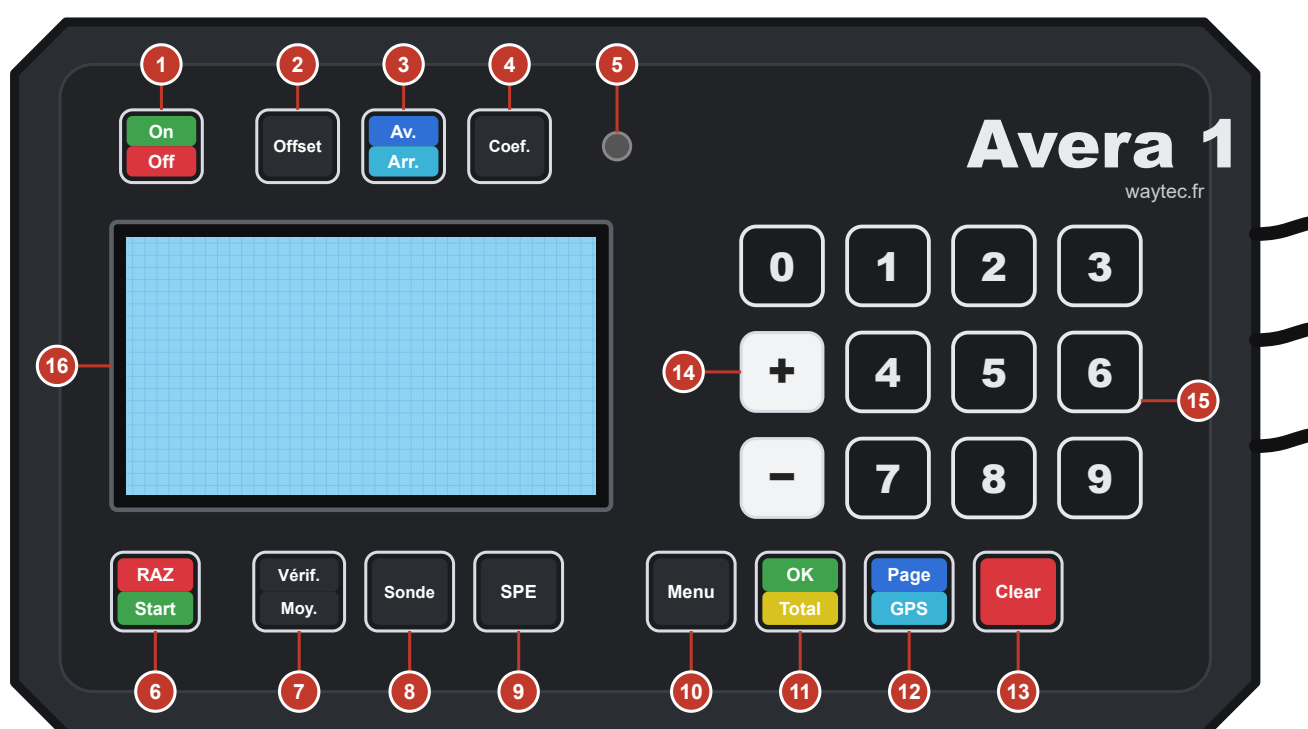


WAYTEC

User manual AVERA + GPS module

Firmware v4.1.2

Tripmaster with pacer · Automatic GPS recal · Flying starts



400 GPS points per ZR · time sheet to the tenth · screen in French, English, Italian and Spanish
waytec.fr

Contents

1. General overview	4
1.1 The two distance counters	4
1.2 How the pacer works	4
2. Installation	5
2.1 AVERA unit	5
2.2 Power supply and probe wiring	5
2.3 Mounting the probes	5
2.4 Installing the GPS module	6
3. Keys and screens	6
3.1 ZR page (regularity)	7
3.2 Link page	7
3.3 Summary page	8
3.4 The gap and the pilot display	8
4. The menu and settings	8
4.1 Choosing the ZR	8
4.2 Recal distance	9
4.3 Screen language	9
5. Calibration	9
5.1 Calibration over a known zone	9
5.2 Calibration on the road (Link page)	9
5.3 Correcting the coefficient after a ZR (Summary page, Coef. key)	10
6. Clock and automatic start	10
6.1 Setting the clock	10
6.2 Programming the start time	10
6.3 Starting after the scheduled time	11
7. Programming averages, offset and flying start	11
7.1 Programming a ZR	11
7.2 Entry rules	11
7.3 Example	12
7.4 ZR offset	12
7.5 Flying start	12
8. Corrections during the rally, time sheet, change at the sign	12
8.1 Checking and correcting the averages (Vérif Moy.)	12
8.2 Road-book handed out just before the start	13
8.3 Average change at the sign	13
8.4 Averages or passing times (time sheet)	13
8.5 Time sheet handed out before the start	14
9. GPS recal	14
9.1 Setting the GPS accuracy	14
9.2 Orga mode or competitor mode?	15

9.3 Doing the recce, step by step	15
9.4 The capture screen	16
9.5 The keys during the recce	17
9.6 Competitor mode: normalisation on the AVERA	17
9.7 Orga mode: PK, CP, CH and normalisation at home	17
9.8 Enabling recal in the rally	18
9.9 What the AVERA does during the rally	18
9.10 New ZR length or moved start	19
10. The Offset page (GPS recal and clock settings)	19
11. Using the AVERA in a rally	20
11.1 Before the start	20
11.2 Manual start	21
11.3 Navigating between ZRs	21
11.4 Manual recal of the total	21
11.5 Resetting and stopping the pacer	21
11.6 End of ZR	21
11.7 Probe alarm	21
12. GPS module, remote controls and pilot display	22
12.1 The GPS module LEDs	22
12.2 Recal remote control	22
12.3 6-pin remote control (option)	23
12.4 Pilot display	23
13. PC link and updates	23
14. Quick reference and messages	24
14.1 Short procedures	24
14.2 Screen messages	25

1. General overview

The AVERA is a tripmaster with a built-in pacer (cadenceur) for regularity rallies. It can be programmed with up to **60 ZRs**, with up to **70 average changes** per ZR, and it can follow a **time sheet** of 199 lines to the tenth of a second during the rally.

It has a retroactive pacer, average change at the sign, a remote display for the pilot and, with the GPS module, **automatic recal** on recced or imported points (400 per ZR).

1.1 The two distance counters

Total: shown in large digits. It is used for the ZR length and to navigate to the next start. The pacer is slaved to this counter; it is the one that recals correct.

Partial: reset to zero at each road-book line for navigation. It is not affected by distance corrections.

1.2 How the pacer works

The pacer calculates the ideal distance from the set average and the time elapsed since the start. The gap displayed is the difference between the measured total and this ideal distance: **negative = late**, positive = early.

Important

Do not enter the menu during a ZR. To correct the averages, the distances or the times during the rally, use

Vérif Moy. (chapter 8): these corrections apply to the current ZR only and are forgotten when you switch off.

What's new in version 4.1.2

- Summary page: the number of recals out of the number of points is correct, including for points sent by the PC software; a cancelled recal is not counted.
- **"No recal" alert:** after 3 points without GPS recal, 3 long beeps, alarm LED on and **----** instead of the last correction, until the next recal (9.9).

