WELCOME TO ALL

Passenger Information System (PIS)
for Train 18
Type - MAE 675U

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PASSENGER INFORMATION SYSTEM (PIS)

- ✓ The Passenger Information System for Train 18 shall give required information to the passengers in a train throughout the journey in both visual and audio information.
- ✓ System shall have provision for public announcement where driver/guard can address all the passengers in the train, Inter Communication (IC) between Driver and Guard communication.
- ✓ The main aim of this system shall be to provide convenience to the passengers by providing the station information and other required information.

PASSENGER INFORMATION SYSTEM (PIS)

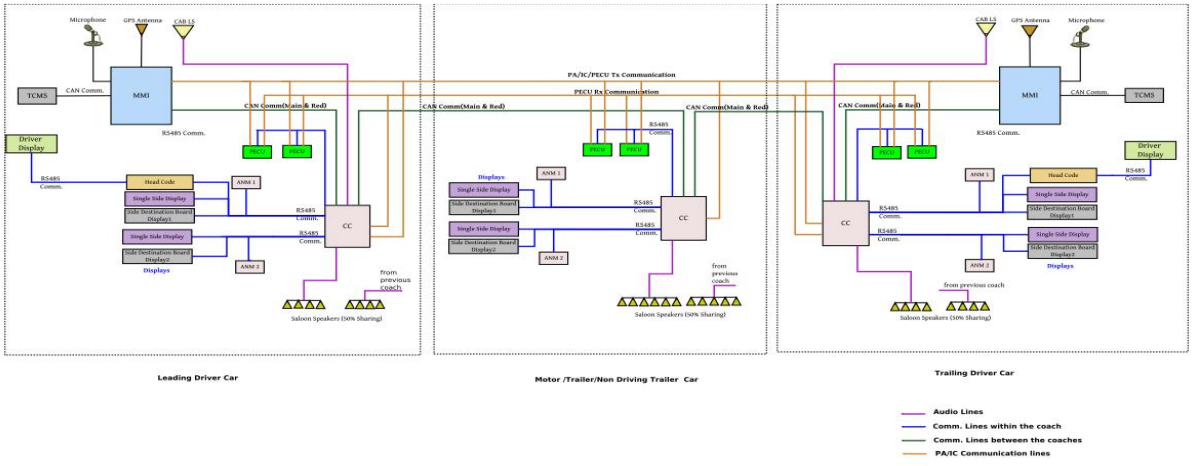
- ✓ The MMI(Man Machine interface) and CC's(Coach controller) in entire train are interfaced with CAN network.
- ✓ The MMI in the trailing coach will behave as Master based on direction of the journey and other MMI becomes Slave.
- ✓ The CC acts as local Master for each coach and interface with all the display boards using RS485 communication.
- ✓ The leading and trailing Coaches consists of Man Machine Interface (MMI) with GPS Antenna, One Head Code, One Car Control (CC), Two SSD's,, Two SDBDS,Two PECUs,Two ANM's, One cab loud speaker, Eight Saloon Speakers and One microphone.

All other coaches other than leading and trailing coaches, will have One Car Control (CC) with built in audio amplifier unit,Two single side displays, Two ANM,Two SDBDS, Two PECUs and Eleven loud Speakers.

PASSENGER INFORMATION SYSTEM (PIS)

- ✓ Speaker of 6 watts R.M.S. rating of reputed make Ahuja is provided with 50% of sharing between coaches in case of single power amplifier failure; at least half of the speakers are still operative in the Coach.
- ✓ Public address system is provided to enable communication between Guard and Passengers.
- ✓ Inter comm is provided to enable communication between Driver and Guard.

SYSTEM BLOCK DIAGRAM



Train 18 PIS System Block Diagram

SCOPE OF SUPPLY

S.No	Module	DTC	TC/NDTC/MC	Total Qty Per Rake
1	Man Machine Interface (MMI)	1	0	2
2	Car Controller (CC)	1	1	16
3	Side Destination Board (SDBDS)	2	2	32
4	Head code Unit (HCD)	1	0	2
5	In Coach Display (Multi-color ICD)	2	2	32
6	Cab Loud Speakers	1	0	2
7	Saloon Speakers	8	11	170
8	GPS Antenna	1	0	2
9	Microphone	1	0	2
10	Ambient Noise Measurement Module (ANM)	2	2	32
11	Passenger Emergency Communication Unit (PECU)	2	2	32

