RACE*SENSE*

TYRE GAUGE

User Manual v1.5

FASTMATE*RACING*.com

- Units of pressure: bar / psi / kPa / kg/cm2
- Unit of temperature: Deg C / Deg F
- Maximum pressure: 6.89 bar / 100 psi
- Pressure accuracy better than +/- 0.01 bar or 0.1 psi over normal ambient temperatures and up to 60psi (over 60 psi accuracy typically better than 0.2 psi).
- Temperature accuracy: 1 deg C

INTRODUCTION AND FEATURES

Bleed valve

ON

SELECT

Battery level

NFC antenna

Type K thermocouple probe socket

USB socket

CHARGING

RaceSense has a rechargeable battery. To charge, TURN OFF the gauge, then plug into a powered USB port for > 2 hours.
Battery life > 3 months in standby or 24 hours continuous use.

IMPORTANT: When the battery runs out you may need to set the time and date
1, Make sure the gauge is TURNED OFF. Plug the RaceSense into a PC
2, RaceSense will appear as a USB Drive
3, Open the ReadMe.txt file in notepad and save.

STARTING UP

RaceSense has 2 modes of operation, <u>gauge mode </u>for single readings and <u>multi-tyre mode</u> for full vehicle readings (2 or 4 tyres)

1   **If RaceSense is OFF**
    Press ON briefly to turn on

quick

30.0 psi
1007mbar
28 C°
1 P&T
p 1

or

Hold ON to enter SETUP

hold

Number	1	p 1
Units	psi	
Temp	C	
T order	P and Ts	
Mode	Gauge	
Start	RF	
Dir	CW	
OLED	Medium	
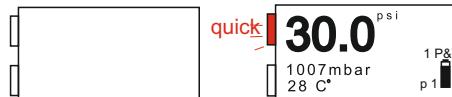
To turn OFF press and hold ON
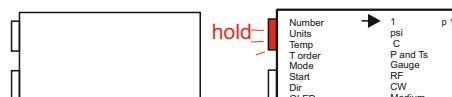
If RaceSense is ON
Press ON to CHANGE MODE between gauge and multi-tyre modes

Setting

quick press

If thermocouple attached

GAUGE MODE

Vehicle no.

Preset no.
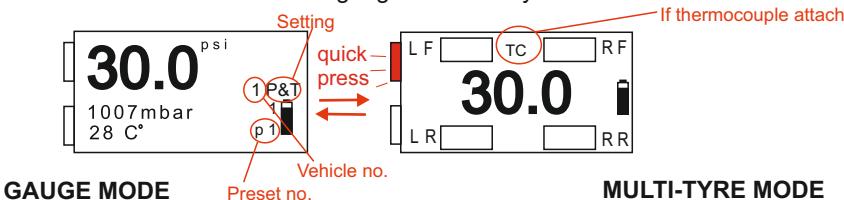
MULTI-TYRE MODE

FOR SINGLE READINGS

Apply chuck to tyre and sample pressure, adjust with bleed valve.

FOR COMPLETE VEHICLE READINGS

Record pressures on all tyres without pressing any buttons.

Saves data for upload.

RaceSense can store up to 7 Presets. Each preset can have many different options set. You can use these for different vehicles for example.

In GAUGE mode you will see vehicle number and PRESET number next to the battery icon. To change Preset number press SELECT.

quick press
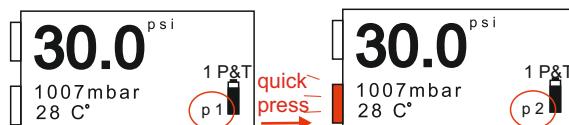
Changing Preset

TO CHANGE PRESET SETTINGS- select Gauge mode, make sure you have the desired Preset selected and then <u>hold</u> SELECT.
(or turn OFF and hold *ON* when powering up)

hold

Changing Preset 1 settings

Number	→ 1	p 1
Units	psi	
Temp	C d/m/y	
T order	P and Ts	
Mode	Gauge	
Start	RF	
Dir	CW	
OLED	Medium	

