FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 3 460 00 01660

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD.
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

REF.DRG.NO.

SIGN.DATE

INVENTORY NO.

CUSTOMER'S REFERENCE DRAWING

1	NOTES & DETAILS OF OUTLINE GENERAL ARRGT. (SHT. NO. 1)	3 460 00 01660
2	ELEVATION OF OUTLINE GENERAL ARRGT. L.H.S. COOLER BANK (SHT. NO. 2)	3 460 00 01660
3	PLAN OF OUTLINE GENERAL ARRGT. L.H.S. COOLER BANK (SHT. NO. 3)	3 460 00 01660
4	END VIEW OF OUTLINE GENERAL ARRGT. L.H.S. COOLER BANK (SHT. NO. 4)	3 460 00 01660
5	ELEVATION OF OUTLINE GENERAL ARRGT. R.H.S. COOLER BANK (SHT. NO. 5)	3 460 00 01660
6	PLAN OF OUTLINE GENERAL ARRGT. R.H.S. COOLER BANK (SHT. NO. 6)	3 460 00 01660
7	END VIEW OF OUTLINE GENERAL ARRGT. R.H.S. COOLER BANK (SHT. NO. 7)	3 460 00 01660
8	O.G.A. PART LIST	3 460 00 01661

DESCRIPTION	APPROX. WT. IN KG.
CORE AND WINDING	202000
TANK AND FITTINGS	44500
BUSHING	3425
COOLER CONTROL CABINET & WIRING	650
COOLER BANK (INCLUDING CONSERVATORS, COOLER, HEADERS, HEADER SUPPORTS, PUMPS, FANS, FITTINGS & P/W ETC.	43000
OIL IN TRANSFORMER TANK	66400
OIL IN COOLER BANK, CONSERVATORS & PIPE WORK	15800
TOTAL WEIGHT INCLUDING OIL	375750
SHIPPING WT. OF TRANSFORMER (GAS FILLED)	245000
UNTANKING WEIGHT (UPPER TANK)	26000

HIGHEST VOLTAGE	AIR CLEARANCE (MIN.) mm		
		LINE TO EARTH	LINE TO LINE
420 KV	H.V.	3500	4000
245 KV	I.V.	2150	2350
52 KV	L.V.	480	530
36 KV	HVN.	320	-

APPROXIMATE OIL CAPACITIES	LITRES
OIL AND TANK INCLUDING TURRETS & OLTC	76300
OIL IN COOLER BANK, CONSERVATORS & PIPE WORK	18200
TOTAL OIL	94500

INSPECTION COVER DETAIL (TABLE)

LOCATION	SIZE	WEIGHT OF EACH	QTY.
HV SIDE ONTANK COVER	Ø610	25	1
IV SIDE ON TANK COVER	Ø610	25	1
TANK END WALL	430 X 730	19	4
TERTIARY POCKET COVER	360 X 460	14	1
TERTIARY POCKET WALL	430 X 590	22	2
IV SIDE TANK WALL	510 X 430	19	3
IV SIDE TANK WALL(BOTTOM)	510 X 430	19 CAT-1	1

पावरग्रिड
(Signature)
DE
(Designation)
16/1/20
(Date)

I. Approved/Released for Fabrication/ Construction
II. Approved/Released for Fabrication/ Construction Subject to Incorporation of Comments, Modification as Noted. Revised Drawing Required.
III. To Be Resubmitted for Approval after Incorporating the Comments.
IV. For Information & Record.
V. Not Approved

