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Moulded Case Circuit Breakers

Feature Information

Industrial Moulded Case Circuit Breakers

DE3 CIRCUIT BREAKERS

Catalogue Number	Ampere Rating	Field Installable Accessories	Factory Installed Accessories	Current Limiting	I-Line	Add-On G.F. Protection Available	Full Line of Optional Lugs Avail.	HACR Rated	Automatic Moulded Case Switch ♦	MAG-GARD Instantaneous Only *
FA	15-100		X◇		X	X	X	X◇		X
FH	15-100		X		X	X	X	X◇	X	X
FC	15-100		X		X	X	X			
FI	20-100		X	X	X	X	X			
Q2	100-225				X				X♦	
KA	70-250		X		X	X	X	X		X
KH	70-250		X		X	X	X	X	X	X
KC	110-250		X		X	X	X			
KI	110-250		X	X	X	X	X			
Q4	250-400	X	X		X		X			
LA	125-400	X	X		X		X			X
LH	125-400	X	X		X		X		X	X
LC	300-600	X	X		X		X			
LI	300-600	X	X	X	X		X			
LX	300-600	X	X		X		X			
LXI	300-600	X	X	X	X		X			
LE	300-600	X	X		X		X			
MA	300-1000	X	X		TO 800A		X			X
MH	300-1000	X	X		TO 800A		X		X	X
MX	125-800		X		X		X			
ME	100-800		X		X		X			
NA	600-1200	X	X		X		X			X
NC	600-1200	X	X		X		X		X	
NX	600-1200	X	X		X		X			
NE	600-1200	X	X		X		X			
PA	600-2000	X	X				X●			
PH	600-2000	X	X				X●		X	
PC	1600-2500	X	X				X●		X	
PXF	1000-2500	X	X				X●			
PEF	1000-2500	X	X				X●			

◇ Except 1 Pole

♦ Accessories may be provided in automatic moulded case switches, with the exception of Q2.

* MAG-GARD® circuit breakers accept the same lugs & accessories as equivalent thermal-magnetic circuit breakers.

● Lugs for PA frame breakers must be used with PALTB or mounting kit supplied.

Square D Micrologic® Features

Circuit Breakers	Zone Selective Interlock	Local Current Indication	Trip Indication	True RMS Sensing	POWERLOGIC Compatible	Optional Integral G.F. Protection	G.F. Indication Only
LX		OPTIONAL			X		
LXI	X	OPTIONAL	X	X	X	X	X
LE	X	OPTIONAL	X	X	X	X	X
MX			OPTIONAL			X	
ME	X	OPTIONAL	X	X	X	X	X
NX			OPTIONAL			X	
NE	X	OPTIONAL	X	X	X	X	X
PXF			OPTIONAL			X	
PEF	X	OPTIONAL	X	X	X	X	X

Moulded Case Circuit Breaker Selection Information

Commercial Circuit Breakers

Catalogue Number Prefix				No. of Poles	Cont. Ampere Rating	UL Listed Interrupting Rating - RMS Symmetrical Amperes			DC Volts◆	Digest Sections
Plug-On	Bolt-On	Unit Mt.	I-Line			AC Volts (50/60 Hz.)				
						120	120/240	240		
QO	QOB	QOU◆		1	10-70	10k	10k		5k◆	DE1/5/3
				2	10-125	10k	10k		5k◆	
				3	10-100	10k	10k	10k	5k◆	
QO-H	QOB-H			2	15-100	10k	10k	10k	...	DE1/5
QO-VH				1	15-30	22k	22k		...	DE1
				2	15-125	22k	22k		...	
				3	15-100	22k	22k	22k	...	
QOB-VH				1	15-30	22k	22k		...	DE5
				2	15-150	22k	22k		...	
				3	15-150	22k	22k	22k	...	
QH	QHB			1	15-30	65k	65k		...	DE1/5
				2	15-30	65k	65k		...	
				3	15-30	65k	65k	65k	...	
QOT				1	15-30	10k	10k		...	DE1
QO-GFI	QOB-GFI			1	15-30	10k			...	DE1/5
				2	15-60	10k	10k		...	
QO-VHGF1	QOB-VHGF1			1	15-30	22k			...	DE1/5
		FAL 240V	FA 240V	1	15-100	10k			...	DE3/5
				2	15-100	10k	10k	10k	...	
				3	15-100	10k	10k	10k	...	
		Q2L	Q2	2	100-225	10k	10k		...	DE3/5
				3	100-225	10k	10k	10k	...	
				2	100-225	22k	22k	22k	...	
		Q2L-H	Q2-H	2	100-225	22k	22k	22k	...	DE3/5
				3	100-225	22k	22k	22k	...	
		Q2LH	Q2H	2	100-225	42k	42k	42k	...	DE3/5
				2	250-400	25k	25k	25k	...	
		Q4L	Q4	2	250-400	25k	25k	25k	...	DE3/5
				3	250-400	25k	25k	25k	...	
		KD		3	100-250	25k	25k	25k	...	DE3
		KG		3	100-250	65k	65k	65k	...	DE3

◆ UL/CSA certified for 1 and 2 pole, 10-70 amperes & 3 pole, 10-60 amperes only.
 ◆ QOU UL/CSA certified for 60 Vdc per pole 80-100A 1- and 2-pole, and 70-100A 3-pole.

Catalogue Numbering System for Moulded Case Circuit Breakers

Breaker Family	FA	L	3	6	100	2100
FA, FH, FC, FI Note: "A" is replaced by letter "H" for KA, KH, KC, KI, Q2 High Interrupting Breaker. "A" is replaced LA, LC, LH, LI, Q4 by letter "C" for Extra High Interrupting MA, MH Breaker. "A" is replaced by the letter NA, NC "I" for current limiting breaker.						
No letter - I-LINE						
L - Lugs on both ends						
F - Terminal Pads Only (No lugs)						
P - Lugs OFF End Only						
B - Bolt-On Breaker (I-LINE), 400A Frame Maximum						
1 - 1 Pole 2 - 2 Pole 3 - 3-Pole						
2 - 240Vac 4 - 480Vac 6 - 600Vac 7 - 347Vac						
015-1200 - Ampere Rating						
000-0000 - Moulded Case Switch						
Special Features						
A, B, C - I-LINE Phase Connections						
XXXX - Factory Installed Accessories (ie, 2100 indicates a factory installed alarm switch)						

DE3 CIRCUIT BREAKERS

Moulded Case Circuit Breakers

Selection Information

Industrial Thermal-Magnetic Circuit Breakers

Electronic Trip Circuit Breakers

DE3 CIRCUIT BREAKERS

Catalogue Number Prefix		No. of Poles	Cont. Ampere Rating	CSA/UL Certified Interrupting Rating - RMS Symmetrical Amperes			DC Volts			Digest Page No.
Unit Mount	I-LINE			AC Volts. 50/60 Hz			125	250	500	
				120/240	277/480	347/600				
Q4L	Q4	2,3	250-400	25k	...	...	...	...	...	DE3-13
FAL	FA	1	15-100	10k	...	...	5k	...	...	DE3-9
240V.	240V.	2	15-100	10k	...	...	5k	5k	...	
		3	15-100	10k	...	...	5k	5k	...	
FAL	FA	1	15-100	25k	18k.	...	10k	...	...	DE3-9
480V.	480V.	2	15-100	25k	18k	...	10k	10k	...	
		3	15-100	25k	18k	...	10k	10k	...	
FAL	FA	1	15-100	25k	18k	14k	10k	...	...	DE3-9
600V.	600V.	2	15-100	25k	18k	14k	10k	10k	...	
		3	15-100	25k	18k	14k	10k	10k	...	
FHL ◇	FH ◇	1	15-30	65k	65k	18k	10k	...	...	DE3-9
600V.	600V.	1	35-100	65k	25k	18k	10k	...	...
		2,3	15-100	65k	25k	18k	10k	10k	...	
FHL-DC *	...	3	...	...	...	...	...	...	20k	...
FCL	FC	2,3	15-100	100k	65k	...	...	...	...	DE3-9
FIL	FI	2,3	20-100	200k	200k	100k	...	...	...	DE3-17
KAL	KA	2,3	70-250	42k	25k	22k	10k	10k	...	DE3-12
KHL ◇	KH ◇	2,3	70-250	65k	35k	25k	10k	10k	...	DE3-12
KHL-DC *	...	3	...	...	...	...	...	...	20k	...
KCL	KC	2,3	110-250	100k	65k	...	...	...	...	DE3-12
KIL	KI	2,3	110-250	200k	200k	100k	...	...	...	DE3-17
LAL	LA	2,3	125-400	42k	30k	22k	10k	10k	...	DE3-13
LHL ◇	LH ◇	2,3	125-400	65k	35k	25k	10k	10k	...	DE3-13
LHL-DC *	...	3	...	...	...	...	...	...	20k	...
LCL	LC	2,3	300-600	100k	65k	35k	...	...	...	DE3-13
LIL	LI	2,3	300-600	200k	200k	100k	...	...	...	DE3-17
MAL	...	2,3	300-1000	42k	30k	22k	14k	14k	...	DE3-14
...	MA	2,3	300-800	42k	30k	22k	14k	14k	...	
MHL ◇	...	2,3	300-1000	65k	65k	25k	14k	14k	...	
...	MH ◇	2,3	300-800	65k	65k	25k	14k	14k	...	DE3-14
MHL-DC *	...	3	...	...	...	...	...	...	20k	...
NAL	NA	2,3	600-1200	100k	50k	25k	...	...	...	DE3-15
NCL	NC	2,3	600-1200	125k	100k	65k	...	...	...	DE3-15
PAF	...	2,3	600-2000	65k	50k	42k	...	...	...	DE3-16
PAF-DC *	...	3	...	...	...	...	...	...	25k	...
PHF ◇	...	2,3	600-2000	125k	100k	65k	...	...	...	DE3-16
PCF ◇	...	2,3	1600-2500	125k	100k	65k	...	...	...	DE3-16
PCF-DC *	...	3	1600-2500	...	...	...	...	...	25k	...

Electronic Trip Circuit Breakers

LEL	LE	3	100-600	100k	65k	35k	...	...	...	DE3-22
LXIL	LXI	3	100-600	200k	200k	100k	...	...	...	DE3-21
LXL	LX	3	100-600	100k	65k	35k	...	...	...	DE3-21
MXL	MX	3	450-800	65k	65k	25k	...	...	...	DE3-21
MEL	ME	3	450-800	65k	65k	25k	...	...	...	DE3-22
NXL	NX	3	600-1200	125k	100k	65k	...	...	...	DE3-21
NEL	NE	3	600-1200	125k	100k	65k	...	...	...	DE3-22
PXF	...	3	600-2500	125k	100k	65k	...	...	...	DE3-21
PEF	...	3	600-2500	125k	100k	65k	...	...	...	DE3-22

◇ Separate UL/CSA ratings available for 240V. and 480V. grounded B single phase systems. Circuit breakers must be ordered with 5861 suffix.

* UL/CSA listed for 500 Vdc nom. 600 Vdc max. rating. The circuit breakers are suitable only for use with UPS (uninterruptible power supplies) and ungrounded systems. See Supplementary Catalogue.

Moulded Case Circuit Breakers

QOU

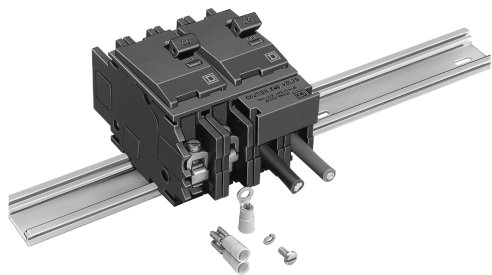
Thermal-Magnetic Trip
Unit Mounting

240 Vac, 48Vdc Max.
10 - 125 Amps

The QOU Series 3 Advantage

General specifications common to LOW AMP (1&2P,10-70A;3P,10-60A) and HIGH AMP (1P,80-100A;2P, 80-125A;3P,70-125A) QOU circuit breakers:

- Terminal lug wire size LOW AMP 1 - #14-2; HIGH AMP 1-#4-#2/0 Cu. or Al.
- Field reversible line and load lugs for convenient flush or surface mount wiring.
- DIN rail mounting (symmetrical rail 35mm X 7.5mm DIN).
- Field installable quick connectors and ring terminal connectors (for forward or reverse mounting).
- Single handle with internal common trip.
- DC rated.
- Exclusive VISI-TRIP® indicator.
- Ambient compensated.
- HACR rated.
- Mounting feet come with breaker.



QOU260, Din Rail Mounted

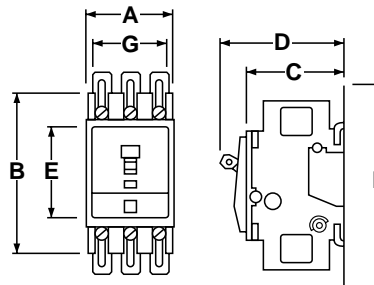
DE3 CIRCUIT BREAKERS

No. of Poles	Description	AIR Rating	Voltage Rating	Amp. Rating	Catalogue Number	Unit Price*	No. of Poles	Description	AIR Rating	Voltage Rating	Amp. Rating	Catalogue Number	Unit Price *						
One	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU110		Two	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	70	QOU270							
				15	QOU115						80	QOU280 ♦							
				15	QOU115HM ◊						90	QOU290 ♦							
				20	QOU120						100	QOU2100 ♦							
				20	QOU120HM ◊						125	QOU2125 ♦							
				25	QOU125			Non-auto Moulded Case Switch	N/A	240Vac	60	QOU200							
				30	QOU130						100	QOU2000 ♦							
				35	QOU135						125	QOU20001 ♦							
				40	QOU140						Three	Thermal-Magnetic Circuit Breaker		10,000 AIR	120/240 Vac	10	QOU310		
				50	QOU150											15	QOU315		
				60	QOU160											20	QOU320		
				70	QOU170											25	QOU325		
				80	QOU180 ♦											30	QOU330		
90	QOU190 ♦	35	QOU335																
100	QOU1100 ♦	40	QOU340																
Two	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU210		Non-auto Moulded Case Switch	N/A	240Vac	60			QOU300						
				15	QOU215					100			QOU3000 ♦						
				20	QOU220					125			QOU30001 ♦						
				25	QOU225					Two			Thermal-Magnetic Circuit Breaker			10,000 AIR	120/240 Vac	70	QOU350
				30	QOU230													60	QOU360
				35	QOU235													70	QOU370 ♦
				40	QOU240						80	QOU380 ♦							
				50	QOU250						90	QOU390 ♦							
60	QOU260	100	QOU3100 ♦																

- ◊ High magnetic trip circuit breakers are recommended for applications where high initial inrush current may occur and for individual dimmer applications.
♦ High AMP circuit breakers available in SERIES 2 only (not DIN mounting).

No. of Poles	Approximate Dimensions In./mm						
	A	B	C	D	E	F	G
1	0.8/19	4.0/102	2.4/60	3.0/76	2.3/57	5.0/127	0.6/15
2	1.5/38	4.0/102	2.4/60	3.0/76	2.3/57	5.0/127	1.3/34
3	2.3/57	4.0/102	2.4/60	3.0/76	2.3/57	5.0/127	2.1/53

Dimensions are approximate. Do not use for construction.



For additional reference QOU Miniature Circuit Breakers & Switches Catalogue 0720CT9401

Moulded Case Circuit Breaker QOU

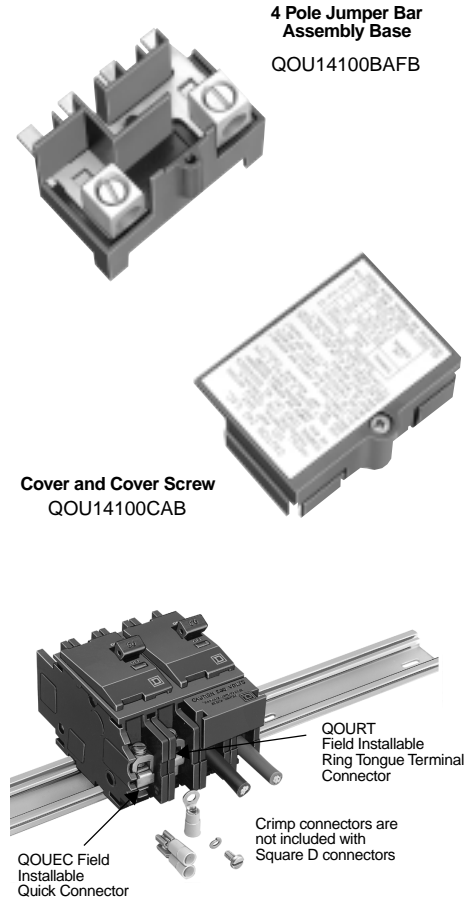
Accessories OEM Mounting Bases

Series 3 QOU Accessories

Description	Catalogue Number	Unit Price ✽
4 Pole jumper bar assembly with front wiring. With base, cover and Screw.	QOU14100JBAF	
Single phase, 4 Pole, 100A jumper bar base with front wiring.	QOU14100BAFB	
Single phase, 4 Pole, 100A jumper bar base with left side wiring.	QOU14100BALB	
Single phase, 4 Pole, 100A jumper bar base with right side wiring.	QOU14100BARB	
4 Pole jumper bar cover.	QOU14100CAB	
Mounting screw for jumper bar cover.	QOU1CMSB	
6 Pole jumper bar assembly with front wiring. With base, cover and Screw.	QOU16150JBAF	
Single phase, 6 Pole, 150A jumper bar base with front wiring.	QOU16150BAFB	
Single phase, 6 Pole, 150A jumper bar base with left side wiring.	QOU16150BALB	
Single phase, 6 Pole, 150A jumper bar base with right side wiring.	QOU16150BARB	
6 Pole jumper bar cover.	QOU16150CAB	
Vertical rainproof cover. (2 & 3 Pole QO,QOU,Q2,FA & KA)	BCV ◇	
Horizontal rainproof cover. (2 Pole, QO, QOU, Q2 & 3 Pole Q2)	BCH ◇	
1-Pole Finger Safe Cover For High Ampere QOU	QOUHFSC1	
1-Pole Finger Safe Cover For Low Ampere QOU	QOULFSC1	
Cover plate for One 2 Pole QOU.	QOUCP2	
Cover plate for One 3 Pole QOU.	QOUCP3	
Cover plate for Two 2 Pole QOU.	QOUCP4	
Cover plate for Three 2 Pole QOU.	QOUCP6	
Ring Tongue Terminal Adaptor	QOURT	
Quick connector end connection wiring	QOUEC	
Quick connector forward or reverse wiring	QOUFR	
Single pole QOU mounting foot	4803501401 ◇	
Two pole QOU mounting foot	4803503901 ◇	
Three pole QOU mounting foot	4803504001 ◇	
Handle padlock attachment - 1 Pole	QOU1PA	
Mechanical Interlock Attachment: Used to interlock two circuit breakers mounted side-by-side so that only one circuit breaker can be ON at a time. A 1-Pole or 2-Pole circuit breaker can be mounted on the left and interlocked with a 2-Pole or 3-Pole circuit breaker on the right.	QOU2DTILA ∞	

◇ For use on series 2 & 3 QOU.

