

GUIDE FOR INSTALLATION AND MAINTENANCE OF DRY TYPE TRANSFORMERS

CAUTION

DANGER

DO NOT REMOVE COVERS OR WORK ON TRANSFORMER
UNLESS POWER HAS BEEN TURNED OFF AND ALL CIR-
CUITS DE-ENERGIZED AND DISCONNECTED.

USE PROPER SAFETY PRECAUTIONS WHEN WORKING ON
THIS EQUIPMENT.

SCOPE

This guide covers general recommendations for the operation and maintenance of Dry-Type Distribution Transformers.

LOCATION

Ventilated dry-type transformers normally are designed for installation indoors in dry locations. They will operate successfully where the humidity is high but under this condition it may be necessary to take precautions to keep them dry if they are shut down for appreciable periods. Locations where there is dripping water should be avoided. If this is not possible, suitable protection should be provided to prevent water from entering the transformer case. Precautions should be taken to guard against accidental entrance of water, such as might be obtained from an open window, by a break in a water or steam line, or from use of water near the transformers.

Adequate ventilation is essential for the proper cooling of transformers. Clean dry air is desirable. Filtered air may reduce maintenance if the location presents a particular problem. When transformers are installed in vaults or other restricted spaces, sufficient ventilation should be provided to hold the air temperature within established limits when measured near the transformer inlets. This usually will require approximately 100 cubic feet of air per minute per kilowatt of transformer loss. The area of ventilating openings required depends on the height of vault, the location of openings, and the maximum loads to be carried by the transformers. For self-cooled transformers, the required effective area should be at least one square foot each of inlet and outlet per 100 kva of rated transformer capacity, after deduction of the area occupied by screens, gratings, or louvers.

Ventilated dry-type transformers should be installed in locations free from unusual dust producing mediums or chemical fumes. Transformers should be located at least 12 inches away from walls or other obstructions that might prevent free circulation of air through and around each unit. The distance between adjacent transformers should not be less than this value. Also accessibility for maintenance should be taken into account in locating a transformer. If the transformer is to be located near combustible materials, the minimum separation established by the National Electrical Code should be maintained.

The transformer case is designed to prevent the entrance of most small animals and foreign objects. However, in some locations, it may be necessary to give considerations to additional protection.

If noise is a factor in the location and operation of any transformers, special consideration should be given to the installation of the equipment.

The impulse strength of these transformers is less than that of liquid-immersed units of the same voltage class. If there is any likelihood that transformers will be exposed to lightning or severe switching surges, adequate protective equipment should be provided.

INSPECTION

New transformers should be inspected when received for damage during shipment. Examination should be made before removing from cars or trucks and if any injury is evident or any indication of rough handling is visible, a claim should be filed with the carrier at once and the manufacturer should be notified.

Subsequently, covers or panels should be removed and an internal inspection made for injury or displacement of parts, loose or broken connections, cracked porcelain, dirt or foreign material, and for the presence of free water or moisture. Corrective measures should be taken where necessary. Shipping braces should be removed if present.

After a transformer is moved, or if it is stored before installation, this inspection should be repeated before placing the transformer in service.

Before placing in service, the operation of fans, motors, thermal relays, and other auxiliary devices should be checked.

HANDLING

Ventilated dry-type transformers can be handled very much like liquid-immersed transformers except that somewhat greater care may be required because of the lighter case. If it is necessary to handle ventilated dry-type transformers outdoors during inclement weather they should be thoroughly protected against the entrance of rain or snow.

The transformer as supplied have provision for overhead lift (without the use of spreaders) or skid movable.

GROUNDING

The case and core assembly of these transformers should be permanently and adequately grounded.

STORAGE

Ventilated dry-type transformers preferably should be stored in a warm dry location with uniform temperature. Ventilating openings should be covered to keep out dust. If it is necessary to leave a transformers outdoors it should be thoroughly protected to prevent moisture and foreign material from entering.

Condensation and the absorption of moisture can be prevented or greatly reduced by the installation of space heaters or other small electric heaters.

PERIODIC INSPECTION AND MAINTENANCE

Like other electric equipment, these transformers require maintenance from time to time to assure successful operation. Inspection should be made at regular intervals and corrective measures taken when necessary to assure the most satisfactory service from this equipment.

