

File No.RDSO-COMP0LKO(MISC)/2/2023-PED/PSEMU/RDSO

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भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ-2260

**Government of India - Ministry of Railways
Research Designs & Standards Organization
LUCKNOW - 226011**

No. EL /7.10.1/LHB

Dated As signed

1-Principal Chief Electrical Engineer,

- Konkan Railway, Belapur Bhawan, Sector-11, Belapur, Mumbai - 400614
- Integral Coach Factory, Chennai-600038
- Rail Coach Factory, Kapurthala-144602
- Modern Coach Factory, Lalganj, Raibareilly-229120

2- Principal Chief Mechanical Engineer

- Eastern Railway, Fairlie Place, Kolkata - 700001
- Northern Railway, Baroda House, New Delhi-110001
- Central Railway, Parcel office, CST, Mumbai CST -400001
- Western Railway, Churchgate, Mumbai — 400020
- Southern Railway, Park Town, Chennai —600003
- East Central Railway, Dighi, Distt- Vashali, Hajipur, Bihar-844101
- East Coast Railway, Bhuvneshwar Orrisu-751016
- North Central Railway, Su bedarganj, Allahabad-211033
- North Eastern Railway, Gorakhpur -273001
- North Western Railway, Jaipur 302006
- Northeast Frontier Railway, Maligaon, Guwahati -781 001
- Western Central Railway, HQR's Office, Annexe Building, Indramarket, Jabalpur (M.P.)— 482001
- South Eastern Railway, Garden Reach, Kolkata —700043
- South Western Railway, New zonal Hq. Office, Firstfloor, west block, Hubli 580020
- South East Central Railway, Bilaspur-495004
- South Central Railway, Nilayam, Secunderabad - 500371

Sub: Modification Sheet no. RDSO/PE/MS/AC/0094-2024(Rev.0) for provision of 4.5kW Underslung Regulated Cum Emergency Battery Charger(UREBC) MCBs in the on-board switch board cabinets and LV side (415V) of under slung HV cubicle for LHB type EOG/HOG AC and Non -AC coaches respectively.

As a measure of system improvement, the modification need was noticed to solve the issues regarding MCB tripping and limitations of resetting the MCB enroute onboard in case of 4.5kW Underslung Regulated Cum Emergency Battery Charger(UREBC),so that enroute failure of battery charger developed by tripping of MCBs before the battery gets fully discharged may be attended.

In view of the above, Modification sheet no. RDSO/PE/MS/AC/0094-2024(Rev.0) is being issued for implementation of user Railways.

Digitally Signed by Pradip
Singh

Date: 21-10-2024 15:22:34
(Pradip Singh)
Director/Metro
For Director General/PS & EMU



सत्यमेव जयते

भारत सरकार

रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

अनुसंधान अभिकल्प एवं मानक संगठन
RESEARCH DESIGN AND STANDARD ORGANISATION
MANAK NAGAR LUCKNOW-226011


MODIFICATION SHEET FOR REMOVAL OF MCBs OF RBC AND EBC PROVIDED IN TERMINAL BOX OF UNDERSLUNG CONSTANT VOLTAGE 4.5 kW REGULATED BATTERY CHARGER CUM EMERGENCY BATTERY CHARGER (UREBC) AND PROVISION OF THESE MCBs WITH MODIFIED RATING IN THE ONBOARD SWITCH BOARD CABINETS AND IN LV SIDE (415V) OF UNDER SLUNG HV CUBICLE FOR LHB TYPE EOG/HOG AC AND NON-AC COACHES RESPECTIVELY.

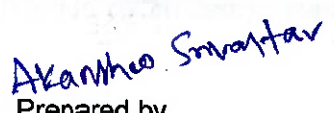

अंडरस्लंग कॉन्स्टेंट वोल्टेज 4.5 कि. वा. रेगुलटेड बैटरी चार्जर व इमेर्जेंसी बैटरी चार्जर (UREBC) के टर्मिनल बॉक्स में आर.बी.सी. एवं ई.बी.सी. के एम.सी.बी. को एलएचबी प्रकार ई.ओ.जी./एच.ओ.जी. ए.सी. कोचों और नॉन -एसी कोचों के लिए स्विच बोर्ड कैबिनेट और अंडरस्लंग एच.वि. क्यूबीकल का एल.वी. साइड (415V) क्रमशः में संशोधित रेटिंग के साथ इन एमसीबी का प्रावधान

MODIFICATION SHEET NO. RDSO/PE/MS/AC/0094-2024(Rev 0)

SN	DATE OF AMENDMENT	AMENDMENT NO.	PAGE NO.	REASON FOR AMENDMENT

अनुमोदित
APPROVED BY


प्रधान कार्यकारी निदेशक/ पी.एस एण्ड ई.एम.यू
PED/PS& EMU

 Prepared by SSE/PS&EMU	 Verified by DSE/Metro
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Page 2 of 16	EL/7.10.1/AC LHB coaches	Modification Sheet No. RDSO/PE/MS/AC/0094-2024(Rev.0)
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RESEARCH DESIGNS AND STANDARDS ORGANISATION
MANAK NAGAR, LUCKNOW-226011
Modification sheet no RDSO/PE/MS/AC/0094-2024(Rev-0)

1.0

1.1 TITLE:


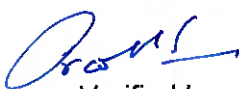
Modification sheet for removal of MCBs of RBC and EBC provided in terminal box of under slung constant voltage 4.5kW Regulated Cum Emergency Battery Charger (UREBC) and provision of these MCBs with modified rating in the on-board switch board cabinets and in LV side (415V) of under slung HV cubicle for LHB type EOG/HOG AC and Non-AC coaches respectively.

1.2 OBJECTIVE:

- 1.2.1 The Modification sheet pertains to all type of LHB AC and Non-AC coaches which have 4.5kW Under slung Constant Voltage Regulated Cum Emergency Battery charger (UREBC) as per RDSO specification no. RDSO/PE/SPEC/AC/0183 (Both Rev-0 & Rev-1).
- 1.2.2 The modifications sheet is issued for removal of MCBs from terminal box and provision of these MCBs with modified rating in the on-board switch board cabinet and LV side (415V) of under slung HV cubicle for LHB type EOG/HOG AC and Non-AC coaches respectively.

