LCU-ONE CAN + Analog

User Manual







INDEX

| 1 – LCU-ONE CAN + Analog description | 2 |
|--|----|
| 2 – LCU-ONE mounting | 3 |
| 3 – LCU-ONE power | 3 |
| 4 – Lambda probe mounting | 4 |
| 5 – LCU-ONE connection | 5 |
| 5.1 – Analog Connection | 5 |
| 5.2 – CAN Connection | 6 |
| 6 – LCU-ONE Configuration | 8 |
| 6.1 – LCU-ONE standard analogue configuration | |
| 6.2 – LCU-ONE Analog custom configuration | 11 |
| 6.2.1 – Preliminary operation | 12 |
| 6.2.2 – Lambda controller Configuration | 12 |
| 6.2.3 – The keyboard | 15 |
| 6.2.4 – Informative panels | |
| 6.2.5 – The analog output graph | 17 |
| 6.2.6 – Online values from Lambda controller | |
| 6.3 – LCU-ONE CAN configuration | |
| 7 – Data visualisation on MXL/EVO3 | 25 |
| 7.1 – Data visualisation on MXL | 25 |
| 7.2 – Data visualisation on EVO3 | 25 |
| 8 – Data analysis with Race Studio Analysis | 26 |
| Appendix – Part numbers and technical drawings | 27 |
| "A" – Part number of LCU-ONE CAN+Analog complete kit | 27 |
| "B" – Spare parts | |
| "C" – Technical drawings | |



1 – LCU-ONE CAN + Analog description

LCU-ONE CAN+Analog (from here onward **LCU-ONE**) is a lambda controller for wide band BOSCH LSU 4.9 lambda probe. It fits petrol and diesel engines as well as alcohol based fuel engines. It is intended to check lambda probe proper working as well as to transmit Air/Fuel Ratio values or Lambda values both through the CAN bus or through a serial RS232 bus.

Lambda value is defined as the ratio between instant AFR and Stoichiometric AFR, to say:

LAMBDA = (A/F)/(A/F) Stoichiometric

where:

A = incoming part of air;

F = parts of petrol the carburetor injects into the engine;

A Stoichiometric / F Stoichiometric = parts of air needed to burn Stoichiometric F;

For gasoline i.e. it needs 14,57 parts of air to completely burn a part of gasoline, obtaining Lambda value=1 read by the probe.

LCU-ONE controller can detect lambda values in a range of 0.65 to 1.6 (free air).

It is reminded that a lambda value lower than 1 means a rich mixture while a lambda value higher than 1 means a lean mixture.

Wide band Lambda probe needs to be heated to work properly and not being poisoned with exhausted gas; **LCU-ONE** precisely manages the probe heater so to keep temperature values in the optimum working range.

If using the CAN bus, **LCU-ONE** supplies information about the probe temperature and a diagnostic highlighting improper functioning situations of the same probe (probe not connected, GND short circuit, power short circuit).

Lambda value is supplied through a 0-5 Volts analog output configurable through **Lambda Configurator**, the software properly developed by AIM to configure its analog controllers.

On the other hand Lambda/AFR value, as well as probe temperature and diagnostics, comes through the CAN bus.

Lambda probe used with LCU-ONE becomes very hot (around 700-800 °C, 1291-1472 °F); it is thereby necessary AVOIDING:

touching it placing it in contact with flammable stuff or fuel.

Warning:

disrespect of those precautions, can cause shocks, burnings or explosions.



2 – LCU-ONE mounting

Install **LCU-ONE** in a flat location and far from heat sources. Install it steady using the lateral fixing holes.

Arrange the wiring in the engine compartment or in the cockpit paying attention not to let them pass close to heat sources.

If using the CAN bus, remember that CAN cable needs to be terminated with an appropriate resistance. This is why the kit includes the terminator inserted in the Deutsch connector plug.

3 – LCU-ONE power

To work properly, **LCU-ONE** needs an external power (between 10 and 15 volts).

It manages the probe heater, that needs 15-20 watt power.

Ensure that LCU-ONE is powered by the vehicle master switch so to avoid it absorbing power from the battery when the engine is off.

To power **LCU-ONE** follow this scheme:

GND cable (black): connect it to vehicle GND (battery negative pole suggested).

power cable (red): connect it to an external 12 volt power source through the vehicle master switch and **protected with an (at least) 5 ampere fuse**.

In case power cable needs to be extended, use cables whose section is at least 1,34 mm².



4 – Lambda probe mounting

Install **LCU-ONE** in a flat location and far from heat sources; install it steady using the supplied bracket.

Arrange the wiring so to avoid it passing close to heat sources.

BOSCH LSU 4.9 Lambda probe is to be installed on the vehicle exhaust pipe using a specific adaptor supplied with the kit and is to be welded on the same pipe. The probe should be sufficiently near to the engine.

Probe working temperature should not exceed 900°C (1652°F) and the same probe should not be exposed to the free flame coming from the exhaust system.

Probe installation angle should be of at least 10° to avoid liquid stuff to come in contact with the probe, polluting it.



Once the probe is installed, pay attention not to let the cable pass near to excessively heated sources (the exhaust pipe for example).

Bosch LSU 4.9 probe auto-calibrates (no calibration is thereby required to the user).

Do not use solvents or additives to clean the probe connector. It is suggested to remove the probe when cleaning the vehicle so to avoid polluting it with detergents.

Never switch the vehicle on with Lambda probe installed and not connected to a correctly working **LCU-ONE** controller: a probe not heated and exposed to exhaust gas would be irremediably damaged.

N.B. BOSCH LSU 4.9 Lambda probe has been designed and developed to be used with unleaded or diesel engine. It can be used with other kind of engines too but its duration needs to be verified by the user with specific tests.



5 – LCU-ONE connection

5.1 – Analog Connection



Refer to the image above to make an **LCU-ONE** analog connection.

Extensions labelled as "3" and "4" are to be used to interface **LCU-ONE** with AIM loggers, while extension labelled as "5" is to be used for serial programming.

Refer to this tutorial appendix for items part numbers and connectors pinout.



5.2 – CAN Connection



In case of a CAN connection with only one **LCU-ONE**, follow the scheme shown above. Use extensions labelled as "1" and "2" to make CAN connections with AIM loggers that support it. It is reminded to use the proper cap indicated in the figure above ("CAN termination") to terminate CAN line.

It is suggested to insert a 5 A fuse for each controller in series between external battery and **LCU-ONE** to protect the system.

Refer to this tutorial appendix to know items part number and connectors pinout.

LCU-ONE, like the logger, needs to be powered by the vehicle master switch.

