No. EL/3.2.19/2 Dated- 29 .11.2004

Chief Electrical Engineer,
- Central Railway, Mumbai CST- 400 001.
- Eastern Railway, Fairlie Place, Kolkata- 700 001
- East Cost Railway, Chandrashekharpur, Bhubaneshwar- 751 016.
- Northern Railway, Baroda House, New Delhi-110 001
- North Central Railway, Hasting Road, Allahabad-211 001.
- Southern Railway, Park Town, Chennai-600 003
- South Central Railway, Rail Nilayam, Secunderabad –500 071
- South Eastern Railway,Garden Reach, Kolkata -700 043
- South Western Railway, Hubli.
- Western Railway, Churchgate, Mumbai–400 020
- West Central Railway, Jabalpur-482001
- South East Central Railway, Bilaspur-495004
- East Central Railway, Hazipur-844101 (Bihar)
- North Western Railway, Jaipur-302006.
- Chittaranjan Locomotive Works, Chittaranjan- 713 331

SPECIAL MAINTENANCE INSTRUCTION NO. RDSO/ELRS/SMI/0231, REV. '0'

1. Title :

Maintenance Practices Schedules Do's and Don't to be followed for P_1 & P_2 Pressure Switches used in Auto Flasher Circuit for Electric Locomotives.

2. Brief History :

Railways are reporting poor performance of RT 116 X. (P_1 & P_2 Pressure Switches) used in the automatic flasher light circuit. The major problem is attributed to the disturbance in the setting of pressure switches P_1 & P_2, because of very close settings i.e P_1 - N/C contact opens at 4.8 kg/cm^2 & closes at 4.5 kg/cm^2 and of P_2 - N/C contact opens at 4.7 kg/cm^2 & closes at 4.4 kg/cm^2. The difference between settings of P1 and P_2 Pressure Switches is only 0.1 kg/cm2, due to which frequent mal-operation of the AFL circuit have been reported by Railways. RDSO has studied this problem in detail and it has been observed that there is no uniform procedure available with Loco Sheds to set the pressure switches clearly mentioning the various " Do's & Don't" to serve as a guide for the maintenance staff of Electric Loco Sheds. This results in improper setting of pressure switches causing mal-operation of the AFL circuit.

3. Object :

To provide the uniform procedure and explicit Do's **& Don't** to the maintenance staff for correct pressure setting of P_1 and P_2 Pressure Switches. The pressure setting of P1 & P_2 are: -

P1	4.8 kg/cm^2	Cut out
	4.5 kg/cm^2	Cut In
P2	4.7 kg/cm^2	Cut out
	4.4 kg/cm^2	Cut In

4. Procedure for Setting of Pressure Switches :

Pressure switch (Type RT) is a controlled double pole change over switch, the contact position of which depends upon the pressure inlet. The bellow of the pressure switch is connected to the process line that controls the inlet pressure. When pressure in the inlet increases, the bellow is actuated so that the main spindle moves upwards and overcome the force of the range spring and operates the micro switch. When the pressure of the bellow decreases, the spindle moves down and the micro switch is again operated to normal position.

The procedure for adjustment of pressure switches is given below: -

i) The pressure value on the pre-calibrated scale indicates the setting value of the pressure switch that can be adjusted by moving the range adjusting spindle. By the movement of range adjusting spindle, the differential pressure of the switch will not change, only the upper and lower limit will change.

ii) The upper and lower limit of differential pressure will vary by varying the differential roller at the same set value.

iii) Mount the Pressure Switch on the test bench as shown in the **Drg. No. SKEL-4687 Alt. '0'** and connect lamp on the terminal of pressure switch as per circuit shown.

iv) The pressure gauge of least count of 0.1 kg/cm^2 of diameter 10" properly calibrated should be mounted in parallel to pressure switch.

v) Remove the seal cap and by using proper size of spanner rotate the range adjusting spindle in such a way that the pointer on the pre-calibrated scale should be between 4 and 5.

vi) As the required differential is 0.3 kg/cm^2 which is equal to the minimum differential setting of RT 116 X pressure switch, hence, to set the required value rotate the differential roller to the position between 1 & 2 on the differential roller.