2.0 BRIEF DESCRIPTION

- 2.1 Issues regarding MCB tripping and limitations of resetting the MCB enroute were highlighted multiple times by Zonal Railways. Further, a provision to resolve the issue was made in the revised specification for UREBC as per RDSO specification no. RDSO/PE/SPEC/AC/0183-Rev 2 (2024) but, the issue still persisted in existing 4.5 kW UREBC and rating of MCBs provided in new variants of Switch Board cabinets also need to be modified.
- 2.2 The tripping of MCBs in enroute leads to stopping of battery charging and battery get discharged which lead to non - functioning of DC loads. The resetting of MCBs is only possible when the train stops and the UREBC terminal box is sometimes positioned on the opposite side of the platform in the under frame.
- 2.3 To resolve the existing reliability issues, a meeting of 4.5 kW UREBC was held at RDSO among Zonal Railways, Production Units and prospective vendors on Date- 25.07.2024. In this meeting it was decided that MCBs of UREBC needs to be shifted onboard to resolve the limitation of MCB resetting enroute. The modification will eliminate the above enroute problem and escorting staff can easily reset tripped MCBs onboard and facilitate uninterrupted operation of 4.5kW UREBC.

 Prepared by SSE/PS&EMU	 Verified by DSE/Metro
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3.0 MODIFICATION TO BE CARRIED OUT:

3.1 All type of AC and Non-AC coaches with 4.5kW underslung REBC only

Existing MCBs of RBC (3P, 20A) and EBC(1P, 20A) provided in terminal box of under slung 4.5kW REBC are to be removed in EOG/HOG/ LHB type AC and Non-AC coaches.



3.2 Provision of UREBC MCBs to the On-board Switch Board Cabinet (SBC) of AC coaches.

There are different variants of Switch Board cabinets provided in LHB type EOG/HOG coaches. Therefore, the modification work in the coaches has been segregated as under based on the requirement in different variants of Switch Board Cabinets:-

CASE-1 (Modifications in Coaches with SBC as per RCF specification no. EDTS 0073, in Power Car as per RCF Specification no. EDTS 0104 and in Pantry car as per RCF Specification no. EDTS 0134)

- The Switch Board Cabinets as per RCF specification no. **EDTS 073, EDTS 0134 and EDTS 0104** are to be provided with S1F160 (3P,20A) and S1F170(1P,25A) MCBs for RBC and EBC respectively.
- The electrical connections of MCBs are to be done in line with sheet no. 23 of 48 of RDSO drawing no. RDSO/PE/SK/AC/0206-2019 incorporating changes marked in red and enclosed at **Annexure A**.

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- c. The MCBs locations are marked in red in **Annexure B1** (For SBC as per **EDTS 0073**), **Annexure B2** (For SBC as per **EDTS 0134**) and **Annexure B3** (For SBC as per **EDTS 0104**) for reference.
- d. For the wires coming from SBC to 4.5 kW RBC cum EBC, the harness details are mentioned below (Harness ref RCF Specification no. **EDTS-253** latest)

Harness No.	Cable size (in mm ²)	Color	Description	Length (in mm)	From	To	Ferrule No.	Remarks
14B	6 mm ² upto 750 V	R	R- Phase (RBC)	As required	SBC	RBC	330125.21A	SBC to RBC NW-23=10M
	6 mm ² upto 750 V	Y	Y- Phase (RBC)		SBC	RBC	330126.22A	
	6 mm ² upto 750 V	B	B- Phase (RBC)		SBC	RBC	330127.17A	
	6 mm ² upto 750 V	R	R-Phase (EBC)		SBC	RBC	330125.22C	
	6 mm ² upto 750 V	BLACK	Neutral (EBC)		SBC	RBC	330128.21C	
	6 mm ² upto 750 V	GNYE	Earth		SBC	RBC	331301.01	

Note: Those wires which are not available as mentioned above needs to be laid separately.

CASE-2 (Modifications in Coaches with SBC as per RDSO specification no. **RDSO/PE/SPEC/AC/0184-2015 (Rev.0)** and SBC as per RDSO specification no. **RDSO/PE/SPEC/AC/0184-2015 (Rev.1)**)

- a. The already existing MCBs for RBC/EBC in SBC to be removed.
- b. The Switch Board Cabinets as per RDSO specification no. **RDSO/PE/SPEC/AC/0184-2015 (Rev.0)** and SBC as per RDSO specification no. **RDSO/PE/SPEC/AC/0184-2015 (Rev.1)** are to be provided with S1F160 (3P, 20A) and S1F170 (1P, 25A) MCBs for RBC and EBC respectively.
- c. The electrical connections of MCBs are to be done in line with sheet no. 23 of 48 of RDSO drawing no. **RDSO/PE/SK/AC/0206-2019** incorporating changes marked in red and enclosed at **Annexure A**.
- d. The MCBs locations are marked in red in **Annexure C** for reference.
- e. For the wires coming from SBC to 4.5 kW RBC cum EBC, the harness details are mentioned below (Harness ref RCF Specification no. **EDTS-253** latest)

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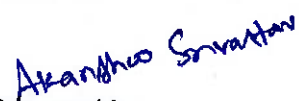

Harn ss No.	Cable size (in mm ²)	Color	Descrip tion	Length (in mm)	From	To	Ferrule No.	Remarks
14B	6 mm ² upto 750 V	R	R- Phase (RBC)	As require d	SBC	RBC	330125.21A	SBC to RBC NW- 23=10M
	6 mm ² upto 750 V	Y	Y- Phase (RBC)		SBC	RBC	330126.22A	
	6 mm ² upto 750 V	B	B- Phase (RBC)		SBC	RBC	330127.17A	
	6 mm ² upto 750 V	R	R- Phase (EBC)		SBC	RBC	330125.22C	
	6 mm ² upto 750 V	BLAC K	Neutral (EBC)		SBC	RBC	330128.21C	
	6 mm ² upto 750 V	GNYE	Earth		SBC	RBC	331301.01	

Note: Those wires which are not available as mentioned above needs to be laid separately.

