

**User Manual**

**LCU1S Open**

**Release 1.00**





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## 1 – Introduction

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LCU1S Open is the new smaller, lighter and faster AiM Lambda Controller open expansion that can be connected to non AiM CAN network. It is of course supported by AiM devices to. **Please note:** the only AiM systems that does not support LCU1S Open are MXL, MXL2 and MyChron.

LCU1S Open allows you to perfectly tune the carburation of the engine as well as to improve the engine performances.

LCU1S uses 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

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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

**Optional and spare parts:**

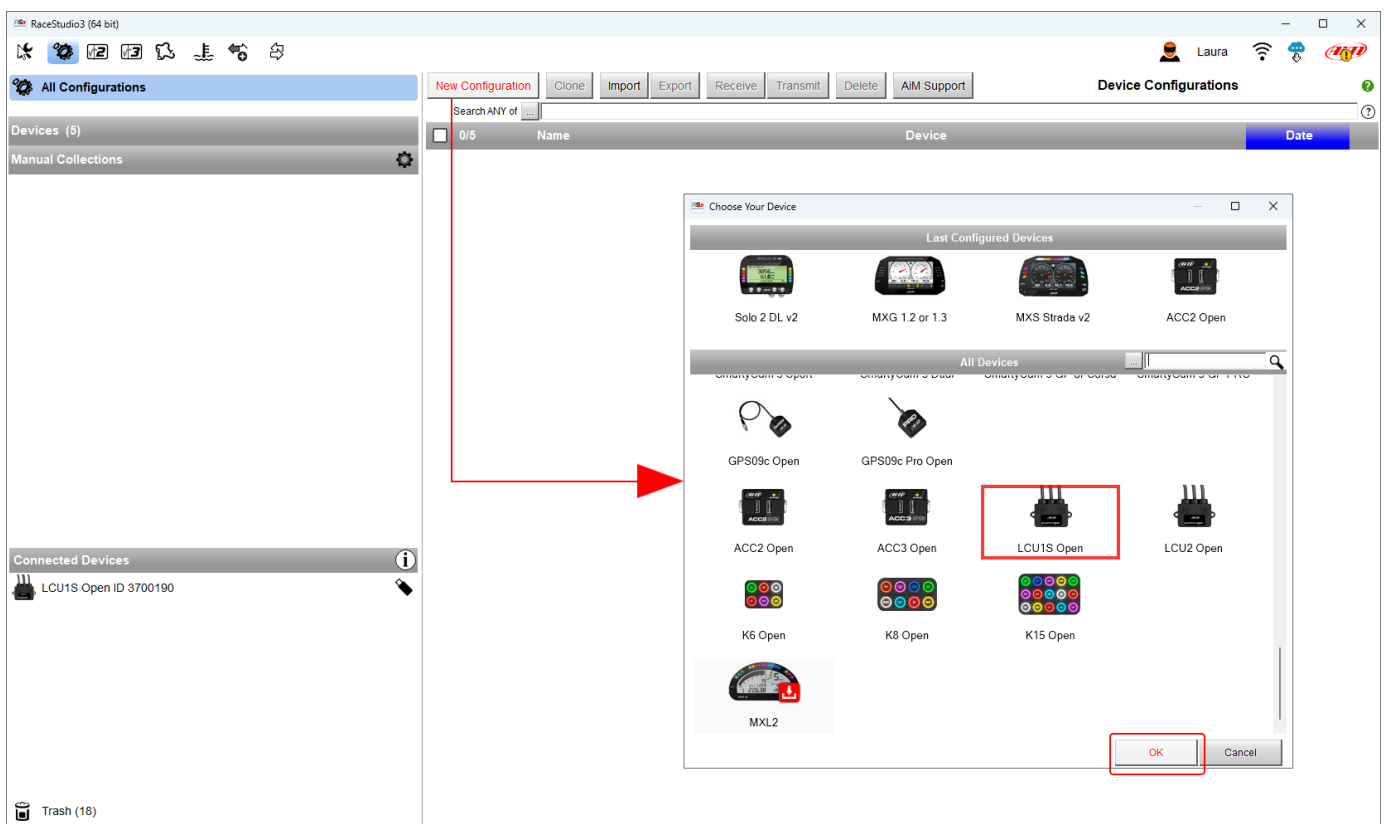
- |                                     |                  |
|-------------------------------------|------------------|
| • Bosch LSU 4.9 Lambda probe        | <b>X05LSU490</b> |
| • Thread iron ring for installation | <b>LBS552680</b> |
| • 50cm AiM CAN cable                | <b>V02552690</b> |
| • 100cm AiM CAN cable               | <b>V02552700</b> |
| • 200cm AiM CAN cable               | <b>V02552720</b> |
| • 400cm AiM CAN cable               | <b>V02551070</b> |