Power Grid Corporation of India Ltd.
Engg. Deptt. (S/S Group) Gurgaon, Haryana

NOTES :-

1. WHEN REFERRING THE O.G.A. DRG. PLEASE QUOTE MVA & W.O. NO.
2. DIMENSIONS SHOWN THUS ▭ ARE OVERALL SHIPPING DIMENSION.
3. WIRING FROM INSTRUMENTS, C.T'S ETC. NOT SHOWN FOR CLARITY.
4. JACK POINTS ARE FOR UNLOADING FROM WAGON.
5. PAINTING AT OUTSIDE TANK, COOLER CONTROL CABINET SHALL BE RAL: 7035. PAINTING SHALL BE AS PER POWERGRID TECHANICAL SPECIFICATION..
6. THE DESIGN FEATURES SHOWN ON THIS DRAWING (GENERALLY IN LINE WITH IEC:60076 & AGREED CUSTOMER SPECIFICATION) MEETS THE STATUTORY, REGULATORY & SAFETY REQUIREMENTS WITH RESPECT TO EARTHING ARRANGEMENT, DANGER AND OTHER LABELS. AND ANTI EARTH QUAKE CLAMPING ARRANGEMENT.
7. ALL HEIGHT WISE DIMENSIONS ARE GIVEN FROM RAIL LEVEL.
8. WEIGHT & OIL QUANTITIES ARE TENTATIVE.
9. GASKET : NITRILE RUBBER CORD GASKET.
10. TOLERANCE WHEREVER NOT MENTION TO BE CONSIDER ±3%.
11. Canopy shall be provided for Buchholz relay, PRD, SPR and MOLG.

BHEL R.O.D.
Lodhi Road
New Delhi-3

REV	DATE	ALT.	RAKESH		REV	DATE	ALT.	RAKESH	
02	13.12.19	CKD.	GK		01	04.11.19	CKD.	GK	
		APPD.	LK/CM				APPD.	LK/CM	
ZONE	PIPE ARRANGEMENT IN SHEET 2,3,5 & 6 AT POSITION MARK AS ⚠ CHANGED IT 12a ADDED.				ZONE	CUSTOMER COMMENTS INCORPORATED.			

TYPE OF PRODUCT	500 MVA 3 PH 400/220/33KV AUTO TRANSFORMER.
NAME OF CUSTOMER	M/S. POWER GRID CORPORATION OF INDIA LTD

ADDITIONAL INFORMATION	भारत हेवी इलेक्टिकल्स लिमिटेड भोपाल					
W.O.- STANDARD	BHARAT HEAVY ELECTRICALS LTD. BHOPAL					
STATUS OF DRAWING "PR"	DEPT	CODE	WEIGHT(kg)	SCALE		
DISTRIBUTION OF PRINTS	TRE	406	-----	COMP.SCALE-1:1		
TRE-1, TRM-3	TITLE	OUTLINE GENERAL ARRANGEMENT NOTES & DETAIL				

