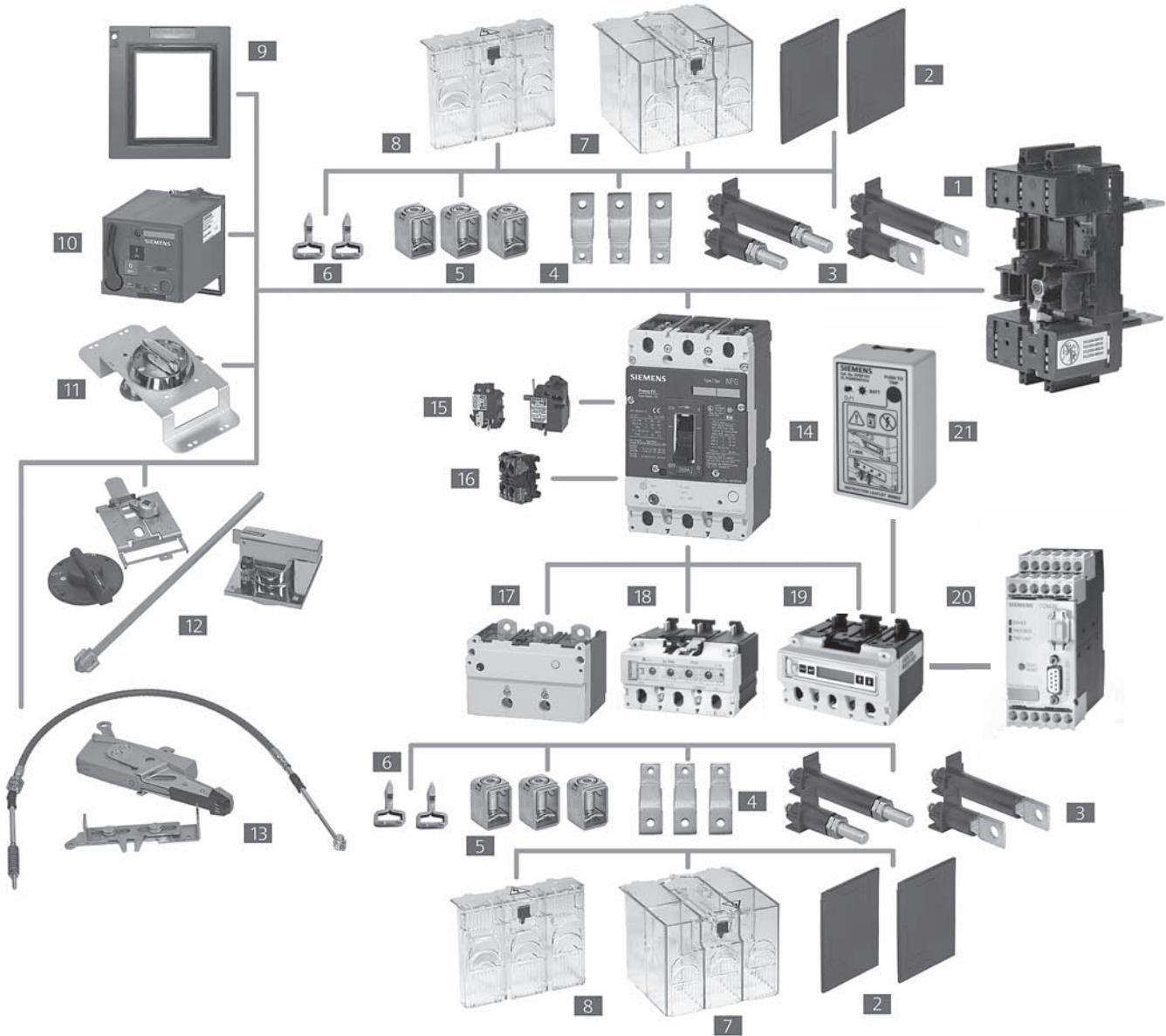


Modularity To Support All Your Application Needs Modules and More: VL Circuit Breakers with Optional Accessories

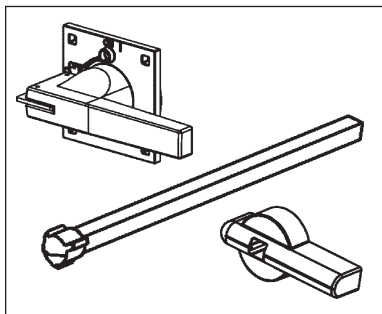
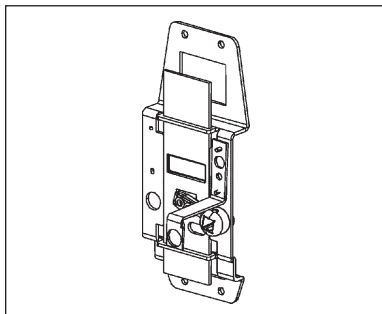
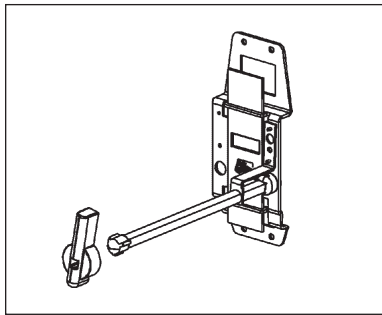
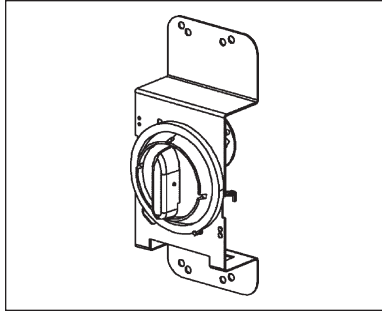


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|--|---|--|
| 1 Base for Plug-In or Draw-Out | 9 Cover Frame for Door Cutout | 17 Thermal Magnetic Trip Unit (525) |
| 2 Interphase Barriers | 10 Stored Energy Operator | 18 Electronic Trip Unit (555) |
| 3 Rear Terminals – Flat and Round | 11 Rotary Handle Operator | 19 Elec. Trip Unit with LCD (586) |
| 4 Bus Extensions | 12 Variable Depth Rotary Operator | 20 Communication Module with ZSI |
| 5 Terminal Connectors | 13 Max Flex Operator | 21 Electronic Trip Unit Tester and LCD Power Supply |
| 6 Plug-In Terminal Blades | 14 Circuit Breaker | |
| 7 Extended Terminal Shield | 15 Shunt Trip or Undervoltage Releases | |
| 8 Standard Terminal Shield | 16 Auxiliary/Alarm Switches | |

