OPERATOR'S MANUAL

M110
2

INCLUDING: INSTALLATION & MAINTENANCE

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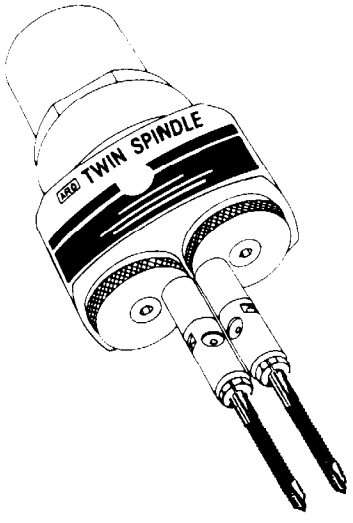
Form: 3257-2

DUAL SPINDLE ATTACHMENT MODEL 48060-1

FOR USE WITH ARO® BANT-A-MATIC® SELF-FEED DRILL

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.



CENTER DISTANCES:
3/8" TO 2-1/8"
(9.5 mm to 54 mm)

TAP SIZES UP TO:
NO. 6 (3.5 mm)

TO ATTACH TO TOOL

REMOVE DRILL CHUCK FROM GEAR SPINDLE. REMOVE SPINDLE NUT (38893). USING A SPANNER TYPE WRENCH UNTHREAD AND REMOVE LOCK NUT (38250) AND FELT SEAL (38895) – R.H. THREADS. ASSEMBLE SPINDLE NUT (38893) TO SPINDLE AND THREAD DRIVING GEAR (47757-21) TO SPINDLE AND TIGHTEN SECURELY – R.H. THREADS. THREAD ADAPTER (47757-321) TO RING GEAR AND BE SURE DRIVING GEAR PROPERLY ENGAGES GEARS IN ADAPTER. TIGHTEN SECURELY.

ASSEMBLE DUAL SPINDLE ATTACHMENT (48057-1) TO ADAPTER ASSEMBLY (48058-1). IMPORTANT – ALTERNATELY TIGHTEN ADJUSTMENT SCREWS (46394-20) APPROXIMATELY 1/2 TURN AT A TIME TO PREVENT DAMAGING THE UNIT. SEE "SPINDLE ADJUSTMENT", PAGE 4.

RECOMMENDED METHOD FOR HOLDING TAPS IN SPINDLES

TO PROPERLY HOLD TAP BIT IN COLLET AND REDUCE THE CHANCE OF SLIPPAGE, INSERT BIT INTO SPINDLE WITH SQUARE END OF TAP SHANK INTO LOCKING INSERT (WHERE APPLICABLE – SMALLER CAPACITY DUAL SPINDLES DO NOT HAVE AN INSERT, ONLY SET SCREWS). TIGHTEN COLLET FIRMLY, THEN TIGHTEN SET SCREWS. NOTE: DO NOT OVERTIGHTEN COLLET. INTENT OF SET SCREWS IS ONLY TO KEEP BIT FROM TURNING COLLETS.

LUBRICATION

OIL RESERVOIRS CAN BE REPLENISHED THRU EITHER SOCKET HEAD SET SCREW (45984) LOCATED ON OPPOSITE SIDES OF THE BODY. THE FELT TYPE OIL RESERVOIRS (46394-26) SHOULD BE SATURATED WITH A GOOD MULTIGRADE 10W/30 OIL AT APPROXIMATELY EVERY 160 HOURS OF USE. USE ONLY MULTIGRADE 10W/30. DO NOT USE GREASE.

