भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
EPBX (0522) 2451200
Fax : 0522 - 2452581

Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
DID (0522) 2450115
DID (0522) 2465310

No. EL/3.2.15 (Oil Free)

Dated 25.04.2016

Chief Electrical Engineer,

- Central Railway, Mumbai CST – 400 001.
- Northern Railway, Baroda House, New Delhi 110 001.
- North Central Railway, Hastings Road, Allahabad- 211001
- Eastern Railway, Fairlie Place, Kolkata -700 001.
- East Central Railway, Hazipur-844101.
- East Coast Railway, Chandrashekharpur, Bhubaneshwar-751016.
- Southern Railway, Park Town, Chennai-600 003.
- South Central Railway, Secunderabad-500 371.
- South Eastern Railway, Garden Reach, Kolkata -700 043.
- South East Central Railway, Bilaspur-495004
- Western Railway, Churchgate, Mumbai-400 020.
- West Central Railway, Jabalpur-482001.
- Chittaranjan Locomotive Works, Chittaranjan-713 331 (WB)

MODIFICATION SHEET No. RDSO/2016/EL/MS/0451 Rev.'0' dated 25.04.16

1.0 TITLE:

1.0 Provision of 2 Nos. of oil free compressors of 1750 LPM each on-board mounting in WAP-4 class of Electric locomotive with modified cab fed by 180 KVA SIV.

2.0 OBJECT:

Railways have been reporting problem of MR air pressure drop on line ever since 'Duranto' train was introduced on Indian Railways while working with WAP-4 locomotives hauling LHB coaches with air suspension springs and control discharge toilets system in these trains.

It is observed that when the driver controls the train by application of brake for observing speed restrictions particularly while passing through 'ghat' section, the MR air pressure drops up to 5.3 Kg/cm^2. In the conventional rake since control toilet discharge system and air springs are not available, therefore, this problem is not observed while working the with conventional rakes by WAP-4 class of electric locomotives.

Further study reveals that the duty cycle of compressors in WAP-4 locomotives while working 'Duranto' train is more than 90%. It, therefore, has become necessary to increase the capacity of compressor and reservoir in WAP-4 locomotive keeping into account that such trains will increase in future.

3.0 EXISTING ARRANGEMENT:

In the existing WAP-4 class of electric locomotive there are two (02) compressors of 1000 LPM capacity each with air dryer in pneumatic control circuit. There are four (04) reservoirs of 150 Liter each & one (01) reservoir of 203 Liter capacity for maintaining MR air pressure and one (01) 53 liter capacity reservoir for auxiliary circuit feeding air to electro pneumatic contactors and tap changer.

4.0 MODIFIED ARRANGEMENT :

The possibility of providing two oil free compressors of 1750 LPM (FAD) capacity each in WAP-4 class of locomotives has been examined, and it is observed that two oil free compressors can be fitted in on board in the existing space.

- The Locomotives with Crew Friendly Cabs having Bi-plate/Tri plate pneumatic panel with 180 KVA Static Inverter.
- Compressor delivery pipe design to be modified.
- Electrical connection for motor to be redesigned and 10 mm^2 Power Cable 4GKW type for electrical connection of higher rating of compressor motors of requisite length and two contactors of 80/125A 750 V 3-phase, 110Vdc rating as per CLW specification No. CLW/ES/3/0095 Alt. 'C' for contactor type -3 main compressor with snubber circuit for WAG-9 electric locomotives.
- Tri-plate may be shifted 125 mm from existing 75 mm towards Rectifier side to have the better clearance for inter-after cooler of the compressor. In between the Rectifier and the tri-plate having clearance of 260mm.
- Un-loader valves to be relocated near compressors.
- The compressor can be mounted on existing available space envelop and the existing mounting arrangements with alternate bracket arrangement to fit the oil free compressor.
- Compressor unit to be reoriented to fit in onboard.

