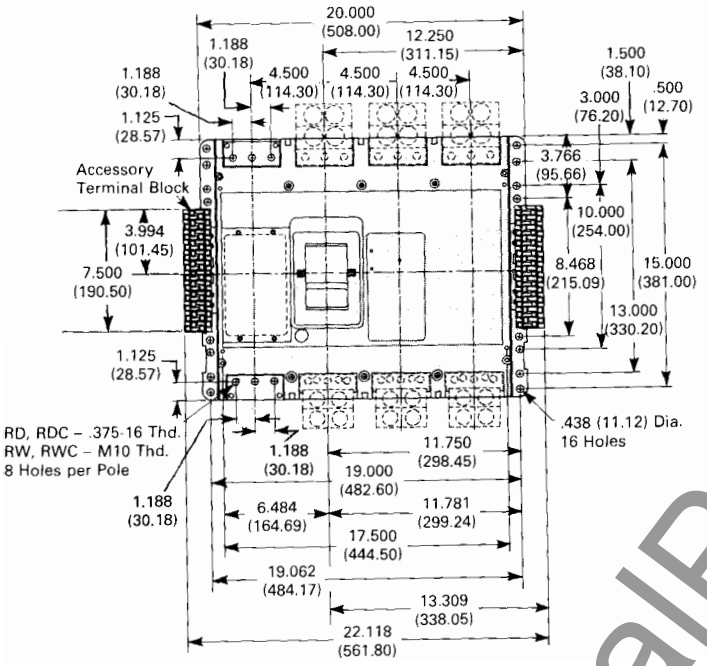
① All handle forces measured approximately 0.250 (6.34) from top of handle.

Series C Molded Case Circuit Breakers, R-Frame
Section 6 – Dimensional Data

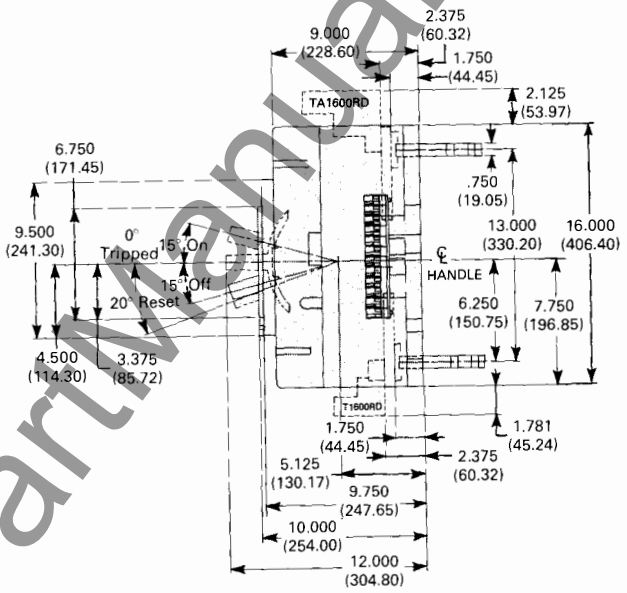
Dimensions in Inches and (Millimeters)
Not to be used for construction purposes unless approved.

Four Pole Circuit Breaker (1600A and 2000A)

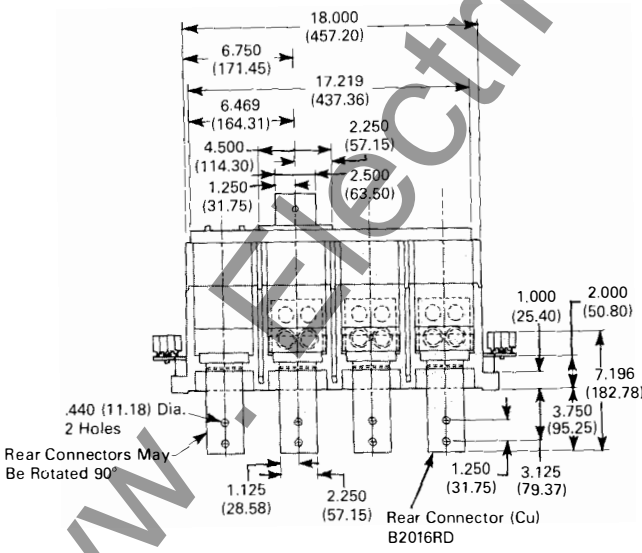
Line End



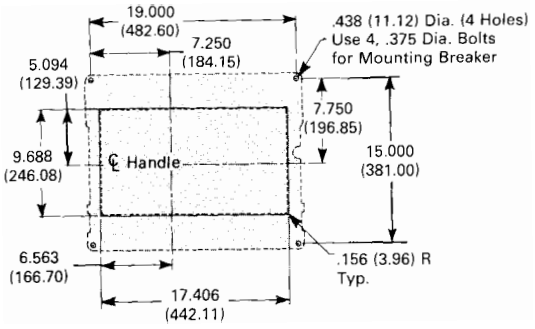
Side View



Line/Load End



Line End



Load End

Front Cover Cutout and Drilling Plan

Series C Molded Case Circuit Breakers, R-Frame
Section 6 – Dimensional Data

R-Frame Circuit Breaker Weights①

3-pole	RD316TW or RD316TAW:	102.10lb (46.35 Kg)
	RS Trip Unit:	0.79lb (0.36 Kg)②
	Rating Plug:	0.05lb (0.02 Kg)

Terminal Weights (Individually Packed)

Cat. Numbers	Cu	Al
TA1600RD T1600RD	5.44lb (2.47 Kg)	2.98lb (1.35 Kg)

Rear Connector Weight

Cat. Number		
B2016RD	Cu	3.35lb (1.52 Kg)

Example:

RD316TW	102.10lb (46.35 Kg)
Packaging	20.00lb (9.07 Kg)
Total	122.10lb (55.43 Kg)

① When an R-frame circuit breaker with RS trip unit, rating plug and terminals is ordered from warehouse stock, the rating plug and terminals are not installed and are packaged separately.

② To be used when trip unit is ordered and shipped separately from the factory.

Series C Molded Case Circuit Breakers, R-Frame
Appendix A – Guide Specifications

Typical Specifications For Series C Molded Case Circuit Breakers

Electrical circuits shall be protected by Series C Molded Case Circuit Breakers as manufactured by Westinghouse Electric Corporation.

Each pole of the 2- and 3-pole circuit breakers shall provide complete circuit overcurrent protection by having inverse time and instantaneous tripping characteristics and, where applicable, be current limiting.

The circuit breakers shall be operated by a toggle type handle and shall have an independent a quick-make, quick-break, over- center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits shall be clearly indicated by the position of the handle. The ON and OFF positions shall be clearly marked on the cover of the circuit breaker along with the international symbols I for ON and 0 for OFF on the handle providing positive indication of the circuit breaker contact position. Additionally, a color-coded indication of the circuit breaker contact position shall be provided: red for ON, green for OFF, and white for tripped. An easily accessible Push-to-Trip button for mechanically exercising the trip unit shall be provided on the cover of each circuit breaker. All poles of a multi-pole circuit breaker shall be so constructed as to ensure simultaneous open, close, and trip operations.

Circuit breakers shall be completely enclosed in a high strength glass-polyester case.

Non-interchangeable trip circuit breakers shall be factory sealed; interchangeable trip circuit breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible from the front of the circuit breaker. Contacts shall be non-welding silver alloy. Arc extinction must be accomplished by means of DE-ION® arc chutes, consisting of metal grids mounted in an insulating support.

The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit current at the line terminals. Where applicable, circuit breakers shall be UL listed for series tested application.

Circuit breakers in 150A and 250A frame sizes shall be equipped with thermal-magnetic trip units. Circuit breakers in 400A, 600A, and 630A frame sizes shall be designed to accept either thermal-magnetic or electronic interchangeable trip units. Circuit breakers in 800A, 1200A, 1250A, 1600A and 2000A frame sizes shall be equipped with electronic trip units. The electronic trip units shall be insensitive to changes in ambient temperature within the normal operating temperature range of the circuit breaker.

Circuit breakers shall be listed with Underwriters Laboratories, Inc. under standard UL489, CSA standard C22.2 No. 5.1, conform to the applicable requirements of NEMA Standards Publication AB1- 1986, meet the appropriate classifications of Federal Specifications W-C-375b, and/or comply with the requirements of International Electrotechnical Commission Standard IEC 947-2, or IEC 157-1.

Circuit breaker ratings and modifications shall be indicated on the drawings.

Molded case circuit breakers shall be of the inverse time and instantaneous trip type as provided by thermal-magnetic or electronic trip elements with either standard interrupting, high interrupting, or current limiting characteristics as shown in Section 1 of this frame book. These circuit breakers shall be listed per UL489.

Molded case circuit interrupters (motor circuit protectors) shall be of the instantaneous (magnetic) only type, poviding instantaneous short circuit protection by means of a front-adjustable trip unit. Instantaneous-only circuit interrupters shall be component recognized per UL489.

Molded case switches shall be of the same construction as the related listed circuit breaker and equipped with a factory sealed, nonadjustable, high instantaneous-only short circuit protection.

Molded case switches shall have no overload or low-level fault protection provided and shall be marked with a maximum withstand rating denoting the type and level of upstream overcurrent protection required. Molded case switches shall be listed per UL1087.

Internally mounted accessories including alarm (signal)/lockout switches, auxiliary switches, shunt trips, and undervoltage release mechanisms shall be of the plug-in type and shall be listed for field installation in circuit breakers which are not factory sealed.

Electrical operators for circuit breakers of the 400A frame size and below shall be of the solenoid type with maximum 5-cycle closing characteristics. Electrical operators for circuit breaker frame sizes 600A through 2000A shall be of the motor driven type. All electical operators shall be cover mounted. All electrical operators shall be listed for field installation per UL489.

Electrical characteristics of accessories shall be as indicated on the drawings.

Circuit breakers in the 150A frame size shall be supplied in 1-, 2-, 3-, and 4-pole models, as specified on the drawings. Circuit breakers in frame sizes 250A through 1200A shall be supplied in 2-, 3-, or 4-pole models, while the 1600A and 2000A circuit breakers are available in 3- and 4-pole models, as specified on the drawings.

Accessory wiring shall be brought out through the side or rear of the circuit breaker, or be connected to a terminal block mounted on the side of the circuit breaker, as specified. The ability to route accessory wiring to the opposite side of the circuit breaker through a trough in the base shall be provided.

Note: For 1600 and 2000 ampere frames, accessory wiring is available on right side only. No wiring trough is provided.

Circuit breakers shall be provided with uniformly designed nameplates to clearly indicate the type, rating, listing/recognition/ certification marks, accessory details, and other information defined in UL489.

All terminals shall comply with UL486A and B and CSA C22.2 No. 65M. Torque markings shall be provided per UL489.

Series C Molded Case Circuit Breakers, R-Frame
Appendix A – Guide Specifications

Available Literature:

Instruction Leaflet No.	Product
29-851	Digitrip 500
29-852	Digitrip 600
29-853	Digitrip 700
29-854	Digitrip 800
29C107A	RD Frame
29C125	Aux. Switch
29C150B	Shunt Trip
29C151	Low Energy Shunt Trip
29C178A	UVR
29C185	Bell Alarm
29C205A	Motor Operator
29C239	Kirk Key Interlock
29C240	Padlockable Handle Lock Hasp
29C312	Terminal Block
29C613A	RS Trip
29C707	Digitrip RMS in RD
29C708A	RS Seltronic Master Connection Diagram
29C709	Digitrip RMS Master Connection Diagram
Drawing No.	**Product**
372D690	Slide Plate Handle Mechansim
Application Data	**Product**
29-167D	Time/Current Curves for RS Seltronic Trip Units
29-167J	Time Current Curves For Digitrip RMS Trip Units

Series C Molded Case Circuit Breakers, R-Frame

Series C Molded Case Circuit Breakers, R-Frame

Series C Molded Case Circuit Breakers, R-Frame

Westinghouse Electric Corporation
Distribution and Control Business Unit
Electrical Components Division
Pittsburgh, Pennsylvania U.S.A. 15220

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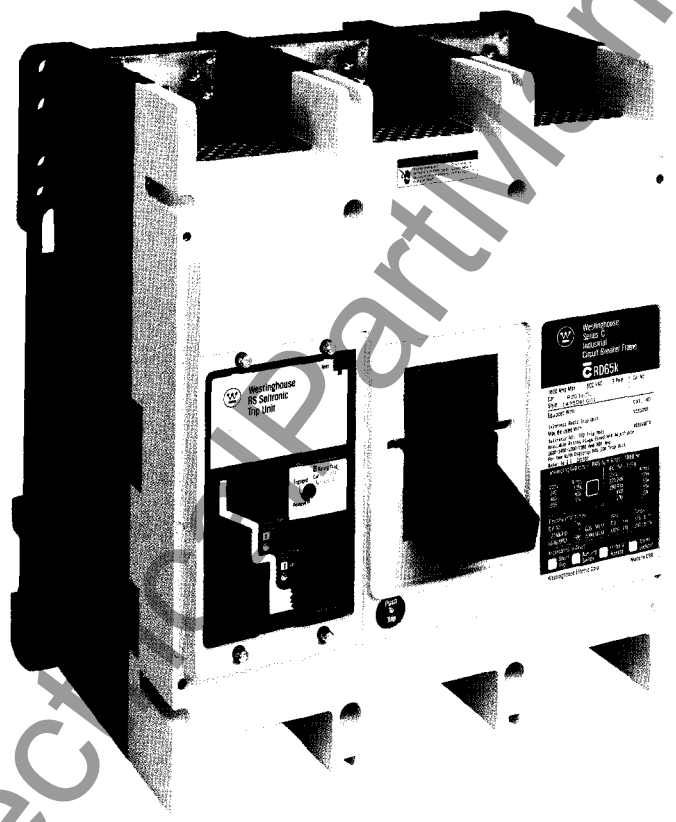
SERIES C™

R-Frame Molded Case Circuit Breakers



D Model 800 to 2000 Amperes with RS Trip Unit

Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

Series C Circuit Breakers

The new Series C line of molded case circuit breakers represents a significant step forward in circuit protection technology. It incorporates, in frame ratings 150A to 2000A, interrupting capacities as high as 100 kA at 480 Vac (200 kA at 240 Vac) in physical sizes normally associated with standard interrupting rating breakers. Series C circuit breakers, in most frame sizes, are physically and electrically interchangeable with the industrial line of molded case circuit breakers they replace.

There are two branches to the Series C line. The branch covering domestic applications complies with applicable UL, NEMA, and CSA standards, as well as being assigned interrupting ratings under IEC 157-1 or IEC 947-2. The world class branch complies with IEC 947-2. The domestic product line which complies with applicable UL/NEMA/CSA standards is composed of six frame ratings: 150A, 250A, 400A, 600A, 1200A, and 1600A/2000A. The six frame ratings of the IEC branch of the Series C line are 160A, 250A, 400A, 630A, 1250A, and 1600A/2000A and are physically interchangeable with the corresponding UL/NEMA/CSA frames.

Series C circuit breakers in the 150A through 630A frame sizes are available with thermal-magnetic trip units. Electronic trip units can be supplied in the 400A through 2000A frame sizes. The electronic trip units for the 400A, 600A, and 630A frames are field-interchangeable with the thermal-magnetic trip unit in the same frame size.

The 150A and 160A frame sizes of Series C circuit breakers are available in 1-, 2-, 3-, and 4-pole models. The 250A through 1250A frame sizes are available in 2-, 3-, and 4-pole models, and the 1600A and 2000A frame sizes are available in 3- and 4-pole models only.

A complete line of external as well as plug-in internal accessories is available for use with Series C circuit breakers.

Because of unique conductor configuration, the 100 kA (at 480 Vac) interrupting rating model of each Series C frame size is inherently current limiting. These models can, therefore, be used in series tested applications at the 100 kA level to protect specified, lower interrupting rating downstream circuit breakers. This current limiting action is achieved without the use of fuse-type current limiters or extra sets of contacts. The 65 kA (at 480 Vac) interrupting rating model of each Series C circuit breaker provides for simple, fully rated application on the 480 Vac secondary of unit substations up to 2500 kVA.

Series C Literature

A new format has been designed for the Series C circuit breaker literature. The literature is designed to provide each user with the needed information presented in the most usable form. The literature includes:

- Frame Books -provide basic descriptions, application data, technical data, dimensional data, and ordering information for each Series C circuit breaker and associated accessories
- Instruction Leaflets -provide installation, inspection, operation, and adjustment information for Series C circuit breakers and accessories
- Time/Current Curve Packets -provide full-size time/current characteristic curves for each Series C circuit breaker

Note: This catalog is published solely for ***information*** purposes and should not be considered all inclusive. If further information is required, Westinghouse Electric Corporation should be consulted.

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Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

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Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

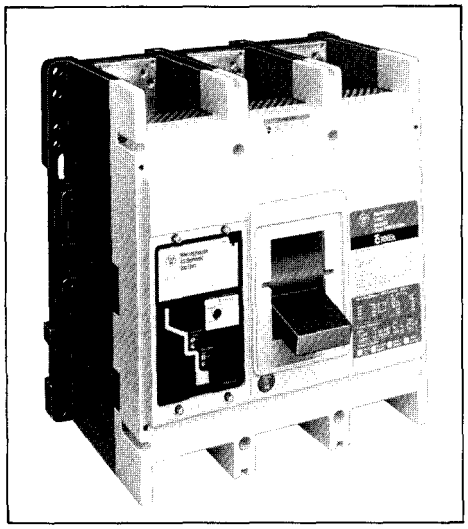


Figure 1-1. R-Frame Series C Circuit Breaker with RS Seltronic™ Trip Unit

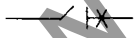
1-1. General Information

R-Frame Circuit Breaker
The R-frame Series C circuit breaker with interchangeable electronic trip units (Figure 1-1) is available in two basic models: the domestic (D) and the world (W) models. In many applications, the R-frame circuit breaker is designed to physically and electrically replace the SPB Systems Pow-R-circuit breaker.

An innovative design of internal components allows applications to be extended to higher interrupting rating levels. In addition, the higher interrupting performance capabilities of the R-frame circuit breaker allow it to be applied in distribution systems requiring high performance capabilities. Each circuit breaker nameplate is color coded to provide easy identification of type and interrupting rating.

The IEC symbols identified in Table 1-1 are defined below:

U_e - Rated Operational Voltage
I_{cu} - Rated Ultimate Short-Circuit Breaking Capacity
I_{cs} - Rated Service Short-Circuit Breaking Capacity
I_{cw} - Rated Short-Time Withstand Current
U_{imp} - Rated Impulse Withstand Voltage



Above symbol denotes suitability for use as isolating device.

Utilization Category - Defines the intended application and is characterized by one or more of the following service conditions: current (expressed as multiple of rated current), voltage (expressed as multiple of rated operational voltage), power factor or time constant, short circuit performance, selectivity, and other service conditions as applicable. The R-frame is assigned a Category A rating. However, the 1600 ampere frame only has a rated short time withstand current (I_{cw}) of at least 12 times its operational current (1600A); and, therefore, qualifies for a Category B rating.

The R-frame circuit breaker is available in a 3-pole configuration to satisfy application requirements in most types of electrical distribution systems. A modular accessory concept permits wide flexibility in accessory installation. This frame book provides basic information about the R-frame circuit breaker, its trip units, and accessories.

1-2. R-Frame Circuit Breaker Types

R-frame circuit breakers are available in four types, the RD, RDC, RW, and RWC. Types RD and RDC (rated from 800A to 2000A) are 600 Vac devices listed in accordance with Underwriters' Laboratories, Inc. Standard UL489 and certified under Canadian Standards Association Standard C22.2 No.5.1 The RD and RDC also comply with International Electrotechnical Commission Recommendations IEC 947-2 but are 600 Vac maximum devices. Types RW and RWC (rated from 800A to 2000A) are 690 Vac devices and comply with International Electrotechnical Commission recommendations IEC 947-2. Table 1-1 gives the interrupting ratings for the different circuit breaker types.

Each circuit breaker rating is achieved by specific design features incorporated into the circuit breaker frame and the type of trip unit selected.

Electronic Trip Units
R-frame circuit breakers are available with the standard Type RS Seltronic analog trip unit or the optional Digitrip RMS Microprocessor type trip unit. For trip unit description and operation, refer to Section 3.

The trip units of the R-frame circuit breaker provide a degree of field interchangeability. With the RS Seltronic trip unit, there is interchangeability within the non-ground fault and ground fault trip unit groups but not between these groups of trip units. Therefore, an RS31600T trip unit can be upgraded in the field with an RS31600TA and an RS31600TG can be upgraded with an RS31600TAG. However, an RS31600T cannot be replaced in the field with an RS31600TG. These same limitations apply to the Digitrip family of trip units along with the added constraint of no field interchangeability among Digitrip RMS model types. For example, the Digitrip RMS 500 cannot be replaced in the field with a Digitrip RMS 600. Any replacement within and between the RS Seltronic and Digitrip RMS trip units can be performed at the Westinghouse manufacturing plant.

Table 1-1. R-Frame Circuit Breaker Interrupting Ratings

UL489 Interrupting Ratings

Circuit Breaker Type	Number of Poles	Interrupting Rating (RMS Sym. Amperes-kA)		
		Volts AC (50/60 Hz)		
		240	480	600
RD	3, 4	125	65	50
CRD⑥	3, 4	125	65	50
RDC	3, 4	200	100	65
CRDC⑥	3, 4	200	100	65

IEC 947-2 Interrupting Rating (Sym. Amperes kA) ①②③④

Circuit Breaker Type	Number of Poles	U_e (Volts AC 50/60 Hz)					
		380		415		690	
		I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
RD	3, 4	65	33	65	33	⑥	⑤
RDC	3, 4	100	50	100	50	⑤	⑥
RW	3, 4	65	33	65	33	25	13
RWC	3, 4	100	50	100	50	35	18

① Interrupting ratings are subject to final test verification.
② Utilization Category A circuit breakers.
③ I_{cw} = 20 kA.
④ For definition of IEC symbols, refer to Part 1-1 (General Information) of Section 1.
● Not applicable.
● 100% Rated versions.

Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

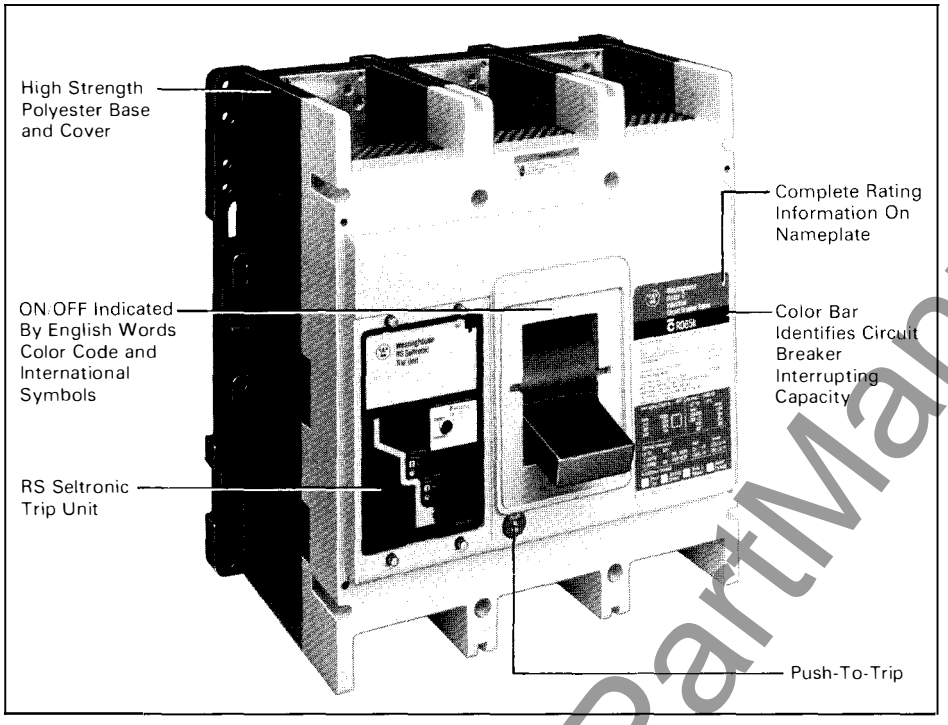


Figure 1-2. R-Frame Circuit Breaker Features

1-3. Features

The Series C circuit breaker line represents an entirely new approach to circuit breaker design. The R-frame circuit breaker (Figure 1-2) uses new design features that improve performance and extend application capabilities.

a. Performance
The R-frame circuit breaker provides higher interrupting ratings and improved operating characteristics compared to previous circuit breaker designs. The enhanced performance characteristics extend R-frame circuit breaker use to applications that previously required larger physical size circuit breakers.

b. Designs
Available RS Seltronic™ and Digitrip RMS trip unit functions are described in Tables 3-1 through 3-5 of Section 3.

c. Construction Details
The 3-pole configuration satisfies application requirements for most types of electrical distribution systems.