Display	Actual	p 1
Tyre RF	0	
Tyre RR	0	
Tyre LR	0	
Tyre LF	0	
Res	High	
Memory	Clear	
Factory	Reset	

Track T	Ask
Labels	+Liners

● *ON* changes value
● *SELECT* moves down the list

1 NUMBER   OPTIONS: 0 to 255

Press *SELECT* until select arrow is against Number. Press *ON* and the Car no.will flash.
ON will increase value, *SELECT* will decrease. Holding either button adjusts for larger
steps.
Once required value is achieved wait a few seconds until it stops flashing.

2 UNITS   OPTIONS: psi, bar, kg/cm2 or kPa

3 TEMP & DATE FORMAT   OPTIONS: centigrade or Fahrenheit
                                                     d/m/y m/d/y or y/m/d

4 T ORDER   OPTIONS: Ps and Ts, Ts first, Ps first, Ts only, Ps only

Ps and Ts- will prompt for Pressure then Temperature measurements on each tyre
Ts first- measure temperatures on all tyres before pressures
Ps first- measure pressures on all tyres, then temperatures
Ts only- measure temperatures on all tyres
Ps only- measure pressures then ask for track t if Track T -> Ask selected.
NOTE if no temperature probe is attached then RaceSense will just measure pressures.

5 MODE   OPTIONS: Gauge, 4 tyre or 2 tyre

see MULTI-TYRE MODE operation

6 START   OPTIONS: 4 Tyre: RF, RR, LF or LR
                                                    2 Tyre: FRONT or REAR

Select starting tyre

7 DIR   OPTIONS: 4 Tyre: CW clockwise or CCW counterclockwise
                                       2 Tyre: N/A

Select sampling direction.

8 OLED   OPTIONS: Low, Medium, Bright

Display brightness

9 DISPLAY   OPTIONS: Actual or OFFSET

In offset mode RaceSense will show any deviation from your desired pressures rather an
absolute values. **No one can tell what pressures you are running.**

- Set Display to Offset
- Set tyres offset values

Press *SELECT* until arrow is against Tyre RF. Press *ON* and the RF offset value will flash.
ON will increase value, *SELECT* will decrease. Holding either button adjusts for larger steps.
Once required value is achieved wait until it stops flashing. Repeat for all other tyres.

10 MEMORY CLEAR   WARNING: This will delete all the current records permanently

RaceSense stores up to 64 sets of recordings, once the memory is full it automatically
deletes the oldest logs so you always have the newest readings.

Should you want to delete the entire memory- Press *SELECT* until select arrow is against Memory Clear. Press *ON* and you'll see confirmation screen.
Hold ON to clear, *press SELECT* to cancel or wait a few seconds.

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11 **FACTORY RESET**   WARNING: This will delete all records and presets

Press *SELECT* until select arrow is against Factory Reset.
Press *ON* and you'll see confirmation screen.
Hold ON to clear, *press SELECT* to cancel or wait.

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12 **TRACK T**   OPTIONS: Ask or User

Ask- will prompt for ambient temperature then track temperature at end of temperature recordings. Click ON button to save each measurement.
If no probe attached the ambient will be taken from the internal sensor.
If skipped, 0 will be recorded.
User- can interrupt temperature measuring at any time to add track temperature.

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13 **LABELS**   OPTIONS: None, Hot/Cold, +TyreSet, +Liners

These are extra flags that the gauge will prompt for after P and T readings.
**Hot/Cold-** Prompts to mark record as a cold or hot run.
+TyreSet- as well as Hot/Cold this will prompt for the Tyre Set number (useful if you are running multiple tyre sets on one vehicle).
+Liners- as well as the above this option prompts for whether the measurements are for tyres or liners (e.g. for Nascar racing where each tyre has an inner liner).

To add session names use PC Setup Tool. When measuring the gauge will prompt to allow the list to be scrolled and the correct label selected.

