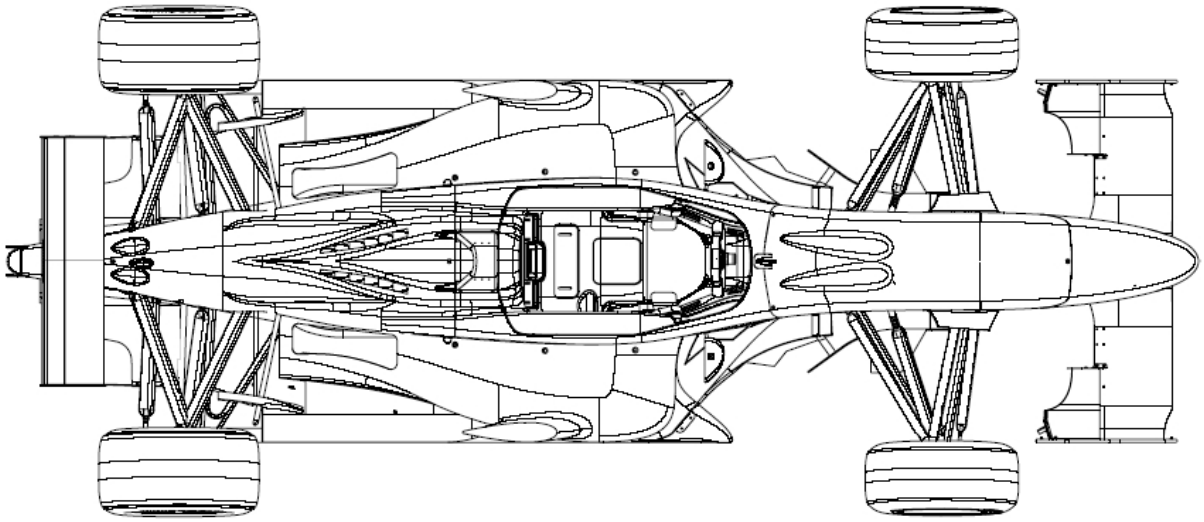
Kit EVO3 Pro

Formula 3 Italia – Dallara 308 and Mygale

User Manual



Racing Data Power

INDEX

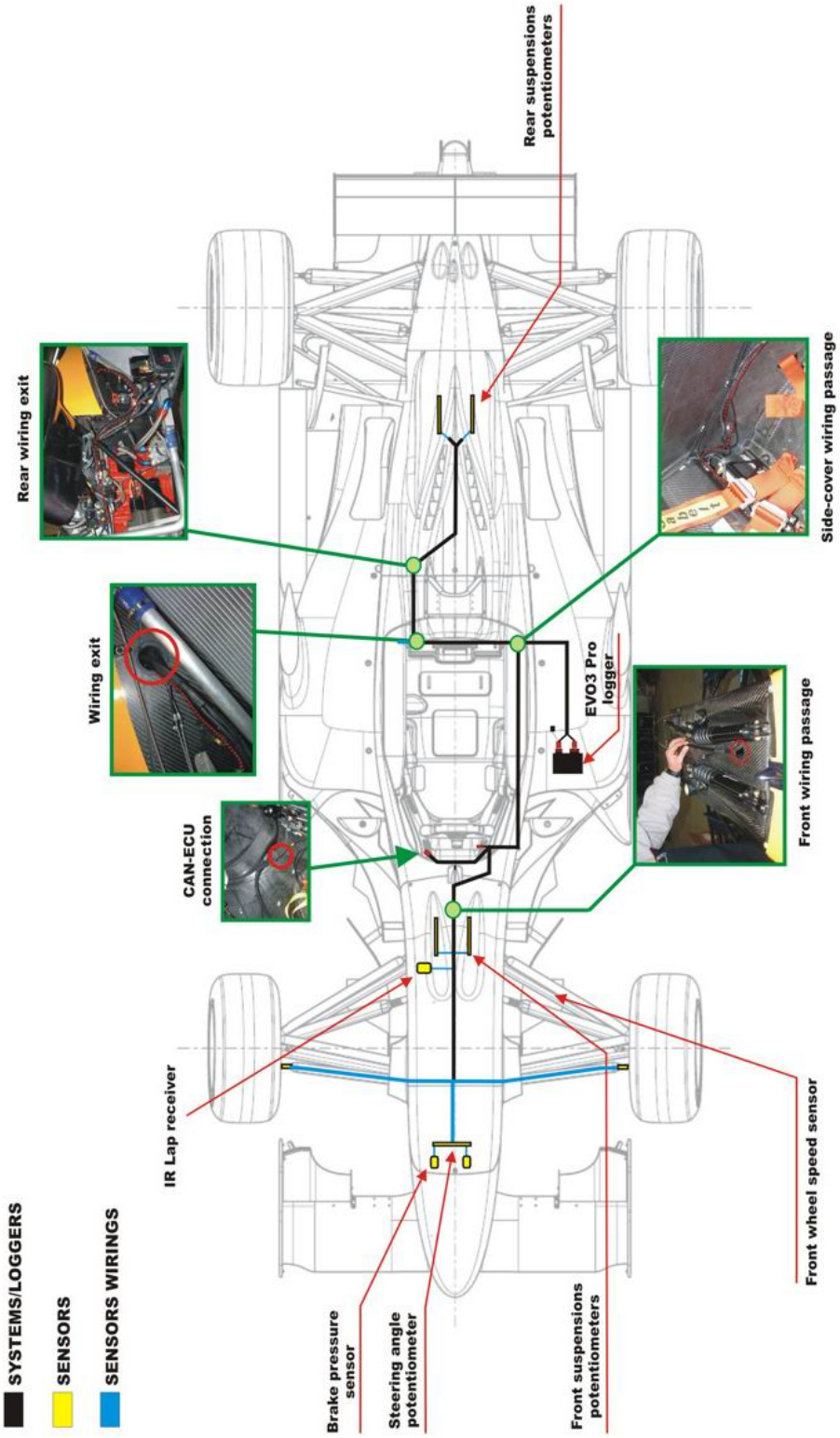
Chapter 1 – Kit components

F3 Italy (2008) Dallara and Mygale data acquisition kit is based on the new **EVO3 Pro** data logger and includes:

- **EVO3 Pro** data logger
- Analog signals wiring
- Digital signals wiring
- 2 front wheel speed sensors + extensions
- 1 “T” cable for front wheel speed sensor
- 1 IR optical receiver (Lap)
- 1 IR optical transmitter + power cable 12V
- 1 USB cable + Race Studio 2 software
- This tutorial
- 4 suspension potentiometers
- 1 steering potentiometer
- 2 brake pressure sensors

