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Government of India - Ministry of Railways
Research, Designs & Standards
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No. EL/3.2.182/Part/3-Ph.

Date: As signed

Principal Chief Electrical Engineer, प्रधान मुख्य विद्युत अभियंता,

i)	Central Railway, Mumbai CST-400001	मध्य रेलवे, मुम्बई, सीएसटी-400001
ii)	East Central Railway, Hazipur-844101	पूर्व मध्य रेलवे, हाजीपुर-844 101
iii)	East Coast Railway, Chandra Shekharapur, Bhubaneswar-751017	पूर्व तटीय रेलवे, चन्द्रशेखरपुर, भुवनेश्वर-751 017
iv)	Eastern Railway, Fairlie Place, Kolkata - 700 001.	पूर्व रेलवे, फेयर्ली प्लेस, कोलकाता-700 001
v)	North Central Railway, Block-A, Subedarganj, Allahabad- 211 033	उत्तर मध्य रेलवे, ब्लॉक ए-2, सुबेदारगंज इलाहाबाद – 211 033
vi)	Northern Railway, Badoda House, New Delhi-110001	उत्तर रेलवे, बड़ोदा हाउस, नयी दिल्ली – 110001
vii)	North Western Railway, Jaipur- 302 006	उत्तर पश्चिम रेलवे जयपुर- 302006
viii)	North Eastern Railway, Gorakhpur-273001	उत्तर पूर्व रेलवे गोरखपुर- 273001
ix)	North East Frontier Railway, Maligaon, Guwahati-781011	उत्तर पूर्व फ्रन्टीयर रेलवे मालीगाँव गुवाहाटी-781011
x)	South Central Railway, Secunderabad - 500371	दक्षिण मध्य रेलवे, रेल निलायम, सिकंदराबाद-500 371
xi)	South East Central Railway, Bilaspur - 495004	दक्षिण पूर्व मध्य रेलवे, बिलासपुर – 495 004
xii)	South Eastern Railway, Garden reach, Kolkata-700043	दक्षिण पूर्व रेलवे, गार्डनरीच, कोलकाता-700 043
xiii)	Southern Railway, Park Town, Chennai - 600003	दक्षिण रेलवे, पार्क टाउन, चेन्नई-600003
xiv)	South Western Railway, Hubli- 580020	दक्षिण पश्चिम रेलवे हुबली-580020
xv)	West Central Railway, Jabalpur-482001	पश्चिम मध्य रेलवे, जबलपुर – 482001
xvi)	Western Railway, Churchgate, Mumbai- 400 020	पश्चिम रेलवे, चर्चगेट, मुम्बई- 400 020
xvii)	Chittaranjan Locomotive Works, Chittaranjan-713331(WB)	चित्तरंजन रेल इंजन कारखाना, चित्तरंजन – 713331
xviii)	Banaras Locomotive Works, Varanasi - 221 004	बनारस रेल इंजन कारखाना, वाराणसी-221004
xix)	Patiala Locomotives Works, Patiala (Punjab)-147003	पटियाला रेल इंजन कारखाना, पटियाला (पंजाब)-147003

Sub.: Technical Circular No. RDSO/2025/EL/TC/0159 (Rev. '0') dated 30.04.2025 for requirement of Tools & testing equipment at Electric Loco Sheds for assembly/overhauling of Traction motor type 6FRA6068.

Ref.: (i) Railway Board letter no 2024/Elect(TRS)/138/11 dated 08.04.2024.

- (ii) Sr.DEE/TRS/GMO letter no. ELS/401/Draft TC/RDSO/2024-25 dated 26.03.2025.
- (iii) RDSO's letter of even No. dated 21.03.2025.

1. During Technical Audit of Traction motor assembly at various Loco Sheds/Workshops, it has been noticed that various tools/gauges/equipment of required accuracy level are not available with Sheds/workshops.
2. A Draft Technical Circular was prepared which provides a list of bare minimum tools/gauges/testing equipment with required accuracy, which are required at Electric Loco Sheds/ Workshops for measurement of various dimensions and parameters with prescribed accuracy level during overhauling/assembly of Traction motor (type 6FRA6068) and circulated to Zonal Railways for comments and suggestions vide letter Ref. (iii).
3. Based on comments/suggestions received, Technical Circular No. RDSO/2025/EL/TC/0159 (Rev. '0') dated 30.04.2025 for requirement of Tools & testing equipment at Electric Loco Sheds for assembly/overhauling of Traction motor type 6FRA6068 is being issued for implementation.

DA: As above

SANJAY
(Sanjay Kumar Tiwari)
KUMAR
Executive Director
TIWARI

Digitally signed
by SANJAY
KUMAR TIWARI
Date: 2025.04.30
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No. EL/3.2.182/Part/3-Ph.

Date: As signed

TECHNICAL CIRCULAR No. RDSO/2025/EL/TC/0159 (Rev '0') dated as signed

Sub.: Technical Circular for requirement of Tools & testing equipment at Electric Loco Sheds for assembly/overhauling of Traction motor type 6FRA6068.

