Power On
Racing Electronics

TS124G

Telemetry Manual with Bosch System

TS124G

PRODUCT DESCRIPTION

TS124G is a 4G device used to send telemetry data in real time. It allows data transmission to one or more connected PCs and, if covered by 3G/4G Network, the transmission occurs in any place. Regarding data receiving, only an Internet connection is necessary.

Thanks to this kind of data transmission, transmitters and other additional systems are no longer necessary.

Furthermore, the system is compatible with all Bosch and Motec devices and it is possible to connect it to any different logger if provided with RS232 data transmission.

TABLE OF CONTENTS

1 Hardware Required

CAR:

- Modem TS124G

- SimCard with enabled internet connection

- Car wiring harness

- Antenna

PIT:

- Internet connection

Software Bosch

Bosch System is composed by two software:

WDServer: used for data reception

Download v203005:

Wdserver

WinDarab: used for data visualization

Download v704069:

WinDarab

Download page:

Download Page

2 How to start

Initial system configuration:

1) Buy a qualified Internet traffic Sim card (see Sim Card) and insert it in a mobile phone in order to verify its mode of operation and remove the PIN Code request (verify this by switching off and on the mobile phone)

2) In RaceCon Configuration enable the transmission data in telemetry (see RaceCon Configuration)

3) Install these three software:

-PowerOnBridge (download it here t1.powerontelemetry.it)

-WDServer and WinDarab

4) Start PowerOnBridge and configure it (See PowerOnBridge Configuration)

5) Once the Sim Card is inserted and the telemetry turned on, connect to the module wireless network and carry on with the APN configuration depending on the telephone operator (see Configure Car)

6) If all has been configured correctly, the green led turns on (it indicates that the module is connected to Internet) and the orange-one (it indicates that the module is receiving data from the logger).

7) Open WDServer and proceed with the configuration (see WDServer Configuration)

8) Start WinDarab and proceed with the configuration (see WinDarab Configuration), now data in telemetry can be seen.

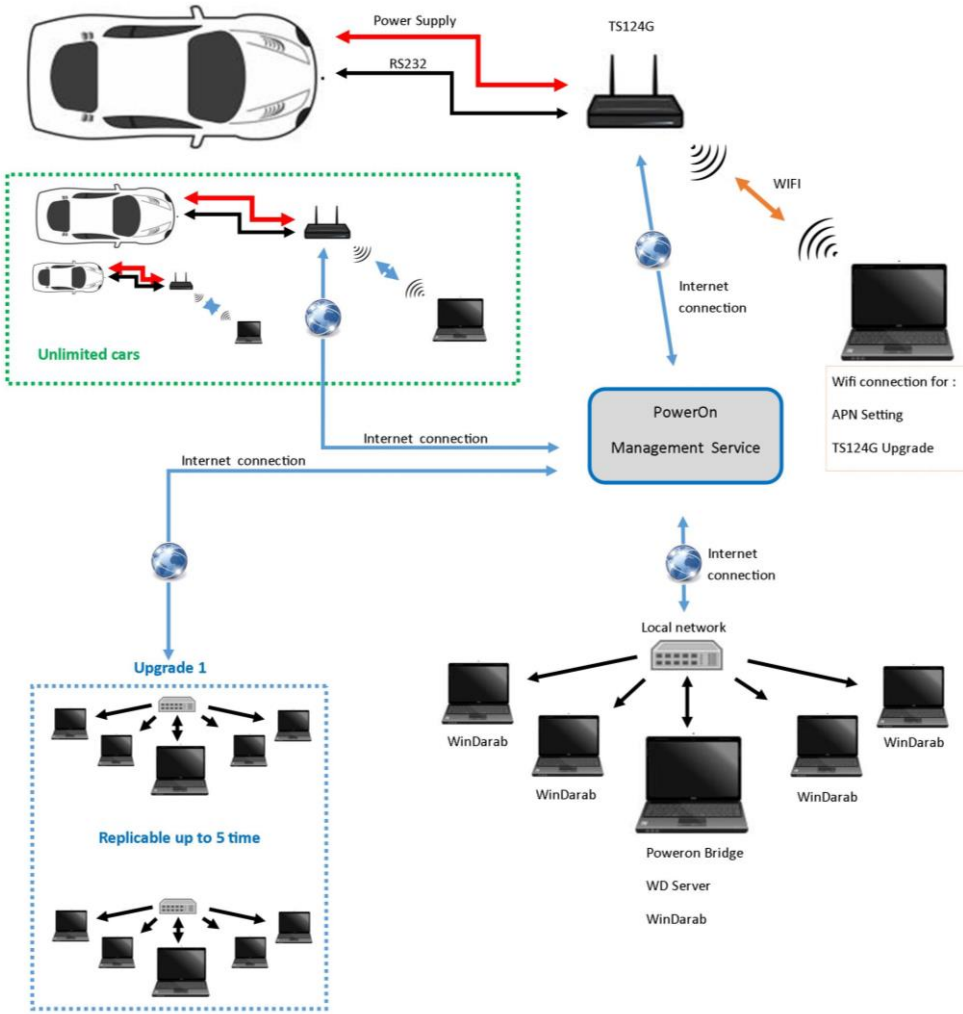
3 Pin Out

Connector	AS008-35PN
Pin	
1	+12V
2	GND
3	RS232 RX (telemetry side)
4	RS232 TX (telemetry side)
5	GND
6	nc

Name	Main
Connector	SMA receptacle

Name	Div
Connector	SMA receptacle

4 System Layout



5 Sim Card

Sim of any provider, unless it has an enabled internet connection, can be used.

Roaming internet, if enabled by the internet navigation contract, can be used.

Be sure of disabling the pin code of the sim card.

It is necessary to use a MINI-SIM or smaller sizes with an adapter.

6 Antennas

The telemetry modules TS124G have two antenna connectors, **Main** and **Diversity** (Div).

An antenna must always be connected to **Main** connector in order to make the module work.

The connection of a second antenna to the **Div** connector is optional; connecting the second antenna, the reception gets improved since its signal is linked to the other reducing interferences.

7 Led Status

LED PWR (red)

If this led is on, the telemetry module is powered

LED WAN (green)

It is permanent when it is trying to connect to a Network.

It flashes when it is accurately connected to a Network.

