

Optimizing and operating the onboard electronic systems

R-series, model-year 2013 onward

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Introduction and rationale

It is understood that the factory BMW owner's manual for the 2013-onward R1200GS, R1200GS Adventure, R1200RT, R1200R and R1200RS 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 (as they relate to fly-by-wire throttle).
- Accessing the riding modes.
- Selecting the riding modes.
- Enabling and disabling the ASC (traction control) and ABS (anti-lock braking) systems.
- Enabling and disabling the cruise control.
- Enabling access to *Enduro Pro* mode using the coding plug (GS models only).
- Customizing the digital display, customizing vehicle software functions and enabling 'hidden' software functions.

The information in this technical article is used and adapted at the readers' personal discretion, and the reader undertaking the procedures described herein accepts responsibility for any deviation from technical standards which may be stipulated by BMW.

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Should any technical errors or discrepancies be found in this document, please forward relevant details to the author at technicwrite@gmail.com for inclusion in updated editions.

Equipment List

- Coding plug (GS and GS Adventure models only) if the *Enduro Pro* riding mode is being selected and/or if the rider wishes to maintain custom riding-mode settings. The coding plug is installed under the rider's seat.

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 2013-onward R-series models makes different throttle-response characteristics possible when the riding mode is changed.

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, in terms of both *throttle-opening quantity* and *throttle-opening speed*. When riding, this translates into 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 (T) movement, and the right-hand side of the equation represents the corresponding speed of throttle butterfly (TB) movement.

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

$$X^{\circ}/sec (T) = (X - Y)^{\circ}/sec (TB)$$

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:

$$X^{\circ}/sec (T) = X^{\circ}/sec (TB)$$

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:

$$X^{\circ}/sec (T) = (X + Y)^{\circ}/sec (TB)$$

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.

The R1200RT, R1200R and R1200RS are shipped from the factory with three pre-programmed riding modes.

All riding modes are selected using the *MODE* button (red arrow, below). Note that an R1200GS digital display is used for purposes of demonstration.



1. ROAD (All models)

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 (All models)

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 (All models)

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 (GS and GS Adventure only)

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 (GS and GS Adventure only)

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



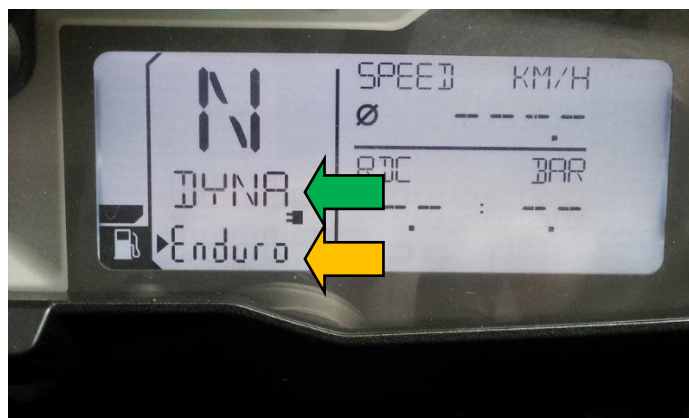
When this mode is selected, the motorcycle's default operational characteristics will be as follows:

- 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)

Pre-selecting and 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 GS and GS Adventure models. 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.

For legal reasons, the coding plug is not connected at the factory, placing responsibility for selection of Enduro Pro mode (and thus, partially disabling the ABS system) in the hands of the rider.

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.

IMPORTANT: The ABS system cannot be disabled on the R1200RT, R1200R and R1200RS.

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 (GS and GS Adventure only), 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 (GS and GS Adventure only), 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 for the GS and GS Adventure:

- ASC and ABS both enabled.
- ASC and ABS both disabled.
- ASC enabled, ABS disabled.
- ASC disabled, ABS enabled.

On the R1200R and R1200RS, ABS cannot be disabled, but ASC can be disabled if required.



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.
2. *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.
3. *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.
4. *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.
5. *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.

