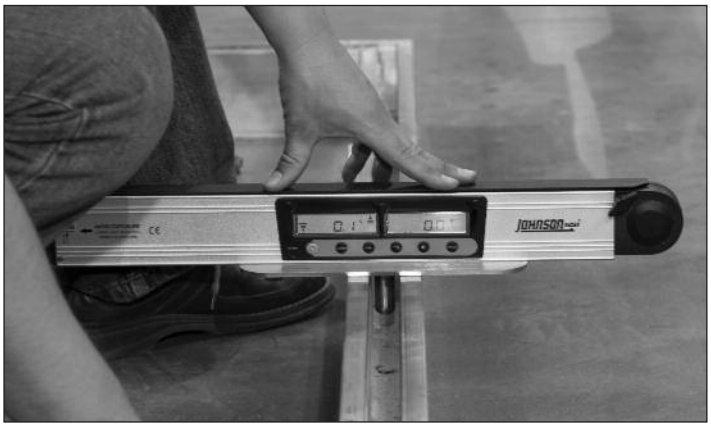
C.R. LAURENCE CO., INC.

PAL1K "PAL" PLUMB/ANGLE/LEVEL LOCATOR KIT

FOR LEVELING CRL's GRS BASE SHOE SYSTEMS

User's Guide See the video at crlaurence.com



RECOMMENDED FOR ALL DRY GLAZE TAPER-LOC™ SYSTEM INSTALLATIONS

Features and Functions:

- **Properly Plumbs CRL's Base Shoe to Concrete or Steel Substrates**
- **Works with All CRL Guardrail and Windscreen Base Shoe Profiles**
- **Vertically Aligns Base Shoe in the Plumb Orientation**
- **Electronic Angle Finder that Also Locates Corner Angles, Plus Stairway and Ramp Angles**
- **Laser Levels Base Shoe in the Horizontal Orientation**
- **Displays Angle and Inclination Simultaneously**
- **1/4"-20 Thread for Connection to CRL Cat. No. LD142 Tripod**

OPERATING INSTRUCTIONS

Preparation

IMPORTANT!!! On all installations the mounted base should be adjusted, if required, to assure it is plumb to plus or minus 1/8" (3 mm) at an extended height of 42" (1067 mm). Spend the time required to plumb the base shoe to this tolerance, as the glass will only be as plumb as the base shoe.

This instruction is intended as a supplement to the GRS Glass Railing System Installation Instructions. Be sure to read both sets of instructions, as each have important and time-saving information. Please read the manufacturer's Instruction Manual supplied with the Digital Device as well.

CRL Cat. No. PAL1K "PAL" Plumb/Angle/Level Locator Kit Includes:

Cat. No. 406065	Digital Plumb/Angle/Level Locator
Cat. No. AMA1	Base Shoe Alignment Mounting Adapter
Cat. No. LT1	Laser Target
Cat. No. ST47099	100' (30.5 m) Professional Chalk Line
Cat. No. P8B	Blue Chalk Refill Bottle
Cat. No. MP1	Black Listo Marking Pencil
Cat. No. 2113338	Sharpie Marking Pen

All in a molded carrying case

Optional accessories available at **crlaurence.com**

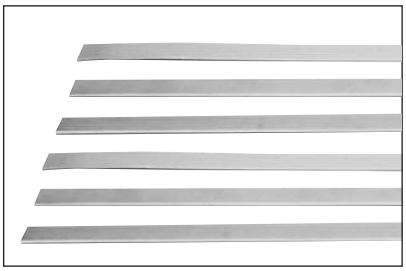
LD142 Aluminum Tripod

LA5 Distance Measuring Laser Meter

Available Shims for Leveling the Base Shoe:

CRL Cat. No. AHS66	1/16” x 3” Aluminum Horseshoe Shims
CRL Cat. No. AHS68	1/8” x 3” Aluminum Horseshoe Shims
CRL Cat. No. AHS64	1/4” x 3” Aluminum Horseshoe Shims
CRL Cat. No. BSS164	1/64” Aluminum Shim Strips
CRL Cat. No. BSS132	1/32” Aluminum Shim Strips
CRL Cat. No. BSS116	1/16” Aluminum Shim Strips

Horseshoe Shims



Shim Strips

Layout and Leveling Procedure

Layout the Guardrail or Windscreen perimeter on the mounting surface with a chalk line. Position the first section of base shoe, starting at the beginning of a run or at a corner, and align with the chalk line mark. If the installation requires that the base shoe be level (as opposed to following the slope of the surface) the first section to be installed should be located at the highest elevation. Start by installing all mounting fasteners hand tight, and then loosen the fasteners for insertion of leveling shims.

