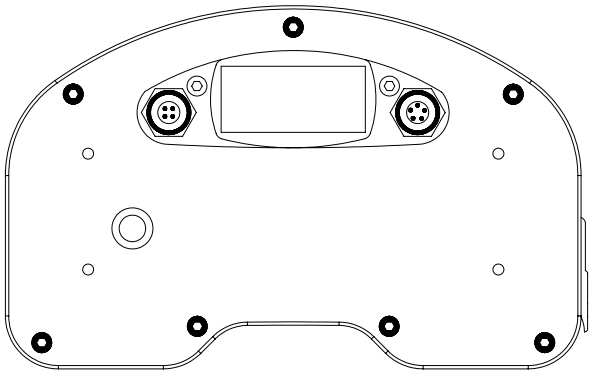
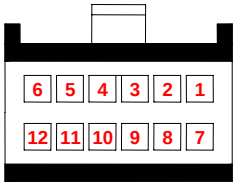
WIRING FOR “MXL PISTA”

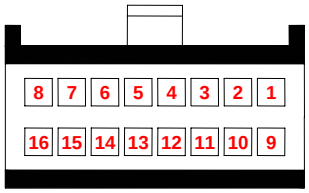


Logger pinout: 12 + 16 pins AMP female connector

Pin	Signal	Pin	Signal
1A	GND	1B	Analog input 4
2A	9-15V Battery input	2B	V reference
3A	CAN 1- (ECU interface)	3B	Analog GND
4A	CAN 1+ (ECU interface)	4B	Analog input 3
5A	RS232 TX (ECU interface)	5B	Analog input 2
6A	RS232 RX (ECU interface)	6B	V reference
7A	USB D-	7B	Analog GND
8A	RPM 150-400V coil - RPM square wave >8V	8B	Analog input 1
9A	+ VB	9B	Analog input 8
10A	GND	10B	USB D+
11A	+ VB	11B	Analog GND
12A	Speed	12B	Analog input 7
		13B	Analog input 6
		14B	V reference
		15B	Analog GND
		16B	Analog input 5



12 Pins AMP female connector pinout (Labelled as “A”) – Contacts insertion view

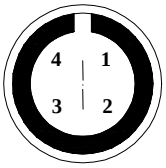


16 Pins AMP female connector pinout (Labelled as “B”) – Contacts insertion view

Connector details

Beacon channel

Pin	Function	Pin	Function
1	Magnetic / Optic codified lap	3	+VB
2	GND	4	Optic not codified lap



4 Pins female Binder connector: outside view

CAN for Expansion Modules

Pin	Function	Pin	Function
1	CAN 0+	4	CAN 0-
2	GND	5	9-15V Battery input
3	+ VB		

5 Pins female Binder connector: outside view

NOTES:

- Pins labelled as “3B”, “7B”, “11B” and “15B” are the “GROUND” signals corresponding to the 8 analog inputs.
- The gauge must be powered by a 9 ÷ 15 V DC power source. **Do not exceed these limits**.
- The “V Reference” signals must be used for thermo resistances, VDO sensors and potentiometers.
- Pins labelled as “9A” and “11A” represent the battery voltage output signal. These pins must be used for those sensors which need to be powered by an external power source (Gyroscope, External accelerometer, speed sensor, lap receiver, etc…). Potentiometers, temperature sensors and pressure sensors must not be connected to these pins.

How to build your own “16+12 Pins AMP connector” harness

Please note: this part of the document is intended only for customers that wish to create their own harness.

How to power the gauge

The gauge must be powered by a **9 ÷ 15 V DC power source**. **Do not exceed these limits**.
We suggest to use 0.5 mm^2 unifilar wires.
See the following table in order to correctly connect the power wires.

Pin AMP connector	Signal	Cable colour
2A	9-15V Battery input	Red
1A	GND	Black

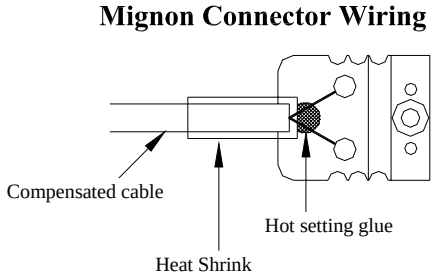
We strongly suggest to connect the “Power input” cable to the bike/car master switch.

