

CPRI

## TEST REPORT



**Central Power Research Institute**

(A Govt. of India Society,  
P.B. No. 8066, Sadashivanagar, P.O.  
Prof. Sir. C.V. Raman Road,  
Bangalore - 560 080

**CENTRAL POWER RESEARCH INSTITUTE**  
(Member of STL)  
**TEST REPORT**



**CPRI**

**Test Report Number** : CPRI BLRHVD22T0693      **Date:** 21 October 2022

**Name and Address of the customer** : M/s. CG Power and Industrial Solutions Limited  
D-2 & D-1/2, MIDC, Waluj, Aurangabad – 431 136,  
Maharashtra, India.

Ref. No. Nil

Dated : 13 September 2022

**Name and Address of the Manufacturer** : M/s. CG Power and Industrial Solutions Limited  
D-2 & D-1/2, MIDC, Waluj, Aurangabad – 431 136,  
Maharashtra, India.

**Particulars of samples tested**

**Type** : Oil filled, Outdoor, IOSK: 145/275/650.

**Description of test sample** : 145kV Current Transformer  
Ratio : 300-600-1200/1A, 600-1200/1A, 3000/1A

**Serial Number** : 220643

**Number of samples tested** : One

**Date(s) of test(s)** : 14 & 15 September 2022

**CPRI sample code Number(s)** : HVD22S0707

**Particulars of tests conducted** : Refer page 3 of 6.

**Test in accordance with Standard/Specification.** : IEC 61869-1:2007 & IEC 61869-2:2012.

**Sampling Plan** : Not Applicable

**Customer's requirement** : Nil.

**Deviations if any** : Nil

**Name of the witnessing persons**

**Customer's representative** : Mr. Yogesh Gopal Warghade

**Other than customer's representatives** : None.

**Test subcontracted with address of the laboratory** : None.

**Documents constituting this report(in words)**

**Number of Sheets** : Six.

**Number of Oscillogram(s)** : Sixty four.

**Number of Graph(s)** : Nil.

**Number of Photograph(s)** : One.

**Number of Test Circuit Diagram(s)** : Three.

**Number of Drawing(s)** : Two.

  
(Priya .S)  
Test Engineer



  
(G. Pandian)  
Head of Division  
Reviewed and Authorized by

**CENTRAL POWER RESEARCH INSTITUTE**  
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**TEST REPORT**



**CPRI**

Test Report Number: CPRIBLRHVD22T0693

Date: 21 October 2022

**DESCRIPTION OF SAMPLE TESTED**

(As assigned by the manufacturer)

Test sample	Current Transformer		
Type	Outdoor, Oil immersed, Live tank		
Serial number	220643		
Highest voltage (U <sub>m</sub> ) (kV)	145		
Number of cores	I	II	III
Accuracy class	0.2S	5P	PX
Accuracy limit factor (ALF)	≤ 10	20	--
Burden (VA)	15	30	--
Minimum knee point voltage, E <sub>k</sub> (V)	--	--	600
Maximum exciting current at V <sub>k</sub> /2 (mA)	--	--	10
Rated transformation ratio	300-600-1200/1A	600-1200/1A	3000/1A
Rated frequency (Hz)	50		
Insulation level	275kV / 650kVp		

  
(Priya S)  
Test Engineer

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Date: 21 October 2022 **CPRI**

**SUMMARY OF TESTS CONDUCTED**

1. Tests conducted : Type test.
2. Rating for which tested : 145kV
3. Schedule of tests

Sl. No.	Test conducted	Clause Numbers	Sheet
1	Impulse Voltage Withstand Test on Primary Terminals	7.2.3.2.1 of IEC 61869-1: 2007 & IEC 61869-2:2012	4 of 6
2.	Wet Power-Frequency Voltage Withstand Test on Primary Terminals	7.2.4 of IEC 61869-1: 2007 & IEC 61869-2:2012	4 of 6
3.	RIV Test	7.2.5.1 of IEC 61869-1: 2007 & IEC 61869-2:2012	4 of 6
Routine tests after dielectric tests			
4.	Dry Power-Frequency Voltage Withstand Test on Primary Terminals	7.3.1 of IEC 61869-1:2007 & IEC 61869-2:2012	5 of 6
5.	Partial Discharge Measurement	7.3.2 of IEC 61869-1: 2007 & IEC 61869-2:2012	5 of 6
<b>Note1:</b> Test Report No. CPRI BLRSCL22T0979 Date: 12 October 2022 pertaining to routine tests after dielectric tests is enclosed to this report.			

4. Oscillogram Numbers : Refer Page 4 of 6.
5. Graph Numbers : Nil.
6. Photograph Numbers : P01.
7. Test Circuit Diagram Numbers : TCD01, TCD02 & TCD03.

**Drawing Numbers**

**Drawing Numbers**

The manufacturer has guaranteed that the sample submitted for the test(s) has been manufactured in accordance with the following drawings

Sl. No.	Drawing Number	Sheet Number	Revision Number
1	413695829 CT42 GA	--	0
2	413695829 CT42 RS	--	0

It is verified that these drawings adequately represent the sample tested. Verification of this drawing by CPRI is limited to dimensional check only wherever possible.

(Priya.S)  
Test Engineer

This is an Amended sheet

R-CPRI BLRHVD22T0693 Dt: 25.11.2022

**ULR-TC5452220HVDT0693F**  
Discipline: Electrical Testing  
Group : Insulating Materials  
and Insulators

HIGH VOLTAGE DIVISION  
P.B.No.8066, SADASHIVANAGAR P.O.  
C.V.RAMAN ROAD, BANGALORE - 560 080, INDIA..  
Telephone +91 (0) 80-22072377

Sheet 3 of 6

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**TEST REPORT**



Test Report Number: CPRI BLRHVD22T0693

Date: 21 October 2022

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**TEST RESULTS**

**1. Impulse Voltage Withstand Test on Primary Terminals**

**Test Connection:** Impulse voltage source connected to primary terminals (P1 & P2). All secondary terminals shorted and earthed through shunt. Frame earthed.

Shot No	Wave Type	Test Voltage kV (Peak)			
		Positive Polarity	Osc. No.	Negative polarity	Osc. No.
-	RFW	400	16	400	38
1	FW	650	19	653	42
2	FW	650	20	647	43
3	FW	653	22	652	44
4	FW	653	24	647	45
5	FW	651	25	651	46
6	FW	653	27	650	47
7	FW	648	28	652	48
8	FW	649	29	650	49
9	FW	652	31	648	50
10	FW	651	32	649	51
11	FW	650	33	650	52
12	FW	652	34	653	53
13	FW	654	35	650	54
14	FW	646	36	648	55
15	FW	654	37	650	56

**Note:** RFW- Reduced Full Wave & FW - Full Wave.

**2. Wet Power-Frequency Voltage Withstand Test on Primary Terminals**

**Test Connection:** High voltage source connected to primary terminals (P1 & P2). All secondary terminals and Frame earthed.

Frequency of test voltage : 50 Hz  
Conductivity of water used for test : 105  $\mu$ S/cm

Test Voltage kV (rms)	Remarks
275	Withstood for one minute

**3. RIV test**

Pre-stress voltage of 126 kV has been applied for thirty seconds before measuring the radio interference

Test voltage in kV(rms)	$\mu$ V @ 1MHz
92	162

*Priya S*  
(Priya S)  
Test Engineer

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**4. Dry Power-Frequency Voltage Withstand Test on Primary Terminals (Routine test after dielectric type tests)**

**Test Connection:** High voltage source connected to primary terminals (P1 & P2). All secondary terminals and Frame earthed.

Frequency of test voltage : 50 Hz

Test Voltage (kVrms)	Remarks
275	Withstood for one minute

**5. Partial Discharge Measurement (Routine test after dielectric type tests)**

**Test connection:** High voltage source connected to primary terminals (P1 & P2). All secondary terminals and Frame earthed.

**Sensitivity of Measurement:** 5 pC.

Pre-stressed Voltage: 220kV for 60 seconds

Measuring Voltage (kV)	Observed discharge magnitude (pC)	Specified discharge magnitude (pC) Maximum
Um = 145kV	Less than 5 pC	10 pC
$((1.2 \cdot U_m) / \sqrt{3}) = 100.5kV$	Less than 5 pC	5 pC

**Ambient conditions during testing:**

Test Description	Temperature in Degree Celsius		Atmospheric Pressure in mBar
	Dry Bulb	Wet Bulb	
Lightning impulse voltage test on primary terminals	26	21	906
Dry & Wet power frequency voltage withstand test on primary terminals	24	20	912
RIV Test			
Partial discharge measurement	27	-	-

**Conclusion:** The instrument transformer complies with the requirement of Clauses 7.2.3.2.1, 7.2.4, 7.2.5.1 & 7.3.2 of IEC 61869-2 for the tests conducted.

  
(Priya.S)  
Test Engineer

This is an Amended sheet

R-CPRIBLRHVD22T0693 Dt: 25.11.2022

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**TEST REPORT**



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**Test Report Number: CPRI BLRHVD22T0693**

**Date: 21 October 2022**

**NOTE**

- a) The Test results relate only to the sample(s) tested.
- b) Publication or reproduction of this Test Report in any form other than by complete set of the whole Test Report and in the language written is not permitted without the written consent of CPRI.
- c) Any Corrections / erasure invalidate the Test Report.
- d) Any anomaly / discrepancy in the Test Report should be brought to notice of CPRI within 45 days from the date of issue.
- e) All documents constituting this Test Report are stitched together with a continuous silk thread, the two ends of which have been brought over the front sheet of this Test Report and sealed with a CPRI logo printed paper sticker.
- f) NABL has accredited this laboratory as per ISO/IEC 17025: 2017, vide Certificate no.TC-5452 for the tests carried out.
- g) Sheet (s) 3 of 6, 5 of 6 and 6 of 6 are the amended sheets to the Report bearing number CPRI BLRHVD22T0693 dated: 21/10/2022. The earlier sheet(s) stand null and void.



