

18.000 TYP

0.500 TYP
0.500 TYP



THREE PHASE POWER TRANSFORMER

MANUFACTURED BY CG POWER SYSTEMS USA INC			
WASHINGTON, MO 63090, USA			
CUSTOMER'S P.O. NO.: 12609 DM-1			
TRANSFORMER		HV	LV
RATED VOLTAGE (NO LOAD) kV		138.0 ✓	13.8 ✓
RATED POWER (MVA)	CLASS	RISE °C	MVA
	ONAN	65	24.0 ✓
	ONAF1	65	32.0 ✓
	ONAF2	65	40.0 ✓
RATED LINE CURRENT ONAF2 65°C		167.3	1673.5
LINE IMPULSE LEVEL kVp		650	110
NEUTRAL IMPULSE LEVEL kVp		150	--
LINE BUSHINGS IMPULSE LEVEL kVp		650	110
NEUTRAL BUSHINGS IMPULSE LEVEL kVp		150	--
WINDING MATERIAL		COPPER	COPPER
FREQUENCY		60 Hz	
PHASES		3	
MANUFACTURER'S ORDER NO.		13158-10	
MANUFACTURER'S SERIAL NO.		20151300359	
MODEL		ZUP2460001	
YEAR OF MANUFACTURE		2013	

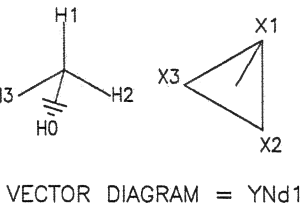
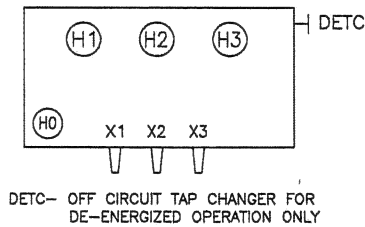
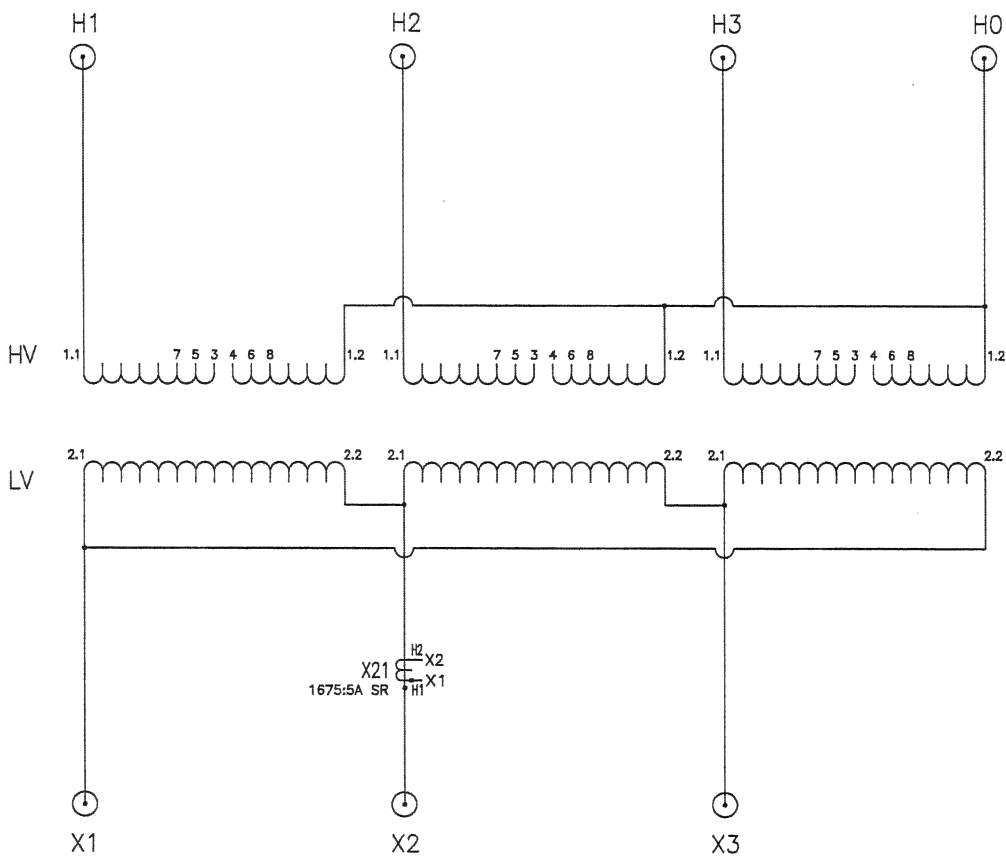
SERVICE DUTY	CONTINUOUS
SERVICE ALTITUDE	<3300 FEET ASL
INSULATION LIQUID	TYPE II MINERAL OIL