7
MOLDED CASE
CIRCUIT BREAKERS

External Accessories

Operating Mechanisms



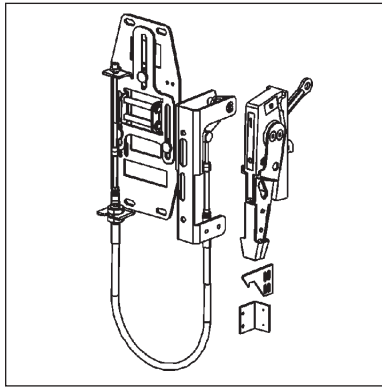
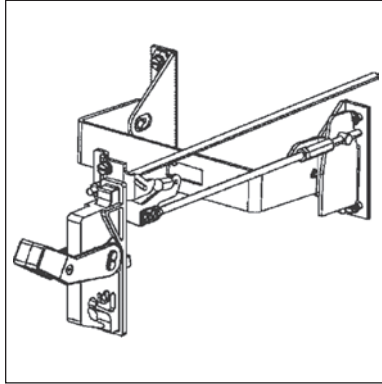
Description	For DG to FG Frame 150 to 250 A	For JG to LG Frame 400 A to 600 A
	Catalog Number	Catalog Number
Through-Door Rotary Handle Operator Kit Fixed depth and the handle is mounted directly on the circuit breaker. Lockable knob (for up to 3 padlocks). NEMA 1, 12 Red Handle Version with red knob, yellow indicator plate NEMA 1, 12	RHFF RHHFEM	RHFL RHHFLEM
Door-Mounted Rotary Handle Operator Kit Variable depth, door mounted handle. Includes knob with masking frame, indicator plate, detachable door coupling, 12" shaft, and breaker mounted rotary operator. Lockable knob (for up to 3 padlocks). NEMA 1, 12	RHVF12	RHVL12
Auxiliary Switch Kits For Direct or Extended Rotary Handle Operators (RHF and RHV). Form C, Early Break type2 Aux. Switch Kit [Ⓞ] Includes 1 switch with 5' wire For Door-Mounted Operator For Through-Door Operator Includes 2 switches with 5' wire For Door-Mounted Operator For Through-Door Operator	— RHSFA1F — RHSFA2F	— RHSLA1 RHSLA1F — RHSLA2 RHSLA2F
Door-Mounted Rotary Operator Mechanism Breaker mechanism only	RHVFBM	RHVLBM
Door-Mounted Rotary Handle Only Standard version NEMA 1, 12 NEMA 3R NEMA 4X Red Handle version	RHVM12H RHVM3RH RHVM4XH RHVMEMH	RHVM12H RHVM3RH RHVM4XH RHVMEMH
NFPA-79 Handle Kit Intermediate handle for NFPA-79 compliance with door-mounted rotary operator	RHVF79H	RHVM79H
Extension Shaft Only, for Door Mounted Operator 2 inches (50.8mm) 3 inches (76.2mm) 12 inches (304.8 mm) 16 inches (406.4 mm) 24 inches (609.6mm) w/ support bracket	RHVMS02 — RHVMS12 RHVMS16 RHVMS24	RHVMS02 — RHVMS12 RHVMS16 RHVMS24

Ⓞ During manual operation, Early Break auxiliary switch contacts open before the breaker opens.

Description	For MG Frame 800 A	For NG to PG Frame 1200 to 1600 A	
	Catalog Number	Catalog Number	
Through-Door Rotary Handle Operator Kit Fixed depth, breaker mounted. For direct fitting to the circuit breaker. Lockable with up to 3 padlocks. NEMA 1, 12	RHFM	—	—
Red Handle version with red knob, yellow indicator plate NEMA 1, 12	—	—	—
Door-Mounted Rotary Handle Operator Kit Variable depth, door mounted handle. Includes knob with masking frame, indicator plate, detachable door coupling, 12" shaft, and breaker mounted rotary operator. Lockable knob (for up to 3 padlocks). NEMA 1, 12	RHVM12	—	—
Auxiliary Switch Kits For Direct or Extended Rotary Handle Operators (RHF and RHV). Early Break type2 Aux. Switch Kit Includes 1 switch with 5' wire For Door-Mounted Operator For Through-Door Operator	RHSMA1 —	—	RHSPA1 —
Includes 2 switches with 5' wire For Door-Mounted Operator For Through-Door Operator	RHSMA2 —	—	RHSPA2 —
Door-Mounted Rotary Operator Mechanism Breaker mechanism only	RHVMBM		RHVPBM
Door-Mounted Rotary Handle Only Standard version NEMA 1, 12 NEMA 3R NEMA 4X Red Handle version	RHVM12H RHVM3RH RHVM4XH RHVMEMH		RHVP3RH RHVP3RH RHVP4XH RHVP4XH
NFPA-79 Handle Kit Intermediate handle for NFPA-79 compliance with door-mounted rotary operator	RHVM79H		RHVP79H
Extension Shaft Only, for Door Mounted Operator 2 inches (50.8mm) 3 inches (76.2mm) 12 inches (304.8 mm) 16 inches (406.4 mm) 24 inches (609.6mm) w/ support bracket	RHVMS02 — RHVMS12 RHVMS16 RHVMS24	—	— RHVPS03 RHVPS12 — RHVPS24

External Accessories

Operating Mechanisms



Description	For DG and FG Frame 150 to 250 A	For JG and LG Frame 400 to 600 A
	Catalog Number	Catalog Number
Variable Depth Flange Mounted Operator Kit Adjustable from 8" to 16" Complete kit, includes handle and variable depth operator. NEMA 1, 3R, 12 NEMA 4X IEC Black Handle NEMA 1, 3R, 12 NEMA 4X	FHV3R FHV4X FHV3RB FHV4XB	FHV3R FHV4X FHV3RB FHV4XB
Max-Flex™, Variable Depth Flange Mounted Operator Kit Complete kit, includes plastic handle, breaker operator, and cable. NEMA 1, 3R, 12 For DG and FG operators, the cable is 36", all others are 48" May be right- or left-hand mounted	MFKF3R	MFKL3R
Handle Only, for Max-Flex™ Variable Depth NEMA 1, 3R, 12 Plastic NEMA 1, 3R, 12 Steel - epoxy coated NEMA 4, 4X Steel - chrome plated Solid color (all gray) Plastic ^① NEMA 1, 3R, 12 Solid color (black handle) Steel epoxy coated ^① NEMA 1, 3R, 12	MFHM3R MFHM3RS MFHM4X MFHM3RB MFHM3RSB	MFHM3R MFHM3RS MFHM4X MFHM3RB MFHM3RSB
Breaker Operator Mechanism Only, for Max-Flex™	MFMF	MFML
Cable Only, for Max-Flex™ Variable Depth 36" 48" 60" 72" 84" 96" 120" 144"	MFCF036 MFCF048 MFCF060 MFCF072 MFCF084 MFCF096 MFCF120 MFCF144	MFCM036 MFCM048 MFCM060 MFCM072 MFCM084 MFCM096 MFCM120 MFCM144
Handle Auxiliary Switch Form C (1NO - 1NC), early break ^② 1 Aux. switch 2 Aux. switch	MFSFA1 MFSFA2	MFSLA1 MFSLA2

① Max-Flex™ handles are available with solid gray or black handles instead of the customary "Red for On" flange handle.

The black handle is preferred for IEC markets, where red handles have a specific meaning.

② During manual operation, Early Break aux. contacts open before the breaker opens.

