LNPO ®

RACING DATA LOGGER

User Manual EN

LAPO®

Thank you for purchasing our LAPO product.

LAPO Team.

1 Table of contents

2 Introduction

LAPO-C is a revolution among race data loggers. Using the latest technology of colorful graphic display, the data visualization has never been so easy-to-read. The basic configuration of LAPO – C records lap and sector times as well as speed of engine revolutions.
Extensive modules allows you to record additional parameters such as engine and exhasut gas temperature, GPS location, acceleration , direction change, and many others.
   The LAPO-C featuring wireless module enables you to transfer data while driving to portable computing devices such as mobile phones, tablet PCs, notebooks, Pcs.
The device is equipped with large easy -to- read graphical color display with touch panel.
It features a clear, mulitlingual menu and extended data visualization capabilities.
Their analysis is particularly fast and easy which is a powerful advantage during competition.
The LAPO-C data logger, like the rest of LAPO products family, features waterproof housing that allows for its use in all weather conditions. Each recoder is equipped as standard with LAPO-DATAKEY – the device for transferring recorded data from the data logger to your computer. This allows the later data analysis using software LAPO RACING STUDIO.

The Lapo is „*THE BEST WAY TO WIN*".

Check the latest versions of software and accessories at *www.lapo.com.pl*

Basic technical parameters:

- Color LCD display with improved brightness
- Touch screen
- Power supply, internal battery
- Operation time with internal power supply: 3 hours continuously
 (in practice due to interruptions during the use, the operation time is several times longer)
- 2 temperature measurements. (PT100,Termocouple-K)
- RPM measurements
- Waterproof housing
- Possibility of online radio data transmission*
- Recorded parameters
- LAP TIMES
- RPM
- 2 temperatures
- GPS position (5 samples per second)*
- G-force (5 samples per second)*
- State of 4 digital signals*
- State of 2 analog signals*

*-available with external module

3 Start of LAPO-C operation

The LAPO-C data logger is equipped with a touch panel so its use is extremely easy and quick.

To power on/off and activation of on-screen menu press ON/OFF button ⏻ .

splash screen

ON/OFF button ⏻

Turning the power on and backlight the LAPO-C screen is followed by pressing and holding ON/OFF button for approximately 2 seconds. The splash screen should be displayed.
The data logger main menu is displayed after time specified in the LAPO-C system setting.

From this moment the selection of appropriate functions is performed by pressing a finger on the pictographs on the screen.

4 LAPO-C race screens

During driving the information about the race parameters are displayed on the data logger screen.

The driver has the opportunity of selecting one of the five race screen layouts.
Menu of race screen selection is available after double, quick pressing the ON/OFF button ⏻

SCREEN 1 *(universal)*

SREEN 2 *(sector times)*

- Lap number
- Results, current times in the sector
- Engine temperature
- red area of temperature exceeded
- Current lap time
- Exhaust gas temperature

Screen labels: LNPOc · L00 · 0:00.0 · S1 L -- --:--.-- · S2 L -- --:--.-- · S3 L -- --:--.-- · 99.9 · 99.9

SCREEN 3 *(best laps)*

- Nr. najlepszego okrążenia
- Lap number
- Best lap number
- Time next lap
- Engine temperature
- Best lap time
- Eesults of next laps
- Exhaust gas temperature
- Red area of temperature exceeded

Screen labels: LNPOc · L00 · 0:00.0 · -- --:--.-- --.-- · -- --:--.-- --.-- · -- --:--.-- --.-- · 99.9 · 99.9

SCREEN 4 *(last laps)*

- RPM engine revolutions
- Best lap
- Red area of temperature exceeded
- Last laps

Screen labels: LNPOc · 0 RPM · 99.9 · 99.9 · -- --:--.-- · -- --:--.-- -.-- · -- --:--.-- -.--
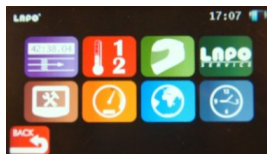
5 LAPO race screens

Basic configuration parameters.

