Operating and optimizing the onboard electronic systems

R1200GS and GS Adventure, model-year 2013 onward

UKGSer profile: *http://www.ukgser.com/forums/member.php?1044494-Nick-V*

Introduction and rationale

It is understood that the factory BMW owner's manual for the 2013-onward R1200GS and R1200GS Adventure are somewhat confusingly laid-out, and written in what is often a grammatically-incorrect style of English.

This document explains the following tasks using a simpler, sequentially-oriented style:

- Understanding differences in throttle-response characteristics.
- Accessing the riding modes.
- Selecting the riding modes.
- Enabling and disabling the ASC (traction control) and ABS (anti-lock braking).
- Enabling and disabling the cruise control.
- Enabling access to Enduro Pro mode using the coding plug.
- Customizing the digital display, customizing vehicle software functions and enabling 'hidden' software functions.

Equipment List

- Coding plug (installed under rider's seat) if the Enduro Pro riding mode is being selected, and/or if the rider wishes to maintain custom riding-mode settings.

Procedure

Understanding throttle-response characteristics

Previous-generation motorcycles featured a direct connection (usually by cable) from the throttle twist-grip to the throttle butterfly pulley. This ensured that any movement of the twistgrip equated to a corresponding, fixed amount of movement of the throttle butterfly valve.

The 'Fly-by-wire' throttle fitted to the GS and GS Adventure makes different throttle-response characteristics possible by changing the current riding mode.

'Throttle response' can be described as degrees of movement at the twistgrip, as that movement relates to degrees of movement at the throttle butterfly valve. When riding, this translates to how 'sensitive' or 'responsive' the engine feels to throttle inputs.

The unit of measurement at both the twistgrip and throttle butterfly valve is degrees per second (°/sec).

Throttle response could be described using an equation in which the left-hand side of the equation represents speed of twistgrip movement, and the right-hand side of the equation represents the corresponding speed of throttle butterfly movement.

With a muted throttle response setting (for example, in Rain and Enduro modes), the equation would be:

$$X°/sec = (X - Y)°/sec$$

Y represents the factor by which throttle butterfly movement is deliberately restrained: while riding, this would make the engine less responsive to throttle inputs. Such a setting would be useful for keeping a margin of safety whenever traction may be compromised.

With a direct throttle response setting (for example, in Road and Enduro Pro modes), the equation would be:

$$X°/sec = X°/sec$$

Throttle response is therefore at a ratio of 1:1. While riding, this would give a true reflection of throttle input translated into throttle response. Such a setting would be useful for everyday riding in normal conditions.

With an augmented throttle response setting (for example, in Dynamic mode), the equation would be:

$$X°/sec = (X + Y)°/sec$$

Y represents the factor by which throttle butterfly movement is deliberately augmented. While riding, this would make the engine respond more quickly to actual throttle inputs. Such a setting works best for fast road or track riding, as it makes more usable engine power available more quickly when the throttle is moved.

Accessing the riding modes

The R1200GS and R1200GS Adventure are shipped from the factory with five pre-programmed riding modes, four of which are accessible immediately. All riding modes are selected using the 'MODE' button (red arrow, below).

1. ROAD
   This mode is most suited to normal tarmac riding and touring conditions.

When this mode is selected, the motorcycle's default operational characteristics will be as follows:
- Throttle response: Direct
- ABS operation: Optimized for tarmac (can be manually disabled)
- Traction control: Drive-wheel spin suppressed (ASC can be manually disabled)
- Dynamic ESA: Hard, Normal and Soft damping settings available (default: Normal)

2. RAIN
   This mode is most suited to tarmac riding under wet or slippery conditions.

When this mode is selected, the motorcycle's default operational characteristics will be as follows:
- Throttle response: Muted
- ABS operation: Optimized for tarmac (can be manually disabled)
- Traction control: Drive-wheel spin suppressed (ASC can be manually disabled)
- Dynamic ESA: Hard, Normal and Soft damping settings available (default: Soft)