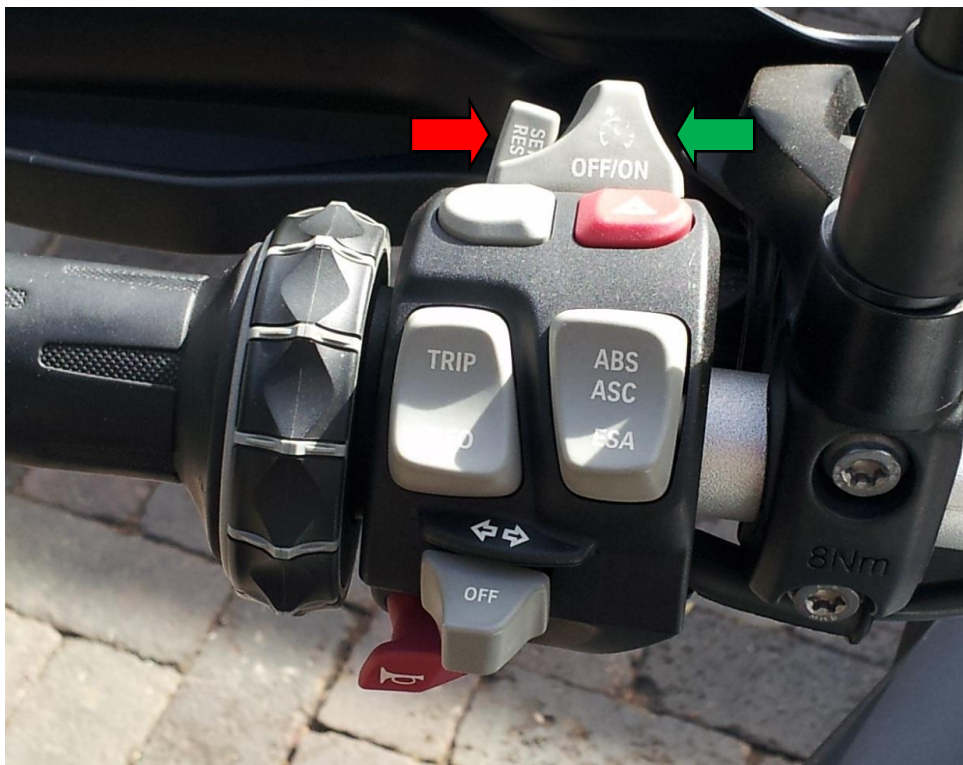


Enabling and disabling the cruise control (if fitted)

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-hand ('On' position).
2. Accelerate or decelerate to the desired speed.
3. Press the Set/Resume rocker switch (red arrow, below) forward.



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



- Release the throttle. The motorcycle will now hold the set speed.
- 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.
- 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 methods to de-activate the cruise control:

- Slide the cruise control On/Off switch toward the left-hand ('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.
- Pull in the clutch lever. To re-activate the cruise control, release the clutch lever, then press the Set/Resume rocker switch.
- Apply either of the brake levers. To re-activate the cruise control, release the brakes, then press the Set/Resume rocker switch.
- 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

On GS and GS Adventure models, connecting the coding plug (as per the section above) changes the motorcycle characteristics in two fundamental ways:

- 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) will be 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.

Enable access to Enduro Pro mode and retention of custom mode settings as follows:

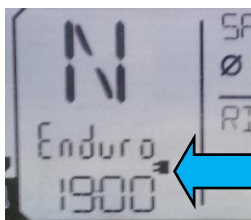
1. Remove the rider's seat and turn it over. The red coding plug (green arrow, below) will be found on the underside of the rider's-seat base.



2. Remove the dust cap from the two-pin connector just ahead of the motorcycle's engine ECU (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 when 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)

R-series models equipped with the Trip Computer Pro are shipped from the factory with the following trip computer functions.

Tip: The motorcycle's display can easily be configured by a BMW Motorrad dealer to read values in Metric or Imperial units. Further, units of measurement can be configured independently to all-Metric, all-Imperial, or a combination of both:

Mileage readouts can be configured to display values in Kilometres or miles.

The current-speed readout on the digital display can be configured to display speed in Km/h or mph.

Current time can be configured to read in 12-hour or 24-hour format.

Temperature displays can be configured to read in either degrees Celcius or degrees Fahrenheit.

Fuel consumption can be configured to read in Kilometres per litre, litres per 100 Kilometres, or miles per gallon.

Tyre-pressure displays can be configured to read in Kilopascals, Bar or Pounds per square inch.

The following information is permanently displayed on the trip computer display:

- Fuel quantity
When the fuel quantity drops below a pre-programmed level, the Fuel reserve light will illuminate on the display, and one line of the display will display the estimated fuel-range remaining (RANGE) until overridden.
- Current gear
When the motorcycle is in Neutral, the gear-position display will indicate 'N', and the green Neutral light will illuminate.
- Current riding mode

The current riding mode is displayed above the 'Time' line. Pre-selected riding modes are displayed on the 'Time' line (see below).

