RAIL COACH FACTORY, KAPURTHALA

CAI N O.: ED/CAI/037 Dated: 24.09.2024

COACH ALTERATION INSTRUCTION SHEET FOR SEGREGATION OF 110V DC (+VE & –VE) AT ALL LEVELS AND PROVISION OF CAGE CLAMP TERMINALS WITH GLASS FUSES FOR ENHANCED FIRE SAFETY IN LHB EOG FIRST AC COACHES

RAIL COACH FACTORY, KAPURTHALA

CAI No. :- ED/CAI/037, Dated :- 24.09.2024

This Coach Alteration Instruction Sheet has been issued for segregation of 110V DC +VE & –VE cables at all levels and provision of Cage Clamp Terminals with Glass Fuses for enhanced fire safety in LHB EOG First AC Coaches wherein following steps are to be taken for modifications in the coach:

1. Removal/Dismantle of Accessories from Coach:

1.1 Disconnections/Removal of Accessories for segregation:

a) Disconnect all the wiring circuits i.e. circuits for Light's, Night Light's, AEL's, BRL's, Mobile Charging Sockets from WAGO terminals provided in Switch Board Cabinet & Annunciator from Annunciator box.
b) Disconnect all the wiring circuits i.e. circuits for Light's, Night light's, Mobile Charging Sockets, Annunciator cables from the WAGO type connectors provided in each Cabin area and circuits for BRL's, AEL's etc. from Cable Tray from the Roof Area of the Coach .
c) Remove all berths from the Cabin Area for opening of the Sidewall Panel.
d) Remove all accessories from the Sidewall Panel which includes ACP Cover, Switch Plate Assemblies, Berth Reading Lights, Mirror, Light Luggage Stand, Coat Hook, berth mounting brackets etc.
e) Open Roof Ceiling in the cabin area followed by removal of sidewall panel.
f) Opening of Partition between Attendant Room and Switch Board Cabinet for ease in access of cables for segregation into different conduits.
g) Removal of 3 or 4 Nos. Dia. 20 mm PVC Rigid conduits from Side wall by removing the conduit clamps from side-wall.
h) Dismantle the WAGO type strips provided for interconnections of wiring in each Cabin.
i) Removal of 110V AC & DC wiring from the PVC conduits installed in the sidewall (Cabin Side)
j) Removal of Roof Ceiling in Cabin as well as Corridor area along with the 02 nos. tray arrangement provided in the roof of the coach.
k) Removal of AC/DC wiring for Pantry and Lavatories Lights from the 40 mm PVC Rigid conduits provided on Cabin side.
l) Opening of Roof Ceiling in Doorway/Gangway area.

2. Modifications required in Under-frame/Roof /Sidewall Arrangement of LHB EOG First AC Coaches:

2.1 Modifications in Under frame Area:-

a) Segregation of 110V DC +VE & -VE Cables is already being done in existing LHB Coaches as the output cables from 4.5 KW RBC i.e. 110V DC +VE, +VE & -VE are routed to SBC, Battery

Fuse Box (+VE) and Battery Fuse Box (-VE) respectively via. different polyamide conduits, hence no change is required in under-frame wiring.

2.2 *Modification in Side Wall Area :-*

a) If required, 01 no. additional PVC Rigid Conduit of Ø20 mm shall be laid above the existing PVC Rigid Conduits on the sidewall for Jumper wiring and clamping of the same shall be done with the help of 2 nos. double conduit clamps to make overall 04 nos. PVC Rigid Conduits on the sidewall. Wiring shall be routed from SBC to Cage clamp terminals via. these 04 nos. PVC Rigid Conduits as per following details:-

1.	Upper Conduit:-	All Annunciator Cables
2.	Below Upper Conduit:-	All DC -VE & Earthing Cables (i.e. 110V DC FLD-, FLE, NL-, ALARM-, PE (Light))
3.	Above Bottom Conduit:-	All DC +VE Cables (i.e. 110V DC FLD+, FLE+, NL+, ALARM-I+, ALARM-II+ (Loop))
4.	Bottom Conduit:-	All MCS Cables (i.e. 110V AC Ph., Ph., Ph., Neutral, Earth).

b) Provision of Cage Clamp Terminals with Glass Fuses similar to LHB Non AC Coaches as per *EDML-235, Rev-Nil* in place of 4-conductor Terminal Blocks and layout shall be as per *SKED-948*.

c) Due to increase in size of Cage Clamp Terminals provided, the length of PVC Conduit for Jumper wiring shall be reduced from 1700 mm to 1650 mm (01 No.) for SBC to Cabin-1, 1400 mm to 1250 mm (4 Nos.) & 2300 mm to 2200 mm (02 Nos.) along with conduit length remain same from 4^{th} to 5^{th} cabin.

