



ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India) ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

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ULR-TC538919000000271F

TEST REPORT

SHEET: 1 OF 11

REPORT NO.: RP-1819-038510 **NAME & ADDRESS OF CUSTOMER** DATE : 02.01.2019 **EPOXY TERMINAL & EQUIPMENT PVT. CUSTOMER REF. NO.** : NIL LTD. DATED : 27.12.2018 Plot No: 6B, Phase III, DATE OF SAMPLE **DATE OF** TS-IIC, IDA, Pashamylaram, RECEIPT TESTING Sangareddy, Dist, Telangana-502307. 29.12.2018 to 29.12.2018 01.01.2019

SAMPLE DESCRIPTION

VOLTAGE TRANSFORMER

MFD. BY: Epoxy Terminal & Equipment

Pvt. Ltd.

RATIO : $33000/\sqrt{3}//110/\sqrt{3}/110/\sqrt{3}$ V

BURDEN: 100 VA/50 VA

CLASS: 0.5/3P RATED VOLTAGE: 33 kV

HSV : 36 kV

Rated IL : 36/70/170 kV

FREQUENCY: 50 Hz.

V.F. : 1.2 Cont & 1.5 for 30 sec.

INSULATION CLASS: B

SAMPLE IDENTIFICATION.

SR. NO. : 551018001

TYPE: 1-Ph Earthed

MFG. YEAR : 2018

MODEL: VT33A

ERDA SAMPLE CODE NO.:

ERDA-00293596

TEST DETAILS & TEST SPECIFICATION ARE AS PER SHEET NO. 2 OF 11.

ENCLOSURE: 1) Photograph of test sample as per Annexure-I (sheet 1 of 1)

2) Drawing No.: 1) ETE-PT-2A SHEET. NO.: 2 OF 2 REV. 00,

2) ETE-PT-2A SHEET. NO.: 1 OF 2 REV. 00.

NOTE: Testing was carried out as per IS 3156:1992, as per customer's request.

REMARKS: The sample **conforms** to the requirements of the mentioned standard

specification as mentioned in tests no. 1 to 8 on sheet no. 2 OF 11.

PREPARED BY

CHECKED BY

APPROVED BY (S.B.PATEL)

Note: 1. This report relates only to the particular sample received in good condition for testing at ERDA, Vadodara.

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TEST DETAILS & TEST SPECIFICATION:

Sr.	TESTS	REFERENCE STANDARD
No.		
1	Verification of terminal marking and polarity.	Cl. No. 9.2 of IS 3156 (Part 1): 1992
2	Lightning Impulse voltage test.	Cl. No. 9.6 of IS 3156 (Part 1): 1992
3	Induced over voltage withstand test.	Cl. No. 9.3.2.2 of IS 3156 (Part 1): 1992
4	Separate source withstand test.	Cl. No. 9.3.2.1 of IS 3156 (Part 1): 1992
5	Power frequency dry withstand test on secondary winding.	Cl. No. 9.4 of IS 3156 (Part 1): 1992
6	Partial discharge test.	Cl. No. 9.1.2 (d) of IS 3156 (Part 1): 1992
7	Determination of errors according to the requirements of the appropriate accuracy class.	Cl. No. 8.2.1 of IS 3156 (Part 2): 1992 for metering winding & Cl. No. 10.1.2.1 of IS 3156 (Part 3): 1992 for protection winding.
8	Temperature rise test.	Cl. No. 9.5 OF IS 3156 (Part 1): 1992

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SHEET: 3 OF 11

TEST RESULTS:

1. Verification of terminal marking and polarity.

(Cl. No. 9.2 of IS 3156 (Part 1): 1992)

Primary winding terminals

: A-N

Secondary winding terminals

: 1a-1n, 2a-2n

Terminal marking & polarity was found Ok.

Terminal marking was found marked clearly & indelibly.

