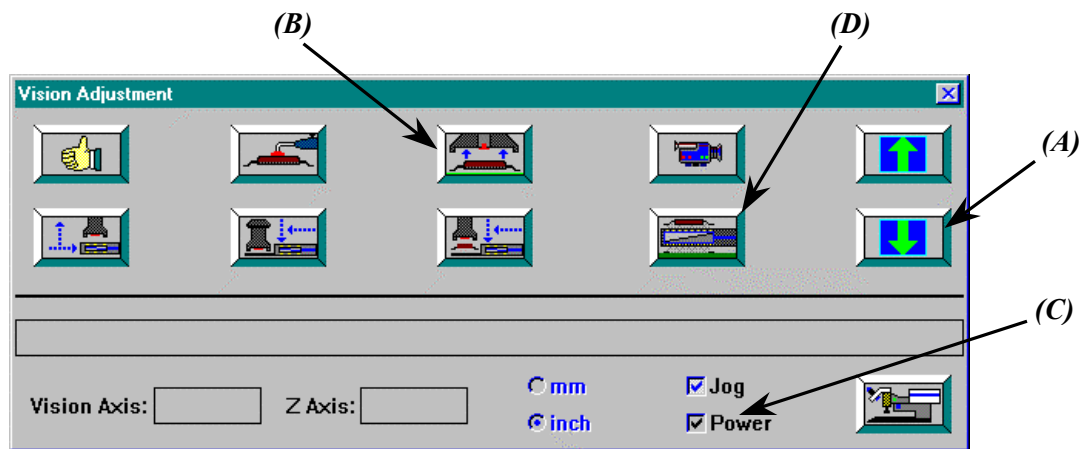


4.7 Vision Alignment Verification and Adjustment

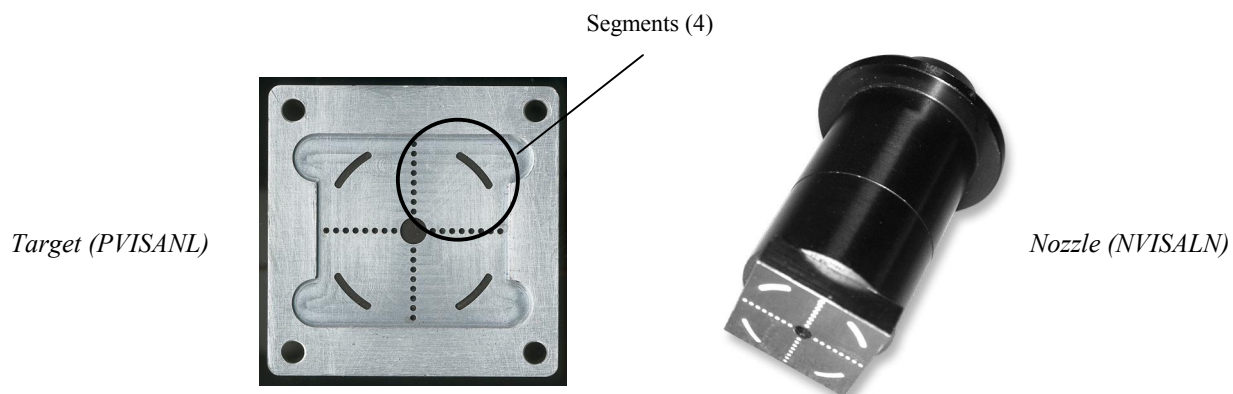
The LTP Beamsplitter Vision System is calibrated at Air-Vac prior to shipment. However, physical movement (such as shipping) and continual use require that the Vision System be periodically verified to insure placement accuracy.

Required tools:

- NPVISALN nozzle and target
 - Glass plate
 - Double stick tape
 - 1.5mm Allen wrench
- Select **Setup** (Main menu) then **Vision System** from the Main menu screen. The Vision Adjustment screen will appear as shown below.



