GaugePilot

RALLY PRO

USER MANUAL

Thank you for purchasing a GaugePilot.
Following the instructions in this manual
will enable you to obtain optimum
performance from your new instrument.

Please retain this manual for future reference.

RALLYPRO-FW3.00-24/11/16

Contents

Using this manual

The following text formatting styles are used in this manual as follows.

`press -hold`	Blue boxed text is text that will appear in the helper above a control knob on your GaugePilot instrument. A bar next to the text means that this action requires a long press (1 second hold) rather than a normal press of the button.
Application	An application available on the GaugePilot instrument, either on the Home Menu or Rally Menu.
`setup➜about` `setup➜preferences➜general`	A description of how to reach a particular setting or screen from the home menu. Each stage may involve turning a knob to highlight an icon and then pressing `select`, or directly pressing a knob indicated by `helper text`.
Important	An important notice

Installation

Installation of your GaugePilot should only be carried out by competent persons.

Important

For correct operation, GaugePilot MUST receive a switched live feed from the ignition circuit. It relies on this input to power itself on and off correctly in concert with the vehicle. I.e. The switched live feed must switch on after the permanent supply is present and switch off before the permanent supply is removed.

The switched lighting feed allows the GaugePilot to automatically dim its display backlight at night-time and also to provide a lights left on warning. If you do not require either of these functions, the switching lighting feed may be left unconnected.

Battery Isolation Switches

GaugePilot is compatible with battery isolation switches BUT you must ensure that GaugePilot has switched itself off prior to Isolating the battery.

> A Battery isolation switch is not a substitute for a switched live feed from the ignition, and the unit will not function correctly if you attempt to use it in this manner.

Wiring

Detailed wiring diagrams are available for positive and negative earth vehicle on the GaugePilot website at www.gaugepilot.uk/resources

Your GaugePilot instrument must be protected by a 2 amp fuse (provided).

Sensors

Details of sensor and sensor installation are available on the GaugePilot website at www.gaugepilot.uk/resources

Controls

Switching On

GaugePilot switches on automatically when the vehicle ignition is turned on. It will also switch on if any of its three buttons are pressed.

If switched on via the vehicle ignition, GaugePilot will go to its default application, set via `Setup➜Preferences➜Favourites`.

If switched on via a button press, GaugePilot will display its main menu.

Switching Off

GaugePilot switches off automatically a fixed time after the vehicle ignition is turned off. It may also be manually switched off from the main menu after the ignition is turned off.

The switch off time is extended whenever the user interacts with the GaugePilot, but the instrument will switch off a fixed time after interaction with the unit stops.

The GaugePilot display can be switched off with the ignition on from the main menu but the instrument will continue to run and monitor the vehicle until the ignition is turned off and will then immediately switch off.

> Should the unit fail to respond whilst switched on, holding the middle knob for 12 seconds will force a restart of the instrument (release the middle knob once the screen turns off) without needing to disconnect the instrument from the car

Operating your instrument

Your GaugePilot instrument is controlled via its three front knobs. These can be rotated left and right, and pushed.

The bottom eighth of the screen is used to display the blue dynamic helper text and also any active alerts (such as a speed warning[1] or low oil pressure[2]).

The helper text guides your use of GaugePilot, by describing what **pressing** each knob will do at any given time. When we refer to helper text in this manual we will highlight it in `blue`.

The requirement for a **long press** of a button is indicated by a horizontal bar next to the `-helper text`. A **long press** is a hold of the button for more than one second.

Where a button has dual function, helper text will be shown for both functions, such as `push - hold`

Turning any of the three knobs will either increase or decrease a value or navigate you left or right depending upon the current context.

A turning helper is displayed on screen when a turning input is required, but may not be obvious.

[1] Requires wheel speed sensor

[2] Requires oil pressure sensor

Main Menu

The **Main Menu** contains 6 icons allowing access to 6 main applications

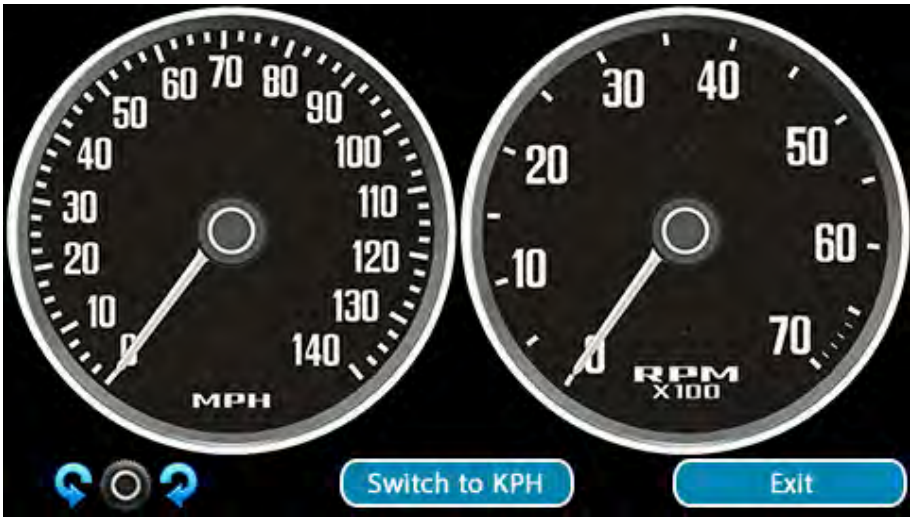
	**Gauges**	displays gauges
	**Rally Menu**	accesses rally computer
	**Stopwatches**	displays stopwatches
	**Service Reminders**	edit service reminders
	**Datalogger**	accesses datalogger
	**Setup & Preferences**	change setup or preferences

Rotating any knob steps through the application icons, with the selected icon growing and brightening. Pushing `Select` will start the highlighted application.

Pushing `Display Off` will blank the display if the ignition is on, and switch the unit completely off if the ignition itself is off.

The Helper changes to `Switch Off` when the vehicle ignition is turned off.

Gauges



On starting the **Gauges** application, the first gauge pair will be displayed. If more than one gauge pair is defined, rotating any knob will move to the next pair (clock-wise) or the previous pair (anti-clockwise).

If no gauges have been defined, a `setup` short cut is displayed which will take you directly to `Setup➜Gauges` to do so.

If you wish to change the units of the gauges being displayed, change the voltage range of the voltage gauge, or switch between analogue and digital speedometers, this can be done by going to `Setup➜Preferences➜Units`

If a speedometer is being displayed, `switch to kph` or `switch to mph` will be displayed to allow you to swap between kph and mph without leaving the application.

> Note that in **Regulation Mode**, the speedometer gauge is not available and a fixed image will be displayed in its place.

Gauges Available

The following Gauges are available (will display minimum value unless fed by suitable sensor data)

Ambient Temperature	C or F	
Oil Temperature	C or F	
Coolant Temperature	C or F	
Intake Temperature	C or F	
Voltage	12V or 6V	
Speed	KPH or MPH Analogue or Digital Disabled in Regulation Mode	
RPM	-	
Fuel Level	-	

Oil Pressure	BAR or PSI	
Fuel Pressure	BAR or PSI	
Boost	BAR or PSI	
AFR 1 - 2	AFR O2 level* Error Code* Status*	
CHT 1 - 4	C or F	
EGT 1 - 4	C or F	
Gear	-	

* Note that the AFR 1 - 2 gauges when fed by an Innovate Motorsports Data stream from an LC-1 or LC-2 (or similar) will display O2 levels, Error codes, and status information.

Alerts

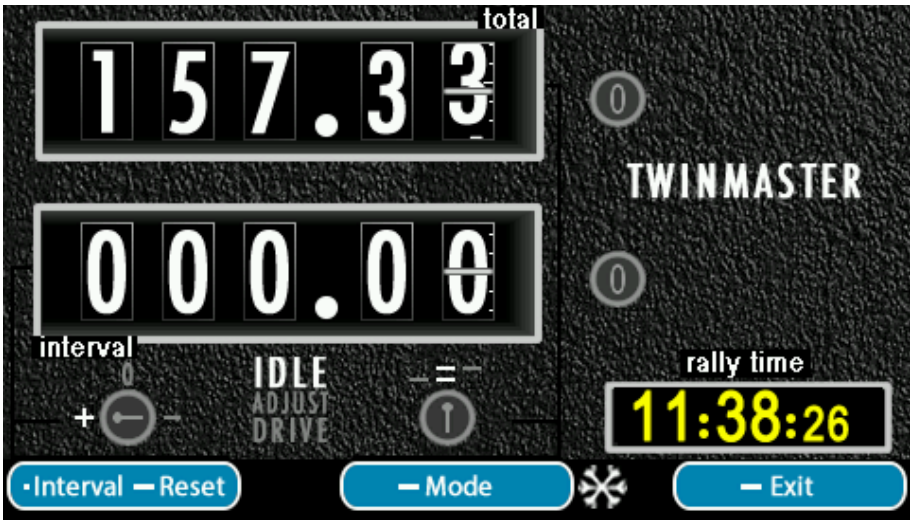
Alerts are always active on your GaugePilot no matter which Application is currently in use.

Alerts appear on screen and/or drive external warning outputs based upon how you have configured them to behave in `Setup➜Alerts`

Red Alerts take priority over Yellow Alerts when displaying alerts on screen, but all warning outputs for which an alert is active will always be triggered.

On-screen alerts are displayed in the bottom eighth of the screen, normally occupied by helpers. Helpers remain on screen during alerts but change colour to match that of the alert. The alert symbol is displayed between the left and middle helper.

In the case of an ice alert, the alert remains with a coloured banner for a 5 second period and then is replaced with a fixed icon at the bottom of the screen until the temperature rises.



Rally Menu

The **Rally Menu** contains icons allowing access to the rally applications, and also summarises the current rally settings (units, active wheel sensor, active tyre set). The rally applications, from left to right, are:-

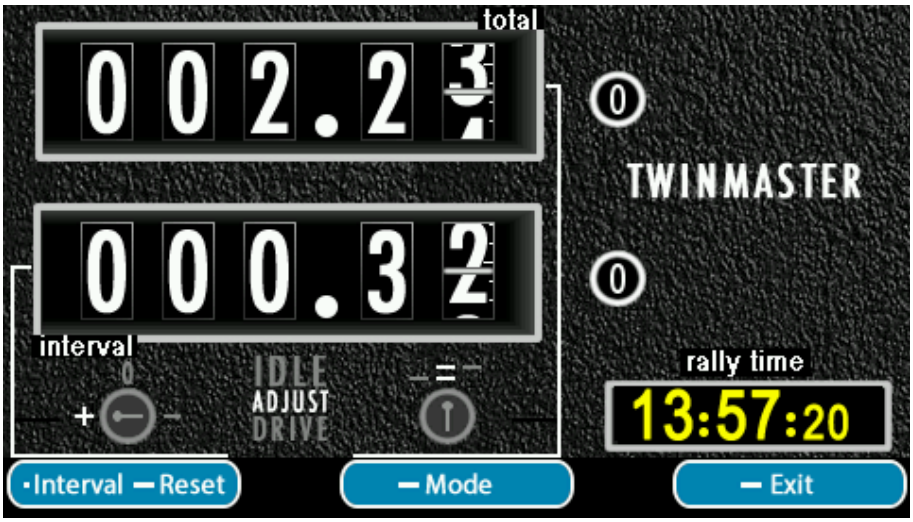
	**Twinmaster**	twin odometer, with rally time
	**Rallymaster**	visual average speed computer, with speed setting to 2 decimal places (RALLY only)
	**TwinTime**	Twin odometer, with rally time, and synchronised stopwatch Regularity, Jogularity, and Lap modes
	**Farina**	table driven rally computer for complex european events (RALLY PRO only)
	**Calibration**	for precise odometer calibration at home and at events, or calibration trimming during an event
	**Rally settings**	Rally computer settings such as miles/km, typeset choice, and whether to use home or roadbook calibration

Rotating any knob steps through the application icons, with the selected icon growing and brightening. Pushing `Select` will start that application. Pushing `Exit` returns to the main menu.

Regulation Mode, when active, time locks out the all average speed and speed displays. This is indicated by the padlock icon and a Mode Active rally plaque.

A long press of `Regulation Mode` provides a screen displaying further proof that GaugePilot is in Regulation Mode and compliant without penalty points. Pushing `Exit` returns to the rally menu.

TwinMaster



The **TwinMaster** application gives the functionality of a Classic Halda Twinmaster rally computer:

- Twin odometers
- Independent Resets
- Drive to upper, lower, or both odometers
- Drive set to forwards, backwards, or off

and, in addition:

- Rally Time
- Ability to adjust both odometers

We have nominated the top odometer Total, and the bottom odometer Interval.

The interval odometer is easily reset by pressing `Interval`.

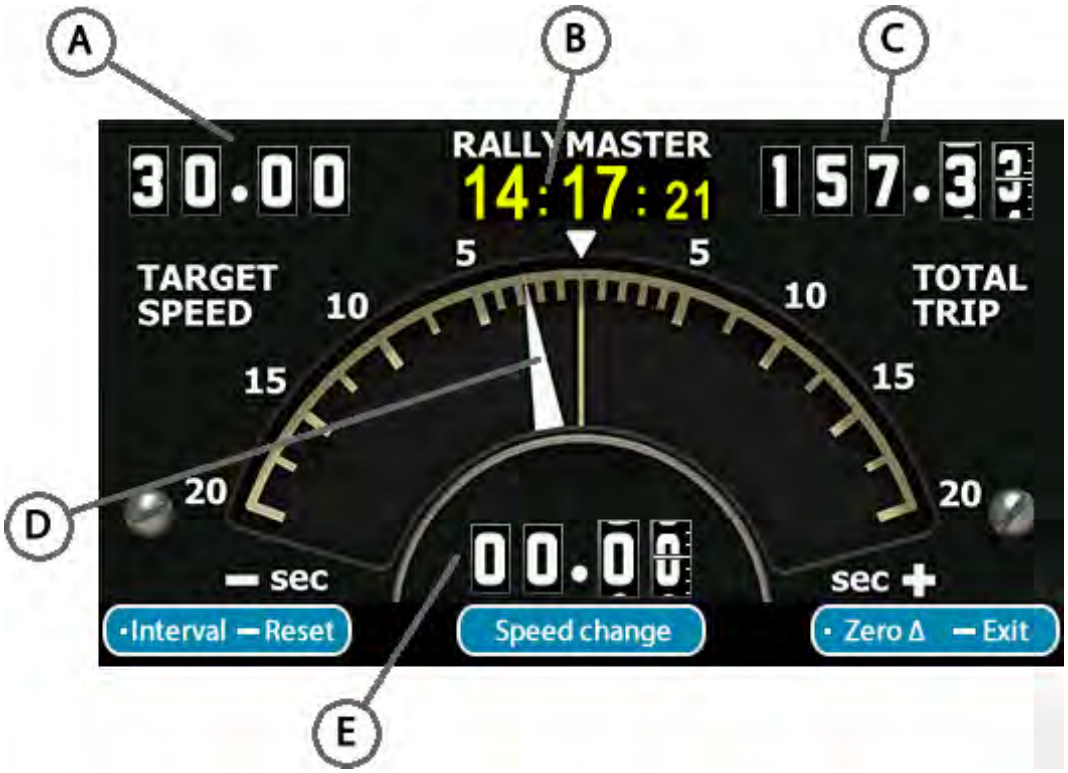
A long press of the middle knob `-Mode` moves the instrument between three different knob modes without affecting any other functionality.

> Idle - Turning the knobs has no effect.
>
> Adjust - Turning the knobs allows adjustment of both the total and interval odometer readings. The white line from the knob to the odometer indicates which knob adjusts which odometer.
>
> Drive - Turning the knobs allows selection of the drive direction (+ forwards, O off, - backwards) and which odometers are driven (_ bottom, = both, — top). The white line from the knob to the drive controls show which knob adjusts which drive control.

A long press of `-Reset`, followed by confirmation of `Reset total` or `Reset all` will reset either the total odometer or all the odometers.

A long press of `-Exit` leaves **TwinMaster**.

RallyMaster



The **RallyMaster** application gives your GaugePilot instrument an average speed indicator with a target speed that may be set with the accuracy to two decimal places.

A - Average speed to be set, adjustable by turning any knob.
B - Rally Time
C - Total odometer
D - Average speed needle, showing time delta to current target average speed. The needle indicates to + or - 20 seconds. If the time ahead or behind target time is greater than 20 seconds a digital window will appear that displays the error in minutes and seconds.
E - Interval odometer

If the average speed computer is running, then `Speed change` is available which will change the target average speed from that moment on without reseting the current accrued time delta; otherwise the user can `Start` the average speed computer at that moment. The interval odometer is not affected.

