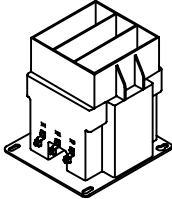
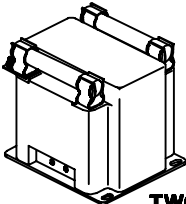
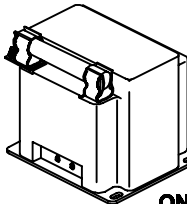
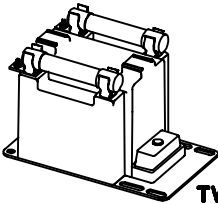
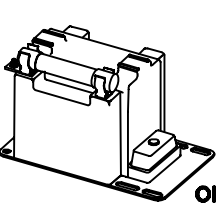
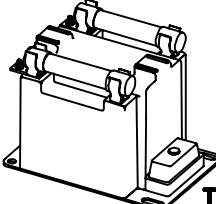
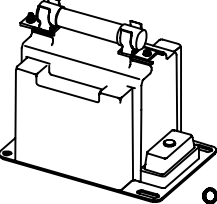
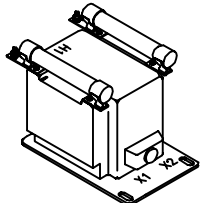
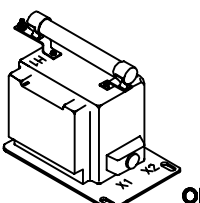
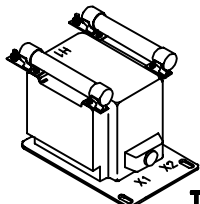
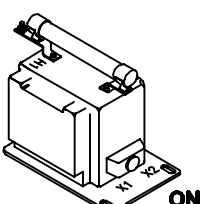
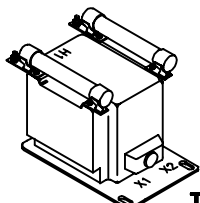
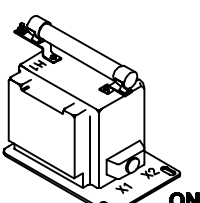
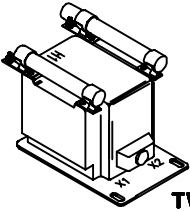
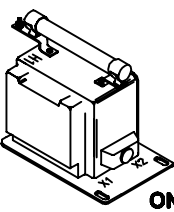
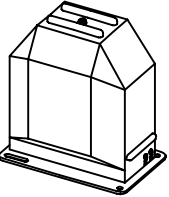
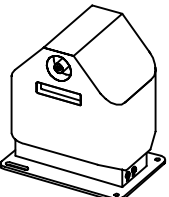
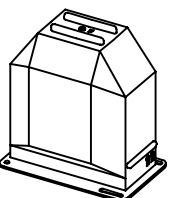
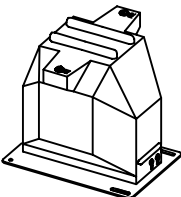
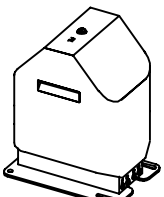
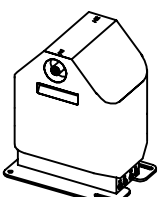
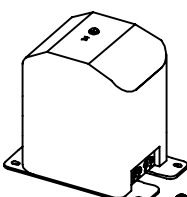


VOLTAGE TRANSFORMERS

**MEDIUM VOLTAGE
FROM 5kV TO 34.5kV**

VOLTAGE TRANSFORMER GROUPS					3
APPLICATION NOTES					4
	MODEL	OVERALL SIZE	VOLTAGE CLASS	PAGE	5
	3PT3-60	W8.94 H9.50 D8.50	5kV		
		MODELS	OVERALL SIZE	VOLTAGE CLASS	PAGE
TWO FUSE	ONE FUSE	PT3-1-45 PT3-2-45	W6.82 H6.03 D5.63	5kV	6
		MODELS	OVERALL SIZE	VOLTAGE CLASS	PAGE
TWO FUSE	ONE FUSE	PTG3-1-60 PTG3-2-60	W10.85 H7.07 D6.38	5kV	8
		MODELS	OVERALL SIZE	VOLTAGE CLASS	PAGE
TWO FUSE	ONE FUSE	PTW3-1-60 PTW3-2-60	W9.31 H8.00 D6.38	5kV	10
		MODELS	OVERALL SIZE	VOLTAGE CLASS	PAGE
TWO FUSE	ONE FUSE	PTG4-1-75 PTG4-2-75	W13.13 H13.06 D10.63	8.7kV	12
		MODELS	OVERALL SIZE	VOLTAGE CLASS	PAGE
TWO FUSE	ONE FUSE	PTW4-1-75 PTW4-2-75	W15.50 H12.17 D9.25	8.7kV	14
		MODELS	OVERALL SIZE	VOLTAGE CLASS	PAGE
TWO FUSE	ONE FUSE	PTG5-1-110 PTG5-2-110	W13.69 H13.06 D10.63	15kV	16