Level Base Shoe Installations
When the base shoe is to be level, as opposed to following the slope of the surface, it is easier to level the shoe along its length before correcting the vertical plumb orientation.

Sloped Base Shoe Installations
When the base shoe is following a sloping grade the laser level can still be useful for preventing any abrupt elevation changes, and it is easier to level the shoe along it’s length before correcting the vertical plumb orientation.

Align the “PAL” Tool with base shoe and point toward the Laser Target set at other end of base shoe

Laser light pinpoints on LT1 Laser Target

Insert shims when mounting surface conditions create occasional gaps under the base shoe. CRL Aluminum Horseshoe Shims up to 1/4" (6.3 mm) thick can be used. Good surface conditions will permit the use of CRL Aluminum Base Shoe Shim Strips. The shim strips are available in thicknesses of 1/64” to 1/16” (.4 to 1.6 mm), and allow for fine adjustment of vertical plumb. After leveling both ends of a base shoe section, place shims at ALL BOLT LOCATIONS where gaps between the base shoe and mounting surface appear. Both sides of the base shoe must be in contact with the mounting surface or shims before tightening bolts, or the base shoe will twist out of vertical plumb alignment. Shims strips should be oriented along the length of the base shoe and must be close to the outer edge. The bottom surface of CRL base shoe is concave to prevent “high centering”, so the outer bottom edges must be in contact with the shims.

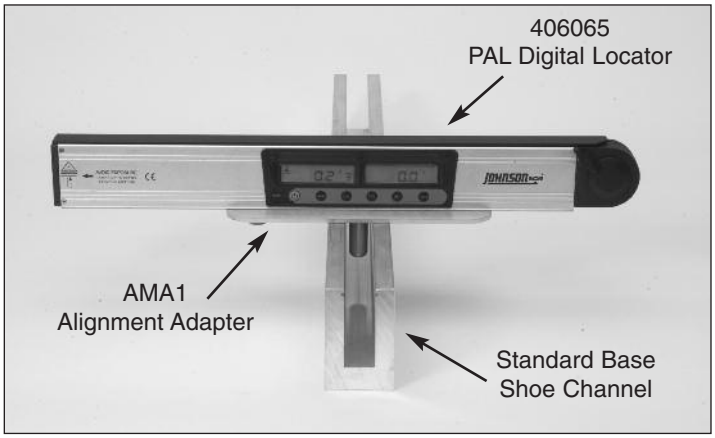
Slide Shim Strips under Base Shoe to fill gaps

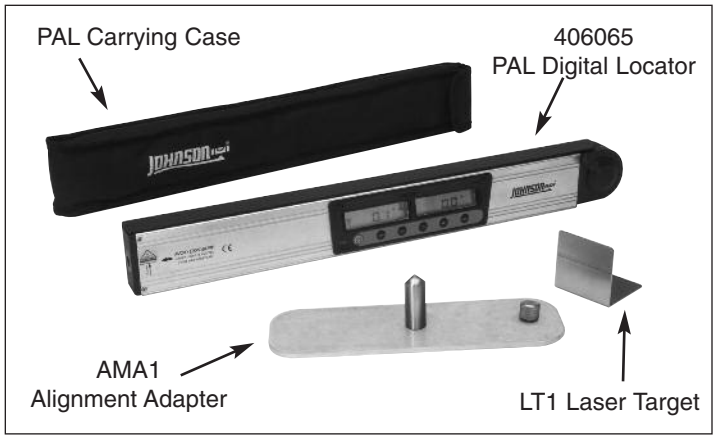
Use the “PAL” Tool to assure the Base Shoe is level at all points