Description	For MG Frame 800 A	For NG Frame 1200 A	For PG Frame 1600 A
	Catalog Number	Catalog Number	Catalog Number
Variable Depth Flange Mounted Operator Kit Adjustable from 8" to 16" Complete kit, includes handle and variable depth operator.			
NEMA 1, 3R, 12	—	—	
NEMA 4X	—	—	
IEC Black Handle	—	—	
NEMA 1, 3R, 12	—	—	
NEMA 4X	—	—	
Max-Flex™, Variable Depth Flange Mounted Operator Kit Complete kit, includes plastic handle, breaker operator, and cable. NEMA 1, 3R, 12 For DG and FG operators, the cable is 36", all others are 48" May be right- or left-hand mounted	MFKM3R	MFKP3RS	MFKP3RS
Handle Only, for Max-Flex™ Variable Depth			
NEMA 1, 3R, 12 Plastic	MFHM3R	—	—
NEMA 1, 3R, 12 Steel - epoxy coated	MFHM3RS	MFHP3RS	MFHP3RS
NEMA 4, 4X Steel - chrome plated	MFHM4X	MFHP4X	MFHP4X
Solid color (all gray) Plastic [Ⓢ]			
NEMA 1, 3R, 12	MFHM3RB	—	—
Solid color (black handle) Steel epoxy coated [Ⓢ]			
NEMA 1, 3R, 12	MFHM3RSB	MFHP3RSB	MFHP3RSB
Breaker Operator Mechanism Only, for Max-Flex™	MFMM	MFMP	MFMP
Cable Only, for Max-Flex™ Variable Depth			
36"	MFCM036	—	—
48"	MFCM048	MFCP048	MFCP048
60"	MFCM060	MFCP060	MFCP060
72"	MFCM072	MFCP072	MFCP072
84"	MFCM084	MFCP084	MFCP084
96"	MFCM096	MFCP096	MFCP096
120"	MFCM120	MFCP120	MFCP120
144"	MFCM144	MFCP144	MFCP144
Handle Auxiliary Switch Form C (1NO - 1NC), early break [Ⓢ] 1 Aux. switch 2 Aux. switch	MFSPA1 MFSPA2	MFSPA1 MFSPA2	MFSPA1 MFSPA2

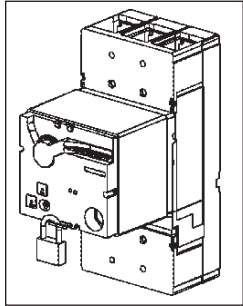
Ⓢ Max-Flex™ handles are available with solid gray or black handles instead of the customary "Red for On" flange handle.

The black handle is preferred for IEC markets, where red handles have a specific meaning.

Ⓢ During manual operation, Early Break aux. contacts open before the breaker opens.

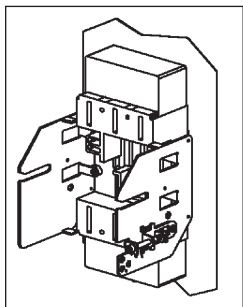
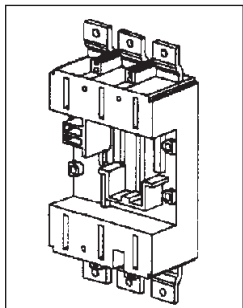
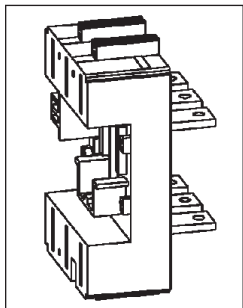
External Accessories

Operating Mechanisms



Description	For DG to FG Frame 150 to 250 A	
	Catalog Number	
Stored Energy and Motor Operators Lockable with up to 3 padlocks.		
AC Voltage DC Voltage	Stored Energy Type	
— 24	SEAFB	
42-48 42-48	SEAFM	
60 60	SEAFY	
110-127 110-127	SEAFN	
220-250 220-250	SEAFR	
Cylinder Locks for Field Installation	CLKF	

Plug-In and Draw-Out Bases



Description	For DG Frame 150 A	For FG Frame 250 A
	Catalog Number	Catalog Number
Plug-in Mounting Base Assembly Includes base, terminal blade kit, sec. terminal block assembly, base trip interlock, and mounting hardware.		
Rear Connected 3-pole	PCBDRC3	PCBFRC3
Front Connected 3-pole	PCBDFC3	PCBFFC3
Draw-out Assembly Includes base, position indicator switch, socket, base trip interlock, crank handle, connectors, and necessary shields.		
Rear Connected 3-pole	DCADRC3	DCAFRC3
Front Connected 3-pole (Draw-out assembly includes side plates and all hardware)	DCADFC3	DCAFFC3
Hex Wrench for racking draw-out assembly and position indicator	DCHP	DCHP
Position Indicator Switch Form "C" switch to indicate breaker engaged/de-engaged position. ^①	DCIP	DCIP
Secondary Terminal Block Assy. Accessory connections for plug-in or draw-out breakers. Pre-wired plug and block with 8 terminal points. ^②	PCTF83	PCTF83
Plug-In Spare Breaker Kit Set of 6 terminal blades, 2 terminal shield, & 1 trip interlock	PCXD3	PCXF3
Draw-out Spare Breaker Kit Set of 6 terminal blades, & 1 trip interlock	DCXD3	DCXF3
Spare Breaker Trip Interlock	PCXFT	PCXFT

① Up to 2 position indicator switches may be mounted per plug-in or draw-out base.

② Up to 2 plugs per breaker (16 terminal points) may be mounted on DG, and FG breakers. Up to 3 plugs per breaker (24 terminal points) may be mounted on JG, LG, MG, NG, and PG breakers.

For JG to LG Frame
400 to 600 A

For MG Frame
800 A

For NG to PG Frame
1200 to 1600 A

Catalog Number

Catalog Number

Catalog Number

Stored Energy Type
SEALB
SEALM
SEALY
SEALN
SEALR
CLKP

Stored Energy Type
SEAMB
SEAMM
SEAMY
SEAMN
SEAMR
CLKP

Motor Operator Type
MTRPB
MTRPM
MTRPY
MTRPN
MTRPR
CLKP

For JG Frame
400 A

For LG Frame
600 A

For MG Frame
800 A

For NG Frame
1200 A

For PG Frame
1600 A

Catalog Number

Catalog Number

Catalog Number

Catalog Number

Catalog Number

PCBJRC3
PCBJFC3

PCBLRC3
PCBLFC3

PCBMRC3
—

PCBNRC3
—

—
—

DCAJRC3
DCAJFC3

DCALRC3
DCALFC3

DCAMRC3
DCAMFC3

DCANRC3
DCANFC3

—
—

DCHP

DCHP

DCHP

DCHP

—

DCIP

DCIP

DCIP

DCIP

—

PCTL83

PCTL83

PCTM83

PCTN83

—

PCXJ3

PCXL3

PCXM3

PCXN3

—

DCXJ3

DCXL3

DCXM3

DCXN3

—

PCXLT

PCXLT

PCXMT

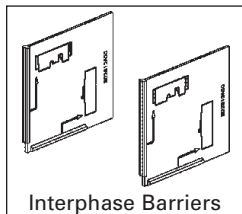
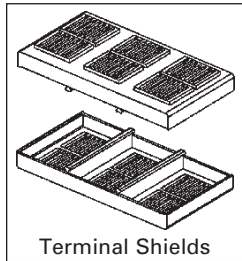
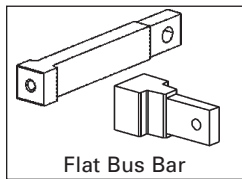
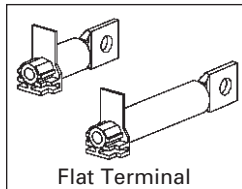
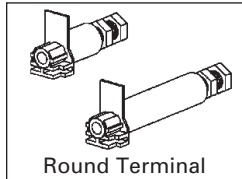
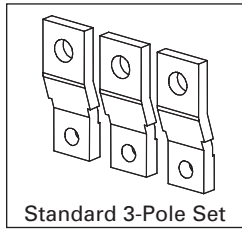
PCXPT

