

Advanced Race & Training Pacer User Guide, Rev. 3.9

The Advanced Race & Training (R&T) Pacer data field will show the number of seconds you are ahead or behind a specified target pace or race goal. Background color will be green if you are ahead or red if you are behind.

Features marked with ✱ are available in all newer devices (Those not listed in Appendix B).

Before a run, you will need to specify your race or training session using the race/training string setting. If configuring Apps is new to you, see Access Settings With Connect IQ App.

For racing, a target pace or race goal can be specified using:

- **"5:40"** will make the App report ahead/behind seconds (pacer time) vs a run with a 5:40 min/km target pace. In this example, if you run at a 5:30 pace instead of the target 5:40 pace, the pacer time will after 2 km show that you are 20 seconds ahead.

- **"42.195@4:00:00"** will make the App calculate the target pace required to meet the race goal of running a marathon in 4 hours, which is 5:41 min/km as above.

- **"3 5:58; 5:40"** will make the App, for the first 3 km (1st segment), target a 5:58 pace, and then an end target pace of 5:40 for the rest of the run. This also imply a marathon in 4 hours, but with the first 3 km at a 0:18 min/km slower "warm-up" pace. Useful if you desire a negative split, and wish to go a bit slower the first 3 km.

- If you prefer, the App can calculate the target pace to use after warm-up. **"3 5:58; 42.195@4:00:00"** will result in same 5:40 target pace after the first 3 km.

- You may prefer to simply specify how much slower you wish the initial pace to be in secs/km using **"3 -18; 42.195@4:00:00"**, which specifies the pace during the first 3 km to be 18 secs/km slower vs. rest of the marathon. The App will do the math.

- For a gradual warm-up, sliding target pace from one segment to the next can be specified. Use **">"** instead of **";"** between segments or race goal. Example: **"2 5:00 > 4:00"** will make the App, over the first 2 km, target a pace sliding from 5:00 to 4:00, and then use 4:00 for the rest of the run. Resulting in a 10k run in 41 min. **"2 -60 > 10@41:00"** will result in the same run, but with the App doing the math for you. If a race with a slowly increasing pace over the entire race distance is desired, say for a 5 km race, use: **"5 -20 > 5@20:00"**.

- Additional elaborative race examples:
  - **"1 5:50; 1 5:44; 42.195@4:00:00"**
  - **"1 -9; 1 -3; 42.195@4:00:00"**
  - **"1 6:00; 1 6:00 > 21.0975@2:00:00"**

For interval and pace training as well as running tests:

- For interval training, a **","** instead of **";"** can be used to make the pacer time reset when shifting to a new segment. In the following example, pacer time will reset to zero right after the initial 2 km warm-up at a 5:30 pace, and before every 1 km interval at pace 4:00: **"2 5:30, 1 4:00; 0.3 5:00, 1 4:00; 0.3 5:00, 6:00"**.

- Specification of repeating intervals is also possible. To do this, put one or more segments inside parentheses, and preceded with "Nx" to specify N repeats. E.g., **"2 5:30, 2x(1 4:00; 0.3 5:00,) 6:00"** will result in same training as above. Up to 20 segments and an end target pace can be specified (✱ up to 40).

- Warm up and rest segments, can be specified to have no target pace using **"-"** instead of a pace. E.g., **"2 -, 2x(1 4:00; 0.3 -,)"**. Pacer time will report **"-"** while running in segments with no target pace. Such segments must end with a **","** after the **"-"** so pacer time is reset before the next segment.

- Segments can be specified with time duration instead of a distance to run. E.g., **"15:00 -, 12:00 4:00"** is a Cooper test with 15 min warm-up, follow by a 12 min run at target pace 4:00, resulting in a 3 km Cooper test.

- A shift to a new segment may also be triggered by a manual press on the LAP button. E.g., **"L -, 12:00 4:00"** is the same Cooper test as above, but now with warm-up period ending, and hence the test starting, when the LAP button is pressed. ✱ Using **"L"** also imply shift to next segment when a Garmin Workout is progressed to next workout step. To allow Pacer App, with ease, to be used in combination with Garmin Workouts.

