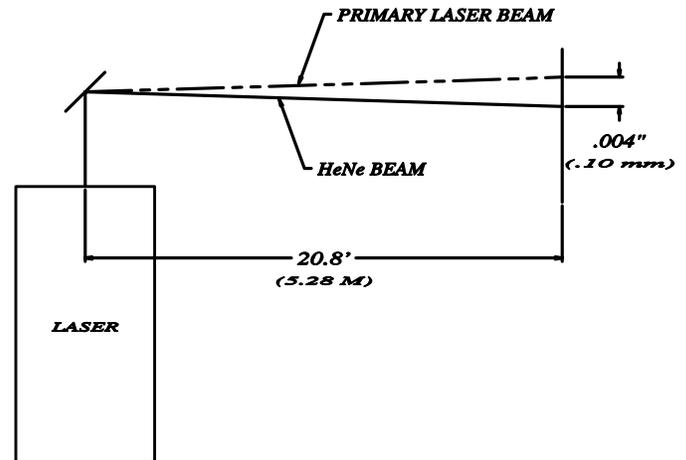


ARM INSTALLATION PROCEDURE

Introduction

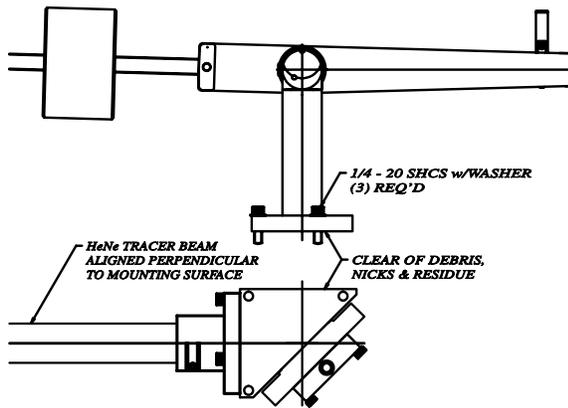
Before an arm can be installed successfully the *PRIMARY LASER BEAM* and the *VISIBLE HeNe TRACER BEAM* must be aligned coincident to within 0.1 mm and angularly to within 0.01 milliradians from one another. This angular requirement is 0.004 inch at 20.8 feet.



By following the procedure below you will achieve this accuracy.

Installation

- 1.0 Prior to mounting the arm take the 3.2" diameter plate (PLATB0076) and bolt it to the laser.
- 2.0 Thread the small threaded cross hair target (PLMAT0008) into the plate in 1.0 above.
- 3.0 **CENTREING**; this cross hair (PLMAT0008) allows you to now fire the Primary Laser and the HeNe. Use the burn paper supplied (PLBRN0001) for laser burns. It is important to ensure both the Primary Laser and the HeNe are centered. If the beams are not centered on the cross hairs you **MUST** move the beams and superimpose them on the cross hairs (PLMAT0008). This can be achieved by steering the beam in the laser deck, or in some cases mechanically moving the plate. Either method will suffice until you have it centered unless you have a situation where there is no further travel available. In this case move to 4.0. (If after performing further actions you cannot superimpose the beams on the cross hairs (PLMAT0008) you would be required to perform full deck realignment.)
- 4.0 **ANGLE**; once you have both beams **CENTERED** in 3.0 above remove the small treaded cross hair (PLMAT0008). In its place thread the 10" tube (PLPET0130). Now take the small threaded cross hair (PLMAT0008) and replace it in the end of the 10" tube. This cross hair allows you to now fire the Primary Laser and the HeNe. Use the burn paper (PLBRN0001) supplied for laser burns. It is important to ensure both the Primary Laser and the HeNe are centered. If the beams are not centered on the cross hairs (PLMAT0008) you **MUST** move the beams and superimpose them on the cross hairs. This can **ONLY** be achieved by steering the beam in the laser deck. The mount closest to the output is always **ANGLE** the one after that is always **CENTERING**. Adjust **ANGLE** only in this instance.
- 5.0 **REPEAT**; you now must repeat 3.0 and 4.0 several times until no adjustments are required. **CENTERING** and **ANGLE** are associated to each other, if you move one aspect the other will change as well.
- 6.0 **INITIAL LAUNCH**; upon completion of 5.0 you have achieved **INITIAL LAUNCH**.



7.0..... The arm is now attached to the mounting surface with the three 1/4 - 20 mounting screws. The base of the arm must be free of all debris, nicks and other residues, such as tape glue. Use the honing stone (PLARK0001) to ensure both surfaces have no high spots.

