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## User Manual

# Yamaha R1 2007/2008/2009 – R6 2006/2007/2008 Plug&Play kit

Release 1.06

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## Presentation

AIM: a world leader in data acquisition for racing applications.

Established in 1976, AIM is now world leader in the production of high performances data loggers for racing applications: dashboards, data loggers, digital displays, lap timers.

AIM set new standards in various motor sports: from karts to bikes, Dragsters, Formula 1 Boat, Offshore and even snowboard!

AIM products merge the functionalities of traditional tachometers, RPM indicators, temperature, pressure and lap timer, with compact units, high performing and easy to use. Different product for different applications but with one shared characteristic: the great innovation.

Each AIM system is completely designed, realised and tested by its technicians. The research and development board includes electronic and mechanical engineers, physics and other specialists that develop firmware, software, hardware and the related documentation. Our reputation is build on quality products, innovative technology and on the steady engagement in customer support.

## Introduction

**MXL Plug&Play kit for Yamaha R1/R6** is the dashboard (with integrated data logger in Pista version) designed for an easy and quick installation: with the minimum effort it is possible to connect directly with the bike Engine Control Unit (ECU) and see (with no need of additional sensors):

- RPM
- Speed
- Engaged gear (calculated)
- Water temperature
- Air temperature
- Oil level
- fuel level
- Turning lights signal
- High beam signal
- Neutral signal
- Battery charge level

The logger, like the stock dash, is powered by the bike master switch.

**MXL Strada, Pista** kits for Yamaha have been developed for the following bike models:

Model	Year 2006	Year 2007	Year 2008	Year 2009
R1	●	✓	✓	✓
R6	✓	✓	✓	●

✓ = supported

● = not supported

**Note:** thanks to the infrared transmitter/receiver (included in **MXL Pista** kit, optional in **MXL Strada** one), it is possible to see/record lap times. Moreover **MXL Pista**, allows to manage and record data coming from 5 additional configurable channels (e.g. suspension potentiometer, throttle sensor, pressure sensor, brake, etc...).

For any additional information not explicitly explained in this tutorial refer to **MXL** and/or **Race Studio Configuration** user manuals.

## Chapter 1 – Plug&Play kit content



Plug&Play kit content for Yamaha changes according on MXL model and on the bike year of production. In the image here below kit components are numbered for more clarity.

### **MXL Strada Plug&Play kit for Yamaha R1 2007/2008 and Yamaha R6 2006/2007/2008:**

- N.1 – MXL Strada (1);
- N.1 – wiring for MXL Strada 12 pins AMP connector (2);
- N.1 – Yamaha bracket kit (3) made up of:
  - n°1 – bracket;
  - n°3 – washers;
  - n°4 – M4\*8 Phillips head screws;
  - n°3 – M5\*18 Phillips head screws;
- N.1 – USB Cable (4);
- N.1 – Race Studio 2 Software Cd (5);
- This user manual + MXL user manual (6).

**Note:** before installing the kit check that it contains all specified items.



**MXL Pista Plug&Play kit for Yamaha R1 2007/2008 and Yamaha R6 2006/2007/2008:**

- N.1 – **MXL Pista (1)**;
- N.1 – **Wiring for MXL Pista AMP 12 pins connector (2)**;
- N.1 – **Infrared receiver with 90cm cable (3)**;
- N.1 – **Infrared transmitter (4)**;
- N.1 – **Transmitter external power cable (5)**;
- N.1 – **Yamaha bracket kit (6) made up of:**
  - n°1 – bracket;
  - n°3 – washers;
  - n°4 – M4\*8 Phillips head screws;
  - n°3 – M5\*18 Phillips head screws;
- N.1 – **USB Cable (7)**;
- N.1 – **Race Studio 2 Software Cd (8)**;
- This user manual + **MXL user manual (9)**.

**Note:** before installing the kit check that it contains all specified items.





### MXL Strada Plug&Play kit for Yamaha R1 2009:

- N.1 – MXL Strada (1);
- N.1 – wiring for MXL Strada 12 pins AMP connector (2);
- N.1 – Adapter cable for Yamaha R1 2009 (3);
- N.1 – Yamaha bracket kit (4) made up of:
  - n°1 – bracket;
  - n°3 – washers;
  - n°4 – M4\*8 Phillips head screws;
  - n°3 – M5\*18 Phillips head screws;
- N.1 – USB Cable (5);
- N.1 – Race Studio 2 Software Cd (6);
- This user manual + MXL user manual (7).

