



OFFICE OF THE SENIOR PROJECT MANAGER, INFRASTRUCTURE DIVISION
ODISHA BRIDGE & CONSTRUCTION CORPORATION LIMITED

(A Government of Odisha Undertaking under Works Department)
O.M.P. Square, Cuttack – 753003 | Email: ctcdi3@obcc.in

No: 383/WE

Date: 01-08-2022

To
The Executive Engineer (Elect),
CDD-II, Badambadi,
TPCODL, Cuttack

Sub: Construction of Netaji Bus Terminus at Khannagar, Cuttack / Regarding TPCODL Concurrence for Transformer, HT Panel & RMU.

Ref: (1) Secretary, C.D.A, Cuttack Memo No-6105, Dt-10-06-2022
(2) TPCODL Email dated- 26-07-2022. Reg. Approved Estimate and Demand note for new connection of 500 KW of CNBT (Secretary Cuttack Development)

Sir,
In inviting a reference to the subject cited above, it is to state that, the Agency -M/s URC Construction (P) Ltd has submitted the following:-

1. GA Drawings of Transformer, HT Panel and RMU
2. GTP of Transformer, HT Panel and RMU
3. Test reports of Transformer, HT Panel and RMU

In this connection, the Agency -M/s URC Construction (P) Ltd has been entrusted for the construction of the aforesaid project and target date of completion is 15-12-2022. As you are well aware that Transformer, HT Panel and RMU are long lead items and its procurement, installation & commissioning is very essential for full-fledged operation of CNBT within the stipulated timeframe.

Therefore, you are requested to provide necessary concurrence on Transformer, HT Panel and RMU for further necessary action at this end.

An early action in this regard is solicited.

Encl:- 1. GA Drawings of Transformer, HT Panel and RMU
2. GTP of Transformer, HT Panel and RMU
3. Test reports of Transformer, HT Panel and RMU

Yours faithfully,

Sr. Project Manager,
Infrastructure Division
O.B. & C.C. Ltd, Cuttack

Memo No. 384(2) / Dt 01-08-2022

Copy submitted to the E.I.C-cum-M.D., O.B. & C.C. Ltd., Bhubaneswar/ Senior Chief General Manager, O.B. & C.C. Ltd. Bhubaneswar for favour of kind information and necessary action.

Sr. Project Manager,
Infrastructure Division
O.B. & C.C. Ltd, Cuttack



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ODISHA BRIDGE & CONSTRUCTION CORPORATION LIMITED

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O.M.P. Square, Cuttack – 753003

Email: ctcdiv3@obcc.in

Memo No. 385 / Dt 01-08-2022

Copy to Mr. Neelakandan E, AGM-Project, CNBT-Cuttack, URC Construction Pvt. Ltd for information and necessary action with reference to his Letter No- URC/CNBT/COR/2021/352, Dt- 30-07-2022 addressed to the Sr.Project Manager (Infrastructure Division), O.B.&C.C. Ltd, Cuttack.


Sr. Project Manager,
Infrastructure Division
O.B. & C.C. Ltd, Cuttack

URC/CNBT/COR/2021/352

Date: 30-07-2022

To,

The Senior Project Manager,
Infrastructure Division,
O.B.&C.C Ltd.,
Cuttack - 753004.

Dear Sir,

Sub: Construction of Netaji Bus Terminus at Cuttack on Turnkey Basis –
Requesting you for a TPCODL Concurrence for Transformer, HT Panel & RMU
- Reg

- Ref: 1. LOI No 3414/SMT-1711 Dated 28.05.2021.
2. Contract Agreement No: 02/Turnkey-Lump Sum /21-22
3. Your Office Letter No. 364/WE Dated 26.07.2022
4. Our Office Letter No. URC/ CNBT/COR/2021/333 Dated 18.07.2022
5. Our Office Letter No. URC/ CNBT/COR/2021/312 Dated 18.06.2022
6. Our Office Letter No. URC/ CNBT/COR/2021/311 Dated 18.06.2022

With reference to your Letter (Ref 3), for the new connection of CNBT. Kindly get the Concurrence from TPCODL for the below Equipment's and Panel Boards to our CNBT Work at the Earliest.

Enclosed:

- 1) GA Drawings of Transformer/HT Panel/RMU
- 2) GTP of Transformer/HT Panel/RMU
- 3) Test Reports of Transformer/HT Panel/RMU

Thanks & Regards


E. Neelakandan,
AGM – Projects,





* Received with above attachments.

CC: The Senior Chief General Manager, O.B. & C.C.Ltd., Bhubaneswar – 751012.



ALFA TRANSFORMERS LTD.

Continuation Sheet No.

SL No	TECHNICAL PARTICULARS	IEC/UL REQUIREMENTS (For detailed requirement please refer to our technical specifications)	
		IEC	UL
	Continuous Rated Capacity (kVA)	800 kVA	800 kVA
1	Rated voltage HV (kV)	11	11
2	Rated voltage LV (V)	433	433
3	System voltage (max.)	12 kV	12 kV
4	Line current HV (A)	41.99	41.99
5	Line current LV (A)	1066.7	1066.7
6	Frequency (Hz)	50	50
7	No. of Phases	Three	Three
8	Energy Efficiency Level as per IS-1180 (Part-1) 2014	BIS Level-2(Amendment-4)	BIS Level-2(Amendment-4)
9	Connection HV	Delta	Delta
10	Connection LV	Star (Neutral Brought out)	Star(Nutral Brought Out)
11	Vector group	Dyn11	Dyn11
12	Type of cooling	ONAN	ONAN
13	Noise level at rated voltage and frequency	64 dB	64dB
14	Winding Material	Copper	Copper
15	Insulation Class	A	A
16	Permissible temperature rise over ambient:		
16.1	Of top oil measured by thermometer	40 °C	40°C
16.2	Of winding measured by resistance	45 °C	45°C
17	Maximum current density (A/mm²)	2.5	2.5
18	OFF Circuit Tap Changer	+5% To -10%,in step of ± 2.5%	+5.0% To -10% ,in step of ± 2.5%
19	Winding Resistance @75 °C		
19.1	HV Winding (in Ohms)	As Per Bidder's Design	1.351(+5% Tolerance)
19.2	LV Winding (in Ohms)	As Per Bidder's Design	0.000557(+5% Tolerance)
20	100% Voltage @100% Voltage	As Per Bidder's Design	
21.1	Max. Total Losses at 50% loading at 75° C (watts)	2147	2147
21.2	Max. Total Losses at 100% loading) at 75° C (Watts)	5837	5837
23	Short circuit impedance voltage at 75° C (+10% tolerance)	5.00%	5.0%
24	Bushing Voltage Grade		
	(a) HV Bushing	17.5 KV	17.5 KV
	(b) LV Bushing	1.1 KV	1.0 KV
	(c) Neutral Bushing at LV Side	1.1 KV	1.0 KV
25	Type of Core	CRGO,M3 Or Better	CRGO,M3 Or Better

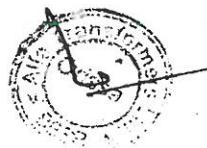


A. Venkant Biju

Sr. Engineer
Electrical Dept.
URCC (P) Ltd.


ALFA TRANSFORMERS LTD.
Continuation Sheet No.

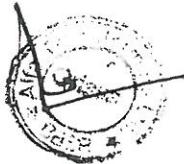
25.1	Thickness of Lamination	<0.23mm	≤ 0.23
25.2	Normal Flux Density (at rated voltage and frequency)	<1.6 T	< 1.6 T
25.3	Maximum flux density (Increase of +12.5% combined voltage and frequency variation from rated)	1.9 T (Max.)	1.9 T (Max)
26.1	No Load Current at Rated Voltage	<=2%	≤ 2%
26.2	No Load Current at 112.5 % Rated Voltage	<=5%	≤ 5%
27	Impulse withstand voltage	75 kVp	75 Kvpeak
28	Power frequency withstand voltage	28 kV	28 Kvrms
29	Voltage fluctuations permissible	(+12.5% to -12.5%)	(+12.5% to -12.5%)
30	Neutral terminal		As per Specification
31	Minimum clearances in air (mm)		
31.1	HV phase to phase/ phase to earth	255 / 140	NA
31.2	LV phase to phase/ phase to earth	75 / 40	NA
32	Minimum clearances in Cable Box (mm)		
32.1	HV phase to phase/ phase to earth (Min.)	130 / 80	130/80
32.2	LV phase to phase/ phase to earth (Min.)	25 / 20	28/20
33	Wheels	The transformer shall be provided with four rollers with locking arrangement suitable for rail gauges in both the axis for movement of transformer in either direction.	The transformer shall be provided with four rollers with locking arrangement suitable for rail gauges in both the axis for movement of transformer in either direction.
34	Efficiency at 75 °C Unity PF		
34.1	125% Load	Bidders to Submit	99.08
34.2	100% Load	Bidders to Submit	99.22
34.3	75% Load	Bidders to Submit	99.34
34.4	50% Load	Bidders to Submit	99.43
35	Efficiency at 75 °C 0.8 PF		
35.1	125% Load	Bidders to Submit	98.85
35.2	100% Load	Bidders to Submit	99.03
35.3	75% Load	Bidders to Submit	99.18
35.4	50% Load	Bidders to Submit	99.29
36	% Voltage Regulation at 75 °C		
36.1	At Unity PF	Bidders to Submit	0.781
36.2	At 0.8 PF	Bidders to Submit	3.564
37	Insulating Material		
37.1	HV winding Insulation	Double Paper Covered with min 30% overlap per layer of Paper	Double Paper Covered with min 30% overlap per layer of Paper
37.2	LV winding Insulation	Double Paper Covered with min 30% overlap per layer of Paper	Double Paper Covered with min 30% overlap per layer of Paper
37.3	HV-LV Insulation	Epoxy diamond dotted Kraft Paper and compressed Pressboard	Epoxy diamond dotted Kraft Paper and compressed Pressboard
38	Oil Specification		
38.1	Applicable Standard for Oil	IS 335 2018	IS 335 2018



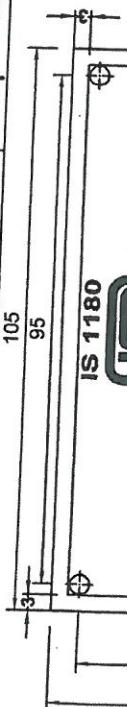
A. Darshant
 Sr. Engineer,
 Electrical Dept
 URCC (P) Ltd

**ALFA TRANSFORMERS LTD.****Continuation Sheet No.**

38.2	Oil Qty	Bidders to Submit	802 Ltrs
38.3	Oil Type	Mineral Oil	Mineral Oil
38.4	Oil Breakdown Voltage	60KV	60KV
39	Buchholz Relay	Provided	Yes, Provided
40	Tank Thickness		
40.1	Top and Bottom	8 mm (Minimum)	6 mm (Minimum)
40.2	Side	5 mm (Minimum)	5 mm (Minimum)
41	Overall Dimensions of Transformer		
41.1	Length	Bidders to Submit	2100
41.2	Breadth	Bidders to Submit	2350
41.3	Height	Bidders to Submit	2200
42	Sealing Arrangement	Sealing Provision of transformer: To prevent unauthorised access to Transformer Core and Winding , a hole in exposed threaded part of Transformer Top Cover Bolt on opposite corners to be made. Tamper Seals to be put after Acceptance Test.	Sealing Provision of transformer: To prevent unauthorised access to Transformer Core and Winding , a hole in exposed threaded part of Transformer Top Cover Bolt on opposite corners to be made. Tamper Seals to be put after Acceptance Test.
43	Markings	As per relevant IS 1180 Part-1 (2014) along with SI No Punching on Top Cover Plate	As per relevant IS 1180 Part-1 (2014) along with SI No Punching on Top Cover



A. Venkateswaran
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.



IS 1180

PART 1
CHAI COOP. 3444
For details of BIS certification marks scheme
Refer: www.bis.gov.in

DISTRIBUTION TRANSFORMER

ALFA TRANSFORMERS LTD.

3 PHASE TRANSFORMER

ENERGY EFFICIENCY LEVEL

IS 1180 (PART: 12014)

ENERGY EFFICIENCY LEVEL - 2
(AMENDMENT - 4)

MAX TOTAL LOSSES

Watts 2447

AT 50% RATED LOAD

Watts

MAX TOTAL LOSSES

Watts 5837

AT 100% RATED LOAD

Watts

TYPE OF COOLING

ONAN

OIL °C 40

Wdg °C 45

MASS OF OIL

Kg. 659

TOTAL MASS

Kg. 3720

VOL. OF OIL

Ltrs. 802

MONTH & YEAR OF MFG.

7/2022

SERIAL NO.

800V

OFF CT KT

FOR HV VARIATION

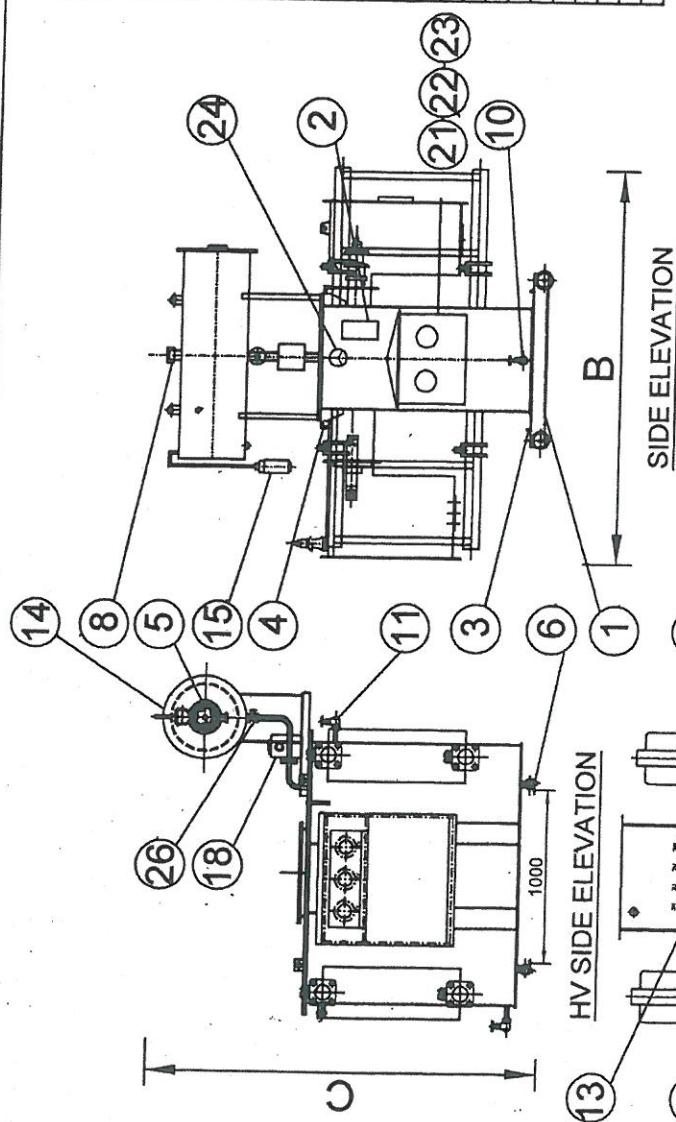
IN 2.5 STEPS FROM -10% TO +5%

CUSTOMER

ORDER NO.

STANDARD FITTINGS

SL. NO.	DESCRIPTION.	QTY.
01	BASE CHANNEL.	02
02	NAME RATING TERMINAL MARKING & DIAGRAM PLATE.	01
03	EARTHING TERMINALS.	02
04	TRANSFORMER LIFTING LUGS.	04
05	MAGNETIC OIL LEVEL GAUGE.	01
06	UNI-DIRECTIONAL ROLLER.	04
07	THERMOMETER POCKET.	01
08	OIL FILLING HOLE WITH CAP.	01
09	AIR RELEASE PLUG.	01
10	BOTTOM DRAIN VALVE.	01
11	TOP FILTER CUM SAMPLING VALVE.	01
12	RADIATOR SHUT OFF VALVE.	01
13	LV CABLE END BOX WITH ALL ARRANGEMENTS.	08
14	CONSERVATOR WITH DRAIN PLUG.	01
15	DEHYDRATING SILICA GEL BREATHER.	01
16	PRESSED STEEL RADIATORS.(900X300X12FINS)	04
17	PRESSURE RELIEF DEVICE.	01
18	BUCHOLTZ RELAY WITH ALARM & TRIP.	01
19	TOP COVER LIFTING LUGS.	01
20	INSPECTION COVER	02
21	MARSHALLING BOX.	01
22	OIL TEMPERATURE INDICATOR WITH CONTACTS.	01
23	WINDING TEMPERATURE INDICATOR WITH CONTACTS.	01
24	OFF LOAD TAP CHANGING SWITCH.	01
25	HY. CABLE END BOX WITH ALL ARRANGEMENTS.	01
26	SHUT OFF VALVE FOR BUCHOLTZ RELAY.	01



<u>TANK SIZE-</u>	<u>PLATE THICKNESS-</u>	<u>CONSERVATOR SIZE-</u>
L = 1550 MM	SIDE PLATE = 4.0 MM	Ø350 x 1000Lg.
B = 570 MM	TOP & BOTTOM = 6.0 MM	
H = 1250MM		

1. ALL DIMENSIONS ARE IN MM.
2. $\pm 10\%$ TOLERANCE ON WEIGHT & DIMENSIONS.

MINIMUM EXTERNAL AIR CLEARANCE		PHASE TO PHASE		PHASE TO EARTH	
H.V.	1350		80		
L.V.	25		20		
KVA		DIMENSIONS ARE IN M.M.			
800		A	B	C	
OVERALL	2100		2350		2200
APPROX. WT. IN KG.			CORE & WIGGS (WITH CORE CLAMP)		
2200			TANK & FITTINGS	OIL KGALRS.	TOTAL
2200			270	600/6000	7770

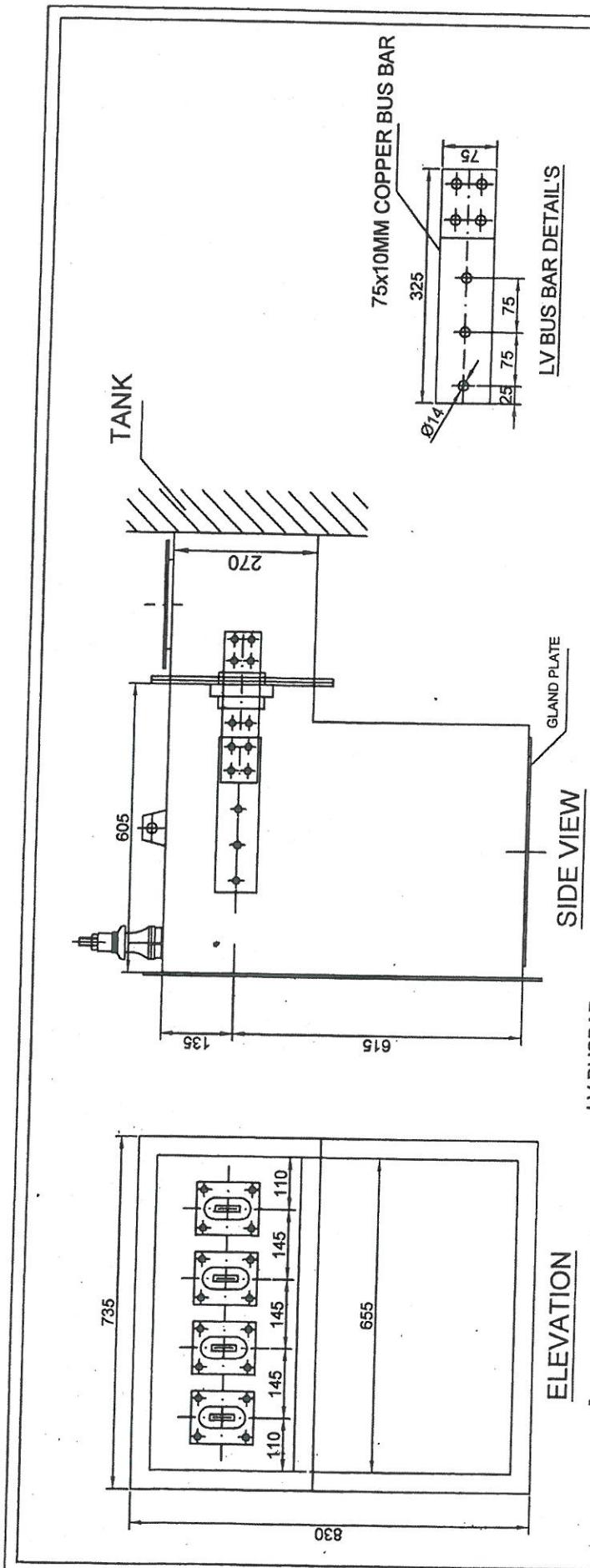


A. Verbs

1

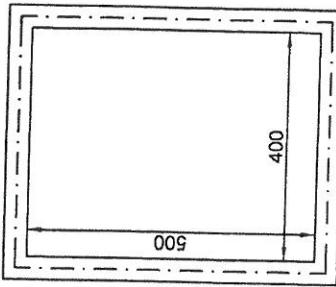
DWG. No.
17068_R2

REVISION	DATE	BRIEF DESCRIPTION
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NOTE

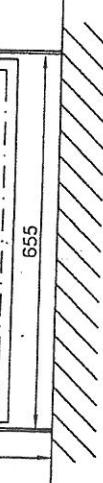
1. ALL DIMENSIONS ARE IN MM.
 2. ±10% TOLERANCE ON WEIGHT & DIMENSIONS.
 3. 1.1KV /2000AMPS LV EPOXY BUSHING



A. Venkayya
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

ALFA TRANSFORMERS LTD.						
MANCHESWAR INDUSTRIAL ESTATE BHUBANESWAR & GIOCHAWAGHODA VADODARA						
2022	NAME	DATE	ALFA	CONSULTANT:-	DWG. NO.	
DGN.	AKB		CUSTOMER:-			
DRN.	DPM					
CHD.	DPM		ORDER NO:-			
APPD.	AKB					
TOLERANCE:-			MANUFACTURE - ALFA TRANSFORMERS LIMITED.			
SCALE IN TS						
Proj.			TITLE:- LV CABLE END BOX DETAIL'S FOR 800KVA  11/0.23KV CRGO TRANSFORMER			17089_R1

REVISION	DATE	BRIEF DESCRIPTION	Proj.
		DRN1	
		CHD1	
		APP	
		TOLE	
		SCAL	



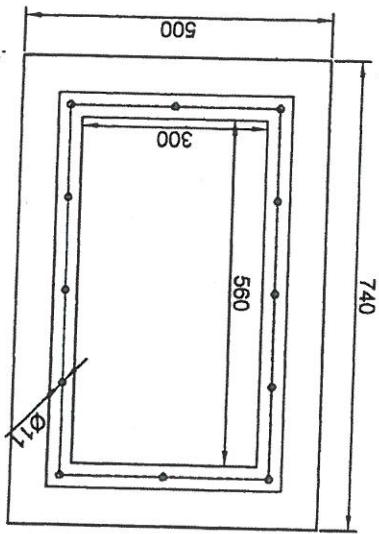
URGC (P) Ltd.
Electrical Deptt.
S.R. Engineer
A. M. A. D.

Title		HV CABLE END BOX DETAILS OF	
800KVA 11KV/433KV TRANSFORMER		Dwg. No. 17088-R0	
SCALE NTS		TOLERANCE - ±10%	
ORDER NO.:-		TENDER NO.:-	
APPD		CLIENT:-	
DRN		CHD.	
2022 NAME DATE		ALFA TRANSFORMERS LTD.	



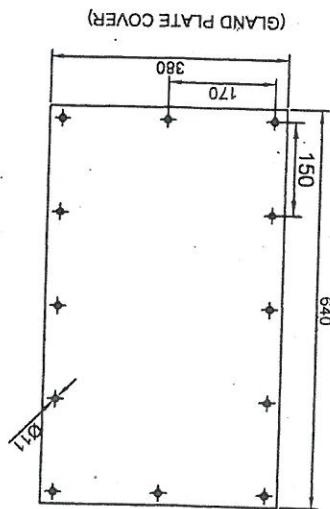
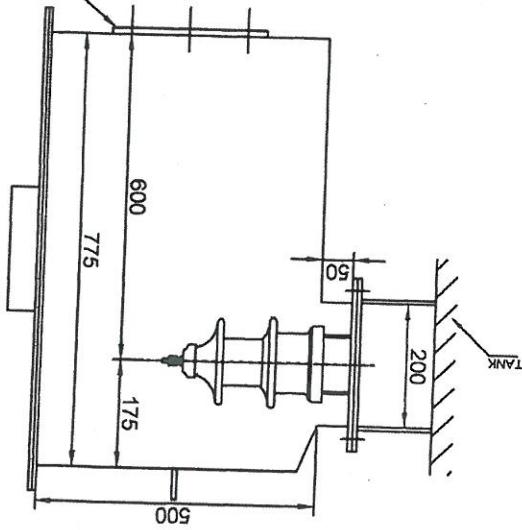
1. ALL DIMENSIONS ARE IN MM.
2. ±10% TOLERANCE ON WEIGHT & DIMENSIONS.
3. 17.5KV 250AMPS HV PORCELLAIN TYPE BUSHING.

DETAILS OF "X"

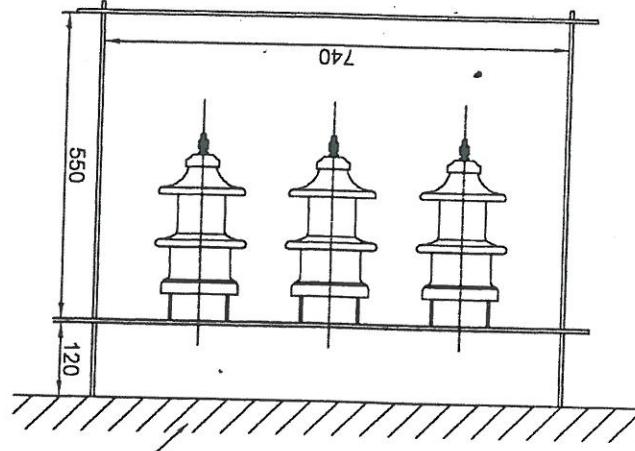


"X" (GLAND PLATE)

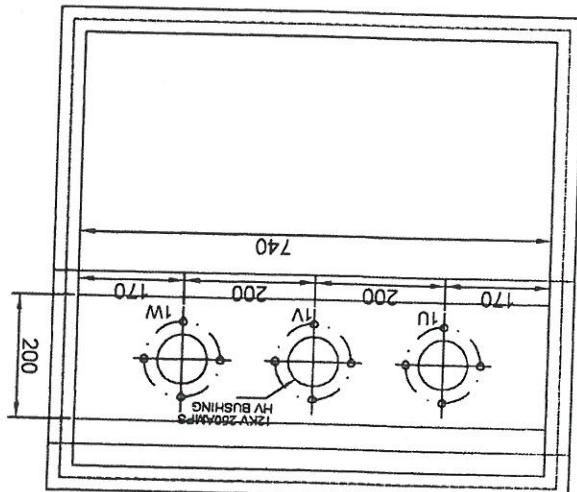
SIDE ELEVATION



PLAN



ELEVATION





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Certificate no. TC-6229

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

Pin Code : 391775, Gujarat, India.

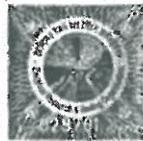
Telephone : 02667-264007, +91 88660 09021

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

Web : http://www.erto.in



ERTO
Quality Assurance Laboratory



TEST REPORT

Report No	: ERTO/TRP/1920/0929
ULR No.	: TC622920000000031F
Date of issue	: 18/01/2020
Total number of pages	: 25
Customer's name	: ALFA TRANSFORMERS LTD.
Address	: Plot No 3337, Mancheswar Industrial Estate, Bhubaneswar, Odisha- 751010
Customer's reference & date	: Letter, dated 10/01/2020
Test specification	
-Standard	: As per IS 1180 (Part 1):2014 with all amendments
-Test procedure	: As per IS 1180 (Part 1):2014 with all amendments
-Non-standard test method	: N/A
ERTO sample ID no.	: ERTO-0800
Test performed at	: ERTO lab
Name of test sample	: 800 kVA, Distribution Transformer
Make	: ALFA TRANSFORMERS LTD.
Rating	: 800 kVA
Technical specification of test sample	: As per page 2.
Test performed	: As per page 5.
Any other details specified by customer:	---
Date of receipt of test sample	: 11/01/2020
Condition on Receipt	: Good
Date(s) of performance of test(s)	: 16/01/2020 to 18/01/2020
List of Enclosures	
-Test sample photo	: As per page 3.
-Rating plate photo	: As per page 4.
-Drawings (As submitted by customer)	: 1) 15128_R0 2) 15129_R0
Remarks	:
1) The sample conforms to the requirements of above mentioned standard for the test nos. 2, 5, 6 & 8 to 14 . 2) The observations of the test nos. 1, 3, 4, 7 are as per page 6 to 9.	
<i>[Signature]</i> Prepared By	
<i>[Signature]</i> Checked By (Yash J. Shah)	
<i>[Signature]</i> Approved By (S.B.Diwan) (HOL)	
Notes:	<ol style="list-style-type: none"> This report relates only to the particular sample tested. Only the tests asked by the customer have been carried out. This report cannot be reproduced in part under any circumstances. Publication of this report requires prior permission in writing from Technical Director, ERTO. In case of any dispute, ERTO will be the exclusive jurisdiction & shall be construed as where the cause has arisen.
Caution: ERTO is not responsible for the authenticity of photocopied or reproduced test reports. ERTO provides support to customers for verification of the authenticity of test reports issued by ERTO.	



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Certificate no. TC-6229

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

Pin Code : 391775, Gujarat, India.

