

MXL

YAMAHA R1 K4 K5 K6
YAMAHA R6 K4 K5



MXL for Yamaha R1 R6 is a product designed to offer the maximum amount of information with the minimum effort for the installation. It directly connects to the bike Engine Control Unit, in order to get, without any extra sensor, the following data:

- rpm
- speed
- water temperature
- air temperature
-

From the bike sensors, it receives:

- oil pressure status
- fuel level status
- turning lights signal
- Hi Beam signal
- Neutral signal
- Battery level

Besides, MXL offers the possibility to manage **5 freely configurable channels**. The configuration can be executed by our Race Studio software, using a normal PC.

MXL for Yamaha can be used in three different modes::

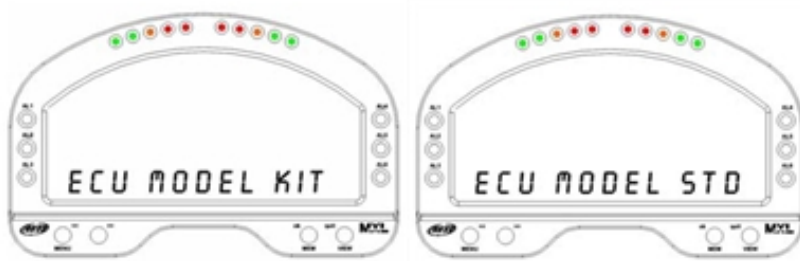
1. **Running mode:** normal mode: shows and, in case of MXL Pista, records, the engine data and the diagnosis codes.
2. **Setting mode:** by this mode, it is possible to set some engine parameters. In Setting Mode it is possible to modify the engine mapping.
3. **Diagnostic Mode:** by this mode, we can manage problems and errors in the Engine Control Unit.

POWER ON

MXL for Yamaha R1/R6 can be installed on both stock bikes and on bikes powered by original YEK kits

Turning the power ON, MXL automatically recognizes which ECU is installed in the bike, working in two different ways. The two ECUs that can be managed are:

1. STOCK ECU ⇄ STD ECU
2. YEC KIT ⇄ KIT ECU



RUNNING MODE

After having recognized the ECU, MXL starts operating in RUNNING MODE. It will show and manage these information :

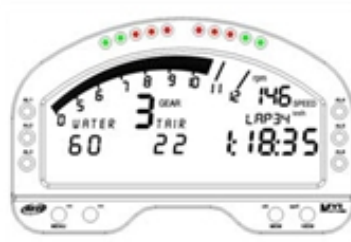
MXL PISTA

RPM	from ECU	Shown and logged
BACK WHEEL SPEED	from ECU	Shown and logged
WATER TEMPERATURE	from ECU	Shown and logged + ALARM LED
AIR TEMPERATURE	from ECU	Shown and logged + ALARM LED
OIL PRESSURE STATUS	from bike sensors	ALARM LED
FUEL LEVEL ALARM	from bike sensors	ALARM LED
BLINKING LIGHTS	from bike sensors	ALARM LED
HIGH POWER LAMP	from bike sensors	ALARM LED
GEAR NUMBER (NEUTRAL INCLUDED)	Calculated, with neutral input management	Shown and logged
YAMAHA_ERR	from ECU	Shown and logged

MXL STRADA

RPM	from ECU	Shown
BACK WHEEL SPEED	from ECU	Shown
WATER TEMPERATURE	from ECU	Shown + ALARM LED
AIR TEMPERATURE	from ECU	Shown + ALARM LED
OIL PRESSURE STATUS	from bike sensors	ALARM LED
FUEL LEVEL ALARM	from bike sensors	ALARM LED
BLINKING LIGHTS	from bike sensors	ALARM LED
HIGH POWER LAMP	from bike sensors	ALARM LED
GEAR NUMBER (NEUTRAL INCLUDED)	Calculated, with neutral input management	Shown
YAMAHA_ERR	from ECU	Shown

In Running Mode MXL shows the data in accordance to the following layout:



It is possible to change layout, information and alarm position by Race Studio Software Configuration Menu.

