

DRIVER DISPLAY UNIT

ARC/DDU/V5.0

USER MANUAL



JULY 2020

RELEASE 1.0



Advanced Rail Controls Private Limited

Bangalore-560092

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IMPORTANT NOTICE

This is a sophisticated microprocessor based equipment and can be serviced only by trained skilled personnel. Opening the equipment by any unauthorized person will make the warranty null and void.

1. INTRODUCTION

This document describes the technical details of Graphic Driver Display Unit (DDU) used in 3-Phase Electric Locomotives of WAP5, WAP7, WAG9 & WAG9H classes being operated by Indian Railways. The DDU is a man machine interface device able to communicate with locomotive control system through MVB. The LED backlit 10.4" XGA LCD screen provides better readability even during daylight conditions, thanks to brightness control. The DDU has various predefined screens which can be used for investigative monitoring.

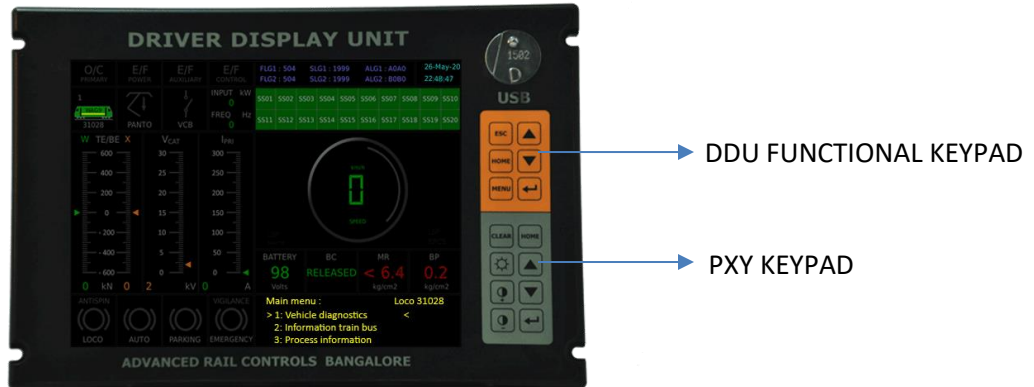
The salient features of the DDU are listed below.

| SL.No. | Features | Values / Conformance |
|--------|-------------------------------|--|
| 1 | LCD Display Size | 10.4 inch, XGA |
| 2 | Overall outer dimensions (mm) | 316(W) x 214(H) x 82(D) |
| 3 | Brightness Control | Available (Automatic & Manual) |
| 4 | Multiple Screen Selection | Available |
| 5 | Host Interfaces | Isolated RS-485 |
| 6 | Third Party Interfaces | USB, Ethernet |
| 7 | Ingress Protection | Totally enclosed (IP65) |
| 8 | Cooling | Natural Chassis cooling |
| 9 | Keypad | Membrane, Functional keys |
| 10 | LCD screen resolution | 1024 x 768 |
| 11 | Operating Temperature | -25 to +70°C |
| 12 | Operating Voltage | 70V DC to 137.5V DC (as per IEC-60571) |
| 13 | Memory | 1GB NAND Flash, 1GB DDR3 RAM |
| 14 | Processor | ARM CORTEX-A8 |
| 15 | Operating System | LINUX |
| 16 | Normative Conforming Standard | IEC-60571 & Linked IECs |
| 17 | Touch screen | P-CAP Technology |

3. INTERFACE DETAILS OF DDU

| Sl. No | Interface Details | Connector Type |
|--------|-------------------|--|
| 1 | POWER | 3 pin sub D 15 pin shell size |
| 2 | POWER | 3 pin circular MIL-26482 I standard panel mount Male connector (This will be mounted as per the customer requirement, by default this slot will be blanked) |
| 3 | MVB | 10 pin circular MIL-26482 I standard panel mount Male connector (This will be mounted as per the customer requirement, by default this slot will be blanked) |
| 4 | MVB | 9 pin D-SUB Male connector |
| 5 | MVB | 9 pin D-SUB Female connector |
| 6 | RS-485/RS-422 | 9 pin D-SUB Female connector |
| 7 | ETHERNET | M12 Female circular connector |
| 8 | CAN/RS-232 | 9 pin D-SUB Male connector |

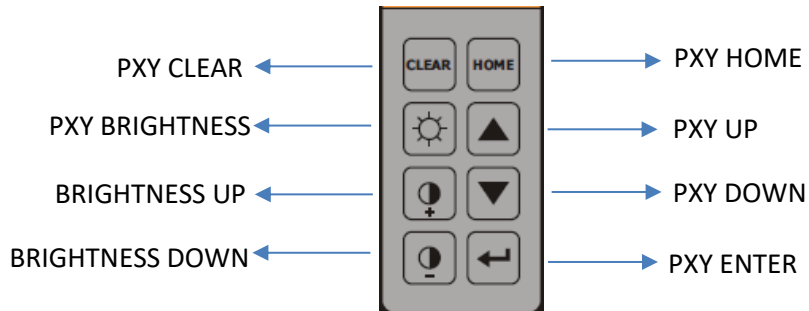
4. OPERATOR CONTROLS OF DDU



The DDU has a rugged membrane keyboard on the right-hand side of the display. There are two sections in the key board, are known as “PXY” keypad and “DDU Functional” keypad on the right-hand side.

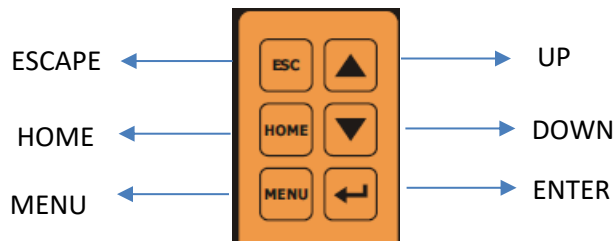
4.1 INDIVIDUAL KEYPAD DETAILS: PXY KEY PAD

The PXY keypad has 08 membrane keys of rugged type. The keys are protected from direct ingress of dust and moisture. The keys are suitable for operation by fingers. The function assigned to each key is given below:



4.2 INDIVIDUAL KEYPAD DETAILS: DDU FUNCTIONAL KEY PAD

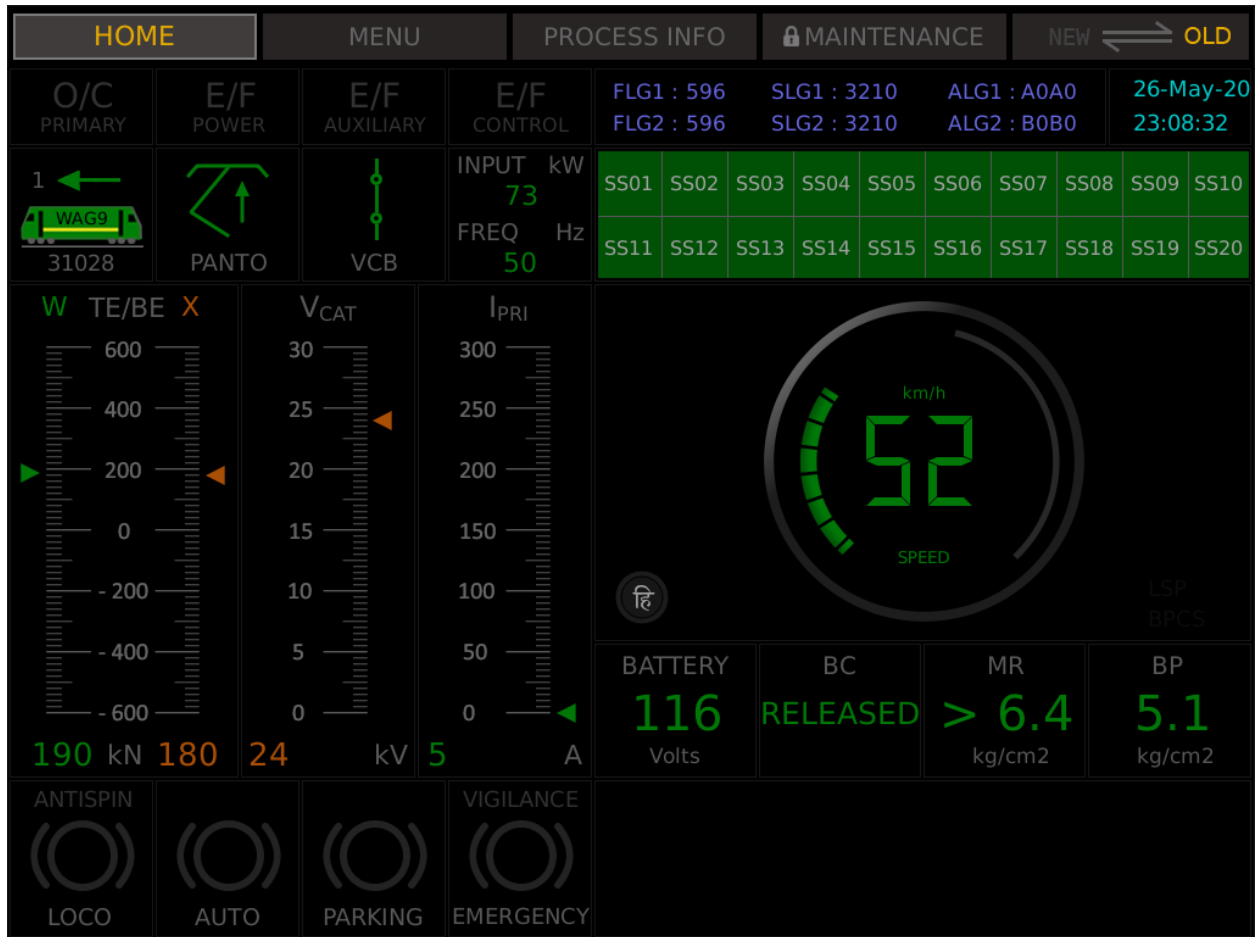
The DDU Functional keypad has 06 membrane keys of rugged type. The keys are protected from direct ingress of dust and moisture. The keys are suitable for operation by fingers. The function assigned to each key is given below:



5 SCREENS

The Driver display has pre-defined dedicated screens in order to monitor real time process variables pertaining to a particular section or sub-system of the locomotive. However, such screens are meant for online monitoring by technical staff whenever required. The locomotive driver, however, needs to view the default screen only most of the times. The screens have been designed to take care of the specification requirement. The details of the screens are explained below.





