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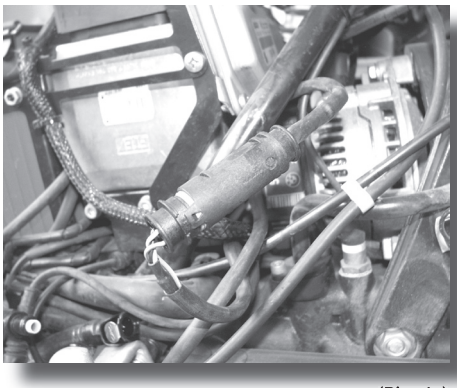
Fitting / Operating Instructions

Part: Performance Controller R 1200 GS/RT/ST

Part Number: **8530120**

Function Theory
Modern engines have to be able to pass stringent emissions test and requirements for different countries, therefore the works settings represent merely a compromise. The PerformanceController ("P.C.") circumvents this compromise and optimises the engine function in a simple fashion. The entire usable RPM range is broken down into 6 sections or modes. The 8 coloured LED's at the front show in what mode you are presently in (tick-over, acceleration, cruise etc.) and with the help of the adjustment buttons the fuel mixture can be adjusted. Using the three buttons on the front and reading the easily understandable instructions fine tuning of the fuel to air ratio can be accomplished. It is now possible to achieve a harmonious engine function throughout the RPM range and to adjust it to the user's personal riding or driving style. Basically, the PerformanceController ("P.C.") allows the rider to use the classic adjustments of a carburettor for the modern fuel injected bike, but with the comfort of pushing electronic buttons instead of turning screws. The beauty of this system is: It doesn't re-program or change the bike's ECU.
Removing of the PerformanceController ("P.C.") from your BMW will return it to its stock settings.



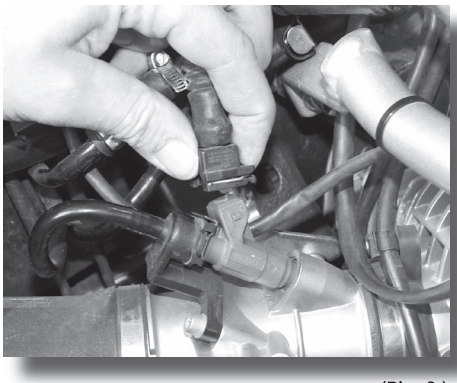
(Pic. A.)

Warning:
The PerformanceController cannot be used together with an after market tune-up chip (EPROM) as only the stock BMW Motronic chip provides the foundation upon which the PerformanceController's optimization functions. **ONLY FOR SPORT INSTALLATION!!**

(Pic. B.)

Installation information:
The first section of the instructions provides general information for the installation of the PerformanceController to your vehicle.
Start with the actual installation only after you have also read the vehicle specific information for your model. The PerformanceController ("P.C.") gets its performance capabilities by working with the bikes ECU. To function, the "P.C." should be installed and connected into the bike's OEM wiring. Simply separate the original injector plug from the injector and plug in the connector of the "P.C." on to the injector instead. The original removed plug is then connected into the controller harness. Then do the same with the other plugs. Now the "P.C." is integrated into the bike's system. The wiring loom of the "P.C." with it's "plug and play" connectors ensures an easy, safe and successful installation.

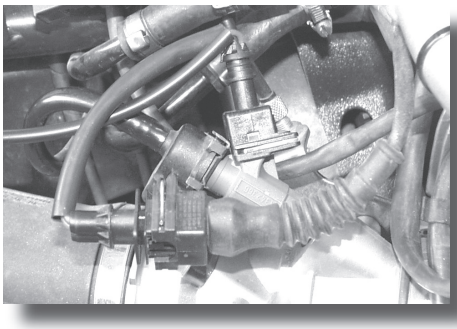
IMPORTANT!!
Please be aware of the safety latches of the plugs, connectors and electrical components. Do not use force to separate or connect any of the plugs, rather acquaint yourself with the different safety clips or latches etc. by looking carefully at the "P.C." loom and connectors first.



(Pic. C.)