5.1 Time of displaying lap result

5.2 On the screen is possible to set the configuration of temperature
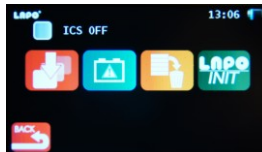
measurements inputs

- alarm temperature
- kind of measurement input
- alarm temperature delay
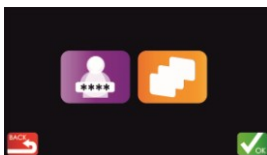- unit of temperature in Celsius / Fahrenheit

Driver's name -

5.3 LAPO service parameters

5.4 Screen configuration

5.4.1 Turning ON/OFF menu Access

The function allows to lock the possibilities of data logger settings changes against unauthorized use. After activation of device locking, the data logger displays only one available race screen. Any attempts to start the menu requires entering the password.
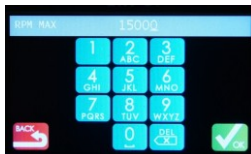
The correct password allows the access to all functions of the data logger. Enter the code 00000 to turn off the lock. The service code in case you forget the access code is 04321.
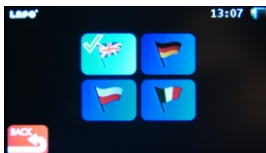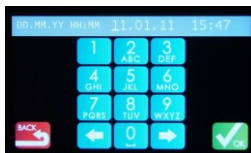
5.4.2 List of available screens

5.5 Upper range of max RPM engine revolutions
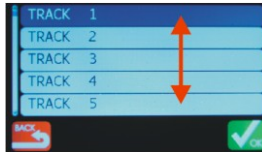

5.6 System language selection
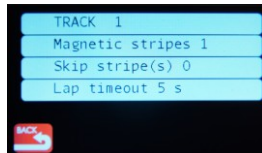

5.7 Date and time settings

6 **Track database**
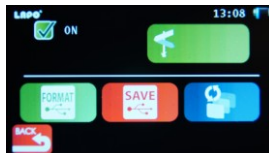
6.1 Track selection from the list

To swipe the list up or down, press the screen with your finger and slide it in the desired

direction. After selecting the track name, press the button

6.2 Track configuration

7 Communication

Saving of data records and configuration on the LAPO-DATAKEY

7.1 Screen saver loading

The Lapo – C data logger allows to load to its memory the own team graphics like the team logo or the other graphics displayed on the screen as a screen saver. Before performing this operation the image file of the screen saver must be loaded to LAPO-DATAKEY by using LAPO-RACING STUDIO software. The image parameters: image of a 24bit BMP and size of 480x273 pixels. Only such format is possible to load to the LAPO-DATAKEY and then to the LAPO data logger.

7.2 Time editing after which the screen saver is activated

The defined value determines after how many seconds from the last operation on the screen or after the engine turning off, the screen saver will be displayed. Entering the value 0 disables the display of the screen saver.

7.3 Splash screen loading

The Lapo – C data logger allows to load to its memory the own team graphics like the team logo or the other graphics displayed on the screen as a splash screen. Before performing this operation the image file of the screen saver must be loaded to LAPO-DATAKEY by using LAPO-RACING STUDIO software. The image parameters: image of a 24bit BMP and size of 480x273 pixels. Only such format is possible to load to the LAPO-DATAKEY and then to the LAPO data logger.

## 7.4 Time editing of how long the splash screen is displayed

The defined value determines for how many seconds from the data logger turning on the splash screen will be displayed. Entering 0 disables the display of the splash screen.

