

GE Energy

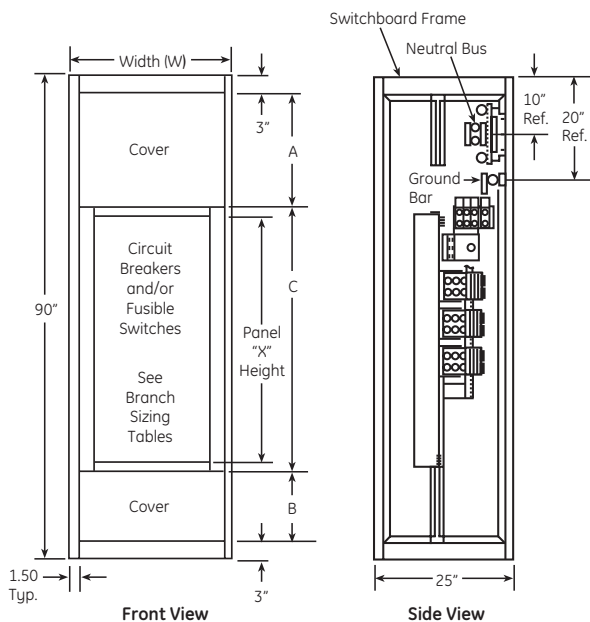
Spectra Series[®] Switchboards

Quick Reference

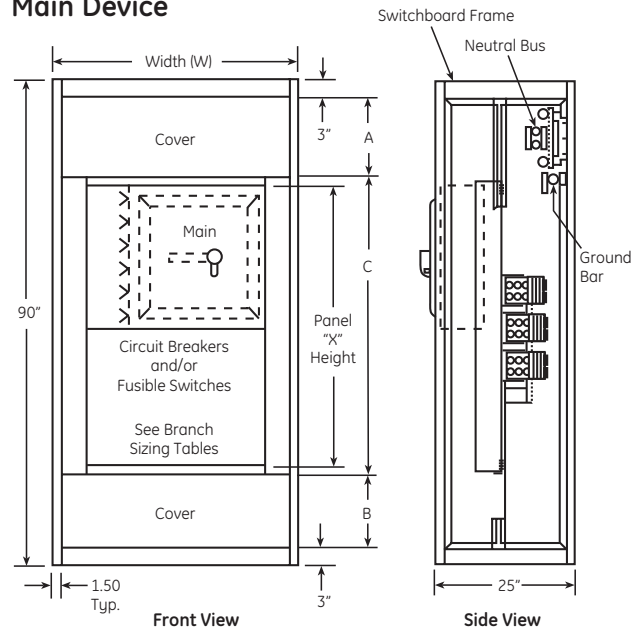


imagination at work

Main Lug



Main Device



Cable Fed Main Devices With or Without CT's

Standard Main Lug Termination

Ampere Rating	Quantity and Size per Ø and N	Minimum Width (W)
400 & 600	(2) 1/0-600MCM	30
800 & 1000	(3) 1/0-600MCM	30
1200	(4) 1/0-600MCM	30
1600	(5) 1/0-600MCM	30
2000	(6) 1/0-600MCM	30
2500	(8) 1/0-600MCM	30
3000	(9) 1/0-600MCM	30
4000	(12) 1/0-600MCM	40
5000	(15) 1/0-600MCM	45

Panel Rating	Panel X Height (X=1.375")	A	B	C
400-2000A	23X	21	28	35
	28X	21	21	42
	33X	21	14	49
	38X	21	7	56
	43X	21	0	63

Note: For bottom feed, reverse A & B dimensions.

Type	Device	Amp Range	Main "X" Height	Min. Width (W)	Panel "X" Height	Top Main			Bottom Main		
						A	B	C	A	B	C
Circuit Breakers	SGDA, SGHA, SGLA, SGPA	400-600	4	35	38X	14	21	49	14	21	49
	SKHA, SKLA, SKPA	800-1200	6	40 ^③ 45	38X ^②	14	14	56	23	21	56
	Fusible Switch	ADS	4/600-H,K,R	10	45	38X	14	7	63	0 ^①	21
4/600-J,T			10	40	38X	14	7	63	0 ^①	21	63
800-1200			19	45	43X	14	7	63	0 ^①	21	63

① Rear access required.

