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No. EL/11.5.5/6

Dated: As signed

**Principal Chief Electrical Engineers;**

- Central Railway, HQs Office, 2<sup>nd</sup> floor, Parcel Office Bldg., Mumbai – 400 001
- East Central Railway, Hajipur (Bihar) – 844 101
- East Coast Railway, Railway Complex, Bhuvneshwar – 751 023
- Eastern Railway, Fairlie Place, Kolkata – 700 001
- North Central Railway, Allahabad – 211 001
- North Eastern Railway, Gorakhpur – 273 001
- North Western Railway, near Jawahar Circle, Jaipur – 302 017
- Northeast Frontier Railway, Maligaon, Guwahati – 781 011
- Northern Railway, Baroda House, New Delhi – 110 001
- Southern Railway, Park Town, Chennai – 600 003
- South Central Railway, HQs Office, Rail Nilayam, Secunderabad – 500 071
- South Eastern Railway, Garden Reach, Kolkata – 700 043
- South East Central Railway, Bilaspur – 495 004
- South Western Railway, Hubli – 580 020
- West Central Railway, HQs Office, Opp. Indira Market, Jabalpur – 482 001
- Western Railway, Churchgate, Mumbai – 400 020
- Banaras Locomotive Works, Varanasi – 221004
- Chittaranjan Locomotive Works, Chittaranjan – 713331 (WB)
- Patiala Locomotive Works, Patiala – 147 003

**MODIFICATION SHEET NO. RDSO/2022/EL/MS/486 (Rev. '1')**

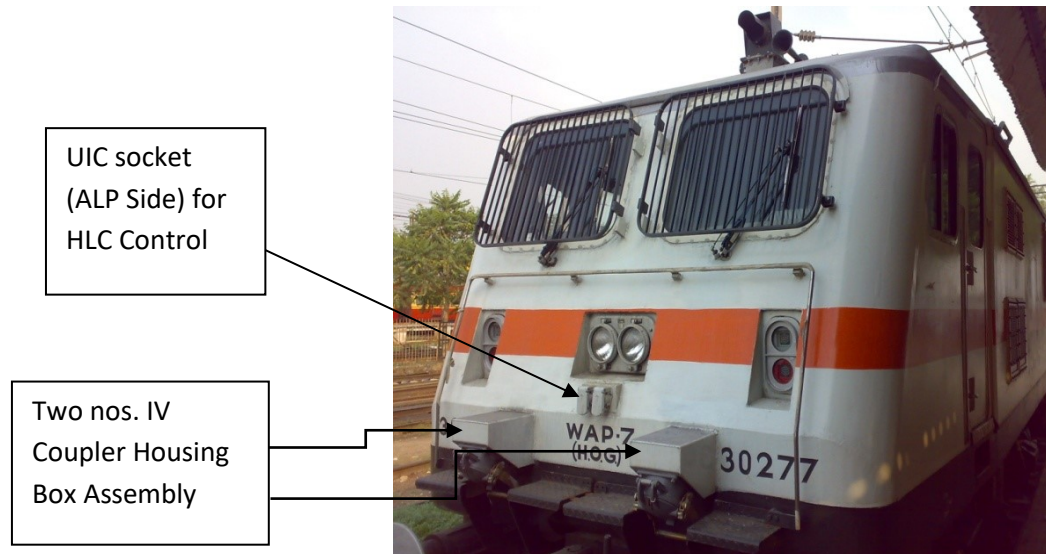
**1.0 Title:**

Modification to ensure continuity of HOG Converters' feed to the train from working loco through dead loco in WAP5/WAP7 class of 3-phase HOG compliant electric locomotives.

