

CG Power and Industrial Solutions Limited
(Formerly Crompton Greaves Limited)
Vacuum Interrupters and Instrument Transformers Division: Power Systems

D-2 & D-1/2, MIDC, Waluj, Aurangabad 431 136, Maharashtra, India
T: +91 240 255 8000 F: +91 240 255 4697



Smart solutions.
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TEMPERATURE RISE TEST

Test report no. : S6/CT/TT/1285/R0 Dated 19th Feb. 2019
Manufacturer : CG Power & industrial solutions ltd., Aurangabad
Name of customer : TATA POWER COMPANY LIMITED, JAMSHEDPUR
Particular of the Tests : Temperature rise test
Object : 132 kV Current Transformer
CGPISL Type : CGC- CI 145
CT Serial no : 181163
Date of test : 18th – 19th Feb.19
No. of Sample Tested : One
Test Location : CG Power & industrial solutions ltd., Aurangabad
Person Attending the Test : Basavaraj P Kalyanimath Branch Coordinator, Quest

Purpose of the tests

Purpose of the test was to verify whether the Current Transformer complies with the specified requirements of the IEC 61869-1 & IEC 61869-2 standard for Temperature Rise Test.

Summary and Conclusion

The Current Transformer has passed Temperature Rise Test as per IEC 61869-1 & IEC 61869-2.

Tested By:
Mr. Sarang Purandare,
Sr. Executive -QA
CGPISL Aurangabad

Witnessed By: 
Mr. Basavaraj P Kalyanimath,
Branch Coordinator,
Quest



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Material data

132 kV Current Transformer

Manufacturer : CG Power & industrial solutions ltd., Aurangabad
 CGPISL Type : CGC- CI 145
 Serial No. : 181163
 Voltage Class : 132 kV
 Rated Frequency : 50 Hz
 Rated Primary Current : 1000-500 A
 Rated Secondary Current : 1 A
 Short Time Current Rating : 40 kA / 3 Sec
 Rating Factor : 1.5
 Insulation Level : 275 kV / 650 kVp

Description	Secondary Core 1	Secondary Core 2	Secondary Core 3	Secondary Core 4	Secondary Core 5
Rated primary Current (Amps)	1000-500	1000-500	1000-500	1000-500	2000-1000-500
Rated Secondary Current (Amps)	1	1	1	1	1
Burden (VA)	-	30	30	30	-
Accuracy Class	PS	5P	0.2S	0.2S	PS
ISF/ALF	-	20	5	5	-
Knee point voltage (V)	1000-500	-	-	-	2000-1000-500
Excitation current @ V_k (mA)	< 15-30 mA	-	-	-	< 15-30-60 mA
Resistance @ 75 °C (Ω)	< 5 – 2.5	-	-	-	< 10 – 5 – 2.5

Sarang Purandare
 Tested By:
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 Sr. Executive -QA
 CGPISL Aurangabad

Basavaraj P Kalyanmath
 Witnessed By:
 Mr. Basavaraj P Kalyanmath,
 Branch Coordinator,
 Quest



Registered Office:
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 Corporate Identity Number: L99999MH1937PLC002641





For detailed description of the Current Transformer references is made to the CGPISL drawings.

1) GA Drawing	:	411931658 CT1 GA /R1
2) Rating and Schematic Diagram	:	411931658 CT1 RS /R1
3) Secondary Box Assembly	:	411931658 CT1 SB /R1

Test procedure:-

▪ **Temperature rise Test:-**

The current transformer was subjected to a temperature rise test. Prior to the test, the d.c resistance of secondary windings no I, II, III, IV & V was measured at ambient temperature by Micro Ohm Meter between S1 and S3 terminals of each winding. The results are presented in Appendix A of this report.

Following this, the primary terminals of the CT under test were connected to high current source (CT). Current source was energized to circulate 1500 A at 50Hz (i.e. 150% of the rated primary current) in the primary winding of the CT under test. To monitor the secondary an ampere-meter was connected in series with resistive burden 30 Ohms between terminals S1 and S3 of core No 3 which is amounted to 1.5A. Secondary winding no I, & V were short circuited being of PS Class cores. And Core no. II & IV core are short circuited with resistive burden 30 ohms.

Every hour, the temperatures on the bellows, primary terminal P2, primary terminal P1, tank, porcelain Insulator, Base were measured by the temperature indicator. The test was continued until the temperature rise of all the mentioned locations of current transformers stabilize to a value well within 1 K per hour. The total test duration was eight hours. The results are presented in Appendix B of this report.

Tested By:
Mr. Sarang Purandare,
Sr. Executive -QA
CGPISL Aurangabad

Witnessed By: 
Mr. Basavaraj P. Keshavnath,
Branch Coordinator,
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After disconnection of the test, immediately the d.c resistance of secondary windings were measured at ambient temperature by Micro Ohm Meter between S1 and S3 terminals of each winding. The results are presented in Appendix A of this report.

