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No. EL/3.2.172 **Date: 17.11.2011**

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South Eastern Railway, Garden Reach, Kolkata 700 043
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South West Railway, Hubli (Karnataka)
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South East Central Railway, Bilaspur-495004 (Chhatisgarh)
Chittaranjan Locomotive Works, Chittranjan (WB)

SPECIAL MAINTENANCE INSTRUCTION NO. RDSO/2011/EL/SMI/0271 Rev '0'.

1. **Title: Special Maintenance Instruction for testing of brazed joints of interconnectors of field coils and compoles coils in Traction motors type HS15250A and TAO659 using high current injection test.**

2. **Brief History:**

In order to detect poor brazed joints in fields coil circuit of traction motors (TM) type TAO-659 & HS 1050 Er/HS15250A, RDSO issued SMI No. 151 for use of high current injection testing of these Brazing Joints of field coil on 08.12.1992. Railways have been able to detect bad brazed joints well in advance and a large number of line failures could have been avoided.

Now, Railway has been reporting a number of cases of failures of TMs due to open circuit/melting of brazed joints of compoles coils in both the types of traction motors. Moreover, because of use of single potted coils , in place of two coils , the voltage drop limit set for brazed joints for traction motor type TAO 659 is also required to be revised .

Over the period of time, in addition to the above Sheds have evolved their own procedures of measurement of temperature of various brazed joints after injecting high current for approx 60 minutes . Joints having temperature more than 4-5°C than the ambient temperature, have been opened and found defective.

Based on reports from various Railways , a need of incorporating detection of brazed joints of interconnectors of compoles coils in addition to those of main field coils and revising the values for single potted coils in case of traction motors type TAO659 has been felt . TMW, Nasik built up the data to decide limits of voltage drops in compoles and main field coils for

both the types of traction motors, vide their letter no . L.253.AC.13, dt.11.08.2011 and NK.TMW.CTA.01 , dt. 15.06.2011.
This SMI supersedes RDSO's SMI No. 151 , issued on 08.12.1992.
To avoid failures of brazed joints of interconnectors of compoles and field coils in service and to detect well in advance the bad joints, it is suggested that railways should carry out the high current injection test on the series field circuit of Traction Motor to measure the voltage drop. gives the procedure of measurement of voltage drops across only MP coils for TAO-659 traction motor.

3. **Object**:

SMI is for prevention of failure of traction motors in service and detection of bad brazed joints of interconnectors of Main Pole and Commutating Pole coils of Traction motors type HS15250A and TA0659 (single potted coils) at the time of overhauling in Electric Loco Sheds , Workshops and Production Units of Indian Railways . The SMI is to be followed by all the vendors of these traction motors , approved for new manufacturing and repairs.

4. **Procedure for High Current Injection test for Stators of TMs type HS15250A/ TAO659:**

4.1. General Preparation :

4.1.1. Dismantle the traction motors and clean the stator properly so that the high current injection test can be performed.

4.1.2. Standard precautions for occupational safety for carrying out such tests must be observed , while carrying out this test.

4.1.3. Please refer to RDSO's drawing no. SKEL 4867 for making connections for this test.

4.1.4. Open the terminal box of the traction motor.

4.2. Main Field Coil Circuit:

4.2.1. Measure the insulation resistance of field circuit with 1000V Megger .

4.2.2. Make the connections of the voltmeter, ammeter and output terminals of DC high current injection sets for field coil circuit as per RDSO drawings of type of TMs.

4.2.3. Inject 500 A from DC High current set to field circuit as shown in the connection . Measure the voltage drop at motor terminals and also record the same .The voltage drop across the series field circuit should be in the range given in Table A

Table A

	Traction motor type	Voltage drop at 30^0 C for MP coils in Volts
i	TAO-659 TM	3.7 $\pm$ 0.2
ii	Hitachi HS 15250A	4.48 $\pm$ 0.2

4.3. Compoles in Armature Circuit:

4.3.1. Short the positive and negative terminals for rocker rings in armature circuit as shown in the RDSO's drawing.

4.3.2. Measure the insulation resistance of armature circuit with 1000V Meggar .

4.3.3. Make the connections of the voltmeter, ammeter and output terminals of DC high current injection sets for armature circuit as per RDSO drawings of type of TMs.

4.3.4. Inject 500 A from DC High current set to field circuit as shown in the connection drawings. Measure the voltage drop at motor terminals and also record the same .The voltage drop across the series field circuit should be in the range given in Table B

Table B		
Traction motor type		Voltage drop at 30^0 C for Compole coils in Volts
i	TAO-659 TM	2.7 ± 0.2
ii	Hitachi HS 15250A	4.0 ± 0.2

4.4. If the recorded value found more than specified value as mentioned above, the investigation should be carried out thoroughly to detect the faulty or bad brazed joint .

4.5. After re-brazing of the defective joint and rechecking of its health, the stator should be allowed for assembly for traction motor.

4.6. Records for the test shall be maintained in the following format for each type of traction motors and reported to RDSO quarterly for fine tuning the above limits.

