



Westinghouse Electric Corporation
Switchgear Division
East Pittsburgh, Pa. 15112, U.S.A.

32-220 P W E A
Price List

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September 1, 1974
Supersedes PL 32-220 dated January 18,
1972 and Supp. to PL 32-220, Page .01, dated
August 15, 1973 E, D, C/1942/PL
Prices effective September 1, 1974,
subject to change without notice.
For standard terms and conditions of sale
refer to Selling Policy 32-000.

75 to 1000 Mva Interrupting,
4160 to 13800 Volts
1200 to 3000 Amperes, Indoor and Outdoor

Standardized Type DHP Medium Voltage Metal-Clad Switchgear

General Information

This price list contains complete data for pricing metal-clad switchgear, both indoor and outdoor, utilizing Type DHP air circuit breakers and Type DVP vacuum circuit breakers.

Selling Policy

For appropriate discounts and multipliers, standard terms, policies and conditions of sale, refer to Selling Policy 32-000.

Pricing Instructions

Medium voltage metal-clad switchgear will be priced in their entirety from this section, and only as complete equipment.

This price list reflects the widely varying characteristics, modifications and detail items available in metal-clad switchgear to meet the individual purchaser's requirements. Pricing starts with the basic indoor metal-clad unit from table B as a base, and all modifications and detail items required are added to this base. The result is a price and detail material list that corresponds directly with the specific switchgear requirements. When used for estimating purposes, the detail material list, so prepared, is in the form necessary to permit final engineering, specification, ordering and manufacturing to proceed.

For pricing examples see pages 15 through 19.

All modifications and detail items added must be priced from the tables in this price list. All items are listed only for application to, and inclusion with, or modification of, the base unit prices. It is not permissible to quote separate prices for any of the items listed in the price list, except as bonafide additions to a complete equipment transaction. Although the price list and Selling Policy 32-000 reflect actual prices, firm quotations must be obtained from the nearest Westinghouse sales office.

Prices listed are for standard arrangements. Any deviation from standard requires special pricing.

Refer to Headquarters for pricing, all transactions which include any device of other than Westinghouse manufacture.

The manufacture of switchgear which will be required to match and line-up with existing equipment, will require special engineering consideration. Therefore, the price shall be requested from the nearest Westinghouse sales office giving complete identifying data on the existing equipment.

Ordering Information

The standard number of drawings and instruction books furnished with an order is 4 (four). However, if requested with the original order, 5 (five) copies per order will be furnished. The price for additional copies will be \$30 list per copy.

When ordering, specify:

1. Single-line diagram showing main connections and sketch showing desired order of assembly units.
2. Item details such as current transformer ratios, relay types, characteristics, ranges, etc.
3. Name of manufacturer and complete nameplate rating of all equipment to be controlled by the switchgear. Generator information should include the field rheostat, field discharge resistor, governor motor information and exciter rating. Synchronous motor information should include exciter rating.
4. The control voltages for operating the closing mechanism and shunt trip coil.
5. Type of cable, number and size of conductors and diameter over lead or braid for each power circuit and where they are to enter (top or bottom).
6. How power cables are to terminate (clamp-type terminals or potheads).
7. Where control cables are to enter (top or bottom).
8. Maximum overall dimensions of shipping section which can be handled and installed at destination.
9. Complete wording for each circuit identification nameplate.

Checkpoint Scheduling

Each metal-clad switchgear order is placed on a computer monitored checkpoint system for scheduling and order follow to maximize effort in engineering, drafting and manufacturing towards making shipment on time.

If a shipping delay is necessary, order will be rescheduled for minimum delay within the limitations of prior scheduled commitments. The following guide lines will help the purchaser avoid shipping delays.

1. Furnish complete information with the order.
2. Advise answers to questions or furnish additional data when requested promptly.
3. Avoid making changes where possible, or advise additional requirements early in the schedule.
4. When drawing approval is required, drawings must be returned by the due date on the transmittal to permit manufacture to proceed on schedule.
5. Do not request drawings to be re-submitted for approval. This will require both shipment to be rescheduled and a price addition for the added cost.

Pricing Customer Changes

Changes made by a customer after entry of an order will require price addition for all additional costs incurred as a direct result of the change including engineering, drafting, changes in material and shop labor and may result in a shipping delay.

Further Information

Description: Type DHP switchgear is described in DB 32-252.

Table A: Application: Available Breaker Types

Table A: Application: Available Breaker Types											Related Required Capabilities③																
Identification	Nominal Voltage Class	Nominal 3-Phase MVA Class	Rated Values		Insulation Level		Current		Rated Interrupting Time	Rated Permissible Tripping Delay	Rated Max. Voltage Divided By K	Current Values															
			Voltage Rated Maximum Voltage	Rated Voltage Range Factor	Rated Withstand Test Voltage	Low Frequency	Impulse	Rated Continuous Current				Rated Short Circuit Current (at rated Max. Kv) ②	Maximum Sym. Interrupting Capability	3 Sec. Short-Time Current Carrying Capability	Closing and Latching Capability (Momentary)												
Circuit Breaker Type	Kv Class	MVA Class	E Kv rms	② K	Low Frequency Kv rms	Impulse Kv rms	Amperes	KA rms	Cycles	Sec.	E/K Kv rms	K Times Rated Short-Circuit Current② KI KA rms	Rated Short-Circuit Current KA rms	1.6 K Times Rated Short-Circuit Current KA rms													
DHP Air Circuit Breaker																											
50 DHP 75	4.16	75	4.76	1.36	19	60	1200	8.8	5	2	3.5	12	12	19													
50 DHP 250		250		1.24			1200 2000	29			3.85	36	36	58													
H 50 DHP 250①							1200 2000								41	4.0	49	49	78								
50 DHP 350		350		1.19			1200 2000 3000	33			5	2	6.6	41						41	66						
75 DHP 500	7.2	500	8.25	1.25	36	95	1200 2000 3000		18	5					2	11.5	23	23	37								
150 DHP 500	13.8	500	15	1.30	36	95	1200 2000 3000															28	2	11.5	36	36	58
H 150 DHP 500①							1200 2000 3000																					37
150 DHP 750							750	1200 2000 3000			37	48	48	77													
H 150 DHP 750①							1200 2000 3000																				
150 DHP 1000	1000	1200 2000 3000																									
DVP Vacuum Circuit Breaker																											
150 DVP 500	13.8	500	15	1.30	36	95	1200 2000	18	2	2	11.5	23	23	37													
H 150 DVP 500①		1200 2000					28							36	58												
150 DVP 750		750						1200 2000																			

① Non-Standard Breaker with High Momentary Rating available for Special Applications.

② For 3 phase and line to line faults, the sym. interrupting capability at a Kv operating voltage

$$= \frac{E}{K_v} (\text{Rated Short-Circuit Current})$$

But not to exceed KI.

Single line to ground fault capability at a Kv operating voltage

$$= 1.15 \frac{E}{K_v} (\text{Rated Short-Circuit Current})$$

But not to exceed KI.

The above apply on predominately inductive or resistive 3-phase circuits with normal-frequency line to line recovery voltage equal to the operating voltage.

③ For Reclosing Service, the Sym. Interrupting Capability and other related capabilities are modified by the reclosing capability factor obtained from the following formula:

$$R (\%) = 100 - \frac{C}{6} \left[(n-2) + \frac{15-T_1}{15} + \frac{15-T_2}{15} + \dots \right]$$

Where C = KA Sym. Interrupting Capability at the Operating Voltage but not less than 18

n = Total No. of Openings

T₁, T₂, etc. = Time interval in seconds except use 15 for time intervals longer than 15 sec.

Note: Reclosing Service with the standard duty cycle 0 + 15s + CO Does not require breaker Capabilities modified since the reclosing capability factor R=100%.

④ Tripping may be delayed beyond the rated permissible tripping delay at lower values of current in accordance with the following formula:

T (seconds) =

$$Y \left[\frac{KI (K \text{ Times Rated Short-Circuit Current})^2}{\text{Short-Circuit Current Through Breaker}} \right]$$

The aggregate tripping delay on all operations within any 30 minute period must not exceed the time obtained from the above formula.



Table B: Base Units
Air Circuit Breaker, 5 Kv and 15 Kv, Indoor

Operating Voltage				4.16 Kv				7.2 Kv	13.8 Kv				
Item	Equipment	Continuous Amperes	① ②	50 DHP	50 DHP	H 50 DHP	50 DHP	75 DHP	150 DHP	H 150 DHP	150 DHP	H 150 DHP	150 DHP
			75	250	250	350	500	500	500	750	750	1000	
List Prices													
Base Unit Including Breaker Element, Housing, Control Switch and Two Lamps and Three Solderless Type Cable Terminals													
1	Breaker Base Unit	1200	B1	\$9750	\$10345	\$12575	\$15155	\$15440	\$14585	\$15335	\$20720	\$22035	\$31105
2		2000	B2	....	14455	15105	19275	18750	18295	19050	27685	28925	37690
3		3000	B3	....	....	....	30065	27135	26380	28645	37690	39195	49755
Future Base Unit Including base unit less removable breaker element													
4	Future Base Unit	1200	F1	3965	3965	3965	5580	5200	5200	5200	5685	5685	8450
5		2000	F2	....	5715	5715	7085	6845	6845	6845	9045	9045	10350
6		3000	F3	....	....	....	10350	9045	9045	9045	10555	10555	13395
Adder for higher continuous current. Available for some configurations. Application must be approved by Switchgear Assemblies Dept., East Pittsburgh													
8 B	2000/3000 A Supplemental Rating Adder③	....	....	6510	6510	....	....	....	....	....	....	....	....
9 B	3000/3750 A Supplemental Rating Adder③	....	....	....	....	....	8140	8140	8140	8140	8140	8140	8140
Dummy Disconnect unit including future base unit with removable dummy element													
10	Dummy Disconnect Unit	1200	D1	6095	6095	6095	9535	7680	7680	7680	9665	9665	11910
11	Dummy Disconnect Unit	2000	D2	....	9305	9305	12520	11090	11090	11090	14585	14585	14585
12	Dummy Disconnect Unit	3000	D3	....	....	....	18070	19125	19125	19125	19125	19125	19125

Table B: Base Units Continued
Vacuum Circuit Breaker, 15 Kv, Indoor

Operating Voltage				13.8 Kv		
Item	Equipment	Continuous Amperes	① ②	150 DVP	H 150 DVP	150 DVP
				500	500	750
List Prices						
Base Unit Including Breaker Element, Housing, Control Switch and Two Lamps and Three Solderless Type Cable Terminals						
1	Breaker Base Unit	1200	B1	\$18655	\$19600	\$27135
2		2000	B2	22365	23820	34975
Adder for higher continuous current. Available for some configurations. Application must be approved by Switchgear Assemblies Dept., East Pittsburgh						
7 B	2000/2500 A Supplemental Rating Adder			3255	3255	3255
8 B	2000/3000 A Supplemental Rating Adder③			6510	6510	6510

① H Indicates Non-standard high momentary circuit breaker.

② All DHP and DVP Breakers have stored energy mechanisms as standard.

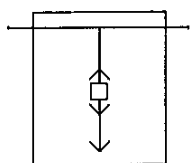
③ Requires Auxiliary Compartment, add increase in Bus capacity from Table I, if required. For Outdoor Weather-proofing, of auxiliary compartment, Add from Table E.

Base Unit

The indoor base unit price includes main bus capacity not exceeding the base unit rating and provisions for DC control. Aluminum bus conductor is standard.

When the main bus capacity is to exceed 1200 amperes, price main bus adder from table I for each auxiliary unit and base unit where required.

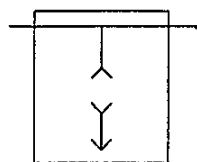
Breaker Base Unit



DC control battery and charger may be included from table Y. Purchaser to furnish AC source for battery charger unless a control power transformer is included from table J.

AC control requires a control power transformer from table J for each power source and one item 1 P AC capacitor trip for each base unit and type WL2 lockout relay.

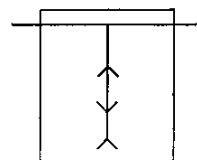
Future Base Unit



All other detail items required including current transformers, relays, instruments, and potential transformers are added from appropriate tables in this price list.

For outdoor metal-clad switchgear add weatherproofing from table E to each auxiliary unit and base unit.

Dummy Disconnect Unit



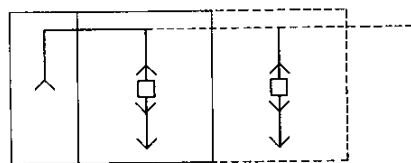
(Add Item 5 P Key Interlocks as Required)

Miscellaneous Adders to Base Unit

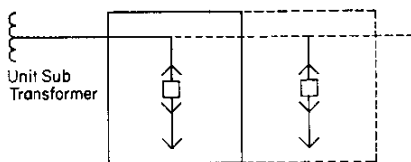
Bus Entrance

The bus entrance adder must be priced for each power connection either to or from the bus of a metal-clad switchgear assembly where no breaker base unit or disconnect unit is included. Note, the unit substation without a transformer secondary breaker will require both a bus entrance from Table B and a throat from table D.