### 3 – Configuring LCU1S Open channels

LCU1S Open can only be configured using AiM RaceStudio 3 software you can freely download from AiM website at [www.aim-sportline.com](http://www.aim-sportline.com) download software/firmware area.

With LCU1S Open powered and connected to the PC, run the software and select the configuration to set or create a new one as shown here below. To create a new configuration:

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





The software enters “Channels” tab.

RaceStudio3 (64 bit) 3.81.06

AIM Devices

All Configurations **LCU1S Open 01**

Save Save As Close Transmit

**Channels** CAN Output

Open connected to AIM master

Total channels: 6 1%  
Total frequency: 25211 404%

Multiplier to calculate AFR (AF) from lambda (AFR = Air Fuel Ratio = pounds of air / pound of fuel)

14.57 - Gasoline Manage Custom Values

ID	<input checked="" type="checkbox"/>	Name	Function	Sensor	Unit	Parameters
Lmd	<input checked="" type="checkbox"/>	Lambda	Lambda	Lambda	# 0.01	
AFR	<input checked="" type="checkbox"/>	AFR	AFR	AFR	# 0.01	
LTm	<input checked="" type="checkbox"/>	LmdTmp	Lambda Temperature	LmdTmp	# 0.1	
LDg	<input checked="" type="checkbox"/>	Diagn	Lambda Diagnosis	LCU-One Diagn	#	

Once LCU1S Open added, the software enters the related tab (0LC1S Open). Here it is possible to set it. Specifically:

- According to the fuel used it is possible to select the related multiplier to calculate AFR from lambda (1)
- It is possible to manage Lambda multiplier through the related button (2) as well as to add a custom value (3)
- It is possible to set channel table (4) clicking on each channel and setting sampling frequency, Unit of measure and display precision.

Multiplier to calculate AFR (A/F) from lambda (AFR = Air Fuel Ratio = pounds of air / pound of fuel)

1 14.57 - Gasoline Manage Custom Values

6.40 - Methanol  
9.00 - Ethanol  
14.57 - Gasoline  
14.60 - Diesel  
15.50 - LPG (Propane)  
17.20 - CNG

ID	✓	Name	Function	Sensor	Unit	Parameters
Lmd	✓	Lambda	Lambda	Lambda	# 0.01	
AFR	✓	AFR	AFR	AFR	# 0.01	
LTm	✓	LmdTmp	Lambda Temperature	LmdTmp	# 0.1	
LDg	✓	Diagn	Lambda Diagnosis	LCU-One Diagn	#	

4

2

3

Lambda Multiplier Manager

Value	Label
6.40	Methanol
9.00	Ethanol
14.57	Gasoline
14.60	Diesel
15.50	LPG (Propane)
17.20	CNG