DE-ENERGIZED TAP CHANGER ON HV	
VOLTAGE CLASS	138 kV
CURRENT RATING	400 A

HIGH VOLTAGE TAPCHANGER FOR DE-ENERGIZED OPERATION			
VOLTAGE	AMPERE AT 40.0 MVA	POS	CONNECTS IN EACH PHASE
144900	159.4	1	3 TO 4
141450	163.3	2	4 TO 5
138000	167.3	3	5 TO 6
134550	171.6	4	6 TO 7
131100	176.2	5	7 TO 8

POSITIVE SEQUENCE IMPEDANCE AT 24.0 MVA	
138/13.8 kV	5.68%

X/R RATIO AT 138/13.8 kV	###
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CURRENT TRANSFORMER LOCATION	CURRENT RATIO	SEC. TAP
X21 1675:5A SR C100	1675:5	X1-X2

APPROXIMATE MASSES AND VOLUMES				
	KG	LBS	LITERS	GALLONS
UNTANKING: CORE AND WINDINGS	24541	54104		
TANK AND FITTINGS	15517	34210		
OIL VOLUME RADIATORS	1529	3371	1730	457
OIL VOLUME MAIN TANK	13319	29363	15069	3981
OIL VOLUME TOTAL	14848	32733	16800	4438
TOTAL MASS	54906	121047		
SHIPPING MASS	51082	112618		

NOTES:
-INSTALLATION & OPERATING INSTRUCTIONS
SEE TRANSFORMER INSTRUCTION MANUAL
-POSITIVE PRESSURE NITROGEN OIL PRESERVATION SYSTEM
-TANK DESIGNED FOR 14.7 PSIG FULL VACUUM FILLING
-25°C LIQUID IS 11.0 INCHES BELOW THE TANK COVER
-LIQUID LEVEL CHANGES ARE 0.88 INCHES PER 10°C
CHANGE IN LIQUID TEMPERATURE
-TRANSFORMER IS FILLED WITH TYPE II MINERAL OIL THAT
CONTAINS LESS THAN 1 PPM PCB AT TIME OF MANUFACTURE

