HIGH POWER LABORATORY

TEST REPORT

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Central Power Research Institute

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

CENTRAL POWER RESEARCH INSTITUTE

CPRI

TEST REPORT

Test Report Number	: CPRIBLRHPL18T0233 Date: 07th January, 2018
Name & Address of the Customer	: M/s. CG Power and Industrial Solutions Ltd., S6, D-2, MIDC, Waluj, Aurangabad – 431136 Maharashtra, India
Name & Address of the Manufacturer	: M/s. CG Power and Industrial Solutions Ltd., S6, D-2, MIDC, Waluj, Aurangabad – 431136 Maharashtra, India
Particulars of sample tested	: 145 kV Current Transformer
Condition of sample on receipt	: New
Type	: --
Description of test sample	: Refer Sheet No. 2 of 6
Serial number	: 181162
Number of samples tested	: One
Date(s) of Test(s)	: 26th October, 2018
CPRI Sample Code No.	: HPL18S0423
Particulars of tests conducted	: Short time current test.
Test in accordance with Standard/Specification	: Clause no. 7.2.201 of IEC 61869-2:2012
Sampling Plan	: Nil
Customer's requirement	: Nil
Deviation if any	: Nil
Name of the witnessing persons Customer's representative	: Mr. Pradip Shinde
Other than Customer's Representative	: None
Test subcontracted with address of the laboratory	: Nil

Documents constituting this report (In words)

Number of Sheets	: Six
Number of Oscillograms	: One
Number of Graphs	: Nil
Number of Photos	: Three
Number of Test circuit Diagrams	: One
Number of Drawings	: Six
Number of documents	: One

(Arunkumar S)
Test Engineer

(S. Sudhakara Reddy)
Head of Division
Approved by

DESCRIPTION OF SAMPLE TESTED

(As assigned by the manufacturer)

Sample	: Current Transformer					
Type	: CGL – CI 145					
Designation	: --					
Serial number	: 181162					
Rated voltage	: 145 kV					
Highest system voltage	: 145 kV					
Rated insulation level	: 275 kV rms					
Frequency	: 50 Hz					
No. of cores	:	I	II	III	IV	V
Accuracy class	:	PX	5P	0.2S	0.2S	PX
Rated output-VA	:	--	30	30	30	--
ISF/ALF	:	--	20	FS5	FS5	--
Transformation ratio						
Core – I to IV	: 500 – 1000/1 – 1 – 1 – 1 A					
Core – V	: 500 – 1000 – 2000/1 A					
Rated short- time current	: 40 kA rms					
Rated peak withstand current	: 100 kA peak					
Duration of short circuit	: 3.0 seconds.					

(Arunkumar S)
TEST ENGINEER

HIGH POWER LABORATORY
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PROF. SIR.C.V. RAMAN ROAD, BENGALURU-560 080, INDIA
PHONE: + 91- (0) 80-22072511

LIST OF DRAWINGS AND PHOTOGRAPHS

Drawings of the sample tested:

The manufacturer has guaranteed that the sample submitted for the test has been manufactured in accordance with the following drawings. It is verified that these drawings adequately represent the sample tested.

Sample drawing numbers:

Sl. No.	Drawing No.	Sheet No.	REV
1	411931658 CT1 RS/R1	--	--
2	411931658 CT1 GA/R2	--	--
3	411931658 CT1 SB/R1	--	--
4	411931658 CT1 CI/R1	--	--
5	411931658 CT1 SV/R0	--	--
6	411931658 CT1 LD/R2	--	--

Total drawings (Duly attested): Six

Photographs of the sample tested

Mounting arrangement before test : 445

Condition of the sample after short circuit test : 448

Condition of core, conductor after short circuit test : 497

Total photographs : Three

(Arunkumar S)
TEST ENGINEER

SCHEDULE OF TESTS
SHORT-TIME CURRENT TESTS

Test conditions

Source : Short-circuit generator & High current transformer
Number of phases : Two
Frequency : 50 Hz
Neutral : Grounded

Test sample
Condition before test : Refer photo No. 445
Mounting arrangement : Primary winding terminal of CT connected to source and all the secondary winding terminals shorted through copper links of negligible impedance. (Refer Photograph No. 445)

Test details
Test circuit drawing number : CRTL/HPL/1SC22B
Short-circuit point : Grounded

Oscillogram Number	Short time current			Observation during test
	Peak (kA)	(kA rms)	Duration (seconds)	
CPRIBLRHPL18 T0233S003	101.4	42.6*	2.87	No abnormalities
*Equivalent to 41.7 kA rms for 3.0 seconds.				

ROUTINE TEST RESULTS

1) The routine tests before and after short time current test were conducted at SC Lab of CPRI, Bengaluru Please refer the appended SC Lab report (Reference Number: **CPRIBLRSCL18T0597**)

2) **Partial discharge test:**
Partial discharge tests were conducted after Short time current test in Cables lab of CPRI, Bangalore
Test connection : High voltage connected to primary, all secondary terminals shorted to grounded body
Sensitivity of measurement : 5 pC
Pre-stressed voltage : 198 kV ac for 60 seconds

Measuring Voltage (kV)	Observed discharge magnitude (pC)	Specified discharge magnitude (pC) Maximum
0.9 Um (131) kV	Less than 5 pC	10 pC
0.9*1.2*Um/√3 (90.5) kV	Less than 5 pC	5 pC

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TEST ENGINEER

3) Power Frequency voltage withstand test on primary terminals after short circuit test was conducted at high voltage division. Laboratory temperature (Dry, Wet) and atmospheric pressure 25°C, 20°C and 683 of Hg

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

Physical inspection:
The current transformer was untanked and inspected. Following are the observations. No visible damage. The insulation next to the surface of the conductor did not show any significant deterioration/carbonization.

Remarks: The performance of the tested sample complies with the requirements of clause 7.2.201 of IEC 61869-2:2012 for the test conducted.

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NOTE

a) The Test results relate only to the item(s) tested.

b) Publication or reproduction of this certificate / report in any form other than by complete set of the whole test certificate / report and in the language written is not permitted without the written consent of CPRI.

c) Any Corrections / erasure invalidate the test certificate / report.

d) NABL has Accredited this laboratory as per ISO 17025-2005 standard, vide certificate no.TC-5452 for the tests carried out.

e) CPRI is a member of STL (Short circuit testing liaison)

f) Any anomaly / discrepancy in the test certificate / report should be brought to notice of CPRI within 45 days from the date of issue.

Additional Information:

CPRI issues following types of reports/certificates:

Test Certificate / Report:
The test certificate / report contains the record of the values of test parameters as obtained during testing, the physical condition of the sample during / after the test(s) and copy of oscillogram(s).
Test certificate is issued when a sample of a particular type and rating has satisfactorily passed all the specified routine tests or type tests or routine & type tests in compliance with the conditions stipulated
in a published National / International standards.
Test report is issued when partial tests are performed as against the complete test requirement for proving specific ratings as per National / International standards or Customer's specific requirements.

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SHORT CIRCUIT LABORATORY
CPRI, BENGALURU

CPRI

SC Lab Reference Number CPRIBLRSCL18T0597

Name & Address of the Customer M/s. CG. Power and Industrial Solution Ltd., 56, D-2, MIDC Waluj, Arunangabad – 431 136, Maharashtra, India.

Name & Address of the Manufacturer M/s. CG. Power and Industrial Solution Ltd., 56, D-2, MIDC Waluj, Arunangabad – 431 136, Maharashtra, India.