As far as the connections with the loggers are concerned refer to each logger user manuals.

Warning: connect LCU-ONE to AIM loggers OFF





In case of more than one **LCU-ONE**, the scheme to be followed is the one indicated above.

It is suggested to insert a 10 A fuse for each controller in series between the external battery and Lambda controller to protect the system. It is recommended to use the proper cap indicated in the previous figure ("CAN termination") to terminate the CAN line.

Refer to this tutorial appendix to know each item part number.

LCU-ONE, like the logger, needs to be powered by the vehicle master switch.

As far as connections with the loggers are concerned, refer to the related user manuals.



6 – LCU-ONE Configuration

To work properly **LCU-ONE** needs to be configured for both the CAN part and the analog part. In case **Race Studio 2** software is available it is possible to use it to completely configure **LCU-ONE**. In case the only analog configuration is needed, follow this instruction.

6.1 – LCU-ONE standard analogue configuration

LCU-ONE analogue part can be configured both through **Race Studio Configuration** software and using the dedicated **Lambda configurator** software.

Configuration through **Race Studio Configuration** (standard configuration) is only possible if calibration curve points $1.95 \rightarrow 0.65 \text{ e} 4.8 \rightarrow 1.6$ have not been modified.

To use Race Studio Configurazione follow this procedure:

run the software;

press "AIM system manager" button on the left vertical keyboard;

select the logger **LCU-ONE** is connected to;

activate channels layer;

select the analogue channel to set the probe on;

double click on type of sensor column corresponding to that channel and select "AIM Lambda LCU-ONE (0.65 - 1.6 Lambda)", as shown here below and click out of the cell to confirm the choice.

| 📓 System man | ager | | | | | | | | | | |
|---------------------|--------------------|------------------------|----------------------|----------------|----------|--|-------------------------------|------|---------------|-----------------|-----------------|
| | ransmit | Receive | | CAN-N | et info | . 🔊 | Set acquisition syste time | m | | | |
| Current configurati | on | | | | | 1 | | | | 1 | |
| Installation name | Data logger type | Ecu | Vehicle name | Available tim | 9 | Time with GPS | Total frequency | Mas | ter frequency | Expansions freq | Tot. Expansions |
| DEFAULT | MXL PISTA | SUZUKI - GSXR | DEFAULT | 12.41.26 (h. | n.s) | 4.36.03 (h.m.s) | 91 (Hz) | 91 (| Hz) | 0 (Hz) | 1 |
| 1 | | | | | | | | | | | |
| Select configural | tion Channels Syst | tem configuration CAN- | Expansions configura | ator | | | | | | | |
| -Speed 1 | | | | | | | | | | | |
| | () 726 | _ | | | | | | | | | |
| Wheel circumfei | rence (mm) / 736 | | | | | | | | | | |
| Pulses per whee | el revolution 4 | - | | | | | | | | | |
| | , | | | | | | | | | | |
| Channel iden | Enabled/disabled | Channel name | | Sampling frequ | 56 | ensor type | | | Measure unit | Low scale | High scale |
| RPM | F Enabled | Engine | | 10 Hz | En | gine revolution spee | d | | rpm | 0 | 16000 |
| SPD_1 | Enabled | Speed_1 | | 10 Hz | 🗾 Sp | eed | | - | km/h .1 | 0.0 | 300.0 |
| CH_1 | 🔽 Enabled | Oil_Press | | 10 Hz | 🗾 Ge | neric linear 0-5 V | | - | ۷.1 | • 0.0 | 5.0 |
| CH_2 | 🔽 Enabled | Fuel_Level | | 10 Hz | 💌 Fu | iel level | | - | % | 0 | 100 |
| CH_3 | Disabled | Channel_3 | | 10 Hz | ▼ Ge | eneric linear 0-5 V | | - | ۷.1 | -] 0.0 | 5.0 |
| CH_4 | Disabled | Channel_4 | | 10 Hz | 🔳 La | mbda sensor NGK TL | 7111W1 - NTK TC6110 | - | A/F .1 | • 0.0 | 5.0 |
| CH_5 | Disabled | Channel_5 | | 10 Hz | - Pr | essure VDO 0-2 bar | | ~ | ∀.1 | ▼ 0.0 | 5.0 |
| CH_6 | Disabled | Channel_6 | | 10 Hz | Pr Pr | essure VDO 0-5 bar | | _ | ۷.1 | • 0.0 | 5.0 |
| CH_7 | Disabled | Channel_7 | | 10 Hz | | RBOX pressure sense | or - X05SNAB01 | | ۷.1 | ▼ 0.0 | 5.0 |
| CH_8 | Disabled | Channel_8 | | 10 Hz | | RBOX pressure sense | or - XOSSNABOO | | ۷.1 | - 0.0 | 5.0 |
| CALC_GEAR | Disabled | Calculated_Gear | | 10 Hz | Ze | ro based potentiome | ter | | # | 0 | 9 |
| ACC_1 | Enabled | LatAcc | | 10 Hz | Mi | d zero potentiometer mbda sensor BOSCH | • | | g .01 | -3.00 | 3.00 |
| LOG_TMP | Enabled | Datalogger_Temp | | 10 Hz | La | mbda sensor NGK TL | 7111W1 - NTK TC6110 | | °⊂ . | <u> </u> | 50 |
| BATT | Enabled | Battery | | 1 Hz | | ater pitot speed sens ro | sor | | V .1 | 5.0 | 15.0 |
| ECU_1 | Enabled | ECT | | 10 Hz | Ex | ternal vertical accele | rometer | | °⊂ | <u>-</u> 0 | 130 |
| ECU_2 | Enabled | GEAR | | 10 Hz | EX EX | ternal horiz, accelero peric linear 0-5 V | ometer | | # | U | / |
| ECO_9 | | MODESEL | | TU HZ | Ge | neric linear 0-500 m\ | / | | # | U | 3 |
| | | | | | Ge | neric linear 0-50 mV 51 0-100 psi sepsor | | | | | |
| | | | | | M | 51 0-150 psi sensor | | | | | |
| | | | | | SE | AT Brake Pressure AT Engine Pressure | | | | | |
| | | | | | SE | AT Water Temperatu | re | | | | |
| | | | | | Oi | ater Temp Suzuki GS/ I Press Suzuki GS/R | XR | | | | |
| | | | | | St | atus signal | 000 ol) | | | | |
| | | | | | Oi | pressure Nagano KN | 410 | | | | |
| | | | | | | M Lambda LCU-ONE (| (0,65 - 1,6 lambda) | | | | |
| | | | | | Fu | iel level | | | | | |
| | | | | | Su | ib_H2O istom_001 | | | | | |
| | | | | | a | istom_002 | | ¥ | | | |
| < | | | | | Ш | | | | | | > |
| | | | | | | | | | | | |