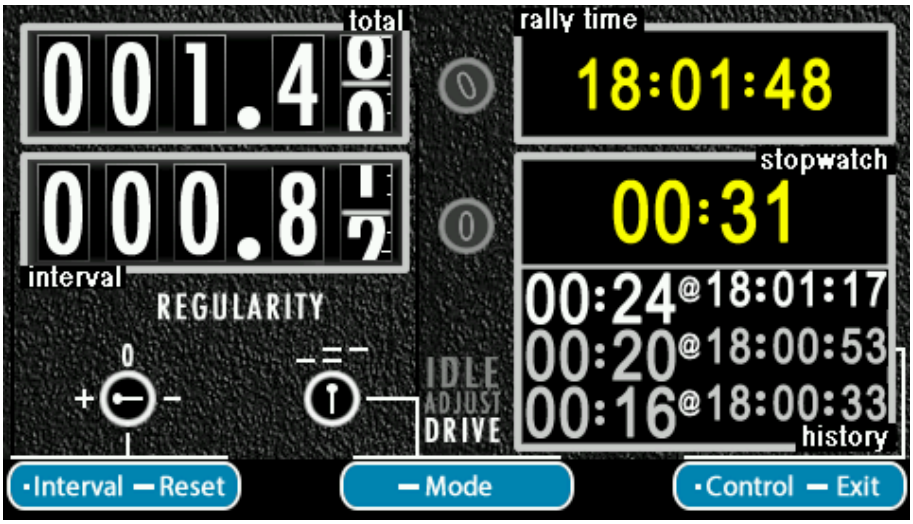
`Zero delta` will reset the time delta to zero and set the target average speed and, if the average speed computer is not running, has exactly the same effect as `Start`. The interval odometer is not affected.

`Interval` will reset the displayed interval odometer (which is common with the **twinmaster** interval odometer) without affecting the average speed calculation.

A long press of `-Reset`, followed by confirmation of `Reset rallymaster`, or `Reset total` will either stop average speed calculations and return the instrument to awaiting a start, or reset the total odometer respectively. The average speed calculation will also stop if the instrument is switched off for more than 4 hours.

A long press of `-Exit` leaves **RallyMaster**.

TwinTime



The **TwinTime** application adds a time-synchronised stopwatch for Regularity, Jogularity, or Lap timing to the functionality of a Classic Halda Twinmaster rally computer:

- Twin odometers
- Independent Resets
- Drive to upper, lower, or both odometers
- Drive set to forwards, backwards, or off
- Rally Time (except Lap mode)
- Ability to adjust both odometers
- Rally Time synchronised stopwatch with history

We have nominated the top odometer Total, and the bottom odometer Interval.

The interval odometer is easily reset by pressing `Interval`.

A long press of the middle knob `-Mode` moves the instrument between three different knob modes without affecting any other functionality.

Idle - Turning the knobs has no effect.

Adjust - Turning the knobs allows adjustment of both the total and interval odometer readings. The white line from the knob to the odometer indicates which knob adjusts which odometer.

Drive - Turning the knobs allows selection of the drive direction (+ forwards, O off, - backwards) and which odometers are driven (_ bottom, = both, — top). The white line from the knob to the drive controls show which knob adjusts which drive control.

The stopwatch is started by pressing `Start` and subsequent timings are captured by pressing `Control`.

Regularity - The stopwatch will reset to zero on each press of control. The current Rally Time and stopwatch value will be held on the display for 30 seconds before being placed into history. The stopwatch is synchronised to Rally Time so there is **no accumulation of part second errors**. Pressing `unhold` will release the hold on the display.

Jogularity - The stopwatch will continue to run on each press of control which will hold Rally time and the stopwatch value on the display for 30 seconds, whilst it continues to run in the background, before placing the values into history. Pressing `unhold` will release the hold on the display

Lap - The stopwatch will reset to zero on each press of control, with the stopwatch time held for three seconds before being placed into history. Pressing `unhold` will release the hold on the display

A long press of `-Reset`, followed by confirmation of `Reset total` or `Reset all` will reset either the total odometer or both odometers, the stopwatch, and clear history.

A long press of `-Exit` leaves **TwinMaster**.

A press of the external navigator button has the same function as pressing both `Interval` and `Control`. A second press of the external navigator button whilst the display is held, will `unhold` the display.

Farina

The **Farina** application is an advanced table-driven rally computer designed for complex events such as the Mille Miglia. It can simultaneously track average speed for a whole stage (“CO”) whilst tracking average speed on inner stage controls (“PC” and “PM”), and intelligently provides relevant information to the driver and navigator depending upon the current position within the stage.

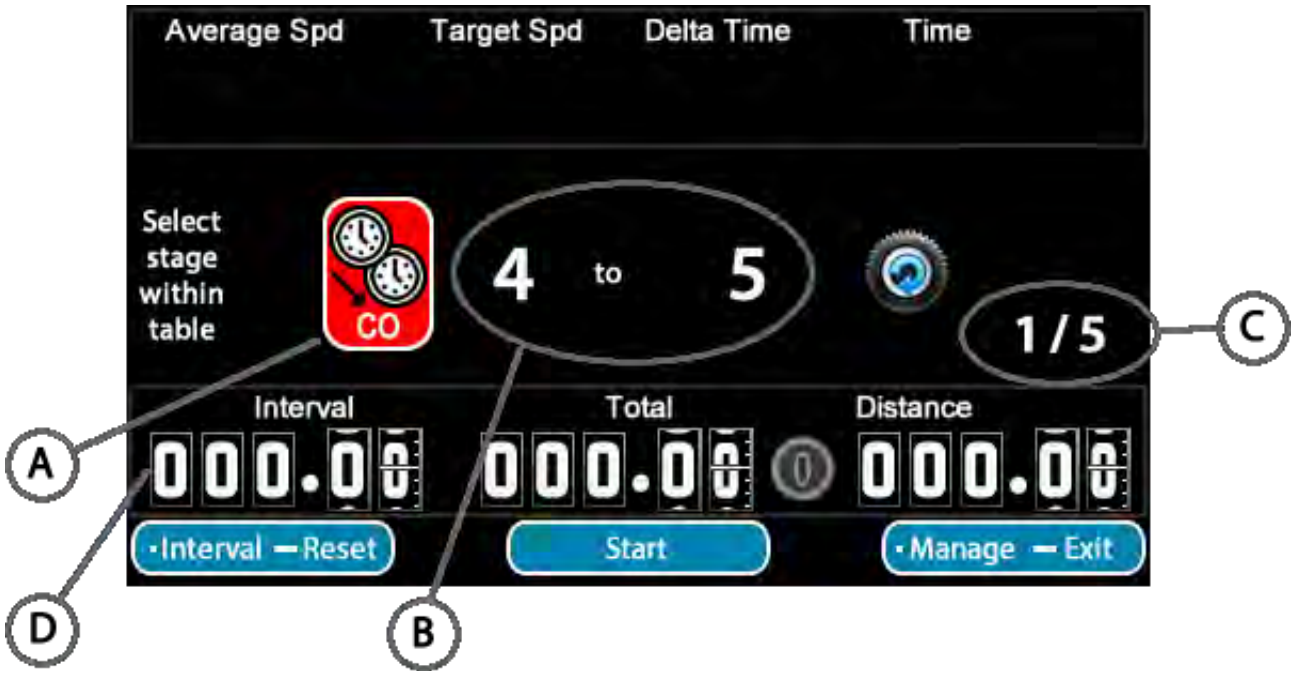
Data is entered ahead of time into a table using a format representative of that provided to drivers during the Mille Miglia, which may also be edited on-the-fly during an event if elements are modified during a stage. Up to 300 CO/CT/PM/PC/startPC row entries can be pre-loaded into the table, representing up to 25 individually accessible CO stages, at any one time.

During an event, stage elements are displayed in a format representative of that used in the Millie Miglia route book, reducing navigator workload and reducing the probability of human error.

The Driver display accessory is an *essential* companion to Farina, providing the driver with the intuitive Rallymaster too-fast too-slow needle display.

Warning output 2 will be triggered at 30 seconds, 15 seconds, and then a ten second countdown to better allow the driver to synchronise themselves to the control timing. It is **strongly** recommended that a **buzzer** be connected to **warning output 2**.

Out-of-stage display



Out-of-stage controls

Before Farina will `Start` at least one *valid stage* of data must be entered into its table. Otherwise `No valid data` will be displayed in place of the Start helper, and the CO icon (A) will be crossed out.

If there is more than a single *valid stage*, the stage to `Start` (or to `Manage`) may be selected by turning any knob. The CO references of the currently selected entry are displayed (B) as well as the total number of *valid stages* held in the table.

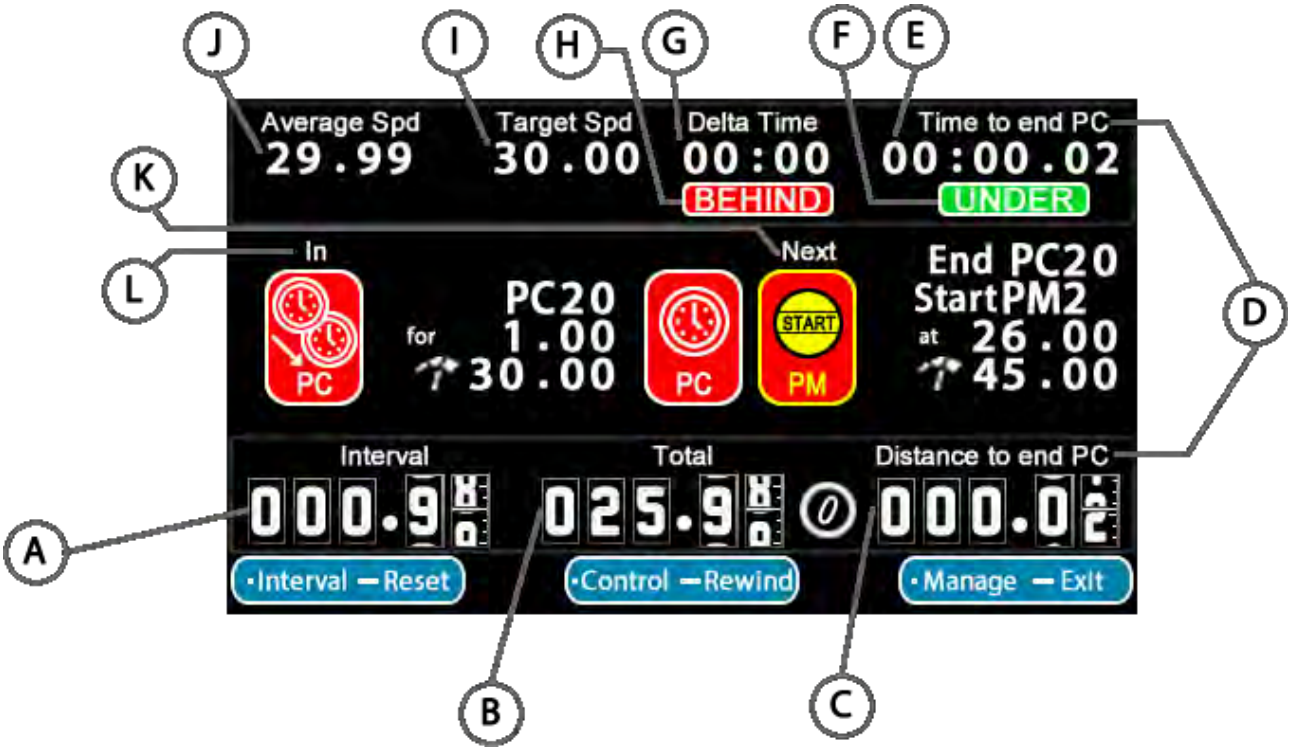
Note, a long press of `-Exit` is required to exit Farina.

Once within a valid stage, by pressing `Start` or re-entering the Farina application having `Exit`ed it with a stage in progress, the display format changes to show information about the current and next control, and the rally computer average speed calculations begin. The navigator remote reset button as the same affect as `Start`

A press of `Manage` takes the user to the data entry table.

The interval tripmeter (D) is available for navigation to the control. A short press of `Interval` resets the tripmeter. A long press of `-Reset`, followed by a confirmation sequence `Reset all` and `Confirm reset all` resets all rally computers.

In-stage display



(A) Interval tripmeter. For use by navigator for following Tulip intervals. Reset with `Interval` button press.

(B) Total tripmeter. Follows the total distance of the stage. Corrected by Farina at each control from the data in the table. Turning any knob will adjust mileage by 1/1000th.

(C) Countdown odometer. Either to the end of the current PM or PC (if in a PC or PM), or to the end of the CO (stage). Context of countdown is indicated (D)

(E) Time remaining until end of current PM or PC, or to end of CO. Whether over or under time is indicated (F)

(G) Time offset from target time for current PM or PC, or within CO. Whether ahead or behind time is indicated (H)

(I) Current target speed. Will be for PM or PC if within PM or PC, otherwise CO target speed.

(J) Current average speed. Will be for current PM or PC if within PM or PC, or otherwise overall average for whole CO

(K) Icon, and details, for next control point (i.e. PC, PM, CT, or CO)

(L) Icon, and details, for either current PM or PC, or for whole CO (if not in PC or PM)

In-stage controls

A short press of `Interval` resets the tripmeter. A long press of `-Reset`, followed by a confirmation sequence `Reset all` and `Confirm reset all` resets all rally computers, and takes Farina out of stage.

A press of `Manage` takes the user to the data entry table. A long press of `-Exit` will exit Farina.

A press of `Control` will advance Farina to the next control point, and reset the interval tripmeter. Pressing the remote navigator reset button is equivalent to pressing Control.

A long press of `-Rewind` will rewind Farina by one control incase of it being advanced a control by accident. Note the remote reset button advances **only,** and **only** works when the navigator is within the Farina application.

Data entry

A press of `Manage` takes the user to the data entry table. Up to 300 entries can be stored and each entry consists of one of the following:

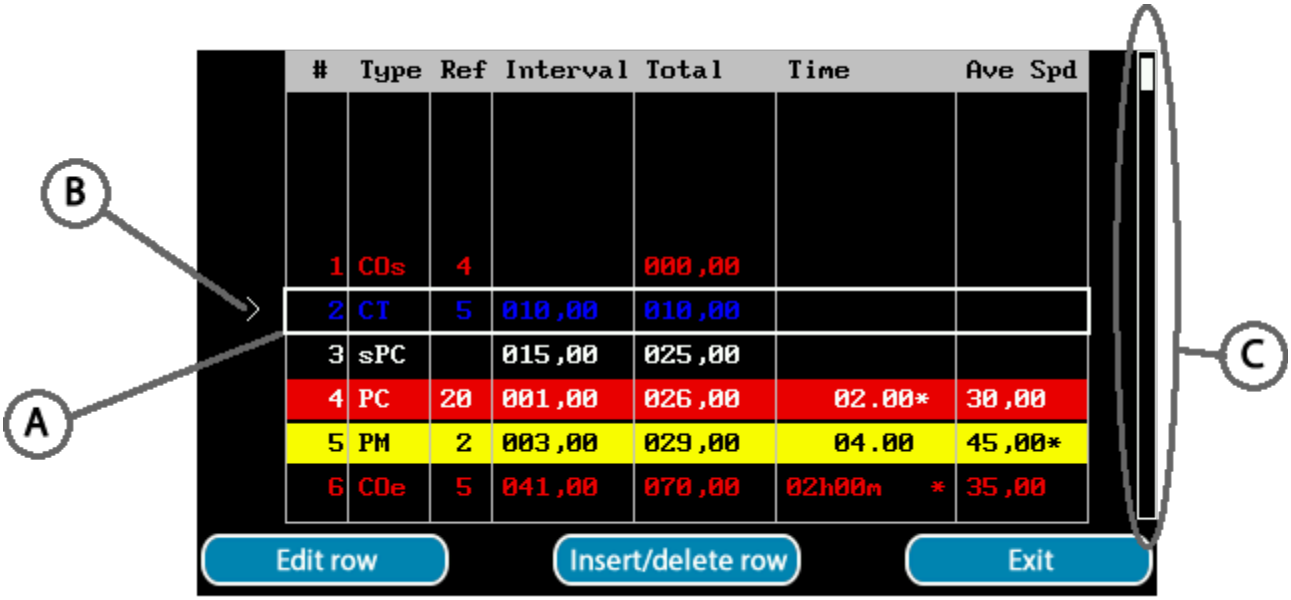
Type	Purpose		Distance	Time / Speed
COs	COntrol Start	The start of an outer timed leg	-	-
COe	COntrol End	The end of an outer timed leg	partial distance to travel to end of CO	total time for whole CO (COs to COe) / average speed for whole CO (COs to COe)
CT	Control Time	An inner control location	partial distance to travel to control	-
sPC	Start PC/PM	Indicates the distance to be travelled prior to the start of the PC/PM on the following row	partial distance to travel to start of PC/ PM	-
PC	PC	A short inner timed leg	distance for PC	time and speed for PC
PM	PM	A longer inner timed leg	distance for PM	time and speed for PM

For entries that include speed and distance, Farina enforces coherence between the entered speed and distance. An asterisk indicates which of speed or distance is being treated as the master dimension (which is the last one modified by the user) and if the distance is altered the non-asterisked dimension will be updated to maintain coherence (as speed = distance / time).