**Note:** before installing the kit check that it contains all specified items.



**MXL Pista for Yamaha R1 2009 kit:**

- N.1 – **MXL Pista (1)**;
- N.1 – **Wiring for MXL Pista AMP 12 pins connector (2)**;
- N.1 – **Adapter cable for Yamaha R1 2009 (3)**;
- N.1 – **Infrared receiver with 90cm cable (4)**;
- N.1 – **Infrared transmitter (5)**;
- N.1 – **Transmitter external power cable (6)**;
- N.1 – **Yamaha bracket kit (7) made up of:**
  - n°1 – bracket;
  - n°3 – washers;
  - n°4 – M4\*8 Phillips head screws;
  - n°3 – M5\*18 Phillips head screws;
- N.1 – **USB Cable(8)**;
- N.1 – **Race Studio 2 Software CD (9)**;
- This user manual + **MXL user manual (10)**.

**Note:** before installing the kit check that it contains all specified items.



## 1.1 – Part numbers

Plug&Play kit **MXL Strada** for Yamaha R1 07/08 – R6 06/07/09: code **X15MXLSYR105**;

Plug&Play kit **MXL Strada** for Yamaha R1 09: code **X15MXLSYR109**;

Plug&Play kit **MXL Pista** for Yamaha R1 07/08 – R6 06/07/08: code **X15MXLCYR105**;

Plug&Play kit **MXL Pista** for Yamaha R1 09: code **X15MXLCYR109**.

**MXL Strada/Pista** for Yamaha R1 2009 **adapter cable** (to switch from a Yamaha R1 2007/2008 Plug&Play kit to a Yamaha R1 2009 Plug&Play kit): code **V02554720**.

### **Optional to all MXL Strada Yamaha kits:**

Infrared receiver: code **X41RX12090**;

Infrared transmitter: code **X02TXKMA01**;

Infrared transmitter power cable: **V02POWTX0**;

### **Spare parts**

**Bracket kit** for Yamaha R1 2007/2008 and Yamaha R6 2006/2007/2008: **DNKTSTMXLY**

**Bracket kit** for Yamaha R1 2009: **DNKTSTMR109**

**Cable** for 12 pin **AMP** connector for **MXL Strada**: **V02.554.35**

**Cable** for 12 pin **AMP** connector for **MXL Pista**: **V02.554.34**

## Chapter 2 – Plug&Play kit installation

**MXL** Plug and Play kit for Yamaha R1/R6 is expressly designed and developed to guarantee the maximum installation ease.

**WARNING: this kit has been properly tested to guarantee total compatibility with a bike entirely according to the stock one sold by the mother house.**

Through the fixing points on the back of the logger the stock dash can be easily and quickly substituted with no need of bending or drilling anything: each component is just “Plug&Play”.

The system is to be connected to the high beam chassis using the bracket included in the kit. The bracket is in black anodised aluminium lightweight and mechanically resistant.

