Technical Specification for Primary Current Sensor Box For 3-Phase Electric Locomotives

Specification No: CLW/ES/3/675/ Draft

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ENCLOSURES

BLW Drawing No.

1. ELSK-178 Alt-1,
2. ELSK-179 Alt-1,
3. ELSK-180,
4. ELSK-181,
5. ELSK-182,
6. ELSK-198 Alt-1
7. ELSK- 199

Draft

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ALTERATION RECORD SHEET

SL NO.	DATE OF AMENDMENT	PAGENO.	ALT. NO.	REASON	INITIAL
New Specification					

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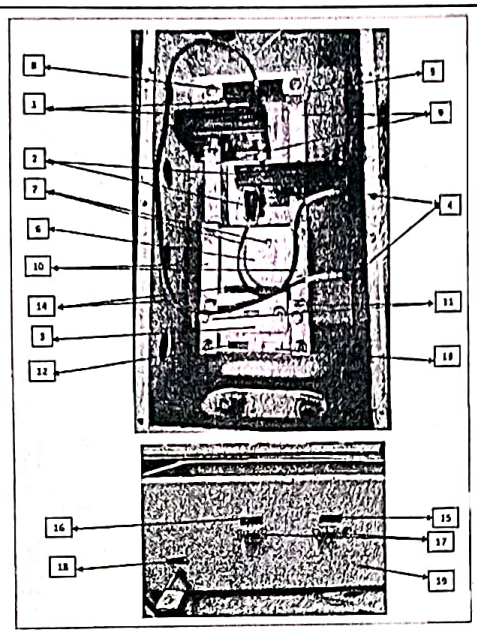
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1. INTRODUCTION

"Primary Current Sensor Box" is a panel consist of Primary Current Sensor, Surge Arrester, Sub-D Connector, which will replace Complete Filter Cubicle Panel to implement RDSO Modification No. RDSO/2024/EL/MS/0504 Rev-1 for removal of Harmonic Filter for 3-Phase Electric Locomotives.



Sr.No.	Qty	Description	CLW specification	Remark
1	01	Primary Current sensor (6.2/1) with connector (6.2A/1)	CLW/ES/03/0084 & CLW/ES/03/0124	As used in Complete Filter Cubicle.
2	01	Primary Current sensor (6.2/2) with connector (6.2A/2)	CLW/ES/03/0084 & CLW/ES/03/0124	
3	01	Surge Arrester (6.21) with its casing.	CLW/ES/03/0085	
4	02	Sub Connector (XE37A:01 & XE37A:02)	CLW/ES/03/0124	
5	02	Insulator	CLW/ES/03/0145	
6	01	Base Plate	ABB No. 3EHP330155P0001	
7	04	Distance bolt for mounting of base plate	ABB No. 3EHP431367P0001	
8	01	Bus Bar, copper (Type-2)	CLW/ES/03/0118	
9	02	Bus Bar, copper (Type-1)	CLW/ES/03/0118	
10	02	Bus Bar, copper (Type-10)	CLW/ES/03/0118	
11	02	Bus Bar, copper (Type-11)	CLW/ES/03/0118	
12	01	Rating Plate (100)	CLW/ES/03/0252	
13	01	Rating Plate (98)	CLW/ES/03/0252	
14	02	Wiring Looms for connection of sensor connector with Sub-D Connector	As per applicable CLW Specification	
15	01	Rating Plate (XE37A:01)	CLW/ES/03/0252	
16	01	Rating Plate (XE37A:02)	CLW/ES/03/0252	
17	02	Sub-D Guide plate	--	
18	01	Rating Plate (Earth)	CLW/ES/03/0252	
19	01	Primary Current Sensor Box (Bare Panel)	BLW Drg No. ELSK-178	

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2. SCOPE OF SUPPLY INCLUDES THE "PRIMARY CURRENT SENSOR BOX" ALONG WITH FOLLOWING ITEMS:

Sl.No.	Item Description	UVAM Item ID	Specification No.	Qty.
1.	Primary Current sensor (6.2/1) with connector (6.2A/1)	2100119 2100197	CLW/ES/03/0084 & CLW/ES/03/0124	01
2.	Primary Current sensor (6.2/2) with connector (6.2A/2)	2100119 2100197	CLW/ES/03/0084 & CLW/ES/03/0124	01
3.	Surge Arrester (6.21) with its casing.	2100046	CLW/ES/03/0085	01
4.	Sub Connector (XE37A:01 & XE37A:02)	2100197	CLW/ES/03/0124	02
5.	Insulator	2100326	CLW/ES/03/0145	02
6.	Base Plate (Type 14)	2100188	CLW/ES/3/0451	01
7.	Distance bolt for mounting of base plate		ABB No. 3EHP431367P0001	04
8.	Bus Bar, copper (Type-2)	2100309	CLW/ES/03/0118	01
9.	Bus Bar, copper (Type-1)	2100309	CLW/ES/03/0118	02
10.	Bus Bar, copper (Type-10)	2100309	CLW/ES/03/0118	02
11.	Bus Bar, copper (Type-11)	2100309	CLW/ES/03/0118	02
12.	Rating Plate (100)	2100516	CLW/ES/03/0252	01
13.	Rating Plate (98)	2100516	CLW/ES/03/0252	01
14.	Wiring Looms for connection of sensor connector with Sub-D Connector	-	As per Annexure-II enclosed herewith	-
15.	Rating Plate (XE37A:01)	2100516	CLW/ES/03/0252	01
16.	Rating Plate (XE37A:02)	2100516	CLW/ES/03/0252	01
17.	Sub-D Guide plate	-	-	02
18.	Rating Plate (Earth)	2100516	CLW/ES/03/0252	01
19.	Primary Current Sensor Box (Bare Panel)	-	BLW Drg No. ELSK-178	01

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3. CLIMATIC AND ENVIROMENTAL CONDITIONS OF LOCO

Maximum atmospheric temperature	Under Sun:+70°C In Shade :+50°C
Humidity	100% saturation during rainy season.
Reference site conditions	i) Ambient Temp. Max. 55°C.min 0°C. ii) The firm will indicate the expected temperature rise in the machine room under reference site conditions. iii) Humidity:60% iv) Altitude: 1776 m above mean sea level against USBRL project condition
Rainfall	Very heavy in certain areas. The locomotive should be designed to permit its running at 10 km/ hr, in flood water level of 200 mm above rail level.
Atmosphere during hot weather	Extremely dusty and desert terrain in certain areas.
Coastal area	Locomotive and equipment will be designed to work in coastal areas in humid and salt laden atmosphere.
Vibration	The equipment, sub-system and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in IEC 61373 unless otherwise prescribed.

4. LIST OF ELECTRICAL COMPONENTS

The following electrical components which are mounted in the cubicle shall be supplied by the panel supplier. Only the makes specified in CLW/ BLW/ RDSO approved vendor directory shall be accepted. The detailed CLW/ RDSO specification of each of these items would be passed on to the successful tenderers.

