Introduction

Traction motor is one of the most important equipment of AC electric locomotives. Traction motor type HS-15250A is being used in AC locomotives type WAG-5, WAG-7, WAP-4 and AC/DC locomotive WCAM-3.

Technical Data

Model	: HS15250A
Type	: Forced ventilated, DC series motor
Minimum field strength	: 40%
Insulation class	: Class 'C' (200)
Number of poles	: 6

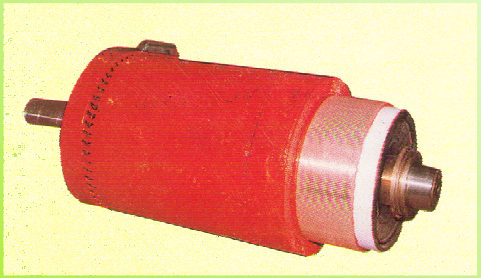
Rating	Continuous	One hour	Maximum Values
Voltage	750V	750V	900 V
Current	900 A	960A	1350 A
RPM	895 rpm	877 rpm	2150 rpm
Power	630 KW	670 KW	--

Resistance Values at 25℃

Armature winding	:	0.00953 ohms ± 10%
Series field winding	:	0.00880 ohms ± 10%
Commutating pole winding	:	0.00674 ohms ± 10%

Armature Details

Core diameter	:	500 mm
Core Length	:	480 mm
Distance between bearing abutment faces	:	949 mm
Overall length of armature	:	1336 mm



Armature Bearings

	Pinion side	Commutator side
Type of bearings	NU 330	NJ324, HJ324
Manufacturer	NSK/ SKF/ FAG	NSK/ SKF/ FAG
Radial clearance of free bearing when new	0.165/0.210mm	0.155/0.195mm
Fitment between inner race and shaft	Intf = .045/0.086mm	Intf = 0.039/0.075mm
Shaft diameter at bearing seat	150 + 0.068 mm + 0.043 mm	120 + 0.059 mm + 0.037 mm
Bearing housing diameter at end shields	320 + 0.010 mm + 0.046 mm	260 + 0.009 mm + 0.041 mm
Fitment between outer race and bearing bracket	Intf = 0.046 mm to Clr = 0.018 mm	Intf = 0.041mm to Clr = 0.016mm
Charge of lubricant (total volume)	925 gm.	864 gm.

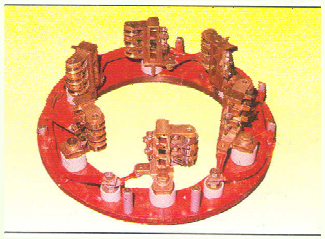
Commutator

Diameter when new	:	400mm
Minimum usable diameter	:	380mm
Riser width	:	20mm
Mica groove depth	:	Max. 2.5 mm Min. 1.2mm
Mica groove width	:	1.1 mm
Length of working face	:	146 mm
Mica thickness	:	1.16 mm
Champhring of segments	:	0.3 x 45°

Carbon Brushes

Number per brush holder	:	3
Brush grade	:	EG 105 S (ACPL) or EG 9049 (SCI) or EG 116 S (Morganite)
Brush type	:	2 split
Brush size	:	20mm x 40mm x 64mm split

Brush spring pressure	:	Max. 3.44 kg/brush ± 10% (With new brush) Min. 2.82 kg/brush ± 10% (With condemn brush)
Brush wear limit (condemn)	:	Brush length is 25 mm
Clearance bottom of brush holder to commutator	:	2~ 4mm
Gap between arc points	:	11.5 to 13.5 mm



Stator

Housing bore dia. (CE)	:	710 + 0.080 mm + 0.0 mm
Housing bore dia. (PE)	:	696 + 0.080 mm + 0.0 mm
End shield collar dia (CE)	:	710 + 0.138 mm + 0.088 mm
End shield collar dia (PE)	:	696 + 0.138 mm + 0.088 mm
Distance between TM nose lugs	:	305.75 to 304.25 mm
Distance between TM Axle cap collar	:	282 + 0.052 mm - 0.00 mm