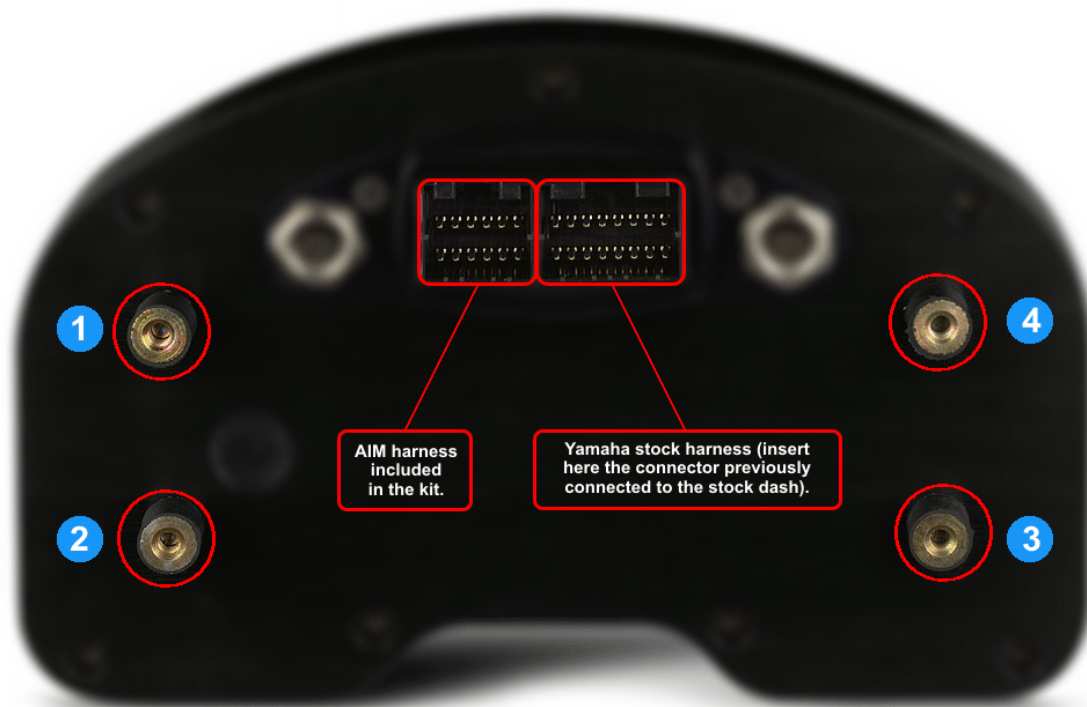
### GENERAL NOTES – Read these notes before installing the system.

- Do not cut any cable: the wiring supplied with the kit is Plug&Play;
- be careful not to damage the stock connectors while plugging/unplugging them;
- do not install the system when the engine is hot;
- be careful not to lose screws and washers.

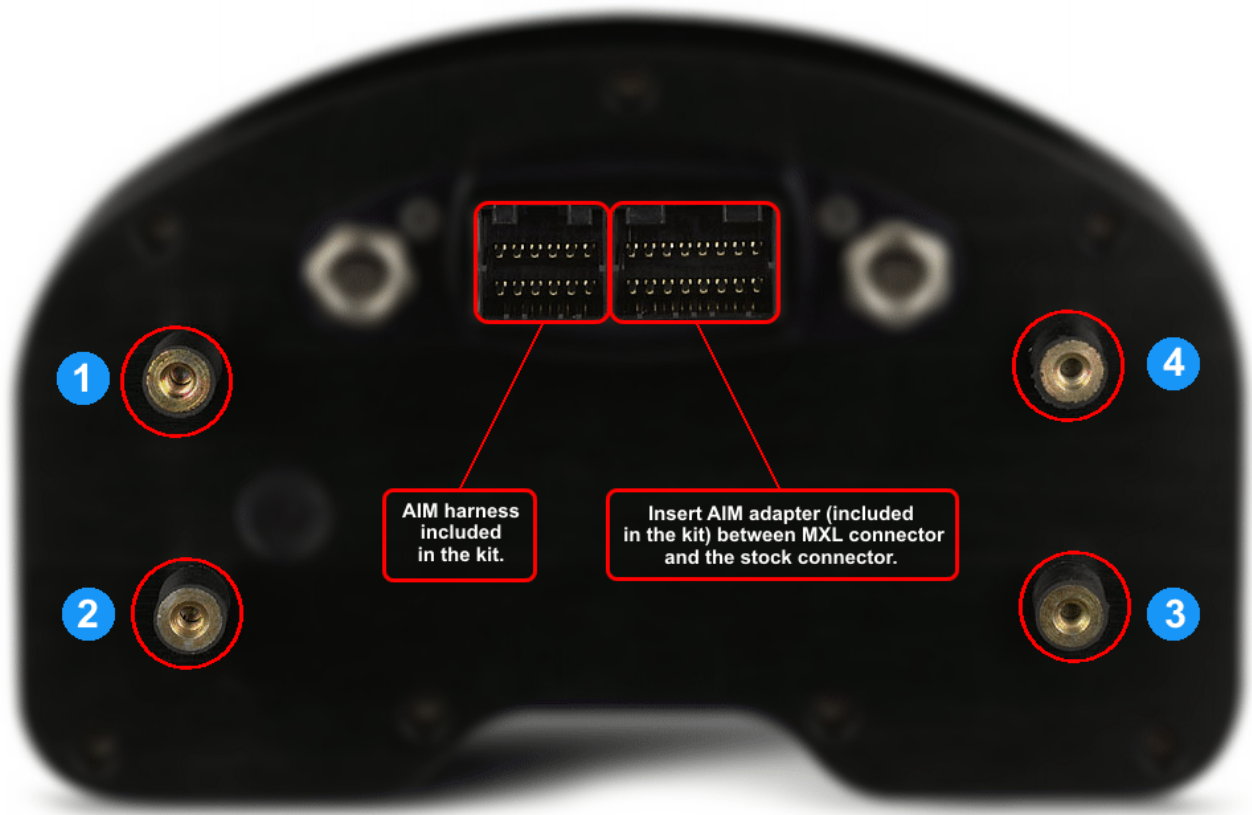
### 2.1 – Installation on Yamaha R1 2007/2008 – R6 2006/2007/2008