Particulars of sample tested 145 kV Current Transformer
CPRI sample code number (s) HPL18S0423
Date(s) of Test(s) 23rd, 24th, 31st October, 1st & 2nd November, 2018

Particulars of tests conducted Routine tests before & after short-time current test as mentioned in below table

Sl.NO	TESTS	SUB-CLAUSE	SHEET NO
1	Tests for ratio error and phase displacement of measuring current transformer	7.3.5.201 of IEC 61869-2	3 of 8 to 4 of 8
2	Determination of the instrument security factor (FS) of measuring current transformer	7.2.6.202 of IEC 61869-2	5 of 8
3	Tests for ratio error and phase displacement of class P protective current transformer	7.3.5.202 of IEC 61869-2	5 of 8
4	Test for composite error of class P protective current transformer	7.3.5.203 of IEC 61869-2	6 of 8
5	Test for rated knee point e.m.f. (E_k) and exciting current at E_k	7.3.203 of IEC 61869-2	6 of 8
6	Determination of the secondary winding resistance (R_{ct})	7.3.201 of IEC 61869-2	7 of 8
7	Test for turns ratio error for class PX protective current transformer	7.3.5.206 of IEC 61869-2	7 of 8
8	Power-frequency voltage withstand tests on secondary terminals	7.3.4 of IEC 61869-1	8 of 8

Test Engineer

Description of sample tested (ratings as assigned by the customer)

Test sample	Current Transformer				
Type	Outdoor				
Designation	CGL-CI145				
Serial number	181162				
Highest voltage for Equipment (U_m)	145 kV				
Rated insulation level	275 / 650 kVp				
Frequency	50 Hz				
Number of cores	I	II	III	IV	V
Accuracy class	PX	5P	0.2S	0.2S	PX
Instrument security factor (FS)	---	20	FS5	FS5	---
Rated Output (VA)	---	30	30	30	---
Accuracy limit factor	---	20	---	---	---
Maximum rated knee point e.m.f (E_K) - V	500 @ 500/1A 1000@1000/1A	---	---	---	500 @ 500/1 A 1000 @ 1000/1 A 2000 @ 2000/1 A
Maximum secondary winding resistance at 75° C (Ω)	2.5 @ 500/1 A 5 @1000/1 A	---	---	---	2.5 @ 500/1 A 5 @1000/1 A 10 @ 2000/1 A
Maximum exciting current at E_k (mA)	30 @ 500/1 A 15 @1000/1 A	---	---	---	60 @ 500/1 A 30 @1000/1 A 15 @ 2000/1 A
Rated transformation ratio	500-1000/1-1-1-1 A				500-1000-2000/1 A
Rated extended primary current	---	---	150%		---

Test Engineer

SC Lab Reference Number: CPRIBLRSCL18T0597

1. TESTS FOR RATIO ERROR AND PHASE DISPLACEMENT OF MEASURING CURRENT TRANSFORMER

Current ratio : 500/1
Accuracy class : 0.2S
Primary connection : P1 – P2
Secondary connection : 3S1 – 3S2

Burden (VA) & Power factor	Type of error		Error at percentage of rated current					
			150	120	100	20	5	1
30 & 0.8 lag	% Current error	BT	0.099	0.101	0.102	0.029	-0.059	-0.088
		AT	0.073	0.083	0.088	0.026	-0.046	-0.082
	Phase displacement (min)	BT	0.166	0.130	-0.320	0.806	5.510	10.187
		AT	1.537	1.076	0.657	1.459	5.656	8.599
7.5 & 0.8 lag	% Current error	BT	0.128	0.134	0.134	0.108	0.104	0.084
		AT	0.122	0.127	0.130	0.112	0.110	0.083
	Phase displacement (min)	BT	0.441	0.341	0.213	1.552	3.100	3.202
		AT	1.014	0.821	0.648	1.653	2.609	1.798

Current ratio : 1000/1
Accuracy class : 0.2S
Primary connection : P1 – P2
Secondary connection : 3S1 – 3S3-1

Burden (VA) & Power factor	Type of error		Error at percentage of rated current					
			150	120	100	20	5	1
30 & 0.8 lag	% Current error	BT	0.026	0.032	0.032	-0.015	-0.040	0.011
		AT	0.033	0.042	0.042	-0.002	-0.021	0.023
	Phase displacement (min)	BT	0.768	0.361	0.210	1.459	4.989	8.024
		AT	0.406	0.035	-0.219	0.925	4.111	5.892
7.5 & 0.8 lag	% Current error	BT	0.046	0.059	0.061	0.052	0.063	0.117
		AT	0.058	0.065	0.063	0.055	0.067	0.117
	Phase displacement (min)	BT	0.802	0.440	0.287	1.360	2.270	3.605
		AT	0.383	0.104	0.156	1.112	1.757	2.191

BT: Before short time - current test
AT: After short time - current test

Test Engineer

SC Lab Reference Number: CPRIBLRSCL18T0597

TESTS FOR RATIO ERROR AND PHASE DISPLACEMENT OF MEASURING CURRENT TRANSFORMER
(contd.,)

Current ratio : 500/1
Accuracy class : 0.2S
Primary connection : P1 – P2
Secondary connection : 4S1 – 4S2

Burden (VA) & Power factor	Type of error		Error at percentage of rated current					
			150	120	100	20	5	1
30 & 0.8 lag	% Current error	BT	0.105	0.103	0.103	0.045	-0.007	-0.036
		AT	0.082	0.126	0.130	0.119	0.111	0.087
	Phase displacement (min)	BT	0.056	0.262	0.038	1.185	4.686	7.282
		AT	1.264	0.902	0.635	1.218	1.740	1.029
7.5 & 0.8 lag	% Current error	BT	0.128	0.131	0.135	0.118	0.109	0.089
		AT	0.117	0.089	0.091	0.046	0.002	-0.029
	Phase displacement (min)	BT	0.361	0.591	0.276	1.129	2.071	1.843
		AT	1.046	1.001	0.691	1.444	4.573	5.724

Current ratio : 1000/1
Accuracy class : 0.2S
Primary connection : P1 – P2
Secondary connection : 4S1 – 4S3-2

Burden (VA) & Power factor	Type of error		Error at percentage of rated current					
			150	120	100	20	5	1
30 & 0.8 lag	% Current error	BT	-0.013	-0.009	-0.013	-0.057	-0.091	-0.043
		AT	-0.016	-0.011	-0.010	-0.050	-0.074	-0.011
	Phase displacement (min)	BT	-0.064	-0.134	-0.108	0.942	4.192	7.325
		AT	0.213	0.094	-0.140	0.835	3.517	5.436
7.5 & 0.8 lag	% Current error	BT	0.007	0.013	0.012	-0.00	0.007	0.054
		AT	0.007	0.014	0.013	0.005	0.016	0.084
	Phase displacement (min)	BT	0.159	0.084	0.130	1.039	1.993	3.648
		AT	0.291	0.095	0.130	0.890	1.456	0.951

BT: Before short time - current test
AT: After short time - current test

Test Engineer

SC Lab Reference Number: CPRIBLRSCL18T0597

2. DETERMINATION OF THE INSTRUMENT SECURITY FACTOR (FS) OF MEASURING CURRENT TRANSFORMER

Core	Ratio	Rated Output (VA)	condition	Secondary winding resistance corrected to 75 °C (Ω)	Secondary limiting EMF (calculated) (V)	Voltage applied at secondary to get 0.5 A (V)	Composite Error (%)
3S1-3S2	500/1	30	BT	2.274	159.2	101.5	> 10
			AT	2.287	159.3	102.4	> 10
3S1-3S3-1	1000/1	30	BT	2.855	161.65	80.3	> 10
			AT	2.908	161.9	81.3	> 10
4S1-4S2	500/1	30	BT	2.317	159.4	110.1	> 10
			AT	2.335	159.5	110.7	> 10
4S1-4S3-2	1000/1	30	BT	2.969	162.12	86.9	> 10
			AT	3.020	162.3	87.6	> 10

3. TESTS FOR RATIO ERROR AND PHASE DISPLACEMENT OF CLASS P PROTECTIVE CURRENT TRANSFORMER

Current ratio : 500/1
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	BT	-0.237
		AT	-0.233
	Phase displacement (min)	BT	1.155
		AT	1.025