3. DYNAMIC
   This mode is most suited to high-speed road riding and track riding conditions.

When this mode is selected, the motorcycle's default operational characteristics will be as follows:
- Throttle response: Augmented
- ABS operation: Optimized for tarmac (can be manually disabled)
- Traction control: Drive-wheel spin suppressed (ASC can be manually disabled)

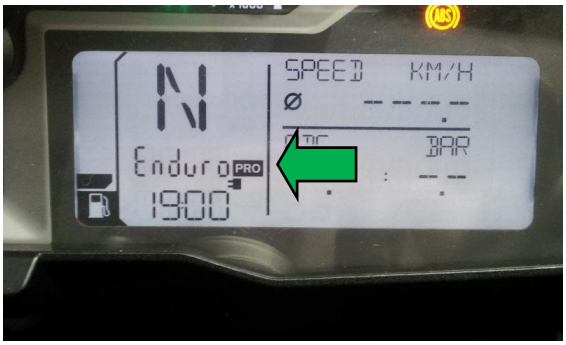
- Dynamic ESA: Hard, Normal and Soft damping settings available (default: Hard)

4. ENDURO
   This mode is most suited to basic off-road riding.

When this mode is selected, the motorcycle's default operational characteristics will be as follows:

- Throttle response: Muted
- ABS operation: Optimized for use of road tyres on loose surfaces. ABS regulation available for both wheels, but can be manually disabled.
- Traction control: Drive-wheel spin partially suppressed (ASC can be manually disabled)
- Dynamic ESA: Hard and Soft damping settings available (default: Soft)

5. ENDURO PRO
   This mode is not available by default, but can be activated using the coding plug. It is most suited to advanced off-road riding.

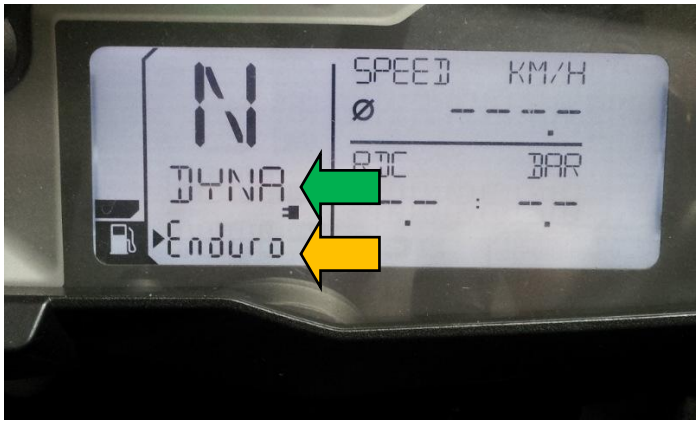


When this mode is selected, the motorcycle's default operational characteristics will be as follows:

- Throttle response: Direct
- ABS operation: Optimized for use of off-road tyres on loose surfaces. ABS regulation available for front wheel only, but can be manually disabled.
- Traction control: Drive-wheel spin partially suppressed (ASC can be manually disabled)
- Dynamic ESA: Hard and Soft damping settings available (default: Hard)

Selecting the riding modes

The riding mode currently active is shown on the top line of the left-hand portion of the digital display (green arrow, below).



If a different riding mode to the current mode has been chosen using the 'MODE' button, the chosen mode will be pre-selected, and shown on the bottom line of the display (yellow arrow, above).

The pre-selected mode will only be set as the new current riding mode if:

1. The throttle is moved to the idle position, and
2. The clutch is pulled all the way in.

Tip:	It is possible to change riding modes 'on the fly' using the method described above, but the safest way to change modes is always to bring the motorcycle to a full stop before releasing the throttle and pulling in the clutch.

When the selected mode has been set and confirmed by the onboard computer as the current riding mode:

1. The top line of the left-hand portion of the digital display will display the new riding mode, and
2. The bottom line of the left-hand portion of the digital display will revert to displaying the current time (below).

A red-coloured coding plug is supplied with the bike, but is not connected at the factory. This plug enables activation of the advanced offroad mode (ENDURO PRO), and also enables the motorcycle to keep custom riding-mode settings in memory when the ignition is switched off.

