

Safety & Operator Instructions

R3, R5, R7 Self-Reversing Tapping Units



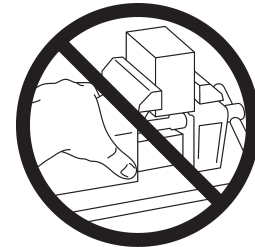
WARNING To Avoid Serious Injury And Ensure Best Results For Your Tapping Operation, Please Read Carefully *All* Operator & Safety Instructions Provided For This Tapping Unit as well as all other safety instructions that are applicable, especially those for your machine tool.

1. Proper Clothing: The rotating spindle of a machine tool 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.

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



3. 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.



4. Proper Stop Arm / Torque Bar Installation For Self-Reversing Attachments On Conventional Machines:

Never extend the length of the standard stop arm supplied with your tapping attachment. A lengthened stop arm could break free, hitting the operator and causing serious injury.



Never hold the stop arm by hand. On reversal, full power of the machine is transmitted through the stop arm and the operator could be seriously injured.



Always mount a torque bar to hold the tapping attachment's stop arm from rotating. The torque bar **must** be mounted securely to the table or quill of your machine. The torque bar installation **must** be stronger than the largest tap in the capacity range of your tapping attachment. Order Tapmatic Torque Bars shown.



1.) Torque Bar Attached To Table



2.) Quill Clamp Installation

Quill Clamp Capacity	Order No.	Max Tap Size	Torque Bar Assembly	Order No.	Max Tap Size
1 1/2" - 2 3/8"	29099	1/2"	Table Mount	29097	3/4"
2 3/8" - 4 1/2"	290991	3/4"	Heavy Duty Table Mount	29096	1 3/4"

5. To Install Collets In Rubber-Flex Collet Chucks:

Some collets vary slightly in outside diameter. This does not affect capacity or performance. To install, put collet into the end of the drive spindle and push the tap chuck nut over it until the threads are engaged. Screw nut down completely. This will seat collet properly. Then back off nut to install tap. Collets must be ordered separately.

6. Inserting Tap In Rubber-Flex Collet Chucks:

Follow instructions to avoid excessive wear on back jaws when using tapping heads with collet chucks. Insert the tap into the tap chuck of the attachment so that the back jaws will engage the square of the tap. Hand tighten the chuck nut first, then tighten the back jaw on those units with adjustable back jaws. Then using the wrenches provided tighten the chuck nut firmly. When tightened correctly, the rubber flex collet should absorb most torque pressure, preventing the back jaws from being damaged by excessive torque. If the tap you are using has a male center at the square end, you must remove the point to assure maximum engagement in the back jaws.

Rubber-Flex Collet

For Use With Tapping Attachments With Rubber-Flex Collet Spindles.

Collet Series	Catalog No.	Collet Range	
		Tap Size	Shank Size
#21000 Series For R3 attachments with capacities (#0-1/4")	21600 ★	#0-#8 Standard	.098-.177
	21700 ★	#10-1/4" Standard	.177-.256
	21500		.040-.098
	21200		.094-.146
#22000 Series For R5 attachments with capacities (#6-1/2")	22100 ★	#0-1/4" Standard	.139-.257
	22200 ★	1/4"-1/2" Standard	.253-.383
	22300		.090-.180
	22000		.194-.318
#24000 Series For R7 attachments with capacities (#10-5/8")	24100 ★	#10-1/2" Standard	.176-.383
	24000 ★		.280-.500
	24300	5/16"-5/8"	.110-.280

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7. Continuous High Production Manual Tapping: Models for use on conventional drill press or milling machines. Speed is a critical factor in tapping. Please always refer to recommended tapping speed chart. Tapmatic Torque Control Reversing Tapping Attachments employ a planetary gear reversing mechanism that increases speed by a 1.75 x 1 ratio. This means that a machine speed of 2,000 RPM results in a reversing speed of 3,500 RPM. It is strongly recommended that you consider the **AVERAGE TAPPING SPEED** rather than machine speed when calculating your cycle time. For example, if machine speed is 1,500 RPM, reverse speed is 2,625 RPM, making your **AVERAGE TAPPING SPEED 2,062 RPM**. You must not exceed the maximum allowable speed marked on your tapping attachment.

8. 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.

9. Be aware of any other applicable safety instructions / requirements.

10. The tapping attachment housing, drive spindle and tap itself can become hot to the touch after operation. Use caution when removing the attachment from the machine or handling.

