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सत्यमेव जयते

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Research, Designs & Standards
Organization, Lucknow – 226011

No. EL/3.2.182 Dated 21.02.2013

Modification Sheet No. RDSO/2013/ EL/MS/0422(Rev.`0')

1. **Title:**

   Use of 5 mm solid end plates in pace of existing 5 x 1 mm thick spot welded laminated end plates assemblies in stators & rotors of traction motor type 6FXA 7059.

2. **Object:**

   2.1. Premature failures of traction motors type 6FXA 7059, used in WAP5 locomotives, have been reported on account of breakage of teeth of end punching of rotors. Uprooting/ breakage /skewing of teeth of end punching of rotors damages the stator windings, leading to pre-mature failure of traction motors. Root cause analysis of damaged end plate assemblies attributes to improper spot welding of end plate assembly. Similar problems have been observed in stators.

   2.2. Quality of resistance spot welding depends on selection of procedure for spot welding parameters viz. electrode diameters, current & pressure , inter spacing of two welds and troubleshooting procedure in case of bad quality spot weld. In addition to the above, damage to these teeth takes place during transportation and handing. Strict process control for proper quality of resistance spot welding and good handling & transpiration practices can only prevent such failures.

   2.3. CLW and other manufacturers of traction motors source these end plate assemblies from approved vendors of CLW. In spite of various corrective measures taken in the past, inconsistency in the quality of resistance spot welding has been observed time and again, which has led to such failures.

   2.4. In order to avoid this problem, worldwide leading manufacturers of traction motors have switched over to solid end plate assemblies from laminated end plate assemblies. A study has been carried out to study the effect of replacement of laminated end plate assemblies with solid end plate assemblies, which suggests insignificant effect on the performance of the motors.

3. Existing arrangement:

3.1. At present rotor and stator end plate assemblies used in traction motor type 6FXA 7059 consists of five numbers of 1mm thick stampings joined together by resistance spot welding and provided at both ends of rotor and stator stampings.

3.2. Based on the study carried out by RDSO on failed traction motors and material lying on shop floor, following defects on end plate assembly were identified

3.2.1. Uprooting of teeth
3.2.2. Breakage of teeth
3.2.3. Skewing of teeth
3.2.4. Damage of end plate assembly during transportation

3.3. The type of defects observed on damaged end plate assembly are attributed to the following reasons

3.3.1. Improper spot welding of end plate assembly
3.3.2. Inadequate packing of end plate assemblies to avoid damage during transportation and handling.
3.3.3. No standard procedure to weed out defective/damaged end plate assemblies

3.4. Inconsistency in process control resistance spot welding and inappropriate handing of laminated end plate assemblies lead to breakage/uprooting/skewing of teeth.

4. Modified arrangement:

4.1. To eliminate this defect so as to avoid premature failures on traction motors in service, a study has been carried out in RDSO for using solid end plate of 5 mm thick in place of five numbers of 1mm thick stampings joined together by resistance spot welding for rotors and stators of traction motor type 6FXA 7059.

4.2. The effect of using solid end plate has been evaluated by calculating iron losses and it is observed that effect of increased eddy current loss is insignificant and will not affect the performance of the traction motor. Further these solid end plates will provide better grip and compactness on rotor and stator cores and the existing problem of uprooting/ breakage /skewing of teeth of end punching of rotor and stator will be eliminated permanently.

4.3. To carry out this modification, 5 mm thick solid end plates shall be used in place of existing laminated end plates made of five numbers of 1mm thick stampings joined together by resistance spot welding for rotors and stators.

4.4. There shall not be any other change in the bill of material or process for manufacturing of rotors and stators for traction motor type 6FXA 7059.

5. Application of Class of locomotives:
WAP5 class of locomotives

6. Material Required:
6.1. Two number solid stator end plates as per drawing no SKEL-4887 Rev '0'.
6.2. Two number solid rotor end plates as per drawing no SKEL-4888 Rev'0'.