Current Sensor

Scheme Position	6.2/1, 6.2/2
Required Number	2
Identification	HIET428008P0002
Details	
Manufacturer	As per CLW approved Vendor Directory on UVAM
Nominal Data	1:5000-1000A-40OHM

Connector

Scheme Position	6.2A/1 ,6.2A/2
Required Number	2

Identification	HETT401293P0001
Details	
Manufacturer	As per CLW approved Vendor Directory on UVAM
Nominal Data	9-Poles GR13-13A

Surge Arrestor

Scheme Position	6.21
Required Number	1
Identification	HAMM312079R0001
Details	
Manufacturer	As per CLW approved Vendor Directory on UVAM
Nominal Data	0.44 KV -5 KA- 30 KA

5. STANDARDS

- IEC 61373: For testing the shock and vibration of Rolling stock
- NF.F.16.101: Rolling stock, Fire behavior, Materials Choosing
- NF.F.16.102: Rolling stock, Fire behavior, Effects on electrical equipment
- 3EHN600359: Insulation Co-ordination
- 3EHN600385: Min. insulation distance for basis insulation within air.

6. WIRING AND CABLING

1. The cables for wiring in the locomotive and equipments will use high grade electrolytic copper stranded conductors tinned as used in the Three Phase Electric locomotive.
2. The cables will be of approved quality and grade of insulation and sheath. They will be fire retarding type. In locations where high temperature are likely to be met, special cables may be employed. For cabling of Primary Current Sensor Box, Electron Beam Irradiated Cable only be used.
3. All connections will be terminated on terminal bars of approved design, provided for the purpose. The terminals and wire cable ends will be marked to facilitate correct connections.
4. Plugs, sockets and connectors will be used to connect pre-assembled units and to facilitate maintenance and ensure a better layout. The details of which will be passed on subsequently to the successful tenderers.
5. No cable having a conductor size of less than 2.5 sq.mm will ordinarily be used.
6. Smaller size cables for internal wiring panels, control cubicles, signal wiring, consistent with the mechanical and electrical equipments may be adopted.
7. Loading of power cables will not be more than 75% of its capacity.
8. Cables for terminal connections will have only crimped joints.
9. All wiring and cabling should be as per Annexure-II of CLW's specification.

7. SHEET METAL STRUCTURE

The Bare Panel for Primary Current sensor box shall comply with the dimensions as specified in relevant drawings and tolerances should be as per IS 2102 (Note: Fine tolerances should be followed for hole dimensions, while coarse tolerances should be applied for all other features.). The cubicle should be of sturdy construction so as not to vibrate loosely or excessively when mounted in the machine room. Material of Bare Panel: ASTM A240 Gr 321.

8. ENVIRONMENTAL AND OPERATIONAL CONDITIONS

The Primary Current Sensor Box Cubicle shall be used under the following conditions:

8.1 Environmental Conditions

Environmental Condition within machine room:

Air Circulation	:	Weak forced cooling
Operational temperature	:	0.....+65 ºC
Environmental air	:	salty, dusty
Air humidity	:	Condensation possible

8.2 Operational conditions

Operational Time:

Daily approx.	:	16 hours (Approx. 330 days per year)
Yearly approx.	:	5,280 hours
Within 30 years approx.	:	158,400 hours

Environmental conditions:

Rated values for environmental temperature and air humidity according to 7.1 "Condition within machine room".

Reliability

Operational Condition	:	According to 7.2
Availability Rate	:	98 %
Lifetime of the Loco	:	Min. 35 years (Maintenance, spare parts, life time)

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9. TEST CONDITIONS

9.1 TYPE TESTING

a) Material certificate for raw material used from an approved test house /supplier has to be procured during inspection and along with supplies.
b) Test certificates of fasteners used to be produced during inspection and to be submitted with test reports.
c) Welding to be checked properly as per an approved test plan, which has to be submitted to Dy. CEE/Design.
d) Panel should be electrically tested after wiring and assembly. The components will be tested as per CLW's stipulations to be passed on to the successful tenderer.
e) All components/ equipments procured shall be inspected/tested at manufacturers premises prior to dispatch as per specn at assembly stages. Test certificate shall be produced for OEM components. Any change will have to be taken prior approval of Dy. CEE/Design and it will involve complete type test.
f) During inspection, inspection/ test certificates of all the components shall be checked & verified.

9.2 ROUTINE TESTING

The Cubicle will be tested for the following routine tests:

1. Integrity and completeness.
2. Testing of inter-connections and functionality of different sub-assemblies within the panel.
3. Suitable checking fixtures are to be made for checking the dimensions of the complete assembled panels.
4. Certificate for raw materials and fasteners to be provided.
5. Complete cubicle and electrical items will be tested.

Tests:

Sl No.	Description	Type Test	Routine Test
(i)	Dimensional Checking	Yes	Yes
(ii)	Verification of Electrical & Mechanical equipments and its test reports	Yes	Yes
(iii)	Complete Continuity test as per cable cutting chart	Yes	Yes
(iv)	Fire–retardant test of all insulating material	Yes	No
(v)	Crimping test: -To check whether proper crimping tool with required pressure is applied so that there is no void in the cross section of the crimped cable	Yes*	Yes*
(vi)	IR and Di-electric Test	Yes	Yes
(vii)	Vibration Test (Optional)	Yes**	No

*Sample cable crimped by each tool of each size are to be sealed in front of the inspector which shall be tested as per EN 50343 for crimping quality. The issued certificate shall be valid for inspection crimping during 3 Months and same process is to be repeated again for next 3

Months.
** Vibrational test will not be required if SS Box is purchased from approved sources for Large fabricated item as per CLW UVAM ID : 2100237.

10. STANDARDS / UNITS
Only IEC-Standards will be accepted. Internally used BBC/ABB/Adtranz-Standards may only be mentioned together with corresponding IEC- Standard. Only the SI unit will be accepted.

11. SCOPE OF SUPPLY
One Primary Current Sensor Box in fully assembled as per CLW specification.

11.1 All individual components of the panel should be procured as per Annexure-I.

12. INSPECTION
1. The Routine inspection will be carried out by authorized representative of Dy. CEE/Design or TPI as the case may be.
2. The complete testing to be carried out as per clause 8 of this specification.

13. SUPPLY OF DOCUMENTS (In addition to those indicated in bid documents of CLW)
(i) Technical details composition and characteristics of the material including fasteners to be used for manufacture of Primary current sensor Box.
(ii) Source(s) of raw materials, sub assembly, sub components and hardwares.
(iii) Manufacturing process.
(iv) Type test plan including checks for vibration and welding.
(v) Routine test plan.
(vi) Source of the components being offered including cables.

14. SUBMISSION OF TENDER QUOTATION
14.1 The tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the complete panel to meet fully the technical requirement of the specification and quality of materials and workmanship.
14.2 Quotation shall not be considered complete unless all information is furnished and are therefore liable to be rejected.

15. TECHNICAL DOCUMENTS TO BE SUPPLIED BY THE SUPPLIER
i) Type Test Reports
ii) Routine test report along with each set
iii) Detailed drawing

16. Stage Inspection
16.1 Purchaser reserve the right to carry out stage inspection during assembly of Primary Current sensor Box or at the premises of the sub-vendors during inspection of components of Primary Current sensor Box.

