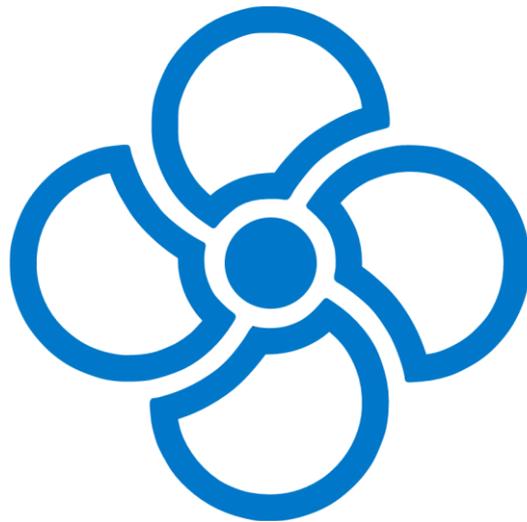


HRM Fan – Android User Manual



 **HRM Fan**

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1. History of changes of the document

The table below presents a list of changes done to this document (the Android User Manual).

Version no	Date	Changes
1.0	19.10.2022	First published version of the Android User Manual in English

2. Android application change log

The table below presents the history of changes introduced in subsequent versions of the mobile application for the Android platform.

Version no	Date	Change
1.1.2	11.10.2022	First published version of the Android application
1.1.5	18.10.2022	Added support for white color in the external RGB LED controller; minor bug fixes

3. Short description

The HRM Fan application for the Android platform is used to configure the HRM Fan device. Thanks to the application it is also possible to manually, remotely control the speed of the fan connected to HRM Fan and a color of a connected compatible RGB LED set.

The application is available in two languages that automatically switch depending on the language set on the phone:

- English – the default language,
- Polish.

The description of the capabilities of the HRM Fan device itself is presented in a separate document: HRM Fan User Manual. **The user manual must be read before the first start-up of the device.** The manual can be downloaded from the support page of our online store at: <https://www.hrmfan.dragilla.com/support>

4. App installation

The application can be downloaded from the Android PLAY store. The link to the application can be found on the website: <https://dragilla.wixsite.com/hrmfan/support>

5. App first run and description of sections

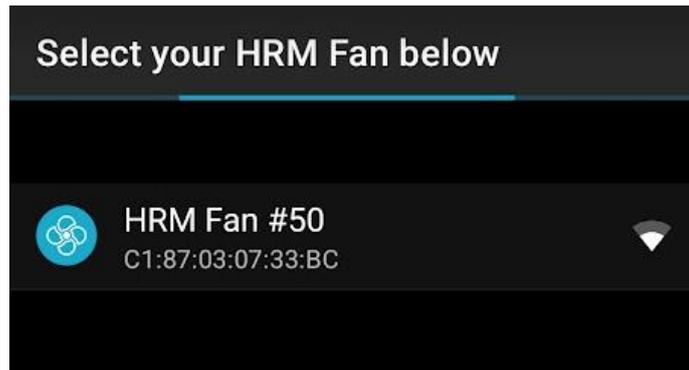
After installing the application, its icon will appear in the list of applications installed on the device:



After clicking on the icon, the application will start. Right after booting, you'll be asked to turn on Bluetooth and, depending on your Android version, Location Sharing or Bluetooth Scanning. Location is only required for the Bluetooth scanning function. Bluetooth is used for communication between the mobile device (smartphone) and HRM Fan, and between HRM Fan and the optional LED driver.

After turning on Bluetooth, the app will start looking for your HRM Fan. Plug the device into an outlet. Once connected to power, the green LED will light up on the device.

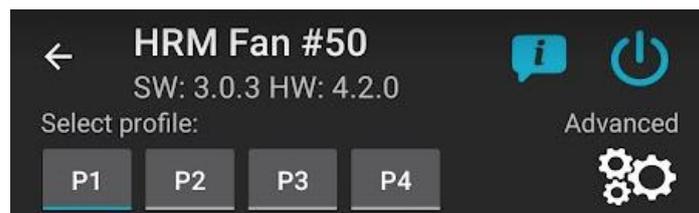
The device will appear on the list in the application - select it.



List of HRM Fan devices

After selecting the device, the application will establish a connection with it and the main application screen will open. On this screen you will see:

- Button to return to the device scanning screen ,
- Top bar with device name (e.g. HRM Fan #50), software (SW) and hardware (HW) versions.
- Button for activating the Information Mode , which shows additional information in the application describing particular functionalities,
- The sleep button , which puts the device into sleep mode,
- The advanced mode button , which turn on the advanced functions in the app,
- List of profiles. You can switch between profiles by clicking on them. The active profile is highlighted.



View of the top bar, function buttons and profiles after connecting to the HRM Fan device

- A bar with section icons. Individual icons are displayed or hidden depending on the selected application mode (Basic or Advanced) and whether the use of an external LED driver is enabled.
Four icons will be visible on first run:
 - Icon of the "Connected devices" section, which is used to configure the heart rate sensor used and to enable/disable the use of an external RGB LED driver,
 - "Manual mode" section icon - used for manual fan speed control, which allows you to test it before configuring its ranges. In this section, you can also set any

RGB LED color that will be displayed on the connected RGB LED strip. Controlling RGB LEDs is possible only through a dedicated Bluetooth RGB LED driver, which can be purchased in the store:

<https://www.hrmfan.dragilla.com/shop>

- Icon of the "HR configuration" section (HR stands for Heart Rate) - this is the section where you can set the heart rate thresholds. The lower limit is the heart rate at which the fan will turn on. The upper one is the heart rate that corresponds to the maximum speed of the fan defined in the "Fan Speed" section. If the heart rate rises above this threshold, the fan will no longer increase its speed.
- "Fan speed" section icon - section for setting fan speed (power) thresholds. The low threshold is the speed the fan will reach when it turns on at the low heart rate threshold. The upper threshold is the maximum speed you want the fan to develop.



