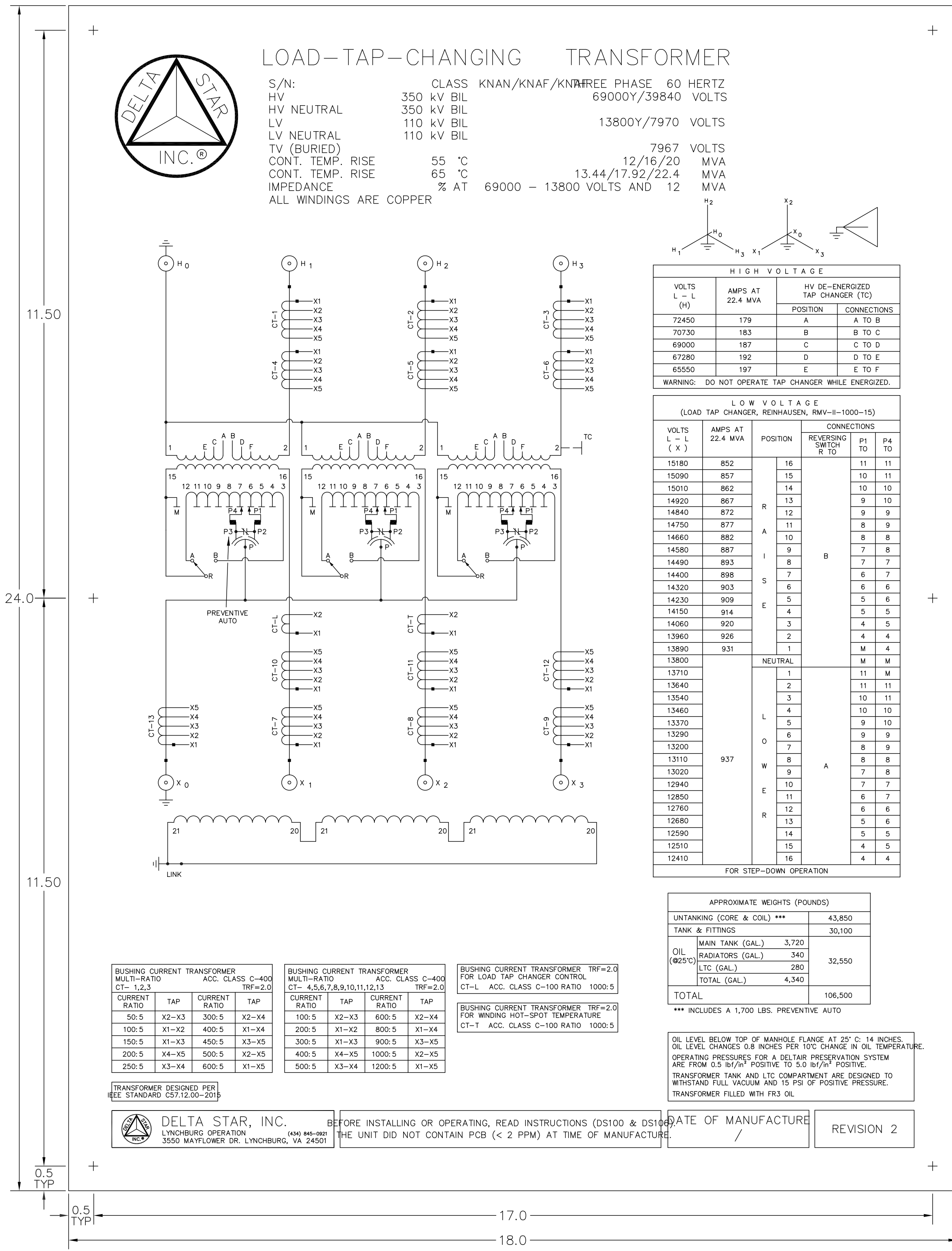




LOAD-TAP-CHANGING TRANSFORMER

S/N: CLASS KNAN/KNAF/KNATREE 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



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

WARNING: DO NOT OPERATE TAP CHANGER WHILE ENERGIZED.

LOW VOLTAGE (LOAD TAP CHANGER, REINHAUSEN, RMV-II-1000-15)				
VOLTS (L-L)	AMPS AT 22.4 MVA	POSITION	REVERSING SWITCH RATIO	CONNECTIONS P1 TO P4
15180	852		16	11 11
15090	857		15	10 11
15010	862		14	10 10
14920	867	R	13	9 10
14840	872		12	9 9
14750	877		11	8 9
14660	882	A	10	8 8
14580	887		9	7 8
14490	893	I	8	7 7
14400	898	S	7	6 7
14320	903		6	6 6
14250	909	E	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		L	4	10 10
13370			5	9 10
13290		O	6	9 9
13200			7	8 9
13110	937	W	8	8 8
13020			9	7 8
12940		E	10	7 7
12850			11	6 7
12760		R	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)	
UNTANNING (CORE & COIL) ***	43,850
TANK & FITTINGS	30,100
OIL (98% ¹)	
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 1°C CHANGE IN OIL TEMPERATURE.
 OPERATING PRESSURES FOR A DELTA STAR PRESERVATION SYSTEM ARE FROM 0.5 PSI/IN² POSITIVE TO 5.0 PSI/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
 3550 MAYFLOWER DR. LYNCHBURG, VA 24501

BEFORE INSTALLING OR OPERATING, READ INSTRUCTIONS (DS100 & DS101) DATE OF MANUFACTURE /
 THE UNIT DID NOT CONTAIN PCB (< 2 PPM) AT TIME OF MANUFACTURE

REVISION 2

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

SERIAL NUMBER	MVA	VOLTAGE (kV)	IMPEDANCE (%)
E4887	12	69 - 13.8	7.92
E4888	12	69 - 13.8	7.95

TRAVERSE CITY LIGHT & POWER
 BARLOW SUBSTATION #1 AND #2
 P.O. # P-2017-1462
 S.O. # E4887, E4888

SCALE: NTS
 DWF: BY/DATE
 BH: 12/20/17
 CRK: BY/DATE
 NBL: 12/20/17

DELTA STAR, INC.
 LYNCHBURG OPERATION
 3550 MAYFLOWER DR. LYNCHBURG, VA. 24501

NAMEPLATE
 E488710 1 OF 4

P:\19-1025.01.TCL&P.BARLOW SWITCHING STATION\PPS\BW-871 (WIRING DIAGRAM T2 NAMEPLATE).DWG ##### 12/20/2017 10:16:36 AM



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

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

TRAVERSE CITY LIGHT & POWER
 BARLOW SUBSTATION - 69kV SWITCH STATION
 TRAVERSE CITY, MICHIGAN

TRANSFORMER NO.2 - NAMEPLATE DIAGRAM

PROJECT NUMBER	19-1025.01	DRAWING NUMBER	871
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