8 Gokart configuration

The user can define 2 main setups of the chassis and the engine. Setups are the element of gokart profile which describes where and in what configuration the laps were performed. Profiles are stored during the recording and can be analyzed on a PC.
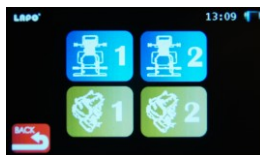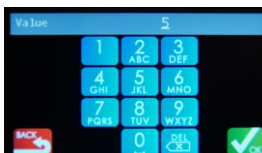
8.1 Chassis profiles

The selection of this option provides the display of the list of chassis settings.
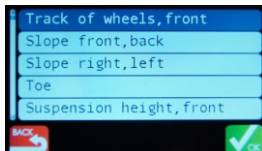
To swipe the list up or down, press the screen with your finger and slide it to the desired
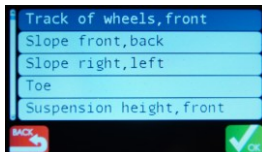
direction. After indicating the selected item from the list, press the following key Now
the parameter can be edited.

8.2 Engine profiles

The selection of this option provides the display of the list of engine settings.

To swipe the list up or down, press the screen with your finger and slide it to the desired direction. After indicating the selected item from the list, press the following key Now the parameter can be edited.
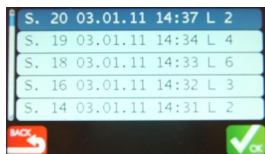

9 Profiles

Detailed analysis of data recorded by LAPO is possibile after entering to its memory the vehicle and track profile on which the vehicle will drive.

10 Logging

The logging function enables to analyses of the acquired data . The selection of this function provides the display of recorded sessions.
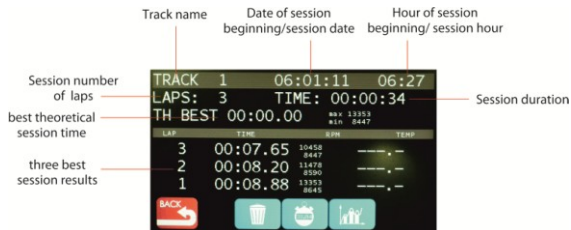
Each item in the list provides the following information:
- session number
- date of session beginning
- hour of session beginning
- laps number in the session.

After selecting the session you are interested in, press the OK key

10.1 Best results in the session

10.1.1   Data deleting of the current session (protected by a code)

10.1.2 Results
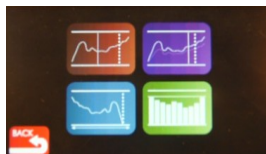

 sorting according to laps sequence

 sorting – the best tops the list

 sorting – the worse tops the list

10.2 Charts

 Temperature graph and RPM graph in the whole session.

The RPM graph is shown on the screen. The top of the screen displays information about the session and the value of the cursor position on the graph. To swipe the graph, press the screen with your finger on the graph area and slide it quickly left or right without moving the finger from the screen plane. Slowly sliding a finger on the graph or touching it caues positioning the cursor and the display of RPM and temperature values.

10.3 Comparison graph of laps

The function enables a comparison of the RPM of consecutive laps in session in relation to the model graph. The model graph is drawn in green. The current lap graph is drawn in white.

- first lap

- best lap

- storing of current lap as the mode l

10.3.1 Maximum lap time definition

To calibrate graphs in the comparative analysis to the screen size, the maximum lap time should be defined. For instance, if we are interested in lap times in the range up to 50 seconds, the maximum lap time should be entered of 2 or 3 seconds longer so as the longest graph could be fully displayed.

10.3.2 Histograms and minimum/maximum RPM

The function allows to visualize consecutive lap times in a bar chart and the differentia times in

relation to the best lap time. Lap times histogram.

The height of a bar is proportional to the obtained lap time. The green bar indicates the lap in which the best time was performed. The top of the screen displays information about performed lap times as well as maximum and minimum RPM for the lap indicted on the chart.
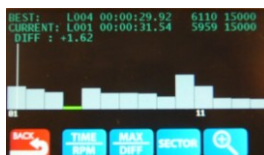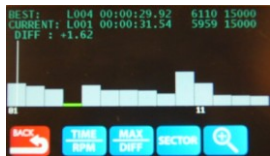

Time gap histogram

The height of a bar is proportional to the time gap in relation to the best lap. The green bar indicates the lap in which the best time was performed. The top of the screen displays

information about performed lap times as well as maximum and minimum RPM for the lap indicted on the chart.

