

Safety and Operation Instructions RCT85 and 100



Safety Precautions and Instructions

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.

On machining Centers: Automatic tool changes should only be made on enclosed machines. Always be sure that stop arm installation is stronger than the largest tap.

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 the stop arm of the tapping attachment held rigidly against rotation? Stop Arm installation must be stronger than the largest tap.

TAPMATIC

Programming Procedure RCT85 and 100 Self Reversing Tapping Units

Thank you for purchasing a Tapmatic RCT model. Please read this instruction sheet carefully before using the attachment.

This tool may be used on enclosed machining centers with orienting spindles. Prior to a tool change, it is necessary that the machine spindle rotation stops in the same position each time. Installation procedures are shown on page 5-6.

IMPORTANT APPLICATION NOTES

The RCT85 is capable of tapping with large tap sizes where torque requirements 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 RPM for your specific tool.

ER25 Spindle	1500 RPM MAX
ER32 Spindle	1200 RPM MAX
ER40 Spindle	800 RPM MAX

- 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 RCT85 tools.

Reduced Cycle Time Programming allows you to achieve faster cycle times and requires writing a sub program. It also improves the life of the tapping attachment's renewable drive parts.

Bore Cycle Programming. It is also possible to use a standard bore cycle such as G85. This does lengthen the cycle time.

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.

Inch Taps: Tap Feed Rate= RPM / Pitch
 Example 1"-12 at 500 RPM
 Tap Feed Rate= 500 / 12=41.66 in/min

Metric Taps; Tap Feed Rate= RPM x Pitch
 Example M24x2 at 500 RPM
 Tap Feed Rate= 500 x 2= 1000 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. On Fadal machines use G8 to cancel "Ramp" for tapping. G9 will turn "Ramp" on again if desired for other operations. Your machine may use different G codes. Please check machine manual.

5. For Blind Holes: Allow for the tap to go deeper than program depth.
 RCT85 allow an extra .175 or 4.5mm
 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. RCT85 Reduced Cycle Time Programming Illustration

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

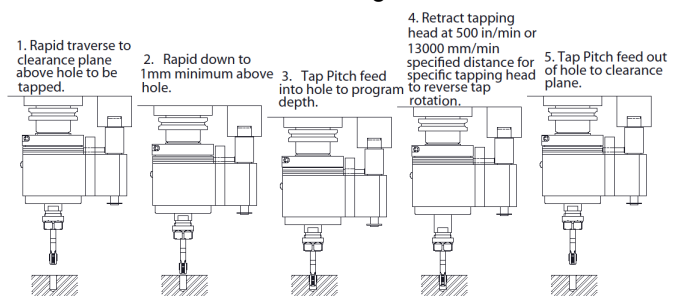
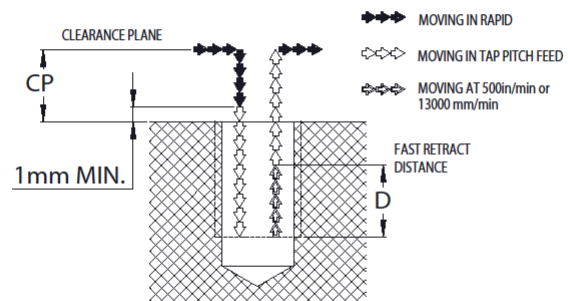


Illustration feeding in and out of hole.



Clearance Plane and Fast Retract Distance RCT85

CP= .600" or 15mm, D= .400" or 10mm
 Please note the distances shown are minimum clearance plane and maximum fast retract distance.



Programming Procedure RCT85 and 100 Self Reversing Tapping Units

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

EXAMPLE

Tapping Unit: RCT85 Tap Size M24x2
500 RPM
Feed Rate In at 100%= 1000mm/min
Sub Program: Rapid approach to 1mm or .040 above part.
Feed in to depth 30mm (Note actual depth slightly deeper than program depth)
Retract 10mm at 13000 mm/min to prepare head for reverse.
(Use maximum feed rate up to 500in/min or 13000mm/min. Do not use rapid.)
Feed out to 15mm clearance plane at 100% Feed Rate.

MAIN PROGRAM

M06 T6	Tool change to tool #6
M00	Program stop
M03 S500	Spindle forward rotation 500 RPM
G8	Ramp off (or 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
G00 G90X25.Y-25.Z15.	Rapid in absolute to hole position X25, Y-25 and Z15 clearance plane
M98 P4 L1	Repeat sub program 04 one time
G00 Y-75.	Rapid to next hole.
M98 P4 L1	Repeat sub program 04 one time

Sub Program 0004

G90	Absolute movement
G00 Z1.	Rapid to 1mm above hole
G01 Z-30.F1000.	Feed in at 100% feed rate
G01 Z-20.F13000.	Fast retract 10mm
G01 Z15.F1000.	Feed out at 100% feed rate to clearance plane
M99	Return to main program

Bore Cycle Programming

For Bore cycle programming steps 1-5 are the same as in Reduced Cycle Time Programming.

6. In the main program use the bore cycle (G85 for example) at each hole location. Be sure to use the proper clearance plane "CP" shown in figure on preceding page for your tapping attachment.

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.

Fadal Machines: Use G8 to cancel ramp for tapping. G9 will turn ramp on again if desired for other operations.