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 drilled hole?
 - 4. Is machine speed correct?
 - 5. Is machine feed correct?
 - 5. Is machine stop set properly so tap releases in neutral rather than bottoming in work piece or fixture?
 - 6. Is work piece held rigidly against rotation and upward movement?
 - 7. Is drilled hole the correct size?
 - 8. Is clearance between the drilled hole and tap sufficient at start position to allow the tap to clear the hole upon retraction?
 - 9. Is the stop arm of the tapping attachment held rigidly against rotation by the torque bar extending from the machine quill or table? Machine torque bar must be stronger than the largest tap to be used.
 - 10. Is the proper cutting fluid or coolant being used for lubricating the tap?
 - 11. If a bottom hole is being tapped is there sufficient chip clearance?
 - 12. Is the correct Tapmatic model for the specific job requirement being used? (Capacity should be reduced 25% for roll form taps.)
 - 13. If a torque control attachment is being used, is the torque set correctly so tap will not break if accidentally bottomed?
 - 14. If depth control feature is employed, is it set correctly to cooperate with the machine stop, provide the total thread depth required and prevent engagement with bottom?
 - 15. Is machine retraction correct for tapping attachment being used?

References for this Safety Information include but are not limited to:

American National Standards Institute
ANSI B11.8-1983 (Adopted May 31, 1983
by Department of Defense)

Coastal Video Communications Corporation
Machine Guarding Copy Right 1994

Society Of Manufacturing Engineers
Tool and Manufacturing Engineers Handbook
Volume 1 Machining
(Library of Congress Catalog No. 82-060312)

Installation

R3, R5, R7 Self-Reversing Tapping Units

This tapping attachment can be used on all types of manually operated machines with rotating non-reversing spindles. It can also be used in many applications that are automated or semi-automated, such as air feed drill units. It should not be used on machines which reverse the spindle on the back stroke or on machines which are automated and have no controlled back stroke. **IMPORTANT:** Always follow all instructions from your machine tool's manufacturer when using this tapping attachment.

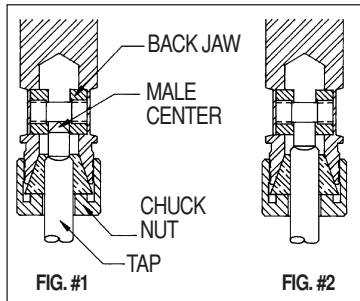
MOUNTING THE STOPARM: Reversing attachments require a stop arm to activate the planetary gear reverse which has a 1.75 to 1 reverse ratio. To assure the best performance of this reversing mechanism, it is extremely important that a short stop arm (as furnished with the unit) be employed. A truarc ring (#40) is provided to hold the stop arm (#32) in place. Extend strong torque bar from machine quill or machine table to engage short stop arm. **DO NOT LENGTHEN STOP ARM.** Also, clamp part to be tapped securely as full power of the machine is transmitted in reverse. **DO NOT HOLD PART BY HAND. DO NOT HOLD STOPARM BY HAND.**

INSTALLING THE ARBOR IN TAPER MOUNT UNITS: Make sure that the taper mount of the unit and the arbor itself are clean and free of oil or grease. Then, with a twisting motion, insert the arbor into the tapping attachment. The twisting motion allows the air entrapped in the taper to be released. When the arbor is inserted completely, several sharp blows should be made on the tang with a lead hammer to make sure the arbor is seated firmly. It is important that this procedure be followed, as the taper may be damaged if slippage occurs. Occasionally, for large units, it may be necessary for the attachment to be pinned to the arbor. This may be done with a #4 Taper Pin.

INSERTING THE TAP:

Rubber Flex Collet Spindle: If the tap you are using has a male center as in Fig. #1, the point should be ground off so that the tap square will be engaged by the back jaws as shown in Fig. #2.

After removing the point, insert the tap into the tap chuck of the attachment so that the back jaws will engage the square of the tap. Hand tighten the chuck nut first. Then tighten back jaws with hex key. Then using wrenches provided, tighten chuck nut. This procedure will assure true running of the tap. Note: Reduce capacity 25% for roll form taps.