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7
MOLDED CASE
CIRCUIT BREAKERS

External Accessories

Connections



Description	For DG Frame 150 A	For FG Frame 250 A
	Catalog Number	Catalog Number
Front Bus Bar Connections Includes nut keeper plates and shield. Standard (straight) 3-Pole Set Bus Bar Connection Strap Kit Includes 6 - Bus Bars, 6 Nut Keepers & Shields 100% rated applications	FBCD3 — —	FBCF3 — —
Rear-Connecting Studs Short length round term. (1piece) Long length round term. (1piece) 3-Pole round term. kit, 2 short + 1 long Short length flat term. (1piece) Long length flat term. (1piece) 3-Pole flat term. kit, 2 short + 1 long Flat bus bar type (1 piece) 3-Pole set of flat bus bar	RTLDSR RTLDLR SRTDR3 RTLDSF RTLDLF SRTDF3 — —	RTLFSR RTLFLR SRTFR3 RTLFSF RTLFLF SRTFF3 — —
Terminal Shields Includes 2 terminal shields. 3-Pole Standard Shield 3-Pole Extended Shield	TSSF3 TSLF3	TSSF3 TSLF3
Interphase Barriers Set of 2 barriers Also fits plug-in and draw-out bases.	IPBF	IPBF
Lug Mounting Assy.	—	—
Breaker Mounting Base Front connected Rear connected	— —	— —

For JG Frame 400 A	For LG Frame 600 A	For MG Frame 800 A	For NG Frame 1200 A	For PG Frame 1600 A
Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
FBCJ3 —	FBCL3 —	FBCM3 —	SSBP SSBPH	SSBP SSBPH
RTLJSR RTLJLR SRTJR3 RTLJSF RTLJLF SRTJF3 — —	— — — — — — RTLLSF SRTL3F3	— — — — — — RTLMSF SRTMF3	— — — — — — RTLNSF SRTNF3	— — — — — — — —
TSSL3 TSLL3	TSSL3 ^① TSLL3 ^①	TSSM3 TSLM3	TSSP3 TSLP3	TSSP3 TSLP3
IPBM	IPBM	IPBM	IPBP	IPBP
—	—	—	—	LMAP1600 ^②
— —	— —	— —	— —	MBPG1600 MBPG1601

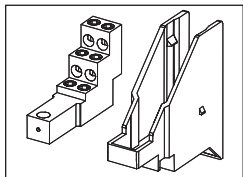
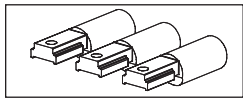
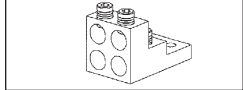
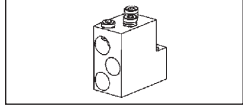
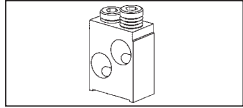
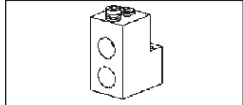
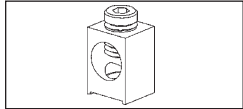
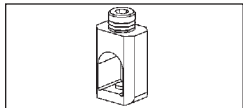
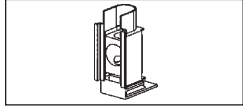
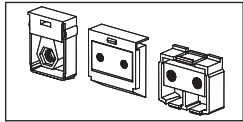
7
 MOLDED CASE
 CIRCUIT BREAKERS

① Not for use with standard AI terminals. Use Standard Shield for rear connection and Extended Shield for bus-bar connection.

② Kit includes connection for one side of breaker only. Order quantity 2 if connecting line and load side.

External Accessories

Connections



Note: pictures provide graphical representations only.

Description	For DG Frame 150 A	For FG Frame 250 A
	Catalog Number	Catalog Number
Nut Keeper Plates For ring/tongue terminal or bus bar connections. (For metric threads on other than the JG frame, change "TNK" to "TMK") 1 Nut Keeper Plate Kit of 3	TNKD TNKD3	TNKF TNKF3
Mechanical Lugs <i>Steel Wrap Around Body (Cu Wire Only)</i> Cable Size; (cables per phase) Single Lug Kit of 3	#8-1/0; 1-hole TW1DG20 3TW1DG20	#4-350 kcmil; 1-hole TW1FG350 3TW1FG350
<i>Aluminum Body (Al or Cu Wire)</i> Cable Size; (cables per phase) Single Lug Kit of 2 Kit of 3 Cable Size; (cables per phase) Single Lug Kit of 2 Kit of 3 Cable Size; (cables per phase) Single Lug	#6-3/0; 1-hole TA1DG30 — 3TA1DG30 — — — —	#4-350 kcmil; 1-hole TAW1FG350 — 3TAW1FG350 — — — —
<i>Copper Body (Cu Wire Only)</i> Cable Size; (cables per phase) Single Lug Kit of 2 Kit of 3 Cable Size; (cables per phase) Single Lug	#6-3/0; 1-hole TC1DG30 [Ⓞ] — 3TC1DG30 [Ⓞ] — —	#4-350 kcmil; 1-hole TCW1FG350 [Ⓞ] — 3TCW1FG350 [Ⓞ] — —
Compression Lugs Cable Size; (cables per phase) Kit of 2 Kit of 3 Cable Size; (cables per phase) Kit of 2 Kit of 3 Cable Size; (cables per phase) Kit of 3	#14-2/0; 1-cable 2CLD20 3CLD20 — — —	#4-350 kcmil; 1-cable — 3CLF350 — — —
Distribution Lugs (Cu Wire Only) Cable Size; (cables per phase) Single Lug Kit of 3 Cable Size; (cables per phase) Single Lug Kit of 3	#14-#2; 3-hole TA3DG02 3TA3DG02 #14-#4; 6-hole TA6DG04 3TA6DG04	#14-#1; 2-hole and #14-2/0; 1-hole TA3FG20 3TA3FG20 #14-#4; 6-hole TA6FG04 3TA6FG04
Control Wire Terminals Control Wire Terminal (Single) Control Wire Terminal (Kit of 3)	— —	— —

Ⓞ Required for 100% rated breakers. Requires 90°C cable sized at 75°C ampacity.

