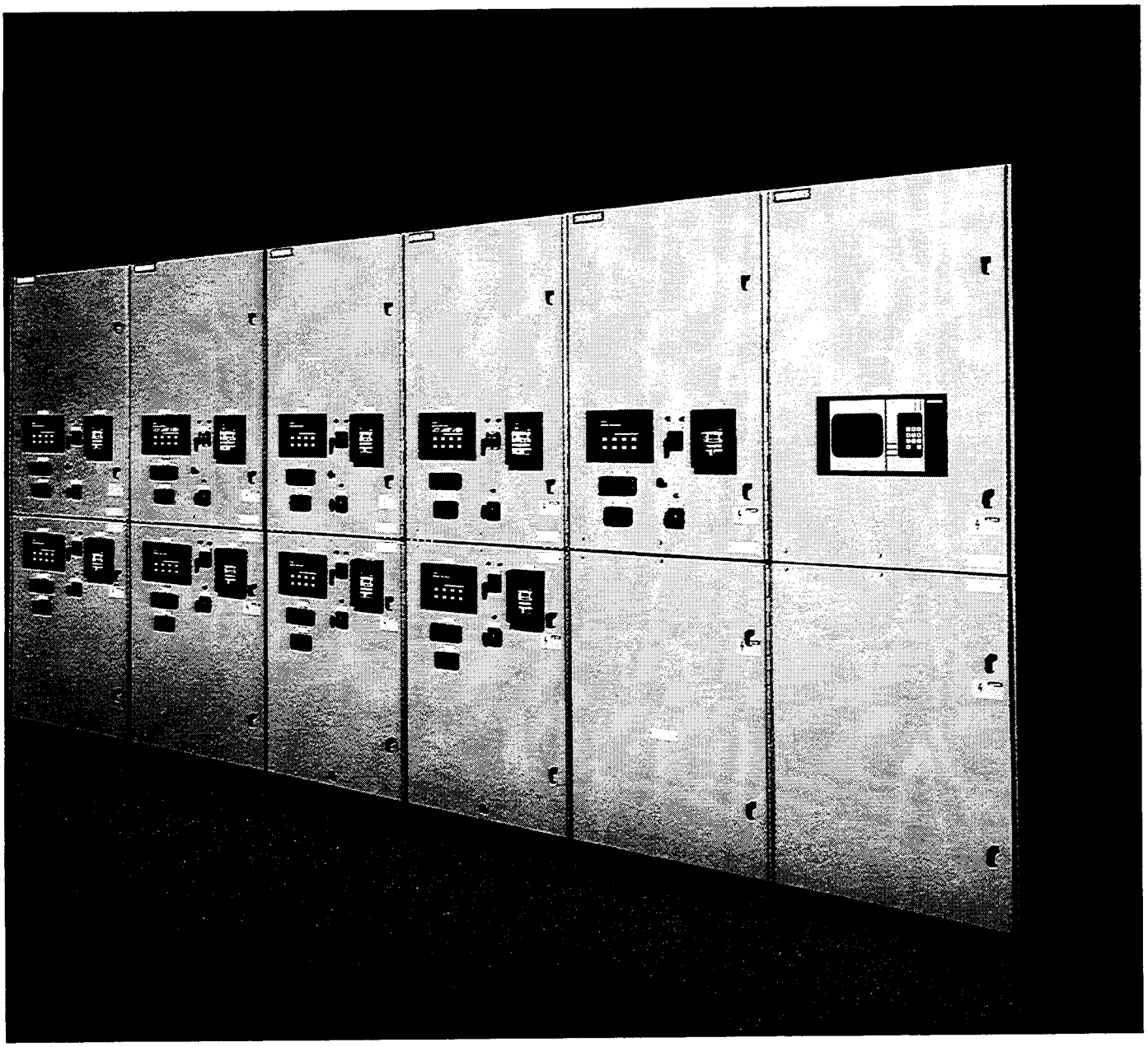
SIEMENS

Medium Voltage Metal-Clad Switchgear Type GM

With 5kV And 15kV Class Vacuum Circuit Breakers Pricing Guide



SG3102 (New)

SIEMENS

Medium Voltage Metal-Clad
Switchgear Type GM
Pricing Guide

SG-3102

January, 1993

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Pricing Information

General Information

The enclosed section contains pricing information for medium voltage switchgear, both Indoor and Outdoor, utilizing the GMI vacuum circuit breaker. The purpose of this section is permit the pricing of switchgear transactions on a sound engineering basis by utilizing standard designs and arrangements.

For any special designs and arrangements, refer to the factory for assistance.

Prices are subject to change without notice. While Siemens has made every effort to assure the correctness of all information contained in this parts price list, we cannot be held liable for printers errors or ommisions.

Description

The Siemens GM medium voltage 5kV, 7.2kV, and 15kV metal-clad switchgear assemblies with horizontal drawout type GMI vacuum circuit breakers are available to fully incorporate the latest developments in proven vacuum interrupter technology. Two circuit breakers may be stacked in one vertical section, allowing significant space savings.