MULTI-TYRE MODE   PRESSURE MEASURING (NO THERMOCOUPLE ATTACHED)

```
L F  30.0      30.0  R F
       30.0    1
             p 1
L R  30.0      30.0  R R
```
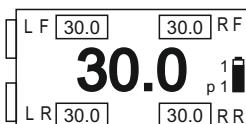
IN SETUP
● Set starting tyre
● Set direction
● 2 or 4 tyre mode

Fit the chuck on first tyre valve, adjust pressure until correct, no need to press any button just move onto next tyre, adjust pressure and repeat.

● SAVING- after all tyres have been measured the data will be saved automatically- Initial and adjusted pressures, time, date, ambient temperature and pressure.

● REDO- to repeat a tyre, press SELECT and it will jump back to the previous tyre.

● RECALL- view last pressure measurement set after completion press SELECT

● PARTIAL READINGS- the gauge will save tyre data even if only 1 or 2 tyres have been recorded in a quick pit stop. A message will appear 'Release button to continue'. After releasing you can take track temp, label the session etc.

RaceSense will measure bulk or internal tyre temperatures if a type K thermocouple probe is attached. It should always be attached BEFORE powering RaceSense on.

CHOOSE MEASUREMENT ORDER in the setup (see Section 4- T ORDER in the Setup explanation)
*e.g. if **Ts first** is selected, and a probe is attached, you can measure Inner, middle and external temps of each tyre before reading the pressures of each tyre.*

RF Inner

31°C

Press top for Ts
Bottom for track
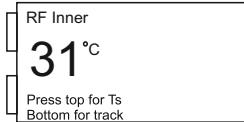
IN SETUP
- Set starting tyre
- Set direction
- 2 or 4 tyre mode
- Set T order

If Track T -> User selected then track temp can be recorded at any time in this process by clicking SELECT.

TYRE PROBE INSTRUCTIONS

- SAFE OPERATION- The probe needle is very sharp. After extending the lead do not let it go as the lead will spring back. Do not put the probe in a pocket. When not in use set the adjuster so that the needle is not exposed.

- PROBE DEPTH- There is a screw adjuster and locking nut so that the tyre can be probed at a consistent depth. A depth of between 3 and 5mm is recommended. The probe can be adjusted up to 15mm which will puncture most tyres. To avoid punctures the needle should obviously not be inserted too deep and the probe should be inserted into the tyre blocks only and not the grooves/voids or sides. Take care with very worn tyres.
  Note: thermocouple position can be 1 or 2mm from the needle tip due so poor response may be seen if the depth is set too low.

- PROBE ANGLE- Make sure to put the probe into the tyre rubber perpendicular to the tyre. If stuck at an angle the probe tip can be damaged.

- HEAT SOURCES- Temperature accuracy will be affected if e.g. the gauge or probe are heated (or cooled). So, do not leave the gauge and probe near sources of heat or where large thermal gradients may be expected e.g. in direct sunlight, on top of engine etc.

- RESPONSE TIME- After insertion it typically takes 2 seconds for the probe to reach 90% of the final temperature, 3 seconds for 95% and 4 seconds + for the temperature response to level out.
  The gauge shows ↓ or ↑ if the temperature is changing. These will clear when stable.

  Car setup, tyre pressures, track conditions and driving style will all affect the bulk tyre temperatures. It does not make sense to compare readings from different car or tyre types or different probe depths.

If you are using the temperature probe that came with your gauge please be aware it is a fast response probe with a thin wall needle. Accidental damage to the probe tip is not covered in your guarantee.

DATA ON A PC- The data on the gauge can be viewed on a PC at any time.
Make sure the gauge is turned off then plug into the PC with the USB cable.
A directory will appear with the file RaceSense.csv

THE APP- Download the RaceSense app from the app store or google.play.
Suitable for Phone 7 and above, Android 5.5+ with NFC (make sure to click allow this app to monitor location when installing).

1 TO SCAN

- iPHONE- press SCAN so you see the scan popup window to enable scanning.

