

# Multi-gauge user guide

## General Information

All operations of the multi-Gauge are performed by using the buttons **SELECT** and **RESET** of the stock instrument cluster. These buttons are normally used to operate the main and trip odometers. Accordingly, the **SELECT** button has been given a built-in delay time of about 2 seconds to avoid conflict with the odometer functions.

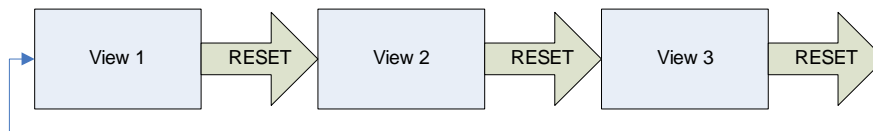
The following description refers primarily to software versions 114 and 64 but differences for other software releases should be very slight.

## Normal operation

With the exception of the timer view modes, none of the other view modes require any user interaction.

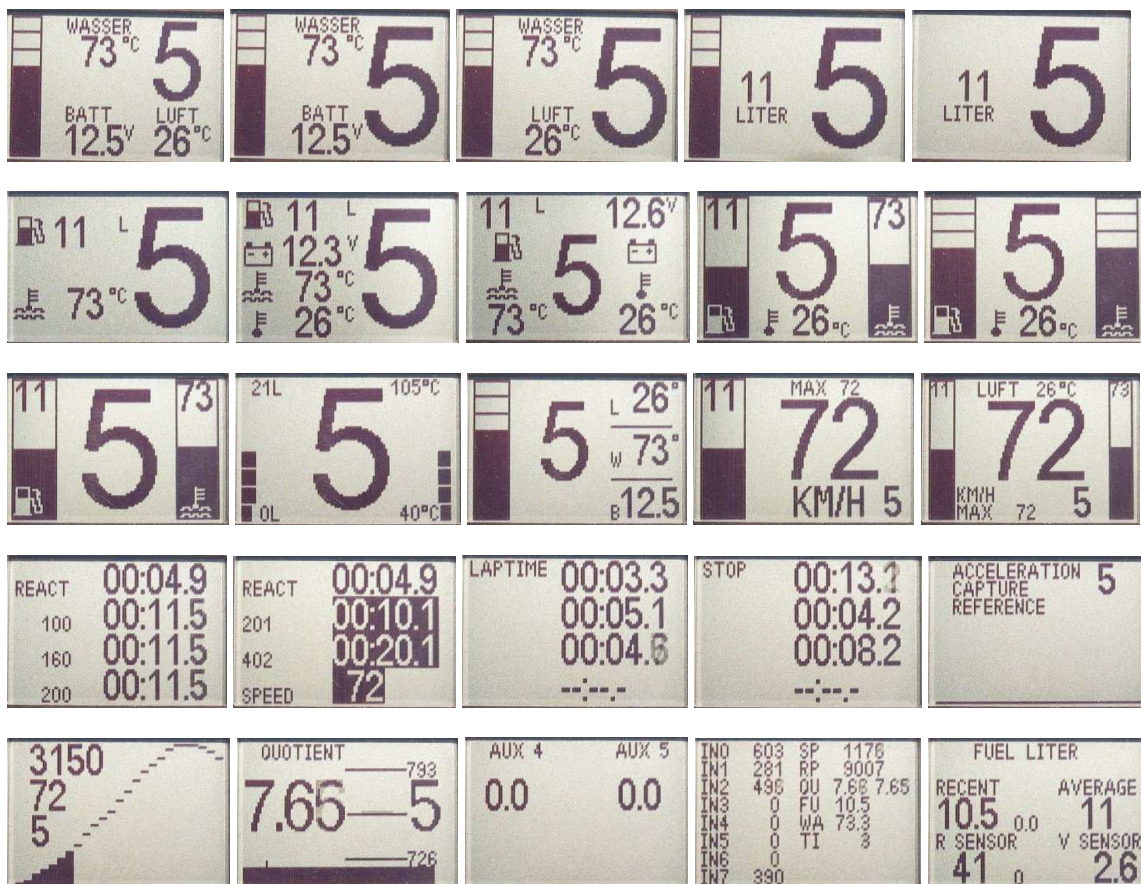
## Preset view modes

To speed up the transition between different view modes, three presets (out of about 25 view modes) can be sequentially toggled by successive presses of the RESET button. Each of the presets can be assigned by entering the Multi-Gauge setup menu when that particular preset (numbered 0, 1, or 2) is displayed.