Telephone : 02667-264007, +91 88660 09021

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

Web : http://www.erto.in



Report No.: ERTO/TRP/1920/0929

ULR No.: TC622920000000031F

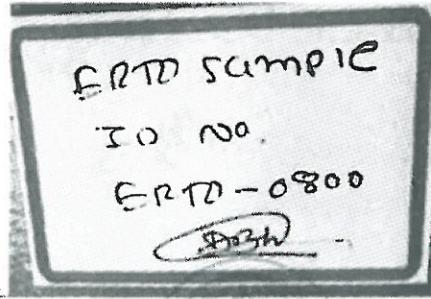
Date: 18/01/2020

Technical Specification of Test Sample declared by customer

1. Test sample : 800 kVA, Distribution Transformer (CRGO Core, Non sealed Type)
2. Name of manufacture : ALFA TRANSFORMERS LTD.
3. Serial No. : 800/07
4. Rating : 800 kVA
5. Energy efficiency level : Level 2
6. Rated voltage at no load H.V/L.V : 11000/433 Volt
7. Rated current at H.V/L.V : 41.99/1066.7 Amp.
8. Number of phases : 3-Phase
9. Connection H.V./L.V : Delta/Star
10. Frequency : 50 Hz
11. Type of cooling : ONAN
12. Temperature rise of oil/winding : 40/45 °C
13. Percentage Impedance : 5.00 %
14. Vector group : Dyn11
15. Winding material : Copper
16. Year of manufacture : 2020
17. Max. total loss at 50% load at 75°C : 2287 W
18. Max. total loss at 100% load at 75°C : 6402 W
19. Basic insulation level of H.V. : 28 kVrms/75 kVp
20. Basic insulation level of L.V. : 03 kVrms
21. Tapping details :

Tap position	HV Taps (volts)	LV (volts)
1	11550	433
2	11275	433
3	11000	433
4	10725	433
5	10450	433
6	10175	433
7	9900	433

ERTO Sample ID No. : ERTO-0800



Prepared By

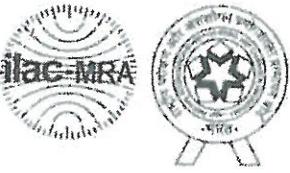


Checked By

A. Deshpande,
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

Page 2 of 25

TE-A 025121



Electrical Research & Testing organisation[®]

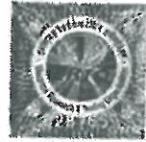
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Plot No. 747, Manjusar Village, B/H Gurukrupa Farm, Savli-Vadodara Road, Ta.: Savli, Dist.: Vadodara.
Pin Code : 391775. Gujarat, India.
Telephone : 02667-264007, +91 88660 09021
Email : erto@erto.in / sr.patel@erto.in
Web : http://www.erto.in

Certificate no. TC-6229



ERTO
Quality Assurance Laboratory

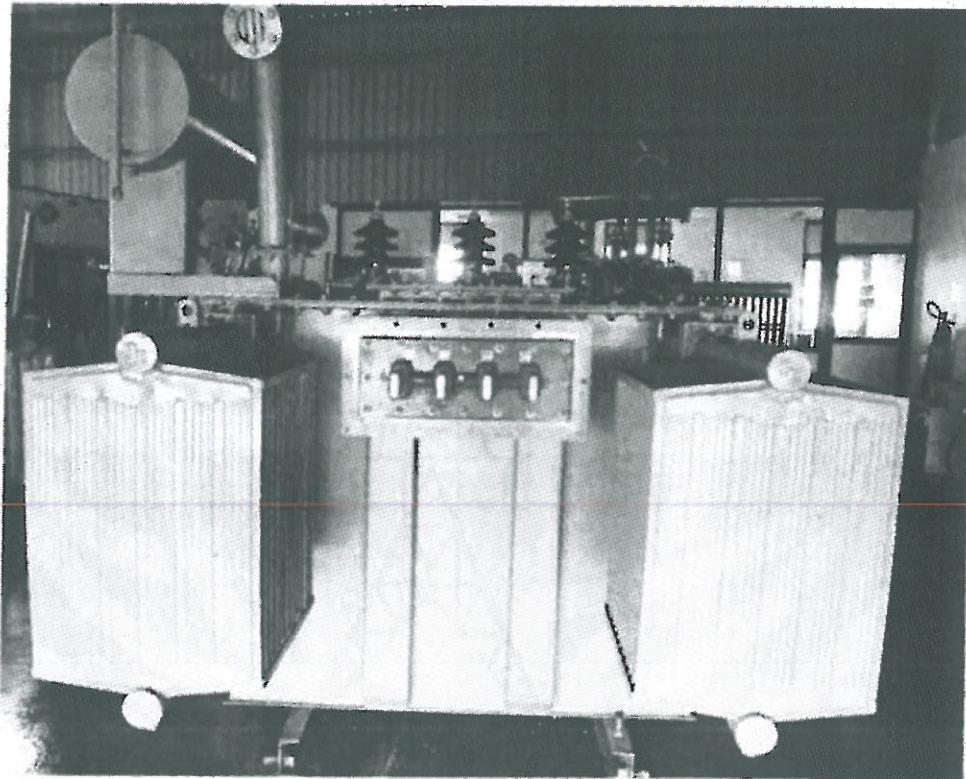


Report No.: ERTO/TRP/1920/0929

ULR No.: TC622920000000031F

Date: 18/01/2020

Test Sample photo



Prepared By



Checked By

TE - A 025125

FORMAT NO.: FF-01, REV NO./DATE:01/11-02-2017

A. Venkatesh
Sr. Engineer
Electrical Dept.
PRCC (P) Ltd.
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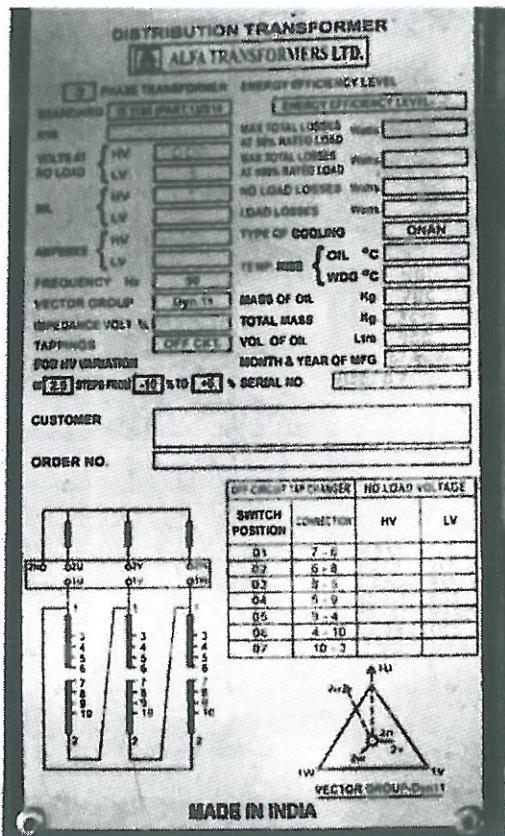


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ULR No.: TC622920000000031F

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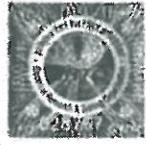
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Tests performed :

Sr. No.	Test details	Test specifications
1.	Measurement of winding resistance	As per cl.no.21.2. (a) of IS 1180 (Part 1) : 2014
2.	Measurement of voltage ratio and check of phase displacement.	As per cl.no.21.2.(b) of IS 1180 (Part 1) : 2014
3.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load.	As per cl.no.21.2. (c) of IS 1180 (Part 1) : 2014
4.	Measurement of no-load loss and current	As per cl.no.21.2. (d) of IS 1180 (Part 1) : 2014
5.	Total losses at 50 percent load	As per cl.no.7.8 of IS 1180 (Part 1) : 2014
6.	Total losses at 100 percent load	As per cl.no.7.8 of IS 1180 (Part 1) : 2014
7.	Measurement of insulation resistance	As per cl.no.21.2. (e) of IS 1180 (Part 1) : 2014
8.	Induced over-voltage withstand test.	As per cl.no.21.2 (f) of IS 1180 (Part 1) : 2014
9.	Separate-source voltage withstand test.	As per cl.no.21.2 (g) of IS 1180 (Part 1) : 2014
10.	Pressure test (Routine)	As per cl.no.21.2 (h) of IS 1180 (Part 1) : 2014
11.	Oil leakage test	As per cl.no.21.2 (j) of IS 1180 (Part 1) : 2014
12.	Lightning impulse test with chopping	As per cl.no.21.3(a) of IS 1180 (Part 1) : 2014 & test procedure followed as per cl. no. 13.3 of IS 2026 (Part 3): 2018
13.	Temperature-rise test	As per cl.no.21.3 (b) of IS 1180 (Part 1) : 2014
14.	Pressure test (type)	As per cl.no.21.3 (d) of IS 1180 (Part 1) : 2014

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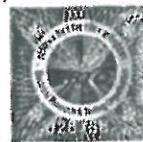
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Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
1.	Measurement of winding resistance : (As per cl.no.21.2.(a) of IS 1180 (Part 1) : 2014) Average oil temperature HV Winding Tap position 1 1U – 1V: 702.40 mΩ 1V – 1W: 703.70 mΩ 1U – 1W: 703.40 mΩ Average: — 703.17 mΩ Tap position 2 1U – 1V: 682.10 mΩ 1V – 1W: 683.85 mΩ 1U – 1W: 684.05 mΩ Average: — 683.33 mΩ Tap position 3 1U – 1V: 662.85 mΩ 1V – 1W: 664.30 mΩ 1U – 1W: 663.40 mΩ Average: — 663.52 mΩ Tap position 4 1U – 1V: 643.50 mΩ 1V – 1W: 645.20 mΩ 1U – 1W: 644.70 mΩ Average: — 644.47 mΩ Tap position 5 1U – 1V: 624.85 mΩ 1V – 1W: 626.40 mΩ 1U – 1W: 625.60 mΩ Average: — 625.62 mΩ			—

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	Tap position 6			---
	1U – 1V:		606.50 mΩ	
	1V – 1W:		608.00 mΩ	
	1U – 1W:		607.20 mΩ	
	Average:	—	607.23 mΩ	
	Tap position 7			
	1U – 1V:		588.85 mΩ	
	1V – 1W:		590.75 mΩ	
	1U – 1W:		589.45 mΩ	
	Average:	—	589.68 mΩ	
	LV Winding			
	2u – 2v:		869.0 μΩ	
	2v – 2w:		867.4 μΩ	
	2u – 2w:		883.7 μΩ	
	Average	—	873.4 μΩ	
2.	Measurement of voltage ratio and check of phase displacement : (As per cl.no.21.2.(b) of IS 1180 (Part 1) : 2014) HV winding and LV winding:			Conforms
	Tap position 1			
	1U1V/2u2n:	46.200 (IS Tol.)	46.152	
	1V1W/2v2n:	46.200 (IS Tol.)	46.240	
	1W1U/2w2n:	46.200 (IS Tol.)	46.210	
	Tap position 2			
	1U1V/2u2n:	45.100 (IS Tol.)	45.034	
	1V1W/2v2n:	45.100 (IS Tol.)	45.122	
	1W1U/2w2n:	45.100 (IS Tol.)	45.092	
	Tap position 3			
	1U1V/2u2n:	44.000 (IS Tol.)	43.916	
	1V1W/2v2n:	44.000 (IS Tol.)	44.004	
	1W1U/2w2n:	44.000 (IS Tol.)	43.974	

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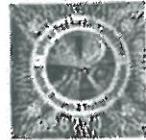
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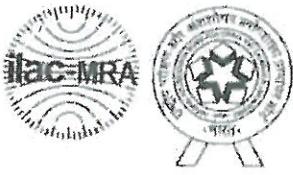
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Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
	Tap position 4			
	1U1V/2u2n: 42.900 (IS Tol.)	42.798		
	1V1W/2v2n: 42.900 (IS Tol.)	42.886		
	1W1U/2w2n: 42.900 (IS Tol.)	42.856		
	Tap position 5			
	1U1V/2u2n: 41.800 (IS Tol.)	41.678		
	1V1W/2v2n: 41.800 (IS Tol.)	41.768		
	1W1U/2w2n: 41.800 (IS Tol.)	41.738		
	Tap position 6			
	1U1V/2u2n: 40.700 (IS Tol.)	40.562		
	1V1W/2v2n: 40.700 (IS Tol.)	40.650		
	1W1U/2w2n: 40.700 (IS Tol.)	40.622		
	Tap position 7			
	1U1V/2u2n: 39.600 (IS Tol.)	39.444		
	1V1W/2v2n: 39.600 (IS Tol.)	39.532		
	1W1U/2w2n: 39.600 (IS Tol.)	39.502		
	Vector Group:	Dyn11	Dyn11	
3.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load: (As per cl.no.21.2.(c) of IS 1180 (Part 1) : 2014) Supply connected on HV side and LV side short circuit. At 50% Load			---
	Tap position 3			
	Average oil temperature	17.0 °C		
	Frequency	50.084 Hz		
	Test current	20.998 A		
	Impedance voltage	271.14 Volts		
	Measured load loss	1002.00 W		
	Impedance voltage (Computed to 50% load)			
	At 17.0 °C	2.46 %		
	At 75°C	2.46 %		
	Load loss (Computed to 50% load)			
	At 17.0 °C	1001.73 W		
	At 75°C	1149.01 W		

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Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
	At 100% Load Average oil temperature Frequency Test current Impedance voltage Measured load loss Impedance voltage (Computed to 100% load) At 17.0°C At 75°C		17.0 °C 50.074 Hz 41.972 Amp. 542.19 Volts 3988.00 W 4.93 % 4.92 %	Conforms
	Load loss (Computed to 100% load) At 17.0°C At 75°C	5.0% (IS Tol.)	3991.49 W 4583.54 W	—
4.	Measurement of no-load loss and current : (As per cl.no.21.2(d) of IS 1180 (Part 1) : 2014) Supply connected on LV winding and HV winding open-circuited. At 100% of rated voltage Mean voltage Frequency RMS voltage No-load current Measured no-load loss Corrected no-load loss		433.10 Volts 50.011 Hz 434.47 Volts 2.6437 Amp. 1028.60 Watts 1025.31 Watts	—
5.	Total losses at 50 percent load (As per cl.no.7.8 of IS 1180 (Part 1) : 2014)	Max.2287 Watts	2174.32 Watts	Conforms
6.	Total losses at 100 percent load (As per cl.no.7.8 of IS 1180 (Part 1) : 2014)	Max.6402 Watts	5608.85 Watts	Conforms
7.	Measurement of insulation resistance : (As per cl.no.21.2(e) of IS 1180 (Part 1) : 2014) Average oil temperature Insulation resistance value HV winding to Earth at 5000 DC Volts for 60 seconds LV winding to Earth at 500 DC Volts for 60 seconds HV winding to LV winding at 5000 DC Volts for 60 seconds		20.2 °C 90.17 GΩ 24.12 GΩ 104.12 GΩ	—

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Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
8.	Induced over-voltage withstand test : (As per cl.no.21.2(f) of IS 1180 (Part 1) : 2014)	Transformer shall withstand 866 volts at 150 Hz frequency for 40 seconds.	Withstood	Conforms
9.	Separate-source voltage withstand test : (As per cl.no.21.2(g) of IS 1180 (Part 1) : 2014) <ul style="list-style-type: none"> ➤ on HV winding: The test voltage of 28 kV ac, rms was applied between the shorted HV winding and earth. The tank and LV winding were shorted together and earthed. The test voltage was applied for 60 seconds. ➤ on LV winding: The test voltage of 3 kV ac, rms was applied between the shorted LV winding and earth. The tank and HV winding were shorted together and earthed. The test voltage was applied for 60 seconds. 	Transformer shall withstand power frequency voltage of 28kV for 60 seconds. Transformer shall withstand power frequency voltage of 3kV for 60 seconds.	Withstood Withstood	Conforms
10.	Pressure test (routine test): (As per cl.no 21.2(h) of IS 1180(Part 1):2014) The transformer with bolted cover was tested at a pressure of 35 kPa above atmosphere pressure maintained inside the tank for 10 min.	There should be no leakage at any point	No leakage observed	Conforms
11.	Oil leakage test: (As per cl.no.21.2(j) of IS 1180 (Part 1) : 2014) The assembled transformer with all fittings including bushings in position was tested at a pressure equivalent to twice the normal head measured at the base of the tank for 8 hours.	There should be no leakage at any point	No leakage observed	Conforms

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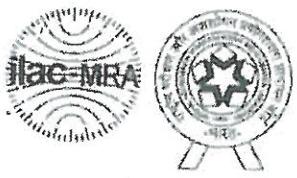
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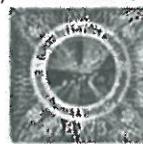
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12.	Lightning impulse test with chopping: (As per cl.no.21.3(a) of IS 1180 (Part 1) : 2014 & test procedure followed as per cl. no. 13.3 of IS 2026 (Part 3): 2018)	Transformer shall withstand the test voltage	Withstood	Conforms
Sr. No.	Test details	Peak Magnitude (kVp)		
1.	Reduced Impulse Wave	Upk -52.87	Upk -53.46	Upk -51.38
2.	100 % full impulse wave	Upk -73.24	Upk -73.78	Upk -72.89
3.	Reduced Chopped Impulse Wave	Upk -52.71	Upk -51.47	Upk -52.50
4.	110 % full Chopped impulse wave	Upk -80.71	Upk -81.52	Upk -81.17
5.	110 % full Chopped impulse wave	Upk -80.91	Upk -81.44	Upk -81.23
6.	100 % full impulse wave	Upk -73.35	Upk -73.51	Upk -73.74
7.	100 % full impulse wave	Upk -73.28	Upk -73.67	Upk -73.76

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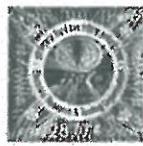
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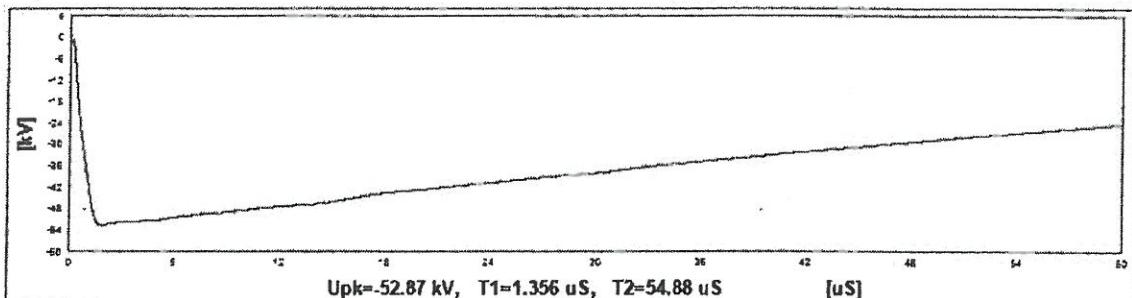
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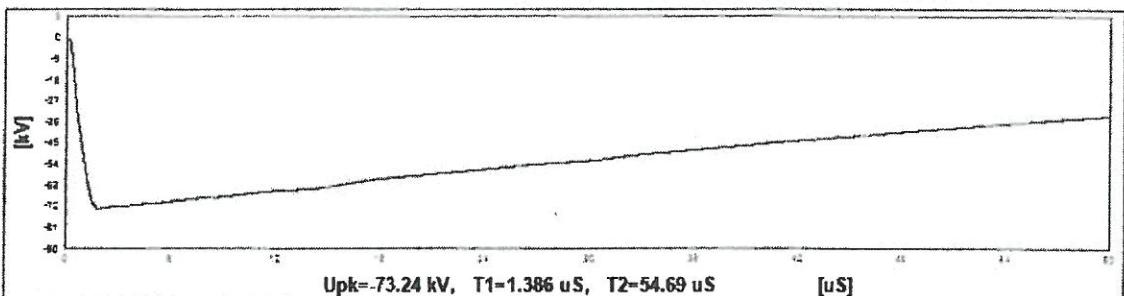
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1. Reduced Impulse Wave



2. 100% Full Impulse Wave

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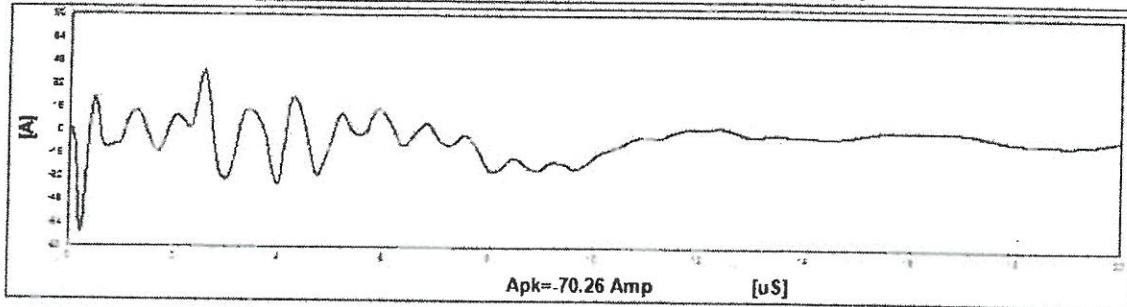
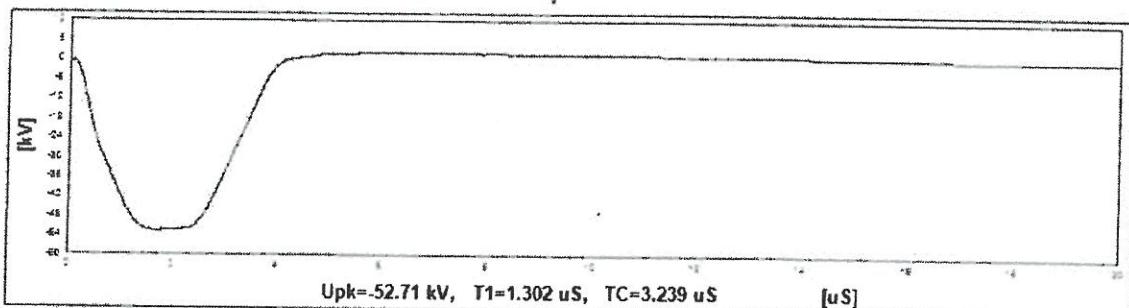
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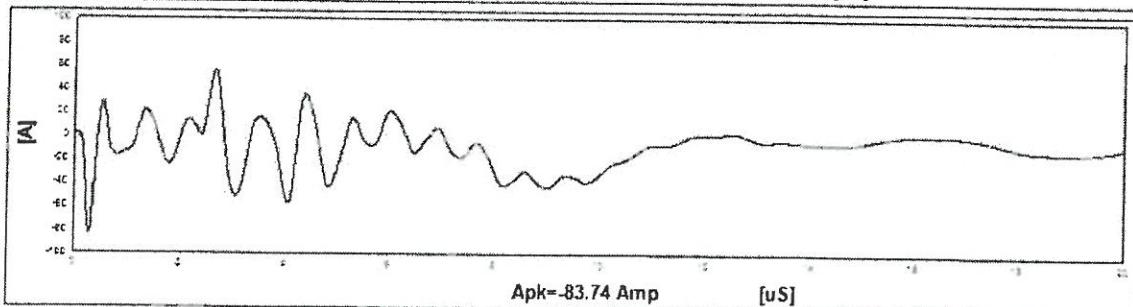
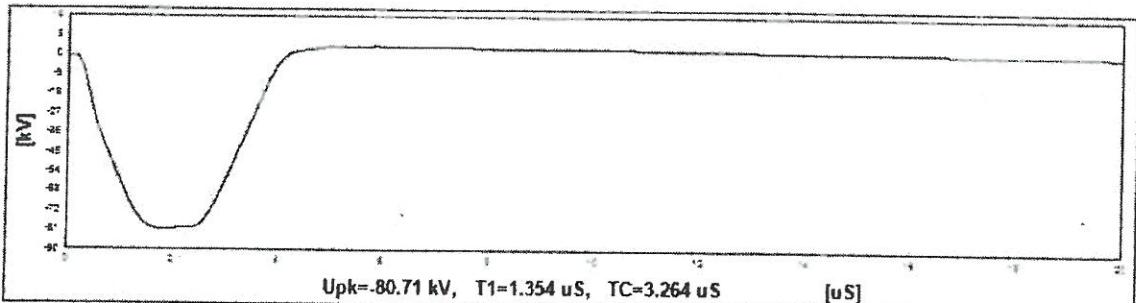
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3. Reduced Chopped Impulse Wave

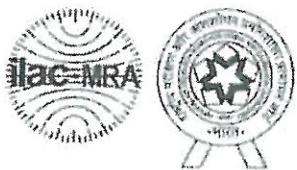


4. 110% Chopped Impulse Wave

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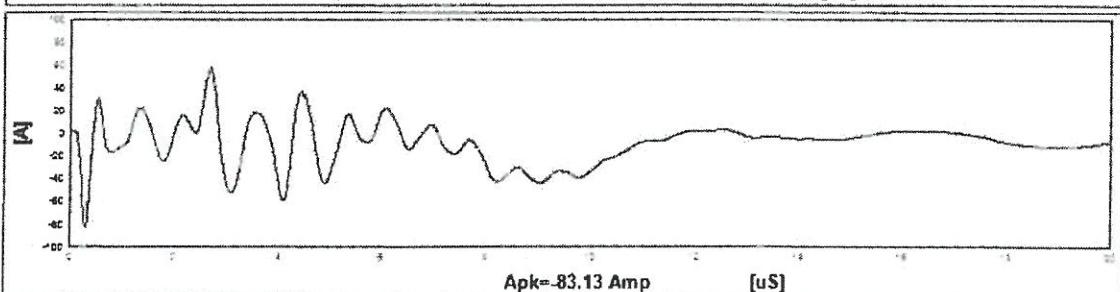
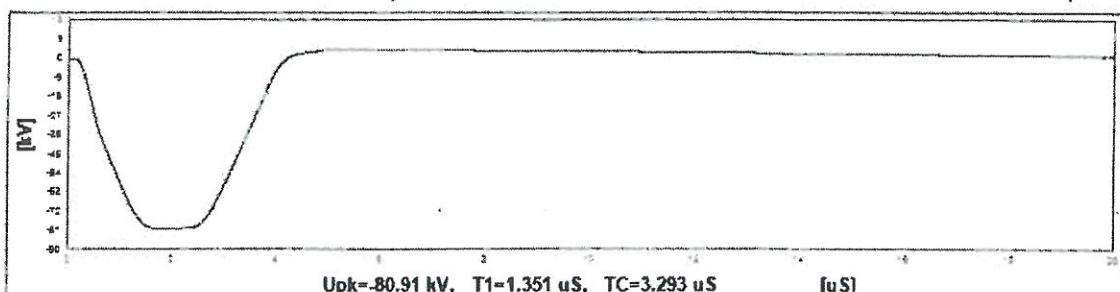
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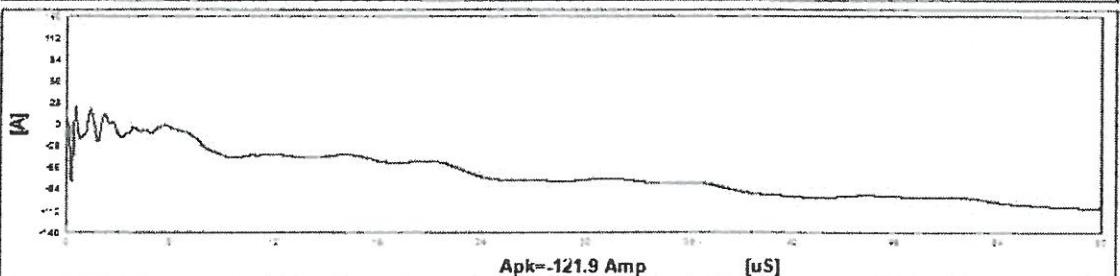
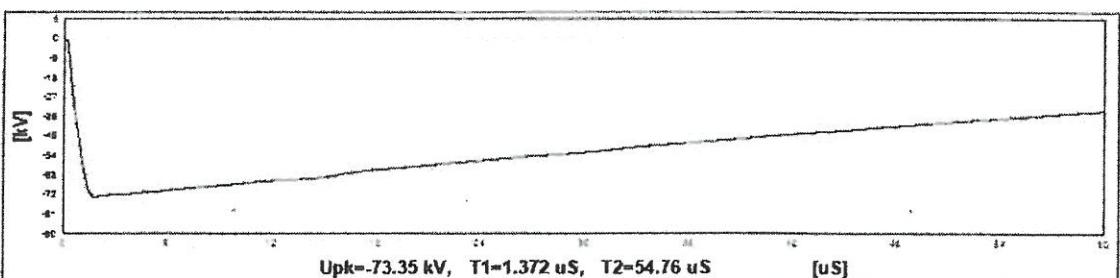
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5. 110% Chopped Impulse Wave



6. 100% Full Impulse Wave

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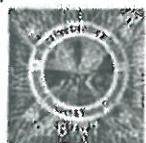
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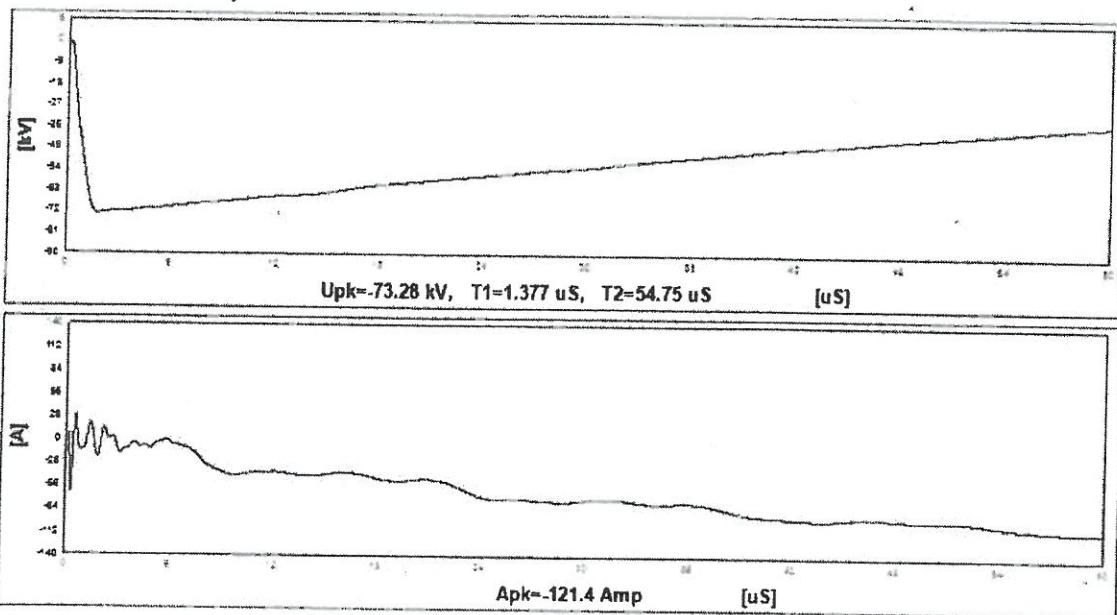
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7. 100% Full Impulse Wave