Enabling and disabling the ASC (traction control) and ABS (anti-lock braking) (if fitted)

The ASC and ABS are both operated using the upper press of the same rocker switch on the left-hand switchgear. Operation of either system depends on the relative amount of time in which the button is pressed.

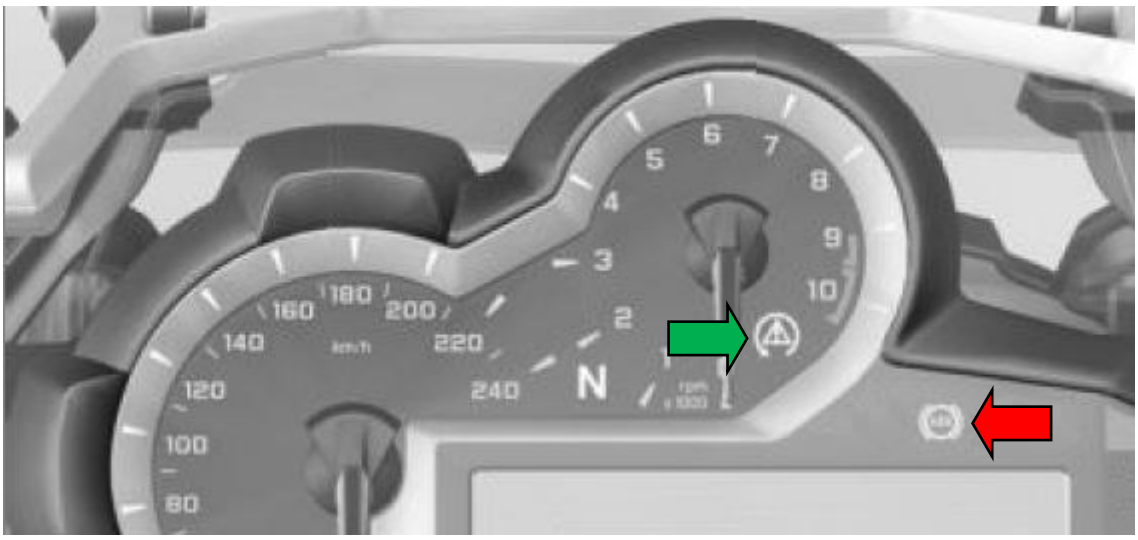
In 'Rain', 'Road' and 'Dynamic' riding modes, ASC and ABS are both active by default as soon as the motorcycle covers a few metres' riding distance.

In the 'Enduro' riding mode, the ASC allows limited drive-wheel spin. The ABS is active on both wheels by default, and ABS action is optimized for road tyres on off-road terrain.

In the 'Enduro Pro' riding mode, the ASC allows limited drive-wheel spin. The ABS is active for the front wheel only, and ABS action is optimized for off-road tyres on off-road terrain.

Four different ASC/ABS configurations can be selected:

1. ASC and ABS both enabled.
2. ASC and ABS both disabled.
3. ASC enabled, ABS disabled.
4. ASC disabled, ABS enabled.



1. *To disable the ASC system:* Press and hold the ABS/ASC button (cyan arrow, below) for approximately 1.5 seconds until the ASC icon (green arrow, above) shows steady yellow. Release the button.

   To disable the ABS system: Press and hold the ABS/ASC button (cyan arrow, below) for approximately 3 seconds until the ABS icon (red arrow, above) shows steady yellow. Release the button.

   To disable both the ASC and ABS systems: Press and hold the ABS/ASC button (cyan arrow, below) for approximately 5 seconds until the ABS icon (red arrow, above) shows steady yellow, but the ASC icon (green arrow, above) still flashes. Release the button.
   Now, Press and hold the ABS/ASC button for approximately 1.5 seconds until the ASC icon (green arrow, above) also shows steady yellow. Release the button.

   To re-enable the ASC system: Press and hold the ABS/ASC button (cyan arrow, below) for approximately 1.5 seconds until the ASC icon (green arrow, above) shows steady yellow. Release the button.