Chapter 2 – Installation

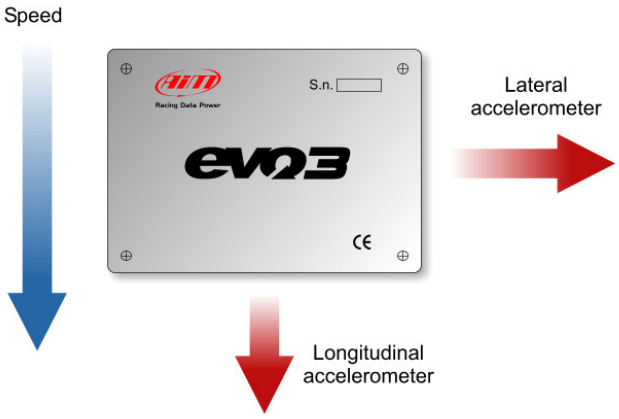
Each kit component should be installed following the figure here below. Cable lengths fit perfectly this installation: it is impossible to install them differently.



Chapter 3 – Components Installation

3.1 – EVO3 Pro

EVO3 Pro is to be installed on the left side of the vehicle in the compartment under the left radiator.
It is suggested to use two strips of industrial Velcro® to fix the logger.
Logger connectors should look the vehicle rear axle



The accelerometers integrated in the logger should be configured following the figure on the left.

Logger characteristics are as follow:

- 4 digital speed input
- 1 digital RPM input
- 12 fully configurable analogue channels
- integrated lateral accelerometer
- 2 CAN lines (max 1Mb/s)
- 16 Mb non volatile internal memory in acquisition
- 5 Khz total sampling frequency
- 1 digital lap input.

3.2 – Front speed

Install the two gear wheels coaxially to the front wheels. Install the supports on the hub and apply them the speed sensors supplied with the kit.

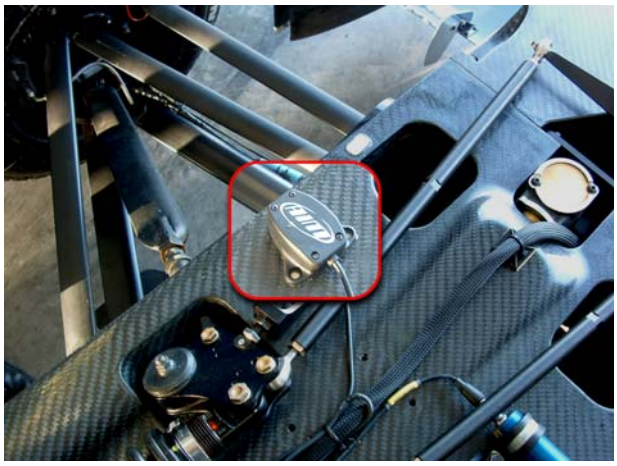
Note: optimum distance between sensor and gear wheel should be between 0,5 and 1,5 mm (max).

Once the sensors installed, stretch the cables on the anti-vibration mountings. It is suggested to protect these wirings with a spiral girdle (not supplied). Insert the speed sensors connectors in the chassis using the “T” cable supplied with the kit.

3.3 – Rear speed

It is possible to install two additional (optional) speed sensors on the driving wheels. The digital wiring has a dedicated connector (rear speed) to be placed at the wiring exit.

3.4 – Beacon

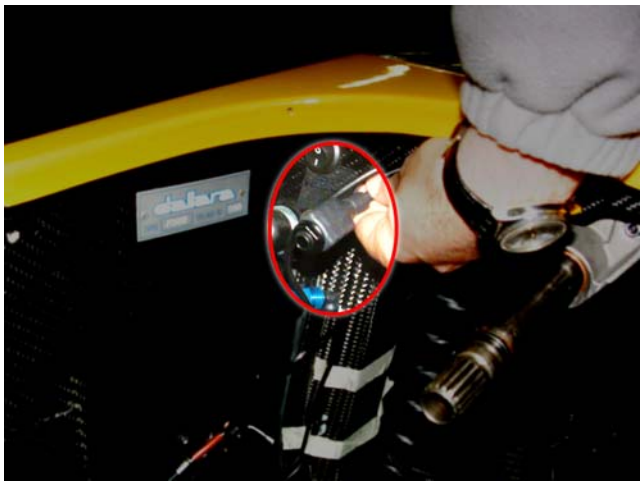


The lap receiver (beacon) is to be installed as in the figure on the left and:

- the “receiver eye” should see the transmitter placed on board of the track;
- use industrial Velcro® to fix the lap receiver;
- drill the front cover in correspondence of the receiver “eye”; hole minimum diameter should be 8 mm (we suggest 20 mm):
- connect the beacon to AIM cable labelled “Lap”.

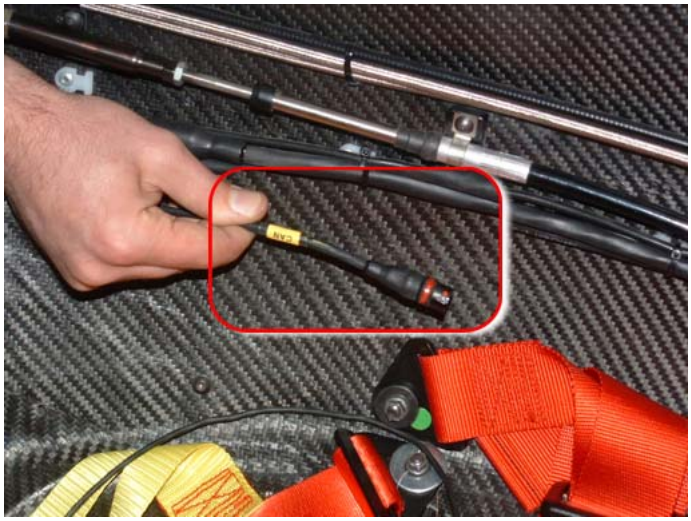
Note: according to the direction of travel the receiver could need to be installed on the other side of the vehicle.

3.5 – USB



It is suggested to install USB female connector (for system configuration and data download) on the left cockpit.