A *valid stage* within the table is one that starts with a COs entry and ends with a COe entry. If the stage contains a sPC it must be immediately followed by either a PC or a PM entry (otherwise the point at the end of the sPC distance will be created as an unidentifiable control within the stage). Entries are executed from Top to Bottom, in incrementing row order.

If a stage entry is immediately followed by another stage entry (i.e. a *valid stage*'s COs immediately follows a *valid stage*'s COe) then Farina will assume that the two stages are back-to-back and ending the first stage will immediately start the next. If a COe is followed by anything other than a valid stage's COs, Farina will stop at the end of that stage and return to the stage selection screen (see later).

Data-entry display



If Farina is currently within stage, the table will open at your position within the stage, which is indicated by a white arrow (B). If Farina is outside of stage, the table will open at the COs of the stage that Farina is currently about to start (thus providing a short cut to your desired point in the table by selecting the CO you wish to edit prior to pressing manage)

The row that will currently be edited is indicated with a white box (A)
The scroll bar (C) indicates your position within the 300 entries.

The data is colour coded on screen as follows, to make identification easier. The default reference for a type is the last preceding reference for that type plus one (or 1 if there is no preceding reference) to ease data entry. References are displayed when Farina is within stage so it is strongly recommended that they be entered to reduce navigator workload during the event.

Type	Colour
COs	Red
COe	Red
CT	Blue
sPC	White
PC	White on Red
PM	Black on Yellow

Data-entry controls

`Edit row` allows the user to modify the currently highlighted row. Data within the row being edited can be modified column-by-column with the columns to-be-edited determined by the entry type.

Type	Columns Allowed
COs	Reference
COe	Reference, Partial Distance, Total Time, Total Speed
CT	Reference, Partial Distance
sPC	Partial Distance
PC	Reference, Partial Distance, Time, Speed
PM	Reference, Partial Distance, Time, Speed

`Insert/delete row` allows the user in turn to `Insert row` or `Delete row` at the currently highlighted position and the user can return to normal edit mode when `Done` inserting/deleting.

Empty rows can be left in the data except:

1. Anything other than a COs following a preceding COe will prevent Farina from automatically starting the next *valid stage* as finishes the previous *valid stage*. This may / may not be desirable depending upon whether the stages are back-to-back or are the end of the day / beginning of the next.
2. A blank row between sPC and PC or PM stages will cause the next display to show an unknown control and not the following starting PC/PM. On entering the control, the PC/PM after the blank will be correctly started.
3. A blank row between consecutive PC or PM stages will cause the next display to show the finishing control but not the following starting PC/PM. On entering the control, the PC/PM after the blank will be correctly started.

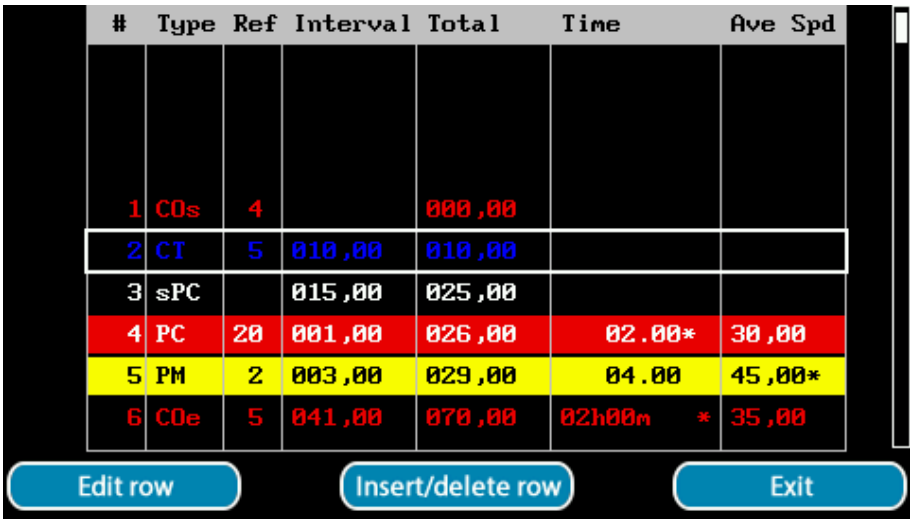
`Exit` leaves table management screen and returns to the main Farina application. If the table was managed within stage, Farina will immediately apply any changes to the current CO and re-plan current progress against any changes to required time, speed, and distance. Farina cannot return to stage if the current stage table has been made *invalid* (though it can return if the stage is subsequently made *valid* by further edits).

A Worked Example

Written table

Controlli					Localita	Distanze		Tempi Imposti		Media		Orario 1a Vett.
Sett.	CO	CT	PC	PM		Parziali	Progr.	Parziali	Progr.	Parziali	Settore	
4	4				**Start location**		0.00					11.45
		5			intermediate location	10.00	10.00					
					example - start PC	15.00	25.00					
			20		example 1	1.00	26.00	2.00		30,00		
				2	example 2	3.00	29.00			45,00		
	5				**end location**	41.00	**70.00**		2.00		**35,00**	13.45

As entered into Farina



Display prior to stage start

(Here, there were 4 other valid stages entered into Farina; the example was the first)

After starting at CO4. Having pressed `Start` on leaving CO4.

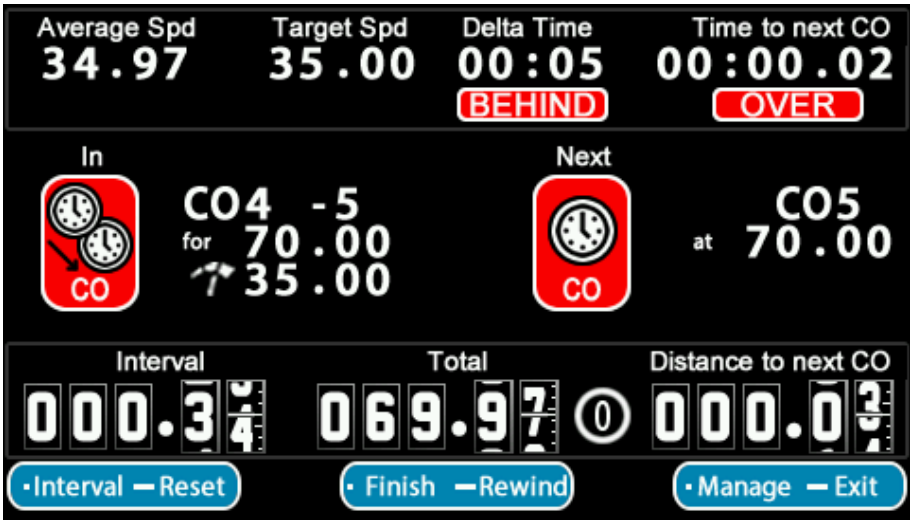
On leaving CT5, toward PC20. Having pressed `Control` at CT5

On starting PC20. Having pressed `Control` at PC20 start.

Just before the end of PC20, which is immediately followed by PM2. Showing countdown.

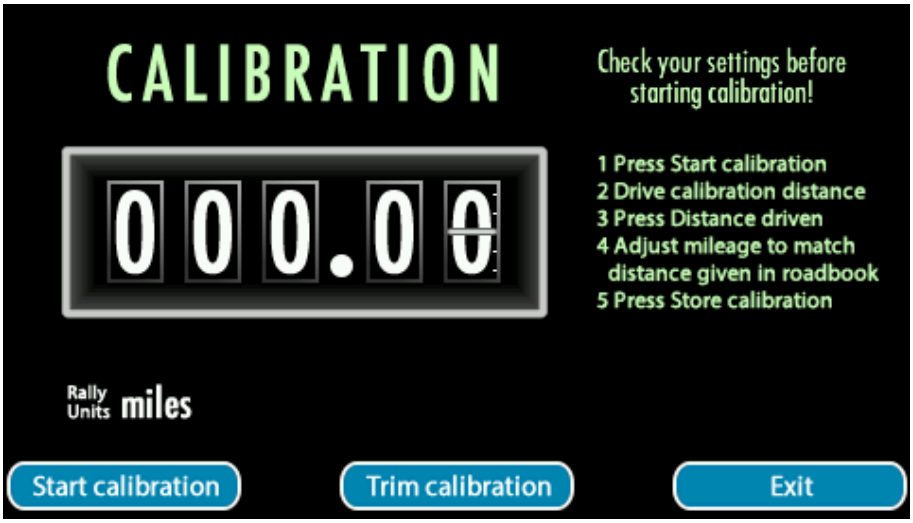
Just inside PM2. Having pressed `Control` at PC20 end /PM2 start (same point).

The run to CO5 after PM2. Having pressed `Control` at PM2 end.



Pressing Finish at CO5 will stop the average speed rally computer. Where this a back-to-back stage, the helper would remain displaying `Control` and the end of CO5 would also be the start of the next valid stage.

Calibration



`Rally Menu➜Calibration` provides a simple and foolproof method to recalibrate your GaugePilot to the rally organisers mile/km on an event.

> All initial setup of wheel sensors should be performed within setup. Calibration is for use at events, when wishing to fine tune the unit to the organiser's mile/km, after initial setup has been performed.
>
> Further, it is critical that users enabling the multiple tyre set functionality on GaugePilot Rally / Rally Pro models setup a calibration value for each individual tyre within `setup➜wheel sensor x` prior to the event that they plan to use those tyres on.

Prior to calibration, via the `Rally Menu➜Settings` or `Setup➜Preferences➜Rally Preferences` menu, ensure that the rally computer units are set to Km or Miles as appropriate for the units that the rally organisers are using for the event. This will ensure that you are able to switch units later whilst maintaining calibration.

GaugePilot Rally / Rally Pro models have the ability to maintain calibration at an event for up to 4 different tyre sets. The rally calibration will be applied to any of the 4 tyre sets no matter which of the 4 were used when calibrating against the organiser's mile/km. If using a GPS sensor, this will also be calibrated against the organiser's mile/km rather than using its theoretical distance.

If two wheel sensors are fitted, both with be calibrated to the organiser's mile/km at the same time.

Please note; when Regulation Mode is active, the ability to change tyre set is disabled. Ensure you are using the correct tyre set before entering Regulation Mode.

`Start calibration` begins a sequence of operations to calibrate the unit to the rally organisers measured distance. See *To Begin Calibration.*

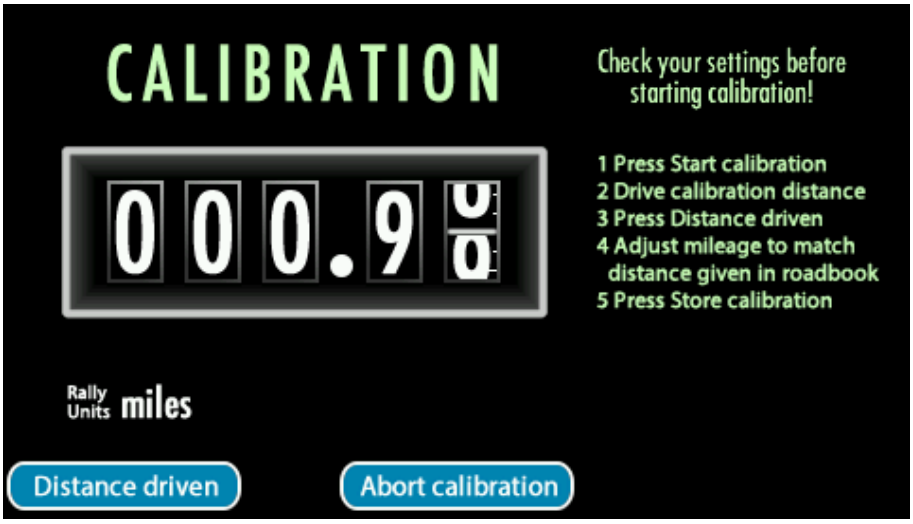
`Trim calibration` can be used at any time to trim the units current calibration up or down by up to 5% to account for road conditions or driving style (or the organiser generating a section of the roadbook using a different vehicle with a different calibration). See *Trim Calibration*.

`Exit` leaves calibration for the menu level above.

TO BEGIN CALIBRATION

At the start of the calibration distance, press `Start Calibration`. If a previous calibration had been started and completed or aborted, the odometer will automatically reset itself to 0.

As you drive the unit odometer will count up using the existing calibration. (either the Rally Calibration from your last event, or the distance per pulse set in setup, whichever was most recent - there is an option in `Settings➜Preferences➜Advanced` to override this).



At the end of the calibration distance, press `Distance driven`.

Turn any knob to change the displayed mileage to the correct mileage according to the rally organiser's roadbook. Each turn of a knob will adjust the distance by 0.01 of a unit.

Press `Store Calibration`, which doesn't appear until a knob is turned. If the displayed mileage is already correct, turn the knob left a click and then right a click so that the instrument can see that you've corrected the mileage and it will then offer you the ability to `Store Calibration`.

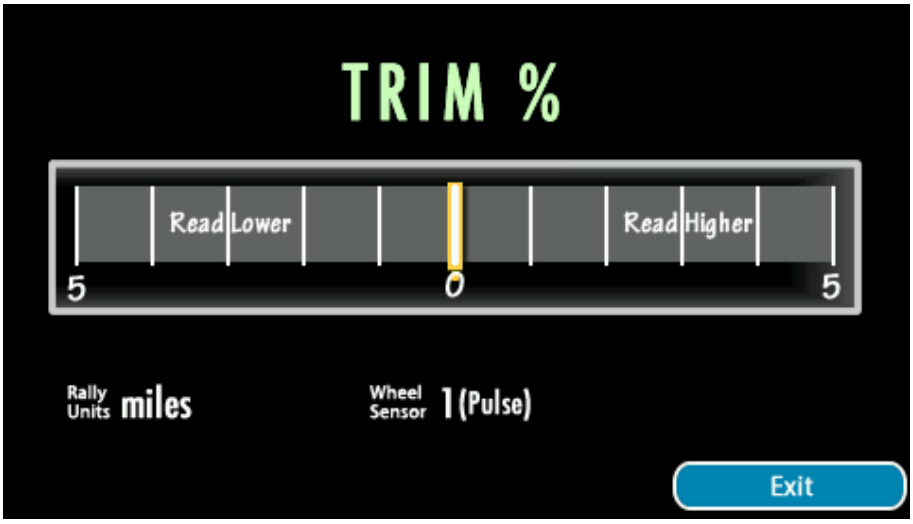
At any point prior to storing the calibration, it can be cancelled by selecting `Abort Calibration` without any changes being made to the existing calibration settings.

Once stored the calibration is used until another calibration is performed. If happy with the calibration select `Exit` or otherwise perform another calibration using `Start Calibration` having driven back to the start of the distance.

CALIBRATION ERRORS

If no pulses have been received from wheel sensors that have been configured in setup, a warning message will be displayed. The calibration for **that** wheel sensor will not be stored.

Trim



During an event, the Navigator is able to trim the current calibration to read higher or lower by up to 5%.

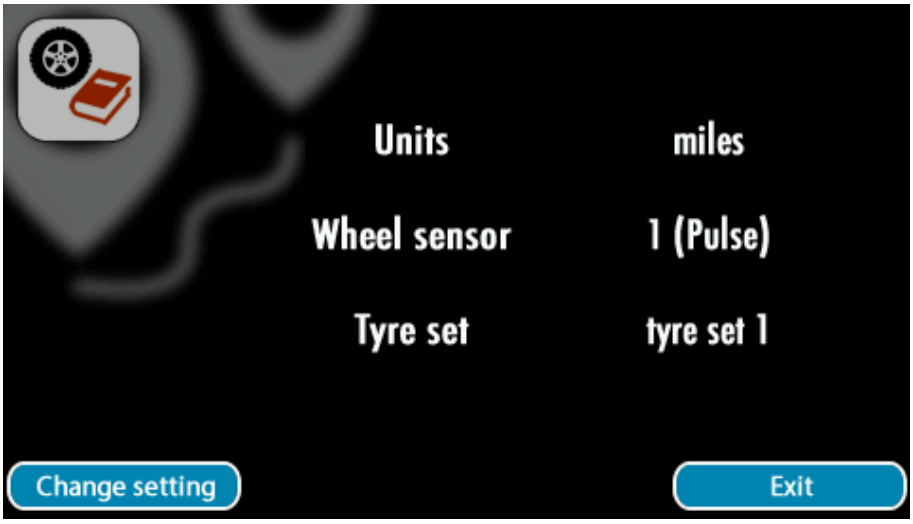
Trim is accessed via `trim calibration` within the `Rally Menu`➜`Calibration` screen.

