Certificate no. TC-6229

Electrical Research & Testing organisation

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in

ERTO
Quality Assurance Laboratory

TEST REPORT

Report No	**: ERTO/TRP/1819/0820**
ULR No.	**: TC622919000000186F**
Date of issue	: 16/03/2019
Total number of pages	: 26
Customer's name	**: RECONS POWER EQUIPMENTS PVT. LTD.**
Address	: Plot No. 38, Sector-25, Faridabad -121004, Haryana (INDIA).
Customer's reference & date	: RP/18-19/ERTO/009, dated 16/02/2019
Test specification	
-Standard	: As per IS 1180 (Part 1):2014 with amendment no. 1 & 2
-Test procedure	: As per IS 1180 (Part 1):2014 with amendment no. 1 & 2
-Non-standard test method	: N/A
ERTO sample ID no.	: ERTO-0908
Test performed at	: ERTO lab
Name of test sample	**: 2500 kVA Distribution Transformer**
Make	**: RECONS POWER EQUIPMENTS PVT. LTD.**
Rating	: 2500 kVA
Technical specification of test sample	: As per page 2.
Test performed	: As per page 5.
Any other details specified by customer	: ---
Date of receipt of test sample	: 25/02/2019
Condition on Receipt	: Good
Date(s) of performance of test(s)	: 28/02/2019 to 09/03/2019
Tests witnessed by	: Mr. Mahendra Yadav (Manager-Operations, M/s. Recons Power Equipments Pvt. Ltd.)
List of Enclosures	
-Test sample photo	: As per page 3.
-Rating plate photo	: As per page 4.
-Drawings (As submitted by customer)	: **1)** RC/18-19/2500/01 REVISION 00 **2)** RC/18-19/2500/02 Sh 1/1

Remarks :

1) The sample **conforms** to the requirements of above mentioned standard for the **test nos. 2, 5, 6 & 8 to 14.**
2) The observations of the **test nos. 1, 3, 4, 7 & 15** are as per page 6 to 9 & 26.

Prepared By (RANA HITANSHU H.)

Checked By
(Yash J. Shah)

Approved By
(S.R.Patel)
(Technical Director)

ERTO

Notes:

1. This report relates only to the particular sample tested.
2. Only the tests asked by the customer have been carried out.
3. This report cannot be reproduced in part under any circumstances.
4. Publication of this report requires prior permission in writing from Technical Director, ERTO.
5. In case of any dispute, ERTO will be the exclusive jurisdiction & shall be construed as where the cause has arised.

Caution: ERTO is not responsible for the authenticity of photocopied or reproduced test reports. ERTO provides support to customers for verification of the authenticity of test reports issued by ERTO.

Certificate no. TC-6229

Electrical Research & Testing organisation™

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in

ERTO
Quality Assurance Laboratory

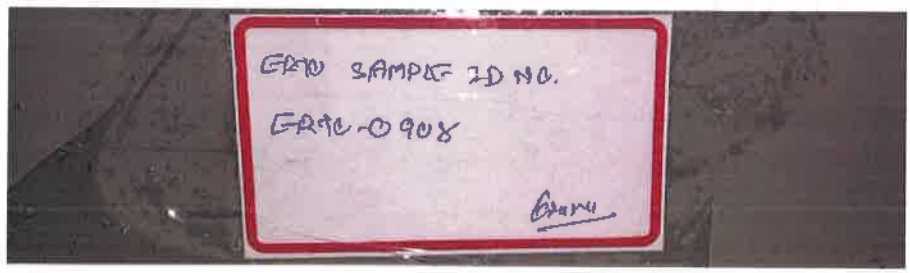
Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Technical Specification of Test Sample declared by customer

1.	**Test sample**	: **2500 kVA Distribution Transformer (Non sealed type)**
2.	**Name of manufacture**	: **RECONS POWER EQUIPMENTS PVT. LTD.**
3.	**Serial No.**	: 5432/02/19
4.	**Rating**	: 2500 kVA
5.	**Energy efficiency level**	: 3
6.	**Rated voltage at no load H.V/L.V**	: 33000/433 Volt
7.	**Rated current at H.V/L.V**	: 43.73/3333.43 Amp.
8.	**Number of phases**	: 3-Phase
9.	**Connection H.V./L.V**	: Delta/Star
10.	**Frequency**	: 50 Hz
11.	**Type of cooling**	: ONAN
12.	**Temperature rise of oil/winding**	: 40/45 °C
13.	**Percentage Impedance (HV to LV)**	: 6.25 %
14.	**Vector group**	: Dyn11
15.	**Winding material**	: Copper
16.	**Year of manufacture**	: 2019
17.	**Max. total loss at 50% load at 75°C**	: 6342.5 W
18.	**Max. total loss at 100% load at 75°C:**	18812.5 W
19.	**Basic insulation level of H.V.**	: 70 kVrms/170 kVp
20.	**Basic insulation level of L.V.**	: 03 kVrms
21.	**Tapping details**	:

Tap position	HV Taps (volts)	LV (volts)
1	36300	433
2	35475	433
3	34650	433
4	33825	433
5	33000	433
6	32175	433
7	31350	433

ERTO Sample ID No. : ERTO-0908



Prepared By

Checked By

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO
Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Test Sample photo

Prepared By

Checked By

ERTO
Quality Assurance Laboratory

TE-A 012011

Electrical Research & Testing organisation

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775. Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

Email : erto@erto.in / sr.patel@erto.in

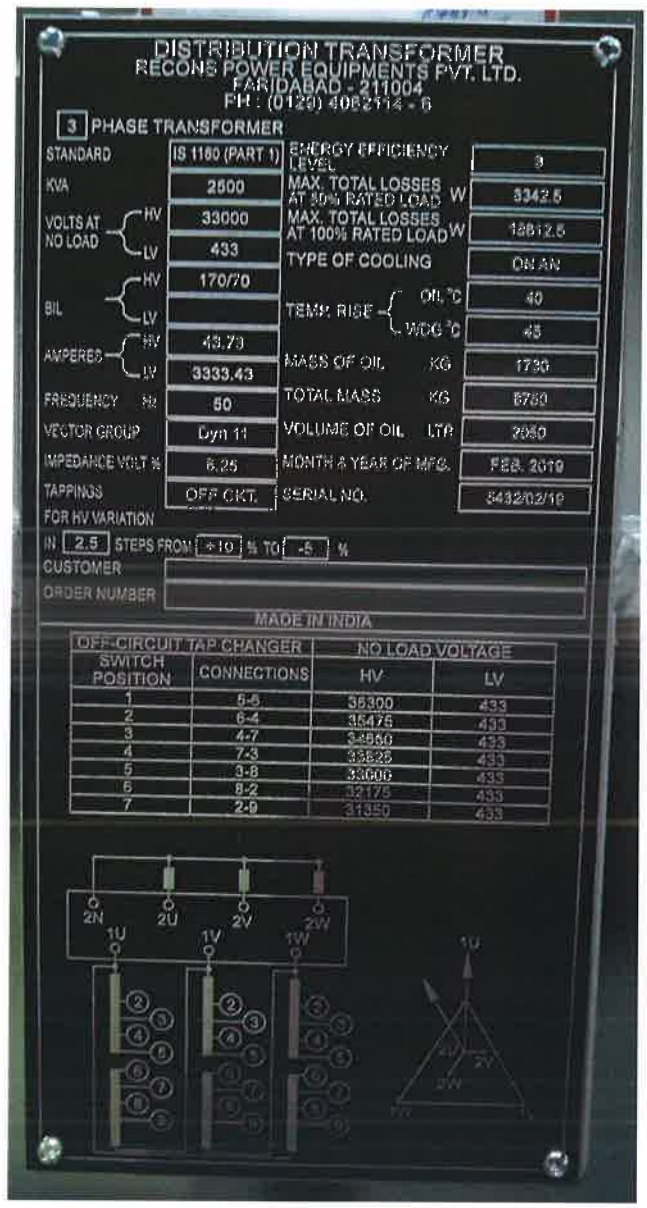
Web : http://www.erto.in

Certificate no. TC-6229

ERTO
Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Rating Plate Photo



Prepared By

Checked By

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Tests performed :

Sr. No.	Test details	Test specifications
1.	Measurement of winding resistance	As per cl.no.21.2. (a) of IS 1180 (Part 1) : 2014
2.	Measurement of voltage ratio and check of phase displacement.	As per cl.no.21.2.(b) of IS 1180 (Part 1) : 2014
3.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load.	As per cl.no.21.2. (c) of IS 1180 (Part 1) : 2014
4.	Measurement of no-load loss and current	As per cl.no.21.2. (d) of IS 1180 (Part 1) : 2014
5.	Total losses at 50 percent load	As per cl.no.7.8 of IS 1180 (Part 1) : 2014
6.	Total losses at 100 percent load	As per cl.no.7.8 of IS 1180 (Part 1) : 2014
7.	Measurement of insulation resistance	As per cl.no.21.2. (e) of IS 1180 (Part 1) : 2014
8.	Induced over-voltage withstand test.	As per cl.no.21.2 (f) of IS 1180 (Part 1) : 2014
9.	Separate-source voltage withstand test.	As per cl.no.21.2 (g) of IS 1180 (Part 1) : 2014
10.	Pressure test (Routine)	As per cl.no.21.2 (h) of IS 1180 (Part 1) : 2014
11.	Oil leakage test	As per cl.no.21.2 (j) of IS 1180 (Part 1) : 2014
12.	Lightning impulse test with chopping	As per cl.no.21.3(a) of IS 1180 (Part 1) : 2014 & test procedure followed as per cl. no. 14 of IS 2026 (Part 3): 2009
13.	Temperature-rise test	As per cl.no.21.3 (b) of IS 1180 (Part 1) : 2014
14.	Pressure test (type)	As per cl.no.21.3 (d) of IS 1180 (Part 1) : 2014
15.	Determination of sound levels	As per cl.no.21.4(a) of IS 1180 (Part 1) : 2014

Prepared By

ERTO Quality Assurance Laboratory

Checked By

TE-A 012013

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775, Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
1.	**Measurement of winding resistance :** (As per cl.no.21.2.(a) of IS 1180 (Part 1) : 2014)			---
	Average oil temperature		27.5 °C	
	HV Winding			
	Tap position 1			
	1U – 1V:		1.8412 Ω	
	1V – 1W:		1.8456 Ω	
	1U – 1W:		1.8421 Ω	
	Average:	---	1.8430 Ω	
	Tap position 2			
	1U – 1V:		1.8008 Ω	
	1V – 1W:		1.8053 Ω	
	1U – 1W:		1.8000 Ω	
	Average:	---	1.8020 Ω	
	Tap position 3			
	1U – 1V:		1.7594 Ω	
	1V – 1W:		1.7638 Ω	
	1U – 1W:		1.7592 Ω	
	Average:	---	1.7608 Ω	
	Tap position 4			
	1U – 1V:		1.7169 Ω	
	1V – 1W:		1.7198 Ω	
	1U – 1W:		1.7137 Ω	
	Average:	---	1.7168 Ω	
	Tap position 5			
	1U – 1V:		1.6722 Ω	
	1V – 1W:		1.6760 Ω	
	1U – 1W:		1.6695 Ω	
	Average:	---	1.6726 Ω	