Pole Bores (average)

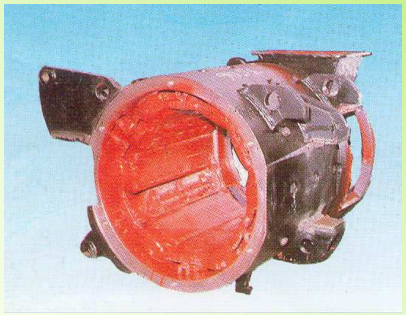
Main pole (at centre)	:	512.7 mm (Nominal air gap = 6.35mm)
Commutating pole (at centre)	:	520 mm (Nominal air gap = 10.0 mm)

Axle Suspension Tube

Roller bearing details	:	Gear end	Non gear end
Manufacturer	:	TIMKEN	TIMKEN
Type of bearing	:	Taper roller Cone M349547 Cup M349510	Taper roller Cone M249747 Cup M 249710
Charge of lubricant (total volume)		1250gm.	900gm.

Pinion

'K' value (18 teeth pinion)	:	94.491 to 94.591 mm (between 3 teeth)
'K' value (23 teeth pinion)	:	131.607 to 131.46 mm (between 4 teeth)
'K' value (16 teeth pinion)	:	96.019 to 95.881 mm (between 3 teeth)
'P' value	:	0.4 mm maximum
Advancement	:	1.92 to 2.0 mm



Lubricant

Armature bearing	:	Shell Alvania grease no.3/ Servo Gem RR3/Lithon 3
Axle suspension bearing	:	Shell Alvania grease no.3/ Servo Gem RR3/Lithon3
Gear case compound	:	Shell Cardium Compound D or F or E/ Bharat Camex Compound F/ H.P. gear tak 2.

Weight (Approx.)

Complete motor (including gear case and motor suspension unit)	:	3485 kg
Armature	:	1010 kg
Pinion	:	29 kg. (for 18 teeth pinion)

Dielectric Test Voltage

New	:	5720V, A.C. for 1 min.
Periodical checking	:	3432 V, AC for 1 min.

Flow Chart for Dismantling

Inspection Cover

Carbon Brush

Pinion Nut

Pinion

Outer bearing stopper (pinion end)

Armature

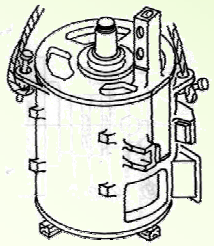
End Shield (PE)

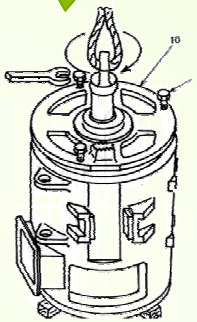
Magnet Frame

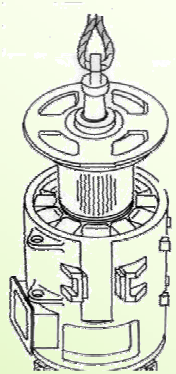
End Shield (CE)

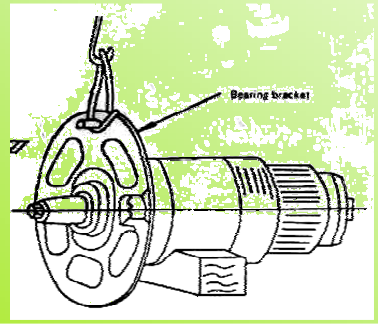
Rocker ring

Brush Holder









Flow Chart for Assembly

Magnet Frame

Armature

Deflector (pinion end)