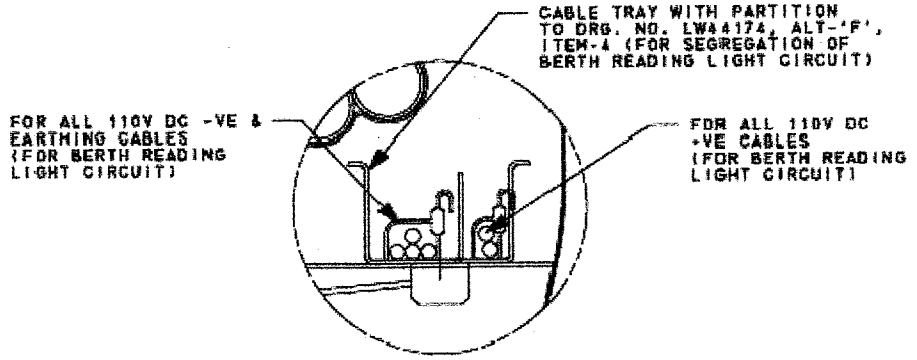
d) 4-Way socketed couplers on the PVC conduits as per Drawing no. *SKED-947* shall be provided in each cabin area for passing of MCS and DC +VE wiring at locations for cables exit to switches.

e) Din Rail of length 310 mm shall be mounted at the existing terminal strip mounting location for accessibility on the same WAGO Bracket. Accordingly, connections shall be done.

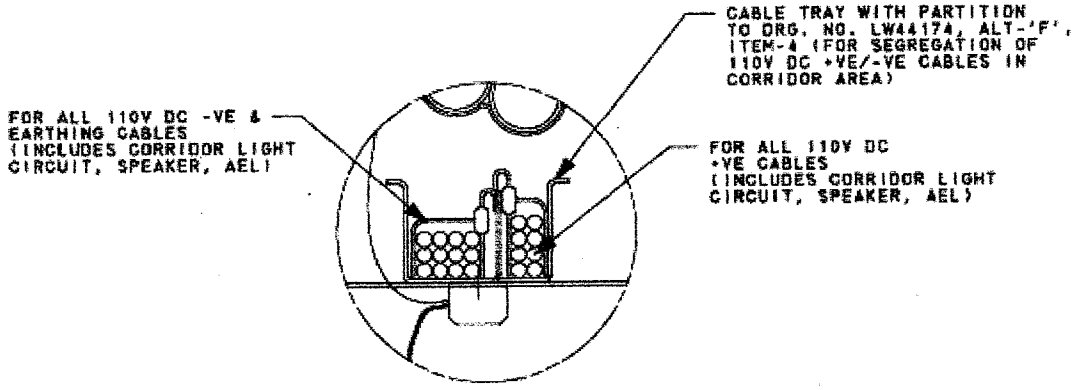
2.3 Modifications in Roof Area:

a) Segregation of 110V DC +VE & -VE shall be done in Branch Wiring by providing extra NW-17 flexible conduit, however due to only 01 No. Cable drop hole in Cant-rail for passing of NW-17 Conduit, branch wiring shall be done with Cable Jackets from the hole to Terminal Strip for easy routing of cables through 01 no. hole. These two Conduits shall be clamped with 02 nos. Tube clamps at the roof. Additional sleeve shall be used for routing of cables separately from conduit to equipment i.e. Limit Switch, Lights.

b) The existing 02 nos. cable tray arrangement to Drawing No. LW44174, Item-6 shall be replaced with Drawing No. LW44174, Item-4 with provision of partition between Cable tray for segregation of DC +VE & -VE cables in Roof Area (inside Cabin area and Corridor Area).



Cable Tray in Cabin Area



Cable Tray in Corridor Area

c) The segregation of 110V DC +VE & -VE wiring shall be done for Speaker Circuit, AEL Circuit, Berth Reading Lights, Annunciator Indication Cables with cables for 110V DC +VE on one side and cables for 110V DC –VE and Earth on other side with the help of partition in Cable Tray being provided in the Corridor Area.

d) Branch wiring for the BRL shall be segregated in the different conduits with the provision of Glass fuse integrated in the Berth Reading Light itself. The Drawings for Berth Reading Lights are as per following details:-

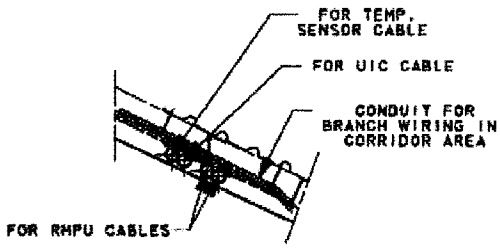
SN	Item description	Drawing no.
1	Berth Reading Light with USB Charging Socket Type A & C with inbuilt 1.0 Amp Glass Fuse (For Longitudinal)	LW76419, Alt-'a'
2	Berth Reading Light with USB Charging Socket Type A & C with inbuilt 1.0 Amp Glass Fuse (For Upper Berth)	LW76420, Alt-'a'
3	Berth Reading Light with USB Charging Socket Type A & C with inbuilt 1.0 Amp Glass Fuse (For Transverse LHS Berth)	LW76421, Alt-'a'
4	Berth Reading Light with USB Charging Socket Type A & C with inbuilt 1.0 Amp Glass Fuse (For Transverse RHS Berth)	LW76422, Alt-'a'