For JG Frame 400 A	For LG Frame 600 A	For MG Frame 800 A	For NG Frame 1200 A	For PG Frame 1600 A
Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
TMKJ TMKJ3 <i>metric only</i>	TNKL TNKL3	TNKM TNKM3	TNKP TNKP3	TNKP TNKP3
1/0-600 kcmil; 1-hole TW1JG600 3TW1JG600	— — —	— — —	— — —	— — —
3/0-250 kcmil; 2-hole TA2JG250 — 3TA2JG250 AL: 250-750 kcmil CU: 3/0-600 kcmil; 1-hole TA1JG750 — 3TA1JG750 — — —	#2-600 kcmil; 2-hole — — 3TA2LG600LD ^① 3TA2LG600LN ^② AL: 250-750 kcmil CU: 3/0-600 kcmil; 1-hole TA1JG750 (400A max) 3TA1JG750 (400A max) — — —	1/0-500 kcmil; 3-hole TA3MG500 3TA3MG500 500 -750 kcmil; 2-hole TA2MG750 — 3TA2MG750 #2-600 kcmil; 3-hole — 3TA3MG600 ^③ (Kit of 3)	1/0-500 kcmil; 4-hole — 2TA4NG500 3TA4NG500 3TA4NG500H ^④ 500 -750 kcmil; 3-hole 2TA3NG750 3TA3NG750 —	1/0-750 kcmil; 6-hole — 3TA6PG750 ^⑤ 600-750 kcmil; 4-hole TA4P750 ^⑥ — 300-600 kcmil; 5; 6-hole TA5P600 ^⑥ TA6R600 ^⑥ —
3/0-250 kcmil; 2-hole TC2JG250 ^③ — — 3/0-750 kcmil; 1-hole TC1JG750 ^③	#2-600 kcmil; 2-hole — — 3TC2LG600LD ^{①③} 3TC2LG600LN ^{②③} — —	1/0-500 kcmil; 3-hole TC3MG500 ^③ — — — —	1/0-500 kcmil; 4-hole — — 3TC4NG500 ^③ — —	— — — 300-600 kcmil; 5-hole TC5R600 ^{③④}
#6-350 kcmil; 1-cable — 3CLJ350 250-600 kcmil; 1-cable 3CLJ600 — 250-750 kcmil; 1-cable 3CLJ750 —	#6-350 kcmil; 2-cable 6CLL350 (kit of 6) 250-750 kcmil; 1-cable 3CLL750 — 250-600 kcmil; 2-cable 6CLL600 (kit of 6) —	— — — — —	1/0-500 kcmil; 4-cable — 12CLN500 (kit of 12) — — — —	— — — — —
#14-#4; 12-hole TA12JG04 3TA12JG04 #14-2/0; 6-hole TA6JG20 3TA6JG20	— — — — —	— — — — —	— — — — —	— — — — —
TA2JG250PT —	— 3TA2LG600LNPT	TA3MG500PT —	— 3TA4NG500PT	— —

7
MOLDED CASE
CIRCUIT BREAKERS

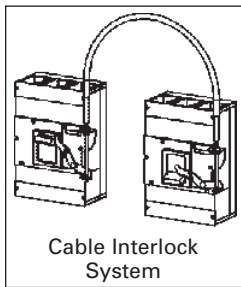
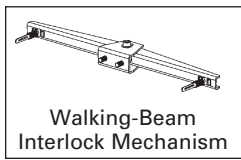
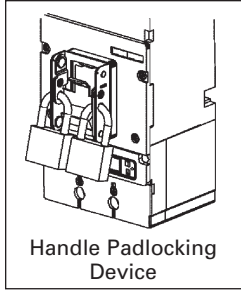
All lug kits include the nut keepers.
 ① Mounted on Load Side Only.
 ② Mounted on Line Side Only.

③ Required for 100% rated breakers. Requires 90°C cable sized at 75°C ampacity.
 ④ Requires extended modified shield.

⑤ Used only with LMAP1600 mounting base.
 ⑥ Used only with MBPG1600 or MBPG1601 mounting base.

External Accessories

General

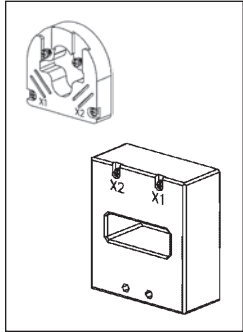


Description	For DG Frame 150 A	For FG Frame 250 A
	Catalog Number	Catalog Number
Handle Padlocking Device To padlock breaker toggle in the "OFF" position. Accepts up to 3 padlocks with 5–8 mm shackles.	HPLF	HPLF
Handle Blocking Device For holding the handle in the "ON" position. Not a lockout/tagout device.	HBDF	HBDF
Walking-Beam Interlock Mechanism Provides mechanical interlocking between two adjacent circuit breakers. Fixed mounted breakers	WBMFFM	WBMFFM
Note: Both breakers must be of the same frame size.		
Cable Interlock Mechanism Provides mechanical interlocking between 2 circuit-breakers - includes operator mechanism for one circuit breaker only. Combination with the next larger or smaller frame size is possible.	CBTF	CBTF
Interlock Cable Cable only, to connect 2 circuit breakers. Cable length 18 in. .46m (recommended up to 250A) Cable length 36 in. .91m (recommended from 400–800A) Cable length 54 in. 1.37m (recommended from 1200–1600A)	CBCF18 CBCM36 CBCP54	CBCF18 CBCM36 CBCP54
Mounting Screw Kit Includes the necessary hardware to mount a circuit breaker to the user's prepared surface Kit with 2 screws (SAE thread) Kit with 4 screws (SAE thread)	MSKF2 MSKF4	MSKF2 MSKF4
Trip Adjustment Sealing Cover Includes a trip unit cover to prevent tampering or adjustment of trip settings. Seal not included. Thermal-Magnetic Trip Units	TSCFTM	TSCFTM

For JG Frame 400 A	For LG Frame 600 A	For MG Frame 800 A	For NG Frame 1200 A	For PG Frame 1600 A
Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
HPLL	HPLL	HPLM	HPLP	HPLP
HBDL	HBDL	HBDM	HBDP	HBDP
WBMLFM	WBMLFM	WBMMFM	WBMPFM	WBMPFM
CBTL	CBTL	CBTM	CBTP	CBTP
— CBCM36 CBCP54	— CBCM36 CBCP54	— CBCM36 CBCP54	— — CBCP54	— — CBCP54
— MSKL4	— MSKL4	— MSKM4	— MSKP4	— MSKP4
TSLTLM	TSLTLM	TSCMTM	—	—

External Accessories

Ground Sensors & Electronic Accessories



Description

Neutral Current Transformer (Ground Sensor, N-pole)

Neutral = 35/60A
 Neutral = 100A
 Neutral = 150A
 Neutral = 250A
 Neutral = 400A
 Neutral = 600A
 Neutral = 800A
 Neutral = 1000/1200A
 Neutral = 1600A

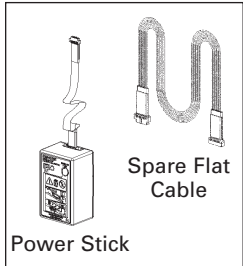
For DG Frame
150 A

For FG Frame
250 A

Catalog Number

Catalog Number

For DG Frame 150 A	For FG Frame 250 A
NGSD060	—
NGSF100	NGSF100
NGSF150	NGSF150
—	NGSJ250
—	—
—	—
—	—
—	—
—	—
—	—



Communications & Electronics

Power Stick - Hand held, battery operated power supply for LCD trip units. (Requires two 9V batteries.) Trip testing for both 555 & 586 trip units.

EPSP18V

EPSP18V

Spare flat cable for Power Stick.

COMPCA

COMPCA

COM20 Profibus Communications Module with ZSI for electronic trip units (order cable separately)

COMPRO20

COMPRO20

COM21 Modbus Communications Module with ZSI for electronic trip units (order cable separately)

COMMOD21

COMMOD21

Cable for COM20/21, 1.5 m (4.9 ft)

COMKIT3

COMKIT3

Cable for COM20/21, 3.0 m (9.8 ft)

COMKIT6

COMKIT6

Addressing Plug - assigns a field bus address without a PC by plugging into COM20/21

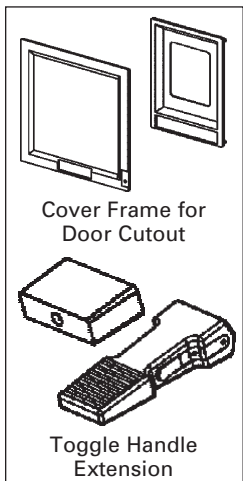
3UF79100AA000

3UF79100AA000



Com20 Profibus & Com21 Modbus Communications Module

Door Cutouts & Extensions



Cover Frame for Door Cutout

For fixed or plug-in mounted circuit breakers. (IP30)
 2-Pole & 3-Pole

BZLF3

BZLF3

For breakers with stored energy operator. (IP40)

BZLFRHSE

BZLFRHSE

Circuit-breaker draw-out mounted and toggle handle operated. Kit includes cover frame (bezel) and escutcheon as needed. (IP40) (not for use with rotary handle or stored energy operator)

BZLFBDC

BZLFBDC

Toggle Handle Extension

For spare or replacement. (One is included with each NG - PG frame.)

