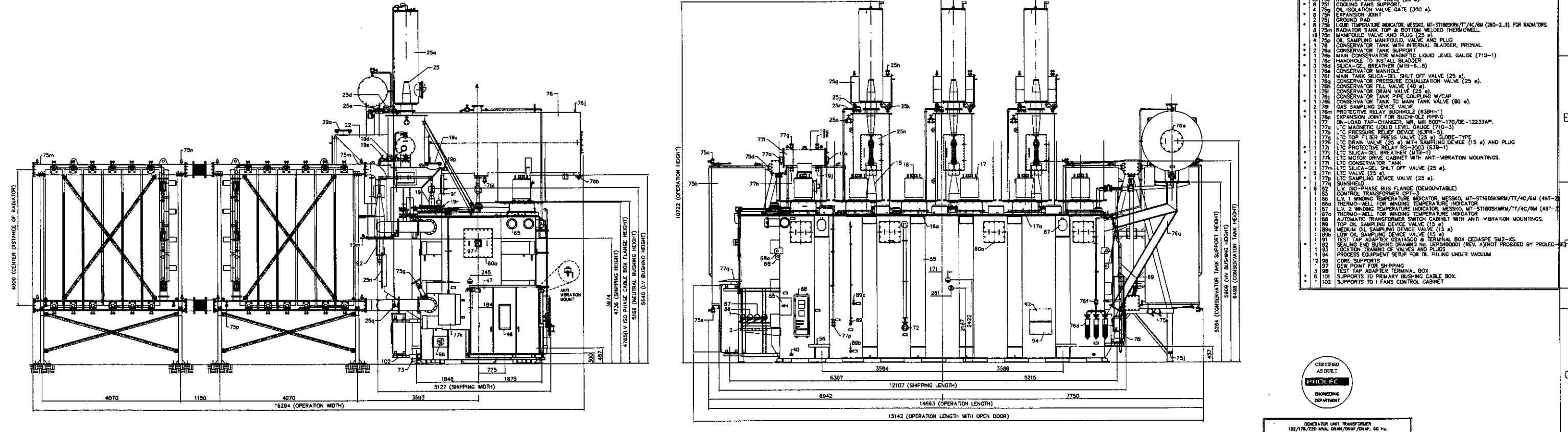
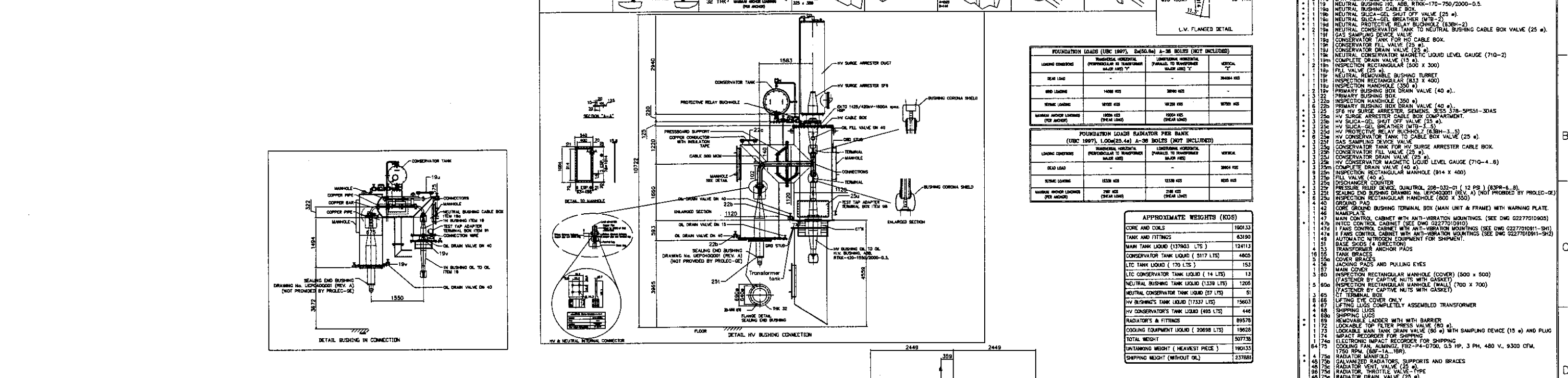