When you turn the power on the first time, MXL starts "Gear calibration feature" and it will show "RUNNING GEAR CAL".



The user has to follow this procedure in order to see the actual gear number

PS: You are supposed to run this procedure every time you change the transmission ratio

Yamaha ECU offers a diagnostic feature (RUNNING MODE): here down you can find the meanings of the error codes

CODE	DESCRIPTION
11	Camshaft sensor problem
12	Pick Up Sensor problem
13 , 14	Air Pressure Sensor problem
15 , 16	TPS Sensor problem
17 , 18	Engine valve EXUP
19	Stock Bike Sensor Problem
20	Air Pressure Sensor problem
21	Water Temperature Sensor problem
22	Air Temperature Sensor problem
23	Air Pressure Sensor problem
30, 41	Max g Sensor problem
33	Cylinder #1 ignition problem
34	Cylinder #2 ignition problem
35	Cylinder #3 ignition problem
36	Cylinder #4 ignition problem
42	Speed sensor or Neutral Sensor problem
43, 46	Injection system problem
47	EXUP valve position sensor problem
48	EXUP servo problem
50	Internal ECU problem

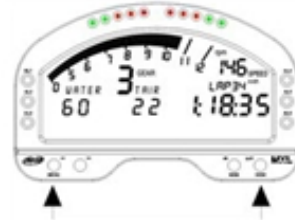
Please, refer to the Yamaha official documentation or to YEC official documentation in order to have a complete description of the problems.

- In case Diagnostic Feature reads more than one error, the YAMAHA ERR item will show the different codes sequentially
- YAMAHA_ERR is not shown in the default configuration. You can anyway change the configuration using race Studio System Manager .

DIAGNOSTIC MODE

Diagnostic Mode let us monitor the proper behavior of the sensors and of the ECU outputs. You can swap from Running Mode to Diagnostic Mode, when the engine is OFF

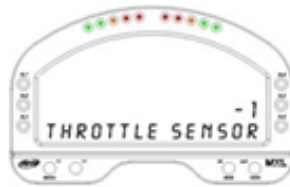
- *HOW TO ENTER INTO DIAGNOSTIC MODE.*



From Running Mode you have to push the pushbuttons **MENU <<** and **VIEW QUIT << or >>** .

, then **MENU**

DIAG MODE is going to show the information about the different sensors in different pages. Please, use the pushbuttons >> and << for changing page.



The pages will be as follows:

PAGE	DESCRIPTION	SHOWN DATA
THROTTLE SENSOR	Master throttle angle	Valve open angle (from 0° to 125°)
ATMO PRESSURE	Atmosphere pressure	Atmosphere pressure Kpa
INTAKE PRESSURE	Air Input Pressure	AirBox pressure Kpa
INTAKE TEMP	Air Temperature	Air temp °C
WATER TEMP	Water temperature	Water temperature °C
VEICHL E SPEED	Shows incremental pulses number read by the sensor	Read pulses from 0 to 999 .
OVERTURN SENSOR	Value read by the anti - overturn sensor	Voltage value * 10 (from 0 to 50)
BATTERY VOLTAGE	Battery voltage	Battery voltage
SWITCH (STOCK BIKE)	Stock bike status	1 = ON (stock on) 0 = OFF (stock down)
SWITCH (YEC KIT)	Gear switch status (Yec Kit)	1= ON 0 = OFF
SELECT SWITCH (STOCK BIKE)	Neutral switch	1 = Neutral 0 = gear
SELECT SWITCH (YEC KIT)	MAP selection switch status	1 = SB 0 = ST
IGNITION COIL 1	When you select and de-select the engine off switch, you turn the coil on 5 times (the shown value is not important).	
IGNITION COIL 2		
IGNITION COIL 3		
IGNITION COIL 4		
INJECTOR 1	When you select and de-select the engine off switch, you turn the injector on 5 times (the shown value I snot important).	
INJECTOR 2		

