

**3428607/2024/O/o PED/TRACTION/RDSO**

भारत सरकार-रेल मंत्रालय  
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Government of India  
Ministry of Railways  
Research, Designs & Standards  
Organization,  
LUCKNOW - 226011



No. EL/2.2.1/High Reach

**Dated:** 23.12.2024

**Principle Chief Electrical Engineer,**

- |  |   |
|--|---|
| 1. Central Railway, Mumbai CST-400001                    | 2. Eastern Railway, Fairlie Place, Kolkata-700001         |
| 3. East Central Railway, Hazipur-844101                  | 4. East Coast Railway, Bhubaneswar- 751016                |
| 5. Northern Railway, Baroda House, New Delhi-110001      | 6. North Central Railway, Subedarganj, Allahabad-211033   |
| 7. North Eastern Railway, Gorakhpur-273001               | 8. North East Frontier Railway, Maligaon, Guwahati-781011 |
| 9. North Western Railway, Jaipur-302006                  | 10. Southern Railway, Park Town, Chennai-600003           |
| 11. South Central Railway, Secunderabad. 500071          | 12. South Eastern Railway, Garden Reach, Kolkata-700043   |
| 13. South East Central Railway, Bilaspur- 495004         | 14. South Western Railway, Hubli-580024                   |
| 15. Western Railway, Churchgate, Mumbai-400020           | 16. West Central Railway, Jabalpur-482001                 |
| 17. Chittaranjan Locomotive Works, Chittaranjan – 713331 | 18. Banaras Locomotive Works, Varanasi-221004             |
| 19. Patiala Locomotive Works, Patiala-147003             |   |

**MODIFICATION SHEET NO. RDSO/2024/EL/MS/0501 Rev. '0', Dated 23.12.2024.**

**1.0 TITLE :**

Provision of Single 410 mm stud in upper frame articulation bearing joint of High Reach Pantograph type WBL-85 HR (HRPT) of M/s Schunk make on Tap-changer based conventional Electric Locomotives.

**2.0 OBJECT:**

Improvement in performance and reliability of High Reach Pantograph type WBL-85HR of M/s Schunk.

**3.0 EXISTING ARRANGEMENTS**

- In HRPT type WBL-85HR model the upper and lower arm articulation joint is fitted by M12 size bearing bolts from the both end faces of arm.
- Railways have reported the failures of Knee/Articulation bolt in M/s Schunk make type WBL-85 HR pantograph. These bearing bolts reported, found loose & breakage of bolt in some cases owing to stress developed from vibration during run, leads pantograph to got entangled/ broken resulting to pantographs failure.
- These type of failures resulting punctuality loss as well as sometimes traffic disruptions also.

**4.0 MODIFIED ARRANGEMENTS :**

M12X 410mm stainless steel(SS304) stud single through bolt is to be provided in place of existing 2 Nos. M12X80 mm hexagonal head screw fitted from both side, step by step procedure for providing single through bolt is as follows;

- Remove the Pantograph from the locomotive roof and lower to floor.
- Uncouple the coupling rod, and remove both side shunts from upper arm.
- Remove the M12x80 hexagon head screw bearing bolt provided in the lower & upper arm articulation joint.
- Clean both side M12 thread inside lower arm with the use of Tapper reamer of size 10mm and 13mm to make adjustments in hole size to suit stud size M12x410 mm.

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- e) Check the stud in both hole of lower arm. Ensure both side bearings in upper arm fit properly on the stud.
- f) Couple the lower arm and upper arm by providing 410mm stainless steel(SS304) stud. Apply Loctite 270 on thread of stud on both side and fit the stud with Hexagonal Lock nut and Hexagonal Nylon lock nut tightened with 70 NM torque. After fitment of stud at joint between Lower arm and Upper arm, couple the coupling rod with lower arm and fit the shunts. Provide SS split pin dimension d=3.2mm,length= 40mm as per IS 549 suitable for M12 stud.
- g) Test Pantograph for raising and lowering timings, adjust raising and lowering timings to specified limit stipulated in specification. Check static force with 7 kg load at height of 150mm, 500mm, 1600mm, 3000mm and 3600mm height.

**5.0 APPLICATION TO CLASS OF LOCOMOTIVES**

Tap-changer Conventional Locomotive provided with high reach pantograph type WBL-85 HR of M/s Schunk make.

**6.0 MATERIAL REQUIRED**

Stud of M12x410 mm. stainless steel hexagonal nut, stainless steel hexagonal nylon lock nut.

**7.0 MATERIAL RENDERED SURPLUS:**

2 numbers M12x80 bolt.

**8.0 REFERENCES :**

Item no: 27 of 41st MSG (Electrical Loco) meeting held on 21<sup>st</sup> and 22<sup>nd</sup> March 2024 at PLW, Patiala, MOM issued vide Railway Board's letter no. 2024/Elect(TRS)/138/4 dated 10.07.2024.