—

—

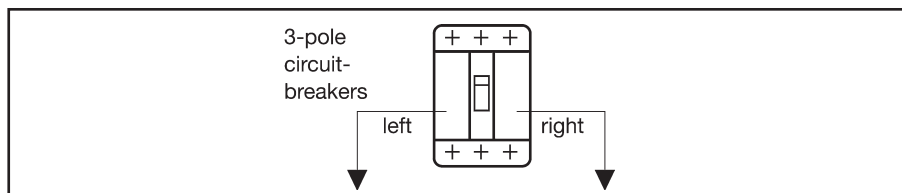
For JG Frame 400 A	For LG Frame 600 A	For MG Frame 800 A	For NG Frame 1200 A	For PG Frame 1600 A
Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
— — — NGSJ250 NGSL400 — — — —	— — — — NGSL400 NGSM600 — — — —	— — — — — NGSM600 NGSN800 — — —	— — — — — — NGSN800 NGSP120 —	— — — — — — — NGSP120 NGSP160
EPSP18V	EPSP18V	EPSP18V	EPSP18V	EPSP18V
COMPCA	COMPCA	COMPCA	COMPCA	COMPCA
COMPRO20	COMPRO20	COMPRO20	COMPRO20	COMPRO20
COMMOD21	COMMOD21	COMMOD21	COMMOD21	COMMOD21
COMKIT4	COMKIT4	COMKIT5	COMKIT5	COMKIT5
COMKIT7	COMKIT7	COMKIT8	COMKIT8	COMKIT8
3UF79100AA000	3UF79100AA000	3UF79100AA000	3UF79100AA000	3UF79100AA000
BZLL3	BZLL3	BZLM3	BZLP3	BZLP3
BZLLRHSE	BZLLRHSE	BZLMRHSE	BZLPRHSE	BZLPRHSE
BZLLBDC	BZLLBDC	BZLMBDC	BZLPBDC	BZLPBDC
THEL	THEL	THEM	THEP	THEP

7
MOLDED CASE
CIRCUIT BREAKERS

VL Circuit Breakers

Accessory Locations

Selection



Locations of Internally Mounted Accessories

Frame Family	Left Pocket	Right Pocket
DG*, FG*, JG, LG 150 to 600A	Up to 3 Auxiliary Switches	Shunt Trip or UVR or up to 3 Auxiliary Switches or up to 2 Auxiliary Switches + 1 Alarm Switch
	Up to 2 Auxiliary Switches + 1 Alarm Switch	Shunt Trip or UVR or up to 3 Auxiliary Switches or up to 2 Auxiliary Switches + 1 Alarm Switch
MG, NG, PG 800 to 1600A	Up to 4 Auxiliary Switches	Shunt Trip or UVR or up to 4 Auxiliary Switches
	Up to 2 Auxiliary Switches + 2 Alarm Switches	Shunt Trip or UVR or up to 4 Auxiliary Switches

* Except DG and FG breakers with Electronic Trip Units. Due to the location of the Magnetic Latch, the Left Pocket is not available for accessories.

Accessory Information

- Aux. Switch is an Auxiliary Switch, 1A or 1B contact
- Alarm Switch has 1A or 1B contact
- UVR is an Undervoltage Release
- The standard location for factory mounted Auxiliary and Alarm Switches is the Left Pocket

Accessory Maximums

DG, FG, JG, LG Maximum Accessories:

- Maximum of six (6) switches total
- DG, FG Maximum of two (2) Alarm Switches, one each in the Left and Right Pockets. JG, LG Max. of 1 Alarm, Left only

MG, NG, PG Maximum Accessories:

- Maximum of eight (8) switches total
- Maximum of two (2) Alarm Switches, Left Pocket only

For applications using COMMOD20 and COMMOD21 for communication using Modbus or Profibus

DG, FG

COMKIT3 & COMKIT6 provide auxiliary contact kit. May add only one or two contact blocks for Alarm or Auxiliary function.

JG, LG

COMKIT4 & COMKIT7 provide auxiliary contact kit mounted in left pole pocket. One contact block can be added for Auxiliary function. Right pole pocket available for other release or an additional Auxiliary contact kit.

MG, NG, PG

COMKIT5 & COMKIT8 provide auxiliary contact kit mounted in Left pole pocket. Two contact blocks can be added for Auxiliary function and one for Alarm function. Right pole pocket available for other release or an additional Auxiliary Contact kit.

VL Circuit Breakers

Selection

Suffix for factory mounted Switch Combinations

If the frame is:	And you need these functions:	Then add this suffix:	Device Catalog Number
DG, FG, JG or LG	1 Alarm Switch 1 NO Alarm 1 NC Alarm	A1	ASKL1
DG, FG, JG or LG	2 Aux. Switches 1 NO + 1 NC Aux. Contacts	A2	ASKL2
DG, FG, JG or LG	2 Aux. + 1 Alarm Switches 1NO + 1NC Aux. and 1NC Alarm 2NO Aux. and 1NC Alarm	A3	ASKL3
MG, NG or PG	2 Aux. + 2 Alarm Switches 1NO + 1NC Aux. and 1NO + 1NC Alarm 2NO Aux. and 2NC Alarm 2NC Aux. and 2NO Alarm	A3	ASKP3
MG, NG or PG	4 Aux. Switches 2NO + 2NC Aux.	A4	ASKP4

Suffix for factory mounted Shunt Trips

If the frame is:	And you need these functions:	Then add this suffix:	Device Catalog Number
DG, FG, JG or LG	24V DC 48-60V DC 110-127V DC 220-250V DC 48-60V AC 110-127V AC 208-277V AC 380-600V AC	RB RC RD RE RM RN RS RV	STRLB24DC STRLC60DC STRLD125DC STRLE250DC STRLM60 STRLN120 STRLS277 STRLV600
MG, NG or PG	24V DC 48-60V DC 110-127V DC 220-250V DC 48-60V AC 110-127V AC 208-277V AC 380-600V AC	RB RC RD RE RM RN RS RV	STRPB24DC STRPC60DC STRPD125DC STRPE250DC STRPM60 STRPN120 STRPS277 STRPV600