## Overview

Screenshots of all viewmodes (1...25)



### **Speed viewmode (14, 15)**

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During normal riding the bike's actual speed is displayed as a digital readout. When stopped, the display shows the maximum speed reached. The maximum speed is reset each time power is switched off.

### **Acceleration viewmodes (16, 17)**

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These two view modes measure the time required to accelerate up three predefined speeds or travel two predefined distances. A five second reaction time counter starts counting from zero upon initiation of the speed or distance acceleration view mode. If any movement of the bike is then detected the reaction time counter stops and the other timers start counting until the bike reaches the predefined speed or distance goals. A new measurement cycle will be started automatically when the bike next comes to a stop.

To preserve the results so they can be read when stopped change gears to neutral before coming to a complete stop.

### **Timer viewmodes (18, 19)**

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The timers are normally operated with an external button not supplied with the Multi-Gauge. A separate document entitled 'upgrade' details the electronics requirements for installation of this button. If this external button is not installed, or not desired, the SELECT button can be used instead.

### **Lap timer (18)**

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Four timers are available. Each button press stops the current timer and starts the next. The results remain visible until the view mode changes. To start a new cycle toggle through the three preset view modes back to the lap timer.

### **Stopwatch (19)**

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Four timers are available. Each button press saves the current intermediate time. Two successive button presses stops the timer completely.

### **Miscellaneous and diagnostic viewmodes (20 .. 25)**

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These viewmodes are not intended for normal use. They give either various information of internal variables or are simply unfinished functions for future use.

### **General**

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The readout for water temperature will remain blank until a temperature of about 40°C (100°F) is reached.

The accuracy of the fuel readout is limited by the fuel-sender. Its output is restricted to 13 discrete steps, intermediate values are calculated by averaging. Deviation of up to 2 liter are possible.

Battery voltage is measured inside the instrument cluster. Therefore this value is also influenced by all consumers using the same cabling (e.g headlight).

# Multi-gauge configuration

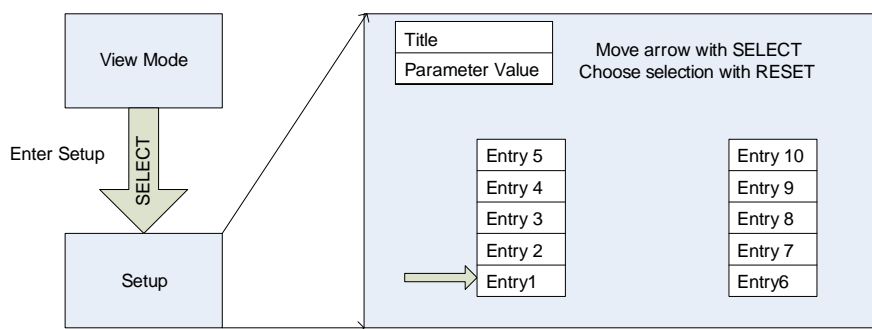
## General Information

The Multi-Gauge comes pre-configured and ready to go. Usually one need **not** make any extra settings. The only change one will wish to make is the selection of the preferred **view mode**. However, there are various ways to change parameters of measurements if one chooses to do so, but keep in mind that they should only be amended on special demand.

For this the Multi-Gauge has a configuration menu to change these.

## How the setup is used

The setup menus are accessed by pressing and holding the SELECT button for about two seconds. Navigation through the setup menus is then accomplished by using the instrument cluster's SELECT and RESET buttons. Upon entry of the setup menu the display shows a selection arrow that serves as a cursor that points to the various menu items.



To move the cursor press and hold the SELECT button until the arrow cursor moves to the desired position. To then select a menu item press the RESET button.

The topmost line of each menu display contains the name of the parameter defined by the current menu. The line just beneath it shows the current value of that parameter.

Once you have changed a parameter's value you can store it permanently by first pointing to, then selecting, the SAVE option in the menu. Unless you save it, the selected value will be lost when power is next switched off.

To return to the normal view (gear, temperature, fuel etc.) you need to proceed through each menu until the view mode menu appears which contains the EXIT option. You may simply continue to press the RESET button since the cursor automatically points to the NEXT option in each menu.

Switching the ignition off during setup can be used as an 'emergency exit'. Doing this will not cause any damage to the Multi-Gauge. There is only a brief instant during the SAVE procedure when a sudden loss of power could result in any data loss and subsequent erratic behaviour.

