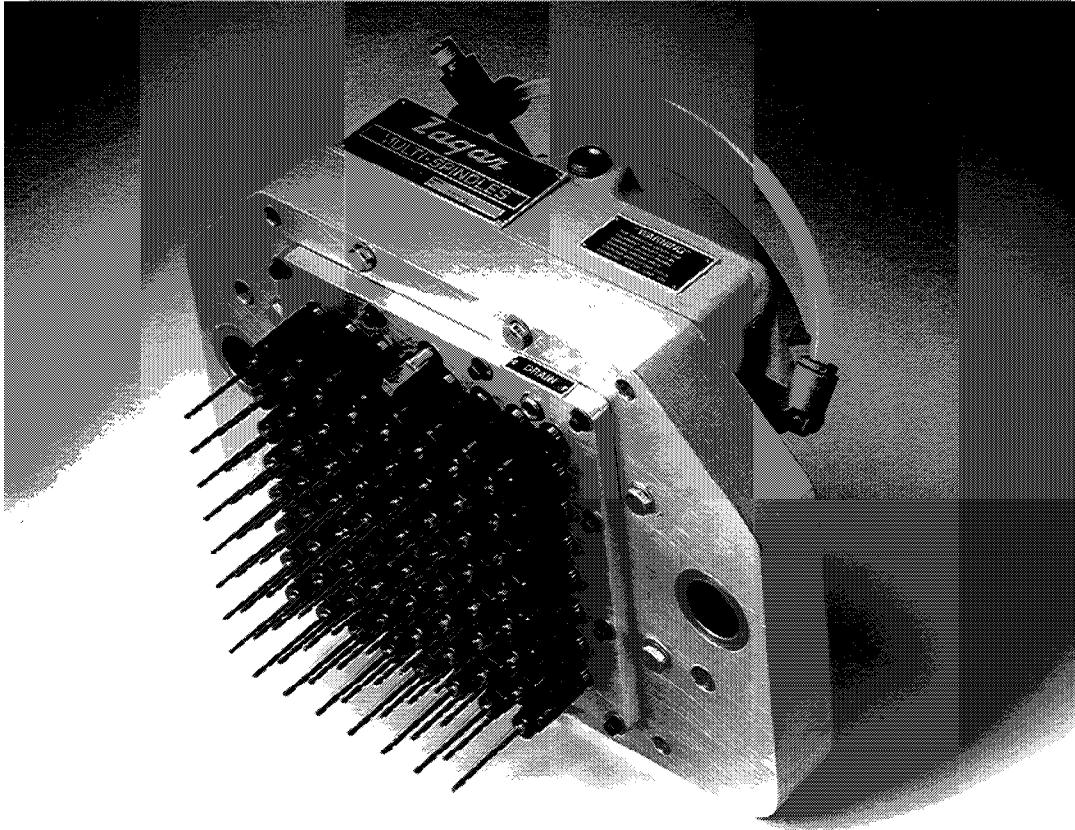


**Another Zagar**  
**MULTIPLE SPINDLE HEAD**  
**for Increased Productivity**



**INSTALLATION**  
**AND MAINTENANCE MANUAL**

**CAUTION**

Read this manual before installing or servicing your multiple-spindle head.

**WARNING**

For operator safety this equipment should not be installed or operated without proper guarding around drive coupling and cutting tools.

**Zagar**

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# Thank you . . .

for your selection of a Zagar multiple-spindle head. With proper care and maintenance, your Zagar head should provide trouble-free performance for many years.

Zagar multiple-spindle heads are factory tested and given an extensive break-in period before shipment.

To obtain the best possible performance from your new Zagar head, we suggest you read this instruction booklet carefully before operating and keep it handy for your future reference. Obviously, the machines and special tooling used with multiple spindle heads must be adequate to realize the many advantages of multiple spindles.

You have received separately complete data on spindle positions, general head construction and a complete parts list. Where the tool requirements are somewhat varied, a tool layout drawing may have been furnished with all necessary information on tool lengths, shank diameter, overall proportions of special tools, and other important data.

## Installation

Zagar Multiple-Spindle Heads are shipped ready for installation. For drilling it is presumed that the drill press selected meets the prescribed torque and thrust requirements. Quills must be reasonably rigid for that type of mounting. Applications where heavy thrust loads are encountered should be flange mounted to avoid excessive end loading of drill press spindle bearings.