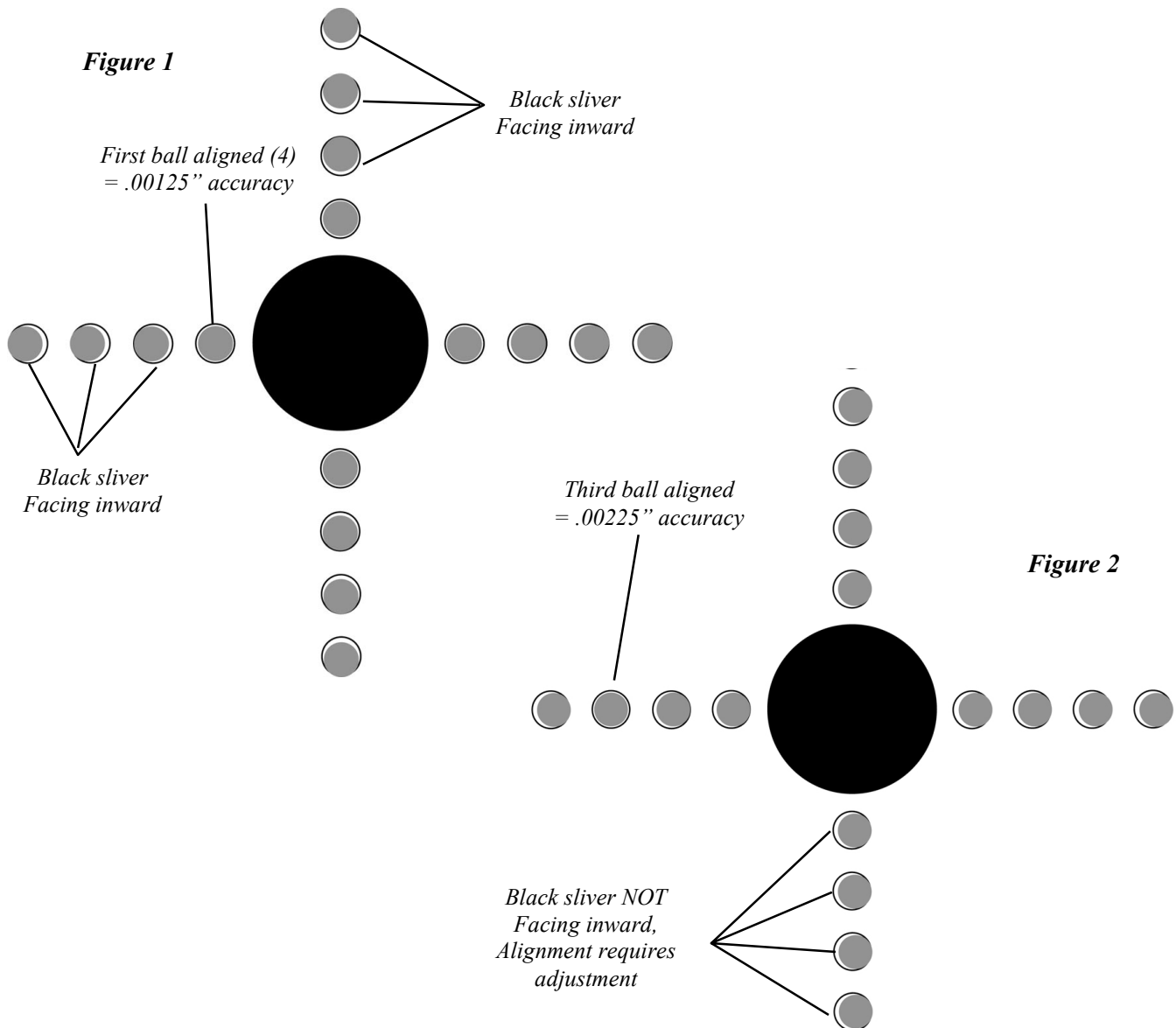
- Load glass plate into carrier and center under head, lock table.
- Use the **Down Arrow Key (A)** to lower the head. Unlock clamping fingers.
- Load nozzle (NPVISALN) into machine. Hold target (PVISANL) under nozzle and activate **Nozzle Vacuum (B)**. Attach double stick tape to bottom of NPVISALN target.