!!ATTENTION!!: if the green led flashes it does not mean that it is ready to broadcast data to the server but it means that it has been able to connect to the right operator network. This led represents an help in order to understand if the right APN has been inserted in the modem configuration (see chapter APN). Even if the Sim card has got no credit, this led flashes in any case because it is connected to the network

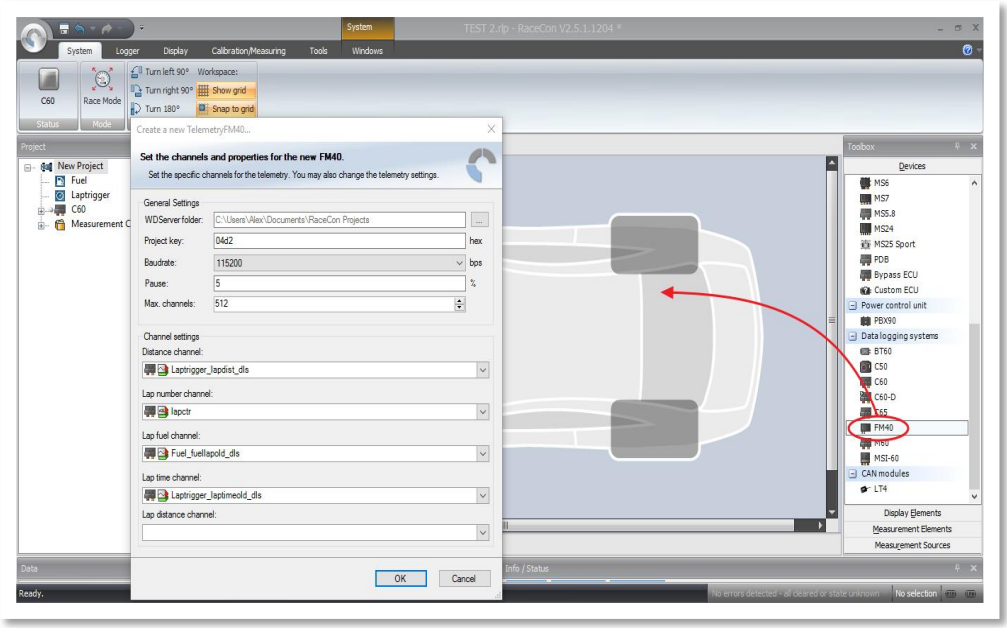
LED DAT (yellow)

The led flashes with a frequency in the amount of the received data quantity

LED SYS (blue)

It turns on during the system initialization

8 *RaceCon* Configuration



Drag icon FM40 inside the project.

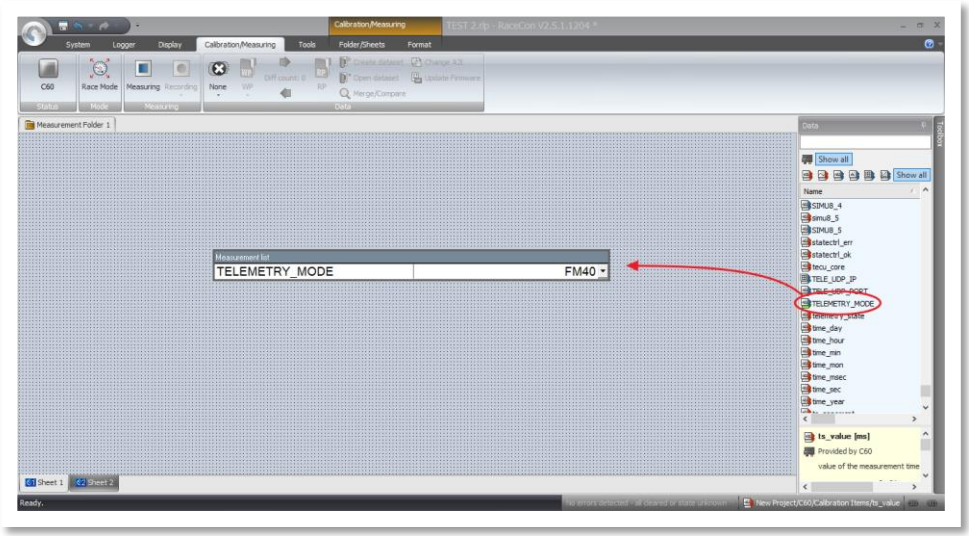
Set the parameters in the opening window:

WDServer folder: address in which DCP files generated by Racecon can be saved, put in the file directory the file where RaceCon files must be saved in (DCP files are necessary for WD server program in order to decode incoming messages).

Project key: the code which is combined to the DCP file name. Default value can be allowed.

Baudrate: data transmission speed in telemetry**. Set always up 115200 bps.**

On Calibration/Measuring menu, drag the *Value "Telemetry_Mode"* inside the document from the right-menu, then verify that it is set up on FM40.



8.1 Special Channels

The program requires some specific channels in FM40 configuration.

Through these channels it is possible to display, for example, the car running on the track, lap times and fuel consumption.

Channels list:

Distance channel: covered distance on lap in progress **"LAPTRIGGER_LAPDIST_DLS".**

Lap number channel: number of lap in progress "**LAPCTR".**

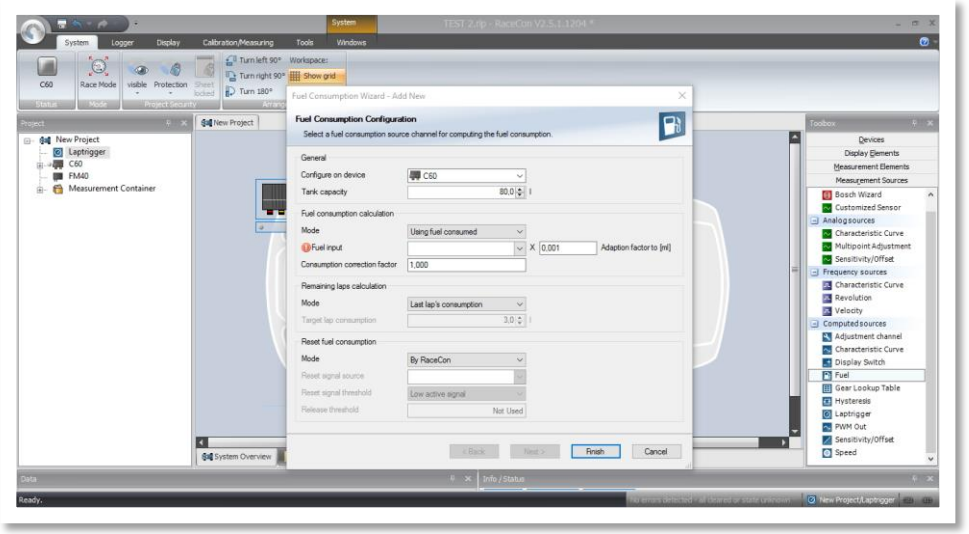
Lap fuel channel: last lap fuel consumption **"FUEL_FUELLAPOLD_DLS".**