- A sliding target pace is also possible for training, useful for e.g. slowly accelerating long runs like: **"15 6:00 > 5:00"**. And progressive 1 km intervals sliding from a 5:00 to a 4:00 target pace, followed by a 1 min rest period can be specified with **"L -, 3x(1 5:00 > 4:00, 1:00 -,)"**.

- Conconi test can be specified using **"1.25 5:00 > 3:00"** which will take 5 minutes if run at the continuously increasing target pace from 5:00 to 3:00. Note that **"5:00 5:00 > 3:00"** is also supported, although not resulting in exactly same run since target pace is now increasing as a function of time and not distance run.

- ✱ Varying your pace during training is important! To enable this, segments with random paces is supported. E.g., **"2.5 R[4:00-5:00]"** will result in a 2.5 km interval at a random pace between 4:00 and 5:00. And **"3x(5:00 -, 1 R[4:20, 4:30, 4:40],)"** will result in 3 rounds of 5 min rest period followed by a 1 km pace interval with the pace randomly being either 4:20, 4:30 or 4:40 min/km.

Note that interval intended segments, e.g. segments using **"L"** and **","** cannot be combined with a race goal like "**5@25:00**".

TIP: Instead of retyping often used race/training string specifications, you can save these in up to 4 presets in settings. ✱ Newer devices support 8 presets, and preset strings may begin with a descriptive text for ease of remembering them, e.g. **"'Parkrun' 5@25:00"**.

Before the run, the data field will display the specified or calculated segment info in a carousel manor. Example using "**10:00 6:00, L 5:30; 2 5:00 > 4:30**":



Note that "Reset >" means reset of pacer time to zero when entering segment 2, and the "Seg #3 > #4" imply a sliding target pace from start of segment 3 to the end pace 4:30 after 2 km.



To see the pre-run information, before you press to start a Run activity, you will on most Garmin devices need to press/swipe down or swipe right. E.g. on Fenix, shown to the left, swipe right to see the data fields. On some devices data fields are not displayed prior to a run, e.g. on Venu and Vivoactive 3-5. On these devices the pre-run information will be displayed when the activity is started and until 30 meters have been elapsed.

The Advanced R&T Pacer data field **may only be inserted in a data screen with a single field (full screen) layout**. It offers though 6 different layouts options, with 3, 4, or 5 configurable data fields, each in either a “conventional” or “max readable” layout.

The “conventional” layouts are always with descriptive labels. Whereas the “max readable” are designed with as big fonts as possible, and use tricks, such as superscript for least significant digit to allow for maximum font size for the digits that matters. E.g., as for the 15.49 distance in the below layout examples for Epix 2. Note that the exact layout design differs across Garmin devices, so experiment to find your preferred layout. The 6 screen layout options for Epix 2, “conventional” is left, “max readability” right:













See table below for the options on data to display in the configurable data fields:

	Data Option	Description	
	Current pace	Current pace as reported by Garmin, averaged over ~5 secs	Pace
	Average pace	Average pace for the entire run so far	
*	Average pace last 1 km	Averag running pace over last (rolling) 1000 meters †	
	Average pace last 4 min	Averag running pace over last (rolling) 3 minutes †	
*	Average pace last 400 m	Averag running pace over last (rolling) 400 meters †	
*	LAP pace	Average pace for the current LAP so far	
*	Last LAP pace	Average pace for the last completed LAP	
	Rest-of-run goal pace	Pace required rest of the race to meet race goal *	
	Current target pace	Current target pace in current segment	
	Elapsed distance	Corrected distance for the entire run so far	Distance
*	LAP distance	Corrected distance run in current LAP	
	Race distance remaining	Race distance remaining (race goal dist. - corrected elapsed dist.) *	
	Elapsed time	The stopwatch time for the entire run so far	Time
*	LAP time	The stopwatch time in current LAP	
*	Last LAP time	The stopwatch time in last completed LAP	
	Estimated time remaining	Est. time remaining to reach finish line (if pace kept at target pace) *	
	Estimated race finish time	Est. race finish time (if "Average pace last 4 min" is maintained) *	
*	Time of day	The time of day based on your current location and time settings	
	HR	Heart rate in beats per minute (bpm)	HR & Other
	HR %Max	Percentage of maximum heart rate	
	%HRR	Percentage of heart rate reserve (max HR minus resting HR)	
*	HR Zone	Heart rate zone (1 to 5)	
*	Total ascent	Total ascent (meters or feet depending on device configuration)	
	Cadence	Running cadence in steps-per-minute	
	Segment number	Current segment number	Segments
	Segment average pace	Average pace so far in current segment	
	Segment elapsed distance	Corrected distance run so far of current segment	
	Segment distance remaining	Distance remaining (segment distance - elapsed segment distance)	
	Segment elapsed time	The stopwatch time for the run in current segment	
	Segment est. time remaining	Est. time remaining to finnish segment (if run at target pace)	
*	Last segment pace	Average pace for the last completed segment	
*	Last segment time	The stopwatch time for the last completed segment	
*	Running power	Stryd running power in Watt	Pwr
*	Running power zone	Stryd running power zone (1 to 5)	

† These pace averages will reset when exiting a segment with pacer time reset marker ","
And will "freeze" during periods with walking/stopped (if enabled in settings, default off).

* Requires race distance & goal to have been defined using the "**@**" marker, e.g. "**5@25:00**"

Many options for pace reporting are provided as pacing is what this App is all about:

- "Current pace" is based on Garmin's build in "Current pace" data field, averaged over ~5 seconds. The limited averaging implies fluctuating yet fast reacting pace reporting.
- The "Average pace last X min/km" options will be much less fluctuating, since they are your average rolling running pace over e.g. the last 4 minutes of running. These will though also be slower to react if you do in fact change your pace. Still, these "averaging pace last X min/km" options are recommended for pacing since steady pacing is important in racing and training.
- If you normally use Garmin's "LAP pace" field to achieve averaging, use "Average last 1 km" instead since it is essentially a "continues LAP pace" type of reporting. The "Average last 400 m" is recommended for track running.
- If enabled in settings, the "Average pace last X min/km" reporting "freeze", gets grayed, and stop updating temporarily whenever you slow down and walk or stop (slower than 8:00 min/km for 5+ secs). This is to avoid impacting reported average pace in case you e.g. stop shortly to drink water during a race.

✱ **Stryd running power** data fields require correct sensor configuration to work. If you have a Garmin multisport device and have your Stryd paired in as BLE power meter, then the data fields should work without further configuration. Otherwise, connect your Stryd in Garmin's "Sensor & Accessory" settings menu as "FP – XXXX", where XXXX is the ANT+ ID for your Stryd. And then set the Pacer App setting "Stryd ANT+ ID" to the above XXXX number.

Power data fields will show a circling "**+**" while (re)connecting, and "**−N−**" in case error. With **N** being an error code as listed in Appendix A.



The **Stryd running power zone** data field require the zones to be configured. In App settings, you may simply enter the critical power, and the App will calculate the 5 power zones. E.g., 274 from the left example. You can also enter a comma-separated list with the lowest values for the 5 zones. From the example, the list would be "178, 220, 247, 274, 316".

Both the running power in Watt and running power zone data field can be averaged. In settings, choose between no, 3, 10 or 30 seconds of averaging, or LAP or Segment average.

This pacer App should work with all Garmin compatible power meter accessories, but Garmin's native running power is not supported.