Set the probe configuration panel that appears bottom on the left of channel layer, highlighted in the figure here below.

| nent configuratio | animal | Receive | | CAN-Net i | 40 🥺 | time | | | | | |
|--|------------------------------|--------------------------|---|----------------|-------------------------|-----------------|---|-----------------|---------------------|--------------------|------------------|
| | n | | Terrere and the second s | T | | 1 | | teriter tiritik | 1274-13 1074-148 | | |
| stallation name | Data logger type | e Ecu | Vehicle name | Available time | Time with GPS | Total frequency | ! | Master fre | dneu | cy Expansions free | 1 Tot. Expension |
| elect configuration Speed_1 Wheel circumfere Pulses per wheel | on Channels Systemce (mm) 73 | stem configuration CAN | Expansions configura | tor | | | | | | | |
| hannel iden | Enabled/disabled | Chappel name | | Sampling frequ | Sensor tune | | | Measureur | * | Low scale | High scale |
| PM | Enabled | Engine | | 10 Hz +1 | Engine revolution speed | 1 | | rpm | - | 0 | 16000 |
| 1.09 | Enabled | Speed 1 | | 10 Hz • | Speed | | + | km/h .1 | | 0.0 | 300.0 |
| 4.1 | Enabled | OIL Press | | 10 Hz •1 | AIM Lambda LCU-ONE (| 0,65 - 1,6 la | - | A/F .1 | | 0.0 | 5.0 |
| H.2 | Enabled | Fuel Level | | 10 Hz - | Fuel level | | | % | | 0 | 100 |
| 13 | C Disabled | Channel_3 | | 10 Hz - | Generic linear 0-5 V | | | ¥ .1 | | 0.0 | 5.0 |
| 4 | Cisabled | Channel_4 | | 10 Hz - | AIRBOX pressure senso | r - X055NA801 | - | mbar | | 0 | 5 |
| US I | C Disabled | Channel_5 | | 10 Hz 📰 | AIM Lambda LCU-ONE (| 0,65 - 1,6 la | | A/F .1 | | 0.0 | 5.0 |
| 1.6 | T Disabled | Channel_6 | | 10 Hz - | Generic linear 0-5 V | | | V .1 | | 0.0 | 5.0 |
| 0 | T Disabled | Channel_7 | | 10 Hz - | Generic linear 0-5 V | | • | ¥ .1 | | 0.0 | 5.0 |
| 18 | C Disabled | Channel_8 | | 10 Hz - | Generic linear 0-5 V | | | ¥ .1 | - | 0.0 | 5.0 |
| LC_GEAR | T Disabled | Calculated_Gear | | 10 Hz 💌 | Calculated Gear | | | | | 0 | 9 |
| C_1 | Frabled | LatAcc | | 10 Hz 🚽 | Lateral accelerometer | | | g .01 | | -3.00 | 3.00 |
| G_TMP | F Enabled | Datalogger_Temp | | 10 Hz 🔄 | Cold joint | | | °C | - | 0 | 50 |
| TT | F Enabled | Battery | | I Hz 💌 | Battery | | | ¥ .1 | | 5.0 | 15.0 |
| U_1 | F Enabled | ECT | | 10 Hz 🔳 | Temperature sensor | | | *C | - | 0 | 130 |
| U_2 | Enabled | GEAR | | 10 Hz - | Gear sensor | | | | | 0 | 7 |
| U_9 | Frabled | MODESEL | | 10 Hz 🔳 | Raw value | | | | | 0 | 3 |

Activate the drop down menu pressing the button green circled in the figure here above and select the type of fuel used by the vehicle.

| Multiplier to calculate AFR from lan | bda |
|---|------------------|
| (14.57) Gasoline | Add custom value |
| (14.57) Gasoline (15.50) LPG (Propane) (6.40) Methanol (9.00) Ethanol (17.20) CNG (14.60) Diesel | |



In case the used fuel is not included in the database (and **only in case its Stoichiometric value is known**) press "Add custom value" button and the window here below appears.

| Custom multiplier value | | × |
|------------------------------|--------------------------------|---|
| Custom multiplier value list | New value Legend for new value | |
| | Save Cancel | |

Fill in the new value and its legend. Press "Add new item to" button and then "Save" button.

The fuel is now available in the drop down menu: select it.



6.2 – LCU-ONE Analog custom configuration

In case calibration curve default points have been changed it is necessary to configure **LCU-ONE** analog part using **Lambda Configurator**, the software properly designed and developed by AIM to manage this device and freely downloadable from AIM website <u>www.aim-sportline.com</u>.

Warning: to correctly configure the controller, ensure that Lambda Configurator is 1.00.07 or later. Moreover it is suggested to perform this operation with the controller switched on and connected.

| Connected to | a 🖬 | lor opt |
|-------------------------------------|---|---------|
| NOT CONNECTED | Analog output for lambda (or AFR) values | |
| N.D. Device ID number | 4.8 Vot | |
| N.D. | 1.95 1.5 | |
| Firmware version | 0 | |
| JN.D. | O.65 1 1.6 Lambda (AFR = Air Fuel Ratio = Pounds of air / pound of fuel) CMultiplier to calculate AFR from lambda | 2 |
| A Restore default lambda | Use: Lambda AFR Add custor | n value |
| Iransmit Iambda configuration | Volt vs. lambda curve points 1.95 Volt at Lambda 0.65 Analog output value in particular conditions Warmup output: Volt 3 or high impe | dance: |
| Read lambda | 4.8 Volt at Lambda 1.6 Error output: Volt 1.5 or high impe | dance |
| Upgrade firmware | Save lambda settings Load lambda settings Racing Da | ata Po |

To configure **LCU-ONE Analog** run the software. The window below appears.

This is the software main window, made of two layers:

- Lambda controller configuration: shows analog output for lambda (or AFR) values graph (central) and is used to configure LCU-ONE Analog, read and transmit the configuration, restore default lambda settings and upgrade LCU-ONE firmware (see paragraph concerning preliminary operations).
- Online values from Lambda controller: shows the status of the connection between LCU-ONE and the PC.



6.2.1 – Preliminary operation

Lambda Configurator software, differently from other AIM software, includes a firmware version of the logger it configures. This is why it is suggested to always check <u>www.aim-sportline.com</u> to know if the software version installed on the PC is the last available. If not download the last one, install it and follow this procedure:

- connect LCU-ONE to the PC serial port
- read logger firmware version that appears in the proper case on the left of the central graph
- press "Upgrade firmware" button
- this panel appears:



If firmware version proposed (in the image above the software proposes version 25.11) is more recent than the one installed on the controller (if for instance the logger has a version 25.08) press "Yes" button and upgrade the firmware.