Suffix for factory mounted Undervoltage Releases

If the frame is:	And you need these functions:	Then add this suffix:	Device Catalog Number
DG, FG, JG or LG	12V DC 24V DC 48V DC 60V DC 110-127V DC 220-250V DC 24V AC 110-127V AC 220-240V AC 208V AC 277V AC 380-415V AC 440-480V AC	UA UB UC UG UD UE UL UN UR UP US UT UU	UVRLA12DC UVRLB24DC UVRLC48DC UVRLG60DC UVRLD125DC UVRLE250DC UVRL24 UVRLN120 UVRLR240 UVRLP208 UVRLS277 UVRLT415 UVRLU480
MG, NG or PG	12V DC 24V DC 48V DC 60V DC 110-127V DC 220-250V DC 110-127V AC 220-240V AC 208V AC 277V AC 380-415V AC 440-480V AC	UA UB UC UG UD UE UN UR UP US UT UU	UVRPA12DC UVRPB24DC UVRPC48DC UVRPG60DC UVRPD125DC UVRPE250DC UVRPN120 UVRPR240 UVRPP208 UVRPS277 UVRPT415 UVRPU480

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MOLDED CASE
CIRCUIT BREAKERS

		DG	FG	JG	LG	MG	NG	PG
Max rated continuous current		150	250	400	600	800	1200	1600
Rated operational voltage								
NEMA	V AC	600	600	600	600	600	600	600
IEC	V AC	690	690	690	690	690	690	690
Rated Impulse Withstand Voltage								
Main conducting paths	kV	8	8	8	8	8	8	8
Auxiliary circuits	kV	4	4	4	4	4	4	4
Ambient Temperature Range	°C	-25 to +75	-25 to +75	-25 to +75	-25 to +75	-25 to +75	-25 to +75	-25 to +75
High Ambient Derating (thermal-mag.)	50°C	93%	93%	93%	93%	95%	95%	95%
	60°C	86%	86%	86%	86%	86%	86%	80%
	70°C	80%	80%	80%	80%	80%	80%	74%
Operating Cycles		20,000	20,000	20,000	10,000	5,000	3,000	3,000
Max switching rate (per hour)		120	120	120	60	60	30	30
Power loss (at max. rated current)								
Thermal-magnetic	W	15 – 48	32 – 80	60 – 175	85 – 230	170 – 250	150 – 220	200 – 260
Electronic trip unit	W	40	60	90	160	250	210	260
IEC ①								
Time constant t = 10 ms								
1 current path								
2 current paths in series								
3 current paths in series								
Up to 250V DC		—	—	—	—	—	—	—
440V DC								
600V DC								
NEMA								
Time constant t = 8 ms								
2 poles switching								
1 current path								
250V DC Max. ②		30	30	30	30	42	42	42
3 poles switching								
2 current paths in series								
500V DC Max. ②		18	25	35	35	65	65	65
Accessories								
Auxiliary/ Alarm Switch								
Current rating (1 or 2 switches)		10	10	10	10	10	10	10
Current rating (3 or 4 same switch)	A	5	5	5	5	5	5	5
Shunt Trip								
Pick-up voltage	V	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1
Power Consumption (short-time) at:								
48 – 60 V AC	VA	401 – 501	401 – 501	401 – 501	401 – 501	401 – 501	401 – 501	401 – 501
110 – 127 V AC	VA	424 – 489	424 – 489	424 – 489	424 – 489	424 – 489	424 – 489	424 – 489
208 – 277 V AC	VA	533 – 736	533 – 736	533 – 736	533 – 736	533 – 736	533 – 736	533 – 736
380 – 600 V AC	VA	408 – 645	408 – 645	408 – 645	408 – 645	408 – 645	408 – 645	408 – 645
24 V DC	W	594	594	594	594	594	594	594
48 – 60 V DC	W	740 – 925	740 – 925	740 – 925	740 – 925	740 – 925	740 – 925	740 – 925
110 – 127 V DC	W	559 – 648	559 – 648	559 – 648	559 – 648	559 – 648	559 – 648	559 – 648
220 – 250 V DC	W	722 – 820	722 – 820	722 – 820	722 – 820	722 – 820	722 – 820	722 – 820
Max. Operating time	ms	50	50	50	50	50	50	50

① Consult Siemens for short circuit values.

② Review individual frame and type values.

Technical Data

• Revised •
10/01/13

		DG	FG	JG	LG	MG	NG	PG
Undervoltage Trip								
Drop voltage (percentage)	V	35% – 70%	35% – 70%	35% – 70%	35% – 70%	35% – 70%	35% – 70%	35% – 70%
Pick-up voltage (percentage)	V	70% – 85%	70% – 85%	70% – 85%	70% – 85%	70% – 85%	70% – 85%	70% – 85%
Power consumption (continuous) at:								
110 – 127 V AC	VA	1	1	1	1	1.1	1.1	1.1
220 – 250 V AC	VA	2.1	2.1	2.1	2.1	2.1	2.1	2.1
208 V AC	VA	1.2	1.2	1.2	1.2	1.2	1.2	1.2
277 V AC	VA	1.4	1.4	1.4	1.4	1.4	1.4	1.4
380 – 415 V AC	VA	1.9	1.9	1.9	1.9	1.9	1.9	1.9
440 – 480 V AC	VA	2.2	2.2	2.2	2.2	2.2	2.2	2.2
500 – 525 V AC	VA	2.5	2.5	2.5	2.5	2.5	2.5	2.5
600 V AC	VA	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Max. opening time	ms	50	50	50	50	50	50	50
Motorized Operating Mechanism								
Motor with stored energy mechanism (synchronizable)		X	X	X	X			
Motor Operator						X	X	X
Max. switching rate (per hour)		120	120	120	60	60	30	30
Command duration	ms	20 – 50	20 – 50	20 – 50	20 – 50	20 – 50	—	—
Closing time	ms	<100	<100	<100	<100	<100	<5,000	<5,000
Charging time	s	<5	<5	<5	<5	<5	<5	<5
Break time	s	<5	<5	<5	<5	<5	<5	<5
Power consumption	VA/W	<500						
Inrush (A)								
Control Voltages								
		110 – 127 V AC						
		220 – 250 V AC						
		24 V DC						
		48 V DC						
		60 V DC						
Operating Range		85 – 110% of rated control voltage						

Technical Data

Unusual Operating Conditions

Reference

Note: The information provided on this and the next page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data below is based less on controlled testing, than on experience and engineering judgment. Contact Siemens for further information on special conditions and treatment.

High Ambient Temperatures

Because thermal-magnetic trip breakers are temperature sensitive and calibrated for a specific ambient of 40° C (104° F) (average enclosure temperature), a higher ambient will cause the breaker to trip at lower current than its nameplate rating, in other words, causing the breaker to "derate" (see Table 1). Similarly, the current carrying capacity of a circuit conductor is based upon a certain ambient temperature, a higher ambient will reduce its current carrying capacity, causing it to "derate." Thus, with a fluctuating temperature, a thermal-magnetic breaker will derate nearly parallel with its connected circuit conductors and maintain close circuit protection. If the application temperature exceeds 40° C (104° F) and is known, either a breaker specially calibrated for the higher ambient or one oversized according to Table 1 may be selected. In a case such as this, the circuit conductors should be oversized as well.

Siemens Electronic Trip Unit Breakers are insensitive to temperature changes. However, they do include circuitry to protect the components from abnormally high temperatures.

Altitude

Reduced air density at altitudes greater than 6600 ft. (2000 meters) affects the ability of a molded case circuit breaker to transfer heat and interrupt faults. Therefore, circuit breakers applied at these altitudes should have interrupting, insulation and continuous currents derated as indicated in Figure 1.