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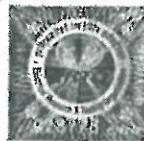
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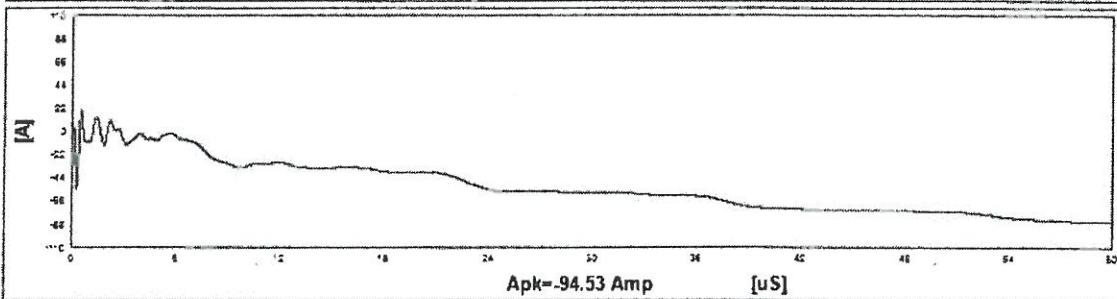
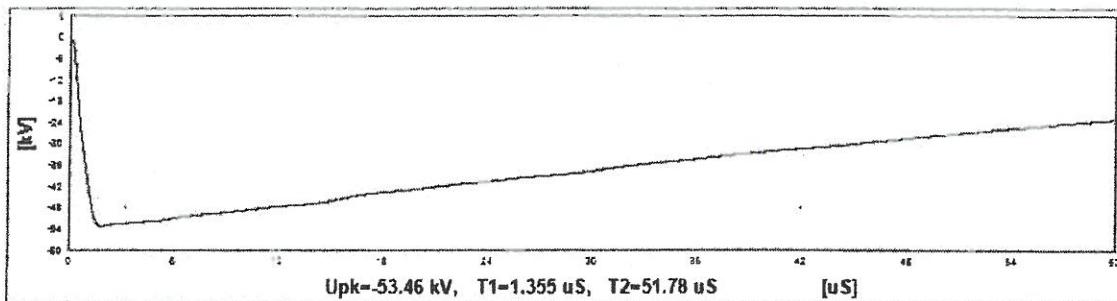


Report No.: ERTO/TRP/1920/0929

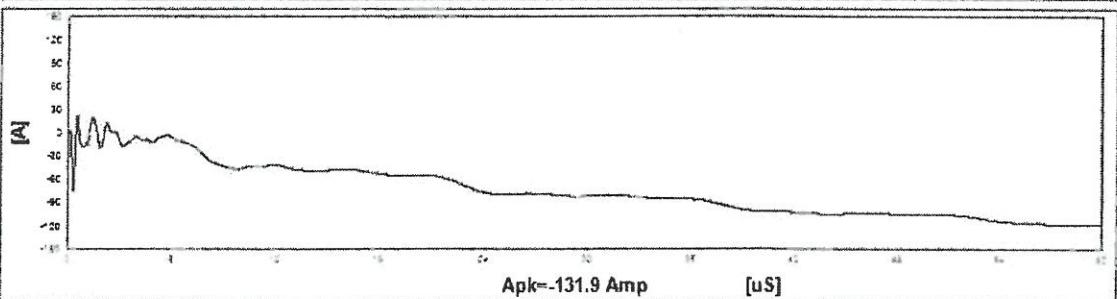
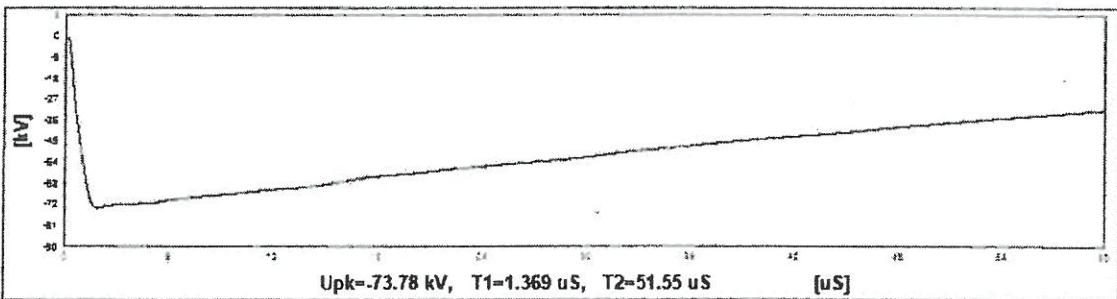
ULR No.: TC622920000000031F

Date: 18/01/2020

1 V PHASE



1. Reduced Impulse Wave



2. 100% Full Impulse Wave

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Telephone : 02667-264007, +91 88660 09021

Certificate no. TC-6229 Email : erto@erto.in / sr.patel@erto.in

Web : http://www.erto.in



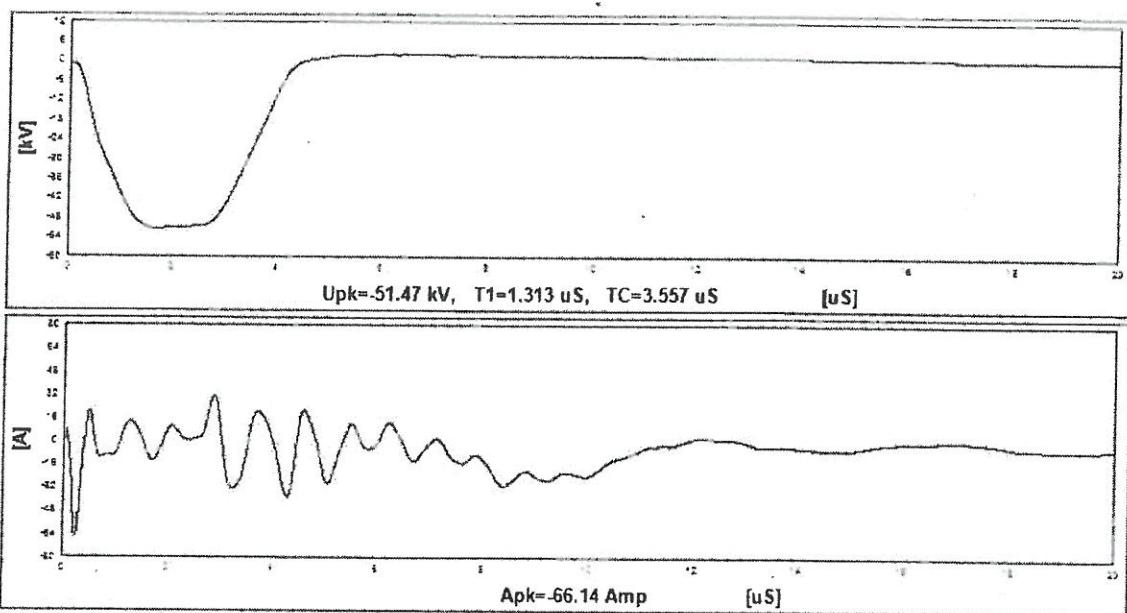
Quality Assurance Laboratory



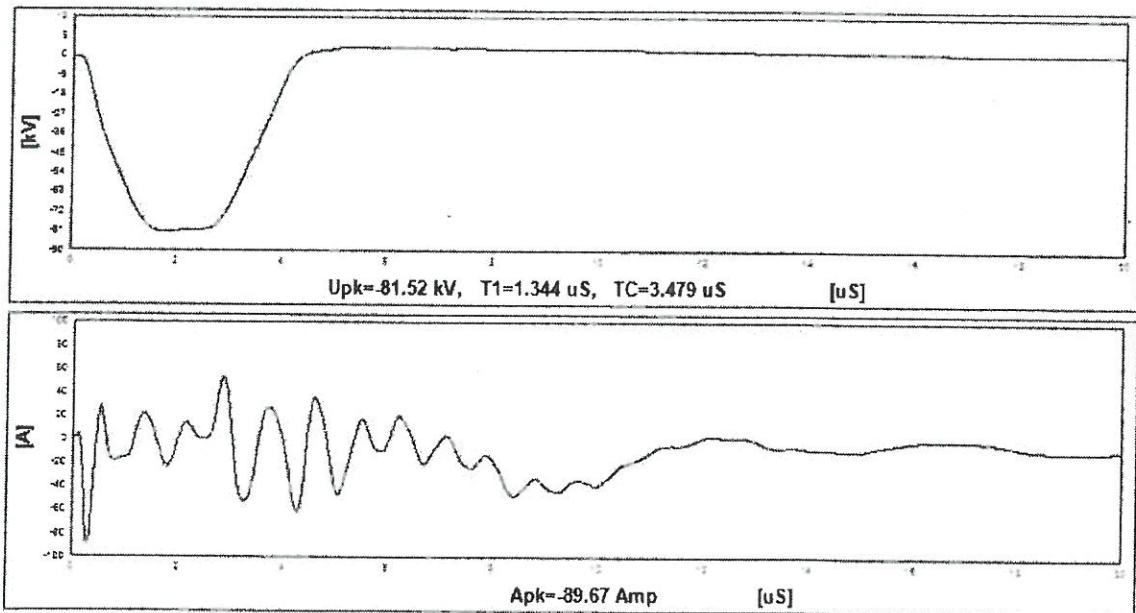
Report No.: ERTO/TRP/1920/0929

ULR No.: TC622920000000031F

Date: 18/01/2020



3. Reduced Chopped Impulse Wave



4. 110% Chopped Impulse Wave

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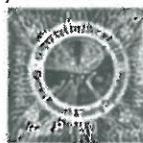
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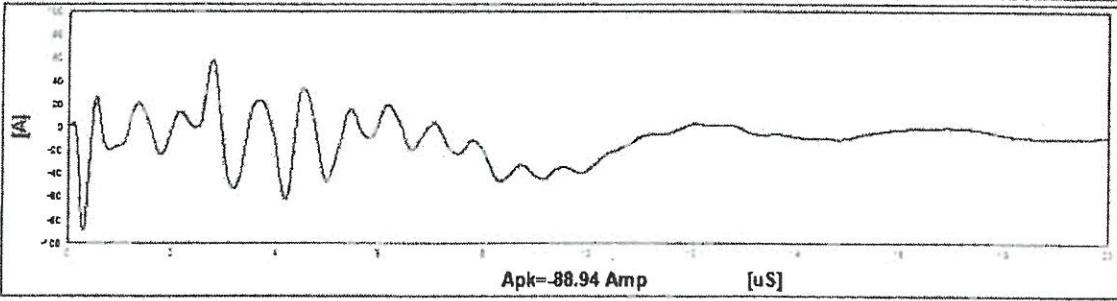
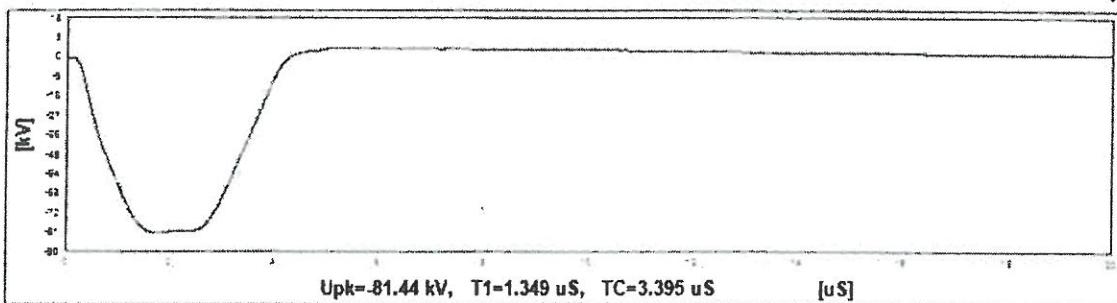


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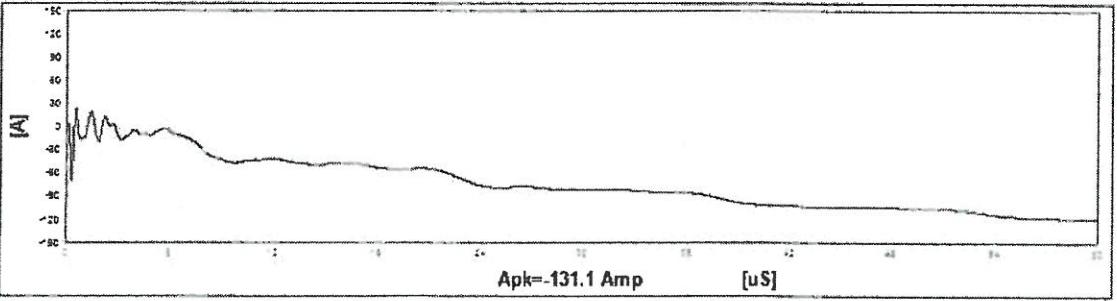
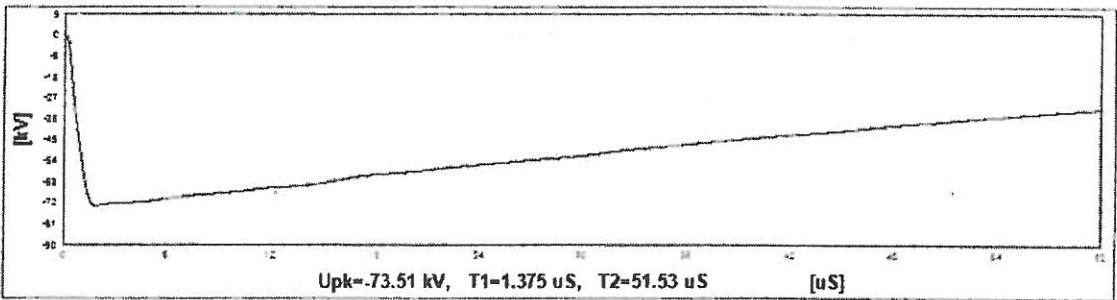
Report No.: ERTO/TRP/1920/0929

ULR No.: TC622920000000031F

Date: 18/01/2020



5. 110% Chopped Impulse Wave



6. 100% Full Impulse Wave

Prepared By



Checked By

A. Patel B.T.
S.T. Enginner
Electrical Dept.
URCC (P) Ltd.

TE-A 025140



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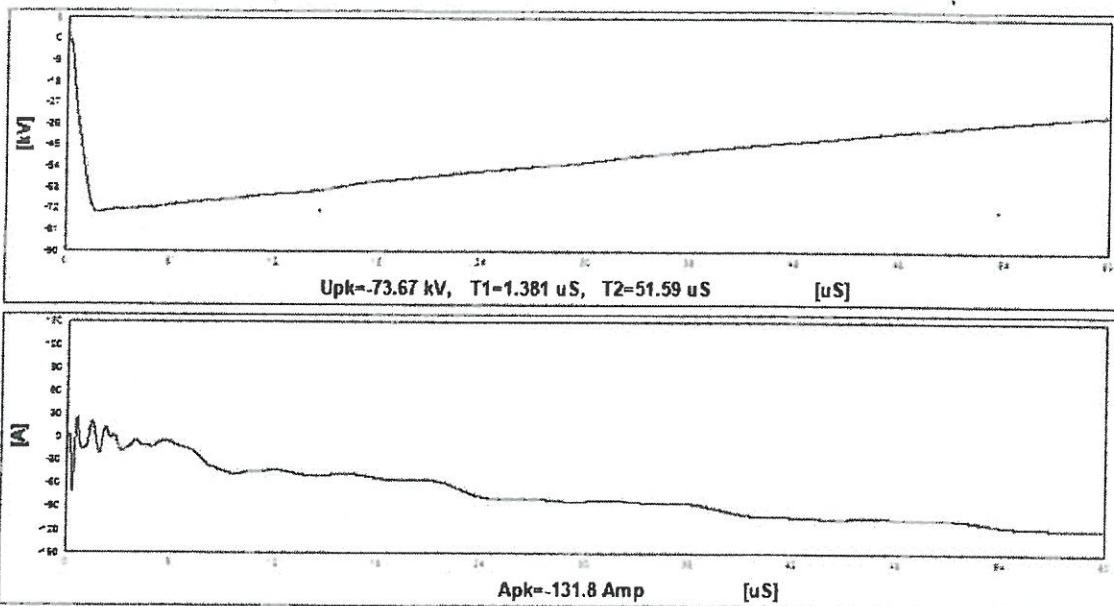
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ULR No.: TC622920000000031F

Date: 18/01/2020



7. 100% Full Impulse Wave

Prepared By



Checked By

TE-A 025141

A. Venkatesh Babu
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.



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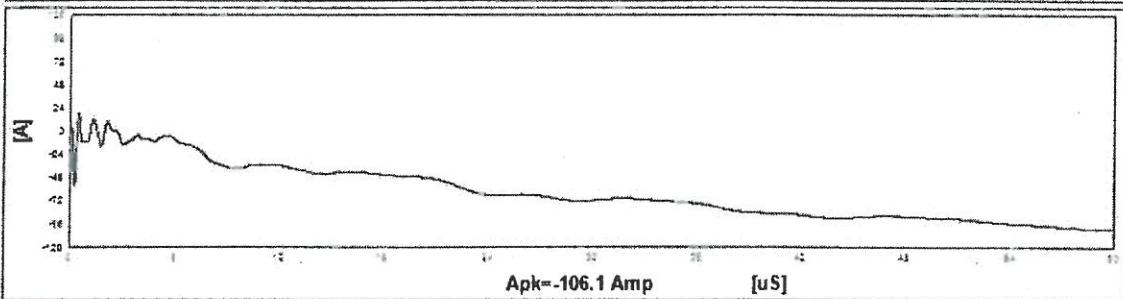
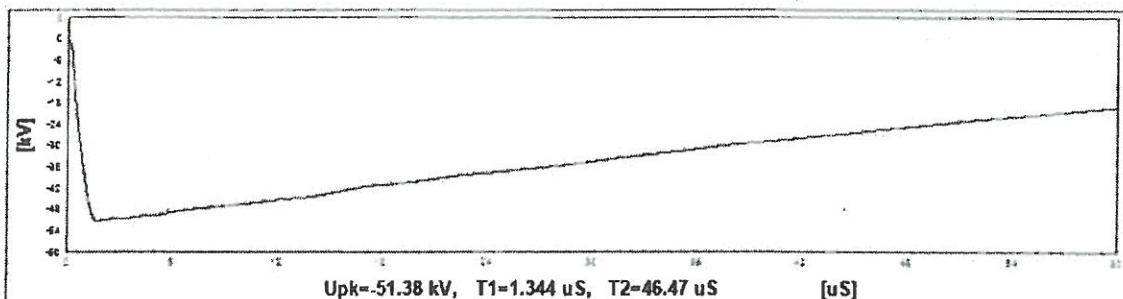


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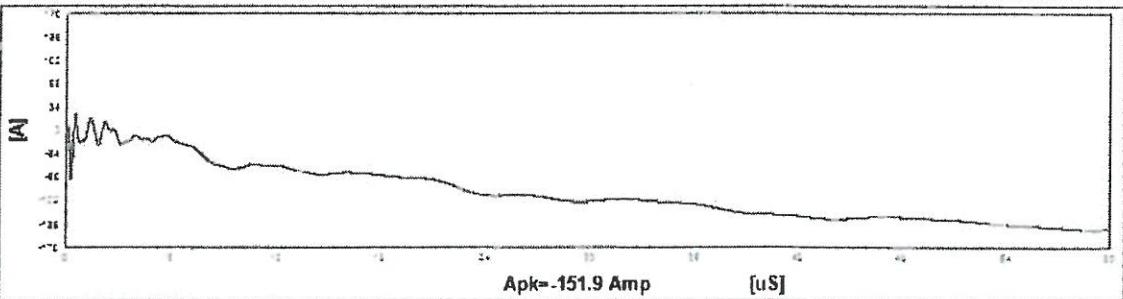
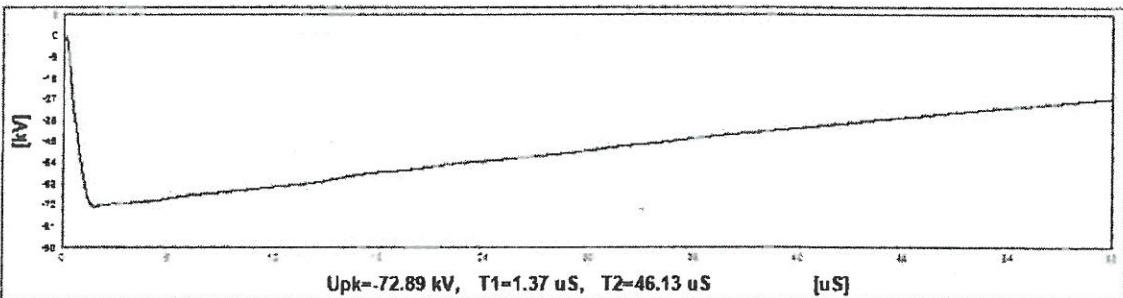
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Date: 18/01/2020

1 W PHASE



1. Reduced Impulse Wave



2. 100% Full Impulse Wave

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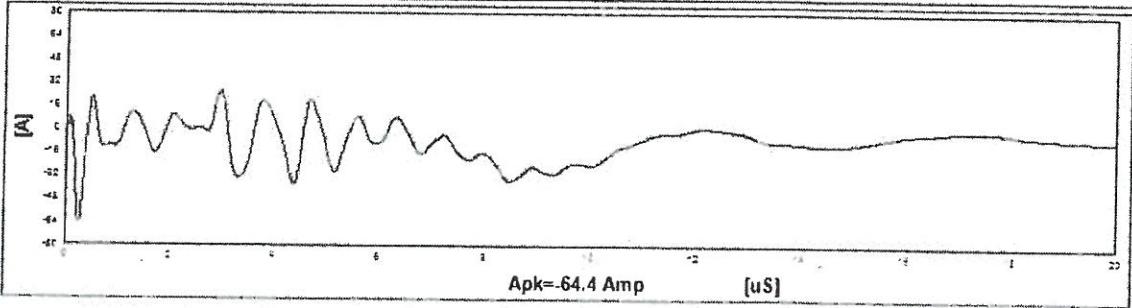
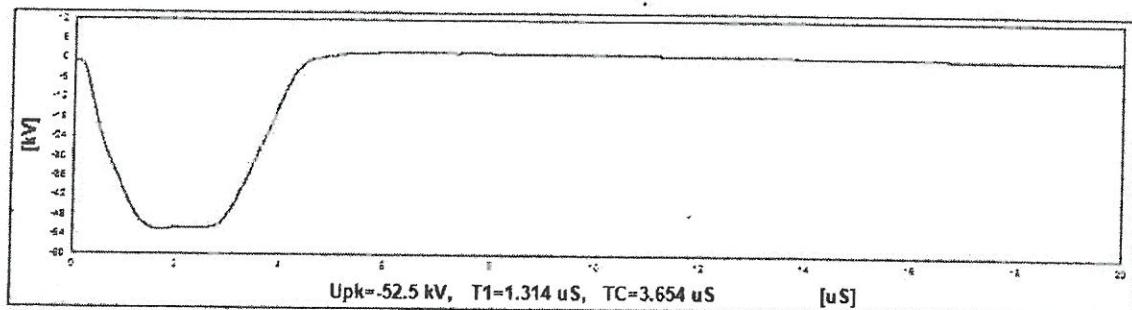


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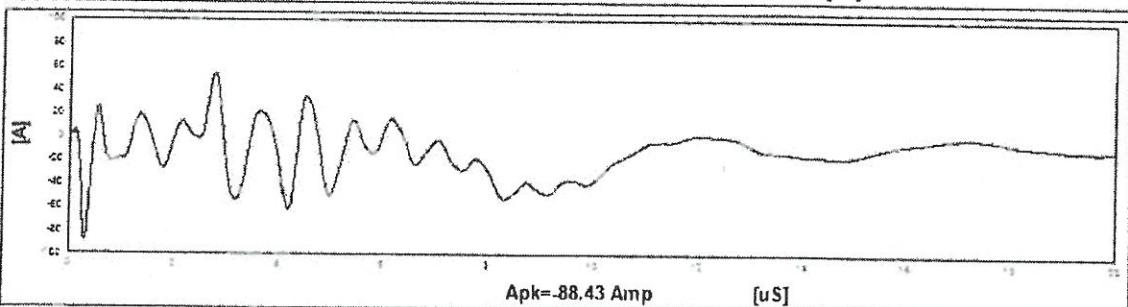
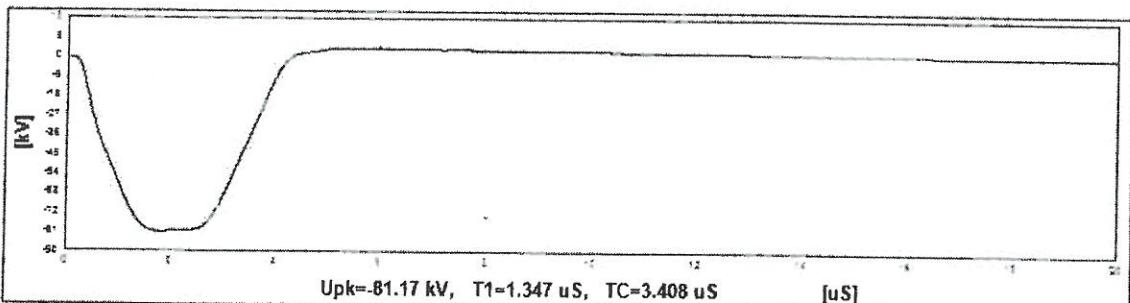
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ULR No.: TC622920000000031F

Date: 18/01/2020



3. Reduced Chopped Impulse Wave

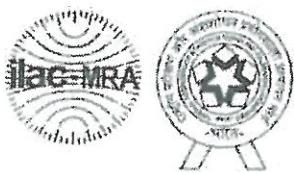


4. 110% Chopped Impulse Wave

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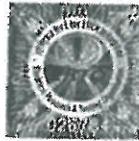
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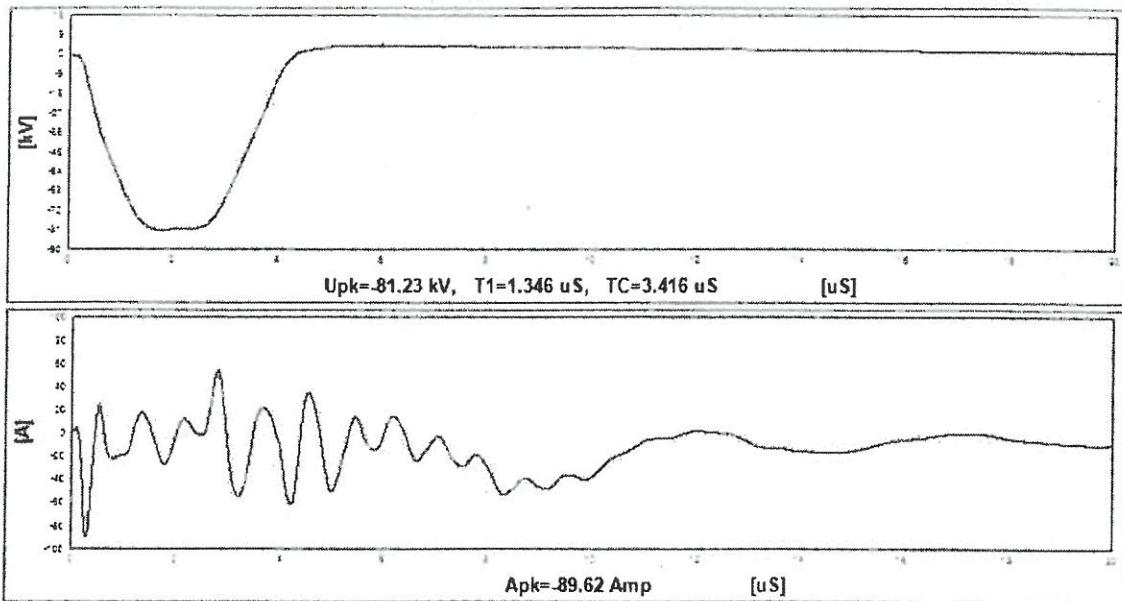
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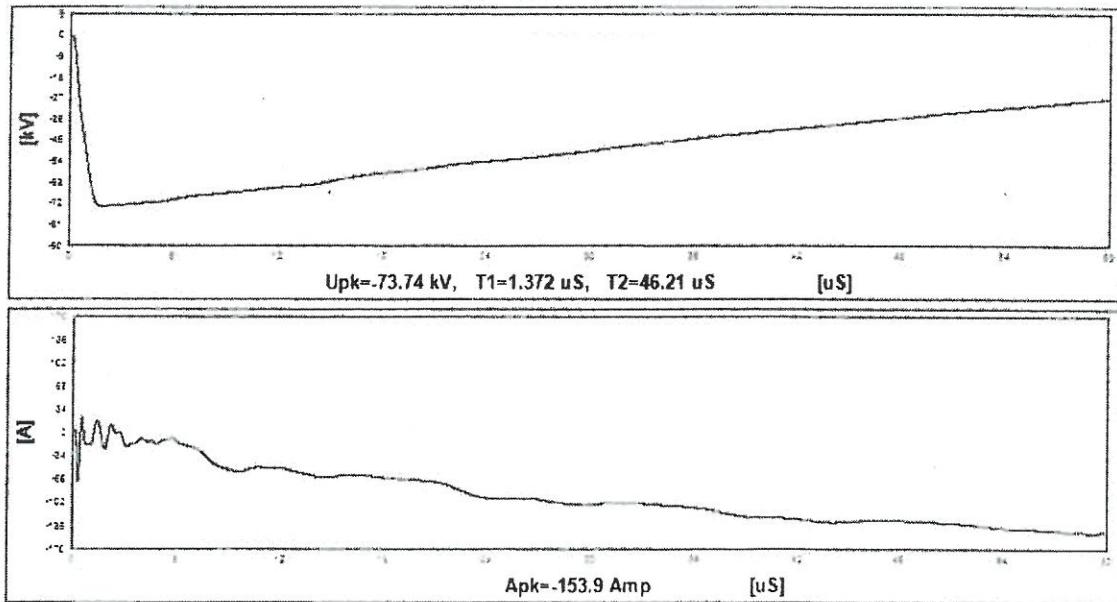
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Date: 18/01/2020



5. 110% Chopped Impulse Wave



6. 100% Full Impulse Wave

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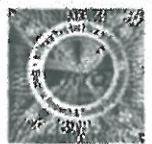
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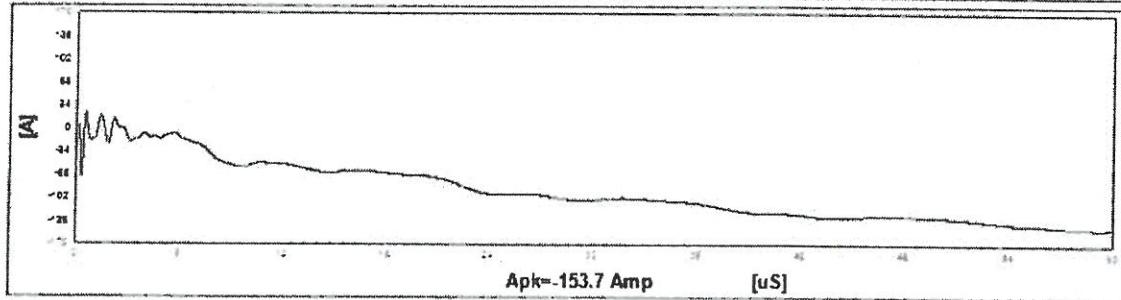
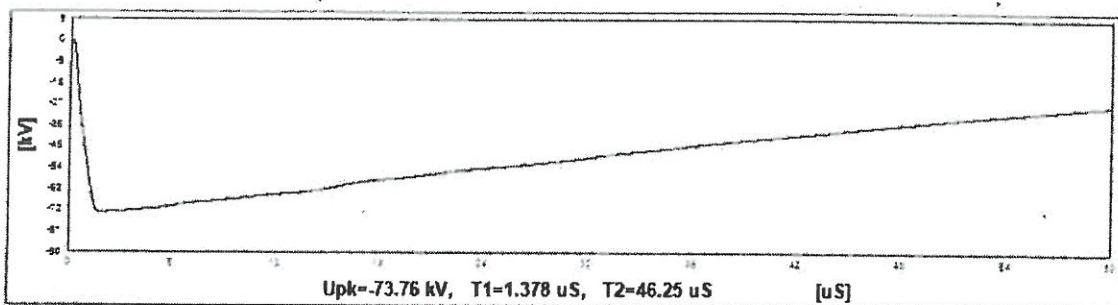
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ULR No.: TC622920000000031F

Date: 18/01/2020



7. 100% Full Impulse Wave

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TE-A 025145

Sr. Engineer
Electrical Dept.
URCO (P) Ltd.



