User Manual

LCU1S + LCU2

Release 1.00

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1 – Introduction

LCU1S and LCU2 are the new small, light and fast AiM Lambda Controller expansions supported by all the last car-bike AiM devices.

Please note: the only systems that do not support LCU1S and LCU2 are MXL, MXL2 and MyChron.

LCU1S and LCU2 allow you to perfectly tune the carburation of the engine as well as to improve the engine performances. They both 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 kits are:

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

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

Available LCU2 kits are:

LCU2 complete kit; part number: **XLCU2AC090**
- LCU2
- Bosch LSU 4.9 Lambda probe
- Thread iron ring for installation

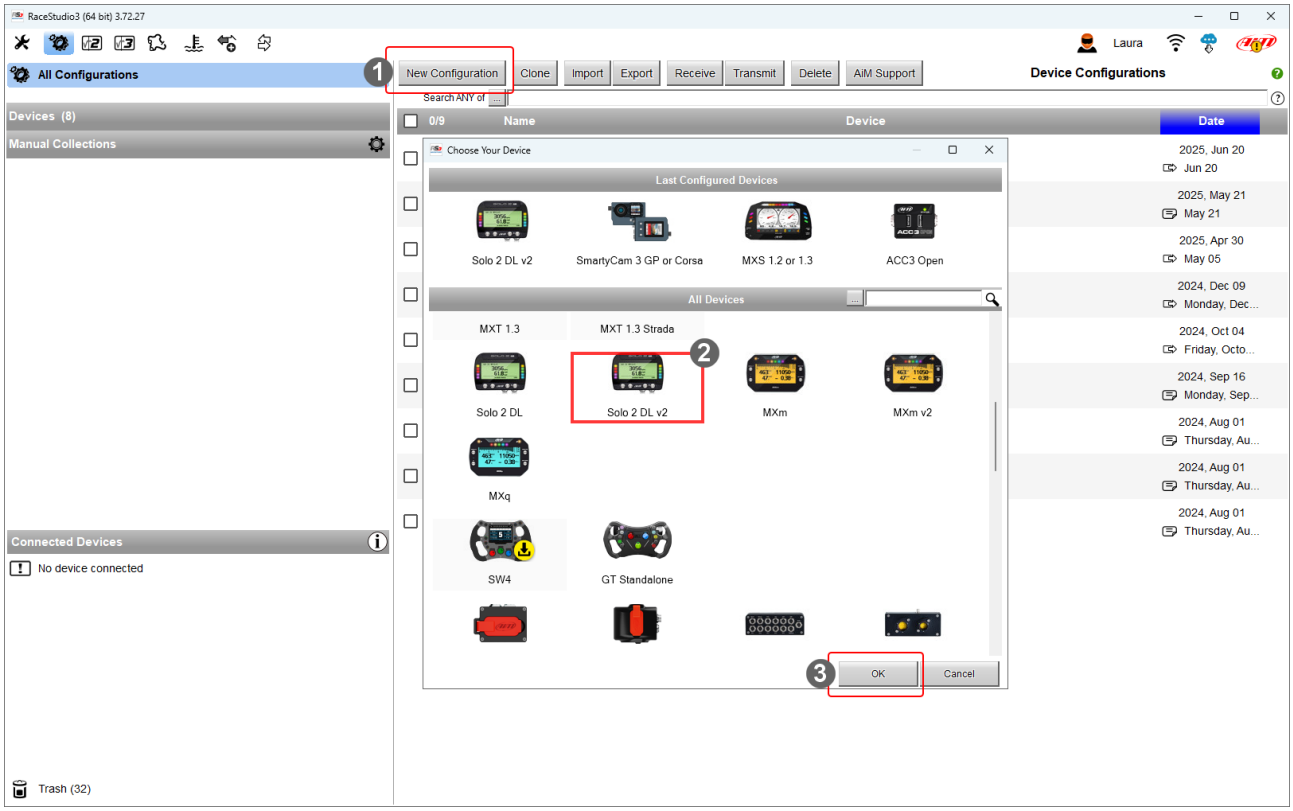
LCU2 kit without Lambda probe; part number: **XLCU2AC0**
- LCU2

Optionals7 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**

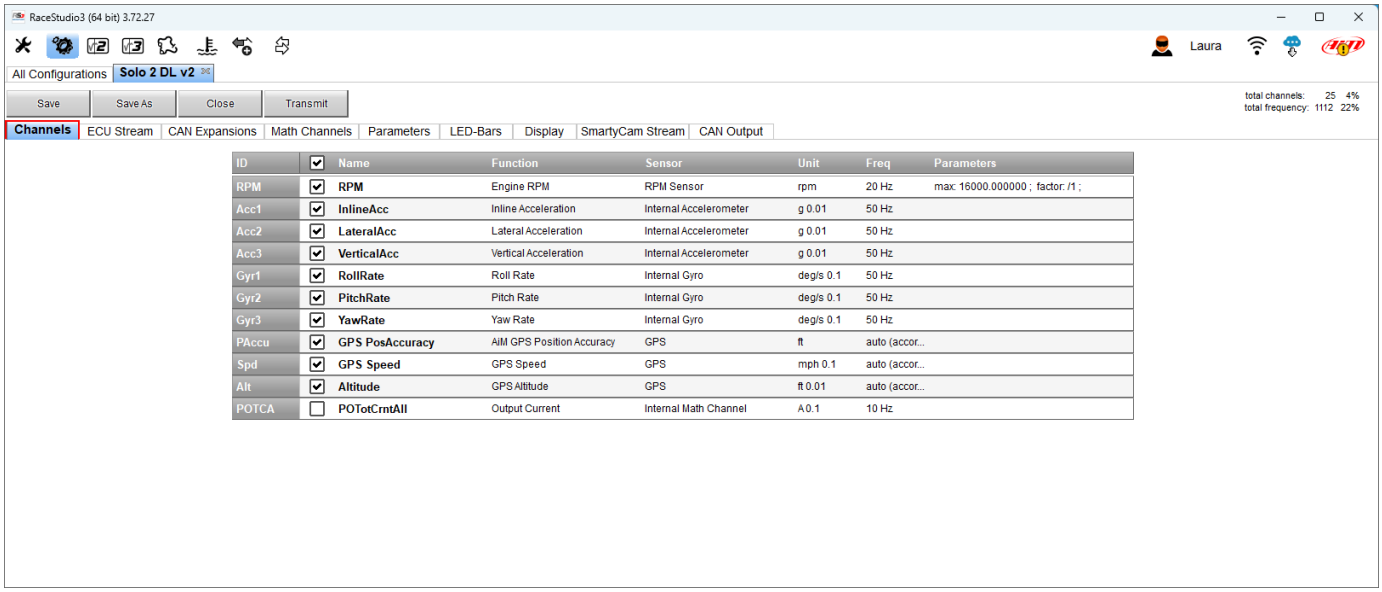
3 – Configuring LCU1S and LCU2

LCU1S and LCU2 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.
To load the expansion in AiM device configuration run the software and select the configuration where to load LCUS1S on or create a new one as shown here below. To create a new configuration:

- Press “New Configuration” (**1**)
- Select the device you are configuring (Solo 2 DL v2 in the example below **2**)
- Press “OK” (**3**)