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 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	-		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 CORPORATION-ISO 9001 CERTIFIED: 802 CLEARWATER LOOP, POST FALLS, ID 83854
 PHONE: (800) 854-6019 OR (208) 773-2951, FAX: (208) 773-3021, E-MAIL: info@tapmatic.com, WEB: www.tapmatic.com

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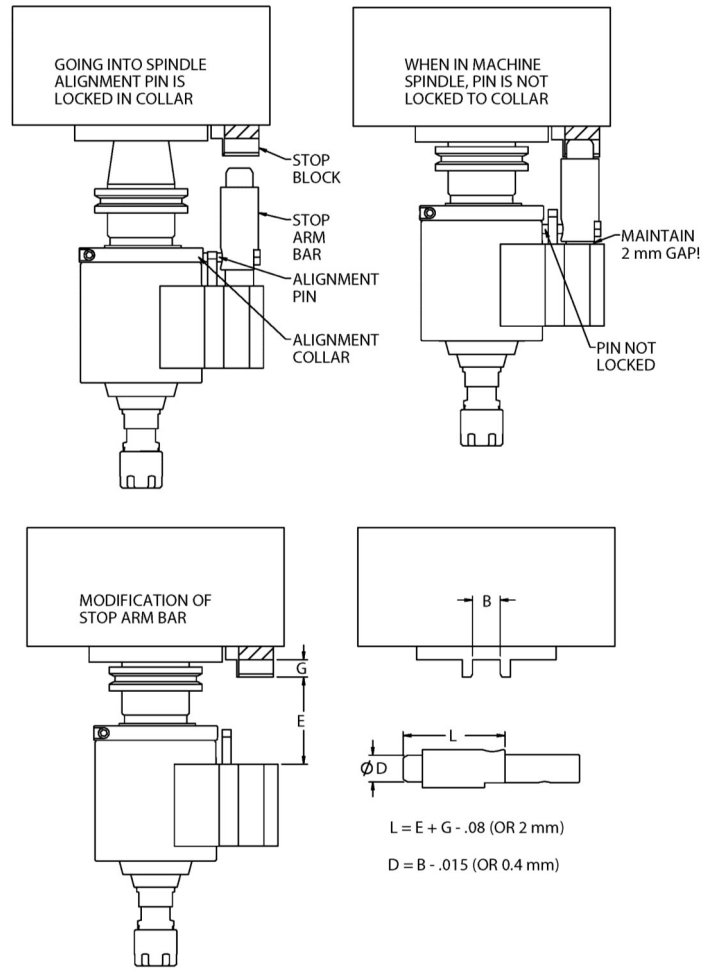
Installation Instructions

In order for the RCT model to reverse, a stop arm is used to prevent the housing from rotating. To allow the tool to travel through an automatic tool change and the stop arm to find the stop location next to your machine spindle, an alignment collar locks the stop arm in a specific orientation. The alignment collar can be adjusted so that its slot is in any position in relationship to the NC shank. When the tool is out of the machine spindle, the Alignment pin is engaged in the slot in the alignment collar. During the automatic tool change, the stop block next to the machine spindle engages the stop arm bar pushing it down against a spring, preventing it from rotating and unlocking it from the alignment collar. This is the position for operation. When the tapping operation is complete the machine spindle will orient for a tool change and this will bring the slot in the alignment collar back in to position to lock with the stop arm when the tapping attachment is removed from the spindle. **The tapping attachments may use standard stop arm assemblies that have a 65mm or 80mm distance from the machine center line to the stop arm center, or we can produce special stop arm assemblies for different offset distances.**

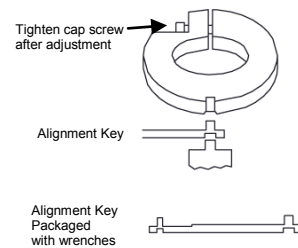
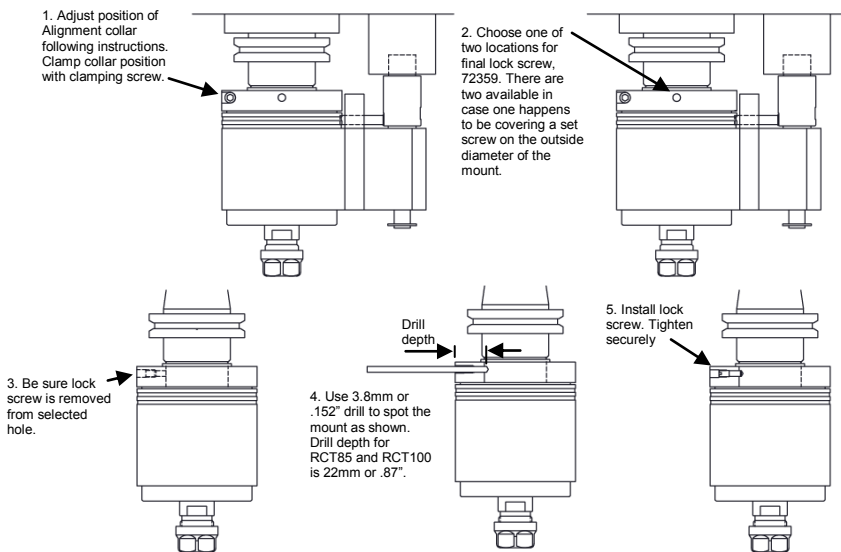
⚠ The following steps involve loading and unloading by hand. Do not attempt an automatic tool change until all steps are completed and clearance has been confirmed. The installation must be stronger than the largest tap. Never attempt to install the tool without first reading all safety instructions for this tool and your machine. Only make automatic tool changes on enclosed machines.