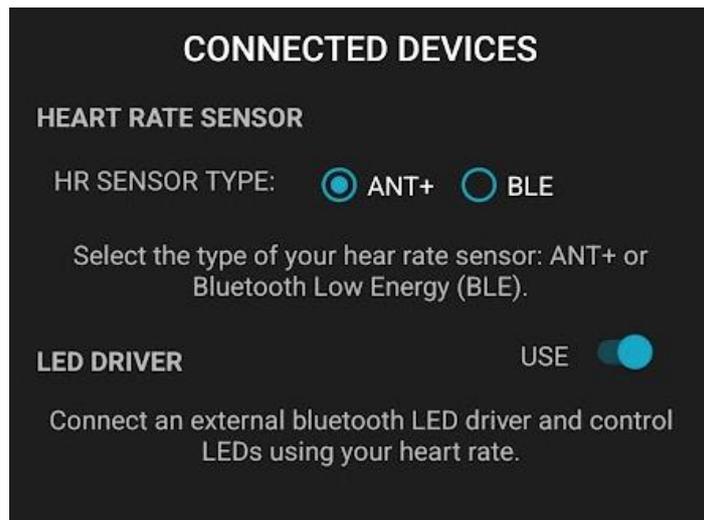
A list of section icons in Basic Mode

In the advanced mode, the icon of the "Time to sleep" section (crescent moon) will additionally appear. Enabling the use of the LED driver will additionally show the color ranges configuration icon ("LED colors" section).



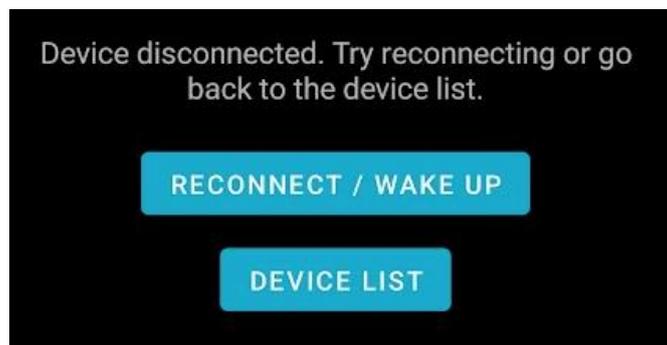
A full list of section icons

- Application workspace that displays controls for the selected section. For example, on first start-up, the "Connected Devices" section is displayed by default.



"Connected devices" section in Basic Mode

NOTE: When the application loses connection to the HRM Fan device (e.g. the user goes beyond the Bluetooth range, puts the device to sleep or the device goes into sleep mode automatically), the reconnect/wake-up screen will appear. From this screen, you can try to connect again (the device will then wake up in the sleep state) or return to the list of devices.



Reconnect/wake-up screen

6. Navigating through the app

Navigating the application is about switching between the sections available in it. This switching can be achieved in two ways:

1. By clicking on the selected section icon,
2. By dragging your finger left-right across the workspace of the application - then the section will be switched to the adjacent one.

7. Device configuration

Before starting the configuration, connect the device to the power supply and connect the fan to it. If the fan has more than one operating mode, select the mode corresponding to the highest speed.

The configuration is saved locally on the phone in the current profile. Each time you save the settings (the "SAVE and SEND" button), it also sends the configuration from the current profile to the device. HRM Fan remembers the last settings sent to it between runs.

Configuration should begin with a fan speed test. Due to the need to support various types of fans, the device allows you to configure a wide range of operation. **Not all fans will work in the full range.** You need to check the speed at which the fan will turn on and will have the right speed for you (appropriate blowing power). The test can be performed in the "Manual mode" section.

Once you have tested the fan speeds and set the range of its operation using the slider in the "Manual mode" section, you can now set the selected speeds in the "Fan speed" section.

You can then set the desired heart rate limits in the "HR Configuration" section. When the lower heart rate threshold is reached, the device will set the fan to the set speed configured as the lower threshold in the "Fan speed" section. As your heart rate increases, the device will steadily increase the fan speed until you reach the upper heart rate threshold. The device will then reach the defined maximum speed which has been set as the upper threshold in the "Fan speed" section. A further increase in heart rate will not change the speed of the fan. The fan speed will be regulated automatically within the defined heart rate range.

The same configuration as for the fan speed can be made for the external RGB LED driver. The colors on the RGB LED strip connected to it will change smoothly in the given range, configured in the "LED colors" section.

