**Introduction**

With a Riten Face Driver, the entire work piece is exposed for machining. Since a face driver locates on the end face of the shaft, it is possible to machine the entire length of the work piece in one operation. In comparison, traditional machining requires multiple operations as the part is reversed to turn both ends. Accuracy and productivity suffer as the part is repeatedly chucked. By eliminating operations and setups the use of a face driver reduces costs, increases productivity and produces a part with a higher degree of accuracy.

The **hydraulic design** performs best in roughing applications where part accuracy is not as critical. It compensates for a higher degree of inaccuracy in the part face in comparison to the mechanical design. Although hydraulic face drivers require some minor disassembly, changing out a set of drive pins and a center point can be accomplished in five to ten minutes. Depending on the mounting, concentricity ranges from .0015 - .0025 inches TIR.

**Face Driving Guidelines**

Following are some helpful pointers in the use of your Riten Face Driver:

1. When setting up for the first time, always use a new insert.
2. Make sure the rough diameter of the workpiece is not more than 3 times the driving diameter.
3. The end face of the workpiece should be square within .005. This is particularly important when using Face Drivers with only 3 drive pins.
4. Know the hardness of the workpiece material. For effective face driving, the hardness should typically be Rockwell C36 or less. Above this level, tailstock force must be increased and the cutting section area reduced because of the increased torque required. The practical upper limit with standard drive pins is about Rockwell C42.
5. Make sure the workpiece center hole is within the diameter range of the selected center point.
6. **IMPORTANT!** Before use, make absolutely sure the drive pins are oriented properly with respect to driver rotation (clockwise or counter-clockwise). Incorrect orientation will result in immediate damage to the face driver.
7. The first cut should always be toward the driver. This will help to firmly embed the drive pins into the workpiece.
8. On the initial clamping and before the operation, remove the workpiece and inspect the drive pin indentations for uniformity. Penetration depth should range from approximately 0.003" - 0.005". Adjust tailstock pressures accordingly. Pin penetration after machining should range from 0.010" - 0.020". Visually inspect the first piece and adjust tail stock pressures accordingly.
9. On the initial clamping and before the operation, remove the workpiece and inspect the drive pin indentations for uniformity. Penetration depth should range from approximately 0.003" - 0.005". Adjust tailstock pressures accordingly. Pin penetration after machining should range from 0.010" - 0.020". Visually inspect the first piece and adjust tailstock pressures accordingly.
10. Periodically check the indentations during subsequent operations. If the penetration line begins to have a raised edge on one side, or there is other evidence that the pin is slipping, the drive pins should be changed immediately.
11. If a live center is needed, consult the current Riten catalog and refer to the CNC Heavy Duty Live Center page, or to the CNC Sprint page if high tailstock forces are required.
Mounting of Face Drivers

Flange Mount  (Spindle Adapter required)

1. Before mounting, indicate on machine spindle to verify accuracy of machine bearings and spindle.

2. Mount spindle adapter onto spindle with adapter mounting screws. Indicate on spindle adapter face where the face driver will be mounted. Make adjustments if necessary to achieve approximately .0002” (.005mm) or less. This number may vary depending on machine characteristics.

3. Mount the face driver to the spindle adapter with the driver mounting screws. Snug the screws, but do not tighten yet. Indicate on the center point nose angle (usually a 60° nose angle). If necessary, make adjustment with the centering screws to achieve approximately .0003” (.008mm) or less. This number may vary depending on machine characteristics.

4. Tighten the driver mounting screws and assemble center point.

Chuck Mount

1. Machine the soft jaws to accept the face driver. Bore the jaws with a 6° (12° included) back taper to match the face driver. Provide a positive stop when boring the jaws to prevent movement when tailstock axial forces are applied.

2. Chuck on the major diameter of the face driver.

3. A Morse Taper mount can be jaw chucked by inserting the driver in a straight shank adapter sleeve and chucking on the sleeve.

Whichever mounting method is used, the intent is to indicate the driver as close to zero as possible. Indicate on the center point angle, and make adjustments as needed to achieve .0003” or less. Inaccuracies in the mounting will be reflected in the part.
Proper tailstock force is vital for satisfactory face driving. The force can be calculated using the following 7 steps:

1. To determine the ratio of the workpiece diameter to the face driver driving diameter, divide the rough workpiece diameter by the driving diameter.

2. To determine the chip cross section multiply the depth of cut (inches) by the feed per revolution (inches).

3. Using the results from steps 1 and 2, find the appropriate tailstock force in Table 1. These values are a starting point and can be adjusted to meet specific variables in the machining operation.

4. The table assumes that the direction of feed is toward the face driver. If the feed direction is away from the driver, the tailstock pressure must be increased by 100%. For plunge cutting, the tailstock pressure must be increased by 50%. If only one operation is to be performed at a time, then the operation with the highest axial force should be chosen for the calculation.

5. To adjust for the type of workpiece material, multiply the force obtained in step 4 by the material factor in Table 2.

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6. Compare final force result with the drive pin selected in Table 3 below. The result should be between the minimum and maximum required force specified for the chosen drive pin. If the final force result is below the minimum required force, choose a drive pin with a shorter edge length or increase the tailstock force. If the result is above the maximum force, choose drive pins with longer edge length or, if possible, choose a larger face driver. The driving diameter chosen should generally be as large as possible in relation to the finished workpiece diameter.

7. It is important to monitor drive pin penetration. In the initial clamping stage, penetration is approximately .008 deep, and after the operation it may be up to .030 deep. After the initial clamping but before the operation, remove the workpiece and inspect the indentations for uniformity.

**Care and Maintenance**

Periodic maintenance may be required to insure that your Riten mechanical face driver functions as designed. The drive pins and center point are the primary wear parts. Changes in drive pin penetration are an indication that the drive pins may need to be replaced.

Center point wear is easily identified by scoring or galling on the contact angle. Once this occurs the center point should be replaced.

Detailed instructions on diagnosing wear problems and replacing pins, center points, and other components can be found on www.riten.com.

*If you have any questions or need technical assistance, call Riten at 1-800-338-0027 and ask to speak to a face driver technical specialist.*