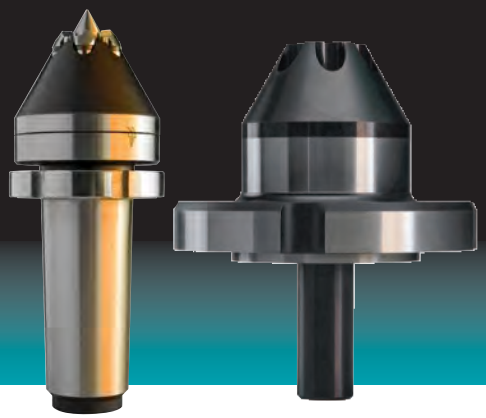
Riten®

Mechanical Face Driver User Guide



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.

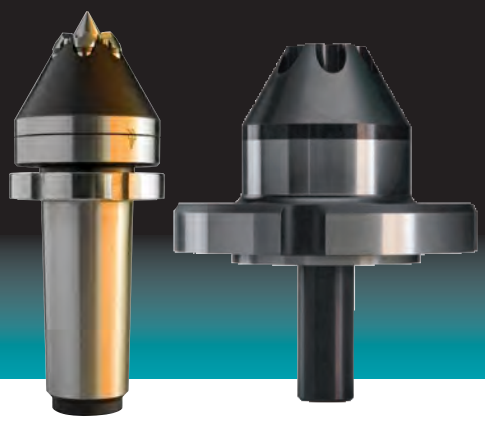
The **mechanical design** has several advantages in comparison to the older hydraulic design. It is a true quick change system, allowing the interchangeability of drive pins and center points without disassembling the face driver. Changing out a set of drive pins and a center point can be accomplished in less than a minute. During operation the center point in the mechanical design locks in place providing superior rigidity and a higher degree of accuracy in comparison to the hydraulic design. Depending on the mounting, concentricity ranges from .0004 -.0008 inches TIR.

Face Driving Guidelines

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

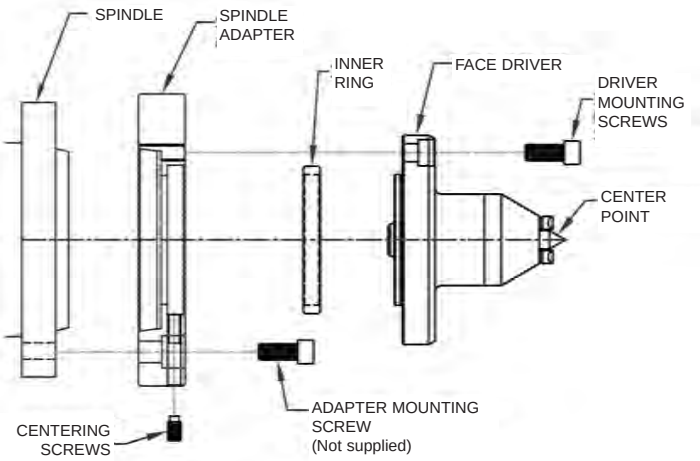
1. When setting up for the first time, always use a new insert.
2. Make sure the rough diameter of the workpiece is not more than 3 times the driving diameter.
3. The end face of the workpiece should be square within .005. This is particularly important when using Face Drivers with only 3 drive pins.
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 standrd drive pins is about Rockwell C42.
5. Make sure the workpiece center hole is within the diameter range of the selected center point.
6. When installing the face driver, **indicate in the center point as close to zero as possible** to reduce runout.
7. **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.
8. The first cut should always be toward the driver. This will help to firmly embed the pins into the workpiece.
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 tail stock pressures accordingly. Pin penetration after machining should range from 0.010” - 0.020”. Visually inspect the first piece and adjust tail stock 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.

Riten® Mounting of Face Drivers



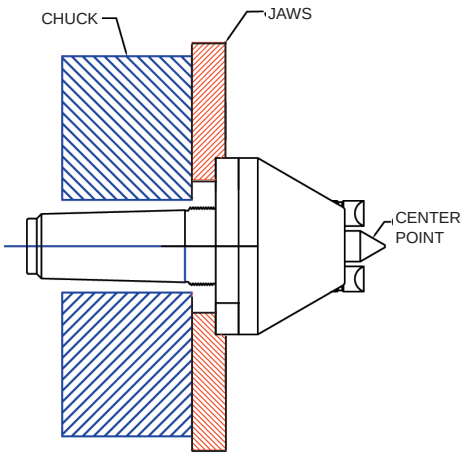
Flange Mount (Spindle Adapter required)

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. Lightly tap inner ring onto face drive with a plastic mallet. Make sure the inner ring remains straight while being mounted, and is flush with the back of the face driver.
4. 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.
5. Tighten the driver mounting screws and assemble center point.



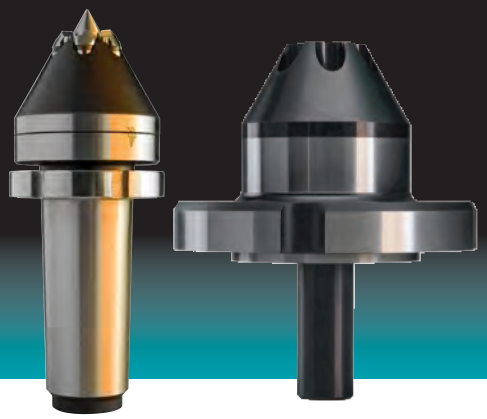
Chuck Mount

1. Machine the soft jaws to accept the face driver. Provide a positive stop when boring the jaws to prevent movement when tailstock axial forces are applied.
2. An alternate method is to insert a Morse Taper driver in a straight shank adapter sleeve and chuck 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.

