

Pulse Monitor 5

User manual

October 2026



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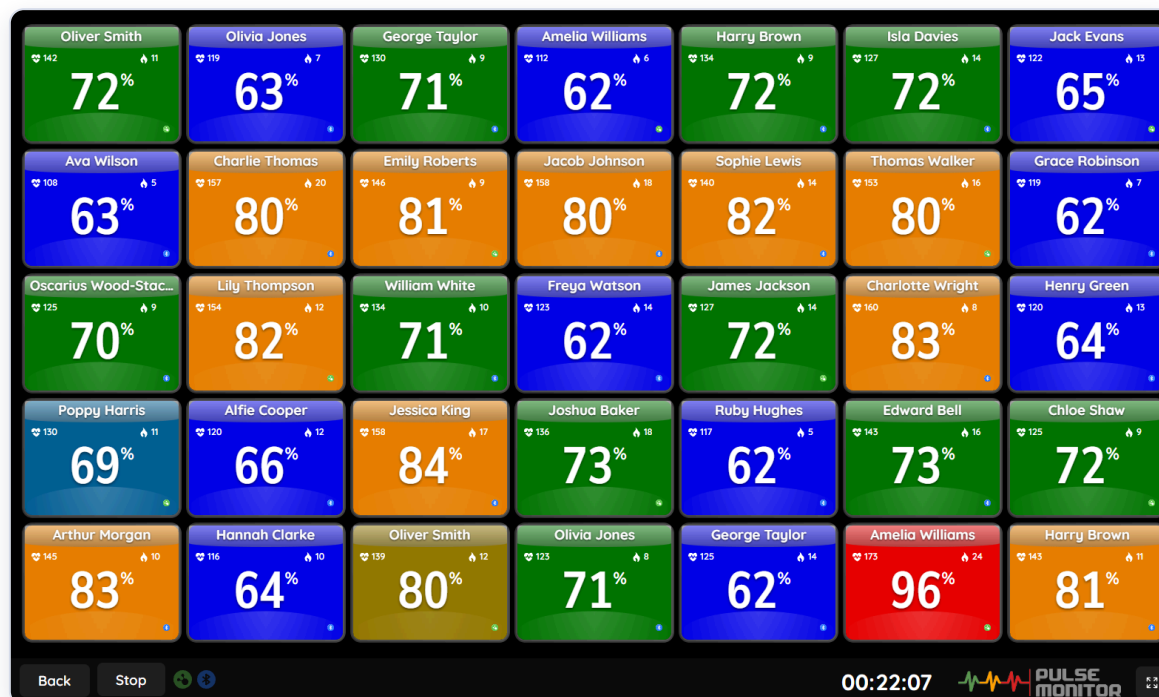
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1 Welcome to Pulse Monitor

Pulse Monitor is a Windows application that shows the heart rate of everyone in a group class **live, on one screen**, and records it so that each participant can get a report afterwards. It is built for fitness clubs, indoor-cycling studios, gyms, schools and any place where a trainer wants to see at a glance who is working too hard, who is not working hard enough, and who needs a break.



The live training screen: one colour-coded box per participant, shown on a wall display.

1.1 What Pulse Monitor does

- **Shows each participant's heart rate in real time.** Every participant gets a coloured box with a nickname, the current heart rate, the percentage of their personal maximum and the calories burned. The colour tells the *training zone* at a glance.
- **Supports up to 42 participants at once** in a single class.
- **Works with two kinds of chest straps:** ANT+ and Bluetooth (see [Two kinds of straps](#)).
- **Records the whole class** and builds a report for every participant: average and highest heart rate, calories, time spent in each zone and a heart-rate chart.
- **Sends the reports** as PDF e-mails or saves them as PDF, TCX or CSV files.
- **Keeps a history** of every participant: a *participant card* with statistics over the last trainings, weeks and months.
- **Runs without a trainer** in *Drop-in* mode, where people simply put on a strap and appear on the screen.

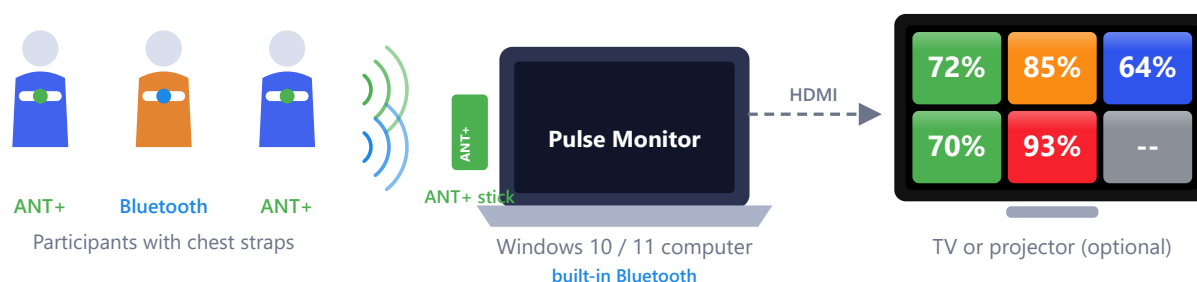
1.2 What's new in version 5

If you used an earlier version of Pulse Monitor, this is what changed:

New in 5	Where to read about it
Bluetooth straps now work next to ANT+ straps, in the same training	Straps and devices
A completely new, modern look with light and dark themes and accent colours	Application layout
Participant card with a statistics chart and a list of all past trainings	Participant card
Drop-in sessions (formerly "Open workout") — walk-in participants on a live screen	Drop-in sessions
A default device for every participant — the strap is assigned automatically	Participants
Range test for any strap	Range test
Trainers list with quick selection when creating a training	Trainers
Save and load a participants list (.pmc) for recurring classes	Choosing participants
A tidier participant box with technology icons and a "check the belt" row	Reading the participant box
One backup file for the whole database, plus clean-up tools for old data	Managing your data

1.3 What you need

The Pulse Monitor system



The Pulse Monitor system: a computer with a receiver, chest straps worn by participants, and an optional wall display.

1. **A Windows computer** — Windows 10 (version 2004 or newer) or Windows 11. A laptop or a mini PC connected to a TV or projector works very well.
2. **Heart-rate chest straps** (or arm bands, or HR watches that broadcast heart rate) worn by the participants. Either ANT+ straps, Bluetooth straps, or a mix of both.
3. **A receiver:**
 - for **ANT+** straps — a **USB ANT+ stick** plugged into the computer (a second stick is supported for a larger range);
 - for **Bluetooth** straps — the computer's own **Bluetooth** adapter (Bluetooth 4.0 / Low Energy or newer). Most modern laptops have one; for a desktop PC you can add a small USB Bluetooth dongle.
4. **A display for the participants** (optional but recommended): a TV or projector connected by HDMI, which shows the live training screen to the whole room.

TIP

When you buy straps, check the box: look for the **ANT+** logo or for **Bluetooth** with *Heart Rate* support. Many straps do both. A list of recommended devices is on our website, <https://www.pulsemonitor.net>.

1.4 Two kinds of straps: ANT+ and Bluetooth

Pulse Monitor speaks to both technologies at the same time. In the program they are simply called **ANT+** and **Bluetooth**; there is nothing more to learn about the technology itself — but a few practical differences are worth knowing before you buy straps.

	ANT+ (recommended)	Bluetooth
Receiver	USB ANT+ stick	Built-in or USB Bluetooth adapter
Number of straps at once	Up to the licence limit (42), one stick handles all of them	Limited by the Bluetooth adapter — usually 5 to 7 (default limit in Pulse Monitor: 7)
Range	Typically around 10 m in a clear room ¹	Depends on the strap and the adapter ²
One strap, many receivers	A strap can be heard by many receivers at once (your stick, a watch, a bike computer...)	A strap normally accepts only one connection at a time — turn Bluetooth off on the participant's phone or watch
Best for	Groups of 10 or more , studios, permanent installations	Small groups, personal training, trying the system without buying a stick

¹ ANT+ — the manufacturers of ANT+ chips state that ANT radios are designed for typical operating environments **up to 30 m**; with heart-rate straps worn on the body, a **range of about 10 m** is the realistic planning figure, and less with many people in the way. ² Bluetooth — there is no single figure: the range depends on the transmit power, the receiver sensitivity and the environment. For orientation: manufacturers of Bluetooth heart-rate straps state ranges of **10 m, often 30 m and even 100 m** (these are best-case figures in the open). Details, and how to measure it, are in [Range of the straps](#).

WARNING

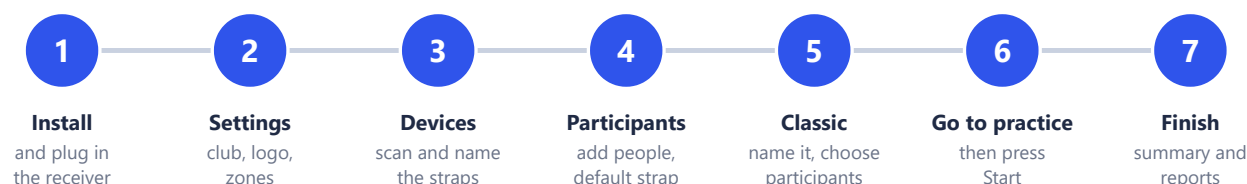
Large groups: use ANT+. A Bluetooth adapter can reliably keep only a handful of connections open. Pulse Monitor lets you set that limit and will not let you add more Bluetooth straps to a training than the limit allows. With ANT+ there is no such restriction.

TIP

Most chest straps and arm bands support **both** technologies, but during a training a strap uses only one of them. Pair such a strap **as ANT+** ([Finding straps with the scanner](#)).

You may mix both kinds in a single training. Each strap is simply registered as ANT+ or Bluetooth when you add it (see [Straps and devices](#)).

1.5 Quick start in ten minutes



The path from installation to a finished class.

1. **Install** Pulse Monitor and plug in the ANT+ stick ([Installation and updates](#)).
2. **Set up the club**: name, address, logo and cardio zones in **Settings** ([Settings](#)).
3. **Add your straps** in **Tools** → **Devices**: scan, click a detected strap, give it a name ([Straps and devices](#)).
4. **Add your participants** in **Tools** → **Participants** ([Participants](#)).
5. Click **Classic** on the main screen, name the class, pick participants and their straps ([Classic training](#)).
6. Click **Go to practice**, then the big **Play** button. The class is running.
7. When it is over: **Finish and summary**. Look at the results and send the reports ([Reports](#)).

No participants to register? Click **Drop-in** instead — straps appear on the screen the moment their owners put them on ([Drop-in sessions](#)).

1.6 About this manual

Names of buttons, menus and windows are written in **bold**, exactly as they appear in the English version of the program. A path such as **Tools** → **Settings** means: open the **Tools** menu and choose **Settings**.

TIP

Tips are shortcuts and good habits.

NOTE

Notes explain how something works.

WARNING

Warnings point out things that can cause data loss or a poor measurement.

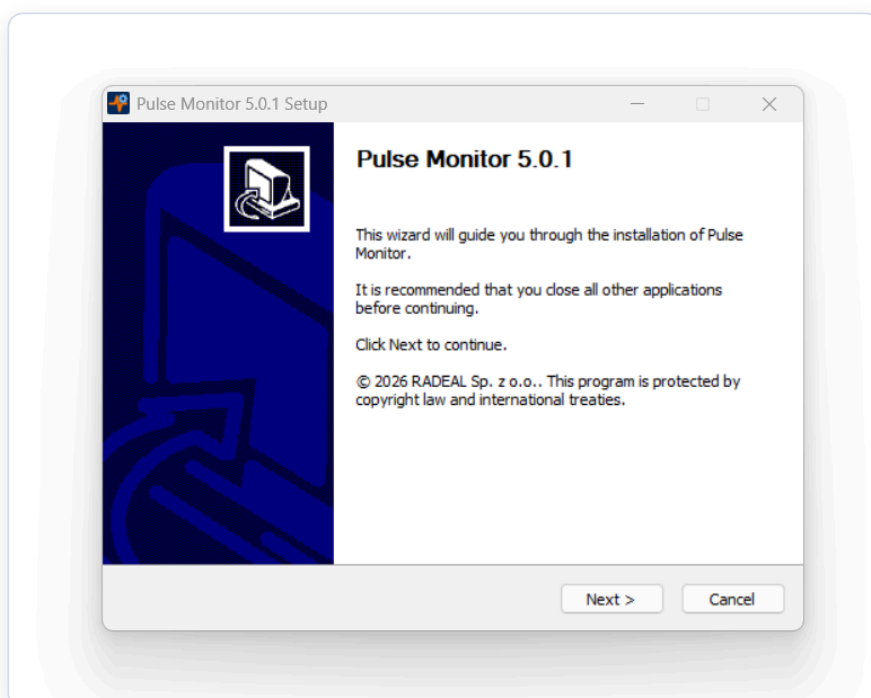
Screenshots in this manual use the default blue accent. Your screen may look slightly different if you use another theme (light or dark), accent colour or language.

2 Installation and updates

2.1 Installing Pulse Monitor

Installation is a single wizard and takes about a minute.

1. **Download** the installer from <https://www.pulsemonitor.net> and run it. Windows will ask for permission to make changes — the installer needs administrator rights, because it also installs the driver for the ANT+ stick.
2. Follow the wizard: **Welcome** → **Licence agreement** → **Installation folder** → **Install** → **Finish**. The default folder (`C:\Program Files (x86)\PulseMonitor5`) is a good choice.
3. When the wizard finishes, a **Pulse Monitor 5** icon is on your desktop and in the Start menu.



The installation wizard.

WARNING

Do not plug the ANT+ stick into the computer before the installation is complete. The installer puts the correct driver in place first; the stick is recognised properly only afterwards. If you plugged it in earlier, simply unplug it, finish the installation and plug it in again.

2.1.1 What the installer adds

Item	Purpose
Pulse Monitor 5 (desktop and Start menu)	Starts the program
Manual (Start menu)	Opens this manual as a PDF

Item	Purpose
Uninstall (Start menu)	Removes the program
ANT+ USB stick driver	Lets Windows talk to the ANT+ receiver
Microsoft Visual C++ 2008 runtime	A system component used by the ANT+ library (installed only if missing)

NOTE

Bluetooth needs nothing extra: the program uses the Bluetooth support that is built into Windows 10 and 11.

2.1.2 Plugging in the receiver

After the installation, plug the **ANT+ USB stick** into any free USB port — preferably a port on the computer itself rather than an unpowered hub. Put the stick on a short USB extension cable if the computer sits behind a desk or inside a rack: the stick should “see” the room, and a stick tucked behind a metal case shortens the range noticeably.

TIP

You can also use long **active USB extension cables** to place the antennas around the room and increase their range.

For **Bluetooth**, make sure Bluetooth is switched **on** in Windows (**Settings** → **Bluetooth & devices**). You do *not* pair the straps with Windows; Pulse Monitor finds and connects to them itself.

2.2 Starting the program

Double-click **Pulse Monitor 5**. A short start-up window appears, showing the version number while the program checks for updates and prepares its database. A moment later the main window opens.

NOTE

Only **one copy** of Pulse Monitor can run at a time. If you start it a second time, the second copy closes immediately.

The very first time, the program opens in the language of your Windows, if it is one of the supported languages, otherwise in English. You can change the language at any time in **Settings** → **Application layout** ([Application layout](#)).

2.3 Updates

Pulse Monitor periodically checks whether a new version is available.

When a new version exists, a window opens with the version number, and you can start downloading the installer right away.

We recommend installing every update: they bring improvements and fixes. Your data (participants, devices, trainings, settings) is **kept** when you update.

TIP

You do not need to uninstall the old version first. Just run the new installer on top of it.

2.4 Where Pulse Monitor keeps your data

Everything you enter and record is stored **only on your computer**, in the folder:

```
C:\Users\<your name>\AppData\Roaming\PMONITOR5\
```

(Type `%APPDATA%\PMONITOR5` in the Windows Explorer address bar to jump there.)