TM type…..			Shed/Workshop……..			
SN	Test Date	Date of Commissioning/Last Repair/Rewinding	Stator No.	Temp.	Voltage drop at 500 Amps	
					MP	CP

5. **Equipment Required:**
   5.1. 1000 V Megger
   5.2. Voltmeter, Range-0-15 V
   5.3. Ammeter, Range 0-1000 amp
   5.4. DC High Current injection set range 0-1000 Amp

6. **RDSO's drawing No. SKEL:** SKEL 4867

7. **Application to class of Locomotives: WAM4**/WAG5/WAP4/WAG7 locomotives using traction motors type HS 15250 and TAO-659 (single potted coils).

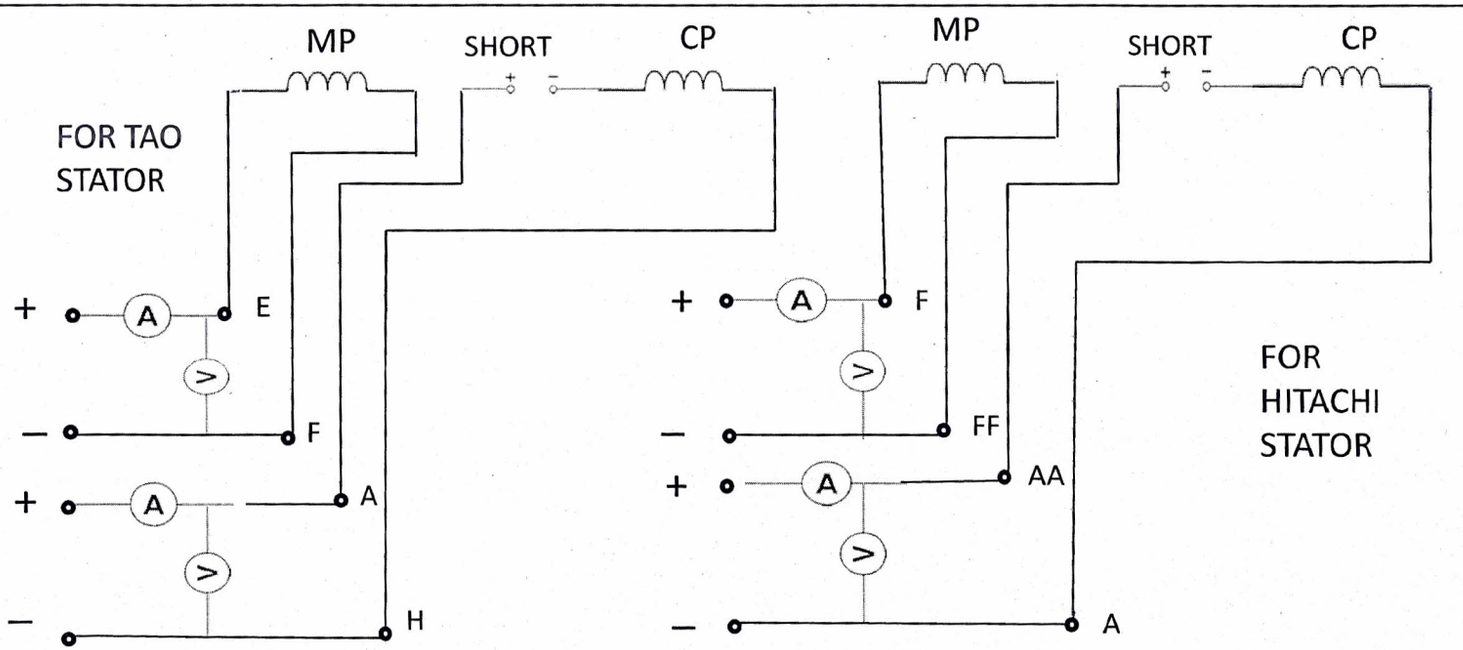
8. **Agency of Implementation:**
   8.1. All Traction Motors Shops/sheds
   8.2. All Electric Loco Sheds
   8.3. All POH Workshops
   8.4. CLW and all the vendors approved for new manufacturing and repair.

9. **Periodicity of Implementation:** During AOH/IOH/POH ,repairs and new manufacturing

17/11/11

(GANESH)
for Director General/Electrical

1. **Distribution**
   As per Mailing list



V – Voltmeter

A - Ammeter

REF No	PART No	DESCRIPTION	DTL. DRG. NO OF LOCO	MAT. SPEC
REF		SCALE	APPD BY	(FOR DG)

CONNECTION ARRANGEMENT FOR TESTING OF BRAZED JOINTS INTERCONNECTION FOR MP & CP COILS OF TRACTION MOTORS TYPE HS 15250A/TAO-659

FIRST ISSUED

SUPERSEDES

SUPERSEDED BY

STATUS	ALT.	REF. No.	DESCRIPTION	APPD BY	DATE

RDSO ELECT. DTE

SKEL-4867

Dt	15.11.11
D	M.AZEEM
C	Sue
EL	3.2.172