The main parameter menus are actually divided into **two** sub menus. The first one contains the settings for normal everyday use. The second contains the various operational values which are not to be changed by the end user. To enter the second menu the Multi-Gauge should first be set to display view mode 0 but this menu need not normally be ever used.

**Menu 1**

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1. VIEWMODE
2. CONTRAST
3. SPEED CORRECTION
4. CONVERTER SPECIAL
5. VCCWATER
6. GEAR DELAYTIME
7. FUEL DELAYTIME
8. FUEL EMPTY
9. SPEEDMODE FACTOR
10. STARTMESSAGE
11. MESSAGE 1
12. MESSAGE 2
13. UNIT SPEED
14. UNIT FUEL
15. UNIT TEMP.
16. LOGO TYPE
17. LANGUAGE
18. SHIFT LIGHT
19. ACCEL STOPSPEED
20. ACCEL DISTANCE
21. ACCEL VIEWMODE
22. OSCILLOSCOPE

**Menu 2**

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1. VCCMAIN
2. REFERENCE VOLTAGE
3. FAZER TYPE
4. CONVERTER
5. BAUDRATE CHECK
6. TANK MAX
7. HALT DETECT
8. OVERVIEW
9. GEAR FIT VALUE
10. TIMER CALIBRATION
11. TEMP ADJUST
12. EXTERNAL SWITCH
13. SIGNALS
14. FUEL SENSOR OFFSET LITER
15. FUEL SENSOR OFFSET OHM

## Detailed description menu 1

### VIEWMODE

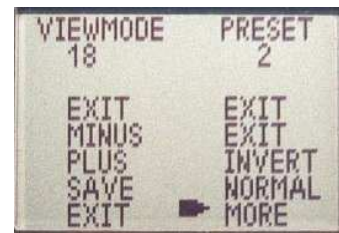
The selection of the values' arrangements in the display. Selectable from 0 to 25;

Mode 0 = Demo mode.

The actual preset number is given at **PRESET**.

Some viewmodes are only intended for debugging purposes.

INVERT switches the display to inverted view.



The following settings are only accessible if you select MORE from the view mode menu. After the last configuration menu MORE will take you back to the viewmode menu.

### CONTRAST

Change the contrast of the LC-Display

But caution: If you change this parameter to a value that impairs readability of the display you may not reach the correct menus again.

So be careful with your changes!

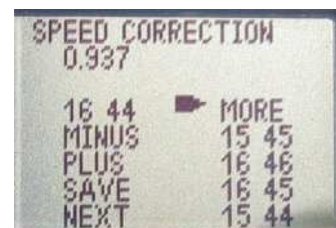


### SPEED CORRECTION

Setup for SPEEDCONVERTER (only if present!!). The second line from the top shows the scaling factor for the compensated speedometer signal. The speedometer value will be multiplied with this factor. Select your transmission ratio from the list or enter any given factor by selecting PLUS or MINUS. Allowed values range from 0.7 to 1.4

Press SAVE to store the factor to the speed converter's circuit!

As the stock speedometer shows around 4% too high value you have to take that into consideration when entering your own factor. With the example above, where only the 15 sprocket is corrected, this would lead to a factor of  $0.937/1.04 = 0.901$ . Do not confuse this function with the SPEEDMODE FACTOR, which is only used for the display of the speed in the Multi-Gauge.



### CONVERTER SPECIAL

Special menu for the speedometer converter. It contains a set of test modes. Only for debugging purposes. The menu items TESTxxx simulate a speed signal that is sent to the speedometer. The value for xxx is not the speed in km/h but rather an internal calculation factor.

This menu is only accessible when selecting MORE from the preceding menu.



### VCCWATER

Supply voltage of the coolant temperature sensor. Relevant for a precise measurement of the water temperature (nominally 4.8V). Current value top right corner. Saved value top left corner.

Adjustment (only needed once after installation):

The (idle) supply voltage is measured when the sensor is unplugged. The value is displayed in the top right corner of the menu.

- Unplug temperature sensor, which is located beneath the right inner fairing.
- Adjustment and storing is done automatically by selecting SAVE.
- Plug in the temperature sensor again.
- Done.



### GEAR DELAYTIME

Adds a delay before a changed gear is displayed in the Multi-Gauge. Used to "calm down" the change of values to avoid misinterpretation of the selected gear.