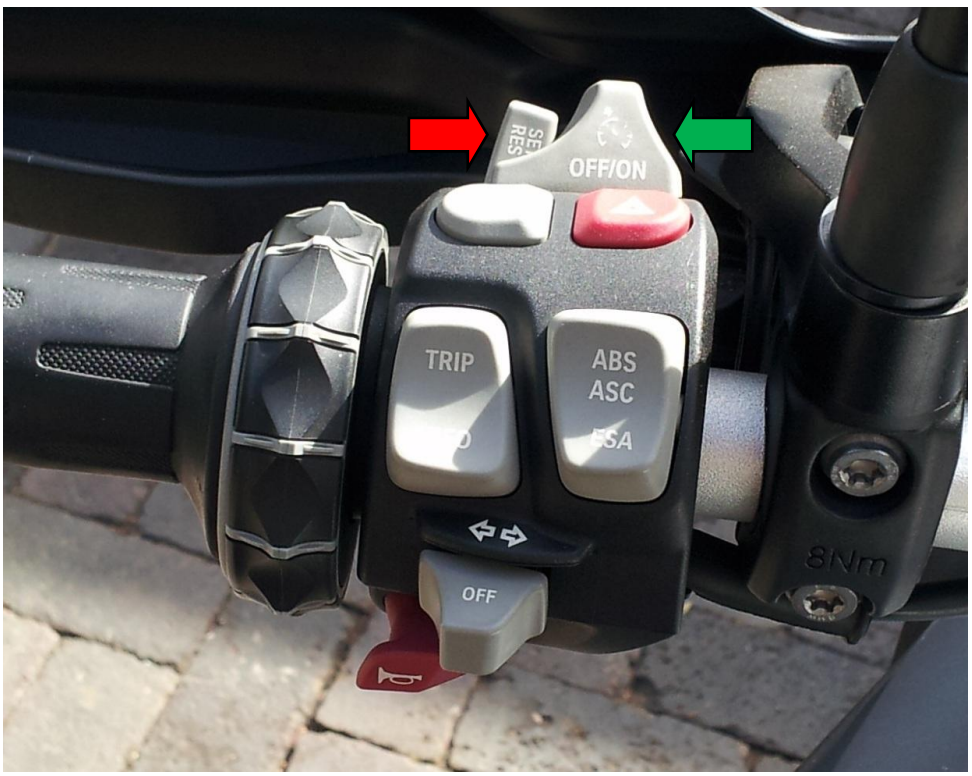
   To re-enable the ABS system: Press and hold the ABS/ASC button (cyan arrow, below) for approximately 3 seconds until the ABS icon (red arrow, above) shows steady yellow. Release the button.

Enabling and disabling the cruise control (if fitted)

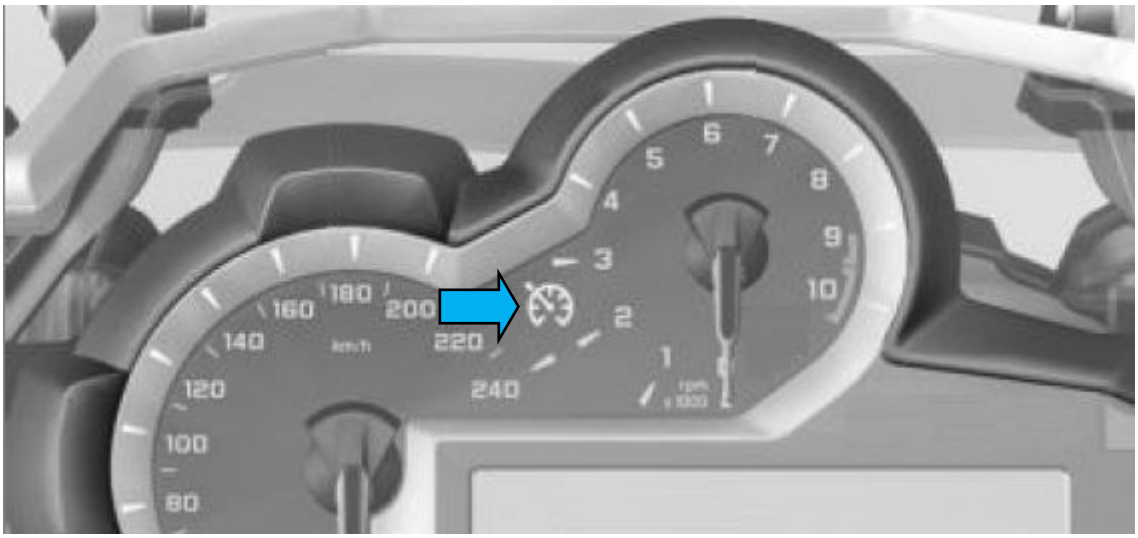
The cruise control enables the motorcycle to hold a set speed with no rider intervention.