REMARK: Conforms

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2. Lightning Impulse Voltage Test

(As per Cl. No.9.6 of IS: 3156 (Part-1) 1992)

Atmospheric Condition:

Dry bulb temperature : 22.0 °C Wet bulb temperature : 18.0 °C

Atmospheric Pressure : 752.3 mm of Hg

Test Parameters:

H.S.V. : 36 kV

Test Voltage : 170 kVp \pm 3 %

No. of Shots to be applied: Calibration,05 +ve & 05 -ve Polarity shots

Test Observation:

Calibration Pulse : 97.726 kVp Wave Shape : 1.390/46.881 µs

No. of Shots Applied : Calibration Pulse, 05 +ve & 05 -ve Polarity shots

No. of Shots recorded

: Calibration Pulse, First & Last shot for both polarity

No. of	Test voltage a	pplied in kVp
Shot	Positive Polarity	Negative Polarity
1.	168.842	168.244
2.	168.640	168.675
3،	168.753	169.803
4.	169.461	169.196
5.	170.365	169.800

REMARKS: Conforms

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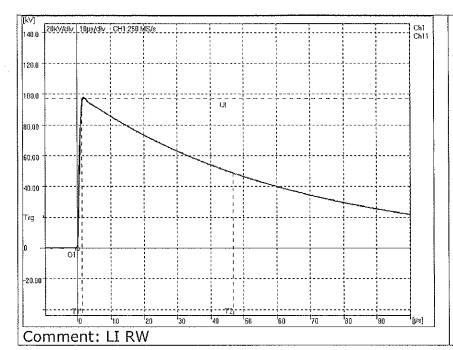
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LIGHTNING IMPULSE VOLTAGE TEST



CALIBRATION SHOT

 $U_p = 97.73 \text{ kV}$ $T_1 = 1.39 \text{ }\mu\text{s}$ $T_2 = 46.88 \text{ }\mu\text{s}$

PREPARED BY



As

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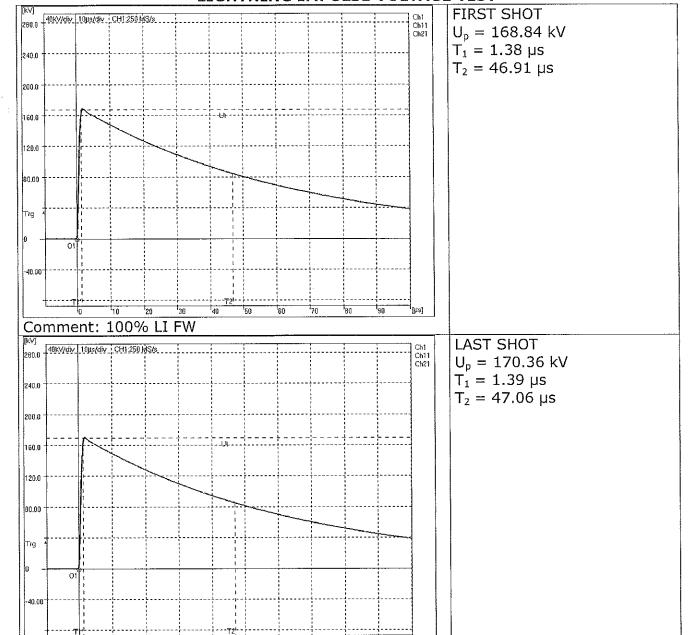
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LIGHTNING IMPULSE VOLTAGE TEST



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Jur.

Comment: 100% LI FW









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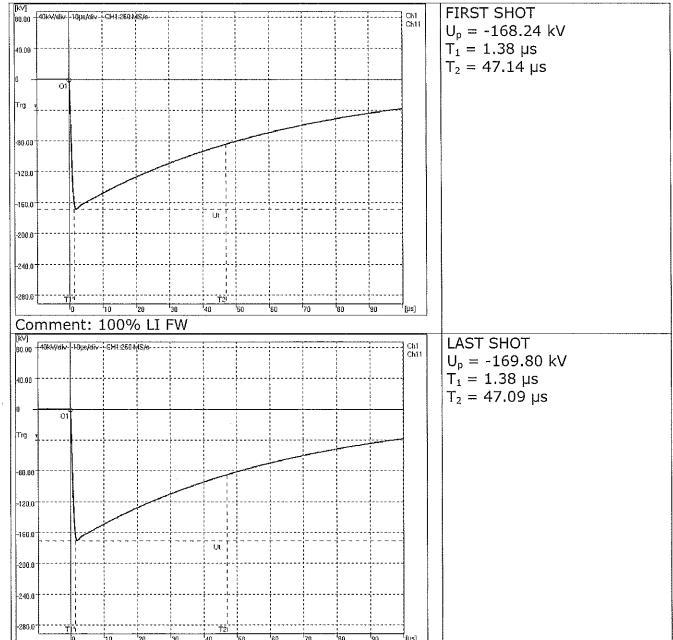
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LIGHTNING IMPULSE VOLTAGE TEST



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Comment: 100% LI FW







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Induced over voltage withstand test. (Cl. No. 9.3.2.2 of IS 3156 (Part 1): 1992)

The test was performed by exciting the secondary winding with a voltage of sufficient magnitude to induce the specified test voltage of 70 kV (rms) in the primary winding. The test voltage at the high voltage side was measured and recorded. The frequency of the exciting voltage was increased to 150 Hz. to prevent core saturation.