Man Machine Interface (MMI)

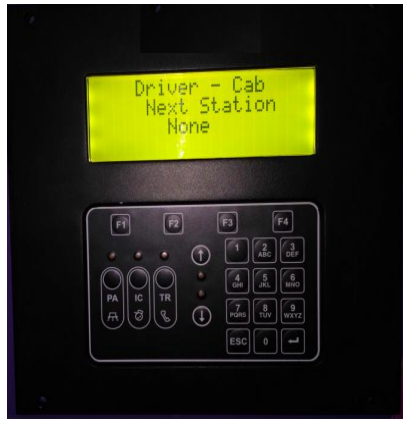
Man Machine Interface is a user friendly module which has 20x4 Matrix LCD and 21 Keys keypad for displaying the menu screens and accepting the user inputs through keyboard.

This module is mainly used for configuration and displaying the menu options, system status and route information to user (Driver/Guard).

This Module is mounted on the driver desk. User can also know the status of each sub system from MMI.

User can enable the PA, IC, TR communication by using the keys provided on the keyboard of MMI module. It has three indication LED's (PA, IC, TR) which will display the audio communication enable / disable status.

Complete PIS system can be configured using MMI Only.



Man Machine Interface (MMI)

- MMI has GPS interface to have real time GPS co-ordinates.
- MMI takes care of all operations such as train route simulation using GPS, Fault Diagnostic of the complete PIS system.
- Train route database of the PIS system is stored in MMI.

Car Control Unit (CC)

Car controller is the main system to control and command all sub systems in that particular coach, it acts as local master for that coach.

Upon receipt of train route selection from MMI, CC will transfer the required information to all displays, then on receipt of station triggers from the MMI, CC will transfer the required display data to display and audio data to the speakers.

All sub systems in a coach like Head code display, Single side display, Side Destination Display Board and ANM are connected through RS485 to car controller unit.

Car Control Unit (CC)

- It also monitors the health of all the sub systems which are under its control and exchanges the data with MMI for central data storage.
- Speakers are routed from CC in each coach by 50% audio sharing from next coach.
- Displays are routed using two RS485 channels in each coach. In case of failure in one channel also 50% displays will work in each coach .
- On the facia of CC unit LEDs are provided for know the health of the CC unit and CAN communication.

Head Code Display (HCD)

The Head Code Display comprises of LED boards

Head Code will be provided at the front end of the driving coach (leading and trailing) above the lookout glass. LED Matrix size: 16x128.

Head code is placed at the front each end of the Driving Coach(Leading and Trailing).

It will displays following....

1. Train no
2. Name of destination station in English, Hindi and Regional language
3. Type of service (Slow/Fast)
4. Handicap symbol along with coach location
5. Ladies special Symbol along with coach no .

Head Code Display (HCD)

In case of communication failure between Car Control and Head Code, Driver / Guard can manually select the train route through Driver Display unit located in driver / guard cabin.

In-Coach Display unit (Single Side Display)

The In-Coach Display unit comprises of 16x144 matrix Multi Colour LED boards.

ICD will display the route related information like present station and next station to the passengers throughout the journey.

In addition to the route related data, the ICD will also display the safety messages upon receiving triggers from CC.

Side Destination Board Display Unit

Side Destination Board Display System will be provided at each side of the coach.

The Side Destination Board Display System will display information in two windows in one window Coach number and Train number, in second window .Train name and Source to Destination. in English, Hindi and Regional language.

LED Matrix size: 16x128.

It will displays following....

1. Train no
2. Coach Number
3. Train name
4. Source to Destination.

Passenger Emergency Communication Unit

The purpose of Passenger Emergency Communication Unit is to provide the emergency communication between Driver/ Guard to Passengers.

When a Passenger Emergency Communication Unit is operated by passenger, an indication will be given to the Driver/Guard of the location of the operated device.

The Driver/Guard will acknowledge the PECU request which is showing on Display screen of MMI thereby enabling bi-directional inter-communication between the Driver and the passenger.

AMBIENT NOISE MEASUREMENT MODULE (ANM)

ANM is basically a noise measurement module to adjust the announcements volume level in passenger area based on the surrounding noise with comprised microphone.

It will detect the background noise, measures the noise level and sends the same to CC.

The CC will adjust the volume level based on the background noise received from ANM.