6.2.2 – Lambda controller Configuration



Under the central graph are configuration panels.



| ($AFR = Air$ Fuel Ratio = Pounds of air / pound of fuel) | Multiplier to calculate AFR from lambda |
|--|--|
| Use: Lambda AFR | |
| Volt vs. lambda curve points | Analog output value in particular conditions |
| 1.95 Volt at Lambda 0.65 | Warmup output: Volt 3 or high impedance 🥅 |
| 4.8 Volt at Lambda 1.6 | Error output: Volt 1.5 or high impedance |
| | |

The first operation to perform is selecting the used fuel in the pop up menu of "Multiplier to calculate AFR from Lambda" panel shown below or insert a new multiplier following the procedure here explained.

| Multiplier to calculate AFR from lam | bda |
|--------------------------------------|------------------|
| (14.57) Gasoline | Add custom value |
| (14.57) Gasoline | |
| (15.50) LPG (Propane) | |
| (6.40) Methanol | |
| (9.00) Ethanol | |
| (17.20) CNG | |
| (14.60) Diesel | |

In case the used fuel Is not included in the database (and **only in case its Stoichiometric value is known**) press "Add custom value" button and the window shown below appears.

| Custom multiplier value | |
|------------------------------|-------------------------------------|
| Custom multiplier value list | Jew value Legend for new value |
| | <mark>√ S</mark> ave C ancel |

Insert the new value and the related legend. Press "Add new item to list" button and then "Save" button.

Likewise, selecting a multiplier from the left box labelled "Custom multiplier value list" and pressing "Remove selected item from list", a multiplier is removed.



Afterwards operate on the other parameters.

| ($AFR=Air\;Fuel\;Ratio=Pounds\;of\;air\;/\;pound\;of\;fue$ | el) Multiplier to calculate AFR from lambda |
|---|--|
| | (14.57) Gasoline Add custom value |
| Use: Lambda AFR | |
| Volt vs. lambda curve points | Analog output value in particular conditions |
| 1.95 Volt at AFR 9.47 | Warmup output: Volt 3 or high impedance |
| 4.8 Volt at AFR 23.31 | Error output: Volt 1.5 or high impedance |

"Use: Lambda/AFR" these buttons allow the user to decide if showing Lambda values or AFR (Stoichiometric values). This choice reflects on the layout of the panel, as shown below:

| -Volt vs. lambda cu | -Volt vs. la | ambda curv | e points | | | |
|---------------------|----------------|------------|---------------------------------------|-----|-------------|-------|
| 1.95 | Volt at Lambda | 0.65 | 1. | .95 | Volt at AFR | 9.47 |
| 4.8 | Volt at Lambda | 1.6 | 4. | .8 | Volt at AFR | 23.31 |
| ····· | | | · · · · · · · · · · · · · · · · · · · | | | |

The coloured button beside the cases indicates the colour this value is drawn in the central graph (in the example the value is shown in light blue).

When the values to show have been decided it is sufficient to fill in the cases with the desired values or leave default ones.

When all values have been inserted it is necessary to transmit the configuration to **LCU-ONE** pressing "Transmit Lambda configuration" button in the left lateral keyboard.

The system shows a confirm message or an error message in case PC connection is not OK (right figure).

| Lambda Configurator 🛛 🔀 | | | | | |
|-------------------------|---------------------------|--|--|--|--|
| (į) | Configuration transmitted | | | | |
| | ОК | | | | |

| Lambda Configurator | | | | | | |
|---------------------|---------------------------------|--|--|--|--|--|
| ♪ | Lambda controller not connected | | | | | |
| | ОК | | | | | |



6.2.3 – The keyboard

On the left of the window are some buttons:

| 入 Restore default lambda | (AFR = Air Fuel R | latio = Poun | ds of air / | pound of fuel) |
|-----------------------------|---------------------|------------------------|-------------|-------------------------|
| | Use: | Lambda | AFR | |
| Transmit Iambda | Volt vs. lambda cur | rve points | • | |
| | 1.95 | Volt at | AFR | 9.47 |
| Read lambda | 4.8 | Volt at | AFR | 23.31 |
| | | | | |
| Upgrade firmware | - | ave lambda settings | B | Load lambda settings |

- "Restore default lambda settings": allows the user to restore default settings on LCU-ONE.
- "Transmit lambda configuration": allows the user to transmit the configuration to the device
- "Read lambda configuration": reads the configuration from a logger
- "Upgrade Firmware": allows the user to update controller firmware.

Bottom central are these buttons:

- "Save lambda settings": allows the user to export a lambda configuration
- "Load lambda settings": allows the user to import a Lambda configuration and transmit it to the controller

In the lower part of the window are:

| <mark>√ ⊡</mark> k | | Exit |
|--------------------|------------|------|
| | <u> Ок</u> | |

- on the left "Select language": allows to change the software language
- on the right "OK" button to save fixed settings and "Exit" to quit without saving.



6.2.4 – Informative panels

Top left of the software main window, a series of panels shows some information concerning the connected **LCU-ONE**. These panels layout changes depending on the fact that the logger is connected or not.

The figure below shows panels layout with **LCU-ONE** connected on the left and with the controller not connected on the right.

| Connected to | |
|-----------------------|--|
| COM 1 | |
| · | |
| Device type | |
| LCU - ONE ANALOG | |
| , Device ID number | |
| 1002225 | |
| Firmware version | |

- Connected to: PC serial port
- Device type: LCU-ONE Analog (the controller has been recognised)
- Device ID number: controller unique ID number
- Firmware Version: controller firmware version.

| Connected to |
|------------------|
| NOT CONNECTED |
| · |
| Device type |
| N.D. |
| |
| Device ID number |
| ND |
| N.D. |
| |
| Firmware version |
| N.D. |
| 1 |

• If **LCU-ONE** is not connected; the panel shows the message "not connected" and all data concerning the controller are set on N.D. (Not available)



6.2.5 – The analog output graph



The "analog output graph" shows output tension values of the controller that refer to measured Lambda (or AFR) values. Graph colours can be changed. Pressing "*Colour options*" button top on the right and this window appears:



Pressing each button a colour choice panel appears showing the available colours for that graph characteristic. Selecting the desired colour and confirming the choice the graph layout changes.



