

## Safety and Operation Instructions RSR50



To avoid serious injury and ensure best results for your application, please read carefully *all* operation and safety instructions for your Tapping Attachment, as well as all other safety instructions that are applicable, especially those for your machine tool.

**Proper Clothing:** The rotating spindle of a machine can snag loose fitting clothing, jewelry, or long hair. Never wear jewelry, long sleeves, neckties, gloves or anything else that could become caught when operating a machine tool. Long hair must be restrained or netted to prevent it from becoming entangled in rotating spindle. Steel-toed boots should also be worn in any machine environment.

**Proper Eye Protection:** Always wear safety glasses with side shields to protect your eyes from flying particles.



**Proper Work Piece Fixturing:** Never hold the work piece or the vise it is held in by hand. The work piece must be clamped firmly to the table of the machine so that it cannot move, rotate or lift.



The tapping attachment can become hot to the touch after operation. Use caution when removing from the machine or handling.

**Always be aware of the Potential Hazards of a Machining Operation:** Sometimes working with your machine can seem routine. You may find that you are no longer concentrating on the operation. A feeling of false security can lead to serious injury. Always be alert to the dangers of the machines with which you work. Always keep hands, body parts, clothing, jewelry, and hair out of the areas of operation, when the machine spindle is rotating. Areas of operation include the immediate point of machining and all transmission components including the Tapping Attachment. Never bring your hand, other body parts or anything attached to your body into any of these areas until the machine spindle is completely stopped.

**Be aware of any other applicable safety instructions or requirements.**

### Check List For Good Tapping

1. **Never** use this unit before reading all safety instructions for this attachment as well as the machine it is to be used on.
2. Is tap sharp and of correct design for current job?
3. Is tap in proper alignment with the drilled hole?
4. Is machine speed correct?
5. Is machine feed correct?
6. Is machine stop set properly so tap releases in neutral rather than bottoming in work piece or fixture?
7. Is drilled hole the correct size?
8. Is clearance plane when tap exits the hole sufficient to allow the tap to clear the hole before moving to a new position?
9. Is work piece held securely?
10. Is the base adapter firmly secured to tapping attachment and turret?
11. If a bottom hole is being tapped, is there sufficient chip clearance?

## Programming Procedure RSR50 Self Reversing Tapping Units

*Thank you for purchasing an RSR tapping attachment. Please read this instruction sheet carefully before using the attachment.*

This tool may be used on enclosed turning centers with driven tools. It is specifically designed for use with EWS base adapters for installation to the machine's turret.

### IMPORTANT APPLICATION NOTES



**This tool must be driven in the counterclockwise direction.** This will allow right hand tapping with automatic reversal. Tapping left hand threads is not possible with this tool.

The torque requirements for tapping may be very high. Use caution and check the following points carefully.

- Be sure to use the proper speed recommended by the tap manufacturer. **DO NOT EXCEED MAXIMUM INPUT RPM** for your specific tool.

RSR50 ER16 Spindle      3300 RPM MAX INPUT SPEED

Please note the gear ratio is 1 to .666, for example an input speed of 3300 RPM results in output tapping speed of 2200 RPM.

- Be sure the drilled hole size is correct. Use maximum allowable hole size to reduce torque.
- In blind holes be sure to allow extra clearance beyond the lead of the tap to be sure the tap cannot bottom in the hole.
- Be sure the work piece is clamped securely so that it can not move and that drilled hole is lined up concentrically and parallel to the machine spindle.

### PROGRAMMING PROCEDURES

There are two possible methods for RSR tools.

**Reduced Cycle Time Programming** allows you to achieve faster cycle times and requires a sub program with multiple steps. It also improves the life of the tapping attachment's drive components.

**Feed in, Feed out Programming.** It is also possible to simply feed in and out of the hole from the clearance plane at the calculated feed rate.

