GaugePilot

CLUBMAN

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.

CLUBMAN-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

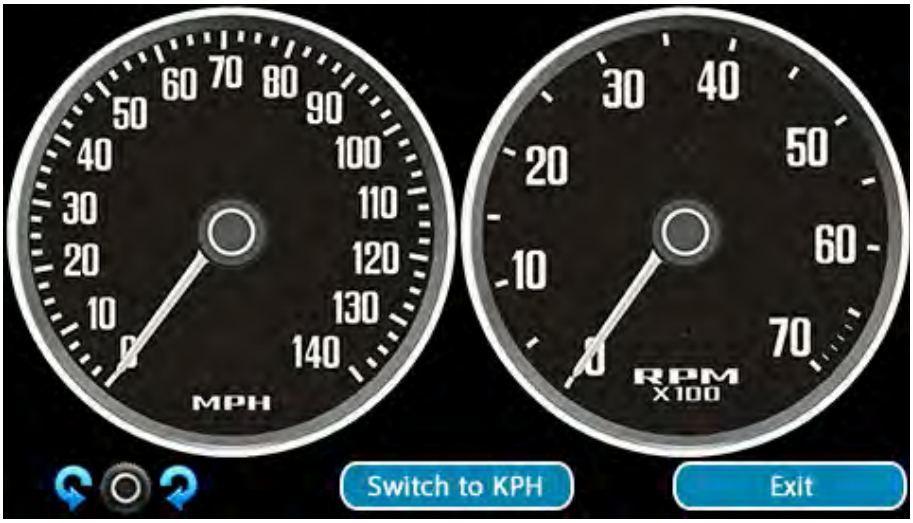
	**Gauges**	displays gauges
	**TwinMaster**	twin odometer with rally time
	**RallyMaster**	visual average speed computer, with speed setting to 2 decimal places
	**Rally Calibration**	for precise odometer calibration at events, or for calibration trimming
	**Rally Settings**	Rally computer settings such as miles/km and which wheel sensor to use.
	**Setup & Preferences**	for initial setup and 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	
Voltage	12V or 6V	
Speed	KPH or MPH Analogue or Digital Disabled in Regulation Mode	
RPM	-	
Fuel Level	-	
Oil Pressure	BAR or PSI	

* Only 1 Temperature input is available so user must choose between Ambient, Oil, or Coolant.

Alerts

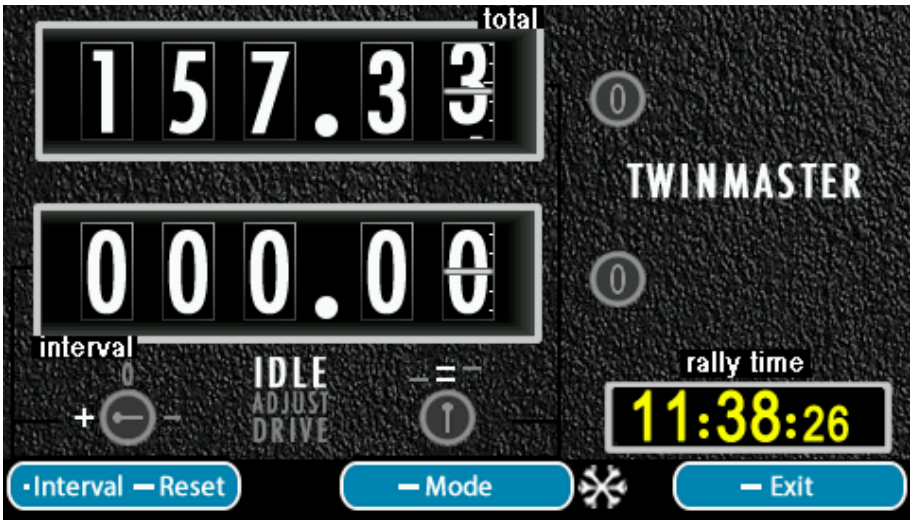
Alerts are always active on your GaugePilot no matter which Application is currently in use.

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

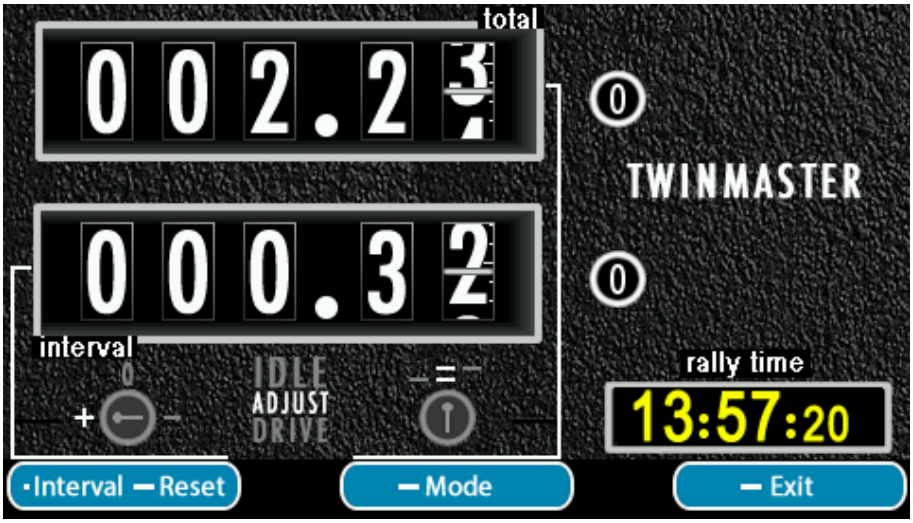
Red Alerts take priority over Yellow Alerts when displaying alerts on screen, but all warning outputs for which an alert is active will always be triggered.