**TC-5452**

(Priya.S)  
Test Engineer

-----End of Test Report-----

This is an Amended sheet

R-CPRI BLRHVD22T0693 Dt: 25.11.2022

**ULR-TC5452220HVDT0693F**  
**Discipline: Electrical Testing**  
**Group : Insulating Materials**  
**and Insulators**

HIGH VOLTAGE DIVISION  
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**Sheet 6 of 6**

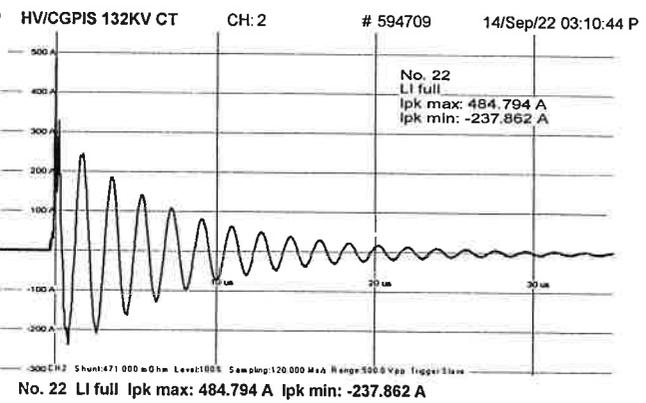
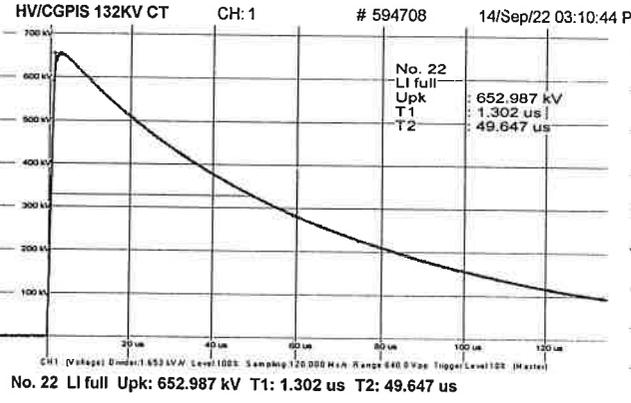
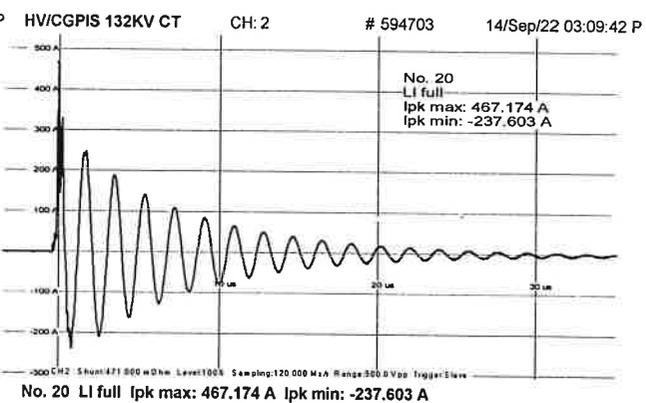
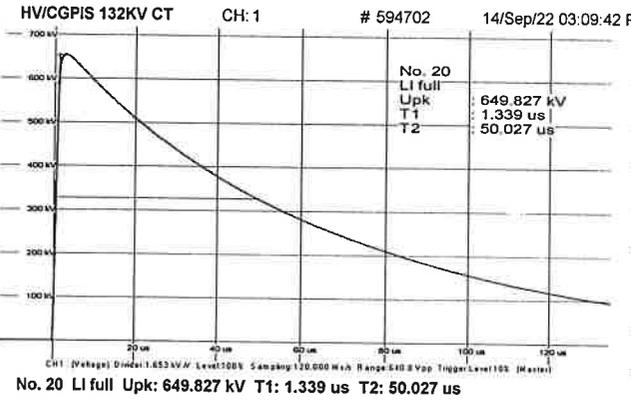
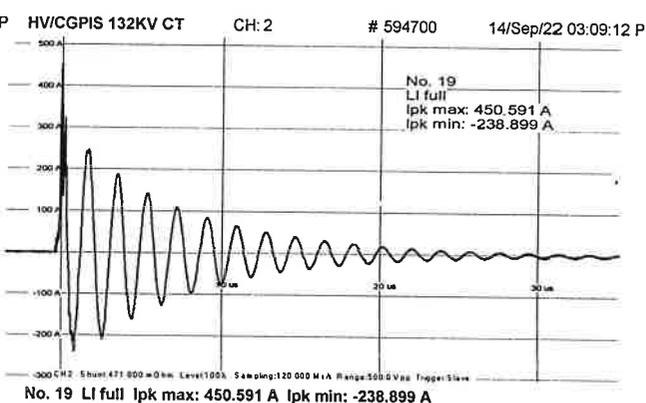
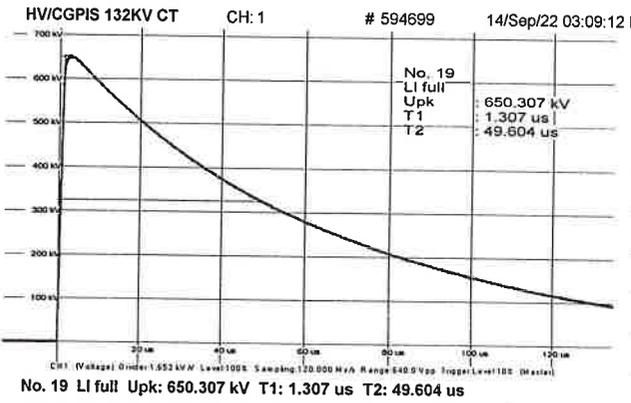
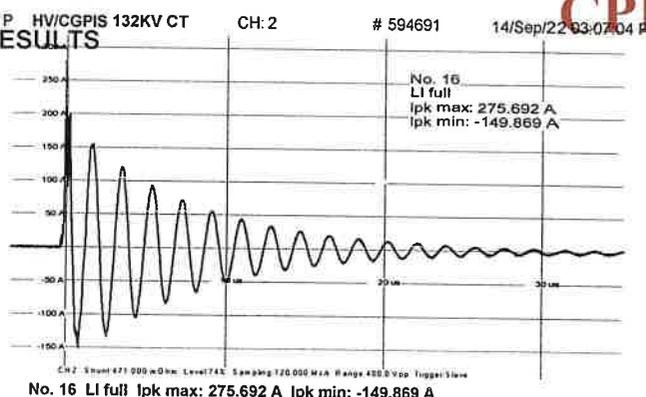
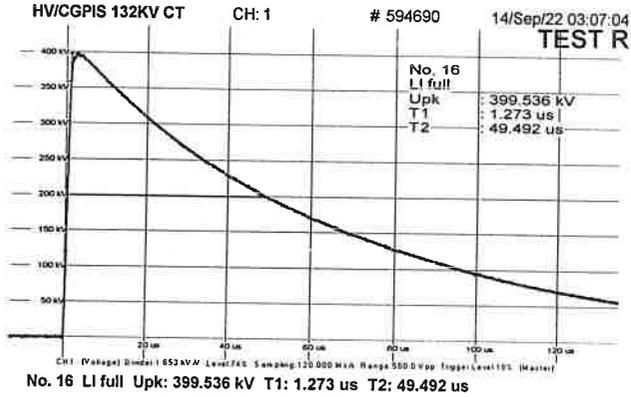
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*Priya*  
(Priya.S)  
Test Engineer

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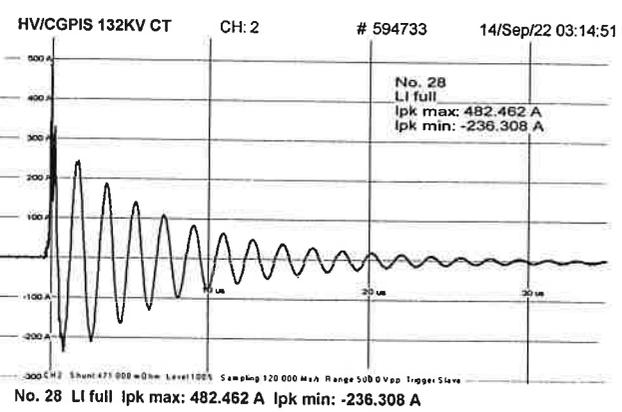
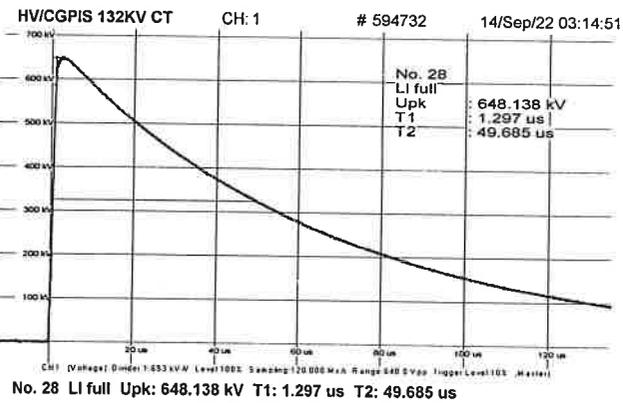
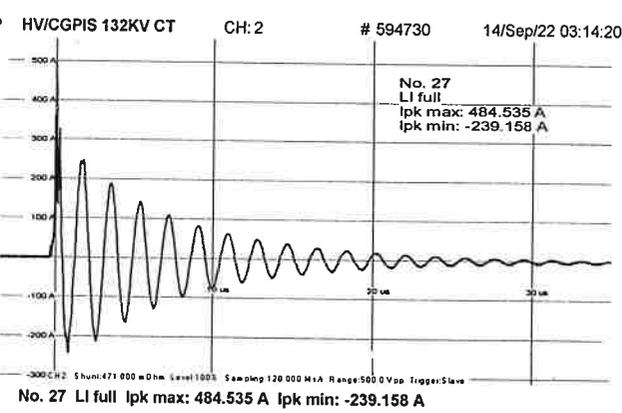
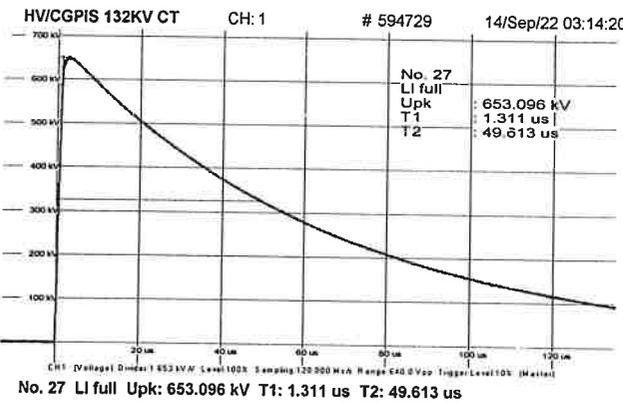
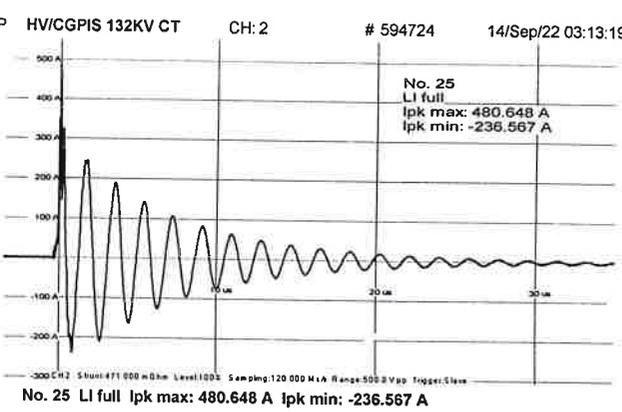
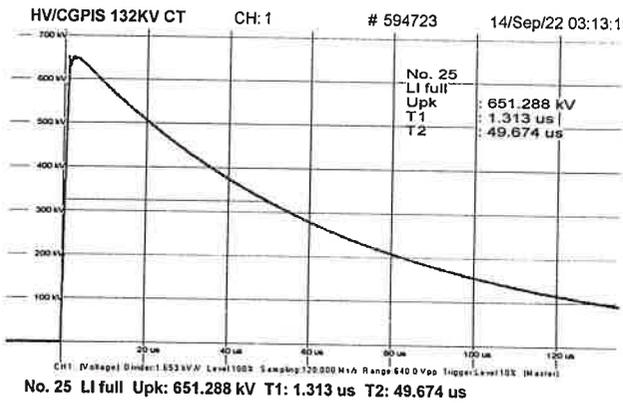
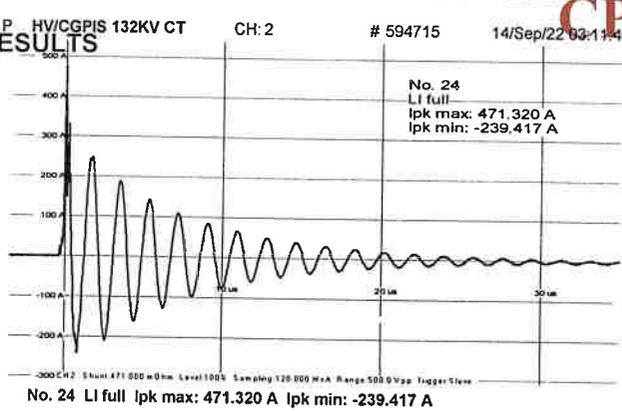
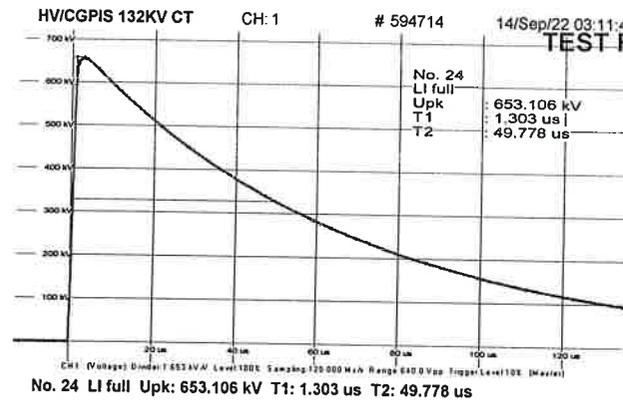


