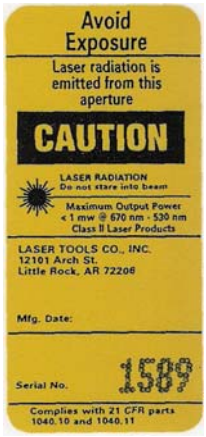
Green Laser Technology™
PowerLine™ Magnetic-Laser "Sheave Alignment System" Instructions

The **PowerLine™ Sheave Alignment System** aligns belts, pulleys, sheaves, sprockets, gear trains, rollers, platforms, conveyors, and other plant equipment. Its purpose is to replace often times inaccurate and time-consuming straightedge and string alignment methods currently in use. Compared to these older methods, the PowerLine™ is easier, faster, and more accurate. With the PowerLine™, you will greatly reduce downtime and belt failures. The new Green Laser Technology™ and ColorGage™ target system increases the brightness of the laser line by 10 fold. This means that the system can be used in direct sunlight and at longer distances.

Component Descriptions

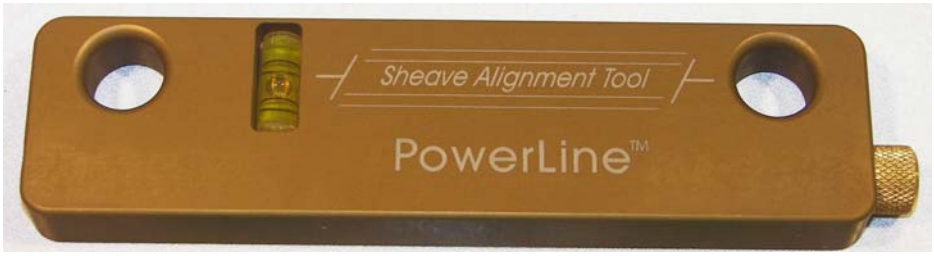
The **PowerLine™ Sheave Alignment System** includes a laser line emitter, three grooved targets, and 2 belt tension testers. All components are especially rugged for long life and are shipped in a sturdy storage case.

Laser Line Emitter:
Its bottom machined surface mounts magnetically to the machined face of sheave, gear, etc. It projects a 1/16" thick laser reference line over a wide angle. The projected reference line is parallel to the machined bottom surface and offset from it by 0.312".



Warning and Certification Label

Bottom Surface is on Back Side



Level Vial **Product Identification Label** **Battery Cap On/Off Switch**

Laser Safety:

Caution- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The Green Laser Technology™ PowerLine™ laser emitter uses a laser system with a maximum output power of less than <1 milliwatt @ 532 nm. The laser classification is a Class II with only minor precautions required. Never stare directly into laser transmitter or aim the laser into someone's eyes. The PowerLine™ complies with 21CFR parts 1040.10 and 1040.11.

ColorGage™ Target

Excellent alignment is achieved when the laser line hits the center of the colored stripes. This reference can be adjusted up or down to compensate for sheaves with different thickness by turning the knurled knob.

The Initial knob setting is to extend the magnet bottom outward from the target bottom by one full turn (1/16") so that center green stripe is elevated 0.312" from the magnet bottom. Adjust the knob up or down from this initial setting to compensate for sheaves with different thicknesses.

Green Reflective Film

ColorGage™ Stripes

Green Center Stripe

.312"

How the ColorGage™ Target Works:

Each target is covered with a green reflective film that bounces most of the laser light back in the direction of the laser transmitter. This means that the laser stripe on the target is brighter when viewed from a position directly adjacent to the laser transmitter. This helps when installing shims under a motor, aligning sheaves at longer distances and viewing the targets in direct sunlight. The colored stripes are 1/16" wide and change color from red to yellow to green and back as the green laser line is moved across the stripes. The fluorescent color change shows the direction and amount of correction required in real time and are more visible in bright light conditions. This makes the adjustment procedure faster.

Three cylindrical and striped targets mount magnetically to the machined face of the companion pulley, sheave, gear, etc. to be aligned. The targets track the position of the machined face relative to the laser reference line emitted by the PowerLine™ laser. Excellent alignment is achieved when the laser line strikes the green center stripe of the cylindrical targets on all three targets simultaneously. Note: As a visual aid, when the laser light strikes the green target center stripe, it produces a brighter reflection then when the laser light strikes the colored stripes on either side of the green center stripe.

