# **Molded Case Circuit Breakers**

### Ordering

In the FD through RD frames, you may order molded case circuit breakers three basic ways:

- 1. As separately ordered frames, trip units and lugs
- As frame, trip unit and lugs ordered as one catalog number and shipped unassembled or assembled
- 3.As Frame and Trip Unit shipped assembled and with the trip unit made non-removable, in compliance with UL 489 / CSA C22.2 No. 5 requirements that to be reverse fed the circuit breaker must not have an interchangeable trip unit.

These two options are described in the following:

#### **Components Ordered Separately**

To get the components for a 3-pole, 400 Amp standard interrupting circuit breaker, you would order the frame (JD63F400), the trip unit (JD63T400) and six lugs (TA2J6500). This option is normally useful only if you stock and use large volumes of product and wish to reduce your inventory cost. You may stock, for example, a smaller number of frames (JD63F400) and a variety of trip units (JD63T300, JD63T350, etc.) and assemble breakers as you need them.

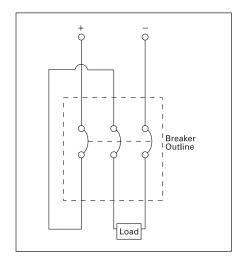
# Frame, Trip Unit and Lugs Ordered Together

If you order the catalog number JD63B400, you will receive a frame, a trip unit and 6 lugs in separate packages. By suffixing this number with "L" (e.g. JD63B400L), you will receive frame, trip unit and lugs assembled in one container. Pursuant to CSA C22.2 No. 5-13 / UL 489, a product ordered thus will have the markings "LINE" and "LOAD", and may not be "reverse fed" (with power flowing from the "OFF" end of the breaker toward the "ON" end).

## Non-Interchangeable Trip Breakers

If you place an "X" after the frame size designator (e.g. JXD63B400), you will receive a frame and trip unit assembled, with the trip unit made non-removable. If you suffix an "L" to this catalog number (e.g. JXD63B400L), you will receive the breaker, non-removable trip unit and lugs assembled. Unless you anticipate a specific need to change the breaker's ampere rating in the future, this is the preferred ordering method, as the products are assembled to Siemens' specifications in our factories. These breakers are suitable for use reverse fed according to CSA C22.2 No. 5-13 / UL 489, since the trip unit is not removable.

The smaller frames (QJ, ED and below) do not have removable trip units, and consequently are shipped only as assembled products. To add lugs, see the ordering instructions on each product's catalog page.



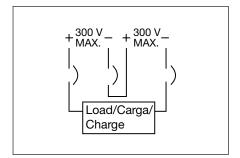
**500V DC Wiring Configuration** 

#### Introduction

# Connecting Breakers for DC Application

Most Siemens thermal magnetic trip MCCBs are applicable on direct current (dc) systems. Generally, for 250 V dc systems a two pole breaker is used, with one pole on each leg of the supply circuit. For three pole breakers applied on 500 V undergrounded DC systems, it is important to connect the power supply "zig-zag" through the breaker as shown in the figure below. This assures that the Voltage between phases on the breaker terminals is uniformly distributed.

See below for an alternative connection diagram. For a list of Sentron breakers with the DC ratings, please refer to pages 5-8 - 5-19.



# **Molded Case Circuit Breakers**

#### **Catalogue Numbering System** Selection/Application If used on 250A frame and above means non-interchangeable trip breaker with factory assembled frame and trip. Solid X D state trip and current limiting (S or C in first character) are non-interchangeable only, and the "X" is omitted. Trip Unit Type Omitted – Thermal-Magnetic S – Sensitrip® Electronic Trip Sentron Series Type/Interrupting Range Omitted – Standard Rating - High IC Rating HH — Extra High IC Rating - Highest IC Rating and Current Limiting Frame Identifier Type ED - Type MD N — Type ND P — Type PD Type FD - Type JD - Type LD - Type RD LM - Type LMD Maximum Voltage 2 - 240 Vac - 480 Vac 6 - 600 Vac Number of Poles -9 used to indicate the max, functions for an electronic trip circuit breaker (always 3 poles) (Specific Application Type) Standard 40°C Breaker M - Calibrated for 50°C Application - Frame Only - 40°C Trip Unit Only W - 50°C Trip Unit Only S - Molded Case Switch - Low Instantaneous Range ETI Breaker - Standard Range ETI Breaker H - High Instantaneous Range ETI Breaker **Maximum Continuous Current Rating** ED Frame - 015, 020, 025, 030, 035, 040, 045, 050, 060, 070, 080, 090, 100, 110, 125 - 070, 080, 090, 100, 110, 125, 150, 175, 200, 225, 250 FD Frame - 200, 225, 250, 300, 350, 400 JD Frame LD Frame - 250, 300, 350, 400, 450, 500, 600 LMD Frame - 500, 600, 700, 800 MD Frame - 500, 600, 700, 800 ND Frame — 900, 100 (1000A), 120 (1200A) PD Frame — 120 (1200A), 140 (1400A), 160 (1600A) RD Frame — 160 (1600A), 180 (1800A), 200 (2000A) Suffix where applicable indicates a breaker shipped with line/loads lugs installed used with a switch to show automatic self protection 400 Hertz Н 100% rated Load side lugs only NAV - Navel Ratings

#### **Applicable Standards**

CSA-C22.2 No. 5, C22.2 No. 14

UL489 — Molded Case Circuit Breakers and Circuit Breaker Enclosures.

