भारत सरकार–रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ– 226011
Tele/Fax : 0522-2452581
E-mail:dirpnloco@gmail.com

सत्यमेव जयते

Government of India
Ministry of Railways
Research, Designs &
Standards Organization,
LUCKNOW-226011

No. EL/3.2.19/3-Phase/CCB Date: As signed

Principal Chief Electrical Engineer,

1. Central Railway, Mumbai CST-400 001.
2. Northern Railway, Baroda House, New Delhi-110001.
3. North Central Railway, Subedarganj, Allahabad- 211001
4. North Eastern Railway, Gorakhpur-273 001
5. Eastern Railway, Fairlie Place, Kolkata -700 001.
6. East Central Railway, Hazipur-844101.
7. North Western Railway, Opp. Railway Hospital,Jaipur-302 006
8. East Coast Railway, Chandrashekharpur, Bhubaneshwar-751 016.
9. Southern Railway, Park Town, Chennai-600 003.
10. South Central Railway, Secunderabad-500 371.
11. South Eastern Railway, Garden Reach, Kolkata -700 043.
12. South East Central Railway, Bilaspur-495004
13. South Western Railway, Hubli (Karnatka)-580 020
14. Northeast Frontier Railway, Maligaon, Guwahati-781 011
15. Western Railway, Churchgate, Mumbai-400 020.
16. West Central Railway, Jabalpur-482001.
17. Chittaranjan Locomotive Works, Chittaranjan-713331 (WB)
18. Banaras Locomotive Works, Varanasi-221004
19. DMW, Patiala- 147003

Sub: Minutes of meeting on Reliability related issues of CCB Brake System provided in 3-Phase Electric Locomotives.
Ref: This office letter of even no dated 02-02-2024

A meeting was conducted at RDSO on 28.02.24 between RDSO & technical representatives of M/s KBIL to discuss the various reliability related issues of "CCB" Brake System reported by Zonal Railways. Based on discussions the MOM has been issued and enclosed herewith for kind information and necessary actions.
This issues with approval of competent authority.

(Rajesh Kumar)
For Director General Std./ Electrical

Encl: As above

Copy to:

• Secretary (Electrical), Railway Board, Rail Bhawan, New Delhi-110001
(Kind attn.: Shri Kishore Vaibhav, EDEE/RS/RB) -for kind information please.

• M/s. Knorr-Bremse India Pvt. Ltd. 51/4 KM Stone, Village & P.O. Bhagola, Delhi Mathura Road (NH-2), Palwal-121102
- for necessary actions please.

(Rajesh Kumar)
For Director General Std./ Electrical

Encl: As above

2634560/2024/O/o PED/TRACTION/RDSO

Minutes of the meeting held at RDSO on 28-02-2024 on Reliability issues of CCB System of 3-Phase Locos.

Members Present:

RDSO	M/s Knorr Bremse India Ltd.,
Sh. R. K. Gupta, PED/PS&EMU '' Rajesh Kumar, JDSE '' Mahendra Pal, JE/D	Sh. C. M. Sawakar, Jt. AGM-Rail Service '' Yogesh Kumar,Chief Manager-System Engg '' Gopal Sharma, Manager – Marketing & Service

Meeting chaired by PED/PS&EMU and focused on review the reliability related issues of CCB systems reported by Zonal Railways. PED/PS&EMU stressed on the implementation of the action plans to improve reliability of the CCB system. The certain problems existing presently should be tackled immediately. Reliability improvements steps should also be taken in new supplies. The decisions and action taken there are furnished below:

SN	Issues / Equipments	Findings/observations	Discussion	Action to be taken
1	ERCP, 20CP & 16CP	Air leakage from breather port, rubber components of breather port becoming hard due to moisture entry.	One cycle of overhauling of breather port of ERCP, 16 CP & 20CP LRUs to be done in all locos with CCB brake system using Breather port kits of these LRUs. Later on Breather port kit shall be replaced in TOH of the respective passenger & freight locos. Earlier, these kits were in use.	1. TOH schedule kits for Breather port of ERCP, 16CP & 20CP to be circulated by M/s KBIL. 2. ZRs are requested for One cycle of overhauling of breather port of ERCP, 16CP & 20CP LRUs of all locos with CCB of M/s KBIL. Later on Breather port kit shall be replaced in respective TOH schedule of locomotive.
2	EBV	LT switch contacts getting affected (contaminated with Sulphur and carbon) due to environmental condition/moisture entry and failure of Nodes.	One cycle cleaning of EBV mode selection switch contact by using EC cleaner kit followed by measurement of contact resistance as per instruction of M/s KBIL, (copy attached). LT switch contacts are to be replaced if contact resistance value is beyond the limit. Latter on cleaning of EBV along with LT switch is to be carried out during the TOH schedule (27 / 36 months for Pass / Goods) to overcome the problem in EBVs. However, LT switch contact from silver plating to gold plating has already been incorporated by firm in revised overhauling IOH/POH kit as well as in new EBVs.	1. Firm has to submit procedure of cleaning of EBV LT switch contacts & permissible values of contact resistance. 2. Firm is also advised to demonstrate the activity at each shed. 3. ZRs are requested for one cycle cleaning of EBV mode selection switch contacts by using EC cleaner kit. 4. Latter on cleaning of EBV along with LT switch is to be carried out during the TOH schedule.
3	Pressure Gauges	Air leakage, zero error, gauge glass breakage and calibration.	This is a bought out item from CLW approved sources.	The reported issues of pressure gauges have been informed to M/s Topgrip & M/s Midland vide RDSO letter dated 27-12-2023. A separate meeting with gauge suppliers is scheduled in 3rd week of March 24.
4	Air Horn	Diaphragm bursting, Horn bell breakages	This is a bought out item from CLW approved firms. Sources has been advised to use diaphragm of Hylum sheet instead of brass/Phosphor bronze	ZRs are requested to ensure use diaphragm with Hylum sheet instead of brass/Phosphor bronze

5	Auto Drain Valve & ULV	Air leakage	Overhauling of ADV & ULV to be carried out during IC schedule as per RAP recommendation in TC142 Rev.1	Firm has to submit scope of overhauling, advise kit of ADV & ULV to be taken up during IC. Accordingly SMI 298 shall be reviewed.
6	NB11/Emergency Exhaust Valve, 821 Valve, Pressure Governor.	Air leakage/diaphragm bursting and setting disturbance due to moisture entry	Based on the field experience, M/s KBIL has proposed overhauling of Emergency Exhaust Valve(EEV), 821 Valve(mounted at panel) and Pressure switch ('O' ring & Diaphragm) in TOH schedule of loco. These will be included in the Overhauling kits.	Firm has to submit TOH schedule kits for these sub-assemblies.
7	**FP-PRV** leakage (reported by WR, NCR)	Air leakage from FP-PRV exhaust port due to rusting/breakage of spring & O-Ring inside the valve.	One cycle check drive of FP-PRV valve to be done by all sheds for all re-mapped Auxiliary panel locos having service completed more than one year. In case of moisture observed inside the valve, spring to be changed. Spare springs are to be provided in adequate number by M/s KBIL to all sheds. However Material of spring is reviewed and upgraded material with more strength (Spring steel to SS shall be provided)	One cycle check drive to be completed by all sheds for all Re-mapped Aux Panel Locos having service more than 1 Year. If moisture is found, then spring to be changed. Air Dryer also to be checked & maintained for the quality of outlet air.
8	2-Way Horn Operating Valve	O-Ring getting cut during overhauling/fitment.	Issues of Two way horn valve revealed the improper positioning of 'O' ring. Sheds shall ensure availability of 'O' ring insertion tool for overhauling of Two way Horn Valve. Special O-Ring insertion tool has been provided to some of the sheds. All the sheds shall ensure availability of Special O-Ring insertion tool to be provided by M/s KBIL.	ZRs are requested to arrange proper tool required for 'O' ring insertion for overhauling of Two way Horn Valve.
9	Over hauling Kits	ZRs reported that complete details of scheduled OH kits of various sub assemblies of CCB system has not been given by M/s KBIL. RDSO vide letter dated 27-11-23 advised to M/s KBIL for review and standardize all the overhauling kits for various valves/sub assemblies of CCB system and submit details so that the brake system shall be maintained properly by electric loco sheds/shops.	Firm agreed to submit details.	Exhaustive list of TOH, IOH & POH by including components & sub-components to be overhauled or to be replaced shall be submitted by 15th March 2024. Price list of all spare parts to be circulated.