#### REDUCED CYCLE TIME PROGRAMMING

1. **Select the proper RPM** for your specific tap and work piece material, but be sure not to exceed the maximum RPM for your tapping attachment.
2. **Calculate the Correct Feed Rate** based on the tap pitch and RPM selected. **Please note we recommend using 64%, based on input speed, going into hole and 68% for the feed rate out of the hole.**

Inch Taps: Tap Feed Rate= RPM / Pitch  
 Example                    1/4"-28 at input 2000 RPM  
 Feed Rate In (64%) = (2000 / 28) x .64 = 45.71 in/min  
 Feed Rate Out (68%) = (2000 / 28) x .68 = 48.57 in/min

Metric Taps; Tap Feed Rate= RPM x Pitch  
 Example                    M6x1 at input 2000 RPM  
 Feed Rate In (64%) = 2000 x 1 x .64 = 1280 mm/min  
 Feed Rate Out (68%) = 2000 x 1 x .68 = 1360 mm/min

**3. Cancel the Operators Ability to adjust Feed Rate and spindle speed** using the machines potentiometer controls. This is normally done by using an M code like M49 for example.

**4. IMPORTANT: Be sure "Ramp" or "Exact Stop" is not used during tapping.** These modes cause the cycle time to be significantly slower and also cause the tapping head to run less smoothly. For example on machines with Fanuc control or Haas machines use G64 while tapping to eliminate "Exact Stop". G61 will make exact stop modal again if desired for other operations.

**5. For Blind Holes: Allow for the tap to go deeper than program depth.**

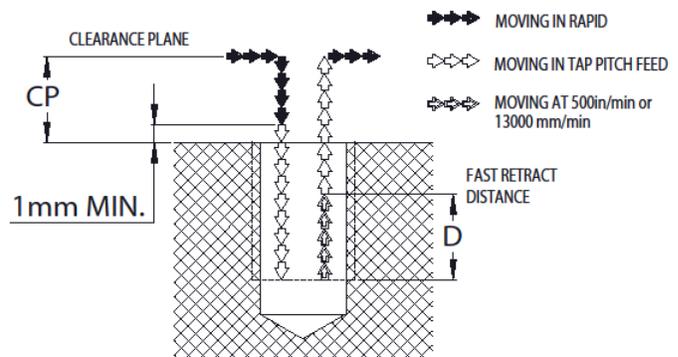
RSR50 allow an extra .160 or 4mm beyond program depth. For program depth, subtract this distance from the desired tapping depth.

The actual extra depth will be less than these values, please check the depth on your first hole and then make any necessary adjustment to your program.

### 6. RSR Reduced Cycle Time Programming Illustration

Write sub program using G01 feed rate and G00 rapid movements as shown in Fig below.

**Illustration feeding in and out of hole.**



**Clearance Plane and Fast Retract Distance**  
 RSR50 CP= .500" or 12mm D= .250" or 6mm

Please note the distances shown are minimum clearance plane and maximum fast retract distance.



## Programming Procedure RSR50 Self Reversing Tapping Units

### Reduced Cycle Time Programming Example Self Reversing Tapping Unit Using G01 Movements

#### EXAMPLE

Tapping Unit: RSR50 Tap Size M6x1  
 Input speed 2000 RPM (Output speed 1332 RPM)  
 Feed Rate In at 64%= 1280 mm/min  
 Sub Program: Rapid approach to 1mm or .040 above part.  
 Feed in to depth .315 or 8mm ( Note actual depth slightly deeper than program depth)  
 Retract 6mm at 13000 mm/min to prepare head for reverse.  
 (Use maximum feed rate up to 500 in/min or 13000 mm/min.  
 Do not use rapid.)  
 Feed out to 12 mm clearance plane at 68% Feed Rate = 1360 mm/min.