Once the stock dash removed:

- fix MXL to the bracket through the four fixing points highlighted in the image here below;
- connect the wiring to the connectors as explained here below.



## 2.2 – Installation on Yamaha R1 2009



Once the stock dash removed:

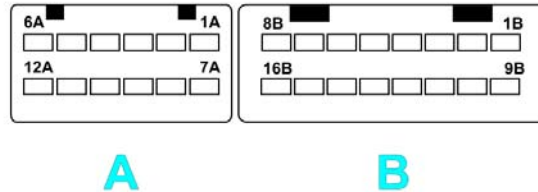
- fix MXL to the bracket using the 4 fixing points highlighted here above;
- connect 12 pins AMP connector (on the left in the image here above) to the AMP harness included in the kit;
- insert AIM adapter (included in the kit) between right MXL connector highlighted here above and the stock connector.

## Chapter 3 –MXL and Yamaha connectors pinout

Up to 2008 Yamaha bikes used a 16 pins AMP female connector for both R1 and R6 while starting from 2009 Yamaha R1 mounts a 20 pins JAE male connector.

### 3.1 – MXL & Yamaha R1 2007/08 – R6 2006/07/08 AMP connectors pinout

The image here below shows MXL AMP connectors and their pinout.



#### Pinout of MXL AMP 12 pins connector ("A")

1A	Analog input 10
2A	(free)
3A	+VB
4A	GND
5A	Lap (optical)
6A	+Vref
7A	GND
8A	Analog input 6 (free)
9A	Analog input 5 (free)
10A	Analog input 7 (free)
11A	Analog input 9 (free)
12A	+Vref
	GND

#### Pinout of MXL AMP 16 pins connector ("B")

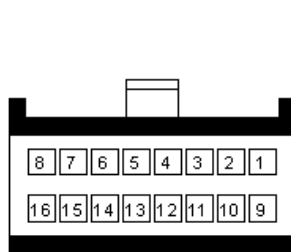
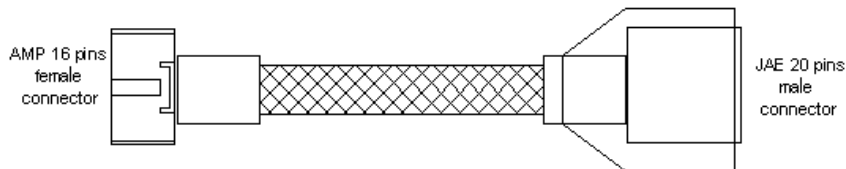
1B	+Vb
2B	+Vb EXT
3B	GND
4B	not used
5B	not used
6B	K-Line
7B	oil level
8B	RPM
9B	+Vb
10B	Hi-beam
11B	turning light
12B	Fuel
13B	turning light
14B	P1
15B	P2
16B	Neutral

Here below is shown Yamaha AMP female connector and its wire colours.