Calculation of Tailstock Forces



Proper tailstock force is vital for satisfactory face driving. The force can be calculated using the following 4 steps:

1. Using Table 1, find the ratio of the rough workpiece diameter to the face driver driving diameter.
2. In Table 2, determine the chip cross section.
3. Using the results from Tables 1 and 2, find the appropriate tailstock force in Table 3. These values are a starting point and can be adjusted to meet specific variables in the machining operation.
4. The tables assume 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%. The tables also assume that material hardness is between Rc 20 and Rc 40.

   Harder materials may require special carbide tipped or diamond plated drive pins. Please contact Riten Technical Service for specific recommendations.

Table 1.
Ratio of Rough Workpiece Diameter to Driving Diameter

		Driving Diameter				
		5.91”	**3.94”**	**1.97”**	**0.79”**	**0.39”**
Rough Workpiece Diameter	**0.79”**				1	2
	1.18”				1.5	3
	1.57”				2	
	1.97”			1	2.5	
	2.36”			1.2	3	
	3.15”			1.6		
	3.94”		1	2		
	5.91”	1	1.5	3		
	7.87”	1.3	2			
	11.81”	2	3			

Table 2.
Chip Cross Section

		Feed per Revolution				
		.008”	**.012”**	**.016”**	**.020”**	**.040”**
Depth of Cut	**.040”**	.008”	.012”	.016”	.019”	.040”
	.080”	.016”	.024”	.030”	.040”	.080”
	.120”	.024”	.035”	.050”	.060”	.120”
	.160”	.030”	.050”	.060”	.080”	.160”
	.200”	.040”	.060”	.080”	.100”	.200”
	.400”	.080”	.120”	.160”	.200”	.400”

Table 3.
Tailstock Force

		Rough Workpiece/Driving Diameter Ratio				
		1	**1.5**	**2**	**2.5**	**3**
Chip Cross Section	**.008”**	495 lb	517 lb	540 lb	562 lb	584 lb
	.016”	540 lb	584 lb	629 lb	674 lb	719 lb
	.019”	562 lb	618 lb	674 lb	731 lb	787 lb
	.024”	584 lb	652 lb	719 lb	787 lb	854 lb
	.030”	629 lb	719 lb	809 lb	899 lb	989 lb
	.035”	652 lb	753 lb	854 lb	955 lb	1057 lb
	.040”	674 lb	787 lb	899 lb	1012 lb	1124 lb
	.050”	719 lb	854 lb	989 lb	1124 lb	1259 lb
	.060”	787 lb	955 lb	1124 lb	1293 lb	1461 lb
	.080”	899 lb	1124 lb	1349 lb	1574 lb	1798 lb
	.100”	1012 lb	1293 lb	1574 lb	1855 lb	2136 lb
	.120”	1124 lb	1461 lb	1798 lb	2136 lb	2473 lb
	.160”	1349 lb	1798 lb	2248 lb	2698 lb	3147 lb
	.200”	1574 lb	2137 lb	2698 lb	3260 lb	3822 lb
	.400”	2698 lb	3822 lb	4946 lb	6070 lb	7194 lb

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. Sharp drive pins indent the part in a well defined straight line. The indentations are symmetrical in terms of length, depth and appearance.

If the penetration line begins to show signs of a raised edge on one side, or there is other evidence that the pin is slipping, the drive pins should be changed immediately. Indentations that are “V” shaped rather than “I” shaped are clear indications of extreme slippage. Drive pins should be replaced well before this occurs. Waiting too long to replace worn drive pins can result in significant damage to the face driver.

Center point wear is easily identified by scoring or galling on the contact angle. Once this occurs the center point should be replaced. Worn center points can contribute to concentricity problems with the workpiece.

When replacing drive pins or center points, a small amount of grease should be applied to the parts being replaced as well as the bores in the face driver carrier body. This will help prevent corrosion and provide lubrication in these critical areas.
The mechanical face driver does not contain hydraulic oil and therefore requires less maintenance. Over time however, the mechanical driver may require service. Internal wear parts include the spherical washer assembly, the tapered wedges, and the spring/spring pin assembly. The spherical washer assembly is responsible for the drive pin compensation. The spring and spring pin assembly control the center point travel, while the tapered wedges lock the center point in place at the appropriate point during chucking. Failure to actuate or excessive run out are indications of excessive wear in these critical components.

Riten offers a comprehensive repair service which includes a complete inspection and replacement of all internal components. Heavily worn or damaged face drivers may also need a new carrier body in addition to the normal maintenance. Mechanical face drivers can be easily repaired by the customer by following the detailed instructions of a Riten representative.

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.

Solutions, not excuses

Riten Industries, Inc.
1100 Lakeview Avenue • P.O. Box 340
Washington Court House, OH 43160 USA
Toll Free: 800-338-0027
740-335-5353 • FAX 740-335-4622
E-mail: sales@riten.com
www.riten.com