Prepared By **Checked By**

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775, Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO
Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
	Tap position 6			---
	1U – 1V:		1.6300 Ω	
	1V – 1W:		1.6341 Ω	
	1U – 1W:		1.6274 Ω	
	Average:	---	1.6305 Ω	
	Tap position 7			
	1U – 1V:		1.5897 Ω	
	1V – 1W:		1.5930 Ω	
	1U – 1W:		1.5864 Ω	
	Average:	---	1.5897 Ω	
	LV Winding			
	2u– 2v:		342.9 µΩ	
	2v– 2w:		339.0 µΩ	
	2u– 2w:		341.2 µΩ	
	Average	---	341.0 µΩ	
2.	**Measurement of voltage ratio and check of phase displacement :** (As per cl.no.21.2.(b) of IS 1180 (Part 1) : 2014)			**Conforms**
	HV winding and LV winding:			
	Tap position 1			
	1U1V/2u2n:	145.20 (IS Tol.)	145.29	
	1V1W/2v2n:	145.20 (IS Tol.)	145.35	
	1W1U/2w2n:	145.20 (IS Tol.)	145.32	
	Tap position 2			
	1U1V/2u2n:	141.90 (IS Tol.)	142.02	
	1V1W/2v2n:	141.90 (IS Tol.)	142.02	
	1W1U/2w2n:	141.90 (IS Tol.)	142.01	
	Tap position 3			
	1U1V/2u2n:	138.60 (IS Tol.)	138.71	
	1V1W/2v2n:	138.60 (IS Tol.)	138.70	
	1W1U/2w2n:	138.60 (IS Tol.)	138.71	

Prepared By

Checked By

ERTO Quality Assurance Laboratory

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775, Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
	Tap position 4			
	1U1V/2u2n:	135.30 (IS Tol.)	135.35	
	1V1W/2v2n:	135.30 (IS Tol.)	135.36	
	1W1U/2w2n:	135.30 (IS Tol.)	135.33	
	Tap position 5			
	1U1V/2u2n:	132.00 (IS Tol.)	132.02	
	1V1W/2v2n:	132.00 (IS Tol.)	131.98	
	1W1U/2w2n:	132.00 (IS Tol.)	132.04	
	Tap position 6			
	1U1V/2u2n:	128.70 (IS Tol.)	128.72	
	1V1W/2v2n:	128.70 (IS Tol.)	128.73	
	1W1U/2w2n:	128.70 (IS Tol.)	128.73	
	Tap position 7			
	1U1V/2u2n:	125.40 (IS Tol.)	125.36	
	1V1W/2v2n:	125.40 (IS Tol.)	125.38	
	1W1U/2w2n:	125.40 (IS Tol.)	125.37	
	Vector Group:	Dyn11	Dyn11	
3.	**Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load:** (As per cl.no.21.2.(c) of IS 1180 (Part 1) : 2014) Supply connected on HV side and LV side short circuit. **At 50% Load**			---
	Tap position 5			
	Average oil temperature		25.0 °C	
	Frequency		49.856 Hz	
	Test current		21.876 Amp.	
	Impedance voltage		1019.82 V	
	Measured load loss		3427.20 W	
	Impedance voltage (Computed to 50% load)			
	At 25.0 °C		3.09 %	
	At 75°C	---	3.10 %	---
	Load loss (Computed to 50% load)			
	At 25.0 °C		3425.31 W	
	At 75°C	---	3790.80 W	---

Prepared By

Checked By

TE-A 012016

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Certificate no. TC-6229 Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
	At 100% Load			
	Average oil temperature		25.0 °C	
	Frequency		49.868 Hz	
	Test current		43.732 Amp.	
	Impedance voltage		2039.64 Volts	
	Measured load loss		13590.00 W	
	Impedance voltage (Computed to 100% load)			
	At 25.0°C		6.18 %	
	At 75°C	6.25% (IS Tol.)	6.21 %	**Conforms**
	Load loss (Computed to 100% load)			
	At 25.0°C		13594.94 W	
	At 75°C	---	15074.02 W	---
4.	**Measurement of no-load loss and current :** (As per cl.no.21.2(d) of IS 1180 (Part 1) : 2014) Supply connected on LV winding and HV winding open-circuited.			---
	At 100% of rated voltage			
	Mean voltage		433.38 Volts	
	Frequency		50.018 Hz	
	RMS voltage		438.61 Volts	
	No-load current		5.6476 Amps	
	Measured no-load loss		2107.60 Watts	
	Corrected no-load loss	---	2082.10 Watts	
5.	**Total losses at 50 percent load** (As per cl.no.7.8 of IS 1180 (Part 1) : 2014)	Max.6342.5 Watts	5872.9 Watts	**Conforms**
6.	**Total losses at 100 percent load** (As per cl.no.7.8 of IS 1180 (Part 1) : 2014)	Max.18812.5 Watts	17156.12 Watts	**Conforms**
7.	**Measurement of insulation resistance :** (As per cl.no.21.2(e) of IS 1180 (Part 1) : 2014)			---
	Average oil temperature		27.1 °C	
	Insulation resistance value			
	HV winding to Earth at 5000 DC Volts for 60 seconds	---	3.70 GΩ	
	LV winding to Earth at 500 DC Volts for 60 seconds	---	3.01 GΩ	
	HV winding to LV winding at 5000 DC Volts for 60 seconds	---	6.07 GΩ	

Prepared By **Checked By**

ERTO Quality Assurance Laboratory

TE-A 012017

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO
Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
8.	**Induced over-voltage withstand test :** (As per cl.no.21.2(f) of IS 1180 (Part 1) : 2014) The test voltage of 866 Volts, 3 – phase was applied to the LV winding of the transformer and HV winding kept open. The supply frequency was maintained at 150 Hz. The test voltage was applied for 40 seconds.	Transformer shall withstand 866 volts at 150 Hz frequency for 40 seconds.	Withstood	**Conforms**
9.	**Separate-source voltage withstand test :** (As per cl.no.21.2(g) of IS 1180 (Part 1) : 2014) ➢ **on HV winding:** The test voltage of 70 kV ac, rms was applied between the shorted HV winding and earth. The tank and LV winding were shorted together and earthed. The test voltage was applied for 60 seconds. ➢ **on LV winding:** The test voltage of 3 kV ac, rms was applied between the shorted LV winding and earth. The tank and HV winding were shorted together and earthed. The test voltage was applied for 60 seconds.	Transformer shall withstand power frequency voltage of 70kv for 60 seconds. Transformer shall withstand power frequency voltage of 3kV for 60 seconds.	Withstood Withstood	**Conforms**
10.	**Pressure test (routine test):** (As per cl.no.21.2(h) of IS 1180(Part 1):2014) The transformer with bolted cover was tested at a pressure of 35 kPa above atmosphere pressure maintained inside the tank for 10 min.	There should be no leakage at any point	No leakage observed	**Conforms**
11.	**Oil leakage test:** (As per cl.no.21.2(j) of IS 1180 (Part 1) : 2014) The assembled transformer with all fittings including bushings in position was tested at a pressure equivalent to twice the normal head measured at the base of the tank for 8 hours.	There should be no leakage at any point	No leakage observed	**Conforms**

Prepared By **Checked By**

ERTO Quality Assurance Laboratory

TE-A 012018

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
12.	**Lightning impulse test with chopping:** (As per cl.no.21.3(a) of IS 1180 (Part 1) : 2014 & test procedure followed as per cl. no. 14 of IS 2026 (Part 3): 2009)	Transformer shall withstand the test voltage	Withstood	**Conforms**

Sr. No.	Test details	Peak Magnitude (kVP)		
		U-Phase (Tap-1)	V-Phase (Tap-5)	W-Phase (Tap-7)
1.	Reduced Impulse Wave	Upk -86.77	Upk -89.83	Upk -90.01
2.	100 % full impulse wave	Upk -165.9	Upk -168.2	Upk -168.1
3.	Reduced Chopped Impulse Wave	Upk -99.1	Upk -99.76	Upk -99.86
4.	110 % full Chopped impulse wave	Upk -183.4	Upk -185.3	Upk -185.2
5.	110 % full Chopped impulse wave	Upk -183.7	Upk -185.2	Upk -185.4
6.	100 % full impulse wave	Upk -167	Upk -168.1	Upk -168.2
7.	100 % full impulse wave	Upk -167.2	Upk -168.2	Upk -168.2

Prepared By

Checked By

ERTO Quality Assurance Laboratory

Electrical Research & Testing organisation™

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775. Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

Email : erto@erto.in / sr.patel@erto.in

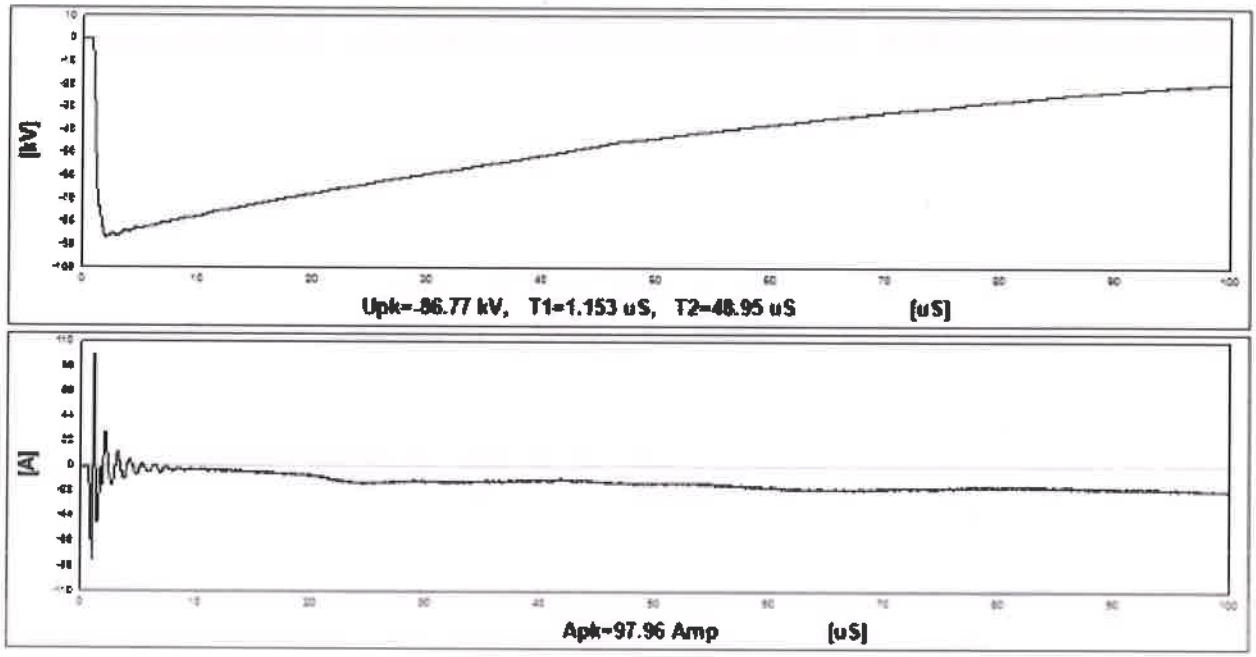
Web : http://www.erto.in

Certificate no. TC-6229

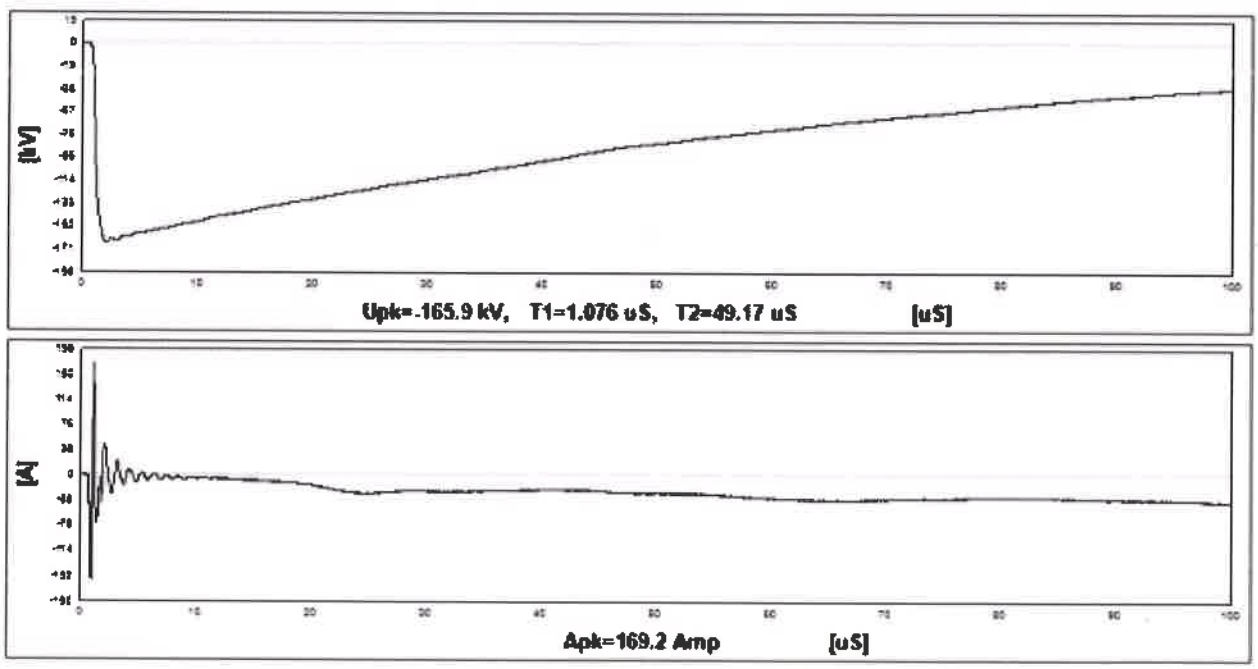
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

