motogadget

Operating and installation guide

motoscope Classic, Chronoclassic and motoscope Classic speedo

Suchen Sie die deutsche Bedienungsanleitung?
Besuchen Sie „support“ auf www.motogadget.de.

ABE
KBA 91262

CE

TÜV

Thank you very much for purchasing a high quality product by *motogadget*.

Please read the following information and recommendations thoroughly and follow these instructions during installation and use of the instrument. No liability is assumed by *motogadget* for damage or defects resulting from negligence or failure to follow the operating and installation guide.

CAUTION FOR ALL U.S. CUSTOMERS

THIS PRODUCT IS NOT D.O.T. APPROVED AND INTENDED FOR SHOW USE ONLY!

CAUTION: IF YOU ARE NOT A CERTIFIED MOTORCYCLE TECHNICIAN PLEASE STOP HERE AND ASK YOUR LOCAL MOTORCYCLE SHOP FOR PROFESSIONAL INSTALLATION!

Do you need further product information's, outside dimensions, 2D or 3D drawings? Please visit:

www.motogadget.de/en/mst_files.html

Contact:

motogadget GmbH
Köpenicker Str. 145
D - 10997 Berlin
Germany

Tel. 030-27 59 19 20
Fax 030-27 59 19 22

www.motogadget.com
info@motogadget.de

Version 4.2

© Copyright by motogadget, Berlin 2007-2011
motoscope and motogadget are registrated trademarks of motogadget GmbH, Berlin, Germany

1 Review of delivery

All products from *motogadget* are thoroughly checked to ensure they are completely fault free when dispatched. Please check the received goods immediately for possible transport damage. If you find any damage or other deficiencies, please contact us immediately.
In this regard we refer to our general terms of business and delivery, which are published under www.*motogadget*.com. Should a return of the received delivery be agreed, please note that we only take back goods in their original packaging. The instrument and its accessories must be returned within the legal period of time and without any traces of use. We do not assume any liability for returns which are insufficiently insured or packed.

2 Exclusion of liability

INSTRUMENT HOUSINGS AND ALL OTHER DELIVERED PARTS MUST NOT BE OPENED OR DISMANTLED. IN CASE OF NON-COMPLIANCE ALL GUARANTEE CLAIMS BECOME INVALID. THE USE OF THE DELIVERED INSTRUMENTS, SENSORS AND ACCESSORY PARTS FOR RACING OR OTHER COMPETITIONS, AS WELL AS ALL USES THAT DO NOT CORRESPOND TO THE RECOMMENDED APPLICATION RENDER ALL GUARANTEE CLAIMS INVALID. MOTOGADGET ACCEPTS NO LIABILITY FOR DIRECT OR INDIRECT DAMAGE OR SUBSEQUENT DAMAGE OF ANY KIND RESULTING FROM THE USE, INSTALLATION OR CONNECTION OF INSTRUMENTS, THE SENSORS OR OTHER DELIVERED EQUIPMENT. THIS EXCLUSION OF LIABILITY PARTICULARLY INCLUDES DAMAGE TO PERSONS, MATERIAL LOSSES AND FINANCIAL DAMAGES. THE USE IN AREAS OF PUBLIC TRAFFIC IS UNDERTAKEN AT THE USER'S OWN RISK.

2.1 Duty of registration

The *motoscope Classic* / *Chronoclassic* / *Speedo h*as a General Operating Permit (ABE) and therefore does not have to be entered into the vehicle documents. The device is identifiable as having a General Operating Permit by a special label with the code "KBA 91262" on the back side of the device.

THE GENERAL OPERATING PERMIT (ABE) IS ONLY VALID WHEN THE DEVICE IS INSTALLED IN TWO- OR THREE-WHEELED VEHICLES AND THE WHEEL CIRCUMFERENCE WHICH HAS BEEN ENTERED INTO SETUP CORRESPONDS TO THE ROLLING TIRE CIRCUMFERENCE GIVEN (TABLE IN APPENDIX).

THE USER IS PERSONALLY RESPONSIBLE FOR CORRECT CALCULATIONS AND ADJUSTMENTS CONCERNING TIRE CIRCUMFERENCE, IMPULSES PER WHEEL ROTATION AND CORRECT INSTALLATION OF THE SPEEDOMETER SENSOR.

3 Technical data and functions

total diameter	85 mm
installation diameter	80 mm
weight without cables	230 gr.
depth without cable gland	34 mm
operating voltage	9 -18 V
current consumption	max. 150 mA
operating temperature	-20 - +80 ℃

3.1 Summary of functions

Function	Measurement range
analogue indicator; depending on type; tachometer or speedometer	0-8/10/14 krpm 0 - 200 km/h or mph
speedometer	0 -350 km/h or mi/h
trip odometer	0 -9999 km or mi
total odometer (adjustable)	0 -250,000 km or mi
trip time	0 - 99:59:59 h/min/s
rev counter (on LCD)	0 -20,000 rpm
rpm threshold LED, int. gear shift light ext.	0 -20,000 rpm
voltage display	9 -18 V
air temperature* (or water temp).	-20 -80 °C/-4 17 6°F
water temperature* (or air temp).	40 -120 °C/104 2 48°F
oil temperature*	40 -160 °C/104 320°F
oil pressure *	0 -8 bar/0 116 psi
time measurement 0 -100 km/h or 0-60 mph	0.0 -- 99.9 seconds
current acceleration	20.0 (-) -- 20.0 m/s2
average speed	0 –350 km/h or mi/h
maximum engine speed	0 -20,000 rpm
maximum positive acceleration	0 -20.0 m/s2
maximum driving speed	0 –350 km/h or mi/h
yellow control LED	flashlight left and right
blue control LED	high beam
green control LED	neutral
gear position indicator	N gear 1 - 6
maximum negative acceleration	0 -- (-20.0) m/s2
red warning LED	various functions
adjustable output for an external gear-shift-light	switching performance max. 1 A

* adjustable min. and max values for temperature and pressure alarm

4 Preparation for installing and connecting the instrument

4.1 Required knowledge and abilities

Installing and connecting the *motoscope classic* and its additional equipment requires no special knowledge or abilities if exact attention is paid to the following installation guide. A reasonable technical understanding should be sufficient. The *motoscope classic* can be installed on a wide range of different vehicles with different specifications and equipment. Therefore, it is not possible to cover all special cases within this description. In cases of doubt, please consult the information supplied on our web site (see Support). If installation of the *motoscope classic* still seems to be too complicated, we recommend installation by a professional expert.

4.2 Required materials for installing and connecting the instrument

The *motoscope classic* is made for a wide range of vehicles. Therefore, additional materials are necessary in order to install the gauge to an individual vehicle. Such materials are:

- mounting bracket for instrument
- mounting bracket for speedometer sensor and push button
- push button
- cables or cable extensions for voltage supply, ignition signal and push button
- assembly materials like cable ties, plug connectors, shrink hose, soldering iron, solder etc.

The use of correct wiring diagrams for the vehicle concerned is also highly recommended.
In order to install the delivered connecting plugs correctly, a suitable crimping tool must be used.

The delivered speedometer sensor equipped with a 1.5m long connecting cable, which makes it possible to mount it the front or rear wheel.

Pushbuttons are not part of the standard scope of delivery. They can be chosen individually from our optional equipment offers. Alternatively the vehicle's headlight flashing switch can be used.

If you don't use a motogadget mounting bracket, you have to made your own bracket by using aluminium with 3mm thickness or stainless steel with 2mm thickness.