- Current time

If a different riding mode has been pre-selected, that riding mode will be shown on the 'Time' line until selected. If a pre-selected riding mode is not selected within a certain time, the currently-selected riding mode will be retained.

Some of the functions listed below will not be accessible until they are enabled via the trip computer's SETUP function, but all are available in the trip computer Pro:

1. Odometer (ODO)

This function displays the motorcycle's total mileage.

2. Trip meter 1 (TRIP 1)

This function displays the first of two re-settable trip meters. The mileage readout automatically rolls over to 0 from 999.

3. Trip meter 2 (TRIP 2)

This function displays the second of two re-settable trip meters. The mileage readout automatically rolls over to 0 from 999.

4. Automatic trip meter (TRIP A).

This function displays the automatic trip meter. The Trip A mileage reading is reset to 0 whenever the motorcycle's ignition has been turned off for 8 hours or longer, and automatically rolls over to 0 from 999.

5. Estimated fuel-range remaining (RANGE).

This function calculates a real-time estimate of the motorcycle's remaining fuel range, as a function of three variables: current fuel quantity, current vehicle speed and average throttle position.

6. Current vehicle speed (SPEED).

In addition to the vehicle speed displayed by the analogue speedometer, this function displays the current vehicle speed digitally on the trip computer display.

7. Ambient temperature (EXTEMP).

This function displays the prevailing air temperature.

If the ambient temperature is registered as 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, warning of the possibility of black ice.

8. Engine coolant temperature (ENGTEMP).

The display can be configured by BMW to read in either degrees Celcius or degrees Fahrenheit.

Nominal engine temperature is between 77 and 88 degrees Celcius.

9. Instantaneous fuel consumption (CONS C).

This function displays the amount of fuel currently being used by the motorcycle. If the motorcycle is stationary, consumption will be displayed in litres per hour. The display can be configured by BMW to display instantaneous consumption in kilometres per litre, litres per hundred kilometres or miles per gallon.

10. Average fuel consumption 1 (CONS 1).

This function displays the first of two readouts showing the average amount of fuel used by the motorcycle since the last function reset. The display can be configured by BMW to read in either litres per hundred kilometres or miles per gallon.

11. Average fuel consumption 2 (CONS 2).

This function displays the first of two readouts showing the average amount of fuel used by the motorcycle since the last function reset. The display can be configured by BMW to read in either litres per hundred kilometres or miles per gallon.

12. Average consumption for range calculation (CONS R).

This function displays the automatic average fuel consumption readout. This fuel consumption readout assumes a mileage readout of 0 at the beginning of each trip and, therefore, calculates average fuel consumption only for the current trip.

13. Average speed (SPEED Ø).

This function displays the average speed of the motorcycle since the last function reset.

14. Front and rear tyre pressures (RDC).

The left-hand part of the display shows the air pressure in the front tyre, while the right-hand part shows the air pressure in the rear tyre. The display can be configured by BMW to read in either Bar or PSI.

15. Current date (DATE).

The date is displayed in Day / Month / Year format.

16. Engine oil level (OILLVL).

This value should be accompanied by an 'OK' reading 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 for at least ten seconds.

If any condition is not conducive to a proper oil-level reading, the 'OK' reading will be replaced by '—'.

If the engine oil level is too low:

- i. The display will continue to read 'OILLVL' until overridden.
- ii. The low-oil level indicator light and Master Caution light will illuminate.

Note:

On some R-series motorcycles, false 'low oil level' warnings may be displayed if the motorcycle's engine is allowed to idle for more than ten seconds on a steep downhill grade. This is of no concern, and will not harm the motorcycle.

If there is genuine concern that the engine oil level is too low, verify the oil level using step 16 above. Alternatively, stop the engine and manually verify the engine oil level using the oil-level sight glass as described in the motorcycle's owner's manual.

17. Current battery voltage (VOLTGE).

Nominal charging voltage is approximately 14 Volts, regardless of power consumption.

18. Stopwatch total time (ALTIME).

This readout displays the total time the ignition has been switched on.

19. Stop watch driving time (RDTIME).

This readout displays the total time spent riding.