U PHASE



1. Reduced Impulse Wave

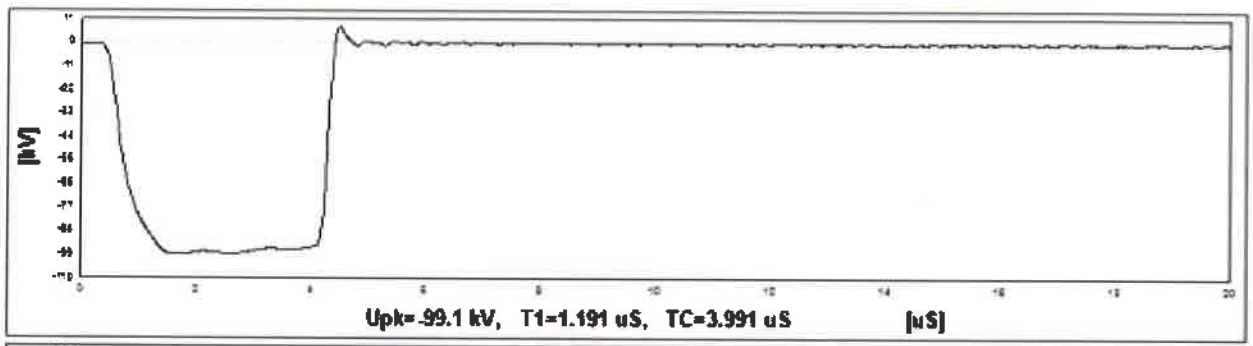


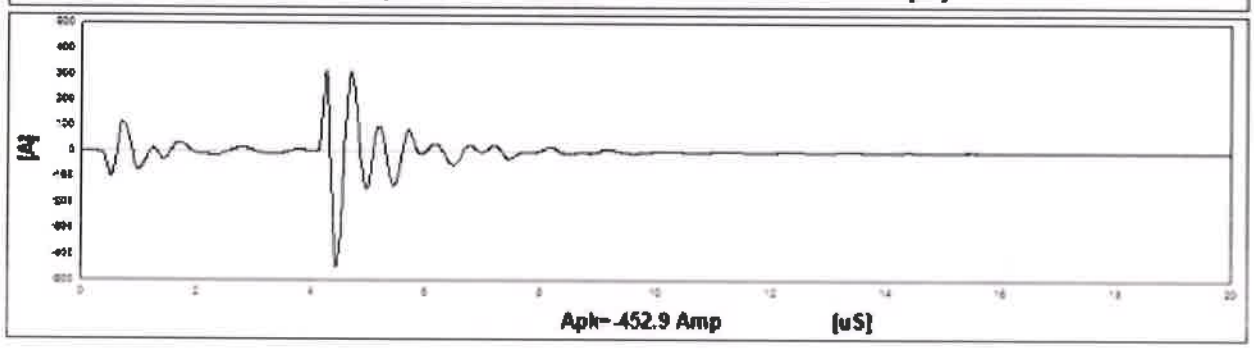
2. 100% Full Impulse Wave

Prepared By

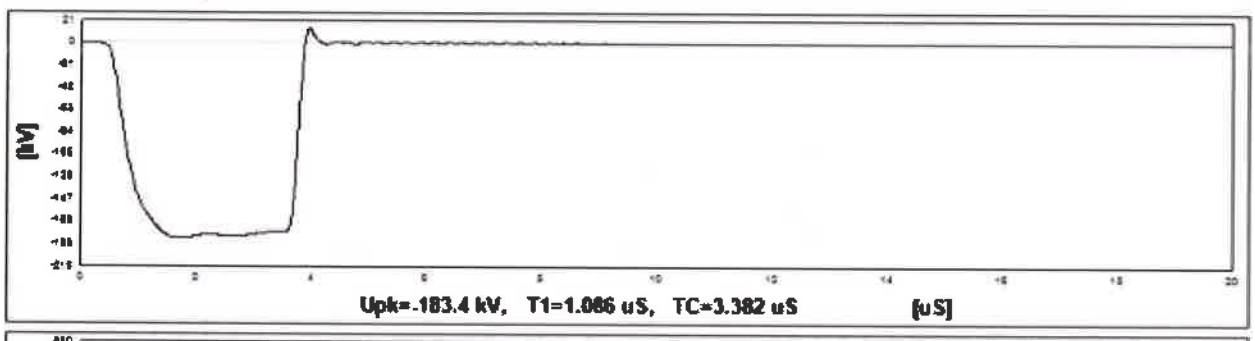
Checked By

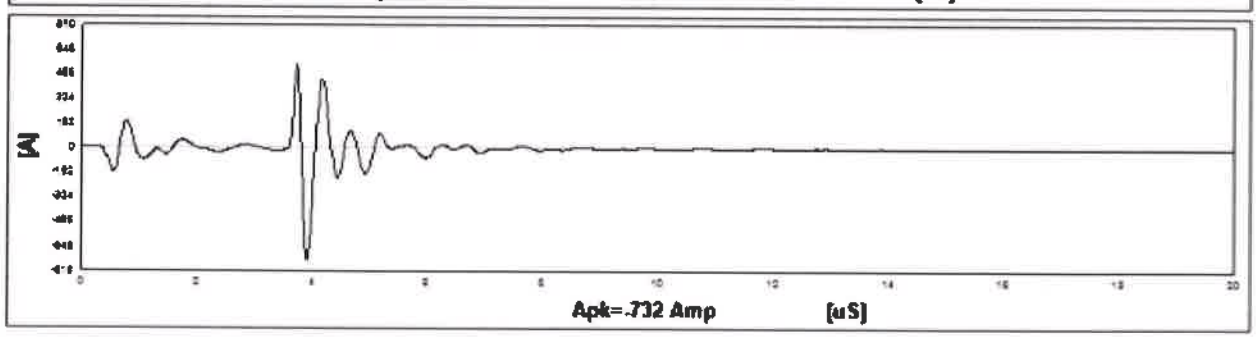
Electrical Research & Testing organisation™
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory





3. Reduced Chopped Impulse Wave



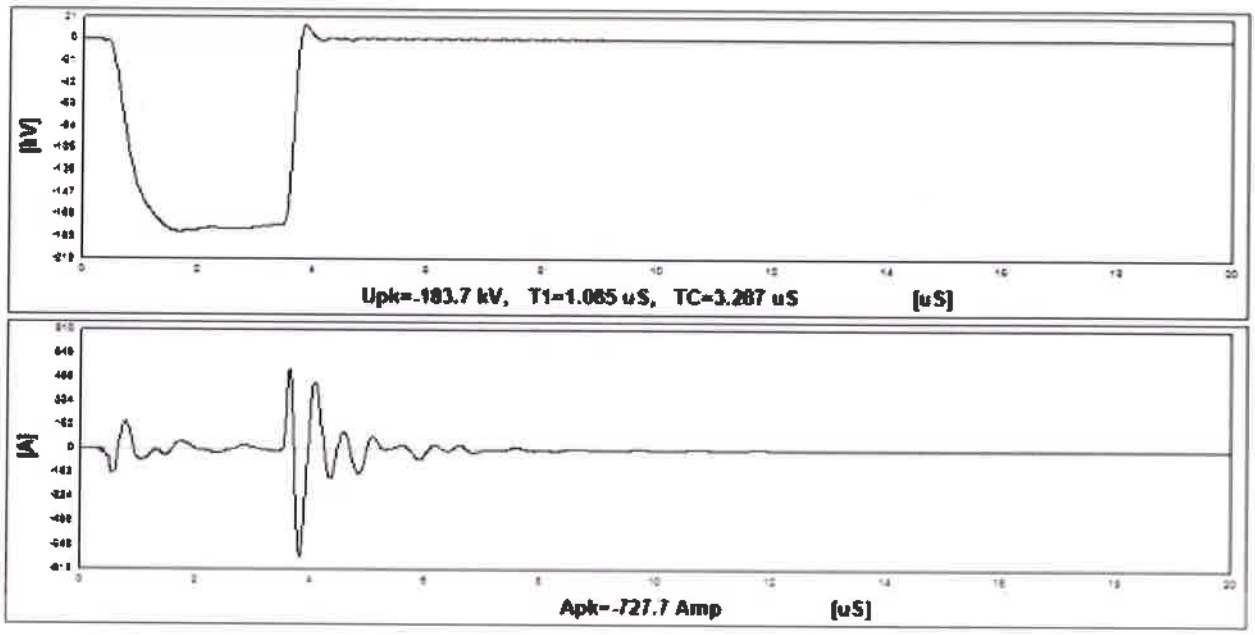


4. 110% Chopped Impulse Wave

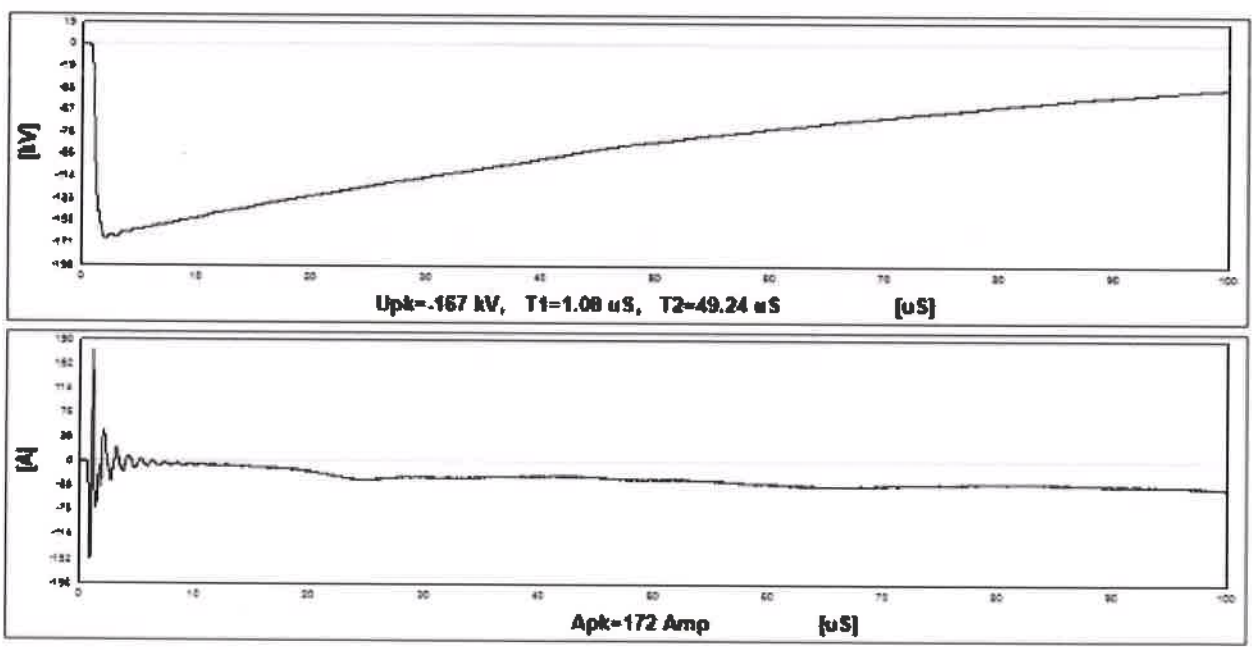
Prepared By

Checked By

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO
Quality Assurance Laboratory