On simultaneous application of 1.5 times the rated primary current the CT showed stabilizing behavior of temperature rise.

The test was passed.


Tested By:
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Witnessed By:
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AVANTHA
GROUP COMPANY



Appendix A

Resistance Measurement

Atmospheric conditions : Ambient temperature 27.7 °C

Winding Resistance Measurements

Winding No.	Secondary Terminals	Initial Resistance (Ω)	Final Resistance (Ω)
1	S1 -S2	1.69	1.76
	S1 -S3	3.40	3.56
2	S1 -S2	3.17	3.31
	S1 -S3	7.28	7.58
3	S1 -S2	1.90	1.99
	S1 -S3	2.38	2.49
4	S1 -S2	2.01	2.08
	S1 -S3	2.31	2.41
5	S1 -S2	1.42	1.48
	S1 -S3	3.19	3.32
	S1 -S4	6.63	6.91

Temperature Rise of Secondary Windings Calculated by Resistance Method

Winding No.	Secondary Terminals	Calculated Temperature Rise (°C)
1	S1 -S3	9.85
2	S1 -S3	8.33
3	S1 -S3	9.63
4	S1 -S3	8.87
5	S1 -S4	8.59

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 CGPISL Aurangabad

Witnessed By: 
 Mr. Basavaraj P Kalyanimath,
 Branch Coordinator,
 Quest





Appendix B

Temperature rise test (Continued)

Temperature measurements on the Current transformer during the test

Time (h)	Tank (°C)	Porcelain Insulator (°C)	Bellow (°C)	Sec Box (°C)	P1 Terminal (°C)	P2 Terminal (°C)	Ambient (°C)
0	28	27.9	27.9	28.4	28	28.1	25.8
1	28.2	28.4	28.6	28.9	35.8	36.2	25.8
2	28.9	29.9	28.4	28.4	38.9	40.2	24.8
3	29.0	27.9	29.4	28.2	43.8	44.5	23.1
4	29.1	28.0	29.6	28.1	47.5	48.1	24.9
5	29.1	28.0	30.1	28.1	51.2	52.9	24.7
6	30.2	28.3	32.1	28.3	54.2	54.8	25.9
7	30.1	28.0	31.9	28.6	56.2	56.9	26.9
8	30.0	28.1	31.8	28.7	58.1	58.6	27.6
9	26.9	25.8	26.7	25.8	59.2	59.5	27.5
10	26.8	25.4	26.8	25.8	60.2	60.5	28.2
11	27.2	25.4	27.0	26.2	60.9	61.3	28.2

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Mr. Sarang Purandare,
Sr. Executive -QA
CGPISL Aurangabad

Witnessed By: 
Mr. Basavaraj P. Kalyanimath,
Branch Coordinator,
Quest



LIST OF DRAWINGS

ITEM NO. 1		145 KV CURRENT TRANSFORMER			RECORD			
SR.NO.	TITLE	DRAWING.NO.	REV.	APPLICATION		RETURN		
				KIND	DATE	DATE	CC	
								1
2	RATING & SCHEMATIC DIAGRAM	411931658 CT1 RS	R1	RA	27.07.2018			
3	SECONDARY BOX ASSEMBLY	411931658 CT1 SB	R1	RA	27.07.2018			
4	SECTIONAL VIEW	411931658 CT1 SV	R0	AA	27.07.2018			
5	COMPOSITE INSULATOR	411931658 CT1 CI	R1	RA	30.07.2018			

As Marked

THE TATA POWER COMPANY LIMITED

PROJECT ENGINEERING DEPARTMENT

JAMSHEDPUR

DRAWING NO. CGC-CI 145

DATE: 02/08/18

BY: [Signature]

FOR: [Signature]

REVISION: [Signature]

DATE: 02/08/18

BY: [Signature]

FOR: [Signature]

REVISION: [Signature]

DATE: 02/08/18

BY: [Signature]

FOR: [Signature]

REVISION: [Signature]

DATE: 02/08/18

BY: [Signature]

FOR: [Signature]

- AA : Application for Approval
- RA : Re-application for Approval
- FD : Final Drawing
- RD : Reference Drawing
- AP : Approved
- AC : Approved with Corrections
- RC : Return for Corrections
- CC : Customer Comments

FOR Line and ST bay

SURFACE FINISH.....
MILD STEEL COMPONENTS : SHOT BLAST + HOT DIP GALVANIZED.

CUSTOMER : TATA POWER COMPANY LIMITED, JAMSHEDPUR
PO. NUMBER : LOI : TPCL/LOI/15-14888, Dated-15.06.2018
ITEM NO. : 1
QUANTITY : 11 NO's.

PACKING DIMENSIONS : L-3150 x W-750 x H-1225 mm.
NET WEIGHT : 450 Kg.
GROSS WEIGHT : 600Kg.

