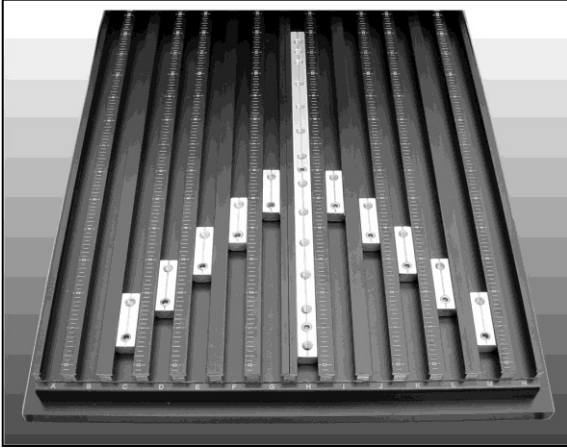


FixLogix CMM Fixture System Instructions

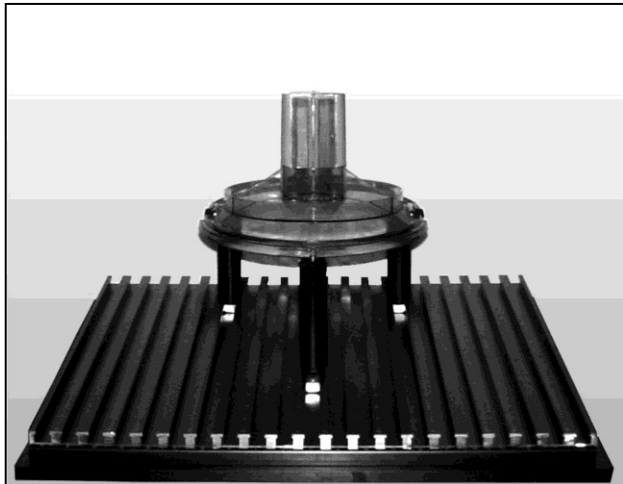


FixLogix uses t-slot technology to provide simple fixture construction. Components are locked onto the plate or linear frames using FixLogix t-nuts. This design offers infinite adjustment for component placement, thereby simplifying fixture builds. The plate and linear frame components are laser engraved with a reference scales. This makes repeat setups easy. FixLogix t-nuts have two threaded holes, allowing the t-nuts to be locked in place with a set-screw so that components can be removed without losing the position of the t-nut. Components with

threaded posts (like standoffs) that are wide enough to bridge across the t-slot may be screwed directly into the t-nuts. This draws the t-nut up and locks the component into position. Smaller components (like clamp rods) should be used with a lock-nut to lock the t-nut.

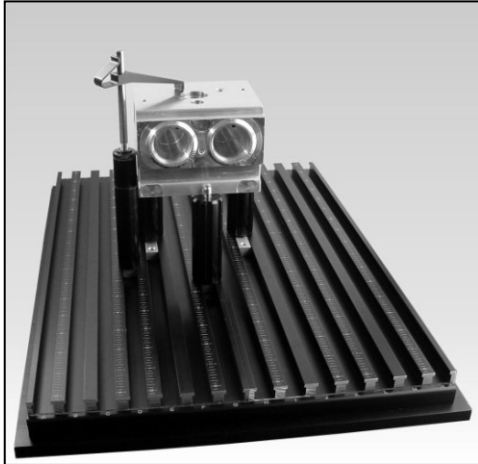
Standoffs for part mounting

Modular fixture systems are best used as staging systems, allowing the CMM to measure part-datum surfaces to establish the datums and alignment. To give the CMM full access to work-piece surfaces, the work-piece is generally fixtured several inches above the plate surface. The standoffs provided in the component kit are used for this function. Standoffs are used with the T-nuts to lock into position on the plate.



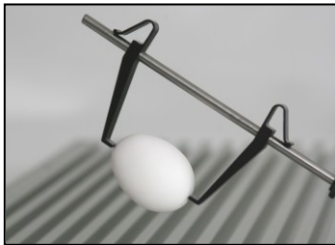


FixLogix standoffs and components are designed to be “**multi-tasking**”. For example, by screwing a spherical top stainless pin into the top of the standoff, it becomes a 2-way locator known as a “**pin standoff**”. The photos above and below show simple “**pinch**” fixtures where the part is held in place by (3) pin standoffs. The single pin standoff pushes the part into the two opposing pin standoffs, creating a very simple and effective staging fixture. Four stainless pins are provided in the component kit.