5. 110% Chopped Impulse Wave



6. 100% Full Impulse Wave

Prepared By

Checked By

Electrical Research & Testing organisation

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775. Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

Email : erto@erto.in / sr.patel@erto.in

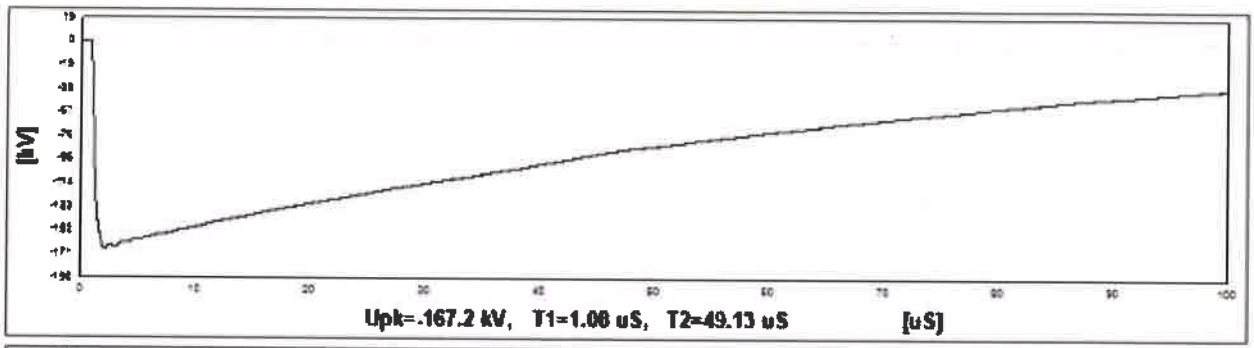
Web : http://www.erto.in

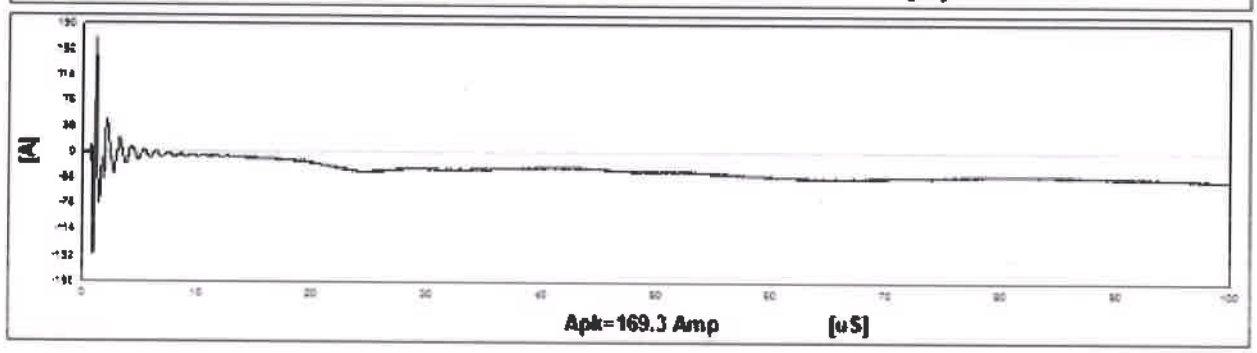
Certificate no. TC-6229

ERTO

Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**





7. 100% Full Impulse Wave

Prepared By

Checked By

ERTO Quality Assurance Laboratory

TE-A 012023

Electrical Research & Testing organisation

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775. Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

Email : erto@erto.in / sr.patel@erto.in

Web : http://www.erto.in

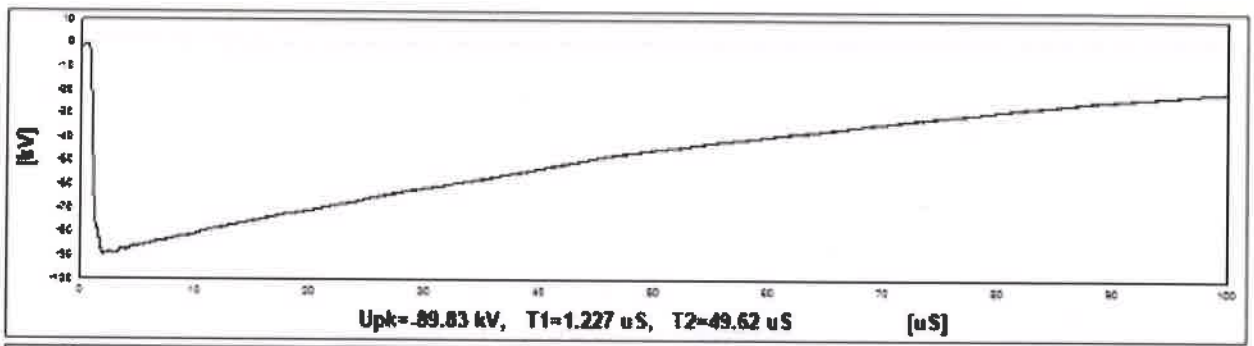
Certificate no. TC-6229

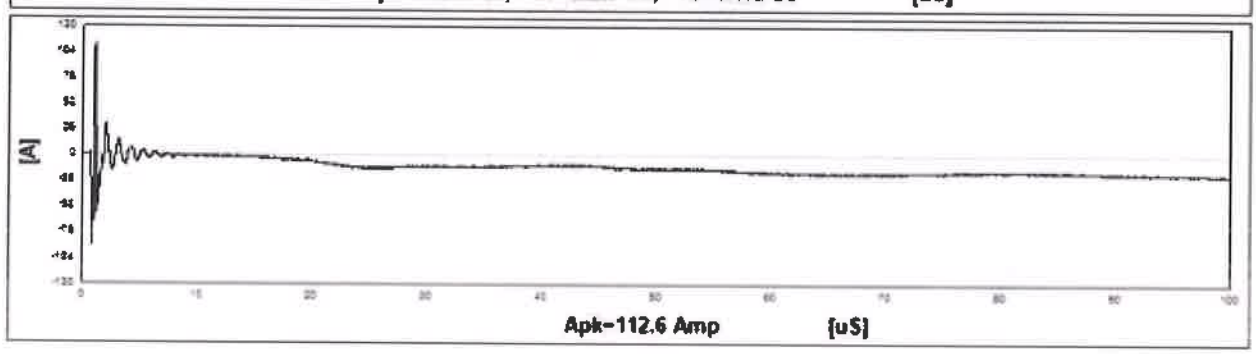
ERTO

Quality Assurance Laboratory

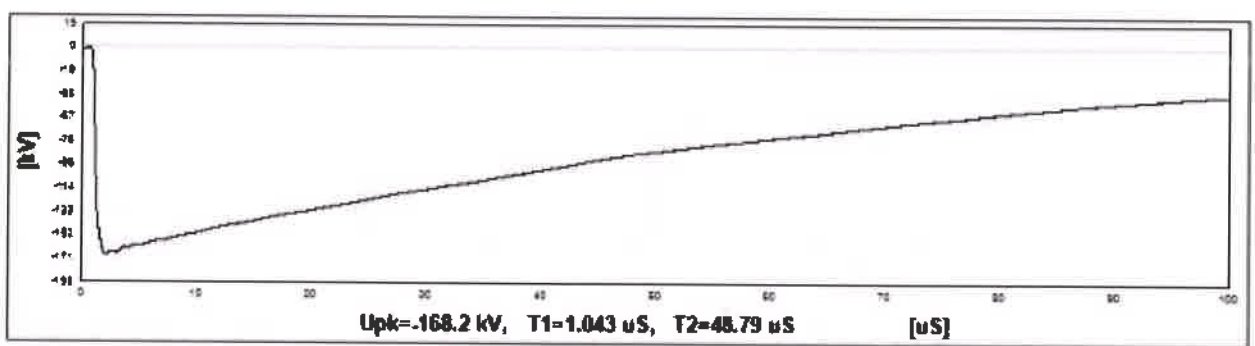
Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

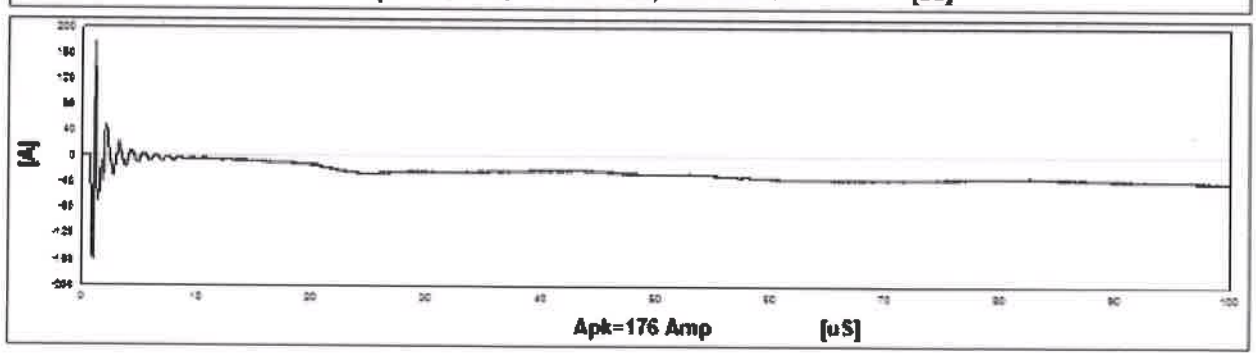
V PHASE





1. Reduced Impulse Wave





2. 100% Full Impulse Wave

Prepared By

Checked By

TE-A 012024

Electrical Research & Testing organisation™

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775. Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