∞ 10A-70A 1 Pole & 2 Pole, 10A-60A 3 Pole.



2-Pole DIN Mounted QOU Circuit

QO Plug-On Mounting Bases ◆

Voltage System	Main Lug Rating	1 Pole Spaces	Max. No. 1-Poles	Catalogue Number	Price ✽	Main Wire Size	
Single phase, 3 Wire	40A	2	2	QON2L40		#14-6 Cu.,#12-6 Al.	
	70A	2	4	QON2-4L70		#14-4 Cu.,#12-3 Al.	
	For unit mounting QO, QO-GFI and QO-EPD Circuit Breakers	100A	6	12	QON6-12L100		#8-1/0 Cu/Al.
		100A	8	16	QON8-16L100		#8-1/0 Cu/Al.
For unit mounting QO (GFI & EPD) Circuit Breakers (without neutral assembly)	70A	1	1	QOMB1		#14-4 Cu.,#12-#2 Al.	
	70A	2	2	QOMB2		#14-4 Cu.,#12-#2 Al.	
	70A	3	3	QOMB3		#14-4 Cu.,#12-#2 Al.	

◆ For QO circuit breakers refer to book DE1.



Moulded Case Circuit Breakers

Introduction

100A - 2500 Amps

Circuit Protection That Meets Your Specific Needs

To help you get the right protection for your electrical system, SQUARE D offers a comprehensive selection of thermal-magnetic moulded case circuit breakers. They span the full range of CSA certified and UL listed interrupting ratings, standard, high, extra high and current limiting. In addition, our thermal-magnetic line includes an unmatched choice of constructions, voltage and ampere ratings.



100A Frame (FAL, FHL, FCL)
15-100 Ampere ratings
Page DE3-9



250A Frame (KAL, KHL, KCL, Q2L)
70-250 Ampere ratings
Page DE3-11 & 12



400A Frame (Q4L, LAL, LHL, LCL)
125-400 Ampere ratings
Page DE3-13



100 Frame (FI)
20-100 Ampere ratings
Page DE3-17



250A Frame (KI)
110-250 Ampere ratings
Page DE3-17



600A Frame (LI)
300-600 Ampere ratings
Page DE3-17



1000 Frame (MAL, MHL)
125-1000 Ampere ratings
Page DE3-14



1200A Frame (NAL, NCL)
600-1200 Ampere ratings
Page DE3-15



2500A Frame (PAF, PHF, PCF)
600-2500 Ampere ratings
Page DE3-16

◇ Q2L frame is rated 100-225A. ◆ LCL frame is rated 300-600A.

Moulded Case Circuit Breaker FAL - FHL - FCL

600Vac, 250Vdc Max.
15 - 100 Amps

100 Ampere Frame

Thermal-magnetic moulded case circuit breakers shown here are permanent trip CSA certified, UL listed, IEC rated. For I-LINE moulded case circuit breakers, see Section DE-5.

Ampere Rating	AC Magnetic Trip Settings Amperes	One Pole		Two Pole		Three Pole		Standard Lug Kit Wire Range
		Catalogue No.	Price ✱	Catalogue No.	Price ✱	Catalogue No.	Price ✱	

100 Ampere Frame

FAL Standard Interrupting 120/240Volt

	Hold	Trip	120Vac		240Vac		240Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price ✱	Catalogue No.	Price ✱	Catalogue No.	Price ✱	
15	275	600	FAL12015		FAL22015		FAL32015	AL50FA	
20	275	600	FAL12020		FAL22020		FAL32020	#14-#14-#4 Cu or #12-#4 Al	
25	275	600	FAL12025		FAL22025		FAL32025		
30	275	600	FAL12030		FAL22030		FAL32030		
35	400	850	FAL12035		FAL22035		FAL32035	AL100FA	
40	400	850	FAL12040		FAL22040		FAL32040	#14-#1/0 Cu or #12-#1/0 Al	
45	400	850	FAL12045		FAL22045		FAL32045		
50	400	850	FAL12050		FAL22050		FAL32050		
60	800	1450	FAL12060		FAL22060		FAL32060		
70	800	1450	FAL12070		FAL22070		FAL32070		
80	800	1450	FAL12080		FAL22080		FAL32080		
90	900	1700	FAL12090		FAL22090		FAL32090		
100	900	1700	FAL12100		FAL22100		FAL32100		



FAL/FHL
One Pole
15-100 Ampere

FAL Standard Interrupting 277/480 Volt

	Hold	Trip	277Vac,125Vdc		480Vac,250Vdc		480Vac,250Vdc		Standard Lug Kit Wire Range
			Catalogue No.	Price ✱	Catalogue No.	Price ✱	Catalogue No.	Price ✱	
15	275	600	FAL14015		FAL24015		FAL34015	AL50FA	
20	275	600	FAL14020		FAL24020		FAL34020	14-#4 Cu or #12-#4 Al	
25	275	600	FAL14025		FAL24025		FAL34025		
30	275	600	FAL14030		FAL24030		FAL34030		
35	400	850	FAL14035		FAL24035		FAL34035	AL100FA	
40	400	850	FAL14040		FAL24040		FAL34040	#14-#1/0 Cu or #12-#1/0 Al	
45	400	850	FAL14045		FAL24045		FAL34045		
50	400	850	FAL14050		FAL24050		FAL34050		
60	800	1450	FAL14060		FAL24060		FAL34060		
70	800	1450	FAL14070		FAL24070		FAL34070		
80	800	1450	FAL14080		FAL24080		FAL34080		
90	900	1700	FAL14090		FAL24090		FAL34090		
100	900	1700	FAL14100		FAL24100		FAL34100		

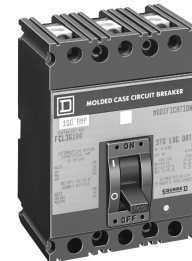
FAL/FHL
Two Pole
15-100Ampere



FAL Standard Interrupting 347/600 Volt

	Hold	Trip	347Vac,125Vdc		600Vac,250Vdc		600Vac,250Vdc		Standard Lug Kit Wire Range
			Catalogue No.	Price ✱	Catalogue No.	Price ✱	Catalogue No.	Price ✱	
15	275	600	FAL17015		FAL26015		FAL36015	AL50FA	
20	275	600	FAL17020		FAL26020		FAL36020	#14-#4 Cu or #12-#4 Al	
25	275	600	FAL17025		FAL26025		FAL36025		
30	275	600	FAL17030		FAL26030		FAL36030		
35	400	850	FAL17035		FAL26035		FAL36035	AL100FA	
40	400	850	FAL17040		FAL26040		FAL36040	#14-#1/0 Cu or #12-#1/0 Al	
45	400	850	FAL17045		FAL26045		FAL36045		
50	400	850	FAL17050		FAL26050		FAL36050		
60	800	1450	FAL17060		FAL26060		FAL36060		
70	800	1450	FAL17070		FAL26070		FAL36070		
80	800	1450	FAL17080		FAL26080		FAL36080		
90	900	1700	FAL17090		FAL26090		FAL36090		
100	900	1700	FAL17100		FAL26100		FAL36100		

FAL/FHL/FCL
Three Pole
15-100Ampere



FHL High Interrupting 347/600 Volt

	Hold	Trip	347Vac,125Vdc		600Vac,250Vdc		600Vac,250Vdc		Standard Lug Kit Wire Range
			Catalogue No.	Price ✱	Catalogue No.	Price ✱	Catalogue No.	Price ✱	
15	275	600	FHL17015		FHL26015		FHL36015	AL50FA	
20	275	600	FHL17020		FHL26020		FHL36020	#14-#4 Cu or #12-#4 Al	
25	275	600	FHL17025		FHL26025		FHL36025		
30	275	600	FHL17030		FHL26030		FHL36030		
35	400	850	FHL17035		FHL26035		FHL36035	AL100FA	
40	400	850	FHL17040		FHL26040		FHL36040	#14-#1/0 Cu or #12-#4 Al	
45	400	850	FHL17045		FHL26045		FHL36045		
50	400	850	FHL17050		FHL26050		FHL36050		
60	800	1450	FHL17060		FHL26060		FHL36060		
70	800	1450	FHL17070		FHL26070		FHL36070		
80	800	1450	FHL17080		FHL26080		FHL36080		
90	900	1700	FHL17090		FHL26090		FHL36090		
100	900	1700	FHL17100		FHL26100		FHL36100		

CSA Certified Interrupting Rating RMS Symmetrical Amperes

Breaker Catalogue No. Prefix	System Voltage				
	120/240	277/480	347/600	125	250
FAL (240V.)					
1-Pole	10k			5k	
2, 3-Pole	10k			5k	5k
FAL (480V.)					
1-Pole	25k	18k		10k	
2, 3-Pole	25k	18k		10k	10k
FAL (600V.)					
1-Pole	25k	18k	14k	10k	
2, 3-Pole	25k	18k	14k	10k	10k
FHL					
1-Pole	15-30	65k	65k	18k	10k
35-100	65k	25k	18k	10k	
2, 3-Pole	65k	25k	18k	10k	10k
FCL					
2, 3-Pole	100k	65k			

FCL Extra High Interrupting 480 Volt

	Hold	Trip	480Vac◇		480Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price ✱	Catalogue No.	Price ✱	
15	275	600	FCL24015		FCL34015		CU30FA
20	275	600	FCL24020		FCL34020		#14-#10 Cu
25	275	600	FCL24025		FCL34025		
30	275	600	FCL24030		FCL34030		
35	400	850	FCL24035		FCL34035		AL100FA
40	400	850	FCL24040		FCL34040		#14-#3 Cu or #12-#1 Al
45	400	850	FCL24045		FCL34045		
50	400	850	FCL24050		FCL34050		
60	800	1450	FCL24060		FCL34060		
70	800	1450	FCL24070		FCL34070		
80	800	1450	FCL24080		FCL34080		
90	900	1700	FCL24090		FCL34090		
100	900	1700	FCL24100		FCL34100		

◇ FCL 2-pole circuit breaker use 3-pole module.
Accessories-DE3-27 - DE3-34
Dimensions-DE3-10
Enclosures -DE3-25

✱ For pricing information please refer to List Price Book

Moulded Case Circuit Breaker Q2L, KD, KG

240 Vac Max
100-250 Amps

225 and 250 Ampere Frame

Ampere Rating	AC Magnetic Trip Settings, Amperes	Two Pole		Three Pole		Two Pole		Three Pole		Two Pole	
		Catalogue No.	Price ✽	Catalogue No.	Price ✽	Catalogue No.	Price ✽	Catalogue No.	Price ✽	Catalogue No.	Price ✽

225 Ampere Frame

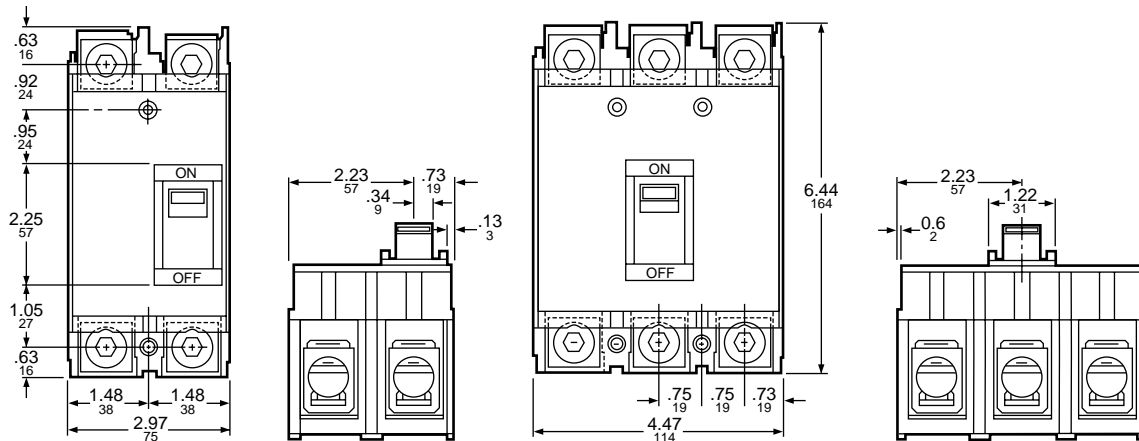
Ampere Rating	Hold	Trip	10,000 AIR				22,000 AIR				42,000 AIR	
			Catalogue No.	Price ✽	Catalogue No.	Price ✽	Catalogue No.	Price ✽	Catalogue No.	Price ✽	Catalogue No.	Price ✽
100	1400	2400	Q2L2100		Q2L3100		Q2L2100H		Q2L3100H		Q2LH2100	
125	1400	2400	Q2L2125		Q2L3125		Q2L2125H		Q2L3125H		Q2LH2125	
150	1400	2400	Q2L2150		Q2L3150		Q2L2150H		Q2L3150H		Q2LH2150	
175	1400	2400	Q2L2175		Q2L3175		Q2L2175H		Q2L3175H		Q2LH2175	
200	1400	2400	Q2L2200		Q2L3200		Q2L2200H		Q2L3200H		Q2LH2200	
225	1400	2400	Q2L2225		Q2L3225		Q2L2225H		Q2L3225H		Q2LH2225	

250 Ampere Frame

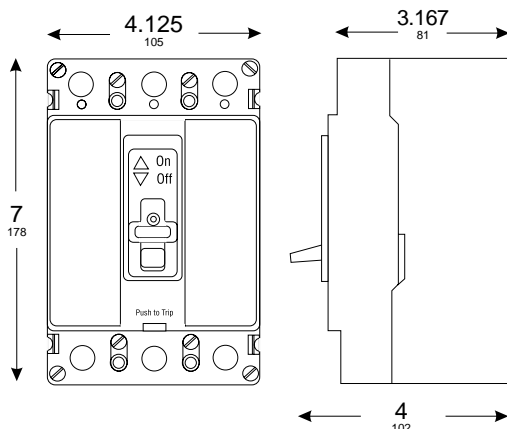
Ampere Rating	Hold	Trip	25,000 AIR		65,000 AIR	
			Catalogue Number	Price ✽	Catalogue Number	Price ✽
100	110	1700	KDLC32100		KGLC32100	
110	1100	1700	KDLC32110		KGLC32110	
125	1100	1700	KDLC32125		KGLC32125	
150	1100	1700	KDLC32150		KGLC32150	
175	1400	2400	KDLC32175		KGLC32175	
200	1400	2400	KDLC32200		KGLC32200	
225	1400	2400	KDLC32225		KGLC32225	
250	1400	2400	KDLC32250		KGLC32250	

- Accessories and replacement lugs are not available on the Q2 breaker. Lugs accept 1 #4 - 300 MCM per Ø.
- Enclosures - DE3-25

Q2L, Q2LH Dimensions



KD, KG Dimensions



Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breakers

KAL - KHL - KCL

250 Ampere Frame

600Vac, 250Vdc Max.
70 - 250 Amps



KAL/KHL
Two & Three Pole
70-250 Ampere

DE3 CIRCUIT BREAKERS

CSA Certified Interrupting Rating RMS Symmetrical Amperes

Breaker Cat. No. Prefix	System Voltage AC			DC	
	240	480	600	125	250
KAL	42k	25k	22k	10k	10k
KHL	65k	35k	25k	10k	10k
KCL	100k	65k			

Accessories - DE3-27 - DE3-24
Enclosures - DE3-25

Ampere Rating	AC Magnetic Trip Settings Amperes	Two Pole		Three Pole		Standard Lug Kit Wire Range
		Catalogue No.	Price ✽	Catalogue No.	Price ✽	

250 Ampere Frame

KAL Standard Interrupting

	Low	High	600Vac, 250Vdc		600Vac, 250Vdc		AL250KA 1-#6-350 kcmil
			Catalogue No.	Price ✽	Catalogue No.	Price ✽	
70	350	700	KAL26070		KAL36070		
80	400	800	KAL26080		KAL36080		
90	450	900	KAL26090		KAL36090		
100	500	1000	KAL26100		KAL36100		
110	550	1100	KAL26110		KAL36110		
125	625	1250	KAL26125		KAL36125		
150	750	1500	KAL26150		KAL36150		
175	875	1750	KAL26175		KAL36175		
200	1000	2000	KAL26200		KAL36200		
225	1125	2250	KAL26225		KAL36225		
250	1250	2500	KAL26250		KAL36250		

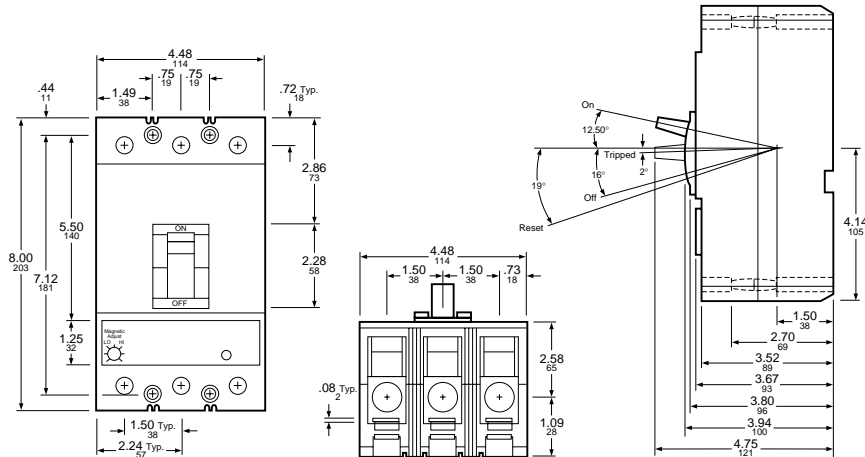
KHL High Interrupting

	Low	High	600Vac, 250Vdc		600Vac, 250Vdc		AL250KA 1-#6-350 kcmil
			Catalogue No.	Price ✽	Catalogue No.	Price ✽	
70	350	700	KHL26070		KHL36070		
80	400	800	KHL26080		KHL36080		
90	450	900	KHL26090		KHL36090		
100	500	1000	KHL26100		KHL36100		
110	550	1100	KHL26110		KHL36110		
125	625	1250	KHL26125		KHL36125		
150	750	1500	KHL26150		KHL36150		
175	875	1750	KHL26175		KHL36175		
200	1000	2000	KHL26200		KHL36200		
225	1125	2250	KHL26225		KHL36225		
250	1250	2500	KHL26250		KHL36250		

