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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/3.1.35.17 Dated: As signed

Principal Chief Electrical Engineer,

- Central Railway, HQs Office, 2nd floor, Parcel Office Bldg., Mumbai – 400 001.
- East Central Railway, Hajipur (Bihar) – 844 101.
- East Coast Railway, Railway Complex, Bhubaneswar – 751 023.
- Eastern Railway, Fairlie Place, Kolkata – 700 001.
- North Central Railway, Prayagraj – 211 001.
- North Eastern Railway, Gorakhpur –273 001.
- North Western Railway, near Jawahar Circle, Jaipur–302 017.
- Northeast Frontier Railways, Maligaon, Guwahati – 781 011
- Northern Railway, Baroda House, New Delhi – 110 001.
- Southern Railway, Park Town, Chennai – 600 003.
- South Central Railway, HQs Office, Rail Nilayam, Secunderabad – 500 071.
- South Eastern Railway, Garden Reach, Kolkata – 700 043.
- South East Central Railway, Bilaspur – 495 004.
- South Western Railway, Hubli – 580020.
- West Central Railway, HQs Office, Opp. Indira Market, Jabalpur – 482 001.
- Western Railway, Church gate, Mumbai – 400 020.
- Banaras Locomotive Works, Varanasi – 221 004.
- Chittaranjan Locomotive Works, Chittaranjan – 713 331 (WB).
- Patiala Locomotive Works, Patiala – 147 003.

MODIFICATION SHEET NO. RDSO/2018/EL/MS/0475 (Rev. '2')

1.0 Title:

Modification in the existing CE resetting scheme to reset the control electronics (VCU) in Multiple Unit Locos.

2.0 Brief History:

2.1 The occurrence of faults, purely transient in nature is being experienced in 3-phase locomotives. These types of transient faults generally causing the VCB off with/without protective action and leading to subsystem isolation with/without Main Power OFF (tripping of VCB). The faults get corrected by resetting the VCU through BL key (Main Electronics off). However, during resetting of the VCU, the BP pressure also drops in the complete train. It takes about 15-20 minutes or

more to regain the required BP pressure and resume the normal train working. This incident affects the punctuality of other trains too and in case of freight operation, stalling of the load also takes place.

2.2 Vide RDSO letter no. EL/11.5.5/21 dated 12.12.2018, a modification sheet no. RDSO/2018/EL/MS/0475 (Rev.'0) was issued to reset the control electronics (VCU) independently in all 3-phase locomotives.

2.3 Zonal Railways informed that in MU operation of the locomotives, the resetting of VCU of trailing locomotive was not possible from the leading loco i.e. to reset the VCU in trailing locomotive, Loco Pilot has to stop the train, get down from the leading locomotive and then resetting of VCU could be done in trailing locomotive. Further, in case of loco trouble experienced on the bridges without provision of pathway, it is not possible to reset the VCU of trailing loco due to non-availability of path to go to the trailing loco. In this connection, revised modification sheet No. RDSO/2018/EL/MS/0475 (Rev.'1) was issued vide letter No. EL/11.5.5/21 dtd. 26.10.2023.

2.4 Vide letter No. ELDD/3220/Pt dtd. 13.09.2024, CLW informed that a lot of confusion arises due to non-availability of connection chart and discrepancies in the drawing and suggested changes in the circuit and requested comments. Meanwhile, RDSO implemented the scheme suggested by ELS/ROU in WAG9H locomotives which were checked jointly by RDSO and ELS/ROU representatives having different combination of brake systems and performance of the same was found satisfactory.

3.0 Objective:

To reset the control electronics (VCU) of the slave (trailing) locomotive from the master (leading) locomotive in both Multiple Unit (MU) and Single Unit (SU) operations without causing a drop in BP pressure through the brake electronics, thereby avoiding prolonged delays, punctuality issues or potential stalling of the train.