BUILT TO IEEE STANDARD C57.12.00

R0.500

Ø0.188 HOLE
6 PLACES

24.000 TYP

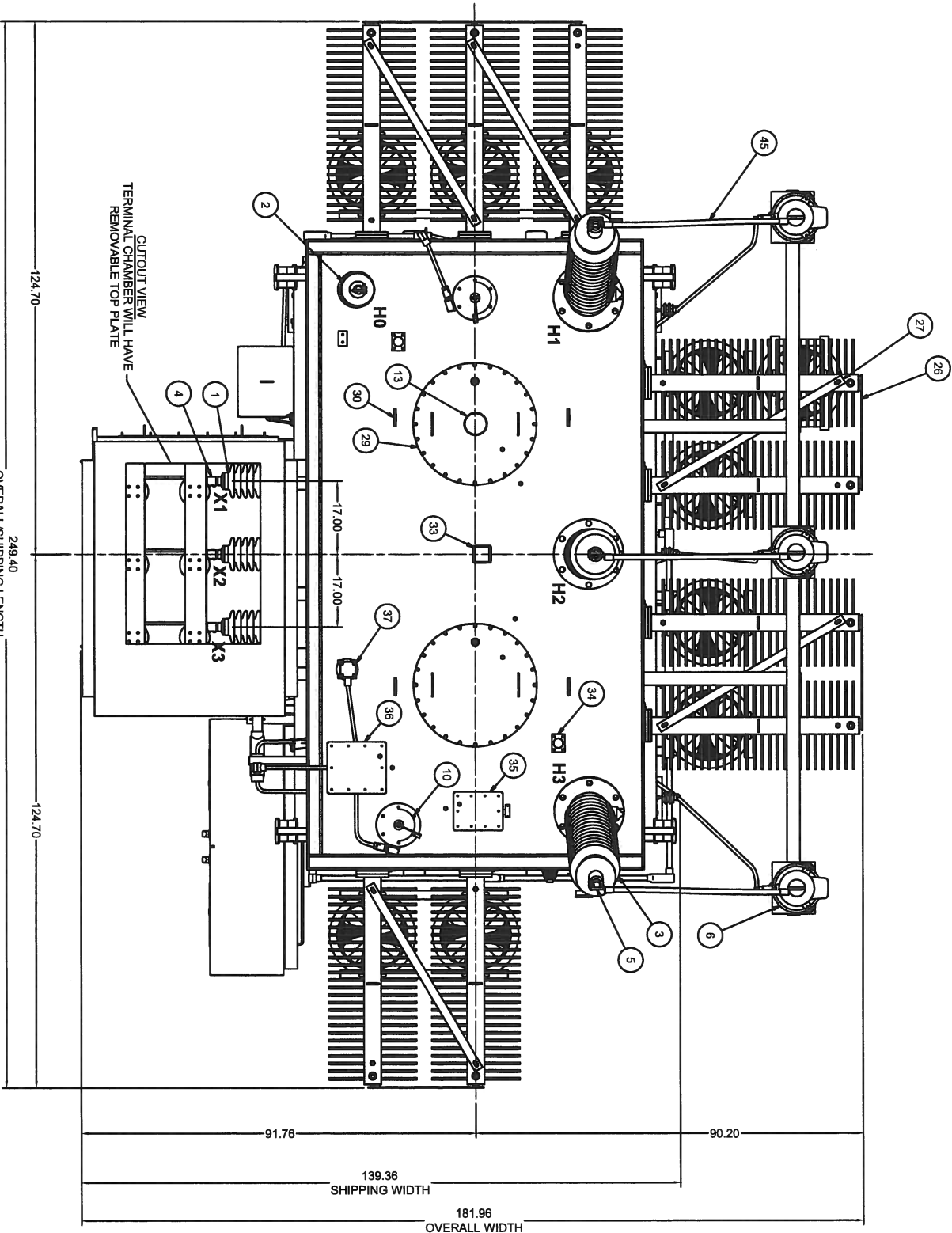


REV	DATE	BY	APP	DESCRIPTION
A	01/15/2013	AP	SH	ORIGINAL ISSUE

CG POWER SYSTEMS USA INC, WASHINGTON, MO 63090 USA		
UNITS	DIVISION	TITLE
INCH	POWER	NAMEPLATE
SCALE	TOLERANCE	MATERIAL
1:1.75	STD ±3 mm ±0.10 in.	--
SHEET	* ±1 ±0.04	PART NUMBER
	** ±0.5 ±0.02	2460001-04
1 of 1	ANGULAR ±2°	