KCL Extra High Interrupting

	Low	High	480Vac, 250Vdc		480Vac, 250Vdc		AL250KI 1-1/0-350 kcmil
			Catalogue No.	Price ✽	Catalogue No.	Price ✽	
110	550	1100	KCL24110		KCL34110		
125	625	1250	KCL24125		KCL34125		
150	750	1500	KCL24150		KCL34150		
175	875	1750	KCL24175		KCL34175		
200	1000	2000	KCL24200		KCL34200		
225	1125	2250	KCL24225		KCL34225		
250	1250	2500	KCL24250		KCL34250		

KAL, KHL, KCL Dimensions



Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breaker Q4L - LAL - LHL - LCL

240Vac, 600Vac, 250Vdc Max.
125 - 600 Amps

400 & 600 Ampere Frame



LAL/LHL
Two and Three Pole
125-400 Amperes

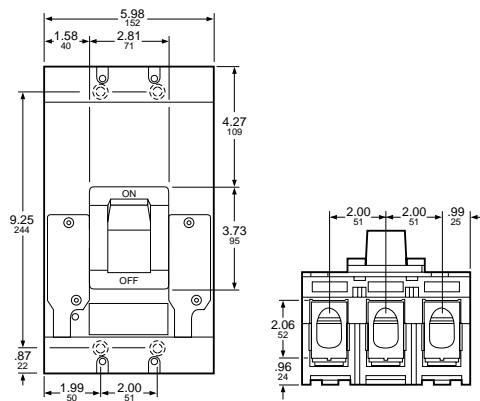
CSA Certified Interrupting Rating RMS Symmetrical Amperes

Breaker Cat. No. Prefix	System Voltage AC			DC	
	240	480	600	125	250
Q4L	25k				
LAL	42k	30k	22k	10k	10k
LHL	65k	35k	25k	10k	10k
LCL	100k	65k	35k		

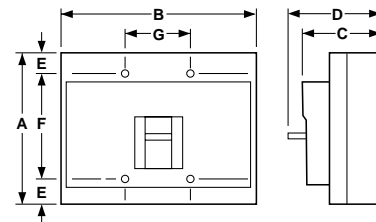
Accessories - DE3-27 - DE3-24
Enclosures - DE3-25

Ampere Rating	AC Magnetic Trip Settings Amperes		Two Pole		Three Pole		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
400 Ampere Frame							
Q4L Standard Interrupting							
	Low	High	240Vac		240Vac		
250	1250	2500	Q4L2250		Q4L3250		AL400LA 1-#1-600 kcmil or 2-#1-250 kcmil AL400LA
300	1500	3000	Q4L2300		Q4L3300		
350	1750	3500	Q4L2350		Q4L3350		
400	2000	4000	Q4L2400		Q4L3400		
LAL Standard Interrupting							
	Low	High	600Vac, 250Vdc		600Vac, 250Vdc		
125	625	1250	LAL26125		LAL36125		AL400LA 1-#1-600 kcmil or 2-#1-250 kcmil
150	750	1500	LAL26150		LAL36150		
175	875	1750	LAL26175		LAL36175		
200	1000	2000	LAL26200		LAL36200		
225	1125	2250	LAL26225		LAL36225		
250	1250	2500	LAL26250		LAL36250		
300	1500	3000	LAL26300		LAL36300		
350	1750	3500	LAL26350		LAL36350		
400	2000	4000	LAL26400		LAL36400		
LHL High Interrupting							
	Low	High	600Vac, 250Vdc		600Vac, 250Vdc		
125	625	1250	LHL26125		LHL36125		AL400LA 1-#1-600 kcmil or 2-#1-250 kcmil
150	750	1500	LHL26150		LHL36150		
175	875	1750	LHL26175		LHL36175		
200	1000	2000	LHL26200		LHL36200		
225	1125	2250	LHL26225		LHL36225		
250	1250	2500	LHL26250		LHL36250		
300	1500	3000	LHL26300		LHL36300		
350	1750	3500	LHL26350		LHL36350		
400	2000	4000	LHL26400		LHL36400		
600 Ampere Frame							
LCL Extra High Interrupting							
	Low	High	600Vac		600Vac		
300	1500	3000	LCL26300		LCL36300		AL600LI35 2-#1-350 kcmil
350	1750	3500	LCL26350		LCL36350		
400	2000	4000	LCL26400		LCL36400		
450	2250	4500	LCL26450		LCL36450		AL600LI5 2-#4/0-500 kcmil
500	2500	5000	LCL26500		LCL36500		
600	3000	5400	LCL26600		LCL36600		

Q4L, LAL, LHL Dimensions



LCL Dimensions



Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breakers

MAL - MHL

1000 Ampere Frame

600Vac, 250Vdc Max.

300 - 100 Amps



MAL/MHL
Two and Three Pole
300-1000 Ampere

Ampere Rating	AC Magnetic Trip Settings Amperes	Two Pole		Three Pole		Standard Lug Kit Wire Range
		Catalogue No.	Price *	Catalogue No.	Price *	

1000 Ampere Frame

MAL Standard Interrupting

	Low	High	600Vac, 250Vdc		600Vac, 250Vdc		AL900MA 3-#3/0-500 kcmil
300	1500	3000	MAL26300		MAL36300		
350	1750	3500	MAL26350		MAL36350		
400	2000	4000	MAL26400		MAL36400		
450	2250	4500	MAL26450		MAL36450		
500	2500	5000	MAL26500		MAL36500		
600	3000	6000	MAL26600		MAL36600		
700	3500	7000	MAL26700		MAL36700		
800	4000	8000	MAL26800		MAL36800		
900	4500	9000	MAL26900		MAL36900		
1000	5000	10000	MAL261000		MAL361000		

MHL High Interrupting

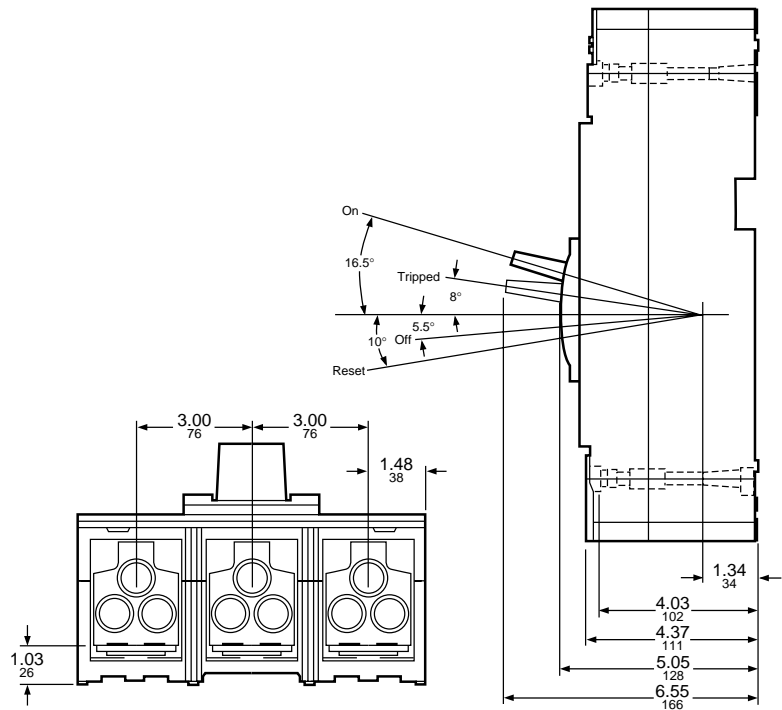
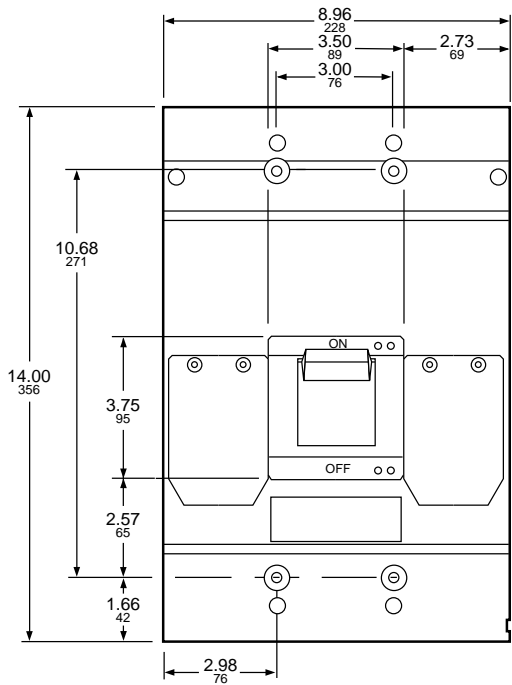
	Low	High	600Vac, 250Vdc		600Vac, 250Vdc		AL900MA 3-#3/0-500 kcmil
300	1500	3000	MHL26300		MHL36300		
350	1750	3500	MHL26350		MHL36350		
400	2000	4000	MHL26400		MHL36400		
450	2250	4500	MHL26450		MHL36450		
500	2500	5000	MHL26500		MHL36500		
600	3000	6000	MHL26600		MHL36600		
700	3500	7000	MHL26700		MHL36700		
800	4000	8000	MHL26800		MHL36800		
900	4500	9000	MHL26900		MHL36900		
1000	5000	10000	MHL261000		MHL361000		

CSA Certified Interrupting Rating RMS Symmetrical Amperes

Breaker Cat. No.	System Voltage AC			DC	
	240	480	600	125	250
Prefix	42k	30k	22k	14k	14k
MAL	42k	30k	22k	14k	14k
MHL	65k	65k	25k	14k	14k

Accessories - DE3-27 - DE3-34
Enclosures - DE3-25

KAL, KHL, KCL Dimensions



Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breaker NAL - NCL

600Vac Max.
600 - 1200 Amps

1200 Ampere Frame



NAL/NCL
Two and Three Pole
600-1200 Amperes

Ampere Rating	AC Magnetic Trip Settings Amperes	Two Pole		Three Pole		Standard Lug Kit Wire Range
		Catalogue No.	Price *	Catalogue No.	Price *	

1200 Ampere Frame

NAL High Interrupting

Ampere Rating	Low	High	600Vac		600Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
600	4000	8000	NAL26600		NAL36600		AL12000NE6 4-3/0-600 kcmil
700	4000	8000	NAL26700		NAL36700		
800	4000	8000	NAL26800		NAL36800		
900	5000	10000	NAL26900		NAL36900		
1000	5000	10000	NAL261000		NAL361000		
1200	5000	10000	NAL261200		NAL361200		

NCL Extra High Interrupting

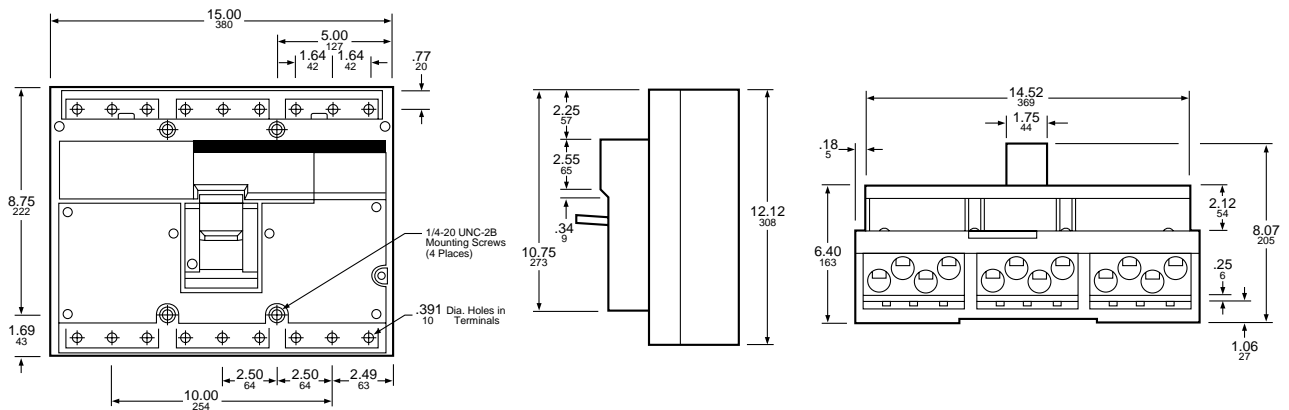
Ampere Rating	Low	High	600Vac		600Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
600	4000	8000	NCL26600		NCL36600		AL12000NE6 4-3/0-600 kcmil
700	4000	8000	NCL26700		NCL36700		
800	4000	8000	NCL26800		NCL36800		
900	5000	10000	NCL26900		NCL36900		
1000	5000	10000	NCL261000		NCL361000		
1200	5000	10000	NCL261200		NCL361200		

CSA Certified Interrupting Rating RMS Symmetrical Amperes

Breaker Cat. No.	System Voltage AC		
	240	480	600
NAL	100k	50k	25k
NCL	125k	100k	65k

Accessories - DE3-27 - DE3-34
Enclosures - DE3-25

NAL & NCL Dimensions



Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breakers

PAF - PHF - PCF

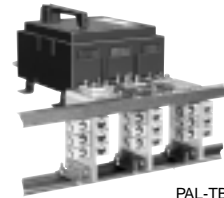
2000 & 2500 Ampere Frame

600Vac Max.
600 - 2500 Amps

Ampere Rating	AC Magnetic Trip Settings Amperes		Two Pole - 600Vac					Three Pole - 600Vac				
			Frame Only		Rating Columns Two Per Kit			Total Price ✽	Frame Only		Rating Columns Three Per Kit		Total Price ✽
	Low	High	Catalogue Number	Price ✽	Kit Catalogue No.	Kit Price ✽	Catalogue Number		Price ✽	Kit Catalogue No.	Kit Price ✽	

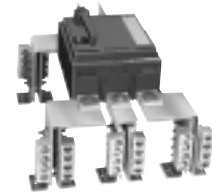


PAF/PHF
Two & Three Pole
600-2000 Ampere



PAL-TB

PAF circuit breaker with one optional PAL-TB terminal pad kit and 18 optional lugs installed. Kits mount on either line or load end of the breaker. Each Kit contains three terminal pads, one per phase, with provisions for mounting of six lugs per pad.
Order lugs (Cat. No. AL2500PA)



PCF circuit breakers are supplied with a terminal pad kit as standard for line and load cable terminations. The pad kit allows mounting a maximum of eight lugs per pad.
Order lugs (Cat. No. AL2500PA)

2000 Ampere Frame

PAF Standard Interrupting - Complete Breaker Requires Frame and Rating Columns

600	3200	9000			PA2600RC					PA3600RC		
700	3200	9000			PA2700RC					PA3700RC		
800	3200	9000			PA2800RC					PA3800RC		
1000	3500	9000			PA21000RC					PA31000RC		
1200	3500	9000	PAF2026		PA21200RC			PAF2036		PA31200RC		
1400	4500	9000			PA21400RC					PA31400RC		
1600	5000	10000			PA21600RC					PA31600RC		
1800	6500	11000			PA21800RC					PA31800RC		
2000	8000	12000			PA22000RC					PA32000RC		

PHF High Interrupting - Complete Breaker Requires Frame and Rating Columns

600	3200	9000			PA2600RC					PA3600RC		
700	3200	9000			PA2700RC					PA3700RC		
800	3200	9000			PA2800RC					PA3800RC		
1000	3500	9000			PA21000RC					PA31000RC		
1200	3500	9000	PHF2026		PA21200RC			PHF2036		PA31200RC		
1400	4500	9000			PA21400RC					PA31400RC		
1600	5000	10000			PA21600RC					PA31600RC		
1800	6500	11000			PA21800RC					PA31800RC		
2000	8000	12000			PA22000RC					PA32000RC		

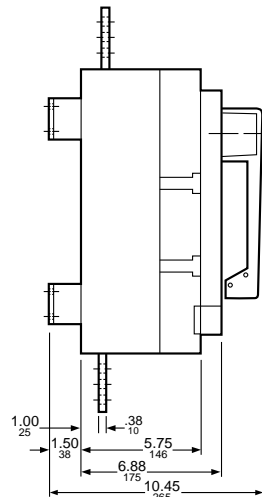
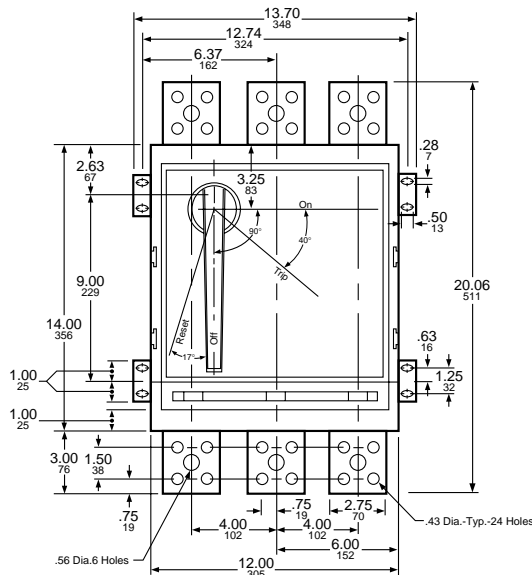
2500 Ampere Frame

PCF High Interrupting - Complete Breaker requires Frame and Rating Columns

1600	6000	12000			PC21600RC					PC31600RC		
1800	6000	12000	PCF2526		PC21800RC			PCF2536		PC31800RC		
2000	6000	12000			PC22000RC					PC32000RC		
2500	8000	14000			PC22500RC					PC32500RC		

✧ Price does not include lugs. See page DE3-33 for catalogue numbers and prices.