Chapter 4 – Connections to the vehicle



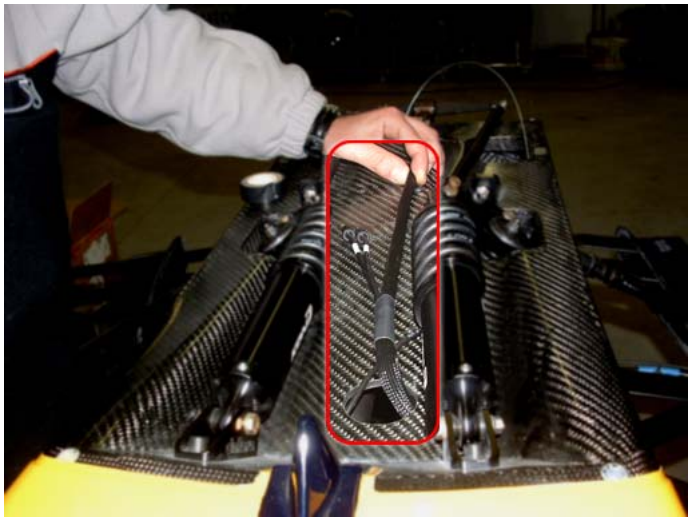
The connector to be used on the engine wiring is shown here on the left and is placed under the gear lever (right side of the cockpit).

Connection to CAN bus CAN 1, which allows the communication with Magneti Marelli ECU, is made through ECU CAN connector (EVO3 Pro digital wiring) placed under the driver's seat.

In the figure is shown "**Side-Cover**" wirings passage.
Stretch the last part of the acquisition wiring on the battery /fire extinguisher zone and let it pass through the "**Exit**".
The first part of acquisition wiring should be stretched on the left part of the vehicle and fixed through proper clips.

"**Exit**" particular; it is suggested to fix the last part of the acquisition wiring to the engine wiring under the air box.

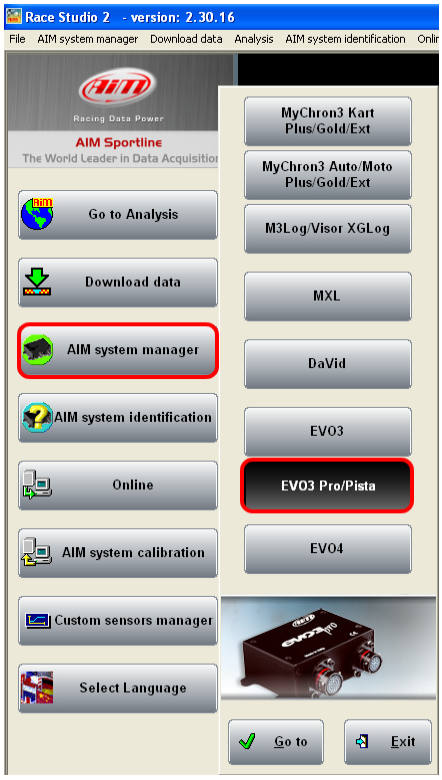
"**Rear exit**" particular.



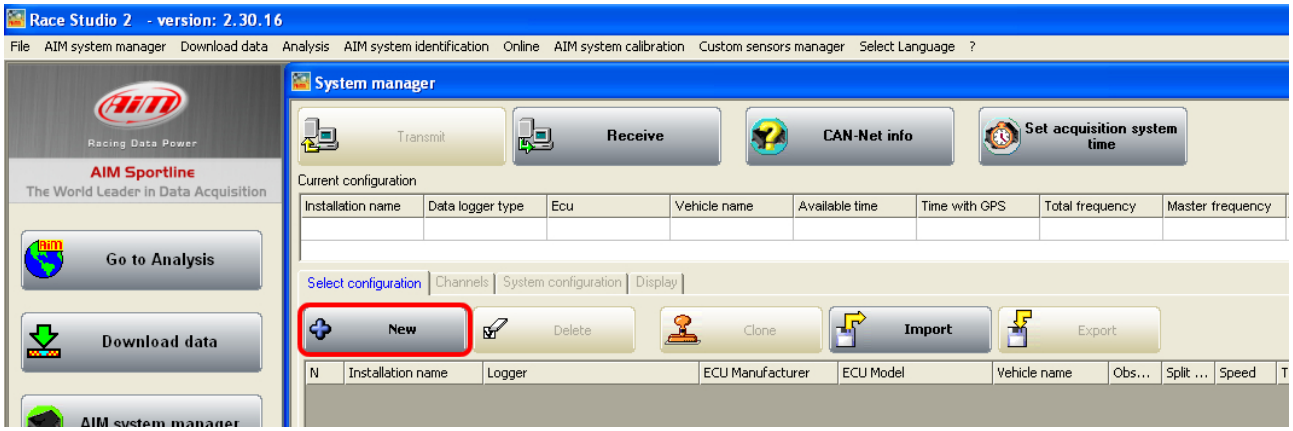
Let the first part of the acquisition wiring come out from the "**front exit**" as shown here on the left.

Chapter 5 – System configuration

Install Race Studio 2 software and run it. The window below appears.
Press **AIM System Manager** button and select **EVO3 Pro** in the left vertical keyboard, as in the figure below; then press "**Go to**" button



This window appears. Press "**New**" button.

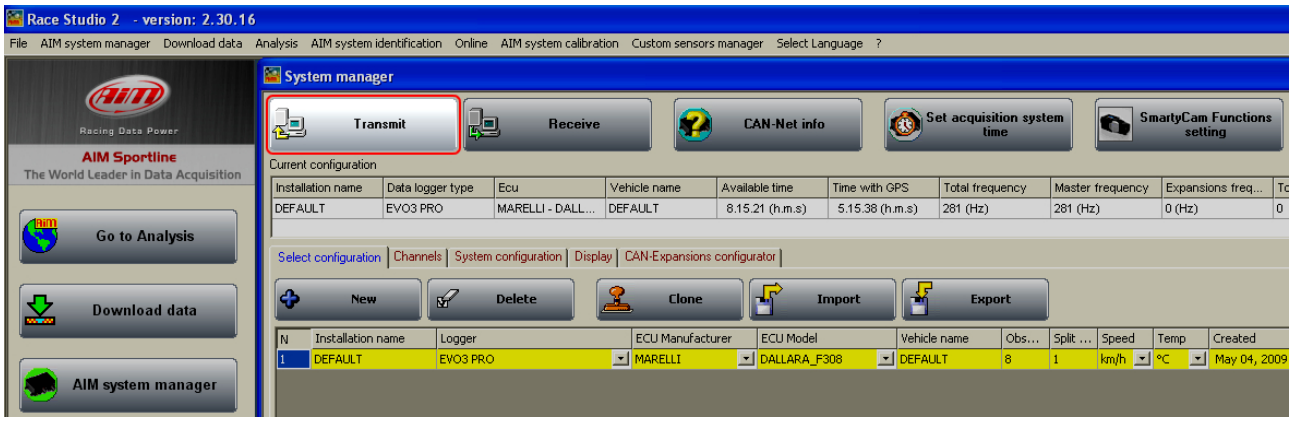


The window here below appears; select:

- Data logger type: "**EVO3 Pro**"
- ECU Manufacturer: "**Marelli**"
- ECU Model: "**DALLARA F_308**"; in case it does not appear, select it manually
- Press "OK" button to create the configuration.

