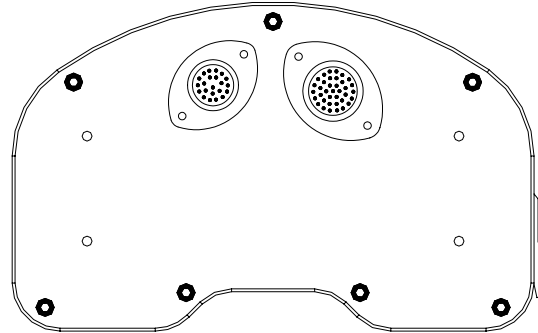


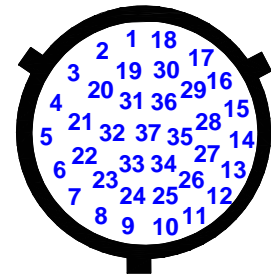
CONSTRUCTIVE DOCUMENTATION	01/03/2005	WIRING	MXL PRO 05 wiring (CAR/BIKES)
Notes: general-purpose wiring for MXL PRO 05 – CAR/BIKE installation Version 1.00			

WIRING FOR “MXL PRO- 05”



Logger pinout: 37 pins Deutsch connector

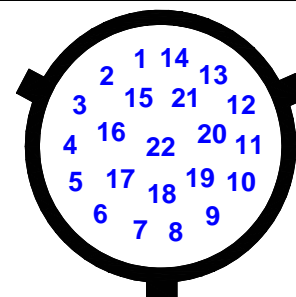
Pin	Signal	Pin	Signal
1	9-15 V Battery input	20	Analog input 12
2	Analog input 1	21	V Reference
3	Analog input 2	22	V Reference
4	Analog GND	23	Analog input 10
5	Analog GND	24	V Reference
6	V Reference	25	Analog input 9
7	V Reference	26	Analog input 8
8	Analog input 3	27	Analog GND
9	Analog input 4	28	GND
10	Analog input 6	29	+VB
11	Analog GND	30	Speed 2
12	RPM Square Wave > 5 V	31	Analog GND
13	RPM coil	32	Analog input 5
14	+ VB	33	Analog input 7
15	GND	34	V Reference
16	+ VB	35	Analog GND
17	+ VB	36	Speed 1
18	GND	37	Lap input
19	Analog input 11		



37 pins Deutsch male connector pinout: contacts insertion view

Logger pinout: 22 pins Deutsch connector

Pin	Signal	Pin	Signal
1	+ VB	12	GND
2	GND	13	+ VB
3	CAN 0+ (Ext. exp. modules)	14	MEM
4	CAN 0- (Ext. exp. modules)	15	VIEW
5	Speed 3	16	Gear Flash
6	Speed 4	17	RS232 RX (ECU interface)
7	USB D+	18	RS232 TX (ECU interface)
8	USB D-	19	GND
9	GND	20	CAN 1+ (ECU interface)
10	+ VB	21	CAN 1- (ECU interface)
11	GND	22	9-15 V Battery input



22 pins Deutsch male connector pinout: contacts insertion view

How to build your own “37 Pins Deutsch 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 You to use 0.5 mm² unifilar wires. See the following table to correctly connect the power wires.

Pin DEUTSCH connector	Signal	Cable colour
1	9-15V Battery input	Red
15	GND	Black

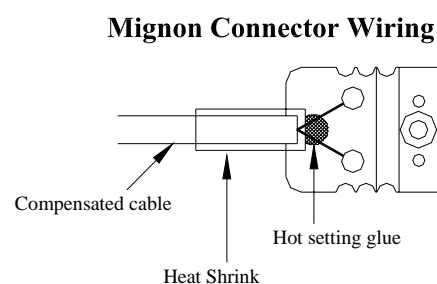
We strongly suggest to connect the “Power input” cable to the bike/car master switch.