The compact frame size allows a high degree of space savings compared to previous circuit breakers designs.

A Push-to-Trip button provides a local means of manually exercising the trip mechanism.

High strength glass-polyester base and cover have excellent dielectric qualities and are inherently fungus proof.

The over-toggle operating mechanism design has increased air gap space between stationary and moving contacts when circuit breaker is in tripped position. The increased air gap provides greater arc impedance during contact opening, which allows higher interrupting ratings to be obtained in compact frame sizes.

The crossbar assembly has high dielectric qualities and ensures simultaneous operation of all moving contacts.

The positive-ON operating mechanism ensures that the operating handle indicates the ON position when the contacts are closed.

d. Internal Accessories
Modular plug-in accessory design simplifies factory installation for improved customer service and facilitates field installation where desired.

The internally mounted accessories include auxiliary switch, alarm (signal)/lockout switch, shunt trip, and undervoltage release mechanism. All of the internal accessories are mounted in an accessory mounting deck installed in the right pole. The standard accessory wiring configuration provides for pigtail leads exiting the right side of the frame (between cover and base) next to the accessory mounting deck. An optional configuration provides for a terminal block to be mounted to the base on the right side of the circuit breaker.

e. External Accessories
Cover design permits field installation of a key interlock, electrical operator, and slide plate handle mechanism without modifying the cover.

f. Markings
The Series C circuit breaker line features a new nameplate format which provides easy identification of circuit breaker type, rating, and operating status.

Nameplates are color coded for immediate rating identification. A color-coded bar identifies the type and the interrupting rating (kA) at the most common application voltage. The color code for the type RD circuit breakers is black.

Consolidated nameplate design provides complete identification and rating information in an easily readable and understandable format.

Circuit breaker status is clearly indicated by circuit breaker handle position and color-coded flags (red for ON, green for OFF, and white for TRIP). The on and off positions are identified in English words (ON and OFF) and international symbols (I and 0).

Series C Molded Case Circuit Breakers, R-Frame
Section 1 – Introduction

g. Equipment Literature
A complete line of technical literature provides specification, ordering, application, and instructional information. This makes the circuit breaker easy to specify, purchase, and apply, saving time and minimizing application errors.

Dimensional data is in Imperial and metric units to satisfy user requirements.

h. Standards Compliance

- Australian Standard AS 2184, Moulded Case Circuit Breakers
- Canadian Standards Association Standard C22.2 No.5.1, Service Entrance and Branch Circuit Breakers
- International Electrotechnical Commission Recommendations IEC 947-2, Low-Voltage Switchgear and Control Gear, Part 2: Circuit Breakers
- Japanese Industrial Specification 8370, Molded Case Circuit Breakers
- National Electrical Manufacturers Association Standards Publication No. AB1 - 1986. Molded Case Circuit Breakers.
- South African Bureau of Standards Standard SABS 156, Standard Specification for Moulded Case Circuit Breakers
- Underwriters' Laboratories, Inc. Standard UL489, Molded Case Circuit Breakers and Circuit Breaker Enclosures, Including Marine Circuit Breakers.

Compliance with these standards satisfies most local and international codes, assuring user acceptability and simplifying application.

i. Federal Specification Classifications
Circuit breaker type RD equal or exceed W-C-375b requirements for class 24(a).

Series C Molded Case Circuit Breakers, R-Frame
Section 2 – Applications

2-1. Introduction

Application flexibility of the R-frame circuit breaker is enhanced by the higher interrupting ratings designed into the Series C line (Figure 2-1).

2-2. Switchboard Application

R-frame circuit breakers are used in distribution systems to provide main and feeder circuit protection. Circuit breakers are currently available for fixed mounting only.

2-3. Individual Enclosure Application

The R-frame circuit breaker can be applied in individual enclosures to meet specific installation requirements.

2-4. 100% Rated Devices

Standard rated devices, by NEC definition, are rated to carry 100% of their nameplate ampere rating for short periods of time (non-continuously) and 80% of their nameplate rating continuously, when enclosed in equipment.

Devices specifically designed to carry 100% of their nameplate ampere rating continuously when enclosed and tested in specific equipment are referred to as **100% rated devices.**

2-5. Special Applications

In mining and other applications, special versions of the R-frame circuit breaker provide safe equipment control and protection. For additional information, see separate frame books or refer to Westinghouse.

For all 3-phase Delta, grounded B-phase applications, reduced interrupting ratings will apply; refer to Westinghouse.

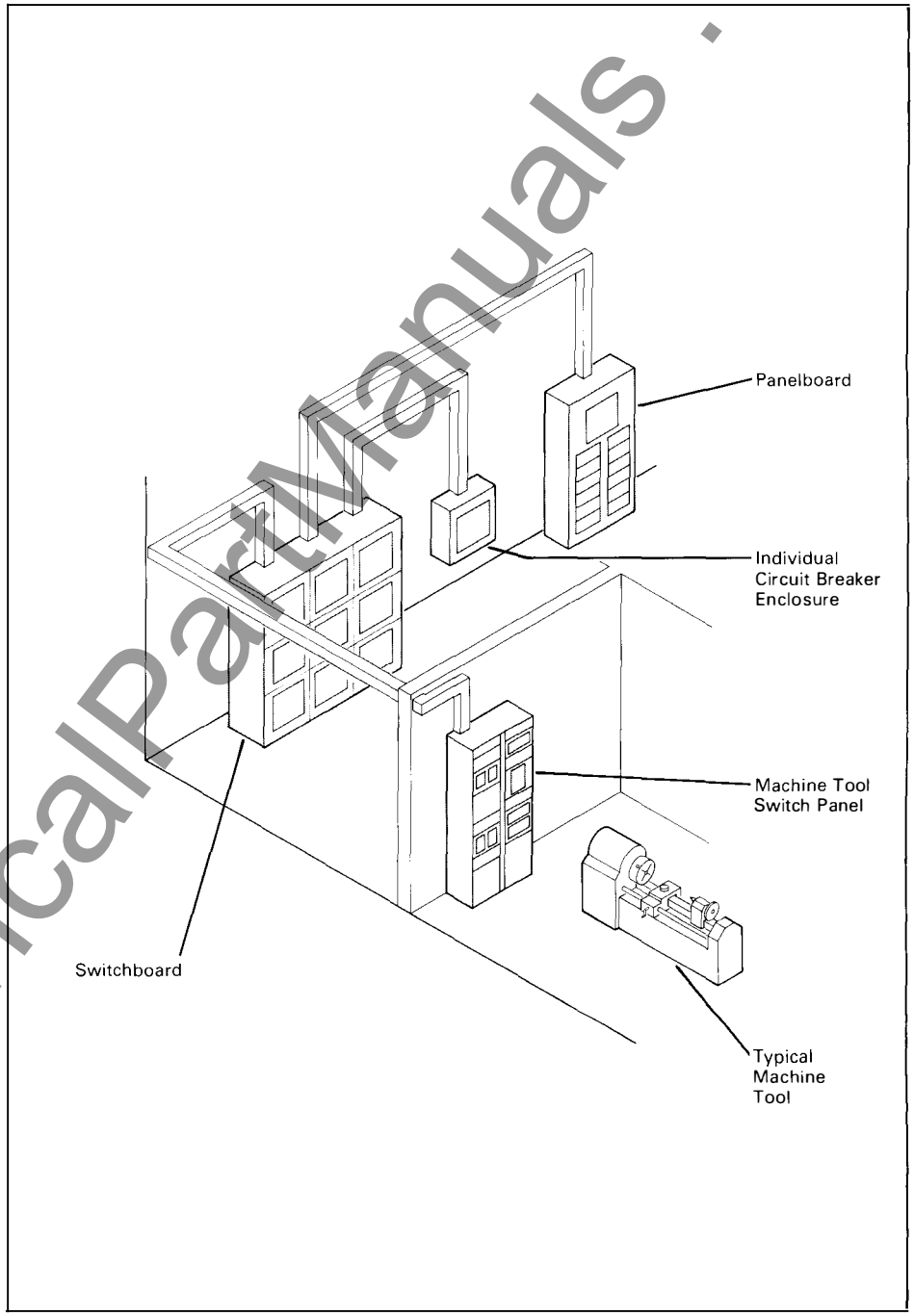


Figure 2-1. R-Frame Circuit Breaker Typical Applications

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

3-1. Physical Description

The R-frame circuit breaker consists of the following components mounted inside a molded glass-polyester case (Figure 3-1):

Operating mechanism

Arc extinguishers

Stationary contact assemblies

Moving contact assemblies

Trip unit.

3-2. Functional Description

The R-frame circuit breaker disconnects a load from an electrical supply when (1) the handle is operated, (2) an overcurrent or short circuit condition develops, (3) a manual trip is initiated locally with the Push-to-Trip button, (4) a shunt trip is remotely activated, or (5) an undervoltage release mechanism initiates a tripping operation remotely upon loss of monitored voltage. Circuit breaker operation is provided by a spring-loaded, independent, over-toggle operating mechanism that provides quick-make and quick-break, trip free operation.

In open air at 40°C, the circuit breaker will carry continuously a current equal to the ampere rating of the installed rating plug without exceeding a 50°C rise at the terminals. For ambient conditions above 40°C, derating of the circuit breaker frame should be considered to avoid exceeding a safe terminal temperature operating range. Consult Westinghouse for recommendations. For ambient temperatures below -5°C, special lubrication may be required for proper mechanical operation of the circuit breaker.

3-3. Component Description

The following paragraphs give the physical and functional descriptions of the circuit breaker components.

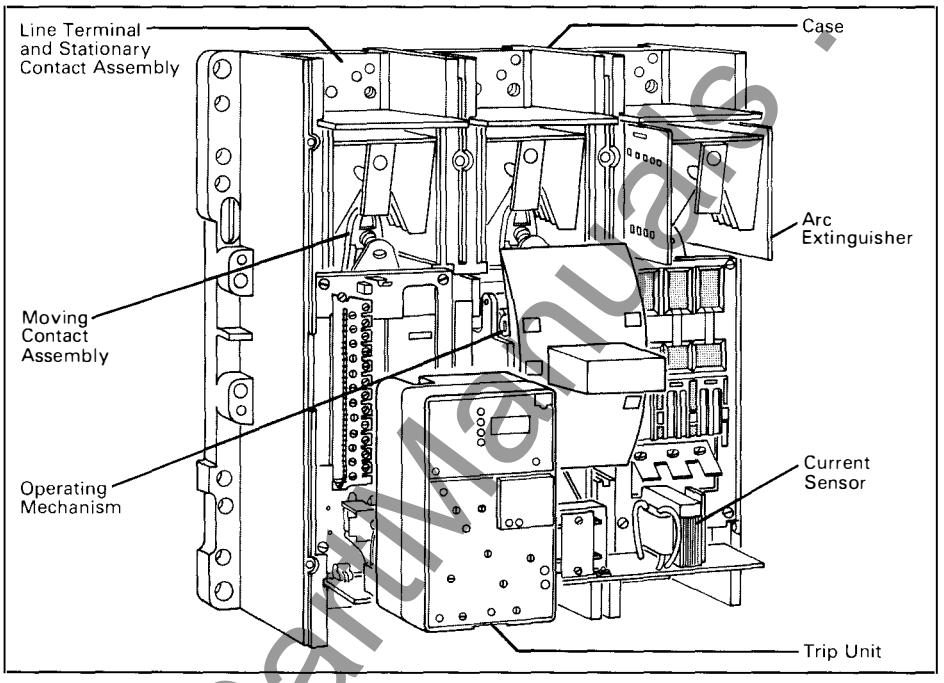


Figure 3-1. R-Frame Circuit Breaker Components

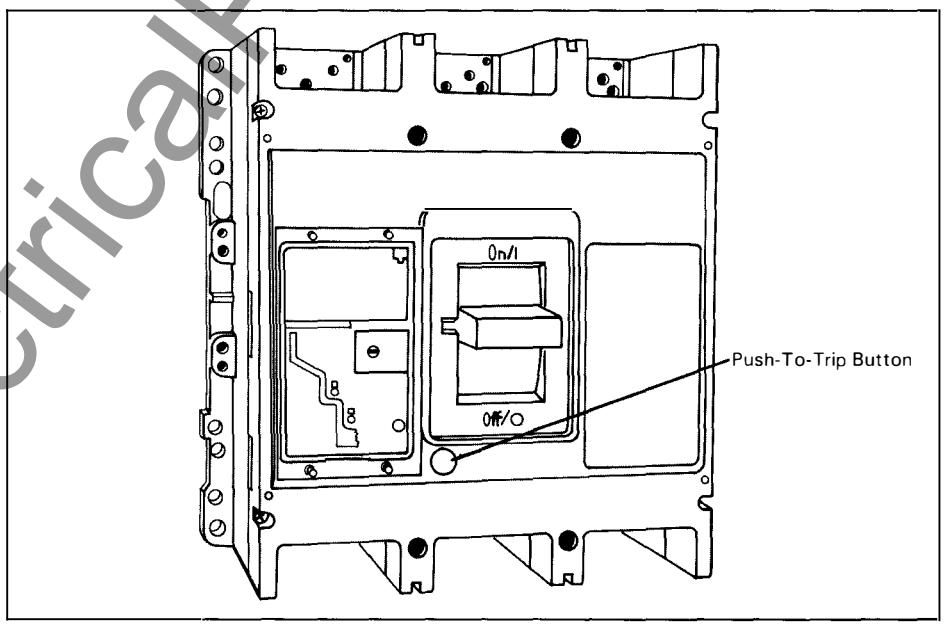


Figure 3-2. Molded Case

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Molded Case
The molded case (Figure 3-2) is a housing for electrically insulating the circuit breaker components and internal accessories. The case consists of a glass-polyester base and cover. The internal case molding forms cavities that isolate terminal areas, individual arc chambers, the operating mechanism, and internal accessories. Barriers isolate the operating mechanism from the accessory mounting cavity. Slots in the cover provide ventilation for the arc chambers.

Operating Mechanism
The operating mechanism provides a means of manually switching the moving contact position from open to closed and from closed to open. It also provides the mechanical means to open the contacts when trip conditions occur. The handle position indicates the contact status: closed, tripped, or open.

Manual Operation
Manual operation of the circuit breaker handle closes and opens the moving contact assembly. When the cradle is latched, the handle arm controls the crossbar rotation. When the handle arm is moved from one position to the other, the crossbar rotates and the moving contacts open or close. The link arrangement between the handle arm and the crossbar provides spring-loaded over-toggle operation.

3-4. Circuit Breaker Trip Operation

Arc Extinguishers
The arc extinguishers dissipate arcs that result when the circuit breaker interrupts current flow. Each arc extinguisher consists of a stack of uniformly spaced, U-shaped steel plates held together by two insulating side plates. When an interruption occurs and the contacts separate, the current flow through the ionized region between the contacts induces a magnetic field around the arc and arc extinguisher. The force drives the arc into the steel plates, deionizing the gas while dividing and cooling the arc.

Moving Contact Assembly
The moving contact assembly provides continuity between the line and load terminals when the circuit breaker is in the closed position. The crossbar and moving contact arm assembly rotate to close the contacts. After the contacts touch, the crossbar overtravels to provide a contact wiping action and create firm contact closure. A contact arm latch holds the moving contact arm in place. When the circuit breaker trips or is switched off, the moving contact assembly moves through the arc extinguisher away from the stationary contact.

Contact Blow-Apart
When current is flowing through the contacts of the R- frame circuit breaker, the positions of the line conductors and the moving contact arms with their flat coil-wound shunts induce opposing magnetic fields. During the tripping operation, under high fault conditions, the resulting opposing forces along the magnetic flux lines cause rapid contact blow-apart. The moving contacts pivot away rapidly from the stationary contacts.

Push-to-Trip Button
The Push-to-Trip button provides a manual means of tripping the circuit breaker. When the button is pressed, a plunger rotates the trip bar causing the circuit breaker to trip.

3-5. Trip Unit Description and Operation

General Description
All trip units are of the self-contained, factory-sealed, type using electronic sensing elements. All interrupting ratings of the R-frame family of circuit breakers will accept either the analog type RS Seltronic™ or Microprocessor Type Digitrip RMS trip unit which plugs into the trip unit mounting deck.

The Type RS Seltronic™ trip unit is available with protection functions and settings as shown in Tables 3-1 and 3-2. The Type Digitrip RMS trip unit is available in models 500, 600, 700 and 800 with protection functions and settings as shown in Tables 3-3 and 3-4. All Digitrip RMS models and associated features are shown in Table 3-5. The continuous ampere rating of the RS Seltronic and Digitrip RMS trip units is determined by the value of the installed rating plug. Both types of trip units are insensitive to ambient temperatures over a range of −20° to +55°C.

Trip Unit Operation
The RS Seltronic™ or the Digitrip RMS trip unit (Figure 3-3), when installed, monitors current from current sensors mounted in the circuit breaker base. These current sensors are mounted internally on the circuit breaker main conductors. The current sensor secondary winding connections plug into the auxiliary current sensor printed circuit board (PCB). A plug-in connection is provided between the PCB and the terminal block on the trip unit deck. The trip unit plugs into the terminal blocks on the trip unit deck.

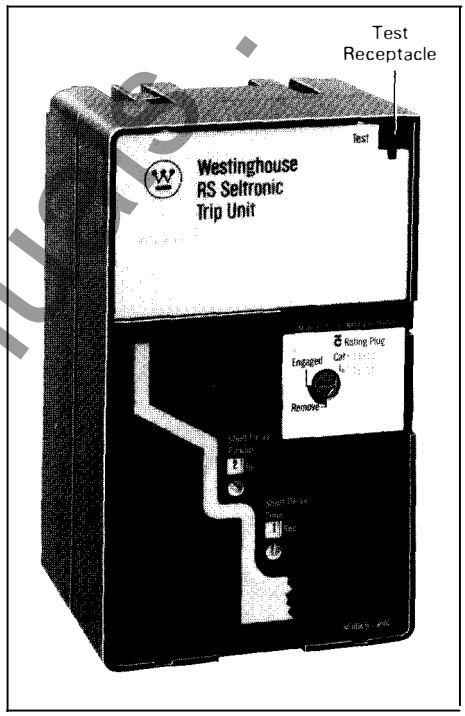


Figure 3-3. Type RS Seltronic™ Trip Unit

A field installed rating plug determines the continuous ampere rating of the trip unit. A mechanical interlock prevents latching and closing of the circuit breaker if the trip unit and rating plug are not installed. Under fault conditions, the trip unit will initiate a trip signal and energize the flux shunt trip. When the flux shunt trip operates, a plunger extends and rotates the trip bar. As the trip bar rotates, the latch releases and the circuit breaker trips.

3-6. Trip Unit Characteristics

Overload (Inverse Time) Trip
The trip unit initiates a trip of the circuit breaker within two hours for an overload of 135 percent, and in less time for higher overloads.

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Type RS Seltronic™ Trip Unit Short Delay/ Instantaneous Trip
For short circuit conditions that exceed the short delay pick-up settings, the trip unit initiates a trip after a prescribed delay by the I^2t ramp function for a trip unit with catalog number suffix T. A flat response time delay action is provided by a trip unit with catalog number suffix TA unless the instantaneous setting (I) is selected.

Type RS Seltronic™ Trip Unit Ground Fault Protection
For ground fault conditions that exceed pick-up and time delay settings, the trip unit initiates a trip signal. Time delay settings have a flat response.

Field Testing
Test points (Figure 3-3) are for functional field testing of the trip unit when connected to the test kit (Catalog number STK2).

Type Digitrip RMS Trip Unit Short Delay/ Ground Fault Trip
For short circuit conditions that exceed the short delay or ground fault pick-up settings, the trip unit initiates a trip signal. Either flat response or I^2t ramp settings may be selected. I^2t ramp settings are identified by the asterisk(*) in the setting viewing window.

Type Digitrip RMS Trip Unit Short Delay/ Ground Fault Protection
When selected, short delay/ground fault pick-up and time delay settings allow selective coordination with other circuit protective devices (Figure 3-4).

DC Application
Type RS Seltronic™ and Digitrip RMS trip units are suitable for AC application only.

Time/Current Curves
Time/Current curves for the RS Seltronic™ trip units are contained in Application Data 29-167D. Time/current curves for the Digitrip RMS trip units are contained in Application Data 29-167J.

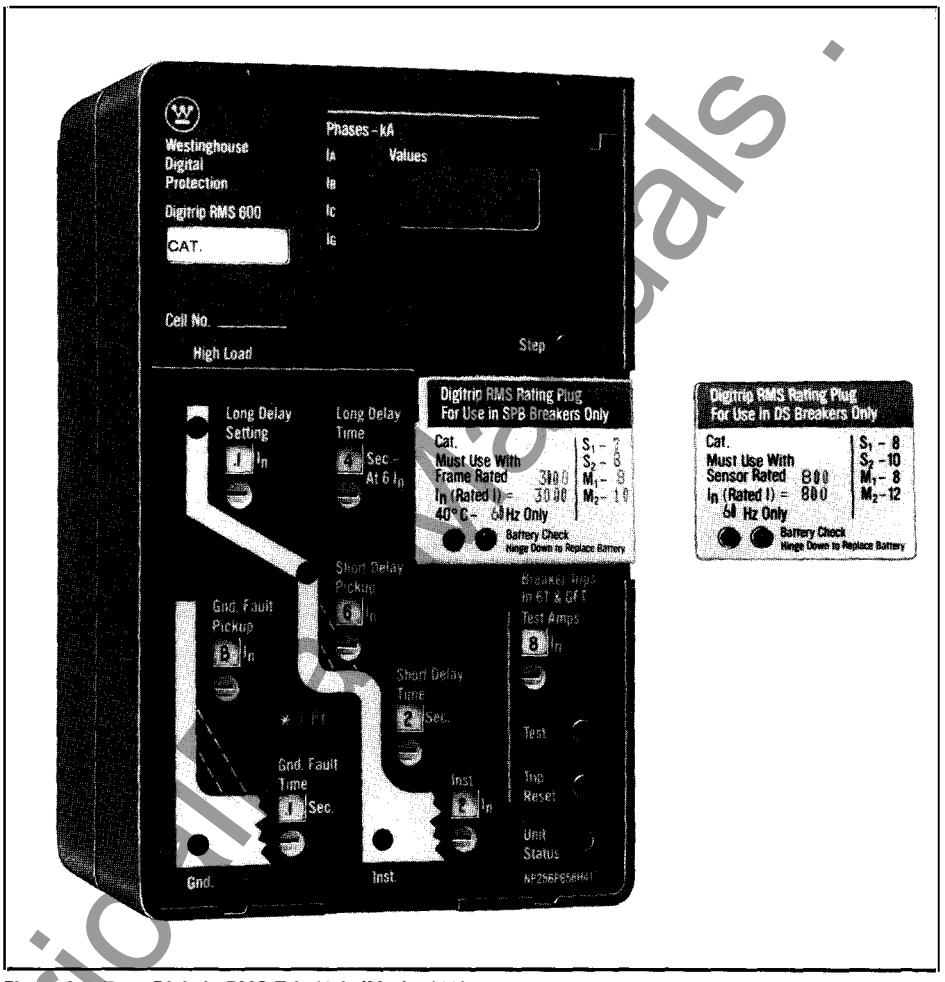


Figure 3-4. Type Digitrip RMS Trip Unit (Model 600)

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Table 3-1. Type RS Seltronic™ (Electronic) Trip Unit Protection Functions

Protection Functions		Trip Unit Catalog Number Suffix			
		T	TA	TG	TAG
Long Time	Fixed Ampere Rating① with Fixed Long Delay	•	•	•	•
	Adjustable Ampere Setting with Fixed Long Delay②	•	•	•	•
Short Time	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp	•		•	
	Adjustable Short Time Delay③ with Adjustable Short Time Pick-up, or		•		•
	Adjustable Instantaneous Pick-up③		•		•
Instantaneous	Fixed Instantaneous (Override)④	•	•	•	•
Ground Fault	Adjustable Ground Fault Pick-up with Adjustable Ground Fault Time			•	•

① See Tables 3-2 and 5-7 for available fixed rating plugs.
② See Tables 3-2 and 5-7 for available adjustable rating plugs.
③ Using trip unit with adjustable short time delay (TA, TAG), instantaneous pick-up is achieved when the lowest time delay setting (I) is selected.
④ Instantaneous override setting fixed at frame withstand rating (20 kA).