8. App's modes of operation

The application can operate in two modes: Basic and Advanced. By default, Basic Mode is selected. Switching between modes is activated by the button with the gear icon: 

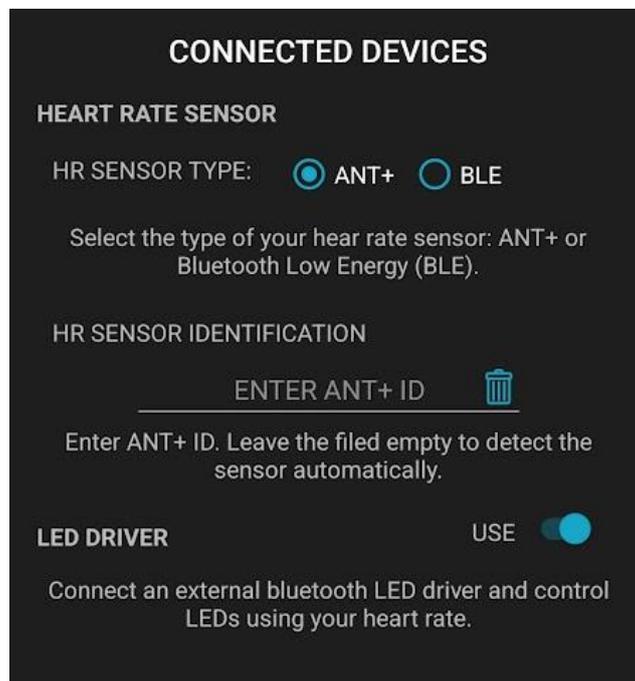
Advanced mode allows you to use extended functions in the application, i.e.:

- Selection of a specific heart rate sensor,
- Using / setting slots for fan speed and LED colors in the "Manual mode" section,
- Divide the workout into phases (Warm up, Training, Cool down),
- Setting the linearity of fan speed increase (linear/exponential),
- Setting the sleep timer (from 0 - off, up to 60 minutes; default 15 minutes).

A detailed description of all functionalities is presented in the following chapters. Next to each description it is marked whether the given functionality is available in Basic or Advanced mode.

9. The information mode

The information mode displays information boxes next to key functionalities in the app. This mode allows you to get to know the app's functionalities better during the first few uses. Later, this mode can be turned off, which simplifies the user interface and makes it cleaner. The information mode can be turned on or off using the button in the upper right corner of the application: 



View of the "Connected devices" section in Advanced Mode with the Information Mode turned on

10. The Sleep mechanism

The sleep mechanism is a mechanism in the HRM Fan device that allows you to:

- Easily turn off the fan after training without disconnecting the cables or reaching to the fan to physically turn it off,

- Leave the device connected to the power supply between workouts. In sleep mode, the fan will not turn on, even if there is an active heart rate monitor in the range of the HRM Fan device,
- Conveniently turn on the device (wake it up) just before training (e.g. from a mobile application or by pressing the button on the housing).

The device in sleep mode indicates its state with a constantly lit red LED on the. In sleep mode, the device does not search for sensors, so it will not connect to them and will not start the fan. However, it is visible for scanning in the mobile application.

The device can be put to sleep in three ways:

1. With a button on the housing,
2. The Sleep button in the mobile application 
3. The device will go into sleep mode by itself after a certain period of inactivity (when no sensor is connected and the device is not in test mode). The default timeout (set when the application is started for the first time) is 15 minutes.

You can wake up the device by:

1. Pressing the button on the housing,
2. Connecting to the device using the mobile application.

Configuration of the time that must elapse before the device goes into sleep mode is described in the chapter: "Sleep timer" section.

11. “Connected devices” section

The "Connected devices" section is a place where you can define the type (ANT+ or BLE) of the heart rate sensor that will be used to control the fan and (optionally) external RGB LEDs.

In Advanced Mode, you can additionally define the ID/name of the heart rate sensor (ANT ID for ANT+ strap or name for BLE strap).

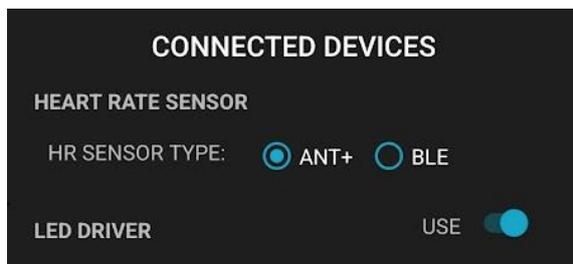
The ID/name of the HR sensor can be read e.g. in the Garmin device or in the Zwift application, in the device detection section. The BLE name can be additionally found by searching for it in the mobile application ("SEARCH" button). After selecting a sensor from the list, a fragment of its name will be automatically copied to the field in the application.

NOTE: The search function is only applicable to a Bluetooth heart rate sensor. The SEARCH button is not available for ANT+ sensors. This functionality has not been implemented because the search takes place on the smartphone, and most of the smartphones sold today are not equipped with ANT+.

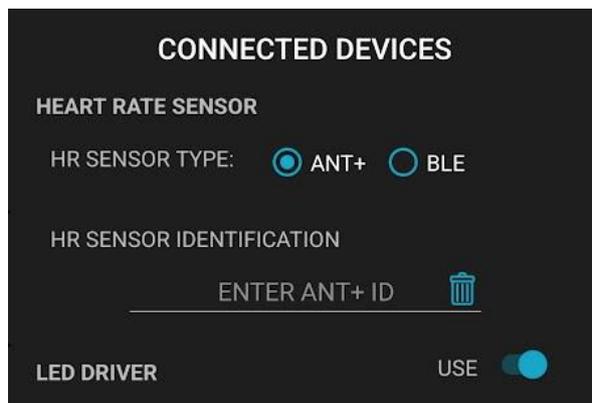
If you don't know the ID/name or don't know how to check it, you can leave this field blank. The device then detects the nearest heart rate sensor and connects to it automatically. However, if you plan to train in a larger group, when there may be a greater number of heart rate sensors in close proximity to HRM Fan, you will need to enter your ID/name of your sensor.

