

90° Squaring User Guide

INSTRUCTIONS

90° Squaring



1. Position Laser & Power On

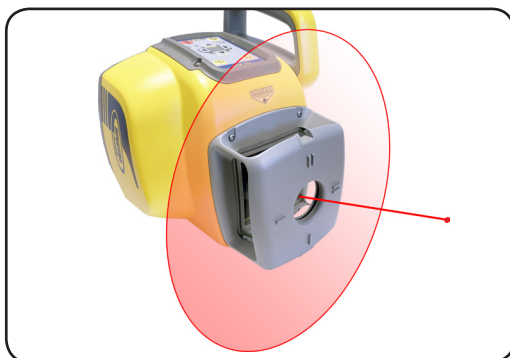
Take the Laser Level off the tripod and lay on a firm surface, at ground level on the rear lay-down mount. The mount is located on the opposing side of the keypad. The laser should be placed over your intended corner point. Then press the **ON/OFF** button once to turn on the level and wait for the laser to self-level before pressing the manual override button once.



2. Pick Up The Vertical

With the Laser prism now spinning (like the wheel of a car), turn the Detector onto it's side (landscape mode) and face towards the Laser. The up and down arrows used for horizontal levelling will then become left and right arrows. The Detector will accurately pinpoint the vertical datum and the arrows on screen will indicate which direction to go. When in alignment it will display a vertical black line. You can then walk up to 250m

forward of your position continually marking the datum. When this is complete, you will have marked out the first part of the 90° and you can now return to the laser to begin setting out the second part.



3. Pick Up The Laser Dot

The second part of the 90° is achieved by marking the position of the red laser dot that is fired from the centre of the lighthouse.

The laser dot cannot be picked up with your detector.

You need a target plate. Our recommendation is to use a small piece of around 300mm long white contiplas board, 6-9" wide or similar. Using a black marker pen, draw a vertical line down the middle of the board. The white

surface is an ideal target to "pick-up" the red dot at distance, even in bright sunlight. Hold the end face of the target board down onto the ground, align the dot onto the black line and mark the position accordingly at appropriate intervals. **This has set 90 degree squaring.** If you had an aerial or top down view, you would see a perfectly set out "L" shape or corner without using a Set Square or 3/4/5 Triangle calculation.

HOW TO SET 90° SQUARING

Working Example

The following description in this guide, explains the general principles of setting-out 90 degree squaring when using the Laser Level. It speeds up the classic 3/4/5 triangle method, giving better accuracy and alignment over much longer distances.

Equipment

You will need the Laser Level, the laser detector (receiver), a target plate and preferably a remote control. You do **not** need a tripod or staff.

(Without a remote control; having another person to assist you, is useful.)

Site Conditions

There are many different work site scenarios. As an example, we are assuming that you have laid a concrete pad or completed your strip foundations (footings) and are ready to set out in one corner, 90 degree (squaring) for brickwork, blocks or timber framing, over a datum *mark*.

Procedure

Place the Laser Level in *"lay-down"* over your corner datum *mark*, on the concrete surface & switch ON. Wait for it to auto (self) level, then press the Manual Override button. As this procedure is using *"alignment"* rather than *"levelling"* it is more convenient to use the laser in its Manual mode.

Next, remove the bracket from your laser detector. Switch the detector ON and lay it on its SIDE over a distant mark along one side of the concrete slab or strip footing. The pick-up window must be facing the rotating beam of the laser level. Using the left/right arrow buttons on the remote control, direct the spinning beam to receive a continuous audible tone on the detector. This has aligned the laser beam exactly on the distant mark.

Next, observe the laser dot projecting from the rotating prism. This is now parallel with the concrete slab or footings along the other axis. Laser prisms are optically cut to split one laser beam - to accurately set 90 degrees. ie. Rotating beam in one axis and laser dot in the other, setting squaring.

The laser dot **cannot** be picked up with your detector. You need a target plate.

Our recommendation is to use a small piece of around 300mm long white contiplus board, 6- 9 ins wide or similar. Using a black marker pen, draw a vertical line down the middle of the board. The white surface is an ideal target to *"pick-up"* the red dot at distance, even in bright sunlight. Hold the end face of the target board down onto the concrete footings, align the dot onto the black line and mark the concrete accordingly at appropriate intervals.

This has set 90 degree squaring.

HOW TO SET 90° SQUARING

Working Example (Continued)

User Tip

Do not mount the Laser Level in “lay-down” on a surveying tripod. It must be positioned directly onto the working surface. If mounted on a tripod, it can potentially introduce an error or inaccuracy to the 90 degree squaring procedure.

Dot axis alignment:

Depending on your make/model of laser level, most have a light house cover over the prism with glass windows. When setting the laser dot axis, the depth of this cover (usually around 20-40mm) prevents you from running your line back to the datum *mark*. So simply mark two positions say 100mm & 1m away from the laser level & strike a line back under the laser's cover to the datum *mark* to give the intersection of both axis.

CHECKING THE CALIBRATION

Controlled Test

If you believe the Laser is not giving accurate datums (after ensuring you have completely ruled out refraction of the laser beam explained on page 6), please carry out the following controlled test in your office, or another indoor location.

