

Rally Trip Meter Calibration

Introduction

Rally car trip meters are a useful tool for rally co-drivers, but they are useless unless they have been calibrated.

Below you will find step-by-step calibration information that I copied from Terratrip's website. The operation of trip meters from other manufacturers is similar, and details should be obtained from the manufacturer if you don't have the original documents.

A basic trip meter is a type of computer that calculates and displays the distance that a vehicle travels. Most trip meters have two distance displays, one used to display a [Total Distance](#) (for example from the start of a rally road section until the end of that road section), and a second display that the co driver "zeros" as each road book feature is arrived at (such as a junction, or a hazard) known as the [Interval Distance](#). On special stages, the Total Distance is useful as it tells the crew how far they have traveled and how far the end of the stage is from their current location. This is helpful in a number of ways:

- If you crash, you can radio your exact position to rescue workers or your team.
- If you get a flat tire, you can use the distance to decide if you should stop and change a wheel or continue to the end of the stage.
- If you lose your place in your pace notes, you can cross reference the distance and find your place again.

The Interval Distance is useful on special stages too. For example in fog you can reset the Interval Distance at the start of each long straight and use the trip meter to count down the driver into the next corner even if it isn't visible. In the U.K, I found this to be particularly useful.

Modern trip meters also have stopwatch functions, count down timers, and other nice features, but I've competed on many events with a basic two-display model and a \$20 stopwatch and do just fine...

It's good but not essential to understand the basics of how trip meters work, as this will help you understand what the calibration number means. If you hate mathematics, please feel free to skip the next section.

How Trip Meters Work

Trip meters measure distance by counting pulses from a sensor that detects the cars movement. The two methods used are:

1. A sensor that counts wheel revolutions (usually the inside end of the studs that secure the wheels) on a non-driven wheel (except 4WD cars of course).
2. A sensor on the mechanical speedometer cable.

The trip meter computer is usually designed so that the "CAL" value, or calibration number is the number of pulses per mile, or pulses per kilometer.

For the maths whizzes, this makes calibration easy if your car uses a wheel stud sensor because you can simply calculate the CAL value. For example:

Assume you have a **tire size of 185 60 15** and use a **4 stud** counting sensor.

You have to first understand what the tire size means. The 185 means the tread width is 185mm, the 60 means the sidewall is 60% aspect ratio (so 60% of 185mm) and 15 means 15 inch wheels. Note that one inch = 25.4mm.

If you can calculate the circumference of the tire, you can use this to figure out the number of pulse per mile (or km). So using the above example:

The wheel diameter is 15 inches, so that is $15 \times 25.4\text{mm} = 381\text{mm}$.

Each sidewall is $60\% \times 185$, so that's 111mm at the top and at the bottom of the wheel.

Therefore the tire height is $381 + 111 + 111 = 603\text{mm}$.

The tire circumference is $603\text{mm} \times \text{Pi} = 1894\text{mm}$.

If your sensor counts four studs per revolution, for each pulse the car travels 473.5mm.

All you have to do now is divide that value into the number of millimeters in one mile (or km). To make life easy, the numbers you should use are:

Millimeters in one mile = 1609344 (5280 feet x 12 inches x 25.4mm)

Millimeters in one kilometer = 1,000,000

So your CAL values are:

Using Miles = $1609344 / 473.5 = 3399$

Using Kilometers = $1000000 / 473.5 = 2112$

You can repeat the above based on your actual tire size and number of wheel studs, then enter the CAL value and try driving the car over a measured mile to confirm your calculation. You should be very close, and you may have to make only minor adjustments to your CAL value to get the calibration perfect.

How to Calibrate Terratrip Trip Meters.

The following is taken from Terratrip's documentation:

CALIBRATION–SETTING NUMBER Terratrip 1

Set CAL switch to CAL, display shows C100. Press F and S to adjust hundreds, F to adjust tens, S to adjust units.

CALIBRATION NUMBER-CALCULATION Terratrip 1

Set calibration to 10% of number of pulses probe gives per mile (for mileage readout) or per kilometre (for kilometre readout).

CALIBRATION NUMBER-CALCULATION Terratrip 202 PLUS and 303 PLUS

Set Calibration Number to number of pulses probe gives per mile (for mileage readout) or per kilometre (for kilometre readout).

ALL MODELS

Set the Calibration Number to 100 (T1), or 0100 (T202PLUS/303PLUS) or 1000 for "HR" (Road Survey models). Exit from Calibration Mode so that displays are now showing Distance. Start with the Distance Displays at zero and run the car over a distance of 1 mile (1 kilometre if you want kilometres displayed). At the end of the run make a note of the number in the Interval Distance Display. Set the tripmeter to Calibration Mode and set the Calibration Number to the same number as was shown on the Interval Distance Display at the end of 1 mile (or 1 kilometre). Exit from Calibration Mode. The instrument is now calibrated.

DISTANCE SECTION CONTROLS Terratrip 1

Press ZERO to zero display. Switch +/- makes display count up or down. Switch 1/0/2 selects which probe is to be used for distance sensing. The centre position of the switch – marked 0 – cuts out both probes.

To adjust the Distance Display press S to adjust the hundredths, F to adjust the tenths, F and S to adjust the units.

DISTANCE SECTION CONTROLS Terratrip 202 Plus and 303 Plus

Press FRZ. Upper display shows F. Both distance displays freeze. Internally Total carries on counting and Interval resets to zero and starts to count again. Press FRZ again and displays count normally.

MANUAL SETTING OF TOTAL DISTANCE -Terratrip 1

Press S to adjust hundredths, F to adjust tenths and F + S to adjust units.

MANUAL SETTING OF TOTAL DISTANCE -Terratrip 202 Plus and 303 Plus

CALIBRATION

Press CAL and the calibration number currently in use is shown. After 3 seconds display will revert to those shown before you pressed CAL. If you press CAL again, within 3 seconds, the other calibration number will, be shown. If you do not wish to use this calibration number press CAL within 3 seconds and the original calibration number will be shown for 3 seconds. When the display shows the Calibration you wish to use do not press any key. After 3 seconds the calibration number will disappear and the unit will use that number. The display shows which calibration number is in use.

To change a calibration number display that calibration number by pressing CAL one or two times. Press CAL SET. Enter the calibration number you require and then press the lower CLR. If you make an error press the upper CLR and the number will revert to the original number. If you try to enter a number of less than 100 the display will show 'Error' and the bleeper sounds when the lower CLR is pressed. Enter a number equal to or greater than 100 and press the lower CLR to enter that number

Please email me if you find any obvious mistakes!

Tony Holden Updated 12 June 2010