Step 1. Modifying the stop arm: With stop block installed on your machine, measure the dimensions shown at right, E, G and B. The stop arm bar should be removed from the tapping attachment. Use the formula shown at right to calculate length L and diameter D. When machining the end of the stop arm be sure to include a lead in chamfer with length of at least 2.5mm and 30° angle, (60° included).

If your machine does not already have a stop block, Tapmatic offers several standard blocks, or we can make a custom block to fit your specific machine. Please contact a Tapmatic sales engineer. Please check clearances when mounting stop block. It must be positioned on the opposite side of the spindle from the tool changer.



Step 2. Adjusting Alignment collar: With tapping attachment in machine spindle and **with spindle oriented for an automatic tool change**, bring the slot in the collar in to position where it is directly over the alignment pin. There is a key packaged with the wrenches to help line this up. **Then tighten the collar securely. After checking clearance with tool changer and in tool magazine area make several automatic tool changes.**



Step 3. Final locking of alignment collar: Follow the instructions at left to fix the alignment collars position so that it cannot slip and lose orientation.

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Installation Check List

1. Pick proper location on spindle face for mounting the stop block. **It must be on the opposite side from where the tool changer moves in.**
2. Make sure stop arm does not interfere with anything in tool magazine, guarding, doors or adjacent tools.
3. Machine stop arm bar to correct length so that when tapping attachment is in machine spindle the bar is pressed down and alignment pin is unlocked from collar.
4. Set alignment collar so that its slot is directly over alignment pin. **Be sure machine spindle is in tool change orientation position when doing this step.**
5. Test automatic tool change to be sure alignment is correct and there is no interference.
6. Install and check program. Please see programming instructions.

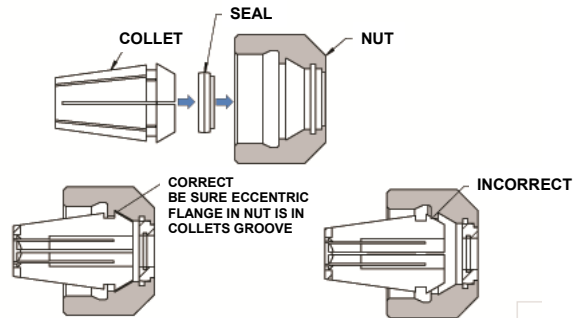
Installing the Tap

Please use only square drive, ERGB collets.

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

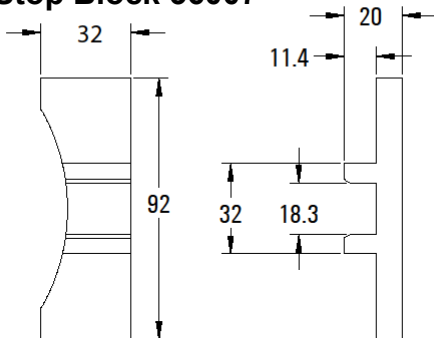
Insert the tap and tighten securely using the two wrenches.

Reduce capacity by 25% if using roll form taps.