② SKHA and SKLA available in 48X.

③ Minimum width may vary due to breaker cable size and quantity.

Distribution Section

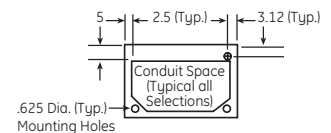
Panel "X" Height	A	B	C
23X	21	28	35
28X	21	21	42
33X	14	21	49
38X	14	14	56
43X	7	14	63
53X	7	0 ^①	77

① Rear access required.

Distribution section front view same as main lug section.
Distribution section side view same as main lug section side view except omit lugs.

Section Layout Notes

- These switchboard arrangements assume line cables enter top. When line cables enter from below, neutral and ground bus are mounted at bottom, and A and B cover dimensions are reversed.
- All dimensions are in inches and X values (1X = 1 3/8 inches).
- Front access to load cables requires a 7" high cover minimum.
- Front access to neutral and/or ground bus requires a 14" high cover minimum.
- Any circuit breakers with externally wired accessories (such as shunt trip, undervoltage release, auxiliary switches) will require a 1X filler between adjacent devices.
- For double branch units, only same circuit breaker type devices can be mounted across from each other.
- All single branch circuit breakers, in service entrance equipment, are mounted with load lugs staggered to allow for equal cabling in both wire gutters. Main device line lugs are located on the left side.
- After determining all applicable conditions, lay out switchboard and calculate branch circuit "x" heights, including future space. Add spaces sufficient to fill panel to standard X increment.



Interrupting Rating, RMS symmetrical (kA)

Molded Case Circuit Breakers

Spectra														
Frame Size	150A				250A			600A				1200A		
	SEDA	SEHA	SELA	SEPA	SFHA	SFLA	SFPA	SGDA	SGHA	SGLA	SGPA	SKHA	SKLA	SKPA
240Vac	18	65	100	200	65	100	200	65	65	100	200	65	100	200
480Vac	14	25	65	100	25	65	100	—	35	65	100	50	65	100
600Vac	10	18	25	25	18	25	25	—	25	65	65	25	42	65

Record Plus											
Frame Size	100A					250A		600A			
	FBV/FCV	FBN/FCN	FBH/FCH	FBL/FCL	FCS	FEN	FEH	FGN	FGH	FGL	FGP
240Vac	65	150	200	200	42	150	200	150	200	200	200
480Vac	35	65	100	150	25	65	100	65	100	150	200
600Vac	22	25	35	42	18	—	—	25	35	42	65

Insulated Case Circuit Breakers – Main Devices

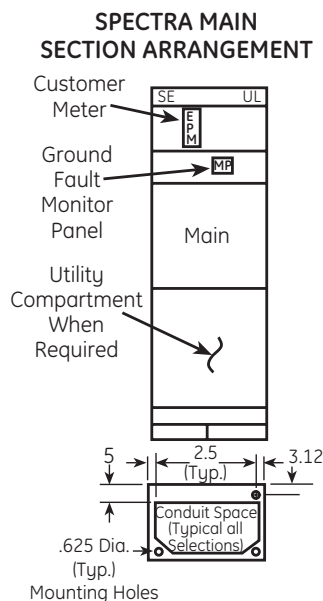
Power Break II						
Frame Size	800A	1600A	2000A	2500A	3000A	4000A
Standard						
240Vac	65	85	85	100	100	100
480Vac	65	65	65	100	100	100
600Vac	50	50	50	85	85	85
High-Break						
240Vac	100	125	125	200	200	200
480Vac	100	100	100	150	150	150
600Vac	65	65	65	100	100	100
Short-time						
(0.5 sec)	25	30	30	42	42	42

GE HPC Switch Interrupting Ratings

Type	Available Ratings		Contact Interrupting Rating Based on Ability to Operate on Overload Unassisted by the Fuse	Switch-fuse Combination at Switch-rated ac Volts with Class L Fuse
	Continuous Amperes	Maximum ac Volts		
HPC/R	800, 1200, 1600, 2000, 2500, 3000, 4000	600	"Open" - 12X amp rating; "Close-Open" - 12X amp rating	200,000

ADS Fusible Switch Branch Device Sizing (Spectra Plug-In Only)