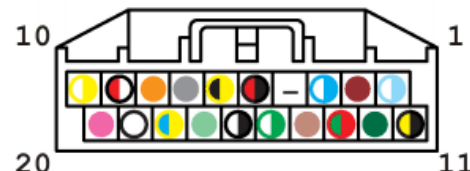
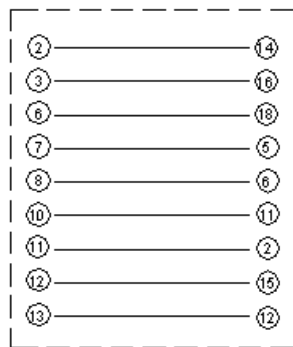


### 3.2 – MXL AMP and Yamaha R1 2009 JAE connectors pinout

To connect Yamaha R1 2009 JAE 20 pins male connector to MXL AMP 16 pins female one it is necessary to use the adapter cable shown here below.



AMP 16 pins female connector pinout contact insertion view



20 pins JAE male connector pinout solder termination view

#### MXL AMP 16 pins female connector pinout

1	+Vb
2	+Vb EXT
3	GND
4	not used
5	not used
6	K-Line
7	oil level switch
8	RPM
9	+Vb
10	Hi-beam
11	turning light
12	Fuel level alarm
13	turning light
14	P1
15	P2
16	Neutral

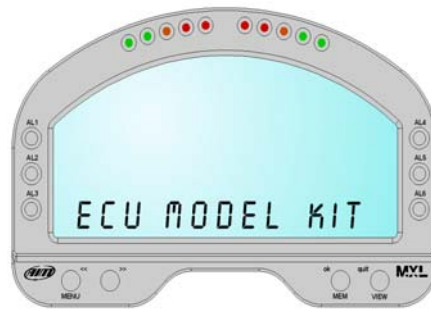
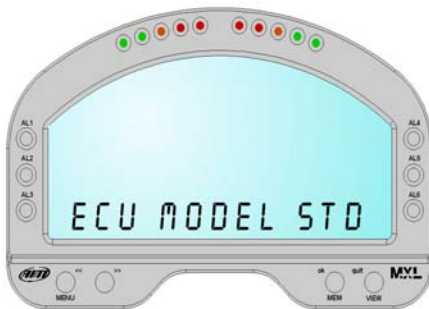
#### Yamaha R1-2009 JAE 20 pins male connector pinout

1	Not used
2	Turn left
3	Not used
4	Not connected
5	Oil level switch
6	RPM
7	6 <sup>th</sup> gear
8	5 <sup>th</sup> gear
9	4 <sup>th</sup> gear
10	3 <sup>rd</sup> gear
11	Hi-beam
12	Turn right
13	Vb dir
14	Vb key
15	Fuel level alarm
16	GND
17	immobilizer led
18	K line
19	1 <sup>st</sup> gear
20	2 <sup>nd</sup> gear

## Chapter 4 – First start up

**MXL** for Yamaha R1/R6 can be installed both on a stock bike and on bikes equipped with original YEC (Yamaha Engineering Corporation) kit. Once the bike started, MXL automatically recognizes and shows the kind of ECU installed. ECU MXL can manage:

- Standard ECU (stock ECU): the display shows “ECU MODEL STD” (image below on the left);
- YEC kit (YEC ECU): the display shows “ECU MODEL KIT” (image below on the right).



Once the ECU identified, MXL shows and manages, as default settings, different information according on MXL model.

### MXL STRADA

RPM <sup>1</sup>	from the ECU	Shown
Rear wheel speed	from the ECU	Shown
Water temperature	from the ECU	Shown + alarm LED
Air temperature	from the ECU	Shown + alarm LED
Oil level	from sensors	Alarm LED
Fuel level alarm	from sensors	Alarm LED
Turning lights	from sensors	Alarm LED
High beam	from sensors	Alarm LED
Engaged gear (Neutral included)	automatically calculated	Shown
Yamaha error codes	from the ECU	Available <sup>2</sup>

<sup>1</sup> RPM data can be sampled both by the bike ECU and by a stock sensor. To use the data coming from the ECU set “RPM” box in **MXL** system configuration layer on “ECU”; to use the data coming from the stock sensor set “RPM” box in **MXL** system configuration layer on “AIM sensor”. Refer to **Race Studio Configuration** user manual for further information concerning MXL configuration. In case a deep analysis of RPM channel is wished use data coming from the stock sensor (set “AIM sensor”) whose sampling frequency is higher.

