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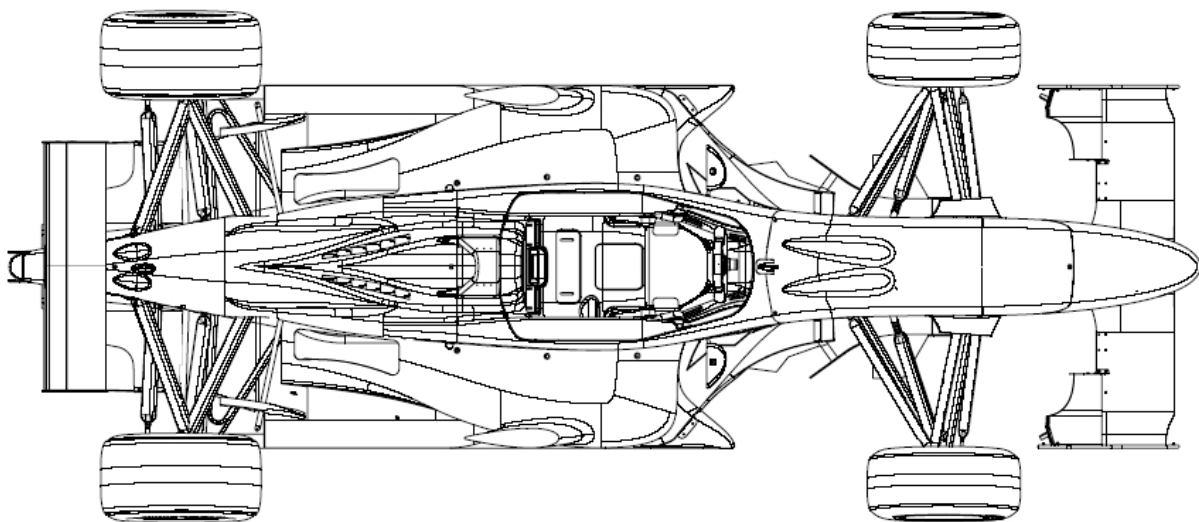
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Kit EVO3 Pro

Formula 3 Italia – Dallara 308 and Mygale
User Manual

Release 1.03



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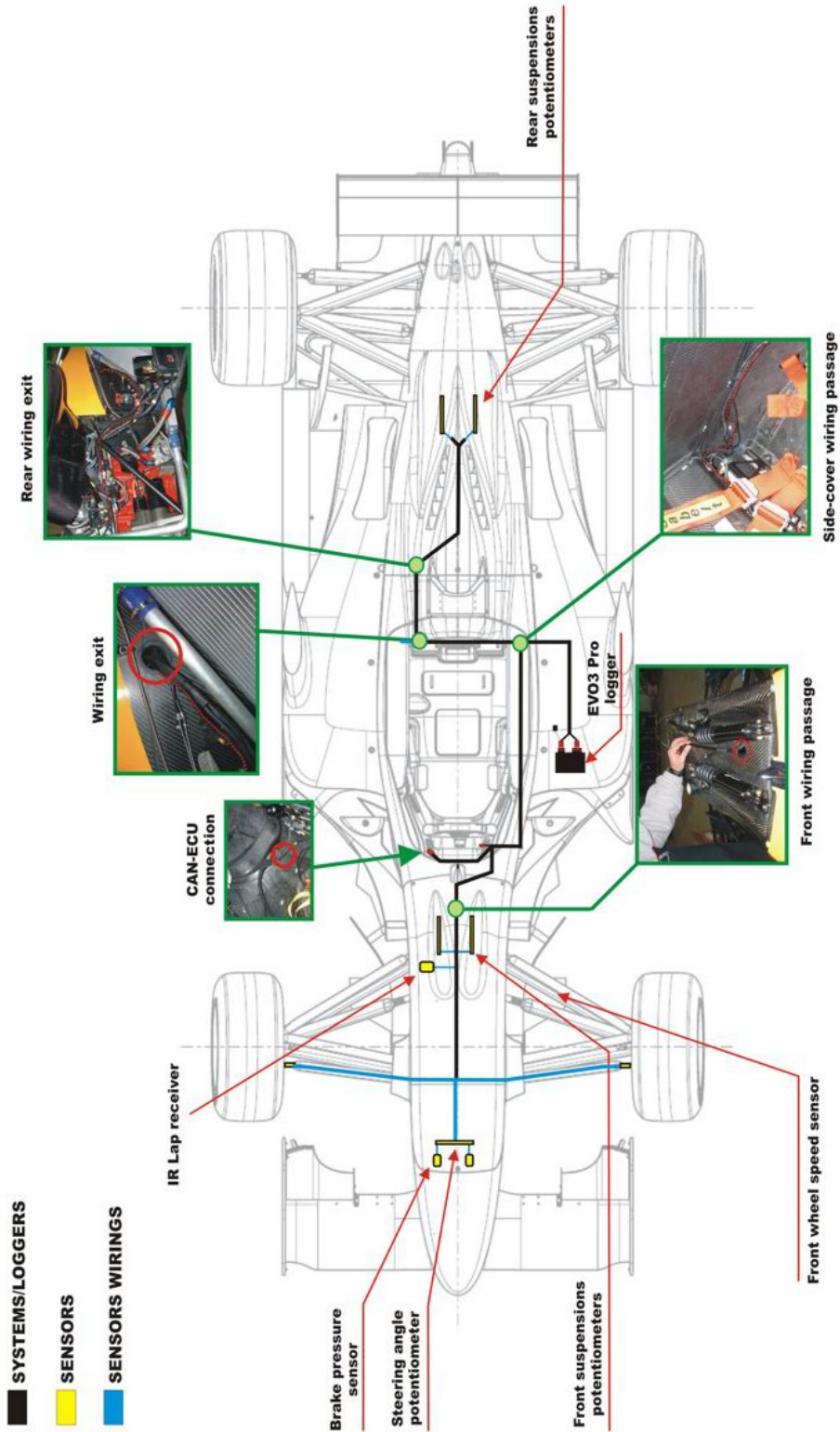
Chapter 1 – Kit components

