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BTS HHPSD Retrofit Project Operation Training-1b (Control System)



Control System



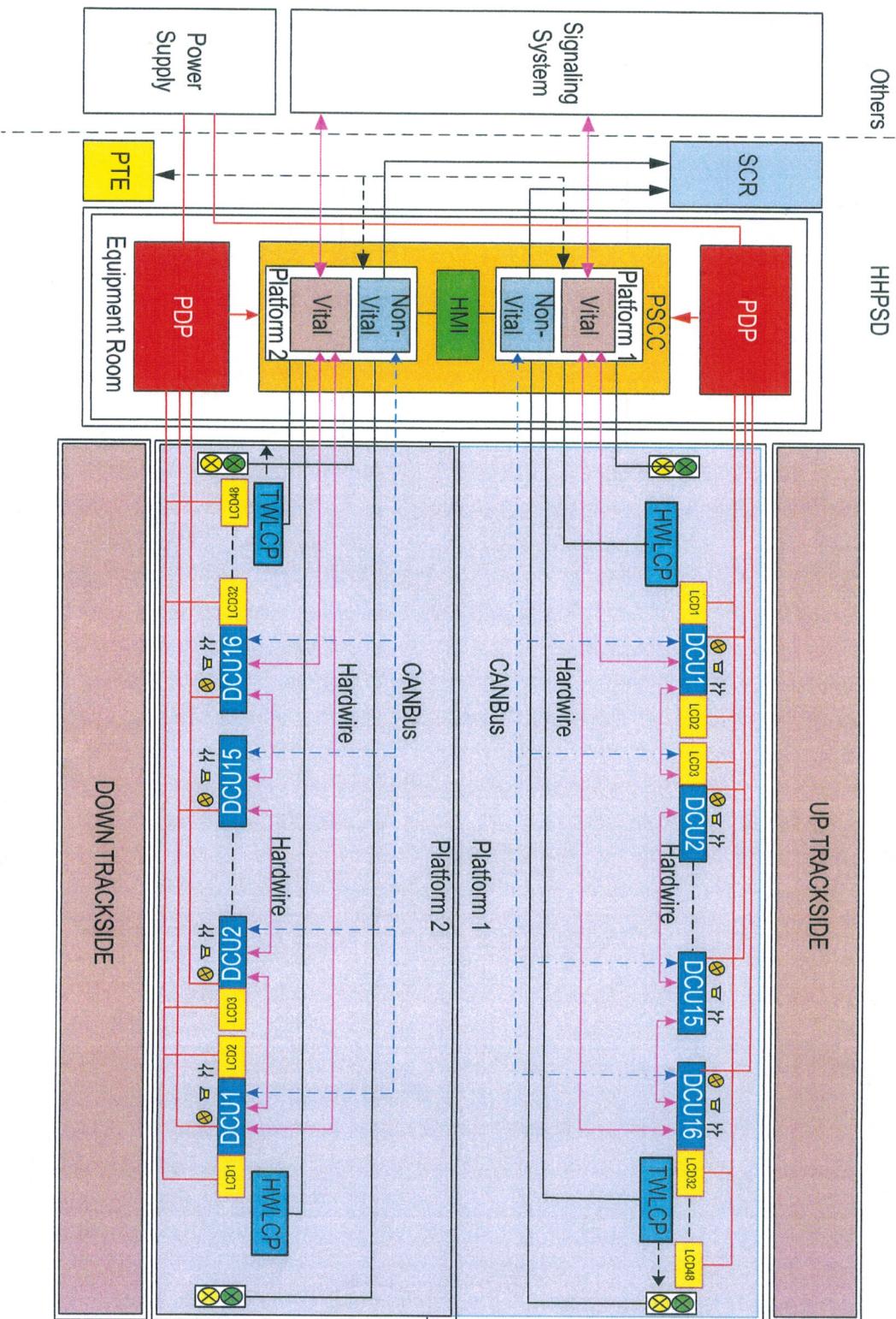
- Control Systems comprises of the Hardware and Software element of the door system. Main components are

- ✓ Platform Screen Control Cabinet (PSCC)
- ✓ Door Control Unit (DCU)
- ✓ Local Control Board (LCB)
- ✓ Local Control Panel (LCP)
- ✓ Portable Test Equipment (PTE)
- ✓ Power Distribution Panel (PDP)
- ✓ Station Control Room (SCR) and Summary Indicator
- ✓ Grounding and cabling
- ✓ SIG interface

Summary

Control System Block diagram

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Control System Platform Screen Control Cabinet

