

## **Scope of Work for modification work in 2-Tier LHB AC Coaches**

**Name of work-** “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 AC Coaches as per CAI no. ED/CAI/033 dated 02.04.2024” in 2-Tier LHB AC coaches.

At present, 110V DC +VE & -VE wires are run through 5 nos. rigid conduit pipes (cabin side) fixed on ceiling, 2 rigid conduit pipes fixed on side wall and one cable tray (corridor side) fixed on ceiling in mixed condition.

To separate the +VE & -VE wires, same need to be removed from these conduits pipes and cable tray and separated then rewiring is to be done.

**Scope of Work:** The following work shall be executed by the contractor for segregation of +Ve and -Ve wires in the LHB AC coach.

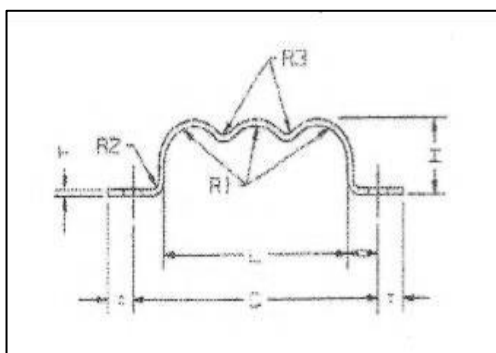
### **Disconnection/Removal of WAGO type connectors and wirings and accessories.**

1. Disconnection of all the wiring circuits i.e. circuits for Lights, Night Lights, AELs, BRLs, from WAGO terminal provided in SBC.
2. Disconnection of all the wiring circuits i.e. circuits for Lights, Night Lights, AELs, BRLs, from WAGO terminal provided in Cabin/Doorway/Corridor area.
3. Dismantling WAGO type strips provided for interconnections of wiring in each cabin as well as door way area. Cage Clamp Terminal with glass fuses to be provided instead of existing WAGO connector.
4. Removal of 110V AC & DC wiring from the PVC conduits fixed on sidewall (cabin side).
5. Removal of 2 nos. rigid PVC conduits-20MM dia from side wall by removing the clamps.

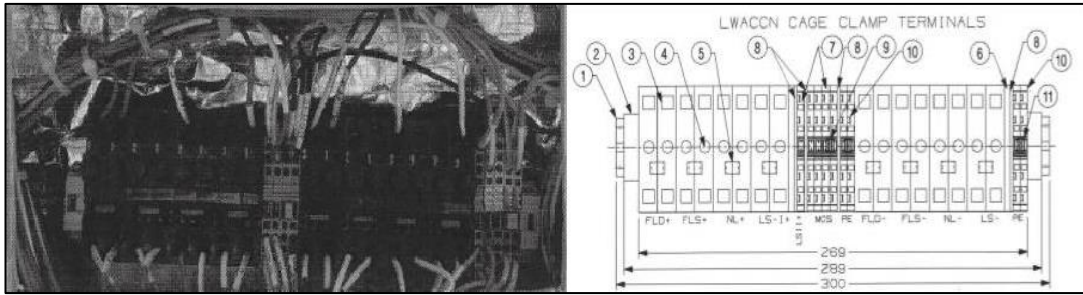
### **Modification in sidewall area**

6. 01 no. additional hole of dia. 04 mm shall be made from the existing bottom side hole at C- C 88 mm for provision of the triple conduit clamp to Drawing No. LP76001, Alt- 'c', item- 16.
7. 3 nos. conduit pipes to be provided instead of existing 2 nos.
8. Removal of AC/DC wiring from rigid PVC conduits.
9. Removal of cable tray arrangement from ceiling (corridor side) including AC/DC wiring from the tray. New Cable Tray with partition to be provided for segregation of +VE & - VE DC wires.
10. Supply and provision of one 3 nos. conduit pipes-20MM dia to be made on side wall panel, Re-wiring through the 3 conduit pipes.
  - Conduit-1 (Top): All DC -VE & Earthing cables (i.e., 110V DC FLD-, FLS-, NL-, ALARAM-, PE (Light)
  - Conduit-2 (Middle): All DC +VE cables (i.e., 110 DC FLD+, NL+, ALARM-I+, ALARM- II+ (Loop)
  - Conduit-3 (Bottom): All MISC. cables (i.e., 110V AC Ph., Ph., Neutral, Earth).

Additional hole on side wall member to be done to tight the Triple conduit clamp (shown below) that shall be used to hold 3 conduit pipes.



11. Supply and provision of Cage Clamp Terminals with Glass Fuses as per EDML-230, in place of existing WAGO connector mounted on side wall as shown in below picture.