The design philosophy followed is such that all the critical process variables and PIXY screen which are needed to be monitored always by the driver has been provided in a permanent screen area and it will always be available irrespective of any pre-defined screen selected. In any screen, the changing portion is a small area in the space of the speedometer dial of the default screen. This is because, locomotive speed can be monitored through other means also (example: standalone speedometer or the speed in the loco speed available on PIXY screen).

5.1 Default Screen (Screen 1)

The driver normally uses the default screen while driving, even though, he can navigate to any other investigative screens, if required. This screen is divided into various sections. The top left portion gives the status of protective relays. When acted, the colour changes to red. Under normal conditions, the colour is not highlighted and gives a grey colour. The middle top provides a window in which processor node numbers are displayed (FLG, SLG & ALG). Right top corner displays current date and time. Please note that the date and time shown are from the driver display processor RTC. In case loco time is needed, the same can be viewed in the PIXY window.

The first graphic mimic in the second row shows the loco type and loco number at bottom, the active cab and the direction selected. The active cab is indicated by a small green dot and the arrow indicates the direction selected. The second graphic mimic displays the status of pantograph. A block arrow is used to represent the pantograph. When both the pantographs are down, the arrow looks down in grey colour. When any one panto is raised, the arrow points upwards with green colour.

The VCB is represented by three-line segments. The notation used is similar to the one used for opening and closing the VCB at OHE neutral sections. When the VCB is OFF, the upper- and lower-line segments are vertical, middle segment is horizontal and the colour is grey. When the VCB is closed, all the three-line segments become vertical with green colour.

Right of the VCB mimic is the area for displaying input power and line frequency. Input power displays the instantaneous power at pantograph, calculated by ALG in kW. The Line frequency is also measured by ALG in Hz. In the second-row right side is the sub-system status. There are 19 subsystems in three phase locomotives. The sub-system 20 does not exist and is retained for getting symmetry of the screen but always remain in grey colour. If a sub-system is isolated, the colour will change to red. A healthy sub-system will be in green colour. For getting the name of the sub-system, Screen-2 can be activated.

The third row is split into two vertical halves. The left portion has three verticals meters viz. TE/BE, Catenary Voltage & Primary Current. The TE/BE meter provides demand (W) set on left side. Actual (X) value realised is shown on the right side, which is a very good scale for comparison. The actual numerical value appears at the bottom. Please note that during bad track conditions, Demand (W) and Actual (X) can vary widely, especially during wheel slip conditions.

The primary current is shown in a 0 to 300A scale.

The right half side of row 3 of the display is again split into two horizontal portions. The upper portion shows the speedometer mimic. The driver display reads the loco type from the MVB (WAG9/WAG9H/WAP7/WAP5) and accordingly adjusts the maximum speed limit range. The portion up to the maximum limit is shown in green colour and above the speed limit is shown in red colour. In WAG9/9H locomotives, the speed limit is 100 km/h and in WAP5/WAP7, the speed limit is 130 km/h. These figures are automatically adjusted based on the loco type. The numerical value of the speed in km/h is displayed at the bottom.

In the right side of the speedometer dial area, an indication is given for the constant speed operation. When driver presses the constant speed button BPCS, this indication turns green. When not in constant speed mode, the colour is grey. Within the same speedometer dial area right bottom corner, an indication for wheel slip (LSP) is provided. When there is wheel slip, this indication turns orange, otherwise, the colour is grey.

Below the speedometer dial, four process variables are displayed viz. battery, BC, MR & BP.

The battery voltage, when normal, will be shown in green. When the value goes below 86V, it will be shown in red.

The brake cylinder pressure (BC) is shown in Boolean form as 'applied' or 'released' depending upon the brake cylinder pressure.

Similarly, MR pressure is also shown in Boolean form. When MR pressure builds up above 6.4 kg/sq.cm, it is shown in green and when it goes below 6.4 kg/sq.cm, it is shown as red.

For brake pressure, absolute analogue value is displayed, which varies from 0 to around 5.6 kg/sq.cm. When the value is above 4.8 kg/sq.cm, it means that the brakes are in released condition and the value will be shown in green. Below 4.8 kg/sq.cm, it is a brake applied condition and hence will be shown in red.

For brake pressure, absolute analogue value is displayed, which varies from 0 to around 5.6 kg/sq.cm. When the value is above 4.8 kg/sq.cm, it means that the brakes are in released condition and the value will be shown in green. Below 4.8 kg/sq.cm, it is a brake applied condition and hence will be shown in red.

The bottom most row has two portions, the left half shows brake status and the right half is dedicated for the PIXY terminal display.

The loco brake status is shown as 'LOCO'. When the loco brake is not applied, the mimic will be shown in grey colour and arrows pointing away. When loco brake is applied, it turns red and arrows pointing inwards. When anti slip (anti spin) brakes comes into action, the text 'ANTISPIN' above the loco brake mimic will light up in red.

The train brake application is represented by a mimic named 'AUTO' which represents auto brake. When not applied, the arrows are grey and pointing away. When brakes are applied, the colour turns red and arrows pointing inwards.

During emergency brake application, the corresponding arrows turns red and points inwards. In release condition, the arrows are grey and pointing outwards.

NAVIGATION TO OTHER SCREENS

While in default screen (screen-1), when <menu> button is pressed in the upper group keypad, a new screen will appear in the place of speedometer dial. The speedometer portion has been sacrificed here to give a menu of predefined screens that can be viewed. Please note that the Driver will normally drive using default screen only. Other sub-screens are needed for investigative purpose. There are 14 pre-defined screens presently catered.

5.2 LIST OF SCREENS

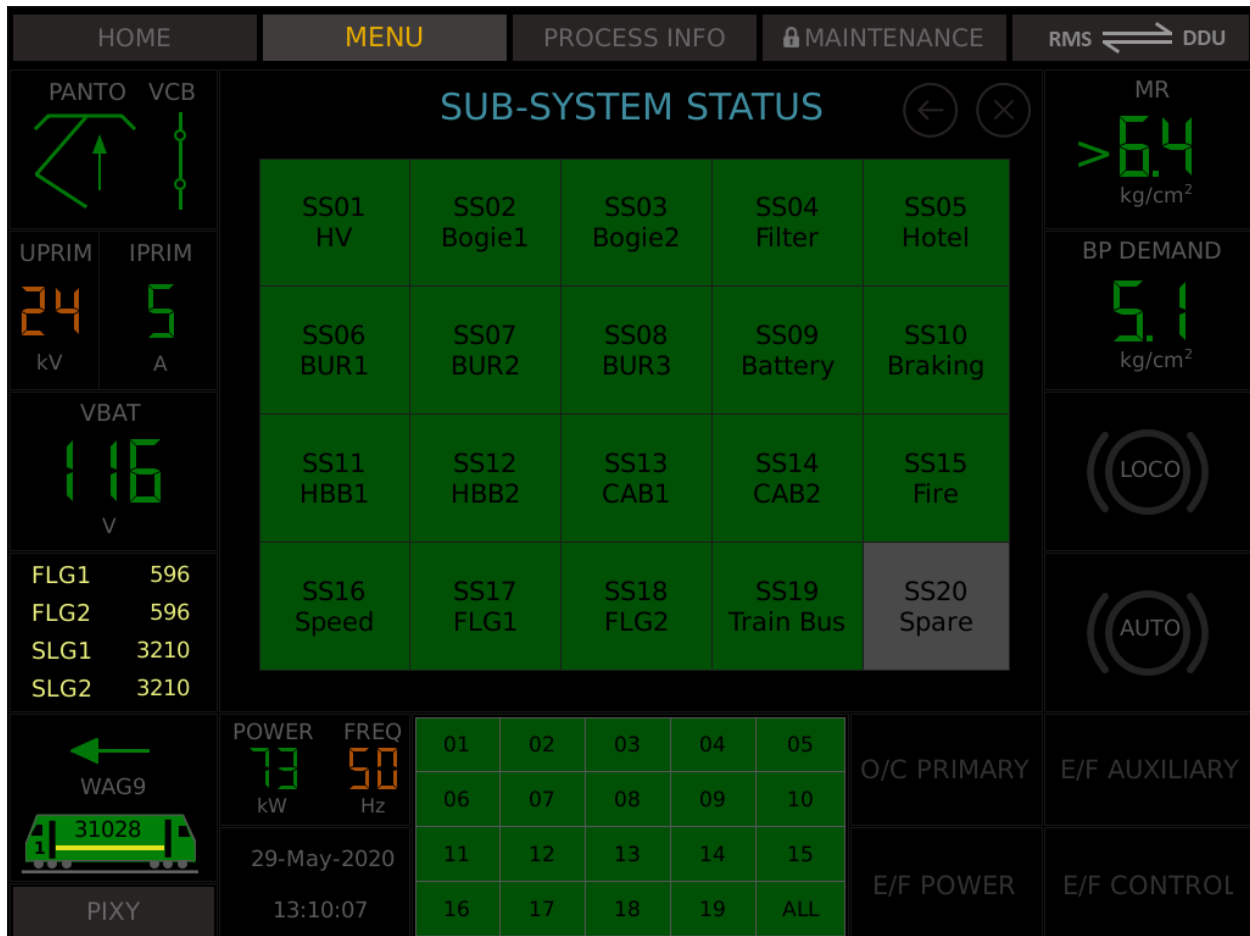
In the above condition, if <HOME> button is pressed, default screen will appear. When the list of screen is displayed, one can navigate to a particular screen by pressing <UP> or <DOWN> arrow keys of the upper group of key pads. After selecting the particular screen, when <ENTER> is pressed, the contents of the selected screen will get displayed. Again by pressing <ESC> will take the menu one level up till the list of screens. Thereafter, by pressing <HOME> in upper group, default screen will appear. Even from any submenu, when <HOME> is pressed in the upper group, default menu will appear.