What's new in version 4.1.0

- **Time sheet of 199 lines** in the averages table (**Vérif Moy.**), to be typed before or during the ZR (8.4).
- **Times to the tenth of a second:** h mm ss,d instead of hh mm ss.
- **Typed times take priority:** the averages are calculated from them and the times no longer change.
- An added line (**Page/GPS**) takes the distance of the line before; the following times are shifted.

What's new in version 4.0.0

- **400 GPS points per ZR** (instead of 255).
- **Screen in 4 languages:** French, English, Italian, Spanish (menu, line **language**).
- **Recce in orga or competitor mode**, chosen when entering the recce; in orga mode, **PK, CP and CH** points to be normalised at home with the PC software.
- **More accurate GPS recal**, finely adjustable in the Offset page (chapter 10): fixed correction (**corr. dist.**), GPS lag (**gps lag ms**), clock offset (**clk ofs ms**) and shift of all the points (**GPS offset**).
- Exchanges with the new PC software v3.0 (normalisation, shifting points, resetting the points in 40 s).

Updating from a previous version

From a 4.0.x or 4.1.x version: only the AVERA changes, with **PC software v3.3**. The GPS module and the recal remote control stay at 4.0.0; the recorded recces and averages are kept.

From a 3.x version: the AVERA (4.1.2), its GPS module and its recal remote control (4.0.0) are updated together, with PC software v3.3. Recces recorded before the update can no longer be read: redo them or send them again from the PC.

2. Installation

2.1 AVERA unit

- Install the unit in the cockpit without obstructing the pilot's view or access to the controls.
- Left side: jack for the pilot display.
- Right side, from bottom to top:
 - 5-pin connector: power supply and wheel probes;
 - 3-pin connector: GPS probe;
 - 6-pin connector: 4-button remote control (optional);
 - 4-pin screw connector: GPS recal module or recal remote control.

On the unit, all the sockets are female except the power socket, which is male: you cannot plug into the wrong socket.

- PC link: USB-C socket on recent AVERAs; on older ones, PC cable plugged into the jack.

2.2 Power supply and probe wiring

Wire	Function	Note
Black	Ground / –	Connect to battery –, together with the blue (ground) wire of each probe.
Red	+ supply	Stable supply, directly from the battery.
Yellow	+ probe supply	Brown wire of the probe.
Green	Probe 1 signal (left)	Black wire of probe 1.
White	Probe 2 signal (right)	Black wire of probe 2, if fitted.

Probe wire colours (3-wire inductive probe): **brown** = +, **blue** = ground (–), **black** = signal.

For a stable supply, connect the AVERA directly to the battery with a 2 A fuse at the battery end. Also fit a 500 mA fuse at the start of each probe's + wire.

2.3 Mounting the probes

- Use 3-wire inductive probes with built-in electronics (PNP output).
- Preferably fit the probe on a non-driven wheel to limit errors due to wheelspin.
- Keep a gap of about 1 mm between the probe and the target where possible.
- Use uniform metal targets, with a diameter at least equal to that of the probe.
- Avoid slotted screws as targets: risk of double pulses at low speed.
- Protect the probe and the cable against stones, spray and sharp edges.

2.4 Installing the GPS module

- 1 Before switching on, connect the GPS module to the 4-pin screw connector.
- 2 Switch the AVERA on.
- 3 After the welcome screen, check that the message **GPS module found** appears.
- 4 Check that the module's red LED stays on steady.
- 5 Install the module outside if possible, or at least inside the car, against the windscreen, always in the same place (see 12.1).

If the AVERA shows **Remote or GPS / missing or error**, the module was not detected: check the connection, then switch the AVERA off and on again.

3. Keys and screens

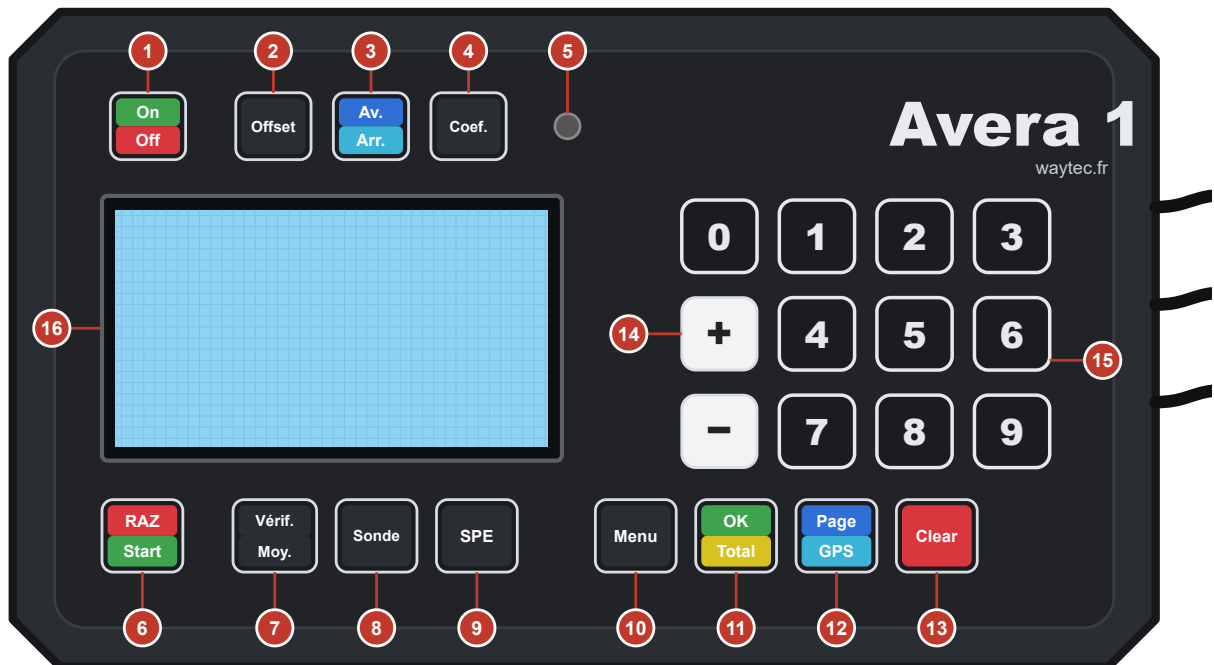


Figure 1 – Front panel of the AVERA.

No.	Key	Short press	Long press (key held)
1	On/Off	Switch on.	Held about 1 s: backlight on / off. Held longer: TURNING OFF . . and switch-off.
2	Offset	In orga recce: CH point.	Offset page (chapter 10).
3	Av./Arr.	—	Reverse: distances are counted down, the screen shows REVERSING and the AVERA beeps continuously. Long press again to return to forward.
4	Coef.	—	Entering the calibration coefficient (5.3).
5	LED	Alarm LED: recal cancel window (3 s), OK key held, reverse, point saved during recce, probe alarm, no GPS recal for 3 points (9.9). Faint glow when GPS recal is enabled.	

No.	Key	Short press	Long press (key held)
6	RAZ/Start	Partial to zero (the total stays frozen in reverse video for 3 s so you can note it).	ZR start: counters to zero and pacer started (11.2).
7	Vérif Moy.	—	ZR averages table, before or during the ZR (chapter 8); time sheet (8.4).
8	Sonde	Held briefly: next probe, G (left) → D (right) → M (mean of both). Sonde + SPE together: GPS probe (P) instead of probe G, or back again (3 beeps; release immediately).	
9	SPE	Special key: SPE + RAZ = start after the scheduled time (6.3); avg ↔ time in the averages table; pause (competitor recce); CP point (orga recce).	
10	Menu	In menus: exit.	Open the menu (chapter 4).
11	OK/Total	Confirm. During the 3 s after a recal: cancel it.	Manual recal of the total (11.4); calibration on the Link page (5.2).
12	Page/GPS	Next page: ZR → Summary → Link. During recce: GPS point. In settings: next line or value.	
13	Clear	4 quick presses: stops the pacer.	Total and partial to zero without starting the pacer.
14	+ / -	Correct the total by the recal. dist value. In menus: - moves down, + moves up; they change values.	
15	0 to 9	Data entry. On the Link page: programming the start time (6.2).	
16	Screen	Three pages, described below.	