PAF & PHF Dimensions



CSA Certified Interrupting Rating

RMS Symmetrical Amperes

Breaker Cat. No. Prefix	System Voltage AC		
	240	480	600
PAF	65k	50k	42k
PHF	125k	100k	65k
PCF	125k	100k	65k

Accessories - DE3-27 - DE3-34

Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breaker FIL - KIL - LIL

600Vac Max.
20 - 600 Amps

Current-Limiting Circuit Breakers
100, 250, 400 & 600 Ampere Frame



FIL36100



KIL36250



LIL36600

Ampere Rating	AC Magnetic Trip Settings Amperes	Two Pole		Three Pole		Standard Lug Kit Wire Range
		Catalogue No.	Price *	Catalogue No.	Price *	

100 Ampere Frame

FIL Current Limiting I-Limiter

Ampere Rating	Hold	Trip	600Vac		600Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
20	275	600	FIL26020		FIL36020		AL50FA 1-#14-#4 Cu or 1-#12-#4 Al
30	275	600	FIL26030		FIL36030		
40	400	850	FIL26040		FIL36040		AL100FA 1-#14-#1/0 Cu or 1-#12-#1/0 Al
50	400	850	FIL26050		FIL36050		
60	800	1700	FIL26060		FIL36060		
70	800	1700	FIL26070		FIL36070		
80	800	1700	FIL26080		FIL36080		
90	800	1700	FIL26090		FIL36090		
100	800	1700	FIL26100		FIL36100		

250 Ampere Frame

KIL Current Limiting I-Limiter

Ampere Rating	Low	High	600Vac		600Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
110	550	1100	KIL26110		KIL36110		AL250KA 1-#6-350 kcmil
125	625	1250	KIL26125		KIL36125		
150	750	1500	KIL26150		KIL36150		
175	875	1750	KIL26175		KIL36175		AL250KI 1-1/0-350 kcmil
200	1000	2000	KIL26200		KIL36200		
225	1125	2250	KIL26225		KIL36225		
250	1250	2500	KIL26250		KIL36250		

400 Ampere Frame

LIL Current Limiting I-Limiter

Ampere Rating	Low	High	600Vac		600Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
300	1500	3000	LIL26300		LIL36300		AL600LI35 2-#1-350 kcmil
350	1750	3500	LIL26350		LIL36350		
400	2000	4000	LIL26400		LIL36400		

600 Ampere Frame

LIL Current Limiting I-Limiter

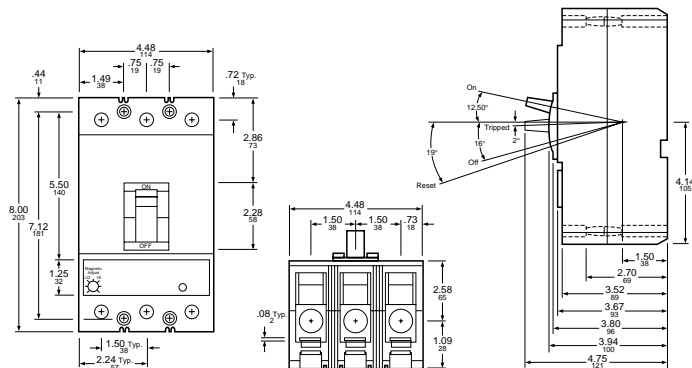
Ampere Rating	Low	High	600Vac		600Vac		Standard Lug Kit Wire Range
			Catalogue No.	Price *	Catalogue No.	Price *	
450	2250	4500	LIL26450		LIL36450		AL600LI5 2-#4/0-500 kcmil
500	2500	5000	LIL26500		LIL36500		
600	3000	5400	LIL26600		LIL36600		

CSA Certified Interrupting Rating RMS Symmetrical Amperes

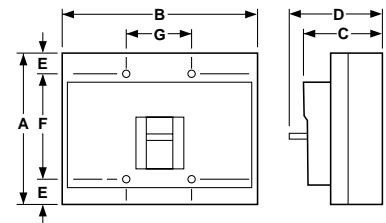
Breaker Cat. No. Prefix	System Voltage AC		
	240	480	600
FIL	200k	200k	100k
KIL	200k	200k	100k
LIL	200k	200k	100k

Accessories - DE3-27 - DE3-34
Enclosures - DE3-25

FIL Dimensions



LIL Dimensions



- A = 11.86/301
- B = 7.49/190
- C = 5.48/139
- D = 6.74/171
- E = 0.55/14
- F = 10.75/273
- G = 2.50/64

Dimensions are approximate. Do not use for construction.

Dual Dimensions: INCHES
millimeters

Moulded Case Circuit Breakers

Moulded Case Switches

100 - 2500 Ampere Frame

240Vac, 600Vac, 250Vdc Max.
100 - 2500 Amps

STANDARD moulded case switches provide no overcurrent protection or short circuit protection. They must not be used on systems that have an available fault current greater than the values listed in the table below.

AUTOMATIC moulded case switches open instantaneously at a factory preset magnetic trip point, calibrated to protect only the moulded case switch itself, when it is subjected to high fault currents. The trip point is non-adjustable and provides no overload or low level fault protection.

Moulded case switches open when the handle is switched to the OFF position or in response to an auxiliary tripping device such as a shunt trip.

Circuit breaker accessories such as SHUNT TRIP, AUXILIARY SWITCHES, UNDERVOLTAGE TRIP and ALARM SWITCH may be provided in either standard or automatic switches, with the exception of QO and Q2L switches.

Standard and automatic moulded case switches are CSA certified and UL listed.

DE3 CIRCUIT BREAKERS

Ampere Rating	2-Pole		3-Pole		Withstand Rating◇				Trip Point-Amps. (Automatic Switch)		Lug Kit Installed
	Catalogue No.	Price ※	Catalogue No.	Price ※	240Vac	480Vac	600Va c	250Vdc	AC◆	DC◆	

Automatic Moulded Case Switches

240Vac Automatic

225	Q2L2000M		Q2L3000M		10k				4500	N/A	N/A
-----	----------	--	----------	--	-----	--	--	--	------	-----	-----

600Vac Automatic

100	FHL26000M		FHL36000M		65k	25k	18k	10k	1500	1725	AL100FA
250	KHL26000M		KHL36000M		65k	35k	25k	10k	4500	5175	AL250KA
400	LHL26000M		LHL36000M		65k	35k	25k	10k	8000	9600	AL400LA
600	MHL260006M		MHL360006M		65k	65k	25k	10k	9000	9900	AL900MA
800	MHL260008M		MHL360008M		65k	65k	25k	10k	9000	9900	AL900MA
1000	MHL26000M		MHL36000M		65k	65k	25k	10k	9000	9900	AL900MA
1200	NCL2600012M		NCL3600012M		125k	100k	65k		16000	N/A	AL1200NE6
2000	PHF260000M		PHF360000M		125k	100k	65k		16000	N/A	N/A
2500	PCF260000M		PCF360000M		125k	100k	65k		16000	N/A	N/A

◇ The "Withstand Rating" is the fault current, at rated voltage, that the moulded case switch will withstand without damage when protected by a circuit breaker or fuses with an equal continuous current rating.

◆ Magnetic trip setting tolerances are ±20% from the nominal values shown.

Unmatched System Coordination

The MICROLOGIC® line of moulded case circuit breakers uses electronic trip technology to provide flexibility and coordination in system circuit protection.

By joining a sensitive measuring capability with sophisticated logic, this technology allows you to customize your circuit protection system to meet your application needs. For example, you can establish specific characteristic tripping responses for each circuit breaker by setting individual current-response levels and introducing intentional time delays for coordination with downstream components. The results of this customization are greater accuracy, superior repeatability and high reliability.

The breakers use the MICROLOGIC® electronic trip system to sense overcurrents and trip the circuit breaker. The MICROLOGIC® Trip System can be either Standard-function or Full-function. Both trip systems provide adjustable tripping functions and characteristics using true root-mean-square (rms) current sensing. The sensing system on an electronic trip moulded case circuit breaker responds to the flow of current through the circuit breaker. Electronic trip circuit breakers are limited to ac systems because the electronic trip system uses current transformers to sense the current.

Adjustable rotary switches on the trip unit allow the user to set the proper overcurrent or ground current protection required in the electrical system.

The circuit breakers are shipped with the long-time pickup set at 1.0 and all other trip unit adjustments set at their lowest settings. Actual settings required for a specific application must be determined by a qualified consultant. A coordination study is recommended to provide coordination between all the circuit breakers in the electrical system.

True RMS sensing is your best choice for applications in which you are using non-linear loads for example, silicon-controlled rectifiers, adjustable frequency motor controls and load switching, such as interruptible power supplies. That's because this type of sensing is impervious to the harmonic distortions produced by non-linear loads like computers and other electronic equipment, which can "trick" a peak-sensing circuit into tripping unnecessarily. True RMS sensing measures the magnitude of the current waveform 33 times per cycle (on a 60-Hz system) as current flows through the circuit breaker's sensor or CT.



Sensor sizes: 250-800A (MX, ME)
100-800 ampere ratings



Sensor sizes: 1200A (NX, NE)
600-1200 ampere ratings



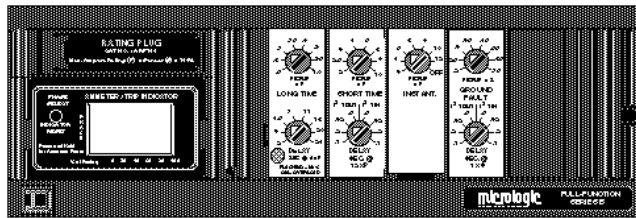
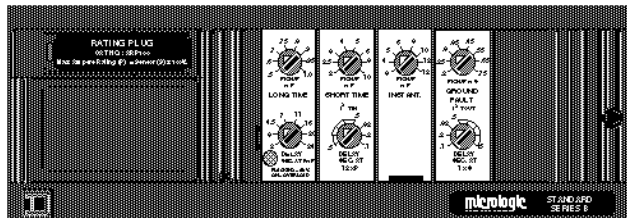
Sensor sizes: 1200-2500A (PX, PE)
600-2500 ampere ratings

Moulded Case Circuit Breakers

MICROLOGIC® Trip Systems Features

Standard and Full-Function

600Vac Max.
100 - 4000 Amps



DE3 CIRCUIT BREAKERS

Circuit Breakers With Standard MICROLOGIC® Trip Systems LXL, LXIL, MXL, NXL, PXF

Standard-function Features:

- 80% Rated
- True RMS Sensing
- Interchangeable Rating Plugs
- LSI, LS(I)G, Trip Configurations
- Short-time Delay = I^2t IN and Ground-fault Delay = I^2t OUT
- Integral Ground-fault Testing
- LED Long-time Pickup Indication
- Thermal & Magnetic Backup Protection
- Long-time & Ground-fault Memory
- Optional Local Trip Indicators - Overload, Short-circuit, Ground-fault
- Optional Local Ammeter/Trip Indicator
- Universal Test Set Available
- Optional I-LINE® Mounting (LX, LXI, MX, NX)
- Optional Neutral Current Transformer for 4-Wire Systems

LXL (125 - 800 Amp).....	DE3-21
LXIL (100 - 600 Amp).....	DE3-21
MXL (125 - 800 Amp)	DE3-21
NXL (600 - 1200 Amp)	DE3-21
PXF (600 - 2500 Amp).....	DE3-21
Optional Features	DE3-23

Circuit Breakers With Full-Function MICROLOGIC® Trip Systems LEL, MEL, NEL, PEF

Full-function Features:

- 100% Rated (600 sensor LE/LEL and 2500 sensor PEF circuit breakers are 80% rated)
- True RMS Sensing
- Interchangeable Rating Plugs
- POWERLOGIC compatible
- LI, LIG, LS(I), LS(I)G (Instantaneous OFF) Configurations
- Short-time Delay = I^2t IN & I^2t OUT and Ground-fault Delay = I^2t IN & I^2t OUT
- Short-time Withstand Rating
- Integral Ground-fault Testing
- Optional Ground-fault Alarm (No Trip) (Requires CIM3F with POWERLOGIC or see Bulletin 0602PD9701.)
- LED Long-time Pickup Indication
- Zone Selective Interlocking (Short-time & Ground-fault)
- Thermal & Magnetic Backup Protection
- Long-time & Ground-fault Memory
- Local Trip Indicators - Overload, Short-circuit, Ground-fault
- Local Ammeter/Trip Indicator
- Universal Test Set Available
- Optional I-LINE® Mounting (LE, ME, NE)
- Optional Neutral Current Transofmrer for 4-Wire Systems

LEL (100 - 600 Amp).....	DE3-22
MEL (325 - 800 Amp)	DE3-22
NEL (600 - 1200 Amp)	DE3-22
PEF (600 - 2500 Amp)	DE3-22
Optional Features	DE3-23

MICROLOGIC® Trip Systems - LXL - LXIL - MXL - NXL - PXF

600Vac Max.
100 - 2500 Amps

Standard-Function, Fixed Mount
Electronic & Current - limiting Electronic

Ampere Rating	Long Time Short Time Instantaneous	Long Time Short Time Instantaneous w/Ground Fault	Price ✱	Rating Plug Installed
250 Frame				
100	LXL36100	LXL36100G		ARP040
125	LXL36125	LXL36125G		ARP050
150	LXL36100	LXL36150G		ARP060
175	LXL36175	LXL36175G		ARP070
200	LXL36200	LXL36200G		ARP080
225	LXL36225	LXL36225G		ARP090
250	LXL36250	LXL36250G		ARP100
400 Frame				
300	LXL36300	LXL36300G		ARP075
350	LXL36350	LXL36350G		ARP088
400	LXL36400	LXL36400G		ARP100
600 Frame				
450	LXL36450	LXL36450G		ARP075
500	LXL36500	LXL36500G		ARP083
600	LXL36600	LXL36600G		ARP100
250 Frame△ Current - limiting				
100	LXIL36100	LXIL36100G		ARP040
125	LXIL36125	LXIL36125G		ARP050
150	LXIL36150	LXIL36150G		ARP060
175	LXIL36175	LXIL36175G		ARP070
200	LXIL36200	LXIL36200G		ARP080
225	LXIL36225	LXIL36225G		ARP090
250	LXIL36250	LXIL36250G		ARP100
400 Frame△ Current - limiting				
300	LXIL36300	LXIL36300G		ARP075
350	LXIL36350	LXIL36350G		ARP088
400	LXIL36400	LXIL36400G		ARP100
600 Frame△ Current - limiting				
450	LXIL36450	LXIL36450G		ARP075.
500	LXIL36500	LXIL36500G		ARP083
600	LXIL36600	LXIL36600G		ARP100

Ampere Rating	Long Time Short Time Instantaneous	Long Time Short Time Instantaneous w/Ground Fault	Price ✱	Rating Plug Installed
800 Frame				
450	MXL36450	MXL36450G		ARP056
500	MXL36500	MXL36500G		ARP063
600	MXL36600	MXL36600G		ARP075
700	MXL36700	MXL36700G		ARP088
800	MXL36800	MXL36800G		ARP100
1200 Frame				
600	NXL36600	NXL36600G		ARP050
700	NXL36700	NXL36700G		ARP058
800	NXL36800	NXL36800G		ARP067
900	NXL36900	NXL36900G		ARP075
1000	NXL361000	NXL361000G		ARP083
1200	NXL361200	NXL361200G		ARP100
1200 Frame				
600	PXF36600	PXF36600G		ARP050
700	PXF36700	PXF36700G		ARP058
800	PXF36800	PXF36800G		ARP067
900	PXF36900	PXF36900G		ARP075
1000	PXF361000	PXF361000G		ARP083
1200	PXF361200	PXF361200G		ARP100
1600 Frame				
1400	PXF361400	PXF361400G		ARP088
1600	PXF361600	PXF361600G		ARP100
2000 Frame■				
1800	PXF361800	PXF361800G		ARP088
2000	PXF362000	PXF362000G		ARP100
2500 Frame■				
2500	PXF362500G	PXF362500G		ARP100

■ Includes Terminal Pad Kit.

△ No instantaneous "off" position.

- Options - DE3-23
- Accessories - DE3-27 - DE3-34
- Dimensions - DE3-24
- Enclosures - DE3-25

DE3 CIRCUIT BREAKERS

Moulded Case Circuit Breakers

MICROLOGIC® Trip Systems - LEL - MEL - NEL - PEF

Full Function, Fixed Mount

600Vac Max.
100 - 2500 Amps

DE3 CIRCUIT BREAKERS

Amp. Rating	Catalogue Number				Price ✱	Factory Installed Rating Plug
	Long Time Instantaneous	Long Time Short Time Instantaneous	Long Time Instantaneous w/Ground Fault Protection 9	Long Time Short Time Instantaneous w/Ground Fault Protection✱		

250 Frame Δ

100	LEL36100LI	LEL36100LS	LEL36100LIG	LEL36100LSG		ARP040
125	LEL36125LI	LEL36125LS	LEL36125LIG	LEL36125LSG		ARP050
150	LEL36150LI	LEL36150LS	LEL36150LIG	LEL36150LSG		ARP060
175	LEL36175LI	LEL36175LS	LEL36175LIG	LEL36175LSG		ARP070
200	LEL36200LI	LEL36200LS	LEL36200LIG	LEL36200LSG		ARP080
225	LEL36225LI	LEL36225LS	LEL36225LIG	LEL36225LSG		ARP090
250	LEL36250LI	LEL36250LS	LEL36250LIG	LEL36250LSG		ARP100

400 Frame Δ

300	LEL36300LI	LEL36300LS	LEL36300LIG	LEL36300LSG		ARP075
350	LEL36350LI	LEL36350LS	LEL36350LIG	LEL36350LSG		ARP088
400	LEL36400LI	LEL36400LS	LEL36400LIG	LEL36400LSG		ARP100

600 Frame Δ

450	LEL36450LI	LEL36450LS	LEL36450LIG	LEL36450LSG		ARP075
500	LEL36500LI	LEL36500LS	LEL36500LIG	LEL36500LSG		ARP083
600	LEL36600LI	LEL36600LS	LEL36600LIG	LEL36600LSG		ARP100

800 Frame

450	MEL36450LI	MEL36450LS	MEL36450LIG	MEL36450LSG		ARP056
500	MEL36500LI	MEL36500LS	MEL36500LIG	MEL36500LSG		ARP063
600	MEL36600LI	MEL36600LS	MEL36600LIG	MEL36600LSG		ARP075
700	MEL36700LI	MEL36700LS	MEL36700LIG	MEL36700LSG		ARP088
800	MEL36800LI	MEL36800LS	MEL36800LIG	MEL36800LSG		ARP100

Δ No Instantaneous "OFF" position.

✱ Substitute (A) in place of (G) for ground-fault alarm (pick-up indication only).