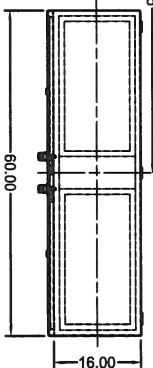
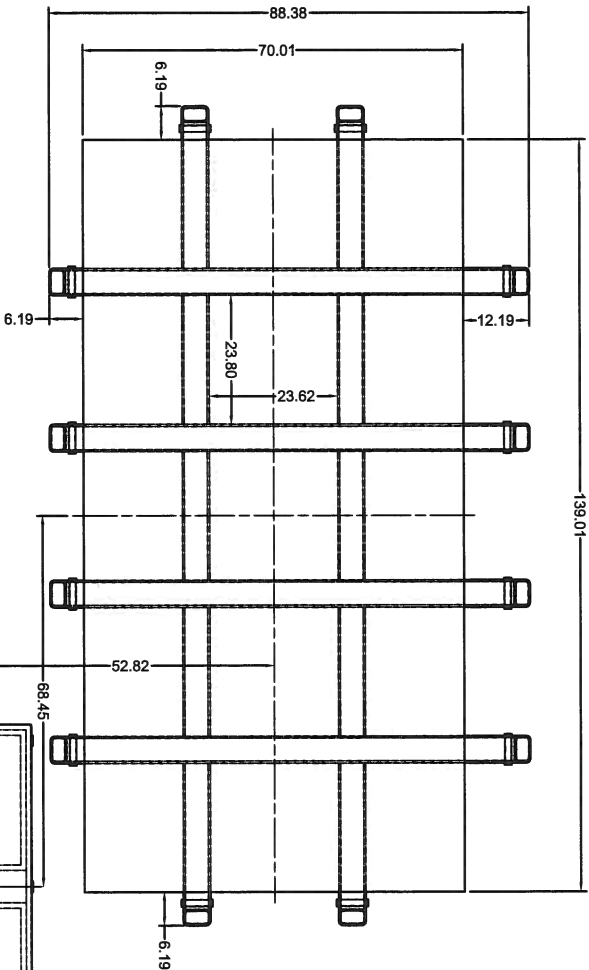
Item	Qty	UoM	Component Description	Manufacturer	Mfg. Part No.	CG Part No.
1	EA	EA	Control Description	Manufacturer	Mfg. Part No.	CG Part No.
2	EA	EA	Low Voltage Bushing - 15kV 110kV/BIL 2000A 1.5" Studs (Bottom Connected)	PCORE	B-89121-40-70	ZU01041289A121H
3	EA	EA	High Voltage Neutral Bushing - 25kV 150kV/BIL 400/1200A 1.5" Studs (Bottom Connected)	PCORE	B-89293-70	ZU01041289A293
4	EA	EA	High Voltage Bushing - 138kV 650kV/BIL 800A 1.5" Studs (Draw Lead Connected)	PCORE	POCS60G0800CS	ZU01044791A650800C
5	EA	EA	Terminal Connector for LV Bushings, 1.5" Stud to 4 Hole NEMA Spade	SEFCOR	44-4B-SND	ZU32002839A02
6	EA	EA	Terminal Connector for HV and Neutral Bushings, 1.5" Stud to 4 Hole 3/4" Thick Lin Plated NEMA Spade	SEFCOR	SNFT-44-4AH-SND	ZU33001970A01
7	EA	EA	High Voltage Arresters, Station Class 108kV/88kV MCOV - Porcelain	Ohio Brass	MVN08G040844A	ZU43005341A08
8	EA	EA	De-energized Tap Changer - 650kV/BIL 5-Position	Qualitrol	032-091-01 CS-35304	ZU24600010ETC
9	EA	EA	Oil Level Indicator 6" Dial with Low Level Alarm Contacts	Qualitrol	IMTL-1026-1	ZU21037911A01
10	EA	EA	Pressure Relief Device 10PSI with Alarm Contacts and Semaphore	Qualitrol	208-009-01	ZU21042390A04
11	EA	EA	Thermal Plate for RTD and EIM	Qualitrol	1251SS	ZU21042390A04
12	EA	EA	Globe Valve - Flange connected to tank w/ 2" NPT outlet, 3/8" Sampler, and plug - Drain Valve	United Brass	1251SS	ZU21031805A01A
13	EA	EA	Globe Valve - 2" NPT - Upper Filter Valve	United Brass	1251SS	ZU21031805A01A
14	EA	EA	4" NPT Male Threaded Pipe w/ Cap - Vacuum Connection	ABR	4508SK33	ZU26036608A01
15	EA	EA	Inertare Oil Preservation System with Full 2000CF 9" CGA-580 Cylinder	McMaster-Carr	4508SK33	ZU26036608A01
16	EA	EA	Isolation Valves for Inertare System, 1/2" NPT	CG Power Systems	4508SK33	ZU26036608A01
17	EA	EA	Handhole in Side Wall for HO Bushing Access, 305mm x 305mm	Schaeffers	4508SK33	ZU26036608A01
18	EA	EA	Control Box Double Door NEMA 4 4811 x 6011 W x 16"D	CG Power Systems	4508SK33	ZU26036608A01
19	EA	EA	Nameplate, Transformer (SS w/black Finish)	CG Power Systems	4508SK33	ZU26036608A01
20	EA	EA	Cooling Fans, 16" Diameter 1/8HP 480VAC 1140RPM 3-Phase	CG Power Systems	4508SK33	ZU26036608A01
21	EA	EA	Control Box NEMA 4 10"8"x4" Hinged w/Screw Clamps (Fan Junction Boxes)	CG Power Systems	4508SK33	ZU26036608A01
22	EA	EA	Radiator 2200CC 520W 26Panel Boiled Header Galvanized + ANSI 70	CG Power Systems	4508SK33	ZU26036608A01
23	EA	EA	Air Vent for Radiator with Plug 1.0" NPT	TTP	4508SK33	ZU26036608A01