✱ **Coloring of HR, cadence & running power zone data fields depending on zone** can be enabled in settings. The color scheme is similar to Garmin's build-in data fields and the Stryd Zones App. Several layout styles are available, here exemplified for a HR-zone in the top data field (note that only top & bottom data fields with round top/bottom can be used for the colored gauge styles):



Colored background



Colored gauge
Garmin Style



Colored gauge
Enhanced Garmin style



Colored gauge
Meter style



Colored gauge
Meter style, top 3 zones

A distance correction in percentage can be configured. A correction that is applied to the elapsed distance used internally in the App. Useful since Garmin devices often report a longer distance than the actual race distance. Mainly due to GPS inaccuracies and that it can be difficult to run the shortest possible path through the race course.

Example: After a marathon, the Garmin GPS reports an elapsed distance of 42,410 meters. Which is a (42,410/42,195-1)*100 = 0.51% error. Running a marathon with a target pace of 5:41 should theoretically bring you below 4 hours. But with a 0.51% error, you would miss the 4-hour race goal by more than a minute. So, accuracy matters in racing!

Which distance correction value to apply depends on the accuracy of your Garmin GPS and how good you are at running the shortest possible path. 0.3% is recommended starting point.

Distance correction by LAP button press is available to assure accurate race pacing. When next to a race marker in a race, press the LAP button, and the elapsed distance used internally by the App will be corrected to match that of the race marker, and pacer time will be updated accordingly. Example: If the LAP button is pressed at a GPS distance of 2020 meters, next to the 2 km race marker, the elapsed distance will then be corrected to the accurate 2000 meters. Make sure race marker distance is set correctly.

The distance correction percentage applied rest of race is also updated whenever a distance correction by LAP button occurs. E.g. adjusted to 1.0% in the above example.

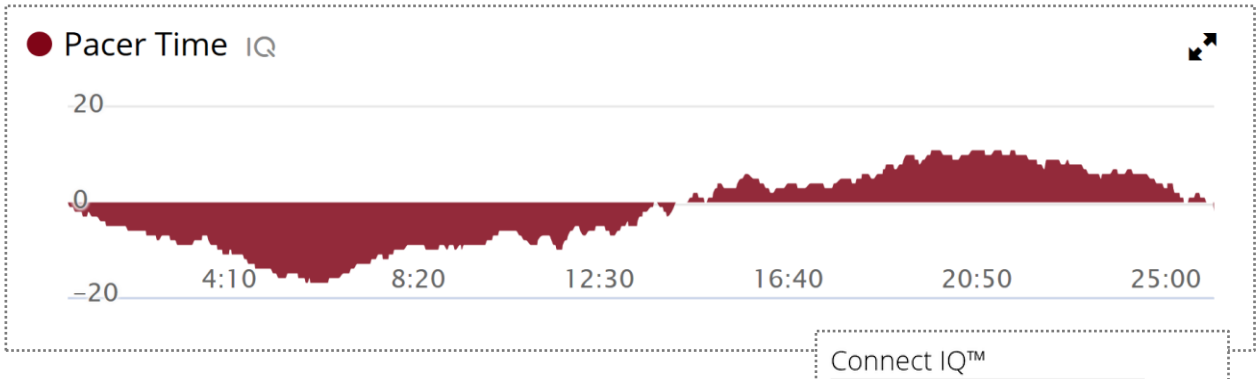
It is not necessary to press the LAP button at every race marker. For a good first correction, it is in fact recommended to wait till second or third race marker, since the GPS and your running path can be a bit "unsteady" initially at a crowded start line. Also, enable race marker alerts to get feedback on accuracy during the race.

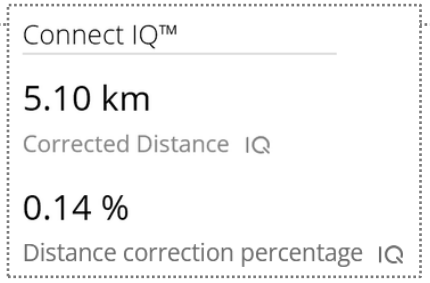
It is strongly recommended to disable “Auto-Lap” in the activity setting on your Garmin device in case you use the LAP button press technique. This way you can after a run better analyze data on Garmin Connect, since Lap splits will not be a confusing mix of both manual and automatic Lap splits. If you do enable “Auto-Lap”, see section on race marker distance.

