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

No. EL/3.2.61 **Date25-02-1999**

MODIFICATION SHEET NO. ELRS/MS/0254

1.0 TITLE

Replacement of existing Rotary Auxiliary Switch with Double Break fishbonetype Auxiliary Switch on Alstom make Vacuum Circuit Breaker type 20 CB.

2.0 OBJECT

A large number of cases of cam meltings and contact overheating of Rotary Auxiliary Switch of VCB type 20 CB resulting in line failure have been reported by the Railways. Investigation shows that these failures are mainly due to inadequate design of the rotary auxiliary switch. In order to over come the failures of VCBs on account of usage of rotary auxiliary switches, it has been decided to replace them with double break fishbone type auxiliary switches which have performed satisfactorily in Air Blast Circuit Breakers type DBFT.

3.0 WORK TO BE CARRIED OUT

(A) To dismentle the existing auxiliary switches, the following procedure, step wise is to be followed.

- Remove the VCB from the locomotive/EMU.
- Mount the VCB on a swiveling trolley and secure it to the trolley base.
- Turn the VCB upside down for accessing the auxiliary equipments.
- Remove the base plate cover.
- Remove all the control wires connected to the auxiliary switch.
- Unscrew the two numbers M6 nuts of the auxiliary switches mounting bracket and remove the switch.
- Loosen the grommets on the support plates.
- Unscrew the 6 Nos. into to remove the existing one piece support plate from the base.

(B) Fitment of the Fish-bone type-Auxiliary Switch

- To fit the fish-bone type auxiliary switch (RDSO Ref. Drg. No. 4509), the following procedure, step-wise is to be followed.
- Fit the two halves of the new support plates (Pt. No. 1 & 2) on the VCB base plate with 6 Nos. M6 nuts along with spring washer and plain washer. Tighten the nuts fully.
- Fit the grommets back on the respective holes of the support plates.
- Ensure that the FRP/Permali operating rod does not slip out of its crank pins on the other end. If it comes out, guide it back into position.
- Place the bracket (Pt. No. 3), brass bush and plate (Pt. No. 7) and Cam & coupler shaft assy. (Pt No.6) on the fixing pillar of support plate No. 1. The slotted groove of the coupler should slide-in on the downed pin ends of the FRP operating rod holding the assembly with one hand.
- Ensure that the smooth and curved portion of the cam face is facing the roller of auxiliary switch.
- Apply a small quantity of moly kote HT17 grease on the mating surfaces of the auxiliary switch roller and cam and also roller bracket and thrust plate.
- Place the fishbone auxiliary switch above the bracket (Pt. No.3) and fasten it to the fixing pillar using 2 Nos. M10 socket head cap screws along with M10 spring washer and plain washers. Tighten using M10 Allen Key.
- Fit the bracket (Pt. No.4) on the fixing pillar of support plate No. 2 using 2 Nos. M10 nuts, spring washer and plain washers. Before tightening fully, ensure that the center of the M8 boss welded on the bracket (Pt. No. 4) matches with countersunk hole of the camshaft. For easily locating the center, screw the special screw in the M8 welded boss on the bracket with M8 lock out. Advance the screw until it just touches the countersunk on the camshaft and it is centrally aligned. At this position, fully tighten the 2 Nos. M10 nuts to fix the bracket firmly.
- Lock the special screw lock nut against the boss on the bracket.

NOTE:

1. This will ensure that the cam face will always be in line with the auxiliary switch roller face and also arrests the vertical movement of the camshaft.
2. At the same time care should be taken not to over tighten the special screw as it might jam the rotary movement of the cam.

- Wire the auxiliary contacts in the same manner as it was previously done. The fishbone type auxiliary switch has a max. of 6 Nos. contacts. The first two (near to the spring and roller) are NC and the balance 4 NO. This configuration can be varied as per need, if required.
- Tie the entire wire harness to the base of the support plate using the nylon cable tie-bars.

(C) OPERATION CHECKS

- Connect air supply (5 Kg/cm sq.) to the VCB.
- Operate the VCB manually by pressing the armature plate of Magnet valve assembly.
- Observe the movement of the cam. It should operate smoothly. Ensure that in the VCB closed condition, the cam should have risen to its maximum position with the auxiliary switch roller resting on the outermost circumference of the cam.
- Repeat the operation 20 times.
- Check NO & NC connections of auxiliary switch using a continuity tester.
- Replace the base plate cover and fasten it to the base.
- Turn the VCB on the swiveling trolley.
- Remove the VCB from the trolley.
- VCB ready for installation in the locomotive/EMU.