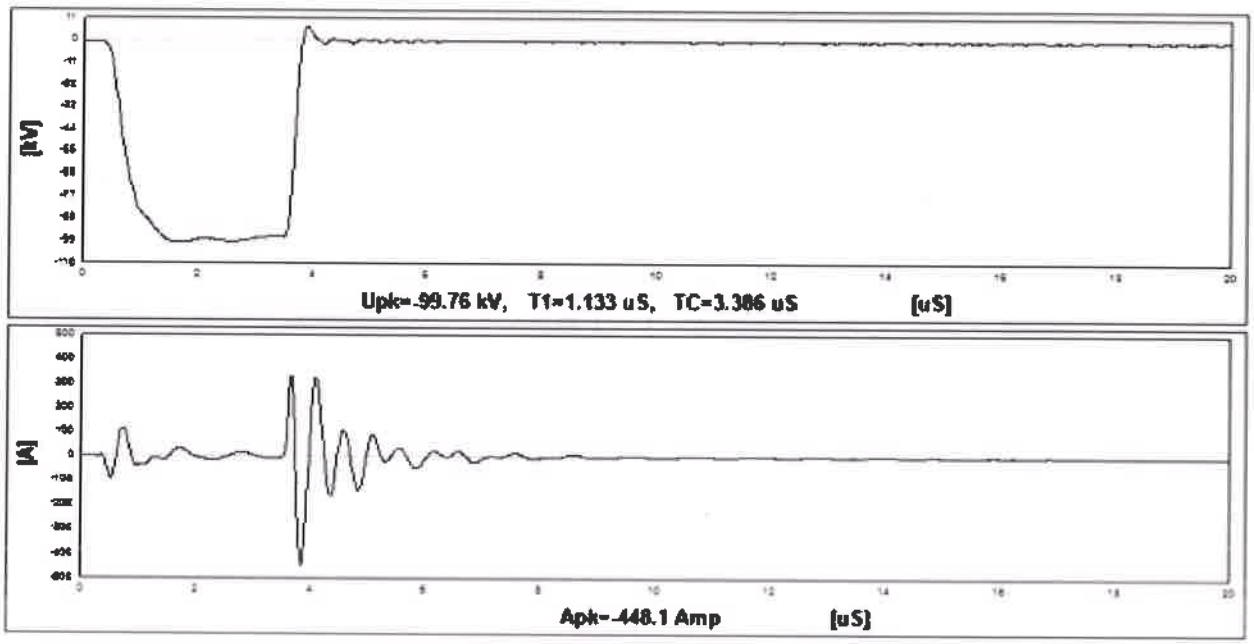
Email : erto@erto.in / sr.patel@erto.in

Web : http://www.erto.in

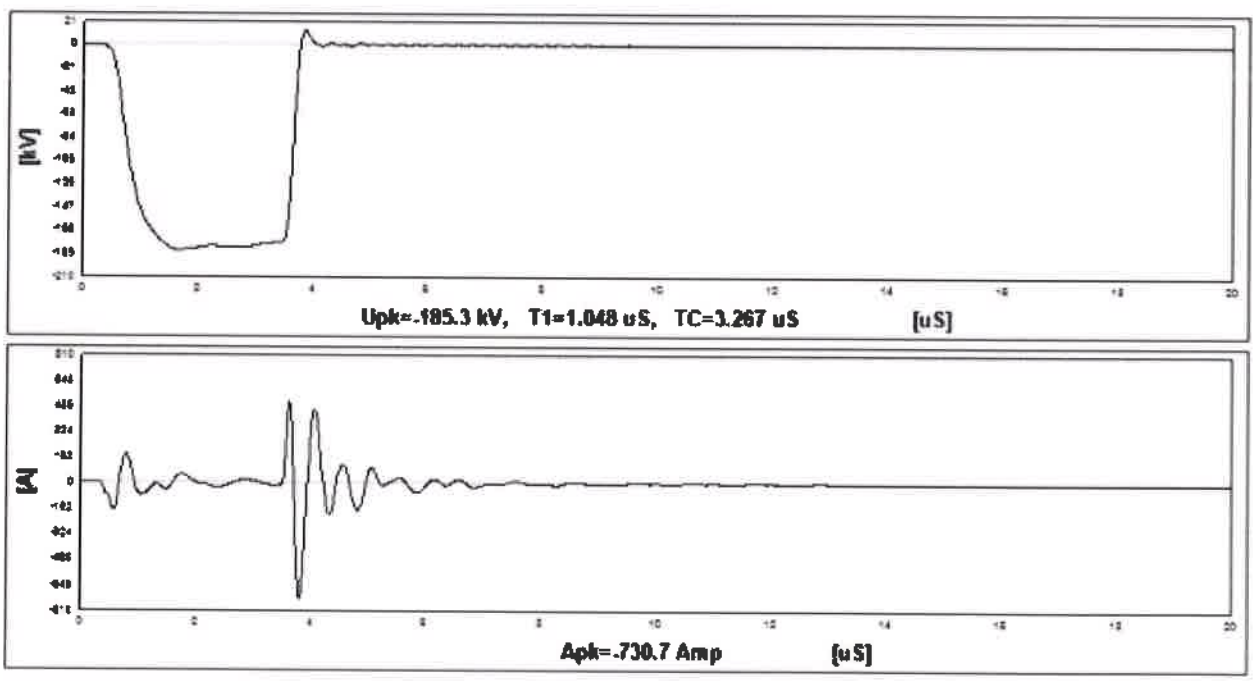
Certificate no. TC-6229

ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**



3. Reduced Chopped Impulse Wave

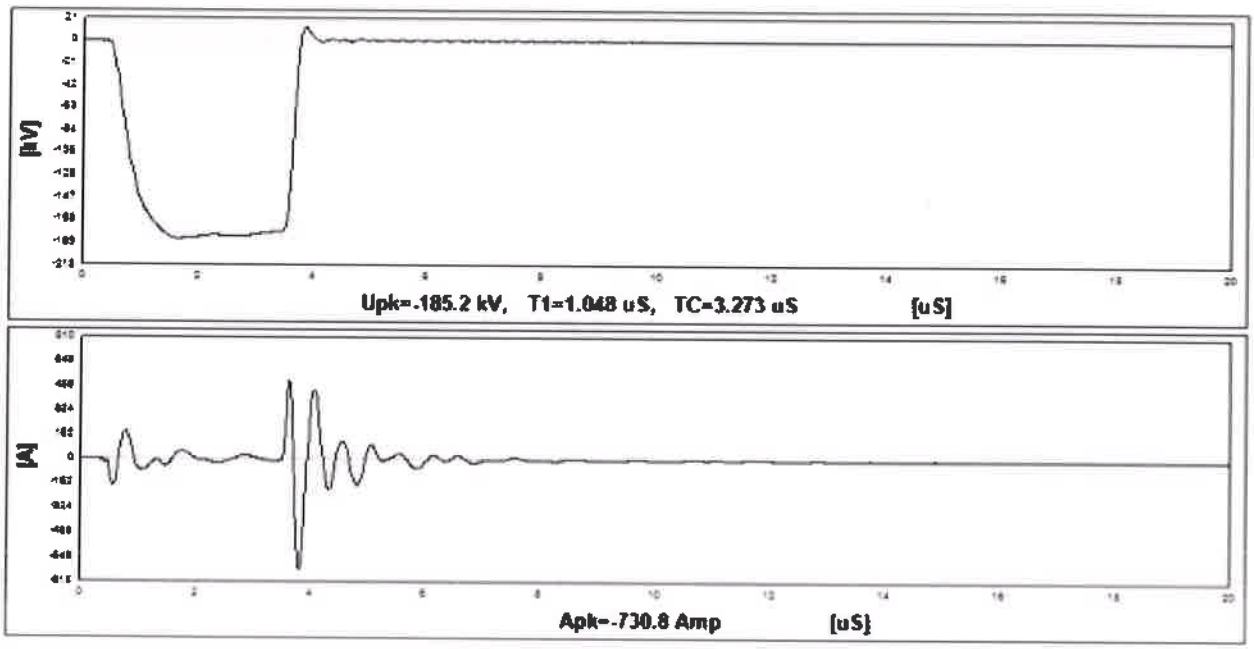


4. 110% Chopped Impulse Wave

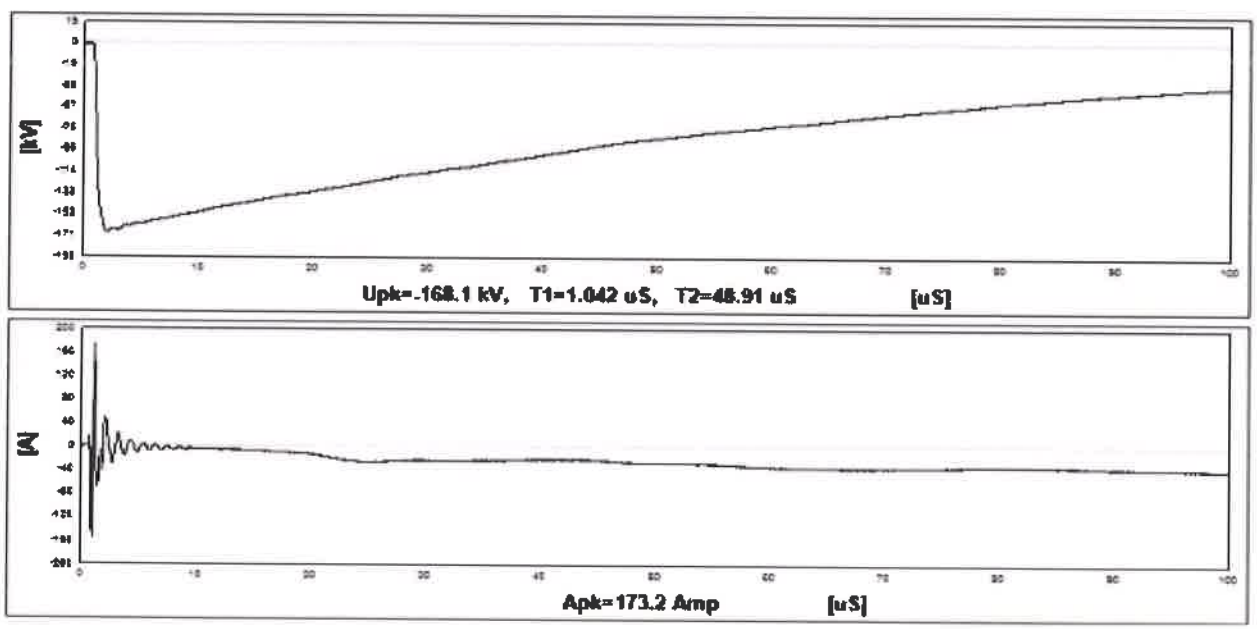
Prepared By

Checked By

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory



5. 110% Chopped Impulse Wave



6. 100% Full Impulse Wave

Prepared By

Checked By

Certificate no. TC-6229

Electrical Research & Testing organisation™

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775, Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

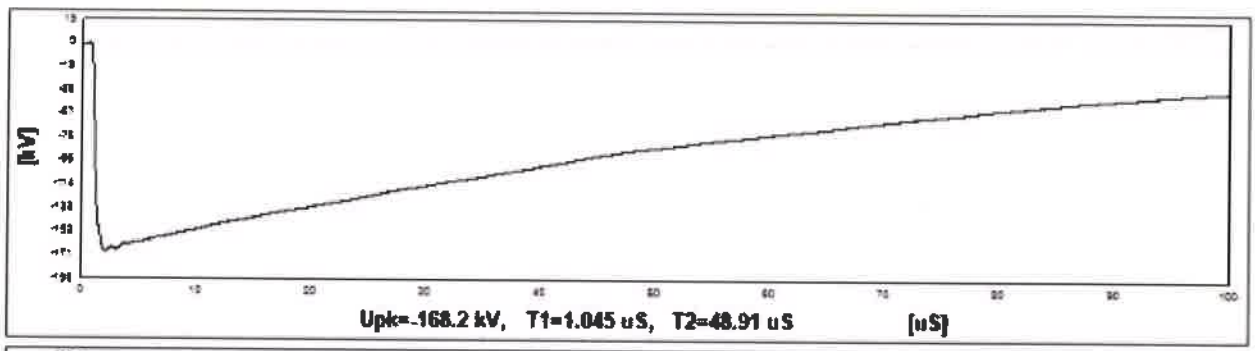
Email : erto@erto.in / sr.patel@erto.in

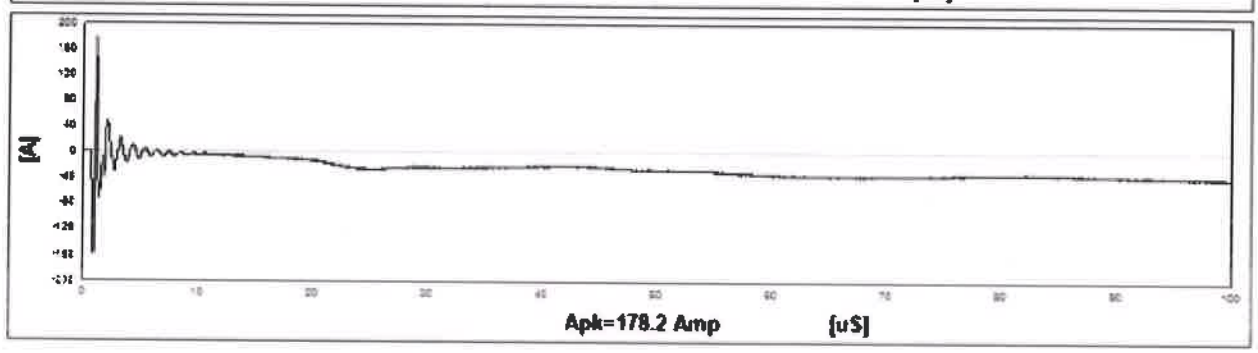
Web : http://www.erto.in

ERTO

Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**





7. 100% Full Impulse Wave

Prepared By

Checked By

ERTO Quality Assurance Laboratory

TE-A 012027

Electrical Research & Testing organisation™

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775, Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