INJECTOR 3		
INJECTOR 4		
AI SOLENOID (solo STOCK)	When you select and de-select the engine off switch, you turn the AI solenoid on 5 times	
MAIN RELAY	When you select and de-select the engine off switch, you turn the main relay on 5 times	
FAN RELAY (solo STOCK)	When you select and de-select the engine off switch, you turn the Fan Relay on 5 times	
PROJECTOR RELAY	When you select and de-select the engine off switch, you turn the projector relay on 5 times	
EXUP	EXUP open angle	EXUP open angle in degree
SUBTHROTTLE	When you select and de-select the engine off switch the sub throttle position changes from totally open to totally close	Sub-throttle position in degrees
ERRCODEEEPROM (solo STOCK)	Cylinder number, in case of some errors in the ECU eeprom	Cylinder number (from 1 to 4). Shows 0 in case of no error.
ERRHAPPENED (solo STOCK)	Shows the sequence of the errors that have been found	Shows the sequence of the errors that have been found . (range from 11 to 50).
ERRHAPPENEDCLR (solo S TOCK)	Shows the number of the errors that have been found. It is possible to reset it moving the engine switch from OFF to ON.	In case of No error, it shows 0, else a number from 1 to 25
MANAGEMENT NUM	Shows the Program Control Number	Value from 0 to 255

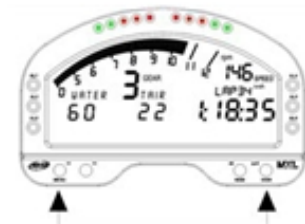
In order to exit from DIAG MODE, you have to turn the power OFF and ON again on both MXL and ECU.

NB: in order to better understand and solve errors and problems, please, refer to Yamaha or YEC manuals.

SETUP MODE .

The Setup Mode let us change some parameters in the Engine Map inside the ECU. In dependence upon the ecu (STOCK or YEC) it is possible to change different parameters.

□ HOW TO ENTER SETUP MODE



: when MXL

After having entered the Running Mode, please, push **MENU <<** and **VIEW QUIT** show the following layout:



you can enter the mode pushing **OK MEM** or **QUIT VIEW** .

Setup Mode will show the parameters that you can change. Several different pages are available. In order to swap from a page to the other, please, push >> or <<. In order to modify the value of a parameter, you have to select the parameter, push OK MEM to show the value, push >> or << to change the value then push OK MEM again to save the value and exit. (Please, push anyway OK MEM also in case the value has not been changed).



STOCK ECU

In case your bike has the **STOCK ECU** you can change **ONLY** the injection times (and, consequently, CO value) for every cylinder. This can be done both with the engine OFF or ON.

The parameters you can change will be::

PAGE	DESCRIPTION	VALUE
CO CYLINDER 1	Changes First cylinder CO (the higher is this value the richest is the mixture)	You can insert a value between -128 and + 127. Default value is 0
CO CYLINDER 2	Changes Second cylinder CO (the higher is this value the richest is the mixture)	
CO CYLINDER 3	Changes third cylinder CO (the higher is this value the richest is the mixture)	
CO CYLINDER 4	Changes Fourth cylinder CO (the higher is this value the richest is the mixture)	