Target Adjustment

The offset between the middle of the center stripe and the magnetic bottom of the target is adjustable to compensate for differences in sheave end wall thickness, belt wear, and groove wear. Turn the knurled knob on the top of the target to make adjustments either up or down. As marked on top, one full turn of the knob moves the target center up or down 1/16". The initial knob setting is to extend the magnet bottom outward from the bottom of the target bottom by one full turn (1/16" extended) so that the target center is 0.312" away from the magnetic bottom. (See sketch on previous page.) For example, it is very common to find sheaves of smaller diameter to have thinner rims than sheaves of larger diameter. During setup, measure this difference using a dial caliper or equal means. Prior to mounting the targets, adjust the knobs of all four targets to compensate for the measured difference. When the laser is on the smaller sheave, the offset will be reduced from the initial setting of 0.312 by turning the knurled knob CCW.

PowerLine™ Sheave Alignment Tool Alignment and Tensioning Procedure

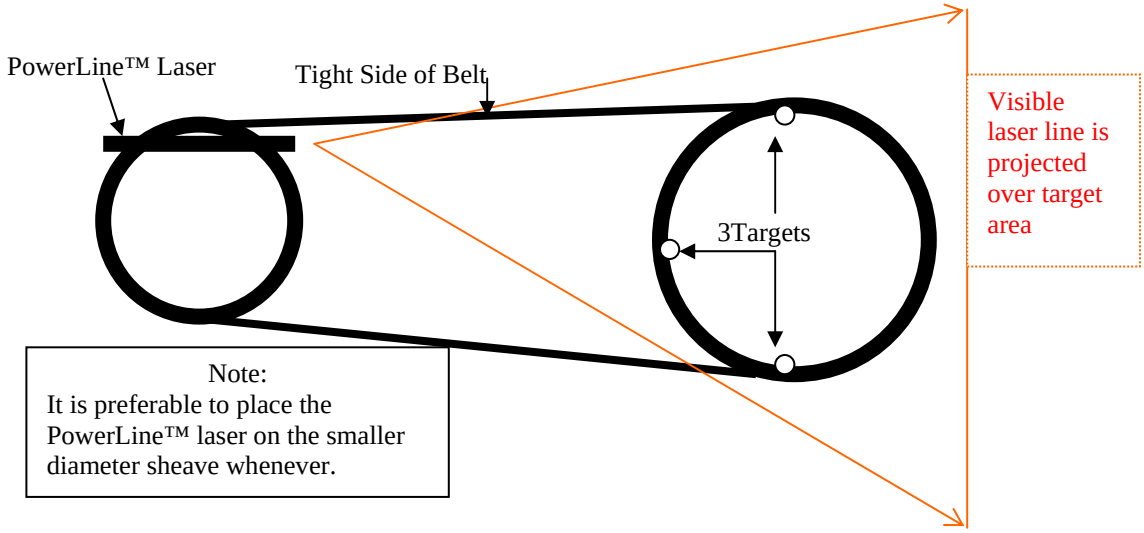
Caution:
Lock out and tag out equipment before you start work.
Follow all applicable plant procedures.

- Inspect machinery bases and foundation for deterioration, looseness, and cracking.
- Check all base bolts for correct torque and eliminate any soft foot conditions.
- Remove belt guards as needed for access.
- Check sheaves and belts for wear. Replace as necessary.
- Check each shaft's runout with a dial indicator. Excessive runout implies shaft or bearing problems.
- Check each sheave's side wobble and runout with a dial indicator. Stay within the sheave manufacturer's guidelines.
- Install V-belts onto the sheaves.

1. Compensate for Sheave End Wall Thickness Difference and Mount Laser and Targets

Using an inside caliper, measure the difference in endwall thickness between the two pulleys being aligned. The measurement can be easily taken using the depth gauge end of the caliper. Place the butt end of the caliper against the machined side face of the sheave and extend out the depth micrometer end of the caliper until it contacts the side of the V-belt. Measure each sheave. If the difference is larger than 1/64", then compensate for it using the targets, as explained in the **Target Adjustment** section above.

Mount the PowerLine™ Laser and targets as figured below. Note that the laser emitter can mount either on the small sheave or the large sheave based on field conditions, however, it is preferable that to mount it on the smaller diameter sheave. Locate the PowerLine™ laser on the sheave rim so it is adjacent to the tight side of the belt. Point the laser line so it projects along the tight side of the belt towards the companion sheave. Mount the four targets on the companion sheave at the 12, 9 and 6 o'clock positions as shown. Make sure each target's magnetic bottom is extended full turn (1/16") from flush when sheaves have equal thickness, or, if you are compensating for sheave end wall thickness differences, make sure your adjustment is done equally on all four targets.



