explona

www.explona.com

explona dakar

User manual

explona dakar is an intuitive to use advanced tripmeter. Its name is not a coincidence as it was designed with Dakar rally in mind. Together with **explona repeater/mini** it allows to build a measurement system suited to the needs of users. The main tripmeter can supply basic data to several independently-controlled repeaters. In case of main unit malfunction the repeater switches automatically to autonomous mode preserving integrity of measurements.

Its aluminum enclosure is waterproof and protects against various environment conditions. In every light condition the readings are clear thanks to big LED display with brightness regulation. The display can be turned off if needed.

The device has a quick recall of the distance reading from every other display mode. It is fully configurable according to the needs of user. Apart from time and stop watch reading, all other readings can be shown on any of three displays. Adjustable "odo" distance aids in navigation during professional rallies. Basic modes of operation are possible from the wired remote controller unit. There can be any number of external *reset* switches connected.

With an external **GPS explona** receiver all measurements are based on GPS. However if data from GPS are unreliable it will revert to classic measurement mode. Furthermore with GPS the track is recorded.

You should calibrate the device (cp. 3.1) after installation and each change of tyres. Imprecise measurements can occur otherwise. The device is supplied not calibrated which is shown by blinking "Cal Err" on display.

1. Features of explona dakar

- Two independent distance counters: partial – "trip" and total – "odo". Both values decrease when reversing. Maximum values are 999.9 and 9999 km (or miles) respectively. After that a roll-over to 0 is made.
- Quick recall of both partial ("trip") and total ("odo") distance.
- Adjustable "odo" distance.
- Speed measurement with 1km/h (mph) resolution.
- Two units of measurement – SI (metric: km, km/h) and GB (imperial: mile, miles per hour).
- When connected to external **GPS explona** receiver additional features are:
  - automatic choice of the best source of information,
  - automatic clock setting based upon chosen time zone,
  - compass – present direction of motion, course,
  - logging of the track,
  - garmin protocol support,
  - automatic calibration.
- Battery-backed 24h clock.
- Stop-watch of 1 second resolution. It counts independently of the voltage supply. Maximum reading is 23:59:59 after which roll-over to 0:00:00 occurs (counting is not stopped).
- Battery voltage measure. Resolution of 0,1V.
- Data transmission to **explona repeater**.
- "Stop" function – freezes distance measurement.

Other features:

- Wired remote controller for basic operations.
- Any number of external *reset* switches.
- Non-volatile memory.
- Easily distinguishable readings.
- Fully configurable displays.
- Three big LED displays. 7 steps of brightness, ability to turn the display off.
- Anti reflex coating, ingress protection IP 65.
- Easy mount thanks to universal fasting.

2. Operation of the explona dakar

2.1.Readings

On each of the three LED displays the following readings can be shown:

- "trip" – short, partial distance,
- "odo" – long, total distance,
- "SoG" – speed (*speed over ground*),
- "Accu" – battery voltage,
- "CoG" – course (if external **GPS explona** receiver is connected and operational).

Additionally readings which can be shown on the bottom display:

- "Hour" – present time,
- "Stoper" – stop-watch.

In order to identify quickly the readings, the following distinction was made:

- distance – value with a dot,
- speed – value without dot,
- voltage – "u" at the end,
- course – three digits with a degree sign,
- time – hour and minute with blinking dot between, without seconds,
- stop-watch – readings with seconds.

2.2.Operation

All functions of **explona dakar** are accessible from keyboard or wired remote controller. Remote controller allows to use most frequent functions: reset, freeze measurement and stop-watch. Remote controller wiring allows to install connector in any place. Any number of external *reset* switches can be connected.

2.3.Zeroing the distance

explona dakar has two distance counters:

- short – "trip", reset by short press,
- long – "odo", reset by long press.

Resetting is done by pressing:

- red button ("enter") on the keyboard; if short distance wasn't shown it will be recalled on the left display untouched; second press will reset,
- red button on the remote,
- external reset switch (if connected).

2.4.The "odo" adjustment

Sometimes it happens that tripmeter readings differ from a roadbook (eq. after a mistake turn). Odo adjustment is necessary to change value, so it is correct again.