5 Quick start

This section provides a guide to quick installation and connection of the *motoscope classic*:

- Prepare all necessary items as mounting bracket for instrument and speed sensor, cable, connectors, screw adhesive and tools for installation
- Provide wiring harness diagram of the vehicle and terminal location plan of the *motoscope classic* (see the appendix of this installation guide)
- Choose suitable positions for installing the *motoscope classic* and the speedometer sensor. Select a point to which the cables will be routed in order to connect the *motoscope classic*, speedometer sensor and the pushbutton to each other. If necessary, cut the *motogadget* mounting bracket for the instrument to fit your vehicle or manufacture your own bracket. Design and make a mounting bracket for the speedometer sensor and attach it to the point you have selected. Subsequently, mount the instrument and all sensors on the vehicle.
- Locate the "switched plus" on the wiring harness of the vehicle by using a voltage indication device (multi-meter). "Switched plus" means current must not flow until electric power is switched "on".
- Remove the battery of your vehicle or remove the cable from the earth battery terminal
- Locate the negative terminal of one ignition coil (primary circuit!) and route a cable from this point to the terminal point that you have chosen in stage. If connect to a CDI ignition system, read the corresponding chapter first.
- Route cables from the voltage supply, speedometer sensor and the push button their chosen terminals. Then connect all cables according to the circuit diagram provided in the appendix to this manual. Connect the cables correctly by using the supplied plug connectors
- Re-connect the vehicle battery and turn the voltage supply "on".
- Navigate to the setup menu (Chapter 12) and adjust all necessary parameters for engine speed, the rev. counter scale, the speedometer and the sensors.
- Start the engine and watch the rev. counter. If it works correctly, ride carefully and slowly for some meters and check the speedometer for plausibility. If you do not detect any problems regarding the electrical or mechanical functioning of the instrument or the vehicle itself continue the test ride.

6 General safety instructions

- Please take care during installation. Damaged parts cannot be returned to *motogadget*.
- Avoid scratching or damaging the surface of the *motoscope classic,* and take care not to damage screw threads.
- For safety reasons, the vehicle battery must be disconnected prior to the installation.
- Take particular care that all delivered parts are fastened securely to your vehicle. This is important for your own and other peoples' safety.
- Make sure that your vehicle is equipped with an interference suppressing ignition system. Use of the motoscope classic with a non-suppressed ignition system will lead to serious damage to the device!

7 Installation of the *motoscope classic*

Instrument fastening screws size is M4. To avoid distortions of the threaded bores, the fastening bolts must be screwed into the instrument housing to a depth of 3 mm. The maximum screw-in length of 5mm must not be exceeded. We recommend the use of additional washers and screw adhesive. The maximum torque applied to the M4 fastening screws must not exceed 8 Nm.

8 Connecting of the motoscope classic and the wiring harness

8.1 Cable routing recommendations

Before routing cables look for suitable cable paths. In general, the cables should be as far away as possible from hot parts of the engine as well as from electrical sources such as spark coils and ignition leads. This avoids malfunctions of the instrument due to strong electromagnetic fields. For functional reasons, an exception is made here for the cable that connects the ignition system itself to the instrument. Look for a suitable place for the respective cables to meet with their plugs and for the plugs to be connected with one another. This is usually in the headlight housing or somewhere below the gas tank. Make sure you take note of the required lengths of cables before cutting them for best fit. It is important here to consider the full lock of the handlebars as well as the front and rear wheel travel! All cables should be routed free of kinks and should not be subject to any tension. In addition, the cables have to be properly isolated, especially in places where mechanical wear can take place. For fastening the cables we recommend cable ties of synthetic material.

8.2 Cable colours, functions, and connections

motoscope classic		
6-pole plug		
Cable colour	**Function**	**Connection**
Red	Voltage supply	Plus (+) switched and **5A fused** voltage
Black	Earth connection	Vehicle earth
Yellow	Signal cable of the rev. counter **This cable must not be connected to the high-tension system of the ignition!**	Leads to the negative pole at one ignition coil. **If connected to a CDI ignition systems please use motogadget ignition signal pickup (article No. 9000001**)
Orange	Input Speedometer signal	Leads to the signal cable of the speedo sensor
Green	Input push button	Leads to the pushbutton that switches to earth
Brown	Output for a gear shift light	Leads to an external gear shift light that switches to earth; max. 1 A switching current
9-pole plug		
Cable colour	**Function**	**Connection**
Violet	Signal wire for air or water temperature	Leads to the signal terminal of the air or water temperature sensor
White/Black	Signal wire for the oil temperature sensor	Leads to the signal terminal of the oil temperature sensor
White	Signal wire for the oil pressure sensor	Leads to the signal terminal of the oil pressure sensor
Blue	Blue warning light/high beam	Leads to the high beam/positive pole
White/Yellow	Red warning light/free assignment possible	Leads to the positive pole of the switching sensor
White/Green	Red warning light/free assignment possible	Leads to the negative pole of the switching sensor
Gray	Green warning light/idle gear	Leads to the idle gear switch
White/Orange	Yellow warning light/indicators	Leads to the positive indicator poles (left or right)
White/Brown	Yellow warning light/indicators	Leads to the negative indicator poles (left or right)
motogadget speedometer sensor		
Black	Polarity does’nt matter	Plus (+) ("switched" voltage of the wiring harness)
Black	Polarity does’nt matter	Motoscope speedometer input

See also in the appendix: Terminal locations of the connecting cables

8.3 Recommendations for using the plug connectors

Route all required cables to the place where the hardware connection of the instrument and its wiring harness is located. Consider the possibility of bringing several strands of wire to one contact before crimping the corresponding pin. It is therefore advisable to carry out all the crimping work at the end of the electrical assembly.
Use a crimping tool suitable for uninsulated cable lugs and crimp the corresponding contact pin to its strand(s) of wire. Then lead the pin from behind into the right plug opening. Pay attention to the

position of the pin's barbs, which must click into the plug connector housing for a correct attachment.

8.4 Battery and voltage supply

The Motoscope require **"switched plus"** for the voltage supply. That means electrical power will flow if ignition lock is switched "on". The *motoscope classic* can operate in a voltage range from 9 V to 18 V DC. Operating the instrument without a battery, for example, using a direct connection to the vehicle's generator is not envisaged or recommended! Please ensure that the polarity of the voltage supply is correct.

Attention!

THE MINIMAL SUPPLY CABLE WIDTH IS 0,75MM². YOU MUST FUSE THE +12V POWER SUPPLY CABLE WITH A 5A FUSE. IF DEVICE WILL BE USE WITHOUT FUSE, DAMAGE AT THE CONNECTING CABLE OR THE MOTOSCOPE ITSELF CAN CAUSE A SHORTCUT AND A CABLE FIRE. THERE MAY BE RISK OF YOUR LIFE! MAKE SURE YOU ARE CAPABLE TO CONNECT THE INSTRUMENT PROPERLY. IF YOU ARE NOT SURE, LET THE SHOP DO THE JOB!

9 Installation and connection of sensors and the pushbutton

9.1 The pushbutton

A pushbutton is needed in order to handle the instrument. **This must be a non-locking switch**. The pushbutton is not part of the standard supply because it is possible to use, e.g. the original head-light-flasher-switch of the vehicle concerned. Different pushbuttons can be ordered from our optional equipment supply.
By pressing the pushbutton will alternate between different screens on the display. Furthermore, all pre-adjustments are carried out with this button.
We recommend fastening the pushbutton onto the handlebar, close to the grip. Connect one of its terminals with the green cable of the *motoscope* and the other one with the earth. Polarity is not relevant (see diagram in chapter 16.1).