The screenshot displays the 'MENU' screen with the following components:

- Navigation Bar:** HOME, MENU (highlighted), PROCESS INFO, MAINTENANCE, NEW ↔ OLD.
- Left Panel:**
 - PANTO VCB: Diagram showing pantograph and VCB status.
 - UPRIM IPRIM: 0 kV, 17.1 A.
 - VBAT: 110 V.
 - FLG1 504, FLG2 502, SLG1 604, SLG2 602.
 - Train icon: 31028, PIXY.
- Central Menu:**
 - SUB-SYS STATUS
 - AUX SYSTEM
 - HV CIRCUIT
 - BRAKING SYSTEM
 - TRACTION CONV
 - ENERGY MONITORING
 - AUX CONV
 - TEMPERATURES
 - TRACTION MOTOR
 - PRESSURES
 - DIAGNOSIS
 - LANGUAGE
 - DRIVER DETAILS
 - FUTURE
- Right Panel:**
 - MR: >6.4 kg/cm²
 - BP DEMAND: 3.9 kg/cm²
 - LOCO (red circle)
 - AUTO (red circle)
- Bottom Section:**
 - POWER: 0 kW, FREQ: 0 Hz.
 - Date: 07-Mar-2019, Time: 12:11:04.
 - Fault Table:

| POWER | FREQ | 01 | 02 | 03 | 04 | 05 | | |
|-------|------|----|----|----|----|-----|-------------|---------------|
| 0 | 0 | | | | | | O/C PRIMARY | E/F AUXILIARY |
| | | 06 | 07 | 08 | 09 | 10 | | |
| | | 11 | 12 | 13 | 14 | 15 | | |
| | | 16 | 17 | 18 | 19 | ALL | E/F POWER | E/F CONTROL |

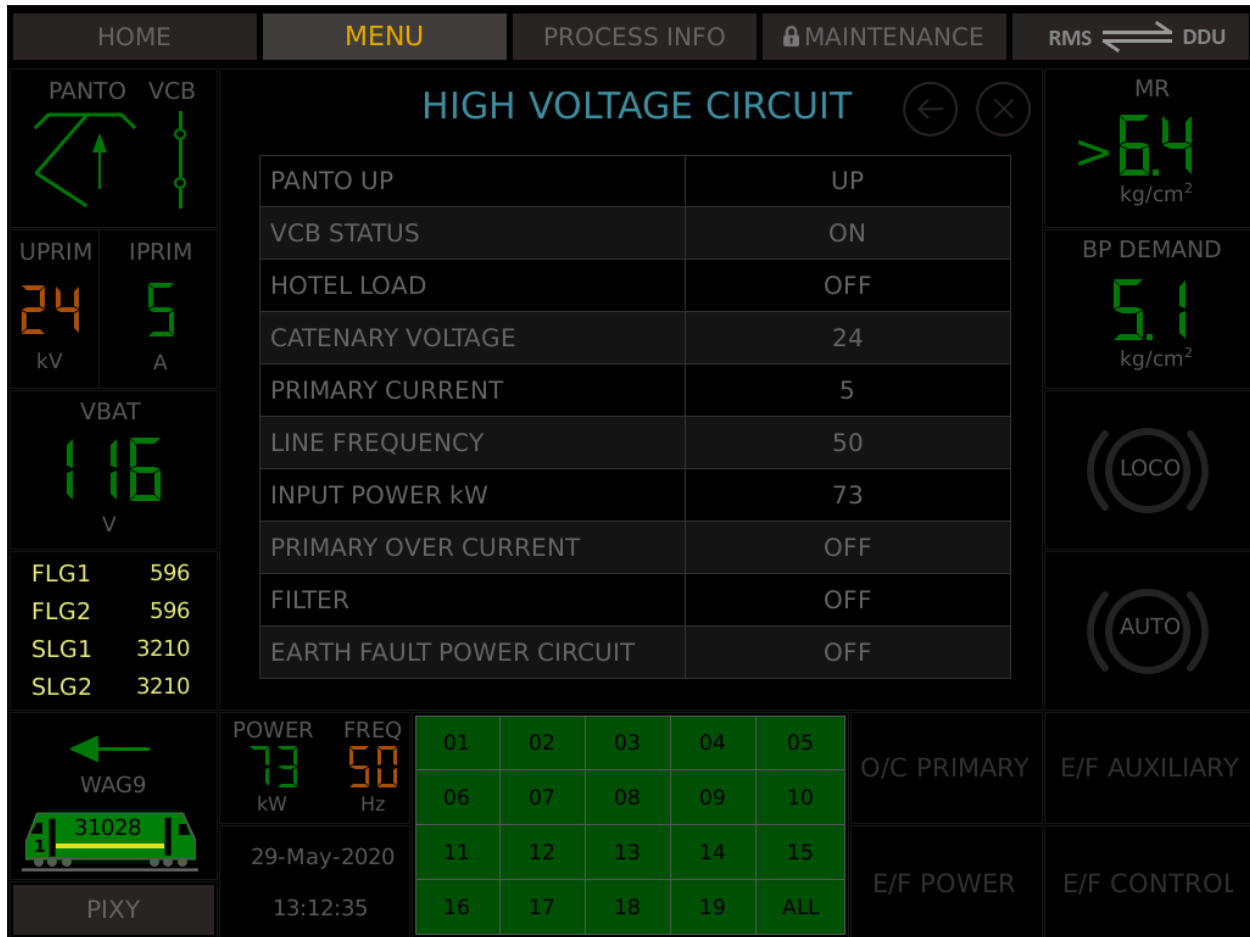
SCREEN 1 : SUB-SYSTEM STATUS



In the sub-system status menu, the names of the sub-systems are listed. To navigate to default screen, press <HOME>. To navigate to list of screens, press <ESC>. The isolated sub-system will be shown in red.

SCREEN 2 : HIGH VOLTAGE CIRCUIT

In the **HIGH VOLTAGE CIRCUIT** screen, Harmonic Filter status and Hotel Load status is additionally provided. Other variables are already available in the default screen. Hotel Load facility is available only in WAP7 & WAP5 class of locomotives.




SCREEN 3: TRACTION CONVERTER

In **TRACTION CONVERTER** screen, converter related parameters are displayed. The screen is split into two columns, one for each traction converter. The process variables displayed include pre-charge & input contactor status, oil pressure & temperatures, input power & ventilation level. Other displayed parameters are already available on default screen. (refer to the picture on next page)

HOME MENU PROCESS INFO MAINTENANCE RMS ↔ DDU

PANTO VCB



UPRIM IPRIM


24 kV 5 A

VBAT

116 V

FLG1 596
FLG2 596
SLG1 3210
SLG2 3210

← WAG9



PIXY

TRACTION CONVERTER

| | | |
|----------------------|------|------|
| FLG NODE | 596 | 596 |
| SLG NODE | 3210 | 3210 |
| ALG NODE | A0A0 | B0B0 |
| PRE-CHARGE CONTACTOR | ON | OFF |
| INPUT CONTACTOR | ON | OFF |
| OIL PRESSURE | 1 | 1 |
| OIL TEMPERATURE | 33 | 33 |
| INPUT POWER | ON | OFF |
| VENTILATION LEVEL | 1 | 1 |

POWER 73 kW

FREQ 50 Hz

30-May-2020

11:20:14

| | | | | |
|----|----|----|----|-----|
| 01 | 02 | 03 | 04 | 05 |
| 06 | 07 | 08 | 09 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | ALL |

