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1. Short description of device

Trip Routing Computer (TC) is intellectual complex system of collecting, storing and imaging information about different parameters of car. TC setups instead of nominal clock of your car at the same time saving factory interior of saloon but installation in separate framing is also possible. The main displayed characteristics are:

- momentary fuel consumption at 100 km of run (L/100 km);
- momentary fuel consumption in relation to current engine RPM speed (L/h);
- averaged value of fuel consumption (L/100 km);
- value of fuel amount in tank (Liters);
- forecasts of run at minimum fuel (km);
- traveling speed of car (km/h);
- averaged traveling speed at the time of trip (km/h);
- odometer (km);
- fuel consumption meter (L);
- current time and date (HH:MM:SS, DD:Mon:YY);
- car-system voltage (Volts);
- temperature inside saloon and outside that is external (degree of centigrade);
- cost of fuel consumed at trip (E / $);
- averaged cost of run (E / $) at 100 km under given cost of fuel.

Except this TC:

- works with any engine electronic control unit (ECU) — exceptions are diesel engines;
- can be installed on any petrol injector car — exceptions are some kinds of monoinjection;
- very easy operating — the device is operated only by three buttons, one of which is "hot";
- device is displaying prompts concerning possible further actions in news ticker at any working mode;
- automatically switches indicator's light intensity from daily to nightly (**dimmer function**) — i.e. The user can setup indicator's intensity for more convenient information perceiving by himself;
- has indicator's intensity adjustment function;
- produces sound signal when rotation or driving speed is exceeded — for safety ride (1+2 control points) and support of get-home engine operation;
- collects detailed statistics (logbook) for 80 trips including: date and time of trip beginning, duration of trip, traveling time, fuel consumption at trip, run at trip, average fuel consumption at 100 km of run at trip, average and maximal speed at trip and also cost of fuel consumed at trip; all trips are conveniently grouped by dates and by order on this date, herewith, you can review summary information for 24-hour period;
- has high-accuracy measurement of car dynamics to given speed mode and also car dynamics in given range of speed and run time on definite distance;
- has different modes of correction: by run, fuel consumption, by float sensor of petrol tank, clock, calendar - for installing TC to concrete car.

6. Warranty certificate

*This warranty is given by manufacturer in addition to constitutional and other rights of users and do not limit them by no means.

"SERG Electronics" expresses you big appreciation for your choice. We have made everything possible to satisfy your needs with this product and the quality corresponds to the highest standards of quality. In order to avoid confusions, we are strongly asking you to read attentively instruction on use of product, warranty obligations conditions and free service maintenance*, and also check correctness of warranty certificate filling. The warranty certificate is valid only at presence of correctly and accurately specified: Trip Computer model, serial number of product, purchase date, setup date, accurate seals of selling organization, customer signature. Serial number and product model should correspond to the specified in warranty certificate. If these conditions are violated and also in a case when the data specified in warranty certificate are changed, erased or copied, the certificate is not valid. We are giving this guarantee on purchased Trip Computer for a period of 36 months from the moment of product setup in the car only for new cars served on original service stations.

In all other cases we are giving this guarantee on purchased Trip Computer for a period of 12 months from the moment of product purchase.

This warranty certificate of "SERG Electronics" confirms acceptance of obligations on satisfaction of requirements of the customers established by the current legislation about protection of the rights of consumers, in case of detection of lacks of a product on itself.

"SERG Electronics" reserves to itself the rights to refuse as in warranty so in a free service of a product in case of non-observance of stated below conditions. All conditions of warranty certificates and free service maintenance are valid within the limits of the legislation on protection of consumer's rights and regulated by the country legislation in which territory they are given.

This warranty is valid for territories of any country with the following conditions:

1. The product should be used according to the rules stated in the operation manual.
2. Warranty service performs by uniform service "SERG Electronics". You can receive more detailed information on our Internet site that has http://www.tripcomputer.ru address.

The manufacturer does not incur warranty obligations and does not make free service of a product in following cases:

a) in case of rules and service conditions, installation of the product violation, stated in operating instruction and setup instruction;
b) if the product has traces of attempts of not qualified repair;
c) if defect is caused by change of construction or product scheme, not provided by the Manufacturer;
d) if defect is caused by action of invincible forces, accidents, deliberate or careless actions of the customer or the third parties;
e) if is found out that damages caused by hit of extraneous subjects, substances, liquids, insects in a product;

Warranty obligations and free service do not extend on following lacks of a product:

a) mechanical damages including furnish and case details, arisen after transfer of the goods to the customer;
b) malfunction of management buttons and/or the product keyboard, arisen because of exploitation of this product;
c) damages caused by mismatch to standards of power lines parameters and other similar external factors;

Setting and setup (assemblage, connection, etc.) of the product described in the documentation that is applied to it, can be executed both by user and experts of the majority of the original service stations corresponding cars brands and selling companies (on a paid basis). However, the person (organization) which has installed a product bears responsibility for correctness and quality of installation. We ask you to pay attention to the importance of correct installation of a product, both for its reliable work and for reception of warranty and free service. Demand to bring all necessary data on installation of your product in warranty certificate from installation expert.