CASE-3 (Modifications in Coaches with SBC as per RDSO specification no. RDSO/PE/SPEC/AC/0200-2020 (Rev.0))

- The already existing MCBs for RBC/EBC in SBC to be removed.
- The MCBs with revised ratings i.e. S1F160 (3P, 20A) and S1F170 (1P, 25A) MCBs for RBC and EBC respectively are to be provided in the on-board panel which were previously being provided in Under-slung panel.
- The Revised MCBs locations are marked in Red in **Annexure D** for reference.
- For the wires coming from SBC to 4.5 kW RBC cum EBC, the harness details are mentioned below (Harness ref RCF Specification no. EDTS-253 latest)
- The electrical connections of MCBs are to be done in line with sheet no. 23 of 48 of RDSO drawing no. RDSO/PE/SK/AC/0206-2019 incorporating changes marked in red and enclosed at **Annexure A**.

Harn ss No.	Cable size (in mm ²)	Color	Descrip tion	Length (in mm)	From	To	Ferrule No.	Remarks
14B	6 mm ² upto 750 V	R	R- Phase (RBC)	As require d	SBC	RBC	330125.21A	SBC to RBC NW- 23=10M
	6 mm ² upto 750 V	Y	Y- Phase (RBC)		SBC	RBC	330126.22A	
	6 mm ² upto 750 V	B	B- Phase (RBC)		SBC	RBC	330127.17A	

 Prepared by SSE/PS&EMU	 Verified by DSE/Metro
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6 mm ² upto 750 V	R	R-Phase (EBC)	SBC	RBC	330125.22C
6 mm ² upto 750 V	BLAC K	Neutral (EBC)	SBC	RBC	330128.21C
6 mm ² upto 750 V	GNYE	Earth	SBC	RBC	331301.01

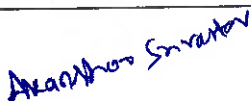

Note: Those wires which are not available as mentioned above needs to be laid separately.

3.3 Provision of UREBC MCBs in the LV side (415V) of under slung HV cubicle of Non-AC coaches.

- The MCBs with ratings S1F160 (3P, 20A) and S1F170 (1P, 25A) MCBs for RBC and EBC respectively are to be provided in LV side (415V) of under slung panel at suitable available place.
- The electrical connections of MCBs are to be done in line with sheet no. LS 70117 of RCF Specification no. EDTS 355 incorporating changes marked in red and enclosed at **Annexure E**.

4.0 APPLICATION:

- 4.5 kW Underslung Regulated Battery Charger cum Emergency Battery Charger (UREBC).
- The different variants of Switch Board Cabinets as per RCF specification no. EDTS 073, EDTS 104 EDTS 134 & EDTS 355 and RDSO specification no. RDSO/PE/SPEC/AC/0184-2015 (Rev.0), RDSO/PE/SPEC/AC/0184-2015 (Rev.1) & RDSO/PE/SPEC/AC/0200-2020 (Rev.0) which are being used in LHB AC and Non-AC coaches.

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5.0 MATERIALS REQUIRED:

The materials required to be purchased from RDSO approved sources as given below:

S.N	Item Description	Make	Remarks
a)	Switchgears	Eaton/ABB/C&S/Siemens/L&T/Schneider	
b)	E beam cables	As per RDSO Specification no. ELRS/SPEC/ELC/0019, Rev.4 or latest from RDSO approved sources	
c)	Computer generated ferrules Class R22/R23 in EN 45545-2 HL 3 Category (self-fire extinguishing low smoke & low toxicity). Test report from EN certified lab for EN45545-2 HL-3 shall be furnished by the firm with supplied model no. and company name at the time of prototype and acceptance test.	Tyco/Phoenix/MV Electro systems/Brady	
d)	Terminal block (6 sq.mm)	Phoenix, Wago, Connectwell & Weidmuller	

Note For interconnection of RBC/EBC with respective MCBs inside on-board SBC and LV side (415V) of under slung HV cubicle of AC and Non-AC coaches respectively.

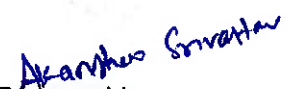

- 1- Spare 6 sq.mm terminal block should be used.
- 2- In absence of 6 sq. mm terminal block, existing spare terminal block should be replaced with 6 sq.mm Terminal block.

6.0 DRAWING/ REFERENCE:

Attached Annexures.

7.0 AGENCY FOR IMPLEMENTATION

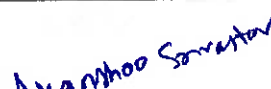
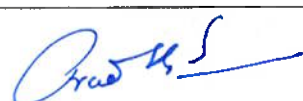
All Zonal Railways, PUs and Workshops of Indian Railways.