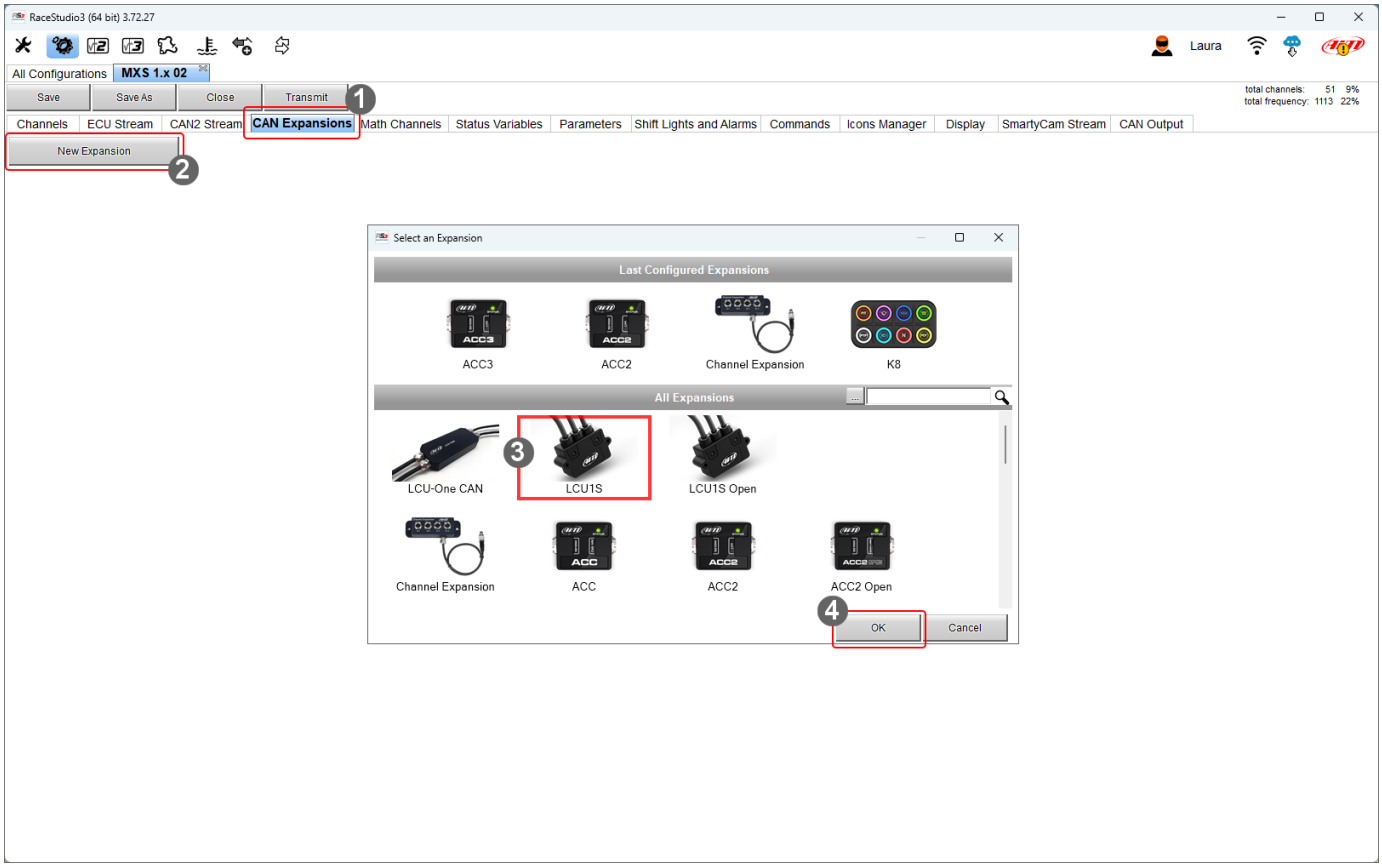
The software enters “Channels” tab.



ID	Name	Function	Sensor	Unit	Freq	Parameters
RPM	RPM	Engine RPM	RPM Sensor	rpm	20 Hz	max: 16000.000000 ; factor: /1 ;
Acc1	InlineAcc	Inline Acceleration	Internal Accelerometer	g 0.01	50 Hz	
Acc2	LateralAcc	Lateral Acceleration	Internal Accelerometer	g 0.01	50 Hz	
Acc3	VerticalAcc	Vertical Acceleration	Internal Accelerometer	g 0.01	50 Hz	
Gyr1	RollRate	Roll Rate	Internal Gyro	deg/s 0.1	50 Hz	
Gyr2	PitchRate	Pitch Rate	Internal Gyro	deg/s 0.1	50 Hz	
Gyr3	YawRate	Yaw Rate	Internal Gyro	deg/s 0.1	50 Hz	
PAccu	GPS PosAccuracy	AiM GPS Position Accuracy	GPS	ft	auto (accor...	
Spd	GPS Speed	GPS Speed	GPS	mph 0.1	auto (accor...	
Alt	Altitude	GPS Altitude	GPS	ft 0.01	auto (accor...	
POTCA	POTotCrntAll	Output Current	Internal Math Channel	A 0.1	10 Hz	

To load and configure LCU1S activate “CAN Expansions” (**1**) tab as shown here below and follow these steps:

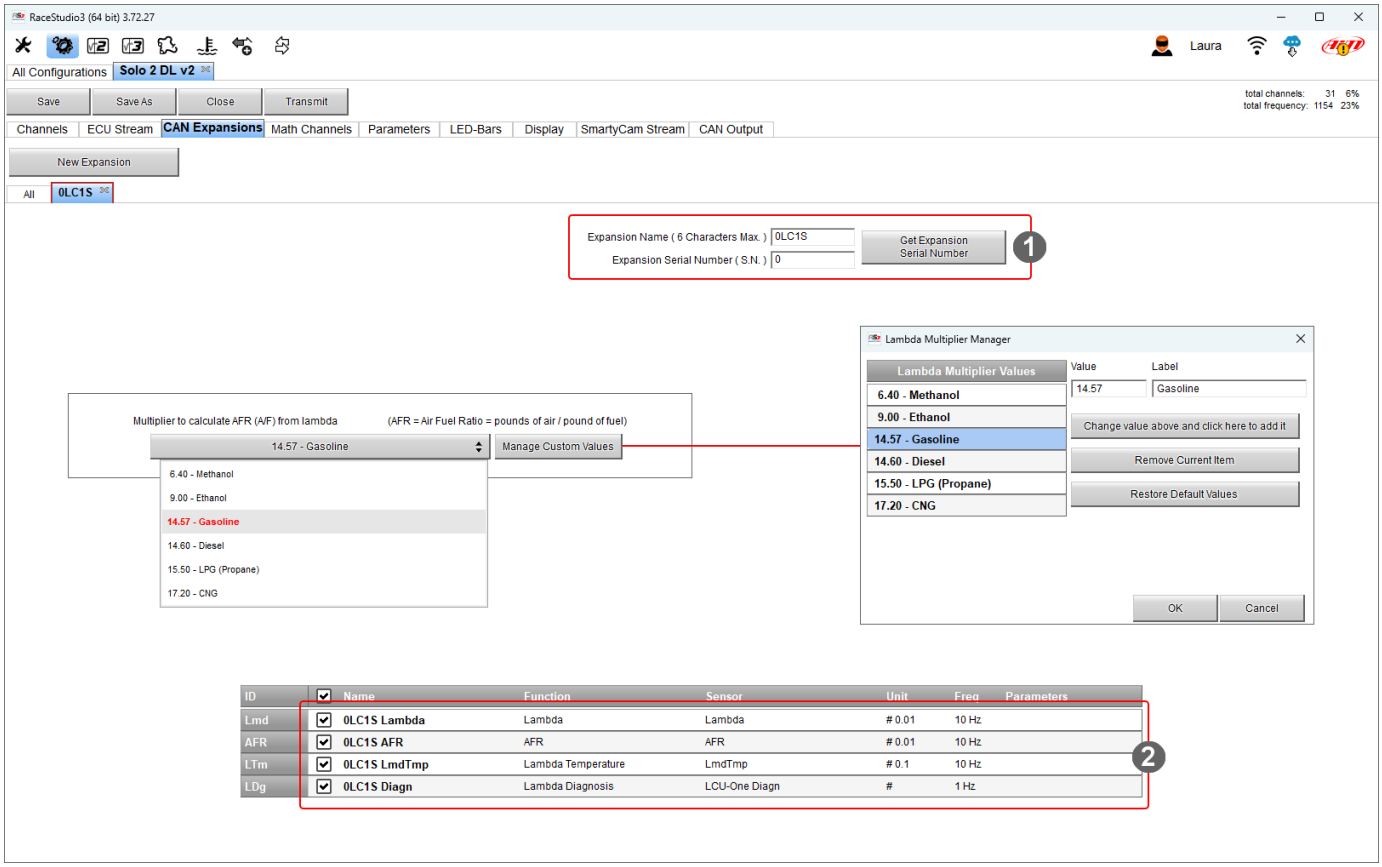
- Press “New Expansion” (**2**)
- Select LCU1S (**3**)
- Press “OK” (**4**)



Once the expansion added, the software enters the related tab (0LC1S). Here it is possible to:

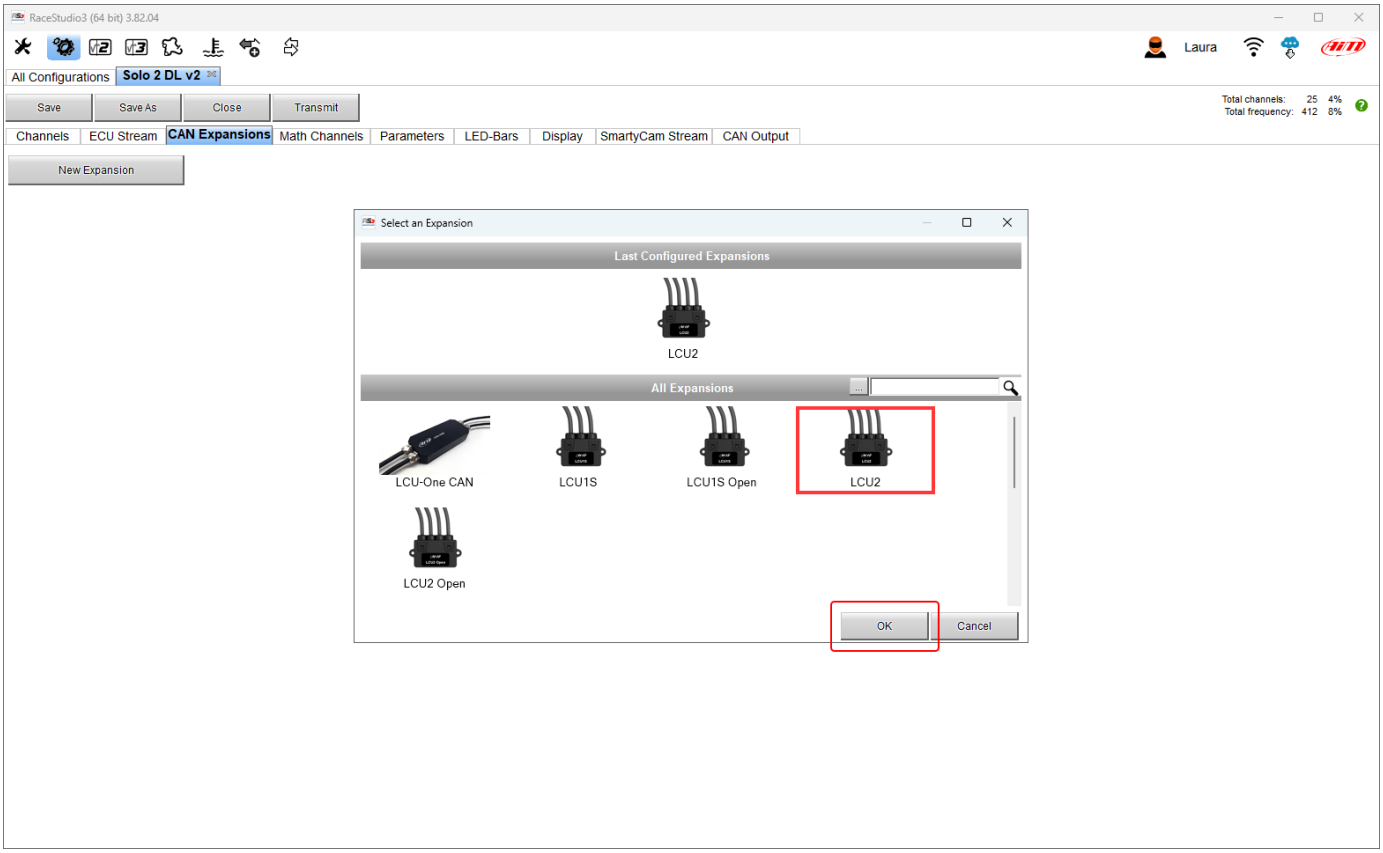
- get the serial number of LCU1S or fill it in manually (**1**); **please note**: to get the serial number from the connected LCU1S it is necessary to power it and connect the master device LCU1S is connected to to the PC via Wi-Fi (or via USB). Please refer to the user manual of each logger to know how to manage Wi-Fi connection;
- select the multiplier to calculate AFR from Lambda value
- manage custom values through the dedicated panel that is prompted clicking the proper button

As far as the channel table (**2**) is concerned, clicking on each channel it is possible to set sampling frequency, Unit of measure and display precision.

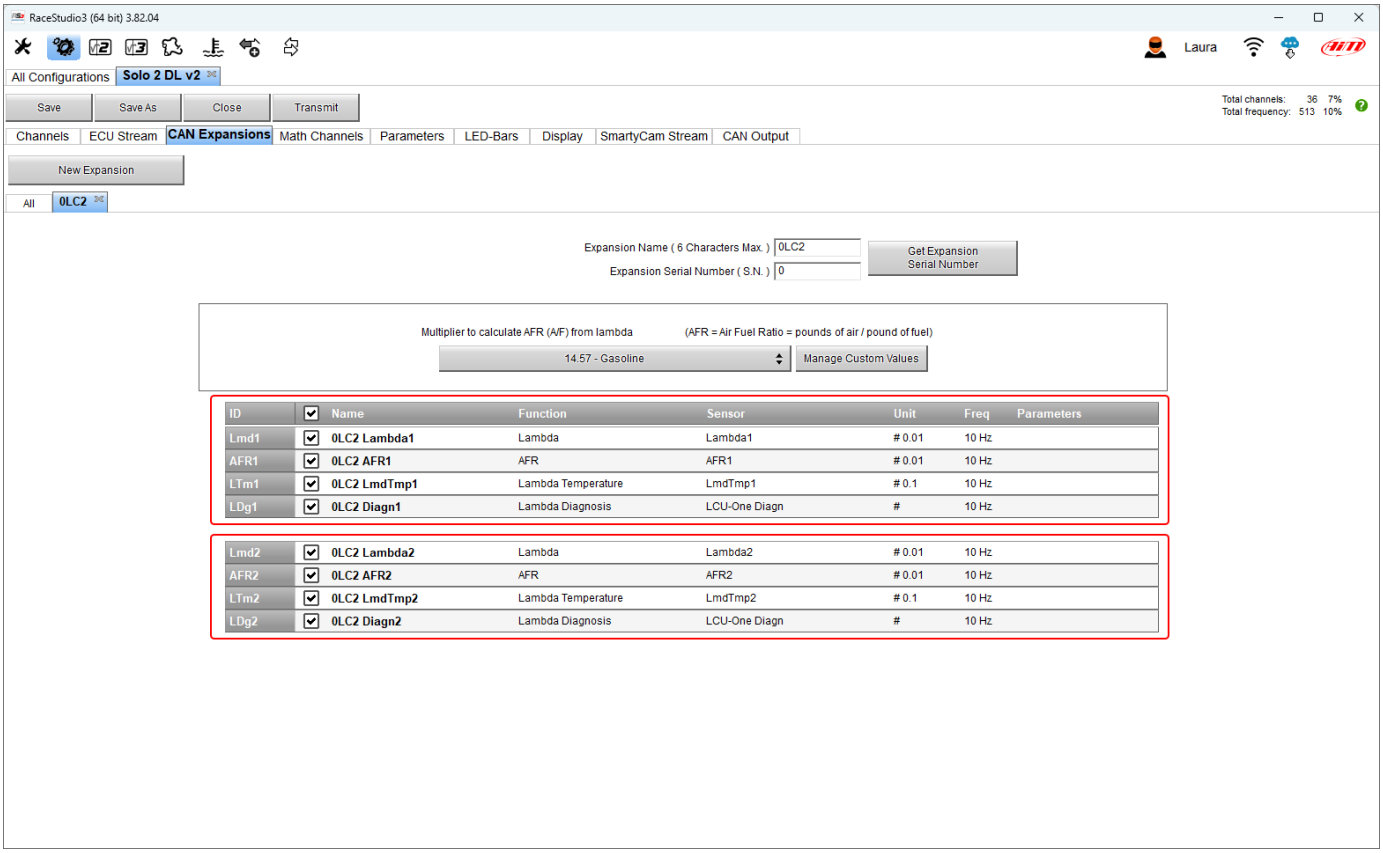


To load and configure LCU2 follow the same steps as for LCU1S:

- select LCU2 as shown here below
- Press “OK”