3.1 ZR page (regularity)

Vmoy	48,50	E	+0004
G - 012			02,350
ZR 03			012,345
10023			

ZR page (layout for illustration)

Vmoy	Current average.
E	Gap in metres: + early, - late (0 while the pacer is not running).
G / D / M / P	Probe in use, followed by the last recal correction (GPS or remote control). ---- : no GPS recal for 3 points (9.9).
On the right	Partial.
ZR nn	ZR number; below it, the probe coefficient.
Large digits	Total.

3.2 Link page

17:34:59	0:00:41
17:35:40	00,000
off	002,184
10023	

Link page (layout for illustration)

Top left	Current time.
Top right	Countdown to the start time; after it, time elapsed since the last start.
Middle	Programmed start time, and partial.
arm / off	Automatic start armed or disarmed.
Large digits	Total; below left, the coefficient.

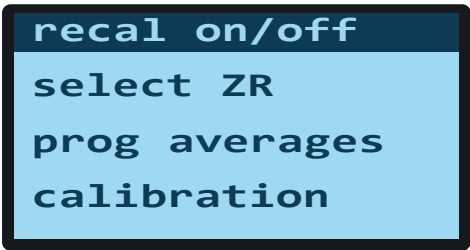
3.3 Summary page

Between the ZR page and the Link page, the Summary page sums up the corrections of the last ZR and suggests a coefficient (see 5.3).

3.4 The gap and the pilot display

The gap is shown on the ZR page for the co-driver. The pilot display shows the gap, the average or the current speed, and the total or the partial depending on the setting; its LEDs give the gap at a glance: **green** = on time, **blue** = late, **red** = early (chapter 12.4).

4. The menu and settings



The menu: 4 lines visible, the selected line in reverse video.

- **Open:** long press on **Menu** (about 1 s).
- **-**: next line; **+**: previous line (the menu loops round).
- **OK/Total**: open the selected line.
- **Menu**: return to the race screen.

Line	Purpose	See
recal on/off	Enables or disables automatic GPS recal. Disabled at every switch-on.	9.8
select ZR	Selects the ZR to drive.	4.1
prog averages	Programs the ZR offset, the flying-start offset and the averages of each ZR.	7
calibration	Automatic calibration over a zone of known length.	5.1
set clock	Sets the internal clock, by hand or from the GPS.	6.1
recal. dist	Correction value of the + / - keys (1 to 40 m).	4.2
GPS recce	Recce of GPS points (orga or competitor mode).	9.3
display set.	Choice of the information on the pilot display, gap beep, Bluetooth.	12.4
GPS accuracy	Capture radius and accuracy requirement for GPS points.	9.1
language	Screen language: French, English, Italian, Spanish.	4.3

If no GPS module was detected at start-up, the lines **recal on/off**, **GPS recce** and **GPS accuracy** do nothing. The Offset page is not part of the menu: it opens with a long press on **Offset** (chapter 10).

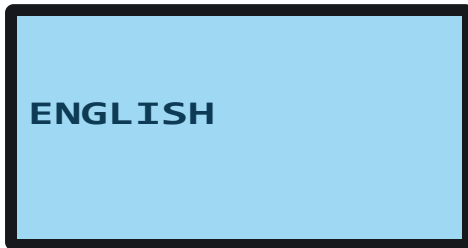
4.1 Choosing the ZR

The **ZR SELECT** screen shows the number in large digits: **+** / **-** to choose (1 to 60), **OK/Total** to confirm (you cannot exit without choosing). Changing ZR resets the GPS offset and the “old dist / new dist” coefficient of the Offset page.

4.2 Recal distance

recal. dist. screen: **+** / **-** set, from 1 to 40 m, the value added to or removed from the total by each press of **+** or **-** (and by the remote control switch); **OK/Total** to confirm.

4.3 Screen language



Choosing the language

Menu, line **language**: **+** / **-** to go from FRANCAIS to ENGLISH, ITALIANO, ESPANOL, then **OK/Total**. The texts change immediately and the language is kept when the AVERA is switched off.

The screen texts are loaded by the PC software. If the AVERA shows **TEXTES ABSENTS** at start-up and **T000**, **T001** ... instead of the texts, load them (PC software manual, "The AVERA screen texts").

5. Calibration

5.1 Calibration over a known zone

- 1 Menu, line **calibration**, **OK/Total**. The screen shows **Stop in front ZE**.
- 2 Place the vehicle at the start of the calibration zone, for example with the door mirror level with the marker, then **OK/Total** (**Menu** to abort).
- 3 Drive through the zone (**Drive the ZE**): the pulses of probes G and D count up.
- 4 At the end marker, press **OK/Total** and do not move the vehicle any more.
- 5 Enter the zone length as 5 digits, for example **01500** for 1,500 km (**Clear** goes back to the first digit).
- 6 **OK/Total**: **CALIBRATED OK**. The coefficients of probes G, D and of their mean are calculated and stored.

The counters are reset to zero at the beginning: calibrate outside a ZR. It is advisable to write down the three coefficients (left probe, right probe, mean).

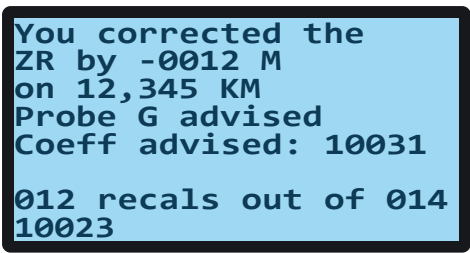
5.2 Calibration on the road (Link page)

Critical point

This procedure is done from the **Link page**. Done from the ZR page, it recalcs the total instead of calibrating.

- 1 At the beginning of a stretch of known length (ZR start or road-book landmark), set total and partial to zero: long press on **Clear** (without starting the pacer), or ZR start with **RAZ**.
- 2 Drive to a known road-book landmark.
- 3 Link page: long press on **OK/Total**, the total goes into reverse video.
- 4 Type the real distance as 6 digits (**012345** = 12,345 km).
- 5 **OK/Total**: the G, D and mean coefficients are recalculated and stored.

5.3 Correcting the coefficient after a ZR (Summary page, Coef. key)



Summary page after a ZR

Right after the ZR, from the ZR page, press **Page/GPS** once: the Summary page shows the sum of the corrections made during the ZR (+/-, manual and GPS recals) and the distance they apply to, the **advised probe** (the most accurate one) and the **suggested coefficient** for it, as well as the number of GPS recals applied out of the number of points in the ZR (a cancelled recal is not counted).

- 1 Select the advised probe with the **Sonde** key.
- 2 Long press on **Coef.**: the coefficient at the bottom left goes into reverse video.
- 3 Type the new coefficient (5 digits).
- 4 Press **Coef.** again to save it for this probe.