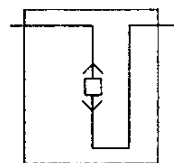
Bus Entrance



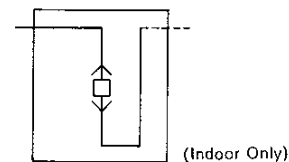
Bus Entrance Plus Throat



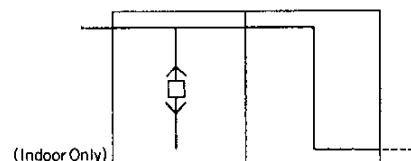
Bus Sectionalizing or Bus Transition



Transition Bus to Motor Starters

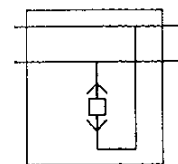


Transition Bus to Non-current Switchgear

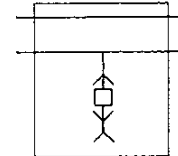


Base Unit Adders for Special Bus Arrangements

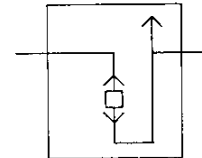
Bus Tie-Main & Transfer Bus or Double Bus



Adjacent Unit Double Bus-Incoming Line

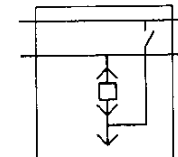


Ring Bus

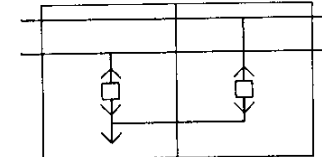


If Ring Bus is Not Completed External to Switchgear by Cables Then Price Necessary Bus Run

Main & Transfer Bus - Feeder or Incoming Line



Adjacent Unit Double Bus - Feeder



Circuit Breaker By-Pass

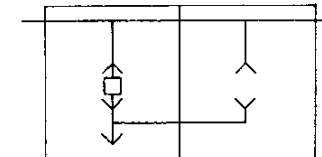




Table B Continued

Item	Miscellaneous Adders	Continuous Amperes		List Prices 5 Kv	15 Kv
13	Bus Entrance	1200	BE1	\$1660	\$2050
14		2000	BE2	2365	2755
15		3000	BE3	2995	3750
16		4000	BE4	3555	4395
17	Bus Sectionalizing or Bus Transition	1200	BT1	2500	2500
18		2000	BT2	2500	2500
19		3000	BT3	2500	2500
20 B	Transition Bus to Motor Starters	1200		3190	.....
21 B		2000		3675	.....
22 B	Transition Bus to Non-Current Switchgear	1200		3190	3190
23 B		2000		3675	3675
Adders For Special Bus Arrangement					
30 B	Bus Tie-Main & Transfer Bus or Double Bus	1200		1260	1595
31 B		2000		2480	2805
32 B		3000		2480	2830
33 B	Main & Transfer Bus -- Feeder or Incoming Line	1200		4365	4585
34 B		2000		7100	7655
36 B	Adjacent Unit Double Bus -- Incoming Line	1200		2150	2150
37 B		2000		2775	2775
38 B		3000		4380	4380
39 B	Adjacent Unit Double Bus -- Feeder	1200		5805	5805
41 B	Back To Back Double Bus -- Feeder	1200		1485	1485
43 B	Ring Bus -- Feeder or Incoming Line	1200		2665	2665
45 B	Circuit Breaker By-Pass	1200		2500	2500

Table C: Accessories

Item	Type	Ampere	List Price	Item	Type	Ampere②	List Price	Item	Type	Ampere②	List Price
Removable Air Circuit Breaker Elements				Manual Ground and Test Devices – Without Remote Control				Removable Vacuum Breaker Elements			
1 C	50 DHP 75	1200 A	\$ 6015	50 C	50 DHP	1200/2000 A	\$ 2975	80 C	150 DVP 500	1200A	\$13665
2 C	50 DHP 250	1200 A	6590	51 C	50 DHP 350	1200/2000A	2975	81 C	150 DVP 500	2000A	15750
3 C	50 DHP 250	2000 A	8955	52 C	50 DHP 350	3000A	4785	82 C	H 150 DVP 500	1200A①	14775
4 C	H 50 DHP 250	1200 A①	8845					83 C	H 150 DVP 500	2000A①	17335
5 C	H 50 DHP 250	2000 A①	9605	53 C	DHP 500	1200/2000A	3500	84 C	150 DVP 750	1200A	21860
6 C	50 DHP 350	1200 A	9820	54 C	DHP 750	1200/2000A	4825	85 C	150 DVP 750	2000A	26230
7 C	50 DHP 350	2000 A	12205	57 C	150 DHP 1000	1200/2/3000A	6165				
8 C	50 DHP 350	3000 A	19950	Electrically Operated Ground and Test Devices – With Remote Control				Item	Miscellaneous		List Price
9 C	75 DHP 500	1200 A	10225	60 C	50 DHP 75	1200A	14040	90 C	Floor channel steel add per indoor 5 Kv unit		\$ 105
10 C	75 DHP 500	2000 A	12170	61 C	50 DHP 250	1200/2000A	14040	91 C	Floor channel steel add per indoor 7.5 Kv or 15 Kv unit		145
11 C	150 DHP 500	1200 A	9600	62 C	H 50 DHP 250	1200/2000A①	16280	92 C	Special box frame channel sill, add per unit		465
12 C	150 DHP 500	2000 A	11680	63 C	50 DHP 350	1200/2000A	16630	93 C	Set Std. Accessories, Indoor		Incl.
13 C	H 150 DHP 500	1200 A①	10350	64 C	50 DHP 350	3000A	16630	94 C	Set Std. Accessories, Aisle-less		Incl.
14 C	H 150 DHP 500	2000 A①	12440	65 C	75 DHP 500	1200/2/3000A	16285	95 C	Set std. Accessories, Shelterfor-M		Incl.
15 C	150 DHP 750	1200 A	15360	66 C	150 DHP 500	1200/2/3000A	14970	96 C	Test Cabinet		270
16 C	150 DHP 750	2000 A	18875	67 C	H 150 DHP 500	1200/2/3000A①	15765	97 C	Motor oper. dolly for breaker		3345
17 C	H 150 DHP 750	1200 A①	16605	68 C	150 DHP 750	1200/2/3000A	15905				
18 C	H 150 DHP 750	2000 A①	20140	69 C	H 150 DHP 750	1200/2/3000A①	17245				
19 C	150 DHP 1000	1200 A	22965	71 C	150 DHP 1000	1200/2/3000A	27035				
20 C	150 DHP 1000	2000 A	28645								
21 C	150 DHP 1000	3000 A	36670								
22 C	75 DHP 500	3000 A	18090								
23 C	150 DHP 500	3000 A	17335								
24 C	H 150 DHP 500	3000 A	19600								
27 C	150 DHP 750	3000 A	27135								
28 C	H 150 DHP 750	3000 A	28645								
Removable Dummy Elements											
30 C	50 DHP	1200 A	2130								
31 C	50 DHP	2000 A	3595								
32 C	50 DHP 350	1200 A	3960								
33 C	50 DHP 350	2000 A	5435								
34 C	50 DHP 350	3000 A	7710								
35 C	DHP 500	1200 A	2480								
36 C	DHP 500	2000 A	4245								
37 C	DHP 750	1200 A	3985								
38 C	DHP 750	2000 A	5550								
41 C	DHP 1000	1200 A	5095								
42 C	DHP 1000	2000 A	7205								
43 C	DHP 1000	3000 A	8185								

① Non-Standard High Momentary Device.

② Set of Adapter Disconnecting Contacts Included
When required for use in both 1200 and 2000 ampere units.



Table D: Throat Connection to Master Unit Substation Transformers – 25,000 Kva Maximum^①

Item	Rating of Conductors	List Price Addition	
		Aluminum	Copper
1 D	1200 Amperes	\$1945	\$2440
2 D	2000 Amperes	2750	3440
3 D	3000 Amperes	4085	5110

Includes: Insulated connections, flange and complete enclosure, 13.8 Kv maximum.

Table E: Weatherproofing for Metal-Clad Equipment 5 Kv and 15 Kv

Item	Equipment	List Price Addition
Standard Height – Aisle-less		
1	Each unit of line up	ALS \$2505
2 E	Service area extension, 3' max. width	2505
Standard Height – Shelterfor-M		
3	Each unit of line up	SHF \$3460
4 E	Service area extension, 3' max. width	3460
Standard Height – Common Aisle Shelterfor-M		
5 E	Each two units with common aisle	\$5950
6 E	Service area extension, 3' max. width	5950
Extra High – Aisle-less		
7 E	Each unit of line up	\$2670
8 E	Service area extension, 3' max. width	2670
Extra High – Shelterfor-M		
9 E	Each unit of line up	\$3870
10 E	Service area extension, 3' max. width	3870
Extra High – Common Aisle Shelterfor-M		
11 E	Each two units with common aisle	\$6520
12 E	Service area extension, 3' max. width	6520
Miscellaneous additions		
13 E	All welded roof seams	\$ 910
14 E	Exhaust fan for Shelterfor-M aisle	1385
15 E	Unit heater for SHF aisle	1385
16 E	Fluorescent light for aisle	85②
17 E	Filters for vent openings	85②
18 E	SHF aisle assembled for shipment	405②
19 E	Channel base for cable trench	325②

Includes: Space heaters as required, but no power source. Add control power transformer if required.

Table F: Power Company Metering

Item	Cont. Amp. (Max.)	List Price		
		Indoor	Outdoor Aisle-less	Outdoor Shelterfor-M
1 F	2000	\$4350	.....	.....
2 F	3000	6215	.....	.....
3 F	2000	.....	\$6590	.....
4 F	3000	.....	7250	.....
5 F	2000	.....	.....	\$6560
6 F	3000	.....	.....	8220

Includes: Compartment and Panel Space for mounting Power Company instrument transformers and/or meters, instruments and relays.

① Applies to Westinghouse Transformers only, for transformers rated above 25,000 Kva and/or separated from the switchgear by more than three feet, price metal enclosed bus run from Tables V and W.

② Adder per base unit or auxiliary unit.

③ NEMA Standard Accuracy.

④ Not for oil or gas-filled cables.

⑤ Includes mounting provisions for multiple sets of current transformers and change in housing to accommodate the additional feeder. Current transformers or termination facilities not included.

⑥ For Cables exceeding 2 per phase with lugs or 1 per phase with pothead terminations.

⑦ For Cables exceeding 6 per phase with lugs or 2 per phase with pothead terminations.

⑧ Lugs or potheads not included. Add as required from Table N.

Table G: Current Transformers 5 Kv and 15 Kv

Item	Type ^③	List Price Each	
		5 Kv	15 Kv
1	Single Secondary	C	\$ 385
2 G	Double Secondary		770
3	Multi-Ratio	MR	505
4	Linear Coupler	LC	1400
5	Zero Sequence	BYZ	475
6 G	Adder for greater accuracy		130
7 G	Adder for certified test		340

Table H: Potential Transformers, 5 Kv and 15 Kv, 50/60 hertz, with Primary Fuses

Item	Equipment	List Price	
		5 Kv	15 Kv
1	One Potential Transformer	1LL \$1595	\$2005
2	Two Potential Transformers	2LL	3190
3	Three Potential Transformers	3LG	4785
4 H	Two LG Transformers		3190
5 H	One LG Transformer		1595
6 H	Adder per Transformer for Certified Test		340

LL line to line connected, LG line to ground connected. Includes necessary compartment provision.

Table I: Increase in Main Bus Capacity 5 Kv and 15 Kv

Item	Ampere Increase	List Price	
		Aluminum	Copper
1	1200A Main Bus		
	1200A unit adder B11	.....	\$ 210
2	2000A Main Bus		
	1200A unit adder B21	\$ 650	980
3	3000A Main Bus		
	1200A unit adder B31	2280	2790
4	3000A Main Bus		
	2000A unit adder B32	1870	2380
5	4000A Main Bus		
	1200A unit adder B41	3385	4045
6	4000A Main Bus		
	2000A unit adder B42	3025	3685
7	4000A Main Bus		
	3000A unit adder B43	1130	1790
8	1200A Double Bus		
	1200A unit adder D11	.....	420
9	2000A Double Bus		
	1200A unit adder D21	1300	1960
10	3000A Double Bus		
	1200A unit adder D31	4560	5580
11	3000A Double Bus		
	2000A unit adder D32	3740	4760

Table J: Control Power Transformers, 50/60 hertz

Item	Equipment	Kva Max.	List Price	
			5 Kv	15 Kv
1	Single Phase	15 Kva	115	\$4070
2	Single Phase	25	125	4760
3	Single Phase	37.5	137	5500
4	Single Phase	50	150	6255
5	Three Phase	15 Kva	315	6250
6	Three Phase	30	330	6980
7	Three Phase	45	345	8235
8	Three Phase	75	375	10220

Includes: Primary fuses, Secondary breaker, interlocks, compartment provisions and connections.

Table K: Current Limiting Fuses, Trunion Mounted

Item	Equipment	List Price	
		5 Kv	15 Kv
1 K	Two current limiting fuses	\$2195	\$2655
2 K	Three current limiting fuses	2560	3085

Includes: Compartment provision, transformer secondary breaker and key interlock. If connected load exceeds 50 Kva single phase or 75 Kva three phase, price from Table U.

Table L: Surge Capacitors, 3 Phase

Item	Max. Rating in Volts	List Price
1 L	2400	\$1750
2 L	4160	1750
3 L	7200	2630
4 L	13800	3520

Includes: Compartment provisions, mounting and connections.

Table M: Lightning Arresters, 3 Phase

Item	Max. Rating in Kv	Station Type	List Price	
			Distribution Type	Intermediate Type
1	3	3SV	\$1480	.....
2	6	6SV	1750	.....
3	9	9SV	2000	.....
4	12	12S	2270	.....
5	15	15S	3125	.....
6	3	3LV	\$505	.....
7	6	6LV	585	.....
8	9	9LV	650	.....
9	12	12L	740	.....
10	15	15L	860	.....
11	3	3IV	.....	\$1125
12	6	6IV	.....	1280
13	9	9IV	.....	1390
14	12	12I	.....	1515
15	15	15I	.....	1765

Includes: Compartment provision, mounting and connections.

Table N: Termination Facilities, 3 Phase 5 Kv and 15 Kv

Item	Adder to Base Unit	List Price Per Unit
1	Solderless lugs, single set	None
	Additional set of lugs	\$ 170
2	Boots for 3 cable lugs	BCC 225
3	Pothead termination, 3 phase	PH 790④
	Each additional set potheads	790④
8 N	Armored Cable Terminator	165
9 N	Conduit hubs	70
10	Bar risers to bus run, 1200A	BR1 920
11	Bar risers to bus run, 2000A	BR2 1325
12	Bar risers to bus run, 3000A	BR3 1990
13	Bar risers to bus run, 4000A	BR4 2680
15	Roof Bushings 1200A	RB1 1285
16	Roof Bushings, 2000A	RB2 2320
17	Roof Bushings, 3000A	RB3 7420
18 N	Roof Bushings, 23 Kv 1200A	1480
19 N	Roof Bushings, 23 Kv 2000A	2670
20 N	Roof Bushings, 23 Kv 3000A	8535

Table O: Extra depth rear enclosure

Item	Equipment	List Price Per Unit
1	For secondary control	REC \$1125
2	For bifurcated feeder⑤	REB 1670
3	For trifurcated feeder⑤	RET 3345
4	For Cables, Indoor⑥⑧	REI 585
5	For Cables, Outdoor⑦⑧	REO 1080

Table P: Optional Additions to Base Units

Item	Equipment	List Price Each
1	Ac capacitor trip	CAP \$1010
3	Additional auxiliary switch each 4 or 9 Pole	MOC 375
4	Permissive local control in test position each 4 Pole	TOC 230
5	Key interlock, per key	K 230
6 P	12 AWG control wire Plus	1650
7 P	Special paint adder Plus	165 ①
8 P	Electric breaker operations counter, per breaker	205
9 P	High voltage detector glow tube	270
10 P	Drip-proof construction adder	885 ①
11 P	Mechanical interlock between two adjacent breaker units	1075
12 P	Glass inspection window with metal flap	270 ①
14 P	Door gaskets for indoor units	240 ①
15 P	Insulated neutral bus, per unit	335 ①
16 P	Bare neutral bus, per unit	165 ①
18 P	Special grounding facility	1325 ①
19 P	Plug for grounding facility without cable	585
20 P	Hinged rear door adder	310 ①
21 P	Furnish wire markers	145 ①
21 P1	Special	265 ①
21 P2	With sleeves	300 ①
22 P	Furnish device markers	100 ①
23 P	Calif. State safety orders	235 ①
24 P	City of Chicago code	235 ①
26 P	Non-Std. Control wire	205 ①
27 P	Short circuit type term. block	160 ①