TAPPING SPEEDS: The Tapping Attachment has been designed to operate properly at recommended tapping speeds. Please refer to chart for the recommendations for specific tap sizes. **Do not exceed the maximum speed shown on the tapping attachment.**

SETTING THE PRE-SELECTED TORQUE CONTROL:

This attachment has a spring loaded ball detent clutch. Driving torque adjustments are made by tightening or loosening the knurled cap (#2) at a setting approaching the tap size to be used, then progressively tighten until the unit will drive a sharp tap to the desired depth. When the desired torque has been determined, the knurled cap may be friction locked in place by a set screw (#5). If later during the operation the clutch slips, it is evident that the tap is dull and should be immediately exchanged for a sharp tap, but the clutch should not be tightened further.

When the proper torque is determined for a specific job, this reference point may be noted to save setup time in the future.

THROUGH HOLE TAPPING: Tapping with this attachment does not require that the operator apply any lead pressure on the tap during the tapping operation. The free axial float in the attachment will automatically permit the tap to follow its own lead. The operator merely moves the machine's spindle behind the lead of the tap until the desired depth is reached. To reduce wear within the taper, it is recommended that a short, quick, upward movement of the machine spindle be made during transition from drive to reverse. The tap will return to a forward rotation as soon as it is withdrawn from the hole.

BOTTOM HOLE TAPPING: For accurate and efficient bottom hole tapping, a machine feed stop should be used to allow the attachment's spindle to disengage in neutral before the tap bottoms in the hole. To achieve this, set the machine stop so that the machine feed plus the attachment's self-feed will equal the desired thread depth. This greatly simplifies the tapping operation, and affords maximum tap protection.

The amount of self-feed built into each of the attachments is as follows: R3 self-feed is 5/16", R5 self-feed is 7/16" and R7 self-feed is 9/16".

Allow for these maximum self feeds when setting your machine stop. Then check the depth of your first hole and make any necessary final adjustment to the machine stop. Please note that you can re-enter a previously threaded part when necessary without cross threading because of the R models re-entry cushion.

If the clutch should slip before the tap reaches the desired depth, check to see that the hole is the correct size, not packed with chips, and that the tap is sharp and undamaged. The torque control clutch is designed as a safety device to prevent tap breakage in case the tap accidentally engages bottom. We do not recommend using the clutch for repetitive bottom hole tapping unless absolutely necessary.

LUBRICATION: This unit is pre-packed at the factory and only needs periodic additions of grease to maintain proper lubrication. Approximately every 600 hours, partially disassemble the unit, per disassembly instructions #4 and #5 and clean Ball Bearing (#9), Gear Carrier sub-assembly (#13), and Reversing Sleeve (#12). Add a small amount (from 1/4 to 3/4 ounce) of #2 multipurpose lithium grease and reassemble. Do not over-lubricate- excess grease will create internal friction and overheating.

TAP LUBRICATION: To insure maximum tap life, the proper lubricant should be used. We recommend Dry-Cut from MQL Systems A Division Of Tapmatic. Call For FREE Sample.

REMOVAL OF TAPERED ARBORS: Removal of the arbor from the Jacobs taper in a tapping attachment will generally require striking the arbor with a soft metal rod. Hold the tapping attachment, with the arbor pointed away, in one hand and strike the arbor sideways on tang or in relief area, with a brass rod grasped in the other hand. Numerous blows may be required. **DO NOT STRIKE THE TAPPING ATTACHMENT.**

Stubborn arbors and arbors installed with Loctite will require the application of heat. Using a soft flame propane torch, evenly heat the interface area where the arbor enters the attachment. (300°F will be required to break down the Loctite.) After applying heat, resume striking the arbor with the soft metal rod until the arbor loosens. Always use caution when handling heated parts.