The test was performed for 40 seconds duration.

The sample withstood the test voltage satisfactorily.

REMARK: Conforms

4. <u>Separate source withstand test.</u> (Cl. No. 9.3.2.1 of IS 3156 (Part 1): 1992)
The test voltage of 3 kV (rms) was applied between the terminal of the primary winding intended to be earthed (N) and earth for one minute. The base plate and all terminals of the secondary windings were connected together to the earth.

The sample withstood the test voltage satisfactorily.

REMARK: Conforms

5. Power frequency dry withstand test on secondary winding.

(Cl. No. 9.4 of IS 3156 (Part 1): 1992)

(A). On secondary windings.

The power frequency voltage of 3 kV (rms) was applied between the secondary winding terminals (all) connected together and the earth. The primary winding terminals and base plate were connected to the earth. The test voltage was applied for one minute. There was no disruptive discharge observed.

The sample withstood the test voltage satisfactorily

(B). Between secondary windings.

The power frequency voltage of 3 kV (rms) was applied between the secondary winding terminals (1a-1n) connected together and the earth. The other secondary winding terminals, primary winding terminals and base plate were shorted and connected to the earth. The test voltage was applied for one minute. There was no disruptive discharge observed. The sample withstood the test voltage satisfactorily.

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(C). Between secondary windings.

The power frequency voltage of 3 kV (rms) was applied between the secondary winding terminals (2a-2n) connected together and the earth. The other secondary winding terminals, primary winding terminals and base plate were shorted and connected to the earth. The test voltage was applied for one minute. There was no disruptive discharge observed. The sample withstood the test voltage satisfactorily.

REMARK: Conforms

6. Partial discharge test. (Cl. No. 9.1.2 (d) of IS 3156 (Part 1): 1992)

NETWORK: Effectively earthed starpoint

The power frequency voltage was applied and raised to the pre-stress voltage level (0.8x1.3 Um = 37.4 kV, where Um=36.0 kV) and maintained for 10 seconds. The voltage was then reduced to partial discharge measuring level (1.1 Um/ $\sqrt{3}$ = 22.9 kV) and maintained for one minute. The partial discharge magnitude measured at the measuring voltage level was 01 pC

Note: Specified Limit = 50 pC.

REMARK: Conforms

7. Determination of errors according to the requirements of the appropriate accuracy class. (Cl. No. 8.2.1 of IS 3156 (Part 2): 1992 for metering winding & Cl. No. 10.1.2.1 of IS 3156 (Part 3): 1992 for protection winding.)

VOLTAGE TRANSFORMER:

PHASE ANGLE	RATIO ERROR	% OF	RATIO ERROR	PHASE ANGLE
ERROR IN MIN.	IN %	RATED	IN %	ERROR IN MIN.
		VOLTAGE		

RATIO: $33000/\sqrt{3}//110/\sqrt{3}$ V, BURDEN: 100 VA, CLASS: 0.5, Secondary terminal: 1a-1n

BURDEN: 100	% at 0.8 Lag. P.F.		BURDEN: 25 %	at 0.8 Lag. P.F.
3.83	-0.345	120	0.153	4.24
2.06	-0.267	100	0.222	2.45
1.03	-0.215	80	0.268	1.28

RATIO: 33000/ $\sqrt{3}$ //110/ $\sqrt{3}$ V, BURDEN: 50 VA, CLASS: 3P, Secondary terminal: 2a-2n

BURDEN: 100 9	% at 0.8 Lag. P.F.		BURDEN: 25 % at 0.8 Lag. P.F.	
14.29	-0.348	150	0.106	8.65
11.62	-0.245	120	0.187	6.43
9.67	-0.168	100	0.252	4.58
6,39	-0.144	5	0.305	1.31
6.38	-0.165	2	0.280	1.47

REMARK: Conforms

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8. Temperature rise test.