"SERG Electronics" declines all responsibility for possible harm expressly or by implication put by "SERG Electronics" production to people, pets or property in case it has resulted from non-observance of rules and service conditions, product installation; deliberate or careless actions of customer or the third parties.

* Here and below in the text of Warranty certificate, service maintenance is understood as elimination of lacks (defects) of the product which have arisen because of the Manufacturer.

Model:		Purchase date:	
Serial number:		Setup date:	
Name, seal and signature of selling organization or original service station representative		**Full name and address of customer:**	

5. Technical characteristics

Parameter	Unit of measurement	Value
Supply voltage	V	12 (8,5...16)
operating current without lightning in working mode, not more than	mA	25
sleep current in «switched off» mode (only clock is working), not more than	mA	1,5
Indicator's lightning current under maximal brightness, not more than	mA	50
Environmental temperature at exploitation	°C	-25...+65
Environmental temperature at storage	°C	-35...+85
Error of tachometer measurement, not more than	rpm	+/- 1
Tachometer measurement range	rpm	15000
Error of fuel consumption measurement, not more than	%	1*
Fuel consumption measurement range	L	9999,9
Error of run measurement, not more than	%	1*
Run measurement range	km	9999,9
Error of movement speed measurement, not more than	%	1*
Movement speed measurement range	km/h	500
Fuel consumption at 100 km measurement range	L/100km	99,9
Error of car dynamics to 100 km/h measurement in «Car dynamics up to 100» mode	s	0,02
Error of fuel level in tank measurement, not more than	%	10*
Error of run forecast on minimum fuel measurement, not more than	%	10*
Fuel tank volume, not less and not more than	L	30…120
Error of car-system voltmeter measurement, not more than	%	5
Error of temperature measurement, not more than	°C	+/-3
Logbook amount of memory	trips	80
Time of all setups storage and logbook at supply absence, not less than	years	10
Time of clock functioning at supply absence (full physical switching off of supply wires), not less than	s	20
Device's mass, not more than	g	150
Overall dimensions of minimal possible TC plane - (functional part, without buttons and holding units to the clock body), not more than	mm	60x35x25

***** Value can be reached only after parameters correction on the specific car.

Attention! TC do not prevent car's diagnostics within limits of car's technical checkup on proprietary service station!

2. Plug in of device

TC version 4.xx is plugging in to car very simple - it is enough just to connect 4 wires that are used on nominal clock of the car (they are presented on nominal clock connector) and 3 informational wires - fuel injector, speedometer sensor and fuel level sensor (float sensor).

Differential characteristics of TC 4.xx device is its full independence from engine control unit (ECU). The device is not plugging in to diagnostic connector and absolutely has no influence on ECU performance. All 3 informational wires that required for device's performance are connecting to electronic scheme of car in information retrieval mode. This means that device is only measuring electric signals that present on injector, speedometer sensor and absolutely do not have any influence on performance of these devices.

All electric signals are introducing to device with standard connector usage. Every device is packaging with reverse part of connector with sufficient length wires. Unified system of wires color marking exists for all devices of version 4.xx:

- **red wire (+BAT):** main power supply of device, plugs in to positive potential of accumulator (presents in nominal clock connector). Power supply on this wire should be present independently from start key presence.
- **white wire (INJ):** plugging in to fuel injector. Wire should be plugged in to signal wire of any engine's injector.
- **blue wire (SPD):** plugging in to speedometer sensor. Wire should be connected to the signal output of sensor.
- **yellow wire (+ILL):** overall light switch signal (presents in nominal clock connector). Switching of "day" / "night" light intensity modes proceeds under this signal.
- **green wire (FUEL):** plugging in to fuel level sensor (float sensor of petrol tank)
- **brown wire (ACC or ON):** signal of secondary device's power supply. Device automatically switches on when signal is appearing on this wire (wire presents on nominal clock connector). Positive potential on this wire should appear at the moment of start key turn and disappear when key is not in the lock. TC switches off automatically in 10 seconds after this signal switching off;
- **black wire (GND):** general wire of device, «mass» of car's electric scheme. Wire presents on car's nominal clock connector.

Except power supply and informational wires standard connector of TC has two connectors for remote temperature sensors plugging in.

Depending on user's requests the device can be supplied with remote temperature sensors or not, or it can be supplied with one – two remote temperature sensors. Temperature sensors plug in to TC at any moment and in any order. Sensors wires have 2.5 meters length. Remote temperature sensors can be installed at any place of car except those places where they can contact with some liquids (especially rain, deicer) and those places where temperature may exceed +85 degrees of centigrade.