	NAME	SIGN	DATE
DRN.	RAKESH		20.10.19
CHD.	GK		20.10.19
APPD.	LK/CM		20.10.19

DRG. NO 3 460 00 01660 REV. 02

SHEET 01 OF 07

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 3 460 00 01660

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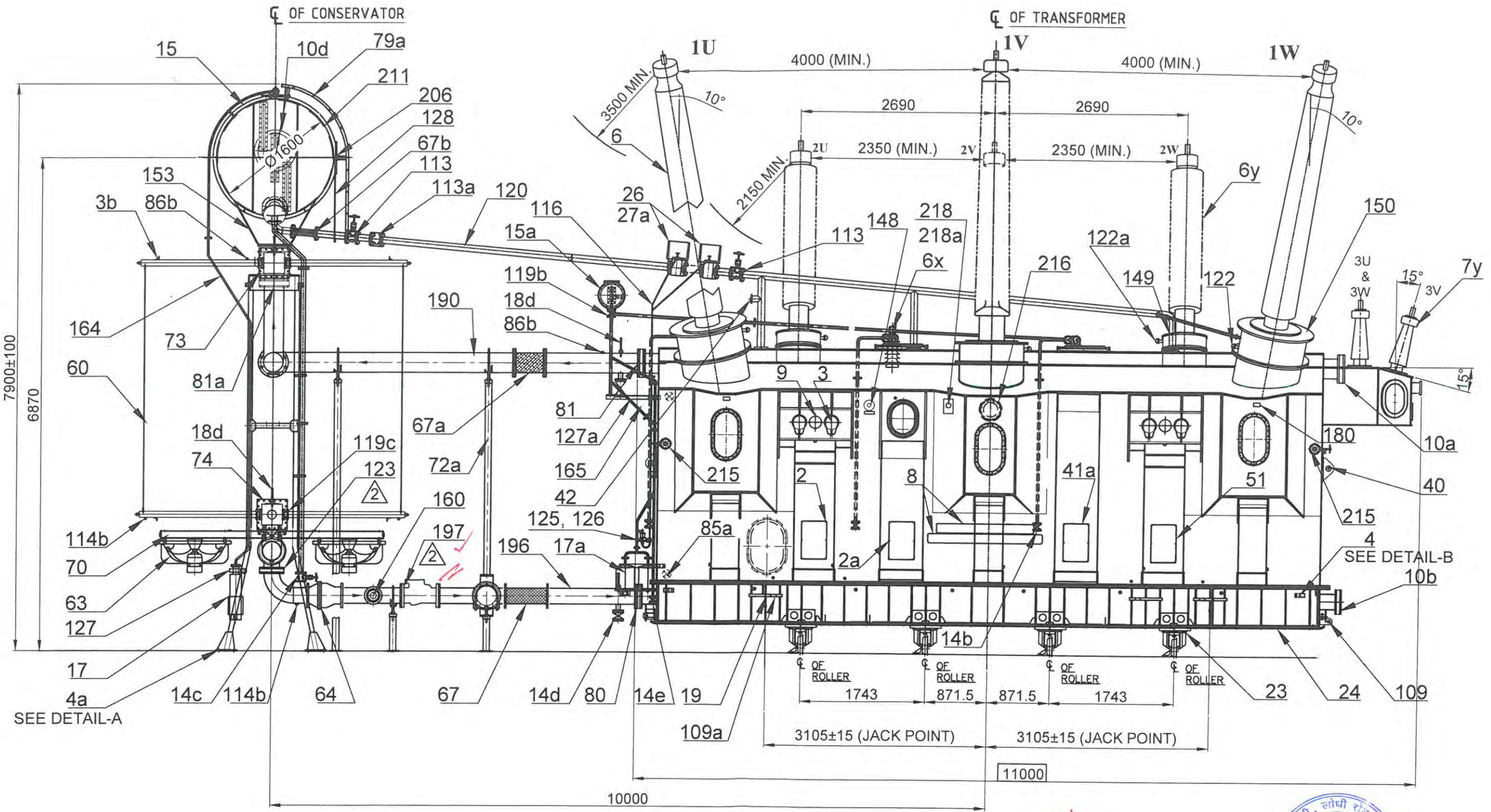
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

REF.DRG.NO.

SIGN.DATE

INVENTORY NO.



CAP-I
R/Fon 16/1/2020

BHEL R.O.D. Lodhi Road New Delhi-3

REV	DATE	ALT.	RAKESH		REV	DATE	ALT.	RAKESH	
02	13.12.19	CKD.	GK		01	04.11.19	CKD.	GK	
		APPD.	LK/CM				APPD.	LK/CM	
ZONE	PIPE ARRANGEMENT IN SHEET 2,3,5 & 6 AT POSITION MARK AS ⚠2 CHANGED.IT.12a ADDED.				ZONE	CUSTOMER COMMENTS INCORPORATED.			

TYPE OF PRODUCT	500 MVA 3 PH 400/220/33KV AUTO TRANSFORMER.
NAME OF CUSTOMER	M/S. POWER GRID CORPORATION OF INDIA LTD

ADDITIONAL INFORMATION	भारत हेवी इलेक्टिकल्स लिमिटेड भोपाल				
W.O.- 69009-A-512-01	BHARAT HEAVY ELECTRICALS LTD. BHOPAL				
STATUS OF DRAWING "PR"	DEPT	CODE	WEIGHT(kg)	SCALE	
DISTRIBUTION OF PRINTS	TRE	406	-----	COMP.SCALE-1:1	
TRE-1, TRM-3	TITLE	OUTLINE GENERAL ARRANGEMENT ELEVATION VIEW (L.H.S)			