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17. IMPORTANT INFORMATION

17.1 All the insulating material should have Fire Retardant Property as per CLW Individual specn.

17.2 The Cable for wiring of Primary Current Sensor Box will be with Electron beam Irradiated cable only. The cable size and cabling have to be according to the CLW document which will be passed on subsequently to the successful tenders.

17.3 The Cable and terminal connections will have only proper crimping joints.

17.4 Supplier will implement any modification arising out of the experience of Indian Railways applicable to Primary Current Sensor Box assembly, free of cost.

17.5 Final Cable cutting chart has been enclosed as Annexure-II. However, RDSO's Modification Sheet should be implemented by panel manufacturer time to time as required free of cost.

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Annexure–I (Primary Current Sensor Box)

18. Details of Sub-components

Sl. No.	Description	Sch. Pos.	Specn. No.	ABB Identification No.	Qty /Panel
a)	Bare Panel of Primary Current Sensor Box*	-	-	-	01No.
b)	Current Sensor	6.2/1 & 6.2/2	CLW/ES/3/0084 With latest alteration	HIET428008P0002	02Nos.
c)	Connector Sub Set	6.2A/1 & 6.2A/2, XE37A: 01 & XE37A: 02	CLW/ES/3/0124 With latest alteration	HIETT401293P0001	02Nos.
d)	Surge Arrestor for Current Transformer	6.21	CLW/ES/3/0085 With latest alteration	HAMM312079R0001	01No
e)	Insulator		CLW/ES/03/0145	-	02 Nos
f)	Base Plate (Type 14)		CLW/ES/3/0451	3EHP 330155 P0001	01 No
g)	Distance bolt for mounting of base plate		ABB No. 3EHP431367P0001		04 Nos
h)	Bus Bar, copper (Type-2)		CLW/ES/03/0118	3EHP330160P0001	01 No
i)	Bus Bar, copper (Type-1)		CLW/ES/03/0118	3EHP330159P0001	02 Nos
j)	Bus Bar, copper (Type-10)		CLW/ES/03/0118	3EHP431001R0001	02 Nos
k)	Bus Bar, copper (Type-11)		CLW/ES/03/0118	3EHP431002P0001	02 Nos
l)	Rating Plate (100)		CLW/ES/03/0252		01 No
m)	Rating Plate (98)		CLW/ES/03/0252		01 No
n)	Wiring Looms for connection of sensor connector with Sub-D Connector		As per Annexure-II enclosed herewith		
o)	Rating Plate (XE37A:01)		CLW/ES/03/0252	3EHP431071P0303	01 No
p)	Rating Plate (XE37A:02)		CLW/ES/03/0252	3EHP431071P0304	01 No
q)	Sub-D Guide plate		-		02 Nos
r)	Rating Plate (Earth)		CLW/ES/03/0252	3EHP431071P0310	01 No

*Note: Bare Panel for Primary Current sensor Box should be supplied with material test report or otherwise to be procured from CLW approved sources for Bare Panel for Large Fabricated Items (SS) with UVAM ID :2100237.

ANNEXURE-II

Cable Connection chart of Primary Current Sensor Box for WAG9HC/ WAG9/WAP7/ WAP5

XE37A:01

Sl. No.	Cable Cross Section (mm^2)	Cable No.	Connection From	Connection To
1.	0.5	1534A	XE37A:01-QE	6.2A/1-4
2.	0.5	1533A	XE37A:01-2	6.2A/1-3
3.	0.5	1531A	XE37A:01-3	6.2A/1-1
4.	0.5	1532A	XE37A:01-6	6.2A/1-2
5.	0.5	1538A	XE37A:01-7	6.2A/1-8
6.	0.5	1539A	XE37A:01-8	6.2A/1-9

XE37A:02

Sl. No.	Cable Cross Section (mm^2)	Cable No.	Connection From	Connection To
1.	0.5	1534B	XE37A:02-QE	6.2A/2-4
2.	0.5	1533B	XE37A:02-2	6.2A/2-3
3.	0.5	1531B	XE37A:02-3	6.2A/2-1
4.	0.5	1532B	XE37A:02-6	6.2A/2-2
5.	0.5	1538B	XE37A:02-7	6.2A/2-8
6.	0.5	1539B	XE37A:02-8	6.2A/2-9

6.21

Sl. No.	Bus Bar	Cable No.	Connection From	Connection To
1.	BAR	98	6.21-Q1	S98.2-Q1
2.	BAR	100	6.21-Q2	S100.2-Q1

6.2/1

Sl. No.	Bus Bar	Cable No.	Connection From	Connection To
1.	BAR	100	6.2/1-IN	S100.3-Q2
2.	BAR	99	6.2/1-OUT	S100.3-Q1

6.2/2

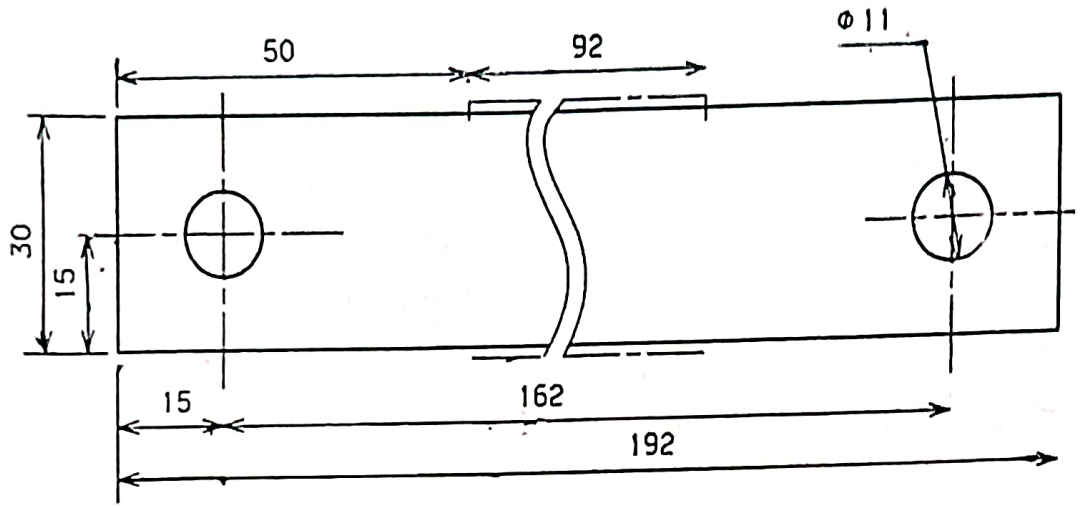
Sl. No.	Bus Bar	Cable No.	Connection From	Connection To
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2.	BAR	98	6.2/2-OUT	S98.3-Q1