TC 4.xx automatically detects remote temperature sensors presence and their number. Appropriate information immediately prints on TC display.

3. Functional possibilities of device

3.1. Main working modes

Trip computer gives all its current information to display in real time mode. All data output with exact direction of measurement unit. The display is proceeding in two lines.

Data output in two modes for convenience — passive and active. The device transfers control to passive mode of displaying automatically if car is not moving and the engine is stopped.

User can select one of following data groups in passive mode on display:

- date / time;
- temperature inside saloon and (or) outside / car-system voltage;
- odometer / fuel consumption meter;
- volume of fuel in tank / forecast of run at this volume;
- average traveling speed / average consumption at 100 km;
- cost of fuel at trip / average cost of 100 km of run.

The same data are available in active mode and furthermore two more groups added:

- real current speed of car / current fuel consumption at 100 km;
- tachometer / current fuel consumption at hour.

Switching over groups of data proceeds:

- by pressing the button «OK» that confirms with sound signal and diverts from the road not so much;
- with buttons «+» and «-» in both directions (without sound signal).

Also there is possibility of indicator's light intensity fast switching in main modes that is very comfortable at saloon's background luminance abrupt changes, for example, at the moment of arriving to the tunnel.

Press «OK» button and while you continue to press it (not more than 1 second) press «+» for fast switching from «day» to «night» mode and backward. Repeat this operation and you will reset lightning.

After +ACC (ON) signal switching off TC continues to work for 10 seconds. At the end of this time the device switches to low consumption mode («sleeping» mode) for energy consumption decrease. TC that is in low consumption mode consumes very small amount of current and can not influence on car's accumulator discharge. No information is displaying and backlight is not working at this moment.

The device switches on automatically at the moment of +ACC (ON) signaling or pressing «OK» button. TC will work for 10 seconds if «OK» button has been pressed but +ACC (ON) signal is missed, after that it will switch to the «sleeping» mode.

TC switches to low consumption mode («sleeping» mode) only from the main modes. This feature is not active in special modes.

4. All presets restitution (total reset)

TC version 4.xx has reserve function or common system reset «**total reset**». This mode allows to return all presets to their values that were set initially by manufacturer. Also this mode allows to reset **logbook** content. After log off from this mode device's clock starts count from «00:00:00, 1 Jan. 2008, Mn».

For log in to this mode it is necessary to press simultaneously and keep «+» and «-» buttons before switching on of device's supply. Without releasing these buttons, switch on supply (turn start key in «+ACC» mode). There will be an inquiry «**total reset?**» on display. Release «+» and «-» buttons. For carrying out of common reset procedure it is necessary to press and keep button "OK" until inquiry will appear about preservation of options on display. Choose affirmative answer «Y» if it is necessary for you to keep entered coefficients and options. If you have chosen negative answer «N», the device returns values of all options and correcting coefficients to the values established by manufacturer.

Attention! Having removed all user setup in a total reset mode, you cannot return them. It will be possible to enter them again only. Be cautious with total reset mode usage!

Further TC will give inquiry about preservation of logbook content. If you will put cursor under "Y" and press "OK", you will choose preservation of all records in logbook. The answer "N" will cause removal of all available trips in logbook.

On **total reset** procedure termination, the device will give "done" message on the display.

For refusal of common reset quickly press any button.

3.2.4. Measuring of car dynamics - “Sport” mode

TC has function of high-accuracy car dynamics time measurement up to the set speed, in a range of set speeds, or a run time of the set distance. For activation of this mode it is necessary to choose «**car dynamics**» mode in the device MENU, letter **A**. Further TC gives a choice - measurement on speed or on distance.

If you have chosen speed measurement, it is necessary to enter initial speed (it can be 0 km/h), final speed (up to 200 km/h) and measurement beginning method – automatic or on a sound signal. At automatic start time starts to be measured in a start of movement. At start on a signal - upon termination of the fourth, long sound signal. TC informs user with sound signal on reaching initial and final speeds. After the movement termination TC displays total time of measurement, time of speeding till initial speed (if it is not equal to zero), dispersal time between initial and final speeds (if the initial is not equaling zero), time of speeding till final speed and stopping time.

If you have chosen distance measurement, it is necessary to enter control distance value (up to 2000 m). Further TC asks to choose measurement beginning – similarly to speed measurement. TC notifies the driver a sound signal at run of set distance. Further, after the movement termination, TC displays total time of measurement, run time of the set distance and stopping time.

Before usage of **car dynamics** function it is necessary to perform correction on odometer (see paragraph 3.2.1.), otherwise, indications can be not accurate.

3.2.5. Individual information about device

Every Trip Computer version 4.xx has its unique serial number. This identifier sets by manufacturer and can not be changed by user.