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.



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`.

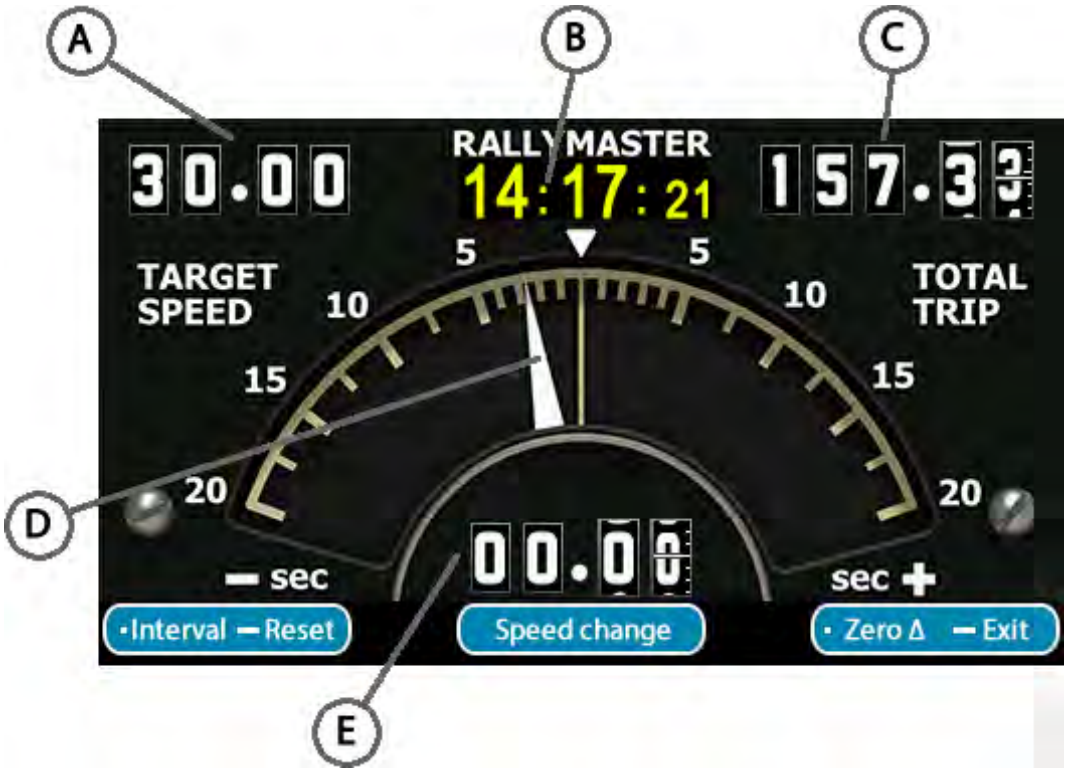
A long press of the middle knob `-Mode` moves the instrument between three different knob modes without affecting any other functionality.

> 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.

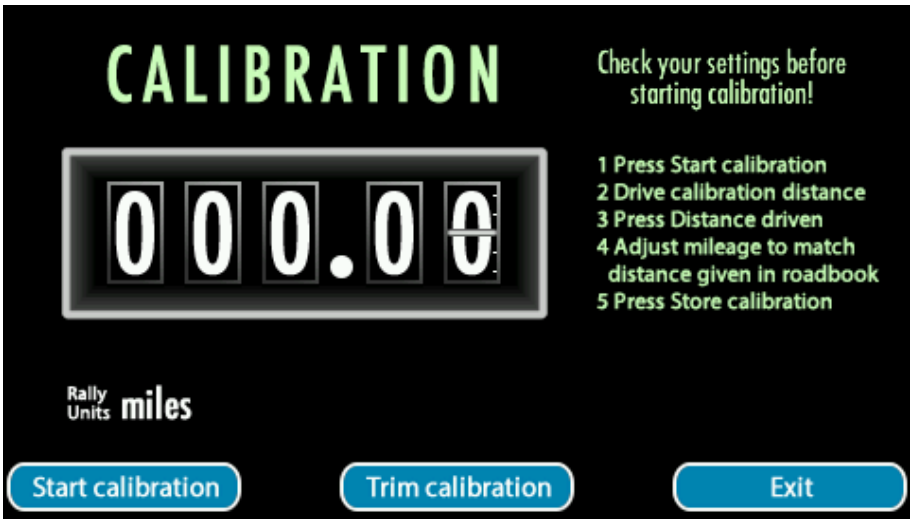
`Zero delta` will reset the time delta to zero and set the target average speed and, if the average speed computer is not running, has exactly the same effect as `Start`. The interval odometer is not affected.

`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**.

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.