10	Scope of Work exhaustive for LRUs & EBVs	Most of the Railways do not have required jigs, fixtures, overhauling & testing test benches for CCB type brake system & specially LRUs/EBVs and it is recommended that IOH & POH of LRUs/EBV may be got overhauled from OEM. Overhauling already initiated by some of the sheds namely ELS/TKD, AQ, KYN, BL, BSL etc.	M/s KBIL stated that, Brake System is a safety critical item and same requires special expertise/skills, controlled environment facility and adequate infrastructure including tools & test benches for performing overhauling to achieve desired reliability. Further, M/s KBIL has recommend that overhauling (IOH/POH) of CCB System shall be performed by the trained Engineer/ personals of OEM only.	Presently, Railways are not having the required facilities for CCB overhauling & its testing. Therefore, to achieve desired reliability of CCB System, LRUs and EBVs overhauling shall be performed by the trained Engineer/ personals of OEM. RDSO has already issued SMI No. RDSO/2016/EL/SMI/0298 (REV. '0') for carrying out scheduled maintenance of CCB system. Scope of work & testing for overhauling of LRUs & EBVs in IOH & POH shall be submitted by M/s KBIL by 10th March 2024.
11	Scope of replacement of unscheduled items on condition basis.	Condition basis replacement of components of CCB	M/s KBIL has to identify and submit list of components desired to be replaced on condition basis.	A list of components desired to be replaced on condition basis to be circulated to Zonal Railways & RDSO.
12	Failure of electronic equipment on account of surges/spikes	Puncturing of diodes is suspected due to surge/spike from the input supply.	Precautions & safety measures to be taken has already been circulated by M/s KBIL vide letter No. CCB-2E/3-Ph. dated 04-Oct-2022 (Copy enclosed).	Railways are advised to comply the OEMs instruction and dis-connect the electrical interface connectors while doing any welding/Meggering/ High Voltage testing on Loco.

(Rajesh Kumar)
Joint Director(Pn)/Electrical

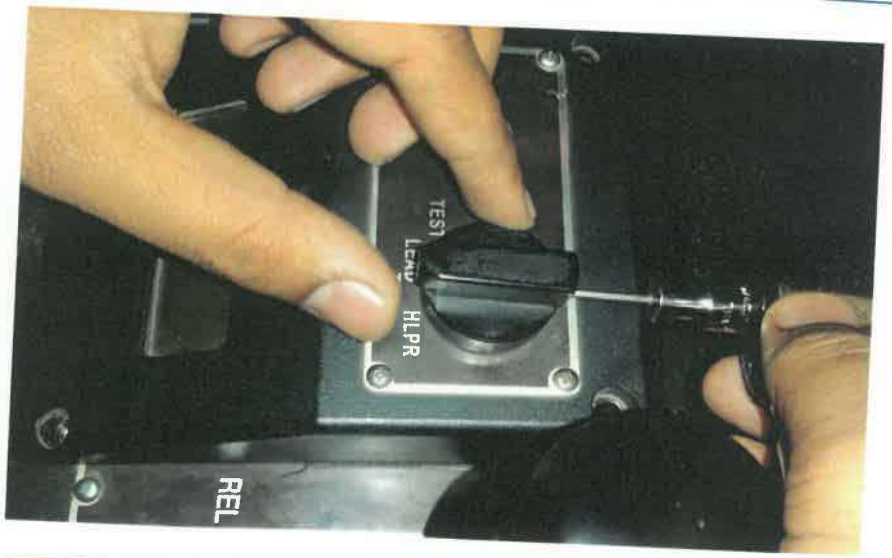
Intermediate Check and Cleaning of CCBII System EBV LT Switch