The mounting surface must be similarly clean and be of a thickness at least comparable to the arm base. It should be anodized aluminum or stainless steel so it is harder than the bare aluminum base of the arm to prevent galling of the Metals.

8.0 In some cases the arm must now be centered on the HeNe beam as close to the vertical axis of rotation of the post as possible. In most cases this is achieved by removing mirror #1 and inserting the O-Ring target (PLBBT0008/0019) substituted for the first mirror, place a piece of tape over the target to let you view the beam, or project it onto a white target on the ceiling. Select a starting position, view the HeNe coming through the target (PLBBT0008/0019). Mark a reference position of the beam viewed. Now rotate the arm 180 degrees and view the variation from the starting point. If there is variation you must mechanically move the arm to reduce the variation until there is no variation detected. Move the arm half of the variation viewed and then repeat from the beginning of 8.0. Once completed you should see no variation as you walk around the laser on the cross hair of (PLBBT0008/0019).

Remove the target (PLBBT0008/0019) and replace the first mirror. Be careful to replace the mirror so that it is seated on the three support posts. The mirror cap is not axially symmetrical and can only be attached properly one way. If the mirror is reversed 180 degrees an error will occur with the beam coming through the arm.

The remainder of the arm styles such as Coherent, Illumina, or arms that use dowel pins etc. cannot be centered and we move onto 9.0.

9.0..... COINCIDENCE CHECK: Tape the last 3 knuckles so that the Primary Laser and the HeNe are directed at the ceiling. Attach the thread adapter (PLADB0004) to the small threaded cross hair (PLMAT0008), also attach the M23 adapter (PLADB0143) if the arm hand piece has a M23 x 1.5 thread, then mount to the end of the arm. First fire the Primary Laser and ensure it is coincident to the HeNe, IF NOT adjust the Primary Laser and the HeNe in this position through the arm. If adjustments were made here, return to 1.0 and repeat.

10.0 ARM ANGLE; with the target (PLADB0004 & PLMAT0008 [and PLADB00143 if M23 hand piece]) still in the end of the arm, place a piece of tape over the target to let you view the beam. Select a starting position, view the HeNe coming through the target (PLADB0004 & PLMAT0008 [and PLADB00143 if M23 hand piece]). Mark a reference position of the beam viewed. Now rotate the arm 180 degrees and view the variation from the starting point. If variation exists, you must adjust the input angle in the laser to reduce the variation. Move the beam half of the variation viewed and repeat until you see no variation as you walk around the laser on the cross hair. If adjustments were made, return to 8.0.

11.0 Untape the final three knuckles. Using the thread adapter (PLADB0004 [and PLADB00143 if M23 hand piece]) screw the 10" tube (PLPET0130) into the end of the arm. Mount the small threaded cross hair (PLMAT0008) in the end of the tube (PLPET0130) and test for runout by exercising the knuckles through all of their positions. The centering deviation should never be greater than 1.0 mm. Remove the tube (PLPET0130) and replace the small threaded cross hair (PLMAT0008 [and PLADB00143 if M23 hand piece]) in the end of the arm. Exercise the knuckles through all of their positions deviation should never be greater than 0.1 to 0.3 mm.

Notes:

- Some arms are shipped without mirrors. To properly install your own mirrors attach the double sided adhesive foam pads (PLMRP0001) provided to the center of the inside pocket of the mirror caps. Remove the paper from the second side to expose the adhesive. Install the proper diameter wave spring and drop the mirror into the cap against the pad. Slight pressure against the mirror with a tissue will prevent it from falling out when it is installed onto the knuckle.
- To remove a mirror from the cap, place the entire cap in a small dish of acetone or lacquer thinner for a few minutes. This will dissolve the adhesive retaining the mirror and allow it to be easily removed from the cap.
- The arm has been aligned at the factory and changing of the mirrors does NOT require realignment of the arm.
- The mirrors can be cleaned with a high grade safety solvent. Fold a Kleenex brand facial tissue into a pad several layers thick and saturate the outer layer with solvent. Wipe once across the surface of the mirror with a fresh pad of tissue each time. Avoid excessive wiping of the mirrors. However, if additional cleaning is needed be sure to use a new tissue each time. Do not use lens tissues to clean the mirrors since they are too hard and may scratch the surface. Scratches out of the beam path are normal from contact with the reference surfaces and where coatings have been removed to allow the substrate to contact the adjusters.
- It is important that mirrors meet the dimensional specs for the arm. Edge chamfer, removed coating areas and mirror thickness and diameter are all important for replacement mirrors. Contact the factory for specs if you are not sure.