The frequency at which these transformers should be inspected depends on operating conditions. For clean dry locations an inspection annually, or after a longer period, may be sufficient. However, for other locations, such as may be encountered where the air is contaminated with dust or chemical fumes, an inspection at three or six month intervals may be required.

Usually after the first few inspection periods a definite schedule can be set up based on the existing conditions.

With the transformer deenergized, covers over openings in the case should be removed. Inspections should be made for dirt, especially accumulations on insulating surfaces or for those which tend to restrict air flow, for loose connections, for the condition of tap changers or terminal boards, and for the general condition of the transformer. Observation should be made for signs of overheating and of voltage creepage over insulating surfaces as evidenced by tracking or carbonization.

Evidence of rusting, corrosion, and deterioration of the paint should be checked, and corrective measures taken where necessary.

CLEANING

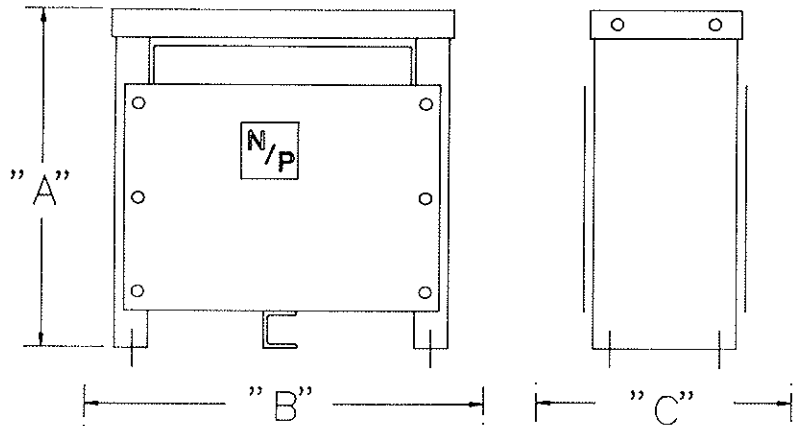
If excessive accumulations of dirt are found on the transformer windings or insulators when the transformer is inspected, the dirt should be removed to permit free circulation of air and to guard against the possibility of insulation breakdowns. Particular attention should be given to cleaning top and bottom ends of winding assemblies, and to cleaning out ventilating ducts.

The windings may be cleaned with a vacuum cleaner, a blower, or with compressed air. The use of a vacuum cleaner is preferred as the first step in cleaning followed by the use of compressed air or nitrogen. The compressed air or nitrogen should be clean and dry and should be applied at a relatively low pressure (not over 25 pounds per square inch). Lead supports, tap changers and terminal boards, bushings, and other major insulating surfaces should be brushed or wiped with a dry cloth. The use of liquid cleaners is undesirable because some of them have a solvent or deteriorating effect on most insulating materials.

PM PRT#	MODEL #	LUG SIZED FOR	ENCLOSURE	WT.
PM7248	DTS10XTMV	#8 AWG	150	250
PM7249	DTS15XTMV	#6 AWG	150	300
PM7251	DTS25XTMV	#2 AWG	200	500
PM7253	DTS45XTMV	1/0 AWG	200	710
PM7255	DTS62.5XTMV	4/0 AWG	350	1100
PM7256	DTS100XTMV	(2) 2/0 AWG	350	1400
PM7257	DTS125XTMV	(2) 4/0 AWG	350	1750
PM7258	DTS150XTMV	(2) 350 MCM	500	2100
PM7259	DTS225XTMV	(2) 350 MCM	500	2600
PM7260	DTS250XTMV	(3) 350 MCM	500	3100
PM7261	DTS350XTMV	(4) 350 MCM	675	3600
PM7262	DTS500XTMV	(4) 500 MCM	675	
	DTS750XTMV	(6) 500 MCM	775	
	DTS1000XTMV	(8) 500 MCM	775	
	DTS1500XTMV	(8) 750 MCM	775	