6.2.6 – Online values from Lambda controller.

| AIM - Lambda Configura | tor - 1.00.07 | | |
|--|--------------------------------------|---------------------------------|------|
| Lambda controller configuration | Online values from lambda controller | | |
| Connected to | Lambda to AFR multiplier | 14.57 | |
| COM 1 Device type LCU - ONE ANALOG | Lambda measure | Battery measure [Volt] 12.61 | |
| 1002225 Firmware version 25.11 | Temperature measure | | |
| – Lambda sond status Open load | | | |
| | | | |
| | | Racing Day | |
| Select language | | | Exit |

This panel shows the controller status and allows the user to set only Lambda/AFR and temperature unit of measure for the shown values.



6.3 – LCU-ONE CAN configuration

As said before, **LCU-ONE** can communicate using the CAN bus too and this type of communication allows it to interface with AIM **MXL/EVO3**. To better profit by this channel it is necessary to configure the controller with **Race Studio 2** software. Refer to the related user manual for further information on the software and to the loggers user manual for further information on these latter and their configuration.

It is suggested to perform this operation with the logger and the controller switched on and connected. Run the software and select the desired logger: **MXL** or **EVO3 PRO/Pista**. The window below appears. Select "**CAN-Expansions configurator**" layer. In case of very first configuration the layer is empty as shown below.



Press "Add Expansion" button and the window shown below appears:



Select **LCU-ONE CAN (CAN only or CAN+analog output)**. The two fields under the keyboard enables, press "*Get serial number from a connected expansion button*" and the system reads the controller serial number. It is also possible to insert this information manually keeping it from the controller.

Repeat this operation as many times as many lambda probes are connected.



The layer is modified as shown below and as many additional layers as many Lambda probe have been added appear.

| ace Studio 2 - version: 2.30.00 |) Analasia - ATM suchas i | lastification Only | ATRA austrasia asilia | tion Curton and | c.l.t | | | | | |
|---|--|--|---|----------------------|--|---|---------------------------|---------------------------------------|---------------------|-------------------|
| Aur system manager Download data | System manag | er | e Alm system callor | acioni Customi sensi | urs manager belett | Language ? | | | | |
| Racing Data Power | Trar | smit | B Receiv | | CAN-Net in | ifo 🚺 | Set acquisition s time | ystem | | |
| AIM Sportline | Current configuration | | | | | | | | | |
| world ceader in Data Acquisition | Installation name | Data logger type | Ecu | Vehicle name | Available time | Time with GPS | Total frequency | Master freque | ncy Expansions freq | . Tot. Expansions |
| | DEFAULT | MXL PISTA S | SUZUKI - GSXR-KI | DEFAULT | 8.48.56 (h.m.s) | 3.58.06 (h.m.s) | 131 (Hz) | 91 (Hz) | 40 (Hz) | 2 |
| Go to Analysis | Select configuration | Channels Syste | m configuration CA | N-Expansions configu | irator | | | | | |
| Download data | Add Expa | | Del. Expansion | | | | | | | |
| AIM system manager | Name of expa | nsion configuration | (6 characters max.) |) LC | (| 📜 Get serial n | umber from a | | | |
| | Ser | ial number of expan | sion (S.N.) | | | Connected | l expansion | | | |
| AIM system identification | Enabled/disable | d Channel nam | e | Sampling | freque Sensor ty | pe | Mea | asure unit Lo | ow scale Hig | h scale |
| , | Enabled | LC_Lambda | | 10 Hz | 🗾 Lambda s | gnal | lami | bda .01 🖃 0. | .00 2.0 | 0 |
| | Enabled | LC_AFR | | 10 Hz | 🗾 AFR signa | l | A/F | .01 💽 0. | .00 20.1 | 00 |
| | C Disabled | LC_LamTmp | | 10 Hz | Temperat | ure sensor | °C | - 50 | 00 900 | |
| Online | ☐ Disabled | LC_Diagn | | 1 Hz | 🗾 Lambda D | iagnosys | # | 0 | 5 | |
| AIM system calibration Custom sensors manager Select Language | Multiplier to ca (14.57) Ga Analog output Warmu Erro | culate AFR from lan soline value in particular o p output: Volt 3 r output: Volt 1.5 | nbda Add cust onditions or high imp or high imp | edance | FR = Air Fuel Ratio = Use: vs. lambda curve po 1.95 Voli 4.8 Vol | Pounds of air / pour Lambda nts at Lambda 0.4 at Lambda 1.4 | AFR | Restore default lambda settings | | |
| | 5 4.8 | | | | Analog output fo | lambda (or AFR) vi | alues | | | |
| | Vot | | | | | | | | | |
| | 3 | | | | | - | | | | |
| | 2.5 | | | | | | | | | |
| | 1.95 | | | | | | | | | |
| aim-sportline.com | - | | | | | | | | | |
| 8 2007 AIM SRL | 0 | | | | | | | | | |
| HEL RIGHTS RESERVED | 0 | | | 0.65 | | 1 Lombala | | 1.0 | 6 | 2 |
| CO SUL NAVIGLIO, MILAN - ITALY | | | | | | Lamoda | | | | |

In case serial number has not been get, press "Get serial number from a connected expansion" button.

Warning: this operation is necessary to transmit the configuration to the controller.

The layer concerning the probe is shown above.

Тор

| Name of expansion configuration (6 characters max.) | LC | Get serial number from a |
|---|----|------------------------------|
| Serial number of expansion (S.N.) | | connected expansion |

Fields "Name of expansion configuration (6 characters max)" and "Serial number of expansion". Inserting a name for the new configuration the layer label is modified live. As far as serial number is concerned, see before.



Central in the page a table made of 7 columns shows the controller channels.

| Enabled/disabled | Channel name | Sampling freque | Sensor type | Measure unit | Low scale | High scale |
|------------------|--------------|-----------------|--------------------|--------------|-----------|------------|
| Enabled | LC_Lambda | 10 Hz 🗾 | Lambda signal | lambda .01 💌 | 0.00 | 2.00 |
| 🔽 Enabled | LC_AFR | 10 Hz 🗾 | AFR signal | A/F .01 📃 | 0.00 | 20.00 |
| Disabled | LC_LamTmp | 10 Hz 🗾 | Temperature sensor | °C 🗾 | 500 | 900 |
| Disabled | LC_Diagn | 1 Hz 🗾 | Lambda Diagnosys | # | 0 | 5 |
| | | | | | | |
| | | | | | | |

Enabled/disabled: shows channel status (enabled/disabled). It can be modified checking or un-checking the related checkbox. LCC_lambda (Lambda value) and LCC_AFR (AFR value) channels are enabled by default.

Channel name: shows the name of the channel and can be modified double clicking on the cell, that becomes editable.

Sampling Frequency: shows the channel sampling frequency and can be set through the pop up menu that appears clicking on the cell (accepted values are from 1 to 50 Hz).

