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Research, Designs & Standards Organization,
LUCKNOW – 226011

No. EL/1.3.10 (MSU) **Date: As signed**

प्रधानमुख्य विद्युत अभियंता,

1. मध्य रेलवे, मुम्बई सीएसटी–400 001
2. पूर्व मध्य रेलवे, हाजीपुर–844 101
3. पूर्वतटीय रेलवे, चन्द्रशेखरपुर, भुबनेश्वर–751 023
4. पूर्व रेलवे, फेयर्ली प्लेस, कोलकाता–700 001
5. उत्तर मध्य रेलवे, ब्लाक ए–2, सुबेदारगंज इलाहाबाद– 211 033
6. उत्तररेलवे, बड़ौदा हाऊस, नई दिल्ली–110 001
7. उत्तर पश्चिम रेलवे जयपुर– 302006
8. उत्तर पूर्व रेलवे गोरखपुर– 273001
9. दक्षिण मध्य रेलवे, रेल निलयम, सिकंदराबाद–500 371
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12. दक्षिण रेलवे, पार्क टाउन, चेन्नई–600 003
13. दक्षिण पश्चिम रेलवे हुबली–580020
14. पश्चिम मध्य रेलवे, जबलपुर–482 001
15. पश्चिम रेलवे, चर्चगेट, मुम्बई– 400 020
16. पूर्वोत्तर सीमांत रेलवे, पान्डुपोर्टरोड, मालीगॉव, गुवाहाटी, असम–781012

Principle Chief Electrical Engineers,

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2. East Central Railway, Hazipur-844 101.
3. East Coast Railway, Chandrashekharpur, Bhubaneshwar-751 016.
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5. North Central Railway, Block-A, Subedarganj, Allahabad- 211 033.
6. Northern Railway, Baroda House, New Delhi-110 001.
7. North Western Railway, Jaipur- 302 006
8. North Eastern Railway, Gorakhpur-273001
9. South Central Railway, Secunderabad-500 071.
10. South East Central Railway, Bilaspur-495 004.
11. South Eastern Railway, Garden Reach, Kolkata-700 043.
12. Southern Railway, Park Town, Chennai-600 003.
13. South Western Railway, Hubli- 580020
14. West Central Railway, Jabalpur-482 001.
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16. North East Frontier Railway, Pandu Port Road, Maligaon, Guwahati, Assam 781012 331

Sub: Revised Special Maintenance Instruction (SMI) no. ELRS/SMI/0217 (Rev. '1') dated 21.08.2025.

Ref: Railway board letter no. 2024/Elect (TRS)/138/4 dated 15.07.2025.

Central Railway has reported that the MSU maximum temperature is permitted only 10°C above the ambient temperature whereas Axle Box Maximum temperature is permitted up to 27°C above the ambient temperature and from past overhauling experience, the temperatures of Axle boxes are found within 27°C but MSU temperatures are always found above the 10°C (up to 20°C above ambient temperature). Same was deliberated as item no. 30 in 42nd MSG.

During 42nd MSG meeting held on 23rd and 24th May 2025 at BLW, it was decided that RDSO should review the SMI 217 for increasing temperature rise above ambient temperature of the MSU bearing.

In view of the above, RDSO has issued revised SMI no. ELRS/SMI/0217 (Rev. '1') dated 21.08.2025.

The above SMI has been uploaded on RDSO website and same can be downloaded through following path:

www.rdso.indianrailways.gov.in---->Specifications / drawings-----> Loco, EMU & Power supply----> other important link for loco ----> SMI/MS/TC ----> serial number wise ----> MASTER LIST OF SPECIAL MAINTENANCE INSTRUCTIONS ----> SMI no. ELRS/SMI/0217 (Rev. '1') dated 21.08.2025.

Encl: As above

21.08.25

(Nirdosh Kumar Gupta)
Director SE/Mech.

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6. Northern Railway, Baroda House, New Delhi-110001.
7. North Eastern Railway, Gorakhpur-273001.
8. South Central Railway, Secunderabad-500 071.
9. South East Central Railway, Bilaspur-495004.
10. South Eastern Railway, Garden Reach, Calcutta-700 043.
11. Southern Railway, Park Town, Chennai-600 003.
12. South Western Railway, Hubli-580020.
13. West Central Railway, Jabalpur-482001.
14. Western Railway, Churchgate, Mumbai-400 020
15. North East Frontier Railway, Maligaon, Guwahati-781011
16. North Western Railway, Jaipur- 302 006

SPECIAL MAINTENANCE INSTRUCTION No. ELRS/SMI/0217 (Rev. '1') Dated: 21.08.2025

1.0 Title:

Remedial measures to arrest the failures of MSU of traction motor type HS15250A /TAO-659 due to the dropping of its adjustment washer/failure of its taper roller suspension bearings.