If you are not able to power the gauge using the master switch, please connect the red wire to the battery’s positive (+) pole and the black one to the negative (-) pole. As the gauge automatically switches on when connected to an external 9-15 V power source, please install an ON/OFF switch along the power cable.

How to connect a thermocouple

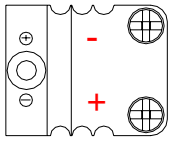
Thermocouples may be connected on any one of the 8 analog inputs.
We remind You to use **compensated cable** to connect the **AMP connector** to the **Mignon** connector (shown in the following picture).

To make the Mignon connector wiring, we recommend you to screw the wirings in the connector and fix them with heat setting glue, as in the picture on the right.



See the following table in order to correctly connect a thermocouple (in this example the thermocouple has been installed on Channel 1).

Pin AMP	Signal	Pin Mignon	Cable colour
8B	Analog input 1	+	Yellow
7B	Analog GND	-	Red



Mignon connector pinout: top side view

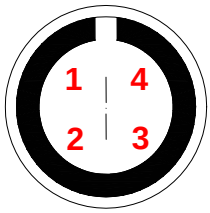
Please note: Thermocouple GND has to be connected to GND belonging to homogeneous channels (0-50mV – i.e. only thermocouples) and not to potentiometers, pressure sensors, Thermoresistor or similar sensors, so to avoid interferences and measurement errors.

How to connect a Thermoresistor

Thermoresistor may be connected on any one of the 8 analog inputs.
We suggest You to use a " 4 x 0.14 mm^2 " wire to connect the **AMP connectors** to the **Binder 719 connector** (shown in the following picture).

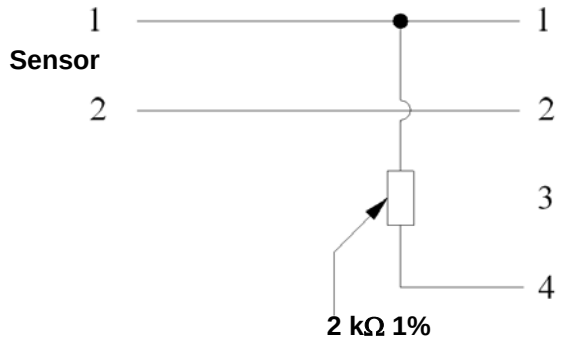
See the following table in order to correctly connect a Thermoresistor (in this example the Thermoresistor has been installed on Channel 2).

Pin AMP	Signal	Pin Binder	Cable colour
5B	Analog input 2	1	White
3B	Analog GND	2	Black
	Not connected	3	
6B	V reference	4	Blue

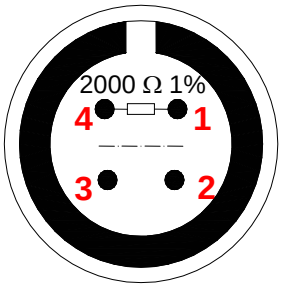


Binder 719 female pinout: solder termination view

If you bought an AIM PT100 Thermoresistor for MXL, an SMD resistor is mounted inside the sensor's connector between pins number 1 and 4, as shown in the following pictures. The value of this resistor is **2 kΩ 1%**. If, on the contrary, you bought another Thermoresistor, you have to mount an SMD resistor between pins number 1 and 4.



4 pins male connector Solder termination view

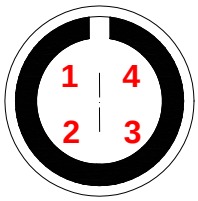


Binder 719 male: resistor installation

How to connect a VDO pressure sensor

VDO pressure sensors may be connected on any one of the 8 analog inputs.
We suggest you to use a " 4 x 0.14 mm^2 " wire to connect the **AMP connectors** to the **Binder 719 connector** (shown in the following picture).
See the following table in order to correctly connect a VDO pressure sensor (in this example the sensor has been installed on Channel 3).

