

TABLE OF CONTENTS

Forward, About This Book	i		
Adjusting the Data, Tips & Traps	vii	16440 Safety Switches	237
How Book is Arranged	xiii	16460 Transformers	245
Abbreviations	581	16465 Bus Duct, 100 Amp Type	253
Appendix, Tables & Charts	584	16466 Bus Duct, Aluminum	255
Index	611	16467 Bus Duct, Copper	263
		16468 Bus Duct Plug-Ins	271
		16470 Panelboards	274
		16471 Load Centers	284
01000 GENERAL REQUIREMENTS		16472 Fusible Panelboards	288
01650 General Equipment Rental	1	16475 Circuit Breakers	290
01652 Site Equipment Rental	5	16476 Fuses	302
01653 Concrete Equipment Rental	7	16480 Motor Starters, Controls & Connections	305
01657 Lifting & Hoisting Equipment Rental ..	8	16485 Motor Control Centers (MCC)	318
01659 Electrical Equipment Rental	9	16490 Time Clocks & Switches.....	327
02000 DEMOLITION		16500 LIGHTING	
02070 Selective Demolition (Cutouts).....	11	16501 Lamps	328
02072 Site Demolition	13	16510 Fluorescent Lighting	331
02076 Interior Demolition & Handling	14	16511 HID Lighting	337
02078 Electrical Demolition	15	16512 Incandescent Lighting	338
		16513 Track Lighting	339
		16530 Site Lighting	341
		16535 Emergency Lighting	343
02600 GENERAL SITEWORK			
02222 Excavating	24	16600 SPECIAL SYSTEMS	
02223 Backfill & Compaction	27	16610 Uninterruptible Power Supply Systems	344
02605 Utility Manholes, Handholes & Racks	29	16650 Medical Products	346
		16670 Grounding & Lightning Protection	348
16100 BASIC ELEC MATERIAL & METHODS		16700 COMMUNICATIONS	
16110 Cable Tray	31	16720 Fire Alarm	350
16111 Conduit & Condulets.....	48	16721 Security & Access Control	355
16112 Conduit Fittings	77	16730 Clock Systems	356
16113 Surface Raceways	90	16740 CCTV Systems	358
16114 Flexible Raceways	101	16750 Nurse Call Systems	359
16115 Undercarpet Raceways	106	16760 Intercommunication Systems	360
16116 Underfloor Duct	107	16771 Music & Sound Systems	363
16117 Wall Duct	109	16772 Telephone & PBX Systems.....	364
16118 Trench Duct	111	16780 Multi Media Systems	369
16119 Knockouts & Wall Penetrations	113	16790 Data Management Systems	370
16120 Wire	122		
16121 Non Metallic Cable & Fittings	126	16800 ELECTRIC HEAT & VENTILATION	
16122 Armored Cable & Fittings	130	16800 Heat Trace.....	374
16123 Medium Voltage Cable	134	16850 Electric Heating Units.....	375
16124 Mineral Insulated Cable & Fittings	142	16860 Electric Fans & Ventilators.....	379
16125 Cable Terminations	144		
16126 Low Voltage & Electronic Cable	148	16900 ELECTRICAL MISCELLANEOUS	
16131 Outlet & Switch Boxes	161	16900 Residential Electrical Assemblies	380
16132 Pull Boxes & Cabinets	172	16950 Electrical Tools	383
16140 Receptacles & Switches	180	16960 Temporary Power & Light	386
16141 Weather & Explosion-Proof	189	16970 Miscellaneous	387
16190 Hangers & Supports	191		
16191 Anchors & Fasteners	201	17000 ELECTRICAL ASSEMBLIES	
		Table of Contents	388
16200 POWER GENERATION			
16210 Generators & Transfer Switches	206		
16300 SERVICE & DISTRIBUTION (over 600V)			
16325 Switchgear	222		
16400 SERVICE & DISTRIBUTION (600V)			
16425 Switchboards	224		
16430 Meter Centers	235		

16141

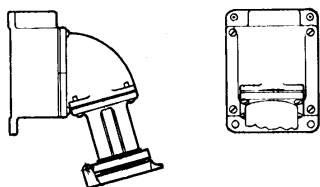
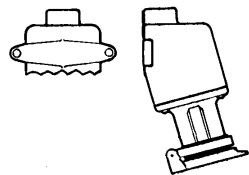
Weather & Explosion-Proof Receptacles

SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1614100100	Explosion-Proof Plug, Type CPH, 30A 2W 3P, .750-1.000 Cable	EA	.640	\$343	\$24.96	\$368
1614100200	30A 3W 4P, .750-1.000 Cable	EA	.640	368	24.96	393
1614100300	60A 2W 3P, .500-.750 Cable	EA	.950	449	37.05	486
1614100400	60A 2W 3P, .750-1.000 Cable	EA	.950	449	37.05	486
1614100500	60A 2W 3P, 1.000-1.375 Cable	EA	.950	449	37.05	486
1614100600	60A 3W 4P, .500-.750 Cable	EA	.950	390	37.05	427
1614100700	60A 3W 4P, .750-1.000 Cable	EA	.950	430	37.05	467
1614100800	60A 3W 4P, 1.000-1.375 Cable	EA	.950	430	37.05	467
1614100900	Explosion-Proof Plug, Type CPP, 20A 2W 3P, .250-.375 Cable	EA	.500	172	19.50	191
1614101000	20A 2W 3P, .375-.500 Cable	EA	.500	172	19.50	191
1614101100	20A 2W 3P, .500-.625 Cable	EA	.500	172	19.50	191
1614101200	30A 2W 3P, .500-.625 Cable	EA	.640	283	24.96	308
1614101300	30A 2W 3P, .625-.750 Cable	EA	.640	283	24.96	308
1614101400	30A 2W 3P, .750-.875 Cable	EA	.640	283	24.96	308
1614101500	30A 3W 4P, .500-.625 Cable	EA	.640	305	24.96	330
1614101600	30A 3W 4P, .625-.750 Cable	EA	.640	305	24.96	330
1614101700	30A 3W 4P, .750-.875 Cable	EA	.640	305	24.96	330
1614101800	Explosion-Proof Receptacle, Type CES, 30A 2W 3P, (3) 3/4" Hubs	EA	2.00	641	78.00	719
1614101900	30A 3W 4P, (3) 3/4" Hubs	EA	2.00	686	78.00	764
1614102000	60A 2W 3P, (3) 1-1/4" Hubs	EA	3.50	915	137	1,052
1614102100	60A 3W 4P, (3) 1-1/4" Hubs	EA	3.50	894	137	1,030
1614102200	Explosion-Proof Receptacle, Type CESD, 30A 2W 3P, (1) 3/4" Hub	EA	2.00	641	78.00	719
1614102300	30A 3W 4P, (1) 3/4" Hub	EA	2.00	686	78.00	764
1614102400	60A 2W 3P, (1) 1-1/4" Hub	EA	3.50	915	137	1,052
1614102500	60A 3W 4P, (1) 1-1/4" Hub	EA	3.50	894	137	1,030
1614102600	Explosion-Proof Receptacle, Type CPS, 20A 2W 3P, Straight, 1/2" Hub	EA	1.70	378	66.30	444
1614102700	20A 2W 3P, Straight, 3/4" Hub	EA	1.70	358	66.30	425
1614102800	20A 2W 3P, Straight, 1/2" Hub	EA	1.70	376	66.30	442
1614102900	20A 2W 3P, Straight, 3/4" Hub	EA	1.70	408	66.30	474
1614103000	20A 2W 3P, Angle, 1/2" Hub	EA	1.70	378	66.30	444
1614103100	20A 2W 3P, Angle, 3/4" Hub	EA	1.70	356	66.30	423
1614103200	20A 2W 3P, Dead End, 1/2" Hub	EA	1.70	378	66.30	444
1614103300	20A 2W 3P, Dead End, 3/4" Hub	EA	1.70	356	66.30	423
1614103400	20A 2W 3P, Dead End, 1" Hub	EA	1.70	410	66.30	477
1614103500	20A 2W 3P, Feed Thru, 1/2" Hubs	EA	1.70	358	66.30	425
1614103600	20A 2W 3P, Feed Thru, 3/4" Hubs	EA	1.70	360	66.30	426
1614103700	20A 2W 3P, Feed Thru, 1" Hubs	EA	1.70	419	66.30	485
1614103800	Weatherproof Plug, Type APR, 20A 2W 2P, .250-.500	EA	.500	244	19.50	263
1614103900	20A 2W 2P, .500-.875	EA	.500	244	19.50	263
1614104000	30A 2W 2P, .875-1.375	EA	.640	281	24.96	306
1614104100	30A 3W 3P, .875-1.375	EA	.640	263	24.96	288
1614104200	30A 4W 4P, .875-1.375	EA	.640	290	24.96	315
1614104300	30A 5W 5P, .500-.875	EA	.640	387	24.96	412
1614104400	60A 2W 2P, .875-1.375	EA	.950	460	37.05	497
1614104500	60A 3W 3P, .875-1.375	EA	.950	430	37.05	467
1614104600	60A 4W 4P, .875-1.375	EA	.950	503	37.05	540
1614104700	100A 2W 2P, 1.375-1.875	EA	1.50	672	58.50	731
1614104800	100A 3W 3P, 1.375-1.875	EA	1.50	655	58.50	713
1614104900	100A 3W 3P, 1.375-1.875	EA	1.50	675	58.50	734
1614105000	Weatherproof Receptacle, Type ARE, 20A 2W 2P, 1/2" w/ Spring Door	EA	1.70	163	66.30	230

16141

Weather & Explosion-Proof Receptacles

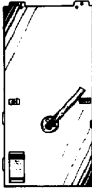



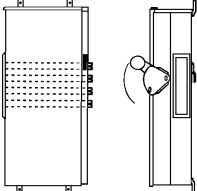
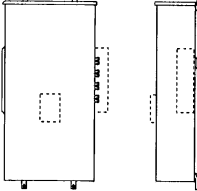
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1614105100	20A 2W 2P, 3/4" w/ Spring Door	EA	1.70	\$182	\$66.30	\$249
1614105200	30A 2W 2P, 1/2" w/ Spring Door	EA	2.00	206	78.00	284
1614105300	30A 2W 2P, 3/4" w/ Spring Door	EA	2.00	247	78.00	325
1614105400	30A 3W 3P, 3/4" w/ Spring Door	EA	2.00	247	78.00	325
1614105500	30A 3W 3P, 1" w/ Spring Door	EA	2.00	252	78.00	330
1614105600	30A 4W 4P, 3/4" w/ Spring Door	EA	2.00	276	78.00	354
1614105700	30A 4W 4P, 1" w/ Spring Door	EA	2.00	280	78.00	358
1614105800	30A 5W 5P, 1" w/ Spring Door	EA	2.00	329	78.00	407
1614105900	60A 2W 2P, 1" w/ Spring Door	EA	3.00	330	117	447
1614106000	60A 2W 2P, 1-1/4" w/ Spring Door	EA	3.00	324	117	441
1614106100	60A 3W 3P, 1" w/ Spring Door	EA	3.00	384	117	501
1614106200	60A 3W 3P, 1-1/4" w/ Spring Door	EA	3.00	387	117	504
1614106300	60A 4W 4P, 1-1/4" w/ Spring Door	EA	3.00	418	117	535
1614106400	60A 4W 4P, 1-1/2" w/ Spring Door	EA	3.00	421	117	538
1614106500	Weatherproof Receptacle, Type AREA, 60A 2W 2P, 1" w/ Spring Door	EA	3.00	477	117	594
1614106600	60A 2W 2P, 1-1/4" w/ Spring Door	EA	3.00	466	117	583
1614106700	60A 3W 3P, 1" w/ Spring Door	EA	3.00	536	117	653
1614106800	60A 3W 3P, 1-1/4" w/ Spring Door	EA	3.00	536	117	653
1614106900	60A 4W 4P, 1-1/4" w/ Spring Door	EA	3.00	567	117	684
1614107000	60A 4W 4P, 1-1/2" w/ Spring Door	EA	3.00	567	117	684
1614107100	100A 2W 2P, 1-1/4" w/ Spring Door	EA	3.75	433	146	579
1614107200	100A 2W 2P, 1-1/2" w/ Spring Door	EA	3.75	628	146	775
1614107300	100A 3W 3P, 1-1/4" w/ Spring Door	EA	3.75	623	146	769
1614107400	100A 3W 3P, 1-1/2" w/ Spring Door	EA	3.75	623	146	769
1614107500	100A 4W 4P, 1-1/2" w/ Spring Door	EA	3.75	695	146	842
1614107600	100A 4W 4P, 2" w/ Spring Door	EA	3.75	695	146	842