Email : erto@erto.in / sr.patel@erto.in

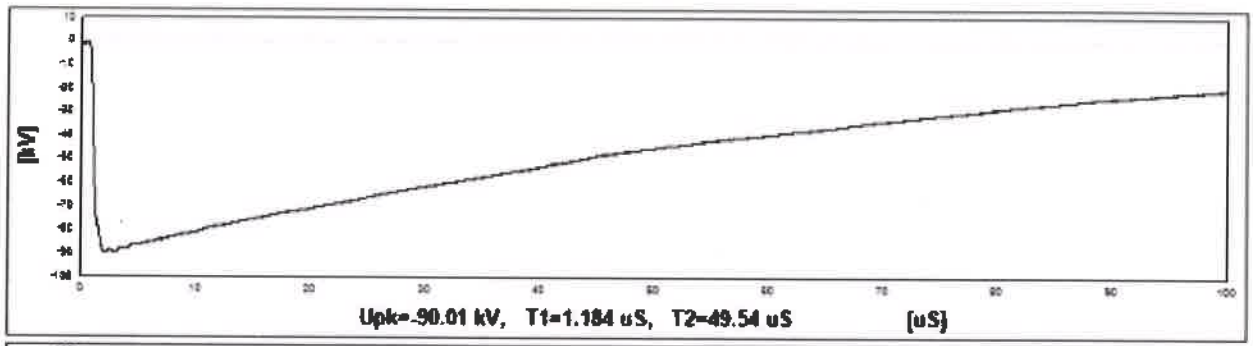
Web : http://www.erto.in

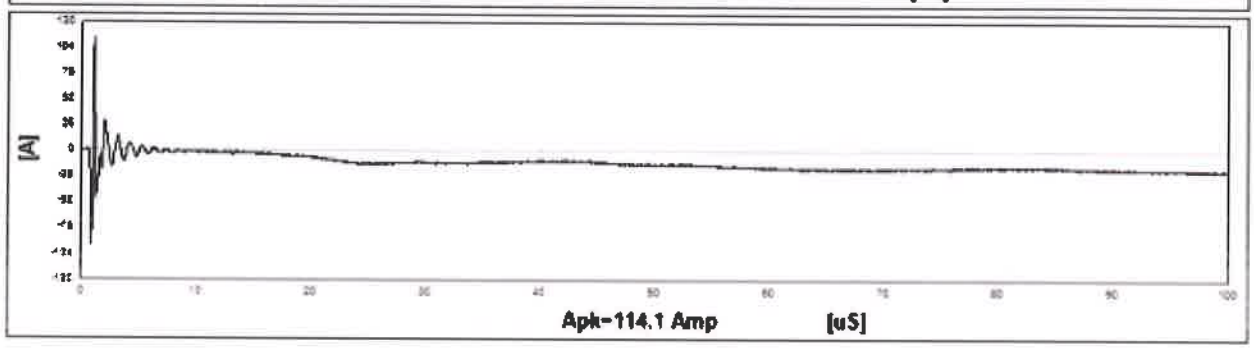
Certificate no. TC-6229

ERTO Quality Assurance Laboratory

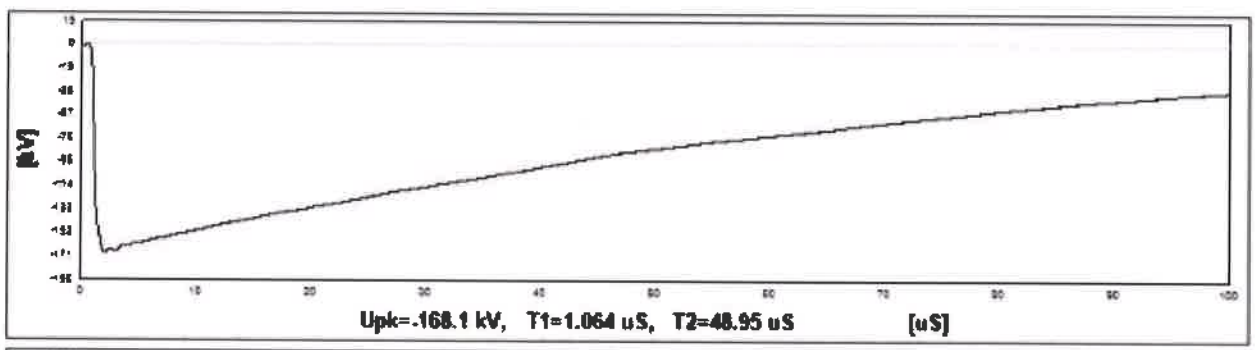
Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

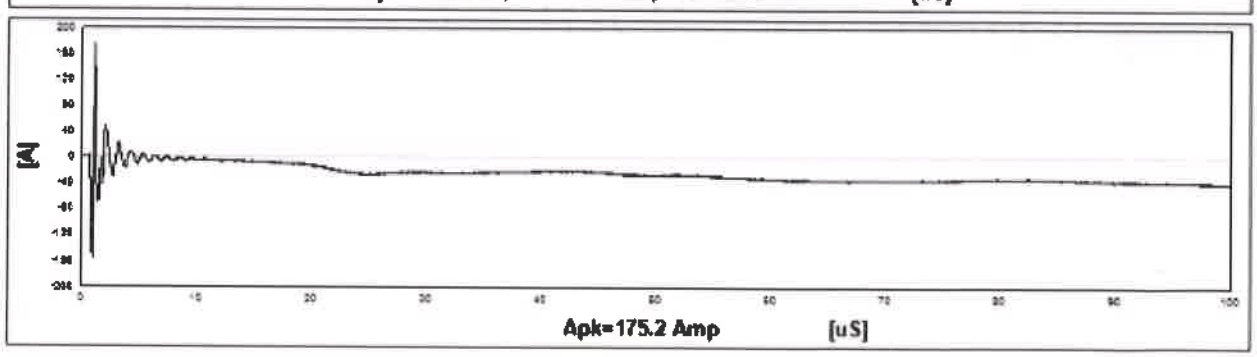
W PHASE





1. Reduced Impulse Wave





2. 100% Full Impulse Wave

Prepared By

Checked By

Electrical Research & Testing organisation

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)

Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.