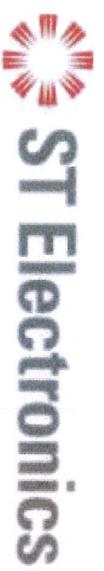


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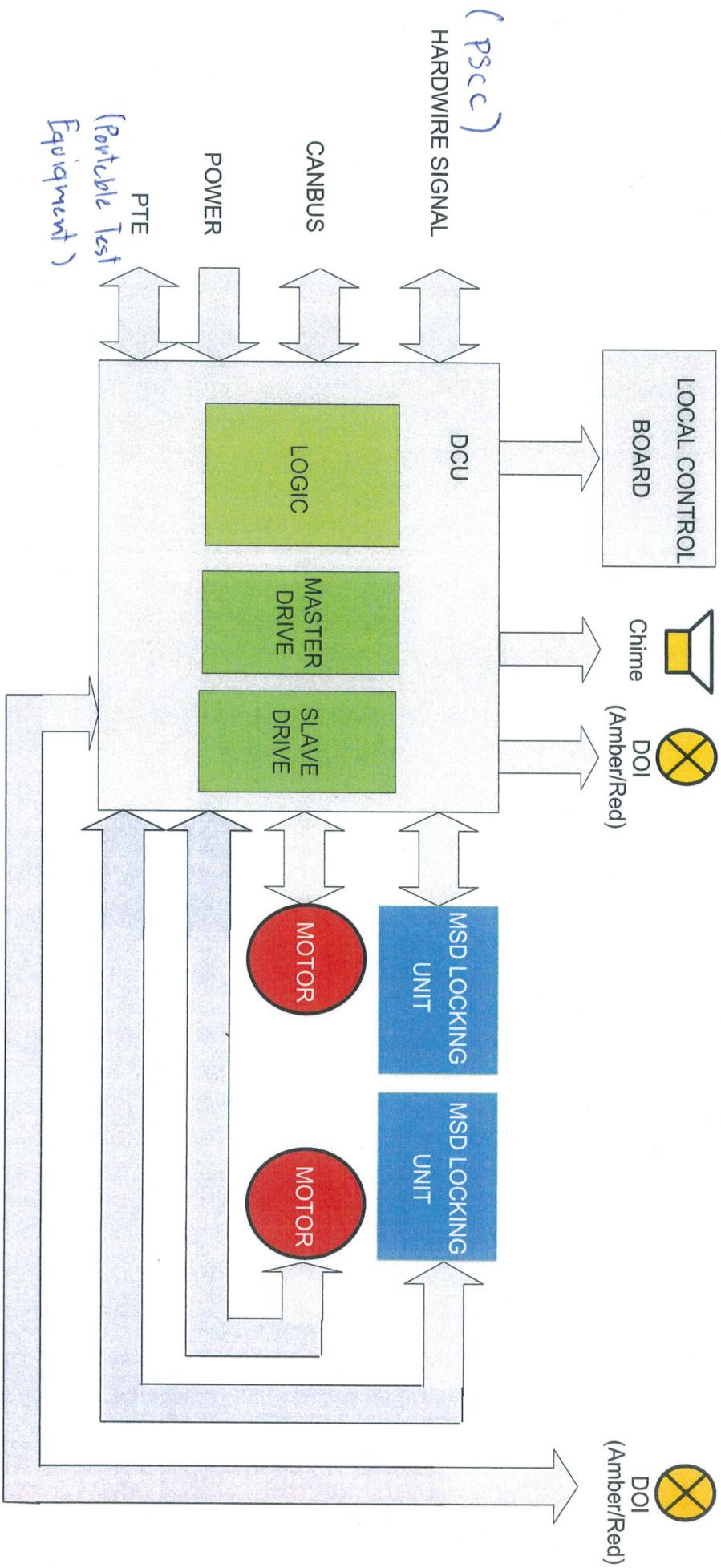
Platform Screen Control Cabinet



- The PSCC is the central point for all electrical signals and data of the HHPSD System of a station
- For control one platform PSCC has two main circuits
 1. Vital Circuit which process signal from Signalling system and to Signalling system
 2. Non Vital Circuit which monitor the HHPSD System

Control System Door Control Unit (DCU)

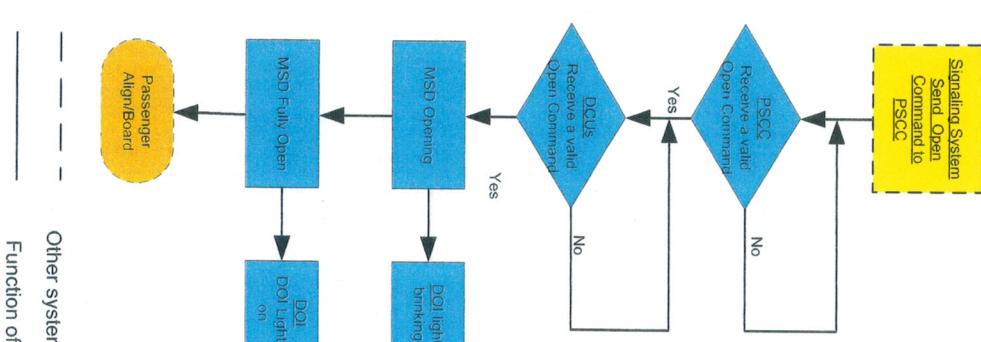
For Test Mode (When Test Mode is bypass All door Close and Lock function)