Table Q: Miscellaneous Optional Equipment

Item	Equipment	List Price
1	Space heater for indoor equipment, add per unit	HTR \$155
2 Q	Separate breaker for space heater control, add per unit	360
3 Q	Thermostatic heater control differential type, add per line up	570
4 Q	Thermostat for space heaters add per unit	145
5 Q	Provisions for padlocking door	80
6 Q	Cylinder lock for door	80
7 Q	Rheostat mechanism, single handwheel	205
8 Q	Clock, up to 12-inch dial, motor or spring drive, with mounting bracket, when required	750
9 Q	Alarm bell	310
10	Test block with plug	TS 185
11	Breaker control switch with two lamps	CS 360
12 Q	Indicating lamp, automatic trip	40
13 Q	Indicating lamp	40
14	Transfer switch	W2 270
15	Ammeter switch	AS 210
16	Voltmeter switch	VS 210
17 Q	Synchronizing switch	270
18 Q	Gov. motor control switch	270
19 Q	Regulator transfer switch	270
20 Q	Toggle switch	85
21 Q	Pushbutton	190
Mimic Bus, Connections and Symbols		
51 Q	Plastic type, plain or colored	365
52 Q	Raised stainless steel type	560
53 Q	Raised painted steel type	560
54 Q	Anodized aluminum type	830
55 Q	Painted	205
56 Q	Tape	180
Annunciators		
61 Q	Mechanical drop type (no lamps) per drop	140
62 Q	Lamp type (without flasher) max. window size 2 x 3 inch, per window	295
63 Q	Lamp type (with flasher) max. window size 2 x 3 inch, per window	325

Table R: Adders for Secondary Control Equipment

Instruments (1% Accuracy)		
1	Temperature Meter Equipment including test resistor and selector switch	T \$1440
2 R	Swinging instrument panel	220
3	Synchroscope with two lamps	S 1020
4	Indicating AC voltmeter	V 440
5 R	Indicating Frequency meter	1115
6	Indicating AC Ammeter	A 440
7 R	Indicating DC Voltmeter	505
8 R	Indicating DC Ammeter and shunt	505
9	Indicating Wattmeter	W 1100
10	Indicating Varmeter	VAR 1320
11 R	Indicating Power factor meter	1115
12 R	Strip chart recorder, amperes	2150
13 R	Strip chart recorder, volts	2150
14 R	Strip chart recorder, watts	2605
15 R	Strip chart recorder, vars	2800
16 R	Strip chart recorder, frequency	2910
17 R	Strip chart recorder, power factor	2910

Table R: Adders for Secondary Control Equipment (continued)

Item	Equipment	List Price
Meters		
18	Watt-hour meter 2 elem.	WH 730
19 R	Watt-hour meter 2½ elem.	985
19	Watt-hour meter 3 elem.	WH3 985
20	Var-hour meter 2 elem.	VH 985
21 R	Var-hour meter 2½ elem.	1165
21	Var-hour meter 3 elem.	VH3 1165
22	Demand attach. for meter	DEM 235
23	15 Min. Dem. attach.	D15 235
23	30 Min. Dem. attach.	D30 235
24 R	Ratchet to prevent rev. rotation	90
25 R	Contact device for WH or VH	90
26	R-2 2 stator KW demand recorder	R-2 2670
27	R-3 3 stator KW demand recorder	R-3 3125
28	RI-2 2 stator KVA demand recorder	RI2 4215
29	RI-3 3 stator KVA demand recorder	RI3 5380
30 R	Watt-var auto. switch for recorder	1270
31 R	Total hours meter	155
32 R	Thermal demand ammeter, 1 phase	455
33 R	Thermal demand ammeter, 3 phase, horiz.	910
34 R	Thermal demand ammeter, 3 phase, vert.	910
35 R	WRA KW Demand recorder, pulse type	4320
36 R	WRI KVA Demand recorder	7295
37 R	CCA Ampere demand cir. chart recorder	1055
38 R	CCV voltage cir. chart recorder	1055
39 R	CCVA KVA demand cir. chart recorder	1615
40 R	CCVAR KVAR demand cir. chart recorder	1615
41 R	CCW KW demand cir. chart recorder	1305
42 R	CCW/CCVAR KW/KVAR demand recorder	1850
Auxiliary Equipment		
43 R	Current teleductor	285
44 R	Voltage teleductor	285
45 R	Watt transducer, 3 phase, VP 2-840	1115
46 R	Var Transducer, 3 Phase, VP 2-840	1115
47 R	Thermal demand transducer	1760
48 R	Thermal converter	1115
49 R	Phase shifter for reactive meter	250
50 R	Lamp type ground detector	310
51	3 phase aux. CT	3AC 1020
52	1 phase aux. CT	1AC 340
53	3 phase aux. PT	3AP 1020
54	1 phase aux. PT	1AP 340

Instruments (2% Accuracy)

61 R	Indicating Dc Voltmeter	450
62 R	Indicating Dc Ammeter and Shunt	450
63	Indicating Ac Voltmeter	V2 385
64	Indicating Ac Ammeter	A2 385
65	Indicating Ac Wattmeter	W2 1045
66	Indicating Ac Varmeter	VAR2 1265
67 R	Indicating Power factor meter	1060
68 R	Indicating frequency meter	1060
69	Temperature Meter equipment including test resistor and selector switch	T2 1385

① Adder per base unit or auxiliary unit.

**Table S: Emergency-Preferred Secondary control equipment**

Item	Equipment	List Price
1 S	Set CV single phase undervoltage relays and automatic control ^①	\$4085
2 S	Set CP three phase undervoltage relays and automatic control ^②	4785
3 S	Automatic transfer for control power ^③	1335
① Includes:		
2	CV single phase undervoltage relays	
2	MG-6 auxiliary relays	
2	SG auxiliary relays	
1	WL2 lockout relay, hand reset	
1	W-2 manual-automatic transfer switch	
② Includes:		
2	CP three phase undervoltage relays	
2	MG-6 auxiliary relays	
2	SG auxiliary relays	
1	WL2 lockout relay, hand reset	
1	W-2 manual-automatic transfer switch	
③ Includes:		
Two contactors with mechanical interlocks, electrical interlocks, transfer relay, fuses, small wiring and terminal blocks, 100 ampere maximum.		

Table T: Generator or Synchronous Motor Field Equipment

Item	Equipment	List Price
1 T	Generator field control, includes 600 Amp. field breaker, handwheel for rheostat, provisions for type SRA or TRA voltage regulator and field compartment	\$5875
2 T	Synchronous motor field control includes ASR field application panel, switch, field discharge resistor and field compartment	8480
3 T	Synchronous motor brushless exciter control from DC source includes rheostat for AC exciter field, field contactor with surge protection	1490
4 T	Synchronous motor brushless exciter control from AC source includes constant voltage transformer, adj. voltage transformer, full wave bridge rectifier with surge protection and field compartment if required	4960

Table U: Load Break Disconnecting Switches 3-Pole, Single Throw, Indoor

Item	Switch Rating Continuous Amperes	Interrupting Amperes	Fuse Type	List Price 5 Kv	List Price 15 Kv	Item	List Price 5 Kv	List Price 15 Kv
Manually Operated, Drawout Complete						Removable Element Only		
4 U	600	600	Unfused	\$ 6555	\$ 7705	24 U	\$2605	\$2955
5 U	600	600	CLE-1	7290	8530	25 U	3330	3785
6 U	600	600	CLE-2	8150	9390	26 U	4190	4655
7 U	600	600	CLE-3	.....	9390	27 U	.....	4655
8 U	600	600	RBA-400	7290	8530	28 U	3330	3785
9 U	600	600	RBA-800	8150	9390	29 U	4190	4655
10 U	1200	1200	Unfused	7110	8255	30 U	3175	3415
11 U	1200	1200	RBA-800	8730	9960	31 U	4975	5095
Electrically Operated, Drawout Complete								
12 U	600	600	Unfused	9735	10880	32 U	5785	6135
13 U	600	600	CLE-1	10460	11710	33 U	6510	6950
14 U	600	600	CLE-2	11320	12575	34 U	7370	7820
15 U	600	600	CLE-3	.....	12575	35 U	.....	7820
16 U	600	600	RBA-400	10460	11710	36 U	6510	6950
17 U	600	600	RBA-800	11320	12575	37 U	7370	7820
18 U	1200	1200	Unfused	10290	11435	38 U	6345	6585
19 U	1200	1200	RBA-800	11890	13130	39 U	7940	8260
Future Drawout Unit								
20 U Unit Less Removable Element				3975	5180			

Table V: Metal-Enclosed, Group Phase Bus Run 3 Phase, 3 Wire, 15 Kv Maximum, Indoor or Outdoor Service

Item	Equipment	List Price	
		Aluminum	Copper
1 V	Bus per foot 1200A	\$ 320	\$ 390
2 V	2000A	450	560
3 V	3000A	660	830
4 V	4000A	885	1075
21 V	Elbows, each 1200A	470	585
22 V	2000A	675	845
23 V	3000A	990	1245
24 V	4000A	1335	1620
31 V	Tees, each 1200A	635	780
32 V	2000A	895	1125
33 V	3000A	1320	1660
34 V	4000A	1775	2160

Price includes termination facilities for connection to Westinghouse Metal-Clad Switchgear assemblies. When bus run is to connect to other than Westinghouse Switchgear or to any transformer, including Westinghouse transformers, refer to Table W for termination price. Price based on centerline length of bus includes expansion joints, vapor barrier, wall flange, and heaters when required. Price does not include hangers or supports.

Table W: Bus Run Terminators 3 Phase, 3 Wire, 15 Kv Maximum Indoor or Outdoor Service

Item - Bus Run Terminator	List Price	
	Aluminum	Copper
1 W To Switchgear 1200A	\$ 920	\$1155
2 W To Switchgear 2000A	1325	1660
3 W To Switchgear 3000A	1985	2480
4 W To Switchgear 4000A	2675	3350
5 W To Transformer 1200A	1025	1285
6 W To Transformer 2000A	1425	1780
7 W To Transformer 3000A	2100	2630
8 W To Transformer 4000A	2780	3480
9 W To Generator 1200A	1675	2100
10 W To Generator 2000A	2310	2890
11 W To Generator 3000A	2985	3735
12 W To Generator 4000A	3545	4435
List Price		
13 W Bus Run Termination, Porcelain Bushings 1200A, 15 Kv Max.	2410	
14 W Bus Run Termination, Porcelain Bushings 2000A, 15 Kv Max.	4565	
15 W Bus Run Termination, Porcelain Bushings 3000A, 15 Kv Max.	11910	
16 W Cable Tap Box for One 3/C Cable	1675	
17 W Additional Set of Cable Lugs	170	
18 W Pothead compartment for one 3/C Cable	2475 ①	
19 W Adder for each additional pothead	790 ①	
20 W Bus Run Heater Thermostat	570	
21 W Support column for Bus Run, Each	405	

① Not for oil or gas-filled cables.

Table X: Optional Relay Equipment Additions to Base Units

Caution: No primary switchgear, current transformer additions or changes, non potential transformers are included in any prices listed on this page unless noted.

Item	Equipment (60 Hertz Only)	NEMA Device No.	Typical Relay	List Price Per Relay
Overcurrent, Non-Directional, Single Phase				
1	Overcurrent, time and instantaneous	50/51 or 50/51 N	CO	PCO \$ 715
4	Overcurrent, time and instantaneous with timer for coordination with "DB" breakers	50/51	CO-4	1735
5	Overcurrent with voltage restraint	50/51 V	COV	1360
6	Overcurrent, time for motor protection	50/51	COM	975
7	Over and undercurrent sensing relay	90/37	COD	720
8	Instantaneous, single element	50	SC	SC1 620
9	Instantaneous, two element	50	SC	SC2 1010
10	Instantaneous, three element	50	SC	SC3 1385
11	Instantaneous, single element	50	ITH	525
Overcurrent, Directional, Single Phase				
12	Phase protection, time and instantaneous	67	IRV	\$1940
13	Phase protection, time	67	CR	1580
14	Phase protection, instantaneous	67	KRV	1660
15	Ground protection, time and instantaneous	67N	IRC, IRP, IRD	1955
18	Ground protection, time	67N	CRC, CRP, CRD	1400
21	Ground protection, instantaneous	67N	KRC, KRP, KRD	1660
24	Ground protection, negative sequence, inst. and time	67N	IRQ	3160
25	Ground protection, negative sequence, time	67N	CRQ	2140
26	Ground protection, negative sequence, instantaneous	67N	KRQ	2655
27	Ground protection, product type	32N	CWC, CWP	1140
Phase Balance Current, 3 Phase				
29	Unbalanced phase current protection for one machine or a single line	46	CM	\$1820
30	Negative sequence current relay for machine protection, time	46	COQ	2140
31	Negative sequence current relay for machine protection, instantaneous	46	POQ	2715
Voltage and Power Relays				
32	Undervoltage relay, time, single phase	27	CV	\$ 660
33	Overvoltage relay, time, single phase	59	CV	OCV 660
34	Under or overvoltage relay, time, single phase	27 or 59	CV	UCV 710
35	Generator ground protection	59	CV-8	695
36	Over and undervoltage relay, time, single phase	27/59	CVD	755
37	Reverse phase voltage relay, time, three phase	47	CP	1020
38	Reverse power relay, single phase	32	CW	955
39	Anti-motoring relay for generator, three phase	32	CRN-1	1630
40	Sensitive reverse power relay, high speed, three phase	32	CCP	5435
41	Negative sequence overvoltage relay, for machine protection, three phase	47	CVQ	2170
42	Instantaneous voltage relay, 1 element, single phase	27	SV	SV1 525
43	Instantaneous voltage relay, 3 element, three phase	27	SV	SV3 1205
44	CW Pull-out relay for syn. motor	55	CW	PR 995
45	Operations indicator	30	.....	RX3 175
46	Voltage Balance Relay, high speed, three phase	60	CFVB	2215
Timing, Temperature and Frequency Relays				
47	Agastat Timing Relay	2, 19, 48	.....	AGA \$ 190
48	Timing relay, 15 cycles maximum, dc	2, 19, 48	TG-1	630
49	Timing relay, 50 minutes maximum, ac	2, 19, 48	TK	610
50	Timing relay, 240 seconds maximum, ac	2, 19, 48	TD	990
51	Timing relay, 3 seconds maximum, dc	2, 19, 48	TD-4	1760
52	Temperature relay, replica type, 1 element	49	BL-1	BL1 1130
53	Temperature relay, replica type, 2 element	49	BL-1	BL2 1865
54	Temperature relay, exploring coil type	49, 68	CT	2050
55	Temperature relay exploring coil type	49	DT-3	2050
56	Underfrequency relay, time	81	CF-1	1140
57	Underfrequency relay, instantaneous	81	KF	1780

Table X: Continued – Optional Relay Equipment Additions to Base Units

Caution: No primary switchgear, current transformer additions or changes, nor potential transformers are included in any prices listed on this page unless noted.