To adjust the long distance press "ADJ". If the long distance wasn't shown on display it will be recalled on the left field. The last digit of a value will blink. Pressing "up" or "down" change value. The corrected value can be accepted in two ways:

- pressing "ADJ" again – new value is entered,
- pressing "enter" – new value of a long distance is entered and short distance ("trip") is simultaneously reset.

2.5. Change of the displayed value

The "F" key changes the display configuration. Pressing this key allows to change value on bottom → left → right display. The description of selected value will blink if being changed. Keys "up" and "down" change the value. The value is accepted by pressing "F" or after a while of idle.

If **explona** is in "odo" adjustment mode the change of display configuration won't be possible.

2.6. The stop-watch

The device is equipped with 24h stop-watch. It can count time even without a power supply. Stop-watch can be operated only when it is shown on the bottom display. In order to show stop-watch press "F" key (bottom display will start blinking) and set description "Stoper" using key "up" or "down".

Stop-watch operation:

- from the keyboard – press "F" key to make the bottom display blink. As long as the bottom display blinks it can be operated with "enter" key,
- from the remote controller – using black key.

Stop-watch works in the usual manner: pressing the keys shortly starts and stops counting of the time. Longer press zeroes the stop-watch.

Change of the time while a stop-watch is running will change stop-watch readings. If change of the time is necessary the stop-watch should be stopped then time changed and finally stop-watch restarted. Stop-watch is not affected by change of the time zone – it is recommended to implement daylight saving time using time zones.

2.7. The "stop" function

The "stop" function allows to freeze distance measurements. It is indicated by showing "Stop" on the distance readings.

The "stop" function is enabled and disabled by:

- yellow button on the remote controller,
- simultaneous pressing "F" and "ADJ".

2.8. Change of the brightness

Keys "up" and "down" change brightness of the display.

Decreasing the brightness below the minimum level turns off the display. It is indicated by showing only dots on the display. All measures are continued but the keyboard is inactive to prevent accidental changes. The "up" key turns the display on.

2.9. Information about a GPS explona receiver

Pressing and holding both "up" and "down" keys in basic mode (without blinking displays) invokes information screen about the **GPS explona** receiver. The left display shows status of the antenna:

- "GO" – all ok,
- "Shrt" – antenna is shorted,

- "Open" – no antenna (eg. disconnected, torn away).

The right display shows work mode ("no", "2d", "3d") and number of satellites used for navigation purposes. If the receiver is not connected or is damaged the right display will show "dead".

2.10.Data transmission to explona repeater

Except for the configuration mode, the device constantly transmits data to **explona repeater**. Current values of short distance "trip", speed "SoG" and (if **GPS explona** receiver is connected) course "CoG" are sent.

2.11.Downloading the track

In order to download the track with garmin protocol:

1. turn off the device,
2. disconnect **GPS explona** receiver and replace it with connection cable,
3. turn the device on and enter the configuration mode (cp. 3),
4. select "Connect" menu (the garmin protocol is enabled now),
5. download the *track*,
6. turn the device off.

track is being recorded only when **GPS explona** receiver is connected and operating correctly.

3. Configuration mode

Entering the configuration mode:

- turn off and turn on the **explona dakar**,
- hold "enter" key while the serial number is displayed,
- the configuration menu will appear.

Blinking display shows an item which can be changed with "up" and "down" keys. "ADJ" or "Enter" key switch between changing of the reading (left display blinks) and changing of the value (right display blinks)

Configuration mode allows to set the following parameters:

- "Cal" – calibration constant *K* (cp. 3.1),
- "Hour" – time,
- "rear" – rear gear indication level: positive – "Hi" or negative – "Lo". Additionally the current state of the gear is shown: "F" when forward and "r" when reverse,
- "zone" – time zone from GMT-12 to GMT+12 (in most of the Europe summer time is GMT+2 and winter time is GMT+1),

- "unit" – units of measurement:
  - SI – metric: km and km/h,
  - GB – imperial: miles and miles per hour.
- "Connect" – this menu position enables communication with a PC using the garmin protocol. It allows to download a track.
- "Accept" – pressing "Enter" key stores the settings and leaves the configuration mode.

