

Connecting Tyre Temperature Sensors to VBOX Video HD2

Introduction

The [RLACS272](#) tyre temperature sensors have been specifically designed for use with [VBOX Video HD2](#) to measure the highly transient surface temperature of a tyre, providing invaluable information for chassis tuning and driver development. They are available in two field of view options: 60° and 120°, and each sensor can measure up to 16 temperature points on an object, with surface temperatures ranging from -20 to +300°C.

Using [VBOX Video Setup Software](#), the infrared channels can be assigned to [Heat Block](#) elements to represent live tyre temperatures.





The user must survey each tyre to ensure the selected infrared beams are focused on appropriate spots across the tyre surface. Both shoulders of the tyre and 2 additional spots in between should be referenced to ensure full coverage, as shown by the green dots in the image below.





For further information, the IR Tyre Temperature Monitoring System datasheet is available on the [VBOX Motorsport](https://www.vboxmotorsport.com) website.

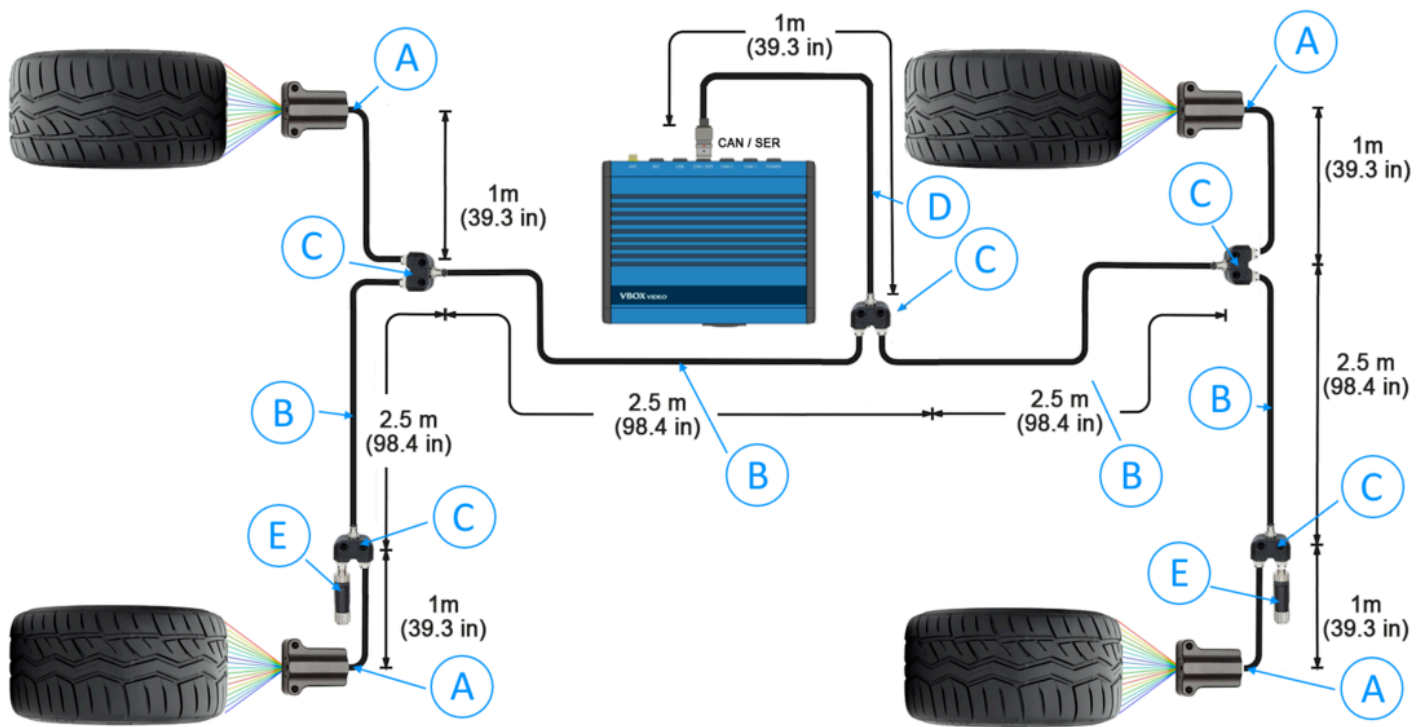
Survey Procedure

Step 1 - Hardware Install

Install the infrared temperature sensors and wiring loom on to your vehicle, making sure the sensors are positioned directly opposite and central to each tyre surface.