4.0 Modified scheme:

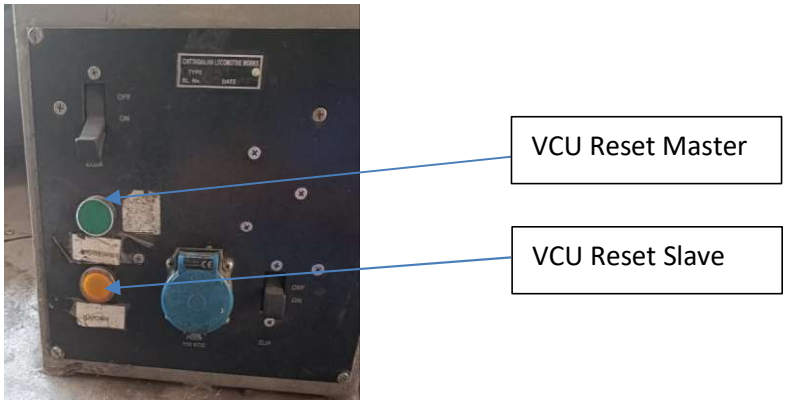
Currently, the VCU (Vehicle Control Unit) reset is required to clear any transient fault. This is done by pressing the VCU reset switch located in SB1, which restores the VCU and clears any transient faults.

However, in the current setup, when both locomotives in MU mode do not have the VCU reset modification, and a transient fault occurs in the rear locomotive, the Loco Pilot (LP) must stop the train, go to the rear locomotive, and manually reset its VCU. This can be particularly challenging if the train is stalled on a bridge or another location without easy access to the rear locomotive.

To improve this process, a new modification is proposed that enables the LP to reset the rear locomotive's VCU from the lead locomotive, saving time and reducing effort. The detailed circuit diagrams are enclosed as Annexure.

Key Modifications:

1. **VCU Reset Switches:**
   - Two push-button switches will be provided: "VCU Reset Master" and "VCU Reset Slave" on the D-Panel of each Cab.
   - Pressing the "VCU Reset Master" button will reset the VCU of the lead locomotive.
   - Pressing the "VCU Reset Slave" button will reset the VCU of the rear locomotive.



2. **Time Delay Relay**:
   - A 60-second time delay relay (Schneider RE17RMMW model) will be installed in SB1.
   - When the VCU reset switch is pressed, the relay provides a cab activation signal to the VCU and keeps the Contactor Control circuit (126 and 126.6) in the energized state for 60 seconds, even when BL key is in the "Driving OFF" position.
3. **Rotary Switch for Cab Selection**:
   - A rotary switch in SB1 will allow selection of the active cab in MU formation.
   - If CAB1 is the active cab, the Z-CAB switch should be set to CAB1; if CAB2 is the active cab, the switch should be set to CAB2.
   - The Z-CAB selection will only be active at the driving end cab of each locomotive, excluding any intermediate cabs.

4. **Modified UIC Coupler Wiring**:

- The UIC coupler will be modified with additional wiring to pins 1, 2, 3 and 4.
- One end of the UIC cable will connect pins 1, 2, 3 and 4 in one configuration, while the other end will connect pins 3, 4, 1 and 2 respectively.

5.0 Conditions for re-setting of VCU:

(i) Condition for VCU reset of Master Loco in MU:
- VCB should be opened;
- Pantograph should be lowered;
- BL key should be in driving (OFF) position;
- Loco speed should be zero*.

(ii) Condition for VCU reset of Slave Loco in MU:
- VCB should be opened;
- Pantograph should be lowered;
- BL key should be in driving (OFF) position;
- Loco speed should be zero*.

***Note:** For locomotives equipped with the CCB brake system, this is not mandatory. However, for locomotives with the FTIL brake system, it is essential to ensure the speed is zero; otherwise, the brakes will not be applied. This is because the feed to the pneumatic panels (2111A and 2111B) is interrupted to prevent a drop in brake pipe (BP) pressure.*

6.0 Procedure for VCU Reset

1. Resetting the Lead (Master) Locomotive VCU:
   - Press and hold the "VCU Reset Switch Master" button for 3 to 4 seconds, then release it.
   - The lead locomotive's VCU will power off and reboot within 60 seconds, displaying node 612 once completed.
2. Resetting the Rear (Slave) Locomotive VCU:
   - Press and hold the "VCU Reset Switch Slave" button for 3 to 4 seconds, then release it.
   - The slave locomotive's VCU will power off, reboot, and within 60 seconds, node 612 will appear.
   - Once node 612 is displayed on the slave locomotive, place the BL key into the driving (D) mode to complete the MU setup.