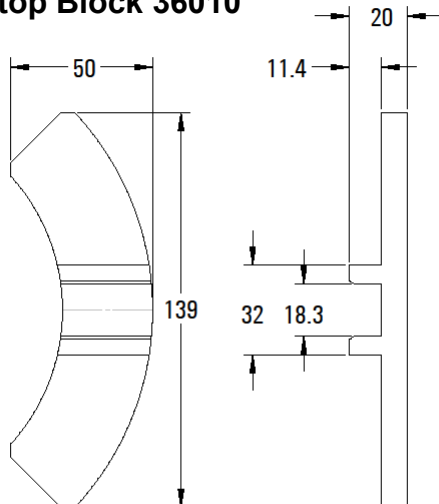


Installation Accessories

Stop Block 36007



Stop Block 36010



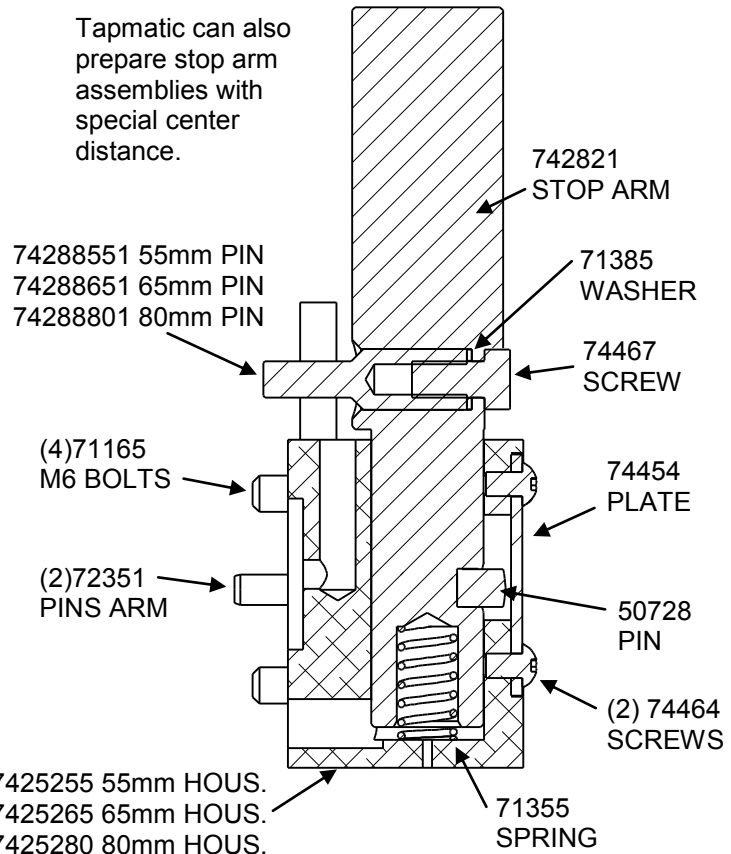
Stop Arm Assemblies for RCT85, 100

Complete Assembly for 55mm Offset 3985551

Complete Assembly for 65mm Offset 3985651

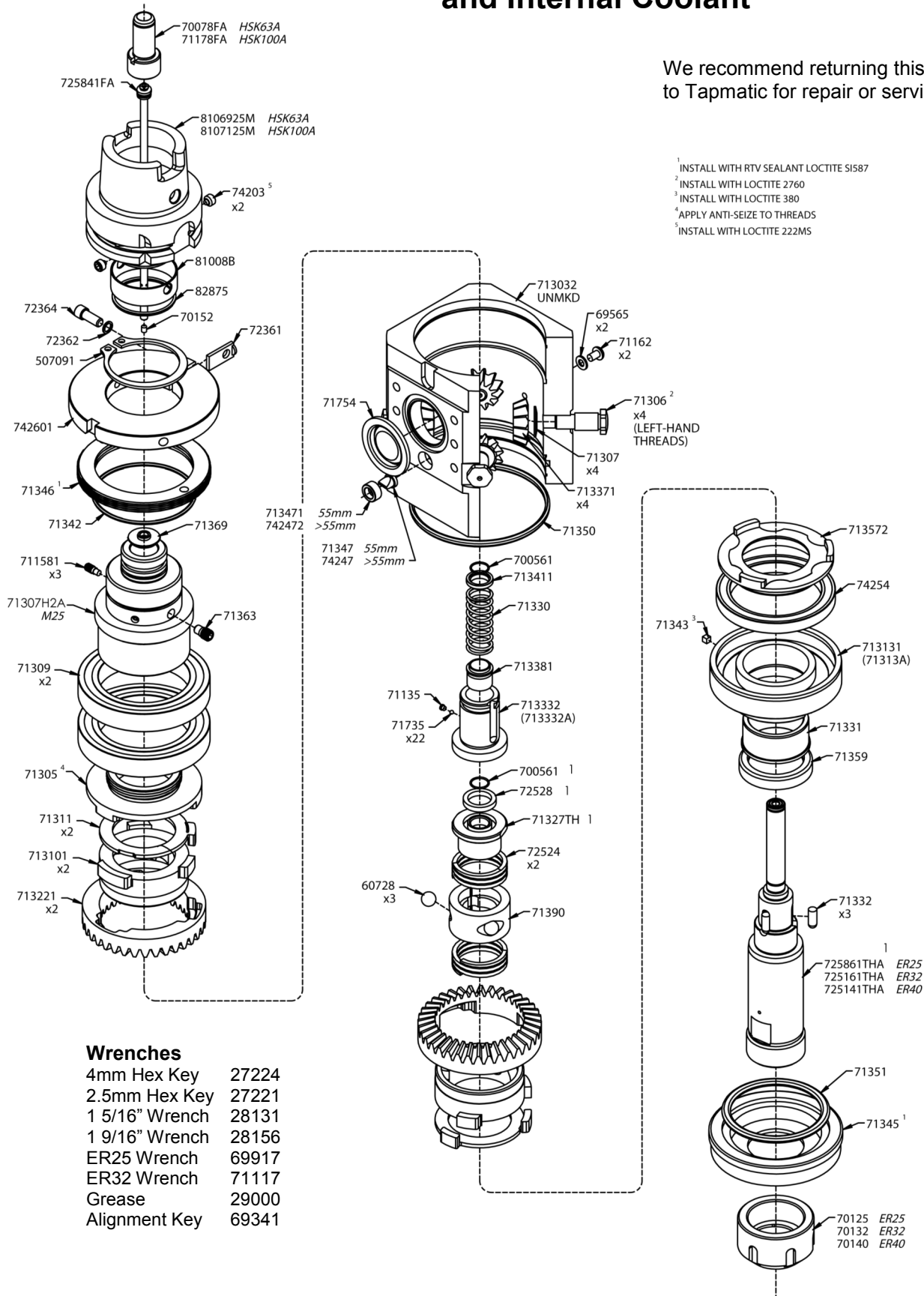
Complete Assembly for 80mm Offset 3985801

Tapmatic can also prepare stop arm assemblies with special center distance.