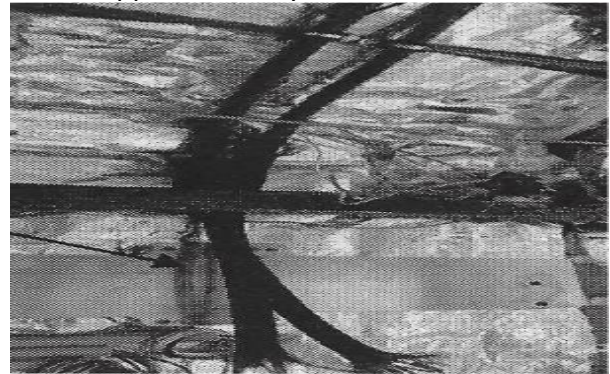
Din rail of length 300 mm shall be mounted at 15 mm below the existing terminal strip mounting location for accessibility on the same WAGO Bracket. Accordingly, connections shall be done. Required material to be supplied by the contractor.

### **Modification in Roof Area**

12. (1) Segregation of 110V DC +VE & -VE shall be done in Branch wiring by providing extra NW-12 flexible conduit, however due to only 01 No. Cable drop hole in Cant-rail for passing of NW-12 Conduit, branch wiring shall be done with Cable Jackets form the hole to Terminal Strip for 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 form conduit to equipment i.e. Limit Switch, Lights. All Cable jackets/sleeves of suitable size required to complete the work shall be supplied by the contractor.

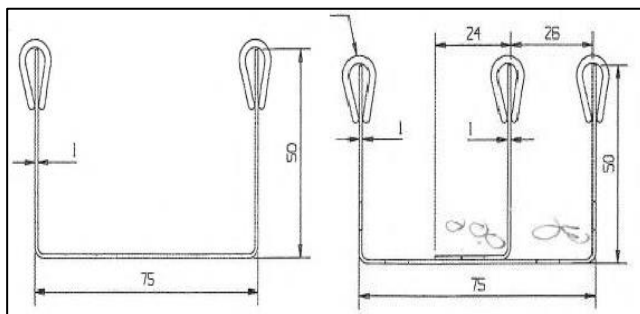


Existing Scheme



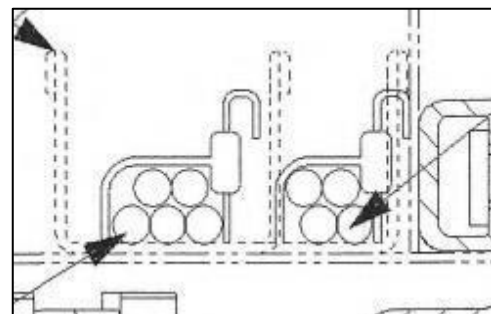
New Scheme

(2) The existing cable tray arrangement to Drawing No. LW44174, Item-6 Length= 18000 mm shall be replaced with Drawing No. LW44174, item-4, Length = 18000mm with provision of partition between Cable tray for segregation of DC+VE & -VE, AC cables in Roof. The required cable tray conforming to drawing no. LW44174, item-4, Length = 18000mm with provision of partition between Cable tray shall be supplied by the contractor.



Existing cable tray

Cable tray to be provided



All +ve Cables

All -Ve cables

(3) The Segregation of 110V DC +VE & -VE wiring shall be done for Speaker Circuit, AEL Circuit with AC Circuit Cables and 110V DC +VE Cables on one side and 110V DC –VE and Earth Cables on other side with the help of partition in Cable Tray being provided in the Corridor Area.

(4) Lavatory wiring from PP end to NPP end shall also be contemplated in dia. 40 mm PVC Rigid Conduits. The cables as provided in conduits dia. 40 mm in Roof is as under:

- 02 conduits for RMPU wiring
- One no. conduit 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 Equipment's 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)

**Modifications in FRP Panels:**

13. As the length of the Cage Clamp Terminals is 270 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 4 cutouts at the same location. The FRP Panel shall be fixed on the sidewall and Mirror along with Luggage rake with no infringement shall occur.

**Modifications in Lav. Wiring**

14. 110V DC +VE branch cables in Lavatory Area shall also be segregated with the provision of cable jackets wherever required.

For further reference, sketch no. SKED-938 & SKED-942 has been prepared and is enclosed.