Test Report Number: CPRIBLRHVD22T0693

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**CPRI**

**TEST RESULTS**



*Priya S*  
(Priya .S)  
Test Engineer

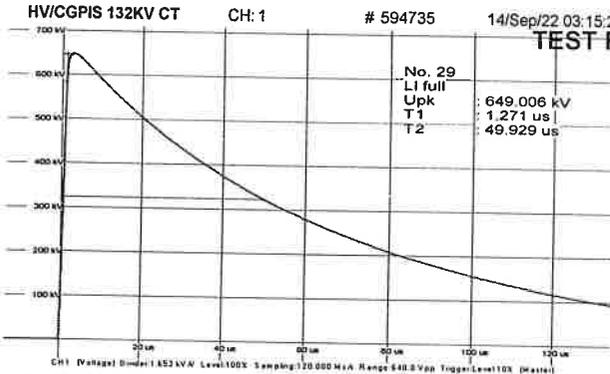
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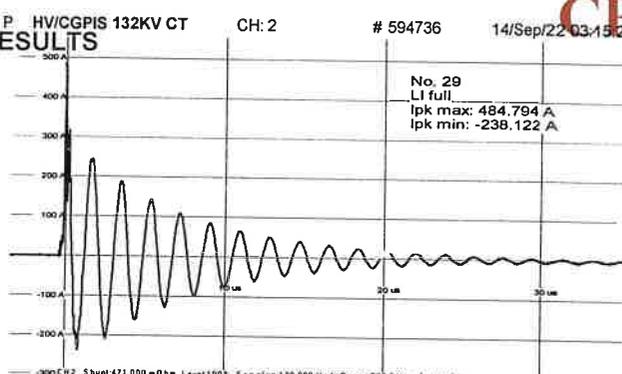
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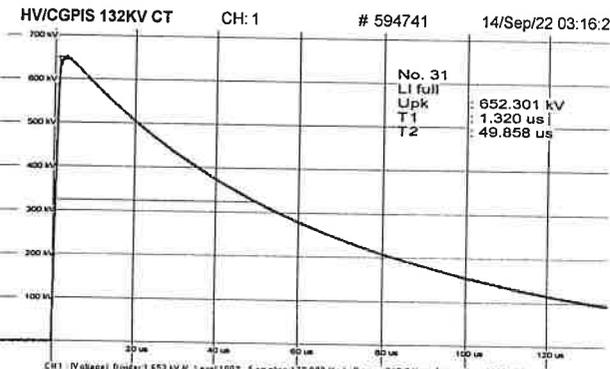
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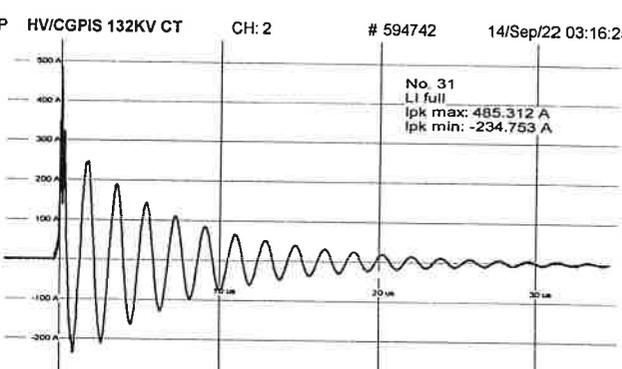
No. 29 LI full Upk: 649.006 kV T1: 1.271 us T2: 49.929 us



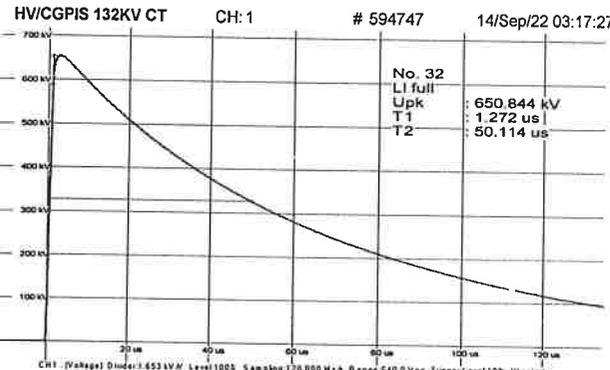
No. 29 LI full Ipk max: 484.794 A Ipk min: -238.122 A



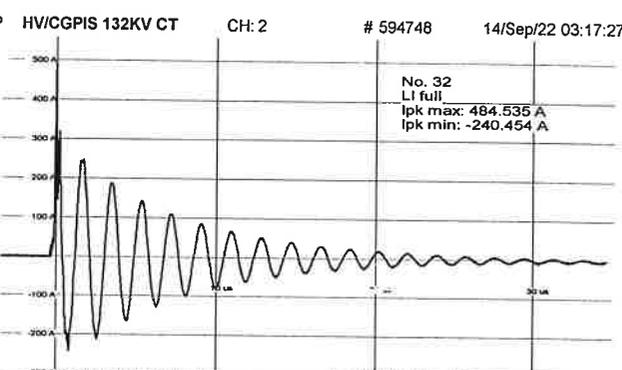
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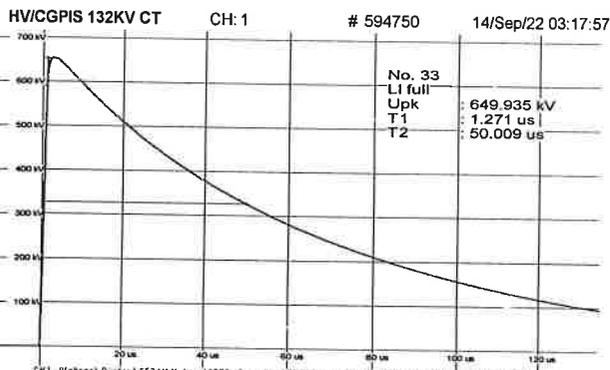
No. 31 LI full Ipk max: 485.312 A Ipk min: -234.753 A



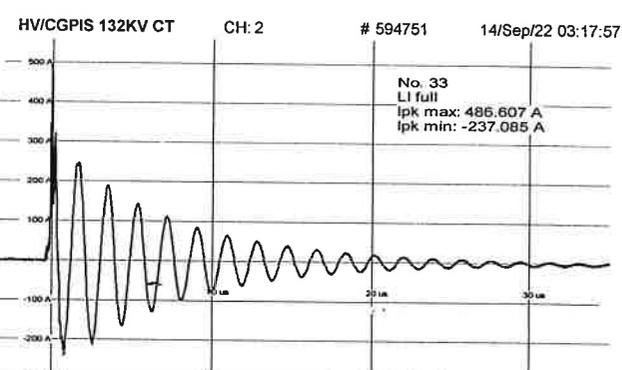
No. 32 LI full Upk: 650.844 kV T1: 1.272 us T2: 50.114 us



No. 32 LI full Ipk max: 484.535 A Ipk min: -240.454 A



No. 33 LI full Upk: 649.935 kV T1: 1.271 us T2: 50.009 us



No. 33 LI full Ipk max: 486.607 A Ipk min: -237.085 A

*Priya*  
(Priya.S)  
Test Engineer

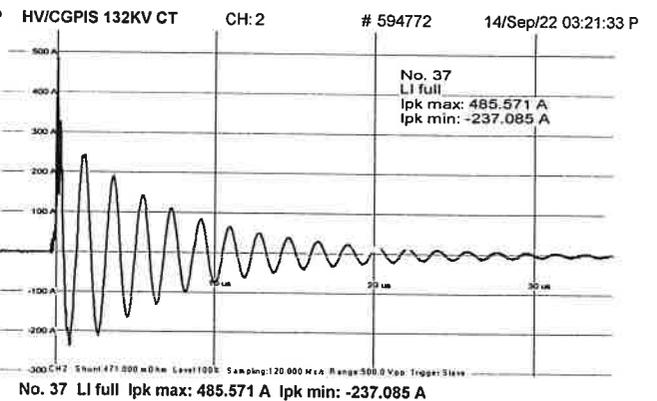
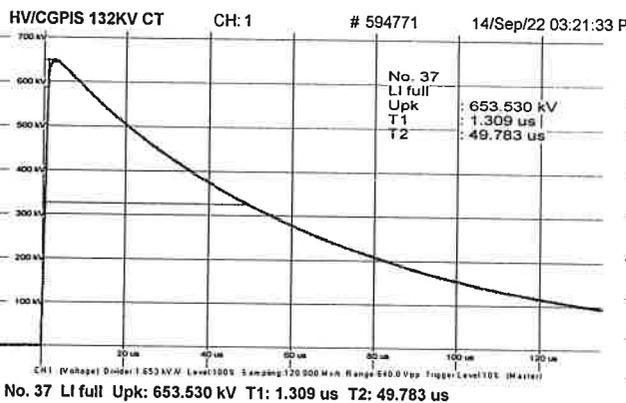
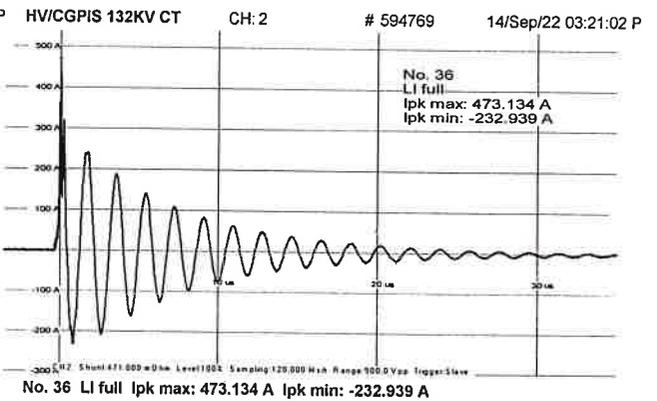
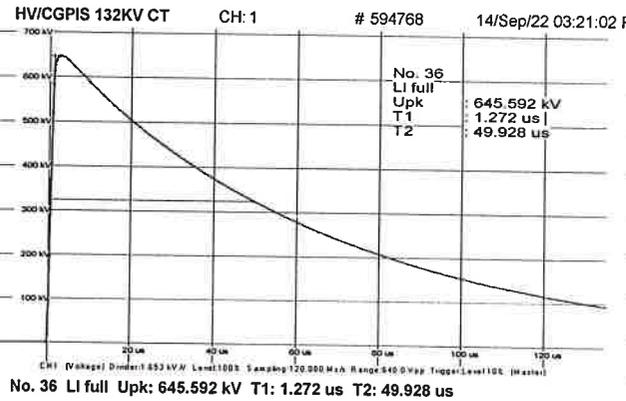
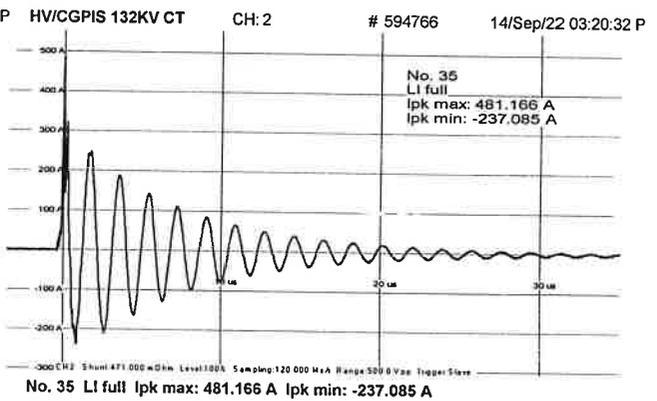
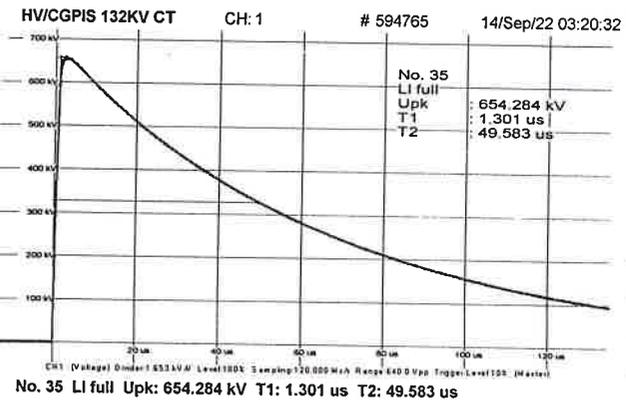
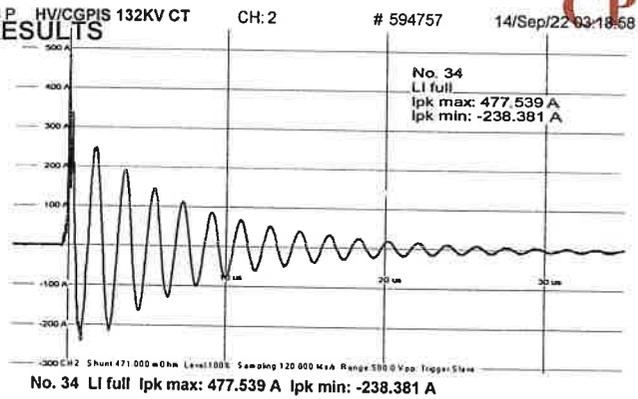
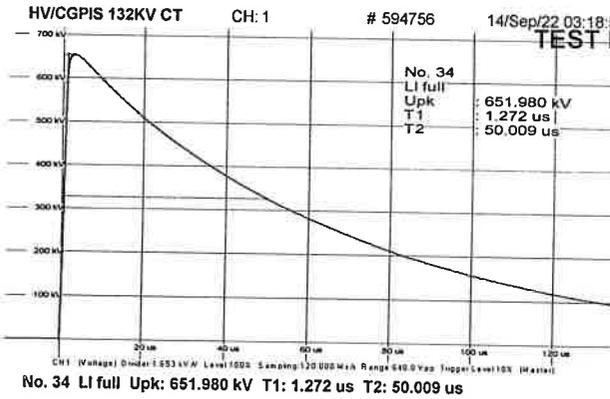
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*Priya*  
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Test Engineer