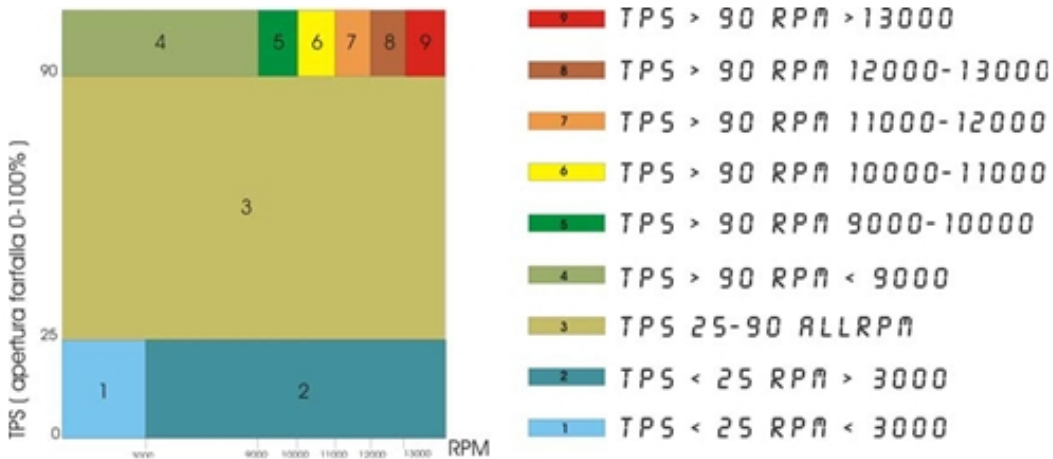
In order to better understand these values, please, refer to the official Yamaha manual .



KIT ECU

In case your bike has the YEC KIT ECU, you can change both injection and ignition parameters. You always can reset the parameters in order to swap back to the original configuration.

Dealing with the injection map, it is possible to have richer or leaner air fuel mixture on 9 different points of the map, as shown in the following table



PAGE	DESCRIPTION	VALUE
TPS<25 RPM < 3000	Changes the amount of injected gasoline in the first part of the map	Correction in percentage \pm 25% of the value of the map.
TPS<25 RPM > 3000	Changes the amount of injected gasoline in the 2 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS 25-90 ALLRPM	Changes the amount of injected gasoline in the 3 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS>90 RPM<9000	Changes the amount of injected gasoline in the 4 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS>90 RPM 9-10000	Changes the amount of injected gasoline in the 5 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS>90 RPM 10-11000	Changes the amount of injected gasoline in the 6 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS>90 RPM 11-12000	Changes the amount of injected gasoline in the 7 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS>90 RPM 12-13000	Changes the amount of injected gasoline in the 8 part of the map	Correction in percentage \pm 25% of the value of the map.
TPS>90 RPM>13000	Changes the amount of injected gasoline in the 9 part of the map	Correction in percentage \pm 25% of the value of the map.

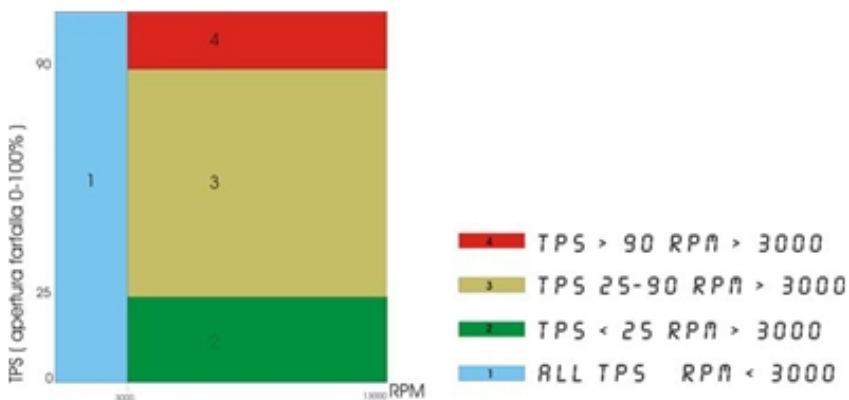
When you increment the value, the mixture will be richer.

ATTENTION:

The value selected in Zone 4 (TPS > 90 RPM < 9000) is applied also to the zones 5,6,7,8, e 9. In these last pages the shown value has to be added to what you select in page nr. 4.

ES : area 4 shows 10% , (the mixture is 10% richer in this area)
 area 5 shows 3% , (the mixture is 10+3 = 13% in this area)

the Ignition Map is divided in 4 parts.



