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TEST REPORT

SHEET 1 OF 25

NAME & ADDRESS OF CUSTOMER RAJASTHAN POWERGEN TRANSFORMER PVT. LTD. Khasra No. 911-914, Karola – Bhinmal Road, Karola, Sanchore, Rajasthan-343041 (India)	REPORT NO.: RP-1819-011066 DATE: 21.06.2018	
SAMPLE DESCRIPTION 10 kVA Single Phase Distribution Transformer 11000/√3/240 Volts, 1.57/41.67 Amps., Oil filled, ENERGY EFFICIENCY LEVEL: 2 Further details as per sheet No. 3 OF 25	CUSTOMER REF. NO.: RPTPL/Type Test/ERDA/002 DATE OF SAMPLE RECEIPT: 26.04.2018	DATED: 26.04.2018 DATE OF TESTING: 01.05.2018 to 17.05.2018
TEST DETAILS As per SHEET 4 OF 25 ENCLOSURES: As per SHEET 2 OF 25 REMARKS: The sample conforms to the requirements of standard for the tests carried out.	SAMPLE IDENTIFICATION ERDA SAMPLE CODE NO.: ERDA-00254192 SERIAL NO.: RPTPL/10KVA/18-19/001 YEAR OF MFG.: 2018 TEST SPECIFICATIONS As per SHEET 4 OF 25	
PREPARED BY 	CHECKED BY 	APPROVED BY  J. R. TAHILWANI

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SHEET 2 OF 25

DATE: 21.06.2018

Enclosures:

Contents	
1. Oscillogram No.	0138/01 to 0138/05
2. Photograph No.	1819-001485/0164
3. Test circuit diagram No.	OLSC/DTC/05
4. Drawing No.	RPTPL/RP/03 Rev.: 01 Sheet No. 1 of 1 RPTPL/OGA/03 Rev.: 01 Sheet No. 1 of 1 RPTPL/IC/03 Rev.: 01 Sheet No. 1 of 1


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SHEET 3 OF 25

DATE: 21.06.2018

TECHNICAL SPECIFICATIONS OF TEST OBJECT ASSIGNED BY CUSTOMER

- | | |
|--|---|
| 1. Name of manufacturer | : RAJASTHAN POWERGEN TRANSFORMER PVT. LTD. |
| 2. Equipment | : 10 kVA Single Phase Distribution Transformer |
| 3. Serial No. | : RPTPL/10KVA/18-19/001 |
| 4. Energy efficiency level | : 2 |
| 5. Type | : Outdoor, Oil cooled, Sealed type, Non Circular Coil |
| 6. kVA rating | : 10 |
| 7. Rated voltage H.V.(volts) | : 11000/ $\sqrt{3}$ |
| L.V. (volts) | : 240 |
| 8. Rated current H.V. (Amp.) | : 1.57 |
| L.V.(Amp.) | : 41.67 |
| 9. Number of phases | : 1 |
| 10. Frequency (Hz.) | : 50 |
| 11. Type of cooling | : ONAN |
| 12. Temperature rise of oil/winding | : 35°C/40°C |
| 13. Percentage Impedance | : 4.0% $\pm$ 10% Tolerance |
| 14. Primary winding conductor | : Polyesterimide Enamel Class H, Aluminium wire, bare dia. 1.74mm |
| 15. Secondary winding conductor | : DPC Aluminium strip, bare size (9.5mm x 2.9mm) x 2 Nos. in parallel |
| 16. Quantity of oil (Litre) | : 34 |
| 17. Weight of oil (kg.) | : 29 |
| 18. Weight of core & coil assly. (kg.) | : 78 |
| 19. Total weight (kg.) | : 144 |
| 20. Polarity | : Subtractive |
| 21. Vector group | : 1-Phase |
| 22. Year of manufacture | : 2018 |
| 23. Insulation Level H.V. | : 75 kVp |
| 24. Insulation Level L.V. | : 03 kVrms |
| 25. Total losses at 75°C (Watts) | : 60 Max. (at 50 % load) |
| 26. Total losses at 75°C (Watts) | : 170 Max. (at 100 % load) |

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DATE: 21.06.2018

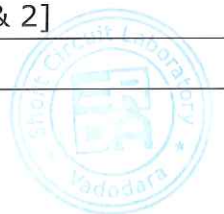
SR. NO.	TEST DETAILS	TEST SPECIFICATIONS
1.	Short-circuit withstand test	Cl. No. (17 & 21.3.c) of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
2.	Lightning Impulse Test	Cl. No. 21.3 a of IS 1180 (Part 1): 2014 [Amendment No.1 & 2] & Test voltage was specified by the customer & Test procedure was followed as per IS: 2026 (Part 3): 2009, Cl. No. 14
3.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load.	Cl. No. 21.2.c of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
4.	Measurement of no-load loss and current	Cl. No. 21.2.d of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
5.	Total losses at 50 % load	Cl. No. 8.8 of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
6.	Total losses at 100 % load	Cl. No. 8.8 of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
7.	Temperature-rise test	As per customer's requirement, testing procedure followed as per Cl. No. 21.3.b of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
8.	No-load current at 112.5 percent voltage	Cl. No. 21.4.c of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
9.	Oil leakage test	Cl. No. 21.2.j of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
10.	Pressure test (routine test)	Cl. No. 21.2.h of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
11.	Pressure test (type test)	Cl. No. 21.3.d of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]
12.	Determinations of sound levels	As per customer's requirement, testing procedure followed as per Cl. No. 21.4.a of IS 1180 (Part 1): 2014 [Amendment No.1 & 2] & Cl. No. 13 of IS 2026 (Part 10): 2009
13.	Measurement of the Harmonics of the No-load current	As per customer's requirement, testing procedure followed as per Cl. No. 10.6 of IS 2026 (Part 1):2011
*14.	Paint adhesion test	Test procedure followed as per ASTM D 3359-2017, Cl. No. 8 & Cl. No. 21.4.d of IS 1180 (Part 1): 2014 [Amendment No.1 & 2]

* Not covered in our NABL scope

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SHEET 5 OF 25

DATE: 21.06.2018

1. Short-circuit withstand test

(Cl. No. 17 & 21.3 c)

ROUTINE TEST RESULTS BEFORE SHORT CIRCUIT

a) MEASUREMENT OF WINDING RESISTANCE

Measurement at oil temperature: 38.7°C	
LV Winding resistance (mΩ)	HV Winding resistance (Ω)
2.1-2.2(n)	1.1-1.2(N)
23.964	20.674

b) MEASUREMENT OF VOLTAGE RATIO AND CHECK OF POLARITY

Polarity: Subtractive was verified

Measured turns ratio between Terminals	Rated turns Ratio	Difference (%)
1.1-1.2(N)/2.1-2.2(n)		
26.475	26.463	0.045

c) MEASUREMENT OF SHORT-CIRCUIT IMPEDANCE AND LOAD LOSS (at 100 % load)

Oil temperature: 39.0°C

Test current (Amp.)	Impedance voltage (V)	Frequency (Hz.)	Load loss measured (Watts)	Impedance Voltage (%Z) at 50 Hz.	Load loss computed at 75°C (Watts)	%Z at 75°C
1.568	253.988	50.040	97.949	4.001	110	4.032

d) MEASUREMENT OF LOAD LOSS (at 50 % load)

Oil temperature: 39.0°C

Test current (Amp.)	Impedance voltage (V)	Frequency (Hz.)	Load loss measured (Watts)	Load loss computed at 75°C (Watts)
0.784	127.101	50.061	24.538	28

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e) MEASUREMENT OF NO-LOAD LOSS AND CURRENT

Oil temperature: 39.0°C

Applied Voltage (V)	Current (Amp.)	Frequency (Hz.)	Losses Measured (Watts)
240.009	0.145	50.028	30

- Total losses at 75°C: 58 Watts (at 50 % load)
- Total losses at 75°C: 140 Watts (at 100% load)

f) MEASUREMENT OF INSULATION RESISTANCE

Oil temperature: 38.7°C, Measured at Voltage: 1000 V DC

	IR value (MΩ)
HV to LV winding	> 2000
HV winding to LV + EARTH	> 2000
LV winding to HV + EARTH	> 2000

g) INDUCED OVER-VOLTAGE WITHSTAND TEST

Sr. No.	Test	Applied voltage (V)	Applied Freq. (Hz.)	Duration (sec.)	Remarks
1.	Between LV windings with HV terminal open & neutral terminal earthed.	756	150	40	Withstood

h) SEPARATE-SOURCE VOLTAGE WITHSTAND TEST

Sr. no.	Test	Applied voltage (kV)	Duration (sec.)	Remarks
1.	Between HV winding and LV winding connected to the tank and earth	03	60	Withstood
2.	Between LV winding and HV winding connected to the tank and earth	03	60	Withstood

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SHORT-CIRCUIT WITHSTAND TEST:

The verification of short-circuit withstand test was performed on the transformer by connecting the secondary winding to single phase of the source and primary winding short circuited using synchronization switch. The test conducted with short circuiting of primary winding; follow the application of the voltage to the secondary winding of transformer as per schematic circuit diagram No. OLSC/DTC/05.

Condition of the equipment under test: As after routine tests.

Supply Frequency: 50 Hz.