Change value above and click here to add it

Remove Current Item

Restore Default Values

OK Cancel

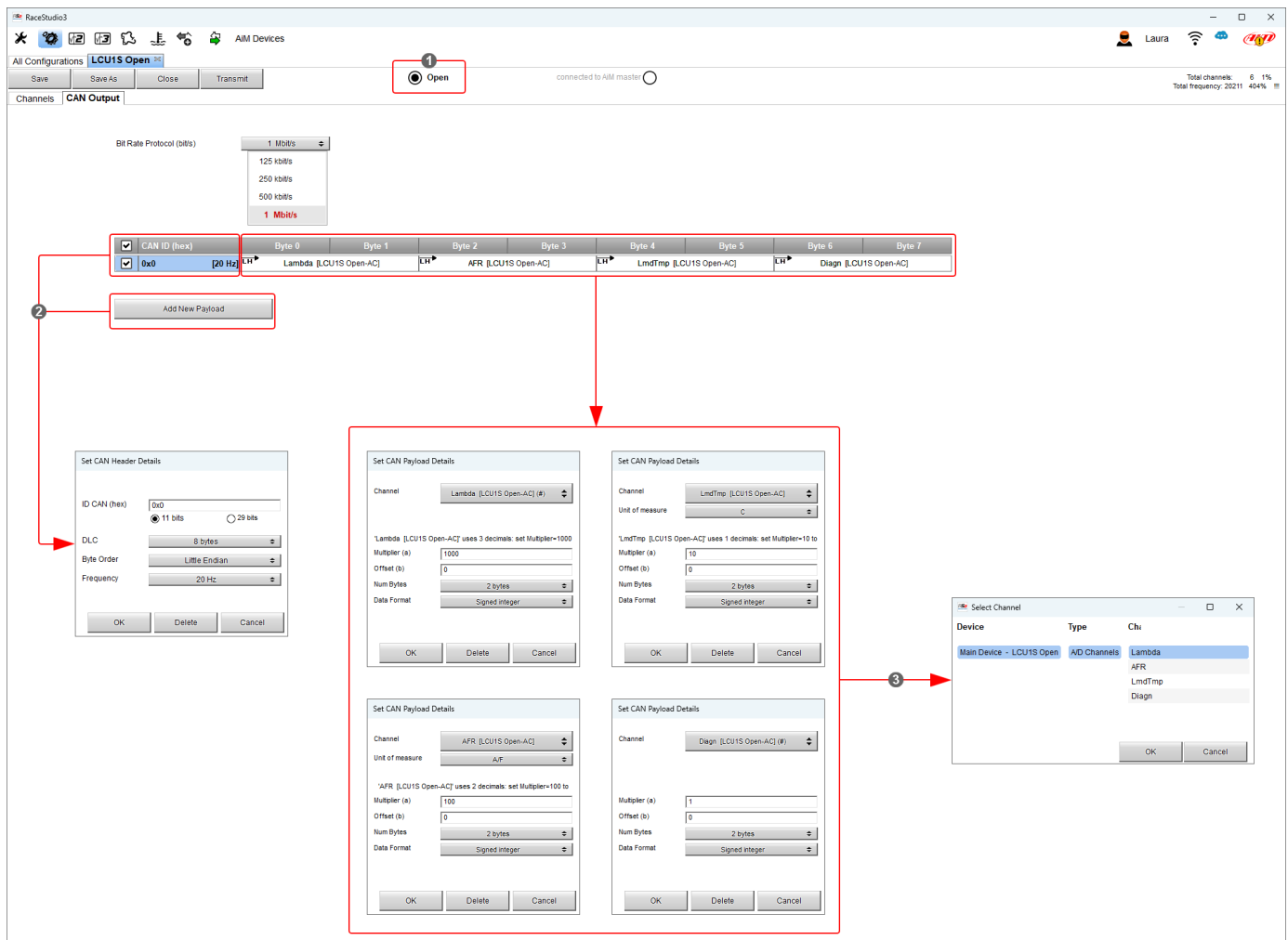
## 4 – Configuring LCU1S Open CAN Output

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 Open you can add and configure more payloads pressing the related button so to satisfy the network parameters.