Item	Equipment (60 Hertz Only)	NEMA Device No.	Typical Relay	List Price Per Relay
Differential Protective Equipment				
58	Generator protection, normal speed, single phase	87	CA	GCA \$ 1240
59	Generator protection, high speed, three phase	87	SA-1	4745
60	Motor protection, normal speed, single phase	87	CA	MCA 1240
61	Motor protection, high speed, three phase	87	ITH	MIT 1545
62	2 winding transformer, normal speed, single phase	87	CA	TCA 1240
63	2 winding transformer, high speed, single phase	87	HU	THU 2890
64	3 winding transformer, normal speed, single phase	87	CA-26	3CA 3405
65	3 winding transformer, high speed, single phase	87	HU-1	3HU 4450
66	Bus, normal speed, single phase	87	CA-16	BCA 2310
67	Bus, high speed, single phase	87	HU-4	BHU 3845
68	Bus, differential, voltage, instantaneous, single phase	87	LC	BLC 1955
69	Bus, differential, current, high speed, single phase	87	KAB	2310
70	Pilot wire relay equipment, 3 phase, per terminal, includes insulating transformer, test switch and milliammeter	87	HCB-1	6445
71	Pilot wire monitoring relays, per terminal		PM	1925
72 X	Neutralizing reactor with protector tube		....	1525
73 X	Mutual drainage reactor with protector tube		....	1445
74 X	Neutralizing and drainage reactors with tube		....	2970
Reclosing Relay Equipment				
75	With 3 reclosures, automatic reset, mechanical type	79	RC	\$ 1745
76	With 3 reclosures, automatic reset, static type	79	DRC	2130
77	With 1 reclosure, automatic reset	79	SGR-12	ASG 945
78	With 1 reclosure, hand reset	79	SGR-1	MSG 675
79	Synchronous checking relay	25	CVE	2230
Miscellaneous Relay Equipment				
80	Auxiliary relay, 1 or 2 contact, light duty		SG	\$ 185
81	Auxiliary relay, multi-contact, heavy duty		MG-6	535
82	Auxiliary relay, multi-contact, hand reset	86	WL2	535
83	Dc overcurrent relay	76	D-3	D-3 1525
84	Ground fault detector, 3 phase		HVS	3460
85	Generator loss of field protection	40	KLF	3100
86	Generator field ground detection	64	DGF	1540
87	Static tripping unit		TRB	370
Auxiliary Equipment				
88	Auxiliary current transformers, 3 phase		....	3AC \$ 1020
90	Auxiliary potential transformers, 3 phase		....	3AP 1020
92	Magnetizing inrush tripping suppressor		TSI, TSP	1640
94	Automatic synchronizer for generators, with speed matching	25/15/60	XASV	17920
95	Automatic synchronizer for generator	25	XA	13700
Network Relays				
96	Master relay, 3 phase	57	CN-33P	\$ 3570
97	Phasing relay, single phase	78	CNJ	1765
98	Desensitizing relay, 3 element, with timer	49	BN	1750

Table Y: Control Batteries with Automatic Voltage Regulated Static Chargers^{①②③}**48 Volt Control Batteries and Chargers.**

Item	Type	List Price Unmounted	List Price Mounted
With Automatic Charge Control			
1 Y	Pasted plate type	\$3675	.....
2 Y	Plante type	4025	.....
3 Y	Lead Calcium type	3675	.....
4 Y	Nickel-cadmium type	3840	.....
5 Y	Pasted plate type	.....	\$5435
6 Y	Plante type	.....	5785
7 Y	Lead Calcium type	.....	5435
8 Y	Nickel-cadmium type	.....	5595

Includes accessories and rack when required. 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 plante type batteries and 65 amperes for one minute for the nickel-cadmium type battery.

125 Volt Control Batteries and Chargers.

Item	Max. One Minute Discharge Rate ④⑤	Circuit Breaker	List Price Unmounted
------	---	--------------------	----------------------------

Pasted Plate Lead Antimony Type

11 Y	75	⑥	\$ 6750
12 Y	111	..	7695
13 Y	148	..	8670
14 Y	220	..	12070
15 Y	375	..	18090

Plante Type

21 Y	75	⑥	\$ 7265
22 Y	111	..	8720
23 Y	148	..	11615
24 Y	244	..	16815
25 Y	375	..	24675

Pasted Plate Lead Calcium Type

31 Y	75	⑥	\$ 6750
32 Y	111	..	7695
33 Y	148	..	8670
34 Y	219	..	12070
35 Y	374	..	18090

Nickel-Cadmium Type

41 Y	70	⑥	\$ 6775
42 Y	112	..	7970
43 Y	130	..	10335
44 Y	193	..	14650
45 Y	375	..	21085

① Prices listed apply only to batteries for indoor domestic service completely assembled, filled, and charged, ready for service when received. Batteries shipped un-assembled and/or packed for export shipment will not be priced per these schedules, but referred to nearest Westinghouse Sales Office 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 nearest Westinghouse Sales Office for review and prices.

② Chargers are 60 Hertz. For 25 or 50 Hertz, refer to nearest Westinghouse Sales Office.

③ Under no circumstances may these prices be used for supply quotations, or segregated from total switchgear assemblies prices.

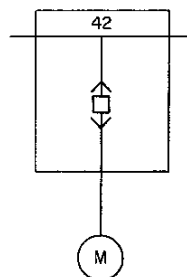
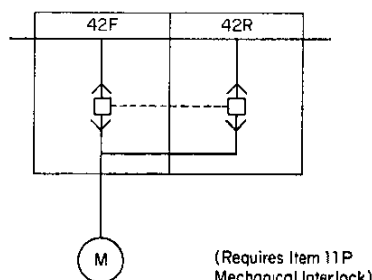
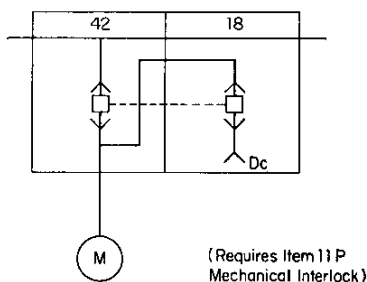
④ These are one minute discharge ratings down to 1.75 volts per cell for the pasted plate, and plante types, and to 1.14 volts per cell for the nickel-cadmium type. For applications where the required, or specified, ratings exceed the values listed, refer the transaction to nearest Westinghouse Sales Office for prices.

⑤ 60 cells for the pasted plate and plante types; 92 cells for the nickel-cadmium.

⑥ May be used for any stored energy operated breaker requiring 125 volt dc control.

**Motor Starting Applications**

The following general arrangement diagrams show motor starting breakers required for the various methods of motor starting.

Full Voltage Motor Starting Breakers
Non-reversing**Reversing****Dynamic Braking****Reduced Voltage Motor Starting Breakers**

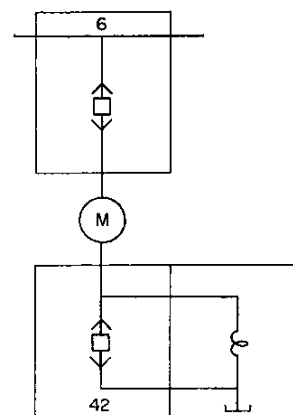
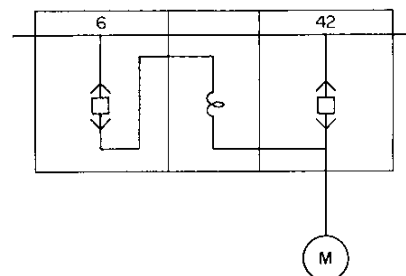
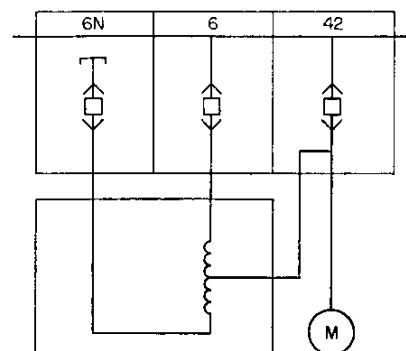
For reduced voltage motor starting applications specify the percent starting voltage desired or limitation on starting current or starting Kva with minimum starting voltage of the drive.

Advise complete motor data including locked rotor amperes, starting power factor, starting torque and starting time at 100% volts.

Advise system short-circuit Kva available at the motor terminals for starting.

Starting reactors will be designed for the purchaser's starting requirements taking into consideration system short-circuit Kva available and furnished without taps.

Starting auto-transformers will be designed for one starting voltage in the range of 80 to 50%.

Neutral Reactor**Line Reactor****Autotransformer**

Motor Starting Autotransformers are Supplied for Separate Mounting and Cable Connection to the Switchgear

Surge Protection

It is recommended that capacitors and lightning arresters be located at the terminals of all rotating AC machines to provide surge protection for the turn to turn and conductor to ground insulation.

Refer to Price List 38-420 for prices.

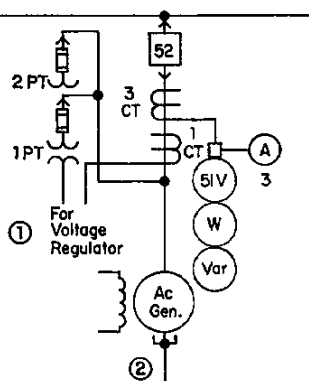
Table Z – Metal-Enclosed Reactors or Autotransformers for Motor Starting Duty for 50/60 Hertz Service

Item	①Rating in Hp of:		Volts at 60 Hertz	List Price	Item	①Rating in Hp of:		Volts at 60 Hertz	List Price
	Synchronous Motor, at 1.0 P-F	Synchronous Motor at 0.8 P-F or Induction Motor				Synchronous Motor, at 1.0 P-F	Synchronous Motor at 0.8 P-F or Induction Motor		
1	250 or less	200 or less	2000-2500	\$ 5310	45	.....	2250	2000-2500	\$15365
2	250 or less	200 or less	2501-4500	6685	46②	.....	2250	2501-4500	19915
3	250 or less	200 or less	4501-7000	7290	47②	.....	2250	4501-7000	21370
4	300; 350	250	2000-2500	5875	48②	.....	2250	7001-14000	24470
5	300; 350	250	2501-4500	6540	49	3000	2500	2000-2500	16215
6	300; 350	250	4501-7000	8005	50②	3000	2500	2501-4500	20810
7	.....	300	2000-2500	6330	51②	3000	2500	4501-7000	22510
8	.....	300	2501-4500	6540	52②	3000	2500	7001-14000	25700
9	.....	300	4501-7000	8005	53②	3500	3000	2000-2500	17880
10	400 to 500	350; 400	2000-2500	6565	54②	3500	3000	2501-4500	23020
11	400 to 500	350; 400	2501-4500	8185	55②	3500	3000	4501-7000	24875
12	400 to 500	350; 400	4501-7000	9070	56②	3500	3000	7001-14000	28750
13	600; 700	450; 500	2000-2500	7320	57②	4000	3500	2000-2500	19670
14	600; 700	450; 500	2501-4500	9260	58②	4000	3500	2501-4500	25090
15	600; 700	450; 500	4501-7000	10370	59②	4000	3500	4501-7000	26625
16	800	600	4501-2500	7575	60②	4000	3500	7001-14000	31295
17	800	600	2501-4500	8800	61②	4500; 5000	4000	2501-4500	27145
18	800	600	4501-7000	10890	62②	4500; 5000	4000	4501-7000	29105
19	900	700	2000-2500	8420	63②	4500; 5000	4000	7001-14000	31085
20	900	700	2501-4500	10690	64②	5500	4500	3000-4500	28685
21	900	700	4501-7000	10890	65②	5500	4500	4501-7000	30660
22	1000	800	2000-2500	9240	66②	5500	4500	7001-14000	33760
23	1000	800	2501-4500	11180	67②	6000	5000	3000-4500	30220
24	1000	800	4501-7000	12285	68②	6000	5000	4501-7000	32590
25	1250	900; 1000	2000-2500	9060	69②	6000	5000	7001-14000	38350
26	1250	900; 1000	2501-4500	12855	70②	.....	5500	3300-4500	31115
27	1250	900; 1000	4501-7000	14060	71②	7000	5500	4501-7000	32465
28②	1250	1000	7001-14000	15540	72②	7000	5500	7001-14000	39685
29	1500	1250	2000-2500	11960	73②	.....	6000	3600-4500	31110
30	1500	1250	2501-4500	14415	74②	8000	6000	4501-7000	33035
31	1500	1250	4501-7000	15685	75②	8000	6000	7001-14000	41895
32②	1500	1250	7001-14000	17790	76②	9000	7000	4501-7000	33980
33	1750; 2000	1500	2000-2500	12180	77②	9000	7000	7001-14000	45320
34	1750; 2000	1500	2501-4500	15865	78②	10000	8000	4800-7000	36665
35②	1750; 2000	1500	4501-7000	16995	79②	10000	8000	7001-14000	49405
36②	1750; 2000	1500	7001-14000	19360	80②	.....	9000	5400-7000	38880
37	2250	1750	2000-2500	13335	81②	12000	9000	7001-14000	52990
38②	2250	1750	2501-4500	17345	82②	.....	10000	6200-7000	41360
39②	2250	1750	4501-7000	18695	83②	13000	10000	7001-14000	56840
40②	2250	1750	7001-14000	21225	84②	15000	12000	7001-14000	63455
41	2500	2000	2000-2500	14220	85②	18000	15000	7001-14000	72655
42②	2500	2000	2501-4500	18370	86②	22500	18000	7001-14000	84000
43②	2500	2000	4501-7000	19880					
44②	2500	2000	7001-14000	22770					

① To select a reactor or autotransformers for a motor rated in kva select one having a hp rating of 0.8 p-f, which is the same as the kva rating of the motor, regardless of the motor power factor. If the kva rating falls between two listed hp ratings (0.8 p-f), use the next higher hp rating (0.8 p-f) listed.

② Price listed is for metal enclosed reactor only. When starting autotransformer is required it is recommended that a metal enclosed dry type, Inerteen, or oil insulated autotransformer be provided for separate mounting and cable connection to the switchgear.

Pricing Example No. 1



① Note some voltage regulators require 3 phase potential from 2 potential transformers. Refer to Price List 56-120.

② Generator neutral grounding devices are not included in switchgear prices.

High resistance grounding by distribution transformer is generally used with a unit type system.

Low resistance grounding is used with a 3 phase 3 wire system.

Low reactance grounding is used with a 3 phase 4 wire system where line to neutral loads are present.

Ac Generator Voltage Regulators

When included with standard switchgear assemblies

Generator voltage regulators should be selected and priced from Price List 56-120. Their selection should be made from the application chart for such regulators with strict adherence to all the rules governing the application and pricing of such regulator equipment.

Where instrument transformers are required for operation with the generator voltage regulators, such transformers will be priced from this price list and under no circumstances from the schedules as listed in voltage regulator Price List 56-120.