4.0 APPLICATION TO CLASS OF LOCOMOTIVES

All locos and EMUs fitted with VCB type 20 CB.

5.0 MATERIAL REQUIRED

I. Double break fishbone type auxiliary switch along with its fittings.

II. Support plates 1 & 2 with their fixing arrangement.

6.0 MATERIAL RENDERED SURPLUS

I. Existing rotary auxiliary switch and its fittings.

II. Existing support plate and its fixing arrangement.

7.0 REFERENCE

I. Item 6 of the MoM held between railways and M/s Alstom in Sept. 98.

II. Modification Sheet of M/s Alstom.

8.0 MODIFICATION DRAWING

RDSO SKEL No.4509

9.0 AGENCY OF IMPLEMENTATION

(a) All Electric Loco Sheds/ EMU car sheds during AOH/IOH or whenever the VCB is received for any repair/attention.

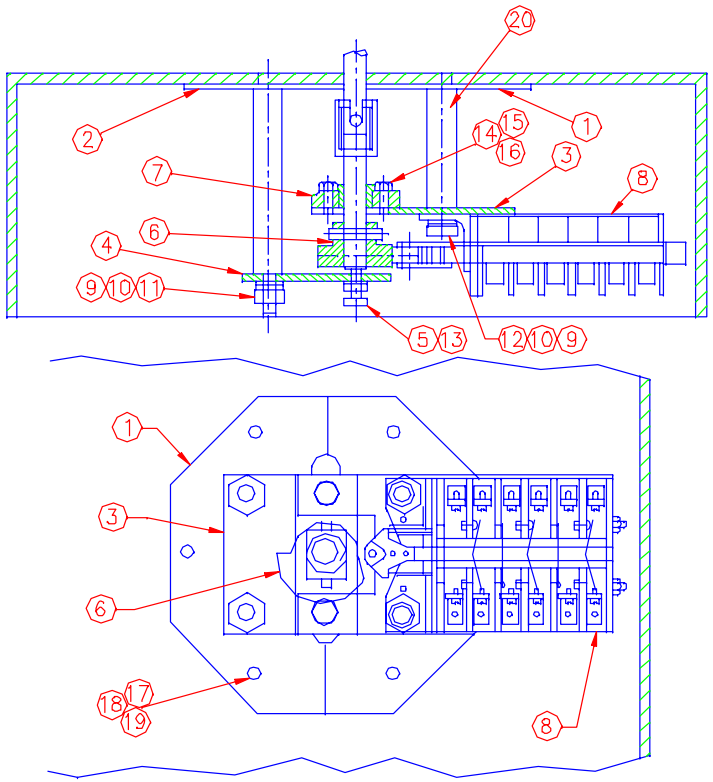
(b) POH shops during POH.

10.0 DISTRIBUTION

As per enclosed list.

(SIYA RAM)

For Director General (Electrical)



REF. No.	PART No.	DESCRIPTION	DETAIL DRG.	QTY/SET	MATL.	SPEC.
20	20	PILLAR		2		
19	19	PLAIN WASHER M8		6		
18	18	S/C SPG. WASHER		6		
17	17	HEX. NUT M6		6		
16	16	M6 PLAIN WASHER (S.S)		4		
15	15	M6 S/C SPG.WASHER (S.S)		4		
14	14	HEX. HD. SCREW M6 x 16		4		
13	13	HEX. NUT M 8 (S.S)		1		
12	12	HEX.SKT HD. CAP SCREW M 10 x 16 LG.		2		
11	11	HEX. NUT M10		2		
10	10	S/C SPG. WASHER M10		4		
9	9	PLAIN WASHER M10		4		
8	8	AUX. SWITCH (FISH BONE)		1		
7	7	BRASS BUSH WITH PLATE		1		
6	6	ASSY. OF SHAFT & CAM		1		
5	5	SPECIAL SCREW		1		
4	4	BRACKET		1		
3	3	BRACKET		1		
2	2	SUPPORT PLATE		1		
1	1	SUPPORT PLATE		1		

REF. | SCALE | APPD. BY (FOR DG.)

ARRANGEMENT OF FISH BONE TYPE AUX. SWITCH FOR VCB TYPE 20CB

FIRST ISSUED

SUPEREDES

SUPEREDES BY

R.D.S.O. ELEC. DTE

SKEL 4509

Dt.	15.2.99
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STATUS	ALT.	REF.No.	DESCRIPTION	APPD.BY	DATE