DEFLECTION TESTING RESULTS:
(Distance from floor to bushing spade)

Under vacuum, prior to oil filling:
X1 Bushing: 2664mm
X2 Bushing: 2665mm
X3 Bushing: 2665mm

After oil filling:
X1 Bushing: 2663mm (-1mm change)
X2 Bushing: 2665mm (no change)
X3 Bushing: 2666mm (+1mm change)



24 / 32 / 40 MVA
138000 WYE, 650kV BIL PRIMARY
13800 DELTA, 110kV BIL SECONDARY
65 DEG C RISE ONAN / ONAF1 / ONAF2
COLOR: ANSI 70 GRAY
NON-SKID FINISH ON TANK COVER
TOTAL APPROX. WEIGHT: 121,047 LBS.
SHIPPING WEIGHT: 112,618 LBS.
TOTAL OIL QUANTITY: 4,438 GAL.

REV	DATE	BY	APP	DESCRIPTION	UNIT	QUANTITY	REMARKS
0	12/1/2013	JRM (revoked)	L.T.	ORIGINAL ISSUE	ROCK	1	POWER
1	12/2/2013	JRM (revoked)	L.T.	ADDED GROUNDING TRANSFORMER AND SUPPORTS	ROCK	1	GENERAL ARRANGEMENT ASSEMBLY
2	3/15/2013	JRM (revoked)	L.T.	EDITED PER CUSTOMER REVISION, ADDED COMMENTS ETC.	Y1B	1	POWER
3	5/20/2013	JRM (revoked)	L.T.	ADDED PER CUSTOMER REVISION, ADDED COMMENTS ETC.	Y1B	1	POWER
4	6/10/2013	JRM (revoked)	L.T.	Added deflection testing info	Y1B	1	POWER
5	6/10/2013	JRM (revoked)	L.T.	Added deflection testing info	Y1B	1	POWER
6	6/10/2013	JRM (revoked)	L.T.	Added deflection testing info	Y1B	1	POWER