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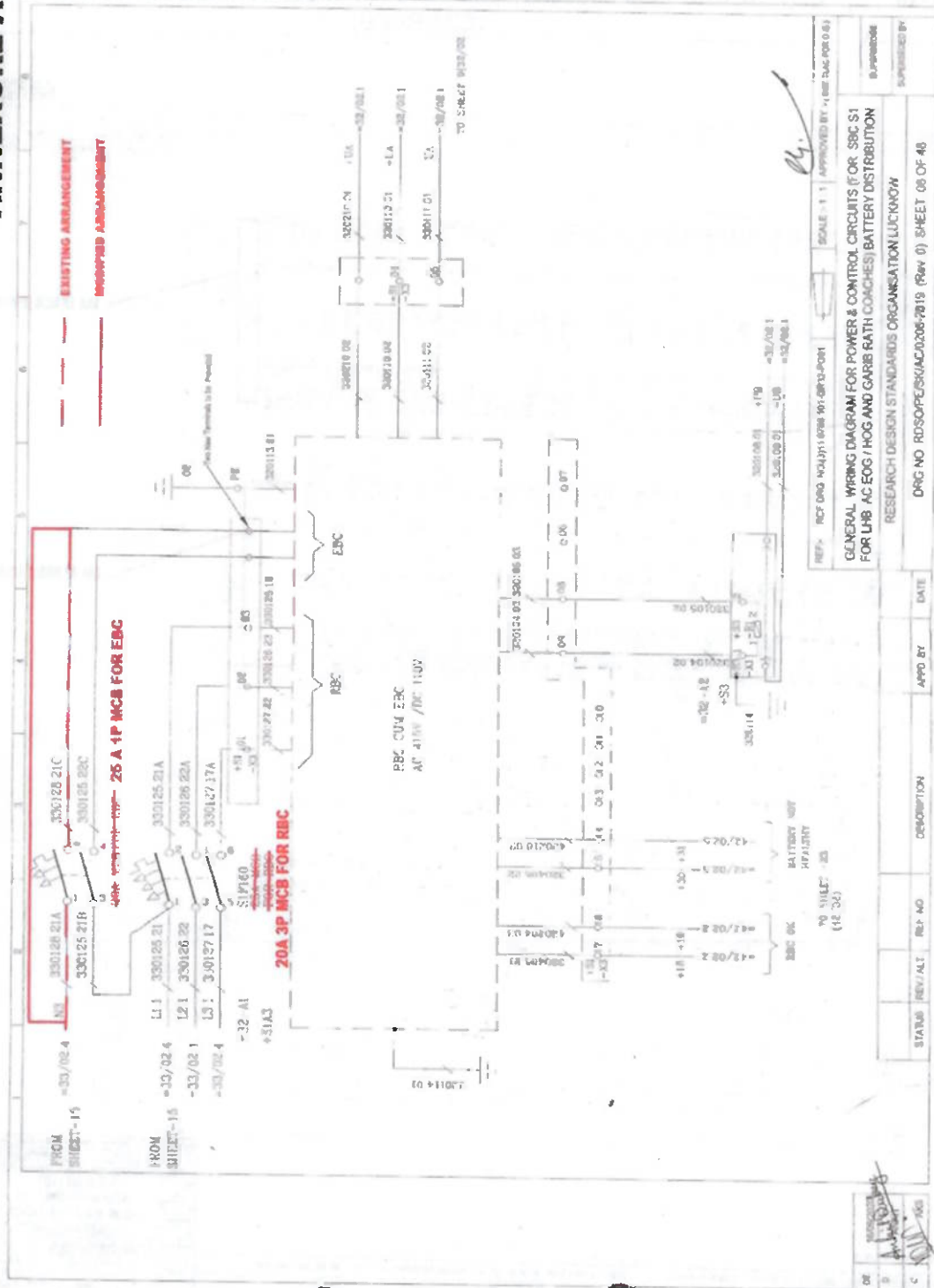
Page 8 of 16	EL/7.10.1/AC LHB coaches	Modification Sheet No. RDSO/PE/MS/AC/0094-2024(Rev.0)
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8.0 ENCLOSURES

S. No.	Annexure	Description
1.	Annexure A	Modified sheet no. 23 of 48 of RDSO drawing no. RDSO/PE/SK/AC/0206-2019. The modifications marked in red.
2.	Annexure B1	MCBs location marked in red for RCF specification EDTS 0073
3.	Annexure B2	MCBs location marked in red for RCF specification EDTS 0104
4.	Annexure B3	MCBs location marked in red for RCF specification EDTS 0134
5.	Annexure C	MCBs location marked in red for RDSO specification RDSO/PE/SPEC/AC/0184-2015 (Rev.0 & Rev.1)
6.	Annexure D	MCBs location marked in red for RCF specification RDSO/PE/SPEC/0200-2020 (Rev -0)
7.	Annexure E	Sheet no. LS 70117 of RCF Specification no. EDTS 355

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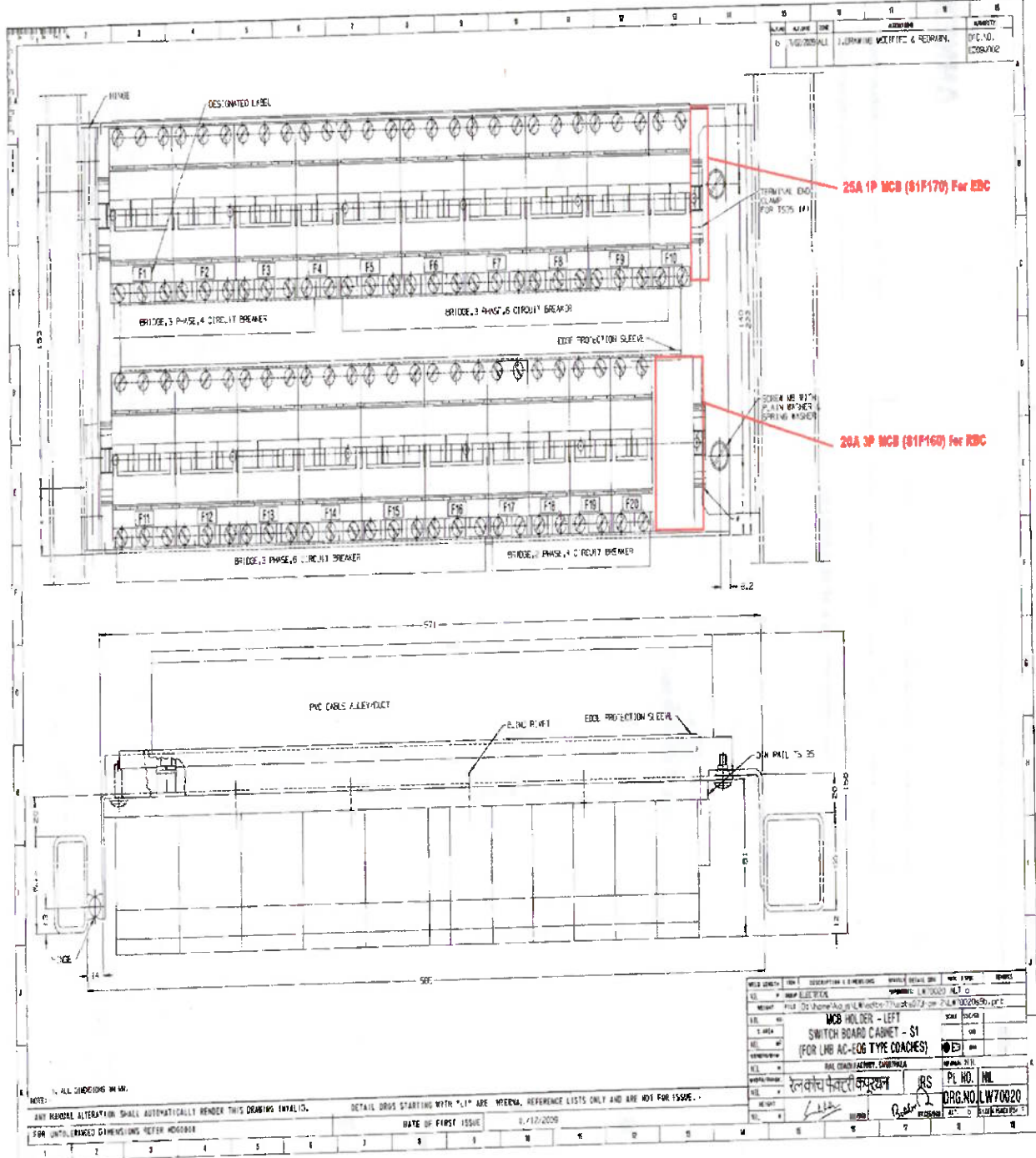
ANNEXURE A



