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

NO. EL / 3.2.114.3 Date : 30.3.95

SPECIAL MAINTENANCE INSTRUCTION NO. ELRS/RDSO/SMI/176

1.0 TITLE :

Fixing of Armature Spider of Motor (KPC - 1) Frame 110 VDC on the shaft of compressor 3HC - 55.

2.0 APPLICATION :

All 25 KV AC EMU's fitted with KPC make compressor type 3HC - 55.

3.0 OBJECT :

EMU's sheds of Indian Railways have reported the following type of defects on the motor compressor sets.

i) Matching of inadequate area of key way with armature bore.

ii) Free movement of the armature on the shaft, instead of press fit.

iii) Wearing of key and key way.

iv) Wear of the shaft at the tappered mating surface.

In order to prevent the above mentioned defects during repair and maintenance of the compressor set special maintenance instruction furnished below to be followed

4. PROCEDURE :

Procedure for fixing armature spider on compressor shaft.

4.1 Dummy motor shaft to be removed as follows .

4.1.1 Remove the commutator cover

4.1.2 Remove the air inlet chamber (item No. 22) by releasing the 8 nos. hex. head Screws securing the end bell.

4.1.3 Remove 4 studs securing the bearing cap (item no 5) and take out the bearing cap. Remove the locknut (item no 10) by using caliper face spanner.

4.1.4 Lift or remove all brushes (item no 7). Disconnect the end connecting leads from the brush bar and terminal board. Protect the commutator by feeding in a strip of press board under the brush holder (item No. 6)

4.1.5 Apply a lifting sling to end bell.

4.1.6 Remove the bolt securing the end bell to the frame (item no 1). Remove the end bell, with brush gear and bearing outer race, taking care to prevent damage to the commutator.

4.1.7 Remove the bearing inner race from the shaft using bearing puller.

4.1.8 Release the plate locking washer and remove the armature shaft nut (item No. 9)

4.1.9 Slightly hammer the shaft from commutator end and remove the shaft from the spider.

4.1.2 After removing the spider from the dummy shaft following precautions to be taken before assembling on to the compressor

4.1.2.1 Remove all the sharp corners on the compressor shaft and armature spider.

4.1.2.2 Clean all the matting surfaces of compressor shaft and armature spider and ensure these are free from dust and rust.

4.1.2.3 Check the dimension of key and key way of shaft and spider. Ensure key has interference fit on crankshaft and slinding fit on the spider. Ensure that there is no damage on either M 36x1.5P and M24x3P threads. Apply thin layer of anti rust oil on shaft and dome of armature spider.

4.1.3 Assembly procedure of armature on to the compressor shaft.

4.1.3.1 Lift the armature horizontally and insert it in to the compressor shaft.

4.1.3.2 Align the key and keyway and push the armature in to the shaft.

4.1.3.3 Place a collar/sleeve on to the shaft to fit against the spider face tighten the nut provided at the end of the shaft (M 24x3P). Ensure a distance of 15 mm approximately from spider face to M36x1.50 thread outer face of the shaft. For correct taper matching of crank shaft and spider armature lock nut M36x1.5P (9) is to be tightened by applying torque of 51 kg.m. After proper tightening, lock the spider with tab washer (8).

4.1.3.4 Assemble the stator on to the compressor by proper location of the spigots using appropriate hardwares.

4.1.3.5 Insert the bearing collar (item 10) and inner race of the roller bearing fix the end bell alongwith the outer race of the roller bearing.

4.1.3.6 Lock the bearing with tab washer (14) and locknut (15) tightened with a torque of 32 kg.m. Fix outside bearing cap with SHIMS (17) using hardwares provides.

4.1.3.7 Fix the armature inlet cover (22), alongwith gasket (23).

4.1.3.8 Fix all the brushes properly into the brush holder.

4.2 Procedure for checking taper angle of crank shaft and spider by blue matching method.

4.2.1 There are two types of gauges available

i) Ring gauge - To measure taper on shaft.

ii) Plug gauge - To measure taper on spider for identification, part no and/ or name of part are engraved on gauges.