Current ratio : 1000/1
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	BT	-0.121
		AT	-0.119
	Phase displacement (min)	BT	0.475
		AT	0.406

BT: Before short time - current test
AT: After short time - current test

Test Engineer

SC Lab Reference Number: CPRIBLRSCL18T0597

4. TEST FOR COMPOSITE ERROR OF CLASS P PROTECTIVE CURRENT TRANSFORMER

Core	Accuracy class	Ratio	Condition	Secondary winding resistance corrected to 75 °C (Ω)	Secondary limiting E.M.F applied (V)	Excitation current measured (mA)	% Composite error
2S1 – 2S2	5P	500/1	BT	3.785	662.1	28.83	0.14
			AT	3.810	662.5	28.65	0.14
2S1 – 2S3	5P	1000/1	BT	8.919	750.4	7.96	0.039
			AT	8.978	751.4	7.84	0.039

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

Core	Exciting current – Ie (measured) at Knee-point e.m.f. – E_k (applied)		
	E_k (V)	Ie (mA)	
		Before STC test	After STC test
1S1-1S2	(1.1 E_k) 550	17.61	17.56
	(E_k) 500	14.97	15.08
	(0.75 E_k) 375	11.46	11.58
	(0.5 E_k) 250	8.75	8.74
	(0.25E_k) 125	5.35	5.35
	(0.1 E_k) 50	2.60	2.49
1S1-1S3	(1.1 E_k) 1100	8.55	8.49
	(E_k) 1000	7.32	7.28
	(0.75 E_k) 750	5.63	5.60
	(0.5 E_k) 500	4.23	4.22
	(0.25E_k) 250	2.57	2.57
	(0.1 E_k) 100	1.21	1.20
5S1-5S2	(1.1 E_k) 550	18.09	18.25
	(E_k) 500	15.57	15.69
	(0.75 E_k) 375	12.18	12.19
	(0.5 E_k) 250	9.18	9.27
	(0.25 E_k) 125	5.73	5.65
	(0.1 E_k) 50	2.67	2.71
5S1-5S3	(1.1 E_k) 1100	8.92	8.98
	(E_k) 1000	7.71	7.72
	(0.75 E_k) 750	5.96	5.95
	(0.5 E_k) 500	4.46	4.47
	(0.25 E_k) 250	2.74	2.73
	(0.1 E_k) 100	1.30	1.31
5S1-5S4	(1.1 E_k) 2200	4.31	4.46
	(E_k) 2000	3.76	3.90
	(0.75 E_k) 1500	2.86	2.92
	(0.5 E_k) 1000	2.07	2.05
	(0.25 E_k) 500	1.23	1.19
	(0.1 E_k) 200	0.58	0.56

Test Engineer

SC Lab Reference Number: CPRIBLRSCL18T0597

6. DETERMINATION OF SECONDARY WINDING RESISTANCE (R_{ct})

Core	Ratio	Secondary winding resistance (Ω)		Secondary winding resistance corrected to 75° C (Ω)	
		Before STC test (32.5° C)	After STC test (29.8° C)	Before STC test	After STC test
1S1-1S2	500/1	1.7595	1.7554	2.0396	2.0556
1S1-1S3	1000/1	3.574	3.565	4.143	4.175
5S1-5S2	500/1	1.3458	1.3402	1.560	1.569
5S1-5S3	1000/1	3.068	3.053	3.556	3.575
5S1-5S4	2000/1	6.590	6.555	7.639	7.676

7. TEST FOR TURNS RATIO ERROR FOR CLASS PX PROTECTIVE CURRENT TRANSFORMER

Primary	Secondary	Ratio	Accuracy Class	Condition of the sample	% Ratio error
P1-P2	1S1-1S2	500/1	PX	BT	-0.008
				AT	0.002
P1-P2	1S1-1S3	1000/1	PX	BT	0.002
				AT	0.002
P1-P2	5S1-5S2	500/1	PX	BT	0.003
				AT	0.005
P1-P2	5S1-5S3	1000/1	PX	BT	0.003
				AT	0.003
P1-P2	5S1-5S4	2000/1	PX	BT	0.003
				AT	0.005