File or folder	Contents
5_pmonitor.db	The database: participants, devices, trainers, trainings and every recorded measurement
settings.json	Your settings (club name, zones, appearance, e-mail account...)
license5.dat	Your licence. It is assigned to the identifier of the computer on which it was installed
traintcx\	The full raw heart-rate recording of every training (used for CSV export)
log.txt	A technical log, useful when you contact support

WARNING

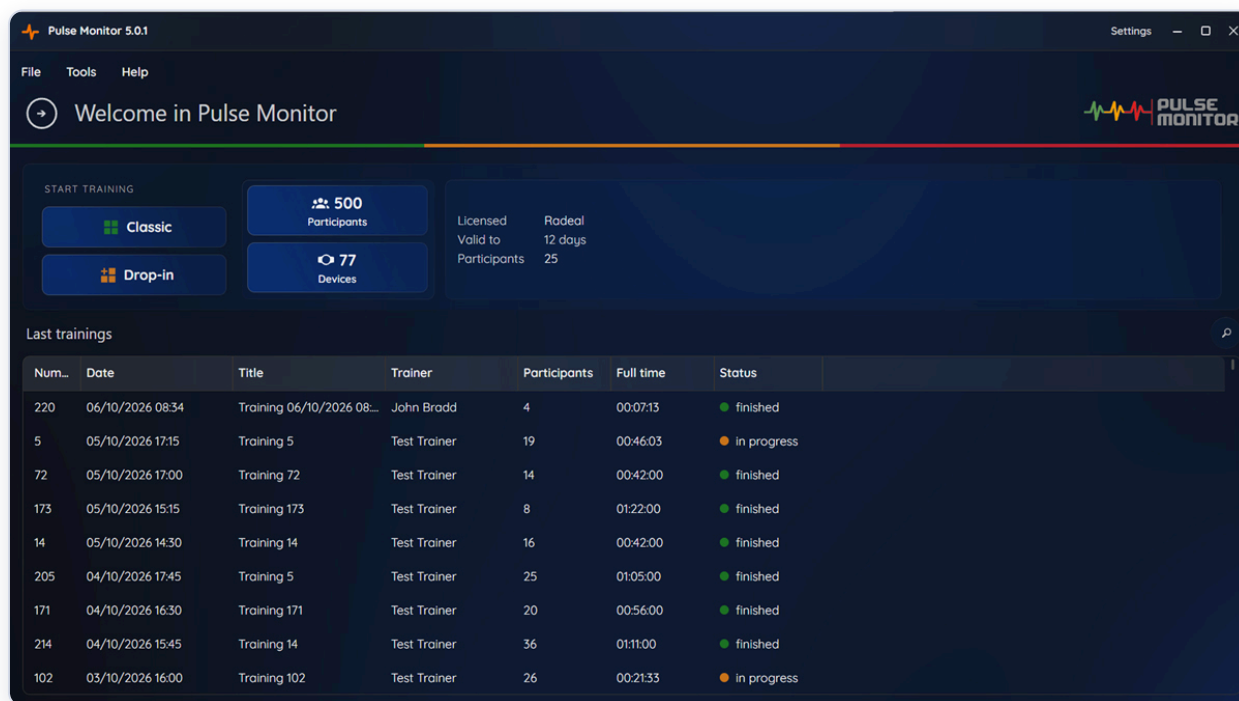
Do not copy or edit `5_pmonitor.db` by hand while the program is running. To make a copy of your data use **File** → **Database** → **Save backup...** ([Backup and restore](#)).

2.5 Uninstalling

Use **Start** → **Pulse Monitor** → **Uninstall**, or **Windows Settings** → **Apps**. Uninstalling removes the program but **does not delete** the data folder described above, so your participants and history are still there if you install Pulse Monitor again later. If you want to remove everything, delete that folder yourself afterwards.

3 Getting to know the main window

The main window is your home base. Everything starts here: you create trainings, open old ones, and reach every list and setting.



The main window of Pulse Monitor.

3.1 Starting a training

Under **Start training** you choose the kind of session:

- **Classic** — *Trainer assigns participants, records data, generates a report.* Use it for a normal class: you decide who takes part, and every measurement is saved. See [Classic training](#).
- **Drop-in** — *People come and go freely — live view only, nothing is saved.* Use it for open gyms and free workouts. See [Drop-in sessions](#).

Hover the mouse over a tile to see this short description.

3.2 Participants and Devices

The two buttons next to the tiles show the number of **Participants** and **Devices** (straps) currently registered. Click either one to open its list — it is the same as **Tools** → **Participants** and **Tools** → **Devices**.

3.3 The list of trainings

The lower half of the window lists every training, newest first.

Column	Meaning
Number	The consecutive number of the training
Date	When the training was created
Title	The name you gave it
Trainer	The trainer you chose
Participants	How many participants it has
Full time	The recorded duration
Status	new (not started yet), in progress (started, not finished) or finished

- **Search.** Type in **Search for training...** to filter the list by title or trainer name. Clear the box to see everything again.
- **Open.** Double-click a row, or right-click and choose **Open**. What you see depends on the status — see [Reopening a training](#).
- **Remove.** Right-click a row and choose **Remove**. After you confirm, the training is deleted together with all its recorded measurements.

WARNING

Removing a training cannot be undone. If you only want to reclaim disk space from old recordings but keep the statistics, use **File** → **Database** → **Database operations** instead ([Cleaning up old data](#)).

3.4 The menus

3.4.1 File

Item	What it does
Data import → Import users data... / Import devices data...	Loads participants (<code>.pmp</code>) or devices (<code>.pmd</code>) from a file (Exporting and importing lists)
Data export → Users data export... / Devices data export...	Saves participants (<code>.pmp</code>) or devices (<code>.pmd</code>) to a file
Database → Import full database...	Restores a complete backup (<code>.pmb</code>) — replaces all current data
Database → Save backup...	Saves a complete backup of all your data
Database → Database operations	Opens the clean-up window for old data
Settings file → Load settings... / Save settings...	Loads or saves the club's settings as a <code>.pms</code> file (Saving and loading the settings)

Item	What it does
Finish	Closes the program

3.4.2 Tools

Item	What it does
Participants	Opens the participants list
Devices	Opens the straps list and the scanner
Trainers	Opens the trainers list
Settings	Opens the settings window (the same as the Settings button in the title bar)

3.4.3 Help

Item	What it does
About	Version, copyright, the licence text and the third-party licences
Register	Opens the registration window

NOTE

The manual is not opened from the program. Use the **Manual** shortcut in the Windows Start menu (**Start** → **Pulse Monitor** → **Manual**).

3.5 Light and dark theme, language

The look of the whole program — theme, colours, language — is changed in **Settings** → **Application layout** ([Application layout](#)). The language and colour-scheme changes take effect after a restart of the program.

4 Licence and registration

4.1 Free mode and a registered licence

Pulse Monitor can be started **without a licence**. In that **Free** mode every training is limited to **two participants**, which is enough to try the whole program: connect a strap, run a class, look at the report.

A **registered licence** lifts that limit to the number of participants you purchased (up to **42** in one training) and is valid for a limited time.

	Free	Registered
Participants in a training	2	As purchased (maximum 42)
Validity	Unlimited	As purchased — a number of days
Registration needed	No	Yes, once per computer

If you try to add more participants than your licence allows, the program tells you: *Your license does not allow you to add another participant to the training.*

NOTE

A licence belongs to the **computer** it is registered on. Depending on what you purchased, one licence can be registered on one or on several computers.

4.2 Getting a licence

You can buy a licence on <https://www.pulsemonitor.net>. After the purchase you receive a **licence code** by e-mail.

4.3 Registering the program

You need an **Internet connection** for this one step.

1. Click **Register** — either the button in the title bar of the main window or **Help** → **Register**.
2. Enter your **licence code**. Type or paste it.
3. Click **Next**.
4. After a moment the window says **Registered successfully**. Click **Ready**.

The main window now shows your licence holder, validity and number of participants. The **Register** button disappears from the title bar, because the program is registered.

4.3.1 If something goes wrong

Message	What to do
The license code you entered is invalid.	Check the code for typing errors (0 and O , 1 and I).
The maximum number of devices for this license has been reached.	The licence code is already in use on another computer (a frequent case). Release it there first (Releasing and moving a licence), or contact us to buy an additional licence.
Failed to connect to server	Check your Internet connection and try again.
This license has been locked by the administrator.	Contact us — see Troubleshooting .
This license has expired.	The validity period is over. Purchase a renewal.
This license does not cover the current program version.	Your licence was bought for an earlier major version. Contact us about an upgrade.
Five incorrect attempts. Window is locked.	Close the window and open it again later.

4.4 Using the program offline

After registration, Pulse Monitor does not need the Internet to run a training. The program periodically verifies the validity of the licence with our server.

4.5 Releasing and moving a licence

The registration window of a registered program has a **Release the license** link. It releases the licence: the program on this computer becomes unregistered (**Free**) again, and the licence is freed so that you can use it again **on this or another computer** — without contacting us. You need an **Internet connection** for this step; if the server cannot be reached, the program says so and the licence stays in force. Your participants, devices and trainings are not touched.

To move a licence to another computer: on the old computer click **Release the license**, then register the same code on the new computer.

WARNING

Do not move the licence file to another computer by hand. The licence is bound to the identifier of the computer on which it was installed and will not work on any other computer. Copying it is also against the licence terms. To move a licence, always use **Release the license**.

4.6 When the licence ends

Fourteen days before the end, the **Valid to** line in the main window turns orange. After the licence expires, a message appears at start-up (**This license has expired. Application functionality is limited.**) and the program continues in **Free** mode. Your data is untouched; once you renew the licence, update it as described in [Renewing a licence](#) and everything works again.

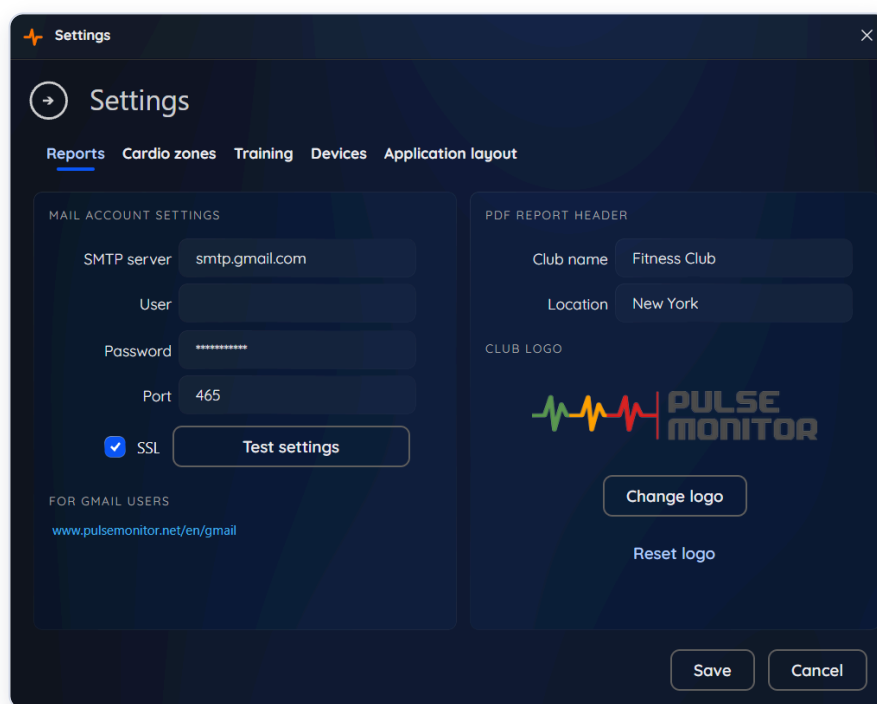
If the licence file does not match the computer or the program version, you see **Your license is not valid. Application functionality is limited.** Register the program again, or contact us.

4.7 Renewing a licence

When you renew a licence or change its version, the licence is updated on our server. To fetch the current licence into the program, open the registration window (**Help** → **Register**) and click **Refresh**. This loads the new licence settings into the program, such as the expiry date or the number of participants (if they have changed).

5 Settings

Open the settings window with the **Settings** button in the title bar of the main window, or with **Tools** → **Settings**. It has five tabs, and a sixth one, **Live API**, when your licence includes that feature:



The Settings window and its five tabs.

Tab	What you set there
Reports	The e-mail account used to send reports, and the club name, location and logo printed on the reports
Cardio zones	The heart-rate zones and their colours
Training	What each participant box shows, belt-contact and antenna indicators, Drop-in options, the calorie calculation
Devices	Which kinds of straps you use, the number of ANT+ receivers, the Bluetooth limit, sleep blocking
Live API	Showing the training on other screens in your network: the switch, the port, the access key (Live API and the browser live view). The tab appears only with a licence that includes the feature
Application layout	Language, units, theme, accent colour, look of the participant boxes

Click **Save** to keep your changes, or **Cancel** to leave without saving. If you changed something and click **Cancel**, the program asks **Cancel changes?** before it discards them.

NOTE

Language, theme and accent colour are previewed immediately while you change them. If you leave with **Cancel**, they return to what they were. After **Save**, a message tells you that the **color scheme change requires restarting the application** — close and open Pulse Monitor again.

TIP

You can save all of these settings to a file and load them on another computer: **File** → **Settings file** → **Save settings...** / **Load settings...** ([Saving and loading the settings](#)).

5.1 Reports

This tab prepares what your participants receive after a training. Do it once, before you send the first report.

5.1.1 Mail account settings

Reports are sent as e-mails with the PDF attached. To send them, Pulse Monitor needs access to an e-mail account that is allowed to send mail (an ordinary mailbox of your club will do).

Field	What to enter
SMTP server	The address of your outgoing mail server, e.g. <code>smtp.yourclub.com</code>
User	Your mailbox login (usually the full e-mail address)
Password	The mailbox password. It is shown as dots
Port	Usually <code>587</code> (the default)
SSL	Leave it checked unless your provider tells you otherwise

Click **Test settings** to check them. The program sends a test message and tells you **Test message sent successfully**, or **I can not send a test message. Check the settings.**

TIP

Gmail users: Google does not accept your normal password for programs like this. Under **For Gmail users** there is a link to a short guide on <https://www.pulsemonitor.net/en/gmail> that shows how to create an *app password* and which settings to use.

If you try to send a report before the account is configured, the program reminds you: *To send reports, configure the e-mail account settings.*

5.1.2 PDF report header

The data printed at the top of every PDF report:

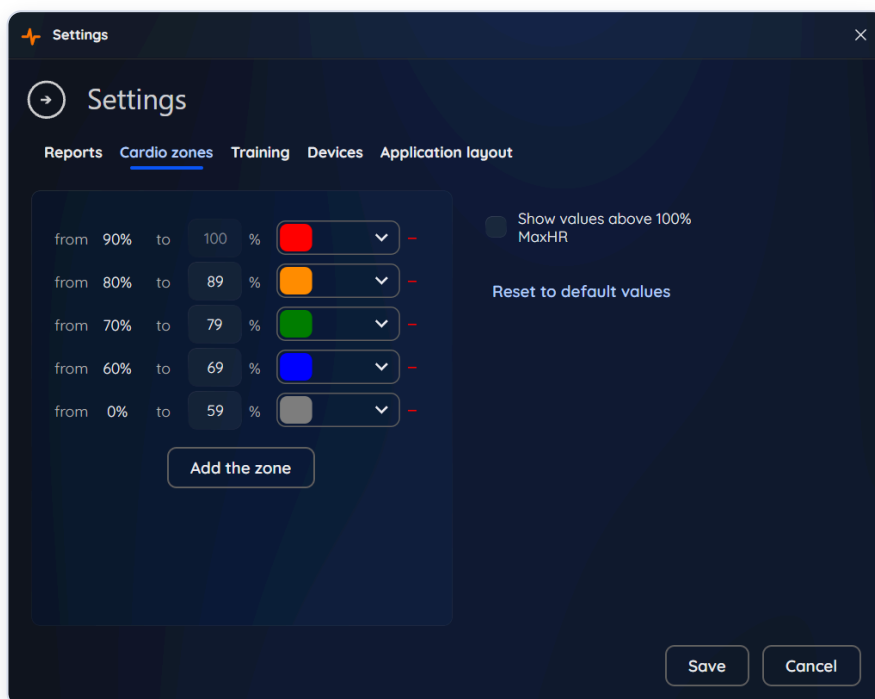
- **Club name** and **Location** — printed under the title of the report.
- **Club logo** — shown in the top-right corner. Click **Change logo** and select an image file (PNG, JPG or GIF). Keep it small: files above **1000 KB** are refused. Click **Reset logo** to return to the standard Pulse Monitor logo.

TIP

A logo with a transparent or white background and a width-to-height ratio of about 2:1 looks best.

5.2 Cardio zones

Heart-rate zones show how hard a participant is working, as a percentage of their personal **Max HR**. Each zone has a colour, and the participant's box on the live screen takes the colour of the zone they are in. Zones also drive the *time in zones* chart on every report.



The cardio zones editor.

5.2.1 The default zones

Default cardio zones (% of the maximum heart rate)



The five default zones.

Zone	From	To	Colour	Typical meaning
1	0 %	59 %	Grey	Rest, very light activity
2	60 %	69 %	Blue	Warm-up, easy effort
3	70 %	79 %	Green	Moderate effort, aerobic endurance
4	80 %	89 %	Orange	Hard effort, high aerobic intensity
5	90 %	100 %	Red	Very hard effort, near maximum

NOTE

There is no single, universal division of heart rate zones. Depending on the training method, zones can have different boundaries - models with three, five or seven zones are all in use. Also, the same percentage of maximum heart rate does not translate into exactly the same level of effort in every person. The default zones in Pulse Monitor are a useful practical model, but the 70 %, 80 % and 90 % boundaries should not be treated as universal physiological thresholds.

5.2.2 Editing the zones

Every row of the editor reads: **from** (*a fixed number*) **to** (*a field you can edit*) %, a **colour** and, on the last row, a red minus sign.

- **Change the upper limit** of a zone by typing a new number in its **to** field. The next zone's **from** adjusts automatically, so there are never gaps or overlaps.
- **Change the colour** by clicking the colour box and choosing another one.
- **Add a zone** with **Add the zone**. The new zone is added on top of the existing ones. You can have at most **eight** zones.
- **Delete a zone** by clicking the red minus on the last row, then confirming **Delete the zone?** The upper limit of the last zone is always 100 %.
- **Reset to default values** restores the five standard zones.

WARNING

Zones are applied to the **whole program**, including reports of earlier trainings: the time-in-zone chart of an old report is drawn with your *current* zones.

5.2.3 Show values above 100 % MaxHR

By default a participant's percentage never goes above **100 %** on the screen, even if their heart rate exceeds their entered maximum. Check **Show values above 100% MaxHR** to see the real percentage, for example **104 %**. Use it when your participants' maximums are rather estimated than measured.

NOTE

This option only changes the *display on the live screen*. The values that are recorded, and the reports, always keep the true heart rate.