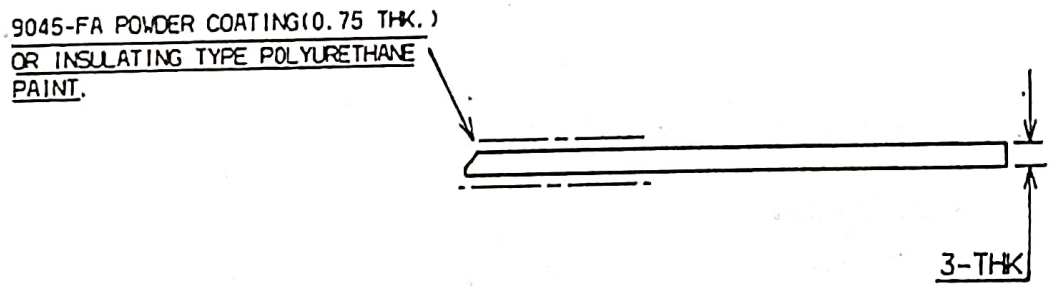
EARTHING CABLE

Sl.No.	Cable Cross Section (mm^2)	Cable No.	Connection From	Connection To
1.	2.5	EARTHING 1	Sub-D Connector	Complete Box body
2.	16	EARTHING 2	Complete Box	Under frame of loco

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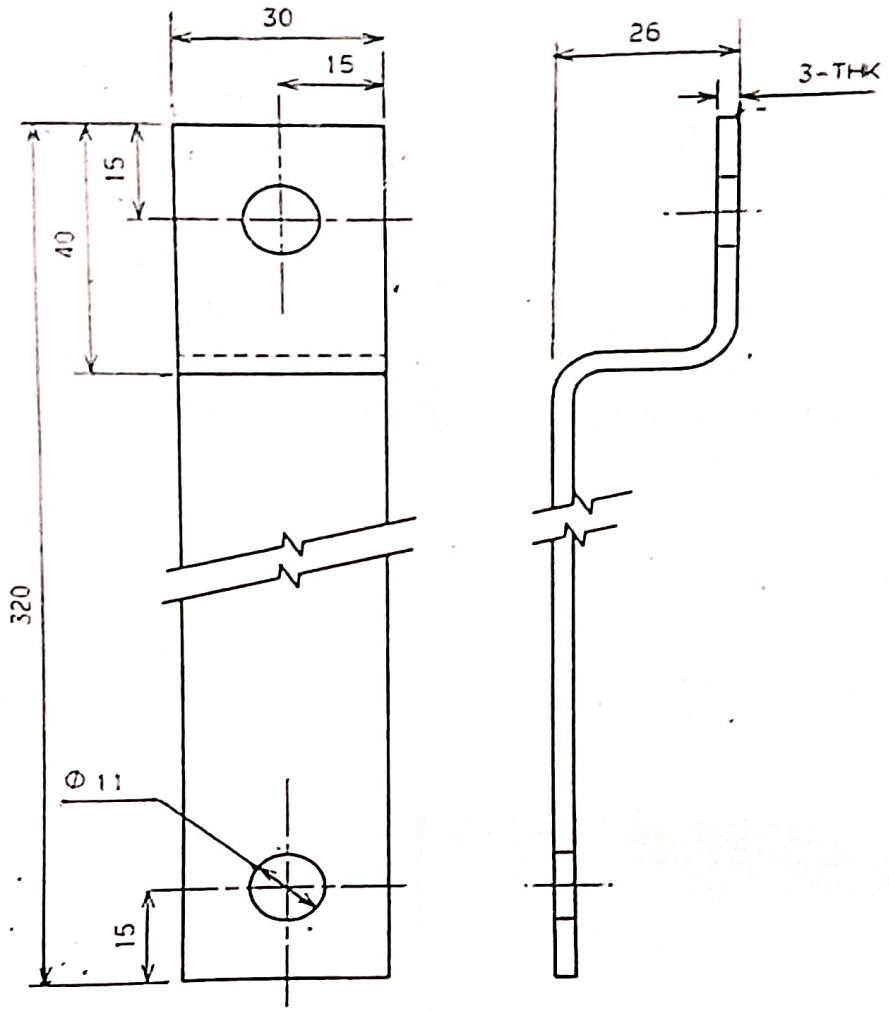


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Bus Bar, copper (Type-2)

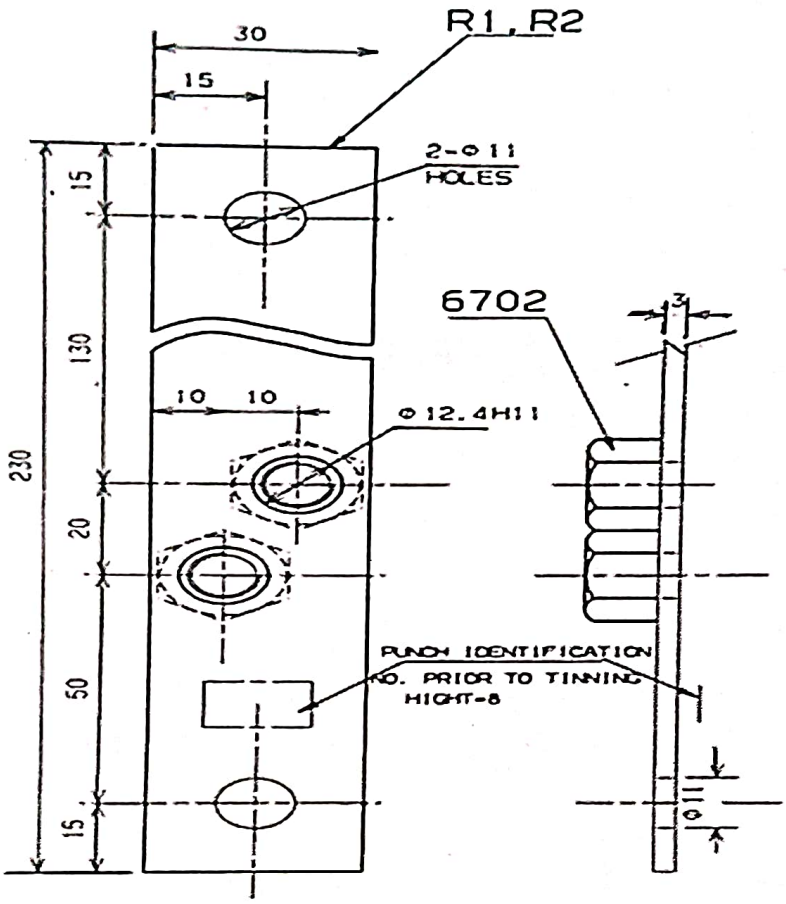
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Bus Bar, copper (Type-1)