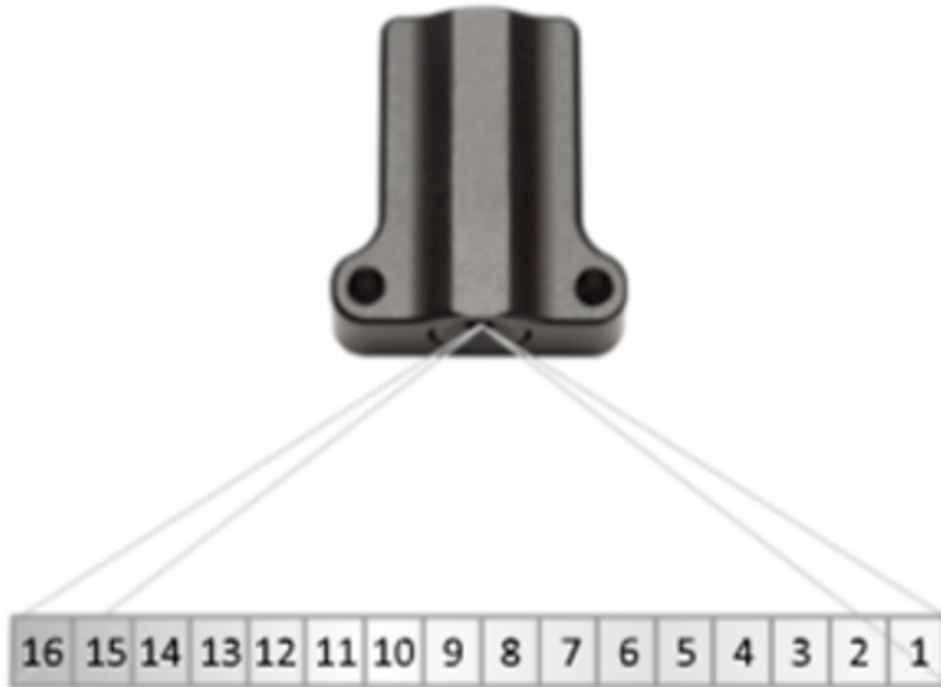
Two 3.2 mm holes are available on either side of each sensor for securely mounting them to the chassis. Alternatively, 3M Dual Lock can be used, however it is advisable to tether them to the chassis as well.





Be aware of the order in which the infrared beams are arranged when mounting the sensors, shown in the image below (Note the orientation of the sensor in the diagram). This is important when selecting which infrared channels to use from the inside shoulder of the tyre to the outside shoulder of the tyre.