To activate the cruise control:

1. Slide the cruise control On/Off switch (green arrow, below) toward the right (‘On’ position).
2. Accelerate or decelerate to the desired speed.
3. Press the Set/Resume rocker switch (red arrow, below) forward.



4. The Cruise Control information icon (cyan arrow, below) will illuminate in steady green.



5. Release the throttle. The motorcycle will now hold the set speed.

6. To accelerate slightly, briefly press the Set/Resume rocker switch forward. Speed will increase by approximately 2 Km/h each time the switch is pressed forward. To accelerate steadily, press and hold the Set/Resume rocker switch forward until the desired speed is reached.

7. To decelerate slightly, briefly pull the Set/Resume rocker switch rearward. Speed will decrease by approximately 2 Km/h each time the switch is pulled rearward. To decelerate steadily, pull and hold the Set/Resume rocker switch rearward until the desired speed is reached.

To de-activate the cruise control:
There are four different ways the cruise control can be de-activated:

1. Slide the cruise control On/Off switch toward the left ('Off' position). To re-activate the cruise control, slide the cruise control On/Off switch toward the right, and press the Set/Resume rocker switch as normal.

2. Pull in the clutch lever. To re-activate the cruise control, release the clutch lever, then press the Set/Resume rocker switch.

3. Apply either of the brake levers. To re-activate the cruise control, release the brakes, then press the Set/Resume rocker switch.

4. Turn the throttle twistgrip (yellow arrow, below) forward past the stop detent. To re-activate the cruise control, press the Set/Resume rocker switch.

Using the coding plug to enable access to Enduro Pro mode and retain custom mode settings

Connecting the coding plug (as per the section above) changes the motorcycle characteristics in two fundamental ways:

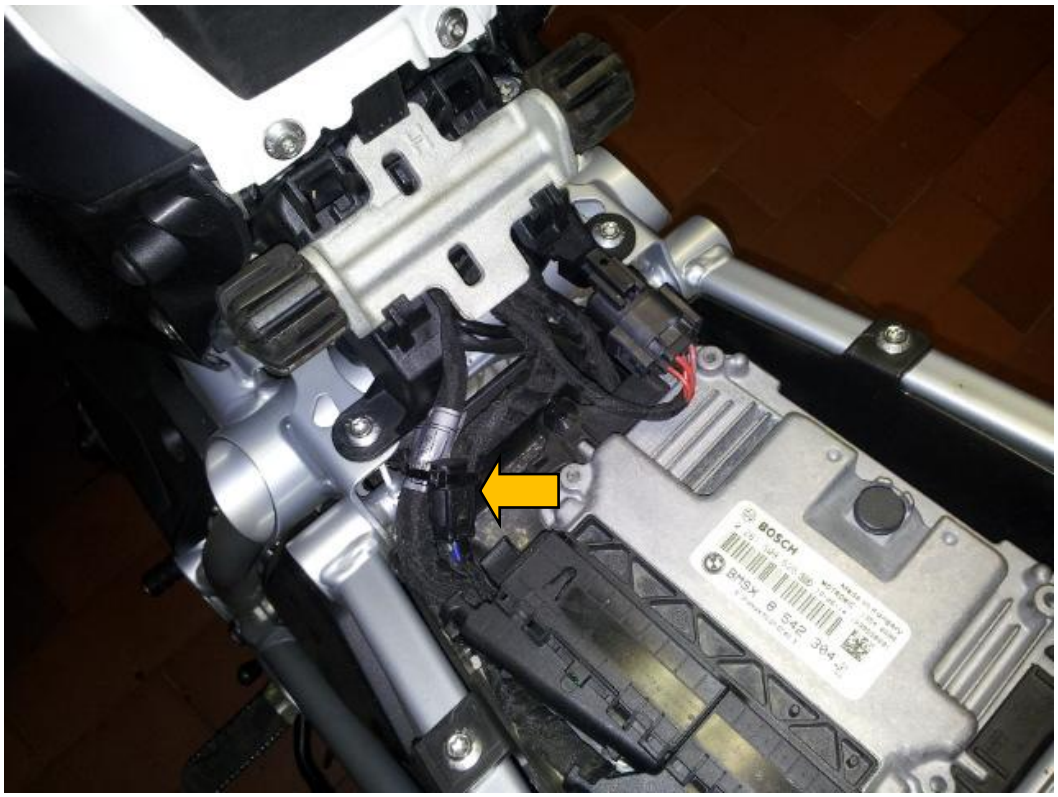
1. Enduro Pro is made available as a fifth riding mode.