EBV LT Switch Cleaning & Checking

Turn OFF Power Supply to CCB

Using 4mm Allen key, remove 4 screws of top cover of EBV

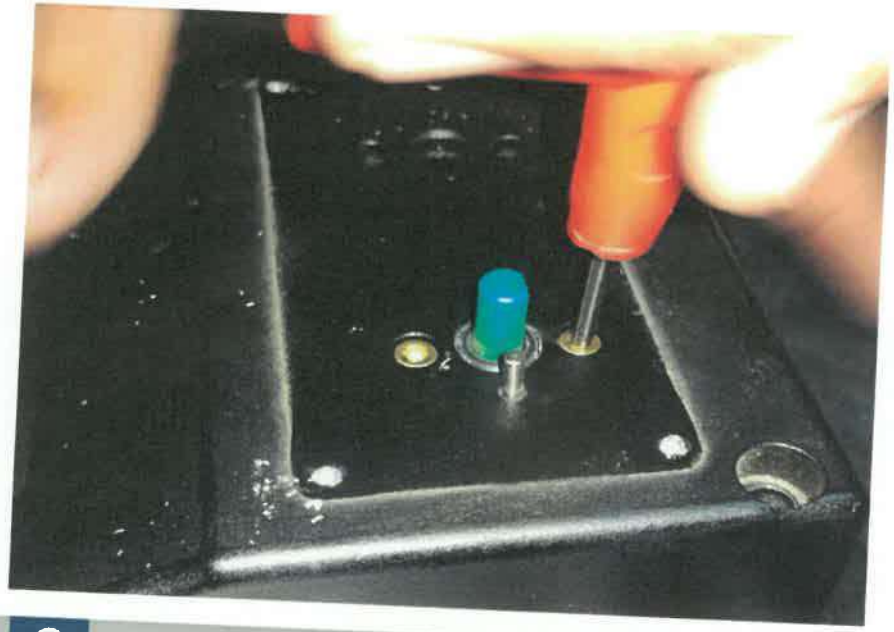
EBV LT Switch Cleaning & Checking



Using 5/64" Allen key, remove the LT Switch knob

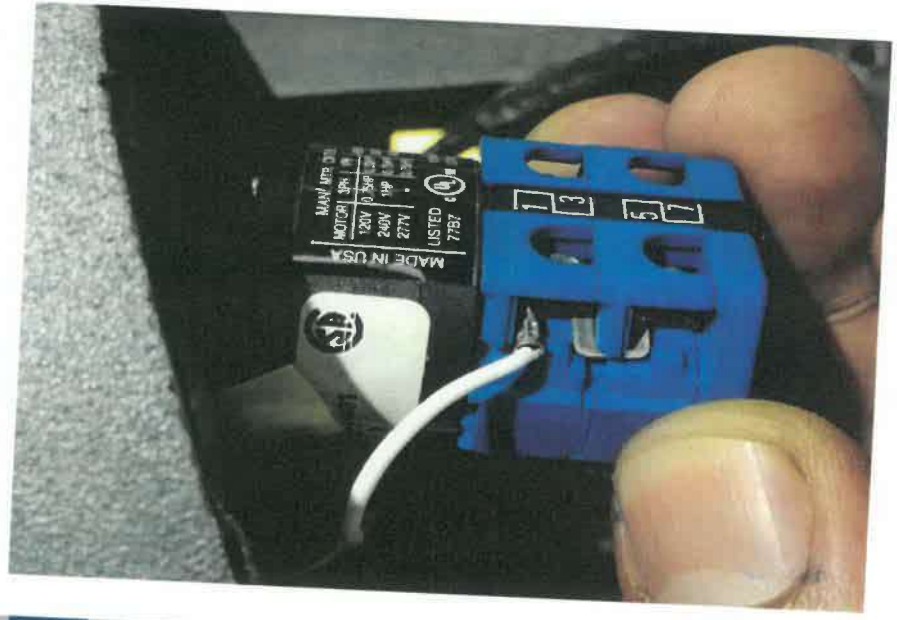
Using Philips Screw Driver, remove 4 screws of LT Switch Decal Plate & remove Decal Plate

EBV LT Switch Cleaning & Checking



Using 2.5mm Allen Key, remove 2 screws of LT Switch & remove LT Switch

EBV LT Switch Cleaning & Checking



Slowly pry out the EBV top cover and lift to remove the LT Switch

Carefully turn the EBV top cover as shown

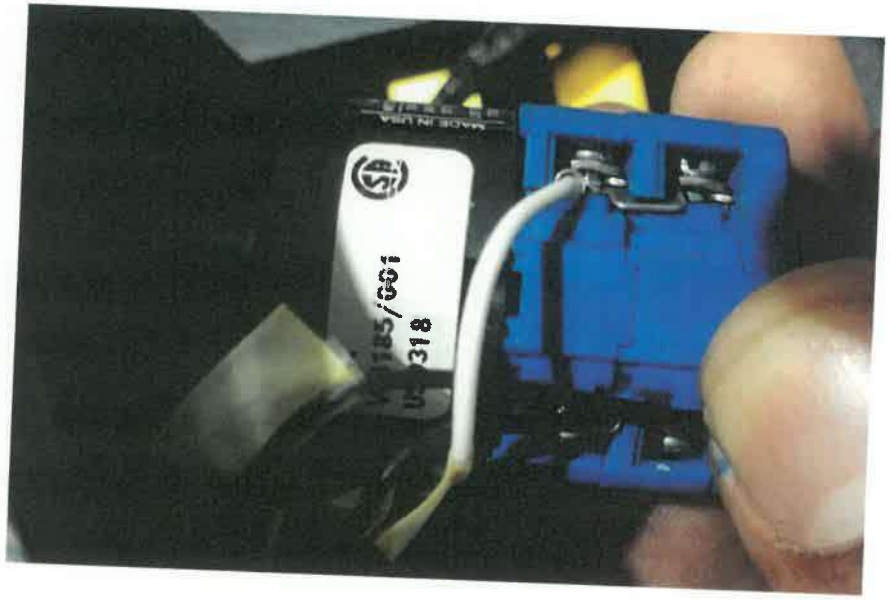
CAUTION:

- **Care to be taken while lifting/turning the top cover to avoid any damage/stretch to display connector & LT Switch wiring**

Slowly take out LT Switch & verify.

