

OPERATOR INSTRUCTIONS

FOR REVERSIBLE TAPPING ATTACHMENT MODEL: HR 3 & 4

This tapping attachment can be used on all types of manually operated machines with rotating non-reversing spindles.

INSTALLING MORSE TAPER ARBOR

Clean the matching taper. Then with a twisting motion, insert the arbor into the attachment. Strike the tang end of the arbor with a plastic hammer to lock it firmly. The hex nuts are provided to remove the arbor.

MOUNTING THE ATTACHMENT TO THE MACHINE

Mount the STOP ARM on the attachment. A circlip is provided to hold the STOP ARM in place. Now mount the attachment on the machine spindle. Ensuring that the taper is free of oil and grease. Extend strong stop bar from machine spindle of machine table to engage short STOP ARM. **DO NOT HOLD STOP ARM BY HAND. DO NOT LENGTHEN STOP ARM, DO NOT HOLD JOB BY HAND.** Clamp the job securely as full power of the machine is transmitted in reverse.

INSERTING THE TAP

A. MODEL : HR :

Insert the desired tap into the chuck of the attachment. The square of the tap is fit and centered between adjustable square nuts & further tighten Chuck Nut which forces the Collect to hold the tap shank with a firm grip. Slacken adjustable square nut in order to center the tap. Check that the adjustable square Nuts only grip the square portion of the tap. Then firmly tighten the Adjustable square nuts.

B. MODEL : HRF :

The Spindle of the attachment has a quick change device. Press the bush of the adaptor (Model: QA) and insert the tap. Now insert the adaptor with the tap into the spindle of the attachment. To disengage the adaptor, push the bush of the adaptor again.

For each tap with varying shank dimension a different adaptor is required.

TORQUE SETTING:

The torque adjustments are made by tightening or loosening the cup nut (3) at the upper end of the attachment. When the desired torque has been determined, the cup nut may be locked in place by a grub screw (5). Proper procedure when beginning tapping operation is to loosen the cup nut so that all the graduations on the body are visible. Then tighten the cup nut progressively until the attachment will drive a sharp tap. When the proper torque is determined for a specific job. This reference point may be noted to save set up time in future. 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.

THROUGH HOLE TAPPING:

Press the tap lightly against the mouth of the hole. The free axial float is provided in the attachment which 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 the wear of the attachment it is recommended that a short, quick upward movement of the machine spindle be made during transition from forward to reverse.

The tap will return to a forward rotation as soon as it is with-drawn 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 machine feed plus the attachment's self feed will equal the desired thread depth.

If clutch should slip before the tap reaches the desired depth, check to see that the hole is of 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 hits to the bottom. We do not recommend using the clutch for repetitive hole tapping unless absolutely necessary.

TAPPING SPEED

The factors to be considered when trying to determine the best tapping speed are :

- * Material to be tapped.
- * Pitch of the thread.
- * Selection of tap :
 - Length of chamfer on tap
 - Rake Angle
 - Standard, spiral or spiral point
- * The percentage of full thread to be cut.

The tapping speed must be reduced as the Percentage of full thread to be cut is increased.
- * Drilled hole with respect to length of the hole to be tapped.
- * Cutting fluid
- * Straight or tapered thread to be tapped.

This tapping attachments have been designed to operate at max 800 R.P.M.

CUTTING FLUID :

The cutting fluid works two ways. Heat generated as the tap proceeds into the hole both by the deformation of the material and by friction. The fluid must dissipate this heat. The fluid must also lubricate so that the friction between the tap, the chips and the hold is minimized.

Be sure to use large quantities of cutting fluid under pressure for tapping. The higher the cutting speed, the deeper the hole and the tougher the material, the more cutting fluid you will need.