4.1 Mounting arrangements:

For providing on-board 1750 LPM capacity compressor following work has to be carried out on WAP-4 class of electric locomotive fitted with crew friendly modified cab fed by 180 KVA SIV valves and pipelines arrangements :-

i. Provision of 1750 LPM capacity compressor in existing space in front of MVMT-1 on two additional mounting channels size 150 x 75 x 10thk. x 1600mm length as per IS:2062 to be diagonally welded on long beam of the locomotive at distance between the channel 350 mm. as shown in the enclosed sketch-1.

ii. Compressor mounting pad of size as same as pads in other existing compressor with M14 tapped hole to be welded on the channel at a distance of 355 x 800 mm.

iii. Tray of existing size 600 mm x 1100 mm to be fixed up below the compressor unit.

iv. *Oil free Compressor is supplied with right orientation and with appropriate mounting bracket to facilitate easy fitment. There is no need for removing compressor unit and its mounting frame.*

v. With the rotation of compressor unit–1, the clearance with stool of MVMT-1 is reduced. To maintain proper clearance for maintenance point of view, the CP-I mounting level has to be raised by 150 mm to the level air duct plate of the MVMT-1 for maintenance purposes.

vi. RGCP setting is Cut-OUT at 10.5 Kg/cm^2 and Cut-IN pressure setting is 8.0 Kg/cm^2.

5.0 APPLICATION TO CLASS OF LOCOMOTIVES:

WAP-4 class of electric locomotives with modified cab fed by 180 KVA SIV.

6.0 MATERIAL REQUIRED:

i. Two oil free compressors of 1750 lpm (FAD) each with complete pipe line arrangement. The oil free compressors shall be type tested as per the provisions of RDSO Specification No. RDSO/2008/EL/Spec/0076 Rev.'2' of August 2013.

ii. M.S. channel size 150 x 75 x 10thk x 1600 mm lengths as per IS: 2062 -2 nos.

iii. Compressor tray size 600mm x 1100 mm or similar to existing.

iv. Fasteners like bolts, plane washers, spring washers etc. for mounting compressor, unloader valves, EMC etc. of requisite sizes and nos. of RDSO's / CLW's approved sources.

v. Welding electrodes- MMAW electrodes approved by RDSO under class A3 / B1, as per IRS M-28-02 should be used. Preferably, 4.0mm diameter of electrode shall be taken to facilitate welding work. The electrodes must be preheated to about 250º C for two hours before use. MIG/MAG welding filler wires approved by RDSO under class -1 as per IRS M-46-03 in 1.2 mm diameter can also be used. The shielding gas for MIG / MAG process shall be carbon dioxide (CO_2).

vi. Seamless or stainless steel pipe line 1¼" & ½" size with fittings requisite length. *Alternatively a flexible hose pipe of suitable length can be fitted at the air outlet point.*

vii. 10 mm^2 Power Cable 4GKW type for electrical connection of higher rating of compressor motors of requisite length and two contactors of 80/125A 750 V 3-phase, 110Vdc rating as per CLW specification No. CLW/ES/3/0095 Alt. 'C' for contactor type -3 main compressor with snubber circuit for WAG-9 electric locomotives.

viii. 2.5 mm^2 Control Cable for electrical connection of additional unloader magnetic valve of requisite length.

ix. One magnetic unloader valve Rotex make or any other make of RDSO/CLW approved source.

7.0 MATERIAL RENDERED SURPLUS:

Existing 2 Nos. of oil lubricated compressors of 1000 lpm capacity each.

8.0 REFERENCE:

Railway Board vide letter No. 2003/Elect (TRS)/440/1Pt.dated 04.02.13 have advised to issue modification to railways to provide higher capacity oil free compressors (2*1750 lpm) as on board in existing WAP-4electric locomotives during major schedules like IOH, POH, POH+RC and MTR to meet the additional air requirement of WAP-4 electric locomotive hauling coaches having air suspension spring and Controlled Discharge Toilet System (CDTS) being provided in trains.