2.0 Object:

During 26th MSG/EL meeting held at Bangalore, Southern Railway on 7th and 8th April, 99, Railways had highlighted few cases of failures of MSU of traction motor type HS 15250A on account of dropping of its adjustment washer and failure of its taper roller suspension bearings.

The matter has been initially investigated at ELS/Gomoh/ER & ELS/CNB/NCR and has also been discussed with the traction motor manufacturers CLW/Chittaranjan, BHEL/Bhopal and COL/Bhopal.

Further, Western railway reported large scale failures of taper roller suspension bearings of Hitachi traction motors. Subsequently, a joint meeting was organised at Dahod Workshop of Western railway on 11.1.2000 which was attended by representatives from M/s Timken (India) Ltd., BHEL/Bhopal, Officers of Western railway and RDSO. Based on the investigations at Dahod Workshop on the failure of taper-roller suspension bearings and suspension tube, it was seen that there is apparently no design deficiency in the MSU of Hitachi traction motors and TAO 659 traction motors having roller suspension bearing arrangement. These failures are mainly taking place due to deficiencies in the maintenance practices and assembly procedure of suspension tube

deficiencies in the maintenance practices and assembly procedure of suspension tube assembly.

The detailed assembly and disassembly instructions for Hitachi suspension motor unit are furnished vide Appendix 'A" of Maintenance Manual of Hitachi Traction Motor type HS 15250A which are to be followed by Railway Workshops/ Electric Loco Sheds. However, this SMI states the precautions which are to be taken during assembly/maintenance of the MSU of traction motor type HS 15250A and TAO 659 (Roller bearings).

Precautions and Maintenance practices which are to be followed during re-discing /assembly of motor suspension unit of Hitachi/ TAO 659 (Roller bearing) was explained in SMI 0217 Rev. 0.

During 42nd MSG meeting held on 23rd and 24th May 2025 at BLW, Central Railway has reported that the MSU maximum temperature is permitted only 10°C above the ambient temperature whereas Axle Box Maximum temperature is permitted up to 27°C above the ambient temperature and from past overhauling experience, the temperatures of Axle boxes are found within 27°C but MSU temperatures are always found above the 10°C (up to 20°C above ambient temperature). RDSO has reviewed the same and amended the permitted increase in temperature of MSU bearing as detailed at para 3.3.25.

3.0 Precautions and Maintenance practices which are to be followed during re-discing /assembly of motor suspension unit of Hitachi/ TAO 659 (Roller bearing):

3.1 Rotate the suspension tube assembly manually. It should stop after about 3 oscillation. If the same is rotating freely, it means the bearings may be dry. If it is not rotating, it means the bearings are jammed.

3.2 Measure the lateral clearance with the dial gauge having least count of0.01 mm. It should be between 0.05 mm to 0.25 mm.

3.3 If the bearings in suspension tube are jammed/dry and its lateral clearance are more or less than the above specified limit, then do the dismantling.

3.3.1 Dismantle the 'MSU'.

3.3.2 Remove taper roller bearings & earthling brush unit etc.

3.3.3 Clean the 'MSU' properly with white spirits/petrol. Check the condition of earth brush. The length of earthling brush should be 55±1 mm as new and condemning limit is 25 mm.

3.3.4 Check the condition of bearing housings (NDE & DE) for any score marks on its periphery. These scoring marks may be due to flow of heavy leakage current in the bearings.

3.3.5 Check the condition of bearing housing (NDE/DE) for any stain marks on its periphery. These stain marks may be due to moisture/water particles presents in the grease.

3.3.6 If there are deep scoring marks or excessive stain marks noticed on the periphery of the bearing housings of 'MSU', reject the MSU.

3.3.7 Check the suspension tube radiographically for any cracks/porosity etc. If there are any cracks etc., **do not use the suspension tube.**

3.3.8 Check the condition of bearings and its rollers.

3.3.9 Check the metal content and contamination of gear ease compound in the grease of bearings. The metal content should not be more than 0.25%.

3.3.10 Follow following process for greasing of bearings:

a. During Overhauls:

Gear End Bearing:	250 gms. on end cover 350.gms. on cone of bearings 650 gms. balance by grease gun.	**By hand**
Total:	1250 gms	
Non- Gear End Bearing:	300 gms. by hand on cone & end cover 600 gms. by grease gun	
Total:	900 gms.	

b. Replenishment of Grease by shed:

G.E. Bearings	**N.G.E. Bearings**
150 grm. (During IC)	250 grm. (During IC)

3.3.11 Mount the bearings in the bearing housings (GE & NGE) of suspension tube as per usual process.

3.3.12 Check the dimension 'A' as per RDSO's SMI No. SMI/0207-99.Rev. 0 of Feb.'99.

3.3.13 Check the condition of the outer face of suspension tube towards the gear wheel end. It should be properly machined to have proper clearance with the corresponding enclosure (Part No. 9- Page 4 of Appendix 'A' of Hitachi Maintenance Manual EL-1).

