User Manual

LCU1S/LCU2 Open

Release 1.00

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1 – Introduction

LCU1S/LCU2 Open are the new small, light and fast AiM Lambda Controller open expansions that can be connected to non AiM CAN network. They are of course supported by AiM devices too. **Please note**: the only AiM systems that does not support LCU1S/LCU2 Open are MXL, MXL2 and MyChron.

LCU1S/LCU2 Open allow you to perfectly tune the carburation of the engine as well as to improve the engine performances.

Both expansions use a Bosch LSU4.9 probe that saves the original calibration for the duration of the sensor life and lasts for more that 100.000 km on a stock car.

2 – Available kits, optionals and spare parts

Available LCU1S Open kits are:

LCU1S Open complete kit; part number: **X08LCU1SAC090**
- LCU1S Open
- Bosch LSU 4.9 Lambda probe
- Thread iron ring for installation

LCU1S Open kit without Lambda probe; part number: **X08LCU1SAC0**
- LCU1S Open

Available LCU2 open kit are:

LCU2 Open complete kit; part number: **X08LCU2AC090**
- LCU2 Open
- Bosch LSU 4.9 Lambda probe
- 2 Thread iron rings for installation

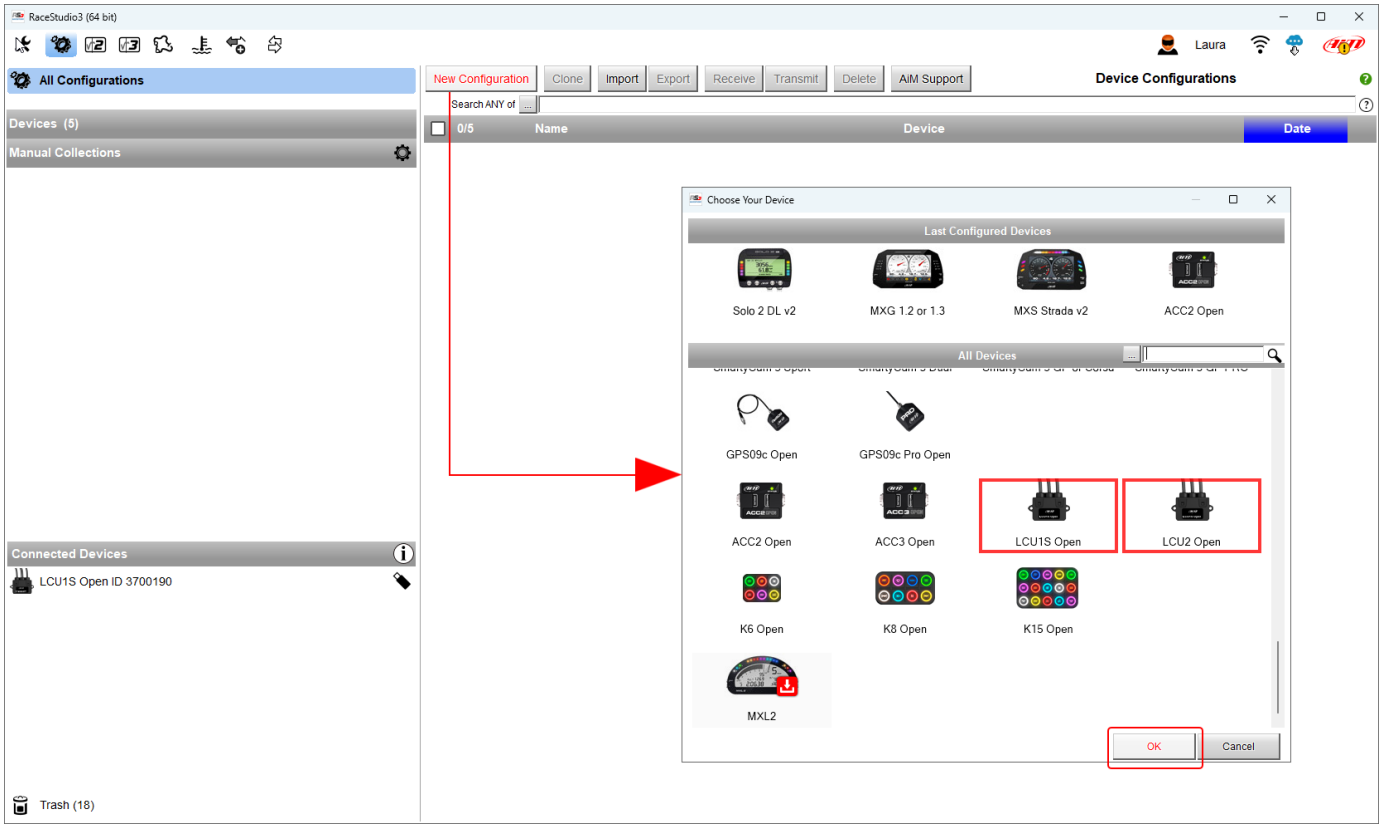
LCU2 Open kit without Lambda probe; part number: **X08LCU2AC0**
- LCU2 Open

Optional and spare parts:
- Bosch LSU 4.9 Lambda probe **X05LSU490**
- Thread iron ring for installation **LBS552680**
- 50cm AiM CAN cable **V02552690**
- 100cm AiM CAN cable **V02552700**
- 200cm AiM CAN cable **V02552720**
- 400cm AiM CAN cable **V02551070**

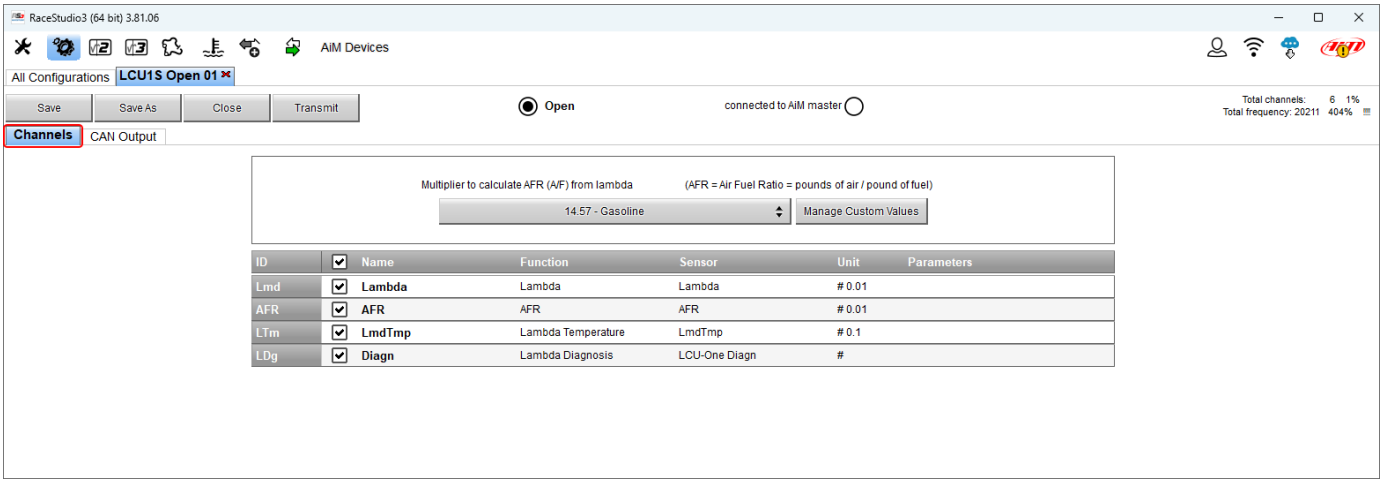
3 – Configuring LCU1S/LCU2 Open channels