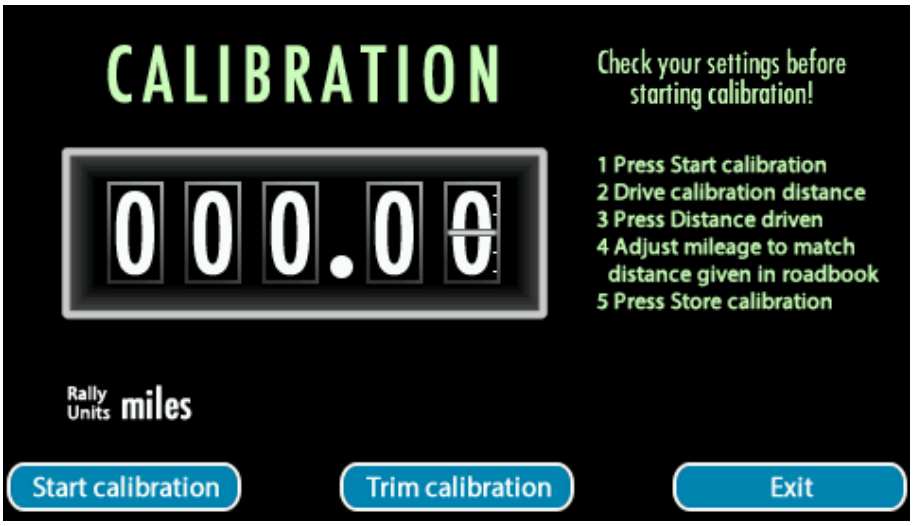
Please note; when Regulation Mode is active, the ability to change tyre set is disabled. Ensure you are using the correct tyre set before entering Regulation Mode.

`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*.

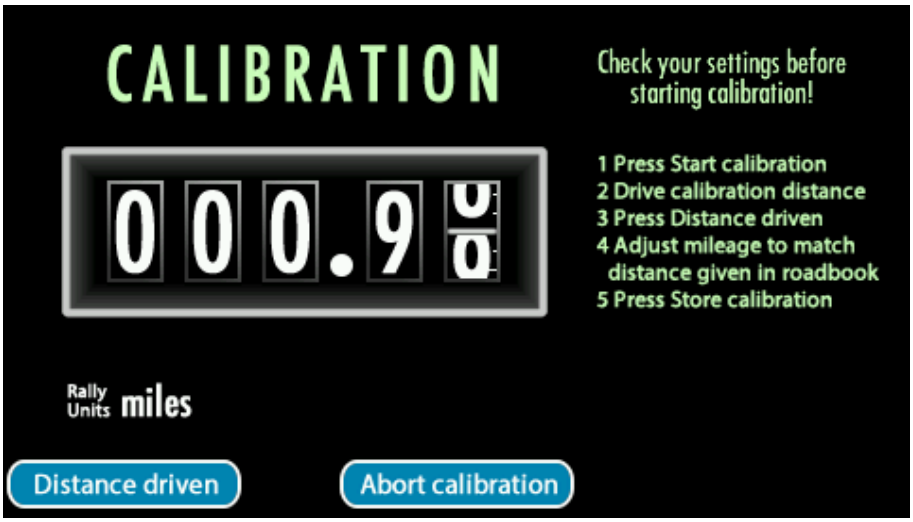
`Exit` leaves calibration for the menu level above.

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`.

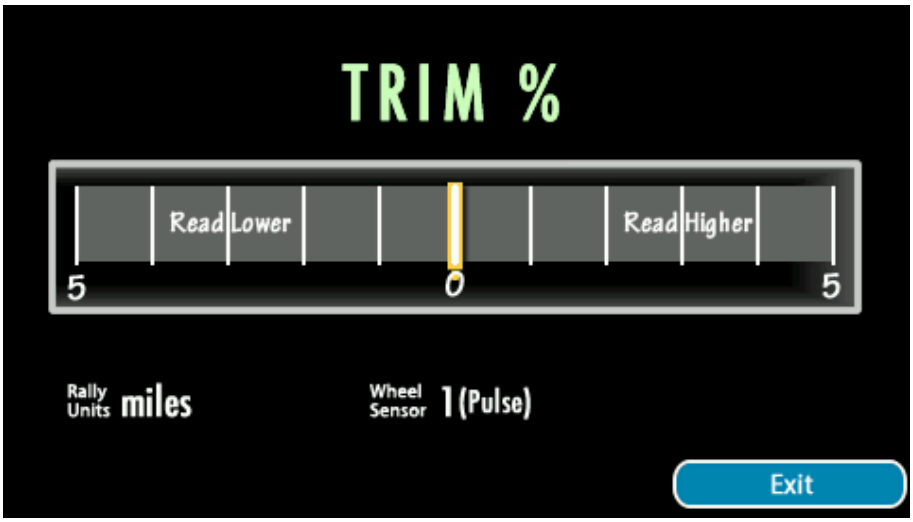
At any point prior to storing the calibration, it can be cancelled by selecting `Abort Calibration` without any changes being made to the existing calibration settings.

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%.

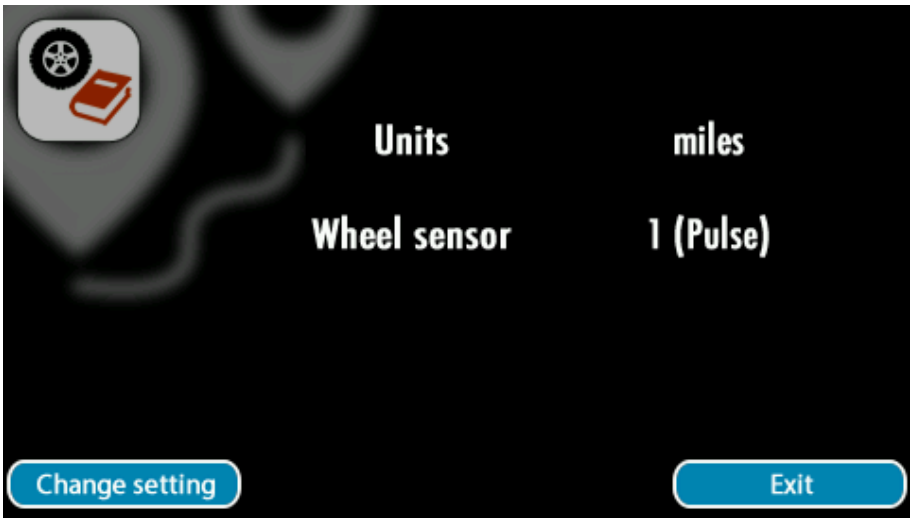
Trim is accessed via `trim calibration` within the `Rally Menu`➜`Calibration` screen.