O/C PRIMARY

E/F POWER

MR

>6.4 kg/cm²

BP DEMAND

5.1 kg/cm²

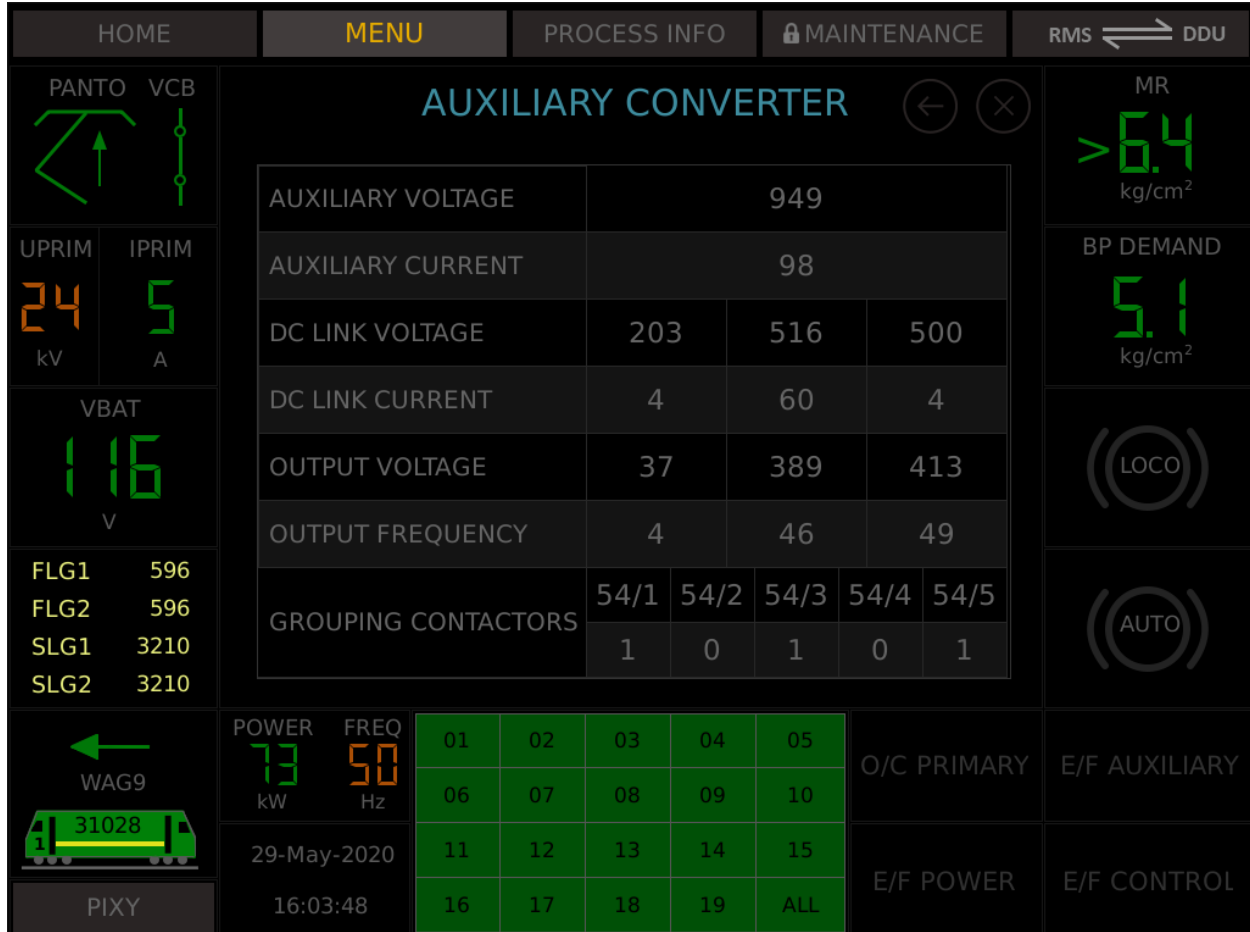
LOCO

AUTO

E/F AUXILIARY

E/F CONTROL

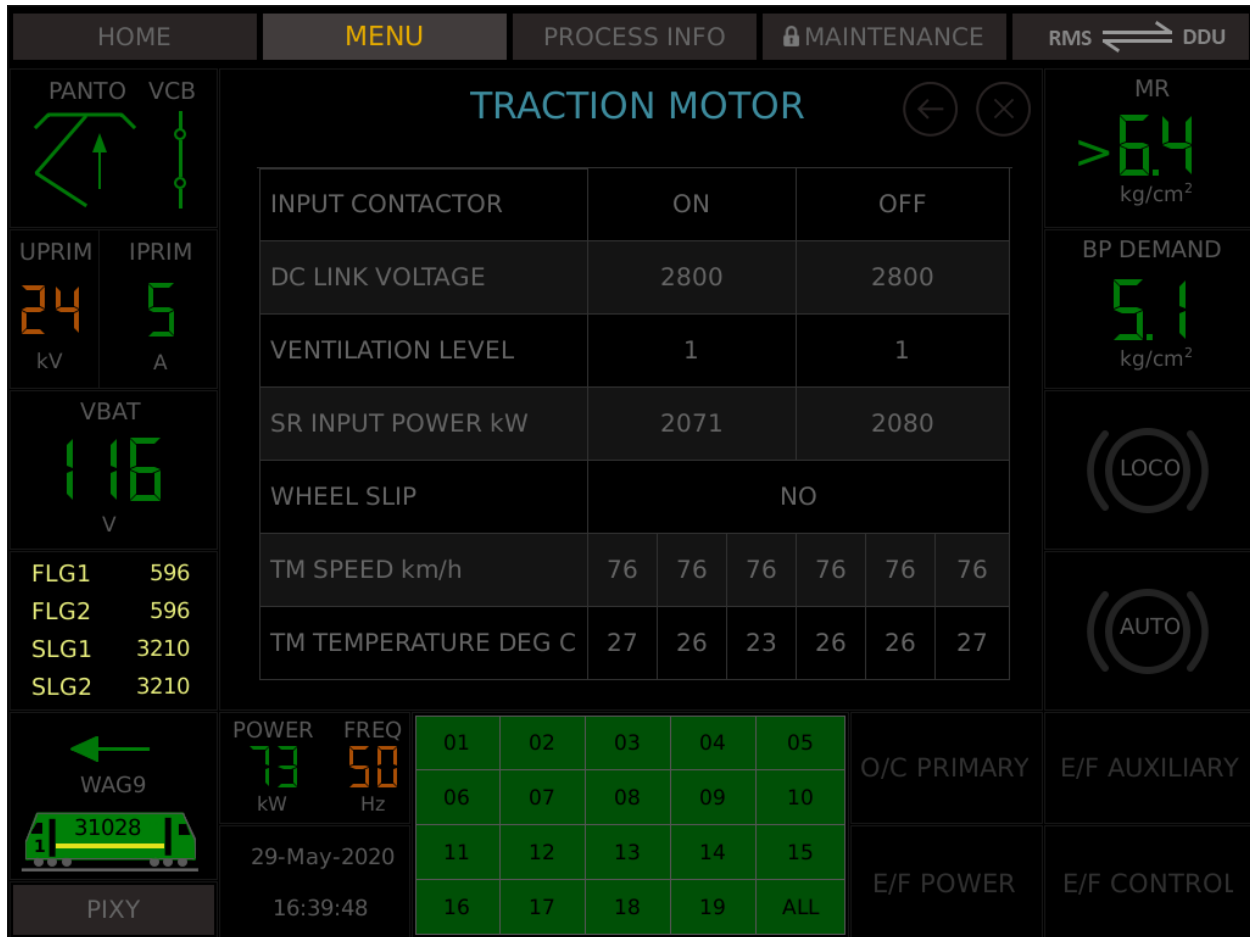
SCREEN 4: AUXILIARY CONVERTER



The Auxiliary Converter screen provides very vital process variable display about the BUR, which will help in easy trouble shooting. The variables include Auxiliary winding voltage, Total current in the auxiliary winding, dc link voltage & dc link current of each BUR, output voltage and output frequency. Please note that there is no direct signal available for the output voltage whereas the displayed value is calculated from dc link voltage and output frequency considering constant v/f relation. The screen also provides the status of BUR grouping contactors.

SCREEN 5: TRACTION MOTOR

The traction motor screen is also vertically split into two columns, one for 3 motors belonging to one bogie. The relevant process variables like input contactor status, dc link voltage, ventilation level, converter input power, wheel slip status, speed of each traction motor reported from speed sensor and temperature of each traction motor reported by the temperature sensor are displayed.




SCREEN 6 : AUXILIARY SYSTEM

The auxiliary system screen essentially displays the status of various auxiliary machines, as to whether these are OFF or ON. It also indicates the BUR status and BUR input voltage. The auxiliary machines considered are Compressors (1,2), Oil Cooling Blowers (1,2), Oil Pump Converter (1,2), Oil Pump Transformer (1,2), Traction Motor Blower (1,2) & Machine Room Blower (1,2).

HOME MENU PROCESS INFO MAINTENANCE RMS ⇌ DDU

AUXILIARY SYSTEM

PANTO VCB



UPRIM IPRIM


24 kV 5 A

VBAT

116 V

FLG1 596
FLG2 596
SLG1 3210
SLG2 3210

← WAG9



PIXY

| | | | | |
|-------------------|----|-----|----|--|
| AUXILIARY VOLTAGE | | 949 | | |
| BUR 1,2,3 STATUS | ON | ON | ON | |
| COMPRESSOR 1,2 | ON | | ON | |
| OCB 1,2 | ON | | ON | |
| SR OIL PUMP 1,2 | ON | | ON | |
| TFP OIL PUMP 1,2 | ON | | ON | |
| TM BLOWER 1,2 | ON | | ON | |
| MR BLOWER 1,2 | ON | | ON | |

MR

>6.4 kg/cm²

BP DEMAND

5.1 kg/cm²

LOCO

AUTO

POWER 73 kW

FREQ 50 Hz

30-May-2020

09:51:21

| | | | | |
|----|----|----|----|-----|
| 01 | 02 | 03 | 04 | 05 |
| 06 | 07 | 08 | 09 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | ALL |

