

**GUARANTEED TECHNICAL PARTICULAR****CUSTOMER: - LARSEN & TOUBRO LIMITED, CONSTRUCTION****Tertiary Loading STR**

Doc No: TPE-D-72-8374

Date: 19th Mar 2024

1.	GENERAL		
	a.	Name of manufacturer	TELAWNE POWER EQUIPMENTS PVT LTD
	b.	Service	OUTDOOR
	c.	Rating	630 KVA
	d.	Duty	Continuous
	Rated voltage of HV		33 kV
	Rated voltage of LV		0.415 kV
	Rated current of HV		11.02 Amp
	Rated current of LV		876.46 Amp
	Temperature rise in oil (Deg. C)		50°C
	Temperature rise in winding (Deg. C)		55°C
	Limit of hot spot temperature to which the transformer is designed (Deg. C)		98°C
	Frequency		50 Hz
	Permissible Overload		IS 2026 (Part 7)
	e.	Number of phases	Chief Engineer/Projects 3
	f.	Cooling	APTRANSCO/VS/Vijayawada. ONAN
	g.	Terminal Connection	
		HV	Delta
		LV	Star
		Vector group	Dyn1
	h.	Tapping	Off Circuit Tap Changer
	i.	Max total losses at 50 % loading in watt at 75°C	1999 W
	j.	Max total losses at 100% loading in watt at 75°C	5697 W
	k.	Impedance at rated current & frequency at 75°C	4.5% (± IS Tol)
	l.	Reactance	4.46% (Approx.)
	m.	Efficiency at 75°C at unity p.f.	
		At full load	99.19%
		At ¾ full load	99.30%



		At ½ full load	99.37%
n.	Efficiency at 75°C at 0.8 p.f. lagging		
		At full load	98.99 %
		At ¾ full load	99.13%
		At ½ full load	99.21%
o.	Load at which maximum Efficiency occurs		47.84%
p.	Maximum Efficiency		99.37%
q.	Regulation at full load at 75°C		
		At unity p.f.	0.758%
		At 0.8 p.f. lagging	3.248%
r.	Terminal arrangement		
		HV	Bare Bushing
		LV	Cable Box with Aluminum Busbar
s.	Reference standard	Chief Engineer/Projects as per IS 1180, Level 1	
t.	Method of Earthing	APTRANSCO/VS/Vijayawada Fully Earthed	
	Impulse level (Windings)		
2.	HV	250 kVp	
	LV	NA	
	One minute power frequency (Windings)		
3.	HV	95 kVrms	
	LV	3 KV rms	
4.	Core Data		
	Type of core construction	Core type	
	Material of core lamination	CRGO	
	Thickness of lamination/Grade	0.23mm/23HP85D	
	Insulation between core lamination	Carlite	
	Insulation of core bolt, washer and plated etc.	Fiberglass and Perma wood	
	Maximum Flux density at rated voltage and frequency	1.65T (Max.)	
	Core bolt insulation withstand voltage for one minute in kV	2 kV	
	Time in seconds for which the transformer can withstand without overheating the following over fluxing conditions (Sec)		



	a. 120 %	60 sec
	b. 140 %	5 sec
	c. 150 %	2 sec
5.	Winding	
	a. Type of winding	
	HV	Cross-Over Winding
	LV	Spiral Winding
	b. Type of Insulation	
	HV	Uniform
	LV	Uniform
	c. Insulation Class	Class 'A'
6.	Insulating materials	
	Turn insulation HV	Kraft paper
	Turn insulation LV	Kraft paper
	Insulation core to LV	Press Compressed Board
	Insulation HV to LV	Press Compressed Board
7.	OCTC	Chief Engineer/Projects
	Make	APTRANSCO/VS/Vijayawada. Paragon/ Giriraj
	Tapping Range	+10% to -10% at 9/2.5%
	No. of steps/Position	8 Steps / 9 Position
8.	HV Bushing	
	Make and type	CJI/Genesis, Porcelain
	Rated voltage	Tertiary Loading STR 52 kV
	Rated current	4000 Amps
	Basic Impulse Level	250 kVp
	Wet and dry power frequency withstand voltage	95 kVrms
	Minimum total creepage distance	1612mm
	Cantilever Strength	3500 N
9.	LV and Neutral bushing	
	Rated Voltage	1.1 kV

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2. FOR EPC CONTRACTS ONLY

R-457, MIDC, Rabale, Behind Pipeline Road, Thane Belapur road, Navi Mumbai - 400701. INDIA

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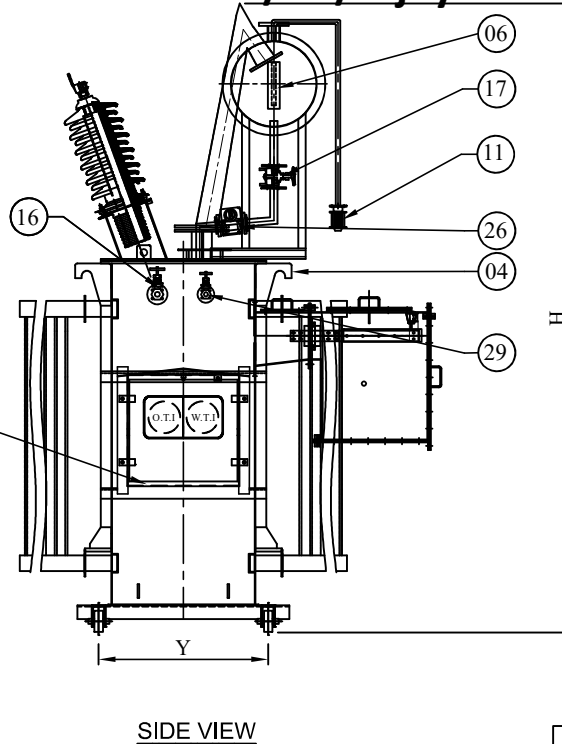
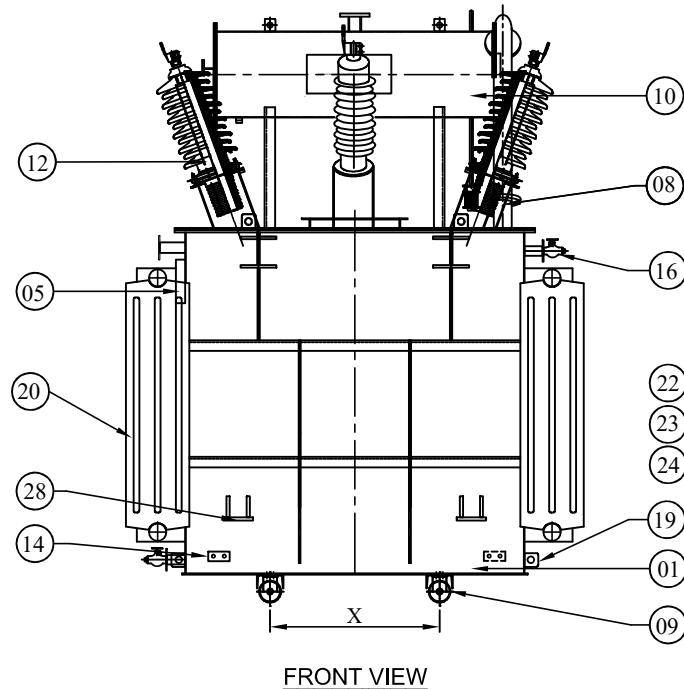
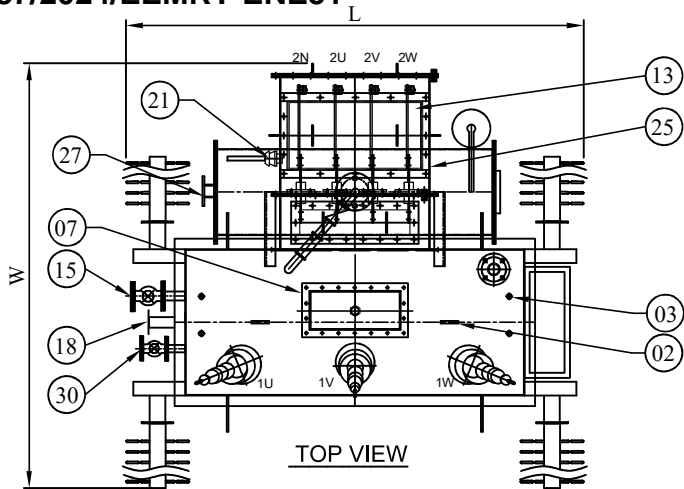


	Rated Current	2150 Amps for ph./ 630 Amps for neural	
10.	Conservator		
	Total Volume in liters	100 Ltr. (Approx.)	
	Volume between the highest and lowest visible oil levels	37 Ltr.	
11.	Tank		
	Type of tank	Conventional (rectangular)	
	Material and Thickness of plates for construction of tank, radiator		
	a. Side plate	M.S. / 4mm	
	b. Bottom plate	M.S. / 5mm	
	c. Cover plate	M.S. / 6mm	
	Radiator fins	1.1 mm	
	Vacuum to which the tank can be subjected to without distortion	As per CBIP	
	Number of bidirectional rollers provided	4	
	spacing between rollers	700 mm	
12.	Minimum clearances for terminals	Phase to phase	Phase to ground
	a. HV	530mm	480mm
	b. LV	25mm	25 mm
13.	Approximate weights (Subjected to ±10% Tol)		
	Core & Winding	1965 Kg	
	Oil	1375 Kg	
	Tank and fitting	800 Kg	
	Radiator	135 Kg	
	Total weight of Transformer	4275 Kgs	
	Approx. quantity of oil	1620 Ltr	
	Overall dimensions (Subjected to ±10% Tol)		
	a.	Length	2300 mm
	b.	Breadth	2100 mm
	c.	Height	3000 mm

**Chief Engineer/Projects
 APTRANSCO/VS/Vijayawada.**

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APTRANSCO/VS/Vijayawada.**

OVERALL DIMENSIONS						
KVA	V/R	L	W	H	X	Y
630	33/0.415	2300	2100	3000	800	800

	MIN. CLEARANCE AS PER IS	
	BETWEEN PH. TO PH.	BETWEEN PH. TO EARTH.
HV	530	480
LV	25	25

BILL OF MATERIAL

QTY.	ITEM NO.	DESCRIPTION
1	1	TRANSFORMER TANK
1	2	TRANSFORMER COVER WITH LIFTING LUG
4	3	THERMOMETER POCKETS
4	4	LIFTING LUGS
1	5	RATING & DIAGRAM PLATE
1	6	PLAIN OIL LEVEL GAUGE
1	7	INSPECTION COVER WITH AIR RELEASE PLUG
1	8	EXPLOSION VENT
4	9	BI-DIRECTIONAL PLAIN ROLLERS
1	10	CONSERVATOR TANK WITH DRAIN PLUG
1	11	SILICA GEL BREATHER
3	12	H.V. BARE BUSHING (PORCELAIN)
1	13	L.V. CABLE BOX
2	14	EARTHING BOSS
1	15	BOTTOM DRAIN VALVE
1	16	TOP FILTER VALVE
1	17	SHUT OFF VALVE BETWEEN BUCHHOLZ RELAY TO CONSERVATOR
1	18	OFF CIRCUIT TAP CHANGER
4	19	PULLING LUGS
4	20	FLANGED TYPE RADIATOR (WITHOUT VALVE)
1	21	ADDITIONAL NEUTRAL BUSHING
1	22	MARSHALING BOX
1	23	DIGITAL TYPE OTI WITH A/T CONTACTS
1	24	DIGITAL TYPE WTI WITH A/T CONTACTS
1	25	WINDING CT
1	26	BUCHHOLZ RELAY
1	27	MAGNETIC OIL LEVEL GAUGE
4	28	JACKING PADS
1	29	TOP SAMPLING VALVE
1	30	BOTTOM SAMPLING VALVE

NOTE:
1) POSITION OF FITTINGS ARE SUBJECT TO CHANGE AT THE TIME OF MANUFACTURING
2) ALL DIMENSIONS WILL HAVE ±10% TOLERANCES.
3) PAINT:- EPOXY SHADE LIGHT GREY 631 IS 5

REV.	DESCRIPTION	DRAWN BY	CHD. BY	APPD. BY	DATE
1	DRG. REVISED AS PER CUS. COMMENTS DTD.-28.03.24	APS	MM	MM	01.04.24

CLIENT : TRANSMISSION CORPORATION OF ANDHRA PRADESH
VIJAYAWADA, ANDHRAPRADESH, INDIA.

PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.

LOA NO :
TITLE : G.A.DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER

SUPPLIER / CONTRACTOR: TELAWNE POWER EQUIPMENT PRIVATE LIMITED

RELEASED FOR PRELIMINARY TENDER INFORMATION APPROVAL CONSTRUCTION

DRAWING No. T P E - D - 2 5 - 8 3 7 4

SHEET 01 OF 01 REV.1

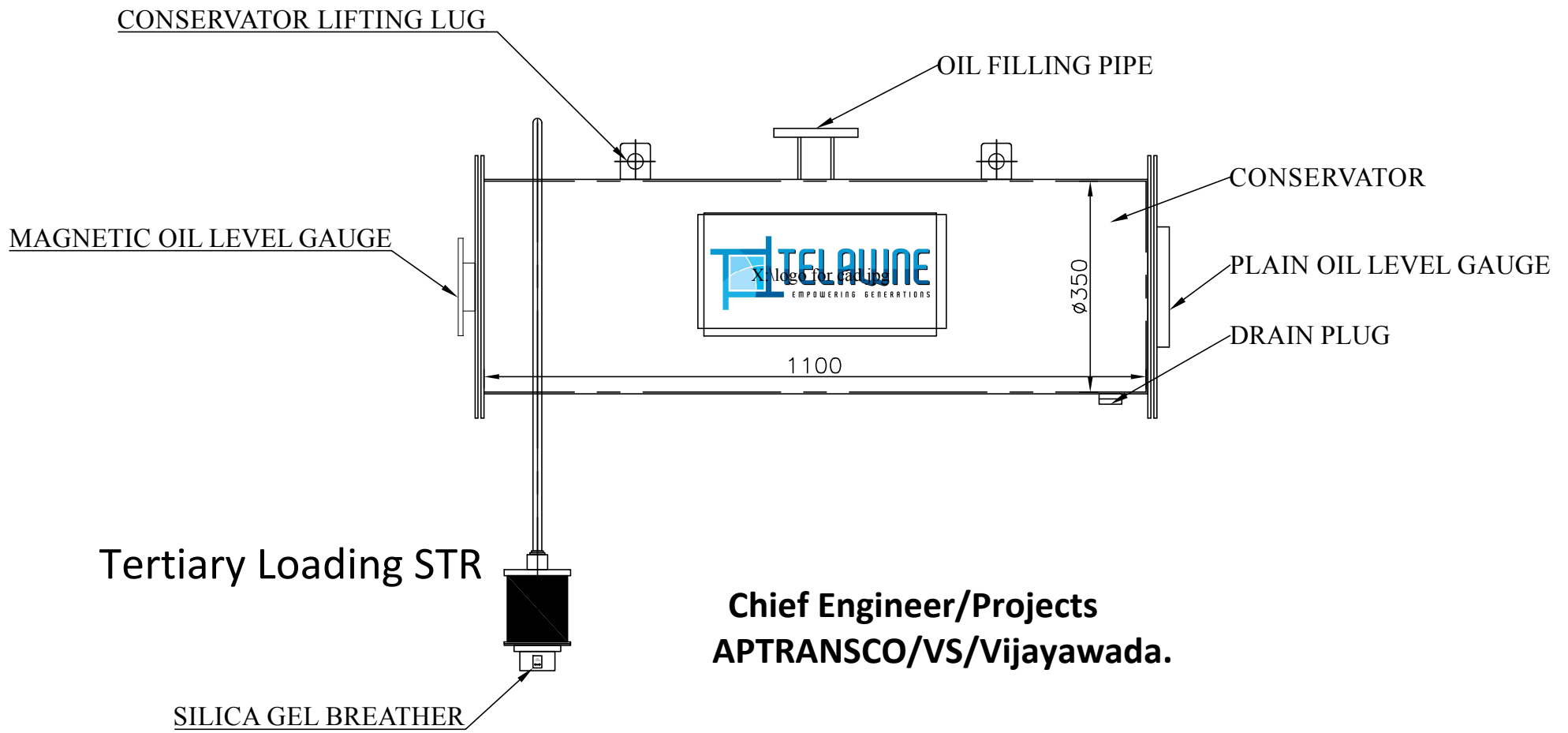
PROJECTION

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NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
2. FOR EPC CONTRACTS ONLY

Since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/VT/LA/Breakers, requirement and capability.



**Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.**

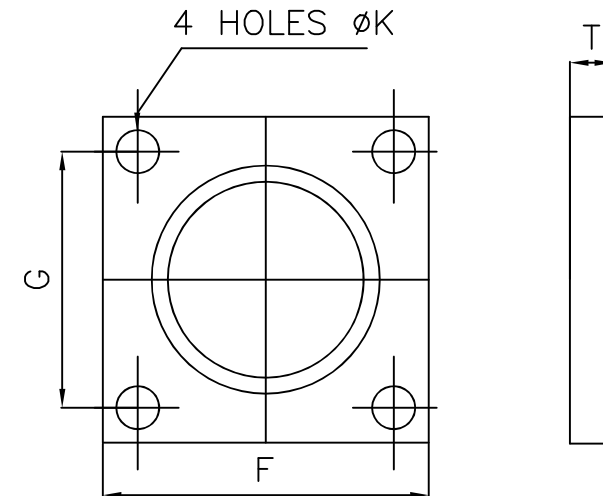
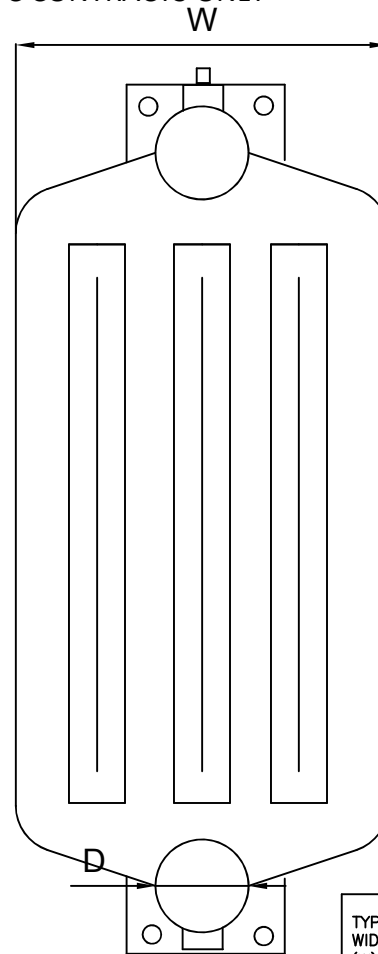
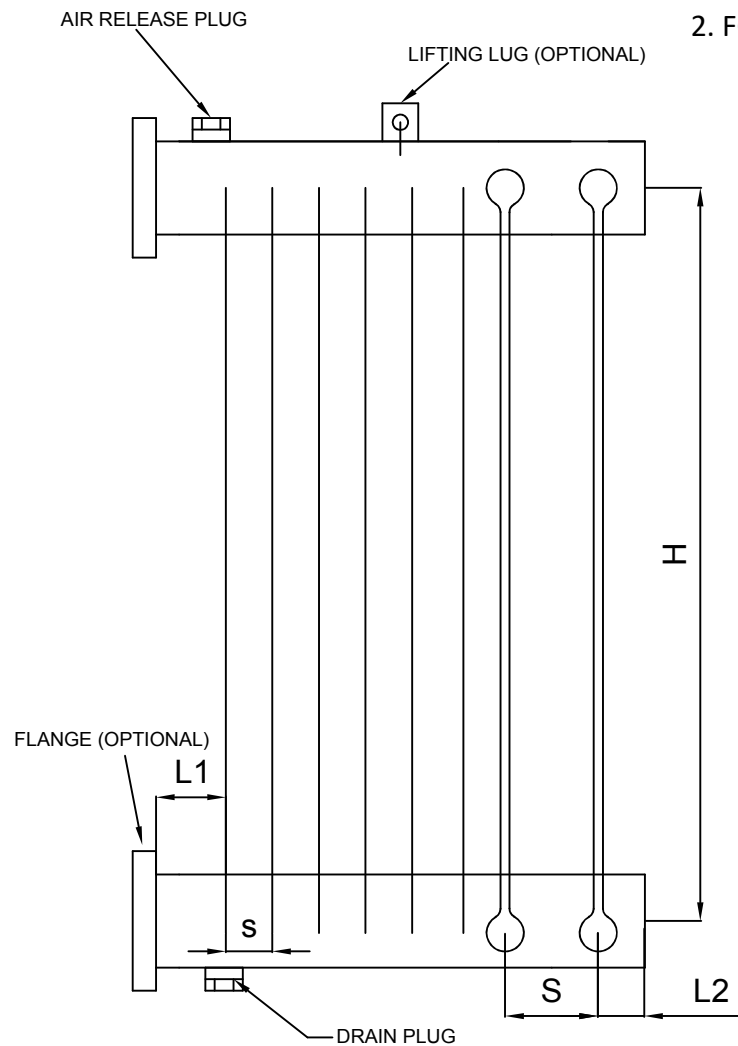
Drawing approval subject to valid vendor registration

CLIENT :  TRANSMISSION CORPORATION OF ANDHRA PRADESH VIJAYAWADA, ANDHRAPRADESH, INDIA.		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		LOA NO :		<table border="1"> <tr> <th>1</th> <th>DRG. REVISED AS PER CUS. COMMENTS DTD.--28.03.24</th> <th>APS</th> <th>MM</th> <th>MM</th> <th>01.04.24</th> </tr> <tr> <th>REV.</th> <th>DESCRIPTION</th> <th>DRAWN BY</th> <th>CHD. BY</th> <th>APPD. BY</th> <th>DATE</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		1	DRG. REVISED AS PER CUS. COMMENTS DTD.--28.03.24	APS	MM	MM	01.04.24	REV.	DESCRIPTION	DRAWN BY	CHD. BY	APPD. BY	DATE						
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REV.	DESCRIPTION	DRAWN BY	CHD. BY	APPD. BY	DATE																				
SUPPLIER / CONTRACTOR :		VENDOR :  TELAWNE POWER EQUIPMENT PRIVATE LIMITED		TITLE : CONSERVATOR DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER		<table border="1"> <tr> <th></th> <th>NAME</th> <th>DATE</th> </tr> <tr> <td>DSGN</td> <td>YPM</td> <td>20.03.24</td> </tr> <tr> <td>DRWN</td> <td>YPM</td> <td>20.03.24</td> </tr> <tr> <td>CHKD</td> <td>PSP</td> <td>20.03.24</td> </tr> <tr> <td>APPD</td> <td>MMM</td> <td>20.03.24</td> </tr> <tr> <td>SHEET</td> <td>01 OF 01</td> <td>REV.1</td> </tr> </table>			NAME	DATE	DSGN	YPM	20.03.24	DRWN	YPM	20.03.24	CHKD	PSP	20.03.24	APPD	MMM	20.03.24	SHEET	01 OF 01	REV.1
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F	G	T	K
150	110	10	18

TYPE WIDTH (W)	CENTER TO CENTER HEIGHT (H)	HEADER SIZE (D)	HEADER EXTN. L1	HEADER END L2	PANEL SPACING (S)	NO. OF PANNELS (N)	TOTAL LENGTH (L)	RADIATOR QUANTITY
300	1200	90	75	50	50	5	(N-1)XS+L1+L2	4

Tertiary Loading STR

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada

CLIENT: TRANSMISSION CORPORATION OF ANDHRA PRADESH
VIJAYAWADA, ANDHRAPRADESH, INDIA.