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.

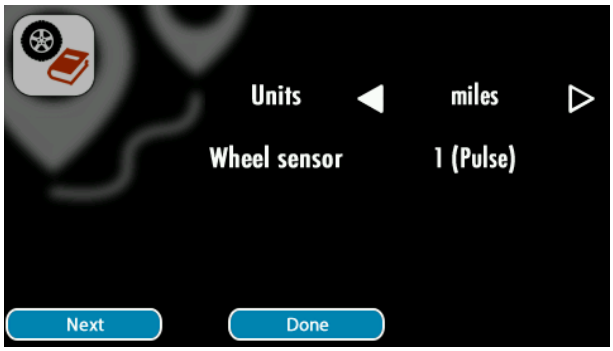
Pressing `Exit` returns you to the calibration screen.

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 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.

Advanced Features

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

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.

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)
- RallyMaster average speed rally application

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.

> 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.

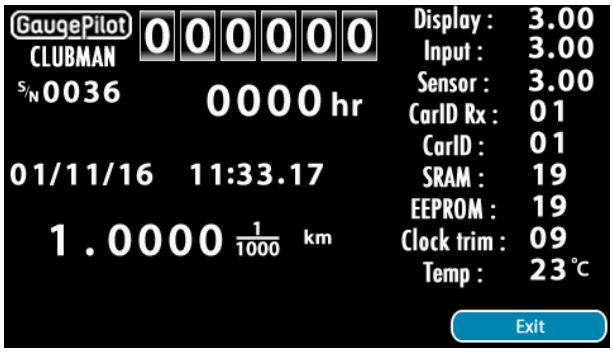
Regulation Mode can be entered or extended via `Setup➜Preferences➜Regulation Mode.`

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
	**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.

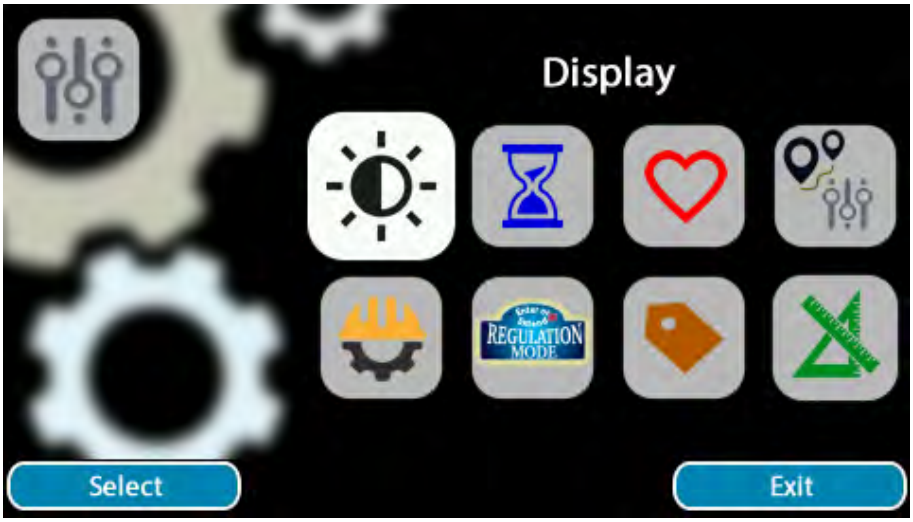
The date format is that selected in `Setup➜Preferences➜Units➜Date format` and can be `dd/mm/yy`, `mm/dd/yy` or `yy/mm/dd`.

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

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)

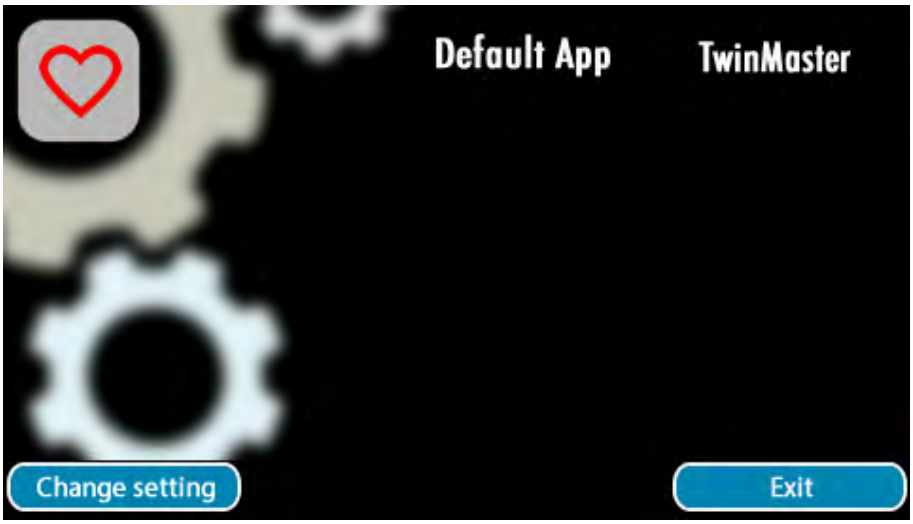
Press `Next` to step down and press `Done` to finish.