LCU1S/LCU2 Open can only be configured using AiM RaceStudio 3 software you can freely download from AiM website at www.aim-sportline.com download software/firmware area.
With LCU1S/LCU2 Open powered and connected to the PC, run the software and create a new configuration. If, on the contrary, you want to use it as slave connected to an AiM device select the configuration to load it on and use it as LCU1S/LCU2 non open version (in this case we would suggest you to refer to LCU1S/LCUS user manual for further information). **To create a new configuration**:

- Press “New Configuration”
- Scroll the menu in the panel that is prompted and select LCU1S/LCU2 Open
- Press “OK”



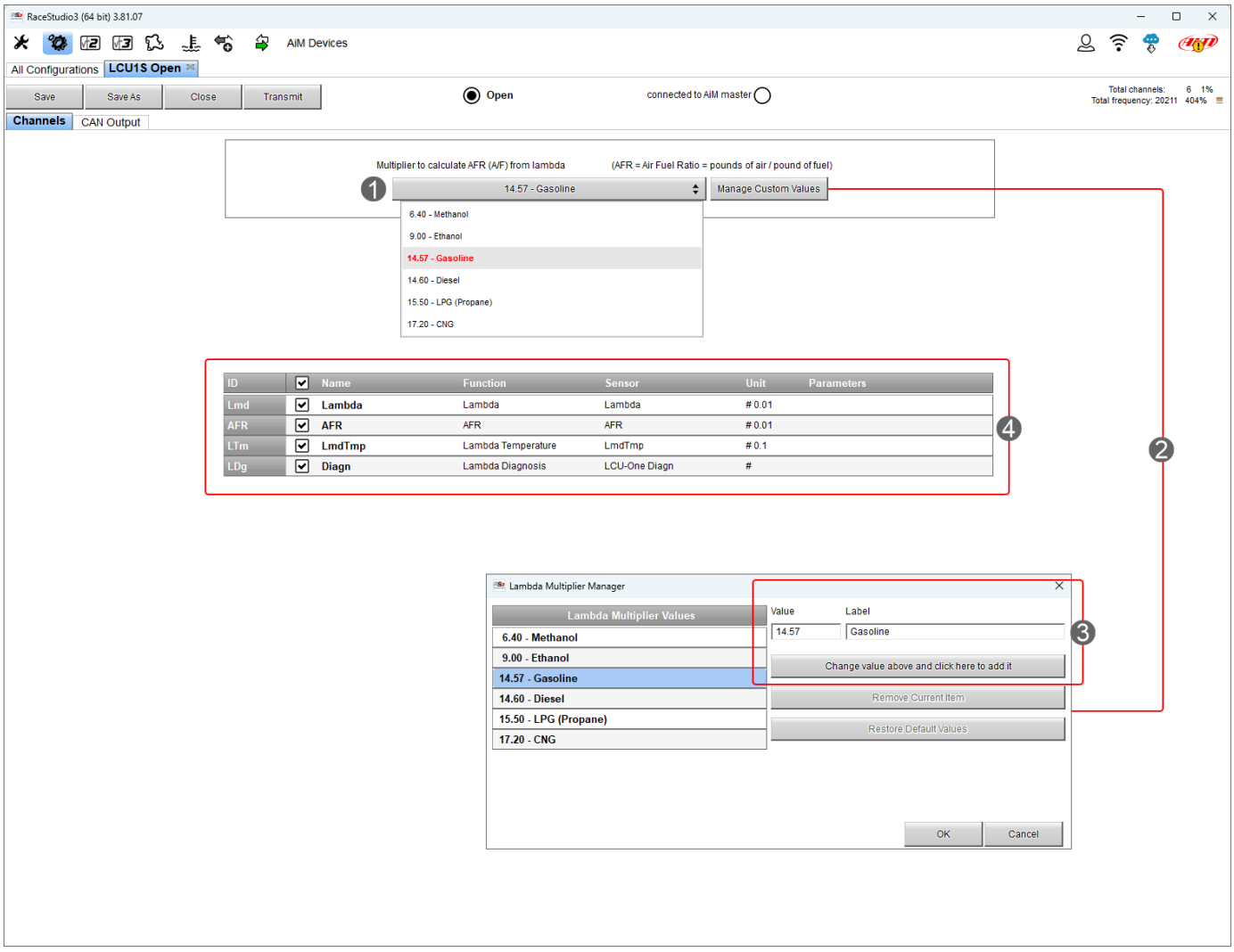
The software enters “Channels” tab.



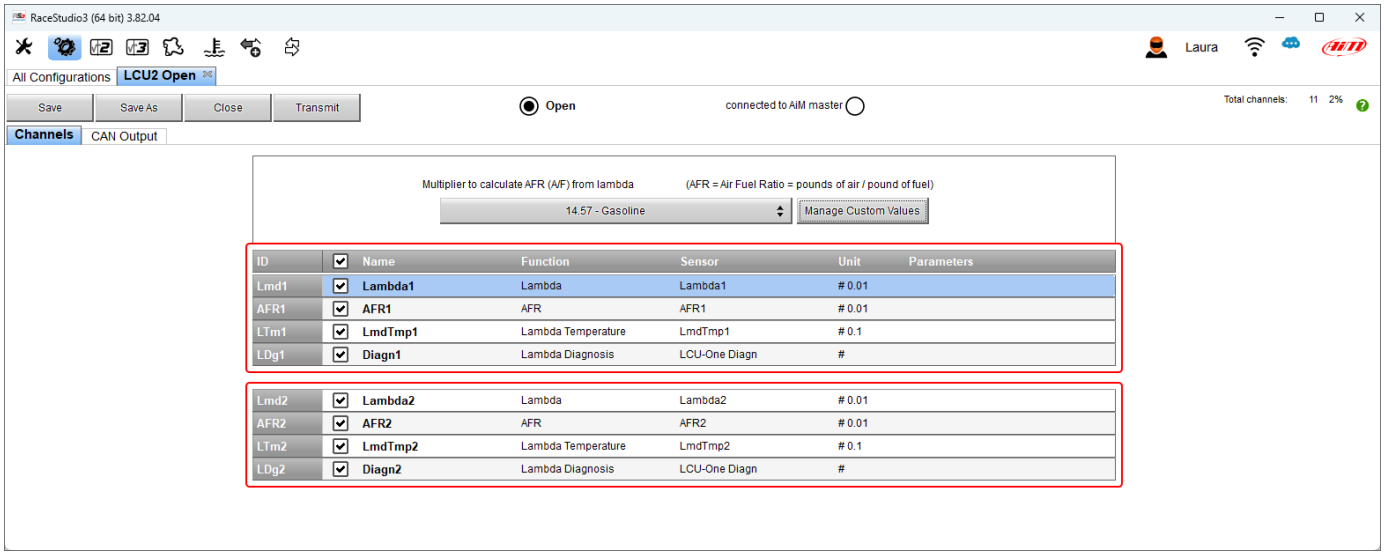
Once LCU1S/LCU2 Open configuration created, the software enters the expansion channel configuration tab (0LC1S Open here below) where thay can be configured. Specifically:

- According to the fuel used select the related multiplier to calculate AFR from lambda (**1**)
- Manage Lambda multiplier through the related button (**2**) or add a custom value (**3**)

Set channel table (**4**) clicking on each channel and setting sampling frequency, Unit of measure and display precision.