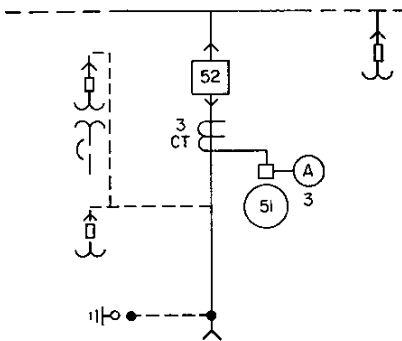
The generator voltage regulator price loses its identity when combined with a standard switchgear equipment and becomes an integral part of such equipment. However, the price of the voltage regulator must be determined from Price List 56-120 subject to user discounts in accordance with Selling Policy 56-000 not subject to metal-clad switchgear discounts per Selling Policy 32-000.

Generator and Exciter Control Unit Indoor 150 DHP 750 1200 A, DC Control

Total Price	Unit Price	Item Table	Qty.	Typical AC Generator and Exciter Control and Protection
\$20720	\$20720	1 B	1	Breaker Base Unit 150 DHP 750 1200A
1540	385	1 G	4	Current Transformers
2005	2005	1 H	1	One LL Potential Transformer
4010	4010	2 H	1	Two LL Potential Transformers
360	360	50 B	1	W-2 Breaker Control Switch with Red & Green Lights
210	210	11 Q	1	W-2 Control Switch with Red & Green Lights
210	210	15 Q	1	W-2 Ammeter Switch
270	270	16 Q	1	W-2 Voltmeter Switch
270	270	17 Q	1	W-2 Synchronizing Switch
270	270	18 Q	1	W-2 Gov. Motor Control Switch
270	270	19 Q	1	W-2 Regulator Transfer Switch
440	440	6 R	1	KA-221 AC Ammeter
505	505	8 R	1	KX-221 DC Ammeter and Shunt
1100	1100	9 R	1	KY-221 Wattmeter
1320	1320	10 R	1	KY-221 Varmeter
5875	5875	1 T	1	Gen. Field Control with Prov. for Reg. & Rheostat
4080	1360	5 X	3	COV Volt. Controlled Overcurrent Relay
\$43185	Total List Price			

Total Price	Unit Price	Item Table	Qty.	Optional Additional Equipment
\$ 220	\$ 220	2 R	1	Swinging Instrument Panel
1020	1020	3 R	1	KI-241 Synchroscope with Two Lamps
770	385	63 R	2	GA-372 AC Voltmeter
\$ 2010	Total List Price			
\$ 1115	\$ 1115	5 R	1	KR 3-221 Frequency Meter
3720	1240	58 X	3	CA Generator Differential Relay
4745	4745	59 X	1	SA-1 Static Gen. Diff. Relay, 3 Phase
535	535	82 X	1	WL2 Lockout Relay, Handreset
2310	385	1 G	6	Current Transformers for Gen. Diff. Relays
1630	1630	39 X	1	CRN-1 Anti-Motoring Relay
3100	3100	85 X	1	KLF Gen. Loss of Field Relay
1540	1540	86 X	1	DGF Gen. Field Ground Detection
1140	1140	27 X	1	CWC Dir. Ground Relay, Product Type
340	340	89 X	1	Auxiliary Current Transformer, 1 Phase
17920	17920	94 X	1	XASV Automatic Syn. with Speed Matching
			1	TRA Static Gen. Voltage Regulator (Refer to PL 56-120)
			3	FP Surge Capacitor (Refer to PL 38-420)
			3	SV Lightning Arresters (Refer to PL 38-420)

Pricing Example No. 2



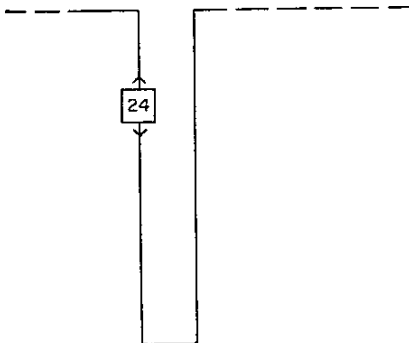
Incoming Line Unit Indoor 50 DHP 250 2000 A, DC Control

Total Price	Unit Price	Item Table	Qty.	Typical Incoming Line Unit
\$14455	\$14455	2 B	1	Breaker Base Unit 50DHP250 2000A
1155	385	1 G	3	Current Transformers
		50 B	1	W-2 Breaker Control Switch with Red & Green Lights
210	210	15 Q	1	W-2 Ammeter Switch
440	440	6 R	1	KA-221 AC Ammeter
2145	715	1 X	3	CO Phase Overcurrent Relay

\$18405 Total List Price

Total Price	Unit Price	Item Table	Qty.	Optional Additional Equipment
\$ 340	\$ 170	1 N	2	Sets of Cable Lugs, Additional
1750	1750	2 M	1	Set of Lightning Arresters, 6 Kv SV
1595	1595	1 H	1	One LL Potential Transformer
3190	3190	2 H	1	Two LL Potential Transformers
4785	4785	3 H	1	Three LG Potential Transformers
1020	1020	90 X	1	Auxiliary Potential Transformers, 3 Phase
4070	4070	1 J	1	Control Power Transformer, 1 PH, 15 Kva
1010	1010	1 P	1	AC Capacitor Trip
715	715	2 X	1	CO Ground Overcurrent Relay
4740	1580	13 X	3	CR Dir. Phase Overcurrent Relay, Time
1400	1400	19 X	1	CRP Dir. Ground Overcurrent Relay, Time
440	440	4 R	1	KA-221 AC Voltmeter
730	730	18 R	1	D2B-2F Watthour Meter, 2 Element
1100	1100	9 R	1	KY-221 Wattmeter
270	270	17 Q	1	W-2 Synchronizing Switch
3720	1240	62 X	3	CA Transformer Differential Relay
8670	2890	63 X	3	HU Transformer Diff. Relay, High Speed
535	535	82 X	1	WL2 Lockout Relay, Hand Reset
1155	385	1 G	3	Current Transformers for Diff. Relays
920	920	10 N	1	Bar Risers to Bus Run, 2000A
4500	450	2 V	10	Metal Enclosed Group Phase Bus, 2000A Feet
1350	675	22 V	2	2000A Elbows for Bus Run
1425	1425	6 W	1	Bus Run Termination to Transformer 2000A

Pricing Example No. 3



Bus Sectionalizing Unit Indoor 150 DHP 500 2000 A, DC Control

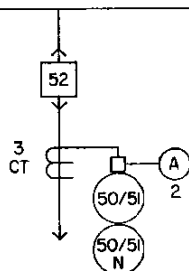
Total Price	Unit Price	Item Table	Qty.	Typical Bus Sectionalizing Unit
\$18295	\$18295	2 B	1	Breaker Base Unit 150DHP 500 2000A
2500	2500	18 B	1	Transition Bus 2000A
.....	.....	50 B	1	W-2 Breaker Control Switch with Red & Green Lights

\$20795 Total List Price

Total Price	Unit Price	Item Table	Qty.	Optional Additional Equipment
\$ 230	\$ 230	5 P	1	Key Interlock
2310	385	1 G	6	Current Transformers for Bus Diff.
13860	2310	66 X	6	CA-16 Bus Differential Relay
23070	3845	67 X	6	HU-4 High Speed Bus Differential Relays
1070	535	82 X	2	WL2 Lockout Relays, Hand Reset

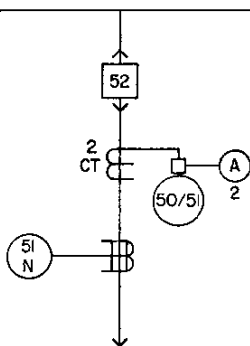


Pricing Example No. 4

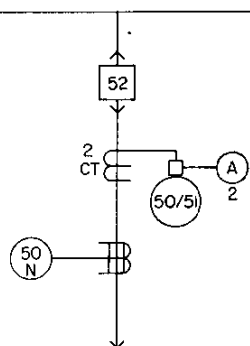


Feeder Unit Indoor 150 DHP 500 1200 Ampere, DC Control

Total Price	Unit Price	Item Table	Qty.	Typical Feeder Unit	4A
\$14585	\$14585	1 B	1	Breaker Base Unit 150DHP 500 1200A	
1155	385	1 G	3	Current Transformers	
210	210	50 B	1	W-2 Breaker Control Switch with Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
1430	715	6 R	1	KA-221 AC Ammeter	
715	715	1 X	2	CO Phase Overcurrent Relay	
		2 X	1	CO Ground Overcurrent Relay	
\$18535 Total List Price					



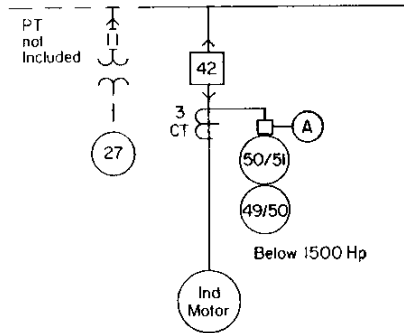
Total Price	Unit Price	Item Table	Qty.	Typical Feeder Unit	4B
\$14585	\$14585	1 B	1	Breaker Base Unit 150DHP 500 1200A	
770	385	1 G	2	Current Transformers	
475	475	5 G	1	BYZ Zero Sequence CT	
210	210	50 B	1	W-2 Breaker Control Switch with Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
1430	715	6 R	1	KA-221 AC Ammeter	
525	525	1 X	2	CO Phase Overcurrent Relay	
		11 X	1	ITH Inst. Overcurrent Relay, 1 Element	
\$18435 Total List Price					



Total Price	Unit Price	Item Table	Qty.	Typical Feeder Unit	4C
\$14585	\$14585	1 B	1	Breaker Base Unit 150DHP 500 1200A	
770	385	1 G	2	Current Transformers	
475	475	5 G	1	BYZ Zero Sequence CT	
210	210	50 B	1	W-2 Breaker Control Switch with Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
1430	715	6 R	1	KA-221 AC Ammeter	
715	715	1 X	2	CO Phase Overcurrent Relay	
		2 X	1	CO Ground Overcurrent Relay	
\$18625 Total List Price					

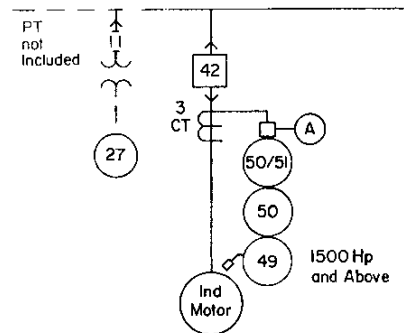
Total Price	Unit Price	Item Table	Qty.	Optional Additional Equipment	
\$ 1155	\$ 385	1 G	3	Current Transformers for Bus Diff.	
650	650	1 I	1	2000A, Aluminum Main Bus, 1200A Unit Adder	
790	790	3 N	1	Pothead Termination, 3 Phase	
1010	1010	1 P	1	AC Capacitor Trip	
3125	3125	5 M	1	Set of Lightning Arresters 15 Kv SV	
1745	1745	75 X	1	RC Multi-Shot Reclosing Relay	
85	85	20 Q	1	Toggle Switch	

Pricing Example No. 5

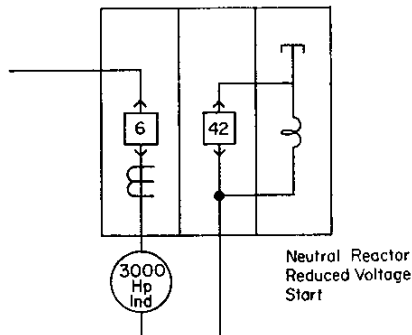


Induction Motor Starting Unit Indoor 75 DHP 500 1200 A, DC Control

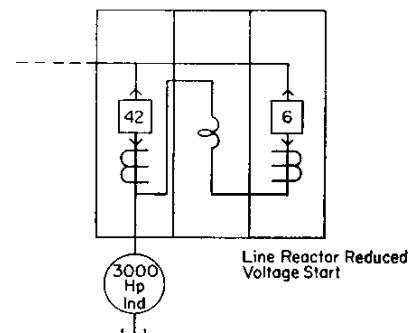
Total Price	Unit Price	Item Table	Qty.	Typical Induction Motor Full Voltage Start Below 1500 HP	5A
\$15440	\$15440	1 B	1	Breaker Base Unit 75 DHP 500 1200A	
1155	385	1 G	3	Current Transformers	
210	210	50 B	1	W-2 Breaker Control Switch with Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
715	715	6 R	1	KA-221 AC Ammeter	
660	660	1 X	1	CO Phase Overcurrent Relay	
1865	1865	32 X	1	CV Undervoltage Relay	
		53 X	1	BL-1 Temperature Relay with Inst., 2 Element	
\$20485 Total List Price					



Total Price	Unit Price	Item Table	Qty.	Typical Induction Motor Full Voltage Start 1500 HP and Above	5B
\$15440	\$15440	1 B	1	Breaker Base Unit 75 DHP 500 1200A	
1155	385	1 G	3	Current Transformers	
210	210	50 B	1	W-2 Breaker Control Switch with Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
715	715	6 R	1	KA-221 AC Ammeter	
1010	1010	1 X	1	CO Phase Overcurrent Relay	
660	660	9 X	1	SC Inst. Overcurrent Relay, 2 Element	
2050	2050	32 X	1	CV Undervoltage Relay	
		54 X	1	CT Temperature Relay, RTD Type	
\$21680 Total List Price					



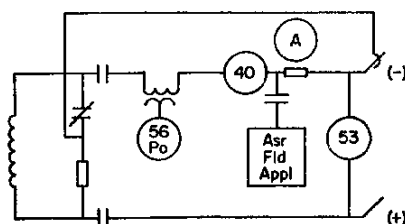
Total Price	Unit Price	Item Table	Qty.	Typical 3000 HP Induction Motor Neutral Reactor Reduced Voltage Start	5C
\$30880	\$15440	1 B	2	Breaker Base Unit 75 DHP 500 1200A	
1155	385	1 G	3	Current Transformers	
375	375	3 P	1	MOC Switch, Auxiliary Contacts	
460	230	4 P	2	TOC Switch, Permissive Control	
210	210	50 B	1	W-2 Breaker Control Switch With Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
715	715	6 R	1	KA-221 AC Ammeter	
1010	1010	1 X	1	CO Phase Overcurrent Relay	
660	660	9 X	1	SC Inst. Overcurrent Relay, 2 Element	
190	190	32 X	1	CV Undervoltage Relay	
2050	2050	47 X	1	Agastat Time Relay	
24875	24875	54 X	1	CT Temperature Relay, RTD Type	
		55 Z	1	Reactor 3000 HP Induction Motor 6.9 KV	
\$63020 Total List Price					



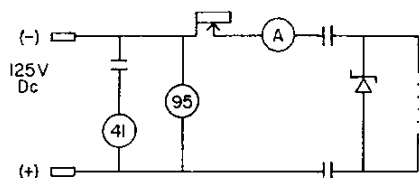
Total Price	Unit Price	Item Table	Qty.	Typical 3000 HP Induction Motor Line Reactor Reduced Voltage Start	5D
\$30880	\$15440	1 B	2	Breaker Base Unit 75 DHP 500 1200A	
2500	2500	17 B	1	Transition Bus 1200A	
2310	385	1 G	6	Current Transformers	
375	375	3 P	1	MOC Switch, Auxiliary Contacts	
460	230	4 P	2	TOC Switch, Permissive Control	
210	210	50 B	1	W-2 Breaker Control Switch with Red & Green Lights	
440	440	15 Q	1	W-2 Ammeter Switch	
715	715	6 R	1	KA-221 AC Ammeter	
1010	1010	1 X	1	CO Phase Overcurrent Relay	
660	660	9 X	1	SC Inst. Overcurrent Relay, 2 Element	
190	190	32 X	1	CV Undervoltage Relay	
2050	2050	47 X	1	Agastat Time Relay	
24875	24875	54 X	1	CT Temperature Relay, RTD Type	
		55 Z	1	Reactor 3000 HP Induction Motor, 6.9 KV	
\$68675 Total List Price					



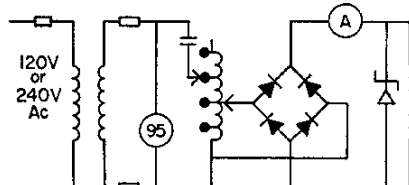
Pricing Example No. 6



DC Excitation from direct connected exciter, Exc. MG set or static exciter, not included in Swgr. price, motor field rheostat or resistor if used not included in Swgr. price.