Turning any of the knobs will move the indicator bar to the required % value and, on `Exit`, the new adjustment will be will communicated to the rally engine.

Performing a calibration will automatically reset the trim value to zero when the new calibration is stored.

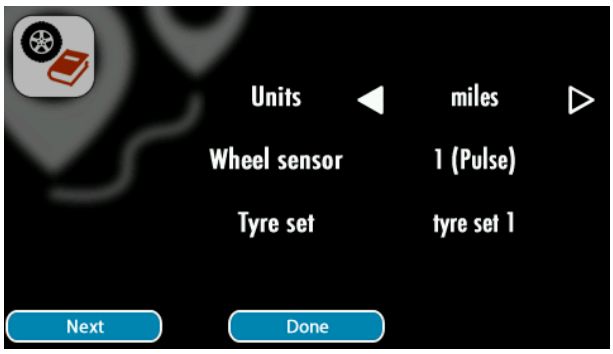
Pressing `Exit` returns you to the calibration screen.

Rally Settings



The rally settings allow you to switch units between Km and Miles (whilst maintaining calibration), switch between wheel sensors (if two sensors are fitted), and switch between tyre sets (on GaugePilot Rally / Rally Pro units if tyre sets have been enabled in `Setup➜Preferences➜General`).

`Change Setting` allows you to step through and alter the units, sensor, and tyre sets in turn.



Item	Allowed Settings	Purpose
Units	miles km	The rally computer may be switched between miles and km without having to recalibrate. Hint, ensure your instrument is using the correct units when performing your calibration!
Sensor*1	1 2	Switch between wheel sensors. The instrument indicates whether each sensor is connected to a pulse sensor or GPS. Sensor is only displayed if two wheel sensors are setup on the instrument.
Tyres*2	Tyreset 1 Tyreset 2 Tyreset 3 Tyreset 4	GaugePilot can hold calibrations for 4 different sets of tyres. This setting tells GaugePilot which set is currently in use. Each tyre set must be setup in `Setup➜Sensors➜Wheel Sensor x` prior to use on an event. Tyre sets are only shown if tyre sets are enabled in `Setup➜Preferences➜General`

*1 Only if two sensors are fitted
*2 Only if tyre sets are enabled

Datalogger

The datalogger allows selected data channels to recorded into GaugePilot's internal flash memory, for later transfer to a USB stick for review on a PC. The USB stick entry point is on the left-hand-side of the rear case and is protect against dust and water ingress by a rubber cover.

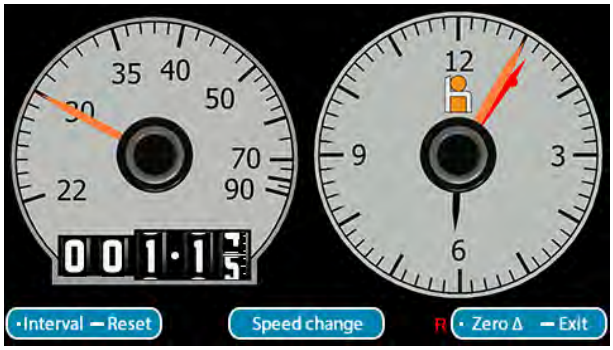
Pressing `start recording` starts a recording which will run until the unit is switched off or the recording is stopped by pressing `stop recording`.

The bar displayed above the helpers gives a visual representation of the available data-logging memory space. Red is occupied space and green is free space.

Pressing `Manage` will open a recording management screen allowing individual recordings to be transferred to a USB memory stick or deleted. Recordings are identified by their time and date.

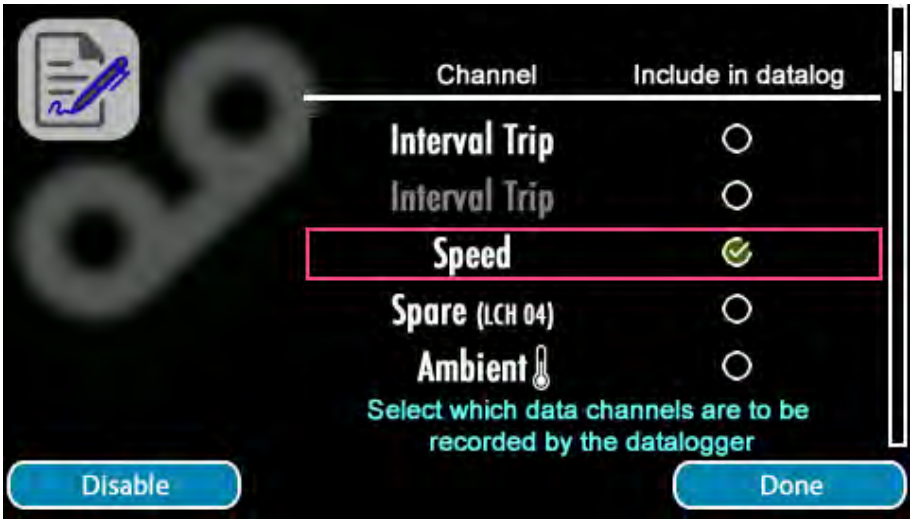
A long press of `-Channels` enters a screen that allows the user to choose which channels are recorded.

If your GaugePilot is recording, an R symbol will appear the bottom of the screen in all applications, as shown below (**SpeedPilot**).



Defining the channels to record

A long press of `-Channels` within the **datalogger** application enters a screen that allows the user to choose which channels are recorded.



The user can `Enable` or `Disable` individual channels in the recording. Some information requires a pair of channels and in this instance the second instance is greyed and its first instance controls whether both channels are recorded or not.

Available recording time is inversely proportional to the number of channels being recorded.

The channels selected for a recording cannot be changed whilst a recording is taking place.

Managing Recordings

Entered by a press of `Manage` within the **datalogger** application.

GaugePilot supports USB mass storage devices (USB memory sticks) in FAT format. Connection of USB hubs or other peripherals is not supported.

When a USB memory stick is inserted and recognised, `Save to USB` becomes available to transfer the current recording to the USB stick. The insertion of the USB stick is also acknowledged on-screen.

The option to `Delete recording` is always available.

Press `Save to USB` to save the highlighted datalog to the USB memory stick. A progress bar is displayed whilst the file is being transferred. The user can leave the data logger whilst the transfer is in progress, and the USB stick will be powered down once the transfer is complete.

The USB port is only powered when in the recording management screen or when a file transfer started within the recording management screen is still in progress.

Viewing Recordings on a PC/Mac

GaugePilot's data logger outputs data in Comma-Separated Values (CSV) format.

> CSV is a widely supported common data exchange format. A comma-separated values (CSV) file stores tabular data (numbers and text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas. The use of the comma as a field separator is the source of the name for this file format.

The filename given to a data log is Lxxxxxx.CSV where xxxxxx is the date in the user's preferred date format (so dd/mm/yy or mm/dd/yy or yy/mm/dd).

A CSV file can be opened by most spreadsheet packages including Numbers (macOS), Excel (Windows), and OpenOffice (multiple platforms).

Temperatures, Pressure, and Speed, are output in the user's preferred units. (Data is stored internally in unit-independent format so can be output in different units to those in use during the recording itself).

Trip, Total Trip, and Average Speed relate to the Rally Computer preferred units (i.e. Miles or Km). Delta time is given in intervals of 1/8 second, with + meaning ahead and - meaning behind. Average Speed A is used by the SpeedPilot application and the CO control in Farina; Average Speed B is used by the RallyMaster application and the PC/PM controls in Farina.

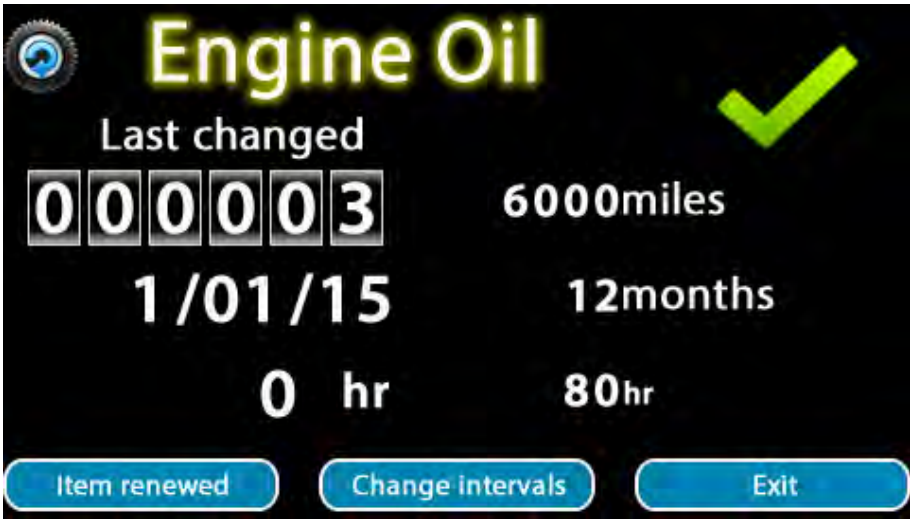
The alerts channel is divided into 9 individual columns, each reporting a value for an individual alert of either 1 (alert active) or 0 (alert inactive).

The first row of the CSV file gives the time and date of the recording and the units for the data being presented (i.e. Celsius or Fahrenheit, BAR or PSI, KPH or MPH).
The second row of the CSV file identifies the data channel represented by each column.
The third and subsequent rows give channel data, and are at 1/12th second intervals.

Example Log File

Recorded yy\mm\dd 16\11\08 11:48.16 Rally Units:Miles Celcius PSI MPH					
VOLTAGE	TRIP	SPEED	AMBIENT_TEMP	OIL_TEMP	OIL_PRESSURE
13.28	44.059	27.25	21	60	80
13.28	44.06	27.25	21	60	80
13.28	44.06	27.25	21	60	80
13.28	44.061	27.25	21	60	80
13.28	44.062	27.25	21	60	80
13.28	44.062	27.25	21	60	80
13.28	44.063	27.25	21	60	80
13.28	44.064	27.25	21	60	80
13.28	44.065	27.25	21	60	80

Service Reminders



Gauge pilot has 16 service monitors with reminders and 5 additional hour run monitors allowing critical components to be life managed.

Service monitors work by mileage, hours run, and/or calendar date.

The intervals can be independently set and/or turned off.

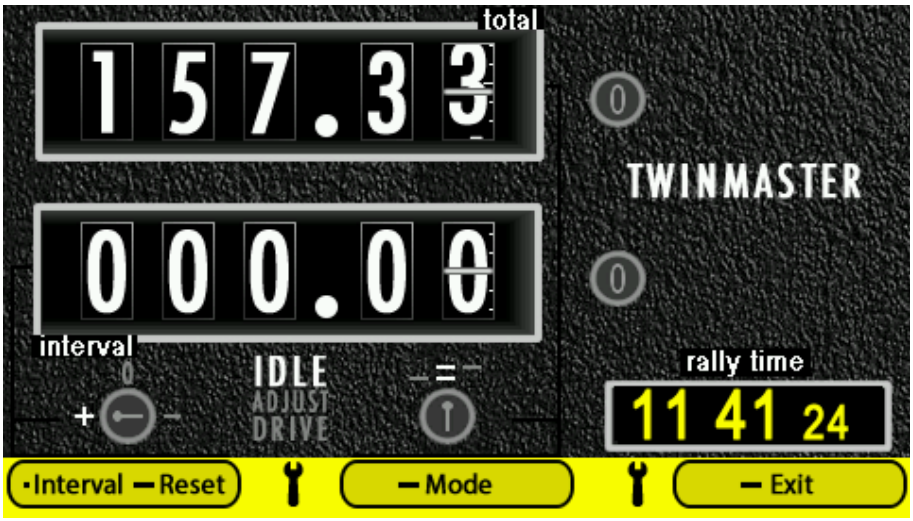
Supported service reminders are:-

Item	Distance	Date	Hours run
Engine Oil	✔	✔	✔
Gearbox Oil	✔	✔	✔
Brake Fluid	✔	✔	
Front Tyres	✔	✔	
Rear Tyres	✔	✔	
Front Brakes	✔	✔	
Rear Brakes	✔	✔	
Spark Plugs		✔	✔
Points		✔	✔
Coolant		✔	
Battery		✔	
Air Filter		✔	
Fuel Filter		✔	
MoT		✔	
Road Tax		✔	

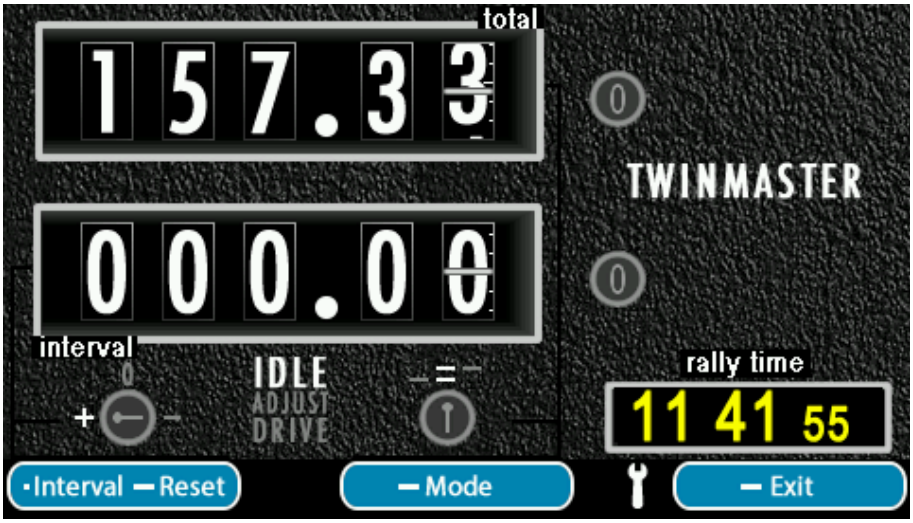
Item	Distance	Date	Hours run
Insurance		✔	
Hours run 1			✔
Hours run 2			✔
Hours run 3			✔
Hours run 4			✔
Hours run 5			✔

When setting the Service reminder frequency we highly recommend that you consult your manufacturers manual or seek guidance from a marque expert.

When a service is due, your GaugePilot will display a service warning at power up. The duration of the warning can be set in `Setup➜Preferences➜Timeouts`.



Thereafter, a spanner symbol will appear at the bottom of the screen in all applications until the service item is renewed. Enter **`service`** to discover which item caused the service reminder.



Stopwatches

The **stopwatch** application brings up a pair of stopwatches.

The left-most `start -reset` helper controls the left stopwatch and the right-most `start -reset` helper the right one.

The right button `exit` exits to the main menu.

A short button press will either `start` or `stop` a stopwatch, depending upon whether it is already running.

A long button press either freezes the display at an `interval` time, unfreezes the frozen `interval` to show the current running time (or the stopped time if the stopwatch has since been stopped), or will `reset` a currently stopped stopwatch if currently stopped.

Advanced Features

Your GaugePilot instrument includes many features to make its use easier. This section describes some of those features in more detail.

CarID - Allows you to use your GaugePilot in up to 4 different cars without having to recalibrate or change settings each time you move the instrument between them.

Multiple Tyre sets - Allows you to use up to 4 different sets of tyres in an event whilst maintaining calibration with the organiser's mile.

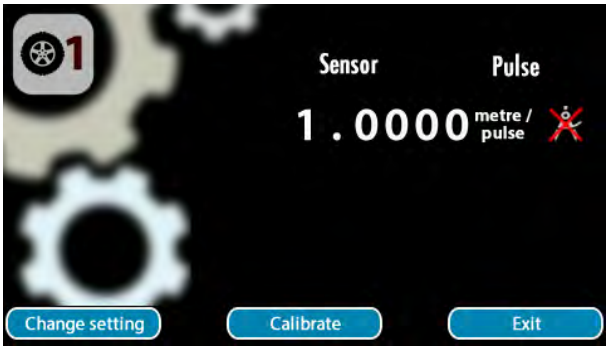
Two wheel sensor inputs - Allows you to run with a live spare sensor for events.

Regulation mode - Allows you to restrict the functionality of your instrument, making it suitable for events with restrictive rules on navigation equipment.

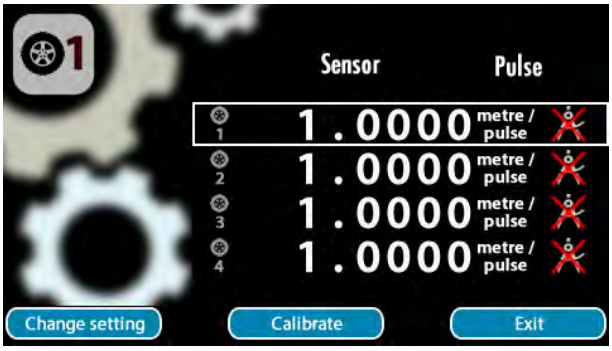
Multiple tyre sets

This feature can be enabled within your GaugePilot Rally / Rally Pro instrument in `setup➜preferences➜general`.