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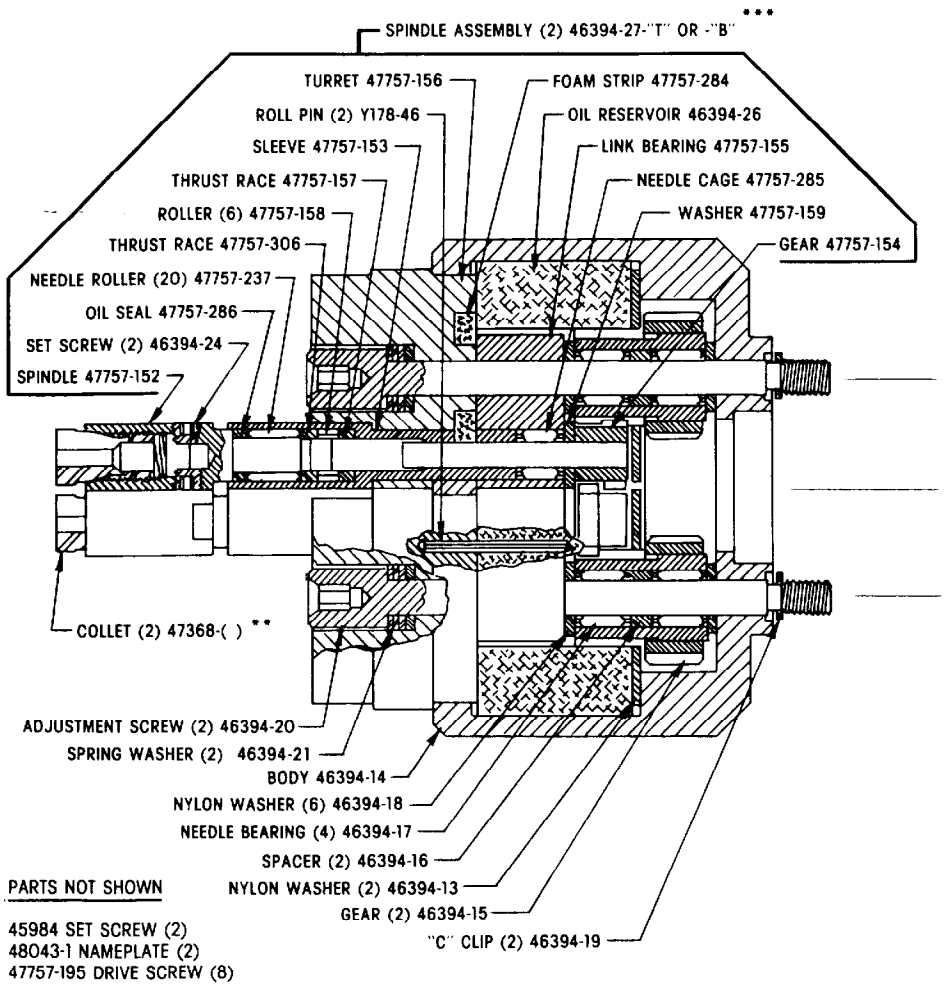
DUAL SPINDLE ATTACHMENT
MODEL 48060-1