Sensor type: shows the sensor installed on that channel and can not be modified.

Measure Unit: shows the unit of measure used to sample that channel and can be modified double clicking on the cell.

Low/High scale: these columns show the channels low and high scale and can be modified double clicking on the cells.



Under the table is "Multiplier to calculate AFR from lambda" field. It allows to both change used fuel and insert a new one.

| | | 1 | |
|-----------------------|---|---|------------------|
| (14.57) Gasoline | - | | Add custom value |
| (14.57) Gasoline | | | |
| (15.50) LPG (Propane) | | | |
| (6.40) Methanol | | | |
| (9.00) Ethanol | | | |
| (17.20) CNG | | | |
| (14.60) Diesel | | | |

Select the used fuel to show AFR.

In case used fuel is not included in the database and **only in case its Stoichiometric value is known** press "Add custom value" button and the figure below appears.

| Custom multiplier value | |
|------------------------------|--|
| Custom multiplier value list | New value Legend for new value |
| | <mark>√ <u>S</u>ave <u>C</u>ancel</mark> |

Insert the new value and the related legend. Press "Add new item to list" button and then "Save" button.

Likewise, selecting a multiplier from the left box labelled "Custom multiplier list" and pressing "Remove selected item from list" button the multiplier is removed.

The **remaining part of the layer** refers to the configuration of **LCU-ONE** analog part. This part of **Race Studio 2** works like **Lambda Configurator**. Refer to the related paragraph for the analog configuration.



Once enabled/disabled the channels it is possible to decide which channel to show on the display depending on the logger and on the connected peripherals. In case of an **MXL** it is possible to show the channels setting them in "System configuration" layer.

| 🚰 Race Studio 2 💿 version: 2.30.00 | | | | |
|---|---|--|---|-----------------------------------|
| File AIM system manager Download data A | Analysis AIM system identification Online AIM system calibration Custo | m sensors manager Select Language ? | | |
| | 🐸 System manager | | | |
| Rating Data Pewer | Lansait La Receive | 😰 CAN-Net into 🕴 | Set acquisition system | - |
| AIM Sportline The World Leader in Data Acquisition | Current configuration Installation name Data togger type Ecu Vehicle nam | ne Available time Time with GPS | S Total frequency Master frequenc | y Expansions freq Tot. Expansions |
| Go to Analysis | DEFAULT MOL PISTA S. SUZURI - CSXR-47 DEFAULT Select configuration Diamons System configuration DWE spansore | 8 44 55 (h m.s) 3 57.17 (h m configurator | s) 132 (Hz) 91 (Hz) | 41 (Hz) 2 |
| Download data | AlM sensor Multiply factor /2 - CCU sonat MAX value 14000 - | Shift Lights Speed Channel Spe | ed_1 | |
| AIM system manager | Over-rev log Alam led None Over-rev threshold Gets sensor Colorband | | Lap segments |)) |
| AIM system identification | Nore Puterionelie Charrel 6 F01 | | Show lap time Show odometer Show running lap time | |
| Online | 6 | 4 5 6 1 / 65 | Channel for alarm Thres | hold |
| AIM system calibration | L Outress Battery 13.3 BEST | 32 1 18:35 LRP L 18:13 | H None 4 H None 4 | |
| Custom sensors manager | Field 1 - always displayed | | Measure Short nan Field 2 - always displayed | ne |
| Select Language | Icc_Lembda IcAM Field 3 - page 1 Icc_AFR Icc_AFR Icc_AFR | Enable static string | MODESEL MAP Field 4 - page 1 | - |
| | Field 3 - page 2 Text 1 LC_Diogn DIAG | 1 | Field 4 - page 2 | 1 |
| | | | | |
| aim-sportline.com | | | | |
| W 2007 AM SAL ALL NIGHTS RESERVED VIA CAVALCANTI, 6 | | | | _ |
| CERNUSCO SUL NAVIGLIO, MILAN - ITALT | | | | 12 |

In this example enabled channels are LCC_Lambda, LCC_AFR and LCC_diagnosis. As shown below each channel can be set in a display field. The example shows the channels set on the fields of pages 1 and 2 of **MXL** (blue box).

| Rom | Shift Lights | -Speed | | |
|---------------------------------------|------------------------|-------------|------------------------------|--------------------------|
| AIM sensor Multiply factor | 15300 🔘 | Channel S | peed_1 | • |
| ECU signal MAX value 16000 | 15000 | | Lap | |
| Over-rev log | 13000 | | Obscuring time 8 | |
| Alarm led None Over-rev threshold V |) 14500 🚫 | | (sec.) | - (5) |
| Gear sensor | 14000 | | Lap segments | 1-LAP |
| | 14000 | | Show lap time | |
| Potentiometer Calculated with neutral | 13500 💿 | | Show odometer | |
| Channel 8 Highest gear number | | | Show running lap time | |
| ECU 7 | 199 9900 | | Condition enabling checked a | larms |
| | | | Engine 🗾 | 2000 |
| Channel for alarm Conditioned | 4 5 6 7 8 | 55 | Channel for alarm | Conditioned Threshold |
| | GEAR | P34 | Fuel_Level 🗾 🗸 | 20 Off |
| | 32 1.18 | 9.35 | None | n Off |
| | 100 | 172 | None | |
| | | | | |
| Link alarm to measure fields | | · · · · MXI | | |
| Measure Short name | | and sur | Measure | Short name |
| Field 1 - always displayed | Enable static string — | _\ ` | Field 2 - always displayed | MAP |
| | | | | |
| Field 3 - page 1 | | — \I | Field 4 - page 1 | |
| | | | | |
| Field 3 - page 2 | | | Field 4 - page 2 | |
| None | | | None | |



In case of an **EVO3** data visualisation is only possible if the logger is connected to a **Formula Steering Wheel** or to a **MyChron3 Dash** and they are set on that display configuration as shown below.



Note: LCC_diagnosis channel shows the probe working status and can show up to four messages:

- 0: status OK
- 1: probe not connected
- 2: + 12 V short circuit
- 3: GND short circuit

The configuration is now ready to be transmitted to the logger.

Warning: this operation needs to be repeated for all the connected LCU-ONE.

When all parameters have been set and the fields assigned it is necessary to transmit the configuration to the logger pressing "*Transmit*" button on **Race Studio 2** top keyboard.