General Installation for all models:
The oxygen (O^2) sensor can be found by back tracing the wiring of the sensor on the exhaust to the connector. After disconnecting the connector plug (Pic. A shows 1150 GS Plug) fit the matching female and male plugs of the "P.C." into the wiring (Pic. B). Bikes of the new 1200 generation use two sensors and two injector sensors. Depending on the vehicle, to reach the connectors some covers or the fuel tank must be removed (see vehicle specific installation texts). The plug on the right injection valve is shown in (Pic. C). As with the O^2 sensor, plug the P.C.'s Injector plug into the existing wiring (Pic. D). For vehicles of the newer R1200 generation (e.g. R1200GS, R1200RT) repeat this process on the left side as well.
Attach the black wire of the "P.C." to a point at the frame (Pic. E) or better to the negative pole of the battery. Route the cables between the seat and gas tank so that the "P.C." can be fitted onto the tank for the initial adjustment period with the provided Velcro strips (Pic. F). After the adjustments have been made to the controller, you can store the unit under the seat.

The more careful you are with routing the cables, the fewer problems you will encounter in the long run. Therefore it is imperative that you fasten all wires with cable ties along the original loom or along the frame. Avoid chafing or squashed cables or wires. All adjustments should only be performed on a warm engine.



(Pic D.)

Note:
After completing the installation of the Performance Controller, it would be recommended to restart the computer system of the bike: 1. Detach the ground (negative) lead from the battery for a few moments. 2. Then re-attach the lead to the battery. 3. Turn the ignition ON, but don't start the bike. 4. Open the throttle fully three times, from "no gas" to "full throttle" then turn the ignition OFF. Now the bikes computer has been reset. Now the bike can be started.

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Part Number: **8530120**

Injectors and Oxygen (O^2) Sensor connectors:
The injection connector is located on the actual injection unit on the throttle body and is attached with a safety clip that must be pressed before CAREFULLY removing the connector!! The O^2 sensor connector for the new 1200 models can only be separated by carefully lifting the safety latch on the side.

Tip:
Before removal of the plug look at the plug that is attached onto the loom of the "P.C." to understand the method of the safety latch!

It could be that the original cables have been fastened with cable ties. Please remove carefully if necessary. After all wires and plugs have been attached re-attach the wires with cable ties where they were previously fastened.

After installation it is advisable to make sure all cables are routed correctly and plugs have been inserted properly.

Vehicle Specific installation instructions:

R 1200 GS, RT & ST

Injector connector and oxygen (O^2) sensor connector:
The 1200 Models require the seat and small side covers to be removed (GS) and also the side fairings (RT, ST) to gain access to the injector plugs.
The O^2 connector for these bike models is situated underneath both cylinders (see Pic. 2). To separate the O^2 connectors first the whole connector assembly needs to be pulled backwards from its mounting, this is done by carefully moving the little plastic "hook" latch and releasing the assembly. Then lift the safety latch of the connector to separate them.

Tip:
Before disconnecting any of the plugs look at the plugs that are attached onto the loom of the "P.C." to understand how the connector works.

The loom of the "P.C" needs to be carefully routed *behind* the throttle body (Pic.1, point A). Once the connectors are fitted onto point C the injector connector (point A) can be attached. Then fasten the loom with cable ties. Repeat the same on other side.

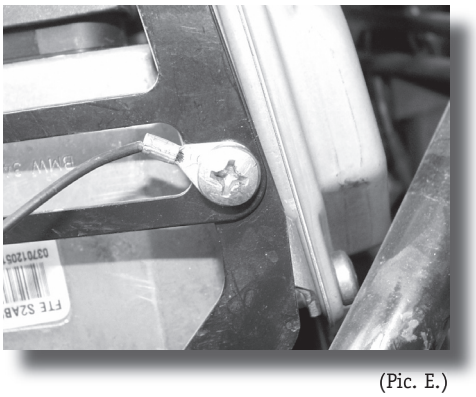
First Use:
After the system has been attached the motor can be started. The "P.C." will start automatically after a few seconds. The LEDs will light up green; you will see an 8 second light sequence from side to side. This is the "Check" mode. The "P.C." is now ready for use.

Note:
Once properly adjusted you won't need to wait for the check mode to finish, you can drive off immediately.

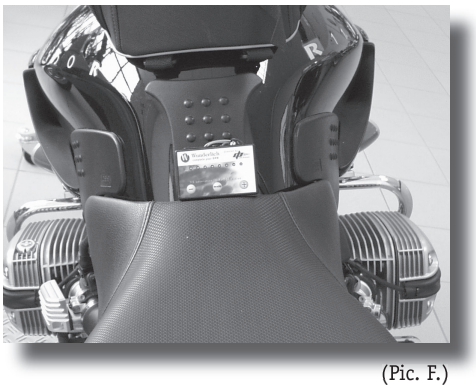
If the motor is in ticking over in neutral gear, one or more green LEDs will light up.