Test No.	Oscillo-gram No.	Applied voltage (Vrms)	Short circuit current on LV (A)		Duration (sec.)	Remarks
			Peak	RMS		
1.	0138/01	-	1276	809	0.1	Calibration Shot
2.	0138/02	240	2073	1114	0.5	No Abnormality
3.	0138/03	240	2012	1087	0.5	No Abnormality
4.	0138/04	240	2075	1121	0.5	No Abnormality
5.	0138/05	240	2149	1130	2.0	Thermal shot No Abnormality

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Measurement of the % reactance during the short circuit test

LV winding was short circuited. AC supply was connected to HV winding to pass test current. Before the short circuit test and after each shot, the percentage reactance was measured.

Sr. No.	Measurement performed		Measured value of % reactance at 50 Hz.	%Change in % reactance
1.	Before test		3.88	-
2.	After the test no.	2.	3.88	0.00
3.	After the test no.	3.	3.88	0.00
4.	After the test no.	4.	3.88	0.00
5.	After the test no.	5.	3.88	0.00

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ROUTINE TEST RESULTS AFTER SHORT CIRCUIT

a) MEASUREMENT OF WINDING RESISTANCE

Measurement at oil temperature: 33.6°C	
LV Winding resistance (mΩ)	HV Winding resistance (Ω)
2.1-2.2(n)	1.1-1.2(N)
23.556	20.244

b) MEASUREMENT OF VOLTAGE RATIO AND CHECK OF POLARITY

Polarity: Subtractive was verified

Measured turns ratio between Terminals	Rated turns Ratio	Difference (%)
1.1-1.2(N)/2.1-2.2(n)		
26.479	26.463	0.060

c) MEASUREMENT OF SHORT-CIRCUIT IMPEDANCE AND LOAD LOSS (at 100 % load)

Oil temperature: 33.3°C

Test current (Amp.)	Impedance voltage (V)	Frequency (Hz.)	Load loss measured (Watts)	Impedance Voltage (%Z) at 50 Hz.	Load loss computed at 75°C (Watts)	%Z at 75°C
1.568	253.374	49.944	96.104	3.999	110	4.034

d) MEASUREMENT OF LOAD LOSS (at 50 % load)

Oil temperature: 33.3°C

Test current (Amp.)	Impedance voltage (V)	Frequency (Hz.)	Load loss measured (Watts)	Load loss computed at 75°C (Watts)
0.784	126.617	49.948	24.020	28

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e) MEASUREMENT OF NO-LOAD LOSS AND CURRENT

Oil temperature: 33.3°C

Applied Voltage (V)	Current (Amp.)	Frequency (Hz.)	Losses Measured (Watts)
240.201	0.146	50.072	30

- Total losses at 75°C: 58 Watts (at 50 % load)
- Total losses at 75°C: 140 Watts (at 100% load)

f) MEASUREMENT OF INSULATION RESISTANCE

Oil temperature: 33.6°C, Measured at Voltage: 1000 V DC

	IR value (MΩ)
HV to LV winding	> 2000
HV winding to LV + EARTH	> 2000
LV winding to HV + EARTH	> 2000

g) INDUCED OVER-VOLTAGE WITHSTAND TEST

Sr. No.	Test	Applied voltage (V)	Applied Freq. (Hz.)	Duration (sec.)	Remarks
1.	Between LV windings with HV terminal open & neutral terminal earthed.	756	150	40	Withstood

h) SEPARATE-SOURCE VOLTAGE WITHSTAND TEST

Sr. no.	Test	Applied voltage (kV)	Duration (sec.)	Remarks
1.	Between HV winding and LV winding connected to the tank and earth	03	60	Withstood
2.	Between LV winding and HV winding connected to the tank and earth	03	60	Withstood

Observation after test: The transformer was untanked and inspected.

- Condition of conductor, core and clamping:
 - No visible damage, deformation or displacement.
- Condition of oil : Clear

Results: 1) % Change in % reactance is within tolerance limits as per standard.
2) The results of routine tests carried out before and after the short-circuit withstand test found within limits as per standard.

REMARKS: The sample **conforms** to the requirements of standard for Short-circuit withstand test.

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2.Lightning Impulse Test (As per Cl. No.21.3.a of IS 1180 (part 1) : 2014 Amendment No. 1 & 2 & Test voltage was specified by the customer & Test procedure was followed as per IS : 2026- (part- III),2009, Cl. No. 14

Waveform	Comment	Ut / kVp	T1 / μ s	T2 / μ s	Tc / μ s
----------	---------	----------	--------------	--------------	--------------

1.1-POLE					
1	LI RW	-48.124	1.306	44.195	
2	100% LI FW	-73.334	1.304	44.532	
3	LI CRW	-49.404	1.340		4.931
4	110% LI CFW	-81.750	1.317		2.873
5	110% LI CFW	-82.313	1.320		2.793
6	100% LI FW	-74.133	1.301	44.464	
7	100% LI FW	-75.171	1.305	44.349	

REMARKS: From the observation of enclosed oscillographic records , it is concluded that the transformer **conforms** to the requirements of the above mentioned standard with respect to the test carried out.

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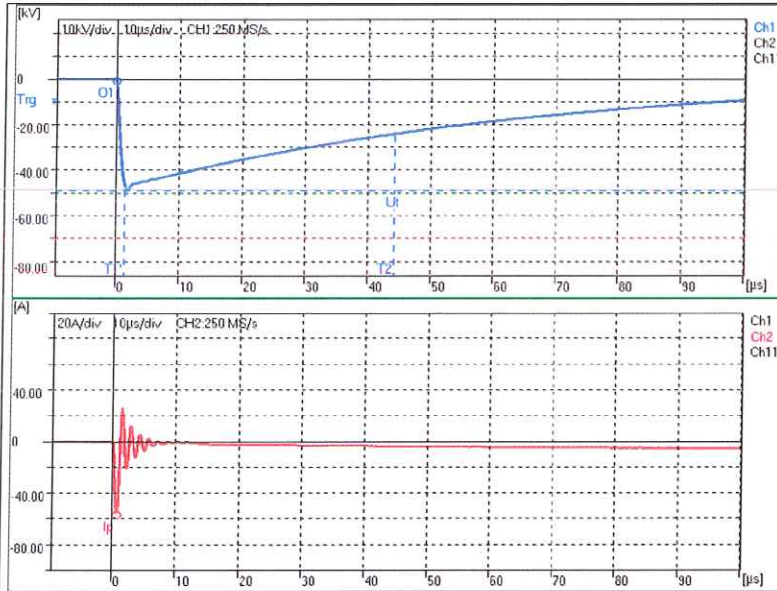


Fig.: 1

$U_p = -48.12 \text{ kV}$

$T_1 = 1.31 \mu\text{s}$

$T_2 = 44.19 \mu\text{s}$

$T_c = \mu\text{s}$

Comment: LI RW

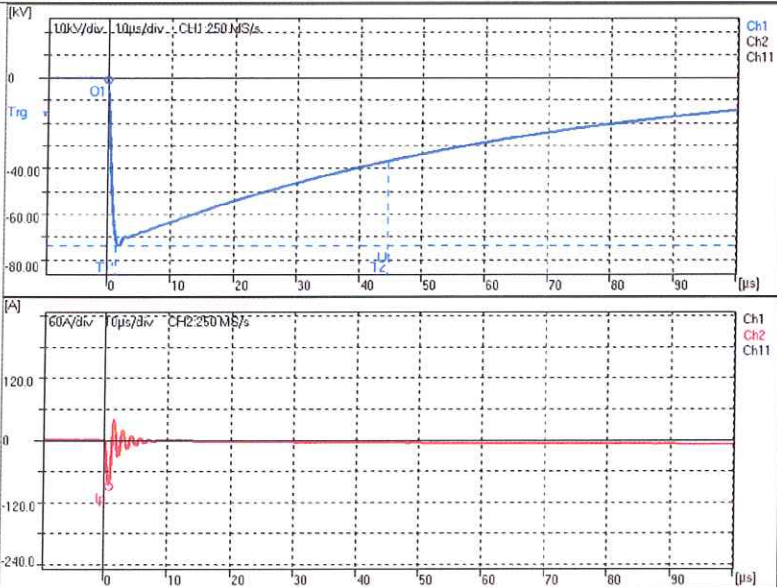


Fig.: 2

$U_p = -73.33 \text{ kV}$

$T_1 = 1.30 \mu\text{s}$

$T_2 = 44.53 \mu\text{s}$

$T_c = \mu\text{s}$

Comment: 100% LI FW

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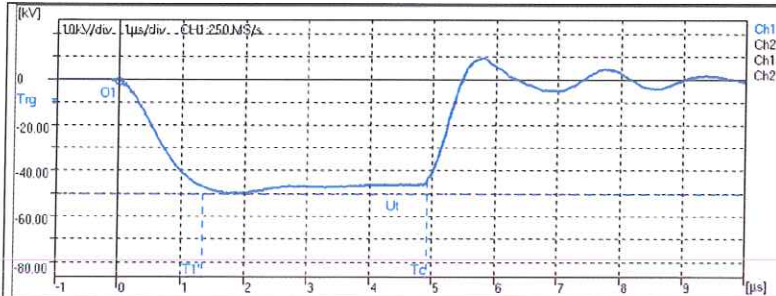