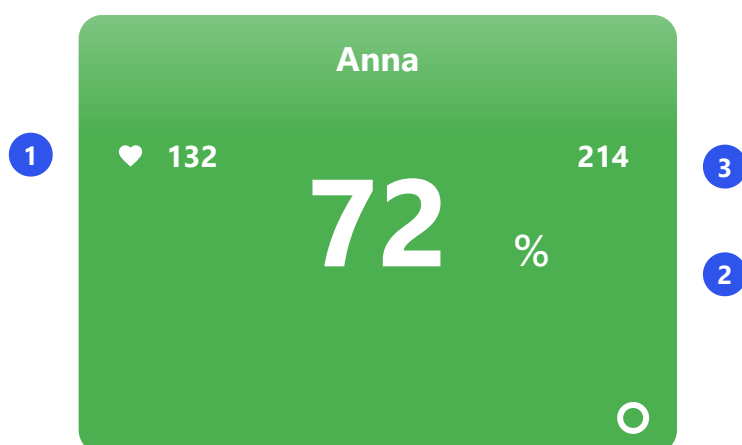
5.3 Training

This tab decides what a participant box shows during a class, how Drop-in sessions behave and how the calories are calculated.

5.3.1 Participant data presentation

Every box has **three data slots** — left, centre (large) and right. You choose what each one shows:

Slot	Default	Choices
Main presentation (centre)	% Of HR MAX	% Of HR MAX, Pulse, Calories
Additional presentation (left)	Pulse	% Of HR MAX, Pulse, Calories, or No presentation
Additional presentation (right)	Calories	% Of HR MAX, Pulse, Calories, or No presentation



- 1 Additional presentation (left)
- 2 Main presentation (centre, large)
- 3 Additional presentation (right)

Each slot shows one of: % Of HR MAX · Pulse · Calories. The side slots can also be switched off.

The three data slots of a participant box.

The centre slot always shows something. The two side slots can be switched off with **No presentation**, which gives a calmer, larger-looking screen.

TIP

For a wall display, the centre slot works best as the **percentage of maximum**: a trainer and a participant can both read it from a distance and it does not depend on age or fitness.

5.3.2 Monitor sensor contact

When checked (the default), a **check the belt** warning appears on a participant's box if their strap keeps sending exactly the same heart rate over many readings — a sign that it lost contact with the skin. See [Reading the participant box](#).

5.3.3 Show antenna activity

When checked (the default), every box shows a small icon of the technology of the participant's strap (ANT+ or Bluetooth) which tells you whether the strap is currently heard. Uncheck it to hide those icons completely.

Each of these two options has an **(i)** icon with a short explanation.

Reset to default values (under the slots) restores this section to the defaults.

5.3.4 Drop-in sessions

Allow unpaired ANT+ devices to join Drop-in sessions. When checked, *any* ANT+ strap the stick can hear appears on the Drop-in screen, even one that was never added to Pulse Monitor. When unchecked (the default), only the straps you registered in **Devices** appear. Bluetooth straps in Drop-in always have to be registered first. See [Drop-in sessions](#).

5.3.5 Calorie calculation

Choose how Pulse Monitor estimates the calories burned. Both options are based on the heart-rate formula of **Keytel et al. (2005)**, which estimates the energy burned from heart rate, age, gender and weight ([Appendix: formulas](#)).

- **Classic (Pulse Monitor)** (default) — the Keytel formula adapted empirically. Its coefficients for women and men were tuned over many years of measurements in clubs, so that the result stays close to what personal devices, such as sports watches, report.
- **Keytel (publication)** — the formula exactly as published by its authors.

The published formula was derived for continuous exercise, and in a group class the heart rate often stays high during short rests, when the muscles burn little. For that reason it can give higher values than a sports watch, especially for heavier participants. The **Classic** option is meant to avoid this.

NOTE

The choice applies to the trainings you record **from then on**. Trainings that are already saved keep the calories they were recorded with, so results recorded with different options are not directly comparable.

Whatever you choose, the calories are an *estimate*, and another device will usually show a somewhat different number, because it uses its own method.

5.4 Devices

5.4.1 Antenna support

Choose which technologies Pulse Monitor uses:

- **ANT+ & Bluetooth** (default) — both are used; straps of either kind work.
- **ANT+** — only ANT+ straps. Bluetooth is not opened at all.
- **Bluetooth** — only Bluetooth straps. You do not need an ANT+ stick.

A switched-off technology is not opened and not checked, and the straps of that kind do not appear in the list when you choose a participant's strap for a training.

TIP

If you only own ANT+ straps, choose **ANT+**. The program no longer looks for a Bluetooth adapter, and you will not see Bluetooth-related messages on computers without one.

5.4.2 Support for ANT+ receivers

Under **Connected receivers** choose **1** or **2**. Two USB sticks in the same computer cover a larger space or a larger room better: a strap heard by either stick is received. With two receivers every participant box shows **two** small ANT+ dots, one per stick. This option is hidden when you choose **Bluetooth** only.

5.4.3 Max Bluetooth straps

How many Bluetooth straps may work at the same time. A typical Bluetooth adapter manages **5 to 7**; the default is **7**, and you can set any number from **1** to **10**. If straps fail to connect during a class, lower the value. When you add participants to a training, Pulse Monitor does not allow you to exceed this number of Bluetooth straps and suggests you use ANT+ straps instead. The option is hidden when you choose **ANT+** only.

NOTE

This limit is **not a restriction of Pulse Monitor**. It comes from the hardware: the Bluetooth adapter in your computer and its driver can keep only a limited number of connections open at the same time.

TIP

Straps that support both ANT+ and Bluetooth are best paired **as ANT+**, so that they do not use up this limit ([Finding straps with the scanner](#)).

5.4.4 System settings

Block sleep and screen saver during training. When checked (the default), Windows will not put the computer to sleep, turn the screen off or start a screen saver while a training or a Drop-in screen is open. This is important for a wall display, where nobody touches the mouse. The normal behaviour returns as soon as you close the training screen.

5.5 Application layout

Setting	What it does
Language	The language of the program. Takes effect after a restart.
Units	metric (kg, cm) or Imperial (lbs, inch) — how weight and height are shown and entered
Colors → Dark / Light	The theme of the program
Accent color	Blue, green, red or orange
Participant panel → Soft / Flat	The look of the participant boxes on the live screen: <i>Soft</i> has rounded corners, a gradient border and a glossy shine; <i>Flat</i> is a plain colour block with square corners

Pulse Monitor is available in **eleven languages**: Chinese, English, French, German, Italian, Korean, Polish, Portuguese (Brazil), Portuguese (Portugal), Russian and Spanish.

WARNING

Changing the **language** requires restarting the application, and so does changing the **color scheme**. Close Pulse Monitor and start it again after you save.

6 Straps and devices

Before a strap can be used in a training, Pulse Monitor has to **know** it. In the program a strap — or an arm band, or an HR watch that broadcasts heart rate — is called a **device**. Every device has:

- an **identifier** that the program recognises it by — a number for ANT+ straps, an address for Bluetooth straps;
- a **source** — **ANT+** or **Bluetooth**;
- a **name** you choose, so that you can tell the straps apart (for example 12).

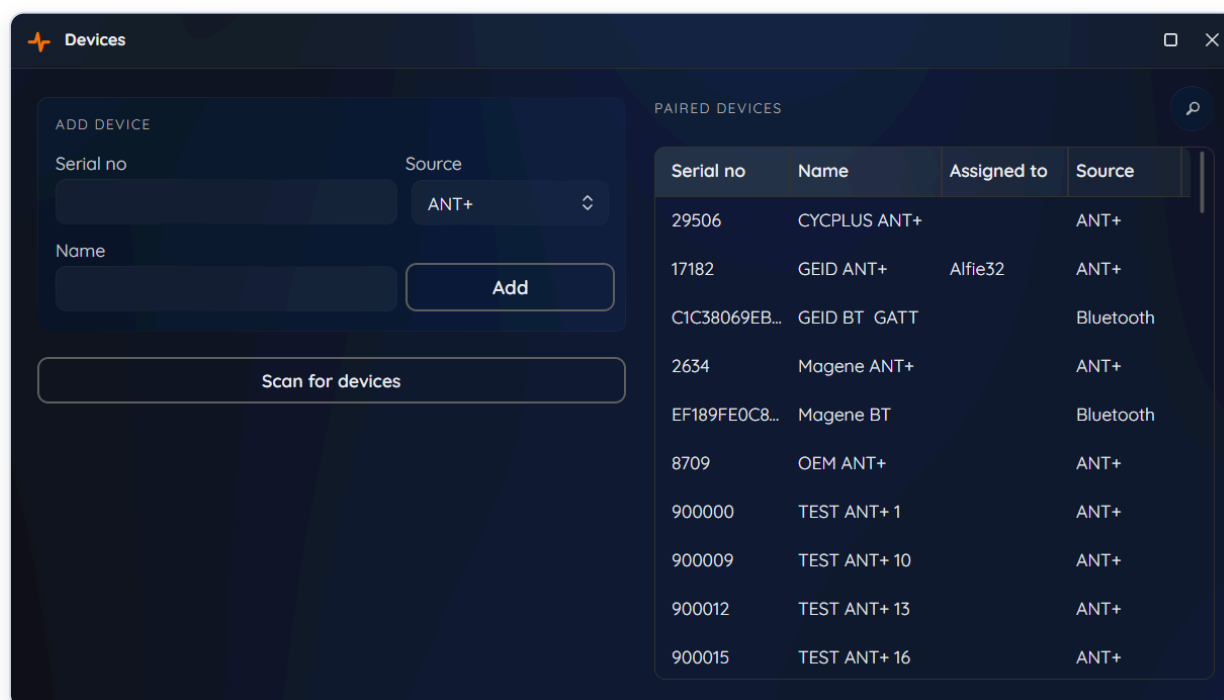
Adding a strap to the program is called **pairing** in this manual. It is *not* the same as pairing in Windows: for Bluetooth straps you do **not** pair anything in the Windows settings. Pulse Monitor finds the strap, remembers its address, and connects when needed.

NOTE

This is done **once per strap**. After that you can use the strap in any number of trainings.

6.1 The Devices window

Open it with **Tools** → **Devices**, or by clicking the **Devices** button on the main window.



The Devices window.

The window has three parts:

1. **Add device** — a small form to add a strap manually.
2. **Scan for devices** — a button that listens for straps in range and lists them under **Detected devices**.

3. **Paired devices** — all straps already known to the program, with a search box.

6.2 Before you start

WARNING

Put the strap on, and moisten the sensor pads. Most heart-rate straps start to transmit only after they detect skin contact. Wear the strap on the bare chest, with the two electrode pads (the rubber or textile patches on the inside) moistened with water or electrode gel. A strap lying on a table sends nothing, and the program cannot find it.

TIP

Pair one strap at a time. When several straps transmit near the receiver, you cannot tell which number belongs to which strap. Put on a single strap, scan, add it, write its name on it — then take it off and do the next one.

6.3 Finding straps with the scanner

1. Make sure the antennas you need are working: the **ANT+** stick is plugged in, and **Bluetooth** is switched on in Windows.
2. Put on the strap.
3. Click **Scan for devices**. The button changes to **Stop scanning**, and the list **Detected devices** appears.
4. While the scan runs, small **pulsing icons** show which receivers are active: the **ANT+** icon and the **Bluetooth** icon. One scan listens to ANT+ **and** Bluetooth at the same time — but only to the technologies you enabled in **Settings** → **Devices**.
5. Within a few seconds the strap appears in the list. **Click it**.
6. Its identifier and source are copied into the **Add device** form. Type a **Name** and click **Add**.

The **Detected devices** list has these columns:

Column	Meaning
Serial no	The identifier of the strap — a number (ANT+) or an address (Bluetooth)
Source	ANT+ or Bluetooth
Pulse	The heart rate the strap is sending right now
In range	How many seconds ago the strap was last heard
Status	New — not yet in your list, or Paired — already added

A detected device is clicked and copied into the form.

TIP

Straps that support both ANT+ and Bluetooth. Most chest straps and arm bands support both technologies. During the scan the program then detects such a strap **twice**, as two different devices with two different serial numbers. We recommend pairing it **only as ANT+**. The number of Bluetooth devices connected at the same time is limited, while with ANT+ there is no such limit — and during a training one strap can use only one of the two technologies anyway.

If no strap appears, see [The strap is not found](#). If the receiver cannot be opened, the program tells you what to check:

- **Make sure the ANT+ antenna is connected to the USB port**
- **Make sure Bluetooth is turned on in your computer**

When you are finished, click **Stop scanning**. Closing the window also stops the scan.

6.4 Adding a strap by hand

Use the **Add device** form when you know the identifier — for example, it is printed on the strap — and do not want to scan.

Field	What to enter
Serial no	For ANT+ : the device number, a whole number greater than 0. For Bluetooth : the 12-digit address, such as <code>AA:BB:CC:DD:EE:FF</code> — colons and dashes are optional

Field	What to enter
Source	ANT+ or Bluetooth
Name	Any short name, for example the strap's number

Then click **Add**. The program checks the data:

- **Complete all data** — a field is empty.
- **Invalid Bluetooth address – expected 12 hexadecimal digits, e.g. AA:BB:CC:DD:EE:FF** — the Bluetooth address has the wrong form.
- **This device is already paired!** — the strap is already in the list.

TIP

Name straps with numbers, starting from 1. Write the number on the strap with a permanent marker, or stick a piece of tape on it. On a busy evening the trainer then simply hands strap number 7 to a participant, and the screen shows "7".

6.5 The list of paired devices

The **Paired devices** list shows:

Column	Meaning
Serial no	The identifier of the strap
Name	The name you gave it
Assigned to	<i>Optional.</i> The participant for whom this strap is the default device (see Default device). Used only by people who have their own strap
Source	ANT+ or Bluetooth

Type in **Search for devices...** to filter the list by name or number.

Right-click a device for its menu:

Command	What it does
Range test	Opens the range test (below)
Release	Detaches the strap from the participant it is assigned to. The strap stays in the list
Remove	Deletes the strap from the list, after confirmation. The participant it was assigned to is left without a default device. Trainings you already recorded keep their data

NOTE

There is no limit on how many straps you register, only on how many are *used at once* in one training.

6.6 Range test

The range test shows how far from the receiver a strap can still be heard. Use it to find the best place for the receiver in your room, to check a doubtful strap, or to find “dead corners”.

1. In the **Paired devices** list, right-click the strap and choose **Range test**. (If a scan is running, the program stops it for you.)
2. **Put the strap on.**
3. Click **Start test**. The window says **Waiting for signal...** until the first signal arrives.
4. Walk away from the receiver, and watch the window.

WARNING

During the test a **Bluetooth** strap (or watch) must **not be connected to anything else**, for example to a phone. Switch off Bluetooth on the phone first, otherwise the strap cannot be heard.



The range test window.

Element	Meaning
A flashing circle	Flashes with every signal received from the strap

Element	Meaning
Signal strength (in dBm) and a bar	How strong the signal is. A value closer to 0 is better: for example –60 dBm is strong, –90 dBm is weak. <i>Available on selected devices</i> — not every strap reports it
Last signal	How many seconds ago the last signal came
Pulse	The heart rate sent in the signal
Beep on every signal	An audible click on every signal, so that you can test without looking at the screen

When the signal is not heard for about **3 seconds** (ANT+) or **5 seconds** (Bluetooth), the window shows **Signal lost**. You have found the edge of the range. Click **Restart test** to try again from another place, or **Stop test** to finish.

TIP

Do the test with two people: one carries the strap, the other watches the screen with the **Beep on every signal** option on and tells you where the sound stops.

6.7 Range of the straps

How far from the receiver can a strap be? There is no single number, and for both technologies the answer is “it depends”.

ANT+ ¹. ANT radios are designed to operate in typical environments **up to about 30 metres** in the open. A strap worn on the chest is a small antenna pressed against a body full of water, which absorbs the signal, so in practice you should plan for **around 10 metres** in a clear room — and less when other people stand between the strap and the stick.

Bluetooth ². The Bluetooth range is not fixed: the Bluetooth SIG names **three factors** that determine it — the **radio spectrum** (Bluetooth uses the 2.4 GHz band), the **transmit power** of the strap (the standard allows from –20 dBm to +20 dBm, i.e. 0.01 mW to 100 mW) and the **receiver sensitivity** of your adapter. A chest strap has a tiny battery and therefore a low transmit power, and a laptop’s internal adapter is usually less sensitive than a good USB dongle. The result can be anything from a few metres to several tens of metres. For orientation: manufacturers of Bluetooth heart-rate straps state ranges of **10 m, often 30 m and even 100 m** — treat these as best-case figures in the open.

What affects the range in your studio

- The **body** of the wearer and of other participants between the strap and the receiver.
- **Walls, metal** (computer case, lockers, mirrors) and **water**.
- **Interference** in the same 2.4 GHz band: Wi-Fi, USB 3 devices, microwave ovens, other wireless equipment.
- The **battery** of the strap — a weak battery lowers the transmit power.

- The **receiver**: the position of the ANT+ stick, the quality of the Bluetooth adapter.

TIP

Do not rely on tables from the Internet: **measure your own room** with the **Range test** ([Range test](#)) with a real participant wearing the strap.

¹ ANT — Garmin / ANT developer documentation (the ANT+ technology owner): *ANT stacks and SoftDevices have been designed to operate in typical operating environments up to 30 meters*. See <https://developer.garmin.com/ant-program> (ANT Advantages page). The “about 10 metres” planning figure for chest straps is the manual’s practical recommendation, not a specification.