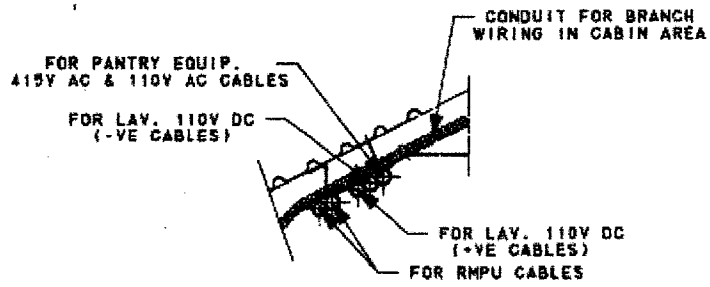
e) Lavatory wiring from PP end to NPP end shall also contemplated in dia. 40 mm PVC Rigid Conduits. These cables shall be segregated as per the details given in Drg. No. SKED-949, Sheet – 2 of 2. The cables as provided in conduits dia. 40 mm in Roof is as under:

- 02 conduits for RMPU wiring
- One no. conduits with all DC +VE cables
- One no. conduits with all DC -VE cables
- One no. conduit with AC cables (including pantry wiring)

Details for 04 Nos. Conduits:-
02 Nos. for RMPU Cables
01 No. for UIC Cable
01 No. for Temperature Sensor Cables

Details for 05 Nos. Conduits:-
02 Nos. for RMPU Cables
01 No. for Pantry Equipments Cable (3-Ø, 415V AC + 3Ø, 110V AC (if req.))
01 No. for Lav. Wiring (110V DC +VE)
01 No. for Lav. Wiring (110V DC –VE)





2.4 Modifications in FRP Panels :

a) As the length of the Cage Clamp Terminals is 280 mm approximately, the cut-out on the FRP panel behind mirror shall be modified to 275 mm (lengthwise) in-place of existing 125 mm to accommodate the Cage Clamp Terminals keeping the center at the same of the cutout at the same location. The FRP Panel shall be fixed on the sidewall and Mirror along with Luggage rake with no infringement shall occur.

2.5 Modifications in Wiring for Doorway/Gangway Area :

a) Jumper Cables for Lavatory Wiring shall be segregated into 3 nos. Polyamide flexible conduit of adequate size as per the details mentioned in the *Drg. No. SKED-949, Sheet - 2 of 2.*

b) 110V DC +VE & -VE branch cables in Lavatory Area shall also be segregated with the provision of cable jackets wherever required.

c) Cables for PACIL Circuit shall also be segregated into 02 nos. polyamide flexible conduits.

3. For further reference, Drawing No. *SKED-948 & SKED-949* has been prepared and is enclosed.

4. For other wiring details, please refer schematic details for the coach as follows:-

SN	Drawing description	Drawing No.
1	Schematic Diagram of Roof for LHB EOG First AC Coaches	LA70002 (Latest)