Table 1 – Temperature derating data for thermal-magnetic breakers

Reference Ampere Rating at 40° C (104° F)	Ampere Rating at:			Siemens Breaker Frames
	25° C (77° F)	50° C (122° F)	60° C (140° F)	
50	55	46	42	DG
60	66	56	52	
70	77	65	60	
90	99	84	78	
100	110	94	87	
125	137	114	100	
150	165	136	120	
175	192	159	140	
200	220	182	160	
225	247	205	180	
250	275	235	220	
300	330	276	252	
350	385	325	301	
400	440	372	340	
500	550	468	435	
600	660	564	525	
700	770	658	613	
800	880	754	704	
900	990	828	749	
1000	1100	900	825	
1200	1320	1090	1000	
1400	1540	1304	1148	
1600	1760	1500	1320	

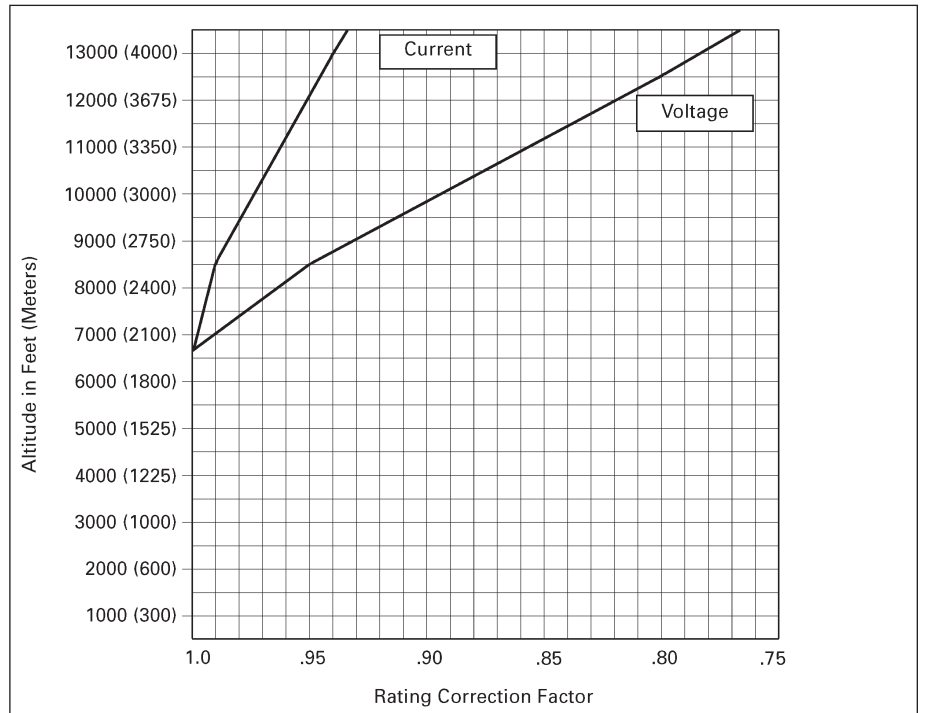


Figure 1 – Altitude adjustment

Technical Data

Unusual Operating Conditions

Reference

Unusual Operating Conditions 400 Hz Systems

Circuit Breaker Derating Required

This table lists the maximum continuous current carrying capacity for Siemens breakers at 400Hz. Due to the increased resistance of the copper sections resulting from the skin effect produced by eddy currents at these frequencies, circuit breakers in many cases require derating. The thermal derating on these devices is based upon 100%, three phase application in open air in a maximum of 40°C (104° F) with 48 in. (1219 mm) of the specified cable or bus at the line and load side. Additional derating of not less than 20% will be required if the circuit breaker is to be utilized in an enclosure. Further derating may be required if the enclosure ambient temperature exceeds 40°C(104° F).

Cable and Bus Sizing

The cable and bus sizes to be utilized at 400Hz are not based on standard National Electric Codes tables for 60Hz application. Larger cross sections are necessary at 400Hz. All bus bars specified are based upon mounting the bars in the vertical plane to allow maximum air flow. All bus bars are spaced at a minimum of 0.25 in. (6 mm) apart. Mounting of bus bars in the horizontal plane will necessitate additional drafting. Edgewise orientation of the bus may change the maximum ratings indicated. If additional information is required for other connections of cable or bus, contact Siemens for information.

Application Recommendations

It is recommended that temperatures be measured on the line and load terminals or T-connectors of the center pole. These are usually the hottest terminals with a balanced load. A maximum temperature of 75°C (35°C over a maximum ambient of 40°C) would verify the particular application. Temperature profiles taken on these breakers can be correlated to ensure that the hottest points within the breaker are within the required temperature limits.

Interrupting Rating

Circuit breakers used in 400 Hz systems are limited to a 5000 A interrupting rating. If higher ratings are required, consult Siemens.

Breaker type	Maximum continuous ampere rating at 40°C (104°F)②			75°C (167F) Copper cable per pole	
	60HZ		Enclosed after derating	No of pieces	Wire size
	Open air	Open air③			
DG	50	48	38	1	#8
	60	57	46	1	#6
	70	63	50	1	#4
	80	72	58	1	#4
	90	80	64	1	#3
	100	90	72	1	#3
	110	95	75	1	#2
	125	105	84	1	#1
	150	125	100	1	#1/0
FG	100	90	72	1	#3
	110	95	75	1	#2
	125	105	84	1	#1
	150	125	100	1	#1/0
	175	140	112	1	#2/0
	200	160	128	1	#3/0
	225	180	144	1	#4/0
	250	200	160	1	250 kcmil
JG	250	210	168	1	250 kcmil
	300	240	192	1	350 kcmil
	350	260	208	1	500 kcmil
	400	300	240	2	#2/0
JG 100% Rated	250	210	210	1	250 kcmil
	300	240	240	1	350 kcmil
	350	260	260	1	500 kcmil
	400	300	300	2	#3/0
LG	400	300	240	2	#3/0
	500	375	300	2	250 kcmil
	600	420	336	2	350 kcmil

Breaker type	Maximum continuous ampere rating at 40°C (104°F)②			75°C (167F) Copper cable per pole	
	60HZ		Enclosed after derating	No of pieces	Wire size
	Open air	Open air③			
LG	400	300	240	2	#3/0
	500	375	300	2	250 kcmil
	600	420	336	2	350 kcmil
MG	600	430	360	2	350 kcmil
	700	500	400	3	250 kcmil
	800	560	448	3	300 kcmil
MG 100% Rated	600	430	430	2	350 kcmil
	700	500	500	3	250 kcmil
	800	560	560	3	300 kcmil
NG	800	560	448	3	300 kcmil
	900	600	480	3	350 kcmil
	1000	650	520	3	400 kcmil
	1200	780	624	4	350 kcmil
NG 100% Rated	900	600	600	3	350 kcmil
	1000	650	650	3	400 kcmil
	1200	780	780	4	350 kcmil
	1200	780	624	4	400 kcmil
PG	1400	850	680	4	500 kcmil
	1600	960	768	5	500 kcmil
	1200	780	780	4	400 kcmil
PG 100% Rated	1400	850	850	4	500 kcmil
	1600	960	960	5	500 kcmil

① The information provided on this page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data above is based less on controlled testing, than on experience and engineering

judgment. Contact Siemens for further information on special conditions and treatment.

② Additional derating may be required if the ambient temperature is greater than 40°C (104°F).

③ Calculated after derating to compensate for the heating of the copper conductor, caused by the skin effect generated by eddy currents produced at 400/415HZ.

7 MOLDED CASE CIRCUIT BREAKERS