3.1.Calibration

Calibration is the process of determining the number of pulses per 1 km (or 1 mile) of the travelled distance. This is necessary to accurately measure the distance if **GPS explona** receiver is not present or GPS signal is insufficient. Calibration should be performed after installation and after each change of tyres. The device is supplied not calibrated which is show by blinking "Cal Err" on display. The calibration constant *K* should be in range 400–65535. If units of measurement are changed (SI ↔ GB) the device needs to be calibrated again.

3.1.1.Automatic calibration with GPS explona receiver

Performing the calibration requires a section of a road of more then 1 km (or 1 mi) length. The section must provide good quality of GPS signal. It shouldn't have obstacles covering the sky (tunnels, trees, bridges, etc).

Calibration procedure:

1. enter the configuration mode (cp. 3) and wait approximately 1 minute for GPS receiver to acquire current position
2. select "Cal" menu,
3. press "F" key, the calibration screen appears: the bottom display shows "GPScal", the left display shows remaining distance and right one shows number of impulses counted so far,
4. drive,
5. after 1 km (or 1 mi) the calibration will end automatically,
6. select "Accept" menu and press "enter" key.

The device leaves GPS calibration mode if signal level was too low. The left display blanks and "Cal" shows on the bottom display. In this case the calibration should be retried (press "F" key to abort calibration and press "F" again to begin)

3.1.2.Calibration without GPS explona receiver

Performing the calibration requires a reference section of road. The length of the section should be 1km or 1mile depending on the choice of units. The more precise section will result in more precise tripmeter measurements. The selected section of road can be:

- reference section of measuring authorities,
- distance between road markers,
- measured by correctly calibrated other tripmeter,
- measuring tape (although lot of patience is required).

Calibration procedure:

1. enter the configuration mode (cp. 3),
2. select "Cal" menu,
3. position your car at the beginning of the section,
4. press "F" key and wait 2 seconds (the device checks if **GPS explona** signal is not available),
5. drive entire section, stop exactly at the end,
6. press and hold "enter" key until "Cal" menu appears,
7. select "Accept" menu and press "enter" key.

3.1.3.Manual correction of the calibration

If calibration constant *K* is known (e.g. it was determined previously for give set of wheels and car) it can be set manually using "up" and "down" keys. This manual mode is helpful also to make small adjustments if previous value gives constant over/understated results.

Calibration procedure:

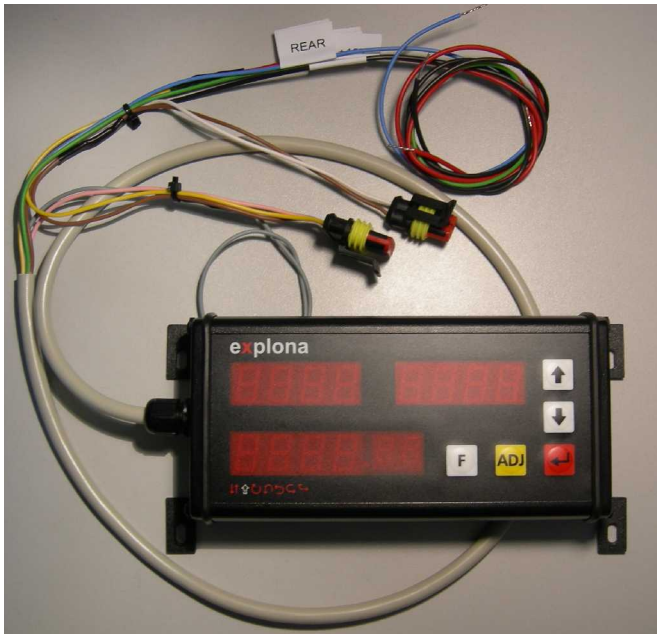
1. enter the configuration mode (cp. 3),
2. select "Cal" menu,
3. press "ADJ" or "Enter" key to enter mode of changing value (the right display will blink)
4. use "up" and "down" keys to set appropriate value of *K*,
5. press "ADJ" or "Enter" key to confirm the change,
6. select "Accept" menu and press "Enter" key.