9.2 Compatibility with ignition systems

Connect the motoscope yellow engine speed input cable to the negative terminal of one spark coil or to the corresponding terminal of the ignition box [clamp 1].
This cable must not be connected to the high-tension side!
The *motoscope classic* can be used with all conventional ignitions that switch to earth/minus. If it is connected to a CDI ignition system the motogadget ignition pickup must used.
In all cases the ignition system must be interference suppressed.
In order to get a correct indication of the engine speed it is necessary to carry out the correct adjustments within the setup menu (see below).

9.3 Installation and connection of the speedometer sensor

The delivered speedometer sensor is a dry reed contact, which is triggered by a magnetic field. Therefore, both delivered magnets must be attached to a wheel with epoxy glue.
Make sure the distance between one magnet and wheel centre is not larger than 20 cm. Make sure both magnets are aligned exactly opposite. This means they are located at one line which goes trough the wheel centre. If the magnets are not aligned exactly, the displayed speed will jump. Use i.e. break disc mounting screws to have an exactly mounting alignment.
The speedometer sensor has to be attached to the vehicle by using a self made bracket. The sensor tip has to be fastened parallel to the magnet's surface. The gap between the magnet and the sensor must not exceed 3 mm and the sensor must not touch the magnet or any other rotating parts. The sensor bracket has to be made sufficiently stable in order to prevent any distance changes during driving. The maximum mounting torque of the sensor nuts is 2 Nm. For secure mounting use screw adhesive (medium strength).

Subsequently, connect one cable of the speedometer sensor with +12 V (instrument red cable) and the other one with the orange cable of the motoscope. Polarity is not relevant.

If your vehicle provides an original speedometer sensor output of +12V and is compatible with the motoscope connect the orange cable of the *motoscope* directly to this output.

ATTENTION!

IF ONE SPEEDOMETER SENSOR CABLE IS CONNECTED WITH +12V AND THE OTHER OPEN END TOUCHING VEHICLE EARTH ACCIDENTALLY, THE SENSOR WILL BE DESTROYED.

THE MAGNET WILL BE DEFECTIVE, IF IT IS EXPOSED TEMPERATURES HIGHER THAN 100℃ OR 212℉ (I.E. HOT BRAKES).

9.4 The gear shift light output

The gear shift light output of the *motoscope classic* (brown cable) can switch a external gear shift light. The maximum current output is 1 A. The output drains to vehicle earth. If a LED lamp is connected, observe the correct polarity.

9.5 Connection of optional temperature and pressure sensors

Please note: We can guarantee compatibility only with motogadget sensors and transmitters.
Before assembling sensors and thread adapters, check whether the sensor, its thread size, type, lead and length is correct for the vehicle concerned. Ensure that seal faces and wrap connections are clean and that you are aware of the maximum torque that can be applied.
Our sensors usually obtain their negative polarity from the vehicle earth. This means only one cable is needed from the temperature or pressure sensor to the connecting plug of the instrument.

9.6 Connection of the control and warning lamps

Since the four control lamps are LED, it is important to be aware of the polarity of the connection (see diagram).

9.6.1 The yellow indicator LED

The indicator LED has two connections at the 9-pole connecting plug, which is designed for one connecting cord with negative polarity and one connecting cord with positive polarity. It is not important which connection carries which polarity. If an indicator lamp cable is already installed on the vehicle simply connect it to the indicator light terminals in the 9-pole plug. If no such lamp is available, please follow the terminal connection diagram in the appendix.

9.6.2 The blue high beam LED

The input for high beam indicator LED must have positive polarity. In most cases the original lamps installed on the vehicle are also designed in this way. If not, route a direct connection from the high beam connection within the headlight.

9.6.3 The green idle gear LED

The idle gear input must be vehicle earth. If this is not the case, use a direct connection from the idle gear switch that switches to earth.

9.6.4 The red control and warning LED

The red warning LED has different functions. It indicates when the pre-adjusted engine speed limit is exceeded by flashing rapidly. It also indicates when pre-adjusted values for minimum or maximum temperatures and pressures are exceeded with a constant red light.
Additional sensors can also be attached to this terminal (e.g. oil pressure switches). However, a prerequisite for this option is that these sensors can switch between ON and OFF, and that their polarity corresponds to the predefined polarity of the LED!

10 Putting the instrument into the initial operation phase

Once all parts are installed securely and all cables are connected properly, fit the connecting plugs together. Re-install the battery and switch on the ignition or voltage supply. If the electrical connection is correct the indicator will move and make a 'home run' to the indicator stop. The backlight of the LCD will also light up and the start display ("motogadget") will appear. Shortly after this, the device will switch automatically to the speed indication and mileage recorder display. If this doesn't happen, turn off the ignition immediately! In such a case all connection terminals on the instrument and all cables have to be re-checked systematically.
If all indications appear correctly, start the engine and watch the rev.-counter needle. The read-out should change according to the engine speed. If not, the corresponding adjustment must be made in the set-up menu. If everything works correctly up to this point, continue with further settings in the set-up menu.

11 Operation and use of the instrument

11.1 General instructions for operation

All functions of the instrument are activated using only one pushbutton. Compressing the button for different times provides access to different levels of the display and the setup.
The system distinguishes between three compression times, which are represented visually by three horizontal bars in the first line of the LCD.

Stage 1:	**< 1 sec**	one bar is shown on the display. Function: mainly choice of the next option or counting up of a numbers
Stage 2:	**1 sec – 3 sec**	Two bars are shown in the display Function: mainly choice of the next/subordinate level or choice of the next digit. Deletion of stored values
Stage 3:	**> 3 sec**	three bars are shown in the display. Function: mainly choice of the previous/primary level or leaving the menu item. You can find the exact sequences for the set-up menu in the flow chart in the appendix (16.3).

11.2 Analogue indication by pointer

Depending on the instrument type engine speed or vehicle speed is displayed by pointer. The speedometer dial require at parameter **MOTOR** the settings **Damp** = 9 and **SCL** = 10k.

The engine speed version is available for ranges of 0 – 8000 rpm, 0 – 10,000 rpm and 0 – 14,000 rpm, which must be predefined in the setup. Furthermore the parameter Input Engine **InpE** is depending on vehicle ignition and must pre adjusted.

If the pointer is oscillating too much, another engine speed input filter (**InpF**) and or another damping factor (**DAMP**) have to be selected in the setup.

If the vehicle power is switches off while the engine is running the needle will stop on its last position. This is normal for stepper motor controlled instruments and not a malfunction. The pointer will calibrate during power on the instrument.

11.2.1 Engine speed limit indication by the red warning LED

The ultra bright red warning LED (triangle symbol on the right) flashes when a pre-adjusted engine speed value is reached (see sub-menu "flash" in the set-up). The pre-adjusted engine speed limit also switches the output for the external gear-shift light. The flashing light can also be altered to a constantly glowing light (see FIM in set-up).

11.3 Indications on the LC display

11.3.1 Choosing indications on the LC display

The LC display of the *motoscope classic* has two lines. Values in the first line can not be changed. Other values can be called up in the second line by pushing the menu push-button shortly. The range of values is determined by preselection (**SCREEN**) in the setup menu.

11.3.2 Speed display (km/h or mph)

The instrument type with engine speed dial will display the current vehicle speed permanently in the top line of the LC display. The measurement range is between 0 and 350 km/h or mph. The unit of measurement can be selected in the setup menu (see Param / SEL).

The instrument type with speedometer dial will display the speed by pointer. If the speed is exceeding 190 km/h or mph the current speed will be displayed in the first line of LCD instead trip odometer. If the current speed is lower than 180km/h the trip odometer will be displayed again.