5. Bill of Material

Material required is as follows:-

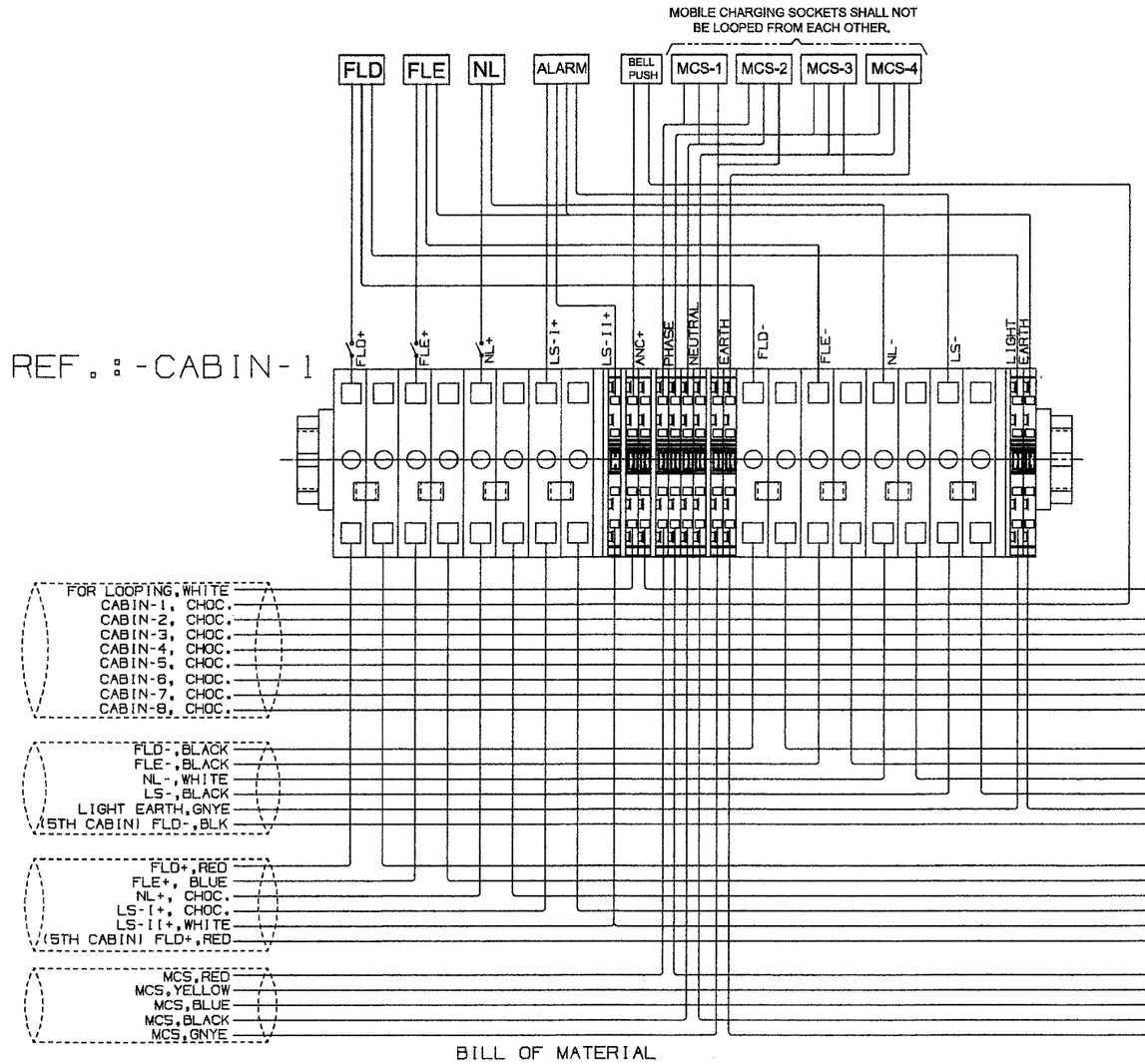
SN	Description	Spec./Drg. No.	QPC
1	Set of Cage Clamp Terminals for LHB EOG FAC Coaches	EDML-235, Rev-Nil	01 Set
2	Polyamide Flexible Conduit, NW-17	RDSO/PE/SPEC/AC/0138 (Latest)	100 Mtrs.
3	Tube Clamp, PG-16		30 Nos.
4	Double Conduit Clamps	LP76001, Alt-'c', Item-9	50 Nos.
5	Cable Tray with Partition (L=3 Mtrs)	LW44174, Item-4	12 Nos.
6	Cable Jacket System	EDTS-138, Corr-2, Item-5	25 Mtrs.
7	Cable Jacket System	EDTS-138, Corr-2, Item-8	25 Mtrs.
8	4-way socketed couplers	SKED-947	34 Nos.
9	PVC Rigid Conduit, Ø20 mm	IS:9537-83,P3,CL 5.1	20 Mtr.

Note:-

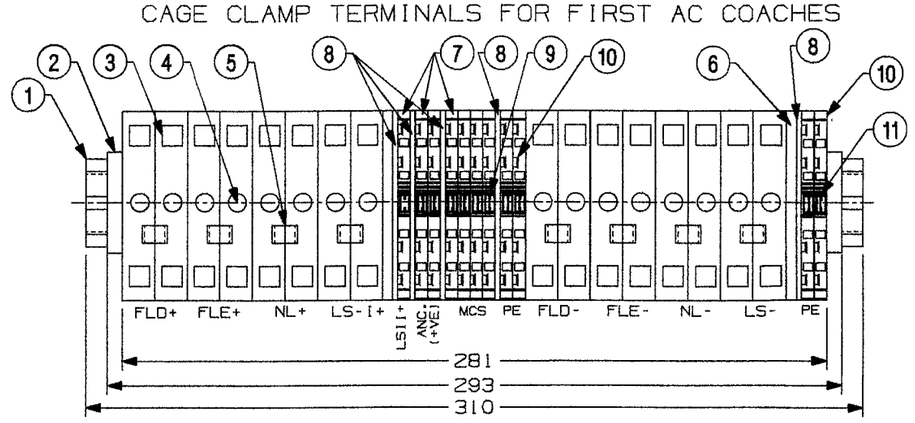
- Cable/PVC Rigid Conduit/Polyamide Conduit if any found damaged shall be replaced with the new.

ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL

MOBILE CHARGING SOCKETS SHALL NOT BE LOOPED FROM EACH OTHER.



CAGE CLAMP TERMINALS FOR FIRST AC COACHES



BILL OF MATERIAL

SN	ITEM	PART NO./STANDARD	QTY./CABIN	REMARKS
1	STEEL RAIL, L=310MM	210-112 OF M/S WAGO OR EQUIV.	01 NO.	FOR MTG. OF TERMINALS
2	SCREWLESS END STOP	249-116 OF M/S WAGO OR EQUIV.	02 NOS.	
3	CAGE CLAMP TERMINAL	282-122 OF M/S WAGO OR EQUIV.	16 NOS.	FOR 110V DC +VE LIGHT, 110V DC -VE LIGHT, LS-I+, LS- (ALARM CKT.)
4	GLASS FUSE, 5X20MM, 1A	IEC127-74	16 NOS.	
5	ADJACENT JUMPER INSULATED	282-402 OF M/S WAGO OR EQUIV.	08 NOS.	
6	END & INTERMEDIATE PLATE	282-311 OF M/S WAGO OR EQUIV.	02 NOS.	
7	4-CONDUCTOR THROUGH TERMINAL BLOCK	280-833 OF M/S WAGO OR EQUIV.	07 NOS.	FOR LS-II+(ALARM CKT.) ANC.+ (ANNUNCIATOR CKT.) PH., NEUTRAL (MCS CKT.)
8	END & INTERMEDIATE PLATE, ORANGE	280-315 OF M/S WAGO OR EQUIV.	05 NOS.	
9	ADJACENT JUMPER INSULATED, GREY	280-402 OF M/S WAGO OR EQUIV.	03 NOS.	
10	4-CONDUCTOR GROUND TERMINAL BLOCK	280-837 OF M/S WAGO OR EQUIV.	04 NOS.	FOR PE (MCS CKT.) PE (LIGHT CKT.)
11	ADJACENT JUMPER INSULATED, GNYE	280-422 OF M/S WAGO OR EQUIV.	02 NOS.	