**2.0 Brief History:**

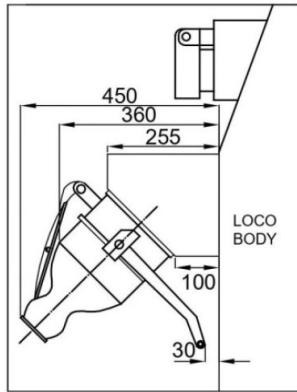
- 2.1** There are two Hotel Load Converters (HLCs) of 500 kVA each have been provided in WAP7 locomotives and similarly two composite converters (Traction & HLCs in same cubicle) have been provided in WAP5 locomotives. Feed of these HLCs is connected through two IV couplers to the train feeders to supply train hotel load. Operation control of hotel load converter is interfaced with HLC Control Unit provided in power car. For this, control signals

of HLCs have been interfaced with HLC Control Unit through 13 pins UIC coupler. A detailed scheme along with cable index for HLC Control Unit has already been elaborated in RDSO/2018/EL/MS/0468, Rev. '0' dtd. 06.02.2018. Sockets of IV couplers and UIC coupler have been provided in either side of the loco as shown in Figure-1.

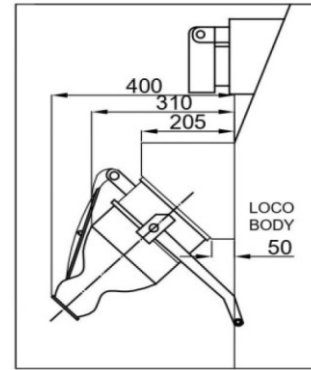


**Figure – 1**

- 2.2** When WAP5/WAP7 locomotive fails on line during train operation, assistant locomotive is connected to the front of failed (dead) loco to haul the train. In this situation, HOG power from HLCs of leading loco can't be transmitted to Power Car through Dead Engine (trailing loco) even after connecting HOG enabled loco (leading loco) as required HOG control and power connections are not made between the two locomotives. In this connection, Northern Railway vide letter No. 230-Elect/TRS/92/2/17 dtd. 10.08.2021 recommended for the modification to cater HLC supply of working loco through dead loco. Eastern Railway had also proposed similar modification which was discussed in 40th MSG meeting under Item No. 6.
- 2.3** In view of above, Modification Sheet No. RDSO/2022/EL/MS/0486, Rev. '0' was issued vide RDSO's letter No. EL/11.5.5/6 dtd. 22.03.2022. In this Modification Sheet, ALP side IV Coupler Socket Housing Box was shifted upward as indicated in the CLW drawing No. SKETCH-28/01/22 enclosed as Annexure-1. LP side IV Coupler Socket Housing Box was retained at its original position.
- 2.4** During 40<sup>th</sup> MSG meeting, Zonal Railways had pointed out the infringement issue of the ratchet handle of IV Coupler with the cab/loco body due to the shorter base dimension (50mm) given in drawing no. CDD-HL-P73-085 (Alt. 2) of the housing box of IV coupler. It was recommended that infringement of the ratchet handle with the loco body may be avoided by introducing the older version of the drawing of IV Coupler Housing Box Assembly i.e. drawing no. CDD-HL-P73-085 (Alt. 1) wherein the box base has been shown as 100 mm.



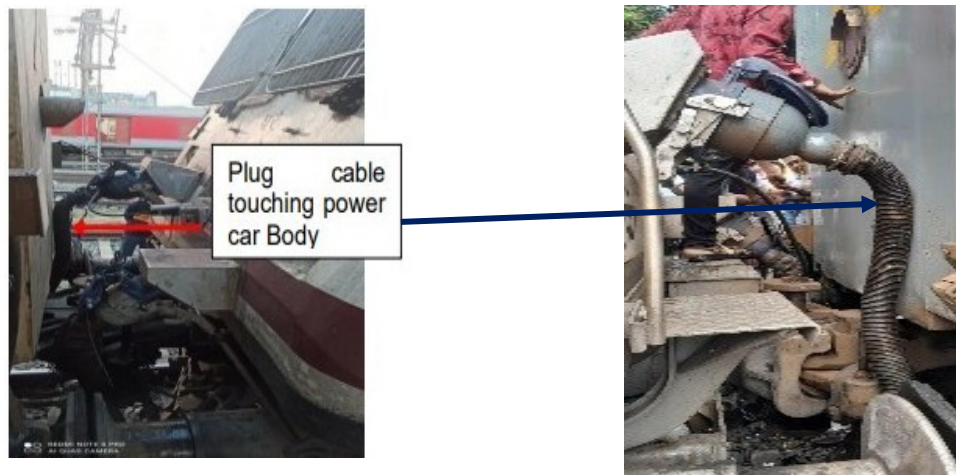
No infringement with CLW Drawing No.  
CDD-HL-P73-085, Alt. 1



