

Valve Body Reaming Fixture & Oversized Pump Base Plate

VB-FIX

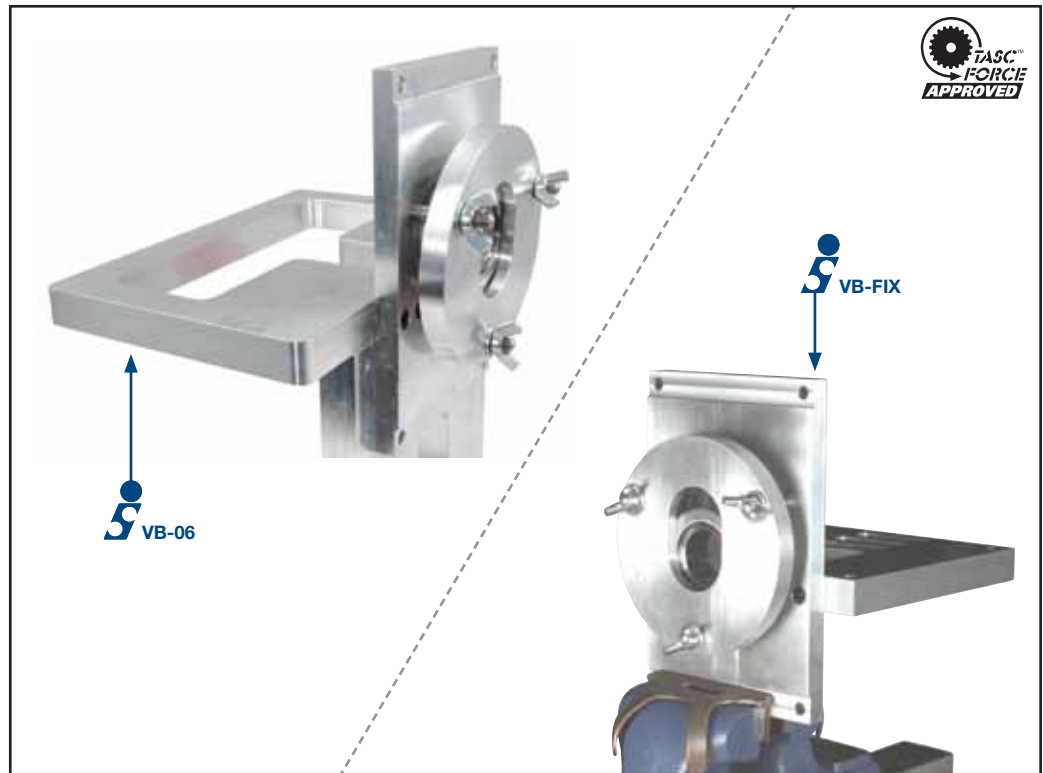
- 1 Base Plate
- 1 Clamp Mounting Plate
- 1 Clamp Plate
- 2 Outer Races
- 1 Inner Race
- 3 Studs
- 3 Washers
- 3 Wing Nuts
- 4 Socket Cap Screws

Patent No. 7,220,085

VB-06

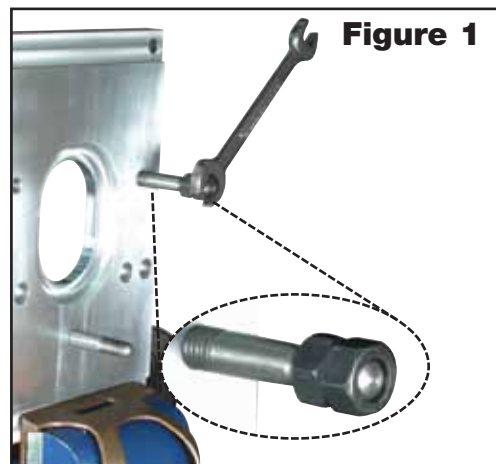
- 1 Oversized Pump Base Plate

Special tool kits have been designed to service a specific bore and were created to be used in conjunction with the Valve Body Reaming Fixture. Part numbers for these specially designed kits begin with an F-, to distinguish them from traditional Sonnax special tools that can be used as stand-alone tools.



Assembly Instruction

1. Remove all parts from shipping container.
2. Install 3 threaded studs into the front plate as shown in Figure 1.
NOTE: Shorter thread must be threaded into the front plate. The shorter thread is an interference fit so it will thread in harder than a normal bolt.
Using a double hex nut on the long threaded portion of the stud helps to thread the stud into the plate. Studs can be locked in place by using Loctite™ 609.
3. Using the 4 socket cap screws, attach the standard base plate or the optional oversized VB-06 base plate as shown in Figure 2. Align the front plate square to the base plate.
4. Coat the 2 outer races as well as the inner race with lightweight grease.