User can see contact in formation of technical support service in a news ticker on display and find out serial number of his device in device info mode («**device info**»), letter «**I**».

3.1.1. Momentary value of fuel consumption

This option allows to inspect current fuel consumption under concrete terms of engine's, conditioner's performance, car loading, definite road conditions and others, in «real time» mode in two variants: depending on car speed (in liters at 100 km) or depending on engine RPM (in liters per hour). This most important characteristics count off under any car speed and allows to reach economic style of ride.

For example, the device can be applied as alternate or addition to nominal economizer successfully in «speed-consumption» mode (liter/100 km), the device displays more or less fuel consumption depending from depressing on accelerator pedal degree. Furthermore, the device works more precisely than nominal economizer. Information output on display performs in the form of contemporary displaying of speed and fuel consumption.

Function will be useful at the moment of engine's technical service execution when displaying in «turn - consumption» mode except mentioned above. For example, it is possible to see straight changes on screen at the moment of engine's working modes settings modification or after inlet line cleaning. Furthermore, it is comfortable to define conditioner's influence on fuel consumption in this mode. Information output on display performs in the form of contemporary displaying of engine RPM and fuel consumption.

3.1.2. High-accuracy tachometer

TC is digital analogue of indicating tachometer displaying absolutely accurate information about current engine RPM.

User can set limit of engine RPM excess by himself. In case if this limit is exceeded TC automatically will produce sound warning.

Function of sound warning allows to select and control maximally get-home engine operation that can be topically for new cars and for sport style of riding.

3.1.3. High-accuracy speedometer of car

The device displays current speed of car at km/h in digital form with accuracy up to tenth and it is more accurate than nominal indicating speedometer of car that always has fault up to 10% included by producer factory. The device is absolutely accurate indicator of car's speed without any faults with installed nominal packages of rubber and circular plates with corresponding specified tire pressure.

User can give two independent limits of speed exceeding by himself.

In case of one limit exceeding TC will automatically produce sound signal concerning speed exceeding that will not divert driver's attention.

The device is permanently inspects car's speed and defines its maximal value. This value records in **logbook** for every trip.

3.1.4. Average value of speed

TC automatically calculates average speed per trip. This calculation begins from the moment when car started its move. Every second new results of calculations display independently whether the car moves or at stop. Data records to logbook upon completion of current trip. At the beginning of a new trip TC automatically starts new calculation of average speed.

3.1.5. Average value of fuel consumed at 100 km

This parameter calculates as relation between consumed fuel and run. This value allows, for example, to define fuel consumption of your car uniquely and to estimate conditions of movement — moving on free course you can see that average consumption will be less than in city traffic jam. While planning long distance trips it is easy to define necessary fuel amount when you can see this parameter on TC display in your car.

Average fuel consumption at 100 km of run fixes in **logbook** applying to every trip. These data can be reviewed at any moment in **logbook**.

User can choose one of three calculation algorithms for average consumption at 100 km of run. This selection is available in «**setup**» mode.

Algorithm 1 — calculation of average consumption at 100 km with averaging on current trip.

Algorithm 2 — continual calculation regardless of trips, average fuel consumption at 100 km. Only fuel that was consumed in movement is included to calculations.

Algorithm 3 — continual calculation regardless of trips, average fuel consumption at 100 km. All fuel is included to calculations together with consumptions in traffic jams, on traffic lights, etc.

Special adaptive algorithm applies for all calculations. Average consumption calculated in 2 and 3 paragraphs is displaying and calculating permanently and style of riding at last 50-150 km of run has the largest influence on it. User can reset value of this parameter at any moment if needed by those starting measurements as if from state clean.

Forecast of run at minimum fuel (see paragraph 3.1.7) and average cost of 100 km of run (see paragraph 3.1.14) will be calculated according to chosen algorithm of average consumption at 100 km calculation.

3.1.6. Minimum fuel in tank

This function is digital analogue of fuel level needle indicator.

TC version 4.xx has three different algorithms of minimum fuel calculation. While putting «A» calculation mode in device's **setup** user sees accurate digital value of car's fuel level sensor on display. Float sensor registrations can modify depending on roll of car and ascending/descending angle of road and, as the result, TC registrations will also modify.

The device is digitizing fuel level sensor in «B» calculation mode only after filling up. Then TC calculates volume automatically according to fuel consumption regardless car's roll and ascending/descending angle of road. Therefore, temporary faults that were caused by inequality of road and other factors will not have influence on result. The moment of car's filling up with fuel is defined by device automatically. Car's engine should be switched off (TC switched off) at the moment of filling up.

Algorithm «C» uses signal from fuel level sensor in real time mode as in «A» algorithm. However, it smooth's this signal effectively as the result minimum fuel measurements become insensitive to fuel movement in tank at car dynamics, stopping time, etc.