Infringement with CLW Drawing No.  
CDD-HL-P73-085, Alt. 2

**Figure – 2: Infringement of loco body to the Ratchet Grip**

- 2.5** In this connection, the modification sheet was revised and draft of revised Modification Sheet No. RDSO/2022/EL/MS/486 (Rev. '1') was circulated to ZRs & PUs vide letter No. EL/11.5.5/6 dtd. 02.08.2023 for comments/suggestions.
- 2.6** In response to above, Western Railway vide letter No. EL 91/2/2/3(HLC) dtd. 24.08.2023 informed that after suggested modification, while attaching IV coupler from power car to loco in case of Upper side IV Coupler (ALP side), the plug assembly of coupler is touching with power car body and is likely to get damaged during the train movement. The photograph of infringement is as given in Figure-3.



**Figure – 3: Infringement of Plug Assembly with Power Car Body**

- 2.7** In order to avoid the infringement of IV coupler jumper plug assembly to Power Car, IVC housing box was modified and Draft-2 of Modification Sheet No. RDSO/2022/EL/MS/486 (Rev. '1') was circulated to ZRs/Pus vide letter No. EL/11.5.5/6 dtd. 26.10.2023 for comments. WR & NR in their comments informed that the modified IV coupler socket works normally when connected to power car/LSLRD and there is no infringement of IV

coupler plug assembly to the Power Car body. However, infringement of ALP side IV coupler plug cable with IV coupler housing hinged covers of LP side of adjacent loco was observed when both locos were connected in MU formation. In view of this, Rev.1 of this modification sheet is therefore being issued.

### **3.0 Objective**

The objective of this modification sheet to ensure availability of HLCs feed of Working HOG locomotive (Leading Loco) to the Power Car of the train through Dead Locomotive (Trailing Loco) connected in between the two and further to avoid infringement of IV coupler jumper plug assembly to the power car body when connected to ALP side housing box of locomotive.

### **4.0 Modification in Existing HOG Scheme**

Following modifications are proposed in the WAP5/WAP7 Locomotives.

#### **4.1 Modification in Locomotives to avoid infringement of IV Coupler Jumper Plug Assembly to the Power Car Body**

Modification in Locomotive to avoid infringement of IV Coupler Jumper Plug Assembly to the Power Car Body has been checked in WAP5 and WAP7 locos. Modification in IV coupler housing box was done in one WAP5 loco (30128) of ELS/GZB as per sketch given in Annexure-2. Modification in IV coupler housing box for WAP7 loco was done by ELS/BRCY in loco nos. 37595 & 39283 as per sketch given in Annexure-3. No infringement of IV coupler plug assembly to the Power Car body was observed when connected to ALP side housing box of the WAP5/WAP7 locomotive.

In view of above, ALP side IV Coupler Socket Housing Box for WAP5 and WAP7 loco shall be designed as per sketch given in Annexure-2 and Annexure-3 respectively. The ALP side IV Coupler Socket Housing Box shall be shifted upward as indicated in the CLW drawing No. SKETCH-28/01/22 enclosed as Annexure-1. LP side IV Coupler Socket Housing Box shall be retained at its original position.

Length of jumper cable duly crimped with each jumper plug and covered with flexible polyamide conduits and its fittings for coaches and power cars shall be maintained to 2.6 meters as mentioned in Para-1.2 of RDSO specification No. RDSO/PE/SPEC/AC/0177 (Rev.01)-2013.

#### **4.2 Modification in Jumper Plug assembly for loco-to-loco connection**

When two locos are connected back-to-back, ALP side IVC socket housing box of one loco will face LP side IVC socket housing box of the second loco. Since, the ALP side IVC socket housing box is shifted upward, the two facing IVC housing box (ALP & LP side) will not be at the same level. However, there is infringement of jumper plug cable (for loco-to-loco

connection) with hinged cover of LP side IV coupler housing box. The infringement may be seen in Figure-4 below.