PROJECT: 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.

LOA NO :

SUPPLIER / CONTRACTOR: TELAWNE POWER EQUIPMENT PRIVATE LIMITED

TITLE: RADIATOR BANK ASSEMBLY DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER

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DRAWING No. T P E - D - 2 5 - 8 3 7 4 B

PROJECTION

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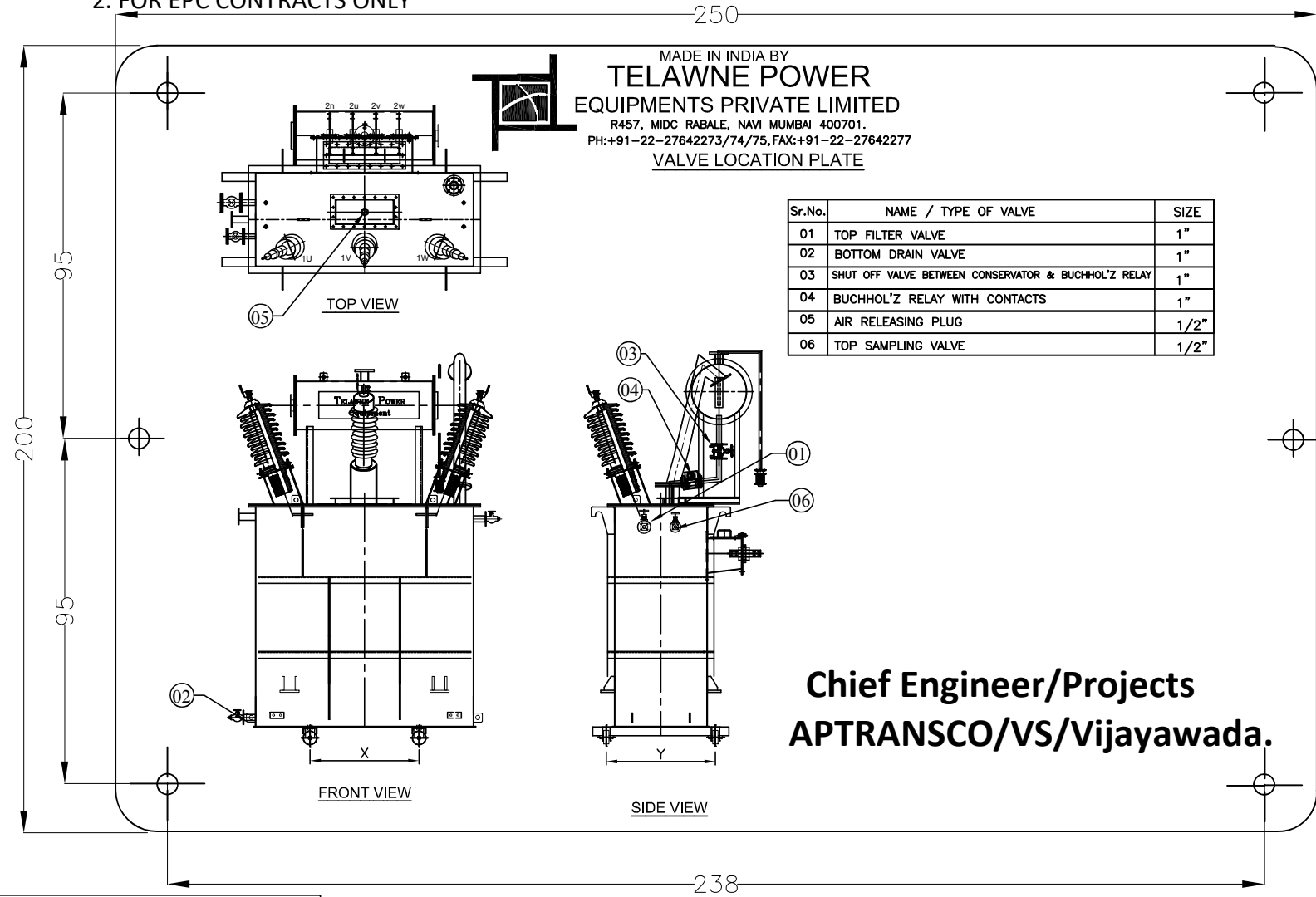
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DRWN	YPM	20.03.24
CHKD	PSP	20.03.24
APPD	MMM	20.03.24
SHEET	01 OF 01	REV.01

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MADE IN INDIA BY
TELAWNE POWER
EQUIPMENTS PRIVATE LIMITED
R457, MIDC RABALE, NAVI MUMBAI 400701.
PH:+91-22-27642273/74/75, FAX:+91-22-27642277
VALVE LOCATION PLATE

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

NOTES :-
1) BOLTED RATING PLATE
2) THE FIGURE ARE ENGRAVED/ETACHED & HAVE THE DEPTH OF 0.2 TO 0.25 MM.
3) COLOR OF PRINT : BLACK
4) MATL: ALUMINUM (250MMX200MM) & ALL VALVE SIZE MENTIONED IN TABLE

1	DRG. REVISED AS PER CUS. COMMENTS DTD.-28.03.24	APS	MM	MM	01.04.24
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				NAME	DATE
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				DRWN YPM	20.03.24
				CHKD PSP	20.03.24
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				SHEET 01 OF 01	REV.1

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PROJECT: 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.

SUPPLIER / CONTRACTOR: TELAWNE POWER EQUIPMENT PRIVATE LIMITED

VENDOR: TELAWNE POWER EQUIPMENT PRIVATE LIMITED

LOA NO :
TITLE: VALVE LOCATION PLATE DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER

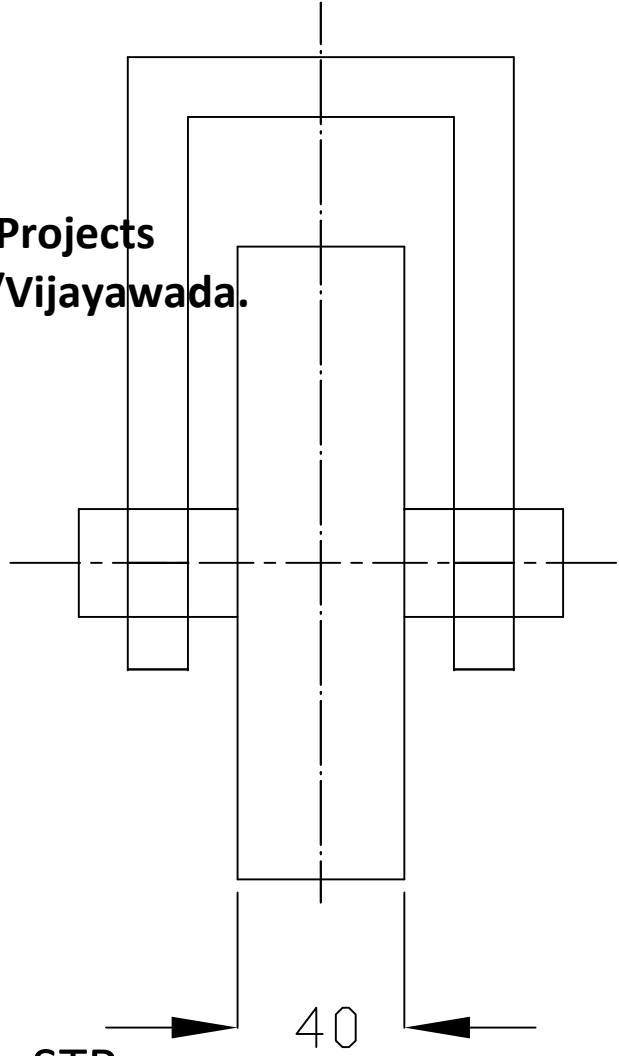
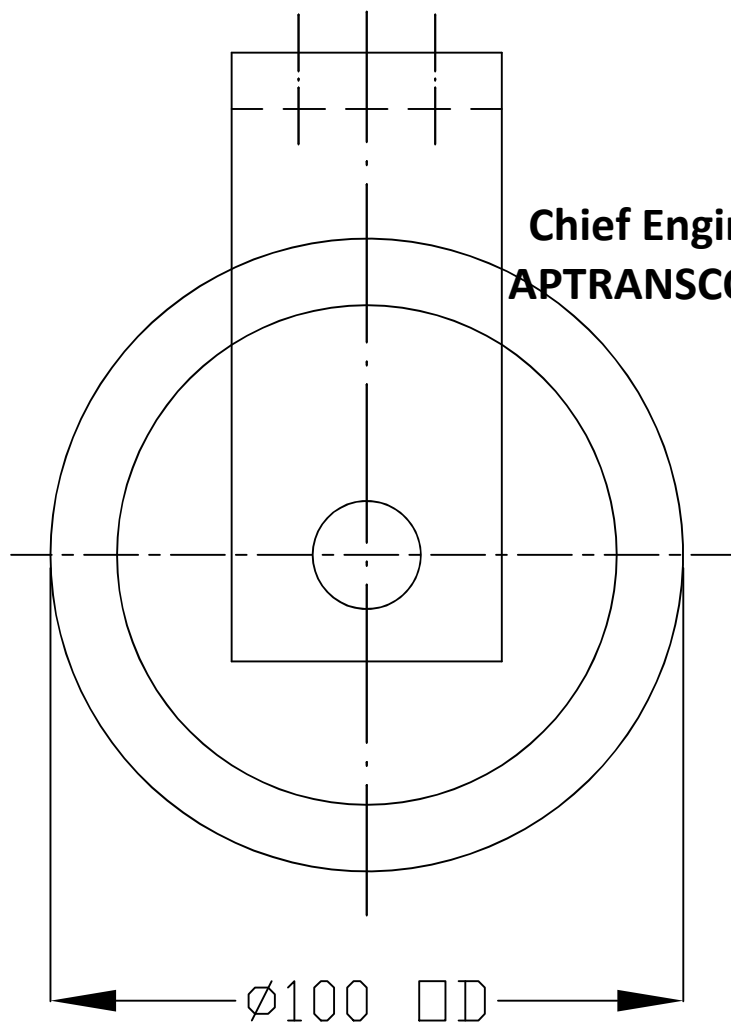
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**Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.**