Possible fault signals:
Blinking red and green LEDs. In this case check all connections.

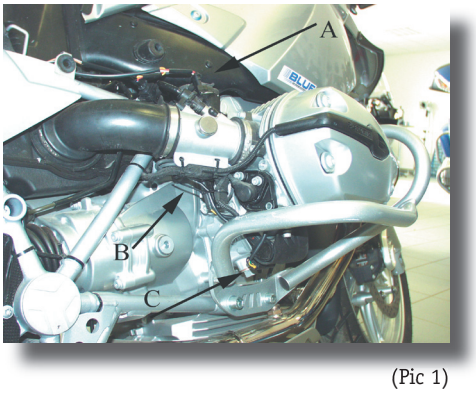
Note: If the right side red and left green LEDs blink together while the throttle is closed during normal riding it is not a failure sign but merely shows that no excess fuel is being injected and therefore no fuel is being wasted.



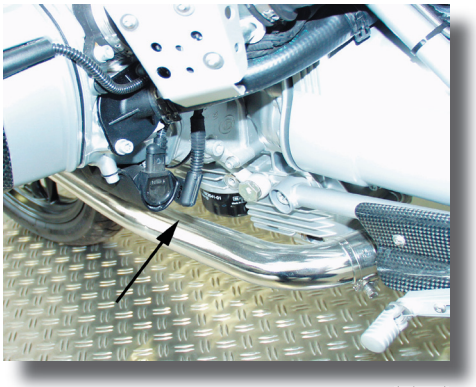
(Pic. E.)



(Pic. F.)



(Pic 1)



(Pic 2)

General note: Our fittings instructions are written to the best of our knowledge but specifications or details may change. If you have difficulties or have doubts with fitting this part please seek advice from your BMW dealer or workshop of your choice.

Please note that in some cases due to vehicle related tolerances beyond our control some products might need adjusting to fit. We can not warranty parts fitting in those circumstances.

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Fitting / Operating Instructions

Part: Performance Controller R 1200 GS/RT/ST — Part Number: **8530120**

The first ride after successful entering the basic settings:

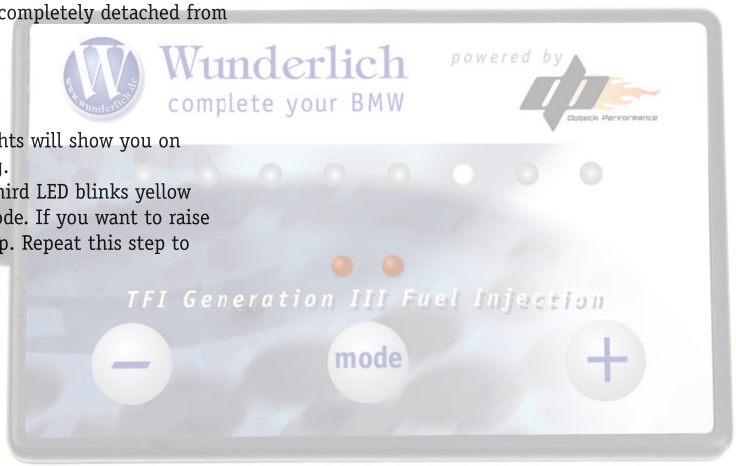
During normal riding different coloured LEDs will light up progressively from one left to right thereby showing which of the modes the "P.C." is optimizing.

Green: Tick over and normal riding, without fast acceleration
Yellow: Fast acceleration (fulfils similar functions of an acceleration pump of a carburettor) and fast riding almost up to full throttle.
Red: At full throttle (similar function as the main jet on a carburettor)
Blue: Only the right LED blinks – Cruise Mode ("Closed Loop")
The O^2 sensor regulates the mixture and thus provides for an economic ride.
Gr.+Red: Blinking red (only the very right LED) together with a blinking green – when the throttle is completely closed during a ride.

The O^2 sensor control is pre set by BMW so that at a certain speed the probe is shut off. The area in which the sensor regulates the mixture is called lower and upper limits of the O^2 sensor.