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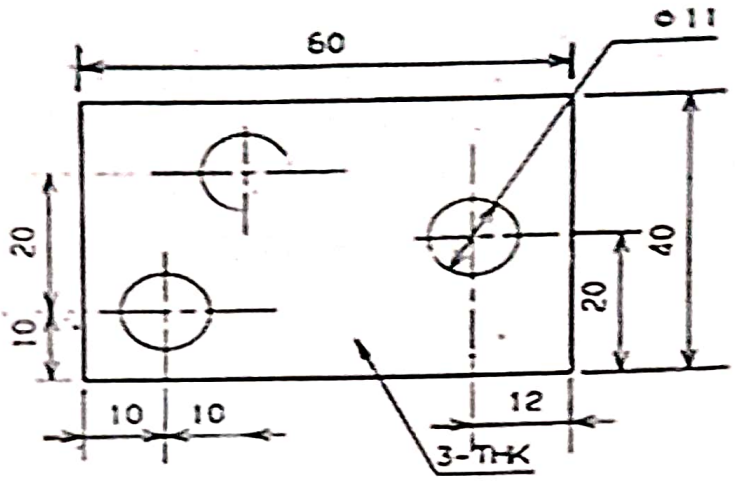
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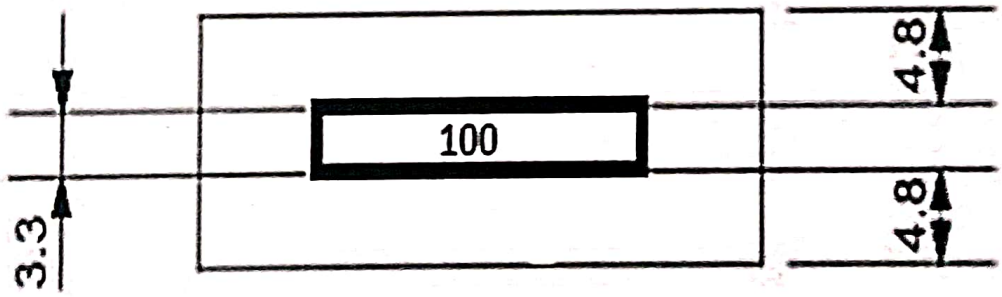
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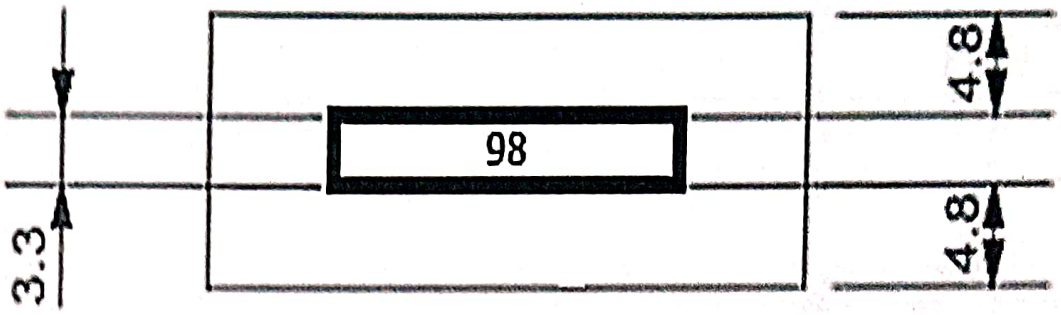
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Bus Bar, copper (Type-11)



Rating plate (100)

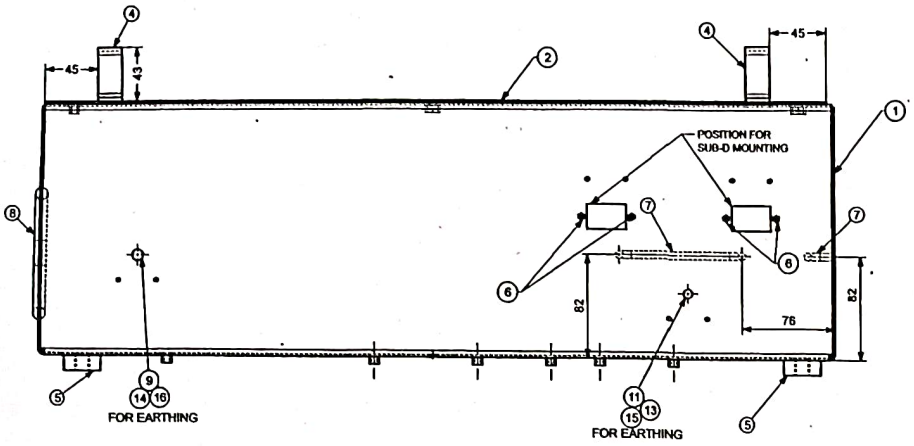
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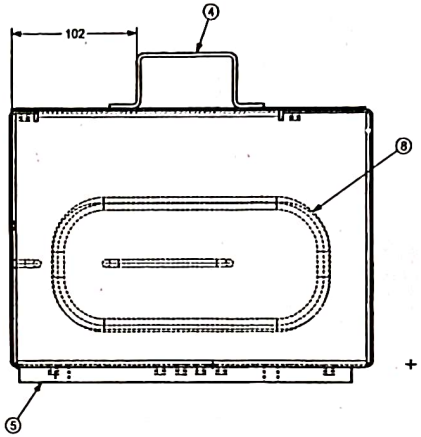


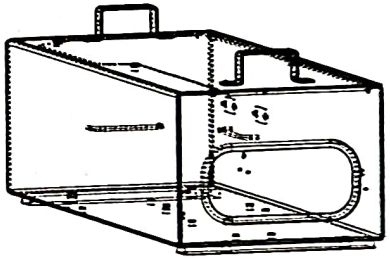
Rating plate (98)

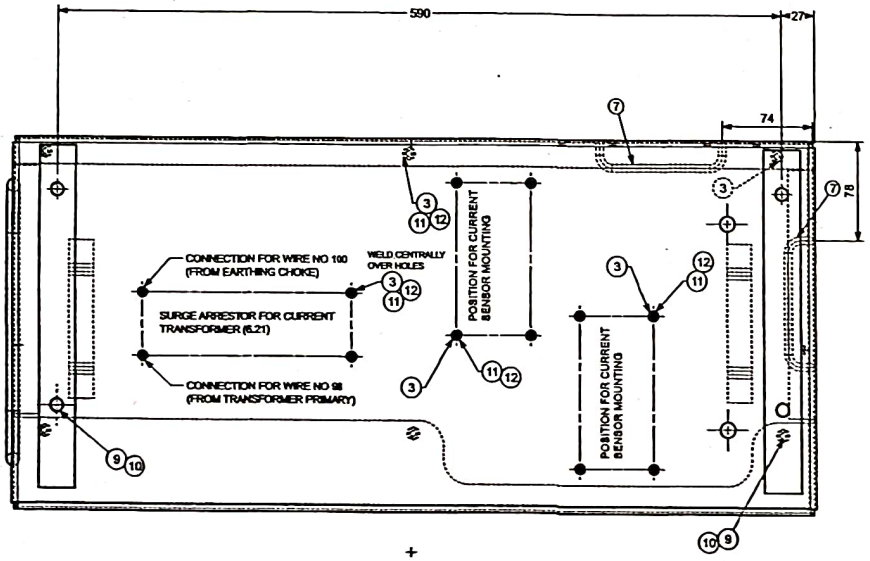
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NOTE: ALL HARDWERS ARE OF STAIN LESS STEEL