11.3.3 Trip counter (km or mi)

The trip odometer function shows the current day mileage in the second line of the LCD. The distance covered is indicated by a value between 0 and 999.99 km or mi. After reaching the latter value the counter starts again at 0 mi or km. The highest values are permanently stored. To ensure accuracy, make sure the starting value is set at the beginning of a ride (compress the pushbutton until two bars appear in the display, then release it).

11.3.4 Odometer (km or Mi)

The total odometer shows the total distance covered since the instrument was put into operation, provided that no other starting value has been entered. The reading can be shown in kilometres or miles. The value remains stored even if the entire board is switched OFF. The total odometer can be reset to 0 within the special sub-category 'RESET/ALL' in the set-up menu. If you wish you can of course choose starting value other than zero – (see set-up menu ODO2set).

11.3.5 Trip time (hh:mm:ss)

The time counter for the current ride (stop-watch) measures the actual riding time because counting stops when the vehicle stands idle. The riding time is recorded to the precise second up to 99 hours, 59 minutes and 59 seconds. The recorded time also remains stored when the board tension is switched OFF. This value can be reset any time.

11.3.6 Vehicle system voltage (V)

This value shows the current vehicle system voltage in a range between 9 V and 18 V.

11.3.7 Temperature indication T1; optional air (air) or water temperature (h2o)

This indication shows the current air or water temperature as soon as the values are within the measurement range of the sensors. Outside the measurement range the display shows " -- ".
In the set-up menu it is possible to define a minimum and maximum value for T1 within the measurement range of the sensor (see minT and maxT). Once the minT and maxT have been defined for T1 and the temperature is within the sensor range, the red warning LED will flash and a report will be displayed on the LCD until the defined minimum value has been reached or when the maximum temperature has been exceeded.
Confirming the warnings by pressing the button wiöll cause the flashing to stop and the LCD report to disappear. Temperature values can be defined in degrees ℃ or ℉ (see set-up).

11.3.8 Temperature indication T2; oil temperature (oil)

This value shows the current oil temperature as soon as it is within the measurement range of the sensor. The same applies as for T1 regarding minimum and maximum values and units of measurement.

11.3.9 Oil pressure indication (bar or psi)

This value shows the current oil pressure as soon as it is within the measurement range of the sensor. For minimum and maximum values the same is valid as for T1 (minP, maxP). Pressure values can be shown in units of bar or psi (see set-up).

11.3.10 Current acceleration (m/s^2)

This value shows the current acceleration in a range of -20 m/s^2 to +20 m/s^2. Negative values are generated during braking. All maximum values get stored automatically (see below).

11.3.11 Engine speed indication on the LCD (RPM)

This value shows the current engine speed as a numerical value on the LCD display in a range between 0 and 20,000 rpm. This indication also requires vehicle-specific pre-settings in the set-up menu.

11.3.12 Speed average (km/h or mph)

This value shows the average speed of all rides since the value was reset to zero. This indication has a range between 0 mph and 350 mph (or km/h).

11.3.13 Acceleration time from 0-100 km/h (sec)

This function measures the time in seconds for an acceleration from 0 to 100 km/h (or mph). In order to carry out that measurement the pushbutton has to be pressed until a small square appears to the left of the value 0.0 s. The instrument is now ready to measure acceleration. Measurement begins automatically. The small square only appears when the current speed is 0 km/h (or mph). If the display shows a measurement, this has to be deleted before the new measurement can be carried out (press the push button until two bars appear).

11.3.14 Maximum driving speed memory (km/h or mph)

This function stores and shows the top speed reached until it is reset to 0.

11.3.15 Maximum engine speed memory (RPM)

This function stores and shows the achieved maximum engine speed until it is reset to 0.

11.3.16 Maximum positive acceleration memory (m/s^2)

This function stores and shows the achieved maximum positive acceleration until is reset to 0.

11.3.17 Maximum negative acceleration memory (m/s^2)

This function stores and shows the achieved maximum negative acceleration until it is reset to 0.

11.3.18 Gear position indicator

This function shows the gear position engaged currently as a number from 1 – 6. The gear position is shown on the LCD to the left of the driving speed indication. A correct display of the gear position requires prior execution of a "learning" function. This enables the device to "learn" the gear transmission ratios of the respective vehicle. The gear position indication is a mathematical function and is calculated using ratios of the driving speed and engine speed. This means that no other sensors or connections for measurements are required. If an idle gear switch is attached to the instrument, the display indicates if the idle gear is engaged. In this case the display shows an N and the control LED flashes. Further details regarding the "learning" function can be found in the corresponding chapter in the set-up menu (set-up→ sub-point PARAM → sub-point GearTCH)

11.4 Erase measurements

Certain measurements, such as trip odometer values, trip times, the average driving speed, as well as the acceleration values and all other maximum values can be reset to 0. All these resets are carried out by selecting the corresponding display with the menu pushbutton and subsequently by pushing and holding the button until 2 bars appear in the display (holding time > 1 and < 3 sec.).

12 The Setup menu

All operations, adjustments, and calibrations of the *motoscope classic* are carried out using a single pushbutton. For this reason the internal design of the set-up is laid out in logical "levels." The selection of and access to these levels as well as to their sub-points is controlled using different button compression times. The different times are represented visually by 1, 2 or 3 horizontal bars on the LCD. This optical control ensures an easy navigation as well as the correct input of data.

In order to enter the set-up menu the pushbutton has to be engaged until all 3 bars appear on the LCD. After releasing the pushbutton **SETUP MENUE** appears in the display. Shortly after this, the first sub-point of the set-up (**SCREEN)** appears in the first line of the LCD. The second line already shows the first sub-point of SCREEN, which is "**ODO1 on**". As long as the small square is shown in the first line (left of SCREEN) it is possible to retrieve the other sub-points such as **LCD**, **MOTOR**, **PARAM**, **SENSOR** or **RESET**. These sub-points are called up by tapping the pushbutton for less then 1 sec. (one bar must be displayed). In order to enter one of the above-mentioned sub-levels (e.g. **ODO1 on**) the pushbutton must be pressed until 2 bars appear on the LCD. At the same time the small square jumps to the second line of the LCD, in order to indicate that the chosen sub-point can be altered within this level. In order to leave the set-up, the pushbutton must be pressed until all 3 bars appear in the LCD (> 3 sec.). The pushbutton should then be released. The diagram in section 16.3 provides more information on how to select and access the different levels, sub-points and adjustments.

12.1 Sub-point SCREEN (adjusting the display)

This sub-point enables the user to select which measurements and functions are displayed on the LCD. Pressing the pushbutton > 1 sec. (until 2 bars appear) enables the user to access the sub-menu SCREEN and to move from function to function within this menu. Press the push button again for > 1 sec. (2 bars) results in an arrow appearing to the left of the selected function. Now the function can be set 'ON' or 'OFF' by pressing the push button < 1 sec. (1 bar). As default value all functions are set to 'ON'. The following functions can be altered:

ODO1 (trip odometer)
ODO2 (total odometer)
Time (trip time)
Volt (board voltage)
TMP1 (temperature 1)
TMP2 (temperature 2)
PRES (pressure)
ACCE (acceleration)
RPM (engine speed)
AVG (average driving speed)
0100 (time measurement 0 - 100 km/h)
MAXS (maximum driving speed)
MAXR (maximum engine speed)
MAXA (maximum positive acceleration)
MINA (maximum negative acceleration)

In order to leave the setting mode of the function, the pushbutton must be pressed until 3 bars appear on the LCD. This takes the instrument back to the set-up menu. To return to the sub-point SCREEN, press the pushbutton again until all 3 bars appear and then let it go.