7. **Material rendered surplus:** Nil

8. Modified drawing:

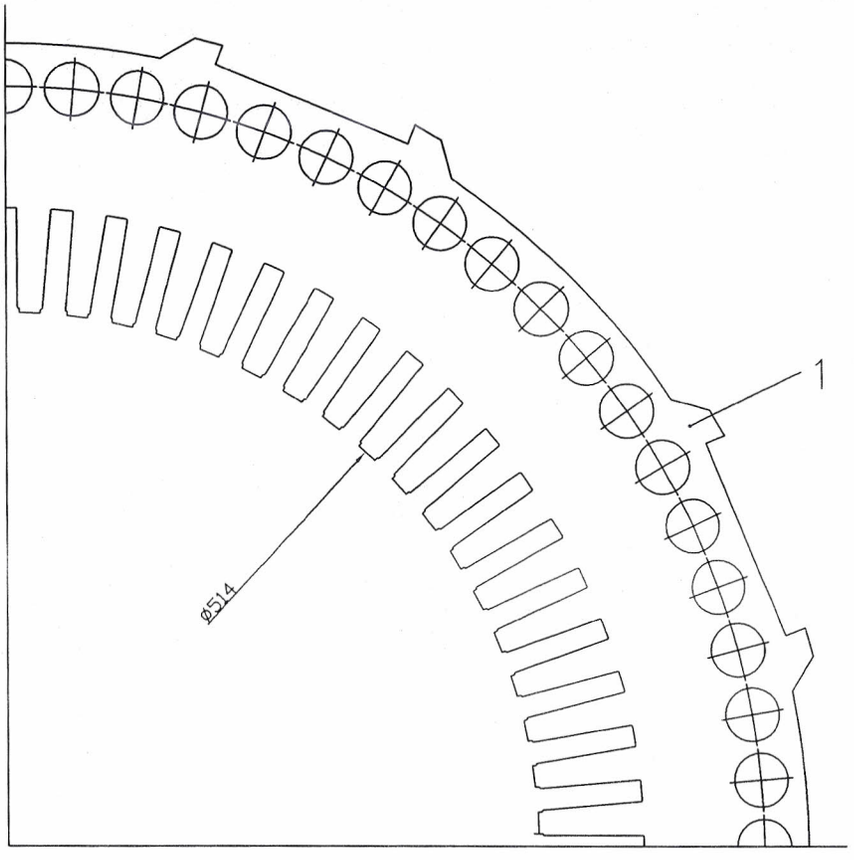
8.1. SKEL-4887 Rev'0' For Solid Stator End Plate for TM type 6FXA 7059.
8.2. SKEL-4888 Rev'0' For Solid Rotor End Plate for TM type 6FXA 7059.

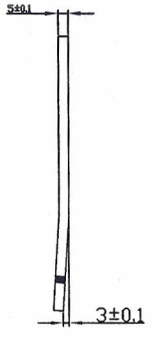
9. Agency of Implementation:

9.1. CLW and all traction motor manufacturers
9.2. All manufacturers of stators and rotors
9.3. Repair agencies carrying out repair of rotors and stators in replacement of the rotor /stator stampings is required.

21/2/12

(Ganesh)
For Director General (Elect)





Note:

1- Dimensions of solid stator end plate are as in CLW drawing no 1TWD.0097.001 (Five numbers of 1 mm thick spot welded stator end plate has been replaced by 5 mm thick stator end plate).

2- Material of stator solid end plate shall be S690QL as per DIN_EN 10137 -2.

3- The cambering shall be provided on rotor end plate assembly in opposite direction for lower & upper end plate for each motor set & upper plate shall be marked as 'X' and lower plate shall be marked as 'Y' .