The window here below appears:

- Press "Transmit" button to transmit the configuration to EVO3 Pro.



Note: refer to chapter 6 of this tutorial to configure the first 7 analogue channels of the logger. As far as 8/9/10/11/12 analogue channels are concerned, on the contrary, they are fully configurable.

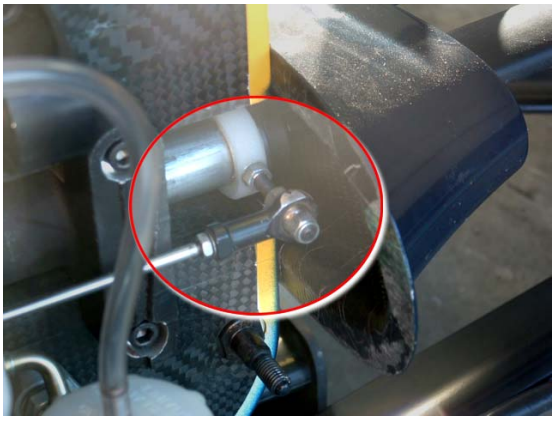
5.1 – Dallara F308 ECU communication protocol

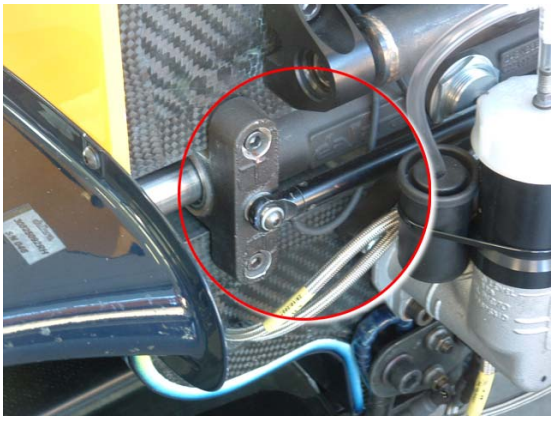
Channels received by AIM logger connected to ECU Dallara F308 are as follows:

ID	Channel name	Fonction
ECU_1	F3_08_RPM	RPM
ECU_2	F3_08_TPS	Throttle position sensor
ECU_3	F3_08_MAP	Manifold air pressure
ECU_4	F3_08_OIL_P	Oil pressure
ECU_5	F3_08_FUEL_P	Fuel pressure
ECU_6	F3_08_AIR_T	Intake air temperature
ECU_7	F3_08_ECT	Engine cooling temperature
ECU_8	F3_08_OIL_T	Oil temperature
ECU_9	F3_08_FUEL_T	Fuel temperature
ECU_10	F3_08_CONS	Fuel consumption
ECU_11	F3_08_ENGTIME	Engine time
ECU_12	F3_08_BATT_V	Battery supply
ECU_13	F3_08_TPS_RAW	Throttle position sensor - raw value
ECU_14	F3_08_BARO_PRESS	Barometric pressure
ECU_15	F3_08_GEAR	Engaged gear

Chapter 6 – Additional sensors

The steering potentiometer is to be installed on the steering box as in the figure.

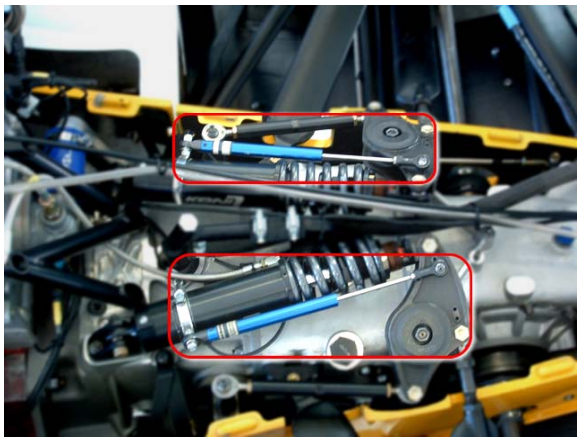




As far as suspensions are concerned, use 100 mm linear potentiometers for front and rear ones.

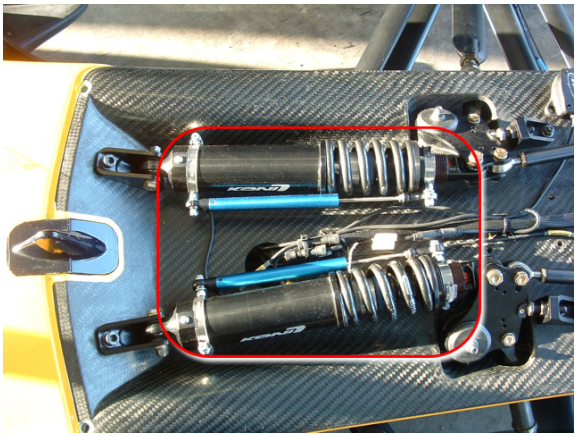
Once potentiometers installed connect them to the dedicated analog inputs:

- CH. 1: front suspension 1
- CH. 2: front suspension 2
- CH. 6: rear suspension 1
- CH. 7: rear suspension 2

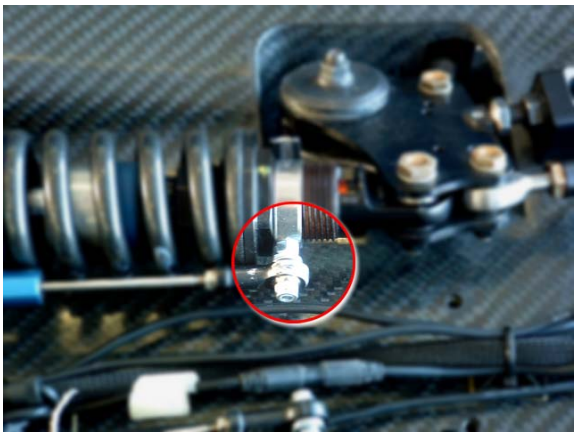


Installation of rear suspensions potentiometers

Particular of inferior Uniball fixing.



Front suspensions potentiometers installation.



Particular of interior Uniball fixing.