12.2 Sub-point LCD (adjusting the display)

The navigation to this sub-point is explained by the diagram in the appendix (section 16.3).
Within this sub-point the contrast (**CNTR**) of the LCD is adjusted in steps of 1 to 7. **Attention!** Step 7 is followed by step 0, which means that the display disappeares! If this happens simply go on pushing the button until the signs appear again in the display.

12.3 Sub-point MOTOR (adjusting the stepper motor)

The navigation to this sub-point is explained by the diagram in the appendix (section 16.3).
Within this sub-point the electronic attenuation of the stepper motor/needle is adjusted (**DAMP**) in steps of 1 to 9. Step 9 provides the highest degree of attenuation to counter needle fluctuations. However, the speed of the needle can also decrease at high attenuation levels and it is important to find a good compromise. ATTENTION: this value may also influence adjustments in **InpF** (see below).
The **MOTOR** menu point also allows the user to select the scale of the rev counter. The following scales can be selected under **SCL**: **8 K**, **10 K** or **14 k**.

12.4 Sub-point PARAM (vehicle specific adjustments)

The navigation to this sub-point is explained by the diagram in the appendix (section 16.3). Under this sub-point the vehicle-specific values are entered and the version of the device software is shown.

The value **WHLSIZE** represents the circumference of the wheel (**in mm!**) on which the proximity switch is fitted (e.g. 1830 mm = 120/60 ZR17, 1870 mm = 120/65 ZR17, 1910 mm = 120/70 ZR17; it is important to check these values yourself since they can differ depending on the tyre manufacturer!)
ImpWHL represents the number of impulses transmitted to the proximity switch per wheel turn. For example, if the sensor is aimed at the brake disc screws, the number to be entered corresponds to the number of screws (e.g. 6).
The values entered in WHLSIZE and ImpWHL are used to calculate the driving speed and many other measurements. It is therefore important to take the necessary care when entering these data and to check the speedometer readings for plausibility before taking the vehicle out onto the road! If incorrect data, calculated measurements will also be incorrectl. Another option of defining calculation factors for the driving speed is offered by the function **TTeach** (speedometer teach) within the sub-point **SENSOR** (see 12.5). However, directly entering values via WHLSIZE and ImpWHL is preferable, since this method is more precise.

The function **ImpENG** enables the user to calibrate the rev. counter, which involves entering the number of ignition impulses generated per crankshaft turn. This input value can depend on the number of cylinders, the engine construction and/or the ignition. If you are uncertain regarding this value, you should consult an expert or your dealer/manufacturer. If the vehicle is still equipped with its original rev. counter, this can be used as a reference. If the entered factor is incorrect the engine speed that is displayed is usually either half or double the true value. Possible values range from 0.25 to 9 impulses.
Under **SEL** the user can select either kilometres or miles as the unit to measures distances and driving speed. The value **InpF** offer a choice of four filters - A, B, C or D – for the measurement of engine speed. The pre-adjusted filter A works for almost all ignitions. If the rev. counter needle nevertheless jitters strongly the other filters should be tried. Attention! This adjustment may also influence the attenuation setting under **DAMP**.

The sub-point **GearTch** enables you to access the "learning" function for the gear position indication and the necessary "learning" countdown. Call up the set-up menu with the pushbutton and navigate under **PARAM** to the sub-point **GearTch** and activate by pressing until 2 horizontal bars appear on the LCD (one arrow and READY will appear in the display). Push the button again (< 1 sec.) **G1** will appear. Pressing the button again starts the "learning" function for the first gear but not yet the necessary countdown (G1 is shown in the LCD and two arrows appear to the right). After the device has "learned" the first gear repeat the process for all other gears (maximum up to **G6**).

Starting the teach countdown: As long as the 2 arrows are visible on the LCD the time for activating the countdown can be chosen by the user, because it has to be activated during a calibration ride. A further short button press starts the countdown from 10 seconds to 0. **Important**! At this time the indicated gear already must be engaged and must not be shifted! Also the clutch must not be engaged!
During countdown (calibration) the driving and engine speeds must be changed (by varying the degree of throttle) and the front brake should be engaged until about ¼ of the max. engine speed is reached (without engaging the clutch!). This allows for tolerances to be ascertained within the gear transmission ratio (e.g. load change reactions, slip). Rear wheel spin and front wheel blocking must be avoided during the calibration as this hampers measurement and the process will have to be started again. Should this be necessary, push and hold the menu button until 3 horizontal bars appear in the LCD. This will cause the device to return to the starting display from where the learning process can be started again. Repeat the accelerating and braking process during the countdown and drive continuously during the last few seconds. Stop driving and navigate to the next gear in the display and prepare it for the next countdown as described above. Then continue the calibration ride and start the countdown **only when** the respective driving gear has been engaged. Repeat this procedure until all gears are calibrated. If less than 6 gears are available and the instrument offers you the option of calibrating a non-existent gear, the process can be stopped by holding the button until 3 bars appear.
The "learning" procedures for different gears can be carried out at different times. In all cases activate **GearTch**, select the respective gear and prepare its calibration as described above. There is no time limit for starting the countdown. The countdown should therefore not be activated until the driving situation makes it expedient to record the data for this gear.
After completing the procedure leave the setup menu and switch the instrument off an on again. Check the display while riding to see if the calibration is correct. In rare cases, gear indication may incorrect in threshold situations.
Since calibration requires a fair degree of concentration, we recommend that you do not conduct this procedure in public traffic.

The thresholds for engine speed limits ('red area') can be set using the function **FLASH**. This setting can also be used to control the activation of an external gear shift light. This function can be used to indicate optimal gear shift revolution speeds or to indicate to the driver when the recommended maximum engine speed has been reached.
In order to select the individual digits representing the desired threshold engage the pushbutton for a short time (1 bar appears). In order to go to the next digit push the button until 2 bars appear on the LCD. To leave the level operate the pushbutton, as always, until 3 bars appear.
Within the next sub-point **FlM** you can select whether the warning LED or the external gear shift light flashes on and off (**Alt**) or glows constantly (**Lev**).
The final **PARAM** sub-point shows the number of the software version (**V**) being used (e.g. V1.06). This cannot be adjusted by the customer but can be important for support enquiries.

12.5 The sub-point SENSOR (adjusting the sensors)

The navigation to this sub-point is explained by the diagram in the appendix (section 16.3). This sub-point allows you to select which sensors are to be used.
Under **T1** you can choose whether air or water temperature is to be measured. This presupposes of course that a corresponding sensor is available. Under **Temp** the temperature unit can be defined, either as degrees Celsius [C°] or Fahrenheit [°F]. Under **PRS** the pressure units can be adjusted to be shown in **bar** or **psi**.
Under the sub-point **H2OmaxT** the upper threshold is entered for the water temperature.
Under the sub-point **H2OminT** the lower threshold is entered for the water temperature.
Under the sub-point **OILmaxT** the upper threshold is entered for the oil temperature.
Under the sub-point **OILminT** the lower threshold is entered for the oil temperature.
Under the sub-point **OILmaxP** the upper threshold is entered for the oil pressure.
Under the sub-point **OILminP** the lower threshold is entered for the oil pressure.
Furthermore, the sub-point **TTeach** (speedometer teach) affords an automatic calibration of the speedometer. This can be helpful when using OEM driving speed sensors. In order to use this

function the vehicle must be driven as constantly as possible at exactly 50 km/h while a 10 second countdown elapses. In order to ensure that speed is constant the vehicle should be driven behind another vehicle that is also being driven at exactly 50 km/h. Such a procedure is undertaken at the driver's own risk! After the countdown has elapsed the device stores the calculated values and returns to the standard display. Following calibration driving speed measurement should be checked for accuracy, and if necessary the procedure should be repeated. We recommend this method only as an aid for the use of vehicle-original sensors. If possible, direct entry of data under **PARAM** is preferable. If the instrument was calibrated by **TTeach**, a star will be displayed in **WHLSIZE** menu**.**

12.6 The sub-point RESET

The navigation to this sub-point is explained by the diagram in the appendix (section 16.3).
Under **RESET** all or individually selected values can be reset to 0 or to their default values.
Attention! If '**yes**' is activated under the point **ALL** (RESET→ALL→yes) all adjustments and entered data will be deleted, including the total odometer readings and the default values will be restored! If '**yes**' is activated under the point **DEF** the default values will be restored but the total odometer reading will remain saved.
All adjustments (or restored default values) only become effective after leaving the set-up.
The function **ODO2Set** allows you to adjust of the total odometer reading.
If this function is selected and activated (see diagram in section 16.3) a six-digit number appears, which can be adjusted to the desired value by using the pushbutton. In order to scroll through the digits, engage the pushbutton for a short time until one bar appears. To move to the next number position press the button has to be hold until 2 bars appear. To leave the sub-point, press the button until 3 bars appear.