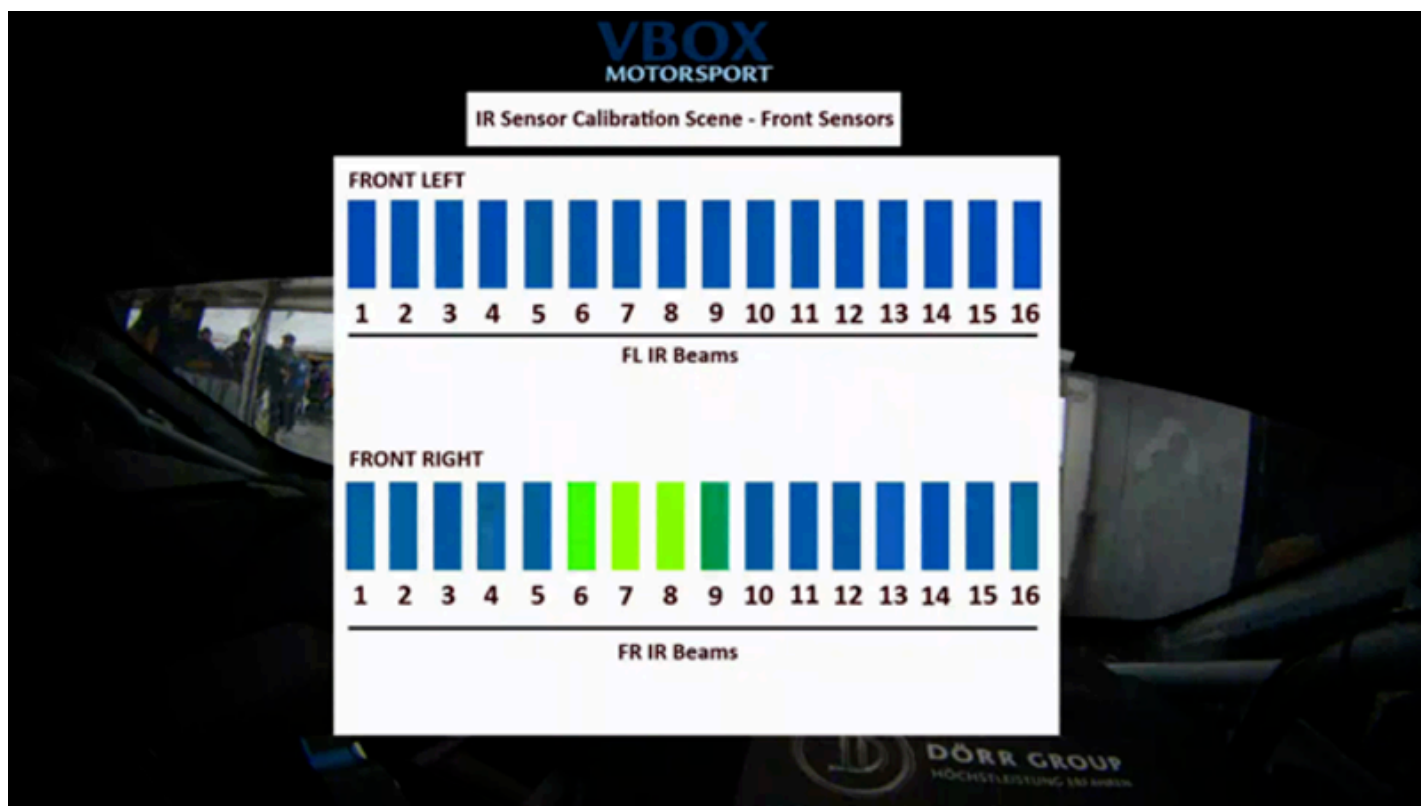
After the installation is complete, ensure to plug the Lemo connector from the infrared Tyre Temperature Monitoring loom in to the '**CAN / SER**' socket on the back of the VBOX Video HD2.