Tertiary Loading STR

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			DRWN	YPM	20.03.24
SUPPLIER / CONTRACTOR:	VENDOR:  TELAWNE POWER EQUIPMENT PRIVATE LIMITED	TITLE: ROLLER ASSEMBLY DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER	CHKD	PSP	20.03.24
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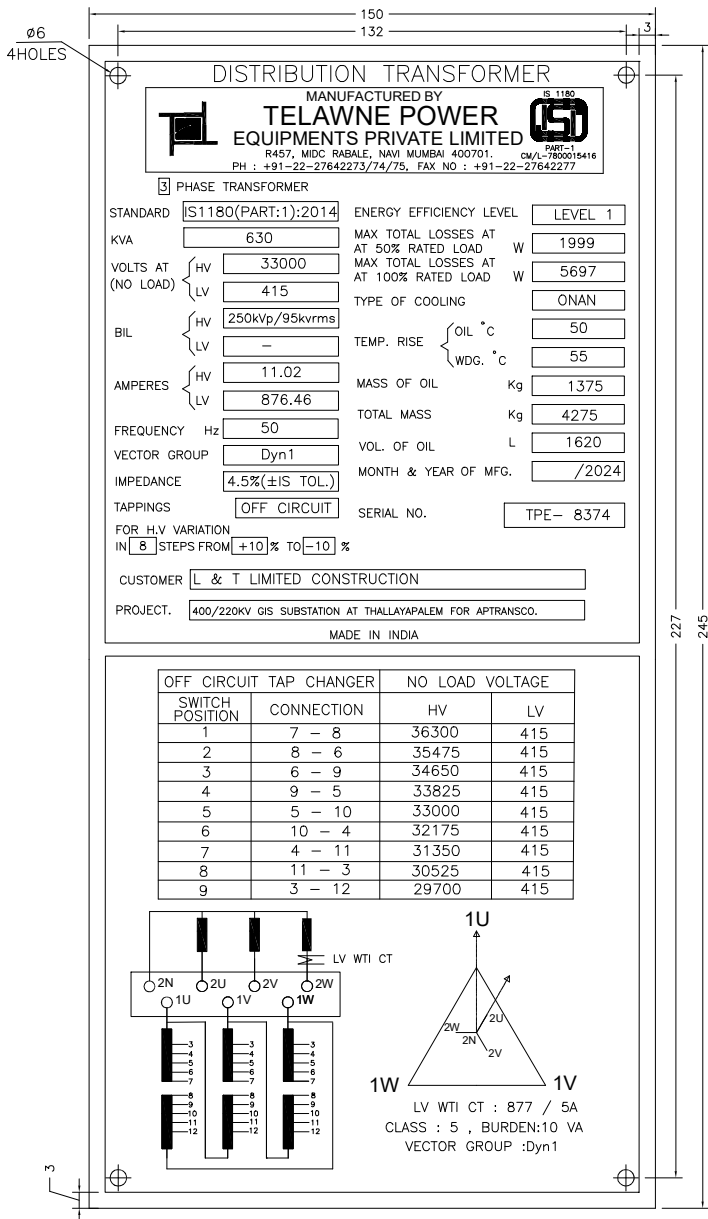
F
E
D
C
B
A



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NOTE : 1) SR NO & IMPEDANCE VALUE SHALL BE PUNCHED AT THE TIME OF FINAL INSPECTION PRIOR OF DISPATCH.
2) ALL LETTERS ARE ENGRAVED
3) MATERIAL : ALUMINUM
4) THICKNESS : 1.6MM

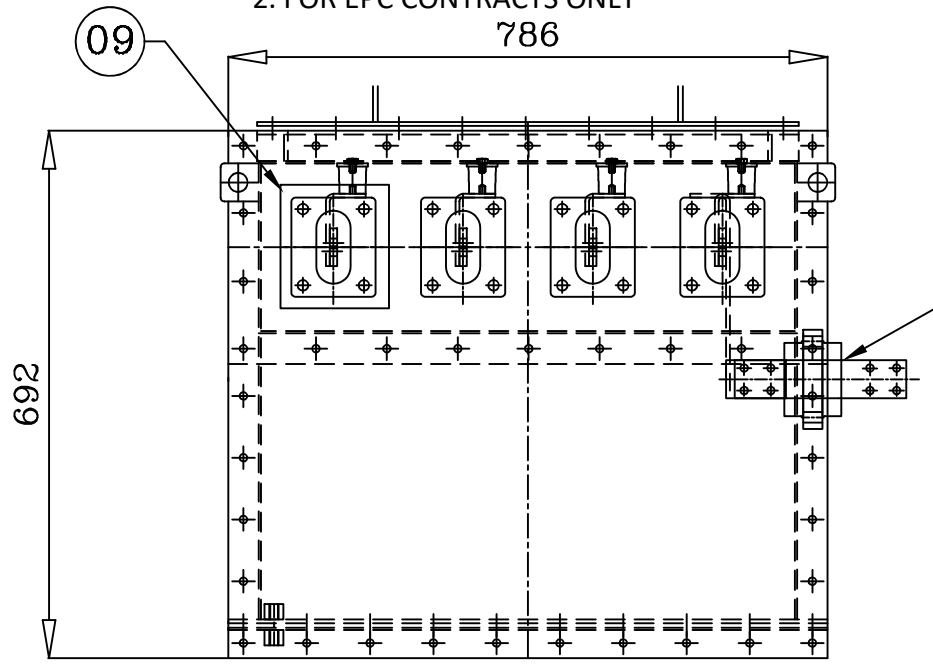
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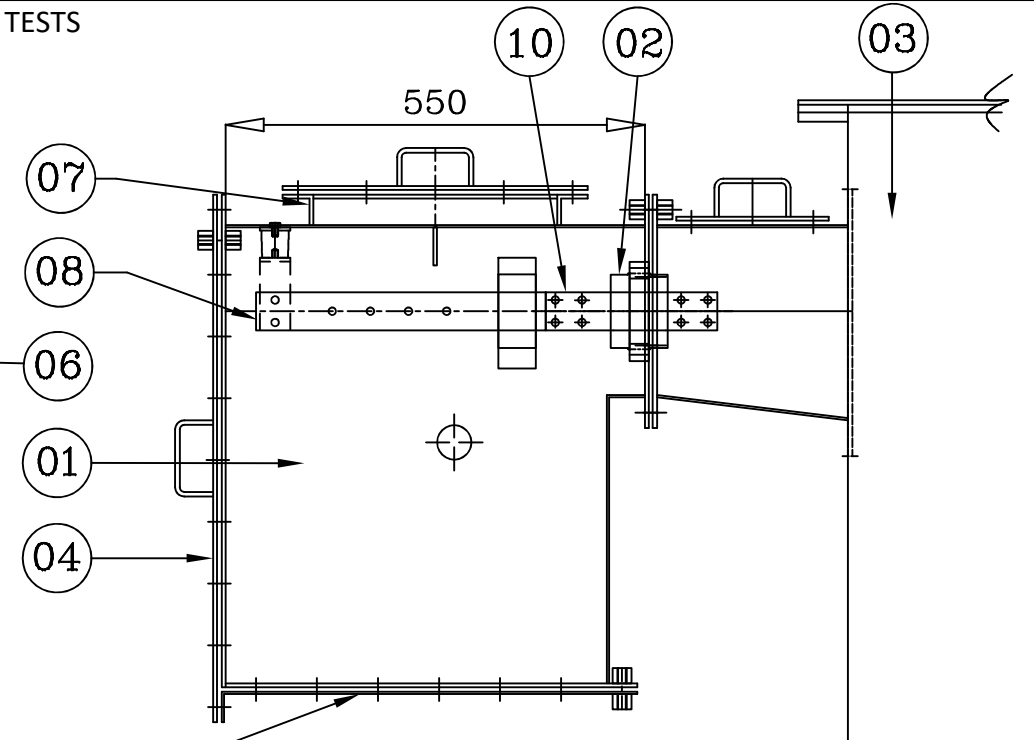
CLIENT : TRANSMISSION CORPORATION OF ANDHRA PRADESH VIJAYAWADA, ANDHRAPRADESH, INDIA.	PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.	LOA NO :	NAME	DATE	
			DSGN		
SUPPLIER / CONTRACTOR :	VENDOR : TELAWNE POWER EQUIPMENTS PVT LTD.	TITLE : RATING AND DIAGRAM PLATE FOR 630 KVA, 33/0.415 KV DISTRIBUTION TRANSFORMER	DRWN	DGP	01.04.2024
			CHKD	MBG	01.04.2024
			APPD	GKK	01.04.2024
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2. FOR EPC CONTRACTS ONLY



FRONT VIEW



SIDE VIEW

GROUND LEVEL

RT	4	10	BIMETALLIC SHEET	BIMETALLIC
	1	9	WTI CT	EPOXY
	4	8	BUS BAR	ALUMINIUM
	1	7	INSPECTION COVER	M.S.
RT	1	6	ADDITIONAL NEUTRAL BUSHING (1.1kV, 2150 Amp.)	EPOXY
RT	1	5	DETACHABLE GLAND PLATE (3THK)	ALUMINIUM
	1	4	FRONT COVER	M.S.
	1	3	TRANSFORMER TANK	M.S.
	4	2	LV BUSHING	EPOXY
	1	1	CABLE BOX SHELL	M.S.
	QTY.		DESCRIPTION	MATL.

BILL OF MATERIAL

NOTE:
 1) POSITION OF FITTINGS ARE SUBJECT TO CHANGE AT THE TIME OF MANUFACTURING
 2) ALL DIMENSIONS WILL HAVE ± 10% TOLERANCES.

LV CLEARANCES(minimum)	
PH. TO PH.	PH. TO EARTH
25	25

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

CLIENT: TRANSMISSION CORPORATION OF ANDHRA PRADESH VIJAYAWADA, ANDHRAPRADESH, INDIA.	PROJECT: 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.	LOAN NO :	1 DRG. REVISED AS PER CUS. COMMENTS DTD.-28.03.24	APS	MM	MM	01.04.24	
SUPPLIER/CONTRACTOR:	VENDOR: TELAWNE POWER EQUIPMENT PRIVATE LIMITED	TITLE: LV CABLE BOX DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER	REV.	DESCRIPTION	DRAWN BY	CHD. BY	APPD. BY	DATE
RELEASED FOR	<input type="checkbox"/> PRELIMINARY <input type="checkbox"/> TENDER <input type="checkbox"/> INFORMATION <input checked="" type="checkbox"/> APPROVAL <input type="checkbox"/> CONSTRUCTION	DRAWING No. T P E - D -	3	1	8	3	7	4
8	7	6	5	4	3	2	1	
			PROJECTION					

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NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS

3

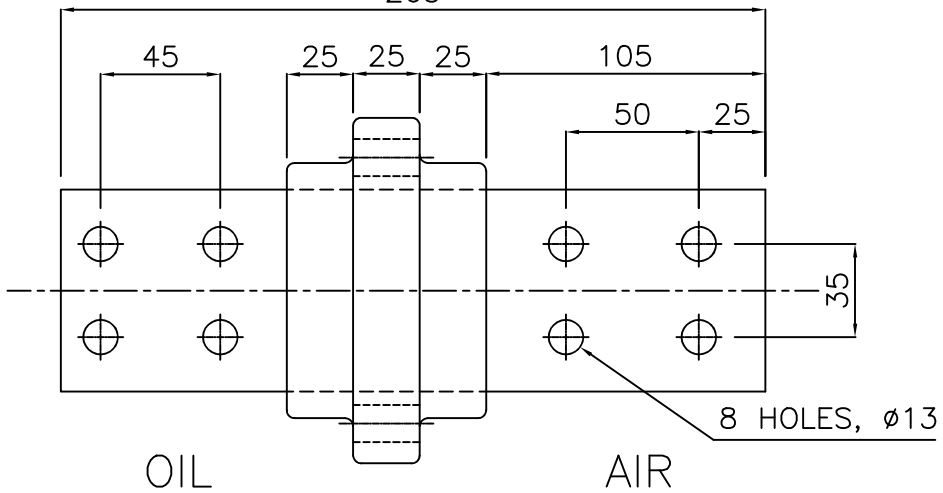
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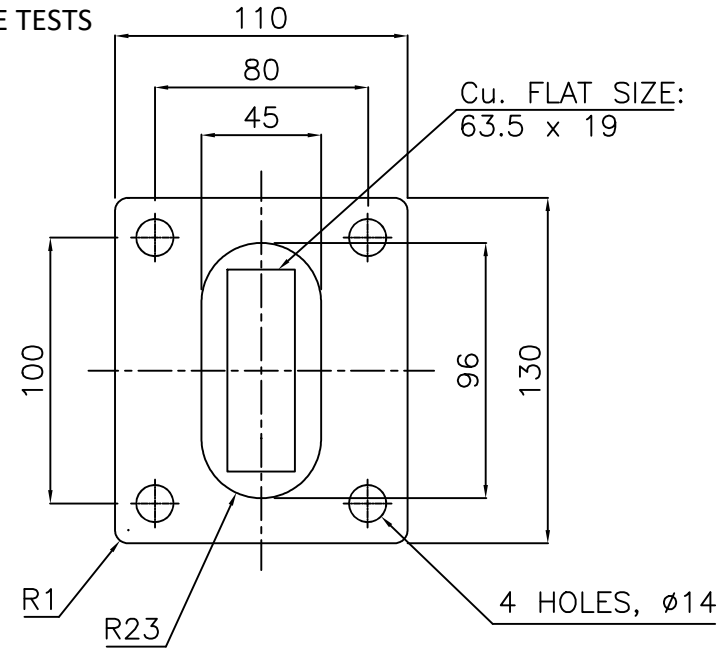
13

875

FOR EPC CONTRACTS ONLY



FRONT VIEW



SIDE VIEW

REFERENCE STANDARD: IS:2099-1986

- 1) Rated Voltage : 1.1 kV
- 2) Maximum Current Capacity : 2150 A
- 3) Copper flat size : 63.5 x 19 mm
- 4) Dry Power Frequency Withstand voltage test : 5kV

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DETAILS :-

- 1) Electrolytic Copper flat With High Electrical conductivity.
- 2) Copper flat to be Electroplated 12 to 15 microns.
- 3) Colour: Of Epoxy Casting Brick red.
- 4) All dimensions are in mm.