#### MAIN PROGRAM

M06 T6	Tool change to tool #6
M00	Program stop
<b>M04 S2000</b>	<b>Spindle counterclockwise rotation 2000 RPM</b>
G64	G64 eliminate exact stop
G00 G43 Z25.H06 M08	Rapid to Z 25mm Height offset #6 coolant on
M49	Cancel feed and speed override Capability if applicable
G00 G90X25.Y-25.Z12.	Rapid in absolute to hole position X25, Y-25 and Z12 clearance plane
M98 P4 L1	Repeat sub program 04 one time

#### Sub Program 0004

G90	Absolute movement
G00 Z1.	Rapid to 1mm above hole
G01 Z-8.F1280.	Feed in at 64% feed rate
G01 Z-2.F13000.	Fast retract 6 mm
G01 Z12.F1360.	Feed out at 68% feed rate to clearance plane of 12 mm
M99	Return to main program

#### Feed in, Feed out Programming

Steps 1-5 are the same as in Reduced Cycle Time Programming, but in the program the rapid approach to 1mm and Fast Retract lines are eliminated.

#### VERY IMPORTANT NOTICE

Please note that the G code for "exact stop" or "ramp" should not be used with a Tapmatic self reversing tapping attachment. Please be sure that these are not in effect when tapping because they will cause the tapping cycle to be significantly slower and thread depth repeatability will be less accurate.

Fanuc Controls and Haas: Use G64 while tapping to eliminate the exact stop. G61 will make exact stop modal again if desired for other operations.

# TAPMATIC

**Tapping Speeds:** The following speed recommendations are for reference only. Please consult tap manufacturer for your specific tap. **Do not exceed the maximum input speed of tapping attachment.**

Material	Low Carbon Steel	High-Carbon Steel	Tool Steel Hard	SS 303, 304, 316	SS 410, 430, 17-4 Hard	SS 17-4 Anneal.	Titan. Alloys	Ni Alloys	Alum Alloys	Alum Die cast	Magn.	Brass, Bronze	Copper	Cast Iron
M/min (ft/min)	10-20 (33-66)	8-12 (26-39)	4-6 (13-20)	6-12 (20-39)	3-5 (10-16)	6-12 (20-39)	4-8 (13-26)	3-5 (10-16)	15-25 (49-82)	10-15 (33-49)	15-25 (49-82)	15-25 (49-82)	8-12 (26-39)	10-20 (33-66)

$$\text{RPM} = \frac{\text{M/min} \times 318.5}{\text{Tap Diameter in mm}}$$

$$\text{RPM} = \frac{\text{ft/min} \times 3.82}{\text{Tap Diameter inch}}$$

## Determining Correct Speed Within Specified Range

**Cutting Speed for Tapping:** Several factors, singly or in combination can cause very great differences in the permissible tapping speed. The principle factors affecting the tapping speed are the pitch of the thread, the chamfer length on the tap, the percentage of full thread to be cut, the length of the hole to be tapped, the cutting fluid used, whether the threads are straight or tapered, the machine tool used to perform the operation, and the material to be tapped. *From Machinery's Handbook 23rd edition.* If your coolant does not have good lubrication quality, start at lower speeds in the recommended range. Roll form taps in particular require good lubrication because of the high friction forces involved. As the lubrication quality of a coolant is often unknown, we recommend starting from the lower speeds in the range.

These factors apply to everyone's tapping speed charts.

-%	Ten Factors Requiring Lower Speeds		Ten Factors Permitting Higher Speeds	+
-20	Poor lubrication	1	Good lubrication	+20
-15	High tensile strength material	2	Low tensile strength material	+15
-15	Large thread diameter	3	Small thread diameter	+15
-10	High alloy Material	4	Low alloy Material	+10
-10	Thread depth more than 1.5 x diameter	5	Thread depth less than 1.5 x diameter	+10
-10	Thread pitch coarse	6	Thread pitch fine	+10
-5	Drill size more than 65% thread	7	Drill size less than 65% thread	+5
-5	Tap lead less than 3.5 threads	8	Tap lead more than 3.5 threads	+5
-5	Blind holes	9	Through holes	+5
-5	Free running spindle, inaccurate feed control	10	Synchronized feed, lead screw or CNC control	+5

### Eight Essential Steps for Trouble Free Performance with Self Reversing Tapping Attachments

1. Never perform any installation or programming, before reading the operator instructions accompanying the tapping attachment and the machine as well as the tap manufacturers recommendations.
2. Choose the correct tap: Follow your tap manufacturers recommendations for your specific application.
3. Calculate the correct tapping speed from the adjacent chart and be sure not to exceed the maximum speed for the tapping attachment.
4. Common sense rule: Begin conservatively and increase speed until optimum results are obtained.
5. Select the best tool for your application. For high production with one size tap don't compromise. For low production with a variety of sizes choose the tool that best covers your range.
6. Follow programming instructions.
7. Follow installation instructions and be sure alignment collar is locked. Please see instructions.
8. Perform regular preventative maintenance. Please see maintenance instructions.