Pinion

Pinion nut/ lock plate

Carbon brushes

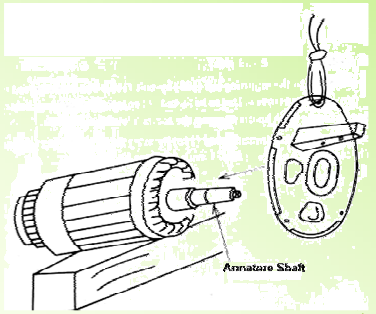
Inspection covers

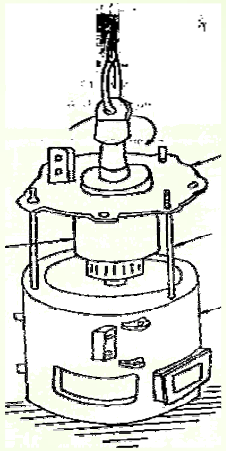
Bearing bracket (CE)

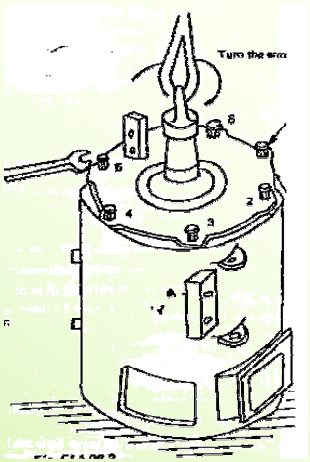
Rocker Ring

Brush Holder

Bearing Bracket (PE)







Do's

- Use torque wrench for tightening nuts & bolts as recommended tightening torque value.
- Ensure that the modifications/ special maintenance instructions are being followed.
- Ensure that the new carbon brushes are of the same grade, as the old ones, while replacing the carbon brushes.
- Ensure that the washers and locking plates are properly provided while assembling the traction motor parts.
- Use Shock Pulse Meter (SPM) for monitoring the condition of bearings and keep a record of the bearings.
- Ensure that all specified clearances are maintained properly.

Don'ts

- Don't use cotton waste or fluffy cloth for cleaning brush gear, commutator since left over fluffs or fibres may cause electrical or mechanical failures.
- Don't reuse used grease or lubricant oil.
- Don't use carbon brushes of different grades on same traction motor.
- Don't use detergent or any other volatile cleaning solvent/ agent, for cleaning inside the traction motor, junction box, insulator etc.
- Don't mix up the greases of same grade but different make.
- Don't allow the wearing of carbon brushes beyond specified condemning size.
- Don't strike the glass bind with a hammer or polish with a file. In case that the armature is set, it shall be supported by the armature core and never with the commutator or glass bind.

Disclaimer:

It is clarified that this pamphlet does not supersede any existing provisions laid down by RDSO, Railway Board or Zonal Railways. The pamphlet is for guidance only and it is not a statutory document.

If you have any suggestion or comment, please write to:

Director (Electrical), CAMTECH, Maharajpur,Gwalior (M.P.) – 474 005

Ph.0751-2470740, Fax 0751-2470841

(For Official Use Only)

भारत सरकार **GOVERNMENT OF INDIA**

रेल मंत्रालय **MINISTRY OF RAILWAYS**

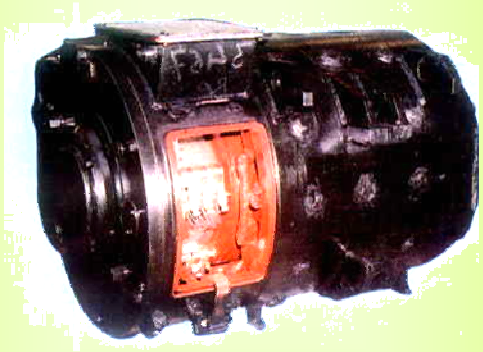
PAMPHLET

on

TRACTION MOTOR HS 15250A

CAMTECH/E/2010-11/TM-15250A

May 2010



Excellence In Maintenance

Indian Railways

Centre for Advanced Maintenance Technology

महाराजपुर, ग्वालियर – 474 005

Maharajpur, GWALIOR - 474 005