  ANDROID- no need as scanning is always available if turned on in your settings.
- Hold the top of your phone to the NFC label in the centre of your RaceSense (some phones may have a slightly different nfc antenna location so you may need to check where this is).
- Once synced you'll hear a beep and the phone will upload your data (if you don't hear a beep then move your RaceSense a little so it's closer to the NFC antenna in the phone).
- You can now view the data (the location and weather will be marked as where and when you were when you synced the data).
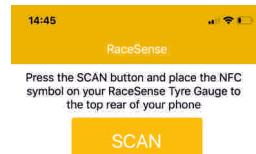
If you have problems scanning please remove any protective case from your phone (some cases can block NFC signals).

Apple have a 20 second time out with the NFC, if you don't scan correctly first time you may have to wait 20 secs before rescanning. To avoid this you can close and restart the app.

2 DATA

- SORT: tap on any column header in the data table to sort by that one.
- DELETE: select the record by tapping it and click the Delete record button: this cannot be undone.
- EDIT LOCATION AND NOTES: tap on the appropriate cell in the data table and the edit dialogue will appear (sometimes the GPS location doesn't correspond to the track name, for instance location says Fawkham when at Brands Hatch, you can map this so any future uploads at Brands Hatch show as this-just tick the "always change this location" check box. Anytime you upload from this location it will be saved as the edited text).

  (landscape orientation not available in Android)

Date	Location	RFMaxP	RFEndP	RRMaxP	RREndP	LRMaxP	LREndP	LFMaxP	LFEndP	RFOut	RFMid	RFIn	RROut
01-12-2019	Brands Hatch	31.8	30.1	33.4	31.2	32.8	31.7	34.5	32.0	33	44	44	23.7
05-12-2019	Brands Hatch	31.8	30.1	33.4	31.2	32.8	31.7	34.5	32.0	33	44	44	23.7
01-12-2019	Brands Hatch	55.6	30.1	36.7	34.1	35.3	33.8	35.7	32.0	23.7	24	23.7	24
03-12-2019	Silverstone	39.1	31.3	36.2	33.4	41.5	31.2	40.6	32.4	33	44	44	23.7
08-11-2019	Knockhill	39.1	31.3	36.2	33.4	41.5	31.2	40.6	32.4	33	44	44	23.7
10-11-2019	Silverstone	44.3	29.5	36.3	30.5	35.8	32.5	34.5	33.4	44	43	45	44
05-12-2019	Cadwell Park	45.1	31.3	46.2	32.5	45.5	31.3	44.5	32.0	33	44	44	23.7
11-11-2019	Cadwell Park	45.1	31.3	46.2	32.5	45.5	31.3	44.5	32.0	33	44	44	23.7

RFIn	RROut	RRMid	RRIn	LROut	AmbP	Car	Notes	Weather	WindSpeed	WindDir
44	23.7	24	33	44	1100	1	Finished 10th	Wet	10.9	NE
44	23.7	24	33	44	1007	2	New tyres	Wet	10	W
23.7	24	23.7	24	23.7	1099	1	n/a	Dry and sunny	25.8	SSE
44	23.7	24	33	44	1288	1	Race 1 position2	Few clouds	10	N
44	23.7	24	33	44	1125	1	n/a	Few clouds	30	NNE
45	44	45	46	39	1054	3	Very slippy	Wet	10	SSW
44	23.7	24	33	44	1022	2	Coached	Wet	10	SSE
44	23.7	24	33	44	1228	1	n/a	Scattered rain showers	14	SSE

3 RECORD SCREEN

- VIEW a single page for each record by tapping on column 1 or 2 (Time and Date). Or tap the LAST RECORD button to get the page for the latest record.

- Edit NOTES, Track T, AmbT, Tyre Set No., Hot/Cold and Session name.

- SHARE with others by email, sms, whatsapp etc
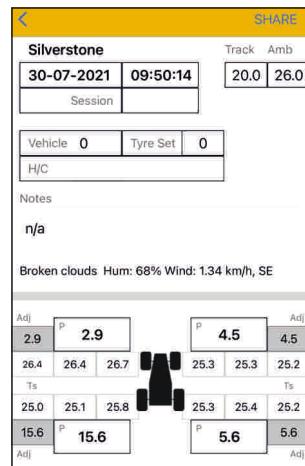
4 ANALYSIS

- SELECT EXPORT from the Data screen to export and analyse.

