



**TPMS
DISPLAY REQUIREMENT
for
INFOTAINMENT**

W201 PLATFORM

MAHINDRA AND MAHINDRA LTD

Introduction

Tyre Pressure Monitoring sensor will measure the pressure and temperature inside the tyre and transmits to the MBFM through radio frequency. The MBFM will receive this information and identifies the data received corresponds to which tyre and give warning signal if undesirable tyre pressure and temperature condition occurs. Along with the warning the MBFM will also transmits the pressure and temperature of each tyre in CAN bus to cluster to display the same.

Indications for TPMS

The indication of TPMS Information from MBFM is done on the DIS

Indications in DIS

1. On Request user to view all the tire pressure and temperature value
2. Text message for Leakage Alert, High Pressure, Low pressure, High temperature and ID not learned for each individual tyre/ combinations of tyre.

List of CAN Signals

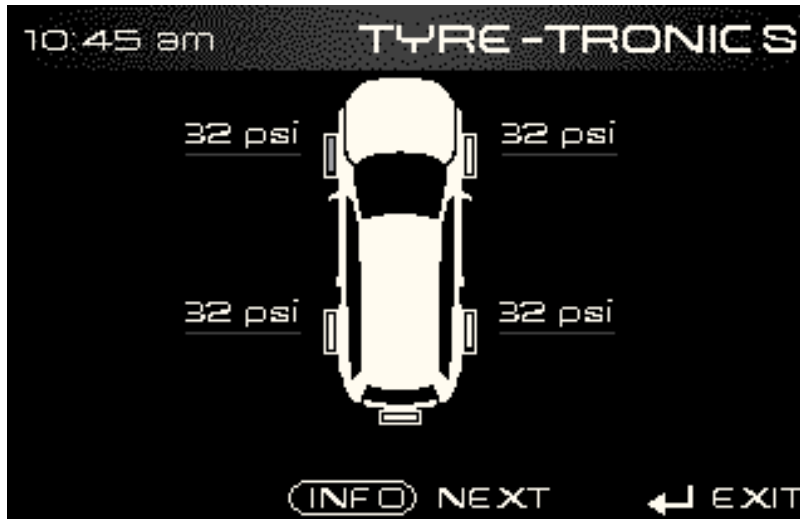
S.No	Signal Name	Transmitter	Function
1	TPMS_ID_NOT_LEARNT	MBFM	ID not learnt alert for each tire
2	TPMS_SIGNAL_MISSING	MBFM	Signal missing alert for each tire
3	LOW_TYRE_PRESSURE	MBFM	Low tyre pressure alert for each tire
4	HIGH_TYRE_PRESSURE	MBFM	High tyre pressure alert for each tire
5	HIGH_TYRE_TEMPERATURE	MBFM	High tyre Temperature alert for each tire
6	PRESURE_LEAKAGE_ALERT	MBFM	Pressure leakage alert
7	TPMS_MALFUNCTION	MBFM	Malfunction alert
8	FL_TYRE_PRESSURE	MBFM	Front Left tyre pressure
9	FR_TYRE_PRESSURE	MBFM	Front Right tyre pressure
10	RL_TYRE_PRESSURE	MBFM	Rear Left tyre pressure
11	RR_TYRE_PRESSURE	MBFM	Rear Right tyre pressure
12	SPARE_TYRE_PRESSURE	MBFM	Spare tyre pressure
13	FL_TYRE_TEMP	MBFM	Front Left tyre temperature
14	FR_TYRE_TEMP	MBFM	Front Right tyre temperature
15	RL_TYRE_TEMP	MBFM	Rear Left tyre temperature
16	RR_TYRE_TEMP	MBFM	Rear Right tyre temperature
17	SPARE_TYRE_TEMP	MBFM	Spare tyre temperature
18	TPMS_ENTER_PR	IC	Learning of the TPMS
19	TPMS_PROGRAM_MODE	MBFM	Learning of the TPMS
20	TPMS_PROGRAM_MODE_FB	IC	Learning of TPMS
21	SPARE_TYRE_SWAP	MBFM	Swapping function
22	SPARE_TYRE_SWAP_FB	IC	Swapping function