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.



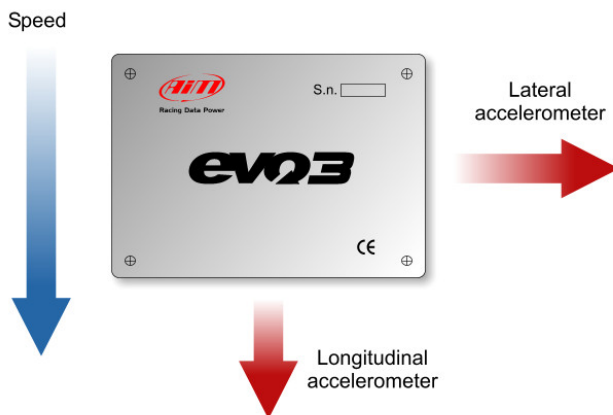
Chapter 3 – Components Installation

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.

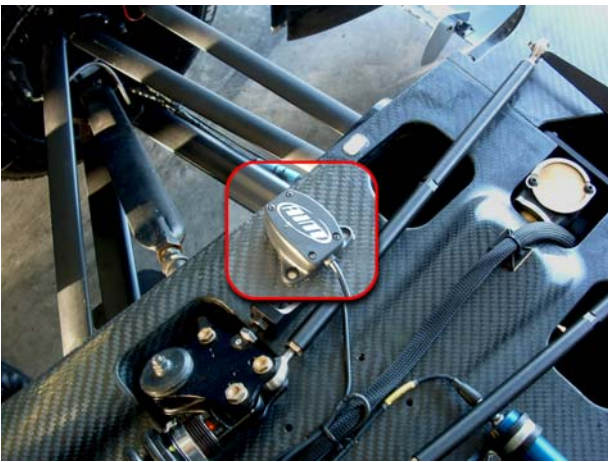
Note: optimum distance between sensor and gear wheel should be between 0,5 and 1,5 mm (max).