NOTES

16430

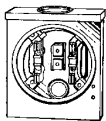
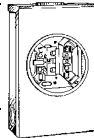
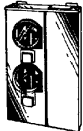
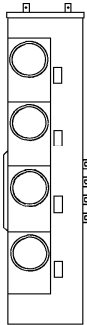
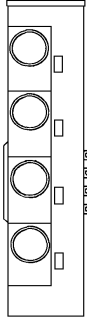
Meter Centers

SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1643000100	Meter Center Service Cubicle, Indoor Fusible Switch Type, 1P 400A	EA	9.50	\$1,511	\$371	\$1,882
1643000200	 1P 600A	EA	13.8	1,943	538	2,481
1643000300		EA	16.9	3,022	659	3,682
1643000400		EA	19.9	4,294	776	5,070
1643000500		EA	9.5	1,871	371	2,242
1643000600		EA	13.8	2,183	538	2,721
1643000700		EA	16.9	4,294	659	4,953
1643000800		EA	19.9	5,877	776	6,653
1643000900	Meter Center Service Cubicle, Indoor Main Breaker Type, 1P 200A	EA	7.90	772	308	1,080
1643001000	 400A	EA	9.50	1,775	371	2,146
1643001100		EA	13.8	2,711	538	3,249
1643001200		EA	16.9	3,406	659	4,065
1643001300		EA	19.0	4,750	741	5,491
1643001400		EA	19.9	6,573	776	7,349
1643001500		EA	22.3	11,226	870	12,096
1643001600		Meter Center Service Cubicle, Indoor Main Breaker Type, 3P 200A	EA	7.90	936	308
1643001700	 400A	EA	9.50	2,159	371	2,529
1643001800		EA	13.8	3,478	538	4,016
1643001900		EA	16.9	4,534	659	5,193
1643002000		EA	19.0	5,637	741	6,378
1643002100		EA	19.9	7,460	776	8,236
1643002200		EA	22.3	11,850	870	12,720
1643002300		Meter Center Service Cubicle, Indoor Main Terminal Type, 1P 800A	EA	16.0	336	624
1643002400	 1P 1600A	EA	21.0	1,199	819	2,018
1643002500		EA	16.0	432	624	1,056
1643002600		EA	21.0	1,679	819	2,498
1643002700	Meter Center Service Cubicle, Outdoor Fusible Switch Type, 1P 400A	EA	9.50	1,655	371	2,026
1643002800	 1P 600A	EA	13.8	2,399	538	2,937
1643002900		EA	16.9	3,550	659	4,209
1643003000		EA	19.9	5,037	776	5,813
1643003100		EA	9.50	1,967	371	2,337
1643003200		EA	13.8	3,142	538	3,681
1643003300		EA	16.9	5,157	659	5,816
1643003400		EA	19.9	6,956	776	7,732
1643003500		Meter Center Service Cubicle, Outdoor Main Breaker Type, 1P 200A	EA	7.90	912	308
1643003600	 1P 400A	EA	9.50	2,063	371	2,433
1643003700		EA	13.8	3,142	538	3,681
1643003800		EA	16.9	4,222	659	4,881
1643003900		EA	19.0	5,709	741	6,450
1643004000		EA	19.9	7,316	776	8,092
1643004100		EA	22.3	12,593	870	13,463
1643004200		EA	7.90	1,079	308	1,388
1643004300		EA	9.50	2,471	371	2,841
1643004400		EA	13.8	4,054	538	4,592
1643004500		EA	16.9	5,301	659	5,960
1643004600		EA	19.0	6,429	741	7,170
1643004700		EA	19.9	8,444	776	9,220
1643004800		EA	22.3	13,241	870	14,111
1643004900	Meter Center Service Cubicle, Outdoor Main Terminal Type, 1P 800A	EA	16.0	360	624	984
1643005000	1P 1600A	EA	21.0	1,319	819	2,138

16430

Meter Centers

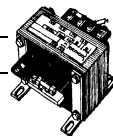
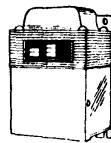
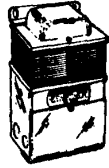
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1643005100	3P 800A	EA	16.0	\$465	\$624	\$1,089
1643005200	3P 1600A	EA	21.0	1,751	819	2,570
1643005300	Meter Center, Indoor Stacking Unit, 1-P 2-Meter, 125A Breaker Space Each	EA	5.20	369	203	572
1643005400	2-Meter, 150A Breaker Space Each	EA	5.85	552	228	780
1643005500	2-Meter, 200A Breaker Space Each	EA	6.70	652	261	914
1643005600	3-Meter, 125A Breaker Space Each	EA	7.15	480	279	759
1643005700	3-Meter, 150A Breaker Space Each	EA	7.80	825	304	1,129
1643005800	3-Meter, 200A Breaker Space Each	EA	8.45	983	330	1,313
1643005900	4-Meter, 125A Breaker Space Each	EA	9.10	624	355	979
1643006000	4-Meter, 150A Breaker Space Each	EA	9.73	1,103	379	1,483
1643006100	4-Meter, 200A Breaker Space Each	EA	10.5	1,319	410	1,729
1643006200	5-Meter, 125A Breaker Space Each	EA	11.0	782	429	1,211
1643006300	5-Meter, 150A Breaker Space Each	EA	11.5	1,367	449	1,816
1643006400	6-Meter, 125A Breaker Space Each	EA	12.0	936	468	1,404
1643006500	Meter Center, Indoor, 400A ML, 4-Meter 2-High, 150A Breaker Space Each	EA	9.73	873	379	1,253
1643006600	Meter Center, Outdoor Stacking Unit, 1-P 2-Meter, 125A Breaker Space Each	EA	5.20	398	203	601
1643006700	2-Meter, 150A Breaker Space Each	EA	5.85	585	228	813
1643006800	2-Meter, 200A Breaker Space Each	EA	6.70	691	261	952
1643006900	3-Meter, 125A Breaker Space Each	EA	7.15	513	279	792
1643007000	3-Meter, 150A Breaker Space Each	EA	7.80	873	304	1,177
1643007100	3-Meter, 200A Breaker Space Each	EA	8.45	1,031	330	1,361
1643007200	4-Meter, 125A Breaker Space Each	EA	9.10	691	355	1,046
1643007300	4-Meter, 150A Breaker Space Each	EA	9.73	1,166	379	1,545
1643007400	4-Meter, 200A Breaker Space Each	EA	10.5	1,367	410	1,777
1643007500	5-Meter, 125A Breaker Space Each	EA	11.0	864	429	1,293
1643007600	5-Meter, 150A Breaker Space Each	EA	11.5	1,463	449	1,912
1643007700	6-Meter, 125A Breaker Space Each	EA	12.0	1,031	468	1,499
1643007800	Meter Center, Outdoor, 230A ML, 2-Meter 2-High, 125A Breaker Space Each	EA	5.20	393	203	596
1643007900	2-Meter 2-High, 200A Breaker Space Each	EA	6.70	523	261	784
1643008000	3-Meter 3-High, 125A Breaker Space Each	EA	7.15	470	279	749
1643008100	3-Meter 3-High, 150A Breaker Space Each	EA	7.80	672	304	976
1643008200	3-Meter 3-High, 200A Breaker Space Each	EA	8.45	768	330	1,097
1643008300	Meter Center, Outdoor, 400A ML, 4-Meter 2-High, 125A Breaker Space Each	EA	9.10	638	355	993
1643008400	4-Meter 2-High, 150A Breaker Space Each	EA	9.73	912	379	1,291
1643008500	4-Meter 2-High, 200A Breaker Space Each	EA	10.5	1,055	410	1,465
1643008600	6-Meter 3-High, 125A Breaker Space Each	EA	12.0	926	468	1,394
1643008700	Meter Center, Outdoor, 600A ML, 6-Meter 3-High, 125A Breaker Space Each	EA	12.5	1,031	488	1,519
1643008800	150A Breaker Space Each	EA	13.0	1,319	507	1,826
1643008900	200A Breaker Space Each	EA	13.5	1,439	527	1,966
1643009000	Meter Socket, Commercial Single, 1-Phase 4-Terminal, 100A	EA	2.80	148	109	257
1643009100	1-Phase 4-Terminal, 200A	EA	4.70	275	183	458
1643009200	3-Phase 7-Terminal, 100A	EA	3.00	212	117	329
1643009300	3-Phase 7-Terminal, 200A	EA	5.00	365	195	560
1643009400	Meter Socket, Standard Single, 1-Phase 4-Terminal, 100A	EA	2.38	27.25	92.82	120
1643009500	1-Phase 4-Terminal, 150A	EA	3.31	32.61	129	162
1643009600	1-Phase 4-Terminal, 200A	EA	4.00	37.59	156	194
1643009610	3-Phase 7 Terminal, 100A	EA	3.00	74.38	117	191
1643009620	3-Phase 7 Terminal, 200A	EA	5.00	123	195	318



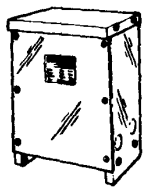
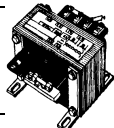
16460

Transformers

SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
164600010	Buck & Boost Transformer, 1P 120/240V Primary 12/24V Secondary, .05KVA	EA	.800	\$72.91	\$31.20	\$104
164600020	.10KVA	EA	.950	87.21	37.05	124
164600030	.15KVA	EA	1.15	98	44.85	143
164600040	.25KVA	EA	1.33	170	51.87	222
164600050	.50KVA	EA	1.90	218	74.10	292
164600060	.75KVA	EA	2.45	286	95.55	382
164600070	1KVA	EA	3.80	239	148	388
164600080	1.5KVA	EA	4.22	295	165	460
164600090	2KVA	EA	4.75	380	185	566
164600100	3KVA	EA	5.42	767	211	978
164600110	5KVA	EA	6.34	832	247	1,079
164600120	7.5KVA	EA	7.00	1,197	273	1,470
164600130	10KVA	EA	7.80	1,496	304	1,800
164600140	Buck & Boost Transformer, 1P 120/240V Primary 16/32V Secondary, .05KVA	EA	.800	59.85	31.20	91.05
164600150	.10KVA	EA	.950	77.81	37.05	115
164600160	.15KVA	EA	1.15	81.23	44.85	126
164600170	.25KVA	EA	1.33	137	51.87	188
164600180	.50KVA	EA	1.90	170	74.10	244
164600190	.75KVA	EA	2.45	222	95.55	318
164600200	1KVA	EA	3.80	208	148	356
164600210	1.5KVA	EA	4.22	258	165	423
164600220	2KVA	EA	4.75	327	185	512
164600230	3KVA	EA	5.42	456	211	667
164600240	5KVA	EA	6.34	808	247	1,055
164600250	7.5KVA	EA	7.00	1,202	273	1,475
164600260	10KVA	EA	7.80	1,496	304	1,800
164600270	Buck & Boost Transformer, 1P 240/480V Primary 24/48V Secondary, .05KVA	EA	.800	89.78	31.20	121
164600280	.10KVA	EA	.950	97	37.05	134
164600290	.15KVA	EA	1.15	117	44.85	162
164600300	.25KVA	EA	1.33	135	51.87	187
164600310	.50KVA	EA	1.90	195	74.10	269
164600320	.75KVA	EA	2.45	235	95.55	331
164600330	1KVA	EA	3.80	269	148	418
164600340	1.5KVA	EA	4.22	308	165	472
164600350	2KVA	EA	4.75	415	185	600
164600360	3KVA	EA	5.42	583	211	794
164600370	5KVA	EA	6.34	859	247	1,107
164600380	7.5KVA	EA	7.00	1,325	273	1,598
164600390	10KVA	EA	7.80	1,646	304	1,951
164600400	Control Transformer, 120V Primary 6V Secondary, .05KVA	EA	.800	63.27	31.20	94.47
164600410	6V Secondary, .10KVA	EA	.950	76.95	37.05	114
164600420	24V Secondary, .05KVA	EA	.800	41.04	31.20	72.24
164600430	24V Secondary, .10KVA	EA	.950	51.30	37.05	88.35
164600440	Control Transformer, 208V Primary 24V Secondary, .05KVA	EA	.800	42.75	31.20	73.95
164600450	24V Secondary, .10KVA	EA	.950	51.30	37.05	88.35
164600460	120V Secondary, .05KVA	EA	.800	41.04	31.20	72.24
164600470	120V Secondary, .10KVA	EA	.950	49.59	37.05	86.64
164600480	Control Transformer, 240/480V Primary 12V Secondary, .10KVA	EA	.950	71.82	37.05	109
164600490	24V Secondary, .05KVA	EA	.800	44.46	31.20	75.66
164600500	24V Secondary, .10KVA	EA	.950	53.01	37.05	90.06