	NAME	SIGN	DATE
DRN.	RAKESH		20.10.19
CHD.	GK		20.10.19
APPD.	LK/CM		20.10.19

DRG. NO 3 460 00 01660 REV. 02

SHEET 02 OF 07

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 3 460 00 01660

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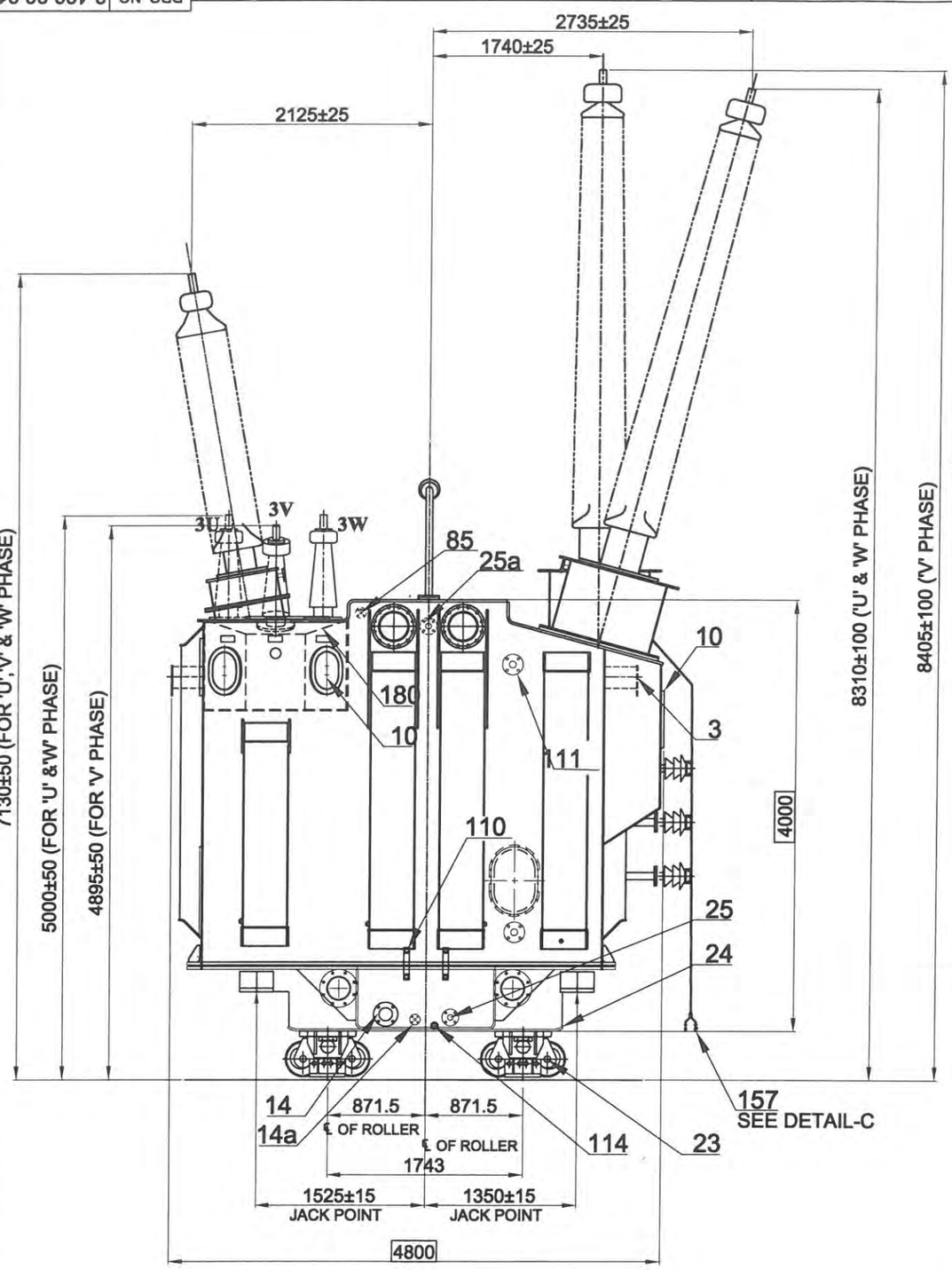
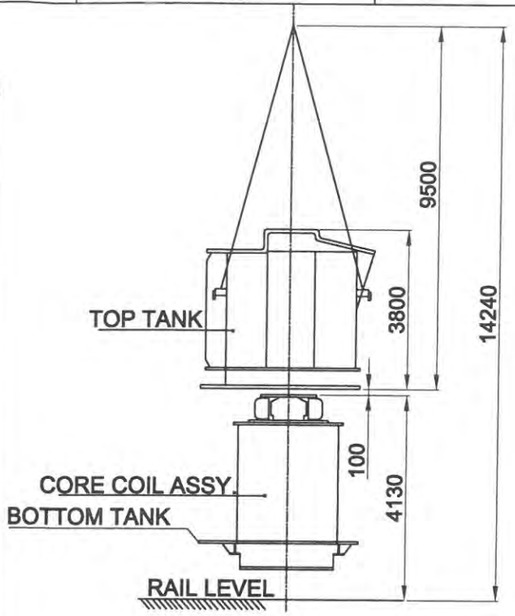
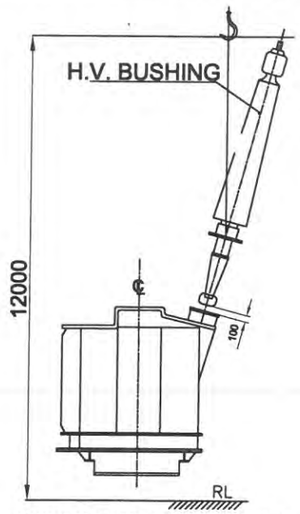
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