Railways should procure the gauges from M/s KPC, M/s KEC for measurement.

4.2.2 Before measurement deburr and clean component thoroughly if necessary it should be lightly polished with 400 or 600 grit polish paper to remove any traces of burr.

4.2.3 Wipe taper portion of gauge and component with a clean piece of cloth.

4.2.4 Apply blue lightly and evenly on entire taper surface of gauge. The amount of blue applied is very important. Too little will not transfer the blue colour to the component. Too much blue will not show the taper defect of the component.

4.2.5 Insert the gauge on/in the component and press firmly (Refer enclosed sketch). Do not hammer or tap the gauge or else it will get locked into the component.

4.2.6 Rotate the gauge clockwise by about 10 degree. This rotation is required to transfer the blue color. Rotation should not be more then 20 degree. This back and forth movement should be once or twice only.

4.2.7 Remove gauge from component. The taper angle is satisfactory if about 90% of the gauge surface makes contact with the component. This can be seen either by appearance of blue colour from the gauge.

4.2.8 In case the blue matching is below 70%, the component needs either revisioning or replacement.

5. DRAWINGS :

i) For fixing armature on compressor shaft follow SK. EL. - 4332

ii) For checking taper angle of crank shaft and spider by blue matching method, follow SK. EL. - 4333

6. AGENCY OF IMPLEMENTATION :

All EMU shed and shop of Indian Railways where 25 KV EMU's are in service.

7. PERIODICITY OF IMPLEMENTATION :

7.1 During assembly of the compressor and motor when new and after major repairs of maintenance/overhaul in the shed/shop.

7.2 Whenever abnormal noise is observed in the compressor during normal operation.

8. REFERENCE :

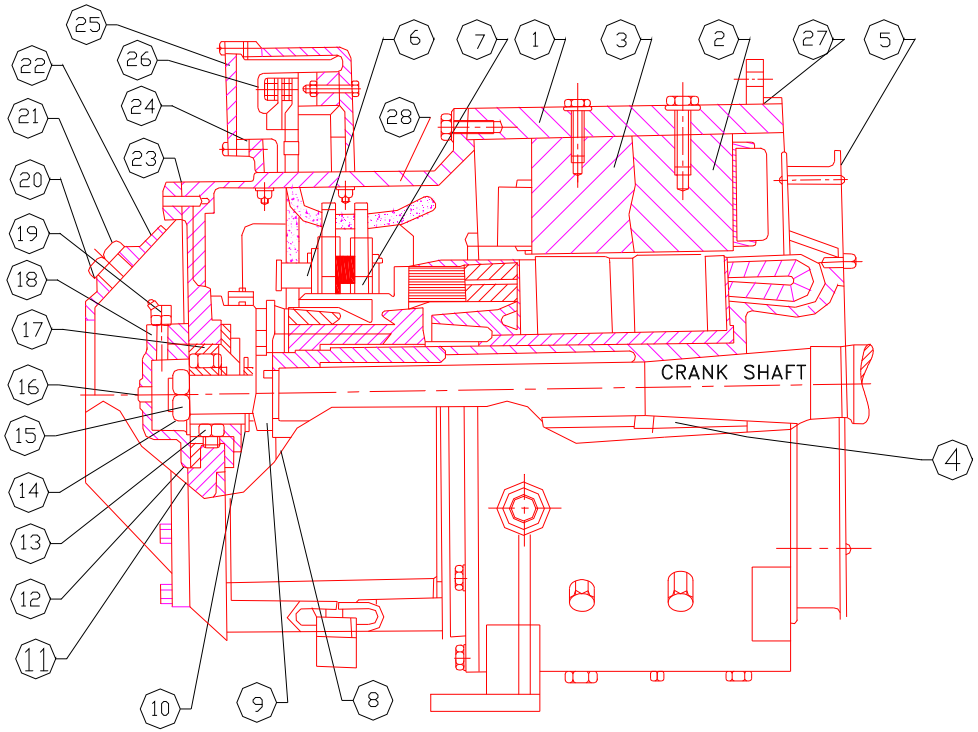
Document No. CP 2616 & CP 2618 issued by M/s KPC vide M/s KPC letter No. MKTG : ACD : HO: RBS dated 5th January 1995.