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

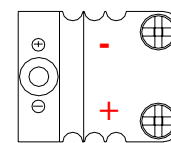
Thermocouples may be connected on anyone of the 12 analog inputs. We remind You to use **compensated cable** to connect the **DEUTSCH connector** to the **Mignon connector** (shown in the table below).

Moreover, 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 to correctly connect a thermocouple (in this example the thermocouple has been installed on Channel 1).

Pin DEUTSCH	Signal	Pin Mignon	Cable colour
2	An. input 1	+	Yellow
4	An. GND	-	Red



Mignon connector pinout:
top side view

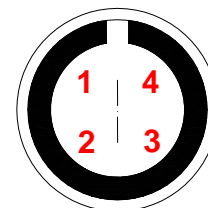
Please note: Thermocouple GND has to be connected to GND belonging to homogeneous channels (0-50mV – i.e. only thermocouples) and not to potentiometers, pressure sensors, Thermoresistor or similar sensors, so to avoid interferences and measurement errors.

How to connect a Thermoresistor

Thermo-resistors may be connected on anyone of the 12 analog inputs. We suggest You to use a “ 4 x 0.35 mm² ” wire to connect the **DEUTSCH connector** to the **Binder 719 connector** (shown in the following picture).

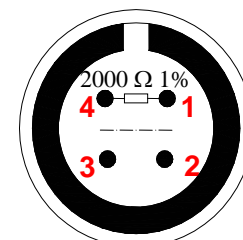
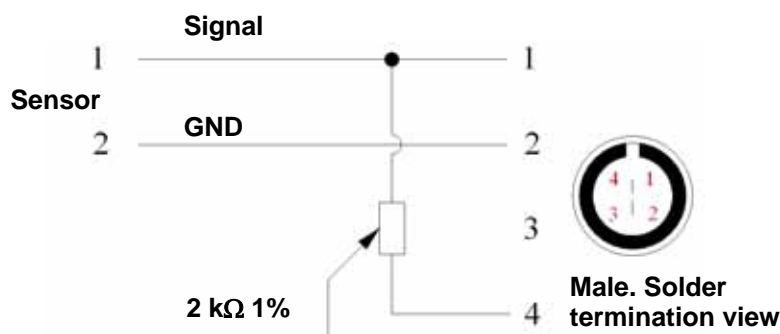
See the following table in order to correctly connect a Thermoresistor (in this example the Thermoresistor has been installed on Channel 2).

Pin DEUTSCH	Signal	Pin Binder	Cable colour
3	An. input 2	1	White
5	An. GND	2	Black
	n.c.	3	
6	V ref.	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.



Binder 719 male:
resistor installation

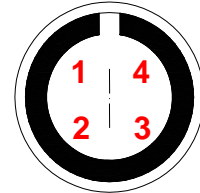
How to connect a VDO pressure sensor

VDO pressure sensors may be connected on anyone of the 12 analog inputs.

We suggest You to use a “ 4 x 0.35 mm² ” wire to connect the **DEUTSCH 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 DEUTSCH	Signal	Pin Binder	Cable colour
8	An. input 3	1	White
5	An. GND	2	Black
	n. c.	3	
6	V ref.	4	Blue



**Binder 719 female pinout:
solder termination view**

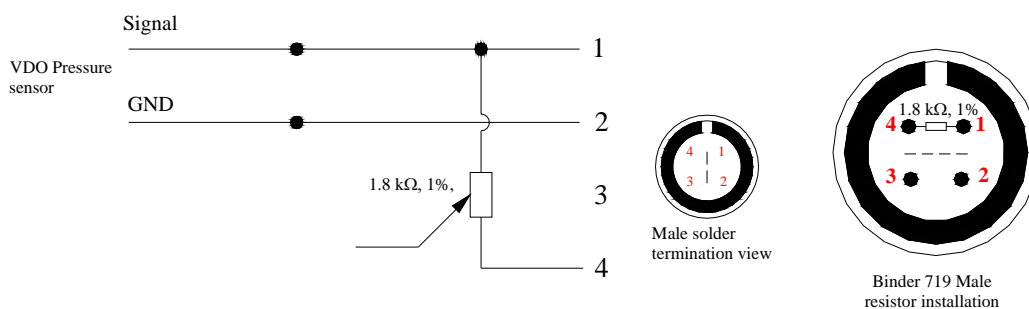
If you bought an AIM VDO pressure sensor, an SMD resistor is mounted inside the sensor's connector between pins number 1 and 4. The value of this resistance is **1.8 kΩ 1%**.