ITEM	DESCRIPTION
1	1. HOIST VOLTAGE INDICATING TEMPERATURE INDICATOR, MESSKO, MT-ST160SKRM/TT/4C/6M (49T-1)
2	2. THERMO-WELL FOR WINDING TEMPERATURE INDICATOR
3	3. LIQUID TEMPERATURE INDICATOR, MESSKO, MT-ST160SKRM/TT/4C/6M (28Q-1)
4	4. THERMO-WELL FOR LIQUID TEMPERATURE INDICATOR
5	5. MAIN TANK PRESSURE RELIEF DEVICE, QUALITROL, 208-031-01 (12 PS) (63PR-1-4)
6	6. HV SURGE ARRESTER, RBE, RTK-170-750/2000-0.5
7	7. L.V.1 BUSHING, TRENCH, 52 KV, 50H2G3
8	8. L.V.2 REMOVABLE BUSHING TURRET
9	9. L.V.2 BUSHING, TRENCH, 52 KV, 50H2G3
10	10. NEUTRAL BUSHING, HO. ASB, RTK-170-750/2000-0.5
11	11. NEUTRAL BUSHING CABLE BOX
12	12. NEUTRAL SILICA-GEL SHUT OFF VALVE (25 #)
13	13. NEUTRAL SILICA-GEL BREATHING (MTB-2)
14	14. NEUTRAL PROTECTIVE RELAY BUSHHOLE (638H-2)
15	15. NEUTRAL CONSERVATOR TANK TO NEUTRAL BUSHING CABLE BOX VALVE (25 #)
16	16. GAS SAMPLING DEVICE VALVE
17	17. CONSERVATOR TANK FOR HV CABLE BOX
18	18. CONSERVATOR FILL VALVE (25 #)
19	19. CONSERVATOR DRAIN VALVE (25 #)
20	20. NEUTRAL CONSERVATOR MAGNETIC LIQUID LEVEL GAUGE (71Q-2)
21	21. COMPLETE DRAIN VALVE (15 #)
22	22. INSPECTION RECTANGULAR (500 X 300)
23	23. NEUTRAL REMOVABLE BUSHING TURRET
24	24. INSPECTION RECTANGULAR (812 X 400)
25	25. INSPECTION RECTANGULAR (300 X 300)
26	26. NEUTRAL REMOVABLE BUSHING TURRET
27	27. INSPECTION RECTANGULAR (812 X 400)
28	28. PRIMARY BUSHING BOX
29	29. PRIMARY BUSHING BOX DRAIN VALVE (40 #)
30	30. INSPECTION HANDHOLE (350 #)
31	31. PRIMARY BUSHING BOX
32	32. SF6 HV SURGE ARRESTER, SIEMENS, 3535 378-SP51-3DAS
33	33. HV SURGE ARRESTER CABLE BOX COMPARTMENT
34	34. HV SILICA-GEL SHUT OFF VALVE (25 #)
35	35. HV SILICA-GEL BREATHING (MTB-3)
36	36. HV PROTECTIVE RELAY BUSHHOLE (638H-3)
37	37. HV CONSERVATOR TANK TO CABLE BOX VALVE (25 #)
38	38. CONSERVATOR TANK FOR HV SURGE ARRESTER CABLE BOX
39	39. CONSERVATOR FILL VALVE (25 #)
40	40. CONSERVATOR DRAIN VALVE (25 #)
41	41. NEUTRAL CONSERVATOR MAGNETIC LIQUID LEVEL GAUGE (71Q-4-6)
42	42. COMPLETE DRAIN VALVE (15 #)
43	43. INSPECTION RECTANGULAR (814 X 400)
44	44. FILL VALVE (25 #)
45	45. DISCONNECT SWITCH
46	46. PRESSURE RELIEF DEVICE, QUALITROL, 208-031-01 (12 PS) (63PR-8-8)
47	47. SEALING END BUSHING DRAWING NO. LEF040001 (REV. A) (NOT PROVIDED BY PROLEC-GE)
48	48. INSPECTION RECTANGULAR (800 X 350)
49	49. INSPECTION RECTANGULAR (800 X 350)
50	50. GROUND PAD
51	51. CORE CONTROL BUSHING TERMINAL BOX (MAIN UNIT & FRAME) WITH WARNING PLATE
52	52. NAMEPLATE
53	53. MAIN CONTROL CABINET WITH ANTI-VIBRATION MOUNTINGS (SEE DWG 02277010905)
54	54. INTC CONTROL CABINET (SEE DWG 02277010910)
55	55. FANS CONTROL CABINET WITH ANTI-VIBRATION MOUNTINGS (SEE DWG 02277010911-SH1)
56	56. BASE SHOTS 4 DIRECTIONS
57	57. AUTOMATIC NITROGEN EQUIPMENT FOR SHIPMENT
58	58. TRANSFORMER ANCHOR PADS
59	59. TANK BRACES
60	60. JACKING PADS AND PULLING EYES
61	61. MAIN COVER
62	62. INSPECTION RECTANGULAR MANHOLE (COVER) (500 X 500)
63	63. INSPECTION RECTANGULAR MANHOLE (MALL) (700 X 700)
64	64. FASTENER BY CAPTIVE NUTS WITH GASKET
65	65. LIFTING EYE COVER ONLY
66	66. LIFTING EYE COVER COMPLETELY ASSEMBLED TRANSFORMER