Pin Code : 391775, Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

Email : erto@erto.in / sr.patel@erto.in

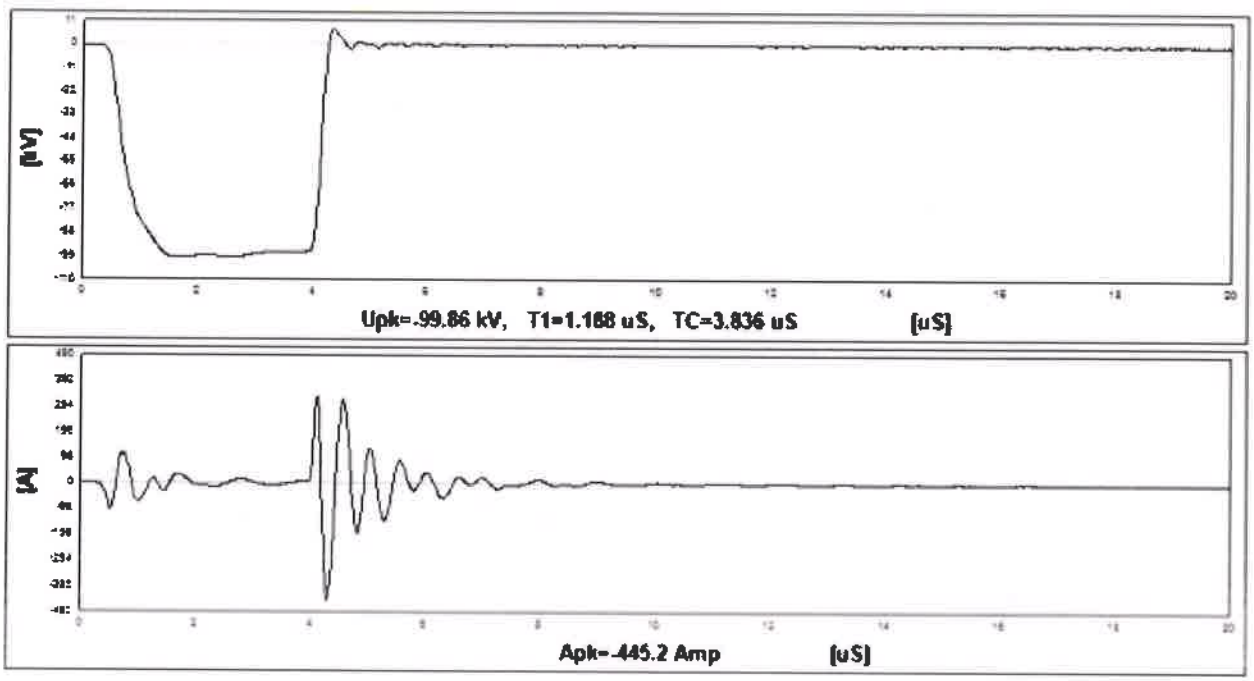
Web : http://www.erto.in

Certificate no. TC-6229

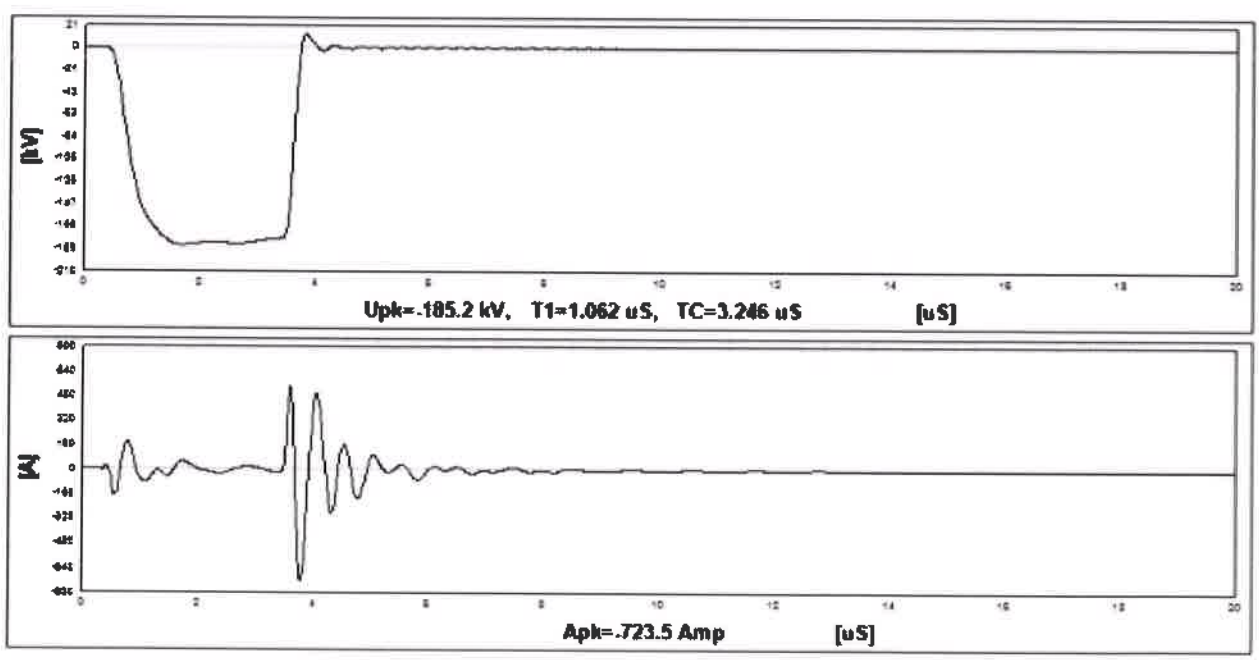
ERTO

Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**



3. Reduced Chopped Impulse Wave



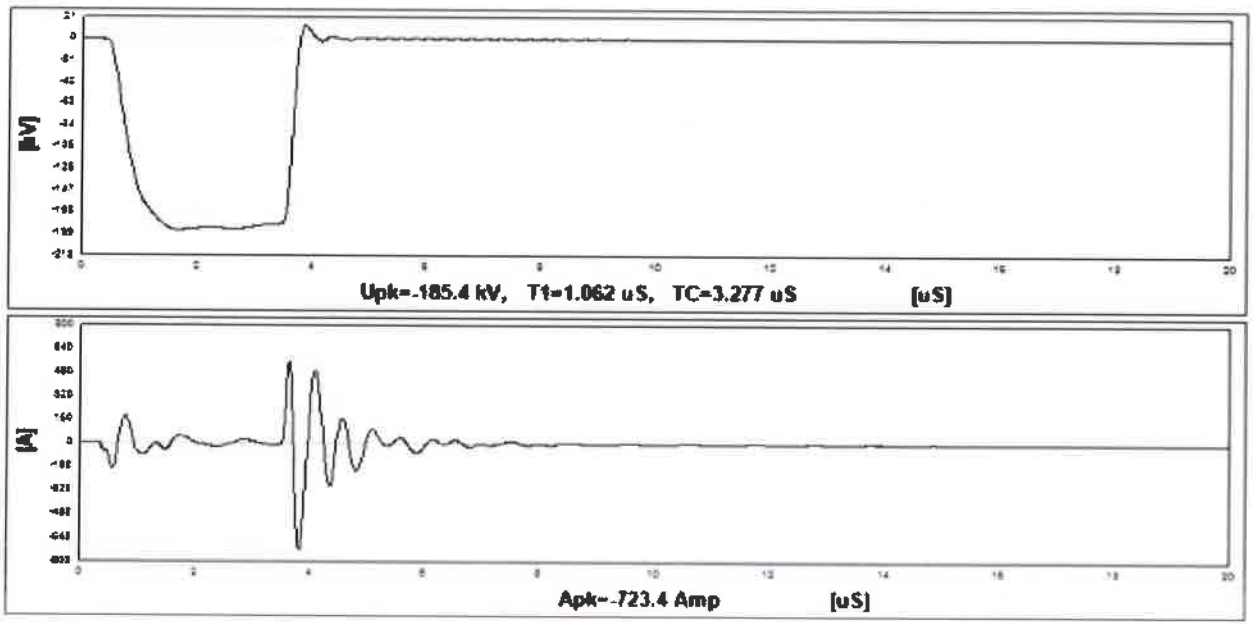
4. 110% Chopped Impulse Wave

Prepared By

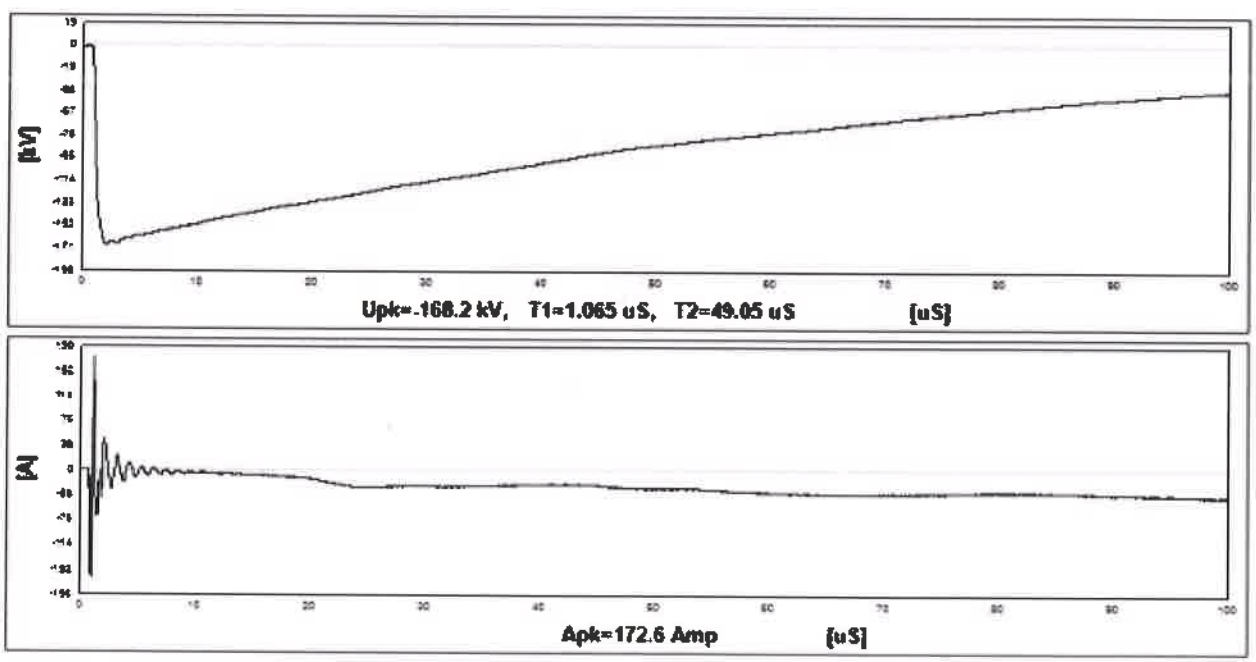
Checked By

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO
Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**



5. 110% Chopped Impulse Wave



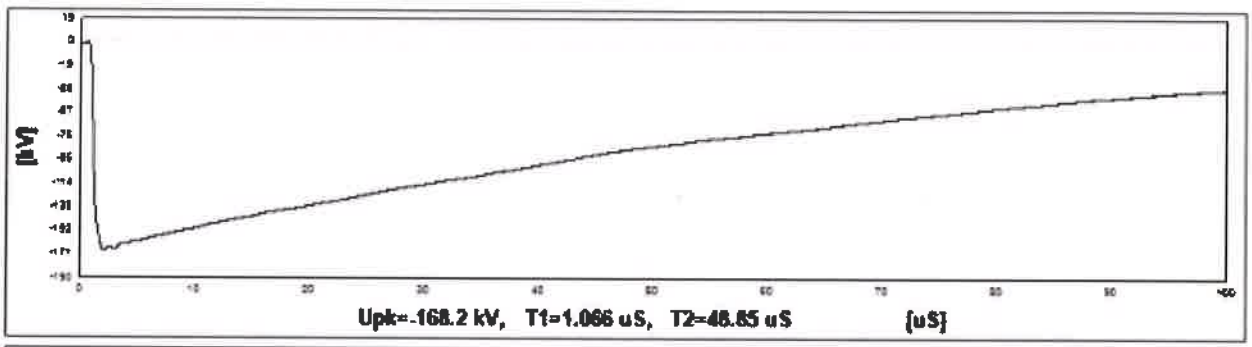
6. 100% Full Impulse Wave

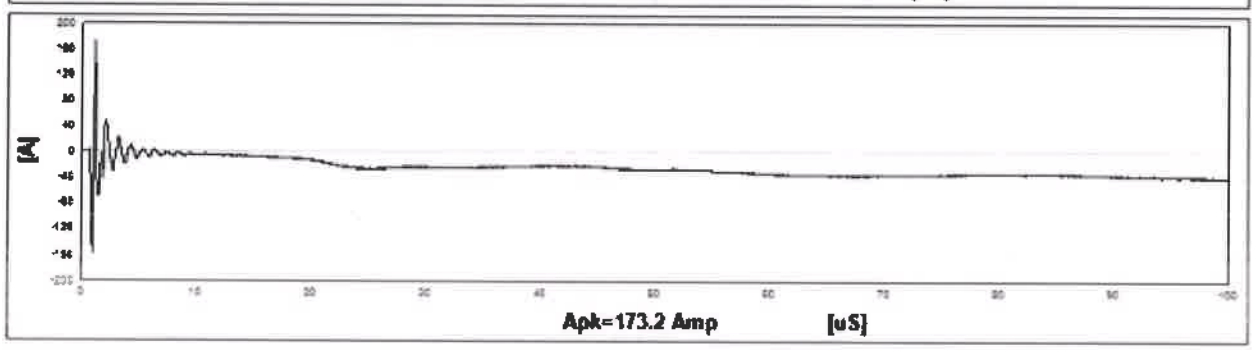
Prepared By

Checked By

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO
Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**





7. 100% Full Impulse Wave

Prepared By

ERTO Quality Assurance Laboratory

Checked By

TE-A 012031

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775, Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
13.	**Temperature-rise test : (Tap position : 7)** (As per cl.no.21.3(b) of IS 1180 (Part 1) : 2014) Before starting test, the dimensions of tank with fins were measured & recorded. Size of tank : L- 1785 mm, W- 710 mm, H- 1835 mm (Avg.) No. of radiators: 04 No. of fins per radiator: 12 Size of fins: L-1600 mm, W-520 mm **Losses fed for temperature-rise test were 18147.23 Watts** (Measured no-load loss:2082.10 W and measured load loss at 75°C at tap no. 7: 16065.13 W) Measured losses were fed to the transformer (i.e. Supply was connected to HV winding and LV windings kept short-circuited) till steady state temperature-rise was attained. Top oil temperature was recorded hourly. After steady state condition, the losses were brought down in reference to the rated current one hour prior to shut down of HV and LV winding.			**Conforms**
	A) Top oil temperature-rise :	Max. 40°C	36.3 °C	
	B) Winding Temperature Rise (Resistance method) 1) HV Winding: 2) LV Winding:	 Max. 45°C Max. 45°C	 38.3 °C 40.2 °C	
	C) Ambient temperature at the time of reduced to rated current:		29.1 °C	
	D) Ambient temperature at the time of shut down:		28.1 °C	
	E) Time of shut down (Hrs):		22:00	

Prepared By

Checked By

ERTO Quality Assurance Laboratory

TE-A 012037

Electrical Research & Testing organisation
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
14.	**Pressure test (type test):** (As per cl.no.21.3(d) of IS 1180(Part 1):2014) The transformer tank was subjected to air pressure of 80 kPa for 30 minutes. The permanent deflections of flat plates were recorded, after pressure has been released.			**Conforms**
	Deflection measured at / **Length of plate (mm)**			
	HV side / 1785	Max. 9.0 mm	2.0 mm	
	LV side / 1785	Max. 9.0 mm	2.0 mm	
	Side A / 710	Max. 5.0 mm	1.0 mm	
	Side B / 710	Max. 5.0 mm	1.0 mm	
	The transformer tank was subjected to vacuum of 500 mm of Mercury for 30 minutes. The permanent deflections of flat plates were recorded, after vacuum has been released.			
	Deflection measured at / **Length of plate (mm)**			
	HV side / 1785	Max. 9.0 mm	1.0 mm	
	LV side / 1785	Max. 9.0 mm	1.0 mm	
	Side A / 710	Max. 5.0 mm	0.0 mm	
	Side B / 710	Max. 5.0 mm	0.0 mm	
	HV SIDE SIDE A SIDE B LV SIDE	There should be no air leakage at any point	No air leakage observed	

Prepared By

Checked By

ERTO Quality Assurance Laboratory

TE-A 012033

Electrical Research & Testing organisation™
(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. Of India)
Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775, Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in
Certificate no. TC-6229
ERTO Quality Assurance Laboratory

Report No.: ERTO/TRP/1819/0820 **ULR No.: TC622919000000186F** **Date: 16/03/2019**

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
15.	**Determination of sound levels:** (As per cl. no. 21.4(a) of IS 1180 (Part 1):2014) **Load condition :** As per cl. no. 6.2 of IS 2026 (Part 10):2009 No-load current and rated voltage **Calculation of the area of the measurement surface :** As per cl. no. 10.1 of IS 2026 (Part 10):2009 Measurement made at 0.3 m from the principal radiating surface **Sound pressure method** As per cl. no. 11.3 of IS 2026 (Part 10):2009			---