- Select the **Z-Power Check Box (C)** to remove the \surd . This will depower the Z-Axis. Gently lower nozzle/target to glass plate.
- Deactivate vacuum and raise nozzle slightly, making sure there is no movement as the two pieces separate.
- Select the **Vision Alignment icon (D)**. The nozzle will automatically move to the vision position. Be sure the microscope is in the top position. Click on 'led adjustment' on Vision Adjustment tool bar. Set top LED to

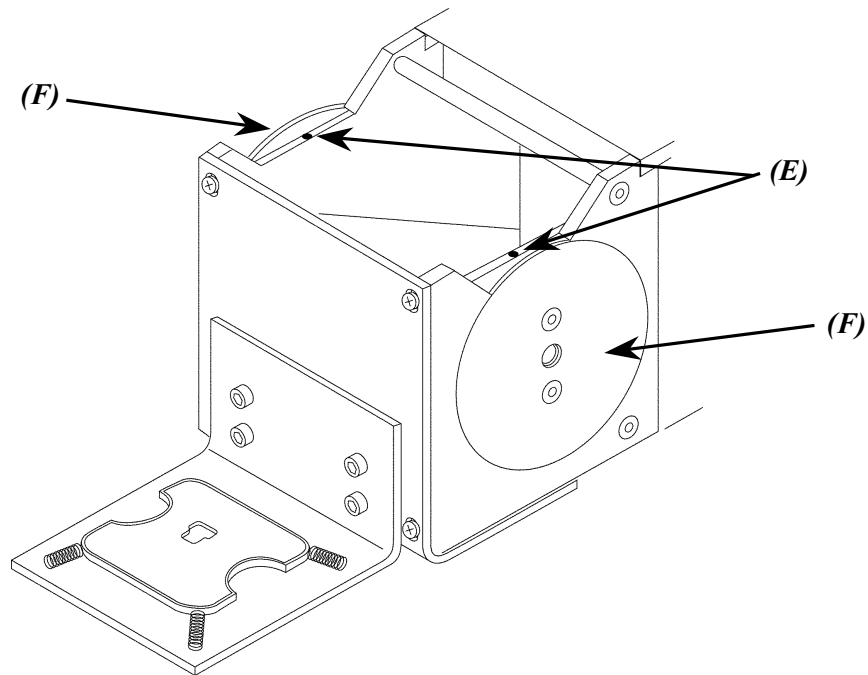
full light (1000). Set bottom to low level (125). **DO NOT MOVE X, Y OR THETA DURING VISION VERIFICATION AS THE TARGET HAS ALREADY BEEN ALIGNED AT BOARD LEVEL.**

- Adjust microscope focus until the image of the target is sharp and clear.
- Uncheck the Z-Power again and raise/lower the nozzle until the green dots on bottom of nozzle are in sharp focus. The images of the nozzle and target should now appear to be in the same “viewing plane”. If not, adjust Z-height until they are.
- Figure 1 is an illustration of proper nozzle to target alignment in the vision system with the nozzle (green dots) properly centered over the target (black circles) (the green dots are slightly smaller than the black nozzle dots). Since the dots are progressively offset from the center, you should see an increasingly large black sliver facing center in all four rows of dots if the alignment is perfect. No vision adjustment is required in this case. (Alignment to the innermost ball set will provide accuracy of .00125” or better. Add .0005” for every ball outward).



- Figure 2 is an illustration of incorrect lead-to-pad alignment as the black sliver in three of the rows does not face center. Vision adjustment is required in this case.

- If the nozzle pattern and target pattern are not aligned in the vision system after alignment at board level, slightly loosen (but do not remove) the two 1.5mm **Set Screws (E)** which hold the two **Vision Adjustment Disks (F)** in place.
- Rotate the disks until best alignment is achieved. Slowly and carefully retighten the set screws while continuing to view the alignment. This will insure that no movement of the cube occurs while tightening the screws.