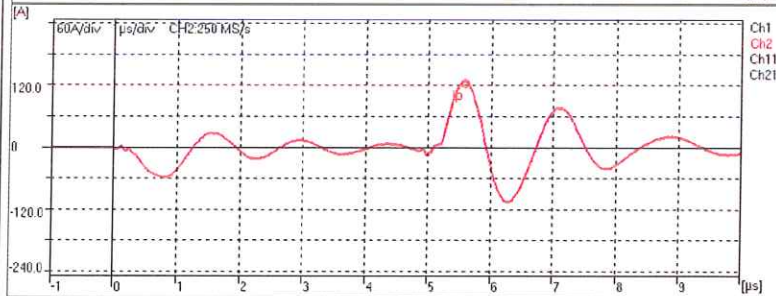
Fig.: 3

$U_p = -49.40 \text{ kV}$

$T_1 = 1.34 \mu\text{s}$

$T_2 = \mu\text{s}$

$T_c = 4.93 \mu\text{s}$



Comment: LI CRW

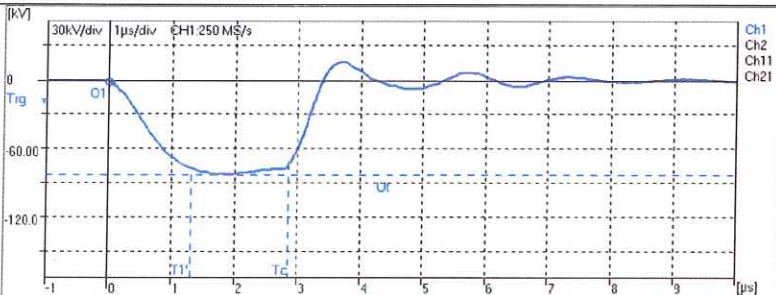


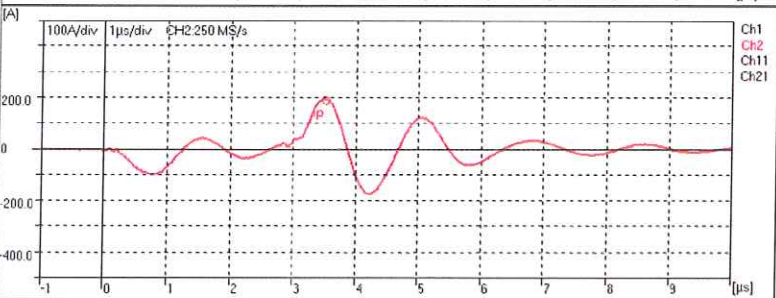
Fig.: 4

$U_p = -81.75 \text{ kV}$

$T_1 = 1.32 \mu\text{s}$

$T_2 = \mu\text{s}$

$T_c = 2.87 \mu\text{s}$



Comment: 110% LI CFW

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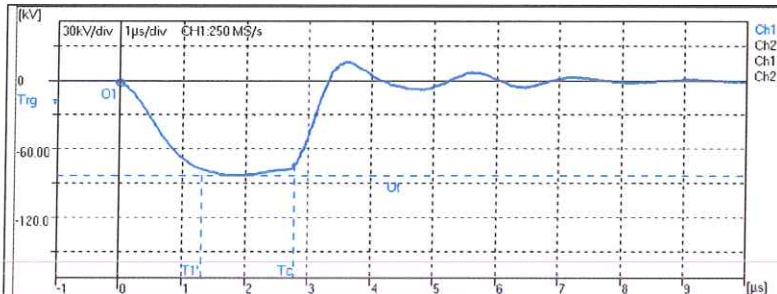


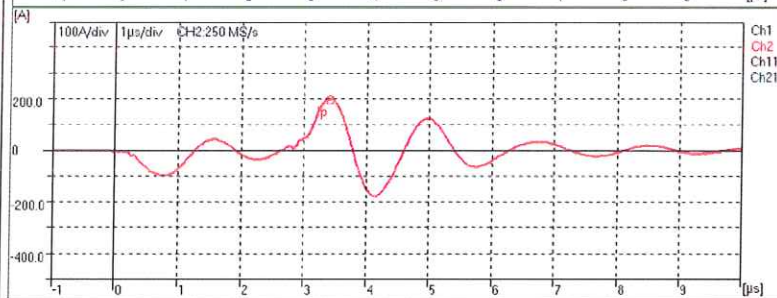
Fig.: 5

$U_p = -82.31 \text{ kV}$

$T_1 = 1.32 \mu\text{s}$

$T_2 = \mu\text{s}$

$T_c = 2.79 \mu\text{s}$



Comment: 110% LI CFW

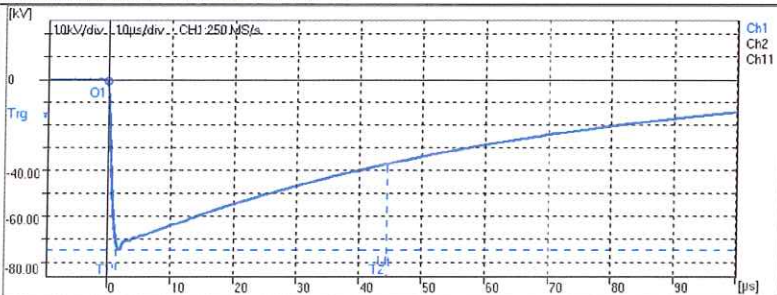


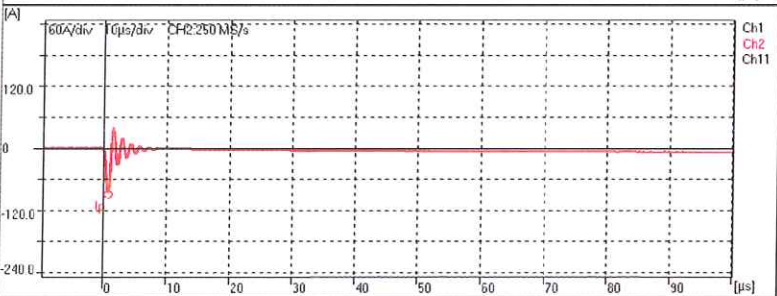
Fig.: 6

$U_p = -74.13 \text{ kV}$

$T_1 = 1.30 \mu\text{s}$

$T_2 = 44.46 \mu\text{s}$

$T_c = \mu\text{s}$



Comment: 100% LI FW

TC 2546885

PREPARED BY

CHECKED BY

TEST REPORT NO. : RP-1819-011066
DATE : 21/06/2018

SHEET NO.: 15 of 25

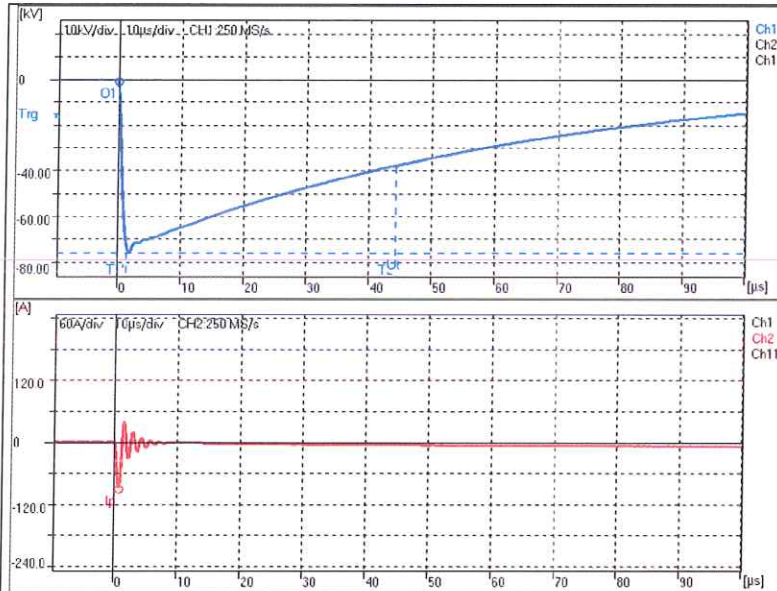


Fig.: 7

$U_p = -75.17 \text{ kV}$

$T_1 = 1.30 \text{ } \mu\text{s}$

$T_2 = 44.35 \text{ } \mu\text{s}$

$T_c = \text{ } \mu\text{s}$

Comment: 100% LI FW

TC 2546886

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REPORT NO.: RP-1819-011066		Sheet : 16 OF 25		
DATE : 21.06.2018				
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
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)			
	At 50% load :			
	Tested with 0.7824 Amps (on HV side)			
	Frequency : 49.905 Hz			
	Top oil temperature : 31.1°C			
	Test current (Amps)		0.7824	
	Impedance voltage (Volts)		126.15	
	Measured load loss (Watts)		23.69	
	Impedance voltage (%)			
	(Computed to 50% load)			
	At 31.1°C		2.00	
	At 75°C	---	2.01	
	Load loss (Watts)			
	(Computed to 50% load)			
	At 31.1°C		23.97	
	At 75°C	---	27.71	
	At 100% load :			
	Tested with 1.5759 Amps (on HV side)			
	Frequency : 49.879 Hz			
	Top oil temperature : 31.1°C			
	Test current (Amps)		1.5759	
	Impedance voltage (Volts)		254.13	
	Measured load loss (Watts)		96.13	
	Impedance voltage (%)			
	(Computed to 100% load)			
	At 31.1°C		3.99	
	At 75°C	4.0 ($\pm 10\%$)	4.04	Conforms
	Load loss (Watts)			
	(Computed to 100% load)			
	At 31.1°C		95.41	
	At 75°C	--	110.33	