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.

Favourites Preferences



Item	Allowed Settings	Notes
Default Application	Gauges SpeedPilot TwinMaster Rallymaster 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.
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

Units Preferences

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

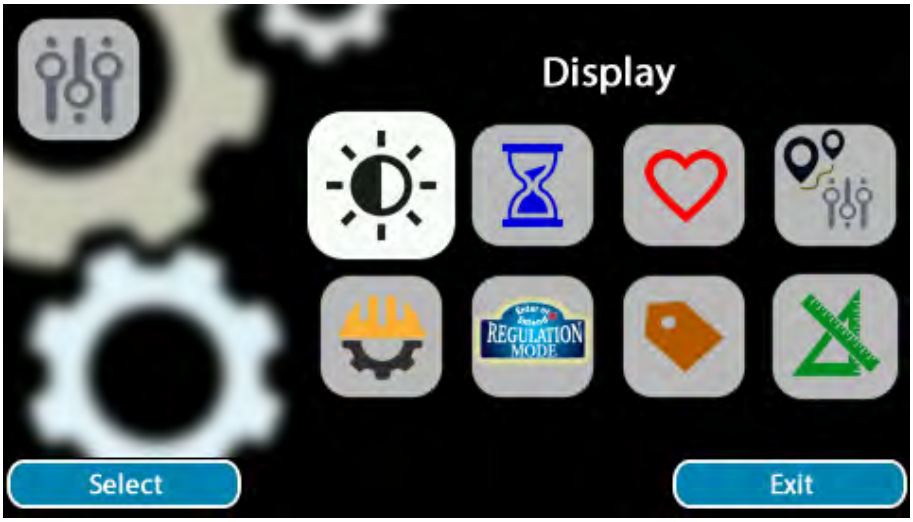
Item	Allowed Settings	Notes
Pressure	BAR PSI	Affects all pressure channels and alerts
Temperature	Celsius Fahrenheit	Affects all temperature channels and alerts
Speed	kph mph	Applies to the speedometer and speed alert only. The rally computer has its own independent settings.
Voltage	12V 6V	Determines 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.

Regulation Mode Preferences



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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.

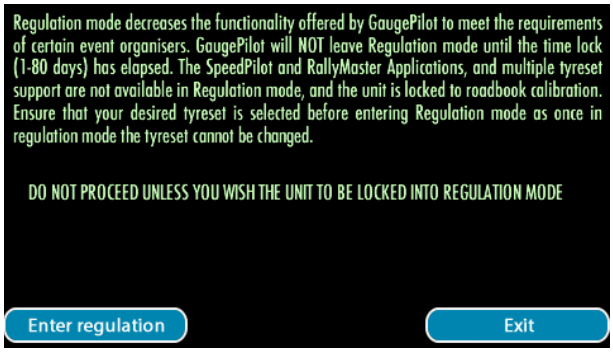
When in **Regulation Mode**, a rally plaque containing the number of whole 24 hours periods the unit will remain in Regulation Mode for will appear in the top left corner of the home screen and the rally menu.

> 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.

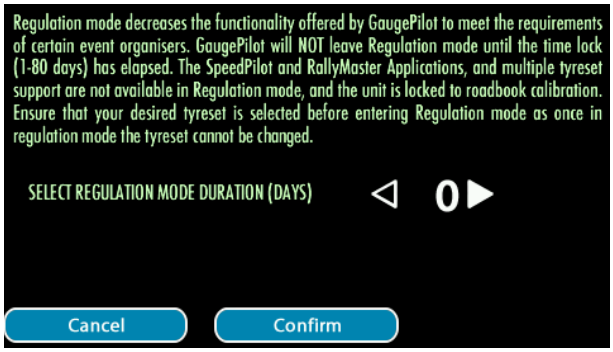
Regulation Mode can be entered or extended via `Setup➜Preferences➜Regulation Mode.`

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.** 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`.

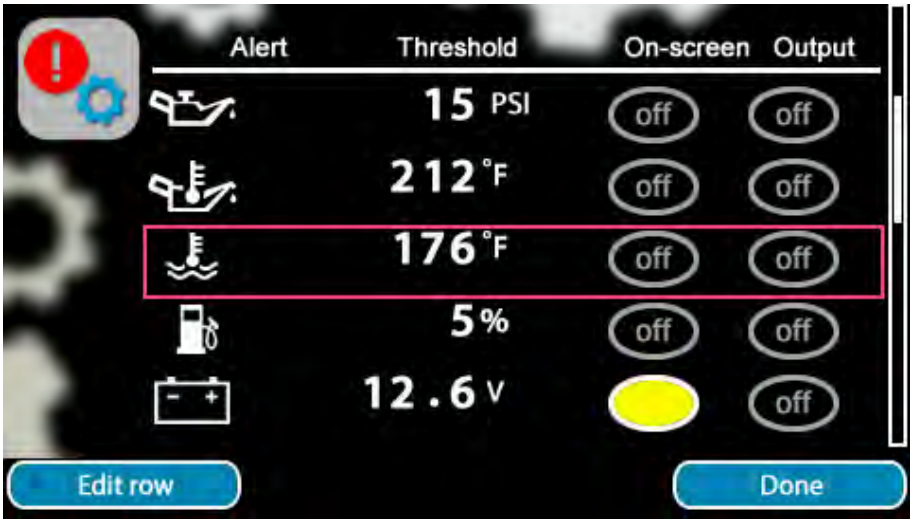
Your units time in Regulation Mode has been extended, and you can `Exit` back to the Rally menu..