## Tapping

Drill presses used for tapping should be equipped with the necessary controls to actuate the tapping cycle. The motor should have the capacity to handle the necessary reversals to meet production requirements and large enough to properly power the multiple-spindle head for tapping at higher speeds.

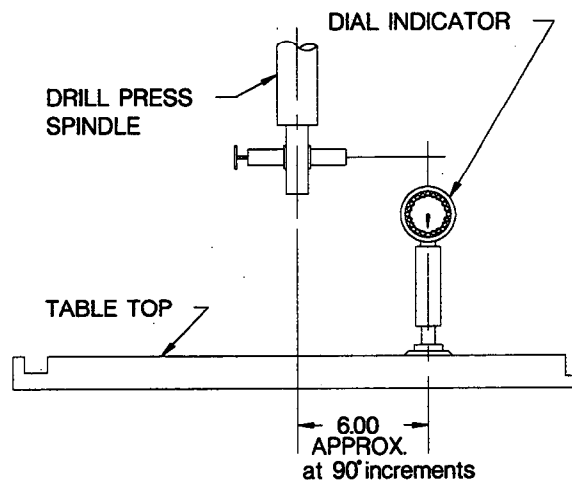
## Drilling and/or Tapping

A multiple-spindle head should line up properly with its jig. For this purpose the head is equipped with guide rods and bushings positioned in our standard location or to suit your specifications.

Guide rod alignment between the head and tooling is necessary so that cutting tools are properly lined up with their respective drill bushings, which result in a more accurate finished work piece. Multiple-spindle heads, when supported only by quill clamps and a loose fitting spindle, may give unsatisfactory performance.

When mounting a Zagar Drill or Tap Head to a drill press, use the following procedure:

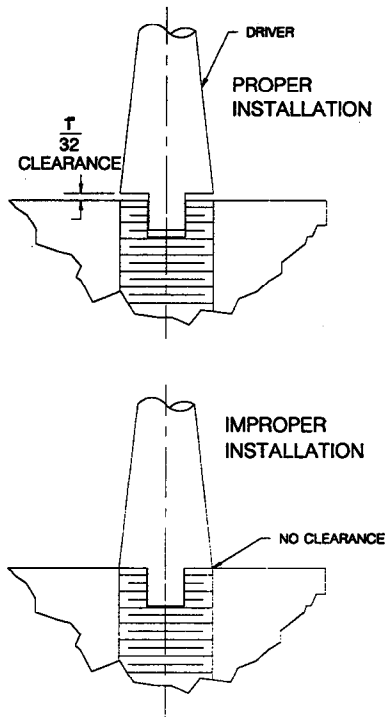
- A. Check the perpendicularity between the axis of the drill press spindle and the table top as shown below.



When the spindle is rotated 360 degrees, the indicator reading should not exceed .003." Correct if necessary before proceeding with installation.

- B. Assemble the driver (usually a separate piece with a Morse or Jacobs taper on one end and a tang on the other end) into the Morse Taper or onto the Jacobs Taper of the drill press spindle.
- C. Mount the quill clamp onto the drill or tap head.
- D. Slip the quill clamp over the drill press quill until the end of the driver tang bottoms into the drive slot of the drill or tap head.
- E. Before clamping the quill clamp onto the drill press quill, drop the head and clamp assembly about 1/32" (.03) away from the end of the driver. Then tighten (2) upper clamp screws. Do not operate the head with the driver bottomed in the drive slot as this will cause the drive bearings in the head to be preloaded and may cause overheating and bearing failure.

When possible, the drill press feeds should be automatic and at a definite rate per revolution.



### **Lubrication (Built In-Oil)**

Through the street elbow or other means provided on the side of the Head Housing fill to point marked “oil level” with one of the recommended oils in the chart at the end of this section.

Maintain proper oil level by checking daily. Proper oil level is important to enable the built-in circulating system to function. Do not overfill as this causes vibration and overheating. Change oil every 500 hours of operation, flush out with clean oil and add new oil.

### **Lubrication (Built In-Grease)**

Head is factory lubricated and sealed. No maintenance inspection or service is required until 2000-hour re-lubrication period. Head needs to be inspected and re-lubricated every 2000 hours. This inspection period also allows for a preventative maintenance replacement of worn parts.