Range 0 .. 25, interval: 1

0 = instantaneous display, no averaging

25 = maximum delay and averaging



### FUEL DELAYTIME

Adds a delay before a changed value for the fuel level is displayed. Used to "calm down" the change of values when the level changes upon acceleration, braking or uphill/downhill rides.

Range: 0 .. 399, interval: 1

0 = instantaneous display, no averaging

399 = maximum delay and averaging



### FUEL EMPTY

Limit of remaining fuel until the warning light should go on.

Range: 0..40 (liters), default: 4

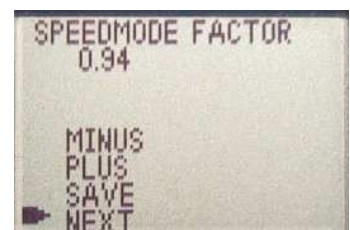


### SPEEDMODE FACTOR

Compensation value for the speedometer viewmode (mode 14, 15). The displayed value can be scaled by any given factor.

Only for the speedometer-viewmode inside the Multi-Gauge, not the stock speedometer!

Range 0.01 .. 5.00, default: 1.00



### STARTMESSAGE

Select whether or not to display the startup messages and logo.





**MESSAGE 1**

Any text that is displayed during startup (if STARTMESSAGE is enabled). Maximum of 9 characters. Line 1.

To edit the text select the desired character by selecting menu item 'LETTER'. Then navigate to the next character position by selecting 'POSITION'. Repeat until your text is finished. Store by selecting 'SAVE'.



**MESSAGE 2**

Same as above. Only for the second line of the message.



**UNIT SPEED**

The unit in which to display the speed: MPH or KM/H



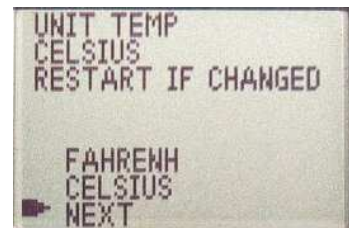
**UNIT FUEL**

The unit in which to display the fuel level: Liters, US gallons or imperial gallons.



**UNIT TEMP**

The unit in which to display the temperature: Fahrenheit or Celsius (Centigrade).



**LOGO TYPE**

The logo for the startup screen: "Fazer 1000 EXUP", "FZ1", "FAZER" or "FAZER JPN" (Japanese character).



**LANGUAGE**

The language for all text used in the display: English or German.



**SHIFT LIGHT**

A flash can indicate an RPM limit, at which to shift gear. By default the fuel tank warning light serves as the flash, but optionally the user can connect an aftermarket LED to the Multi-Gauge.



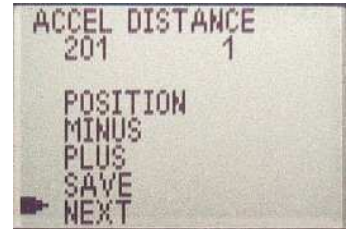
**ACCEL STOPSPEED**

Associated to viewmode DRAGMODE 1. Stop-speeds for acceleration measurement. The build-in stopwatch is automatically started if a movement is detected (speed > 0) and stops if the given values are exceeded. 3 consecutive measurements are done at a time. The 3 different entries are accessible by toggling through POSITION.



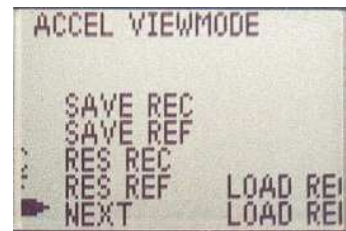
**ACCEL DISTANCE**

Associated to viewmode DRAGMODE 2. Stop-distances for acceleration measurement. Similar as before, except that 2 consecutive distances can be set.



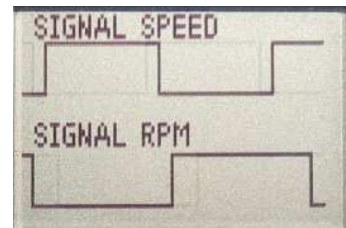
**ACCEL VIEWMODE**

Saving and restoring acceleration curves. Viewmode 20 is logging the acceleration in realtime for all 6 gears. These values can be saved to memory for later reference or analysis. Still in evaluation, unfinished.



**OSCILLOSCOPE**

Oscilloscope function to view the raw speedo and RPM signals. For check-up purposes.





## Detailed description menu 2

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### VCCMAIN

The supply voltage for the processor. Nominally 3V. It depends on the individual specimen of the processor. Only to be measured on the circuit board.