67	67. SHIPPING LUGS
68	68. REMOVABLE LADDER WITH WITH BARRIER
69	69. LOCKABLE TOP FILTER PRESS VALVE (80 #)
70	70. LOCKABLE MAIN TANK DRAIN VALVE (80 #) WITH SAMPLING DEVICE (15 #) AND PLUG
71	71. IMPACT RECORDER FOR SHIPPING
72	72. ELECTRONIC IMPACT RECORDER FOR SHIPPING
73	73. COUPLING FAN, ALUMINUM, 132-14-0700, 0.5 HP, 3 PH, 480 V, 9300 CFM, 1750 RPM, (68-1A-1ER)
74	74. RADIATOR MANIFOLD
75	75. CALVANEZED RADIATORS, SUPPORTS AND BRACES
76	76. RADIATOR VENT. VALVE (25 #)
77	77. RADIATOR THROTTLE VALVE-TYPE
78	78. RADIATOR DRAIN VALVE (25 #)
79	79. COUPLING FAN SUPPORT
80	80. OIL ISOLATION VALVE GATE (300 #)
81	81. EXPANSION JOINT
82	82. GROUND PAD
83	83. LIQUID TEMPERATURE INDICATOR, MESSKO, MT-ST160SKRM/TT/4C/6M (28Q-2-8), FOR RADIATORS
84	84. RADIATOR BANK TOP & BOTTOM WELDED THERMOWELL
85	85. MANIFOLD VALVE AND PLUG (25 #)
86	86. OIL SAMPLING MANIFOLD VALVE AND PLUG
87	87. CONSERVATOR TANK WITH INTERNAL BLADDER, PRONAL
88	88. CONSERVATOR TANK SUPPORT
89	89. MAIN CONSERVATOR MAGNETIC LIQUID LEVEL GAUGE (71Q-1)
90	90. HANDHOLES TO INSTALL BLADDER
91	91. MAIN TANK SILICA-GEL SHUT OFF VALVE (25 #)
92	92. CONSERVATOR PRESSURE EQUALIZATION VALVE (25 #)
93	93. CONSERVATOR DRAIN VALVE (25 #)
94	94. CONSERVATOR TANK PIPE COUPLING W/CAP
95	95. CONSERVATOR TANK TO MAIN TANK VALVE (80 #)
96	96. GAS SAMPLING DEVICE VALVE
97	97. PROTECTIVE RELAY BUSHHOLE (638H-1)
98	98. EXPANSION JOINT FOR BUSHHOLE PIPING
99	99. ON-LOAD TAP-CHANGER, MTR, MTR 600Y-170/DE-12233WP
100	100. LTO MAGNETIC LIQUID LEVEL GAUGE (71Q-3)
101	101. LTO TOP FILTER PRESS VALVE (65 #) DOBE-TYPE
102	102. LTO DRAIN VALVE (25 #) WITH SAMPLING DEVICE (15 #) AND PLUG
103	103. PROTECTIVE RELAY BUSHHOLE (638H-1)
104	104. LTO SILICA-GEL BREATHING (MTB-1)
105	105. MOTOR DRIVE CABINET WITH ANTI-VIBRATION MOUNTINGS
106	106. LTO CONSERVATOR TANK
107	107. LTO SILICA-GEL SHUT OFF VALVE (25 #)
108	108. LTO DRAIN VALVE (25 #)
109	109. LTO SAMPLING DEVICE VALVE (25 #)
110	110. SUNSHIELD
111	111. L.V. 150-PHASE BUS FLANGE (DEMOUNTABLE)
112	112. CONTROL TRANSFORMER CPT-3
113	113. L.V. 1 WINDING TEMPERATURE INDICATOR, MESSKO, MT-ST160SKRM/TT/4C/6M (49T-2)
114	114. THERMO-WELL FOR WINDING TEMPERATURE INDICATOR
115	115. LIQUID TEMPERATURE INDICATOR, MESSKO, MT-ST160SKRM/TT/4C/6M (49T-3)
116	116. THERMO-WELL FOR LIQUID TEMPERATURE INDICATOR
117	117. AUTOMATIC TRANSFORMER SWITCH CABINET WITH ANTI-VIBRATION MOUNTINGS
118	118. TOP OIL SAMPLING DEVICE VALVE (15 #)
119	119. MEDIUM OIL SAMPLING DEVICE VALVE (15 #)
120	120. LOW OIL SAMPLING DEVICE VALVE (15 #)
121	121. TEST TAP ADAPTER GS214500 & TERMINAL BOX CSDAS2-S2-XS
122	122. SEALING END BUSHING DRAWING NO. LEF040001 (REV. A) (NOT PROVIDED BY PROLEC-GE)
123	123. LOCATION DRAWING OF VALVES AND PLUGS
124	124. PROCESS EQUIPMENT SETUP FOR OIL FILLING UNDER VACUUM
125	125. CORE SUPPORTS
126	126. DEW POINT FOR SHIPPING
127	127. TEST TAP ADAPTER TERMINAL BOX
128	128. SUPPORTS TO PRIMARY BUSHING CABLE BOX
129	129. SUPPORTS TO 1 FANS CONTROL CABINET
130	130. SUPPORTS TO 1 FANS CONTROL CABINET