Chapter 7 – Troubleshooting

7.1 – Speed

PROBLEM	PROBABLE REASON	SUGGESTED SOLUTION
Wheel speed signal missing.	Sensor magnets distance is not the one suggested.	Set the sensor magnets distance as suggested.
	The sensor is not connected to the proper input.	Connect the speed sensor to the logger speed input.
	Cable is damaged or broken.	Replace the cable.
	Sensor is damaged.	Replace the sensor.
Wheel speed value is incorrect.	Wheel circumference value is incorrect (default value is 1666 mm).	Set the correct value Channels layer of Race Studio 2.
	The number of magnet is incorrect / incoherent with the configuration.	Set the correct value Channels layer of Race Studio 2.
High or low peaks.	Sensors magnets distance is not between 6 and 15 mm.	Set the distance and check sensor / magnet alignment.
	The sensor is damaged.	Replace the sensor.

7.2 – Data

PROBLEM	PROBABLE REASON	SUGGESTED SOLUTION
The logger stored no data.	The logger switched off during the test.	Check that the logger is correctly powered and that there are no short circuits on the wirings[1].
	A configuration has been transmitted before download.	Transmitting a new configuration /calibration logger memory is deleted.
Sampled data are wrong.	The sensor is damaged.	Replace the sensor.
	The wiring is damaged.	Replace the wiring.
	Channels calibration/ auto-calibration was wrong/unsuccessful.	Repeat the calibration/auto-calibration.

[1] It is reminded that carbon cover has a negative potential.

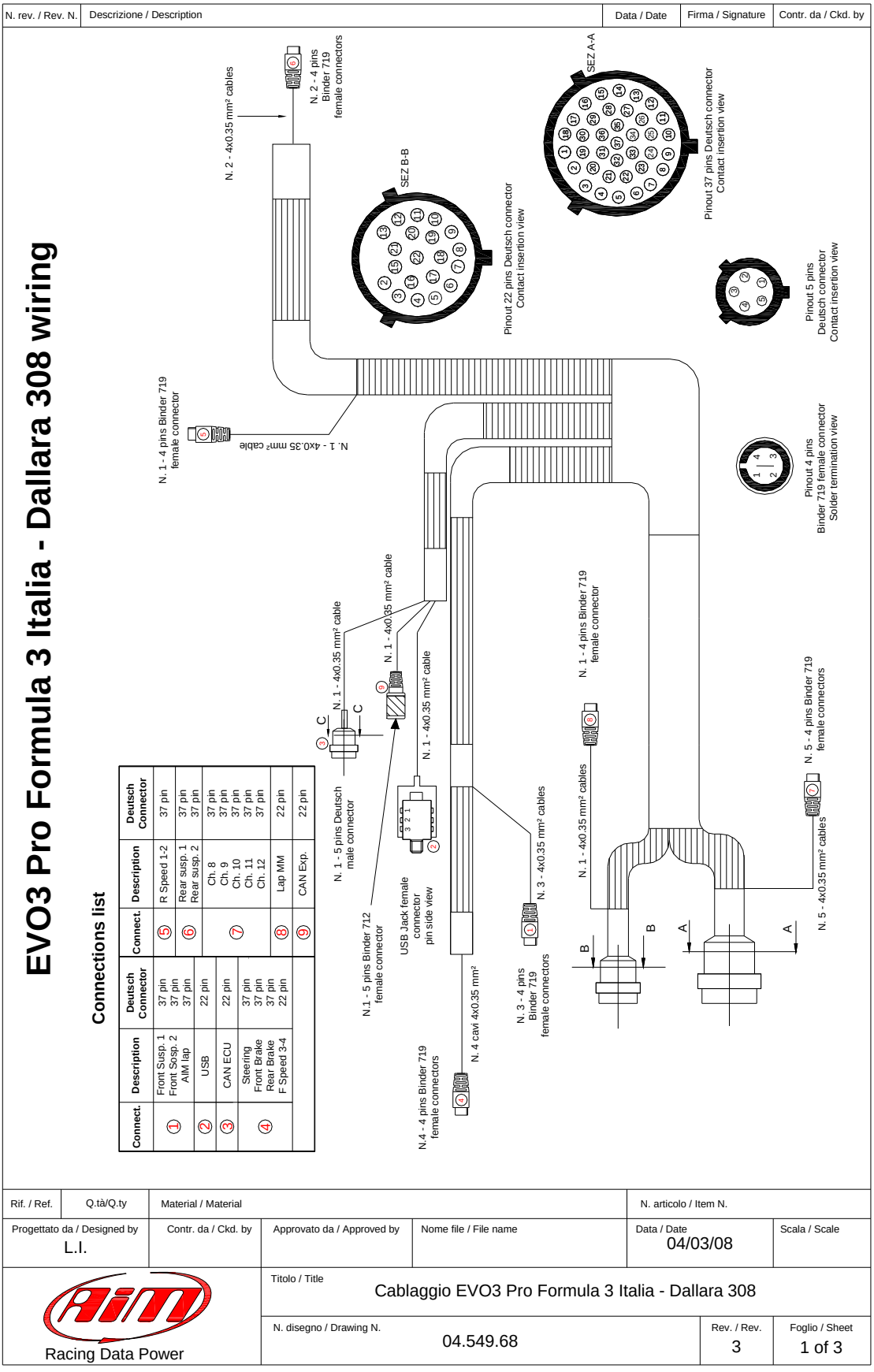
7.3 – Lap times

PROBLEM	PROBABLE REASON	SUGGESTED SOLUTION
Some laps are united.	Incorrect receiver installation	Re-install the receiver
All laps are united.	Verify that the receiver is installed on the correct side of the vehicle.	Re-install the receiver.
	Verify that the receiver or the cable are not damaged.	Replace the cable or the receiver.
	Verify the correct positioning of the transmitter.	Re-install the transmitter.
	The hole on the cover is too small.	Enlarge the hole (suggested 20mm).
	Transmitter battery is exhausted.	Replace the battery.
Lap times are too short.	Verify that laps labelled “Vehicle stop” are not considered.	Disable laps marked as “Vehicle stop” in Race Studio Analysis.
	Verify that there is no more than one AIM lap transmitter on the track.	Remove additional transmitters or increase obscuring time in Race Studio 2 Configuration.

7.4 – Logger – PC communication

PROBLEM	PROBABLE REASON	SUGGESTED SOLUTION
There is no communication between Race Studio 2 and the logger.	The logger is switched off.	Switch the logger on.
	USB driver not correctly installed.	Re-install USB driver.
	PC USB port not working properly.	Try a second USB port if available.
	USB cable is damaged.	Replace the USB cable.