It will be operated at 110V DC supply.

Saloon and Cab Loudspeakers

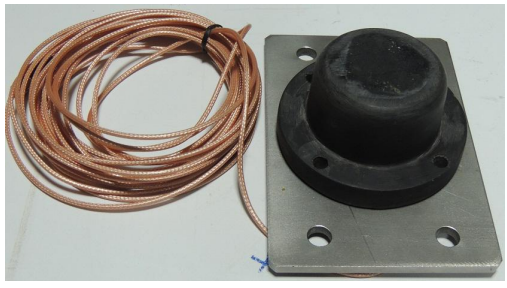
Speaker of 6 watts r.m.s. rating of reputed make Ahuja is provided.

50% of sharing is provided for the speakers between coaches in case of single power amplifier failure; at least half of the speakers are still operative in the coach.

GPS Antenna

A rugged GPS antenna with anti-theft protection of required cable length is provided for use on rail vehicles.

This will be located in the both driver desks to detect the GPS location and gives the information to MMI.

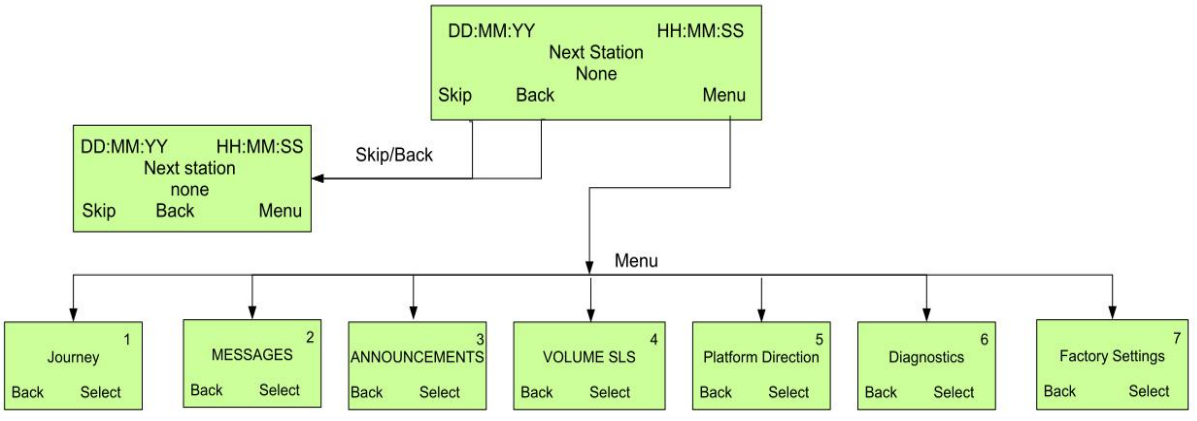


MMI Keypad

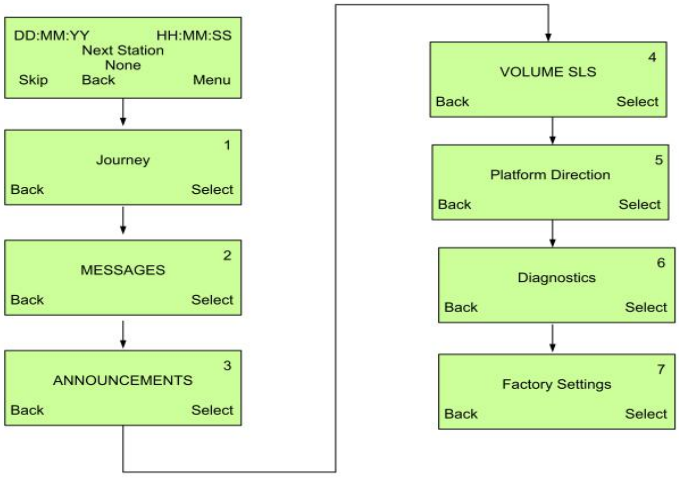
All the PIS operation will be originated based on the selection of the user with Alphanumeric Keypad which will be available on both MMI.

1. If 'Back (F1) key' pressed Default Screen will be displayed.
2. If 'Back (F4) key' pressed menu option will be selected
3. 'F1' to 'F4' are functional keys for entering the messages as per the data shown in LCD.
4. If 'Left Key' Pressed previous menu screen will be displayed.
5. If 'Right Key' Pressed next menu screen will be displayed.
6. 0-9 Keys can be used for data entry (Numeric / Alphanumeric)
7. 'PA' key is used for public addressing
8. 'IC ' key is used for Intercom b/w driver to guard
9. 'TR' key is used for train radio (optional) .