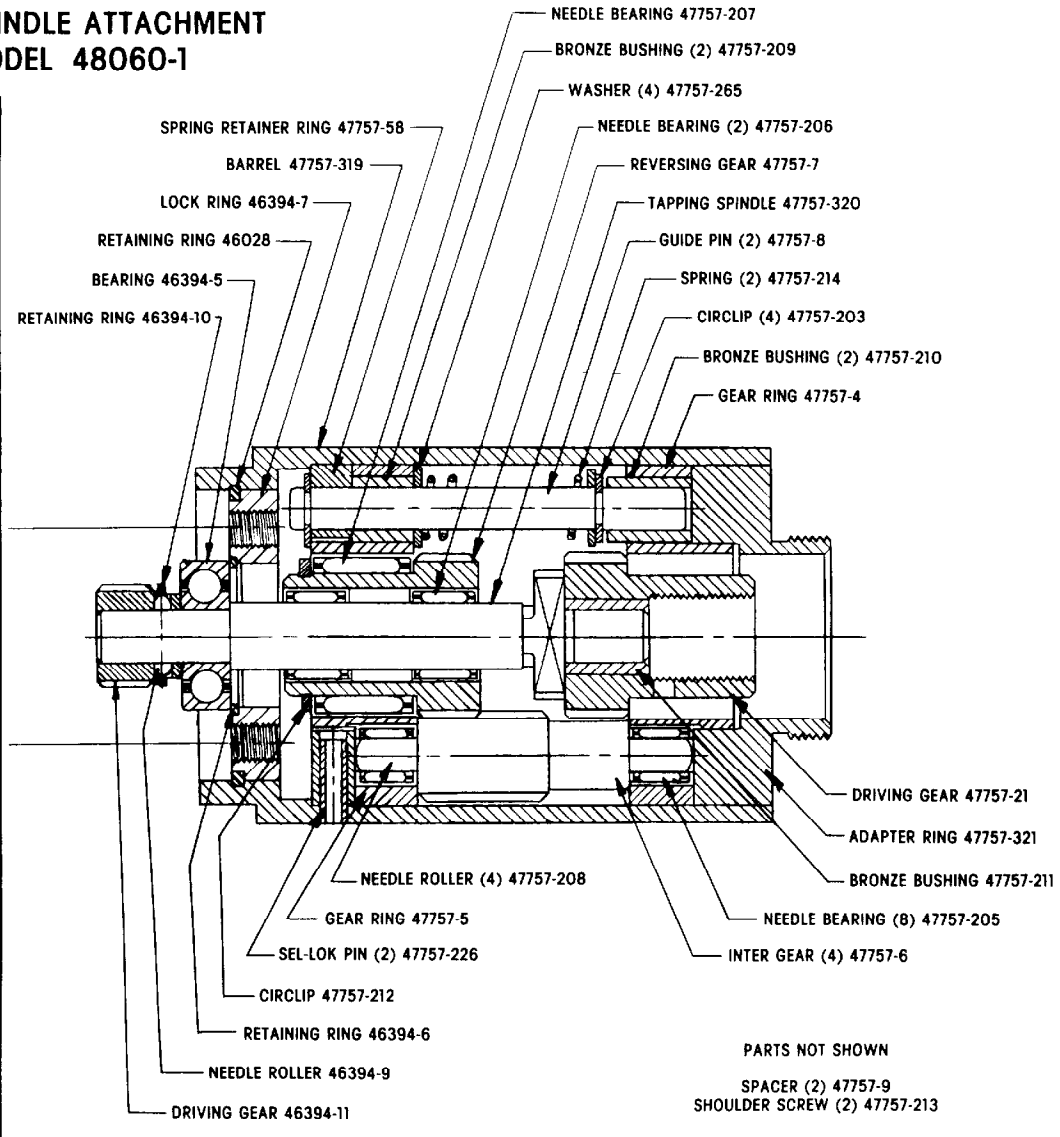
PARTS NOT SHOWN

45984 SET SCREW (2)
48043-1 NAMEPLATE (2)
47757-195 DRIVE SCREW (8)
46058 WRENCH, 3 mm HEX
46394-29 WRENCH, 8 mm OPEN END
46394-30 WRENCH, 8 mm BOX END
46394-32 WRENCH, 2 mm HEX (2)

** NOTE: COLLETS ARE NOT FURNISHED WITH DUAL SPINDLE ATTACHMENT
— — COLLETS MUST BE ORDERED SEPARATELY.

*** -"T" OR -"B" STAMPED ON HOUSING

PARTS ON THIS SIDE OF HEAVY LINE ARE INCLUDED IN TWIN SPINDLE HEAD ASSEMBLY 48057-1



PARTS NOT SHOWN

SPACER (2) 47757-9
SHOULDER SCREW (2) 47757-213

PARTS ON THIS SIDE OF HEAVY LINE ARE INCLUDED IN ADAPTER ASSEMBLY 48058-1

DUAL SPINDLE ATTACHMENT
MODEL 48060-1

DISASSEMBLY

The Dual Spindle Attachment can be serviced without removing the complete assembly from tool. Using 3 mm hex wrench supplied with unit, loosen both Adjusting Screws (43694-20) – IMPORTANT: Alternately unthread Adjusting Screws approximately 1/2 turn at a time or unthread screws simultaneously to prevent damaging the unit and remove dual spindle unit from tool.

Push back on head of Adjusting Screw (46394-21) to compress Spring Washer (46394-21) and expose "C" Clip (46394-19) out of counterbore of Body and remove "C" Clip. Rotate Spindle Turret and at the same time pull back slightly on Turret to locate alignment of Spindle with notch in Body (46394-14) and remove Spindle Assembly from Body. To remove Gear (46394-15) from Body, remove Oil Reservoir (46394-26) and Nylon Washer (46394-13)–bend washer slightly to remove. Needle Cage (46394-17), Spacer (46394-16) and Washer (46394-18) are loose parts and will drop out. DO NOT disassemble Spindle (46394-27-X) unless it is necessary to replace a part.