Do this between ZRs

Confirming the coefficient erases all the corrections made since the start and recalculates the total with the new coefficient. Never do it during a ZR.

6. Clock and automatic start

6.1 Setting the clock

Menu, line **set clock**: the **set time** screen shows the time in large digits and beeps every second.

Keys	Effect
1 / 4	Hour +1 / -1
2 / 5	Minute +1 / -1
3 / 6	Second +1 / -1
+ / -	Fine adjustment: ±62.5 ms per press, to match the AVERA to the organiser's clock
Page/GPS (T.GPS)	Takes the time from the GPS module. This is Universal Time (UTC) : then add the time-zone offset with 1 (in France: +1 h in winter, +2 h in summer)
OK/Total	Confirms and writes the time into the clock (also resets clk ofs ms to 0)

The internal clock is based on a temperature-compensated oscillator accurate to 5 ppm. It is still advisable to reset it at least once a day. For an additional fine offset, see **clk ofs ms** on the Offset page (chapter 10).

6.2 Programming the start time

On the **Link** page, with the keypad:

Keys	Effect
1 / 4	Hours +1 / -1
2 / 5	Minutes +1 / -1

Keys	Effect
3 / 6	Seconds +1 / -1
8 / 0	+30 s / -30 s
7	Next full minute
9	Arm / disarm the automatic start (arm / off)

Any change to the time disarms the start: press **9** last. When armed, the countdown is shown; at the exact time, the AVERA starts and switches to the ZR page by itself.

6.3 Starting after the scheduled time

- 1 On the start line, set total and partial to zero: long press on **Clear**.
- 2 On the Link page, enter the time at which the start should have taken place.
- 3 Press **SPE** and **RAZ** together (only once that time has passed).
- 4 The averages table appears; the pacer runs as if the start had taken place at the programmed time.
- 5 Leave the table (**OK/Total**): the AVERA switches to the ZR page. Drive off, then recal the total as soon as possible if you were already on the move.

7. Programming averages, offset and flying start

7.1 Programming a ZR

- 1 Menu, line **prog averages**, **OK/Total**. The **prog ZR** screen shows a ZR number: **+** / **-** to choose it, **OK/Total** to program it (**Menu** to exit).
- 2 **OFFSET : ZR offset**, 6 digits (**000000** for a standard ZR), **OK/Total**.
- 3 **START OFFSET : flying-start offset**, 6 digits (**000000** for a standing start), **OK/Total**.
- 4 The averages table appears: enter the average / distance pairs. **-** moves to the next field (average → distance → next line), **+** to the previous one; digits overwrite the field starting from the left. **Page/GPS** inserts a line after the current line: it takes the distance of the line before, and it is up to you to fill it in. **SPE** shows the passing times instead of the averages (8.4).
- 5 Put the cursor on the **last line in use** and confirm with **OK/Total**. The AVERA saves (about 5 s, LED on), then offers the next ZR.
- 6 **Menu** to exit: the ZR shown at that moment becomes the current ZR (check it, or go through **select ZR**).

Lines after the cursor are erased

When you confirm, the ZR ends at the line where the cursor is: the following lines are erased. Always confirm while on the last line in use.

7.2 Entry rules

- Averages as 4 digits: 45,00 km/h is entered as **4500** (99,99 km/h at most).
- Distances as 6 digits: 5,000 km is entered as **005000**. Each distance is the point where the line's average **ends** (cumulative distance from the start).

- For the last change, program a distance slightly longer than the ZR length: the ZR ends when the pacer reaches this distance.
- 70 lines at most per ZR when programming (199 during the rally, in the table opened with **Vérif Moy.**, see 8.1).

7.3 Example

Line	Average	Distance	Meaning
01	4500	005000	45,00 km/h from the start to 5,000 km
02	4950	008000	49,50 km/h from 5,000 to 8,000 km
03	3000	013000	30,00 km/h to the end (12,500 km ZR)

7.4 ZR offset

The ZR offset is used when the ZR does not begin at 0 km in the road-book. Example: if the ZR begins at 7,850 km, program 007850. At the ZR start, the total and the pacer start from this value. In a ZR timed from its start, the offset stays at 000,000.

ZR offset and GPS recal

The GPS points of a recce start from 0 km. With a ZR offset, the distances no longer match: do not use a ZR offset on a ZR with GPS recal. Note also that sending the averages from the PC software resets the ZR offset to 0.

7.5 Flying start

With a flying-start offset other than 000,000, the AVERA **starts by itself** (pacer started, counters to zero) when the total passes this distance. The vehicle can thus build up speed before the real zero point of the ZR.

- 1 Program the run-up distance, for example 000250 for 250 m.
- 2 Stopped at the run-up point (250 m before the start line), long press on **Clear**: counters to zero, flying start armed.
- 3 Drive off: as you cross the line, at 250 m, the pacer starts and the total restarts from zero (or from the ZR offset).

Set it back to 000,000 when not in use

The flying start is armed at every switch-on and by every long press on **Clear**. A forgotten flying-start offset would make the ZR start by itself after this distance.

Remember. The ZR offset shifts the distance base of the whole ZR. The flying-start offset is only used to handle a run-up distance before the real start.

8. Corrections during the rally, time sheet, change at the sign

8.1 Checking and correcting the averages (Vérif Moy.)

Before the start or during the ZR, long press on **Vérif Moy.**: the ZR averages table appears, with the cursor on the current section. Correct an average or a distance, or add a line (**Page/GPS**), then exit with **OK/Total** (or another long press on **Vérif Moy.**). The pacer recalculates its ideal position from the start with the corrected table.

- Here the table has **199 lines** (70 when programming). Beyond line 99, the number is shown as its last two digits in white on black: 05 in reverse video = line 105.
- A line added with **Page/GPS** takes the distance of the line before and lasts 0 s until you have filled it in; the following lines move down one place.
- These corrections apply to the current ZR only: they are lost when you change ZR and when you switch off (lines 71 to 199 too).
- Do not go down past the last line: the empty lines you pass through would be added to the ZR.
- GPS recals are not processed while the table is open: be quick.

8.2 Road-book handed out just before the start

Program average / distance pairs in advance with very large distances, for example 90 km. Start, then replace them with the real values as soon as they are known, using **Vérif Moy.** If the organiser hands out a **time sheet**, type it directly as times (8.4).

8.3 Average change at the sign

- 1 Program the known distances as usual.
- 2 For the unknown distance, enter a distance greater than the ZR length, for example 099000.
- 3 At the sign, hold the **Capture** button on the remote control until the averages table appears, then release.
- 4 The 99 is replaced by the captured distance (the distance at the moment of the press).
- 5 Enter the new average if needed, then confirm with a short press on Capture or with **OK/Total**.

The change happens at the right moment even if the crew was early or late at the time of the capture.

8.4 Averages or passing times (time sheet)

In the averages table, **SPE** switches between averages (**avg**) and **times** (**time**): each line then shows the cumulative time from the start at its end distance, **to the tenth of a second**, in the form **h mm ss,d**. The distance stays in the second column and is corrected as usual.

Typing a time: always 6 digits, in this order: hours, tens of minutes, minutes, tens of seconds, seconds, tenths. Digits overwrite the field starting from the left; **-** moves to the distance, then to the next line.