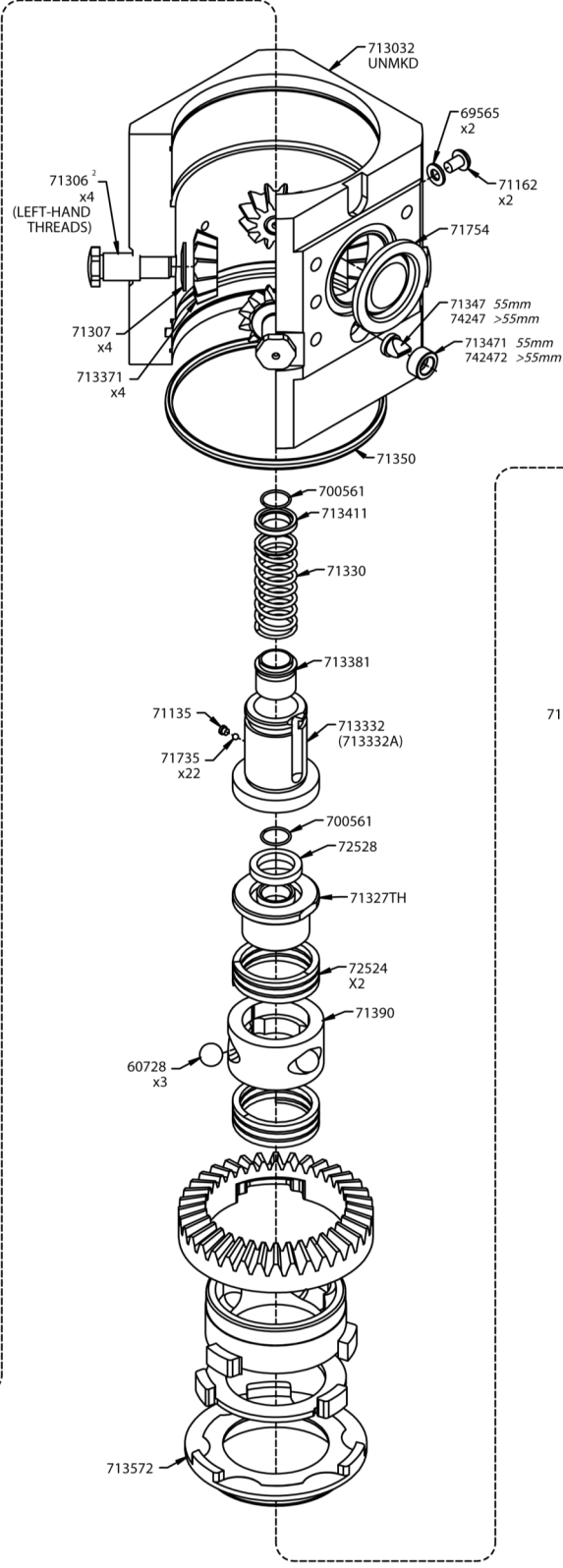
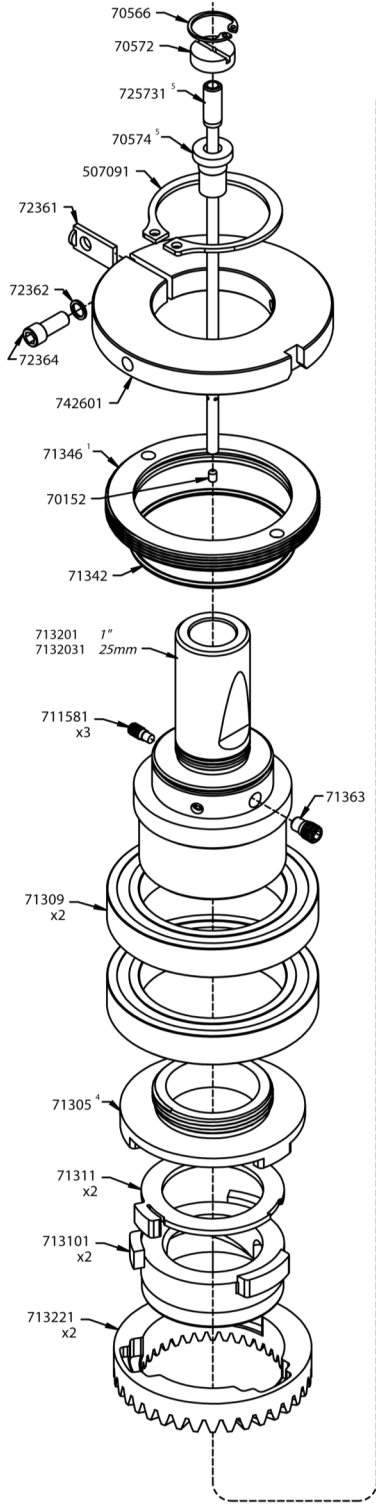
RCT85 and 100 with HSK Shank and Internal Coolant

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



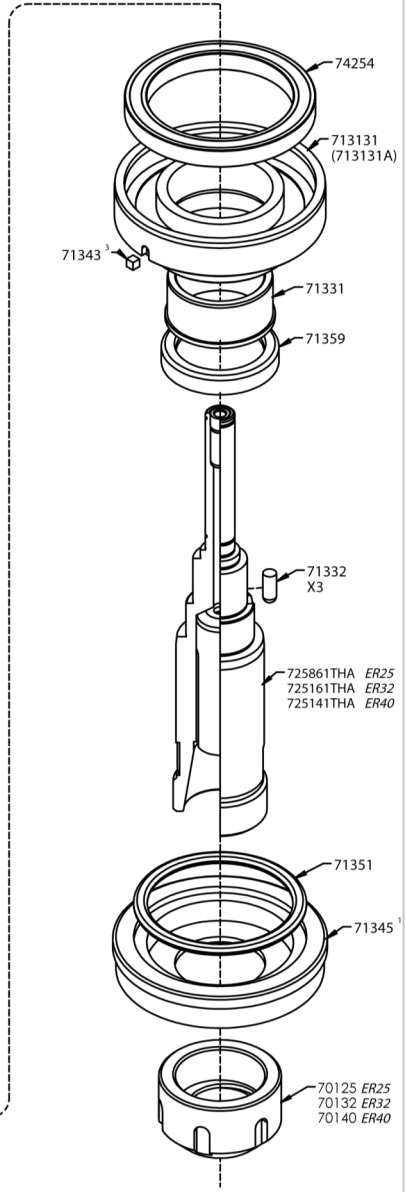
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RCT85 and 100 with Straight Shank and Internal Coolant



