

Government of India
Ministry of Railways
Research Designs & Standards Organisation
Manak Nagar , Lucknow - 226011

No. EL/3.2.11

Dated - 29-12-94

MODIFICATION SHEET NO. RDSO/WAM4/184

1.0 Title of the modification

Tolerances between motor bars and slots to be adopted on M/s Jyoti make of Arno Convertor.

2.0 Application to class of electric locomotives :

All electric locos which are fitted with Jyoti make of Arno Convertor.

3.0 Object of modification :

3.1 Railways have reported regarding the cracking of rotor bars of arno convertor. Detailed investigation into the failure and discussions with M/s Jyoti revealed that these defects are caused mainly by thermal stresses produced as a result of the expansion and contraction of the bars and end ring during starting, running and rest.

3.2 In order to arrest the cracking of rotor bars in service, it is emphasised the need for providing adequate but not excessively tight fits between the copper bar and the slots. In view of this a modification is being issued to follow carefully, the dimension and tolerances on the bars and on the slots of the rotor to be adopted.

4.0 Material Required :

4.1 Copper rotor bar as per IS: 1897 latest.

5.0 Details of modification or works to be carried out.

5.1 Examine the working drawing , dimension, tolerances relating to rotor bars and slots.

5.2 Railways are advised to follow the following dimensions as furnished by M/s. Jyoti :-

Dimension	Nominal	Minimum	Maximum
Slot width	7.11	7.085	7.135
Copper bar width	6.5	6.39	6.61
Tolerance between			
slots & bar	-	0.475	0.745
Slot height	20.37	25.345	20.395
Copper bar height	20	(Not specified in IS:1897)	

5.3 Following tolerances should be adopted on the rotor bars :-

Bar width	$6.5 \pm 0.11 \text{ mm}$
Bar height	$20 + 0.0 \text{ mm}$ $- 0.1 \text{ mm}$

The above tolerances will ensure that the minimum clearance is 0.345 mm. However, radial clearance has not been clearly defined in the drawings and in IS:1897 But M/s Jyoti has advised that this radial clearance will be about 0.4 mm.

- 5.4 In order to achieve the radial clearance of 0.4 mm the rotor bars must all be firmly bedded down in the core slots.
- 5.5 While repairing any rotor with cracked bars, it is desirable to replace all the bars and both the end rings i.e. old bars and rings should not be reused.
- 5.6 Rotor bars should be "Araldited" only in the middle third of the rotor slots leaving the end third portion free for expansion and contraction.

6 Modification Drawing. No. SK. EL.-4318

7 **Agency for implementation :**

All electric loco sheds and shops of Indian Railways.

8 **Periodicity of modification :**


To be carried out whenever rotor bar is required to be changed.

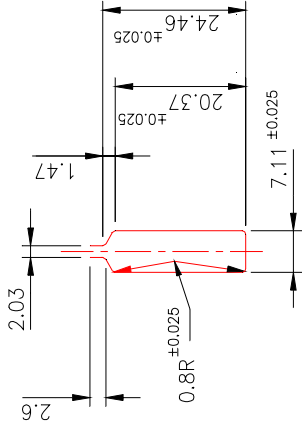
9 **Bibliography :**

Retest on "Reliability engineering study on electric locomotives" prepared by RITES in the month of July,1992 for Arno failure.

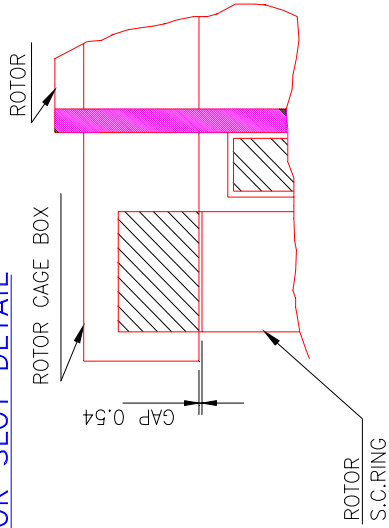
10 **Distribution :**

As per enclosed list.

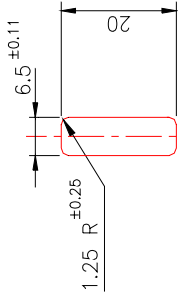

(R.K. Kulshrestha)
for Director General/Elec.



ROTOR SLOT DETAIL



S.C.RING & CAGE BAR ASSY.



C.U. GAGE BAR SECTION
DETAIL (IS : 1897)

REF :	SCALE 1 : 1	APPROVED	FOR DG
DETAILS OF ROTOR SLOT CAGE BAR AND S.C.RING FOR 120KVA ARNO CONVERTOR OF M/S JYOTI MAKE			
R.D.S.O. ELECT. DTE.		SKEL-4318	

Dt.	01.12.94
T	S. CHANDRA
D	S.K. SRIVASTAVA