**NOTES:**

- ITEMS REMOVED FOR SHIPMENT ARE MARKED WITH (\*).
- NUMBERING IS ACCORDING WITH G.E. PROLEC STD. LIST.
- ALL OIL VALVES WITH MEANS OF SECURING THEM IN OPEN/CLOSE POSITIONS.

**TOLERANCES**

Centerline distance of not inclined bushings	±0.25
Centerline distance of inclined bushings	±0.50
Bushings height (distance to floor)	±0.25
Outlet of control cabinet distance	±0.25
Hv & Lv bushings center line	±0.25
Bushings & surge arrester center line	±0.25
Surge arrester height (distance to floor)	±0.25
Center tank distance to short side	±0.25
Center tank distance to large side	±0.25
Conservator height	±0.25
Anchoring center line	±0.25
Bracing base center line	±0.25
Outline	0-3000
Dimensions	3000-5000
	5000 y Mayores

**OPERATION CENTER OF GRAVITY** (Symbol: Circle with dot)

**SHIPPING CENTER OF GRAVITY** (Symbol: Circle with cross)

**PROLEC** ENGINEERING DEPARTMENT

OPERATOR UNIT TRANSFORMER  
132/175/220 MVA, ONAN, 50 Hz, 60 Hz  
THREE PHASE, RESON AMBENT SFC AND  
HOT SPOT TEMPERATURE RISE OF 6V. UP TO 1000 MAHA.  
PRIMARY : 380 KV  
SECONDARY : 69/76/110 MVA, 13.8 KV

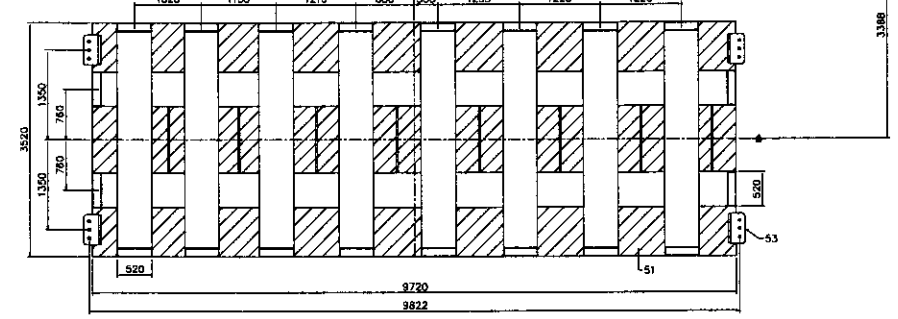
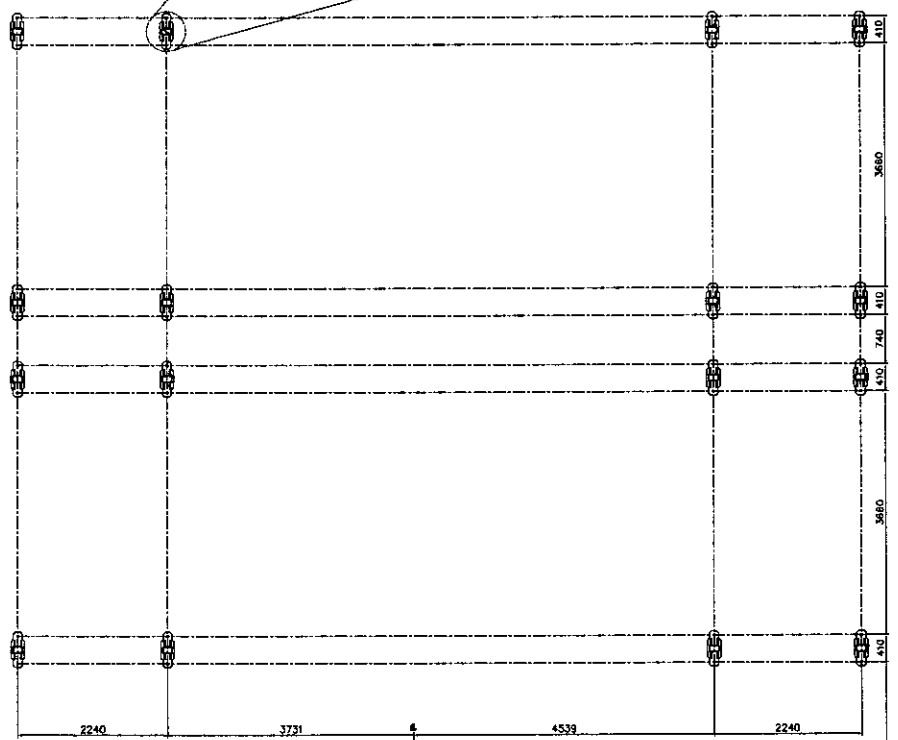
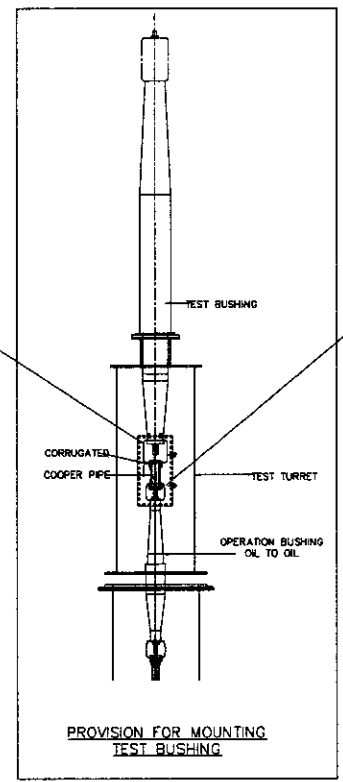
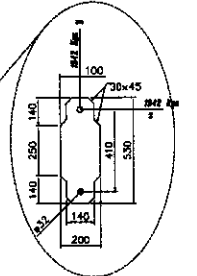
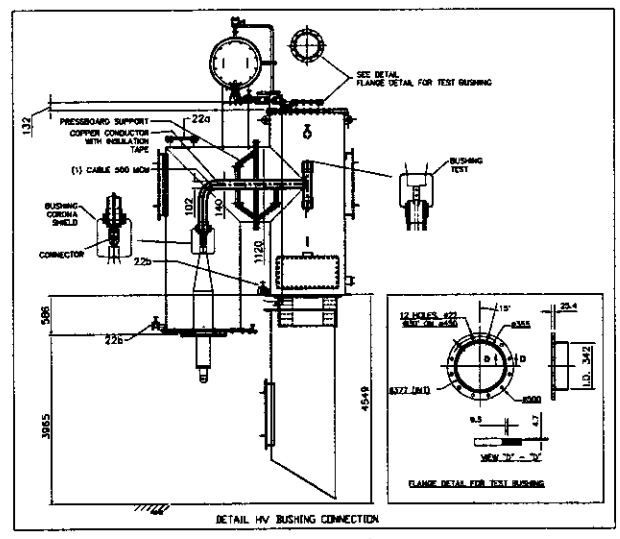
**PROLEC GE ENGINEERING POWER DIVISION**  
http://www.proleg.com