IMP NOTE:-WE PROVIDE BIMETALLIC SHEET BETWEEN BUSHING & BUSBAR.



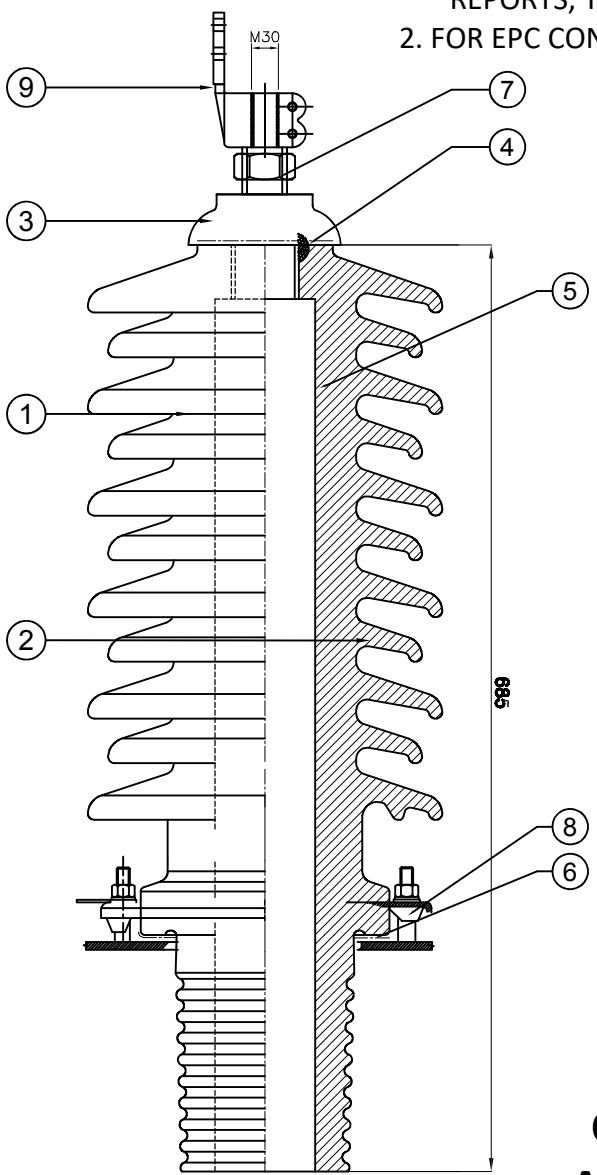
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REV.	DESCRIPTION	DRAWN BY	CHD. BY	APPD. BY	DATE

CLIENT :  TRANSMISSION CORPORATION OF ANDHRA PRADESH VIJYAWADA, ANDHRAPRADESH, INDIA.	PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.	LOA NO :	NAME				DATE	
			DSGN	YPM	19.03.24	DRWN	YPM	19.03.24
SUPPLIER / CONTRACTOR:	VENDOR :  TELAWNE POWER EQUIPMENT PRIVATE LIMITED	TITLE : LV BUSHING DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER	CHKD	PSP	19.03.24	APPD	MMM	19.03.24
			SHEET	01	OF	01	REV.1	
RELEASED FOR	<input type="checkbox"/> PRELIMINARY	<input type="checkbox"/> TENDER	<input type="checkbox"/> INFORMATION	<input checked="" type="checkbox"/> APPROVAL	<input type="checkbox"/> CONSTRUCTION	DRAWING No.	T P E - D -	5 0 - 8 3 7 4
8	7	6	5	4	3	2	1	PROJECTION

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8 7 6 5 4 3 2 1 14

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
2. FOR EPC CONTRACTS ONLY



BILL OF MATERIAL

ITEM	QTY.	DESCRIPTION
1	1	INSULATOR
2	1	BRASS STEM
3	1	CAP
4	1	SEALING WASHER FOR STEM
5	1	SEPARATOR
6	1	SEALING WASHERS GASKET
7	3	HEXAGONAL NUT(FOR STEM)
8	1	CLAMPING ARRANGEMENT
9	1	PALM CONNECTOR

TECHNICAL DATA

TYPE:- OIL COMMUNICATING, SOLID PORCELAIN TYPE	
RATED VOLTAGE	= 52 kV
RATED CURRENT	= 4000 AMP.
P.F.WITHSTAND VOLTAGE (DRY & WET)	= 95 kV
LIGHTNING IMPULSE WITHSTAND VOLTAGE	= 250 kVp
TOTAL CREEPAGE DISTANCE(31mm/kV)	= 1612 mm
RATED SHORT TIME CURRENT	= 31.5kA
TEMPERATURE RISE	= 45°C
CANTILEVER STRENGTH	= 3500N
COLOUR	= BROWN

MAKE OF BUSHING
CJI
ANY REPUTED

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APTRANSCO/VS/Vijayawada.**

1	DRG. REVISED AS PER CUS. COMMENTS DTD.-28.03.24	APS	MM	MM	01.04.24
REV.	DESCRIPTION	DRAWN BY	CHD. BY	APPD. BY	DATE

CLIENT: **TRANSMISSION & DISTRIBUTION OF ANDHRA PRADESH VJYAWADA, AP**
 PROJECT: **400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.**

SUPPLIER/CONTRACTOR: **TELAWNE POWER EQUIPMENT PRIVATE LIMITED**
 TITLE: **HV BUSHING DRAWING FOR 630KVA,33/0.415KV DISTRIBUTION TRANSFORMER**

NAME	DATE
DSGN YPM	19.03.24
DRWN YPM	19.03.24
CHKD PSP	19.03.24
APPD MMM	19.03.24
SHEET 01 OF 01	REV.1

8 7 6 5 4 3 2 1

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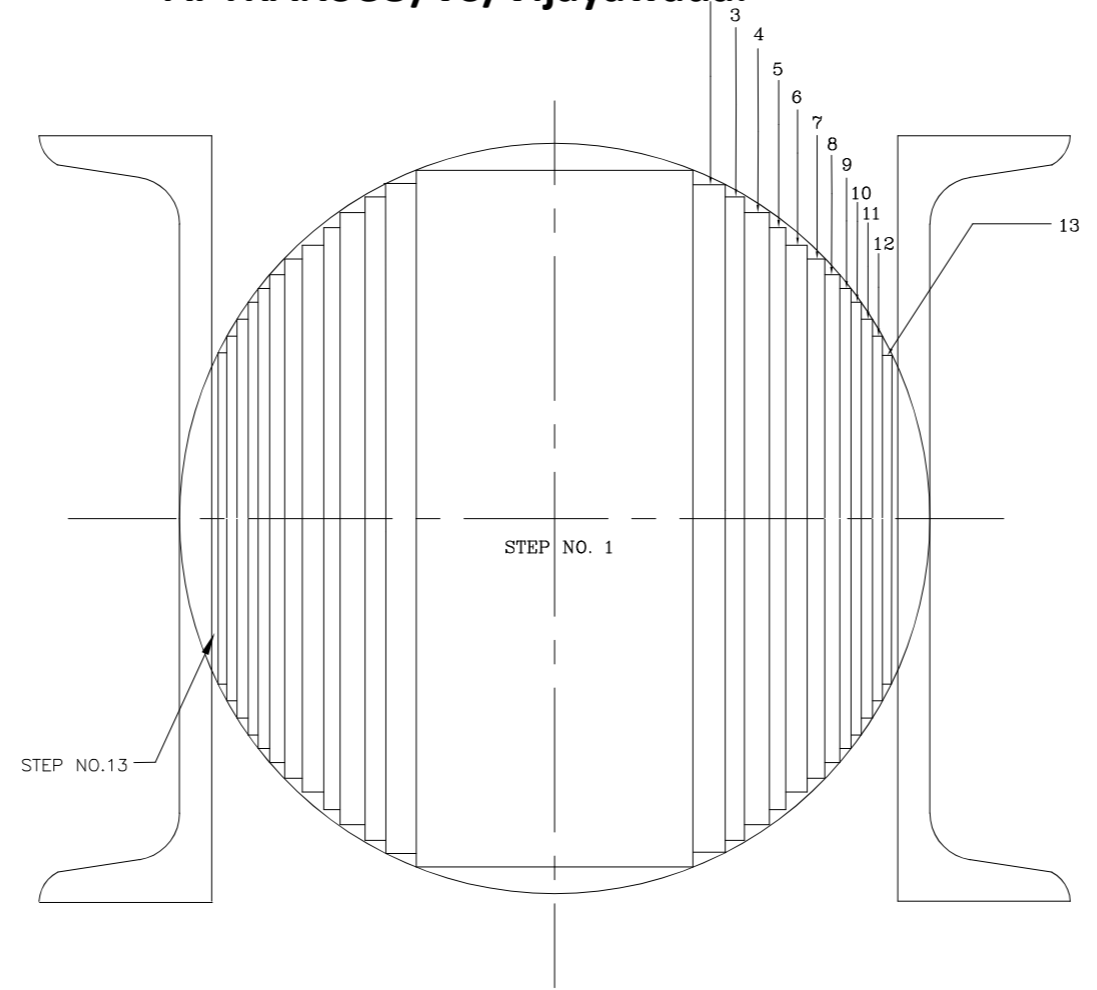
8752987/2024/EEMRT-ENE51




Sr.NO	DISCRPTION	AS OFFERED
1	PRIMARY VOLTAGE	33000 V
2	SECONDARY VOLTAGE	415 V
3	RATING (KVA)	630
4	VECTOR GROUP	Dyn1
5	CONFIRMING TO IS	IS-1180 , & IS-2026
6	PERMISSIBLE VOLTAGE FLUCTUATION(%)	36 KV
7	TEMP. OF TOP OIL (MAX)*C	50
8	TEMP OF WINDING (MAX)*C	55
9	CORE DETAILS	
	a)CORE MATERIAL	CRGO
	b)GRADE OF LAMINATION(THICKNESS)	0.23mm / 23ZDKH85
	c)FLUX DENSITY W/M	1.65 T Max
	d)NO OF STEPS OF CORE	13
	% IMPEDANCE	4.5 % (+ IS TOL)