Using the GRS PAL Digital Locator
Assemble the Adapter Base onto the digital device by aligning the thread in the adapter base with the thread on the bottom of the digital device. Hand-tighten the thumbscrew, being careful that the digital device is seated flat against the base adapter. The large pin protruding from the adapter base must be positioned at the center of the PAL Digital Locator, so please pay attention to the adapter base orientation that best centers the pin. Push the power button and the PAL is ready for use. Please perform the Self-Check and Calibration Procedure as described at the end of this document.

Before placing the PAL on top of the base shoe, wipe the base shoe's top surface clean. The accuracy of the level depends on a smooth, clean surface and a balanced PAL with both top surfaces of the base shoe in contact with the PAL.

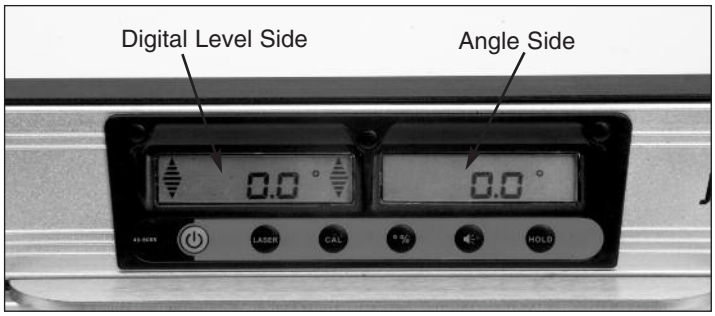
Insert the PAL base adapter pin into the base shoe's pocket with the length of the PAL in line with the length of the base shoe for horizontal leveling, or perpendicular to the base shoe for vertical plumb adjustment. Start with the horizontal leveling orientation and perform the end-to-end shimming procedure. The display will indicate with two arrows the direction that the PAL needs to rotate for obtaining plumb or level. The PAL has two displays. The left hand display is for leveling, and the right hand display is for indicating angles with the protractor arm.





Correcting Out of Plumb
The mounted base should be adjusted, if required, to assure that it is plumb to plus or minus 1/8" (3.2 mm) at an extended height of 42" (1067 mm). To accomplish this the angle indication display must read from one end of the base shoe to the other within 0.4 degrees. Angular variation up to 0.4 of a degree is acceptable if the variation from one base shoe to the next is leaning to the same side of vertically plumb. With the PAL oriented perpendicular to the base shoe, take a reading at three or four locations along the base shoe's length, inserting shims as you go along.

Shim Thickness Selection
0.4 of a degree equals 5/16" (8 mm) out of position at 42" (1067 mm) above the mounting surface. When installing CRL 4" (102 mm) tall base shoe, insertion of a 1/64" (.4 mm) thick shim strip will move the 0.4 reading back to zero. Tighten the mounting bolts to the correct torque, and then double check the vertically plumb orientation.



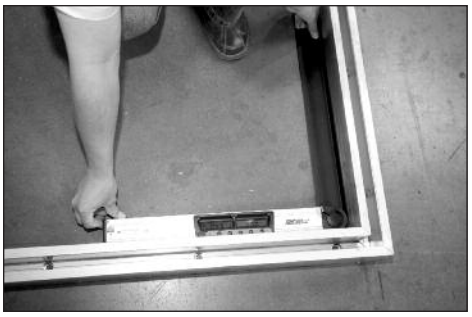
Display for Digital Level and Angle Locator