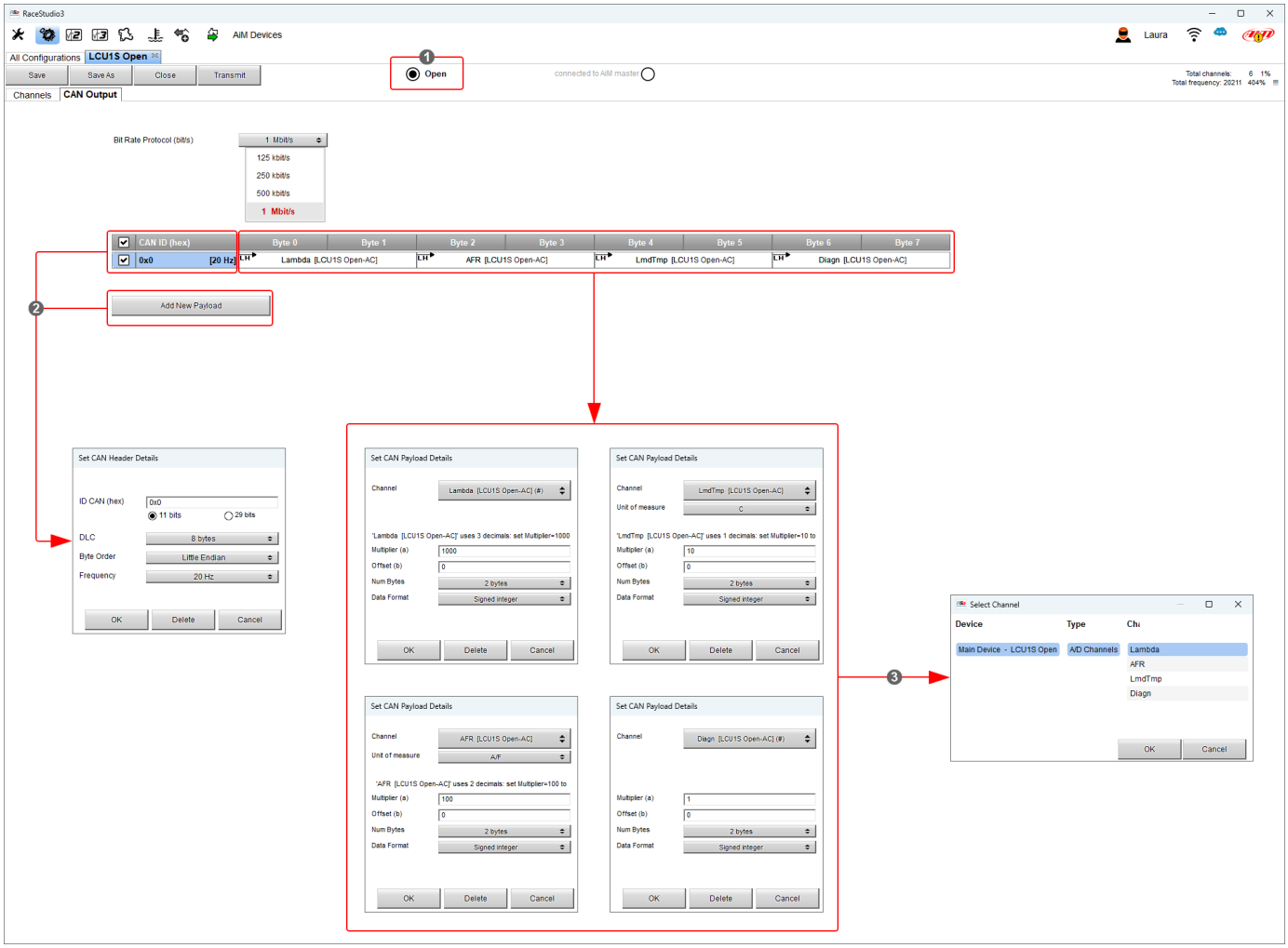


LCU1S and LCU2 channels configuration procedure is the same except for the fact that configuration table is doubled in LCU2 as shown here below and so you need to set bot LCUs channels.

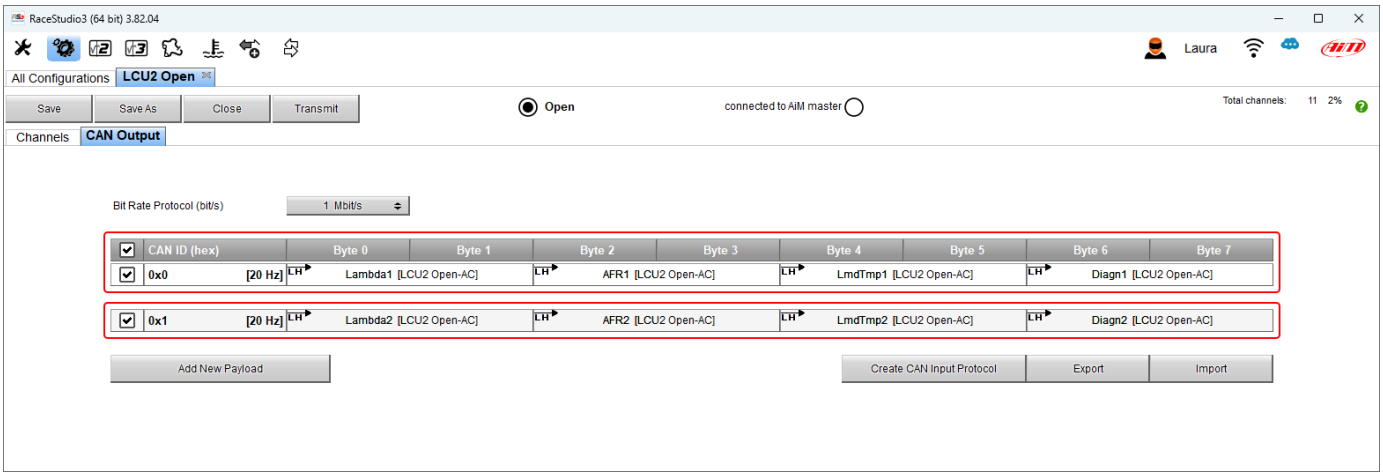


4 – Configuring LCU1S/LCU2 Open CAN Output

To configure CAN Output enter the related tab and ensure that the tab is set on “Open” (**1**).
The software offers a default example of configuration you can set according to the CAN network you are going to connect your LCU1S Open to.
Once CAN Header details set (**2**) configure all bytes (**3**) according to the frame of the vehicle protocol.
In case more devices of the network can receive the information supplied by LCU1S/LCU2 Open you can add and configure more payloads pressing the related button so to satisfy the network parameters.