- EXPORT a csv of all data or specific car and tyre set data.

- ANALYSE hot and cold data- If a record has been labelled as Hot or Cold by the gauge or in the Record screen these can be selected so you can see how your cold pressures relate to your measured hot pressures in a simple screen.
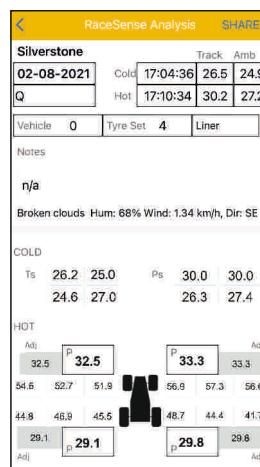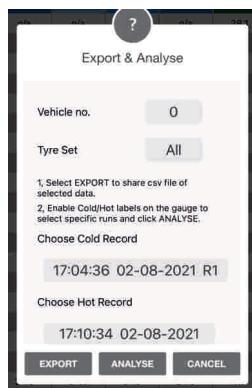

5 OPTIONS

- CHOOSE DATA TO VIEW: RaceSense gives you a lot of data, if you want to hide any columns you can set these or choose to hide all temperature readings by checking "hide temperatures".
- SELECT UNITS: RaceSense syncs data in default units of psi and centigrade. To view in different units select the required ones here.
- EXPORT: email a csv file of your data to yourself or anyone else.
- DELETE: Clear the data and settings in the app.

THE PC SETUP TOOL can be used to for configuration and this may be more convenient and faster than using the gauge user interface.

- SAVE SETUPS- favourite or commonly used setups on the PC for later use or load the complete setup from a gauge and copy to another.

- ADD SESSION LABELS-The Setup application must be used if session labels are to be loaded onto the gauge so that logs can have text labels like FP1, Q, R1 etc.

- LIMIT PRESETS- change the number of presets from 1-7.

TO INSTALL use the *RaceSenseGaugeSetupInstaller* (download the latest file from fastmateracing.com/tyre-gauge-downloads/). Run the installer and follow the instructions. *Suitable for PC only.*
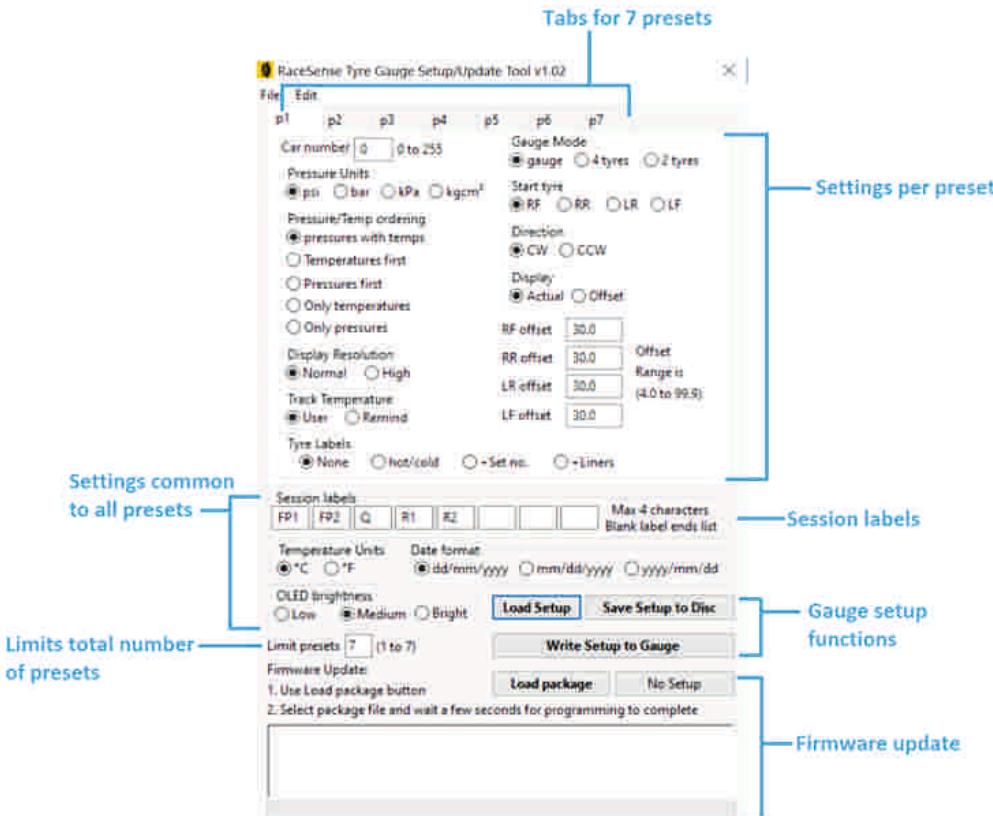
- THE TABS- p1, p2 etc. are pressed to select the different presets. Some settings e.g. units and date format are common to all presets.