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
	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.

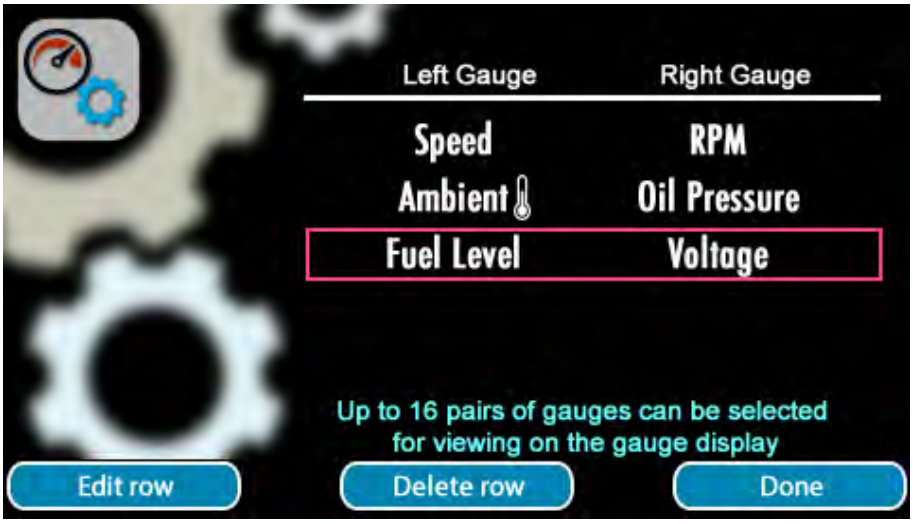
When setting the alert threshold we highly recommend that you consult your manufacturers manual or seek guidance from a marque expert.

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`.

Sensors

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

GaugePilot directly supports one temperature sensor (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).

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.

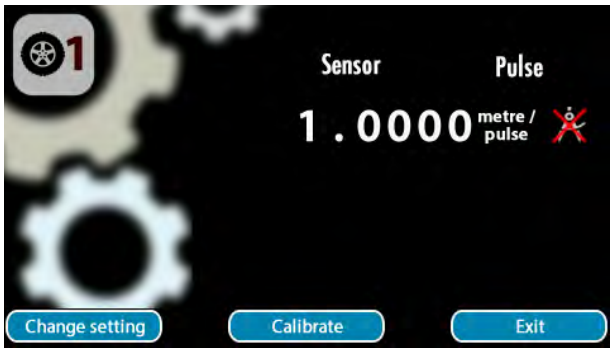
Define the wheel sensors fitted to wheel sensor input 1 and wheel sensor input 2 BEFORE proceeding with setting up the calibrations for either sensor as, if two Pulse sensors are fitted, the unit will automatically store settings for both sensors simultaneously, reducing installation time.

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.

At an event, calibration to the organiser's Roadbook is performed within the Rally Application. It is NOT performed within setup.

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



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`.

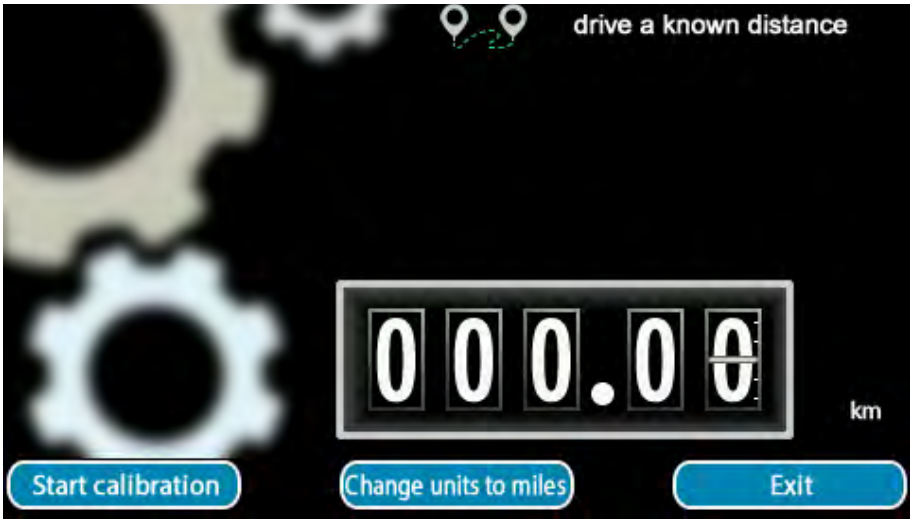
To set, drive the car at a chosen steady speed. Turn any knob to increase or decrease the target speed to that chosen speed. Press `At target speed now` and the instrument will immediately recalibrate itself to display the current speed as the chosen speed. `At target speed` now can be pressed as many 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`.