List of Modes of operation

1. Normal mode
2. Malfunction mode
3. Pressure / Temperature Request mode
4. Swapping mode
5. Manual Learning Mode

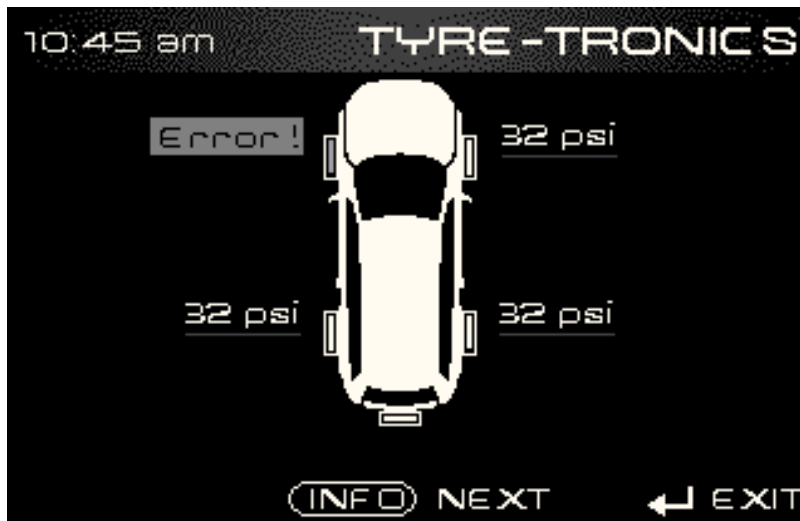
1. NORMAL MODE

When user enters into INFO mode and into TPMS screen infotainment system should display all the tire pressure and temperature which is currently received by the system from MBFM for 4 tires. Spare tire pressure and temperature needs to be displayed only if there is an alert for that particular tire.

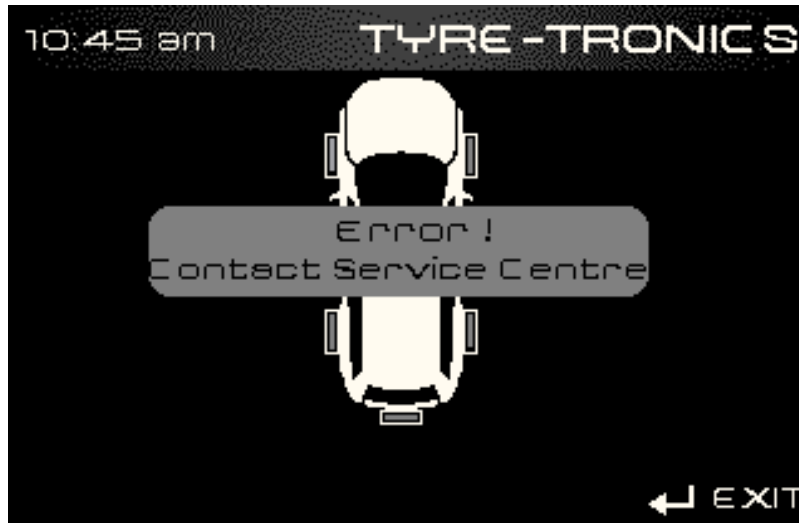


If tire pressure / temperature is not received/signal invalid/on-fail then it should display as ERROR at that particular location nearer to that particular tire.

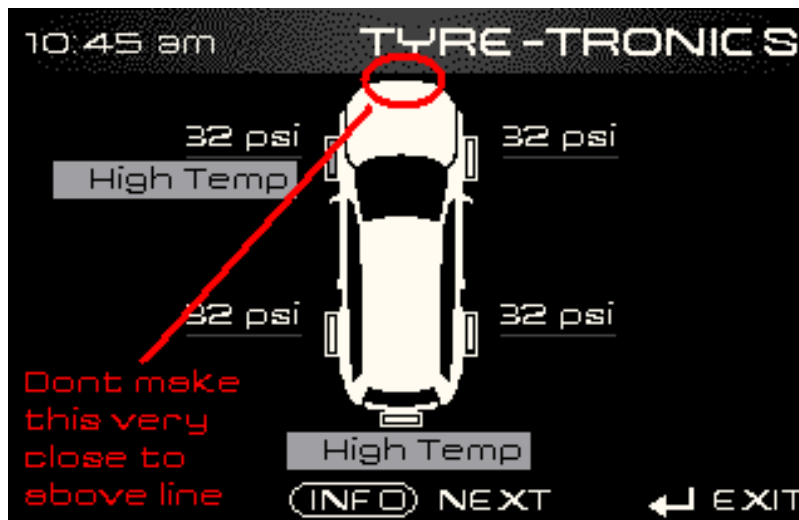
If error is for less than 4 tyre, then display should be as below



If error is for 4 tyre or above, then display should be as below



If there is an alerts low pressure/ leakage alert/ high pressure/ high temperature, then the corresponding alert needs to be displayed along with the highlighting that particular tire.