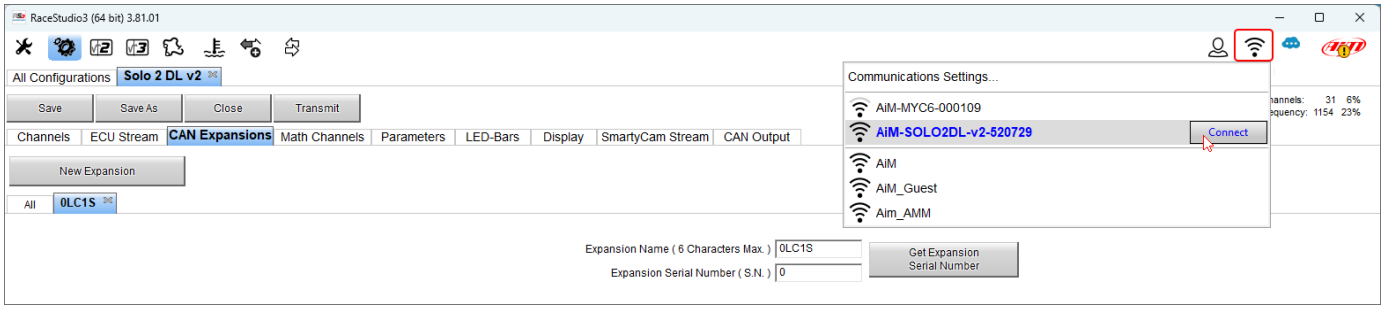
As for LCU1S, **once LCU2 added to the logger configuration**, the software enters the related tab (0LC2) and you can get its serial number or fill it in manually, select the multiplier to calculate AFR from Lambda value and manage custom values through the dedicated panel that is prompted clicking the proper button. As far as the channel table is concerned, clicking on each channel it is possible to set sampling frequency, Unit of measure and display precision. The only difference between LCU1S and LCU2 is that the configuration table is doubled as shown here below.



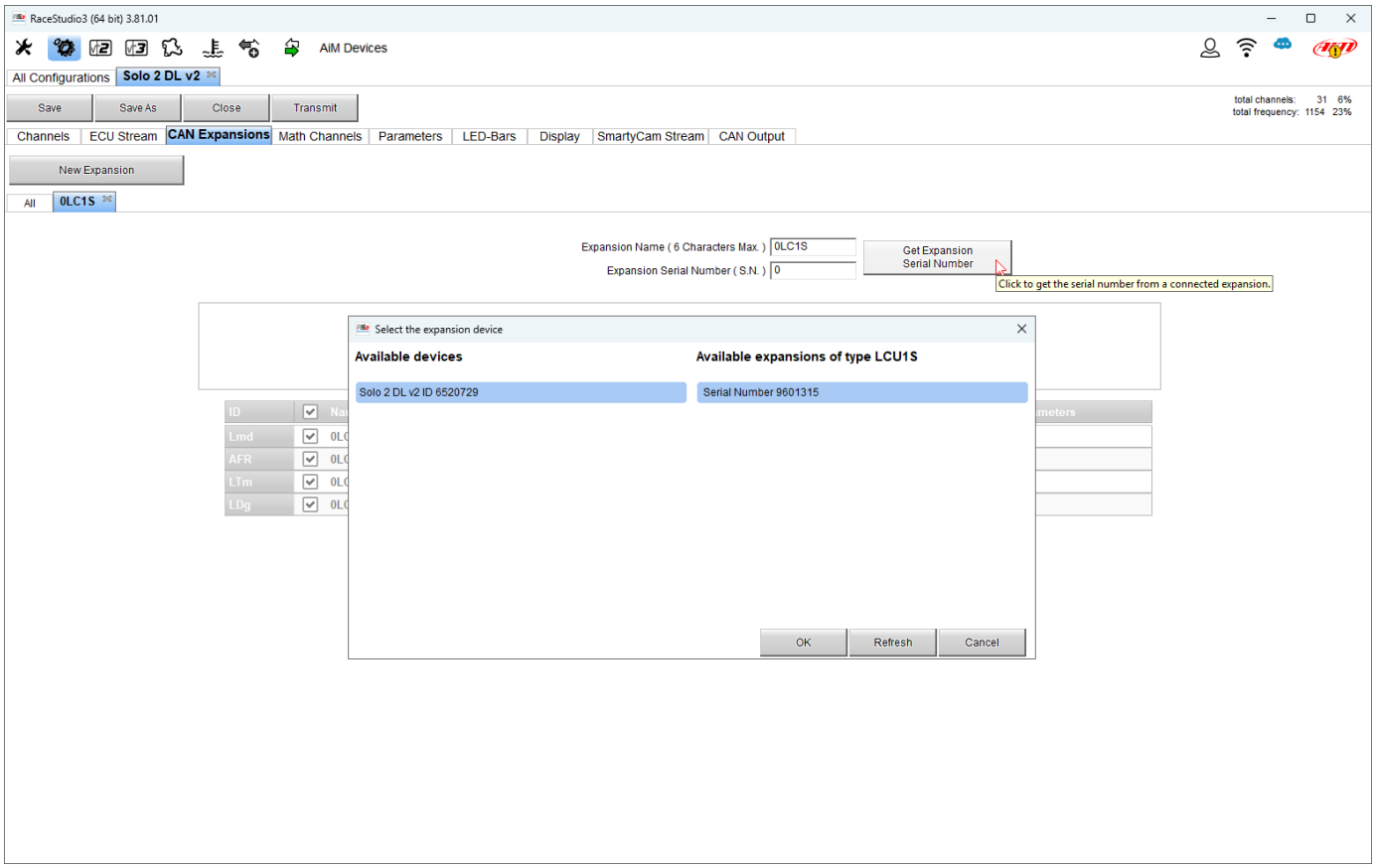
4 – Getting the serial number of a connected LCU1S/LCU2

To get the serial number of the connected LCU1S/LCU2 ensure that the expansion is powered and connect the master logger to the PC. To do so:

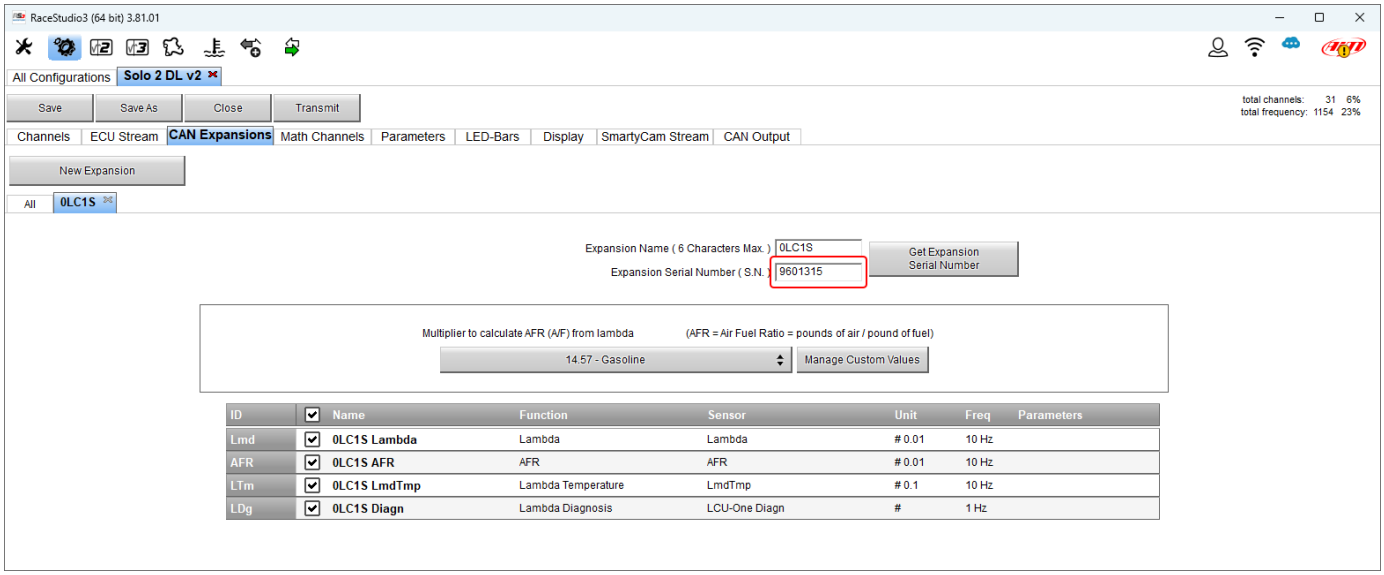
- click the Wi-Fi icon top right of the software view (or plug the USB cable of the logger in the PC USB port)
- select the logger to connect via Wi-Fi and press “Connect”.