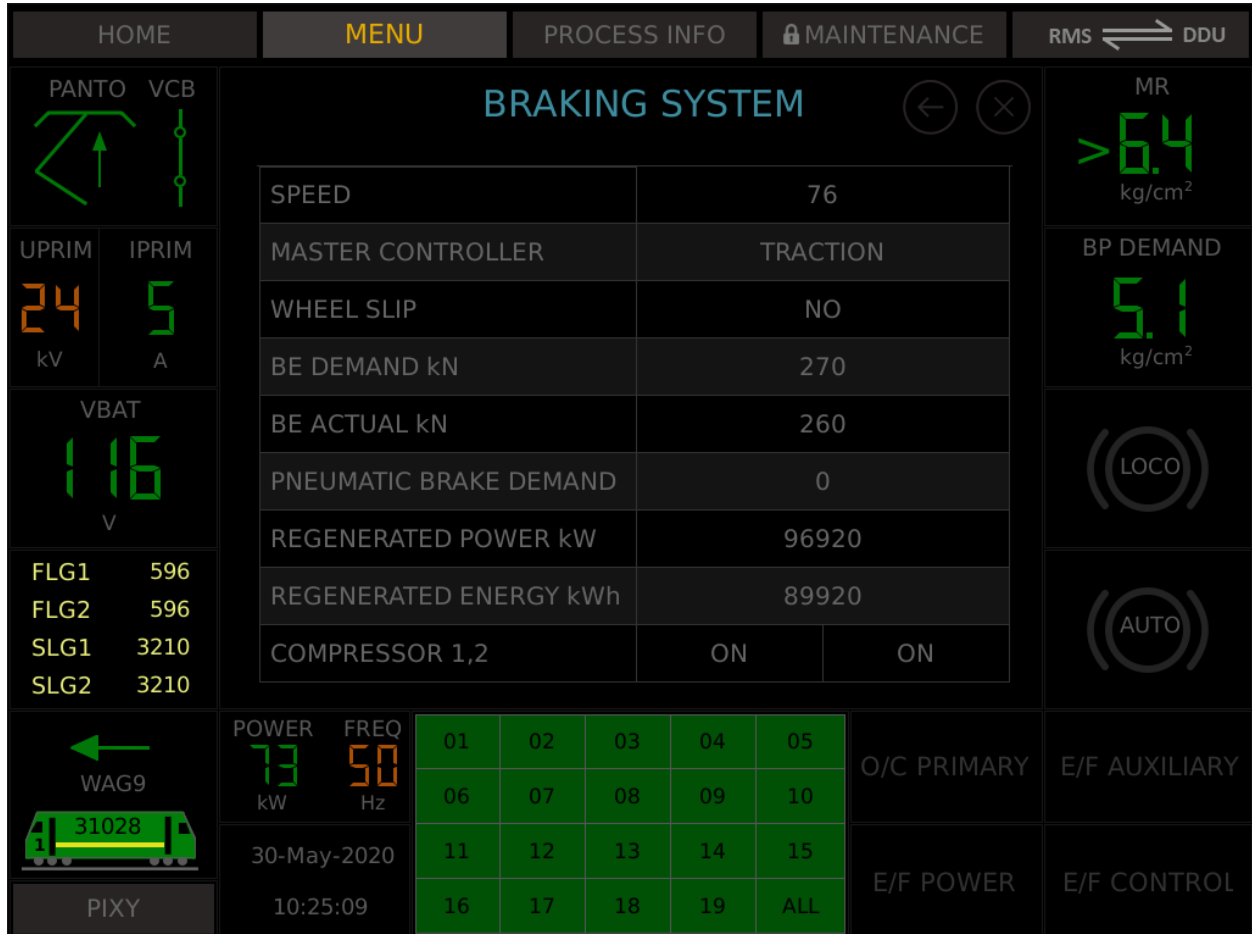
O/C PRIMARY

E/F AUXILIARY

E/F POWER

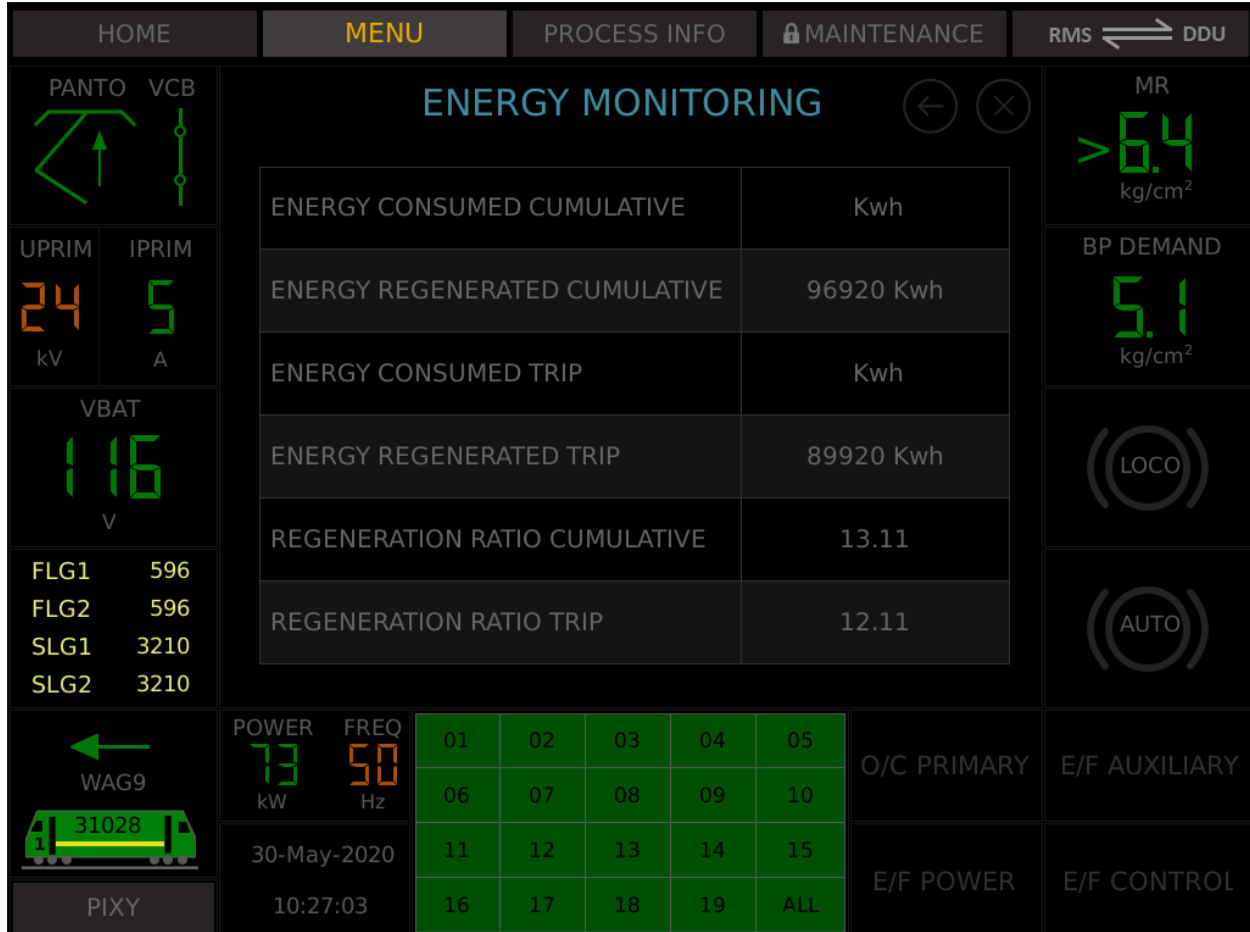
E/F CONTROL

SCREEN 7 : BRAKING SYSTEM



The braking system screen displays the process variables related to braking, which include locomotive speed, master controller position (traction/braking region), BE demand and BE Actual, Pneumatic Brake Effort demand (when regeneration fails), regenerated power & energy as well as status of compressor.(refer the picture on next page)

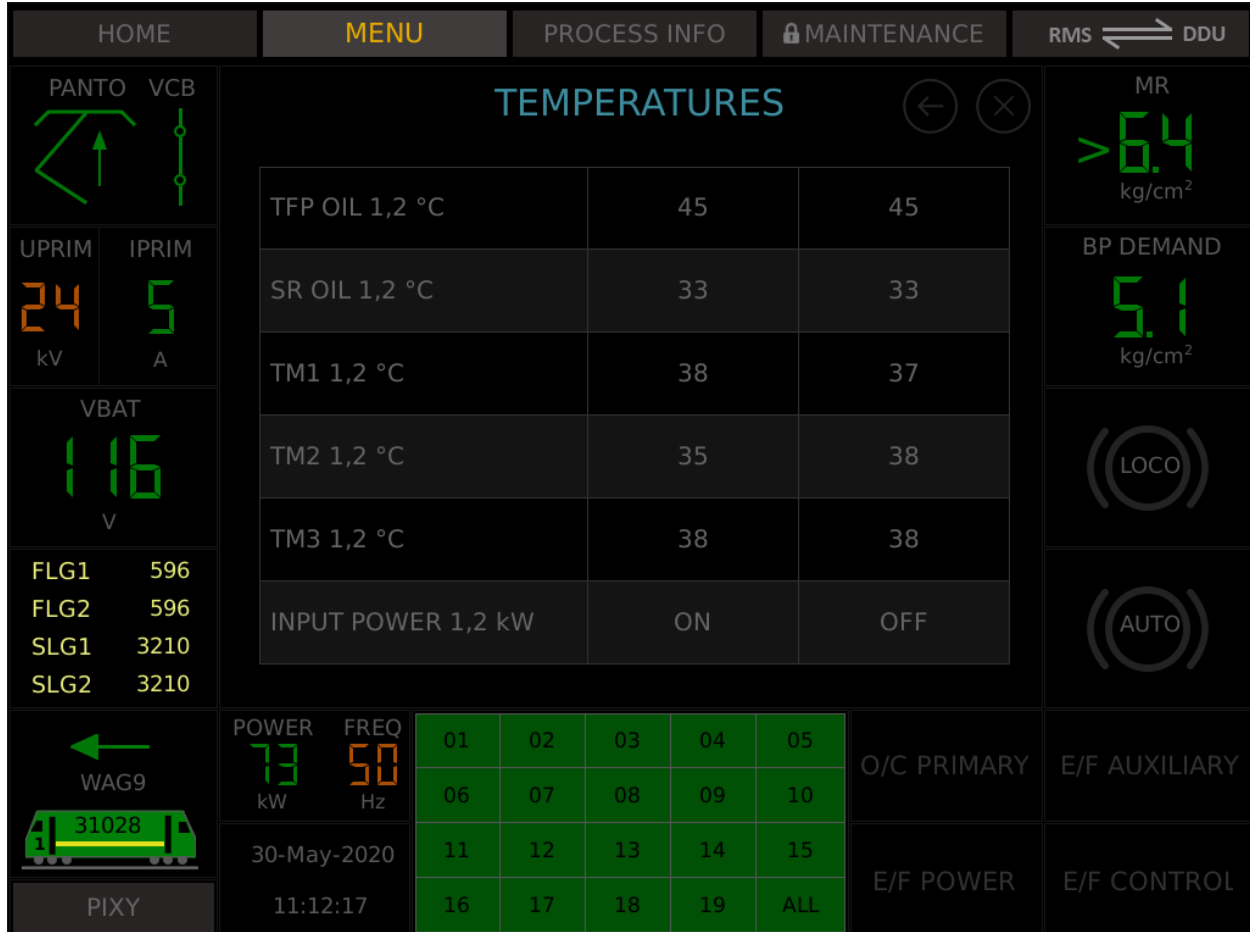
SCREEN 8 : ENERY MONITORING



The screen for energy monitoring displays the energy consumed and regenerated. The cumulative value is the one taken from the NVRAM of DIA computer, which is available on MVB. The trip energy is calculated by the driver display itself from the time of switching ON. This value is not saved in any memory and will vanish once the locomotive is OFF. Trip energy can be used for comparison of driver performance under identical conditions of operation.

The regeneration ratio (energy regenerated/energy consumed) is calculated by the driver display and displayed. This factor also provides a measure of the efficiency of regeneration and is a good comparison tool.

SCREEN 9: TEMPERATURES



The temperature screen provides various temperatures recorded by sensors and the same can be compared with the converter input power. The temperatures of transformer oil, traction converter oil and traction motors are displayed along with converter input power for each bogie.

SCREEN 10: PRESSURES

This screen shows the pressure variables. It includes Transformer oil pressure, converter oil pressure, MR pressure, BP pressure and status of BC1 & Bc2. (Refer the picture on next page)

HOME
MENU
PROCESS INFO
MAINTENANCE
RMS DDU

PANTO VCB

UPRIM 24 IPRIM 5
kV A

VBAT 116
V

FLG1 596
FLG2 596
SLG1 3210
SLG2 3210

WAG9
31028

PIXY

PRESSURES

| | | |
|--------------------|----------|---|
| TFP OIL 1,2 bar | 3 | 2 |
| SR OIL 1, 2 bar | 1 | 1 |
| MR PRESSURE > 6.4 | > 6.2 | |
| BP PRESSURE kg/cm2 | 5.1 | |
| BC1 PRESSURE | RELEASED | |
| BC2 PRESSURE | RELEASED | |

POWER 73 kW

FREQ 50 Hz

30-May-2020

11:18:41

| | | | | |
|----|----|----|----|-----|
| 01 | 02 | 03 | 04 | 05 |
| 06 | 07 | 08 | 09 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | ALL |