Location of measure-ment	Ambient noise Before object energized (dB)	Ambient Noise when object energized (dB)	Ambient noise after object de-energized (dB)
1	34.9	43.4	33.9
2	34.2	43.7	34.2
3	34.0	43.1	33.8
4	33.8	42.9	33.6
5	33.6	42.8	34.1
6	33.7	43.2	33.8
7	33.9	43.0	33.9
8	33.8	42.9	34.0
9	34.4	43.4	33.7
10	34.1	43.2	34.3

The uncorrected average A-weighted sound pressure level $\overline{L_{pA0}}$: The average A-weighted background noise pressure level before the test object energized			43.2 dB
The average A-weighted background noise pressure level after the test object de-energized $\overline{L_{bgA}}$:			34.1 dB
The corrected average A-weighted sound pressure level $\overline{L_{pA}}$:			33.9 dB
The calculated A-weighted sound power level L_{wA} :	---	Max. 62 dB (As specified by customer)	37.5 dB 52.9 dB	--- **Conforms**

Prepared By

Checked By

TE-A 012034

DISTRIBUTION TRANSFORMER

RECONS POWER EQUIPMENTS PVT. LTD.
FARIDABAD - 121004
PH. : (0129) 4062114 - 8

3 PHASE TRANSFORMER

STANDARD	IS 1180 (PART 1)	ENERGY EFFICIENCY LEVEL	3
KVA	2500	MAX. TOTAL LOSSES AT 50% RATED LOAD W	6342.5
VOLTS AT NO LOAD HV	33000	MAX. TOTAL LOSSES AT 100% RATED LOAD W	16812.5
VOLTS AT NO LOAD LV	433	TYPE OF COOLING	ON AN
BIL HV	170/70	TEMP. RISE OIL °C	40
BIL LV		TEMP. RISE WDG °C	45
AMPERES HV	43.73	MASS OF OIL KG	1730
AMPERES LV	3333.43	TOTAL MASS KG	8750
FREQUENCY Hz	50	VOLUME OF OIL LTR	2050
VECTOR GROUP	Dyn 11	MONTH & YEAR OF MFG.	MARCH 2019
IMPEDANCE VOLT %	6.25	SERIAL NO.	5432/02/19
TAPPINGS	OFF CKT		

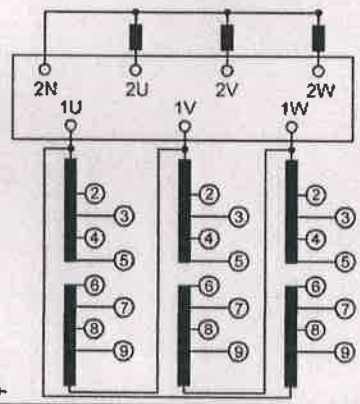
FOR HV VARIATION IN 2.5 STEPS FROM +10 % TO -5 %

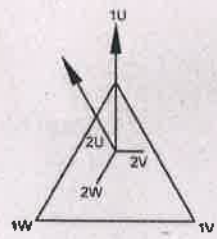
CUSTOMER

ORDER NUMBER

MADE IN INDIA

OFF-CIRCUIT TAP CHANGER		NO LOAD VOLTAGE	
SWITCH POSITION	CONNECTIONS	HV	LV
1	5-6	36300	433
2	6-4	35475	433
3	4-7	34650	433
4	7-3	33825	433
5	3-8	33000	433
6	8-2	32175	433
7	2-9	31350	433





Recons Power Equipments Pvt. Ltd.

ERTO

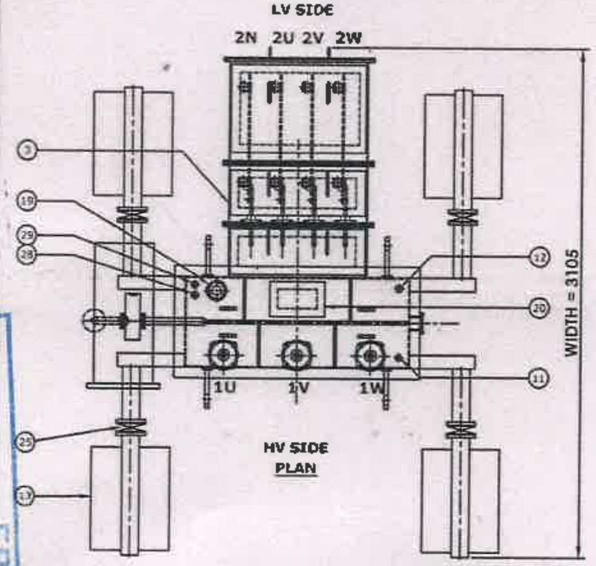
Test Report No. : GR&I/TR0119/09820
Date : 16/2/19
Sample : 2500 KVA
Verified by :

Verification of this drawing by ERTO is limited to relevant dimensional checks only.
Verified dimensions are marked with *

ERTO Quality Assurance Laboratory

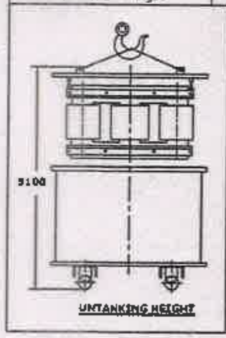
SCALE N.T.S	DRN BY	MR.BNJ		PO. NO. & DATE	
	CHD BY	M.YADAV		DRG. NO.	RC/18-19/2500/01
	PASS BY			REVISION & DATE	00
CLIENT					

Recons Power Equipments Pvt. Ltd.
(formerly known as RECTIFIERS & CONTROLS)
PLOT NO. 38, SECTOR-25, FARIDABAD-121004 (HARYANA)
Ph. : 0129-4062114-16, Fax . 0129-4065111, 4151323
Email : admin@reconsindia.com Website : www.reconsinda.com



APPROX. WEIGHT IN Kgs.

CORE & WINDING IN Kgs.	4550
OIL IN Kgs.	1730
OIL IN Ltrs.	2050
TOTAL WEIGHT Kgs.	8750



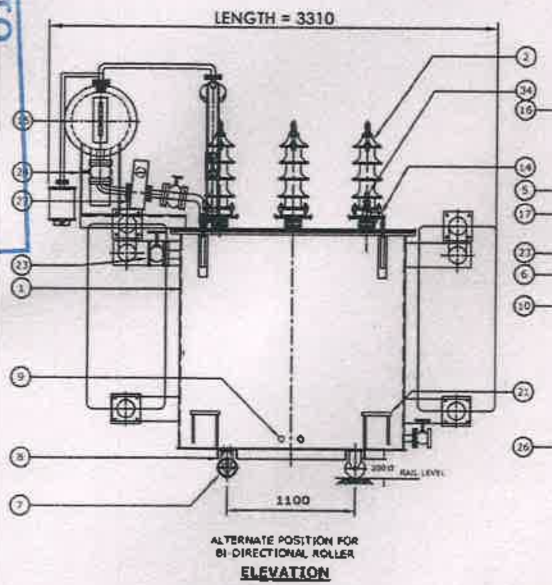
NOTES :-

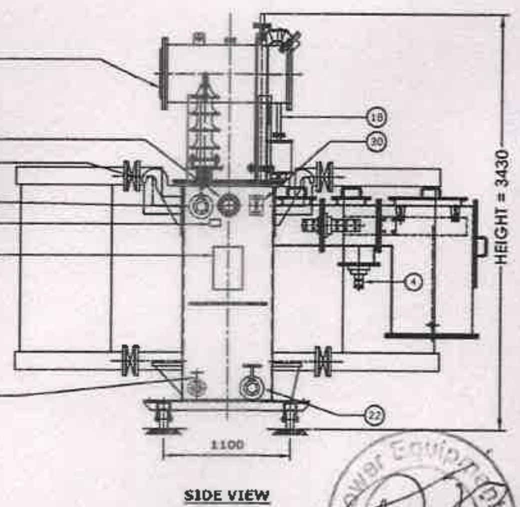
1) ALL DIMENSIONS ARE IN mm
2) ALL DIMENSIONS & WEIGHT ARE SUBJECT TO ± 10% TOLERANCE.
3) TAPPINGS ON HV FOR HV VARIATION OF + 10% TO -5% IN STEP OF 2.5% BY OFF CKT.
4) PAINT :- POLYURETHANE SHADE NO 631 OF I S : 5
5) POSITION OF FITTINGS SHOWN ARE INDICATIVE. ITS POSITION & SHAPE OF FITTINGS MAY CHANGE WHILE ACTUAL DESIGN & MANUFACTURING.
6) MIN.CLEARANCES :-

	33 KV	0.433 KV
PHASE TO PHASE	350	25
PHASE TO EARTH	320	20

LEVEL - 3
IS 1180 (PART-1):2014

TANK INSIDE DIMENSIONS IN mm	
LENGTH	1785
WIDTH	710
HEIGHT	1835 (Avg.)
HEIGHT	1830 (HV SIDE)
HEIGHT	1840 (LV SIDE)





SR.NO	DESCRIPTION	QTY
30	TRANSPORT OIL LEVEL GAUGE	1
29	POCKET FOR W.T.I.	1
28	POCKET FOR O.T.I.	1
27	DOUBLE FLOAT BUCHHOLZ RELAY WITH ALARM & TRIP CONTACTS (GOR 2)	1
26	BOTTOM DRAIN CUM SAMPLING VALVE (20 mmØ S. S .F.)	1
25	RADIATOR VALVES (BUTTERFLY TYPE)	8
24	SHUT-OFF VALVE (50 mmØ D.S.F) G.M. GATE VALVE	2
23	TOP FILTER VALVE (32 mmØ D. S .F.)	1
22	BOTTOM FILTER VALVE (32 mmØ D. S .F.)	1
21	JACKING PADS	4
20	INSPECTION COVER	1
19	EXPLOSION VENT WITH OIL SIGHT GLASS AND DOUBLE DIAPHRAGH	1
18	SILICA GEL BREATHER (1 kgs) WITH FLANGE	1
17	LIFTING LUGS FOR COMPLATE TRANSFORMER	4
16	PRISMATIC TYPE OIL LEVEL GAUGE	1
15	CONSERVATOR WITH LIFTING LUGS, OIL FILLING CAP & DRAIN PLUG	1
14	LIFTING LUGS FOR TOP COVER	4
13	P.S. RADIATORS WITH AIR RELEASE PLUG, LIFTING LUG & DRAIN PLUG RADIATORS SIZE :- 520 x 1600 x 12 FINS	4
12	THERMOMETER POCKET	2
11	AIR RELEASE PLUG	1
10	RATING AND DIAGRAM PLATE	1
9	EARTHING TERMINALS (M-16)	2
8	BASE CHANNEL WITH HAULING HOLE	2
7	200 Ø FLAT ROLLERS (BI-DIRECTIONAL)	4
6	WARNING PLATE FOR TAP SWITCH	1
5	TAPPING SWITCH HANDLE WITH POSITION INDICATOR & LOCKING DEVICE	1
4	ADDITIONAL NEUTRAL EPOXY BUSHING (1 KV/2150 Amps)	1
3	L V CABLE BOX WITH DCC (1KV/4000 Amps)	1
2	HV BARE PORCELAIN BUSHING (36 KV/250 Amps)	3
1	TRANSFORMER TANK	1

DRN	
CHD	
APPRD	

GENERAL ARRANGEMENT
OF TRANSFORMER
2500 KVA, 33/0.433 KV

RECONS POWER EQUIPMENTS PVT. LTD.
PLOT NO. 38, SECOTOR-25, FARIDABAD - 121 004
HARYANA (INDIA)

SHEET: Sh 1/1 | SCALE: N.T.S.

DRG.NO. - RC/18-19/2500/01

REV. NO | DATE & SIGN | BRIEF RECORD

Recons Power Equipments Pvt. Ltd.

ERTO
Test Report No.: ERTO-19R01/119/1028/12
Date: 16/3/19
Sample: 2500 KVA
Verified by: [signature]
Verification of this drawing by ERTO is limited to relevant dimen... checks only.
Verified dimensions are marked with *