

4751081/2026/O/o WM/Design/DMW/PTA

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भारतसरकार-रेलमंत्रालय  
 अनुसंधानअभिकल्पऔरमानकसंगठन  
 लखनऊ- 226011  
 Government of India - Ministry of Railways  
 Research, Designs & Standards Organization,  
 LUCKNOW - 226011

No. EL/3.35.17

Dated: 12/01/17

**Chief Electrical Engineers;**

- Central Railway, HQs Office, 2<sup>nd</sup> floor, Parcel Office Bldg., Mumbai-400 001
- East Central Railway, Hajipur (Bihar)-844 101
- Eastern Railway, Fairlie Place, Kolkata – 700 001
- East Coast Railway, Railway Complex, Bhubneshwar – 751 023
- Northern Railway, Baroda House, New Delhi-110 001
- North Central Railway, Allahabad – 211 001
- South East Central Railway, Bilaspur-495 004
- South Central Railway, HQs Office, Rail Nilayam, Secunderabad-500 071
- South Eastern Railway, Garden Reach, Kolkata- 700 043
- Southern Railway, Park Town, Chennai – 600 003
- West Central Railway, HQs Office, Opp. Indira Market, Jabalpur-482 001
- Western Railway, Churchgate, Mumbai – 4000 020

**Modification Sheet No. RDSO/2017/EL/MS/0457(Rev.0)****1.0 Title:**

Modification in cooling circuit of M/s BHEL make IGBT based traction converter to prevent air locking, spillage of coolant and fluctuation in coolant level.

**2.0 Object:**

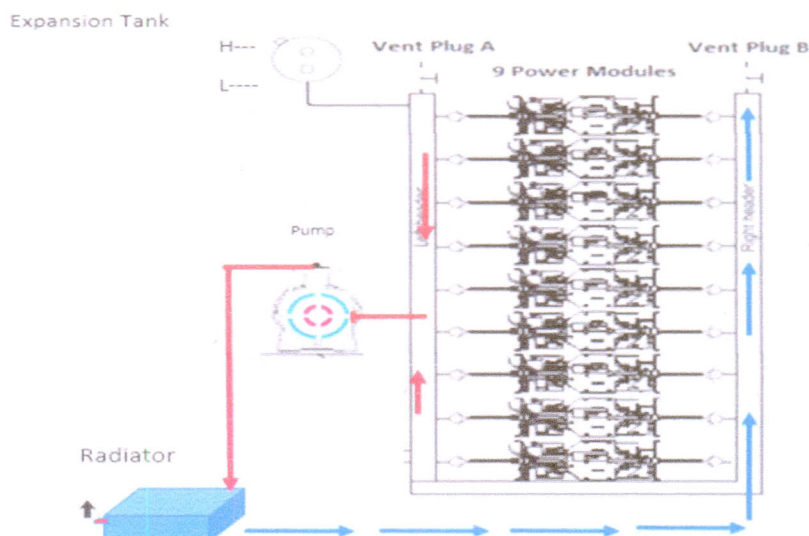
The problem of coolant level fluctuation and coolant overflow has been reported by CLW and zonal railways in M/s BHEL make IGBT based Traction Converter. The coolant level indicated in the Level Gauge does not remain stable and fluctuates during starting of Pump.

Root cause for Coolant fluctuation was analyzed and found that level fluctuation is due to entrapped air in the coolant circuit. Air bubbles in the coolant circuit act like springs when compressed and expand when pump stops resulting in coolant overflow from the Expansion Tank. Therefore entrapped air needs to be continuously exhausted during operation.

**3.0 Existing Arrangement:**

Air is extracted by making part of the coolant flow through the Expansion Tank where air and coolant gets separated. Air will be exhausted through the breather mounted on the Tank.