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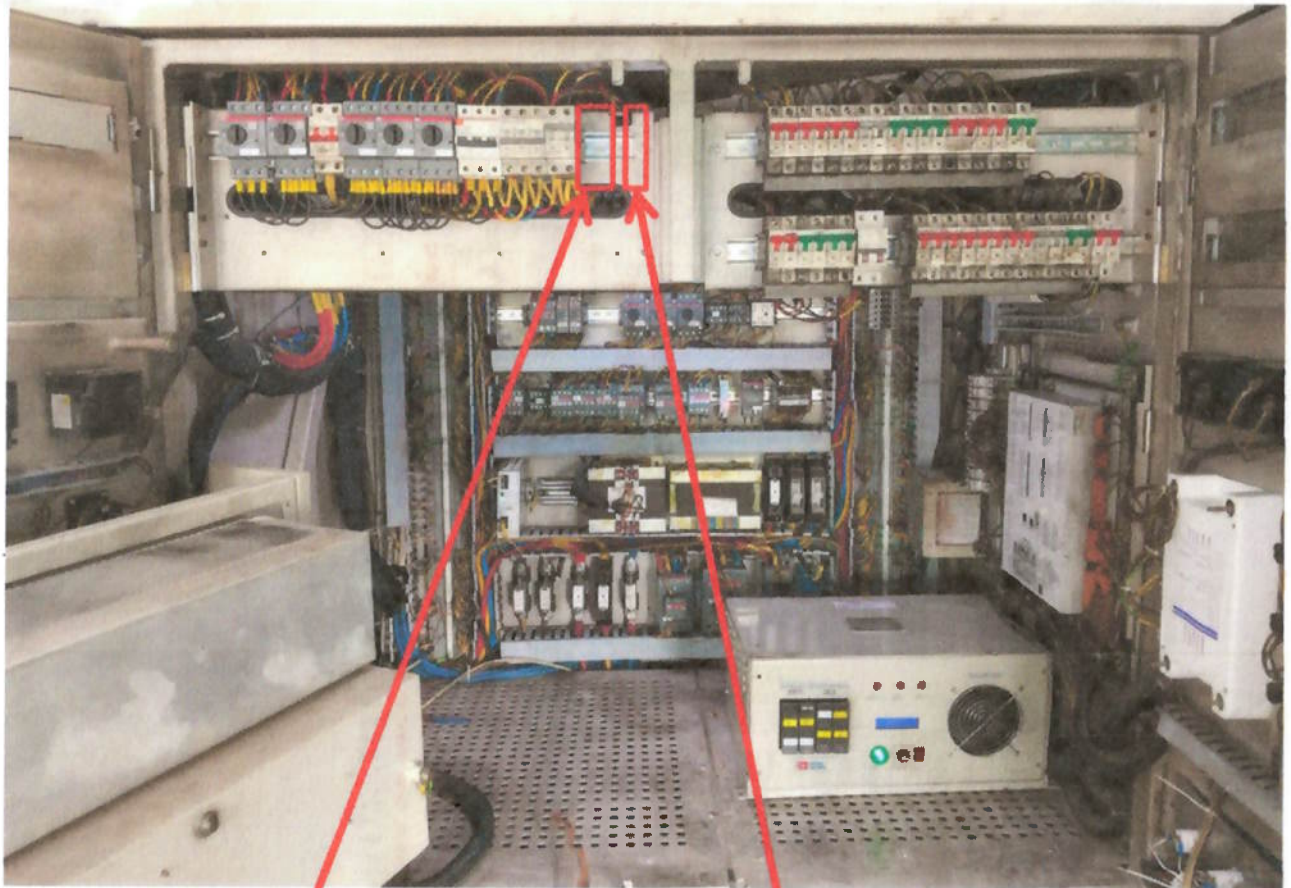
ANNEXURE B1