**TRANSFORMER'S OUTLINE**

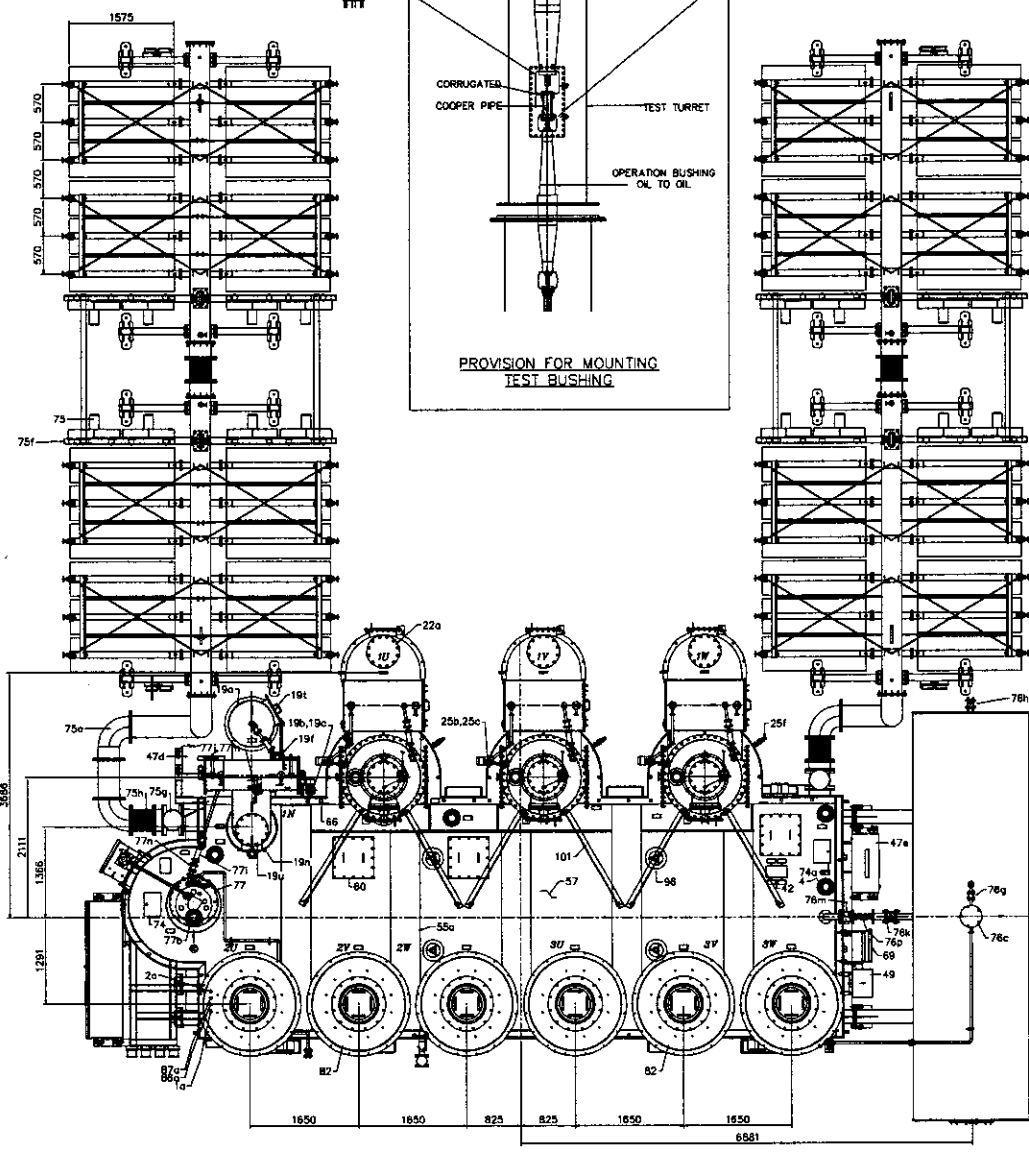
DESIGN GROUP 1

REVISIONS:  
DATE: 08/26/10  
BY: FCG  
CHKD: FCG

PROJECTION: 1:55  
DIMENSIONS: mmms.  
REVISION: INDICATED  
DRAWING NO.: G227709D801  
sheet: 1 of 1



"BASE DETAIL"  
THE HATCHED AREA REPRESENT THE BOTTOM OF THE TRANSFORMER.  
THIS AREA DOESN'T SIT ON THE FLOOR.



APPROXIMATE WEIGHTS (KGS)	
CORE AND COILS	190133
TANK AND FITTINGS	53190
MAIN TANK LIQUID (137903 LTS)	124113
CONSERVATOR TANK LIQUID ( 5117 LTS)	4605
LTC TANK LIQUID ( 170 LTS )	153
LTC CONSERVATOR TANK LIQUID ( 14 LTS)	13
NEUTRAL BUSHING TANK LIQUID (1339 LTS)	1205
NEUTRAL CONSERVATOR TANK LIQUID (57 LTS)	51
HV BUSHING'S TANK LIQUID (17357 LTS)	15603
HV CONSERVATOR'S TANK LIQUID (495 LTS)	448
RADIATORS & FITTINGS	89578
COOLING EQUIPMENT LIQUID ( 20698 LTS)	18628
TOTAL WEIGHT	507738
LIFTING WEIGHT ( HEAVEST PIECE )	190133
SHIPPING WEIGHT (WITHOUT OIL)	237881

NOTES	TOLERANCES
a) ITEMS REMOVED FOR SHIPMENT ARE MARKED WITH (*)	Centerline distance of not inclined bushings ±.50
b) NUMBERING IS ACCORDING WITH G.E. PROLEC STD. LIST.	Centerline distance of inclined bushings ±.15
c) ALL OIL VALVES WITH MEANS OF SECURING THEM IN OPEN/CLOSE POSITIONS.	Bushings height (distance to floor) ±.12
	Outlet of control cabinet distance ±.6
	Hv & Lv bushings center line ±.6