MP

PREPARED BY

QAL

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REPORT NO.: RP-1819-011066		Sheet : 17 OF 25		
DATE : 21.06.2018				
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
4.	Measurement of no-load loss and current : (As per cl.no.21.2.d of IS 1180 (Part 1): 2014) Tested with average 240.35 Volts (on LV side) Frequency : 49.961 Hz RMS voltage (Volts) No-load current (mA) Measured no-load loss (Watts) Corrected no-load loss (Watts)		240.08 144.71 29.53 29.56	--
5.	Total losses at 50 % load (Watts) : (As per cl.no.8.8 of IS 1180 (Part 1):2014)	Max. 60	57.27	Conforms
6.	Total losses at 100 % load (Watts) : (As per cl.no.8.8 of IS 1180 (Part 1):2014)	Max. 170	139.89	Conforms


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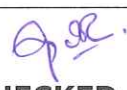
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REPORT NO.: RP-1819-011066

Sheet : 19 OF 25

DATE :21.06.2018

Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
8.	No load current at 112.5 percent voltage : (As per Cl.no.21.4.c of IS 1180 (Part1: 2014)) Test voltage of 112.5 percent of rated voltage at rated frequency was applied to the L.V. winding terminals and H.V. winding terminals were kept open circuited. No load current was recorded. Test voltage(Volts) No load current (mA) No load current(%)	Max. 6.0	270.21 189.85 0.46	Conforms
9.	Oil leakage test : (As per cl.no.21.2.j of IS 1180 (Part1: 2014)) The assembled transformer with all fittings including bushings in position was tested at a pressure at the top equivalent to the head that was available at the base of the tank for 6 hours.	There should be no leakage at any point	No leakage observed.	Conforms
10.	Pressure test (routine test) : (As per cl.no.21.2.h of IS 1180 (Part 1: 2014)) The transformer was tested at an air 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
  PREPARED BY CHECKED BY				

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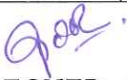
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REPORT NO.: RP-1819-011066			Sheet : 20 OF 25	
DATE : 21.06.2018				
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
11.	Pressure test (Type test) : (As per cl.no.21.3.d of IS 1180 (Part 1: 2014)) The transformer was tested at an air pressure OF 100 kPa above atmosphere pressure maintained inside the tank for 30 min.	There should be no leakage at any point & no deformation of tank	No leakage & No deformation of tank observed.	Conforms
PREPARED BY 		CHECKED BY 		

TC 2555958





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TEST REPORT NO: RP-1819-011066

DATE: 21.06.2018

SHEET 21 OF 25

Particulars of Tests & Cl. No.:

12) Determinations of sound levels [A- Weighted Sound Power Level Measurement]
[As per customer's request, testing procedure followed as per as per Cl. No. 21.4.a of IS 1180 (Part 1):2014 & Cl. No. 13 of IS 2026 (Part 10): 2009]

Condition of transformer Transformer was energized at no load condition & excited at the rated voltage of sinusoidal waveform & rated frequency.

Details of equipment used: **Name:** Sound level meter **Make:** Lutron
Meter Type: Type 1 **Serial No.:** I.62852
Calibration Report No. & Date: NCQC-M/141117/01, Dt. 27/11/2017

TEST RESULTS:

A-Weighted sound pressure levels of the background noise

Sr. No.	Measurement Locations (Refer Sketch Below)	At the start of test dB(A)	At the end of test dB(A)
1	A	45.9	46.4
2	B	46.3	46.7
3	C	46.4	47.0
4	D	46.5	46.5
5	E	46.2	46.4
6	F	46.1	47.0
7	G	46.9	47.2
8	H	46.8	46.7
9	I	46.9	47.0
10	J	46.1	47.4
Arithmetic Average $\bar{L}_{bgA}$		46.5	46.8

A-Weighted sound pressure levels at energized condition L_{pAi}

Sr. No.	Measurement Locations (Refer Sketch Below) dB(A)	L_{pAi} dB(A)
1	A	46.9
2	B	47.6
3	C	47.6
4	D	47.7
5	E	47.2
6	F	47.8
7	G	47.5
8	H	47.4
9	I	47.8
10	J	47.4
Arithmetic Average $\bar{L}_{pAi0}$		47.5

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TC 2555957

TEST REPORT NO: RP-1819-011066

DATE: 21.06.2018

SHEET 22 OF 25

TEST PARAMETERS:

Measurement distance : 1 m,

Microphone Spacing: 1 m

Measurement made : Half of the height of the transformer tank

Method followed: Sound pressure measurement as per Cl. No. 11, 11.3 & Table 2 of IS 2026 (Part 10): 2009.

Length of prescribed contour: 10.08 m

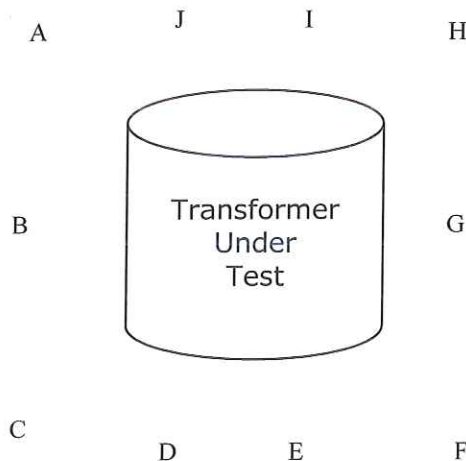
Transformer Tank Height: 0.600 m

Person present during sound level measurement: 3

A-Weighted sound pressure level ($\overline{L}_{pA}$):	47.5 dB(A)
Corrected average A-weighted sound pressure level ($\overline{L}_{pA}$):	40.6 dB(A)
Calculated A- weighted sound power level (L_{WA}) :	49.4 dB(A)

REMARKS: 1) Guaranteed value of sound pressure level is considered as 48 db (A) as mentioned in customer's letter.

2)Transformer conforms to the requirement of guaranteed value of sound pressure level



Sketch showing the locations of sound measurement

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SHEET No. 23 of 25

REPORT NO.: RP-1819-011066		Date: 21.06.2018		
Sr. No.	Particulars of test and clause no.	Requirement as per specification.	Obtained value	Remarks
13	Measurement of the Harmonics of the No-load current (As per customer's request testing procedure followed as per cl. no. 10.6 of IS 2026 (Part 1):2011)	The harmonics of the no-load current shall be measured and magnitude of the harmonics shall be expressed as a percentage of the fundamental component.	Refer table 1 for individual current harmonics components & individual voltage harmonics components measured at LV side at rated voltage i.e. 240 V Current THD: 29.47% Voltage THD: 2.54%	---
Prepared by: <i>WMP</i>		Checked by: <i>Agar</i>		

TC 2555955



REPORT NO.: RP-1819-011066

Date: 21.06.2018

TABLE-1 : Harmonics in voltage and current (as a percentage of fundamental)

Harmonic order	Current I_R in %	Current I_R in Amps	Voltage V_{RY} in %
1	100.00	0.14	100.00
2	6.91	0.01	0.07
3	27.64	0.04	1.37
4	0.00	0.00	0.07
5	6.91	0.01	2.10
6	1.73	0.00	0.03
7	0.00	0.00	0.22
8	0.41	0.00	0.02
9	0.00	0.00	0.10
10	0.21	0.00	0.01
11	1.31	0.00	0.20
12	0.07	0.00	0.01
13	0.90	0.00	0.02
14	0.07	0.00	0.03
15	0.41	0.00	0.02
16	0.21	0.00	0.04
17	0.90	0.00	0.12
18	0.14	0.00	0.02
19	0.55	0.00	0.07
20	0.35	0.00	0.05
21	0.21	0.00	0.02
22	0.21	0.00	0.03
23	0.41	0.00	0.03
24	0.14	0.00	0.01
25	1.04	0.00	0.10
THD %	29.47		2.54
Parameter measured	0.15 A		240.09 V

Prepared by 

Checked by 

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TEST REPORT No.: RP-1819-011066		DATE: 21-06-2018		SHEET 25 OF 25	
Sr. No.	Particular of Tests and Cl. No.	Requirements as per specification	Obtained value	Remarks	
14.	Paint Adhesion Test at 36°C & 30 % RH Test Method A – X-cut tape test (Test procedure followed as per ASTM D 3359-2017, Cl. No. 8) Cl. No. 21.4.d of IS 1180 (Part 1): 2014 - Adhesion strength of pressure sensitive tape 6.7 N/cm.	--	Observation 1-5A – No peeling or removal was observed at the location. Observation 2-5A – No peeling or removal was observed at the location. Observation 3-4A – Trace peeling or Removal along incisions or at their intersection between the first coat and second coats.	--	
 PREPARED BY		 CHECKED BY			