BT: Before short time - current test
AT: After short time - current test

Test Engineer

CPRI

SC Lab Reference Number: CPRIBLRSCL18T0597

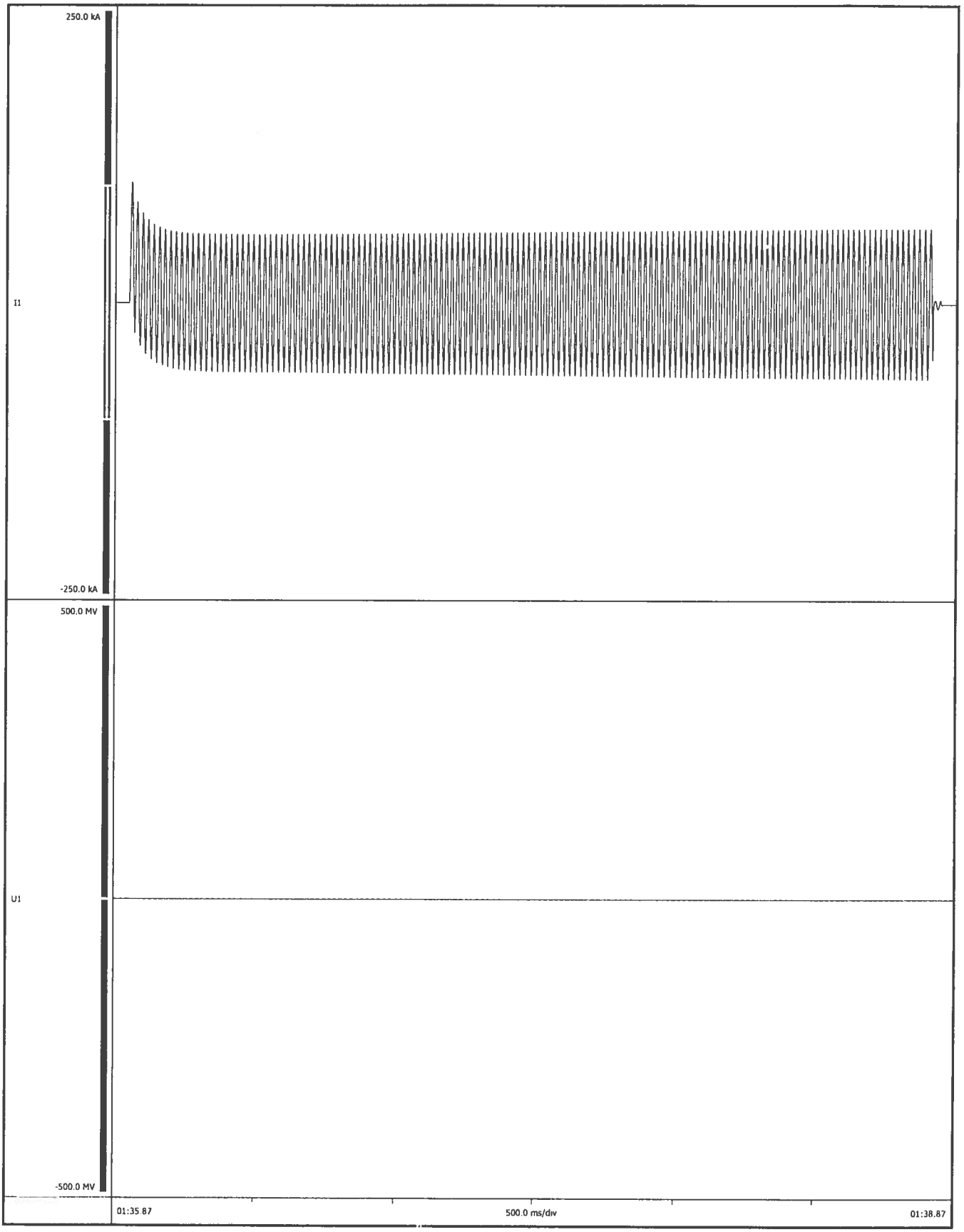
8. POWER FREQUENCY VOLTAGE WITHSTAND TESTS ON SECONDARY TERMINALS

Condition of the sample: As after short time current test

Procedure	Applied voltage (kV)	Duration (s)	Observation
Power frequency voltage applied between secondary winding terminals (1S1 – 1S3) connected together and earth. All the other secondary winding terminals (2S1 – 2S3), (3S1 – 3S3-1), (4S1 -4S3-2), (5S1 – 5S4) & the primary winding terminals (P1 – P2) connected together to earth.	2.7	60	Withstood
Power frequency voltage applied between secondary winding terminals (2S1 – 2S3) connected together and earth. All the other secondary winding terminals (1S1 – 1S3), (3S1 – 3S3-1), (4S1 -4S3-2), (5S1 – 5S4) & the primary winding terminals (P1 – P2) connected together to earth.	2.7	60	Withstood
Power frequency voltage applied between secondary winding terminals (3S1 – 3S3-1) connected together and earth. All the other secondary winding terminals (1S1 – 1S3), (2S1 – 2S3), (4S1 -4S3-2), (5S1 – 5S4) & the primary winding terminals (P1 – P2) connected together to earth.	2.7	60	Withstood
Power frequency voltage applied between secondary winding terminals (4S1 – 4S3-2) connected together and earth. All the other secondary winding terminals (1S1 – 1S3), (2S1 – 2S3), (3S1 -3S3-1), (5S1 – 5S4) & the primary winding terminals (P1 – P2) connected together to earth.	2.7	60	Withstood
Power frequency voltage applied between secondary winding terminals (5S1 – 5S4) connected together and earth. All the other secondary winding terminals (1S1 – 1S3), (2S1 – 2S3), (3S1 -3S3-1), (4S1 – 4S3-2) & the primary winding terminals (P1 – P2) connected together to earth.	4.5	60	Withstood

Remarks: The sample tested complies with the sub-clauses of the standards referred to.

Test Engineer



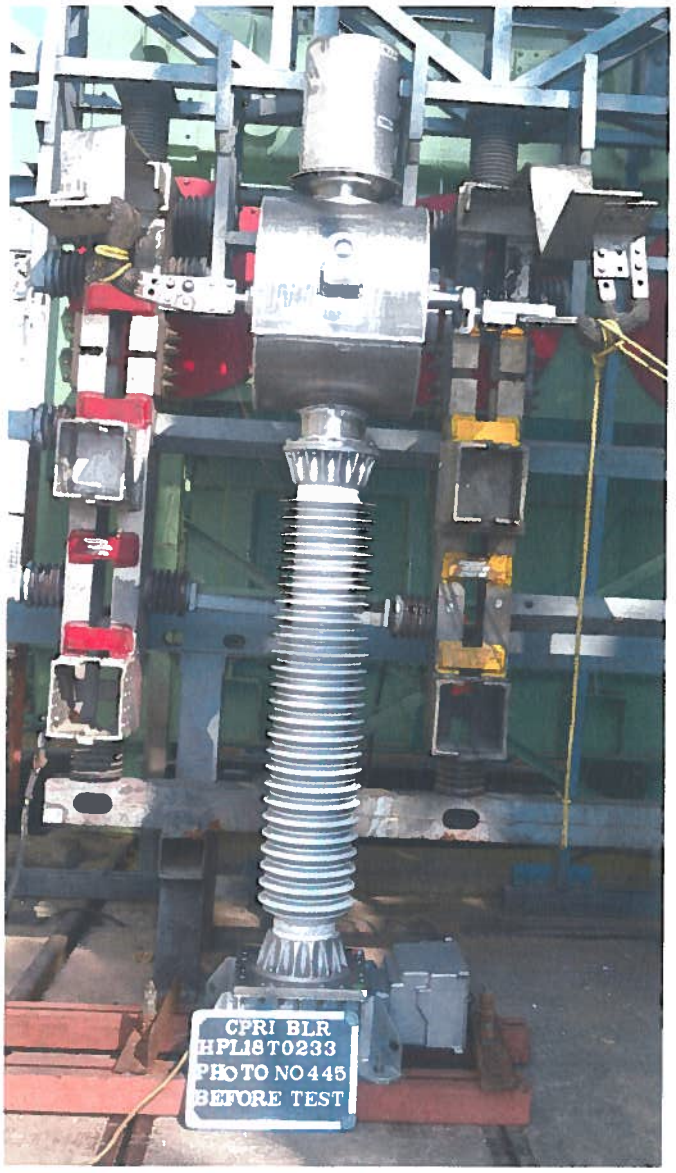
High Power Laboratory

CPRI, Bengaluru

Test Engineer

CPRIBLRHPL18
T0233S003

26-10-2018



Photograph No. 445: Mounting arrangement before short-circuit test

(Arunkumar S)
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Test Report No. CPRIBLRHPL18T0233

Photograph No. 448: Condition of sample after short circuit test

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Test Report No. CPRIBLRHPL18T0233

Photograph No. 497: Condition of core, conductor after short circuit test

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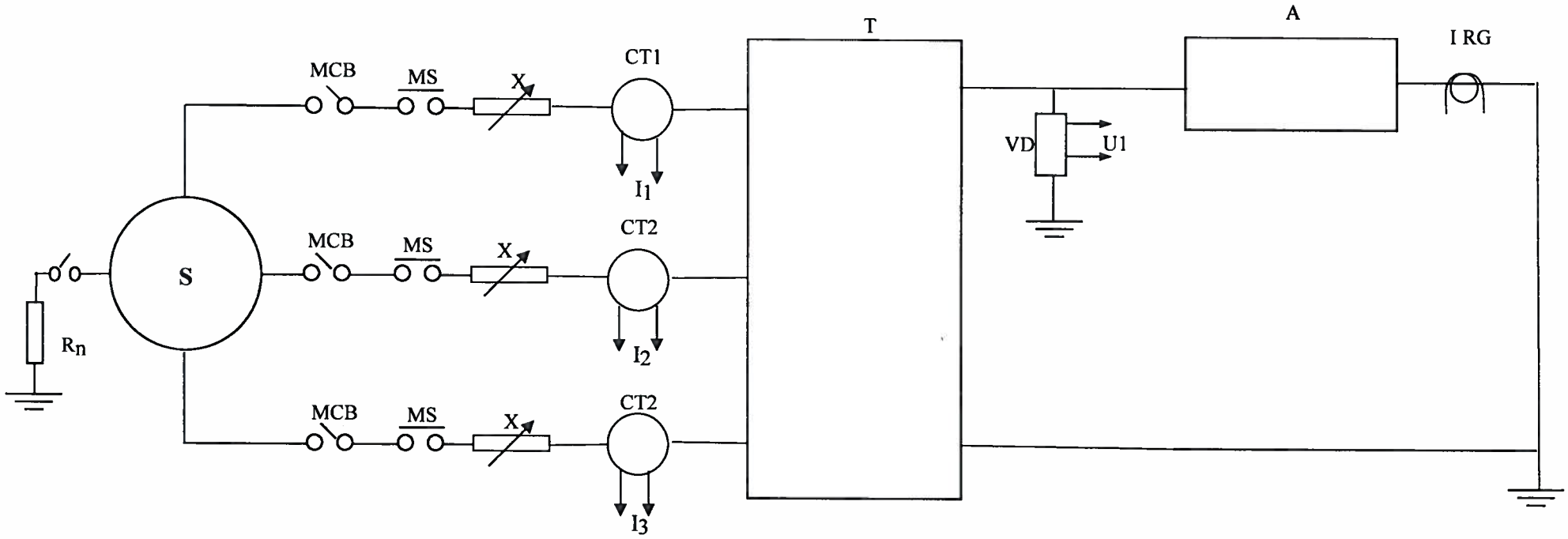