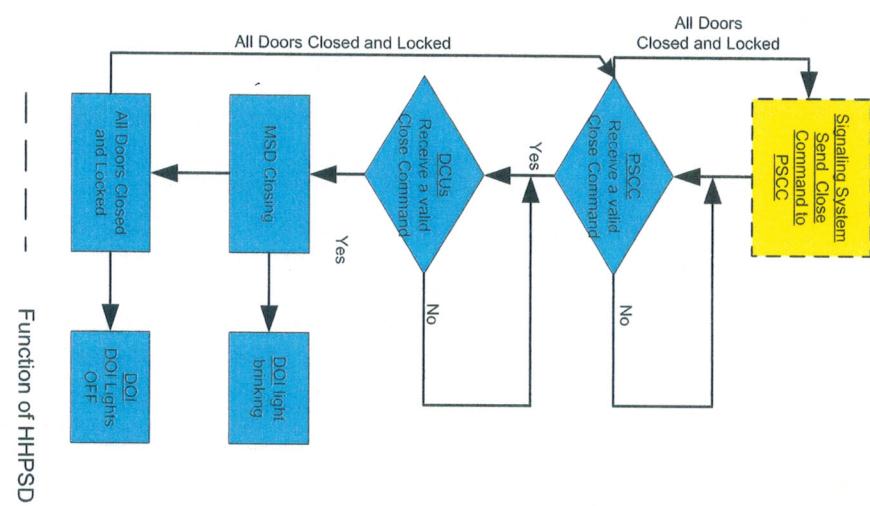
Control System Door Control Unit (DCU)



Normal Operation



Normal Operation



Normal Open Flow Chart

Normal Closed Flow Chart

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Door Control Unit (DCU)



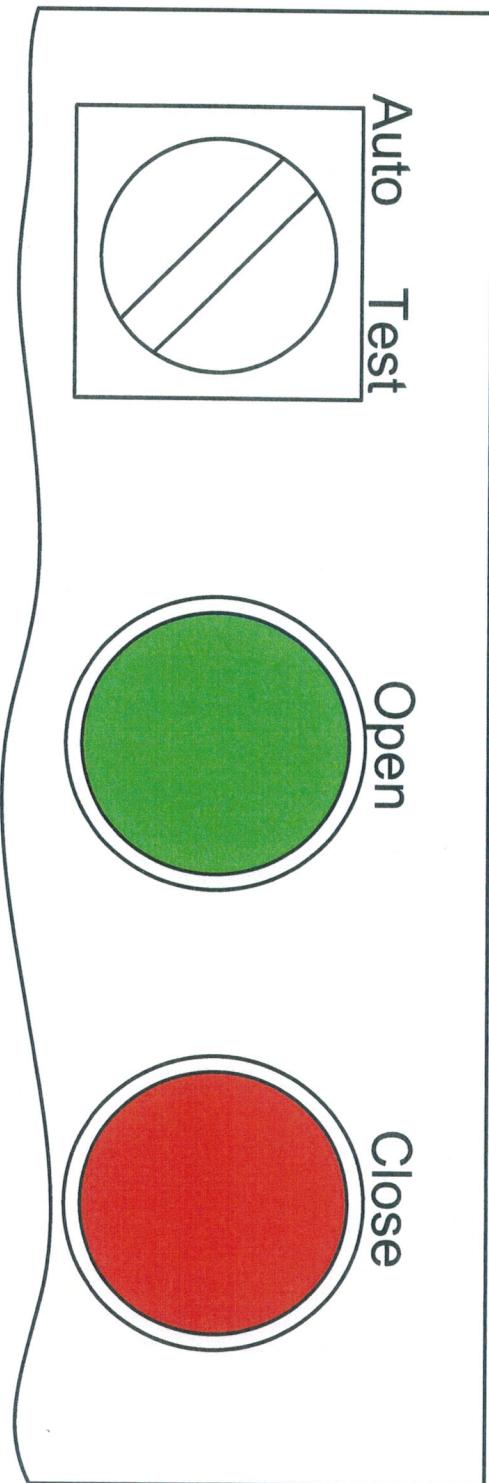
The basic operation flow is as below:

- Station Signalling system forward the open command to PSCC and PSCC send this command to all DCUs to open the ASD doors.
- The train may wait for the dwell time for passengers to alight and board the train. After that, Signalling system forwards the close signal to PSCC and PSCC send this command to each DCU to close the ASD doors.
- After HHPSD system all ASD doors are closed and locked PSCC send "All Doors Closed and Locked" signal to signalling system for train left station.

Control System Local Control Board



Local Control Board (LCB)