For navigation in a logbook mode use buttons «+» and «-». For log in to a mode of viewing of dates / trips / data for a trip press «OK». For log off from a mode of viewing of a logbook keep button "OK" pressed during 3 seconds.

All trips in logbook are grouped by dates. Except full information on every trip user can see full statistics for every day independently from number of trips for these days.

Having entered into **logbook** review mode (a letter «**L**») user can choose the date that he needs with «+» and «-» buttons. After the date have been chosen with "OK" button, user begins to view total statistics for day.

TC version 4.xx stores following total data for day in its memory:

- total duration of all trips within the mentioned date;
- total duration of movement within the mentioned date;
- total run for day;
- total fuel consumption for day;
- average fuel consumption among trips for the mentioned day at 100 km;
- average speed among trips for the mentioned day;
- maximum speed reached for day;
- cost of consumed fuel for day (daily taximeter function).

It is possible to start viewing of separate trips within the chosen date using buttons «+» and «-». "The earliest" trip has number 1 other trips (if there are some) have corresponding serial numbers.

TC stores full information about every trip:

- serial number of a trip within date;
- exact time of trip start;
- duration of a trip;
- time spent in movement from total time of a trip;
- run at a trip;
- fuel consumption at trip;
- average fuel consumption during on trip at 100 km of run;
- average speed of movement during a trip;
- maximum speed registered at trip;
- cost of fuel consumed at trip (taximeter function)

3.2.3. Counters reset

Total fuel consumption counters and total run (odometer) accumulate values continuously. Switching on full physical switching-off of feeding wires at the moment of device switching off, values of these counters remain invariable remaining in non volatile memory of the device. Also these values do not depend on beginning / termination of trips.

Average consumption at 100 km of run reset is possible only in that case if 2 or 3 algorithm of average consumption calculation is chosen. Average consumption resets automatically in the beginning of each trip in case of algorithm 1 usage.

For counters reset it is necessary to use corresponding option in **MENU**. After you have entered into **MENU**, choose «**counters reset**» bookmark (letter **R**) and press «OK». The device will offer all counters reset separately.

For log off from counters reset mode keep button "OK" pressed during 1.5 seconds.

• Selection of average consumption at 100 km of run calculation mode.
There are 3 different algorithms of average consumption at 100 calculation mode in TC. One of them can be installed at user's will:

1) Average consumption at 100 km of trip. However, value of average cost at 100 km will be separately calculated for each trip. The movement mode, congestion of roads, will produce direct impact on indications of every trip separately. In the beginning of every trip the indications will start from zero.
2) Total average cost at 100 km in movement. Indications will be calculated continuously, independently from trips. That fuel which has been spent in movement, without idle time will participate in calculations only.
3) Total average cost at 100 km. Indications are calculated continuously, independently from trips. All spent fuel participates in calculations, including idle time, engine warming up, etc.

Algorithms 2 and 3 are adaptive, the greatest contribution to indications bring last of 50-150 km of run. If it is necessary it is possible to reset these indications using **MENU** paragraph «Counters reset». After reset, indications will start to be calculated again, without taking into account collected «history».

• Data groups
Initially all TC indications in the main modes output in pairs, i.e. in data groups. In a new device or after **total reset** performing, data are grouped according to factory presets. There are 6 groups of data that available in a passive mode (parking) and 8 groups of data available in active (movement). There is a possibility to change structure of each group and their total number for "parking" and "movement" separately in options paragraph of "data group». After each group contents change quantity of created groups and a question is output, are there any more groups required in this mode? At the answer «N», that number of group will stay that was entered.

There is possibility to return all groups to that kind which was at the new device in «data group» paragraph. Return of these presets will be reflected only in data groups and will not mention other setup options.

3.2.2. Logbook

Any of your trips remains in non volatile memory of TC that can contain last 80 trips. However, "the oldest" trip is rubbed clean after performing of a "new" trip.

TC automatically begins record about a new trip if after device switching on engine starts and car is starting to move. Until, while the car will not move, record about a new trip is not created in device's memory.

If engine has been switched off, but start key remained in the lock and has been turned in position «I» then record about a trip will be continued independently from an idle time.

For artificial continuation of record about the previous trip (for example, on the fuel station), user can press button «+» before device switching on and switch on device keeping it pressed. There will be an inscription "trip continuation". To continue record about a trip manually it is possible only if the previous record about a trip has been begun within current date.

For navigation in a **logbook** mode use buttons «+» and «-». For log in to a mode of viewing of dates / trips / data for a trip press «OK». For log off from a mode of viewing of a **logbook** keep button "OK" pressed during 3 seconds.

3.1.7. Forecast of run at minimum fuel

TC automatically calculates distance that car will be able to pass on minimum fuel in tank with current value of average consumption at 100 km.