When enabled, within `setup➜sensors➜wheel sensor 1` and `setup➜sensors➜wheel sensor 2`, you are able to setup independent distances per pulse for four different sets of tyres.



Above: Multiple tyre sets disabled



Above: Multiple tyre sets enabled

This then allows all four sets of tyres to be used during an event, calibrated to the event organiser's mile, whilst only driving the calibration distance on one of the sets.

`setup➜sensors➜wheel sensor`	`rally computer➜calibration`
`Home value tyre set 1 H[1]`	`Roadbook value R on tyre set N`
`Home value tyre set 2 H[2]`	
`Home value tyre set 3 H[3]`	
`Home value tyre set 4 H[4]`	

`For tyre set M, when calibrated using rally computer➜calibration`

`Live[M] = R * H[M] / H[N] * Trim`

To use multiple tyre sets

- Activate tyre sets in `Setup➜Preferences➜General`
- Before the event, ensure that you have set the distance per pulse for each of the tyre sets in `setup`.
- Drive the event organisers calibration distance on one of your sets of tyres and and `calibrate`
- When you change tyres, change the current tyre set in the `rally settings` or `rally preferences`

CarID

If enabled in `setup➜preferences➜general`, your GaugePilot will look for a CarID tag in your wiring loom at each power up. If found, it will automatically switch over to that CarID's settings (or return to Car ID 1 if no tag is found) and, briefly on power up, display the CarID detected at the top of the splash screen.

CarID tags allow a single GaugePilot to be used across up to 4 different vehicles.

If a CarID tag is found and CarID is disabled in `setup➜preferences➜general`, a small red warning icon will be displayed, briefly on power up, at the top of the splash screen. CarID 1 will be used.

Your unit is supplied with a loom that does not have a tag fitted and will be recognised as CarID 1.

All GaugePilot settings are entirely independent between cars of differing car ID except:-

Car ID enabled is a global setting across all 4 cars
Time and Date is common across all 4 cars
Regulation Mode is applied (and expires) across all 4 cars when in force
Datalog recordings use common storage across all 4 cars

To use CarID

Enable CarID in `setup➜preferences➜general`

Ensure that you fit a loom with a different CarID tag in each vehicle that you wish to use your GaugePilot instrument in. Looms are available with CarID of 2, 3, or 4, and with no tag (CarID 1).

Two Wheel Sensor Inputs

Two Wheel Sensor Inputs allows you to run with a live spare sensor for events.

If two sensors are connected to your instrument, it will display which input is currently in use and also allow you to switch inputs in the Rally Settings and Rally Preferences menus. It will also display whether the current sensor is a Pulse or GPS-based sensor to save you remembering how your car is wired up.

If two Pulse sensors are in use, when performing initial setup a distance per pulse value will be stored for both sensors automatically.

If a Pulse sensor and a GPS sensor is in use, initial setup can take advantage of the GPS sensor to calibrate the Pulse sensor. No known distance is required to do this as the GPS sensor is itself already calibrated.

Likewise, when performing a calibration to the event organiser's mile, a distance per pulse value will be captured for both sensors, whether Pulse or GPS.

Both wheel sensor input 1 and wheel sensor input 2 are treated identically internally.

Should a wheel sensor become dislodged on an event, you can simply switch over to your live spare sensor in the menu and continue. The instrument takes care of the change in distance per pulse value itself.

Regulation Mode

GaugePilot includes a reduced functionality mode that we call **Regulation Mode** which disables features that certain rally organisations and governing bodies impose penalty points for.

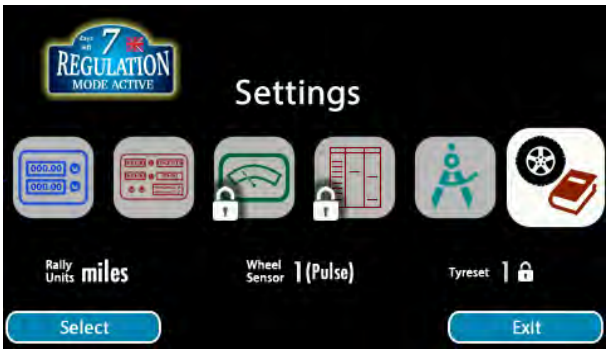
Regulation Mode allows restricted events to be competed in without a points disadvantage. We recommend that for events outside of the United Kingdom that you check with the event organiser and their documentation for what equipment functionality is allowed.

Regulation Mode disables the following GaugePilot features

- Display of own vehicle speed and average speed (including speedometer gauge)
- SpeedPilot, RallyMaster, and any other average speed rally applications
- Multiple tyreset support (becomes locked to current tyreset)

Regulation Mode can be set for between 1 and 80 days, to cover the duration of even the longest restricted rules event. When in Regulation mode, Regulation Mode can be extended for further days at any time, up to the 80 day limit.

When in **Regulation Mode**, a rally plaque containing the number of whole 24 hours periods the unit will remain in Regulation Mode for will appear in the top left corner of the home screen and the rally menu.



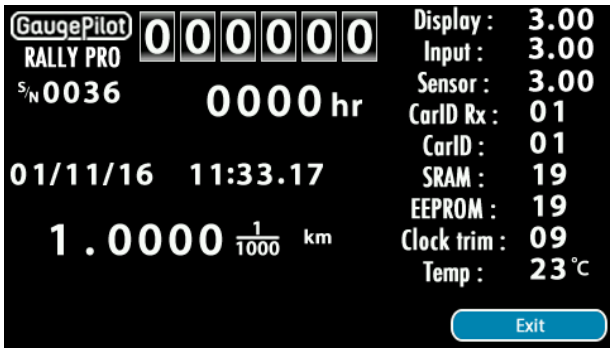
> Once a GaugePilot is in Regulation Mode there is no way to remove it from Regulation Mode other than waiting for the time-based lock to expire. Changing the time or date, removing the internal backup battery, performing a factory settings reset or firmware update, or switching Car ID will not remove, or accelerate removal, of Regulation Mode.

Regulation Mode can be entered or extended via `Setup➜Preferences➜Regulation Mode.`

Setup

Select the **setup** menu from the GaugePilot **main menu** and you will be taken into the top level setup menu screen. This in turn allows access to the following settings menus (clockwise, from top left)

	**Time / Date**	set the time and date
	**Preferences**	set display brightness, timeouts, favourites, rally preferences, units, and other general settings
	**Alerts** setup	choose which alerts are enabled and when
	**Gauges** setup	choose which gauges are displayed in gauges
	**Interfaces** setup	configure connections to digital accessories such as Innovate Motorsports MTS sensors, CANbus, or the GaugePilot external display
	**Sensors** setup	configure the external sensors that you have connected
	**Installers Tools**	tools to assist the installer



Pressing the About button displays some diagnostic information from your unit.

Live value	Distance per pulse currently in use by GaugePilot (in 1/1000 mile or 1/1000 km depending upon **units** currently selected) for the currently selected wheel sensor (1 or 2)
Temperature	The temperature inside the GaugePilot unit
Clock Trim	Set at the factory, to make your individual GaugePilot keep perfect time.
CarID Rx	The CarID detected by your unit
CariD	The CarID currently being used by your unit. (If carID is turned off, it will be 1 irrespectively of the carID detected)
Display	software revision
Input	software revision
Sensor	software revision
S/N	Unit serial number (4 digits)

Time / Date

Allows setting of the current time and/or date, via the left `Set Time` or middle `Set Date` buttons.

Once in set mode, each element can be set in turn by turning any knob clockwise or anti-clockwise, pressing `Next` to move to the next element.

When setting the date, `Done` is pressed for the final element.

When setting the time, `Start clock` is pressed after setting the seconds, which restarts the clock, allowing synchronisation with rally time.

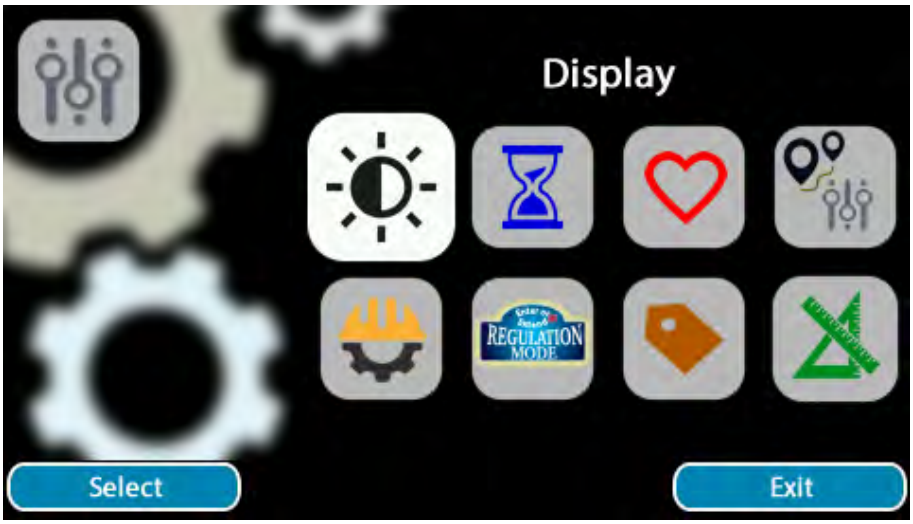
The date format is that selected in `Setup➜Preferences➜Units➜Date format` and can be `dd/mm/yy`, `mm/dd/yy` or `yy/mm/dd`.

Time not set warning

If GaugePilot powers up and cannot recover the current time from the internal battery backed real-time-clock this icon is displayed briefly at power up.

Unless the internal battery was deliberately disabled during a period of storage (possible via the `Setup➜Installers tools` menu) the appearance of this symbol means that the internal CR2032 lithium metal battery should be replaced.

Preferences



Select the preference menu to make changes to various basic unit settings. These are grouped in the follow categories:

	Display	Settings for the display day and night brightness levels (and separate driver display day and night brightness level settings if this accessory is installed). The screens switch automatically between day and night brightnesses, controlled by the vehicles lighting circuit.
	Timeouts	Time related settings such as how long the unit will remain on for and how long messages will appear for.
	Favourites	Favourite applications including the default app at ignition on.
	Rally Preferences	User preferences for rally computer functionality that is not changed on a regular basis. Key preferences such as km/miles, tyre set 1-4, and active wheel sensor are also available in the `Rally➜Settings` menu over in the **Rally** application itself)
	Units	User units and format preference for Gauges and Alerts. These do not affect the Rally Computer which operates with its own independent settings.
	General	General settings that are made at install time and rarely changed.
	Regulation Mode	Enter or Extend Regulation Mode
	Advanced Settings	Settings for Power Users

These groups are described in further detail in the following pages.

Display Preferences

Allows adjustment of the day-time and night-time screen brightness and the brightness of the screen on the drivers display accessory,

The screens switch automatically between day and night brightnesses, controlled by the vehicles lighting circuit.

Item	Allowed settings	Notes
Day time	1, 2, …, 15	Brightness with vehicle lights off
Night time	1, 2, …, 15	Brightness with vehicle lights on
Driver day	1, 2, …, 15	Brightness of external display with vehicle lights off
Driver night*	1, 2, …, 15	Brightness of external display with vehicle lights on

Change setting by pushing the left hand knob with `Change Setting` helper above.

Turn left or right to increase or decrease the value (1 = least bright, 15=most bright)

Press `Next` to step down and press `Done` to finish.

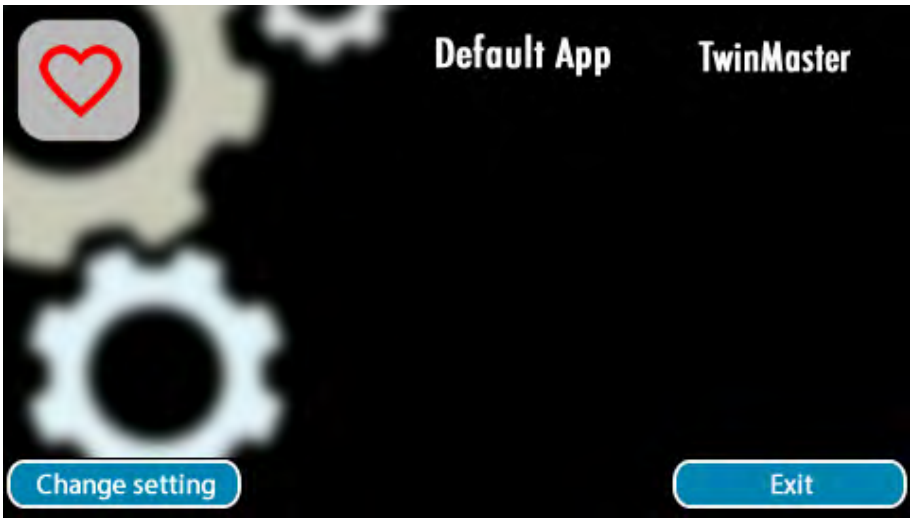
* Driver day and night settings only shown if external display is connected and configured.

Timeouts Preferences

Allows adjustments to time related settings as follows:

Item	Allowed settings	Notes
Ignition timeout	15-105 seconds (in 15 second steps)	Time unit stays on after the vehicle ignition is switched off when not interacted with after ignition off.
Idle timeout	15-465 seconds (in 15 second steps)	Time that the unit will stay active for, once interacted with, after the ignition is switched off.
Service timeout	15-90 seconds (in 15 second steps)	Time service reminder alert is present as a warning at startup. A spanner symbol will persistently appear in the status bar thereafter.

Favourites Preferences



Item	Allowed Settings	Notes
Default Application	Gauges TwinMaster Rallymaster TwinTime* TwinTime Jog TwinTime Reg TwinTime Lap Farina* Stopwatch	The application you wish GaugePilot to default to when switched-on via the vehicle ignition.

Rally Preferences

Item	Allowed Settings	Notes
Units	km / Miles	Units to use for distance. GaugePilot will translate its internal calibration between km and miles automatically.
Wheel sensor*1	1 2	Allows switching between wheel sensor 1 and 2. Wheel sensors are setup in `setup➜sensors➜wheel sensor 1` and `setup➜sensors➜wheel sensor 2` Rally Calibration is stored independently for wheel sensor 1 and wheel sensor 2 if both are fitted.
Tyres*2	Tyreset 1 Tyreset 2 Tyreset 3 Tyreset 4	GaugePilot can store and use independent calibrations for 4 different sets of tyres. If tyre-sets are enabled in general settings, (`setup➜preferences➜general`) this setting tells GaugePilot which set to currently use.
Confirm Reset	none warning 1 warning 2	Will flash the appropriate warning output whenever an odometer is reset or a target speed is changed as visual / audible feedback to the navigator. We recommend that a buzzer be fitted to warning 2 for this purpose.

*1 Only shown if two wheel sensors are fitted
*2 Only shown if tyre sets are enabled in general settings

Units Preferences

User units and formats of preference for Gauges and Data Logging.

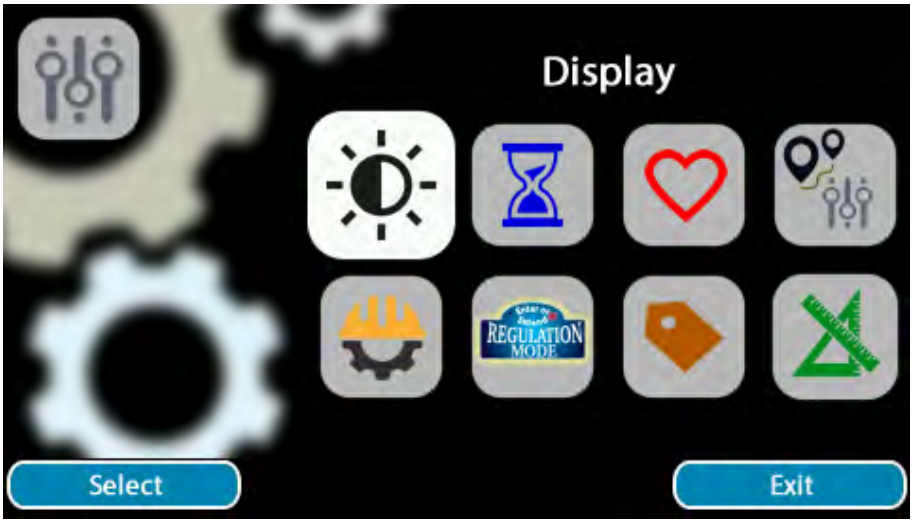
Item	Allowed Settings	Notes
Pressure	BAR PSI	Affects all pressure channels and alerts
Temperature	Celsius Fahrenheit	Affects all temperature channels and alerts
Speed	kph mph	Applies to the speedometer and speed alert only. The rally computer has its own independent settings.
Voltage	12V 6V	Determines the visible range of the Voltmeter displayed in Gauges.
Speedometer	analogue digital	Determines whether an analogue or digital speedometer is displayed in Gauges
Date format	dd/mm/yy mm/dd/yy yy/mm/dd	Dates can be displayed as either dd/mm/yy or mm/dd/yy or yy/mm/dd to suit your locale
Rev counter	0-7000 0-10000	The rev counter can either be the standard range (typically 7,000 rpm) or an extended range to 10,000 rpm for high revving engines.