Akash Srinivasan
Prepared by
SSE/PS&EMU

Praveen
Verified by
DSE/Metro

ANNEXURE B 2



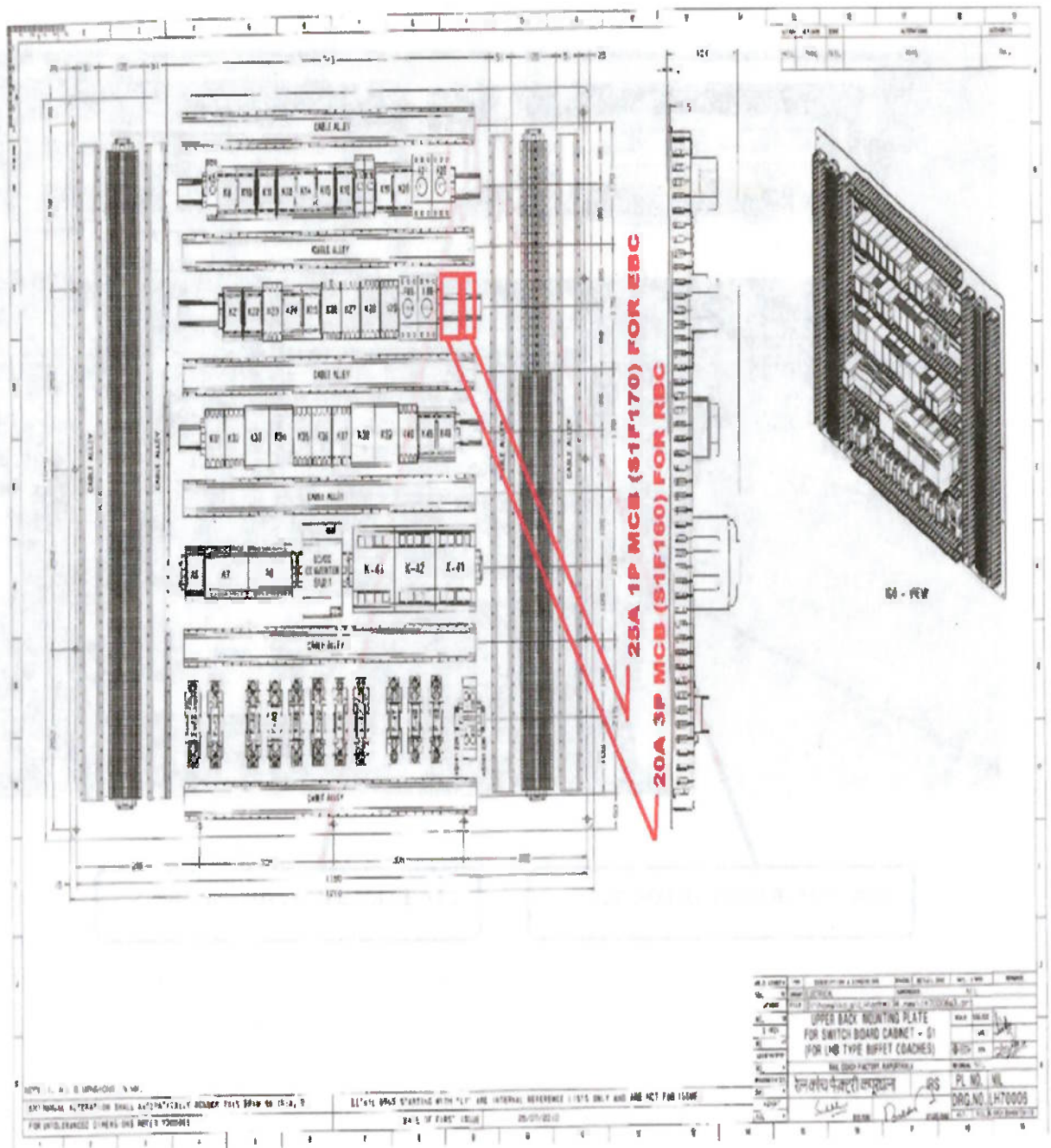
20A 3P MCB (S1F160) FOR RBC

25A 1P MCB (S1F170) FOR EBC

Axantho Srinivasan
Prepared by
SSE/PS&EMU

Prashant
Verified by
DSE/Metro

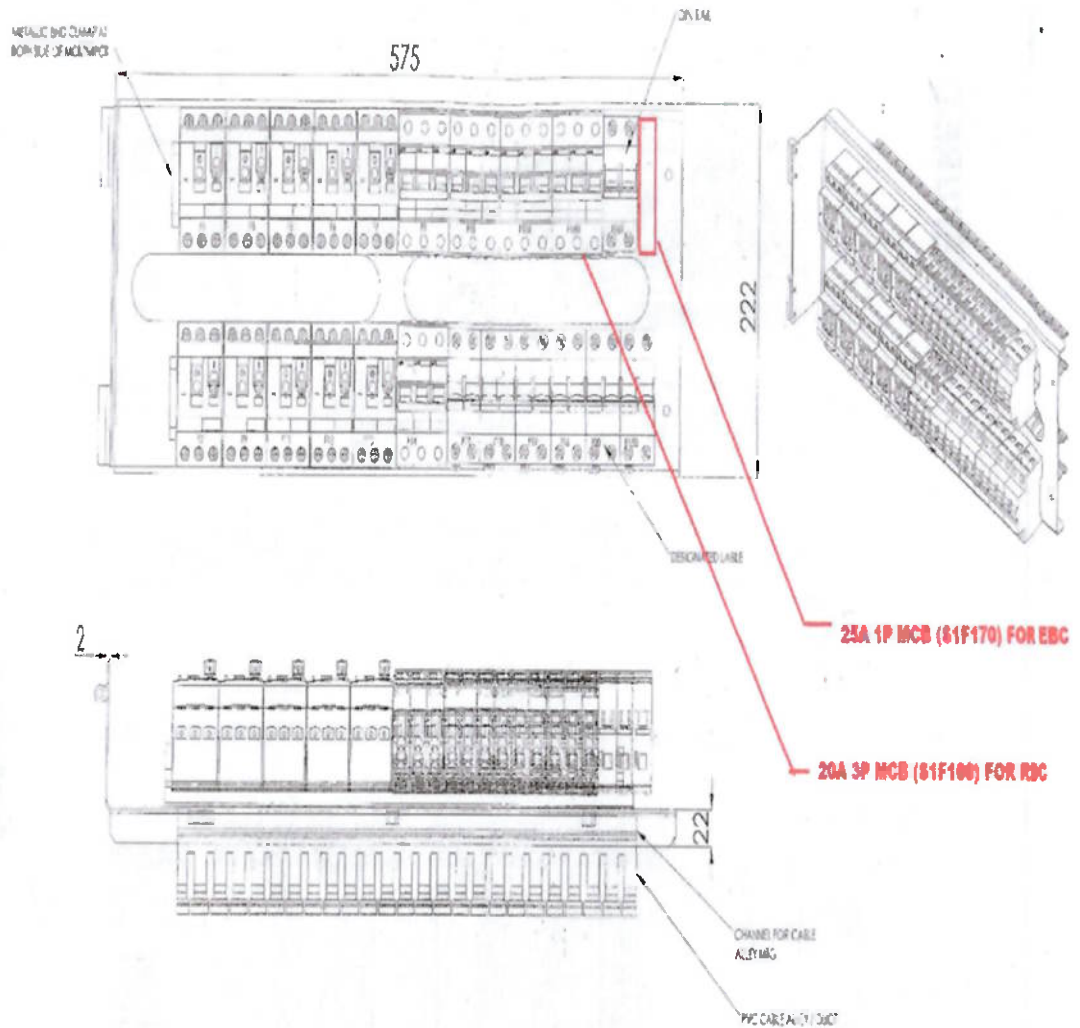
ANNEXURE B3



Akashdeep Srinivasan
 Prepared by
 SSE/PS&EMU

[Signature]
 Verified by
 DSE/Metro

ANNEXURE C



NOTE:
1. ALL DIMENSIONS IN MM
2. FOR UNTOLERANCED DIMENSIONS REFER MDG0008
3. EDGE PROTECTION SLEEVE PROVIDE ON ALL CUTOUT.