MR >6.4
kg/cm²

BP DEMAND 5.1
kg/cm²

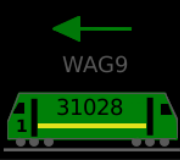
O/C PRIMARY

E/F AUXILIARY

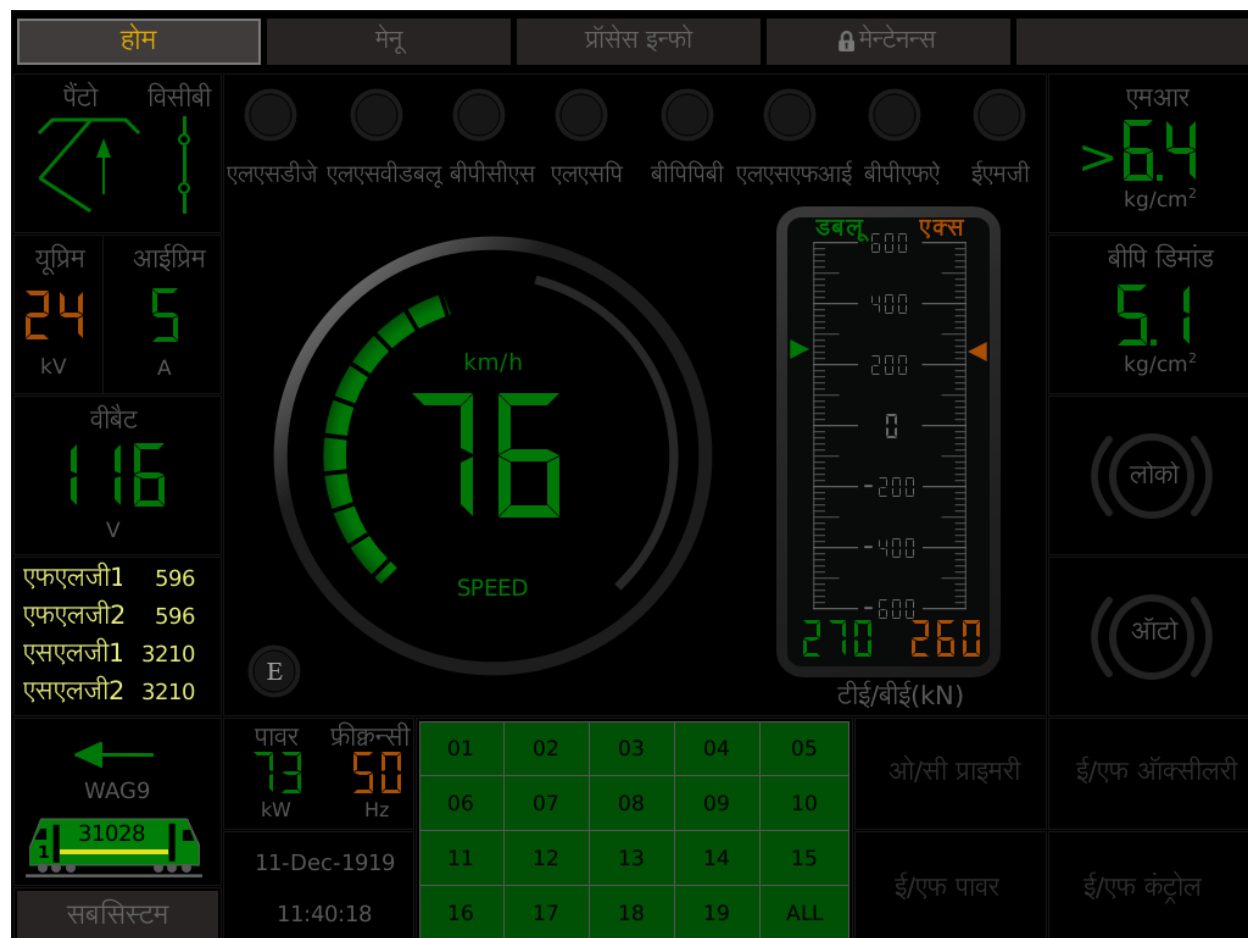
E/F POWER

E/F CONTROL

SCREEN 11: DIAGNOSIS

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-------------------------------|-------------------------|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|--|
| HOME | MENU | PROCESS INFO | MAINTENANCE | RMS ⇌ DDU | | | | | | | | | | | | | | | | | | | | | |
| DIAGNOSIS DETAILS | | | | | | | | | | | | | | | | | | | | | | | | | |
| Proc | Sub | Fault Message | | | | | | | | | | | | | | | | | | | | | | | |
| FLG2 | SS02 | 2: Lifesign from VIU1 missing | | | | | | | | | | | | | | | | | | | | | | | |
| Signal Name | 10--_1004-MMVBDIsSLG1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Symptoms | Failed function due to isolation of VIU1 : - Bogie 1 isolated | | | | | | | | | | | | | | | | | | | | | | | | |
| Cause | | | | | | | | | | | | | | | | | | | | | | | | | |
| Advice | | | | | | | | | | | | | | | | | | | | | | | | | |
|  <p>WAG9 31028 PIXY</p> | | POWER 73 kW | FREQ 50 Hz | <table border="1"> <tr><td>01</td><td>02</td><td>03</td><td>04</td><td>05</td></tr> <tr><td>06</td><td>07</td><td>08</td><td>09</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>ALL</td></tr> </table> | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | ALL | O/C PRIMARY E/F AUXILIARY E/F POWER E/F CONTROL |
| 01 | 02 | 03 | 04 | 05 | | | | | | | | | | | | | | | | | | | | | |
| 06 | 07 | 08 | 09 | 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | 12 | 13 | 14 | 15 | | | | | | | | | | | | | | | | | | | | | |
| 16 | 17 | 18 | 19 | ALL | | | | | | | | | | | | | | | | | | | | | |
| | | 30-May-2020 | 11:37:45 | << | | | | | | | | | | | | | | | | | | | | | |

SCREEN 12: LANGUAGE



SCREEN 13: DRIVER DETAILS

This screen is not made active and is reserved for future implementations. The full-fledged implementation would be available in future through an authentication device like a USB stick. The data has to be entered by the driver before the start of the journey. It is not mandatory to enter the data for the functioning of the equipment. This feature can help in comparison of driving performance, specific energy consumption etc. (Please refer to the photo on the next page)

SCREEN 14 : INPUT/OUTPUT SIGNALS

The physical input/output signals, both analog and digital, can be viewed using this multi-level screen. In this screen, the description of the signal, name used in FUPLA and the location of the signals and the actual value can be viewed (channel+slot+connector+pin number eg: 12/EA05 : means channel-12, E slot, A connector, pin-5). These screens will be quite useful for troubleshooting.

SCREEN 14.1: ANALOG SIGNALS

SCREEN 14.1.1: ANALOG SIGNALS -FLG1

| FLG1 INPUT SIGNALS | | |
|---------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT:CONNECT OR:PIN |
| Angle Transmitter | 0101-XAngTrans | 12/EA05 |
| Pressure Auto Brake | 0101-XPrAutoBkLn | 6/EC01 |
| FLG1 OUTPUT SIGNALS | | |
| TE/BE Meter Bogie-1 | 0201-XMeterT/B1 | 2/EG01 |
| TE/BE Meter Bogie-2 | 0201-XMeterT/B2 | 4/EI01 |

SCREEN 14.1.2: ANALOG SIGNALS -FLG2

| FLG2 INPUT SIGNALS | | |
|------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT:CONNECT OR:PIN |
| Angle Transmitter | 0101-XAngTrans | 12/EA05 |
| Pressure Auto Brake | 0101-XPrAutoBkLn | 6/EC01 |
| FLG2 OUTPUT SIGNALS | | |
| TE /BE Meter Bogie-1 | 0201-XMeterT/B1 | 2/EG01 |
| TE/BE Meter Bogie-2 | 0201-XMeterT/B2 | 4/EI01 |
| Pneumatic Brake Demand | 0201-WPnBEdem | 1/EC05 |

SCREEN 14.1.3: ANALOG SIGNALS -SLG1 (INPUTS)

| SLG1 ANALOG SIGNALS | | |
|----------------------------|----------------------|----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT:CONNECTOR:PIN |
| Primary Current | 0104-XAIpr | 1/AA06 |
| Total BUR Current | 0104-XAIBUR | 2/AC06 |
| Filter Current | 0104-XAIFilts | 3/AE06 |
| Pressure TFP Oil | 0106-XADruckTR | 8/AI06 |
| Pressure SR Oil | 0106-XADruckSR | 12/DK07 |
| Temperature 1 TFP Oil | 0106-XATmp1OelTR | 11/DI05:09 |
| Temperature 2 TFP Oil | 0106-XATmp2OelTR | 10/DI06:01 |
| Temperature1 SR Oil | 0106-XATmp1OelSR | 11/DG05:09 |
| Temperature2 SR Oil | 0106-XATmp2OelSR | 10/DG06:01 |
| TM1 Temperature (sensor 1) | 0106-XATmp1Mot1 | 7/DA05:09 |
| TM1 Temperature (sensor 2) | 0106-XATmp2Mot1 | 6/DA06:01 |
| TM2 Temperature (sensor 1) | 0106-XATmp1Mot2 | 9/DC05:09 |
| TM2 Temperature (sensor 2) | 0106-XATmp2Mot2 | 8/DC06:01 |
| TM3 Temperature (sensor 1) | 0106-XATmp1Mot3 | 7/DE05:09 |
| TM3 Temperature (sensor 2) | 0106-XATmp2Mot3 | 6/DE06:01 |

SCREEN 14.1.4: ANALOG SIGNALS -SLG2

| SLG2 ANALOG SIGNALS | | |
|----------------------------|------------------|--------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME | CHANNEL/SLOT: CONNECTOR:PIN |
| Primary Current | 0104-XAIpr | 1/AA06 |
| Total BUR Current | 0104-XAIBUR | 2/AC/06 |
| Filter Current | 0104-XAIFilt | 3/AE06 |
| Pressure TFP Oil | 0106-XADruckTR | 8/AI06 |
| Pressure SR Oil | 0106-XADruckSR | 12/DK07 |
| Temperature 1 TFP Oil | 0106-XATmp1OelTR | 11/DI05:09 |
| Temperature 2 TFP Oil | 0106-XATmp2OelTR | 10/DI06:01 |
| Temperature1 SR Oil | 0106-XATmp1OelSR | 11/DG05:09 |
| Temperature2 SR Oil | 0106-XATmp2OelSR | 10/DG06:01 |
| TM1 Temperature (sensor 1) | 0106-XATmp1Mot1 | 7/DA05:09 |
| TM1 Temperature (sensor 2) | 0106-XATmp2Mot1 | 6/DA06:01 |
| TM2 Temperature (sensor 1) | 0106-XATmp1Mot2 | 9/DC05:09 |
| TM2 Temperature (sensor 2) | 0106-XATmp2Mot2 | 8/DC06:01 |
| TM3 Temperature (sensor 1) | 0106-XATmp1Mot3 | 7/DE05:09 |
| TM3 Temperature (sensor 2) | 0106-XATmp2Mot3 | 6/DE06:01 |