If more than 1 alert is present for many tires, it should start displaying in the round robin and 5 sec for each tire.

Priority of tires should start from FL, FR, RR, RL and Spare tire.

2. MALFUNCTION MODE

This mode occurs whenever there is an error in the system or during the pressure leakage and temperature alerts. This needs to be give priority and alert the user immediately. Whenever any of the alerts from 1 to 7 occurs, infotainment system should display the TPMS screen as in the normal mode and it can either timeout after 30sec or when the user press exit.

3. SWAPPING MODE

Swapping is changing the Faulty tire / Normal tire from one location to another location in the vehicle and the same will be updated in the MBFM and provide the display to the customer about the swapping of the tire and fault of the swapped tire.

SPARE_TYRE_SWAP	SPARE_TYRE_SWAP_FB	ACTION IN INFOTAINMENT
0x0 / Invalid/Signal missing	0x0/signal missing	Action 1
0x1/0x2/0x3/0x4	0x1	Action 2 FL tire swapped. Please Rectify the swapped tire
0x1/0x2/0x3/0x4	0x2	Action 2
0x1/0x2/0x3/0x4	0x3	Action 1

If any signal coming other than the above said combination, infotainment should perform Action 1.

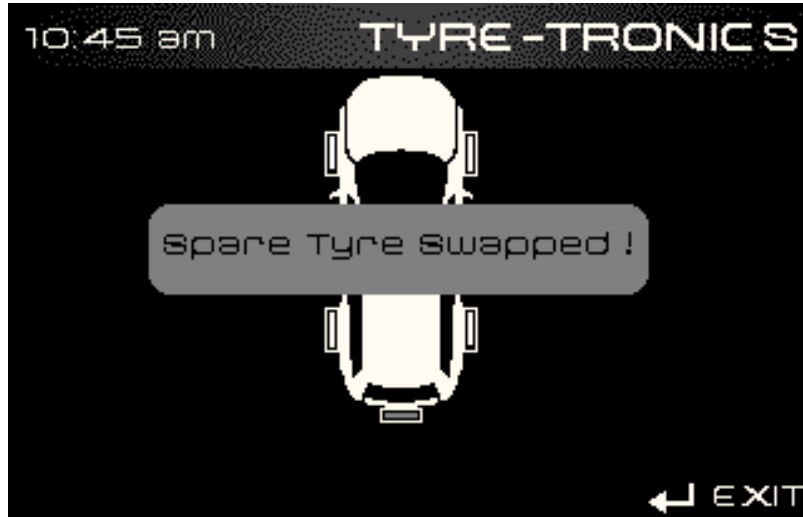
Action 1:

No information on Swapping needs to be displayed

Action 2

Information like

"FL TIRE SWAPPED WITH SPARE. PLEASE RECTIFY AND ACKNOWLEDGE BY PRESSING TPMS BUTTON"



Should be displayed on every ignition ON for 10sec (Calibrateable)