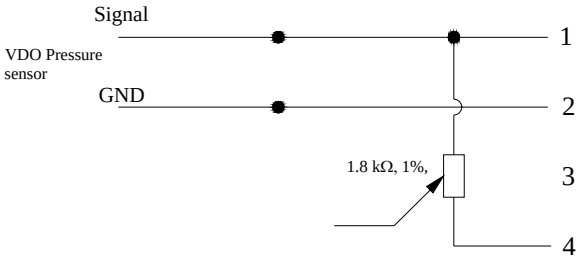
Pin AMP	Signal	Pin Binder	Cable colour
4B	Analog input 3	1	White
3B	Analog GND	2	Black
	Not connected	3	
6B	V reference	4	Blue



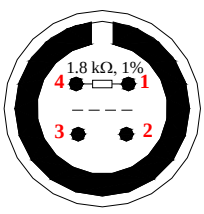
Binder 719 female pinout: solder termination view

If you bought an AIM VDO pressure sensor, an SMD resistor is mounted inside the sensor's connector between pins number 1 and 4. The value of this resistor is **1.8 kΩ 1%**.
Please do not tamper in anyway the SMD resistor or the sensor will not work properly. If, on the contrary, you bought a VDO sensor on your own, please **be sure it is a VDO sensor without warning contact, insulated return** and mount the resistor on your own between pin 1 (signal) and pin 4 (V reference) as specified in the figure below.
Please refer to the following table to see **VDO sensors compatibility with AIM instruments**:

VDO Pressure sensor:	VDO Pressure sensors:	VDO Pressure sensors:
• **without warning contact** • **insulated return**	• without Warning contact • common ground	• with warning contact • common ground
Compatibility: YES	**Compatibility: NO**	**Compatibility: NO**



Male solder termination view



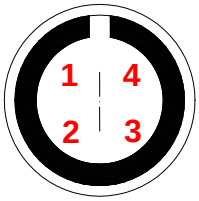
Binder 719 Male resistor installation

VDO pressure sensor with Binder 719 and resistor installation.

How to connect a potentiometer

Potentiometers may be connected on any one of the 8 analog inputs.
See the following table in order to correctly connect a potentiometer (in this example the sensor has been installed on Channel 4).

Pin AMP	Signal	Pin Binder	Cable colour
1B	Analog input 4	1	White
3B	Analog GND	2	Black
	Not connected	3	
2B	V reference	4	Blue

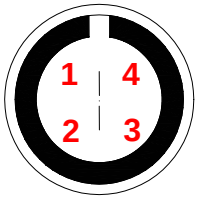


Binder 719 female pinout: solder termination view

How to connect the Speed sensor

See the following table in order to correctly install the speed sensor:

Pin AMP	Signal	Pin Binder	Cable colour
12A	Speed	1	White
10A	GND	2	Black
11A	+ VB	3	Red
	Not connected	4	



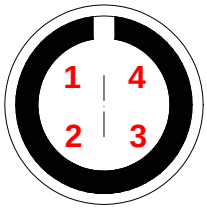
Binder 719 female pinout: solder termination view

How to connect the “on-board” Gear sensor

The gear sensor is usually an “on-board” sensor which is powered by the vehicle’s battery: in order to correctly sample the engaged gear You only have to connect the gear signal on the right connector pin. See the following table in order to correctly measure the engaged gear.

Please note: the “on-board gear sensor MUST be connected on channel number 8.

Pin AMP	Signal	Pin Binder	Cable colour
9B	Analog input 8	1	White
	Not connected	2	
	Not connected	3	
	Not connected	4	

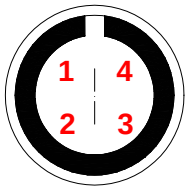


Binder 719 female pinout: solder termination view

How to connect the Gyroscope (Bikes) or the Ext. accelerometer (Cars)

The Gyroscope/External accelerometer may be connected on any one of the 8 analog inputs. See the following table in order to correctly connect a Gyroscope/External accelerometer (in this example the sensor has been installed on Channel 5).

Pin AMP	Signal	Pin Binder	Cable colour
16B	Analog input 5	1	White
15B	GND	2	Black
9A	+ VB	3	Red
	Not connected	4	

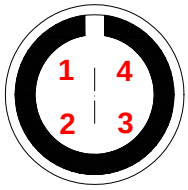


Binder 719 female pinout: solder termination view

How to connect the 100 PSI Pressure Sensor

This sensor can be connected only on channels 4 to 8 (those with + VB voltage output). See the table below to correctly connect it (in this example the sensor is installed on Channel 5).

Pin AMP	Signal	Pin Binder	Cable colour
16B	Analog Input 5	1	White
15B	Analog GND	2	Black
9A	+ VB	3	Red
2B	V reference	4	blue



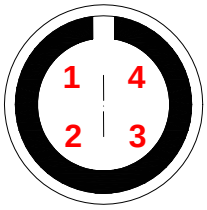
Binder 719 female pinout: solder termination view

Other sensors that need V Battery to be connected are: **100 Bar pressure sensor** for **Formula Renault 2000** and **Pitot Tube sensor**.

