# SWITCH BOARD CABINET FOR LHB EOG/HOG AC COACHES

RDSO SPEC: RDSO/PE/SPEC/AC/184-2015(Rev-1)

# User Manual

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# INTRODUCTION

Before using this product, be sure to read this chapter carefully.

It's not a secret – electricity can be dangerous and when things go wrong lives can be at stake!

Electrical engineers are Industrial safety doctors, so it's our duty to keep employee's health and maintain a quality of life that we all deserve by providing safe work practices to avoid electrical accidents.

**How much electricity is dangerous?????**

| CURRENT | EFFECT |
|---|---|
| 0.5 – 3mA | Tingling sensations |
| 3 – 10mA | Muscle contractions (painful) |
| 10 – 40mA | "can't let go" phenomena |
| 40 – 75mA | Respiratory paralysis (possibly fatal) |
| 75 – 200mA | Ventricular fibrillation (likely fatal) |
| 200 – 500mA | Heart clamps tight |
| >1.5A | Tissue and organs began to burn |

***Fact: A 15 amp circuit breaker was designed to protect equipment - not people!***

# HEALTH AND SAFETY

It deals with the handling of panel in proper way. An individual to be considered as 'qualified' with regard to certain equipment in the workplace, but 'unqualified' as to other equipment. "An employee, who is undergoing on the job training and who, in the course of such training, has demonstrated the ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person also considered to be a qualified person for the performance of those duties".

The following requirements must be met, in the order given, before circuits or equipment's are re-arranged, even temporarily.

1. People handling the equipment should be aware about the panel safety handlet.
2. Ensure that the product is in the off condition before working on the conducting or terminal side
3. A qualified person must conduct tests and visual inspection, as necessary, to verify that tools electrical jumpers, short, ground and other such devices have been removed, so that the circuits and equipment can be safely re-energized.
4. Employees exposed to the hazards associated with re-energizing the circuit or equipment must be warned to stay clear of the circuits and equipment.
5. Each lock and tag must be removed by the employee who applied it or someone else under that employee's direct supervision.
6. A visual determination that all employees are clear of the circuits and equipment's must be made.

For any queries related to panels, feel free to contact ALIND at service@alindrelays.com

This maintenance and troubleshooting manual is intended for basic trouble shooting of SBC for LHB EOG/HOG AC Coaches with RDSO specification no. RDSO/PE/SPEC/AC/0184-2015(Rev.0)

NOTE:

Before starting trouble shooting of SBC for AC Coaches, ensure to switch off the Disconnecting & earthing device. Before working on SBC panel ensure that 750V AC power supply is not available in the panel.

During inspection proper and sufficient lighting. Now carefully look for any traces of fumes or burning smell and blacking of cable harness. If found take extra precaution in dealing with the same as there are risks of getting burn injuries to the operator.

# ELECTRICAL MAINTENANCE SCHEDULE

The maintenance practices of AC coach panel for the also more or less similar to LHB AC coaches. The various maintenance schedules and their periodicity are proposed below same

Periodic Maintenance Schedules

Schedule D1: Trip / Weekly

Schedule D2: Monthly ± 3days

Schedule D3: Half Yearly ± 15 days

Shop Schedule (SS-1), IOH: 18 Months / 6 Lakh km whichever is earlier

Shop Schedule (SS-2), POH: 36 Months/12 Lakh km whichever is earlier

ELECTRICAL PANELS MAINTENANCE ACTIVITIES

| ACTIVITIES | | Weekly(D1) | Monthly(D2) | HY(D3) | IOH(SS-1) | POH(SS-2) |
|---|---|---|---|---|---|---|
| 1 | Check Panel cover for proper fitment along with their securing arrangement | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | Clean the panel with blower and vacuum cleaner and check for loose connection | | ✓ | ✓ | ✓ | ✓ |
| 3 | Check panel covers hinges and gasket for proper condition | | ✓ | ✓ | ✓ | ✓ |
| 4 | Check the availability of proper rating HRC fuses | | ✓ | ✓ | ✓ | ✓ |
| 5 | Replace if Fuse is Blown/Missing | | ✓ | ✓ | ✓ | ✓ |
| 6 | Check Rotary Switches for Proper Working | | | ✓ | ✓ | ✓ |
| 7 | Check intactness/tightness of suspension arrangement | | | | ✓ | ✓ |
| 8 | Ensure all cable entry holes are provided with grommets | | | | ✓ | ✓ |