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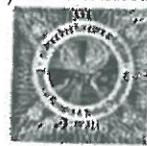
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Report No.: ERTO/TRP/1920/0929

ULR No.: TC622920000000031F

Date: 18/01/2020

Sr. No.	Particulars of test & cl.no.	Requirements as per specifications	Obtain value	Remarks
13.	<p>Temperature-rise test : (Tap position : 7) (As per cl.no.21.3(b) of IS 1180 (Part 1) : 2014)</p> <p>Before starting test, the dimensions of tank with fins were measured & recorded.</p> <p>Size of tank : L- 1485 mm, W- 590 mm, H- 1250 mm No. of radiators: 04 No. of fins per radiator: 12 Size of fins: L-800 mm, W-520 mm</p> <p>Losses fed for temperature-rise test were 5796.54 Watts (Measured no-load loss:1025.31 W and measured load loss at 75°C at tap no.7: 4771.23 W) Measured losses were fed to the transformer (i.e. Supply was connected to HV winding and LV winding kept short-circuited) till steady state temperature-rise was attained. Top oil temperature was recorded hourly. After steady state condition, the losses were brought down in reference to the rated current one hour prior to shut down of HV and LV winding.</p> <p>At the shut down, the hot windings resistance was measured and temperature-rise calculated.</p> <p>A) Top oil temperature-rise : Max. 40°C 23.3 °C</p> <p>B) Winding Temperature Rise (Resistance method) 1) HV Winding: Max. 45°C 2) LV Winding: Max. 45°C 40.3 °C 41.6 °C</p> <p>C) Ambient temperature at the time of reduced to rated current: 16.7 °C</p> <p>D) Ambient temperature at the time of shut down: 18.6 °C</p> <p>E) Time of shut down (Hrs) 12:00</p>			Conforms

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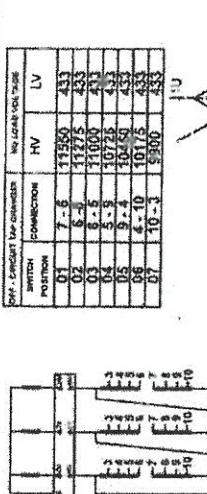
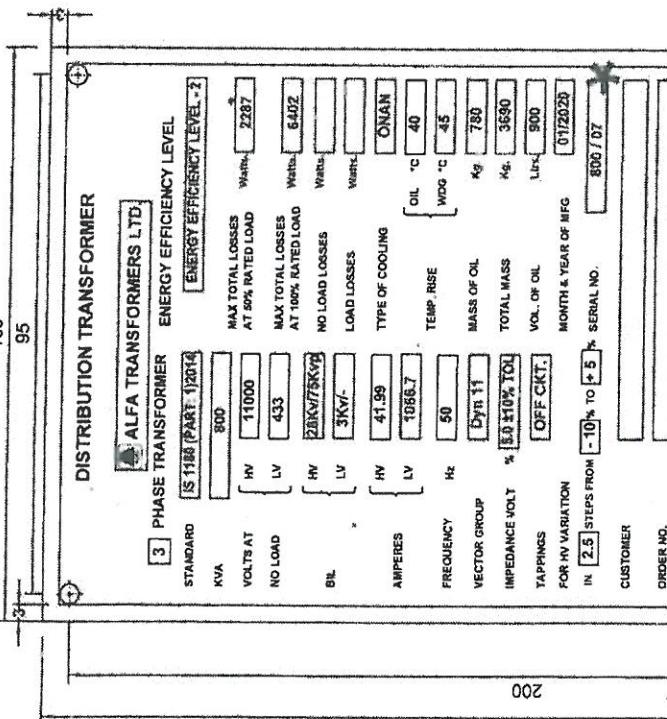
ULR No.: TC622920000000031F

Date: 18/01/2020

Sr. No.	Particulars of test & cl.no.		Requirements as per specifications	Obtain value	Remarks										
14.	Pressure test (type test): (As per cl.no.21.3(d) of IS 1180(Part 1):2014)				Conforms										
	The transformer tank was subjected to air pressure of 80 kPa for 30 minutes. The permanent deflections of flat plates were recorded, after pressure has been released.														
	<table border="1"> <thead> <tr> <th>Deflection measured at</th> <th>Length of plate (mm)</th> </tr> </thead> <tbody> <tr> <td>HV side</td> <td>1485</td> </tr> <tr> <td>LV side</td> <td>1485</td> </tr> <tr> <td>Side A</td> <td>590</td> </tr> <tr> <td>Side B</td> <td>590</td> </tr> </tbody> </table>		Deflection measured at	Length of plate (mm)	HV side	1485	LV side	1485	Side A	590	Side B	590			
Deflection measured at	Length of plate (mm)														
HV side	1485														
LV side	1485														
Side A	590														
Side B	590														
	The transformer tank was subjected to vacuum of 500 mm of Mercury for 30 minutes. The permanent deflections of flat plates were recorded, after vacuum has been released.														
	<table border="1"> <thead> <tr> <th>Deflection measured at</th> <th>Length of plate (mm)</th> </tr> </thead> <tbody> <tr> <td>HV side</td> <td>1485</td> </tr> <tr> <td>LV side</td> <td>1485</td> </tr> <tr> <td>Side A</td> <td>590</td> </tr> <tr> <td>Side B</td> <td>590</td> </tr> </tbody> </table>		Deflection measured at	Length of plate (mm)	HV side	1485	LV side	1485	Side A	590	Side B	590			
Deflection measured at	Length of plate (mm)														
HV side	1485														
LV side	1485														
Side A	590														
Side B	590														
	<div style="text-align: center;"> <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> HV SIDE </div> <div style="display: flex; justify-content: space-around;"> SIDE A SIDE B </div> <div style="margin-top: 20px;"> LV SIDE </div> </div>		There should be no air leakage at any point	No air leakage observed											
	<div style="text-align: right; margin-top: 20px;"> </div>														
	<div style="text-align: left; margin-top: 20px;"> <i>Prepared By</i> </div>														
	<div style="text-align: right; margin-top: 20px;"> <i>Checked By</i> </div>														

TE-A 025147

A. Venkant Patel
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

105	95	
3		
DISTRIBUTION TRANSFORMER		
ALFA TRANSFORMERS LTD. IS 1198 PART 12014		
3 PHASE TRANSFORMER ENERGY EFFICIENCY LEVEL -2		
STANDARD IS 1198 PART 12014		
KVA	800	MAX TOTAL LOSSES Watts 2287
VOLTS AT NO LOAD	HV 11000 LV 433	AT 50% RATED LOAD Watts
NO LOAD	HV 218KV/75KV LV 3KV/	AT 100% RATED LOAD Watts 6402
BIL	LV 3KV/	NO LOAD LOSSES Watts
		LOAD LOSSES Watts
AMPERES	HV 41.88 LV 1086.7	TYPE OF COOLING OIL 'C' 40
FREQUENCY Hz	50	TEMP. RISE W/o 'C' 45
VECTOR GROUP Dyn 11	MASS OF OIL Kg 780	
IMPEDANCE VOLT %	11±10% TOL	TOTAL MASS Kg 3630
TAPINGS	OFF CKT.	LIFE 900
FOR HV VARIATION IN 2.5 STEPS FROM -10% TO +5% SERIAL NO.	MONTH & YEAR OF MFG 01/2020	01/01/2020
CUSTOMER		
ORDER NO.		
OFF CIRCUIT TEST CONNECTOR No. OF LEADS & THEIR POSITION SWITCH CONNECTION HV LV		
01 7 6 1150 433 02 6 5 1125 433 03 5 4 1100 433 04 3 9 1075 433 05 3 4 1045 433 06 4 10 1015 433 07 10 1 980 433		
 VECTOR GROUP-Dyn 11		
		
MADE IN INDIA 4 HOLES Ø 3.6		
<small>No part of this document is the property of ALFA TRADES DEVICES LTD. This document is the property of ALFA TRADES DEVICES LTD.</small>		

Test Report No. ERTOTR11192010929
 Date 18/01/2020
 Sample 800KVA
 Verified by P.D.
 Verification of this document by ERTO is limited to relevant dimension checks only.
 Verified dimensions are marked with *



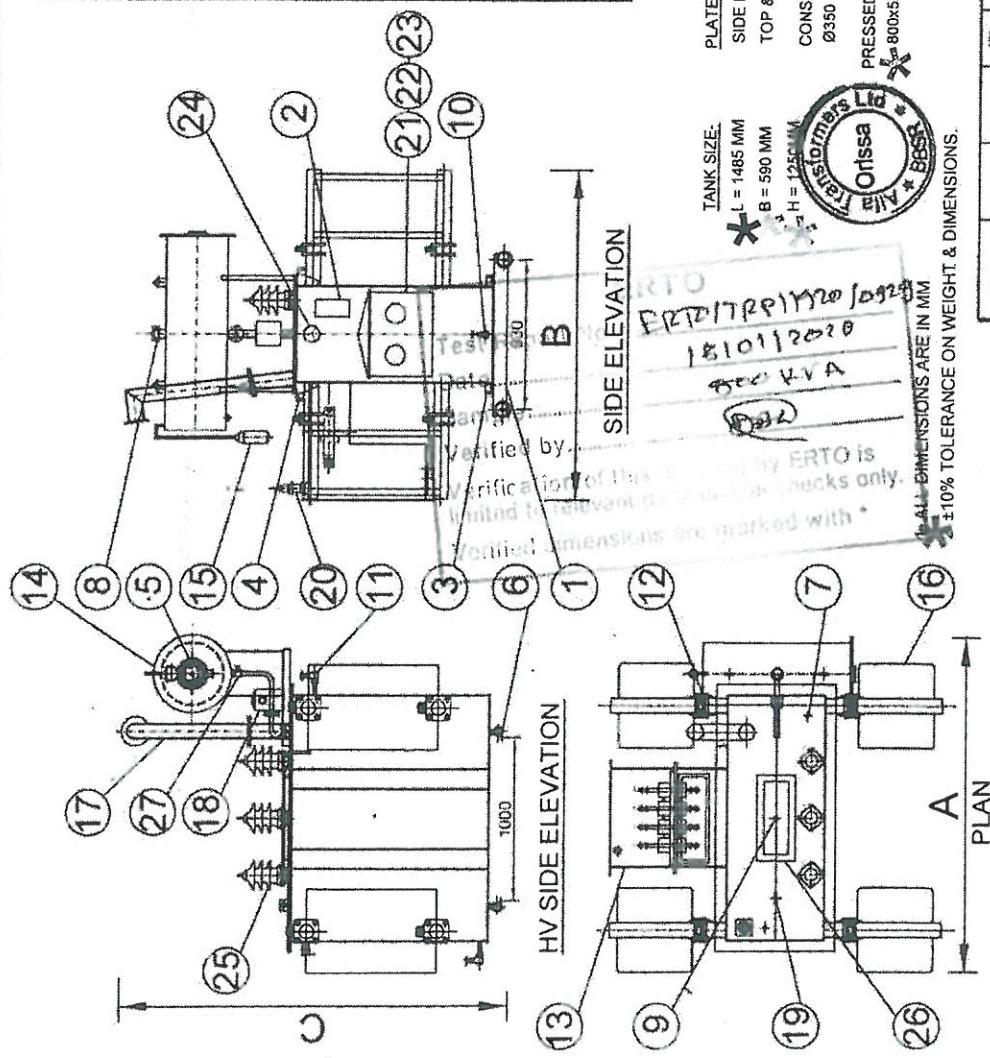
2020	NAME	DATE	ALFA TRANSFORMERS LTD.
DGN	AKB	CUST OWNER	ALFA TRANSFORMERS LTD.
DRN	DPM	TENDER NO.	
SDH	DPM	ORDER NO.	
APPD	AKB	MANUFACTURE	ALFA TRANSFORMERS LTD.
SCALENTS		TOLERANCE	±10%
REV	DATE	BRIEF DESCRIPTION	TITLE: RATING DIAGRAM AND TERMINAL MARKING 800KVA 11/43KV CRGO TRANSFORMER
			DWS. No. 15128 RO

NOTE:-
 1. ALL DIMENSIONS ARE IN MM.
 2. ±10% TOLERANCE ON WEIGHT & DIMENSIONS.

*A. Sengar
Engineer
URCC (P) Ltd.*

STANDARD FITTINGS

SL. NO.	DESCRIPTION	QTY
01	BASE CHANNEL	02
02	NAME RATING TERMINAL MARKING & DIAGRAM PLATE	01
03	TWO EARTHING PADS.	02
04	TRANSFORMER LIFTING LUGS.	04
05	MAGNETIC OIL LEVEL GAUGE.	01
06	UNI DIRECTIONAL ROLLER.	04
07	THERMOMETER POCKET.	01
08	OIL FILLING HOLE WITH CAP.	01
09	AIR RELEASE PLUG.	01
10	BOTTOM DRAIN VALVE.	01
11	EXTRA NEUTRAL BUSHING.	01
12	RADIATOR SHUT OFF VALVE.	01
13	LV CABLE ENDBOX WITH ALL ARRANGEMENT.	01
14	CONSERVATOR WITH DRAIN PLUG.	01
15	DEHYDRATING SILICA GEL BREATHER.	01
16	PRESSED STEEL RADIATOR (Ø300x520x12FINS -4Nos.)	04
17	EXPLOSION VENT PIPE WITH DOUBLE DISCHARGE.	01
18	BUCHOLZ RELAY WITH ALARM & TRIP.	01
19	TOP COVER LIFTING LUGS.	02
20	EXTRA NEUTRAL BUSHING.	01
21	MARSHALLING BOX.	01
22	oil TEMPERATURE INDICATOR WITH CONTACTS.	01
23	WINDING TEMPERATURE INDICATOR WITH CONTACTS	01
24	OFF LOAD TAP CHANGING SWITCH.	01
25	KV BUSHINGS.	03
26	INSPECTION COVER	01
27	SHUT OFF VALVE FOR BOTH SIDE OF BUCHOLZ RELAY.	01



MINIMUM EXTERNAL AIR CLEARANCE		
PHASE TO PHASE	PHASE TO EARTH	
H.V	255	140
L.V	75	40
KVA	DIMENSIONS ARE IN M.M.	
800	A B C	
OVERALL	2000	2325
		2320
		APPROX. WT. IN KG.
CORE & WIGGS (WITH CORE CLAMP)	TANK & FITTINGS	OIL kg/ltrs. TOTAL
2100	810	780/900 3690

REVISION	DATE	BRIEF DESCRIPTION	DWG. No.
		GENERAL ARRANGEMENT OF 800KVA	15129_RO
		110/433KV TRANSFORMER	

As per standard
Electrical Dept.
URCC (P) Ltd.



ANNEXURE -II

Technical Deviation

Technical Specification Ref: ENG-EHV-009

Sr. No	Clause No	Tender Clause No	Details of Deviation with justifications
1	Pg. No 76 of 233 Doc. No ENG-EHV-009 - TS 11KV RMU 5.5 Circuit Breaker for transformer/local feeder control	The Breaker contact resistance should be <=50mico ohms.	The contact resistance of the circuit breaker will be as per manufacturer's type tested design
2	Pg. No 82 of 233 Doc. No ENG-EHV-009 - TS 11KV RMU 5.11 Remote Control of the RMU	Also, the PCB of motor should be covered by anti-tracking agent. There should be relay with timer instead of only relay, which is used in the latching circuit	As per early supplied to TPCDL.

Technical Specification Ref: Doc. No D-NPCE-SPEC-23

Sr. No	Clause No	Tender Clause No	Details of Deviation with justifications
1	Pg. No 104 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I 4.0 GTP CT & PT	4.3.1 Transformation ratio (CT ratio): 30/5, 50/5 ,100/5, 200/5 & 300/5	Kindly confirm CTs ratio, we have considered 300/5A, 15VA CL 0.2
2	Pg. No 105 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I 4.1 RMU Configurations	B) There will be 3 no's of 11KV Current Transformer	We have considered 60-400/1A, 5P10, 2.5VA for outgoing breaker
3	Pg. No 109 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I 5.5 Circuit Breaker for transformer/local feeder	5.5.6 The Breaker contact resistance should be <=50 micro-ohms.	The contact resistance of the circuit breaker will be as per manufacturer's type tested design

A. Venkant Ray.
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.



Sr. No	Clause No	Tender Clause No	Details of Deviation with justifications
	control		
4	Pg. No 109 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I 5.5 Circuit Breaker for transformer/local feeder control	5.5.10 three toroid transformers incorporated in the transformer tee-off bushings	CT shall be mounted on cable in the cable compartment
5	Pg. No 111 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I 5.6 Bushing and cable termination	Note: Supply of Cable terminations is not to be part of RMU supply.	Supply of cable termination boot is included in scope of supply, kit is not included in 11kV supply. Also, RMU to Metering panel is been connected via cable, which is in purchaser scope.
6	Pg. No 114 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I 5.11 Remote Control of the RMU	Also, the PCB of motor should be covered by anti-tracking agent. There should be relay with timer instead of only relay, which is used in the latching circuit	As per early supplied to TPCDL.
7	Pg. No 118 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I Bushing	epoxy bushings of reputed make (as approved by the Purchaser) with Brass studs as per the rating.	Kindly allow as per manufacturer standard practice
8	Pg. No 119 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit Annexure - I Approved Sub Vendor List	Epoxy Resin Cast C.T.- Pragati Make, Huphen Fabricator, Huphen Electromech Epoxy Resin Cast P.T.- Pragati Make, Huphen Fabricator, Huphen Electromech TTB - DAV make & Model name is SSFS TB (Link) - Connect well	Kindly allow as per manufacturer standard make
9	Pg. No 119 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit	7.1 Type Tests 7) Operational & Interlock performance Test	Please note this are routine test, not Type Test

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Sr. Engineer
Electrical Dept.
URCC (P) Ltd



Sr. No	Clause No	Tender Clause No	Details of Deviation with justifications
	Annexure - I Approved Sub Vendor List	12 Dimensional and Visual Checks.	
10	Pg. No 120 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit 7.0 Test for RMU	7.2 Routine Tests 5) SF6 Pressure withstand test	5) SF6 leakage test is part of the Routine test at the tank stage and cannot be carried out as acceptance test during final inspection. We shall provide SF6 gas leakage test as an part of routine test report
11	Pg. No 127 of 233 Doc. No D-NPCE-SPEC-23 - TS 11KV RMU with CTPT Unit 19. GTP	45.3 Height - Minimum 1200mm above GL	Maximum height of cable box is 800mm

A. Venkant Ray

Sr. Engineer
Electrical Dept.
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PART -A - TECHNICAL

ANNEXURE –I

1. BILL OF MATERIAL FOR 3 WAY RING MAIN UNIT (2 LOAD BREAK SWITCH + 1 CIRCUIT BREAKER)

Supply of 11kV, 630A, 21KA/3 SEC, 3 WAY, EXTENSIBLE, OUTDOOR, MOTORIZED, RING MAIN UNIT, COMPRISING OF 2 ISOLATORS (LBS) & 1 (CB), TYPE: MCR: CC+M+SSV

Lucy Electric make SF6 insulated, 11kV, Extensible, Outdoor, Motorized, Ring Main Unit (type MCR) contained within a metal clad enclosure having degree of protection to IP-54, suitable for Outdoor use, free standing and comprising,

2 - 630 Amp triple pole, single break, 3 position (ON, OFF & EARTH) ring main switches, each with independent **Motorized** charged spring mechanism and fully rated earth switch.

2 - Cable box with gland plate suitable for a front bottom entry 1Rx3Cx400 Sq.MM.

1 - 630 Amp triple pole, vacuum circuit breaker with independent **Motorized** charged spring mechanism and fully rated earth switch.

1 - Cable box with gland plate suitable for a front bottom entry 1Rx3Cx400 Sq.MM

1 – Air Insulated Metering Panel

3 – Nos of with Potential Transformer 11kV/v3/110/v3, CL: 0.2, 50VA along with Fuses

3 – Nos of Current Transformer 300/5, CL 0.2, 15VA,

The unit will comprise of following:

1 - Mimic diagram on front panel complete with status indicators

1 - Set of positive standard mechanical interlocks

3 -Nos of Resin Cast current transformers for CB protection with ratio 60-400/1A, CL 5P10, 2.5VA

1 - Nos Self powered relay, **Ashida make for Circuit Breaker**

1 - Set of fully interlocked test access covers

3 - Nos of VPIS for ring isolator switches & circuit breaker

2- Fault Passage Indicator, **C&S make for ring isolator**

3- Operation counter for LBS & CB

2 - External stud for earthing connections

1 - SF6 gas pressure indicator and SF6 recharging facility

1 - Local 'PUSH TO TRIP' mechanism suitably shrouded in each breaker.

1 - Set of auxiliary terminals

2 - Battery (2x12V DC, 7AH)

1 - Battery charger, 230V AC Input & 24V DC Output, 5Amps.

1 - Operating handle

1 - Operation/ installation and commissioning manual.

Paint Finish: Outer Enclosure - Paint finish in Dark Admiralty Grey shade no.632 of IS: 5 / RAL7032

Kindly Note: The RMU & Metering Panel to be connected via Cable & required Energy which is in purchaser scope.

A. D. Darji
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Electrical Deptt.
URCC (P) Ltd.



Electric

LUCY ELECTRIC INDIA PVT LTD

CUSTOMER : URC CONSTRUCTION (P) LTD, ODISHA
 PRODUCT : MCR
 VARIANT : SSV(NE) WITH METERING UNIT
 RATING : 11KV, 50HZ, 21KA FOR 3SEC, 3 WAY.

IF IN DOUBT ASK

A. Gopal Reddy
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

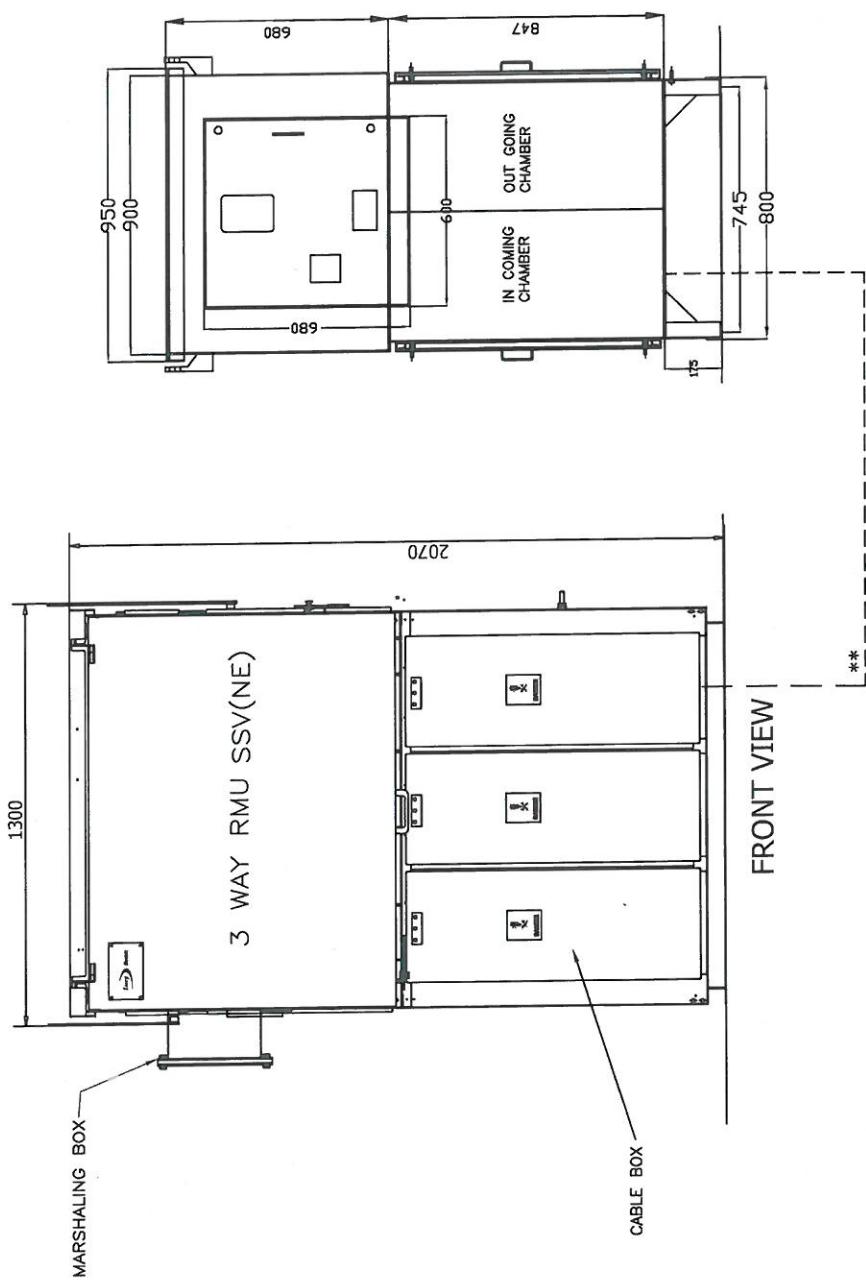
LOCATION: COTTACK NEAR JAI BUS TERMINAL (CNBT)

END CUSTOMER : TP CENTRAL ODISHA DISTRIBUTION | LIMITED

Lacy Electric

ISS. NO. 00

OUTDOOR, MOTORISED, NON-EXTENSIBLE RMU RMU TYPE: SSV(NE)



NOTES:

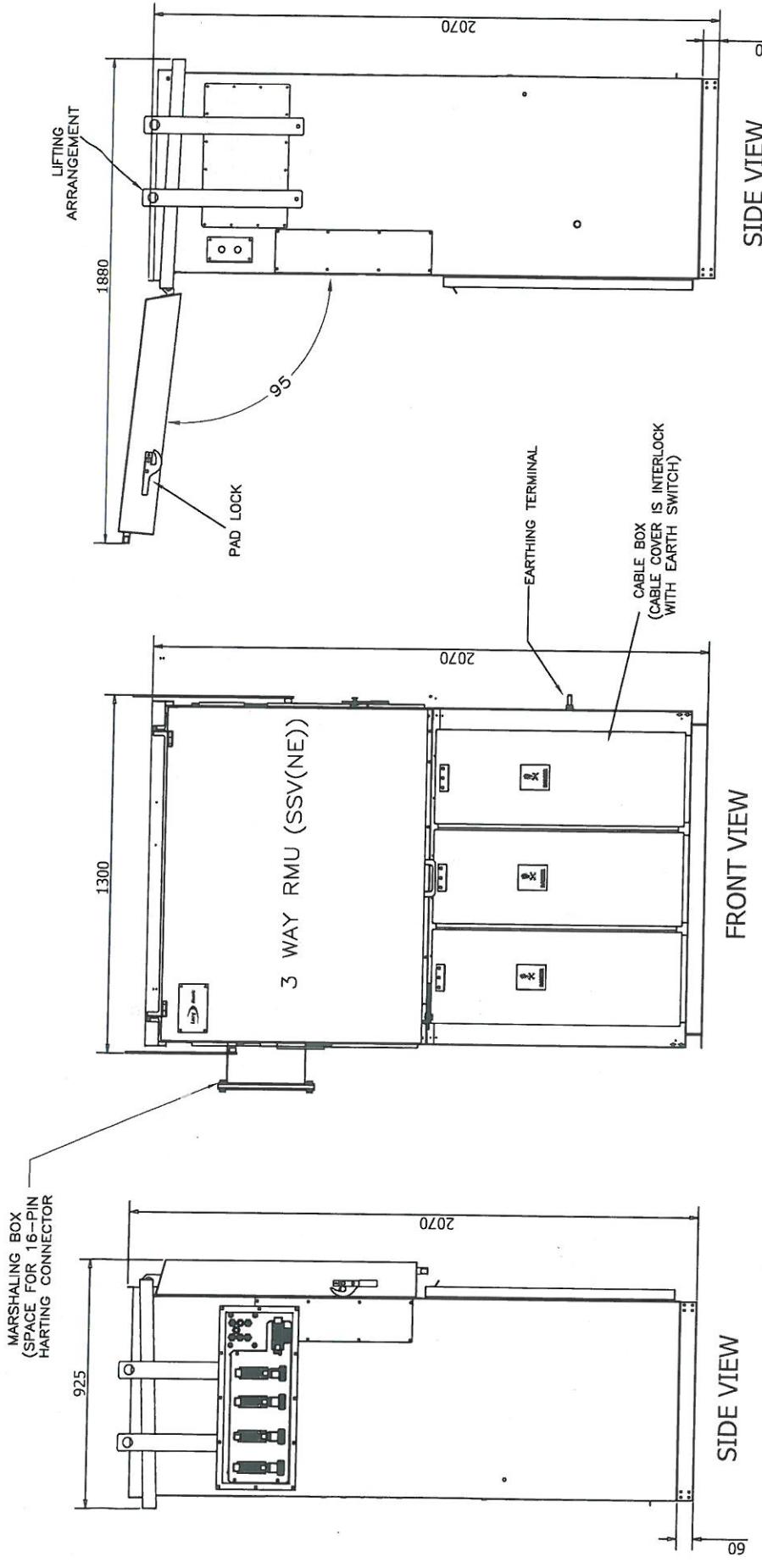
1. ALL DIMENSIONS ARE SUBJECTED TO MANUFACTURING TOLERANCE $\pm 5\%$.
 2. ENCLOSURE SHALL BE POWDER COATED WITH RAL 7032.
 3. PAINT THICKNESS SHALL BE 80–100 MICRONS.
 4. ENCLOSURE EARTHING (EXTERNAL & INTERNAL) – GI 35X6 mm
 5. POSITION OF COMPONENTS ARE TENTATIVELY SHOWN, THEY MAY BE CHANGE DURING DETAIL ENGINEERING.