How to create the USB data download cable that connects AMP connector to Binder 719 female connector

See the following table in order to correctly create the USB data download cable.

Pin AMP	Signal	Pin Binder	Cable colour
10B	USB D+	1	White
10A	GND	2	Black
7A	USB D-	3	Red
	Not connected	4	



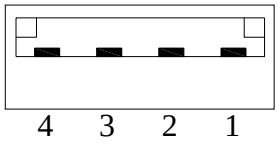
Binder 719 female pinout: solder termination view

Note: please pay attention not to create shortcuts between GND, USB D+ and USB D-; this may damage your Pc. Please check you cable before connecting it to the Pc USB port.

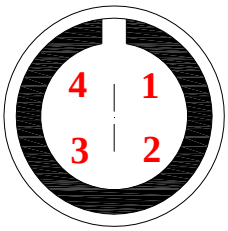
How to create the USB data download cable that connects Binder 719 male connector to USB connector (for complete wiring)

See the following table in order to correctly create the USB data download cable that connects Binder 719 male connector to USB connector.

Pin USB	Signal	Pin Binder
10B	USB D+	1
10A	GND	2
7A	USB D-	3
	Not connected	4



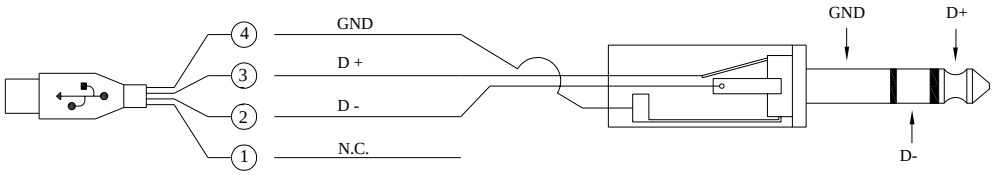
USB Connector pinout front view

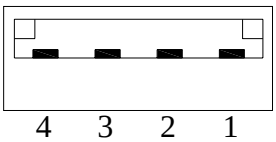


Binder 719 male pinout: solder termination view

Note: please pay attention not to create shortcuts between GND, USB D+ and USB D-; this may damage your Pc. Please check you cable before connecting it to the Pc USB port.

How to create the USB cable that connects USB connector to Jack connector that plugs laterally into MXL for data download.





USB Connector pinout front view

Note: please pay attention not to create shortcuts between GND, USB D+ and USB D-; this may damage your Pc. Please check you cable before connecting it to the Pc USB port.

How to connect the RPM sensor

The RPM signal may be sampled either from the ECU or from the coil.

- The RPM signal sampled from the ECU is, usually, a 12 Volts square wave signal. Your MXL is able to sample RPM square wave signals down to 8 V.
- The RPM signal sampled from the coil is, usually, a 150 - 400 V signal.

Your MXL is able to sample both RPM signals using a single RPM input. See the following table in order to correctly measure the RPM channel.
We suggest you to use 0.5 mm^2 unifilar wires.

Pin AMP	Signal	Cable colour
8A	RPM 150-400V coil - RPM square wave >8V	White

How to connect your MXL to the ECU – CAN protocol

Your MXL is able to sample data incoming from external ECUs (please refer to the user's manual or to **Race Studio 2** for the available ECUs list).
If your ECU is equipped with a CAN communication protocol and is included among the available ECUs list, here below you find the information you need to create the "ECU-CAN" communication cable.
We suggest You to use 0.5 mm^2 unifilar wires.

Pin AMP	Signal	Cable colour
4A	CAN 1+ (for ECU interface)	White
3A	CAN 1- (for ECU interface)	Blue

How to connect your MXL to the ECU – RS232 protocol

Your MXL is able to sample data incoming from external ECUs (please refer to the user's manual or to **Race Studio 2** for the available ECUs list).
If your ECU is equipped with an RS232 (serial) communication protocol and is included among the available ECUs list, here below you find the information you need to create the "ECU-RS232" communication cable.
We suggest You to use 0.5 mm^2 unifilar wires.