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Local Control Board

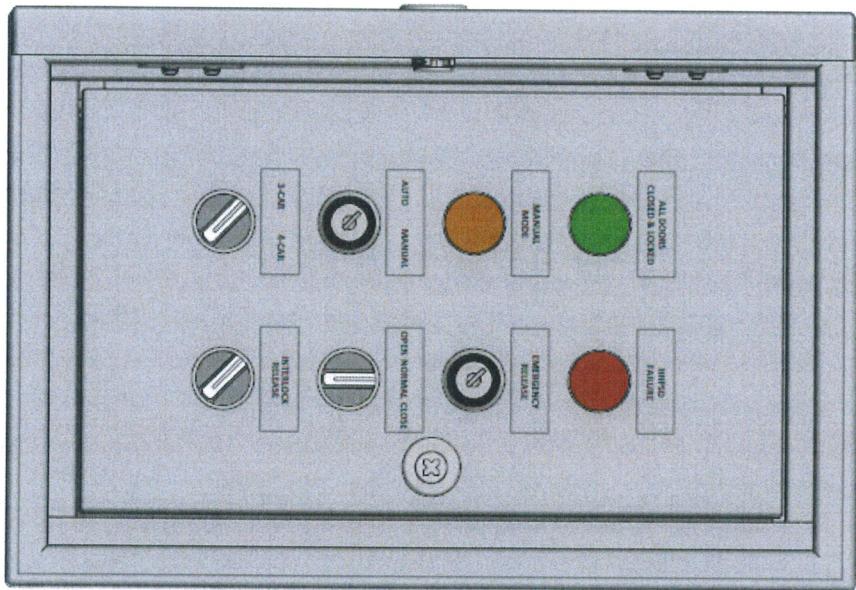
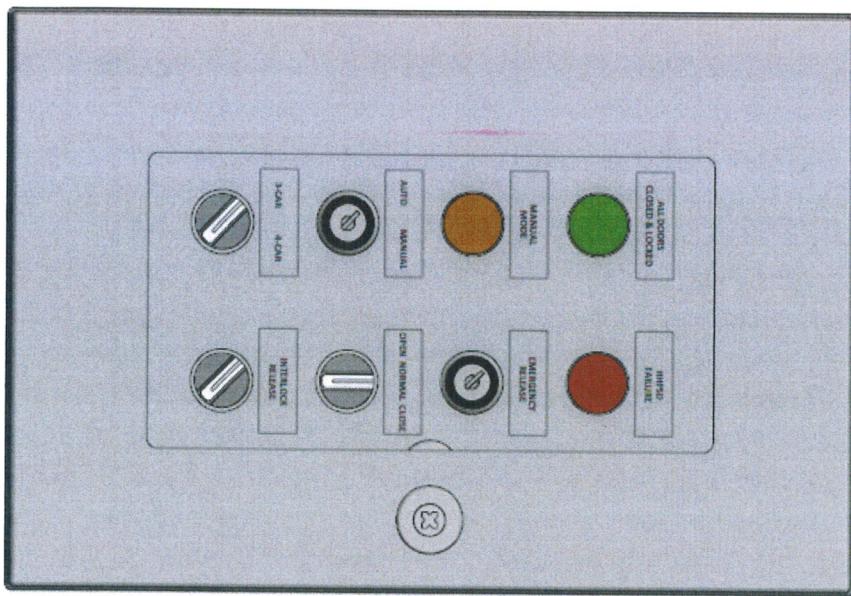
DCU Local Control Board is designed for operator or maintenance team to manually open or close the door

- This control board has a select switch with Auto/test two position and two push button named “open” and “close”
- When select switch turn to “test” position, first door closed and locked signal will be bypassed
- Only at this “test” mode door can be opened or closed manually by press “open” or “close” button on LCB board.
- When LCB select switch turn to “Auto” mode, DCU only receive command from PSCC to open or close door.



Control System Local Control Panel

BTSHHPSD
LCP LAYOUT



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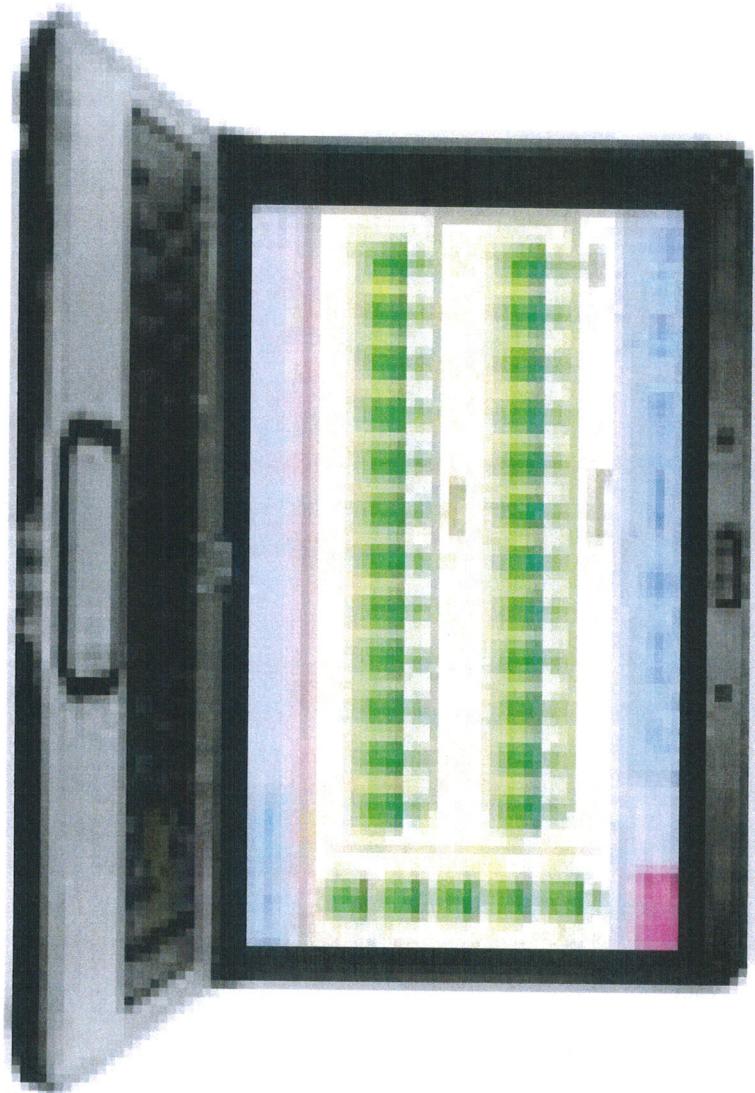
Local Control Panel