DT	16.08.2024
D	AKS
C	AKS

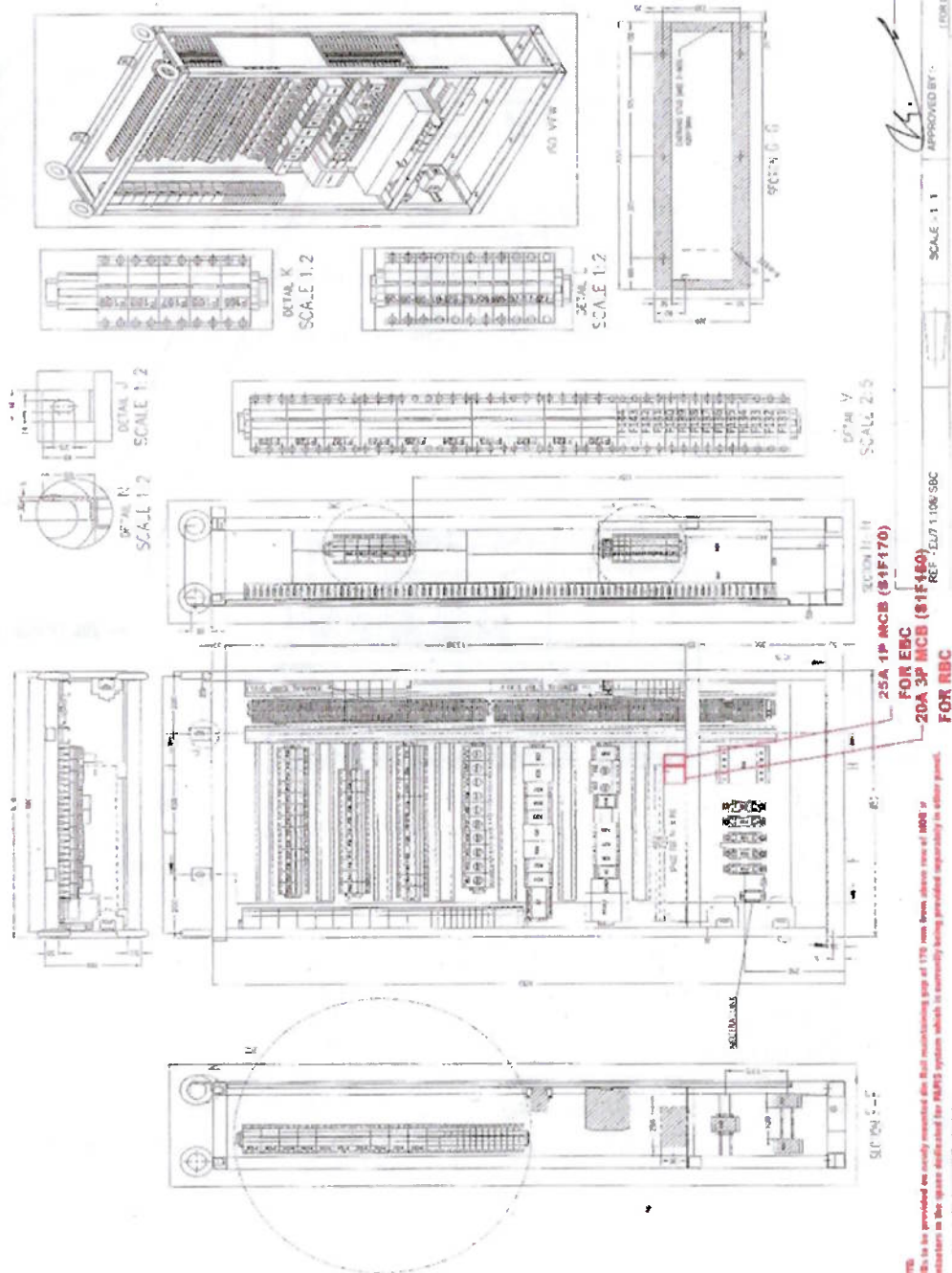
REV	BY	DATE	DESCRIPTION	APPROVED BY	DATE
1	AKS	16.08.2024	FOR CHANNEL IN PPS SIDE 20A/10/5 MM		

REF.	SCALE - 1:1	APPROVED BY -	DESIGNED BY -
MPCB / MCB HOLDER - LEFT SWITCH BOARD CABINET - S1 SPEC 184 (SWITCH BOARD CABINET - S1 FOR LHB AC - EOG TYPE COACHES)		RESEARCH DESIGN STANDARDS ORGANISATION LUCKNOW	
ORG NO RDSO/PE/MS/AC/0094-2019 (REV. 1)		SHEET 5 OF 16	