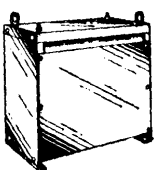
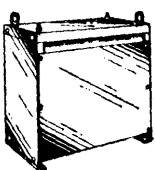
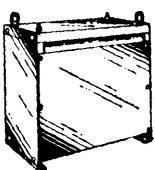
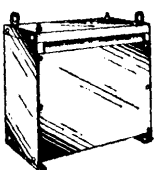
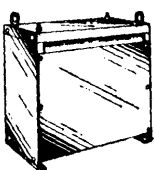
16460	Transformers					
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1646000510	120V Secondary, .05KVA	EA	.800	\$42.75	\$31.20	\$73.95
1646000520	120V Secondary, .10KVA	EA	.950	53.87	37.05	90.92
1646000530	120V Secondary, .15KVA	EA	1.15	59.85	44.85	105
1646000540	120V Secondary, .25KVA	EA	1.33	70.11	51.87	122
1646000550	Control Transformer, 240V Primary 120V Secondary, .05KVA	EA	.800	41.04	31.20	72.24
1646000560	.10KVA	EA	.950	53.01	37.05	90.06
1646000570	Control Transformer, 277V Primary 24V Secondary, .05KVA	EA	.800	47.03	31.20	78.23
1646000580	24V Secondary, .10KVA	EA	.950	56.43	37.05	93.48
1646000590	120V Secondary, .05KVA	EA	.800	41.04	31.20	72.24
1646000600	120V Secondary, .10KVA	EA	.950	53.01	37.05	90.06
1646000610	Control Transformer, 480V Primary 120V Secondary, .05KVA	EA	.800	41.04	31.20	72.24
1646000620	120V Secondary, .10KVA	EA	.950	53.01	37.05	90.06
1646000630	240V Secondary, .05KVA	EA	.800	47.88	31.20	79.08
1646000640	240V Secondary, .10KVA	EA	.950	59.85	37.05	96.90
1646000650	Control Transformer, 600V Primary 24V Secondary, .05KVA	EA	.800	55.58	31.20	86.78
1646000660	24V Secondary, .10KVA	EA	.950	65.84	37.05	103
1646000670	120V Secondary, .05KVA	EA	.800	55.58	31.20	86.78
1646000680	120V Secondary, .10KVA	EA	.950	54.72	37.05	91.77
1646000690	Dry Non-Vent Transformer, 1P 240/480V Primary 120/240V Secondary, 15KVA	EA	12.7	1,787	495	2,282
1646000700	25KVA	EA	15.2	2,685	593	3,278
1646000710	37.5KVA	EA	19.0	3,976	741	4,717
1646000720	50KVA	EA	21.7	5,109	846	5,955
1646000730	75KVA	EA	23.4	6,242	913	7,154
1646000740	100KVA	EA	25.0	7,909	975	8,884
1646000750	Dry Non-Vent Transformer, 1P 600V Primary 120/240V Secondary, 15KVA	EA	12.7	1,920	495	2,415
1646000760	25KVA	EA	15.2	2,895	593	3,487
1646000770	37.5KVA	EA	19.0	4,382	741	5,123
1646000780	50KVA	EA	21.7	5,087	846	5,934
1646000790	75KVA	EA	23.4	6,926	913	7,838
1646000800	100KVA	EA	25.0	8,529	975	9,504
1646000810	Dry Non-Vent Transformer, 3P 480V Primary 208Y/120V Secondary, 15KVA	EA	13.8	2,406	538	2,945
1646000820	30KVA	EA	16.9	3,021	659	3,680
1646000830	45KVA	EA	19.0	4,386	741	5,127
1646000840	75KVA	EA	21.7	6,768	846	7,614
1646000850	112.5KVA	EA	23.4	9,170	913	10,083
1646000860	150KVA	EA	25.0	11,829	975	12,804
1646000870	225KVA	EA	29.2	17,827	1,139	18,966
1646000880	300KVA	EA	34.5	19,559	1,346	20,904
1646000890	Dry Non-Vent Transformer, 3P 480V Primary 240V Secondary, 15KVA	EA	13.8	1,646	538	2,185
1646000900	30KVA	EA	16.9	2,864	659	3,523
1646000910	45KVA	EA	19.0	4,391	741	5,132
1646000920	75KVA	EA	21.7	6,768	846	7,614
1646000930	112.5KVA	EA	23.4	9,170	913	10,083
1646000940	150KVA	EA	25.0	11,842	975	12,817
1646000950	225KVA	EA	29.2	17,827	1,139	18,966
1646000960	300KVA	EA	34.5	19,456	1,346	20,802
1646000970	Dry Non-Vent Transformer, 3P 600V Primary 208Y/120V Secondary, 15KVA	EA	13.8	1,725	538	2,263
1646000980	30KVA	EA	16.9	3,121	659	3,780
1646000990	45KVA	EA	19.0	4,759	741	5,500
1646001000	75KVA	EA	21.7	7,289	846	8,136



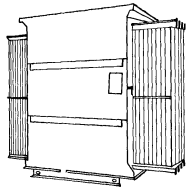
16460	Transformers						
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL	
1646001010	112.5KVA	EA	23.4	\$9,918	\$913	\$10,831	
1646001020	150KVA	EA	25.0	11,842	975	12,817	
1646001030	225KVA	EA	29.2	18,340	1,139	19,479	
1646001040	300KVA	EA	34.5	20,135	1,346	21,481	
1646001050	Dry Type Transformer, 1P 2.4KV Primary 120/240V Secondary, 167KVA	EA	29.2	14,868	1,139	16,007	
1646001060	250KVA	EA	34.5	19,389	1,346	20,734	
1646001070	333KVA	EA	42.2	23,816	1,646	25,461	
1646001080	Dry Type Transformer, 1P 5KV Primary 120/240V Secondary, 167KVA	EA	29.2	15,960	1,139	17,099	
1646001090	250KVA	EA	34.5	20,715	1,346	22,060	
1646001100	333KVA	EA	42.2	25,351	1,646	26,997	
1646001110	Dry Type Transformer, 1P 8.66KV Primary 120/240V Secondary, 167KVA	EA	29.2	16,771	1,139	17,910	
1646001120	250KVA	EA	34.5	22,637	1,346	23,982	
1646001130	333KVA	EA	42.2	26,941	1,646	28,587	
1646001140	Dry Type Transformer, 1P 15KV Primary 120/240V Secondary, 167KVA	EA	29.2	18,896	1,139	20,034	
1646001150	250KVA	EA	34.5	24,475	1,346	25,820	
1646001160	333KVA	EA	42.2	29,241	1,646	30,887	
1646001190	Dry Type Transformer, 1P 240/480V Primary 120/240V Secondary, .05KVA	EA	.800	83.42	31.20	115	
1646001200	.10KVA	EA	.950	111	37.05	148	
1646001210	.15KVA	EA	1.15	116	44.85	161	
1646001220	.25KVA	EA	1.33	140	51.87	192	
1646001230	.50KVA	EA	1.90	200	74.10	275	
1646001235	.75KVA	EA	2.75	214	107	321	
1646001240	1KVA	EA	3.80	312	148	460	
1646001250	1.5KVA	EA	4.40	333	172	505	
1646001260	2KVA	EA	4.75	496	185	681	
1646001265	3KVA	EA	5.40	618	211	829	
1646001270	5KVA	EA	6.30	807	246	1,052	
1646001280	7.5KVA	EA	6.90	1,133	269	1,402	
1646001290	10KVA	EA	9.50	1,405	371	1,776	
1646001300	15KVA	EA	12.7	1,769	495	2,264	
1646001310	25KVA	EA	15.2	2,302	593	2,895	
1646001320	37.5KVA	EA	19.0	3,068	741	3,809	
1646001330	50KVA	EA	21.7	3,732	846	4,578	
1646001340	75KVA	EA	23.1	5,061	901	5,962	
1646001350	100KVA	EA	25.0	4,759	975	5,734	
1646001355	167KVA	EA	27.0	6,991	1,053	8,044	
1646001370	Dry Type Transformer, 1P 480V Primary 120/240V Secondary, 3KVA	EA	5.40	618	211	829	
1646001380	5KVA	EA	6.34	807	247	1,054	
1646001390	7.5KVA	EA	6.90	1,133	269	1,402	
1646001400	10KVA	EA	9.50	1,405	371	1,776	
1646001410	15KVA	EA	12.7	1,884	495	2,379	
1646001412	25KVA	EA	16.9	2,302	659	2,961	
1646001420	Dry Type Transformer, 1P 600V Primary 120/240V Secondary, 15KVA	EA	12.7	1,390	495	1,885	
1646001430	25KVA	EA	15.2	1,821	593	2,414	
1646001440	75KVA	EA	23.4	3,980	913	4,892	
1646001450	100KVA	EA	25.0	5,169	975	6,144	
1646001460	167KVA	EA	27.0	8,032	1,053	9,085	
1646001470	3KVA	EA	5.40	439	211	650	
1646001480	5KVA	EA	6.34	593	247	840	
1646001490	7.5KVA	EA	6.90	831	269	1,100	

16460	Transformers					
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1646001500	10KVA	EA	9.50	\$1,034	\$371	\$1,404
1646001510	37.5KVA	EA	19.0	2,417	741	3,158
1646001520	50KVA	EA	21.7	2,938	846	3,785
1646001530	Dry Type Transformer, 3P 2.4KV Primary 277/480V Secondary, 225KVA	EA	34.5	21,653	1,346	22,999
1646001540	300KVA	EA	42.2	25,757	1,646	27,403
1646001550	500KVA	EA	54.3	33,944	2,118	36,061
1646001560	750KVA	EA	59.4	44,619	2,317	46,935
1646001570	1000KVA	EA	63.3	52,412	2,469	54,880
1646001580	1500KVA	EA	70.3	61,026	2,742	63,768
1646001590	2000KVA	EA	76.0	71,679	2,964	74,643
1646001600	2500KVA	EA	95.0	81,524	3,705	85,229
1646001610	Dry Type Transformer, 3P 5KV Primary 277/480V Secondary, 225KVA	EA	34.5	21,653	1,346	22,999
1646001620	300KVA	EA	42.2	25,757	1,646	27,403
1646001630	500KVA	EA	54.3	33,952	2,118	36,070
1646001640	750KVA	EA	59.4	44,610	2,317	46,927
1646001650	1000KVA	EA	63.4	52,412	2,473	54,884
1646001660	1500KVA	EA	70.4	61,026	2,746	63,772
1646001670	2000KVA	EA	76.0	71,679	2,964	74,643
1646001680	2500KVA	EA	95.0	81,524	3,705	85,229
1646001690	Dry Type Transformer, 3P 8.66KV Primary 277/480V Secondary, 225KVA	EA	34.5	23,812	1,346	25,157
1646001700	300KVA	EA	42.2	29,882	1,646	31,528
1646001710	500KVA	EA	54.3	38,561	2,118	40,678
1646001720	750KVA	EA	59.4	48,434	2,317	50,750
1646001730	1000KVA	EA	63.4	55,383	2,473	57,856
1646001740	1500KVA	EA	70.4	63,586	2,746	66,332
1646001750	2000KVA	EA	76.0	71,132	2,964	74,096
1646001760	2500KVA	EA	95.0	82,123	3,705	85,828
1646001770	3000KVA	EA	106	97,620	4,115	101,735
1646001780	Dry Type Transformer, 3P 15KV Primary 277/480V Secondary, 225KVA	EA	34.5	25,864	1,346	27,209
1646001790	300KVA	EA	42.2	32,512	1,646	34,158
1646001800	500KVA	EA	54.3	41,852	2,118	43,970
1646001810	750KVA	EA	59.4	52,519	2,317	54,835
1646001820	1000KVA	EA	63.3	59,893	2,469	62,361
1646001830	1500KVA	EA	70.3	68,922	2,742	71,663
1646001840	2000KVA	EA	76.0	77,121	2,964	80,085
1646001850	2500KVA	EA	95.0	89,006	3,705	92,711
1646001860	3000KVA	EA	106	105,828	4,115	109,943
1646001870	Dry Type Transformer, 3P 480V Delta Primary 208Y/120V Secondary, 3KVA	EA	7.60	1,045	296	1,341
1646001880	6KVA	EA	9.50	1,197	371	1,568
1646001890	9KVA	EA	10.9	1,600	425	2,025
1646001900	15KVA	EA	13.8	2,406	538	2,945
1646001910	30KVA	EA	16.9	2,872	659	3,531
1646001920	45KVA	EA	19.0	5,209	741	5,950
1646001930	75KVA	EA	21.7	5,209	846	6,055
1646001940	112.5KVA	EA	23.4	6,931	913	7,844
1646001950	150KVA	EA	25.0	8,236	975	9,211
1646001960	225KVA	EA	29.2	7,637	1,139	8,776
1646001970	300KVA	EA	34.5	8,161	1,346	9,507
1646001980	500KVA	EA	44.4	17,893	1,732	19,625
1646001990	750KVA	EA	48.6	30,537	1,895	32,432