² Bluetooth — Bluetooth SIG, *3 key factors that determine the range of Bluetooth*: <https://www.bluetooth.com/blog/3-key-factors-that-determinethe-range-of-bluetooth>

6.8 Choosing the right place for the receiver

- Put the **ANT+ stick** so that it has a free line of sight to the participants. A short USB extension cable lets you move it away from the computer’s metal case, which otherwise absorbs the signal.
- Keep the stick away from other **USB 3** devices and from Wi-Fi routers: they emit noise in the same radio band.
- Plan for around **10 metres** with ANT+ straps in a clear room; Bluetooth varies with the strap and the adapter ([Range of the straps](#)). People’s bodies between the strap and the receiver shorten it in both cases. Measure it with the **Range test**.
- For a large studio use **two ANT+ sticks** and **good-quality active USB extension cables** (**Settings** → **Devices** → **Connected receivers: 2**) on opposite sides of the room.
- For **Bluetooth**, place the computer near the group. The built-in adapter in a laptop has a smaller range than a dedicated USB Bluetooth dongle.

6.9 Batteries and care

- Heart-rate straps use a coin battery (usually CR2032) that lasts for roughly a year of regular use. A strap that has a weak battery often “drops out” or gives odd values — change the battery first.
- For **care** (rinsing, drying, washing, storage), always follow the **recommendations of the manufacturer** of your strap.

6.10 Straps and licences

The number of straps you may register is not restricted by the licence. What is restricted by the licence is the number of participants in one training ([Licence and registration](#)).

7 Participants and trainers

A **participant** is a person whose heart rate you want to monitor. Registering participants in advance has big advantages: the live screen shows their nickname, the percentage and calories are calculated from their own data, their results are kept, and they can receive a report by e-mail.

7.1 The participants list

Open it with **Tools** → **Participants**, or with the **Participants** button on the main window.



Full name	Nickname	Gender	Weight	Height	Age	Max HR	Default device	E-mail
Alfie Watson	Alfie29	male	112	155	28	184		alfie.watson2
Alfie White	Alfie435	female	94	157	28	186		alfie.white435
Alfie Wright	Alfie260	female	45	166	32	173	Garmin BT	alfie.wright2
Amelia Baker	Amelia489	female	73	187	40	182		amelia.baker
Amelia Brown	Amelia433	male	83	170	38	168		amelia.browi
Amelia Hughes	Amelia411	male	56	155	49	194		amelia.hughe
Amelia Hughes	Amelia471	male	82	198	43	183		amelia.hughe
Amelia Jackson	Amelia19	male	119	193	62	163		amelia.jacks

The participants list.

Column	Meaning
Full name	The participant's name
Nickname	The short name shown on the live screen
Gender	male or female
Weight, Height, Age	Body data, used to calculate calories
Max HR	The participant's maximum heart rate, the reference for all percentages
Default device	<i>Optional.</i> The participant's own strap
E-mail	Where reports are sent

At the top, **Add Participant** creates a new participant, and **Search participant...** filters the list by name, nickname or e-mail address as you type.

Right-click a participant, or double-click for the card:

Command	What it does
Participant card	Opens the participant's card with statistics (Participant card). Also opens with a double-click
Edit	Opens the participant's data for editing
Remove	Deletes the participant, after confirmation

7.2 Adding and editing a participant

Click **Add Participant**, fill in the form and click **Save**.

The participant form.

Field	What to enter
Full name	Name and surname. Used on reports
Nickname	A short name — this is what appears on the live screen . Use something your group will recognise. Shorter is better: it must fit in the box
Gender	male or female , used in the calorie calculation
Age	In years

Field	What to enter
Weight	In kg or lbs , according to your units setting
Height	In cm or inch
Default device	<i>Optional.</i> The strap this participant normally uses (Default device). — none — is allowed
Max HR	The maximum heart rate (Maximum heart rate)
E-mail	<i>Optional.</i> The address to which the participant's reports are sent

All fields except **E-mail** are required. If something is missing, or weight, height or maximum heart rate is not a positive number, the program asks you to **Enter the relevant data**.

WARNING

Choose your units first. Weight and height are stored exactly as you type them, in the unit selected at that moment under **Settings** → **Application layout** → **Units**. If you change from metric to imperial later, existing numbers are *not* converted — they are simply read in the new unit. So decide on **metric** or **imperial** before you enter your first participant.

7.2.1 Maximum heart rate

Max HR is the highest heart rate this person can reach. Every percentage and every colour on the screen is calculated from it, so it is the single most important number you enter.

- **If you know it** — from a stress test or from a hard effort wearing a strap — type it in. This is the best case.
- **If you do not**, click into the empty **Max HR** field **after you entered the age and gender**. Pulse Monitor fills in an *estimate* calculated from age and gender (see [Appendix: formulas](#)).

TIP

The estimate is a population average: for an individual it can be off by ± 10 beats or more. If a participant keeps "maxing out" at 95 % without effort — or never gets above 80 % even when exhausted — adjust their **Max HR**. You can do it during a training too, without losing anything ([Pausing and going back](#)).

7.2.2 Default device

If a participant always uses the same strap, set it as their **Default device**. The advantages are two-fold:

- In a **Classic** training, when you pick the participant, their strap is **selected for you** (their name has a star ★ in the list).
- In **Drop-in** sessions, a strap that is the default device of a participant is displayed with **that participant's nickname and data**, instead of a "?" ([Drop-in sessions](#)).

A strap can be the default device of only one participant. In the **Devices** list the column **Assigned to** shows who owns it.

7.2.3 Calories

The calories shown are an *estimate* from heart rate, age, gender and weight; they are higher the harder the participant works. The formula is in [Appendix: formulas](#). Treat them as a comparison between workouts, not as a medical measurement.

7.3 Removing a participant

Right-click the participant and choose **Remove**. The program asks *Delete (name) together with all of their data? Trainings on record: N. This cannot be undone.* — click **OK** to confirm.

WARNING

Removing a participant also deletes **all of their history**: their results in every training they took part in. This cannot be undone. Make a backup first if you are not sure ([Backup and restore](#)).

7.4 Exporting and importing lists

You can move your participants and your devices to another computer, or share them between two computers in a club.

7.4.1 Export

- **File** → **Data export** → **Users data export...** saves all participants.
- **File** → **Data export** → **Devices data export...** saves all devices.

Both open a file dialog. Participants are saved to a file with the extension **.pmp**, devices to a file with the extension **.pmd**. A message **A copy of the data has been saved** confirms the export.

NOTE

A participant's default device is exported **together with the identifier of the strap**, so that it can be matched on the other computer.

7.4.2 Import

- **File** → **Data import** → **Import users data...** or **Import devices data...**

The import window asks what to do with the data from the file:

Option	Result
Complete and update from a data file	New items are added. Items that already exist (a participant with the same full name, a device with the same number) are updated from the file

Option	Result
Only a complete list of new data from a file	Only the new items are added. Items that already exist are left as they are
Remove and replace the entire list with the data from a file	The whole list is deleted first and then replaced by the file

Choose the file with **Select the file to import**. When it is done, the program confirms **Import completed successfully**.

TIP

When you move *both* participants and devices, **import the devices first**, then the participants. That way each participant's default device is found and reconnected. A device that is not in the program is silently skipped and the participant simply has no default device.

WARNING

The third option deletes your current list. Make a backup first ([Backup and restore](#)).

Files from a different source, or damaged ones, are refused with **Invalid data file format**.

7.5 Trainers

A **trainer** is simply a name that you can select when creating a training, so that it appears in the training list and on the reports. Maintaining a list of trainers saves typing and keeps the spelling consistent.

Open the list with **Tools → Trainers**.

- **Add trainer** adds a name. If the name is already on the list, the program says **This trainer already exists!**
- **Search trainer...** filters the list.
- Right-click a trainer to **Edit** the name or to **Remove** it (after confirmation: **Do you want to remove this trainer?**).

NOTE

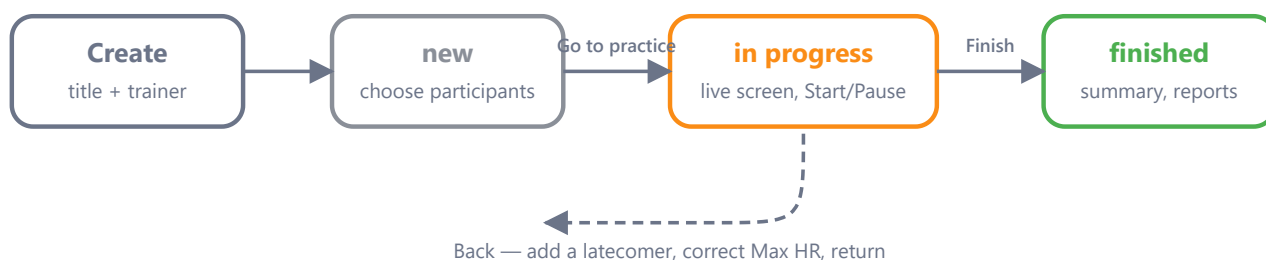
A trainer's name is saved *in each training* as text. Renaming or removing a trainer in this list does not change trainings that were already created.

A trainer is also added to the list automatically when you type a new name in the **Create new training** window. The program remembers the **last trainer** you used and suggests that name next time.

8 Classic training

A **Classic** training is the full-featured session: you decide **who** takes part and with **which strap**, the program **records** everything, and afterwards every participant has a **report**.

The status of a Classic training



The life of a Classic training.

A training always has one of three **statuses**, shown in the list on the main window:

Status	Meaning	What you can do
new	Created, not started	Add and remove participants, start the training
in progress	Started at least once, not finished	Add or remove participants, go back to the live screen and continue
finished	Closed with Finish	Look at the summary and reports. Participants can no longer be changed

8.1 Step 1 — Create the training

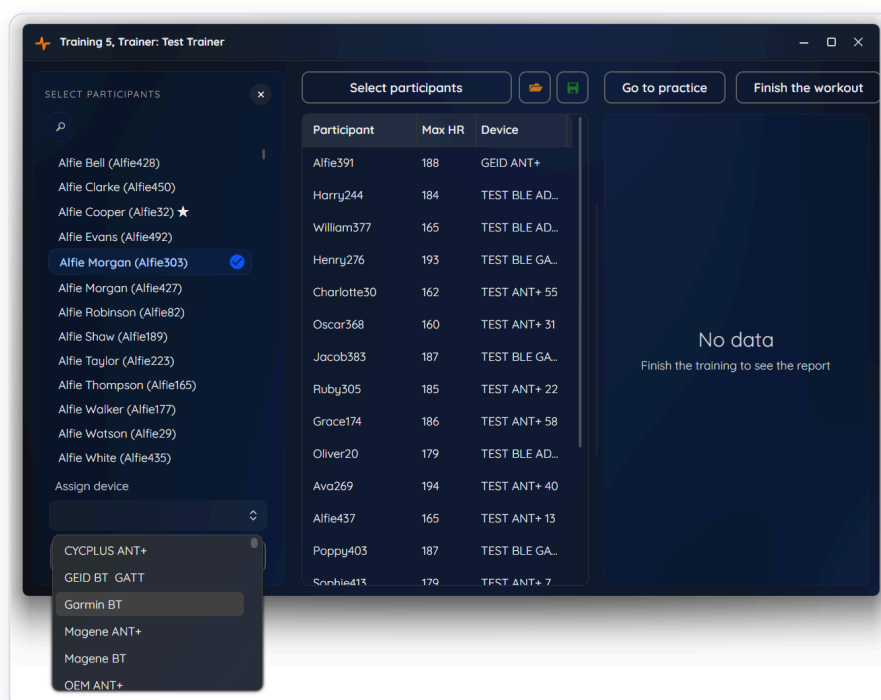
On the main window click **Classic**. The **Create new training** window opens.

Field	What to enter
Title	The name of the class. The program suggests <i>Training</i> with the current date and time — keep it or type something better, such as <i>Spinning Monday 18:00</i>
Trainer	Pick a trainer from the list, or type a new name. The last trainer you used is suggested

Click **Next**. Click **Cancel** to give up — nothing is created.

8.2 Step 2 — Choose participants

The training window opens. Its title shows the training name and trainer, followed by **(new)**.



The training window before the start.

The window has two sides: the **participants of this training** on the left and a **work area** on the right (empty before the start; after the training it shows reports).

8.2.1 Adding a participant

1. Click **Select participants**. A panel opens on the left.
2. Find the person: scroll the list or type in **Search participant...**. Participants who are already in this training are not shown again. A ★ next to a name means that the participant has a **default device**.
3. Click the name. If the participant has a default device, it is **selected for you** under **Assign device**. Otherwise, choose a strap from the list.
4. Click **Add**. The participant appears on the list.

Under **Assign device** you only see straps that are **not yet used** in this training, and only of the kinds enabled in **Settings** → **Devices**.

Repeat for everyone. Close the panel with the × in its corner, or by clicking **Select participants** again.

TIP

Participants and straps must already exist in the program before you can select them. Prepare them in advance in **Tools** → **Participants** and **Tools** → **Devices**, and give every regular participant a **default device** — then adding a participant to a class is a single click.

The list of the training's participants has three columns: **Participant**, **Max HR** and **Device**.

8.2.2 Limits

- **Participants.** You cannot add more people than your **licence** allows: *Your license does not allow you to add another participant to the training.* The technical maximum is **42**. A program without a licence allows two ([Licence and registration](#)).
- **Bluetooth straps.** You cannot add more Bluetooth straps than the limit set in **Settings** → **Devices**: *No more Bluetooth straps can be added to this training – the maximum is 7. Use ANT+ straps instead.* ANT+ straps have no such limit.
- **One strap per participant** and **one participant per strap** within a training.

8.2.3 Editing and removing

Right-click a participant in the list of the training:

Command	What it does
Edit	Opens the participant's data — for example, to correct the Max HR — and applies the change
Remove from training	Removes the participant from this training only, after confirmation. The participant stays in your database

8.2.4 Saving and loading a list of participants

Do you run the same class every week with the same people? Two small buttons above the list save you the setup:

- **Save list** — saves the current list of participants **with their straps** to a file with the extension `.pmc`. The file name is taken from the training title.
- **Load list** — loads such a file into the current training. Participants and straps that were already added, and ones that no longer exist in your database, are skipped. The program reports **List loaded. Items in file: N. Added: M.**

NOTE

The list is only valid on the **same computer / the same database**: it points to participants and straps that are already in the program. It does not contain personal data.

8.3 Step 3 — Go to the live screen

When everyone is on the list, click **Go to practice**. (The button appears as soon as there is at least one participant.) If the list is empty, the program reminds you to **Select trainees**.

The training status changes to **in progress**, and the **live screen** opens in full screen. Participants' boxes are there, but nothing is being recorded yet: **the training starts only when you press Start**.

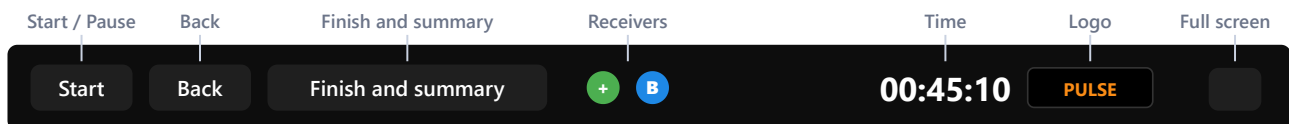
8.4 Step 4 — The live screen



The live screen — before the start.

The live screen is designed for a **wall display**: it fills the whole screen, uses a black background and large, high-contrast digits. It never needs scrolling — whether you have 4 or 42 participants, the program arranges the boxes in a grid and enlarges or shrinks them so that **every box is always on the screen**.

8.4.1 The bottom bar



The bottom bar of the live screen.

Element	What it does
Start / Pause	Starts the recording. After starting, the button becomes Pause
Back	Leaves the live screen without finishing the training (Pausing and going back)
Finish and summary	Ends the training and opens the summary. Visible after the training was started at least once
Pulsing ANT+ and Bluetooth icons	Show which receivers are open and working
Time (hh:mm:ss)	The recorded duration of the training
Logo	The Pulse Monitor logo

Element	What it does
Full-screen button	Toggles full screen

The big orange **Play** button in the middle of the screen does the same as **Start**. It disappears once the training runs.

8.4.2 Starting

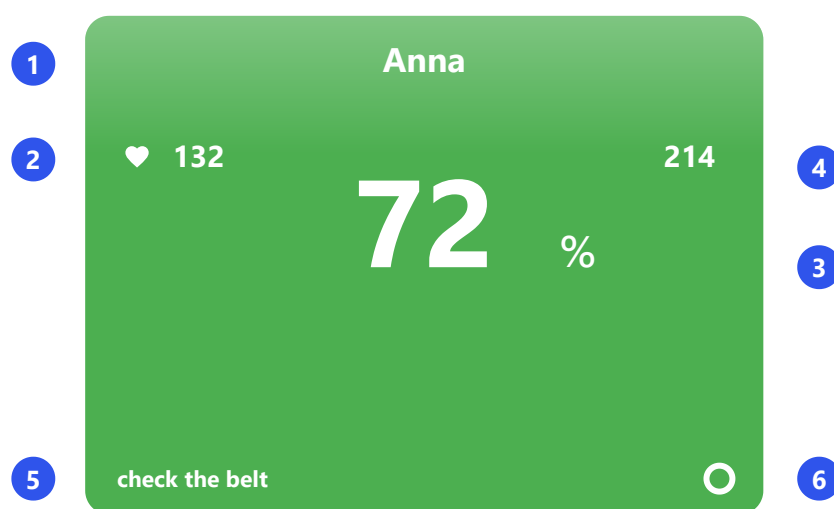
Press **Start** (or the big **Play** button). The clock starts and **recording** begins. From now on the program saves each participant's heart rate every ten seconds.