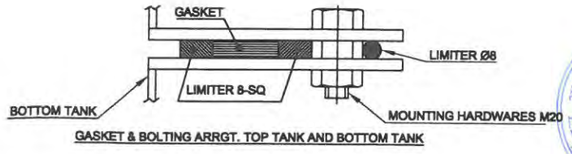


UNTANKING

UNTANKING WEIGHT 26 TONNES (APPROX.)

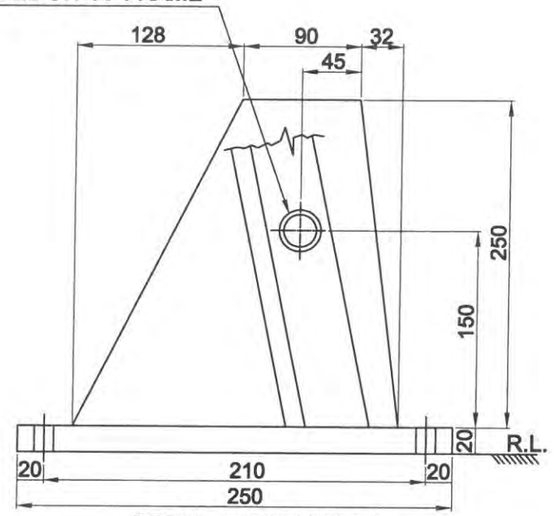


DISCONNECTION-H.V.BUSHING

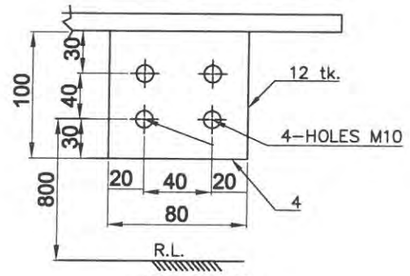


GASKET & BOLTING ARRGT. TOP TANK AND BOTTOM TANK

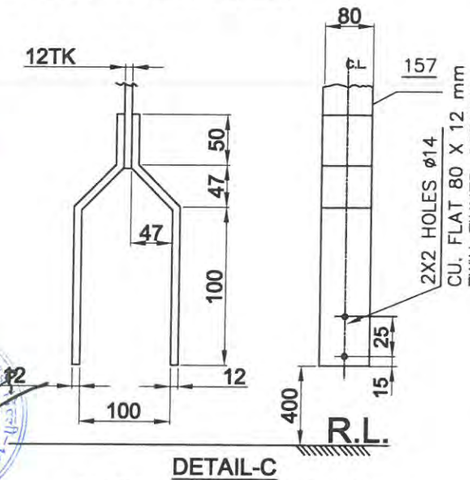
BOSS M16 STAINLESS STEEL ON "A" FRAME



DETAIL-A (ITEM NO.4a)



DETAIL- B
EARTHING ARRGT. ON TANK
(SUITABLE FOR CONNECTION
TO 75 X 12 mm M.S. FLAT)



DETAIL-C
NEUTRAL GROUNDING ARRGT.

BHEL R.O.D. Lodhi Road New Delhi-3

REV	DATE	ALT.	RAKESH		REV	DATE	ALT.	RAKESH	
02	13.12.19	CKD.	GK		01	04.11.19	CKD.	GK	
		APPD.	LK/CM				APPD.	LK/CM	
ZONE	PIPE ARRANGEMENT IN SHEET 2,3,5 & 6 AT POSITION MARK AS ⚠2 CHANGED.IT. 12a ADDED.				ZONE	CUSTOMER COMMENTS INCORPORATED.			