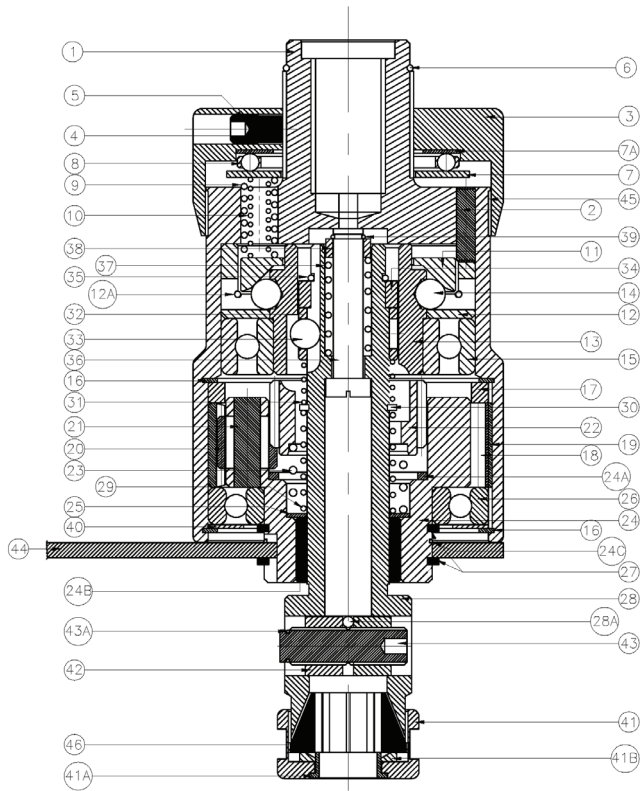
LUBRICATION :

This attachment is prepacked at the factory and only needs periodic - additions of grease to maintain proper lubrication. Approximately every 600 Hrs partially disassemble the attachment and clean ball bearing and gears. Add a small amount of grease and reassemble. Do not over lubricate. Excess grease will create internal friction and over-heating.

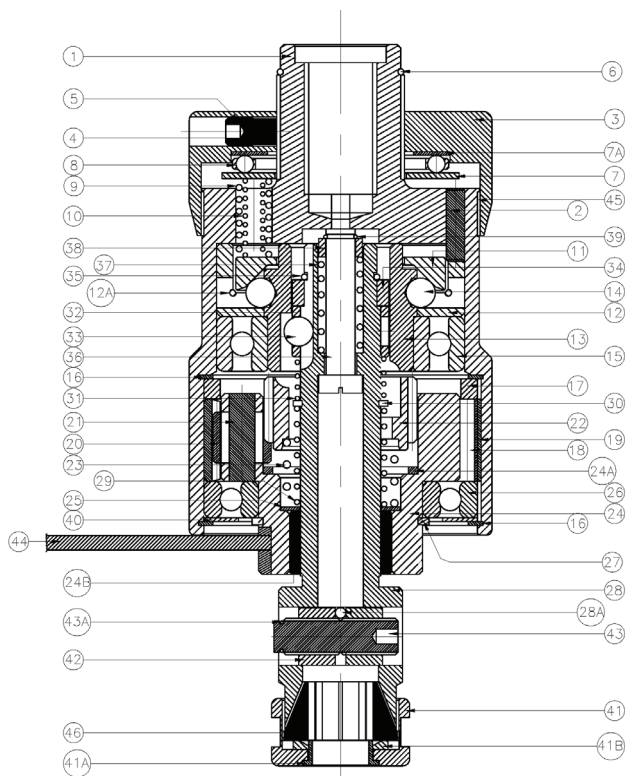
SERVICE OVERHAUL AND REPAIR

Since overhaul and repair are time consuming for someone not familiar with the attachment, we recommend that they be sent to us. We will be glad to get your tapping attachment operational again in shortest possible time.