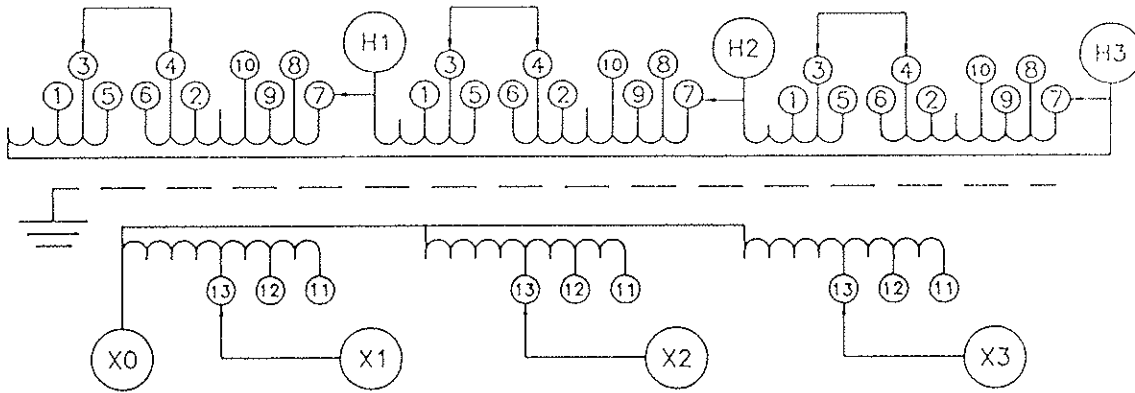
NOTES: 3R AFTER MODEL # DESIGNATES
RAIN SHIELDS SUPPLIED WITH UNITS.

ENCLOSURE	DIMENSIONS		
	"A"	"B"	"C"
150	23"	23"	15"
200	28"	26"	18"
350	36"	33"	21"
500	46"	43"	28"
675	61"	56"	36"
775	74"	68"	44"



SPECIFICATION SHEET

PRIMARY CONNECTION SEE PAGES 8-11



SECONDARY CONNECTION SEE PAGE 12

	VOLTAGES				LINE JUMPERS				TAPS	LINES ON
P R I	504	439	404	232	7	8	9	10	6-5	H1-H2-H3
	492	427	392	220	7	8	9	10	5-4	
	480	415	380	208	7	8	9	10	4-3	
	468	403	368	196	7	8	9	10	3-2	
	456	391	356	184	7	8	9	10	2-1	
S E C	480 Y/ 277				11 11 11					X0-X1-X2-X3
	380 Y/ 220				12 12 12					
	208 Y/ 120				13 13 13					