vii) Increase the pressure gradually till the first change takes place and yellow lamp will glow. Then reduce the pressure gradually to reduce the pressure so that change over takes place and yellow lamp will extinguish and the red lamp will glow.

viii) Note the reading on the pressure gauge. If it is other than 4.5 kg/cm^2 rotate the range spindle clock-wise for decreasing the pressure and anti-clockwise for increasing pressure and repeat the step (vii) above till the adjustment of 4.5 kg/cm^2 is obtained. Repeat the test 2-3 times till the reading of 4.5 kg/cm^2 is stabilized.

ix) Increase the pressure from 4.5 kg/cm^2 gradually till the yellow lamp glows. Note the reading of pressure gauge.

x) If the reading is other than 4.8 kg/cm^2 rotate the differential roller slightly and repeat the steps (ix) above till the required value is obtained. Repeat the test 2-3 times till the reading of 4.8 kg/cm^2 is stabilized.

xi) After proper adjustment, tighten the locking screw on the differential roller carefully with the help of screwdriver. Tighten the sealing cap on the range-adjusting spindle carefully. Ensure while tightening that differential roller and range spindle should not move. After tightening, check the set points again, if the set values are found within specified value, fix the metallic cover on the switch.

DO's

- Always use proper calibrated pressure gauge for accurate setting of the switch. The scale provided on the pressure switch is only for reference purpose.
- Ensure that the pressure gauge should be of least count lesser than or equal to the specified repeatability of the pressure switch i.e. 0.1 kg/cm^2 .
- Before adjusting the differential value, ensure that the locking screws provided on the differential roller should be unscrewed.
- After adjustment of the set values tightening the locking screw provided on the differential roller should lock the differential roller.
- Always use proper size of screwdriver for locking / unlocking of differential locking screw.
- Ensure proper electrical connections to the terminals using proper size of thimbles.
- After fixing the pressure switch at its position the metallic cover to be fixed tightly to ensure no ingress of dirt or water.
- For panel mounting, use the screws and nut provided along with every switch by the supplier to ensure rigid fixing of the pressure switch to the panel to avoid disturbance of the setting due to undue vibrations.
- For adjusting the range adjusting spindle use proper size of 'D' spanner for adjustment

DON 'T

- Do not disturb the position of the guide knob or the spring retainer position, as these are set by the manufacturer.
- Do not disturb the spring connected between the micro-switch and its operating lever. If disturbed, this can lead to mono stable condition of the micro switch and the specified differential values can't be achieved.
- Do not over tighten the differential locking screw.
- Do not try to inter change the components or dismantle the switch for maintenance purpose.
- Do not use Pliers for adjusting the range adjusting spindle.

5. <u>Application to</u> :

All Electric Locomotives.

6. <u>Agency of Implementation</u> :

All Electric Loco Sheds, POH Shops & CLW.

7. <u>Periodicity of Implementation</u> :

Whenever P_1 & P_2 pressure switch require adjustment or new fitment of pressure switch.

8. <u>Reference</u> :

EDEE (RS), Railway Board's letter No. 2002/Elec.(TRS)/441/1 dated 27.02.2004.

(S. K. Sinha)

Encl: Drg. No. SKEL -4687, Alt. '0' for Director General/Elect.