	Bushings & surge arrester center line ±.12
	Surge arrester height (distance to floor) ±.12
	Center tank distance to short side ±.12
	Center tank distance to large side ±.12
	Conservator height ±.12
	Anchoring center line ±.3
	Bracing beam center line ±.3
	Bottom distance ±.1
	±.4
● OPERATION CENTER OF GRAVITY	Dullins 0-3000 ±.25
⊗ SHIPPING CENTER OF GRAVITY	Dimensions 3000-5000 ±.40
	Dimensions 5000 y Mayores ±.50



GENERATOR UNIT TRANSFORMER  
132/178/220 MVA, ONAN/ONAF/ONAF, 60 Hz.  
THREE PHASE, DESIGN AMBIENT 50°C AND  
HOT SPOT TEMPERATURE RISE OF 48°C UP TO 1300 MAR.  
PRIMARY : 300 KV  
SECONDARY : 66/66/110 MVA, 13.8 KV

**PROLEC** THIS DRAWING CONTAINS PROPRIETARY INFORMATION WHICH CAN NOT BE REPRODUCED WITHOUT PERMISSION OF PROLEC GE.

PROLEC GE ENGINEERING POWER DIVISION  
http://www.prolecge.com

TITLE: TRANSFORMER'S OUTLINE

DF: Montoya  
08/26/10  
CHKD: FGC  
08/26/10

PROJECTION  
SCALE: 1:55  
DIMENSIONS: mms.  
REVISION: INDICATED

DRAWING NO.: G227709D801  
sheet 2 of 2

# PROLEC

## TRANSFORMER

SERIAL No G2277- THREE-PHASE, 60 Hz, ALTITUDE UP TO 1000 MASL

VOLTAGE RATING 380 000 - 13 800 - 13 800 YNd5d5  
 132 000 KVA CONTINUOUS - ONAN  
 176 000 KVA CONTINUOUS - ONAF1  
 220 000 KVA CONTINUOUS - ONAF2  
 286 000 KVA SHORT TIME (4 HRS) WITH PRELOAD AT 220 MVA