LEGEND

S	2500 MVA short circuit generator
R_n	Generator neutral grounding resistor
MCB	Master circuit breaker
MS	Make switch
X	Variable current limiting reactor
T	300 kA testing transformer
VD	Voltage divider
CT1, CT2 & CT3	Measuring current transformer
A	Apparatus under test
I_1 I_2 I_3	Currents recorded on primary side of 300 kA transformer
RG	Rogowski Coil

Test Engineer

CPRI HIGH POWER LABORATORY BANGALORE

Schematic diagram of test circuit

Drg. No. CRTL/HPL/1SC 22 B

LIST OF DRAWINGS

ITEM NO. 1	145 KV CURRENT TRANSFORMER						
SR.NO.	TITLE	DRAWING.NO.	REV.	RECORD			
				APPLICATION		RETURN	
				KIND	DATE	DATE	CC
1	GENERAL ARRANGEMENT DRAWING	411931658 CT1 GA	R2	RA	30.07.2018		
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		

IF IN DOUBT ASK

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

सीपीआरआई द्वारा इस रेखाचित्र का सत्यापन जहँ कहींभी संभाव होसिर्फ विमीय जांच तक ही सीमित है।
THE VERIFICATION OF THIS DRAWING BY CPRI IS LIMITED TO DIMENSIONAL CHECKS ONLY. WHEREVER POSSIBLE

परीक्षण अभियन्ता / Test Engineer
उच्च शक्ति प्रयोगशाला / H.P. LAB
सी. पी. आर. आई. / CPRI
बेंगलुरु / Bangaluru

FOR Line and ST bay

रिपोर्ट क्र.सं.क.....
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Document Pertaining to
Report No. CPRI BLR/HPL/ST0233

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

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

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

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE
R6				R4				R2	GA & CI DRG.REVISED	STJ	30.07.18
R5				R3				R1	R/S,SB DRG.REVISED & SV,CI DRGs ADDED.	STJ	27.07.18

	SIGN	NAME
DRN		STJ
CHD		SDS
APPD		YPS

LIST OF DRAWINGS FOR 145 kV CURRENT TRANSFORMER TYPE : CGC-CI 145

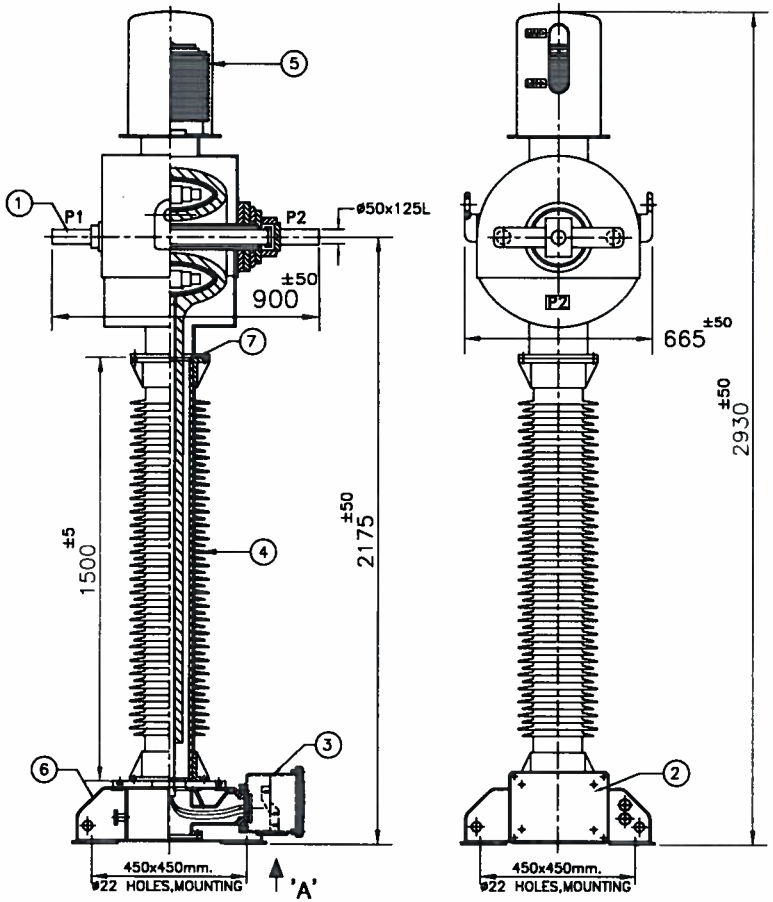
SCALE N.T.S. DATE :30.06.2018 ALL DIMENSIONS ARE IN mm

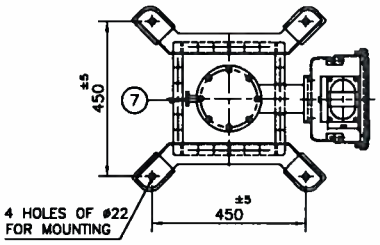
CG Power and Industrial Solutions Limited, Aurangabad (Formerly Crompton Greaves Limited)

DRG.NO: 411931658 CT1 LD/R2

LC3-SHELL

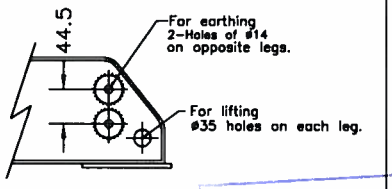
IF IN DOUBT ASK





VIEW FROM 'A'

MOUNTING DETAILS



EARTHING & LIFTING DETAILS

NO.	QTY.	DESCRIPTION	MATERIAL
1	2	PRIMARY TERMINAL SIZE-- ø50x125L	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.

सीपीआरआई द्वारा इस रेखाचित्र का सत्यापन जहाँ कहींभी संभाव होसिर्फ विमीय जांच तक ही सीमित है।
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रिपोर्ट क्रमांक ..... से संबंधित दस्तावेज
Document Pertaining to
Report No. CPRI/B&R/HP/15T0233

परीक्षण अभियन्ता / Test Engineer
उच्च शक्ति प्रयोगशाला / H.P. LAB
सी. पी. आर. आई. / CPRI
बेंगलुरु / Bengaluru

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

NO	REVISION	SIGN	DATE
R6			
R5			
R4			
R3			
R2	CUST.COMMENTS ADDED	STJ	30.07.18
R1	CUST.COMMENTS ADDED	PSC	17.07.18

	SIGN	NAME
DRN		STJ
CHD		SDS
APPD		YPS

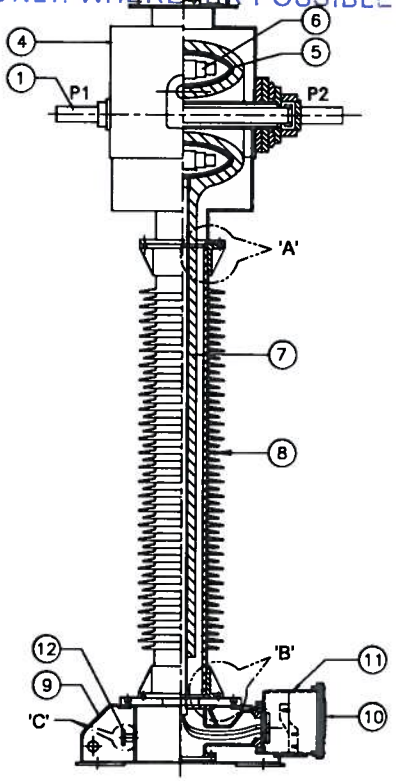
GENERAL ARRANGEMENT DRAWING FOR 145 kV CURRENT TRANSFORMER
TYPE:CGC-CI 145

SCALE N.T.S. | DATE :30.06.2018 | ALL DIMENSIONS ARE IN mm

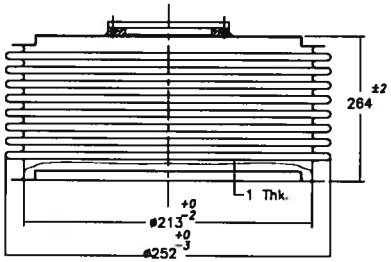
CG Power and Industrial Solutions Limited, Aurangabad (Formerly Crompton Greaves Limited)