#### Example:

Tap size M6, Material Tool Steel, Rotational Speed Range recommended by tap manufacturer 800-1050

Minus factors:	High Tensile Strength	-15	Plus Factors:	Coolant lubricity good	+20
	Tap depth 3x Diameter	-10		Small thread diameter	+15
	Drill Size 75% Thread	-5		Pitch Fine	+10
	Blind Hole	-5		Lead 3.5 threads	+5
	Total	-35		CNC Machine	+5
				Total	+55

#### Apply Factors Against RPM range of 250

+ .55 x 250 = 137      137 + 800 = 937 New Low Speed for Range  
 - .35 x 250 = -88      1050 - 88 = 962 New High Speed for Range

# TAPMATIC

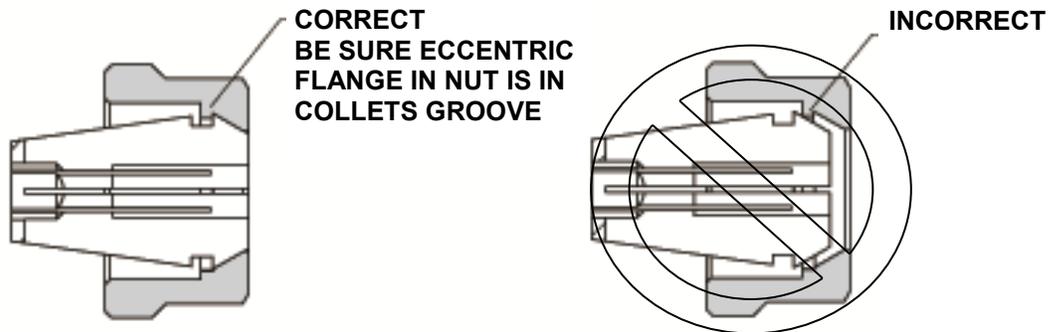
## Installing the Tap

Please use square drive, ERGB collets whenever possible.

Be sure to put collet into nut as shown below, before installing nut on to threads.