MULTIPLE APPLICATIONS

Valve Body Reaming Fixture

PART NUMBERS VB-FIX, VB-06

5. Install the 2 outer races and the inner race into the pocket in the clamp plate forming a ball and socket as shown in Figure 3.
6. Install the round clamp plate over the 3 threaded studs as shown in Figure 4.

NOTE: Orientation of the pocket must face the pocket in the front plate.

7. Install the 3 flat washers over the threaded studs.
8. Install the 3 wing nuts finger tight.

Basic VB-FIX Procedures

1. Mount the fixture in a vise (see Figure 4). Test fit the guide pin in the bore. Make sure pin slides in and out freely. If pin does not slide smoothly, clean guide pin and valve/pump body bore, lubricate pin with cutting fluid and recheck fit.
2. Put valve/pump body on base of reaming fixture, open circuits facing up when-ever possible (see Figures 5 and 6). Due to valve/pump body variations, it may be necessary to clamp with the circuits down. In this case, position the bore to be reamed over the cutout in the plate in order to provide a source of lubrication and removal of chips. Once the valve/pump body has been secured following steps 1-6, the complete fixture can then be removed from the vise and rotated 180° for better access to the circuits through the cutout in the plate.
3. Install reamer guide into inner race of reaming fixture (see Figure 7).
4. Install guide pin through the reamer guide (see Figure 8).

Figure 3

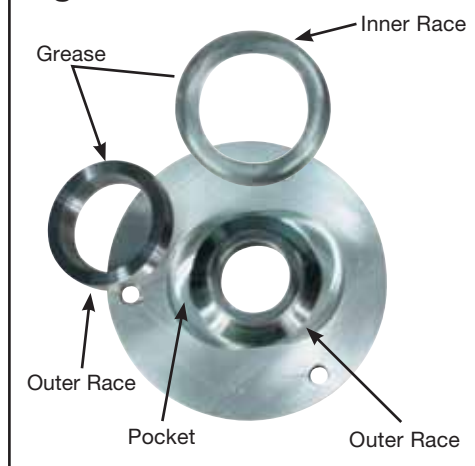


Figure 6

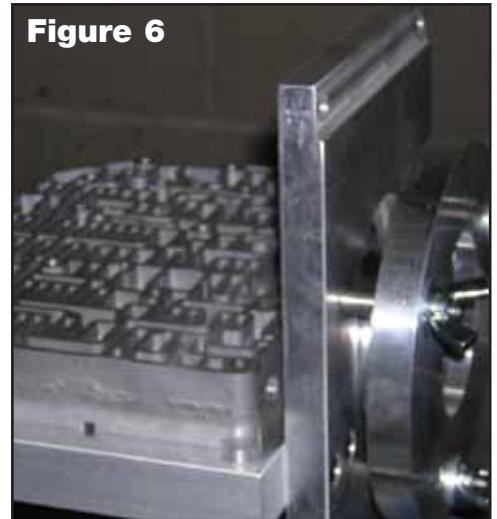


Figure 4



Figure 7

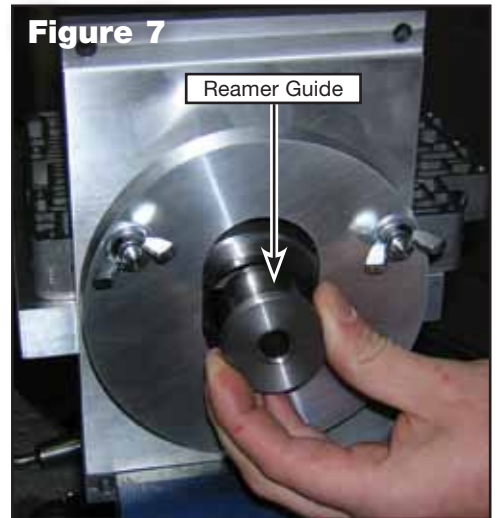


Figure 5

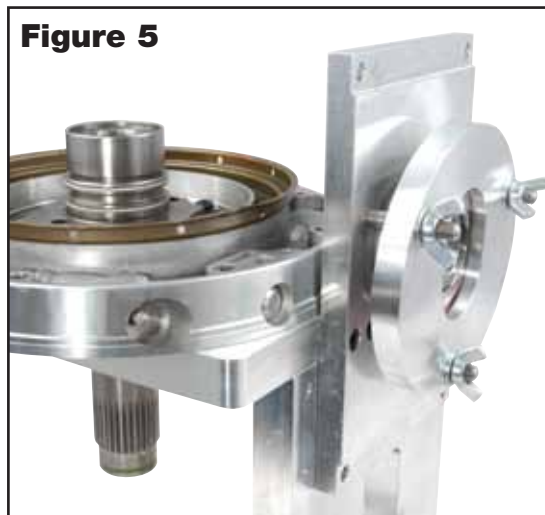
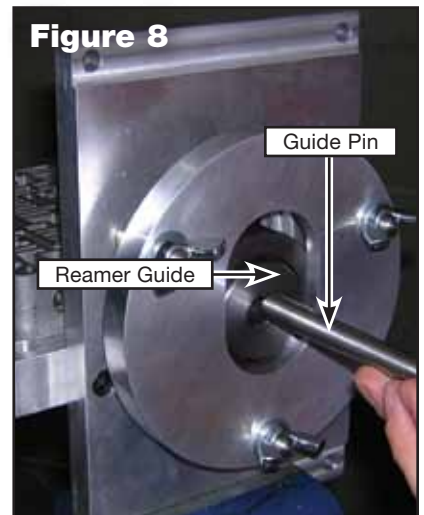