Table 3-2. Type RS Seltronic™ (Electronic) Trip Unit Protection Functions and Rating Settings⑧

Trip Unit Maximum Rating Amperes (I_n)	Fixed Rating Plug Amperes (I_n)	Adjustable Rating Plug Amperes (I_n)	Adjustable Short Time Delay		
			Pick-up Setting Range⑤	Time Delay	
				I^2T Ramp (Standard)	Independently Adjustable Time Setting (Optional)
1600	800 1000 1200 1250⑥ 1400 1600	800/1000/1200/1600 800/1000/1250/1600②	2 To 8	Fixed	I⑦ (No Intentional Delay) 100/200/300 m sec
2000	1000 1200 1250⑥ 1400 1600 2000	1000/1200/1600/2000 1000/1250/1600/2000②	2 To 8	Fixed	I⑦ (No Intentional Delay) 100/200/300 m sec

⑤ Multiple of the fixed rating plug value or setting of the adjustable rating plug.
⑥ For use with RW and RWC circuit breakers only.
⑦ Instantaneous pick-up occurs with short delay time adjustment set at I
⑧ As an option, ground fault protection with pick-up settings adjustable to 200A, 400A, 600A, 800A, 1000A, and 1200A. Ground fault time delay settings adjustable to instantaneous (I), 150 ms, 300 ms, and 500 ms.

Table 3-3. Type Digitrip RMS (Microprocessor Based) Trip Unit Protection Functions⑨

Protection Functions		Protection Function Identifier					
		LI	LS	LSI	LIG	LSG	LSIG
Long Time	Long Delay Setting	•	•	•	•	•	•
	Adjustable Long Delay Time	•	•	•	•	•	•
Short Time	Adjustable Short Delay Pick-up		•	•		•	•
	Adjustable Short Delay Time		•	•		•	•
Instantaneous	Adjustable Instantaneous Pick-up	•		•	•		•
	Fixed Instantaneous (Override)⑩		•			•	
Ground Fault	Adjustable Ground Fault Pick-up				•	•	•
	Adjustable Ground Fault Time				•	•	•

⑨ See Tables 3-4 and 5-14 for available rating plugs.
⑩ Instantaneous override setting fixed at frame withstand rating (20 kA RMS).

Table 3-4. Type Digitrip RMS (Microprocessor Based) Trip Unit Protection Functions and Rating Settings⑮

Trip Unit Maximum Rating Amperes (I_n)	Fixed Rating Plug Amperes (I_n)⑪	Adjustable Long Delay (Standard)		Adjustable Short Delay (Optional)			Adjustable Instantaneous (Optional)
		Pick-up Range⑫	Time Delay Range (Sec.)	Pick-up Range⑬	Time Delay Setting (Sec.)		Pick-up Range⑬
					Using I^2T Ramp	Using Flat Response	
1600	800 1000 1200 1250⑭ 1600	0.5-1.0	2 To 24 @ 6X Rating Plug Amperes	2 To 8	0.1 To 0.5	0.1 To 0.5	2 To 10
2000	1000 1200 1250⑮ 1600 2000	0.5-1.0	2 To 24 @ 6X Rating Plug Amperes	2 To 8	0.1 To 0.5	0.1 To 0.5	2 To 10

⑪ Rating plugs for the Digitrip RMS trip units are available in 50 Hz or 60 Hz versions. Adjustable rating plugs not available for Digitrip RMS trip units.
⑫ The adjustable long time pick-up adjustment permits a pick-up range of 50 to 100% of the rating plug value. A 1600A circuit breaker can provide 400A circuit protection when equipped with a Digitrip trip unit with adjustable long time pick-up adjustment set to 0.5 with an 800A rating plug. A 2000A circuit breaker can likewise provide 500A circuit protection.
⑬ Multiple of fixed rating plug amperes.
⑭ For use with RW and RWC circuit breakers only.
⑮ As an option, ground fault protection with pick-up settings at A, B, C, D, E, F, H and K. Values range from 200A to 1200A as a function of the installed rating plug. Ground fault time delay settings in seconds at 0.1, 0.2, 0.3, 0.4, 0.5 (flat response) and I^2T ramp settings at 0.1, 0.3, and 0.5. Ground fault protection has the ground fault zone interlocking function supplied as standard when ground fault protection is ordered

Series C Molded Case Circuit Breakers, R-Frame
Section 3 – Description

Table 3-5. Digitrip RMS Trip Unit Model Features

	Digitrip RMS Type	500	600	700	800
	Instruction Leaflet No.	I.L. 29-851	I.L. 29-852	I.L. 29-853	I.L. 29-854
Protection	Long Delay Setting	X	X	X	X
	Long Delay Time	X	X	X	X
	Long Time Memory	X	X	X	X
	Short Delay Pick-up	OPT.	OPT.	OPT.	OPT.
	Short Delay Time	OPT.	OPT.	OPT.	OPT.
	Flat/I^2T Response	X	X	X	X
	Zone Interlocking	①	①	①	①
	Instantaneous Pick-up	OPT.	OPT.	OPT.	OPT.
	Ground Fault Pick-up	OPT.	OPT.	OPT.	OPT.
	Ground Fault Time	OPT.	OPT.	OPT.	OPT.
	Flat/I^2T Response	X	X	X	X
	Ground Time Memory	X	X	X	X
	Zone Interlocking	①	①	①	①
	Interchangeable Rating Plug	X	X	X	X
Local Trip Indication	Mode of Trip LEDs	X	X	X	X
	Battery – for Mode of Trip LEDs	X	X	X	X
	Battery Status LED	X	X	X	X
	Battery Test Pushbutton	X	X	X	X
Test	Integral Test Provisions	X	X	X	X
	Trip Unit Status Indication LED	X	X	X	X
	Auxiliary Power Module	OPT.	OPT.	OPT.	OPT.
Local Display On Trip Unit	Power/Relay Module		X	X	X
	4 Digit Display		X		X
	øA Current LED		X	②	X
	øB Current LED		X	②	X
	øC Current LED		X	②	X
	Gnd. Current LED		⑥	②⑥	⑥
	Display Stepping Pushbutton		X		X
	High Load LED		X		X
Remote Signals	Remote Signal Contacts:				
	Long Delay Trip		X	X	X
	Short Circuit Trip		X	X	X
	Ground Fault Trip		⑥	⑥	⑥
	High Load Alarm		X	X	X

	Digitrip RMS Type	500	600	700	800
	Instruction Leaflet No.	I.L. 29-851	I.L. 29-852	I.L. 29-853	I.L. 29-854
Energy Monitoring	Potential Transformer Module			X	X
	PTM Disconnect Plug for Dielectric Testing of Circuit Breaker			X	X
	Energy Monitoring: Parameters				
	Peak Demand			④	X
	Peak Demand Reset PB			④	X
	Present Demand			④	X
	Energy Consumption			④	X
Communications	INCOM (Integrated Communications)			X	X
	INCOM Address Register			X	X
Transmittable Data	Transmittable Parameters:				
	Individual Phase Currents			②	③
	Ground Currents			②⑥	③⑥
	Energy			④	③
	Breaker Status: Open/Closed/Tripped			②	③
	Mode of Trip:				
	Override			②	③
	Instantaneous			②	③
	Discriminator			②	③
	Short Delay			②	③
	Ground Fault			②⑥	③⑥
	Long Delay			②	③
	Long Delay Pick-up				③
	Information:				
	External Trip Command (Over INCOM)			②	③
	Data Memory Test Failure (RAM)			②⑤	③
	Program Memory Test Failure (ROM)			②⑥	③
	Missing or Defective Rating Plug			④	③
	Reverse Power Flow			④	③
	Response to Depressing Test Pushbutton			④	③
	Communication Failure			②⑤	②⑤
Control	Breaker Command (Via INCOM):				
	Trip			X	X
	Close			OPT.⑦	OPT.⑦

OPT = Optional
① Use of zone interlocking is optional with breaker wiring modification.
② Remote location only unless optional AEM local monitor is used.
● Local (on face of trip unit) or remote via INCOM.
④ Remote only.
⑤ On AEM denoted by absence of response from addressed breaker.
⑥ Supplied only when trip unit is equipped with ground fault protection option.
⑦ Requires electrical operator option.

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

4-1. General Information

A complete line of accessories is available for use with Series C circuit breakers. Internally mounted accessories are plug-in types for use only with the Series C R-frame circuit breaker. The following paragraphs describe each accessory and provide operation, rating, and specification information.

4-2. Line and Load Terminals

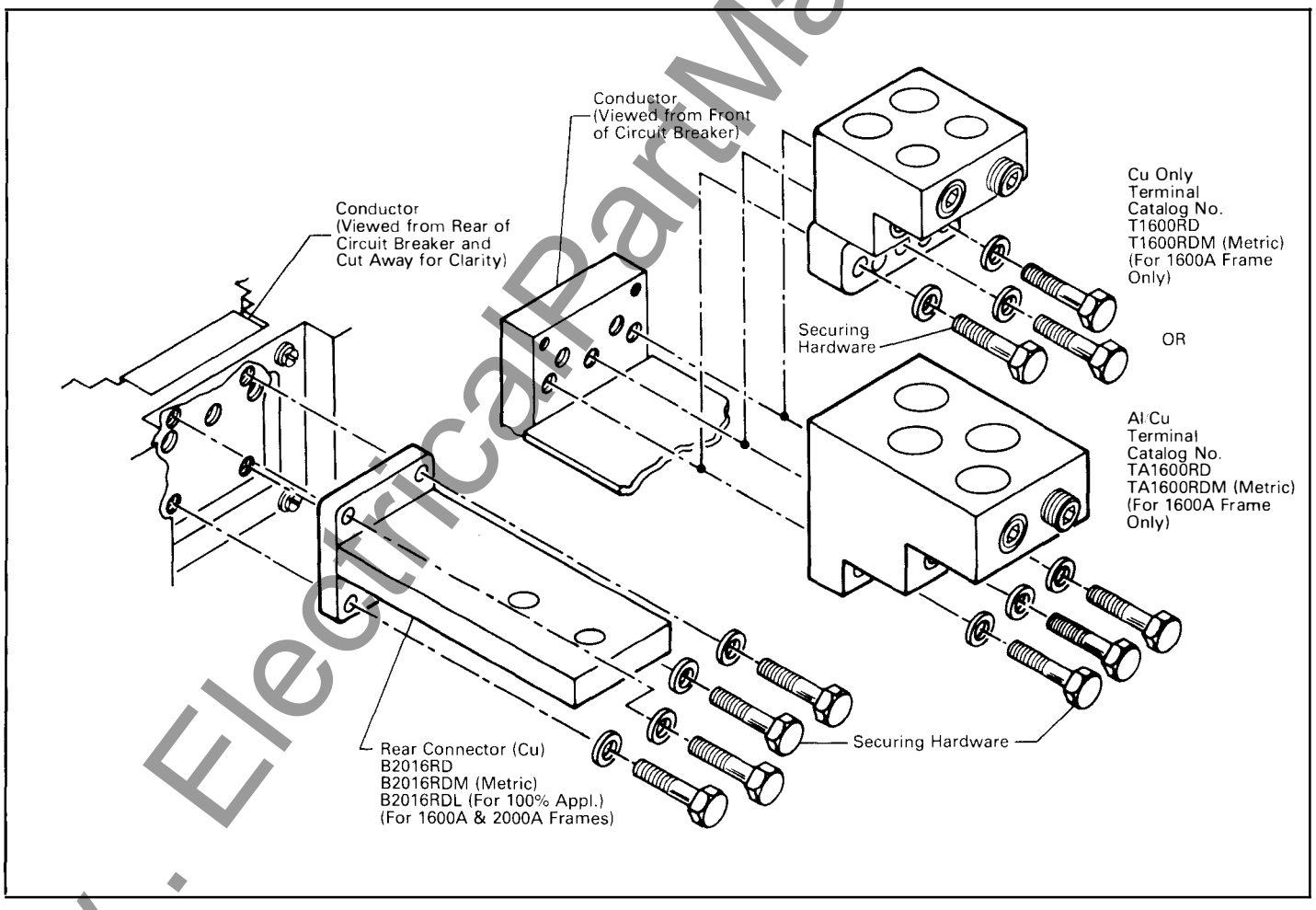
Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories, Inc. Standards UL486A and UL486B and CSA C22.2 No.65M. Unless otherwise specified, R-frame circuit breaker line and load terminals are shipped separately for field installation.

4-3. Internal Accessories

All internal accessories are of the plug-in type installed in an accessory deck mounted in the right-hand pole of the circuit breaker only. Internal accessories are listed for field installation under UL File E64983. The available plug-in internal accessories include the following:

- Alarm (Signal)/Lockout Switch
- Auxiliary Switch
- Shunt Trip
- Low Energy Shunt Trip
- Undervoltage Release Mechanism.

For external connections, 18 inch long pig-tail leads exit the right-side of the circuit breaker next to the accessory deck. An optional configuration includes a terminal block mounted on the right-side of the base. To identify allowable accessory installation combinations, see Figure 4-2.



Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

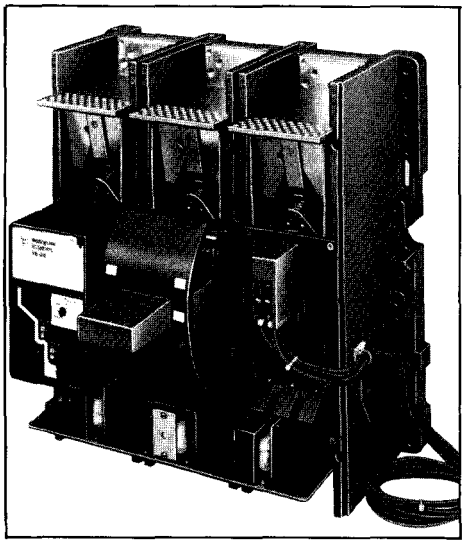
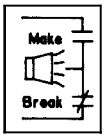
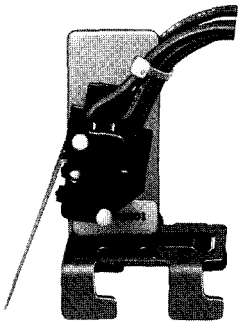


Figure 4-1. Typical Internal Plug-in Accessory Installed in R-frame Circuit Breaker

Alarm (Signal)/ Lockout Switch





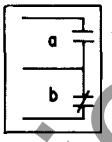
The alarm (signal)/lockout switch monitors circuit breaker trip status and provides remote signaling and interlocking capabilities when the circuit breaker trips. The alarm (signal)/lockout switch consists of one or two single pole double throw (SPDT) switches arranged in a plug-in module that mounts in retaining slots in the accessory panel. The SPDT switch contacts are identified as make and break contacts. When the circuit breaker trips, the make contact closes and the break contact opens. Table 4-1 provides electrical ratings data for the alarm (signal) /lockout switch.

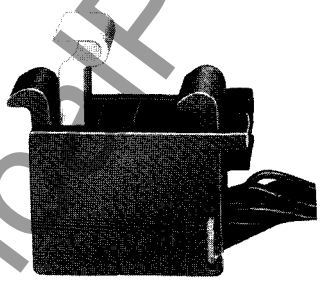
Table 4-1. Alarm (Signal)/Lockout Switch Electrical Ratings Data ① ②

Maximum Voltage	Freq.	Maximum Current Amps
600	50/60 Hz	6.0
125	DC	0.5③
250	DC	0.25③

① Endurance - 500 electrical operations plus 2500 mechanical operations
② Pigtail wire size - No. 18 AWG (0.82 mm^2). Leads are red, black, and blue.
③ Noninductive load

Auxiliary Switch





The auxiliary switch provides circuit breaker contact status information by monitoring the position of the contact arm assembly. The auxiliary switch is used for remote signaling and interlocking purposes, and consists of two or four SPDT switches arranged in a plug-in module that mounts in retaining slots in the accessory deck. Each SPDT switch has one ''a'' and one ''b'' contact. When the circuit breaker contacts are open, the ''a'' contact is open and the ''b'' contact is closed. Table 4-2 provides electrical ratings data for the auxiliary switch.

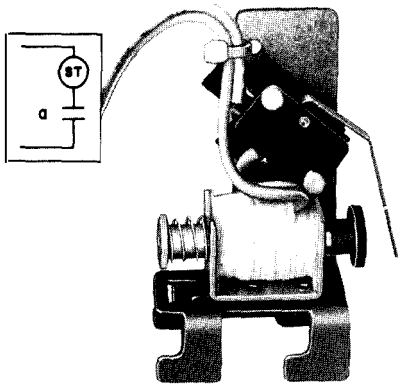
Table 4-2. Auxiliary Switch Electrical Ratings Data ④ ⑤

Maximum Voltage	Freq.	Maximum Current Amps
600	50/60 Hz	6.0
125	DC	0.5⑥
250	DC	0.25⑥

① Endurance - 500 electrical operations plus 2500 mechanical operations
② Pigtail wire size - No. 18 AWG (0.82 mm^2). Leads are red, black, and blue.
③ Noninductive load

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

Shunt Trip



The shunt trip provides remote tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch arranged in a plug-in module that mounts in retaining slots in the accessory panel. Table 4-3 also provides electrical ratings data for the shunt trip.

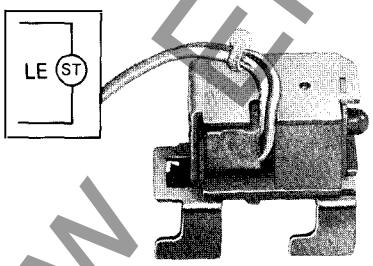
Table 4-3. Shunt Trip Electrical Ratings Data

- Approximate unlatching time of 6 milliseconds.
- Average circuit breaker contact total opening time approximately 62 milliseconds, at rated voltage.
- Endurance – 500 electrical operations.
- Shunt trip can be operated up to a maximum of six times per minute.
- Maximum operating voltage – 110% of maximum voltage range rating.
- Pigtail wire size – No. 18 AWG (0.82 mm²). Leads are yellow and white.

Catalog Suffix	Application Ratings		Electrical Operating Ratings						
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I_p (A)	I_{rms} at 0.250s (A)	I_{rms} at 0.033s (A)	VA	One Minute Dielectric Withstand Voltage (V)
03/03K	24	50/60	24	16.8	71.1		50.3	1210	1050
	24	DC	24	16.8		36.1		870	1050
05/05K	48-60	50/60	48	33.6	13.1		9.2	450	1170
			60		17.2		12.2	740	
08/08K	110/127	50/60	110	60	4.3		3.0	330	1500
			120		4.4		3.5	420	
			127		5.4		3.8	483	
11/11K●	208-240	50/60	110	60.5	4.2		3.0	330	1480
			120		4.5		3.2	390	
			127		4.6		3.3	430	
			208		7.9		5.6	1170	
			220		8.5		6.0	1370	
			240		8.7		6.1	1470	
14/14K	380-440	50/60	380	266.0	4.5		3.2	1220	1880
			415		5.0		3.6	1500	
			440		5.3		3.7	1640	
	220-250	DC	220	154.0		2.4		530	1500
			250			2.7		680	
18/18K	480-600	50/60	480	336.0	0.6		.4	200	2200
			525		0.7		.5	270	
			550		0.7		.5	280	
			600		0.8		.6	360	
23/23K	48-60	DC	48	33.6		9.8		470	1120
			60			11.6		700	
26/26K	110-125	DC	110	77.0		3.3		370	1250
			120			3.6		440	
			125			3.8		480	

① Suitable for use with Class 1 GFP devices; marking label supplied with accessory kit.

Low Energy Shunt Trip

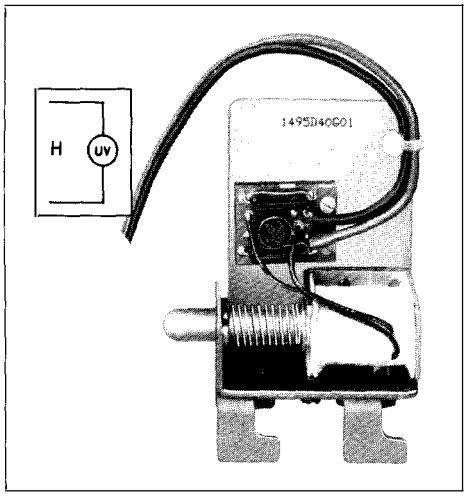


Low Energy Shunt Trip (LEST) devices are designed to operate from low energy output signals from dedicated current sensors typically applied in ground fault protection schemes. However, with a proper control voltage source, they may be applied in place of conventional trip devices for special applications. The LEST consists of an intermittent-rated solenoid and a plunger assembled to a plug-in module. The plug-in module is mounted in slots in the accessory mounting deck in the right pole of the circuit breaker. When the solenoid is energized, the plunger extends and presses against the trip bar tripping the circuit breaker. The trip bar resets the LEST when the trip signal is removed and the circuit breaker handle is moved to the reset (extreme off) position. The leads are yellow and white

The LEST is designed to trip the circuit breaker when a 100 microfarad capacitor charged to 28 Vdc is discharged through the solenoid.

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

Undervoltage Release Mechanism



The undervoltage release mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating. Tables 4-4a and 4-4b provide electrical ratings data for each operating voltage of the handle actuated reset undervoltage release mechanism.

Note: Undervoltage release mechanism accessories are not designed as circuit interlocks and are not recommended for use as such.

Handle Actuated Reset The undervoltage release mechanism consists of a continuous rated solenoid with a plunger mounted in a plug-in module. The trip bar resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (OFF) position. With no voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

Table 4-4a. AC Undervoltage Release Mechanism (Handle Reset) Ratings● ⑤

Catalog Suffix	Application Ratings	Electrical Operating Ratings					Approximate Operating Time (ms)			
	Voltage (V)	Supply Voltage (V)	Dropout Voltage (V) Min.	Dropout Voltage (V) Max.	Pickup Voltage (V) Max.	VA	Min.② UVR Response	Initiation③ Circuit Breaker Contact Separation	Maximum Circuit Breaker Contact Opening	Dielectric④ Withstand Voltage (V)
01/01K	9	9	3.2	6.3	7.7	3.9	5	46	77	1018
02/02K	12	12	4.2	8.4	10.2	2.3	5	46	77	1024
03/03K	24	24	8.4	16.8	20.4	3.1	5	46	77	1048
05/05K	48-60	48 60	21.0	33.6	40.8	3.4 6.0	5	46	77	1120
08/08K	110-127	110 120 127	44.5	77.0	93.5	3.3 3.6 3.8	5	46	77	1254
11/11K	208-240	208 220 240	84.0	145.6	176.8	4.2 6.6 7.2	5	46	77	1480
29/29K	380-500	380 415 440 480 500	168.0	266.0	323.0	3.8 8.3 8.8 9.6 10.0	5	46	77	1960

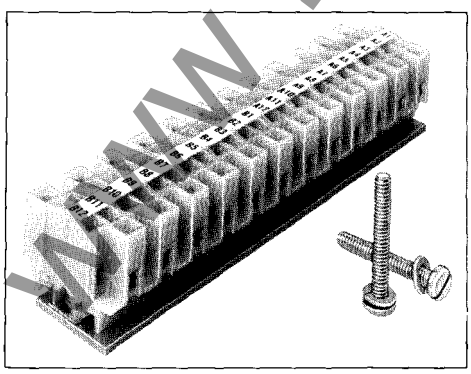
Table 4-4b. DC Undervoltage Release Mechanism (Handle Reset) Ratings① ⑤

Catalog Suffix	Application Ratings	Electrical Operating Ratings					Approximate Operating Time (ms)			
	Voltage (V)	Supply Voltage (V)	Dropout Voltage (V) Min.	Dropout Voltage (V) Max.	Pickup Voltage (V) Max.	VA	Min.② UVR Response	Initiation③ Circuit Breaker Contact Separation	Maximum Circuit Breaker Contact Opening	Dielectric④ Withstand Voltage (V)
20/20K	12	12	4.2	8.4	10.2	3.4	5	46	77	1024
21/21K	24	24	8.4	16.8	20.4	4.3	5	46	77	1048
23/23K	48-60	48 60	21.0	33.6	40.8	4.8 7.2	5	46	77	1120
26/26K	110-125	110 120 125	43.8	77.0	93.5	3.3 3.6 3.8	5	46	77	1250
28/28K	220-250	220 250	87.5	154.0	187.0	6.6 7.5	5	46	77	1500

① Endurance – 500 electrical operations plus 2500 mechanical operations.
② UVR will override a momentary voltage dip up to the response time shown.
③ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.
④ For 1 minute.
⑤ Pigtail wire size – No. 18 AWG (0.82 mm²). Leads are orange and brown.

4-4. External Accessories

Accessory Terminal Block (for fixed mounted configuration)



Internal accessory wiring leads are normally supplied with pigtail leads (No. 18 AWG) that exit from the right-side of the circuit breaker. Where specified, fixed mounted accessory terminal blocks are available. A maximum of one 24 point terminal block can be installed on the right-side of the circuit breaker for the internal accessories. Terminal block ordering information is given in Table 5-13.