Lap time channel: last lap time "**LAPTRIGGER_LAPTIMEOLD_DLS".**

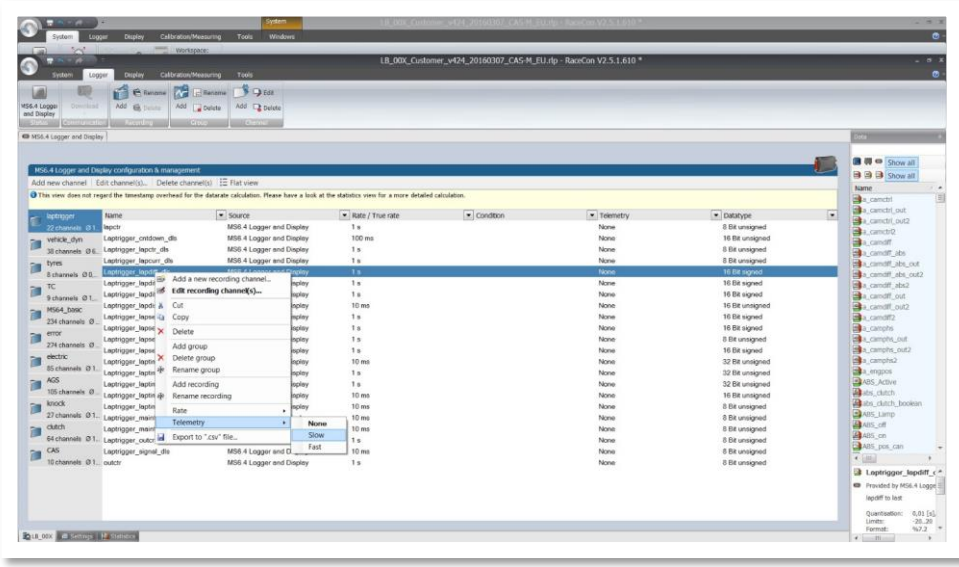
Lap distance channel: not necessary.

For some of these channels, e.g. *lap fuel channel,* it is necessary to add them on RaceCon configuration.

To do it, go on RaceCon main page, in the right-menu, in “measurement source” section and add the desired channel by dragging it in the centre of the page. (see image)



8.2 Channels in Telemetry



Enter inside the *Logger* menu where logged channels are filed in order to insert channels which must be sent to telemetry.

Channels leaved on NONE won't be sent in telemetry.

The frequency of the sent channels in telemetry must be spread over sent channels quantity and modality (FAST & SLOW MODE).

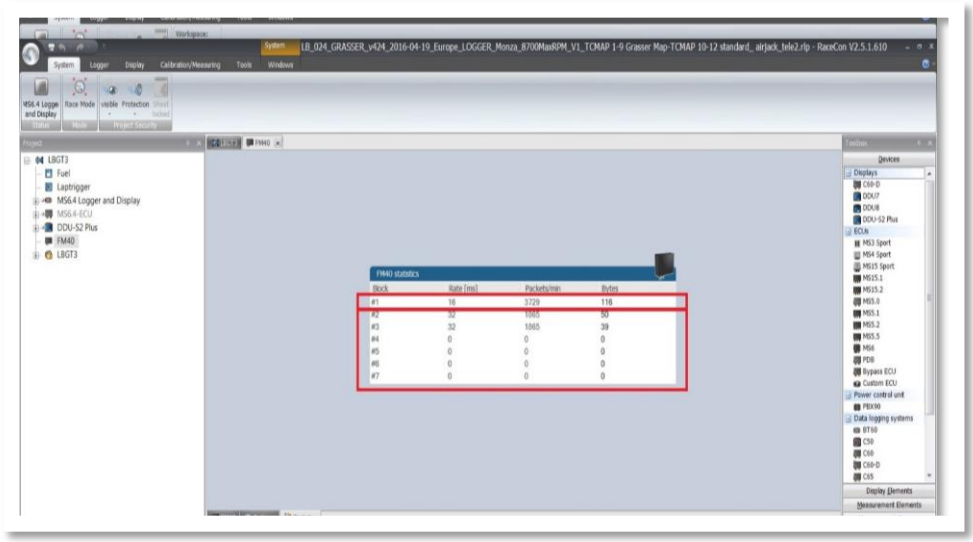
Channels are grouped into 8 blocks and are sent in this order:

FAST BLOCKS (blocks #1) This block is broadcasted at every cycle. Channels which require a high frequency reading (i.e. RPM, SPEED) must be inserted in this block, generally.

SLOW BLOCKS (blocks 2...8) One of these blocks is sent in sequential order at every cycle. Channels which require a low frequency reading (i.e. WATER, TEMP., TYRE TEMP) are sent in these SLOW blocks, generally.

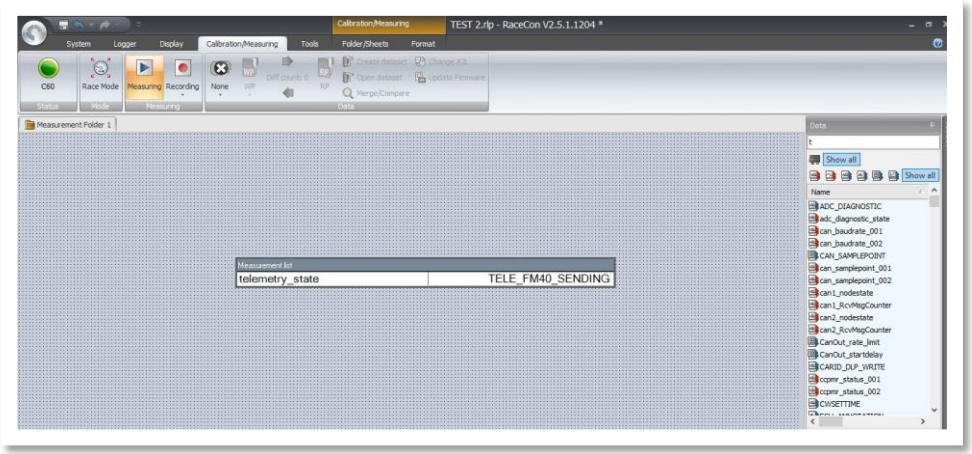
When the maximal number of channels is reached, an error is displayed in Racecon.