To disassemble Spindle Assembly (46394-27-X): Using a flat bottom type punch or similar tool and an arbor press, remove Gear (47757-154) from Spindle (47757-152). CARE SHOULD BE TAKEN TO REPLACE GEAR (47757-154) IN THE SAME POSITION WHEN REASSEMBLING. Turret stamped "T", the Gear is assembled with gear teeth up. Turret stamped "B" the Gear is assembled with gear teeth down. Remove Spindle from the Sleeve carefully because the six (6) Rollers (47757-158) are loose parts and will drop out. NOTE: Thrust Race (47757-306) is press fit on Spindle. Using a "C" type washer that properly fits spindle, press Thrust Race off Spindle. Remove Oil Seal (47757-286). If Link Bearing (47757-155) and Sleeve (47757-153) are removed from Turret, it will be necessary to remove the Foam Strip (47757-284) first. Lift one end of Foam Strip and pull so it slides through notch under Link Bearing. Using a proper size punch and an arbor press, remove Link Bearing. Press Sleeve through remaining distance in Turret.

To disassemble Adapter Assembly (48058-1): Remove the Adapter Assembly from the drilling unit (tool). Remove Retaining Rings (46394-6) and (46028) and remove Lock Ring (46394-7) from barrel. Remove two (2) Circlips (47757-203) from the two (2) Guide Pins (47757-8). Pull off Barrel (47757-319). Remove Retaining Ring (46394-10), Needle Roller (46394-9) and Bearing (46394-5). Remove Shoulder Screws (47757-213) to disassemble the remaining adapter parts.

REASSEMBLY

Pack bearings and coat gears with a good grade of bearing grease when assembling. Saturate Oil Reservoirs with a good multigrade 10W/30 oil.

Assembling Spindle (46394-27-X): When fitting the Sleeve (47757-153) it is important that the slot in the Sleeve lines up with the groove in the back face of the Turret. Push Foam Strip (47757-284) into the groove in the Turret (widest side across groove). The center of the strip should be under the Sleeve and the two ends should meet at the point opposite the Sleeve.

Press the Link Bearing (47757-155) over the small end of the Sleeve keeping the 5 mm hole in the Link Bearing aligned with the 5 mm hole in the Turret. To maintain alignment, use a 5 mm pin inserted through the bore in the Link Bearing and the Turret. Assemble Oil Seal (47757-286) to Spindle. Assemble Thrust Race (47757-306) to Spindle and press on up to the shoulder. Be certain Thrust Race is pressed on and squarely seated or premature failure of the bearing may occur. Drop the Thrust Race into the bore of the Sleeve assembled in the Turret. Place a small amount of grease on Spindle and position the twenty (20) Needle Rollers (47757-237) between the Oil Seal (47757-286) and Thrust Race (47757-306). Place a small amount of grease on shoulder between the two Thrust Races and position the six (6) Rollers (47757-158) on Spindle. Slide Spindle into Sleeve insuring Foam Strip is kept out of the way. Place a few drops of oil into sleeve and push Spindle firmly down into Sleeve.

Hold Spindle in position and turn Turret assembly over with gear end up. Apply a small amount of grease to Needle Cage (47757-285) and slide cage over the end of the Spindle into the bore of the Link Bearing. Place Washer (47757-159) over Spindle. Be certain Gear is positioned correctly – position with gear teeth up on Turret stamped "T". Position Gear with gear teeth down on Turret stamped "B". Press Gear on Spindle. IMPORTANT – When pressing Gear on Spindle allow an end play of .001".

Press Roll Pins (Y178-46) into 1/8" dia. holes in Turret. Assemble Set Screws (46394-24) to Spindle.