**Additional Modification required in LHB EOG AC 2T Coaches:**

For Segregation of 110V DC +VE and –VE Cables in LHB EOG AC 2T Coaches, same modification as advised above are to be followed and in addition to above, following are also required: -

1. For BRL Lights, Jumper wiring to be done through Cable tray in the Roof Area of the Corridor side which will be replaced by cable tray arrangement with partition to drawing no. LW44174, item-4 for segregation of DC +VE & -VE Cables. Jumper wiring shall be terminated at the same terminals used in existing coaches.
2. 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 Light itself. The Drawing 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' |

**For other wiring details, refer to schematic details for the coach as follows: -**

| SN | Drawing description   | Drawing no.      |
|----|---|------------------|
| 1  | Schematic Diagram of Roof for AC 2- Tier EOG LHB type Coaches | LW70212, Alt-'c' |

2. Wires for Connection of all the wiring circuits i.e. circuits for Lights, Night Lights, AELs, BRLs, from WAGO terminal provided in Cabin/Doorway/Corridor area to be provided to the Railways.
3. All required cable sleeves of required size and cable ferrules shall be provided by the contractor.
4. Contractor shall draw out the cables from the rigid PVC pipe using PG9 gland/socket to secure the wires from sharp edges.
5. Contractor shall test the insulation of the DC wires in the coach and submit wire insulation report in soft copy and hard copy to the Railways.
6. All other necessary work & items required to execute the above said segregation or wires shall be arranged by the contractor and no extra payment shall be made to him for that.

Quantity Sheet for one LHB AC coach:

**Table-2: - For LHB EOG AC 2-Tier Coaches (EDML-230,Rev-Nil)/CAI No. ED/CAI/033 dt. 02.04.2024.**

| SN | ITEM DESCRIPTION   | DRG. /SPEC NO.   | UNIT | QTY<br>required per<br>coach | REMARKS   |
|----|--|--|------|------------------------------|---|
| 1. | Set of Cage Clamp<br>Terminals with<br>Glass fuses (Layout<br>as per SKED-938) | Steel Rail: Length=300mm Cat. No.<br>210-112 (01 No.)<br>Screw less End Stop:<br>Cat.No. 249-117 (02 Nos.)<br>Cage Clamp Terminals:<br>Cat. No. 282-122 (16 Nos.)<br>Glass Fuse: 5×20 mm, 1A IEC127-74<br>(16 Nos.)<br>Adjacent jumper Insulated: Cat.No.<br>282-402 (08 Nos.)<br>Cat. No. 280-402 (01 No.)<br>Cat. No. 280-422 (02 Nos.)<br>End & Intermediate plate:<br>Cat. No. 282-311 (02 Nos.)<br>Cat. No. 280-334 (02 Nos.)<br>Cat. No. 280-315 (02 Nos.)<br>4-Conductor through Terminal<br>block:<br>Cat. No. 280-833 (05 Nos.)<br>4-conductor Ground Terminal Block:<br>Cat, No. 280-837 (04 nos.)<br>of M/s WAGO/Phoenix/ Weidmuller<br>or equivalent approved make | No.  | 9                            | For compartment<br>lighting/ mobile<br>charging points in<br>transverse<br>berths/chain pull alarm<br>circuit |
| 2. | 4-Conductor<br>terminal strip 2.5<br>sq. mm (10-pole)                          | Cat. No. 261-210 of M/s<br>WAGO/Phoenix/Weidmuller or<br>equivalent approved make  | No.  | 9                            | For Berth Reading<br>Lights   |
| 3. | 4-Conductor<br>terminals strip<br>2.5 sq.mm (3- pole)                          | Cat. No. 261-203 of M/s<br>WAGO/Phoenix/Weidmuller or<br>equivalent approved make  | No.  | 9                            | For Mobile Charging<br>Points in Longitudinal<br>Berths   |
| 4. | Flat Connecting<br>Complete (With<br>bracket to Drg. No.<br>CC72431)           | CC72428  | No.  | 2                            | For PA System<br>(Vestibule Area)   |