Step 2 - Calibration Scenes

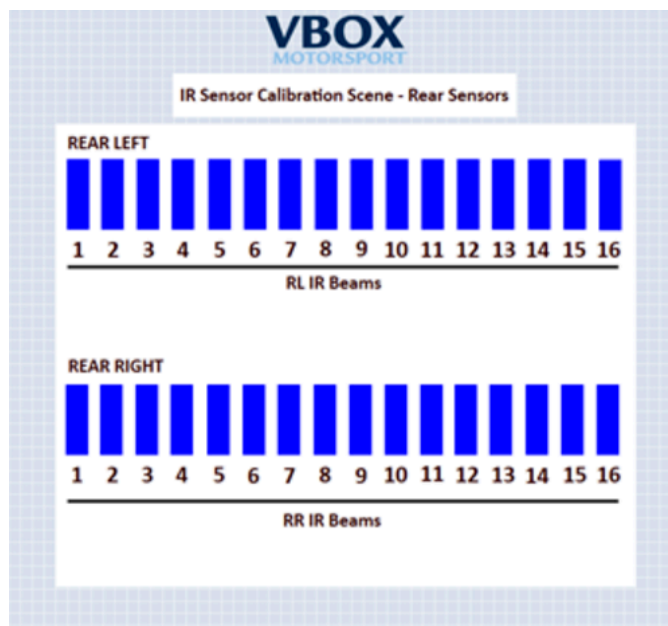
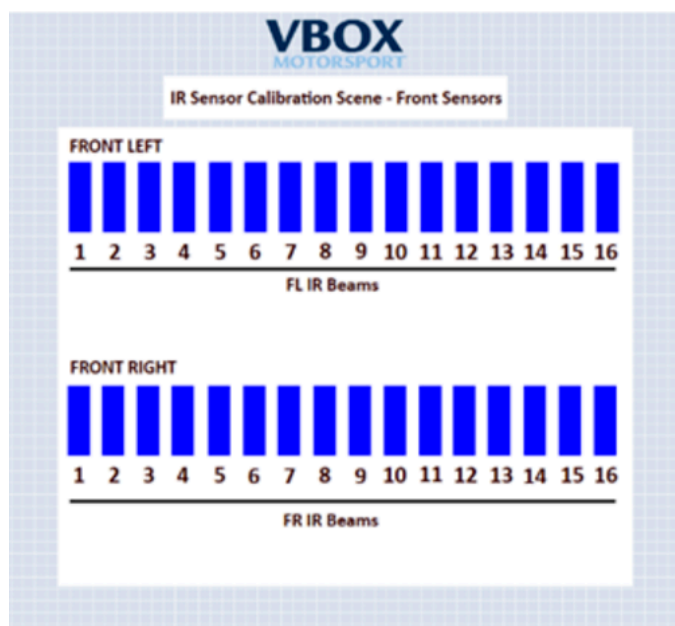
Calibration scene files are required to identify which infrared channels to use over the surface of a tyre in order to guarantee full coverage.

When a hot object is passed in front of the sensors, the [VBOX HD2 Heat Block Elements](#) associated with the infrared channels will react by changing colour. This can be seen in the screen shot below – infrared channels 6, 7, 8 and 9 from the Front Right sensor are detecting heat from the hot object positioned in front of the sensor.





The Calibration scene files can be found on our [VBOX Motorsport](https://vboxmotorsport.com) website. There is one for the front sensors and another for the rear sensors. Please install one of these calibration scenes on to the VBOX Video HD2 and proceed to [Step 3](#).



https://racelogic.support/02VBOX_Motorsport/Video_Data_Loggers/VBOX_Video_HD2/

Step 3 - Infrared Channel Referencing

A hot object is required to trigger the infrared channels. In this case we have used a heat gun to apply temperature to piece of aluminium.



Use the [HD2 Video Preview](#) feature, either on a mobile device or a laptop, and then move the hot object in front of a sensor at chosen spots on across the tyre surface. The Heat Block elements in the calibration scene will react as you move the hot object in front of each sensor.

Note: The video preview has a 1 or 2 second delay.



