

# ***VERTICAL SHAFT ALIGNMENT LASER***

## ***QUAD 4000***

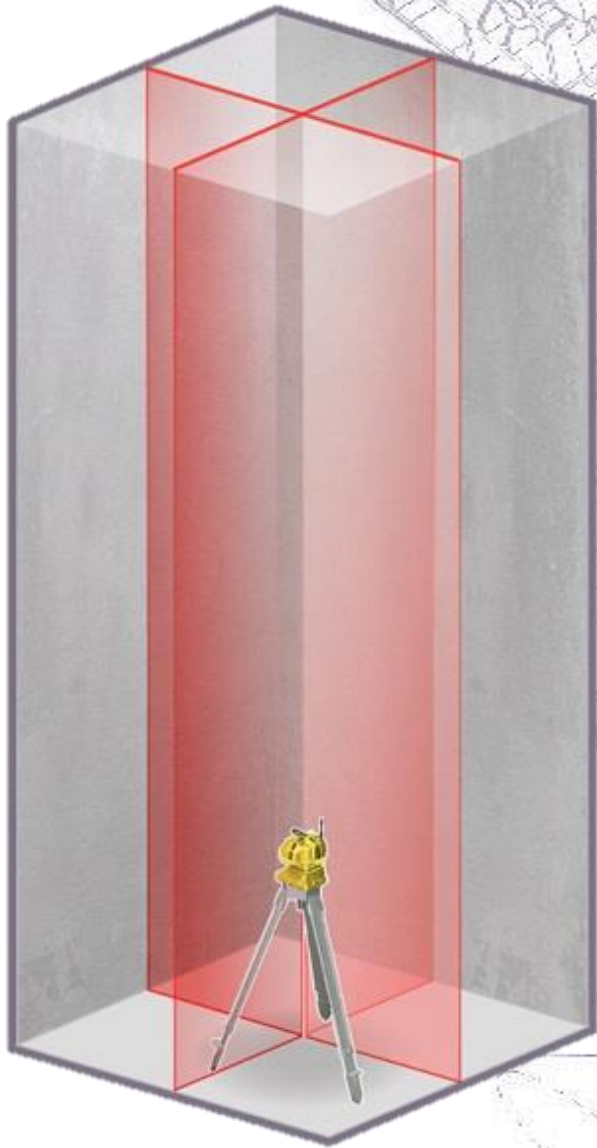
### **PLUMB, SQUARE & RACK CONTROL**

The *QUAD 4000* projects laser straight plumb lines up to 1500 feet on all four wall surfaces at the same time. This allows you to accurately control plumb as well as square and rack all from one set up, and all at one time.

In addition, the *QUAD 4000* sets up in minutes, it's easy to use, it's versatile and it's accurate.

***There Is Nothing Else Like It!***

The *QUAD 4000* will save you time and money on ***ALL*** your shaft alignment projects!



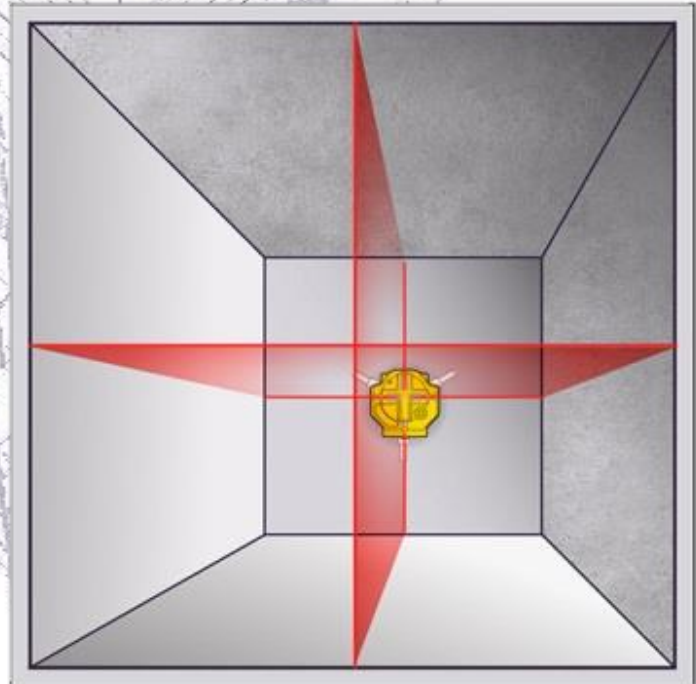
#### **SPECIFICATIONS:**

- ***Vertical Range: 1500' (457m) Depending on conditions and laser detector.***
- ***Plumb Accuracy:  $\pm 3/32''$  per 100' ( $\pm 2.25\text{mm}$  per 30m)***
- ***Square Accuracy:  $\pm 1/16''$  per 100' ( $\pm 1.5\text{mm}$  per 30m)***
- ***Operating Temp: 0° to +120° F (-18° to +50° C)***
- ***Warranty: 2 Years***