2239900



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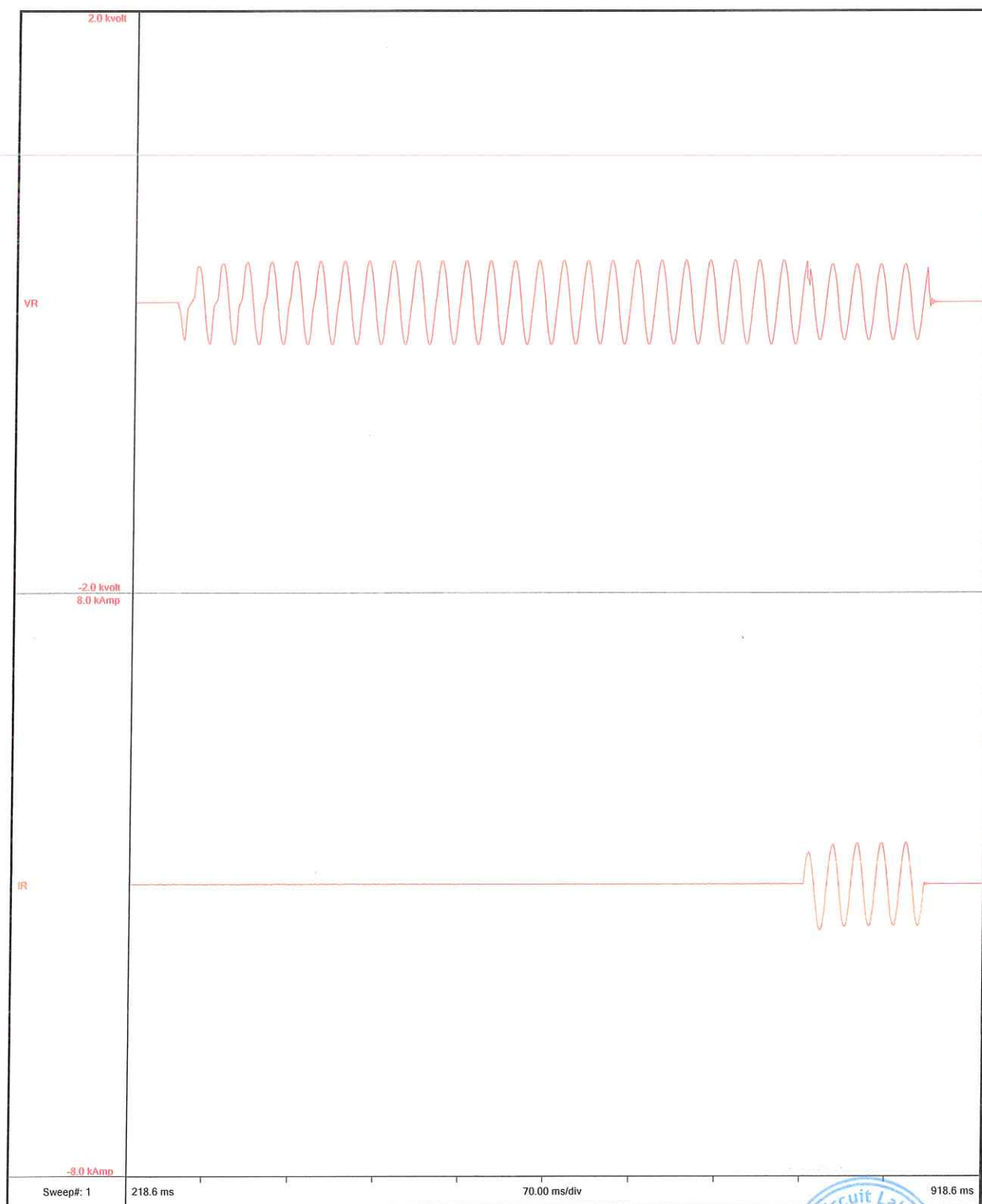
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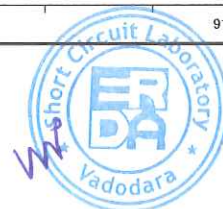
REPORT NO.: RP-1819-011066

DATE: 21.06.2018



TC 2515141

OSCILLOGRAM NO. : 0138/01





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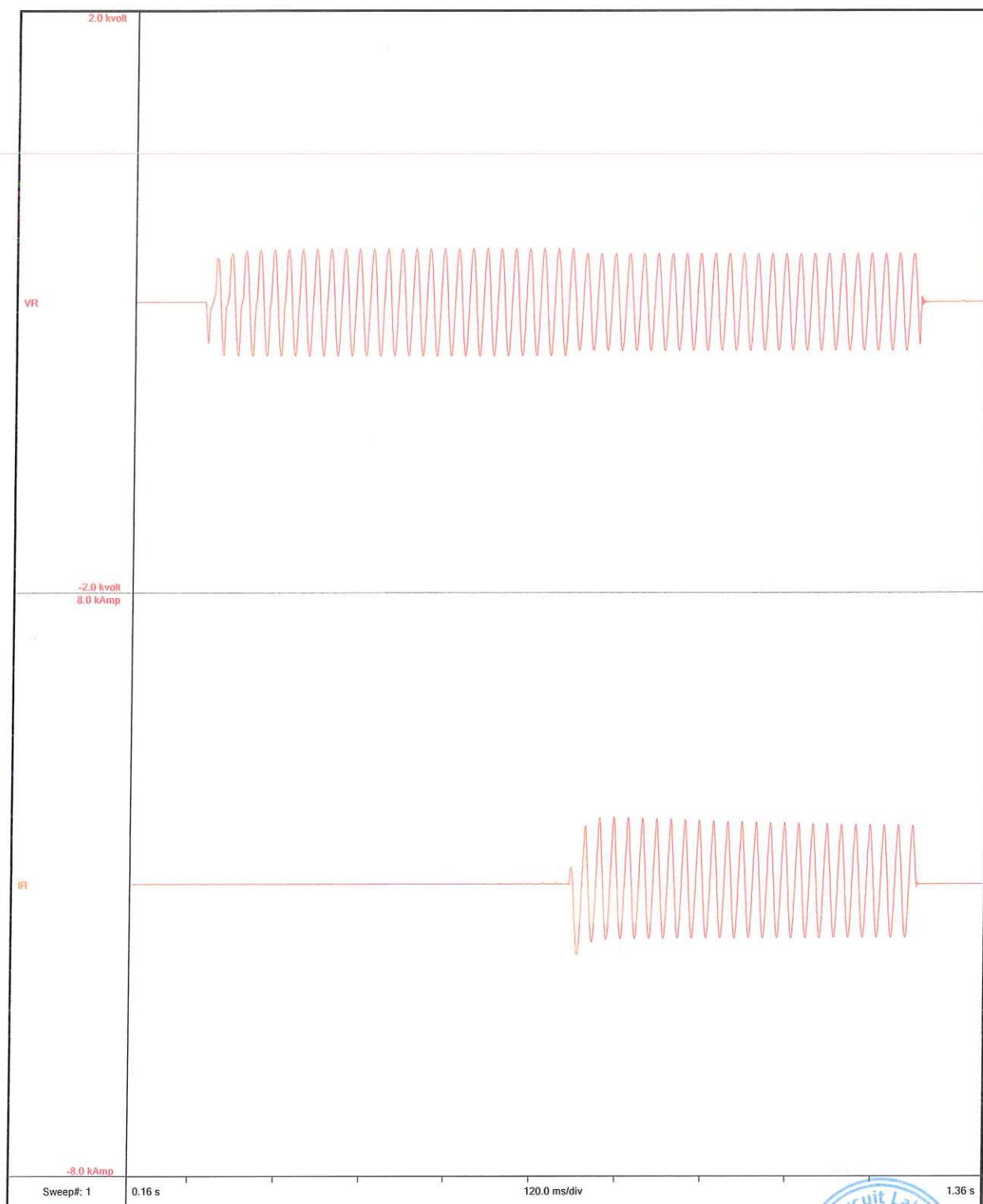
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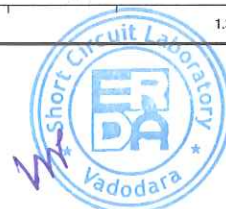
REPORT NO.: RP-1819-011066