Available interrupting capacities from 250MVA through 1000MVA. The equipment meets or exceeds the latest requirements of ANSI, NEMA, and IEEE standards.

This equipment is ideal for applications in industrial plants, commercial buildings, electric utility systems, cogeneration installations and other applications of a electrical system. It is commonly used for the protection of any medium voltage power circuit.

Additional Descriptive Information:
SG-3101 GM MV Specification Bulletin
SG-3109 GM MV Brochure

Check List For Ordering Switchgear

To Expedite The Ordering Of Switchgear, Provide The Following:

1. Single-line diagram.
2. Front view arrangement.
3. Current Transformer ratios, relay types, characteristics and ranges, etc.
4. Complete data of controlled equipment such as motors and generators.
5. Control voltage for breaker operating – trip and close.
6. Cable data, sizes, direction (top or bottom), number of cables per circuit, bus duct requirements, etc.
7. Termination of conductors per circuit such as potheads, cable lags, bus duct, etc.
8. Secondary control wiring entry – top or bottom? Which unit(s)?
9. Shipping splits (other than standard) or limitations of any kind.
10. Complete nameplate information.

Ratings Of Switchgear

Type GMI Vacuum Circuit Breaker Ratings
Application - Vacuum Circuit Breaker Types Rated On Symmetrical Current Basis, Per ANSI Standards.

Identification			Rated Values								Rated Required Capabilities (3)				
			Voltage		Insulation Level		Current					Current Values			
	Nominal Voltage Class	Nominal 3-Phase MVA Class	Rated Max. Voltage (2)	Rated Voltage Range Factor (3)	Rated Withstand Test Voltage		Rated Cont. Current (4)	Rated Short Circuit Current (at rated Max.kV) (5) (6)	Rated Interrupting Time	Rated Permissable Tripping Delay Y	Rated Max. Voltage Divided by K	Max. Sym. Interrupting Capability (7)	3-Sec. Short Time Current Carrying Capability	Closing and Latching Capability (Momentary)(8)	
					Low Frequency	Impulse						K Times Rated Short Circuit Current Kl		1.6 K times Rated Short Circuit Current (9)	2.7 K times Rated Short Circuit Current
Circuit Breaker Type	kV Class	MVA Class	E kV rms	K	kV rms	kV Crest	Amps	I kA rms	Cycles	Sec.	E/K kV rms	kA rms	kA rms	kA rms	kA Crest
5-GMI-250 (1)	4.16	250	4.76	1.24	19	60	1200 2000	29	5	2	3.85	36	36	58&78 (1)	97&132 (1)
5-GMI-350	4.16	350	4.76	1.19	19	60	1200 2000 3000	41	5	2	4.0	49	49	78	132
7-GMI-500	7.2	500	8.25	1.25	36	95	1200 2000 3000	33	5	2	6.6	41	41	66	111
15-GMI-500 (1)	13.8	500	15.	1.30	36	95	1200 2000	18	5	2	11.5	23	23	37&58 (1)	62&97 (1)
15-GMI-750	13.8	750	15.	1.30	36	95	1200 2000 3000	28	5	2	11.5	36	36	58&77 (1)	97&130 (1)
15-GMI-1000	13.8	1000	15.	1.30	36	95	1200 2000 3000	37	5	2	11.5	48	48	77	130

(1) High close and latch (momentary) rating available for special application.

(2) Maximum voltage for which the breaker is designed and the upper limit for operation.

(3) K is the ratio of rated maximum voltage to the lower limit of the range of operating voltage in which the required symmetrical and asymmetrical interrupting capabilities vary in inverse proportion to the operating voltage.

(4) 3000 ampere units available with increased fan-cooled rating of 4000 amperes.

(5) To obtain the required symmetrical interrupting capability of a circuit breaker at an operating voltage between 1/K times rated maximum voltage and rated maximum voltage, the following formula shall be used:

$$\text{Required Symmetrical Interrupting Capacity} = \text{Rated Short-Circuit Current} \times \frac{\text{Rated Maximum Voltage}}{\text{Operating Voltage}}$$

For operating voltages below 1/K times rated maximum voltage, the required symmetrical interrupting capability of the circuit breaker shall be equal to K times rated short-circuit current.

(6) With the limitations stated in 5.10 of ANSI Standard C37.04-1979, all values apply for polyphase and line-to-line faults. For single phase-to-ground faults, the specific conditions stated in 5.10.2.3 of ANSI Standard C37.04-1979 apply.

(7) Current values in this column are not to be exceeded even for operating voltages below 1/K times rated maximum voltage. For voltages between rated maximum voltage and 1/K times rated maximum voltage, follow 5 above.

(8) Current values in this column are independent of operating voltage up to and including rated maximum voltage.

(9) Included for reference only.

Pricing Steps And Example

1 - Layout the line-up according to information in SG-3101 page 21 and customers requirements. Determine the proper number of vertical sections and price from Table 1.

2 - Determine number of Circuit Breaker Units and price from Table 2.

3 - Determine Incoming power source connection(s) and Bus Modifications and add per Table 3.