The App will allow for a maximum of 4% distance correction. To indicate that the App has accepted and made the correction, the device will make an extra beep and one long vibration shortly after the LAP button has been pressed. If you by accident press the LAP button, you can undo the correction by pressing it again within 100 meters, which will also be followed by an extra beep and vibration to acknowledge the “undo”.

Note that distance corrections will not influence Garmin reported distances in the FIT file. That is, the distances shown on the Garmin Connect web and App are not corrected. Since the distance correction by LAP button press technique is beneficial only when running an official race with race markers, it is disabled by default. And ignored if a segment shift is to be triggered by the LAP button, as e.g. in the **“L -, 12:00 4:00”** example.

FIT file recording, for ahead/behind graph on Garmin Connect. If enabled in setting, this will cause pacer time to be reported in an extra graph on Garmin Connect, looking like this:





Furthermore, as illustrated to the right, the summary data on Garmin Connect web, will include:

- Corrected total elapsed distance
- Distance correction percentage as configured or, if enabled, as calculated at the last distance correction by LAP button press

If you observe a trend, say a typical correction around 0.5% when using distance correction by LAP button press in races, you should set the distance correction percentage to that very value.

✱ If distance correction by LAP button press is enabled, an additional graph will show the progression of applied distance correction percentage throughout the race.

Race marker & goal reached alerts will, if enabled, alert with a beep and one long vibration, whenever you *should* pass a race marker. That is, whenever the corrected elapsed distance is incremented by the race marker distance. This way you will know if the corrected elapsed distance is aligning with the race markers as you pass them, or whether to do a correction using the distance correction by LAP button press technique. Intended to replace the Garmin build in "Auto-Lap" beeps when disabled in races. Will also alert when the race goal is reached.

Segment alerts will, if enabled, alert with a beep and one long vibration when you pass to the next segment. Intended for training and running tests. If enabled, it is recommended to disable "Auto-Lap" in the activity settings on your Garmin device to avoid multiple confusing beeps.

✱ If above segment alert is enabled, then also a segment reminder pop-up screen can be enabled. Which will be shown shortly whenever you enter a new segment. You can enable this on your Garmin device by going to activity settings for the activity(s) you have included the App in and then go: Alarms/Alerts -> Add New -> Connect IQ Data Fields (at the bottom of the list) -> Select this App -> Edit Settings -> On (or, for older devices, Edit Settings and then select No). This exact sequence may differ on your specific device.



Pacing alerts can also be configured. When pacer time changes in configurable intervals, the device will alert by a beep and two vibrations. If a 10 second interval is chosen, the App will alert, if you run too slow, as the pacer time drops below first -10 and later -20 seconds. If you speed up, it will alert again as you cross -10, 0, 10, 20, … seconds.

Note that it did not alert as you (re)crossed -20 seconds after speeding up. It first alert as the pacer time increases by one more interval, in this case, -10 seconds. This design is chosen to prevent excessive alerts in the desired case where you lie steadily around a pacer time of e.g. 10 seconds.

A black & white color scheme can be selected for the pace time field if preferred for improved contrast and hence readability. White background if you are ahead, black if you are behind.

Miles can be chosen instead of meters. All specified and reported paces will then be in min/mile and all distances in miles.

Race marker & Auto-Lap distance is configurable in case the distance between race markers is not the default 1000 m. If 1 mile, enter 1609. This setting is always in meters, also if miles have been chosen above.

If you have "Auto-Lap" enabled in the activity settings on your Garmin device, make sure this distance is set to the same distance as that of your Garmin device "Auto-Lap" distance. Reason being that the App cannot tell the difference between a user pressed LAP event and an "Auto-Lap" event - unless both are set to same distance.