1. Introduction :

- 1.1 RDSO had carried out a Technical Audit of Loco Sheds and POH workshops for assembly of Traction motor (Type-6FRA6068). During the Audit, it has been observed that various tools required for proper assembly of these Traction motors were either not valuable or were not of the required accuracy for maintaining proper assembly parameters for the same.
- 1.2 Maintenance of critical dimensional parameters upto the level of 1 micron are very critical for proper assembly of Traction motors to ensure their reliability to the proper measurement of various parameters during the assembly may be attributed to one of the major reasons for pre-mature failure of Traction motors.
- 1.3 Railway Board also advised to issue such list vide para 14 of MoM of MTRS review held on 07.04.2025 and MoM circulated vide Railway Board letter no. 2024/Elect(TRS)/138/11 dated 08.04.2025

2. Objective:

- 2.1 The objective of this Technical Circular is to provide a list of bare minimum tools/gauges/testing equipment with required accuracy, which are required at Electric Loco Sheds/ Workshops for measurement of various dimensions and parameters with prescribed accuracy level during overhauling/assembly of Traction motor (type 6FRA6068).
- 2.2 RDSO has compiled the list of bare minimum tools/gauges/testing equipment required during assembly/overhauling of Traction motor as below:-

SN	Name of equipment	Purpose	Measuring Range	Ref./Drawing
1.	Bore dial gauge with least count of 1 microns	For measuring internal diameters of end frame , bearing racer	50-400 mm (minimum)	SMI/0318 dated 16/10/2017
2.	Dial Snap Gauge with least count of 1 microns	For measuring shaft diameter , bearing outer racer	75-320 mm (minimum)	SMI/0314 dated 2/9/2017

3.	Digital Vernier caliper digital with least count of 1 micron	For K- value of pinion /main gear.	Suitable sizes	
4.	Digital Vernier depth gauge with least count of 10 micron	Clearance between outer face of end frame (DE/NDE) and inner face of outer bearing cap (DE/NDE)		MS -0460 and 0466
5.	Dial gauge with least count of 1 micron	Measuring free RC of bearing/ assembled TM RC and axial play.	0-400 micron	RDSO's SMI/0336 dated 01.04.2025
6.	Ring Gauge of pinion	Checking tapperness of pinion shaft	SKEL-5043(Alt-0)	SMI/0278 Amendment-1
7.	Tapper Plug Gauge	Checking tapperness and correctness of TM Shaft	SKEL-5032 (Alt-0)	
8.	Torque Wrenches(M10 to M20)	For tightening of various fasteners	Up to 1300 Nm	ABB doc no. 3EHW 411479
9.	Set of pneumatic spanner/tools	For bolts/screws tightening. Ensuring tightness of hex bolts and allen screw as per requirement.	Up to 400 Nm	
10.	Gauge for measuring distance between inner labyrinth (DE) to inner labyrinth (NDE) outer edge on shaft.	CLW's Drg. No.3TJF.096.040	696±0.2 mm (Max)	CLW WI 21.514 dated 2/5/2024
11.	Induction Heater with feature of temperature display, temperature setting, auto cut off and demagnetization	Heating of end frame and assembly components	CLW specification no MT/2161 Dated 13/06/13	SMI/0301 dated 8/11/2016
12.	Four and half digit LCR meter	Measure the inductance between two phases	Suitable range (millihenry)	SMI/0262 dated 10/6/2010
13.	Hydraulic system for pinion extraction and mounting	For inserting/ removal of pinion.	0-2500 bar	
14.	VVVF Drive for no load test	For measurement noise and vibration of assembled TM	150 Hz 0-3000 rpm	
15.	SPM meter	Condition monitoring		SMI- 058 (July-1979)

		of bearing in situ.		
16.	Decibel Meter	For measuring of TM noise	120 dB	
17.	Grease gun with digital grease meter	For greasing of TM bearing		SMI-0322
18.	Infrared temperature gun	For temperature monitoring	0-250 °C	
19.	Baking oven with temperature control	For drying stator/rotor at 120°C for 24 h.	0-200 °C	ABB doc. No. 3EHW 411433 Ch. 4.04 p.29
20.	Digital Insulation Tester (Megger) 2.5 kV	Measuring insulation resistance with PI & Dielectric absorption Ratio testing capabilities	1 MΩ to 1 GΩ	
21.	Tongue tester (Amps)	For current measurement	0-1000Amp	
22.	Tin wire	For measuring backlash		ABB doc. No. 3EHW 411433 Ch. 4.04
23.	Ferrous Debris Monitor (Metal content detector)	To detect metal content in grease and Gear case oil.		SMI-0324 dated 24.08.2018
24.	Growler test set	To detect rotor bar crack		
25.	Digital tachometer	For motor rpm measurement	0-3000rpm	
26.	UST test set with probe	To detect crack in rotor shaft		
27.	Filler gauge	Clearance /gap checking	0.04 to 1.0 mm	
28.	Vibration Meter	Checking of TM vibration	0-20mm/sec	
29.	4.5 Digit Multimeter	For Resistance measurement & temp. sensor continuity test		

3.0 Agency of Implementation :

All Electric Loco Shed/ Workshops maintaining 6FRA6068 Traction motors.

Encl: Nil

SANJAY KUMAR TIWARI
 Digitally signed by
 (Sanjay Kumar Tiwari)
 Executive Director/Rolling Stock
 Date: 2025.04.30
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