Amp. Rating	Catalogue Number				Price ✱	Factory Installed Rating Plug
	Long Time Instantaneous	Long Time Short Time Instantaneous	Long Time Instantaneous w/Ground Fault Protection ✱	Long Time Short Time Instantaneous w/Ground Fault Protection✱		

1200 FrameΔ

600	NEL36600LI	NEL36600LS	NEL36600LIG	NEL36600LSG		ARP050
700	NEL36700LI	NEL36700LS	NEL36700LIG	NEL36700LSG		ARP058
800	NEL36800LI	NEL36800LS	NEL36800LIG	NEL36800LSG		ARP067
900	NEL36900LI	NEL36900LS	NEL36900LIG	NEL36900LSG		ARP075
1000	NEL361000LI	NEL361000LS	NEL361000LIG	NEL361000LSG		ARP083
1200	NEL361200LI	NEL361200LS	NEL361200LIG	NEL361200LSG		ARP100

1200 Frame

600	PEF36600LI	PEF36600LS	PEF36600LIG	PEF36600LSG		ARP050
700	PEF36700LI	PEF36700LS	PEF36700LIG	PEF36700LSG		ARP058
800	PEF36800LI	PEF36800LS	PEF36800LIG	PEF36800LSG		ARP067
900	PEF36900LI	PEF36900LS	PEF36900LIG	PEF36900LSG		ARP075
1000	PEF361000LI	PEF361000LS	PEF361000LIG	PEF361000LSG		ARP083
1200	PEF361200LI	PEF361200LS	PEF361200LIG	PEF361200LSG		ARP100

1600 Frame

1400	PEF361400LI	PEF361400LS	PEF361400LIG	PEF361400LSG		ARP088
1600	PEF361600LI	PEF361600LS	PEF361600LIG	PEF361600LSG		ARP100

2000 Frame

1800	PEF361800LI	PEF361800LS	PEF361800LIG	PEF361800LSG		ARP090
2000	PEF362000LI	PEF362000LS	PEF362000LIG	PEF362000LSG		ARP100

2500 Frame

2500	PEF362500LI	PEF362500LS	PEF362500LIG	PEF362500LSG		ARP100
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◆ Includes terminal pads. Price does not include lugs. Order lugs separately. See page DE3-33.

◇ 2500A PEF Circuit Breakers are 80% rated.

- Options - DE3-23
- Accessories - DE3-27 - DE3-34
- Dimensions - DE3-24
- Enclosures - DE3-25

Moulded Case Circuit Breaker MICROLOGIC® Options

LXL, LXIL, MXL, NXL, PXF
LEL, MEL, NEL, PEF

Neutral Current Transformers

Catalogue Number	Price ✽	Sensor	Where Used
LE25CT2		250	LXL, LEL, LXIL
LE4CT2		400	LXL, LEL, LXIL
LE6CT2		600	LXL, LEL, LXIL
ME8CT2		800	MXL, MEL
NE12CT2		1200	NXL, NEL
PE12CT2		1200	PXF, PEF
PE16CT2		1600	PXF, PEF
PE20CT2		2000	PXF, PEF
PE25CT2		2500	PXF, PEF

Neutral current transformers are required on 3Ø, 4W systems.

Electronic Trip Indicator and Current Meter Field Installable Kits

Device	Catalogue No.	Optional	Price ✽
Local Trip Indicator Kit	ALTI	LXL, LXIL, MXL, NXL	
Local Trip Indicator Kit	ALTIP	PXF	
Local Current Meter Kit/Trip Indicator	ALAM	LXL, LXIL, MXL, NXL	
Local Current Meter Kit/Trip Indicator	ALAMP	PXF	

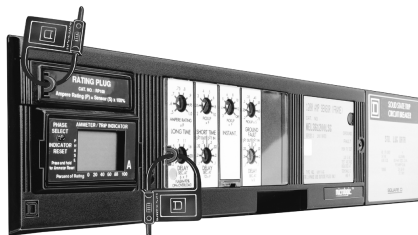
Local Current Meter Kit & Local trip indicator is standard with LEL, MEL, NEL, and PEF breakers.



Combination Local Current Meter and Trip Indicator

Trip Unit Seal

Catalogue Number	Package Quantity	Price
TUSEAL	100	



Electronic Trip Unit Seals Installed To Restrict Access

Interchangeable Rating Plug Kits For all Series B MICROLOGIC® Trip Systems

Catalogue Number	Multiplier Value	Price ✽
ARP040	0.400	
ARP050	0.500	
ARP056	0.563	
ARP058	0.583	
ARP060	0.600	
ARP063	0.625	
ARP067	0.667	
ARP070	0.700	
ARP075	0.750	
ARP080	0.800	
ARP083	0.833	
ARP088	0.875	
ARP090	0.900	
ARP100	1.00	

Note: Interchangeable with Series A Rating Plugs.

Test Equipment For Circuit Breakers With the MICROLOGIC® Trip System

Description	Catalogue Number	Price ✽
Universal Test Set (includes test module for Full-Function and Standard-Function LEL, MEL, NEL, PEF, SE, LXL, LXIL, MXL, NXL, PXF)	UTS3	
Test Module for Full Function and Standard Function LEL, MEL, NEL, PEF, SE, LXL, LXIL, MXL, NXL, PXF. (For use with existing CBTU1 or UTS3 test set)	CBTMB	

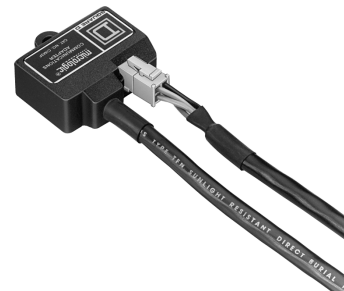


Universal Test Set

PowerLogic Communication Adaptor

Description	Catalogue Number	Price ✽
Communication Adaptor	CIM3F◇	

◇ Required for PowerLogic hhookup and when using ground fault pick-up and indication "ONLY" option.



CIM3F Communication Adaptor

Moulded Case Circuit Breakers MICROLOGIC® Trip Systems - Dimensions

LEL, LXL, LXIL, MEL, MXL
NEL, NXL, PEF, PXF

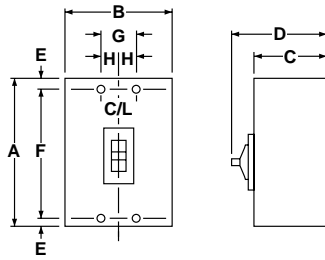


Figure 1
MEL, MXL

Figure 2
LEL, LXL
LXIL, NEL
NXL

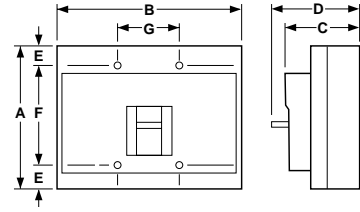
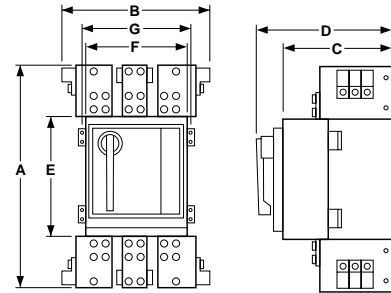
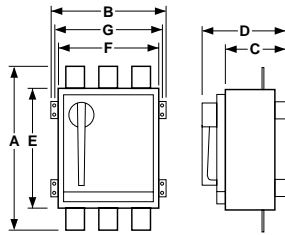


Figure 3
PEF, PXF
PAF, PHF

Figure 4
PEF2000 & 2500A
PXF2500A



DE3 CIRCUIT BREAKERS

Breaker Catalogue Number Prefix	No. Poles	Fig. No.	Dimensions-Inches/Millimeters						
			A	B	C	D	E	F	G
LE, LX, LXI	2 & 3	2	11.86/301	7.49/190	5.48/139	6.74/171	.55/14	10.75/273	2.50
MEL, MXL	2 & 3	1	14.75/375	9/229	4.37/111	6.5/165	1.66/42	11.43/290	3/76
NEL, NXL	2 & 3	2	12.12/308	14.98/381	6.4/163	8.07/205	1.69/43	8.75/222	5/127
PEF, PXF	2 & 3	3	20.1/511	13.75/349	7.25/184	10.41/264	14/356	12/305	12.75/324
PEF 2000 & 2500A, PXF 2500A	2 & 3	4	26.1/663	23.3/592	13.33/339	16.48/417	14/356	12/305	---

Dimensions are approximate. Do not use for construction.



FA100S



FA100RB



KA225DS



FA100X



FA100Y

Circuit breaker enclosures are UL Listed, CSA Certified and are suitable for use as service entrance equipment. The short circuit current rating of an enclosed circuit breaker is equal to the interrupting rating at the supply voltage marked on the circuit breaker installed. Exceptions and restrictions are footnoted. Enclosures listed below are for use with 80% Ampere rated unit circuit breakers listed on pages DE3-9 through DE3-22. Breakers are ordered and shipped separately for field installation. For ground bars and neutral assemblies, refer to page DE3-26.

Circuit Breaker			Type 1 Flush		Type 1 Surface		Type 3R▲	
Catalogue Number Prefix	Ampere Rating	Number of Poles	Enclosure Catalogue No.	Price	Enclosure Catalogue No.	Price	Enclosure Catalogue No.	Price
FAL, FHL, FCL	15-100	1, 2, 3	FA100F		FA100S		FA100RB	
Q2L, Q2L-H, Q2LH	100-225	2, 3	Q23225NFC†		Q23225NSC†		Q23225NRBC†	
KAL, KHL, FCL, FAL FHL	70-225	2, 3	KA225F		KA225S		KA225RB	
LAL, LHL, Q4L KAL, KHL	125-400	2, 3	LA400F		LA400S		LA400R	
MEL	100-800	3			ME1000S		ME1000R	
MAL, MHL, MXL, LAL, LHL, Q4L	125-1000	2, 3	MA1000F		MA1000S		MA1000R	

▲ Enclosures with NRB or RB suffix have provisions for 3#4" through 21#2" bolt-on hubs in top endwall. Enclosures with R suffix have blank endwalls and require field cut opening.

† Factory installed groundable neutral assembly includes (2) ground lugs and (2) neutral lugs. Equipment ground kit is also included.

Circuit Breaker			Type 4, 4X, 5 Stainless Steel		Without Knockouts* (Type 12/3R)	
Catalogue Number Prefix	Ampere Rating	Number of Poles	Enclosure Catalogue No.	Price	Catalogue No.	Price
FAL, FHL, FCL	15-100	1, 2, 3	FA100DS		FA100AWK	
KAL, KHL▲, FIL■	20-225	2, 3	KA225DS		KA225AWK	
KIL■, KCL	110-250	2, 3	IK250DS		IK250AWK	
LAL, LHL, Q4L	125-400	2, 3	LA400DS		LA400AWK	
LEL◆, LXL, LXIL	100-600	3			LX600AWK	
LCL, LIL	300-600	2, 3			LX600AWK	
MAL, MHL, MXL	125-1000	2, 3	MA1000DS		MA1000AWK	
NAL, NCL, NXL	600-1200	2, 3			NA1200AWK†▲	

* Suitable for rainproof Type 3R application by removing drain screw from bottom endwall.

▲ Wire bending space provided for 250 kcmil (Al/Cu) 75°C conductors maximum.

◆ LEL 100% rated circuit breaker except for 600 Amp frame.

■ Short circuit rating is 100,000 AIR at 480Vac maximum.

† Short Circuit Ratings: NAL, 240Vac – 100,000, 480Vac – 50,000, 600Vac – 25,000
NCL, 240Vac – 125,000, 480Vac – 100,000, 600Vac – 65,000
NEL, 240Vac – 125,000, 480Vac – 100,000, 600Vac – 65,000

▲ Does not have outside operator, not CSA Certified

Circuit Breaker			Type 7* Cast Aluminum		Type 9■ Cast Aluminum	
Catalogue Number Prefix	Ampere Rating	Number of Poles	Enclosure Catalogue No.	Price	Enclosure Catalogue No.	Price
FAL, FHL▲	15-60	1, 2, 3	FA060X▼		FA060Y	
	15-100	1, 2, 3	FA100X▼		FA100Y	

* NEMA Type 7 – Indoor Hazardous Locations – Class I, Groups C and/or D, Divisions 1 or 2.

■ NEMA Type 9 – Indoor Hazardous Locations – Class II, Groups E and/or G, Class III, Divisions 1 or 2.

▼ Suitable for rainproof applications—includes PKDB-1 breather and drain kit.

▲ Use 75°C Cu conductors only.

Accessories - DE3-26
Dimensions - DE3-26

Moulded Case Circuit Breakers

Enclosures—Accessories, Dimensions

Accessories Insulated Groundable Neutral Assembly

Circuit Breaker Catalogue Number Prefix	Ampere Rating	Neutral Assembly for Use With						Wire Range per Terminal In-Out Wire Bending Space per NEC Table 373-6	Grounding Electrode Conductor Terminals
		Type 1 & 3R		Type 4-4x-5 & 12		Type 7 & 9			
		Catalogue Number	Price	Catalogue Number	Price	Catalogue Number	Price		
FAL, FHL, FCL FAL, FHL	100 100	SN100FA		SN100FA		----- 100SNA		(1) #14-1/0 Cu or (1) #12-1/0 Al FA060X/Y - #14 - #6 Cu FA100X/Y - #14 - #3 Cu	(1) #14-4 AWG Cu (1) #14-4 AWG Cu (1) #14-4 AWG Cu
KAL, KHL KAL, KHL, KIL■, KCL■ KAL, KHL	225 225 225	SN225KA		SN225KA		----- 225SNA		(1) #4 - 300 kcmil Cu or Al (1) #4 - 250 kcmil Cu (1) #4 - 300 kcmil Cu	(2) #14 - 1/0 AWG Cu or Al (2) #14 - 1/0 AWG Cu (1) #14-4 AWG Cu
LAL, LHL, Q4L LAI, LHL, Q4L, LCL, LIL LXL, LXIL LCL, LIL, LXL*, LXIL* LCL, LXL LIL, LXIL, LEL	400 400 400 400	400SN		----- SN400LA SN400LA SNC400LX SNC800LX		----- ----- ----- -----		(1) #1-600 Kcmil or (2) #1-250 Cu or Al (1) #1-600 Kcmil or (2) #1-250 Cu or Al (1) #1-600 Kcmil or (2) #1-250 Cu or Al (1) #2-600 kcmil Cu (2) #2-600 kcmil Cu	(2) #14-1/0 AWG Cu (2) #6-250 kcmil Cu (2) #6-250 kcmil Cu (2) #6-225 kcmil Cu (1) #2-4/0 AWG Cu
MAL, MHL, MXL* MAL, MHL, MXL*, MEL* LCL, LXL, LIL, LXIL*, LEL* NAL, NCL, NXL	1000▲ 1000 1000 1200	AL800SN		SN1000MA		----- ----- ----- -----		(3) 3/0-500 kcmil Cu or Al (3) 3/0-500 kcmil Cu or Al (3) 3/0-500 kcmil Cu or Al (4) 3/0-600 kcmil Cu or Al (4) 3/0-600 kcmil Cu or Al	(1) #6-250 kcmil Cu (1) #1-4/0 AWG Cu (1) #1-4/0 AWG Cu (1) #4-350 kcmil Cu (1) #4-350 kcmil Cu

- A SN400LA solid neutral is required when installing a KCL/KIL 250 Ampere rated breaker.
- * When using MXL, MEL, LXL, LEL or LXIL circuit breaker with integral ground fault protection on a 3PH4W system, neutral assembly SN 1000MA OR SNC800LX must be used for neutral CT. Order neutral CT separately.
- ▲ Rated maximum 900 Amperes when used with Al wire.
- ◆ SN1200NACT includes neutral CT for use with NXL circuit breaker with integral ground fault protection.
- All Cu neutral assembly.

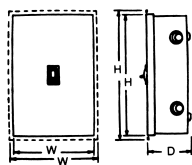
Equipment Ground Kits

Circuit Breaker Catalogue Number Prefix	Ground Bar Catalogue Number	Number of Terminals	Conductors Per Terminal	Wire Range	Price
Q2L, Q2LH FAL, FHL, FCL, FIL KAL, KHL, KCL, KIL LAL, LHL Q4L	PK0GTA-2	2	1	#10-2/0 CU or #6-2/0 Al	
MAL, MHL, MXL, MEL LCL, LEL, LIL LXL, LXIL NAL, NCL, NXL	PK0GTA-4	4	1	#6-250 kcmil Al or Cu	

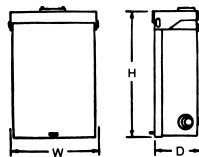
Dimensions (inches)

Catalogue No.	Series	Approximate Dimensions			Catalogue No.	Series	Approximate Dimensions		
		H	W	D			H	W	D
Q23225NFC	E3	27 5/8	11 1/8	5	KA225RB	E2	28 3/8	13 1/8	6 5/8
Q23225NRBC	E3	26 3/8	10 1/4	5 3/4	KA225S	E2	28 5/8	12 3/8	5 5/8
Q23225NSC	E3	26 1/4	9 7/8	5	KA225X◆	C2	22 5/8	10 7/8	7 3/4
FA060X	E1	16	9 7/8	7	KA225Y◆	A2	21 7/8	10 7/8	7 1/2
FA060Y	E1	16	9 7/8	7	LA400AWK	E2	42 1/4	13 7/8	7 1/2
FA100AWK	E2	19 1/2	9 1/8	4 7/8	LA400DS	E2	42 1/4	13 7/8	7 1/2
FA100DS	E2	19 1/2	9 1/8	4 7/8	LA400F	E2	45 5/8	16 1/2	6 7/8
FA100F	E2	19 1/2	9 7/8	4 1/8	LA400R	E2	44 1/4	16	8
FA100RB	E2	18	9 1/4	5 1/8	LA400S	E2	44 1/2	15 3/8	6 7/8
FA100S	E2	18 1/8	8 5/8	4 1/8	LX600AWK	E3	57 1/2	20 3/8	8 1/8
FA100X	E1	16	9 7/8	7	MA1000AWK	E3	57 1/2	20 3/8	8 1/8
FA100Y	E1	16	9 7/8	7	MA1000DS	E3	57 1/2	20 3/8	8 1/8
IK250AWK	E2	42 1/4	13 7/8	7 1/2	MA1000F	E2	52 5/8	21 7/8	7 3/4
IK250DS	E2	42 1/4	13 7/8	7 1/2	MA1000R	E2	52 1/8	21 5/8	9 7/8
KA225AWK	E2	25 1/4	9 1/2	5 3/8	MA1000S	E2	51 7/8	20 1/4	7 3/4
KA225DS	E2	25 1/4	9 1/2	5 3/8	ME1000S	E1	62 1/4	23	14 3/4
KA225F	E2	29 7/8	13 3/4	5 5/8	ME1000R	E1	62 1/4	23	14 3/4
					NA1200AWK	E1	66	35 13/16	14 7/8

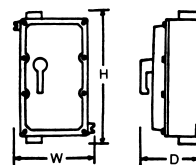
◆ Tapped conduit opening, top and bottom endwall: FA060X/Y—3/4", FA100X/Y—1 1/4", KA225X/Y—2 1/2"



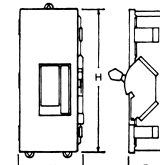
Type 1
Q2, FA, KA, LA, MA



Type 3r
Q2, FA, KA, LA, MA



Type 7, Type 9
FA, KA



Type 4, 4X, 5, 12, 12K
Ik, FA, KA, LA, LX, MA

Dimensions are approximate. Do not use for construction.