DESIGN AMBIENT TEMPERATURE	50 °C
MAXIMUM HOT SPOT RISE	48 °C
MAXIMUM TOP OIL RISE	45 °C
MAXIMUM HOT SPOT TEMPERATURE	98 °C

HIGH VOLTAGE WINDING			
VOLTS	AMPERES	LOAD TAP CHANGER	DIAL POS.
110 000	297	1	13
121 000	304	2	12
132 000	307	3	11
143 000	311	4	10
154 000	315	5	9
165 000	318	6	8
176 000	322	7	7
187 000	326	8	6
198 000	330	9	5
209 000	334	10	4
220 000	338	11	3
231 000	342	12	2
242 000	347	13	1
253 000	352	14	0
264 000	357	15	9
275 000	361	16	8
286 000	366	17	7
297 000	371	18	6
308 000	376	19	5
319 000	381	20	4
330 000	387	21	3

LOW VOLTAGE WINDING LV1	
VOLTS	AMPERES
24 000	4600
26 000	4300
28 000	4000

IMPEDANCE @ 75 °C		
DIAL	HV - LV2	HV - LV1 + LV2
1	11.00%	11.00%
11	13.00%	13.00%
21	15.00%	15.00%

MAXIMUM SYMMETRICAL SHORT CIRCUIT CURRENT (5 sec)	
LV1	26.277 KA
LV2	26.277 KA
HV	3.747 KA

CTS LOCATIONS	PURPOSE
(A) BUSHING U	CLIENT USE
(B) BUSHING V	CLIENT USE
(C) BUSHING W	CLIENT USE
(D) BUSHING X	CLIENT USE
(E) BUSHING Y	CLIENT USE
(F) BUSHING Z	CLIENT USE
(G) BUSHING AA	CLIENT USE
(H) BUSHING AB	CLIENT USE
(I) BUSHING AC	CLIENT USE
(J) BUSHING AD	CLIENT USE

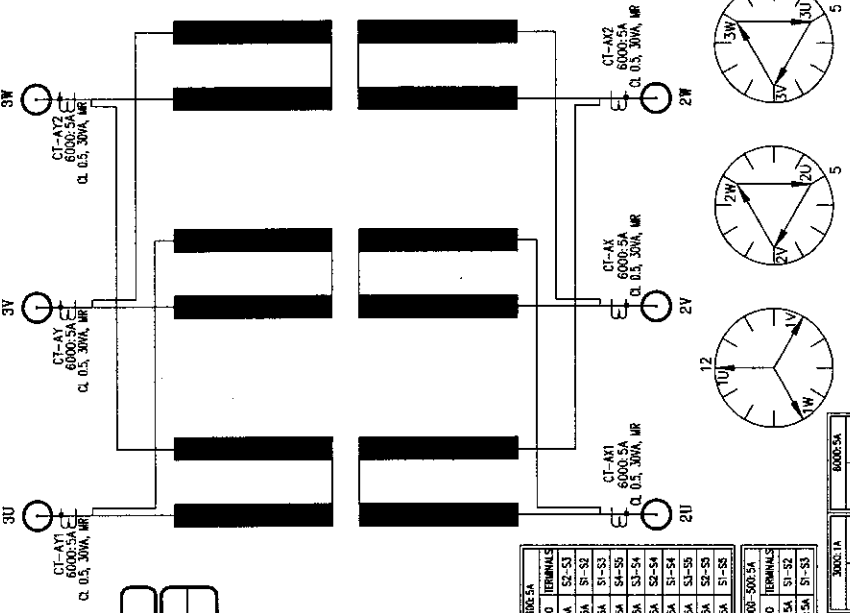
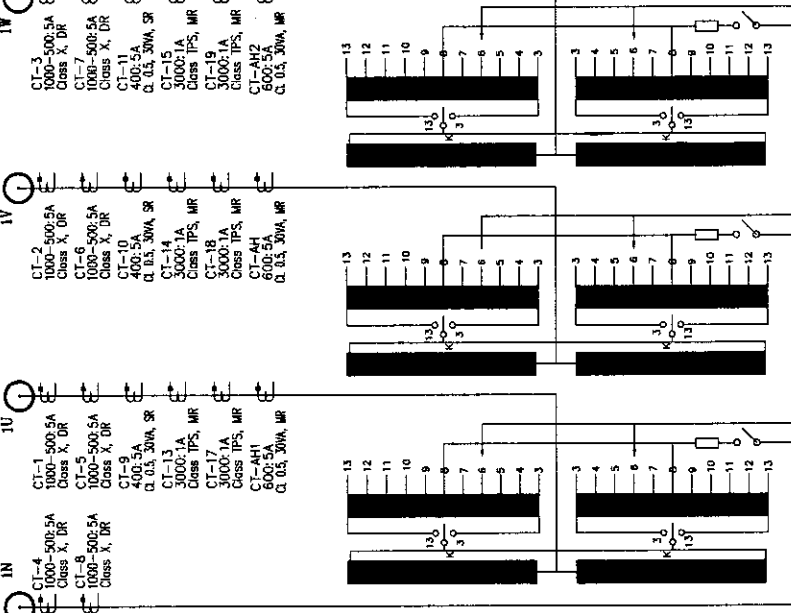
APPROXIMATE WEIGHTS (KGS)	
CORE AND COILS	190133
TANK AND FITTINGS	63190
MAIN TANK LIQUID (137903 LITS)	124113
CONSERVATOR TANK LIQUID (5117 LITS)	4605
LTC TANK LIQUID (170 LITS)	153
LTC CONSERVATOR TANK LIQUID (14 LITS)	13
NEUTRAL BUSHING TANK LIQUID (1339 LITS)	1205
NEUTRAL CONSERVATOR TANK LIQUID (57 LITS)	51
HV BUSHING'S TANK LIQUID (17337 LITS)	15603
HV CONSERVATOR'S TANK LIQUID (495 LITS)	446
RADIATOR'S & FITTINGS	86578
COOLING EQUIPMENT LIQUID (20698 LITS)	18628
TOTAL WEIGHT	507738
UNTANKING WEIGHT (HEAVIEST PIECE)	190133
SHIPPING WEIGHT (WITHOUT OIL)	237801