HR 3



HR 4



NOMENCLATURES

Part No.	Part Name	Ordering Numbers			
		HR3	HRF3	HR4	HRF4
1.	Body	1 HR3 (a)	1 HR3 (a)	1HR4(a)	1HR4(a)
2.	Pin for Body	2 HR3 (a)	2 HR3 (a)	2HR4(a)	2HR4(a)
3.	Cup Nut	3 HR3	3 HR3	3HR4	3HR4
4.	Pin for Cup Nut	4 HR3	4 HR3	4HR4	4HR4
5.	Grub Screw	5 HR3	5 HR3	5HR4	5HR4
6.	Lockring for Cup Nut	6 HR3	6 HR3	6HR4	6HR4
7.	Washer for Cup Nut	7 HR3	7 HR3	7HR4	7HR4
7A.	Washer for Cup Nut	7 AHR3	7 AHR3	7AHR4	7AHR4
8.	Thrust Bearing	8 HR3	8 HR3	8HR4	8HR4
9.	Pressure Spring Outer	9 HR3 (9 Nos.)	9 HR3 (9 Nos.)	9HR4(6Nos)	9HR4(6Nos)
10.	Pressure Spring Inner	10 HR3 (9 Nos.)	10 HR3 (9 Nos.)	10HR4(6Nos)	10HR4(6Nos)
11.	Pressure Plate	11 HR3	11 HR3	11HR4	11HR4
12.	Clutch Driver	12 HR3	12 HR3	12HR4	12HR4
12.A	Lockring for Clutch Driver	12 AHR3	12 AHR3	12AHR4	12AHR4
13.	Forward Driver	13 HR3©	13 HR3©	13HR4©	13HR4©
14.	Balls for Forward Driver	14 HR3(6Nos)	14 HR3(6Nos)	14HR4(6Nos)	14HR4(6Nos)
15.	Ball Bearing for Forward Driver	15 HR3©	15 HR3©	15HR4©	15HR4©
16.	Circlip for Body	16 HR3(2Nos)	16 HR3(2Nos)	16HR4(2Nos)	16HR4(2Nos)
17.	Spacer	17 HR3	17 HR3	17HR4	17HR4
18.	Gear Ring	18 HR3	18 HR3	18HR4	18HR4
19.	Key for Gear Ring	19 HR3	19 HR3	19HR4	19HR4
20.	Pinion	20 HR3 (b) 3 Nos.	20 HR3 (b) 3 Nos.	20HR4(b)3Nos	20HR4(b)3Nos
21.	Pin for Pinion	21 HR3 (b) 3 Nos.	21 HR3 (b) 3 Nos.	21HR4(b)3Nos	21HR4(b)3Nos
22.	Reverse Gear	22 HR3	22 HR3	22HR4	22HR4
23.	Spring for Reverse Gear	23 HR3	23 HR3	23HR4	23HR4
24.	Carrier	24 HR3 (b)	24 HR3 (b)	24HR4(b)	24HR4(b)
24 A	Ring for Carrier	24 AHR3 (b)	24 AHR3 (b)	24AHR4(b)	24AHR4(b)
24 B	Bush for Carrier	24 BHR3 (b)	24 BHR3 (b)	24BHR4(b)	24BHR4(b)
24 C	Spacer for Carrier	24 CHR3 (b)	24CHR3 (b)	-	-
25.	Washer for Carrier	25 HR3 (b)	25 HR3 (b)	25HR4 (b)	25HR4 (b)
26.	Ball Bearing for Carrier	26 HR3 (b)	26 HR3(b)	26HR4 (b)	26HR4 (b)
27.	Circlip for Carrier	27 HR3 (2 Nos.)	27 HR3 (2 Nos.)	27HR4	27HR4
28.	Spindle	28 HR3	-	28HR4	-
28.A	Pin for Spindle	28 AHR3	-	28AHR4	-
29.	Expansion Spring	29 HR3	29 HR3	29HR4	29HR4
30.	Lockring for Spindle	30 HR3	30 HR3	30HR4	30HR4
31.	Spring for Ball Carrier	31 HR3	31 HR3	31HR4	31HR4
32.	Ball Carrier	32 HR3	32 HR3	32HR4	32HR4
33.	Balls for Ball Carrier	33 HR3 (3Nos)	33 HR3(3Nos)	33HR4(3Nos)	33HR4(3Nos)
34.	Washer for Spindle	34 HR3	34 HR3	34HR4	34HR4
35.	Lockring for Washer	35 HR3	35 HR3	35HR4	35HR4
36.	Stud for Spindle	36 HR3	36 HR3	36HR4	36HR4
37.	Comp. Spring for Stud	37 HR3	37 HR3	37HR4	37HR4
38.	Washer for Stud	38 HR3	38 HR3	38HR4	38HR4
39.	Lockring for Stud	39 HR3	39 HR3	39HR4	39HR4
40.	Thrust Washer	40 HR3	40 HR3	40HR4	40HR4
41.	Chuck Nut	41HR3(d)	-	41HR4(d)	-
41A.	Bush for Chuck Nut	41AHR3 (d)	-	41AHR4(d)	-
41B.	Washer for Chuck Nut	41BHR3 (d)	-	41BHR4(d)	-
42.	L-R Nuts	42 HR3	-	42HR4	-
43.	L-R Stud	43 HR3	-	43HR4	-
43A.	E-Type Circlip	43AHR3	-	43AHR4	-
44.	Stop Arm	44 HR3	44 HR3	44HR4	44HR4
45.	Torque Strip	45 HR3(a)	45 HR3(a)	45HR4(a)	45HR4(a)
46.	Collet	S413	-	S613	-
	Collet	S453	-	S623	-
47.	Spanner Set	47 HR3	-	47HR4	-
48.	Allen Key	48 HR3	48 HR3	48HR4	48HR4
49.	Arbor				
	(a)M20x2.50/MT2	49(a)HR3	49(a)HR3	-	-
	(b) M20 x 2.50/MT3	49(b) HR3	49(b) HR3	49(b)HR4	49(b)HR4
	(c) M20x2.50/MT4	49© HR3	49© HR3	49b©HR4	49©HR4