This type of lubrication is recommended when there is a need for minimum (or zero) leakage, spindle centers are large enough to allow anti-friction thrust bearings, and rotational speed is less than half of head maximum.

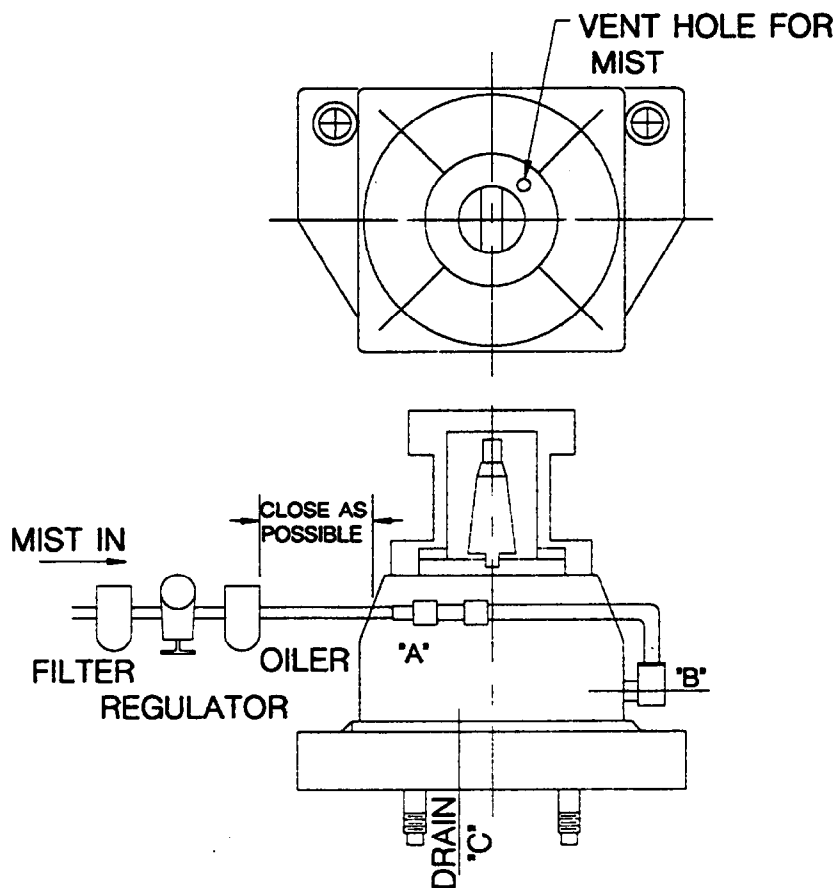
### Lubrication (Oil Mist)

Many Zagar heads are mist lubricated because of high speed drilling operation, tapping operation or out-of-ordinary operational or installation problems. Ports necessary for piping in a mist lubricator are marked "Mist Inlet."

Before running a new head or when the head has been idle for a few days, the bearings must be pre-oiled by running the mist lubricator for a period of 5 minutes before start-up. (Settings should be made as described on Page 7.) During this 5 minute period, intermittent jogging or manual turning of head will be helpful.

Heads 6.00" and under have one mist inlet to main bearing and one to housing.

Heads 8.00" through 16.00" have one mist inlet to main bearing and two to housing.



All other heads have one mist inlet to main bearing and four to housing plus one pre-lube inlet.

Mist Lubricator setting:

1. Fill bowl with oil.
2. Adjust air regulator for 2 to 5 P.S.I.
3. Set needle valve to 3 to 12 drops a minute for heads up to 16" square, 12 to 18 drops a minute for large square and rectangular heads.

Mist will vent through the top of the head through a vent hole at the main drive spindle. No other outlet is required.

Number of oil drops per minute can be varied to suit operating conditions. MORE for higher speeds or heavier drilling. LESS for light drilling or in case of excessive leakage.

If the head is in continuous operation, drain off oil once a week by removing drain plug "C." After every 500 hours of operation, drain and flush out with clean oil.

After some continued operation, additional oil will accumulate in the spindle head. This may cause some spindle leakage. When even a slight amount of spindle leakage is objectionable, the drain plug "C" should be removed and a drain line should be installed with a shut-off cock so that the accumulated oil can be drained when necessary.