2. Customizations made to the riding-mode settings (for example, switching to 'Normal' damping from the 'Hard' damping default in 'Dynamic' mode) are retained in memory when the ignition is switched off. The next time the ignition is turned on, all riding-mode settings will be as the rider previously set them.

Tip:	If the coding plug is not connected, customizations are not retained in memory when the ignition is switched off. The next time the ignition is turned on, all riding-mode settings will revert to the factory presets.

1. Remove the rider's seat and turn it over. The red coding plug (green arrow, below) will be found on the underside of the rider's-seat base.

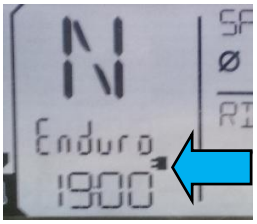
2. Remove the dust cap from the two-pin connector (yellow arrow, below).



3. Connect the coding plug to the two-pin connector.

4. To verify that Enduro Pro mode is available, turn on the ignition and kill switches:

a. The ‘Coding plug inserted’ symbol (cyan arrow, below) will now appear on the digital display.



b. Press the ‘Mode’ button to scroll through the available riding modes. ENDURO PRO will now be available as a fifth mode.

Warning:	ABS functionality is not available for the rear wheel in Enduro Pro mode. BMW Motorrad recommend that this setting should only be used for loose-surface riding, and only when using dedicated off-road tyres. Extra caution should be applied whenever the ABS is disabled or Enduro Pro mode has been selected.

Familiarization with the Trip Computer Pro (if fitted)

R1200GS and GS Adventure models equipped with the Trip Computer Pro are shipped from the factory with the following trip computer functions accessible immediately:

1. Average speed (SPEED Ø)
2. Odometer (ODO)
3. Trip meter 1 (TRIP 1)
4. Trip meter 2 (TRIP 2)
5. Estimated fuel-range remaining (RANGE)
6. Front and rear tyre pressures (RDC).
   The display can be configured by BMW to read in either Bar or PSI.
7. Engine oil level (OILLVL).
   This value should read ‘OK’ if the following conditions are met:
   i. The engine oil quantity is adequate.
   ii. Motorcycle stationary on a level surface.
   iii. Engine running.
   iv. Engine at operating temperature.
   v. The throttle has not moved off idle position for at least ten seconds.
8. Current date (DATE).
   This is displayed in the Day / Month / Year format.
9. Ambient temperature (EXTEMP).
   The display can be configured by BMW to read in either degrees Celcius or degrees Fahrenheit.
   If the ambient temperature is 3 degrees Celcius or less, the display will switch automatically to the ambient temperature reading and begin to flash, and the ice crystal symbol will be displayed as a warning of the possibility of black ice.
10. Engine coolant temperature (ENGTEMP).

The display can be configured by BMW to read in either degrees Celcius or degrees Fahrenheit. Nominal engine temperature is approximately 83 degrees Celcius.

