

# Molded Case Circuit Breakers

## Introduction

### 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
2. 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

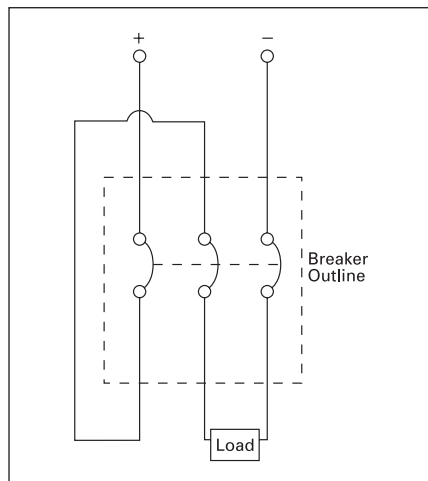
If you place an "X" after the frame size designator (e.g. JXD63B400), you will receive a frame and trip unit assembled, with the trip unit made non-removable. If you suffix an "L" to this catalog number (e.g. JXD63B400L), you will receive the breaker, non-removable trip unit and lugs assembled. Unless 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.

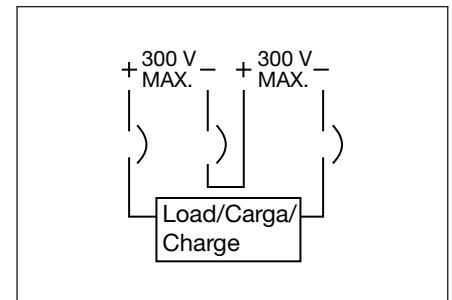
### Connecting Breakers for DC Application

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.



500V DC Wiring Configuration

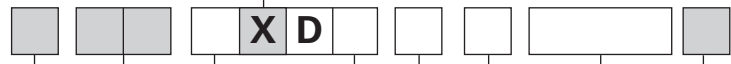


# Molded Case Circuit Breakers

## Catalogue Numbering System

## Selection/Application

If used on 250A frame and above means non-interchangeable trip breaker with factory assembled frame and trip. Solid 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
- H — High IC Rating
- HH — Extra High IC Rating
- C — Highest IC Rating and Current Limiting

### Frame Identifier

- E — Type ED
- F — Type FD
- J — Type JD
- L — Type LD
- LM — Type LMD
- M — Type MD
- N — Type ND
- P — Type PD
- R — Type RD

### Maximum Voltage

- 2 — 240 Vac
- 4 — 480 Vac
- 6 — 600 Vac

### Number of Poles

- 1
- 2
- 3
- 9 used to indicate the max. functions for an electronic trip circuit breaker (always 3 poles)

### (Specific Application Type)

- B — Standard 40°C Breaker
- M — Calibrated for 50°C Application
- F — Frame Only
- T — 40°C Trip Unit Only
- W — 50°C Trip Unit Only
- S — Molded Case Switch
- L — Low Instantaneous Range ETI Breaker
- A — 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
- FD Frame — 070, 080, 090, 100, 110, 125, 150, 175, 200, 225, 250
- JD Frame — 200, 225, 250, 300, 350, 400
- 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

- L — where applicable indicates a breaker shipped with line/loads lugs installed
- A — used with a switch to show automatic self protection
- Y — 400 Hertz
- H — 100% rated
- P — Load side lugs only
- NAV — Navel Ratings

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

### Applicable Standards

- CSA-C22.2 No. 5, C22.2 No. 14
- UL489 — Molded Case Circuit Breakers and Circuit Breaker Enclosures.
- 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

- ① 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.
- ③ Use minimum frame size for ampere rating.

# Molded Case Circuit Breakers

## FD 250A Frame Sentron Series

Selection

Type FXD6-A<sup>①</sup>

Blue Label

### Non-Interchangeable Trip (Assembled Circuit Breaker – Without Lugs)

Continuous Current Rating @ 40°C	2-Pole <sup>②</sup>		3-Pole	
	Catalogue Number		Catalogue Number	
70	FXD62B070		FXD63B070	
80	FXD62B080		FXD63B080	
90	FXD62B090		FXD63B090	
100	FXD62B100		FXD63B100	
110	FXD62B110		FXD63B110	
125	FXD62B125		FXD63B125	
150	FXD62B150		FXD63B150	
175	FXD62B175		FXD63B175	
200	FXD62B200		FXD63B200	
225	FXD62B225		FXD63B225	
250	FXD62B250		FXD63B250	