- Once the logger connected press “Get Expansion Serial Number” as shown here below
- A panel is prompted: select the connected expansion to configure and press “OK”



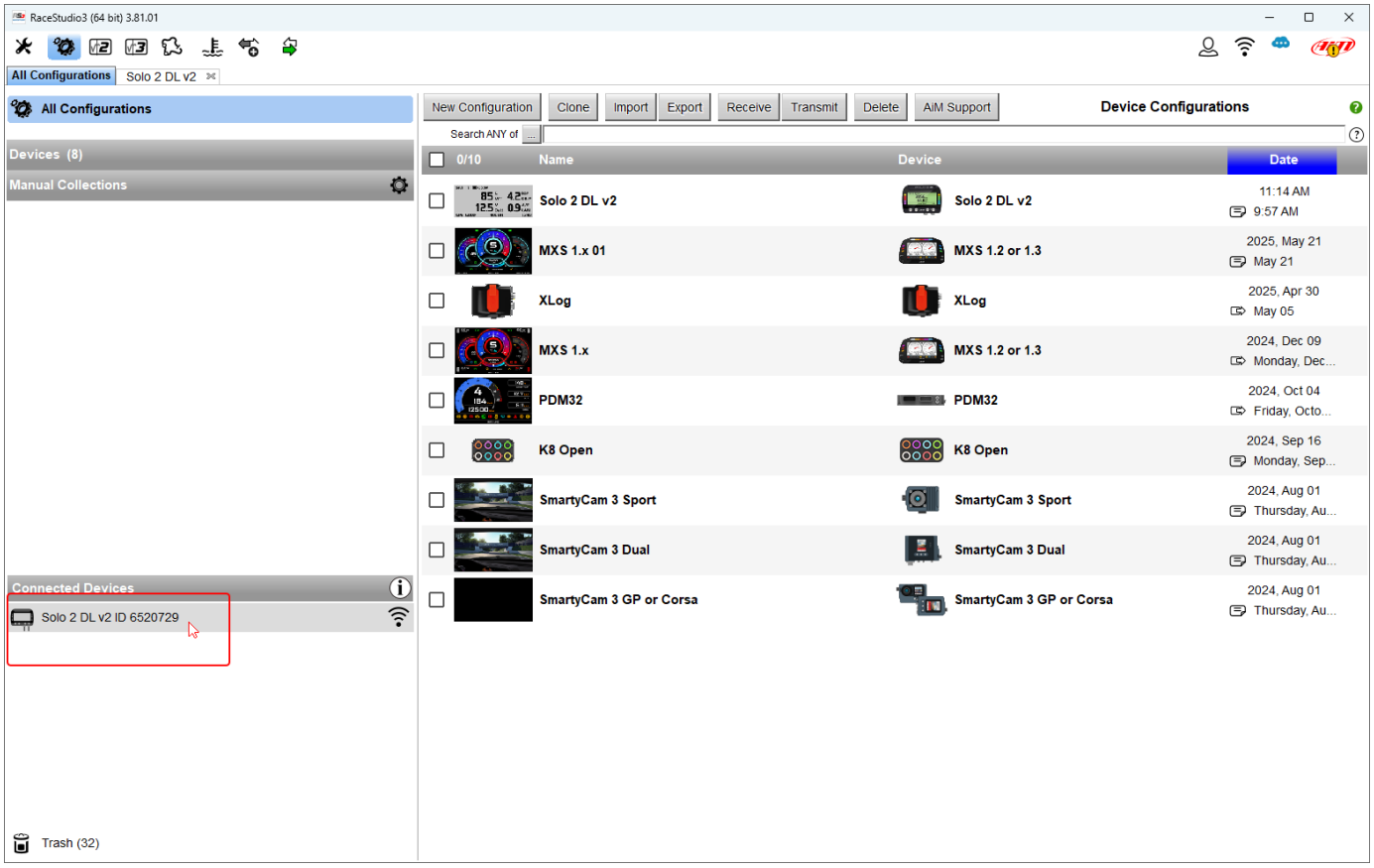
- the software comes back to “CAN Expansions” tab and shows LCU1S/LCU2 Serial number.



5 – Online view and firmware update

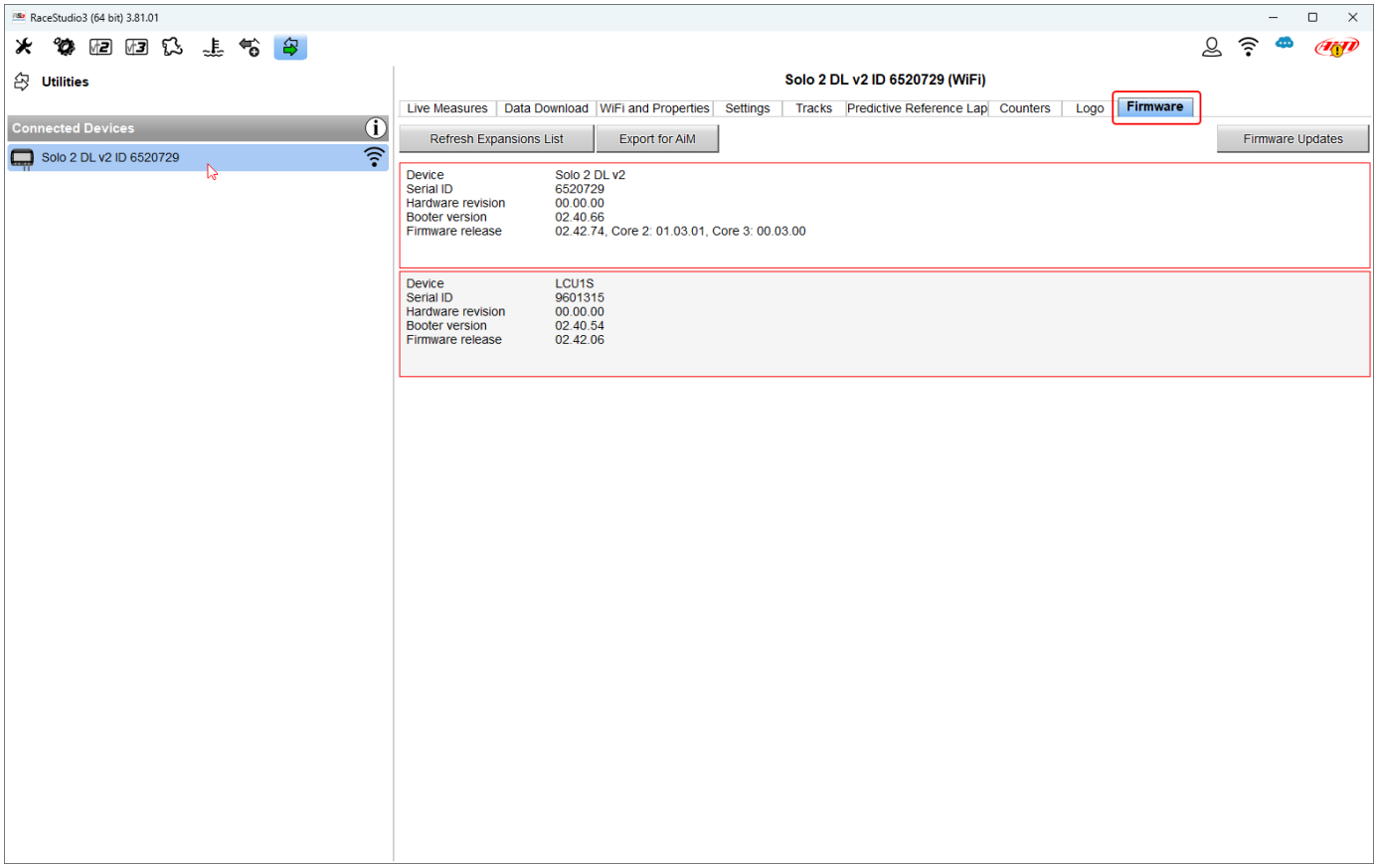
Once LCU1S/LCU2 is connected and identified it is suggested to complete, save and transmit the configuration to the logger. This procedure changes according to the logger that is being configured.
Now it is possible to enter online view and check LCU1S/LCU2 values. To do so:

- enter “Configurations” view
- Press the logger you are configuring as shown here below.