In addition to configuring the heart rate monitor, you can also enable/disable the use of an external RGB LED driver in the "Connected devices" section. Toggling the switch ("LED driver" - "USE") will show an additional icon of the "LED colors" section  on the list at the top of the screen.

After enabling this option, HRM Fan will start searching for a compatible RGB LED driver. Make sure that the driver is connected to the power supply and is within range of the HRM Fan device. After connecting the RGB LED driver, the device will change the color of the LED on the housing to orange (does not apply to the test mode in which the LED blinks red).



View of the "Connected devices" section in Basic Mode



View of the "Connected devices" section in Advanced Mode

12. "Manual mode" section

Manual mode allows for:

- **Manual fan speed control** in the range from 0 to 100%,
- **Manual control of the external RGB LED driver** (provided that it was enabled in the "Connected devices" section and HRM Fan connected to it - this is indicated by the orange color of the LED on the housing of the HRM Fan device).

NOTE: When manual fan control is enabled, the fan will run at the speed set on the slider regardless of the data coming from the heart rate sensor.

NOTE: When LED manual control is on, the LEDs will show the color set on the slider regardless of the data coming from the heart rate sensor.

Manual fan speed control is done by setting the required value on the slider and setting the switch on the right to "ON", which will turn on the test mode. After turning on the fan speed test mode, any adjustment of the value on the slider will automatically send a new value to the HRM Fan device, which will change the speed of the connected fan accordingly.

The fan speed test mode is signalled on the device by a flashing red LED (single flashes).

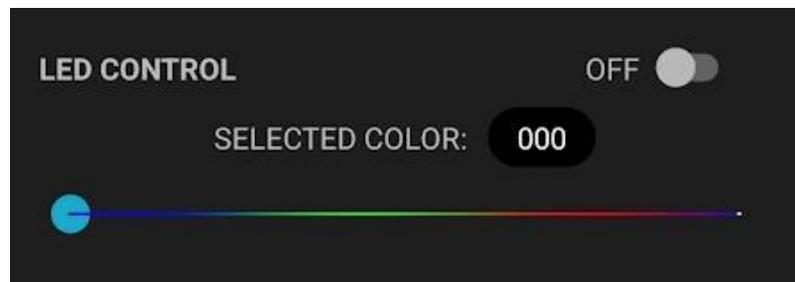
Manual control of the colors of the external RGB LEDs is done by selecting a color on the slider with a range of colors (rainbow) and setting the switch on the right to "ON", which will turn on the test mode. After turning on the test mode, each adjustment of the value on the slider will automatically send a new value to the HRM Fan device, which will change the color of external RGB LEDs accordingly.

NOTE: If the HRM Fan device has failed to connect to the RGB LED driver, it is not possible to test the colors. The switch will automatically return to the "OFF" position.

In addition to the color itself, the number of the selected color appears above the slider. This number allows you to remember the exact color that has been tested in manual mode to be used in the color configuration ("LED colors" section).

RGB LED test mode is signalled on the device by a red LED blinking (double blinks).

NOTE: If both the fan speed and RGB LED test modes are enabled, the LED on the HRM Fan housing will flash red - three short blinks.



Controlling external RGB LEDs in the "Manual mode" section

The rightmost color on the slider is white (200). The leftmost is black (000) which represents the RGB LEDs being off. This allows you to set the color ranges in such a way that, for example, during the Warm up stage, the LEDs are white, and they turn off during the Cool down stage. A detailed description of the division of workout into phases is provided in the "HR configuration" section in the "Dividing the workout into phases" section. For a description of the color configuration, see the "LED colors" section.

Additionally, in the **Advanced Mode** it is possible:

- Using saved fan speed settings; there are three programmable slots, default: 0%, 50%, 100%,

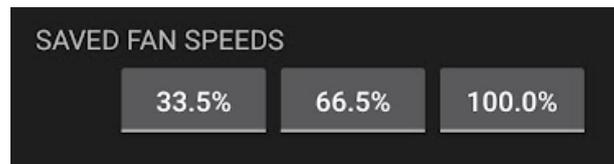
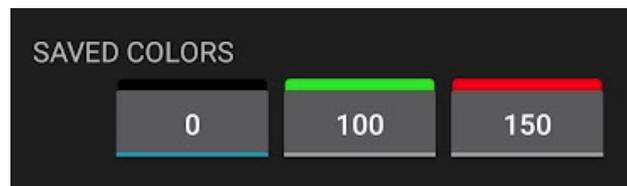


Photo of saved fan speed values

- Using saved color settings. There are three programmable slots, default: 15 (blue), 85 (green), 155 (red).



Zdjęcie zapisanych wartości kolorów

The currently active slot is highlighted from the bottom (e.g. "0" above).

Programming a slot consists in setting the selected value on the speed or color slider and holding the selected slot with your finger for one second. After this time, the phone will vibrate and the value will be programmed into the selected slot.