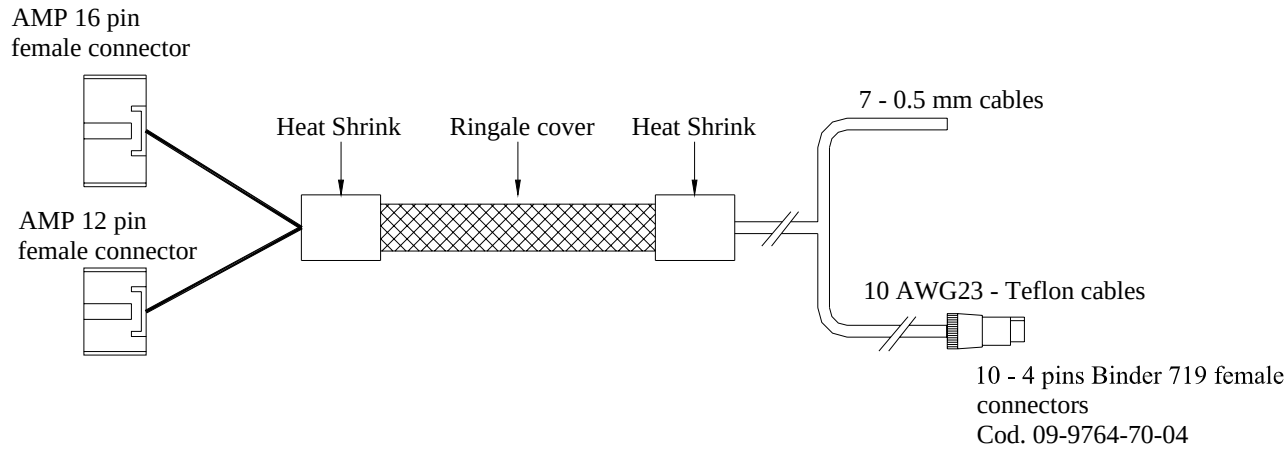
Pin AMP	Signal	Cable colour
6A	RS232 RX (for ECU interface)	White
5A	RS232 TX (for ECU interface)	Blue

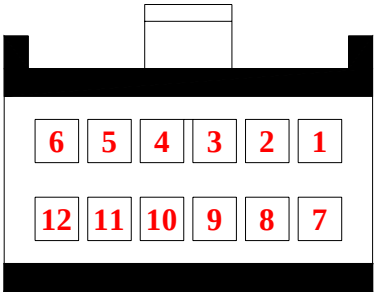
AIM harnesses for MXL Pista “16+12 pins AMP connector”

If you bought an AIM wiring for **MXL Pista**, here follows explanation of three different wirings for 16+12 AMP female connector on **MXL Pista**:

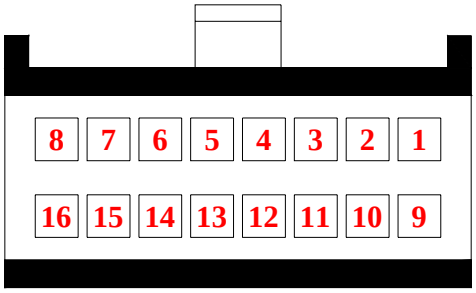
- **MXL Pista** standard (no thermocouples) – Code 04.554.02
- **MXL Pista** with one thermocouple – Code 04.554.08
- **MXL Pista** with two thermocouples – Code 04.554.15