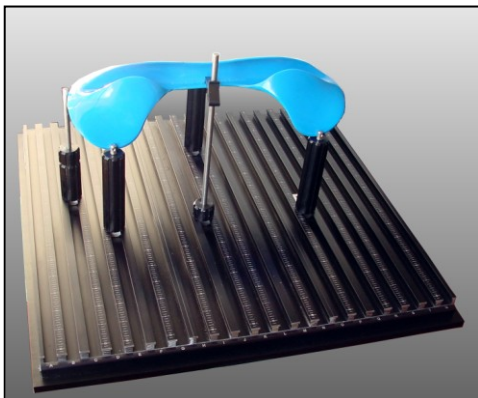
Whenever possible we recommend that 3 standoffs are used to mount the work-piece, preventing the work-piece from “**rocking**” in the setup. In the photo left, standoffs are shown combined with other components to create new tooling, such as pin standoff (2-way locator), or as a combination side locator - clamp assembly. Once again the pinch fixture concept is employed for the fixture in the photo left to create a simple effective fixture. In this case the fixture is a classic six point nest, or 3-2-1 fixture. The 3-2-1 fixture is very common, and applicable to a wide range of parts.

Clamps and clamp rods

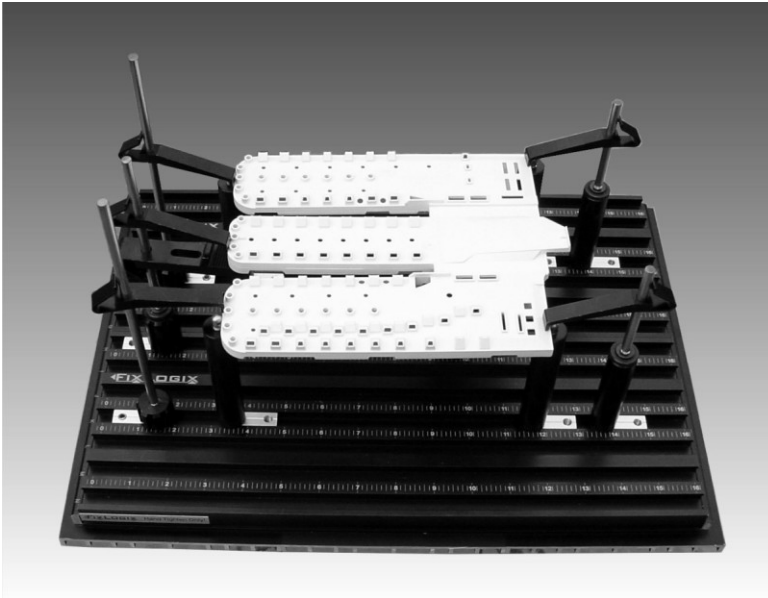


FixLogix clamps are “**self-wedging**” due to the spring on the back that pre-wedges the clamp. This allows for “**near zero**” clamp force on soft or flexible parts when needed. The clamps can also be used as infinitely adjustable basing points.

The clamps slide easily into position when pressed in the center between the rod and the tip. They release easily by lifting at the rear on the flat portion of the spring. For extra firm clamping force, press the clamp into position while applying gentle side pressure to the clamp rod (kind of a “**bow & arrow**” technique, but be careful not to overdo it). When using clamps in a fixture with (3) primary plane locators, be sure to apply the clamp force inside the triangle formed by the (3) plane locators. Otherwise it is possible to lever the part up, and lose contact with one of the locators.



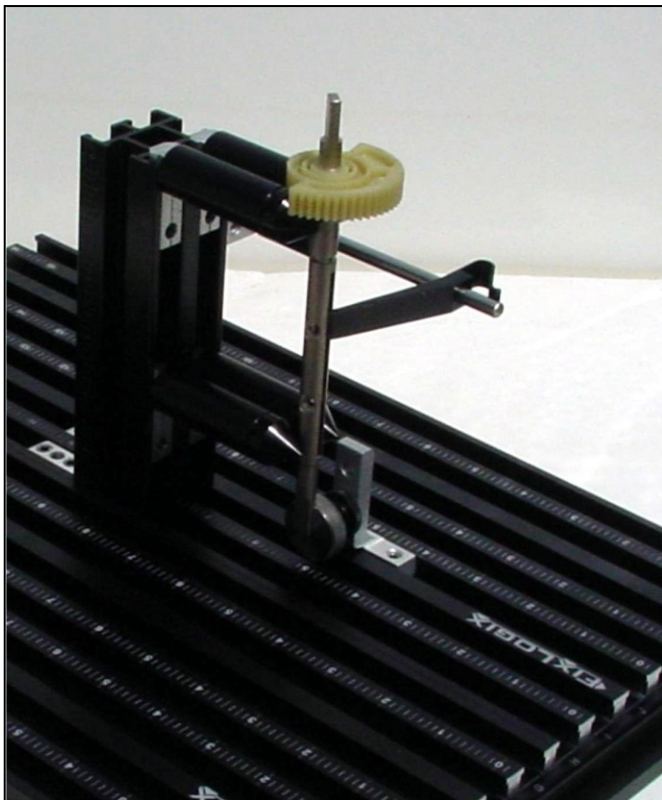
The photo left shows a sculpted part in a simple 3-2-1 nest, with 3 base datum locators and the overhead clamp force applied **inside** the triangle formed by the three base locators. The two pins clock the rotation, and the end-stop provides the final locator. Once again the opposing pin standoff is used to force the part against the front two pin standoffs. Notice how different this part is from the rectangular part shown above, yet the same 3-2-1 concept may be applied.