3.3.14 Apply KE-45-RTV on the faces of the suspension tube (Refer Hitachi Maintenance Manual EL-1, Page 95-Fig EL 1-104 & page 96 - Fig. EL-1-105) and also at the joints of adjustment washer. It is very essential to avoid entry of water into the bearings.

3.3.15 Check the run-out of the gear facing the enclosure. It should not be more than 0.05 mm (Ref. Clause 4.4.2 (2) of Appendix 'A' of Hitachi Maintenance Manual EL.1).

3.3.16 Check the correct fitment of the enclosure on the gear and also ensure that all the enclosure grooves are free from dirt and swarf.

3.3.17 Mount the suspension tube-unit on the axle as per usual process.

3.3.18 Do not weld the adjustment washer.

3.3.19 Apply Loctite 222/ANR 124-on the threaded portion of adjustment washer-fixation-socket head cap screws size M12x70L (Ref. RDSO's Modification Sheet No. RDSO/WAM4/165 of Jan.'92) and tighten these screws at the following specified torque as mentioned in Hitachi Maintenance Manual EL-1.

Bolt Size	**Tightening Torque** – (Kfg.m)		
	Minimum Value	Standard Value	maximum Value
M12	3.55	4.18	5.03

3.3.20 If for any reason, the adjustment washer drops on line, it is recommended that Railways should not provide the another adjustment washer at that place but to send whole wheel set unit along with the suspension tube to their respective Loco Workshops for removal of motor suspension unit and then re-fitment of motor suspension unit as per assembly procedure stipulated in Hitachi Maintenance Manual.

3.3.21 Tighten the suspension tube fixation bolts at the following torque (Ref. RDSO's SMI- 183) of Dec.'96 with amendment 1).

Bolt Size	**Tightening Torque** – (Kfg.m)		
	Minimum Value	Standard Value	maximum Value
M36	96	121	145

3.3.22 Measure the lateral clearance with the help of dial gauge. It should be between 0.05 mm to 0.25 mm.

3.3.23 Even during re-discing, take out the adjustment washer. Ensure that wheel disc presses the abutment piece. Refit the adjustment washer after grinding to 0.025 mm finish and maintain the specified lateral clearance.

3.3.24 Railways Workshops/Sheds must ensure dry air for filling the grease with the help of grease gun/pump. Grease must be stored in moisture free chamber.

3.3.25 After complete assembly of MSU, run the same on **No load** for 2 hours in each direction at 250 rpm. The temperature rise of the bearings should not be more than **20 deg. C** above the ambient.

3.3.26 **Storage**:

3.3.27 Wheel set-unit must be protected against the entry of water/ foreign particles. The machined surfaces must be coated with a suitable rust preventive.

3.3.28 For short term storage the wheelset should be kept in a covered building.

3.3.29 If the wheel sets are stored outside, the-tube should be turned so that the open portion is on the lower side and wedged in position. The assembly should be covered with water proof sheets for further protection and again the machined surfaces should be coated with a suitable rust preventive.

4.0 Application:

Motor suspension unit of Traction Motor type HS 15250A.

5.0 Material Required:

- KE 45-RTV
- Loctite 222/ANR 124
- Magnetic dial gauge L/C =0.01 mm
- Torque Wrench- 0-150 Kg.f.m.
  0-10 Kg.f-m.

6.0 Material rendered surplus:

Nil

7.0 Reference:

i) Hitachi Maintenance Manual EL-1I for Traction motor HS15250A.
ii) 26th MSG/EL held at Bangalore, S. Rly. on 7th and 8th April 99.
iii) 42nd MSG meeting held at BLW on 23rd and 24th May 2025.
iv) RDSO's Investigation Report No. ELRS/TR/0093 of Jan 2000.
v) RDSO's Modification Sheet No. RDSO/WAM4/165 of Jan '92
vi) RDSO's SMI No. RDSO/ELRS/183 of Dec '96 with its one amendment of March 1998.
vii) RDSO SMI No. SMI /0207-99 Rev.0 of Feb '99.

8.0 Agency of implementation:

i) All Electric Loco Workshops.
ii) All Electric Loco Sheds having facilities for rediscing of wheel sets.
iii) All Traction Motor manufacturers.

9.0 Periodicity of Implementation:

- During IC (degreasing).
- During AOH
- Whenever the adjustment washer drops/suspension bearings fails.
- During rediscing.

10.0 Distribution: As per mailing list enclosed.

Encl.: Nil.

21.08.25

(Nirdosh Kumar Gupta)
DSE/Mech