Local Control Panel (LCP) is designed for driver or operator to open or closed HHPSD doors, there are follow lamps, key switches and push buttons on LCP panel:

- Two lamps, one is Green for closed & locked, other red for failure
- One key select switch with two position and spring return type (Auto, Manual two positions)
- One select switch with 3 position named "Open", "Normal" and "Close" position and spring return type
- One select switch with 2 position named "3-Car" and "4-Car" position
- One key switch with two positions and the key can be removed from "Normal" position only and this switch is spring type

Control System Portable Test Equipment



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PTE



The PTE interfaces with the DCU to configuration parameters, health monitoring and diagnostic information. The PTE is software that runs on a portable PC, which is connected directly to the DCU maintenance connectors through the special interface unit and cable provided

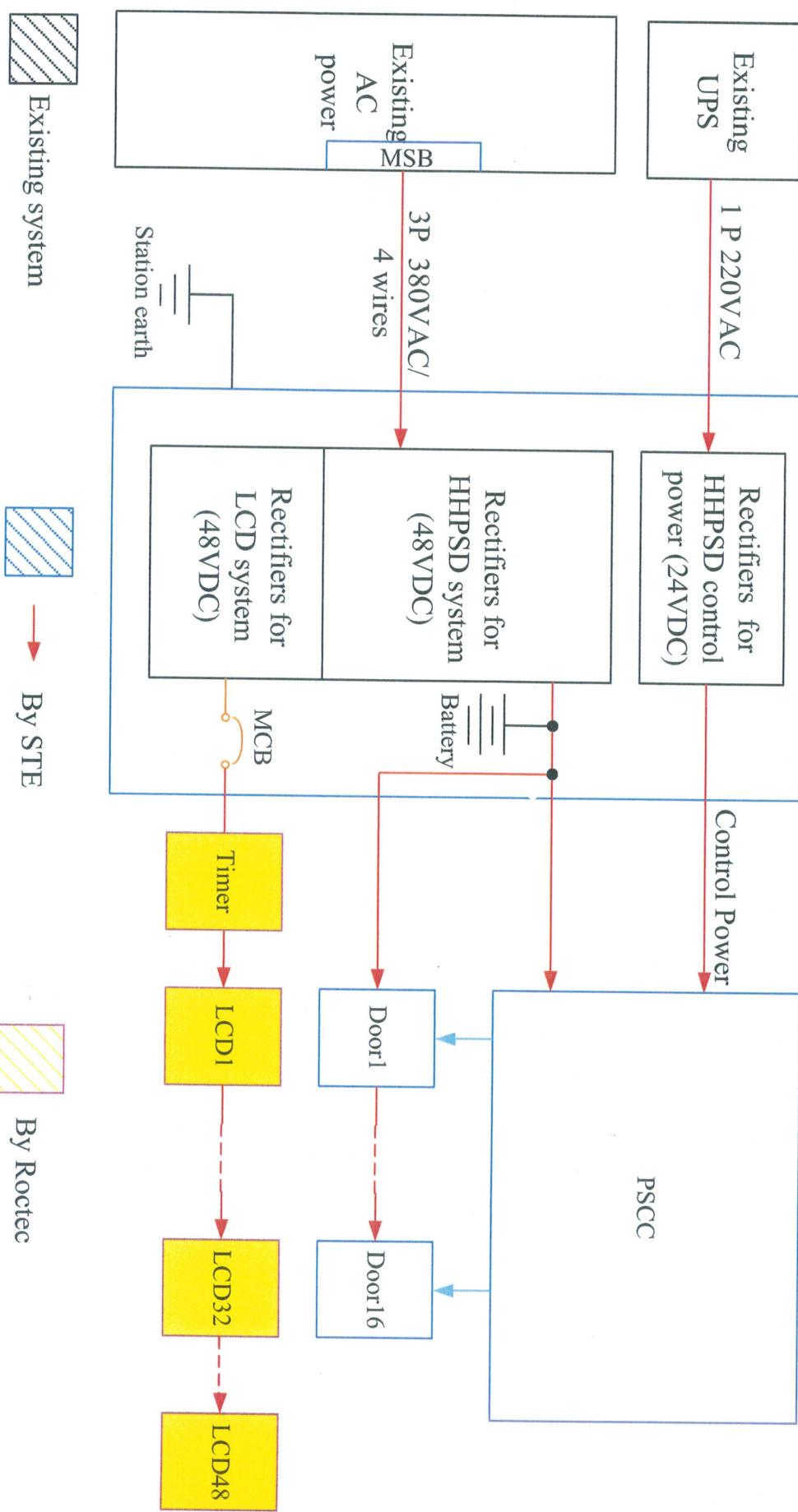
The software includes the following functions:

- Select preset motion profiles.
- Configure motion profile (acceleration/velocity/time)
- Configure Obstruction Detection parameters
- Configure re-close time.
- Data monitoring when connected to the DCU.
- Event Logging - view the event logs at either the DCU which is continuously updated.
- When log in PSCC PTE will monitoring HHPSD system status and download HHPSD system fault history from PLC