Insert a dummy Adjusting Screw (46394-20) (or a shaft of same dia.) thru Adapter side of Body to maintain alignment of parts to be assembled into Body and assemble Nylon Washer (46394-18) to dummy screw. Assemble one Needle Cage (46394-17), Spacer (46394-16) and a Needle Cage (46394-17) into Gear (46394-15) and assemble Gear to the dummy screw. Assembly Nylon Washer (46394-13) into Body – Bend Washer slightly to insert into Body and assemble Oil Reservoir (46394-26) into Body.

Assemble Spring Washer (46394-21) and Nylon Washer (46394-18) to Adjusting Screw (46394-20) and assemble adjusting Screw to Spindle Assembly.

Assemble another Nylon Washer (46394-18) to Adjusting Screw. Assemble the Spindle Assembly into Body while holding Adjusting Screw in alignment with dummy screw to maintain parts alignment and using Adjusting Screw to push the dummy screw out of Body. NOTE: Align Spindle Assembly with notch in Body to assemble. After assembling Spindle to Body, depress head of Adjusting Screw and assemble "C" Clips to Screw securing Screw to Body.

Assembling Adapter (48058-1): If Needle Bearings (47757-205) and/or Bronze Bushings are being replaced – press Needle Bearings into Gear Rings (47757-4) and (47757-5) to flush or to .010" below face of Gear Ring. Press short Bronze Bushings (47757-209) into Gear Ring (47757-5) and the long Bronze Bushings into Gear Ring (47757-4). Press Needle Bearings (47757-206) into Reversing Gear (47757-7) – the top Needle Bearing should be pressed flush with the back face of the dogs and should not obstruct the engagement of the dogs. Lightly grease all Needle Bearings with a good grade of bearing grease. DO NOT GREASE BRONZE BUSHINGS. Remove excess grease from bearings as this can affect the performance of the adapter by blocking breather channels. Assemble Reversing Gear into Gear Ring (47757-5) and assemble Circlip (47757-212) to Gear. Be sure Gear rotates freely.Assemble Needle Roller (47757-208) into large end of Inter Gear (47757-6) and press through leaving an equal projection of the Needle Roller at each end of Gear.

Place Adapter Ring (47757-321)/Gear Ring (47757-4) Assembly on working surface with Gear Ring "up" and assemble Inter Gears into Needle Bearings – adjacent and diametrically opposite Gears should be reversed. Assemble Gear Ring (47757-5) to Inter Gears and push together maintaining alignment of Needle Bearings. Assemble Spacers (47757-9) between Gear Rings, assemble Shoulder Screws (47757-213) and tighten sub-assembly. Be sure gears rotate freely. Slide Guide Pins (47757-8) into bushings – Pins must slip freely into bushings. Partially withdraw Guide Pin and assemble Washer (47757-265), Spring (47757-214) and second Washer (47757-265). Seat Guide Pin in bushing, compress Spring slightly and assemble Circlips (47757-203) to Guide Pins. Fit Spindle (47757-320) into assembly and assemble Bearing (46394-5) and Gear (46394-11) onto Spindle and secure with Needle Roller (46394-9) and Retaining Ring (46394-10). Grease gear dog and tapping spindle tangs. Slide Barrel over assembly so that Guide Pins project through Spring Retainer Ring. NOTE: Barrel should be a slide fit. A tight fit will affect the performance of the Tapping Adapter. Using a pair of long nosed pliers pull Guide Pins through Spring Retaining Ring and assemble Circlip (47757-203) to groove. Assemble Lock Ring (46394-7) to Barrel and secure with Retaining Rings (46394-6) and (46028).

NOTE: When assembling Dual Spindle Attachment to Adapter assembly, alternately thread Adjusting Screws (46394-20) approximately 1/2 turn at a time to prevent damaging the unit.

SPINDLE ADJUSTMENT

FOR SIMPLE SPINDLE ADJUSTMENT THE "X" "X" AND "Y" "Y" AXIS OF THE COMPONENT SHOWN IN FIG. 1 SHOULD COINCIDE WITH THE "X" "X" AND "Y" "Y" AXIS OF THE DRILL HEAD AND DRILLING UNIT AS SHOWN IN FIG. 2. THE SPINDLES SHOULD THEN BE ADJUSTED IN THE MANNER SHOWN IN FIGS. 3 AND 4.