*** DOTTED LINE SHOWS EXTERNAL 3CORE/1CORE CABLE CONNECTED BETWEEN CB & METERING SUPPLY.

A. Sandip Ray
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.



OUTDOOR, MOTORISED, NON-EXTENSIBLE RMU RMU TYPE: SSV(NE)



NOTES:

1. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCE $\pm 5\%$.
2. ENCLOSURE SHALL BE POWDER COATED WITH RAL 7032.
3. PAINT THICKNESS SHALL BE 80-100 MICRONS.
4. ENCLOSURE EARTHING (EXTERNAL & INTERNAL) - GI 35X6 mm
5. POSITION OF COMPONENT'S ARE TENTATIVELY SHOWN, THEY MAY BE CHANGE DURING DETAIL ENGINEERING.

IF IN DOUBT ASK

A. Venkatesh
Sr. Engineer,
Electrical Dept.
URCC (P) Ltd.

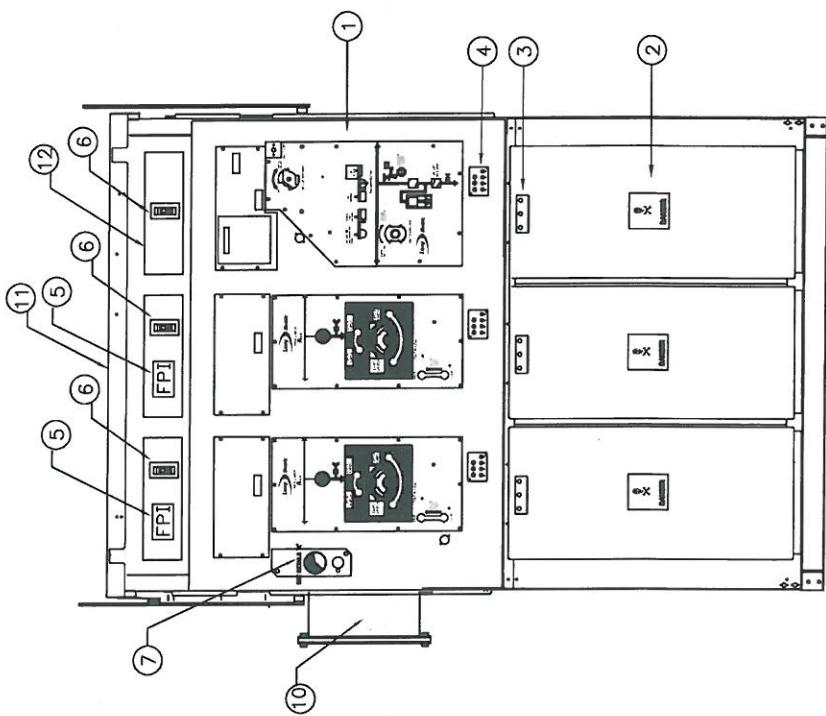
SHEET 1 OF 2

NO	REVISION	SIGN	DATE	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DRG. NO.	ISS. NO.
								G.A. 11KV_SSV(NE)_04	00

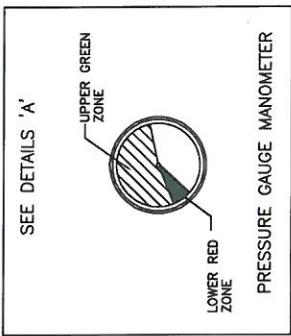


GENERAL ARRANGEMENT FOR 11KV, 3 WAY,
SF6 INSULATED, OUTDOOR
NON-EXTENSIBLE MOTORISED RMU
TYPE: SSV(NE)

SR.NO.	DESCRIPTION	SR.NO.	DESCRIPTION
1.	FASCIA/FRONT PANEL	6.	LOCAL REMOTE SWITCH FOR 3 WAY RMU
2	CABLE BOX	7.	PRESSURE GAUGE MANOMETER
3.	CABLE BOX HANDLE	10.	MARSHALLING BOX 16-PIN HARTING CONNECTOR
4.	VOLTAGE PRESENCE INDICATION SYSTEM (VPS)	11.	BATTERY MOUNTED ON TOP OF THE RMU TANK
5.	FPI FOR LBS-1 & 2	12.	BATTERY CHARGER MOUNTED INSIDE LV COMPARTMENT



IF IN DOUBT ASK



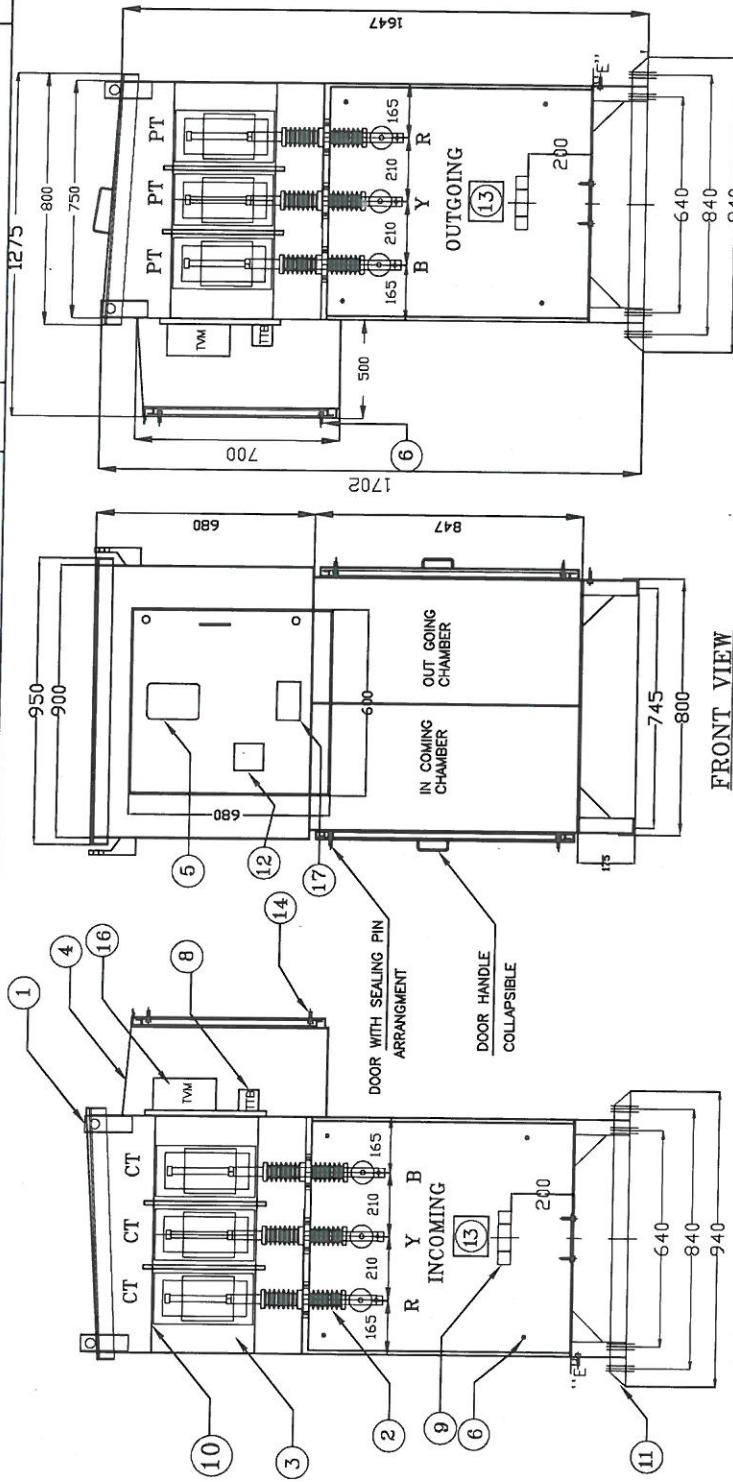
A. Sandesh
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

SHEET 2 OF 2



CHANGE DURING DETAIL ENGINEERING.

SR.NO.	DESCRIPTION	SR.NO.	DESCRIPTION
1.	LIFTING LUG	6.	SEALING ARRANGEMENT
2	BUSHING	7.	INTERLOCK FOR CT PT CHAMBER
3.	HT CHAMBER CT/PT	8.	TEST TERMINAL BLOCK WITH TRANSPARENT COVER
4.	METERING CHAMBER	9.	CABLE FIXING CLAMP
5.	TOUGHNED GLASS	10.	3mm BRACKET FOR CT/PT MOUNTING



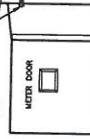
NOTES:-

- ALL DIMENSIONS ARE IN MM.
- FABRICATION BOX 3MM THICK.
- CT & PT WILL BE OF SINGLE PHASE DRY TYPE.
- FINISH & PT POWDER COATED WITH AZTECH GREY AFTER PRETREATMENT.
- CT & PT COMPARTMENT FULL WELDED FROM INSIDE & ONLY TOP COVER WILL BE OPENABLE FOR MAINTENANCE.
- ALL HARDWARE EXPOSED TO ATMOSPHERIC CONDITIONS ARE OF B GRADE.
- CABLE CLAMP SUITABLE FOR 70 Sqmm TO 300 Sqmm.
- CT SECONDARY STAR POINT EARTHED IN CT/PT CHAMBER.
- USBAR SIZE OF 30X6 MM FOR ALL CUBICLES.
- SEALING BOLTS ARRANGEMENT - TWO PROVIDED DIAGONALLY ON EACH DOOR OF THE CABLE CHAMBER, FOUR NOS. PROVIDED ON THE TOP COVER INCLUDING SEALING BOLTS.
- POSITION OF COMPONENTS ARE TENTATIVELY SHOWN, THEY MAY BE CHANGE DURING DETAIL ENGINEERING.

IF IN DOUBT ASK

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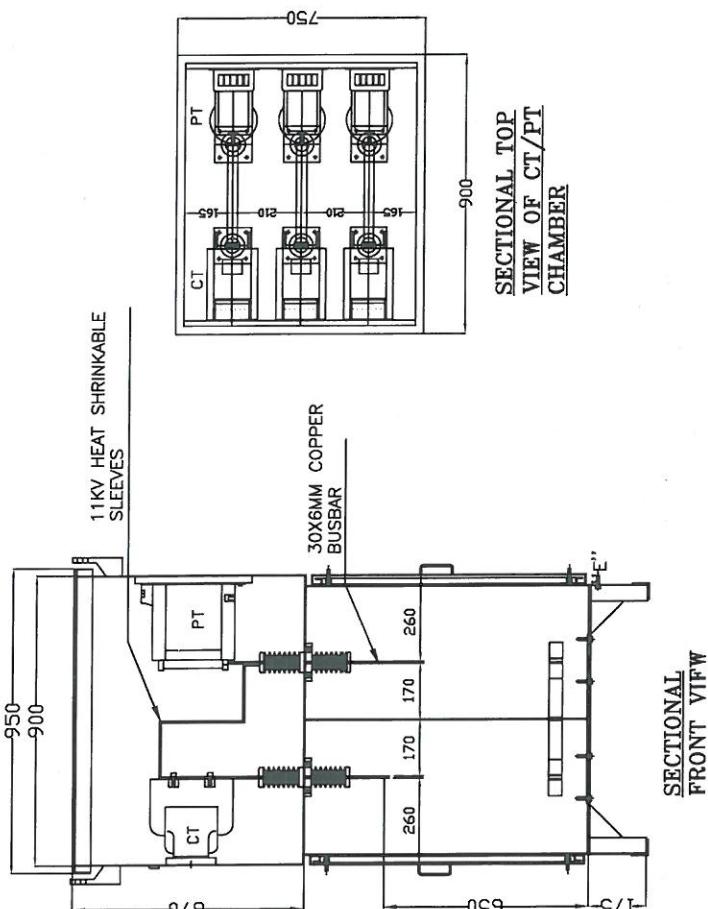
DETAIL VIEW FOR
INTERLOCKING



SHEET 1 OF 2

NO	REVISION	SIGN DATE	NO	REVISION	SIGN DATE	THIRD ANGLE PROJECTION	SIGN / NAME	DRN	ASV	GENERAL ARRANGEMENT FOR METERING UNIT
							SCALE: NTS	APPD	TRR	
							ISS. NO. 00	DRG. NO. GA_11KV_SSv(NE)_05		Lucy Electric India Pvt Limited

SR. NO	DESCRIPTION	QUANTITY NOS.
1	CUBICLES MADE OF 3 mm SHEET STEEL (HUPHEN FAB MAKE)	1
2	HT METERING CURRENT TRANSFORMER 300/5A, CL=0.2, 15VA (HUPHEN FAB MAKE)	3
3	POTENTIAL TRANSFORMER FUSE TYPE 11KV/ $\sqrt{3}$ /110V/ $\sqrt{3}$, 50 VA CL = 0.2 (HUPHEN FAB MAKE)	3
4	SEALING BOLT ARRANGEMENT OF DOOR	10
5	INCOMMING TERMINAL CONNECTION	3
6	OUTGOING TERMINAL CONNECTION	3
7	COPPER BUS BAR SIZE 30 X 6 MM	6
8	LIFTING HOOK	4
9	DANGER BOARD AS PER SPECIFICATION	2
10	CABLE BOX	2
11	EARTH BOLTS	2
12	BOLT M10 WITH BUSH (FOR INTERLOCKING ARRANGEMENT)	2
13	CABLE GLAND PLATE ADJUSTABLE TYPE	2
14	TOUGHENED GLASS FOR METER READING	1
15	TRIVECTOR METER (CUSTOMER SCOPE OF SUPPLY)	-
16	T.T.B. (MAKE: DAV/EQL)	1

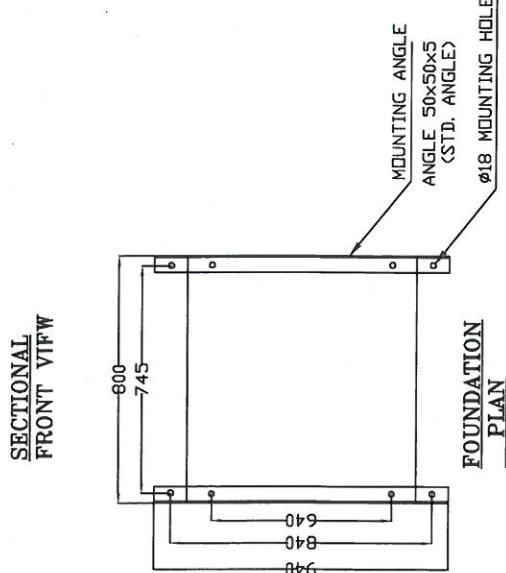


IF IN DOUBT ASK

*A. Venkatesh
Sri. Engineer,
Electrical Deptt.
URCC (P) Ltd.*

TECHNICAL SPECIFICATION : -

1. FABRICATION : 3MM. M.S. SHEET WITH SUPPORTING ANGLES
2. PAINTING : POWDER COATING!
3. SHADE:- AZTECH GREY
4. BUSBAR : TINNED ELECTROLYTIC COPPER
5. METER DOOR HINGES WILL NOT BE VISIBLE FROM OUT SIDE (INTERLOCKED).
6. TOP SIDE COVER (CTP COVER) INTERLOCKED WITH METER DOOR.
7. PROVISION FOR INCOMMING & OUTGOING SUPPLY THROUGH CABLE.
8. THE IDENTIFICATION MARKS R.Y.B. & EARTH TERMINAL WILL BE MARKED BY PAINT OR EMBOSSED
9. ALL HARDWARE USED IN GRADE 8.8 (H.T)
10. CABLE GLAND PLATE (DETACHABLE TYPE) WITH ADJUSTABLE TERMINATION.



NO	REVISION	SIGN	DATE	REVISION	SIGN	DATE	SIGN / NAME	GENERAL ARRANGEMENT FOR METERING UNIT	SHEET 2 OF 2
							DRN	ASV	
							ALL DIMN'S ARE IN mm	CHD APPD	ASV TRR
							SCALE: NTS		
							THIRD ANGLE PROJECTION DATE: 15.06.2022	DRG. NO. GA_11KV_SSV(NE)_05	ISS. NO. 00

SPECIFICATION SHEET & IMPORTANT NOTES

RMU PANEL DESCRIPTION:			
SF6 INSULATED, 11kV NON-EXTENSIBLE OUTDOOR RMU (Type: SSV(NE)) comprising of: 1) 2 NO - 630 A TRIPLE POLE, SINGLE BREAK, 3 POSITION (ON, OFF & EARTH) ISOLATORS 2) 1 NO - 630 A TRIPLE POLE, VACUUM CIRCUIT BREAKER			
SIZE OF WIRING IN PANEL:			
1) FOR CT CIRCUIT: 2.5SQMM (RED,YELLOW,BLUE,BLACK) 2) FOR AC CIRCUIT: 1.0SQMM (BLACK) 3) FOR DC CIRCUIT: 1.0SQMM (GREY)			
RMU MATERIAL & COLOR SHADE:			
1) FOR MAIN TANK: 3MM 2) FOR OUTER ENCLOSURE: 2MM 3) PAINT SHADE: RAL 7032			
RMU EXTENSIBILITY:			
1) RMU IS BOTH SIDE NON-EXTENSIBLE TYPE			
CABLE ENTRY & ACCESS:			
1) BOTTOM CABLE ENTRY SUITABLE FOR CABLE UPTO 1RX3CX400SQMM 2) FRONT ACCESS FOR CABLE COMPARTMENT			

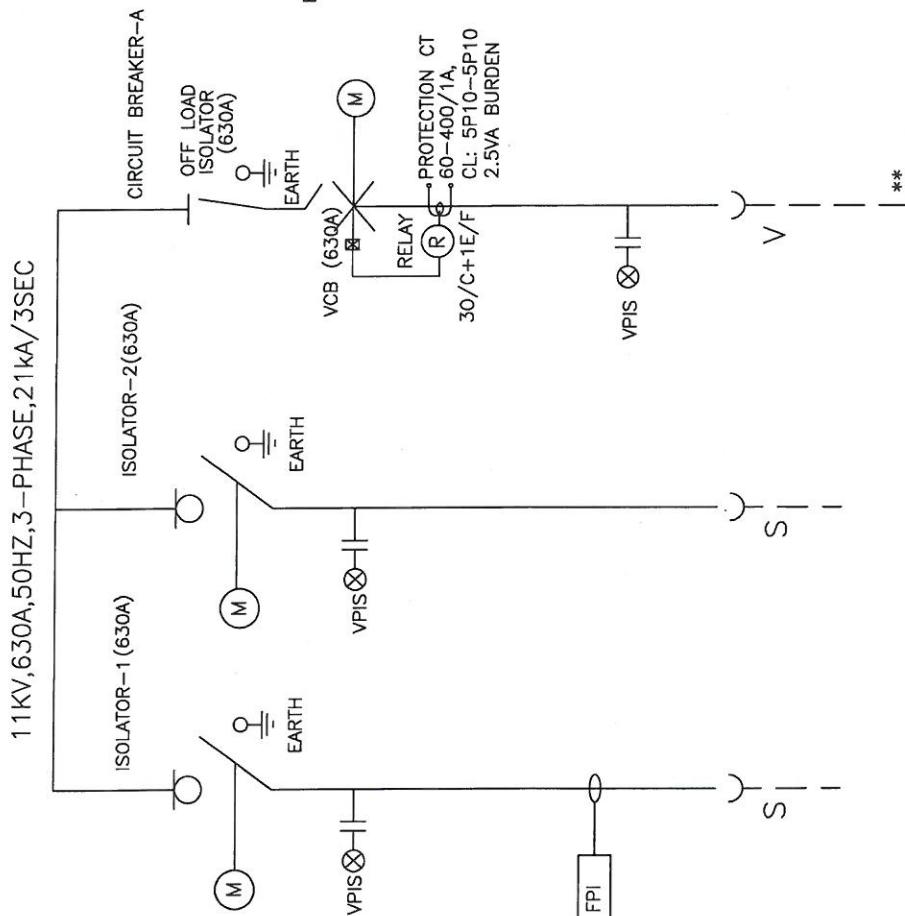
IF IN DOUBT ASK

RATED VOLTAGE:	11 kV
SYSTEM VOLTAGE:	12 kV
POWER FREQUENCY WITHSTAND VOLTAGE:	28 kV
IMPULSE WITHSTAND VOLTAGE:	75 kV _p
RATED FREQUENCY:	50 Hz
RATED SHORT CIRCUIT WITHSTAND FOR 3SEC:	21 kA
SHORT CIRCUIT PEAK MAKING CURRENT	52.5 kA _p
RATED CURRENT (ISOLATOR):	630 A
RATED CURRENT (CB):	630 A
DEGREE OF PROTECTION (FOR MAIN TANK):	IP 67
DEGREE OF PROTECTION (FOR OUTER ENCLOSURE):	IP 54
REF STANDARDS:	IEC 62271-1, 100, 103, 200, IEC 60529

NO	REVISION	SIGN DATE	NO	REVISION	SIGN DATE	THIRD ANGLE PROJECTION	DRG. NO.	GA_11KV_SSV(NE)_06	ISS. NO.	00
							DRN	ASV	SIGN / NAME	
							CHD	ASV	SPECIFICATION SHEET FOR 3 WAY, SF6 INSULATED, OUTDOOR NON-EXTENSIBLE RMU	Lacey Electric India Pvt Limited URCC
							APPD	TRR		

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Sr. Engg. Dept.
Electrical (P) Ltd.

SINGLE LINE DIAGRAM



IF IN DOUBT ASK

S - ISOLATOR

V - CIRCUIT BREAKER

M - MOTORIZED MECHANISM

** DOTTED LINE SHOWS EXTERNAL 3CORE/1CORE CABLE CONNECTED BETWEEN CB & METERING PANEL BUSBAR & IT IS NOT IN LUCY ELECTRIC SCOPE OF SUPPLY.

3 WAY SF6 INSULATED NON-NON-EXTENSIBLE OUTDOOR RMU WITH METERING, TYPE:SSV(NE)

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NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DRG. NO.	GA_11KV_SSV(NE)_07	SINGLE LINE DIAGRAM FOR 11KV, 3 WAY, SF6 INSULATED, OUTDOOR NON-EXTENSIBLE MOTORISED RMU WITH METERING UNIT (TYPE: SSV(NE) WITH METERING)			ISS. NO. 00
											DRN	CHD	APPD	TRR



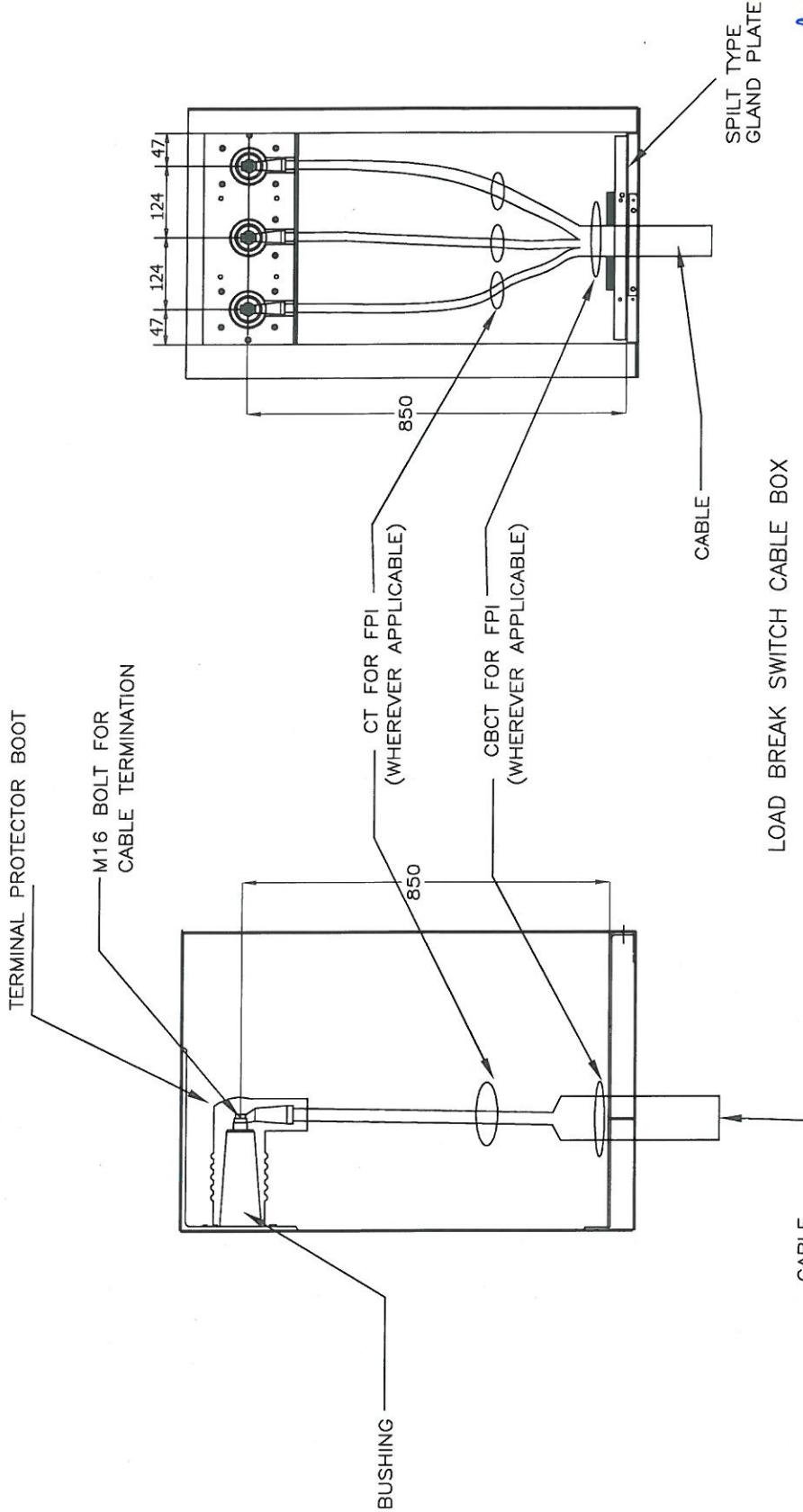
BILL OF MATERIAL FOR 3 WAY SF6 INSULATED NON-EXTENSIBLE OUTDOOR RMU TYPE:SS(NE)