NOTE

Until you press **Start** the boxes already show live data, so you can check that every strap works **before** the class begins. Nothing is recorded and the clock does not run.

8.4.3 Reading the participant box

Each participant has one box.



Colour of the whole box = the participant's current zone

Grey box with dashes (--) = no signal from the strap

Anatomy of a participant box.

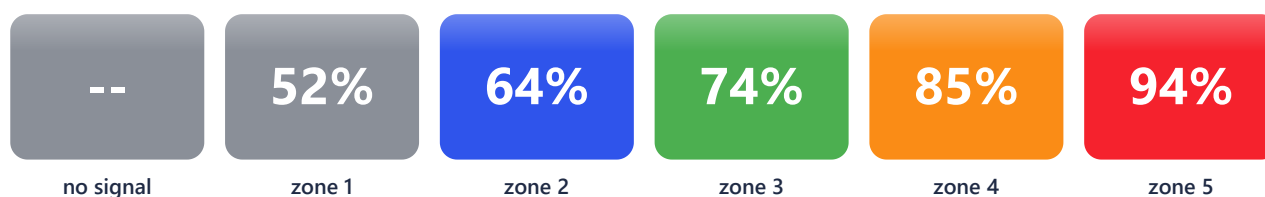
Number	Element	Meaning
1	Nickname	The participant's nickname. In Drop-in sessions, a small ? appears after it for an unknown participant
2	Left slot	By default the heart rate in beats per minute

Number	Element	Meaning
3	Centre slot	The large number: by default the percentage of the participant's maximum heart rate
4	Right slot	By default the calories burned so far
5	Check the belt	A warning in the bottom-left corner, see below
6	Technology icon	In the bottom-right corner: the technology of the participant's strap and its signal

You choose what slots 2, 3 and 4 show in **Settings** → **Training** ([Participant data presentation](#)).

8.4.3.1 The colour of the box

The **colour of the whole box** is the colour of the participant's current **cardio zone**.



Box colours and zones.

With the default zones: **grey** is rest (up to 59 %), **blue** is a warm-up, **green** is moderate effort, **orange** is hard effort, and **red** is very hard effort, near maximum (from 90 %). A trainer can read the state of the whole room from the colours alone.

A **grey box with dashes (–)** means that **no signal** is being received from that strap at the moment — the strap is not on, is out of range or its battery is flat. The values come back automatically as soon as the strap is heard again.

8.4.3.2 The “check the belt” warning

A strap that has lost good contact with the skin often keeps sending its last value for a while, or sends a perfectly constant one. When the heart rate has not changed over a series of consecutive readings (about 15 on one receiver), the box shows **check the belt** in its bottom-left corner. Ask the participant to tighten the strap and moisten the electrodes.

- The warning disappears as soon as the value changes.
- You can switch it off in **Settings** → **Training** → **Monitor sensor contact**.

8.4.3.3 The technology icon

In the bottom-right corner each box shows **the technology of that participant's strap**:

Icon	Meaning
Green ANT+ symbol	An ANT+ strap that is currently heard
Blue Bluetooth symbol	A Bluetooth strap that is currently heard
The same symbol in white and dimmed	The strap is not heard at the moment (no signal)
Two ANT+ symbols	You use two ANT+ receivers; each symbol shows whether <i>that</i> receiver hears the strap

You can hide these icons completely with **Settings** → **Training** → **Show antenna activity**.

8.4.4 Pausing and going back

- **Pause** stops the clock and the recording; the boxes continue to show live values. Press **Start** to continue. Use it for a water break or an explanation.
- **Back** closes the live screen and brings you back to the training window — **without finishing** the training. The status stays **in progress**, and everything recorded so far is kept. There you can, for example:
 - add a participant who came late,
 - correct a participant's **Max HR**,
 - then click **Go to practice** again and press **Start**.

When you come back to the live screen, the clock continues from where it stopped, and the **calories and highest heart rate continue from their earlier values** — they do not start from zero.

TIP

Late arrival: **Back** → **Select participants** → **Add** → **Go to practice** → **Start**. Everybody else's measurements are not interrupted for more than a few seconds, and the program records nothing while you are in the training window.

8.4.5 Full screen

The live screen opens in **full screen**, without a title bar. To exit full screen press **Esc** or click the full-screen button in the bottom bar; click it again to return. In the windowed mode there is a title bar with the usual minimise, maximise and close buttons.

NOTE

Keep the computer awake. While the live screen is open, Windows does not go to sleep and does not start the screen saver (**Settings** → **Devices** → **Block sleep and screen saver during training**). This is on by default.

8.4.6 Finishing

Click **Finish and summary**. The program asks **Do you want to end this workout?** Click **Yes**.

The recording is closed, the results of every participant are calculated and saved, the status becomes **finished**, and the **summary** opens ([The summary screen](#)). A finished training cannot be continued.

WARNING

Finish and summary is final. If somebody asked you for just a short break, use **Pause**, not **Finish**.

8.5 Reopening a training

On the main window, double-click a training in the list (or right-click and choose **Open**). What you see depends on the status:

Status	Opens	Typical use
new	The training window	Prepare participants in advance, start later
in progress	The training window with Go to practice	Continue the class after a break or after a crash of the computer
finished	The training window with the Summary and Send reports buttons	Look at the results, send or save reports

NOTE

If the computer switched off or the program crashed during a class, the recorded data is not lost: the training is still **in progress**. Open it and go on, or click **Finish the workout** in the training window to close it with what has been recorded.

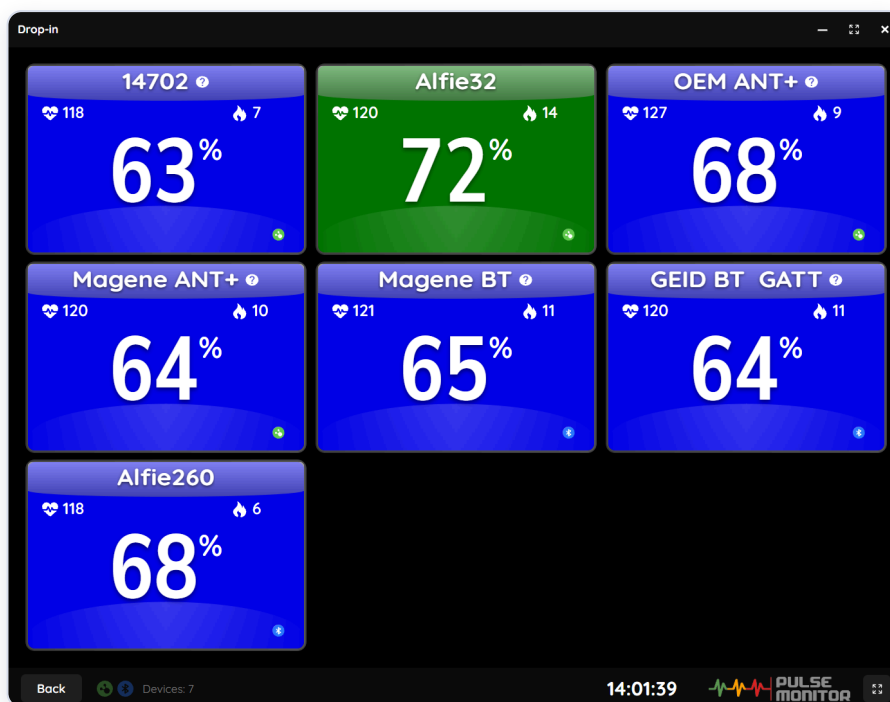
8.6 Deleting a training

Right-click a training in the main list and choose **Remove**. After confirmation (**Do you want to remove this training?**) the training and all its measurements — including the raw data file — are deleted. This cannot be undone.

9 Drop-in sessions

Drop-in is the mode for a gym or a studio where people **come and go freely**. There is no class to create, no list of participants and nobody to start anything: whoever puts on a strap and stands in range appears on the screen, and whoever leaves disappears.

People come and go freely — live view only, nothing is saved.



A Drop-in screen with a few participants.

9.1 Classic or Drop-in?

	Classic	Drop-in
Created in advance	Yes — title, trainer, list of participants	No
Who is on the screen	Participants you added, always	Whoever is heard — appears and disappears automatically
Start / Pause	Yes	No — it is always live
Recorded in the database	Yes	No — nothing is saved
Reports and statistics	Yes	No
Uses the participant's data (max HR, weight...)	Always	Only for a participant's own default strap

	Classic	Drop-in
Typical use	Group classes, courses	Open gym, free training, a demonstration at an event

NOTE

Drop-in used to be called *Open workout*. The idea is the same, but it is much improved in version 5: participants are recognised by their **default device**, and Bluetooth straps work too.

9.2 Starting a Drop-in session

On the main window click **Drop-in**. The live screen opens in full screen and starts listening immediately. If a receiver is not available, the program tells you, for example *Make sure the ANT+ antenna is connected to the USB port*.

9.3 What appears on the screen

Each participant gets a box exactly like in a Classic training ([Reading the participant box](#)): the colour of the zone, the percentage, the heart rate and the calories.

The bottom bar shows:

Element	Meaning
Back	Leaves the Drop-in screen. Because this screen often runs on a wall display, the program asks first: Do you want to exit the Drop-in view?
Pulsing ANT+ / Bluetooth icons	The receivers that are open
Devices: N	How many straps are currently on the screen
Clock	The current time of day (there is no training clock in Drop-in)
Full-screen button	Toggles full screen. Esc leaves full screen

9.4 Who appears

A participant appears **at the first reading** from their strap and disappears after **30 seconds of silence**. If they return, they appear again as a **new** participant — the calories count **from zero**.

What the box shows depends on which strap it is:

The strap is...	The box shows
The default device of a registered participant	The participant's nickname and real data: their Max HR , age, weight and gender, so percentages and calories are accurate
Registered in Devices but nobody's default device	The name of the strap and generic values (Max HR 185, age 25, weight 70 kg). A small ? is shown after the name
Not registered at all (ANT+ only)	The strap number with generic values and a ?. Shown only if you allowed it in Settings → Training → Allow unpaired ANT+ devices to join Drop-in sessions

TIP

For the best Drop-in experience, register your straps, number them, and set each regular member's strap as their **default device**. They will see **their own nickname** and **correct** percentage and calories, every time they pick up their strap.

9.4.1 Bluetooth in Drop-in

A Bluetooth strap has to be **registered first** — Pulse Monitor connects only to straps it knows, because every connection occupies one of the limited Bluetooth slots, and it would be wasteful if a stranger's strap took the slot. The **Allow unpaired** option concerns ANT+ only.

9.5 Limits

- At most as many participants as your **licence** allows — in Free mode, two ([Licence and registration](#)). Anyone beyond that is ignored.
- At most the **Max Bluetooth straps** number of Bluetooth connections at the same time.

9.6 A wall display that runs all day

Drop-in is designed to run without a trainer next to the screen:

- The computer stays awake while the screen is open (**Block sleep and screen saver during training**).
- When the room empties, the screen is simply empty; when someone enters, they appear.
- Leaving the screen is protected by a confirmation, so that a stray tap does not close it.

TIP

Place the ANT+ stick on a short extension cable in the middle of the room, and the computer or the display near the entrance, so that people see themselves as they walk in.

10 Reports and the training summary

Right after a **Classic** training ends — and at any time afterwards — you can look at the results, give the participants their reports, or export the data. Drop-in sessions are not recorded, so they have no reports.

10.1 The summary screen

When you click **Finish and summary** on the live screen, a **summary screen** opens in full screen: one coloured box per participant, in the same grid as on the live screen.



The summary screen.

Each box shows:

Value	Meaning
Average heart rate	The average over the whole training, and — in the line above the number — the same value as a percentage of the maximum
Highest heart rate	The peak, with its percentage
Calories burned	The total for the whole training

The **colour** of a box is the zone of the participant's **average** heart rate, so you see at once who worked at which intensity during the whole class. The total **time** of the training is shown in the bottom bar.

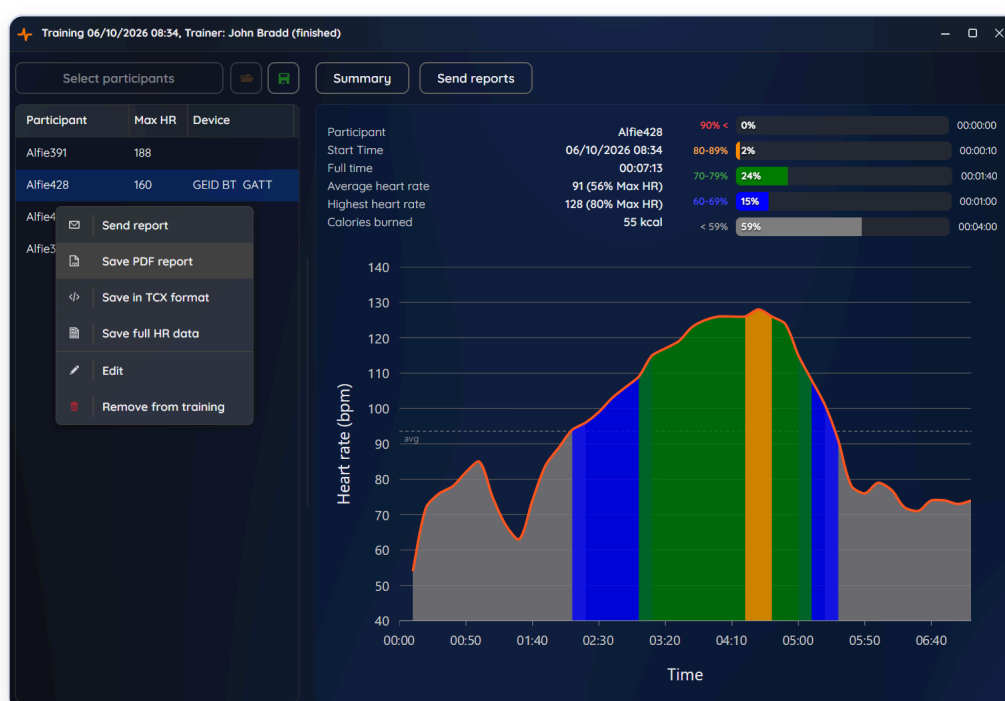
Click a participant's box to open their **heart-rate chart**: a line of the heart rate against the time of the training, drawn over coloured bands of your zones. A participant who was present for only a part of the class has their line in the right place along the time axis. Close it with **x** or **Esc**. **Back** returns to the training window.

NOTE

The percentages in reports and in the summary are always calculated from the participant's **maximum heart rate as it was when the training was finished** (it is remembered when you click **Finish**). If you change a participant's **Max HR** later, the reports of their *old* trainings do not change.

10.2 The training window of a finished training

Open a finished training from the main window. The window shows the list of participants on the left, and **a report of the selected participant** on the right.



The report of the selected participant.

The report of a participant has three parts:

1. **The figures:** Participant, Start Time, Full time, Average heart rate, Highest heart rate and Calories burned.
2. **Training in zones:** a bar for each zone showing **how much time** the participant spent there and what **percentage** of the training that is.
3. **The heart-rate chart** of the whole training, drawn over the zone bands.

If a participant's strap did not deliver any data during the training, the panel says **No data was recorded for this participant** and no report can be created for them.

10.2.1 Buttons of a finished training

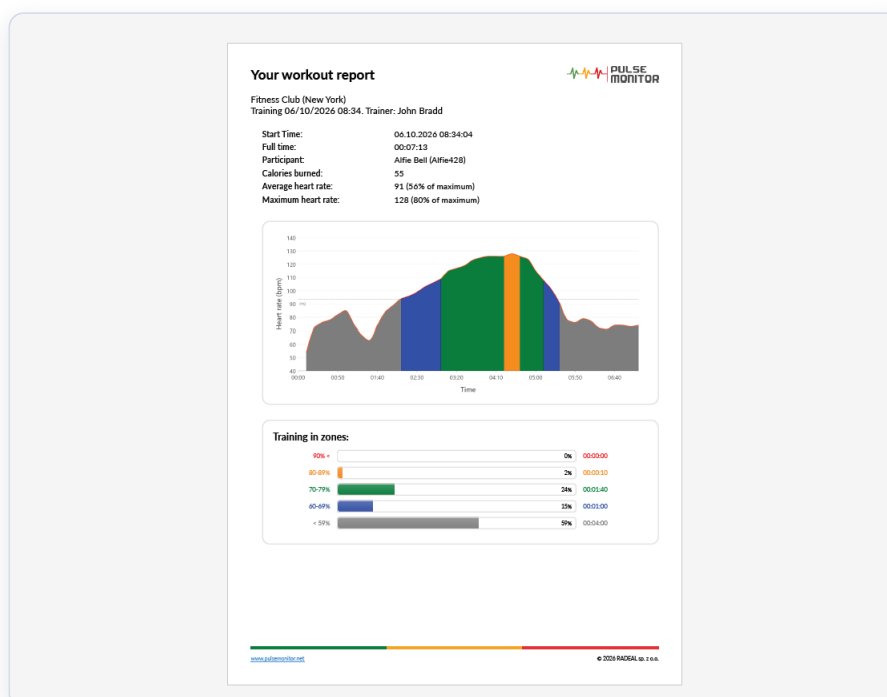
Button	What it does
Summary	Opens the summary screen again
Send reports	Sends the e-mail report to all participants who have not received it yet (Sending reports)

10.2.2 The participant menu

Right-click a participant in a finished training:

Command	What it does
Send report	Sends this participant's report by e-mail
Save PDF report	Saves the report as a PDF file
Save in TCX format	Saves the training as a TCX file
Save full HR data	Saves all raw readings as a CSV file
Edit	Opens the participant's data
Remove from training	Removes the participant from this training

10.3 The PDF report



A sample PDF report.