Please do not tamper in any way 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: <ul style="list-style-type: none"> • without warning contact • insulated return <p style="text-align: center;">Compatibility: YES</p>	VDO Pressure sensors: <ul style="list-style-type: none"> • without warning contact • common ground <p style="text-align: center;">Compatibility: NO</p>	VDO pressure sensors: <ul style="list-style-type: none"> • with warning contact • common ground <p style="text-align: center;">Compatibility: NO</p>
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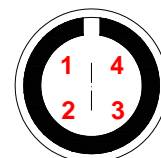


VDO pressure sensor with Binder 719 and resistor installation.

How to connect a potentiometer

Potentiometers may be connected on anyone of the 12 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 DEUTSCH	Signal	Pin Binder	Cable colour
9	An. input 4	1	White
5	An. GND	2	Black
	n.c.	3	
6	V ref.	4	Blue

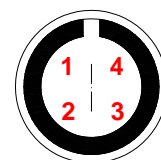


Binder 719 female pinout:
solder termination view

How to connect Speed sensors #1 and #2

Your MXL can sample up to 4 speed channels: 2 of them may be connected to the “37 pins Deutsch connector”. In the example below is a correct installation of speed channel #1. We suggest You to use a “4 x 0.35 mm²” wire to connect the **DEUTSCH connectors** to the **Binder 719 connector** (shown in the following picture).

Pin DEUTSCH	Signal	Pin Binder	Cable colour
36	Speed 1	1	White
28	GND	2	Black
14	+ VB	3	Red
	n.c.	4	



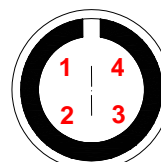
Binder 719 female pinout:
solder termination view

How to connect the “on-board” Gear sensor

The gear sensor is usually an “on-board” sensor powered by the vehicle’s battery: in order to correctly sample the engaged gear You only have to connect the gear signal on the correct 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 12.

Pin DEUTSCH	Signal	Pin Binder	Cable colour
20	An. input 12	1	White
	n.c.	2	
	n.c.	3	
	n.c.	4	

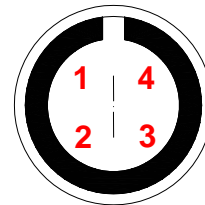


Binder 719 female pinout:
solder termination view

How to connect the Gyroscope (bikes) or the Ext. accelerometer (cars)

The Gyroscope/External accelerometer can be connected only on channels 8, 9, 10 or 11: to say those which in AIM standard wiring have + VB voltage output and in Race Studio 2 software can be set on those channels. See the following table to correctly connect a Gyroscope / External accelerometer (in this example the sensor is installed on Channel 8).

Pin DEUTSCH	Signal	Pin Binder	Cable colour
26	An. input 8	1	White
35	An. GND	2	Black
16	+ VB	3	Red
34	V Ref.	4	Blue

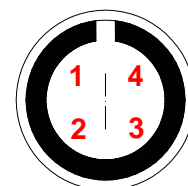


Binder 719 female pinout:
solder termination view

How to connect the 100 PSI Pressure Sensor

This sensor can be connected only on channels 8 to 11 (those with + VB voltage output). See the table below to correctly connect it (in this example the sensor is installed on Channel 9).