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Power Distribution Panel (PDP)

Power supply for one platform



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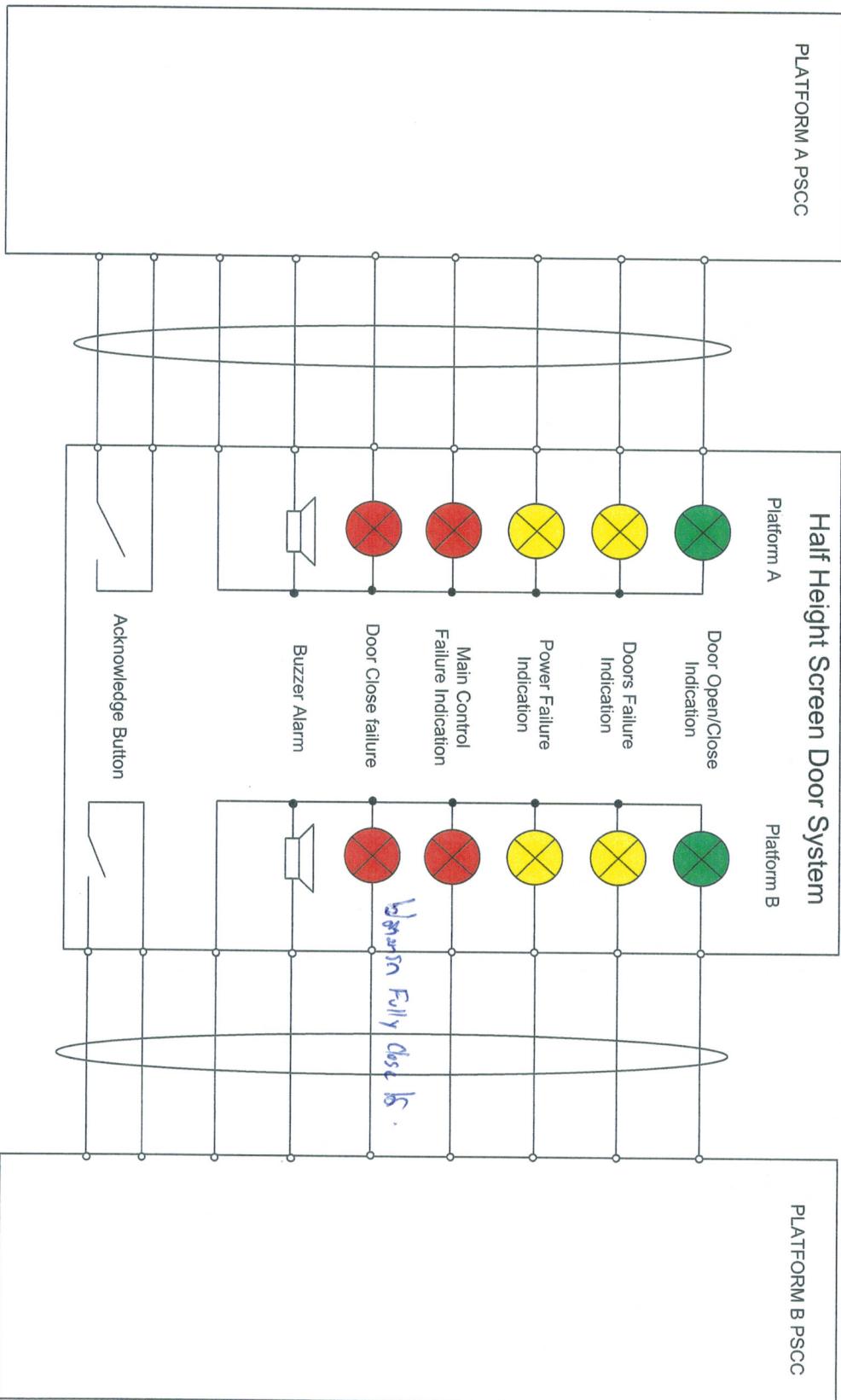
Power Distribution Panel (PDP)



The Power Distribution Panel provide the rectification of AC power source and distributed to the respective equipment as shown in the figure.

- STE will supply battery to HHPSD motive power when PDP input AC power was lost and battery will support HHPSD system fully cycles run 5 times in one hour.
- The power system shall have N+1 redundancy configuration for HHPSD system.
- To protect the equipment the DC power supply is using the floating system.
- AC and DC earth leakage detector were installed in PDP to indicate whatever AC or DC earth failure and send those alarms to PSCC for indication on HMI and SCR panel.