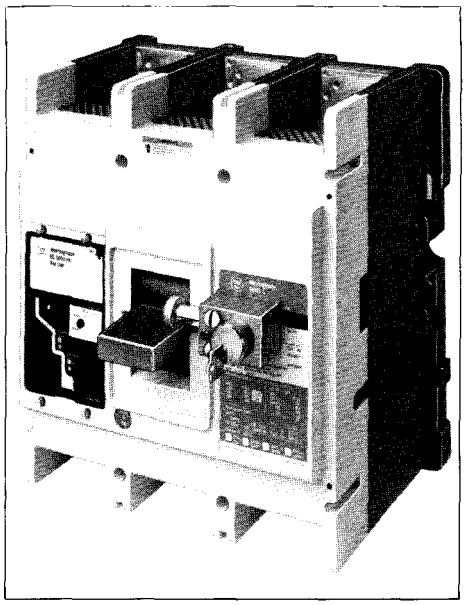
For convenience in determining the appropriate number of terminal block points required, refer to Table 4-5.

Table 4-5. Number of Control Wires For Each Internally Mounted Accessories

Type of Accessory	Number of Contacts Per Single Accessory	Required Number of Wires
Auxiliary Switch	2a/2b 4a/4b	6 12
Alarm (Signal)/ Lockout Switch	1m/1b 2m/2b	6 12
Shunt Trip	N/A	2
Undervoltage Release Mechanism	N/A	2

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

• Key Interlock

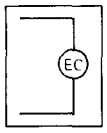


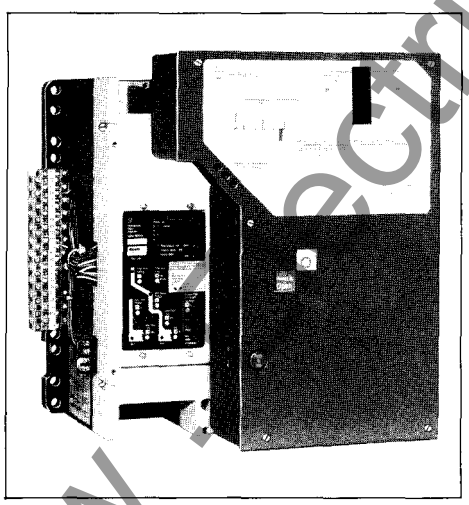
Lock and interlock accessories are used to deter undesired circuit breaker operation and establish interlocked control systems.

The key interlock is used to externally lock the circuit breaker handle in the OFF position. When the key interlock is locked, an extended deadbolt blocks movement of the circuit breaker handle. Uniquely coded keys are removable only with the deadbolt extended. Each coded key controls a group of circuit breakers for a given specific customer installation.

The key interlock assembly consists of a mounting kit and a customer supplied deadbolt lock. The mounting kit comprises a mounting plate, which is secured to the circuit breaker cover in the right-pole position; key interlock mounting screws; and, a wire seal. Specific mounting kits are required for individual key interlock types.

• Electrical (Motor) Operator





The motor operator allows the circuit breaker to be opened, closed, or reset remotely. It also has a lock-off capability and provisions for manual operation.

The motor operator contains a reversible motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches and relays are used to control the motor.

Since the motor operator is equipped with control relays, only a momentary control signal is required to close or open the circuit breaker. Once an operation is initiated, the control relays seal in and the motor operator completes its operation. The relays carry the motor current. The control momentary switches only provide the signal.

The motor operator is U.L. listed as a recognized component suitable for field installation on all type R-frame circuit breakers and molded case switches under UL File E64124.

From the point of energization of the closing mechanism at 85% voltage, the closing time is 30 cycles ±10%.

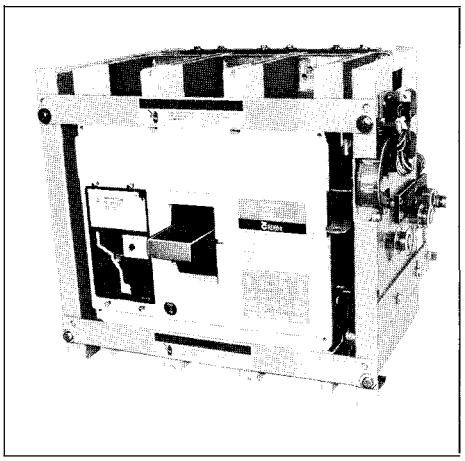
Table 4-6. Available Motor Operator Ratings and Operating Conditions① ● ③ ④

Rated Voltage (V)⑤	Frequency	Motor In-Rush Current (A)	Dielectric Withstand Voltage (V)
120	50/60 Hz	40	1000 VAC
240	50/60 Hz	27	1000 VAC
48	DC	53	1000 VAC

① Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
② Electric Operating time at rated voltage;
(a) To turn breaker ON – ½ second max.
(b) To turn breaker OFF – ½ second max.
● Motor operating temperature; Class "A" temperature limits apply.
④ A minimum 1 KVA power source is recommended for motor operation.
⑤ Applied voltage should be no less than 85% or no more than 110% of rated.

Series C Molded Case Circuit Breakers, R-Frame
Section 4 – Accessories and Modifications

- **Drawout Cassette**

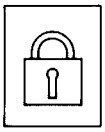


The drawout cassette is currently for use with the standard 3-pole 65 KA/480 VAC, 1600A and 2000A RD circuit breakers only. It consists of two separate components: the movable mechanism which is factory mounted to the circuit breaker frame (shown in figure) and the stationary mechanism which is housed in the cassette and shipped separately.

The drawout mechanism has four positions.

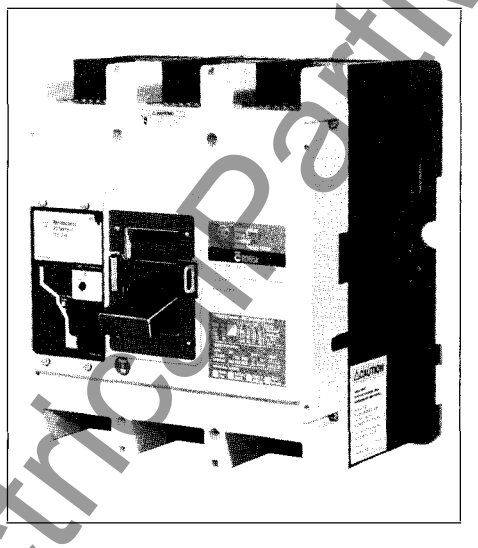
- Connected – The breaker is fully connected to the primary stabs and secondary contacts.
- Test – The breaker is not connected to the primary stabs but is connected to the secondary contacts.
- Disconnected – Both the primary stabs and the secondary contacts are disconnected.
- Withdraw – The breaker can be removed from the cassette.

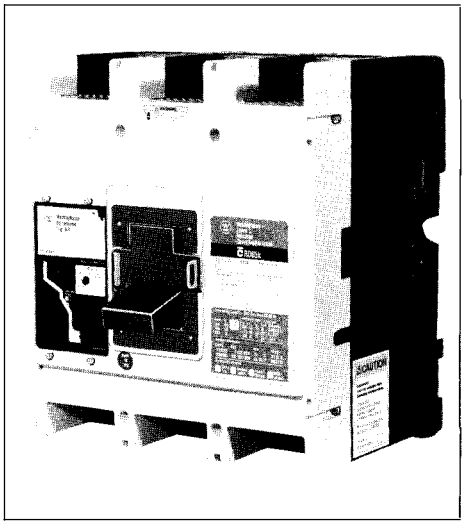
- **Padlockable Handle Lock Hasp**



The padlockable handle lock hasp is used to externally lock the circuit breaker handle. Safety is ensured since the trip-free circuit breaker mechanism is capable of tripping when the handle is locked in the on position. The lock hasp is Underwriters' Laboratories listed under File E7819.

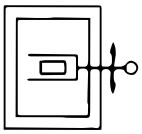
The lock hasp consists of a mounting plate and a lock plate. The two plates are connected by a hinge. When the lock plate is positioned to block the circuit breaker handle it may be secured by placing one or more padlock shackles through the hasp on the mounting plate. The lock hasp is designed to accept a maximum of three padlock shackles, each with a maximum diameter of ¼ inch.

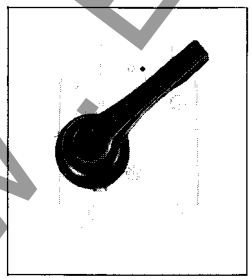




Two versions of the lock hasp are available: One permits the circuit breaker handle to be locked in both the on and off positions (see figure to left above). The second permits the circuit breaker handle to be locked in the off position only (see figure to right above).

- **Slide Plate Handle Mechanism**





The slide plate handle mechanism provides a means of externally operating a circuit breaker installed in a shallow depth enclosure. When applied to enclosures that are hinged on the right-hand side, the handle mechanism also functions as an enclosure locking device. The handle mechanism can be used in NEMA 1, and 12 enclosure applications; a special version can be used in NEMA 3, 4 and 5 enclosure applications. The handle mechanism will accept up to three padlock shackles each with a maximum diameter of 5/16 inch (7.94mm). The handle mechanism is an Underwriters' Laboratories, Inc. recognized component for panelboard accessories under UL File E56845.

4-5. Miscellaneous Accessories

Seltronic™ Portable Test Kit

The Seltonic™ portable test kit provides verification of performance of all ratings of Seltronic™ trip units installed in Series C circuit breakers. The test kit operates on 120-Volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker. Catalog No. STK2.

Molded Handle Extension

Use to manually operate circuit breaker "ON" and "OFF". Catalog No. HEX6.

4-6. Accessory Combinations

Different combinations of accessories can be supplied. Figure 4-2 shows the different accessories or combinations that can be used internally with R-frame circuit breakers. All internal accessories fit into an accessory mounting deck that is positioned in the right-hand pole in the circuit breaker. The key interlock external accessory is also positioned on the cover over the right-hand pole.

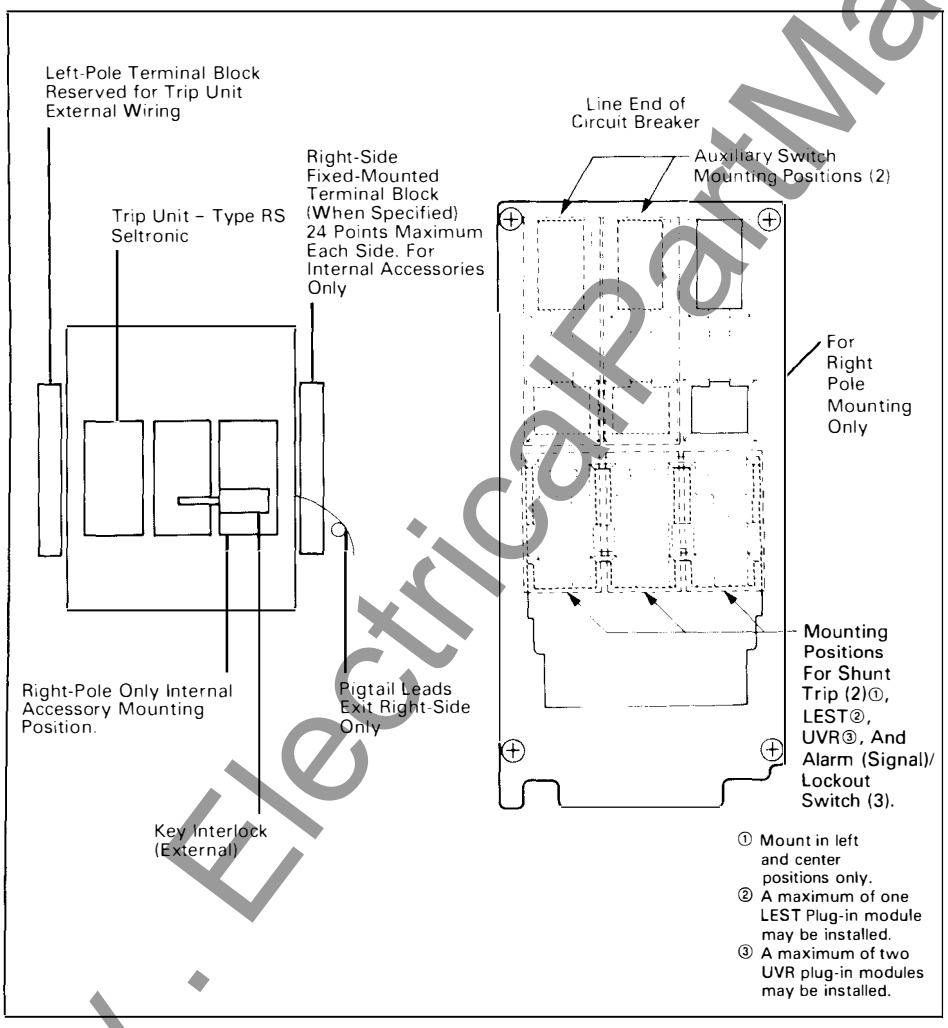


Figure 4-2. Accessory Mounting Locations

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

5-1. General Information

When ordering an R-frame circuit breaker use the catalog numbers given in Tables 5-1 through 5-14. Interrupting ratings can be found in Table 1-1. List any accessories or modifications required together with the applicable catalog number. REFER TO WESTINGHOUSE FOR AVAILABILITY OF ALL CIRCUIT BREAKERS, MOLDED CASE SWITCHES, ACCESSORIES, AND MODIFICATIONS.

List Prices: see Price List 29-020. Discount Symbol CB-2.

5-2. Ordering Instructions - Circuit Breakers

Circuit breakers will be shipped from the factory with trip units installed. Rating plugs will be shipped separately when an RS trip unit is specified. However, rating plugs will be factory installed in all circuit breakers with Digitrip RMS trip units. Circuit breaker frame and trip unit catalog numbers are shown separately for ordering convenience only.

Order complete circuit breaker by specifying applicable frame with trip unit, rating plug, and accessories using the applicable catalog designations.

5-3. Ordering Instructions - Accessories

When ordering an accessory that is for installation by the customer, use the field installation kit catalog number.

5-4. Ordering Example

Customer Requirements
One UL listed molded case circuit breaker, 600 Vac per UL 489, as follows:

Item 1. 3-pole, 600V, 1600A, 60 Hz, with 65 kA interrupting capacity at 480 volts
Item 2. Electronic trip unit with adjustable short time pick-up and adjustable short time delay settings.
Item 3. One 2a/2b auxiliary switch with pigtail leads
Item 4. One shunt trip, 120 volts, 50/60 Hz with pigtail leads
Item 5. Load side terminals for (4) 600 mcm copper conductors per phase.
Item 6. Fixed mounted, suitable for reverse feed application.

Ordering Steps
1. Refer to Table 1-1, select RD circuit breaker (This covers item 1 above, in part.)
2. Refer to Table 3-1,select Type RS Seltronic™ trip unit with suffix TA (this covers item 2 above, in part.)
3. Refer to Table 5-1, select Catalog No. RD316TAW. (This covers items 1, 2, and 6 above.)

Type RS Seltronic™ Trip Unit Catalog Numbers ①②

Example: RS31600T

RS	3	1600	T	
Trip Unit Type	Number of Poles	Maximum Trip Unit Ampere Rating	Suffix	
RS: Seltronic™	3, 4	1600 2000	T: TA: TG: TAG:	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp Adjustable Short Time Delay with Adjustable Short Time Pick-up or Adjustable Instantaneous Pick-up Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp and Adjustable Ground Fault Pick-up with Adjustable Ground Fault Time Adjustable Short Time Delay with Adjustable Short Time Pick-up or Adjustable Instantaneous Pick-up and Adjustable Ground Fault Pick-up with Adjustable Ground Fault Time

① Rating plug for Seltronic™ trip units must be ordered separately. Refer to Table 5-7.
② RS Seltronic™ trip units only are not warehouse items. Must be ordered from the factory.

Type Digitrip RMS Trip Unit Catalog Numbers ③④

Example: T51ALI

T	5	1	B	LI
RMS Trip Unit Prefix	Trip Unit Model	Protection Function Identifier	Trip Design Series	Protection Function
T	5 (=500) 6 (=600) 7 (=700) 8 (=800)	1 (=LI) 2 (=LSI) 3 (=LS) 4 (=LIG) 5 (=LSG) 6 (=LSIG)	B	LI LSI LS LIG LSG LSIG

③ Rating plug for Digitrip RMS trip units must be specified separately and is shipped installed in trip unit. Refer to Table 5-14.
④ Digitrip RMS trip units only are not warehouse items. Must be ordered from the factory.

ORDERING INFORMATION

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

Notes:
(a) Type RD circuit breakers with interchangeable rating plugs are suitable for reverse feed applications.
(b) A suffix TA trip unit with flat response short delay settings was selected. Depending on customer preferences, a suffix T trip unit with I^2t ramp curve configuration might have been acceptable.

4. Refer to Table 5-7, select rating plug Catalog No. 16RS16T.

5. Refer to Table 5-15, select (3) wiring terminals, Catalog No. T1600RD.

6. Refer to Table 5-17, select auxiliary switch Catalog No. A2X6RA.

7. Refer to Table 5-18, select shunt trip Catalog No. SNT6RA08.

Notes:
(c) Since selected accessory catalog references were non-kit types, each accessory will be factory installed. This will result in a longer lead time. If accessories had been ordered as kits, for field installation, shipment from the warehouse would have meant a much reduced lead time.
(d) When internal accessories are ordered for field installation, accessory mounting arrangements can be verified by referring to Figure 4-2.

Order Entry

Enter order by specifying as follows:

Item 1. Quantity (1) circuit breaker Catalog No. RD316TAW to include: one auxiliary switch Catalog No. A2X6RA and one shunt trip Catalog No. SNT6RA08.
Item 2. Quantity (1) 1600A rating plug Catalog No. 16RS16T.
Item 3. Quantity (3) wiring terminals Catalog No. T1600RD.

Note:
The rating plug (Item 2) and wiring terminals (Item 3) will be packaged separately from the circuit breaker.

5-5. Circuit Breakers

Catalog numbers for 3 and 4 pole circuit breakers with RS Seltronic analog trip units and Digitrip RMS (Models 500 & 600) microprocessor trip units are contained in this section. The RS Seltronic rating plug and Digitrip RMS rating plug catalog numbers are identified in Tables 5-7 and 5-14, respectively. For descriptions of trip units refer to Section 3 of frame book.

Table 5-1. Types RD, RDC, CRD, and CRDC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 600 Vac, 1600 Amps

Complete Circuit Breaker ① without Rating Plug and Terminals		Seltronic Trip Unit Only ②
Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame ⑩	
65 KA@ 480 Vac		
RD316TW	CRD316TW	RS31600T
RD316TAW	CRD316TAW	RS31600TA
RD316TGW ③ ④	CRD316TGW ③ ④	RS31600TG
RD316TAGW ③ ④	CRD316TAGW ③ ④	RS31600TAG
RD316TGRW ③ ④ ⑤	CRD316TGRW ③ ④ ⑤	RS31600TG
RD316TAGRW ③ ④ ⑤	CRD316TAGRW ③ ④ ⑤	RS31600TAG
100 KA@ 480 Vac		
RDC316TW	CRDC316TW	RS31600T
RDC316TAW	CRDC316TAW	RS31600TA
RDC316TGW ③ ④	CRDC316TGW ③ ④	RS31600TG
RDC316TAGW ③ ④	CRDC316TAGW ③ ④	RS31600TAG
RDC316TGRW ③ ④ ⑤	CRDC316TGRW ③ ④ ⑤	RS31600TG
RDC316TAGRW ③ ④ ⑤	CRDC316TAGRW ③ ④ ⑤	RS31600TAG

Table 5-2. Types RD, RDC, CRD, and CRDC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 600 Vac, 2000 Amps

Complete Circuit Breaker ① without Rating Plug and Terminals		Seltronic Trip Unit Only ②
Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame ⑩	
65 KA@ 480 Vac		
RD320TW	CRDC320TW	RS32000T
RD320TAW	CRDC320TAW	RS32000TA
RD320TGW ③ ④	CRDC320TGW ③ ④	RS32000TG
RD320TAGW ③ ④	CRDC320TAGW ③ ④	RS32000TAG
RD320TGRW ③ ④ ⑤	CRDC320TGRW ③ ④ ⑤	RS32000TG
RD320TAGRW ③ ④ ⑤	CRDC320TAGRW ③ ④ ⑤	RS32000TAG
100 KA@ 480 Vac		
RDC320TW	CRDC320TW	RS32000T
RDC320TAW	CRDC320TAW	RS32000TA
RDC320TGW ③ ④	CRDC320TGW ③ ④	RS32000TG
RDC320TAGW ③ ④	CRDC320TAGW ③ ④	RS32000TAG
RDC320TGRW ③ ④ ⑤	CRDC320TGRW ③ ④ ⑤	RS32000TG
RDC320TAGRW ③ ④ ⑤	CRDC320TAGRW ③ ④ ⑤	RS32000TAG

Table 5-3. Types RW and RWC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 690 Vac, 1600 Amps

Complete Circuit Breaker ① without Rating Plug and Terminals		Seltronic Trip Unit Only ②
65 KA@ 480 Vac	100 KA@ 480 Vac	
RW316TW	RWC316TW	RS31600T
RW316TAW	RWC316TAW	RS31600TA
RW316TGW ③ ④	RWC316TGW ③ ④	RS31600TG
RW316TAGW ③ ④	RWC316TAGW ③ ④	RS31600TAG
RW316TGRW ③ ④ ⑤	RWC316TGRW ③ ④ ⑤	RS31600TG
RW316TAGRW ③ ④ ⑤	RWC316TAGRW ③ ④ ⑤	RS31600TAG

Table 5-4. Types RW and RWC Circuit Breakers with Seltronic Trip Unit Catalog Numbers, 3-Pole, 690 Vac, 2000 Amps

Complete Circuit Breaker ① without Rating Plug and Wiring Terminals		Seltronic Trip Unit Only ②
65 KA@ 415 Vac	100 KA@ 415 Vac	
RW320TW	RWC320TW	RS32000T
RW320TAW	RWC320TAW	RS32000TA
RW320TGW ③ ④	RWC320TGW ③ ④	RS32000TG
RW320TAGW ③ ④	RWC320TAGW ③ ④	RS32000TAG
RW320TGRW ③ ④ ⑤	RWC320TGRW ③ ④ ⑤	RS32000TG
RW320TAGRW ③ ④ ⑤	RWC320TAGRW ③ ④ ⑤	RS32000TAG

Table 5-5. Types RD and RDC Circuit Breaker Catalog Numbers, 4-Pole, 600 Vac, 1600 Amps and 2000 Amps

1600 Amp Complete Circuit Breaker ① without Rating Plug and Terminals	2000 Amp Complete Circuit Breaker ① without Rating Plug and Terminals
RD416TW ⑥	RD420TW ⑥
RD416TAW ⑥	RD420TAW ⑥
RD416TEW ⑦	RD420TEW ⑦
RD416TAEW ⑦	RD420TAEW ⑦
RDC416TW ⑥	RDC420TW ⑥
RDC416TAW ⑥	RDC420TAW ⑥
RDC416TEW ⑦	RDC420TEW ⑦
RDC416TAEW ⑦	RDC420TAEW ⑦

Table 5-6. Types RW and RWC Circuit Breaker Catalog Numbers, 4-Pole, 690 Vac, 1600 Amps and 2000 Amps

1600 Amp Complete Circuit Breaker ① without Rating Plug and Terminals	2000 Amp Complete Circuit Breaker ① without Rating Plug and Terminals
RW416TW ⑥	RW420TW ⑥
RW416TAW ⑥	RW420TAW ⑥
RW416TEW ⑦	RW420TEW ⑦
RW416TAEW ⑦	RW420TAEW ⑦
RWC416TW ⑥	RWC420TW ⑥
RWC416TAW ⑥	RWC420TAW ⑥
RWC416TEW ⑦	RWC420TEW ⑦
RWC416TAEW ⑦	RWC420TAEW ⑦

Table 5-7. Type RS Seltronic Interchangeable Rating Plugs for 3- and 4-Pole 1600 and 2000 Amp Trip Units ⑨

Trip Unit Maximum Continuous Ampere Rating at 40 C	Rating Plug Ampere Rating	Rating Plug Catalog Number
1600	800	16RS08T
	1000	16RS10T
	1200	16RS12T
	1250 ⑧	16RS125T ⑧
	1400	16RS14T
	1500	16RS15T
	1600	16RS16T
	800/1000/1200/1600	A16RS16T1
	800/1000/1250/1600 ⑧	A16RS16T2 ⑧
2000	1000	20RS10T
	1200	20RS12T
	1250 ⑧	20RS125T ⑧
	1400	20RS14T
	1600	20RS16T
	2000	20RS20T
	1000/1200/1600/2000	A20RS20T1
	1000/1250/1600/2000 ⑧	A20RS20T2 ⑧

① Consists of circuit breaker frame and Seltronic™ trip unit.
② Seltronic™ trip unit may be ordered separately for field installation if identical to currently installed trip unit. If desired replacement trip unit is different from installed trip unit, refer to section 1, paragraph 1-2 and contact Westinghouse before ordering. Refer to Table 3-1 for trip unit model identification.
③ Frame equipped with auxiliary current sensors for ground fault application.
④ Supplied with neutral sensor Catalog No. NS16RD (1600A sensor) or NS20RD (2000A sensor) for use with ground fault protection function. Shipped in carton with circuit breaker.
⑤ Frame equipped with Power Relay Module to provide contact closure for remote ground fault indication.
⑥ Unprotected 4th pole.
⑦ Protected 4th pole.
⑧ For use with Type RW and RWC circuit breakers only.
⑨ Rating plug is packaged and shipped separately from circuit breaker.
⑩ Quantity of 6 B2016RDL rear connectors included in carton with breaker.