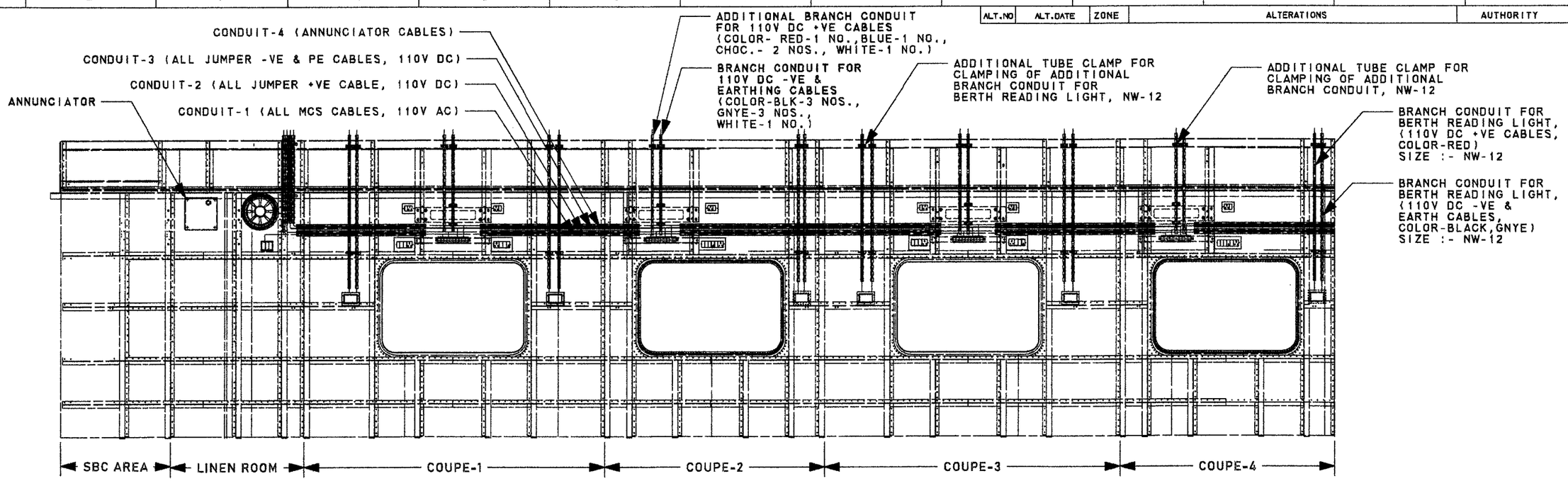
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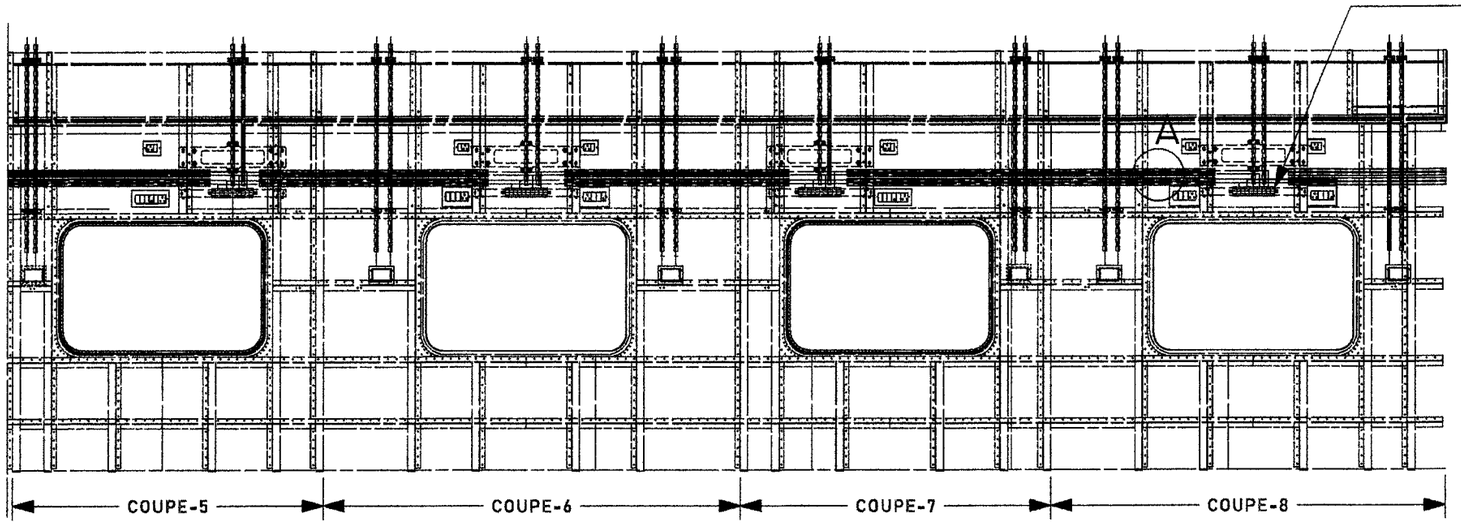
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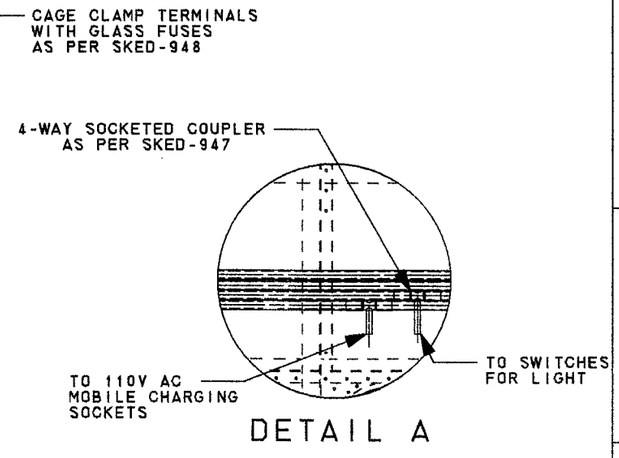
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NIL KG		CAGE CLAMP TERMINALS WITH GLASS FUSES FOR CABIN AREA OF LHB EOG FAC COACHES			SCALE	SSE/ED
S.AREA						CHD
NIL M²						DRN
~~LENGTH / DIA~~					REF.DRG.No.	NIL
NIL M		RAIL COACH FACTORY, KAPURTHALA				
~~WIDTH / THICK~~		रेल कोच फैक्टरी कपूरथला		IRS	PL NO.	NIL
NIL M					DRG.NO.	SKED-948
HEIGHT		SEE/D&D		DY.CEE/DP	ALT.	NIL
NIL M					SIZE	A2
					SHEET	1/1

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NOTE:-

2. FOR FAC COACHES WITHOUT FLAT ROOF, 04 NOS. PVC RIGID CONDUITS, Ø 20 MM ARE TO BE LAID ON THE SIDEWALL AND CLAMPED SECURELY. WIRING SHALL BE DONE AS PER SKED-948.
1. FOR FAC COACHES WITH FLAT ROOF, 04 NOS. METALLIC CONDUITS ARE WELDED IN THE SIDEWALL. THEREFORE, REQUIRES REARRANGING OF WIRING ONLY AS PER SKED-948.