The 6 adjustment modes:
1) Green "cruise" mode (blinking green LED)
2) Yellow (blinking yellow LED) acceleration and fast driving almost to the full throttle mark.
3) Red: Full throttle (blinking red LED)
4) Blue – green: Lower limit of the O^2 sensor range (Far right blue LED with blinking green LED)
5) Blue – yellow: Upper limit of the O^2 sensor range (Far right Blue LED with blinking yellow LED)
6) Blue – red: beginning phase of full throttle mode (Far right blue LED with blinking red LED)

Adjustment Modes:
If you press the "Mode" button the LEDs for the mode you are in will start to blink. With every further push of the mode button, the modes will be changed and shown with the corresponding LED colours.
In every one of the 6 adjustment modes the settings can be adjusted to the left (less) or the right (more) with the - and + buttons.
To make sure that the "P.C.'s" internal software is running properly, you should check to make sure that all 6 setting areas are present. For this, press the "Mode" button repeatedly and cycle through the individual settings areas. Note: The buttons are quite sensitive, sometimes when pressing it may "jump" a setting. In this case just try again.
To end the adjustment mode simply don't change or adjust modes for about 8 seconds. The current settings will then automatically be saved and will stay in memory, even if the unit is later completely detached from the bike.



The adjustment process:
There are 8 LEDs on the front side of the "P.C." which are multi functional. The lights will show you on which adjustment mode you are in, and also any change of the value of the setting.
Example: You enter the mode for acceleration ratio, the yellow LED blinks. If the third LED blinks yellow that means that a value of 3 on a scale from 0,5 to 8 has been adjusted for this mode. If you want to raise the value to 3.5 push the + button once. Now the third and fourth LED will light up. Repeat this step to raise the value to 4. These settings are in increments of 0.5.

Adjustment Mode (Blinking LED)
Far left, first LED rapid blinking = OFF
Far left, first LED slow blinking = 1
First and second LED blinking together = 1.5
Second LED blinking alone = 2
Second and third LED light up together = 2.5 and so on and so on.

When you reach the eighth LED while adjusting it can happen that in some modes in which the right blue LED is used that the two colours blink together at the same time.

A very easy to use demo of the adjustment process can be found in your dealers web site or in the **www.wunderlich.de** website under the **8530120** part number.

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General Note:
For all modes and adjustments one should start with the recommended base setting and then slowly and methodically change each mode to fit one's person liking. As with any optimization there will come a point where power, acceleration or other performance characteristics cannot be improved upon.

Note: For all adjustments the motorcycle should have reached it's normal operating temperature. Please ensure that your air cooled motor does not run too long while stationary to avoid overheating!!

The PerformanceController ("P.C.") is delivered stock without bike specific presets. We have determined base settings for each vehicle group that should be used as a starting point for further adjustments. These settings must be entered into the "P.C." first as without the base settings the "P.C." will not have any effect on the engine. The settings have been determined using stock motorcycles. After market parts fitted your machine such as custom mufflers or pipes, performance air filters or modified cam shafts mean that additional adjustments might be of benefit.

The green mode – "Cruise Mode"
This setting regulates the general area in which the oxygen (O^2) sensor controls the fuel to air mixture, I.E. in tick-over and cruise mode without sudden acceleration. This setting should not really vary from our pre-determined settings. The setting can be increased minimally if you encounter persistent problems with starting in very cold conditions.

The yellow mode – "Acceleration Pump"
The setting for this area regulates the amount of fuel that is added for hard acceleration or high speed riding. The yellow mode ends automatically when the red mode starts (see information for adjusting the blue – red area). This setting also ensures that when you switch from the green or cruise mode (O^2 sensor controlled) to the acceleration mode there is no delay (better throttle response). Depending on the bike and after market parts fitted such as performance pipes, Blue air filter, etc. these settings may vary some from the base setting.

The red mode – "Full Throttle"
This setting controls the amount of fuel that is added to the injection during full throttle driving. Depending on setting (see blue-red adjustment) the red mode starts at around 5000 to 5500 RPM when at full throttle. For example if you accelerate in first gear right up to the RPM limit and shift gears in racing or drag racing fashion the red LED will stay lit all the time.
On tuned up bikes with modified camshafts, free flow air filters, larger air ducts or sport exhaust systems etc. this setting is particularly important to ensure that the full throttle mode is supplied with sufficient fuel. Also during long highway full throttle rides this is important. The base settings can be modified by three or more setting steps from the recommended settings, depending on the bike and the tuning stage.