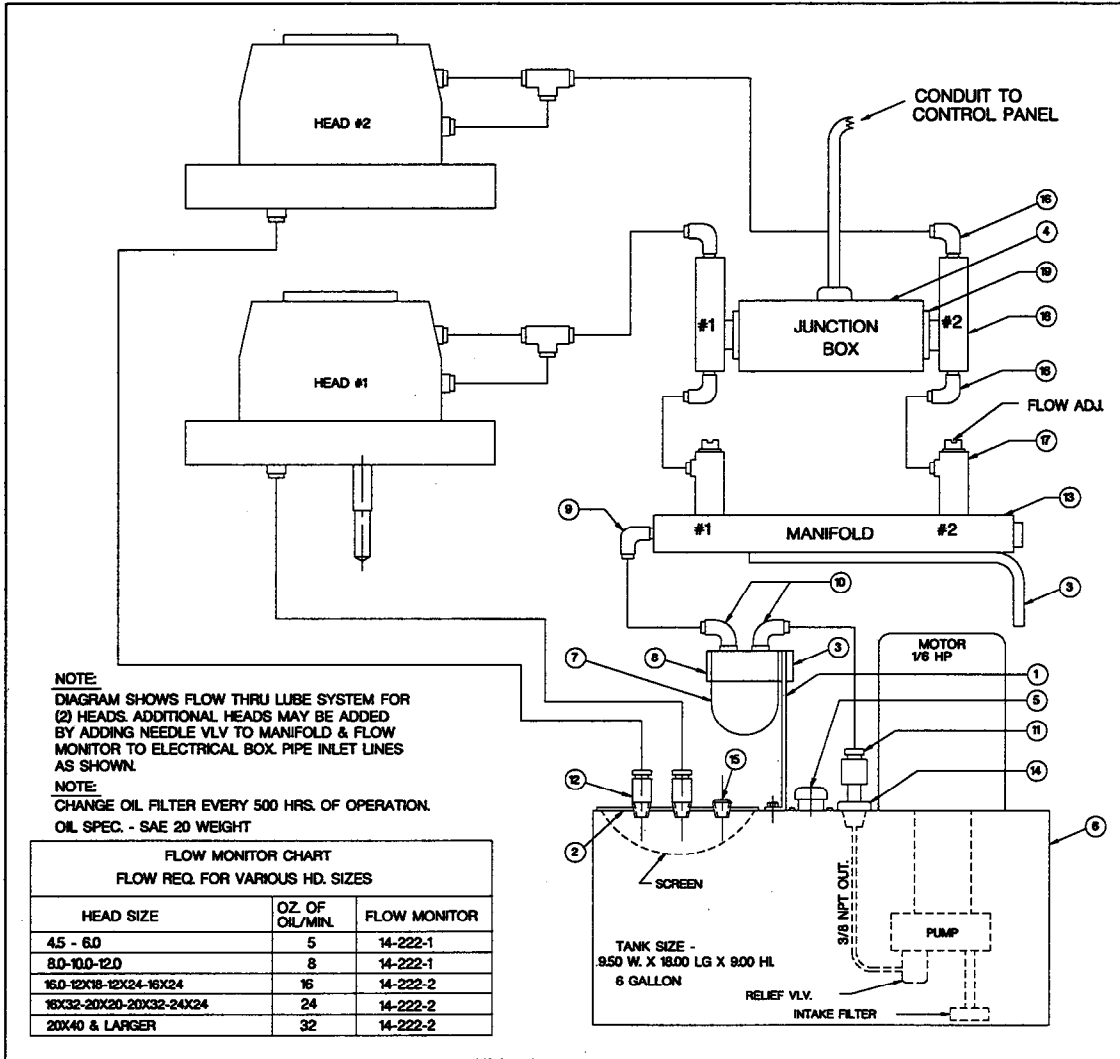
### **Lubrication (Flow Thru)**

Flow thru lubrication combines the benefits of built-in and oil mist systems. Positive oil flow can be directed to all points and is recirculated to the central system to be filtered and cooled. The flow rate is adjustable to suit and is not dependent on head speed or direction of rotation. See Page 8 for system diagram, installation instructions, and adjustment instructions.