Switch Rating	Branch	Volts	Poles	Fuse Class	Blank Option	Min. Width (in.)	X Height	Min. Depth (in.)
30A	Double Branch	240V 600V	2, 3P	H, K, R	Yes	40	4X	25
60A	Double Branch	240V 600V	2, 3P	H, K, R	Yes	40	4X 5X	25
100A	Double Branch	240V 600V	2, 3P	H, J, K, R T	Yes	40	5X 7X	25
200A	Single Branch	240V	2, 3P	H, K, R	No	40	7X	25
	Double Branch			J, T	Yes			
	Double Branch	600V		H, K, R	Yes	45		
400A	Single Branch	240V	2, 3P	J, T	No	40	10X	25
		600V		H, K, R		45		
600A	Single Branch	240V	2, 3P	J, T	No	40	10X	25
		600V		H, K, R		45		
800A	Single Branch	240V	2, 3P	L	No	45	19X	25
1200A		600V						



Molded Case Circuit Breaker Branch Device Sizing – Plug-In

Mounting	Max. Breaker Amps	Breaker Frames	3-Pole Module ^② X Height	2-Pole Module ^② X Height	Min. Width (in.)	Min. Depth (in.)
Double	100	THQB, THQB, TEY, TEYF	3	—	35	25
		SE, SF	3	3	35	25
		SG	4	4	40	25
		FB	3	2	35	25
	150	TEB, TED, TQD, THQD	3	2	35	25
		THED, SF	3	3	35	25
		SG	4	4	40	25
	225	TQD, THQD	3	2	35	25
		SF, FE ^④	3	3	35	25
		SG	4	4	40	25
	250	TJD	6	6	45	25
		SF	3	3	35	25
		SG	4	4	40	25
	400	TJD	6	6	45	25
		SG	4	4	40	25
	600 ^①	SG, FG	4	4	40	25
		<i>micro-EntelliGuard</i> trip unit SGHC, SGLC, SGPC	4	—	40	25
	Double Adjacent to Fusible Switch	150	SEDA, SEHA, SELA, SEPA	4	4	40
250		SFHA, SFLA, SFPA	4	4	40	25
Single	250	SF	3	3	35	25
		SG	4	4	35	25
	400	TJD	6	6	35	25
		SG	4	4	35	25
	600	SG, FG	4	4	35	25
		<i>micro-EntelliGuard</i> trip unit SGHC, SGLC, SGPC	4	—	35	25
		SK	6	6	45 ^⑤	25
		<i>micro-EntelliGuard</i> trip unit SKHC, SKLC, SKP ^③	6	—	45 ^⑤	25
Single Adjacent to Fusible Switch	250	SF	4	4	40	25
		SKP	6	6	45	25

Molded Case Circuit Breaker Branch Device Sizing – Bolt-On

Mounting	Max. Breaker Amps	Breaker Frames	3-Pole Module ^② X Height	2-Pole Module ^② X Height	Min. Width (in.)	Min. Depth (in.)	
Double	100	TED, FB	3	2	35	25	
		TEY, TEYF	3	—	35	25	
		SE, SF, THED	3	3	35	25	
		SG	4	4	40	25	
	150	TED	3	2	35	25	
		SE, SF	3	3	35	25	
		SG	4	4	40	25	
	225	SF	3	3	35	25	
		SG	4	4	40	25	
	250	SF, FE ^④	3	3	35	25	
		SG	4	4	40	25	
	400	SG	4	4	40	25	
		600 ^①	SG, FG	4	4	40	25
	<i>micro-EntelliGuard</i> trip unit SGHC, SGLC, SGPC		4	—	40	25	
	Single	250	SF	3	3	35	25
			SG	4	4	35	25
		400	SG	4	4	35	25
			SK	6	6	40	25
600		SG, FG	4	4	35	25	
		<i>micro-EntelliGuard</i> trip unit SGHC, SGLC, SGPC	4	—	35	25	
1200		SKH, SKL	6	6	45 ^⑤	25	
		<i>micro-EntelliGuard</i> trip unit SKHC, SKLC, SKP ^③	6	—	45 ^⑤	25	

① Double branch mounting available through 3000A.

② Add 2x to height for accessories on breakers.

③ SKP requires 45" minimum width if used as a main breaker with cables.

④ FE shown at 100kAIC at 3X. If 150 kAIC, then X height is 5X.