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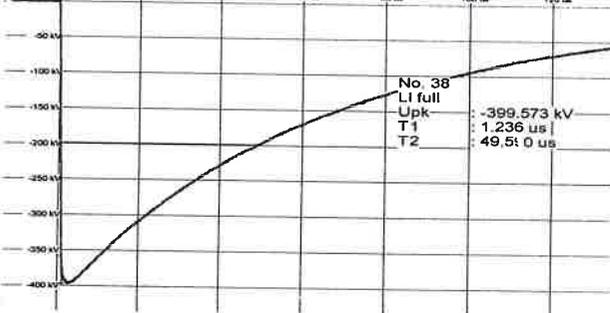


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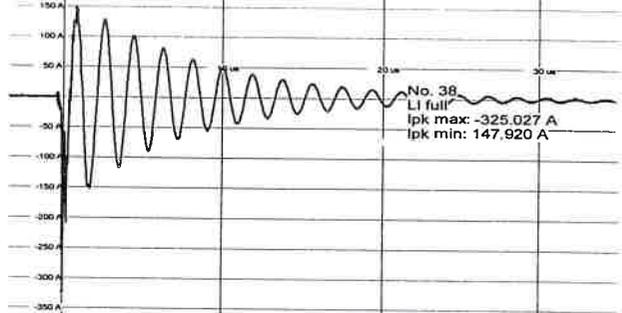
HV/CGPIS 132KV CT CH: 1 # 594774 14/Sep/22 03:26:40 P  
CH1 (Voltage) Divisor: 1.533 kV/V Level: 120k Sampling: 120.000 M/s Range: 800.0 Vpp Trigger: Level: 10k (Master)



No. 38  
LI full Upk : -399.573 kV  
T1 : 1.236 us  
T2 : 49.510 us

No. 38 LI full Upk: -399.573 kV T1: 1.236 us T2: 49.590 us

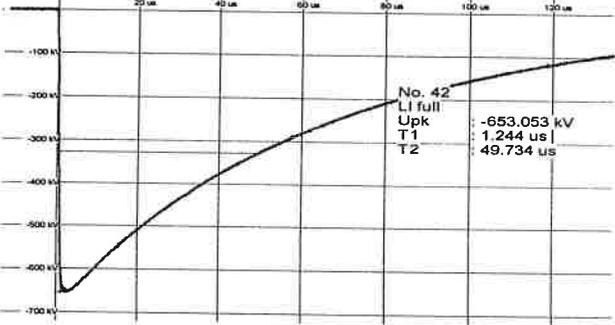
HV/CGPIS 132KV CT CH: 2 # 594775 14/Sep/22 03:26:40 P  
CH2 (Current) Shunt: 471.000 mOhm Level: 120k Sampling: 120.000 M/s Range: 325.0 Vpp Trigger: Slave



No. 38  
LI full lpk max: -325.027 A  
lpk min: 147.920 A

No. 38 LI full lpk max: -325.027 A lpk min: 147.920 A

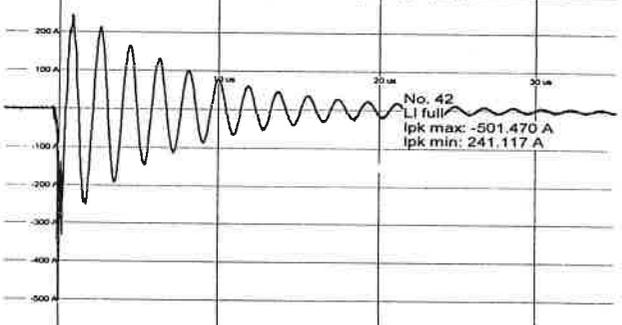
HV/CGPIS 132KV CT CH: 1 # 594786 14/Sep/22 03:28:47 P  
CH1 (Voltage) Divisor: 1.533 kV/V Level: 120k Sampling: 120.000 M/s Range: 800.0 Vpp Trigger: Level: 10k (Master)



No. 42  
LI full Upk : -653.053 kV  
T1 : 1.244 us  
T2 : 49.734 us

No. 42 LI full Upk: -653.053 kV T1: 1.244 us T2: 49.734 us

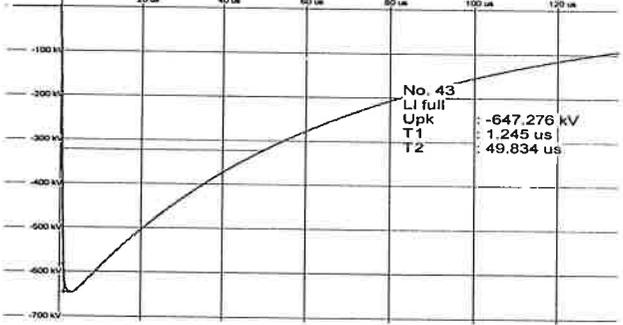
HV/CGPIS 132KV CT CH: 2 # 594787 14/Sep/22 03:28:47 P  
CH2 (Current) Shunt: 471.000 mOhm Level: 120k Sampling: 120.000 M/s Range: 540.0 Vpp Trigger: Slave



No. 42  
LI full lpk max: -501.470 A  
lpk min: 241.117 A

No. 42 LI full lpk max: -501.470 A lpk min: 241.117 A

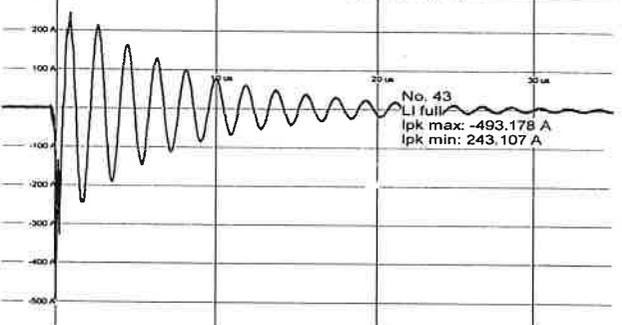
HV/CGPIS 132KV CT CH: 1 # 594789 14/Sep/22 03:29:18 P  
CH1 (Voltage) Divisor: 1.533 kV/V Level: 120k Sampling: 120.000 M/s Range: 800.0 Vpp Trigger: Level: 10k (Master)



No. 43  
LI full Upk : -647.276 kV  
T1 : 1.245 us  
T2 : 49.834 us

No. 43 LI full Upk: -647.276 kV T1: 1.245 us T2: 49.834 us

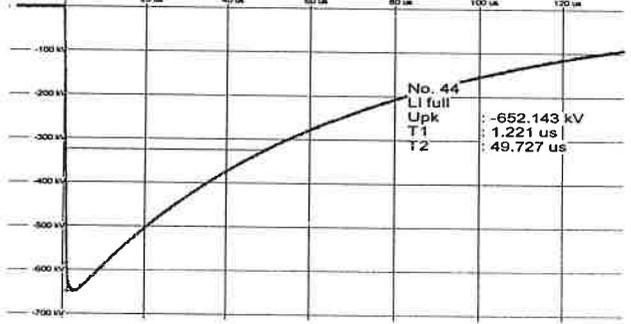
HV/CGPIS 132KV CT CH: 2 # 594790 14/Sep/22 03:29:18 P  
CH2 (Current) Shunt: 471.000 mOhm Level: 120k Sampling: 120.000 M/s Range: 640.0 Vpp Trigger: Slave



No. 43  
LI full lpk max: -493.178 A  
lpk min: 243.107 A

No. 43 LI full lpk max: -493.178 A lpk min: 243.107 A

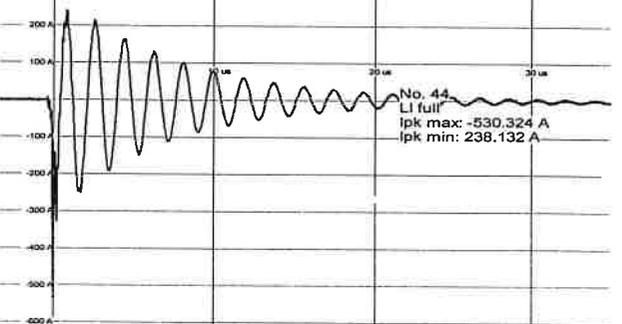
HV/CGPIS 132KV CT CH: 1 # 594792 14/Sep/22 03:29:49 P  
CH1 (Voltage) Divisor: 1.533 kV/V Level: 120k Sampling: 120.000 M/s Range: 800.0 Vpp Trigger: Level: 10k (Master)



