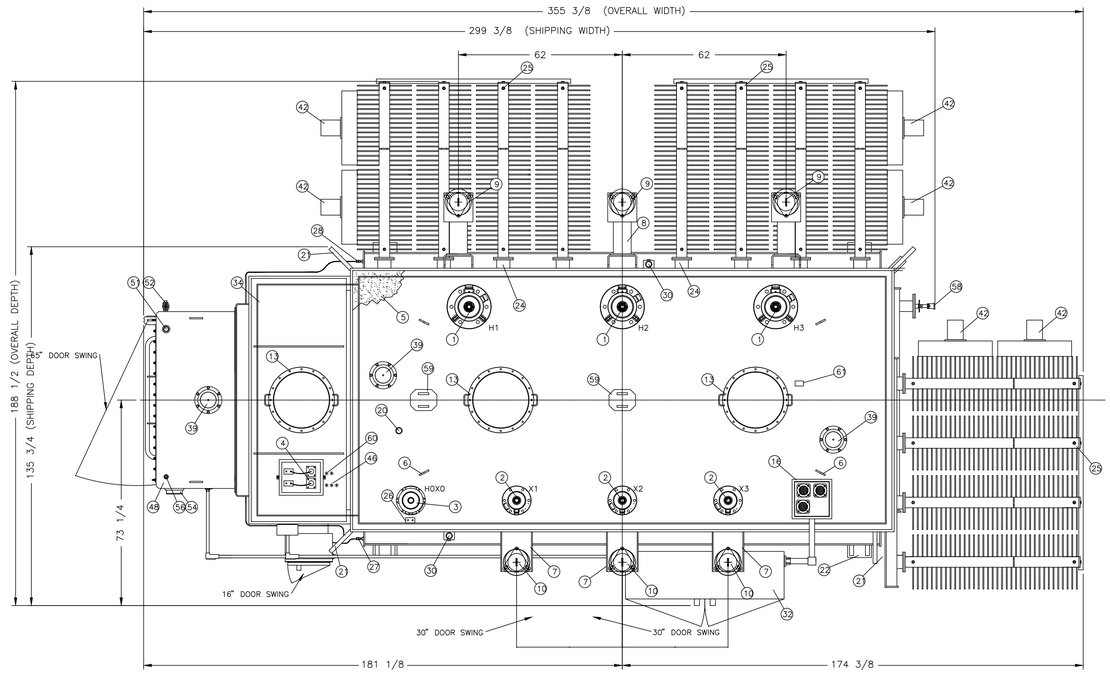


ITEM	QTY		DESCRIPTION
1	3	*	HV BUSHING, ABB, TYPE 'O+C' , #138Z0800AA, 138 KV, 800A, 550 KV BIL, 1.50–12 THD SILVER PLATED STUD (DRAW LEAD)
2	3	*	LV BUSHING, ABB, TYPE 'O+C' , #069Z2000AA, 69 KV, 2000A, 350 KV BIL, 1.50–12 THD SILVER PLATED STUD (BOTTOM CONNECTION)
3	1	*	HOXO BUSHING, ABB, TYPE 'O+C' , #025W0412AT, 25 KV, 600/1200A, 250 KV BIL, 1.50–12 THD SILVER PLATED STUD
4	2		TEMPERATURE BUSHING, PORCELAIN PRODUCTS #20008 (WITH GROUND PAD & STAINLESS STEEL NAMEPLATE)
5	1		NON–SKID COVER, WELDED
6	4		LIFTING LOOP FOR LIFTING COVER ONLY
7	3		LV SURGE ARRESTER MOUNTING
8	3	*	HV SURGE ARRESTER MOUNTING
9	3	*	HV ARRESTERS, HUBBELL, #MVN–108GA084AA, 108 kV RMS, 84 kV MCOV
10	3	*	LV ARRESTERS, HUBBELL, #MVN–054GA042AA, 54 kV RMS, 42 kV MCOV
11	1		LOGO
12	1		NAMEPLATE (STAINLESS STEEL)
13	3		BOLTED MANHOLE COVER WITH LIFTING HANDLES, Ø21" (ROUND) OPENING (ON RAISED FLANGES) (COVER WEIGHT 60#)
14	4	*	FAN CONNECTION BOX
15	1		CONDUIT JUNCTION BOX (NEMA 4)
16	1		CURRENT TRANSFORMER LEAD JUNCTION BOX
17	1		CHANNEL BASE, SEE BASE DETAIL
18	1		DE–ENERGIZED TAP CHANGER WARNING NAMEPLATE
19	2		TAP CHANGER MECHANISM FOR HV WINDING FOR DE–ENERGIZED OPERATION ONLY, PADLOCKING IN ANY POSITION
20	1		Ø2.00" NPT MALE CONNECTION FOR VACUUM FILLING, WELDED NIPPLE WITH CAP
21	4		LIFTING LUG FOR LIFTING COMPLETE UNIT
22	4		JACKING LUG WITH LIFING EYE FOR PULLING IN ALL DIRECTION (FULLY ASSEMBLED & OIL FILLED)
23	3	*	TYPICAL RADIATOR GROUP BRACING, SEE DRAWING #A–46623
24	24		RADIATOR SHUT–OFF VALVE
25	12	*	REMOVABLE RADIATOR, MOUNTED ON SHUT–OFF VALVE
26	5		GROUND PAD, (2) 0.5–13NC, 1.75" CENTER TO CENTER
27	1		Ø0.25" VALVE FOR GAS SAMPLING, UNITED #80–1/4
28	1		Ø0.25" VALVE FOR GAS SHUT–OFF, UNITED #80–1/4
29	1		GFI RECEPTACLE