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

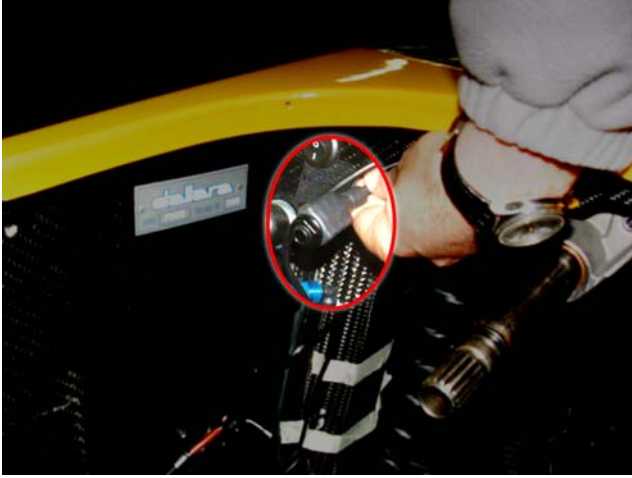


The lap receiver (beacon) is to be installed as in the figure on the left and:

- 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”.

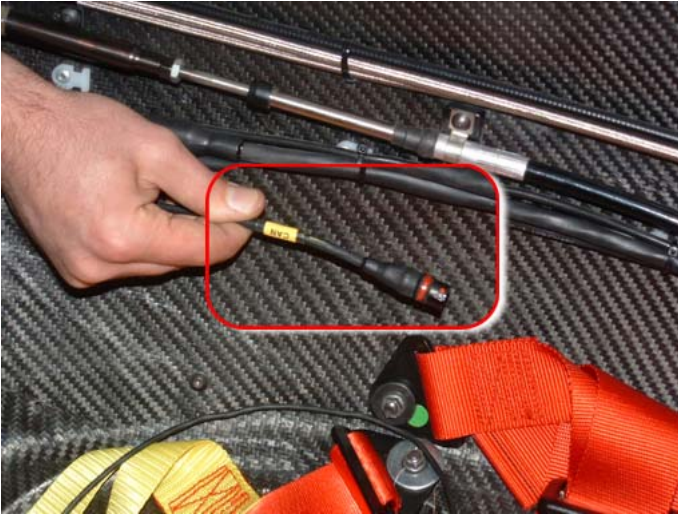
Note: according to the direction of travel the receiver could need to be installed on the other side of the vehicle.

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.

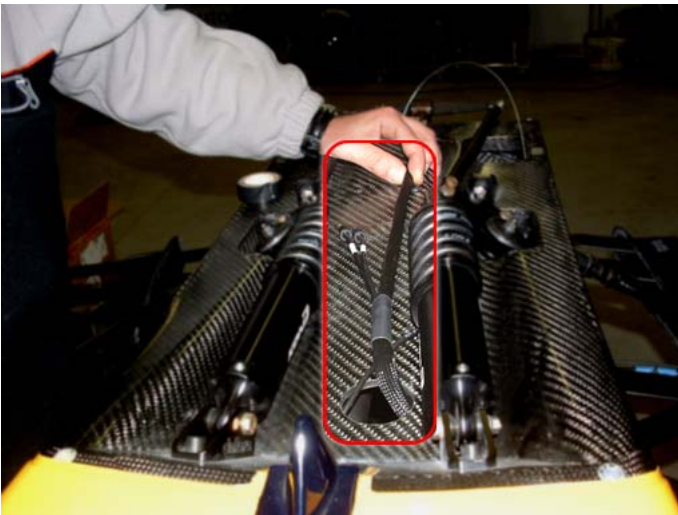
Stretch the last part of the acquisition wiring on the battery /fire extinguisher zone and let it pass through the "**Exit**". The first part of acquisition wiring should be stretched on the left part of the vehicle and fixed through proper clips.



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



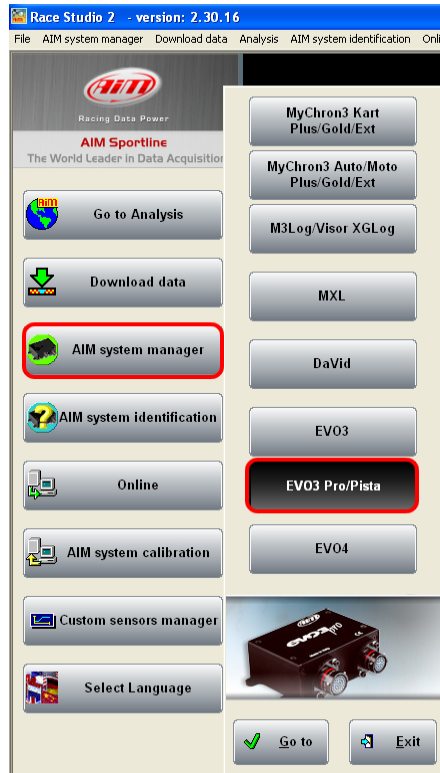
“Rear exit” particular.