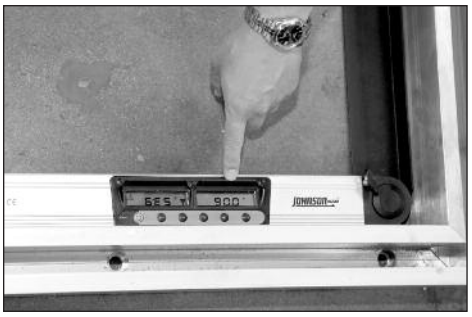
Horizontal Leveling
Starting with the first base shoe segment that is located at the highest elevation, perform the end-to-end leveling operation, and then adjust the vertical plumb orientation. Now place the PAL in line with the base shoe's length. Push the LASER button to turn on the laser. AVOID EXPOSURE TO THE LASER LIGHT. Install the next base shoe aligning the top surfaces with the adjacent base shoe, and at the opposite end place the laser target on top of the base shoe with it's targeting line facing the laser source. Shim the base shoe until the laser light is centered on the targeting line. Leave the laser on the first base shoe to perform this function for all base shoes up to a 100 foot (30 m) long run. The PAL can be moved to a previously leveled base shoe nearer to the new work area if the run exceeds 100 feet (30 m). Each new run direction should repeat this process. It is undesirable to turn the laser perpendicular to the base shoe for leveling of an adjacent run of base shoe. NOTE: THE LASER DOES NOT LEVEL ITSELF, so occasionally check the level angle display as you work.

Following a Grade
The PAL's Laser is not self-leveling, and because of this it is appropriate for use on sloping grades, stairs, and ramps. Adjust the base shoe's vertically plumb orientation. Now place the PAL in line with the base shoe's length. Push the LASER button to turn on the laser. AVOID EXPOSURE TO THE LASER LIGHT. Install the next base shoe aligning the top surfaces with the adjacent base shoe, and at the opposite end place the laser target on top of the base shoe with it's targeting line facing the laser source. Shim the base shoe until the laser light is centered on the targeting line. Leave the laser on the first base shoe to perform this function for all base shoes up to a 100 foot (30 m) long run. The PAL can be moved to a previously leveled base shoe nearer to the new work area if the run exceeds 100 feet (30 m). Each new run direction should repeat this process. It is undesirable to turn the laser perpendicular to the base shoe for leveling of an adjacent run of base shoe. Sometimes grades will intentionally ungulate, so it may be necessary to move the laser's location to compensate. The laser's purpose in this application is to avoid abrupt elevation changes that look unsightly.

Using the Angle Locator
The Angle Locator (Protractor Arm) is very useful for making field layout drawings and setting base shoe corner angles. Simply loosen the locking screw and unfold the angle locator arm. Match the angle of subject surfaces and read the angle indication from the right hand display. Depressing the HOLD button is useful for retaining the angle information when working blind.


Unfold locator arm


Match angle of subject surface


Read angle indicator

PAL Digital Locator Self-Check and Calibration

Please read the Manufacturer's Instruction Manual supplied with the Digital Device

Important: It is the responsibility of the user to verify the calibration of the instrument before each use

To guarantee the best measuring precision of the incline, vertical, and leveling plane:
- Calibrate before first use
- Calibrate before important measurements
- Calibrate if the device has been dropped or struck

Horizontal Calibration:
Put the angle level on a smooth level plane and observe the LCD display. Note the reading after ten seconds. Then turn the angle level 180° on the same plane. After another ten seconds note the second angle reading. Calibration is necessary if the difference between the two measuring readings is over 0.1°

Vertical Calibration:
Put the angle level on a smooth vertical plane and observe the LCD display. Note the reading after ten seconds. Then turn the angle level 180° on the same plane. After another ten seconds note the second angle reading. Calibration is necessary if the difference between the two measuring readings is over 0.1°

Ordering Information:

CRL Cat. No. PAL1K	Complete PAL Kit with 406065 Digital Laser Device
CRL Cat. No. PAL0K	PAL Kit without 406065 Digital Laser Device
CRL Cat. No. 406065	Digital Laser Device Only
CRL Cat. No. AMA1	Base Shoe Alignment Mounting Adapter
CRL Cat. No. LT1	Laser Target
CRL Cat. No. ST47099	100' (30.5 m) Professional Chalk Line
CRL Cat. No. P8B	Blue Chalk Refill
CRL Cat. No. MP1	Black Listo Marking Pencil
CRL Cat. No. 2113338	Sharpie Marking Pen
CRL Cat. No. LD142	Aluminum Tripod
CRL Cat. No. LA5	Distance Measuring Laser Meter