(Cl. No. 9.5 OF IS 3156 (Part 1): 1992)

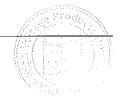
The specified voltage of 1.2 times the rated primary voltage (i.e. $33/\sqrt{3}$ kV * 1.2 = 22.9 kV) was applied to the primary winding of the voltage transformer and the rated burdens (i.e. 100 VA/50 VA) connected across the secondary windings of voltage transformer. For steady state, the resistances of secondary windings, primary winding and the temperature of body were measured. The resistances of the primary winding and secondary windings were measured immediately after shut down, and the temperature rise calculated.

The ambient temperature & body temperature were recorded.

The temperature rises so obtained were as follows:

Sr. no.	Temperature rise of :	Specified limit for temperature rise test:	Obtained value :
1.	Primary winding (Resistance method)	80 °C	A-N = 2.90 °C
2.	Secondary winding (Resistance method)	80 °C	1a-1n = 3.34 °C
			2a-2n = 3.52 °C
3.	Body (Thermocouple method)	80 °C	1.0 °C
4.	Ambient temperature	40 °C	21.8 °C

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The voltage transformer was re-energized at 1.2 times the rated primary voltage (i.e. $33/\sqrt{3}$ kV * 1.2 = 22.9 kV) up to steady state, and then raised to 1.5 times the rated primary voltage (i.e. $33/\sqrt{3}$ kV * 1.5 = 28.6 kV) for 30 sec. duration.

The resistances of the primary winding and secondary windings were measured immediately after shut down, and the temperature rise calculated.

The ambient temperature & body temperature were recorded.

The temperature rises so obtained were as follows:

Sr. no.	Temperature rise of :	Specified limit for temperature rise test:	Obtained value :
1.	Primary winding (Resistance method)	80 °C	A-N = 5.55 °C
2.	Secondary winding (Resistance method)	80 °C	1a-1n = 8.00 °C
			2a-2n = 7.87 °C
3.	Body (Thermocouple method)	80 °C	1.3 °C
4.	Ambient temperature	40 °C	23.5 °C

REMARK: Conforms

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Annexure-I

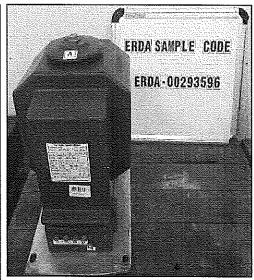
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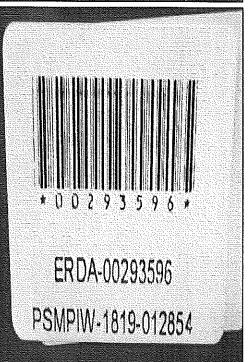
DATE: 02.01.2019

SHEET: 1 OF 1

PHOTOGRAPHS OF TEST SAMPLE

VOLTAGE TR	(ANS)		
Rated S.V : 33 kV		HSV.: 36 kV	
Rated I.L : 36/70/170 k		Freq.:50 Hz	
OVF: 1.2 cont. & 1.5 for 3	30 Sec.	Ins, class : B	
RATIO: 33000/RT3 // 1	10/RT3/	110/RT3 V	
CORE 1: Burden - 100	VA, Cla	ss - 0.5	
CORE 2 : Burden - 50V	'A, Clas	s - 3P	
Drg. No. ; ETE-PT-2A	Type:	1-Ph Earthed	
Model : VT33A	Mfg. Y	ear: 2018	
Ref. Std : IS-3156	Serial	No. : 551018001	
33000/RT3 // 110/RT3	V = 1.25	1a - 1n	
33000/RT3 // 110/RT3	TOTAL	2a - 2n	
EPOXY TERMINAL &	EQUIPN NGANA		