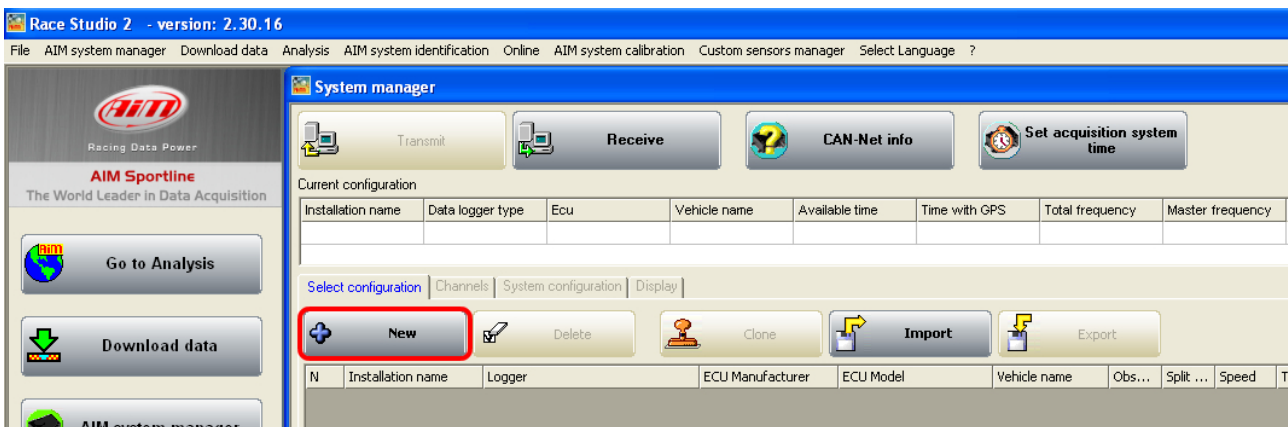
Let the first part of the acquisition wiring come out from the “front exit” as shown here on the left.

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.



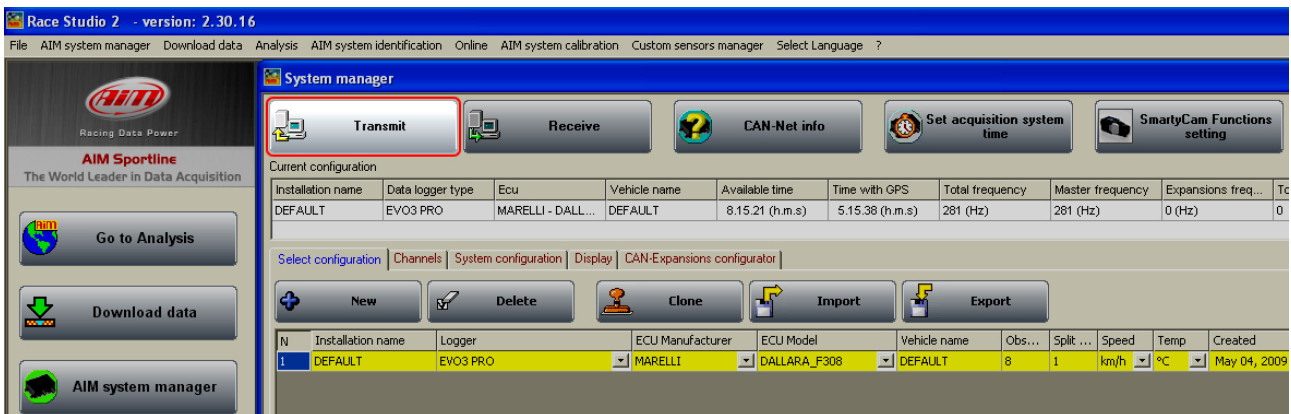
The window here below appears; select:

- 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.