20. Date of the next service (SERV D).

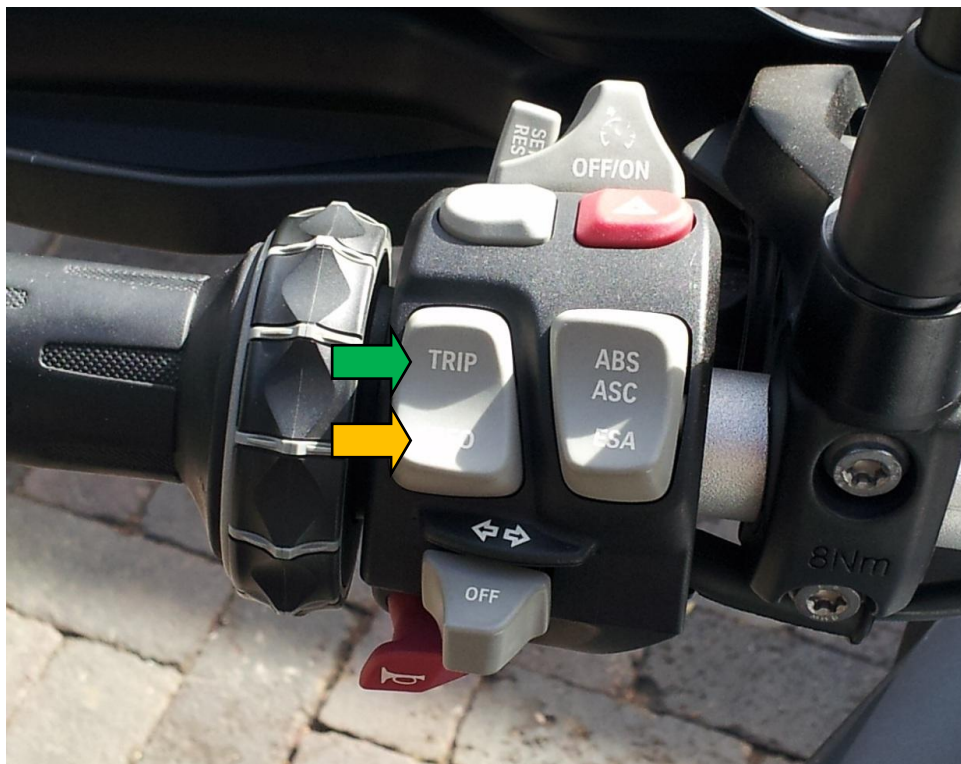
This readout displays the countdown distance to the next service interval.

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

Certain information items in the list above will not be visible on the Trip Computer Pro display unless they have been enabled by the rider.

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

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



2. 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 motorcycle's digital display will update it's time and date values from information provided by the BMW Navigator 5 GPS system (if installed).

'OFF': The displayed time and date must be set manually using the SETUP CLOCK and SETUP DATE functions as described below.

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.

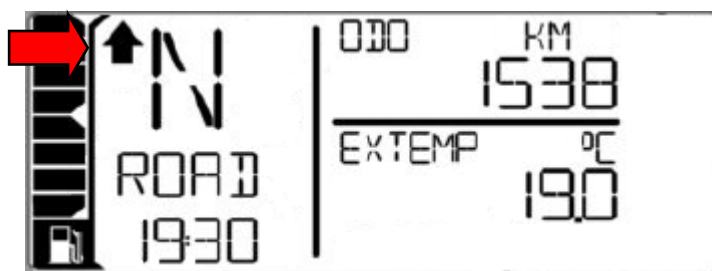
3. SETUP DATE.

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 an 'Economic shift point' visual cue (red arrow, below). This will prompt upshifts at the most economical point in the rev range.



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 maximum 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.

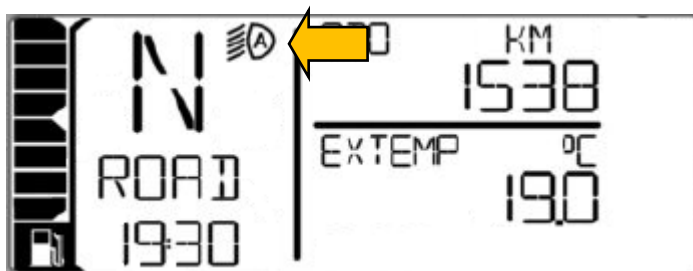
Press the TRIP button to reach the next setup function.

6. SETUP DLIGHT AUTO.

This function allows the headlight cluster to automatically switch between the daytime running light (LED headlights) or LED 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 over and above 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, or can be prevented from appearing on the display).
- 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).
- iii. Current vehicle speed (SPEED).
- iv. Current battery voltage (VOLTGE).
- 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.