Wiring for MXL Pista: No thermocouple - Code 04.554.20

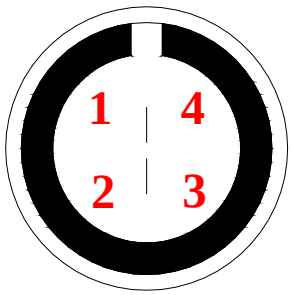




12 Pins AMP female connector pinout contact insertion view



16 Pins AMP female connector pinout contact insertion view



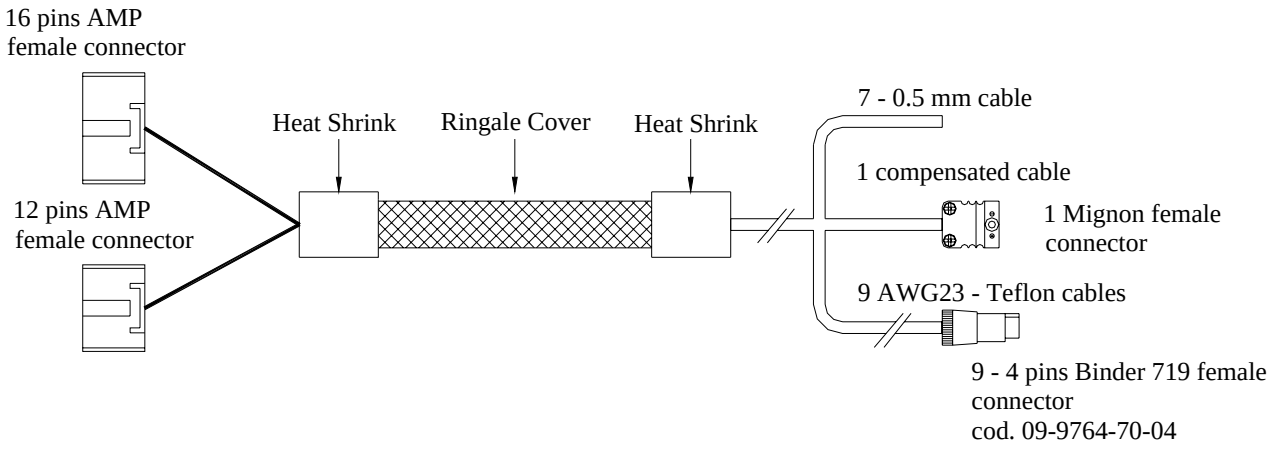
4 pins Binder 719 female connector pinout solder termination view

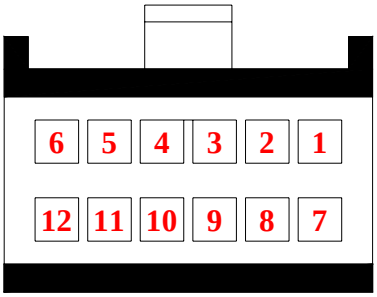
Notes:

- On **Channels 1 to 3 you can connect** Thermoresistor, VDO Pressure sensors, potentiometers and all sensors that do not need +VB voltage output; to say:
  - **no Gyroscope** for bike installations
  - **no external accelerometer** for car installations
  - **no Pitot tube**
  - **no 0-100 PSI Pressure Sensor**
  - **no 100 Bar Pressure Sensor for formula Renault 2000**.
- On **Channels 4 to 8 you can connect any sensor, except for thermocouples** sensors, that need compensated cable; see following pages - wirings codes 04.554.08 and 04.554.15.
- On **Channel 8 you can connect gear sensor or any other sensor that do not need +VB voltage output**, as for channels 1 to 3.

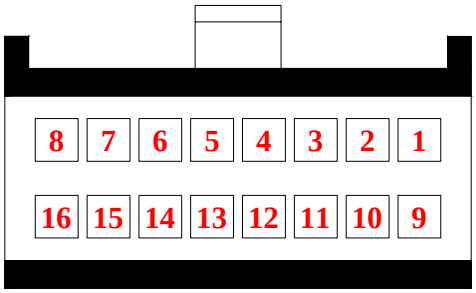
Channel name	Pin AMP 12 pins	Pin AMP 16 pins	Signal	Pin Binder	Cable colour
Ch. 1		8	Analog Input 1	1	White
		7	Analog GND	2	Black
				3	Red
		6	V Reference	4	Bleu
Ch. 2		5	Analog Input 2	1	White
		7	Analog GND	2	Black
				3	Red
		6	V Reference	4	Bleu
Ch. 3		4	Analog Input 3	1	White
		3	Analog GND	2	Black
				3	Red
		6	V Reference	4	Bleu
Ch. 4		1	Analog Input 4	1	White
		3	Analog GND	2	Black
	9		+ VB	3	Red
		2	V Reference	4	Bleu
Ch. 5		16	Analog Input 5	1	White
		15	Analog GND	2	Black
	9		+VB	3	Red
		2	V Reference	4	Bleu
Ch. 6		13	Analog Input 6	1	White
		15	Analog GND	2	Black
	9		+ VB	3	Red
		2	V Reference	4	Bleu
Ch. 7		12	Analog Input 7	1	White
		11	Analog GND	2	Black
	11		+ VB	3	Red
		14	V Reference	4	Bleu
Ch. 8		9	Analog Input 8	1	White
		11	Analog GND	2	Black
	11		+ VB	3	Red
		14	V Reference	4	Bleu
Speed	12		Speed	1	White
	10		GND	2	Black
	11		+ VB	3	Red
				4	Bleu
USB		10	USB D+	1	White
	10		GND	2	Black
	7		USB D-	3	Red
				4	n.c.