SR.	TAG NO.	DESCRIPTION	QTY.	MAKE	DETAILS
1	Q89	ISOLATOR	2 NOS	LUCY ELECTRIC	11KV, 630A, 21KA FOR 3SECS
2	Q52	CIRCUIT BREAKER	1 NOS	LUCY ELECTRIC	11KV, 630A, 21KA FOR 3SECS
3	VI	VACUUM INTERRUPTERS (1X3)	1 SETS	SHAANXI/CG/EQL	11KV, 630A, 21KA FOR 3SECS
4	Q89	SELECTOR SWITCH / DISCONNECTOR	1 NOS	LUCY ELECTRIC	11KV, 630A, 21KA FOR 3SECS
5	Q89/Q52 BSH	RING/BREAKER BUSHING (1X3)	3 SETS	SHUBHADA POLYMERS	SUITABLE FOR 11KV SYSTEM
6	Q89/Q52 CBB	CABLE BOX WITH SPLIT TYPE GLAND PLATE	3 NOS	LUCY ELECTRIC	SUITABLE FOR CABLE UPTO 1RX3CX400SQ.MM
7	HL	OPERATING HANDLE	1 NO	LUCY ELECTRIC	STD.
8	PGM	SF6 GAS PRESSURE GAUGE MANOMETER	1 NO	WIKA	MIN PRESS:- 0.05 BAR
9	VPIS	CAPACITIVE VOLTAGE INDICATION (VPIS)	3 NOS	MUP ELECTRONICS	NON-SCADA, SUITABLE FOR 11KV SYSTEM
10	50/51	OVER CURRENT & EARTH FAULT RELAY	1 NOS	ASHIDA	MODEL: ADR241S-AM-460-09-01-35-01-00-10 SELF POWERED RELAY, AUX SUPPLY:24V DC WITH 20% SETTING
11	CTP	PROTECTION CT'S : 60~400/1A	1 SETS	G&M/NPPL/SHUBHDA/VIDYUT	2.5VA BURDEN,CLASS: 5P10~5P10
12	FPI	FAULT PASSAGE INDICATOR	1 NO	C&S	CSFPI- WITH SC & EF PROTECTION
13	M	MOTOR FOR ISOLATOR & CIRCUIT BREAKER	3 NOS	LUCY ELECTRIC	24V DC,48W,2A
14	PS	SF6 GAS PRESSURE SWITCH	1 NO	DIKSHIT/EQL	WITH 1NO+1NC CONTACTS
15	L/R	LOCAL REMOTE SWITCH AND PUSH BUTTON ASSEMBLY	3 NOS	MUP ELECTRONICS/EQL	2A 24V DC RATED TWO POSITION SWITCH
16	PCB I1,I2	CONTROL CARD FOR ISOLATOR 1 & 2	2 NOS	MUP ELECTRONICS/EQL	2A 24V DC RATED
17	PCB CBA,CBB	CONTROL CARD FOR CIRCUIT BREAKER A	1 NO.	MUP ELECTRONICS/EQL	2A 24V DC RATED
18	TC CB-A	TRIP COIL FOR CIRCUIT BREAKER A	1 NO.	LUCY ELECTRIC	24V DC RATED
19	3XCT	DISCONNECTING TERMINAL BLOCK FOR CB	1 SET	CONNECTWELL/ELMEX/EQL	DISCONNECTING TYPE TERMINALS
20	MOC	MECHANICAL OPERATION COUNTER	3 NOS	SWASTIK/EQL	NON REVERSIBLE
21	MOC	CABLE CLEAT (HDPE)	3 NOS	PEACE POWER/EQL	SUITABLE FOR 11KV SYSTEM FOR CABLE UPTO 1RX3CX400SQ.MM
22	RAB	RIGHT ANGLE BOOTS,NON TOUCH-PROOF(1X3)	3 SETS	3M/RAYCHEM/EQL	SUITABLE FOR 11KV SYSTEM
22	MFR	MECHANICAL FLAG FOR RELAY	1 NO	POWERINST/EQL	AS PER MANUFACTURE STANDARD
23	1,2,3	16-PIN HARTING CONNECTOR	4 NOS.	SAI/EQL	MALE FEMALE PLUG SOCKET
24	B	BATTERY (1X2)	1 SET	EXIDE/HBL POWER SYSTEM/AMARAJA	(2X12V DC), 7AH
25	BC	BATTERY CHARGER	1 NO	GOGATE ELECTROSYSTEM/ALAN	1/P-230V AC, O/P: 24V DC, 5A
26	MU	METERING UNIT	1 NO	HUPHEN FABRICATOR	SUITABLE FOR 11KV SYSTEM

A. John P.T.
Sr. Engineer
Electrical Dept.
UROCC (P) Ltd.

IF IN DOUBT ASK

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DRN	CHD	APPD	TRR	SIGN / NAME	BILL OF MATERIAL FOR 11KV, 3 WAY, SF6 INSULATED, OUTDOOR NON-EXTENSIBLE MOTORISED RMU (TYPE: SSV(NE))	Lacy Electric India Pvt Limited
									ALL DIMN'S ARE IN mm SCALE: NTS	ASV	ASV	ASV	ISS. NO. 00	DRG. NO. GA_11KV_SSV(NE)_08	ISS. NO. 00



NOTES :

1. ALL DIMENSIONS ARE SUBJECTED TO MANUFACTURING TOLERANCE $\pm 5\%$, UNLESS OTHERWISE STATED.
2. SHEET THICKNESS OF CABLE BOX IS 2 MM GALVATTE.
3. SPLIT TYPE GLAND PLATE HOLE PROVIDED.

**Sr. Engineer
Electrical Dept.
URCC (P) Ltd.**

SHEET 1 OF 2



Incy Electric
India Pvt Limited

ISS. NO. 00

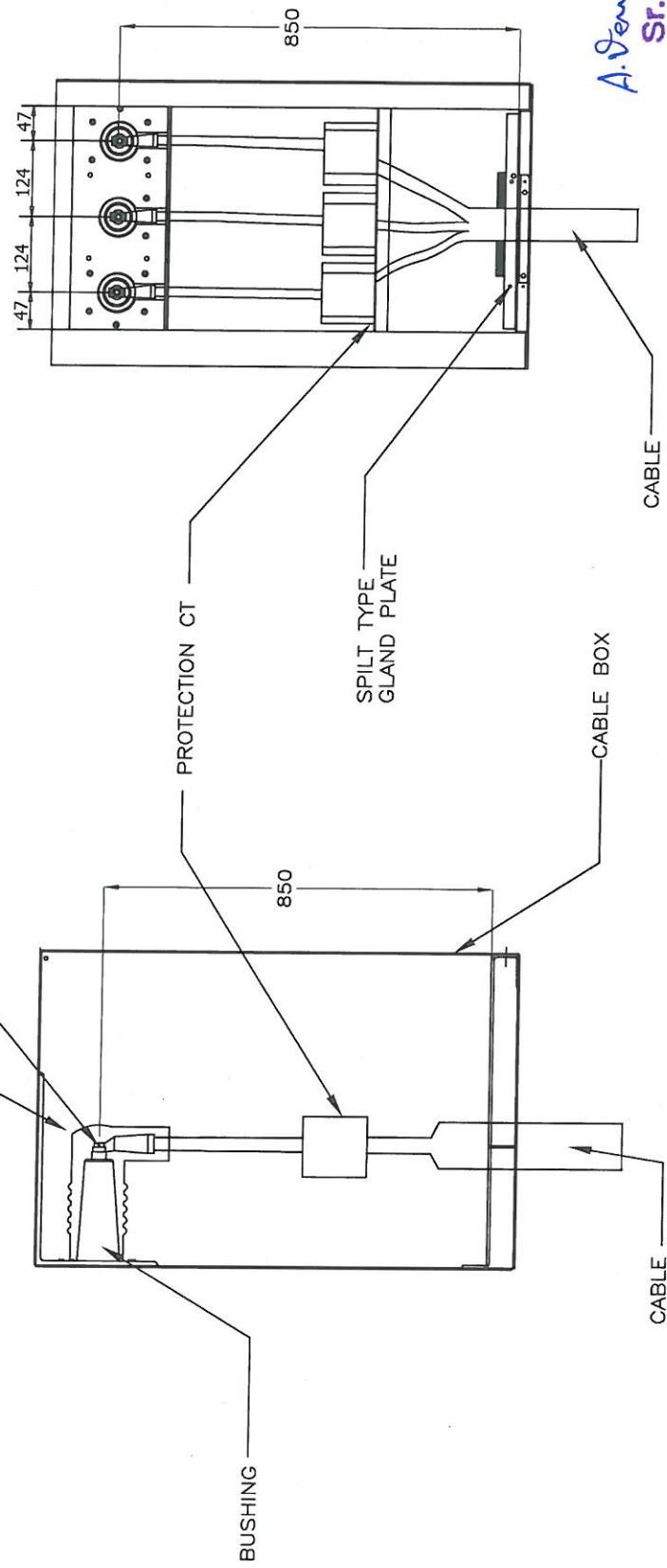
Table 1. Summary of the main characteristics of the three groups of patients.

IF IN DOUBT ASK

DRAWING NO. GA_11KV_SS/(NE)_09						ISS. NO. 00				
NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DATE: 15.06.2022	DRG. NO. GA_11KV_SS/(NE)_09
								ALL DIMN'S ARE IN mm SCALE: NTS	DRN CHD APPD	ASV ASV TRR
									SIGN / NAME	TYPICAL CABLE TERMINATION OF LOAD
										Lacy Electric India Pvt Limited

TERMINAL PROTECTOR BOOT

M12X16 REDUCER BOLT
FOR CABLE TERMINATION



CIRCUIT BREAKER CABLE BOX

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Sr. Engineer
Electrical Deptt.
URCC (P) Ltd.

SHEET 2 OF 2



ISS. NO. 00

- NOTES :
1. ALL DIMENSIONS ARE SUBJECTED TO MANUFACTURING TOLERANCE $\pm 5\%$, UNLESS OTHERWISE STATED.
 2. SHEET THICKNESS OF CABLE BOX IS 2 MM GALVATITE.
 3. SPLIT TYPE GLAND PLATE HOLE PROVIDED.

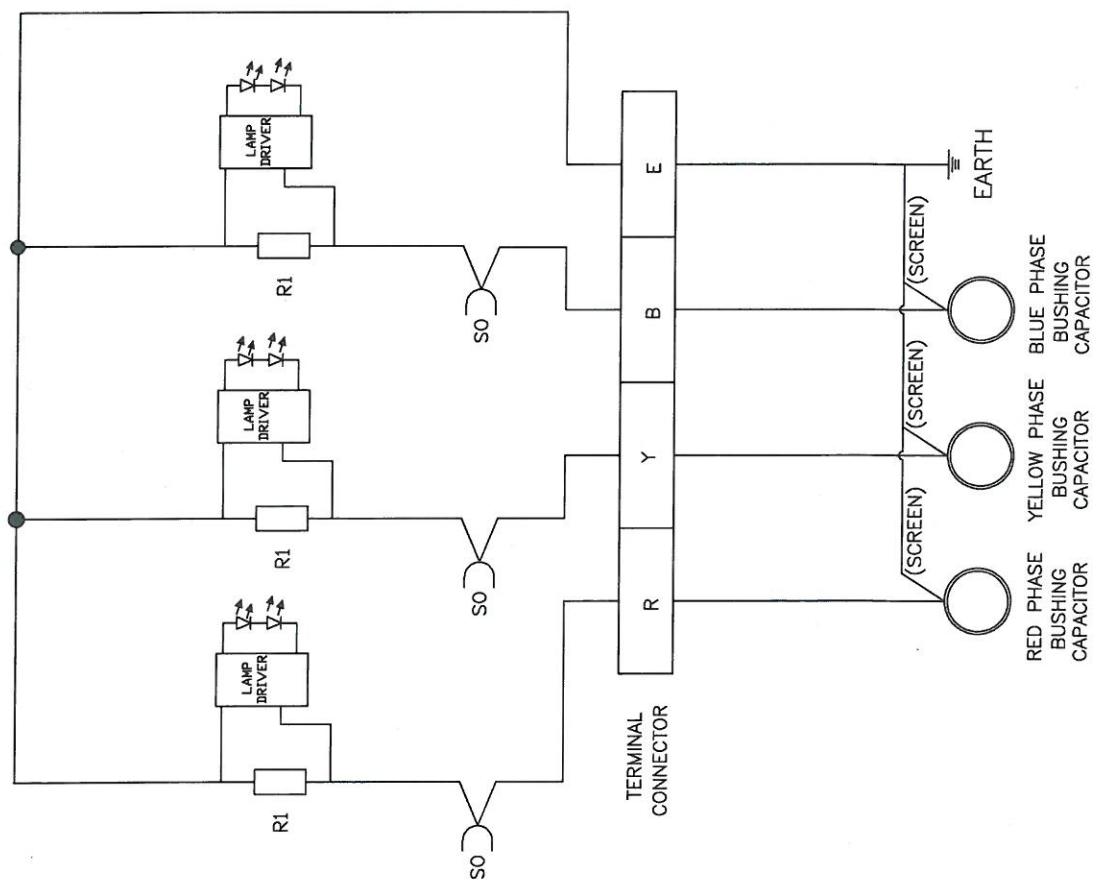
IF IN DOUBT ASK

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	SIGN / NAME	
								DRN	ASV
								SCALE: NTS	CHD APPD TRR

ISS. NO. 00

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URCC (Pv. Ltd.)

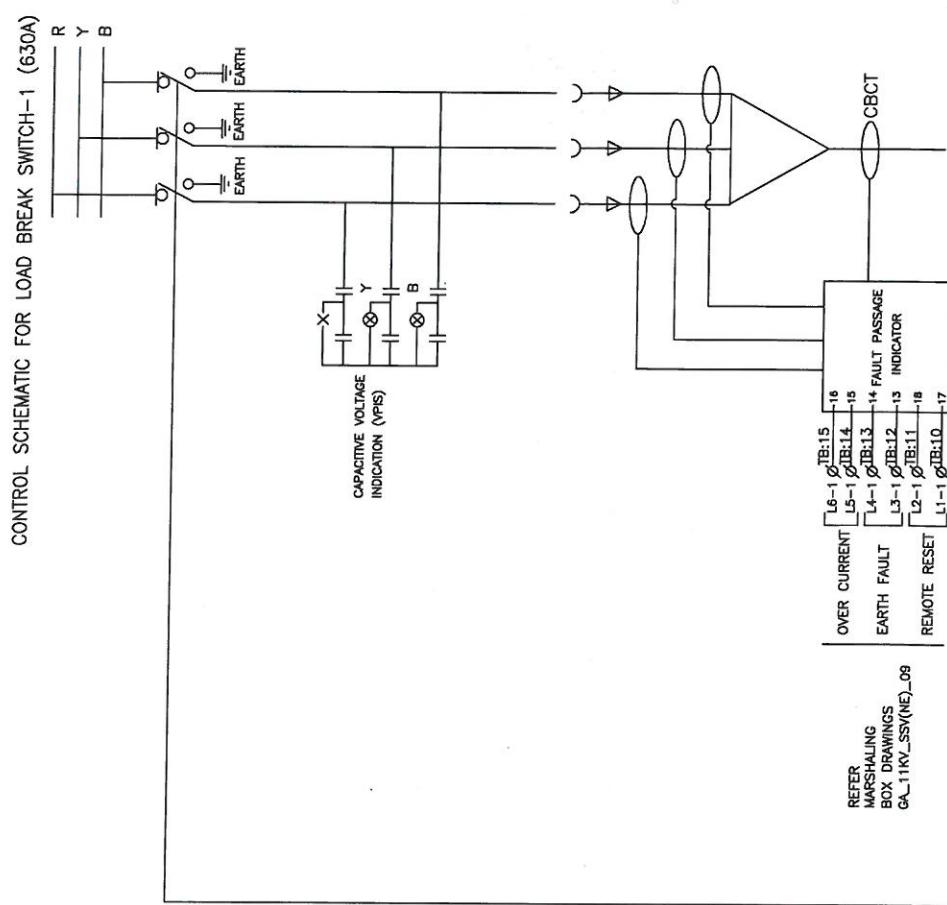
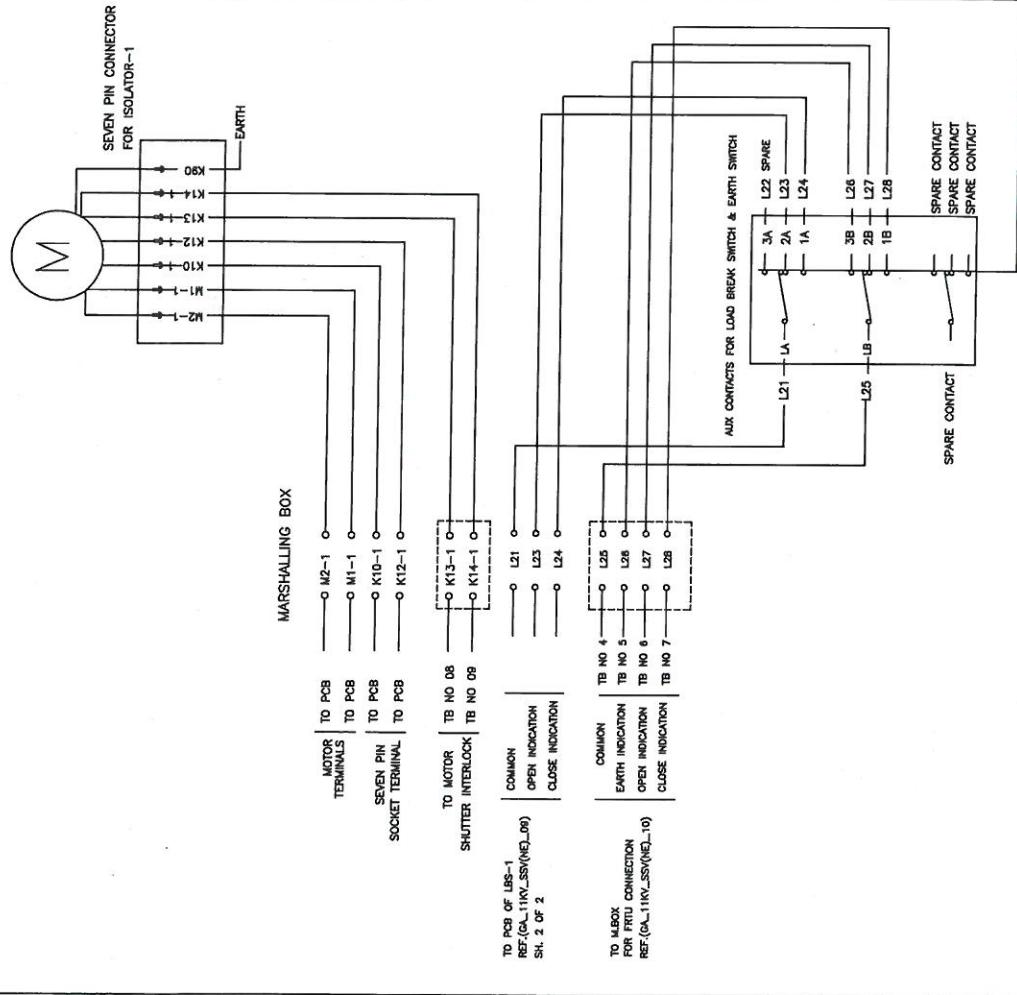
VPIIS : VOLTAGE PRESENCE INDICATION SYSTEM



IF IN DOUBT ASK

NO	REVISION	SIGN	DATE	SIGN	DATE	SIGN / NAME		ALL DIMN'S ARE IN mm	SCALE: NTS	CONTROL SCHEMATIC FOR VPIIS	
						DRN	ASV			APPD	TRR
										DRC. NO. GA_11KV_SSV(NE)_10	ISS. NO. 00





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Sr. Engg. Dept
Electrical (P) Ltd
URCC

SHEET 1 OF 3



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India Pvt Limited

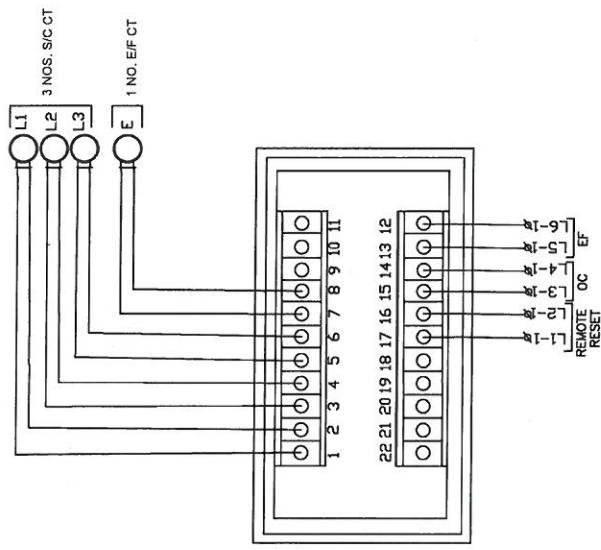
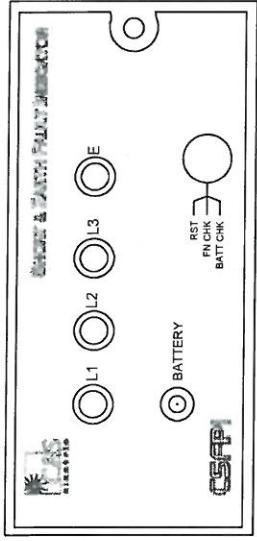
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ISS. NO. 00

CONTROL SCHEMATIC FOR LOAD BREAK SWITCH-1 (6:30A)

IF IN DOUBT ASK

FAULT PASSAGE INDICATOR MAKE: C&S



TERMINAL STRIP

IF IN DOUBT ASK

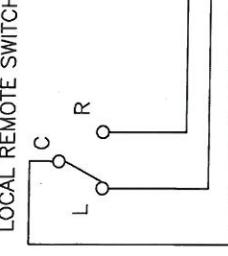
NOTE:-
FPI WITHOUT SEPARATE POTENTIAL FREE CONTACT

SHEET 2 OF 3



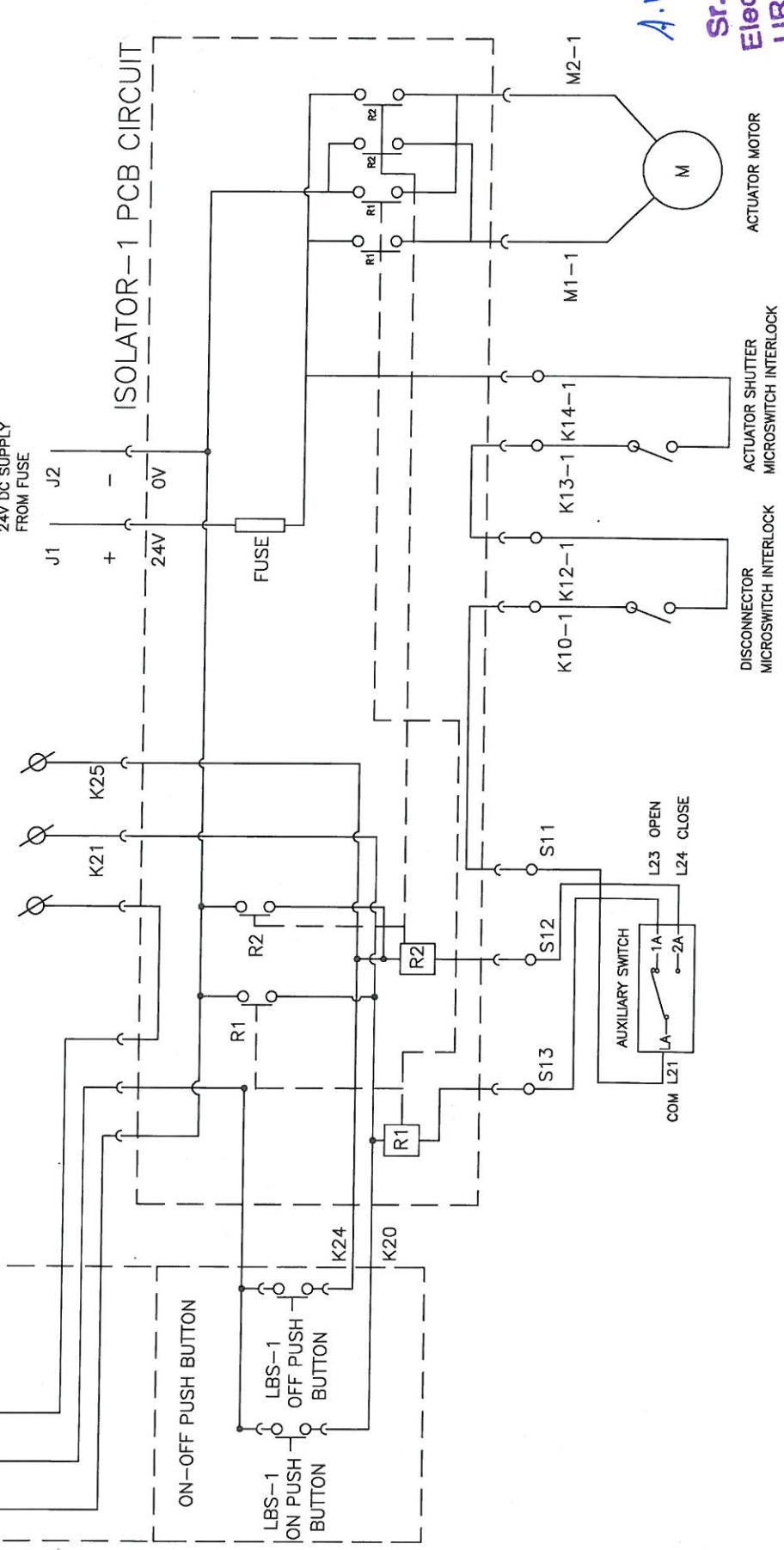
SHEET 2 OF 3									
LUMINOSO SEPARATE POTENTIAL FREE CONTACT									
NO	REVISION	SIGN	DATE	SIGN	DATE	ALL DIMN'S ARE IN mm		SIGN / NAME	
						DRN	ASV	C&S MAKE FPI DETAIL VIEW	
						CHD	ASV	 Lacey Electric India Pvt Limited	
						SCALE: NTS	APPD	DRG. NO. GA_11KV_SSV(NE)_11	
						THIRD ANGLE PROJECTION	TRR	ISS. NO. 00	
						DATE: 15.06.2022			

LOCAL CONTROL STATION



COMMON ON OFF

ON-OFF PUSH BUTTON



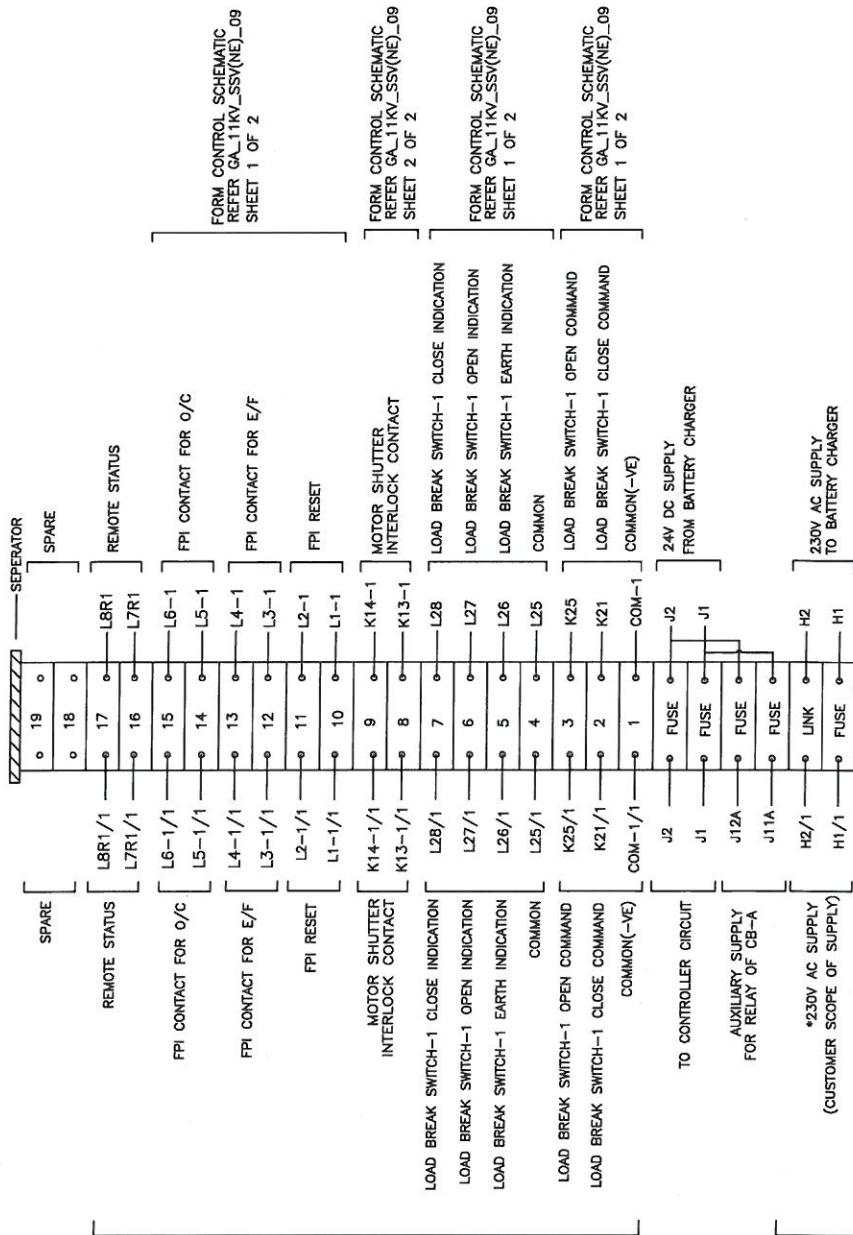
IF IN DOUBT ASK

SHEET 3 OF 3

NO	REVISION	SIGN	DATE	REVISION	SIGN	DATE	CONTROL SCHEMATIC FOR LOAD BREAK SWITCH-1 (LBS-1 PCB – CONTROL CARD SCHEMATIC)	
							DRN	NAME
							ALL DIMN'S ARE IN mm	ASV
							SCALE: NTS	ASV
							APPD	TRR
							THIRD ANGLE PROJECTION DATE: 15.06.2022	DRG. NO.GA_111KV_SSv(NE)_11 ISS. NO. 00



→ TO HARTING PIN | TO RMU →
CONNECTOR



If IN DOUBT ASK

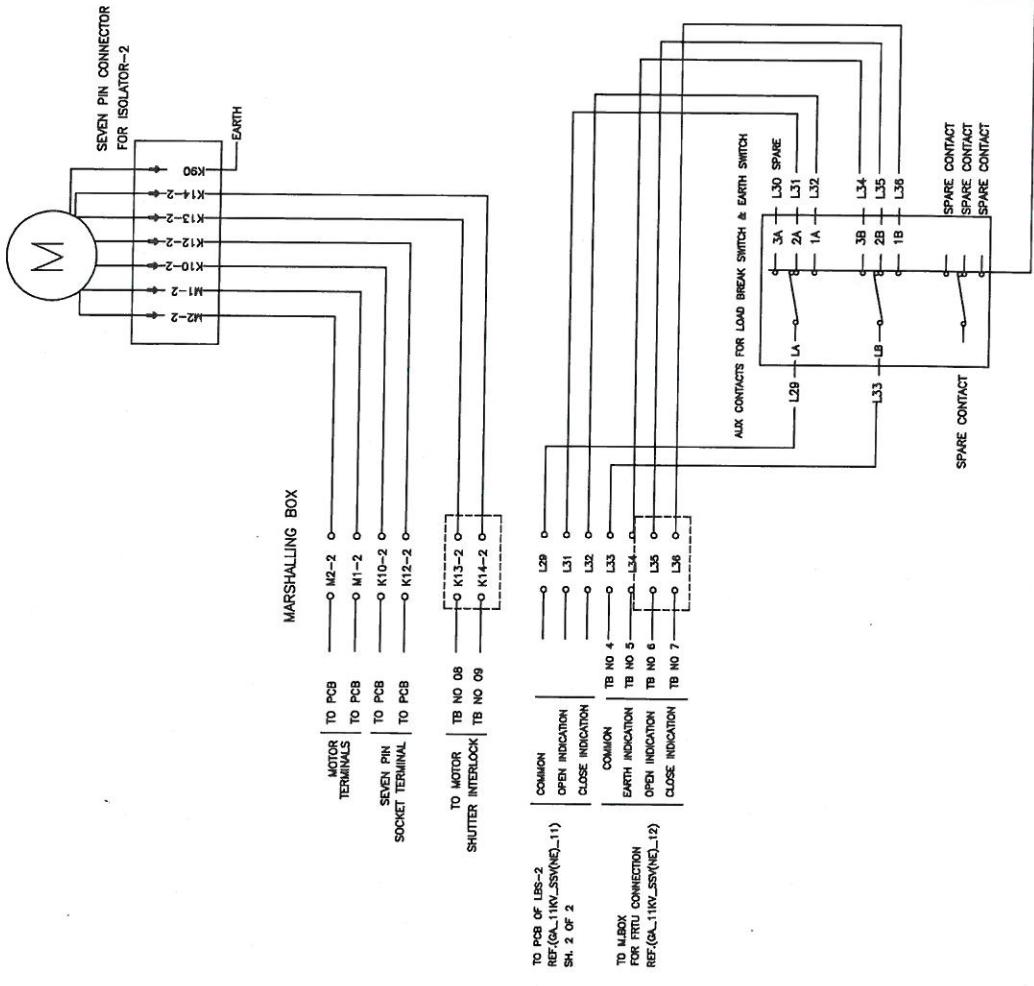
NOTE:
* 230V AC AUXILIARY SUPPLY IS IN CUSTOMER SCOPE OF SUPPLY.
LEI ONLY PROVIDE PROVISION TO CONNECT AC SUPPLY WIRES.