The screenshot displays the RaceStudio3 interface for configuring LCU1S Open CAN Output. The interface is divided into several sections:

- Top Bar:** Shows the 'All Configurations' tab with 'LCU1S Open' selected. The 'Open' button is highlighted with a red circle and labeled '1'.
- Channels:** The 'CAN Output' tab is active. A dropdown menu for 'Bit Rate Protocol (bit/s)' is open, showing options: 125 kbit/s, 250 kbit/s, 500 kbit/s, and 1 Mbit/s. The 'CAN ID (hex)' is set to '0x0' and '20 Hz' is selected. The 'Add New Payload' button is highlighted with a red circle and labeled '2'.
- Byte Configuration:** A table shows the configuration for bytes 0 through 7:
 

Byte	0	1	2	3	4	5	6	7
Content	Lambda [LCU1S Open-AC]	AFR [LCU1S Open-AC]	LmdTmp [LCU1S Open-AC]	Diagn [LCU1S Open-AC]				
- Set CAN Header Details:** A dialog box showing 'ID CAN (hex)' as '0x0', 'DLC' as '8 bytes', 'Byte Order' as 'Little Endian', and 'Frequency' as '20 Hz'.
- Set CAN Payload Details:** Four dialog boxes are shown, each for a different channel:
  - Lambda [LCU1S Open-AC] (#):** Channel: Lambda [LCU1S Open-AC] (#), Unit of measure: C, Multiplier (a): 1000, Offset (b): 0, Num Bytes: 2 bytes, Data Format: Signed integer.
  - AFR [LCU1S Open-AC]:** Channel: AFR [LCU1S Open-AC], Unit of measure: A/F, Multiplier (a): 100, Offset (b): 0, Num Bytes: 2 bytes, Data Format: Signed integer.
  - LmdTmp [LCU1S Open-AC]:** Channel: LmdTmp [LCU1S Open-AC], Unit of measure: C, Multiplier (a): 10, Offset (b): 0, Num Bytes: 2 bytes, Data Format: Signed integer.
  - Diagn [LCU1S Open-AC] (#):** Channel: Diagn [LCU1S Open-AC] (#), Multiplier (a): 1, Offset (b): 0, Num Bytes: 2 bytes, Data Format: Signed integer.
- Select Channel:** A dialog box showing the 'Main Device - LCU1S Open' and 'AD Channels' with 'Lambda' selected.

Red arrows and numbers indicate the sequence of steps: 1 (Open button), 2 (Add New Payload button), and 3 (Select Channel dialog box).



## 5 – Online view and firmware update

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

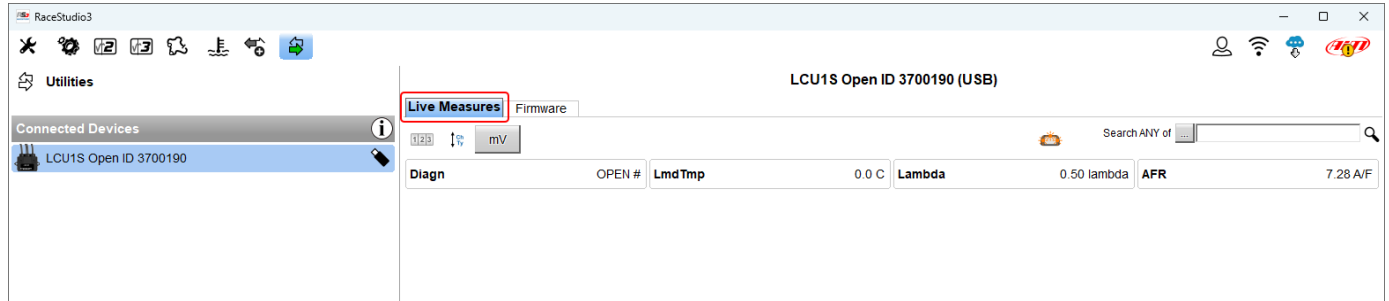
- enter “Configurations” view
- Press LCU1S Open connected.(3700190 in the example below)

The screenshot shows the RaceStudio3 (64 bit) 3.81.08 interface. The left sidebar has a 'Connected Devices' section highlighted with a red box, showing 'LCU1S Open ID 3700190'. The main area displays a table of device configurations under the 'Device Configurations' tab.