Sometimes a very flexible part will require multiple basing locators to achieve sufficient rigidity for repeatable measurements. In the case where more than (3) primary locators are used, then the clamps should be positioned over or very near the basing locators to prevent rocking and distortions. Notice in the photo that the clamp rods are used with lock-nuts. This is especially important when mounting the rod directly to the plate, to prevent the steel rod from marring the t-slot.

The lock-nut also improves the rigidity of the rod in the joint.

Risers and Right Angle T-nuts



The FixLogix component kit includes (2) t-slotted risers and right angle t-nuts that allow the risers to be mounted vertically on the fixture plate. The risers feature (6) t-slots, and are laser engraved with reference scales for easy repeat setups. The risers are mounted to the plate with our right angle t-nuts (see below).

Vertical risers allow the part to be presented in a vertical orientation. In some cases this allows better access to the features of interest on the part. The fixture in the above photos show a riser used to create a vertical presentation of the part. Four standoffs with conical components on the ends simulate a Vee, and locate the shaft axis. The shaft has a flat on the side near the bottom, which is used to time the rotation of the part in the fixture.



The right angle t-nuts have (6) tapped holes. This allows the t-nuts to also be used as sliding tooling locators. They can be used to hold standoffs, conical locators, clamp rods, magnetic locators, or even alone as a locator. Spring plungers may be used in the right angle t-nuts to create spring-loaded locators for more production oriented setups. The right angle t-nuts can be locked into the t-slot either with the nylon tipped set-screws, or can be drawn up and locked with a screw/lock-nut combination

Mini Jackstand component



The Mini jackstand detail is a stainless steel platform that is used with a locknut to lock it place once the desired position is set. It may be used on a standoff, or other tooling components with a threaded hole. It may also be used as a clamping device in some setups.

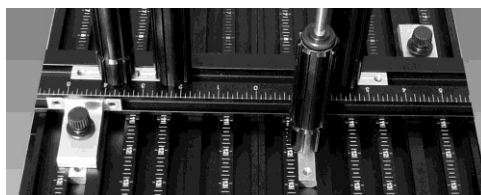
In the vertical fixtures shown above it was used horizontally to clock the rotation of the part. The shaft had a flat that was butted flush against the jackstand face.

Swivel Head



The component kit includes two swivel heads. There is a threaded post on the bottom, and the ball swivel end has a threaded hole. When the swivel is released it rotates in two axis. The bottom swivels 360°, and the ball swivel is about 190°, allowing an infinite number of angles to be set. The swivel may be mounted on the plate, and also the vertical risers. Both locating components and clamp rods may be mounted. We do not recommend attaching long standoff setups, as this will create an unfavorable leverage. This is less of an issue for clamping, but becomes significant in a weight-bearing application. So try to set the swivel as close to the work-piece as possible.

Cross-slide assemblies



The setscrews can be left un-tightened until the slide is in the desired position.

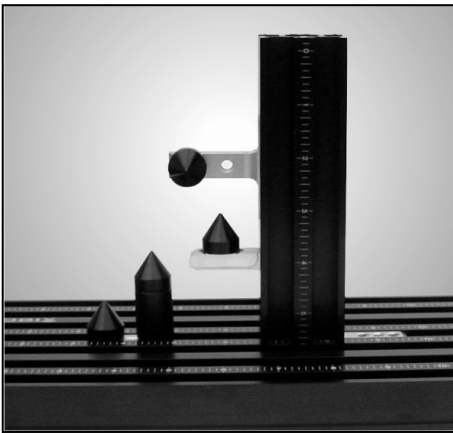
A cross-slide assembly is included in the kit. The cross-slide allows infinite positioning of components between then t-slots. It can also be set at any XY angle, or mounted onto the risers, also on an angle if needed. The lockdown clamps are used with a thumb-screw and locknut, which attach to a t-nut in the t-slot.

Set Screws



Set screws are used to lock the standard and right angle t-nuts into position. The standard t-nuts included two threaded holes. This allows a set screw to be used in addition to a component like a standoff. Then the component may be removed for a different setup, and the t-nut will remain locked in position. This is very useful for quick change-over where a fixture is used frequently for the same few setups. Be careful not to over-tighten the screws. It is possible to mushroom out the tips.