4. Installation

The device must be installed in a safe way. It should not endanger health of driver and passenger during both regular work and accident. In particular it mustn't obstruct the airbags.

The installation can be performed in an authorized garage. Current list of authorized garages is available on the website: **www.explona.com**

4.1.Contents of the set



The set contains of:

1. **explona dakar**,
2. remote controller,
3. remote controller wiring,
4. user manual and warranty card,
5. TX10 driver to adjust the fastenings,
6. set of stickers,
7. box.

4.2.Mechanical installation

The device should be permanently attached. It shouldn't restrict the field of view. The enclosure is equipped with four fastenings. The TX10 driver (included) should be used if the fastenings need to be adjusted or repositioned. Be careful not to unscrew both fastenings from one side simultaneously. It may compromise the leak proof. All fastenings should be tighten after mount.

explona is specifically sealed to be leak proof.

Opening of the device breaks the seal and voids warranty.

4.3.Electrical installation

Power supply should be protected with a 3A to 5A fuse. The wiring should be connected according to the drawing on the last page. Wire connections:

- black "GND" – ground,
- red "+12V" – power supply after ignition dedicated switch (**explona** doesn't have its own switch),
- green "SPEED" – speed impulses,
- blue "REAR" – rear gear connection,
- grey – data connection to **explona repeater/mini**.

Two-pin connector is used for remote controller. Additional external *reset* switches can be connected parallel to the remote controller (see the schematics).

Four-pin connector is used for external **GPS explona** receiver or PC communication cable (neither is in the set).

4.3.1.Connection of the speed signal

explona dakar can be directly connected to vehicles equipped with electrical speedometer or reed switch sensor.

If vehicle has an electrical speedometer vehicle speed signal (VSS) from car's wiring should be found. It can be accomplished with the use of voltmeter. When the ignition switch is turned on and car is moving the voltage on speed signal should vary periodically (e.g. 0 i +12V or 0 i +5V).