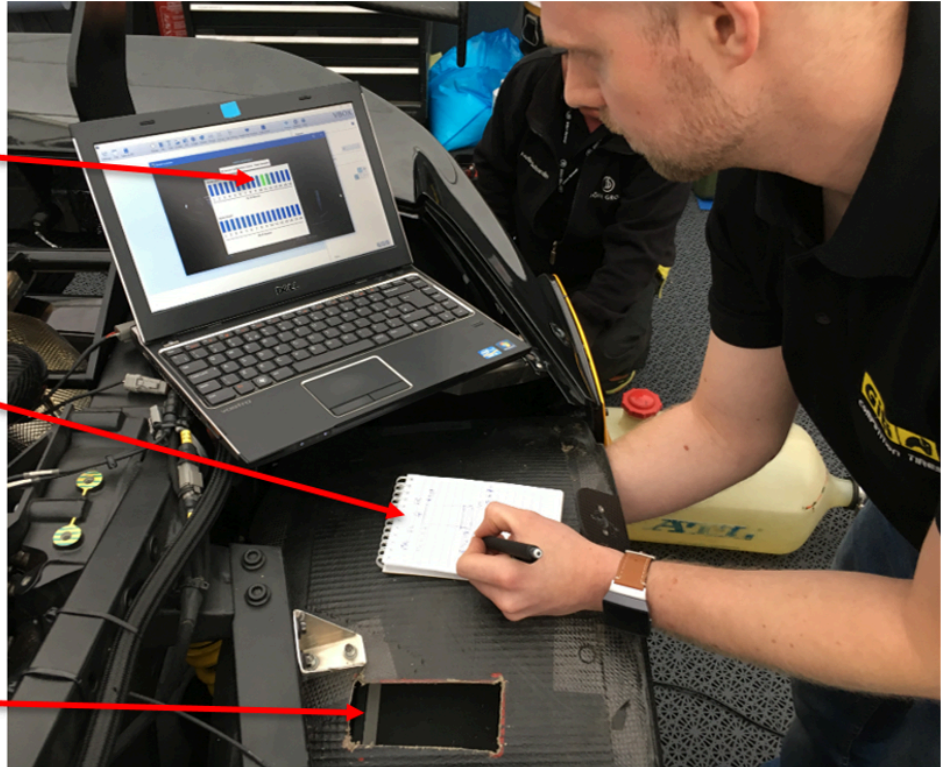
Survey 4 relevant infrared channel numbers across the tyre surface, and then repeat the process for each sensor.

Note: Only 2 sensors can be calibrated at one time using the HD2 video preview, please install the 2nd calibration scene to complete the process for the 2 remaining sensors.

Infrared channel reference viewed in the Calibration Scene, via the HD2 video preview.

Noting the number of the reacting infrared channel.

Moving the hot object across the tyre surface.



Step 4 - Scene Configuration

Install '**RL_TyreTemp_Monitoring**' on to the VBOX Video HD2. This scene configuration file is available to download from the [VBOX Motorsport](https://www.racelogic.co.uk/vbox-motorsport/) website.

The scene has been configured to work straight away after installing the sensors and loom. However, the pre-selected infrared channels may not cover the entire tyre surface due to variables such as, tyre width, and the standoff distance between the sensor and the tyre surface.

To change the pre-selected infrared channels to the ones noted down during [Step 3](#), follow the steps below:

1. Open the [VBOX Video Setup Software](#), click '**Settings**' from the top left corner of the screen, then select '**CAN**'.
2. Select '**Vehicle Database**' from the Source drop down menu. Select '**Racelogic**' from the first drop down menu, and then '**Tyre Temperature Sensors**' from the second drop down menu.



VBOX Video

Settings File Save to SD Gauge Bar Text Image PiP G-Ball Shape Range Group Lap Timing Heart rate Heat block Options Help