- SET LIMITS- change the total number of presets to avoid having to scroll through unused presets on the gauge (by default this is 7 which is the maximum).

- SESSION LABELS- There are up to 8 session labels. Each label can have a maximum of 4 alphanumeric characters. Fill the label boxes from left to right as shown above. A blank label ends the list and there must be 2 or more labels. To turn off session labelling blank out the first label or all of them. You may need to click in the label boxes and press delete to remove spaces so that new characters can be added.

- TO PROGRAM- Once you are happy with the setup make sure the gauge is turned off then plugged in to the PC using USB lead and then click 'Write Setup to Gauge'. After a short while the gauge will be updated and message 'Setup, Programming complete' will appear in the box at the bottom of the app.

- SAVE TO DISC- You can also save the setup to disc by clicking 'Save Setup to Disc', then browsing to location on PC and editing the filename. 'Load Setup' can be used to open a previously stored setup or to load a setup from the gauge.

FIRMWARE UPGRADING

The firmware on the RaceSense Tyre Gauge can be upgraded with the SETUP TOOL as new releases become available.

Please see https://fastmateracing.com/tyre-gauge-downloads/ for our latest releases and full instructions.

WARRANTY AND CARE

RaceSense is water resistant but should never be immersed in water or left in very wet conditions for any length of time. Never attempt to dismantle or service your RaceSense yourself as it will void the warranty.
RaceSense is rugged but always try to protect your RaceSense from shocks, hard and sharp objects, extremes of heat and prolonged exposure to direct sunlight.
If not in use, store your RaceSense in a clean, dry environment at room temperature.
Do not expose to strong chemicals and cleaning products as they may damage the seals, case and finish.

If this product should fail due to defects in materials or workmanship, FastmateRacing will repair or replace it free of charge for a period of 12 months from the date of purchase. This warranty is only extended to the original purchaser and covers failures due to defects in materials or workmanship that occur during normal use. It does not cover damage or failures resulting from neglect, accident, misuse, mishandling, alteration or modifications of the product or any failure caused by the operation of the product outside the scope of its published specifications. FastmateRacing shall in no event be liable for any incidental or consequential damages arising from the use or inability to use the product. FastmateRacing do not assume any responsibility for losses or claims by third parties that may arise through the use of this product.
If a claim under warranty appears to be necessary email hello@fastmateracing.com (or telephone +44 (0)1784 481562 to obtain a returns number before returning your RaceSense.

This User Manual and its contents are intended solely for the use of our customers to obtain knowledge regarding the operation of the RaceSense tyre gauge.The contents shall not be disclosed or reproduced without the prior written consent of Swimovate Ltd. Great care has been taken to ensure the accuracy of this documentation but it's contents are subject to change at any time without notice. The latest version of this documentation can be downloaded from https://fastmateracing.com.

CE   N NFC

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