<sup>2</sup> Yamaha\_ERR channel is not shown by the default configuration. To see it on **MXL** display configure the logger using **Race Studio Configuration** software. Refer to **Race Studio Configuration** user manual for further information concerning **MXL** channels configuration.



## MXL PISTA

RPM <sup>3</sup>	from the ECU	Shown and recorded
Rear wheel speed	from the ECU	Shown and recorded
Water temperature	from the ECU	Shown and recorded + alarm LED
Air temperature	from the ECU	Shown and recorded + alarm LED
Oil level	from the sensors	Alarm LED
Fuel alarm	from the sensors	Alarm LED
Turning lights	from the sensors	Alarm LED
High beam	from the sensors	Alarm LED
Engaged gear (Neutral included)	calculated	Shown and recorded
Yamaha error codes	from the ECU	Alarm LED – Available <sup>4</sup>

<sup>3</sup> RPM data can be obtained both from the bike ECU and from a stock sensor. To use the data coming from the ECU set “RPM” box in **MXL** system configuration layer on “ECU”; to use the data coming from the stock sensor set “RPM” box in **MXL** system configuration layer on “AIM sensor”. Refer to **Race Studio Configuration** user manual for further information concerning MXL configuration. In case a deep analysis of RPM channel is wished use data coming from the stock sensor (set “AIM sensor”) whose sampling frequency is higher.

<sup>4</sup> Yamaha\_ERR channel is not shown by the default configuration. To see it on **MXL** display configure the logger using **Race Studio Configuration** software. Refer to **Race Studio Configuration** user manual for further information concerning **MXL** channels configuration.

## Chapter 5 – Calibration, gear calculation, data download and analysis

**MXL Strada/ Pista** can show engaged gear number on the display.

### Warning:

- for **MXL** to correctly show the engaged gear, “Gear calibration procedure” needs to be performed. Refer to **MXL** user manual to know how to perform it.
- In case crown/pinion ratio is modified new calibration and gear computation are needed.
- Refer to **Race Studio Configuration** user manual for further information concerning the gear sensor calibration and the gear computation.

**MXL** can be configured only using a PC and **Race Studio 2** software (included in the kit). To connect **MXL** to the PC use the proper USB cable that comes with the kit.

For any further information concerning **Race Studio 2** software installation and working mode refer to the related user manual.

Once a test session is over it is possible to download data recorded by the logger (**MXL Pista** only) and save them in a database integrated in **Race Studio 2** software.

For further information concerning data download refer to **Race Studio Configuration** user manual.

## Chapter 6 – Error codes

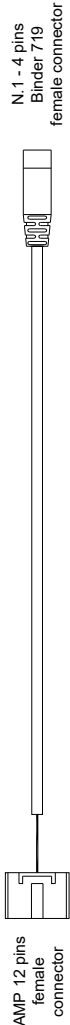
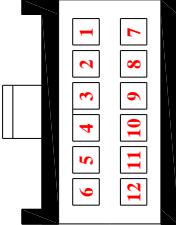


Yamaha ECUs offer a diagnostic function of the errors that can occur on the bike. The table here below shows the meaning of the different error codes (YAMAHA\_ERR channel):