MAIN MENU SCREENS



MAIN MENU SCREENS FLOW



Power up initialization

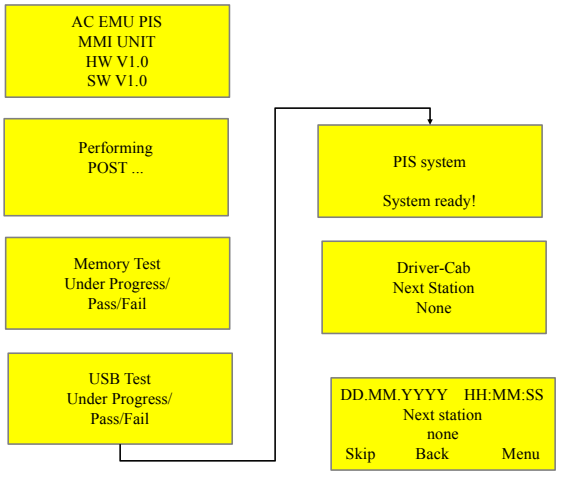
After power on MMI will display module name with Hardware and Software versions as first screen.

After displaying the Hardware and Software versions it will initialize itself and communication network

After initializing the communication network it will display Memory test screen with Pass/failure status.

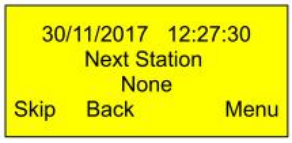
After Memory test USB test status will be displayed with Pass/Fail status.

Then After system will get ready to operate by user. As the PIS system is interlocked with Master key to getting PIS mastership.



When motor man inserts the key the PIS control will be given to UN-occupied cab I.e guard cab, A cab is said to be occupied where the master key is inserted and vice versa.

The MMI unit of UN-occupied cab here in after called as Master MMI screen is as shown below



Row 1 → displays GPS date and time / GPS signal status
If GPS signal is good then it will display date and time where as if GPS signal is poor it will display GPS signal poor text on LCD screen.

Row 2 → displays Present / Next station based on the train position and distance travelled

Row 3 → displays None in default condition where journey is not selected and displays the station id if journey is selected

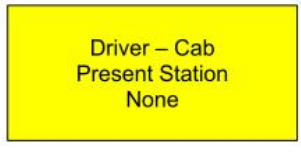
Row 4 → Menu Screen access options

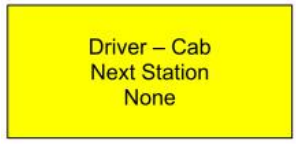
The MMI unit of occupied cab here in after called as Slave MMI screen is as shown below

Row 1 → displays cab details

Row 2 → displays Present / Next station based on the train position and distance travelled

Row 3 → displays None in default condition where journey is not selected and displays the station id if journey is selected



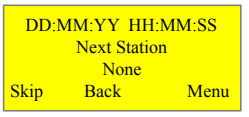


NOTE :

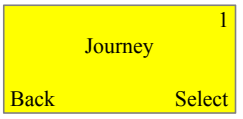
If None of the cab is occupied then both the MMI will act as slave and MMI will display following screen

Journey selection procedure

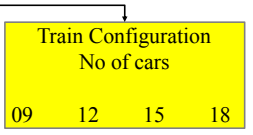
Once MMI takes the mastership then it will display the default menu screen as shown in the below figure



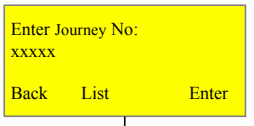
Press F4 to access the menu options, MMI will display the following menu screen



Press F4 to enter the journey details, MMI will display the following menu screen

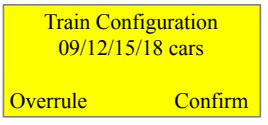


Enter journey number using alphanumeric keypad provided on MMI unit. After entering the journey no press F4 key to confirm, If any wrong number is entered press F1 to cancel the number, F1 will act as cancel key



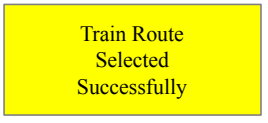
Journey selection procedure

Press F4 key to confirm the Train configuration, then MMI will display the following screen

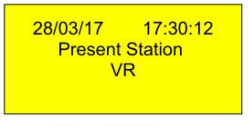


Press F4 key to confirm the Train configuration as 12 Car.