Wiring for MXL Pista: One thermocouple - Code 04.554.08

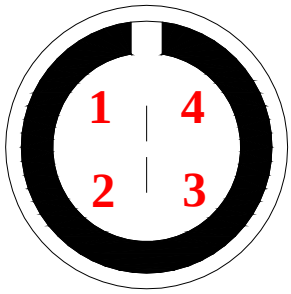




12 Pins AMP female connector pinout contact insertion view



16 Pins AMP female connector pinout contact insertion view



4 pins Binder 719 female connector pinout solder termination view

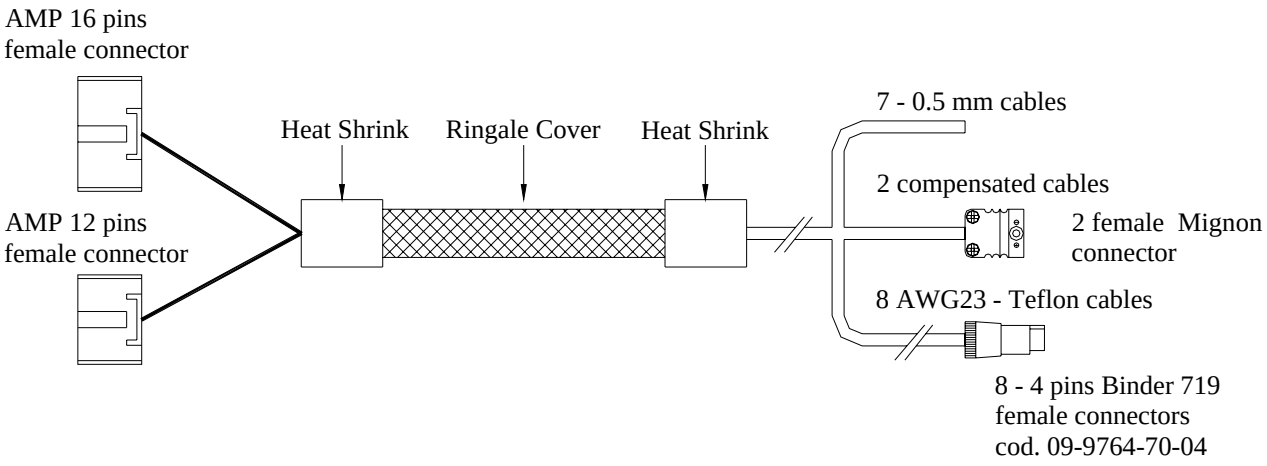
Notes:

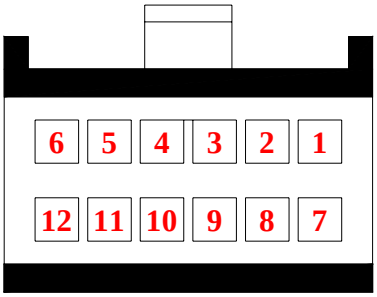
- On **Channel 1 you can connect only thermocouple sensors**.
- On **Channels 2 and 3 you can connect** Thermoresistor, VDO Pressure sensors, potentiometers and all sensors that do not need +VB voltage output; to say:
  - **no Gyroscope** for bike installations
  - **no external accelerometer** for car installations
  - **no Pitot tube**
  - **no 0-100 PSI Pressure Sensor**
  - **no 100 Bar Pressure Sensor for formula Renault 2000**.
- On **Channels 4 to 8 you can connect any sensor, except for thermocouples** sensors, that need compensated cable.
- On **Channel 8 you can connect gear sensor or any other sensor that do not need +VB voltage output**, as for channels 1 to 3.