30	2		Ø0.25" NPT FEMALE TEST CONNECTION WITH PLUG, GAS SPACE SEAL
31	1		REPAIR CABINET AND ASSEMBLY (NEMA 3R)
32	1		MAIN CONTROL CABINET 60 X 60 X 18 WITH 11 X 62 OPENING IN BOTTOM FOR USERS CONDUIT, PROVISIONS FOR PADLOCKING (NEMA 4)
33	2		WINDING TEMPERATURE INDICATOR, MESSKO #635–306683
34	1		PA COMPARTMENT
35	1		DRAIN CONNECTION – 2" GLOBE VALVE, UNITED # 125T–2
36	1		UPPER FILTER PRESS CONNECTION – 1" GLOBE VALVE, UNITED # 125T–2
37	2		SEALED WELL BULB FOR WINDING TEMPERATURE INDICATOR
38	1		LIQUID TEMPERATURE INDICATOR, WITH ADJUSTABLE CONTACTS, 0–160°C, MESSKO #635–306663
39	3		PRESSURE RELIEF DEVICE WITH ALARM CONTACTS, QUALITROL, (TWO ON MAIN TANK, ONE ON LTC), #LPRD–000–00026733
40	1		MAGNETIC LIQUID LEVEL GAUGE WITH LOW LEVEL ALARM CONTACTS, QUALITROL #032–028–01 CS10722
41	2		SUDDEN PRESSURE RELAY QUALITROL # 900–009–03 (ONE ON MAIN TANK, AND ONE ON LTC)
42	24	*	COOLING FAN, KRENZ # F26D–A10002, 230V, 1 PHASE, 1140 RPM, 22" DIA.
43	1		BOTTOM FILTER PRESS VALVE, UNITED # 125T–2
44	1		1/2" SAMPLING BALL VALVE, UNITED # 80–1/2
45	14		PROVISIONS FOR GROUNDING SURGE ARRESTERS
46	1		PA CORE GROUND NAMEPLATE
47	1		SEALED WELL BULB FOR MAIN TANK TEMPERATURE
48	1		LTC MECHANISM COMPARTMENT, REINHAUSEN, TYPE RMVII–1500
49	1		LTC HANDCRANK BOSS LOCATED INSIDE MOTOR DRIVE COMPARTMENT
50	1		LTC POSITION INDICATOR
51	1		LTC Ø2.00" VACUUM CONNECTION, WELDED NIPPLE WITH CAP
52	1		LTC Ø1.00" FLANGE MOUNTED DRAIN VALVE, UNITED
53	1		LTC MOTOR DRIVE HOUSING
54	1		LTC LIQUID LEVEL GAUGE
55	1	*	LTC DEHYDRATING BREATHER
56	1		LTC Ø1.00" FILL PLUG, WELDED NIPPLE WITH CAP
57	2		TAP CHANGER IDENTIFICATION NAMEPLATE
58	1		TAP CHANGER LOCKING DEVICE
59	2		PROVISIONS FOR MOUNTING UNI–HOIST (FOR SAFETY HARNESS WAIVER)
60	1		MAIN CORE GROUND NAMEPLATE
61	1		LTC CORE GROUND NAMEPLATE