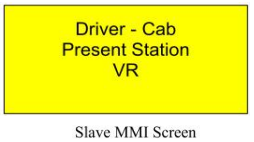
If entered journey no is available in MMI then MMI will display the Train Route Selected screen.



After displaying the confirmation screen it will display the journey information



Master MMI Screen
(un-occupied cab)



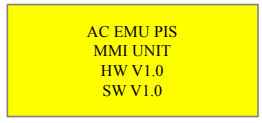
Slave MMI Screen
(Occupied cab)

If entered journey no is not available in MMI then MMI will display the Route Not Availble message on LCD screen

Route Deselection

Train route can be deselected from both the cabs (Occupied and Un-Occupied), to deselect the train route long press Key 'ESC' for 5 seconds then all the devices of PIS system will get reset.

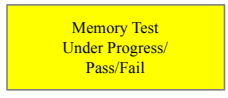
After power on MMI will display module name with Hardware and Software versions as first screen .



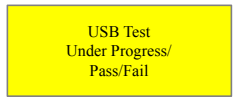
After displaying the Hardware and Software versions it will initialize the itself and communication network

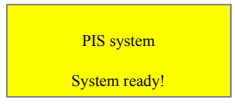
Route Deselection

After initializing the communication network it will display Memory test screen with Pass/failure status.

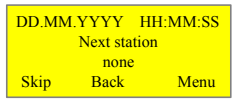


After Memory test USB test status will be displayed with Pass/Fail status.





Then After system will get ready to operate by user with Menu options.



Public address

- ✓ Driver / Guard can enable the Public address to make the announcements to the passengers, The procedure to enable the public address from Driver / Guard cab during journey is as follows :
- ✓ To enable the Public address, Press 'PA' key on MMI unit, LED on 'PA' key is ON to indicate that PA is enable and a jingle audio will be played in all Cab and Saloon loudspeakers to indicate that Public address is enabled.
- ✓ To speak through Microphone PA/TR Rotary switch on driver desk shall be rotate to Driver PA side then speak.
- ✓ During the PA the first row of MMI screen will display the text "… PA CALL ..." to indicate the Driver / Guard that public address is enabled.

Public address

Master MMI Screen

… PA CALL ...
Present Station
VR

Slave MMI Screen

… PA CALL ...
Present Station
VR

- ✓ During the PA, Only initiating end Microphone will be enabled and Non-initiating end Microphone will be disabled to avoid the Miscommunication to the passengers.
- ✓ To disable the PA, press the "PA" key again from initiating end MMI then PA will be disabled and the screen of Master and Slave MMI will display PA disable message as follows.

Public Address
Disconnected

If "PA" key pressed at Non-initiating end MMI to disable the PA, MMI will display the message like "Disable from Other cab" message on LCD screen.

- ✓ After displaying the PA disable message on screen it will display the previous screen, 'PA' LED will be OFF to indicate that PA is disabled then Rotate the PA/TR switch to Default position

Inter Comm

The procedure to enable the inter comm between Driver and Guard during journey is as follows :

✓ To enable the Intercomm , Press 'IC' key on MMI unit then at initiator & non-initiator end LED on 'IC' key will blink for 30 seconds and a Jingle tone will be played from both Cab loudspeakers for 10 seconds to indicate that intercomm request is sent to other cab.

✓ At non-initiator cab a message will be displayed a message on MMI screen "Inter comm Request" To enable the intercomm.

Initiating End MMI

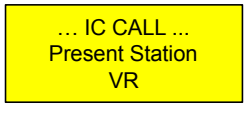
Non-Initiating End MMI

Inter Comm

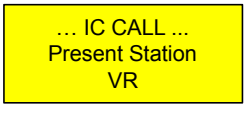
✓ If Non-Initiating end MMI gives the acknowledgment for IC request then Inter Comm Enabled Message on both MMI screens.

✓ During the IC the first row of MMI screen will display the text "… IC CALL ..." to indicate the Driver / Guard that Inter Comm is enabled.