Ph 3 Hz 50/60

Pri 480/415/380/208 Δ W/(2) 2 1/2% FCAN & BN

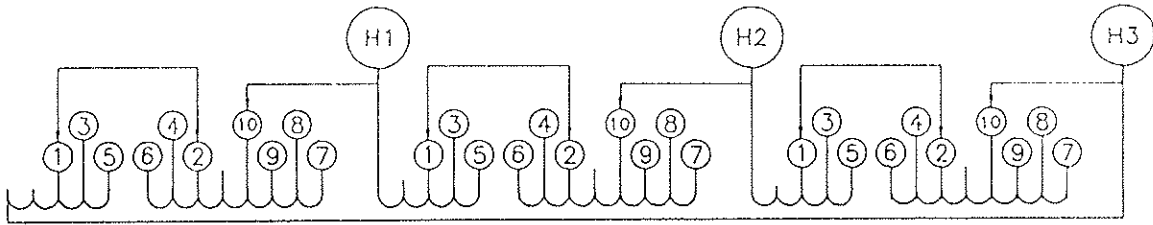
Sec 480/380/208 Y 4W

Const NEMA1 Type ISOL

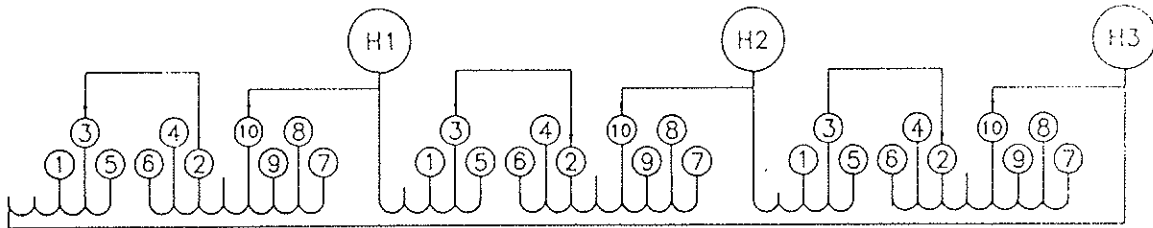
T Rise 115° C Ins Cl 220

Finish ANSI 61 GRAY

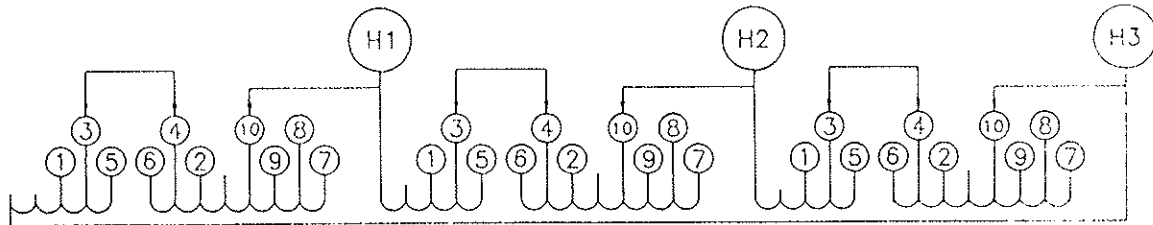
PRIMARY 184V



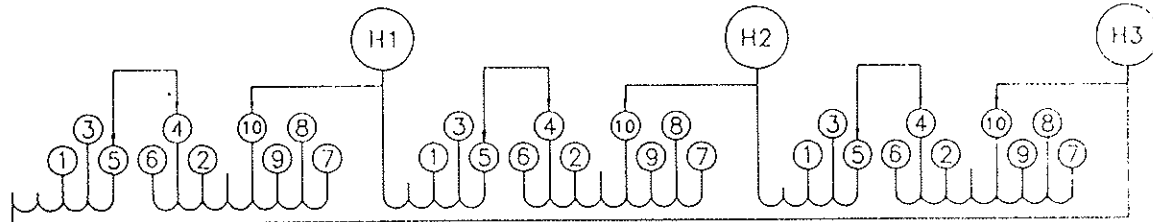
PRIMARY 196V



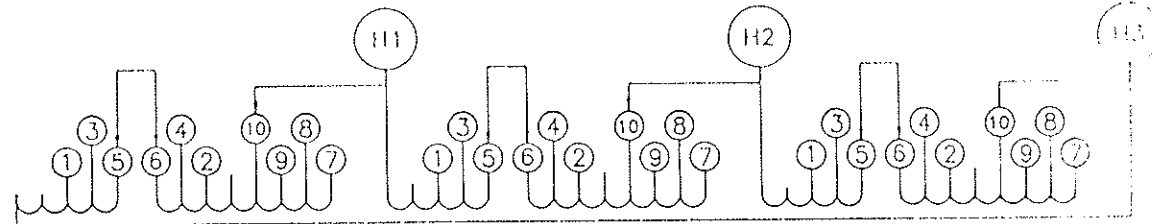
PRIMARY 208V



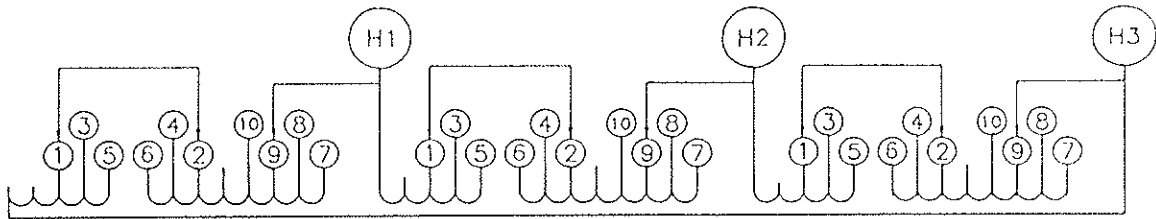
PRIMARY 220V



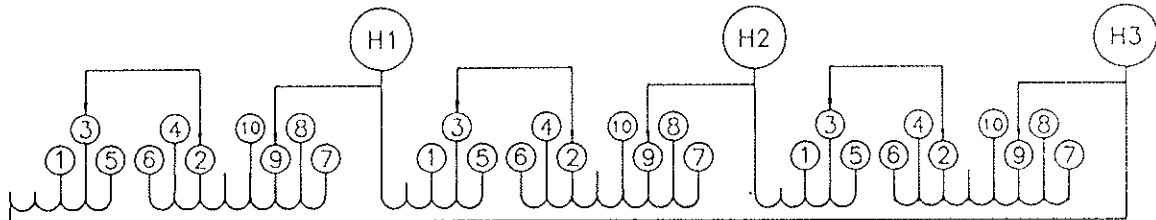
PRIMARY 232V



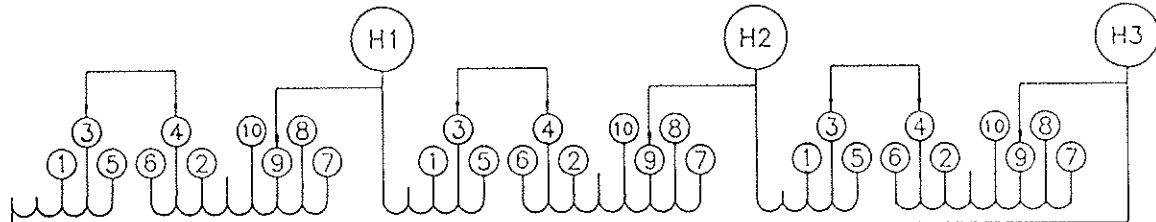
PRIMARY 356V



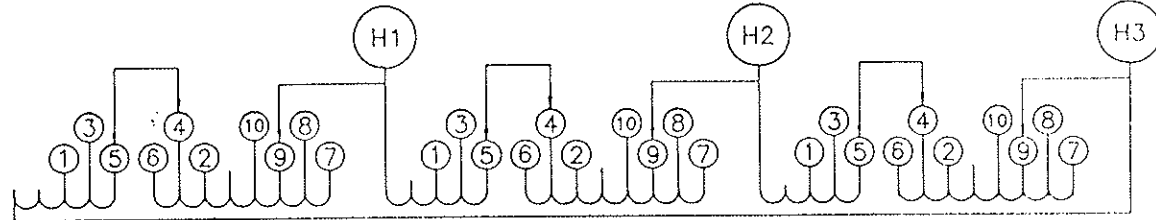
PRIMARY 368V



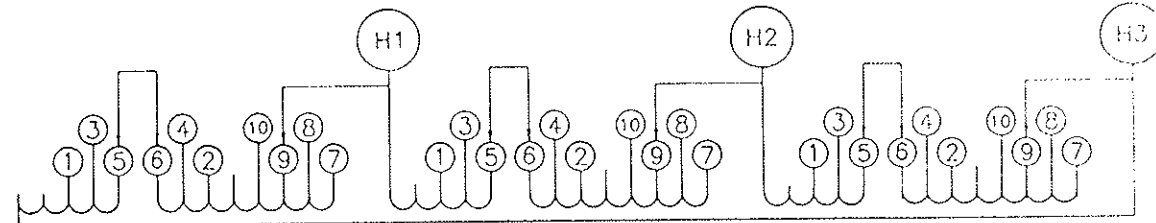