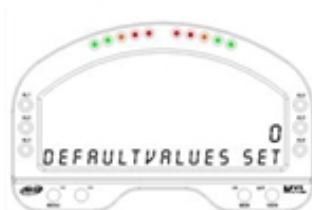
You can change the parameters in 3 of them by the following timing pages

PAGE	DESCRIPTION	VALUE
Ignition time TPS<25	Change the ignition timing in area 2 of the map.	Correction in degrees between -15° and +15° with reference to the map value
Ignition time TPS 25-90	Change the ignition timing in area 3 of the map.	Correction in degrees between -10° and +10° with reference to the map value
Ignition time TPS > 90	Change the ignition timing in area 4 of the map.	Correction in degrees between -5° and +5° with reference to the map value

ATTENTION: in order to take the maximum advantage by this feature, please refer to the official Yamaha Kit (YEC) manual

The Kit ECU offers two more possibilities to change parameters :

PAGE	DESCRIPTION	VALUE
INJN COR TO SPEED	Changes the amount of injected mixture, in dependence of the speed	Correction on 20 step (-10 / +10). +10 is like to multiply by two the default corrected parameter -10 is like to avoid any correction 0 is like to use the default corrected parameter Every step is so an increment of 10% (plus or minus) toward the correction that the ECU already uses.
DEFAULTVALUES SET	Let you see the number of parameters you have modified (both injection than ignition). You can then reset the changes	Number of parameters you have modified.

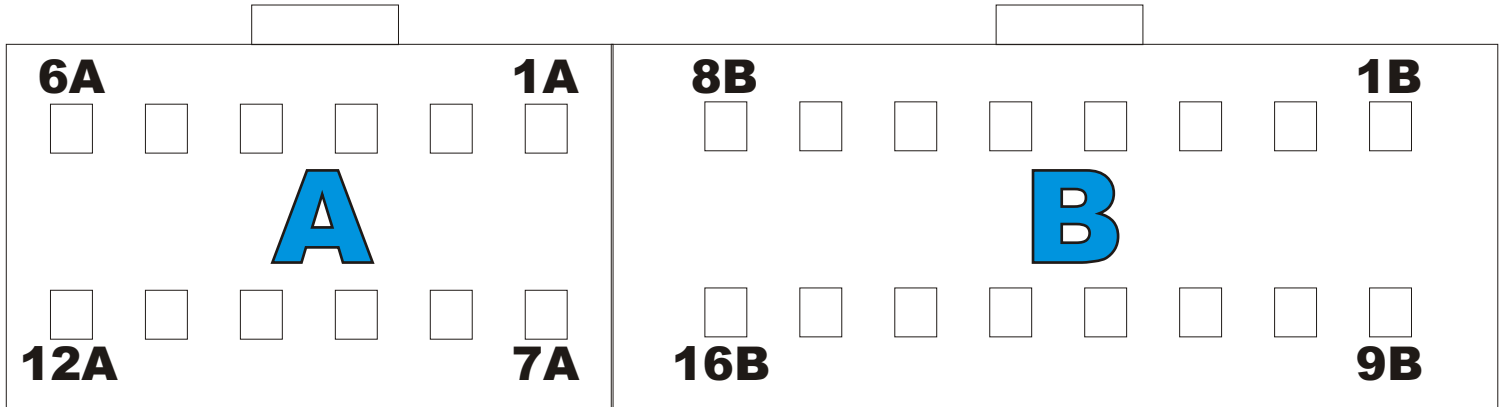


After having shown the number of modified parameters, you can reset the system, going back to the default parameters: you have to push >> or << then OK_MEM . LED 4 starts blinking, then the parameters are reset.

In order to exit from SETUP you have to turn the power OFF and ON again.