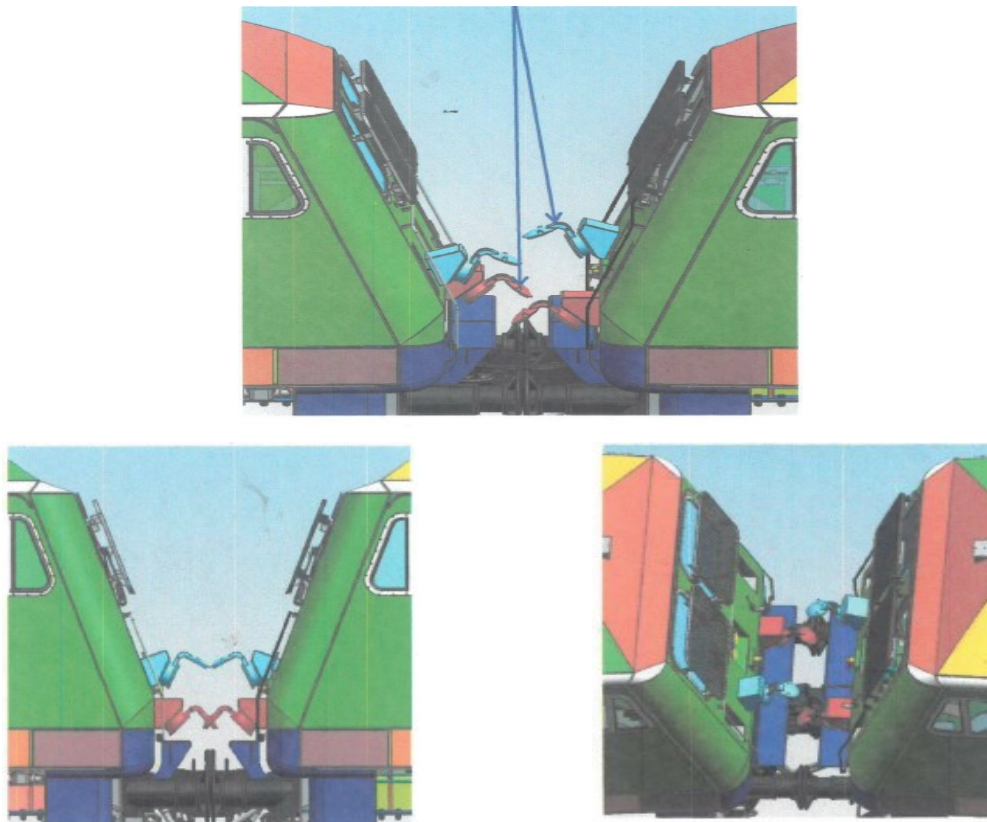


**Figure – 4: Infringement of Plug Assembly with LP side IVC Housing Hinged Cover**

To resolve the above issue, cable entry flange of existing plug may be provided at twisted angle to the extent which may permit the opening of hinged cover of the other loco.

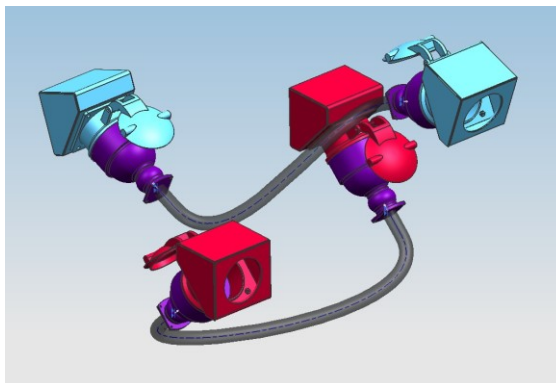
#### **4.3 Scheme for HLCs feed of Leading Loco through Dead Locomotive (Trailing Loco)**

The scheme given below will be able to feed HLC power from leading loco to train through dead/trailing locomotive. Sketches of the two coupled locomotives with modified ALP side IV Coupler Housing Box have been shown in the Figure – 5 below.