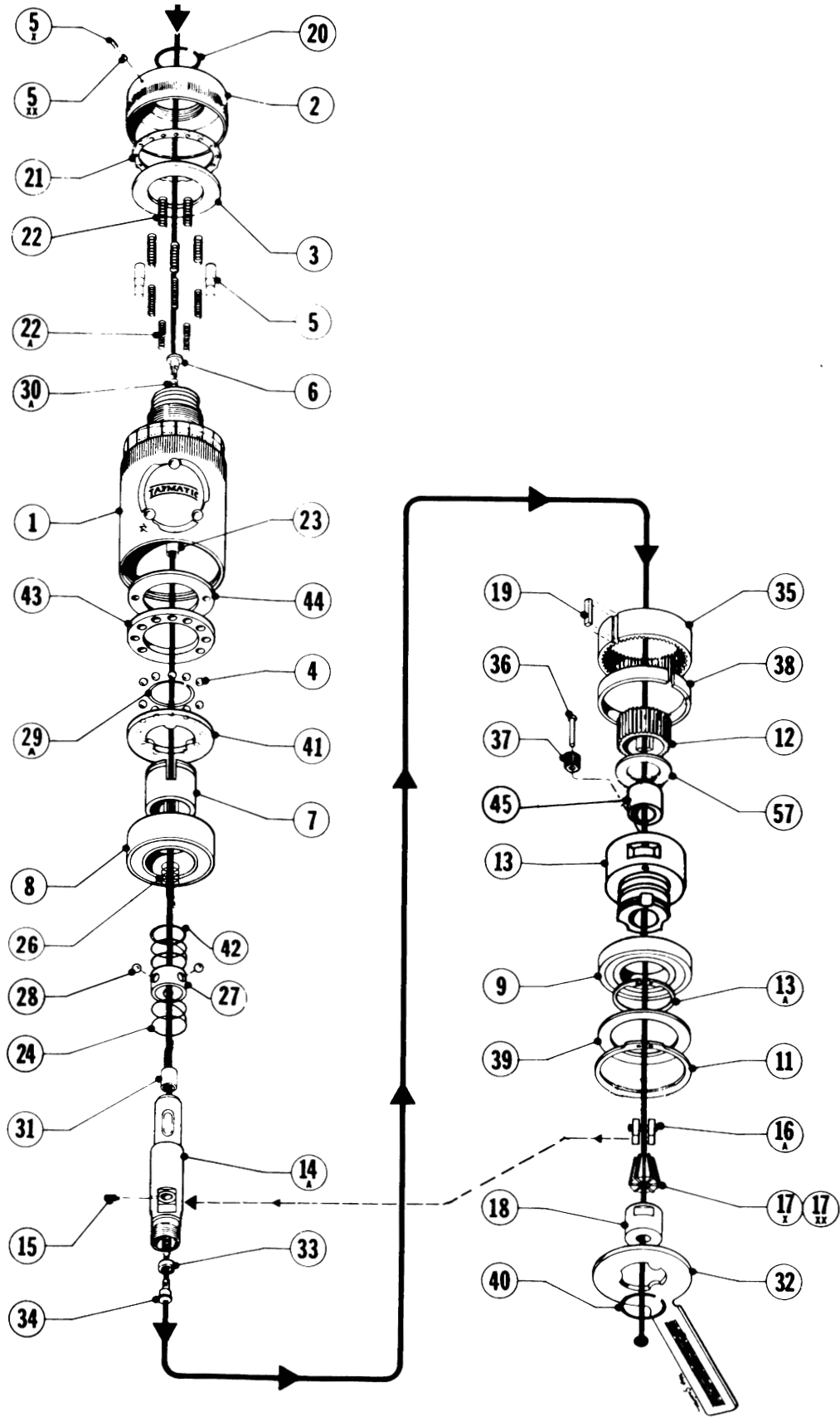
MAXIMUM TAPMATIC TAPPING SPEEDS**

Size	Cast Iron and Bronze	Plastics and Aluminum	Steel	Stainless Steel	Brass	Copper	Size	Cast Iron and Bronze	Plastics and Aluminum	Steel	Stainless Steel	Brass	Copper
0 -80	2000	2000	2000	1900	2000	2000	1/4 -20	1000	1200	750	400	1200	1200
1 -64	2000	2000	2000	1600	2000	2000	1/4 -28	1200	1200	850	400	1300	1200
1 -72	2000	2000	2000	1600	2000	2000	5/16 -18	850	1100	650	300	1200	1100
2 -56	1900	2000	1800	1300	2000	2000	5/16 -24	900	1200	700	350	1300	1200
2 -64	2000	2000	1900	1300	2000	2000	3/8 -16	700	900	550	250	1200	900
3 -48	1800	1900	1700	1000	1900	1900	3/8 -24	750	1000	600	300	1200	1000
3 -56	1900	2000	1800	1100	2000	2000	7/16 -14	600	800	450	200	950	800
4 -40	1700	1800	1500	900	1900	1800	7/16 -20	650	850	475	225	1000	850
4 -48	1800	1900	1600	1000	2000	1900	1/2 -13	500	650	400	200	850	650
5 -40	1650	1700	1600	800	1800	1700	1/2 -20	575	750	425	200	1000	750
5 -44	1750	1800	1700	900	1900	1800	9/16 -12	450	600	350	175	800	600
6 -32	1500	1600	1500	700	1700	1600	9/16 -18	500	675	375	175	900	675
6 -40	1650	1700	1600	800	1800	1700	5/8 -11	375	500	300	150	700	500
8 -32	1400	1400	1200	600	1400	1400	5/8 -18	450	600	325	150	800	600
8 -36	1500	1500	1300	700	1500	1500	3/4 -10	325	400	250	125	575	400
10 -24	1300	1400	1100	500	1500	1400	3/4 -16	375	475	275	125	650	450
10 -32	1400	1500	1200	600	1500	1400	7/8 -9	275	350	200	90	500	350
12 -24	1300	1400	900	400	1500	1400	7/8 -14	300	400	250	100	550	400
12 -28	1400	1500	1000	500	1500	1400	1 -8	250	300	175	75	425	300
							1 -14	275	350	200	100	475	350