		<p>MODELS</p> <p>PTW5-1-110 PTW5-2-110</p>	<p>OVERALL SIZE</p> <p>W15.50 H12.17 D9.25</p>	<p>VOLTAGE CLASS</p> <p>15kV</p>	<p>PAGE</p> <p>18</p>	
<p>TWO FUSE ONE FUSE</p>						
	<p>MODEL</p> <p>PT6-1-125</p>	<p>OVERALL SIZE</p> <p>W13.75 H13.44 D9.50</p>	<p>VOLTAGE CLASS</p> <p>25kV</p>	<p>PAGE</p> <p>20</p>		
<p>ONE BUSHING</p>						
	<p>MODEL</p> <p>PT6-2-125</p>	<p>OVERALL SIZE</p> <p>W13.75 H15.00 D9.50</p>	<p>VOLTAGE CLASS</p> <p>25kV</p>	<p>PAGE</p> <p>22</p>		
<p>TWO BUSHING</p>						
	<p>MODEL</p> <p>PT7-1-150 PT7-1-200</p>	<p>OVERALL SIZE</p> <p>W13.75 H14.94 D9.50</p>	<p>VOLTAGE CLASS</p> <p>34.5kV</p>	<p>PAGE</p> <p>24</p>		
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<p>TWO BUSHING</p>						
	<p>MODELS</p> <p>PT7-2-150 PT7-2-200</p>	<p>OVERALL SIZE</p> <p>W16.50 H15.75 D16.25</p>	<p>VOLTAGE CLASS</p> <p>34.5kV</p>	<p>PAGE</p> <p>28</p>		
<p>ONE BUSHING</p>						
	<p>MODELS</p> <p>PT7A-1-150</p>	<p>OVERALL SIZE</p> <p>W18.75 H22.00 D16.00</p>	<p>VOLTAGE CLASS</p> <p>34.5kV</p>	<p>PAGE</p> <p>29</p>		
<p>TWO BUSHING</p>						
	<p>MODELS</p> <p>PT8-1-250</p>	<p>OVERALL SIZE</p> <p>W18.00 H21.00 D14.00</p>	<p>VOLTAGE CLASS</p> <p>34.5kV</p>	<p>PAGE</p> <p>30</p>		
<p>ONE BUSHING</p>						

VOLTAGE TRANSFORMER GROUPS

GROUP 1. Transformers for application with 100% of rated primary voltage connected to the primary terminals either line-to-line or line-to-ground. These transformers are capable of operating at 125% of rated volts in emergency conditions, but cannot have their thermal burden rating exceed 65% of rated volt-amperes and 105°C Ave. winding temperature. This will result in a reduced life expectancy. Consult the factory for details. Continuous operation at 110% of rated voltage is permissible, provided that the thermal burden rated volt-amperes is not exceeded.

RATED PRIMARY VOLTAGE FOR RATED SYSTEM VOLTAGE LINE-TO-LINE	TURNS RATIO	BASIC IMPULSE INSULATION LEVEL(kV CREST)
840 for 1455Y*	7:1	45*
1200 for 2078Y*	10:1	45*
2400 for 4160Y	20:1	60 or 45*
4200 for 7280Y	35:1	75
4800 for 8320Y	40:1	75

RATED PRIMARY VOLTAGE FOR RATED SYSTEM VOLTAGE LINE-TO-LINE	TURNS RATIO	BASIC IMPULSE INSULATION LEVEL(kV CREST)
7200 for 12470Y	60:1	95 OR 110
8400 for 14560Y	70:1	95 OR 110
12000 for 20785Y	100:1	125 or 150
14400 for 24940Y	120:1	125 or 150

GROUP 2. Transformers are for line-to-line connection, but may be connected line-to-neutral at a voltage of the rated line volts divided by the square root of three. Continuous operation at 110% of rated voltage is permissible, provided that the thermal burden rated volt-amperes is not exceeded.

RATED PRIMARY VOLTAGE FOR RATED SYSTEM VOLTAGE LINE-TO-LINE	TURNS RATIO	BASIC IMPULSE INSULATION LEVEL(kV CREST)
2400 for 2400Y	20:1	45
3300 for 3300Y*	30:1	60 or 45*
4200 for 4200Y*	35:1	60 or 45*
4800 for 4800Y	40:1	60 or 45*
7200 for 7200Y	60:1	75 or 110*
8400 for 8400Y*	70:1	75 or 110*
11000 for 11000Y	100:1	95 or 110

RATED PRIMARY VOLTAGE FOR RATED SYSTEM VOLTAGE LINE-TO-LINE	TURNS RATIO	BASIC IMPULSE INSULATION LEVEL(kV CREST)
12000 for 12000Y	100:1	95 or 110
13200 for 13200Y	110:1	95 or 110
14400 for 14400Y	120:1	95 or 110
18000 for 18000Y*	150:1	125*
21000 for 21000Y*	175:1	125*
24000 for 24000Y	200:1	125 or 150
27600 for 27600Y*	240:1	150 or 200
34500 for 34500Y	300:1	150 or 200

GROUP 4. Transformers are for line-to-ground connection, indoors only. The neutral terminal is insulated to withstand a test voltage of 10kV. They may be continuously operated at 110% of rated voltage, provided that the thermal burden rated volt-amperes is not exceeded. Group 4A transformers may be operated at 125% of rated primary voltage, under emergency conditions, provided that the burden does not exceed 65% of the rated thermal burden, with a limit of 75°C. temperature rise. This will result in a reduced life expectancy. Consult the factory for details.