Channel name	Pin AMP 12 pins	Pin AMP 16 pins	Signal	Pin Mignon	Cable colour
Ch. 1		8	Analog Input 1	+	Yellow
		7	Analog GND	-	Red

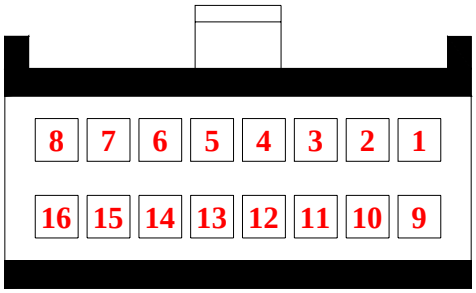
Channel name	Pin AMP 12 pins	Pin AMP 16 pins	Signal	Pin Binder	Cable colour
Ch. 2		5	Analog Input 2	1	White
		7	Analog GND	2	Black
				3	Red
		6	V Reference	4	Bleu
Ch. 3		4	Analog Input 3	1	White
		3	Analog GND	2	Black
				3	Red
		6	V Reference	4	Bleu
Ch. 4		1	Analog Input 4	1	White
		3	Analog GND	2	Black
	9		+ VB	3	Red
		2	V Reference	4	Bleu
Ch. 5		16	Analog Input 5	1	White
		15	Analog GND	2	Black
	9		+VB	3	Red
		2	V Reference	4	Bleu
Ch. 6		13	Analog Input 6	1	White
		15	Analog GND	2	Black
	9		+ VB	3	Red
		2	V Reference	4	Bleu
Ch. 7		12	Analog Input 7	1	White
		11	Analog GND	2	Black
	11		+ VB	3	Red
		14	V Reference	4	Bleu
Ch. 8		9	Analog Input 8	1	White
		11	Analog GND	2	Black
	11		+ VB	3	Red
		14	V Reference	4	Bleu
Speed	12		Speed	1	White
	10		GND	2	Black
	11		+ VB	3	Red
				4	Bleu
USB		10	USB D+	1	White
	10		GND	2	Black
	7		USB D-	3	Red
				4	n.c.

Wiring for MXL Pista: Two thermocouples - Code 04.554.15

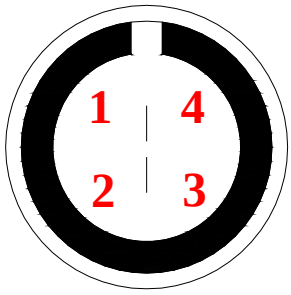




12 Pins AMP female connector pinout contact insertion view



16 Pins AMP female connector pinout contact insertion view



4 pins Binder 719 female connector pinout solder termination view

Notes:

- On **Channels 1 and 2 you can connect only thermocouple sensors**.
- On **Channel 3 you can connect** Thermoresistor, VDO Pressure sensors, potentiometers and all sensors that do not need +VB voltage output; to say:
  - **no Gyroscope** for bike installations
  - **no external accelerometer** for car installations
  - **no Pitot tube**
  - **no 0-100 PSI Pressure Sensor**
  - **no 100 Bar Pressure Sensor for formula Renault 2000**.
- On **Channels 4 to 8 you can connect any sensor, except for thermocouples** sensors, that need compensated cable.
- On **Channel 8 you can connect gear sensor or any other sensor that do not need +VB voltage output**, as for channel 3.

Channel name	Pin AMP 12 pins	Pin AMP 16 pins	Signal	Pin Mignon	Cable colour
Ch. 1		8	Analog Input 1	+	Yellow
		7	Analog GND	-	Red
Ch. 2		5	Analog input 2	+	Yellow
		7	Analog GND	-	Red

Channel name	Pin AMP 12 pins	Pin AMP 16 pins	Signal	Pin Binder	Cable colour
Ch. 3		4	Analog Input 3	1	White
		3	Analog GND	2	Black
				3	Red
		6	V Reference	4	Bleu
Ch. 4		1	Analog Input 4	1	White
		3	Analog GND	2	Black
	9		+ VB	3	Red
		2	V Reference	4	Bleu
Ch. 5		16	Analog Input 5	1	White
		15	Analog GND	2	Black
	9		+VB	3	Red
		2	V Reference	4	Bleu
Ch. 6		13	Analog Input 6	1	White
		15	Analog GND	2	Black
	9		+ VB	3	Red
		2	V Reference	4	Bleu
Ch. 7		12	Analog Input 7	1	White
		11	Analog GND	2	Black
	11		+ VB	3	Red
		14	V Reference	4	Bleu
Ch. 8		9	Analog Input 8	1	White
		11	Analog GND	2	Black
	11		+ VB	3	Red
		14	V Reference	4	Bleu
Speed	12		Speed	1	White
	10		GND	2	Black
	11		+ VB	3	Red
				4	Bleu
USB		10	USB D+	1	White
	10		GND	2	Black
	7		USB D-	3	Red
				4	n.c.

INDICE