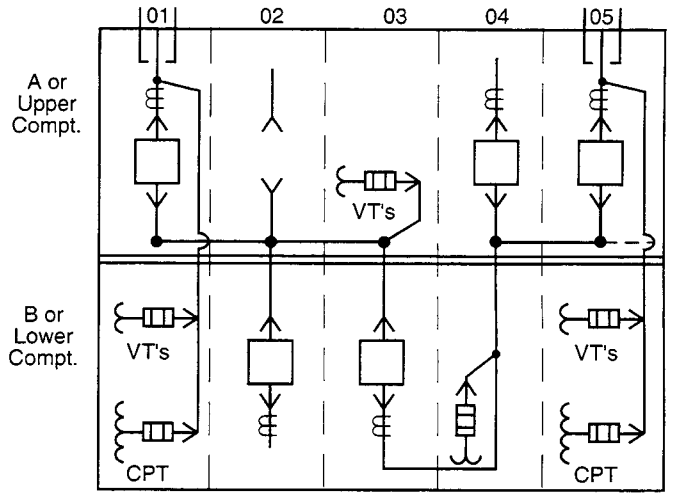
4 - Add CT's, VT's from Table 6.

5 - Add Meters, switches from Table 11 and Relays from Table 10

6 - Price additions for Structure Modifications Table 7 and Misc. per Table 8 as required by specifications.

Check: Indoor vs. Outdoor; Operating voltage; MVA rating; control power DC vs. AC; special requirements.

Vertical Section



Front View Arrangement

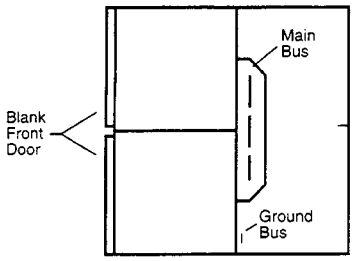
Pricing Steps Example

Vertical Section	1		2		3		4		5		Qty.	List Price	Total
Compartment	A	B	A	B	A	B	A	B	A	B			
Item Description													
Vertical section - 1200A copper (Cu)		1		1		1		1		1	5	$4,809	$24,045
Circuit Breaker 15-GMI-500-1200A-37	1			1		1	1		1		5	$18,880	$94,400
Provision for Future - 1200A			1								1	$5,385	$5,385
Bus Tie transition								1			1	$1,480	$1,480
Bus duct risers - 1200A Cu	1								1		2	$1,330	$2,660
Compression lugs				1			1				2	$210	$420
Voltage Transformer VT - 15kV		2			2			2		2	8	$2,782	$22,256
Current Transformer CT, single ratio	3			3		3	3		3		15	$296	$4,440
Control Power Transformer. CPT - 15kV-10kVA 1ph		1								1	2	$6,673	$13,346
Power Meter 4300	1			1		1	1		1		5	$1,850	$9,250
Overcurrent Relay SCOR 3ph & ground 50/51 & 51N	1			1		1	1		1		5	$4,394	$21,970
MOC & TOC each breaker unit	1			1		1	1		1		5	$869+403	$6,360
Test Block - PK 2	1			1		1	1		1		5	$365	$1,825
Test Cabinet											1	$560	$560
Lift Truck (windlass)											1	$2,750	$2,750
Control Power Throwover		1									1	$2,445	$2,445
Control Switch + 2 lights	1		1	1		1	1		1		6	$390	$2,340
												Total List	$215,932

Pricing Customer Changes - Changes made by a customer after entry of an order will require price change(s) for all costs incurred as result of the change(s) including engineering, drafting, materials and shop labor. A factory review must be made to determine all disciplines involved in making any changes.

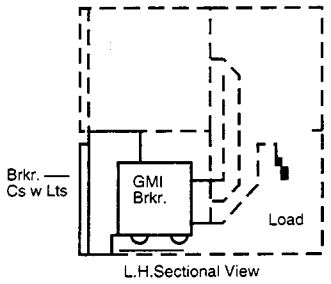
Unit Descriptions

Vertical Section - Price Per Table 1



Each Vertical Section is an indoor structure with Blank upper and lower cells with front hinged doors and bolted rear covers, insulated main bus of the Type & ampacity selected and a copper ground bus 1/4" X 2".

Circuit Breaker Unit - Price Per Table 2

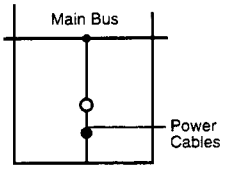


L.H.Sectional View

Each Circuit Breaker Unit includes a drawout vacuum breaker element, necessary cell modifications to accept a breaker (such as racking mechanism and rails, primary insulated disconnects, steel safety shutters, main bus taps, load run backs and one set of mechanical type lugs for connection of customer's power cables), one set of fused pullout blocks for secondary control circuit disconnect. Breaker unit control can be 48, 125, 250VDC.