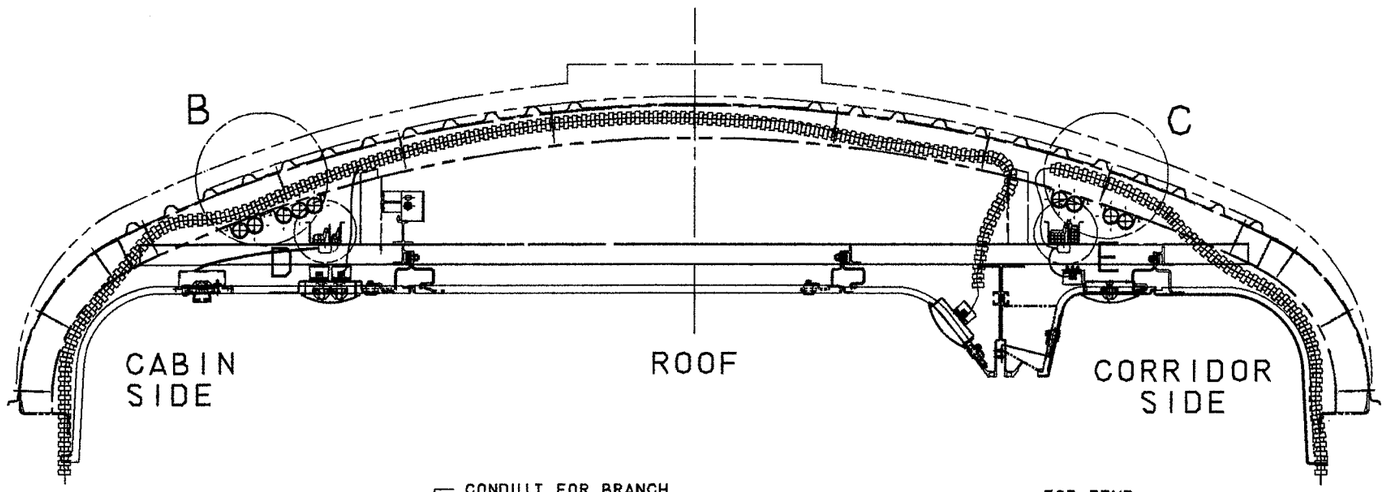
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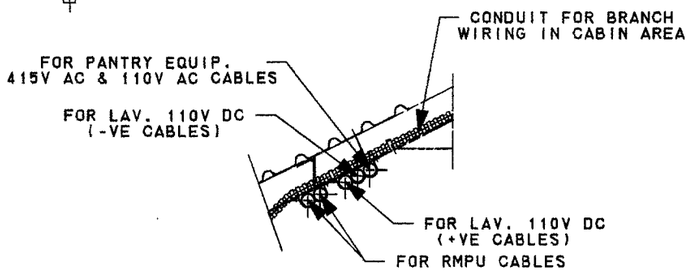
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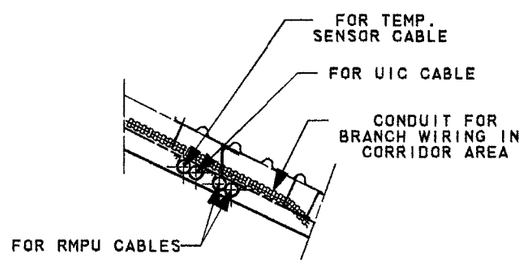
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WEIGHT	FILE	D:\JASWINDER\AC COACHES WAGO\SKED-949s1.prt				
NIL KG		MOD. REQ. IN SIDEWALL & ROOF ARRGT. OF LHB EOG FAC COACHES FOR THE PROVISION OF CAGE CLAMP TERMINALS & DC +VE/-VE SEGREGATION	SCALE	SSE/ED	
S.AREA				CHD	
NIL M²				DRN	Jaswinder Singh
~~LENGTH / DIA~~		RAIL COACH FACTORY, KAPURTHALA	REF.DRG.No.	NIL	
NIL M			PL NO.	NIL	
~~WIDTH / THICK~~		रेल कोच फैक्टरी कपूरथला . IRS			
NIL M			DRG.NO.	SKED-949	
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NIL M					

ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY

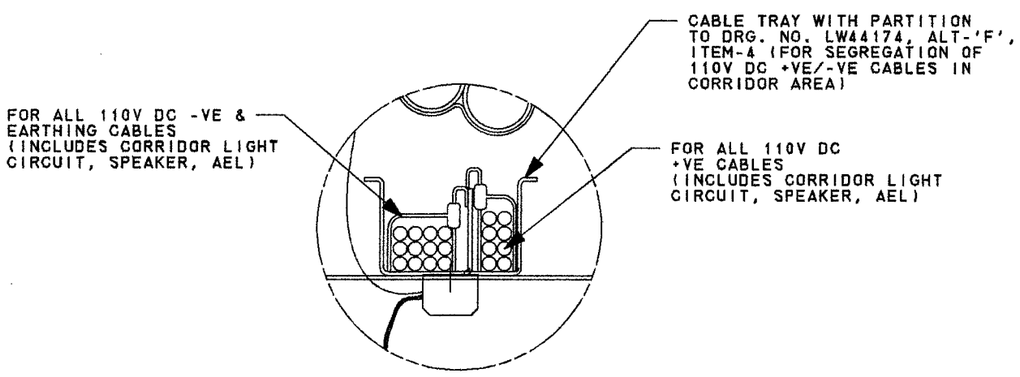




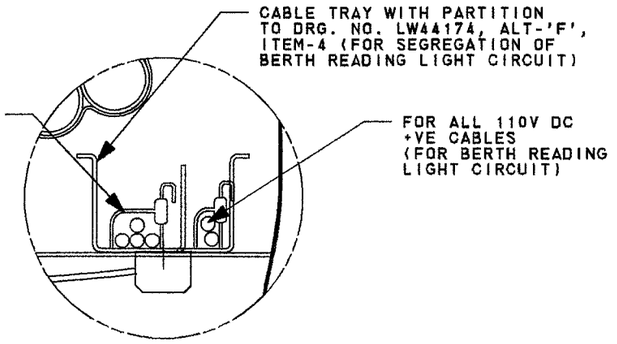
DETAIL B



DETAIL C



DETAIL E



DETAIL D

SEGREGATION OF LAVATORY JUMPER CABLES INTO 110V DC +VE/-VE & 110V AC CIRCUIT

H.NO.	FROM	TO	REMARKS	BUNCH DETAILS (FERRULE NO.)
50	POWER PANEL	+S19X1	ALL DC +VE CABLES	320405.23,430102.05,320507.04,320508.04, 720104.01,720105.01,720106.03,720107.03, 520101.03,520401.03,320301.20,RES-1,RES-2
			ALL DC-VE & EARTH CABLES	520103.03,520402.23,320302.20, 520106.01,4301PE.03
			ALL AC CABLES	330607.02,330608.02
53	+S19X1	+S16X1	ALL DC +VE CABLES	320405.27,430102.10,320507.21,320508.33, 720104.03,720105.03,720106.05,720107.05, 520101.07,520401,320301.22,RES-3,RES-4
			ALL DC-VE & EARTH CABLES	520103.07,520402,320302.22, 520106.07,530106.27
			ALL AC CABLES	330607.05,330608.07
56	+S16X1	+S17X1	ALL DC +VE CABLES	320405.29,430102.02,320507.17,320508.29, 720104.02,720105.02,720106.04,720107.04, 520101.05,520401,320301.21,RES-3,RES-4
			ALL DC-VE & EARTH CABLES	520103.05,520402,320302.21, 520106.04,4301PE.02
			ALL AC CABLES	330607.02,330608.06
59	+S17X1	+S18X1	ALL DC +VE CABLES	320405.27,430102.10,320507.21,320508.33, 720104.03,720105.03,720106.05,720107.05, 520101.07,520401,320301.22,RES-7,RES-8
			ALL DC-VE & EARTH CABLES	520103.07,520402,320302.22, 520106.07,4301PE.01
			ALL AC CABLES	330607.05,330608.07

NOTE:-
1. CABLE HARNESS NO. 51D,51F,51G,54D,54F,54G,57D,57F,57G,60D,60F FOR CORRIDOR LIGHTING SHALL ALSO BE SEGREGATED IN TWO POLYAMIDE FLEXIBLE CONDUITS.
2. CABLE HARNESS NO. 63,63A FOR PACIL SHALL ALSO BE SEGREGATED IN TWO POLYAMIDE FLEXIBLE CONDUITS.

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WEIGHT	FILE	D:\JASWINDER\AC COACHES WAGO\SKED-949sl.prt				
NIL KG		MOD. REQ. IN SIDEWALL & ROOF ARRGT. OF LHB EOG FAC COACHES			SCALE	SSE/ED	
S.AREA		FOR THE PROVISION OF CAGE CLAMP TERMINALS & DC +VE/-VE SEGREGATION				CHD	
NIL M^2						DRN	Jaswinder Singh
~~LENGTH / DIA~~		RAIL COACH FACTORY, KAPURTHALA			REF.DRG.No.	NIL
NIL M						
~~WIDTH / THICK~~		रेल कोच फैक्टरी कपूरथला	IRS		PL NO.	NIL
NIL M						
HEIGHT		SEE/D&D		DY.CEE/DP	DRG.NO.	SKED-949
NIL M					ALT.	NIL	SIZE A2	SHEET 2/2