Time on the sheet	Type in	Displayed
3 min 12,4 s	003124	0 03 12,4
12 min 34,5 s	012345	0 12 34,5
1 h 05 min 00 s	105000	1 05 00,0

- 9 h 59 min 59,9 s at most (a single digit for the hours).
- Type the lines in order: each time must be greater than the one on the line before, and each distance further on. Otherwise the line's average stays at 00,00.
- A time too short for the distance gives 99,99 km/h, the highest possible average.

Typed times take priority. As soon as you type a time, the AVERA calculates the averages from the times, and the times no longer change, even when you leave the table. The pacer therefore follows the time sheet to the nearest tenth. During the rally, if times have been typed, the table opens directly on the times.

Back to averages: by typing an average (in the **avg** view), with **spd mod** on the Offset page (chapter 10), or when changing ZR. The times are then recalculated from the averages.

Line	Typed time	Distance	Calculated average
01	003124	002350	43,97 km/h (2,350 km in 3 min 12,4 s)
02	007450	005800	45,56 km/h (3,450 km in 4 min 32,6 s)
03	015000	011300	45,52 km/h (5,500 km in 7 min 15,0 s)

You can also start a ZR with averages and finish it with a time sheet: type the times of the remaining lines; the lines already passed keep their values.

When programming averages, only the averages are saved

In chapter 7 too, **SPE** shows the times and a typed time calculates the line's average. But the AVERA only saves the averages, to the hundredth of a km/h: during the rally, the times are recalculated from them and may differ by a few hundredths of a second per line. To follow a time sheet exactly, type it in **Vérif Moy.** (8.5).

8.5 Time sheet handed out before the start

- 1 Choose the ZR (menu, line **select ZR**) if it is not already the current ZR. A ZR programmed with a single line is enough (for example a holding average up to 90 km, 8.2).
- 2 Long press on **Vérif Moy.**, before the start or during the ZR.
- 3 **SPE** to switch to the times (**time**).
- 4 For each line of the sheet: the time (6 digits), **-**, the distance (6 digits), **-** to move to the next line.
- 5 Exit with **OK/Total**. If the sheet is not finished at the start, reopen the table during the ZR and carry on: the pacer realigns itself on the times automatically.
 - As with averages, the last line sets the end of the ZR: the ZR ends when the pacer reaches its distance.
 - Do not go down past the last line of the sheet (8.1).
 - GPS recalcs are not processed while the table is open: if possible, type the sheet before the start.

9. GPS recal

With the GPS module, the AVERA corrects its total by itself when passing **GPS points** recorded in advance: the **reconnaissance** ("recce"). Each point stores a GPS position (in the module) and the distance the AVERA must show at that spot (in the AVERA). In the rally, when the car passes closest to a point, the AVERA sets its total to the point's distance.

Capacity: **60 ZRs of 400 points** each. Points are taken on the AVERA during the recce, or imported from the PC software.

9.1 Setting the GPS accuracy

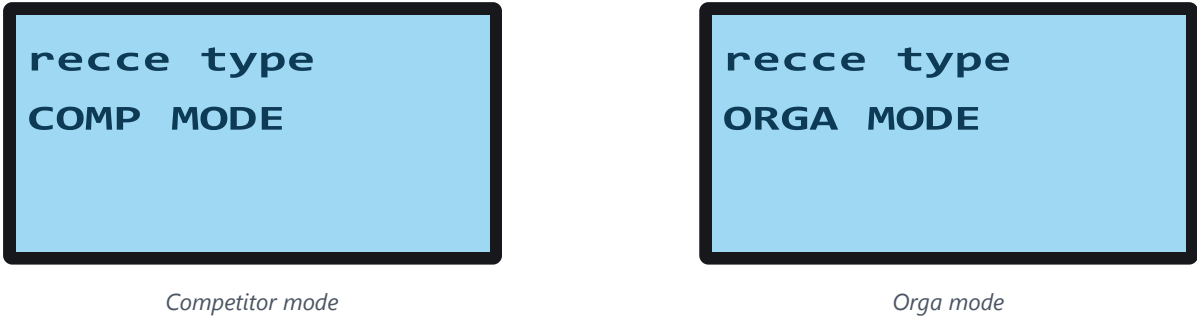
Menu, line **GPS accuracy**. Two screens follow one another: **+** / **-** to change the value, **OK/Total** to confirm.

Screen	Setting	Values
Point dist	Capture radius: maximum distance, in metres, between the car (at its closest) and the recorded point for the recal to take place. At least the width of the lane.	2 to 9 m
GPS accuracy	Requirement on GPS quality at the moment of passing: the smaller the figure, the more demanding the AVERA (and the greater the risk that it does not recal).	1 (very demanding) to 4

Recommended values: **Point dist = 7** and **GPS accuracy = 3**. They are stored in the GPS module. This setting needs the GPS module connected; if it does not answer, the AVERA shows **error**.

9.2 Orga mode or competitor mode?

When you enter the recce, the AVERA asks for the **recce type**. The choice applies to the whole session (all the ZRs recce one after another); next time, the AVERA offers the last mode used.



	Competitor mode	Orga mode
For whom	The crew who recce the route and wants points ready to use as soon as the recce is over.	The organiser, or the crew who wants to check and normalise at home with the PC software.
Points taken	AUTO (automatic interval) or manual (Page/GPS), all of type AUTO.	AUTO, plus marked points: PK (Page/GPS), CP (SPE), CH (Offset).
Normalisation	Done on the AVERA , during the recce: distance typed then Page/GPS , and at the end of the ZR on the official length.	None on the AVERA : the distances stay as measured. Normalisation is done afterwards in the PC software , on the PKs.
Pause	Long press on SPE .	No pause (SPE takes a CP).
Suggested automatic interval	ZR length / 350 (40 m minimum).	ZR length / 300 (40 m minimum), to leave about 100 places for PKs, CPs and CHs.

Want to normalise at home? Choose orga mode.

In orga mode, the AVERA records your road-book landmarks as **PKs**, with the distance it was measuring at that spot. At home, the PC software rescales each section when you type the true distance of each PK (PC software manual, chapter "Normalising a section on a PK"). You stay in control of the corrections, you see the recce on a map, and you can send it to your team-mates' AVERAs. In competitor mode, normalisation is done once and for all during the recce and the landmarks are not kept.

9.3 Doing the recce, step by step

Before you start

- GPS module connected **before** switching the AVERA on (message **GPS module found** at start-up); antenna with a clear view of the sky, in the position it will have in the rally.
- AVERA calibrated on the probe you will use in the rally.
- Let the GPS acquire satellites for a few minutes: a point is only accepted with **at least 6 satellites** and an **HDOP below 1.20** (shown as **120**).
- Reccing a ZR **replaces** its old points.

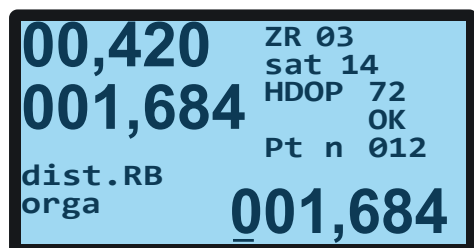
- 1 Long press on **Menu** choose **GPS recce** with **+** / **-**, then **OK/Total**.