Select channels to log

Source: Vehicle database

Vehicle / ECU details: Racelogic

Tyre Temperature Sensors

Tick channels to log

Log	Channel
<input checked="" type="checkbox"/>	Tyre Temperature FL 01
<input checked="" type="checkbox"/>	Tyre Temperature FL 02
<input checked="" type="checkbox"/>	Tyre Temperature FL 03
<input checked="" type="checkbox"/>	Tyre Temperature FL 04
<input checked="" type="checkbox"/>	Tyre Temperature FL 05
<input checked="" type="checkbox"/>	Tyre Temperature FL 06
<input checked="" type="checkbox"/>	Tyre Temperature FL 07
<input checked="" type="checkbox"/>	Tyre Temperature FL 08
<input checked="" type="checkbox"/>	Tyre Temperature FL 09
<input checked="" type="checkbox"/>	Tyre Temperature FL 10
<input checked="" type="checkbox"/>	Tyre Temperature FL 11
<input checked="" type="checkbox"/>	Tyre Temperature FL 12
<input checked="" type="checkbox"/>	Tyre Temperature FL 13
<input checked="" type="checkbox"/>	Tyre Temperature FL 14
<input checked="" type="checkbox"/>	Tyre Temperature FL 15
<input checked="" type="checkbox"/>	Tyre Temperature FL 16
<input checked="" type="checkbox"/>	Tyre Temperature FR 01
<input checked="" type="checkbox"/>	Tyre Temperature FR 02
<input checked="" type="checkbox"/>	Tyre Temperature FR 03
<input checked="" type="checkbox"/>	Tyre Temperature FR 04
<input checked="" type="checkbox"/>	Tyre Temperature FR 05
<input checked="" type="checkbox"/>	Tyre Temperature FR 06
<input checked="" type="checkbox"/>	Tyre Temperature FR 07
<input checked="" type="checkbox"/>	Tyre Temperature FR 08
<input checked="" type="checkbox"/>	Tyre Temperature FR 09

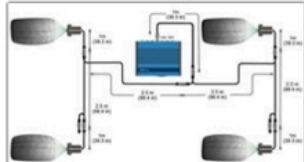
CAN Inputs - 16 remaining

Export Clear all

Racelogic->Tyre Temperature SensorsTyre Temperature FL 01	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 02	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 03	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 04	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 05	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 06	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 07	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 08	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 09	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 10	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 11	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 12	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 13	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 14	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 15	X
Racelogic->Tyre Temperature SensorsTyre Temperature FL 16	X
Racelogic->Tyre Temperature SensorsTyre Temperature FR 01	X
Racelogic->Tyre Temperature SensorsTyre Temperature FR 02	X
Racelogic->Tyre Temperature SensorsTyre Temperature FR 03	X
Racelogic->Tyre Temperature SensorsTyre Temperature FR 04	X

CAN connection information: Racelogic Tyre Temperature Sensors

In order to connect to the Tyre Temperature sensors the RLACS272 should be plugged into the CAN / SER socket. Note this product operates at 1Mbit/s. Further information can be found on our support centre, including the calibration [here](#). Please ensure 'Send acknowledge' is ticked in CAN bus settings. Please ensure 'Terminated' is ticked in CAN bus settings.



Alternatively, download the IR Temperature Sensors CAN file from [here](#), and then load it in to the HD2 setup software by selecting '**User configurable**' from the Source drop down menu, and clicking '**Load database**'.

- Click the '**Clear all**' button to remove the pre-selected infrared CAN Channels.
- Select the 4 infrared channels per sensor noted down during [Step 3](#) from the list of available CAN messages in the '**Tick channels to log**' section.



Select 'CAN' from the settings menu.

Click the, 'Clear all' button to remove the pre-selected infrared channels.

The screenshot shows the VBOX Video software interface. The 'Settings' menu is open, and 'CAN' is selected. The 'CAN Inputs' window shows 16 remaining inputs, with a 'Clear all' button highlighted. The 'Tick channels to log' window shows a list of infrared channels, with 'FL_IR_Beam_3' through 'FR_IR_Beam_14' selected. A red arrow points to the 'Clear all' button, and another red arrow points to the selected channels in the 'Tick channels to log' window.