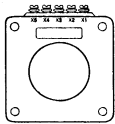
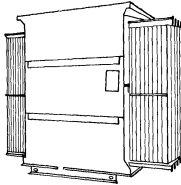
16460	Transformers					
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1646002000	1000KVA	EA	51.8	\$36,830	\$2,020	\$38,850
1646002002	Dry Type Transformer, 3P 480V Delta Primary 208Y/120V Secondary, 15KVA, NEMA3R	EA	14.8	2,449	577	3,026
1646002003	30KVA, NEMA3R	EA	17.9	2,915	698	3,613
1646002004	45KVA, NEMA3R	EA	20.0	5,252	780	6,032
1646002005	75KVA, NEMA3R	EA	23.7	5,371	924	6,296
1646002006	112.5KVA, NEMA3R	EA	25.9	7,094	1,010	8,104
1646002007	150KVA, NEMA3R	EA	28.0	8,607	1,092	9,699
1646002008	225KVA, NEMA3R	EA	32.7	8,009	1,275	9,284
1646002009	300KVA, NEMA3R	EA	38.5	8,836	1,502	10,337
1646002010	500KVA, NEMA3R	EA	48.9	18,791	1,907	20,698
1646002011	750KVA, NEMA3R	EA	53.6	31,542	2,090	33,632
1646002019	Dry Type Transformer, 3P 480V Delta Primary 240V Delta Secondary, 6KVA	EA	9.50	817	371	1,188
1646002020	9KVA	EA	10.9	1,093	425	1,518
1646002030	15KVA	EA	13.8	1,416	538	1,954
1646002040	30KVA	EA	16.9	2,090	659	2,749
1646002050	45KVA	EA	19.0	2,515	741	3,256
1646002060	75KVA	EA	21.7	3,792	846	4,639
1646002070	112.5KVA	EA	23.4	5,045	913	5,957
1646002080	150KVA	EA	25.0	6,588	975	7,563
1646002090	225KVA	EA	29.2	7,640	1,139	8,779
1646002100	300KVA	EA	34.5	8,165	1,346	9,511
1646002110	500KVA	EA	44.4	17,891	1,732	19,623
1646002120	750KVA	EA	48.6	30,537	1,895	32,432
1646002130	1000KVA	EA	51.8	36,830	2,020	38,850
1646002140	Dry Type Transformer, 3P 4W 480V Delta Primary 240/120V Secondary, 30KVA	EA	16.9	2,196	659	2,856
1646002150	45KVA	EA	19.0	2,621	741	3,362
1646002160	75KVA	EA	21.7	3,890	846	4,737
1646002170	112.5KVA	EA	23.4	5,494	913	6,406
1646002180	150KVA	EA	25.0	6,883	975	7,858
1646002190	225KVA	EA	29.2	7,922	1,139	9,061
1646002200	300KVA	EA	34.5	8,452	1,346	9,798
1646002210	500KVA	EA	44.4	18,169	1,732	19,900
1646002220	750KVA	EA	48.6	32,063	1,895	33,958
1646002230	1000KVA	EA	51.8	36,893	2,020	38,913
1646002240	Dry Type Transformer, 3P 600V Primary 208Y/120V Secondary, 6KVA	EA	9.50	868	371	1,239
1646002250	9KVA	EA	10.9	1,688	425	2,113
1646002260	15KVA	EA	13.8	1,723	538	2,262
1646002270	30KVA	EA	16.9	2,309	659	2,968
1646002280	45KVA	EA	19.0	2,753	741	3,494
1646002290	75KVA	EA	21.7	4,092	846	4,938
1646002300	112.5KVA	EA	23.4	5,913	913	6,825
1646002310	150KVA	EA	25.0	7,268	975	8,243
1646002320	225KVA	EA	29.2	7,879	1,139	9,018
1646002330	300KVA	EA	34.5	13,381	1,346	14,726
1646002340	500KVA	EA	44.4	20,349	1,732	22,081
1646002350	750KVA	EA	48.6	30,994	1,895	32,889
1646002360	1000KVA	EA	51.8	37,193	2,020	39,213
1646002370	Isolation Transformer, 1P 120/240V Primary 120/240V Secondary, 1.5KVA	EA	3.80	552	148	700
1646002380	2KVA	EA	4.75	620	185	806
1646002390	3KVA	EA	5.42	672	211	883

16460	Transformers						
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL	
1646002400		5KVA	EA	6.34	\$855	\$247	\$1,102
1646002410		7.5KVA	EA	6.90	1,137	269	1,406
1646002420		10KVA	EA	9.50	1,411	371	1,781
1646002430		15KVA	EA	12.7	1,924	495	2,419
1646002440		25KVA	EA	15.2	2,707	593	3,299
1646002450	Isolation Transformer, 3P 208V Delta Primary 208Y/120V Secondary, 9KVA	EA	10.9	1,638	425	2,063	
1646002460		15KVA	EA	13.8	2,040	538	2,578
1646002470		30KVA	EA	16.9	2,565	659	3,224
1646002480		45KVA	EA	19.0	3,087	741	3,828
1646002490		75KVA	EA	21.7	4,660	846	5,506
1646002500		112.5KVA	EA	23.4	6,498	913	7,411
1646002510		150KVA	EA	25.0	7,652	975	8,627
1646002520		225KVA	EA	29.2	10,239	1,139	11,378
1646002530		300KVA	EA	34.5	13,445	1,346	14,791
1646002540		500KVA	EA	44.4	20,563	1,732	22,294
1646002550	Isolation Transformer, 3P 480V Delta Primary 208Y/120V Secondary, 9KVA	EA	10.9	1,638	425	2,063	
1646002560		15KVA	EA	13.8	2,040	538	2,578
1646002570		30KVA	EA	16.9	2,565	659	3,224
1646002580		45KVA	EA	19.0	3,087	741	3,828
1646002590		75KVA	EA	21.7	4,660	846	5,506
1646002600		112.5KVA	EA	23.4	6,050	913	6,962
1646002610		150KVA	EA	25.0	7,725	975	8,700
1646002620		225KVA	EA	29.2	10,239	1,139	11,378
1646002630		300KVA	EA	34.5	13,445	1,346	14,791
1646002640		500KVA	EA	44.4	20,563	1,732	22,294
1646003500	K Rated Dry Transformer, K13 3P 480V Delta Primary 208Y/120V Secondary, 15KVA	EA	13.8	2,483	538	3,022	
1646003502		30KVA	EA	16.9	3,411	659	4,071
1646003504		45KVA	EA	19.0	4,010	741	4,751
1646003505		75KVA	EA	21.7	5,677	846	6,524
1646003506		112.5KVA	EA	23.4	11,599	913	12,511
1646003508		150KVA	EA	25.0	14,087	975	15,062
1646003510		225KVA	EA	29.2	20,520	1,139	21,659
1646003512		300KVA	EA	34.5	28,870	1,346	30,215
1646003514		500KVA	EA	44.4	44,033	1,732	45,764
1646003520		K Rated Dry Transformer, K13 3P 480V Delta Primary 208Y/120V Secondary, 15KVA 3R	EA	14.8	2,526	577	3,103
1646003522		30KVA 3R	EA	17.9	3,454	698	4,152
1646003524		45KVA 3R	EA	20.0	4,053	780	4,833
1646003526		75KVA 3R	EA	23.7	5,840	924	6,764
1646003528		112.5KVA 3R	EA	25.9	11,761	1,010	12,771
1646003530		150KVA 3R	EA	28.0	14,249	1,092	15,341
1646003532		225KVA 3R	EA	32.7	20,892	1,275	22,168
1646003534		300KVA 3R	EA	38.0	29,544	1,482	31,026
1646003536		500KVA 3R	EA	48.9	44,930	1,907	46,837
1646003600		K Rated Dry Transformer, K4 3P 480V Delta Primary 208Y/120V Secondary, 15KVA	EA	13.8	1,894	538	2,433
1646003602		30KVA	EA	16.9	2,903	659	3,562
1646003604		45KVA	EA	19.0	3,356	741	4,097
1646003605		75KVA	EA	21.7	4,583	846	5,429
1646003606		112.5KVA	EA	23.4	7,631	913	8,544
1646003608		150KVA	EA	25.0	10,111	975	11,086
1646003610		225KVA	EA	29.2	15,369	1,139	16,508

16460	Transformers						
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL	
1646003612	300KVA	EA	34.5	\$21,311	\$1,346	\$22,657	
1646003614	500KVA	EA	44.4	29,455	1,732	31,186	
1646003630	K Rated Dry Transformer, K4 3P 480V Delta Primary 208Y/120V Secondary, 15KVA 3R	EA	14.8	1,937	577	2,514	
1646003632	30KVA 3R	EA	17.9	2,946	698	3,644	
1646003634	45KVA 3R	EA	20.0	3,399	780	4,179	
1646003636	75KVA 3R	EA	23.7	4,745	924	5,670	
1646003638	112.5KVA 3R	EA	25.9	7,794	1,010	8,804	
1646003640	150KVA 3R	EA	28.0	10,482	1,092	11,574	
1646003642	225KVA 3R	EA	32.7	15,741	1,275	17,016	
1646003644	300KVA 3R	EA	38.0	21,986	1,482	23,468	
1646003646	500KVA 3R	EA	48.9	30,353	1,907	32,260	
1646003700	Stainless Steel Dry Transformer, 1P 480V Primary 240Y/120V Secondary, 3KVA 3R	EA	5.40	950	211	1,161	
1646003702	5KVA 3R	EA	6.30	1,368	246	1,614	
1646003704	7.5KVA 3R	EA	6.90	1,475	269	1,744	
1646003706	10KVA 3R	EA	9.50	1,689	371	2,060	
1646003708	15KVA 3R	EA	12.0	2,467	468	2,935	
1646003710	25KVA 3R	EA	15.2	3,399	593	3,992	
1646003750	Stainless Steel Dry Transformer, 3P 480V Primary 208Y/120V Secondary, 3KVA 3R	EA	6.50	1,441	254	1,695	
1646003752	6KVA 3R	EA	9.50	1,740	371	2,111	
1646003754	9KVA 3R	EA	10.9	2,129	425	2,554	
1646003756	15KVA 3R	EA	13.8	2,736	538	3,274	
1646003758	30KVA 3R	EA	16.9	4,608	659	5,268	
1646005000	Oil Filled Transformer, 3P 5KV Primary 277/480V Secondary, 150KVA	EA	30.0	13,124	1,170	14,294	
1646005002	225KVA	EA	36.0	15,903	1,404	17,307	
1646005004	300KVA	EA	44.0	19,687	1,716	21,403	
1646005006	500KVA	EA	50.0	24,731	1,950	26,681	
1646005008	750KVA	EA	53.0	31,550	2,067	33,617	
1646005010	1000KVA	EA	78.0	37,877	3,042	40,919	
1646005012	1500KVA	EA	85.0	46,683	3,315	49,998	
1646005014	2000KVA	EA	95.0	59,316	3,705	63,021	
1646005016	2500KVA	EA	100	68,144	3,900	72,044	
1646005018	3000KVA	EA	115	71,936	4,485	76,421	
1646005020	3750KVA	EA	120	82,080	4,680	86,760	
1646005060	Oil Filled Transformer, 3P 15KV Primary 277/480V Secondary, 150KVA	EA	30.0	13,124	1,170	14,294	
1646005062	225KVA	EA	36.0	15,903	1,404	17,307	
1646005064	300KVA	EA	44.0	19,067	1,716	20,783	
1646005066	500KVA	EA	50.0	24,752	1,950	26,702	
1646005068	750KVA	EA	53.0	31,550	2,067	33,617	
1646005070	1000KVA	EA	78.0	37,877	3,042	40,919	
1646005072	1500KVA	EA	85.0	46,683	3,315	49,998	
1646005074	2000KVA	EA	95.0	59,316	3,705	63,021	
1646005076	2500KVA	EA	100	68,144	3,900	72,044	
1646005078	3000KVA	EA	115	71,936	4,485	76,421	
1646005080	3750KVA	EA	120	82,037	4,680	86,717	
1646005200	Pole Mount Transformer, Dry Type 1P 480V Primary 120/240V Secondary, 5KVA	EA	7.00	616	273	889	
1646005205	10KVA	EA	11.0	954	429	1,383	
1646005210	15KVA	EA	14.0	1,235	546	1,781	
1646005215	25KVA	EA	17.0	1,496	663	2,159	
1646005220	37KVA	EA	21.0	2,074	819	2,893	
1646005225	50KVA	EA	24.0	2,993	936	3,929	