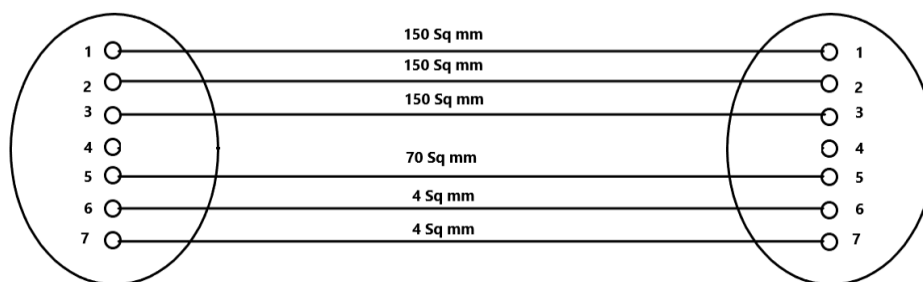


**Figure – 5: Sketch of the IV Coupler Housing Box after modification**

- 4.4** Sketch of IVC Jumper Plug Assemblies (male-male) for connection between two locomotives has been shown in Figure-6. Pin to pin connection between two IVC plugs has been shown in Figure-7.



**Figure – 6: Sketch of IVC Jumper Plug Cable**



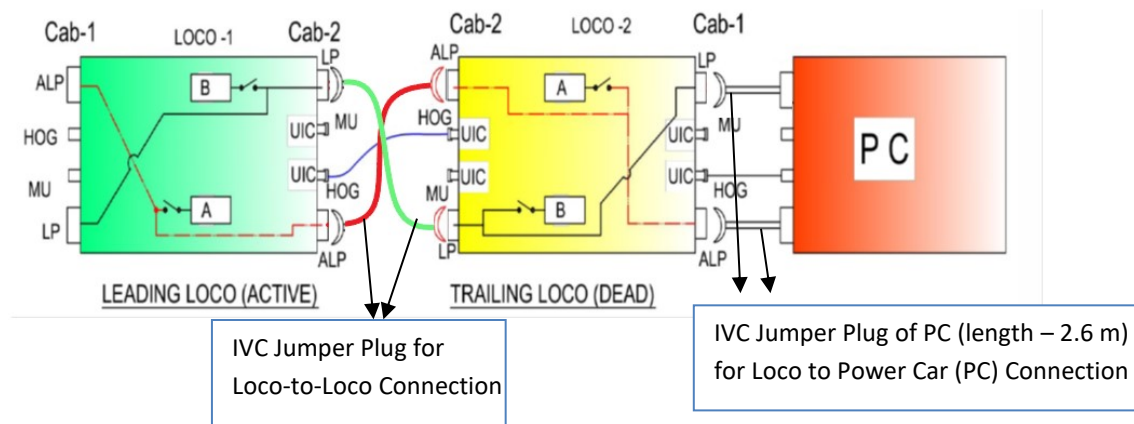
**Figure – 7: IVC Jumper Plug Cable layout**

**4.5 Method to feed HLC supply from Working loco to Dead loco**

- (i) Connect one IVC Jumper Plug (having plug assembly at both ends) between active loco (leading) LP side IVC housing socket assembly to dead loco (trailing) LP side IVC housing socket assembly.
- (ii) Connect another IVC Jumper Plug (having plug assembly at both ends) between active loco (leading) ALP-side IVC housing socket assembly to dead loco (trailing) ALP-side IVC housing socket assembly.
- (iii) Connect 13-Pin UIC Coupler Jumper (Male - Male) between active loco (leading) ALP-side UIC socket to dead loco (trailing) ALP-side UIC.
- (iv) Trip HOTEL load MCB 129.2 in SB-2 of dead locomotive.
- (v) Trip MCBs (if available) on both HLC Cubicles of dead locomotive.
- (vi) Keep IV Couplers and UIC Couplers connected between dead locomotive and Power car as it is.

- 4.6** Connection of IVC Jumper Plug and UIC couplers between active loco and dead loco and further to Power Car will be look like the sketch shown in Figure – 8.





## 5.0 Material required:

- Two numbers IV Coupler Jumper Plugs assembly with twisted cable entry flange as mentioned in Para-4.2.
- Two (02) IVC housing box per loco as per sketch given in Annexure-2 and Annexure-3 for WAP5 and WAP7 loco respectively.
- One number 13 Pin UIC-Coupler jumper Plug (MALE-MALE) having same length as being used in existing Power Car to Loco connection.