Moulded Case Circuit Breaker Electrical Accessories

Factory Installed

Electrical accessories are available on all moulded case circuit breakers except Q2, QO Moulded Case Switches, and QOB-VH (125A - 150A). Factory installed accessories take up an additional pole space on QO, QOU, QO-GFI, QO-EDP and QO-PL circuit breakers. To order, add suffix number to circuit breaker catalogue number. Example: FAL 360151021.

Accessory	Description	QO, QOB, & QOU Circuit Breakers ■				Industrial Circuit Breakers			
		Rated Voltage	Coil Burden	Suffix	Price ‡	Rated Voltage	Coil Burden	Suffix	Price ‡
Shunt-Trip	Trips the circuit breaker electrically using a remote control source. Device includes a coil clearing contact. Minimum voltage on AC systems is 55% of rated voltage, minimum voltage on DC systems 75% of rated voltage. <u>Application</u> • For use with momentary or maintained push button. • Not available on QO-GFI, QO-EDP or Q12150. • QO breakers have terminals to accept (2) #14-#12 Cu. • Industrial breakers have (2) black #16 Cu. leads.	AC				AC			
		24	60VA	1042		24	21VA	1042◇	
		120	72VA	1021		120	29VA	1021	
		208	228VA	1021		208	107VA	1021	
		240	288VA	1021		240	154VA	1021	
						277	14VA	1037◇	
						480	45VA	1037◇	
		AC/DC				DC			
		12	60VA	1042		24	36VA	1027	
		24	168VA	1042		48	36VA	1028	
				125	44VA	1029			
				250	15VA	1030▲			
Ground Fault Shunt-Trip	Trips the breaker electrically using the signal from a MICROLOGIC® Ground fault module. Order GFM from page DE3-29. <u>Application</u> • For use only with MICROLOGIC® ground fault module. • Industrial breakers have (2) orange #18 Cu. leads.							G▲	
Under-Voltage Trip (UVT)	Trips the breaker electrically when a control circuit falls below 35 - 70% of nominal voltage (not field adjustable). Picks up at 35 - 85% of nominal voltage. <u>Application</u> • UVT must be energized in order to close the circuit breaker. • Industrial breakers have (2) brown #18 Cu. leads	-				AC			
						24	5VA	1143Fs	
						120	8VA	1121	
						240	8VA	1124	
						DC			
						24	2VA	1127	
						48	3VA	1128	
Time Delay Unit	Provides adjustable time delay for UVT of .1 seconds - .6 seconds before circuit breaker trips. For use with 120 Vac UVT only <u>Application</u> • Adjustable - for use with 120Vac undervoltage trip (UVT) • I-LINE unit requires 1.5" of mounting space. • Color code: brown leads. (size)	-				120Vac	Unit Mount 690-UVTD	I-Line Mount 690-UVTD1	
Auxiliary Switches	Used for control circuits associated with circuit breaker operation. Auxiliary switch contains 1, 2 or 3 snap switches each- with 1 "A" contact (N.O.) & 1 "B" contact (N.C.). <u>Application</u> • Breakers have # 18Cu. leads, yellow for "A" contacts, blue for "B" contacts and striped for common. • Electrical ratings: <u>QO, QOB, & QOU</u> <u>LA, MA, ME, MX, NH, PA</u> 5A @ 120Vac 15A, .25HP @ 125-250Vac <u>FA, KA, FI, KI, LI</u> .5A @ 125Vdc 11A, .25HP @125-250Vac .25A @ 250Vdc 5A @ 30Vdc 5A Lamp load @ 125Vac	1A	120	1200	-	AC/DC	-	-	
		1B	120	1201	-	-	-	-	
		1A & 1B	-	-	-	-	250	-	1212
		2A & 2B	-	-	-	-	250	-	1352
		3A & 3B	-	-	-	-	250	-	1364‡
Alarm Switches	Used with control circuits and is actuated only when the breaker has tripped. Standard construction includes a double throw N.O. contact. <u>Application</u> • QO breakers have terminals to accept (2) #14-#12 Cu. • Industrial breakers have (2) red #18 Cu. leads. • Electrical ratings: 7A @ 250Vac, 7A(res) @ 28Vdc, 4A(ind) @ 28Vdc (min. 10Vac/DC)	1A	120	2100		AC/DC	-	2100	
		1B				250	-	2103	
		1A				DC	-	2100	
		1B				28	-	2103	
Visi-Blade Breaker	Allows the position of the contacts to be seen through a clear window. Not available on Q2, FA/FH (1P), FI, KI, LI, ME & P frame breakers.			N/A*	-	-		V	

◇ Not available on FI, KI, or KC.
▲ Not available on LC, LE, LI, LX, or LXI circuit breaker.
‡ Not available on FA, FC, FH, FI, or KI circuit breaker.

◆ Not available on ME or MX.
* QO, QOB & QOU c/w visi-trip® as standard.
■ QO breakers will accept only one accessory per circuit breaker.

DE3 CIRCUIT BREAKERS

Moulded Case Circuit Breakers

Electrical Accessories

Field Installed

Complete field installable accessory catalogue number by inserting suffix from page DE3-27 in between the parentheses in the catalogue numbers shown in the table below. For example, to order a 120V shunt-trip kit for an LAL breaker order LA1(1021).

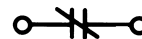
Breaker	Shunt-Trip	Ground-Fault Shunt-Trip	Under Voltage Trip	Auxilliary Switches	Alarm Switch
Miniature Circuit Breakers (QO, QOB, QOU)	Factory Installed Only	Not Available	Not Available	Factory Installed Only	Factory Installed Only
FA, FC, FH, FI KA, KC, KH, KI	Factory Installed Only				
LA, LH (SERIES 4)	LA1()	LA1G	LA1()	LA1()	Factory Installed Only
LE, LX, LXI, LC, LI	LC1()	Not Available	LC1()	LC1()	Factory Installed Only
Q4	LA1()	LA1G	LA1()	LA1()	Factory Installed Only
MA, MH (SERIES 2)	MA1()	MA1G	MA1()	MA1()	Factory Installed Only
ME, MX	Factory Installed Only				
NA, NC, NE, NX (SERIES 1, 2 & 3)	NA1()	NA1()	NA1()	NA1()	NA1()
PA, PH, PC (SERIES 4)	PA1()	Factory Installed Only	PA11121G PA11124F	PA1()	Factory Installed Only
PE, PX (SERIES 4, 5, 6)	PA1()	Factory Installed Only	PA11121G PA11124F	PA1()	Factory Installed Only

◊120V Under-Voltage Trip. Mounts in left port only.
 ◆240V Under-Voltage Trip. Mounts in left port only.

AUXILIARY SWITCH CONTACT CONFIGURATION

Colour Code:
 "A" — Yellow Leads
 "B" — Blue Leads
 Common — Striped Leads

"A" CONTACT
 Breaker Closed



"B" CONTACT
 Breaker Closed



1A/1B

Breaker Closed

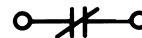


ALARM SWITCH CONFIGURATION

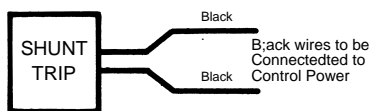
Colour Code: Red Leads
 Breaker Open or Closed



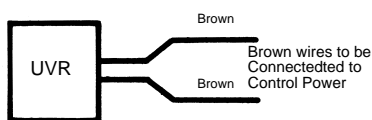
Breaker Tripped



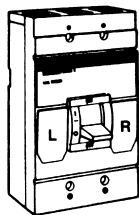
SHUNT TRIP WIRING DIAGRAM



UNDERVOLTAGE TRIP WIRING DIAGRAM

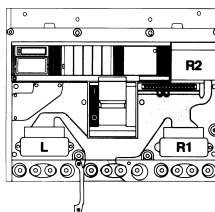


Field Installed Accessory Mounting Locations



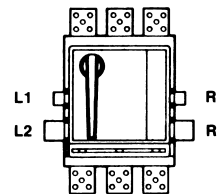
LA, LC, LE, LH, LI, LX, LXI, MA, MH & Q4

Both ports (L-left) & (R-right) will accept shunt-trips, UV Trips, and auxilliary switches. Alarm switches are factory installed only. Maximum 1 device per port.



NA, NC, NE & NX

'L' port and 'R1' port will accept shunt-trips, UV Trips, and alarm switches. Auxilliary switches mount in 'R2' port only.



PA, PC, PE & PX

'L1' & 'L2' or 'R1' & 'R2' port combinations are required to mount a single shunt-trip. Both 'L1' & 'R1' will accept auxilliary switches. Both 'L2' & 'R2' ports will accept a UV trip.

Moulded Case Circuit Breaker MICROLOGIC® Ground Fault Module

Field Installed

The MICROLOGIC® Ground Fault Module (GFM) is a CSA certified and UL listed circuit breaker accessory. It is a combination ground fault relay and ground fault sensing device. The GFM is a self-powered ground fault sensing device that signals a circuit breaker ground fault shunt-trip. It is available for use with unit mount or I-Line construction breakers. Fewer components are required at the branch level since the GFM eliminates the need for a control test panel and relay device. The integral Push-To-Test button allows testing at the job site and eliminates the need for costly primary injection testing. The GFM uses electronic circuitry to provide branch circuit ground fault protection using a compact module that mounts directly to the OFF end lugs of the circuit breaker. By eliminating the need for wiring external ground fault relays and sensors, the GFM saves space and reduces labor costs.

Standard Features Include ...

- All GFMs supplied for I-Line mounting, are easily converted by removing the I-Line brackets.
- All GFMs must be used with a 3-pole breaker.
- Up to 200,000A short circuit withstand rating at 240 and 480Vac. Up to 100,000A short circuit withstand rating at 600Vac.

Adjustable ground fault pickup settings

GFM 100FA and GFM100FI modules are adjustable from 20A through 100A. GFM250 module is adjustable from 40A through 200A.

Adjustable ground fault delay settings

Actual time delay varies with the magnitude of the ground fault.

Sealable adjustments

A clear plastic shield that fits over posts protruding from the module can be sealed by attaching a sealing wire through the hole in the posts.

Integral Push-To-Test button

A button on the face of the GFM allows testing of the ground fault system without the need for any peripheral equipment. (Separate 120 Vac required for Push-to-Test)

Zone selective interlocking

Zone selective interlocking (ZSI) is standard with upstream MICROLOGIC® trip system circuit breakers. The GFM can also be zone interlocked with the GC-100 ground fault system by using a restraint interface module (Catalogue Number RIM32).

Ground fault indication

A pop-out indicator on the face of the GFM indicates the module has sensed a ground fault and initiated a tripping signal to the companion circuit breaker.

Neutral current transformer

A neutral current transformer (CT) is supplied with each GFM for 3-phase 4-wire applications or 1-phase 3-wire applications

Ground Fault Module Selection Data

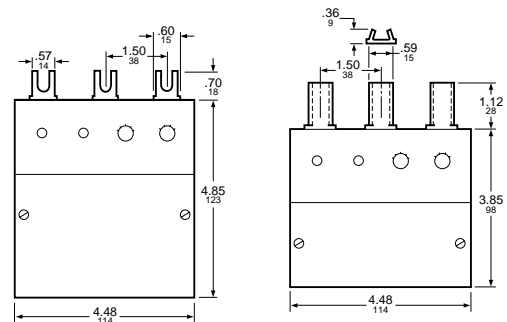
Companion Circuit Breaker Prefix	Catalogue Number ▲	Enclosure Space Required		Ground Fault Pickup Adjustment Range Amperes	Price ※
		Panel-board	Switchboard/Enclosure		
FAL, FHL, FCL FA, FH, FC	GFM100FA	LA	KA	20-100	
FIL, FI	GFM100FI	LA	LA	20-100	
KAL, KHL, KCL, KIL, KA, KH, KC, KI	GFM250	LA	LA	40-200	

- ▲ Moulded case circuit breakers using the GFM require a ground fault shunt trip (add suffix G to the circuit breaker catalogue number when ordering).



Ground Fault Module

Dual Dimensions: INCHES
millimeters



Depth: Unit Mount - 3.22/82; i-Line Mount - 4.85/123

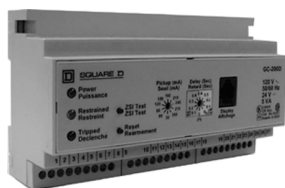
GFM100FA & FI

GFM250

Moulded Case Circuit Breakers

GC200 Ground Fault Relays Class 970

GC-200 Ground Fault Relays work in conjunction with Square D and Federal Pioneer circuit breakers, with shunt trip coils, for use in service entrance switchboards, feeder protection and general equipment protection applications. GC-200 relays functionally replace existing Square D GC-100 relays and Federal Pioneer MGFR relays. GC-200 relays can also be used in other retrofit applications. The GC200 relay is supported also by Federal Pioneer toroidal, and rectangular sensors (contact Schneider Electric), in addition to the Square D rectangular sensors noted below.



GC-200 Relays Features

- Adjustable Pickup and Time Delay settings
- I2t -- Inverse Time Characteristics
- ZSI -- Zone Selective Interlocking
- ZSI Push-to-Test with Signal Indication
- Two sets of Contacts (1 Form A ;10A@ 120Vac. and 1 Form C; 5A@ 120Vac.N/O, 1 N/C)
- Auxiliary Trip Input Terminals
- External Battery Backup Connection
- Optional GC DSP Display Module

GC DSP Display Features

- LCD Back Lit Display
- Surface (Panel) Mounted
- Local Display of System Parameters
- "Fine tuning" Adjustment of Ground Fault Relay Settings
- Remote Testing of Ground Fault Relay
- Remote Resetting of Ground Fault Relay
- User selectable French or English text.
- Multiple Length Display Cables (Optional)

Catalog Number	Pickup Settings										
GC-200A	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	
GC-200B	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.0	
GC-200C	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	
GC-200D	30A	90A	90A	120A	150A	180A	210A	240A	270A	300A	
GC-200E	120A	240A	360A	480A	600A	720A	840A	960A	1080A	1200A	

Catalog Number	Time Delay Settings (Sec)					
All Types	Inst.	0.10	0.20	0.30	0.40	

Catalog Number	Description	Price
GC-200A	0.03 - 0.3A Relay	
GC-200B	0.30 - 3.0A Relay	
GC-200C	3.0 - 30A Relay	
GC-200D	30A - 300A Relay	
GC-200E	120A - 1200A Relay	
GC DSP	GC-200 Display	
GC4	4' GC-200 to GC DSP Cable	
GC12	12' GC-200 to GC DSP Cable	
GC30	30' GC-200 to GC DSP Cable	

Catalog Number	Description	Window Size (in)	Window Size (mm)	Price
GT 912	Ground Fault Sensor*	5 x 8	127 X 203	
GT 918	Ground Fault Sensor*	5 x 14	127 x 356	
GT 930	Ground Fault Sensor*	5 x 26	127 x 660	
GT 1218	Ground Fault Sensor*	8 x 14	203 x 356	
GT 1224	Ground Fault Sensor*	8 x 20	203 x 508	
GT 1230	Ground Fault Sensor*	8 x 26	203 x 660	
GT 1530	Ground Fault Sensor*	11 x 26	280 x 660	
GT 1327	Ground Fault Sensor*	9 x 235	228 x 596	
GT 1330	Ground Fault Sensor*	9 x 265	228 x 673	

* Rectangular sensors 600:1 for GC-200E only. See Federal Pioneer Sensors (1000:1) for other versions (See Redi-Reference).

** Note: GC12 12' cable shipped standard with GC DSP display units.

Moulded Case Circuit Breaker Field Installed Mechanical Accessories

Electrical Operators, Handle Accessories, Mechanical Interlocks, Cylinder Locks.



KAM02120AC
WITH KAL Circuit Breaker

Cylinder Lock

Used to lock the breaker in the "OFF" position.
Breaker cannot be reset when locked off.

Breaker Prefix	Catalogue Number Factory Inst. Suffix	Field Inst.	Price @
FA, FAL, FH, FHL KA, KAL, KH, KHL	CL■	Factory Installed Only	
LA, LAL LH, LHL, Q4 MA, MAL MH, MHL	Field Installable Only	LA1CL MA1CL	

■ Not available on Mag-Gard Breakers.

Electrical Operators

Provides remote ON, OFF/RESET control of moulded case circuit breakers.

- A complete line of field installable electrical operators.
- Not applicable on LE/LX, ME/MX or NE/NX circuit breakers.
- Installing side mounted motor operators requires the use of a separate mounting pan.
- Side mounted electrical operators require an additional 4 1/2" of mounting space in I-LINE® installations

Breaker Prefix	Top Mount			Side Mount			Mounting Pan	
	Voltage	Catalogue No.	Price *	Voltage	Catalogue No.	Price *	Catalogue No.	Price *
FA, FH, FC	...	...	...	120Vac	FAM01		...	...
FAL, FHL, FCL	...	...	...	120Vac	FAM01		FAMOP	
FI, KI, KA, KH, KC	...	...	...	120Vac	KAM01		...	...
FIL, KIL KAL, KHL, KCL	120Vac 240Vac 24Vdc 125Vdc	KAM02120AC KAM02240AC KAMO224DC KAMO2125DC		120Vac	KAM01		KAMOP	
LA, LH, Q4 LAL, LHL, Q4L	...	...	...	120Vac 120Vac	LAM01 LAM01		...	...
MA, MH MAL, MHL	...	...		120Vac 120Vac	MAM01 MAM01		...	...
PA, PH, PC, PE, PX	120Vac	PAM02*					MAMOP	

* Use PA2ECM electronic module for PAM02 electrical operator.