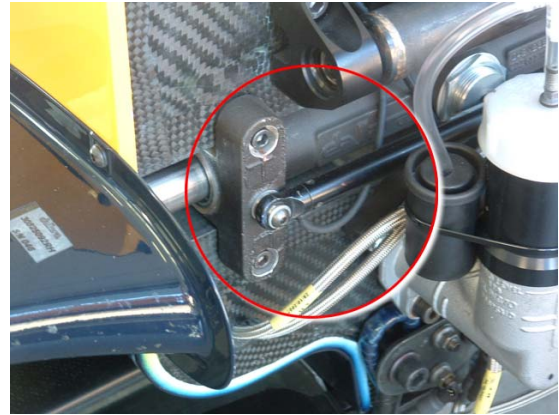
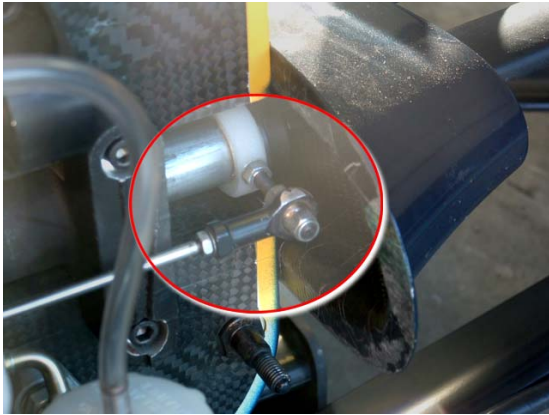
5.1 – Dallara F308 ECU communication protocol

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

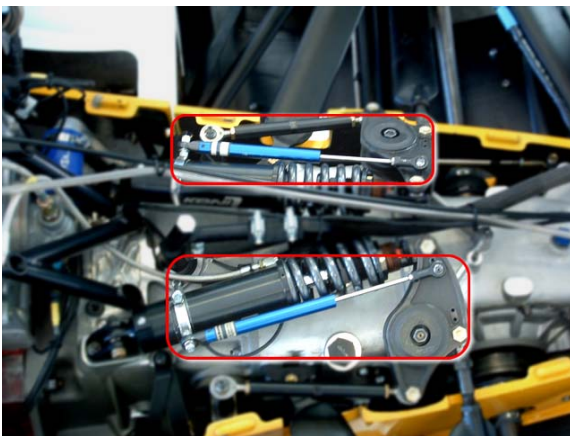
The steering potentiometer is to be installed on the steering box as in the figure.



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:

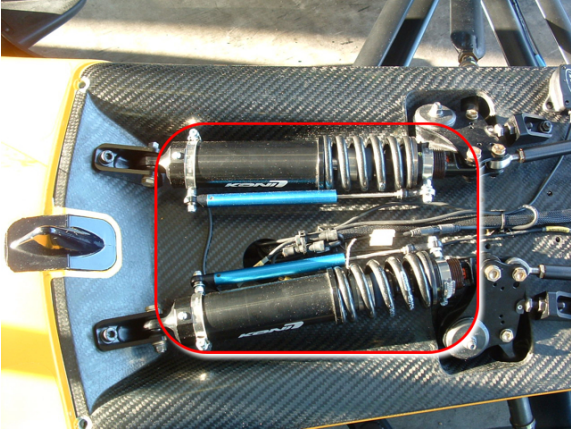
- CH. 1: front suspension 1
- CH. 2: front suspension 2
- CH. 6: rear suspension 1
- CH. 7: rear suspension 2



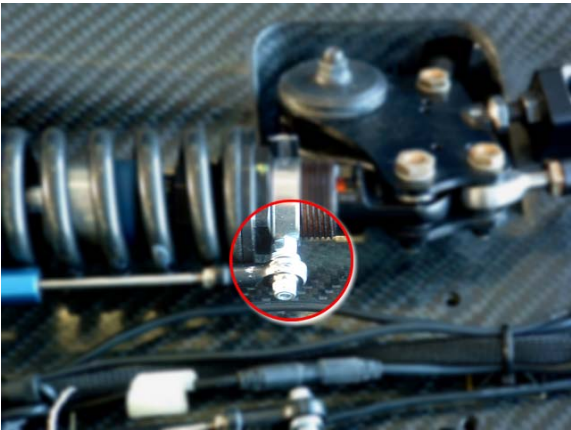
Installation of rear suspensions potentiometers