CAN Inputs - 16 remaining

Export Clear all

IR SENSORS FULLREF	FL_IR_Beam_5	X	IR SENSORS FULLREF	FL_IR_Beam_7	X
IR SENSORS FULLREF	FL_IR_Beam_10	X	IR SENSORS FULLREF	FL_IR_Beam_12	X
IR SENSORS FULLREF	FR_IR_Beam_5	X	IR SENSORS FULLREF	FR_IR_Beam_7	X
IR SENSORS FULLREF	FR_IR_Beam_10	X	IR SENSORS FULLREF	FR_IR_Beam_12	X
IR SENSORS FULLREF	RL_IR_Beam_5	X	IR SENSORS FULLREF	RL_IR_Beam_7	X
IR SENSORS FULLREF	RL_IR_Beam_10	X	IR SENSORS FULLREF	RL_IR_Beam_12	X
IR SENSORS FULLREF	RR_IR_Beam_5	X	IR SENSORS FULLREF	RR_IR_Beam_7	X
IR SENSORS FULLREF	RR_IR_Beam_10	X	IR SENSORS FULLREF	RR_IR_Beam_12	X

Tick channels to log

Begin typing to search database

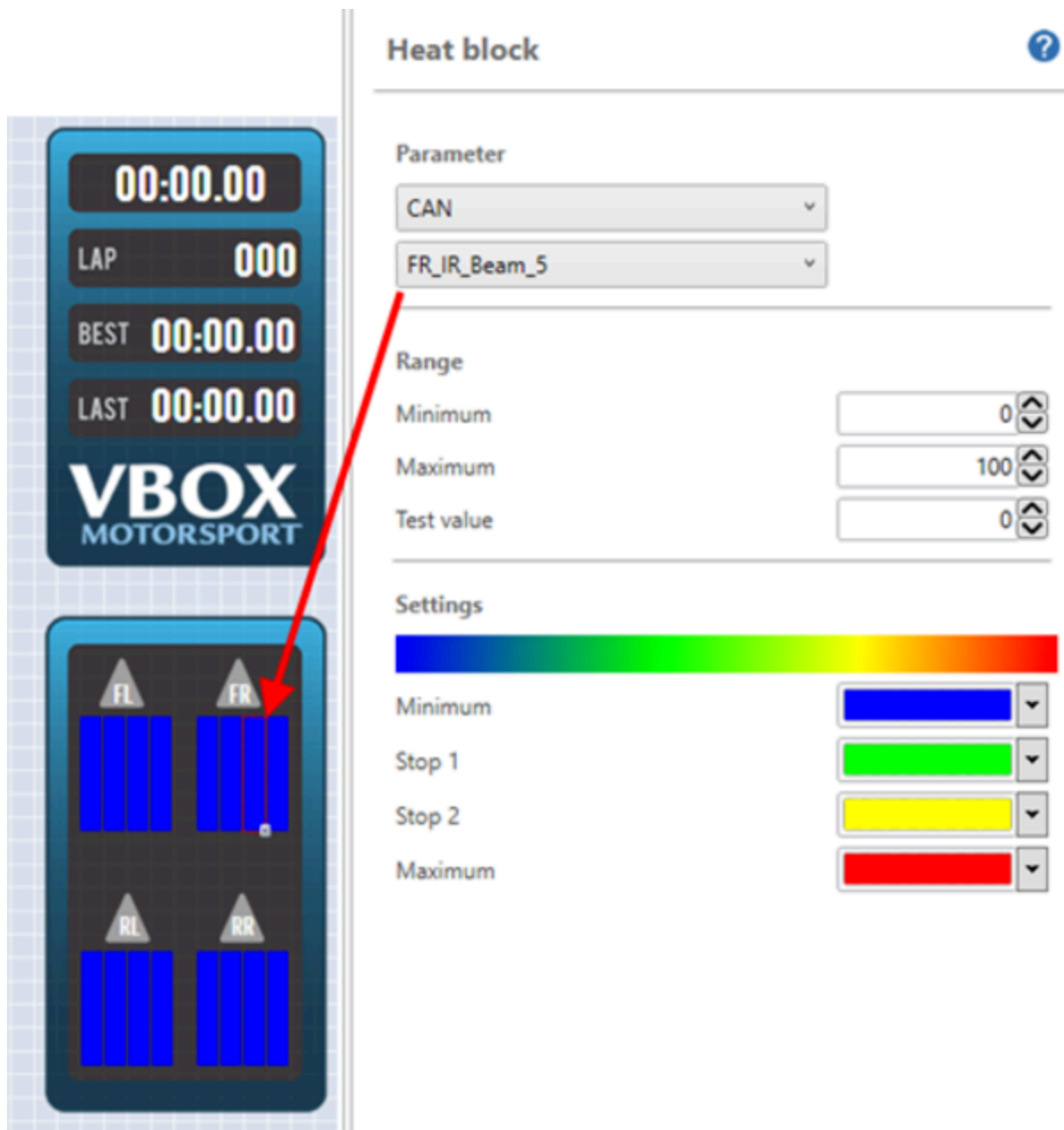
☐ Log Channel

<input type="checkbox"/>	FL_IR_Beam_3
<input checked="" type="checkbox"/>	FL_IR_Beam_4
<input checked="" type="checkbox"/>	FL_IR_Beam_5
<input checked="" type="checkbox"/>	FL_IR_Beam_6
<input checked="" type="checkbox"/>	FL_IR_Beam_7
<input checked="" type="checkbox"/>	FL_IR_Beam_8
<input checked="" type="checkbox"/>	FL_IR_Beam_9
<input checked="" type="checkbox"/>	FL_IR_Beam_10
<input checked="" type="checkbox"/>	FL_IR_Beam_11
<input checked="" type="checkbox"/>	FL_IR_Beam_12
<input checked="" type="checkbox"/>	FL_IR_Beam_13
<input checked="" type="checkbox"/>	FL_IR_Beam_14
<input checked="" type="checkbox"/>	FL_IR_Beam_15
<input checked="" type="checkbox"/>	FR_IR_Beam_1
<input checked="" type="checkbox"/>	FR_IR_Beam_2
<input checked="" type="checkbox"/>	FR_IR_Beam_3
<input checked="" type="checkbox"/>	FR_IR_Beam_4
<input checked="" type="checkbox"/>	FR_IR_Beam_5
<input checked="" type="checkbox"/>	FR_IR_Beam_6
<input checked="" type="checkbox"/>	FR_IR_Beam_7
<input checked="" type="checkbox"/>	FR_IR_Beam_8