- 1 INSTALL WITH RTV SEALANT LOCTITE SI587
- 2 INSTALL WITH LOCTITE 2760
- 3 INSTALL WITH LOCTITE 380
- 4 APPLY ANTI-SEIZE TO THREADS
- 5 APPLY HIGH PERFORMANCE NITRILE RUBBER GLUE BETWEEN COOLANT TUBE AND RUBBER SLEEVE

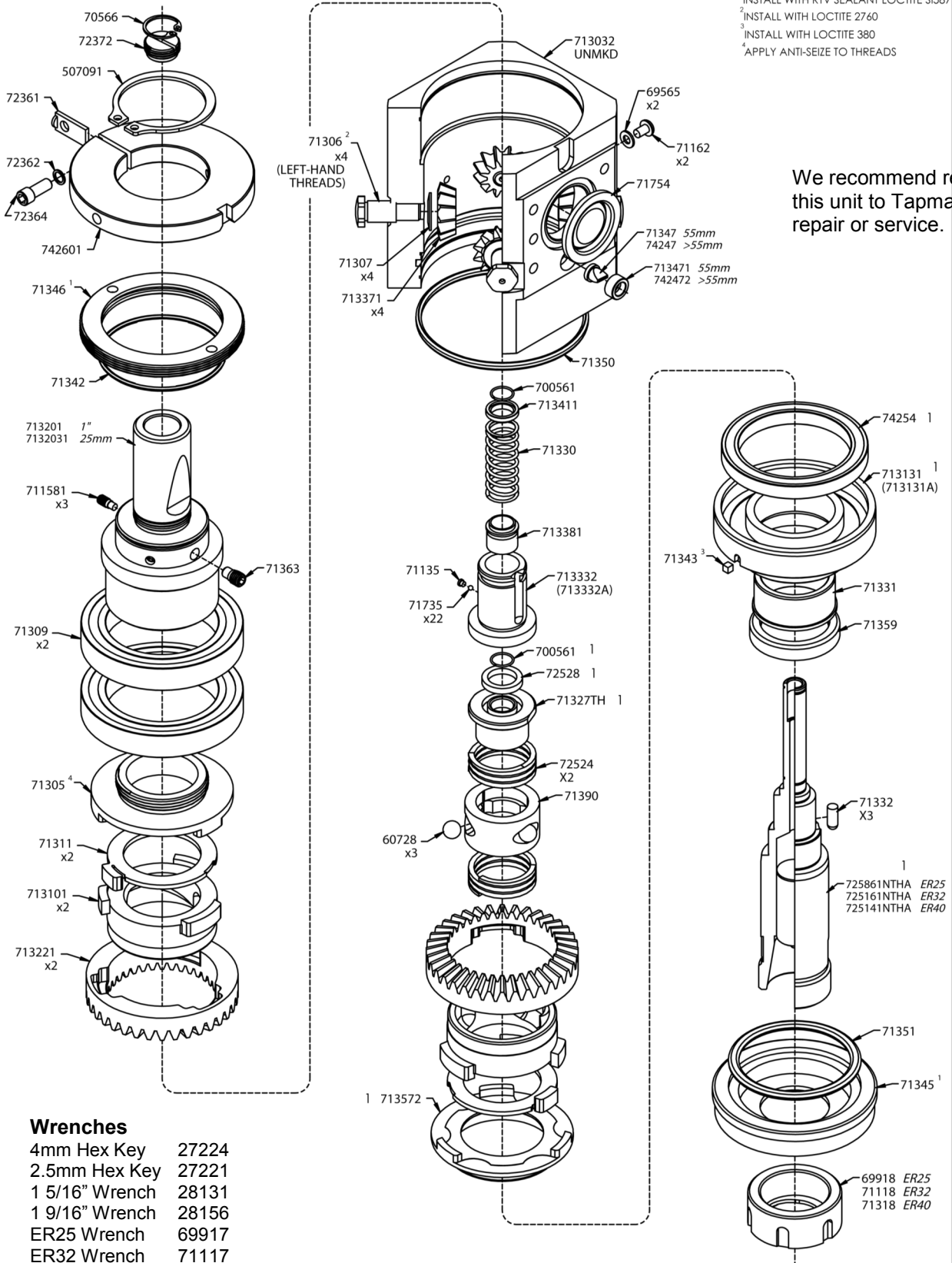
We recommend returning this unit to Tapmatic for repair or service.



Wrenches

4mm Hex Key	27224
2.5mm Hex Key	27221
1 5/16" Wrench	28131
1 9/16" Wrench	28156
ER25 Wrench	69917
ER32 Wrench	71117
Grease	29000
Alignment Key	69341