Brushless exciter control DC source not included. Add 125 volt battery as required.



Brushless exciter control ac source not included add single phase control power transf. as required.

Brushless exciter control shown above is typical for Westinghouse machines only. Brushless exciter control for machines of other manufacturers may require additional devices.

Synchronous Motor Starting Unit Indoor 75 DHP 500 1200 A, DC Control

Total Price	Unit Price	Item Table	Qty.	Typical Syn. Motor Full Voltage Start Above 1500 HP Conventional DC Excitation	6A
\$21680	\$21680	..	1	Set of Equipment, Same as for Induction Motor Example 5B	
505	505	8 R	1	KX-221 DC Ammeter & Shunt	
1320	1320	10 R	1	KY-221 Varmeter	
8480	8480	2 T	1	Syn. Motor ASR Field Application Control	
190	190	47 X	1	Agastat Time Relay	
185	185	80 X	1	SG Auxiliary Relay	
\$32360 Total List Price					

Total Price	Unit Price	Item Table	Qty.	Typical Syn. Motor Full Voltage Start Above 1500 HP Brushless Exec. DC Source	6B
\$21680	\$21680	..	1	Set of Equipment, Same as for Induction Motor Example 5B	
505	505	8 R	1	KX-221 DC Ammeter & Shunt	
1320	1320	10 R	1	KY-221 Varmeter	
1490	1490	3 T	1	Brushless Exciter Control From DC Source	
995	995	44 X	1	CW Pull-out Relay for Syn. Motor	
190	190	47 X	1	Agastat Time Relay	
185	185	80 X	1	SG Auxiliary Relay	
\$26365 Total List Price					

Total Price	Unit Price	Item Table	Qty.	Typical Syn. Motor Full Voltage Start Above 1500 HP Brushless Exc. AC Source	6C
\$21680	\$21680	..	1	Set of Equipment, Same as for Induction Motor Example 5B	
505	505	8 R	1	KX-221 DC Ammeter & Shunt	
1320	1320	10 R	1	KY-221 Varmeter	
4960	4960	4 T	1	Brushless Exciter Control From AC Source	
995	995	44 X	1	CW Pull-out Relay for Syn. Motor	
190	190	47 X	1	Agastat Time Relay	
185	185	80 X	1	SG Auxiliary Relay	
\$29835 Total List Price					

Total Price	Unit Price	Item Table	Qty.	Optional Additional Equipment for Ind. or Syn. Motor Control	
\$ 375	\$ 375	3 P	1	MOC Switch, Auxiliary Contacts	
230	230	4 P	1	TOC Switch, Permissive Control	
185	185	80 X	1	SG Auxiliary Relay	
535	535	81 X	1	MG-6 Auxiliary Relay	
475	475	5 G	1	BYZ Zero Sequence CT	
525	525	11 X	1	ITH Inst. Overcurrent Relay, 1 Element	
1820	1820	29 X	1	CM Phase Current Unbalance Relay	

Motor Differential Protection					
3720	1240	60 X	3	CA Motor Differential Relay	
535	535	82 X	1	WL2 Lockout Relay, Hand Reset	
2310	385	1 G	6	Current Transformers for Motor Diff.	
3465	385	1 G	9	Current Transformers for Motor Diff. Line Reactor Start	
4620	385	1 G	12	Current Transformers for Motor Diff. Auto-Transf. Start	

Self Balancing Type Motor Diff. Protection					
1425	475	5 G	3	BYZ Zero Sequence CT	
1545	1545	61 X	1	ITH Inst. Motor Diff. Relay, 3 Phase	
535	535	82 X	1	WL2 Lockout Relay, Hand Reset	

Surge Protection					
			3	FP Surge Capacitors (Refer to PL 38-420)	
			3	SV Lightning Arresters (Refer to PL 38-420)	

Table AA: Tests and Inspection

Item	Standard Tests and Inspection	List Price
1	Standard Tests	no charge
2	Customer inspection	no charge
3	Standard tests, witnessed	\$2440 plus \$1300 per day
4	Standard tests, certified reports	\$230 for first five copies; \$15 for each additional copy

Standard Tests and Inspection

All commercial type products are given the standard tests and inspection as described below as part of the regular manufacturing procedure.

1. Metal-clad Housing

- a. Control circuits are checked functionally to determine that the devices will operate when proper voltages are applied. Interlock circuits are operated under operating conditions or are checked for continuity if not operated.
- b. Relaying and metering circuits are energized and devices are checked to be certain polarities are correct, that elements are in operating condition, and that relay contacts will perform their assigned purposes.
- c. All units are checked on a bedplate for accuracy of manufacture and correct door alignment. A master fixture is used to insure the interchangeability of breakers and to check primary and secondary contact alignment.
- d. High potential tests of primary and secondary circuits are made in accordance with NEMA standards.

2. Power Circuit Breaker

- a. Inspection checks of the breaker mechanism and manual operation are made prior to electrical test of the breaker.
- b. No load breaker operational tests are made at maximum, standard and minimum control voltage ratings.
- c. The resistance of each pole of the breaker is measured by the milli-volt drop method.
- d. High potential tests are made on the primary and secondary circuits in accordance with NEMA standards.
- e. Breaker units are checked with master fixtures to assure interchangeability of units and correct alignment of primary and secondary contacts.

Customer Inspection

When required, customer inspection must be specified on the order.

1. Customer's inspector and Westinghouse customer order engineer check the number of units and arrangement with the equipment specifications.
2. Customer inspector can make check of all materials, including devices, relays, excess material and breakers both for quality and workmanship.
3. Customer's inspector can check shipping group and plans for shipment.
4. Inspector can inspect equipment after test or painting as desired.
5. Customer's inspector witnesses no tests but can obtain certified test reports. (See additional charge, Table A.)

Standard Tests, Witnessed

When required, witnessing of tests must be specified on the order. See charges listed.

1. Customer inspection as outlined above.
2. In addition, inspector can request commercial tests on several breakers, and witness no load operation of breakers by manual control and by relays. Checks may be witnessed on all relays, instruments, meters and devices in some or all units. Checks and operation of all breaker control circuits at operating voltages can be witnessed.
3. The inspector can witness both primary and secondary high potential tests.

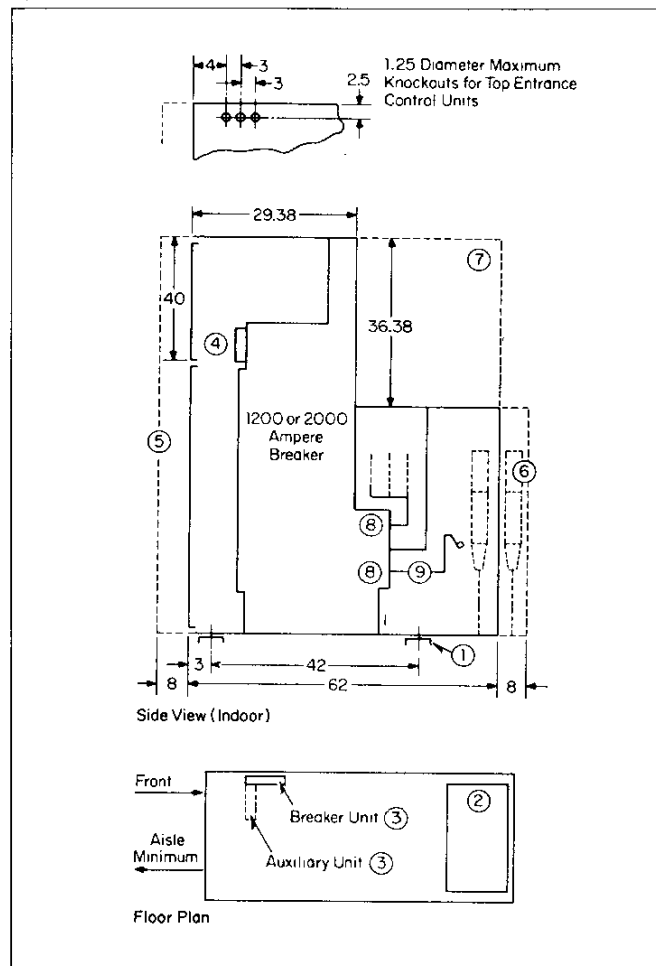
Table AB: Special Reports

Item	List Price
Seismic Certification	
1 Per each base unit ^①	\$285
2 Per foot Group phase bus ^②	10
Quality Assurance Documentation^③	
3 Per each base unit	\$420
4 Per foot Group phase bus	15

^① Includes a report correlating Westinghouse seismic test data (sine beat method) in terms of the specific requirements.

^② Includes a report to provide support points and stiffness factors to permit the design of the support systems.

^③ Quality assurance applies to completely assembled switchgear designed and tested in accordance with Westinghouse Switchgear Division Standard Quality Assurance and Procedures Manual.

**Type DHP Porcel-line Metal-Clad Switchgear**
Type 50 DHP 250 or 50 DHP 75**Approximate Weight and Dimensions in Inches**

Ampere Rating	Wt. (Lbs.) Unit Less Breaker	Width of Unit	Depth	Height	Aisle Minimum
---------------	------------------------------	---------------	-------	--------	---------------

Indoor

Aux.	2200	26	62	90.38	36
1200	1600		⑤		
2000	1800		⑥		

Outdoor Aisle-Less

End Panel	300	1.5			
Aux.	2550	26	82.62	107	59
1200	1950		⑥		
2000	2150				

Outdoor Shelterfor-M

End Panel	900	1.5			
Aux.	2750	26	151.5	111.75	73.5
1200	2150		⑥		
2000	2350				

Outdoor Common Aisle Shelterfor-M

End Panel	1200	1.5			
Aux.	5200	26	228	111.75	72
1200	4000		⑥		
2000	4400				

Ampere Rating	Wt. (Lbs.) Breaker	Type Circuit Breaker
---------------	--------------------	----------------------

1200	600	50 DHP 75
------	-----	-----------

1200	800	50 DHP 250
------	-----	------------

2000	800	H 50 DHP 250
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① Foundation supports for Indoor Switchgear supplied by purchaser, steel channel recommended.

② Opening for main cables.

③ Opening for secondary conduits, 2 inch maximum.

④ Customers terminal blocks.

⑤ For full height instrument panel on all units add 8 inches.

⑥ Indoor add 8 inch extra depth line compt. where required.

Outdoor add 12 inch extra depth line compt. where required.

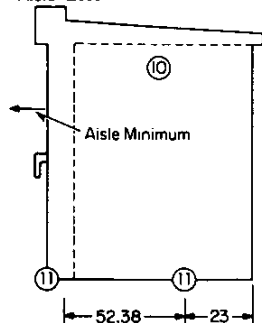
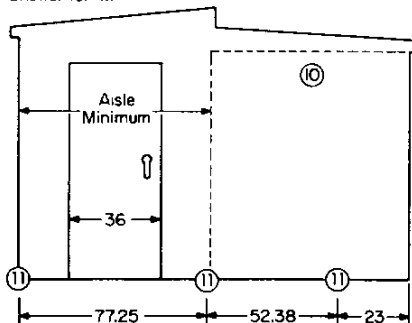
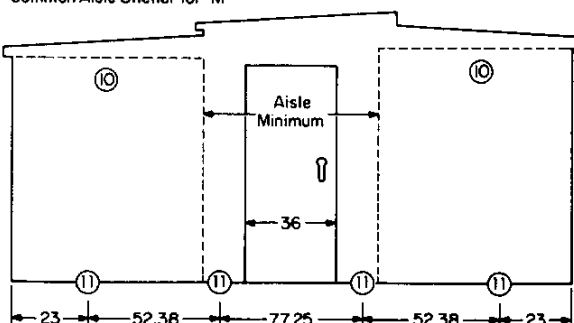
⑦ Optional PT location, access door front.

⑧ Front accessible CT location.

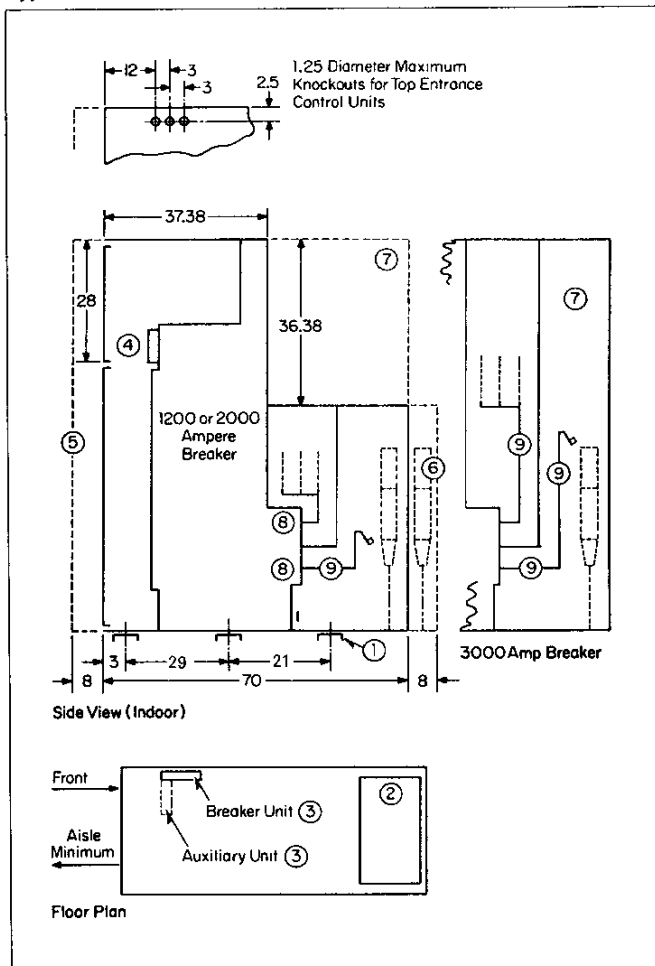
⑨ CT location.