General Preferences

These are settings made at time of installation and rarely change there after.

Item	Allowed Settings	Notes
Handedness	regular reversed	if reversed is selected the positions of the left and right hand buttons will be reversed compared with images shown in this manual which show the regular positions. The setting allows the 'action' button to be nearest the person using GaugePilot whether that be the driver or passenger in a LHD or RHD vehicle.
Service Units	km miles	Decides the unit of distance used by the service monitor application only. The rally computer and speedometer use their own independent units.
CarID	active disabled	If enabled GaugePilot will look for a Car ID tag in the wiring loom each time it starts up to identify which car (of a possible 1-4) it has been installed in. If the car GaugePilot is installed in has changed it will switch to over that car's settings. After enabling or disabling Car ID, the unit should be switched off (with ignition off) and back on again for any change to the current Car ID to take effect. The `setup`➜`about` screen identifies the currently received and currently active Car ID (may be different if Car ID is disabled yet a Car ID tag is fitted to the vehicle)
Tyre sets	active disabled	Turns on and off Tyre set support. If enabled, four different sets of tyres can be used on the vehicle, each with their own calibrations.

Regulation Mode Preferences



GaugePilot includes a reduced functionality mode that we call **Regulation Mode**.

Regulation Mode disables features that certain rally organisations and governing bodies impose penalty points for.

Regulation Mode allows restricted events to be competed in without a points disadvantage. We recommend that for events outside of the United Kingdom that you check with the event organiser and their documentation for what equipment functionality is allowed.

Regulation Mode disables the following GaugePilot features

- Display of own vehicle speed and average speed (including speedometer gauge)
- SpeedPilot, RallyMaster, and any other average speed rally applications
- Multiple tyreset support (becomes locked to current tyreset)

Regulation Mode can be set for between 1 and 80 days, to cover the duration of even the longest restricted rules event. When in Regulation mode, Regulation Mode can be extended for further days at any time, up to the 80 day limit.

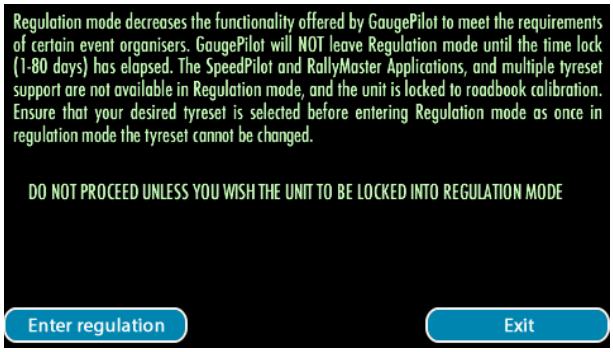
When in **Regulation Mode**, a rally plaque containing the number of whole 24 hours periods the unit will remain in Regulation Mode for will appear in the top left corner of the home screen and the rally menu.

> Once a GaugePilot is in Regulation Mode there is no way to remove it from Regulation Mode other than waiting for the time-based lock to expire. Changing the time or date, removing the internal backup battery, performing a factory settings reset or firmware update, or switching Car ID will not remove, or accelerate removal, of Regulation Mode.

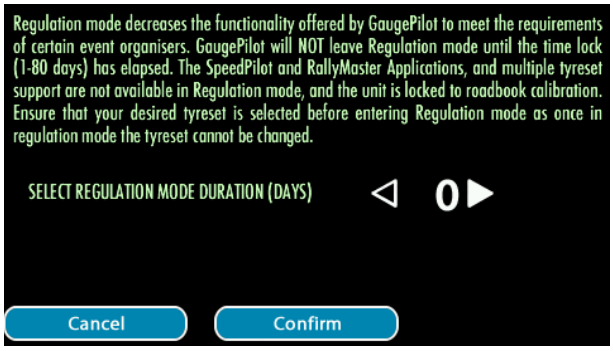
Regulation Mode can be entered or extended via `Setup➜Preferences➜Regulation Mode.`

To enter regulation mode

Go to `Setup`➜`Preferences`➜`Regulation mode`. A warning screen will appear reminding the user that this is a time locked operation that is not immediately reversible.



Press `Enter regulation` and you will be given the option to enter the number of days that Regulation Mode should last for. The default, zero, will NOT enter regulation mode, even if `Confirm` is pressed.



Turning any knob will increase / decrease the number of days. When at the correct value, press `Confirm`.

Your unit is now in Regulation Mode, and you can `Exit` back to the Rally menu.

When in **Regulation Mode** a rally plaque will appear in the top left corner of the **Main Menu** and **Rally Menu**. The number displayed on the plaque is the number of whole 24 hour periods for which GaugePilot will remain in Regulation Mode, for easy inspection by scrutineering.

To extend regulation mode

Go to `Setup`➜`Preferences`➜`Regulation Mode`. A screen will appear showing the user the time and date at which the instrument will currently leave Regulation Mode (based on the instruments current time and date settings).

Press `Extend regulation` and you will be given the option to enter the number of days that Regulation Mode should be extended for. The default, zero, will NOT enter regulation mode, even if `Confirm` is pressed.

Turning any knob will increase / decrease the number of days. When at the correct value, press `Confirm`.

Your units time in Regulation Mode has been extended, and you can `Exit` back to the Rally menu..

Advanced Settings

Settings for power users. Use with caution.

Item	Allowed Settings	Notes
Pulses per Measurement (Sensor 1)	1… 19	The number of wheel sensor pulses a speed measurement is made over. If the speedo is oscillating using the default of 1, try changing to the number of pulses per revolution from your sensor.
Pulses per Measurement (Sensor 2)	1… 19	The number of wheel sensor pulses a speed measurement is made over. If the speedo is oscillating using the default of 1, try changing to the number of pulses per revolution from your sensor.
Calibration	Rally Setup	Defaults to the last calibration method used - either Setup or Rally Calibration. Override allows a user to return to their home calibration after an event, for example.

Alert Setup

Select the Alerts icon (`Setup`➜`Alerts`) in **Setup** to make changes to your alert settings. There are 10 different alerts available, and each alert is configured individually. An alert can be output on-screen coloured either Yellow or Red, to one of the external warning outputs, or to both screen and an external warning output simultaneously. The level that each alert occurs at is set using the units the user has set in their preferences (`Setup`➜`Preferences`➜`Units`)

If multiple alerts are triggered on-screen, Red alerts take priority over Yellow alerts, and alerts within a colour category are prioritised in the following order, with only the highest priority alert icon displayed.

Icon	Warning	Priority	Gauge Channel
	Low Oil Pressure	Highest Priority (Ignition On Only)	Oil Pressure
	High Oil Temperature		Oil Temperature
	High Coolant Temperature		Coolant Temperature
CHT	High Cylinder Head Temperature		CHT 1 Temperature
	Low Fuel Level		Fuel Level
	Low Battery Voltage		Voltage (Internal Sensor)
	Set Speed Exceeded		Speed (Wheel Sensor)
	Ice Warning (Temperature Low)		Ambient Temperature
	RPM Shift Light (RPM High)	Lowest Priority (Ignition On Only)	RPM
	Lights On	Ignition Off Only	N/A

Alerts rely on sensor data being available for channel on which the alert relies. If sensor data for a channel is not available then the alert will not function correctly.

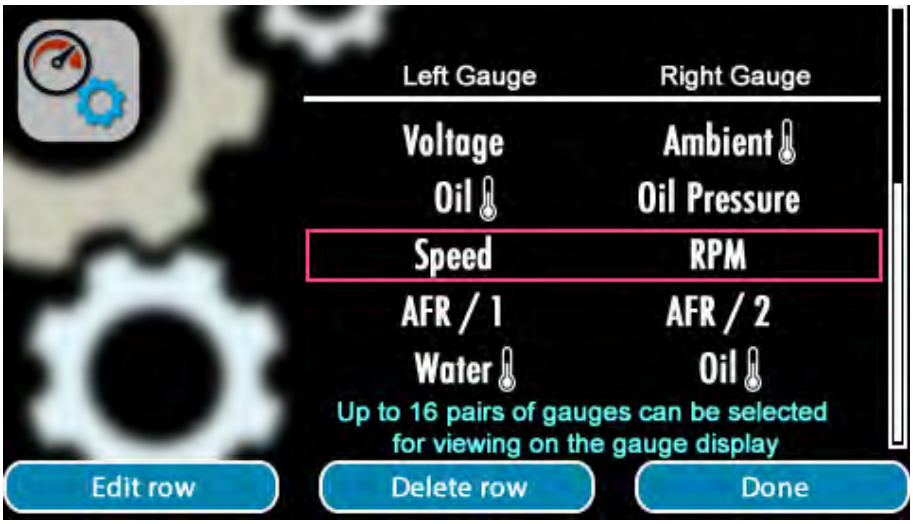
When setting the alert threshold we highly recommend that you consult your manufacturers manual or seek guidance from a marque expert.

Changing an alert

Within the `Setup`➜`Alerts` screen, turn a knob clockwise or anti-clockwise until the row containing the alert you wish to change is within the highlighted rectangle, and press `edit row`. You will then be able to change the warning threshold, on-screen alert, and warning output used by that alert in turn by turning any knob clockwise to increase and anti-clockwise to decrease the highlighted value before pressing `next` to move onto the next column. The `next` helper becomes `done` when editing the final column.

Alert threshold are set in the current preferred units, set in `Setup`➜`Preferences`➜`Units`

Gauge Setup



Up to 16 gauge pairs may be chosen for viewing within the Gauge application.

The units used by the gauges, whether the voltmeter has a 12V or 6V scale, whether the Speedometer is analogue or digital, and whether the rev-counter reads to 7k or 10k, is determined by the user's unit preferences (`settings➜preferences➜units`)

To change a pair of gauges, scroll so that the row to be changed is within the highlight box, and press `Edit row`.

To add a pair of gauges, scroll (by turning any knob clockwise) down to the row below the last occupied row and press `Add row` which appears in place of edit row. This will both create a new empty entry and begin editing it unless there are already the maximum of 16 entries.

To delete a pair of gauges, scroll so that the row to be deleted is within the highlight box, and press `Delete row`.

Interfaces

GaugePilot has three digital interfaces over which it can exchange data. The interfaces menu allows these three interfaces to be configured.

Icon	Interface	Allowed settings
RS232 1	RS232 1	Innovate Motorsports MTS data input Innovate Motorsports MTS data output GaugePilot driver display Unused
RS232 2	RS232 2	Innovate Motorsports MTS data input Innovate Motorsports MTS data output GaugePilot driver display Unused
CANBus	CANbus	DTA S PRO ECU gauge stream input Unused

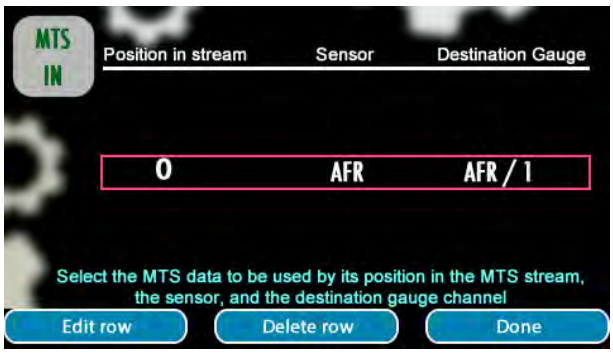
If there are any specific configuration options for a currently selected interface function, this can be accessed via the `Manage` button when the interface and the required device have been selected.

Innovate Motorsports MTS Input

Allows gauge data to be sourced from an Innovate Motorsports MTS serial chain, from devices such as the LC-1, LC-2, TC-4 and SSI-4.

Accessed via the `Manage` button from rs232 1 or rs232 2 if configured as the Innovate Motorsports MTS input.

> Note, only one interface can be used as the Innovate Motorsports MTS Input at any one time.



The manage screen allows the mapping between the data contained in the MTS serial stream and GaugePilot gauge channels to be defined.

For each GaugePilot gauge channel that is to receive its data from the MTS serial stream, three pieces of information are required, and this information makes up a row in the mapping table.

`Edit row` allows the current row to be modified, `Delete row` deletes the currently highlighted row, and if you scroll to below the last entry it is possible to `Add row`.

Column	Entry	Note
1	Position in stream	The offset of the desired data in the MTS serial stream. The first innovate data is at offset 0. Each channel of a TC-4 or SSI-4 occupies 1 position in the stream, making 4 channels in total per device; each LC-2 occupies 2 positions in the stream.
2	Sensor	The type of data held at this offset
3	Destination Gauge	The gauge channel to put this data into. Valid options are dependant upon the sensor selected.

> Ensure that any gauge channels being sent data by the Innovate Motorsports MTS input are not also receiving data from another source, such as the internal analogue inputs. Otherwise the display will show data from either source at random and so will jump between valid readings and (most likely) minimum or maximum readings.

Example 1. A single LC-2 lambda sensor is connected. To display this data in AFR/1 gauge, the following entry should be made:

0 AFR AFR/1

Example: Two LC-2 lambda sensors are connected. To display the first in AFR/1 gauge and the second in AFR/2 gauge, the following entries should be made:

0	AFR	AFR/1
2	AFR	AFR/2

(The offset is 2 for the second AFR channel, as each LC-2's data occupies two MTS channels)

Example 3: One LC-2 lambda sensor and a TC-4 quad thermocouple interface are connected, of which the first two channels are CHT, and the second two channels are EGT

0	AFR	AFR/1
2	CHT	CHT/1
3	CHT	CHT/2
4	EGT	EGT/1
5	EGT	EGT/2

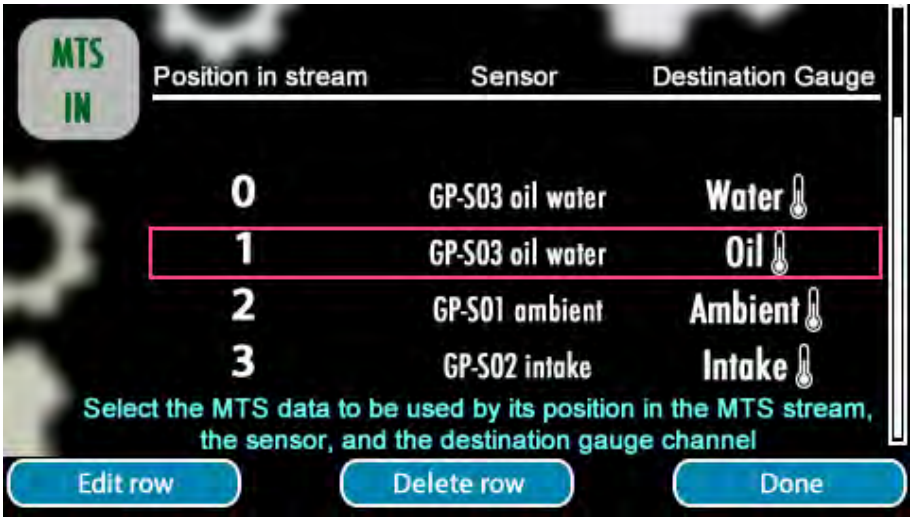
(The CHT and EGT channels should be configured to their respective ranges within the TC-4 itself)

Example 4: A SSI-4 quad 0-5V interface is being used to generate an RPM signal from a source incompatible with GaugePilot's own RPM input.

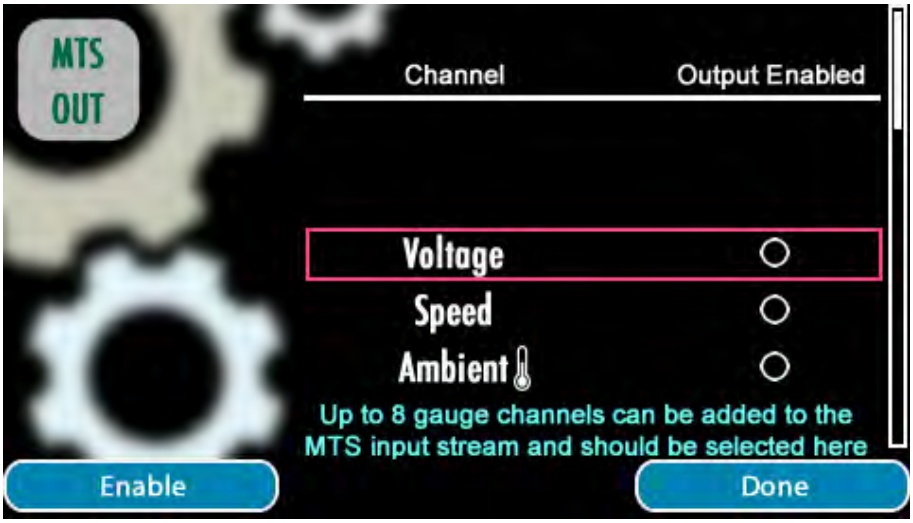
0	RPM(10230)	RPM

(Channel 1 of the SSI-4 must be configured such that the maximum rpm is 10230)

Example 5: A SSI-4 quad 0-5V interface is being used to generate 4 temperature signals; Coolant on CH0, Oil on CH1, Ambient on CH2, and Intake on CH3.