- Position the Laser Level on it's tripod in the **middle** of your office, garage, workshop etc... somewhere where you have space (10m or similar).
- Ensure there is no glazing or reflective surfaces in line of sight of the laser beam. This is to prevent the Refraction of the laser beam (See Refraction Issues section on page 6 for further details).
- Turn off all the lights and press the **ON/OFF** button once and the Laser Level will power on and begin automatically self-levelling horizontally.
- ***No other button needs to be pressed for the laser to self level.***
- This self levelling process takes around 15-20 seconds and then the prism will start spinning and will project a laser beam 360 degrees around the room.
- With the laser level keypad facing your chest (towards you) walk to the left hand wall and mark the position of the laser beam on the wall.
- With the laser level keypad facing your chest (towards you) walk to the right hand wall and mark the position of the laser beam on the wall.
- Walk back to the laser and carefully twist the laser level round so the laser keypad now faces the left wall.
- ***Be extremely careful not to overly disturb the laser when twisting it round to the point the tripod position moves or is kicked.***
- The laser will momentarily stop and re-start when turned round. This is normal. The laser will then self level again and project a laser beam 360 degrees around the room.
- Walk to the datum marks on both the left and right wall. You should see that the beam is hitting these marks.
- **If it is hitting the datum marks then the laser is operating correctly.**

If it's not hitting the datum mark's...

(and you have 100% ruled out Refraction and have not pressed Manual override)

Please contact the Service Department: **08000 869 769** who will be able to advise how to send it for repair / calibration.

REFRACTION ISSUES

Product types: All Rotary and Cross line laser levels

Although there will always be the 0.1% of products that develop a fault, 99.9% of the technical enquiries we receive relating to “incorrect levels”, “random positions”, “out-of-level” or “Detector not picking up the beam correctly” transpire to being Refraction of the laser beam.

Laser levelling equipment is used by many different industries in various work-site environments. Users should be aware of the possibility of refraction problems, when using this type of equipment.

“Refraction” is the phenomenon where light is transmitted but moves direction when it passes from one medium to another e.g. through air then glass or water. This is why a pond of water appears shallower than it actually is or when you shine a torch at a window and the beam bounces off to another position. In the same way, this refraction can affect the correct setting-out, when using laser beams.

An easy example to understand is if, for example, a rotary laser is operated with a double-glazed window behind it. The true level position can be refracted and the deviation can be appreciable, even over small distances. In some instances, a double beam position can occur and the wrong level marked.

Our advice is to be aware of this and take appropriate care when setting out with your laser level, **both** indoor & outdoors.

A simple *fix* (if the laser cannot be moved or lowered) is to position a simple brown cardboard cover over the laser level on the side towards the refraction surface.

The following surfaces can potentially be problematic:

All glazing - single, double or treble glazed units. Patio / Bi-fold glass doors etc.

Glazed office partitioning.

Vehicle or Site Plant - glass windows & windscreens. (Curved windows are the worst)

Panel van sides - wet surfaces.

Mirrors & mirrored surfaces.

Stainless steel, shiny aluminum panels & reflective Celotex panels

Water – fountains, water displays, rivers, dams and weirs etc.

In addition, please be aware of the effects of amber & green warning beacons on plant & equipment. This “strobe effect” is a known problem and can affect all types of laser detectors to give erratic readings.

Our main advice is just to be site-aware when using laser levelling equipment, to ensure the reliable and accurate setting-out of your jobs.

It’s also important to understand that refraction of the beam, occurs with all lasers regardless of cost and or brand purchased.

CARE & MAINTENANCE

Protecting the Laser Level Kit

- Your Laser Level is precision levelling equipment and should be treated as such. Always handle with care and transport within the carry case provided.
- Always turn the laser level off when transporting or moving around the job site.
- Ensure the laser & accessories are clean and dry before storing in the case.
- If wet, dry well before storing and store the case and contents at room temperature. Failure to do so may void warranty.
- ***NEVER store the Laser Level Kit in a van, car or an unheated location (workshop / shed / garage / lockup etc.) overnight. The Laser Level Kit is designed to work in cold and wet conditions but it's the storage of the product when not in use that is critical. Keeping it in a secure heated building increases the usable life of the product and reduces the possibility of theft.***
- When the laser level is not in use or is being stored long term, it is highly recommended to remove the batteries or battery pack from the base of the laser as well as the batteries in the remote control and detector.
- Ensure the protective lighthouse glass is clean and free of dust and dirt at all times.
- Only use the supplied charger with the laser. The charger is for indoor use only. If the charger becomes damaged, stop using immediately and purchase a replacement. ***Never use a generic charger with this laser.***
- Always check the accuracy of the laser level before precision levelling is attempted. Failure to do so may result in inaccurate levels. See page 5 for further details.
- If the Laser Level has received a heavy impact or has been dropped, please ensure the calibration is checked.
- There are no user serviceable parts inside the Laser Level. Warranty void if tampered.

Laser Levels Online

**Unit 35, Bridge Business Centre, Beresford Way, Dunston Road,
Chesterfield, Derbyshire, S41 9FG, United Kingdom**

Freephone: 08000 869 769 (Free from UK mobiles and landlines)

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