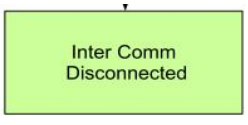
Master MMI Screen



Master MMI Screen



✓To disable the IC, press the "IC" key again from initiating end MMI then IC will be disabled and the screen of Master and Slave MMI will display Inter Comm disabled message as follows.



Inter Comm

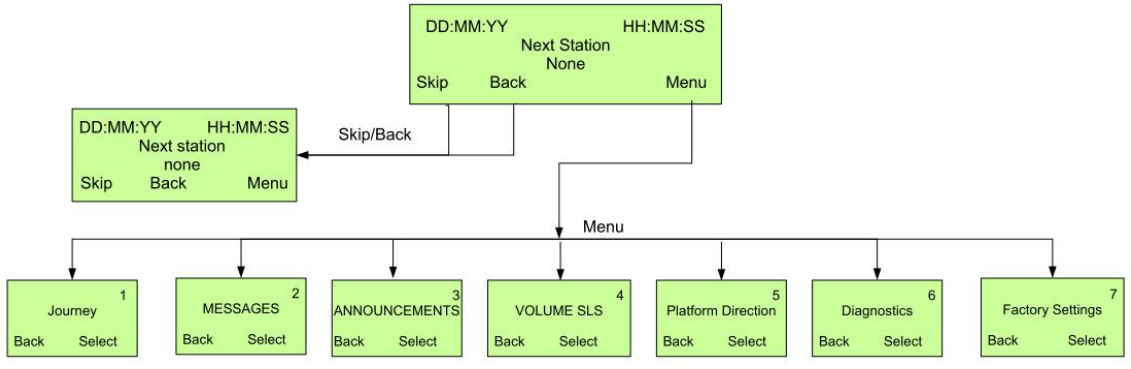
✓ PA/TR Rotary switch is not needed during the IC as the IC lines are connected directly through Train lines.

✓If Non-Initiating end user has not given the acknowledgment for Inter Comm request, IC LED will be blink for 30Sec and gives the "Inter Comm Enabling Fail" message on MMI screens.

✓Initiator can only disable the IC. If Non-Initiator tries to disable the IC then MMI will display the "Disable from Other cab" message on LCD screen as follows:

Menu Screen operations

✓After inserting the Master key other end MMI will become master and MMI will display the menu for accessing the PA/PIS system in offline as follows:



Messages

✓ This option is used to display the required message to all the passengers inside the coaches. It can be a Welcome message, safety message or wishes.

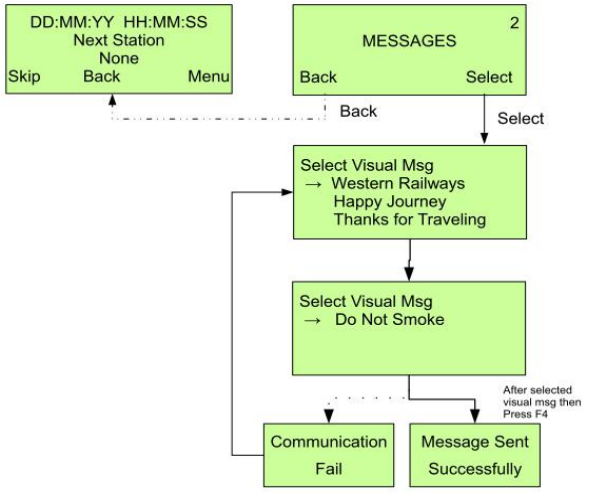
✓ When user selects the 'Messages' option then MMI will display the following screen

✓Press 'F4' to display the list of messages and screen is as follows

✓ User can select the required messages using Left(←) and Right (→) keys, selected message will be sent to all CC units then display on Internal Displays(SSD/DSD).

✓ Press 'F4' to select the required message, then MMI will send the same message to MMI and MMI will send the message to all CC's, as a result of this all the in coach displays (Single Side Display and Double Side Display) will display the selected message.

Messages



Announcements

✓ This option is used to make the audio announcements to all the passengers inside the coach. It can be a Welcome message, safety message or wishes.