<input checked="" type="checkbox"/>	FR_IR_Beam_9
<input checked="" type="checkbox"/>	FR_IR_Beam_10
<input checked="" type="checkbox"/>	FR_IR_Beam_11
<input checked="" type="checkbox"/>	FR_IR_Beam_12
<input checked="" type="checkbox"/>	FR_IR_Beam_13
<input checked="" type="checkbox"/>	FR_IR_Beam_14
<input checked="" type="checkbox"/>	FR_IR_Beam_15

Select the infrared channels, noted down during step 3.

5. Assign the new infrared channels to the corresponding Heat Block elements in the scene configuration. Select 'CAN' from the Parameter section, then select the applicable infrared channels from the drop down below.





The Heat Block colours can be changed depending on user preference, as well as the maximum and minimum temperature range.

Note: If changes to the temperature ranges or colour are required, these changes will have to be applied to all Heat Block elements to ensure they all react in the same way.

After the new infrared channels have been assigned to each Heat Block, [save](#) your scene configuration to the HD2 Setup Software, and then install it on to VBOX Video HD2 via the SD card.



Step 5 - Double Check!

After updating the infrared channels in the scene configuration, it is very important to double check each sensor is operating correctly via the [HD2 Video Preview](#) feature. Please make sure each heat block element is reacting by moving something hot in front of the sensor at the previously referenced spots on the tyre surface. If calibrated correctly, all 4 heat block elements should change colour at each referenced spot.

If there are any problems, please contact support@racelogic.co.uk.

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