Alexander Srinivasan
Prepared by
SSE/PS&EMU

Praveen
Verified by
DSE/Metro

ANNEXURE D



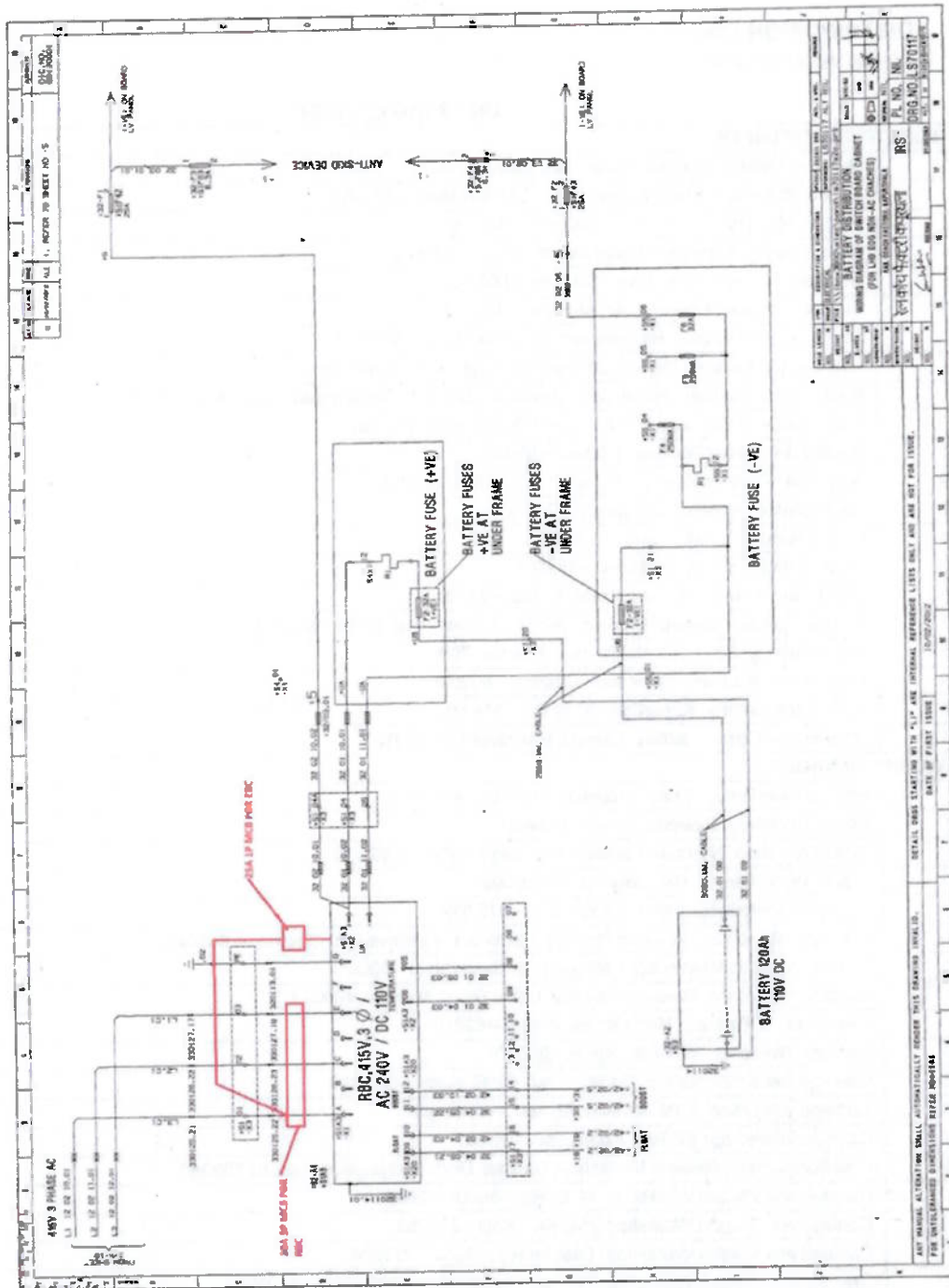
FORM COMPLETE
 FOR THE F-35, HOW CALIBRATION TYPE ACQUAINTS
 HIGH DESIGN STANDARDS ORGANISATION LUCKNOW
 RD50/SEI/AC/0243-202; (REV.4)
 SHEET 7 OF 8

STATUS	REQ/AT	REF NO	DESCRIPTION	AMTD IN	DATE
			FOR SUPPLY OF 1000 EMERGENCY SUPPLIES		

[illegible]

Verified by
DSE/Metro

ANNEXURE E



Prepared by
SSE/PS&EMU

Verified by
DSE/Metro

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9.0 DISTRIBUTION LIST
As per list enclosed

DISTRIBUTION LIST

CHIEF ELECTRICAL ENGINEER:	
1	Northern Railway, Baroda House, New Delhi – 110 001.
2	Central Railway, II Floor, Parcel office, CST Mumbai – 400 001.
3	Eastern Railway, Fairlie Place, Kolkata – 700 001.
4	South Eastern Railway, Garden Reach, Kolkata – 700 043
5	Southern Railway, Park Town, Chennai – 600 003.
6	Western Railway, Church gate, Mumbai – 400 020.
7	South Central Railway, Rail Nilayam, Secunderabad – 500 371.
8	East Central Railway, Dighi Distt- Vaishali, Hajipur Bihar- 844 101.
9	North Central Railway, North Central Railway, Block A, Subedarganj, Allahabad-211033.
10	South Western Railway, 1 st Floor, DRM Office, Hubli 580 020
11	South East Central Railway, Bilaspur-495004
12	North East Frontier Railway, Maligaon, Guwahati - 781001
13	North Eastern Railway, Gorakhpur – 273001
14	North Western Railway, Jaipur – 302006
15	West Central Railway, Jabalpur – 482001
16	East Coast Railway, Bhuvneshwar, Orissa – 751016
17	Konkan Railway, Belapur Bhavan, Sector-11, Belapur, Mumbai - 400614
18	Metro Railway, 33 /1 J.L. Nehru road, Kolkata- 700071
19	Integral coach factory, Perambur, Chennai - 600038
20	Rail Coach Factory, Kapurthala (Punjab) – 144 602
21	Modern Rail Coach Factory, Lalganj, Raebareli(UP)-229120
CHIEF WORKS MANAGER:	
1	Matunga Workshop, Central Railway, Mumbai - 400 019.
2	Liluah Workshop, Eastern Railway, Howrah
3	C&W Workshop, Northern Railway, Alambagh, Lucknow-226 05
4	C & W Workshop, N. Rly., Jagdhari – 135 002
5	Mechanical Workshop, NER, Gorakhpur – 273 012
6	Carriage Workshop, Southern Railway, Perambur, Ayanavaram, Chennai – 600023.
7	SCR, Lallagudda Workshop, Lallaguda, Secunderabad - 500017
8	Carriage Workshop, Western Railway, Lower Parel, Mumbai-400013
9	CRWS, W. C. Railway, Nisha3Pura, Bhopal-462010
10	Carriage Workshop, NW Rly., Ajmer - 305001
11	Carriage Repair Workshop, Gadag Road, SWR, Hubli – 580 020
12	Carriage Workshop, S.W. Railway, Mysore Vishwanath.
13	Carriage Workshop, SE Rly., Kharagpur - 721301
14	New Bongaigaon, Railway Workshop, Dangtal, Distt. Bongaigaon, Assam-783380
15	Carriage and Wagon Workshop, N. C. Rly., Jhansi – 248003
16	Carriage and Wagon Workshop, WC Rly., Kota - 324002
17	Carriage and Wagon Workshop, Eastern Rly., Liluha - 711204
18	Carriage and Wagon Workshop, W. Rly., Pratap Nagar, Vadodara - 390004
19	Carriage and Wagon Workshop, N Rly., Amritsar - 143001
20	Central Workshop, Golden rock, S. Rly., Trichi - 620004
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