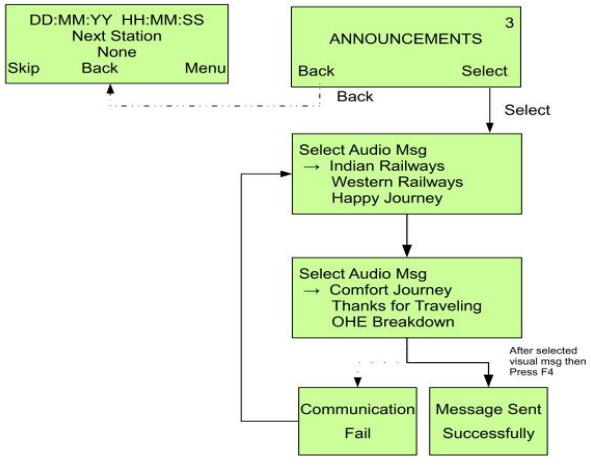
✓ When user selects the 'Announcements' option then MMI will display the following screen.

✓ Press 'F4' to display the list of messages and screen is as follows

✓ User can select the required audio messages using Left(←) and Right (→) keys, selected audio message will be sent to all CC units then announced in the coach area through speakers.

✓ Press 'F4' to select the required message, then MMI will send the same message to all CC's, CC will play the selected audio message as a result of this the selected audio announcements can be heard in all the coaches.

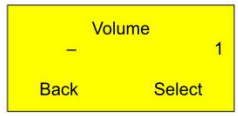
Announcements



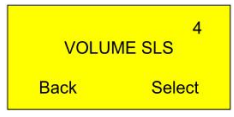
Volume Level Selection

✓ This option is used to select the various volume levels of audio.

✓ When user selects the 'Volume SLS' option then MMI will display the volume levels as follows.



✓ User can increase/decrease the volume level through Left (←) and Right (→) keys. Selected Volume level will be sent to all the CC units to configure the volume for journey announcements.

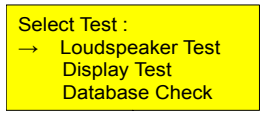


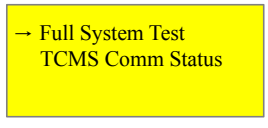
✓MMI will provide the Volume levels from 1 to 5 where the Volume min is '1' and Maximum is '5'.

Diagnostics

✓ This option is used to verify the diagnosis of the PA/PIS system with Display Test, Audio test, Full system Test, TCMS Communication status. When user selects the 'Diagnostic' option then MMI will display the following menu options.

✓ When user Press F4 (Select) button then MMI will display the following options :

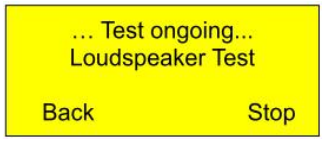




✓User can select the required test condition using Left (←) and Right (→) keys.

Loud Speaker Test

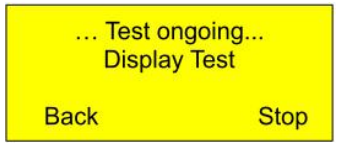
✓When user selects the 'Loud Speaker Test' then Jingle tone will be announced continuously in all the coaches and MMI will display the stop screen as follows:



✓When user selects the Back (F1) option then MMI will display the previous screen (Diagnosis Menu) followed by Loudspeaker testing. When user selects the Stop (F4) option then MMI will display the previous screen (Diagnosis Menu) by terminating the Loudspeaker testing.

Display Test

✓When user selects the 'Display Test' then all the LEDs of ICDs (SSD/DSD) and Head Code units will be glow continuously in all coaches and MMI will display the stop screen as follows:



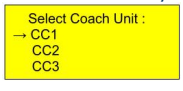
✓When user selects the Back (F1) option then MMI will display the previous screen (Diagnosis Menu) followed by Display testing. When user selects the Stop (F4) option then MMI will display the previous screen (Diagnosis Menu) by terminating the Display testing.

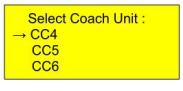
Database Check

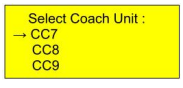
✓When user selects the 'Database Check' option then database will be verified and displayed the following message :

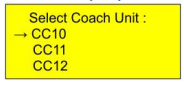
Full System Test

✓ When user selects the 'Full System Test' then all the Car Controller units list will be displayed as follows :



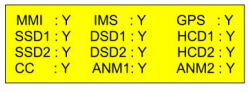




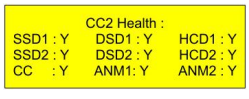


✓ User can select required CC and get the coach health information using Left (←) and Right (→) keys. When user select any of the CC then MMI will display the all the sub assembles health information which are equipped in the Coach as follows.

