



Innovative Advances in Wheel Alignment



This document gives an insight into the advances achieved by the innovative method and design of the Trackace Laser Wheel Alignment Gauge.

The Trackace boasts fast, easy and laser accurate diagnosis of a vehicles front wheel alignment (tracking), with minimal cost.

These benefits have never before been available in the financial scope of cost effectiveness for the motorist and have remained within the domain of expensive commercial equipment.

Historically such developments are usually at a cost of reduced functionality, accuracy, reliability or ease of use. The advanced features of the Trackace break these historical rules and bring the functionality of the commercial sector to the masses, simultaneously simplifying the actual process, improving accuracy and the reliability of the solution.

Compact storage. The creation of a process that uses a single reversible wheel gauge placed consecutively on each wheel is the obvious major contributing feature for reducing the apparatus required. The innovative prop legs provide mounting the gauge and all the adjustment features required with two identical compact parts. The laser unit folds flat allowing the whole kit to be stored in compact case that fits the requirement for storage of a home solution.

Ease of use / Functionality. The obvious improvement is the size and weight of apparatus compared to it's commercial counterparts. This not only manifests itself during the checking process but in moving equipment in and out of storage or a vehicle when the user wants to get mobile. Laser levelling is by way of smooth pivoting action of both laser unit and wheel gauge, where the adjustable feet method requires more time and attention to prepare for use on the average driveway etc, which cannot be expected to match the straightness of a workshop floor.

Width adjustment to suit wheel size is of an easy slide action, height and gauge levelling adjustment is an easy one phase process of adjusting prop leg angles as the gauge is positioned against a wheel. The required posture whilst positioning and simultaneously adjusting height and level is comfortable as the angles of the legs are ergonomic to that of a person in a knelt position and the lightweight apparatus adds to the comfort of use whilst reducing the risk of injury.

Commercial gauges have separate mechanisms for adjusting height, width and level, some of which are not in a comfortable position. Often five separate adjustments are required for each of the pair of gauges, totalling ten adjustments before the heavy gauges should then be removed for a separate pre-calibration procedure, which may require more mechanism adjustments. With the Trackace no understanding of a separate pre-calibration process is required buy the user.

Accuracy. Obviously the main concern with diagnostic equipment. Most equivalent commercial gauges are calibrated by placing the units face to face with pins contacting. This only leaves a matter of inches for the laser to travel and be lined up with a zero line. Over this short distance any small misjudgement when calibrating will be exaggerated many times when the gauges are moved far apart to the width of a vehicle. Of coarse this is if a separate pre-calibration is carried out at all, if not the user may be using seriously un-calibrated equipment.

The Trackace uses a simple two stage process utilising a single reversible gauge, placed consecutively on each wheel. This completely eliminates any possibility of using an un-calibrated pair of gauges. Calibration of the Trackace is automatic, as it is incorporated into the checking process. Not only is calibration ensured at every use but it is over a distance of approximately eight feet (laser travel of approx 16 feet at calibration) and then second part of the checking process is within this distance.

This calibration is far superior to all laser commercial counterparts as the Trackace is the only laser triangulating apparatus that calibrates at a greater distance than its operating distance.

Where a scaled target was used years ago on equipment similar to today's commercial laser gauges; a scale could not be accurate for different sized vehicles.

The Trackace laser unit is always placed at a specific distance from the wheel and the scale matches this distance. This is the point where angular difference is measured, thus the scale used with Trackace's new method is extremely accurate on any size vehicle.

For those motorists who want to carry out their own adjustments, checks as adjustments are made will require the two stage process to be repeated. With the Trackace already to hand, rechecks can easily take less than one minute.

To understand how the Trackace achieves such accuracy from such a simple checking process, you need to understand the difference between the basic principles of how commercial laser gauges work against how the innovative features of the Trackace work.

How Commercial Gauges Work.

The following diagrams are exaggerated for easy interpretation.

Fig 1 illustrates how a pair of commercial laser gauges are calibrated close together. Fig 2 shows when the gauges are moved many times further apart, onto a vehicle any tiny misjudgement is also multiplied many times. Although the pair of wheels are parallel, the gauges will inaccurately indicate a misalignment if any small misjudgement was made at calibration.