### **Recommended Oils (SAE-20) for Built In, Mist, or Flow Thru Lube**

<b>Maker</b>	<b>Brand Name</b>
Sun	Sunvis 68
Rando	HD 68
Shell	Tellus 68
Nuto	Nuto 68
Mobil	DTE-26

**Note:**  
**Do not use detergent oil.**



**Switch Data**

- S.P.S.T.—N.O. Reed Switch
- Oil Flow Closes Switch
- Max. Switching Vol.—200 VDC—150 VAC
- Max. Switching Current—1.0 DC—7 AC

Item No.	Part Description	Part No.	Zagar No.
1	Foot Bracket		792-26
2	Oil Return Cover Plate		792-27
3	Angle Bracket		792-28
4	Junction Box		792-29
5	Filter Breather & Strainer		13-104-1
6	Pump & Tank System 1/6 HP & 1725 Motor/Intake Filter Relief Vlv. & 3/8 NPT Discharge		13-126-5
7	Oil Filter		13-225-1
8	Adapter Kit		13-226-1
9	Male Elbow	#6520-06-06	13-232-2
10	Male Elbow	#6520-06-08	13-232-4
11	Female Connector	#6463-06-06	13-235-1
12	Male Connector	#6510-06-06	13-230-1
13	Manifold (Alumi-Tec)	#AM-202504	13-242-1
14	Rubber Grommet		11-670
15	Plug (Return Oil Fittig)	#6900-06-00	13-236-5
16	Male Connector	#6510-04-04	13-230-2
17	Right Angle Valve	#SCO-04-04	13-240-1
18	Flow Monitor	#LPH-375-1-B-C-NC	14-222-1
19	Sealing Ring	T & B #5262	12-765-4
20	Pipe Plug - 3/8 NPT		12-86

Sizing "Flow Thru Oil" System				Adj. Vlv. for proper oil flow	Pump Output	
Line	Parts List #	No. of Head	Head Sizes	Oz. of oil/min.		
1	792-201-1	1	4.5 - 6.0	5	5	
2	792-201-2	2		5	10	
3	792-201-3	3		5	15	
4	792-201-4	4		5	20	
5	792-201-1	1	8.0 - 10.0 - 12.0	8	8	
6	792-201-2	2		8	16	
7	792-201-3	3		8	24	
8	792-201-4	4		8	32	
9	792-202-1	1	16.0 - 12x18 - 12x24 - 16x24	16	16	
10	792-202-2	2		16	32	
11	792-203-1	1		16x32 - 20x20 - 20x30 - 24x24	24	24
12	792-204-1	1			20 x 40 & Larger	32



## Balancing Instructions—Zagar Gearless Heads (10" & Larger)

1. Remove pipe plug from balancing adjustment hole in housing.
2. Looking through balancing hole, rotate head and note original counter-weight settings. **Record for future reference.** (see sketch)
3. To make counter weight heavy, loosen set screws and move both weights one division toward the zeros on balance plate and **tighten set screws.**
4. If heavier counter-weight does not improve head balance, return weights to original position. Then move weights one division away from the zeros to lighten counter-weight. Repeat process until head runs smoothly.

**Note:** Counter weights may not each be on the same number when the best balance point is reached.

5. Be certain that set screws are **tight** when balancing adjustment is completed.

**Note:** When head is not in balance, the effective counter-weight could be either heavy or light.

**When adjusting weights never move more than one division at a time!**

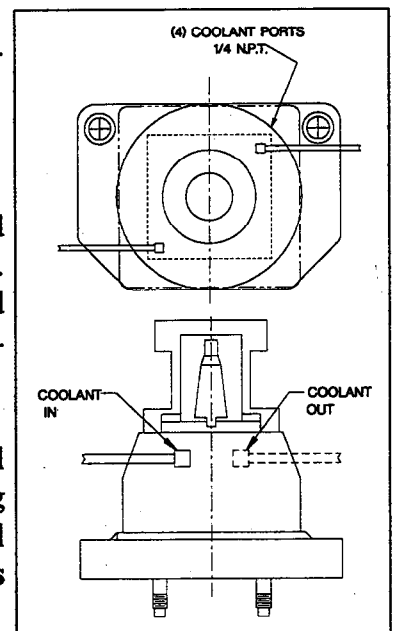
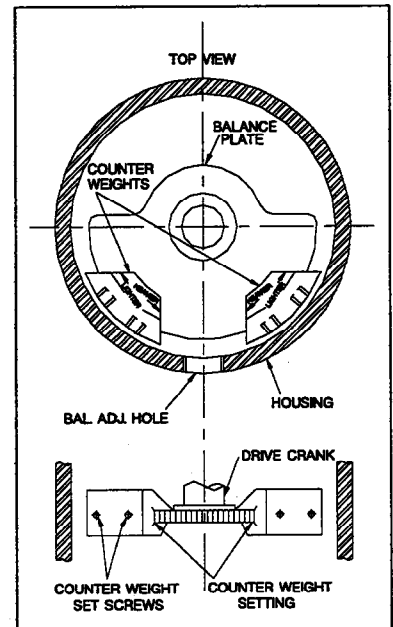
When head is close to a correct balance, quarter and half divisions will affect balance.