Control System Station Control Room & Summary Lamp



Control System

Station Control Room & Summary Lamp



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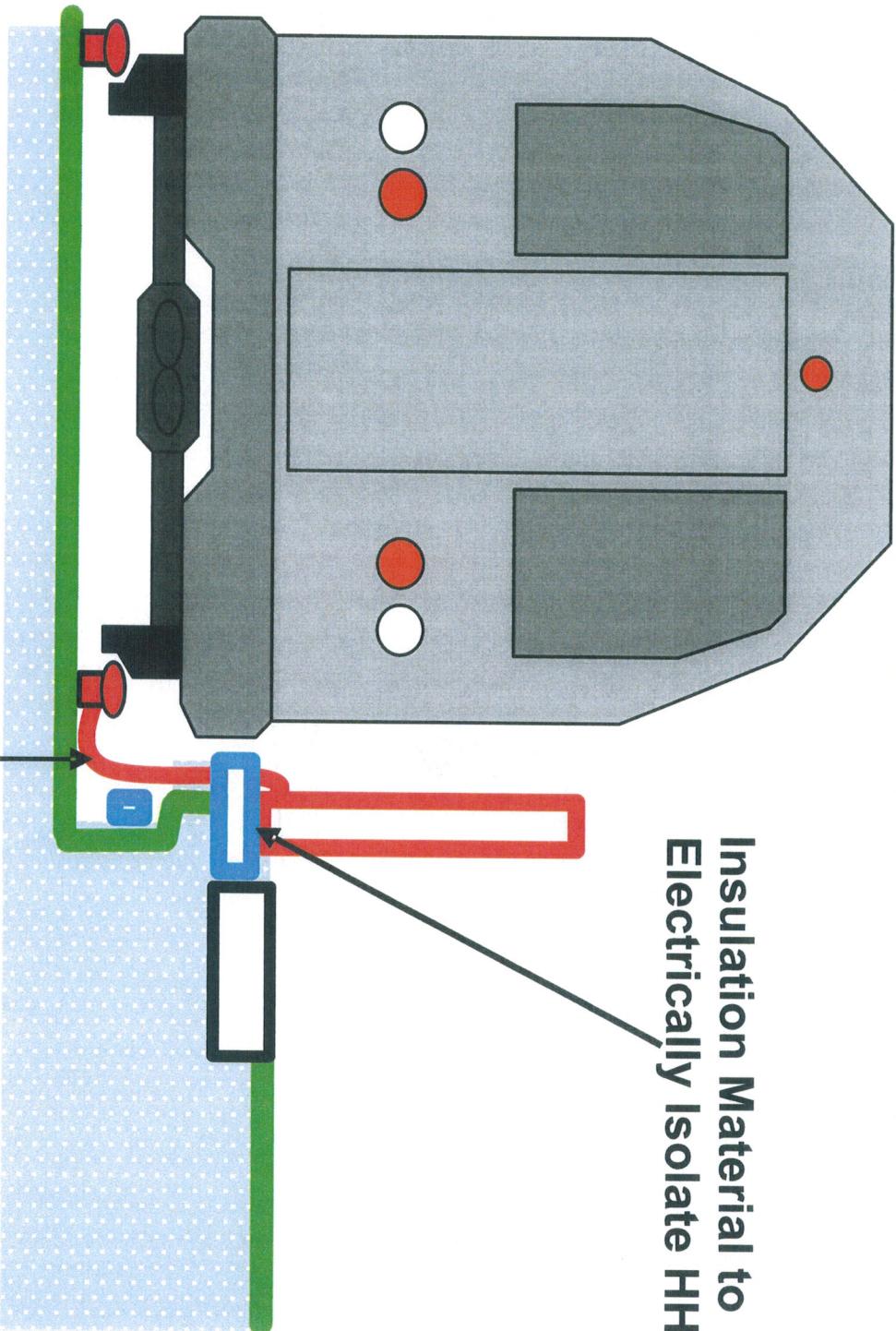
A remote fault monitoring panel shall be installed in SCR room to monitor the following items:

- Door open/close indication. (Green LED)
- Door failure indication. (Yellow LED) and Audible alarm. (Buzzer)
- Power failure indication. (Yellow LED) and Audible alarm. (Buzzer)
- Main controller failure indication (Red LED) and Audible alarm. (Buzzer)
- Acknowledgment button.
- Door closed failure. (Red LED)