Copy to : As per Standard Mailing List No. EL/M/0019

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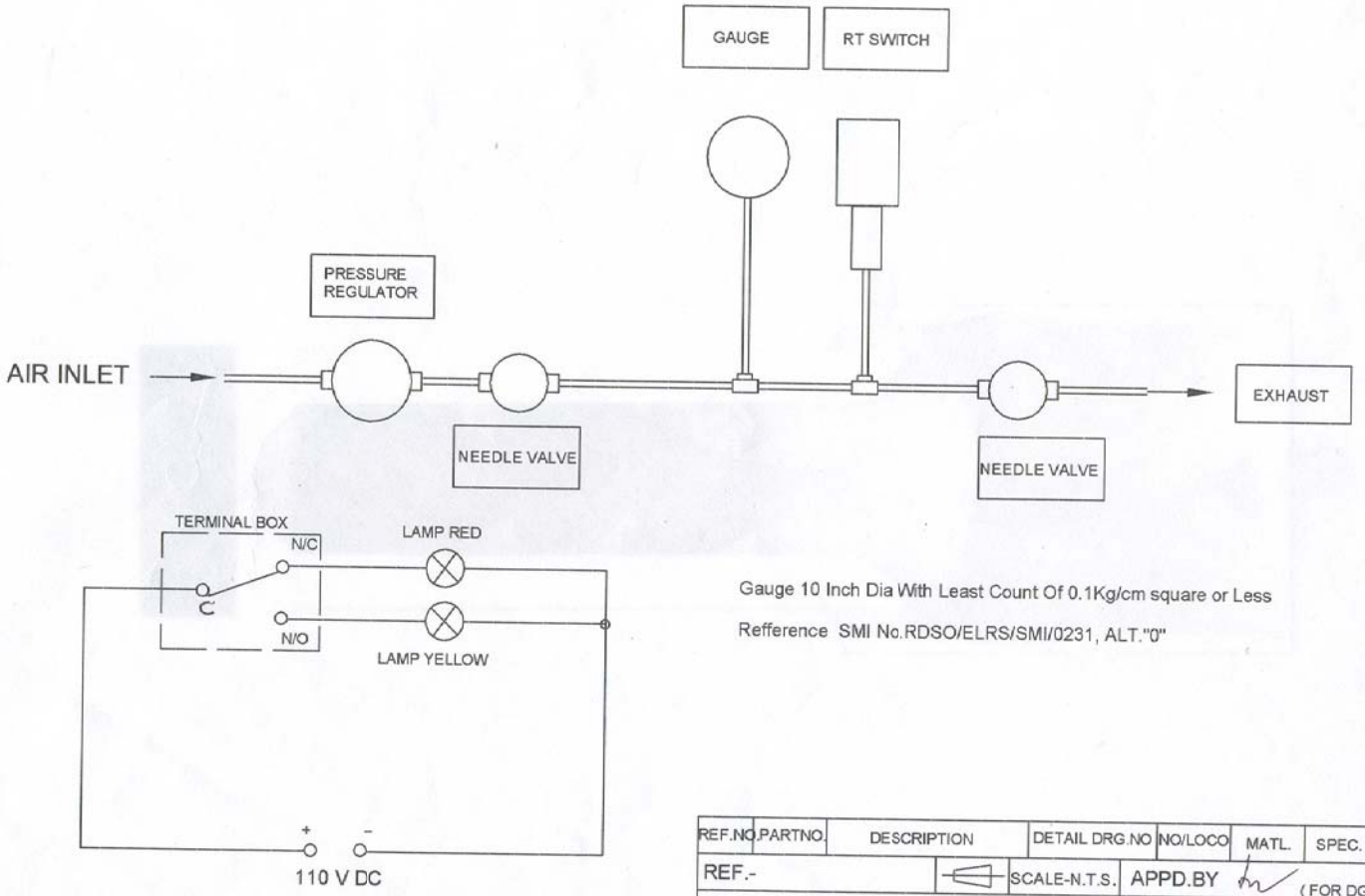
PIN

(S .K. Sinha)

Encl: Drg. No. SKEL 4687, Alt. '0' for Director General/Elect.



Gauge 10 Inch Dia With Least Count Of 0.1Kg/cm square or Less

Refference SMI No.RDSO/ELRS/SMI/0231, ALT."0"

REF.NO.	PARTNO.	DESCRIPTION	DETAIL DRG.NO	NO/LOCO	MATL.	SPEC.
REF.-			SCALE-N.T.S.	APPD.BY	(FOR DG)	

Dt.	18.11.2004
D.	K.P.NIGAM
C.	M.C.Mahant
T.	

STATUS	ALT	REF.NO.	DESCRIPTION	APPD.BY	DATE

TEST RIG FOR TESTING OF RT PRESSURE SWITCH

FIRST ISSUED - NOV.2004

SUPERSEDES -

SUPERSEDED BY -

RDSO. ELECT.DTE | SKEL- 4687, ALT."O"