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

7.2 – Data

PROBLEM	PROBABLE REASON	SUGGESTED SOLUTION
The logger stored no data.	<p>The logger switched off during the test.</p> <p>A configuration has been transmitted before download.</p>	<p>Check that the logger is correctly powered and that there are no short circuits on the wirings¹.</p> <p>Transmitting a new configuration /calibration logger memory is deleted.</p>
Sampled data are wrong.	<p>The sensor is damaged.</p> <p>The wiring is damaged.</p> <p>Channels calibration/ auto-calibration was wrong/unsuccessful.</p>	<p>Replace the sensor.</p> <p>Replace the wiring.</p> <p>Repeat the calibration/auto-calibration.</p>

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).
Lap times are too short.	Transmitter battery is exhausted.	Replace the battery.
	Verify that laps labelled “Vehicle stop” are not considered. Verify that there is no more than one AIM lap transmitter on the track.	Disable laps marked as “Vehicle stop” in Race Studio Analysis. 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. USB driver not correctly installed. PC USB port not working properly. USB cable is damaged.	Switch the logger on. Re-install USB driver. Try a second USB port if available. Replace the USB cable.

Appendix "A" – Technical drawings

EVO3 Pro Formula 3 Italia - Dallara 308 wiring

Connections list

Connect.	Description	Deutsch Connector	Deutsch Connector
①	Front Susp. 1 Front Susp. 2 AM lap	37 pin 37 pin 37 pin	37 pin 37 pin 37 pin
②	USB	22 pin	
③	CAN ECU Steering Front Brake Rear Brake F Speed 3-4	37 pin 37 pin 37 pin 37 pin 22 pin	37 pin 37 pin 37 pin 37 pin 22 pin
④			
⑤	R Speed 1-2		37 pin
⑥	Rear susp. 1 Rear susp. 2		37 pin 37 pin
⑦	Ch. 8 Ch. 9 Ch. 10 Ch. 11 Ch. 12		37 pin 37 pin 37 pin 37 pin 37 pin
⑧	Lap MM		22 pin
⑨	CAN Exp.		22 pin

Rif. / Ref.	Q.tà/Q.ty	Material / Material
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Cablaggio EVO3 Pro Formula 3 Italia - Dallara 308

N. disegno / Drawing N.

04.549.68

Rev. / Rev.	Foglio / Sheet
3	1 of 3

N. rev. / Rev. N.	Descrizione / Description		Data / Date	Firma / Signature	Contr. da / Ckd. by		
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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	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 mm ²	2200 mm	Lap GND V battery
Rif. / Ref.	Q.tà/Q.ty	Material / Material		N. articolo / Item N.			
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		Cablaggio EVO3 Pro Formula 3 Italia - Dallara 308					
N. disegno / Drawing N.		04.549.68		Rev. / Rev.	Foglio / Sheet		
				3	2 of 3		


N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by
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Table of cables 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	Length	Channel
4	F Speed 3-4	5	white	1	4x0.35 mm ²	2900 mm	Speed 3 GND V battery Speed 4
		11	black	2			
		10	red	3			
		6	bleu	4			
8	Lap MM	14	white	1	4x0.35 mm ²	110 mm	Lap V battery
		10	red	2			
			bleu	3			
				4			

Table of cables 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	Length	Channel
9	CAN Exp.	4	white black red bleu	1	4x0.35 mm ²	830 mm	CAN 0+ GND V battery CAN 0-
		2		2			
		13		3			
		3		4			
				5			

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

Table of cables 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	Length	Channel
3	CAN ECU	20	white black red bleu	2	4x0.35 mm ²	1320 mm	CAN 1+ GND VB ext CAN 1-
		19		4			
		22		1			
		21		3			

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		Titolo / Title Cablaggio EVO3 Pro Formula 3 Italia - Dallara 308			
		N. disegno / Drawing N. 04.549.68	Rev. / Rev. 3	Foglio / Sheet 3 of 3	