No. 44  
LI full Upk : -652.143 kV  
T1 : 1.221 us  
T2 : 49.727 us

No. 44 LI full Upk: -652.143 kV T1: 1.221 us T2: 49.727 us

HV/CGPIS 132KV CT CH: 2 # 594793 14/Sep/22 03:29:49 P  
CH2 (Current) Shunt: 471.000 mOhm Level: 120k Sampling: 120.000 M/s Range: 640.0 Vpp Trigger: Slave



No. 44  
LI full lpk max: -530.324 A  
lpk min: 238.132 A

No. 44 LI full lpk max: -530.324 A lpk min: 238.132 A

*Priya*  
(Priya.S)  
Test Engineer

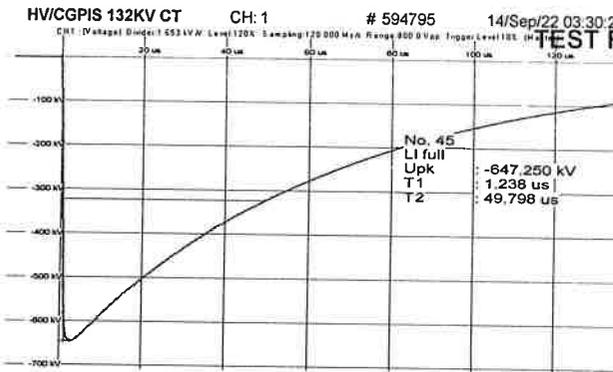
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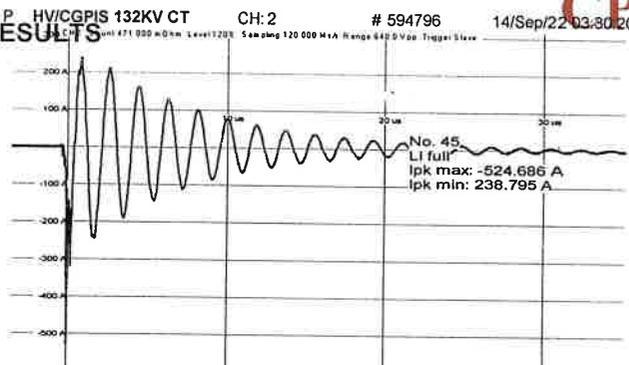
Test Report Number: CPRI BLRHVD22T0693

Date: 21 October 2022

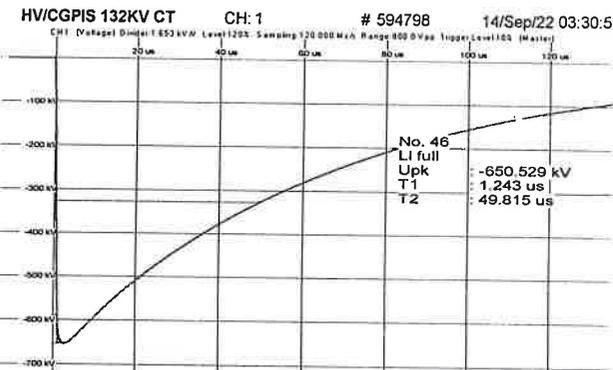
**TEST RESULTS**



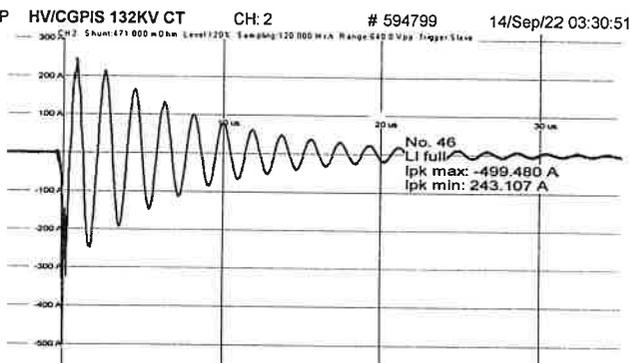
No. 45 LI full Upk: -647.250 kV T1: 1.238 us T2: 49.798 us



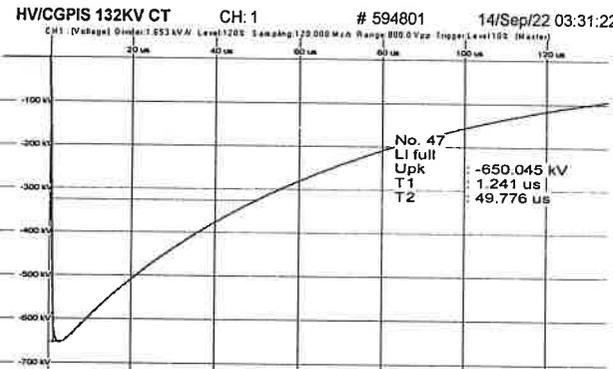
No. 45 LI full Ipk max: -524.686 A Ipk min: 238.795 A



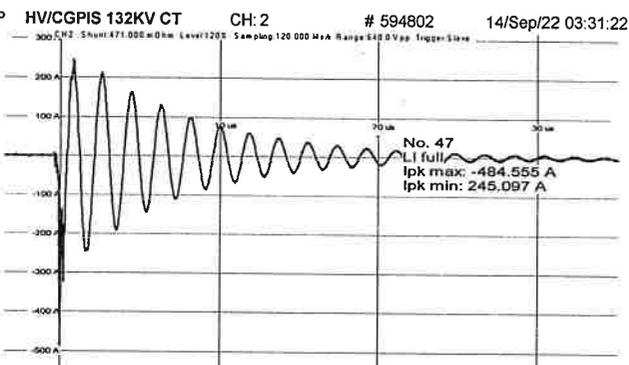
No. 46 LI full Upk: -650.529 kV T1: 1.243 us T2: 49.815 us



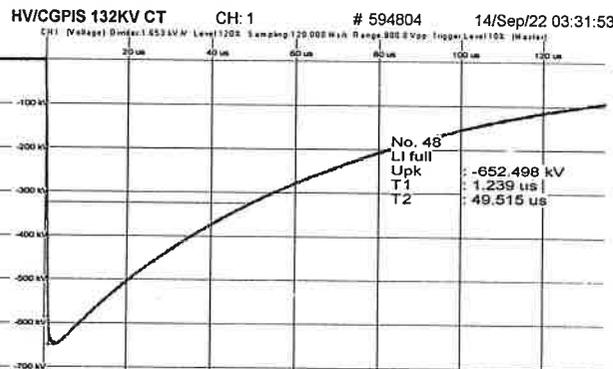
No. 46 LI full Ipk max: -499.480 A Ipk min: 243.107 A



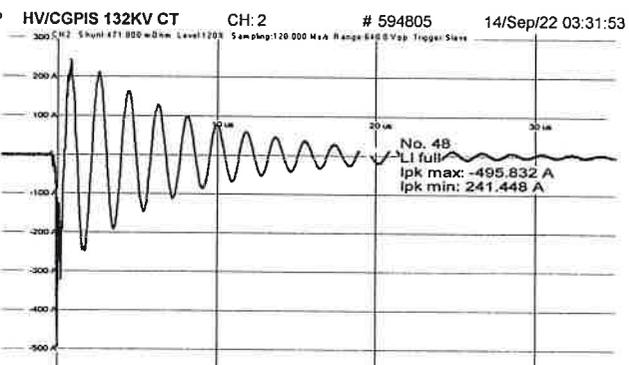
No. 47 LI full Upk: -650.045 kV T1: 1.241 us T2: 49.776 us



No. 47 LI full Ipk max: -484.555 A Ipk min: 245.097 A



No. 48 LI full Upk: -652.498 kV T1: 1.239 us T2: 49.515 us



No. 48 LI full Ipk max: -495.832 A Ipk min: 241.448 A

*Priya*  
(Priya .S)  
Test Engineer

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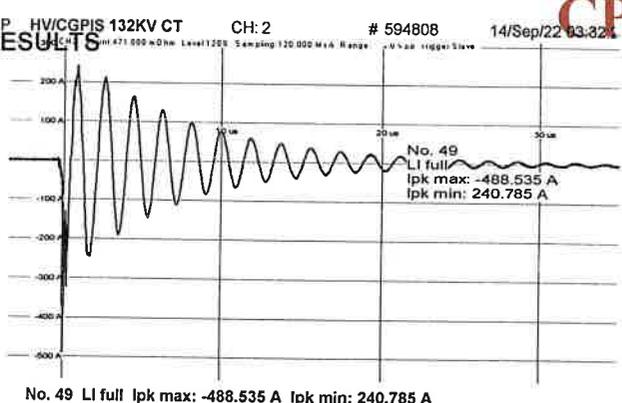
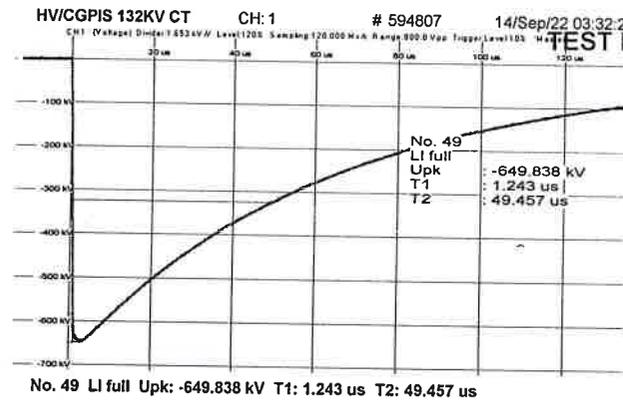


Test Report Number: CPRIBLRHVD22T0693

Date: 21 October 2022

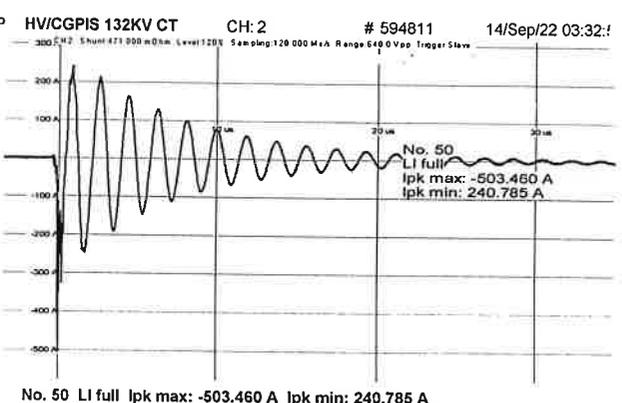
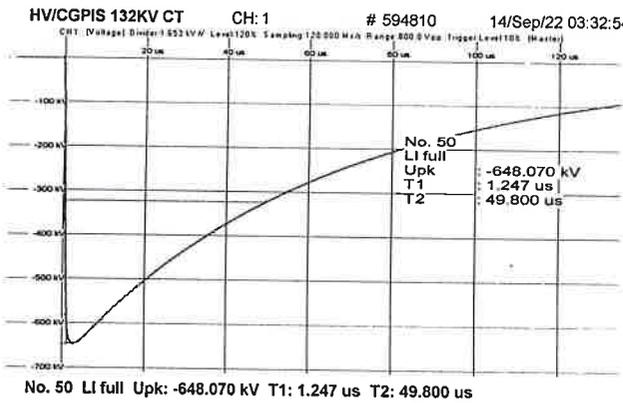
**CPRI**