DATE: 21.06.2018



OSCILLOGRAM NO. : 0138/02

TC 2515142





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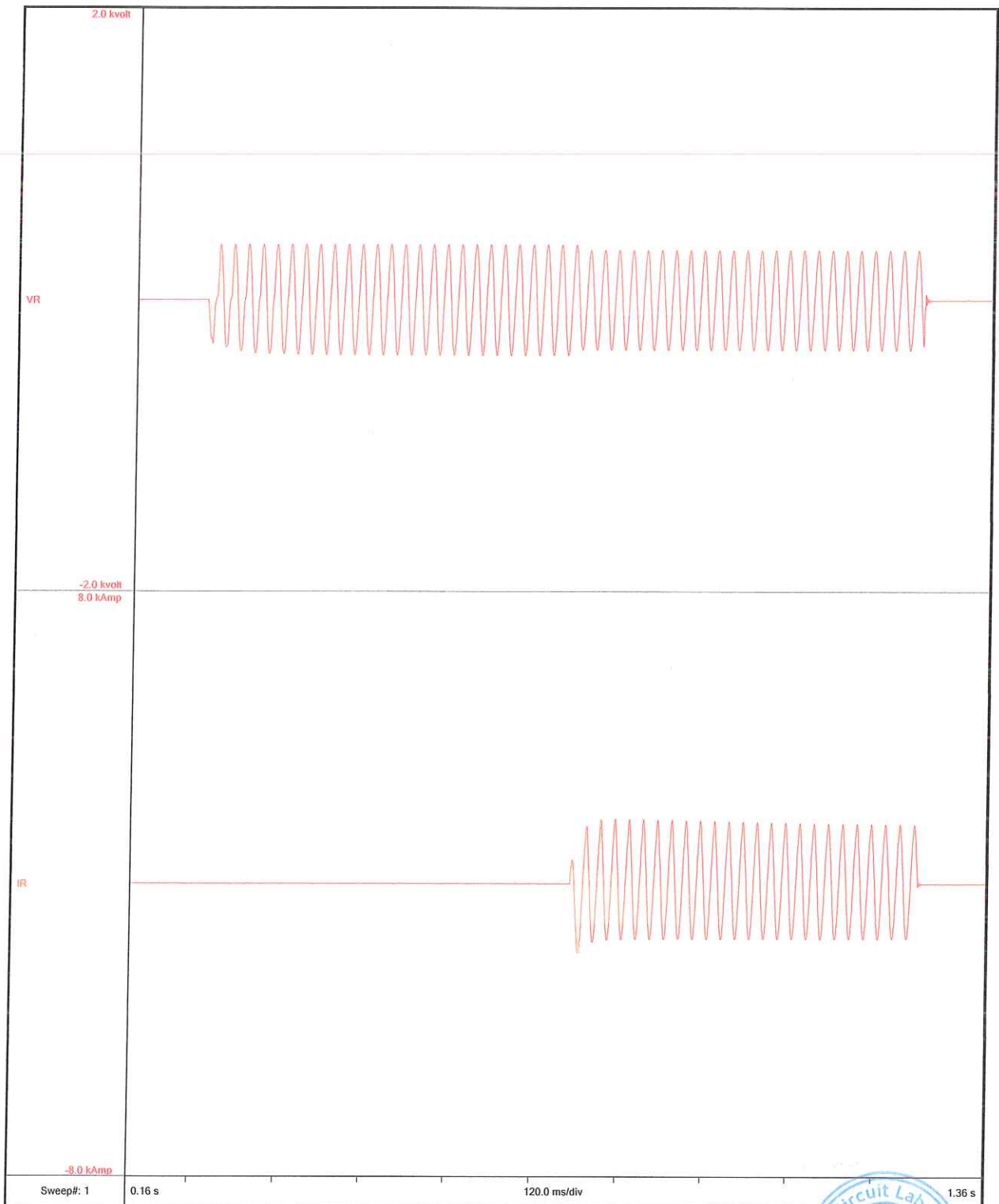
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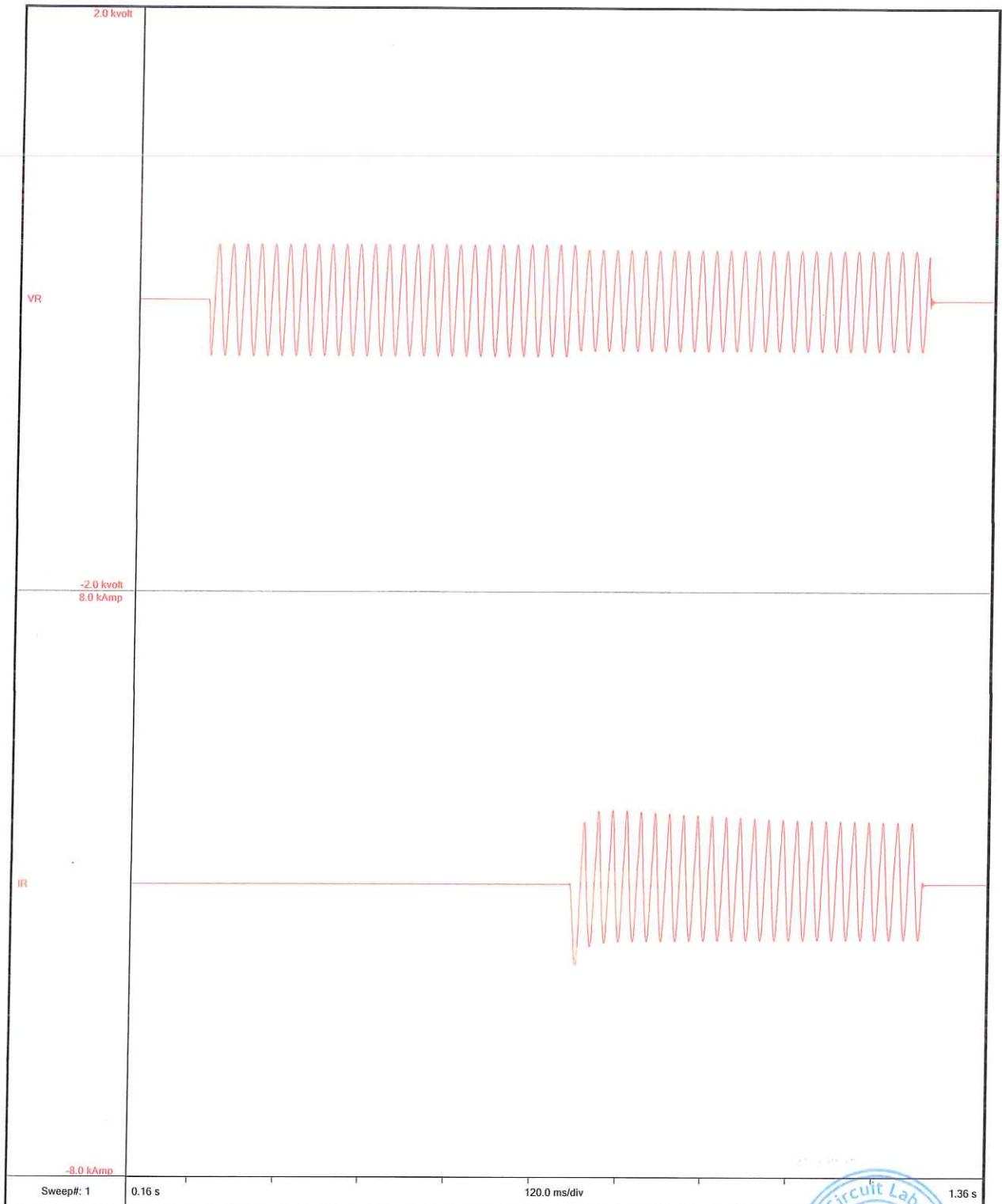
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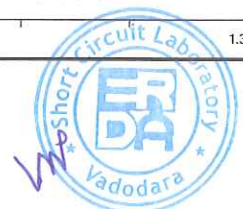
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OSCILLOGRAM NO. : 0138/04

TC 2515144





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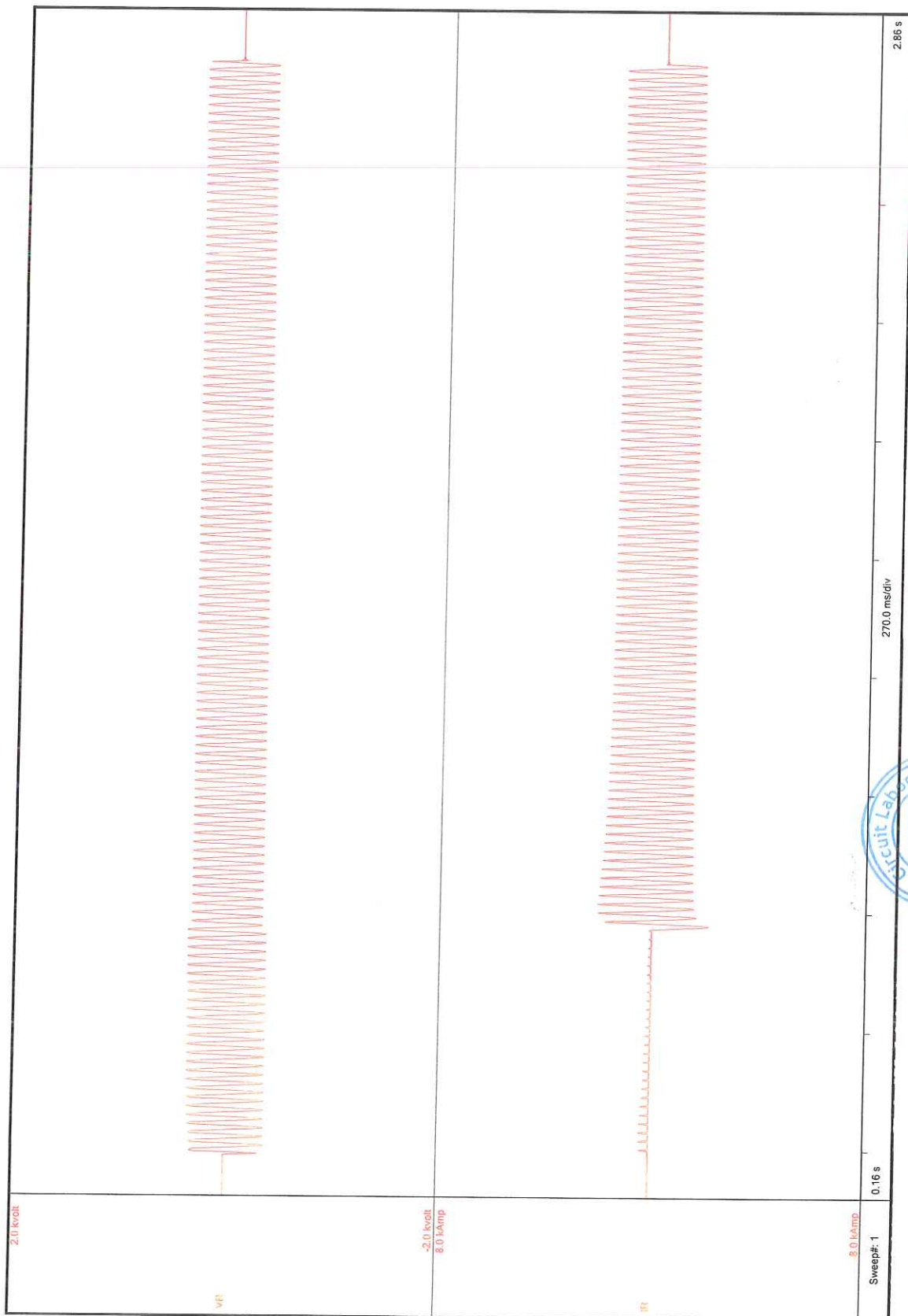
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DATE: 21.06.2018