DRG.NO: 411931658 CT1 GA/R2

IF IN DOUBT ASK

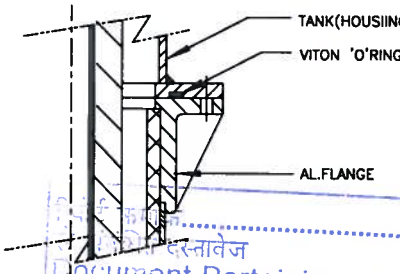


SECTIONAL SIDE VIEW

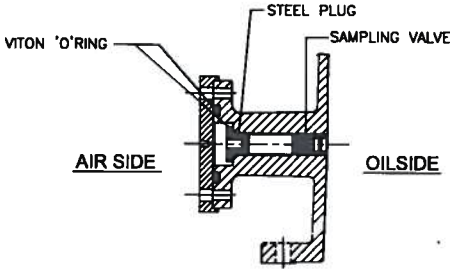


BELLOWS ARRANGEMENT

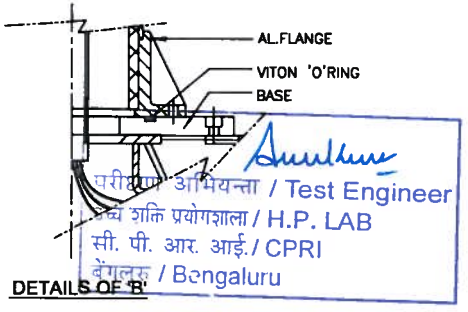
NO.	QTY.	DESCRIPTION	MATERIAL
1	2	PRIMARY TERMINAL	ALUMINIUM
2	1	BELLOWS	STAINLESS STEEL
3	1	BELLOWS LEVEL INDICATOR	ACRYLIC
4	1	TANK (HOUSING)	ALUMINIUM
5	1	SHELL	ALUMINIUM
6	5	CORE	CRGO/NANO
7	1	BUSHING	OIP
8	1	COMPOSITE INSULATOR	GREY COLOUR
9	1	BASE	MILD STEEL
10	1	RATING & SCHEMATIC DIAGRAM	ALUMINIUM
11	1	SECONDARY TERMINAL BOX	ALUMINIUM
12	1	OIL FILLING / DRAIN VALVE	STEEL PLATED



DETAILS OF 'A'



(12) DETAILS OF 'C'
OIL FILLING/DRAIN VALVE ASSEMBLY



DETAILS OF 'B'

GENERAL NOTES :-
1) NO. OF PRIMARY TURNS = 2 TURNS.
2) TYPE OF WINDING = BAR TYPE PRIMARY.
3) PRIMARY CONDUCTOR = ALUMINIUM ROD & ALUMINIUM TUBE
4) CROSS SECTION OF PRIMARY CONDUCTOR : 1962.5 Sq.mm.

	SECONDARY WINDING			
	TOTAL NO OF SECONDARY TURNS (NO)	CONDUCTOR SIZE (SWG/SQ.MM.)	MATERIAL OF SECONDARY WINDING	TAPPED WINDING
CORE I	2000	16x1,15x1/ 2.075,2.627	COPPER	YES
CORE II	2000	19x1,18x1/ 0.8107,1.167	COPPER	YES
CORE III	2000	21x2,21x3/ 1.0378,1.5567	COPPER	YES
CORE IV	2000	21x2,21x3/ 1.0378,1.5567	COPPER	YES
CORE V	4000	16x1,15x1,16x2/ 2.075,2.627,4.150	COPPER	YES

NO	REVISION	SIGN	DATE
R6			
R5			
R4			
R3			
R2			
R1			

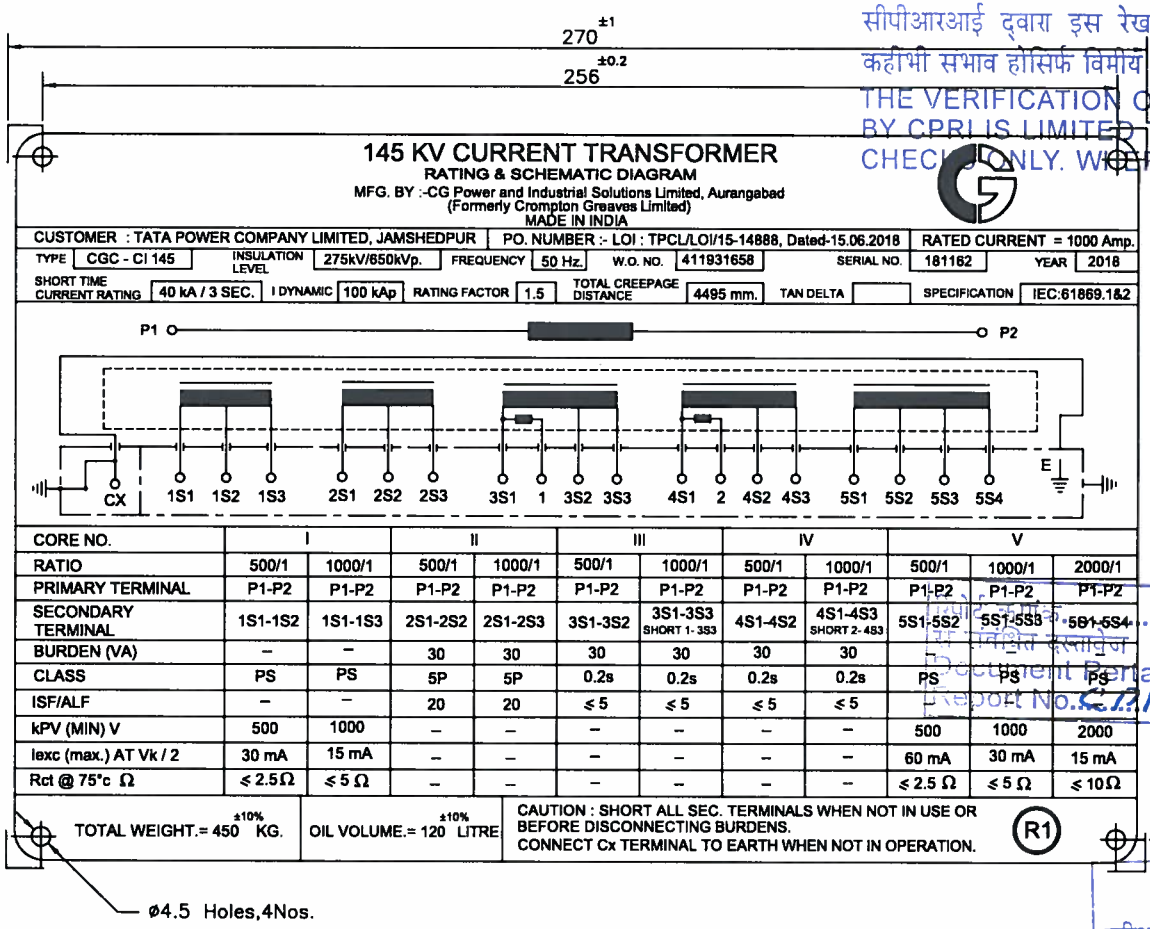
	SIGN	NAME
DRN		STJ
CHD		SDS
APPD		YPS

SECTIONAL VIEW
FOR 145 kV CURRENT TRANSFORMER

CG Power and Industrial Solutions Limited, Aurangabad (Formerly Crompton Greaves Limited)