Remarks:

***1. Subsystem Isolation and Nodes**:*

- *If any subsystem is isolated in the master locomotive, the BPFA will illuminate. The LP must press the BPFA; after isolating the subsystem, node 504 will appear.*

- *In the slave locomotive, if a subsystem is previously isolated, the VCU reset will halt at node 71 (indicating a fault) and will not progress if BPFA is unacknowledged, causing the locomotive to shut down.*
- *To resolve this issue, the modification detailed in sheet no. 4 ensures that during a VCU reset, the BPFA feed remains active for 60 seconds. This allows any isolated subsystems to automatically acknowledge, enabling node 504 to appear.*

Note: *The LP should monitor the subsystem status of the slave locomotive from the master screen for priority 1 or 2 faults.*

2. ***Brake Pressure (BP) Drop During VCU Reset****:*
   - *For locomotives with CCB-type brake systems (with or without a parking brake), no BP drop is observed in either locomotive during VCU reset.*
   - *For locomotives with FTIL brake systems, a BP drop may occur during VCU reset. The modification in sheet no. 5 reduces this BP drop to 2–4 seconds, restoring BP to its normal level of 5 kg/cm².*
3. ***Z-CAB Position Verification****:*

   Place the BL key in the driving "OFF" position. Reset the VCU and observe the position of contactors 126.7/1 and 126.7/2:
   - *If 126.7/1 closes, Z-CAB should be set to Cab-1.*
   - *If 126.7/2 closes, Z-CAB should be set to Cab-2.*
4. ***Extended Boot Time for Certain Propulsions****: Locomotives with non-ABB or CGL propulsion (e.g., BT propulsion locomotives) may require more than 60 seconds for booting. Adjust the TPBIR timing based on the specific boot time of the propulsion system.*
5. ***Driving Position Requirement****: The MU VCU reset process for both locomotives should be conducted with the BL key in the driving "OFF" position (node 612).*

7.0 Material required:

(i) Two (02) nos. push button switch – one is as “VCU Reset Switch Master” and other is “VCU Reset Switch Slave”.

(ii) One (01) no. Rotary switch (as rotary switch configuration) for Z-CAB to be fitted in SB-1.

(iii) One (01) no. OFF time delay relay (60 Second) type RE17RMMW of M/s Schneider for ‘TPBIR timer relay’ to be fitted in SB-1.

(iv) One (01) no. contactor type LC1D09FD for ‘RESET’ relay and to be fitted in SB-1.

(v) One (01) no. contactor type LC1D128FD for ‘PBIR’ relay and to be fitted in SB-2.

(vi) One (01) no. Auxiliary contact block type LADC22 of M/s Schneider and to be fitted on 130.1 Contactor in SB-2.

(vii) Two (02) pair of existing diodes in SB1 123/8 terminal 5/6 and 7/8 to be used.

(viii) 1.5 Sq. mm cable used in WAG-9 class of loco (approx. 200 meter).

(ix) One (01) no. modified UIC Coupler.

(x) Seventeen (17) nos. Wago Connector.

8.0 Material Rendered Surplus: Nil.

9.0 Application to the Class of Locomotives:

WAG9/WAG9H/WAG9HC class of 3-phase electric locomotives running in MU.

10.0 Agency of Implementation:

Electric Loco Sheds and PUs/Workshops holding MU of WAG9/WAG9H/WAG9HC class of 3-phase electric locomotives.

Encl: As above.

-sd-
For Director General (Traction)