Pin DEUTSCH	Signal	Pin Binder	Cable colour
25	An. input 9	1	White
11	An. GND	2	Black
29	+ VB	3	Red
24	n.c.	4	



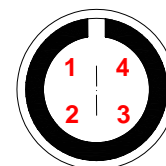
Binder 719 female pinout:
solder termination view

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

How to connect the Lap receiver

See the following table in order to correctly install the lap receiver:

Pin DEUTSCH	Signal	Pin Binder	Cable colour
37	Lap input	1	White
28	GND	2	Black
14	+ VB	3	Red
37	Lap input	4	Blue



Binder 719 female pinout:
solder termination view

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 5 V.
- The RPM signal sampled from the coil is, usually, a 150 - 400 V signal.

Your MXL can 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 mm² unifilar wires.

Pin DEUTSCH	Signal	Cable colour
13	RPM coil	White
18	GND	Black
12	Square wave >5V	Blue

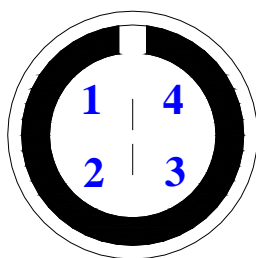
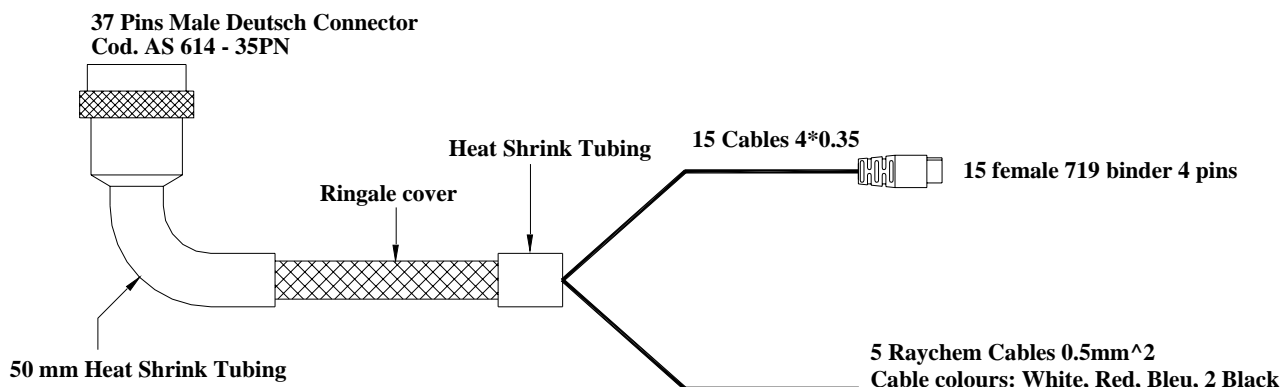
AIM harnesses for MXL PRO 05 “37 pins Deutsch connector”

If you bought an AIM wiring for **MXL PRO 05**, here follows explanation of two different wirings for 37 Pins Deutsch connector on **MXL PRO 05**:

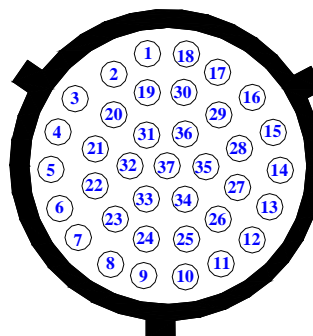
- **MXL PRO 05** standard wiring (no thermocouple) - Code 04.554.20
- **MXL PRO 05** with one thermocouple - Code 04.554.23.