NOTES:

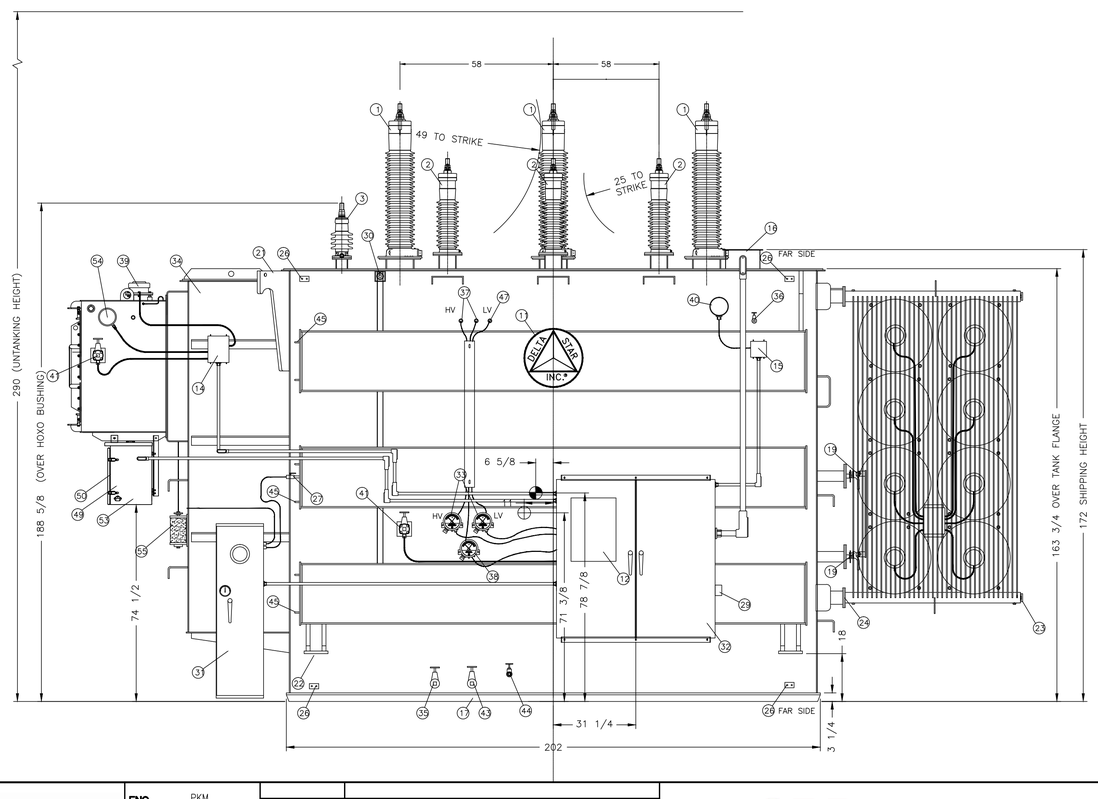
* 1.	ITEMS REMOVED FOR SHIPMENT
2.	TANK DESIGNED FOR FULL VACUUM
3.	MANUFACTURED IN ACCORDANCE WITH ANSI & NEMA
4.	PAINT FINISH: ANSI #70 LIGHT GRAY
5.	ALL DIMENSIONS ARE IN INCHES
**6.	MARK "MAIN" CORE GROUND
7.	UNIT DESIGNED FOR RAIL SHIPMENT
8.	IMPACT RECORDER REQUIRED
9.	RIGID CONDUIT REQUIRED
10.	SPARE GASKETS REQUIRED
11.	DESIGNED FOR –20°C
12.	ALL EXTERNAL HARDWARE IS STAINLESS STEEL, WITH SILICON BRONZE NUTS
**13.	MARK "PA" CORE GROUND
14.	UNIT TO BE SHIPPED WITHOUT OIL IN MAIN TANK & LTC (OIL TO BE INHIBITED 0.3 DBPC)