Conical Locators

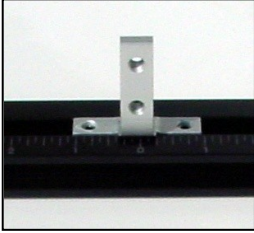


Conical locators are useful for locating in part holes, and for creating simulated Vees. They are available in both 1" diameter and ¾" diameter sizes. The standard kit includes the larger size, while the small CMM kit includes the smaller. The conicals can be mounted in a variety of positions as shown, and may also be used mounted directly to the swivel head.

Mounting the fixture plate to your CMM



FixLogix plates come standard with a clamp ledge all around the perimeter. Optional clamp assemblies are available from FixLogix with a stainless hand knob and clamp strap designed for the plates. Just advise us on the thread size of the tooling holes in your CMM plate.



Sliding t-nut tooling block.

This component provides threaded holes perpendicular to the t-slot. It simplifies fixture construction in many applications.

The FixLogix standard kits are quite comprehensive, and are designed to allow a wide variety of part styles and types to be easily fixtured. That being said, there are optional components available from FixLogix that may further simplify your specific fixture requirements. We don't include these items in the standard kit, as what may be very useful for one company is useless to the next. In order of universal usefulness:

Magnetic locator



The magnetic locator is $\frac{3}{4}$ " diameter x $\frac{1}{2}$ " tall with a flat ground face and nickel-plated case. It has a threaded post that allows it to be attached in many orientations to T-nuts, standoffs, and other locating components.

Magnetic pin-standoff assembly



Magnetic pin-standoff attachments allow for edge location in conjunction with magnetic holding.

Spherical Z pin



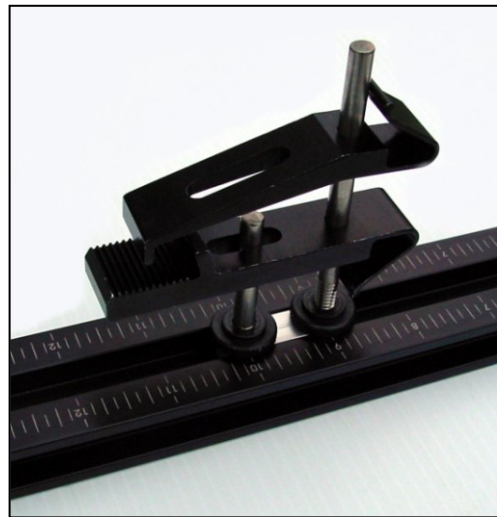
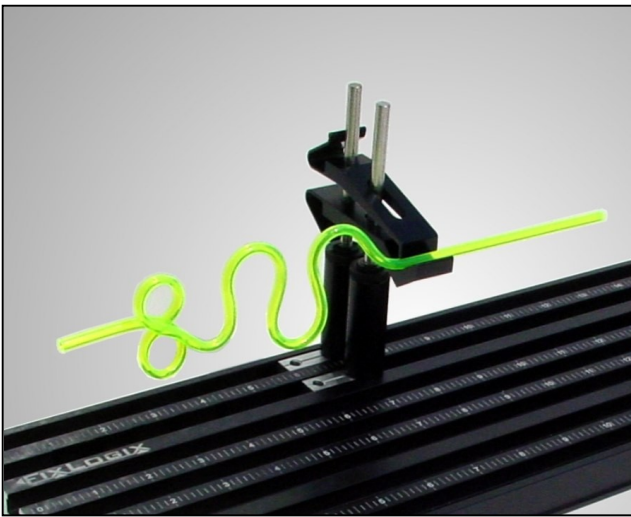
The #CZP-5 is a heavier-duty and longer pin with more travel than the standard pins that come in the kit. They are 2" x $\frac{5}{16}$ ths dia. with 1" x $\frac{1}{4}$ -20 threaded post.

Small Pin Standoffs



Small pin-standoffs are useful for small parts like soft drink bottle closures. Stainless steel, 2" length x .250" diameter large OD.

"Trap Slot Clamp" locators, or "soft locators" for flexible parts



Because FixLogix clamps have a built-in spring detail they are self-wedging. The clamp bodies are much more rigid, yet can be set to apply the gentlest of force to trap the part in location. The standard clamps just have a single drilled hole, and they swivel around the rod freely.

The self-wedging design also allows the clamps to be used as basing point or locators. In this case the free swiveling is not desirable. The trap slot clamps have an extra slot milled into them. A second rod through the slot prevents the clamp from swiveling. The slot does give the freedom to set the clamp at a variety of angles then can be locked in place once the desired angle is set. Shown in the photo above are the box trap-slot clamp, the Vee trap-slot clamp, and the wide version of the standard clamp with a trap-slot. These are especially good for manual CMMs and arms.

Additionally these clamps may be used as "soft locators" to flexible parts. They are used in addition to standard "hard locators" like standoffs to lend additional support to a flexible part without over-constraining the part.