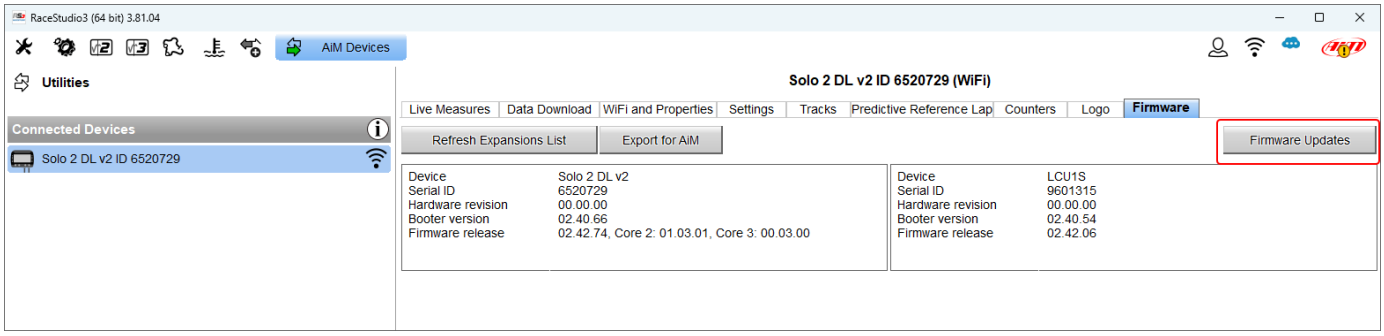
The software enters Online view:

- Activate “Firmware” tab
- The view shows the logger and its expansions on the right part of the view as shown below.

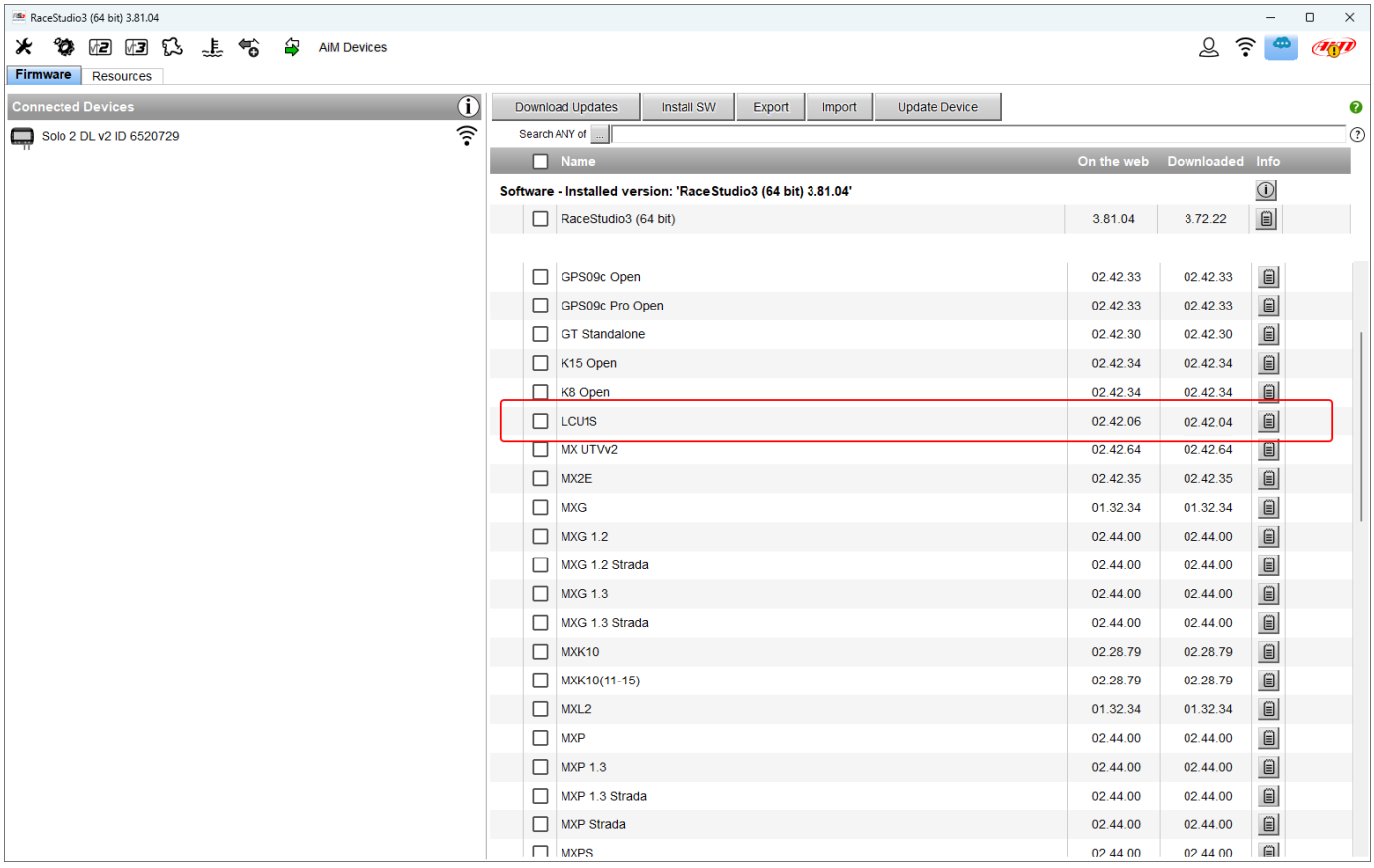


To update both logger and expansions firmware:

- click the related button top right of the view



- the software enters firmware update view where it is possible to download and install the firmware as for any AiM device.



6 – Diagnostic codes in Race Studio Analysis

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

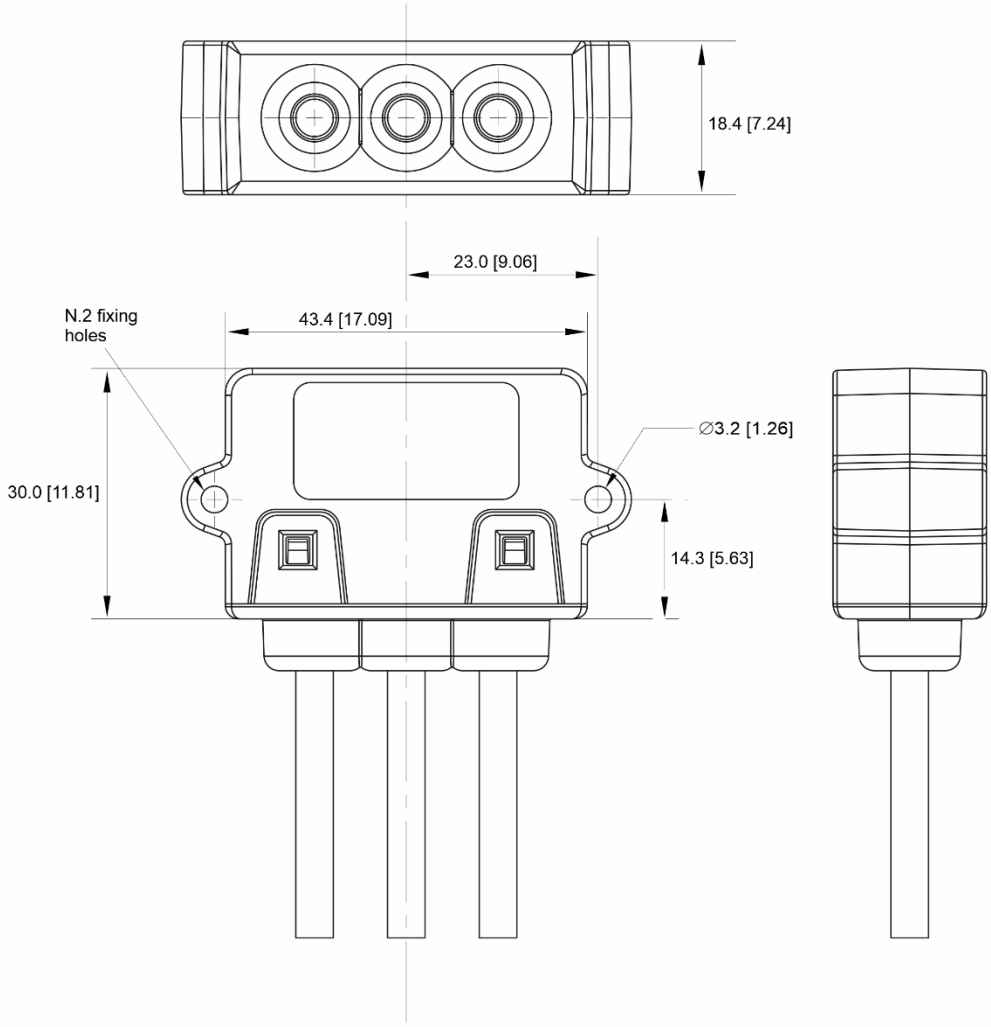
- 0 = Unknown [--]
- 1 = OK [OK]
- 2 = WarmUp [WUP]
- 3 = Probe disconnected from controller and circuit open [OPEN]
- 4 = 12V short circuit [SC+12]
- 5 = GND short circuit [SCgnd]
- 6 = Low Voltage on (LCU1S) [LowV]