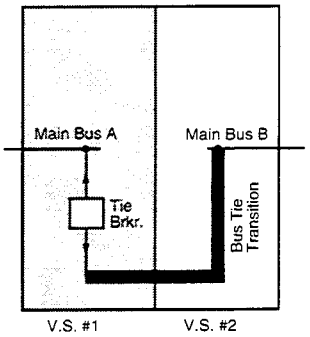
For AC capacitive trip refer to Addition per Table 8.
Power sources are not included.

Cable Entrance - Price Per Table 3



A cable entrance must be priced for any connection directly to or from the main bus when not going through a breaker or some type of disconnect.

Bus Tie Transition - Price Per Table 3



A Bus Tie Transition Adder must be priced whenever a transition from the main bus to the upper or lower cross bus is required.

Provision For Future Breaker - Price Per Table 2

Each provision for Future Breaker is similar to a Circuit Breaker Unit except the breaker element is not included.

Connection To Existing GM Design - Indoor or Outdoor

See Table 3 for proper connections and price.

Connection To Other Than GM Design - Indoor

Where a connection to existing obsolete or other than Siemens design a Transition to Non-SEA design is required, refer to factory. In most cases a 36" wide transitional unit will be supplied.

Connections To Other Than GM Design - Outdoor

For these connections, refer to factory for review.

Connections To Transformer - Indoor Or Outdoor

For transformer connection to Indoor switchgear add an Indoor Transformer Connection. See Table 3.

For connection to Outdoor Add the Outdoor Transformer Throat price to the above indoor price. See Table 3.

Connection to Siemens Medium Voltage Motor Control (MVC-81000)

Refer to factory for price and transition layout.

Vertical Sections

Table 1: Vertical Section - Each

List Price - Each		
5kV or 15kV		
Main Bus Amps	Copper	Aluminum
1200	$4809	$4330
2000	$5549	$5070
3000	$6290	$5875
4000	$6570	$6020

Circuit Breaker Units

Table 2: Circuit Breaker Unit[1][2], Provision For Future Unit, Spare Breaker Element[3]

Circuit Breaker Unit						Provision For Future Unit				Spare Breaker Element				
Max. kV	Nominal MVA	Close & Latch (KA)	Amps			Max. kV	Amps			Max. kV	MVA	Amps		
			1200	2000	3000		1200	2000	3000			1200	2000	3000
			List Price - Each				List Price					List Price - Each		
5kV	250	58	$17,920	$21,610	$33,990	5kV or 15kV	$5,385	$6,410	$8,185	4.76kV	250	$12,540	$15,200	$25,815
5kV	350	78	$26,855	$28,770	$34,340					4.76kV	350	$21,475	$22,358	$27,157
8.25kV	500	66	$20,980	$23,590	$37,828					8.25kV	500	$15,590	$17,178	$29,645
15kV	500	37	$18,880	$24,040	$38,540					15kV	500	$13,495	$17,627	$30,360
15kV	750	58	$20,750	$24,995	$40,080					15kV	750	$15,360	$18,584	$31,893
15kV	1000	77	$31,325	$33,890	$41,609					15kV	1000	$25,950	$27,475	$33,429

[1] Standard close & latch and 5 cycles interrupting rated breakers. High Momentary close & latch breakers are available. Contact Factory for price.

[2] 3750A and 4000A Circuit Breaker ratings are forced cooled ratings; contact Factory for availability.

[3] Spare breaker prices are not to be used for renewal or replacement breakers. Contact Factory for Renewal or Replacement of breaker element for existing switchgear.

Incoming Source Connections/Bus Modifications

Table 3: Incoming Connections -Terminations - Bus Modifications

Item	List Price - Each				
		Ampere Rating			
		1200A	2000A	3000A	4000A
Cable Entrance		$2108	$2849	$3588	$4656
Bus Duct Risers		$1330	$2665	$3650	(3)
Bus Tie Transition		$1480	$2220	$2960	$4110
Roof Bushings (3 phase)		$4875	$12270	(3)	(3)
Bifurcated Feeder (2)		$1166	$2010	N/A	N/A
Indoor Transformer Conn.		$7398	$8140	$9618	(3)
Outdoor Transformer throat Adder		$2035	$3514	$4995	(3)
Transition to Siemens MVC Motor Control		$7399	$8139	(3)	(3)
Connection to Siemens Existing Swgr. (GM)		$6359	$7890	(3)	(3)
Pothead(s) 1-3/C or 3-1/C	$4220				
Armored Cable Terminator	$410				
Conduit Hub	$435				
Additional Cable Lugs (set of 3)	$125				
Compression (Crimp) type Lugs	$210				
Cable Boots (set of 3)	$187				
Neutral Bus - Bare bus and link	(3)				
Neutral Bus - Installed	(3)				
Transition to NON-Siemens or NOT present design		(3)		(3)	N/A

(1) Price per each Vertical Section
(2) Price per Circuit Breaker Unit-One High only.
(3) Refer to Factory

Surge Protection

Table 4: Surge Protection

Surge Capacitors - 3 Phase		Surge Protection - 3 Phase - List Price			
Max. Rating	List Price	Max Rating	Distribution Type	Intermediate Type	Station Type
4.8kV	$1180	3kV	$285	$1846	$2564
7.5kV	$1850	4.5kV	NA	$2085	$2960
13.8kV	$3590	6kV	$395	$2085	$2960
		7.5kV	NA	$2275	$3711
		9kV	$480	$2275	$3711
		12kV	$585	$2460	$4320
		15kV	$756	$2600	$6315

Power Company Metering

Table 5: Power Company Metering Section

Each Section - 5kV or 15kV	List Price - Each
Section - max. 36" wide	$7,029
Section - max. 48" wide	$8,510

Price includes:
Space only for mounting meters, etc.
Mounting provisions only for power company VT's and CT's.