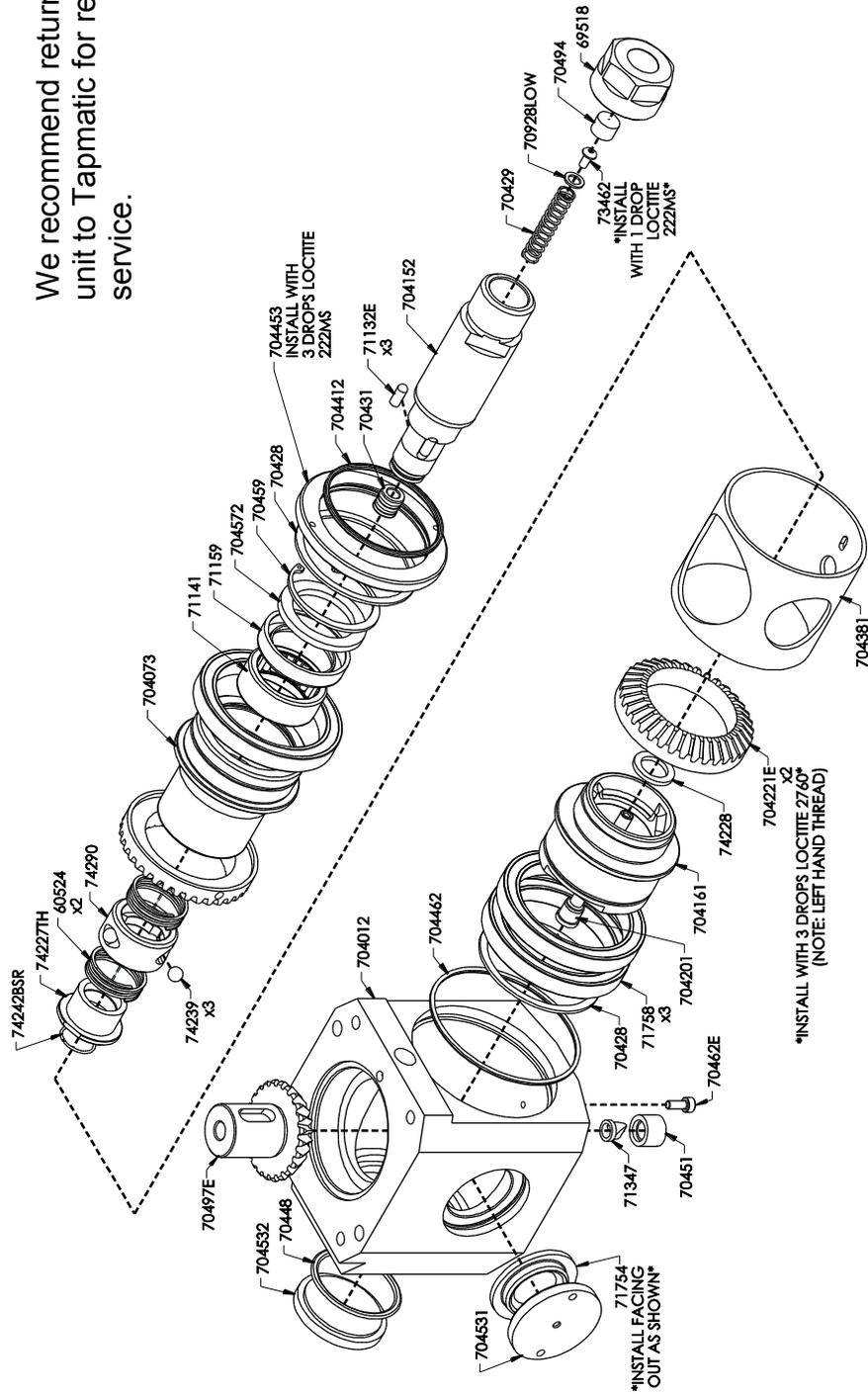
Insert the tap and tighten securely using the two wrenches.

Reduce capacity by 25% if using roll form taps.



## RSR50 Parts List

We recommend returning this unit to Tapmatic for repair or service.