	(d) M20x2.50/MT5	-	-	49(d)HR4	49(d)HR4
	(e) JT3/MT3	49(e) HR3	49(e) HR3	-	-
	(f) JT3/MT4	49(f) HR3	49(f) HR3	-	-
	(g) JT4/MT4	-	-	49(g)HR4	49(g)HR4
	(h) JT4/MT5	-	-	49(h)HR4	49(h)HR4
50	Nut for Arbor	50HR3	50HR3	50HR4	50HR4
51.	Spindle	--	51 HRF3	-	51HRF4
52.	Pressure Block	--	52 HRF3	-	52HRF4
53.	Spring for Pressure Block	--	53 HRF3	-	53HRF4
54.	Lockring for Pressure Block	--	54 HRF3	-	54HRF4
55.	Balls	--	55HRF3(3Nos)	-	55HRF4(3Nos)
56.	Knurling Sleeve	--	56 HRF3	-	56HRF4
57.	Spring for Kn. Sleeve	--	57 HRF3	-	57HRF4
58.	Lockring for Kn. Sleeve	--	58 HRF3	-	58HRF4

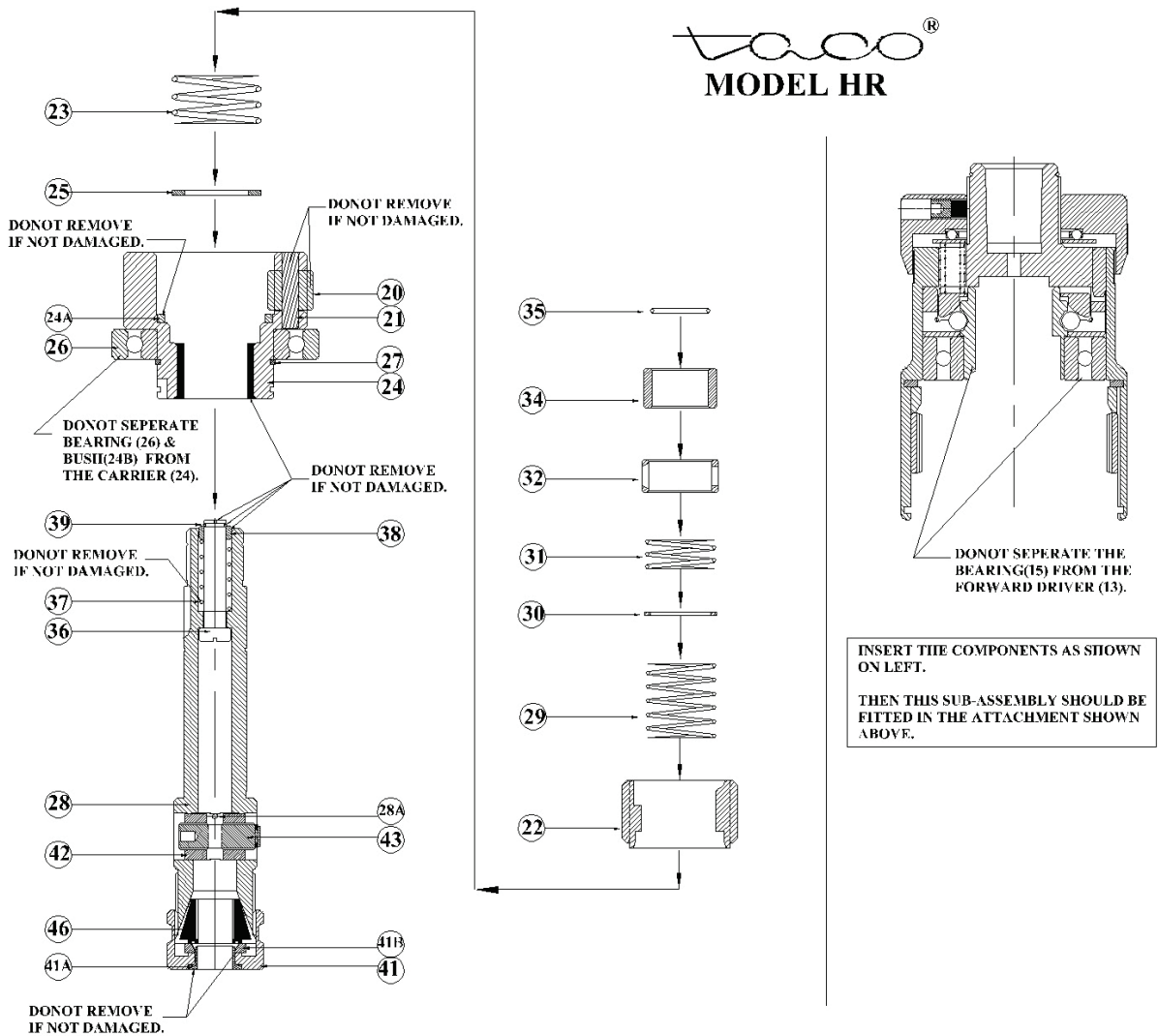
Note: - Following parts are only available as an assembly.

- (a) Body (1) with Part No. (2) and (45).
- (b) Carrier (24) with Part No. (20), (21), (24A), (24B), (24C), (25) and bearing (26).
- (c) Bearing (15) with Part No. (13).
- (d) Chuck Nut (41) with Part No. (41A) and (41B).

Recommended Cutting Speed