TYPE OF PRODUCT	500 MVA 3 PH 400/220/33KV AUTO TRANSFORMER.
NAME OF CUSTOMER	M/S. POWER GRID CORPORATION OF INDIA LTD

ADDITIONAL INFORMATION	भारत हेवी इलेक्टिकल्स लिमिटेड भोपाल				
W.O.- STANDARD	BHARAT HEAVY ELECTRICALS LTD. BHOPAL				
STATUS OF DRAWING "PR"	DEPT	CODE	WEIGHT(kg)	SCALE	
DISTRIBUTION OF PRINTS	TRE	406	-----	COMP.SCALE-1:1	
TRE-1, TRM-3	TITLE: OUTLINE GENERAL ARRANGEMENT END VIEW (R.H.S)				

	NAME	SIGN	DATE
DRN.	RAKESH		20.10.19
CHD.	GK		20.10.19
APPD.	LK/CM		20.10.19

DRG. NO 3 460 00 01660 REV. 02

SHEET 07 OF 07

INVENTORY NO. | SIGN.DATE | REF.DRG.NO.

INVENTORY NO. | SIGN.DATE | REF.DRG.NO. | THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

FIRST ANGLE PROJECTION

DRG. NO. 3 460 00 01663

REV	DATE	ALT.	RAKESH	GK	LK/CM
02	16.12.19	CKD.	APPD.		
ZONE POSITION OF CTS REVISED					
01	04.11.19	CKD.	APPD.		
ZONE CUSTOMER COMMENTS INCORPORATED. SHEET 2 ADDED.					

6 -HOLES DIA 7 R12 R4

भारत हेवी इलेक्ट्रिकल्स लिमिटेड

BHARAT HEAVY ELECTRICALS LIMITED

परिणामित्र TRANSFORMER

TO STANDARD : IEC60076/IS2026

शीतन प्रकार TYPE OF COOLING	ONAN/ONAF/OFAF
निर्धारण उ.वो. और म.वो. मे.वो.ए. RATING HV & IV (MVA)	300/400/500 60% 80% 100%
निर्धारण नि.वो. मे.वो.ए. RATING LV (MVA)	100.2/133.6/167 60% 80% 100%
शून्य भार वोल्टता उ.वो. कि.वो. NO LOAD VOLTAGE HV (kV)	400
शून्य भार वोल्टता म.वो. कि.वो. NO LOAD VOLTAGE IV (kV)	220
शून्य भार वोल्टता नि.वो. कि.वो. NO LOAD VOLTAGE LV (kV)	33
लाईन धारा उ.वो. ए. LINE CURRENT HV (AMPS)	721.69
लाईन धारा म.वो. ए. LINE CURRENT IV (AMPS)	1312.16
लाईन धारा नि.वो. ए. LINE CURRENT LV (AMPS)	2921.74
ताप वृध्दि तेल सैं. TEMPERATURE RISE OIL(°C)	50 OVER AMBIENT OF 50°C
ताप वृध्दि कुंडलन सैं. TEMPERATURE RISE WINDING(°C)	55 OVER AMBIENT OF 50°C
क्रय आदेश संदर्भ PURCHASE ORDER REF.	CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 DATED 29/07/2019

फेज PHASE	3
आवृति हर्ट्ज FREQUENCY HZ	50
संयोजन प्रतीक CONNECTION SYMBOL	YNa0d11

प्रतिबाधा वोल्ट 500 मे.वो.ए. आधार IMPEDANCE VOLT AT 500 MVA BASE	उ.वो.स्थिति 9/ नि.वो. HV POSITION 9/LV	60%(MIN)
	उ.वो.स्थिति 9/ म.वो. HVPOSITION 9/IV	12.5%± 10% TOL
	म.वो./ नि.वो. IV/LV	45%(MIN)