Figure 8



MULTIPLE APPLICATIONS

Valve Body Reaming Fixture

PART NUMBERS VB-FIX, VB-06

5. Align valve/pump body so guide pin fits fully into the valve bore; leave wing nuts on fixture loose (see Figure 9).
6. Using a "C" clamp, clamp valve/pump body securely to fixture base (see Figure 10). It is recommended to use only one clamp, as two clamps may distort valve/pump body. Position valve/pump body close to reamer guide. Do not clamp over the bore being repaired.
7. Check fit of alignment pin. The pin should slide smoothly with no binding.
8. Lightly tighten all three wing nuts continuously, then recheck pin fit while sequentially snugging down the wing nuts by hand. Wiggling the pilot may also be necessary during this process to keep the guide pin moving freely. Do not use pliers or tools to tighten wing nuts. Do not overtighten one wing nut as this will pull the fixture out of alignment.
9. Recheck to see if alignment pin slides smoothly in bore. If pin does not slide freely, loosen wing nuts and readjust.
10. Remove alignment pin and install the reamer (see Figure 11).
11. The guide nub on the large reamer cutting diameter should fit into the first valve/pump body land to be cut (see Figures 12 and 13).
12. Ream valve/pump body using standard procedure.

NOTE: These are general guidelines for using the VB-FIX. Check for specific instructions packaged with each F-Series tool kit.