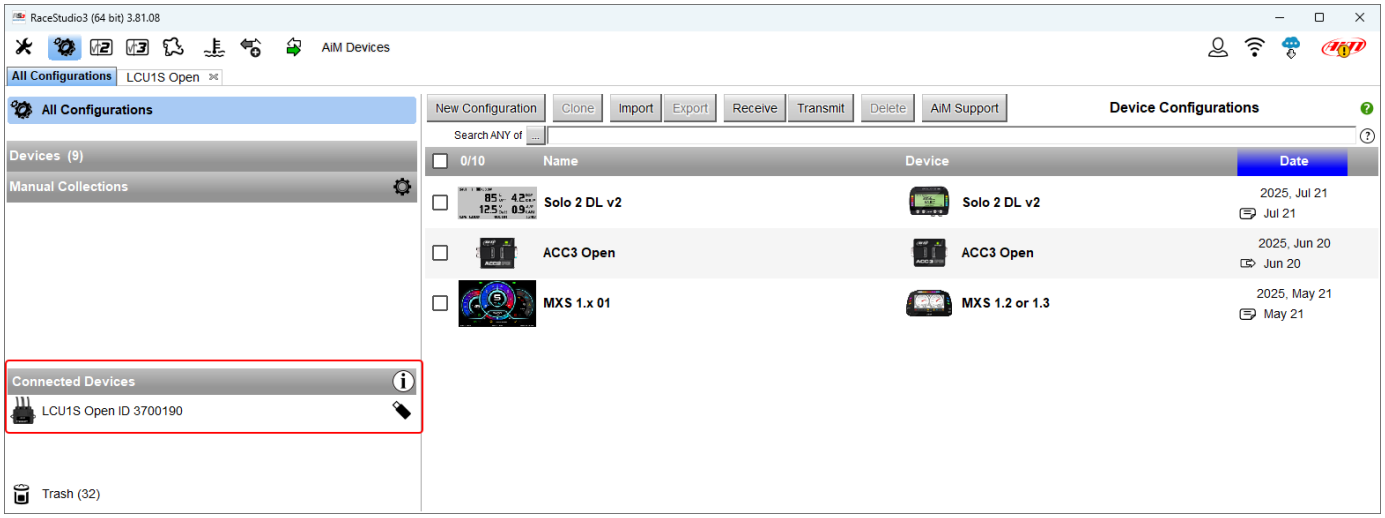
As for channels configuration procedure, CAN Output LCU1S/LCU2 configuration procedure is the same for both controllers except for the fact that the payload table of LCU2 is doubled as shown here below.

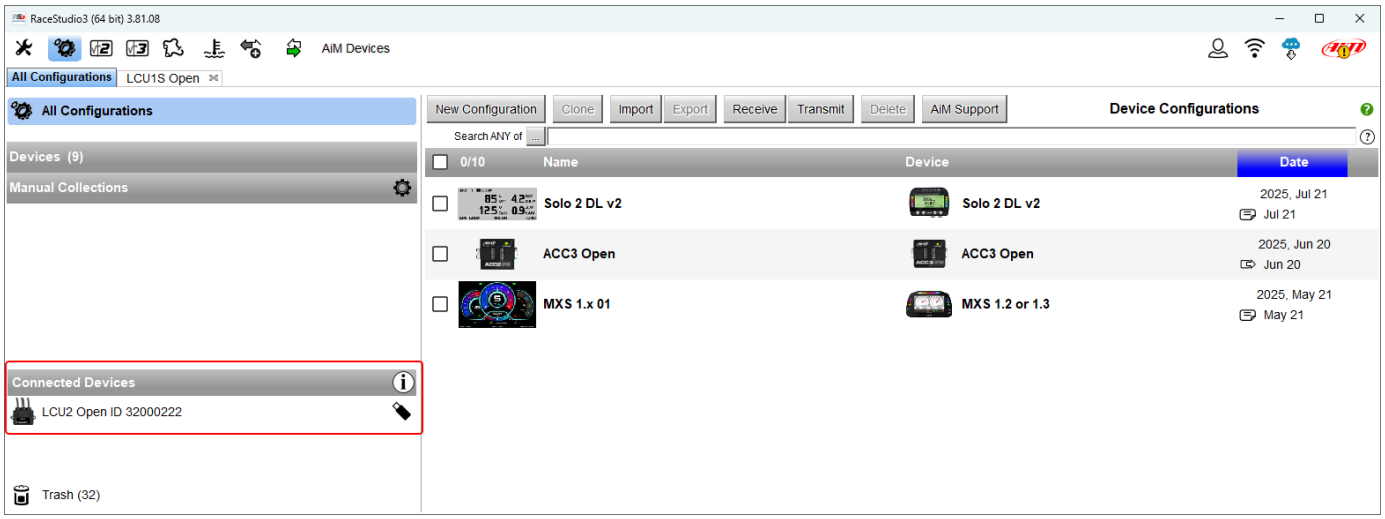


5 – Online view and firmware update

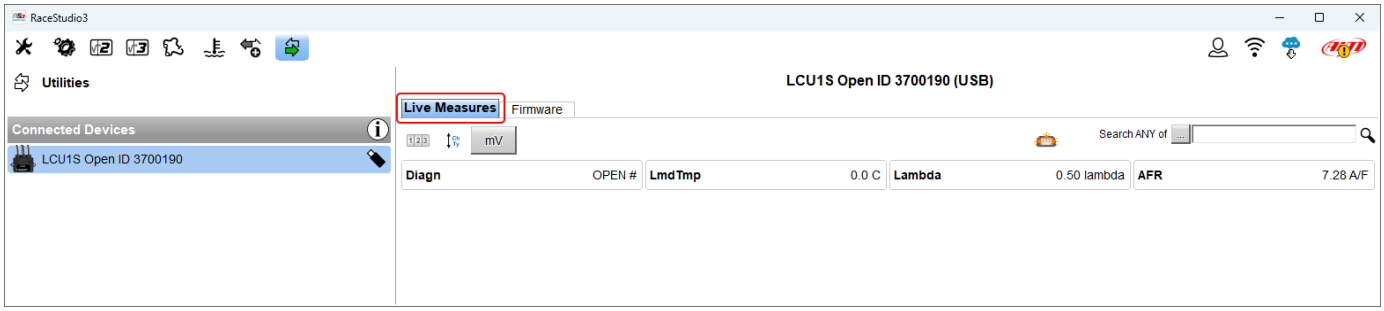
Once LCU1S/LCU2 Open connected, identified and correctly configured it is suggested to save and transmit the configuration to LCU1S/LCU2.
Now it is possible to enter online view and check LCU1S/LCU2 Open values. To do so:

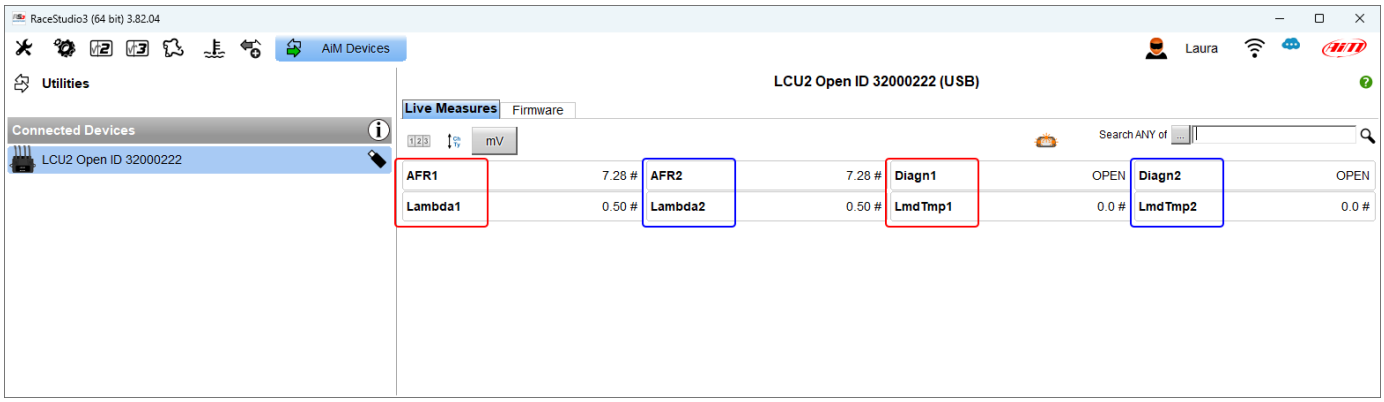
- enter “Configurations” view
- Press LCU1S/LCU2 Open connected.



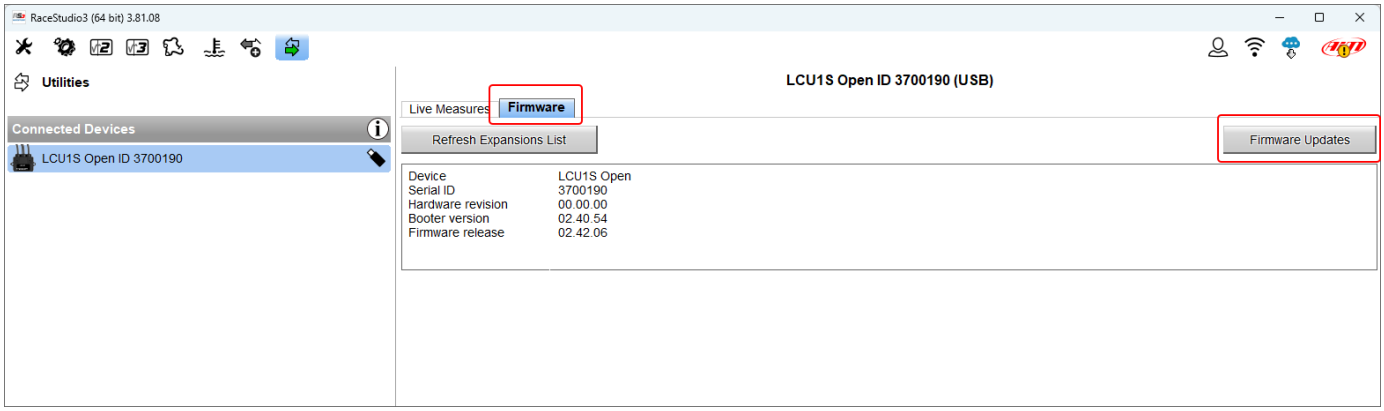


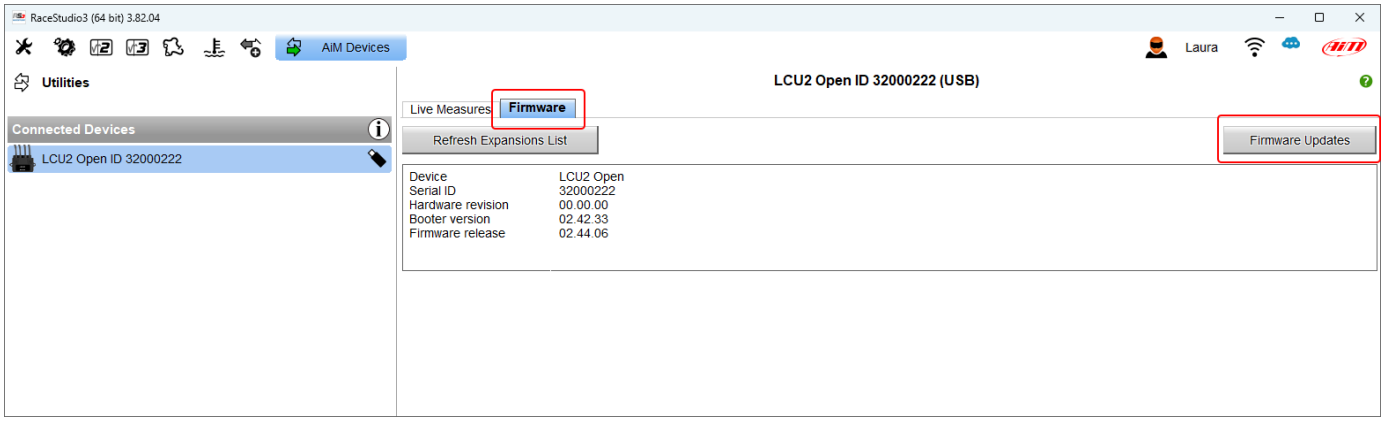
The software enters “Live measures” view and shows the expansion live measures as shown below.