16460	Transformers					
SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1646005230	75KVA	EA	26.0	\$4,053	\$1,014	\$5,067
1646005235	100KVA	EA	28.0	5,237	1,092	6,329
1646005240	167KVA	EA	30.0	7,695	1,170	8,865
1646005500	Pole Mount Transformer, Dry Type 3P 480V Primary 120/240V Secondary, 30KVA	EA	21.0	2,770	819	3,589
1646005505	45KVA	EA	23.0	3,591	897	4,488
1646005510	75KVA	EA	27.0	5,320	1,053	6,373
1646005515	112KVA	EA	30.0	6,270	1,170	7,440
1646005520	150KVA	EA	32.0	7,802	1,248	9,050
1646005525	225KVA	EA	36.0	11,201	1,404	12,605
1646005530	300KVA	EA	42.0	13,680	1,638	15,318
1646005535	500KVA	EA	57.0	20,520	2,223	22,743
1646006000	Silicon Filled Transformer, 3P 5KV Primary 277/480V Secondary, 225KVA	EA	36.0	34,072	1,404	35,476
1646006002	300KVA	EA	44.0	37,877	1,716	39,593
1646006004	500KVA	EA	50.0	42,921	1,950	44,871
1646006006	750KVA	EA	53.0	55,575	2,067	57,642
1646006008	1000KVA	EA	78.0	65,621	3,042	68,663
1646006010	1500KVA	EA	85.0	84,560	3,315	87,875
1646006012	2000KVA	EA	95.0	103,455	3,705	107,160
1646006014	2500KVA	EA	100	118,631	3,900	122,531
1646006100	Silicon Filled Transformer, 3P 15KV Primary 277/480V Secondary, 225KVA	EA	36.0	34,072	1,404	35,476
1646006102	300KVA	EA	44.0	37,877	1,716	39,593
1646006104	500KVA	EA	50.0	42,921	1,950	44,871
1646006106	750KVA	EA	53.0	55,575	2,067	57,642
1646006108	1000KVA	EA	78.0	65,621	3,042	68,663
1646006110	1500KVA	EA	85.0	84,560	3,315	87,875
1646006112	2000KVA	EA	95.0	103,455	3,705	107,160
1646006114	2500KVA	EA	100	118,631	3,900	122,531
1646008000	Current Transformer, Split Core, 400:5A	EA	.500	295	19.50	315
1646008010	500:5A	EA	.500	295	19.50	315
1646008020	600:5A	EA	.500	295	19.50	315
1646008030	800:5A	EA	.500	257	19.50	276
1646008040	1000:5A	EA	.500	287	19.50	306
1646008050	1200:5A	EA	.600	287	23.40	310
1646008060	1500:5A	EA	.600	287	23.40	310
1646008070	1600:5A	EA	.600	287	23.40	310
1646008080	2000:5A	EA	.600	299	23.40	323
1646008090	2500:5A	EA	.700	299	27.30	327
1646008100	3000:5A	EA	.700	321	27.30	348
1646008110	4000:5A	EA	.700	342	27.30	369
1646008120	5000:5A	EA	.700	385	27.30	412
1646008500	Bell & Chime Transformer, 120V Primary 10V Secondary, 5 Watt, Handy Mount	EA	.340	12.83	13.26	26.09
1646008510	15 Watt, w/ 4" Plate	EA	.340	17.96	13.26	31.22
1646008520	15 Watt, Handy Mount	EA	.340	12.83	13.26	26.09



ELECTRICAL ASSEMBLIES

Z1000 GENERAL REQUIREMENTS

Z1030 Temporary Facilities

005 Temporary Power & Light	390
-----------------------------------	-----

G4000 SITE ELECTRICAL UTILITIES

G4013 Ductbanks

005 Ductbank, Feeders by Amps, 3Ø, 3 & 4W, PVC 40, Incl Civil	392
010 Ductbank, Feeders by Amps, 3Ø, 3 & 4W, PVC 80, Incl Civil	394
020 Ductbank, Feeders by Amps, 3Ø, 3 & 4W, PVC 40, Less Civil.....	396
025 Ductbank, Feeders by Amps, 3Ø, 3 & 4W, PVC 80, Less Civil.....	398
030 Ductbank, PVC Schedule 40, Including Civil Work, Less Wire	400
035 Ductbank, PVC Schedule 80, Including Civil Work, Less Wire	401
040 Ductbank, PVC EB-20, Including Civil Work, Less Wire	402
045 Ductbank, PVC EB-35, Including Civil Work, Less Wire	403
050 Ductbank, PVC DB-60, Including Civil Work, Less Wire	404
055 Ductbank, PVC DB-120, Including Civil Work, Less Wire	405
060 Ductbank, PVC Schedule 40, Conduit & Spacers Only	406
065 Ductbank, PVC Schedule 80, Conduit & Spacers Only	407
070 Ductbank, PVC EB-20, Conduit & Spacers Only	408
075 Ductbank, PVC EB-35, Conduit & Spacers Only	409
080 Ductbank, PVC DB-60, Conduit & Spacers Only	410
085 Ductbank, PVC DB-120, Conduit & Spacers Only	411
090 Ductbank Breakout, Civil Work Complete	412
095 Ductbank Breakout, Excavating & Backfill Only	413
100 Ductbank Breakout, Concrete, Forms & Placing	414

D5010 ELECTRICAL SERVICE & DISTRIBUTION

D5012 Secondary Transformers

005 Dry Transformers, 3Ø 480V Primary, 120/208V Secondary, Using EMT, NEMA1.....	415
010 Dry Transformers, 3Ø 480V Primary, 120/208V Secondary, Using EMT, NEMA3R.....	417
020 Dry Transformers, 3Ø 480V Pri., 120/208V Sec., Using EMT, K-4 Rated, NEMA1.....	419
025 Dry Transformers, 3Ø 480V Pri., 120/208V Sec., Using EMT, K-4 Rated, NEMA3R.....	421
030 Dry Transformers, 3Ø 480V Pri., 120/208V Sec., Using EMT, K-13 Rated, NEMA1.....	423
035 Dry Transformers, 3Ø 480V Pri., 120/208V Sec., Using EMT, K-13 Rated, NEMA3R.....	425

D5013 Main Switchboards

005 Switchboard Lineup, 120/240V 3Ø 4-Wire, no Branch Breakers	427
010 Switchboard Lineup, 120/240V 3Ø 4-Wire, w/ Branch Breakers	428
015 Switchboard Lineup, 277/480V 3Ø 4-Wire, no Branch Breakers	429
020 Switchboard Lineup, 277/480V 3Ø 4-Wire, w/ Branch Breakers	430

D5018 Service & Panelboard Feeders

005 Feeders by Amps, 3Ø 3-Wire, Aluminum Conduit on Wall	431
010 Feeders by Amps, 3Ø 4-Wire, Aluminum Conduit on Wall	433
020 Feeders by Amps, 3Ø 3-Wire, Aluminum Conduit on Ceiling	435
025 Feeders by Amps, 3Ø 4-Wire, Aluminum Conduit on Ceiling	437
030 Feeders by Amps, 3Ø 3-Wire, Aluminum Conduit in Slab	439
035 Feeders by Amps, 3Ø 4-Wire, Aluminum Conduit in Slab	441
040 Feeders by Amps, 3Ø 3-Wire, Aluminum Conduit in Trench	443
045 Feeders by Amps, 3Ø 4-Wire, Aluminum Conduit in Trench	445
050 Feeders by Amps, 3Ø 3-Wire, EMT on Wall	447
055 Feeders by Amps, 3Ø 4-Wire, EMT on Wall	449
060 Feeders by Amps, 3Ø 3-Wire, EMT on Ceiling	451
065 Feeders by Amps, 3Ø 4-Wire, EMT on Ceiling	453
070 Feeders by Amps, 3Ø 3-Wire, EMT in Slab	455
075 Feeders by Amps, 3Ø 4-Wire, EMT in Slab	457
080 Feeders by Amps, 3Ø 3-Wire, IMC Conduit on Wall.....	459
085 Feeders by Amps, 3Ø 4-Wire, IMC Conduit on Wall.....	461
090 Feeders by Amps, 3Ø 3-Wire, IMC Conduit on Ceiling.....	463
095 Feeders by Amps, 3Ø 4-Wire, IMC Conduit on Ceiling.....	465
100 Feeders by Amps, 3Ø 3-Wire, IMC Conduit in Slab	467
105 Feeders by Amps, 3Ø 4-Wire, IMC Conduit in Slab	469

ELECTRICAL ASSEMBLIES

D5018 Service & Panelboard Feeders (continued)

110	Feeders by Amps, 3Ø 3-Wire, IMC Conduit in Trench.....	471
115	Feeders by Amps, 3Ø 4-Wire, IMC Conduit in Trench.....	473
120	Feeders by Amps, 3Ø 3-Wire, PVC Schedule 40 on Wall.....	475
125	Feeders by Amps, 3Ø 4-Wire, PVC Schedule 40 on Wall.....	477
130	Feeders by Amps, 3Ø 3-Wire, PVC Schedule 40 on Ceiling.....	479
135	Feeders by Amps, 3Ø 4-Wire, PVC Schedule 40 on Ceiling.....	481
140	Feeders by Amps, 3Ø 3-Wire, PVC Schedule 40 in Slab.....	483
145	Feeders by Amps, 3Ø 4-Wire, PVC Schedule 40 in Slab.....	485
150	Feeders by Amps, 3Ø 3-Wire, PVC Schedule 80 on Wall.....	487
155	Feeders by Amps, 3Ø 4-Wire, PVC Schedule 80 on Wall.....	489
160	Feeders by Amps, 3Ø 3-Wire, PVC Schedule 80 on Ceiling.....	491
165	Feeders by Amps, 3Ø 4-Wire, PVC Schedule 80 on Ceiling.....	493
170	Feeders by Amps, 3Ø 3-Wire, PVC Schedule 80 in Slab.....	495
175	Feeders by Amps, 3Ø 4-Wire, PVC Schedule 80 in Slab.....	497
180	Feeders by Amps, 3Ø 3-Wire, PVC Coated Galvanized Steel on Wall.....	499
185	Feeders by Amps, 3Ø 4-Wire, PVC Coated Galvanized Steel on Wall.....	501
190	Feeders by Amps, 3Ø 3-Wire, PVC Coated Galvanized Steel on Ceiling.....	503
195	Feeders by Amps, 3Ø 4-Wire, PVC Coated Galvanized Steel on Ceiling.....	505
200	Feeders by Amps, 3Ø 3-Wire, PVC Coated Galvanized Steel in Slab.....	507
205	Feeders by Amps, 3Ø 4-Wire, PVC Coated Galvanized Steel in Slab.....	509
210	Feeders by Amps, 3Ø 3-Wire, Galvanized Steel on Wall.....	511
215	Feeders by Amps, 3Ø 4-Wire, Galvanized Steel on Wall.....	513
220	Feeders by Amps, 3Ø 3-Wire, Galvanized Steel on Ceiling.....	515
225	Feeders by Amps, 3Ø 4-Wire, Galvanized Steel on Ceiling.....	517
230	Feeders by Amps, 3Ø 3-Wire, Galvanized Steel in Slab.....	519
235	Feeders by Amps, 3Ø 4-Wire, Galvanized Steel in Slab.....	521

D5020 Lighting Branch & Equipment Wiring

D5024 Switches & Branch Wiring

005	Residential Switch, Romex & Plastic Box, Specification Grade.....	523
010	Residential Switch, Romex & Plastic Box, Residential Grade.....	525
020	Residential Switch, Romex & Steel Box, Specification Grade.....	527
025	Residential Switch, Romex & Steel Box, Residential Grade.....	529
030	Residential Switch, BX & Steel Box, Specification Grade.....	531
035	Residential Switch, BX & Steel Box, Residential Grade.....	534