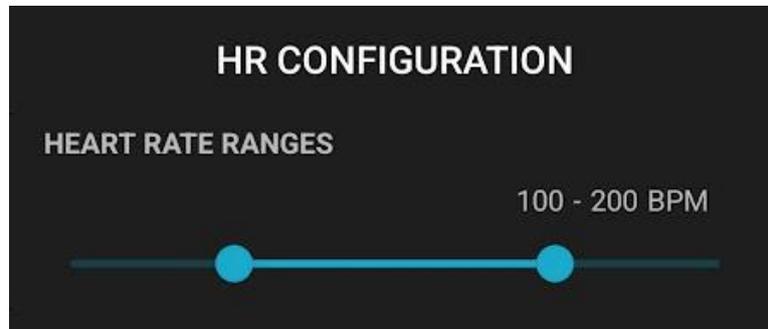
In the manual mode, there is no need to save the settings with the "SAVE and SEND" button. After setting the selected parameters, they are saved automatically. Therefore, this button does not appear in this section.

13. "HR configuration" section

The "HR Configuration" section is used to set the heart rate thresholds. The heart rate thresholds set the heart rate range within which the device will control the fan and/or the LEDs. When the lower heart rate threshold is reached, the device will set the fan to the set speed configured as the lower threshold in the "Fan speed" section. As the heart rate increases, the device will steadily increase the fan speed until the upper heart rate threshold is reached - the fan will then reach the maximum speed defined as the upper limit in the "Fan speed" section. A further increase in heart rate will not change the speed of the fan. When the heart rate starts to drop, the HRM Fan will reduce the fan speed accordingly until the heart rate reaches the lower limit of the defined range - then the fan will turn off.

NOTE: In order to avoid switching the fan on/off several times, when the heart rate fluctuates on the border of the lower range, the so-called hysteresis was introduced, which causes the

fan to turn off two beats/min below the set value, and turn on exactly when this value is reached. For example, when the user sets the heart rate range as 100-200 beats/min and his/her heart rate increases from 90 beats/min, the fan will turn on when the heart rate reaches 100 beats/min. When the heart rate is 99 beats/min, the fan will remain on. It will turn off only at 98 beats/min.



View of the "HR configuration" section in Basic Mode

13.1. Dividing the workout into phases

In the **Advanced Mode**, there is an additional option "Divide workout into phases". It allows you to define separate values of selected parameters independently for the three phases of training:

1. Warm up,
2. Training,
3. Cool down.

Workout phases are defined by hear rate ranges, for example:

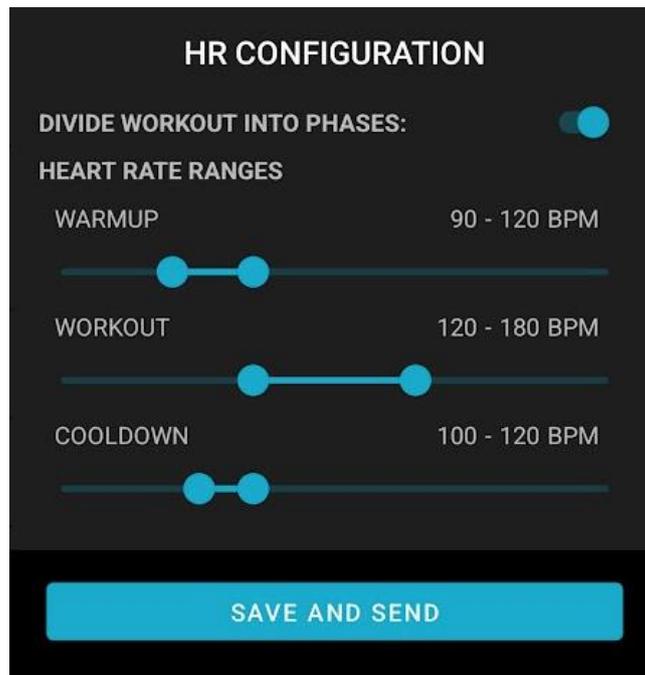
1. Warm up – from 80 to 120 beats/min,
2. Training - from 120 to 190 beats /min,
3. Cool down - from 120 to 100 beats /min.

The app works in such a way that the stages flow seamlessly into each other – it is impossible to set the heart rate ranges that define the stages so that they overlap or are separate. In addition, the transition points between the warm up phase and the training phase and between the training phase and the cool down phase must be set with the same value. In the example above, it is 120 beats per minute.

The user can define the following parameters individually for each stage:

- Fan speed ranges (see the description of the "Fan speed" section),
- Exponentiality of fan speed changes (see description in "Exponentiality of the speed increase"),

- Color ranges (see the description of the "LED colors" section).

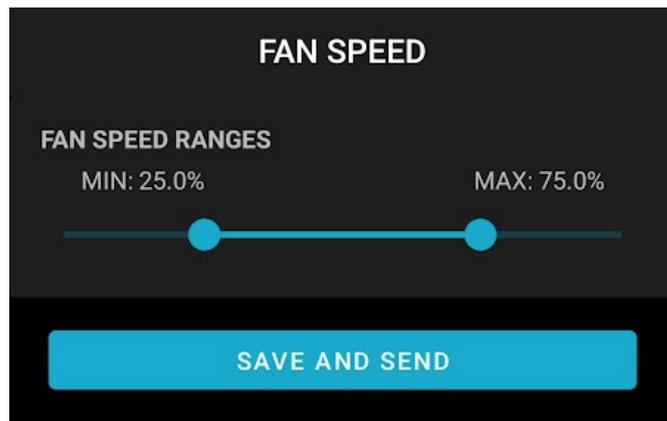


View of the "HR configuration" section in Advanced Mode with the workout divided into phase turned on

14. "Fan speed" section

In the "Fan speed" section, you can set the edge fan speeds that will be used by the HRM Fan algorithm:

- The minimum speed at which the fan turns on when the heart rate reaches the low heart rate threshold defined in "HR configuration",
- The maximum speed that the fan will reach when the heart rate reaches or exceeds the upper heart rate threshold.



