

NOTE: PROVIDE 3/16" MOUNTING HOLES.

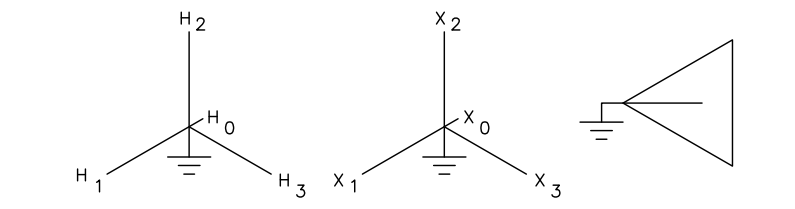
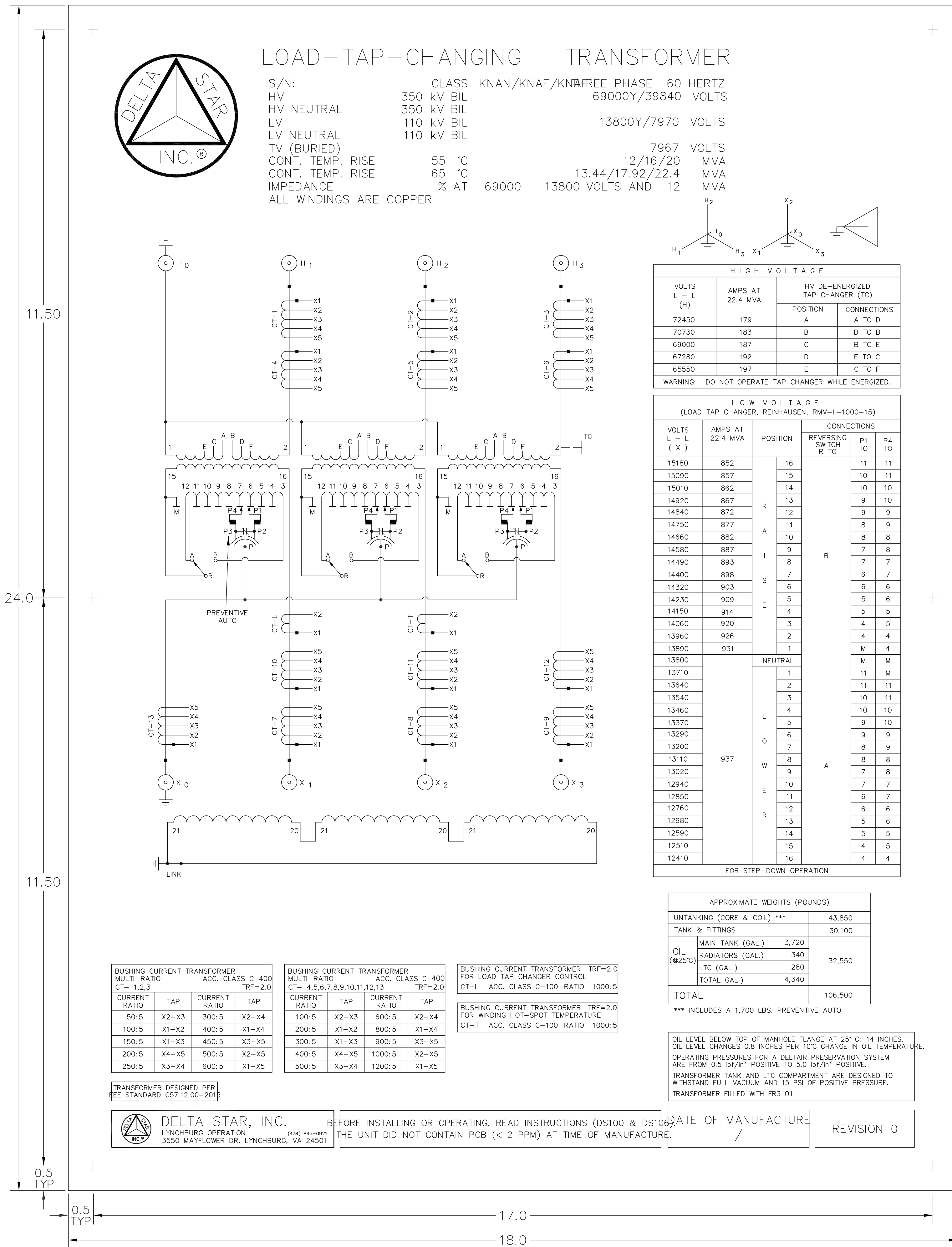


# LOAD-TAP-CHANGING TRANSFORMER

S/N: CLASS KNAN/KNAP/KNAP FREE PHASE 60 HERTZ  
 HV 350 kV BIL 69000Y/39840 VOLTS  
 HV NEUTRAL 350 kV BIL  
 LV 110 kV BIL 13800Y/7970 VOLTS  
 LV NEUTRAL 110 kV BIL  
 TV (BURIED) 7967 VOLTS  
 CONT. TEMP. RISE 55 °C 12/16/20 MVA  
 CONT. TEMP. RISE 65 °C 13.44/17.92/22.4 MVA  
 IMPEDANCE % AT 69000 - 13800 VOLTS AND 12 MVA  
 ALL WINDINGS ARE COPPER

NOTE: TRANSFORMER IS DESIGNED FOR A NOMINAL 8.0% IMPEDANCE AT 69 - 13.8 KV ON A 12 MVA BASE, WITH A 7.5% STANDARD TOLERANCE. MEASURED IMPEDANCE VALUE TO BE ADDED AFTER FACTORY TESTING.