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
2. FOR EPC CONTRACTS ONLY

630 KVA, 33/0.415KV.											
STEP No.	1	2	3	4	5	6	7	8	9	10	11
L. mm	200	190	180	170	160	150	140	130	120	110	100
STACK THICKNESS	40	34	22	16	14	12	10	10	6	8	6
CROSS SECTION cm ²	80	64.6	39.6	27.2	22.4	18	14	13	7.2	8.8	6
STEP No.	12	13									
L. mm	80	60									
STACK THICKNESS	10	6									
CROSS SECTION cm ²	8	3.6									
TOTAL CROSS SECTION AREA = 312.40 cm ²											
EFFECTIVE CORE AREA = 303.03 cm ²											
NO. OF LV TURNS = 22 T											

**Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.**



CLIENT :  TRANSMISSION CORPORATION OF ANDHRA PRADESH VIJYAWADA, ANDHRAPRADESH, INDIA.	PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.	LOA NO : 	NAME	DATE				
			DSGN					
			DRWN	DGP 01.04.2024				
			CHKD	MBG 01.04.2024				
			APPD	GKK 01.04.2024				
SUPPLIER / CONTRACTOR:  TELAWNE POWER EQUIPMENTS PRIVATE LIMITED	TITLE : - CORE AREA & CORE STEPS DETAILS 630 KVA 33/.415KV, DIST. TRANSFORMER	SHEET	OF	REV. R2				
RELEASED FOR <input type="checkbox"/> PRELIMINARY <input type="checkbox"/> TENDER <input type="checkbox"/> INFORMATION <input checked="" type="checkbox"/> APPROVAL <input type="checkbox"/> CONSTRUCTION		DRAWING No. T P E - D - 7 2 - 8 3 7 4 A	PROJECTION					
8		7	6	5	4	3	2	1

16
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A

8752987/2024/EEMRT-ENE51

R-457, MIDC, Rabale, Behind Pipeline Road, Thane Belapur road, Navi Mumbai - 400701. INDIA
 Tel: 022-27642273/ 74/ 75 | Fax: 022-27642277
 E-mail tpepl@telawne.com | website: www.telawne.com



NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST
 REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
 2. FOR EPC CONTRACTS ONLY

Rev : R0
 Date : 18-Mar-24
 Doc No : TPE-D-72-8374B

Rating 630 kVA
Voltage ratio 33/0.415 kV
Vector group Dyn1

FLUX DENSITY CALCULATION

Gross core area of limb & yoke	=	312.40	cm ²
Effective core area of limb & yoke (A)	=	303.03	cm ²
LV voltage per phase	=	415/√3	Volts
LV voltage per phase	=	239.6	Volts
LV turns per phase (T)	=	22	Turns
Frequency (F)	=	50	Hz
Flux Density	=	$\frac{\text{Phase voltage} \times 10^4}{4.44 \times F \times A \times T}$	
	=	$\frac{239.60}{4.44 \times 50} \times \frac{10^4}{303.03 \times 22}$	
Hence, Flux density at 100% of rated voltage	=	1.62	Tesla
So, Flux density at 110% of rated voltage	=	1.62*1.1	
	=	1.781	Tesla

NSU

Prepared By

GKK

Approved By

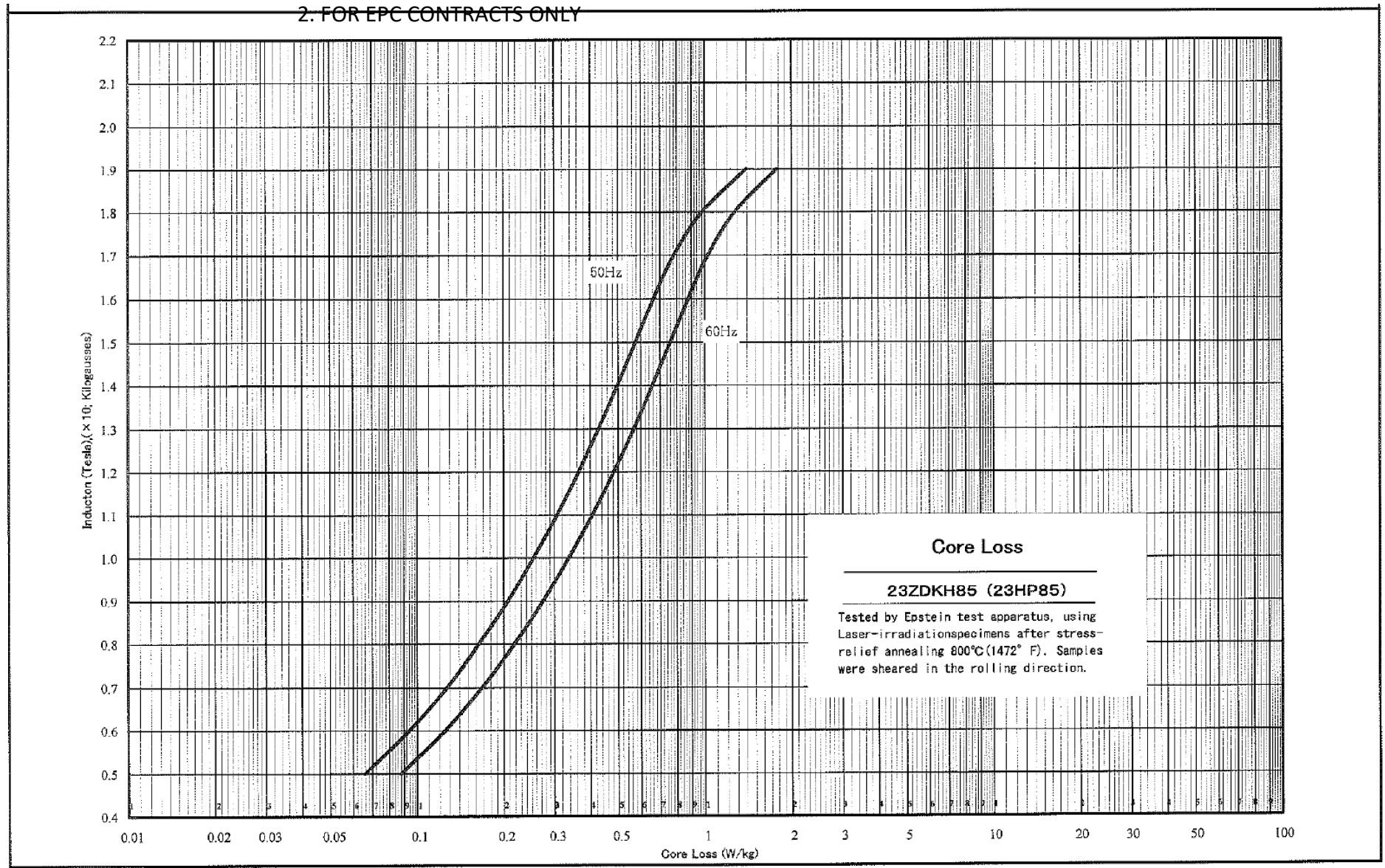
Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

Since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/VT/LA/Breakers, requirement and capability.

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 2. FOR EPC CONTRACTS ONLY



CLIENT: TRANSMISSION CORPORATION OF ANDHRA PRADESH
 VIJAYAWADA, ANDHRAPRADESH, INDIA.

PROJECT: 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.

LOA NO :
 TITLE: - CORE LOSS CURVE OF 630 KVA 33/.415KV, DIST. TRANSFORMER

SUPPLIER / CONTRACTOR:

VENDOR: TELAWNE POWER EQUIPMENTS PRIVATE LIMITED

	NAME	DATE
DSGN	DGP	15/03/2024
DRWN	MBG	15/03/2024
CHKD	GKK	15/03/2024
APPD		
SHEET 1 OF 1		REV. R1

8752987/2024/EEMRT-ENE51R EPC CONTRACTS ONLY

R-457, MIDC, Rabale, Behind Pipeline Road, Thane Belapur road, Navi Mumbai - 400701. INDIA
 Tel: 022-27642273/ 74/ 75 | Fax: 022-27642277
 E-mail tpepl@telawne.com | website: www.telawne.com



Rev : R0
 Date : 18-Mar-24
 Doc No : TPE-D-72-8374C

Rating 630 kVA
Voltage ratio 33/0.415 kV
Vector group Dyn1

NO LOAD LOSSES CALCULATION

Core weight (kg) = 1112 (Approx)
 Flux density (Tesla) = 1.62 Tesla
 Grade of core = 23ZDKH85
 Watts/kg at 1.62 T = 0.69 Watts / kg
 Core building factor = 1.25
 No load loss = Core weight x Watts per kg x core building factor
 Calculated no load losses in Watts = 959 Watts (Approx.)

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Prepared By

GKK

Approved By

Drawing approval subject to valid vendor registration

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

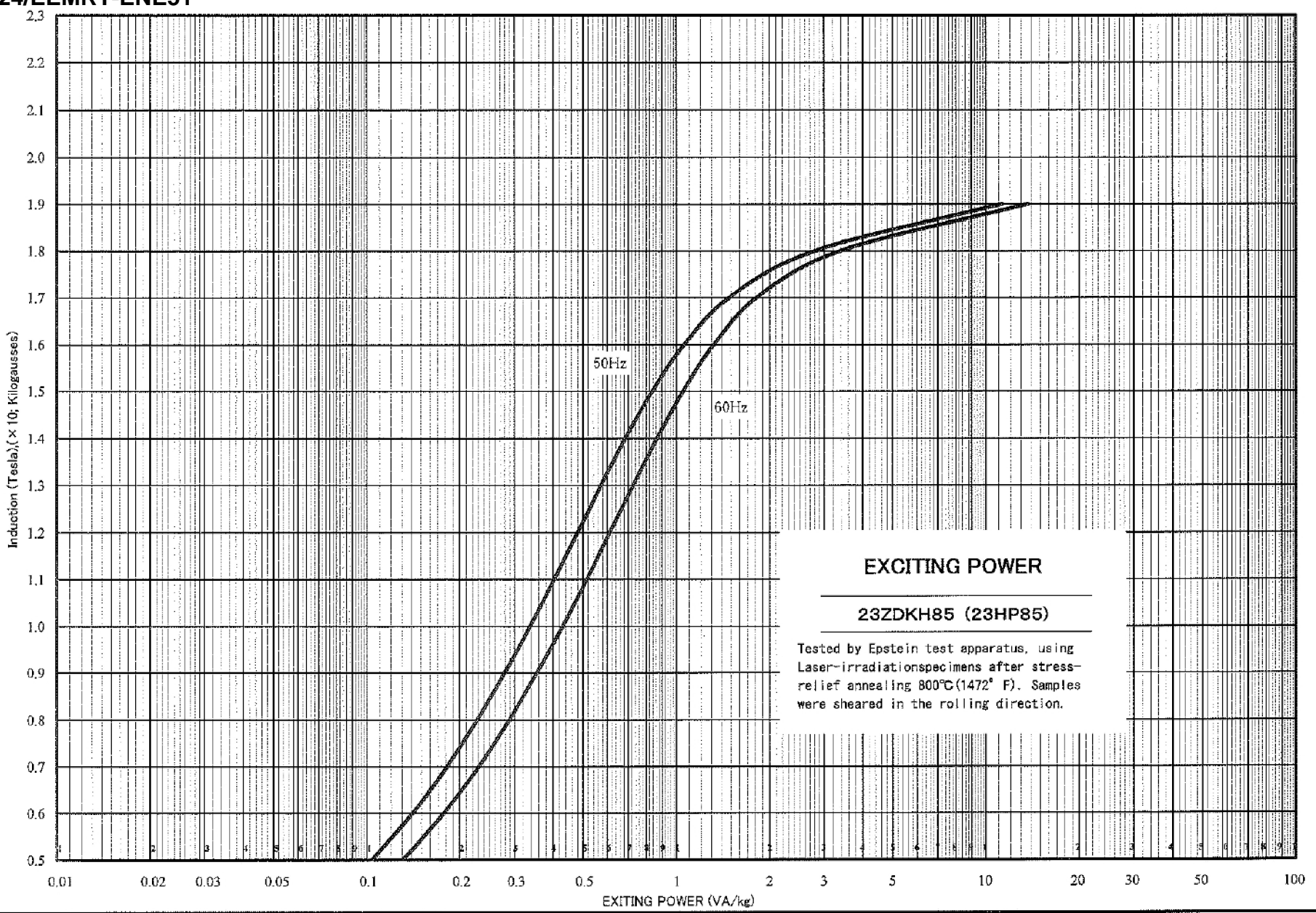
Tertiary Loading STR

Since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/VT/LA/Breakers, requirement and capability.