RCT85 and 100 with Straight Shank Without Internal Coolant



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

Wrenches

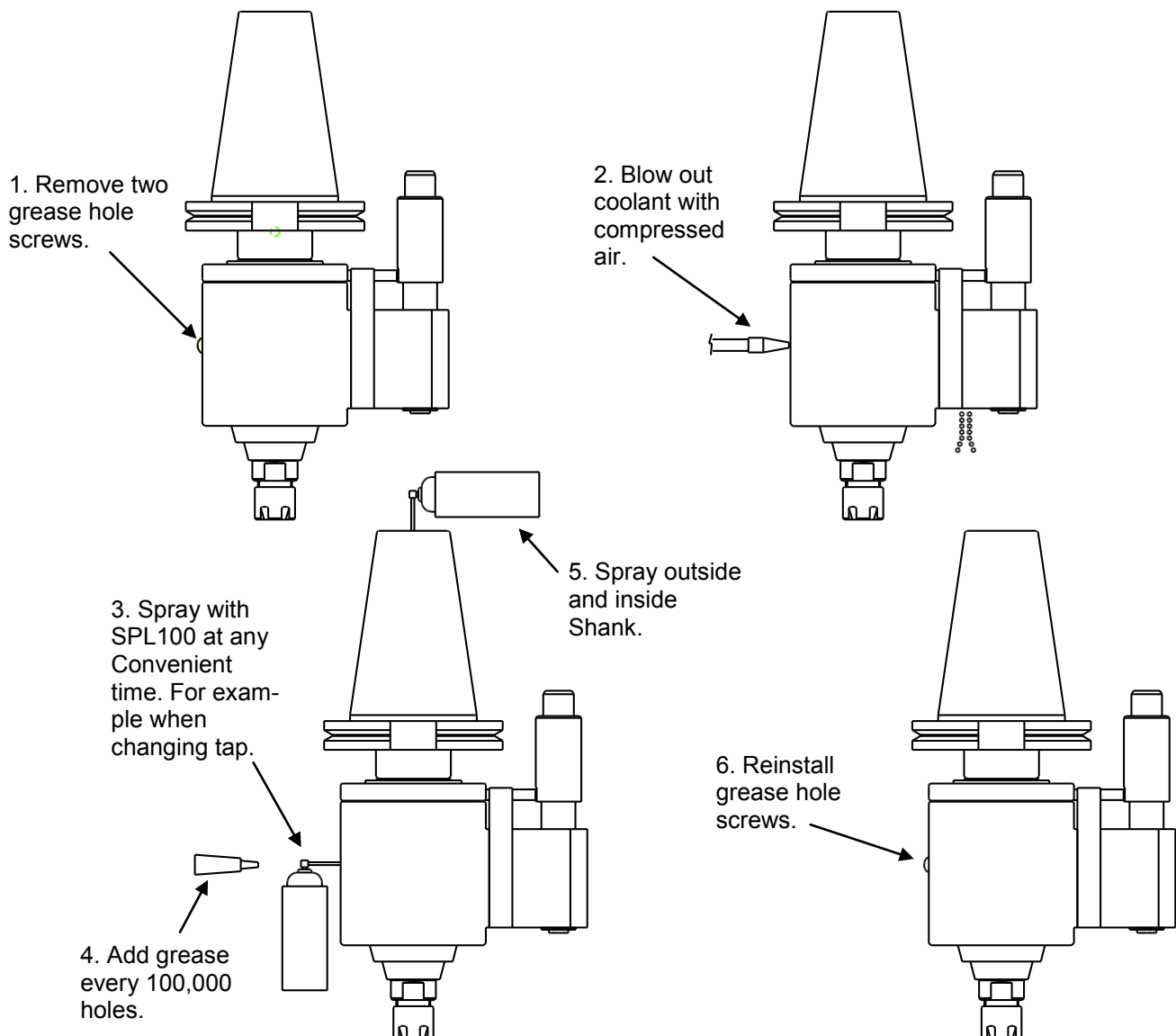
4mm Hex Key	27224
2.5mm Hex Key	27221
1 5/16" Wrench	28131
1 9/16" Wrench	28156
ER25 Wrench	69917
ER32 Wrench	71117
Grease	29000
Alignment Key	69341

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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 Prolong EP2 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 Prolong SPL100 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.



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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 cost by fax or email before the repair is completed.

IMPORTANT: Be sure to return tool complete with collet nut, and if applicable stop arm and back jaw, because otherwise these missing parts would be added to every non-warranty repair.

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.

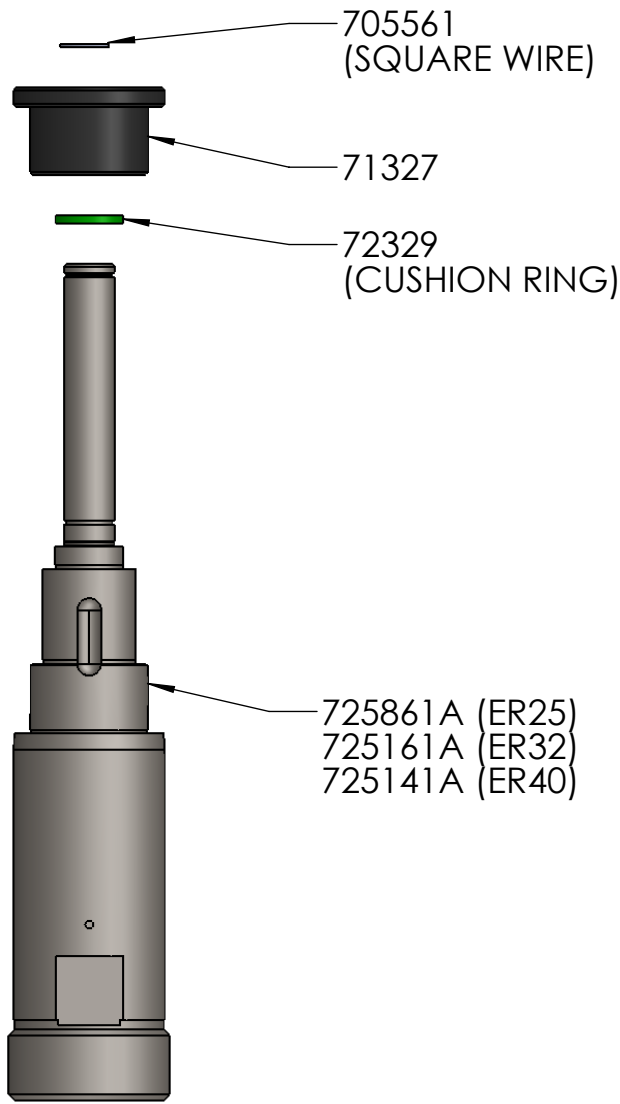
Priority Service: Tapmatic services tools returned for repair in the order in which they are received. All tools will be evaluated and repaired within three weeks from the date they arrive subject to receiving the customer's approval to proceed with the repair.