SCREEN 14.2.1 DIGITAL SIGNALS

SCREEN 14.2.1.1: DIGITAL SIGNALS HBB1

| HBB1 DIGITAL INPUTS GROUP 1 | | |
|-------------------------------|-------------------------|--------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Relay Control Electronics ON | 0101-MRelMCEOn | 2/OA09 |
| Emergency Stop | 0101-LEmgStop | 3/OA02 |
| MR Blower OK | 0101- MMRBlowerOk | 4/OA10 |
| Max TE Limit | 0101-LMaxTELimit | 5/OA03 |
| Banking Operation | 0101-LSwBankOp | 6/OA11 |
| Compressor ON | 0101-LSwComprOff | 7/OA04 |
| Compressor Direct | 0101-LSwComprDir | 8/OA12 |
| Foot Switch Loco Brake | 0101-LFootSwLoBk | 9/OD01 |
| Driving Direction Forward | 0101-LTrvDirFor | 10/OD9 |
| Driving Direction Reverse | 0101-LTrvDirRev | 11/OD02 |
| Throttle in Traction Mode | 0101-LTEDemand | 12/OD10 |
| Throttle in Braking Zone | 0101-LBEDemand | 13/OD03 |
| TE/BE Demand Switch > 1/3 | 0101-LT/BDem>1/3 | 14/OD11 |
| TE/BE Demand Switch > 2/3 | 0101-LT/BDem>2/3 | 15/OD04 |
| Push Button Fault Acknowledge | 0101-LPBFaultAck | 16/OD12 |

SCREEN 14.2.1.2: DIGITAL INPUTS HBB1 GROUP 2

| HBB1 DIGITAL INPUTS GROUP 2 | | |
|------------------------------|-------------------------|--------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Auxiliary Supply Fuse Status | 0102-MFuseAux | 1/QA01 |
| MCB Oil Cooling Blower 1 | 0102- MMCBloCT1 | 2/QA09 |
| MCB Machine Room Blower 1 | 0102- | 3/QA02 |

| | | |
|------------------------------------|------------------|---------|
| | MMCBloMR1 | |
| MCB Scavenge Blower to MR1 | 0102-MMCBMScBlo1 | 4/QA10 |
| MCB Oil Pump SR1 | 0102-MMCBPumpC1 | 5/QA03 |
| MCB TFP Pump 1 | 0102-MMCBPumpT1 | 6/QA11 |
| MCB TM Blower 1 | 0102-MMCBloTM1 | 7/QA04 |
| MCB Scavenge to TM Blower 1 | 0102-MMCBTScBlo1 | 8/QA12 |
| Earth Fault in 400/110V AC Circuit | 0102-MEFR415/110 | 9/QD01 |
| Earth Fault in Hotel Load Circuit | 0102-MEFRHotel | 10/QD09 |
| VCB Status | 0102-MAuxConVCB | 11/QD02 |
| VCB ON Command | 0102-LVCBOn | 12/QD10 |
| Earth Fault in Filter Circuit | 0102-MEFRFilter | 13/QD03 |
| Earth Fault in Control Circuit | 0102-MEFRContrl | 14/QD11 |
| CoCo Detect | 0102-BDetCoCo | 15/QD04 |
| BEF Model | 0102-MBEFModel | 16/QD12 |

SCREEN 14.2.1.3: DIGITAL SIGNALS HBB1 OUTPUT GROUP 1

| HBB1 DIGITAL OUTPUTS GROUP 1 | | |
|------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Fault Indication Lamp | 0201-MLampFInd | 1/OG19 |
| Fault Status Lamp | 0201-MLampFault | 2/OG20 |
| Buzzer Black | 0201-BBuzzBlack | 8/OG03 |
| Command Self MCE | 0201-BSelfMCE | 12/OJ03 |
| Contactora Compressor 1 | 0201-BContCP1 | 14/OJ09 |
| Buzzer Red | 0201-BBuzzRed | 16/OG14 |

SCREEN 14.2.1.4 DIGITAL SIGNALS HBB1 OUTPUT GROUP 2

| HBB1 DIGITAL OUTPUTS GROUP 2 | | |
|------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| VCB ON Command (EFDJ) | 0202-BVCBOnPulse | 7/QJ06 |
| Contactora Self Hold | 0202-BContSelfH | 12/QJ03 |
| VCB ON Command (MTDJ) | 0202-BVCBOn | 13/QJ12 |
| Contactora VCB Disable | 0202-BVCBDisable | 14/QJ09 |

SCREEN 14.2.2: DIGITAL SIGNALS HBB2

SCREEN 14.2.2.1: DIGITAL SIGNALS HBB2 INPUT GROUP 1

| HBB2 DIGITAL INPUT GROUP 1 | | |
|-------------------------------|----------------------|------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR: PIN |
| MCB Compressor 2 | 0101-MMCBCompr2 | 1/OA01 |
| Emergency Stop | 0101-LEmgStop | 3/OA02 |
| MR Blower OK | 0101-MMRBlowerOk | 4/OA10 |
| Max TE Limit Switch | 0101-LMaxTELimit | 5/OA03 |
| Switch Banking Operation | 0101-LSwBankOp | 6/OA11 |
| Switch Compressor OFF | 0101-LSwComprOff | 7/OA04 |
| Switch Compressor Direct | 0101-LSwComprDir | 8/OA12 |
| Foot Switch Loco Brake | 0101-LFootSwLoBk | 9/OD01 |
| Direction Forward | 0101-LTrvDirFor | 10/OD09 |
| Direction Reverse | 0101-LTrvDirRev | 11/OD02 |
| Throttle in Traction Mode | 0101-LTEDemand | 12/OD10 |
| Throttle in Brake Mode | 0101-LBEDemand | 13/OD03 |
| TE/BE Demand > 1/3 Switch | 0101-LT/BDem>1/3 | 14/OD11 |
| TE/BE Demand > 2/3 Switch | 0101-LT/BDem>2/3 | 15/OD04 |
| Push Button Fault Acknowledge | 0101-LPBFaultAck | 16/OD12 |

SCREEN 14.2.2.2: DIGITAL SIGNALS HBB2 INPUT GROUP 2

| HBB2 DIGITAL INPUT GROUP 2 | | |
|----------------------------------|----------------------|------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR: PIN |
| Pressure Switch Pan1 | 0102-MPrSwPan1 | 1/QA01 |
| Pressure Switch Pan2 | 0102-MPrSwPan2 | 2/QA09 |
| Pressure Switch Park Brake | 0102-MPrSwParkBk | 3/QA02 |
| Brake Electronics OK | 0102-MBrakElecOK | 4/QA10 |
| Cock Brake Control | 0102-LCockBkCon | 5/QA03 |
| Emergency Brake Out | 0102-LEmgBkOut | 6/QA11 |
| Pressure Switch Loco Brake | 0102-MPrSwLocoBk | 7/QA04 |
| Pressure Switch Emergency Brake | 0102-MPrSwEmgBk | 8/QA12 |
| Pressure Switch Air Flow | 0102-MPrSwAFlow | 9/QD01 |
| Driver Command Pan Up | 0102-LPanUp | 10/QD09 |
| MR Pressure > 7.5 Bar | 0102-MPrSw75bar | 11/QD02 |
| Fire Alarm | 0102-MFireAlarm | 12/QD10 |
| Pressure Switch Brake Cylinder 2 | 0102-MPrSwBkCyl2 | 13/QD03 |
| Pressure Switch Low MR | 0102-MPrSwLowMR | 14/QD11 |
| MR Pressure > 8 bar | 0102-MPrSw8bar | 15/QD04 |
| Pressure Switch Brake Feed Pipe | 0102-MPrSwBkFP | 16/QD12 |

SCREEN 14.2.2.3 DIGITAL SIGNALS HBB2 OUTPUT GROUP 1

| HBB2 DIGITAL OUTPUT GROUP 1 | | |
|-------------------------------|------------------|-----------|
| SIGNAL DESCRIPTION | SIGNAL NAME | CONNECTOR |
| Fault Indication Lamp | 0201-MLampFInd | 1/OG19 |
| Fault Status Lamp | 0201-MLampFault | 2/OG20 |
| EP Valve Auto Brake Out | 0201-BEPAutBkOut | 4/OG07 |
| Reset Vigilance Penalty Brake | 0201-BResVigPeBk | 7/OJ13 |
| Buzzer Black | 0201-BBbuzzBlack | 8/OG03 |
| EP Valve Anti Spin 2 | 0201-BEPAntSpin2 | 12/OJ03 |
| Vigilance Reset | 0201-BVigReset | 13/OJ12 |
| Vigilance Control | 0201-BVigControl | 14/OJ09 |
| Buzzer Red | 0201-BBbuzzRed | 16/OG14 |

SCREEN 14.2.2.4 DIGITAL SIGNALS HBB2 OUTPUT GROUP 2

| HBB2 DIGITAL OUTPUT GROUP 2 | | |
|--------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| EP Valve Release Parking Brake | 0202-BEPRelPBk | 6/QG18 |
| EP Valve Compressor Unload | 0202-BEPCPUndload | 8/QG03 |
| EP Valve sanding 1-3 | 0202-BEPSand13 | 9/QG17 |
| EP Valve Panto1 | 0202-BEPPan1 | 10/QG23 |
| EP Valve Sanding 2-4 | 0202-BEPSand24 | 11/QG12 |
| Contactora Compressor 2 | 0202-BContCompr2 | 12/QJ10 |
| Panto Disable | 0202-BPanDisable | 14/QJ09 |
| EP Valve Parking Brake | 0202-BEPApplPBk | 15/QG22 |
| EP Valve Loco Brake Out | 0202-BEPLBkOut | 16/QG14 |

SCREEN 14.2.3 DIGITAL SIGNALS STB1

SCREEN 14.2.3.1 DIGITAL SIGNALS STB1 INPUT GROUP 1

| STB1 DIGITAL INPUT GROUP 1 | | |
|----------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| MCB Status Compressor 1 | 0101-MMCBCompr1 | 1/JA01 |
| Apply Parking Brake | 0101-LParkBrake | 2/JA09 |
| Hotel Load Contactora Status | 0101-LHotelOn | 4/JA10 |
| Cab Activating Switch in Driving | 0101-LActKSwD | 5/JA03 |
| Cab Activating Switch in Cooling | 0101-LActKSwC | 6/JA11 |
| Constant Speed Button | 0101-LConstSpeed | 7/JA04 |
| Hotel Load Off | 0101-LHotelOff | 8/JA12 |
| Foot Switch Sanding | 0101-LFootSwSand | 9/JD01 |
| Direction Forward | 0101-LTrvDirFor | 10/JD09 |
| Direction Reverse | 0101-LTrvDirRev | 11/JD02 |