- 2 **Recce type:** or to switch from **COMP MODE** to **ORGA MODE**, to confirm.
- 3 **Choosing the ZR:** the screen shows the reminder **warning the data will be erased** and the ZR number in large digits. / to change ZR, to confirm (to quit).
- 4 **MANU or AUTO:** / then .
 - **MANU:** you take each point yourself with .
 - **AUTO:** the AVERA takes a point at every "interval". It first asks for the official ZR length (**ZR len.**, 5 digits, for example **12500** for 12,500 km), then ; it then suggests the **interval** in metres: / to adjust it (40 to 300 m), to confirm.
- 5 Position the car facing the ZR start marker. Hold down for a moment: the counters go to zero.
- 6 Drive. In AUTO, the first point is taken after 100 m, then at every interval. The other points are taken as described in 9.5; the capture screen is described in 9.4.
- 7 At the ZR finish, **hold the key:** the AVERA ends the ZR (**saving**), saves its points (up to about 18 s for 400 points: do not switch off), then offers the **next ZR**, without asking for the mode again.
- 8 When the session is over, at the ZR selection screen, press to leave the recce.

Always leave with Menu before switching off

The number of points of each ZR is only saved (in the AVERA and in the module) when you leave the recce with . Switching the AVERA off directly from the recce would lose the ZRs of the session.

9.4 The capture screen



Capture screen (orga mode)

Top left	Partial (navigation counter).
Below, large digits	ZR total: the distance that will be recorded at the next point.
ZR / sat / HDOP	ZR being recded, number of satellites, HDOP × 100 (072 = 0.72). OK : accuracy acceptable.
Pt n	Number of the next point.
dist.RB	Distance to be recorded (bottom right): it follows the total, or the distance you type on the keypad (the current digit is underlined).
orga	Reminder of orga mode.

At each point taken, the AVERA shows **POINT SAVED !** for 1 s, beeps and lights the alarm LED; the point number goes up. Other messages:

POOR ACCURACY !	Fewer than 6 satellites or HDOP of 1.20 or more: the point is not taken. Wait for a better signal or move forward a few metres.
FAILED! / TIMEOUT !	The GPS module gave a bad answer or did not answer: the point is not taken; check the connection and take the point again.

9.5 The keys during the recce

Key	Competitor mode	Orga mode
Page/GPS	In MANU: takes a point (AUTO). In AUTO: no effect on its own. After typing a distance: normalises (see 9.6), without taking a point.	Takes a PK point.
SPE	Long press: pauses the automatic points (Pause at the bottom of the screen, alarm LED on); long press again to resume. Handy in a tunnel or a series of hairpins.	Takes a CP point (only one per press).
Offset	—	Takes a CH point (only one per press).
Digits 0 ... 9	Type a distance into "dist.RB" (6 digits, in metres: 003000 = 3,000 km).	
+ / -	Correct the total by the value set in recal. dist in the menu.	
Clear	Goes back one point number: the next point will replace the last one taken.	
RAZ held	Resets the counters to zero.	
On/Off held	End of the ZR (see 9.3, step 7).	

9.6 Competitor mode: normalisation on the AVERA

When passing a road-book landmark whose exact distance you know:

- 1 Stop level with the landmark.
- 2 Type its distance (6 digits, for example 003000 for 3,000 km).
- 3 Press **Page/GPS**: the AVERA beeps three times.

All the points taken since the previous normalisation (or since the start) are then **corrected proportionally**, and the total restarts from the typed distance. No point is recorded at that spot. Automatic capture resumes as you drive on.

In **AUTO**, at the end of the ZR (**On/Off** key held), the AVERA does the same with the **official length** typed at the start: it takes a last GPS point at the finish, records it as a **PK** at that length, and rescales the last section. So stop exactly on the finish line before holding **On/Off**, with good GPS reception: if the GPS is poor at that moment, the AVERA ends the ZR without a finish point or final normalisation, and without any message. In MANU, this last point keeps the measured distance.

9.7 Orga mode: PK, CP, CH and normalisation at home

- **PK** (**Page/GPS**) at each road-book landmark whose distance is known (junction, sign, marker post...) and **at the finish**: in orga mode, the AVERA does not take a finish point by itself. To normalise at home afterwards, **do not type a distance**: the PK keeps the measured distance, and you will type the true one in the PC software.
- **CP** (**SPE**) at passage controls, **CH** (**Offset**) at time controls: they serve as landmarks in the table and on the map of the PC software.
- AUTO points are taken automatically, as in competitor mode (no pause in orga mode).

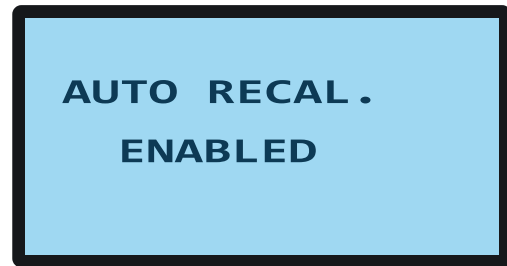
Distance typed before Page/GPS in orga mode

If you type a distance and then press **Page/GPS**, the AVERA records the PK at that distance and **recals its total** to it, like a manual recal, but without correcting the earlier points. This is useful to start a new section on a road-book figure; to normalise at home, let the AVERA record the measured distance instead.

At home: PC software, *Read combined file from AVERA*, then normalise the PKs in order, save and send back (PC software manual, chapters "Normalising a section on a PK" and "Recommended methods").

9.8 Enabling recal in the rally

- 1 Menu, line `recal on/off`, **OK/Total**.
- 2 **+** or **-** to show `AUTO RECAL. ENABLED`, then **OK/Total**.
- 3 On the main screen, the alarm LED flashes quickly and faintly.



Automatic recal enabled

Repeat at every switch-on

GPS recal is **disabled every time the AVERA is switched on**. Enable it **before the start** of the ZR: if enabled after the start, it does not work on that ZR.

9.9 What the AVERA does during the rally

- At the ZR start, the module loads the points of the ZR (its red LED goes off for about 2 s then flashes 3 times).
- At each point, when the car passes closest (within the `Point dist` radius) and GPS reception is good, the total is set to the point's distance. The settings of the Offset page (chapter 10) let you fine-tune this recal.
- The correction is shown on the ZR screen (below the probe letter) and the alarm LED stays on for **3 seconds**: a short press on **OK/Total** during that time, on the ZR page, **cancels** this recal. The AVERA does not beep for a GPS recal.
- A point passed in the opposite direction (U-turn, out-and-back on the same road) is ignored. A point without coordinates is skipped.
- Missed point (GPS lost, point off the line driven): the module leaves it and looks for the following ones; it never goes back.
- The point type (AUTO, CP, PK, CH) makes no difference to the recal.
- Recals are not processed while the menu, the averages table or the Offset page is open.
- At the end of the ZR, the module stops (its green LED flashes 3 times, then the red one stays on steady) and the AVERA moves on to the next ZR.

Big correction after a stretch without recal

When the GPS signal is poor for a while (hairpin bends, forest, cliffs), the points go by without recal and the total can drift by several tens of metres (corners cut compared with the recce, probe wheel spinning...). After 3 points without recal, the AVERA warns you: 3 long beeps, alarm LED on and `----` instead of the last correction on the ZR page, until the next recal. The correction that comes next is usually right: follow the new gap, even if it jumps by 50 m or more. Only cancel a correction (**OK/Total** within 3 s) if you are sure it is wrong.

ZRs with hairpin bends: clean the hairpins

In a series of hairpins, a recce point can be only a few metres from the road on the other side. Before the rally, open these ZRs in the PC software (v3.3): the points at risk are highlighted in fluo, and the "Clean hairpins" button removes them (PC software manual, "Hairpin points").