Handle Accessories

Breaker Prefix	No. of Poles	Catalogue No.	Price *	Breaker Prefix	No. of Poles	Catalogue No.	Price *
Handle Padlock Attachment (Locks on or off)				Handle Tie			
Q2	2,3	HPAFYQ		(2)FA	3	FKHT	
FA, FH, FC, FI, KA, KH, KC, KI	1, 2, 3 2, 3	HPAFK HPAFK		(2)KA, (2)FI (2)KI, or (1)FI + (1)KI	2, 3	FKHT	
LA, LH, MA, MH ME, MX, Q4	2, 3	HPALM⊕ HPAXLM◇		(2)LA or (2)Q4	2, 3	LAHT	
NA, NC, NE, NX NH	2, 3 2, 3	HPANE HPANA■		Replacement Handle▲			
LC, LE, LI, LX, LXI	2, 3	AHPALI		PA, PC, PH, PX, PE	3	HRPA	
Handle Extension				▲ Manufactured after March 1975			
MA, MH, ME, MX, NC, NE, NX NH	2, 3 2, 3	MAHEX NAHEX					
LA, LC, LH, LE, LI, LX, LXI, Q4	2, 3	AHEXLI					

⊕ MA, MH, ME and MX Circuit breakers will not lock in ON position.

◇ Use with MAHEX handle extension.

■ Use with NAHEX handle extension.

Walking Beam Mechanical Interlock Components

Circuit Breaker		Price *	Walking Beam Ass'y.		Mounting Pan	
Prefix	Suffix	Adder	Catalogue No.	Price *	Catalogue No.	Price *
Manually Operated						
FAL, FHL	WB		FA4WB		FA-WBP4	
KAL	WB		KA4WB		KA-WBP4	
LAL, LHL	WB		LA6WB		LA-WBP6	
MAL, MHL	WB		MA9WB		MA-WBP9	
Electrically Operated						
FAL, FHL	WBMO		FA9WB		FA-WBP9	
KAL	WBMO		KA9WB		KA-WBP9	
LAL, LHL	WBMO		LA10WB		LA-WBP10	
MAL, MHL	WB		MA13WB		MA-WBP13	



Walking Beam Mechanical Interlock

Requires two circuit breakers with WB suffix, one walking beam assembly and one mounting pan.

Moulded Case Circuit Breakers

Operating Mechanisms


Door Mounted
Class 9421

Type L Circuit Breaker Operating Mechanism



The Type L door mounted, variable depth operating mechanisms listed below are complete kits featuring heavy duty, all metal construction with trip indication. All of the operating mechanisms can be padlocked in the "OFF" position when the enclosure door is open. The handle assemblies can be locked "OFF" with up to three padlocks which also locks the door closed. The 3" handle accepts one padlock. A door drilling template is supplied with each kit to ease installation.

The complete kits are rated for installation into type 1, 3, 3R and 12 enclosures. They include a handle assembly, operating mechanism and shaft assembly. Complete installation instructions are included with each kit. Circuit breakers are not included and must be ordered separately.

Complete Kits

 <p>Complete Kit (does not include circuit breaker)</p>			Includes: Operating Mechanism Standard 6" Handle Standard Shaft Kit			Includes: Operating Mechanism Standard 6" Handle Long Shaft Kit			Includes: Operating Mechanism Short 3" Handle Long Shaft Kit		
Use With											
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (Amps)	Type	Price *	Mounting Depth Min.-Max.	Type	Price *	Mounting Depth Min.-Max.	Type	Price *	Mounting Depth Min.-Max.
FAL, FHL,	2-3	100	LN1		5 1/2-10 7/16 140-265	LN4		5 1/2-21 140-533	LN3		5 1/2-21 140-533
KAL, KHL	2-3	250	LP1		6 1/4-11 3/16 159-284	LP4		6 1/4-21 3/4 159-552	LP3		6 1/4-21 3/4 159-552
LAL, LHL	2-3	400	LR1		6 5/16-10 7/8 160-276	LR4		6 5/16-21 1/2 160-546	3" handles are not recommended for use with these circuit breakers		
MEL, MXL	2-3	800	LT1		7 3/16-11 5/8 183-295	LT4		7 3/16-22 1/4 183-565			
MAL, MHL	2-3	1000	LT1		7 3/16-11 5/8 183-295	LT4		7 3/16-22 1/4 183-565			

Type 4 Handle Assemblies▲

Use With							 <p>Special 3" Version</p>			
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (Amps)	Type 4 (Painted)		Type 4 (Chrome Plated)		Type 4 (Painted)		Type 4 (Chrome Plated)	
			Type	Price *	Type	Price *	Type	Price *	Type	Price *
FAL, FHL	2-3	100	LH46		LC46		LH43		LC43	
KCL, KAL, KHL	2-3	250	LH46		LC46		LH43		LC43	
LAL, LHL	2-3	400	LH46		LC46		3" handles are not recommended for use with these circuit breakers			
MEL, MXL	2-3	800	LH48		LC48					
MAL, MHL	2-3	1000	LH48		LC48					

Dual Dimensions: INCHES
Millimeters

Electrical Interlock Kits - Class 9999

Optional accessory for use with operating mechanisms listed on this page.

Description	Class	Type	Price *
Single Pole Double Throw	9999	R47	
Double Pole Double Throw	9999	R48	

How to Order

TO ORDER SPECIFY:	CATALOGUE NUMBER
• CLASS NUMBER	Class Type
• TYPE NUMBER	9421 LP4

▲Not available on FIL, KIL, LIL

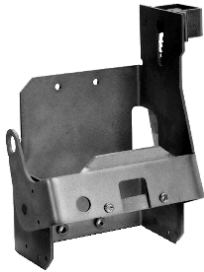
For more information and pricing, please refer to Control Catalogue 2.

Moulded Case Circuit Breaker Operating Mechanisms

Flange Mounted, Variable Depth Class 9422

Circuit Breaker operating mechanisms listed below are shipped with the external operating handle assembled to a bracket. Circuit breakers are not included and must be ordered separately. A trim plate is provided with each kit to eliminate any mounting screws from being accessible from the front and also provide an attractive installation.

The operating handle used is the type A1. Bracket mounted Circuit Breaker Operating Mechanisms can be used with Class 9423 door closing mechanisms.



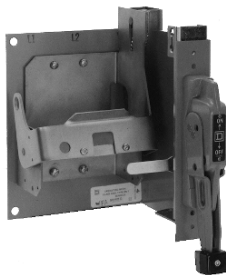
TYPE BN1

Circuit Breaker Operating Mechanisms

Use With			Operating Mechanism Right Hand Flange Mounting	
Circuit Breaker Frame Size	No. of Poles	Frame Size (Amps)	Type	Price ✽
FAL, FHL	2-3	100	BN1	
KAL, KHL	2-3	250	BP1	
LAL, LHL	2-3	400	BR1	

Flange Mounted, Variable Depth

Designed for installation in custom built control enclosures where main or branch circuit protective devices are required. All circuit breaker operating mechanisms are suitable for either right- or left- hand flange mounting, convertible on the job.



TYPE RN1

Circuit Breaker Frame Size	No. of Poles	Frame Size (Amps.)	Variable Depth Mtg. Range Min.-Max. ⇨	Operating Mechanism and Handle Mechanism (6")			
				Includes Type A 1 Handle Mechanism ⇩		Includes Type A2 Handle Mechanism *	
				Type	Price ✽	Type	Price ✽
FAL, FHL	2-3	100	5.38 - 17.75 137 - 451	ARN11		ARN21	
KAL, KHL	2-3	250	6.38 - 17.88 162 - 454	ARP11		ARP21	
LAL, LHL	2-3	400	7.44 - 18.25 189 - 464	ARR11		ARR21	
LIL	2-3	400	7.44 - 18.25 189 - 464	ARR12		ARR22	
MEL, MXL	2-3	800	9.00 - 18.38 229 - 467	ART11		ART21	
MAL, MHL	2-3	1000	9.00 - 18.38 229 - 467	ART11		ART21	

⇨ Class 9422 Type R2 (Book CP2) will extend mounting depth 7".

⇩ Handle mechanism A1 suitable for use on type 1, 3, 3R, 4 (sheet steel) & 12 enclosures.

* Handle mechanism A2 suitable for use on type 4 (stainless Steel) enclosures.

Electrical Interlocks - Class 9999

Description	Class	Type	Price ✽
Single pole, double throw	9999	R26	
Double pole, double throw	9999	R27	

How to Order

TO ORDER SPECIFY:	CATALOGUE NUMBER	
• CLASS NUMBER	Class	Type
• TYPE NUMBER	9422	LP4

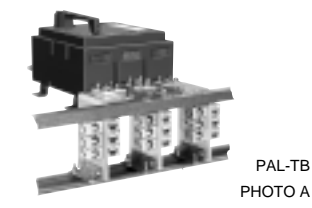
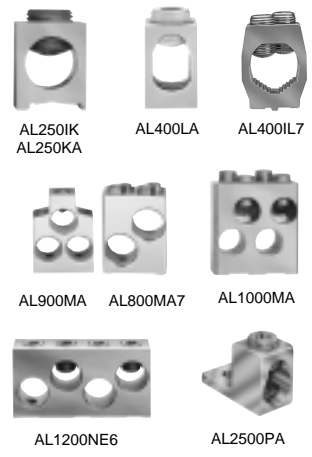
For more information and pricing, please refer to Control Catalogue 2.

Moulded Case Circuit Breakers

Mechanical Lugs, Terminal Pad Kits

Mechanical Lug Information

Kit Catalogue Number	Circuit Breaker Application			Number of Wires Per Lug and Wire Range◆	Lugs Per Kit	Price * Per Kit
	Standard	Ampere Rating	Optional			
Aluminum Lugs For Use With Aluminum or Copper Wire						
AL50FA	FA,FH FI	15-30	FA,FH FI	35-100	1-#14-#4 Cu or 1-#12-#4 Al	3
AL100FA4	FC	35-100	FC	15-30	1-#14-#3 Cu or 1-#12-#1 Al	3
AL100FA	FA,FH FI	35-100	FA,FH FI	15-30	1-#14-#1/0 Cu or 1-#12-#1/0 Al	3
AL100TF*	...	...	FA FH,FC	15-100	1-#12-#3 Cu	3
AL250ME	ME,MX	100-250	...	...	1-#6-350 kcmil	3
AL250KA	KA,KH	70-250	...	...	1-#4-350 kcmil	3
AL250KI	KC,KI	110-175	...	...	...	...
AL250KI	KC,KI	200-250	KI	110-175	1-1/0-350 kcmil	3
AL400LA	Q4,LA,LH	125-400	...	...	1-#1-600 kcmil or 2-#1-250 kcmil	1
AL400LH7	...	...	Q4,LA,LH	120-400	1-350-750kcmil	1
AL600LI35	LE, LX, LXI	100-250	LI, LC, LE, LX, LXI	...	2-#1-350 kcmil	1
AL600LI5	LI, LC, LE, LX, LXI	300-600	LE, LX, LXI	...	2-4/0-500 kcmil	1
AL600LI7	...	...	LI, LC, LE, LX, LXI	100-250	1-500-750kcmil	1
AL400ME7	...	...	ME,MX	250-400	1-350-750 kcmil	1
AL800MA7	...	...	MA,MH ME,MX	300-1000 100-800	2-500-750 kcmil	1
AL900MA	MA,MH ME,MX	300-1000 300-800	ME,MX	100-250	3-#3/0-500 kcmil	1
AL1000MA	...	...	MA,MH	300-1000	4-#1/0-350 kcmil	1
AL1200NE6	NA,NC,NE,NX	600-1200	...	...	4-#3/0-600 kcmil	1
AL2500PA▲	...	...	PAF,PHF,PEF PXF,PCF	600-2500	1-#1/0-750 kcmil	2
Copper Lugs For Use With Copper Wire Only						
CU30FA4	FC	15-30	...	...	1-#14-#10 Cu	3
CU100FA	...	...	FA,FI FH,FC	15-100	1-#14-#1 Cu	3
CU100TF●	...	...	FA FH	15-100	1-#12-#3 Cu	3
CU250KA	...	...	KA,KH KC,KI	70-250 110-250	1-#4-250 kcmil Cu	3
CU250ME	...	...	ME,MX	125-250	1-#4-250 kcmil	3
CU400LA	...	...	Q4,LA,LH	125-400	1-#1-600 kcmil Cu or 2-#1-250 kcmil Cu	1
CU600LI35	...	...	LC,LI, LE, LX, LXI	...	2-#1-350kcmil	1
CU600LI5	...	...	LC,LI, LE, LX, LXI	...	2-#4/0-500kcmil	1
CU600II7	...	...	LC,LI, LE, LX, LXI	...	1-500-750kcmil	1
CU1000MA	...	...	ME,MX MA,MH	100-800 300-1000	3-#3/0-500 kcmil Cu	1
CU1200NE6	...	...	NA,NC,NE,NX	600-1200	4-#3/0-600 kcmil Cu	1



PAL-TB PHOTO A
PAF circuit breaker with one PAL-TB terminal pad kit and 18 optional lugs installed. Kits mount on either line or load end of the breaker. Each kit contains three terminal pads, one per phase, with provisions for mounting a maximum of six lugs per pad. Order lugs (Cat. No. AL2500PA).

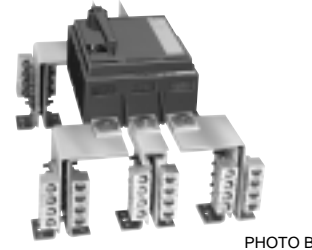


PHOTO B
PCF, PE-20, PE-25 and PX-25 circuit breakers are supplied with a terminal pad kit for line and load cable terminations. The pad kit allows mounting a maximum of eight lugs per pad. Order lugs (Cat. No. AL2500PA).

- ▲ All P Frame breakers require terminal pads for mounting lugs of any type. See table below.
- ◆ Unless otherwise specified, wire sizes apply to both aluminum and copper conductors.
- * For use in the "off" end only, when the off end is the load end.

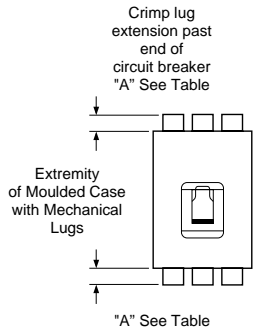
Terminal Pad Kits For PA, PC and PE

Circuit Breaker Prefix	Terminal Pad Kit		Al/Cu Lug Kits Catalogue Number	Price * Per Kit
	Catalogue Number	Price *		
PAF, PHF, PXF-12, PEF-12 PXF-16, PEF-16, PXF-20	PAL-TB (See photo A at right)		AL2500PA■	
PCF, PEF-20, PXF-25, PEF-25	Included With Breaker (See photo B at right)		AL2500PA●	

- Two lugs per kit, maximum six lugs per terminal.
- Two lugs per kit, maximum eight lugs per terminal.

Moulded Case Circuit Breaker VERSAtile™ Crimp Lugs Power Distribution Connectors

Compression Lugs



CSA Certified and UL Listed Field Installable VERSAtile™ Lug Kits

Breaker Type	VERSAtile System Range▲	Dimension A (inches)	VERSA-CRIMP Tool Type	Max Lugs Per Terminal	Kit Catalogue Number	Lug Quantity Per Kit	Price* Per Kit
Aluminum Compression Lug Kits							
FA, FH, FC, FI	#8-1/0	1.3	VC-6 Series	1	VC100FA	3	
KA, KH, KC, KI	#4-300 kcmil	1.5	VC-6 Series	1	VC250KA3	3	
KA, KH, KC, KI	250-350 kcmil	1.5	VC-6 Series	1	VC250KA35	3	
LA, LH, Q4	250-350 kcmil	1.25	VC-6 Series	2	VC400LA35	2	
LA, LH, Q4	#4-300 kcmil	1.0	VC-6 Series	2	VC400LA3	2	
LA, LH, Q4	#2/0-500 kcmil	2.2	VC-6 Series	1	VC400LA5	1	
LA, LH, Q4	500-750 kcmil Al or 500 kcmil Cu	2.5	VC-6 FT or VC-8	1	VC400LA7	1	
*LC, LI, LE, LX, LXI	#4 AWG-300 kcmil	1.05	VC-6 Series	2	VC600L13	2	
*LC, LI, LE, LX, LXI	#2 AWG-500 kcmil	3.20	VC-6 Series	2	VC400L15	2	
*LC, LI, LE, LX, LXI	500-750 kcmil	3.45	VC-6FT or VC-8C	1	VC600L17	1	
ME2, MX2	4-300 kcmil	1.5	VC-6 Series	1	VC250ME	3	
ME2, MX2	250-350 Kcmil	1.5	VC-6 Series	1	VC250ME35	3	
ME4, MX4	#2/0-500 kcmil	2.2	VC-6 Series	1	VC400ME5	1	
ME4, MX4	500-750 kcmil Al or 500 kcmil Cu	2.5	VC-6 FT or VC-8	1	VC400ME7	1	
MA, MH, ME, MX	#2/0-500 kcmil	1.9	VC-6 Series	2	VC600MA5	2	
MA, MH, ME, MX	500-750 kcmil Al or 500 kcmil Cu	2.1	VC-6 FT or VC-8	2	VC800MA7	2	
NA, NC, NE, NX	#2/0-500 kcmil	3.3	VC-6 Series	4	VC1200NE5	4	
NA, NC, NE, NX	500-750 kcmil Al or 500 kcmil Cu	3.6	VC-6 FT or VC-8	4	VC1200NE7	4	
PAF, PHF, PXF, PEF	#2/0-500 kcmil	◆	VC-6 Series	6-8	VC2000PA5	1	
PAF, PHF, PCF	500-750 kcmil Al	◆	VC-6 FT or VC-8	6-8	VC2500PA7	2	
PAF, PEF	or 500 kcmil Cu						
Copper Compression Lug Kits							
FA, FC, FH, FI	#6 1/0 Cu	1.4	VC-6 Series	1	CVC100FA	3	
KA, KH, KC, KI	#2/0-300 kcmil Cu	1.5	VC-6 Series	1	CVC250KA3	3	
LA, LH, Q4	#4-300 kcmil Cu	1.3	VC-6 Series	2	CVC400LA3	2	
LI	#2/0-300 kcmil Cu	1.3	VC-6 Series	2	CVC400IL3	2	
LA, LH, Q4	250-500 kcmil Cu	2.3	VC-6 Series	1	CVC400LA5	1	
LI	250-500 kcmil Cu	2.4	VC-6 Series	1	CVC400IL5	1	
*LC, LI, LE, LX, LXI	250-500 kcmil	3.20	VC-6 Series	1	CVC600LI5	1	
ME4, MX4	#250-500 kcmil Cu	2.6	VC-6 Series	1	CVC400ME5	1	
MA, MH, ME, MX	250-500 kcmil Cu	2.4	VC-6 Series	2	CVC600MA5	2	
NA, NC, NE, NX	#250-500 kcmil Cu	3.3	VC-6 Series	4	CVC1200NE5	4	
NA, NC, NE, NX	500-750 kcmil Cu	3.6	VC-6 Series	4	CVC1200NE7	4	

▲ Unless otherwise specified, wire sizes apply to both aluminum and copper conductors.