YAMAHA YZF-R1 2004/2006

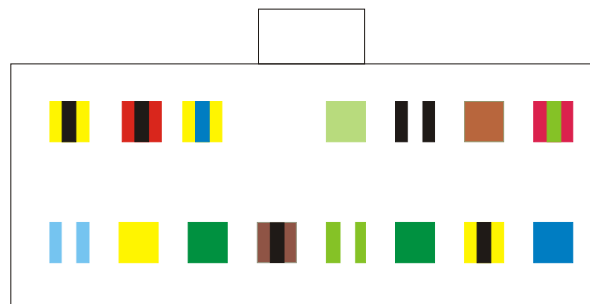
PLUG AND PLAY KIT PINOUT FOR pxl-13



Rear view
MXL AMP Multilock 40 Male connector

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

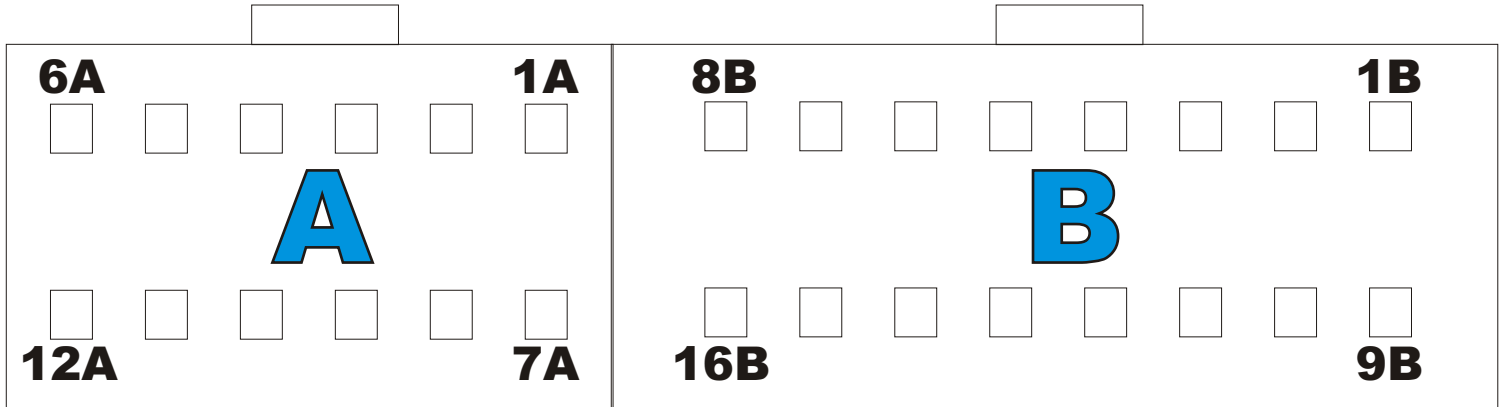
1B +Vb
2B +Vb EXT
3B GND
4B not used
5B not used
6B K-line
7B oil level
8B RPM
9B + Vb
10B Hi-beam
11B turning light
12B Fuel
13B turning light
14B P1
15B P2
16b NEUTRAL



BIKE amp FEMALE CONNECTOR -
WIRE COLOURS

YAMAHA YZF-R6 2004/2005

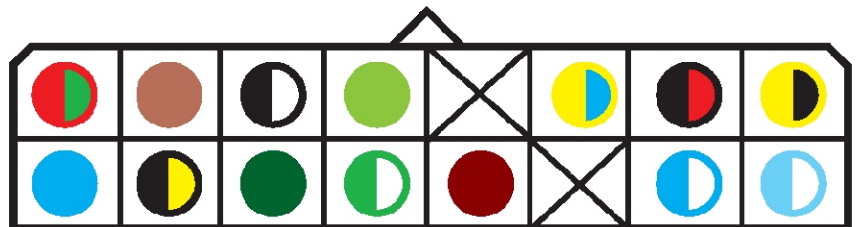
PLUG AND PLAY KIT PINOUT FOR pxl-13



Rear view
MXL AMP Multilock 40 Male connector

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

- 1B** RPM
- 2B** Oil level
- 3B** not used
- 4B** not used
- 5B** K-line
- 6B** not used
- 7B** GND
- 8B** + Vb
- 9B** + Vb
- 10B** turning light
- 11B** turning light
- 12B** hi-beam
- 13B** neutral
- 14B** not used
- 15B** fuel level
- 16b** + Vbext



**Bike connector -
wires colours**