If the configuration has been correctly transmitted the system shows no messages. Otherwise, the system shows the window below.

| ł | xpansion configuration prob | lems | | | |
|---|--|----------------------------|--------------------------------|---------------------------|--------|
| | To transmit configuration, following p | problems have to be fixed: | | | |
| | Name of expansion configuration | Expansion type | Expansion Serial Number (S.N.) | Charles . | ······ |
| | LC | LCU-ONE | | No serial number assigned | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | · | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

It warns the user that no serial number has been assigned to the connected expansion. It is thereby necessary to close this window pressing "*Cancel*" button and get the expansion serial number pressing "Get serial number form a connected expansion" button as explained before.



7 – Data visualisation on MXL/EVO3

7.1 – Data visualisation on MXL

The visualisation of Lambda channels on **MXL** works like the visualisation of any other channel and switch from one page to the other of the display is made through "MEM/View" button. Refer to **MXL** user manual for further information. In the image below Lambda value is **0.955** and channel name is **LAM**.



Switching **MXL** on, Lambda controller is recognised at start up and probe warm-up procedure starts. During this period the controller takes the probe to its working temperature (up to around 780 $^{\circ}$ C – 1436 $^{\circ}$ F). During warm-up (around 20-30 seconds), Lambda value shown on the display is 1.00. When the probe is 100% working displayed value becomes, with the engine off, 1.60 (free air).

Warning: it is reminded that LCU-ONE, like the logger, needs to be powered by the vehicle master switch.

7.2 – Data visualisation on EVO3

Visualisation of lambda channels on **EVO3** works exactly like the visualisation of any other channel and is possible only if the logger is connected to a display like **MyChron3 Dash** and **Formula Steering wheel**. Refer to **EVO3** user manual for further information. In the image below Lambda value is 0.95 and the field is labelled as " λ "



Switching **EVO3** on, Lambda controller is recognised at start up and probe warm-up procedure starts. During this period the controller takes the probe to its working temperature (until around 780 °C – 1436 °F). During warm-up (around 20-30 seconds), lambda value shown on the display is 1.00. When the probe is 100% working, that value becomes, with the engine off, 1.60 (free air).

Warning: it is reminded that LCU-ONE needs to be powered, like the logger, by the vehicle master switch.



8 – Data analysis with Race Studio Analysis

During data analysis, the presence of Lambda controller adds one or more channels, depending on which channels have been enabled in **LCU-ONE** layer, to measures toolbar (as shown in the figure below):

Lambda: shows Lambda value recorded during the session; Lambda_Temp: indicates the probe internal temperature while working;

| Manag | jement | | | × | | | | | | |
|--------|------------------|------|-------------|--------|--|--|--|--|--|--|
| Meas | sures Laps Prof | iles | | | | | | | | |
| Pe 'Pe | r Lap' Color 🛛 🚺 | | Sort | | | | | | | |
| | Tests Loaded: | | | | | | | | | |
| X | ROZZANO D MARF | λA (| 6-08-05 1_0 | 001 | | | | | | |
| | 5 00 | .35. | .350 | | | | | | | |
| | Measu | es: | | | | | | | | |
| | Engine | | | rpm | | | | | | |
| | Datalogger_Temp | | | °C | | | | | | |
| | Battery | | | ٧ | | | | | | |
| | Lambda | | | lambda | | | | | | |
| 1 | Lambda_Temp | | | °C | | | | | | |

To better analyse engine carburation values, it is suggested to show XY Lambda graph with RPM value on abscissa value and Lambda value on ordinate axle. This way a more immediate reading of carburetion status is available.





Appendix – Part numbers and technical drawings

"A" – Part number of LCU-ONE CAN+Analog complete kit

WARNING: each kit contains one only extension for each communication protocol and depending on the connector (plastic or metallic) that is wished on the wiring and that is in any case included in the kit, kit part number is going to change following this table. LCU-ONE CAN+Analog complete kit includes: LCU-ONE CAN+Analog Bosch LSU 4.9 lambda probe X08LCKACR CAN+Analog + RS232 wiring Extension with plastic RS232 Deutsch connector CAN line termination cap Metallic CAN + metallic Analog X08LCKACR710 Plastic CAN + metallic Analog X08LCKACR711 Metallic CAN + plastic Analog X08LCKACR610 Plastic CAN + plastic Analog X08LCKACR611 "B" – Spare parts BOSCH LSU 4.9 Lambda probe X05LSU490 CAN + Analog + RS232 wiring V02359040 Analog extension plastic Deutsch Binder 712 (metallic) V02359070 Analog extension plastic Deutsch Binder 719 (plastic) V02359060 Extension plastic RS232 Deutsch connector V02539130 CAN extension plastic Deutsch Binder 712 (metallic) V02359100 CAN extension plastic Deutsch Binder 719 (plastic) V02359110 V02359080 CAN termination cap



"C" – Technical drawings







| N.rev. / Rev. | N. Descrizione / | Description | | | | Data / date | Firma / Sign | Contr. da / Ckd. by |
|---------------|------------------|----------------------|--|--|--|--------------------|--------------|---------------------|
| | | PINO | UT LCU- | ONE | CAN+Ana | alog | | |
| | | | | | | | | |
| | | | 1 GND (pov 2 +V bat 3 H- 4 IP-/VS 5 VS+ 6 RS232RX 7 +VB 8 GND (CA 9 H+ | ver) 10 t 11 - 13 14 PC 15 16 AN) 17 18 | Rcal IP+ RS232TX PC CAN+ CAN- nc GND (signal) Lambda Out GND (RS232) | | | |
| Rif. / Ref. | Q.tà / Q.ty | Materiale / Material | | 1 | | N. articolo / Iter | m N. | |
| Progettato d | a / Designed by | Contr. da / Ckd. by | Approvato da / Approved by | Nome file / File r | name | Data / Date | | Scala / Scale |
| | <u> </u> | | Titolo / Title | Pine | out LCU-ONE CAN | +Analog | | |
| (/ | 7 8/1 | | N. disegno / Drawing N. | | | | Rev. / Rev. | Foglio / Sheet |
| Rad | cing Data P | ower | | | | | | 1 di 1 |