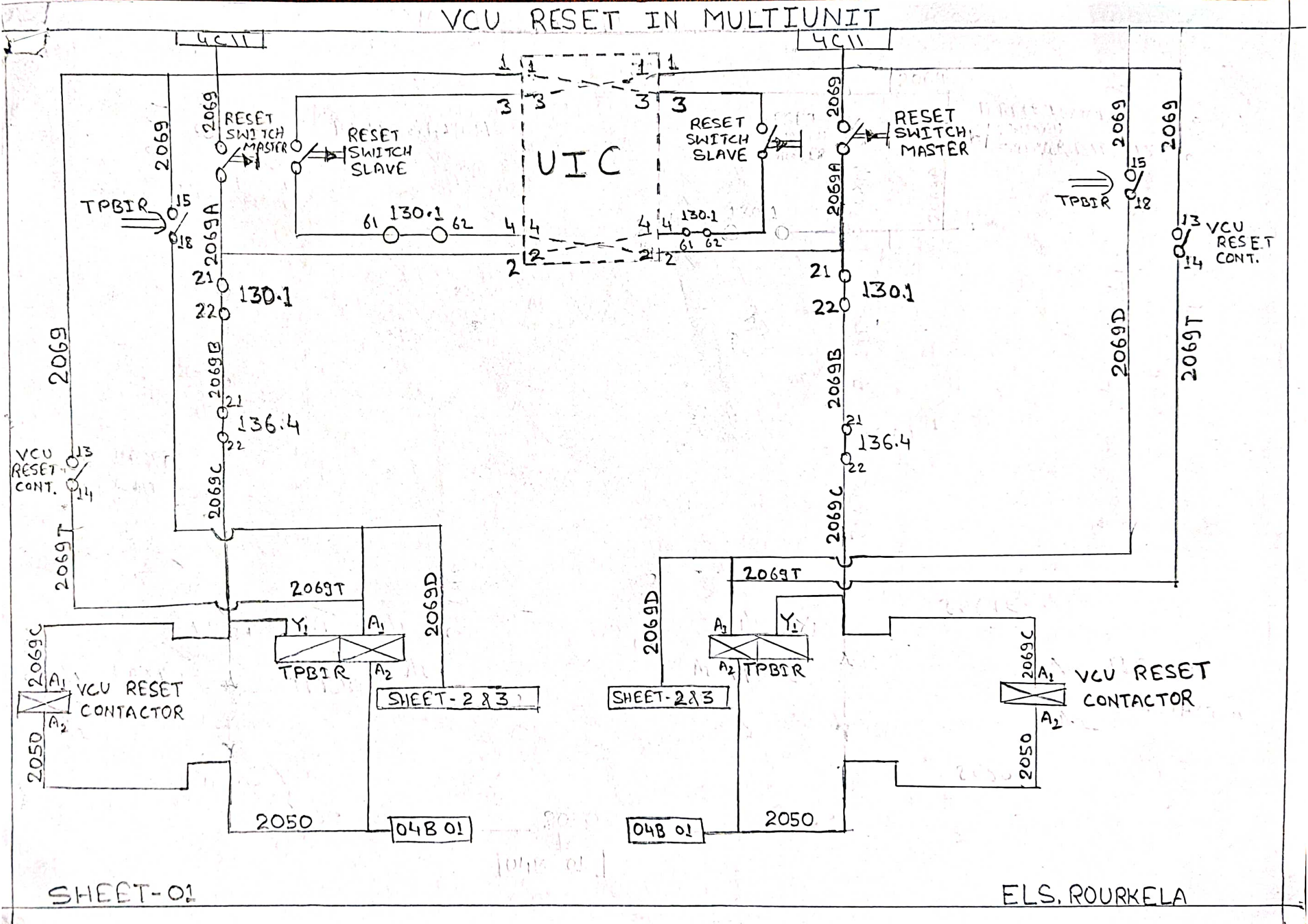
Copy to:

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

Digitally Signed by Amit Kumar Saraf