Figure 9

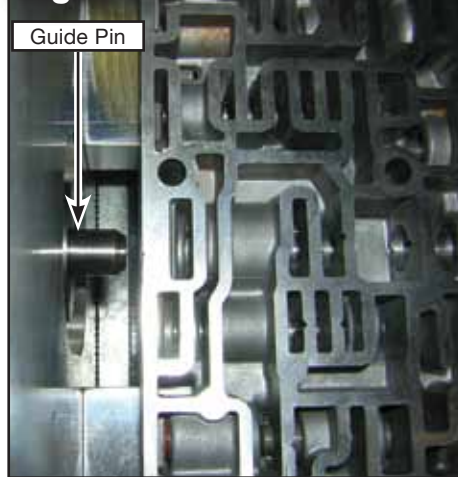


Figure 11

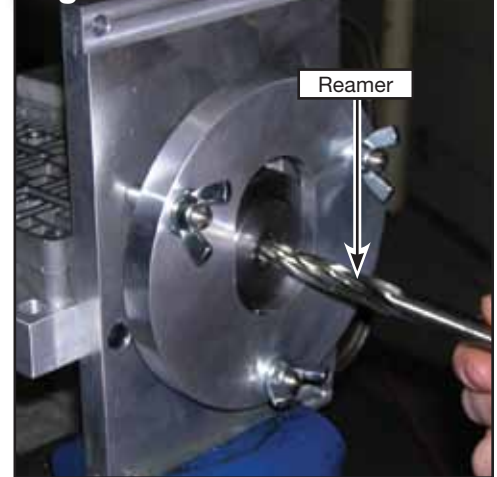


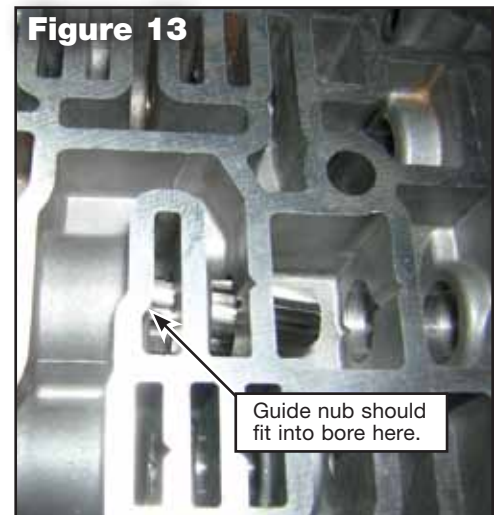
Figure 10



Figure 12



Figure 13

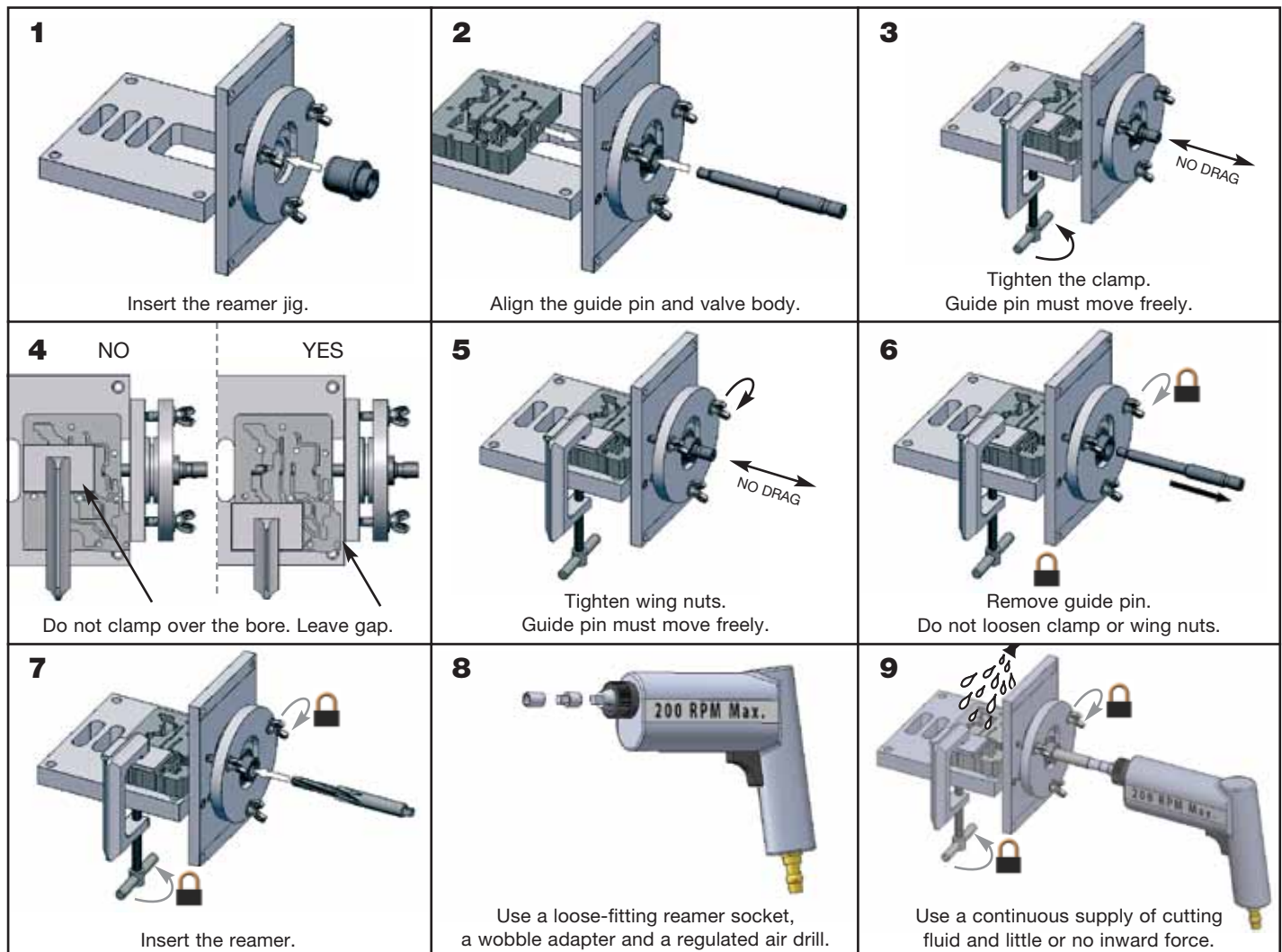


MULTIPLE APPLICATIONS

**Valve Body
Reaming Fixture**

PART NUMBERS VB-FIX, VB-06

VB-FIX Reaming Instructions



Important Notes

- Clean the bore thoroughly in a solvent tank.
- Generously lubricate the bore and reamer with cutting fluid (i.e. Mobilmet S-122, Lubegard Bio-Tap, Tap Magic™, etc.). For best results, provide a continuous flow of water-soluble cutting fluid (i.e. Mobilmet S-122) during the reaming process.
- The reamer should be turned using a low rpm, high torque air drill regulated to a maximum of 200 rpm.
- Examine the bore after cleaning for surface finish, debris, and burrs. Flashing and burrs on the exit side of lands and bores must be carefully removed. A small piece of Scotchbrite™ material attached to a wire and powered with a drill motor is ideal for the task.