⑤ Minimum width may vary due to breaker cable size and quantity.

① Double mounting not available in 2500A or higher main bus rating.

② Add 1x to height for accessories on breakers.

③ SKP requires 45" minimum width if used as a main breaker with cables.

④ FE shown at 100kAIC at 3X. If 150 kAIC, then X height is 5X.

⑤ Minimum width may vary due to breaker cable size and quantity.

Outdoor Enclosures

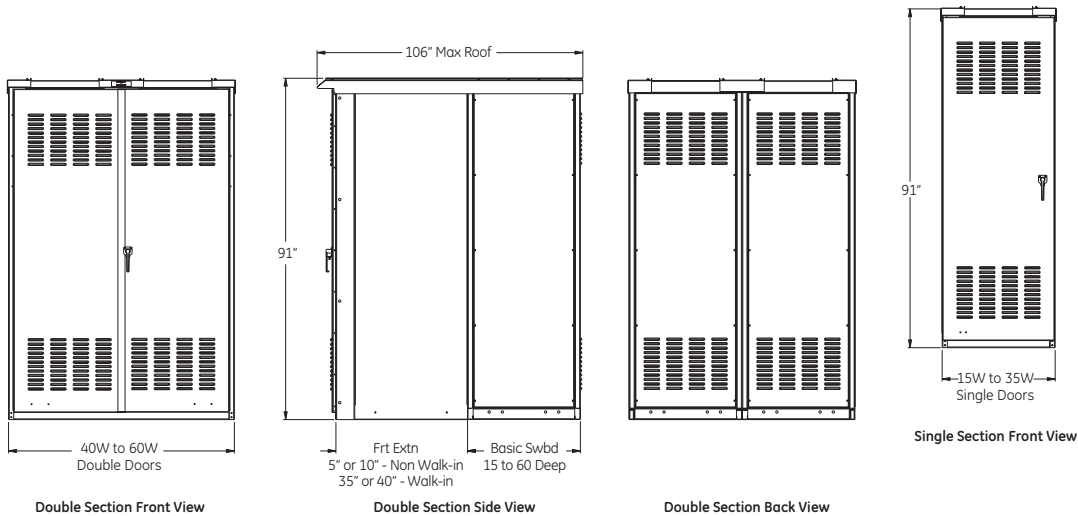
NEMA 3R outdoor enclosures consist of standard indoor cubicles and components enclosed with a front frame and roof assembly to provide a weather resistant structure. Any number of sections may be bolted together. However, all sections must be of the same depth. Standard outdoor construction consists of:

- Flat roof
- Section height 91"
- Front and rear venting
- Galvanized end caps, front/rear louvered doors and rear covers
- Standard screen behind louvers
- Single door 15"W – 35"W
- Double door 40"W – 60"W
- Wind stop on each door
- 3-point catch with provisions for padlock

- Front extensions: non-walk in 5" & 10", walk in 35" & 40"
- 110 mph wind rating
- Floor sills 1.5"

Options available are:

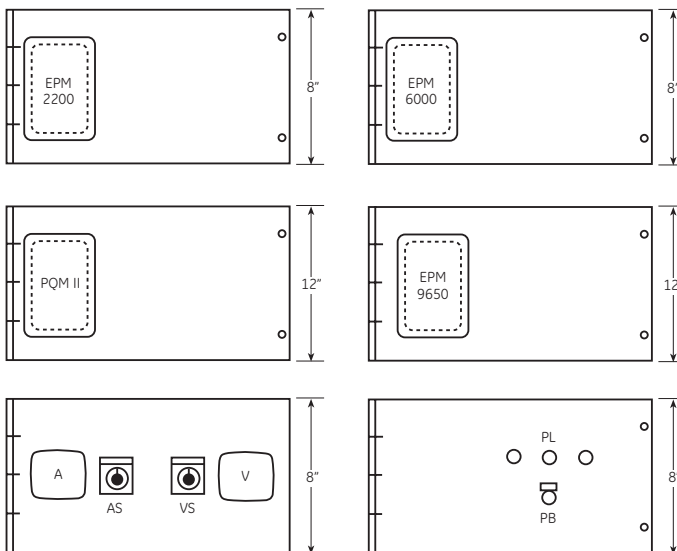
- Gasketing
- Fluorescent light, 120-volt, 15-amp and grounded convenience outlet
- Rodent guards
- Rear doors same as front with wind stops
- Lifting brackets
- Inside, movable, 4-way hoist and trolley (walk-in only)
- Busway entrance
- 130 mph wind rating
- Filters



Note: For busway top exit application flat roof is used.