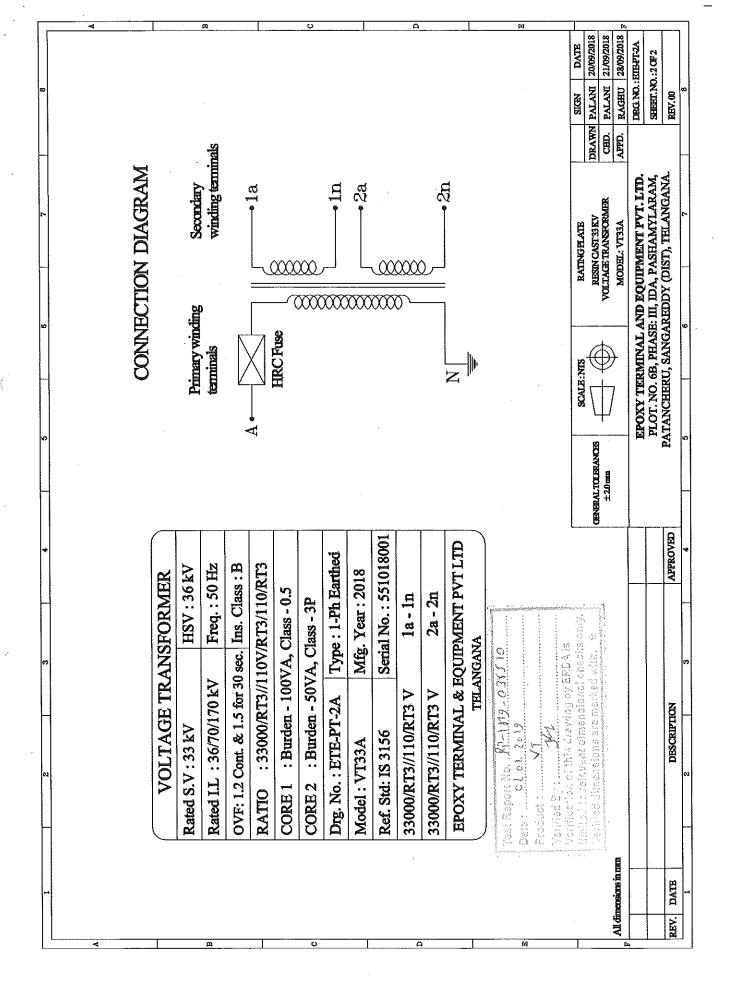


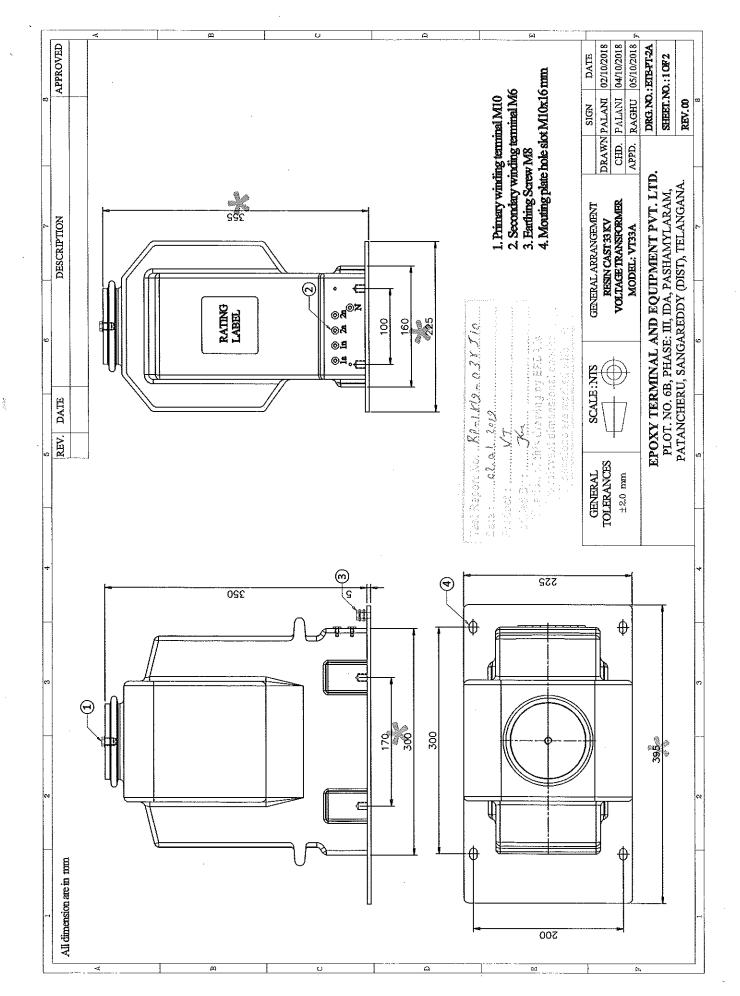












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