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

Table 5-8. Types RD and CRD Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 1600 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	65 KA@ 480 Vac		
500	RD316T51W	CRD316T51W	T51BLI
	RD316T52W	CRD316T52W	T52BLSI
	RD316T53W	CRD316T53W	T53BLS
	RD316T54W③⑤⑥	CRD316T54W③⑤⑥	T54BLIG
	RD316T55W③⑤⑥	CRD316T55W③⑤⑥	T55BLSG
	RD316T56W③⑤⑥	CRD316T56W③⑤⑥	T56BLSIG
600	RD316T61W④	CRD316T61W④	T61BLI
	RD316T62W④	CRD316T62W④	T62BLSI
	RD316T63W④	CRD316T63W④	T63BLS
	RD316T64W④⑤⑥	CRD316T64W④⑤⑥	T64BLIG
	RD316T65W④⑤⑥	CRD316T65W④⑤⑥	T65BLSG
	RD316T66W④⑤⑥	CRD316T66W④⑤⑥	T66BLSIG

Table 5-9. Types RDC and CRDC Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 1600 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	100 KA@ 480 Vac		
500	RDC316T51W	CRDC316T51W	T51BLI
	RDC316T52W	CRDC316T52W	T52BLSI
	RDC316T53W	CRDC316T53W	T53BLS
	RDC316T54W③⑤⑥	CRDC316T54W③⑤⑥	T54BLIG
	RDC316T55W③⑤⑥	CRDC316T55W③⑤⑥	T55BLSG
	RDC316T56W③⑤⑥	CRDC316T56W③⑤⑥	T56BLSIG
600	RDC316T61W④	CRDC316T61W④	T61BLI
	RDC316T62W④	CRDC316T62W④	T62BLSI
	RDC316T63W④	CRDC316T63W④	T63BLS
	RDC316T64W④⑤⑥	CRDC316T64W④⑤⑥	T64BLIG
	RDC316T65W④⑤⑥	CRDC316T65W④⑤⑥	T65BLSG
	RDC316T66W④⑤⑥	CRDC316T66W④⑤⑥	T66BLSIG

Table 5-10. Types RD and CRD Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	65 KA@ 480 Vac		
500	RD320T51W	CRD320T51W	T51BLI
	RD320T52W	CRD320T52W	T52BLSI
	RD320T53W	CRD320T53W	T53BLS
	RD320T54W③⑤⑥	CRD320T54W③⑤⑥	T54BLIG
	RD320T55W③⑤⑥	CRD320T55W③⑤⑥	T55BLSG
	RD320T56W③⑤⑥	CRD320T56W③⑤⑥	T56BLSIG
600	RD320T61W④	CRD320T61W④	T61BLI
	RD320T62W④	CRD320T62W④	T62BLSI
	RD320T63W④	CRD320T63W④	T63BLS
	RD320T64W④⑤⑥	CRD320T64W④⑤⑥	T64BLIG
	RD320T65W④⑤⑥	CRD320T65W④⑤⑥	T65BLSG
	RD320T66W④⑤⑥	CRD320T66W④⑤⑥	T66BLSIG

Table 5-11. Types RDC and CRDC Circuit Breakers with Digitrip RMS Catalog Numbers, 3-Pole, 600 Vac, 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	Standard Rated Circuit Breaker Frame	100% Rated Circuit Breaker Frame	
	100 KA@ 480 Vac		
500	RDC320T51W	CRDC320T51W	T51BLI
	RDC320T52W	CRDC320T52W	T52BLSI
	RDC320T53W	CRDC320T53W	T53BLS
	RDC320T54W③⑤⑥	CRDC320T54W③⑤⑤	T54BLIG
	RDC320T55W③⑤⑥	CRDC320T55W③⑤⑥	T55BLSG
	RDC320T56W③⑤⑥	CRDC320T56W③⑤⑥	T56BLSIG
600	RDC320T61W④	CRDC320T61W④	T61BLI
	RDC320T62W④	CRDC320T62W④	T62BLSI
	RDC320T63W④	CRDC320T63W④	T63BLS
	RDC320T64W④⑤⑥	CRDC320T64W④⑤⑥	T64BLIG
	RDC320T65W④⑤⑥	CRDC320T65W④⑤⑥	T65BLSG
	RDC320T66W④⑤⑥	CRDC320T66W④⑤⑥	T66BLSIG

Table 5-12. Type RW Circuit Breaker with Digitrip RMS Catalog Numbers, 3-Pole, 690 Vac, 1600 Amps and 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	1600 Amps	2000 Amps	
	65 KA@ 415 Vac		
500	RW316T51W	RW320T51W	T51BLI
	RW316T52W	RW320T52W	T52BLSI
	RW316T53W	RW320T53W	T53BLS
	RW316T54W③⑤⑥	RW320T54W③⑤⑥	T54BLIG
	RW316T55W③⑤⑥	RW320T55W③⑤⑥	T55BLSG
	RW316T56W③⑥⑥	RW320T56W③⑤⑥	T56BLSIG
600	RW316T61W④	RW320T61W④	T61BLI
	RW316T62W④	RW320T62W④	T62BLSI
	RW316T63W④	RW320T63W④	T63BLS
	RW316T64W④⑤⑥	RW320T64W④⑤⑥	T64BLIG
	RW316T65W④⑤⑥	RW320T65W④⑤⑥	T65BLSG
	RW316T66W④⑤⑤	RW320T66W④⑤⑤	T66BLSIG

Table 5-13. Type RWC Circuit Breaker with Digitrip RMS Catalog Numbers, 3-Pole, 690 Vac, 1600 Amps and 2000 Amps

Digitrip RMS Model	Complete Circuit Breaker① without Rating Plug and Terminals		Digitrip RMS Trip Unit Only②
	1600 Amps	2000 Amps	
	100 KA@ 415 Vac		
500	RWC316T51W	RWC320T51W	T51BLI
	RWC316T52W	RWC320T52W	T52BLSI
	RWC316T53W	RWC320T53W	T53BLS
	RWC316T54W③⑤⑥	RWC320T54W③⑤⑥	T54BLIG
	RWC316T55W③⑤⑥	RWC320T55W③⑤⑥	T55BLSG
	RWC316T56W③⑤⑥	RWC320T56W③⑤⑥	T56BLSIG
600	RWC316T61W④	RWC320T61W④	T61BLI
	RWC316T62W④	RWC320T62W④	T62BLSI
	RWC316T63W④	RWC320T63W④	T63BLS
	RWC316T64W④⑤⑥	RWC320T64W④⑤⑥	T64BLIG
	RWC316T65W④⑤⑥	RWC320T65W④⑤⑥	T65BLSG
	RWC316T66W④⑤⑥	RWC320T66W④⑤⑥	T66BLSIG

Table 5-14. Type Digitrip RMS Interchangeable Rating Plugs for 3-Pole Trip Units●

Trip Unit Maximum Continuous Ampere Rating @ 40°C	Fixed Rating Plug Ampere Rating	Frequency (Hz)	Rating Plug Catalog Number
1600	800	60	PD6R16A080
	1000		PD6R16A100
	1200		PD6R16A120
	1600		PD6R16A160
	800	50	PD5R16A080
	1000		PD5R16A100
	1250		PD5R16A125
	1600		PD5R16A160
2000	1000	60	PD6R20A100
	1200		PD6R20A120
	1600		PD6R20A160
	2000		PD6R20A200
	1000	50	PD5R20A100
	1250		PD5R20A125
	1600		PD5R20A160
	2000		PD5R20A200

① Consists of circuit breaker frame and Digitrip RMS trip unit.
② Digitrip RMS trip unit may be ordered separately for field installation if identical to currently installed trip unit. If desired replacement trip unit is different from installed trip unit refer to Section 1, Paragraph 1-2 and contact Westinghouse before ordering. Refer to Table 3-3 for trip unit model identification.
③ Frame equipped with power relay module with Automatic Trip Relay (ATR) contacts for remote ground fault indication.
④ Frame equipped with power relay module with ATR contacts for remote phase and/or ground fault indication.
⑤ Frame equipped with auxiliary current sensors for ground fault application.
⑥ Supplied with neutral sensor Catalog No. NS16RD (1600A sensor) or NS20RD (2000A sensor) for use with ground fault protection function. Neutral sensor is shipped in carton with circuit breaker.
⑦ Rating plug shipped installed in circuit breaker Digitrip RMS trip unit.

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

5-6. Accessories

Accessory catalog numbers are identified in Tables 5-3 through 5-9. All mounting hardware is supplied unless otherwise noted.

Termination Accessories

Line and Load Terminals

R-frame circuit breakers have Cu/Al terminals as standard and Cu only terminals as an option. Specify if factory installation is required.

Table 5-15. Line and Load Terminal Catalog Numbers

	Catalog Number	Max Breaker Amps	Terminal Body Material	Wire Type	Hardware	AWG/MCM Wire Range/No Conductors	Metric Wire Range mm^2	Torque Values lb-in (N m)	
								Wire Lug	Mtg Hdwe
Wire Terminals	TA1600RD	1600	Aluminum	Cu/Al	English	500-1000 (4)	300-500	550 (62)	480 (54)
	TA1600RDM	1600	Aluminum	Cu/Al	Metric	500-1000 (4)	300-500	375 (42)	480 (54)
	T1600RD	1600	Copper	Cu	English	1-600 (4)	50-300	550 (62)	480 (54)
	T1600RDM	1600	Copper	Cu	Metric	1-600 (4)	50-300	375 (42)	480 (54)
Rear Connectors	B2016RD	2000	Copper		English				360 (41)
	B2016RDL⑩	2000	Copper		English				360 (41)
	B2016RDM	2000	Copper		Metric				360 (41)

Note: TA1600RDM, T1600RDM and B2016RDM are for use on Type RW and RWC circuit breakers only.

⑩ For use with 100% rated 1600A and 2000A frame. **Do not order separately unless for replacement purposes.** Is included in breaker carton when 100% rated device is ordered.

Internal Accessories

All internal accessories are installed in an accessory panel and mounted in the right-hand pole of the circuit breaker only.

Table 5-16. Alarm (Signal)/Lockout Switch

Number of Contacts (Make & Break)	Connection Type (Factory Installed)	Field Installation Kits①
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Numbers②③	Catalog Numbers●③
1	A1L6RA	A1L6RPK
2	A2L6RA	A2L6RPK

① Listed with Underwriters Laboratories, Inc. for field installation under E64983.
② A maximum of three ASL plug-in modules may be installed in a circuit breaker
③ Refer to Figure 4-2 of Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-17. Auxiliary Switch

Number of Contacts (a & b)	Connection Type (Factory Installed)	Field Installation Kits④
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number⑤⑥	Catalog Number⑤⑥
2	A2X6RA	A2X6RPK
4	A4X6RA	A4X6RPK

④ Listed with Underwriters Laboratories, Inc. for field installation under E64983.
⑤ A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker.
⑥ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-18. Shunt Trip

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific Ac or Dc voltages within the voltage range shown. Specific application ratings are shown in Table 4-3. Performance data is shown applicable circuit breaker accessory nameplate.

Voltage Rating (Ac Freq = 50/60 Hz)	Connection Type (Factory Installed)	Field Installation Kits●
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number⑥⑨	Catalog Number⑥⑨
24 Vac or 24 Vdc	SNT6RA03	SNT6P03K
48-60 Vac	SNT6RA05	SNT6P05K
110-127 Vac	SNT6RA08	SNT6P08K
208-240 Vac	SNT6RA11	SNT6P11K
380-440 Vac or 220-250 Vdc	SNT6RA14	SNT6P14K
480-600 Vac	SNT6RA18	SNT6P18K
48-60 Vdc	SNT6RA23	SNT6P23K
110-125 Vdc	SNT6RA26	SNT6P26K

⑦ Listed with Underwriters Laboratories, Inc. for field installation under E64983.
⑧ A maximum of three shunt trip plug-in modules may be installed in a circuit breaker.
⑨ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-19. Low Energy Shunt Trip (LEST)

Specific application information is contained in Section 4.

Connection Type (Factory Installed)	Field Installation Kit
18-inch Pigtail Leads	Pigtail Leads
Catalog Number	Catalog Number
LST6RA	LST6RPK

Series C Molded Case Circuit Breakers, R-Frame
Section 5 – Selection and Ordering Information

Table 5-20. Undervoltage Release Mechanism (Handle Activated Reset)

Select handle reset undervoltage release mechanism catalog number for the voltage within the indicated voltage range. Undervoltage release mechanism coils are designed to be applied at specific Ac or Dc voltages within the voltage range shown. Specific application ratings are shown in Tables 4-4 and 4-5. Performance data is shown on applicable circuit breaker accessory nameplates.

Voltage Rating (Ac Freq = 50/60 Hz)	Connection Type (Factory Installed)	Field Installation Kits①
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number②●	Catalog Number②●
9 Vac	UVH6RA01	UVH6RP01K
12 Vac	UVH6RA02	UVH6RP02K
24 Vac	UVH6RA03	UVH6RP03K
48-60 Vac	UVH6RA05	UVH6RP05K
110-127 Vac	UVH6RA08	UVH6RP08K
208-240 Vac	UVH6RA11	UVH6RP11K
380-500 Vac	UVH6RA29	UVH6RP29K
12 Vdc	UVH6RA20	UVH6RP20K
24 Vdc	UVH6RA21	UVH6RP21K
48-60 Vdc	UVH6RA23	UVH6RP23K
110-125 Vdc	UVH6RA26	UVH6RP26K
220-250 Vdc	UVH6RA28	UVH6RP28K

① Listed with Underwriters Laboratories, Inc. for field installation under E64983.
② A maximum of two UVR plug-in modules may be installed in a circuit breaker.
● Refer to Section 4-6 to ensure space is available for the combination of accessories required.

External Accessories

Table 5-21. Fixed Mounted Circuit Breaker Terminal Block●

Catalog Number

TBRD	Factory Installed
TBRDK	Field Mounting Kit

④ One 24 point accessory terminal block provided with circuit breaker when ordered factory installed or shipped from warehouse as separate item when ordered for field installation. See RS Seltronic master connection diagram (IL 29C708) and Digitrip RMS master connection diagram (IL 29C709).

Table 5-22. Key Interlock Mounting Kit⑤

Key interlock mounting kits are for field installation only. Select mounting kit catalog numbers to match type of lock used. Key interlocks are supplied by customer.

Lock Manufacturer	Lock Type	Bolt Projection in Withdrawn Position	Kit Cat. No.
Superior	B-4003-1	1 inch	KYK6
Kirk	F	1 inch	KYK6
Federal Pioneer	VK	1 inch	KYK6
Square D	SF	1 inch	KYK6
Castell	K or QK	1 inch	CTK6

⑤ Listed with Underwriters Laboratories, Inc. for field installation under E64983.

Table 5-23. Electrical (Motor) Operator

Operating Voltage	Frequency	Catalog Numbers Terminal Blocks	
		Factory Installed	Field Installation Kits
120	50/60 Hz	EOP6T08	EOP6T08K
240	50/60 Hz	EOP6T11	EOP6T11K
48	Dc	EOP6T21	EOP6T21K

RD Drawout Cassette
(For 65 KA/480 Vac version only)

Movable Mechanism
Catalog Number: RD20DOM

Stationary Mechanism
Catalog Numbers: RD20DOS (without shutters)
RD20DOSS (with shutters)

Note: Movable mechanism is ordered with RD circuit breaker and is shipped mounted to circuit breaker frame. Stationary mechanism is ordered separately from W34.

Padlockable Handle Lock Hasp

Lock on/off – Catalog Number: HLK6

Lock off (only) – Catalog Number: HLK6OFF

Note: The padlockable handle lock hasps are factory installed only.

Slide Plate Handle Mechanism

Style Numbers: 505C294G03 (w/o provisions for Kirk key)
505C294G04 (with provisions for Kirk key)

Miscellaneous Accessories

Seltronic™ Portable Test Kit
Catalog Number: STK 2

For verification of performance of Seltronic™ trip units.

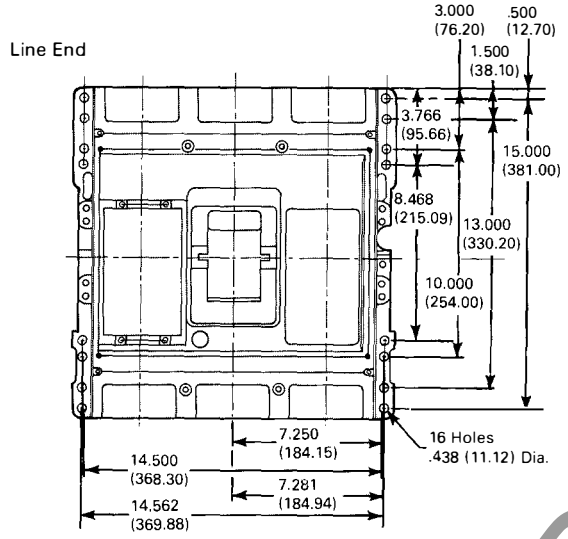
Molded Handle Extension
Catalog Number: HEX6
Style number: 315C882G01 Included in shipping carton with every R-frame circuit breaker.

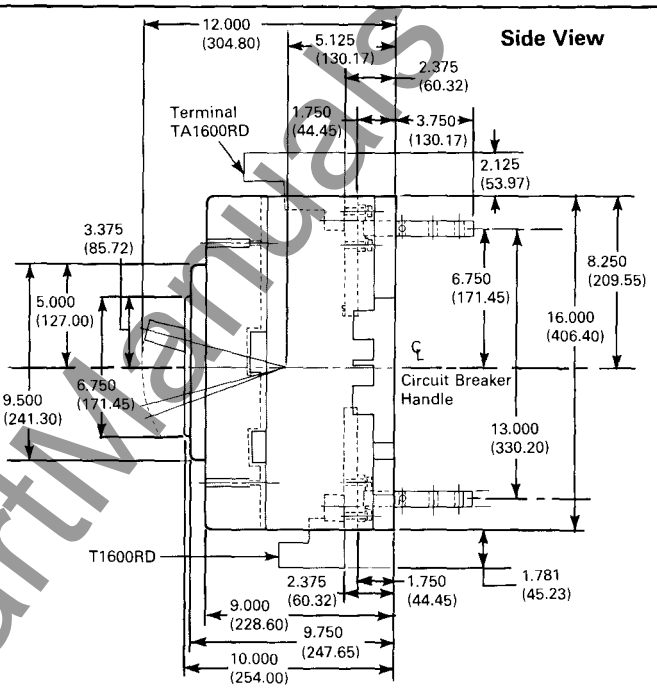
ORDERING INFORMATION

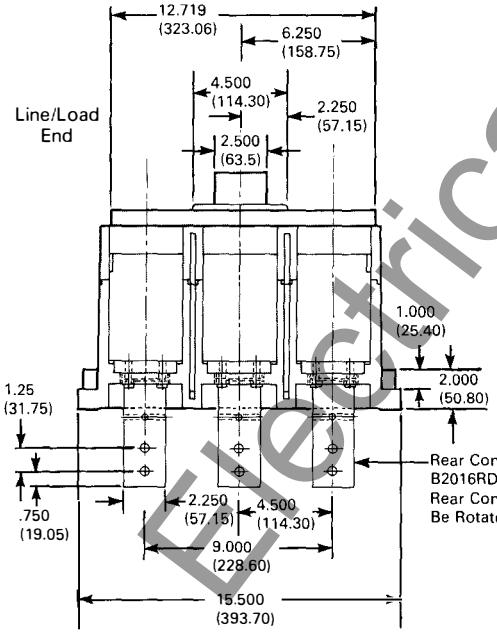
Series C Molded Case Circuit Breakers, R-Frame
Section 6 – Dimensional Data

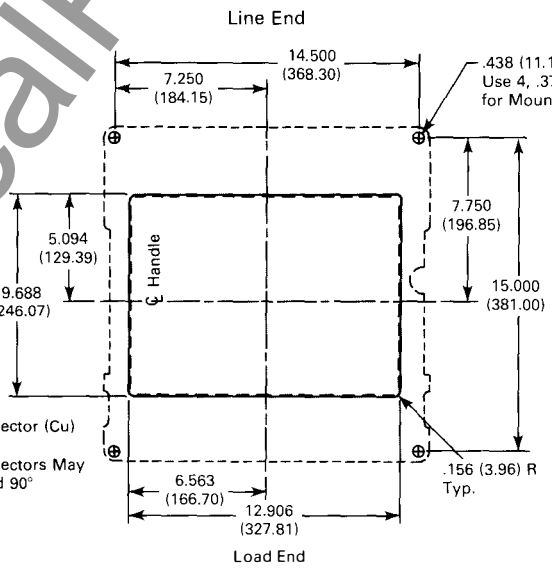
Dimensions in Inches and (Millimeters)
Not to be used for construction purposes unless approved.

Three Pole Circuit Breaker (1600A and 2000A)

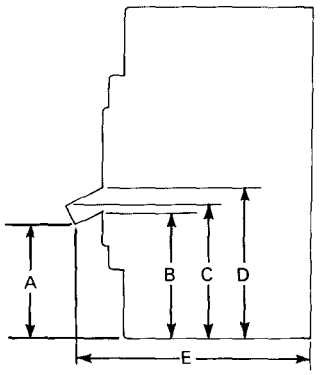








Front Cover Cutout and Drilling Plan



Circuit Breaker Handle Travel Distances and Handle Forces (See Table Below)

	A	B	C	D	E	Handle① Force
ON	9.08 (230.63)	8.55 (217.17)	9.77 (248.16)	9.57 (243.08)	11.86 (301.24)	192 Pounds (87.10 Kilograms)
TRIPPED	7.29 (185.17)	7.26 (184.40)	8.23 (209.04)	8.25 (209.55)	12.00 (304.80)	—
OFF	5.53 (140.46)	5.94 (150.88)	6.70 (170.18)	6.96 (176.78)	11.62 (295.15)	144 Pounds (65.33 Kilograms)
RESET	4.98 (126.49)	5.46 (138.68)	6.18 (156.97)	6.50 (165.10)	11.40 (289.56)	102 Pounds (46.27 Kilograms)

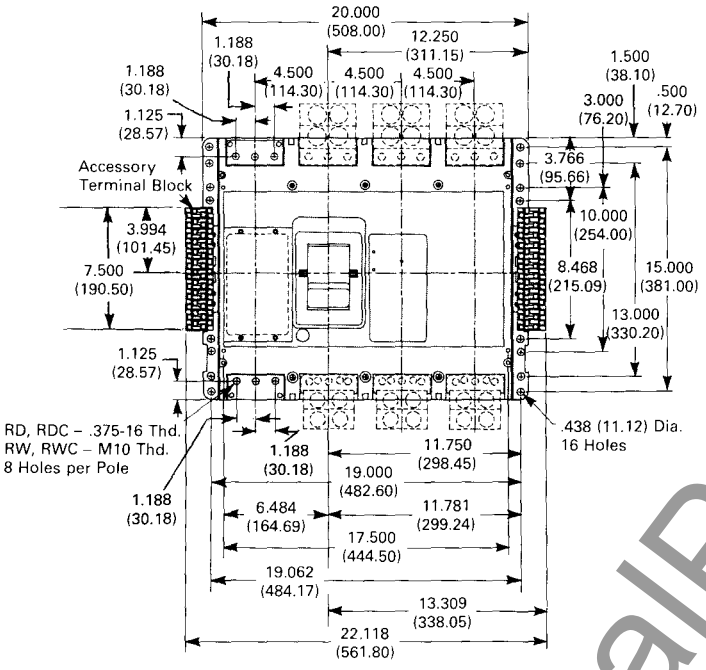
① All handle forces measured approximately 0.250 (6.34) from top of handle.

Series C Molded Case Circuit Breakers, R-Frame
Section 6 – Dimensional Data

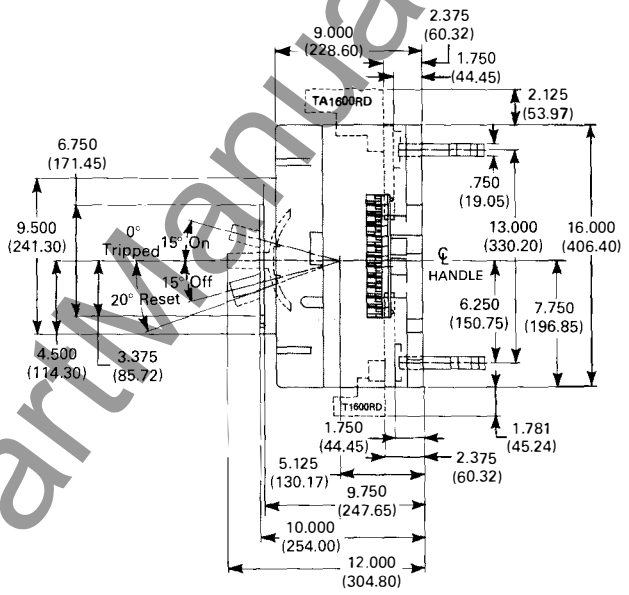
Dimensions in Inches and (Millimeters)
Not to be used for construction purposes unless approved.