Appendix “A” – Technical drawings



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Wiring table from 37 pins Deutsch connector ending with Binder 719 connectors

Connection number	Label	37 pins Deutsch connector pin	Cable colour	Binder 712 connector pin	Cable type	Lenght	Channel
1	Channel 1 Front Susp. 1	2 4 21	white black red bleu	1 2 3 4	4x0.35 mm²	2250 mm	Analog channel 1 GND V Reference
1	Channel. 2 Front Susp. 2	3 4 21	white black red bleu	1 2 3 4	4x0.35 mm²	2250 mm	Analog channel 2 GND V Reference
4	Channel 3 Steering	8 5 6	white black red bleu	1 2 3 4	4x0.35 mm²	2650 mm	Analog channel 3 GND V Reference
4	Channel 4 Front Brake	9 5 17 6	white black red bleu	1 2 3 4	4x0.35 mm²	2830 mm	Analog channel 4 GND V battery V Reference
4	Channel 5 Rear Brake	32 31 17 7	white black red bleu	1 2 3 4	4x0.35 mm²	2830 mm	Analog channel 5 GND V battery V Reference
6	Channel 6 Rear Susp. 1	10 31 7	white black red bleu	1 2 3 4	4x0.35 mm²	2450 mm	Analog channel 6 GND V Reference
6	Channel 7 Rear Susp. 2	33 35 34	white black red bleu	1 2 3 4	4x0.35 mm²	2450 mm	Analog channel 7 GND V battery V Reference
7	Channel 8	26 35 16 34	white black red bleu	1 2 3 4	4x0.35 mm²	110 mm	Analog channel 8 GND V battery V Reference
7	Channel 9	25 11 16 24	white black red bleu	1 2 3 4	4x0.35 mm²	130 mm	Analog channel 9 GND V battery V Reference
7	Channel 10	23 11 29 24	white black red bleu	1 2 3 4	4x0.35 mm²	150 mm	Analog channel 10 GND V battery V Reference
7	Channel 11	19 27 29 22	white black red bleu	1 2 3 4	4x0.35 mm²	170 mm	Analog channel 11 GND V battery V Reference
7	Channel 12	20 27 29 22	white black red bleu	1 2 3 4	4x0.35 mm²	190 mm	Analog channel 12 GND V battery V Reference
5	R Speed 1-2	36 28 14 30	white black red bleu	1 2 3 4	4x0.35 mm²	1150 mm	Speed 1 GND V battery Speed 2
1	AIM Lap	n.c. 28 14 37	white black red bleu	1 2 3 4	4x0.35 mm²	2200 mm	Lap GND V battery

Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.

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Racing Data Power

Titolo / Title: Cablaggio EVO3 Pro Formula 3 Italia - Dallara 308

N. disegno / Drawing N.	Rev. / Rev.	Foglio / Sheet
04.549.68	3	2 of 3

N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by

Table of cabes from Deutsch 22 pin connector ending with Binder 719 connectors

Connection number	Label	22 pins Deutsch connector pin	Cable colour	Binder 719 connector pin	Cable type	Lenght	Channel
4	F Speed 3-4	5 11 10 6	white black red bleu	1 2 3 4	4x0.35 mm²	2900 mm	Speed 3 GND V battery Speed 4
8	Lap MM	14 10	white red bleu	1 2 3 4	4x0.35 mm²	110 mm	Lap V battery

Table of cabes from Deutsch 22 pin connector ending with Binder 712 connectors

Connection number	Label	22 pins Deutsch connector pin	Cable colour	Binder 712 connector pin	Cable type	Lenght	Channel
9	CAN Exp.	4 2 13 3	white black red bleu	1 2 3 4 5	4x0.35 mm²	830 mm	CAN 0+ GND V battery CAN 0-

Table of cabes from Deutsch 22 pin connector ending with Jack connector

Connection number	Label	22 pins Deutsch connector pin	Cable colour	Jack connector pin	Cable type	Lenght	Channel
2	USB	8 9 n.c. 7	white black red bleu	1 3 2	4x0.35 mm²	1600 mm	USB D- GND USB D+

Table of cabes from Deutsch 22 pin connector ending with 5 pins Deutsch connector

Connection number	Label	22 pins Deutsch connector pin	Cable colour	5 pins Deutsch connector pin	Cable type	Lenght	Channel
3	CAN ECU	20 19 22 21	white black red bleu	2 4 1 3	4x0.35 mm²	1320 mm	CAN 1+ GND VB ext CAN 1-

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Titolo / Title: Cablaggio EVO3 Pro Formula 3 Italia - Dallara 308

N. disegno / Drawing N.	Rev. / Rev.	Foglio / Sheet
04.549.68	3	3 of 3

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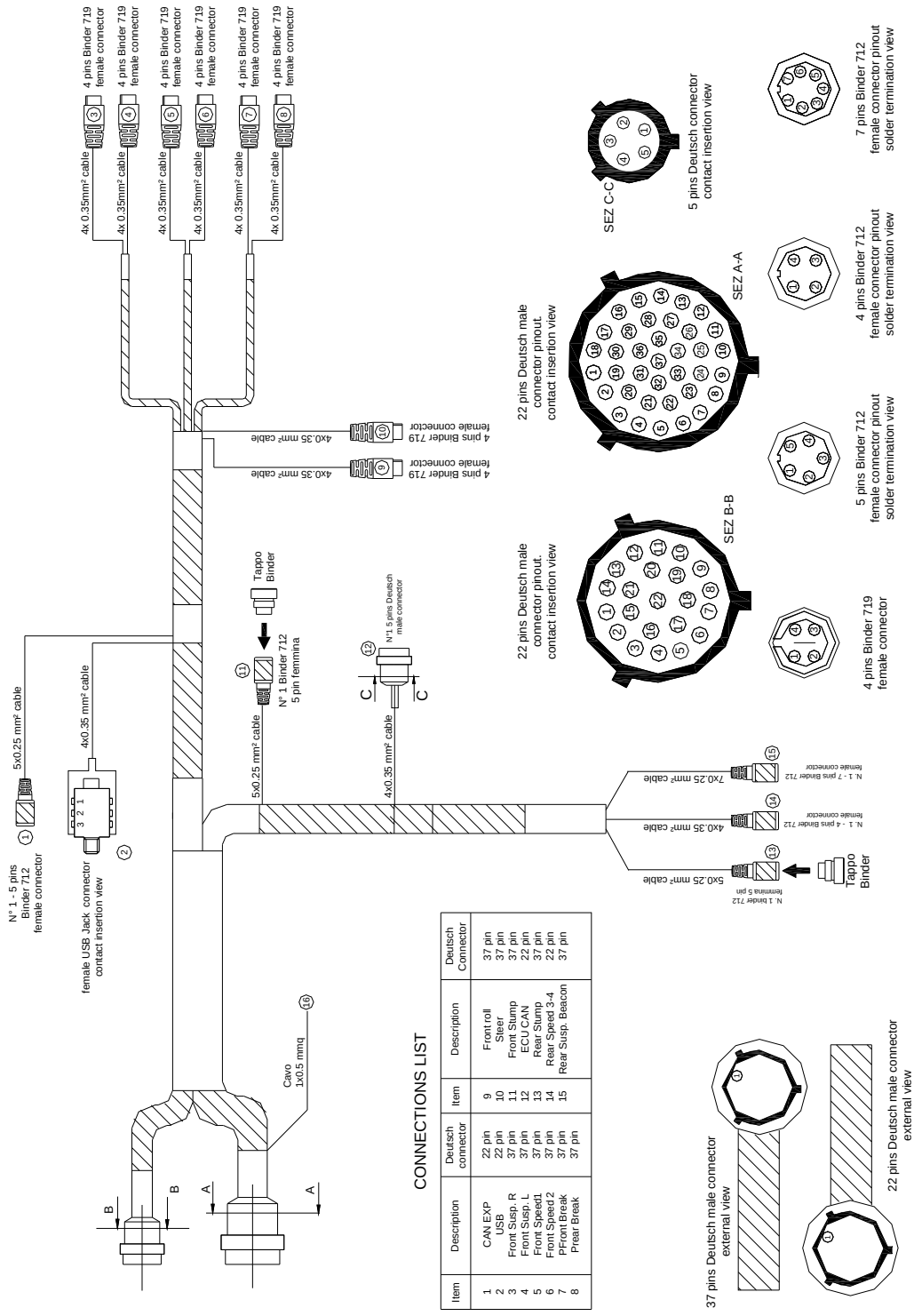
EVO3 Pro Formula 3 Italia - Mygale wirings