Lap times histogram and sector times

Below the lap times histogram is shown the sector times histogram.

Press the following key to display detailed information about successive sectors.
The green bar indicates the best sector time.
The yellow bar indicates the time beyond analysis range.
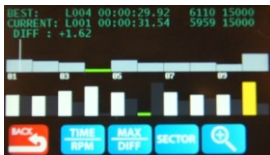
11 LAPO accessories installation

On the back of the LAPO-C data logger are 3 connectors to connect basic elements of the system
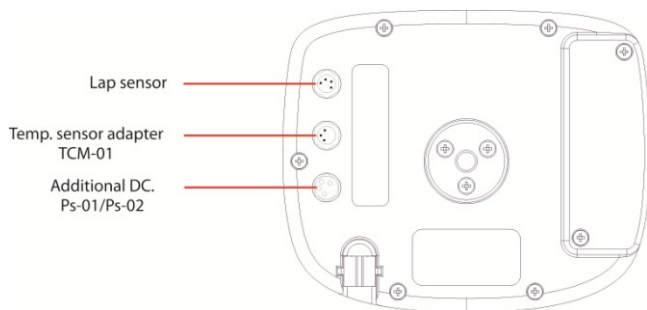
11.1 LAPO-MLS-01 magnet sensor

The LAPO-MLS-01 is the sensor sensitive to the magnetic field from the lap line. It should be mounted possibly close to the track plane and positioned by the arrow on the casing to the direction of driving (the front of the vehicle). The sensor is mounted to the floor plane with 3M velcro. Before sticking the velcro to the sensor and the floor plane, the surface to which the velctro will be fixed should be degreased. For additional sensors protection against the falling out from the bracket, we suggest to use the mounting stripe in order to extra fastening the sensor.

Exemplary mounting the LAPO-MLS-01 lap sensor and the LAPO-DLS-01 (for magnet stripe)
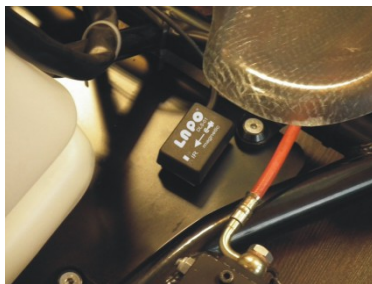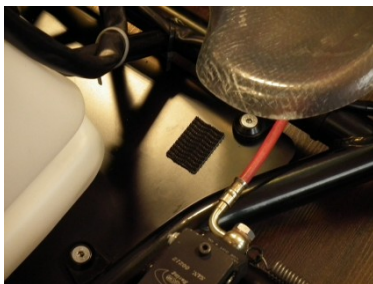

11.2 LAPO-DLS-01 dual sensor laps

The LAPO-DLS-01 is the sensor in which two sensors are mounted: the first one reacts to the magnetic field from the lap line and the second responds to the signal from the IR receiver. Depending on the kind of the signal that is held at the end of the lap, the sensor installation is proceeded similarly to the LAPO-MLS-01 sensor when the magnetic stripe or the sensor is mounted on the front part of kart and is positioned by the measuring window to the IR receiver direction.

ATTENTION!

When using the dual sensor it is recommended to set the time from the lap line to the value approximate to the expected obtained time in the lap or in the sector for instance 5 seconds less than the expected time. It is due to the probability of extraneous IR sources existing on the track which can be recorded as the finish line of the lap/sector.

11.3 RPM sensor

The RPM sensor consists of two plastic brackets and a cable to transmit pulses from the high voltage ignition system. One end of the cable should be inserted to the plastic and mounted to the high voltage cable as shown on the picture below.
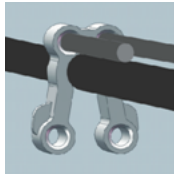
High voltage cable
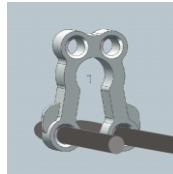
Measuring cable

The second end mount to the bracket and insert it to the mounting socket in the casing as shown on the picture.

LAPO®