Instrument and Metering Arrangements

Abbreviation	Description
A	Ammeter type AB40-250
V	Voltmeter type AB40, 250
EPM	EPM
PQM	PQM
AS	Ammeter Switch
VS	Voltmeter Switch
PL	Pilot Light
PB	Push Button
GFR	ITI GF Relay



Main Devices (Inches)

Type	Device		Stationary			Draw out		
	Designation	Ampere Rating	Min. Unit Height	Min. Section Width	Min. Section Depth ^{②⑥}	Min. Unit Height	Min. Section Width	Min. Section Depth ^{②⑥}
High Pressure Contact Switches	THPR ^⑦	800	28 ^①	30"	25"	--	--	--
		1200	32 ^①	30	25	--	--	--
		1600	32	30	25	--	--	--
		2000	40	30	25	--	--	--
	THPC	2500	44	35	30	--	--	--
		3000	44	40	35	--	--	--
Bolted Pressure Switches	QA or CBC	800	28	25	30	--	--	--
		1200	32	30	30	--	--	--
		1600	32	30	30	--	--	--
		2000	32	30	30	--	--	--
		2500	36	35	35	--	--	--
		3000	48	45	35	--	--	--
MCCB Standard & Hi-Break	SG	600	20	25 ^⑥	25	--	--	--
	SK	1200	24	25 ^⑥	25	--	--	--
WavePro	30	800	--	--	--	28	30	40 ^④
	50	1600	--	--	--	28	30	40 ^④
	T50H	2000	--	--	--	28	30	40 ^④
	75	3200	--	--	--	32	35	50
	100	4000	--	--	--	32	40	50 ^④
	125	5000	--	--	--	(refer to factory GE-Houston)		
Metering		--	--	25	25	--	--	--
Ground Fault-Ground Break		--	8	25	25	--	--	--
Automatic Throwover	800	--	28H x 35W x 35D			--	--	--
	4000	--	28H x 35W x 35D			--	--	--

- ① CT compartment on line side requires 4" filler.
- ② If metering CTs are required, add 5" to depth. For devices at extreme top or bottom, depth shown may not provide sufficient conduit entrance space. See Section 5.10 for conduit space available.
- ③ When integral ground fault is present, a 4" filler is required on the load side.
- ④ Additional depth for metering CTs not required for any stationary units or for electrical drawout units.
- ⑤ 30" width is recommended for 1200A devices or when more than three devices are stacked in one section.
- ⑥ If vertical neutral bar is required, add 5" to depth.
- ⑦ Not available in electrical unit.

Power Break II Dimensions (Inches) Includes Incoming Lugs and Customer Meter CTs

Amp Rating		Stationary ^①						Draw Out ^{①②③}					
		Manual			Electrical			Manual			Electrical		
		Unit	Section	Unit	Section	Unit	Section	Unit	Section	Unit	Section		
Frame	Sensor	Height	Width	Depth	Height	Width	Depth	Height	Width	Depth	Height	Width	Depth
800 ^②	200, 400, 800	20"	30"	25"	20"	30"	25"	20" ^①	30"	40"	20" ^①	30"	40"
1600	800, 1000, 1600	20	30	30	20	30	30	20	30	40	20	30	40
2000 ^②	2000	20	30	30	20	30	30	20	30	40	20	30	40
2500	1000, 2000, 2500	40	40	35	40	40	35	32	30	40	32	30	40
3000	3000	40	40	35	40	40	35	32	40	40	32	40	40
4000	4000	40	40	40	40	40	40	44	40	45	44	40	45

- ① Width and depth will vary depending on neutral risers, lug arrangement and number of devices included in the section.
- ② Max. of 72 secondary contacts.
- ③ Rear access may be required for 2500A through 4000A drawout.