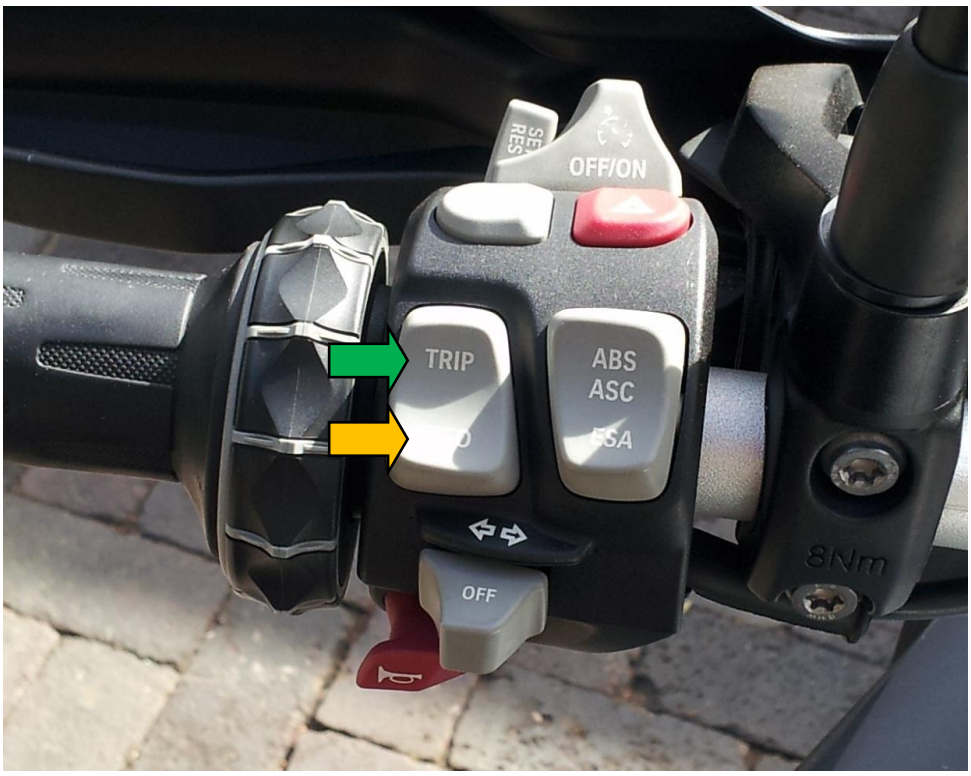
11. Average fuel consumption 1 (CONS 1).
    The display can be configured by BMW to read in either litres per hundred kilometres or miles per gallon.

12. Average fuel consumption 2 (CONS 2).
    The display can be configured by BMW to read in either litres per hundred kilometres or miles per gallon.

Customizing the digital display, customizing vehicle software functions and enabling 'hidden' software functions

To enable the additional trip computer functions, the trip computer setup menu must be accessed:

5. Press the TRIP button (green arrow, below) repeatedly, until the display reads 'SETUP ENTER'.



6. Press and hold the TRIP button until the first setup item is reached.

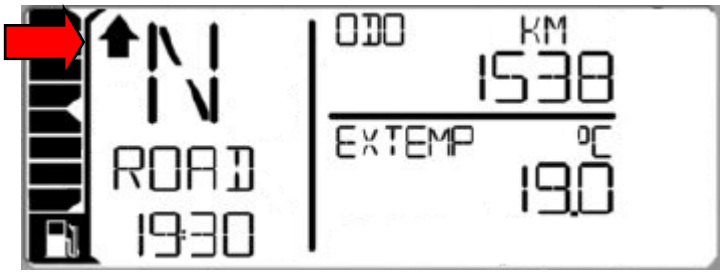
Display setup items are as follows:

1. SETUP GPS TM.
   Press the INFO button to switch the function on or off:
   'ON': The information display updates it's time and date from info provided by the Navigator 5 GPS system (if installed).
   'OFF': The displayed time and date must be set manually.
   Press the TRIP button to reach the next setup function.