Instruments, Transformers, CPT's

Table 6: Instrument Transformers (CT's & VT's), Control Power Transformers (CPT) and Current Limiting Fuses - 5kV and 15kV

Current Transformers (CT's) Torodial Type
(per ANSI standard accuracy, includes short circuit terminal block)

Description	List Price - Each
Single Ratio, single secondary	$296
Multi-Ratio, single secondary	$515
Zero Sequence 50:5,100:5	$520
Certified Test report Adder	$228
Per CT secondary protection (Thyrite)	$410
Auxiliary CT, single phase	$865

Voltage Transformer (VT's)
(per ANSI standards, includes primary and secondary fuses, compartmentation, connections and shutter)

Description	List Price - Each
Voltage Transformer, 5kV	$2,225
Voltage Transformer, 15kV	$2,782
Certified Test report Adder	$228
Auxiliary VT, single phase	$865

Control Power Transformers (CPT)
(per ANSI standards, includes primary fuses, secondary breaker and interlocks, compartmentation, connections and shutter)

Type	kVA	List Price - Each	
		5kV	15kV
Single Phase	5	$3,780	$5,475
	15	$4,695	$6,673
	25	$10,284	$10,483
	37.5	$10,698	$12,860
	50	$14,006	$14,840
Three Phase	15	$9,395	$10,684
	30	$11,565	$12,925
	45	$12,862	$13,684
	75	$19,695	$22,980

Current Limiting Fuses
25E max. (includes fuses, compartmentation, mounting and connections and shutter, key interlocks)

	List Price - Each	
	5kV	15kV
Two (2) Fuses	$3,662	$3,845
Three (3) Fuses	$3,922	$4,105

Note: CPT Larger Than 15KVA 1ph. and all 3ph units require mounting in rear cable area.

Structure Modifications

Table 7: Weatherproofing and Other Structure Modifications

Modifications	List Price - Each
Outdoor - NEMA 3R Non-Walkin - OGM per vertical section	$1,110
- NEMA 3R ShelterClad Single Aisle Walkin - SGM per vertical section	$1,850
- NEMA 3R ShelterClad Common Aisle Walkin - SGM per vertical section	$3,699
Exhaust Fan in Aisle (wall mounted.)	$2,310
Aisle Heater	$2,796
Fluorescent Light for Aisle	$135
Screens	$210
Hinged Rear door (indoor)	$185
Hinged Rear door (outdoor)	$605
Indoor Bottom Floor plate	$148
Two Point Latch (each door)	$429
Two Point Latch with Lock (each door)	$509
Padlock Hasp	$55
Rear Extension (12"-indoor)	$407
Rear Extension (12"-outdoor)	$1,102
Channel Steel (per Vert. section)	$185
Porcelain Bus Supports, Primaries, Inserts per Breaker Cell	$1,112
HV Neon Glow Tubes (3 phase)	$890
Glass Inspection Window (each door)	$185
Indoor Drip-proof Roof (per Vert. Sect.)	$960
Special Exterior Paint Color	$2,790 plus $410 per Vert. Sect.

Miscellaneous

Table 8: Miscellaneous

Miscellaneous	List Price - Each
AC Capacitive Trip (STD.)	$167
Key Interlock per cylinder	$335
Larger CT wire than #14AWG	$50
Wire markers (per Vert. Sect.) (sleeve type slip-on)	$180
Device nameplates (per Vert. Sect.)	$95
Ring type wire terminal (insulated)	$85
California or Chicago Code (per Vert. Sect.)	$375
Future device cutout & cover only	$90
Future device cutout, cover, wiring	$185
Panelboard AC or DC with 100A main	$1,200
Molded Case Breaker 1 pole	$90
Heaters for Indoor (per Vert. Sect.)	$102
MCCB or Switch for Heaters	$192
Thermostat - fixed button type	$190
Thermostat - adjustable	$895
Humidistat	$385
Indicating light	$40
Mimic Bus - colored plastic (per Vert. Sect.)	$125
Alarm Bell or Horn	$289
AUTOMATIC TRANSFER	
Control Power Throwover (max. 100A)	$2,445
Primary Power Transfer - 1 phase [1]	$7,195
- 3 phase [1]	$8,500
Delayed Transfer	$2,270
Delayed Return	$1,646
HIGH RESISTANCE GROUNDING	
2400 Volt WYE	$8,715
2400 Volt Delta	$10,948
4160 Volt WYE	$9,997
4160 Volt Delta	$11,685