**TEST RESULTS**



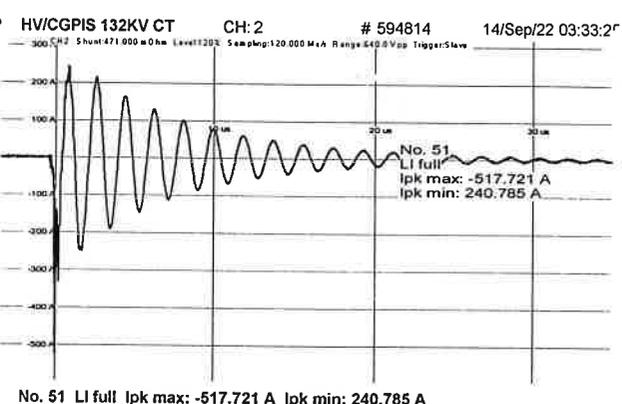
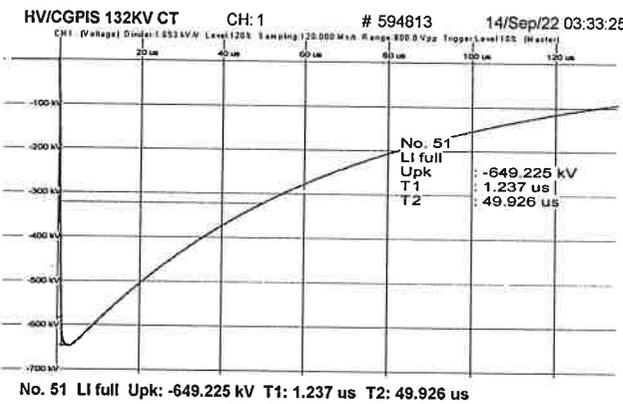
No. 49 LI full Upk: -649.838 kV T1: 1.243 us T2: 49.457 us

No. 49 LI full Ipk max: -488.535 A Ipk min: 240.785 A



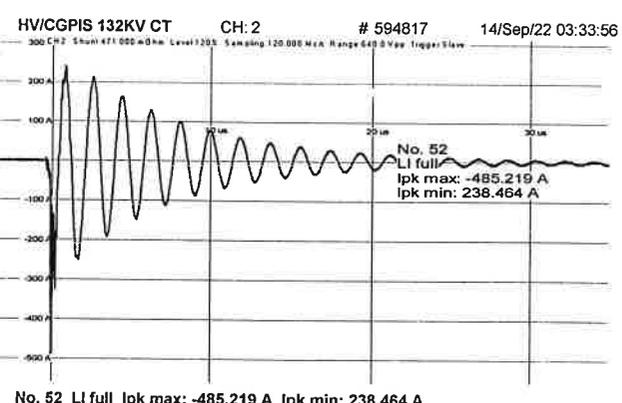
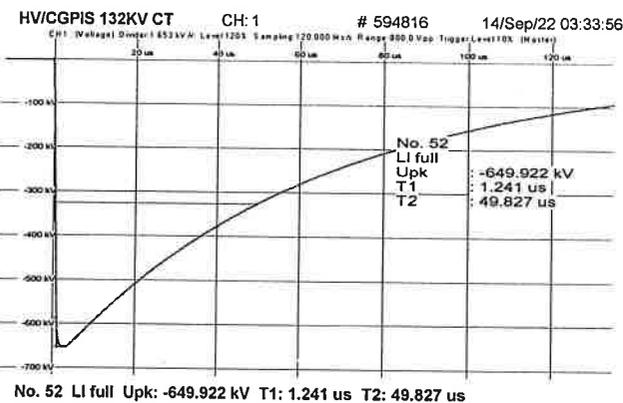
No. 50 LI full Upk: -648.070 kV T1: 1.247 us T2: 49.800 us

No. 50 LI full Ipk max: -503.460 A Ipk min: 240.785 A



No. 51 LI full Upk: -649.225 kV T1: 1.237 us T2: 49.926 us

No. 51 LI full Ipk max: -517.721 A Ipk min: 240.785 A



No. 52 LI full Upk: -649.922 kV T1: 1.241 us T2: 49.827 us

No. 52 LI full Ipk max: -485.219 A Ipk min: 238.464 A

*Priya S*  
(Priya S)  
Test Engineer

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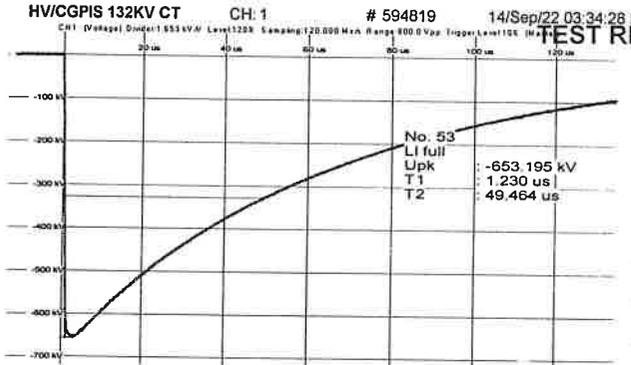


Test Report Number: CPRIBLRHVD22T0693

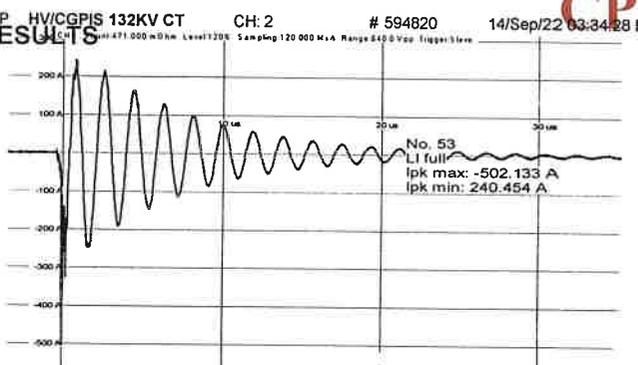
Date: 21 October 2022

**CPRI**

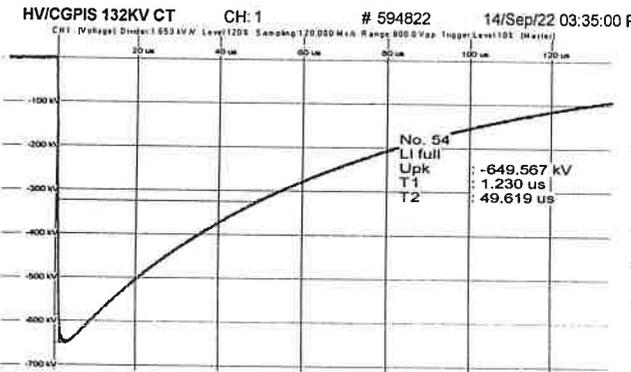
**TEST RESULTS**



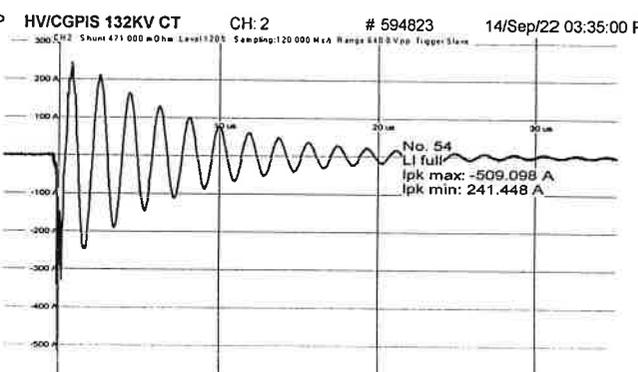
No. 53 LI full Upk: -653.195 kV T1: 1.230 us T2: 49.464 us



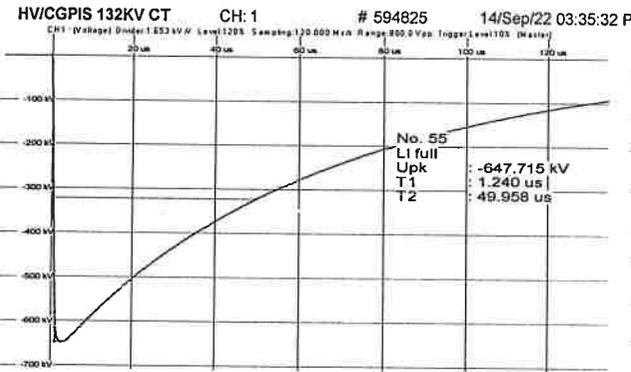
No. 53 LI full lpk max: -502.133 A lpk min: 240.454 A



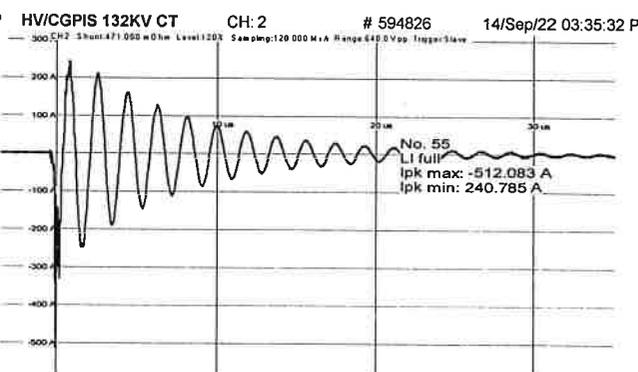
No. 54 LI full Upk: -649.567 kV T1: 1.230 us T2: 49.619 us



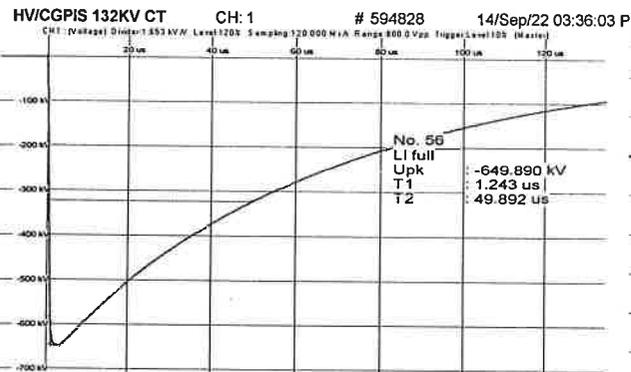
No. 54 LI full lpk max: -509.098 A lpk min: 241.448 A



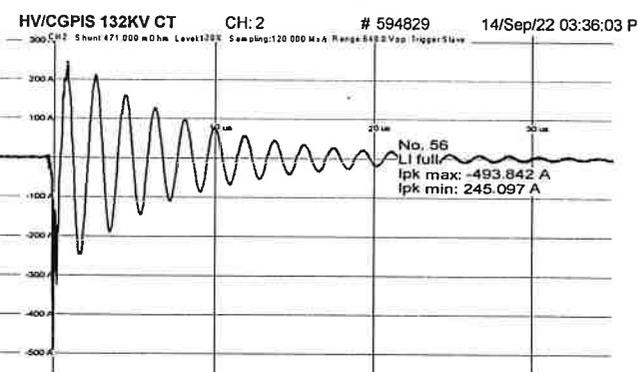
No. 55 LI full Upk: -647.715 kV T1: 1.240 us T2: 49.958 us