This parameter has estimative nature — accurate value can not be evaluated because average consumption at 100 km can modify depending on road conditions and style of riding. However, it is comfortable to use this forecast while calculating safety distance to the next petrol station.

Forecast of run on minimum of fuel calculates permanently and displays in real time mode. Algorithm of calculations does not depend from set calculation mode of minimum in tank («A», «B», «C») but depends from chosen algorithm of average consumption at 100 km calculation (see paragraph 3.1.5).

3.1.8. Total (summary) fuel consumption

TC displays total fuel consumption in liters from the moment of last reset.
Data stores in nonvolatile memory.

3.1.9. Total (summary) run

The device displays total run in kilometers from the moment of last reset.
Data stores in nonvolatile memory.

3.1.10. Car-system voltage

The device displays car-system voltage in Volts. It is possible to notice accumulator's discharge or generator's interoperability in advance, for example, at the moment of car's city beam switching on or radio recorder long-term use with rundown engine.

3.1.11. Temperature inside saloon and (or) outside

Depending on user's requests the device can be supplied with remote temperature sensors or not, or it can be supplied with one – two remote temperature sensors. TC automatically defines number of sensors and displays one or two values of temperature (external/internal). Sensors absence is assumed herewith any values of temperature will be absent on display.

3.1.12. Clock & calendar

TC displays current time (HH:MM:SS) and date (DD:Mon:YY) as nominal clock instead of which the device should be installed.

3.1.13. Cost of fuel consumed at trip

TC calculates cost of fuel that was consumed at trip. Beginning from the moment when engine switched on and therefore fuel consumption began, TC displays cost of fuel that was consumed in Euro or dollars. Cost of liter of fuel can be set in setup mode the same as units of measurement in Euro (E) or USA dollars ($).

TC automatically starts information collection about new trip when it starts (i.e. engine was switched off for not less than 10 seconds and switched on again) moreover, trip fuel meter resets.

Data about cost of trip permanently stored in corresponding part of logbook. In order to find out more particularly about algorithm of recording trips to device's memory see chapter **logbook**.

3.1.14. Average cost of 100 km of run

TC estimates averaged value of petrol cost at 100 km of run analogically with average fuel consumption at 100 km of run calculation (see 3.1.5).

This value allows to define costs on fuel consumption of your car identically and to estimate conditions. During long trip planning it is easy to specify budget that is needed for given distance pass if you can see this parameter on TC display of your car.

Estimation of fuel cost at 100 km is conducted according to chosen algorithm of average consumption calculation at 100 km (see paragraph 3.1.5). For algorithm 1 calculation starts from the beginning of a new trip every time. For algorithms 2 and 3 it lasts continually.

3.2. Special modes of TC (MENU)

Except main working mode TC version 4.xx has large number of different **setups** that allow to adapt device for specific car perfectly; system of statistic information collection and storage (**logbook**); mode of accurate measurements of car dynamics to given speed or time of given distance pass. All these functions are associated in what is known as device's **MENU**. Log in to **MENU** is performed very easy, it is enough just to press and hold «OK» button during 1.5 seconds while you're using one of the main modes. All options inside of **MENU** are marked with letter **M** on TC display.

Staying in device's MENU it is possible to choose transition to one of the following modes:

- **logbook** review mode - for reviewing trips statistics, letter **L**;
- **setup** mode - for setup of all device's parameters, letter **S**;
- **counters reset** mode - for resetting of accumulated data concerning total fuel consumption, letter **R**;
- mode of **car dynamics** measurement, for measurements of car dynamics features, letter A;
- reviewing of individual information about device (**device info** mode) - here you can find out Internet address of technical support service and serial number of device, letter **I**;
- log off from menu to the main modes - TC remembers group of output data and submode where log in to **MENU** performed and it recovers original mode of information display during log off from **MENU**.

- Over RPM signals setup.
  Device can inform about exceeding of given turns with sound signal at user's will. TC version 4.xx has disconnectable limit of engine overspeeding that user can choose for himself. TC produces sound signal in 1 second from the moment when this overspeeding was detected. Further repeat signal concerning the same overspeeding is possible if speed decreases lower than limit level and beginning from this moment not less than 5 seconds passed. During few seconds ECU produces «double injection» signals that give additional power for engine on some cars after log off from engine's braking mode. These signals reflected in TC as engine RPM increased in 2 times. However, sound signal producing about overturning can perform.

- Indicator's setup
  Trip Computer indicator can be set individually on your level of view for optimal readability of information. Wide limits of image contrast changing foreseen in device and also lightning brightness of indicator setup for day light («day» mode) and for night-time trips («night» mode, overall lightning switched on). Brightness timing range has limits from lightning absolute absence to maximal brightness for comfortable usage rather in «day» mode or «night» mode. TC automatically switches from day lightning to night lightning and backward in the main modes depending from whether overall dash board light is switched on or not. Except this some possibilities to change brightness manually exist in main modes just with simple press of two buttons at a time (see paragraph 3.1.).