A one-page A4 report with:

- the **title** *Your workout report*, the **club name** and **location**, the **name** of the training and the **trainer** — and your **logo** in the top-right corner (set in **Settings** → **Reports**);
- a table: **Start Time**, **Full time**, **Participant**, **Calories burned**, **Average heart rate** and **Maximum heart rate**, each with its percentage **of maximum**;
- **Training in zones**: for every zone, the time and the percentage, in the zone's colour;
- the **heart-rate chart** of the training;
- a footer with the address of the product's website.

The language of the report is the language of the program. Chinese and Korean reports are supported, too.

10.4 Sending reports

A participant receives the report **by e-mail**: a friendly message with the main figures, and the **PDF** and **TCX** files as attachments. The subject reads *Your workout report*.

Before you send anything:

1. Set up the **mail account** and the **club data** in **Settings** → **Reports** ([Reports](#)).
2. Fill in the **e-mail address** of each participant.
3. Be connected to the Internet.

10.4.1 One participant

Right-click the participant and choose **Send report**. The program checks for an e-mail address (*This participant has no email address*), asks **Do you want send a report to the user?** and sends the message. A confirmation says **Report sent**, or **Failed to send the report**.

10.4.2 All participants

Click **Send reports**. The program asks **Whether to send reports to customers?** and then opens a small window with a **progress bar** and the name of the participant to whom the report is currently being sent. Sending to a large group may take a while; **Cancel** stops it at any moment, and the reports that already went out stay sent. At the end the program says **Reports sent: N**.

Reports are sent only to participants **who have not received one yet**. A participant with no e-mail address is skipped. You can click **Send reports** again later — for example after adding missing addresses — and only the remaining participants will get a message.

TIP

Send the reports right after the class. Participants like to see their heart-rate chart while they still remember how they felt.

NOTE

If sending fails every time, check the mail account with **Test settings**, and — for Gmail — read the guide linked in **Settings** → **Reports**.

10.5 Exporting the data

You can take the recorded data of a participant to other programs. Right-click the participant of a finished training:

Format	Command	Contents	Use it for
PDF	Save PDF report	The report described above	Printing, archiving, sending by hand
TCX	Save in TCX format	A training with the heart rate every ten seconds , total time, calories, average and maximum heart rate	Importing the workout into fitness services and apps that read TCX files
CSV	Save full HR data	Every raw reading: two columns, hr and time (with a tenth of a second), separated by semicolons	Your own analysis in a spreadsheet

NOTE

Straps send readings at various intervals — mostly once a second, sometimes several times a second, sometimes once every two or three seconds. That is why the **CSV** rows are not at exactly regular intervals.

A participant who has no recorded data cannot be exported: the program says so (*No data to write* or *No data was recorded for this participant*).

11 Participant card

The **participant card** is the personal page of one participant. It collects, in a single window, everything the program knows about them: their data, their history and — most useful — **how their heart rate changes over weeks and months**. Use it to see progress: a falling *average* heart rate at the same effort is a good sign.

11.1 Opening the card

Open **Tools** → **Participants** and then either:

- **double-click** the participant, or
- **right-click** the participant and choose **Participant card** (the first item in the menu).



The participant card.

11.2 The left panel

The left panel has two sections.

Participant details — the nickname in large letters, the full name below it, and then the **gender** (with an icon), **age**, **weight**, **height**, **Max HR**, **default device** and **e-mail**. The **Edit** button opens the participant's form, so you can correct something without leaving the card.

From trainings — figures from the participant's **whole history**:

Line	Meaning
First training / Last training	The dates of the first and the last measured training
Number of trainings	How many trainings the participant took part in
Total training time	The sum of the recorded time
Calories burned	The sum of the calories

11.3 The Statistics tab

The right panel shows a **bar chart**. For every training or period there are two bars:

- a **green** bar — the **average** heart rate;
- a **red** bar — the **highest** heart rate.

Above the chart the program shows the **total time** and the **calories** of the range you selected.



The five ranges of the chart.

Choose the range with the buttons above the chart:

Range	What the bars represent
Last 30 trainings	One pair of bars per training, the 30 most recent
This month	The trainings of the current calendar month
Previous month	The trainings of the previous month
Last 30 weeks	One pair of bars per week
Last 30 months	One pair of bars per month

When there is less history than the maximum of 30 positions, the chart is simply shorter. A week or a month in which the participant did not train appears as a **gap**.

NOTE**How the numbers are calculated.**

- Only **finished** trainings in which the participant was **actually measured** are counted.
- The average of a week or a month is **weighted by time**: a long training counts more than a short one.
- The **highest** value of a week or a month is the highest of its trainings.

11.4 The Last trainings tab

The second tab lists every training of the participant, with its **Date**, **Title**, **Full time**, **Average heart rate**, **Maximum heart rate** and **Calories burned**.

Right-click a training and choose **View report** to see this participant's report of that training — the same figures, zone chart and heart-rate chart as in the training window. There you can click **Save PDF report** to export it, and **Back** to return to the list.



A report of a past training, opened from the card.

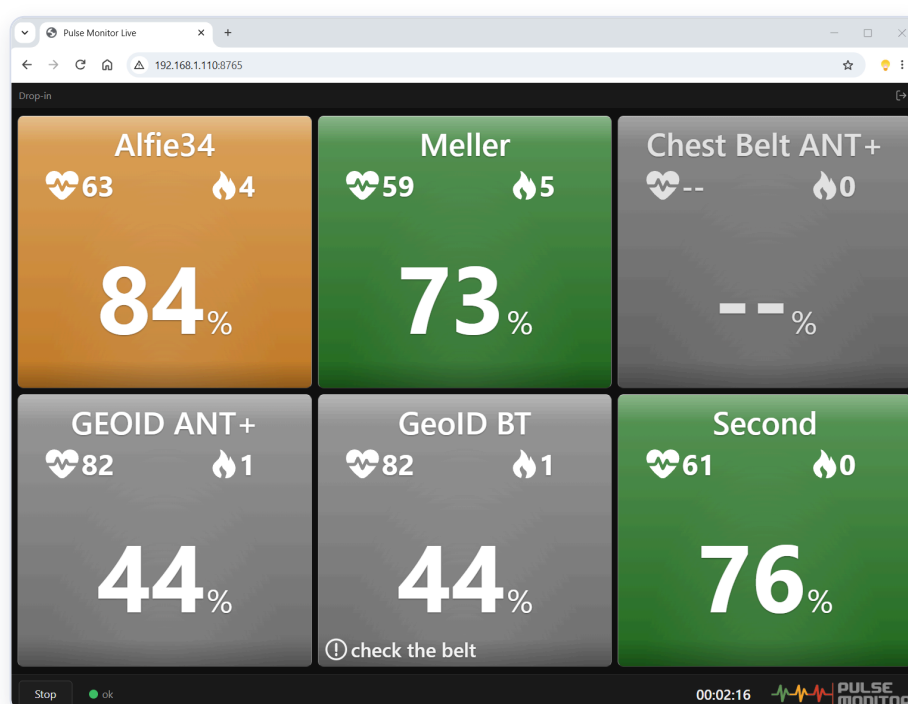
TIP

A participant who asks "how am I doing compared with last month?" can be answered in ten seconds: open the card, choose **This month** and then **Previous month**.

12 Live API and the browser live view

The **Live API** shows a training on **other screens**: while a live screen is open, Pulse Monitor publishes the current state of the boxes on your **local network**. A TV, a tablet or any computer in the same network opens a link in its browser and sees the same coloured boxes as on the training screen — without a second antenna and without another copy of the program. Developers can read the same data from their own programs.

Your screen, on any screen in the building — the data never leaves your network.



The live view in a browser.

NOTE

The Live API is an **optional feature**, available with a licence that includes it, and it is **off** until you switch it on. The data goes **directly from the computer running Pulse Monitor to the devices in your network, encrypted**. Pulse Monitor (the manufacturer) receives none of it, and nothing is sent over the Internet. To extend your license to include Live API features, please contact your license vendor.

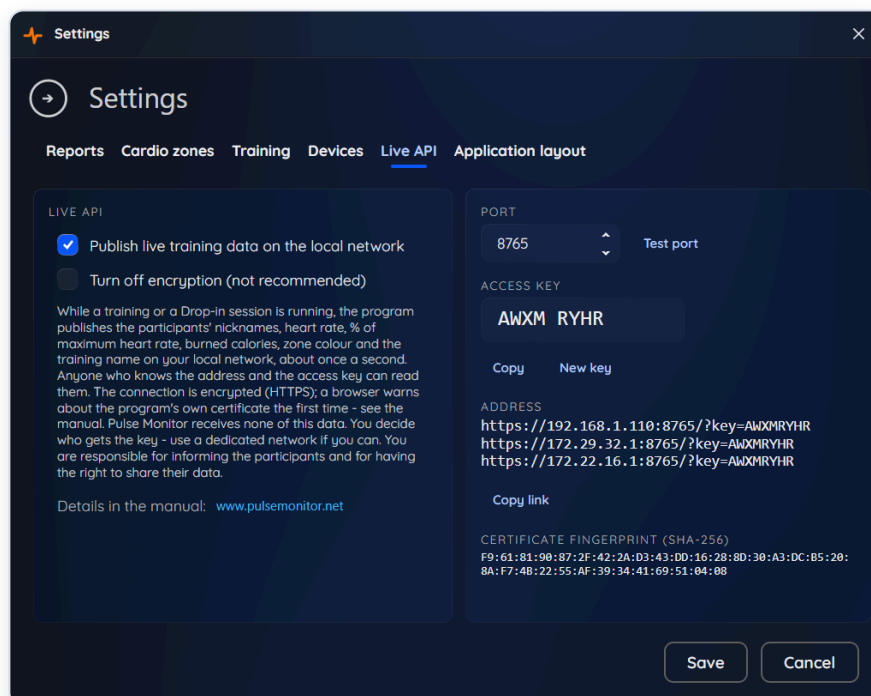
12.1 What you need

- **A licence that includes the Live API.** Without it the **Live API** tab does not appear in the Settings window.
- **The computer running Pulse Monitor and the devices that watch in the same network** — wired or Wi-Fi, for example the club's router. The devices need a browser; a smart TV, a tablet, a phone and any computer will do.

- **Windows Firewall** must allow Pulse Monitor to receive connections ([Windows Firewall](#)).

12.2 Switching it on

1. Open **Settings** → **Live API** ([Settings](#)).



The Live API tab in the Settings.

2. Tick **Publish live training data on the local network**. The program asks for a confirmation: **During trainings, the participants' heart rate data will be available on your local network to anyone who has the access key. Do you confirm that the participants have been informed and that you are entitled to share their data?** Answer **Yes** only if that is so ([Privacy and personal data](#)).
3. Click **Test port** ([Test port](#)).
4. Click **Save**.

The connection is **encrypted by default**. The first time a browser opens the link it warns about the certificate — this is normal and is explained in [Encryption and the certificate](#).

The tab shows everything you need to connect:

Field	What it is
Port	The number of the door the program listens on. The default 8765 is fine; change it only when another program uses it (1024–65535).
Test port	Checks that the port is free and makes Windows Firewall ask for permission the first time (Test port).

Field	What it is
Access key	Eight characters, for example <code>K7MH 3RAW</code> . Copy copies it, New key replaces it (The access key).
Address	The link to the live view — one line for each network address of this computer, with the key in it, for example <code>https://192.168.1.15:8765/?key=K7MH3RAW</code> . Copy link copies the first one.
Certificate fingerprint (SHA-256)	Identifies the program's own certificate. A program of yours can compare it with what the server presents (Encryption and the certificate). Shown while the encryption is on.
Turn off encryption (not recommended)	One switch for the whole connection. Leave it unticked unless you have a good reason (Turning the encryption off).

TIP

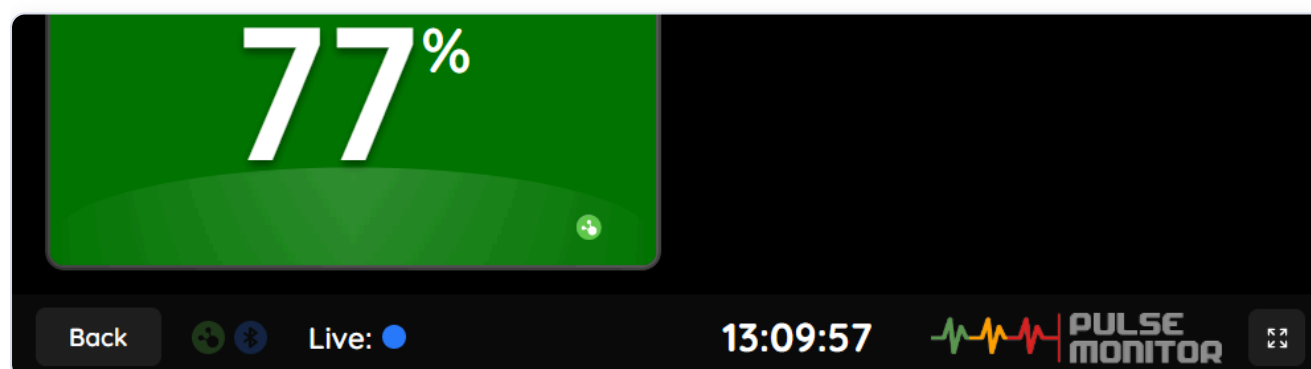
If the **Address** field shows **several lines**, use the one that begins like the addresses of your other devices (for example `192.168.1.1...`). A computer with virtual adapters, for example for virtual machines, lists more addresses.

NOTE

The Live API works **only while a live screen is open** — a classic training ([Classic training](#)) or a Drop-in session ([Drop-in sessions](#)). When you close the screen, it stops. The changes you save in the settings apply from the next time you open a live screen.

12.3 The “Live:” indicator

When the Live API is on, the bottom bar of the live screen shows **Live:** and a small coloured disc:



The Live indicator in the bottom bar.

Disc	Meaning
Grey	Starting: the program is opening the port.
Blue	It works, but no device is watching at the moment.
Green	At least one device is watching.
Orange	An error: the program could not open the port, most often because another program already uses it . Choose another port in the settings (Troubleshooting).
(nothing)	The Live API is off, or your licence does not include it.

12.4 Watching in a browser

Open the link from the **Address** field in the browser of any device in the same network, for example on a TV:

```
https://192.168.1.15:8765/?key=K7MH3RAW
```

The first time, the browser warns that the connection is not trusted — see [Encryption and the certificate](#) for what to click.

The page shows the participants as boxes — like the training screen: the nickname, the heart rate, the calories, the percentage of the maximum heart rate and the zone colour in the background. A grey box with dashes is a participant **without a signal**. A small **check the belt** at the bottom of a box is the same warning as on the training screen ([Monitor sensor contact](#)).

NOTE

The arrangement of the information in the browser view is **fixed** (the default one): the heart rate on the left, the calories on the right and the percentage of the maximum heart rate in the middle. Changing **what the boxes show and where** in the program's settings ([Participant data presentation](#)) does **not** change the browser view. The zone colours and the **Show values above 100 % MaxHR** option do apply to it, because they come from the program's own data.

- The title bar shows the **name of the training** (**Drop-in** for a Drop-in session), the bottom bar the **status**, the time of the training and the **Start / Stop** button.
- The boxes fit the screen: the page chooses the number of columns and rows so that all participants are visible. Up to 42 participants are shown; on a very small screen the page scrolls.
- For a **full screen** use the browser's full-screen key (usually **F11**).
- The status next to the button tells what is happening: **ok** (data arrives), **waiting for training** (the program works but there is nothing to show yet), **no new data** (the transmission stopped — the training screen was closed, or the sensors were lost), **cannot connect** (the page retries by itself), **wrong key**.

TIP

For a TV, **save the whole link with `?key=...` as a bookmark** (or keep it as the start page of the TV's browser). Opened that way the page connects at once, every time. A page opened without the key waits for the **Start** button after a reload.

The page remembers the address and the key in that browser. The icon in its top right corner (**Forget this connection**) removes them again. If you open `https://192.168.1.15:8765/` **without** the key, the page asks for the address and the key and connects when you click **Connect**.

12.4.1 The web viewer

Besides the built-in view you can use the **web viewer** hosted on our website. Open <https://www.pulsemonitor.net/webclient/> in the browser of any device in the same network and enter the **address** and the **access key** shown in **Settings** → **Live API**. The page itself is loaded from pulsemonitor.net, but the participants' data goes **straight from your browser to the Pulse Monitor computer**, not through our servers.

1. **Once for each browser**, open the address of the computer (for example `https://192.168.1.15:8765/`) and accept the certificate warning ([Encryption and the certificate](#)). The web viewer connects to the computer over the same encrypted connection, so the browser has to trust it first.
2. Open the web viewer, enter the address and the key, and click **Connect**.
3. Your browser, for example Chrome, may ask for **permission to access devices on your local network**. Allow it — the viewer needs it to reach the computer.

12.5 The access key

The access key is what allows a device to read the data: **whoever has the key can watch** your trainings as long as a live screen is open.