13 Cleaning of the instrument

Use only gentle, non-corrosive detergents and a soft cloth for cleaning the *motoscope classic*. Do not clean the instrument with a steam cleaner and avoid using anything that might scratch the aluminium housing and the dial face cover. The use of silicon spray from time to time keeps the colour of the anodised housing fresh and protects the instrument from dirt.

14 Safety instructions

The *motoscope classic* provides a lot of information at one time. Users consequently require a certain "training" period in order to learn to recognise all the given information quickly and correctly. Please take this into account, particularly during your first rides with the *motoscope classic.*

The user is responsible for the correct installation of the speedometer sensor as the input of all calculation factors for speed determination, such as the wheel circumference and the triggered impulses per wheel revolution. The user is also responsible for mounting the instrument, the sensors, and all other accessory parts to the vehicle correctly and securely.

DO NOT OPERATE THE INSTRUMENT WHILE DRIVING! THIS MAY CAUSE LOOSING CONTROL OVER THE VEHICLE AND WILL RESULT TO A ACCIDENT WITH SERIOUS INJURIES OR DEATH.

15 Troubleshooting

15.1 After the installation and during the initial operating phase

- switch the vehicle voltage “ON” and “OFF” for some seconds
- check functions with the motor on and off
- vehicle battery should be charged sufficiently and the vehicle system voltage must be higher than 9 V.
- check all cables, connections, and sensors for correct installation and good contacts.
- check all cables, connections, and sensors for correct polarities and/or short-circuits.
- make sure that the vehicle has a interference suppressed ignition system. Running the motoscope with an ignition system without interference suppressed may damage the device
- If the above mentioned attempts do not help, switch OFF the ignition/voltage supply and separate the sensor cable, the push button cable, and the ignition impulse cable from the device. Then connect the voltage supply only and check that the polarity is correct.
- In case of wrong settings set all data to their default values (see RESET→DEF, section 12.6). If you still have no success try resetting all values (see RESET→ALL, section 12.6)

15.2 Return and complains

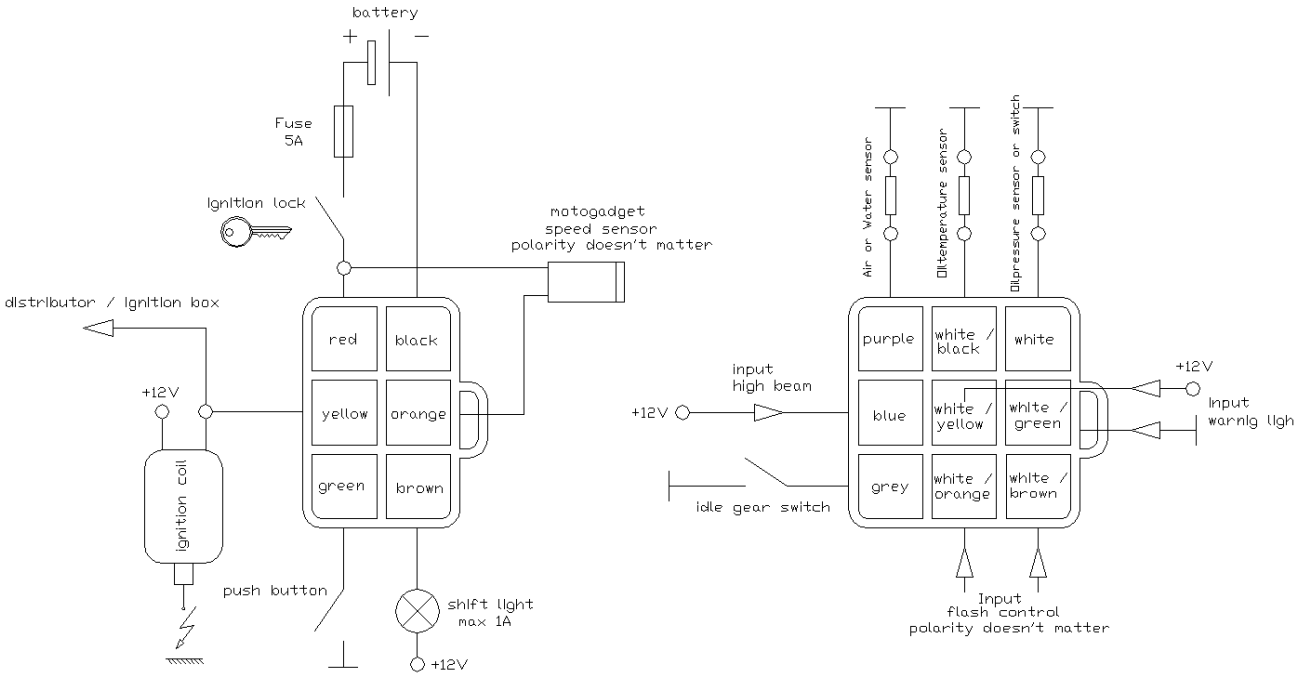
If you like to return a defective instrument for repair or change please observes following issues:

- Make sure again there is no connection failure. In doubt use a different voltage source to recheck.
- Not prepaid shipments will be rejected.
- The Shipment to motogadget is carried out by your own risk. You are responsible for a sufficient insurance.
- Make sure the package is adequate.
- Attach the invoice and a failure description with Motorcycle model and year.
- If you are located outside the EU, you have to declare “repair item” and value 1 Euro in shipment custom declaration.

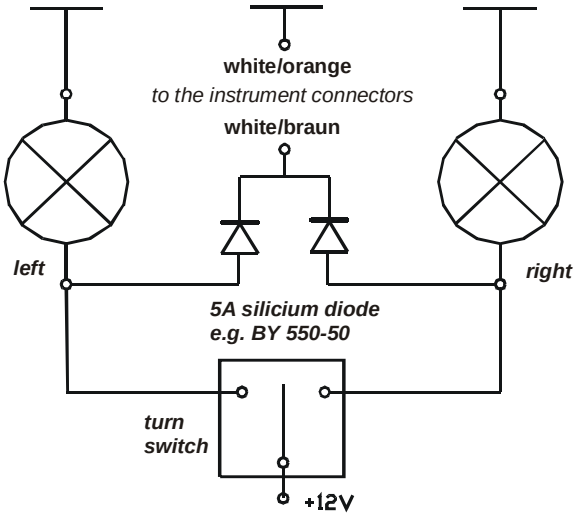
The *motogadget* team wishes you pleasant and safe riding, and lots of fun with your new *motoscope*.