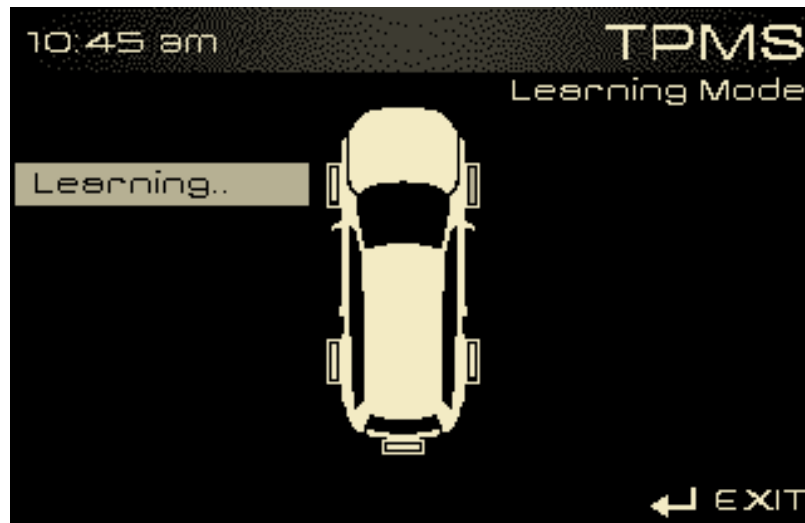
Manual Learning

This function will come only during the ignition ON and Engine OFF condition.

TPMS_ENTER_PR (FROM CLUSTER)	TPMS_PROGRAM_MODE_FB (FROM Cluster)	Actions
0x1	0x1	Learning action 1
0x1	0x2	Learning action 2
0x1	0x3	Learning action 3
0x1	0x4	Learning action 4
0x1	0x5	Learning action 5
0x1	0x6/0x7	Learning action 6
0x0/0x1	0x8	Learning action 7
0x0/On-fail/Signal invalid/signal missing	0x0/On-fail/Signal missing/signal invalid	Default screen of Infotainment system