Date: 21-11-2024 17:52:33
Reason: Approved

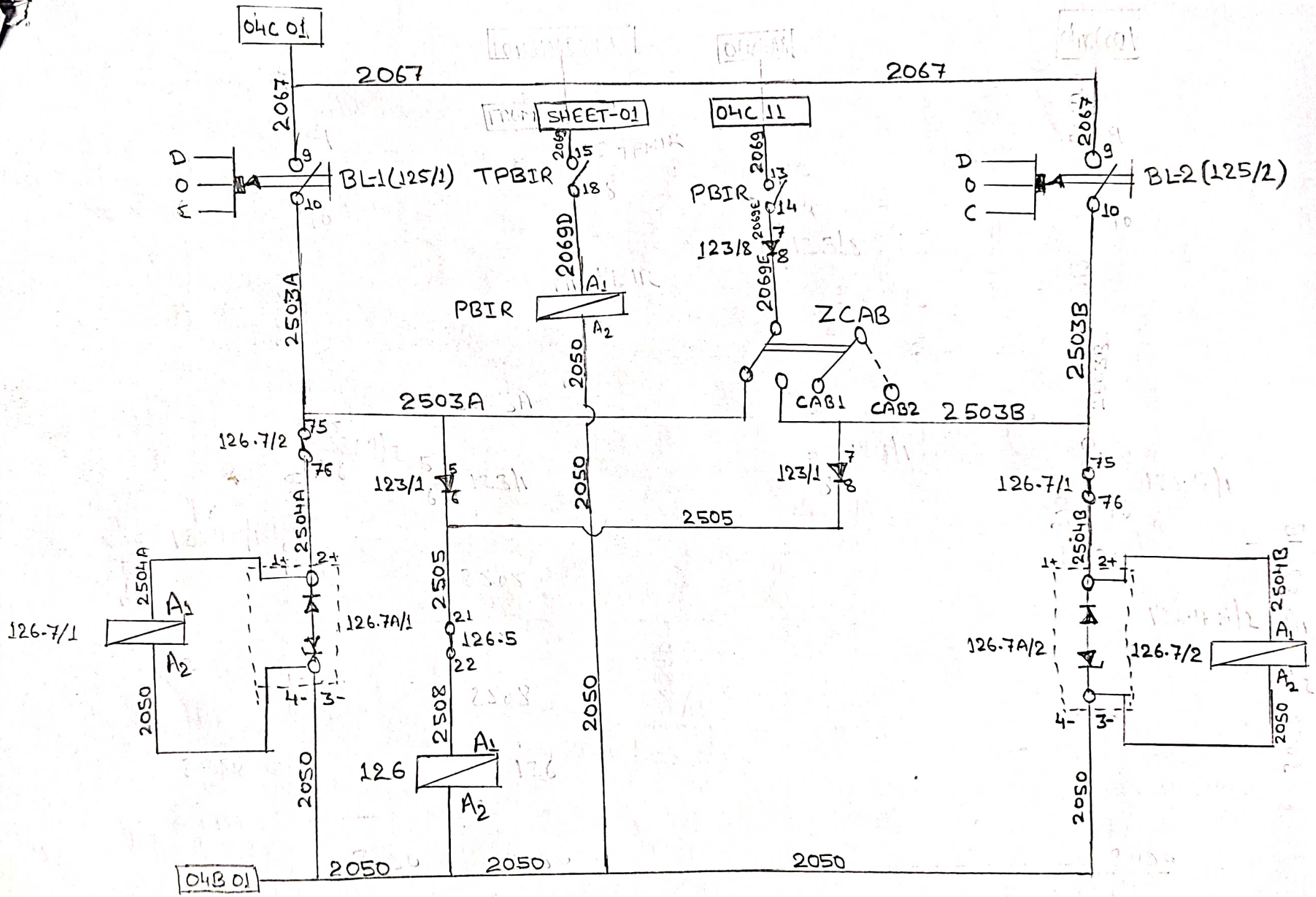
For Director General (Traction)