[1] Includes devices (1)27, (1)86, (4) aux. relays and selector switch

Accessories

Table 9: Accessories

Accessories	List Price - Each
Breaker Lift Truck (windlass)	$2,750
Test Cabinet	$560
Lift Sling	$595
Fifth Wheel Device	$970
Electrical Racking Device	$2,135
Secondary Test Coupler	$220

Ground & Test Device 5/15kV	1200A	2000A	3000A
Manual	$10,875	$11,910	*
Electrical	*	*	*

Standard Accessories included at NO charge:

1 - Manual racking crank
1 - Spring charging lever
1 - set Drawout rails (stacked breakers only)
1 - Lift sling (stacked breakers only & Outdoor Non Walkin)

* Refer to factory

Relays

Table 10: Protective Relays [1]

Description	NEMA Device Number	Type	List Price Each
Overcurrent:			
Time and Inst.			
1-Phase	50/51	CO,BEI-51A	$1,427
1-Phase	50/51	SCOR	$2,095
3-Phase & GND	50/51 N	SCOR	$4,394
2-Phase & GND	50/51N	BASLER	$3,596
3-Phase	50/51	BASLER	$3,596
Communication Module For SCOR			$750
1-Phase	50/51	CO-4	$4,097
Voltage Restraint			
1-Phase	50/51 V	COV	$2,893
For Motor Prot.	50/50H		
1-Phase	51	COM	$2,540
Inst., 1-EL	50	SC,PJC	$1,260
Inst., 3-EL	50		$2,836
Inst., 1-EL	50GS	IT,HFC,BEI-51	$1,080
Overcurrent, Directional, Single Phase:			
Phase Time & Instantaneous	67	IRV	$4,690
Phase Time	67	CR	$3,163
Grd. Time & Instantaneous	67N		$4,709
Grd. Time	67N		$3,367
Grd. Neg. Seq Time & Inst	67N	IRQ	$9,566
Grd. Neg Seq Time	67N	CRQ	$5,435
Grd. Product Type	32N	CWC	$3,270
Grd. Product Type	32N	CWP	$3,330
Phase Balance Current, 3-Phase:			
Unbalance Phase Current	46	CM	$5,525
Negative Sequence, Time	46	COQ,BEI-46N	$7,713
Negative Sequence, Inst.	46	POQ	$7,082
Voltage and Power:			
Under or Over Voltage 1-Phase	27 or 59	CV,IAV	$1,500
Under/Over Voltage 1-Phase	27/59	CV,BEI-27/59	$1,706

Description	NEMA Device Number	Type	List Price Each
Voltage and Power: (con't)			
Grd. Over LVolt.	59G or 64	CV-8,IAV	$1,855
UV Reverse Phase Time, 3Phase	27/47	CP	$2,218
Reverse Power 1-Phase	32	CW,ICW	$2,390
Anti-Motoring 1-Phase	32	CRN-1	$3,533
Anti-Motoring 1-Phase	32	SRW	$5,180
UV, Neg Seq., 3-Phase	27/47	CVQ,BEI-47N	$5,390
UV or OV, Inst., 1-Phase Flush Mtd.	27/59	SV,NGV	$1,250
UV or OV. inst., 1-EL, Surface Mtd.	27/59	SV	$796
Pull Out for Syn. Motor (Pwr. Factor)	55	CW	$2,395
Volt Balance - 3 Phase	60	CVQ,BEI-47N	$4,505
Timing Temperature, and Frequency:			
AGASTAT	2,48,62		$350
Timer	2,48,62	TD-4,SAM	$4,394
		TD-5,SAM	$2,659
Temp., 1-EL	49/50	BL-1,BEI-49	$2,865
Temp., 2-EL	49/50	BL-1,TMC	$5,284
Temperature Exploring Coil	49	DT-3	$4,535
Underfrequency, Time	81	CF-1,BEI-81	$2,895
Underfrequency, Instantaneous	81	KF	$4,442
Frequency			
Digital 1-set pt.	81	MDF-1,BEI-81	$5,948
Digital 2-set pt.	81		$7,820
Digital 3-set pt.	81		$9,677
Differential:			
Transf. Motor Gen., 1-Phase, Normal Speed	87	CA,IJD	$3,004
Generator, High Speed, 3-Phase	87G	SA-1	$9,229
Motor, High Speed, 3-Phase	87M	IT,HFC	$2,545

[1] Types Available - Siemens, Basler, ABB/W, GE, MultiLin

Relays

Table 10: Protective Relays [1] (con't)