Innovate Motorsports MTS Output



Allows Innovate Motorsports MTS data to be output by the GaugePilot.

If no data is specified to be added by GaugePilot then the data will be a simple pass-through of the data being input (assuming that the Innovate Motorsports MTS Input is active on the other RS232 port).

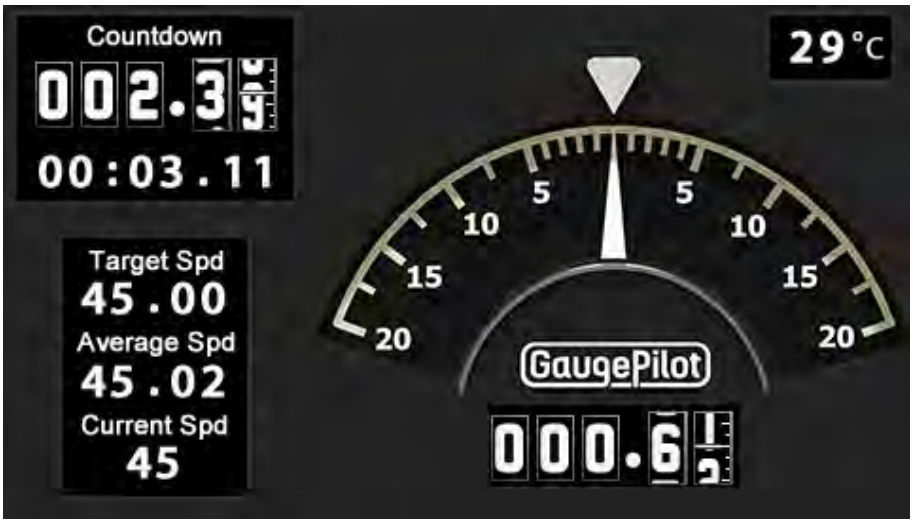
If the Innovate Motorsports MTS Input is not active, and channels of gauge data have been specified to be added by GaugePilot, an MTS stream will be generated with GaugePilot as the timing master of that stream.

If the Innovate Motorsports MTS Input is active, and channels of gauge data have been specified to be added by GaugePilot, the MTS stream will have those specified channels added to it and GaugePilot will announce itself in the chain as an OT/1 with name ‘GPILOT ‘.

GaugePilot Driver Display

Allows a connected slave driver display accessory to receive data for display to the driver.

A slave display is provided with the GaugePilot Rally Pro.



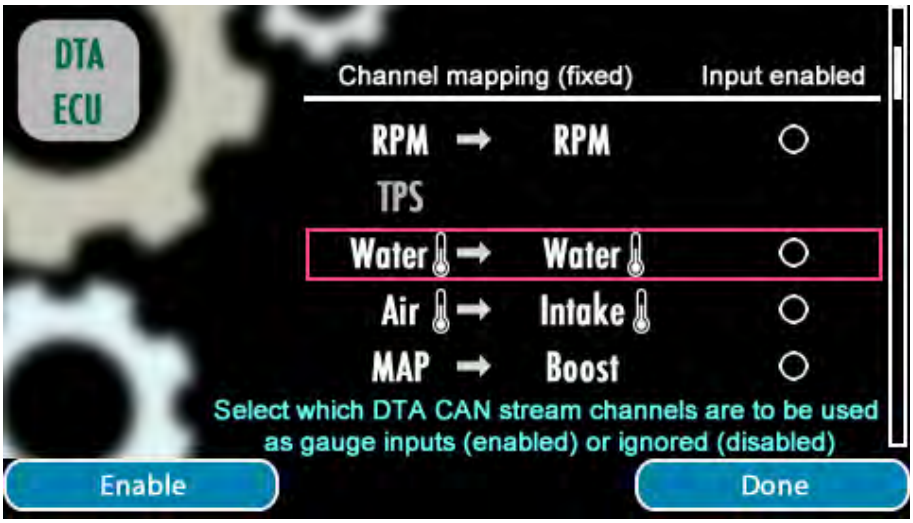
This provides the primary information for the driver when using the **Farina** application, with the main instruments display primarily displaying information for the navigator.

It also replicates the timing information provided when using the **RallyMaster** application.

The drivers display provides this information no matter what application is displayed by main instrument.

DTA S Pro ECU

Allows gauge data being transmitted over CANbus by a DTA S Pro ECU to be utilised by GaugePilot avoiding the need for duplicate sensors.



The user can choose to `Enable` or `Disable` GaugePilot's use of the individual channels of gauge data held within the DTA S Pro CANbus stream.

Sensors

Setup of all directly connected sensors is performed here, including initial settings for the wheel speed sensor(s).

GaugePilot directly supports two temperature sensors (for Ambient, Oil, Coolant, or Intake), one pressure sensor (For Oil, Fuel, or Boost), a fuel level sender, a connection for RPM, and two wheel speed sensors (for wheel, gearbox, or propshaft sensors). Additional sensors are supported over digital interfaces (see `setup➜interfaces`).

GaugePilot has been specifically designed to be wired independently to the vehicles original wiring system and receive its inputs from modern high accuracy senders that are installed in tandem with OEM equipment. This is to protect the originality of the classic vehicle and to also ensure that signal interference is kept to a minimum.

Wheel Speed Sensor 1 or 2

Item	Allowed settings	Notes
Sensor	Pulse GPS Not Fitted	• Pulse for a traditional Pulse sensor. • GPS if using our GP-GPS external GPS driven pulse sensor that generates 8000 pulses per km. • Not Fitted if no pulse sensor is installed on this input.

Define the wheel sensors fitted to wheel sensor input 1 and wheel sensor input 2 BEFORE proceeding with setting up the calibrations for either sensor as, if two Pulse sensors are fitted, the unit will automatically store settings for both sensors simultaneously, reducing installation time.

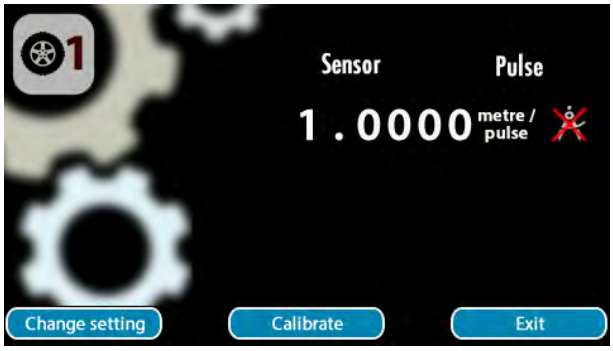
Either sensor input can be used as the primary sensor if only one sensor is installed but ensure an input is set to Not Fitted if no sensor is attached. Users are only given the choice of which wheel sensor to use if two wheel sensors are fitted, and warnings will be given during calibration if no pulses are received from a Pulse sensor.

If one GPS and one Pulse sensor are fitted, the user is given the option to setup the calibration of the Pulse sensor using the GPS reference, by 'match sensor to distance reported by GPS sensor'. This will match the calibration of the Pulse sensor to that of the GPS sensor over an arbitrary driven distance.

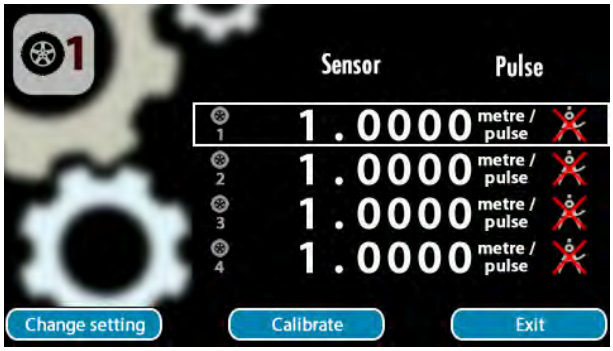
If intending to use tyre sets, note that calibrations with tyre sets disabled are stored as tyre set 1. All the tyre sets to be used in a rally must be setup prior to the event for calibration during the rally to be maintained across those different tyres.

At an event, calibration to the organiser's Roadbook is performed within the Rally Application. It is NOT performed within setup. This becomes important when using tyre sets as the individual tyre calibrations within setup are used to translate the calibration performed against the organisers mile between those sets of tyres.

If the sensor is defined as a Pulse sensor the middle button allows calibration of that pulse sensor to be performed.



If tyre sets are enabled (in `setup`➜`preferences`➜`general`) turning any knob will allow you to select which of the four tyre sets you are about to setup. The tyre set to be calibrated is highlighted with a rectangle.



The options for calibration partly depend upon what combination of sensors have been fitted.

Option	Sensors Fitted	Notes
drive at a known speed	Pulse	Calibrate by driving at a fixed (known) speed - for example using a TomTom or GPS speedo.
drive a known distance	Pulse	Calibrate by driving a known distance - for example a local measured mile. [MOST ACCURATE OPTION]
match sensor to distance reported by the GPS sensor	Pulse + GPS	Calibrate the Pulse sensor using the distance travelled as measured by the GPS sensor.
enter radial tyre size and pulse sensor rotational details	Pulse	Use the radial tyre size, differential / speedometer cable ratio, pulses per revolution information to derive the distance each pulse from the wheel sensor represents.
enter tyre diameter and pulse sensor rotational details	Pulse	Use the tyre diameter, differential / speedometer cable ratio, pulses per revolution information to derive the distance each pulse from the wheel sensor represents.
enter the distance travelled for each pulse in metres	Pulse	Manually enter the distance each pulse represents.

Drive at a known speed

If you don't have a local measured mile that you can use to calibrate your wheel sensor, you can calibrate it by driving at a fixed speed against an known accurate speed reference such as a portable satnav. The target speed can be in mph or kph - If you wish to change the units being used select `change units to miles` or `change units to km`.

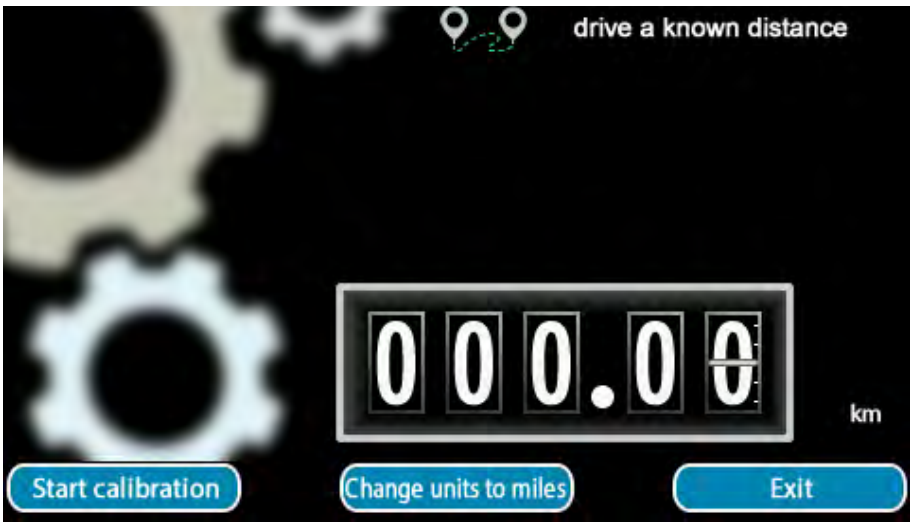
To set, drive the car at a chosen steady speed. Turn any knob to increase or decrease the target speed to that chosen speed. Press `At target speed now` and the instrument will immediately recalibrate itself to display the current speed as the chosen speed. `At target speed` now can be pressed as many times as necessary for you to be happy that the speed indication being made matches the vehicles actual speed.

On `exit`, any new calibration will be stored.

> If no pulses are received from a wheel sensor during the process a message will be shown reporting the issue, and settings for that wheel sensor will not be saved.

Drive a known distance

If you have a local measured mile you can calibrate your wheel sensor using that distance.



At the start of the calibration distance, press `Start Calibration`. If a previous calibration had been started and completed or aborted, the odometer will automatically reset itself to 0.

As you drive the unit odometer will count up using the existing calibration. (either the calibration from your last event, or the calibration performed in setup, whichever was last - there is an option in `Settings`➜`Preferences`➜`Advanced` to override this).
At the end of the calibration distance, press `Distance driven`.

Turn any knob to change the displayed mileage to the distance that you know you have just driven. Each knob will adjust the distance a different amount to allow for large errors in initial setup (by default the instrument assumes 1.0000 metres per pulse - your sensor may produce a pulse every 0.1250 metre or 2.0000 metre resulting in a reported mileage that is several times larger or smaller than that driven) - either up or down by 1.00 units, 0.10 units, or 0.01 units.

Press `Store Calibration`, which doesn't appear until a knob is turned. If the displayed mileage is already correct, turn the knob left a click and then right a click so that the unit can see that you've corrected the mileage and it will then offer you the ability to `Store Calibration`.

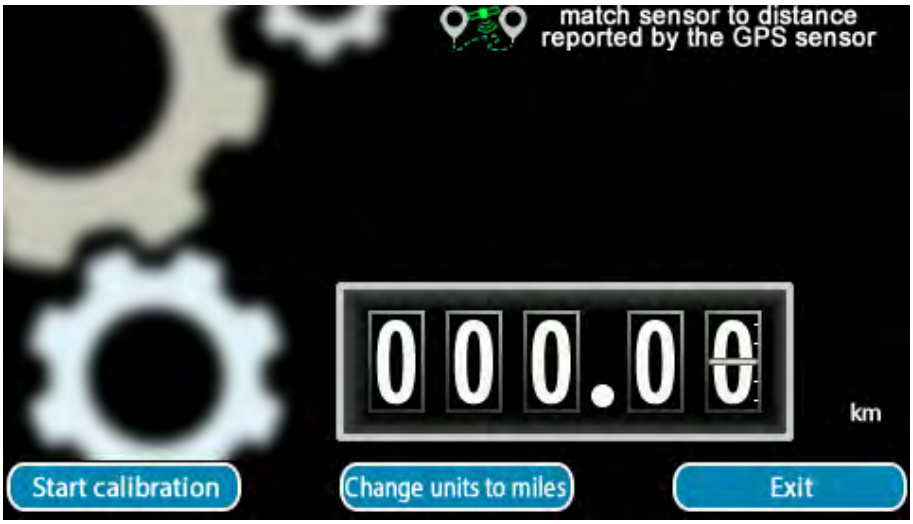
At any point prior to storing the calibration, it can be cancelled by selecting `Abort Calibration` without any changes being made to the existing calibration settings.

Once stored the calibration is used until another calibration is performed. If happy with the calibration select `Exit` or otherwise perform another calibration using `Start Calibration` having driven back to the start of the distance.

Units can be changed between miles and km using `change units to miles` and `change units to km`.

> If no pulses are received from a wheel sensor during the process a message will be shown reporting the issue, and settings for that wheel sensor will not be saved.

Match sensor to distance reported by the GPS sensor



If you have both a pulse sensor and a GPS sensor fitted, you can calibrate your pulse sensor to match the distance reported by the GPS sensor over a driven route.

At the start of the calibration distance, press `Start Calibration`. If a previous calibration had been started and completed or aborted, the odometer will automatically reset itself to 0.

As you drive the unit odometer will count up using the GPS sensor input to derive the distance. At the end of the route chosen, press `Distance driven`.

If happy with the distance reported by the GPS sensor (i.e. no issues with the GPS signal during the test route), press `Store Calibration`.

At any point prior to storing the calibration, it can be cancelled by selecting `Abort Calibration` without any changes being made to the existing calibration settings.

Once stored the calibration is used until another calibration is performed. If happy with the calibration select `Exit` or otherwise perform another calibration using `Start Calibration`.

Units can be changed between miles and km using `change units to miles` and `change units to km`.

> If no pulses are received from a wheel sensor during the process a message will be shown reporting the issue, and settings for that wheel sensor will not be saved.

Enter Radial Tyre Size and pulse sensor rotational details

Use the radial tyre size, differential / speedometer cable ratio, pulses per revolution information to derive the distance each pulse from the wheel sensor represents.