An alternative Pacer App is available. The *Readable* R&T Pacer is an alternative to the *Advanced* R&T Pacer. The two Apps are very similar, e.g. have the exact same race/training string specification options. The Readable R&T Pacer though, is focused more on maximum readability vs the Advanced R&T Pacer. And can be inserted in any data field layout.

An Advanced R&T Pacer (*CLONE*) App is also available for download. This is to allow different static configurations for different activities. E.g. one for training and another for racing. Or, you can use both in same activity, to have the original App configured for a plan A race goal and the clone App configured to a fall-back plan B race goal.

Finally, the MAX FONT data field for Runners may also be of interest!

This Advanced R&T Pacer is completely free. But, if you like it, **please leave a positive review to help promote the App!**

Happy Racing & Training!

Hr. Mortensen

Appendix A: Screen Messages & Limitations

- Runs up to 999 km and 99 hours are supported. Pacer Time can go up to +/- 10 hours.
- If an invalid formatted race/training string has been entered, or too high or too low distances/paces/durations are entered or calculated, "**`Invalid string`**" will be displayed. Note that time duration segments, LAP button triggered segments, and segments with reset marker "," cannot have a race goal defined using the "**@**" marker since they are not intended for racing.
- "**`Invalid distance %`**" will be displayed if the distance correction setting is not between 0.0 and 4.0
- For other setting, "**`Invalid case`**" will be displayed. This can be due to a failed App update or corrupt settings data. Try un-install and reinstall the App and/or the Garmin IQ mobile App. This can also be due to an activity saved and then later resumed, which is only supported on high memory devices.
- "**`-:--`**" reported for a pace or time data field means it is not yet available, invalid or out-of-bound.
- "**`-`**" reported for a data field means "not applicable" (e.g. if no race goal is specified for a data field requiring a race goal) or "data not available" (e.g. for a HR data field if no pulse is measured).
- "**`Insert in full screen`**" appears if the Advanced R&T Pacer data field is inserted in a none-full-screen layout. Use instead the Readable R&T Pacer data field.
- Stryd connection errors are displayed using "**`-N-`**". **`N`** can be one of these codes (make sure your Stryd & Garmin device has the latest firmware):
    - No ANT/power meter sensor connection could be established
    - ANT+ connection initially established, but lost during run
    - Power meter connection initially established, but lost during run
    - Invalid ANT+ ID entered in settings (must be blank or between 1 and 1048576)
    - Missing or invalid critical power or comma-separated power zone values entered in settings
    - You may have too many sensors connected. Try disconnecting other sensors.
    - Not a multisport device. You must enter a valid ANT+ ID in App settings

Appendix B: High Memory Garmin Device List

These older devices do not have enough memory and hence do **NOT** support features marked by ✱

- Approach® S62
- Captain Marvel
- D2™ Air
- Darth Vader™
- Enduro™
- fēnix® 5, quatix® 5
- fēnix® 5S
- fēnix® 6, fēnix® 6 Dual Power, fēnix® 6 Solar
- fēnix® 6S, fēnix® 6S Dual Power, fēnix® 6S Solar
- fēnix® Chronos
- First Avenger
- ForeAthlete 245
- ForeAthlete 645
- ForeAthlete 645 Music
- ForeAthlete 935
- Forerunner® 245
- Forerunner® 645
- Forerunner® 645 Music
- Forerunner® 935
- Mercedes-Benz Venu®
- Rey™
- Venu®
- vívoactive® 3
- vívoactive® 3 Mercedes-Benz® Collection
- vívoactive® 3 Music
- vívoactive® 4
- vívoactive® 4S, GarminActive S

The following devices do support features marked by ✱ except though for the segment reminder pop-up screen feature:

- D2™ Charlie
- D2™ Delta
- D2™ Delta PX
- D2™ Delta S
- Descent™ Mk1
- fēnix® 5X, tactix® Charlie