## 6.0 Application to the Class of Locomotives:

WAP5 and WAP7 locomotives fitted with 2x500 kVA IGBT based Composite Converters and standalone Hotel Load Converters.

## 7.0 Agency of Implementation:

All PUs, POH Shops, Electric Loco Sheds Holding WAP5/WAP7 class of 3-Phase Electric Locomotives.

## 8.0 Periodicity of Implementation:

During Commissioning, Maintenance Schedule (IT/IA/IB/IC) and Overhauling Schedules (TOH/IOH/POH).

-sd-

Encl: As above

For Director General (Elect.)

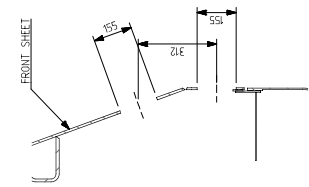
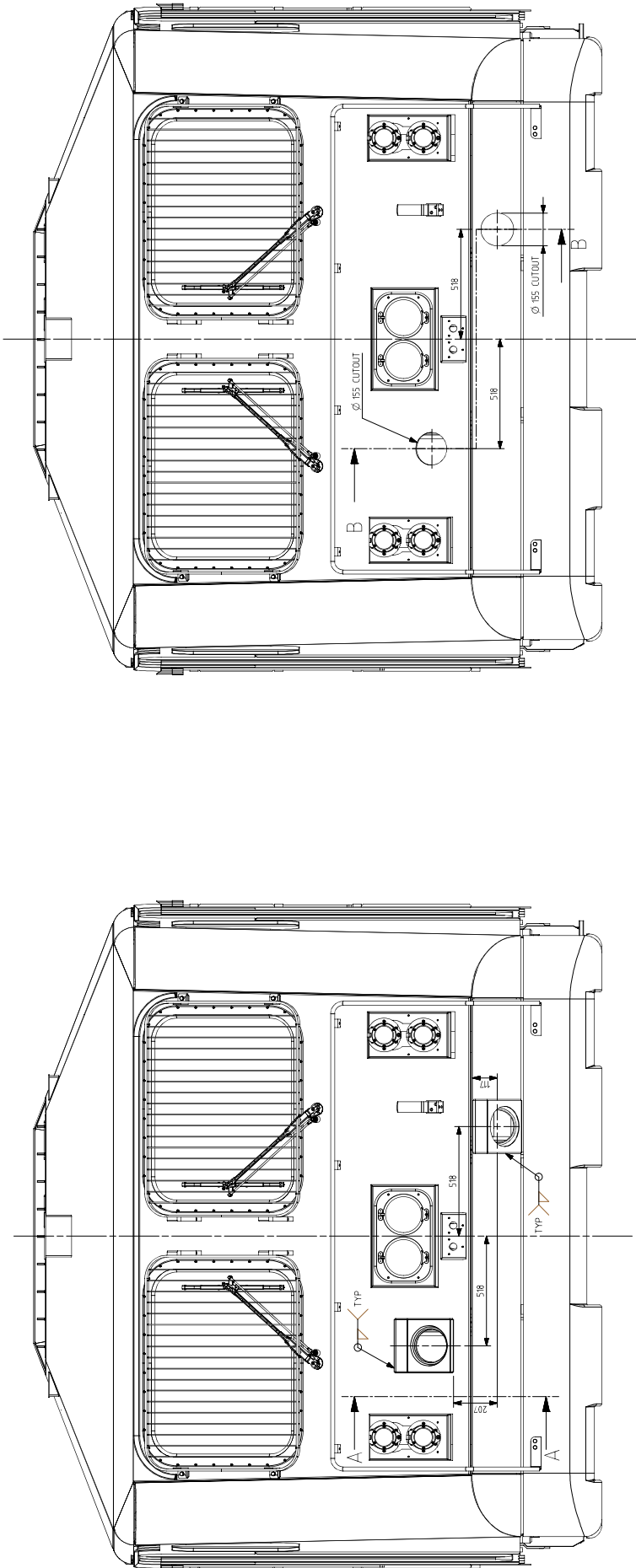
## Copy to:

Secretary (Electrical), Railway Board, Rail Bhawan, New Delhi – 110 001

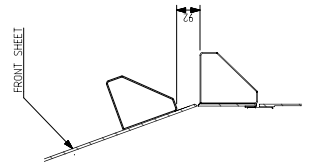
Encl: As above

For Director General (Elect.)