No. 55 LI full lpk max: -512.083 A lpk min: 240.785 A



No. 56 LI full Upk: -649.890 kV T1: 1.243 us T2: 49.892 us



No. 56 LI full lpk max: -493.842 A lpk min: 245.097 A

*Priya*  
(Priya .S)  
Test Engineer

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TEST REPORT



Test Report Number: CPRIBLRHVD22T0693

Date: 21 October 2022

**CPRI**



Photograph number P01  
Test sample

  
(Priya.S)  
Test Engineer

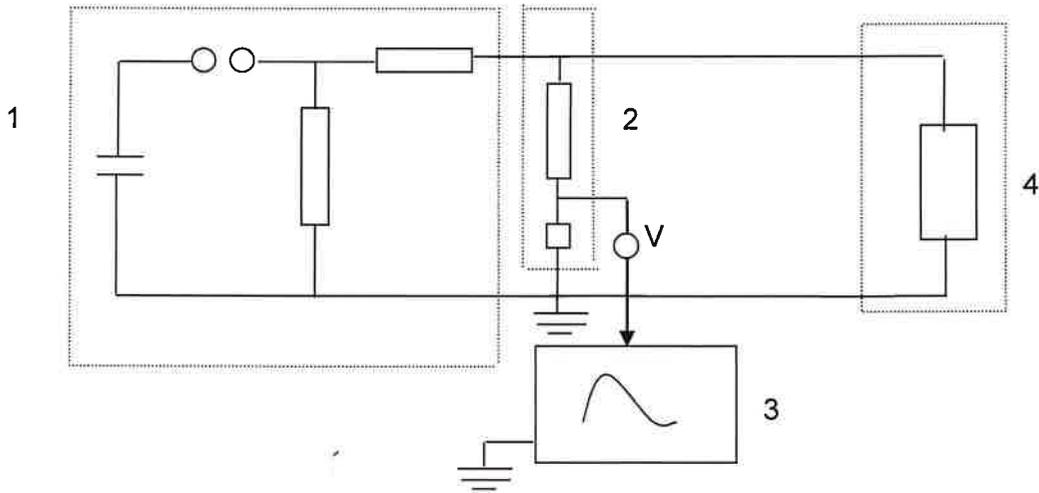
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**TEST REPORT**



Test Report Number: CPRIBLRHVD22T0693

Date: 21 October 2022

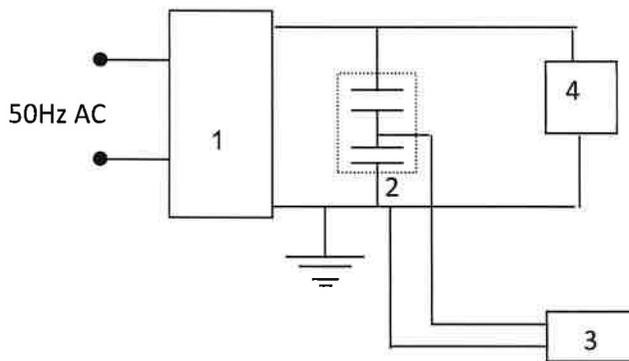
**CPRI**



**Legend:**

- 1. Impulse voltage generator
- 2. Impulse voltage divider
- 3. Digital recorder for measurement of voltage
- 4. Test object
- V. Voltage

**TCD01 : Schematic Diagram for Impulse Voltage Test**



**Legend:**

- 1: HV AC Source
- 2: Voltage Divider
- 3: RMS Voltmeter
- 4: Test Sample

**TCD02 : Schematic Diagram for Power Frequency Test**

*Priya*  
(Priya .S)  
Test Engineer

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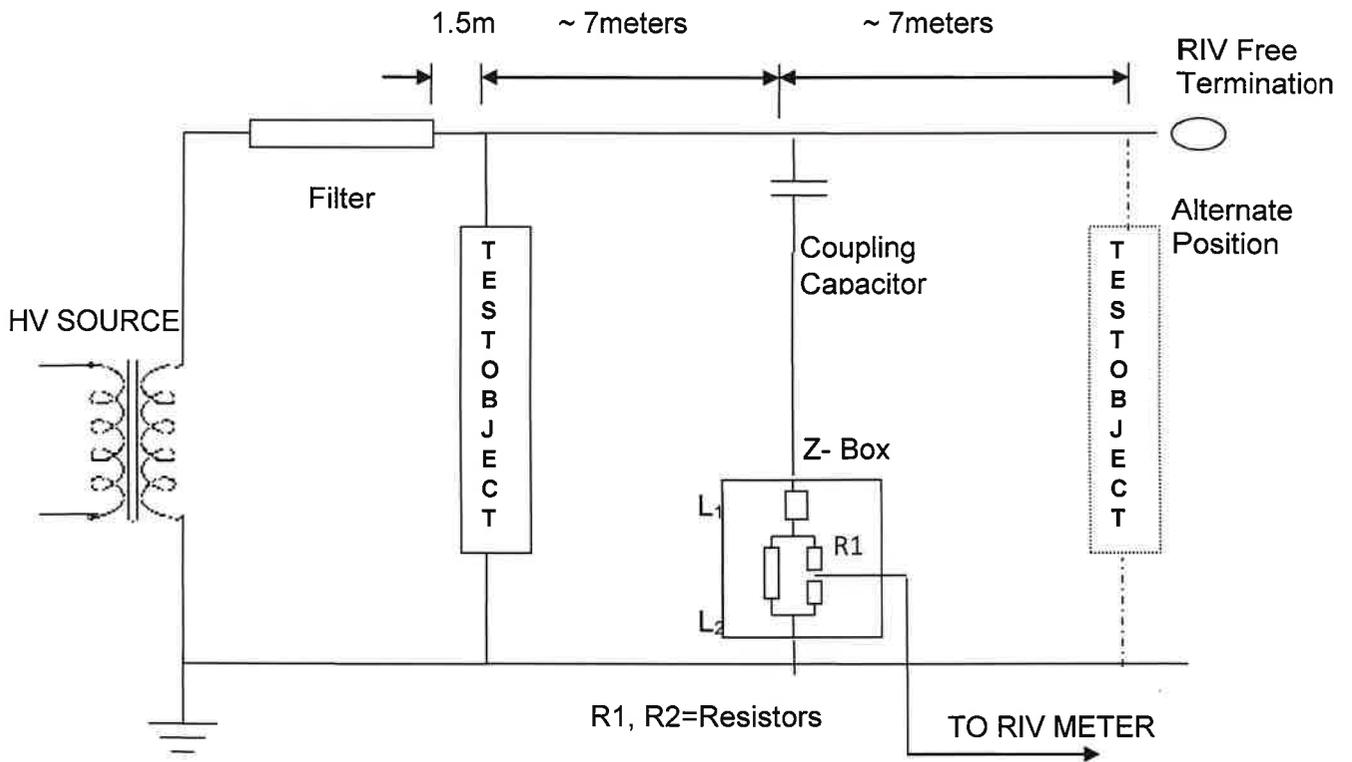


**CPRI**

Test Report Number: CPRIBLRHVD22T0693

Date: 21 October 2022

Test arrangement for testing of insulators/other equipment's above 33kV up to including 400kV rating.



TCD03 : Circuit for Radio Interference Test

  
(Priya .S)  
Test Engineer

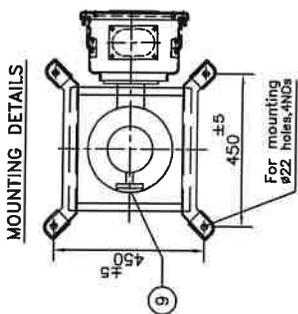


NO.	QTY.	DESCRIPTION	MATERIAL
1	1	BELLOW LEVEL INDICATOR	ACRYLIC
2	1	HOUSING	ALUMINIUM
3	1	BASE	MILD STEEL
4	2	NEMA PRIMARY TERMINAL SIZE-100x100x20mm.Thk.	ALUMINIUM
5	1	PORCELAIN INSULATOR	PORCELAIN - BROWN COLOUR
6	1	SECONDARY TERMINAL BOX	DRG.NO.-413695929 0142 SB
7	1	RATING & SCHEMATIC DIAGRAM	DRG.NO.-413695929 0142 RS
8	1	BELLOW	STAINLESS STEEL
9	1	SAMPLING VALVE	STEEL PLATED

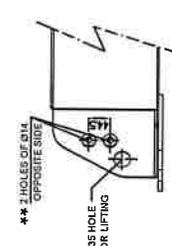
### TECHNICAL SPECIFICATIONS

#### 132 kV CURRENT TRANSFORMER

SPECIFICATION	UNIT	RATING
HIGHEST SYSTEM VOLTAGE (Ph-Ph)	Kilo Volts	145
HIGHEST SYSTEM VOLTAGE (Ph-E)	Kilo Volts	145/√3
POWER FREQUENCY WITHSTAND VOLTAGE FOR 1 MIN. (DRY & WET)	Kilo Volts	275
LIGHTNING IMPULSE WITHSTAND VOLTAGE	Kilo Volts(Peak)	650
FREQUENCY	Hz	50
TOTAL & NOMINAL SPECIFIC CREEPAGE DISTANCE	mm	3625
TOTAL WEIGHT (±10%)	mm/kV	25
OIL VOLUME (±10%)	Kilogram	450
APPLICABLE STANDARDS	Litre	120
	-	IEC 61869-1&2

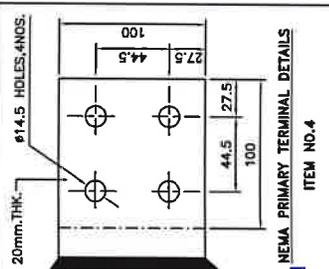


VIEW FROM 'A'



VIEW FROM 'B'

EARTHING DETAIL



NEMA PRIMARY TERMINAL DETAILS

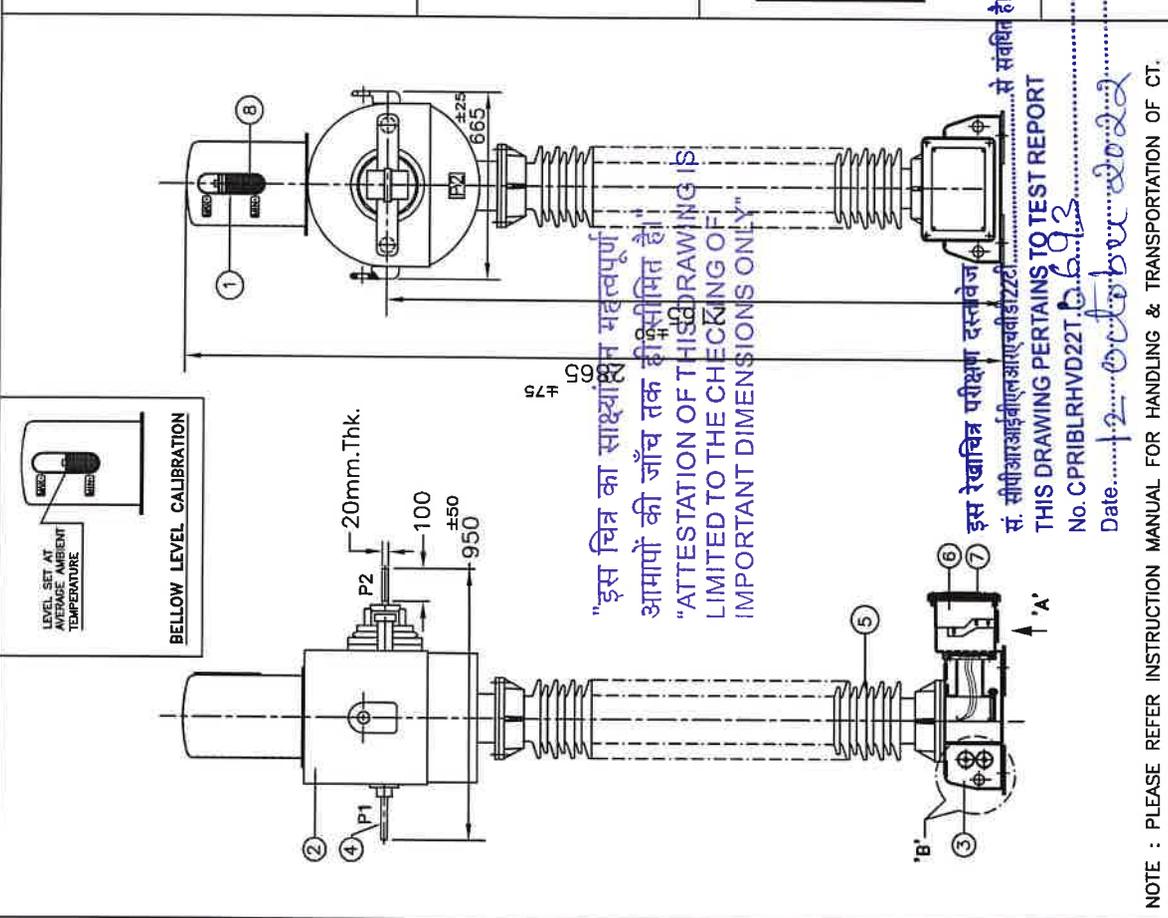
ITEM NO. 4

DETAILS OF PRIMARY WINDING :  
 PRIMARY CONDUCTOR SIZE/CROSS SECTION : ROD=ø50, CROSS SECTION = 19.62 SQ.CM.  
 PRIMARY TERMINAL = 100X100X20 THK.  
 TOTAL NO OF TURNS : 2 NOS.