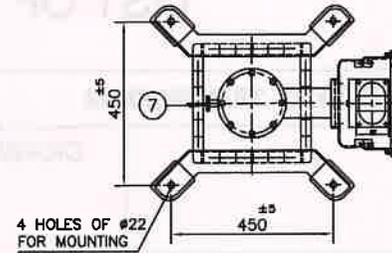
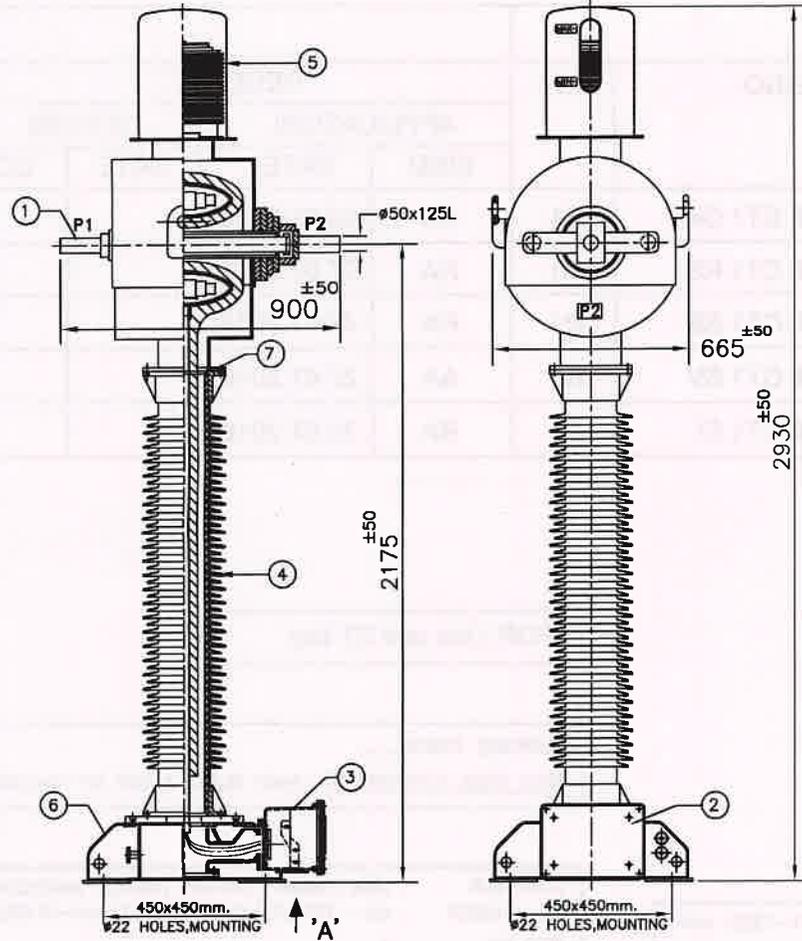
NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	SCALE	N.T.S.	DATE	ALL DIMENSIONS ARE IN mm	DRG.NO: 411931658 CT1 LD/R2
R6				R4								LIST OF DRAWINGS FOR 145 KV CURRENT TRANSFORMER TYPE : CGC-CI 145
R5				R3								
				R1	R/S,SB DRG.REVISED & SV,CI DRGg ADDED.	STJ	27.07.18					



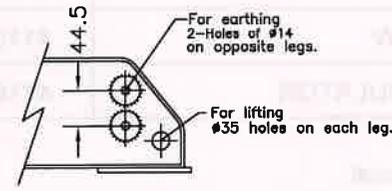
CG Power and Industrial Solutions Limited, Aurangabad
Drawing Control System Limited

LC3-SHELL

IF IN DOUBT ASK



VIEW FROM 'A'
MOUNTING DETAILS



EARTHING & LIFTING DETAILS

NO.	QTY.	DESCRIPTION	MATERIAL
1	2	PRIMARY TERMINAL SIZE-#50x125L	ALUMINIUM
2	1	RATING & SCHEMATIC DIAGRAM	DRG.NO.411931658 CT1 RS
3	1	SECONDARY TERMINAL BOX	DRG.NO.411931658 CT1 SB
4	1	COMPOSITE INSULATOR	GREY COLOUR
5	1	BELLOWS	STAINLESS STEEL
6	1	BASE	MILD STEEL
7	1	OIL FILLING / DRAIN VALVE	STEEL PLATED.

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

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	SCALE	N.T.S.	DATE	ALL DIMENSIONS ARE IN mm
R6				R4							
R5				R3							
				R2	CUST.COMMENTS ADDED	STJ	30.07.18		SIGN	NAME	GENERAL ARRANGEMENT DRAWING FOR 145 KV CURRENT TRANSFORMER TYPE:CGC-CI 145
				R1	CUST.COMMENTS ADDED	PSC	17.07.18			STJ SDS YPS	DRG.NO: 411931658 CT1 GA/R2



CIG Power and Industrial Solutions Limited, Aurangabad
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