16 Appendix

16.1 Terminal locations of the instrument connectors



16.2 Connection scheme to merge two turn signal control lamps



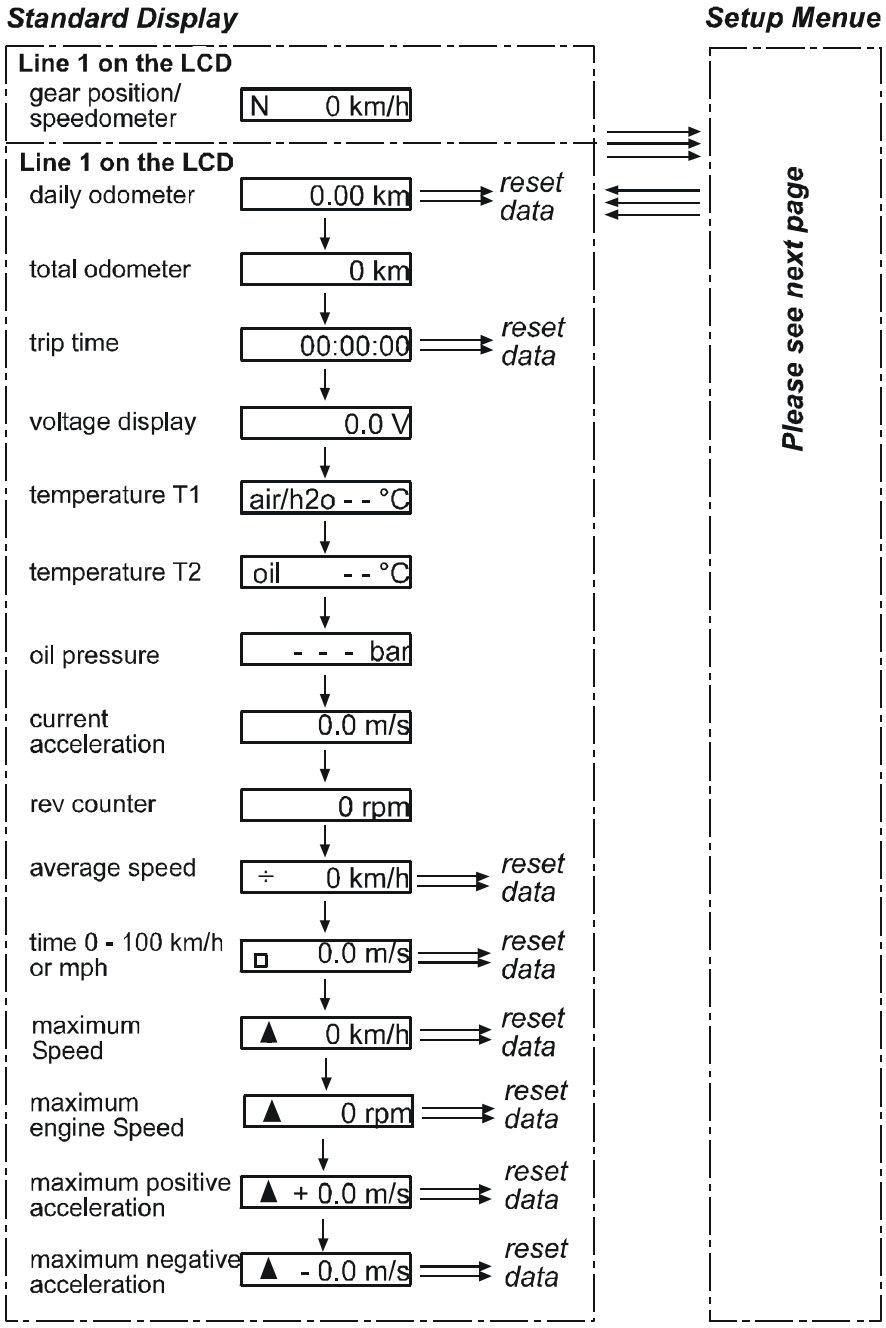
16.3 General overview of operations using the menu pushbutton

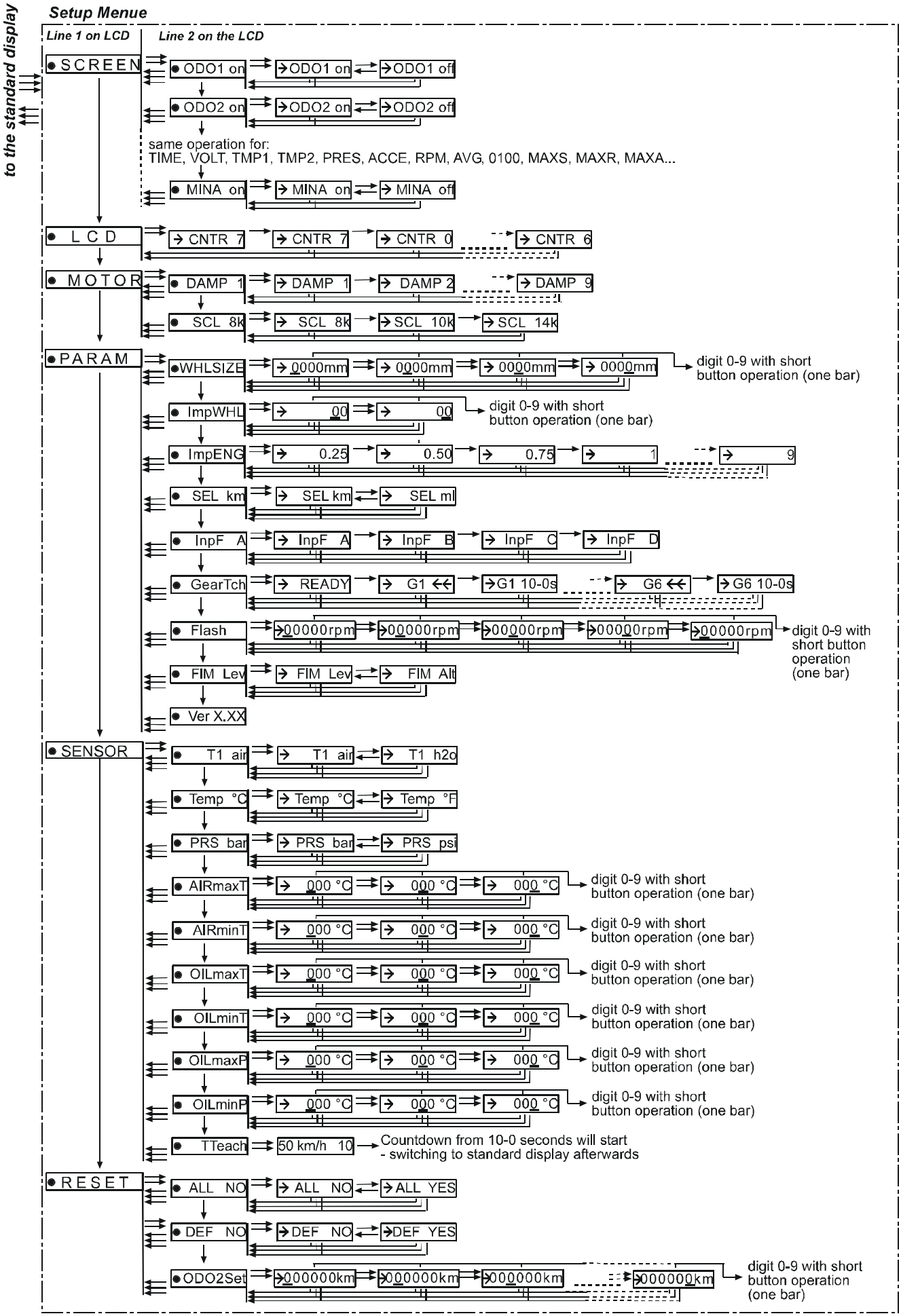
Signs and symbols:

→ = *1 bar on LCD*

⟹ = *2 bars on LCD*

⟹ = *3 bars on LCD*




to the standard display
Setup Menue
Line 1 on LCD
Line 2 on the LCD
SCREEN
ODO1 on
ODO1 on
ODO1 off
ODO2 on
ODO2 on
ODO2 off
same operation for:
TIME, VOLT, TMP1, TMP2, PRES, ACCE, RPM, AVG, 0100, MAXS, MAXR, MAXA...
MINA on
MINA on
MINA off
LCD
CNTR 7
CNTR 7
CNTR 0
CNTR 6
MOTOR
DAMP 1
DAMP 1
DAMP 2
DAMP 9
SCL 8k
SCL 8k
SCL 10k
SCL 14k
PARAM
WHLSIZE
0000mm
0000mm
0000mm
0000mm
digit 0-9 with short button operation (one bar)
ImpWHL
00
00
digit 0-9 with short button operation (one bar)
ImpENG
0.25
0.50
0.75
1
9
SEL km
SEL km
SEL ml
InpF A
InpF A
InpF B
InpF C
InpF D
GearTch
READY
G1
G1 10-0s
G6
G6 10-0s
Flash
00000rpm
00000rpm
00000rpm
00000rpm
00000rpm
digit 0-9 with short button operation (one bar)
FIM Lev
FIM Lev
FIM Alt
Ver X.XX
SENSOR
T1 air
T1 air
T1 h2o
Temp °C
Temp °C
Temp °F
PRS bar
PRS bar
PRS psi
AIRmaxT
000 °C
000 °C
000 °C
digit 0-9 with short button operation (one bar)
AIRminT
000 °C
000 °C
000 °C
digit 0-9 with short button operation (one bar)
OILmaxT
000 °C
000 °C
000 °C
digit 0-9 with short button operation (one bar)
OILminT
000 °C
000 °C
000 °C
digit 0-9 with short button operation (one bar)
OILmaxP
000 °C
000 °C
000 °C
digit 0-9 with short button operation (one bar)
OILminP
000 °C
000 °C
000 °C
digit 0-9 with short button operation (one bar)
TTeach
50 km/h 10
Countdown from 10-0 seconds will start
- switching to standard display afterwards
RESET
ALL NO
ALL NO
ALL YES
DEF NO
DEF NO
DEF YES
ODO2Set
000000km
000000km
000000km
000000km
digit 0-9 with short button operation (one bar)

16.4 Table of tire circumferences

Zoll Inch	Reifendimension Tyre Size	Abrollumfang für ABE / Gutachten
16	100/90 16	1770
16	110/90 16	1824
16	120/80 16	1806
16	120/90 16	1878
16	130/70 16	1776
16	130/90 16	1933
16	150/80 16	1951
16	140/90 16	1987
16	150/80 16	1951
16	160/80 16	1999
16	180/60 16	1878
16	180/70 16	1987
16	200/60 16	1924
16	240/50 16	1951
17	100/80 17	1788
17	110/70 17 54 H TL	1770
17	110/70 V 17 V 250(54V) TL	1770
17	110/70 V 17 V250 (54V) TL	1770
17	110/70 ZR 17 54 W TL	1770
17	110/80 - 17 57 H TL	1836
17	110/80 -17 57 H TL	1836
17	120/60 ZR 17 (55W) TL	1740
17	120/70 - 17 58 V TL	1812
17	120/70 B 17 M/C 58 V TL	1812
17	120/70 ZR 17 (58W) TL	1812
17	120/80 - 17 61 H	1884
17	120/80 - 17 M/C 67H reinf.	1884
17	120/80 -17 M/C 67H reinf. TL	1884
17	120/90 - 17 rear	1957
17	130/60 ZR 17 59W TL	1776
17	130/70 17 62 H TL	1854
17	130/70 ZR 17 62W TL	1854
17	130/80 - 17 65 H TL	1933
17	130/80 - 17 65 H TL	1933
17	130/80 - 17 65 S	1933
17	140/80 - 17 69 H	1981
17	140/80 - B 17 M/C 69 H TL	1981
17	140/80 B 17 M/C 69H TL	1981
17	150/60 ZR 17 66W TL	1848
17	150/70 17 69 H TL	1939
17	150/70 17 69 V TL	1939
17	150/70 R 17 69 H TL	1939
17	150/70 ZR 17 (69W) TL	1939
17	150/80 17	2029
17	160/60 VB 17 (69V) TL	1884
17	160/60 ZR 17 (69W) TL	1884
17	160/70 B 17 73 V TL	1884
17	160/70 ZR 17 73 W TL	1884
17	170/60 VB 17(72V) TL	1921
17	170/60 ZR 17 (72W) TL	1921
17	180/55 ZR 17 (73W) TL	1903
17	180/55 ZR 17 V300 (73W) TL	1903
17	190/50 ZR 17 (73W)TL	1878
17	200/50 ZR 17 (75W) TL	1919

Zoll Inch	Reifendimension Tyre Size	Abrollumfang für ABE / Gutachten
18	90/90 - 18 51 H TL	1869
18	100/90 - 18 56 H	1924
18	100/90 - 18 56 H TL	1924
18	100/90 - 18 61 H TL	1924
18	100/90 - 18 M/C 61 H TL	1924
18	110/80 - 18 58 H TL	1912
18	110/80 - 18 58 H TL	1912
18	110/80 - 18 M/C 58 S	1912
18	110/90 18	1978
18	110/100 18	2099
18	120/70 ZR 18 59W TL	1888
18	120/80 - 18 62 H TL	1960
18	120/80 - 18 62 S	1960
18	120/90 - 18 65 H TT/TL	2032
18	120/90 - 18 M/C 61 H TL	2032
18	130/70 18 63 H TL	1930
18	130/70 B 18 69 H reinf. TL	1930
18	130/80 18	2008
18	140/80 - 18 70 R	2057
18	150/70 VB 18 TL	2014
18	160/60 VB 18 V280 (70V) TL	1960
18	160/60 ZR 18 (70W) TL	1960
18	170/60 VB 18 V280 (73V) TL	1996
18	170/60 ZR 18 (73W) TL	1996
18	180/55 18	1981
18	200/50 18	1951
18	240/40 18	1960
18	3.00 - 18 47 S	1894
18	3.00 - 18 52 M reinf.	1894
18	3.00 - 18 52 P reinf.	1894
18	3.25 - 18 52 H	1930
18	3.25 - 18 52 S	1930
18	3.25 - 18 59 P reinf.	1930
18	3.25 - 18 59 P reinf.	1930
18	3.50 - 18 56 S	1960
18	3.50 - 18 62 P reinf.	1960
18	3.50 - 18 62 P reinf.	1960
19	100/90 - 19 57 H TT/TL	2002
19	110/90 - 19 62 H TL	2057
19	110/90 19 57 S TL	2057
19	3.00 - 19 49 S	1972
19	3.00 - 19 54 P reinf.	1972
19	3.25 - 19 54 H TT/TL	2008
19	3.25 - 19 54 P	2008
19	3.25 - 19 54 S TT/TL	2008
19	3.25 - 19 54 V TL	2008
19	3.50 - 19 57 H TT/TL	2038
19	3.50 - 19 57 P	2038
19	3.50 - 19 57 S TL	2038
19	3.50 - 19 57 V TT/TL	2038
21	80/90 - 21 48 H	2045
21	80/90 - 21 54 H TL	2045
21	90/90 - 21 54 S	2099