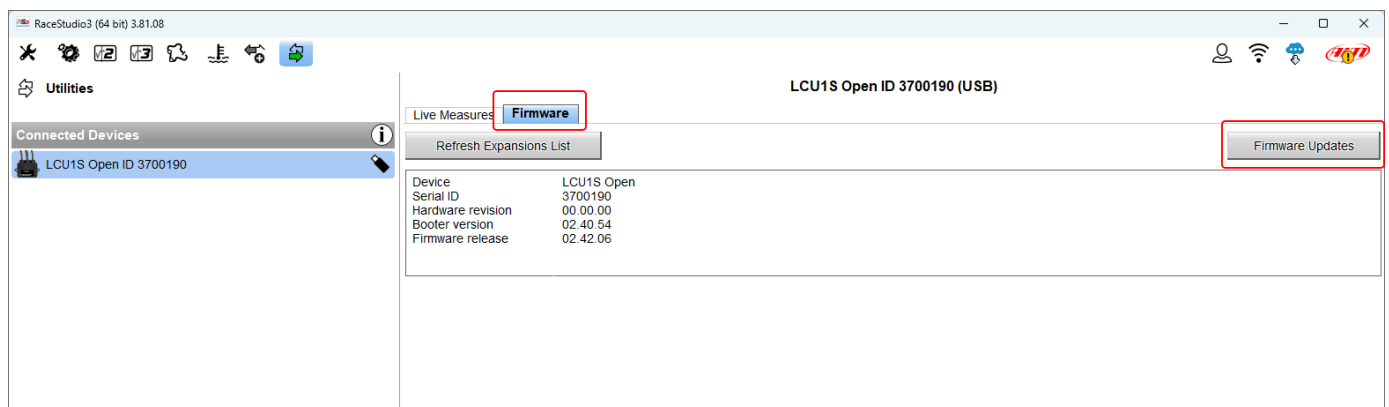
Name	Device	Date
Solo 2 DL v2	Solo 2 DL v2	2025, Jul 21 Jul 21
ACC3 Open	ACC3 Open	2025, Jun 20 Jun 20
MXS 1.x 01	MXS 1.2 or 1.3	2025, May 21 May 21
XLog	XLog	2025, Apr 30 May 05
MXS 1.x	MXS 1.2 or 1.3	2024, Dec 09 Monday, Dec...
PDM32	PDM32	2024, Oct 04 Friday, Octo...
K8 Open	K8 Open	2024, Sep 16 Monday, Sep...
SmartyCam 3 Sport	SmartyCam 3 Sport	2024, Aug 01 Thursday, Au...
SmartyCam 3 Dual	SmartyCam 3 Dual	2024, Aug 01 Thursday, Au...
SmartyCam 3 GP or Corsa	SmartyCam 3 GP or Corsa	2024, Aug 01 Thursday, Au...



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



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





The software enters Firmware update view.

To update LCU1S Open firmware scroll the list of available updates select, download and install LCU1S Open firmware as for any AiM device.

The screenshot shows the RaceStudio3 (64 bit) 3.81.08 Firmware update view. The interface includes a top toolbar with icons for various functions, a 'Connected Devices' list on the left, and a main area for selecting and downloading updates. The 'LCU1 S Open' update is highlighted with a red box.