7 – Technical specifications and drawings

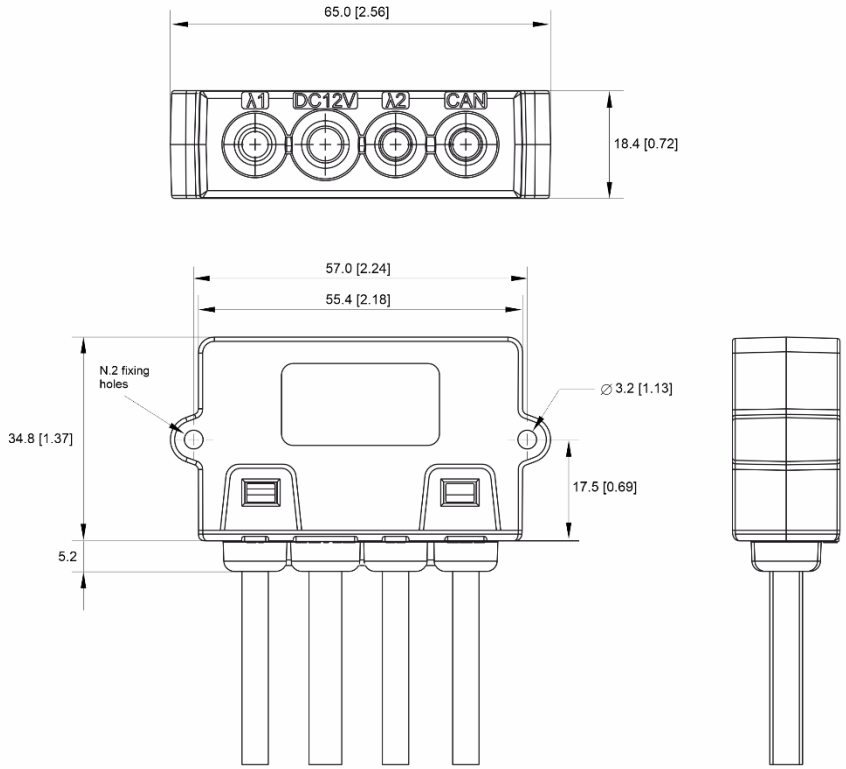
LCU1S/LCU2 technical specifications are:

- Sensor compatibility Bosch LSU4.
- 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 65.0x34.8x18.4mm
- Weight 70g
- Waterproof IP67

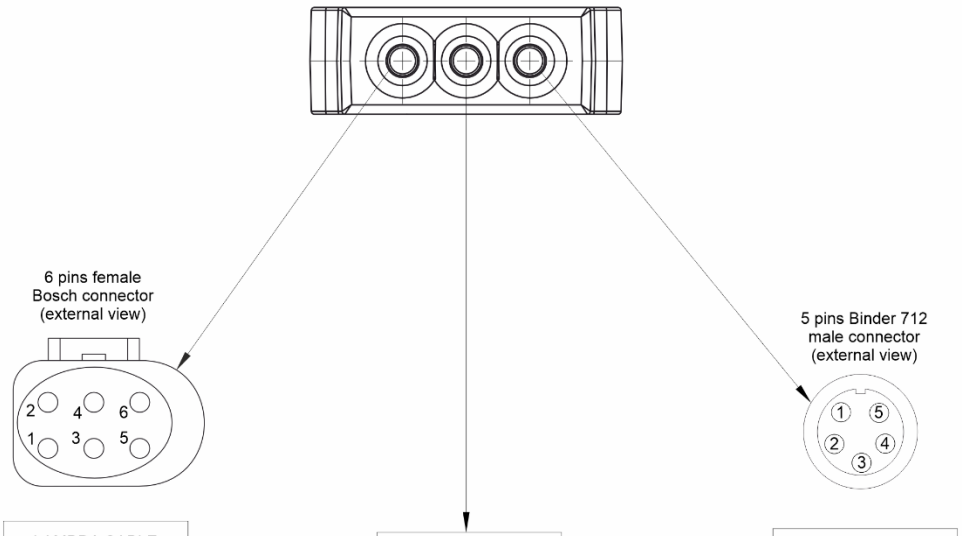
LCU1S Dimensions in mm [inches]



LCU2 dimensions in mm [inches]