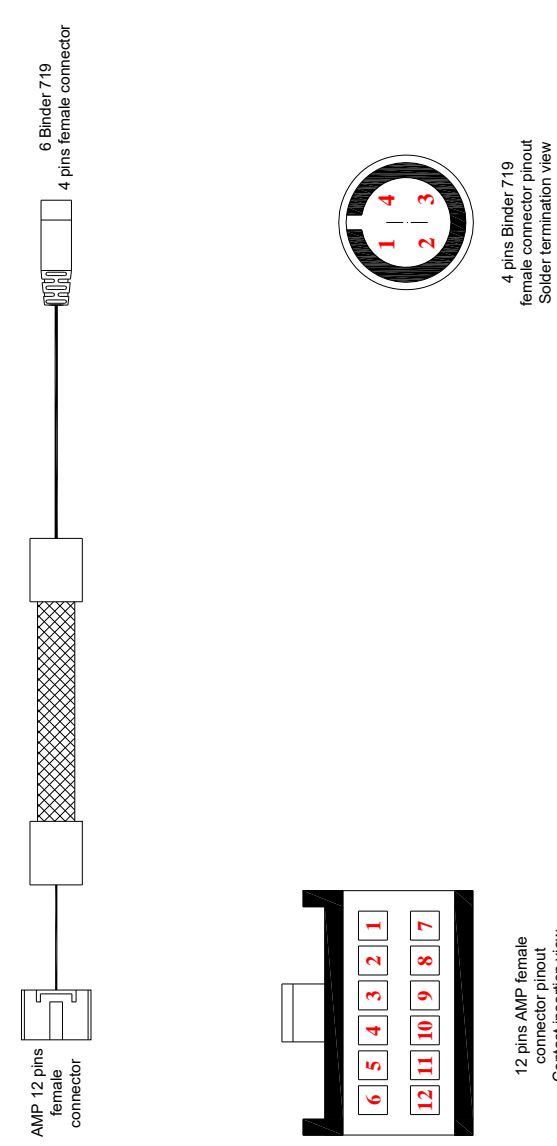

11	Cam shaft sensor problem
12	Driving shaft sensor problem
13,14,20,23	Air pressure sensor problem
15,16	Throttle position sensor problem
17,18	EXUP engine valve problem
19	Side stand sensor problem
21	Water temperature sensor problem
22	Intake air temperature sensor problem
30,41	Roll over sensor problem
33	Ignition coil #1 problem
34	Ignition coil #2 problem
35	Ignition coil #3 problem
36	Ignition coil #4 problem
42	Speed sensor or neutral (N) switch sensor problem
43,46	Injection system problem
47	EXUP valve position problem
48	EXUP servomotor problem
50	Internal ECU problem

**Warning: refer to Yamaha and YEC official documentation for the complete description of the errors.**

**In case diagnostic function detects more than one error, YAMAHA\_ERR channel shows error codes in sequence.**

## Appendix – Wirings and pinout


N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by																								
<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);"> <p><b>MXL Strada Plug&amp;Play Yamaha R1 2007/2008 - R6 2006/2007/2008 optical lap cable</b></p> </div> <div style="text-align: center;">  <p>AMP 12 pins female connector</p> <p>N.1 - 4 pins Binder 719 female connector</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>AMP 12 pins female connector pinout contact insertion view</p> </div> <div style="text-align: center;">  <p>4 pins Binder 719 female connector pinout Solder termination view</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> <p><b>Binder 719 connector table</b></p> <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Channel</th> <th>Binder pin</th> <th>Cable colour</th> <th>AMP 12 pins pin</th> <th>Connection</th> <th>Lenght</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center;">LAP</td> <td style="text-align: center;">1</td> <td style="text-align: center;">white</td> <td style="text-align: center;">4</td> <td style="text-align: center;">Lap in</td> <td rowspan="4" style="text-align: center;">330 mm</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">black</td> <td style="text-align: center;">3</td> <td style="text-align: center;">Analogic GND</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">red</td> <td style="text-align: center;">2</td> <td style="text-align: center;">+Vp</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">bleu</td> <td style="text-align: center;">4</td> <td style="text-align: center;">Lap in</td> </tr> </tbody> </table> </div>					Channel	Binder pin	Cable colour	AMP 12 pins pin	Connection	Lenght	LAP	1	white	4	Lap in	330 mm	2	black	3	Analogic GND	3	red	2	+Vp	4	bleu	4	Lap in
Channel	Binder pin	Cable colour	AMP 12 pins pin	Connection	Lenght																							
LAP	1	white	4	Lap in	330 mm																							
	2	black	3	Analogic GND																								
	3	red	2	+Vp																								
	4	bleu	4	Lap in																								
Rif. / Ref.	Q.tà/Q.ty	Material / Material	N. articolo / Item N.																									
Progettato da / Designed by L.I.	Contr. da / Ckd. by	Approvato da / Approved by	Nome file / File name	Data / Date																								
	Titolo / Title Cavo Lap ottico MXL Strada per Plug&Play Yamaha R1 2007/2008 - R6 2006/2007/2008																											
	N. disegno / Drawing N. <b>04.554.35</b>		Rev. / Rev.	Foglio / Sheet <b>1 of 1</b>																								