Type FD6-A<sup>⑦</sup>

Blue Label

### Interchangeable Trip

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

### 2-Pole 600V AC, 250V DC<sup>②</sup>

Continuous Current Rating @ 40°C	Catalogue Number	Frame Only	Trip Unit Only
70	FD62B070	FD62F250	FD62T070
80	FD62B080		FD62T080
90	FD62B090		FD62T090
100	FD62B100		FD62T100
110	FD62B110		FD62T110
125	FD62B125		FD62T125
150	FD62B150		FD62T150
175	FD62B175		FD62T175
200	FD62B200		FD62T200
225	FD62B225		FD62T225
250	FD62B250		FD62T250

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

Continuous Current Rating @ 40°C	Catalogue Number	Frame Only	Trip Unit Only
70	FD63B070	FD63F250	FD63T070
80	FD63B080		FD63T080
90	FD63B090		FD63T090
100	FD63B100		FD63T100
110	FD63B110		FD63T110
125	FD63B125		FD63T125
150	FD63B150		FD63T150
175	FD63B175		FD63T175
200	FD63B200		FD63T200
225	FD63B225		FD63T225
250	FD63B250		FD63T250

### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	CSA / UL 489 AIR (File E10848)					IEC 947-2					
	Volts AC (50/60Hz)		Volts DC			Volts AC (50/60Hz)					
	240	480	600	250	500 <sup>④</sup>	220/240		380/415		500	
FXD6-A, FD6-A	65	35	22	30 (2-P)	50 (3-P)	65	33	35	9	20	10
HFXD6 <sup>⑤</sup> , HFD6 <sup>⑥</sup>	100	65	25	30 (2-P)	25 (3-P)	100	50	65	33	42	21
HHFD6 <sup>⑤</sup> , HHFXD6 <sup>⑥</sup>	200	100	25	—	—	200	100	100	50	65	33
CFD6	200	200	100	50 (2-P)	50 (3-P)	—	—	—	—	—	—

### Instantaneous Adjustment Trip Range

Breaker Ampere Rating	Nominal Instantaneous Values							
	Low <sup>⑦</sup>	2	3	4	5	6	7	High <sup>⑦</sup>
70-90	600	640	690	730	770	810	850	900
100-110	700	770	840	920	990	1060	1140	1200
125-150	800	900	1000	1100	1200	1300	1400	1500
175-200	900	1060	1210	1370	1520	1780	1930	2000
225-250	1100	1300	1500	1700	1900	2100	2300	2500

Note: FD frame qualified to UL489 supplement SB "NAVAL". See page 5-137 for additional information.

### Ordering Information

#### Complete Breaker Unassembled with Lugs

Prices of FD6, HFD6, and HHFD6 breakers includes frame, trip and both line and load lugs (TA1FD350A). When ordered by these catalogue numbers, the customer will receive the frame, trip, and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

#### Complete Breaker Assembled without Lugs

Prices of FXD6, HFXD6, HHFXD6, and CFD6 includes frame with non-interchangeable trip unit installed only. Order required lugs separately. For line and load lugs (TA1FD350A) installed, add suffix "L" to catalogue number (add 2 times list price of lugs for each pole).

50°C Applications see page 5-137.

400 Hz Applications see page 5-137.

### Lugs For 75°C Wire<sup>④</sup>

Catalogue Number	Wire Range
TA1FD350A	#6–350 kcmil Cu
TC1FD350	#4–350 kcmil Al
	#6–350 kcmil Cu
Compression Lug	
CCF250	350 kcmil Cu/Al

① Type FXD6-A circuit breakers are CSA / UL Listed for reverse fed applications.

② 2-pole units are 3-pole width.

③ When wired as shown on page 5-4, this circuit breaker is CSA Certified / UL 489 listed and rated for use on 500V DC ungrounded UPS systems only.

④ See Note: A, page 5-147.

⑤ HFD6 and HHFD6 type circuit breakers meet the UL criteria for "current limiting" at 240 and 480V AC.

⑥ HACR rated.

⑦ +/- 20% Tolerance.

Modifications page 5-150  
Accessories page 5-151 - 5-159