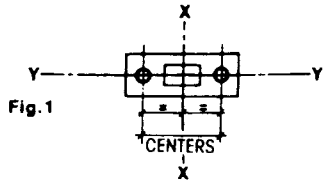


Fig. 1

IMPORTANT –
IF THE PROCEDURE IS NOT FOLLOWED AND BOTH SPINDLES ARE MOVED OUT TO ONE SIDE OF THE HEAD, ANY SUBSEQUENT SPINDLE ADJUSTMENT WILL RESULT IN THE NECESSITY OF HAVING TO RE-ADJUST THE RELATIONSHIP BETWEEN THE DRILLING UNIT AND THE COMPONENT.

FIG. 2 SHOWS THE TWIN SPINDLE HEAD WITH THE SPINDLES SET TO THE MINIMUM CENTERS.

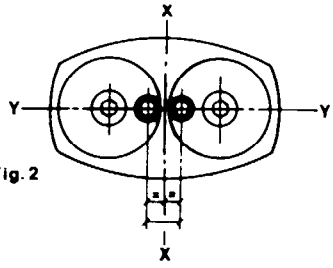


Fig. 2

TO ADJUST THE SPINDLES AS SHOWN IN FIG. 3 LOOSEN BOTH SCREWS "A" AND ROTATE BOTH TURRETS IN THE DIRECTION INDICATED BY THE ARROWS TO THE APPROXIMATE CENTERS THAT ARE REQUIRED.

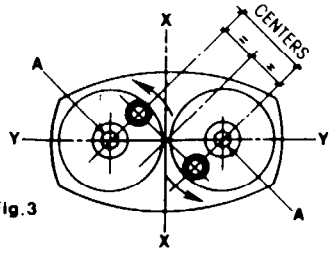


Fig. 3

ROTATE THE COMPLETE DRILL HEAD ASSEMBLY TO BRING BOTH SPINDLES TO THE REQUIRED "Y" "Y" AXIS AS SHOWN IN FIG. 4. FINALLY ADJUST SPINDLE CENTERS ON AXIS "Y" "Y" TO SUIT GAUGE OR DRILL BUSHINGS AND TIGHTEN SCREWS "A" SECURELY.

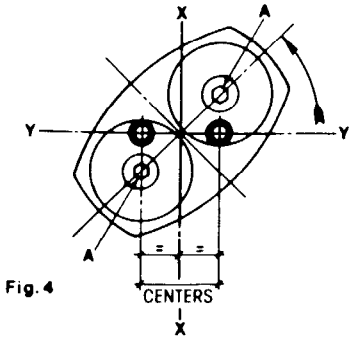


Fig. 4

TAP CHART 47368-( ) COLLETS

PART NO.	TAP RANGE (METRIC)
47368-27	No. 0 – No. 6 (M 1.6 – M 3.5)

COLLET PART NUMBER	BORE DIA. (REF.)	ACCEPTS DRILL SIZE INCH	NO.	MM
47368-1	.039		61	1.0
47368-2	.043		57	1.1
47368-3	.047	3/64	56	1.2
47368-4	.052		55	1.3
47368-5	.055		54	1.4
47368-6	.059		53	1.5
47368-7	.063	1/16	52	1.6
47368-8	.067		51	1.7
47368-9	.071		50	1.8
47368-10	.075		48	1.9
47368-11	.079	5/64	47	2.0
47368-12	.083		45	2.1
47368-13	.087		44	2.2
47368-14	.091		43	2.3
47368-15	.094	3/32	42	2.4
47368-16	.098		40	2.5

COLLET PART NUMBER	BORE DIA. (REF.)	ACCEPTS DRILL SIZE INCH	NO.	MM
47368-17	.102		38	2.6
47368-18	.106		36	2.7
47368-19	.110	7/64	35	2.8
47368-20	.114		33	2.9
47368-21	.118		32	3.0
47368-22	.122		31	3.1
47368-23	.126	1/8		3.2
47368-24	.130		30	3.3
47368-25	.134		29	3.4
47368-26	.138			3.5
47368-27	.142	9/64	28	3.6
47368-28	.146		26	3.7
47368-29	.150		25	3.8
47368-30	.154		23	3.9
47368-31	.157	5/32	22	4.0