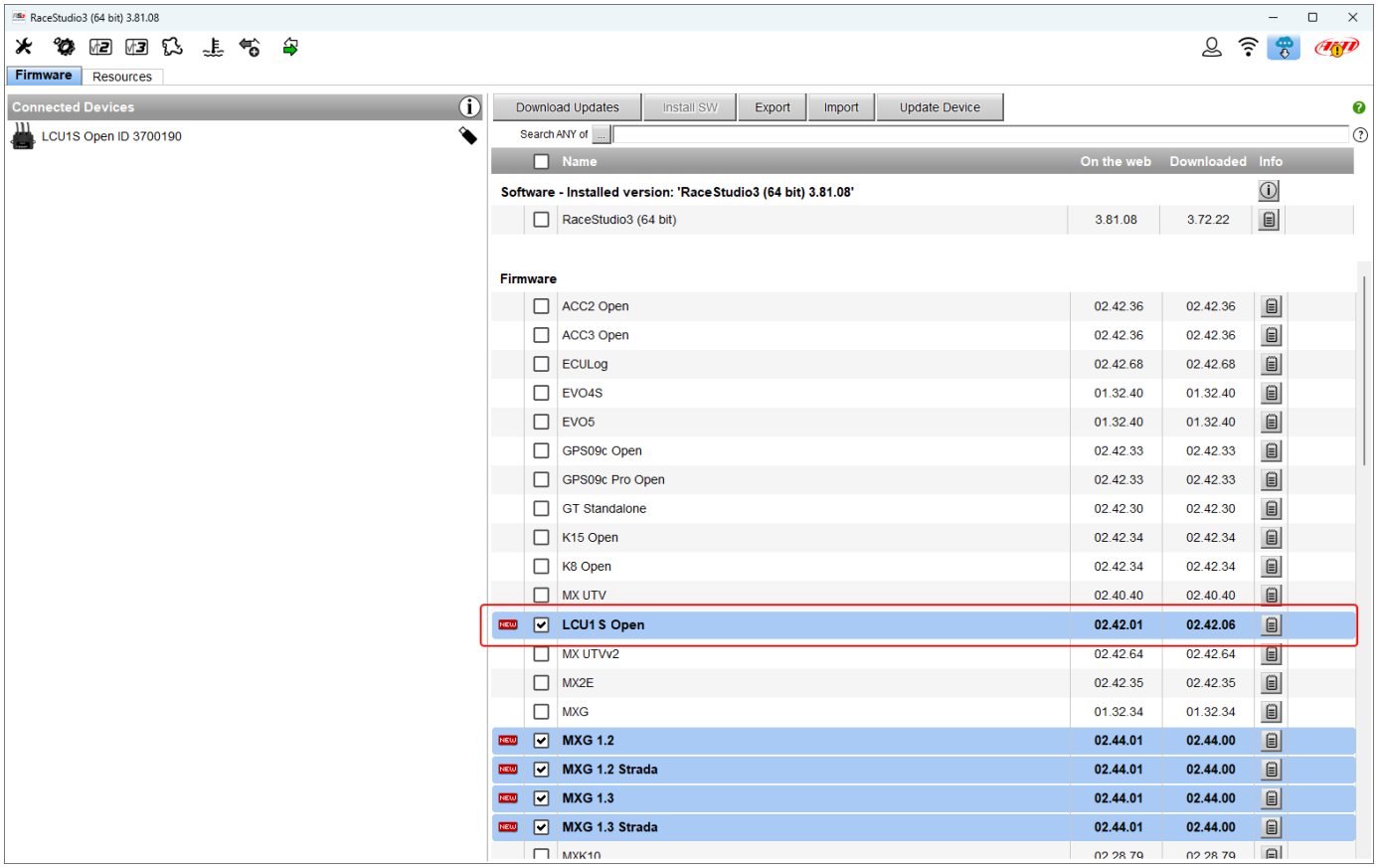


From this page it is also possible to update LCU1S/LCU2 Open firmware activating the related tab. To update the firmware press the related button.





The software enters Firmware update view.
To update LCU1S/LCU2 Open firmware scroll the list of available updates select, download and install LCU1S/LCU2 Open firmware as for any AiM device.



6 – Diagnostic codes in Race Studio Analysis

When LCU1S/LCU2 Open are connected to any AiM logger, sampled data can be downloaded and analysed. According to the controller status Race Studio Analysis will show some diagnostic codes. Here below their meaning are explained.

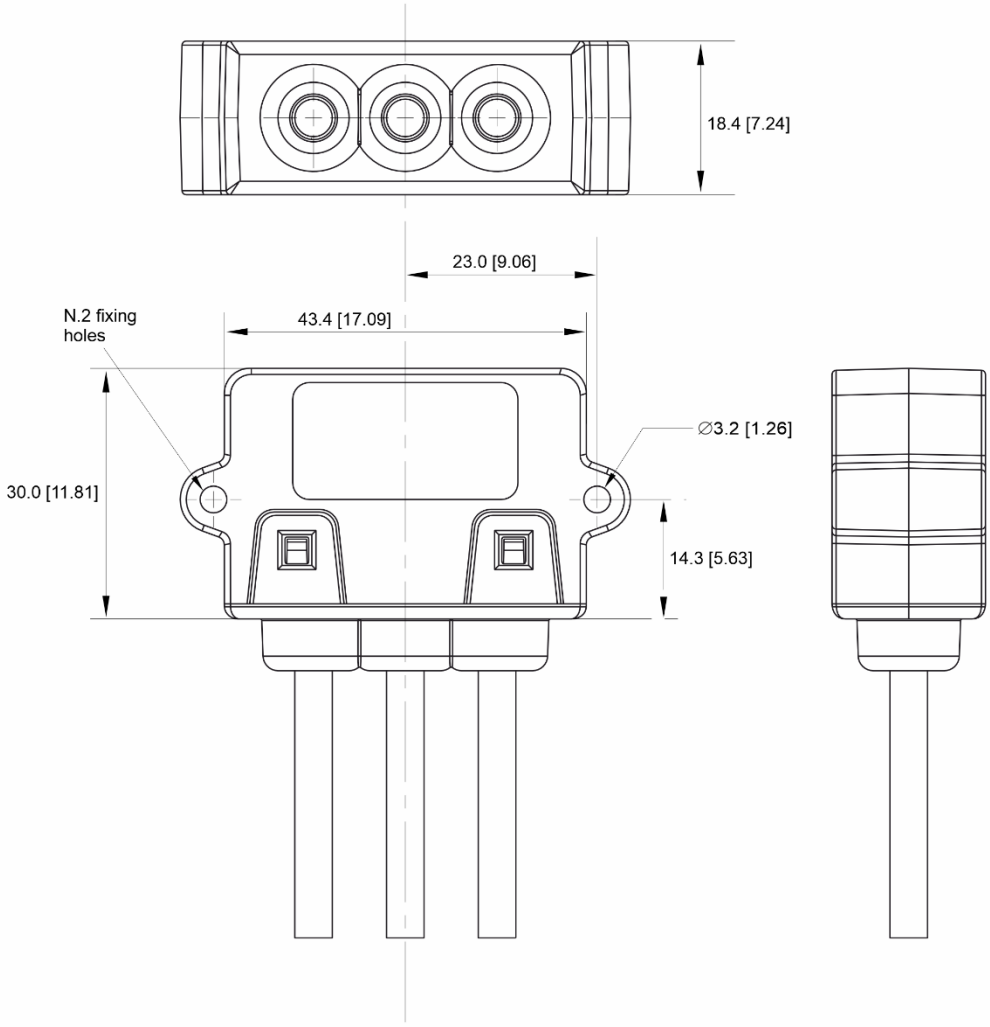
- 0 = Unknown [--]
- 1 = OK [OK]
- 2 = WarmUp [WUP]
- 3 = Probe disconnected from controller and circuit open [OPEN]
- 4 = 12V short circuit [SC+12]
- 5 = GND short circuit [SCgnd]
- 6 = Low Voltage on (LCU1S) [LowV]