◆ PAF, PHF, PEF and PXF require terminal pads for mounting lugs of any type.

* These lugs cannot be used on I-Line breakers.

Power Distribution Connectors For Circuit Breakers - For Field Replacement of Mechanical

Can be used for multiple load connections on one breaker. Use in place of standard distribution blocks to save space and time.

Field installable kits, including tin plated aluminum connectors and all necessary mounting hardware are available for Square D FA, KA, LA, Q4, MA, ME and MX moulded case circuit breakers.

Each is CSA certified & UL listed for copper wire only for use on the OFF end of the circuit breaker when the OFF end is the Load end.

Use With Breaker■	Breaker Ampere Rating	Number of Wires Per Terminal & Wire Range◆	Catalogue Number	Lug Quantity Per Kit	Dimension A (In)	Price* Per Kit
FAL, FHL, FCL	15-100	6-#14-6 Cu	PDC6FA6	3	1.0	
		3-#14-2 Cu	PDC3FA2	3	1.2	
KAL, KHL	70-250	6-#14-4 Cu	PDC6KA4	3	1.0	
		2-#14-1 Cu	PDC3KA20	3	1.5	
		1-#12-2.0 Cu				
LAL, LHL, Q4L	125-400	6-#12-2.0 Cu	PDC6LA20	1	2.25	
		12-#14-4 Cu	PDC12LA4	1	1.25	
		3-#14-2 Cu	PDC4LA250	1	2.0	
		1-#2-250 kcmil Cu				
MAL, MHL MEL, MXL	125-1000	6-#12-2.0 Cu	PDC6MA20	1	0.0	
		12-#14-4 Cu	PDC12MA4	1	0.0	

■ Not for use with I-Line mounted circuit breakers

◆ When using fine stranded wire, increased cross sectional area may cause maximum wire size to be reduced.

Moulded Case Circuit Breakers MAG-GARD® Motor Circuit Protectors

600Vac
3 - 1200 Amps

Magnetic Trip
Selection Table

Adjustable Instantaneous Trip Circuit Breakers For Single Motor Circuit Protection



Adjustable instantaneous trip circuit breakers are intended for use in combination with motor starters with overload relays for the protection of motor circuits from short circuits. Other specific applications include rectifiers and resistance welders. These C/B's contain a magnetic trip element in each pole with the trip point adjustable from the front. Interrupting ratings are determined by testing the instantaneous trip C/B in combination with a contactor and overload relay. Refer to C.E.C. 28-210.

Select instantaneous trip C/B's as follows:

1. This selection table is suitable for motors with Locked-Rotor Indicating Code Letters as follows;

Horsepower	Motor Code Letters
1/2 or less	A-L
3/4 to 1 1/2	A-K
2 to 3	A-J
5 to 25	A-H
30 to 125	A-G
150 or more	A-F

For other motors order a special thermal-magnetic circuit breaker with magnetic trip settings for the specific motor - specify motor horsepower, voltage, frequency, full load current and code letter or locked rotor current.

2. Determine motor HP rating from the motor nameplate.

3. Refer to the table at right and select an instantaneous trip C/B with an ampere rating recommended for the HP and voltage involved.

4. Select an adjustable trip setting of at least 700%, not to exceed 1300%, of the motor full load amperes. (FLA).

5. The 1300% maximum setting may be inadequate for instantaneous trip circuit breakers to withstand current surges typical of the magnetization current of auto-transformer type reduced voltage starters, or open transition wye-delta starters during transfer from "start" to "run", constant HP multi-speed motors, and motors labeled "high efficiency". Select thermal-magnetic circuit breakers from page DE3-5 for those applications.

6. Part-winding motors, should have two circuit breakers selected from the above at not more than one half the allowable trip setting for the horsepower rating. The two circuit breakers should operate simultaneously as a disconnecting means.

7. Motor full load currents, 1/2 HP thru 200 HP are taken from Table 44 of the C.E.C. & Table 430-150 of the NEC. Above 200 HP from UL 98, Table 18.2. Select wire and circuit breakers on basis of horsepower rather than nameplate full load current for General Motor Applications. **Do not use these values to select overload relay thermal units. See Book CP2 for selection of thermal units when actual full load is not known.** The voltages listed are rated motor voltages. Corresponding nominal system voltages are 200 to 208, 220 to 240, 440 to 480 and 550 to 600 volts.

■ If due to motor starting characteristics, trip settings at the 1300% maximum permitted level are needed, the next size MAG-GARD circuit breaker should be chosen.

* Only LO and HI settings are shown, intermediate settings are available on all circuit breakers.

Based on 1990 CEC Section 28-210 & Table 44, and 1990 NEC Article 430-52 and Table 430-150.

HP Ratings of Induction Type Squirrel-Cage and Wound Rotor Motors				Full Load Amps. (Note7)	Standard MAG-GARD® Circuit Breaker Catalogue No.	Magnetic Trip Settings*	
Three Phase 60 Hz ac						LO	HI
200 Volts	230 Volts	460 Volts	575 Volts				
...	...	...	1/2	0.8	FAL36003-11M	1000%	3500%
...	...	1/2	...	1	FAL36003-11M	800%	2800%
...	...	...	3/4	1.1	FAL36003-11M	700%	2500%
...	...	3/4	...	1.4	FAL36003-11M	600%	2000%
...	...	1	...	1.8	FAL36003-11M	400%	1600%
...	1/2	...	...	2	FAL36003-11M	400%	1400%
...	...	...	1 1/2	2.1	FAL36003-11M	400%	1300%
1/2	...	...	...	2.3	FAL36003-11M■	300%	1200%
...	...	1 1/2	...	2.6	FAL36007-12M	700%	2700%
...	...	...	2	2.7	FAL36007-12M	700%	2600%
...	3/4	...	...	2.8	FAL36007-12M	600%	2500%
3/4	...	...	...	3.2	FAL36007-12M	600%	2200%
...	...	2	...	3.4	FAL36007-12M	500%	2100%
...	1	...	...	3.6	FAL36007-12M	500%	1900%
...	...	...	3	3.9	FAL36007-12M	500%	1800%
1	...	...	...	4.1	FAL36007-12M	400%	1700%
...	...	3	...	4.8	FAL36007-12M	400%	1500%
...	1 1/2	...	...	5.2	FAL36007-12M	300%	1300%
1 1/2	...	...	...	6	FAL36007-12M■	300%	1200%
...	...	5	...	6.1	FAL36007-12M■	300%	1100%
...	2	...	...	6.8	FAL36015-13M	700%	2600%
...	...	5	...	7.6	FAL36015-13M	700%	2400%
2	...	...	...	7.8	FAL36015-13M	600%	2300%
...	...	...	7 1/2	9	FAL36015-13M	600%	2000%
...	3	...	...	9.6	FAL36015-13M	500%	1900%
...	...	7 1/2	10	11	FAL36015-13M	500%	1600%
...	3	...	10	14	FAL36030-15M	700%	2500%
...	...	10	...	15.2	FAL36030-15M	700%	2300%
...	5	...	...	17	FAL36030-15M	600%	2100%
...	...	...	15	17.5	FAL36030-15M	600%	2000%
5	...	...	...	21	FAL36030-15M	500%	1700%
...	...	15	...	22	FAL36030-15M	700%	2600%
...	7 1/2	...	20	25.3	FAL36050-16M	600%	2300%
7 1/2	...	...	20	27	FAL36050-16M	600%	2100%
...	10	...	...	28	FAL36050-16M	500%	2100%
...	...	...	30	32	FAL36050-16M	500%	1800%
10	...	...	...	32.2	FAL36050-16M	500%	1800%
...	...	25	...	34	FAL36050-16M	400%	1700%
...	...	30	...	40	FAL36050-16M	400%	1500%
...	...	...	40	41	FAL36100-18M	700%	2700%
...	15	...	...	42	FAL36100-18M	700%	2600%
...	...	...	...	48.3	FAL36100-18M	600%	2300%
...	...	40	50	52	FAL36100-18M	600%	2100%
...	20	...	...	54	FAL36100-18M	600%	2000%
20	...	...	60	62	FAL36100-18M	500%	1800%
...	...	50	...	65	FAL36100-18M	500%	1700%
...	25	...	...	68	FAL36100-18M	400%	1600%
...	...	60	75	77	FAL36150-24M	600%	1400%
25	...	...	...	78.2	FAL36150-24M	600%	1400%
...	30	...	...	80	FAL36150-24M	600%	1400%
...	...	...	...	92	KAL36250-25M	700%	1400%
...	...	75	...	96	KAL36250-25M	700%	1300%
...	...	...	100	99	KAL36250-25M	600%	1300%
...	40	...	...	104	KAL36250-26M	700%	1400%
...	...	...	...	119.6	KAL36250-29M	700%	1500%
...	...	100	...	124	KAL36250-29M	700%	1400%
...	...	...	125	125	KAL36250-29M	700%	1400%
...	50	...	...	130	KAL36250-29M	700%	1300%
...	...	150	...	144	KAL36250-30M	700%	1400%
50	...	...	...	149.4	KAL36250-30M	700%	1300%
...	60	...	...	154	KAL36250-31M	700%	1500%
...	...	125	...	156	KAL36250-31M	700%	1400%
...	...	...	...	177.1	KAL36250-32M	700%	1400%
60	...	150	...	180	KAL36250-32M	700%	1400%
...	75	...	200	192	KAL36250-32M	700%	1300%
...	...	...	...	220.8	LAL36400-33M	700%	1400%
...	...	200	...	240	LAL36400-35M	700%	1500%
...	...	...	250	242	LAL36400-35M	700%	1400%
...	100	...	...	248	LAL36400-35M	700%	1400%
100	...	...	...	285.2	LAL36400-36M	700%	1400%
...	...	300	...	289	LAL36400-36M	700%	1400%
...	...	250	...	302	LAL36400-36M	700%	1300%
...	125	...	...	312	LAL36400-36M	600%	1300%
...	...	...	350	336	MAL36600-40M	700%	1500%
125	...	...	...	358.8	MAL36600-40M	700%	1400%
...	150	...	...	360	MAL36600-40M	700%	1400%
...	...	300	...	361	MAL36600-40M	700%	1400%
...	...	...	400	382	MAL36600-40M	700%	1300%
150	...	350	...	414	MAL36600-42M	700%	1400%
...	...	...	500	472	MAL36600-44M	700%	1500%
...	...	400	...	477	MAL36600-44M	700%	1500%
...	200	...	...	480	MAL36600-44M	700%	1500%
200	...	...	...	552	MAL36800-45M	700%	1400%
...	...	500	...	590	MAL36800-45M	700%	1400%
...	250	...	...	602	MAL36800-45M	700%	1300%

Enclosure Types



Type 1



Type 3R



Type 7/9



Type 12

DE3 CIRCUIT BREAKERS

Provides Protection Against ...	Enclosure Type															
	Non-Hazardous Locations								Hazardous Locations							
	1	2	3	3R	4	4X	5	12	7A	7B	7C	7D	9E	9F	9G	
Accidental contact with enclosed equipment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Dripping and light splashing of non corrosive liquids		X	X	X	X	X	X	X								
Limited amounts of falling dirt	X	X	X	X	X	X	X	X								
Windblown dust			X		X	X										
Rain, sleet, and external ice formation			X	X	X	X										
Hose directed water					X	X										
Corrosion						X										
Settling airborne dust, lint, fibers, and filings			X		X	X	X	X								
Circulating dust			X		X	X		X								
Acetylene									X							
Hydrogen, manufactured gas										X						
Ethyl ether, ethylene, cyclopropane										X	X					
Gasoline, hexane, naphtha, benzene, butane, propane										X	X	X				
Alcohol, acetone, benzol, natural gas, lacquer solvent										X	X	X				
Metal dust													X			
Carbon black, coal dust, coke dust														X		
Flour, starch, grain dust														X	X	
Usage																
Indoors	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Outdoors			X	X	X	X										

Glossary

accessory (device). An electrical or mechanical device that performs a secondary or minor function apart from overcurrent protection.

alarm switch (bell alarm). An auxiliary switch that operates only upon the tripping of the circuit breaker with which it is associated.

ambient temperature rating. The ambient temperature of a circuit breaker on which its rated continuous current is based.

arc chute (arc stack). A series of steel plates assembled in an insulated housing over the stationary and movable contacts. The plates help cool and extinguish the arc when the circuit breaker contacts are separated under load.

auxiliary switch. A switch which is mechanically operated by the main switching device for signalling, interlocking or other purposes.

bell alarm. See alarm switch.

branch circuit. The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s).

circuit breaker. A device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined overcurrent without injury to itself when properly applied within its rating.

circuit breaker frame. (1) The circuit breaker housing containing the current components, the current sensing components and the tripping and operating mechanisms. (2) That portion of an interchangeable trip unit circuit breaker remaining when the interchangeable trip unit is removed.

coil clearing switch. A mechanically-operated switch in series with the coil of a shunt trip device that breaks the coil circuit when the circuit breaker opens.

continuous current rating (handle rating). The maximum direct current or rms current, in amperes, at rated frequency which a device or an assembly will carry continuously without exceeding the specified limits of observable temperature rise.

continuous load. A load where the maximum current is expected to continue for three hours or more.

current-limiting circuit breaker. A circuit breaker that does not use a fusible element and when operating within its current-limiting range, limits the I²T let through to a value less than the I²T of a 1/2 cycle wave of symmetrical prospective current.

current path (of a circuit breaker). The current-carrying conductors within a circuit breaker between, and including, line and load terminations.

electrical operator (motor operator). A controlling device which is used to open, close and reset a circuit breaker.

fixed mounting. A circuit breaker mounted such that it cannot be removed without removing primary and sometimes secondary connections or mounting supports.

frame size. A term applied to a group of moulded case circuit breakers which are physically interchangeable with each other. Frame size is expressed in amperes and corresponds to the largest ampere rating available in the group. The same frame size designation may be applied to more than one group of circuit breakers.

frequency. The number of cycles per second for an ac system.

frequency rating. The frequency of the circuit for which the circuit breaker is designed.

ground fault. An unintentional electrical path between a part operating normally at some potential to ground, and ground.

ground fault delay. The length of time the circuit breaker trip unit delays before initiating a trip signal to the circuit breaker after a ground fault has been detected.

ground fault module. An electronic accessory used with thermal-magnetic circuit breakers to provide branch circuit ground fault protection and ground-fault indication.

ground fault pickup. The level of ground fault current at which the trip system begins timing.

handle rating. Continuous current rating.

I-Limiter. The Square D Family of current-limiting circuit breakers.

instantaneous pickup. The current level at which the circuit breaker trips with no intentional time delay.

instantaneous trip (as applied to circuit breakers). A qualifying term indicating that no delay is purposely introduced in the action of the device.

interrupting rating. The highest current at rated voltage available at the circuit breaker's incoming terminals. When the circuit breaker is used at more than one voltage, the interrupting rating is shown for each voltage level. The interrupting rating of a circuit breaker must be equal to or greater than the available short circuit current at the point at which the circuit breaker is applied to the system.

inverse time. A qualifying term indicating that there is purposely introduced a delayed action, which delay decreased as the magnitude of the current increases.

let-through. An expression related to energy (measured in ampere-squared seconds) that passes through an overcurrent protective device during an interruption.

MAG-GARD®. The Square D family of instantaneous-trip circuit breakers (motor short-circuit protectors).

moulded case circuit breaker. A circuit breaker that is assembled as an integral unit in a supportive and enclosed housing of insulating material.

motor short-circuit protector. A recognized component with no thermal elements that provides short-circuit protection only.

neutral current transformer. A current transformer that encircles the neutral conductor; required on circuit breakers with ground-fault protection, when applied on a grounded system.

non-automatic circuit breaker. One which opens only in response to an act of an operator or by an accessory device.

operating mechanism. The mechanism by which the contacts are actuated.

overcurrent. Any current in excess of the rated current of equipment or the ampacity of a conductor.

overcurrent trip element. A device which, for a given pole of a circuit breaker, detects overcurrent and transmits the energy necessary to trip the breaker automatically. It may actuate the breaker operating mechanism directly or may form part of a trip unit.

overcurrent trip switch. See alarm switch.

peak let-through. The maximum peak current that passes through an overcurrent protective device during an interruption.

push-to-trip button. A button used to manually trip the circuit breaker.

rated interrupting current. A rating which is established under prescribed test conditions at a specified voltage and which is the maximum available current at which the circuit breaker may be applied.

Moulded Case Circuit Breakers

Glossary

residual ground-fault sensing. A means of providing equipment ground-fault protection using sensors on each individual phase.

root-mean-square (rms). The square root of the arithmetic mean of the squares of a set of numbers.

rms current sensing. A method of determining the true rms current of sinusoidal and non-sinusoidal waveforms.

shunt trip. A trip mechanism energized by a source of voltage which may be derived either from the main circuit or from an independent source.

switching duty circuit breaker. A circuit breaker intended to switch fluorescent lighting loads.

terminal block. The connections for control wiring.

thermal-magnetic circuit breaker. General term for circuit breakers that use bimetals and electromagnetic assemblies to provide both thermal and magnetic overcurrent protection.

thermal trip. A trip element consisting of a bimetal that bends because of the heat generated by current passing through it. The bimetal's bending force and deflection trips the circuit breaker during overload conditions.

undervoltage trip. An opening release which permits a circuit breaker to open automatically if the voltage across the terminals of its main circuit falls below a pre-determined value.

zero-sequence ground-fault sensing. A means of providing equipment ground-fault protection using a single sensor surrounding all phase and neutral conductors.