2. SETUP CLOCK.
   Press and hold the TRIP button until the hour numerals start to flash. Press the TRIP button repeatedly to set the hour value. Press and hold the TRIP button a second time until the minute numerals start to flash. Press the TRIP button repeatedly to set the minute value.
   Press the TRIP button to reach the next setup function.

3. SETUP DATE.
   Press and hold the TRIP button until the day, month or year numerals (as appropriate) start to flash. Press the TRIP button repeatedly to set the relevant value.
   Press the TRIP button to reach the next setup function.

4. SETUP ECOSFT.
   This function gives the rider the option of a visual cue to shift up at the most economical point in the rev range (red arrow, below).

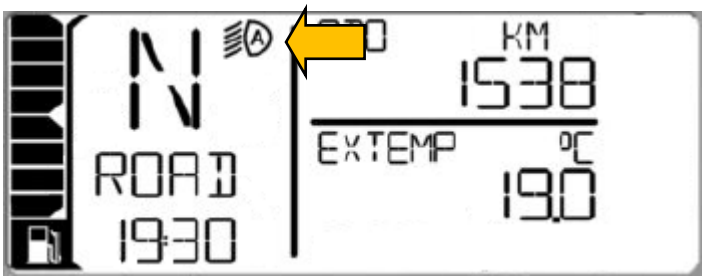


   Press the INFO button to switch the function on or off:
   'ON': The upshift arrow symbol will appear on the display at the most economical upshift point in the rev range.
   'OFF': The upshift arrow symbol will not appear on the display.
   Press the TRIP button to reach the next setup function.

5. SETUP BRIGHT.
   This function allows the rider to set the information display to one of five brightness settings. (The display illuminates automatically when the motorcycle is in low ambient light.)
   Press the INFO button to switch the function on or off:
   '1' is the dimmest setting.
   '5' is the brightest setting.
   Press the TRIP button to reach the next setup function.

6. SETUP DLIGHT AUTO.
   This function allows the headlight cluster to automatically switch between the daytime running light (LED headlights) or auxiliary light (conventional headlights) under daylight conditions, and the dipped beam under low light conditions. It is most useful in countries where law dictates that motorcycles must have a front-facing light active at all times when on public roads.

   Press the INFO button to switch the function on or off:
   'ON': The automatic-changeover symbol will appear on the display (yellow arrow, below). The transition between daytime running light and dipped beam takes place automatically whenever the motorcycle is ridden in low ambient light.



   'OFF': The transition between daytime running light and dipped beam must be selected by the rider, using the daytime running light button on the left-hand switchgear (cyan arrow, below).

Press the TRIP button to reach the next setup function.

Tip:	If, when starting the bike with the DRL in 'dipped beam' mode and the headlights will not switch to dipped beam, you can force the transition by briefly flashing the high beam.

7. SETUP BC CUSTOM

Press the INFO button to switch between Basic and Custom modes:

BASIC: In this mode, scrolling through the digital display using the 'INFO' and 'TRIP' buttons yields a relatively basic set of information.

CUSTOM: This mode:

i. Enables additional information items to be added to the 'Basic' information set.
ii. Allows the rider to customize which information appears on the top and bottom lines of the digital display (some items can be set on both lines if desired).
iii. Allows the rider to choose which functions are or are not displayed as trip computer items.

The following additional information is made available to the rider in BC 'Custom' mode:

i. Automatic trip meter (TRIP A).

ii. Instantaneous fuel consumption (CONS C).
If the motorcycle is stationary, instantaneous consumption will be displayed in litres per hour. If the motorcycle is moving, instantaneous consumption will be displayed in litres per hundred kilometres.

iii. Current vehicle speed (SPEED).
In addition to being displayed by the analogue speedometer, the current vehicle speed will be displayed digitally on the trip computer display.

iv. Current battery voltage (VOLTGE).
Nominal charging voltage is approximately 14 Volts, regardless of power consumption.

v. Total time the ignition has been switched on (ALTIME).

vi. Total time spent riding (RDTIME).

When all functions have been set, press and hold the TRIP button until the display reverts to ‘SETUP ENTER’. Programming is now complete.