2. Turning the PowerLine™ Laser on and off

Turn on the PowerLine™ laser by rotating the battery compartment end cap clockwise until the battery circuit is energized. To turn off the laser, rotate the end cap counterclockwise and back off one full turn. This will ensure the laser does not energize inadvertently in storage. Spare batteries are included in the case.

3. Align Equipment Using Laser Targets

Align equipment until the projected laser line strikes the green center of the colored stripes on all four targets simultaneously. This indicates excellent alignment. If the targets are not “aligned”, then the procedure for correcting any misalignment is as follows:

The misalignment visible between the 12 o’clock and 6 o’clock targets indicates the amount of “vertical” angular and parallel misalignment. To correct this misalignment, loosen, shim, and tighten base bolts and/or adjust the sheave axial positions on their respective shafts until “vertical" misalignment is corrected. The laser line should now strike the green center of the colored stripes of both the 12 o’clock and 6 o’clock targets.

The misalignment visible between the 9 o’clock and the 12 and 6 o’clock targets indicates the amount of “horizontal” misalignment. To correct, adjust the position of the front and/or back feet of one or both of the machines horizontally to correct for horizontal misalignment until the laser line strikes the green center stripes of the colored targets at the 9 o’clock, 12 o’clock and 6 o’clock targets simultaneously. Remember to test and adjust for proper belt tension while aligning. After adjustment, the laser line should now strike the green center stripe of all three targets, indicating excellent alignment. Note: The 9 o’clock target can be repositioned to the 3 o’clock position to aid in viewing any horizontal misalignment

The user has the option to turn the sheaves every 90 degrees to check alignment. The targets should still show excellent alignment as long as the alignment prerequisites were met, especially shaft runout and sheave wobble.

Restore equipment to normal.

4. Belt Alignment Tolerances

Per Gates Rubber Company, a prominent V-belt manufacturer, good alignment tolerance is as follows: -V-belt drive sheave alignment should be less than ½° or 1/10” per foot of drive center distance after tensioning. -Synchronous, Polyflex® and Micro-V® belts should be within ¼° or 1/16” per foot of driver center distance. Using the PowerLine™ laser and ColorGage™ targets and following the correct alignment procedure will insure that the alignment will always be well within these tolerance values.

Using PowerLine™ Level Vial:

Each PowerLine™ laser emitter has a 40 arc minute vial mounted to the top of the unit. Use it to check the levelness of pulleys, sheaves, sprockets, conveyors, etc. as needed. The vial is preset level in the factory so it runs true with the edges and bottom magnetic surface of the housing.

Maintenance:

The PowerLine™ is weather-resistant, rugged, and durable. The front optic window is coated with a high performance film. Clean lens with a lint free cloth or swab using a premium glass cleaner solution. Clean housing and targets with damp cloth only. Magnets are nickel coated to prevent rusting.

Calibration:

The PowerLine™ laser is factory calibrated so that the laser line is emitted exactly 0.312” above the bottom magnetic surface. No field calibration is required.

Battery Replacement:

To replace discharged batteries, unscrew and remove the 2 Duracell size “AAA” alkaline batteries and install new ones. The negative ends go in first. Batteries are included in the case at initial shipment.

Technical Specifications: Model GL80 Sheave Alignment System

Laser Power	Class II <1 mw @532nm
Sheave Alignment Tool:	1 ¾" x 6 ¾" x 5/8"
Weight of Laser Tool:	14 oz.
Vial:	40 Arc min.
Beam Spread:	60 inches @ 36 inches
Line Width:	1/16" @ 30 inches
Housing / Target:	High Grade Hard Anodized Aluminum
ColorGage™ Targets:	Qty. 3- adjustable over 5/8", Fluorescent
Target Dimensions:	1 ¼" diameter x 1 1/8" length
Magnets:	Nickel Plated, Rare Earth
Power:	Qty. 2- Size "AAA" Batteries (5 hrs.)
Accuracy:	+/- 1/16"@10 feet
Sheave Size Range:	All
Operating Distance:	50 feet
Case Dimensions:	10-5/8 x 7x 3 inches
IP Rated:	67

Warranty: One year

For Product Service or Application Assistance please contact:

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