PRIMARY 380V



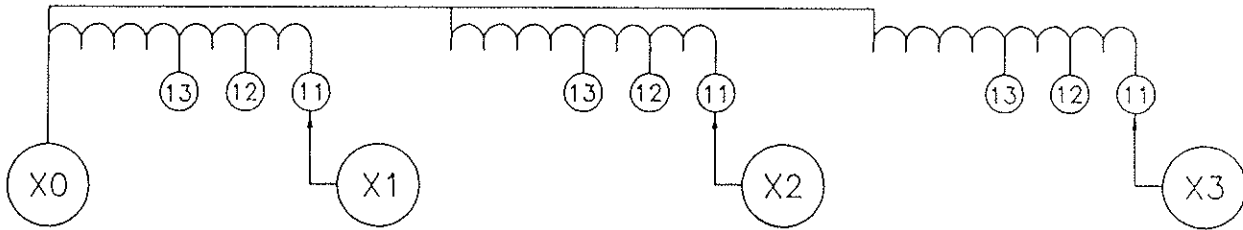
PRIMARY 392V



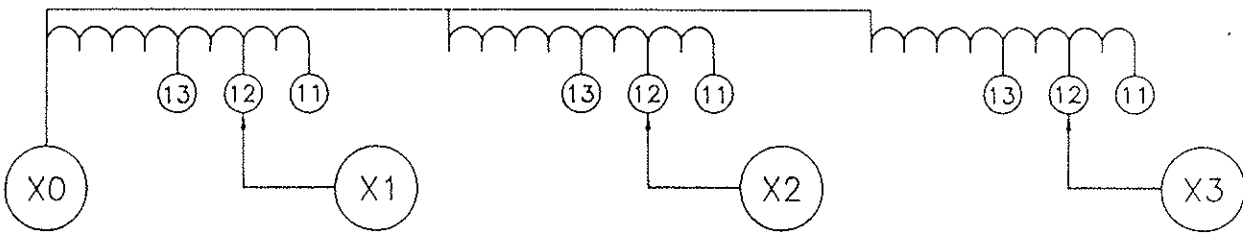
PRIMARY 404V



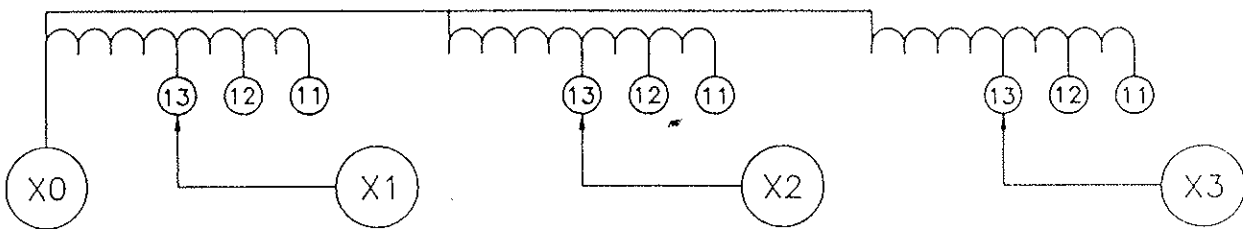
SECONDARY 480 Y / 277



SECONDARY 380 Y / 220



SECONDARY 208 Y / 120



POWER TRANSFORMER CONNECTION CHART

INCOMING PRIMARY VOLTAGE	CONNECT INCOMING LINES AS FOLLOWS	CONNECT EACH WINDING TAP AS FOLLOWS
504	L1-H1-7, L2-H2-7, L3-H3-7	6 - 5
492	L1-H1-7, L2-H2-7, L3-H3-7	5 - 4
480	L1-H1-7, L2-H2-7, L3-H3-7	4 - 3
468	L1-H1-7, L2-H2-7, L3-H3-7	3 - 2
456	L1-H1-7, L2-H2-7, L3-H3-7	2 - 1
439	L1-H1-8, L2-H2-8, L3-H3-8	6 - 5
427	L1-H1-8, L2-H2-8, L3-H3-8	5 - 4