SERIAL NUMBER	MVA	VOLTAGE (KV)	IMPEDANCE (%)
E4887	12	69 - 13.8	-
E4888	12	69 - 13.8	-



VOLTS L-L (H)	AMPS AT 22.4 MVA	HV DE-ENERGIZED TAP CHANGER (TC) CONNECTIONS	
		POSITION	CONNECTIONS
72450	179	A	A TO D
70730	183	B	D TO B
69000	187	C	B TO E
67280	192	D	E TO C
65550	197	E	C TO F

WARNING: DO NOT OPERATE TAP CHANGER WHILE ENERGIZED.

VOLTS L-L (X)	AMPS AT 22.4 MVA	POSITION	CONNECTIONS	
			REVERSING SWITCH R TO	P1 TO P4 TO
15180	852	16		11 11
15090	857	15		10 11
15010	862	14		10 10
14920	867	13		9 10
14840	872	12		9 9
14750	877	11		8 9
14660	882	10		8 8
14580	887	9		7 8
14490	893	8		7 7
14400	898	7		6 7
14320	903	6		6 6
14230	909	5		5 6
14150	914	4		5 5
14060	920	3		4 5
13960	926	2		4 4
13890	931	1		M 4
13800			NEUTRAL	M M
13710		1		11 M
13640		2		11 11
13540		3		10 11
13460		4		10 10
13370		5		9 10
13290		6		9 9
13200		7		8 9
13110		8		8 8
13020		9		7 8
12940		10		7 7
12850		11		6 7
12760		12		6 6
12680		13		5 6
12590		14		5 5
12510		15		4 5
12410		16		4 4

FOR STEP-DOWN OPERATION

APPROXIMATE WEIGHTS (POUNDS)	
UNTANKING (CORE & COIL) ***	43,850
TANK & FITTINGS	30,100
OIL (25°C)	
MAIN TANK (GAL.)	3,720
RADIATORS (GAL.)	340
LTC (GAL.)	280
TOTAL GAL.	4,340
TOTAL	106,500

\*\*\* INCLUDES A 1,700 LBS. PREVENTIVE AUTO

OIL LEVEL BELOW TOP OF MANHOLE FLANGE AT 25° C. 14 INCHES.  
 OIL LEVEL CHANGES 0.8 INCHES PER 10°C CHANGE IN OIL TEMPERATURE.  
 OPERATING PRESSURES FOR A DELTAIR PRESERVATION SYSTEM ARE FROM 0.5 lbf/in² POSITIVE TO 5.0 lbf/in² POSITIVE.  
 TRANSFORMER TANK AND LTC COMPARTMENT ARE DESIGNED TO WITHSTAND FULL VACUUM AND 15 PSI OF POSITIVE PRESSURE.  
 TRANSFORMER FILLED WITH FR3 OIL.

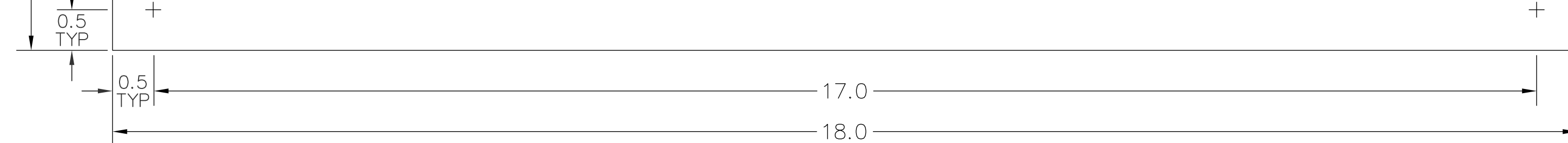
BUSHING CURRENT TRANSFORMER MULTI-RATIO ACC. CLASS C-400 TRF=2.0			
CURRENT RATIO	TAP	CURRENT RATIO	TAP
50:5	X2-X3	300:5	X2-X4
100:5	X1-X2	400:5	X1-X4
150:5	X1-X3	450:5	X3-X5
200:5	X4-X5	500:5	X2-X5
250:5	X3-X4	600:5	X1-X5

TRANSFORMER DESIGNED PER IEEE STANDARD C57.12.00-2015



DELTA STAR, INC. LYNCHBURG OPERATION (434) 845-0921 3550 MAYFLOWER DR. LYNCHBURG, VA 24501  
 BEFORE INSTALLING OR OPERATING, READ INSTRUCTIONS (DS100 & DS100) THE UNIT DID NOT CONTAIN PCB (< 2 PPM) AT TIME OF MANUFACTURE.

DATE OF MANUFACTURE / REVISION 0



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APP	DATE	ISSUED FOR
ENG. NMA		
DR JPB		
CK NMA	12-30-2020	RECORD DRAWINGS
APP MPM	02-21-2020	CONSTRUCTION

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

**TRAVERSE CITY LIGHT & POWER**  
 BARLOW SUBSTATION - 69KV SWITCH STATION  
 TRANSFORMER NO.1 - NAMEPLATE DIAGRAM  
 TRAVERSE CITY, MICHIGAN

PROJECT NUMBER	DRAWING NUMBER
19-1025.01	861

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