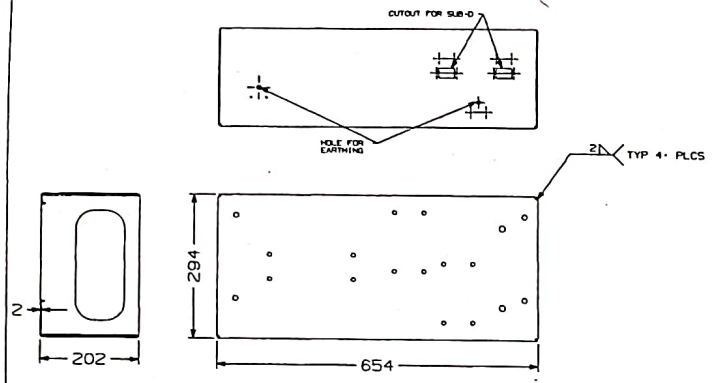
PRIMARY CURRENT SENSOR BOX FOR EB REMOVAL

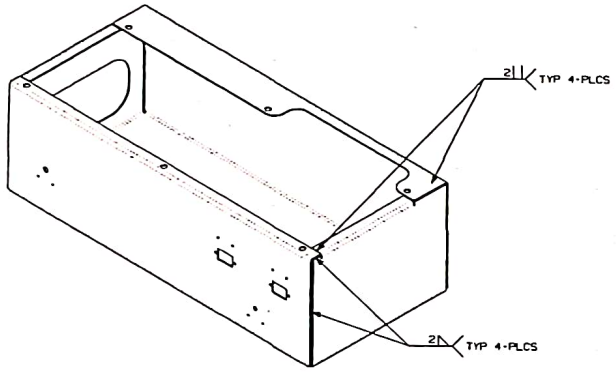
DRAWING NO- ELSH-178

(168)

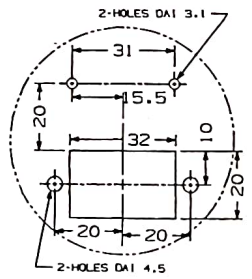
Wt./ASSLY.	C-1 FINISH ROUGH	(01) ROUGH CLEANING	SURFACE ROUGHNESS VALUE TO ISI 3073	GRADE NO	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
Kg	C-10 FLAME CUT	(18) CHAMFERED		Ra µm	.025	.050	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
		(01A) BURRS REMOVED		SYMBOL	▽▽▽▽			▽▽▽			▽▽			▽		-

ALT. NO.	ALTERATION	REASON	CHECKED BY SSE/ELECT	VERIFIED BY ADE/ELECT-I	APPROVED BY Dy.CDE-I
(01)	DRAWING REVISED AND REDRAWN				

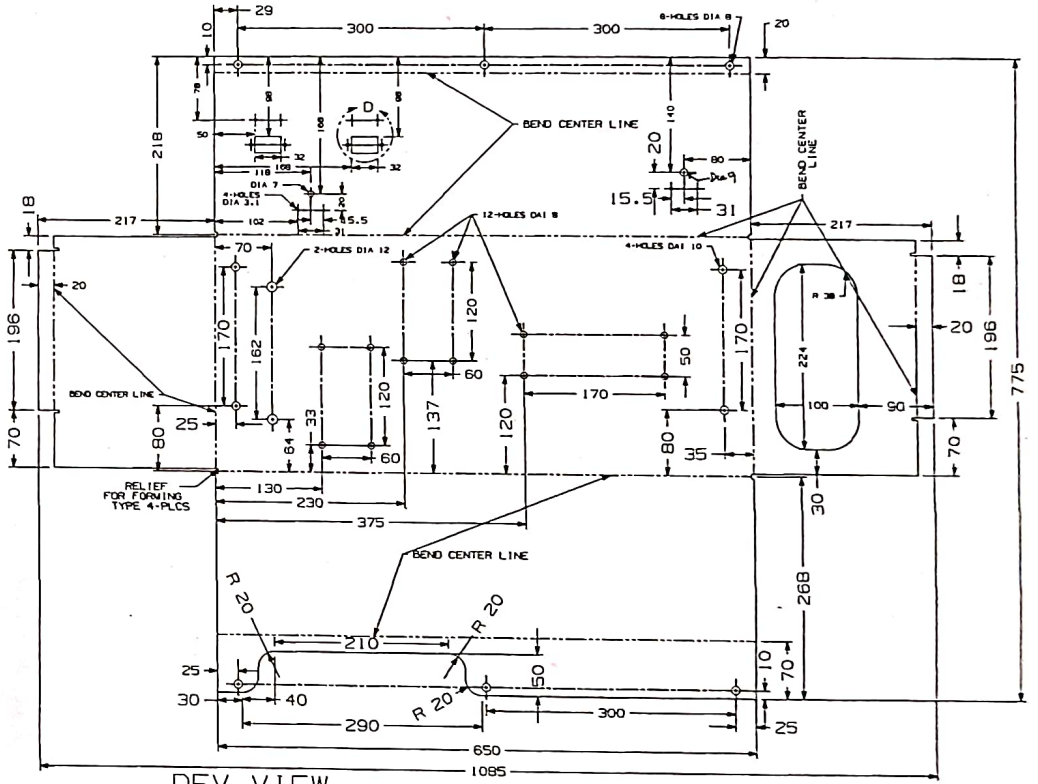




ISOMETRIC VIEW



DETAIL D
TYPR 2 PLCS



SHEET 1085 X 775 X 2 MM THK.		ELSK-179	18.5 KG	SS SHEET	ASTM A240 GR 321
NO.OFF	DESCRIPTION & DIMENSION	ITEM PART NO.	Wt./UNIT	MATERIAL	SPECIFICATION
GROUP : SUPERSTRUCTURE			SUPERSEDED BY		
			SUPERSEDES		

FILTER CUBICLE BOX SHEET

SCALE | CHECKED BY | PROJECTION | DRAWN BY | ALT. 1

THIS DRAWING IS A PROPERTY OF BLW/INDIAN RAILWAYS AND ANY UNAUTHORISED USE OF THE DRAWING WILL BE CONSIDERED ILLIGAL AND BLW/INDIAN RAILWAYS WILL HAVE RIGHT TO INITIATE LEGAL PROCEEDINGS AGAINST THE DEFAULTERS.

WAG$_{6HC}$, WAP$_7$

Dy.CDE-I	ADE/ELECT-I	1/ELSK-178
		ASSLY. PART NO.