OSCILLOGRAM NO.:0138/05

TC 2506781



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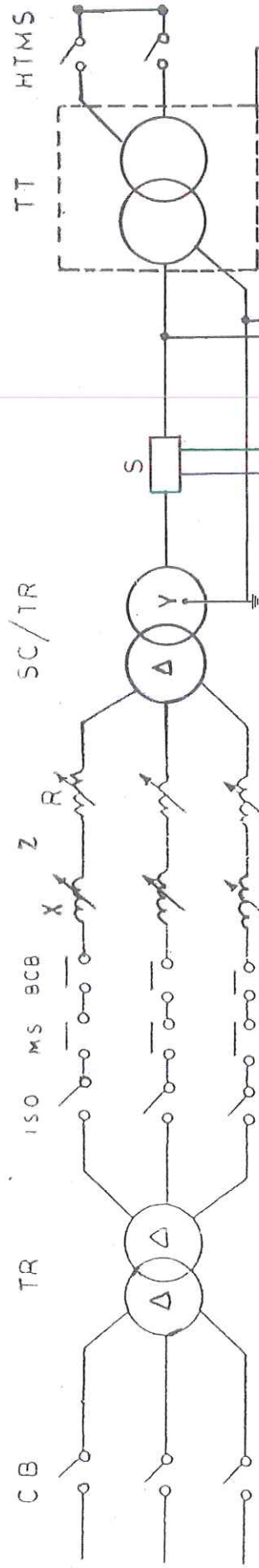
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DISTRIBUTION TRANSFORMER			
RAJASTHAN POWERGEN TRANSFORMER PVT. LTD., JALORE, RAJASTHAN			
1 PHASE TRANSFORMER			
STANDARD	IS : 1180 (Part-1)/2014	ENERGY EFFICIENCY LEVEL	2
KVA	10	MAX. TOTAL LOSS AT 50% RATED LOAD W	60
VOLTS AT NO LOAD (V)	HV 11000 / 3 LV 240	MAX. TOTAL LOSS AT 100% RATED LOAD W	170
BIL (kV Peak)	HV 75 LV NA	TYPE OF COOLING	ONAN
CURRENT (A)	HV 1.57 LV 41.67	TEMP. RISE OIL °C	35
FREQUENCY	Hz 50	WDG °C	40
VECTOR GROUP	1-PHASE	MASS OF OIL	kg 29
IMPEDANCE VOLT %	4	TOTAL MASS	kg 144
DISPATCH DATE		VOLUME OF OIL	Ltr 34
CONDUCTOR MATERIAL	ALUMINIUM	MONTH & YEAR OF MFG	/2017
CUSTOMER	JVVNL	SERIAL NO.	
P.O. No.		EXPIRY DATE G.P.	
MADE IN INDIA			
SUBSTRUCTIVE POLARITY			



TC 2554244



- CB - 66 kV CIRCUIT BREAKER
 TR - 66 kV/11kV TRANSFORMER
 ISO - ISOLATOR
 BCB - BACKUP CIRCUIT BREAKER
 MS - MASTER CIRCUIT BREAKER
 Z - SOURCE SIDE IMPEDANCE
 X - REACTANCE
 R - RESISTANCE
 SC/TR - SHORT CIRCUIT TRANSFORMER
 HTMS - H.T. MAKE SWITCH
 T.T. - TEST TRANSFORMER
 S - CURRENT MEASURING DEVICE



ELECTRICAL RESEARCH AND
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SCHEMATIC CIRCUIT DIAGRAM

DRN. BY	CHKD.	DATE	DRG. NO.
S.B.S.	A.V.P.	30-9-01	OLSC/DTC/05

REPORT NO.: RP-1819-011088
 DATE: 21.06.2018

4 HOLES
of Ø3.6mm

DISTRIBUTION TRANSFORMER

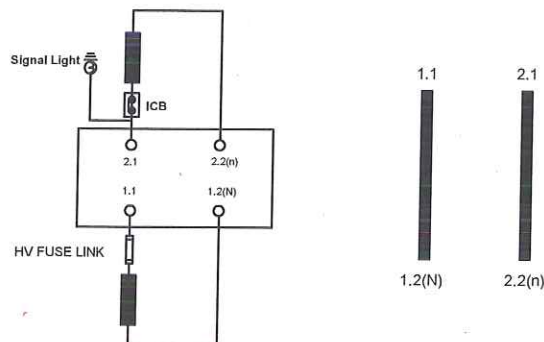
RAJASTHAN POWERGEN TRANSFORMER PVT LTD
JALORE, RAJASTHAN

1 PHASE TRANSFORMER

STANDARD	IS : 1180 (Part-1)/2014	ENERGY EFFICIENCY LEVEL	2
KVA	10	MAX. TOTAL LOSS AT 50% RATED LOAD W	60
VOLTS AT NO LOAD (V)	HV 11000 / $\sqrt{3}$ LV 240	MAX. TOTAL LOSS AT 100% RATED LOAD W	170
BIL (kV Peak)	HV 75 LV NA	TYPE OF COOLING	ONAN
CURRENT (A)	HV 1.57 LV 41.67	TEMP. RISE	OIL °C 35 WDG °C 40
FREQUENCY	Hz 50	MASS OF OIL	kg 29
VECTOR GROUP	1-PHASE	TOTAL MASS	kg 144
IMPEDANCE VOLT %	4	VOLUME OF OIL	Ltr 34
DISPATCH DATE	-	MONTH & YEAR OF MFG.	/2018
CONDUCTOR MATERIAL	ALUMINIUM	SERIAL NO.	RPTPL/10 KVA/18-19/001
CUSTOMER	JVVNL	EXPIRY DATE G.P.	-
P.O. No.			

MADE IN INDIA

SUBTRACTIVE POLARITY



NOTES :-

- 1- *** MARKED ITEMS SHOULD BE PUNCHED AT THE TIME OF DISPATCH.
- 2- ALL LETTERS, FIGURES ETC. TO BE ENGRAVED & POLISHED BLACK.
- 3- MATERIAL - STAINLESS STEEL 0.9 WITH TOLERANCE ± 0.1 MM. THICK.
- 4- ALL DIMENSIONS ARE IN MM.

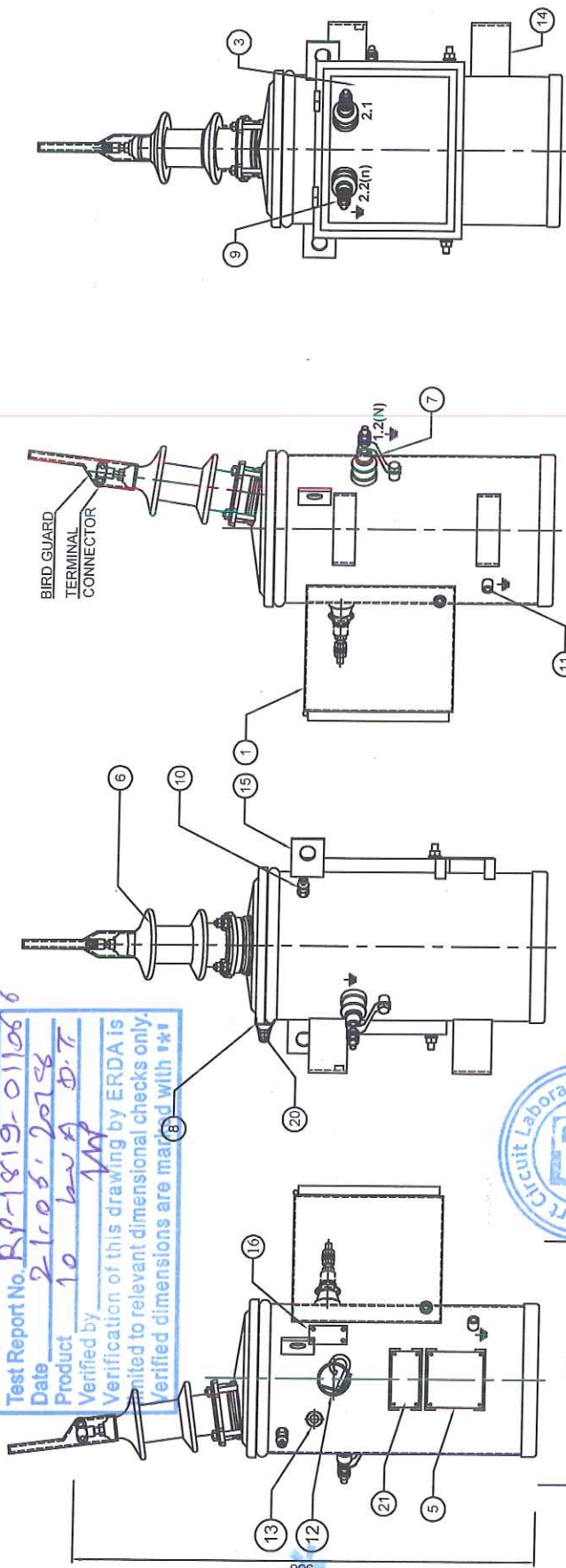


Test Report No. RP-1813-011066
Date 21.06.2018
Product 10 kVA D.T.
Verified by [Signature]
Verification of this drawing by ERDA is limited to relevant dimensional checks only.
Verified dimensions are marked with **

01	28.05.18				
00	23.08.17				ORIGINAL ISSUE.
Rev	Date	Draw	Checked	Approved	Description

	Title : RATING & DIAGRAM PLATE				Work Order : _____	
	Rating : 10 KVA, 11/√3/0.240 KV, 1Ø, 50 Hz, TRF.	Drawing No. : RPTPL/RP/03	Rev. : 01	Sheet No. : 01	Total Sheets: 01	
RAJASTHAN POWERGEN TRANSFORMER P. LTD. Karola - Bhinmal Road, Karola, Santhore - 343041 Dist - Jalore, Rajasthan (India)				All dimensions are in millimeters unless otherwise stated. If in doubt - Please Ask !		Scale : NTS

Test Report No. **RP-1819-01106**
 Date **21.05.2018**
 Product **10 kVA D.T.**
 Verified by **W.A.D.T.**
 Verification of this drawing by ERDA is
 limited to relevant dimensional checks only.
 Verified dimensions are marked with *.