At terminal 1 White wire is installed at the left side of the Securing Screw.

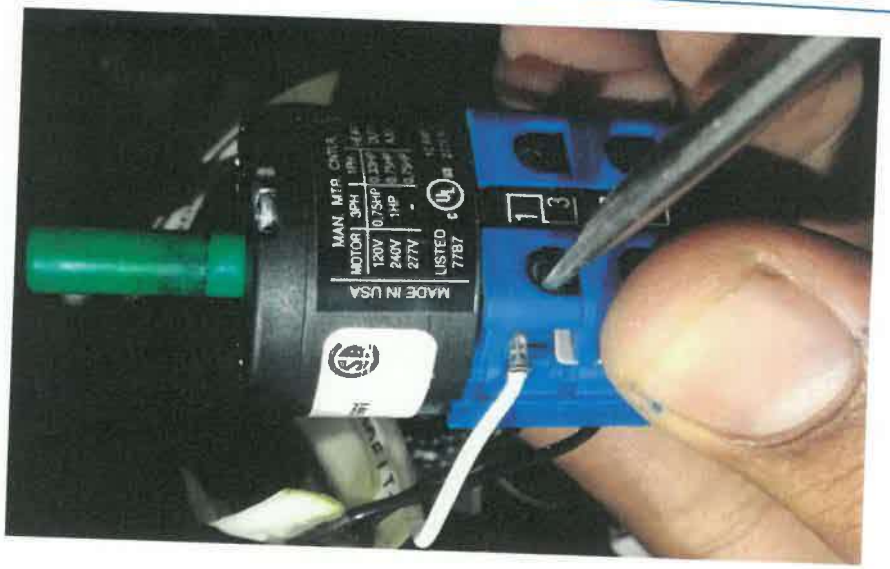
EBV LT Switch Cleaning & Checking



At terminal 1 wire is installed at the left side of the Securing Screw.

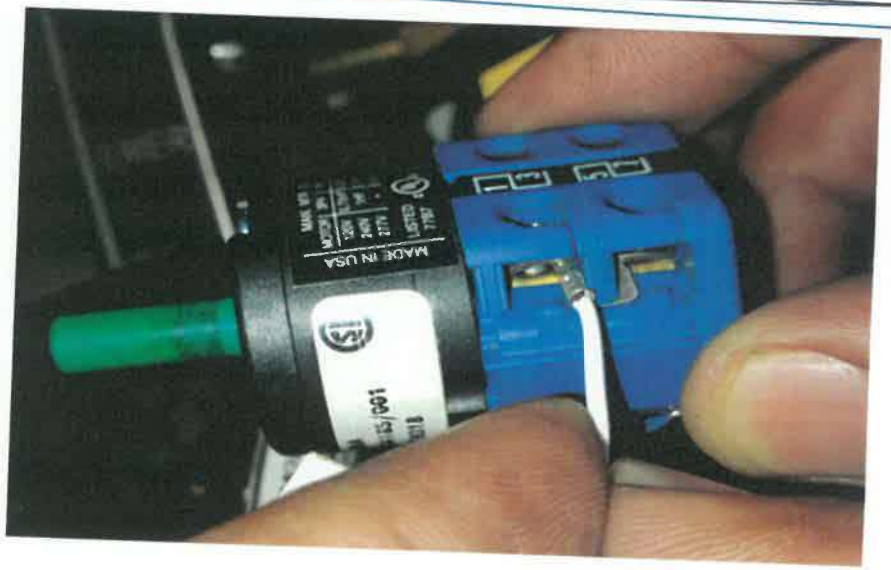
This may lead to improper contact of washer plate of the screw with the shorting plate & causing the problem of logging "EBV Currently Inactive" message.

EBV LT Switch Cleaning & Checking



Using Screw Driver, slacken the wire at Terminal 1& disconnect.

EBV LT Switch Cleaning & Checking



Insert the wire at Terminal 1 on right side of the Securing Screw placing the wire over the shorting plate & tighten the Securing Screw using a Screw Driver.

This will ensure positive contact of the wire with the shorting plate.