Code 04.554.20

Wiring for MXL PRO 05: No thermocouple



4 Pins Binder 719 female connector pinout
solder termination view



37 Pins Deutsch connector pinout
contact insertion view
(Code AS614 – 35PN)

Notes:

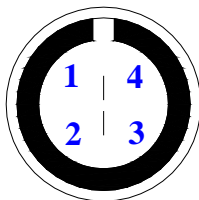
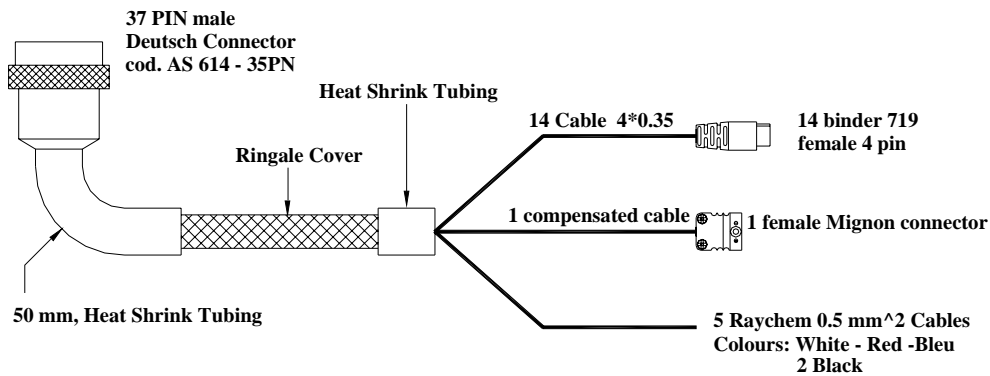
- On **Channels 1 to 7 you can connect** Thermoresistor, VDO Pressure sensors, potentiometers and all sensors that do not need +VB voltage output; to say:
 - **no Gyroscope** for bike installations
 - **no external accelerometer** for car installations
 - **no Pitot tube**
 - **no 0-100 PSI Pressure Sensor**
 - **no 100 Bar Pressure Sensor for formula Renault 2000.**
- On **Channels 8 to 11 you can connect any sensor, except for thermocouples** sensors, that need compensated cable; see following pages - wiring code 04.554.23.
- On **Channel 12 you can connect gear sensor or any other sensor that do not need +VB voltage output**, as for channels 1 to 7.

Channel name	Pin DEUTSCH	Signal	Pin Binder	Cable colour
Ch_1	2	+ Analog input 1	1	White
	4	Analog GND	2	Black
		Not connected	3	
	21	+ V Reference	4	Blue
Ch_2	3	+ Analog input 2	1	White
	4	Analog GND	2	Black
		Not connected	3	
	21	+ V Reference	4	Blue
Ch_3	8	+ Analog input 3	1	White
	5	Analog GND	2	Black
		Not connected	3	
	6	+ V Reference	4	Blue
Ch_4	9	+ Analog input 4	1	White
	5	Analog GND	2	Black
		Not connected	3	
	6	+ V Reference	4	Blue
Ch_5	32	+ Analog input 5	1	White
	31	Analog GND	2	Black
		Not connected	3	
	7	+ V Reference	4	Blue
Ch_6	10	+ Analog input 6	1	White
		Analog GND	2	Black
	31	Not connected	3	
	7	+ V Reference	4	Blue
Ch_7	33	+ Analog input 7	1	White
	35	Analog GND	2	Black
		Not connected	3	
	34	+ V Reference	4	Blue
Ch_8	26	+ Analog input 8	1	White
	35	Analog GND	2	Black
	16	+ VB	3	Red
	34	+ V Reference	4	Blue
Ch_9	25	+ Analog input 9	1	White
	11	Analog GND	2	Black
	29	+ VB	3	Red
	24	+ V Reference	4	Blue
Ch_10	23	+ Analog input 10	1	White
	22	Analog GND	2	Black
	29	+ VB	3	Red
	24	+ V Reference	4	Blue
Ch_11	19	+ Analog input 11	1	White
	27	Analog GND	2	Black
	29	+ VB	3	Red
	22	+ V Reference	4	Blue
Ch_12 / Gear	20	+ Analog input 12	1	White
	27	Analog GND	2	Black
		Not connected	3	
	22	+ V Reference	4	Blue