End of ZR

Let the pacer stop by itself at the end of the ZR (or stop it with 4 presses on **Clear**) before starting another ZR. Otherwise the module stays on the old ZR and no longer recals.

9.10 New ZR length or moved start

If the organiser announces a new ZR length after the recce has been done, or moves the start without changing the distances, use the [Offset page](#) (chapter 10): lines **old dist** / **new dist** or **GPS offset**.

10. The Offset page (GPS recal and clock settings)

The Offset page groups together the fine settings of GPS recal, the correction of distances when the organiser changes the ZR at the last minute, a tweak of the averages and a clock offset.

```
GPS offset      0
corr. dist.    -3
old dist       12500 X
new dist       12620
spd mod        0
gps lag ms     10
clk ofs ms     0
1.009600
```

Offset page: the X marks the line being set.

How to use it

- **Open**: long press on **Offset**.
- **Page/GPS**: next line (the X on the right follows).
- **+** / **-**: change the value of the line, one step per press.
- Digits: entry of **old dist** and **new dist**.
- **OK/Total**: exit and apply the settings.
- While the page is open, GPS recalcs are not processed: do not go there in the middle of a ZR.

Line	Purpose	Values	Kept when switched off?
GPS offset	Shifts all GPS recal distances without rescaling them: when the organiser moves the ZR start but the road-book distances do not change. Value in metres, subtracted from each recal distance (start moved 150 m further along the route: +150; 150 m earlier: -150). Tip: on this page, pressing SPE copies the current partial into the offset (reset the partial with RAZ at the old start, drive to the new one, open the page and press SPE).	in metres	no : reset to 0 at switch-on and at every ZR change or end
corr. dist.	Fixed correction added to every GPS recal , to compensate for a constant offset you have noticed (the AVERA always recalcs 3 m too far: -3).	-5 to +5 m	yes
old dist / new dist	New ZR length announced after the recce: type the old length (the one of the recce) and the new one, in metres as 5 digits (12500 = 12,500 km). All the recal distances of the ZR are multiplied by new / old; the coefficient is shown on the last line.	5 digits (59 999 m at most)	no

Line	Purpose	Values	Kept when switched off?
<code>spd mod</code>	Adds (or subtracts) km/h to all the averages of the current ZR , when you leave the page (+1 = each average goes up by 1 km/h). If a time sheet has been typed (8.4), it gives way to the averages: the times are recalculated.	in steps of 1 km/h	no : lost when you change ZR and when you switch off
<code>gps lag ms</code>	GPS lag compensated at recal: the distance travelled during that time (speed × lag) is added. Set it by trial, starting low.	0 to 250 ms, in 10 ms steps (default 10)	yes
<code>clk ofs ms</code>	Shifts the internal clock in steps of 62.5 ms, in addition to the time setting: to match an organiser's start clock that is not synchronised with their timing system. Immediate effect.	±19 steps (about ±1.2 s), shown in ms	yes, reset to 0 when the time is set
bottom line	"new dist / old dist" coefficient applied to the recal distances.	1.000000 = no effect	—

old dist / new dist coefficient

The coefficient is reset to 1 when the AVERA is switched off, when each ZR is changed or ends, and **every time the page is opened** (it starts again from 10000 / 10000). Set it just before the start of the ZR concerned; if you reopen the page afterwards, type the old and the new length again before leaving it. Like the GPS offset, it also applies to the points of the recal remote control.

spd mod

The new average only takes effect at the **next average change**, and the AVERA then recalculates its ideal position from the start (the gap may jump). Set `spd mod` **before the start** of the ZR.

So at a GPS recal, the AVERA takes: point distance × coefficient + distance travelled since the closest pass + speed × `gps lag ms` – GPS offset + `corr. dist.`.

11. Using the AVERA in a rally

11.1 Before the start

- 1 GPS module (or recal remote control) connected **before** switching the AVERA on; check for the message `GPS module found`.
- 2 Set the clock to the organiser's clock or to the GPS (6.1).
- 3 Calibrate the unit (chapter 5) and choose the probe (`Sonde` key).
- 4 Program the ZR averages, any offsets and the flying starts (chapter 7).
- 5 Choose the ZR to drive (`select ZR`).
- 6 If the GPS module is used: **enable recal** (`recal on/off` → `ENABLED`), to be repeated after every switch-on.
- 7 Offset page settings specific to this ZR (GPS offset, new length): just before the start.
- 8 On the Link page, program the start time and arm it (`9` key), or prepare a manual start.

11.2 Manual start

About 10 seconds before the start, hold **RAZ** down. After about 3 seconds, the first average appears at the top left. Release **RAZ** at the exact moment of the start: counters to zero (or to the ZR offset), pacer started, beep.

11.3 Navigating between ZRs

Between two ZRs, use the Link page like a standard tripmaster: partial reset at each change of direction (short press on **RAZ**), total, time and countdown to the next start.

11.4 Manual recal of the total

- **With + / -**: each press corrects the total by the **recal. dist** value (beep).
- **By typing it in**: long press on **OK/Total**, the total freezes in reverse video; type the landmark distance as 6 digits (012345 = 12,345 km), then press **OK/Total** **as you pass the landmark**: the total takes the typed value at that instant. So type it before you reach the landmark.

ZR page or Link page?

To correct the ZR, make the entry from the **ZR page**. From the Link page, the same procedure performs a **calibration** (5.2) and changes the coefficients.

After a recal (manual or GPS), the alarm LED stays on for about 3 s: a short press on **OK/Total** during this time, on the ZR page, cancels the correction; once the LED is off, it is final. Only the last recal can be cancelled.

11.5 Resetting and stopping the pacer

Long press on RAZ	Resets total and partial to zero, then starts the pacer (ZR start).
Short press on RAZ	Resets the partial to zero.
Long press on Clear	Resets total and partial to zero without starting the pacer, and re-arms the flying start. A running pacer is not stopped.
4 quick presses on Clear	Stops the pacer (and the GPS recal of the ZR).

11.6 End of ZR

The ZR ends by itself when the pacer reaches the distance of the last averages line: the pacer stops, the GPS module is informed, the AVERA moves on to the next ZR, and the GPS offset and the Offset page coefficient return to 0 and 1. The counters keep running for the liaison. Look at the Summary page (5.3) straight away if you want to correct the calibration.

It is important that the pacer stops (by itself or with 4 presses on **Clear**) before you start another ZR.

11.7 Probe alarm

If one probe counts much less than the other (more than 4 times less), the AVERA beeps and shows **probe G missing or faulty, switch to probe D** (or the reverse for probe D). Switch to the other probe with the **Sonde** key. The check is only done once per switch-on: with only one probe fitted, the message therefore appears once, which is normal.

12. GPS module, remote controls and pilot display

12.1 The GPS module LEDs

Situation	LED
Power-up	2 short flashes.
Idle (menu, liaison, before the start, after a ZR)	Red, steady.
Detection by the AVERA at start-up	Green on for about 1.4 s, then 2 flashes.
Recce	Green on from the first point recorded until you leave the recce.
ZR start with recal enabled	Red off for about 2 s (points loading), then 3 quick flashes.
During the rally, recal running	Red flickering (looks dimly lit).
End of ZR	Green: 3 quick flashes, then red steady.
Point reset (from the PC)	Green flashing quickly for about 40 s.
Exchanges with the PC (reading, sending)	Green and red on, with brief interruptions.

The LEDs show neither satellite reception nor recal: GPS quality is read on the AVERA screen during the recce (sat, HDOP).