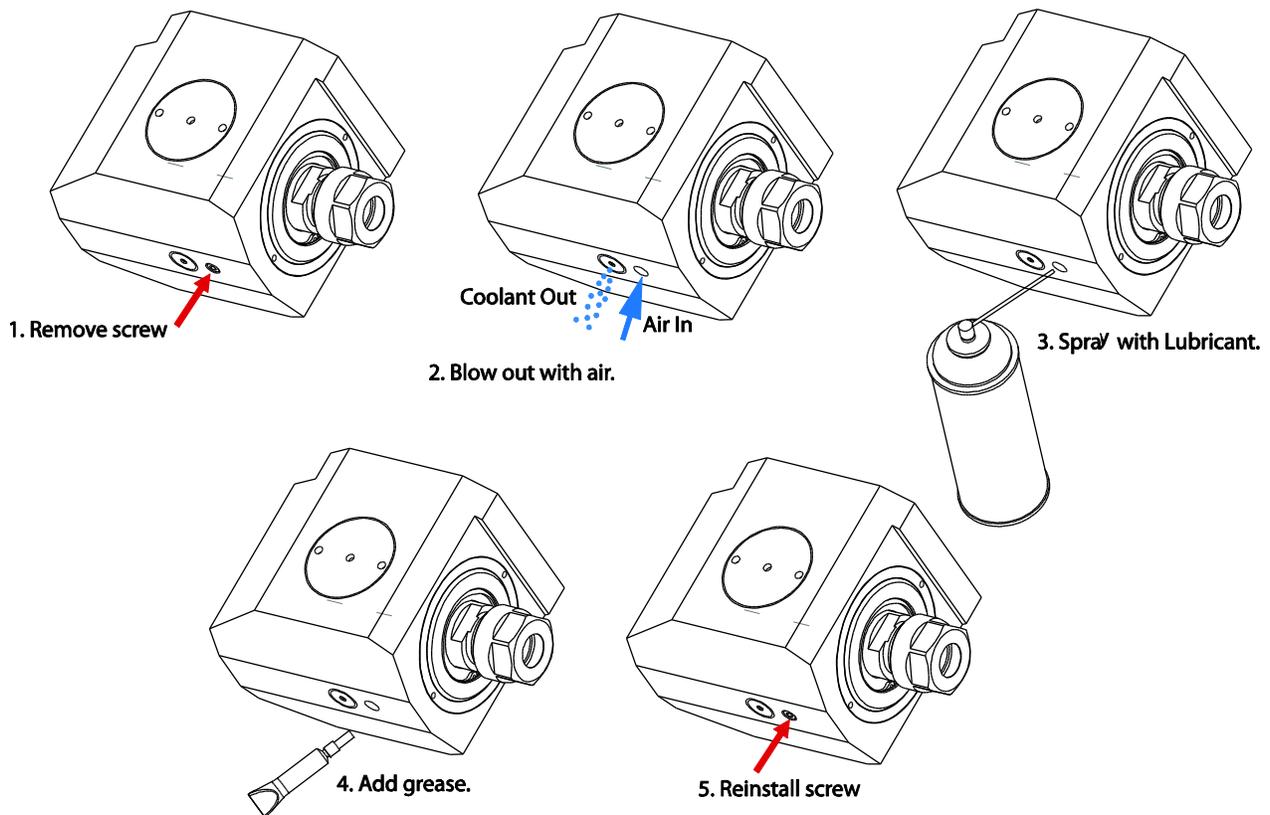
Wrenches  
 ER16 Wrench 28100  
 3/4" Wrench 28075

# TAPMATIC

## Maintenance

**Lubrication:** We recommend lubrication every 100,000 cycles. To lubricate remove grease hole plug and add grease from the tubes provided. Use two tubes. For additional tubes order part number 29000 for a box of 12. We recommend Fuchs Renolit S2 TX high performance grease. The tapping attachments come from the factory already lubricated and ready for operation. In addition to grease we also recommend the use of a penetrating spray lubricant such as Fuchs ANTICORIT DFW 7301 or LPS No 2.

**Removing Coolant:** If coolant enters inside the tool please follow the procedure shown below to remove coolant and re-lubricate the tapping attachment. We also recommend following this procedure if you plan to store the unit.





**Repair Service is available at....**

**Attention: Repair Department  
Tapmatic Corporation  
802 Clearwater Loop  
Post Falls, ID 83854**

**To Expedite Repair:** Return tool direct to Tapmatic Corporation. Tapmatic will inspect the tool and advise you of the repair costs by fax or email before the repair is completed.

**Cost Notification:** Tapmatic will FAX a cost notification to you, soliciting your approval before repairs are completed.

If it is determined that a tool cannot be repaired, at the customer's request, Tapmatic will return the disassembled parts. We are not able to reassemble a tool using damaged or worn out parts.

**Optional Return Procedure:** Tools may also be returned for repair through your local Tapmatic Distributor. They will ship the tool to us and include instructions for the repair and return. You may already have an open account with them which facilitates the handling of invoicing.

**Priority Service:** Tapmatic services tools returned for repair in the order in which they are received. All tools will be evaluated and repaired within three weeks from the date they arrive subject to receiving the customer's approval to proceed with the repair.

Priority is given to tools shipped to us by overnight or second day service.

If a repair is sent to us by UPS ground or similar service it can also be given priority. Just call and let us know you need priority service and advise if you would like the tool returned to you by overnight or second day. Typical turn around, not including shipping time, for priority repairs is 5 to 7 days subject to receiving the customer's approval to proceed with the repair.

If we can answer any questions please call our toll free number:

**800 395-8231**