**9.0 MODIFICATION DRAWING:**

Annexure-I (Enclosed)

**10.0 AGENCY FOR IMPLEMENTATION :**

Electric Loco Sheds, Diesel loco sheds holding Electric loco & POH Workshops.

Encl: Annexure -1

Rajesh Kumar  
for Director General Std./Electrical

**Copy to :**

1. Secretary (Electrical), Railway Board, Rail Bhavan, New Delhi-110001  
(Kind Attn.: Shri Avinash Singh Kushwah, EDEE/RS/RB): - for kind information and necessary action please).
2. As per standard mailing list  
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3. M/s. Schunk Metal & Carbon (India) Pvt. Ltd., No. 485/2, 13<sup>th</sup> cross Road, 4<sup>th</sup> phase, Peenya Industrial Area, Bangalore-560058 - for information.


Encl: Annexure -1

Rajesh Kumar  
for Director General Std./Electrical

**Annexure-1****Modification Procedure**

Following listed procedure for modification of M-12 stud in Pantograph.

<u>Sr. No.</u>	<u>Procedure</u>
1	<ul style="list-style-type: none"> <li>Uncouple coupling rod.</li> <li>Remove both side shunts from Upper arm</li> <li>Remove M12 bearing bolts from both side of joint between Upper arm and lower arm.</li> </ul> <div data-bbox="631 485 1088 806"></div> <div data-bbox="1138 459 1276 835"></div> <div data-bbox="1312 510 1430 594"><b>Bearing Bolt size is M12</b></div>
2	<ul style="list-style-type: none"> <li>After removing M12 bolts clean both side thread inside Lower arm and make size to 12 MM with help of taper Rimmer of size 10MM -13MM.</li> </ul> <div data-bbox="612 896 881 1241"></div> <div data-bbox="907 907 1084 1232"></div> <div data-bbox="1084 949 1182 1092"><b>Tapper Rimmer of size 10MM - 13MM</b></div> <div data-bbox="1211 903 1451 1236"></div>
3	<ul style="list-style-type: none"> <li>Check the stud in both hole of lower arm. Also check both side bearings in upper arm before fitment of stud.</li> <li>Couple the Lower arm and upper arm with help of 410 MM long M12 stud.</li> </ul> <div data-bbox="670 1312 899 1358"><b>M-12, 1.75mm pitch Rolled threads</b></div> <div data-bbox="764 1358 1369 1619"></div> <div data-bbox="1136 1276 1390 1423"><b>STUD SIZE M12X1.75MM Pitch Total Length: 410MM Drg. No.: SK/DL/M/121/VTA</b></div> <div data-bbox="719 1661 1346 1787"></div>

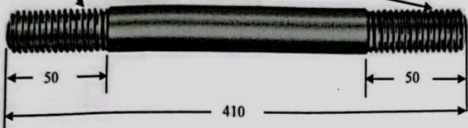
	<ul style="list-style-type: none"> <li>After assembling of M12 stud at joint of Lower arm and Upper arm apply Loctite 270 on thread of stud on both side and fit the stud with Hex. Lock nut and Hex. Nylon lock nut. All nuts should be tightened with 70 NM torque.</li> </ul>	 <p><b>M12X1.75MM Pitch through stud fitted with double locknut</b></p>
	<ul style="list-style-type: none"> <li>After fitment of stud at joint between Lower arm and Upper arm, couple the coupling rod with lower arm and fit the shunts.</li> <li>Test Pantograph for raising and lowering timings and 7 kG load test.</li> </ul>	

### STUD DRAWING

**NOTE:**

- DO NOT SCALE THE DRAWING.
- REMOVE BURRS & SHARP EDGES.
- A SAMPLE SHOULD BE GET APPROVED BY THE CONSIGNEE BEFORE BULK SUPPLY.
- MATERIAL & SPECIFICATION: - SS-304 (A2-70)
- Stainless Steel Hex lock nut 02 nos. & Stainless Steel Hex Nylon lock nut 02 nos. suitable to the stud threads to be supplied with the stud for HR pantograph.

M-12, 1.75mm pitch  
Rolled threads



50 410 50

All dimensions are in mm unless otherwise specified.

SSE (M)/MP	
P	1.01
D	19/11/22
C	C.R.D.P.
T	Kor
ADME	AB
Approved	

Ref. No.	PL No.	Description	No./Loco	Matl.	Spec.
Applicable for locos		HEADING OF DRAWING Stud for HR pantograph			Projection Symbol
Scale NTS		Ref. No.			First Issued
Diesel Shed Vatva Western railway		Drawing No. SK/DL/M/221/VTA			Supersedes Superseded by

ALT.	No. of Places	Ref. No.	Description	ALT. Note No.	Sign.	Date	App. by (Sign)	Date