⑩ Side view unit same as indoor except space for two sets potheads.

⑪ Tie down clips supplied for purchasers foundation bolts.

Aisle-Less**Shelter for-M****Common Aisle Shelter for-M**

Type DHP Porcel-line[®] Metal-Clad Switchgear
Type 50 DHP 350



Approximate Weight and Dimensions in Inches

Ampere Rating	Wt. (Lbs.) Unit Less Breaker	Width of Unit	Depth	Height	Aisle Minimum
Indoor					
Aux.	2200	26	70	90.38	46
1200	1600		⑤		
2000	1800		⑥		
3000	2400	36			

Outdoor Aisle-Less					
End Panel	300	1.5	90.62	107	68
Aux.	2550	26	⑥		
1200	1950				
2000	2150				
3000	2800	36			80

Outdoor Shelterfor-M					
End Panel	900	1.5			
Aux.	2750	26	158.9	111.75	73.5
1200	2150		⑥		
2000	2350				
3000	3100	36			

Outdoor Common Aisle Shelterfor-M					
End Panel	1200	1.5			
Aux.	5200	26	244	111.75	72
1200	4000		⑥		
2000	4400				
3000	5800	36			

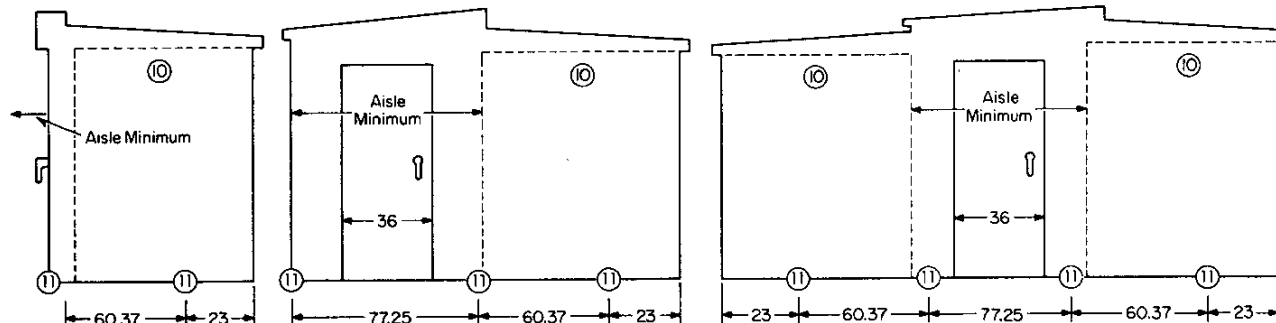
Ampere Rating	Wt. (Lbs.) Breaker	Type Circuit Breaker
1200	1100	50 DHP 350
2000		
3000	1500	

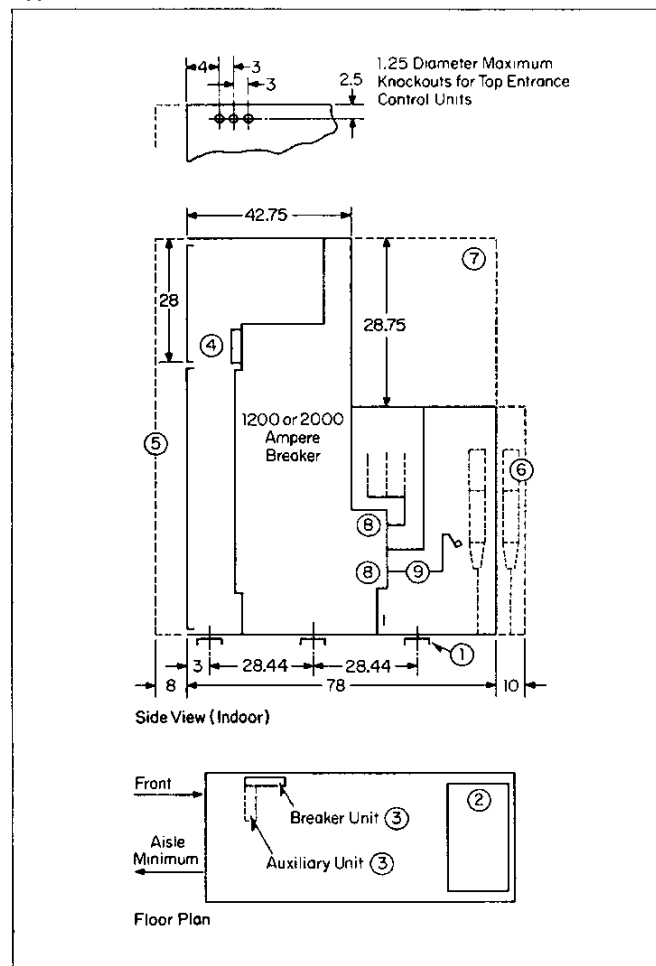
- ① Foundation supports for Indoor Switchgear supplied by purchaser, steel channel recommended.
- ② Opening for main cables.
- ③ Opening for secondary conduits, 2 inch maximum.
- ④ Customers, terminal blocks.
- ⑤ For full height instrument panel on all units add 8 inches.
- ⑥ Indoor add 8 inch extra depth line compt. where required.
Outdoor add 12 inch extra depth line compt. where required.
- ⑦ Optional PT location when main cables exit bottom, access door rear.
- ⑧ Front accessible CT location 1200/2000A breakers.
- ⑨ CT location.
- ⑩ Side view unit same as indoor except space for two sets potheads.
- ⑪ Tie down clips supplied for purchasers foundation bolts.

Aisle-Less

Shelter for-M

Common Aisle Shelter for-M



**Type DHP Porcel-line[®] Metal-Clad Switchgear**
Type 150 DHP 500 or 75 DHP 500**Approximate Weight and Dimensions in Inches**

Ampere Rating	Wt. (Lbs.) Unit Less Breaker	Width of Unit	Depth	Height	Aisle Minimum
Indoor					
Aux.	2800	36	78	90.38	49
1200	2000		⑤		
2000	2200		⑥		
3000	2400				

Outdoor Aisle-Less

End Panel	300	1.5			
Aux.	3200	36	100.62	107	80
1200	2400		⑤		
2000	2600				
3000	2800				

Outdoor Shelterfor-M

End Panel	900	1.5			
Aux.	3500	36	169.5	111.75	73.5
1200	2700		⑥		
2000	2900				
3000	3100				

Outdoor Common Aisle Shelterfor-M

End Panel	1200	1.5			
Aux.	6600	36	264	111.75	72
1200	5000		⑥		
2000	5400				
3000	5800				

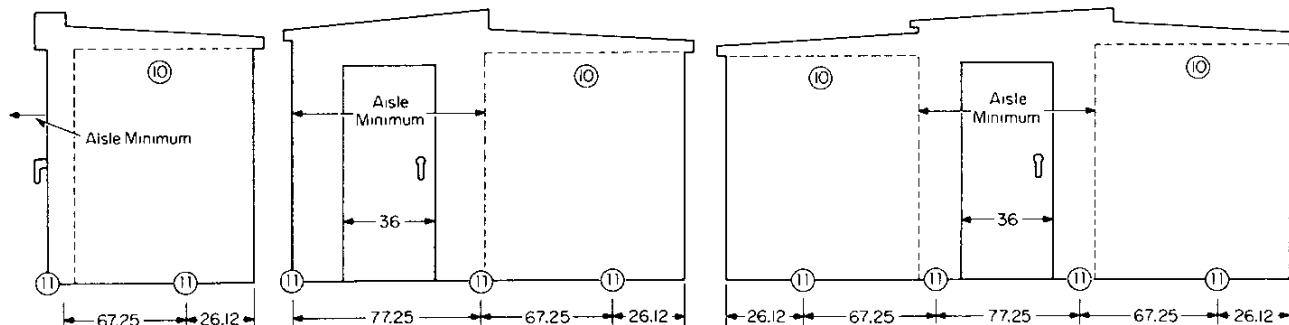
Ampere Rating	Wt. (Lbs.) Breaker	Type Circuit Breaker
1200	1400	75 DHP 500
2000		150 DHP 500
3000	1500	H 150 DHP 500

- ① Foundation supports for Indoor Switchgear supplied by purchaser, steel channel recommended.
② Opening for main cables.
③ Opening for secondary conduits, 2 inch maximum.
④ Customers terminal blocks.
⑤ For full height instrument panel on all units add 8 inches.
⑥ Indoor add 10 inch extra depth line compt. where required.
⑦ Outdoor add 12 inch extra depth line compt. where required.
⑧ Optional PT location when main cables exit bottom, access door rear.
⑨ Front accessible CT location.
⑩ CT location.
⑪ Side view unit same as indoor except space for two sets potheads.
⑫ Tie down clips supplied for purchasers foundation bolts.

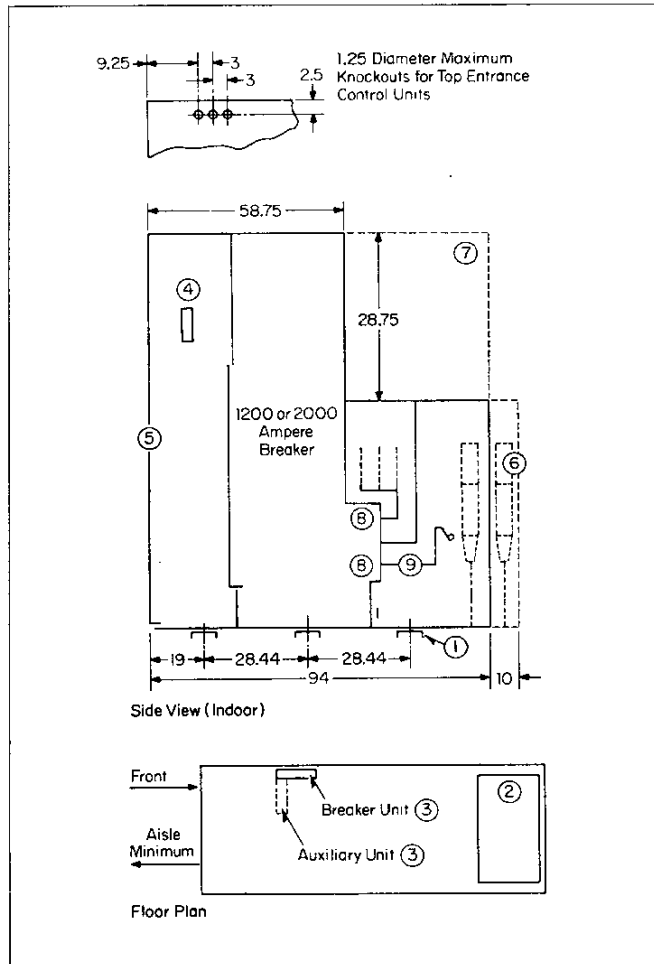
Aisle-Less

Shelter for-M

Common Aisle Shelter for-M



Type DHP Porcel-line[®] Metal-Clad Switchgear
Type 150 DHP 750 or 150 DHP 1000



Approximate Weight and Dimensions in Inches

Ampere Rating	Wt. (Lbs.) Unit Less Breaker	Width of Unit	Depth	Height	Aisle Minimum
Indoor					
Aux.	2800	36	94	90.38	55
1200	2000		⑤		
2000	2200		⑥		
3000	2400				

Outdoor Aisle-Less

End Panel	300	1.5			
Aux.	3200	36	108.62	107	85
1200	2400		⑥		
2000	2600				
3000	2800				

Outdoor Shelterfor-M

End Panel	900	1.5			
Aux.	3500	36	185.5	111.75	81.5
1200	2700		⑥		
2000	2900				
3000	3100				

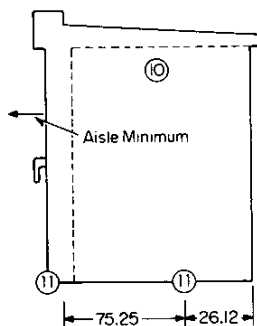
Outdoor Common Aisle Shelterfor-M

End Panel	1200	1.5			
Aux.	6600	36	288	111.75	80
1200	5000		⑥		
2000	5400				
3000	5800				

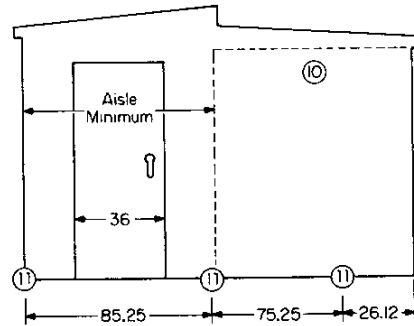
Ampere Rating	Wt. (Lbs.) Breaker	Type Circuit Breaker
1200	2200	150 DHP 750
2000		H 150 DHP 750
3000	2300	
1200	2350	150 DHP 1000
2000		
3000	2450	

- ① Foundation supports for Indoor Switchgear supplied by purchaser, steel channel recommended.
- ② Opening for main cables.
- ③ Opening for secondary conduits, 2 inch maximum.
- ④ Customers terminal blocks.
- ⑤ Full height instrument panel on all units.
- ⑥ Indoor add 10 inch extra depth line compt. where required.
Outdoor add 12 inch extra depth line compt. where required.
- ⑦ Optional PT location when main cables exit bottom, access door rear.
- ⑧ Front accessible CT location.
- ⑨ CT location.
- ⑩ Side view unit same as indoor except space for two sets potheads.
- ⑪ Tie down clips supplied for purchasers foundation bolts.