9.0 MODIFICATION DRAWING:

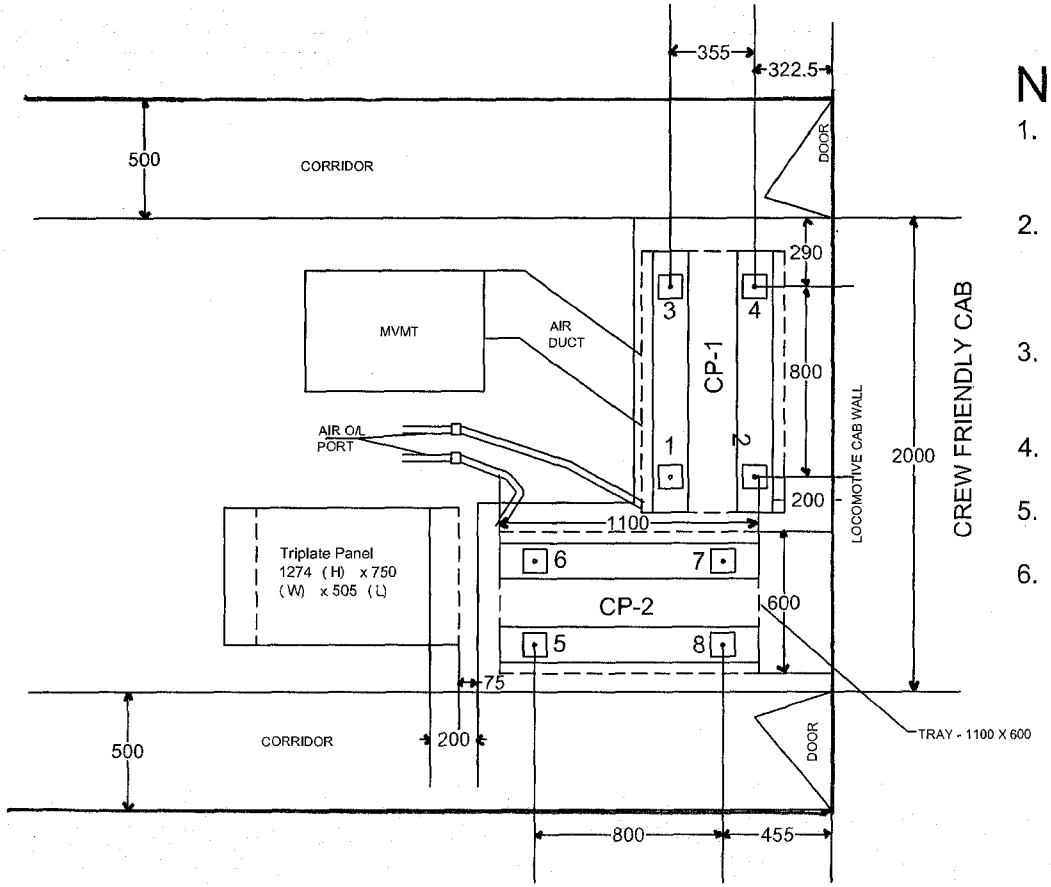
RDSO drawing No. SKEL 5010 for G.A of On-Board Mounting of 1750 LPM Capacity Oil Free Compressors on WAP-4 class of electric locomotives.

10.0 AGENCY OF IMPLEMENTATION:

All the Electric Loco Sheds & Electric Loco Workshops having WAP-4 class of locos modified cab fed by 180 KVA SIV valves layout arrangement during major schedules like IOH, POH, POH+RC and MTR.

(Kishore Vaibhav)
for Director General/Elect.

Encl: RDSO Drg. No. SKEL 5010



NOTE:

1. Tri plate pneumatic panel is to be shifted 125mm from existing location towrds rectifier side.
2. The compressor can be mounted on existing available space and the existing mounting arrangement with alternate bracket arrangement to fit the oil free compressor
3. The CP-1 mounting level is to be raised by 150mm to the level of air duct plate of the MVMT-1 for maintenance purposes.
4. All dimensions are in mm.
5. The drawing is not to scale.
6. Mounting holes for compressor is given from 1 to 8.

REF.	PART NO.	DESCRIPTION	DETAIL DRG. NO.	NO./ LOCO	MATL	SPEC

G.A. OF ONBOARD MOUNTING OF 1750LPM CAPACITY OIL FREE COMPRESSORS ON WAP4 ELECTRIC LOCOMOTIVES	FIRST ISSUED April 2016
	SUPERSEDES
RDSO. ELECT. DTE SKEL5010	SUPERSEDED BY

Dt	25.04.16
D	V.K.Gupta
C	A J Singh
T	

STATUS	ALT.	REF. NO	DESCRIPTION	APPD. BY	DATE