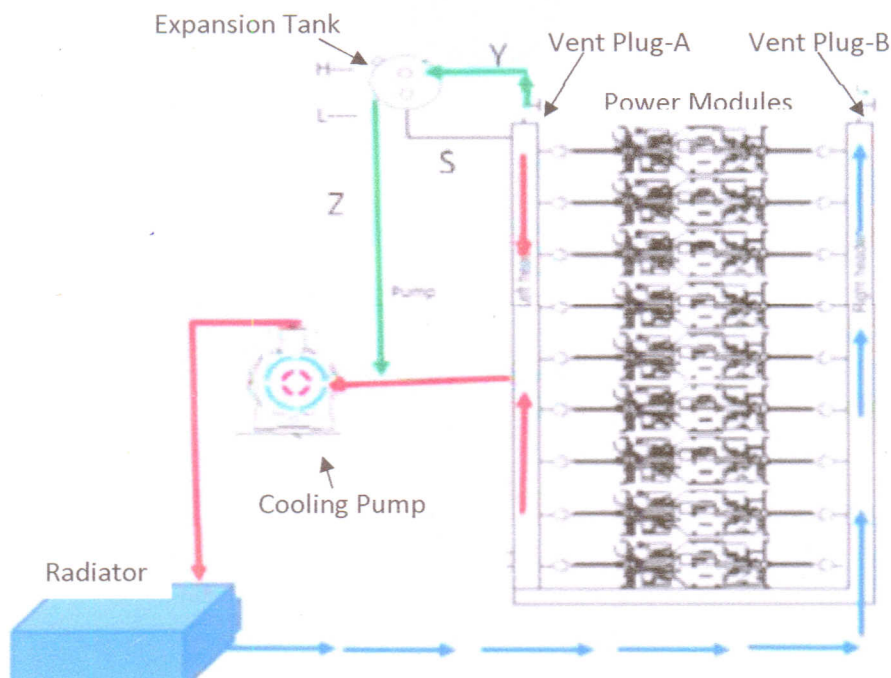
Existing cooling system of IGBT based traction converter is shown in figure- I



**Fig-I:** Existing cooling arrangement

#### 4.0 Modified Arrangement:

The modification indicated below in Fig-II of the cooling circuit ensures continuous removal of air from the coolant. Air which gets collected at vent plug-A shall be drained into the expansion Tank along with coolant. Air gets separated in the expansion Tank. The bypass line (Z) ensures positive pressure in suction line



**Fig-II:** Modified arrangement to avoid coolant fluctuation

*Wrey*



## 5.0 Work to be done for modified arrangement:

### 5.1 Modification in Expansion Tank

- i. Elbow and Nozzle assembly shall be welded to expansion tank as per RDSO drawing no. SKEL-5020 (Item No. 9)
- ii. Connection to be provided between expansion tank and suction line (Z) of pump with the help of flexible hose pipe assembly as per drawing no. RDSO Drg no. SKEL-5021
- iii. Vortex breaker assembly (SKEL-5020) to be welded to the expansion tank SKEL-5020 after drilling suitable hole as indicated in SKEL-5020 (Item No. 8)



Expansion Tank

$\frac{3}{4}$ " SS hose connection as per RDSO Drg no. SKEL-5021

1" SS hose connection as per RDSO Drg no. SKEL-5021

### 5.2 Modification in Power Module Compartment

- i. Elbow and Nozzle assembly shall be mounted in Power Module Compartment as per RDSO drawing no. SKEL-5019, 5020 & 5021
- ii. Connection (Y) of Fig-II to be provided with the help of  $\frac{1}{4}$  inch Green gates hose of length 650mm as below:



$\frac{1}{4}$  inch SS elbow +  $\frac{1}{4}$  Nozzle on the LH side of Power module compartment

$\frac{1}{4}$  inch SS elbow (1 No) +  $\frac{1}{4}$  Nozzle on the tank (1 No)

$\frac{1}{4}$  inch hose connection (Refer 5.1 ii) from top side of tank to LH top column elbow

Not required

*Wing*

**6.0 Material required per loco:**

2 Sets of Welded assembly of 1/4" SS Elbow + 1/4" Nozzle for expansion tank and power module compartment

Modified SS Hose (Ref RDSO DrgNo. SKEL-5021)	-	2 Set
Ring clamp (12mm – 22 mm)	-	4Nos
Hose (10 mm – 14 Kg/cm <sup>2</sup> ) of M/s Gates Green Line (650 MM length or similar)	-	2 Nos

**7.0 Material Rendered Surplus:**

Nil

**8.0 Application to class of locomotives:**

All 3-phase electric locomotives fitted with M/s BHEL make IGBT based traction converter.

**9.0 Reference:**

M/s BHEL's proposal for coolant circuit modification and decision taken during performance review meeting held at IRIEN/Nasik Road on 30-12-2016

**10.0 Agency of Implementation:**

- I. CLW/All zonal railways holding 3-phase electric locomotive fitted with M/s BHEL make IGBT based traction converter.
- II. POH workshop to ensure modified arrangement during POH of locomotive

*Suresh Kumar*  
12/01/17

(Suresh Kumar)  
for Director General/Elect.

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Secretary (Electrical),  
Railway Board, Rail Bhawan,  
New Delhi – 110 001

*Suresh Kumar*  
12/01/17

Encl: Nil

for Director General (Elect.)