9. DISTRIBUTION :

As per enclosed list.

Enclosure : As mentioned above.

(R.K. Kulshreshtha)
for Director General (Elect.)



ITEM NO.	DESCRIPTION
1	YOKE
2	MAIN POLE SUB ASSEMBLY
3	COMM. POLE SUB ASSEMBLY
4	KEY FOR SHAFT AND SPIDER
5	ARMATURE ASSEMBLY
6	BRUSH GEAR ASSEMBLY
7	CARBON BRUSH
8	TAB WASHER
9	ARMATURE NUT
10	COLLER
11	INSIDE BEARING CAP
12	BEARING SLEEVE
13	ROLLER
14	TAB WASHER
15	HEX. LOCK NUT
16	PLUG
17	SHIM
18	OUTER BEARING CAP
19	GREASE NIPPLE
20	WASHER
21	PLUG
22	INLET COVER
23	GASKET
24	TERMINAL BOX
25	TERMINAL BOX COVER
26	TERMINAL BLOCK ASSEMBLY
27	SECURING LUGS
28	END BELL

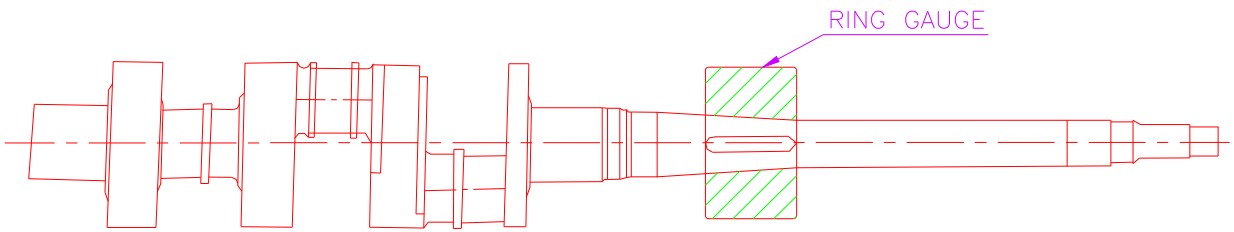
DL	B6. 12.94
D	S.CHANDRA
T	S.K. SHRIVASTAVA

REF :- KPC DOC. NO. CP. 2616	SCALE :- NTS	APPROVED FOR D.G.

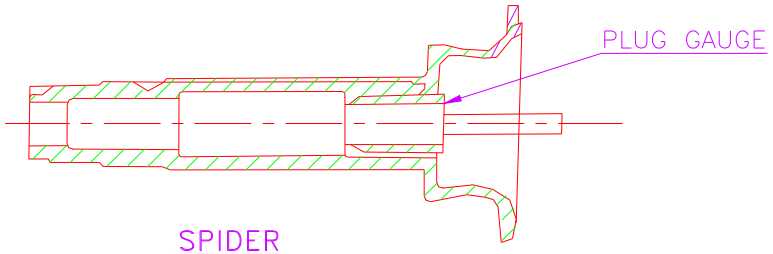
FIXING ARMATURE SPIDER ON COMPRESSOR SHAFT

(3HC-55 COMPR. WITH KPC-1 FRAME-110 VDC MOTOR)

R.D.S.O. ELECT. DTE. | SKEL-4332



CRANK – SHAFT



SPIDER

REF :- KPC DOC. NO. CP. 2618	SCALE:- NTS	APPROVED FOR D.G.

RING AND PLUG GAUGES FOR COMPRESSOR MOTOR SET

R.D.S.O. ELECT. DTE.	SKEL-4333

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D	S.CHANDRA
T	S.K. SHRIVASTAVA