7 – Technical specifications and drawings

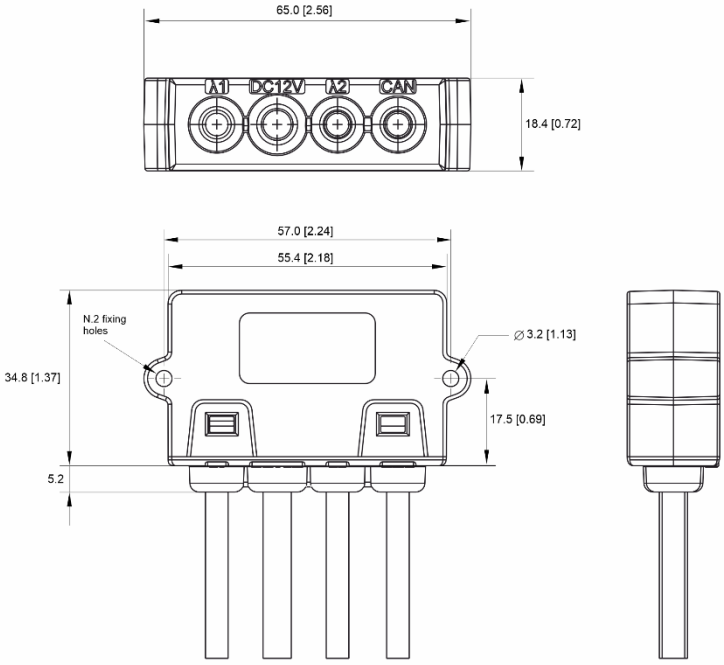
LCU1S/LCU2 Open technical specifications are:

- Sensor compatibility Bosch LSU4.9
- Power supply voltage 9-15V
- Power supply current 50mA ÷ sensor heater typical current 750 mA up to 2A on cold sensor
- Reaction time Less than 10msec
- Material Latigloss 57
- LCU1S Dimensions 43.4x30x18.4 mm
- LCU2 Dimensions 65.0x34.8x18.4 mm
- Weight 70g
- Waterproof IP67

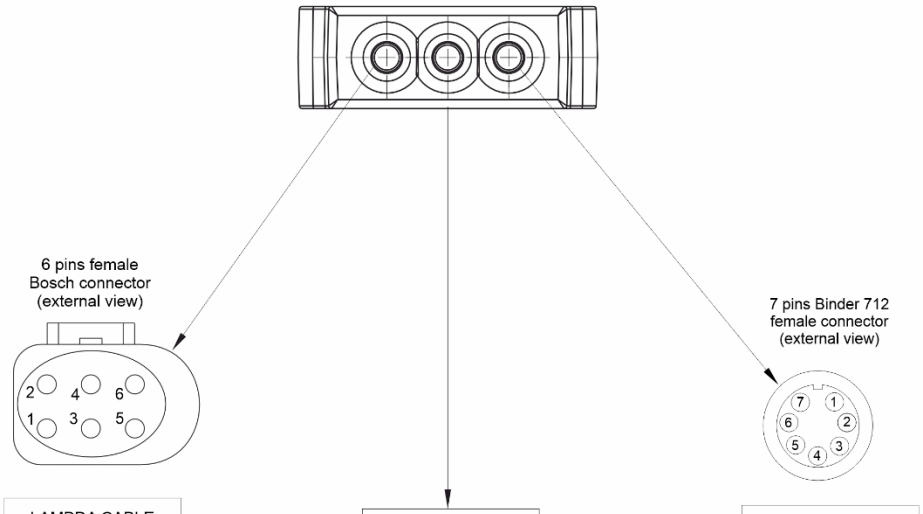
LCU1S Open Dimensions in mm [inches]



LCU2 Open Dimensions in mm [inches]



LCU1S Open Pinout

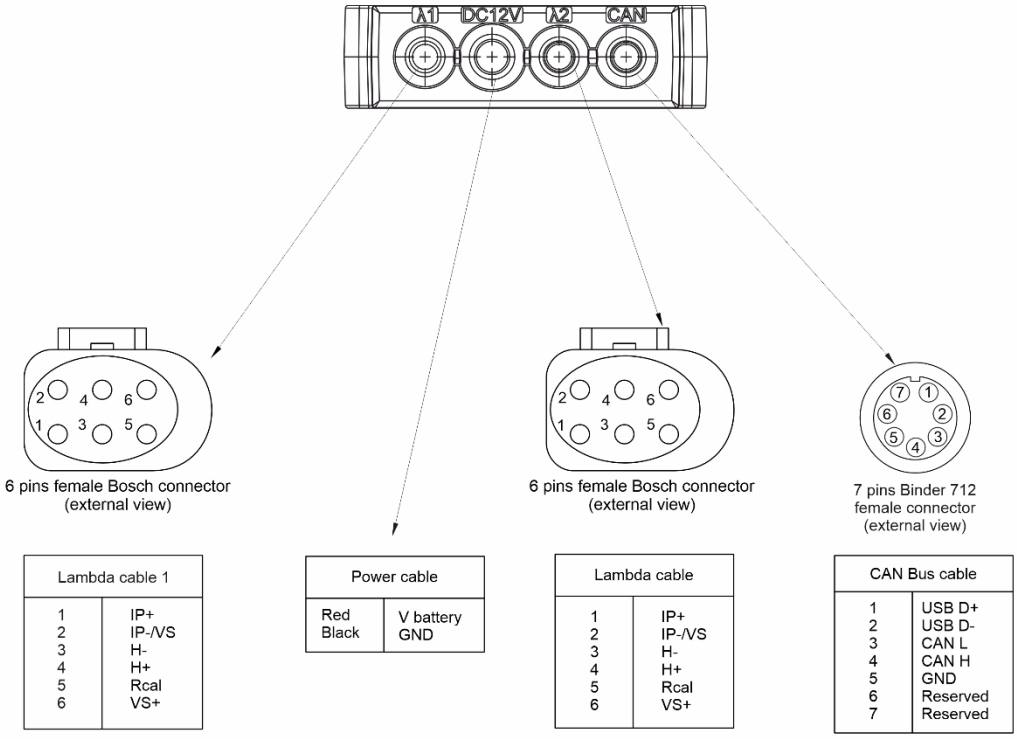


LAMBDA CABLE	
1	IP+
2	IP-/VS
3	H-
4	H+
5	Rcal
6	VS+

POWER CABLE	
Red	V battery
Black	GND

CAN Bus cable	
1	USB D+
2	USB D-
3	CAN Low
4	CAN High
5	GND
6	Reserved
7	Reserved