SCALE N.T.S. | DATE : 27.07.2018 | ALL DIMENSIONS ARE IN mm | DRG.NO: 411931658 CT1 SV/R0

IF IN DOUBT ASK



145 KV CURRENT TRANSFORMER

RATING & SCHEMATIC DIAGRAM

MFG. BY :-CG Power and Industrial Solutions Limited, Aurangabad
(Formerly Crompton Greaves Limited)
MADE IN INDIA

सीपीआरआई द्वारा इस रेखाचित्र का सत्यापन जहाँ कहींभी संभाव होसिर्फ विमीय जांच तक ही सीमित है।
THE VERIFICATION OF THIS DRAWING BY CPRI IS LIMITED TO DIMENSIONAL CHECK ONLY. WHEREVER POSSIBLE

CUSTOMER : TATA POWER COMPANY LIMITED, JAMSHEDPUR				PO. NUMBER :- LOI : TPCL/LOI/15-14888, Dated-15.06.2018						RATED CURRENT = 1000 Amp.		
TYPE: CGC - CI 145	INSULATION LEVEL: 275kV/650kVp.		FREQUENCY: 50 Hz.		W.O. NO.: 411931658		SERIAL NO.: 181162		YEAR: 2018			
SHORT TIME CURRENT RATING: 40 kA / 3 SEC.	I DYNAMIC: 100 kAp		RATING FACTOR: 1.5		TOTAL CREEPAGE DISTANCE: 4495 mm.		TAN DELTA:		SPECIFICATION: IEC:61869.1&2			

CORE NO.	I		II		III		IV		V		
RATIO	500/1	1000/1	500/1	1000/1	500/1	1000/1	500/1	1000/1	500/1	1000/1	2000/1
PRIMARY TERMINAL	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2	P1-P2
SECONDARY TERMINAL	1S1-1S2	1S1-1S3	2S1-2S2	2S1-2S3	3S1-3S2	3S1-3S3 SHORT 1- 3S3	4S1-4S2	4S1-4S3 SHORT 2- 4S3	5S1-5S2	5S1-5S3	5S1-5S4
BURDEN (VA)	–	–	30	30	30	30	30	30	–	–	–
CLASS	PS	PS	5P	5P	0.2s	0.2s	0.2s	0.2s	PS	PS	PS
ISF/ALF	–	–	20	20	≤ 5	≤ 5	≤ 5	≤ 5	–	–	–
kPV (MIN) V	500	1000	–	–	–	–	–	–	500	1000	2000
Iexc (max.) AT Vk / 2	30 mA	15 mA	–	–	–	–	–	–	60 mA	30 mA	15 mA
Rct @ 75°c Ω	≤ 2.5Ω	≤ 5 Ω	–	–	–	–	–	–	≤ 2.5 Ω	≤ 5 Ω	≤ 10Ω

TOTAL WEIGHT.= 450 ±10% KG. | OIL VOLUME.= 120 ±10% LITRE

CAUTION : SHORT ALL SEC. TERMINALS WHEN NOT IN USE OR BEFORE DISCONNECTING BURDENS.
CONNECT Cx TERMINAL TO EARTH WHEN NOT IN OPERATION.

R1

ø4.5 Holes,4Nos.

MATERIAL & PROCESS : ALUMINIUM ANODISED
THICKNESS : 1.0mm
COLOUR : BACKGROUND NATURAL ALUMINIUM & LETTER: BLACK

Document Pertaining to Report No. CPRI/BLR/HP/18TC233

परीक्षण अभियन्ता / Test Engineer
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सी. पी. आर. आई./ CPRI
बेंगलुरु / Bengaluru

NO	REVISION	SIGN	DATE
R6			
R5			
R4			
R3			
R2			
R1	CUSTOMER COMMENTS ADDED.	STJ	27.07.18

	SIGN	NAME
DRN		STJ
CHD		SDS
APPD		YPS

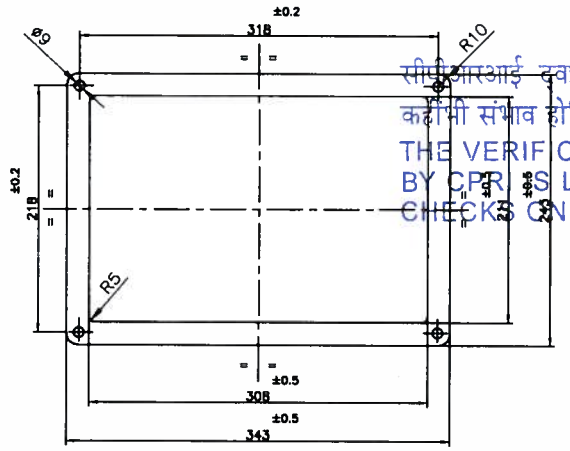
RATING & SCHEMATIC DIAGRAM
145 kV CURRENT TRANSFORMER
TYPE : CGC-CI 145

CG Power and Industrial Solutions Limited, Aurangabad (Formerly Crompton Greaves Limited)

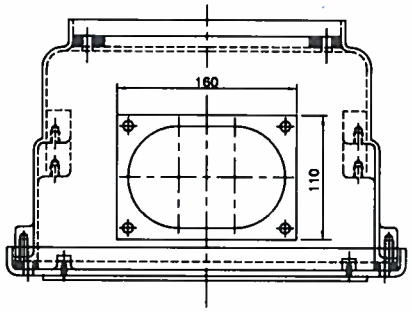
SCALE 1:1 | DATE : 30.06.2018 | ALL DIMENSIONS ARE IN mm | DRG.NO: 411931658 CT1 RS/R1

IF IN DOUBT ASK

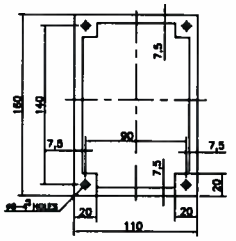
SL.NO.	QTY	ITEM	RM SIZE/SPECIFICATION
6	1	GASKET FOR BACK SIDE	NEOPRENE–3Thk.
5	1	GASKET FOR COVER	NEOPRENE–10Thk.
4	1	GASKET FOR GLAND PLATE	NEOPRENE–5Thk.
3	1	GLAND PLATE	160x110x4mm.Thk.
2	19	SEC.TERMINAL BLOCK WITH MARKER	MAKE:ELMEX TYPE–KBT M5–15
1	1	SECONDARY BOX ASSEMBLY	ALUMINIUM (Min.4mm.Thk)



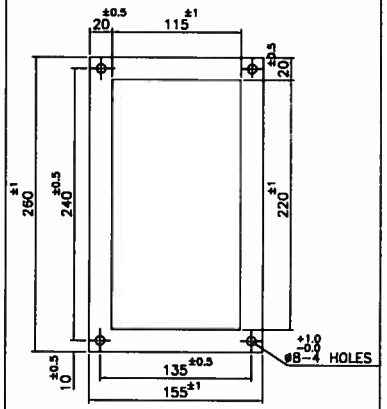
GASKET FOR COVER
ITEM NO.5



BOTTOM VIEW (FROM 'A')

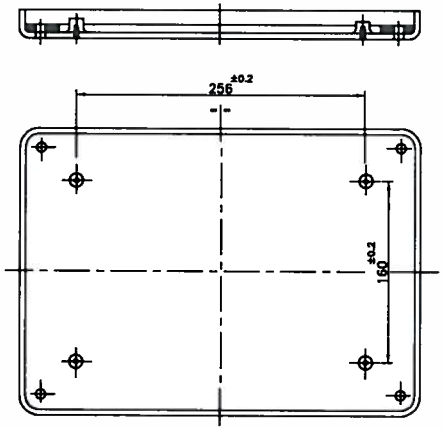


GASKET FOR GLAND PLATE
ITEM NO.4

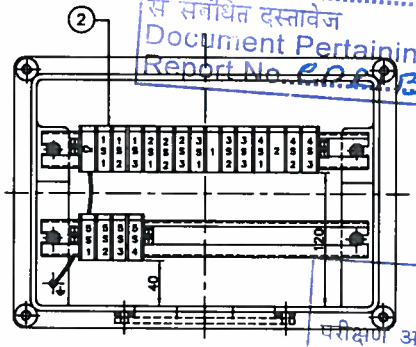


GASKET FOR BACK SIDE
ITEM NO.6

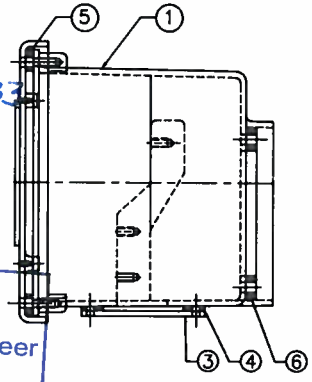
COVER



NOTES :
1) SECONDARY BOX ASSEMBLY TO CONFIRM IP 55 AS PER IEC 60529.
2) Cx:TERMINAL FOR CAPACITANCE & TAN DELTA MESUREMENT ONLY. SHOULD BE KEPT EARTHED WHEN NOT IN USE.