The blue-green mode – "Lower O^2 Sensor Limit"
This mode regulates the lower RPM that the O^2 sensor controls. To check the function of this mode ride the bike in low RPM (1500 - 2600), keep the bike in a gear that lets it roll "freely", without any load on the motor an see if the blue lamp comes on anywhere between 1700 - 2600 RPM. This tells you that the O^2 sensor is controlling the mixture, while the "P.C" is adding a little fuel as well.
If the blue LED does not come on to about 2600 RPM make sure that the base settings for blue-green mode have been entered properly. If the bike was in good running order before fitting the "P.C", then adjust the mode until the blue lamp lights up as required. The ideal of this setting is between 1700 –2600 RPM. If the bike was running very rough before the P.C was fitted, a synchronisation might be needed, this can only be performed by your BMW dealer.

The blue-yellow mode – "Upper O^2 Sensor Limit"
This mode regulates the upper RPM that the O^2 sensor controls. This area is set on stock bikes so that the sensor controls the mixture around the range between 8 – 110 Km/h or 5- 70 MPH at normal riding.
To check the function of this mode ride in a high gear while increasing the RPM slowly and in small increments and watch at which speed the blue LED lights up and then, as you reach higher speeds, when it turns off. As long as the blue lamp lights up the O^2 sensor is controlling the fuel mixture. This test should be performed between 8 – 110 Km/h or 5- 70 MPH during normal riding without significant acceleration or load. Keep the bike in a gear that lets it roll "freely", without any load on the motor. Generally this setting should not vary a lot from the base settings, if any try to reduce and test lower setting to avoid unnecessary fuel consumption.

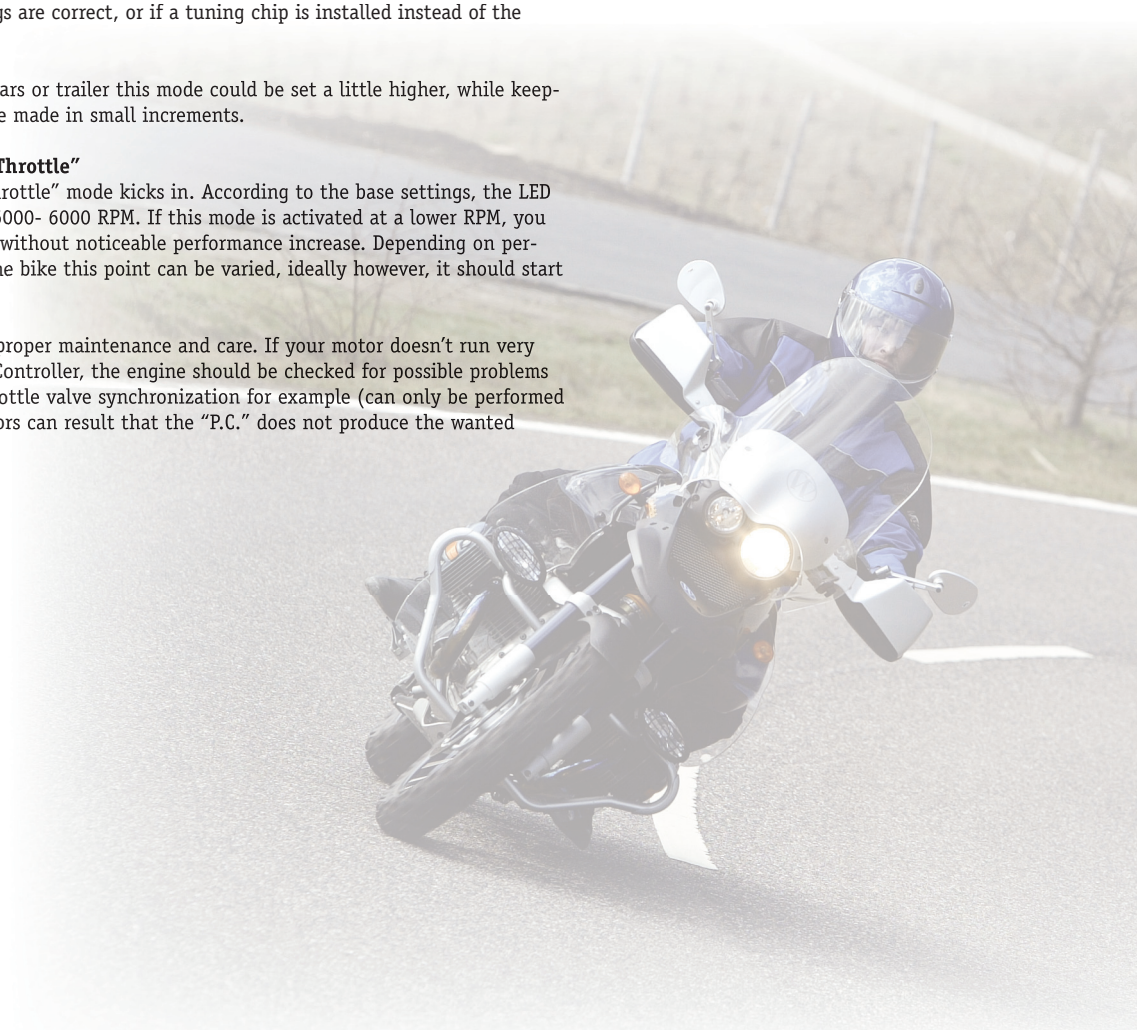
Note: In some cases the blue LED will blink unexpectedly at other speeds, like for example during descent of a mountain or when a strong tail wind is "pushing" at higher speeds than 110 Km/h (70 Mph). This causes load on the engine to be reduced, which in turn is sensed by the "P.C.". This phenomenon is normal and should not influence the settings.