It is possible to see how many blocks are sent by clicking on FM40 and by entering in *Statistics*.

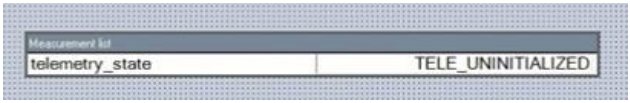


8.3 RaceCon Configuration Check

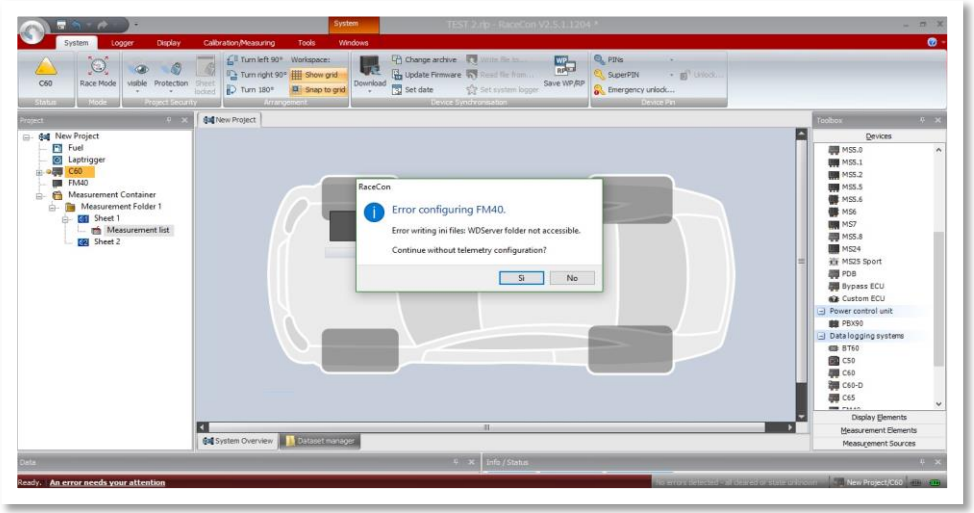
Enter inside Calibration/Measuring menu and drag inside the document the Telemetry state channel on the right-menu in order to check the right dispatch of the data from Logger to the telemetry module. If it has been configured correctly, “TELE_FM40_SENDING” message is displayed.



Otherwise “TELE_UNINITIALIZED” is displayed.



Attention: if a project is copied from a PC to another it is necessary to update the WDServer folder address. Otherwise this error will be displayed:



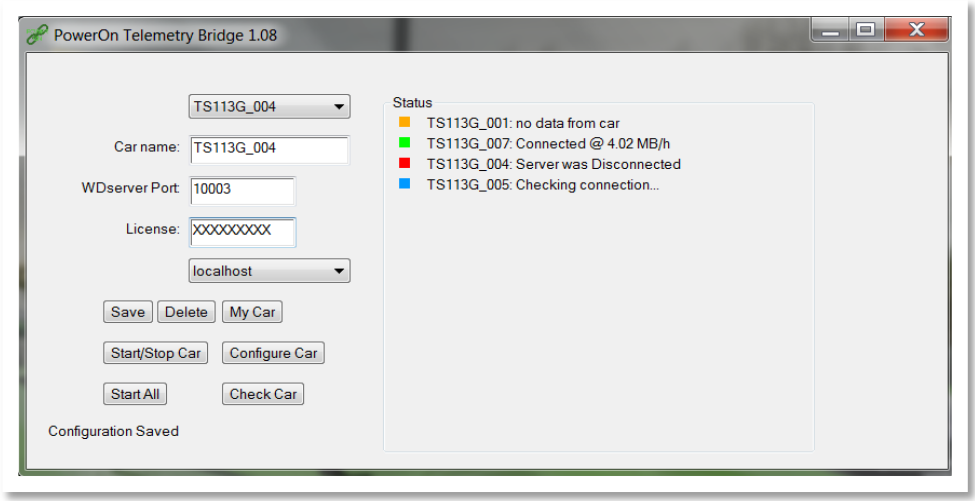
9 *PowerOnBridge* Configuration

Download the latest version of Power On Bridge

Install the Power On Bridge by following the instruction.

9.1 New Car

Create a new car with connected license and set up the transmission port with WD Server.



-*Car name*

-*WDserver port*: The inserted port, which can have any value from 10000 to 19999, must have different values from car to another.

This port must be the same of the set up WDserver-one for the corresponding car (from 10000 to 19999).

-*License*: The license code allows the connection to the Server. This license is supplied from PowerOn.

Set up the peripheral device on which received data must be broadcasted. For Bosch system set it up on *localhost.*

After having set up all parameters for the connection, the configuration can be saved and then displayed in the drop-down menu.

By opening the drop-down menu it is possible to add other cars and delete them with *Delete* button.

Press *Start/Stop Car* in order to open and close the communication with the Server, by closing the program all communications with Server get closed.

With *Start All* button it is possible to start at the same time all saved cars.

All saved cars are displayed on the right box, with their connection status (on their side)

Inside the status box it is possible to have small diagnostics with a 3 colours markers:

- Red the program is disconnected from the server.
- Orange the program is connected to the server but it doesn't receive any data in telemetry.
- Green the program is connected to the server and it receives data in telemetry. When there is a connection with the server the writing speed: XX,XX MB/h appears at the bottom and this allows to understand the traffic size which is used for the selected car.
- Blue it stands for a waiting status which happens when another pc is using the same license code. As soon as the first user gets disconnected, the second one gets connected automatically (*Checking connection…*).

For a complete list of errors see PowerOnBridge Error List

By clicking the button "minimize", the program will shift to the hidden taskbar.