Item	Allowed settings	Notes
Pulses/rev	1, 2, 3, .. , 16	The number of pulses to be expected per revolution of the wheel / prop shaft / cable that the sensor is monitoring.
Diff Ratio	1.00, 1.01, … , 9.99	Where the number of revolutions is affected by the ratio of a differential or gearbox speedometer drive, then the drive ratio should be provided. **For a sensor sensing directly from a wheel, this should be set to 1.00**.
Correction	0%, 1%, … , 5%	The Diameter, either directly entered (cross-ply) or calculated (radials), is typically that of an unloaded tyre. The effective diameter of the tyre will typically be 2%-3% lower due to loads placed upon it. This setting allows fine tuning of the speedometer Gauge
Tyre Width	135, 145, …, 355	The radial tyre width
Tyre Profile	25, 30, …, 85	The radial tyre profile
Rim Size	12, 13, …, 24	The size of the wheel itself

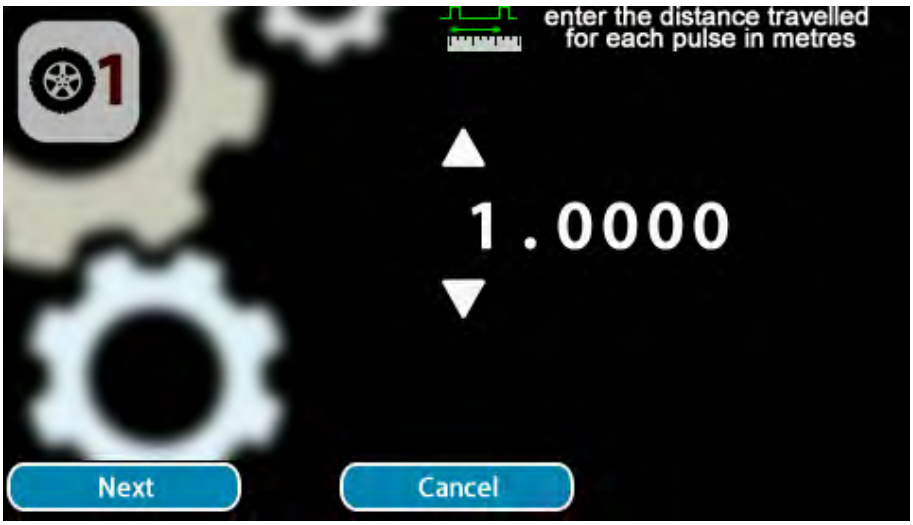
Enter Tyre Diameter and pulse sensor rotational details

Use the tyre diameter, differential / speedometer cable ratio, pulses per revolution information to derive the distance each pulse from the wheel sensor represents.

Item	Allowed settings	Notes
Pulses/rev	1, 2, 3, .. , 16	The number of pulses to be expected per revolution of the wheel / prop shaft / cable that the sensor is monitoring.
Diff Ratio	1.00, 1.01, … , 9.99	Where the number of revolutions is affected by the ratio of a differential or gearbox speedometer drive, then the drive ratio should be provided. **For a sensor sensing directly from a wheel, this should be set to 1.00**.
Correction	0%, 1%, … , 5%	The Diameter, either directly entered (cross-ply) or calculated (radials), is typically that of an unloaded tyre. The effective diameter of the tyre will typically be 2%-3% lower due to loads placed upon it. This setting allows fine tuning of the speedometer Gauge
Diameter	500 - 999mm	The diameter of the tyre in mm

Enter the distance travelled for each pulse in metres

This option allows you to directly enter the distance the car travels for each pulse in metres.



The number is entered in three steps with the format x.yyzz where x=0…15, yy=00..99 and zz=00..99

This option is useful if you already know how far the car moves for each pulse generated.

A single pulse MUST represent a distance of less than 16 metres for GaugePilot to function correctly.

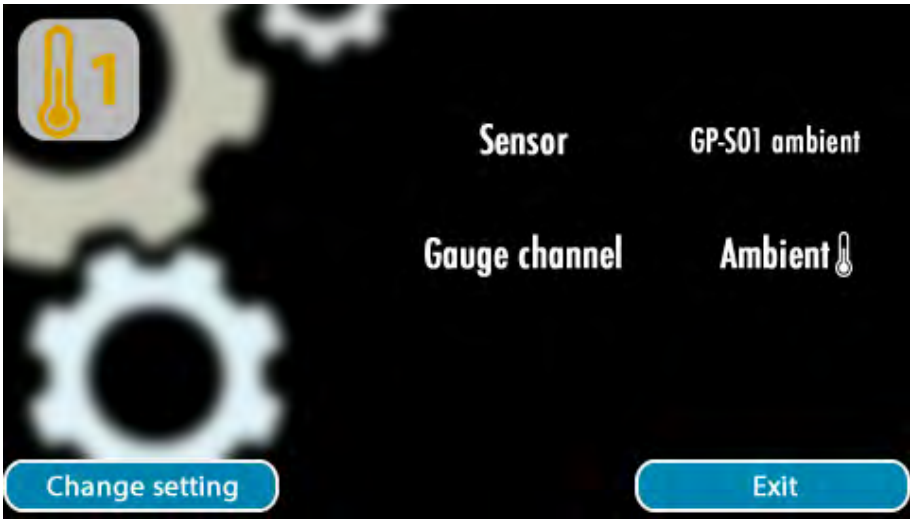
GaugePilot has an internal rounding error of less than 1cm per 2.5 million wheel sensor pulses.

GaugePilot has been tested to 2000 Hz input pulse frequency so sensor performance (maximum frequency) will be the limiting factor on the minimum distance each pulse represents.

GaugePilot rejects pulses greater than 2000 Hz as part of its NoFalsePulse technology within the GaugePilot RallyEngine™. This technology minimises the chances of receiving a double pulse from a wheel sensor by ignoring two pulses that are too close together to be two intentional separate pulses.

At 200 km/h you will have a pulse rate of 111.11 Hz with a wheel sensor generating a pulse for every 0.5m travelled.

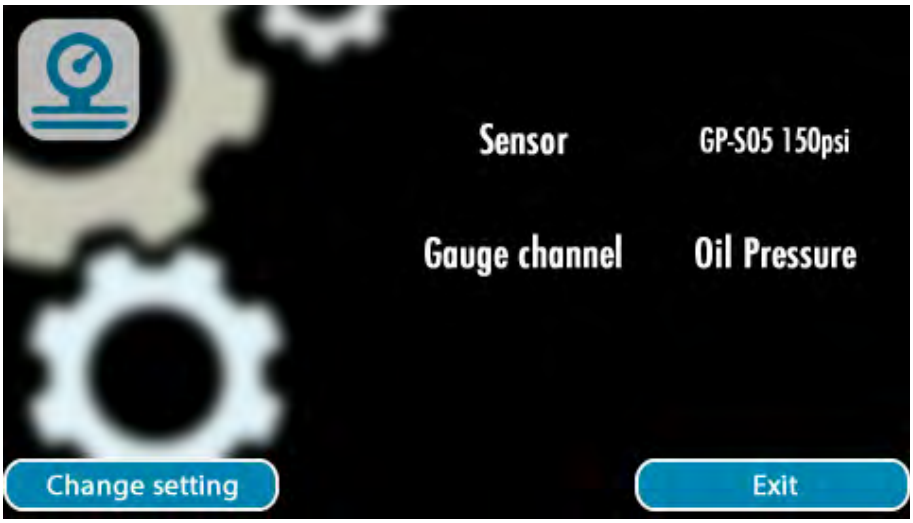
Temperature 1 and 2



Temperature inputs 1 and 2 are identical and allow connection of dedicated 2-wire resistive sensors for measuring Ambient, Coolant, Oil, or Intake temperature.

Item	Allowed settings	Notes
Sensor	GP-S01 Ambient GP-S02 Intake GP-S03 Oil Coolant	The physical sensor connected to the input
Gauge channel	Ambient Coolant Oil Intake Discard	The gauge channel to which the sensor data should be connected, or Discard if the input is not being used (to ensure that maximum or minimum values are not being sent to a gauge channel that is receiving its correct data from another source).

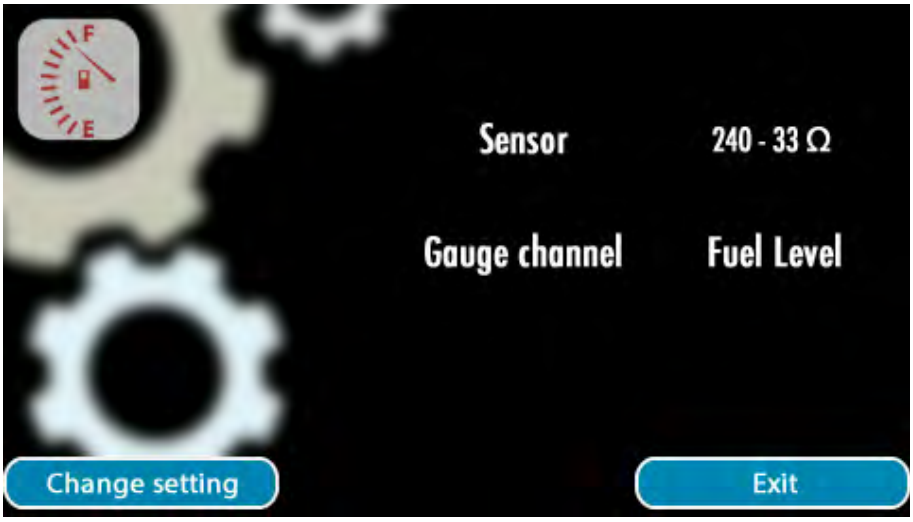
Pressure



The pressure input allows connection of a 3-wire 5V powered sensor, providing a 0-5V input signal, for measuring Oil Pressure, Fuel Pressure, or Boost.

Item	Allowed settings	Notes
Sensor	GP-S05 150psi GP-S07 100psi GP-S08 3Bar MAP	The physical sensor connected to the input
Gauge channel	Oil Pressure Fuel Pressure Boost Discard	The gauge channel to which the sensor data should be connected, or Discard if the input is not being used (to ensure that maximum or minimum values are not being sent to a gauge channel that is receiving its correct data from another source).

Fuel



The fuel sender input allows connection of a 2-wire resistive sensor to measure fuel level. This sender must NOT be connected to any other device in addition to GaugePilot - this feature is targeted at vehicles currently without a fuel gauge and for which the addition of a fuel sender is desirable.

Sensor - Sensor type fitted. Currently supported sensors are:-

Sensor	Impedance (Ω)	
	Empty	Full
240-33Ω	240	33
10-180Ω	10	180
0-30Ω	0	30
0-90Ω	0	90
73-10Ω	73	10
16-158Ω	16	158
40-250Ω	40	250
90-0Ω	90	0
245-13Ω	245	13

Gauge channel - The data from the fuel level input can be sent only to the Fuel Level channel. If readings from the fuel level input are not required, the channel can be set to discard.

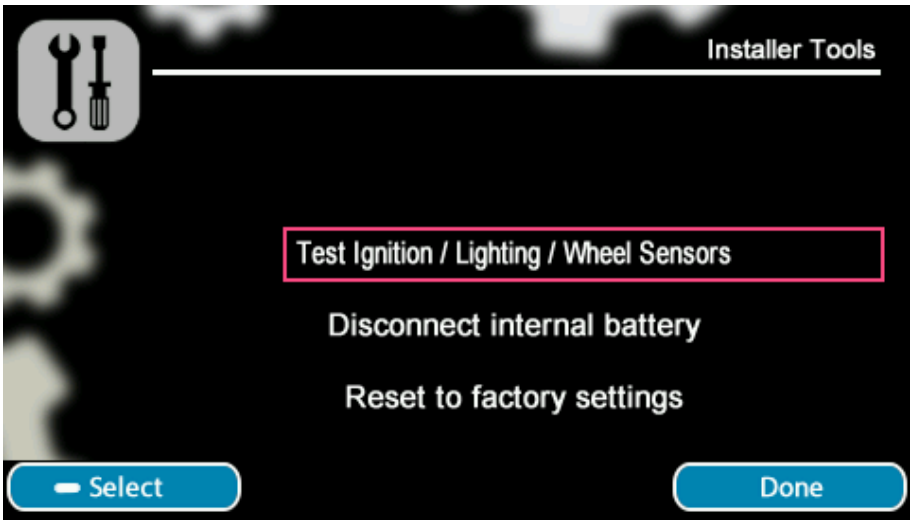
RPM

The RPM input allows connection to either a Kettering Ignition system to measure engine RPM (High level input) or to a low level signal from an electronic ignition system (Low level input).

Where the signal produced by the vehicle isn't suitable for direct connection to GaugePilot, it can be brought in via a device such as the Innovate Motorsports SSi-4 via a serial interface. In this case set the Gauge channel to Discard and configure the serial interface such that it sends data to the RPM channel instead.

Item	Allowed Settings	Notes
Cylinders	1, 2, …, 12	Number of spark events to expect each cycle
Engine	4 stroke 2 stroke	Whether a cycle is one or two revolutions of the engine
Edge polarity	Rising Falling	
Gauge channel	RPM discard	Select RPM if the internal RPM input is being used. Choose discard if RPM is being received over a different interface.
Spark Duration	1.0 - 4.0 mS	The minimum dead time between two engine spark events. Used internally to avoid detecting a single spark multiple times. At 10,000 rpm a 4 cylinder engine will have a dead time of 2.0mS; a 6 cylinder engine 3.0mS; a 8 cylinder engine 1.5mS. If the rev counter jumps around - increase your value. If the rev counter halves at high rpm - decrease your value.

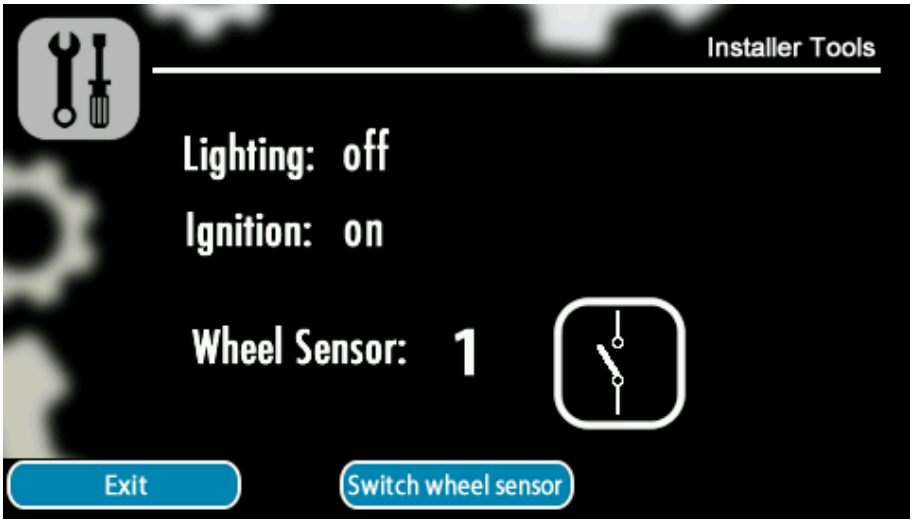
Installer Tools



The highlighted option is selected with a long press of `-Select`. Turning any knob scrolls the highlight window. Selecting `Done` exits the installer tools.

Test Ignition / Lighting / Wheel Sensors

Assists the installer with the setting up of wheel sensors and checking that the Ignition and Lighting feeds are correctly fitted.



In this screen, whenever the active wheel sensor is connecting its pulse output to ground (e.g. because ferrous metal is in front of a GP-S04 sensor), the display will show the wheel sensor switch as on (switch closed and its background green) and the unit will activate warning outputs 1 and 2. When the active wheel sensor is not connecting its pulse output to ground (e.g. because serous metal is not in front of a GP-S04 sensor), the display will show the wheel sensor switch as off (switch open and its background black) and the unit will deactivate warning outputs 1 and 2.

The active wheel sensor can be swapped by pressing `Switch wheel sensor`.

Additionally, the status of the Ignition and Lighting feeds will be shown. The installer should check that they each switch on and off separately as expected (the lighting feed status is updated every couple of seconds, not instantly).

Pressing `Exit` leaves this test mode and the wheel sensors will immediately exit from test mode.

Disconnect internal battery

For long term vehicle storage where the owner does not want to rundown GaugePilots internal lithium battery the battery can be disconnect by long pressing `-Select`. The Battery is returned to function on reconnecting power to the unit, or switching on the ignition. The internal clock will need to be set to the correct time and date. If done whilst the GaugePilot is in Regulation Mode, the unit will not include the time it is subsequently powered off for as part of the time the unit is locked in regulation mode for.

Reset to factory settings

To reset your GaugePilot to the original factory default settings. press `-Select`, You will be asked to long press `-Confirm` that you wish to carry out this operation. The unit will briefly activate both warning outputs before switching off.

NOTES