D5025 Receptacles & Branch Wiring

115	Commercial Receptacle, Duplex 15A, Surface, EMT.....	537
120	Commercial Receptacle, Duplex 20A, Surface, EMT.....	539
123	Commercial Receptacle, Duplex 15A, Surface, RGS.....	541
125	Commercial Receptacle, Duplex 20A, Surface, RGS.....	543
127	Commercial Receptacle, Duplex 15A, Recessed, EMT.....	545
130	Commercial Receptacle, Duplex 20A, Recessed, EMT.....	547
148	Commercial Receptacle, Duplex 15A, Recessed, HCF-90.....	549
150	Commercial Receptacle, Duplex 20A, Recessed, HCF-90.....	551
205	Commercial Receptacle, Duplex 15A, Recessed, MC.....	553
210	Commercial Receptacle, Duplex 20A, Recessed, MC.....	555

D5027 Motor Control & Wiring

005	Motor Wiring, 3Ø 3-Wire 208V, Using Combination Starter, NEMA1.....	557
010	Motor Wiring, 3Ø 3-Wire 208V, Using Combination Starter, NEMA3R.....	559
020	Motor Wiring, 3Ø 3-Wire 480V, Using Combination Starter, NEMA1.....	561
025	Motor Wiring, 3Ø 3-Wire 480V, Using Combination Starter, NEMA3R.....	563
030	Motor Wiring, 1Ø 2-Wire 208V, Using Magnetic Starter & Safety Switch, NEMA1.....	565
035	Motor Wiring, 1Ø 2-Wire 208V, Using Magnetic Starter & Safety Switch, NEMA3R.....	567
040	Motor Wiring, 3Ø 3-Wire 208V, Using Magnetic Starter & Safety Switch, NEMA1.....	569
045	Motor Wiring, 3Ø 3-Wire 208V, Using Magnetic Starter & Safety Switch, NEMA3R.....	571
050	Motor Wiring, 3Ø 3-Wire 480V, Using Magnetic Starter & Safety Switch, NEMA1.....	573
055	Motor Wiring, 3Ø 3-Wire 480V, Using Magnetic Starter & Safety Switch, NEMA3R.....	575

D5028 Branch Wiring

010	Common Branch Circuits, Using EMT.....	577
-----	--	-----

D5013

Switchboard Lineup, 120/240V 3Ø 4-Wire, Incl. Distribution Breakers

010

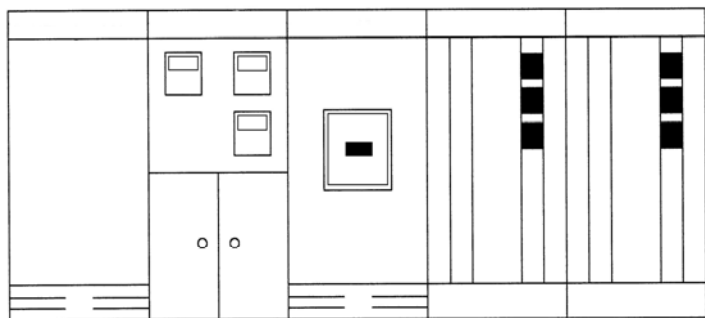
Assembly Logic:

All the assemblies below include an auxiliary pull section, metering and CT compartment, main breaker section (including the main breaker), one, two or three distribution sections with three (3) 250A frame breakers in each distribution section (panelboard), and a variety of measuring instruments.

The labor for each assembly includes moving equipment from the delivery point to the service entry location (up to 100 feet), assembling equipment and terminating wire on lugs or breakers.

Use feeders in assembly section *D5018 Service & Panelboard Feeders* to add to these assemblies.

For additional breakers in the distribution section, go to *Division 16400 Service & Distribution* in the unit cost section of this book.



SWITCHBOARD LINEUP, 120/240V 3Ø 4-WIRE		PRICE PER EACH (EA)					
MODEL COMPONENTS		QUAN	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
Switchboard, 120/240V 3Ø 4W w/(2) Distribution Section & (6) Breakers, 2000A							
Switchboard Auxiliary Section, Pull Type, 36" Wide, for 2000A		1	EA	11.0	\$1,623	\$429	2,052
Switchboard Utility Section, Metering & CT Compartment 240V 3P 4W, 2000A		1	EA	11.6	2,083	454	2,537
Switchboard Main Breaker Section, w/ Thermal Breaker 240V 3P, 65K 80%, 2000A		1	EA	22.0	10,102	858	10,960
Switchboard Distribution Section, 240V 3P 4W Nema1, CU Bus, 2000A		2	EA	44.0	9,302	1,716	11,018
Switchboard Distribution Section Breaker, 240V 3P, 65K AIC 225A		6	EA	9.36	8,866	365	9,231
Switchboard Instrument, Current Transformer (3) for 240V 4W, 2000A		1	EA	2.00	2,786	78.00	2,864
Switchboard Instrument, Potential Transformer, 240V 4W		1	EA	2.00	2,665	78.00	2,743
Switchboard Instrument, AC, Ammeter & Switch		1	EA	3.00	1,526	117	1,643
Switchboard Instrument, AC, Voltmeter Switch		1	EA	3.00	1,526	117	1,643
Switchboard Instrument, AC, Wattmeter		1	EA	3.00	2,666	117	2,783
TOTAL				111	\$43,145	\$4,329	\$47,474

010	SWITCHBOARD LINEUP, 120/240V 3Ø 4-WIRE	PRICE PER EACH (EA)				
ASSEMBLY NO.	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
3010010	Switchboard, 120/240V 3Ø 4-Wire w/(1) Distribution Section(s) & (3) Branch Bkrs, 800A	EA	66.0	\$25,897	\$2,574	\$28,471
3010015	w/(2) Distribution Section(s) & (6) Branch Bkrs, 800A	EA	87.0	33,431	3,393	36,824
3010020	w/(3) Distribution Section(s) & (9) Branch Bkrs, 800A	EA	108	40,964	4,212	45,176
3010025	w/(1) Distribution Section(s) & (3) Branch Bkrs, 1200A	EA	72.0	29,555	2,808	32,363
3010030	w/(2) Distribution Section(s) & (6) Branch Bkrs, 1200A	EA	95.0	37,597	3,705	41,302
3010035	w/(3) Distribution Section(s) & (9) Branch Bkrs, 1200A	EA	118	45,640	4,602	50,242
3010040	w/(1) Distribution Section(s) & (3) Branch Bkrs, 1600A	EA	78.0	32,462	3,042	35,504
3010045	w/(2) Distribution Section(s) & (6) Branch Bkrs, 1600A	EA	103	41,037	4,017	45,054
3010050	w/(3) Distribution Section(s) & (9) Branch Bkrs, 1600A	EA	128	49,613	4,992	54,605
3010055	w/(1) Distribution Section(s) & (3) Branch Bkrs, 2000A	EA	84.0	34,060	3,276	37,336
3010060	Switchboard, 120/240V 3Ø 4-Wire w/(2) Distribution Section(s) & (6) Branch Bkrs, 2000A	EA	111	43,145	4,329	47,474
3010065	w/(3) Distribution Section(s) & (9) Branch Bkrs, 2000A	EA	138	52,229	5,382	57,611
3010070	w/(1) Distribution Section(s) & (3) Branch Bkrs, 2500A	EA	93.0	36,774	3,627	40,401
3010075	w/(2) Distribution Section(s) & (6) Branch Bkrs, 2500A	EA	121	46,633	4,719	51,352
3010080	w/(3) Distribution Section(s) & (9) Branch Bkrs, 2500A	EA	150	56,493	5,850	62,343
3010085	w/(1) Distribution Section(s) & (3) Branch Bkrs, 3000A	EA	101	56,565	3,939	60,504
3010090	w/(2) Distribution Section(s) & (6) Branch Bkrs, 3000A	EA	131	67,588	5,109	72,697
3010095	w/(3) Distribution Section(s) & (9) Branch Bkrs, 3000A	EA	162	78,610	6,318	84,928
3010100	w/(1) Distribution Section(s) & (3) Branch Bkrs, 4000A	EA	115	72,796	4,485	77,281
3010100	w/(2) Distribution Section(s) & (6) Branch Bkrs, 4000A	EA	147	85,224	5,733	90,957
3010105	w/(3) Distribution Section(s) & (9) Branch Bkrs, 4000A	EA	184	97,651	7,176	104,827

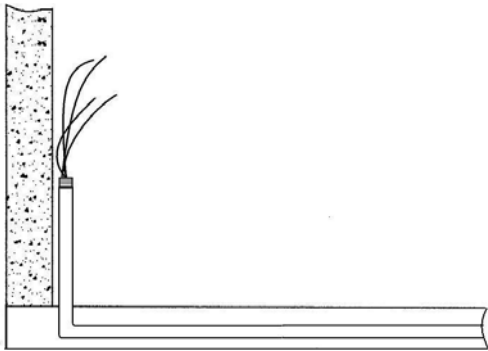
D5018

Feeders by Amps, 3Ø 3-Wire, EMT in Slab

070

Assembly Logic:

Feeders in this section range from 15 to 4,000 amps using EMT conduit and THHN wire installed in a concrete slab. The model assembly below illustrates the level of detail that is contained in each of the assemblies in this section although the materials and labor vary significantly.



The assembly description includes the amperage value for each feeder along with the number of conduits required for that amperage rating and the number of each type of wire in the conduit. For instance, the 4,000 Amp feeder requires ten 4" conduits each containing three #500MCM phase wires and one #500MCM ground wire totaling thirty phase wires and ten #500MCM ground wires. The totals are shown in parentheses within the conduit and wire description.

All costs are based on the material and labor required to complete a 100' run with 5% added to wire length for leads. The conduit run changes direction twice using field bends or manufactured sweeps.

THREE PHASE, THREE (3) WIRE + Ground		PRICE PER 100 LINEAR FEET (CLF)					
MODEL COMPONENTS		QUAN	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
400A, 3-Phase 3-Wire, (1) 4" EMT, w/ (3) # 500MCM & (1) # 3G							
Conduit, EMT in Slab or Trench, Add Couplings & Support, 4"		100	LF	12.0	\$575	\$468	\$1,043
Conduit Coupling, Steel Compression for EMT, Material Only, 4"		10	EA		1,133		1,133
Conduit Elbow, EMT Manufactured, 4"		2	EA	2.52	236	98.28	334
Conduit Connector, Steel Compression for EMT, 4"		2	EA	.950	192	37.05	229
Conduit Support, Plastic Tie, Standard 9" Long		10	EA		8.00		8.00
Wire, Copper THHN, 600V, Stranded, #3		105	LF	1.26	105	49.14	154
Wire, Copper THHN, 600V, Stranded, #500MCM		315	LF	11.8	2,756	461	3,217
		PER C.L.F.		28.5	\$5,005	\$1,113	\$6,118
		PER L.F.		.285	\$50.05	\$11.13	\$61.18