VCU RESET IN MULTIUNIT



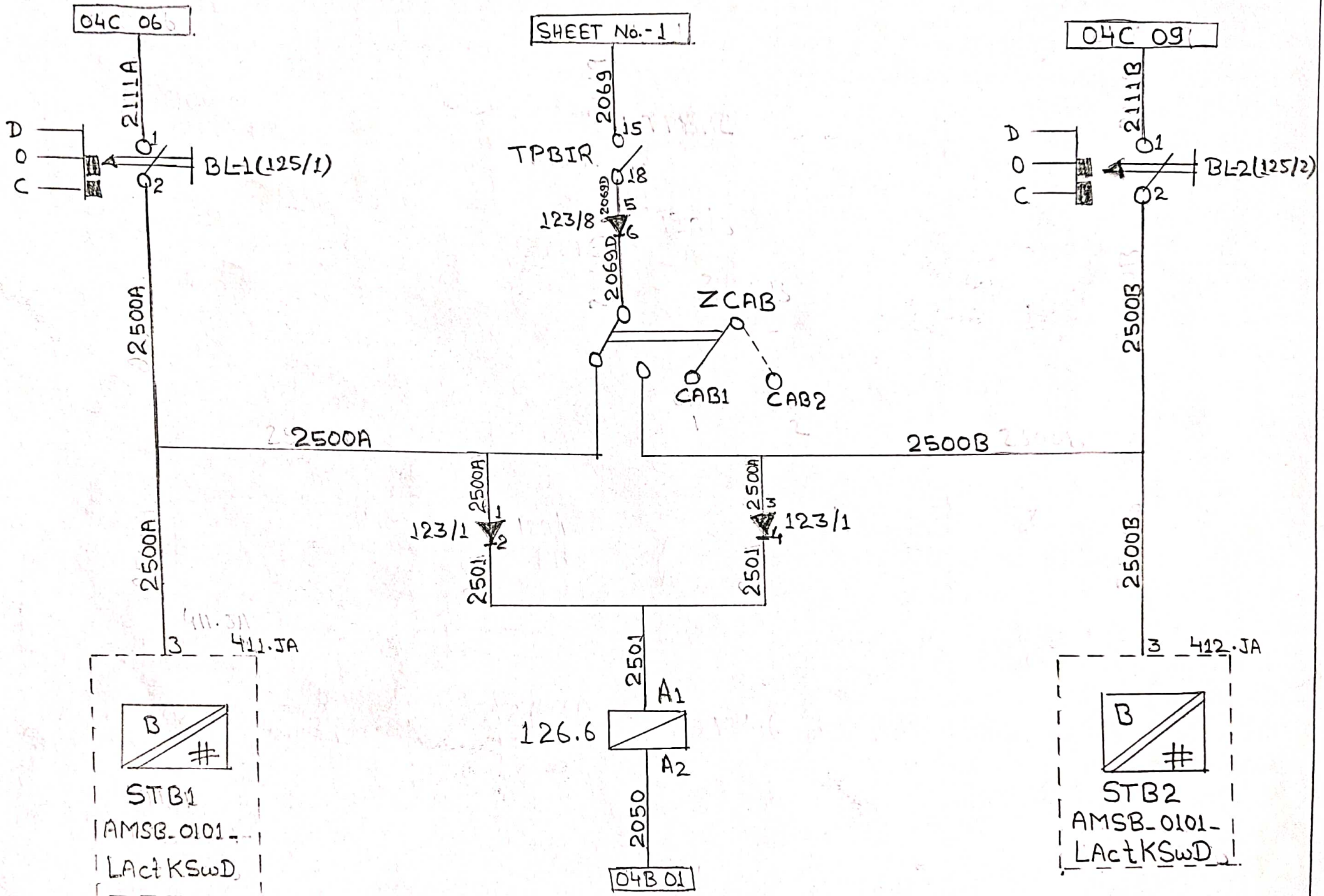
SHEET-01

ELS. ROURKELA



SHEET-02

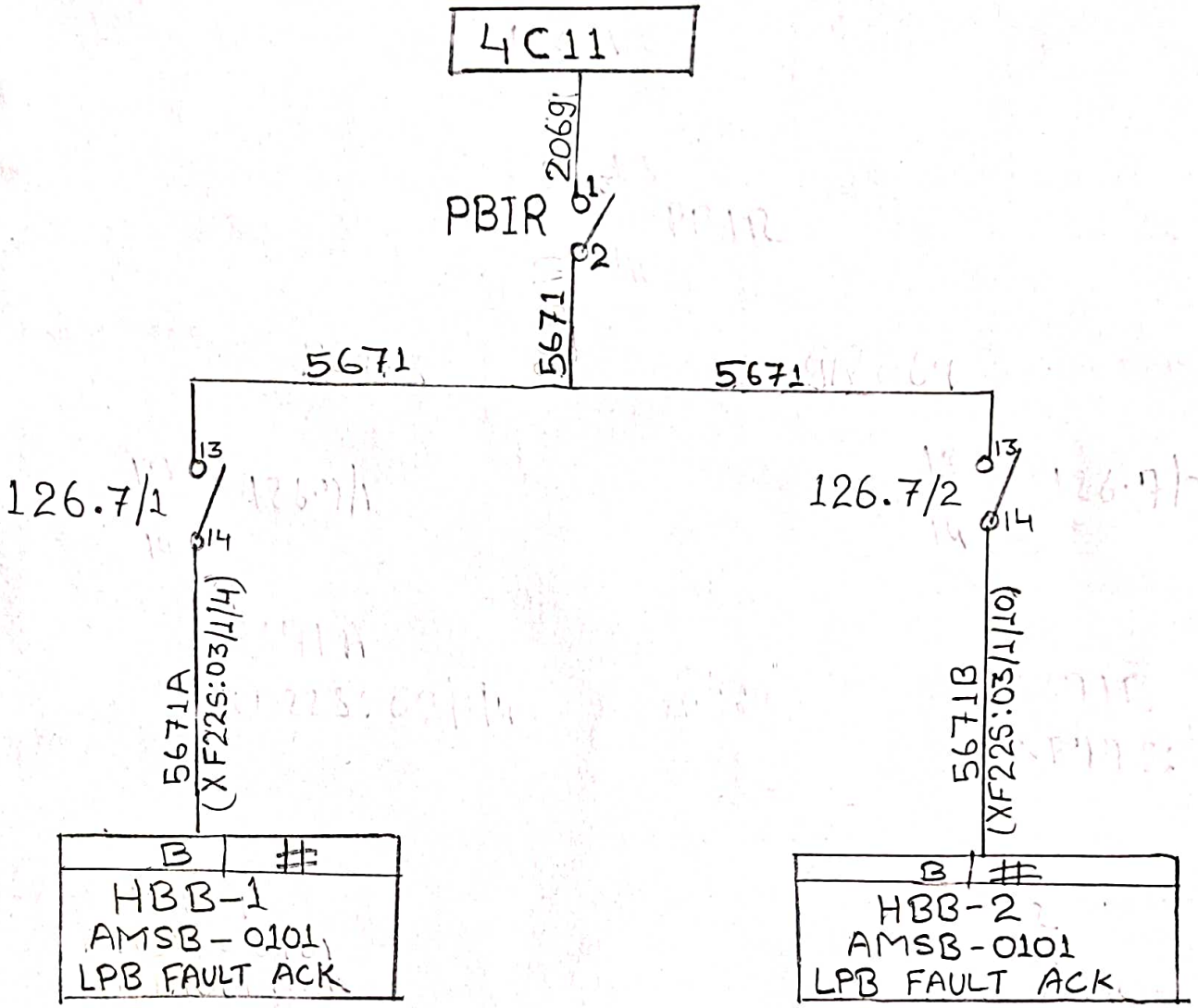