**These maximum tapping speeds are for optimum tapping conditions for the tap size, tap pitch and material involved. Optimum conditions are (1) a through hole or blind hole with generous chip clearance; (2) thread depth is one times a tap diameter or less; (3) free machining material; (4) tap drill diameter for 60% thread; (5) use of LPS Tapmatic Cutting Fluid or Coolant; and (6) proper designed tap. Reduce speed accordingly for each non-optimum condition.

Parts Listing

R3, R5, R7 Self-Reversing Tapping Units



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IDENT	PART NAME	R3	R5	R7
1	Housing- #6JT	60301BB (1)	60501BB (1)	-
1	Housing-DINB16	60301BG (1)	60501BG (1)	-
1	Housing- #33JT	60301BE (1)	60501BE (1)	-
1	Housing 5/16-24	60301BH (1)	-	-
1	Housing- 3/8-24	60301BI (1)	-	-
1	Housing- 1/2-20	60301BJ (1)	60501BJ (1)	60701BJ (1)
1	Housing- 5/8-16	60301BK (1)	60501BK (1)	60701BK (1)
1	Housing- 3/4-16	-	60501BL (1)	60701BL (1)
1	Housing- 7/8-20	-	-	60701BM (1)
1	Housing- #3JT	-	-	60701BC (1)
2	Clutch Adjustment Cap	60302 (2)	60502 (2)	60702 (2)
3	Spring Plate	60303	60503	60703
4	Clutch Balls	60328 (10 set)	60728 (12 set)	60728 (16 set)
5	Clutch Pin	60305 (2 set)	60505B (2 set)	607051 (2 set)
5X	Lock Set Screw	50305A (3)	50305A (3)	50305A (3)
5XX	Lock Set Screw Plug	503051	503051	503051
6	Spring Hanger	60306B	60506B	60706B
7	Clutch Sleeve	60307	60507	60707
8	Ball Bearing	60308	60708	60708
9	Ball Bearing (Narrow)	51305	50709	60709
10	Spacer	-	605101	60710B
11	Truarc Ring	61311	50611	60711
12	Reversing Sleeve	60312	60512	60712
13	Gear Carrier	603133A	605133A	607133A
13A	Bearing Retaining Ring	603131	58774	607131
14A	Drive Spindle	603143A (4)	605143A (4)	607143A (4)
15	Back Jaw Retainer	60315	50315	50315
16A	*Back Jaw	603161	56516	50716
17X	Rubber Flex Collet (Small)	21600	22100	24100
17XX	Rubber Flex Collet (Large)	21700	22200	24500
18	Tap Chuck Nut	50318	56518	50718
19	Key	50319	51523	60719
20	Stop Ring	60320	58744	50920
21	Adjustment Thrust Bearing	60321	60521	60721
22	*Clutch Spring (Light)	-	-	60722 (8 set)
22A	*Clutch Spring (Heavy)	603221 (10 set)	607221 (12 set)	607221 (8 set)
23	Guide Spindle	60323B	60523B	60723B
24	*Ball Driver Springs	60324 (2 set)	60524 (2 set)	60724 (2 set)
26	*Cushion Spring	60326B	60526B	60726B
27A	Ball Retainer	603273	605273	607273
28	Feed Balls	60328 (3 set)	60528 (3 set)	60728 (3 set)
29	Retaining Ring	60340	60529	60729
30A	*Return Spring	60330B	60530B	60730B
31	Guide Spindle Bearing	60331B	60531B	60731B
32	*Stop Arm	60332	60532	60732
33	Spring Bearing	60333	50734	60733
34	Lower Spring Hanger	60334	50706	50706
35	Ring Gear	60335	60535	60735
36	Gear Pins	603363 (3 set)	605363 (3 set)	607363 (3 set)
37	Planet Gears	60337 (3 set)	60537 (3 set)	60737 (3 set)
38	Spacer	60338	-	-
39	Bearing Cover	60339	60539	60739
40	Retaining Ring	60329	60529	607131
41	Clutch Driver	60341	60541	60741
42	Spirolox Ring	60342	60542	60742B
43	Ball Clutch Plate	60343	60543	60743
44	Friction Washer	603441	60544B	60744
45	Bronze Insert	60345 (1)	69531 (5)	60745 (1)
57	Thrust Washer	61357	61557	61757
WRENCH KITS	Stop Arm	(1) 60332	(1) 60532	(1) 60732
	Truarc Ring	(1) 603131	(1) 58774	(1) 607131
	Wrench	(2) 28062 5/8"	(1) 28097 31/32"	(1) 28131 1 5/16"
	Wrench	-	(1) 28075 3/4"	(1) 28097 31/32"
	Spring Puller	(1) 29090	(1) 29090	(1) 29090
	Hook	(1) 29080 #10 Hook	(1) 29085 #5 Hook	(1) 29085 #5 Hook
	Key	(1) 27093 3/32" Key	(1) 27125 1/8" Key	(1) 27156 5/32" Key
	Key	(1) 27078 5/64" Key	(1) 27078 5/64" Key	(1) 27078 5/64" Key
	Spanner Wrench	(1) 60360 Spanner Wrench (Thd Mount)	(1) 29070 Spanner Wrench (Thd Mount)	(1) 60760 Spanner Wrench (Thd Mount)