Four Pole Circuit Breaker (1600A and 2000A)

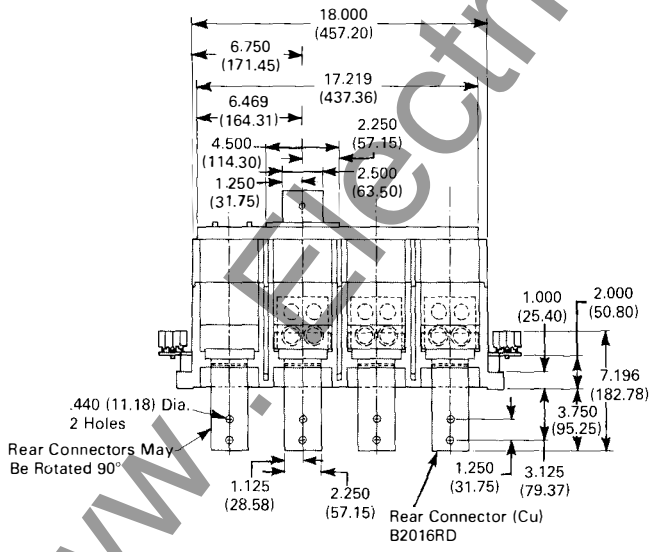
Line End



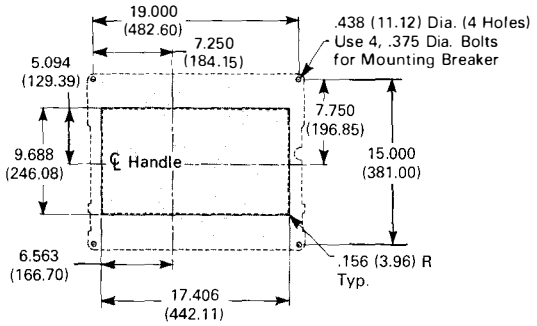
Side View



Line/Load End



Line End



Load End

Front Cover Cutout and Drilling Plan

Series C Molded Case Circuit Breakers, R-Frame
Section 6 – Dimensional Data

R-Frame Circuit Breaker Weights①

3-pole	RD316TW or RD316TAW:	102.10lb (46.35 Kg)
	RS Trip Unit:	0.79lb (0.36 Kg)②
	Rating Plug:	0.05lb (0.02 Kg)

Terminal Weights (Individually Packed)

Cat. Numbers	Cu	Al
TA1600RD T1600RD	5.44lb (2.47 Kg)	2.98lb (1.35 Kg)

Rear Connector Weight

Cat. Number		
B2016RD	Cu	3.35lb (1.52 Kg)

Example:	RD316TW	102.10lb (46.35 Kg)
	Packaging	20.00lb (9.07 Kg)
	Total	122.10lb (55.43 Kg)

① When an R-frame circuit breaker with RS trip unit, rating plug and terminals is ordered from warehouse stock, the rating plug and terminals are not installed and are packaged separately.

② To be used when trip unit is ordered and shipped separately from the factory.

Series C Molded Case Circuit Breakers, R-Frame
Appendix A – Guide Specifications

Typical Specifications For Series C Molded Case Circuit Breakers

Electrical circuits shall be protected by Series C Molded Case Circuit Breakers as manufactured by Westinghouse Electric Corporation.

Each pole of the 2- and 3-pole circuit breakers shall provide complete circuit overcurrent protection by having inverse time and instantaneous tripping characteristics and, where applicable, be current limiting.

The circuit breakers shall be operated by a toggle type handle and shall have an independent a quick-make, quick-break, over- center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits shall be clearly indicated by the position of the handle. The ON and OFF positions shall be clearly marked on the cover of the circuit breaker along with the international symbols I for ON and 0 for OFF on the handle providing positive indication of the circuit breaker contact position. Additionally, a color-coded indication of the circuit breaker contact position shall be provided: red for ON, green for OFF, and white for tripped. An easily accessible Push-to-Trip button for mechanically exercising the trip unit shall be provided on the cover of each circuit breaker. All poles of a multi-pole circuit breaker shall be so constructed as to ensure simultaneous open, close, and trip operations.

Circuit breakers shall be completely enclosed in a high strength glass-polyester case.

Non-interchangeable trip circuit breakers shall be factory sealed; interchangeable trip circuit breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible from the front of the circuit breaker. Contacts shall be non-welding silver alloy. Arc extinction must be accomplished by means of DE-ION® arc chutes, consisting of metal grids mounted in an insulating support.

The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit current at the line terminals. Where applicable, circuit breakers shall be UL listed for series tested application.

Circuit breakers in 150A and 250A frame sizes shall be equipped with thermal-magnetic trip units. Circuit breakers in 400A, 600A, and 630A frame sizes shall be designed to accept either thermal-magnetic or electronic interchangeable trip units. Circuit breakers in 800A, 1200A, 1250A, 1600A and 2000A frame sizes shall be equipped with electronic trip units. The electronic trip units shall be insensitive to changes in ambient temperature within the normal operating temperature range of the circuit breaker.

Circuit breakers shall be listed with Underwriters Laboratories, Inc. under standard UL489, CSA standard C22.2 No. 5.1, conform to the applicable requirements of NEMA Standards Publication AB1- 1986, meet the appropriate classifications of Federal Specifications W-C-375b, and/or comply with the requirements of International Electrotechnical Commission Standard IEC 947-2, or IEC 157-1.

Circuit breaker ratings and modifications shall be indicated on the drawings.

Molded case circuit breakers shall be of the inverse time and instantaneous trip type as provided by thermal-magnetic or electronic trip elements with either standard interrupting, high interrupting, or current limiting characteristics as shown in Section 1 of this frame book. These circuit breakers shall be listed per UL489.

Molded case circuit interrupters (motor circuit protectors) shall be of the instantaneous (magnetic) only type, providing instantaneous short circuit protection by means of a front-adjustable trip unit. Instantaneous-only circuit interrupters shall be component recognized per UL489.

Molded case switches shall be of the same construction as the related listed circuit breaker and equipped with a factory sealed, nonadjustable, high instantaneous-only short circuit protection.

Molded case switches shall have no overload or low-level fault protection provided and shall be marked with a maximum withstand rating denoting the type and level of upstream overcurrent protection required. Molded case switches shall be listed per UL1087.

Internally mounted accessories including alarm (signal)/lockout switches, auxiliary switches, shunt trips, and undervoltage release mechanisms shall be of the plug-in type and shall be listed for field installation in circuit breakers which are not factory sealed.

Electrical operators for circuit breakers of the 400A frame size and below shall be of the solenoid type with maximum 5-cycle closing characteristics. Electrical operators for circuit breaker frame sizes 600A through 2000A shall be of the motor driven type. All electical operators shall be cover mounted. All electrical operators shall be listed for field installation per UL489.

Electrical characteristics of accessories shall be as indicated on the drawings.

Circuit breakers in the 150A frame size shall be supplied in 1-, 2-, 3-, and 4-pole models, as specified on the drawings. Circuit breakers in frame sizes 250A through 1200A shall be supplied in 2-, 3-, or 4-pole models, while the 1600A and 2000A circuit breakers are available in 3- and 4-pole models, as specified on the drawings.

Accessory wiring shall be brought out through the side or rear of the circuit breaker, or be connected to a terminal block mounted on the side of the circuit breaker, as specified. The ability to route accessory wiring to the opposite side of the circuit breaker through a trough in the base shall be provided.

Note: For 1600 and 2000 ampere frames, accessory wiring is available on right side only. No wiring trough is provided.

Circuit breakers shall be provided with uniformly designed nameplates to clearly indicate the type, rating, listing/recognition/ certification marks, accessory details, and other information defined in UL489.

All terminals shall comply with UL486A and B and CSA C22.2 No. 65M. Torque markings shall be provided per UL489.

Series C Molded Case Circuit Breakers, R-Frame
Appendix A – Guide Specifications

Available Literature:

Instruction Leaflet No.	**Product**
29-851	Digitrip 500
29-852	Digitrip 600
29-853	Digitrip 700
29-854	Digitrip 800
29C107A	RD Frame
29C125	Aux. Switch
29C150B	Shunt Trip
29C151	Low Energy Shunt Trip
29C178A	UVR
29C185	Bell Alarm
29C205A	Motor Operator
29C239	Kirk Key Interlock
29C240	Padlockable Handle Lock Hasp
29C312	Terminal Block
29C613A	RS Trip
29C707	Digitrip RMS in RD
29C708A	RS Seltronic Master Connection Diagram
29C709	Digitrip RMS Master Connection Diagram
Drawing No.	**Product**
372D690	Slide Plate Handle Mechansim
Application Data	**Product**
29-167D	Time/Current Curves for RS Seltronic Trip Units
29-167J	Time Current Curves For Digitrip RMS Trip Units

Series C Molded Case Circuit Breakers, R-Frame

Series C Molded Case Circuit Breakers, R-Frame

Series C Molded Case Circuit Breakers, R-Frame

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Type RD 800-1600 Amperes

SERIES C™

R-Frame Molded Case Circuit Breakers

Table of Contents

Section 1
Introduction

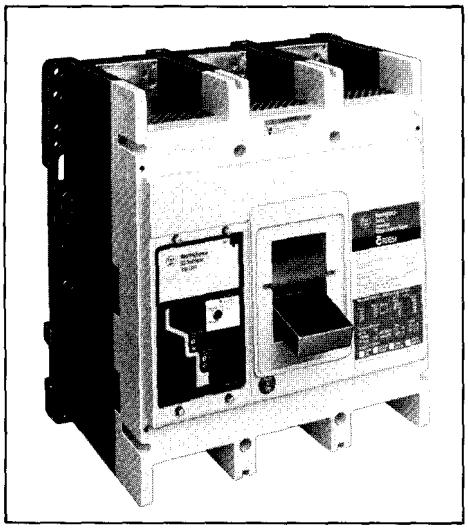

Figure 1-1. R-Frame Series C Circuit Breaker with RS Seltronic™ Trip Unit

1-1. General Information

R-Frame Circuit Breaker
The R-frame Series C circuit breaker with interchangeable solid state trip units (Figure 1-1) is available in the RD model. In many applications, the R-frame circuit breaker is designed to physically and electrically replace the SPB Systems Pow-R circuit breaker family.

An innovative design of internal components allows applications to be extended to higher interrupting rating levels. In addition, the higher interrupting performance capabilities of the R-frame circuit breaker allow it to be applied in distribution systems requiring high performance capabilities. Each circuit breaker nameplate is color coded to provide easy identification of type and interrupting capacity rating.

The IEC symbols identified in Table 1-1 are defined below:

U_e - Rated Operational Voltage
I_{cu} - Rated Ultimate Short-Circuit Breaking Capacity
I_{cs} - Rated Service Short-Circuit Breaking Capacity
I_{cw} - Rated Short-Time Withstand Current
U_{imp} - Rated Impulse Withstand Voltage
Utilization Category A - Circuit breakers without an intentional short-time delay provided for selectivity.
Utilization Category B - Circuit breakers with an intentional short-time delay provided for selectivity.

The R-frame circuit breaker is available in a 3-pole configuration to satisfy application requirements in most types of electrical distribution systems. A modular accessory concept permits wide flexibility in accessory installation. This frame book provides basic information about the R-frame circuit breaker, its trip units, and accessories.

1-2. R-Frame Circuit Breaker Types

R-Frame circuit breakers will be available in several types. However, the Type RD (rated from 800A to 1600A) is the only type currently available and is listed in accordance with Underwriters Laboratories, Inc. Standard UL489 and certified under Canadian Standards Association Standard C22.2 No. 5.① Type RD complies with International Electrotechnical Commission Recommendations IEC 947-2.

① Some listings pending; refer to Westinghouse.

Each circuit breaker rating is achieved by specific design features incorporated into the circuit breaker frame and the type of trip unit selected. R-frame Seltronic trip units (RS31600T and RS31600TA) are interchangeable and do not affect the circuit breaker interrupting rating.

Electronic Trip Units
R-frame circuit breakers are available with the standard Type RS Seltronic analog trip unit. For the trip unit description and operation, refer to Section 3.

1-3. Features

The Series C circuit breaker line represents an entirely new approach to circuit breaker design. The R-frame circuit breaker (Figure 1-2) uses new design features that improve performance and extend application capabilities.

a. Performance
The R-frame circuit breaker provides high interrupting capacities and improved operating characteristics compared to previous circuit breakers of similar physical size. The enhanced performance characteristics extend R-frame circuit breaker use to applications that previously required physically larger circuit breakers.

b. Designs
Available RS Seltronic™ trip unit functions are described in Table 3-1 of Section 3.

Table 1-1. R-Frame Circuit Breaker Interrupting Capacity Ratings

UL489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (RMS Symmetrical Amperes) Volts ac (50/60 Hz)		
		240	480	600
RD	3	125,000	65,000	50,000

IEC 947-2 Interrupting Capacity Rating②

Circuit Breaker Type	Number of Poles	Interrupting Capacity (RMS Symmetrical Amperes) Volts ac (50/60 Hz)			
		220/240	380/415	440	500
RD	3	125,000	65,000	65,000	50,000

Circuit Breaker Type	Number of Poles	Interrupting Capacity (RMS Symmetrical Amperes)			
			U_e③ (Volts ac 50/60 Hz)		
			380	415	500
RD	3	I_{cu}③	85,000	65,000	42,000
		I_{cs}③	43,000	33,000	21,000
		I_{cw}③	20,000	20,000	20,000

② Interrupting ratings are subject to final test verification.
③ For definition of IEC symbols, refer to Section 1-1 (General Information)

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Type RD 800-1600 Amperes

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R-Frame Molded Case Circuit Breakers

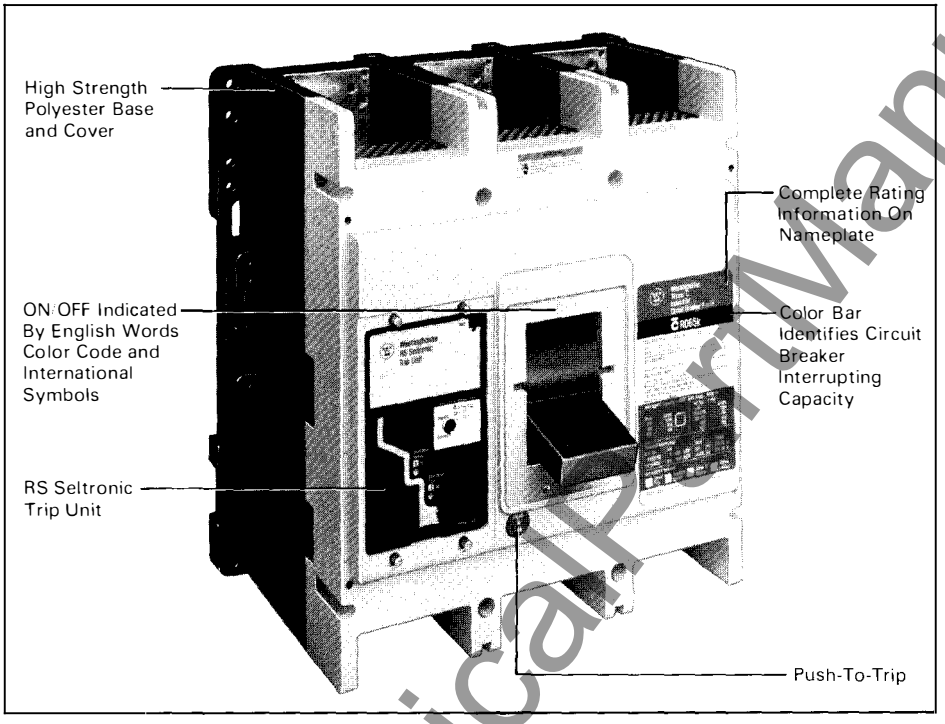

Figure 1-2. R-Frame Circuit Breaker Features

c. Construction Details
The 3-pole configuration satisfies application requirements for most types of electrical distribution systems.

The compact frame size allows a high degree of space savings compared to previous circuit breakers designs.

A Push-to-Trip button provides a local means of manually exercising the trip mechanism.

High strength glass-polyester base and cover have excellent dielectric qualities and are inherently fungus proof.

The over-toggle operating mechanism design provides increased air gap between stationary and moving contacts when circuit breaker is in tripped position. The increased air gap provides greater arc impedance during contact opening, which allows higher interrupting capacity ratings to be obtained in compact frame sizes.

The crossbar assembly has high dielectric qualities and ensures simultaneous operation of all moving contacts.

The positive-ON operating mechanism ensures that the operating handle indicates the ON position when the contacts are closed.

d. Internal Accessories
Modular plug-in accessory design simplifies factory installation for improved customer service and facilitates field installation where desired.

The internally mounted accessories include auxiliary switch, alarm (signal)/lockout switch, shunt trip, and undervoltage release mechanism. All of the internal accessories are mounted in an accessory mounting deck installed in the right pole. The standard accessory wiring configuration provides for pigtail leads exiting the right side of the frame (between cover and base) next to the accessory mounting deck. An optional configuration provides for a terminal block to be mounted to the base on the right side of the circuit breaker.

e. External Accessories
Cover design permits field installation of a key interlock without modifying the cover.

f. Markings
The Series C circuit breaker line features a new nameplate format which provides easy identification of circuit breaker type, rating, and operating status.

Nameplates are color coded for immediate rating identification. A color-coded bar identifies the type and the interrupting rating (kA) at the most common application voltage. The color code for the type RD circuit breakers is black.

Consolidated nameplate design provides complete identification and rating information in an easily readable and understandable format.

Circuit breaker status is clearly indicated by circuit breaker handle position and color-coded flags (red for ON, green for OFF, and white for trip). The on and off positions are identified in English words (ON and OFF) and international symbols (I and 0).

g. Equipment Literature
A complete line of technical literature provides specification, ordering, application, and instructional information. This makes the circuit breaker easy to specify, purchase, and apply, saving time and minimizing application errors.

Dimensional data is in Imperial and metric units to satisfy user requirements.

h. Standards Compliance

- Australian Standard AS 2184, Moulded Case Circuit Breakers
- British Standards Institution Standard BS 4752: Part 1, Switchgear and Control Gear, Part 1: Circuit Breakers
- Canadian Standards Association Standard C22.2 No. 5, Service Entrance and Branch Circuit Breakers

- International Electrotechnical Commission Recommendations IEC 157-1 (P1 and P2), Low-Voltage Distribution Switchgear, Part 1: Circuit Breakers
- Japanese Industrial Specification 8370, Molded Case Circuit Breakers
- National Electrical Manufacturers Association Standards Publication No. AB1 - 1986. Molded Case Circuit Breakers.
- South African Bureau of Standards Standard SABS 156, Standard Specification for Moulded Case Circuit Breakers
- Swiss Electro-Technical Association Standard SEV 157-1, Safety Regulations for Circuit Breakers
- Underwriters Laboratories, Inc. Standard UL489, Molded Case Circuit Breakers and Circuit Breaker Enclosures, Including Marine Circuit Breakers
- Union Technique de l'Electricite Standard NF C 63-120, Low Voltage Switchgear and Control Gear Circuit Breaker Requirements
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, Low Voltage Switch Gear and Control Gear, Circuit Breakers.

Compliance with these standards satisfies most local and international codes, assuring user acceptability and simplifying application.

i. Federal Specification Classifications
Circuit breaker type RD equal or exceed W-C-375b requirements for class 24(a).

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R-Frame Molded Case Circuit Breakers

Section 2 Applications

2-1. Introduction

Application flexibility of the R-frame circuit breaker is enhanced by the higher interrupting ratings designed into the Series C line (Figure 2-1).

2-2. Switchboard Application

The RD circuit breakers are used in distribution systems to provide main and feeder circuit protection. Circuit breakers are currently available for fixed mounting only.

2-3. Individual Enclosure Application

The R-frame circuit breaker can be applied in individual enclosures to meet specific installation requirements.

2-4. Special Applications

In mining and other applications, special versions of the R-frame circuit breaker provide safe equipment control and protection. For additional information, see separate frame books or refer to Westinghouse.

For all 3-phase Delta, grounded B-phase applications, reduced interrupting ratings will apply; refer to Westinghouse.

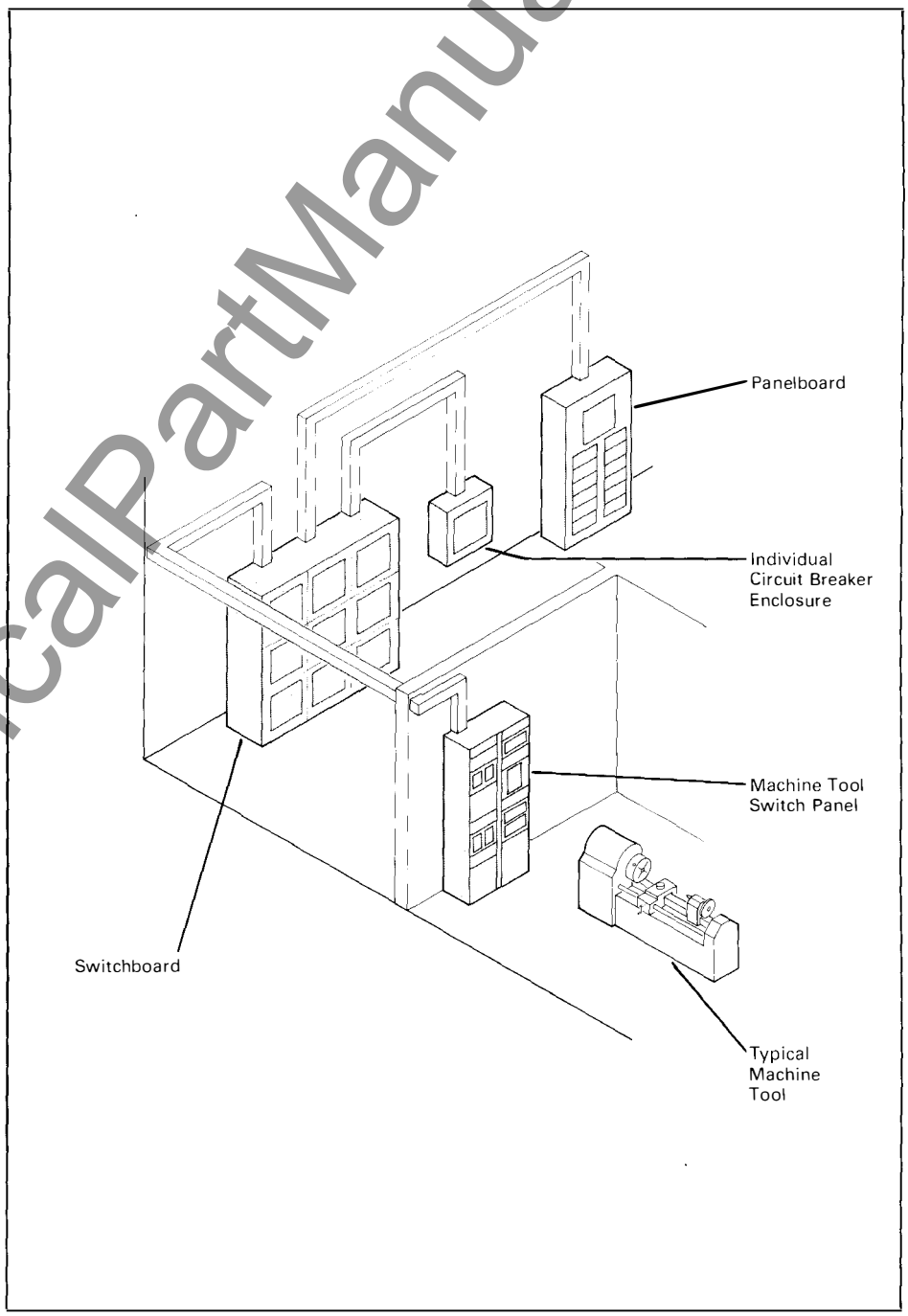

Figure 2-1. R-Frame Circuit Breaker Typical Applications

Section 3
Description

3-1. Physical Description

The R-frame circuit breaker consists of the following components mounted inside a molded glass-polyester case (Figure 3-1):

Operating mechanism

Arc extinguishers

Stationary contact assemblies

Moving contact assemblies

Trip unit.