CT Compartment Dimensions

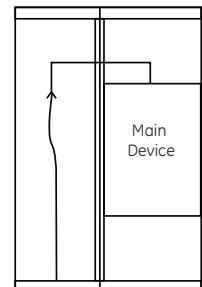
CT Centerline	Ampere Ratings	Minimum Section Width (inches) ^①	Minimum Section Depth (inches) ^①
9" or 11"	600	35	35
	800		
	1000		
	1200		
	1600		
	2000		
	2500		
3000			
	4000	40	40

① Add 5" to depth when busway entrance is required.

Bussed Pull Sections

Section has cross bus that connects to adjacent main section bus.

Amperage	Standard (in.)		Minimum (in.)	
	Width	Depth	Width	Depth
800	35	25	25	25
1000	35	25	25	25
1200	35	25	25	25
1600	35	25	30	25
2000	35	25	30	25
2500	35	25	35	25
3000	35	25	35	25
4000	40	30	40	30
5000	45	40	45	40



Bussed Pull Section

Short-Circuit Ratings Fusible Switch Units

The short-circuit or interrupting rating of the fusible switch is the lower of the fuse or the switch rating. Spectra Series[®] switches have a 200,000 amp short-circuit rating.

Fuse Classification

UL Class	Available Amp Rating	Maximum Short-Circuit Rating in Sym. RMS Amps	Max Voltage	Application
H	15-600	10,000	250/600	One-time general purpose
J	15-600	200,000	600	
RK1	15-600	50,000	250/600	Fast-acting rejection sizing mains & feeders, current limiting
		100,000		
		200,000		
L	800-1200	200,000	600	Rejection means available in two forms: Fast-acting mains & feeders; Time-delay motor starting current limiting
R	30-600	100,000	250/600	Duel element rejection means, motor starting current limiting
		200,000		
T	100-800	200,000	250/600	Fast-acting small physical mains & feeders, current limiting

① Ratings are based on latest revision of the National Electric Code Article 430. Horsepower ratings for switches with Standard Class H fuses are based on one-time fuses having minimum time delay. When time delay fuses are used, the horsepower ratings are maximum for the switches.

Maximum Horsepower^① Fusible Switch

Rating in Amps ^①	Volts, ac						Volts, dc		
	2-Pole			3-Pole			2-Pole	3-Pole	
	120	240	480	600	240	480	600	125	250
With Standard Fuses									
30	1/2	1 1/2	3	3	3	5	7 1/2	2	5
60	1 1/2	3	5	10	7 1/2	15	15	5	10
100	-	7 1/2	10	15	15	25	30	-	20
200	-	15	25	30	25	50	60	-	40
400	-	-	-	-	50	100	125	-	50
600	-	-	-	-	75	150	200	-	50
With "Time-delay" Fuses									
30	2	3	7 1/2	10	7 1/2	15	20	3	-
60	3	10	20	25	15	30	50	-	-
100	-	15	30	40	30	60	75	-	-
200	-	15	50	50	60	125	150	-	-
400	-	-	-	-	125	250	350	-	-
600	-	-	-	-	200	400	500	-	-

① Ratings are based on latest revision of the National Electric Code Article 430. Horsepower ratings for switches with Standard Class H fuses are based on one-time fuses having minimum time delay. When time delay fuses are used, the horsepower ratings are maximum for the switches.

General

- Spectra switchboards are designed, built and tested in accordance with NEMA PB-2 and UL 891. All sections are UL Listed and labeled.
- Spectra 1 switchboards are front accessible and may be installed mounted against a wall. All main and branch devices are group mounted in panelboard construction. Maximum main device rating is 1200A.
- Spectra 2 switchboards are front accessible and include an individually mounted main device section that feeds group mounted Spectra 1 distribution section(s). Maximum main device rating is 4000A.
- Switchboard is a completely self-supporting structure with 90° high vertical sections bolted together to form the required arrangement. All sections are rear aligned and may be rolled, moved or lifted into the installation position and bolted directly to the floor without the addition of floor sills. The structure frame is die-formed 12 gauge steel with reinforcing corner gussets. Bolt-on enclosure covers are code gauge steel. All steel surfaces are chemically cleaned to provide an excellent point bonding surface. Exterior paint finish is ANSI 61 light gray.
- Standard busbars are tin-plated aluminum based on density rating of 750 amperes per square inch maximum (copper at 1000 amperes per square inch is available) and are mounted on supports of high impact non-tracking insulators. Buses are braced to withstand the mechanical forces exerted during short circuits of 65,000 amperes RMS symmetrical as standard. Optional bracing up to 200,000A RMS symmetrical is available. A full length ground bus bar is secured to each vertical section.
- All lugs are UL Listed for use with cable whose ampacity is based on 75°C conductor temperature rating.
- Switchboard current ratings, including devices, is based on operation in a 25°C room ambient.