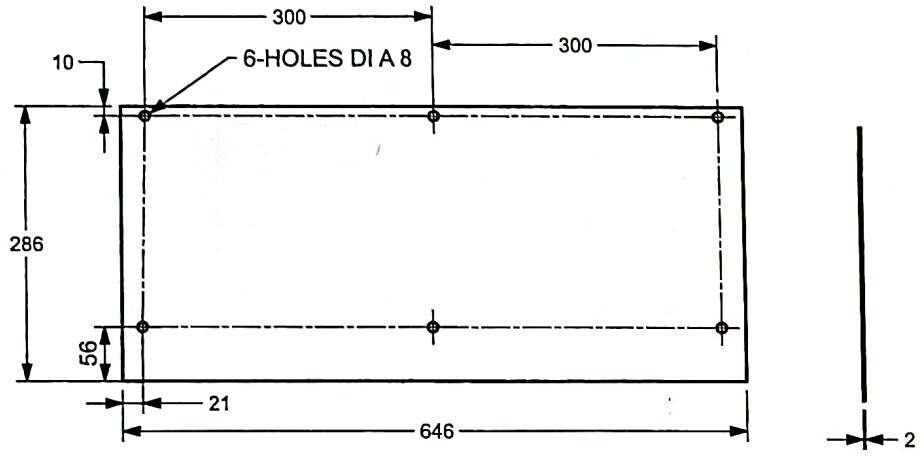
बा.रे.का. BANARAS LOCOMOTIVE WORKS VARANASI

DRG NO. ELSK-179

ISSUING AUTHORITY : SSE/RECORDS ALL DIMS. ARE IN mm.	TOLERANCES ON UNTOLERANCED DIMENSION TO

NX-TEAMCENTER

F-1 FINISH ROUGH	(01) ROUGH CLEANING	SURFACE ROUGHNESS VALUE TO IS: 3073	GRADE NO	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	ALT. NO.	ALTERATION	REASON	CHECKED BY SSE/VEH	VERIFIED BY ADE	APPROVED BY Dy. CDE/ MECH
F-10 FLAME CUT	(1B) CHAMFERED		Ra μm	.025	.050	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50						
	(01B) BURRS REMOVED		SYMBOL	▽▽▽▽			▽▽▽			▽▽			▽		□						



NO. OFF	DESCRIPTION & DIMENSION	ITEM	PART NO.	Wt./UNIT	MATERIAL	SPECIFICATION
					SS SHEET	ASTM A240 GR 321

GROUP : SUPERSTRUCTURE

SUPERSEDED BY

SUPERSEDES

FILTER COVER SHEET

SCALE	SIZE	CHECKED BY	
1:5	A3		21.04.25
PROJECTION		DRAWN BY	21/04/25
ALT.			

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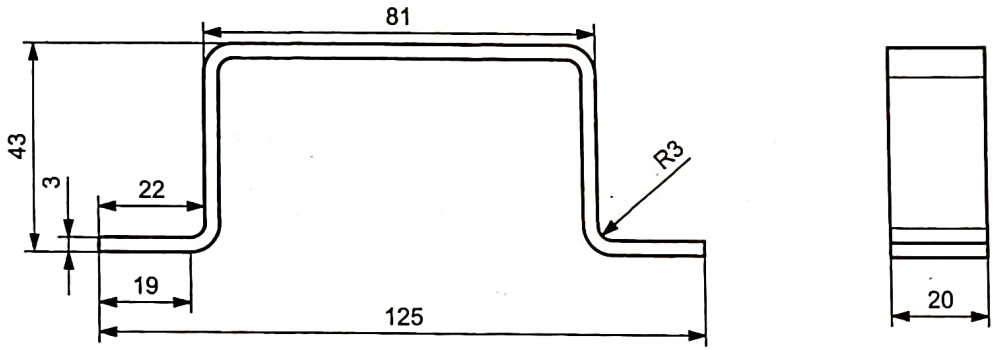
WAG$_{9HC}$, WAP$_7$

Wt./ASSLY.= Kg			
TOLERANCES ON UNTOLERANCED DIMENSION TO			2/ELSK-178
ISSUING AUTHORITY : SSE/RECORDS	21.04.25	21/4/25	
ALL DIMENSION ARE IN mm.	Dy. CDE/I	ADE/ELECT-2	ASSLY. PART NO.

बरेका BANARAS LOCOMOTIVE WORKS VARANASI

DRG NO. ELSK-180

∩-1 FINISH ROUGH	(01) ROUGH CLEANING	SURFACE ROUGHNESS VALUE TO IS: 3073	GRADE.NO	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	ALT. NO.	ALTERATION	REASON	CHECKED BY SSE/VEH	VERIFIED BY ADE	APPROVED BY Dy.CDE/MECH
∩-10 FLAME CUT	(1B) CHAMFERED		Ra µm	.025	.050	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50						
	(01B) BURRS REMOVED		SYMBOL	▽▽▽▽			▽▽▽			▽▽			▽		□						



NO.OFF	DESCRIPTION & DIMENSION	ITEM	PART NO.			
				Wt./UNIT	SS SHEET	ASTM A240 GR 321
	GROUP :			SUPERSEDED BY	MATERIAL	SPECIFICATION
				SUPERSEDES		
	HANDLE			SCALE 1:5 / SIZE A3	CHECKED BY	
				PROJECTION	DRAWN BY	
				ALT.		

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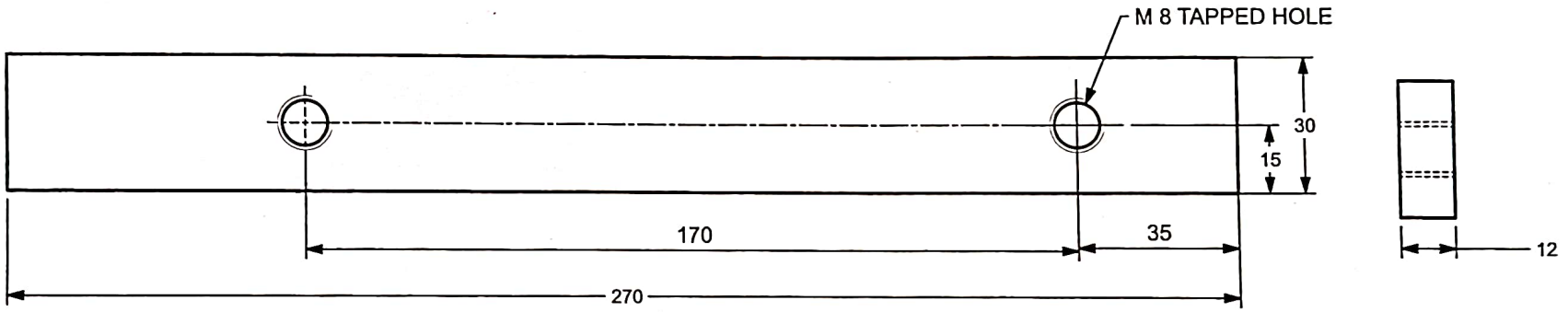
WAG9HC, WAP7

Wt./ASSLY.= Kg			
TOLERANCES ON UNTOLERANCED DIMENSION TO			
ISSUING AUTHORITY : SSE/RECORDS			
ALL DIMENSION ARE IN mm.	Dy.CDE/1	ADE/ELECT-C	4/ELSK-178 ASSLY. PART NO.