**Annexure A:****List of material that is to be supplied by the Contractor:**

| S. No. | Item Description   | Specification/Drawing  | QPC | Unit  |
|--------|--|--|-----|-------|
| 1      | Set of Cage Clamp Terminals with Glass fuses (Layout as per SKED-938)  | Steel Rail: Length=300mm Cat. No. 210-112 (01 No.)<br>Screw less End Stop:<br>Cat.No. 249-117 (02 Nos.)<br>Cage Clamp Terminals:<br>Cat. No. 282-122 (16 Nos.)<br>Glass Fuse: 5×20 mm, 1A IEC127-74 (16 Nos.)<br>Adjacent jumper Insulated: Cat.No. 282-402 (08 Nos.)<br>Cat. No. 280-402 (01 No.)<br>Cat. No. 280-422 (02 Nos.)<br>End & Intermediate plate:<br>Cat. No. 282-311 (02 Nos.)<br>Cat. No. 280-334 (02 Nos.)<br>Cat. No. 280-315 (02 Nos.)<br>4-Conductor through Terminal block:<br>Cat. No. 280-833 (05 Nos.)<br>4-conductor Ground Terminal Block: Cat, No. 280-837 (04 nos.)<br>of M/s WAGO/Phoenix/ Weidmuller or equivalent approved make | 9   | Nos.  |
| 2      | 4-Conductor terminal strip 2.5 sq. mm (10-pole)  | Cat. No. 261-210 of M/s WAGO/Phoenix/Weidmuller or equivalent approved make  | 9   | No.   |
| 3      | 4-Conductor terminal strip 2.5 sq.mm. (3-pole)   | Cat. No. 261-203 of M/s WAGO/Phoenix/Weidmuller or equivalent approved make  | 9   | No.   |
| 4      | Flat Connecting Complete (with bracket) to Drg. No. CC72431  | CC72428  | 2   | No.   |
| 5      | Polyamide Flexible Conduit NW-17   | RDSO/PE/SPEC/AC/0138   | 80  | Mtr   |
| 6      | Tube Clamp-PG16  |  | 20  | Nos.  |
| 7      | Cable tray with partition.   | IX50X75-IS737-06   | 18  | meter |
| 8      | 20 mm Dia PVC rigid pipe   |  | 18  | Meter |
| 9      | Supply of heat shrinkable, polyolefin, high performance cable sleeve of size 6.4 mm dia, 2-inch length of required colour. |  | 1   | set   |

|    |  |                  |     |       |
|----|--|------------------|-----|-------|
| 10 | 4 Way Socketed couplers as per Drawing no. SKED-947.                                     |                  | 8   | Nos.  |
| 11 | Cable Jacket, Item-5   | EDTS-138, Corr-2 | 25  | Mtr   |
| 12 | Cable Jacket, Item-8   | EDTS-138, Corr-2 | 25  | Mtr   |
| 13 | Thin Walled flexible elastomeric with copper conductor of size 1.5 SQMM. colour Grey     |                  | 980 | meter |
| 14 | Supply & Provision of printed ferrules for each end Terminal point for segregated wires. |                  | 1   | set   |
| 15 | Labour work (skilled)  |                  | 1   | Job   |

## **Terms & Conditions-**

1. All the work must be done in a good workmanship manner in all respect as per scope of work and schedule of rates and quantities.
2. The contractor shall intimate the day to day progress to authorized representative.
3. The contractor shall undertake all safety measures during the course of work and shall be responsible for any losses or deficiencies occurring during the course of execution of work.
4. The work must be carried out as per I E rules, codes of practice, tech specification and site the requirements.
5. Subsequent to completion of work the firm shall draw a joint report with concerned SSE prior to submission of the final bill.
6. If damages are caused as a result of execution of work, its shall be responsibility of the contractor to the repair and make good the loss of property at his own cost to the satisfaction of the railway administration.
7. Any other work not mentioned in the scope of work but essential for compilation of the work shall be deemed to be included in this scope of work as per requirement of the site and shall be done by the contractor without any extra charges.
8. The rate should be inclusive of travelling, boarding, applicable taxes, incidental and postal expenses. The workshop shall not arrange payment against these heads separately.
9. Successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST act to railway immediately after the award of the contract, without which no payment shall be released to the contractor. The contractor shall be responsible for the deposition of applicable GST to the concerned authority.
10. The firm shall be solely responsible for the correct execution of work to the satisfaction of the railway.
11. The firm shall have to follow all the statutory requirement of central and state govt. and its rules and regulation along with all the subsequent amendments.

### **Scope of Work (Mechanical Work):**

#### **2 -Tier LHB AC Coaches**

1. Stripping and Fitting of Cabin Mirrors (QPC-09 nos.),
2. Stripping and Fitting of LP rack (QPC-09 nos.),
3. Stripping and Fitting of brackets for tranverse upper berths (QPC-35 nos.),
4. Stripping and Fitting of Coat Hook (QPC-09 nos.),
5. Stripping and Fitting of Cabin and aisle side above window upper panels (QPC-18 nos.),
6. Complete Stripping and Fitting of Cabin and aisle side Curved ceiling (QPC-18 nos.),
7. Stripping & fitting of partition wall just behind the switch Board cabinet. (All sorts of items which are required to strip to expose the electrical wirings underneath will be completely under firm's scope, except seat berth, communication door stripping & fitting) (QPC-01 Set.),
8. Cut out on the FRP panel behind mirror should be length wise centrally enlarged from 125 mm to 275 mm (QPC-09 nos.)