9.2 Car Configure

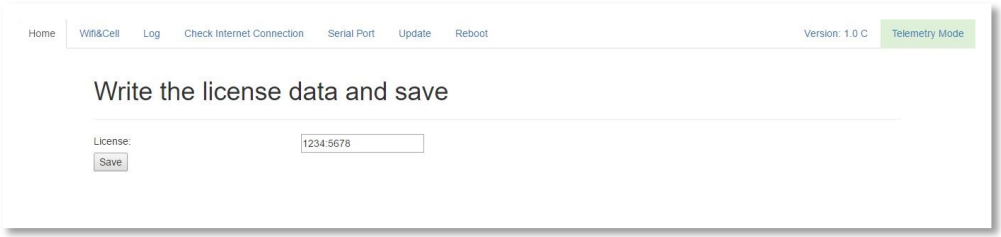
After having set up the program and having configured own vehicle, turn on the device and connect to its Wi-Fi network (TS124G_XX).

The default password for the device connection is the same of the Wi-Fi name (capital letters included)

By clicking the button *Configure Car* it is possible to enter to the configuration page.

If by clicking the button the web page does not open, you can enter your browser and type *10.10.0.25* in the address bar.

- *HOME:*



Insert the license key in this screen (default inserted)

- *WIFI&CELL:*

Mode: Here the telemetry module function mode can be chosen:

- Router Mode: Choosing this mode the module works as a Wi-Fi internet hotspot.
- Telemetry Mode: In this mode the module sends vehicle data to the server

APN: insert here the APN. It is necessary in order to connect the device to the network through the own providers (here must me used the same APN which would be used inserting the sim in a tablet).

In order to know the correct APN, it should be asked when buying the sim card. Or this can be found searching for it in the network. More APN will be found for each provider and if it is not clear which APN is the correct one, we advise to contact the provider. Once the correct APN has been inserted, on the telemetry module a green flashing led will turn on. Furthermore, on this page it is possible to set a new Wi-fi network name and a new password.

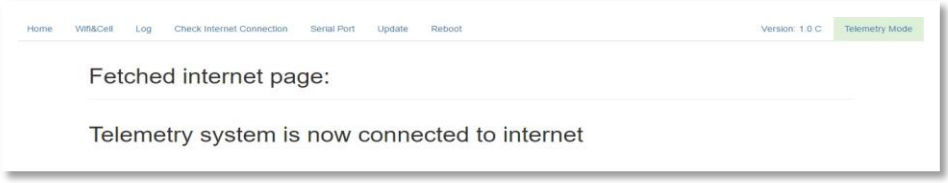
Press Save button and reboot the modem in the reserved page.

- *LOG:*

It is possible to download the device log file, which is the telemetry module file archive, by clicking on Log page.

If need be, the file can be sent to Power On in order to be analyzed.

- *CHECK INTERNET CONNECTION:*

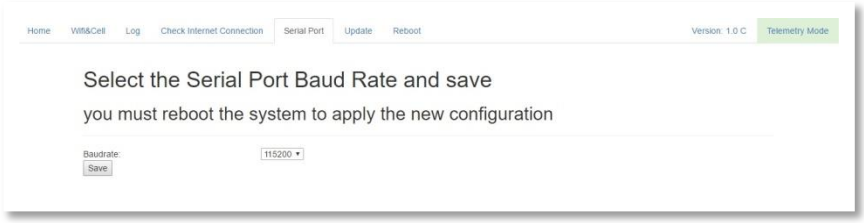


By clicking on ‘’Check Internet Connection’’, this screen will be displayed. In this page it is possible to verify if the device, after having set up the correct APN, is connected to the network.

- *UPDATE:*

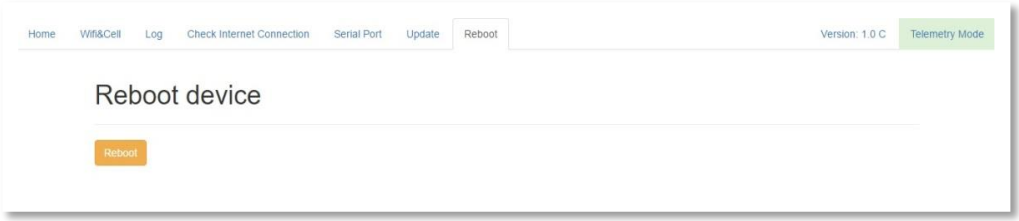
In this screen it is possible to update automatically the device with the last update version. (see Upgrading the module)

- *SERIAL PORT:*



Here the speed communication of serial port (RS-232) can be chosen.

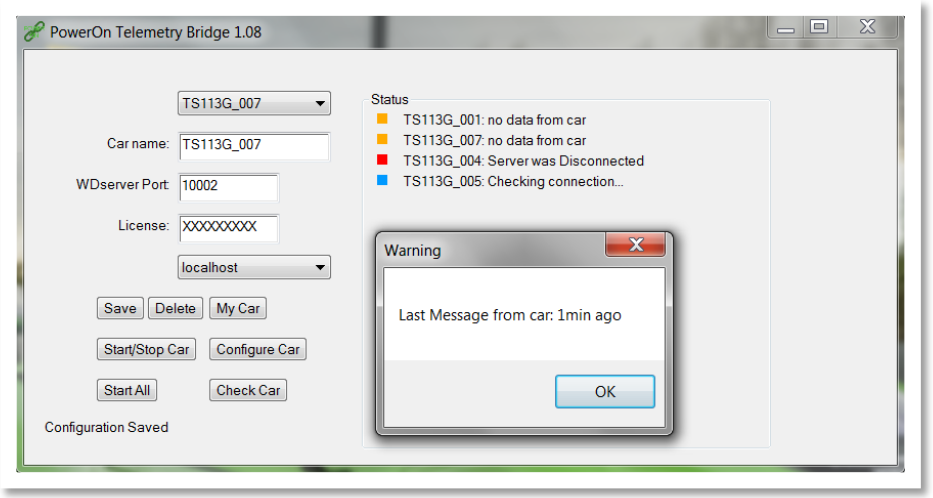
- *REBOOT:*



Here the module reboot can be started. The reboot is necessary in order to save modifications applied in the previous screens.