Surging:
If the base settings have been set properly, this phenomenon should not be felt. Otherwise, there are two possibilities:
1) Surging while the blue LED is lit - Possible cause could be bad connections, which should be checked, or bad throttle valve synchronization.
2) Surging without lit blue LED - Possible cause could be wrong settings on the lower or upper limit, which can be checked by ensuring the base settings are correct, or if a tuning chip is installed instead of the original.

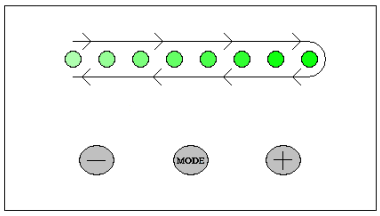
In cases of carrying very heavy loads, side cars or trailer this mode could be set a little higher, while keeping in mind that adjustments should only be made in small increments.

The blue-red mode – "Beginning of Full Throttle"
This controls at which point the red "full throttle" mode kicks in. According to the base settings, the LED should light up at full throttle from about 5000- 6000 RPM. If this mode is activated at a lower RPM, you will experience increased fuel consumption without noticeable performance increase. Depending on personal driving style and level of tuning on the bike this point can be varied, ideally however, it should start between 5000 – 5500 RPM.

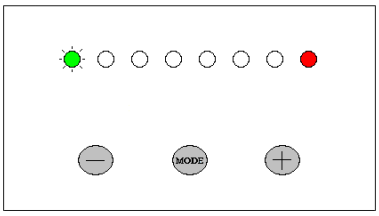
Note: The basis for a finely tuned motor is proper maintenance and care. If your motor doesn't run very smoothly before installing the PerformanceController, the engine should be checked for possible problems that need to be sorted out first, such as throttle valve synchronization for example (can only be performed by your BMW dealer). Worn out "tired" motors can result that the "P.C." does not produce the wanted improvements.



Startup



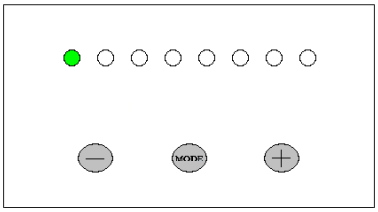
Display at startup, the LED light up green and have an 8 second light sequence from side to side.



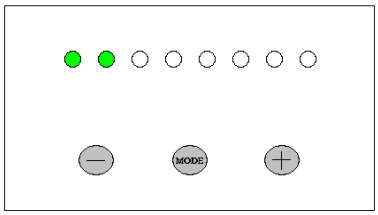
Fault warning
The green LED light blinks, while the red LED is lit. This means the "P.C:" is connected but is not receiving an injector signal.

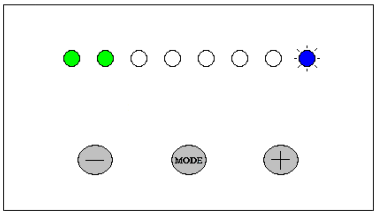
A very easy to use demo of the adjustment process can be found in your dealers website or in the **www.wunderlich.de** website under the 8530100 part number

Operating Mode

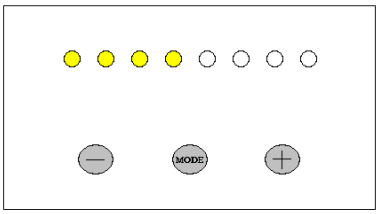


Neutral
The green LED is constantly lit.