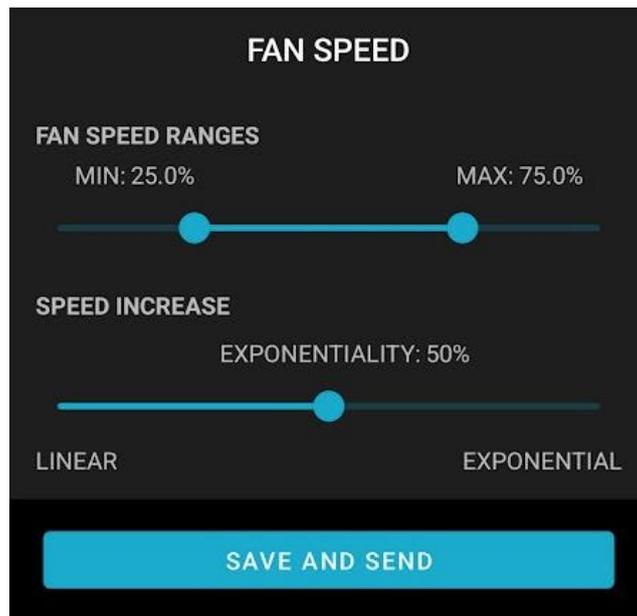
View of the "Fan speed" section in Basic Mode

If the **Advanced Mode** is on and the user has enabled the "Divide workout into phases" option, then for each of the stages (Warm up, Training, Cool down) you can define the fan speed limits independently. For example:

1. For warm up, set a relatively narrow speed range of e.g. 25-30%,
2. For training, set a wider range, e.g. 30-100%,
3. And for cooling, when, for example, we want the fan not to blow too hard - constant speed 25%.

The point at which a phase change occurs (e.g. from warm up to training) is determined by the heart rate ranges assigned to each phase. These ranges can be defined in the "Heart rate configuration" section.

In the **Advanced Mode**, it is also possible to define the degree of exponential change of the fan speed. This functionality is described in the next chapter.



View of the "Fan speed" section in Advanced Mode with the option of dividing the workout into stages disabled

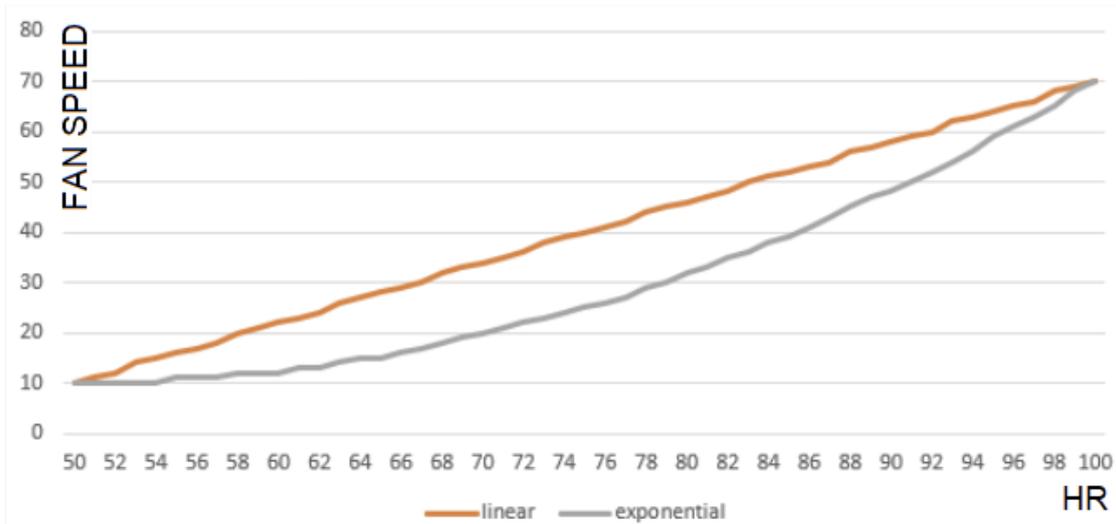
14.1. Exponentiality of the fan speed increase

Functionality available in The **Advanced Mode**.

By default, the fan speed in HRM Fan changes uniformly (linearly) within the defined range, i.e. it increases by the same amount when the heart rate changes e.g. from 100 to 120 beats per minute and the same when the heart rate increases from 160 to 180 beats.

Research shows that the increase in heart rate is not proportional to the increase in subjective fatigue, i.e. an increase from 100 to 120 beats/min will be felt as less fatiguing than an increase from 160 to 180.

For this reason, HRM Fan allows you to change the way the fan speed increases - from linear to exponential. The exponential increase works in such a way that in the lower heart rate range (e.g. 100-120 beats/min) the speed will increase slower than in the upper range (e.g. 160- 180 beats/min). In other words, the closer the heart rate is to the upper range limit, the more the increase in fan speed will be. This is illustrated in the chart below.