- It has **eight characters** from a set that avoids look-alikes (no 0 and O, no 1 and l and L), so it is easy to dictate and to type on a TV remote. Capital letters, small letters, spaces and dashes do not matter: `k7mh 3raw` is the same key.
- **Copy** copies the key as one string, without the space.
- **New key** makes a new key after a confirmation (**Generate a new key? Anyone using the old key will stop receiving data.**). Click **Save** to apply it. The devices that use the old key stop receiving data; give the new one to the others. Do this whenever the key may have got to the wrong person.
- A device that sends a **wrong key five times** is blocked for **one minute**. A person who mistyped the key once or twice is not affected.

WARNING

The encryption protects the data on its way, but **whoever has the key can read it**. Give the key only to the people and the devices that need it, and use a **separate network** if you can (a router only for the displays) rather than a Wi-Fi shared with the guests of the club.

12.6 Encryption and the certificate

Everything the program sends — the page, the data and the live stream — is **encrypted** (HTTPS and WSS), so that someone who only watches the traffic of the network cannot read the heart rates. This is switched on by default and you do not have to do anything for it.

The encryption needs a **certificate**. Pulse Monitor **makes its own** on your computer the first time it is needed. Nobody can issue an official certificate for the private address of a computer, so a browser does not know this one in advance and **warns** about it. The warning does not mean that something is wrong — it means that the certificate is not from a public authority. You accept it **once** for each browser:

Browser	What to do
Chrome, Edge	Your connection is not private → click Advanced → Continue to ... (unsafe)
Firefox	Warning: Potential Security Risk Ahead → Advanced... → Accept the Risk and Continue
Safari (iPad, iPhone, Mac)	This Connection Is Not Private → Show Details → visit this website → Visit Website

The browser remembers the choice for that address, so the next time the page opens at once. A page that Pulse Monitor itself serves needs no more than this — its data connection works with the same choice.

NOTE

When the **network address of the computer changes** (for example the router gave it a new one), the program makes a new certificate that includes the new address, and the browsers ask once more. To avoid it, give the computer a **fixed address** in the router (a *DHCP reservation*). The certificate is also renewed about every two years.

TIP

Smart TVs. The browser of some TVs does not offer to continue after the warning. Then show the page on a **different device** that is connected to the TV (a small PC or a tablet), or, if there is no other way and the network is yours alone, turn the encryption off ([Turning the encryption off](#)).

12.6.1 Turning the encryption off

The **Live API** tab has one option, **Turn off encryption (not recommended)**. When you tick it, the program asks **Are you sure? Without encryption anyone who can see the traffic of the network can read the participants' heart rate data. Turn it off only on a network that only you control, or when a device cannot accept the certificate.** After you answer **Yes** and save, the page and the data are served as plain `http://` and `ws://` on the same port — the links in the **Address** field change to `http://...`.

It is **one switch for the whole connection**: the page and the data are never encrypted separately. Untick the option to go back to the encrypted connection.

NOTE

The web viewer on pulsemonitor.net works **only with the encryption on**. With the encryption off, use the built-in view: open the address of the computer in the browser ([Watching in a browser](#)).

WARNING

Without the encryption, anybody in the same network who can see the traffic can read the heart rates of your participants. Use this only in a network that you alone control, and not with a Wi-Fi shared with guests.

12.7 What is published

For each participant on the screen: the **nickname** (not the full name), the **heart rate**, the **percentage of the maximum heart rate**, the **calories** burned so far, the **zone colour**, and whether the sensor has a signal or the belt needs checking. For the training: its **name** and the **time**. Only the **current values** are published — there is no history and nothing is saved by the Live API.

NOTE

Heart rate together with a nickname is health data. **You** decide who can see it and **you** are responsible for informing the participants ([Privacy and personal data](#)).

12.8 Windows Firewall

The first time Pulse Monitor opens the port, Windows asks whether it may receive connections. In the window that appears:

1. Tick **Private networks** (the club's network at home or at work).
2. Leave **Public networks** unticked, unless the club's network is a public one and you know why.
3. Click **Allow access**.

If you clicked **Cancel**, or the devices cannot connect, the permission is missing. To give it:

1. Open **Windows Security** → **Firewall & network protection** → **Allow an app through firewall**.
2. Click **Change settings**.
3. Find **Pulse Monitor** in the list and tick **Private**. If it is not on the list, click **Allow another app...** and choose `PulseMonitor5.exe` from the folder where Pulse Monitor is installed.
4. Click **OK**.

TIP

Windows also treats every network as **Private** or **Public**. If the network is marked **Public**, change it in **Settings** → **Network & internet**: open the connection (Wi-Fi or Ethernet) and set the **Network profile type** to **Private**.

12.8.1 Test port

Test port opens the port for a moment. It shows the Windows Firewall window if the program has not asked yet, and tells you whether the port is **free** or **already used** by another program. It **cannot check** whether other devices can reach the computer: a connection from the computer to itself never meets the firewall. The real test is to **open the link on another device**, for example on a phone in the same network.

12.9 Troubleshooting

What you see	What to check
The browser shows a warning about the certificate	Normal, once for each browser: accept it as described in Encryption and the certificate .
The page does not open at all, or says cannot connect	A live screen must be open on the computer (the Live API works only then). The device must be in the same network as the computer. Check the Windows Firewall (Windows Firewall). Some routers and the Wi-Fi for guests isolate devices from each other (<i>client isolation</i>) — use the main network or switch the isolation off. If the page is not served by Pulse Monitor itself, open the Pulse Monitor address in that browser once and accept the certificate.
The warning came back, or an old link stopped working	The computer got a new network address (and with it a new certificate), or you changed the port . Copy the link again from the Address field, and give the computer a fixed address in the router.
Wrong key	The key was changed or mistyped. Copy the link again from the Address field.
Too many attempts , or no answer for a minute	After five wrong keys the device is blocked for one minute. Wait, and use the right key.
Waiting for training	The program works but there is no data yet. It disappears within a moment after the live screen is open; if it stays, check that the training screen has started.
No new data	The live screen was closed, or the program lost its sensors. The last values stay on the page.
The indicator is orange	The program could not open the port. Another program uses it: choose a different Port in the settings and click Save .
The Live API tab is not in the Settings	Your licence does not include the Live API. To extend it, please contact your licence vendor.

12.10 For developers

The same data can be read by your own program. Here is the short version.

The most accurate and up-to-date documentation of the Live API, including the data format and **example clients in several languages**, is available at <https://github.com/radeal-eu/pulselive>.

Request	Answer
GET /live?key=...	The latest snapshot as JSON; 503 until the first one exists.
GET /ws?key=... (WebSocket)	The latest snapshot at once, then every new one — about once a second.
GET /?key=...	The live view page described above.

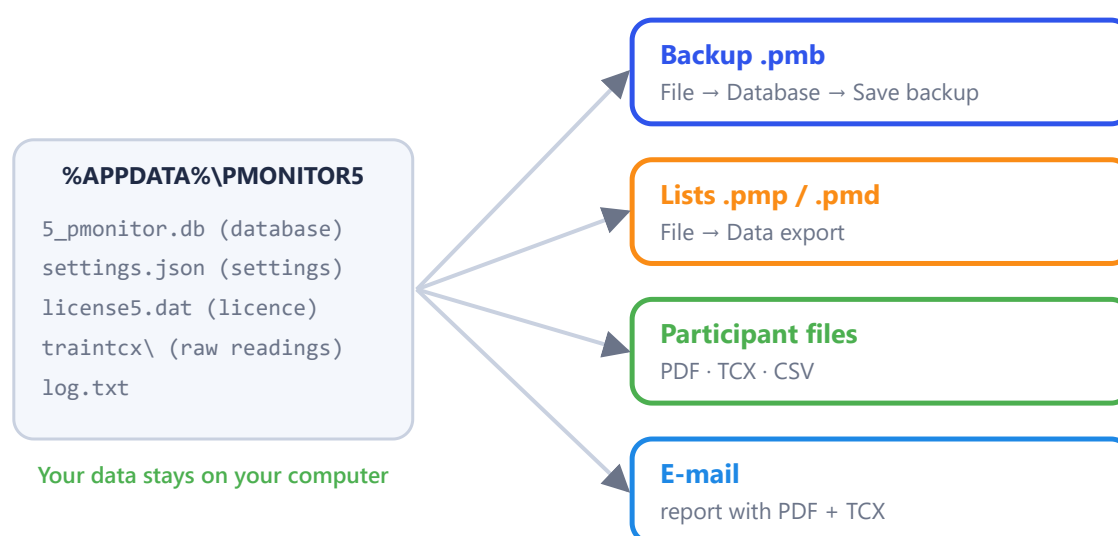
The addresses are `https://...` and `wss://...` (`http://...` and `ws://...` when the encryption is turned off). The certificate is self-signed, so a program should compare its SHA-256 fingerprint with the one shown in **Settings** → **Live API** instead of switching the check off. The key can also be sent in the header `Authorization: Bearer ...`. A snapshot contains the complete state, so the last one is all that is needed:

```
{
  "v": 1,
  "seq": 1234,
  "sentAt": "2026-10-15T18:30:01Z",
  "training": { "name": "Spinning 18:00", "elapsedSec": 1834 },
  "participants": [
    {
      "nick": "Ania",
      "color": "#FF8800",
      "hr": 142,
      "pctMax": 78,
      "kcal": 312,
      "signal": true,
      "checkBelt": false
    }
  ]
}
```

`sentAt` changes with every snapshot; when it stops changing, nothing is being published. Up to **20** devices can be connected to the live stream (`/ws`) at the same time — the browser view uses it, so each open browser page counts as one device. Reading `/live` with ordinary requests does not count towards this limit.

13 Managing your data

Everything Pulse Monitor knows — participants, straps, trainers, trainings and every recorded measurement — lives in **one database file** on your computer. This chapter shows how to protect it, move it and keep it tidy.



What is stored where.

13.1 Backup and restore

A backup protects you from a broken disk, a lost computer or an accidental deletion. **We recommend making one regularly** — for example, once a month and always before a major change (an update, a large import, cleaning the database).

13.1.1 Making a backup

1. Choose **File → Database → Save backup...**
2. Pick a place and a name. The program suggests `pulsemonitor-<date>.pmb`.
3. Click **Save**. A message tells you **A copy of the data has been saved**.

The backup file contains **all data**: participants, devices, trainers, trainings and their measurements. It is a compressed file and is usually small.

TIP

Save the backup on a **different** disk — an external drive or a cloud folder — not on the same disk as the program.

NOTE

A backup contains the **database**. It does **not** contain your **settings** or your **licence**. Save the settings separately ([Saving and loading the settings](#)); the licence is registered on each computer ([Licence and registration](#)).

13.1.2 Restoring a backup

1. Choose **File** → **Database** → **Import full database...**
2. The program warns you: **Note: The import will overwrite all existing data in the program.** Click **OK** only if you are sure.
3. Select the `.pmb` file.
4. After loading, the program says **The data file loaded. Please restart the application.** Close Pulse Monitor and start it again.

WARNING

Restoring **replaces everything** you have now with the content of the backup. Data entered after the backup was made is gone. If you are not sure, make a fresh backup of the current state first.

13.1.3 Moving to another computer

1. On the old computer: **File** → **Database** → **Save backup...**, and **File** → **Settings file** → **Save settings...**
2. Install Pulse Monitor on the new computer and start it once.
3. **File** → **Database** → **Import full database...**, select the backup, restart the program.
4. **File** → **Settings file** → **Load settings...**, select the settings file, restart the program.
5. Release the licence on the old computer and register it on the new one ([Releasing and moving a licence](#)).

13.2 Saving and loading the settings

The club's settings can be saved to a file and loaded on another computer, or after a reinstallation.

Saving. Choose **File** → **Settings file** → **Save settings...** and pick a place. The file has the extension `.pms`.

The file contains: the club name and address and the logo, the appearance (theme, accent colour, participant panel, language), units, the cardio zones, what the participant box shows, the related switches, and the **mail account** settings. It does **not** contain the antenna and Bluetooth settings or the licence.

WARNING

The file contains the **e-mail password as plain text**. The program reminds you after saving. Keep the file in a safe place and do not send it around.

Loading. Choose **File** → **Settings file** → **Load settings...** and select a `.pms` file. The program first checks the whole file. A file that is not a Pulse Monitor settings file, comes from a newer version of the program, or is damaged, is refused with a message and nothing is changed. If the file is fine, the program asks

Replace the current settings with the ones from this file? Antenna settings are not changed. After you confirm, the settings are replaced — all or nothing — and the program asks you to **restart the application**.

13.3 Exporting and importing the participants and straps

If you only want to share your **participants** or your **straps** — for example between two computers of one club — use **File** → **Data export** and **File** → **Data import** instead. They are described in [Exporting and importing lists](#).

13.4 Cleaning up old data

Every training stores a heart-rate record every ten seconds for every participant. Over the years this adds up. The clean-up tools let you reclaim space.

Open **File** → **Database** → **Database operations**.

13.4.1 Delete training data

Under **Delete training data** choose **Older than a year** or **Older than a month** and click **Remove**. After you confirm (**Are you sure you want to delete this data?**), the program deletes the **detailed heart rate records** of every *finished* training older than the chosen period and reports **Deleted records: N**.

Deletes only the detailed heart rate records from this period. Keeps the general training statistics of the participants.

Kept	Removed
The training itself and its place in the list	The ten-second heart-rate records
The participants and their figures: average heart rate, highest heart rate, calories, time	The heart-rate chart and the time in zones of that training
The participant card statistics	PDF reports and TCX files can no longer be created for that training

The database file is also **compacted**, so the space is released at once.

NOTE

This does not delete the raw readings files (`traintcx\<number>.csv`) used by **Save full HR data**. If you want to free this space too, delete the files of old trainings from that folder.

13.4.2 Empty the database

Under **Empty the database**, **Delete all data from the database** *completely empties the program's database* — participants, devices, trainers and all trainings. After you confirm (**Do you want to delete all participant, device, and workout data from the program?**), the program says **Database cleared**. **Restart the application**.

WARNING

There is no way back. Make a backup first. Your **settings** and your **licence** are not deleted by this operation.

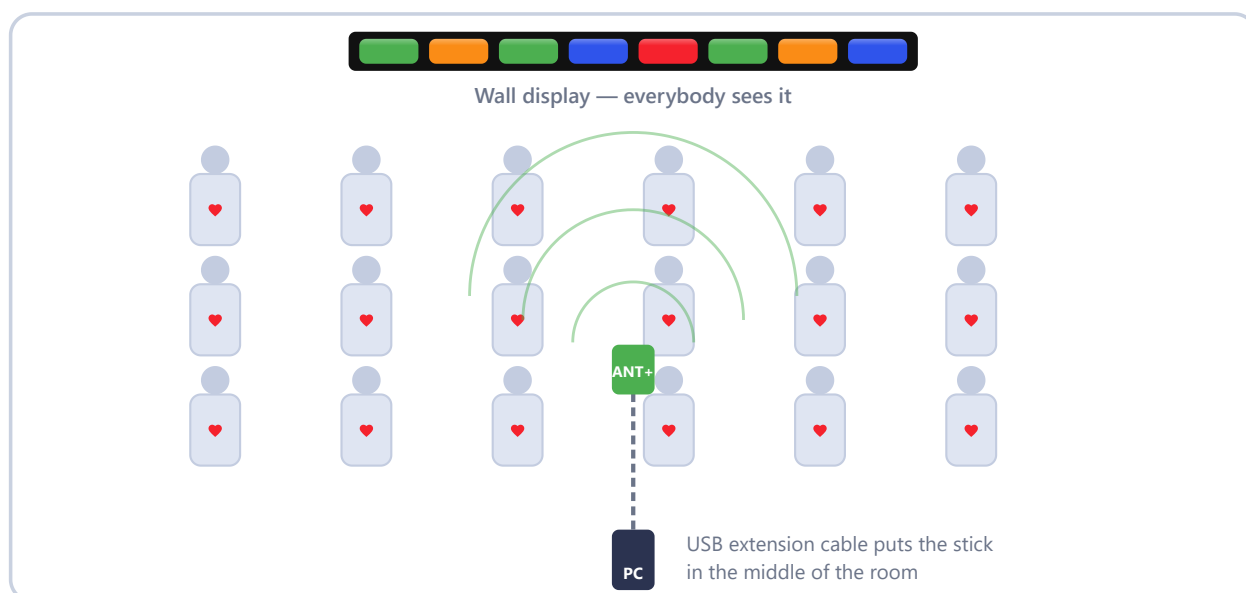
13.5 Privacy and personal data

- **All data stays on your computer.** Participants' names, e-mail addresses, body data and heart-rate records are stored only in the local database. Pulse Monitor does not send them to any server.
- When you **send a report by e-mail**, you yourself forward that participant's data to the participant, through the mail account you configured.
- The program contacts the Internet only to **check for updates** and, if it is registered, to **confirm the licence**. Neither of these transmits participant data.
- If you switch on the optional **Live API**, the current values of the participants on the live screen (nickname, heart rate, calories) are published **on your local network**, encrypted, to the devices that have the access key. They are still not sent to us or to any server on the Internet; you decide who gets the key ([Live API and the browser live view](#)).
- You are the **data controller** for the personal data of your participants. In many countries (for example, in the European Union) you must inform participants what you store and why, and delete their data when they ask. The tools in this chapter help with that.

14 Tips for a great class

Small habits that make the difference between “it works” and “participants love it”.

14.1 Setting up the room



A typical setup in a studio.