4. Firms identification mark should be punched on outer surface of teeth portion at 2 locations

	1	SOLID STATOR END PLATE	-	2	S690QL	DIN-EN 10137-2
REF.	PART NO.	DESCRIPTION	DETAIL DRG. NO.	NO./TM	MATL.	SPEC.

REF. CLW DRG.NO. 1TWD.0097.001 | SCALE : NTS | APPD. BY. FOR DG

SOLID STATOR END PLATE FOR TM 6FXA 7059

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SUPERSEDES ——

RDSO.ELECT.DTE. SKEL-4887 Alt. '0'

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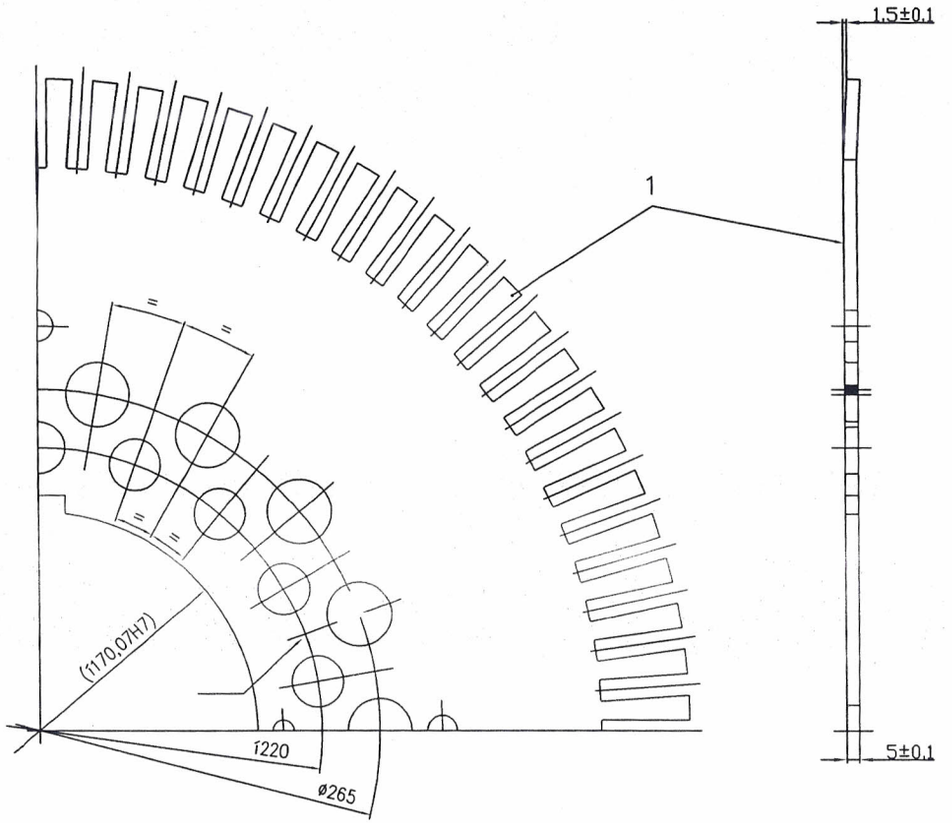

Note:

1-Dimensions of solid rotor end plate are as in CLW drawing no 2TWD.097.002(Five numbers of 1 mm thick spot welded rotor end plate has been replaced by 5 mm thick rotor end plate)

2-Material of rotor solid end plate shall be S690QL as per DIN_EN 10137 -2.

3.- The cambering shall be provided on rotor end plate assembly in opposite direction for lower & upper end plate for each motor set & upper plate shall be marked as 'X' and lower plate shall be marked as 'Y'.

4. Firms identification mark should be punched on outer surface of teeth portion at 2 locations.

.	1	SOLID ROTOR END PLATE	-	2	S690QL	DIN-EN 10137-2
REF.	PART NO.	DESCRIPTION	DETAIL DRG. NO.	NO./LOCO	MATL.	SPEC.

REF. CLW DRG.NO. 2TWD.097.002 | SCALE : NTS | APPD. BY. FOR DG

SOLID ROTOR END PLATE FOR TM 6FXA 7059

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SUPERSEDES ——

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RDSO.ELECT.DTE. SKEL-4888 Alt. '0'

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