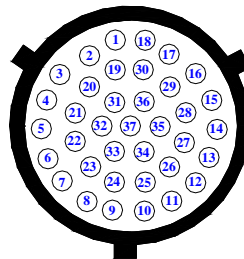
Channel name	Pin DEUTSCH	Signal	Pin Binder	Cable colour
Lap	37	Lap input	1	White
	28	GND	2	Black
	14	+ VB	3	Red
	37	Lap input	4	Blue
Speed 1	36	Speed 1	1	White
	28	GND	2	Black
	14	+ VB	3	Red
		Not connected	4	
Speed 2	30	Speed 2	1	White
	28	GND	2	Black
	14	+ VB	3	Red
		Not connected	4	

Code 04.554.23

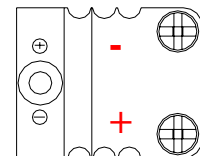
Wiring for MXL PRO 05 – one thermocouple



4 pins Binder 719
Female connector pinout
Solder termination view



37 Pins Deutsch Connector Pinout
Contact Insertion view
(Code AS614 – 35PN)



Mignon connector
pinout:
top side view

Notes:

- On **Channel 1** you can connect **only thermocouple sensors**
- On **Channels 2 to 7** you can connect Thermoresistor, VDO Pressure sensors, potentiometers and all sensors that do not need +VB voltage output; to say:
 - **no Gyroscope** (bike) , **no external accelerometer** (car installations)
 - **no Pitot tube**
 - **no 0-100 PSI Pressure Sensor,**
 - **no 100 Bar Pressure Sensor for formula Renault 2000.**
- On **Channels 8 to 11** you can connect any sensor, **but no thermocouples**
- On **Channel 12** you can connect gear sensor or any other sensor that do **not need +VB voltage output**, as for channels 2 to 7

Channel name	Pin DEUTSCH	Signal	Pin Mignon	Cable colour
Ch_1	2	Analog input 1	+	Yellow
	4	Analog GND	-	Red

Channel name	Pin DEUTSCH	Signal	Pin Binder	Cable colour
Ch_2	3	Analog input 2	1	White
	5	Analog GND	2	Black
		Not connected	3	
	6	V Reference	4	Blue
Ch_3	8	Analog input 3	1	White
	5	Analog GND	2	Black
		Not connected	3	
	6	V Reference	4	Blue
Ch_4	9	Analog input 4	1	White
	5	Analog GND	2	Black
		Not connected	3	
	6	V Reference	4	Blue
Ch_5	32	Analog input 5	1	White
	31	Analog GND	2	Black
		Not connected	3	
	7	+ V Reference	4	Blue
Ch_6	10	Analog input 6	1	White
	31	Analog GND	2	Black
		Not connected	3	
	7	+ V Reference	4	Blue
Ch_7	33	Analog input 7	1	White
	35	Analog GND	2	Black
		Not connected	3	
	34	+ V Reference	4	Blue
Ch_8	26	Analog input 8	1	White
	35	Analog GND	2	Black
	16	+ VB	3	Red
	34	+ V Reference	4	Blue
Ch_9	25	Analog input 9	1	White
	11	Analog GND	2	Black
	29	+ VB	3	Red
	24	+ V Reference	4	Blue
Ch_10	23	Analog input 10	1	White
	11	Analog GND	2	Black
	16	+ VB	3	Red
	24	+ V Reference	4	Blue
Ch_11	19	Analog input 11	1	White
	27	Analog GND	2	Black
	29	+ VB	3	Red
	22	+ V Reference	4	Blue
Ch_12 / Gear	20	Analog input 12	1	White
	27	Analog GND	2	Black
	29	Not connected	3	
	22	+ V Reference	4	Blue