3-2. Functional Description

The R-frame circuit breaker disconnects a load from an electrical supply when (1) the handle is operated, (2) an overcurrent or short circuit condition develops, (3) a manual trip is initiated locally with the Push- to-Trip button, or (4) an automatic trip is initiated remotely by a shunt trip or an undervoltage release mechanism on loss of monitored voltage. Circuit breaker operation is provided by a spring-loaded independent over-toggle operating mechanism that provides quick-make and quick-break, trip free operation.

In open air at 40°C, the circuit breaker will carry continuously a current equal to the ampere rating of the installed rating plug without exceeding a 50°C rise at the terminals. For ambient conditions above 40°C, derating of the circuit breaker frame should be considered to avoid exceeding a safe terminal temperature operating range. Consult Westinghouse for recommendations. For ambient temperatures below -5°C, special lubrication may be required for proper mechanical operation of the circuit breaker.

3-3. Component Description

The following paragraphs give the physical and functional descriptions of the circuit breaker components.

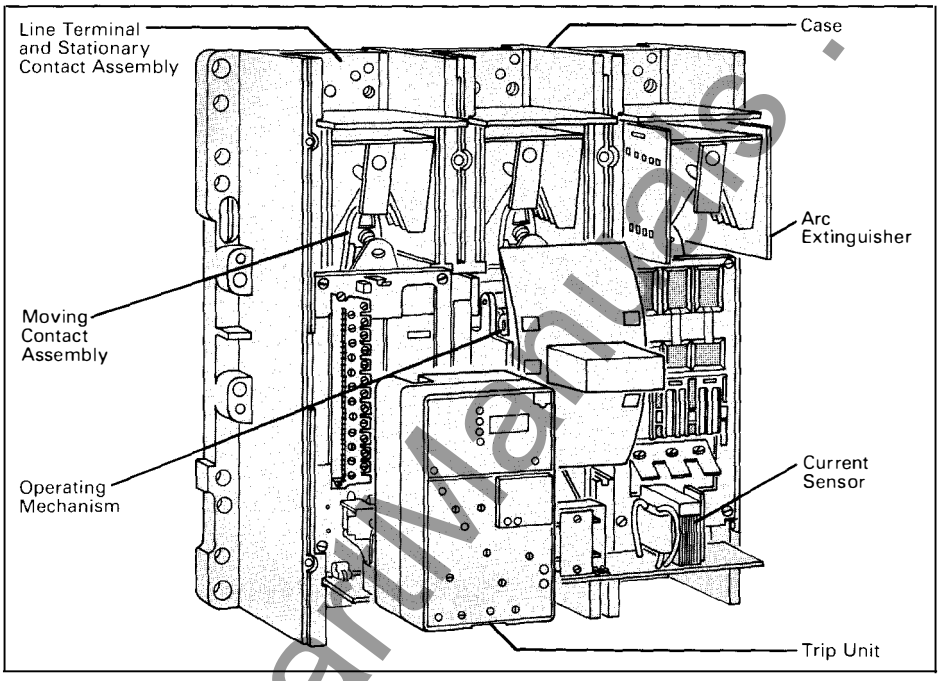

Figure 3-1. R-Frame Circuit Breaker Components

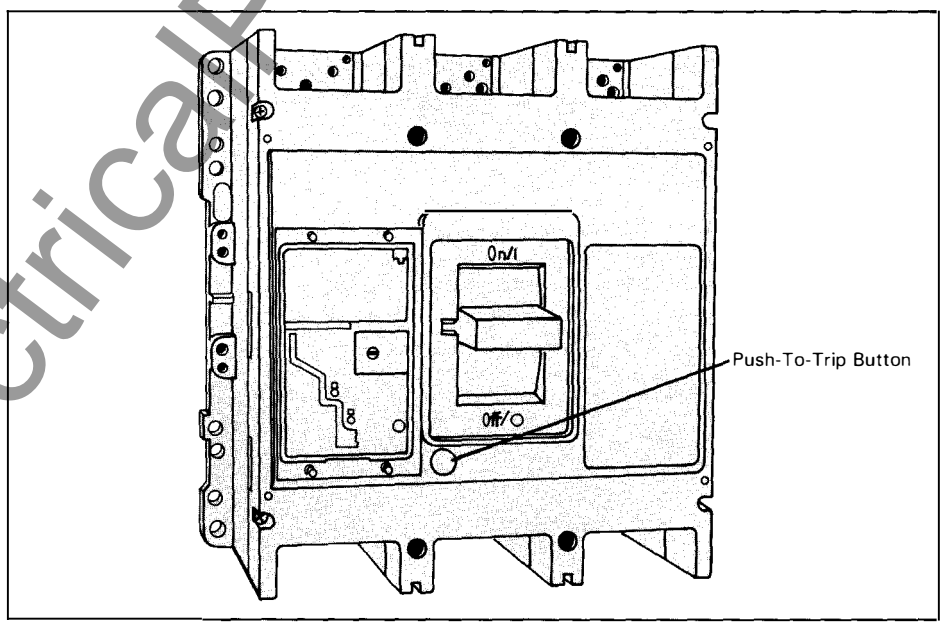

Figure 3-2. Molded Case

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Molded Case
The molded case (Figure 3-2) is a housing for electrically insulating the circuit breaker components and internal accessories. The case consists of a glass-polyester base and cover. The internal case molding forms cavities that isolate terminal areas, individual arc chambers, the operating mechanism, and internal accessories. Barriers isolate the operating mechanism from the accessory mounting cavity. Slots in the cover provide ventilation for the arc chambers.

Operating Mechanism
The operating mechanism provides a means of manually switching the moving contact position from open to closed and from closed to open. It also provides the mechanical means to open the contacts when trip conditions occur. The handle position indicates the contact status: closed, tripped, or open.

Manual Operation
Manual operation of the circuit breaker handle closes and opens the moving contact assembly. When the cradle is latched, the handle arm controls the crossbar rotation. When the handle arm is moved from one position to the other, the crossbar rotates and the moving contacts open or close. The link arrangement between the handle arm and the crossbar provides spring- loaded toggle operation.

3-4. Circuit Breaker Trip Operation

Arc Extinguishers
The arc extinguishers dissipate arcs that result when the circuit breaker interrupts current flow. Each arc extinguisher consists of a stack of uniformly spaced, U-shaped steel plates held together by two insulating side plates. When an interruption occurs and the contacts separate, the current flow through the ionized region between the contacts induces a magnetic field around the arc and arc extinguisher. The force drives the arc into the steel plates, deionizing the gas while dividing and cooling the arc.

Moving Contact Assembly
The moving contact assembly provides continuity between the line and load terminals when the circuit breaker is in the closed position. The crossbar and moving contact arm assembly rotates to close the contacts. After the contacts touch, the crossbar overtravels to provide a contact wiping action and create firm contact closure. A contact arm latch holds the moving contact arm in place. When the circuit breaker trips or is switched off, the moving contact assembly moves through the arc extinguisher away from the stationary contact.

Contact Blow-Apart
When current is flowing through the contacts of the R- frame circuit breaker, the positions of the line conductors and the moving contact arms with their flat coil-wound shunts induce opposing magnetic fields. During the tripping operation, under high fault conditions, the resulting opposing forces along the magnetic flux lines cause rapid contact blow-apart. The moving contacts pivot away rapidly from the stationary contacts.

Push-to-Trip Button
The Push-to-Trip button provides a manual means of tripping the circuit breaker. When the button is pressed, a plunger rotates the trip bar causing the circuit breaker to trip.

3-5. Trip Unit Description and Operation

General Description
All trip units are of the self-contained, factory-sealed, type using electronic sensing elements. All interrupting ratings of the R-frame family of circuit breakers will accept the analog type RS Seltronic™ trip unit which plugs into the trip unit mounting deck.
The Type RS Seltronic™ trip unit is available in two models with protection functions and settings as shown in Tables 3-1 and 3-2. The continuous ampere rating is determined by the value of the installed rating plug. The trip unit is insensitive to ambient temperatures over a range of -20° to +55°C.

Trip Unit Operation
The Type RS Seltronic™ trip unit (Figure 3-3) when installed, monitors current from current sensors mounted in the circuit breaker base. These current sensors are mounted internally on the circuit breaker main conductors. The current sensor secondary winding connections plug into the auxiliary current sensor printed circuit board (PCB). A plug-in connection is provided between the PCB and the terminal block on the trip unit deck. The trip unit plugs into the terminal blocks on the trip unit deck.

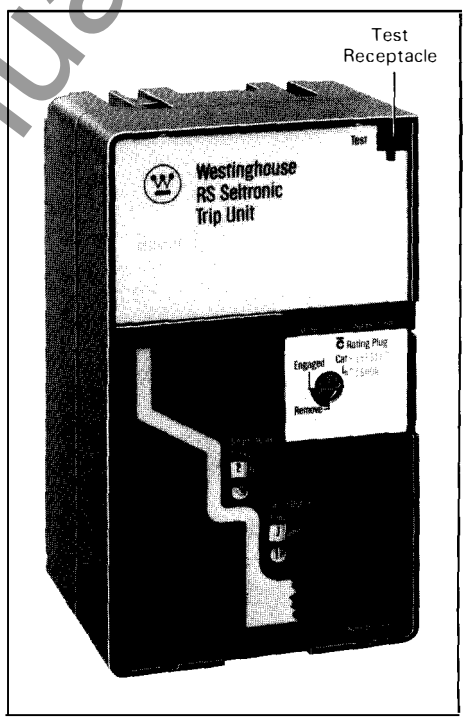

Figure 3-3. Type RS Seltronic™ Trip Unit

A field installed rating plug determines the continuous ampere rating of the trip unit. A mechanical interlock prevents latching and closing of the circuit breaker if the trip unit and rating plug are not installed. Under fault conditions, the trip unit will initiate a trip signal and energize the flux shunt trip. When the flux shunt trip operates, a plunger extends and rotates the trip bar. As the trip bar rotates, the latch releases and the circuit breaker trips.

3-6. Trip Unit Characteristics

Overload Trip
The trip unit initiates a trip of the circuit breaker within two hours for an overload of 135 percent, and in less time for higher overloads.

Type RS Seltronic™ Trip Unit Short Delay/ Instantaneous Trip
For short circuit conditions that exceed the short delay pick-up settings, the trip unit initiates a trip after a prescribed delay by the I^2t ramp function for a trip unit with catalog number suffix T. A flat response time delay

action is provided by a trip unit with catalog number suffix TA unless the instantaneous setting (I) is selected.

Field Testing
Test points (Figure 3-3) are for functional field testing of the trip unit when connected to the Seltronic test kit (Catalog number STK2).

DC Application
Type RS Seltronic™ trip unit is suitable for AC application only.

Time/Current Curves
Time/Current curves for Type RS Seltronic™ trip units are contained in Application Data 29-167D.

Table 3-1. Type RS Seltronic™ (Electronic) Trip Unit Models Protection Functions

Protection Functions		Trip Unit Catalog Number Suffix	
		T	TA
Long Time	Fixed Ampere Rating① with Fixed Long Delay	•	•
	Adjustable Ampere Setting with Fixed Long Delay②	•	•
Short Time	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp	•	
	Adjustable Short Time Delay③ with Adjustable Short Time Pick-up, or		•
	Adjustable Instantaneous Pick-up③		•
Instantaneous	Fixed Instantaneous (Overide)④	•	•

① See Table 5-2 for available fixed rating plugs.
② See Table 5-2 for available adjustable rating plugs.
③ Using trip unit with adjustable short time delay (TA), instantaneous pick-up is achieved when the lowest time delay setting (I) is selected.
④ Override setting fixed at frame withstand rating (20 kA).

Table 3-2. Type RS Seltronic™ (Electronic) Trip Unit Protection Function and Rating Settings

Protection Function	Rating/Setting Description
Ampere Rating Fixed at 100%	Rating plugs available - 800A, 1000A, 1200A, 1250A, 1400A, 1500A, 1600A (I_n)
Adjustable Ampere Rating	Two adjustable rating plugs available with four settings. 800A/1000A/1200A/1600A(I_n) and 800A/1000A/1250A/1600A (I_n)
Short Delay Pick-up (Adjustable)	In multiples of installed rating plug amperes(I_n) with marks at 2-3-4-5-6-7-8x
Short Delay Time (Fixed)	I^2t ramp configuration
Short Delay Time (Adjustable)	Flat response with time delay settings at 100ms, 200ms, and 300ms
Instantaneous Pick-up⑤	In multiples of installed rating plug amperes (I_n) with marks at 2-3-4-5-6-7-8x

⑤ Occurs with short delay time adjustment set at *I*

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Section 4 Accessories and Modifications

4-1. General Information

A complete line of accessories is available for use with Series C circuit breakers. Internally mounted accessories are plug-in types for use only with the Series C R-frame circuit breaker. The following paragraphs describe each accessory and provide operation, rating, and specification information.

4-2. Line and Load Terminals

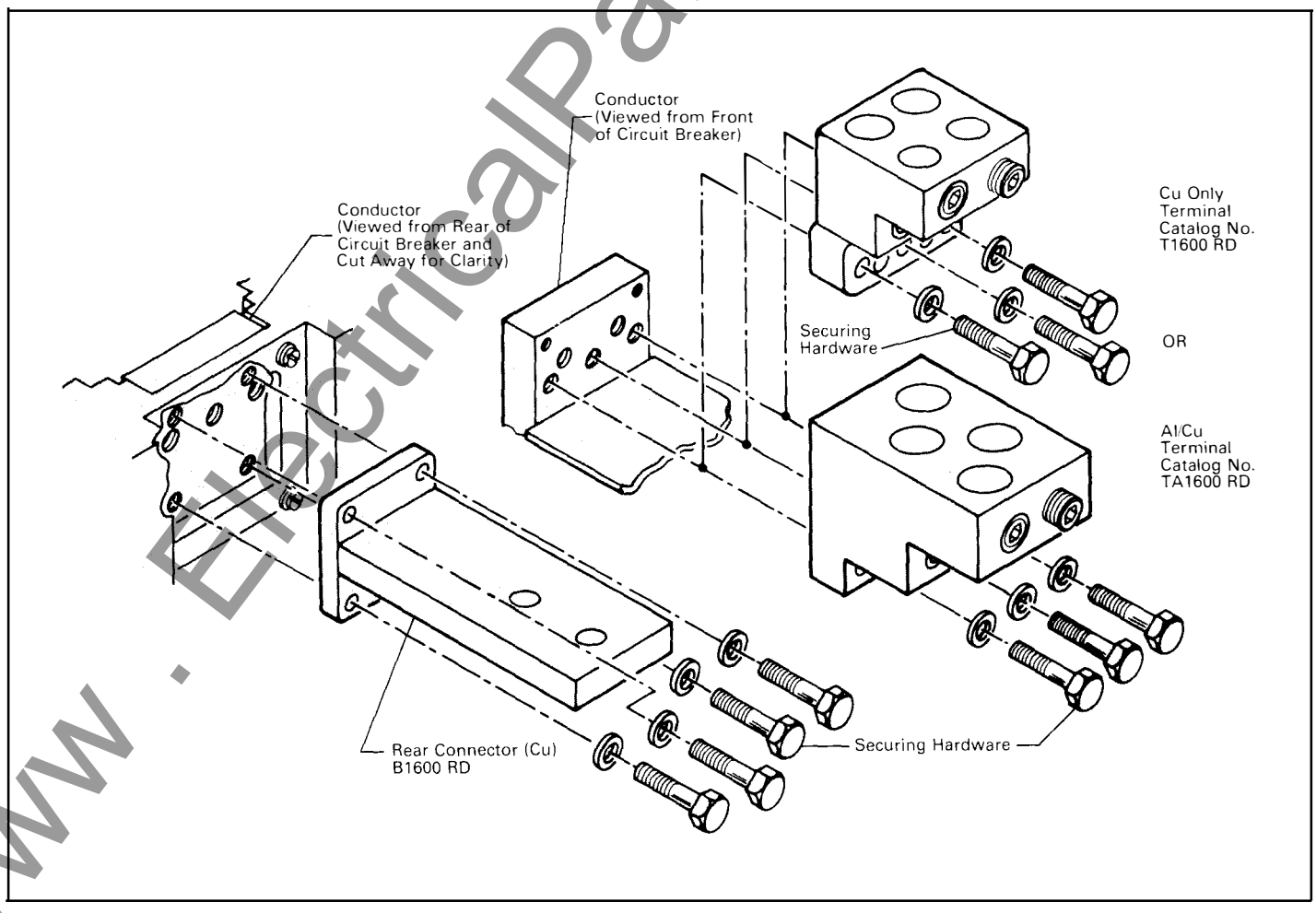
Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories, Inc. Standards UL486A and UL486B and CSA C22.2 No.65M. Unless otherwise specified, R-frame circuit breaker line and load terminals are shipped separately for field installation.

4-3. Internal Accessories

All internal accessories are of the plug-in type installed in an accessory deck mounted in the right-hand pole of the circuit breaker only. Internal accessories are listed for field installation under UL File E64983. The available plug-in internal accessories include the following:

- Alarm (Signal)/Lockout Switch
- Auxiliary Switch
- Shunt Trip
- Undervoltage Release Mechanism.

For external connections, 18 inch long pig-tail leads exit the right-side of the circuit breaker next to the accessory deck. An optional configuration includes a terminal block mounted on the right-side of the base. To identify allowable accessory installation combinations, see Figure 4-2.



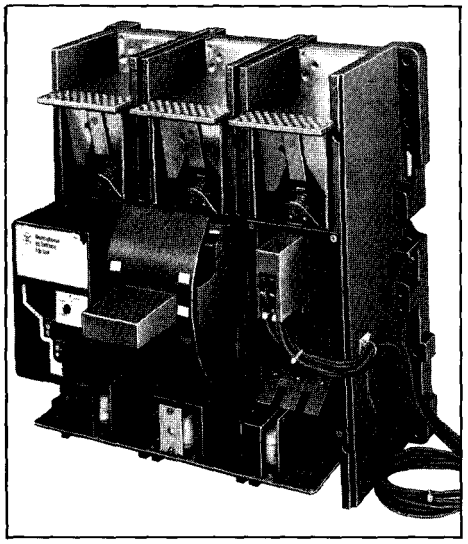
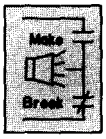
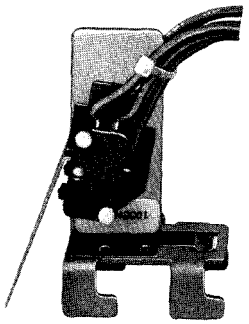


Figure 4-1. Typical Internal Plug-in Accessory Installed in R-frame Circuit Breaker

Alarm (Signal)/ Lockout Switch





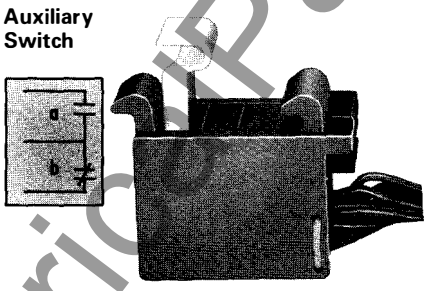
The alarm (signal)/lockout switch monitors circuit breaker trip status and provides remote signaling and interlocking capabilities when the circuit breaker trips. The alarm (signal)/lockout switch consists of one or two single pole double throw (SPDT) switches arranged in a plug-in module that mounts in retaining slots in the accessory panel. The SPDT switch contacts are identified as make and break contacts. When the circuit breaker trips, the make contact closes and the break contact opens. Table 4-1 provides electrical ratings data for the alarm (signal) /lockout switch.

Table 4-1. Alarm (Signal)/Lockout Switch Electrical Ratings Data ① ②

Maximum Voltage	Freq.	Maximum Current Amps
600	50/60 Hz	6.0
125	DC	0.5●
250	DC	0.25●

① Endurance - 500 electrical operations plus 2500 mechanical operations
② Pigtail wire size - No.18 AWG (0.82 mm²)
③ Noninductive load

Auxiliary Switch



The auxiliary switch provides circuit breaker contact status information by monitoring the position of the contact arm assembly. The auxiliary switch is used for remote signaling and interlocking purposes, and consists of two or four SPDT switches arranged in a plug-in module that mounts in retaining slots in the accessory deck. Each SPDT switch has one "a" and one "b" contact. When the circuit breaker contacts are open, the "a" contact is open and the "b" contact is closed. Table 4-2 provides electrical ratings data for the auxiliary switch.

Table 4-2. Auxiliary Switch Electrical Ratings Data ④ ⑤

Maximum Voltage	Freq.	Maximum Current Amps
600	50/60 Hz	6.0
125	DC	0.5⑥
250	DC	0.25⑥

④ Endurance - 500 electrical operations plus 2500 mechanical operations
⑤ Pigtail wire size - No.18 AWG (0.82 mm²)
⑥ Noninductive load

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Type RD 800-1600 Amperes

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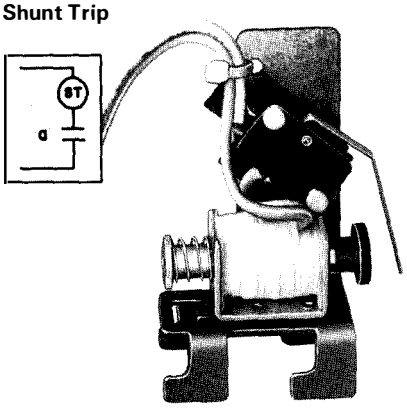
R-Frame Molded Case Circuit Breakers

Shunt Trip



The shunt trip provides remote tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch arranged in a plug-in module that mounts in retaining slots in the accessory panel. Table 4-3 also provides electrical ratings data for the shunt trip.

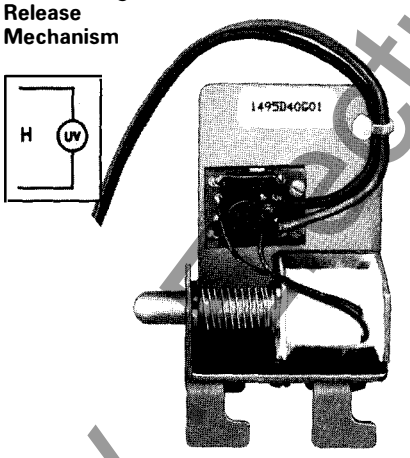
Table 4-3. Shunt Trip Electrical Rating Data

Electrical Operating Ratings ① ② ③ ●

Supply Voltage at 50/60 Hz	Minimum Operating Voltage	VA
120	43	120

① Approximate unlatching time — 6 milliseconds
● Approximate total circuit breaker contact opening time — 18 milliseconds
③ Endurance — 500 electrical operations plus 2500 mechanical operations
● Pigtail wire size - no. 18 AWG (0.82mm²)

Undervoltage Release Mechanism



The undervoltage release mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating. Table 4-4 provides electrical ratings data for each operating voltage of the handle actuated reset undervoltage release mechanism.

Note: Undervoltage release mechanism accessories are not designed as circuit interlocks and are not recommended for use as such.

Handle Actuated Reset The undervoltage release mechanism consists of a continuous rated solenoid with a plunger mounted in a plug-in module. The trip bar resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (OFF) position. With no voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

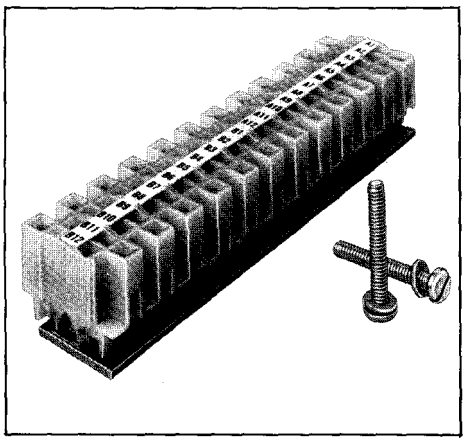
Table 4-4. Undervoltage Release Mechanism (Handle Actuated Reset) Electrical Rating Data

Electrical Operating Ratings ⑤ ⑤

Supply Voltage at 50/60 Hz	Dropout Voltage		Pickup Voltage Max.	VA
	Min.	Max.		
120	44.5	77	93.5	1.8

⑤ Endurance — 500 electrical operations plus 2500 mechanical operations
⑥ Pigtail wire size - no. 18 AWG (0.82mm²)

Accessory Terminal Block
(for fixed mounted configuration)



Internal accessory wiring leads are normally supplied with pigtail leads (No. 18 AWG) that exit from the right-side of the circuit breaker. Where specified, fixed mounted accessory terminal blocks are available. A maximum of one 24 point terminal block can be installed on the right-side of the circuit breaker for the internal accessories. Terminal block ordering information is given in Table 5-8.

For convenience in determining the appropriate number of terminal block points required, refer to Table 4-5.