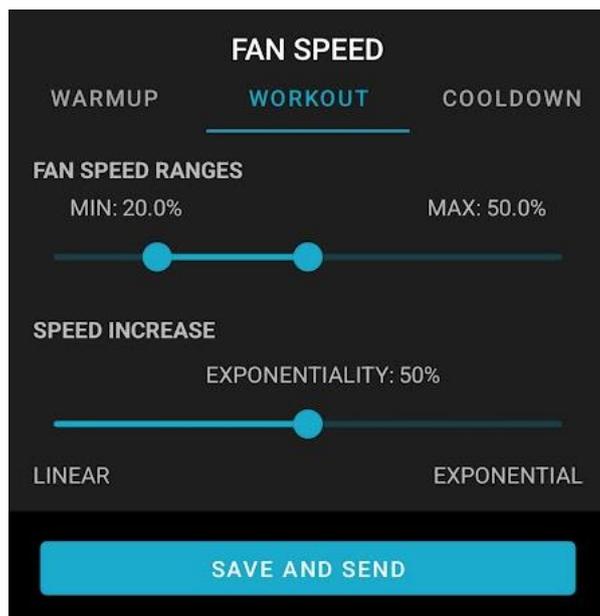


Fan speed changes - vertical axis (from 10-70%) in the heart rate range from 50 to 100 beats/min (horizontal axis) for two types of speed increase: linear (orange) and exponential (gray)

There are five settings for the parameter that determines the exponential growth of velocity: from 0% (default, linear increase), through 25%, 50%, 75% to 100% (fully exponential growth). It is recommended to test different settings and choose the subjectively best.

NOTE: If the division of workout into stages has been enabled in the "HR configuration" section, exponentiality can be defined for each stage independently, for example:

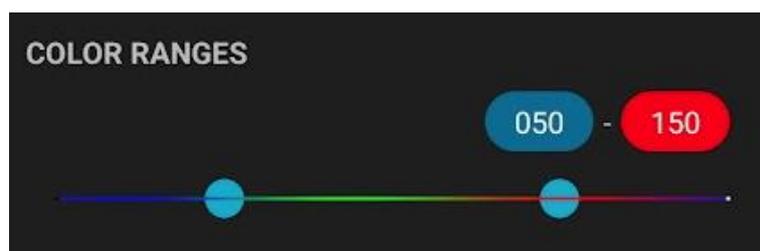
1. For the warmup stage, we can set the exponentiality to 0% (linear increase),
2. For the training stage, we can define the exponentiality as 50%,
3. For cool down, we can go again with a linear increase (0%).



View of the "Fan speed" section in Advanced Mode with the option to divide the workout into phases enabled

15. "LED colors" section

In the "LED colors" section, you can configure the color range that will be used within the defined heart rate range (section "HR configuration"). The colors are selected on the slider with a rainbow of colors.



Color range slider - rainbow

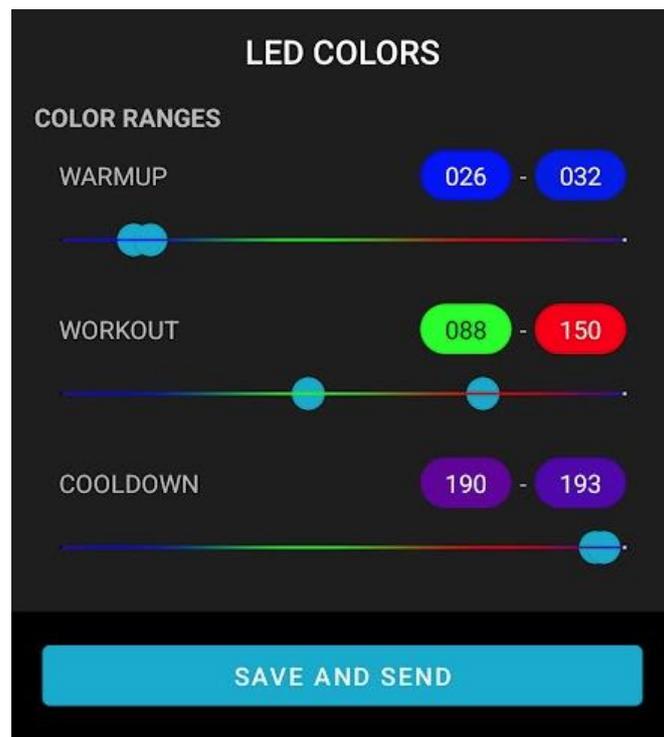
The left color selected on the slider will be sent to the connected RGB LED driver when the heart rate reaches the lower limit. This will be the same heart rate value at which the fan will turn on.

The right color is the "maximum" color - that is, corresponding to the upper limit of the heart rate. If the heart rate rises above the high threshold, the color will no longer change.

The colors will smoothly change over the configured heart rate range, from left to right, which is in the example scenario shown in the photo above - from blue to red through all the colors of the rainbow in between.

In the **Advanced Mode**, if workout is divided into stages, it is possible to configure the color range individually for each stage, e.g.:

1. Blue for warm up,
2. From green to red in the training phase,
3. Violet for cool down.



View of the "LED colors" section in Advanced Mode with workout divided into stages enabled

The colors always change in the given ranges in a linear manner. The exponential functionality (described in the chapter "Exponential growth of speed), applies only to speed of the fan.

16. "Sleep timer" section

Functionality available in The **Advanced Mode**.