SCREEN 14.2.3.2 DIGITAL SIGNALS STB1 INPUT GROUP 2

| STB1 DIGITAL INPUT GROUP 2 | | |
|--------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Temp Relay Control Electronics | 0102-MReTempCEL | 1/LA01 |
| Cutout Switch Bogie-1 | 0102-LSwBogOut1 | 2/LA09 |
| Cutout Switch Bogie-2 | 0102-LSwBogOut2 | 3/LA02 |
| Switch Configuration | 0102-LSwConfig | 4/LA10 |
| Switch Fail Mode | 0102-LSwFailMode | 5/LA03 |
| Relay MCE On | 0102-MRelMCEOn | 6/LA11 |
| Command VCB On | 0102-LVCBOn | 10/LD09 |
| Key Switch Simulation | 0102-LSwKSim | 11/LD02 |
| Contactor Hotel Load | 0102-MContHotel | 12/LD10 |
| VCB Status | 0102-MAuxConVCB | 13/LD03 |
| CoCo Detect | 0102-BDetCoCo | 14/LD11 |
| Primary Current High | 0102-MIPrimHigh | 15/LD04 |

SCREEN 14.2.3.3 DIGITAL SIGNALS STB1 OUTPUT GROUP 1

| STB1 DIGITAL OUTPUT GROUP 1 | | |
|-------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Lamp Wheel Slip Indication | 0201-MLampWSlip | 1/JG19 |
| Lamp Constant Speed | 0201-MLampCSpeed | 2/JG20 |
| Lamp Parking Brake | 0201-MLampParkBk | 6/JG18 |
| Lamp Hotel Load | 0201-MLampHotel | 10/JG23 |
| Air Drier Release Valve | 0201-BAirDryer | 12/JJ03 |
| EP Valve Anti Spin 1 | 0201-BEPAntSpin1 | 13/JJ12 |
| Contactor Hotel Load | 0201-BContHotel | 14/JJ09 |
| Lamp Train Parting Indication | 0201-MLampTPart | 15/JG09 |

SCREEN 14.2.3.4 DIGITAL SIGNALS STB1 OUTPUT GROUP 2

| STB1 DIGITAL OUTPUT GROUP 2 | | |
|-----------------------------|----------------------|----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT:CONNECTOR:PIN |
| Relay MCE Off | 0202-BRelMCEOff | 1/LG07 |
| Contactor Self MCE | 0202-BSelfMCE | 6/LG18 |

| | | |
|------------------------|----------------------|---------|
| Lamp Configuration | 0202- MLampConfig | 8/LG03 |
| Lamp Test | 0202-BLampTest | 9/LG17 |
| VCB On Command (MTDJ) | 0202-BVCBOn | 10/LG23 |
| VCB On Pulse (EFDJ) | 0202- BVCBOnPulse | 11/LG24 |
| Contactor Compressor 1 | 0202- BContCompr1 | 14/LJ02 |
| VCB Disable | 0202- BVCBDisable | 15/LG09 |
| Contactor Self Hold | 0202-BContSelfH | 16/LG14 |

SCREEN 14.2.4 DIGITAL SIGNALS STB2

SCREEN 14.2.4.1 DIGITAL SIGNALS STB2 INPUT GROUP 1

| STB2 DIGITAL INPUT GROUP 1 | | |
|--------------------------------|----------------------------|--------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Apply Parking Brake | 0101-LParkBrake | 2/JA09 |
| Hotel Load On | 0101-LHotelOn | 4/JA10 |
| Cab Activating Switch in Drive | 0101-LActKSwD | 5/JA03 |
| Cab Activating Key in Cooling | 0101-LActKSwC | 6/JA11 |
| Constant Speed Button On | 0101- LConstSpeed | 7/JA04 |
| Hotel Load Off | 0101-LHotelOff | 8/JA12 |
| Foot Switch Sanding | 0101- LFootSwSand | 9/JD01 |
| Direction Forward | 0101-LTrvDirFor | 10/JD09 |
| Direction Reverse | 0101-LTrvDirRev | 11/JD02 |
| Loco Speed > 105% | 0101- MSpeed105% | 13/JD03 |
| Loco Speed > 110% | 0101- MSpeed110% | 14/JD11 |
| Speed Alarm | 0101- MSpeedAlarm | 16/JD12 |

SCREEN 14.2.4.2 DIGITAL SIGNALS STB2 INPUT GROUP 2

| STB2 DIGITAL INPUT GROUP 2 | | |
|----------------------------|----------------------------|--------------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| MCB Oil Cooling Blower | 0102- MMCBBloCT2 | 1/LA01 |
| MCB MR2 Blower | 0102- MMCBBloMR2 | 2/LA09 |
| MCB Scavenge MR | 0102- MMCBMScBlo2 | 3/LA02 |
| MCB Oil Pump SR2 | 0102- MMCBPumpC2 | 4/LA10 |
| MCB Oil Pump2 TFP | 0102- MMCBPumpT2 | 5/LA03 |
| MCB TM Blower 2 | 0102- MMCBBloTM2 | 6/LA11 |

| | | |
|---------------------------------|------------------|---------|
| MCB Scavenge TM Blower | 0102-MMCBTScBlo2 | 7/LA04 |
| Earth Fault BUR | 0102-MEFRBUR | 8/LA12 |
| Wish Pan Up | 0102-LPanUp | 9/LD01 |
| Pressure Switch BC1 | 0102-MPrSwBkCyl1 | 10/LD09 |
| Smoke Warning | 0102-MSmogWarn | 11/LD02 |
| Fire Equipment Failed | 0102-MFailFireEq | 12/LD10 |
| Pressure Switch Emergency Brake | 0102-MPrSwEmgBk | 13/LD03 |
| Pressure Switch Park Brake | 0102-MPrSwParkBk | 14/LD11 |
| Vigilance Warning | 0102-MVigWarn | 15/LD04 |
| Emergency Brake Vigilance | 0102-MEmgBkVig | 16/LD12 |

SCREEN 14.2.4.3 DIGITAL SIGNALS STB2 OUTPUT GROUP 1

| STB2 DIGITAL OUTPUT GROUP 1 | | |
|-----------------------------|----------------------|----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT:CONNECTOR:PIN |
| Lamp Wheel Slip | 0201-MLampWSlip | 1/JG19 |
| Lamp Constant Speed | 0201-MLampCSpeed | 2/JG20 |
| Lamp Park Brake | 0201-MLampParkBk | 6/JG18 |
| Lamp Test Output | 0201-BLampTest | 7/JJ13 |
| Lamp Hotel Load | 0201-MLampHotel | 10/JG23 |
| Contactors Compressor 2 | 0201-BContCompr2 | 13/JJ12 |
| Lower Panto | 0201-BPanDisable | 14/JJ09 |
| Lamp Train Part | 0201-MLampTPart | 15/JG09 |

SCREEN 14.2.4.4 DIGITAL SIGNALS STB2 OUTPUT GROUP 2

| STB2 DIGITAL OUTPUT GROUP 2 | | |
|-----------------------------|----------------------|----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT:CONNECTOR:PIN |
| EP Valve Loco Brake Out | 0202-BEPLBkOut | 12/LJ03 |
| EP Valve Compressor Unload | 0202-BEPCPUnload | 13/LJ12 |
| EP Valve Panto 2 | 0202-BEPPan2 | 14/LJ09 |

SCREEN 14.2.5 DIGITAL SIGNALS SLG1

SCREEN 14.2.5.1 DIGITAL SIGNALS SLG1 INPUT

| SLG1 DIGITAL INPUTS | | |
|-----------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Input Contactor | 0103-MLdSEin | 9/WD01 |
| Filter Discharge Contactor | 0103-MFiltDhcOn | 10/WD09 |
| Filter Contactor | 0103-MFiltOn | 11/WD02 |
| Filter Adaptation Contactor | 0103-MFiltAdpOn | 12/WD10 |
| Protective Shutdown Wire | 0103-MHS-HalteKr | 13/WD03 |
| DC Link Capacitor Pressure | 0102-MDruCZK | 14/WD11 |
| Pre-Charging Contactor | 0103-MSRSEin | 15/WD04 |
| External Protective Turn Off Wire | 0103-MExtRLgez | 16/WD13 |

SCREEN 14.2.5.2 DIGITAL SIGNALS SLG1 OUTPUT

| SLG1 DIGITAL OUTPUTS | | |
|------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Filter Contactor | 8501-BFiltOn | 1/WG19:07 |
| Filter Adaptation Contactor | 8501-BFiltAdpOn | 2/WG20:07 |
| Filter Discharge Contactor | 8501-BFiltDhcOn | 3/WG08:07 |
| Pre-Charging Contactor | 8702-BSRSEin | 4/WG02 |
| Input Contactor | 8701-BLdSEin | 5/WG24:12 |
| Protective Turn Off Wire | 0870-BExtRLabtr | 6/WG21:09 |
| GUSP Contactor | 8601-BGUSpEin | 7/WG10:23 |
| External Protective Turn Off | 0870-BHS-HalteKr | 8/WG06:18 |

SCREEN 14.2.6 DIGITAL SIGNALS SLG2

SCREEN 14.2.6.1 DIGITAL SIGNALS SLG2 INPUT

| SLG2 DIGITAL INPUTS | | |
|----------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Input Contactor | 0103-MLdSEin | 9/WD01 |
| Filter Discharge Contactor | 0103-MFiltDhcOn | 10/WD09 |

| | | |
|-----------------------------------|------------------|---------|
| Filter Contactor | 0103-MFiltOn | 11/WD02 |
| Filter Adaptation Contactor | 0103-MFiltAdpOn | 12/WD10 |
| Protective Shutdown Wire | 0103-MHS-HalteKr | 13/WD03 |
| DC Link Capacitor Pressure | 0102-MDruCZK | 14/WD11 |
| Pre-Charging Contactor | 0103-MSRSEin | 15/WD04 |
| External Protective Turn Off Wire | 0103-MExtRLgez | 16/WD13 |

SCREEN 14.2.6.2 DIGITAL SIGNALS SLG2 OUTPUT

| SLG2 DIGITAL OUTPUTS | | |
|------------------------------|----------------------|-----------------------------|
| SIGNAL DESCRIPTION | SIGNAL NAME IN FUPLA | CHANNEL/SLOT: CONNECTOR:PIN |
| Filter Contactor | 8501-BFiltOn | 1/WG19: 07 |
| Filter Adaptation Contactor | 8501-BFiltAdpOn | 2/WG20: 07 |
| Filter Discharge Contactor | 8501-BFiltDhcOn | 3/WG08: 07 |
| Pre-Charging Contactor | 8702-BSRSEin | 4/WG02 |
| Input Contactor | 8701-BLdSEin | 5/WG24: 12 |
| Protective Turn Off Wire | 0870-BExtRLabtr | 6/WG21: 09 |
| GUSP Contactor | 8601-BGUSpEin | 7/WG10: 23 |
| External Protective Turn Off | 0870-BHS-HalteKr | 8/WG06: 18 |

6. CONTACT DETAILS:

For any warranty/service-related queries, please contact:

| |
|--|
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