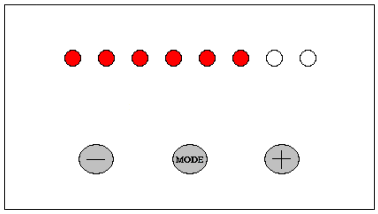




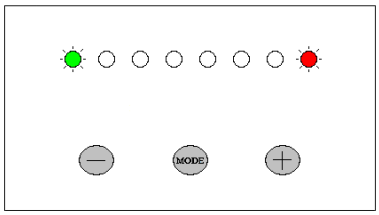
Normal driving and "Cruise" mode
During normal riding first one green LED lights up then depending on load more light up. During cruise mode the blue LED will blink as well.



Acceleration Pump
Under rapid acceleration a steady yellow lights up, more light up with increased load



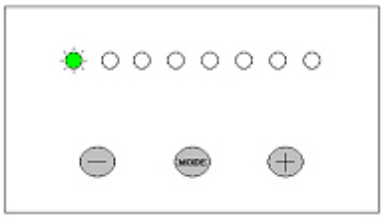
Full Throttle
Red LEDs light up during full throttle riding and increase with load



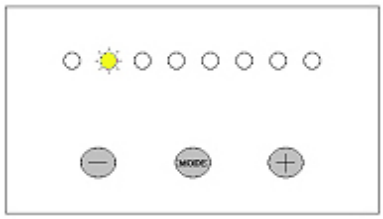
Deceleration
The green + red LEDs on both ends flash back and forth showing that the injectors are off.

Base Settings (BS)

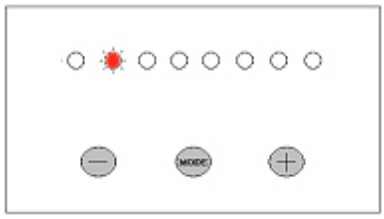
Note: These settings have been determined in Germany using high octane "Super Unleaded" fuel. As fuel quality varies all over the world it may be that (especially) the yellow and red mode values need to be set higher when lower quality fuel is used. But **always** start with low settings as described.



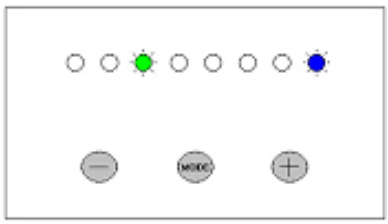
Base Settings (BS) Green = 1
Press the "Mode" button for the green "Cruise" mode. Press the plus/minus button to adjust to BS.



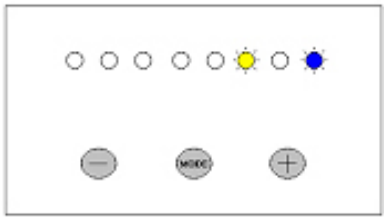
Base Settings (BS) Yellow = 2
Press the "Mode" button for the yellow "Acceleration" mode. Press the plus/minus button to adjust to BS.



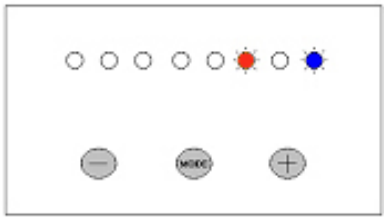
Base Settings (BS) Red = 2
Press the "Mode" button for the red "Full Throttle" mode. Press the plus/minus button to adjust to BS.



Base Settings (BS) Blue – Green = 3
Press the "Mode" button for the blue-green "Lower O² Sensor Limit" mode. Press the plus/minus button to adjust to BS.



Base Settings (BS) Blue-Yellow = 6
Press the "Mode" button for the blue-yellow "Upper O² Sensor Limit" mode. Press the plus/minus button to adjust to BS.



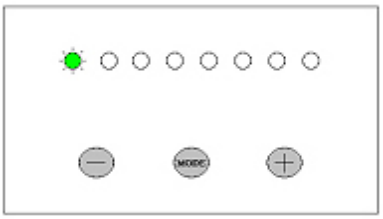
Base Settings (BS) Blue – Red = 6
Press the "Mode" button for the blue-red "Beginning of Full Throttle" mode. Press the plus/minus button to adjust to BS.