Table 4-5. Number of Control Wires For Each Internally Mounted Accessories

Type of Accessory	Number of Contacts Per Single Accessory	Required Number of Wires
Auxiliary Switch	2a/2b 4a/4b	6 12
Alarm (Signal)/ Lockout Switch	1m/1b 2m/2b	6 12
Shunt Trip	N/A	2
Undervoltage Release Mechanism	N/A	2

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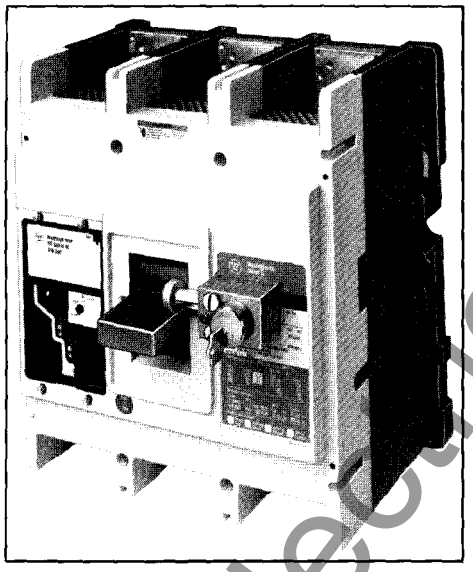
4-4. Lock and Interlock Accessories

Lock and interlock accessories are used to deter undesired circuit breaker operation and establish interlocked control systems. Lock and interlock accessories include:

- Key Interlock

To identify allowable accessory installation combinations, see paragraph 4-6.

Key Interlock



The key interlock is used to externally lock the circuit breaker handle in the OFF position. When the key interlock is locked, an extended deadbolt blocks movement of the circuit breaker handle. Uniquely coded keys are removable only with the deadbolt extended. Each coded key controls a group of circuit breakers for a given specific customer installation.

The key interlock assembly consists of a mounting kit and a purchaser supplied deadbolt lock. The mounting kit comprises a mounting plate, which is secured to the circuit breaker cover in the right-pole position; key interlock mounting screws; and, a wire seal. Specific mounting kits are required for individual key interlock types.

4-5. Miscellaneous Accessories

Seltronic™ Portable Test Kit

The Seltonic™ portable test kit provides verification of performance of all ratings of Seltronic™ trip units installed in Series C circuit breakers. The test kit operates on 120-Volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker.

- Seltronic™ Portable Test Kit (STK2)

4-6. Accessory Combinations

Different combinations of accessories can be supplied. Figure 4-2 shows the different accessories or combinations that can be used internally with R-frame circuit breakers. All internal accessories fit into an accessory mounting deck that is positioned in the right-hand pole in the circuit breaker. The key interlock external accessory is also positioned on the cover over the right-hand pole.

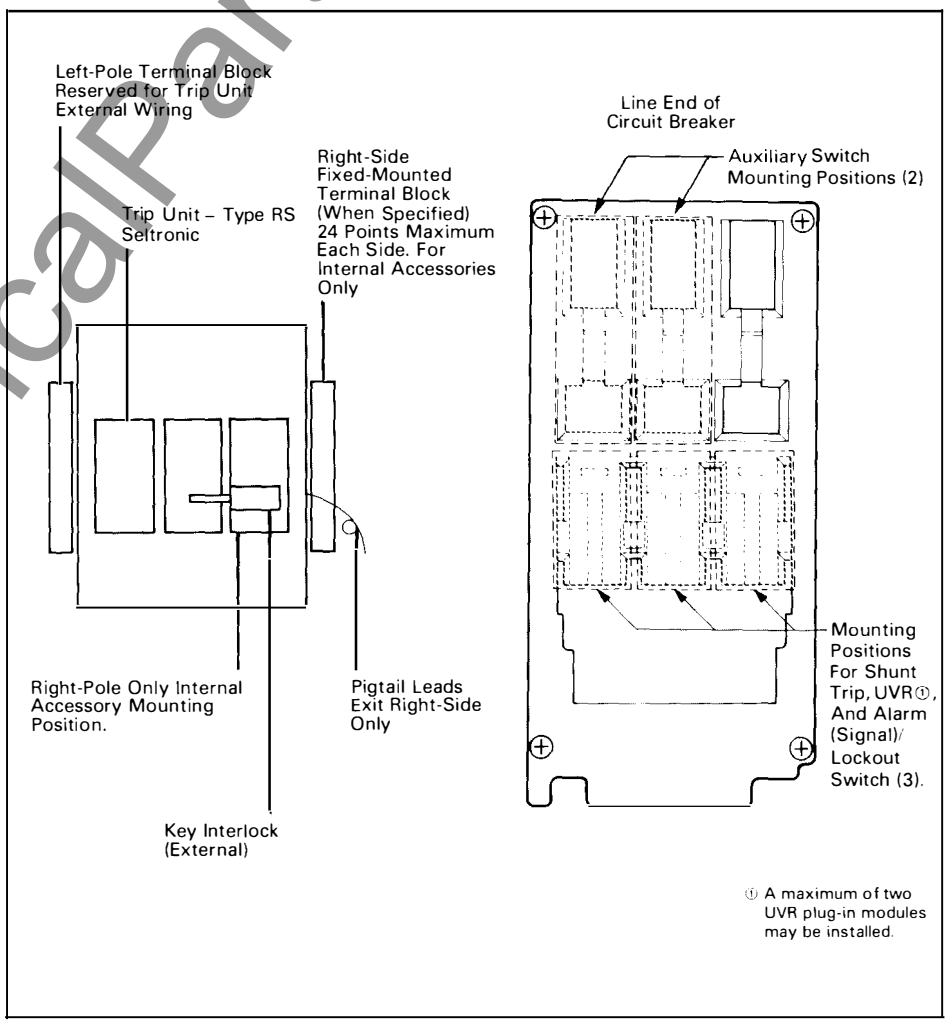


Figure 4-2. Accessory Mounting Locations

Section 5
Selection and Ordering Information

5-1. General Information

When ordering an R-frame circuit breaker use the catalog numbers given in Tables 5-1 through 5-9. Interrupting ratings can be found in Table 1-1. List any accessories or modifications required together with the applicable catalog number. REFER TO WESTINGHOUSE FOR AVAILABILITY OF ALL CIRCUIT BREAKERS, MOLDED CASE SWITCHES, ACCESSORIES, AND MODIFICATIONS.

List Prices: see Price List 29-020. Discount Symbol CB-2.

5-2. Ordering Instructions - Circuit Breakers

Circuit breakers will be shipped from the factory with trip units installed. Rating plugs will be shipped separately. Circuit breaker frame and catalog numbers are shown separately for ordering convenience only.

Order complete circuit breaker by specifying applicable frame with trip unit, rating plug, and accessories using the applicable catalog designations.

5-3. Ordering Instructions - Accessories

When ordering an accessory that is for installation by the customer, use the field installation kit catalog number.

5-4. Ordering Example

Customer Requirements
One UL listed molded case circuit breaker, 600 Vac per UL 489, as follows:

Item 1. 3-pole, 600V, 1600A, 60 Hz, with 65 kA interrupting capacity at 480 volts
Item 2. Electronic trip unit with adjustable short time pick-up and short time delay settings.
Item 3. One 2a/2b auxiliary switch with pigtail leads
Item 4. One shunt trip, 120 volts, 50/60 Hz with pigtail leads

Type RS Seltronic™ Trip Unit Catalog Numbers ①②

Example: RS31600T

RS	3	1600	T	
Trip Unit Type	Number of Poles	Maximum Rating Plug Ampere Rating	Suffix	
RS: Selectronic™	3	1600	T:	Adjustable Short Time Pick-up with Short Time Delay I^2t Ramp
			TA:	Adjustable Short Time Delay with Adjustable Short Time Pick-up or Adjustable Instantaneous Pick-up

① Rating plug for Seltronic™ trip units must be ordered separately. Refer to Table 5-2.
② RS Seltronic™ trip units are not warehouse items. Must be ordered from the factory.

Item 5. Load side terminals for (4) 600 mcm copper conductors per phase.
Item 6. Fixed mounted, suitable for reverse feed application.

Ordering Steps
1. Refer to Table 1-1, select RD circuit breaker (This covers item 1 above, in part.)
2. Refer to Table 3-1,select Type RS Seltronic™ trip unit with suffix TA (this covers item 2 above, in part.)
3. Refer to Table 5-1, select Catalog No. RD316TAW. (This covers items 1, 2, and 6 above.)

Notes:
(a) Type RD circuit breakers with interchangeable rating plugs are suitable for reverse feed applications.
(b) A suffix TA trip unit with flat response short delay settings was selected. Depending on customer preferences, a suffix T trip unit with I^2t ramp curve configuration might have been acceptable.

4. Refer to Table 5-2, select rating plug Catalog No. 16RS16T.

5. Refer to Table 5-3, select (3) wiring terminals, Catalog No. T1600RD.

6. Refer to Table 5-5, select auxiliary switch Catalog No. A2X6RA.

7. Refer to Table 5-6, select shunt trip Catalog No. SNT6RA08.

Notes:
(a) Since selected accessory catalog references were non-kit types, each accessory will be factory installed. This will result in a longer lead time. If accessories had been ordered as kits, for field installation, shipment from the warehouse would have meant a much reduced lead time.
(b) When internal accessories are ordered for field installation, accessory mounting arrangements can be verified by refering to Figure 4-2.

Order Entry

Enter order by specifying as follows:

Item 1. Quantity (1) circuit breaker Catalog No. RD316TAW complete with Catalog No. RS31600TA trip unit.
Item 2. Quantity (1) 1600A rating plug Catalog No. 16RS16T.
Item 3. Quantity (3) wiring terminals Catalog No. T1600RD.
Item 4. Quantity (1) auxiliary switch Catalog No. A2X6RA factory installed on Item 1.
Item 5. Quantity (1) shunt trip, 120V, 50/60 Hz., Catalog No. SNT6RA08 factory installed on Item 1.

Note:
The rating plug (Item 2) and wiring terminals (Item 3) will be packaged separately from the circuit breaker.

ORDERING INFORMATION

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5-5. Circuit Breakers

Circuit breaker catalog numbers are identified in Table 5-1. Type RS Seltronic™ rating plugs are identified in Table 5-2.

Table 5-1. Type RD, Circuit Breaker Catalog Numbers 3-Pole 600 Vac, 1600 Amps Maximum

Complete Circuit Breaker① Without Rating Plug and Wiring Terminals	Seltronic Trip Unit Only②
RD316TW RD316TAW	RS31600T RS31600TA

Table 5-2. Type RS Seltronic Interchangeable Rating Plugs For 3- Pole Trip Units

Trip Unit Maximum Continuous Ampere Rating at 40°C	Rating Plug Ampere Rating	Rating Plug Catalog Number
1600	800 1000 1200 1400 1500 1600 800/1000/1200/1600	16RS08T 16RS10T 16RS12T 16RS14T 16RS15T 16RS16T A16RS16T1

① Consists of circuit breaker frame and Seltronic™ trip unit.
② Seltronic™ trip unit may be ordered separately for field installation if identical to currently installed trip unit. If desired replacement trip unit is different from installed trip unit, contact Westinghouse before ordering. Refer to Table 3-1 for trip unit model identification.

5-6. Accessories

Accessory catalog numbers are identified in Tables 5-3 through 5-9. All mounting hardware is supplied unless otherwise noted.

Termination Accessories

Line and Load Terminals

R-frame circuit breakers have Cu/Al terminals as standard and Cu only terminals as an option. Specify if factory installation is required.

Table 5-3. Line and Load Terminal Catalog Numbers

Max Breaker Amps	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Metric Wire Range mm²	Catalog No.'s (Individually Packed)
Cu/Al Pressure Terminals					
1600	Aluminum	Cu/Al	500-1000(4)	300-500	TA1600RD
Optional Copper Pressure Type Terminals					
1600	Copper	Cu	1-600(4)	50-300	T1600RD
Rear Connector					
1600	Copper				B1600RD

Internal Accessories

All internal accessories are installed in an accessory panel and mounted in the right-hand pole of the circuit breaker only.

Table 5-4. Alarm (Signal)/Lockout Switch

Number of Contacts (Make & Break)	Connection Type	Field Installation Kits③
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Numbers●⑤	Catalog Numbers●⑤
1 2	A1L6RA A2L6RA	A1L6RPK A2L6RPK

③ Listed with Underwriters Laboratories, Inc. for field installation under E64983.
④ A maximum of three ASL plug-in modules may be installed in a circuit breaker.
⑤ Refer to Figure 4-2 of Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-5. Auxiliary Switch

Number of Contacts (a & b)	Connection Type	Field Installation Kits ①
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Numbers ②③	Catalog Numbers ②③
2 4	A2X6RA A4X6RA	A2X6RPK A4X6RPK

① Listed with Underwriters Laboratories, Inc. for field installation under E64983.
② A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker.
③ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-6. Shunt Trip

Specific application ratings are shown in Table **4-3**. Performance data is shown on applicable ciruit breaker accessory nameplates.

Vltg. Rating (ac Freq = 50/60 Hz)	Connection Type	Field Installation Kits ④
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Numbers ⑤⑥	Catalog Numbers ⑤⑥
120	SNT6RA08	SNT6P08K

④ Listed with Underwriters Laboratories, Inc. for field installation under E64983.
⑤ A maximum of three shunt trip plug-in modules may be installed in a circuit breaker.
⑥ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-7. Undervoltage Release Mechanism (Handle Acuated Reset)

Specific application ratings are shown in Table **4-4**. Performance data is shown on applicable circuit breaker accessory nameplates.

Voltage Rating (ac Freq = 50/60 Hz)	Connection Type	Field Installation Kits ⑦
	18-inch Pigtail Leads	Pigtail Leads
	Catalog Number ⑥⑧	Catalog Number ⑥⑧
120	UVH6RA08	UVH6RP08K

⑦ Listed with Underwriters Laboratories, Inc. for field installation under E64983.
⑨ A maximum of two UVR plug-in modules may be installed in a circuit breaker.
⑧ Refer to Section 4-6 to ensure space is available for the combination of accessories required.

Table 5-8. Fixed Mounted Circuit Breaker Terminal Block ⑩

Catalog Number

TBRD	Factory Installed
TBRDK	Field Mounting Kit

● One 24 point accessory terminal block provided with circuit breaker when ordered either factory installed or shipped from warehouse as separate item. Points on the accessory terminal block are dedicated to a type of accessory.

Lock and Interlock Accessories

Table 5-9. Key Interlock Mounting Kit⑪

Key interlock mounting kits are for field installation only. Select mounting kit catalog numbers to match type of lock used. Key interlocks are supplied by customer.

Lock Manufacturer	Lock Type	Bolt Projection in Withdrawn Position	Kit Cat. No.
Superior	B-4003-1	1 inch	KYK6
Kirk	F	1 inch	KYK6
Federal Pioneer	VK	1 inch	KYK6
Square D	SF	1 inch	KYK6
Castell	K or QK	1 inch	CTK6

⑪ Listed with Underwriters Laboratories, Inc. for field installation under E64983.

Miscellaneous Accessories

Seltronic™ Portable Test Kit
Catalog Number: STK 2

For verification of performance of Seltronic™ trip units.

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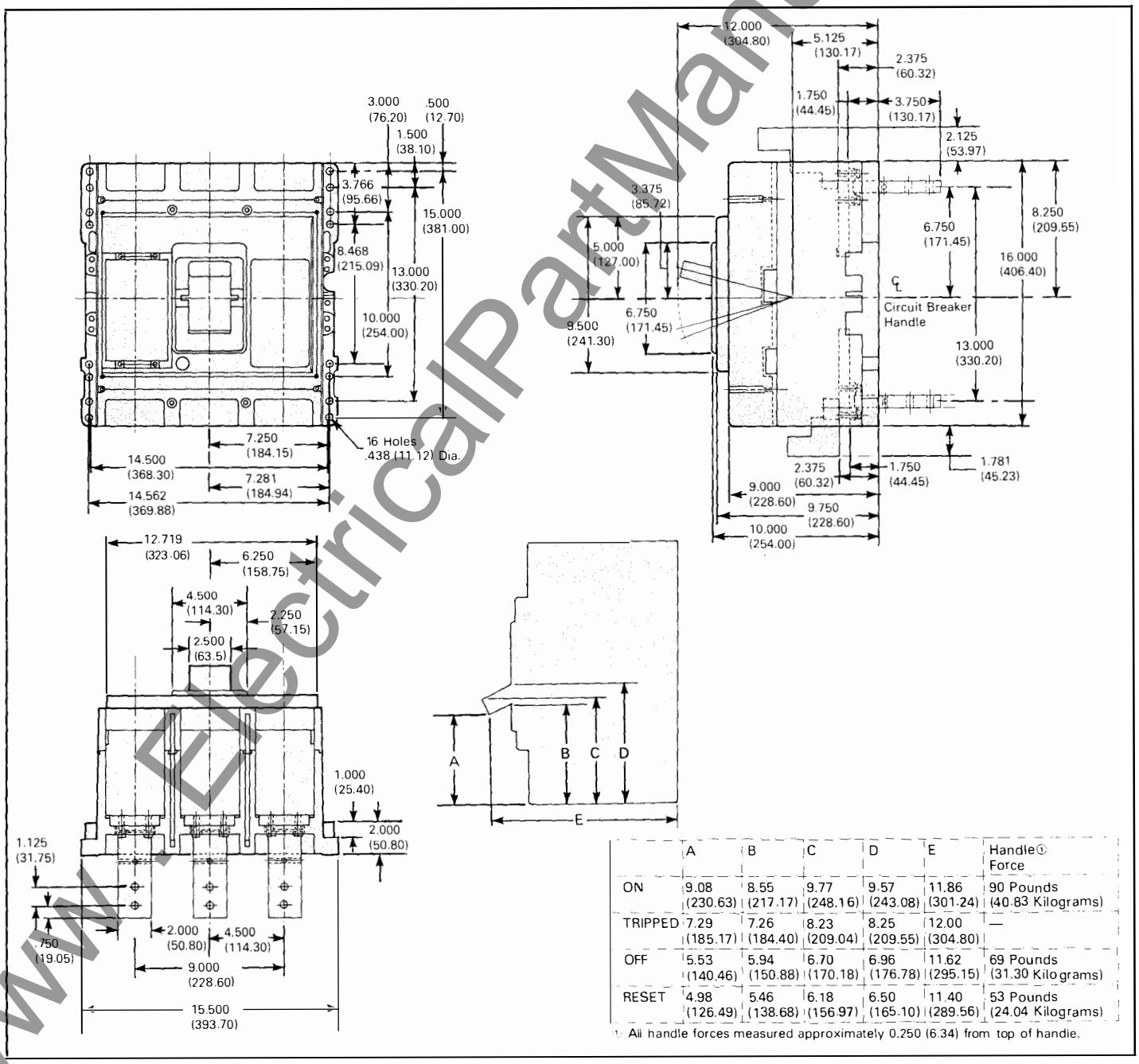
Section 6
Dimensional Data



	A	B	C	D	E	Handle① Force
ON	9.08 (230.63)	8.55 (217.17)	9.77 (248.16)	9.57 (243.08)	11.86 (301.24)	90 Pounds (40.83 Kilograms)
TRIPPED	7.29 (185.17)	7.26 (184.40)	8.23 (209.04)	8.25 (209.55)	12.00 (304.80)	—
OFF	5.53 (140.46)	5.94 (150.88)	6.70 (170.18)	6.96 (176.78)	11.62 (295.15)	69 Pounds (31.30 Kilograms)
RESET	4.98 (126.49)	5.46 (138.68)	6.18 (156.97)	6.50 (165.10)	11.40 (289.56)	53 Pounds (24.04 Kilograms)

① All handle forces measured approximately 0.250 (6.34) from top of handle.

R-Frame Circuit Breaker Weights①

3-pole	RD316TW or RD316TAW:	102.10lb (46.35 Kg)
	RS Trip Unit:	0.79lb (0.36 Kg)②
	Rating Plug:	0.05lb (0.02 Kg)

Terminal Weights (Individually Packed)

Cat. Numbers	Cu	Al
TA1600RD T1600RD	5.44lb (2.47 Kg)	2.98lb (1.35 Kg)

Rear Connector Weight

Cat. Number		
B1600RD	Cu	3.35lb (1.52 Kg)

Example:

RD316TW	102.10lb (46.35 Kg)
Packaging	20.00lb (9.07 Kg)
Total	122.10lb (55.43 Kg)

① When an R-frame circuit breaker with RS trip unit, rating plug and terminals is ordered from warehouse stock, the rating plug and terminals are not installed and are packaged separately.

② To be used when trip unit is ordered and shipped separately from the factory

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Appendix A Guide Specifications

Typical Specifications For Series C Molded Case Circuit Breakers

Electrical circuits shall be protected by Series C Molded Case Circuit Breakers as manufactured by Westinghouse Electric Corporation.

Each pole of the 2- and 3-pole circuit breakers shall provide complete circuit overcurrent protection by having inverse time and instantaneous tripping characteristics and, where applicable, be current limiting.

The circuit breakers shall be operated by a toggle type handle and shall have an independent a quick-make, quick-break, over- center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits shall be clearly indicated by the position of the handle. The ON and OFF positions shall be clearly marked on the cover of the circuit breaker along with the international symbols I for ON and 0 for OFF on the handle providing positive indication of the circuit breaker contact position. Additionally, a color-coded indication of the circuit breaker contact position shall be provided: red for ON, green for OFF, and white for tripped. An easily accessible Push-to-Trip button for mechanically exercising the trip unit shall be provided on the cover of each circuit breaker. All poles of a multi-pole circuit breaker shall be so constructed as to ensure simultaneous open, close, and trip operations.

Circuit breakers must be completely enclosed in a high strength glass-polyester case.

Non-interchangeable trip circuit breakers shall be factory sealed; interchangeable trip circuit breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible from the front of the circuit breaker. Contacts shall be non-welding silver alloy. Arc extinction must be accomplished by means of DE-ION® arc chutes, consisting of metal grids mounted in an insulating support.

The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit current at the line terminals. Where applicable, circuit breakers shall be UL listed for series tested application.

Circuit breakers in frame sizes 100A through 600A shall be equipped with thermal-magnetic trip units. Circuit breakers in 800A and through 1600A frame sizes shall be equipped with electronic trip units that are insensitive to changes in ambient temperature within the normal operating temperature range of the circuit breaker. The 250A, 400A, 600A, and 630A frame sizes shall be designed to accept either thermal-magnetic or electronic interchangeable trip units.

Circuit breakers shall be listed with Underwriters Laboratories, Inc. under standard UL489, conform to the applicable requirements of NEMA Standards Publication AB1- 1986, meet the appropriate classifications of Federal Specifications W-C-375b, and/or comply with the requirements of International Electrotechnical Commission Standard IEC 947-2.

Circuit breaker ratings and modifications shall be indicated on the drawings.

Molded case circuit breakers shall be of the inverse time and instantaneous trip type as provided by thermal-magnetic or electronic trip elements with either standard interrupting, high interrupting, or current limiting characteristics as shown in Section 1 of this frame book. These circuit breakers shall be listed per UL489.

Molded case circuit interrupters (motor circuit protectors) shall be of the instantaneous (magnetic) only type, providing instantaneous short circuit protection by means of a front-adjustable trip unit. Instantaneous-only circuit interrupters shall be component recognized per UL489.

Molded case switches shall be of the same construction as the related listed circuit breaker and equipped with a factory sealed, nonadjustable, high instantaneous-only short circuit protection.

Molded case switches shall have no overload or low-level fault protection provided and shall be marked with a maximum withstand rating denoting the type and level of upstream overcurrent protection required. Molded case switches shall be listed per UL1087.

Internally mounted accessories including alarm (signal)/lockout switches, auxiliary switches, shunt trips, and undervoltage release mechanisms shall be of the plug-in type and shall be listed for field installation in circuit breakers which are not factory sealed.

Electrical operators for circuit breakers of the 400A frame size and below shall be of the solenoid type with maximum 5-cycle closing characteristics. Electrical operators for circuit breaker frame sizes 600A through 1600A shall be of the motor driven type. All electrical operators shall be cover mounted. All electrical operators shall be listed for field installation per UL489.

Electrical characteristics of accessories shall be as indicated on the drawings.

Circuit breakers in the 150A frame size shall be supplied in 1-, 2-, 3-, and 4-pole models, as specified on the drawings. Circuit breakers in frame sizes 250A through 1200A shall be supplied in 2-, 3-, or 4-pole models, while the 1600A circuit breaker is available in 3- and 4-pole models, as specified on the drawings.

Accessory wiring shall be brought out through the side or rear of the circuit breaker, or be connected to a terminal block mounted on the side of the circuit breaker, as specified. The ability to route accessory wiring to the opposite side of the circuit breaker through a trough in the base shall be provided.

Note: For 1600 ampere frames, accessory wiring is available on right side only. No wiring trough is provided.

Circuit breakers shall be provided with uniformly designed nameplates to clearly indicate the type, rating, listing/recognition/ certification marks, accessory details, and other information defined in UL489.

All terminals shall comply with UL486A and B and CSA C22.2 No. 65M. Torque markings shall be provided per UL489.

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