**CAUTION !**  
 1- BEFORE INSTALLING OR OPERATING READ INSTRUCTION MANUAL # G2277.  
 2- DO NOT OPERATE TRANSFORMER WHEN THE READING OF LIQUID LEVEL GAUGE IS BELOW THE LOW POINT OF THE SCALE.



**GENERATOR UNIT TRANSFORMER**  
 132/176/220 MVA, ONAN/ONAF1/ONAF2, 60 Hz.  
 THREE PHASE, DESIGN AMBIENT 50°C AND  
 HOT SPOT TEMPERATURE RISE OF 48°C, UP TO 1000 MASL,  
 PRIMARY : 380 KV ⚡  
 SECONDARY : 66/88/110 MVA, 13.8 KV ⚡

RATED WITHSTAND VOLTAGES (KV)		
HV LINE TERMINAL	S1	1050 LI 1425 AC 630
HV NEUTRAL	U	650 AC 275
LV1 LINE TERMINAL	LI	250 AC 95
LV2 LINE TERMINAL	LI	250 AC 95



**NOTES**  
 1- MAXIMUM OPERATING PRESSURES OF LIQUID PRESERVATION SYSTEM: 0 MPa (ATMOSPHERIC PRESSURE).  
 2- TANK DESIGNED FOR 0.103 MPa VACUUM FILLING.  
 3- ALL WINDINGS COPPER.  
 4- TO BE FILLED WITH MINERAL OIL WHICH CONTAIN NO DETECTABLE LEVEL OF PCB.

Ratio	Terminals	Ratio	Terminals
24000	21	66000	21-25
33000	22	88000	21-25
44000	23	110000	21-25
55000	24	138000	21-25
66000	25	176000	21-25
88000	26	220000	21-25
110000	27	286000	21-25

IRC - 60076 - 1  
 MANUFACTURE DATE: / 20...  
 PROLEC DE BLVD. CARLOS SALINAS DE GORTARI NM 9.25 APODACA, NL. 66600 MEXICO

MATERIAL: STAINLESS STEEL  
 DIMENSIONS: 26" x 12"  
 BLACK COLOR LETTERING

"TRANSFORMER DESIGNED FOR A NOMINAL HV(1) - LV(2) AND HV(1) - LV(3)  
 IMPEDANCE OF 13.00% @ 110 MVA (TOLERANCE +10% /- 0%).  
 FOR A NOMINAL HV(1) - LV(1) + LV(2) APPROX IMPEDANCE OF 15.00% @ 220 MVA  
 FOR A NOMINAL LV(1) - LV(2) APPROX IMPEDANCE OF 25.00% @ 110 MVA  
 THE ACTUAL MEASURED IMPEDANCE VALUE WILL BE SHOWN ON THE NAMEPLATE AFTER TESTS".



PROLEC GE ENGINEERING POWER DIVISION  
 http://www.prolecge.com

TITLE: NAMEPLATE  
 DFTM: AMPE 08/26/10  
 CHKD: FGG 08/26/10

PROJECTION	NONE
SCALE	NONE
DIMENSIONS IN:	NONE
REVISION:	0
DRAWING NO.:	G227709D802
SHEET:	1 of 1