- Volume of sound signals setup
  It is possible to switch off or set volume of all device's sound signals in range from 1 to 3, where «3» corresponds to maximal volume.

- Petrol cost calculation
  For appropriate calculation of trip cost and average cost at 100 km of run, it is required to enter price per 1 liter of petrol setup in appropriate paragraph and select currency. TC will output data in main modes and create records in logbook in the currency that user will select - Euro (€) or dollars ($).
  TC will output data about cost in main modes and also record data about cost of trips in logbook. As in logbook so in main modes those units of measurements will be displayed that user has entered - Euro and Euro at 100 km (E, E/100) or dollars and dollars at 100 km ($, $/100).

• Odometer correction
All measurements in TC that are connected with distance and speed estimate with «odometer coefficient» usage. This coefficient has 100.0% value (factory preset) in a new device or after «**total reset**» procedure performing. Depending on specific car and its diameter of wheels, this coefficient can require correction. User can find out the most acceptable coefficient for his car after registering on technical support forum. However, for more accuracy it is possible to complete coefficient correction procedure on run. It is necessary for this:

1) To check tire pressure — for reaching high accuracy it should correspond to recommendations for this car.
2) To reset odometer value (daily run meter) on the panel board of car and in TC of total run meter (**counters reset** mode).
3) To pass from 500 to 700 km on car with car's odometer or on TC indications — depending on what will become earlier.
4) If odometer of TC values and car odometer differs slightly, there is no need to correct the device on run. Otherwise, it is necessary to complete following actions:

- To choose **setup** mode in device's **MENU** and bookmark of run correction in it. Using buttons «+» and «-» set real value of run (in km) instead of TC indications. After pressing «OK» button device will recalculate new value of correcting coefficient of run automatically and will save it in non volatile memory. Beginning from this moment all measurements of TC related to speed and run will perform with this new coefficient participation.
• During tire changing and especially in case of substandard wheels installation it is possible to require additional execution of run correction. For real value of run check it is possible to use GPS receiver or measurements of kilometer stakes along extended (not less than 500 km) traces.

Example: I have passed 626.3 km according to odometer measurements on panel board. However, TC shows 611.7 km. I log in to setup mode through device's MENU and choose «run correction» mode there. Then I press «+» button and set number as 626.3 km. Press «OK». Device shows my correcting coefficient in percents. From this moment TC shows correct values of speed and run.

• Overspeeding signal setup.
Device can inform about exceeding of given speed with sound signal at user's will. TC version 4.xx has two limits of overspeeding, user can choose for himself every of them (and can disable it both). Different sound signals correspond to these limits, that is why this function is very convenient in practical usage — one of signals can be set on maximal allowed speed on high-road and another one in locality borders. TC produces sound signal in 1 second from the moment when this overspeeding was detected. Further repeat signal concerning the same overspeeding is possible if speed decreases lower than limit level and beginning from this moment not less than 10 seconds passed.

3.2.1. Setup of device

Setup mode allows user to correct all TC measurements and, therefore, to adapt device for specific car.

TC requires setup. After setup of device to your car, make sure to setup 3 main meters - fuel consumption meter, odometer and meter of fuel level in tank. Most of TC data are calculated by these meters.

Independently from engine type, wear-out rate of its junctions and assemblages and also in case of outsize diameter wheel mounting, user can correct TC indications at any time using very simple algorithm of correction mentioned below. Having corresponding correction of meters conducted, TC enters received correcting coefficient to nonvolatile memory. Correction that was made properly allows to reach accuracy of device not lower than it was mentioned in technical characteristics chapter.

For navigation in setup mode use buttons «+» and «-». For log in to setup submodes of distinct parameters press on button «OK». For log out of MENU press and hold «OK» during 1.5 seconds.

Following options are available in **setup** mode (letter «**S**» always presents on display):

• Correction of nominal clock date and time, correction of daily rate. User can setup exact time, date and day of week on clock that is installed in TC. It is possible to correct clock if necessary entering positive or negative value in daily rate correction mode.

Device's clock is always functioning - in all modes and even after switching off of engine (switching off of ACC signal) when TC switches off in 10 seconds, clock continues to function supplying from car's accumulator. At full physical switching off of TC from car-system (i.e. at +BAT wire switching off) device saves all setups and all logbook in full. Time of these data storage is not less than 10 years. And the clock continues to function for not less than 20 seconds after full switching off of supply and stop working after this, when supply is leading it can take the value of the 1 January 2008, 00:00:00.

• Tachometer indications correction.
TC can work with injector engines of any type with any number of cylinders. Sometimes tacho correction can be required — coefficient of tacho correction can take integer values from 1 to 9. Usually it equals 2, 3 or 4.