Installing the module

- Connect it **before** switching the AVERA on: it is only detected at start-up. A module connected afterwards is not seen; a loose contact that makes it restart during the rally cuts recal until the next ZR.
- Place the antenna in the same spot for the recce and for the rally (preferably outside, or at least inside the car, against the windscreen, with a clear view of the sky): all recal is based on the antenna position.
- Without a detected module, the menu lines **recal on/off**, **GPS recce** and **GPS accuracy** do nothing, and clock synchronisation by GPS is inactive.

12.2 Recal remote control

It connects to the 4-pin screw connector, **instead of the GPS module**, and is used for ZRs without GPS recal: the crew confirm each point of the list themselves as they pass it. The points are those stored in the AVERA (GPS recce or "distances only" sent by the PC software), 400 at most per ZR.

- **Connection:** connect it before switching the AVERA on. At start-up, the AVERA shows **Remote found**. Without this pairing, every press shows **---,---**.
- **Screen:** **NEXT PT**, the number of the next point in large digits, and its distance **kkk,mmm**. At the ZR start, it goes back to point 1.
- **VALID** (confirm): recal the AVERA on the displayed point (the total takes its distance, the partial restarts from 0), then moves on to the next point. The LED stays on for 3 s: this is the cancel window.
- **ANNUL** (cancel): during these 3 s, cancels the last recal (once only). The remote control stays on the next point: go back with **PT PRÉCÉDENT** if you want to recal that point again.
- **PT SUIVANT / PT PRÉCÉDENT** (next / previous point): changes point without a recal (the AVERA beeps).
- **---,---**: the AVERA did not answer (for example if it is in a menu). Caution: **VALID** still advances the number; go back with **PT PRÉCÉDENT**.

12.3 6-pin remote control (option)

Control	Effect
Gel (freeze)	Freezes the AVERA screen as long as it is pressed, so you can read off a distance at a precise point while driving; the AVERA keeps counting and shows the real values again when released.
+ / – switch	Corrects the total by the recal. dist value from the menu, one step per press, with a beep (like the + / – keys).
Capture	Short press: captures the distance at the moment of the press. Long press: the captured distance becomes that of the next average change and the averages table appears: average change at the sign (chapter 8).
RAZ	Like the RAZ key: short press = partial to zero, long press = ZR start.

12.4 Pilot display

It plugs into the jack on the left side of the AVERA. Its bottom line shows a distance; its top line, on the ZR page, shows the gap in metres (**EC** , "–" = late) and a speed (**VM** set average or **VI** current speed). The LEDs show the gap:

Display	Green LED	Blue LEDs (late)	Red LEDs (early)
9 LEDs	Always on on the ZR page	1 to 4 LEDs from –3, –6, –12 and –24 m	1 to 4 LEDs from +3, +6, +12 and +24 m
23 LEDs	On its own between 0 and +1 m	Bar of 11 LEDs, from –1 m to –24 m	Bar of 11 LEDs, from +2 m to +25 m

Outside the ZR page, the gap LEDs are off. Above 99 km/h, the speed only shows its last two digits (105 km/h → 05). The 23-LED display adjusts its brightness by itself (light sensor).

Menu "display set.": what the display shows

– / **+**: next / previous line; **Page/GPS**: change the value; **OK/Total**: save and exit.

Line	Choice	Effect
BIP	OFF / GRN / INV.	AVERA beep: never, when the gap is within ±4 m, or when it goes outside that range.
ZR	toZR / part	Distance sent on the ZR page: ZR total, or partial.
Lnk	toZR / part	Same choice for the Link page.
Spd	Avg / Ins	Set average of the section (VM) or current speed (VI).
Bluetooth	OFF / ON	Bluetooth link (set back to OFF at every start-up).

13. PC link and updates

The AVERA PC software v3.3 has its own manual. In short, on the AVERA side:

- **PC mode**: the AVERA is switched on with the PC cable connected and shows **AVERA PLUGGED**, then **GPS module found**. After "Connect" in the software: **AVERA LINKED**. Click "Connect" **within 20 s** of switching

on: after that, the AVERA starts normally (switch it on again to try again).

- **Only one operation per switch-on:** to do another one, switch the AVERA off and on again (cable connected), then Disconnect / Connect in the software.
- The **GPS module must be connected** to read or send GPS recces and to reset the points.

Software operation	AVERA screen
Read from the AVERA	SENDING DATA...
Send combined file / distances only	RECEIVING DATA... , then coordinates (transm. error in case of error)
Send the averages	RECEIVING avg/dist , averages , then SAVING... (sometimes several minutes: do not switch off) and automatic restart
Reset GPS points	ERASING... (about 40 s), then POINTS ERASED or GPS MODULE MUTE
Load the texts	RECEPTION TEXTES , then TEXTES OK (or MAUVAISE VERSION)

Firmware update: with the Firmware tab of the PC software (.cry file supplied by WAYTEC); capture must be started in the software **before** switching the AVERA on. Then: load the texts and choose the language; after an upgrade from a 3.x version, also reset the GPS points again and send the recces and the averages back.

14. Quick reference and messages

14.1 Short procedures

To...	Do
Program a standard ZR	Menu > prog averages > ZR > OFFSET 000000 > START OFFSET 000000 > average / distance pairs > OK on the last line.
Flying start	The same, with a START OFFSET other than 000000; long press Clear at the run-up point.
Enable GPS recal	Menu > recal on/off > + or - > ENABLED > OK (at every switch-on, before the start).
Recce to normalise at home	Menu > GPS recce > ORGA MODE > ZR > AUTO > ZR len. > interval > RAZ held at the start > Page/GPS at each landmark (PK) and at the finish > On/Off held > ... > Menu.
Recce normalised on the AVERA	Menu > GPS recce > COMP MODE > ZR > AUTO > ZR len. > interval > RAZ held at the start > distance + Page/GPS at the landmarks > On/Off held on the finish line > ... > Menu.
Correct the averages during a ZR	Vérif Moy. long (before the start or during the ZR) > edit > OK.
Time sheet	Vérif Moy. long > SPE (time) > 6-digit time (h mm ss,d) > - > distance > - ... > OK.
New ZR length	Offset long > Page/GPS down to "old dist" > old length > Page/GPS > new length > OK.
ZR start moved	Offset long > "GPS offset" with + / - (or SPE) > OK.
Stop the pacer	4 quick presses on Clear.
Partial to zero / total and partial to zero	Short press on RAZ / long press on Clear.

14.2 Screen messages

Message	Meaning
TEXTES ABSENTS , then T000 ...	Screen texts to be loaded from the PC software.
GPS module found / Remote found	GPS module / recal remote control detected at start-up.
Remote or GPS missing or error	Nothing answered on the 4-pin connector: check the connection, switch on again.
AVERA PLUGGED	The AVERA started in PC mode (USB cable or USB charger connected). Without "Connect" within 20 s, it starts normally.
POINT SAVED !	Recce: point saved.
POOR ACCURACY !	Recce: fewer than 6 satellites or HDOP too high, point refused.
FAILED! / TIMEOUT !	Recce: the GPS module gave a bad answer / did not answer.
error / error1	GPS accuracy: the module does not answer.
probe G missing or ...	Probe alarm (11.7).
REVERSING	Reverse engaged (Av./Arr. key).
---- on the ZR page, 3 long beeps, LED on	No GPS recal for 3 points (poor GPS reception): the total may drift; the next correction is usually right (9.9).

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