Channel name	Pin DEUTSCH	Signal	Pin Binder	Cable colour
Lap	37	Lap Input	1	White
	28	GND	2	Black
	14	+ VB	3	Red
	37	Lap input	4	Blue
Speed 1	36	Speed 1	1	White
	28	GND	2	Black
	14	+ VB	3	Red
		Not connected	4	
Speed 2	30	Speed 2	1	White
	28	GND	2	Black
	14	+ VB	3	Red
		Not connected	4	

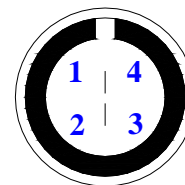
Channel name	Pin DEUTSCH	Signal	Cable colour
RPM	13	RPM coil	White
	18	GND	Black
	12	Square wave >5V	Blue
Power	15	GND	Black
	1	9-15 V Power Input	Red

How to build your own “22 Pins Deutsch connector” harness

How to create the USB cable

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

Pin DEUTSCH	Signal	Pin Binder	Cable colour
7	USB D+	1	White
9	GND	2	Black
8	USB D-	3	Red
	Not connected	4	



Binder 719 female pinout:
solder termination view

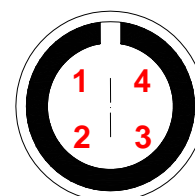
Note: Please pay attention not to make short circuits between GND, USB D+ and USB D-; this event would damage your PC. Please check your cable before connecting it to the PC USB Port.

How to connect Speed sensors #3 and #4

Your MXL is able to sample up to 4 speed channels: 2 of them may be connected to the “22 pins Deutsch connector”. In the example described here below is shown how to correctly install speed channel #3.

We suggest You to use a “ 4 x 0.35 mm² ” wire to connect the **DEUTSCH connectors** to the **Binder 719 connector** (shown in the picture on the right).

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



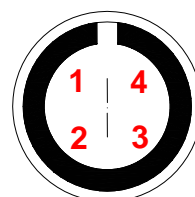
Binder 719 female pinout:
solder termination view

How to create the “External expansion modules” cable

Your MXL may be expanded, via CAN protocol, in order to increase the total amount of available input channels.

We suggest You to use a “ 4 x 0.35 mm² ” wire to connect the **DEUTSCH connectors** to the **Binder 719 connector** (shown in the following picture).

Pin DEUTSCH	Signal	Pin Binder	Cable colour
3	CAN 0+	1	White
2	GND	2	Black
13	+ VB	3	Red
4	CAN 0-	4	Blue



Binder 719 female pinout:
solder termination view

How to connect your MXL to the ECU – CAN protocol

Your MXL can sample data incoming from an external ECU. Please check **Race Studio 2** Software to know which are the supported ECU.

Moreover, for supported ECU list and Instrument-ECU communication information, please see ECU-AIM_Logger_1.xx. pdf file you find in **Race Studio 2** CD Rom or you can freely download from “Documents” page of our website www.aim-sportline.com.

If your ECU is equipped with a CAN communication protocol and is included among the available ECU list, here below you find the information you need to create the “ECU-CAN” communication cable.

We suggest You to use 0.5 mm² unifilar wires.

Pin DEUTSCH	Signal	Cable colour
20	CAN 1+	White
19	GND	Black
21	CAN 1-	Blue

How to connect your MXL to the ECU – RS232 protocol

Your MXL can sample data incoming from external ECU. Please check **Race Studio 2** Software to know which are the supported ECU.

Moreover, for supported ECU list and Instrument-ECU communication information, please see ECU-AIM_Logger_1.xx. pdf file you find in **Race Studio 2** CD Rom or you can freely download from “Documents” page of our website www.aim-sportline.com.

If your ECU is equipped with a 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 mm² unifilar wires.

Pin DEUTSCH	Signal	Cable colour
17	RS232 RX (for ECU interface)	White
19	GND	Black
18	RS232 TX (for ECU interface)	Blue

How to remote the gauge’s keyboard

Your MXL PRO allows you to remote the keyboard’s pushbuttons: in particular you may remote **MEM** and **VIEW** ones.