Material	Rake Angle	Cutting Speed Speed feet/min Type Tap. - HSS	Cutting Fluid
Steel carbon 0.10 – 0.50 % C 0.50 – 1.10 %C	10° - 15°	20 – 50 20 – 40	Oil emulsion Or Sulphur-base oil
Steel-Chromium Nickel	10° - 15°	10 – 30	Heavy Sulphur-base oil
Steel-Chromium-Molybdenum	10° - 15°	10 – 30	Heavy Sulphur-base oil
Steel-stainless	10° - 15°	10 – 23	Heavy Chloride base oil Sulphur-base oil
Monel Metal	10° - 15°	10 – 23	Heavy Chloride base oil
Steel-cast	10° - 15°	15 – 50	Soluble oil or Sulphur-base oil
Iron-cast	3° - 7°	30 – 80	Dry or Soluble oil
Brass Drawn	10° - 15°	60 – 100	Soluble oil or light base oil
Brass Cast	0° - 5°	60 – 100	Soluble oil or light base oil
Bronze	5° - 10°	35 – 60	Dry
Aluminum Drawn	20° – 30°	60 – 100	Kerosene or Soluble oil
Aluminum Cast	10° – 15°	60 – 100	Kerosene or Soluble oil
Duralumin	10° – 20°	60 – 100	Dry
Bakelite	0° – 5°	30 – 65	Dry
Plastics, Soft	20° - 30°	60 – 70	Dry
The above information are subject to Tapping Speed instructions			