DO NOT CHANGE THIS VALUE! Only intended for initial factory configuration.



### REFERENCE VOLTAGE

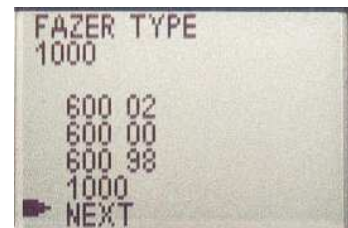
The reference voltage for the Multi-Gauge's processor. Used to calculate voltage differences in the bike's circuit. It depends on the individual specimen of the processor. Only to be measured on the circuit board.

DO NOT CHANGE THIS VALUE! Only intended for initial factory configuration.



### FAZER TYPE

Enables switching the gear recognition between the FZS 600 and the FZS 1000 models (also dependent on the bike's year of production).



### CONVERTER

Selects whether or not the speed conversion menu items should be displayed in menu 1. Selecting this is only available if the circuit board is equipped with the speed compensation chip.



### BAUDRATE CHECK

To test the built-in speed converter, if available. The data transmission to the converter is tested with a decreasing bit rate (OK or FAIL). The medium value of the OK-range can be programmed in the CONVERTER SPECIAL menu. Only for check-up purposes.



### TANK MAX

Maximum capacity of the fuel tank. Ranging from 4..40 liters, default: 21 liters. By changing the value in the FAZER TYPE menu, this value will automatically adjusted to suit the FZS 600 or the 1000 model.



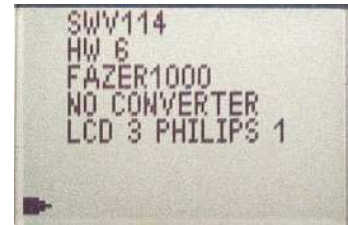
### HALT DETECT

Latency time in seconds without speedo or tacho signals before idle is detected (displayed as '-', no gear calculation possible).



### OVERVIEW

Some general information on the Hard- and Software in use.



### GEAR FIT VALUE

Matching values for gear recognition. The comparison ratio for speed and RPM can be modified. However, it is already optimized and set for the selected Fazer-Type. To be used with viewmode QUOTIENT.

Default values in order of appearance:

FZS1000 : 0, 3.67, 4.98, 6.11, 6.88, 7.64, 8.22, 9.00, 2.00

FZS600 : 0, 0.27, 0.40, 0.51, 0.59, 0.66, 0.74, 0.85, 0.10

The parameters have to be modified if an external speedometer is used. Multiply the correctionfactor (e.g  $15/16 = 0.9375$ ) to all entries.



### TIMER CALIBRATION

The build-in timebase used for acceleration measurements needs to be calibrated: press START, wait for exactly 1 minute, press STOP, press SAVE, done!



### TEMP ADJUST

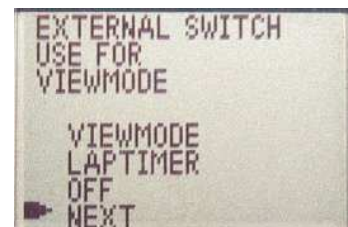
In case the ambient temperature readout is not accurate enough modify the correction-factor until the actual value matches the real temperature. To get best results this should be done at ambient temperatures below 10°C!



### EXTERNAL SWITCH

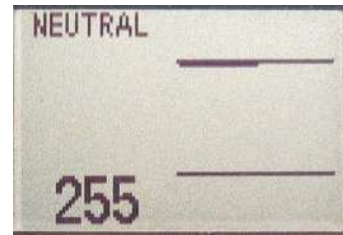
For laptimer control an optional external switch can be connected to the multi-gauge. This could either be the horn, flashlight or any additional mounted switch. As an alternative function this switch can be used for toggling viewmodes.

Consult the document "multi gauge upgrade.pdf" for hardware details.



**SIGNALS**

Real-time view of the sensor signals for Neutral, fuel tank potentiometer, battery voltage, water temperature and air temperature. Only for diagnostic purposes!



**FUEL SENSOR OFFSET LITER**  
**FUEL SENSOR OFFSET OHM**

The fuel sensor consists of a stepped resistor switch. The resistance is measured by the multi-gauge and mapped to the corresponding fuel level. To correct for various imperfections the mapping can be shifted in both directions.

To be used with viewmode FUEL (25).



**Fazer fuelsensor**