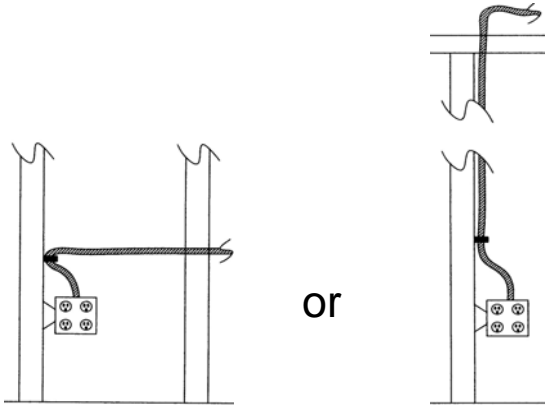
070		THREE PHASE, THREE (3) WIRE + Ground		PRICE PER 100 LINEAR FEET (CLF)				
ASSEMBLY NO.	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL		
1001000	15A, 3-Phase 3-Wire, (1) 1/2" EMT, w/ (3) # 14 & (1) # 14G	CLF	4.26	\$91.00	\$166	\$257		
1001005	20A, 3-Phase 3-Wire, (1) 1/2" EMT, w/ (3) # 12 & (1) # 12G	CLF	5.09	106.00	198	304		
1001010	25A, 3-Phase 3-Wire, (1) 1/2" EMT, w/ (3) # 10 & (1) # 10G	CLF	5.32	131	208	339		
1001015	30A, 3-Phase 3-Wire, (1) 1/2" EMT, w/ (3) # 10 & (1) # 10G	CLF	5.32	131	208	339		
1001020	35A, 3-Phase 3-Wire, (1) 3/4" EMT, w/ (3) # 8 & (1) # 10G	CLF	6.26	206	244	450		
1001025	40A, 3-Phase 3-Wire, (1) 3/4" EMT, w/ (3) # 8 & (1) # 10G	CLF	6.26	206	244	450		
1001030	45A, 3-Phase 3-Wire, (1) 3/4" EMT, w/ (3) # 6 & (1) # 10G	CLF	6.82	270	266	536		
1001035	50A, 3-Phase 3-Wire, (1) 3/4" EMT, w/ (3) # 6 & (1) # 10G	CLF	6.82	270	266	536		
1001040	60A, 3-Phase 3-Wire, (1) 3/4" EMT, w/ (3) # 6 & (1) # 10G	CLF	6.82	270	266	536		
1001045	70A, 3-Phase 3-Wire, (1) 1" EMT, w/ (3) # 4 & (1) # 10G	CLF	8.26	415	322	737		
1001050	80A, 3-Phase 3-Wire, (1) 1-1/4" EMT, w/ (3) # 3 & (1) # 8G	CLF	9.56	609	373	982		
1001055	90A, 3-Phase 3-Wire, (1) 1-1/4" EMT, w/ (3) # 3 & (1) # 8G	CLF	9.56	609	373	982		
1001060	100A, 3-Phase 3-Wire, (1) 1-1/2" EMT, w/ (3) # 1 & (1) # 6G	CLF	11.3	904	440	1,344		
1001065	110A, 3-Phase 3-Wire, (1) 1-1/2" EMT, w/ (3) # 1 & (1) # 6G	CLF	11.3	904	440	1,344		
1001070	125A, 3-Phase 3-Wire, (1) 1-1/2" EMT, w/ (3) # 1 & (1) # 6G	CLF	11.3	904	440	1,344		
1001075	150A, 3-Phase 3-Wire, (1) 1-1/2" EMT, w/ (3) # 1/0 & (1) # 6G	CLF	12.3	1,012	478	1,490		
1001080	175A, 3-Phase 3-Wire, (1) 1-1/2" EMT, w/ (3) # 2/0 & (1) # 6G	CLF	13.2	1,168	514	1,682		
1001085	200A, 3-Phase 3-Wire, (1) 2" EMT, w/ (3) # 3/0 & (1) # 6G	CLF	15.1	1,441	588	2,029		
1001090	225A, 3-Phase 3-Wire, (1) 2-1/2" EMT, w/ (3) # 4/0 & (1) # 6G	CLF	18.1	2,277	708	2,985		
1001095	250A, 3-Phase 3-Wire, (1) 2-1/2" EMT, w/ (3) #250 & (1) # 4G	CLF	19.3	2,531	754	3,285		
1001100	300A, 3-Phase 3-Wire, (1) 3" EMT, w/ (3) #350 & (1) # 4G	CLF	22.8	3,453	890	4,343		
1001105	350A, 3-Phase 3-Wire, (1) 4" EMT, w/ (3) #500 & (1) # 3G	CLF	28.5	5,005	1,113	6,118		

D5018	Feeders by Amps, 3Ø 3-Wire, EMT in Slab								
070	THREE PHASE, THREE (3) WIRE + Ground				PRICE PER 100 LINEAR FEET (CLF)				
ASSEMBLY NO.	DESCRIPTION				UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1001105	400A, 3-Phase 3-Wire, (1)	4" EMT, w/ (3) #500 & (1) # 3G			CLF	28.5	\$5,005	\$1,113	\$6,118
1001110	450A, 3-Phase 3-Wire, (2)	3" EMT, w/ (6) # 4/0 & (2) # 2G			CLF	42.3	5,418	1,649	7,067
1001115	500A, 3-Phase 3-Wire, (2)	3" EMT, w/ (6) #250 & (2) # 2G			CLF	44.2	5,864	1,723	7,587
1001120	600A, 3-Phase 3-Wire, (2)	3" EMT, w/ (6) #350 & (2) # 1G			CLF	46.4	7,070	1,810	8,880
1001125	700A, 3-Phase 3-Wire, (2)	3-1/2"EMT, w/ (6) #500 & (2) #1/0G			CLF	55.2	10,068	2,153	12,221
1001130	800A, 3-Phase 3-Wire, (2)	3-1/2"EMT, w/ (6) #600 & (2) #1/0G			CLF	60.4	11,181	2,355	13,536
1001135	900A, 3-Phase 3-Wire, (3)	3"EMT, w/ (9) #600 & (2) #2/0G			CLF	71.5	10,868	2,790	13,658
1001140	1000A, 3-Phase 3-Wire, (3)	3-1/2"EMT, w/ (9) #500 & (3) #2/0G			CLF	82.7	15,007	3,227	18,234
1001145	1200A, 3-Phase 3-Wire, (3)	4"EMT, w/ (9) #600 & (3) #3/0G			CLF	97.2	17,327	3,791	21,118
1001150	1600A, 3-Phase 3-Wire, (4)	4"EMT, w/ (12)#600 & (4) #3/0G			CLF	130	23,104	5,055	28,159
1001155	2000A, 3-Phase 3-Wire, (5)	4"EMT, w/ (15)#600 & (5) #3/0G			CLF	162	28,880	6,318	35,198
1001160	2500A, 3-Phase 3-Wire, (6)	4"EMT, w/ (18)#600 & (6) #3/0G			CLF	192	34,323	7,483	41,806
1001165	3000A, 3-Phase 3-Wire, (8)	4"EMT, w/ (24)#500 & (8) #500G			CLF	250	46,552	9,741	56,293
1001170	3200A, 3-Phase 3-Wire, (8)	4"EMT, w/ (24)#600 & (8) #500G			CLF	271	51,002	10,552	61,554
1001175	4000A, 3-Phase 3-Wire, (10)	4"EMT, w/ (30)#500 & (10)#500G			CLF	337	63,358	13,124	76,482
Additional Notes									

D5025

Commercial Receptacle, Duplex 20A, Recessed, HCF-90 Cable

150



Assembly Logic:

The assemblies below offer a 10' or 20' branch option. The 10' branch is used when you do not intend to measure the horizontal branch between each receptacle and is used as a vertical drop. This option can also be used when the distance between receptacles is determined to be closer than normal and the branch is run horizontally through metal or wood studs.

Use the 20' branch option when running cable horizontally through wood or metal studs and no vertical drop is required.

A two or three wire branch cable is offered. The three cable option is used on split neutral circuits where one of the wires is used to carry through to a second circuit or when the receptacle is switched.

RECEPTACLE, COMMERCIAL GRADE NEMA 5-20R & HCF-90		PRICE PER EACH (EA)				
MODEL COMPONENTS	QUAN	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
Duplex, 125V 3-W NEMA 5-20R, (2) Standard, 2-Gang, w/ 20' Branch, #12/3						
Receptacle, Duplex 20A 125V 3W, NEMA 5-20R, Ivory, Side Wire w/ Grnd Term.	2	EA	.500	\$13.52	\$19.50	\$33.02
Receptacle Plate, Stainless for Duplex, Type 302, 2-Gang	1	EA	.100	2.99	3.90	6.89
Outlet Box, Steel Square, 4" x 2-1/8" Deep, for MC, w/ Mounting Bracket	1	EA	.300	8.50	11.70	20.20
Outlet Box Plaster Ring, Steel Square, 4", Square to 2-gang, 5/8" Deep	1	EA	.140	2.40	5.46	7.86
Armored Cable, Copper Type HCF-90 Hospital Grade, 3-Conductor, #12-3	20	LF	.643	26.46	25.08	51.54
Armored Cable Tie, Nylon, for BX, MC & HCF-90, Standard 4"	2	EA	.050	.75	1.95	2.70
Cable Termination, Wire Nut Spring Type, 74B Large - Yellow	4	EA	.040	.45	1.56	2.01
Fastener, Sheet Metal Screw, Pan Head, 12 x 1"	2	EA	.200	.08	7.80	7.88
TOTAL			1.97	\$55.15	\$76.95	\$132

150	RECEPTACLE, COMMERCIAL GRADE NEMA 5-20R & HCF-90	PRICE PER EACH (EA)				
ASSEMBLY NO.	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
2010010	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (1) Standard, 1-Gang, w/ 10' Branch, #12/2	EA	1.27	\$28.42	\$49.53	\$77.95
2010015	(1) Standard, 1-Gang, w/ 20' Branch, #12/2	EA	1.56	37.49	60.84	98.33
2010020	(2) Standard, 2-Gang, w/ 10' Branch, #12/2	EA	1.59	37.77	62.01	99.78
2010025	(2) Standard, 2-Gang, w/ 20' Branch, #12/2	EA	1.87	46.84	72.93	120
2010030	(1) Standard, 1-Gang, w/ 10' Branch, #12/3	EA	1.32	32.71	51.48	84.19
2010035	(1) Standard, 1-Gang, w/ 20' Branch, #12/3	EA	1.65	45.68	64.35	110
2010040	(2) Standard, 2-Gang, w/ 10' Branch, #12/3	EA	1.64	42.17	63.96	106
2010045	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (2) Standard, 2-Gang, w/ 20' Branch, #12/3	EA	1.97	55.15	76.95	132
2010050	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (1) GFCI, 1-Gang, w/ 10' Branch, #12/2	EA	1.32	54.75	51.48	106
2010055	(1) GFCI, 1-Gang, w/ 20' Branch, #12/2	EA	1.61	63.83	62.79	127
2010060	(2) GFCI, 2-Gang, w/ 10' Branch, #12/2	EA	1.69	90.44	65.91	156
2010065	(2) GFCI, 2-Gang, w/ 20' Branch, #12/2	EA	1.97	99.52	76.83	176
2010070	(1) GFCI, 1-Gang, w/ 10' Branch, #12/3	EA	1.37	59.04	53.43	112
2010075	(1) GFCI, 1-Gang, w/ 20' Branch, #12/3	EA	1.70	72.02	66.30	138
2010080	(2) GFCI, 2-Gang, w/ 10' Branch, #12/3	EA	1.74	94.85	67.86	163
2010085	(2) GFCI, 2-Gang, w/ 20' Branch, #12/3	EA	2.07	107.82	80.73	189
2010090	Duplex Receptacle, 125V 3-W, NEMA5-20R, (1) TVSS, 1-Gang, w/ 10' Branch, #12/2	EA	1.27	56.10	49.53	105.63
2010095	(1) TVSS, 1-Gang, w/ 20' Branch, #12/2	EA	1.56	65.18	60.84	126.02
2010100	(2) TVSS, 2-Gang, w/ 10' Branch, #12/2	EA	1.59	93.14	62.01	155.15
2010105	(2) TVSS, 2-Gang, w/ 20' Branch, #12/2	EA	1.87	102.22	72.93	175.15
2010110	(1) TVSS, 1-Gang, w/ 10' Branch, #12/3	EA	1.32	60.39	51.48	111.87
2010115	(1) TVSS, 1-Gang, w/ 20' Branch, #12/3	EA	1.65	73.37	64.35	137.72