1. **The screen.** Mount a TV or a projector where **everybody can see it from their place** — for a cycling studio, on the wall in front of the bikes. The more participants you have, the smaller each box becomes, so choose a large screen or a projector for big groups.
2. **The computer.** Connect it by HDMI. In Windows set the display mode to **Duplicate** if the trainer wants to see the same picture on the laptop, or **Extend** if the trainer wants to keep working on the laptop screen. The live screen can be moved to the second display and switched to full screen.
3. **The receiver.** Put the ANT+ stick on a short USB extension cable, in a central, elevated position with a clear line of sight to the participants. Use **two sticks** in a very large room ([Antenna support](#)).
4. **Power.** Plug the computer in. Training screens keep the computer awake, but a flat battery ends the class.
5. **Quiet computer.** Close other programs, especially those that show notifications or start updates in the middle of a class. Turn off Windows notifications while you train (**Focus mode**).

14.2 Before every class

A short checklist:

- ☐ Straps are charged — the battery is fine — and **numbered**.
- ☐ The ANT+ stick is plugged in; Bluetooth is on (if you use it).

- ☐ The training is created and the participants are on the list with their straps (**Load list** if it is a regular class).
- ☐ You are on the live screen, and the boxes of participants who are already wearing their straps show values (strap check before **Start**).
- ☐ Participants wear the straps **on bare skin, moistened**, snug but comfortable.

14.3 Putting on the strap correctly

- The strap goes **directly on the skin**, just below the chest muscles (below the bust for women), with the sensor in the middle of the chest, logo upright.
- **Moisten the electrodes** (the two rubber patches on the inside) with water or electrode gel. Dry skin is the number one reason for jumpy or missing readings.
- It must be **snug**, but you should be able to breathe normally.
- Very hairy chests, dry skin, and cold weather make contact harder: moisten more generously, and wear the strap a few minutes before the class.

TIP

For some **combat sports** such as boxing, karate or jiu-jitsu, intense movements make an **arm band** or a **wrist HR watch** more practical than a chest strap.

WARNING

Do **not** wear a heart-rate strap over a pacemaker or an implanted defibrillator without your doctor's agreement.

14.4 Getting the numbers right

- **Check each participant's Max HR.** It is the foundation of all percentages and colours. If you know a measured value, enter it. The age-based estimate is a starting point only ([Maximum heart rate](#)).
- **Adapt the zones** to the type of class. A cycling studio may prefer zones tuned to endurance; a boot camp may prefer a different split. Change them in **Settings** → **Cardio zones**.
- **Give everyone a nickname** that is short and recognisable. It must fit in the box.
- **Pick the right centre value.** The percentage of maximum is the best "one number" for a group; calories are motivating for a weight-loss class; plain heart rate is best for athletes who know their own zones.

14.5 Using the screen to coach

- **Colours first.** Glance at the room: a wall of green is moderate effort; reds are the people to ease off or praise.
- A **grey box with dashes** during a class means that participant's strap is not heard — a loose strap, flat battery or out of range. Quietly check on them.
- **Check the belt** warns you of poor contact before the readings become nonsense.

- Use **Pause** for explanations and water breaks, so that the report is not diluted by minutes of standing around.
- **Calories** are an estimate. Use them to compare workouts of the same person, not different people.

14.6 After the class

1. Click **Finish and summary** — not before the cool-down is over, or the average heart rate will look lower than it should.
2. Show the summary on the wall for a minute: people like to see the colours of the whole class.
3. Send the reports.
4. Once a month, make a backup ([Backup and restore](#)).

14.7 Straps: buying and caring

- Buy straps from a **reputable brand** that explicitly lists **ANT+** and/or **Bluetooth Heart Rate**. Cheap unbranded straps are frequently less accurate and fail more often. Most of them support both technologies; pair such a strap **as ANT+** ([Finding straps with the scanner](#)).
- A strap works for years if you **rinse it after use**, **dry it** and **change the battery** when it begins to misbehave.
- For a studio with **10 or more** participants, buy **ANT+** straps ([Two kinds of straps](#)).
- Keep a few spare, numbered straps. Mark them with the number you registered in **Devices**.

15 Troubleshooting and FAQ

15.1 Straps and receivers

15.1.1 The program says “Make sure the ANT+ antenna is connected to the USB port”

1. Check that the **ANT+ stick** is plugged in. Try a different USB port, preferably one directly on the computer.
2. Plugged it in before installing? Unplug it, **reinstall** Pulse Monitor (a new installation over the old one is fine), and plug the stick in afterwards ([Installing Pulse Monitor](#)).
3. Open **Device Manager** in Windows and look for the ANT stick (it is listed as a USB device). If it is shown with a warning sign, reinstall the program: the installer installs the driver again.
4. Restart the computer.
5. If you do not use ANT+ at all, choose **Bluetooth** in **Settings** → **Devices** → **Antenna support**, and the message will not appear again.

15.1.2 The program says “Make sure Bluetooth is turned on in your computer”

- Turn Bluetooth on in **Windows Settings** → **Bluetooth & devices**, and check that the computer has a Bluetooth adapter at all (desktop PCs often do not).
- Make sure it is **Bluetooth 4.0 / Low Energy** or newer.
- If you do not use Bluetooth, choose **ANT+** in **Settings** → **Devices** → **Antenna support**.

15.1.3 The strap is not found by the scanner

- **Is it on, and moist?** A strap sends data only when it detects skin contact. Moisten the electrodes and put it on.
- **Is it a strap of the supported kind?** It must be **ANT+** or **Bluetooth Low Energy with the Heart Rate service**. A strap that supports only the older “Bluetooth Classic”, or only a proprietary protocol, cannot be used.
- **Is the right technology enabled?** See **Settings** → **Devices**. A strap of a disabled technology is not looked for.
- **Is the strap busy with something else?** A Bluetooth strap usually accepts **one connection only**. Switch off Bluetooth on the participant’s phone and watch, and close other fitness apps. An ANT+ strap does not have this problem.
- **Is it within range?** Stand close (a metre or two) to the receiver during pairing.
- **Is the battery fine?** Try another strap to see if the problem is with that one.
- Scan with **only one strap on** at a time.

15.1.4 A Bluetooth strap disconnects or does not connect in a training

- Check that the **Bluetooth limit** (**Settings** → **Devices** → **Max Bluetooth straps**) is not above what your adapter can handle. Lower it by one or two and try again.
- A laptop's internal adapter handles fewer straps than a good USB Bluetooth dongle. For larger groups use **ANT+**.
- Wi-Fi 2.4 GHz and USB 3 devices disturb Bluetooth. Move the dongle away from them on a short cable.
- Keep a strap and the computer in **line of sight**.

15.1.5 One participant's box shows dashes and is grey

No signal from that strap in the last few seconds. Check, in order: is the strap **on**; is it **moist**; is it **in range**; is the **battery** fine; is the strap a **Bluetooth** strap that is **connected elsewhere**? The box recovers on its own when the strap is heard again.

15.1.6 Heart rate jumps wildly, shows zero, or looks unrealistic

- Dry electrodes or a loose strap are the cause in nine cases out of ten. Moisten and tighten.
- Check for sources of interference very close to the strap: a mobile phone in the pocket of a tight garment, a strong magnet, a high-voltage cable, some gym machines with their own transmitters.
- Replace a weak battery.

15.1.7 The live view in a browser does not open

Make sure a live screen is open on the computer, that the device is in the same network, and that Windows Firewall allows Pulse Monitor ([Windows Firewall](#)). The table of symptoms is in [Troubleshooting](#).

15.1.8 "check the belt" keeps on appearing

The same value was repeated across many readings. Typical reasons: a loose strap, dry electrodes, or a participant standing still on a resting heart rate in a quiet moment (rare — a real heart rate nearly always moves by a beat or two). Tighten the strap, moisten it, and if it persists, replace the strap. You can disable this warning in **Settings** → **Training**.

15.1.9 Several straps appear in the scan and I cannot tell which is which

Pair **one strap at a time** ([Before you start](#)). Other people's straps in range are also detected, with their own numbers.

15.1.10 One strap shows up as two devices, ANT+ and Bluetooth

This is normal. A strap that supports both technologies is detected by the scanner as **two devices with two different serial numbers**, one for ANT+ and one for Bluetooth. Pair it **only as ANT+**: the number of Bluetooth devices connected at the same time is limited, ANT+ has no such limit, and a strap can use only one of the two technologies during a training ([Finding straps with the scanner](#)).

15.2 Trainings

15.2.1 I cannot add another participant to the training

- *Your license does not allow you to add another participant to the training.* — your licence limit has been reached. Free mode allows two participants. See [Licence and registration](#).
- *No more Bluetooth straps can be added to this training.* — you reached the Bluetooth limit. Use ANT+ straps, or raise the limit if your adapter can handle it ([Max Bluetooth straps](#)).
- A participant or a strap is **missing from the list** — it may already be used in this training (each can be used once); or the **technology** of that strap is disabled in **Settings** → **Devices**.

15.2.2 The percentages and colours look wrong

They depend entirely on the participant's **Max HR**. Open the participant (or right-click in the training: **Edit**) and check the value. Also check the zones in **Settings** → **Cardio zones**.

15.2.3 Calories seem too high or too low

Calories are calculated from heart rate, age, gender and **weight**. Check those fields. If you changed **Units** after entering participants, the stored weight is read in the new units ([Adding and editing a participant](#)).

15.2.4 I closed the live screen by mistake

Nothing is lost. In the training window click **Go to practice** and then **Start**. Everything recorded so far is kept, and the clock and the calories continue ([Pausing and going back](#)).

15.2.5 The computer went to sleep during a class

Check that **Settings** → **Devices** → **Block sleep and screen saver during training** is on. If a company policy forces sleep, adjust the Windows power settings of the computer.

15.2.6 The summary of the training says “No data”

- The training was never **started** (**Start** was not pressed), or it was finished immediately.
- A participant's strap did not send anything during the training: the report cannot be created for them.

15.3 Reports and e-mail

15.3.1 The report is not sent

1. Does the participant have an **e-mail address**?
2. Is the **mail account** set up in **Settings** → **Reports**? Use **Test settings**.
3. Is the computer **online**?
4. **Gmail, Outlook and others** require a special *app password* or a setting for programs ([For Gmail users](#)).
5. Corporate or school networks sometimes block outgoing mail on port 587 — ask your administrator.

15.3.2 The logo does not appear on the PDF

Choose a **PNG, JPG or GIF** file smaller than **1000 KB** in **Settings** → **Reports**. After saving, create a new PDF.

15.4 Program and licence

15.4.1 The program does not start, or closes immediately

- Pulse Monitor can run **only once**. Check that it is not already running in the background (**Task Manager**) or on another Windows user session.
- Restart the computer and try again.
- If the problem persists, send us the file `log.txt` from the data folder ([Where Pulse Monitor keeps your data](#)).

15.4.2 I changed the language or colours, but nothing changed

These changes need a **restart** of the program.

15.4.3 “Your license is not valid. Application functionality is limited.”

The licence file does not fit this computer or this version of the program, or it has expired. Register again with your code ([Registering the program](#)). If the code is refused, contact us.

15.4.4 Do I lose my data when I update?

No. Updating keeps all of your data and settings.

15.5 Frequently asked questions

How many participants can the program handle? Up to **42** at a time. Your licence may allow fewer. Without a licence, **two**.

Do I need the Internet? Not to train. You need it to **register** the licence, to **check for updates** and to **send reports** by e-mail.

Can I use it on a Mac or a tablet? No. Pulse Monitor runs on **Windows 10 and 11**.

Can participants use arm bands, HR watches or phones? Some sports watches can transmit heart rate over ANT+ or Bluetooth (“broadcast heart rate”). If a watch does, it can be registered like any other strap. A watch that shows the heart rate only on its own screen cannot be used.

Can a participant use a strap that is not in my Devices list? In a **Classic** training: no, each participant needs a registered strap. In **Drop-in**: yes, an unregistered **ANT+** strap can be shown if you allow it in **Settings** → **Training**.

Can I use ANT+ and Bluetooth straps in the same class? Yes, with **ANT+ & Bluetooth** selected in **Settings** → **Devices**.

Does the program work with several languages at the same time? The program is shown in one language at a time, chosen in **Settings**. Reports use the same language.

Where is my data? In `%APPDATA%\PMONITOR5` ([Where Pulse Monitor keeps your data](#)).

Where can I find the manual? In the Windows Start menu: **Pulse Monitor** → **Manual**.

15.6 Getting help

- **Online FAQ:** <https://www.pulsemonitor.net/en/faq>
- **Website:** <https://www.pulsemonitor.net>
- When you write to us, please include: the **version** of the program (**Help** → **About**), a description of what you did, the exact **message** that appeared, the type of your straps and the `log.txt` file.

Appendix A — Formulas

These are the calculations Pulse Monitor performs. They are given for transparency; they are estimates, not medical measurements.

Percentage of maximum heart rate

$$\text{percentage} = \frac{\text{heart rate}}{\text{Max HR}} \times 100$$

The heart rate used on the live screen is the **average of the last three seconds**. Without **Show values above 100% MaxHR** the result is limited to 100.

Estimated maximum heart rate

Used only to fill an empty **Max HR** field, from age a in years:

Gender	Estimate
male	$202 - 0.55 \times a$
female	$216 - 1.09 \times a$

The result is limited to the range 40–250 bpm. These are the sex-specific formulas of **Whyte et al. (2008)**, derived for trained athletes. Always replace the estimate with a measured value if you have one.

Calories — Keytel option

With the **Keytel (publication)** option selected in **Settings** → **Training** → **Calorie calculation** ([Calorie calculation](#)), calories are calculated for every ten-second window from the average heart rate HR in that window, the age a in years and the weight w in kilograms (pounds are converted):

Gender	Energy per minute (kJ)
male	$0.2017 \times a + 0.1988 \times w + 0.6309 \times HR - 55.0969$
female	$0.074 \times a - 0.1263 \times w + 0.4472 \times HR - 20.4022$

$$\text{kcal} = \frac{\text{energy per minute} \times \text{minutes}}{4.184}$$

This is the formula of **Keytel et al. (2005)**, *Prediction of energy expenditure from heart rate monitoring during submaximal exercise*, Journal of Sports Sciences 23(3). A negative result is counted as zero. The total for a training is the sum of its windows.

Recording windows

Quantity	Value
A record in the database	every 10 seconds, per participant
No-signal detection	no reading for 6 seconds
"Check the belt"	about 15 identical readings in a row (about 8 with two ANT+ receivers); lit for up to 30 seconds, then re-armed
Drop-in: participant disappears	after 30 seconds without a reading

Appendix B — Files

Pulse Monitor saves and reads these files of its own:

Extension	Contents	Where it comes from
<code>.pmb</code>	A complete backup of the database	File → Database → Save backup...
<code>.pmp</code>	Exported participants	File → Data export → Users data export...
<code>.pmd</code>	Exported devices	File → Data export → Devices data export...
<code>.pms</code>	The club's settings	File → Settings file → Save settings...
<code>.pmc</code>	A list of participants with straps for one training	Save list in the training window

Each file type has its own extension, so the file dialogs offer only the files that fit.

Appendix C — Default settings

Setting	Default
Club name (reports)	<i>Fitness Club</i>
Mail port / SSL	587 / on
Cardio zones	5 zones: 0–59, 60–69, 70–79, 80–89, 90–100 % (grey, blue, green, orange, red)
Show values above 100 %	off
Main (centre) slot	% of max HR
Left slot	Pulse
Right slot	Calories
Monitor sensor contact	on
Show antenna activity	on
Allow unpaired ANT+ devices in Drop-in	off
Live API (needs a licence that includes it)	off
Live API port	8765
Live API encryption (HTTPS/WSS)	on
Live API access key	made when the Live API is first switched on
Calorie calculation	Classic (Pulse Monitor)
Antenna support	ANT+ & Bluetooth
ANT+ receivers	1
Max Bluetooth straps	7 (range 1–10)
Block sleep and screen saver during training	on
Theme	Dark
Accent colour	Blue
Participant panel	Soft
Units	metric

Appendix D — Glossary

Access key

The eight characters that allow a device to read the Live API. It is shown in **Settings** → **Live API**.

ANT+

A low-power wireless standard for sports sensors. Heart-rate straps with the ANT+ logo are received by a USB ANT+ stick.

Bluetooth (Low Energy)

The wireless standard of phones and computers. Straps that implement the Bluetooth *Heart Rate* service work with Pulse Monitor without pairing in Windows.

Box

The coloured rectangle showing one participant on the live screen.

Calories

The estimated energy burned, in kilocalories, calculated from the heart rate.

Classic training

A session with a list of participants, which is recorded and can be reported on.

Default device

The strap that belongs to a participant. It is selected automatically in a training and identifies the participant in Drop-in.

Device

In the program, a registered heart-rate strap, arm-band etc.

Drop-in session

A live view for whoever comes, with nothing recorded.

Live API

An optional feature that publishes the live screen on your local network, so that a browser on a TV or a tablet can show it. See [Live API and the browser live view](#).

Max HR

The highest heart rate of a participant. The reference for percentages and colours.

Pairing

Adding a strap to the program. Not the Windows pairing.

Participant

A person registered in the program.

Receiver

The device that receives the signal of the straps: the ANT+ USB stick, or the Bluetooth adapter.

Strap

A chest strap with a heart-rate sensor.

TCX

A file format for sports training data, understood by many fitness applications.

Zone

A range of the percentage of maximum heart rate, with a colour.

Legal information

Personal data

Information and personal data entered into the program are saved only on your computer. The application does not transmit them to other parties without your knowledge. If you send training reports by e-mail, you forward the data to the recipients through your own e-mail account. If you switch on the optional Live API, the current values of the participants on the live screen are published on your local network, encrypted, to the devices that have the access key; they are not sent to the manufacturer.

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