N. rev. / Rev. N.		Descrizione / Description		Data / Date	Firma / Signature	Contr. da / Ckd. by
<p><b>MXL Pista Plug&amp;Play for Yamaha R1 2007/2008 - R6 2006/2007/2008 cable</b></p>  <p>6 Binder 719 4 pins female connector</p> <p>AMP 12 pins female connector</p> <p>4 pins Binder 719 female connector pinout Solder termination view</p> <p>12 pins AMP female connector pinout Contact insertion view</p>						
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 <b>Cavo MXL Pista per Plug&amp;Play Yamaha R1 2007/2008 - R6 2006/2007/2008</b>				
		N. disegno / Drawing N. <b>04.554.34</b>			Rev. / Rev.	Foglio / Sheet <b>1 of 2</b>

N. rev. / Rev. N.	Descrizione / Description	Data / Date	Firma / Signature	Contr. da / Ckd. by
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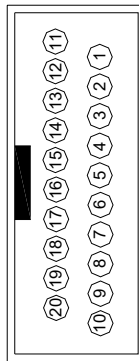
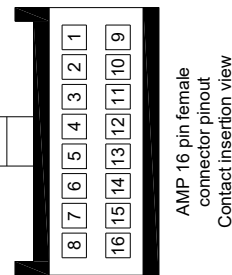
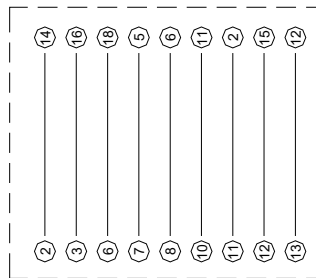
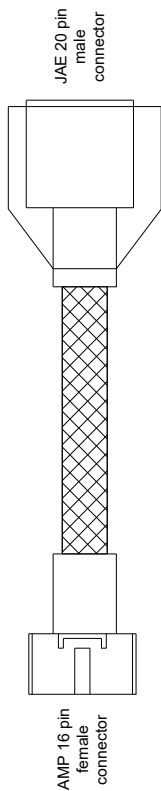
### Binder 719 connector table

Channel	Binder pin	cable colour	AMP 12 pins pin	Connection	Lenght
Ch. 5	1	White	8	Analog input 5	330 mm
	2	black	6	Analog GND	
	3	n.c.			
	4	bleu	5	V reference 1	
Ch. 6	1	White	7	Analog input 6	330 mm
	2	black	6	Analog GND	
	3	n.c.			
	4	bleu	5	V reference 1	
Ch. 7	1	White	9	Analog input 7	380 mm
	2	black	12	Analog GND	
	3	n.c.			
	4	bleu	11	V reference 2	
Ch. 9	1	White	10	Analog input 9	380 mm
	2	black	12	Analog GND	
	3	red	2	+ VB	
	4	bleu	11	V reference 2	
Ch. 10 / Gyro	1	White	1	Analog input 10	430 mm
	2	black	3	Analog GND	
	3	red	2	+ VB	
	4	bleu	11	V reference 2	
Lap	1	White	4	Lap in	430 mm
	2	black	3	Analog GND	
	3	red	2	+ VB	
	4	bleu	4	Lap in	


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
	Titolo / Title <b>Cavo MXL Pista per Plug&amp;Play Yamaha R1 2007/2008 - R6 2006/2007/2008</b>			
	N. disegno / Drawing N. <b>04.554.34</b>		Rev. / Rev.	Foglio / Sheet <b>2 of 2</b>



MXL Strada/Pista adapter cable for Yamaha YZF-R1 2009



N.B.: insulate unemployed pins of JAE connector

Rif. / Ref.	Q.tà / Q.ty	Materiale / Material		N. articolo / Item N.	
Progettato da / Designed by L.I.	Contr. da / Ckd. by	Approvato da / Approved by	Nome file / File name	Data / Date	Scala / Scale
 Racing Data Power		Titolo / Title Cavo adattatore MXL Strada/Pista per Yamaha YZF-R1 2009			
		N. disegno / Drawing N. 04.554.72		Rev. / Rev.	Foglio / Sheet 1 of 1