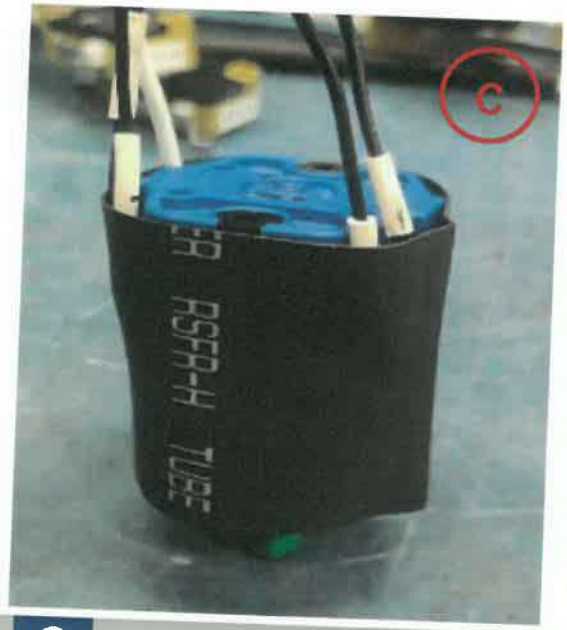
This will ensure positive contact of the wire with the shorting plate.

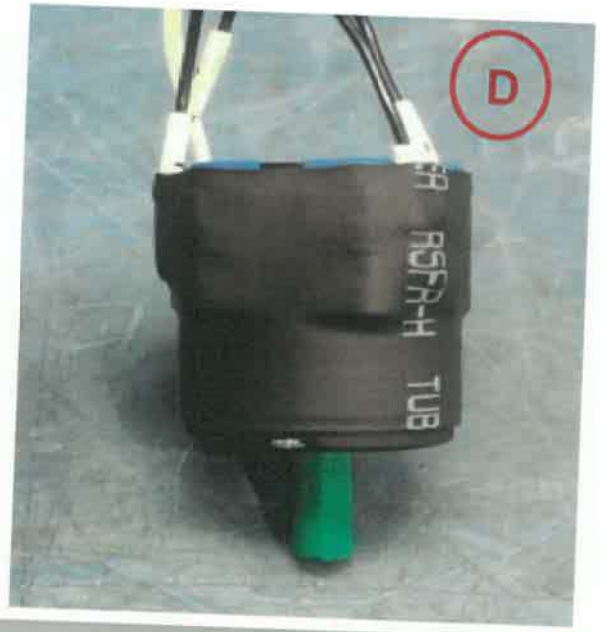
EBV LT Switch Cleaning & Checking

Heat Shrinkable Tubing Application on LT Switch

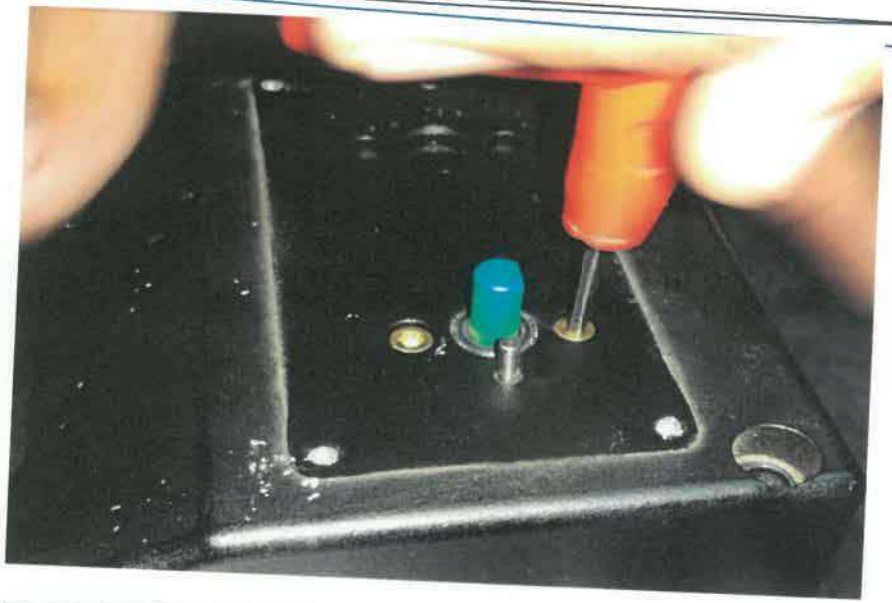
One more Improvement suggestion from KB India to protect the LT switch contacts from environmental effect.