| N.rev. / Rev. | N. Descrizione / I | Description | | | | Data / date | Firma / Sign | Contr. da / Ckd. by |
|---|----------------------------------|-----------------------------------|--|---|---|--|---|---------------------|
| | | 9 pins DB9 serial female connetor | NOTE : for the serial line to work properly make a connection between pins 7 (RTS) and 8 (CTS) of DB9 connector | | | | | |
| cable via Analog | AN+Analog | | 9876 0000 54321 | 9 pins serial DB9 female connector pinout Contacts insertion view | DB9 connector pinout | 1 nc 2 RS232RX PC 3 RS232TX PC 4 NC | 8 4 6 BND C C C C C C C C C C C C C C C C C C C | 2 2 2 |
| RS232 programming ca for LCU-ONE CAN Connettore Deutsch 4 pin fermina | Connettore Deutsch 4 pin Fermina | | 4 pins Deutsch female connector pinout Contacts insertion view | Deutsch connector pinout | 1 nc 2 GND 3 RS232RX PC 4 RS232TX PC | | | |
| Rif. / Ref. | Q.tà / Q.ty | Materiale / Material | | | | N. articolo / Iter | m N. | |
| Progettato d | a / Designed by | Contr. da / Ckd. by | Approvato da / Approved by | Nome file / File name | | Data / Date | | Scala / Scale |
| | | | Titolo / Title Cavo di progra | ammazione RS232 | via Analo | og per LCU | -ONE Ca | n+Analog |
| Racing Data Power | | N. disegno / Drawing N. | V02359130 | | | Rev. / Rev. | Foglio / Sheet 1 di 1 | |



| N.rev. / Rev. N. Descrizione / I | Description | | | | Data / date | Firma / Sign | Contr. da / Ckd. by |
|--|-------------------------------------|---|---------------------------|---|---------------------------------------|---------------------------|--|
| | 4 pins Binder 719 male connector | | | | | | |
| onnection cable N+Analog plastic Binder | | | | 4 pins Binder 719 male connector pinout Contacts insertion view | Binder connector Pinout | 2 GND 3 nc nc | |
| Analog co | | | 0 4 ○w | 4 pins Deutsch female connector pinout Contacts insertion view | Deutsch connector pinout 1 Lambda out | 2 GND 3 nc nc | |
| | 4 pins Deutsch female connecto | | | | | | |
| Rif. / Ref. Q.tà / Q.tv | Materiale / Material | | | | N. articolo / Iter | n N. | |
| Progettato da / Designed by | Contr. da / Ckd. by | Approvato da / Approved by | Nome file / File name | | Data / Date | | Scala / Scale |
| Racing Data P | ower | Titolo / Title Cavo di colleg N. disegno / Drawing N. | amento Analog 02.359.0 | g per LCU-ONE 60 | CAN+Ana | alog Binde Rev. / Rev. | er plastico Foglio / Sheet 1 di 1 |



٢

| | 4 pins Binder 712 male connector | | | | | | |
|--|---|--|-------------------------|---|-----------------------------------|---------------------------|--------------------------|
| nnection cable +Analog metallic Binder | | | | 4 pins Binder 712 male connector pinout Contacts insertion view | Binder connector pinout | 2 GND 3 nc nc | |
| Analog col for LCU-ONE CAN- | is Deutsch | | 04 0w 0+ 0v | 4 pins Deutsch female connector pinout Contacts insertion view | Deutsch connector pinout | a GND nc nc | |
| Rif. / Ref. Q.tà / Q.ty Progettato da / Designed by L.I. | Materiale / Material Contr. da / Ckd. by | Approvato da / Approved by Nor | me file / File name | | N. articolo / Itel Data / Date | m N. | Scala / Scale |
| Racing Data F | Power | Titolo / Title Cavo di collegame N. disegno / Drawing N. | ento Analog 02.359.0 | per LCU-ONE | E CAN+Ana | alog Binde Rev. / Rev. | Foglio / Sheet 1 di 1 |



٢

٦

| CA | N termina | ation cap pinou | it | | |
|---|----------------------------|--|--------------------|-------------|----------------|
| 6 pins male c | Deutsch onnector | 6 pins Deutsch male connector pinout Contacts insertion view | | | |
| | | Note: there is a 120 Ohm resistance between pins 1 and 4 of the connector | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Rif. / Ref. Q.tà / Q.ty Materiale / Material | | | N. articolo / Iter | n N. | |
| Progettato da / Designed by Contr. da / Ckd. by | Approvato da / Approved by | Nome file / File name | Data / Date | | Scala / Scale |
| | Titolo / Title | Pinout tappo di terminazion | le linea CA | AN | <u> </u> |
| Racing Data Power | N. disegno / Drawing N. | 02.359.080 | | Rev. / Rev. | Foglio / Sheet |



LCU ONE-CAN+Analog User manual Release 1.05

| N.rev. / Rev. N. Descrizione / | Description | | | | Data / date | Firma / Sign | Contr. da / Ckd. by |
|--|---|---|---|--------------------------|-----------------------------------|--------------|--|
| | 5 pins Binder 712 male connector | | | | | | |
| on cable og metallic Binder | | | 5 pins Binder 712 female connector Pinout Contacts insertion view | Binder connector pinout | 2 GNU 3 +VB 5 CAN- | | |
| CAN connection c for LCU-ONE Can+Analog r | 6 pins Deutsch female connector | □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ | 6 pins Deutsch female connector pinout Contacts insertion view | Deutsch connector Pinout | 2 GND 3 +VB 5 CAN- | 0 Q | |
| Rif. / Ref. Q.tà / Q.ty Progettato da / Designed by L.I. | Materiale / Material Contr. da / Ckd. by | Approvato da / Approved by | Nome file / File name | | N. articolo / Iter Data / Date | n N. | Scala / Scale |
| Racing Data P | ower | Titolo / Title Cavo di colleg N. disegno / Drawing N. | amento CAN per V02359100 | LCU-ONE (| Can+Analo | Rev. / Rev. | metallico Foglio / Sheet 1 di 1 |



LCU ONE-CAN+Analog User manual Release 1.05

| N.rev. / Rev. N. Descrizio | ne / Description | | | | Data / date | Firma / Sign | Contr. da / Ckd. by |
|----------------------------|-------------------------------------|---------------------------------|---|--------------------------|--------------------------|--------------|--------------------------|
| | 4 pins Binder 719 male connector | | | | | | |
| lection cable | | | 4 pins Binder 719 female connector pinout contacts insertion view | Binder connector pinout | 2 GND 3 +VB 4 CAN- | | |
| CAN conn | IOI LOO-ONE Call+ | 0 0 0 | 6 pins Deutsch female connector pinout Contacts insertion view | Deutsch connector pinout | 5 CAN- 5 nc | 0 UC | |
| Rif. / Ref. Q.tà / Q.ty | Materiale / Material | | | | N. articolo / Iter | n N. | |
| Progettato da / Designed | by Contr. da / Ckd. by | Approvato da / Approved b | V Nome file / File name | | Data / Date | | Scala / Scale |
| | | Titolo / Title Cavo di colle | egamento CAN per | LCU-ONE | Can+Anal | og Binder | plastico |
| Racing Data | Power | N. disegno / Drawing N. | V02359110 | | | Rev. / Rev. | Foglio / Sheet 1 di 1 |