9.3 Car Check

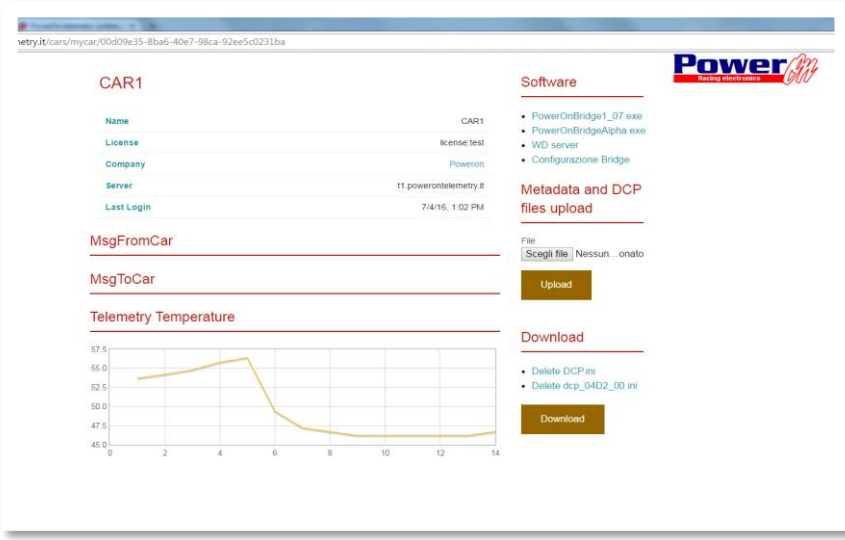
Once the communication with the Server has started, the last received message from the car can be displayed by clicking on *Check Car*.



Once pressed, the message ‘*”Last Message from car: Xmin ago”* appears.

9.4 My Car

In PowerOnBridge program, a new Internet page will be open by clicking on ‘’MyCar’’. Useful details and download will be found in this internet page, if the license code is the correct one.



As it is shown in the upper screenshot, here it is possible to upload and download the DCP files. These files are useful if transmitted data from an access which does not belong to the local network one must be visualized. In this case, a second license for PowerOnBridge is needed.

In order to reach this file sharing, this procedure shall be observed:

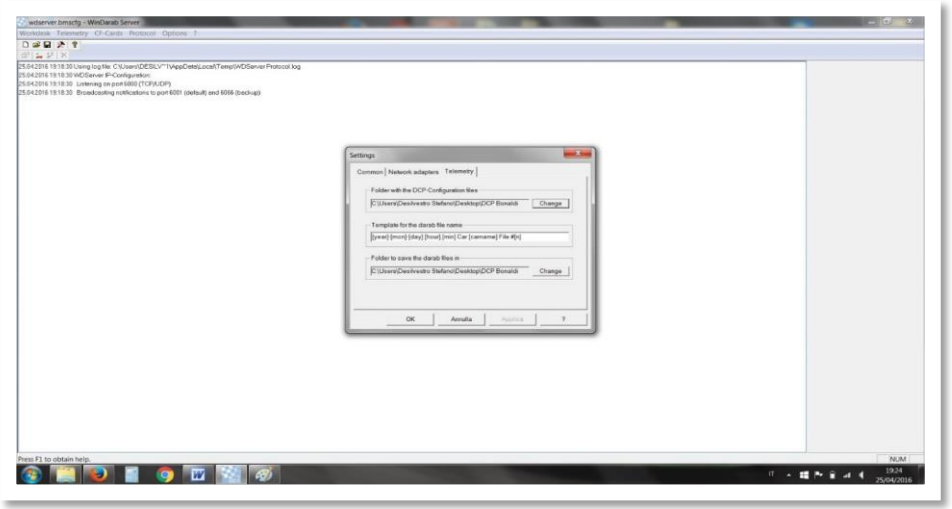
- Click on *Choose file* button.
- Select all DCP files and choose *Upload.*
- Click *Download* to download all files.

In My Car a temperature diagram of TS124G modem installed in the car can be displayed.

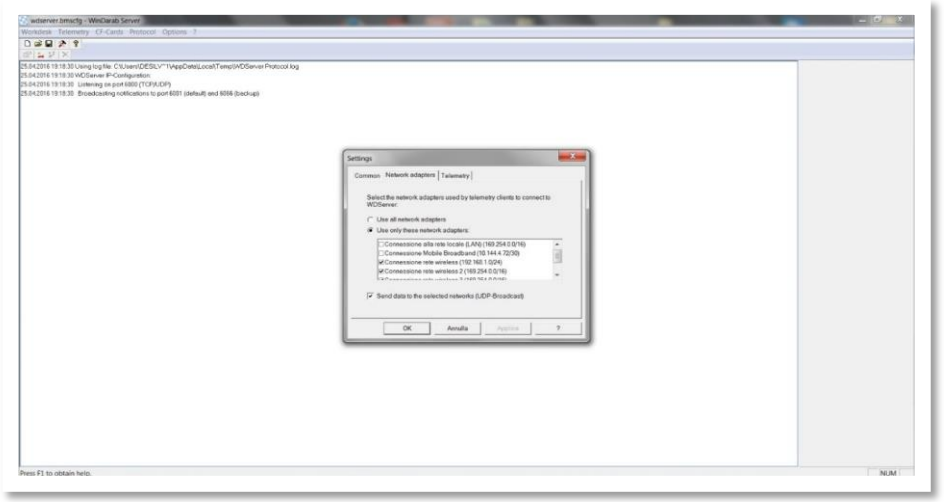
10 WD Server Configuration

Set up the WD Server Program

Open Wd Server and set with which network files will be shared with telemetry data in *Workdesk* > *Setting* > *NetworkAdapters*.



In *Telemetry* window, set in which folder files DCP created by RaceCon will be read.



Set the folder which contains the telemetry saved files, once the communication with the device in the car has finished.

10.1 Add New Cars

In the menu bar, click *Telemetry* and then *Add car.*

In *Car setting* enter the name of the car.