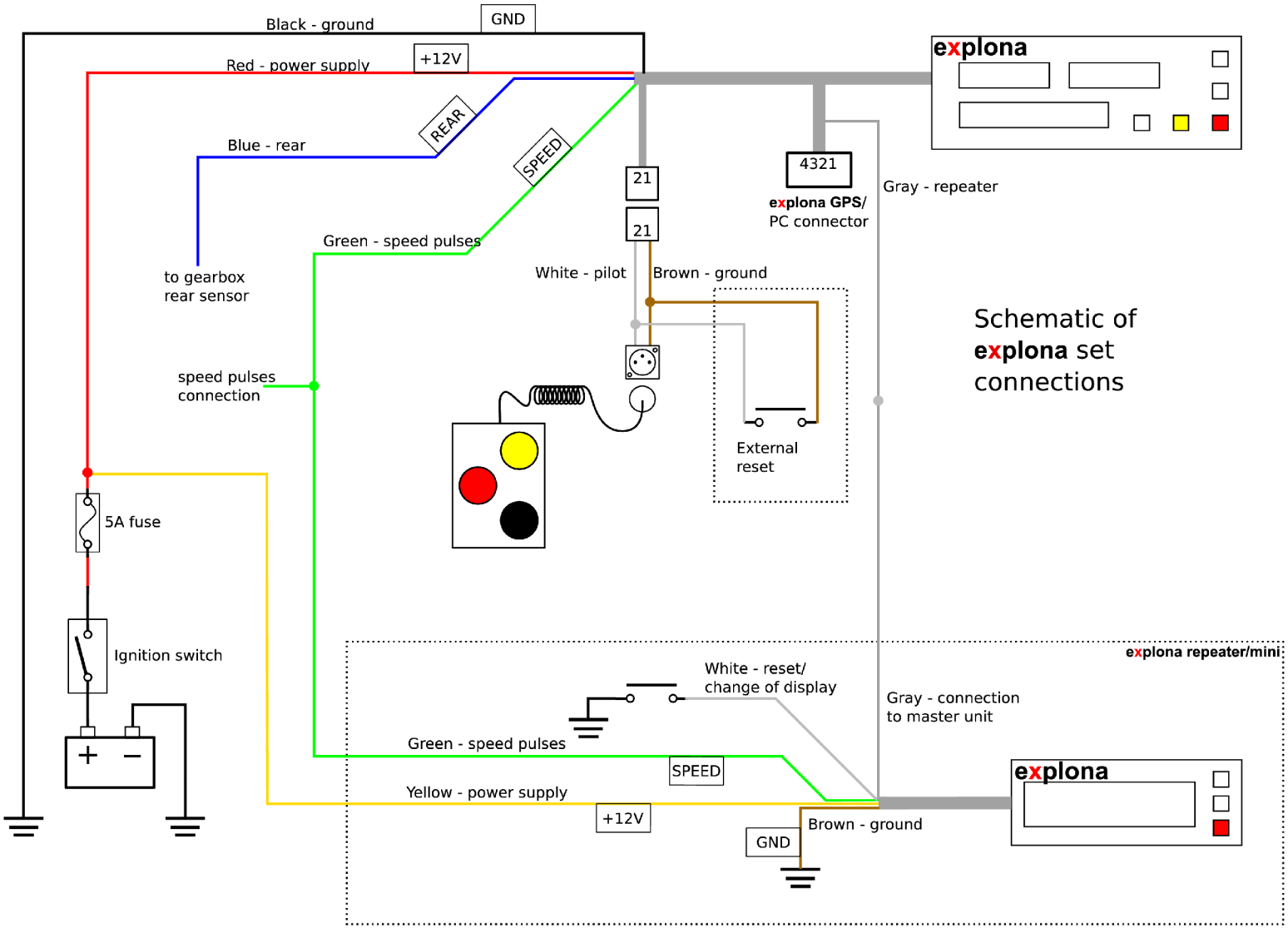
If reed switch sensor is used one of its contacts should be connected to the "SPEED" wire and the other to the ground.

If the car is equipped with mechanical speedometer or has no speedometer at all it is necessary to use additional connection module. That module can accept signal from turn converter or sensor mounted near wheels.

The calibration should be performed after installation of the device.

5. Troubleshooting

explona has a blank display.	The display is turned off – press and hold the "up" key, it should become brighter. The power is not connected – check the device wiring.
"Cal Err" blinks on the display.	The device is not calibrated. The measurements has no meaning. Do the calibration (cp. 3.1).
Connected repeaters aren't working.	Leave the configuration mode (data is not sent). Check the wiring.
PC communication using garmin protocol doesn't work.	Enter configuration mode and select "Connect" menu. Communication with PC is possible only in this setting.
Does **explona** work under water?	Ingress protection IP65 informs that device is protected from water jets but it doesn't mean the device can be placed under water for a prolonged time.


Black - ground
GND
Red - power supply
+12V
Blue - rear
REAR
SPEED
Green - speed pulses
to gearbox
rear sensor
21
21
4321
explona GPS/
PC connector
Gray - repeater
White - pilot
Brown - ground
speed pulses
connection
External
reset
5A fuse
Ignition switch
Schematic of
explona set
connections
explona repeater/mini
White - reset/
change of display
Gray - connection
to master unit
Green - speed pulses
SPEED
Yellow - power supply
+12V
GND
Brown - ground

6. Technical data

External dimensions [mm]	enclosure: 160×82×32 with fastenings: 195×97×40
Enclosure	aluminum, black
Ingress protection	IP65 – dust tight, protected from water jets
Display	3 red LED display with 7 brightness steps, can be turned off; anti reflex coating
Weight	710g
Operating voltage	10–40V DC
Power consumption	max 5W
Temperature range	-20–70 ºC
Partial distance resolution	10m
Total distance resolution	100m
Garmin interface	RS232, 8N1, 9600
Track record	from last 14 hours of driving

7. Rating plate

The disposed device mustn't be placed as an unsorted municipal waste, it must be collected separately.