Control System Grounding and Cabling



**Insulation Material to
Electrically Isolate HHPSD**



HHPSD Bonding Cable to Return Rail

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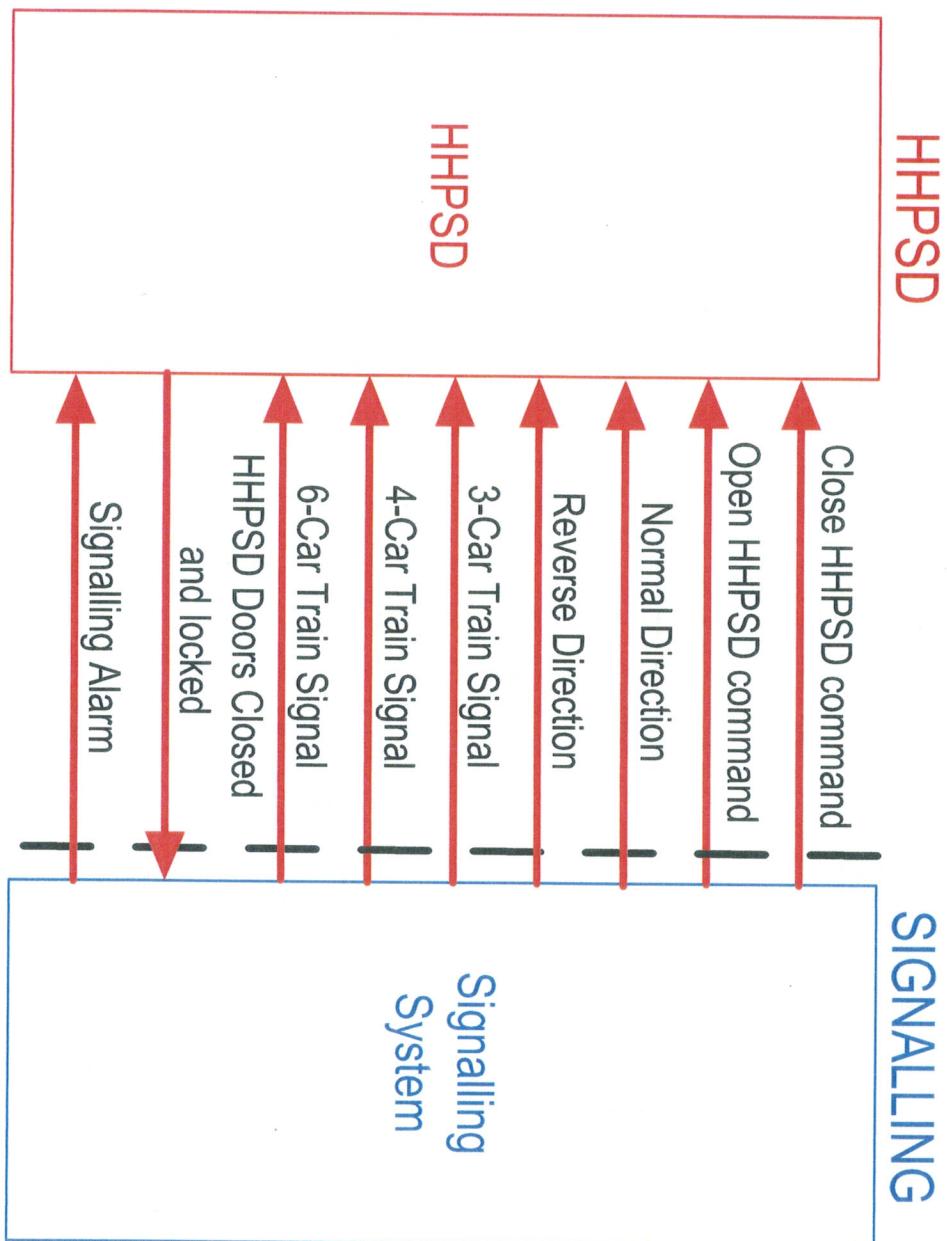
Control System Grounding and Cabling



- The HHPSD is situated at the platform edge and is not in electrical contact with the station structure
- HHPSD structure will be bonded to the local traction return rail with double 50mm² cable at a single impedance bond (to prevent traction fault loops) located at the platform end
- There is no conductive path between station earth in the HHPSD room and the HHPSD structure.
- All HHPSD structural elements will be metal to metal bolted to achieve bonding integrity
- All passenger interface areas of HHPSD is PVDFC coated for prevent touch voltage hazard

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Control System SIG Interface



Control System SIG Interface



DOOR CLOSE COMMAND

Function:

A **DOOR CLOSE** Signal (double cut) will be provided by the SIG to HHPSD. This Signal is designed to be low activated to close HHPSD doors.

DOOR OPEN COMMAND

Function:

A **DOOR OPEN** Signal (double cut) will be provided by the SIG to HHPSD. This Signal will then send the OPEN command by PSCC to all the HHPSD doors to open.

NORMAL DIRECTION

Function:

When train run in normal direction at platform signalling system will send this signal (double cut) to HHPSD system. The DIRECTION and TRAIN TYPE signals must appear BEFORE the Door Open Command can allow doors to open.

Control System SIG Interface



REVERSE DIRECTION

Function:

When train run in reverse direction at platform signalling system will send this signal (double cut) to HHPSD system. The **DIRECTION** and **TRAIN TYPE** signals must appear BEFORE the Door Open Command can allow doors to open.

3-CAR TRAIN SIGNAL

Function:

When 3-car train approaching at platform signalling system will send this signal (double cut) to HHPSD system and then PSCC will just open 3-car HHPSD doors. The **DIRECTION** and **TRAIN TYPE** signals must appear BEFORE the Door Open Command can allow doors to open.

4-CAR TRAIN SIGNAL

Function:

When 4-car train approaching at platform signalling system will send this signal (double cut) to HHPSD system and then PSCC will just open 4-car HHPSD doors. The **DIRECTION** and **TRAIN TYPE** signals must appear BEFORE the Door Open Command can allow doors to open.

Control System SIG Interface

6-CAR TRAIN SIGNAL (for future function)

Function:

When 6-car train approaching at platform signalling system will send this signal (double cut) to HHPSD system but HHPSD system no response. The DIRECTION and TRAIN TYPE signals must appear BEFORE the Door Open Command can allow doors to open. This signal terminates at terminal block for future HHPSD system upgraded to 24 HHPSD doors operation.

SIGNALLING ALARM SIGNAL

Function:

When Signalling system is failure Signalling system will send this signal (double cut) to HHPSD system. Then this signal will be send to SCR display panel to show "Signalling Alarm" on SCR panel. This Signalling alarm is active low.