WIRING DIAGRAM FOR LBS-1

NO	REVISION	SIGN DATE	NO	REVISION	SIGN DATE	THIRD ANGLE PROJECTION	SIGN / NAME		DRN	ASV	MARCHALLING BOX DIAGRAM FOR LBS-1
							ALL DIMN'S ARE IN mm	CHD APPD			
							SCALE: NTS	TRR	DRG. NO. GA_11KV_SSV(NE)_12	ISS. NO. 00	URCC (P) Ltd.

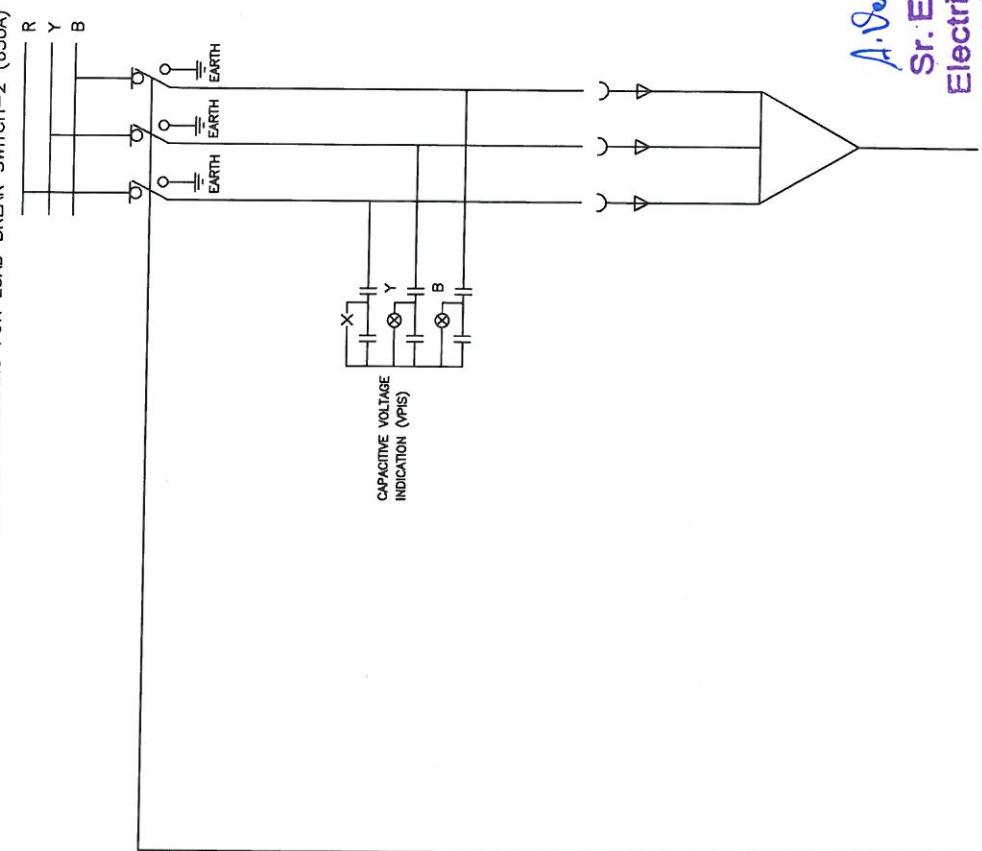
A. Venkatesh
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.



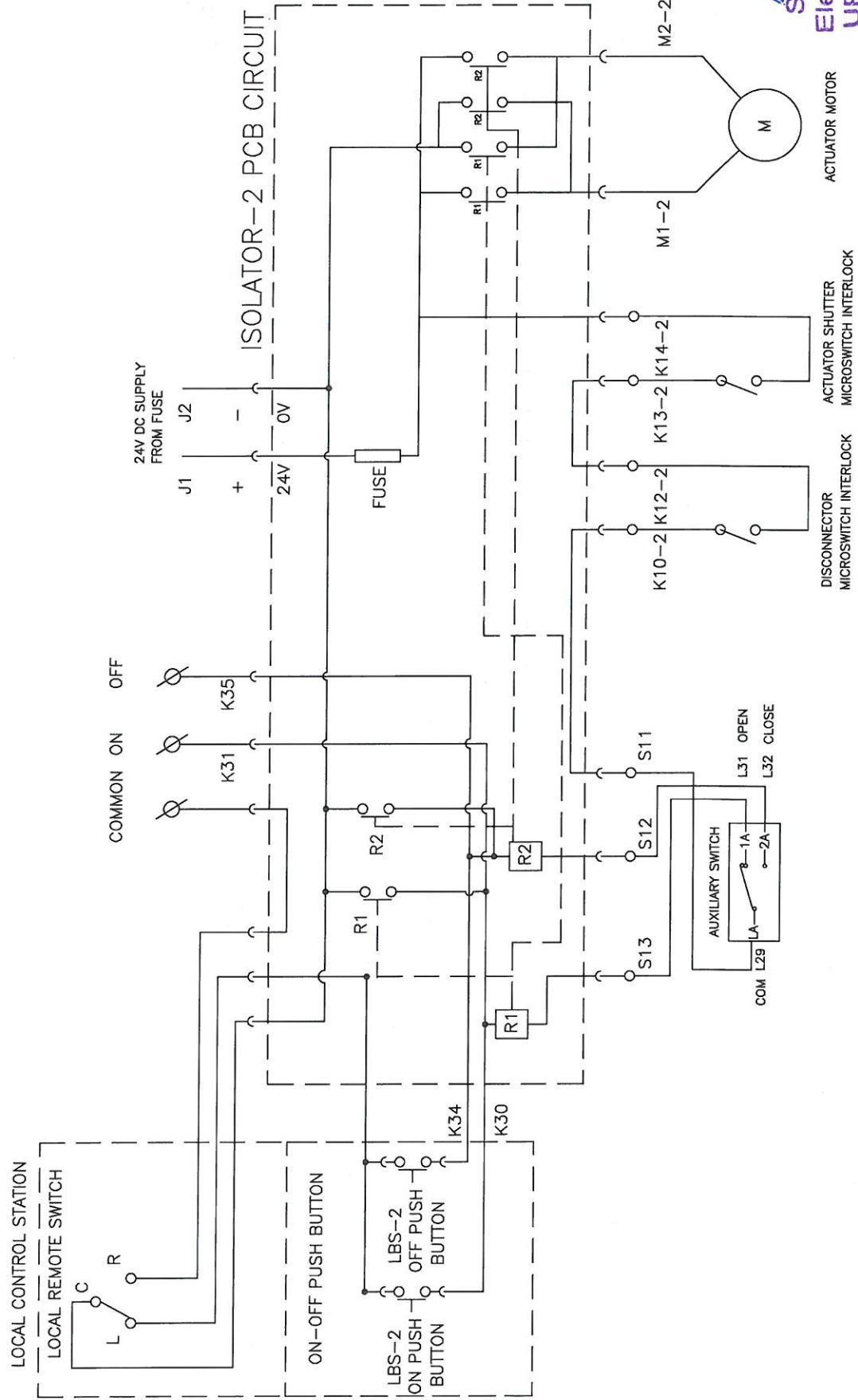


IF IN DOUBT ASK

CONTROL SCHEMATIC FOR LOAD BREAK SWITCH-2 (630A)

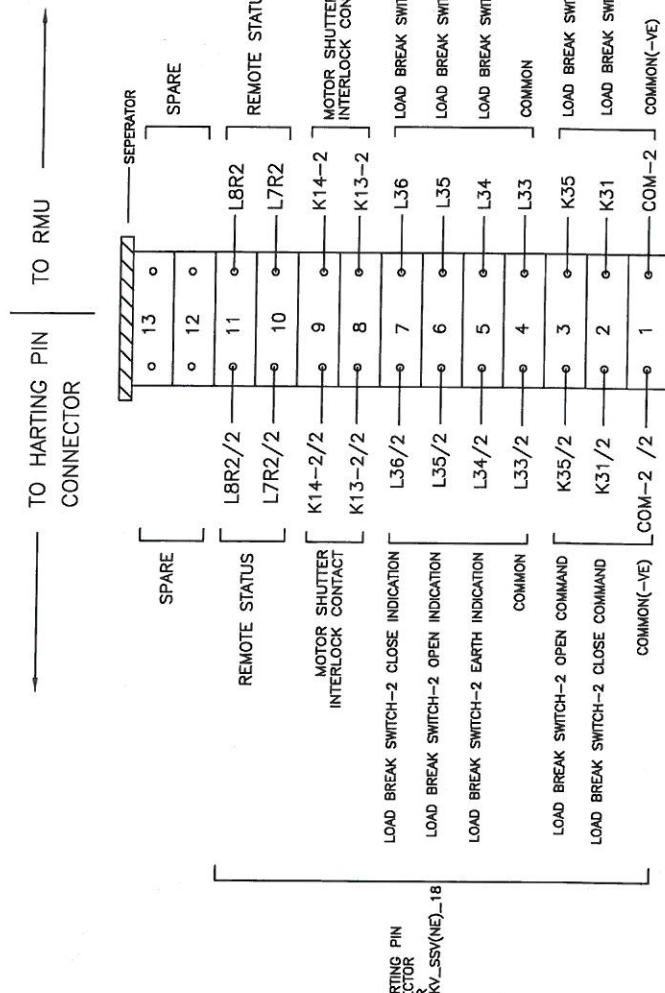


SHEET 1 OF 2			
DRN	ASV	CONTROL SCHEMATIC FOR LOAD BREAK	
CHD	ASV	SWITCH-2 (LBS-2 AUXILIARY SWITCH	
APPD	TRR	INDICATION)	
NO	REVISION	SIGN DATE	THIRD ANGLE PROJECTION
			DATE: 15.06.2022 DRG. NO. GA_11KV_SSv(NE)_13 ISS. NO. 00



SHEET 2 OF 2			
DRN	ASV	SIGN / NAME	CONTROL SCHEMATIC FOR LOAD BREAK
CHD	ASV		SWITCH-2 (LBS-2 PCB - CONTROL
SCALE: NTS	APPD		CARD SCHEMATIC)
NO	REVISION	SIGN DATE NO	THIRD ANGLE PROJECTION DATE: 15.06.2022 DRC. NO. GA_11KV_SSV(NE)_13
			ISS. NO. 00





A. J. *[Signature]*
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

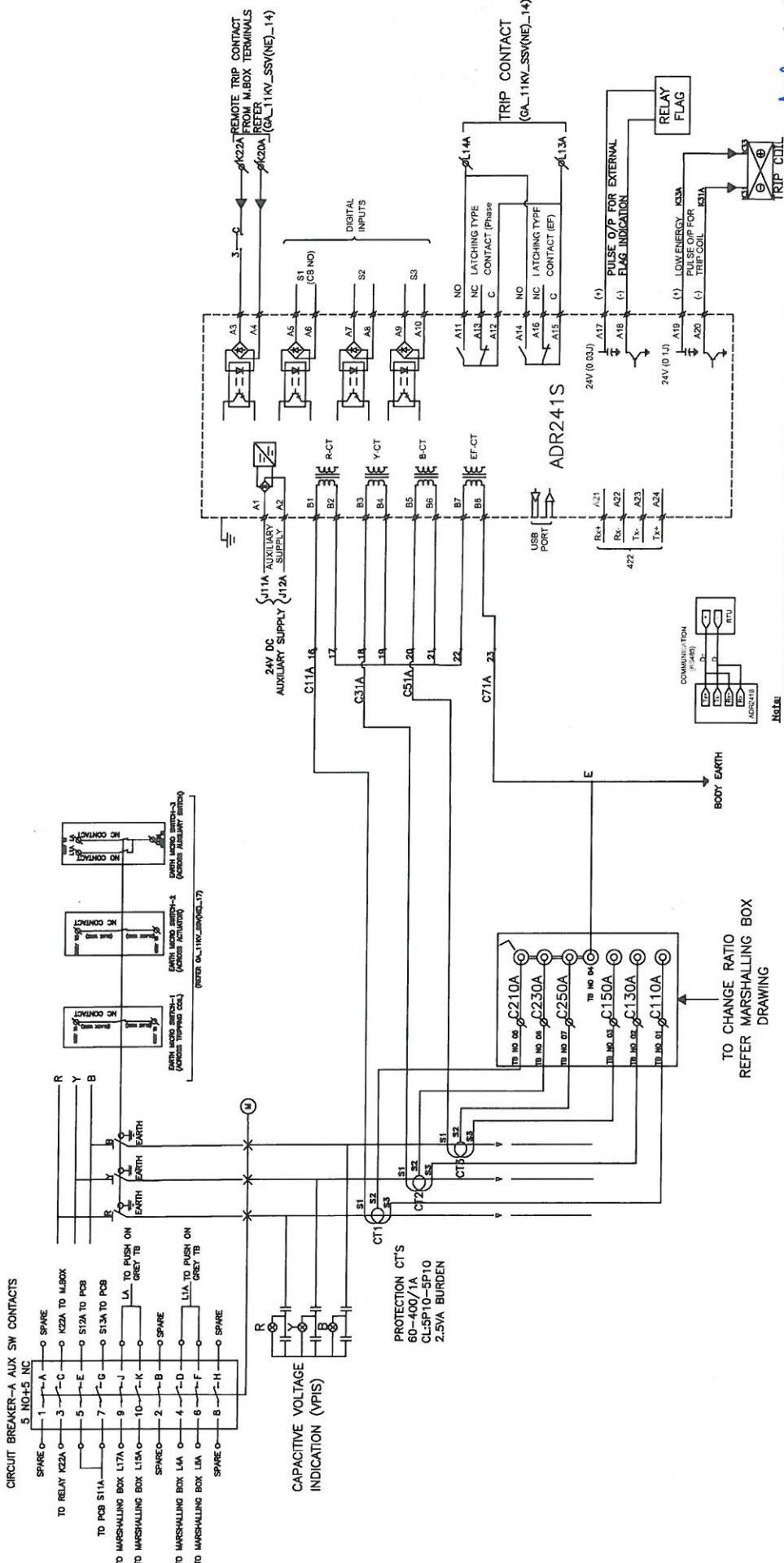
WIRING DIAGRAM FOR LBS-2

NO	REVISION	SIGN	DATE	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	SIGN	NAME	DRN	CHD	APD	DRG. NO.	GA_11KV_SSV(NE)_14	ISS. NO.	00



Larsen & Toubro
Electric
India Pvt Limited

CONTROL SCHEMATIC FOR CIRCUIT BREAKER-A (630A)



- * AUXILIARY SUPPLY 24V DC REQUIRED WHEN IN BUILT
- * BATTERY SUPPLY IS NOT AVAILABLE FOR DISPLAY.
- ** WHENEVER APPLICABLE

A. Venkatesh
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

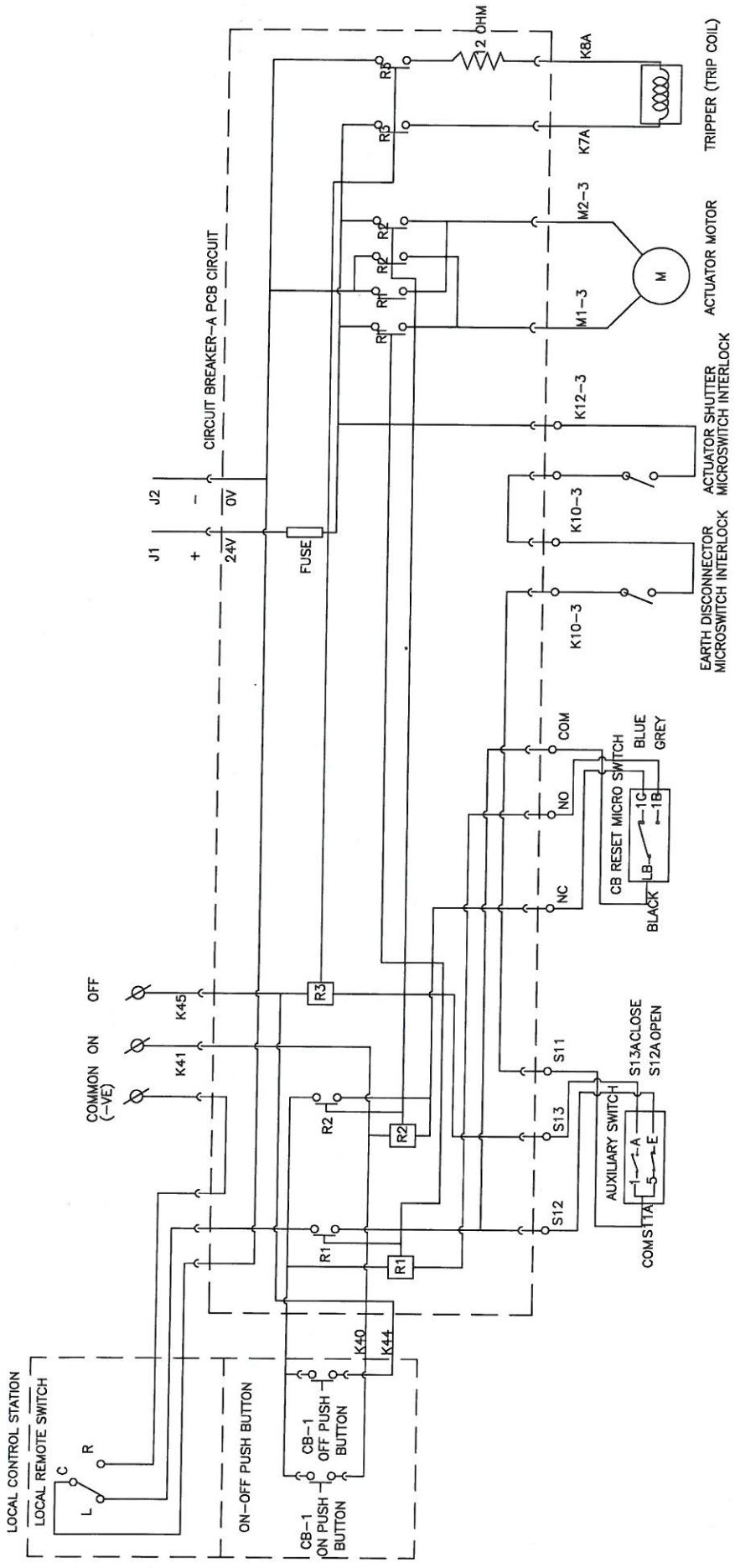
SHEET 1 OF 2



CONTROL SCHEMATIC OF CIRCUIT BREAKER-A
(CB-A WIRING DETAIL OF ASHIDA RELAY
ADR241S)

ISS. NO. 00

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DRG. NO. GA_11KV_SSV(NE)_15
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ASHI ENGINEER,
Electrical Dept.
URCC (P) Ltd.

SHEET 2 OF 2

CONTROL SCHEMATIC OF CIRCUIT BREAKER-A
(CB-A PCB CONTROL CARD DETAILS)

Lancy Electric
India Pvt Limited

ISS. NO. 00

DRC. NO. GA_11KV_SS/(NE)_15

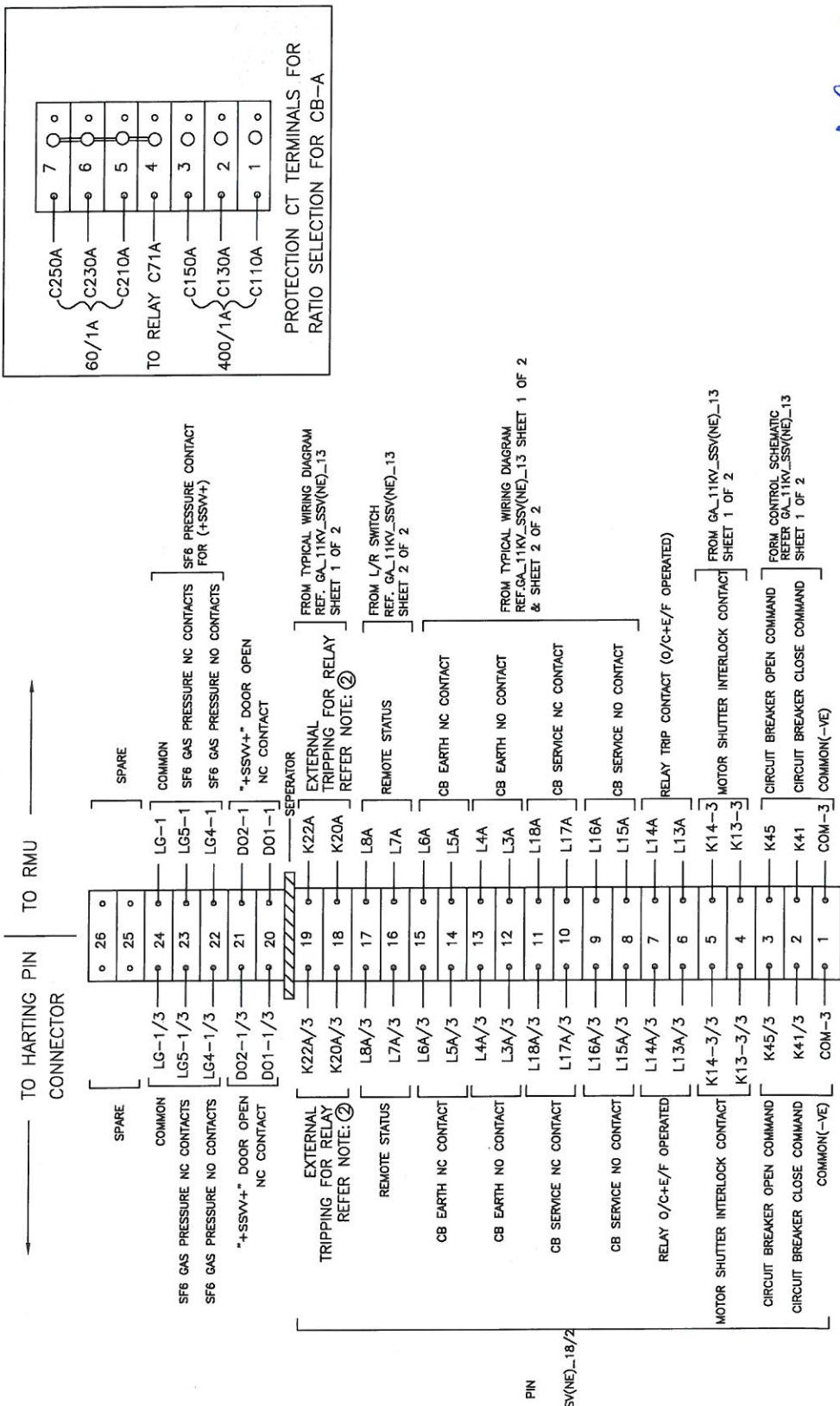
DATE: 15.06.2022

ALL DIMN'S ARE IN mm
SCALE: NTS

DRN ASV
CHD ASV
APPD TRR

IF IN DOUBT ASK

NO	REVISION	SIGN DATE	REVISION	SIGN DATE	THIRD ANGLE PROJECTION
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A. Nambiar
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

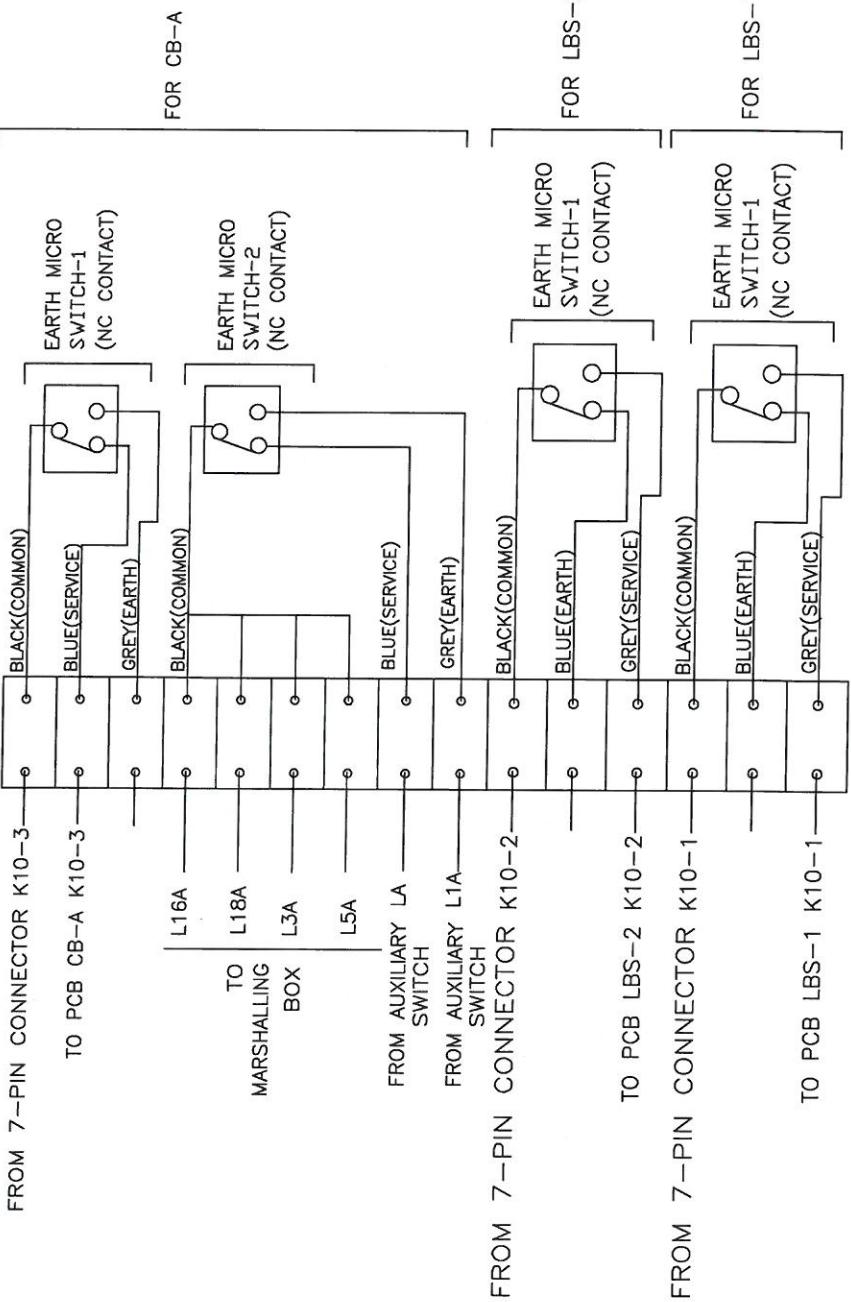
MARSHALLING BOX WIRING DIAGRAM FOR CB-A

NOTES:

- FOR RELAY :
- ADDITIONAL FEATURE : REMOTE TRIPPING IS POSSIBLE BY 230V AC SUPPLY TO TERMINAL K20A, K22A OFF CB A
 - ADDITIONAL FEATURE : AUXILIARY SUPPLY 24V DC REQUIRED WHEN IN BUILT BATTERY SUPPLY IS NOT AVAILABLE FOR DISPLAY FOR CB-A CT RATIO :
 - PRESENTLY CT CONNECTED TO RATIO - 60/1A (FOR THIS SHORTING LINK AT 04.05.06.07)
 - TO SELECT CT RATIO - 400/1A (FOR THIS CONNECT SHORTING LINK AT 01.02.03.04)

NO	REVISION	SIGN	DATE	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DATE: 15.06.2022	SIGN / NAME	DRN	ASV	MARSHALING BOX DIAGRAM FOR CB-A	
									ALL DIMN'S ARE IN mm	CHD	APPD	TRR	
									SCALE: NTS				Lucy Electric India Pvt Limited
									ISS. NO. 00				

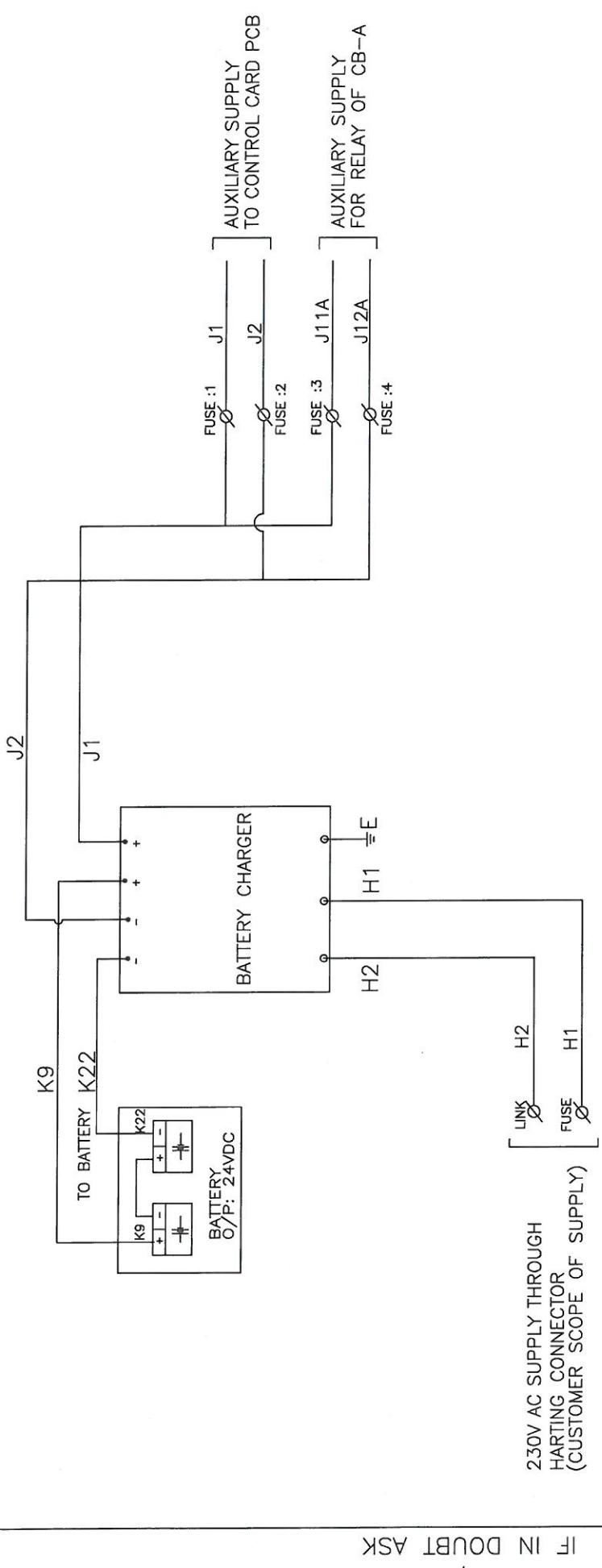
PUSH ON GREY TB (INTERNAL MOUNTED)



A. Venkatesh
Sr. Engineer
Electrical Deptt
URCC (India) Ltd.

IF IN DOUBT ASK

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	SIGN / NAME	DRN	ASV	GREY TB DIAGRAM FOR 4WAY RMU	Lancy Electric India Pvt Limited
								ALL DIMN'S ARE IN mm	CHD	ASV		
								SCALE: NTS	APPD	ASV		
								THIRD ANGLE PROJECTION	DATE: 15.06.2022	TRR	DRC. NO. GA_11KV_SSV(NE)_17	ISS. NO. 00



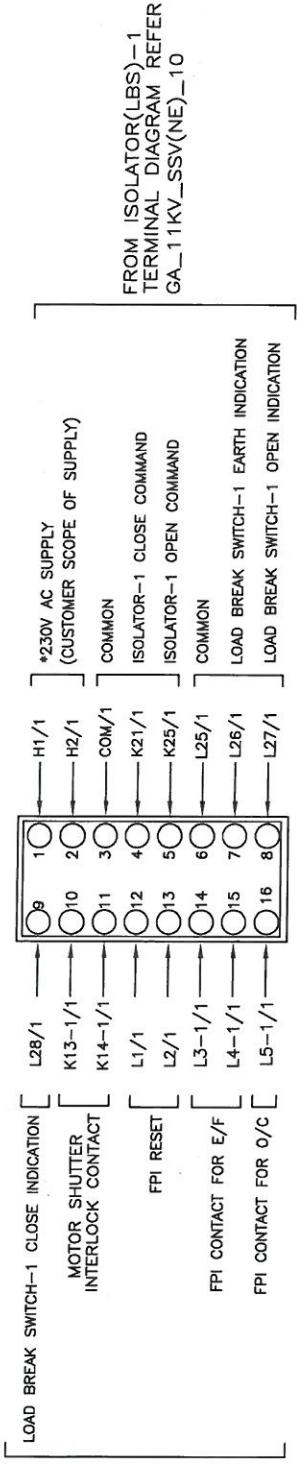
A. Venkata Rao
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

NO	REVISION	SIGN	DATE	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DATE: 15.06.2022	DRG. NO. GA_111KV_SSV(NE)_18	ISS. NO. 00

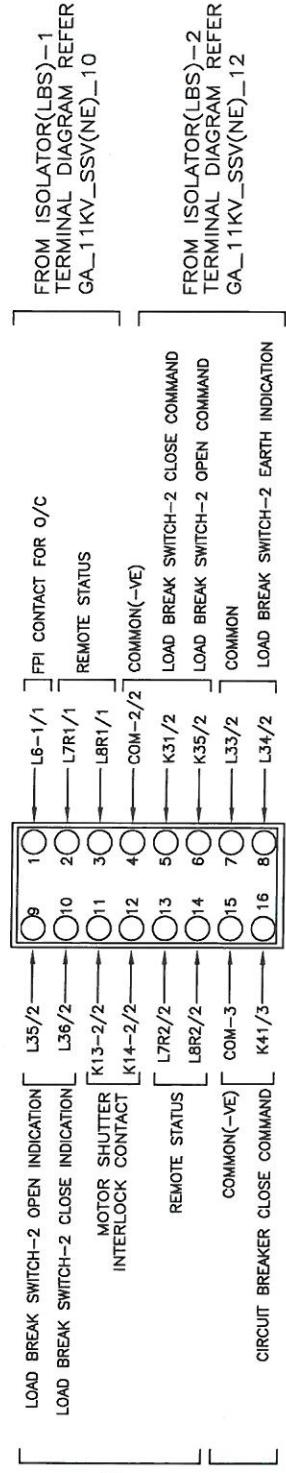


Electric
India Pvt Limited

16-PIN HARTING CONNECTOR-1



16-PIN HARTING CONNECTOR-2

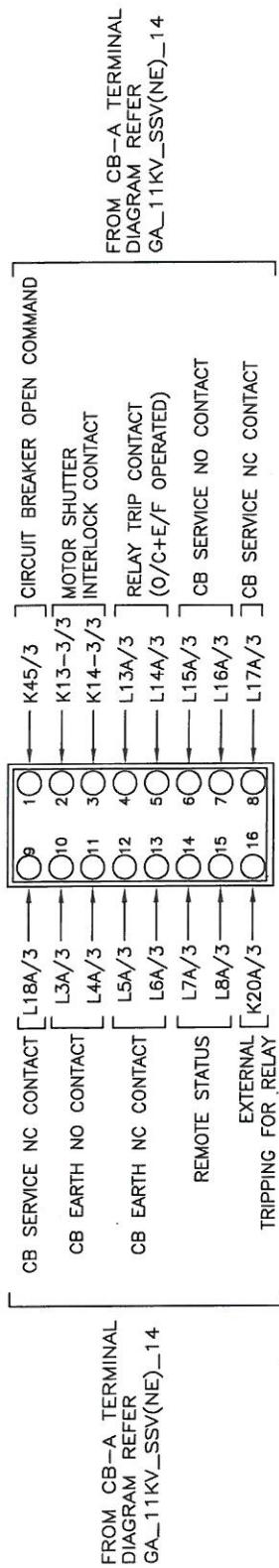


IF IN DOUBT ASK

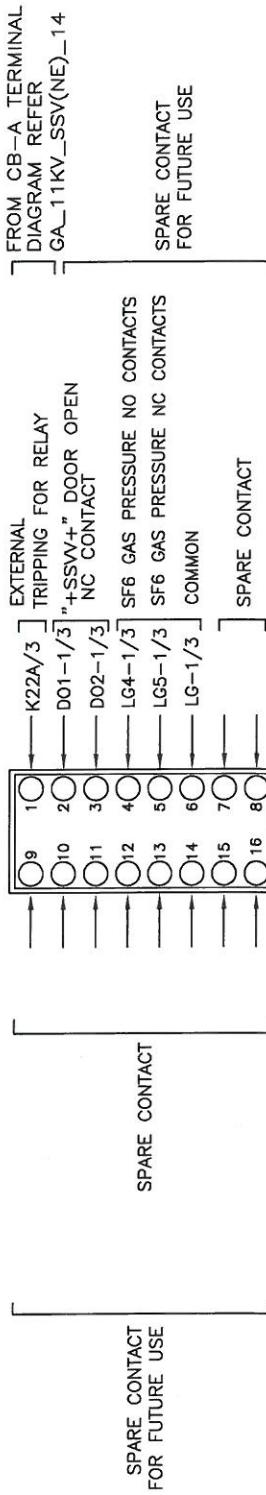
A. V. Venkateswaran
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

SHEET 1 OF 2			
NO	REVISION	SIGN DATE	02 DRAWING UPDATED BDA 27.03.22
			ALL DIMN'S ARE IN mm SCALE: NTS
		REVISION	DRN CHD APPD TRR
			HARTING PIN CONNECTOR DIAGRAM
			DATE THIRD ANGLE PROJECTION DATE: 15.06.2022
			DRG. NO. GA_11KV_SSV(NE)_19
			ISS. NO. 00

16-PIN HARTING CONNECTOR-3



16-PIN HARTING CONNECTOR-4



IF IN DOUBT ASK

S.P. Engineer
Electrical Dep.
URCC (P) Ltd.

SHEET 2 OF 2

Lucy Electrical India Pvt Limited
HARTING PIN CONNECTOR DIAGRAM
DATE: 15.06.2022 DRG. NO. GA_11KV_SSV(NE)_19

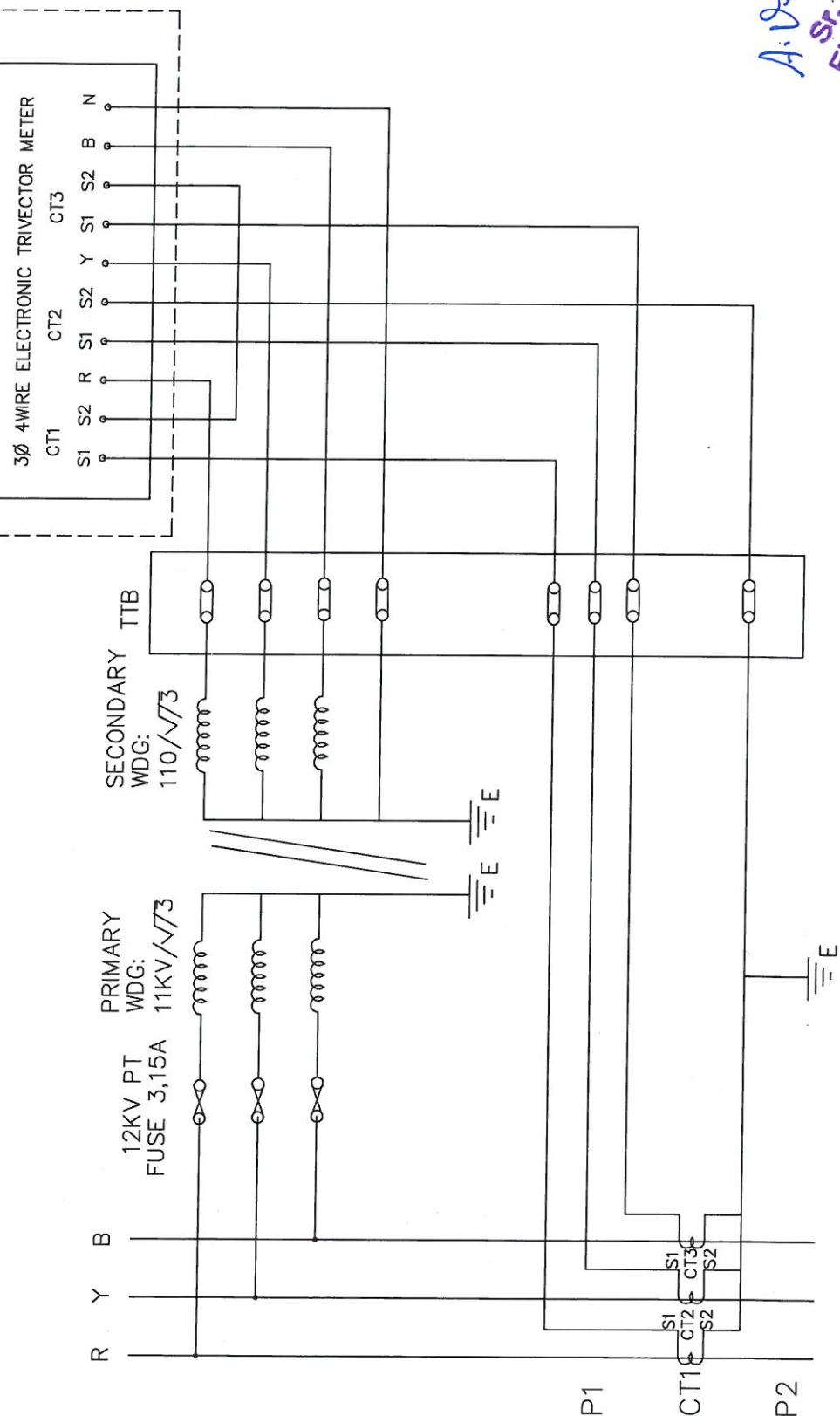
ISS. NO. 00

NO REVISION SIGN DATE NO REVISION SIGN DATE THIRD ANGLE PROJECTION SCALE: NTS

DRN ALL DIM'S ARE IN mm CHD APPD

ASV ASV TRR

TM IS IN CUSTOMER SCOPE OF SUPPLY



NOTES:

1. 11KV RESIN CAST CTs 3NOs. AS PER IS2705
2. 11KV RESIN CAST PTs 3NOs. AS PER IS3156 with FUSE.
3. CT STAR POINT I CT/PT CHAMBERS
4. FUSE RATING: 12kV.3.15A FUSE, MAKE: COOPER BUSMAN

IF IN DOUBT ASK

A. Venkateswaran

Sr. Engineer
URCC (P) Ltd.



ISS. NO. 00

NO	REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	WIRING DIAGRAM OF METERING UNIT	
									DRN	ASV
									All DIMN'S ARE IN mm	CHD
									SCALE: NTS	ASV
									APPD	TRR
									DATE: 15.06.2022	DRG. NO. GA_11KV_SSY(NE)_20

A. Venkatesh
Sr. Engineer
Electrical Dept.
URCC (P) Ltd.

MATERIAL : ANODISED AL.
BACKGROUND : RED COLOR WITH WHITE LETTER

REVISION	SIGN	DATE	NO	REVISION	SIGN	DATE	THIRD ANGLE PROJECTION	DRG. NO. GA_11KV_SSV(NE)_21	ISS. NO. 00
								DRN ALL DIMN'S ARE IN mm SCALE: NTS	SIGN / NAME DRN ASV CHD ASV APPD TRR
									Laney Electric India Pvt Limited



IF IN DOUBT ASK

GUARANTEED TECHNICAL PARTICULARS
OF 12KV, 25kA INDOOR VACUUM CIRCUIT BREAKER/PANEL

S.No	Description	Firm Comments
1	MANUFACTURERS' NAME	Megawin Switchgear-P-Limited
2	Applicable standard	IEC 62271-100/200
3	Type/Draw-out/Semi draw out	Horizontal Draw out/Horizontal isolation
4	Type Designation	MHVCB
5	Type of Installation	Indoor
6	Rated Voltage	11kV
7	Maximum Continuous Voltage	12kV
8	Power Frequency withstand Voltage	28kV
9	Lightning Impulse withstand	75kV
10	Nominal Current Rating	630A
11	Rated short time rating for 3 Sec.	25kA
12	Breaking Capacity in KA	
	Symmetrical	25kA
13	Making Capacity	62.5 KA
14	Type of Closing Mechanism	Spring charging Motor/Manual
15	Trip free or not	Trip Free
16	Number of Poles of VCB	Three
17	Number of Breaks per pole	One
18	Maximum power required for tripping (Shunt trip)	<300 Watts
19	Duty cycle used for breaking capacity	0-0.3sec-CO-3min-CO
20	Tripping Coil/Closing coil voltage	110V DC
21	Rating of spring Charging motor	230V AC

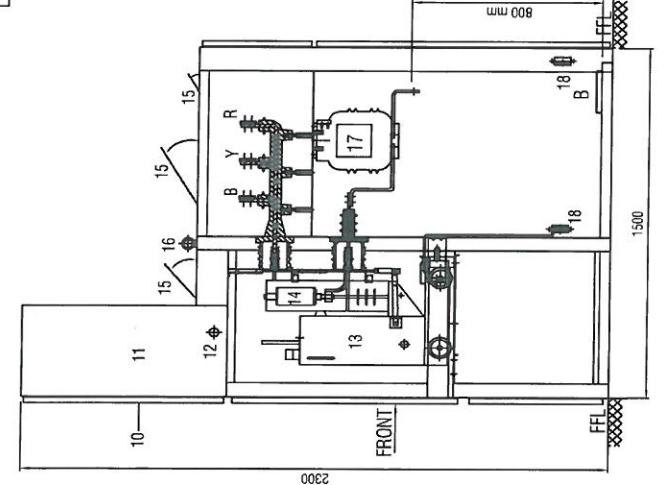
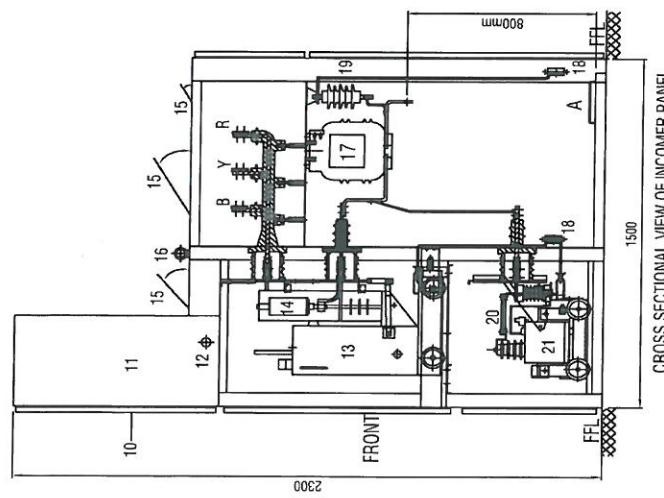
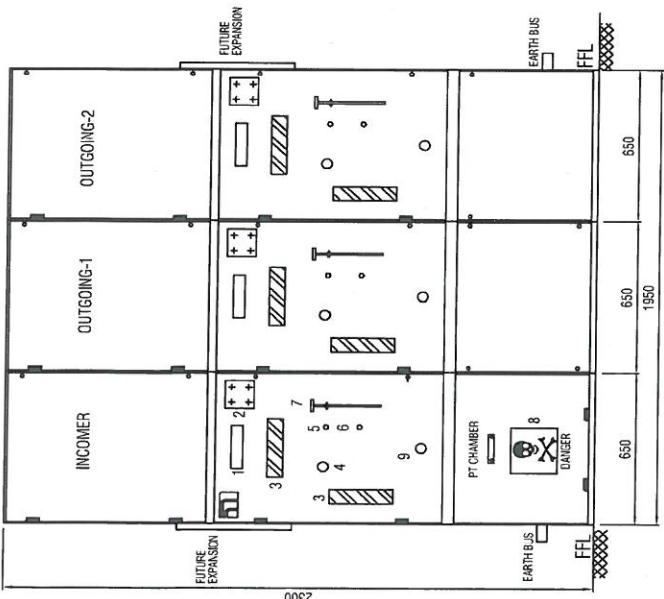

 Sr. Engineer
 Electrical Dept.
 URCC (P) Ltd.

BILL OF MATERIAL 11kV, 630A, 25kA Indoor VCB 3 Panel (1 IC+2 OG) - 1 Set.				
SI.No.	Description	Ratings	Qty / Panel	
			I/C-1 No.	O/G-
1	Vacuum Circuit Breaker		11kV, 630A, 25kA/3Sec	1 No. 1 No.
1.1	Megawin make, Horizontal Draw Out VCB fitted with Manual / Motor Operated spring charging mechanism with 230V AC Motor & Motor control switch, Mechanical ON / OFF indicator Operation Counter, Automatic safety shutters & push button			
	Shunt trip Coil	110V DC		
	Closing Coil	110V DC		
	Auxiliary contact	6 NO +6 NC		
	Antipumping Module	110V DC		
1.2	Power Pack (INPUT 230V AC, O/P 110V DC, BATTERY BACK UP, CONTINUOUS LOAD 100WATTS, IMPULSE LOAD 450WATTS FOR 240ms)	230V AC / 110V DC	1 No.	
2	Potential Transformer			
2.1	Megawin make, Three Phase, Resin cast, Dry type, Potential Transformer with one set of HTFS / LTFS of Ratio :	(11kV) / (110V)	1 Set.	-
	Secondary 1: for Metering	CI - 0.5,50VA		
3	Current Transformer			
3.1	Megawin make, Single Phase, Resin Cast, Dry Type Current Transformer of Ratio :	**/5-5A	3 Nos.	3 Nos.
	Core 1: for Metering	CI - 0.5,7.5VA		
	Core 2: for Protection	5P10,7.5VA		
4	Metering			
4.1	Secure Make 96 sq.mm Digital Ammeter with Inbuilt Selector Switch CI. 0.5	5A, 110V AC Aux	1 No.	1 No.
4.2	Secure Make 96 sq.mm Digital Voltmeter with Inbuilt Selector Switch CI. 0.5	110V AC	1 No.	-
4.3	Secure make Digital MFM CI.0.5	5A, 110V AC (PT) & 110V AC Aux.	1 No.	1 No.
5	Protection			
5.1	Megawin make, M 140C type, Numerical Non-directional IDMT combined 3 O/C+1 E/F relay with highset, Trip circuit Supervision and RS 485 port communication	5A, 110V DC	1 No.	1 No.
5.2	Megawin make High speed / Master trip relay MVAJH 13 (86)	110V DC	1 No.	1 No.
6	Indication Lamps			
6.1	VCB OFF/ON/Auto trip/Trip circuit healthy/Spring charge Indication lamps	-	1 Set.	1 Set.
6.2	R,Y,B Phase Indication Lamps	110V AC	1 No.	-
7	Control Switches / Push Buttons			
7.1	Breaker Control Switch (Close-Neutral-Trip)	110V/25A	1 No.	1 No.
8	Control wiring with appropriate colors	-	1 Lot.	1 Lot.
9	Busbar Ratings			
9.1	Copper Busbar with PVC Sleeve	11kV, 630A, 25kA	1 Set.	1 Set.
9.2	Earth bus	-	1 Set.	1 Set.
10	Common For Switchgear			
10.1	Heater ON / OFF switch with filament type 80Watts space heater & thermostat, single phase switch with socket, Lamp for panel illumination with snap type door limit switch, Fuses / MCBS for AC / DC control.	-	1 Set.	1 Set.
11	Enclosure			
11.1	MS Sheet steel enclosure & installation suitable for Indoor	IP4X	1 Set.	1 Set.
11.2	Incoming (Excluding Cable termination kits, lugs & glands)	-	Bottom	Busbar
11.3	Outgoing (Excluding Cable termination kits, lugs & glands)	-	Busbar	Bottom
12	Surge Protection			
12.1	Equal make Surge Arrester	9kV,10kA	3 Nos.	-
13	Castell Interlock and key (2 Base + 1 Key)	-	1 Set.	-

Note:

- 1 Our Offer is based on the above BoM, any change/addition in it will have Techno-Commercial Implication.
- 2 Our scope is limited to Design, Manufacture & Supply. Unloading, Installation, Erection, Commissioning & Testing at site are not included.
- 3 As per customer SLD since outgoing is connect with dry type transformer so we have not considered transformer auxiliary relay.
- 4 As per customer SLD, we have considered Copper Busbar
- 5 230V AC auxiliary supply to be arranged by you.
- 6 Makes of equipments shall be as per Megawin's standard only.
- 7 Kindly check our above BoM and confirm the same before finalizing the Order to check for any Techno-Commercial implication if needed.

ALL DIMENSIONS ARE IN mm
FFL=FINISHED FLOOR LEVEL



A. Shyamal
Sr. Engineer
Electrical Dept.
URC (P) Ltd.

URC (P) Ltd.

LEGEND OF VCB PANEL

1. FEEDER NAME PLATE
2. PANEL NUMBER PLATE
3. VIEW GLASS
4. MANUAL SPRING CHARGING PORT
5. MANUAL CLOSING PORT
6. MANUAL TRIPPING PORT
7. MANUAL CLOSE/TRIP ROD
8. DANGER BOARD
9. VCB TRUCK RACK IN / OUT PORT
10. METERRING DOOR
11. METERING CHAMBER
12. INTERPANEL WIRING TROUGH
13. VCB TRUCK
14. VACUUM INTERRUPTER
15. PRESSURE RELIEF VENT
16. LIFTING HOOK
17. CURRENT TRANSFORMER
18. EARTH BUS
19. SURGE ARRESTER
20. PT FUSE
21. POTENTIAL TRANSFORMER

NOTE:

*METERING EQUIPMENT MAY BE RELOCATED
BASED ON WIRING CONVENIENCE

METERING DOOR DESCRIPTION

- | | |
|---------------|-------------------------|
| R Ph - RED | : R PHASE INDICATION |
| Y Ph - YELLOW | : Y PHASE INDICATION |
| B Ph - BLUE | : B PHASE INDICATION |
| H1 - RED | : VCB ON |
| H2 - GREEN | : VCB OFF |
| H3 - BLUE | : SPRING CHARGED |
| H4 - AMBER | : AUTO TRIP |
| H5 - WHITE | : TRIP CIRCUIT HEALTHY |
| S1 - BLACK | : TCH CHECK PUSH BUTTON |

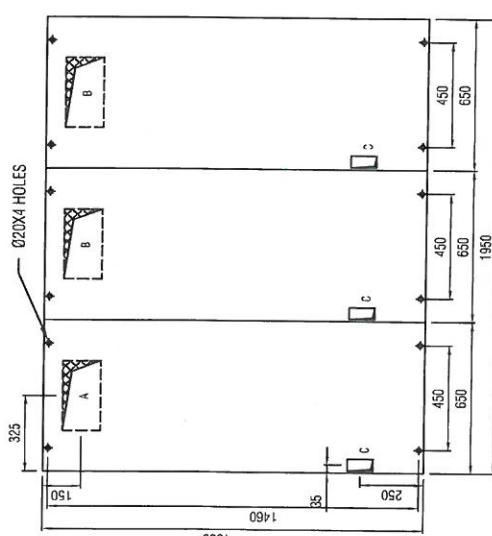
BOTTOM CABLE ENTRY DETAILS:

- A: INCOMING TOP CABLE ENTRY (300mm X 150mm)
- B: OUTGOING TOP CABLE ENTRY (300mm X 150mm)
- C: CONTROL CABLE ENTRY (20mm X 75mm)

MICAWIN SWITCHGEAR		SCALE
SALEM, TAMIL NADU, INDIA.		1:10
Web: www.micawinswitchgear.com		ISSUE NO.
PROJECT NO.		RO
MS-SIG		4
DESIGN NO.		MS-B14LC2MABLJD
		5 SHEETS

MICAWIN STANDARD BUSINESS GROUP
12KVA/80A, 25kA/3sec. INDOOR 3 PANEL LINEUP
GENERAL ARRANGEMENT

APPROVED	DATE	BY	TITLE	LEAD TIME: 5-7 weeks from receipt of confirmed order	
				APPROVED	ISSUED
APPROVED	14.03.19	M.E	12KVA/80A, 25kA/3sec. INDOOR 3 PANEL LINEUP		
CHECKED	14.03.19	M.E	GENERAL ARRANGEMENT		
DRAWN	14.03.19	RAGAV M.E			
RESPONSIBILITY					
RO	FEST ISSUE				
RESPONSIBILITY					



URC (P) Ltd.