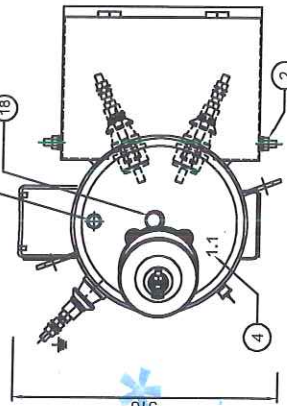


Tank diameter	365 mm
Tank height	600 mm

WEIGHTS / QTY.	
TRANSFORMER OIL	Ltrs. 34
TOTAL TRANSFORMER	Kg. 144
TRANSFORMER OIL	Kg. 29
TANK & FITTINGS	Kg. 37
CORE COIL ASSY	Kg. 78

Locking height (mm)	345
LV hole height (mm)	405
Oil level indicator (mm)	500
Breaker handle height (mm)	525

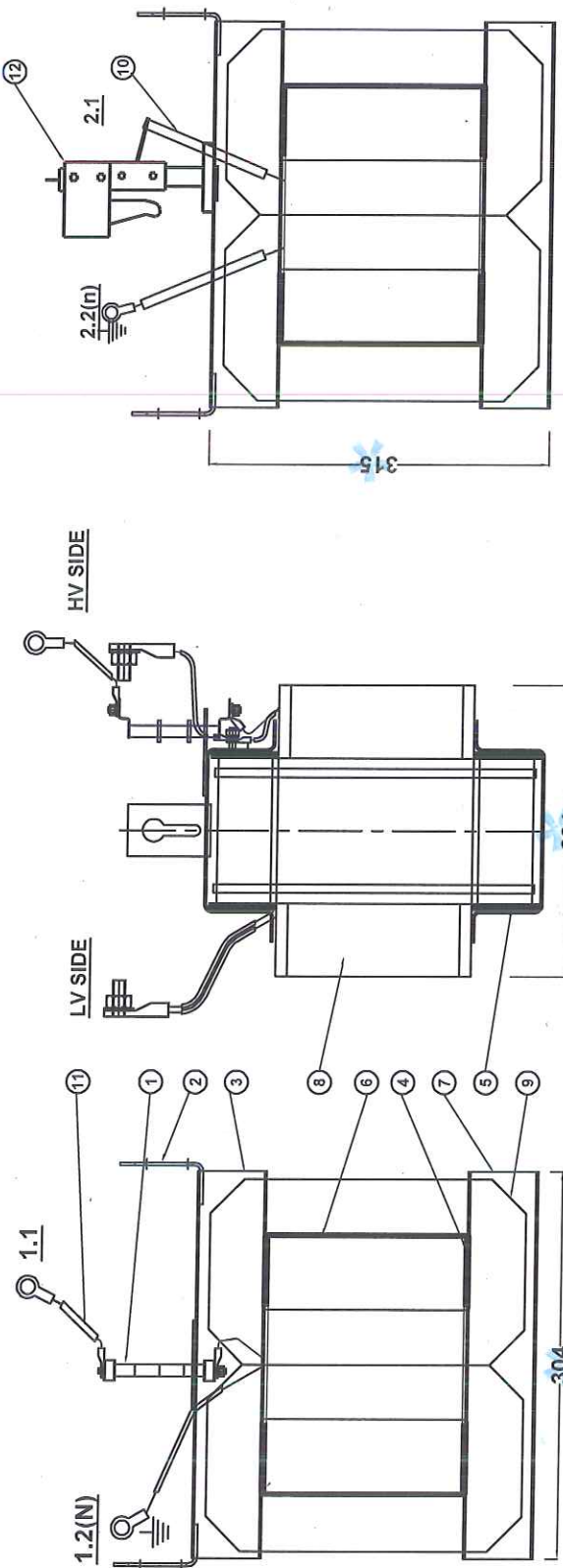
AIR CLEARANCES (MM)	
VOLTAGE	H.V. L.V. (enclosed)
PHASE TO PHASE	NA NA
PHASE TO EARTH	140 20



S. No.	Description	Qty.
21	TECHNICAL PLATE*	1
20	TOP COVER ANTI THEFT BOLT	-
19	-	-
18	OIL FILLING HOLE WITH WELDED COVER AND WITH EXTENDED PIPE as per IS 114*	1
17	THERMOMETER POCKET WITH CAP	1
16	OIL LEVEL GUAGE	1
15	Lifting lugs for complete unit	2
14	Pole mounting bracket (as per spec)	2
13	Signal light*	1
12	Internal Circuit Breaker handle*	1
11	Tank Earthing terminal	2
10	Pressure relief device	1
9	L.V. Bushing	2
8	Top cover rim	-
7	H.V. Neutral bushing	1
6	H.V. Bushing	1
5	Rating & terminal marking plate	1
4	H.V. Terminal marking	1 set
3	L.V. Terminal marking	1 set
2	Earthing terminal (LV box)	2
1	LV cable box*	1

Notes :-
 1- All dimensions are in mm. Tolerance $\pm 5\%$
 2- This drawing shows only general disposition of fittings.
 3- Tank side plate - 2.0 mm. Thk.M.S.
 Top & bottom - 2.5 mm. Thk.M.S.
 4- Paint Shade : Olive Green Color conforming to No. 220 of IS : 5 / 1961
 * Not provided at the time of Type Testing

Title : OUTLINE GENERAL ARRANGEMENT		Drawing No. : RP/PL/OGA/03		Rev. : 01		Total Sheets: 01	
Rating : 10 KVA, 11V/0.240 KV, 50 Hz, TRF.		Rajasthan Powergen Transformer P. Ltd.		Karnal - Bhimtal Road, Karnal, Sonbhadra - 231041 Dist - Jajaira, Rajasthan (India)		Scale : N.T.S	
01	28.05.2018	00	23.05.2017	Rev	Date	Draw	Draw
ORIGINAL ISSUE		Description		Approved		Checked	



L.V. SIDE VIEW

SIDE VIEW

H.V. SIDE VIEW

Test Report No. RP-1819-011086
 Date 21.06.2019
 Product 10 kVA D-T
 Verified by MP
 Verification of this drawing by ERDA is limited to relevant dimensional checks only. Verified dimensions are marked with *.

CORE SIZE	
Core Window Height	222 mm
Core build up	2 x 37.25 mm
Core Sheet width	140 mm

CONDUCTOR SIZE	
Bare	LV 9.5 x 2.9 HV 1.74 Dia
Covered	9.9 x 3.3 1.82 Dia
Aluminium	DPC Polyesterimide enamel (Class H)
Configuration	1W x 2D

COIL DIMENSIONS	
LV	HV
ID 81 x 146	146 x 211
OD 138 x 203	229 x 294
AXIAL HT.	212

Notes :-
 1- All dimensions are in mm. Tolerance $\pm 5\%$
 2- This drawing shows only general disposition of fittings.
 * Not provided at the time of Type Testing

SL.No.	DESCRIPTION	Qty.
12	INTERNAL CIRCUIT BREAKER*	1
11	HV LEAD	-
10	LV LEAD	-
9	CORE (CRGO)	2 nos
8	LV & HV COIL (ALUMINIUM)	1 set
7	BOTTOM CORE CLAMP	1
6	COIL SEPARATOR	1 set
5	CHANNEL SEPARATOR	1 set
4	END INSULATION	1 set
3	TOP CORE CLAMP	1
2	LOCKING CUM LIFTING LUG	2
1	HV FUSE LINK*	1

LIST OF FITTINGS

Rev	Date	Draw	Checked	Approved	Description
01	28.05.2018				ORIGINAL ISSUE
00	23.08.2017				

INTERNAL CONSTRUCTIONAL DETAIL DRAWING

Rating : 10 KVA, 11/0.240 KV, 50 Hz, TRF.	Drawing No. : RP/PL/C/03	Rev. : 01	Sheet No. : 01	Total Sheets : 01
RAJASTHAN POWERGEN TRANSFORMER P. LTD. Karnal - Bhimtal Road, Karnal, Saran - 343041 Dist - Jalore, Rajasthan (India)				Scale : N.T.S