LCU1S Pinout

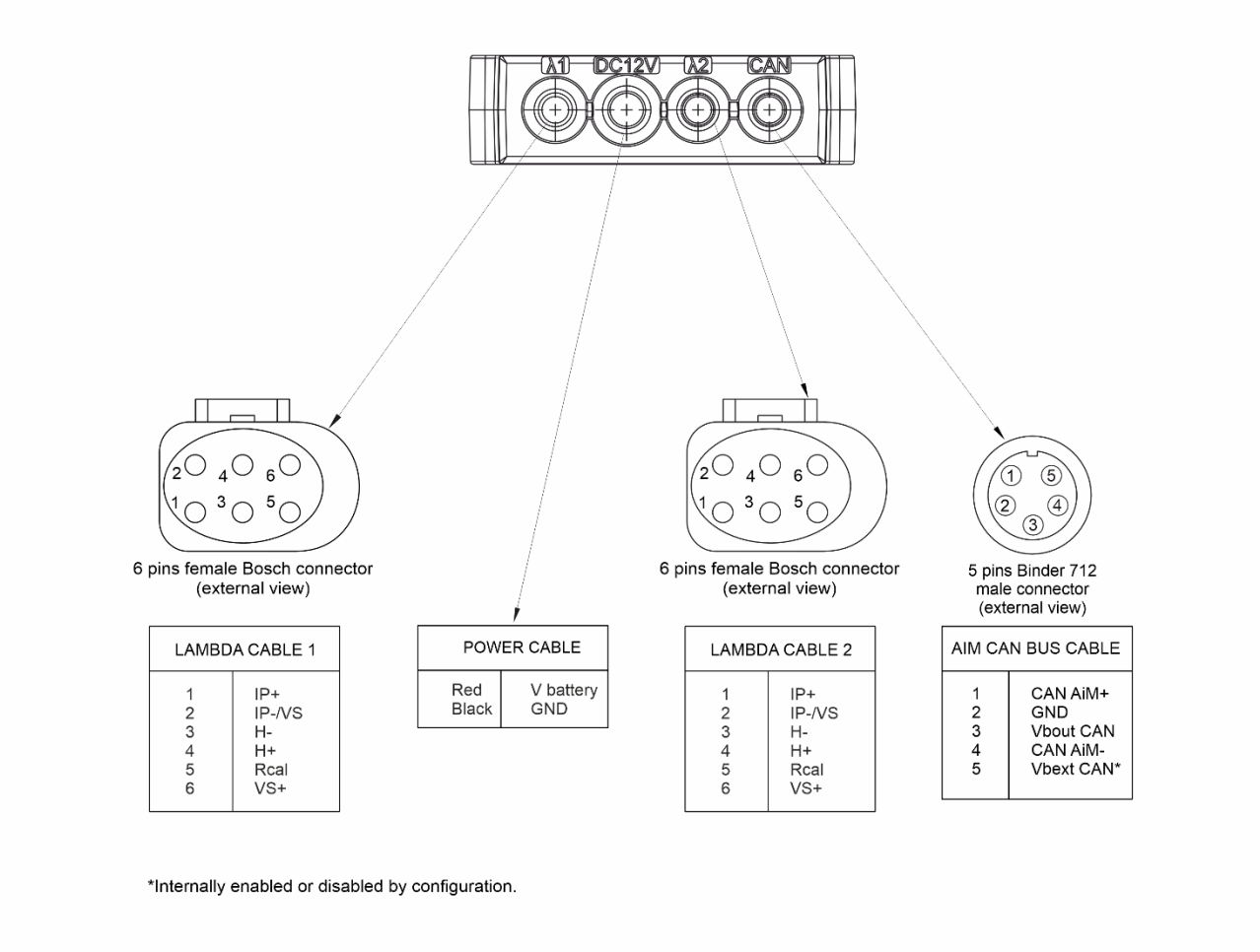


LAMBDA CABLE	
1	IP+
2	IP-/VS
3	H-
4	H+
5	Rcal
6	VS+

POWER CABLE	
Red	V battery
Black	GND

AIM CAN BUS CABLE	
1	AiM CAN+
2	GND
3	+Vb
4	AiM CAN-
5	Vbext

LCU2 Pinout



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

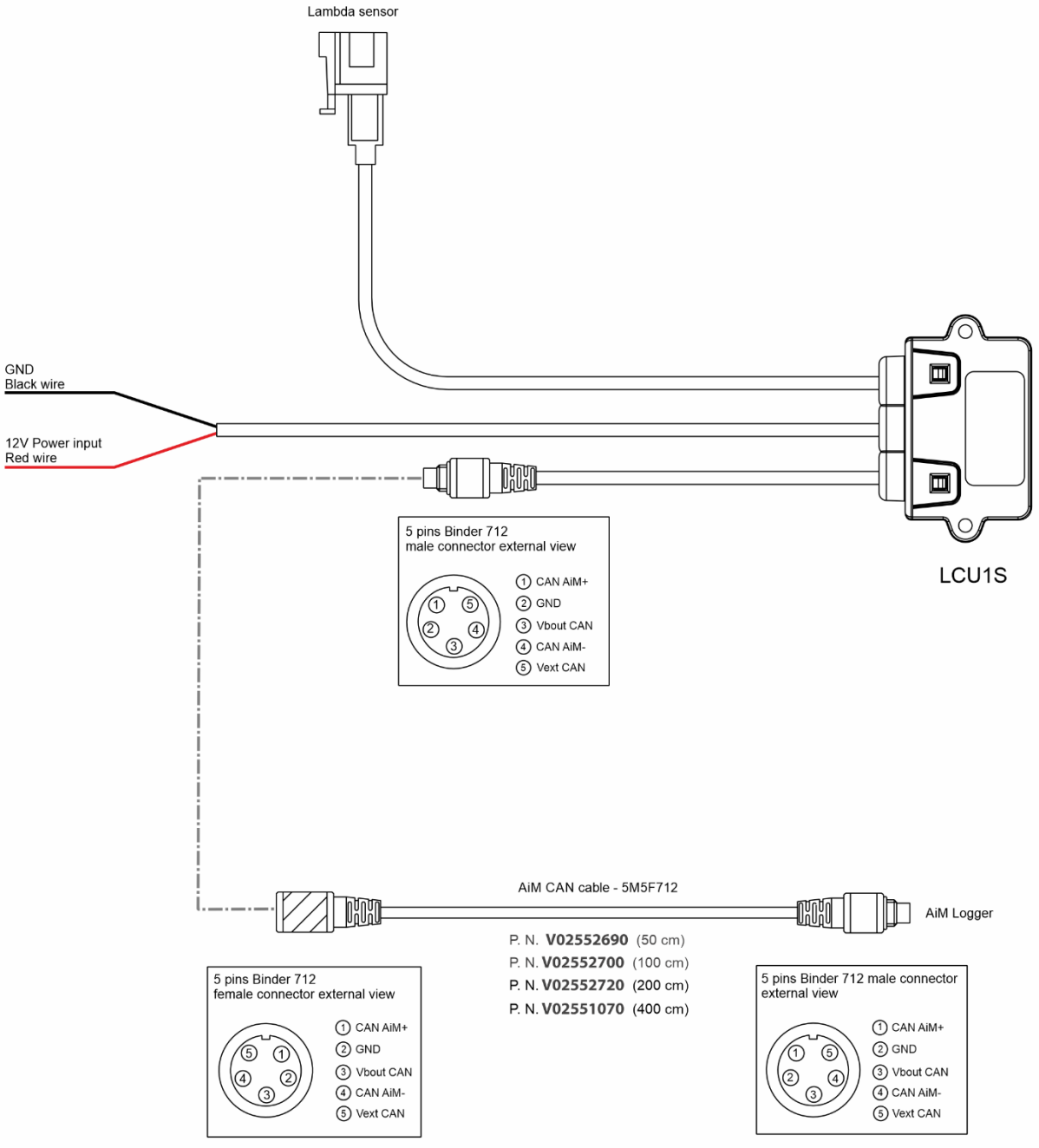
POWER CABLE	
Red	V battery
Black	GND

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

AIM CAN BUS CABLE	
1	CAN AiM+
2	GND
3	Vbout CAN
4	CAN AiM-
5	Vbext CAN*

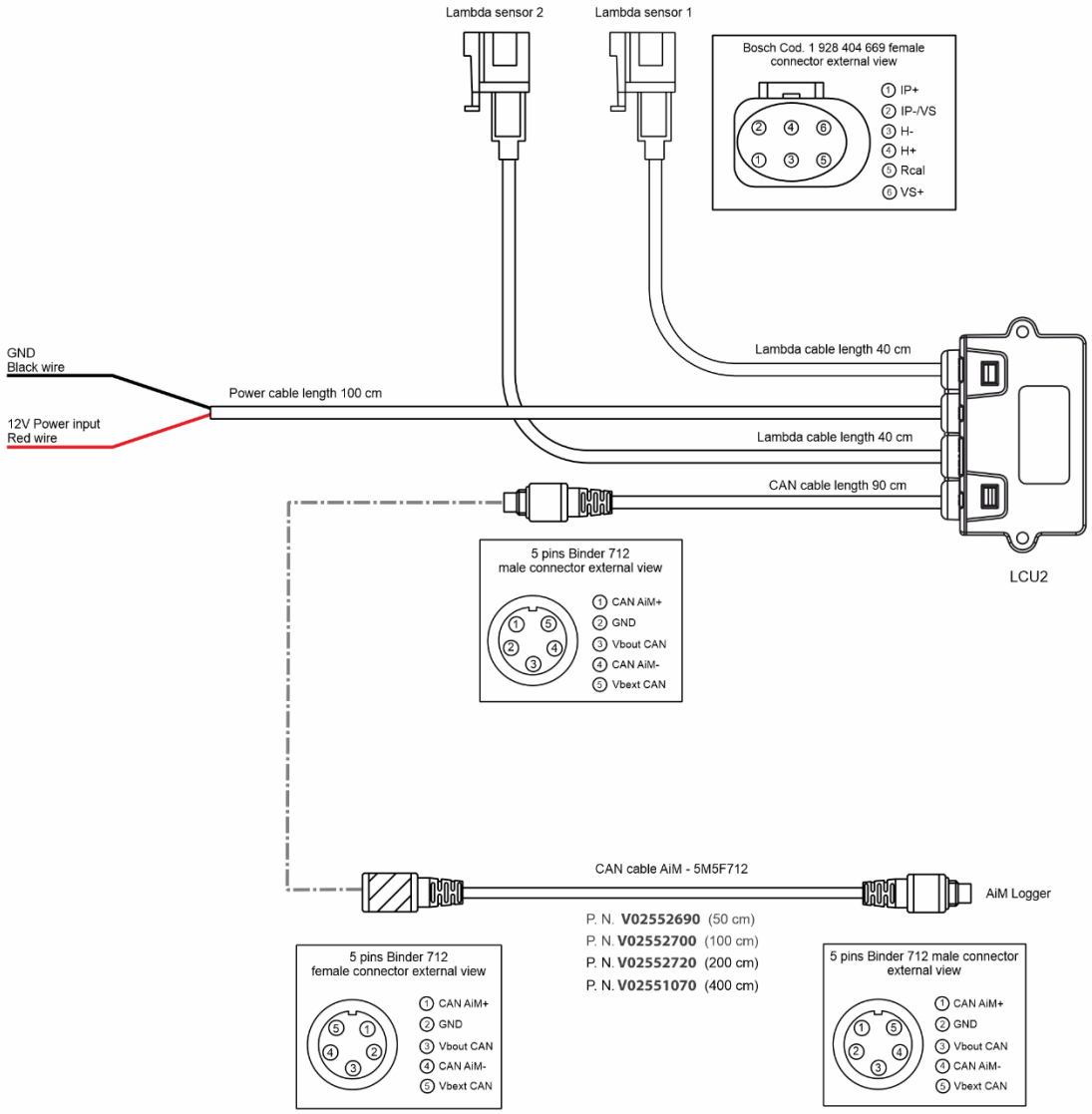
*Internally enabled or disabled by configuration.

LCU1S Connections



EXTERNAL POWER SUPPLY IS ALWAYS REQUIRED

LCU2 Connections



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