विद्युत रोधन स्तर INSULATION LEVEL

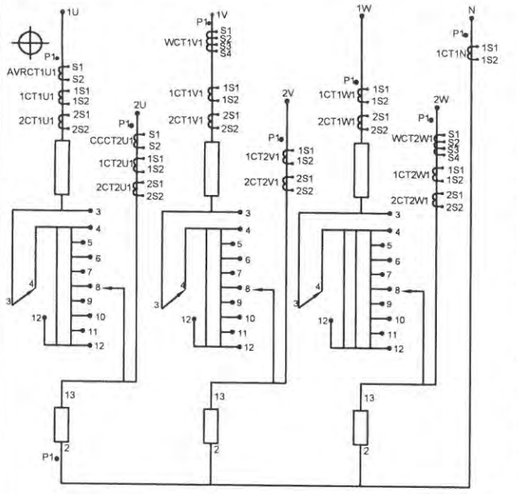
उ.वो. HV	SI 1050 LI 1300-AC 38
म.वो. IV	LI 950 - AC 38
नि.वो. LV	LI 250 - AC 95

निर्माणकार की क्रम संख्या MAKER'S SERIAL NO.	6007959 & 6007960
विद्युत विनिर्देश संख्या ELEC. SPEC. NO.	601432
निर्माण वर्ष YEAR OF MANUFACTURE	2020
आरेख ड्राईंग संख्या DIAGRAM DRG. NO.	3 460 00 01663
पारूप ड्राईंग संख्या OGA DRG.NO.	3 460 00 01660
क्रोड और कुंडलन । कि.ग्रा. । CORE & WINDING (kg)	202000
तेल का भार । कि.ग्रा. । WEIGHT OF OIL (kg)	82215
पूर्ण भार । कि.ग्रा. । TOTAL WEIGHT (kg)	375750
तेल मात्रा । लीटर । OIL QUANTITY (LITRE)	94500
परिवहन भार । कि.ग्रा. । TRANSPORT WEIGHT (kg)	245000
टैंकी से निकालने का भार । कि.ग्रा. । UNTANKING WEIGHT (kg)	26000

ग्राहक CUSTOMER: POWER GRID CORPORATION OF INDIA LIMITED.

OLTC MODEL

● टर्मिनल्स टैंकी ढक्कन के ऊपर
TERMINALS ON TANK COVER



धारा परिणामित्र CURRENT TRANSFORMER

नामकरण NOMENCLATURE	अनुपात RATIO	श्रेणी ACCURACY CLASS	भार BURDEN OHMS /VA	जानु बिन्दु वोल्टता KNEE POINT VOLTAGE MIN (VOLT)	उत्तेजक धारा MAG CURRENT AT KPV(MAX) (mA)	द्वितीयक प्रतिरोध SECONDARY RESISTANCE MAX (OHMS)	उद्देश्य PURPOSE
1CT 1CT 1CT 1U1 1V1 1W1	1600/1 1S1-1S2	PS	-	1600	25	4.0	RESTRICTED EARTH FAULT
2CT 2CT 2CT 1U1 1V1 1W1	1000/1 2S1-2S2	0.2S ISF≤ 5	20 VA	-	-	-	METERING
1CT 1CT 1CT 2U1 2V1 2W1	1600/1 1S1-1S2	PS	-	1600	25	4.0	RESTRICTED EARTH FAULT
2CT 2CT 2CT 2U1 2V1 2W1	1600/1 2S1-2S2	0.2S ISF< 5	20 VA	-	-		METERING
WCT 1V1	802 / 3.0-2.6-2.2 S1-S2-S3-S4	5	1.6 ∽	-	-	-	HV+RTD
WCT 2W1	1312 / 3.3-2.9-2.5 S1-S2-S3-S4	5	1.6 ∽	-	-	-	IV+RTD
WCT 3U1	2922 / 3.7-3.3-2.9 S1-S2-S3-S4	5	1.6 ∽	-	-	-	LV+RTD
1CT 1N	1600/1 1S1-1S2	PS	-	1600	25	4.0	RESTRICTED EARTH FAULT
AVRCT1UI	802/1.0 S1-S2	5	1.6 ∽	-	-	-	AVR CT
CCCT2U1	1312/5.0 S1-S2	5	1.6 ∽	-	-	-	CC CT