415	L1-H1-8, L2-H2-8, L3-H3-8	4 - 3
403	L1-H1-8, L2-H2-8, L3-H3-8	3 - 2
391	L1-H1-8, L2-H2-8, L3-H3-8	2 - 1
404	L1-H1-9, L2-H2-9, L3-H3-9	6 - 5
392	L1-H1-9, L2-H2-9, L3-H3-9	5 - 4
380	L1-H1-9, L2-H2-9, L3-H3-9	4 - 3
368	L1-H1-9, L2-H2-9, L3-H3-9	3 - 2
356	L1-H1-9, L2-H2-9, L3-H3-9	2 - 1
232	L1-H1-10, L2-H2-10, L3-H3-10	6 - 5
220	L1-H1-10, L2-H2-10, L3-H3-10	5 - 4
208	L1-H1-10, L2-H2-10, L3-H3-10	4 - 3
196	L1-H1-10, L2-H2-10, L3-H3-10	3 - 2
184	L1-H1-10, L2-H2-10, L3-H3-10	2 - 1

OUTGOING
SECONDARY
VOLTAGE

CONNECT OUTGOING
LINES AS FOLLOWS

480/277	L1-H1-11, L2-H2-11, L3-H3-11,N-X0
380/220	L1-H1-12, L2-H2-12, L3-H3-12,N-X0
208/120	L1-H1-13, L2-H2-13, L3-H3-13,N-X0