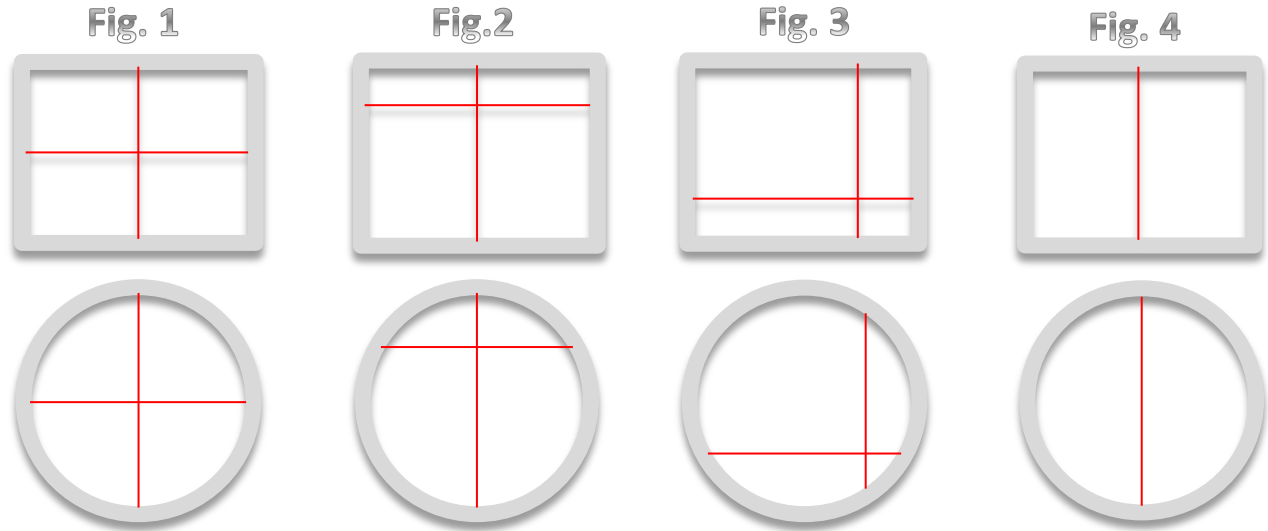
**For full list of specifications see QUAD 4000 "Brochure"**

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# Vertical Shaft Alignment Set Up Procedure



Establish control points at the bottom of the shaft based on where you need vertical control on the shaft wall or walls as illustrated above.

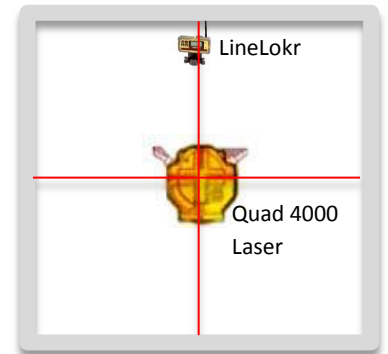
The Quad 4000 will be placed at and directly over the center of the intersecting points as illustrated in Fig. 1, 2, & 3.

If you are only using one plumb line reference as depicted in Fig. 4, then set a point to set the Quad 4000 over at the mid-point of your line.

Set the LineLokr over far point against the wall surface along your baseline using a batter board, trivet or tripod. Follow directions in the owner's manual for set up getting directly over your point.

Set the Quad 4000 up over your intersection point using a trivet mount or tripod. Follow directions in the owner's manual for set up getting directly over your point.

Make sure that the Quad 4000 is directly over the point, and that the forward shooting laser plane is on the LineLokr photo cell. This will allow the laser to lock on to the center and stay locked until turned off.



The purpose of the LineLokr is to hold your line or line and square so that the laser reference will not drift off of line while the Quad 4000 is in use.

Read the laser plumb location on the wall surface using a laser detector to establish your points.

## **Accuracy**

The vertical laser plumb accuracy is  $\pm 3/32$  per 100 vertical feet ( $\pm 2.25\text{mm}$  per 30m)

This means that the total deviation on a 500 foot shaft would be  $15/32$  or  $.468''$  at the top, and zero at the bottom.

➤ **Note:** If the standard accuracy 3/32 per 100 feet is **NOT** tight enough, then follow the procedure below for obtaining maximum plumb accuracy.

### Maximum Accuracy Procedure

➊ Set the Quad 4000 and the LineLokr as described above. Using the laser receiver find the center of the laser beams along the wall surface and mark or scribe those locations up or down the wall surface at intervals i.e. Every 10, 20, or 50 feet – whatever the job dictates. Do this along the entire surface, top to bottom or bottom to top.

➋ Move the LineLokr on line as close to the wall as possible behind the Quad 4000

➌ Rotate the Quad 4000 180° and lock the LineLokr being careful to be directly over your intersecting point.

(Performing this set up will throw whatever vertical error exist to the opposite side in an equal amount)

➍ Now repeat your marking process on the wall surfaces up and down the shaft walls at the same locations as your first marks i.e. Every 10, 20, or 50 feet etc.

➎ The midway point between any two reference marks will be your most precise plumb measurement from top to bottom.