All oscillator plates are balanced in a static condition before installation in drill head.

### Coolant

When running multiple-spindle heads under severe speeds or load conditions, the heat generated might require the use of a coolant. Tapped port holes are provided for this purpose and are marked "coolant." Use any two diametrically opposed ports for best circulation and convenience to the operation.

This coolant chamber is in no way connected with the internal mechanism of the drill head so that any type of coolant, cutting oil, soluble oil, soluble water, tap water, or regular machine oil may be used. **Caution: Do not run coolant in any other ports except where marked "Coolant."**



### Troubleshooting

Problem	Cause
<p><b>Head Overheats</b> Normal operating temp. is 100° - 130°. Over 130° may be caused by a malfunction. Head should be checked.</p>	<p>No oil Low oil level Oil level too high Improper oil R.P.M. too high Driver bottoming (see Page 6) Feed rate too high Dull tools Heat transfer from machine</p>
<p><b>Vibration</b></p>	<p>Oil level too high Loose machine quill Head mounting bolts loose No guide rods Guide rods misaligned Head not balanced Driver misaligned</p>
<p><b>Holes out of . . .</b></p> <ul style="list-style-type: none"> <li>- position</li> <li>- round</li> <li>- square</li> </ul>	<p>Parts located improperly Part support inadequate No bushing plate Misaligned bushings Worn bushings Table not square with head Guide rods misaligned Improper feed rate Dull tools Improperly sharpened tools Improper tools No coolant Improper coolant No coolant at cutting edge</p>

## Drill Head Inspection Report

S.O. Number \_\_\_\_\_

\_\_\_\_\_ New Head

\_\_\_\_\_ Rework

\_\_\_\_\_ Repair

**Checked for:**

\_\_\_\_\_ Spindle side play \_\_\_ max.

\_\_\_\_\_ Spindle end play \_\_\_ max.

\_\_\_\_\_ Input shaft turns freely

**Test Run**

**Position:**

\_\_\_\_\_ Horizontal

\_\_\_\_\_ Vertical

\_\_\_\_\_ Other

**Input Speed:**

\_\_\_\_\_ R.P.M.

**Temperature:**

\_\_\_\_\_ Deg. Fahrenheit

**Dated:** \_\_\_\_\_

**Assembled by:** \_\_\_\_\_  
name clock no.

**Checked for:**

\_\_\_\_\_ Lube connections

\_\_\_\_\_ Spindle accessories supplied

\_\_\_\_\_ Spindle accessories fit properly

\_\_\_\_\_ Mounting adapter and driver supplied

\_\_\_\_\_ Mounting adapter and driver fit properly

\_\_\_\_\_ Operators safety warning tag

**Dated:** \_\_\_\_\_

**Inspected by:** \_\_\_\_\_  
name clock no.

# **DESIGNERS AND MANUFACTURERS OF**

## **Multiple Spindle Heads**

Gearless or Geared  
Machining Center Heads  
Rotating Heads

## **Drilling and Tapping Units**

Ball Screw Actuated CNC  
Quill-Feed Units  
Air/Electric Quill-Feed Units  
Cam Automated Quill-Feed Units  
Lead Screw Tap Units  
CNC Control Modules

## **Workholding Fixtures**

Specializing in Collets and  
Collet Fixtures  
Standard and Special  
Manual Air and/or Hydraulic  
Automated Index  
Internal or External Clamping

## **Fixtures**

Drill Jigs and Fixtures  
Multiple-Spindle, Individual  
Lead-Screw Tapping  
Automatic/Manual Clamping Systems

## **Standard & Special Machines**

Turn-key Special Machine Systems  
Automatic Material Handling  
CNC Control Integration

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