• Fuel consumption meter correction.
All measurements in TC that are related to fuel consumption are calculated with «consumption coefficient» usage. In a new device or after «**total reset**» procedure performing this coefficient has 100.0% value (factory preset). Depending on specific car and its engine type, this coefficient can require correction. User can find out the most acceptable coefficient for his car after registering on technical support forum. However, for more accuracy it is acceptable to perform consumption coefficient correction procedure by yourself. It is necessary for this:

1) To consume fuel up to the moment of minimal residue indicator confident lightning (lamp is on control panel)
2) To reset fuel consumption meter using counters reset in TC MENU (directly before car filling).
3) To fill fuel tank of car. To save check that was received in cash with sold fuel volume note (just put it in your jockey box).
4) To repeat 3 paragraph 2-3 times because in order to get high accuracy it is necessary to consume at least 100 L of fuel. For this reason it is recommended to fill on the same fuel station.
5) After consuming 100 L of fuel or more (as on checks) it is necessary to wait until indicator-lamp confident lightning (similarly to paragraph 1). Herewith, if the measurements of TC total fuel consumption meter and total volume of consumed fuel as on checks are differing slightly it is not required to correct the device for consumption. Otherwise it is necessary:
To enter in device's MENU, to choose setup mode and to follow into odometer correction subdivision. To set true value of consumed fuel in liters (values as on checks) use buttons “+” and “-”. Press “OK” button after this and device will automatically recalculate the value of correcting consumption coefficient and save it in non volatile memory. Beginning from this moment all TC calculations related to fuel consumption will perform with this coefficient.

Example: After I have made fuel consumption meter reset my car have consumed 117.6 liters of fuel as on checks. TC has calculated 79.8 liters. I'm entering correcting consumption mode in the setup. Press “+” button and wait till 79.8 liters will become 117.6 liters. Then I release “+” button and press “OK”. TC has calculated correct consumption coefficient value for my car and saved it in the memory.

• Setup of fuel level in tank indications.
TC receives information about fuel level in tank on signal of car's float sensor. Because these meters are functioning differently on different cars, setup of device can be required.

Following parameters are participating in tank's setup: level of signal in empty tank (confident lightning on control panel), level of signal in full tank, volume of tank, quantity of fuel in tank at confident lightning, type of indicator (stabilized or not stabilized) and algorithm of fuel level calculation.

It is required for setup:

1)) To install «A» algorithm of fuel level calculation.
2) To enter volume of car's tank (see car description)
3) Enter the number that corresponds to empty tank. You can find out number from manufacturer or in technical support or you can define this number by yourself. In order to do this in case of strong lightning of indicator-lamp on control panel, log in to setup mode, choose tank setup and confirm this choosing «Y» in «minimal tank» bookmark. This operation needs to be performed with switched in engine (the engine is working).
4) Enter the number that corresponds to full tank. You can find out number from manufacturer or in technical support or you can define this number by yourself. In order to do this fill full tank «up to ejection», choose tank setup and confirm this choosing «Y» in «full tank» bookmark. As in the previous case, engine should be switched in.
5) Enter the quantity of fuel that has left in tank at strong lightning of lamp (usually 5...10 liters) — see car's description.
6) Setup type of indicator. Two types of indicators exist. Indicators that have stabilized on supply output signal and non stabilized indicators. If type of indicator is unknown in advance, it is required to trace rather measurements of TC depend on engine's functioning or not (depend on power supply). If they are depending, then indicator is not stabilized.

Example: I have come to the fuel station right after lamp's strong lightning. I have entered MENU, Setup while engine was switched in then I have chosen «tank setup» paragraph. I have answered positively in other words «Y» in this paragraph on question «minimal tank?». Then I have switched off the engine, filled my car up to ejection of petrol pistol, switched in the engine again, log in to MENU and answered «Y» in tank setup on question «full tank?». Then I have set tank volume as in passport and minimal fuel in tank. Displaying mode is «A» and indicator is stabilized.*

User can choose one of three calculation algorithms of minimum fuel at his discretion. «A» algorithm allows to output data in real time mode, moreover, TC measurements are duplicating flow sensor of fuel condition.
If you have chosen «B» algorithm of calculation, TC measures level of fuel only once - after filling in. Then device calculates everything automatically. Therefore, the result does not depend from road conditions and flow sensor wear-out rate. It is necessary to mark that device defines the moment of fuel filling by itself. For the right functioning of «B» algorithm it is required to switch off engine during filling in and to take out key from main driving switch (TC switches off in 10 seconds).
«C» algorithm uses signal of fuel level indicator in real time mode as «A» algorithm. However, it effectively smooths this signal, as the result fuel level measurements become insensitive to fuel movement in tank during car dynamics, stops, etc.

* It is necessary to choose «non stabilized indicator» if dependence of minimum fuel in tank from supply voltage appears on your car in «A» displaying mode.