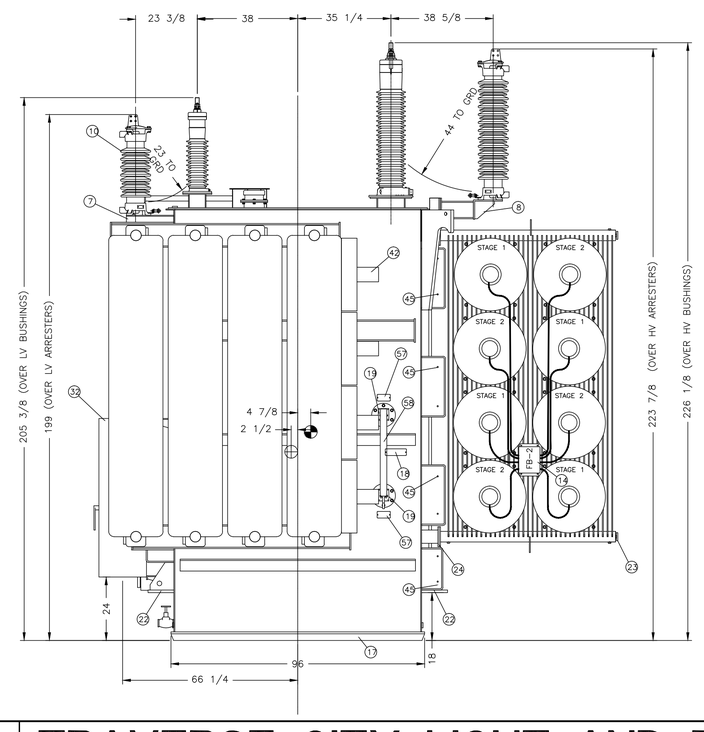
OPERATING CENTER OF GRAVITY

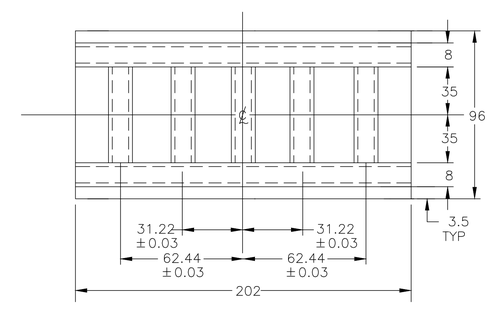
SHIPPING CENTER OF GRAVITY WITHOUT OIL

SHIPPING WITHOUT OIL 182,000 LBS.

APPROXIMATE WEIGHTS (POUNDS)			
UNTANKING (CORE & COIL) ***			133,000
TANK & FITTINGS			75,500
OIL	MAIN TANK	(11,215 GAL.)	98,500
	RADIATORS	(1,555 GAL.)	
	LTC	(345 GAL.)	
	TOTAL	(13,115 GAL.)	
TOTAL			307,000
*** INCLUDES 9,200 LBS, PREVENTIVE AUTO			







BASE DETAIL
BOTTOM VIEW
NOTE: BASE DESIGNED TO BE PLACED ON FLAT PAD OR 2 PIERS

TRAVERSE CITY LIGHT & POWER P.O. # 10–0373.01 S.O. # E4087

MVA	90/120/150//168
PHASE	3
HERTZ	60
CLASS	ONAN/ONAF/ONAF
RISE	55/65° C
PRIMARY VOLTAGE (kV)	138 GRD Y / 79.67
SECONDARY VOLTAGE (kV)	69 GRD Y / 39.84

TRAVERSE CITY LIGHT & POWER
Investing Our Energy In You

ENG.	PKM
DR	RAS
CK	PKM
APP	MALANEY

DATE	ISSUED FOR
1/6/2014	RECORD DRAWINGS
8/28/2012	CONSTRUCTION

GRP Engineering, Inc.
PETOSKEY, MICHIGAN, 231–439–9683
GRAND RAPIDS, MICHIGAN, 616–942–7183

TRAVERSE CITY LIGHT AND POWER

EAST HAMMOND SUBSTATION — TRAVERSE CITY, MICHIGAN

TRANSFORMER NO.1 (90MVA) - OUTLINE DIAGRAM

PROJECT NUMBER: 10-0396.01

DRAWING NUMBER: 850