Download Updates		Install SW	Export	Import	Update Device
Search ANY of					
<input type="checkbox"/> Name	On the web	Downloaded	Info		
<b>Software - Installed version: 'RaceStudio3 (64 bit) 3.81.08'</b>					
<input type="checkbox"/> RaceStudio3 (64 bit)	3.81.08	3.72.22			
<b>Firmware</b>					
<input type="checkbox"/> ACC2 Open	02.42.36	02.42.36			
<input type="checkbox"/> ACC3 Open	02.42.36	02.42.36			
<input type="checkbox"/> ECULog	02.42.68	02.42.68			
<input type="checkbox"/> EVO4S	01.32.40	01.32.40			
<input type="checkbox"/> EVO5	01.32.40	01.32.40			
<input type="checkbox"/> GPS09c Open	02.42.33	02.42.33			
<input type="checkbox"/> GPS09c Pro Open	02.42.33	02.42.33			
<input type="checkbox"/> GT Standalone	02.42.30	02.42.30			
<input type="checkbox"/> K15 Open	02.42.34	02.42.34			
<input type="checkbox"/> K8 Open	02.42.34	02.42.34			
<input type="checkbox"/> MX UTV	02.40.40	02.40.40			
<b>NEW</b> <input checked="" type="checkbox"/> LCU1 S Open	<b>02.42.01</b>	<b>02.42.06</b>			
<input type="checkbox"/> MX UTVv2	02.42.64	02.42.64			
<input type="checkbox"/> MX2E	02.42.35	02.42.35			
<input type="checkbox"/> MXG	01.32.34	01.32.34			
<b>NEW</b> <input checked="" type="checkbox"/> MXG 1.2	<b>02.44.01</b>	<b>02.44.00</b>			
<b>NEW</b> <input checked="" type="checkbox"/> MXG 1.2 Strada	<b>02.44.01</b>	<b>02.44.00</b>			
<b>NEW</b> <input checked="" type="checkbox"/> MXG 1.3	<b>02.44.01</b>	<b>02.44.00</b>			
<b>NEW</b> <input checked="" type="checkbox"/> MXG 1.3 Strada	<b>02.44.01</b>	<b>02.44.00</b>			
<input type="checkbox"/> MXK10	02.28.79	02.28.79			