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BANARAS LOCOMOTIVE WORKS
VARANASI

DRG NO. ELSK-181

~1 FINISH ROUGH	(01) ROUGH CLEANING	SURFACE ROUGHNESS VALUE TO IS: 3073	GRADE.NO	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	ALT. NO.	ALTERATION	REASON	CHECKED BY SSE/VEH	VERIFIED BY ADE	APPROVED BY Dy.CDE/MECH
~10 FLAME CUT	(1B) CHAMFERED		Ra μm	.025	.050	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50						
	(01b) BURRS REMOVED		SYMBOL	▽▽▽▽			▽▽▽			▽▽			▽		□						



NO.OFF	DESCRIPTION & DIMENSION	ITEM	PART NO.	Wt./UNIT	MATERIAL	SPECIFICATION
					STL PLATE	IS:2062, E-250
GROUP : SUPERSTRUCTURE				SUPERSEDED BY		
				SUPERSEDES		

FILTER TAPPING PAD

SCALE 1:5	SIZE A3	CHECKED BY	21.4.25
PROJECTION		DRAWN BY	21/4/25
ALT.			

WAG9HC, WAP7

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Wt./ASSLY.= Kg			
TOLERANCES ON UNTOLERANCED DIMENSION TO			
ISSUING AUTHORITY : SSE/RECORDS	21.04.25	A.Kaw 21/4/25	5/ELSK-178
ALL DIMENSION ARE IN mm.	Dy.CDE/I	ADE/ELECT-I	ASSLY. PART NO.

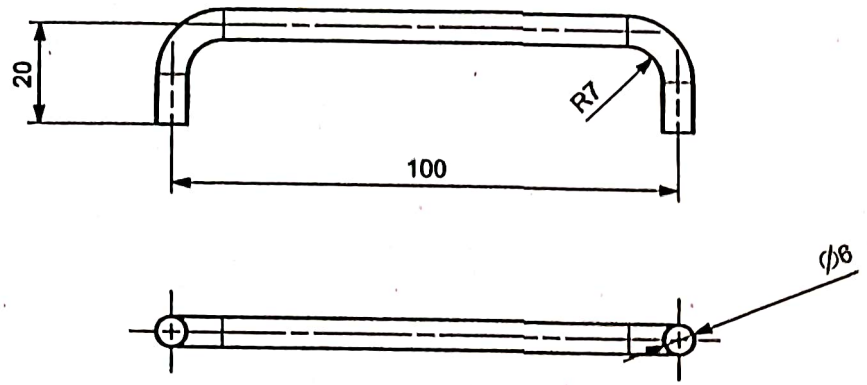
बरेका BANARAS LOCOMOTIVE WORKS VARANASI

DRG NO. ELSK-182

164

F-1 FINISH ROUGH	(01) ROUGH CLEANING	SURFACE ROUGHNESS VALUE TO IS: 3073	GRADE NO.	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
F-10 FLAME CUT	(18) CHAMFERED		No µm	.025	.050	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
	(01A) BURRS REMOVED		SYMBOL	▽▽▽			▽▽▽			▽▽			▽		□

ALT. NO.	ALTERATION	REASON	CHECKED BY (DESIGN)	PASSED BY (DESIGN)	APPROVED BY (DESIGN)
01	DIM. 100 AND 20 WAS 150 AND 30 RESP.	MODIFICATION			



NO. OFF	DESCRIPTION & DIMENSION	ITEM	PART NO.	WT./UNIT	MATERIAL	SPECIFICATION
	GROUP : SUPERSTRUCTURE				Stainless STEEL	IS 6321

SUPERSEDED BY

SUPERSEDES

TIE ROD

SCALE	SIZE	CHECKED BY	
1:5	A3		19.5.25
PROJECTION		DRAWN BY	19/5/25
ALT.	01		

WAG-9, WAP-7

THIS DRAWING IS A PROPERTY OF B.L.W./INDIAN RAILWAYS AND ANY UNAUTHORISED USE OF THE DRAWING WILL BE CONSIDERED ILLEGAL AND B.L.W./INDIAN RAILWAYS WILL HAVE RIGHT TO INITIATE LEGAL PROCEEDINGS AGAINST THE DEFAULTERS.

Wt./ASSLY.: Kg		
TOLERANCES ON UNTOLERANCED DIMENSION TO		
ISSUING AUTHORITY : SSE/RECORDS		
ALL DIMENSION ARE IN mm.	Dy.CDE-I	ADE/ELECT-I

20.05.25 — 20/5/25

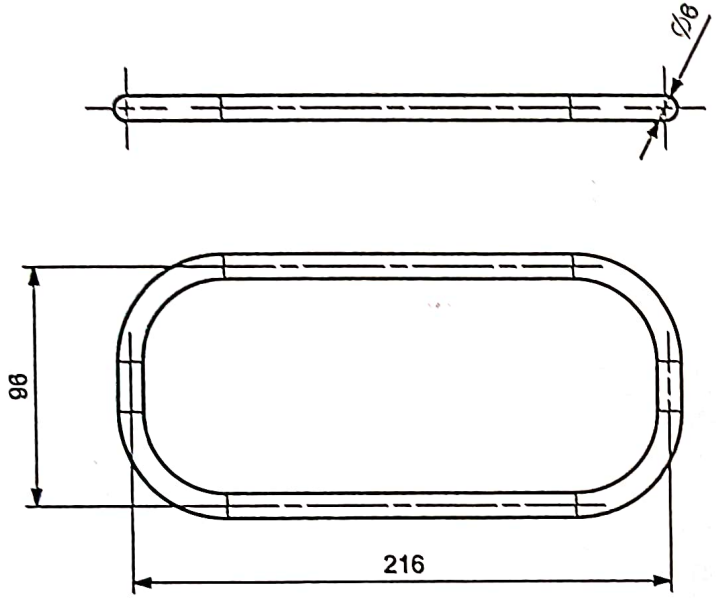
7/ELSK-170
ASSLY. PART NO.

बरेका | BANARAS LOCOMOTIVE WORKS VARANASI

DRG NO. ELSK-198

NX-TEAMCENTER

F-1 FINISH ROLLED	(01) ROLLED CLEANING	SURFACE ROUGHNESS VALUE TO IS: 3073	GRADE NO.	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	ALT. NO.	ALTERATION	REASON	CHECKED BY SSE/WEL	VERIFIED BY ADE	APPROVED BY Dy.CDE/MECH
F-10 FLAME CUT	(15) CHAMFERED		Ra μm	0.025	0.050	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50						
	(21) BURRS REMOVED		SYMBOL	▽▽▽▽			▽▽▽			▽▽			▽		◻						



NO. OFF	DESCRIPTION & DIMENSION	ITEM	PART NO.	WT./UNIT	MATERIAL	SPECIFICATION
				Stainless	STEEL	45.321
	GROUP : SUPERSTRUCTURE			SUPERSEDED BY		
				SUPERSEDES		
	CIRCULAR TIE ROD			SCALE 1:5	SIZE A3	DRAWN BY
				PROJECTION		DRAWN BY
				ALT.		

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WAG9HC, WAP7

Wt./ASSLY.= Kg		
TOLERANCES ON UNTOLERANCED DIMENSION TO		
ISSUING AUTHORITY : SSE/RECORDS	21.04.25	21/4/25
ALL DIMENSION ARE IN mm.	Dy.CDE/T	ADE/ELEX-3

7/ELSK-178
ASSLY. PART NO.

बरेका BANARAS LOCOMOTIVE WORKS VARANASI

DRG NO. ELSK-199

(192)