Description	NEMA Device Number	Type	List Price Each
Differential: (con't)			
Transf., 2 Winding, 1-Phase	87T	BDD,HU,BEI-87T	$5,840
Transf., 3 Winding 1-Phase	87T	BDD,HU-1	$7,267
Bus, Normal Speed, 1-Phase	87B	CA-16	$7,460
Bus. High Impedance 1-Phase	87B	KAB	$4,490
Pilot Wire	87	CPD,HCB-1	$14,557
Neutralizing Reactor	—		
Mutual Drainage Reactor	—		
Pilot Wire Monitoring	85	PMA	$6,580
	85	PMD	$5,235
	85	PMD-1	$2,632
	85	PMD-13	$5,235
Reclosing:			
Mech. Type, 6-Shot	79	RC,BEI-79	$3,937
Inverter DC to AC			$2,610
Static Type, 4-Shot	79	MRC	$3,122
Static 1 Reclosure	79	SGR-52	$3,340
Sync Check	25	CVX-BEI-25	$3,596
	25	CVE-3	$3,596
Sync Check	25	CVX-1	$4,085
Miscellaneous - Motor Protection:			
Motor Protection - Solid State			
W/O RTD Sensing			$1,855
W/ RTD Sensing			$3,600
Miscellaneous - Motor Protection:			
Motor Protection - Solid State			
Without Diff. & RTD Options			$4,729
With Differential Option			$7,580
With Differential & RTD Options			$12,592

Description	NEMA Device Number	Type	List Price Each
Miscellaneous - Generator Protection:			
Generator Overexcitation v Hz	24		$10,825
Generator Loss of Field	40	CEH,KLF,BEI-40Q	$8,273
Generator Field Gnd Detection	64G	DGF	$5,239
Miscellaneous - Breaker Backup:			
Breaker Failure Backup	50/62BF	SBF-1,SVC	$9,399
Auxiliary Relays:			
Industrial Control, Surface mtd		AAR,ARD	$195
General Purpose Surface mtd		SG,HGA	$290
General Purpos Surface mtd		MB-6,HFA	$482
General Purpose Flush mtd			$1,212
With O & R coils, Surface mtd			$1,164
With O & R coils, Flush mtd			$1,865
Trip & Lockout, Handset	86	ELECTROSW-LOR	$1,120
Indication Relay, 1-Unit	30,94	TR-1,HAA	$540
Indicating Relay, 2-Unit			$1,140
Indicating Relay, 1-Unit			$593
Static Trip, 1-Unit			$495
High Speed Tripping, Surface mtd	94	AR,HGA14	$1,053
High Speed Tripping, Flush mtd			$2,205
DC Overcurrent	76		$4,155

[1] Types Available - Siemens, Basler, ABB/W, GE, MultiLin

Instruments, Meters, Switches

Table 11: Instruments, Meters, Switches

Description	List Price - Each	
	Indicating	Recording (chart type)
AC Ammeter	$130	$6.350
AC Voltmeter	$130	$8,165
DC Ammeter with shunt	$185	-----
DC Voltmeter	$133	-----
Frequency Meter	$260	$8,596
Varmeter	$611	$7,942
Power Factor Meter	$560	$8,911
Wattmeter	$579	$7,295
Thermal Demand Ammeter, 1 phase	$595	
Elapsed Time Meter, hours	$296	
Watthour Meter, 2 element	$1,175	
2 1/2 or 3 element	$1,929	
Varhour Meter, 2 element	$1,483	
2 1/2 or 3 element	$2,235	
Demand attachment	$350	
Pulse Initiator	$579	
Rachet device for WHM or VARHM	$155	
SIEMENS 4300 Power Meter	$1,850	
SIEMENS 4700 Power Meter	$2,615	
Communications Adder	$680	
Relay/Discretes Adder	$385	
SyncScope with two lamps	$790	
Annunciator per window	$560	
Swing BKT. for Syncscope	$185	
SWITCHES		
Mech. operated switch (MOC)(6a-6b)	$869	
Truck operated switch (TOC)(2a-2b)	$403	
Breaker control switch (CS) w/two lights	$390	
Transfer switch	410	
Selector switch (amps and volts)	$235	
Pushbutton	$210	
Toggle cutoff switch	$175	
Test Block (PK-2)	$365	
Test Switch FT-1	$425	
LIGHTS		
Indicating light (incandescent)	$40	
Push-to-test type	$175	
LED type	$185	

Transducers	List Price - Each	
	0-1ma	4-20ma
Current, 1 phase	$405	$1,134
Voltage, 1 phase	$405	$1,134
Watts, 3 phase	$1,890	$2,520
Vars, 3 phase	$2,016	$2,646
Power Factor	$1,764	$2,356
Frequency	$1,890	$2,394
Watt/Var, 3 phase,3 W	$3,400	$4,100
Watt/Watthour (2 elem)	$3,750	$4,210
Var/Varhour (2 elem)	$3,478	$4,034

Battery Systems

Table 12: Batteries, Charger & Rack - 48VDC and 125VDC

48 Volt Control Batteries And Chargers[1][2][3][4][5]		
Type	List Price	
With Automatic Charge Control	Unmounted[9]	Mounted[6][7]
Pasted Plate type	$10,157	$11,580
Planté type	$14,554	$15,963
Lead Calcium type	$9,642	$11,052
Nickel-Cadmium type	$9,343	$10,752

May be used with any stored energy breaker requiring 48 volt dc control. Maximum discharge rate is 75 amperes for one minute for pasted plate and planté type batteries and 65 amperes for one minute for the nickel-cadmium type battery.