N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by
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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 suspension	2	white	1	4x0.35mm ²	2560 mm	Analog channel 1 analog GND n.c. V. reference
		4	black	2			
		n.c.	red	3			
		21	bleu	4			
4	Channel 2 Front left suspension	3	white	1	4x0.35mm ²	2560 mm	Analog channel 2 analog GND n.c. V. reference
		4	black	2			
		n.c.	red	3			
		21	bleu	4			
9	Channel 3 front roll	8	white	1	4x0.35mm ²	2270 mm	Analog channel 3 analog GND n.c. V. reference
		5	black	2			
		n.c.	red	3			
		6	bleu	4			
7	Channel 4 front brake pressure	9	white	1	4x0.35mm ²	2300 mm	Analog channel 4 analog GND V battery n.c.
		5	black	2			
		17	red	3			
		n.c.	bleu	4			
8	Channel 5 rear brake pressure	32	white	1	4x0.35mm ²	2300 mm	Analog channel 5 analog GND V battery n.c.
		31	black	2			
		17	red	3			
		n.c.	bleu	4			
10	Channel 6 Steering	10	white	1	4x0.35mm ²	2030 mm	Analog channel 6 analog GND n.c. V. reference
		31	black	2			
		n.c.	red	3			
		7	bleu	4			
5	Speed 1 front	36	white	1	4x0.35mm ²	2250 mm	Speed 1 GND V battery n.c.
		28	black	2			
		14	red	3			
		n.c.	bleu	4			
6	Speed 2 front	30	white	1	4x0.35mm ²	2250 mm	Speed 2 GND V battery n.c.
		28	black	2			
		14	red	3			
		n.c.	bleu	4			

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	white	1	5x0.25 mm ²	650 mm	Analog channel 11 Analog GND V battery V reference Analog channel 12
		27	black	2			
		29	red	3			
		22	bleu	4			
		20	orange	5			
13	Channels 9/10 Stump posteriore	25	white	1	5x0.25 mm ²	1450 mm	Analog channel 9 Analog GND V battery V reference Analog channel 10
		11	black	2			
		16	red	3			
		24	bleu	4			
		23	orange	5			

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	white	1	7x0.25 mm ²	1450 mm	Analog channel 7 Analog GND V battery V reference Analog Channel 8 Lap GND
		35	black	2			
		16	red	3			
		34	bleu	4			
		26	orange	5			
		37	yellow	6			
		18	grey	7			

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 mm ²	2000 mm	GND

Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.			
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		Titolo / Title Cablaggio EVO3 Pro Formula 3 Italia Mygale				
		N. disegno / Drawing N. 04.549.71	Rev. / Rev. 1	Foglio / Sheet 2 of 3		


N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by
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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	4x0.35mm ²	1450 mm	Speed 3 GND V battery Speed 4