ELEVATION



SIDE VIEW

NO	REVISION	SIGN	DATE
R6			
R5			
R4			
R3			
R2			
R1	GASKET DETAILS ADDED.	STJ	27.07.18

	SIGN	NAME
DRN		STJ
CHD		SDS
APPD		YPS

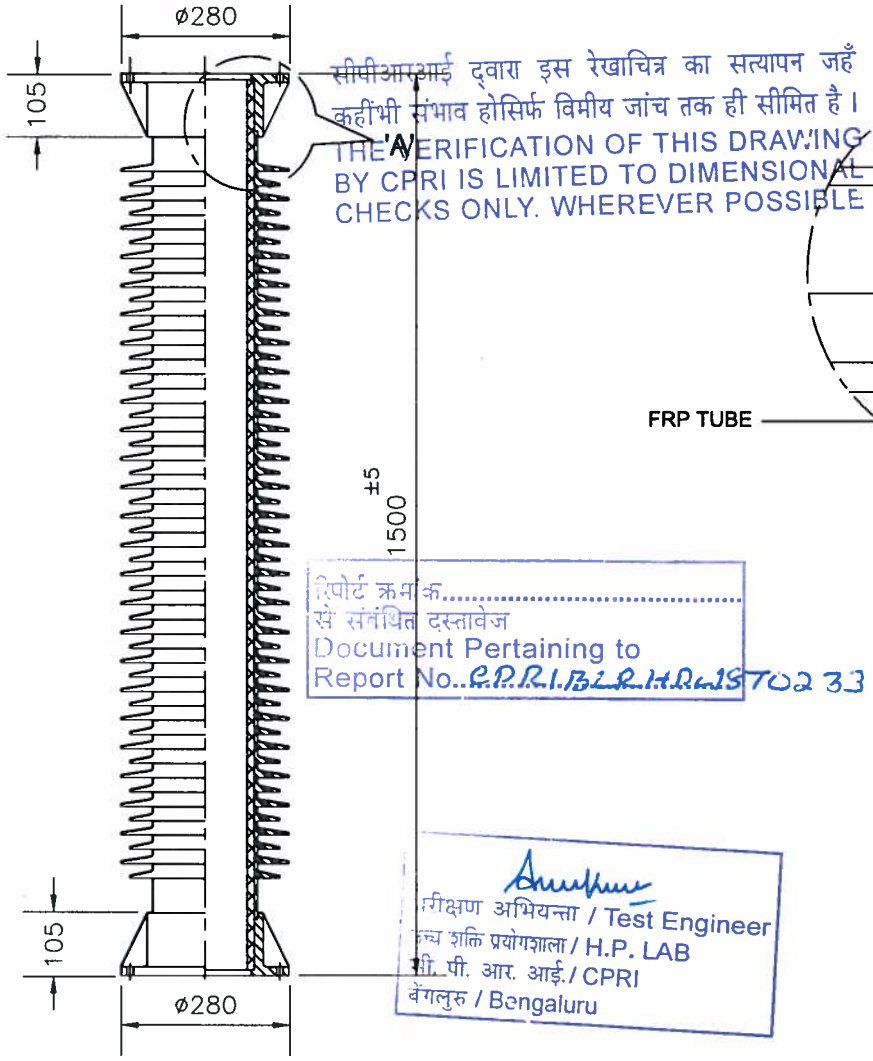
SECONDARY BOX ASSEMBLY FOR 145 kV CURRENT TRANSFORMER TYPE : CGC–CT 145

SCALE N.T.S. DATE :30.06.2018 ALL DIMENSIONS ARE IN mm

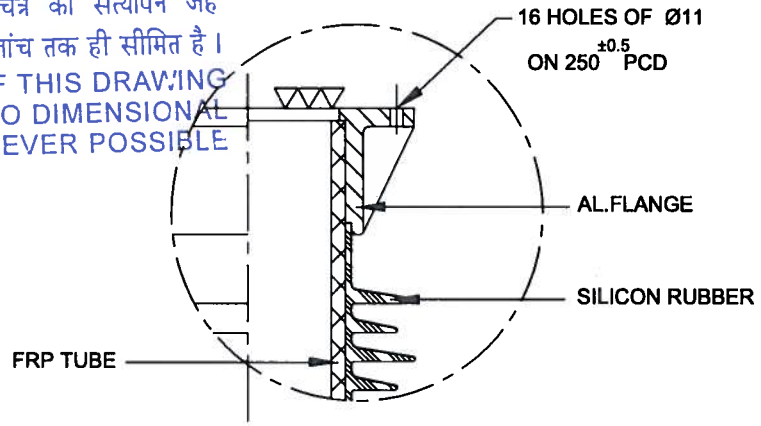
CG Power and Industrial Solutions Limited, Aurangabad (Formerly Crompton Greaves Limited)

DRG.NO: 411931658 CT1 SB/R1

IF IN DOUBT ASK



सीपीआरआई द्वारा इस रेखाचित्र का सत्यापन जहँ कहींभी संभाव होसिर्फ विमीय जांच तक ही सीमित है।
THE VERIFICATION OF THIS DRAWING BY CPRI IS LIMITED TO DIMENSIONAL CHECKS ONLY. WHEREVER POSSIBLE



DETAILS AT `A'

रिपोर्ट क्रमांक.....
से संबंधित दस्तावेज
Document Pertaining to
Report No. CPRI/BLR/HPL/15T02 33

परीक्षण अभियन्ता / Test Engineer
उच्च शक्ति प्रयोगशाला / H.P. LAB
सी. पी. आर. आई. / CPRI
बेंगलुरु / Bengaluru

NOTES:-

1. INSULATOR TO CONFIRM TO IEC:61462 (1998)
2. MAXIMUM MECHANICAL LOAD-BENDING (MML) : 1000 kg.
3. SPECIFIED MECHANICAL LOAD-BENDING (SML) : 2500 kg.
4. SEALING SURFACE : ▽▽▽ FINISH ON BOTH FLANGES.
5. MINIMUM CREEPAGE DISTANCE : 4495 mm.
6. COLOUR OF INSULATOR SHEDS : RAL 7040
7. MATERIAL OF FLANGES : ALUMINIUM ALLOY.
8. ALTERNATING SHED PROFILE TO MEET REQUIREMENT OF IEC 60815
9. MAKE : SHEMAR , CHINA

NO	REVISION	SIGN	DATE
R6			
R5			
R4			
R3			
R2			
R1	CUST.COMMENTS ADDED	STJ	30.07.18

	SIGN	NAME
DRN		STJ
CHD		SDS
APPD		YPS
SCALE	N.T.S.	DATE : 27.07.2018

COMPOSITE INSULATOR
FOR 145 kV CURRENT TRANSFORMER

ALL DIMENSIONS ARE IN mm

CG Power and Industrial Solutions Limited, Aurangabad (Formerly Crompton Greaves Limited)

DRG.NO: 411931658 CT1 CI/R1