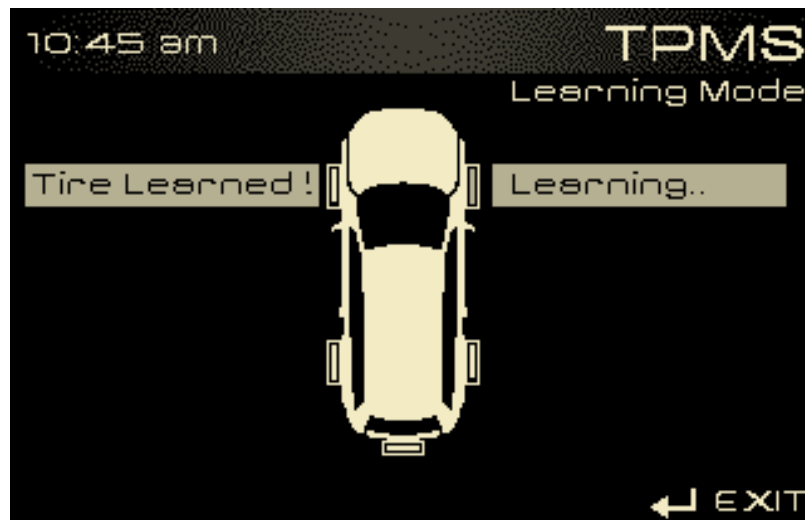
Learning action 1

Infotainment should display the message



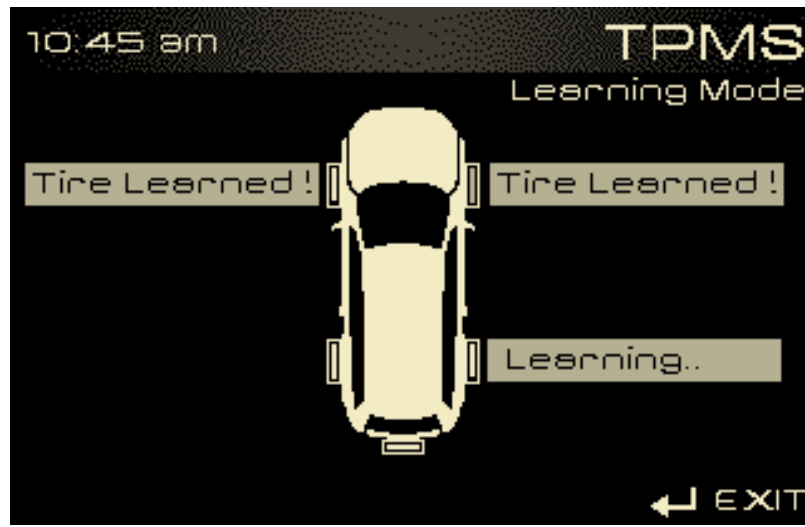
Learning action 2

Infotainment should display the message



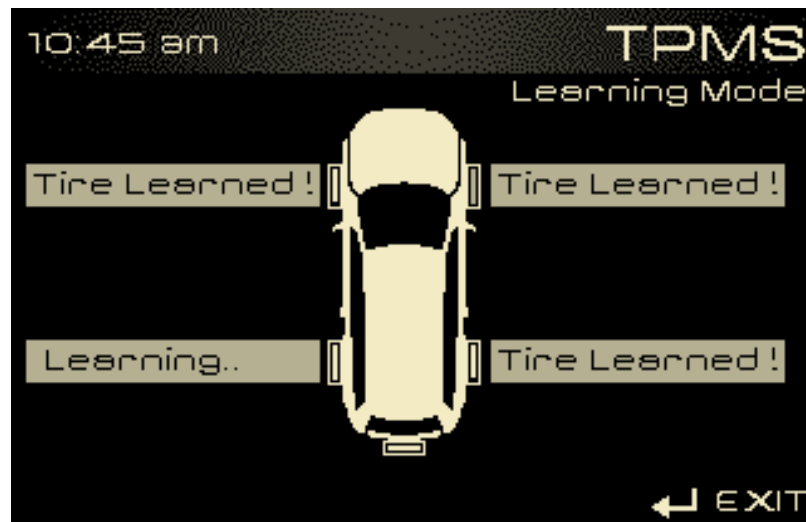
Learning action 3

Infotainment should display the message



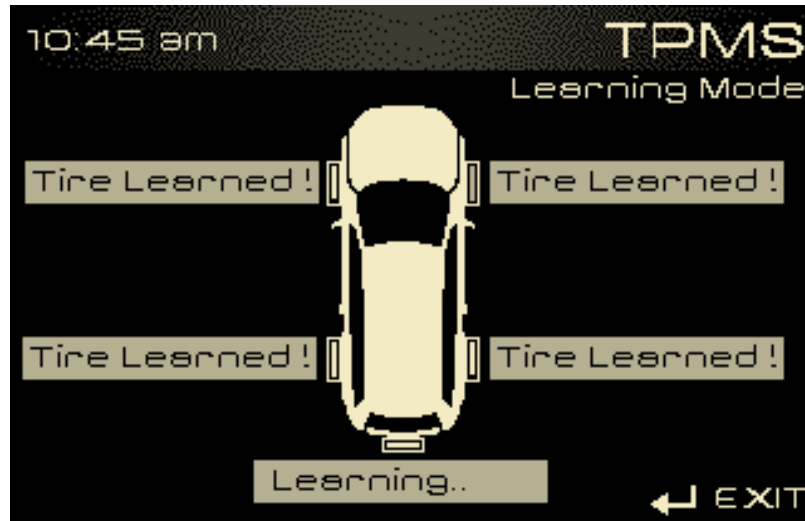
Learning action 4

Infotainment should display the message



Learning action 5

Infotainment should display the message



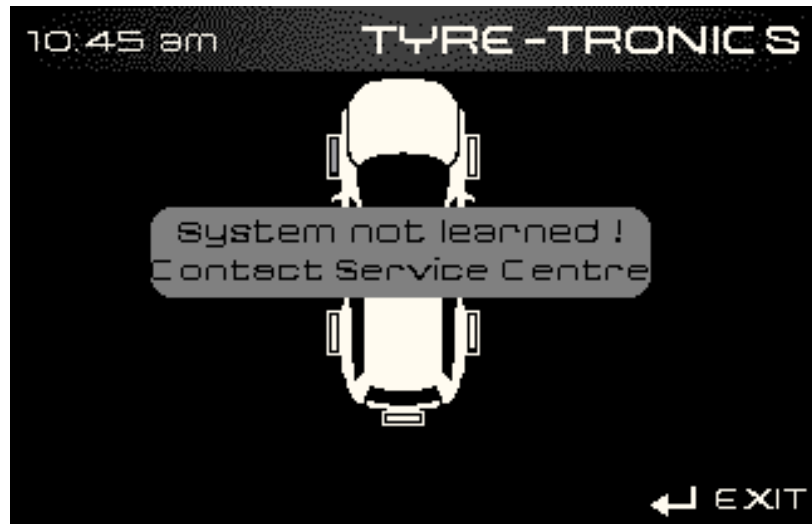
Learning action 6

Infotainment should display the message



Learning action 7

Infotainment should display the message



When there is no change in CAN message on above two signals for more than Infotainment should timeout to Default screen after 2 min.