## Annexure- 1



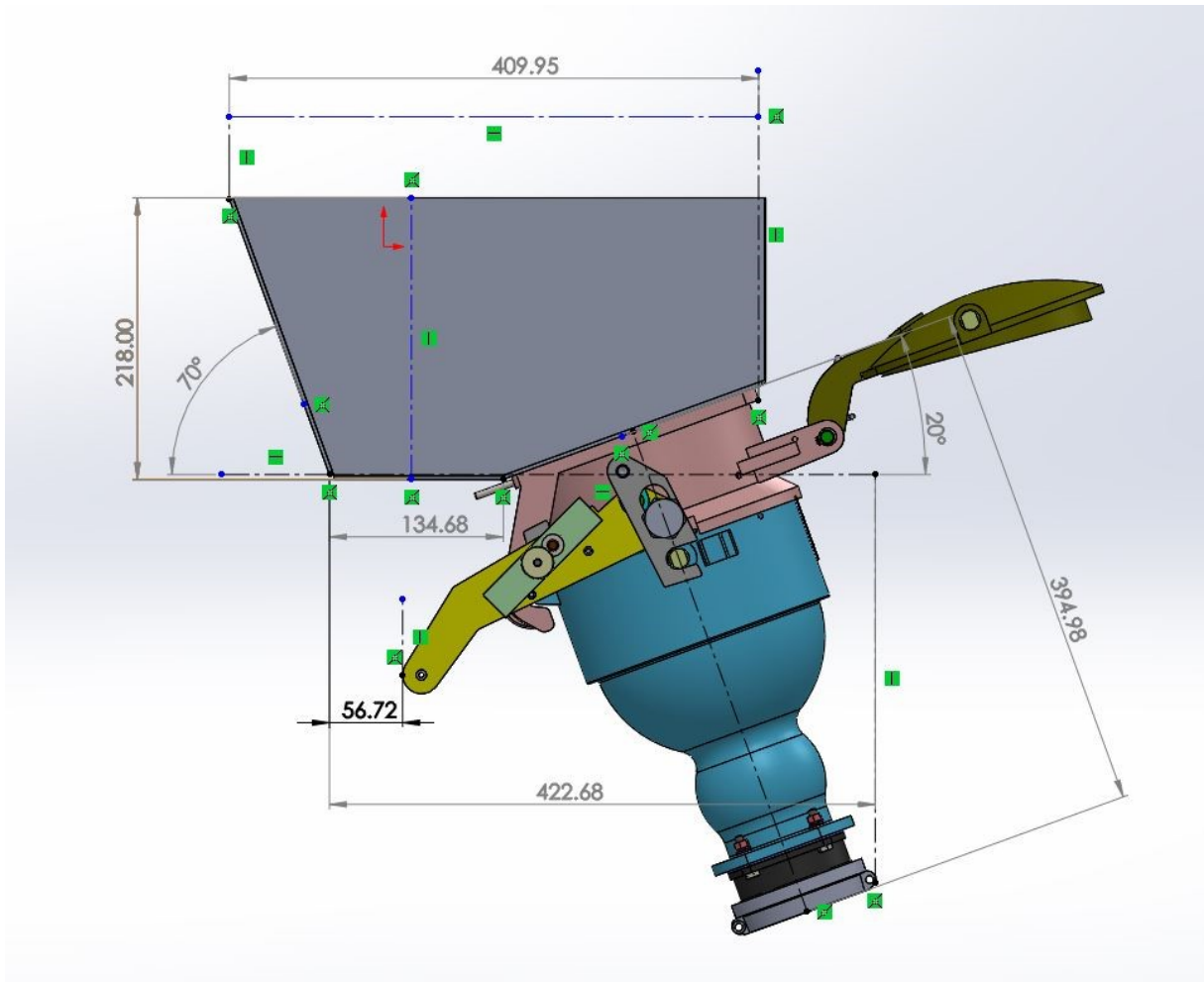
SECTION B-B



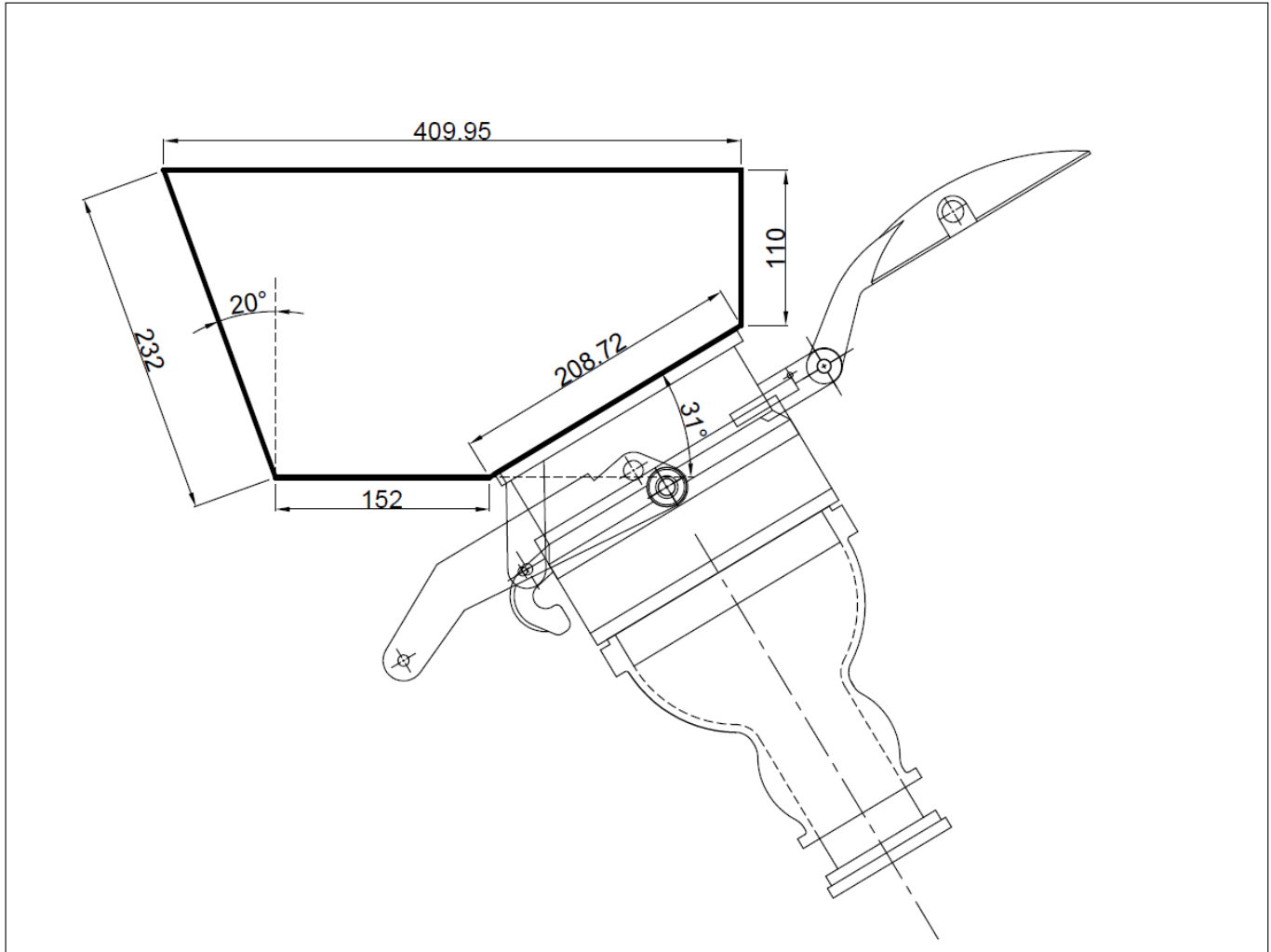
SECTION A-A

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**SKETCH of Modified Housing Box (Socket) for WAP5 Locomotives**



**SKETCH of Modified Housing Box (Socket) for WAP7 Locomotives**