| | | | | | | |
|---|---|---|---|---|---|---|
| 9 | Check the connection of switch gear terminals block for overheating and tightness | | | | ✓ | ✓ |
| 10 | Check the fixation and terminal connection of pump controller | | | ✓ | ✓ | ✓ |
| 11 | Checking all earthing and replace if required | | | | ✓ | ✓ |
| 12 | Take IR of Live Terminal to Body for power and control. supply Should be more than specified value | | | ✓ | ✓ | ✓ |
| 13 | Replace MCB and MPCB on condition basis | | | | | ✓ |
| 14 | Check millivolt drop test of contacts and replace them if the measuring value is more than specified value | | | | | ✓ |
| 15 | Check The tightness of earthing connection | | | | ✓ | ✓ |
| 16 | MMR to be calibrated on test bench | | | | | ✓ |
| 17 | Replace E&D device complete Rotary Switch | | | | | ✓ |
| 18 | Replace open type control fuse unit for HT circuit with fuse base holder | | | | | ✓ |
| 19 | Check the marking number of terminal blocks and nomenclature of switch gears | ✓ | ✓ | ✓ | ✓ | ✓ |
| 20 | Replace contactor with Burr sound | | | | | ✓ |
| 21 | Replace On board Rotary Switch if damaged or cracked | ✓ | ✓ | ✓ | ✓ | ✓ |
| 22 | Remove any foreign | ✓ | ✓ | ✓ | ✓ | ✓ |

| | | | | | | |
|---|---|---|---|---|---|---|
| | materials | | | | | |
| 23 | Clean and ensure proper fitment of all fuses | | ✓ | ✓ | ✓ | ✓ |
| 24 | Ensure danger plate is riveted on the panel door | ✓ | ✓ | ✓ | ✓ | ✓ |

# TROUBLESHOOTING PROCEDURE

## 1. COACH SUPPLY IS NOT GETTING ON

- When disconnecting & earthling switch is on, check the status of MMR relay if it is ON, and ensure that phase sequence is O.K. If phase sequence is not correct the red LED will blink alternately. Correct the phase sequence. If every parameter (phase sequence, over/under voltage) is OK the front panel lamp will indicate MMR OK.

- If MMR is not getting energized please check the 125A fuse, F50, F51, F52 for net 1 and F53, F54,F55 for net 2. If Fuse is blown replace it with correct rating fuse.

- Turn ON the "Rotary switch" marked power supply ON/OFF. Depending on the switch position of change over switch Main contactor K01/K02 will be switched ON. If it is not switching ON.

- Please check the control fuses (2A) of step down transformer (750/415 V). Replace if any fuse found blown out. This will ensure that 60 KVA transformer is energized and voltmeter in front panel indicate proper voltage (750V).

- 415V,3 phase supply is distributed when contactor K44 IS energized. or K43 is energized. If it is not energizing check the related control fuse, if blown replace and re check the function

## 2. COACH LIGHTING IS NOT GETTING ON

Coach Lighting works on 110 DC supply

- Check the following in sequence, MCB F24, contractor K49 are ON, if not

- Check with multimeter the 110V DC supply is OK or not. This can be checked on the front panel using indicating Lamp. ON push button (S8) and NC of stop push button (S10).

- Check the light ON push button (S8) and NC of stop push button (S10).

- For passenger area check MCB, F40, F39.for reading light MCB F27 and F28. for night light MCB F34.Entrance and sanitary area MCB, F25.

- If found any of the MCB tripped, before resetting ensure that there is no major fault.

### 3. NO WATER IN THE COACH

Empty water tank

- Check water contactor at K24 and K25, one contactor should be in ON position.
- Check pump overload relay F-21 & F-22 if found tripped reset it and observe for 10 minutes under operation.
- If both pump contactors are OFF, ensure that pump controller is working all right (PI refer pump controller manual)
- If pump is working but water is not coming out, remove air lock, or do priming, and also check for proper rotation of pump.

### 4. AIR CONDITIONING NOT WORKING

There is provision to operate air conditioning in AUTO as well as MANUAL mode. Manual mode can be resorted when Air conditioning compact controller Fails. To operate AC in manual mode, follow the steps given below:

- Change AUTO-MANUAL switch from AUTO mode to Manual mode.
- First switch on the vent fan using MCB, observe contactor K26.
- Switch on the condenser fan using MCB, observe contactor K31, K32.
- Switch on the compressor using MCB, observe contactor K33, K34. 5. When all unit switched ON observe for a while till the cooling effect is felt. Also observe for any thermal overload tripping.
- Since AC is working on manual mode temperature control will not be there. Observe the temperature, if it is too low switch off the compressors for a while.

# DO'S AND DON'T'S

**DO'S**

- Regularly Check the Healthiness of the SBC, as displayed on the front doors.
- Check the temperature of the panel, if it is unusually warm take remedial actions
- Check the voltage and current in the meter provided on the front panel before starting the repair/diagnosis.
- Always refer schematic drawings and documentation
- Before starting repair/trouble shooting please refer relevant schematic drawing and documents.
- Before starting repair please switch OFF the D & E (Disconnecting and Earthing) device.
- Ensure there is NO voltage is available in the SBC, Particularly Capacitor.
- Please use proper tools for testing and Rectification/Repair.
- Always use rubber insulated shoes, safety googles and hand gloves, as per requirements.
- Do not work alone on the panel, Helper is useful in the case of Emergency.

**DONT'S**

- Do not attempt any repair work without isolating SBC from incoming supply.
- Do not try touch isolating and D & switching OFF also, as it still has incoming supply.
- Do not try bypass protection device without ensuring healthiness of circuit.
- Do not replace FUSE, with higher ratings specified. It may lead to fault and even • Do not try change current rating setting of thermal overload relay/MPCB.
- Do not leave the door open after repair close securely and
- Do not leave the unattended during process.


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