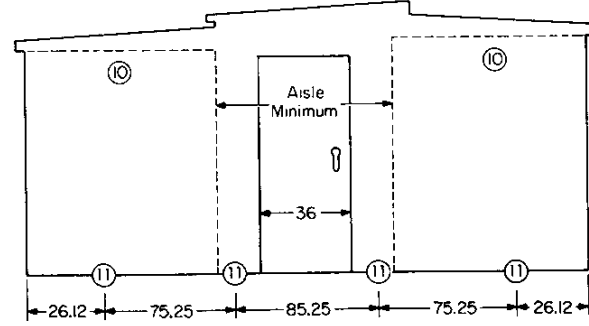
Aisle-Less

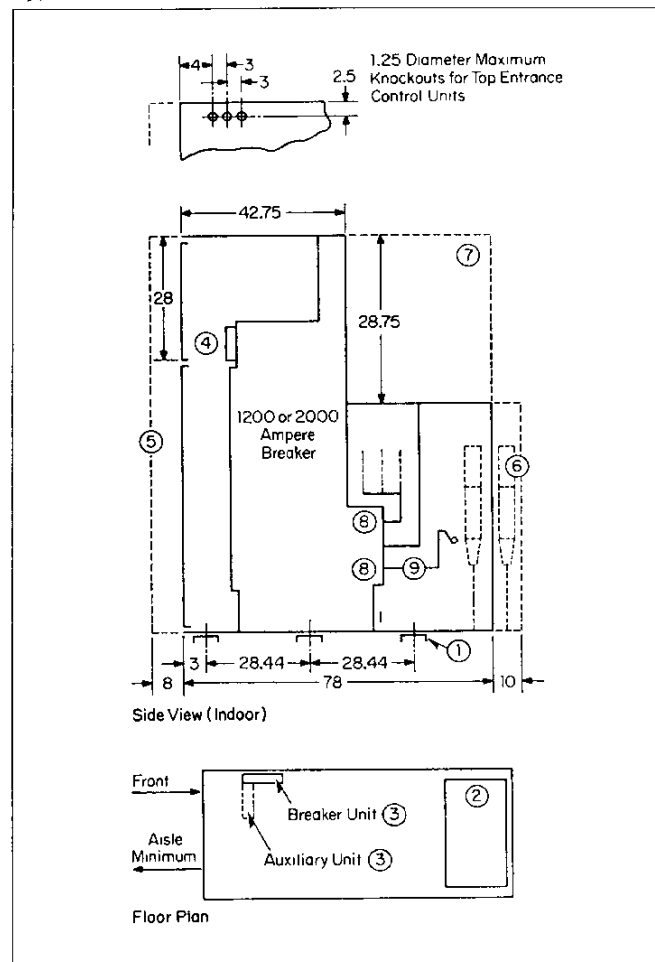


Shelter for-M



Common Aisle Shelter for-M



**Type DVP Porcel-line® Metal-Clad Switchgear
Type 150 DVP 500 or 150 DVP 750****Approximate Weight and Dimensions in Inches**

Ampere Rating	Wt. (Lbs.) Unit Less Breaker	Width of Unit	Depth	Height	Aisle Minimum
Indoor					
Aux.	2800	36	78	90.38	49
1200	2000		⑤		
2000	2200		⑥		

Outdoor Aisle-Less

End Panel	300	1.5			
Aux.	3200	36	100.62	107	80
1200	2400		⑥		
2000	2600				

Outdoor Shelterfor-M

End Panel	900	1.5			
Aux.	3500	36	169.5	111.75	73.5
1200	2700		⑥		
2000	2900				

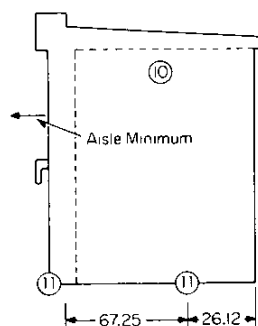
Outdoor Common Aisle Shelterfor-M

End Panel	1200	1.5			
Aux.	6600	36	264	111.75	72
1200	5000		⑥		
2000	5400				

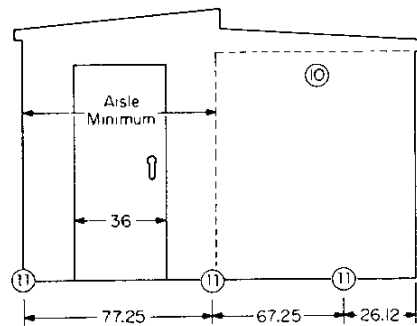
Ampere Rating	Wt. (Lbs.) Breaker	Type Circuit Breaker
1200	900	150 DVP 500
2000	900	H 150 DVP 500
1200	950	150 DVP 750
2000		

- ① Foundation supports for Indoor Switchgear supplied by purchaser, steel channel recommended.
② Opening for main cables.
③ Opening for secondary conduits, 2 inch maximum.
④ Customers terminal blocks.
⑤ For full height instrument panel on all units add 8 inches.
⑥ Indoor add 10 inch extra depth line compt. where required.
Outdoor add 12 inch extra depth line compt. where required.
⑦ Optional PT location when main cables exit bottom, access door rear.
⑧ Front accessible CT location.
⑨ CT location.
⑩ Side view unit same as indoor except space for two sets potheads.
⑪ Tie down clips supplied for purchasers foundation bolts.

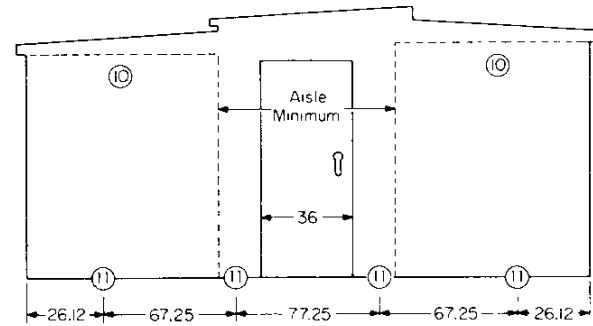
Aisle-Less



Shelter for-M



Common Aisle Shelter for-M



Application Quick Check Table

For application of circuit breakers in a radial system supplied from a single source transformer. Short-circuit duty was determined using E/X amperes and 1.0 multiplying factor for X/R ratio of 15 or less and 1.25 multiplying factor for X/R ratios greater than 15.

Source Transformer MVA Rating		Kv Operating Voltage							
Motor Load		2.4	4.16	6.6	12	13.8			
100%	0%								
1	1.5	50 DHP 75 12 KA	50 DHP 75 10.1 KA	150 DHP 500 23 KA	150 DHP 500 22.5 KA	150 DHP 500 19.6 KA			
1.5	2								
2	2.5								
2.5	3	50 DHP 250 36 KA	50 DHP 250 33.2 KA	75 DHP 500 41.3 KA					
3	3.75								
3.75	5	50 DHP 350 49 KA							
5	7.5								
7.5	10								
10①	10	Breaker Type and Sym. Interrupting Capacity at the Operating Voltage	50 DHP 350 46.9 KA		150 DHP 750 35 KA	150 DHP 750 30.4 KA			
10	12①								
12	15								
15	20								
20①	20								
	25				150 DHP 1000 46.3 KA	150 DHP 1000 40.2 KA			
	30								
	50①								

① Transformer Impedance 6.5% or more, all other Transformer Impedances are 5.5% or more.



Typical Specifications

General

The type DHP metal-clad switchgear described in this specification will be an assembly of breaker housings, auxiliary housings, and horizontal drawout circuit breakers arranged to suit the specific requirements of the purchaser. The switchgear will be designed, manufactured and tested in accordance with the latest standards of ANSI and NEMA.

The breaker housings and auxiliary housings will be bolted to each other to form a rigid metal enclosed switchgear assembly. Each housing will consist of functional components or modules. They will be the breaker/bus, control, and line modules (and, if required, an upper rear module). Metal side pans will provide a double thickness of steel between adjacent housings and metal barriers will isolate the primary major sections of each circuit. Removable metal barriers will provide access to the primary major sections of each circuit. Rear covers will be bolted-on sheets.

Weatherproofing: Aisle-less

Each shipping group will be mounted upon an integral base frame. A weatherproof enclosure will be assembled onto the complete metal enclosed switchgear assembly. A weatherproof door will be provided on the breaker drawout side of each housing.

Weatherproofing: Shelterfor-M

Each shipping group will be mounted upon an integral base frame. A weatherproof enclosure will be assembled onto the complete metal enclosed switchgear assembly. The weatherproof enclosure will extend on the breaker drawout side of the complete assembly to form an operating and/or maintenance aisle large enough to permit interchange of circuit breakers. A weatherproof door with an inside quick-release latch mechanism will be located at each end of the aisle to permit opening door even when locked from outside.

Panels: Indoor and Shelterfor-M

A formed hinged panel for control devices, relays, meters and instruments will enclose the upper front of each housing.

All units will have front panels that can be closed for any position of the breaker element to form a continuous line.

Panels: Aisle-less

A full-height formed hinged panel will be located on the breaker drawout side behind the outer weatherproof door and will be used for control devices, relays, meters, and instruments.

Breaker/Bus Module

The main bus will have flame retardant insulation. Porcelain main bus supports will cover the bus opening between housings to provide a non-combustible fire wall. Bus joints shall

be provided in each unit. All bus joints will be silver-plated, bolted, and insulated with boots secured by nylon hardware. The stationary primary contacts will be silver-plated and recessed within porcelain supports. An automatic shutter will cover the stationary primary disconnecting contacts when the breaker is in the disconnected position or out of the housing with full air clearance to live parts. The stationary secondary contacts will be silver-plated multiple sockets. A stationary guide rail, levering-in screw, and safety interlocks will be provided to function with the circuit breaker. A ground contact will ground the breaker between and including the operating and test positions. Breaker/bus modules of the same rating will be interchangeable and will house any circuit breaker of the same rating.

Control Module

One set of terminal blocks will be provided for secondary connections to external circuits. One control circuit cutout device will be provided in each circuit breaker housing. Switchgear secondary wire will be #14AWG.

Line Module

The ground bus will extend the length of the switchgear assembly. The ground bus joints will be silver-plated and will be bolted to each housing and to each breaker ground contact. A clamp-type terminal will be furnished for terminating a ground cable. Clamp-type terminals, one/phase, will be furnished for terminating power cables unless other terminations are specified.

Instrument Transformers

Ring-type current transformers will be furnished as indicated in the detail specification. Their thermal and mechanical rating will be coordinated with the circuit breakers. Their accuracy rating will be at least equal to NEMA Standard requirements.

The standard location for at least one ring type current transformer per phase on the bus side and line side of breaker units will be front accessible to permit adding or changing current transformers without removing high voltage insulated connections. Potential transformers or control power transformers up to 15 Kva single phase are trunion mounted with current limiting fuses in enclosed compartments. They are disconnected, grounded and isolated from high voltage when the access door is open.

A mechanical interlock is provided for control power transformers to require the secondary breaker to be open before the access door can be opened to disconnect the primary fuses.

Finish

Steel will be cleaned and phosphatized. The final indoor finish will be light grey ASA #61. The final outdoor finish will be dark grey ASA #24, applied over a coat of light grey

paint. An undercoating compound will be applied to outdoor switchgear.

Circuit Breaker

The circuit breakers will be horizontal drawout type. The breakers will be operated by a motor-charged spring type stored energy mechanism. The stored energy mechanism will be charged normally by a universal electric motor and in an emergency by a manual handle. The primary contacts will be silver-plated and supported on porcelain insulators. The primary disconnecting fingers will be silver-plated and retained to the primary contacts with individual leaf springs. Hinged tilting arc chutes with center coil blowout magnets will be provided in "Limitrak" enclosures. A vertical metal barrier in front of the arc chutes will form a shield from primary parts.

The secondary disconnecting contacts will be silver-plated multiple plugs of the train-line coupler type. The plugs will automatically engage the housing sockets in the breaker operating position and manually in the breaker test position. A guide channel will provide lateral alignment with the housing guide rail. Horizontal levering will be provided by rotating and engaging a shaft and nut assembly onto the housing screw. The levering mechanism shall spin-free to prevent over tightening when breaker is levered into the operating position. Interlocks will be provided to prevent levering of a closed breaker to prevent closing of a breaker between operating and test positions, to trip breakers upon insertion or removal from housing and to discharge stored energy mechanisms upon insertion or removal from the housing. The breaker will be secured positively in the housing between and including the operating and test positions. Circuit breakers of the same rating will be interchangeable and will fit any housing of the same rating.



Your best buy in switchgear because you get:

Performance

Only Westinghouse DHP Porcel-Line metal-clad provides magnetic air circuit breakers with all live parts to ground through porcelain insulation. In addition, the housings utilize porcelain bus supports and porcelain contact bottles on both 5 kv and 15 kv ratings.

Why porcelain? Excellent dielectric characteristics—non-tracking, non-combustible, and non-hygroscopic—won't age and easy to clean—the near ultimate in insulation.

Reliability

Has been determined in a complete testing program—including components, product verification, and environmental tests, to assure you of in service reliability.

Minimum Space

Reduced depth and minimum number of auxiliary compartments assures smaller space requirements to meet your needs.

Flexibility

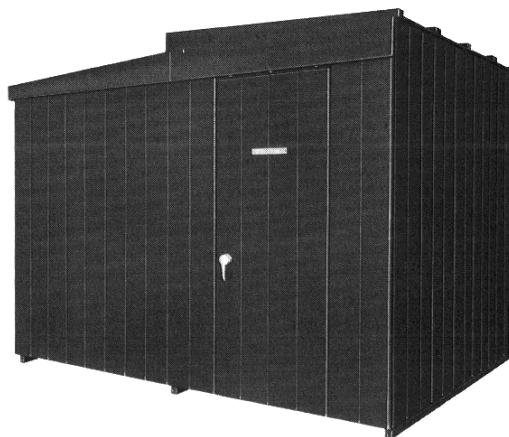
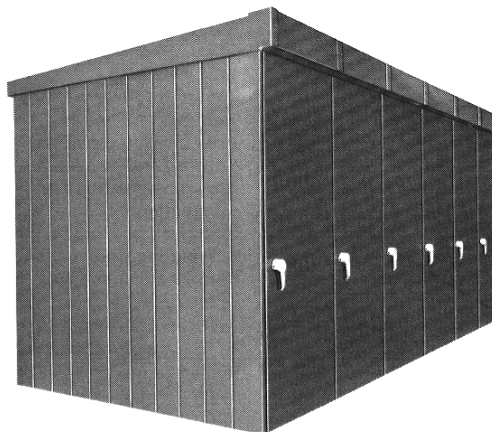
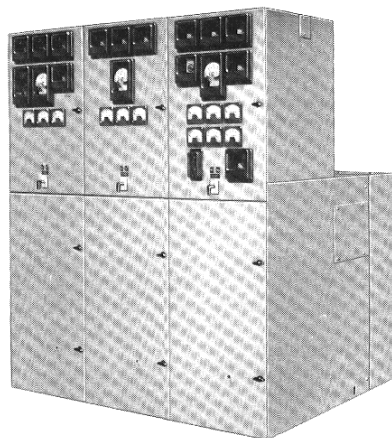
Choice of ratings, control voltages, extended ratio range of front accessible current transformers are some of the features of DHP Porcel-Line metal-clad that provide flexibility in meeting the requirements of your application.

Safety

Provided by complete metal barriering of major compartments, safety interlocks to prevent levering with the breaker closed, inter-phase breaker barriers interlocked to prevent removing with the breaker in the housing, and levering device which spins free at the end of the breaker travel, assuring positive engagement of main disconnecting contacts—thus eliminating danger of over travel.

Maintenance

Long life porcelain insulation, tilting arc chutes, horizontal drawout breakers, front accessible current transformers are but a few of the features resulting in reduced maintenance costs.



Westinghouse Electric Corporation
Switchgear Division, East Pittsburgh, Pa. 15112