Item	Qty	UoM	Component Description	Manufacturer	Mfg. Part No.	CG Part No.
1	EA	EA	Low Voltage Bushing - 15kV 110kV/BIL 2000A 1.5" Studs (Bottom Connected)	PCORE	B-89121-40-70	ZU01041289A121H
2	EA	EA	High Voltage Neutral Bushing - 25kV 150kV/BIL 400/200A 1.5" Studs (Bottom Connected)	PCORE	B-89293-70	ZU01041289A293
3	EA	EA	High Voltage Bushing - 138kV 650kV/BIL 800A 1.5" Studs (Draw Lead Connected)	PCORE	POC650A0800CS	ZU01044719A650800C
4	EA	EA	Terminal Connector for LV Bushings, 1.5" Stud to 4 Hole NEMA Spade	SEFCOR	44-4B-SND	ZU32020639A02
5	EA	EA	Terminal Connector for HV and Neutral Bushings, 1.5" Stud to 4 Hole 3/4" Thick Tin Plated NEMA Spade	SEFCOR	SNF1-44-4AH-SND	ZU3202061970A01
6	EA	EA	High Voltage Arresters, Station Class 108kV/88kV/MCOV - Porcelain	Ohio Brass	MVN108GA08AAA	ZU34057341A88
7	EA	EA	De-Energized Tap Changer - 650kV BIL 5-Position	Qualitrol	44CS04-5314-JLN	ZU2460001DETC
8	EA	EA	Oil Level Indicator 6" Dial with Low Level Alarm Contacts	Qualitrol	032-091-01 CS-35304	ZU21037911A01
9	EA	EA	Thermal Plate for RTD and ETM	Qualitrol	1WTL-1026-1	ZU21038394A04
10	EA	EA	Pressure Relief Device 10PSI with Alarm Contacts and Semaphore	Qualitrol	208-009-01	ZU21042390A01
11	EA	EA	Globe Valve - 2" NPT - Upper Filler Valve	United Brass	127TSS	ZU21030711A01A
12	EA	EA	Globe Valve - 2" NPT - Upper Filler Valve	United Brass	125TSS	ZU21031905A01A
13	EA	EA	4" NPT Male Threaded Pipe w/ Cap - Vacuum Connection	ABB	4508KC33	ZU26036608A01
14	EA	EA	Inerting Oil Preservation System with Full 200CF/g CGA-380 Cylinder	McMaster-Carr	4508KC33	ZU26036608A01
15	EA	EA	Isolation Valves for Inerting System, 1/2" NPT	CG Power Systems	---	ZU70036394C01
16	EA	EA	Handhole in Side Wall for HO Bushing Access, 905mm x 305mm	Schaeffers	---	ZU70048629A01
17	EA	EA	Control Box Double Door NEMA 4 48H x 60W x 16D	CG Power Systems	---	ZU26062914A01V
18	EA	EA	Nameplate, Transformer (SS w/black Finish)	Krenz	F16 A6489	ZU26064783A01
19	EA	EA	CG Logo Plate	---	---	ZUR40502202069A1T
20	EA	EA	Cooling Fans, 16" Diameter 176HP 460VAC 1140RPM 3-Phase	---	---	---
21	EA	EA	Control Box NEMA 4 10"x8"x4" Hinged w/Screw Clamps (Fan Junction Boxes)	---	---	---
22	EA	EA	Radiator 2200CC 520W 28Panel Boiled Header Galvanized + ANSI 70	---	---	---
23	EA	EA	At Vent for Radiator with Plug 1.0" NPT	TTP	---	---
24	EA	EA	Drain Vent for Radiator with Plug 1.0" NPT	TTP	---	---
25	EA	EA	Shut-off Valve for Radiator	Zentith/ETX	---	---
26	EA	EA	Horizontal End Radiator Bracing	CG Power Systems	---	---
27	EA	EA	Diagonal (Top Only) Radiator Bracing	CG Power Systems	---	---
28	EA	EA	Jacking Provisions	CG Power Systems	---	---
29	EA	EA	Manhole in Tank Cover, 24" Diameter Opening	CG Power Systems	---	---
30	EA	EA	Lifting Lugs for Cover Only	CG Power Systems	---	---
31	EA	EA	Lifting Lugs for Complete Transformer	CG Power Systems	---	---
32	EA	EA	Grounding Pads - NEMA 2-Hole, Stainless Steel	CG Power Systems	---	---
33	EA	EA	Full Protection Mounting - 8" Tall 4" x 4" Square Tube 1/4" Thick	CG Power Systems	---	---
34	EA	EA	Impact Recorder Mounting Provisions	CG Power Systems	---	---
35	EA	EA	Core Ground Bushing with Ground Strap w/ Steel Enclosure	CG Power Systems	---	---
36	EA	EA	Current Transformer Junction Block 5 Wire w/ Steel Enclosure	Central Maloney	70131551	ZU02011896A01
37	EA	EA	Rapid Rise Pressure Relay Flange Mounted Air Space Vertical	Qualitrol	70317415	ZU02019298A05
38	EA	EA	Insulating Base for Arresters and Arrester Ground Cables	Qualitrol	910-014-02	ZU21037910A01
39	EA	EA	Pressure/Vacuum Gauge Assembly w/ Bleeder	Ohio Brass	50-35E	ZU21001566A01
40	EA	EA	Ground Lug for Arresters and Arrester Ground Cables	Fargo	273097-3001	ZU21048381A01
41	EA	EA	Station Post Insulators for LV Bushings	CG Power Systems	GC-209	ZU35013491A01
42	EA	EA	Air Terminal Chamber for LV Bushings	Lapp	315205-70	ZU01048074A205
43	EA	EA	Copper Bus Bar for LV Cable Connections	CG Power Systems	---	---
44	EA	EA	Viewing Window for Control Box, 12" x 12"	Schaeffers	SPMKSS6-1212	ZU26048531A02
45	EA	EA	HV Bushing/Arrester Connection, 500MCM Insulated Cable	CG Power Systems	---	---