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8 7 6 5 4 3 2 1



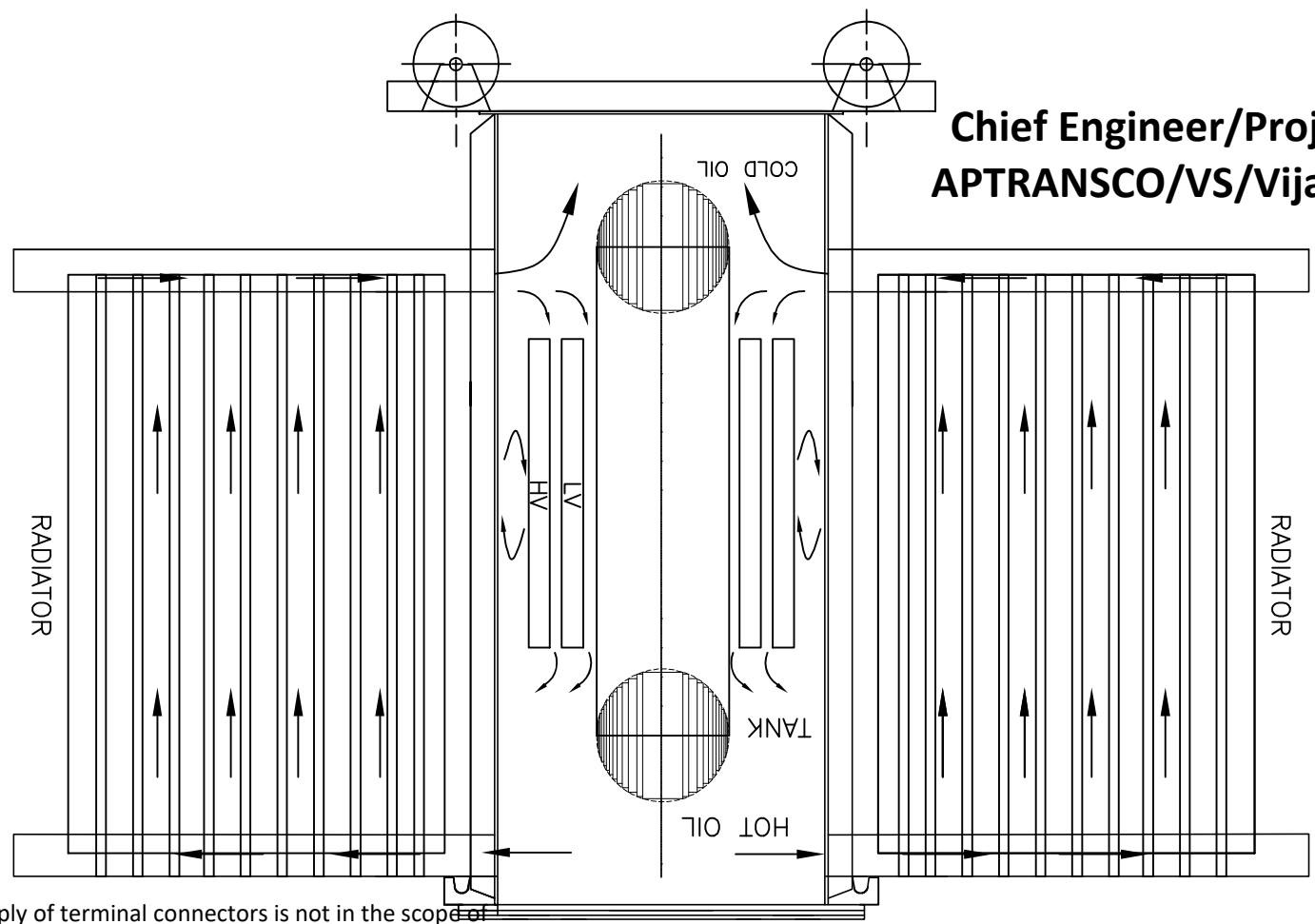
CLIENT : TRANSMISSION CORPORATION OF ANDHRA PRADESH VIJAWADA, ANDHRAPRADESH, INDIA.	PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.	LOA NO :	NAME	DATE			
			DRWN : DGP	15/03/2024			
SUPPLIER / CONTRACTOR:	VENDOR : TELAWNE POWER EQUIPMENTS PRIVATE LIMITED	TITLE : - POWER LOSS CURVE OF 630 KVA 33/415KV, DIST. TRANSFORMER	CHKD : MBG	15/03/2024			
			APPD : GKK	15/03/2024			
RELEASED FOR <input type="checkbox"/> PRELIMINARY <input type="checkbox"/> TENDER <input type="checkbox"/> INFORMATION <input checked="" type="checkbox"/> APPROVAL <input type="checkbox"/> CONSTRUCTION	DRAWING No. T P E - D - 7 2 - 8 3 7 4 D	SHEET 1 OF 1	REV. R1	PROJECTION			
8	7	6	5	4	3	2	1

20
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B

8752987/2024/EE-MRT-ENE51		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		VENDOR : TELAMNE POWER EQUIPMENT PRIVATE LIMITED		CONTRACTOR : SUPPLIER /	
TITLE : OIL FLOW DIAGRAM FOR 630KVA, 33/0.415KV DISTRIBUTION TRANSFORMER		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		VENDOR : TELAMNE POWER EQUIPMENT PRIVATE LIMITED		CONTRACTOR : SUPPLIER /	
DRWN : DGP		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		VENDOR : TELAMNE POWER EQUIPMENT PRIVATE LIMITED		CONTRACTOR : SUPPLIER /	
CHKD : MBG		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		VENDOR : TELAMNE POWER EQUIPMENT PRIVATE LIMITED		CONTRACTOR : SUPPLIER /	
APPD : GKK		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		VENDOR : TELAMNE POWER EQUIPMENT PRIVATE LIMITED		CONTRACTOR : SUPPLIER /	
DATE : 15/03/2024		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		VENDOR : TELAMNE POWER EQUIPMENT PRIVATE LIMITED		CONTRACTOR : SUPPLIER /	

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
 2. FOR EPC CONTRACTS ONLY

SIDE VIEW OF TANK



**Chief Engineer/Projects
 APTRANSCO/VS/Vijayawada.**

Since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/VT/LA/Breakers, requirement and capability.

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NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST
 REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
 2. FOR EPC CONTRACTS ONLY

Rev : R0
 Date: 18-Mar-24
 Doc No : TPE-D-72-8374G

Rating 630 kVA
Voltage ratio 33/0.415 kV
Vector group Dyn1

LOAD LOSS CALCULATION

LV:
 LV phase current in Amperes at 630 kVA = $\frac{\text{Base KVA rating}}{\text{LV Voltage (in kV)} \times \text{Sqrt}(3)}$
 = $\frac{630}{0.415 \times \text{Sqrt}(3)}$
 LV phase current in Amperes at 630 kVA = 876.46 Amp
 LV resistance at 75°C (ohms/phase) = 0.000698 Ohms
LV I²R at 75°C (3 phase) in Watts = 1609 Watts

HV:
 HV phase current = $\frac{\text{KVA rating}}{\text{HV Voltage (in kV)} \times \text{Sqrt}(3)}$
 Drawing approval subject to valid vendor registration = $\frac{630}{33 \times 3}$
 HV phase current in Amperes at 630 kVA = 6.36 Amp
 HV resistance at 75°C (ohms/phase) = 18.22 Ohms
HV I²R at 75°C (3 phase) in Watts = 2213 Watts
 Total I²R Losses at 75°C in Watts (HV+LV) = 3822 Watts
 Total stray Losses in Watts (Approx) = 318 Watts
 Calculated Load Losses at 75°C in Watts (Approx) = 4140 Watts

NSU
 Prepared By

GKK
 Approved By

Chief Engineer/Projects
APTRANSCO/VIS/Vijayawada.

Since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/VT/LA/Breakers, requirement and capability.

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 E-mail tpepl@telawne.com | website: www.telawne.com



Rev : R0
 Date : 18-Mar-24
 Doc No : TPE-D-72-8374H

Rating 630 kVA

Voltage ratio 33/0.415 kV

Drawing approval subject to valid vendor registration

Vector group Dyn1

VOLTAGE PER TURN CALCULATION

Gross core area of Limb & Yoke	=	312.40	cm ²
Effective Core area of Limb & Yoke	=	303.03	cm ²
LV Voltage per phase	=	415/√3	Volts
Flux Density	=	1.62	T
LV Turns	=	22	Turns
frequency	=	50	Hz
$\frac{\text{Phase Voltage}}{\text{Turn}}$	=	$\frac{\text{Flux density} \times 4.44 \times A \times F}{10000}$	
$\frac{\text{Phase Voltage}}{\text{Turn}}$	=	$\frac{1.62 \times 4.44 \times 303.03 \times 50}{10000}$	
Hence, Voltage per turn	=	10.90	

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Prepared By

GKK
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- NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
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Tertiary Loading STR

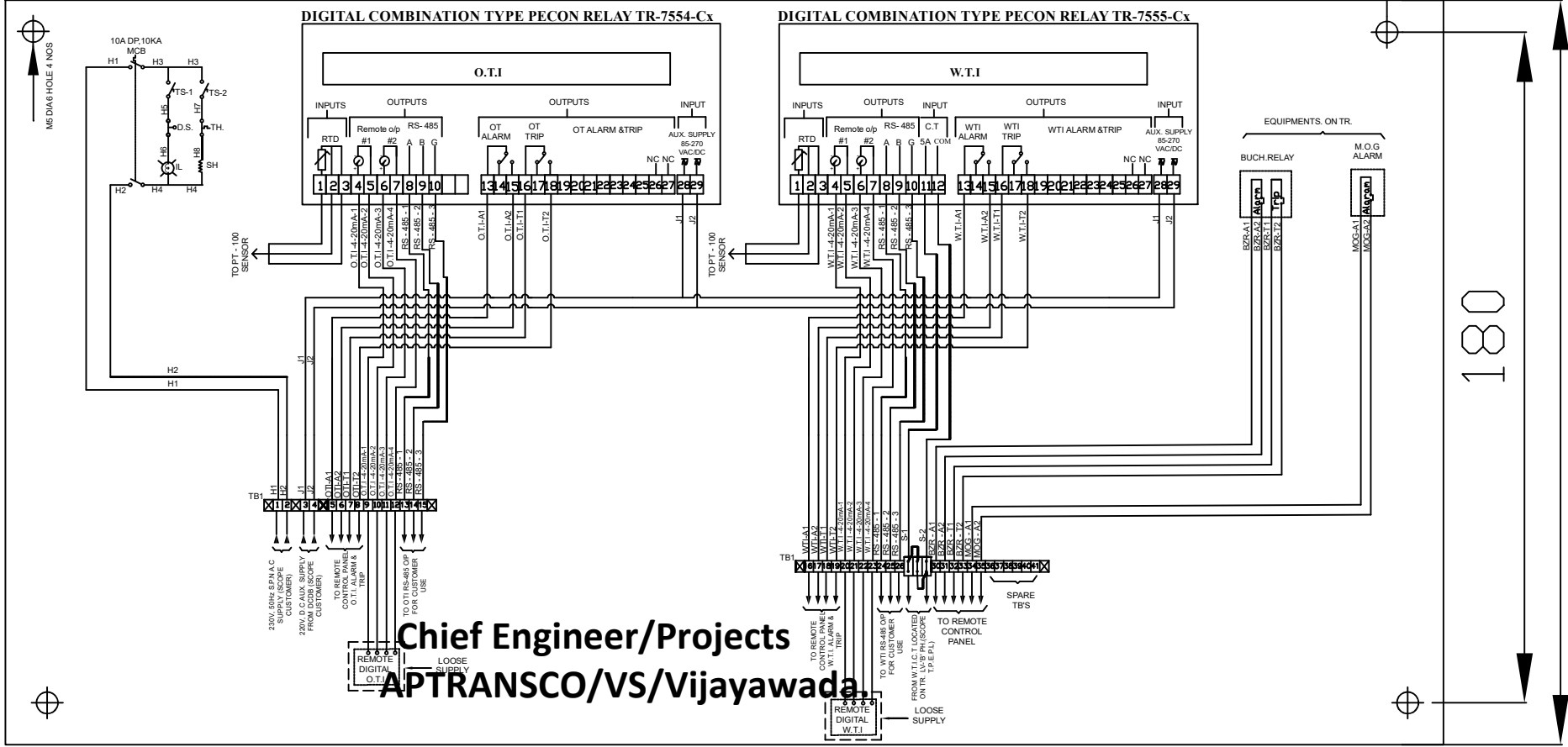
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300
280