Molded Case Circuit Breaker Lugs, Line Shields, Covers and Bus Connectors

Accessory	Wire Size	For Use With	Catalog Number	
Copper-Aluminum Lugs	#14-6 Cu, #12-2 Al	TQC (15-60A)	TQAL 3	
	#4-1/0 Cu-Al	TQC (70-100A)	TQAL 4	
	#1-300 MCM	TQD	TCAL 25	
	#14-8	E150, THLC1, TB1 (15-30A)	TCAL 14	
	#14-3 Cu, #12-1 Al	E150, THLC1, TB1 (15-60A)	TCAL 12	
	#6-2/0 Cu, #4-2/0 Al	E150, THLC1, TB1 (70-90A)	TCAL 12A	
	#3-3/0 Cu, #1-3/0 Al	E150, THLC1, TB1 (100-150A)	TCAL 15	
	#4-300 MCM	F225 Load end	TCAL 24	
		Line end	TCAL 26	
		J400, J600 (thru 400A)		
	(1) 6-600 MCM or (2) 2/0-250 MCM	TJD	TCAL 43	
	(2) 4/0-350 MCM Cu or (2) 300-500 MCM Al	J600 (45-600A)	TCAL 63	
	(1) 750 MCM Cu-Al	J400, TJD	TCAL 47	
	(2) 3/0-250 MCM Cu-Al			
	Copper Only Lugs with Follower and Extra Plating	(2) 1/0-250 MCM or (1) #4-600 MCM	K1200	TCAL 41
(2) 2/0-500 MCM		K1200	TCAL 61	
(3) 3/0-500 MCM		K1200	TCAL 81 ^{①②}	
(4) 250-350 MCM or (4) 250-500 MCM Al		K1200 (1000-1200A)	TCAL 121 ^④	
(4) 250-350 MCM		TK4V - Load end	TCAL 131 ^④	
Line Shield		#14-2/0	E150, TB1 (thru 150A)	TCO 12
		#1-300 MCM	TQD (100 -225A)	TCT 25
			F225 Load end	TCO 24
		#14-300 MCM	Line end	TCO 26
		(1) 6-600 MCM or (2) 2/0-250 MCM	J400	TCO 43
		(2) 250-350 MCM	J600	TCO 63
		(1) 1/0-600 MCM or (2) 1/0-250 MCM	K1200	TCO 41 ^②
		(2) 2/0-500 MCM	K1200	TCO 61
		(3) 250-500 MCM	K1200 (700-1000A)	TCO 81A
		(4) 250-400 MCM	K1200 (1200A)	TCO 121
Lug Cover, TKM Breaker (two per breaker)		TEB, TEC, TED, THED	TEDLS	
		TFH and TFK	TFKLS	
		TJJ and TJK	TJKLS	
Connector (back strap)		TCO41, TCAL41 Lugs	789A448G3 ^③	
		TCO61, TCAL61,		
		TCAL81 Lugs, TCO81A	789A448G1	
	TCO121; TCAL 121 Lugs	789A448G2		
	TKM	TKMC1		

① Not suitable for 1000-amp aluminum conductor.

② Not UL listed.

③ End cover supplied with 800A frame is used as lug cover.

④ Suitable for 500 MCM copper for voltage drop considerations.

Standard Fusible Switch Module Terminations (Cu/Al Mechanical)

Amp Rating	Voltage	Wire Size (Cu/Al)	# Wires Per Pole
30	240/600	#14-#2	1
60	240	#14-#2	1
60	600	#14-1/0	1
100	240/600	#14-1/0	1
200	240/600	#6-250 MCM	1
400	240/600	1/0-250 MCM or #2-600 MCM	2 or 1
600	240/600	1/0-250 MCM or #2-600 MCM	4 or 2
800	600	1/0-250 MCM or #2-600 MCM	6 or 3
1200	600	1/0-250 MCM or #2-600 MCM	8 or 4

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