D5025

Commercial Receptacles, Duplex 20A, Recessed, HCF-90 Cable

150	RECEPTACLE, COMMERCIAL GRADE NEMA 5-20R & HCF-90	PRICE PER EACH (EA)				
ASSEMBLY NO.	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
2010120	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (2) TVSS, 2-Gang, w/ 10' Branch, #12/3	EA	1.64	\$97.55	\$63.96	\$162
2010125	↓ (2) TVSS, 2-Gang, w/ 20' Branch, #12/3	EA	1.97	111	76.83	187.35
2010130	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (1) Hospital Grade, 1-Gang, 10' Branch, #12/2	EA	1.27	35.31	49.53	84.84
2010135	↓ (1) Hospital Grade, 1-Gang, 20' Branch, #12/2	EA	1.56	44.39	60.84	105
2010140	↓ (2) Hospital Grade, 2-Gang, 10' Branch, #12/2	EA	1.59	51.56	62.01	114
2010145	↓ (2) Hospital Grade, 2-Gang, 20' Branch, #12/2	EA	1.87	60.64	72.93	134
2010150	↓ (1) Hospital Grade, 1-Gang, 10' Branch, #12/3	EA	1.32	39.60	51.48	91.08
2010155	↓ (1) Hospital Grade, 1-Gang, 20' Branch, #12/3	EA	1.65	52.58	64.35	117
2010160	↓ (2) Hospital Grade, 2-Gang, 10' Branch, #12/3	EA	1.64	55.96	63.96	120
2010165	↓ (2) Hospital Grade, 2-Gang, 20' Branch, #12/3	EA	1.97	68.94	76.83	146
2010170	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (1) Isolated Ground, 1-Gang, 10' Branch, #12/2	EA	1.27	39.73	49.53	89.26
2010175	↓ (1) Isolated Ground, 1-Gang, 20' Branch, #12/2	EA	1.56	48.81	60.84	110
2010180	↓ (2) Isolated Ground, 2-Gang, 10' Branch, #12/2	EA	1.59	60.40	62.01	122
2010185	↓ (2) Isolated Ground, 2-Gang, 20' Branch, #12/2	EA	1.87	69.47	72.93	142
2010190	↓ (1) Isolated Ground, 1-Gang, 10' Branch, #12/3	EA	1.32	44.02	51.48	95.50
2010195	↓ (1) Isolated Ground, 1-Gang, 20' Branch, #12/3	EA	1.65	57.00	64.35	121
2010200	↓ (2) Isolated Ground, 2-Gang, 10' Branch, #12/3	EA	1.64	64.80	63.96	129
2010205	↓ (2) Isolated Ground, 2-Gang, 20' Branch, #12/3	EA	1.97	77.78	76.83	155
2010210	Duplex Receptacle, 125V 3-W, NEMA 5-20R, (1) Child Safe, 1-Gang, w/ 10' Branch, #12/2	EA	1.27	40.07	49.53	89.60
2010215	↓ (1) Child Safe, 1-Gang, w/ 20' Branch, #12/2	EA	1.56	49.14	60.84	110
2010220	↓ (2) Child Safe, 2-Gang, w/ 10' Branch, #12/2	EA	1.59	61.07	62.01	123
2010225	↓ (2) Child Safe, 2-Gang, w/ 20' Branch, #12/2	EA	1.87	70.14	72.93	143
2010230	↓ (1) Child Safe, 1-Gang, w/ 10' Branch, #12/3	EA	1.32	44.36	51.48	95.84
2010235	↓ (1) Child Safe, 1-Gang, w/ 20' Branch, #12/3	EA	1.65	57.33	64.35	122
2010240	↓ (2) Child Safe, 2-Gang, w/ 10' Branch, #12/3	EA	1.64	65.47	63.96	129
2010245	↓ (2) Child Safe, 2-Gang, w/ 20' Branch, #12/3	EA	1.97	78.45	76.83	155

Additional Notes

Note 1: The feed or home run from the panelboard is not included in the assembly calculation.

Note 2: All labor is based on \$38.00 per MH.

APPENDIX: TABLES & CHARTS

Device Configuration Chart	585
Metric Conversion Chart	587
Comparison of Drawing Scales	588
Maximum Number of Conductors in Conduit or EMT	589
Ampacities of Insulated Conductors	592
Wire Capacity of Standard Boxes	594
Electrical Formulas	595
System Grounding Conductor Sizes	596
Full Load Motor Current	597
Transformer Current Capacity	599
Transformer Wiring Schedule	601
Dry Type Transformer Wiring Schedule	602
Dry Transformer Dimensions & Weights	603
NEMA Starter Sizes	604
Generator Rating Guide	605
3 Phase Circuit Schedule	608
Manhour Conversion Table	609
Labor Rates	610

METRIC CONVERSION CHART

Conductors & Conduit

Conductors			Conduit	
MCM/AWG	MM ² Equiv.	Std. MM ²	Inches	MM
500	253.35	300	6"	155
400	202.71	240	5"	129
350	177	185	4"	103
300	152	150	3-1/2"	91
250	126.64	150	3"	78
4/0	107.2	120	2-1/2"	63
3/0	85.03	95	2"	53
2/0	67.43	70	1-1/2"	41
1/0	53.48	70	1-1/4"	35
1	42.42	50	1"	27
2	33.63	35	3/4"	21
4	21.15	25	1/2"	16
6	13.3	16		
8	8.37	10		
10	5.26	6		
12	3.31	4		
14	2.08	2.5		
16	1.31	1.5		
18	0.82	1		

Metric Length Equivalents

1 inch (in)		=2.54 cm	1 centimeter	=.3937 in
1 foot (ft)	=12 in	=.3048 m	1 decimeter	=3.937 in
1 yard (yd)	=3 ft	=.9144 m	1 decimeter	=.328 ft
1 mile	=5280 ft	=1.6093 km	1 meter	=39.37 in
1 mile	=1760 yd	=1.6093 km	1 meter	=3.281 ft
1 nautical mile	=6083 ft	=1.853 km	1 meter	=1.0936 yds
1 nautical mile	=2028 yd	=1.853 km	1 kilometer	=.62137 mi

COMPARISON OF DRAWING SCALES

Metric Scales Vs Customary Ratios & Scales

Metric Scales	Customary Ratio	Customary Scales
1:5 1:10 1:20	1:4 1:8 1:12 1:16	3"=1'0" 1-1/2"=1'0" 1"=1'0" 3/4"=1'0"
1:50 1:100 1:200	1:24 1:48 1:96 1:192	1/2"=1'0" 1/4"=1'0" 1/8"=1'0" 1/16"=1'0"
1:500 1:1000	1:384 1:480 1:600 1:960	1/32"=1'0" 1"=40'0" 1"=50'0" 1"=80'0"
1:2000 1:5000	1:1200 1:2400 1:4800 1:6000	1"=100'0" 1"=200'0" 1"=400'0" 1"=500'0"
1:10000 1:25000	1:10560 1:12000 1:21120 1:24000	6"=1mi 1"=1000'0" 3"=1mi 1"=2000'0"
1:50000 1:100000	1:63360 1:126720	1"=1mi 1/2"=1mi

NEMA STARTER SIZES

Single & Three Phase AC Induction Type
Squirrel Cage & Wound Rotor Motors

NEMA SIZE	Maximum Horsepower Single Phase Motors Full Voltage Starting		Maximum Horsepower Three Phase Motors Full Voltage Starting			Maximum Horsepower Three Phase Motors Auto Transformer Starting		
	115V	230V(240)	200V(208)	230V(240)	460V(480)	200V(208)	230V(240)	460V(480)
00	1/3	1	1-1/2	1-1/2	2	1-1/2	1-1/2	2
0	1	2	3	3	5	3	3	5
1	2	3	7-1/2	7-1/2	10	7-1/2	7-1/2	10
2	3	5	10	15	25	10	15	25
3		7-1/2	25	30	50	25	30	50
4		15	40	50	100	40	50	100
5			75	100	200	75	100	200
6			150	200	400	150	200	400
7				300	600		300	600
8				450	900		450	900
9				800	1600		800	1600

NEMA STARTER ENCLOSURES

NEMA TYPE	NEMA Enclosure Description	Indoor and/or Outdoor
1	General Purpose	Indoor
2	Drip-proof	Indoor
3	Dust-tight, Rain-tight, Sleet-tight	Outdoor
3R	Rainproof, Sleet Resistant	Outdoor
3S	Dust-tight, Raintight, Sleetproof	Outdoor
4	Watertight, Dust-tight, Sleet Resistant	Indoor/Outdoor
4X	Watertight, Dust-tight, Sleet Resistant & Corrosion Resistant	Indoor/Outdoor
5	Dust-tight	Indoor
6	Submersible, Watertight, Dust-tight, Sleet Resistant	Indoor/Outdoor
7	Class I, Group A, B, C or D Hazardous Locations, Air-Break	Indoor
8	Class I, Group A, B, C or D Hazardous Locations, Oil Immersed	Indoor
9	Class II, Group E, F or G Hazardous Locations, Air-Break	Indoor
10	Bureau of Mines	Indoor/Outdoor
11	Corrosion Resistant and Dripproof, Oil-Immersed	Indoor
12	Industrial Use, Dust-tight and Driptight	Indoor
13	Oil and Dust-tight	Indoor

GENERATOR RATING GUIDE

Use Chart to Choose Transfer Switch Size
3 Phase Amperes at 80% Power Factor

Ampere Rating by Voltage									
Generator KW Size	Generator KVA	120V Amps	208V Amps	220V Amps	240V Amps	277V Amps	440V Amps	460V Amps	480V Amps
4	5	24	14	13	12	10	7	6	6
5	6	30	17	16	15	13	8	8	8
7	9	42	24	23	21	18	11	11	11
9	11	54	31	30	27	23	15	14	14
10	13	60	35	33	30	26	16	16	15
12	15	72	42	39	36	31	20	19	18
15	19	90	52	49	45	39	25	24	23
20	25	120	69	66	60	52	33	31	30
25	31	151	87	82	75	65	41	39	38
27	34	163	94	89	81	70	44	42	41
30	38	181	104	99	90	78	49	47	45
35	44	211	122	115	105	91	57	55	53
36	45	217	125	118	108	94	59	57	54
40	50	241	139	131	120	104	66	63	60
45	56	271	156	148	135	117	74	71	68
50	63	301	174	164	151	130	82	79	75
55	69	331	191	181	166	143	90	86	83
60	75	361	208	197	181	157	99	94	90
65	81	391	226	213	196	170	107	102	98
70	88	421	243	230	211	183	115	110	105
75	94	452	261	246	226	196	123	118	113
80	100	482	278	263	241	209	131	126	120
85	106	512	295	279	256	222	140	134	128
90	113	542	313	296	271	235	148	141	135
100	125	602	347	328	301	261	164	157	151
110	138	662	382	361	331	287	181	173	166
115	144	692	399	378	346	300	189	181	173
125	156	753	434	411	376	326	205	196	188
140	175	843	486	460	421	365	230	220	211
150	188	903	521	493	452	391	246	236	226
155	194	933	538	509	467	404	255	243	233
165	206	993	573	542	497	430	271	259	248
170	213	1024	591	558	512	443	279	267	256
175	219	1054	608	575	527	456	287	275	263
190	238	1144	660	624	572	496	312	298	286
200	250	1204	695	657	602	522	328	314	301
230	288	1385	799	755	692	600	378	361	346
250	313	1505	868	821	753	652	411	393	376
300	375	1806	1,042	985	903	783	493	471	452
350	438	2107	1,216	1,150	1,054	913	575	550	527
400	500	2408	1,390	1,314	1,204	1,043	657	628	602
450	563	2710	1,563	1,478	1,355	1,174	739	707	677
500	625	3011	1,737	1,642	1,505	1,304	821	785	753
600	750	3613	2,084	1,971	1,806	1,565	985	942	903
650	813	3914	2,258	2,135	1,957	1,695	1,067	1,021	978
750	938	4516	2,605	2,463	2,258	1,956	1,232	1,178	1,129

GENERATOR RATING GUIDE

Use Chart to Choose Transfer Switch Size
3 Phase Amperes at 80% Power Factor

Ampere Rating by Voltage									
Generator KW Size	Generator KVA	120V Amps	208V Amps	220V Amps	240V Amps	277V Amps	440V Amps	460V Amps	480V Amps
800	1000	4817	2,779	2,627	2,408	2,087	1,314	1,257	1,204
850	1063	5118	2,953	2,792	2,559	2,217	1,396	1,335	1,280
900	1125	5419	3,126	2,956	2,710	2,348	1,478	1,414	1,355
950	1188	5720	3,300	3,120	2,860	2,478	1,560	1,492	1,430
1000	1250	6021	3,474	3,284	3,011	2,608	1,642	1,571	1,505
1100	1375	6623	3,821	3,613	3,312	2,869	1,806	1,728	1,656
1200	1500	7225	4,169	3,941	3,613	3,130	1,971	1,885	1,806
1300	1625	7828	4,516	4,270	3,914	3,391	2,135	2,042	1,957
1400	1750	8430	4,863	4,598	4,215	3,652	2,299	2,199	2,107
1500	1875	9032	5,211	4,926	4,516	3,913	2,463	2,356	2,258
1600	2000	9634	5,558	5,255	4,817	4,174	2,627	2,513	2,408
1700	2125	10236	5,905	5,583	5,118	4,434	2,792	2,670	2,559
1800	2250	10838	6,253	5,912	5,419	4,695	2,956	2,827	2,710
1900	2375	11440	6,600	6,240	5,720	4,956	3,120	2,984	2,860
2000	2500	12042	6,948	6,569	6,021	5,217	3,284	3,141	3,011
2500	3125	15053	8,684	8,211	7,526	6,521	4,105	3,927	3,763