1. Rotary Switch assembly - (A)
2. Tubing Shrinkable Size 45 mm - (B)
3. Inserting Tubing Over LT switch assembly – (C)
4. Shrink tubing over LT Switch using Hot Air Gun – (D)
5. Assemble Rotary Switch in EBV – (E)





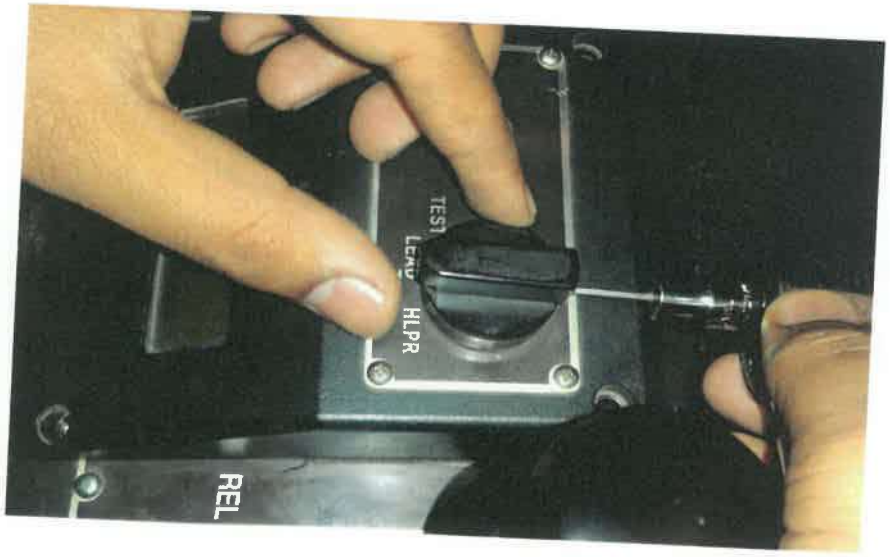
EBV LT Switch Cleaning & Checking



Using 2.5mm Allen Key, fix 2 screws of LT Switch & tighten

Using Philips Screw Driver, fix 4 screws of LT Switch Decal Plate, tighten and fix Decal Plate

EBV LT Switch Cleaning & Checking



Using 5/64” Allen key, remove the LT Switch knob

EBV LT Switch Cleaning & Checking

SC2 Carefully turn the EBV top cover as shown

CAUTION:

- Care to be taken while lifting/turning the top cover to avoid any damage/stretch to display connector & LT Switch wiring

Turn ON power supply to CCB

CAUTION:

- Ensure no sparking/shorting

Contact Resistance Checking – LT Switch in Field Service

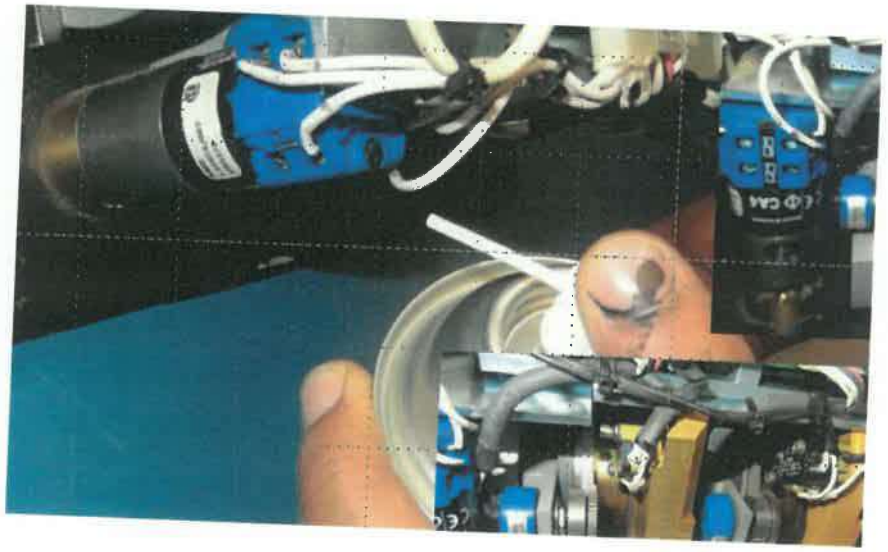
Using Multimeter, Check Contact Resistance of LT Switch at 4 different Positions as per Table -1 given below:

LT - Switch Resistance Checking Chart			
MODE	Multermeter Black Probe at Pin No.	Multimeter Red Probe at Pin No.	Resistance Value
TEST	1	8	0.04 ohm
		6	0.04 ohm
LEAD	1	8	0.04 ohm
		4	0.04 ohm
TRL	1	6	0.04 ohm
		2	0.04 ohm
HLPR	1	2	0.04 ohm
		4	0.04 ohm

Note : Contact Resistance should not be more than 2 Ohm at any contact position of the LT Switch. Replcae LT Switch if Contact Resistance found >2.0 Ohms

EBV LT Switch Cleaning & Checking

Cleaning of LT Switch



With electronic component cleaner (Make - Stanvac, Model - 8376 or equivalent) and spray it with its nozzle aimed on the terminals of LT Switch.