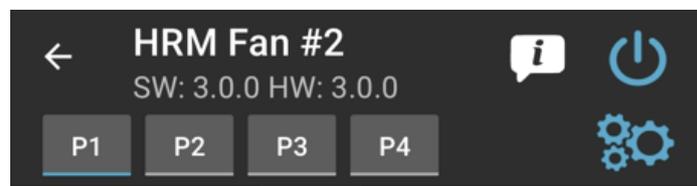
Configuration of the time that must elapse before the device goes into sleep mode is possible thanks to the slider, on which the time is set in minutes (from 0 to 60). If we set 0 minutes, the device will never go to sleep automatically. It will be possible to put it to sleep using the

sleep button or the button on the housing. Disabling the automatic sleep mode allows you to automate the use of the device. If, for example, we are sure that there will not be an accidental heart rate sensor in the vicinity of the device, which could unnecessarily turn on the fan or RGB LEDs, then leaving the device in the awake mode allows for immediate detection of the heart rate sensor when we start training - it will not be necessary to wake up the device.

NOTE: In the **Basic Mode**, the configuration of the sleep timer is hidden, while the sleep mechanism itself works in the same way as in the Advanced Mode. So it is possible to switch to Advanced Mode for a while, change the sleep timer setting, save the settings and return to the Basic Mode.

17. Profiles

There are four profiles available in the mobile application (P1, P2, P3, P4). Profiles are sets of settings that you can switch between using the profile buttons. Clicking on one of the buttons will load the configuration from the selected profile and send it to the connected HRM Fan device. The data in the profile is saved with the "SAVE and SEND" button (available in all sections except for the "Manual mode" section). Configurations in all profiles are saved locally on the phone, so they can be used on several HRM Fan devices and between runs. Information about the currently set profile is also saved locally, so that after turning the mobile application off and on again, it will be set to the last used profile.



Profile switching buttons (P1-P4)

Profiles can be used for several purposes:

- When more than one person is using one HRM Fan device, it is possible to save several sets of settings, e.g. one for each person. Then there is no need to reconfigure the device each time the device is handed over to another person,
- When we want to use more than one configuration for different types of training (e.g. a different configuration for running on a treadmill and a different configuration for training on a trainer).

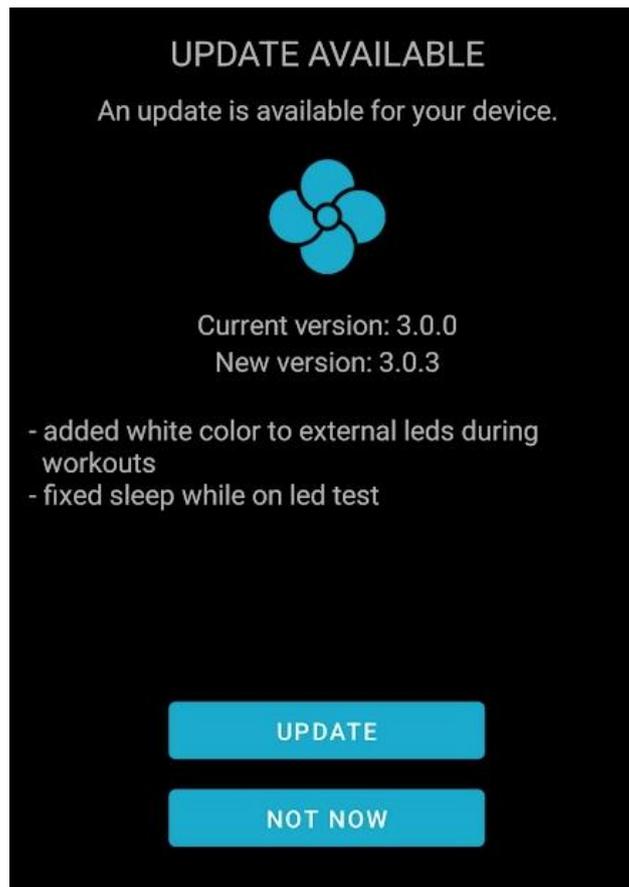
The entire configuration of the HRM Fan device and other application settings are saved as part of the profile, including:

- Configuration of connected devices (type and, if applicable, name or ID of the heart rate sensor),
- Whether the RGB LED driver is to be connected,
- Manual mode settings including fan speed and color slot configuration,
- Configuration of heart rate ranges,
- Configuration of the division of workout into stages,
- Configuration of fan speed ranges,
- Configuration of exponentiality of the fan speed changes,
- Configuration of color ranges,
- Configuration of the sleep timer,
- Current profile,
- Mode of the application – Basic or Advanced,
- Information mode setting (on or off).

18. Remote HRM Fan software update

The mobile application allows you to update the software on the HRM Fan device. New versions of the software for the device are created and published on a special website available only for the HRM Fan mobile application. Each new version has its own unique software version number, as well as the minimum hardware version number required to run it.

After connecting to the device, the mobile application downloads the current software version and hardware version from it. Then it checks the software versions available on the website. Based on this information, the application decides whether a new software version is available for the device it is connected to. If so - the user is presented with a message informing about the new version with a list of changes. The user can start the update process or postpone it.



A screen prompting for a new version

After clicking the UPDATE button, the application will carry out the update process itself.

19. Trouble shooting

Common problems are described in the main user manual in a separate document: HRM Fan - User Manual, which can be downloaded in the support section of our website: <https://www.hrmfan.dragilla.com/support>

20. Contact information

The creator and seller of the device is:

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The product page can be found at: <https://hrmfan.dragilla.com>