For a R 1200 GS fitted with Blue air filter, Remus Sport header pipes and Remus Revolution silencer we have determined the following settings:

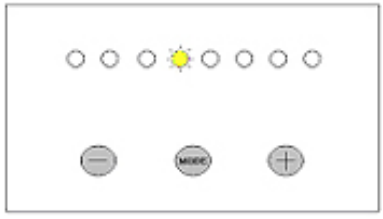
Green:1 / Yellow = 4 / Red = 4 / Blue– green = 3 / Blue-yellow = 6 / Blue - red = 6

Our test bike showed that when the PerformanceController was switched on, other than the optimised riding and better throttle response there was the additional benefit of a good power increase (see Dyno graphs below). These values may differ from bike to bike because of manufacturing tolerances.

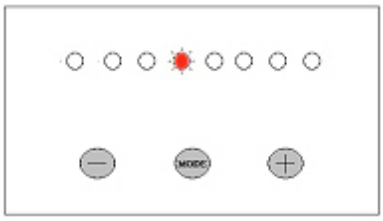
A very easy to use demo of the adjustment process can be found in your dealers website or in the **www.wunderlich.de** website under the 8530100 part number



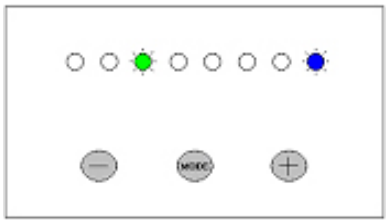
Green = 1.0
Press the "Mode" button for the green "Cruise" mode. Press the plus/minus button to adjust.



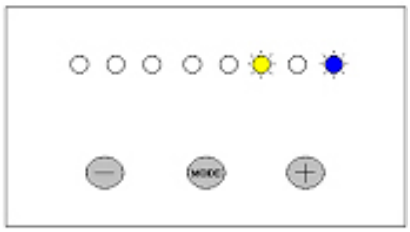
Yellow = 4
Press the "Mode" button for the yellow "Acceleration" mode. Press the plus/minus button to adjust.



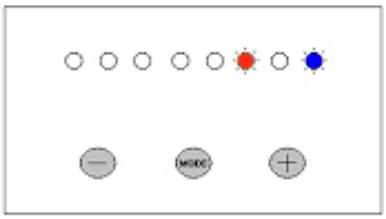
Red = 4
Press the "Mode" button for the red "Full Throttle" mode. Press the plus/minus button to adjust.



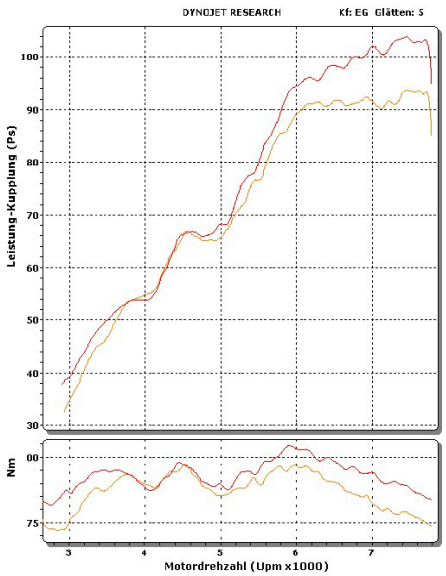
Blue – Green = 3,0
Press the "Mode" button for the blue-green "Lower O² Sensor Limit" mode. Press the plus/minus button to adjust.



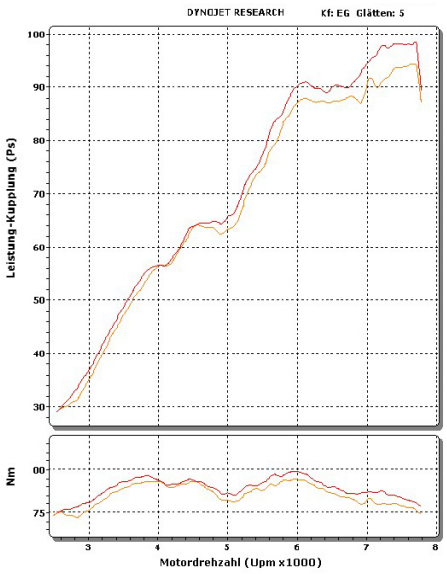
Blue-Yellow = 6
Press the "Mode" button for the blue-yellow "Upper O² Sensor Limit" mode. Press the plus/minus button to adjust.



Base Settings (BS) Blue – Red = 6
Press the "Mode" button for the blue-red "Beginning of Full Throttle" mode. Press the plus/minus button to adjust to BS.



R 1200 GS with Remus sport header , Revolution silencer + Blue air filter with and without PerformanceController



R 1200 GS all standard, with and without PerformanceController