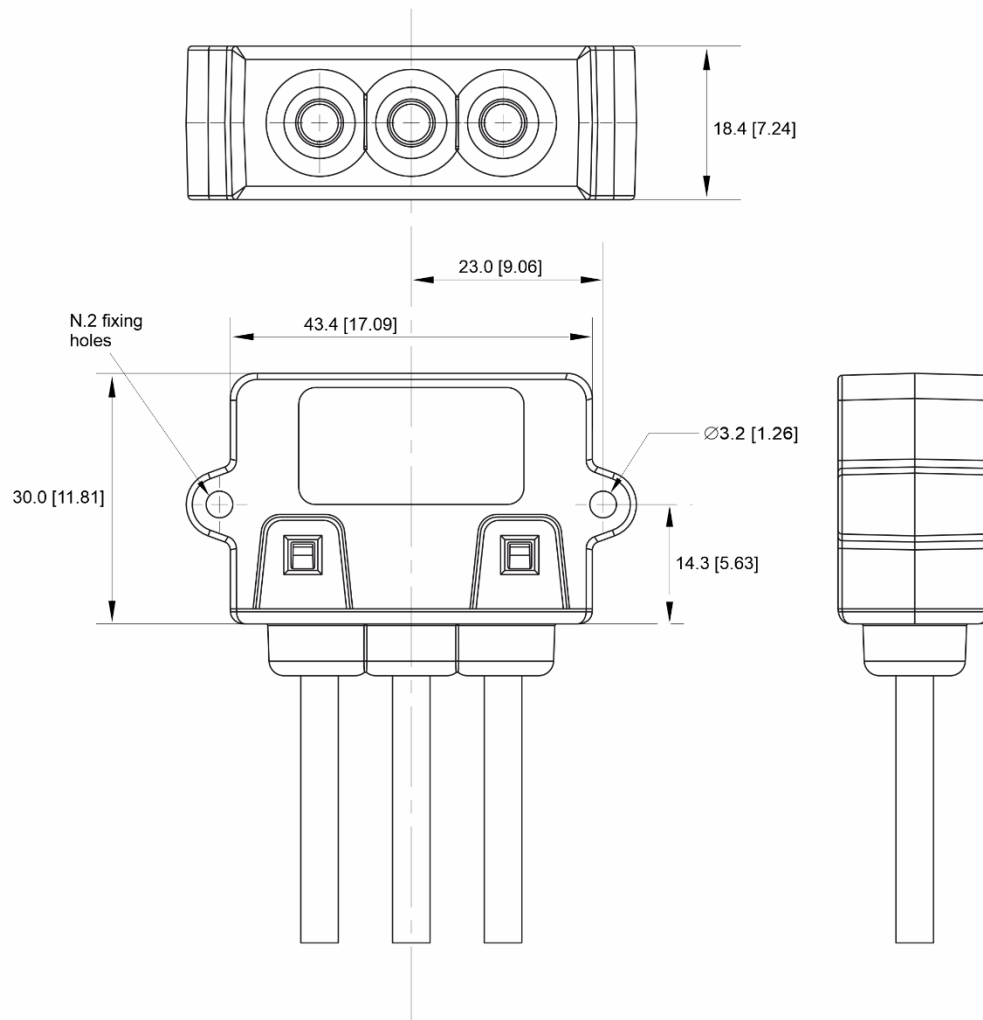


## 6 – Technical specifications and drawings

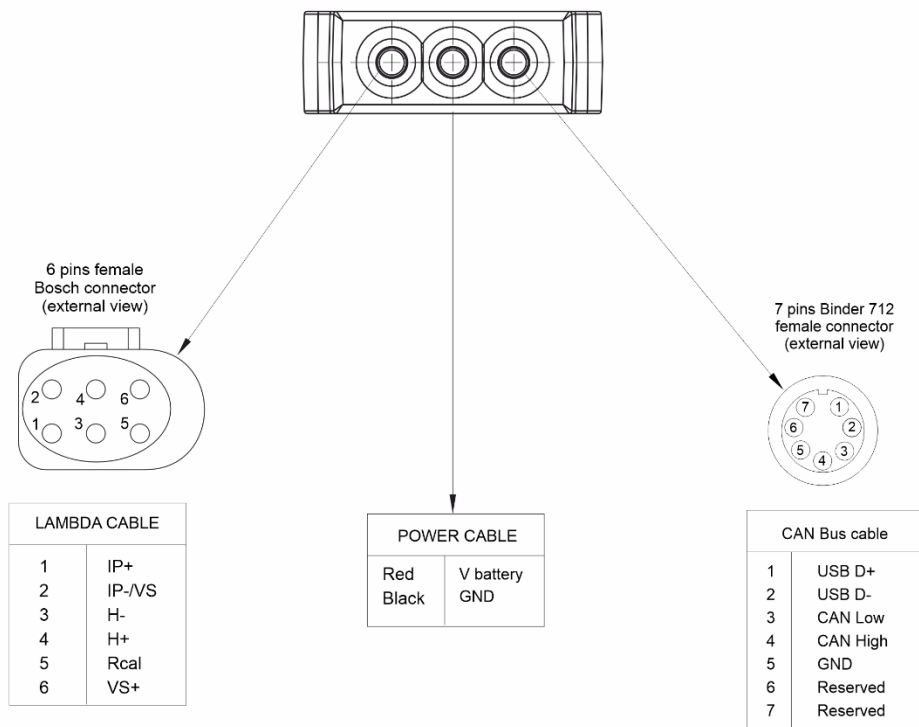
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LCU1S Open technical specifications are:

• 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
• Dimensions	43.4x30x18.4 mm
• Weight	70g
• Waterproof	IP67

**LCU1S Open Dimensions in mm [inches]**

## LCU1S Open Pinout



## LCU1S Open cables