DETAILS OF SECONDARY WINDING :

TOTAL NO OF SECONDARY TURNS (NO)	CONDUCTOR SIZE (SWG/SC.M.M.)	MATERIAL OF SECONDARY WINDING	CORE DETAILS	
			TAPPED WINDING	CROSS SECTIONAL AREA (SQ.CM.)
2400(600+600+1200)	21X4,21X2,19X1 / 2.072,1.036,0.810	COPPER	YES	6.25
2400(1200+1200)	19X2,19X1 / 1.62,0.810	COPPER	YES	15.75
6000	15X1,7.5X1	COPPER	YES	10

उच्च वोल्टता प्रभाग/ HIGH VOLTAGE DIVISION  
 सी पी आर आई / CPRI  
 बेंगलूर/ BANGALORE - 560 080



इस रेखाचित्र परीक्षण दस्तावेज से संबंधित है।  
 सं: सीपीआरआई/एलआर/एवी/22T.0.6.9.3  
 THIS DRAWING PERTAINS TO TEST REPORT  
 No. CPRI/HRVD22T.0.6.9.3  
 Date: 2022.06.02

NOTE : PLEASE REFER INSTRUCTION MANUAL FOR HANDLING & TRANSPORTATION OF CT.

NO	REVISION	SIGN	NAME	SCALE	N.T.S.	DATE	REVISION	SIGN	DATE	NO
R6			NVN							R2
R5			YGW							R1
			SDS							

GENERAL ARRANGEMENT DRAWINGS  
 FOR 132 KV CURRENT TRANSFORMER  
 TYPE-10SK-145/275/650



CPRI Power and Industrial Solutions Limited, Aurangabad  
 DRG.NO.-413695929 CT42 GA/RO

# CPRI

## TEST REPORT



## Central Power Research Institute

(A Govt. of India Society)

P.B.No. 8066, Sadashivanagar Post Office,  
Sir C.V. Raman Road,  
Bengaluru - 560 080 (INDIA)

**CENTRAL POWER RESEARCH INSTITUTE**  
(Member of STL)



**CPRI**

**TEST REPORT**

**Test Report Number** : CPRI BLSCL22T0979      **Date:** 12 October 2022

**Name and Address of the Customer** : M/s. CG Power and Industrial Solutions Limited,  
D-2 & D-1/2, MIDC, Waluj, Aurangabad – 431 136,  
Maharashtra, India.

**Name and Address of the Manufacturer** : M/s. CG Power and Industrial Solutions Limited,  
D-2 & D-1/2, MIDC, Waluj, Aurangabad – 431 136,  
Maharashtra, India.

**Particulars of sample tested** : 145 kV, 1200-600-300/1 A, 1200-600/1 A, 3000/1 A  
Current Transformer

**Type** : Outdoor, oil immersed, live tank  
**Description of test sample** : Refer Sheet 2 of 9  
**Serial Number** : 220643  
**Number of samples tested** : One

**Date (s) of Test (s)** : 16 September, 2022

**CPRI Sample code Number(s)** : HVD22S0707

**Particulars of tests conducted** : Refer Sheet 3 of 9

**Test in accordance with Standard / specification** : IEC 61869-2: 2012 & IEC 61869-1: 2007

**Sampling plan** : Not applicable

**Customer's requirement** : Nil  
**Deviations if any** : Nil

**Name of the witnessing persons**  
**Customer's representative** : Mr. Yogesh Warghade, Design - Executive  
**Other than customer's representatives** : None

**Test subcontracted with address of the laboratory** : None

**Documents constituting this report (in words)**  
**Number of Sheet(s)** : Nine  
**Number of Oscillogram(s)** : Nil  
**Number of Graph(s)** : Nil  
**Number of Photograph(s)** : Nil  
**Number of Test Circuit Diagram(s)** : Nil  
**Number of Drawing(s)** : Nil

(S. Shenbagarajan)  
Test Engineer



(Swaraj Kumar Das)  
Head of Division  
Reviewed and Authorized by

**CENTRAL POWER RESEARCH INSTITUTE**  
(Member of STL)



**TEST REPORT**

**Test Report Number: CPRIBLRSC22T0979**

**Date: 12 October 2022**

**DESCRIPTION OF SAMPLE TESTED**  
(As assigned by the manufacturer)

Test sample	Current Transformer		
Type	Outdoor, oil immersed, live tank		
Designation	IOSK:145/275/650		
Serial number	220643		
Highest voltage for Equipment ( $U_m$ )	145 kV		
Rated insulation level	275/ 650 kV		
Frequency	50 Hz		
Number of cores	I	II	III
Accuracy class	0.2S	5P	PX
Instrument security factor	FS 10	---	---
Accuracy limit factor	---	20	---
Rated Output (VA)	15	30	---
Minimum knee point Voltage ( $E_k$ )	---	---	600 V
Maximum secondary winding resistance at 75 °C $R_{ct}$ ( $\Omega$ )	---	---	12
Maximum exciting current at $E_k/2$ (mA)	---	---	10
Rated transformation ratio	1200-600-300/1 A	1200-600/1 A	3000/1 A

  
(S. Shenbagarajan)  
**Test Engineer**

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**TEST REPORT**

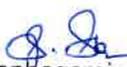
Test Report Number: CPRI BLR SCL22T0979

Date: 12 October 2022

**SUMMARY OF TESTS CONDUCTED**

1. Tests conducted : Refer the table below
2. Rating for which tested : Refer Sheet 4 of 9 to Sheet 8 of 9
3. Schedule of test results :

Sl. No	Tests Conducted	Clause Numbers	Sheet
1	Power-frequency voltage withstand tests on secondary terminals	7.3.4 of IEC 61869-1	4 of 9
2	Tests for ratio error and phase displacement of measuring current transformer	7.3.5.201 of IEC 61869-2	5 of 9
3	Determination of the instrument security factor (FS) of measuring current transformer	7.2.6.202 of IEC 61869-2	6 of 9
4	Tests for ratio error and phase displacement of class P protective current transformer	7.3.5.202 of IEC 61869-2	6 of 9
5	Test for composite error of class P protective current transformer	7.3.5.203 of IEC 61869-2	7 of 9
6	Test for turns ratio error for class PX protective current transformer	7.3.5.206 of IEC 61869-2	7 of 9
7	Determination of secondary winding resistance ( $R_{ct}$ )	7.3.201 of IEC 61869-2	7 of 9
8	Test for rated knee point e.m.f. ( $E_k$ ) and exciting current at $E_k$	7.3.203 of IEC 61869-2	7 of 9
9	Verification of markings	7.3.6 of IEC 61869-1	8 of 9
10	Inter-turn overvoltage test	7.3.204 of IEC 61869-2	8 of 9

  
(S. Shenbagarajan)  
Test Engineer

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**CPRI**

**TEST REPORT**

Test Report Number: CPRI BLSCL22T0979

Date: 12 October 2022

**3) DETERMINATION OF THE INSTRUMENT SECURITY FACTOR (FS) OF MEASURING CURRENT TRANSFORMER**

Instrument security factor : FS 10  
Rated secondary current : 1 A

Ratio	Secondary connection	Rated Output (VA)	Secondary winding resistance corrected to 75 °C (Ω)	Secondary limiting EMF (calculated) (V)	Voltage applied at secondary to get 1 A (V)	Composite Error (%)
300/1	1S1-1S2 & (Short 1-1S2)	15	0.9494	157.7	66.3	>10
600/1	1S1-1S3 & (Short 1-1S3)	15	1.9500	166.0	66.2	>10
1200/1	1S1-1S4 & (Short 1-1S4)	15	3.0813	175.6	66.3	>10

**4) TESTS FOR RATIO ERROR AND PHASE DISPLACEMENT OF CLASS P PROTECTIVE CURRENT TRANSFORMER**

Current ratio : 600/1  
Accuracy class : 5P

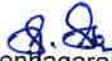
Primary connection : P1 – P2  
Secondary connection : 2S1 – 2S2

Burden (VA) & Power factor	Type of error	Error at percentage of rated current
		100
30 & 0.8 lag	% Current error	-0.247
	Phase displacement (min)	2.44

Current ratio : 1200/1  
Accuracy class : 5P

Primary connection : P1 – P2  
Secondary connection : 2S1 – 2S3

Burden (VA) & Power factor	Type of error	Error at percentage of rated current
		100
30 & 0.8 lag	% Current error	-0.0913
	Phase displacement (min)	0.90

  
(S. Shembagarajan)  
Test Engineer

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**CPRI**

**TEST REPORT**

Test Report Number: CPRIBLRSC22T0979

Date: 12 October 2022

**5) TEST FOR COMPOSITE ERROR OF CLASS P PROTECTIVE CURRENT TRANSFORMER**

Secondary connection	Rated Output (VA)	Secondary winding resistance corrected to 75° C	Secondary limiting E.M.F applied (V)	Excitation current measured (mA)	Composite error (%)
2S1 – 2S2	30	3.382	655.37	25.23	0.13
2S1 – 2S3	30	9.181	754.98	5.31	0.026

**6) TEST FOR TURNS RATIO ERROR FOR CLASS PX PROTECTIVE CURRENT TRANSFORMER**

Primary	Secondary	Ratio	Accuracy Class	% Ratio error
P1-P2	3S1 – 3S2	3000/1	PX	0.0045

**7) DETERMINATION OF THE SECONDARY WINDING RESISTANCE ( $R_{ct}$ )**

Secondary connection	Ratio	Secondary winding resistance at 24 °C ( $\Omega$ )	Secondary winding resistance at 75 °C ( $\Omega$ )
3S1 – 3S2	3000/1	7.9595	9.529

**8) TEST FOR RATED KNEE POINT E.M.F ( $E_k$ ) AND EXCITING CURRENT AT ( $E_k$ )**

Secondary connection: 3S1-3S2		
Knee point voltage	Knee-point voltage applied (V)	Exciting current measured (mA)
1.1 $V_k$	660	3.32
$V_k$	600	2.58
0.75 $E_k$	450	1.95
0.5 $E_k$	300	1.48
0.25 $E_k$	150	0.94
0.1 $E_k$	60	0.51

(S. Shenbagarajan)  
Test Engineer

**CENTRAL POWER RESEARCH INSTITUTE**  
(Member of STL)



**TEST REPORT**

Test Report Number: CPRIBLRSC22T0979

Date: 12 October 2022

**NOTE**

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TC-5452

  
(S. Shenbagarajan)  
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-----End of Test Report-----