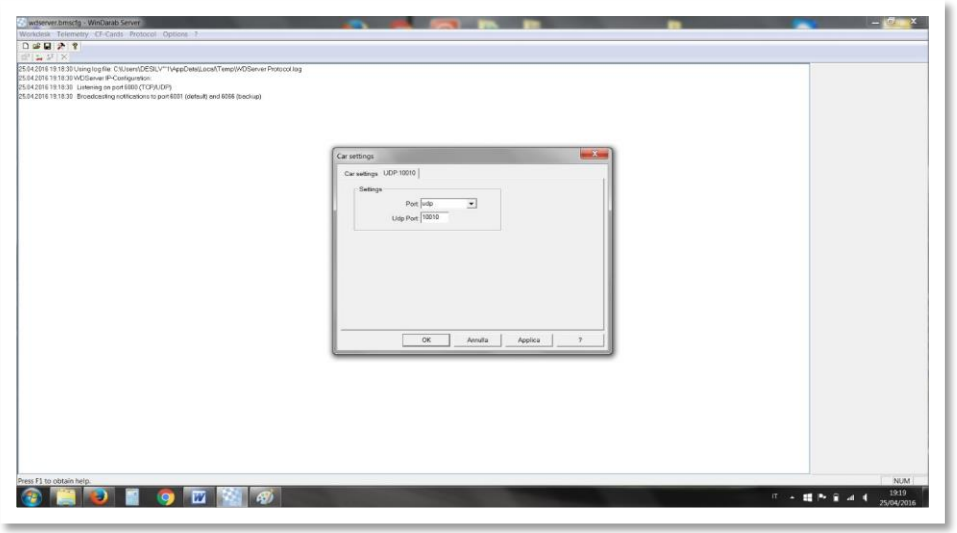
If more than one car with different DCP files is used, set the DCP files directory in the window which appears.

Click *New com.*

Write UDP in the COM Port visualization window.

Enter the UDP port number which is assigned into the Poweron Bridge.

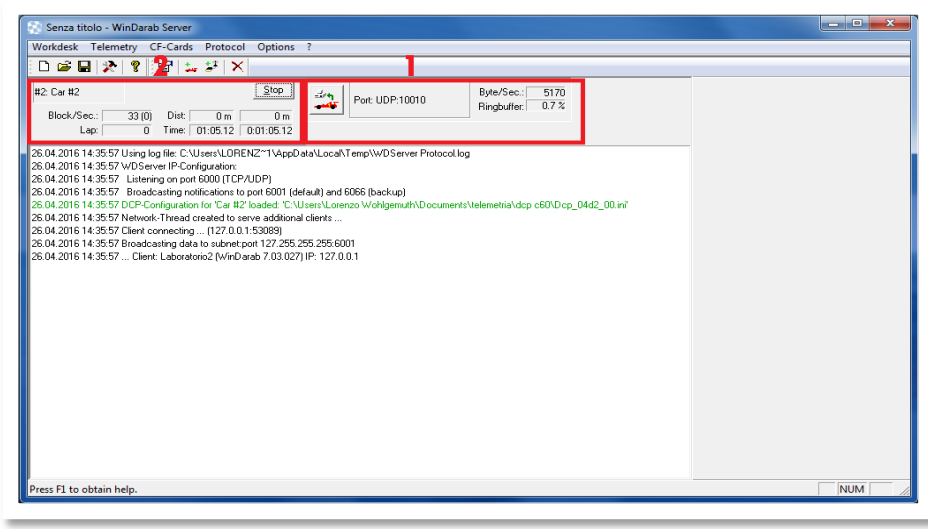
Click *Ok.*



10.3 Receiving Data

After started the program PowerOnBridge and established the server communication, the WD Server begins to receive data if the modem placed in the car transmits them.

The visualisation of the created car in WD Server is splitted into two parts:



Part 1:

In this section is possible to know if the program is receiving data.

Once the connection to the server is established, with the label *Byte/Sec,* data transmission of the device on the car is displayed.

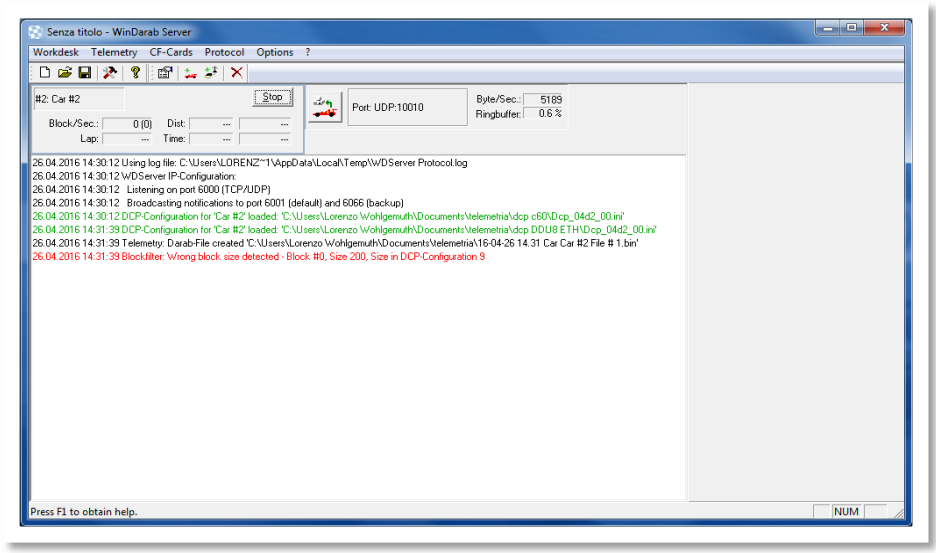
Part 2:

If the loaded DCP file is correct, WD server can recognize the data packs and consequently part 2 will be enabled.

Click *Block/Sec* to check if the program can decode the received data

If the loaded DCP file is not the correct-one the red message *“Wrong block size detected”* appears.

As shown in the screenshot, even if the DCP file is not correct , the program receives the data in part 1, but it isn’t able to decode them, consequently part 2 is neither activated nor displayed.



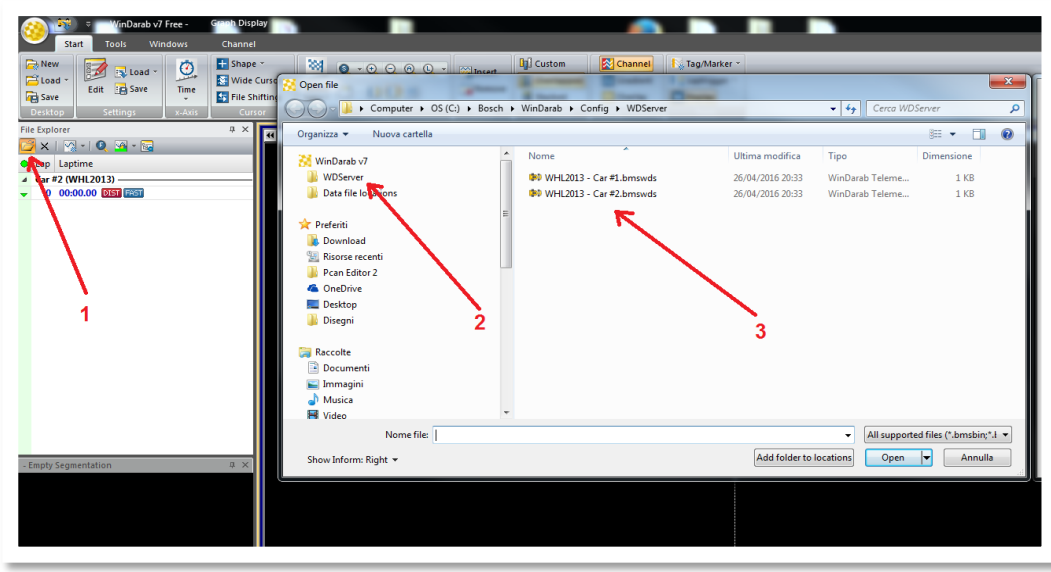
The log window shows the client connection through WinDarab.