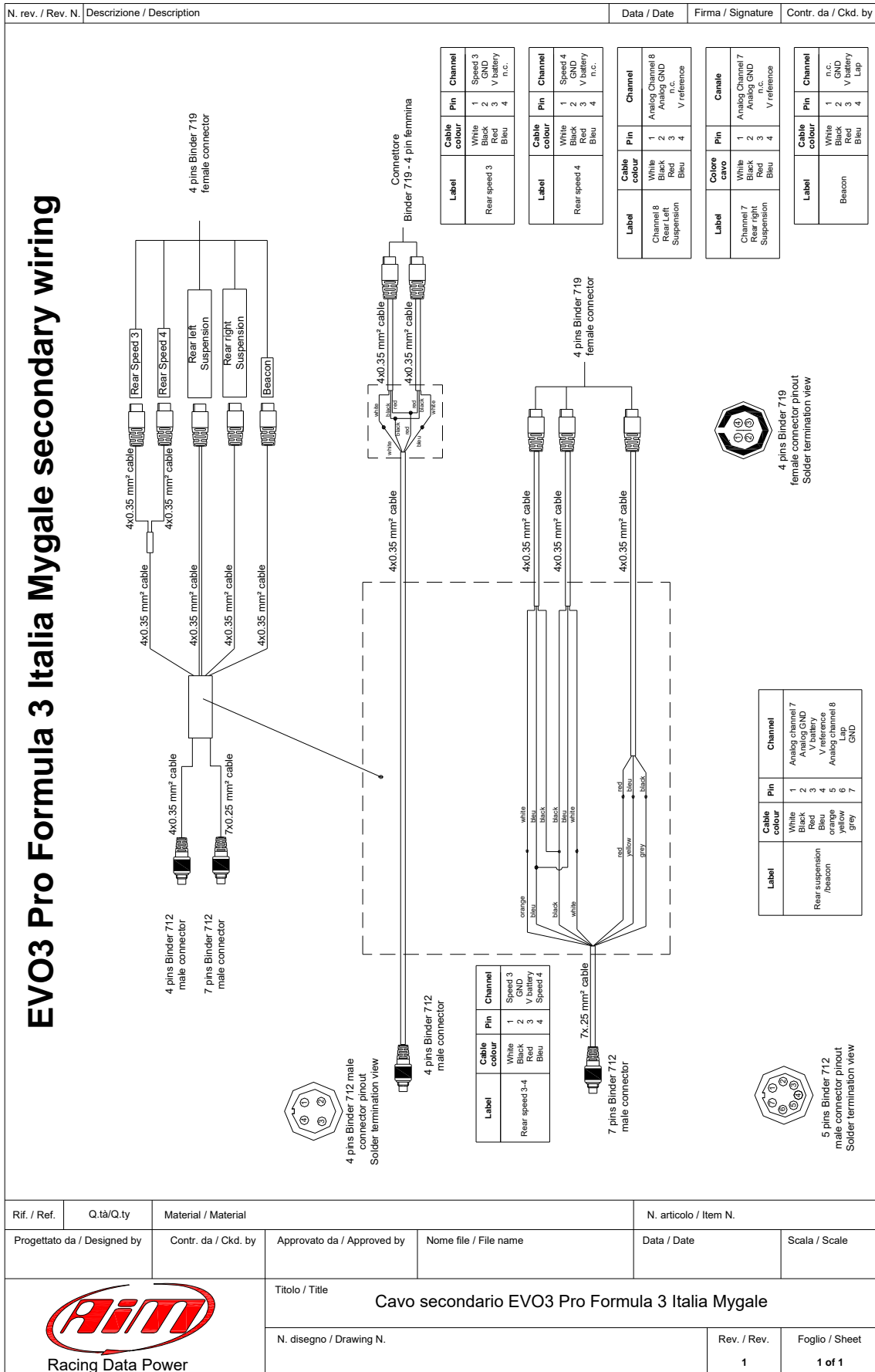
Table of cables from Deutsch 22 pins connector ending with 5 pins Binder 712 female connector							
Connection number	Label	22 pin Deutsch connector pin	Cable colour	Binder 712 connector pin	Type of cable	Length	Channel
1	CAN EXP	4 2 13 2 22	white black red bleu orange	1 2 3 4 5	5x0.25 mm ²	1300 mm	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 mm ²	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 mm ²	1540 mm	CAN 1+ GND Vb ext CAN 1-

Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.		
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N. disegno / Drawing N.			04.549.71	Rev. / Rev. 1	Foglio / Sheet 3 of 3

EVO3 Pro Formula 3 Italia Mygale secondary wiring



Label	Cable colour	Pin	Channel
Rear speed 3	White	1	Speed 3
	Black	2	GND
	Red	3	V battery
	Bleu	4	n.c.

Label	Cable colour	Pin	Channel
Rear speed 4	White	1	Speed 4
	Black	2	GND
	Red	3	V battery
	Bleu	4	n.c.

Label	Cable colour	Pin	Channel
Channel 8 Rear right Suspension	White	1	Analog Channel 8
	Black	2	Analog GND
	Red	3	n.c.
	Bleu	4	V reference

Label	Colore cavo	Pin	Canale
Channel 7 Rear right Suspension	White	1	Analog Channel 7
	Black	2	Analog GND
	Red	3	n.c.
	Bleu	4	V reference

Label	Cable colour	Pin	Channel
Beacon	White	1	n.c.
	Black	2	V battery
	Red	3	Lap
	Bleu	4	Lap



4 pins Binder 719 female connector pinout Solder termination view

Label	Cable colour	Pin	Channel
Rear suspension /beacon	White	1	Analog channel 7
	Black	2	Analog GND
	Red	3	V reference
	Bleu	4	V reference
	orange	5	Analog channel 8
	yellow	6	Lap
	grey	7	GND



5 pins Binder 712 male connector pinout Solder termination view

Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.		
Progettato da / Designed by	Contr. da / Ckd. by	Approvato da / Approved by	Nome file / File name	Data / Date	Scala / Scale
		Titolo / Title Cavo secondario EVO3 Pro Formula 3 Italia Mygale			Rev. / Rev.
		N. disegno / Drawing N.			Foglio / Sheet 1 of 1