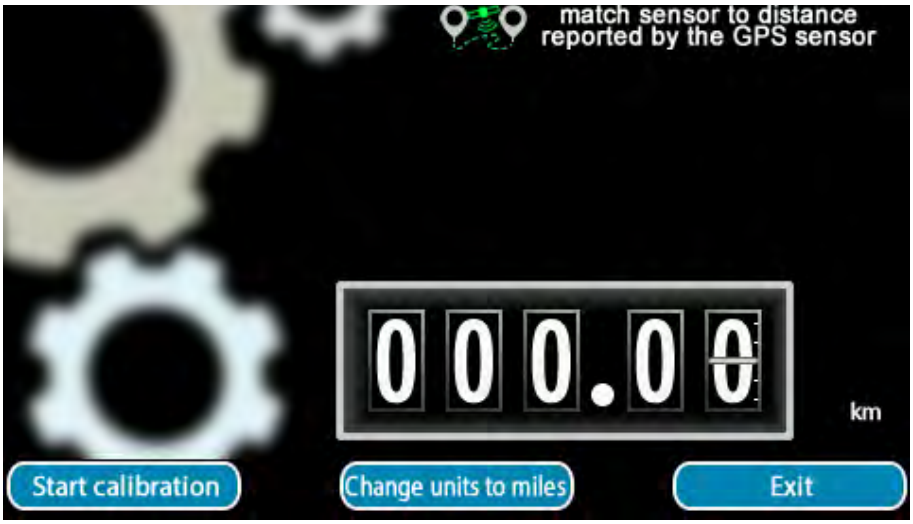
At any point prior to storing the calibration, it can be cancelled by selecting `Abort Calibration` without any changes being made to the existing calibration settings.

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

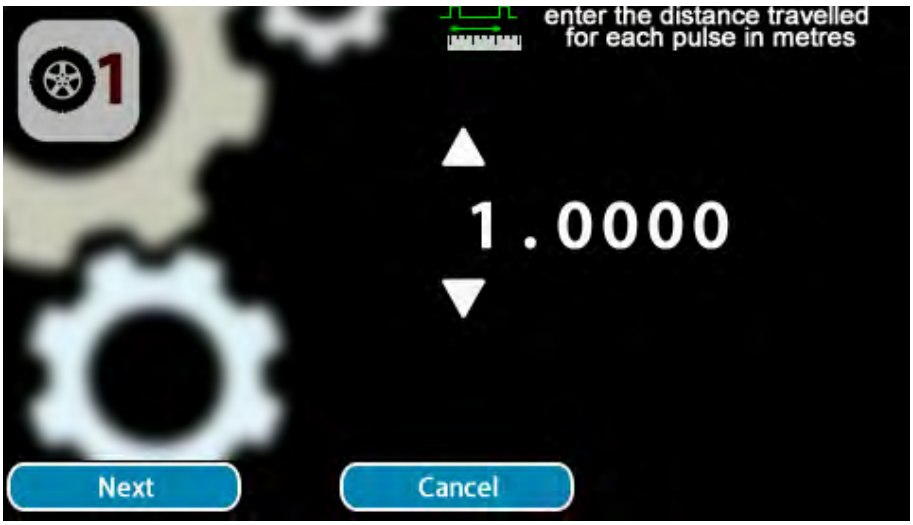
Enter Tyre Diameter and pulse sensor rotational details

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.

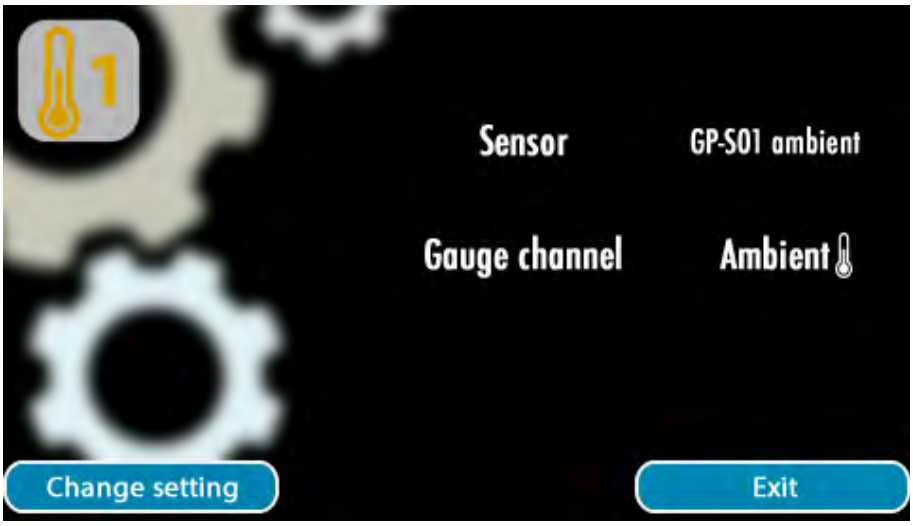
GaugePilot has an internal rounding error of less than 1cm per 2.5 million wheel sensor pulses.

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.

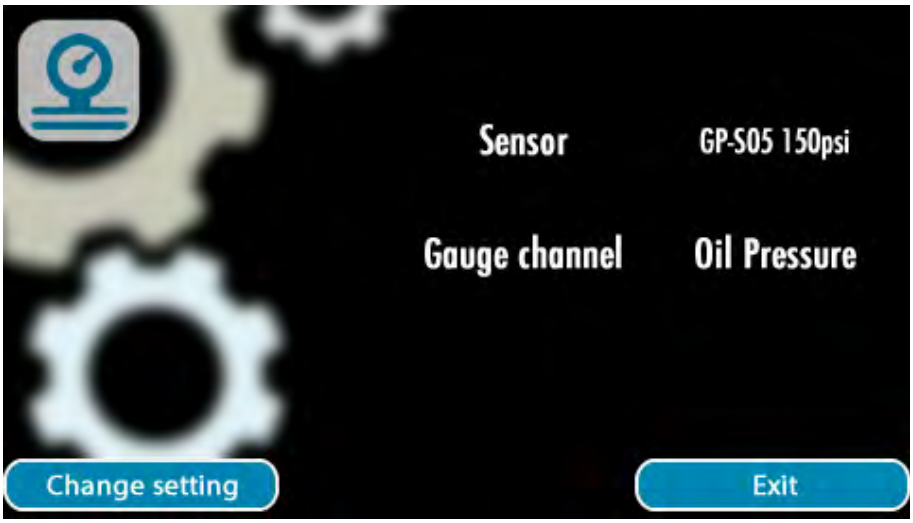
Temperature 1



Temperature input 1 allows 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).