125 Volt Control Batteries And Chargers[1][2][3][4][5][8]		
Maximum One Minute Discharge Rate[3]	List Price	
	Unmounted[9]	Mounted[6][7]
Pasted Plate Lead Antimony Type		
75	$18,837	$21,656
111	$21,244	--------
148	$22,882	--------
220	$34,011	--------
375	$40,515	--------
Planté Type		
75	$28,075	$30,893
111	$29,724	--------
148	$39,067	--------
244	$48,684	--------
375	$56,368	--------
Pasted Plate Lead Calcium Type		
75	$17,795	$20,613
111	$21,244	--------
148	$22,882	--------
219	$28,293	--------
374	$33,469	--------
Nickel-Cadmium Type		
75	$16,202	$19,021
112	$19,620	--------
130	$23,118	--------
193	$28,184	--------
375	$35,230	--------

[1] Included-Rack and Accessories. Charger power source not included. Charger power required 1ph 120V or 240V 60Hz.

[2] Prices listed apply only to batteries for indoor domestic service, completely assembled, filled, and charged, ready for service when received. Batteries shipped unassembled and (or) packed for export shipment will not be priced per these schedules, but referred to the factory for prices. Also, batteries for outdoor locations, especially where low temperatures will occur, special details, such as reduced battery ratings, enclosures, and space heaters are involved. Therefore, all such transactions should also be referred to the factory for review and prices. Batteries suitable for indoor service with 100% rated output at 77oF ambient.

[3] Down to 1.75 volts per cell for the pasted-plate and planté types, and to 1.14 volts per cell for the nickel-cadmium type. For applications where the required, or specified, ratings exceed the values listed, refer the transactions to factory for prices.

[4] Under no circumstances may these prices be used for supply quotations, or segregated from total Swithgear Equipment prices in any formal quotations.

[5] Chargers are 60 cycle. For 25 or 50 cycles, refer to factory

[6] All batteries shipped separately for customer mounting.

[7] Chargers furnished mounted.

[8] May be applied for any stored energy operated breaker.

[9] Includes Batteries, Charger and Rack(s) for installation remote from the switchgear.

Tests, Inspections, Drawings

Table 13: Tests And Inspection

Description	Price
Standard ANSI Production Test	No Charge
Customer Inspection	No Charge
Formal Witness Test	$2,500 plus $1,250/day
Certified Test Reports	$250 for 5 copies

Standard Tests, Witnessed
When required, witnessing of the Standard ANSI Production Test must be specified on the order.
See TABLE 13 for additional cost.

Customer Inspection
When required, customer inspection must be specified on the order. Inspection includes:

1. Visual inspection of number of units and arrangements.
2. Inspector can check materials, devices, relays, breakers, etc. for quality and workmanship.
3. Inspector can check shipping group and plans for shipping.
4. Inspector can check equipment after tests or painting as desired.

Drawings, Standard Prints and Reproducibles:
a. Four sets of prints - No Charge
Or
b. Two sets of prints and one set vellum - No Charge

Additional Standard Prints or Reproducibles:
a. Additional print set per dwg. - $15.00
b. Additional Vellum set per dwg. - $40.00

Special Prints:
Mylars, auto-positive: $85.00/print
AutoCad-DXF format: contact factory

Instruction Books:
More than four (4): $100 each

Standard Production Tests:
All of the switchgear products are given the standard tests and inspection as described as part of the regular manufacturing procedure.

A. Metal-Clad Vertical Section

1. All sections are checked for levelness, plumb and correct door alignment on leveling channels.
2. A master breaker fixture is used to ensure interchangeability of breakers and to check primary and secondary contact alignment.
3. The wiring of all current operated relays, instruments and meters is checked by means of circulating current through the secondary injection of all transformers and associated wiring. The wiring of voltage operated devices is checked in a similar manner by energizing the secondary potential and control power circuits. Proper operation of relays and targets is verified (not calibrated) by increasing current and voltage beyond pick-up values. Other wiring not verifiable in this manner is checked for continuity.
4. Simulated operational check of control circuit involving breaker operation using test cables and breaker operation simulator.
5. Sequence operation tests are performed as required.
6 High potential tests of primary circuits and secondary wiring in accordance with the ANSI standards are made.

B. Power Circuit Breaker

Each circuit breaker is placed in a master inspection fixture and to assure conformance with engineering specifications, the following items are checked:

1. Breaker mechanism and mechanical clearances are re-checked after the initial running of 300 mechanical operations.
2. Correct alignment of the secondary and primary disconnects are checked, including contact pressure.
3. All electrical circuits are checked.
4. Interchangeability of like breaker ratings, including interlock checks.
5. Automatic spring discharge on breaker withdrawal from unit is checked.
6. No load breaker operation at minimum and maximum control voltage ratings to assure proper coil selection.
7. Check of breaker opening and closing times at standard control voltage.
8. High potential tests remade on the primary and secondary circuits in accordance with the ANSI standards.
9. Millivolt measurement of each breaker pole resistance is checked and recorded.

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