11 WinDarab Configuration

Create a new file in *File Explorer*.

Enter *Bosch>Windarab>Config>WDServer* folder.

If WDServer is open, a temporary file with real time received data is created. (*.bmswds).



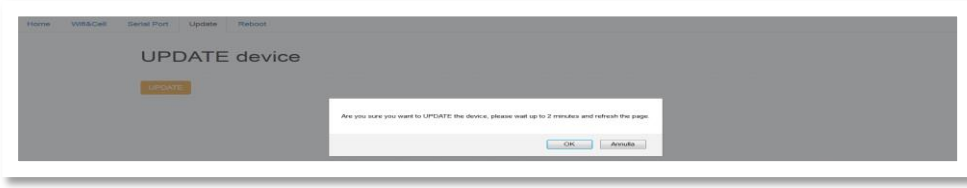
12 Module Update

In the device configuration page, the TS124G can be upgraded automatically by clicking on Configure Car button in PowerOnBridge.

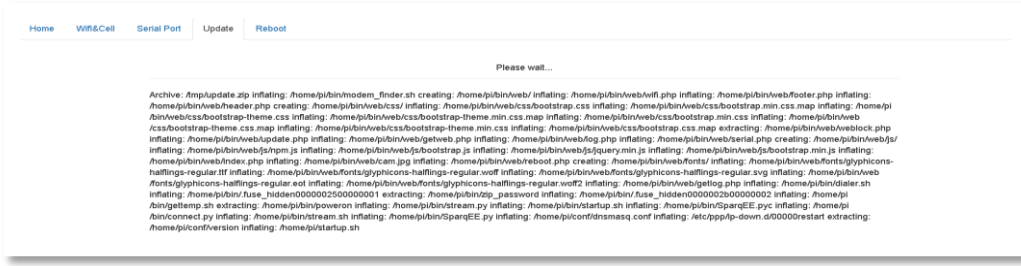
Be sure that the module is correctly connected to Internet.

- Connect to the Wi-fi module network and enter the configuration page.

-Enter the *Update* page. Click on UPDATE button and then press OK.



If the update run out successfully, some signs corresponding to the downloaded packets during the update will be displayed.



Wait a minute and then refresh the page.

13 Utility

- Before insert in the Sim card inside the modem, be sure that the pin code has already be disabled.

- If the Internet connection in the box is not permanent, PowerOnBrige program could lose the connection to the server. Click on Start/Stop Car button in order to restart the connection to the server.

-Be sure of a permanent Internet connection in the box.

It happens very often that using the free racetrack Wi-Fi during the first trial competition days, the system works correctly but later, during the race competition, the system could have a precarious connection. This happens because more people will be connecting to the same wi-fi network.

Recommended is a second Sim card which can be insert in a smartphone, tablet or modem in order to create an hotspot network which can guarantee a more permanent internet connection.

If in WDServer the communication with the car has stopped and it won't be activated, click on Start/Stop Car button.

14 Optional Upgrade

Upgrade1

An optional upgrade can be bought if telemetry on more than one not connected pc is required.

Thanks to this upgrade, the configuration and visualization telemetry software can be used on three different pcs at the same time.

Two new license codes to be used in different places will be given.

15 PowerOnBridge Error List

15.1 Section “Status” Errors

Error Message	Description	Possible Solution
Checking connection...	Server connection in progress	/
Could not get license information	Error during the connection to the license server	Check internet connection
Car already connected	Car is already connected to and running in the same PowerOn Bridge	Remove one of the two identical cars
Error checking license	License error	Check if the added license is the right one
Server was Disconnected	PowerOn Bridge was disconnected from the server because of user's request or because of an error	Check the internet connection
Server Disconnected	PowerOn Bridge is not connected to the server	Switch on the chosen vehicles
Waiting for server become ready	Waiting for streaming server availability, the wait continues until other bridge take up the connection	Check if the same car is running on another PowerOn Bridge (check also if another PowerOn Bridge is on)

Server Unreachable	The streaming server is unreachable, there is no connection	Check the internet connection and firewall settings regarding the tcp traffic from port 10000 to 50000 reception
Authentication	Authentication on the streaming server	/
ERROR in UDP Socket Creation	Error in the UDP socket creation for the local wd server	Check if other programs are broadcasting on the same PowerOn Bridge port and check if the right value was added (between 1000 and 65000)
Connected @	PowerOn Bridge is connected to the server and receives data at the specified speed	/
no data from car	PowerOn Bridge is connected to the server but the telemetry is not sending any data	Check the license and the right APN in the telemetry
Authentication Error, check username and password	Error during the license authentication on the server streaming	Check if the computer firewall interrupts the connection

15.2 “Check Car” Screen Errors

Error Message	Description	Possible Solution
Could not get information	Error during the license server connection	Check internet connection
Last Message from car…	Last telemetry connection to the PowerOn bridge is shown	/
Error communicating with server, check connection and license information	Error during the license authentication (not valid or license server error)	Check if the added license is the right one
Error communicating with server, check connection	No connection to the license server	Check internet connection

15.3 “Popup” Errors

Error Message	Description	Possible Solution
Couldn't open config file	Configuration file not existing or missing reading authorisation	Check that the "client.conf" file is in the PowerOn Bridge installation folder (Default "C:\Program Files (x86)\PowerOnBridge") and check the reading/writing authorisation existence in the folder
Configuration Saved	The selected car configuration was saved accurately	/
Error retrieving car details or license information's	"My Car" page cannot be opened on the license server	Check the internet connection and check that the license is the right one.

NOTE

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