CONNECTIONS LIST

Item	Description	Deutsch connector	Item	Description	Deutsch Connector
1	CAN EXP	22 pin	9	Front roll	37 pin
2	USB	22 pin	10	Steer	37 pin
3	Front Susp. R	37 pin	11	Front Stump	37 pin
4	Front Susp. L	37 pin	12	ECU CAN	22 pin
5	Front Speed1	37 pin	13	Rear Stump	37 pin
6	Front Speed 2	37 pin	14	Rear Speed 3-4	22 pin
7	PFront Break	37 pin	15	Rear Susp. Beacon	37 pin
8	Prear Break	37 pin			

Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.

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Racing Data Power

Titolo / Title: Cablaggio EVO3 Pro Formula 3 Italia Mygale

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N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by

Wiring table from 37 pins Deutsch connector ending with 4 pins Binder 719 female connector

Connection number	Label	37 pins Deutsch connector pin	Cable colour	Binder 719 connector pin	Cable type	Length	Channel
3	Channel 1 Front right supension	2 4 n.c. 21	white black red bleu	1 2 3 4	4x0.35mm²	2560 mm	Analog channel 1 analog GND n.c. V. reference
4	Channel 2 Front left suspension	3 4 n.c. 21	white black red bleu	1 2 3 4	4x0.35mm²	2560 mm	Analog channel 2 analog GND n.c. V. reference
9	Channel 3 front roll	8 5 n.c. 6	white black red bleu	1 2 3 4	4x0.35mm²	2270 mm	Analog channel 3 analog GND n.c. V. reference
7	Channel 4 front brake pressure	9 5 17 n.c.	white black red bleu	1 2 3 4	4x0.35mm²	2300 mm	Analog channel 4 analog GND V battery n.c.
8	Channel 5 rear brake pressure	32 31 17 n.c.	white black red bleu	1 2 3 4	4x0.35mm²	2300 mm	Analog channel 5 analog GND V battery n.c.
10	Channel 6 Steering	10 31 n.c. 7	white black red bleu	1 2 3 4	4x0.35mm²	2030 mm	Analog channel 6 analog GND n.c. V. reference
5	Speed 1 front	36 28 14 n.c.	white black red bleu	1 2 3 4	4x0.35mm²	2250 mm	Speed 1 GND V battery n.c.
6	Speed 2 front	30 28 14 n.c.	white black red bleu	1 2 3 4	4x0.35mm²	2250 mm	Speed 2 GND V battery n.c.

Wiring table from 37 pins Deutsch connector ending with 5 pins Binder 712 female connector

Connection number	Label	37 pins Deutsch connector pin	Cable colour	Binder 712 connector pin	Cable type	Length	Channel
11	Channels 11/12 Stump anteriore	19 27 29 22 20	white black red bleu orange	1 2 3 4 5	5x0.25 mm²	650 mm	Analog channel 11 Analog GND V battery V reference Analog channel 12
13	Channels 9/10 Stump posteriore	25 11 16 24 23	white black red bleu orange	1 2 3 4 5	5x0.25 mm²	1450 mm	Analog channel 9 Analog GND V battery V reference Analog channel 10

Wiring table from 37 pins Deutsch connector ending with 7 pins Binder 712 female connector

Connection number	Label	37 pins Deutsch connector pin	Cable colour	Binder 712 connector pin	Cable type	Length	Channel
15	Rear suspension/ beacon	33 35 16 34 26 37 18	white black red bleu orange yellow grey	1 2 3 4 5 6 7	7x0.25 mm²	1450 mm	Analog channel 7 Analog GND V battery V reference Analog Channel 8 Lap GND

Tabella cavi connettore Deutsch 37 pin non cablati

Connection number	Label	37 pins Deutsch connector pin	Cable colour	Cable type	Length	Channel
16	GND	18	black	1x0.5 mm²	2000 mm	GND

Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.