The remote switches for MXL PRO are active low (i.e. they trigger to GND).

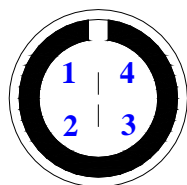
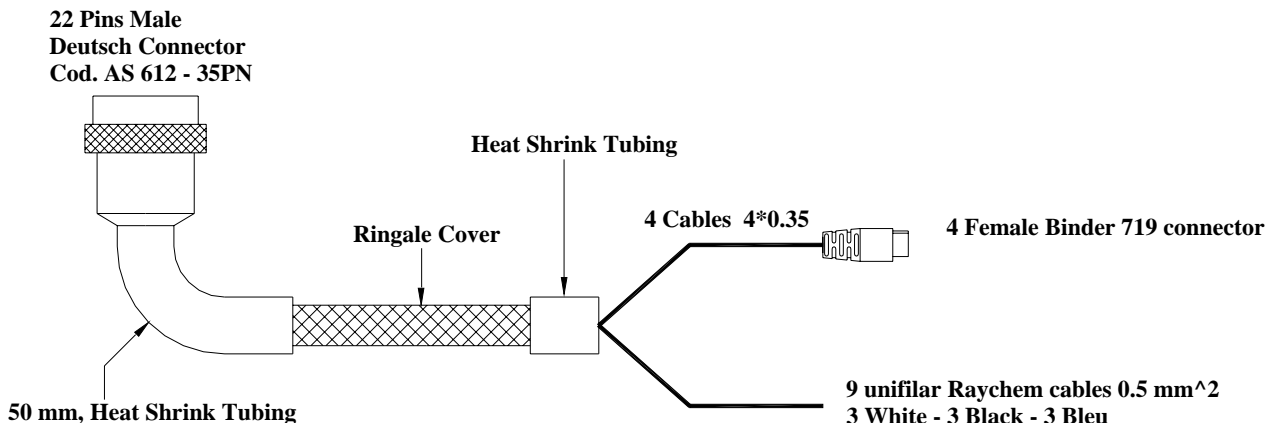
It is suggested to use 0.5 mm² unifilar wires.

Pin DEUTSCH	Signal	Cable colour
14	MEM	White
12	GND	Black
15	VIEW	Blue

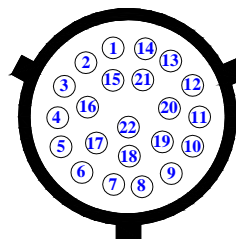
AIM harnesses for MXL PRO 05 “22 pins Deutsch connector”

If you bought an AIM wiring for **MXL PRO 05**, you find here following explanation of wirings for 22 Pins Deutsch connector on **MXL PRO 05**:

Wiring for MXL PRO 05 Code 04.554.24



4 Pins Binder 719 female connector pinout
solder termination view



22 Pins Deutsch connector pinout
contact insertion view

Table of Channels cabled with Binder 719 female connector

Channel name	Pin DEUTSCH	Signal	Pin Binder	Cable colour
USB	7	USB D+	1	White
	9	GND	2	Black
	8	USB D-	3	Red
		Not connected	4	
Speed 3	5	Speed 3	1	White
	11	GND	2	Black
	10	+ VB	3	Red
		Not connected	4	
Speed 4	6	Speed 4	1	White
	11	GND	2	Black
	10	+ VB	3	Red
		Not connected	4	
Expansion	3	CAN 0+	1	White
	2	GND	2	Black
	13	+ VB	3	Red
	4	CAN 0-	4	Blue

Table Channels without connector

Channel name	Pin DEUTSCH	Signal	Cable colour
Keyboard	14	MEM	White
	12	GND	Black
	15	VIEW	Bleu
CAN	20	CAN 1+	White
	19	GND	Black
	21	CAN 1-	Bleu
RS232	17	RS232 RX	White
	19	GND	Black
	18	RS232 TX	Bleu