वोल्टता एवं विद्युत धारा की सारणी TABLE OF VOLTAGES & CURRENTS

ओ.एल.टी.सी. OLTC			उ.वो.लाइन टर्मिनल्स HV LINE TERMINALS 1U, 1V, 1W			म.वो.लाइन टर्मिनल्स IV LINE TERMINALS 2U, 2V, 2W				नि.वो.लाइन टर्मिनल्स LV LINE TERMINALS 3U, 3V, 3W			
स्थान POSN	समायोजन CONNECTION		वोल्टता VOLTAGE	विद्युत धारा CURRENT (Amps)		वोल्टता VOLTAGE	विद्युत धारा CURRENT (Amps)			वोल्टता VOLTAGE	विद्युत धारा CURRENT (Amps)		
	3 TO	13 TO	K.V.	ONAN 300MVA	ONAF 400MVA	K.V.	ONAN 300MVA	ONAF 400MVA	OFAF 500MVA	K.V.	ONAN 100.2MVA	ONAF 133.6MVA	OFAF 167MVA
1		12	440	393.65	524.86								
2		11	435	398.17	530.90								
3		10	430	402.80	537.07								
4		9	425	407.54	543.39								
5	4	8	420	412.39	549.86								
6	4	7	415	417.36	556.48								
7		6	410	422.45	563.27								
8		5	405	427.67	570.22								
9a		4											
9b	↕	3	400	433.01	577.35	721.69	220	787.30	1049.73	1312.16	33	1753.05	2337.39	2921.74
9c		12											
10		11	395	438.49	584.66	730.82							
11		10	390	444.12	592.15	740.19							
12		9	385	449.88	599.84	749.81							
13	12 12	8	380	455.80	607.74	759.67							
14		7	375	461.88	615.84	769.80							
15		6	370	468.12	624.16	780.20							
16		5	365	474.53	632.71	790.89							
17		4	360	481.13	641.50	801.88							

टिप्पणियाँ

1 ऊपर की सारणी में शून्य भार वोल्टता दिखलाई गई है ।
2 परिणामित्र के आपेक्षित टर्मिनल स्थान लगभग यहाँ दिखाये अनुसार है ।
3 टैंकी क्रोड और कुंडलन के साथ शून्य भार के लिए उपयुक्त है ।
4 निरीक्षण और डाइइलेक्ट्रिक टेस्ट के लिए प्रत्येक छः महीने तेल का नमूना निकालें ।

NOTES:-
1. THE ABOVE TABLE GIVES VOLTAGE AT NO LOAD.
2. THE RELATIVE TERMINAL POSITIONS ON TRANSF. ARE APPROX.AS SHOWN.
3. THE TANK IS SUITABLE FOR FULL VACUUM WITH CORE AND WINDING INSIDE.
4. TAKE OIL SAMPLES EVERY SIX MONTHS FOR INSPECTION AND DIELECTRIC TEST.

भारत मे निर्मित MADE IN INDIA

CAT-I

400

I. Approved/Released for Fabrication/ Construction
II. Approved/Released for Fabrication/ Construction Subject to Incorporation of Comments. Modification as Noted. Revised Drawing Required
III. To Be Resubmitted for Approval after Incorporating the Comments.
IV. For Information & Record.
V. Not Approved

पावरग्रिड (Signature) CDE (Designation) 16/12/2019 (Date) Power Grid Corporation of India Ltd. Engg. Deptt. (S/S Group) Gurgaon, Haryana

(ALL DIMENSIONS ARE IN mm)

ADDITIONAL INFORMATION
W.O.- STANDARD
STATUS OF DRAWING "PRI"
DISTRIBUTION OF PRINTS: TRE-1, TRM-3

DEPT	CODE	WEIGHT(kg)	SCALE
TRE	406	-----	COMP.SCALE-1:1

BHARAT HEAVY ELECTRICALS LTD. BHOPAL
भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल

TITLE: RATING & DIAGRAM PLATE

TYPE OF PRODUCT: 500 MVA 3 PH 400/220/33KV AUTO TRANSFORMER.
NAME OF CUSTOMER: M/S. POWER GRID CORPORATION OF INDIA LTD

	NAME	SIGN	DATE
DRN.	RAKESH		20.10.19
CHD.	GK		20.10.19
APPD.	LK/CM		20.10.19

DRG. NO. 3 460 00 01663 REV. 02
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