**NOTE**: — Position omitted if not used.

UL486A — Wire Connectors and

#### NOTE:

(A) Molded case circuit breakers are designed and tested in accordance to applicable portions of UL 489 and CSA22.2 No. 5 and meet application requirements of the National Electric Code. Unless marked otherwise, circuit breakers are 80% duty rated.

Solderless Lugs for use with copper wire UL486B — Wire Connectors and Solderless Lugs for use with aluminum wire

UL943 — Ground Fault Interrupters (for personnel protectors)

(B) Molded case circuit breakers are to be connected with 60 or 75°C wire for circuit breakers having a rated ampacity of 100 amperes or less. Circuit breakers having a rated ampacity greater than 100 amperes shall only be cabled with 75°C cable unless otherwise indicated on the circuit breaker label. Exceptions to this rule are outlined in the article 110-14 C(1)(2) of the 2005 National Electric Code and Canadian Electric Code.

UL1087 — Molded Case Switches UL50 — Cabinets and Boxes UL869 — Service Equipment NEMA AB-1 — Molded Case Circuit Breakers and Molded Case Switches

<sup>1</sup> Interrupting ratings are not limited to the values or groups of values listed. However, the values listed are minimum values for the class specified.

② Single-unit or duplex construction must be specified.

<sup>3</sup> Use minimum frame size for ampere rating.

# **Molded Case Circuit Breakers**

# **FD 250A Frame Sentron Series**

Type HFD6<sup>®</sup>, Type HFXD6<sup>®</sup>

# Black Label

Interchangeable Trip			
Continuous Current Rating	Complete Breaker Unassembled with Lugs	Frame Only	Trip Unit Only
@ 40°C	Catalogue Number	Catalogue Number	Catalogue Number

#### 2-Pole 600V AC, 250V DC (3 Pole Width)

70	HFD62B070		FD62T070
80	HFD62B080		FD62T080
90	HFD62B090		FD62T090
100	HFD62B100		FD62T100
110	HFD62B110		FD62T110
125	HFD62B125	HFD62F250	FD62T125
150	HFD62B150		FD62T150
175	HFD62B175		FD62T175
200	HFD62B200		FD62T200
225	HFD62B225		FD62T225
250	HFD62B250		FD62T250

# 3-Pole 600V AC, 500V DC<sup>1</sup>

70 80 90 100 110 125 150 175 200	HFD63B070 HFD63B080 HFD63B090 HFD63B100 HFD63B150 HFD63B150 HFD63B150 HFD63B150 HFD63B200 HFD63B200	HFD63F250	FD63T070 FD63T080 FD63T090 FD63T100 FD63T110 FD63T125 FD63T150 FD63T175 FD63T200
250	HFD63B250		FD63T250

Type HHFD<sup>®</sup>, HHFXD6<sup>©3®®</sup>

#### 3-Pole 600V AC, Extra High Interrupting

70	HHFD63B070		FD63T070
80	HHFD63B080		FD63T080
90	HHFD63B090		FD63T090
100	HHFD63B100		FD63T100
110	HHFD63B110		FD63T110
125	HHFD63B125	HHFD63F250	FD63T125
150	HHFD63B150		FD63T150
175	HHFD63B175		FD63T175
200	HHFD63B200		FD63T200
225	HHFD63B225		FD63T225
250	HHFD63B250		FD63T250

Type CFD6<sup>36</sup>

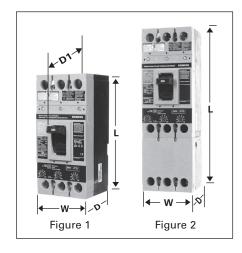
# Red Label

#### **Fuseless Current Limiting**

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)			
	3-Pole		
Continuous Current Rating	600V AC/500V DC		
@ 40°C	Catalogue Number		
70	CFD63B070		
80	CFD63B080		
90	CFD63B090		
100	CFD63B100		
110	CFD63B110		
125	CFD63B125		
150	CFD63B150		
175	CFD63B175		
200	CFD63B200		
225	CFD63B225		
250	CFD63B250		

- $\ensuremath{\textcircled{0}}$  When wired as shown on page 5-4, this circuit breaker is CSA Certified / UL listed and rated for use on 500V DC ungrounded UPS systems.
- © For non-interchangeable trip 3-pole HFD6 type circuit breaker, change prefix identifier from HFD6 to HFXD6. Price equals frame and trip prices combined, e.g. price of HFXD63B250 equals price of HFD63F250 plus price of FD63T250. Order lugs separately.
- ③ Type HFXD6, HHFXD6, CFD6 are CSA Certified / UL Listed for reverse feed applications.
- ® Type HFXD6, HFD6, HHFD6, HHFXD6 meet the CSA Certified / UL criteria for "Current Limiting" at 240 VAC and 480V AC.
- $\$  FXD6, ETI, CFD6, ETI See page 5-59 for ordering information.
- HACR rated.

# **Selection/Dimensions**



## Dimensions (in inches)

Breaker Type	w	L	D	D1 (to handle)
Figure 1 FXD6-A, FD6-A, HFD6, HFXD6, HHFD6, FD6-ETI <sup>©</sup>	4.50	9.50	4	5.25
Figure 2 CFD6, CFD6-ETI <sup>®</sup>	4.50	14.25	4	5.25

# Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)		
FD6-A, HFD6, HHFD6, FXD6-A				
Assembled	Assembled Circuit Breaker (less connectors)			
2	1	8.6		
3	1	10		
FD6-A, HFD6, HHFD6 Frame Only				
2	1	7.5		
3	1	8.7		
FD6 Trip Unit Only				
2	1	1.1		
3	1	1.3		
CFD6 Assembled Circuit Breaker (less terminals)				
2	1	31		
3	1	34		