✓ DTC coach is having the MMI, GPS, CC, SSD, DSD, ANM and Head Code units and remaining are having the CC, SSD, DSD, ANM only. So CC1 and CC12 coach health will display as follows :



✓ All the remaining CC2 to CC11 coaches health will be displayed as follows:



✓ Note : When the status shown as 'Y' then sub assemble communication with CC is fine, if the communication is not fine then it will show as 'N'

TCMS Comm Status

✓When user selects the 'TCMS Communication Status' option then MMI Communication with TCMS will be verified and displayed the following message :

TCMS Comm Status
Found Ok

✓If TCMS Communication failed then following message will be displayed

TCMS Comm Status
Failed

Factory Settings

✓ This option is used to Upload/Download the database of the PA/PIS system with Upload, Down load options.

✓Erase and Database Information options are available to know the database status and Erase the existing information with user confrontation

✓This option will be Password Protected and the Password is "1234"

7
Factory Settings
Back Select

Enter Password

Factory Settings
→ Database
Simulation Mode
ANM Enable/Disable

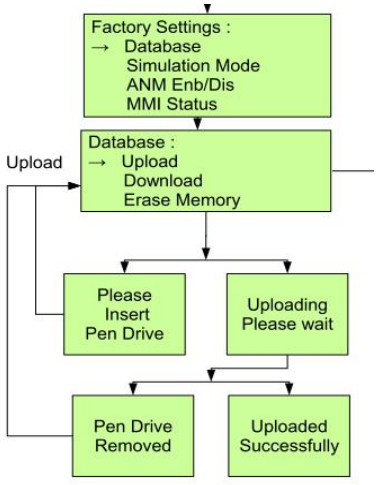
Factory Settings
→ Database Info

Upload

✓ Database option is used to Upload/Download the Journey information into MMI module.

✓To upload the data Copy the required information into Pendrive then insert into USB slot of MMI.

✓Then Uploading process will be done then Upload Success/Failed message will be displayed on MMI screen.



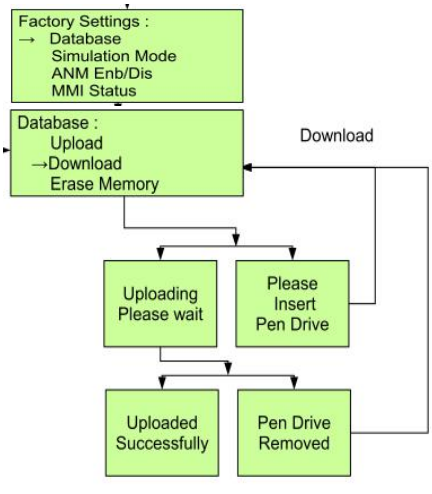
Download

✓ This option is used to Download the Trip, Fault and Event data from MMI module.

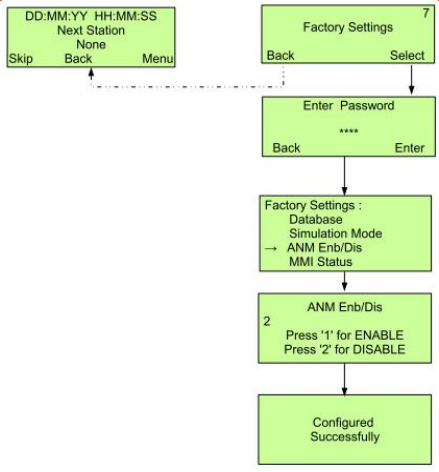
✓To download the data insert Pendrive into USB slot of MMI.

✓Then Downloading process will be done then Download Success/Failed message will be displayed on MMI screen.

✓Downloaded Trip/Faults/Events data will be verified with Application software.



ANM Configuration



✓ This option is used Enable/Disable the ANM functionality in the PIS System.

✓ If ANM Enabled, announcements volume level will be varied based on the ambient noise.

✓If ANM Disabled, announcements volume will be fixed with the configured volume level from Volume level section option (4 th).

Database information

✓When user selects the 'Database Info' option then MMI will show the memory information with Total Journey files and Journey Reference file availability as follows:

DB Information
Total no. of Files : xxx
Journey Reference file
Available

Quires Please..... ?

Thank You.