Group 4A for Operation at 100% Rated Voltage		
RATED PRIMARY VOLTAGE FOR RATED SYSTEM VOLTAGE LINE-TO-LINE	TURNS RATIO	BASIC IMPULSE INSULATION LEVEL(kV CREST)
2400 for 4160 GND Y	20:1	60 or 45*
4200 for 7200 GND Y	35:1	75
4800 for 8320 GND Y	40:1	75
7200 for 12470 GND Y	60:1	110
8400 for 14560 GND Y	70:1	110

*Not recognized in ANSI/IEEE C57.13.

Group 4B for Operation at 58% Rated Voltage		
RATED PRIMARY VOLTAGE FOR RATED SYSTEM VOLTAGE LINE-TO-LINE	TURNS RATIO	BASIC IMPULSE INSULATION LEVEL(kV CREST)
4200 for 4160 GND Y	35:1	60 or 45
4800 for 4800 GND Y	40:1	60 or 45
7200 for 7200 GND Y	60:1	75
8400 for 8400 GND Y	70:1	75
11000 for 11000 GND Y	100:1	110
12000 for 12000 GND Y	100:1	110
13200 for 13200 GND Y	110:1	110
14400 for 14400 GND Y	120:1	110

NOTE: Voltage transformers connected line-to-ground on an ungrounded system cannot be considered to be grounding transformers and must not be operated with the secondaries in closed delta because excessive currents may flow in the delta. For further details see ANSI/IEEE C57.13

APPLICATION NOTES:

1. Delta Connected Supply Systems

When applying voltage transformers to ungrounded delta connected supply systems, the transformer must not be connected in wye with the wye-point connected to neutral ground, or ungrounded. The advent of zero sequence currents caused by a ground fault in the system will cause damage, and eventual destruction of the transformer if the fault is not removed quickly.

2. Ferroresonance.

Most voltage transformers are lightly loaded, particularly when associated with watt-hour metering and relaying schemes. If the voltage transformer has one primary lead grounded, and during an abnormal condition creating a large overvoltage, the transformer may saturate, and its impedance may cause a resonance with the system capacitance. This resonance, or oscillation, may be sustained and could destroy the voltage transformer. If, however, the secondaries are connected in delta, with a broken corner, and a suitable power resistor is connected across the broken corner, then ferroresonance can be damped. Our recommendation for the resistive value is shown on the catalog sheet where it applies. The power rating is determined by the user.

3. Secondary Circuit Check

Immediately prior to connecting the burden and leads to the transformer, a check of the impedance of that circuit should be made. This will avoid a possible short-circuit connection to the transformer. If a short-circuit is applied to the transformer, it can be withstood for one second. Note: Only secondary circuit fuses can adequately protect the transformer from such a short circuit.

4. Primary Fuse Rating

Values shown are suggested for normal installations, in order to protect the system from a voltage transformer failure. Higher ratings at users option, may be used to avoid unusual clearing due to conditions resulting from magnetizing in-rush.

ROUTINE FACTORY TESTS

VOLTAGE CLASS	NO. OF BUSHINGS	CONNECTION	LV 1 MIN 60Hz	H2 1 MIN 60Hz	HV 1 MIN 60Hz	INDUCED 18 SEC, 400Hz
5kV	1	L-GND N	2.5kV	10kV	NA	15kV OR 19kV
	2	L-L	2.5kV	NA	15kV OR 19kV	DOUBLE VOLTAGE
8.7kV	1	L-GND N	2.5kV	10kV	NA	26kV
	2	L-L	2.5kV	NA	26kV	DOUBLE VOLTAGE
15kV	1	L-GND N	2.5kV	10kV	NA	34kV
	2	L-L	2.5kV	NA	34kV OR 36kV	DOUBLE VOLTAGE
25kV	1	L-GND N	2.5kV	10kV	NA	50kV
	2	L-L	2.5kV	NA	50kV	DOUBLE VOLTAGE
34.5kV	1	L-GND N	2.5kV	10kV	NA	70kV
	2	L-L	2.5kV	NA	70kV OR 80kV	DOUBLE VOLTAGE

Routine Factory Tests include: Polarity, accuracy, and partial discharge per CANADIAN STANDARDS (CAN3-C13-M83) (Partial discharge tests can also be carried out to IEC requirements on request)

ANSI BURDEN DATA

BURDEN	VA	POWER FACTOR	ANGLE
W	12.5	0.10	84.3°
X	25	0.70	45.6°
M	35	0.20	78.5°
Y	75	0.85	31.8°
Z	200	0.85	31.8°
ZZ	400	0.85	31.8°