*These items are considered normal wear replacement parts and are not covered under warranty.

- (1) Housing only available as an assembly with Ident. #5 and #23.
- (2) Clutch Adjustment Cap only available as an assembly with Ident #5X and #5XX
- (3) Lock Set Screw comes with Ident. #5XX.
- (4) Drive Spindle only available as an assembly with Ident 31.
- (5) Bronze Insert #45 sold only as an assembly with Gear Carrier #13.

INSTRUCTIONS FOR DISASSEMBLY

1. For partial disassembly, screw clutch adjustment cap (2) fully upward to relieve clutch spring pressure. For total disassembly, remove top ring (20), unscrew and remove clutch adjustment cap (2).
2. Remove thrust bearing (21), spring cap (3), and clutch springs (22) and (22A). Note: For reassembly there is an equal number of light and dark colored springs alternating in the clutch spring holes.
3. From the lower end remove tap chuck nut (18), collet (17X or 17XX), back jaw retainer screw (15), and back jaw (16A).
4. Remove retaining ring (40), stop arm (32), tuarc ring (11), and bearing cover (39).
5. Grasp three lobes of gear carrier (13) and lift out complete gear carrier subassembly. Remove reversing sleeve (12.)
6. Remove spacer (38). Remove ring gear (35) and key (19), noting for reassembly that key (19) keys ring gear to keyway in housing (1)
7. Remove return spring (#30A) by threading spring puller (supplied with unit) into tapped hole in part (#34), and pulling out to expose spring for removal with spring hook (also supplied with unit).
8. Grasp spindle and lift out spindle and bearing clutch subassembly. CAUTION- If bearing- clutch sub assembly is stuck in place, rap bottom of housing on wood surface to loosen.
9. Carefully invert the housing over a clean receptacle, rap housing if required, and clutch balls (4), ball clutch plate (43), and friction washer (44) will fall out.

INSTRUCTIONS FOR ASSEMBLY

1. Reverse procedure for disassembly.

Repair Policy

R3, R5, R7 Self-Reversing Tapping Units

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, by United Parcel Service and enclose the following statement with your purchase order: "**Authorization given to repair and return tool without notification if total repair cost does not exceed 40% of the cost of a new tool.**" Tapmatic will repair the tool and call to request your credit card # for invoicing.

Important: Be sure to return the tool complete with the tap chuck nut, back jaw and if the tool is a reversing unit, include stop arm. Otherwise, we will add these missing parts 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 tapping attachment cannot be repaired, at the customer's request, Tapmatic will return the disassembled parts. We are not able to reassemble tapping attachments 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 tapping attachments 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 the 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 return shipment by overnight or second day before we agree to upgrade your repair order to priority service. Typical turnaround, 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.

TAPMATIC®

The Tapping Specialists

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