180
200

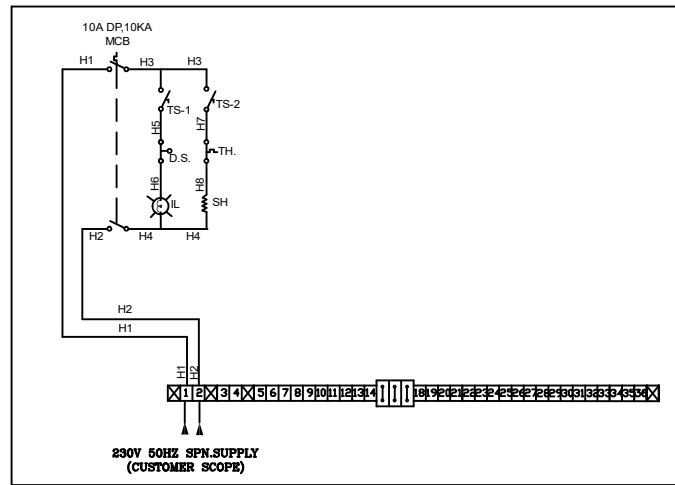
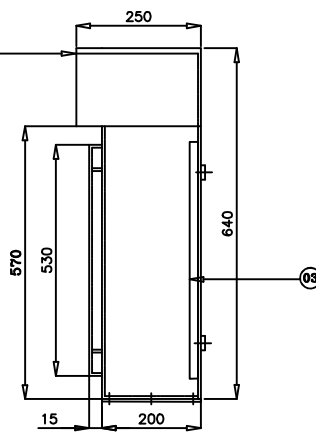
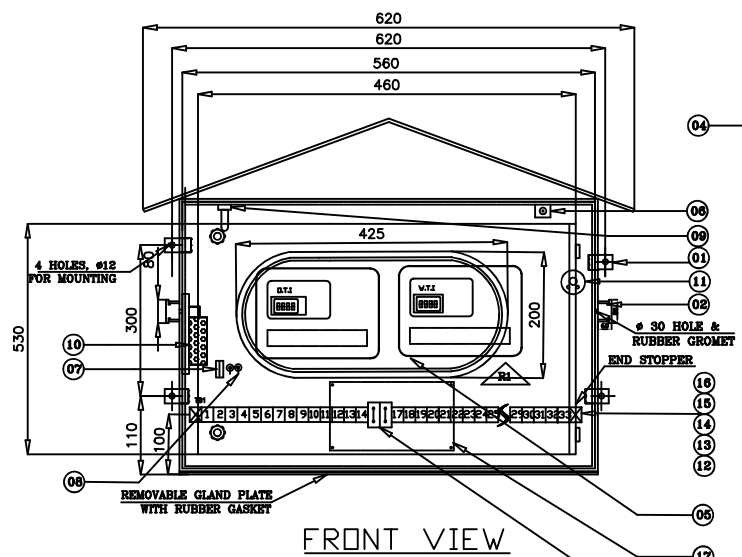


Chief Engineer/Projects
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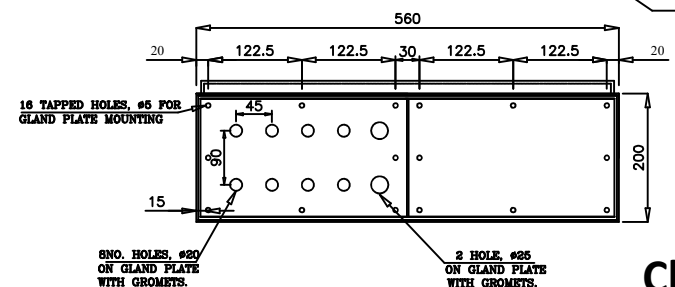
3	REVISED AS PER CUSTOMER COMMENTS	MK	AKK	GKK	04.04.24
2	OTI & WTI SEPARATELY RTD ADDED	MK	AKK	GKK	03.04.24
1	REVISED AS PER CUSTOMER COMMENTS	MK	AKK	GKK	01.04.24
REV.	DESCRIPTION	DSGN	DRWN	CHKD	APPD DATE

CLIENT : TRANSMISSION CORPORATION OF ANDHRA PRADESH VJYAWADA, ANDHRAPRADESH, INDIA.		PROJECT : 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.		LOA NO :	
SUPPLIER / CONTRACTOR:		VENDOR : TELAWNE TELAWNE POWER EQUIPMENTS PRIVATE LIMITED		TITLE : WIRING DRAWING OF MARSHALLING BOX FOR 630 KVA 33/0.415KV TRANSFORMER	
RELEASED FOR <input type="checkbox"/> PRELIMINARY <input type="checkbox"/> TENDER <input type="checkbox"/> INFORMATION <input checked="" type="checkbox"/> APPROVAL <input type="checkbox"/> CONSTRUCTION	DRAWING No. T P E - D - 7 4 - 8 3 7 4 A		SHEET OF 3		PROJECTION

87/2987/2024/EEMRT-ENE51



NOTES:- ALU. WIRING DIAG. PLATE.
1) 1.0MM ALU. WHITE BACKGROUND PLATE TO BE USED.
2) DIAG. PLATE TO BE MOUNTED BACKSIDE OF M.BOX DOOR ON 'Z' M.S BRACKET..



Chief Engineer/Projects
APTRANSCO/Vs/Vijayawada.

- NOTES:-
- M. Box WILL BE FABRICATED BY 2.0MM M.S SHEET AND SHOULD BE AS PER-I.P PROTECTION-IP55.
 - PAINT TYPE & SHADE-POWDER COATING LIGHT GRAY SHADE NO.-631 MIN 60 MICRON AS PER IS 5.
 - RABBERISED GASKET WILL BE USED ON DOOR FOR DUST AND WATER PROOFING.
 - INTERNAL WIRING WILL BE DONE WITH 1.5MM COPPER WIRES FLEXIBLE WIRE.
 - 4MM CLOSE TYPE TERMINAL BLOCK MAKE-CONNECTWELL.
 - PROVIDE LOCKWASHER ON DOOR LOCKING KNOBS.
 - OTI & WTI SHOULD BE MOUNTED ON PLATE & SHALL BE IN CENTER OF INSPECTION GLASS.
 - ALL HOLES SHOULD BE CLOSED BY SUITABLE SIZE OF RUBBER GROMETS.
 - REMOVABLE GLAND PLATE SIZE 3MM THK WITH GLAND HOLES & RUBBER GASKET.
 - RABBERISED GASKET WILL BE USED IN M.BOX FRONT DOOR & IN BOTTOM GLAND PLATES.
 - DIMENSION SHALL BE ±10%
 - POSITION OF FITTING ARE SUBJECT TO CHANGES AT THE TIME OF MANUFACTURING

M.BOX OVERALL DIMENSION	
L	620 mm
B	250 mm
H	640mm

Sr.No	DESCRIPTION	LOCATION	MAKE	QTY
18	6MMSQ DISCONNECTABLE MELOMEN TYPE TERMINAL.	M.BOX	CONNECTWELL	3
17	ALU. WIRING DIAG. PLATE	M.BOX	---	1
16	WIRES, LUGS AND FERRULES	M.BOX	RAPUTED	LS
15	DIN RAIL FOR TB MOUNTING 360MM LONG.	M.BOX	RAPUTED	1
14	END STOPPER FOR TB'S	M.BOX	CONNECTWELL	3
13	END PLATES FOR 4MMSQ TB'S	M.BOX	CONNECTWELL	2
12	4MM SQ. CLOSE CONTACT TYPE TERMINAL BLOCKS.	M.BOX	CONNECTWELL	38
11	KNOB TYPE THERMOSTATE WITH SPIRAL COIL SENSOR WITH 1 N.C. CONTACT.	M.BOX	ELMAC/Bq.	1
10	SPACE HEATER-60WATTS, 230V 50Hz.	M.BOX	GIRSHCO	1
9	LAMP HOLDER WITH 5W,230V 50HZ CFL BULB.	M.BOX	ANCHOR	1
8	10A SINGLE POLE 230V A.C. TOGGLE SWITCH.	M.BOX	KAYCEE	1
7	10A, DP 10KA 'C' CURVE MCB	M.BOX	SIEMENS	1
6	DOOR SWITCH	M.BOX	---	1
5	COMBINATION TYPE-TR-TR-PROTECTION RELAY DIGITAL SCANNER WITH O.T.I TR. WITH P.T-100 SENSOR-4-20mA REMOTE OUTPUT FOR O.T.I A&S-485 PORT.MODEL-TR-7554-Cx.	M.BOX	PECON	1
5a	COMBINATION TYPE-TR-TR-PROTECTION RELAY DIGITAL SCANNER WITH W.T.I TR. WITH P.T-100 SENSOR-4-20mA REMOTE OUTPUT FOR W.T.I A&S-485 PORT.MODEL-TR-7555-Cx.	M.BOX	PECON	1
4	CANOPY OF M.BOX.	M.BOX	---	1
3	M.S. ACCESSORIES MOUNTING PLATE.	M.BOX	---	1
2	POCKET FOR TAKING OUT CAPILIARIES.	M.BOX	---	2
1	MOUNTING SUPPORT LUGS.	M.BOX	---	4

BILL OF MATERIAL
Drawing approval subject to valid vendor registration

REV.	DESCRIPTION	DSGN	DRWN	CHKD	APPD	DATE
3	REVISED AS PER CUSTOMER COMMENTS	MK	AKK	GKK		04.04.24
2	OTI & WIT SEPARATELY RTD ADDED	MK	AKK	GKK		03.04.24
1	REVISED AS PER CUSTOMER COMMENTS	MK	AKK	GKK		01.04.24

NAME	DATE
DSGN	
DRWN	MK 20.03.24
CHKD	AKK 20.03.24
APPD	GKK 20.03.24
SHEET	OF REV. 3

CLIENT: TRANSMISSION CORPORATION OF ANDHRA PRADESH VJAYAWADA, ANDHRAPRADESH, INDIA.

PROJECT: 400/220KV GIS SUBSTATION AT THALLAYAPALEM FOR APTRANSCO.

LOA NO :

SUPPLIER/ CONTRACTOR: TELAWNE POWER EQUIPMENTS PRIVATE LIMITED

VENDOR: TELAWNE POWER EQUIPMENTS PRIVATE LIMITED

TITLE: GA DRAWING OF MARSHALLING BOX FOR 630 KVA 33/0.415KV TRANSFORMER

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