LCU2 Open pinout



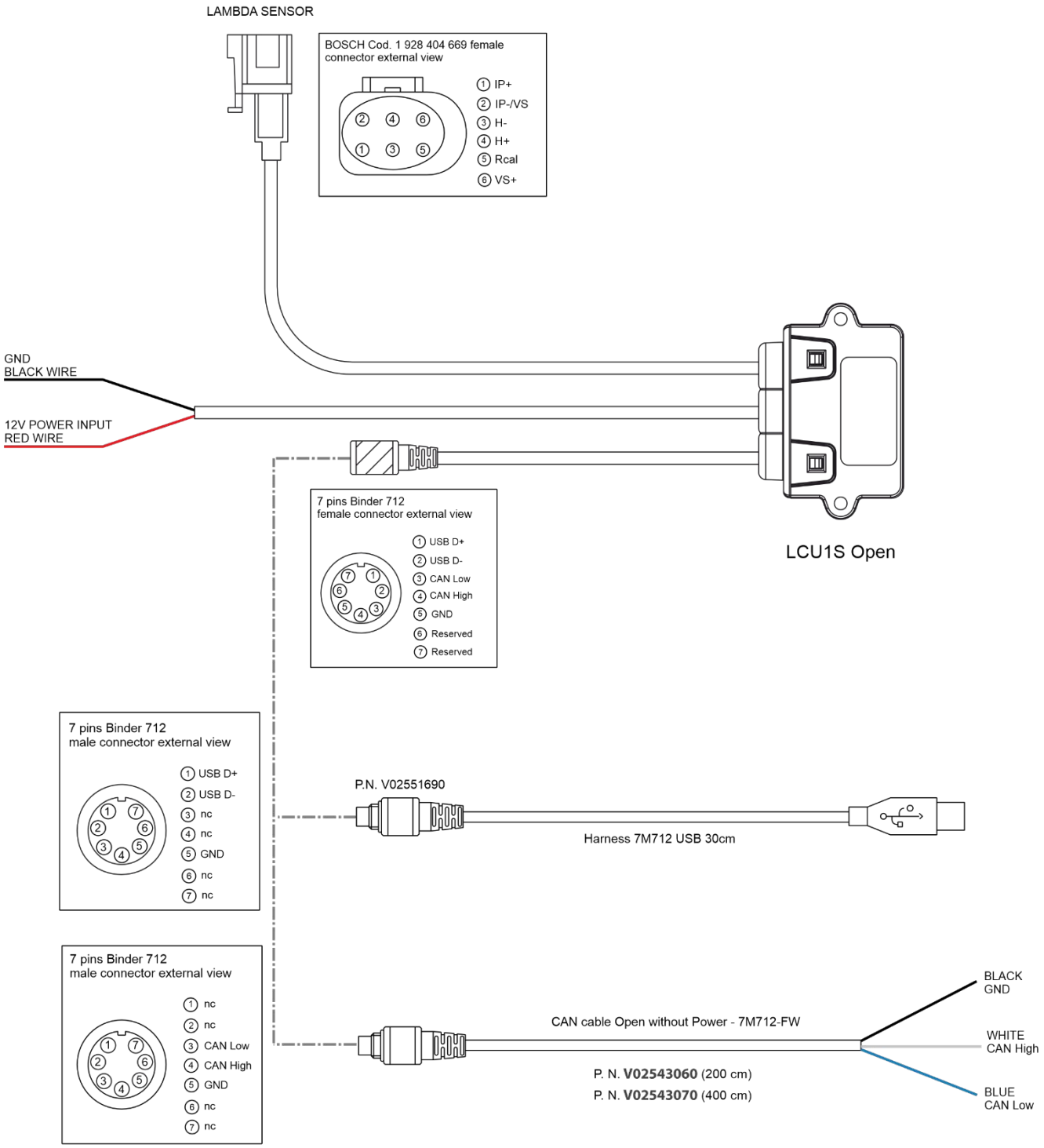
Lambda cable 1	
1	IP+
2	IP-/VS
3	H-
4	H+
5	Rcal
6	VS+

Power cable	
Red	V battery
Black	GND

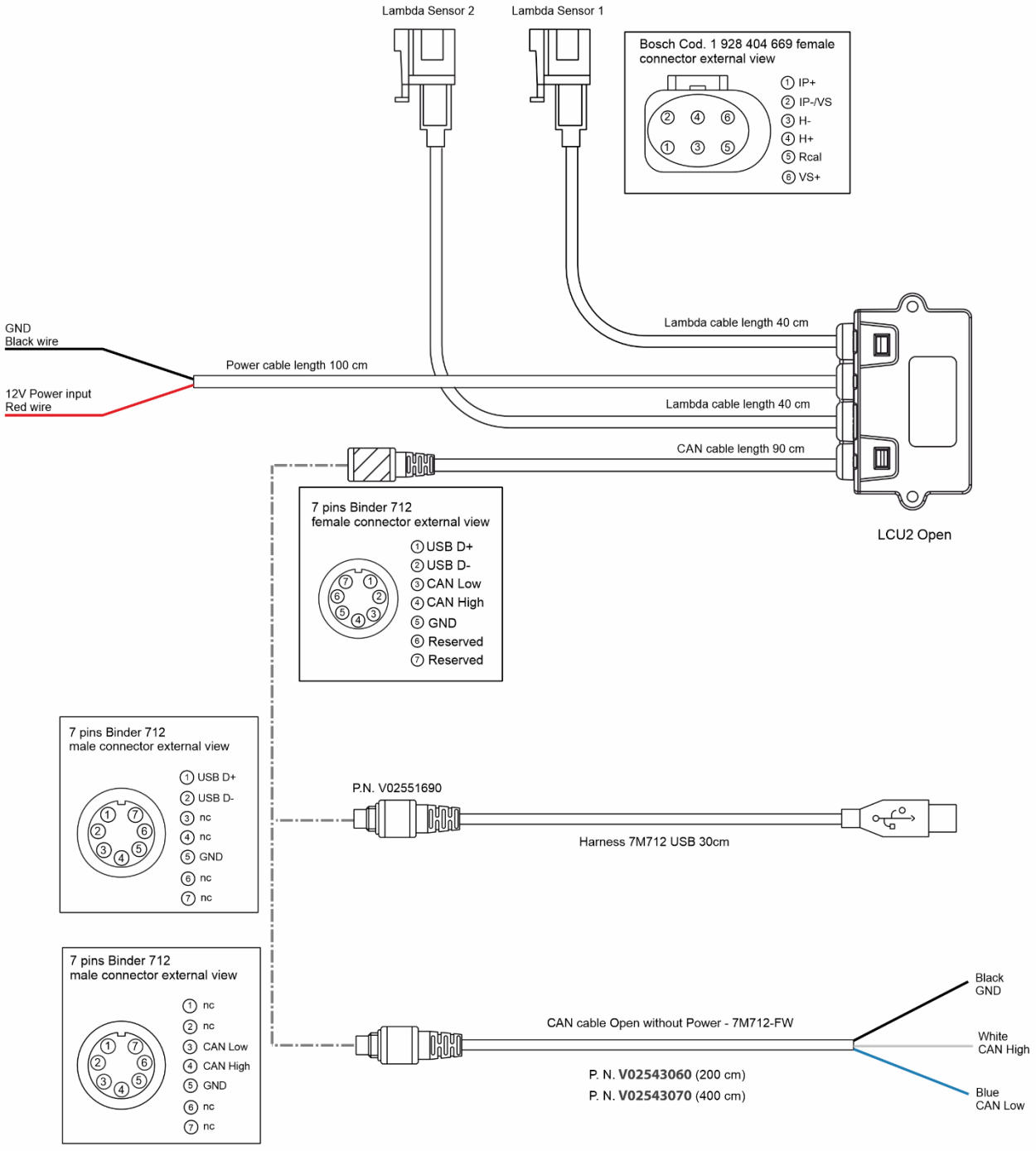
Lambda cable	
1	IP+
2	IP-/VS
3	H-
4	H+
5	Rcal
6	VS+

CAN Bus cable	
1	USB D+
2	USB D-
3	CAN L
4	CAN H
5	GND
6	Reserved
7	Reserved

LCU1S Open cables



LCU2 Open cables



EXTERNAL POWER SUPPLY IS ALWAYS REQUIRED