ASSEMBLY PROCEDURE



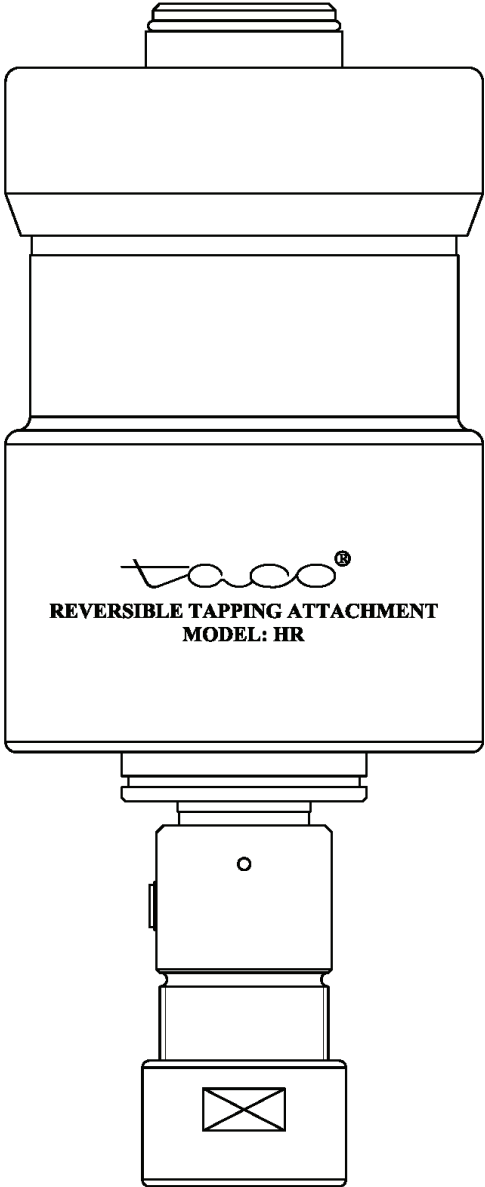
INSTRUCTIONS FOR DISASSEMBLY

1. Remove Lockring (6) and unscrew cup nut (3).
2. Hold unit in vertical position and remove thrust bearing (8), Washer (7) & Washer (7A).
3. Carefully invert unit over a clean receptable, pressure springs (9 & 10) will drop out.
4. From the lower end remove Chuck Nut (41), Collet (46) if necessary then remove E-Type Circlip (43A) and Loosen L-R stud (43) to remove Nuts(42) (For Model HR).
5. Remove Circlip (27), Stop Arm (44), Circlip (16) and Bearing Cover (40). Do not remove Circlip (27) which holds bearing.
6. Lift out complete gear – carrier sub-assembly with spindle unit.
7. Remove Gear Ring (18), key (19) and Spacer (17).
8. Remove Lockring (35), Washer (34), Ball Carrier (32), Balls (33) and Spring (31).
9. Lift out Reverse Gear (22) and Spring (23).
10. Remove Lockring (30), Expansion Spring (29) and Washer (25) for relieving spindle unit from Carrier sub-assembly.
11. Remove Circlip (16) for disassembling clutch sub-assembly. Invert the Body over a clean receptable. Lift off pressure plate (11), Balls (14), Clutch Driver (12). For reassembly pack grease in clutch sub-assembly, so Pressure Plate (11) will stay in place while reassembling Clutch Bearing assembly.
12. Do not disassemble Ball bearings (15 & 26).
13. Do not disassemble pinion (20) – Carrier (24) sub assembly.

INSRTUCTIONS FOR ASSEMBLY

1. Clean and lubricate all parts requiring lubrication thoroughly.
2. Reverse procedure for assembly.

PROCEDURE FOR MOUNTING THE STOP-ARM



**STOP ARM
PART# 44**



**CIRCLIP FOR CARRIER
PART# 44**