After some time after ensuring the Cleaning compound dried up, check once again Contact Resistance of LT Switch contacts as mentioned in earlier procedure.

Replace LT Switch with new one if no improvement found and ensure proper connection of the wires at the terminals as per the wiring diagram.

EBV LT Switch Cleaning & Checking

Fix the top cover of EBV

Using 4mm Allen key & tighten 4 Screws

- Do the wire connection for both the EBVs & Check as described
- Please do take care of wires, LT switch while doing the activities not to pull out the wires, avoid any damage to LT Switch and wires
- After completion, Power-up CCB
- Check operation of both EBVs selecting each position (LEAD, HLPR, TRL, TEST) and ensure both EBVs are working properly/responding according to the position selected
- Keep record of the Locomotives attended and update HO regularly

Thank You

2634569/2024/O/o PED/TRACTION/RDSO

KNORR-BREMSE

Ref: CCB-2E/3-ph/Inst.
04 Oct 2022

Knorr-Bremse
India Private Limited

Director General (Electric Locos)
Research Design & Standards Organization,
Manak Nagar, Lucknow.
Fax: 0522-2452581
Tel: 0522-2465739
Email: dse1rdso@gmail.com

Kind Attan: Mr. Rajesh Kumar (JDSE/RDSO)

Sub: Precautions to be taken on CCB during Meggering/Welding on 3-phase Locomotives.

Dear Sir,

This is with reference to above said subject, we would like to bring to your notice that we are noticing that different practices of isolating CCB Electronics is being followed by different maintenance sheds while performing meggering test or welding on locomotives resulting into burning of electronics nodes (PCB boards) sometimes.

In this regards we would once again like to submit list of precautions to be followed on CCB System prior to Meggering and welding in the Locomotive to avoid failures due to spike as below:

- While Meggering/welding, all connectors of CCB system (WJB, PSJB and EBV controller) is to be disconnected irrespective of meggering voltage/Welding and remain disconnected till the testing/welding activity is completed.

Table -1

S. No.	Activity Work	Disconnect Connectors	Connector Location
1	Meggering/Welding	260A, 260B & 237A	On Wiring Junction Box
2		LON cable connector	J103 connector on PSJB
3		EBV circular connectors	J100A, J100B on PSJB

- Whenever locomotive is under manufacturing at production units of IR connectors of CCB system (refer table above) have to be kept disconnected until the manufacturing is complete, locomotive comes for final testing.
- Ensure that the earthing cables/connectors are properly connected and secured.

Note:

- It is strongly recommended to connect the earthing cable nearest to welding point. Failing to follow these instructions may damage any of the electronic components in CCB system immediately or later in service.

2634560/2024/O/o PED/TRACTION/RDSO

KNORR-BREMSE

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India Private Limited

- Ensure proper fitment/Locking of CCB circular connectors after welding / meggering. Do not disconnect /connect any of the CCB connectors while the CCB system is ON – This may lead to severe electrical surge in the system/in that particular valve/PCB/LRU and will malfunction/fail.

We would request you to please issue instructions to all the maintenance sheds and production units to follow above precautions while performing Welding/Megring on locomotives without fail so that electronic failures occurring due to entry of Electrical Spike can be avoided.

We would be pleased to provide you further information in this regard, if desired.

Thanking you,
For Knorr Bremse India Pvt Ltd

Yours truly,

(Manoj Sehgal)
Asst General Manager
Marketing & Service

(Avinash Kumar)
Asst General Manager
Marketing & System Engg.

Copy to:

- PCEE/Prod. units (CLW, BLW, PLW & DAKE) – for your kind information and necessary action please.
- CELE / Zonal Railways – for your kind information and necessary action please.
- Sr.DEE/ TRS/ELS/ ZR – for your kind information and necessary action please.

Regd. Office & Works : 51/4 KM Stone, Vill. & P.O. Baghola, Delhi Mathura Road (NH-2), Palwal-121102, Haryana (India)
Phone : +91 1275 222 402, +91 1275 306 400 E-mail : kbindia@knorr-bremse.com
CIN : U35203HR1993PTC034722