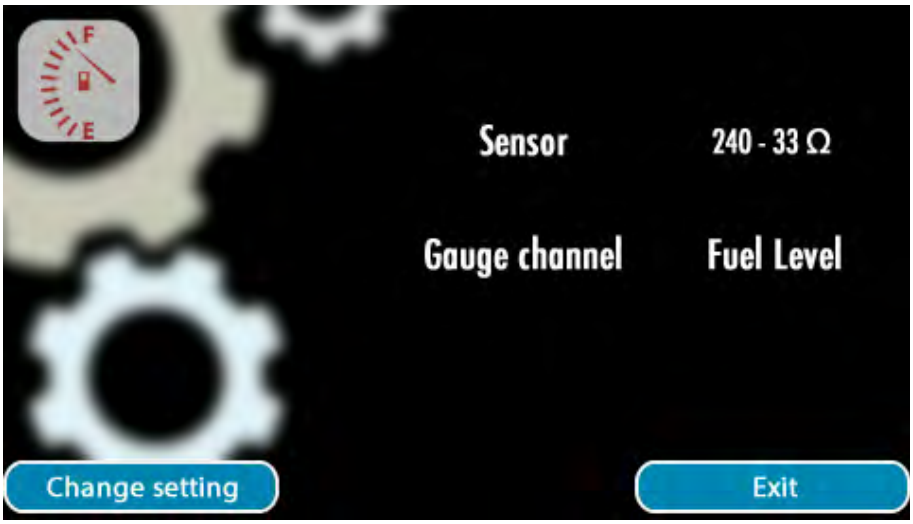
Pressure



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.

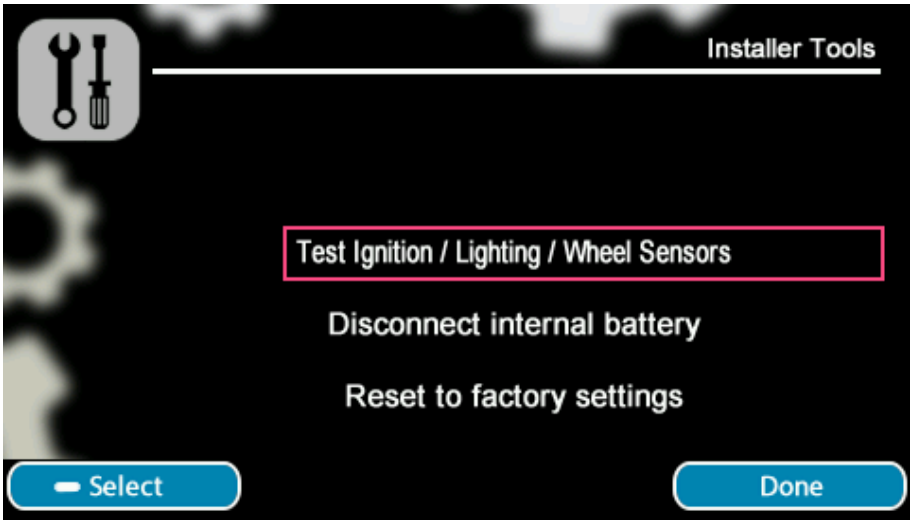
RPM

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.

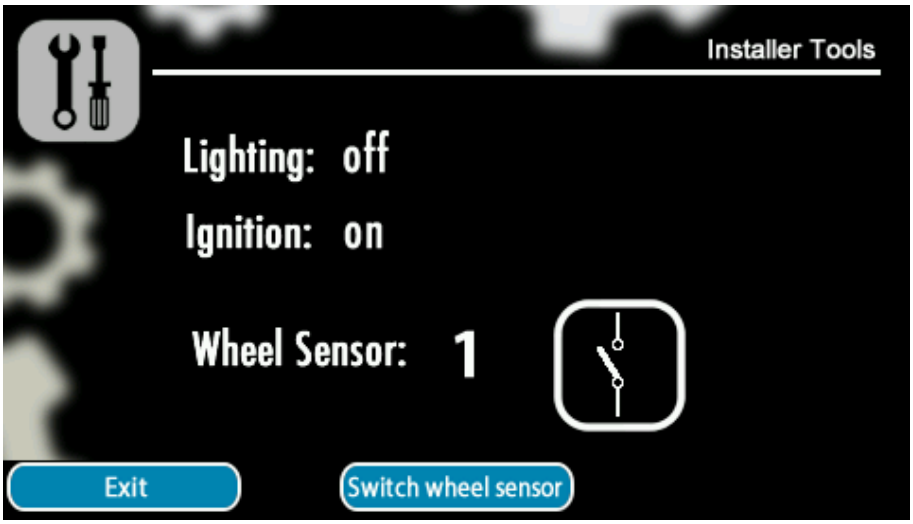
Installer Tools



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