LEONARDO: USAGE MANUAL

1. SENSORS

1.1 Innovative features of the sensors

The sensors detect the athlete's passage using passive infrared technology: it is the body of the athlete that reflects the beam, without the need for a reflector. The detection distance of the photocell goes from 10 cm to 180 cm as default setting.

The audio sensor is equipped with a loudspeaker that allows to perform the starting sequence from the blocks (*"On your marks"- "Get set" - Shot*) for an authentic race simulation, a fundamental method also in the training of reactivity and reflexes.

During the usage sessions, the sensors store the time in an internal buffer and communicate it to the tablet accordingly. In case of temporary communication problems (due to radio interference, for example, or because it is out of radio range) the recorded time is not lost, but the sensor keeps the data in the internal memory and communicates it to the tablet once communication is restored.

1.2 Mounting the sensors

The installation of the sensors has been designed to be as fast as possible. The supplied sensors can be easily installed on the tripods or mounted using the handy clamps supplied.

Once arranged, the sensors switch on by pressing the black button on the back. You can then proceed to the radio pairing with the tablet (if it has not already been done), bringing the tablet close to the sensors, one at a time.

Please observe the following usage instructions:
- use the photocells vertically, i.e. taking care that the side with the screws is facing downwards;
- do not point the photocells towards direct sunlight, towards a reflecting surface or towards a moving background object located within the range of the photocell itself (for example, vegetation moved by the wind at a distance of less than 2-3 meters from the photocell). In these circumstances of use, in fact, infrared disturbances may occur (green LED blinks erratically): just slightly change the orientation of the sensor to mitigate the problem;
- do not use the photocells in the rain;
- make sure that you are not near strong electromagnetic fields (for example, telecommunications infrastructure and electricity transport).

1.3 Status of the sensors

1.3.1 Photocell not paired with the tablet

The LED is red. It means that the photocell is not paired with the tablet: to pair it, just bring it close to the tablet and press on "Add sensor" in the "Sensors" page.

1.3.2 Photocell paired to the tablet

The LED is green, which means that the photocell is correctly paired with the tablet, but the internal sensor is in standby to save energy. Two minutes after the last communication with the tablet, the red LED starts to flash and the radio communication is temporarily disabled to save energy. The user obviously does not have to worry about anything.

1.3.3 System on race

The LED is green and blinks every time a passage is recorded: the internal sensor and the radio communication with the tablet are active. To start the race just press "Start" in the main page. During the race the photocells record the time in the internal memory and periodically sync with the tablet, to which they send the times recorded in their internal memory thanks to a coded protocol, so that no passages are lost due to radio interference or any other interference, including temporary physical obstacles between the tablet and the sensors.

1.3.4 Funzionamento LED

Red LED on   → sensor not paired
Green LED on   → sensor in operating mode
Green LED blinks   → passage detected
Green LED flashes   → after 2 minutes of standby mode
Blue LED on   → sensore charging
LED off (during charge)   → fully charged battery

2. TABLET

2.1 Tablet and pairing with sensors

The tablet is equipped with a built-in radio communication module that allows communication with the sensors. Please observe the following usage instructions:
- charge the tablet only when it is off;
- make sure you are within a range of about 160 m in open space with eye contact, taking care to point the back of the tablet towards the photocell, possibly without any obstacles on the line of sight;
- to maximize battery life, we recommend that you turn off your tablet screen when you are not using it and turn off the Wi-Fi connection.

Pairing the sensor with the tablet is very easy. You just need to do it the first time you use it, and if you bought a complete kit, we took care to do it for you.

The tablet queries all the sensors in the list visible in the "Sensors" page: the sensors paired with the tablet must all be turned on to proceed with the race session; if you do not want to use a sensor, you must remove it from the aforementioned list.

To pair a new sensor, just approach it to the tablet and press "Add Sensor" on the "Sensors" page. The LED on the back of the sensor will turn green.

3. APP LEONARDO

3.1 RACE section

In the section RACE it is possible to:
- set the **start mode** of the chronometer: by setting *"Start at first passage"* the start corresponds to the first passage recorded by the sensors, while by setting *"Start with Audio"* the sensor equipped with speaker performs the audio countdown;
- set the **type of session**: by selecting *"Infinite gates"* the first time recorded is considered as the start and the following ones represent all the passages, or, by choosing *"Gate to gate"*, the times recorded are considered start, arrival, start, arrival and so on;
- select **one or multiple athletes** by tapping the names displayed in the list and previously created in the section ATHLETES;
- select **an exercise** from the list of exercises previously created in the section EXERCISES.

The vertical bar on the right shows the status of the sensors (you can use it to check simply and quickly the connectivity) and allows to start the race session by pressing the "START" button.

Note well: the update frequency of the status of the sensors is reduced to optimize battery drain; to check connectivity and battery level it is advised to go to the section SENSORS.

By pressing the *"START"* button, the system initializes all the available sensors. The table is populated with the times recorded by the respective sensors, duly ordered; it is possible to select or deselect one or multiple athletes for every passage recorded in order to assign a time to a specific athlete. You can choose to display the time from the start of the session, the partial time from the previous passage, the speed or the acceleration; in order to calculate speed and acceleration, the system needs to know the distances where sensors are placed, which you need to set previously in the section EXERCISES. It is now possible to save the times recorded.

3.2 ATHLETES section

In the section ATHLETES you can display the existing athletes and create new ones, by setting first name, last name and assigning to each one an identifying color.

3.3 EXERCISE section

In the section EXERCISES you can display the existing exercises and create new ones, by setting:

- name (if you don't write anything, the name will be automatically completed upon the following data);
- possible custom notes;
- total distance;
- partial distances.

It is possible to assign available sensors to partials of the exercise (start, partial distances and total distance) in order to record this information in the table of times and to make Leonardo calculate automatically speed and acceleration.

3.4 SENSORS section

In the section SENSORS it is possible to display the available sensors and to add new ones, by approaching them one by one to the tablet and pressing the button *"Add sensor"*.

Note well: although it is possible to change the name of a sensor, it is preferable, for an optimal usage, to set the distance in the section EXERCISES.

By going in the subsection *"Advanced"* it is possible to configure the sensors in order to make them record just one passage, ignoring the passages immediately following the first one (e.g. useful in the case of track cycling) and to configure the time intervals of the audio start.

3.5 HISTORY section

In the section HISTORY it is possible to display the times of all saved sessions. By clicking on the titles in the header bar, the table can be sorted by date, exercise, final time and athlete. By entering in the detail section of every single session you can display also all partial times and you can insert text notes.

The table can be exported in CSV format (compatible with the majority of spreadsheets, e.g. Microsoft Excel) and it can be saved on the microSD card placed in the tablet or sent via email to an email address.

3.6 INFO section

In the section INFO it is possible to check whether there are available updates for the app and to proceed with update. It is also available a quick guide to discover all the features of Leonardo.