ELS, ROURKELA



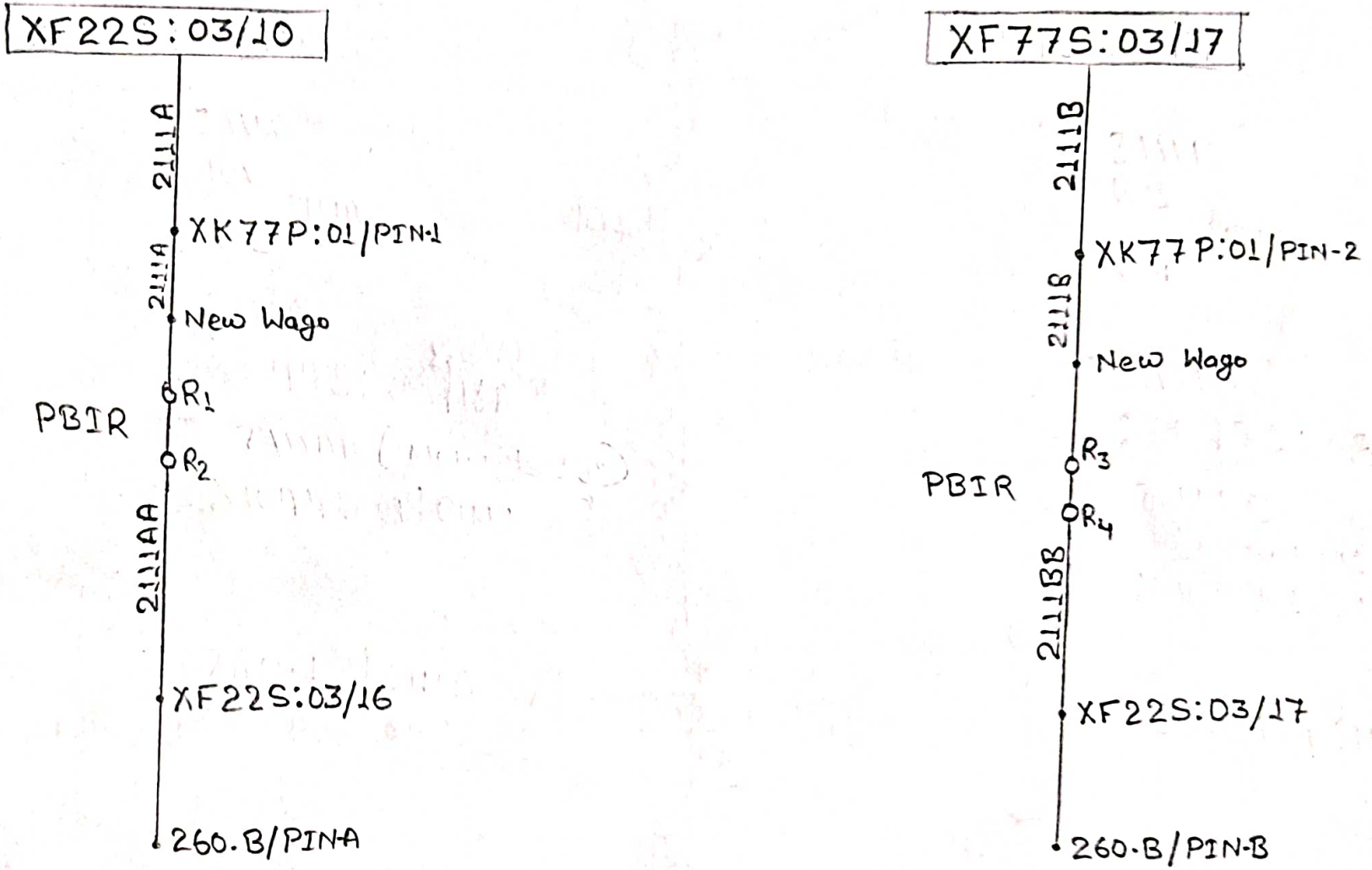
SHEET-03

ELS, ROURKELA

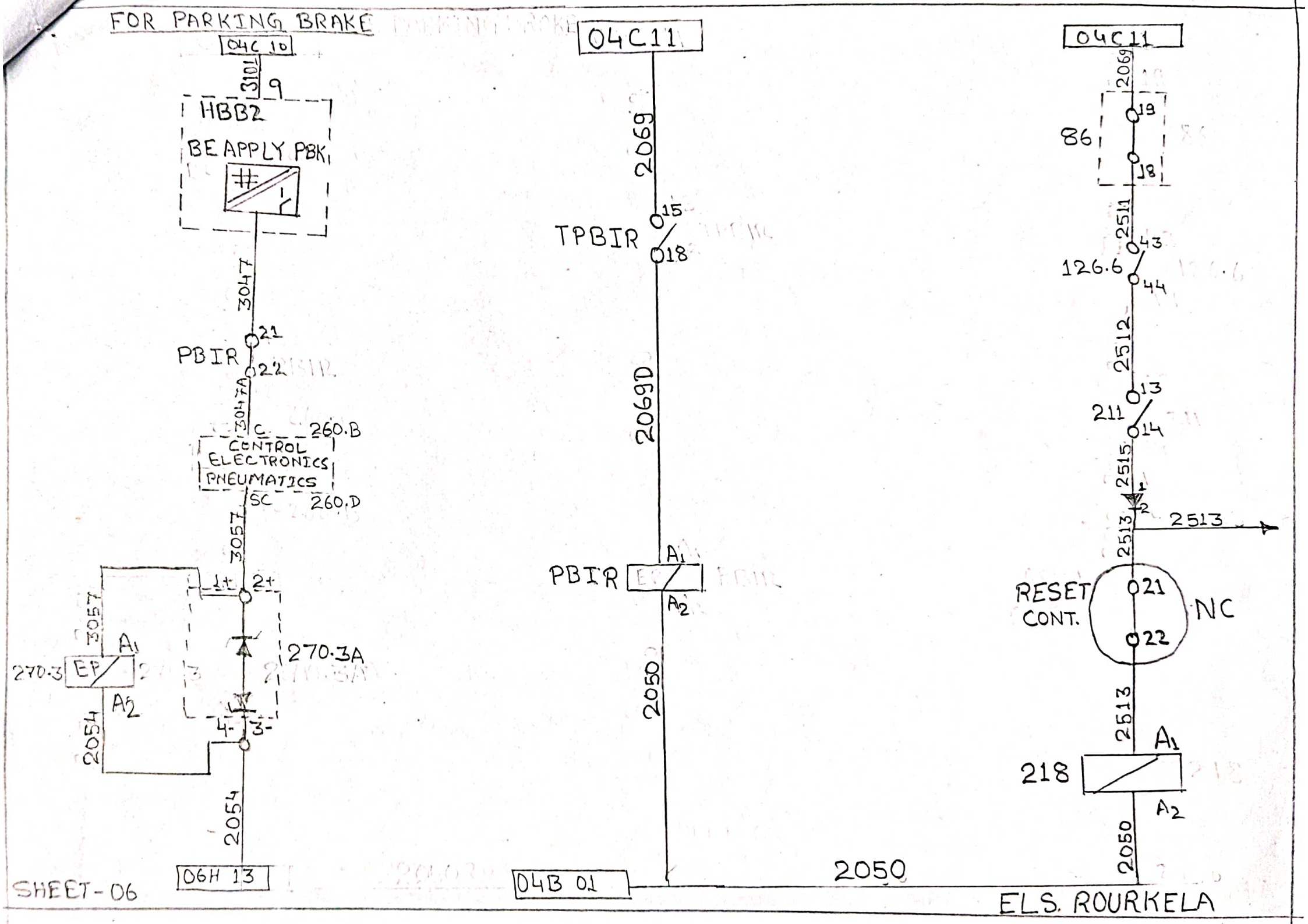
FAULT ACKNOWLEDGEMENT



TO BE CARRIED IN FTIL LOCO ONLY TO AVOID PRESSURE DROP.



FOR PARKING BRAKE



SHEET-06

ELS. ROURKELA