- If adjustment was required, repeat procedure to verify alignment is now correct.

4.7.1 Precision Optical Alignment Instructions

Purpose: To align DRS24 vision system placement accuracy to 0.001” or better

Items Required:

- Precision Optical Alignment Kit (P/N 0024.92.010)
 - Placement Nozzle (P/N 0024.92.050)
 - Glass Reticle Board with 0.00025” target scaling
 - Glass Reticle Component
 - Holding Fixture
 - 100X Portable Microscope
 - Spray Adhesive
- Isopropanol Alcohol and Wipes
- 1.5mm Allen Wrench
- Profile for Precision Optical Alignment Procedure (1167126.drs under System/System/System)
- Profile for Precision Optical Alignment Procedure-Adjustment Process (1167127.drs under System/System/System)

Conditions:

- Open profile 1167126.drs under (Precision Optical Alignment Profile) located in the hidden menu portion of the DRS24 software under System/System/System.
- Prior to running profile make sure Glass Reticle Board is installed in fixture. Use silicone cement to glue in place. Make sure Glass Reticle Board, Glass Component, and Holding Fixture are completely clean of adhesive. Carrier must be verified to be flat within 0.003in./in. with blade nozzle.

Procedure: Profile for Precision Optical Alignment Procedure (1167126.drs under System/System/System)

- Spray mist of adhesive in air and wave Glass Reticle Board (target) through to lightly coat. You need a lot less adhesive than you think. (Event # 1)
- Install Glass Reticle Board in (front) center of carrier. (Event # 2)
- Open locking clamps, load Placement Nozzle, and close clamps. (Nozzle holding mechanism lowers.) (Event # 3)
- Hold Glass Reticle Component under Placement Nozzle, Make sure “up” is facing up. (Nozzle holding mechanism raises.) (Event # 4)
- (Placement Nozzle vacuum is activated.) (Event # 5)
- Align reticles using vision system, lock table. (Vision system is presented.) (Event # 6) Note: Z height may need slight manual adjustment.
- (Glass Reticle Component is positioned near Glass Reticle Board.) (Event # 7)
- Do Not Touch the Machine or Table! (Glass Reticle Component is placed using force placement system) (Event # 8)
- Unlock Carrier and slide forward, place 100X Portable Microscope carefully over reticle and check placement. Note: You will see crosshairs of component over black and white rings of target. Starting (and including) center bulls eye count each black and white ring to center of crosshair. Each ring (including center bulls eye) is 0.00025”. Add up ring count to find placement error. (Placement Nozzle retracts) (Event # 9)
- (If adjustment is required go to linking icon for next procedure.) (Event # 10)

Adjustment Procedure: Profile for Precision Optical Alignment Procedure-Adjustment Process (1167127.drs under System/System/System)

- Slide Board with component back under nozzle. (Event # 1)
- Move x/y carrier to center Placement Nozzle over Glass Reticle Component. Lock carrier. (Placement Nozzle lowers) (Event # 2)
- Do Not Touch the Machine or Table! (Glass Reticle Component is placed using force placement system) (Event # 3)
- Manually raise Placement Nozzle ¼" to separate Glass Reticle Component from Reticle Board. (Break adhesive bond manually, if necessary—carefully.) (Event # 4)
- Align reticles using vision system, lock table. (Vision system is presented.) (Event # 5)
- Loosen vision system adjustment wheels lock screw. Make correction to vision system optics. Retighten wheels. (Event # 6) Manually adjust z if necessary. Note: Move vision system optics in the opposite direction from the center of the target. Move the same distance the dot is from the center of the target.
- (Glass Reticle Component is positioned near Glass Reticle Board.) (Event # 7)
- Do Not Touch the Machine or Table! (Glass Reticle Component is placed using force placement system) (Event # 8)
- Unlock Carrier and slide forward, place 100X Portable Microscope carefully over reticle and check placement. (Placement Nozzle retracts) (Event # 9)
- (If adjustment is required repeat procedure.) (Event # 10)