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

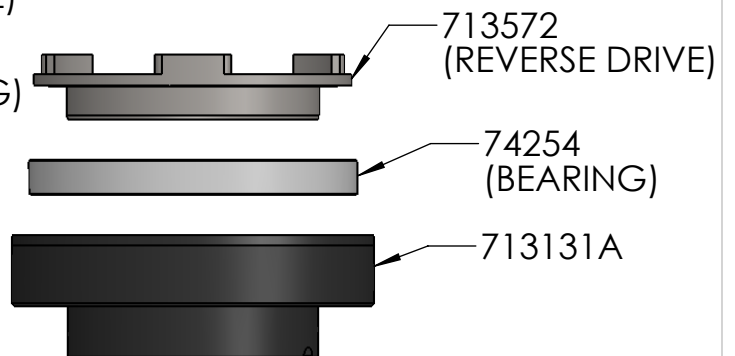
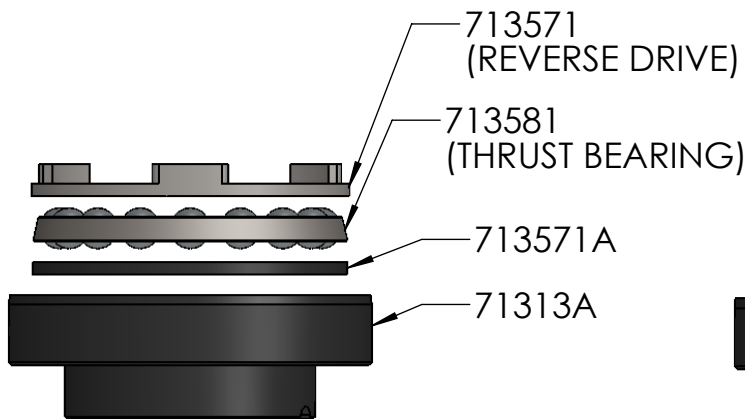
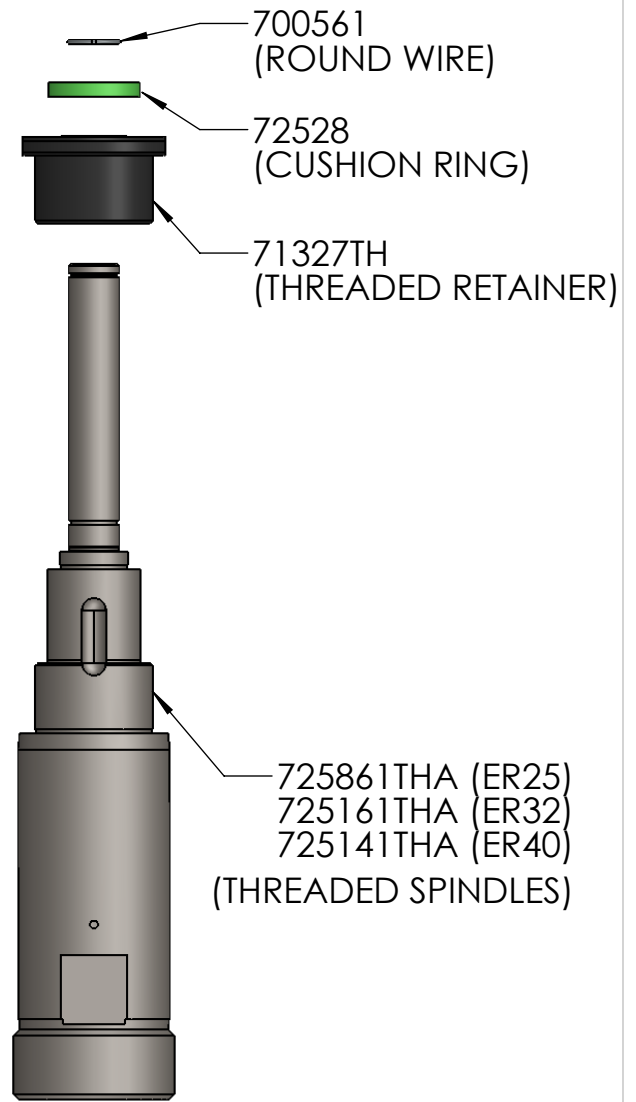
If a repair is sent to us by UPS ground or similar service it can also be given priority. Just call and let us know you need priority service and advise if you would like the tool returned to you by overnight or second day. In the interest of fairness, to all our customers, we ask that you approve shipment by overnight or second day before we agree to upgrade your repair order to priority service. Typical turn around, not including shipping time, for priority repairs is 3 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

ORIGINAL RCT85



NEW RCT85



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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	
		MATERIAL	
NEXT ASSY	USED ON	FINISH	
APPLICATION		DO NOT SCALE DRAWING	

	NAME	DATE
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CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

TAPMATIC CORPORATION POST FALLS, IDAHO		
RCT85 UPDATES		
SIZE A	DWG. NO. RCT85 UPDATES	REV.
SCALE: 1:1.5	WEIGHT:	SHEET 1 OF 1