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भारत सरकार — रेल मंत्रालय  
अनुसंधान अभिकल्प और मानक संगठन  
लखनऊ — 226011  
Government of India - Ministry of Railways  
Research, Designs & Standards Organization.  
LUCKNOW - 226011

No. EL/3.1.3.5/2(Elect)

Dated: 25/09/17

**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/0464, (Rev.0)**

**1.0 Title:**

Provision of Auxiliary interlock for monitoring of A2-B2 segment of Harmonic filter ON (8.1)/adoption (8.2) Contactor in GTO/IGBT locomotives.

**2.0 Object:**

In the harmonic Filter contactor 8.1/8.2 feedback of closing of contacts is monitored by auxiliary interlock fitted on the side of the contactor segment A1-B1. There is no auxiliary interlock on the contactor segment A2-B2. Both the segments A1-B1 and A2-B2 are driven by a common crossbar.

In case of breakage of crossbar, there are two possibilities:

- a. Contactor segment A1-B1 is not closed irrespective of the status of the segment A2-B2. In this case controller will not get the feedback of closing the contactor and harmonic filter will be isolated with message 8.1/8.2 struck Off.
- b. Contactor segment A1-B1 is closed but contact segment A2-B2 is not closed. In this case controller gets the feedback accordingly, while contactor segment A2-B2 remains in open condition.

In case of condition no. (ii), in case contactor segment A1-B1 gets closed the controller gets the feedback accordingly, while contactor segment A2-B2 remains in open condition. In such case loco works normally as there is no monitoring of no current flowing through the filter circuit as segment A1-B1 & A2-B2 are connected in series. There is protective shutdown for over current only. While locomotive is in motion, mobile contact B2 may touch with fixed contact A2, causing making and breaking of circuit on load, which may result in fire in the filter cubicle. In order to prevent such type of fire incidences, a modification is required to be carried out in harmonic filter contactor.

### **3.0 Existing Arrangement:**

As per existing arrangement closing of filter contactors 8.1/8.2 is monitored by auxiliary interlock, which is fitted on the side of contactor segment A1-B1. There is no auxiliary interlock on the contactor segment A2-B2 although there is a provision for the same. Both the segments A1-B1 and A2-B2 are driven by a common crossbar.

As per the ToT document the nomenclature followed for the power and auxiliary contact is given below:

A1-B1 --- main contact on left side segment

A2-B2 --- main contact on right side segment

1A - 1B --- auxiliary interlock contact for feedback to SR1

3A - 3B --- auxiliary interlock contact for feedback to SR2

Presently, 1A-1B & 3A-3B interlocks are being used only on segment A1-B1.

### **4.0 Modified Arrangement:**

In order to prevent failure of loco and fire incidences due to breakage of the cross bar and consequent wrong feedback to the ALG controllers, modification need to be carried out by providing auxiliary interlocks in the side of segment A2-B2 and connecting them in series with auxiliary interlocks of A1-B1. Both the auxiliary contacts should be 'NO' type. In the present arrangement 1A-1B and 3A-3B contacts are in general 'NO' type. In case 'NO' type of contacts are not available at 1A-1B and 3A-3B then cams may be interchanged to accommodate the two 'NO' interlocks.



After this modification ALG1/ALG2 controllers get contactor closing feedback only after closing of both the segments.

The circuit diagram of existing and modified arrangement for contactor 8.1 & 8.2 are given below in Fig-1 and Fig-2 respectively:

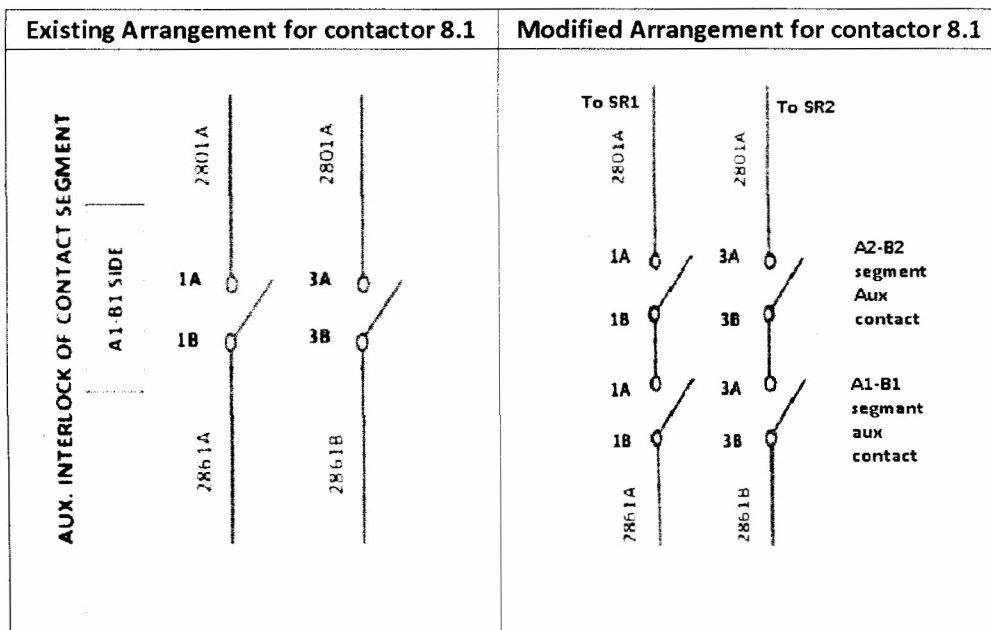


Fig-1 Circuit Diagram of auxiliary contact for contact 8.1

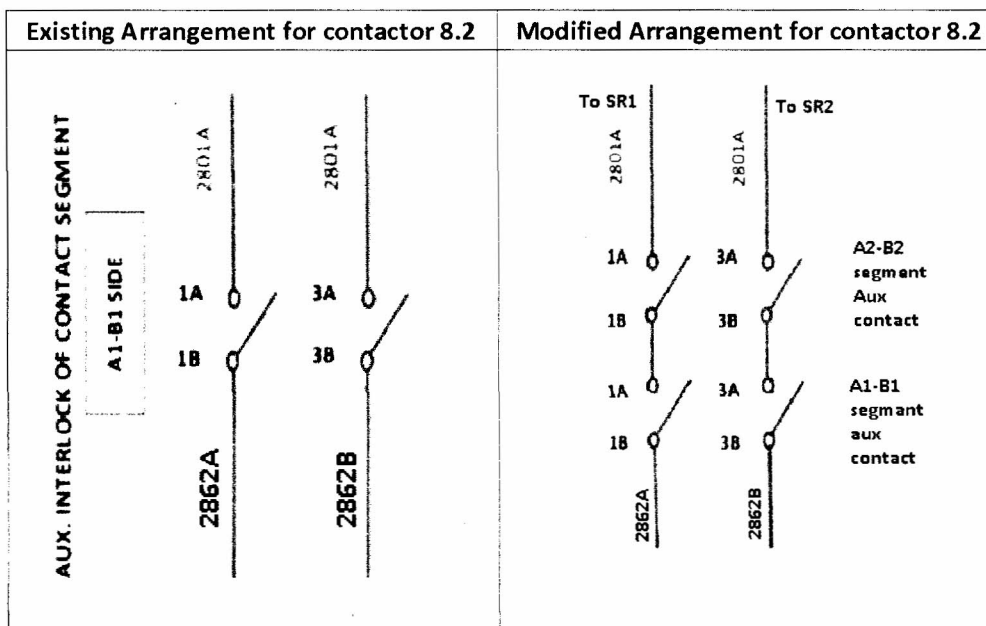


Fig-2 Circuit Diagram of auxiliary contact for contact 8.2

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**5.0 Material required:**

- I. Auxiliary contact: 04 No. (Two each for 8.1 and 8.2 contactors)
- II. 1.5 mm<sup>2</sup> cable: 500 mm (250 mm each for 8.1 and 8.2 contactors)
- III. Fasten lug 6.3 x 0.8: 04 Nos. (Two each for 8.1 and 8.2 contactors)

**6.0 Material Rendered Surplus:**

Nil

**7.0 Application to class of locomotives:**

All 3-phase electric locomotives.

**8.0 Reference:**

Decision taken by Railway Board in MoM of 38<sup>th</sup> MSG.

**9.0 Agency of Implementation:**

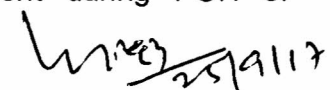
- I. CLW/All Zonal Railways holding 3-phase electric locomotive.
- II. POH workshop to ensure modified arrangement during POH of locomotive

Encl: Nil

Copy to:

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

Encl: Nil

  
(Suresh Kumar)  
for Director General/Elect.

  
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for Director General (Elect.)

