

**Government of India  
Ministry of Railways  
Research, Designs & Standards Organisation  
Manak Nagar, Lucknow - 226 011**

No. EL/3.2.5

Dated 12.12.1996

**MODIFICATION SHEET NO.RDSO/WAM4/196**

**1.0     Title :**

Adoption of improved BHRR assembly on Traction Motor type TAO-659 with flexible lead wires.

**2.0     Application :**

Traction Motors type TAO-659

**3.0     Object :**

Traction Motor type TAO-659 are provided with brush holder revolving ring assembly BHRR having connections made of formed solid copper rods to suit the connections with brush holders. Since the Traction Motor type TAO 659 is prone to the voltage as well as current transients, this causes recurrent flashovers of the BHRR assembly and the commutator. It leads to carbonisation and earth faults on BHRR lead insulation.

Further the air gap between the adjacent brush box assembly is 23 mm in the existing arrangements, leading to frequent flashovers due to ionisation and presence of carbon dust etc. Earthing and short circuits of insulated solid connections are also taking place at the fixing clamps.

**3.1**     During the 23rd MSG/EL held at MSG/Rly/BRC, this problem was discussed in detail. M/S ARCO and also displayed their modified version of BHRR assembly with 1500 V cables.

**3.2**     It is proposed to modify the 'BHRR' assembly with flexible connections using flame retardant cables (Fluonlex brand Hitachi make).

To Facilitate Railways to modify the existing BHRR assembly this modification sheet is Issued to take corrective action by way of introducing flexible Fluonlex cables for interconnections of the BHRR assembly. The air gap between the adjacent brush box assembly in the proposed arrangement has been increased from 23mm to 51mm.

Similar arrangements is working satisfactory on HS 15250 A Traction Motors for electric locos. M/s BHEL, Bhopal, have already switched over to similar arrangements on TAO 659 TM having Sr. No.4707125 and onwards.

lead	1.	Lead wires as per RDSO Drg. No. SKEL. 4396 (Ref 21 & 22)	1 set of 4
		Wires	
nos	2.	Cleats as per RDSO Drg. No. SKEL. 4396(Ref.23)	5
required	3.	Polyamide non-woven mat type EH 3511 as per RDSO Drg. No. SKEL.-4396 (Ref. 25)	As
required	4.	Silicone treated glass tape ( TWILL WEAVE ) 0.25x25 mm as per Hitachi Spec. A0211 TDSO Drg. No. SKEL.-4396 (Ref.25)	As
required	5.	Silicone treated Fibre glass tape 0.18 mm thick x 25 mm width.	As
required	6.	Resin Dr. Beck 520 'F'	As
required	7.	Anti tracking varnish Dr. Beck E-233	As

- 5.1** Remove the solid copper rod Connections Assembly from the BHRR assembly.
- 5.2** Clean the BHRR assembly and damaged components like Brush Holder as well as sparking tip assembly. Maintain a spark gap of  $10 \pm 0.5$  mm. Ensure the  $60^\circ$  alignment of BH pockets.
- 5.3** Weld the cleats to the steel ring for anchoring the lead wires at the required place as per RDSO Drg. No SKEL..4396.
- 5.4** Insulate the cleats with Fibre Glass tape, size 0.18x25mm 1 layer lap.
- 5.5** Install the lead wires with M8 bolts to the BH support Insulators and ensure proper tightening of the bolts.
- 5.6** Cover to approximately 60 mm of the lead wires with fibre glass tape (0.18 x 25) at the position neat the cleats (1 layer-half lap).
- 5.7** Tie the lead wires to the cleats using TRILL weave Glass Tape (AYA EGT) (4 turns) , ENSURE placement of polyamide Non woven Mat type between the cleat and the lead wire (to absorb vibration) Apply Resin Dr. Berck 520 'F'. Keep the BHRR assembly in a baking oven at  $100^\circ$  C for 4 hrs. so that curing of resin may take place.
- 5.8** Apply anti tracking Varnish of Dr. Beck E-233 on Brush holders, cleats and lead wires.
- 5.9** Check IR and carryout HV test at 10 KV 50Hz AC for one minute.

**6.0      Reference Drawing No. -**

SKEL. 4396 (Sheet 1 & 2) & 4397.

**7.0      Periodicity of Implementation :**

- During overhaul of Traction Motors
- During IOH/POH
- New Traction Motors.

**8.0      Agency of Implementation :**

- All Electric Loco sheds and POH shops of Indian Railways

**9.0      Likely source**

- 1)      BHEL, Bhopal
- 2)      M/s ARCO Electro-Technologies Pvt. Ltd., Bombay.

Dr. Beck varnishes/resin and fibre-glass tape may be procured from existing approved sources.

**Distribution :**              As per mailing list.

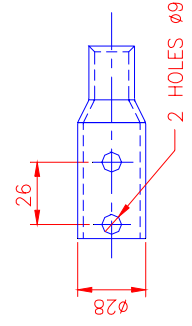
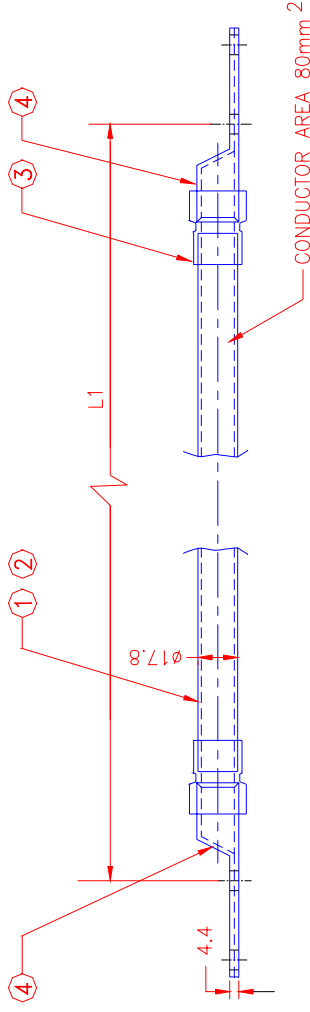


Encl : Drg. SKEL. 4396 ( Sheet 1 & 2 ) 4397

(R. K. Kulshrestha )  
for Director General/Electrical







NOTES:-

- 1. MINIMUM CONTACT AREA OF TERMINAL TO INSULATOR 26mm x 39mm
- 2. REF 1 & 2 ARE FLAME-RETARDANT FLUONLEX INSULATED WIRE (WFM2) SPECN NO E0028 OR EQUIVALENT

4	SOLDERLESS TERMINAL	8	ETP Cu-99% IS:1897'83
3	INSULATION TUBE	4	SILICON RUBBER HIT A0251
2	CABLE (L1 624)	2	WFM2-80mm 2 E0028
1	CABLE (L1 619)	2	WFM2-80mm 2 E0028
REF	DESCRIPTION	QTY	MATL SPECN
REF:-	SCALE:-	NTS	APPROVED BY:- FOR D.G.

TRACTION MOTOR TYPE TAO-659  
LEAD WIRE

RDSO.ELEC.DTE. SK.EL-4397