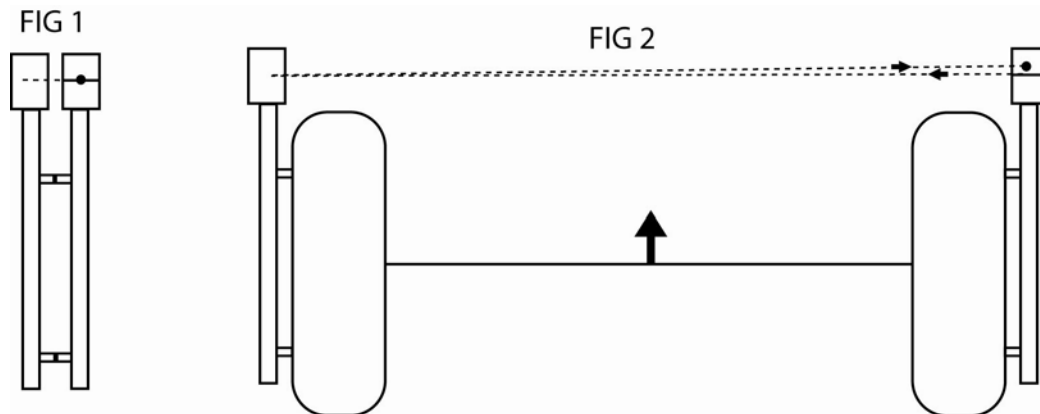
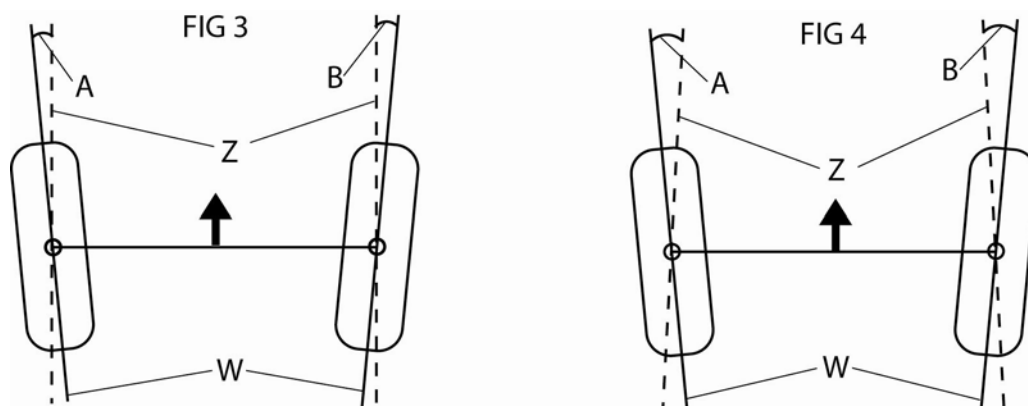


Fig 3 shows how these gauges measure the alignment of toe-out wheels. The solid lines W represent the planes of the wheels at which the pair of gauges are placed. The dashed lines Z represent the position at which the gauges would zero and in fig 3 are parallel to represent perfectly calibrated gauges. The of angles A and B are the angles measured, the sum of which is the correct result of how much the pair of wheels deviate from being parallel.

Fig 4 shows how a mis-calibration will manifest itself. The dashed lines Z at which the gauges read zero are not parallel. The angles A and B are increased. The sum of which will now produce an inaccurate result.



How The Trackace Works.

Fig 5 shows stage one of the checking process. Again line W represents the plane of the wheel at which the gauge is placed. This time dashed calibration line Z is at the same angle. The remote unit is positioned on the ground at a specific distance from the right wheel and so the laser is reflected straight back to the zero line on the scale. The required distance is exactly the same as the length of the wheel gauge which is used to set, so no tape measure is needed.

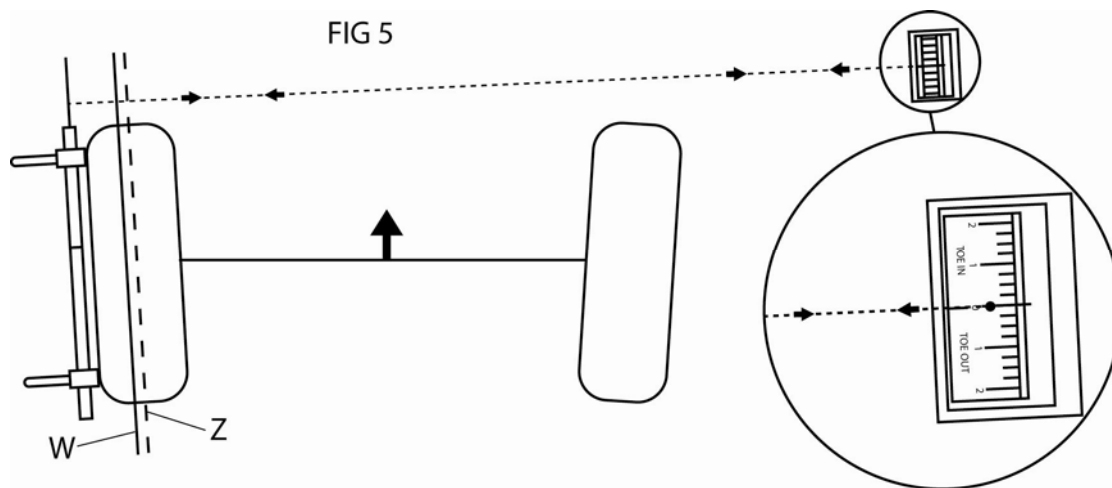


Fig 6 shows the second stage. The wheel gauge is simply placed on the right wheel. The mirror intercepts the laser at an angle relative to the right wheel. The laser is reflected according to this angle back to the scale which shows an accurate result because the scale matches the distance the unit was placed from the right wheel. This angle is the total difference from one wheel to the other, which is exactly the same as the sum that both wheels deviate from parallel.