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Racing Data Power

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N. disegno / Drawing N.	Rev. / Rev.	Foglio / Sheet
04.549.71	1	2 of 3

N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by

Table of cables from Deutsch 22 pins connector ending with 4 pins Binder 712 female connector

Connection number	Label	22 pins Deutsch connector	Cable colour	Binder 712 connector pin	Type of cable	Length	Channel
14	Speed 3-4 rear	5 11 10 6	white black red bleu	1 2 3 4	4x0.35mm²	1450 mm	Speed 3 GND V battery Speed 4

Table of cables from Deutsch 22 pins connector ending with 5 pins Binder 712 female connector

Connection number	Label	22 pin Deutsch connector pin	Cable colour	Binder 712 connector pin	Type of cable	Length	Channel
1	CAN EXP	4 2 13 2 22	white black red bleu orange	1 2 3 4 5	5x0.25 mm²	1300 mm	CAN 0+ GND V battery CAN 0- Vbext

Table of cables from Deutsch 22 pins connector ending with Jack connector

Connection number	Label	22 pins Deutsch connector pin	Cable colour	Jack connector pin	Type of cable	Length	Channel
2	USB	8 9 n.c. 7	white black red bleu	1 3 2	4x0.35 mm²	1870 mm	USB D- GND n.c. USB D+

Table of cables from 22 pins Deutsch connector ending with 5 pins Deutsch connector

Connection number	Label	22 pins Deutsch connector pin	Cable colour	5 pins Deutsch connector pin	Type of cable	Length	Channel
12	CAN ECU	20 19 22 21	bianco nero rosso blu	2 4 1 3	4x0.35 mm²	1540 mm	CAN 1+ GND Vb ext CAN 1-

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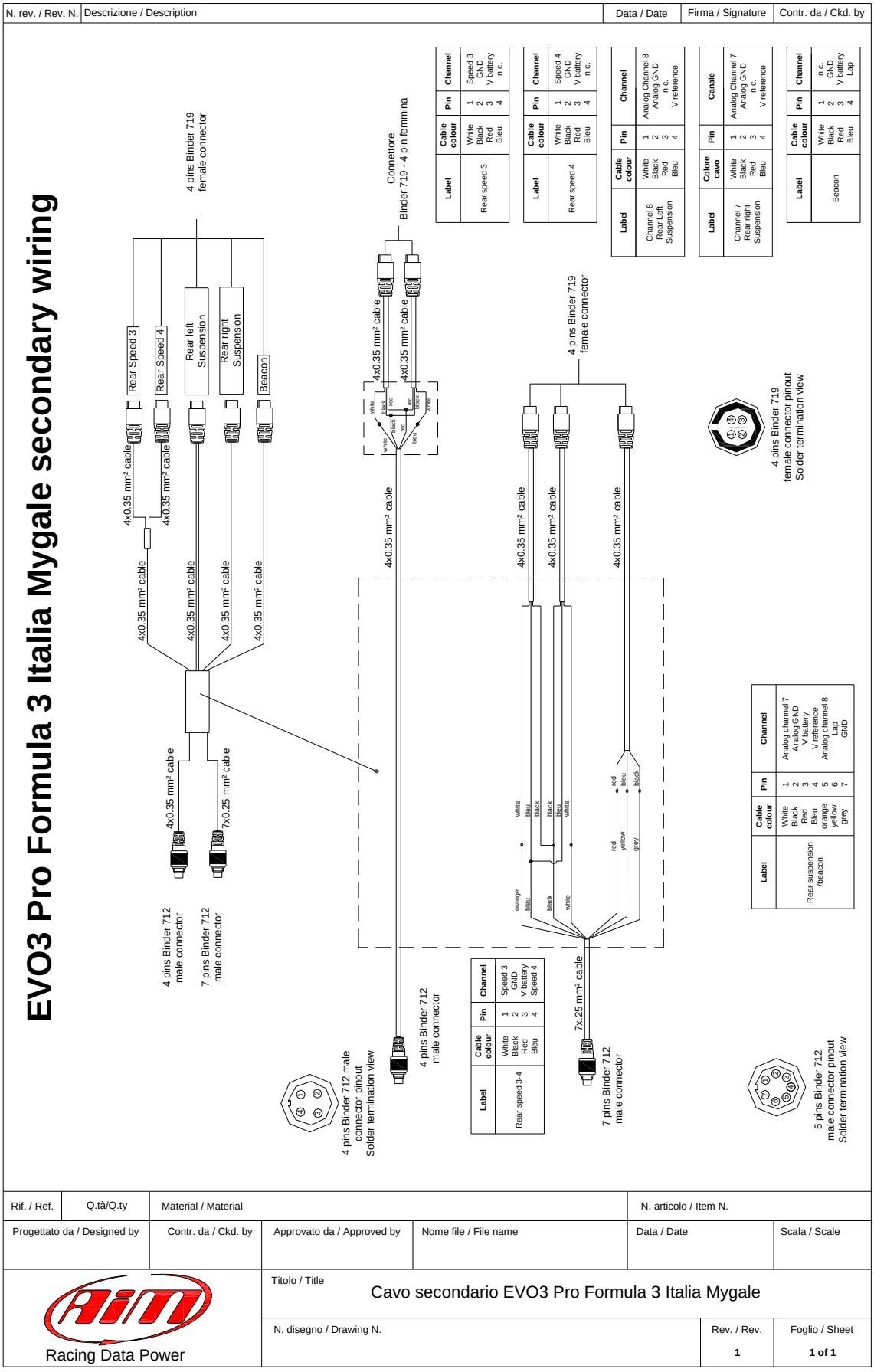
N. disegno / Drawing N.	Rev. / Rev.	Foglio / Sheet
04.549.71	**1**	**3 of 3**


EVO3 Pro Formula 3 Italia Mygale secondary wiring
4 pins Binder 719 female connector
Connettore Binder 719 - 4 pin femmina
Rear Speed 3
Rear Speed 4
Rear left Suspension
Rear right Suspension
Beacon
4x0.35 mm² cable
7x0.25 mm² cable
4 pins Binder 712 male connector
7 pins Binder 712 male connector
4 pins Binder 712 male connector pinout Solder termination view
4 pins Binder 719 female connector pinout Solder termination view
5 pins Binder 712 male connector pinout Solder termination view
Rear speed 3
Rear speed 4
Channel 8 Rear Left Suspension
Channel 7 Rear right Suspension
Rear suspension /beacon
Rear speed 3-4
Label
Cable colour
Colore cavo
Pin
Channel
Canale
White
Black
Red
Bleu
orange
yellow
grey
Speed 3 GND V battery n.c.
Speed 4 GND V battery n.c.
Analog Channel 8 Analog GND n.c. V reference
Analog Channel 7 Analog GND n.c. V reference
n.c. GND V battery Lap
Analog channel 7 Analog GND V battery V reference Analog channel 8 Lap GND
N. rev. / Rev. N.
Descrizione / Description
Data / Date
Firma / Signature
Contr. da / Ckd. by
Rif. / Ref.
Q.tà/Q.ty
Material / Material
N. articolo / Item N.
Progettato da / Designed by
Approvato da / Approved by
Nome file / File name
Scala / Scale
Titolo / Title
Cavo secondario EVO3 Pro Formula 3 Italia Mygale
N. disegno / Drawing N.
Rev. / Rev.
1
Foglio / Sheet
1 of 1
Racing Data Power