ARO
Tool Products

OPERATOR'S MANUAL

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

SECTION M40
MANUAL 27
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"000" SERIES DRIVE MOTORS AND MILL MOTORS

Models: 7531–( ), 7533–( ), 7534–( ), 7535–( ), 7536–( ) and 7537–( ).

⚠ WARNING

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

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

Pneumatic tools should always be installed and used in accordance with A.N.S.I. B186.1 "Safety Code For Portable Air Tools."

⚠WARNING

- Operate this tool at 90 p.s.i.g. (6.2 bar) maximum air pressure at the air inlet of the tool.
- Disconnect air supply from tool before performing maintenance procedures.
- Keep hands, clothing and long hair away from rotating end of tool.
- Anticipate and be alert for sudden changes in motion during start up and operation of any power tool.
- Never exceed rated r.p.m. of tool.
- Wear suitable eye and hearing protection while operating tool.
- Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.
- Do not remove any labels. Replace any damaged label.
- Use only accessories recommended by ARO.

NOTICE

- The use of other than genuine ARO replacement parts may result in safety hazards, decreased tool performance and increased maintenance and may invalidate all warranties.
- ARO is not responsible for customer modification of tools for applications on which ARO was not consulted.
- Tool maintenance and repair should be performed by authorized, trained, competent personnel. Consult your nearest ARO authorized servicenter.
- It is the responsibility of the employer to place the information in this manual into the hands of the operator.

For parts and service information, contact your local ARO distributor, or the Customer Service Dept. of the Ingersoll–Rand Distribution Center, White House, TN at PH: (615) 672–0321, FAX: (615) 672–0801.

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FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

⚠ WARNING

Wear eye protection when operating or performing maintenance on this tool.

⚠ WARNING

Turn off air supply and disconnect air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

⚠ WARNING

Do not use damaged, frayed or deteriorated air hoses and fittings.

⚠ WARNING

Wear hearing protection when operating this tool.

⚠ WARNING

Do not overreach when operating this tool. Keep body stance balanced and firm.

⚠ WARNING

Operate at 90 p.s.i.g. (6.2 bar/620 kPa) maximum air pressure.

WARNING = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.

CAUTION = Hazards or unsafe practices which could result in minor personal injury or product or property damage.

NOTICE = Important installation, operation or maintenance information.

MODEL IDENTIFICATION

MODEL NUMBER	TOTAL RED.	RATED R.P.M.	MOTOR ASSEMBLY	GEARING 1ST RED.	2ND RED.	3RD RED.	4TH RED.	DRIVE	HEAD
DRIVE MOTORS									
~~7531–E~~	512:1	40	33047–1	38254	38254			39636	36274 (REVERSIBLE)
~~7531–1–E~~	1493:1	13	36264–1	36017	38256	38254		39636	
~~7531–2–E~~	2473:1	8	33047–1	36287	38256	38254		39636	
~~7531–3–E~~	4096:1	5	33047–1	38254	38254	38254		39636	
~~7531–4–E~~	7211:1	3	36264–1	36017	36017	38256	38254	39636	
~~7531–6–E~~	901:1	23	36264–1	36017	36017	38256		39636	
~~7531–8–E~~	309:1	62	36264–1	38256	38254			39636	
MILL MOTORS									
7533–2–B	38.6:1	550	33254–1	36287				38715	36277 (SINGLE DIRECTION)
7534–2–B	23.3:1	900	35098–1	36017				38715	
7535–2–C	8:1	2700	33254–1					39831	
7536–2–B	4.83:1	4500	35098–1					38715	
7537–2–C	1:1	20,000	35098–1					38724–1	

~~CANCELLED MODELS~~

ROUTINE LUBRICATION REQUIREMENTS

Lack of or an excessive amount of lubrication will affect the performance and life of this tool. Use only recommended lubricants at below time intervals:

EVERY 8 HOURS OF TOOL OPERATION – Fill lubricator reservoir of recommended F.R.L. with spindle oil (29665). If an in line or air line lubricator is not used, apply several drops of spindle oil (29665) in air inlet.

EVERY 40 HOURS OF TOOL OPERATION – Flush tool with a solution of three (3) parts cleaning solvent to one (1) part spindle oil (or use kerosene).

EVERY 160 HOURS OF TOOL OPERATION – Lubricate gearing. Pack bearings, coat shafts and lubricate gears with NLGI #1 "EP" grease (33153).

AIR SUPPLY REQUIREMENTS

For maximum operating efficiency, the following air supply specifications should be maintained to this air tool:

- AIR PRESSURE – 90 p.s.i.g. (6.2 bar)
- AIR FILTRATION – 50 micron
- LUBRICATED AIR SUPPLY
- HOSE SIZE – 5/16" (8 mm) I.D.

An ARO® model C28231–810 air line FILTER/REGULATOR/LUBRICATOR (F.R.L.) is recommended to maintain the above air supply specifications.

RECOMMENDED LUBRICANTS

After disassembly is complete, all parts, except sealed or shielded bearings, should be washed with solvent. To relubricate parts, or for routine lubrication, use the following recommended lubricants:

Where Used	ARO Part #	Description
Air Motor	29665	1 qt Spindle Oil
"O" Rings & Lip Seals	36460	4 oz. Stringy Lubricant
Gears and Bearings	33153	5 lb. "EP" – NLGI #1 Grease

INSPECTION, MAINTENANCE AND INSTALLATION

Disconnect air supply from the tool or shut off air supply and exhaust (drain) line of compressed air before performing maintenance or service to the tool.

It is important that the tools be serviced and inspected at regular intervals for maintaining safe, trouble–free operation of the tool.

Be sure the tool is receiving adequate lubrication, as failure to lubricate can create hazardous operating conditions resulting from excessive wear.

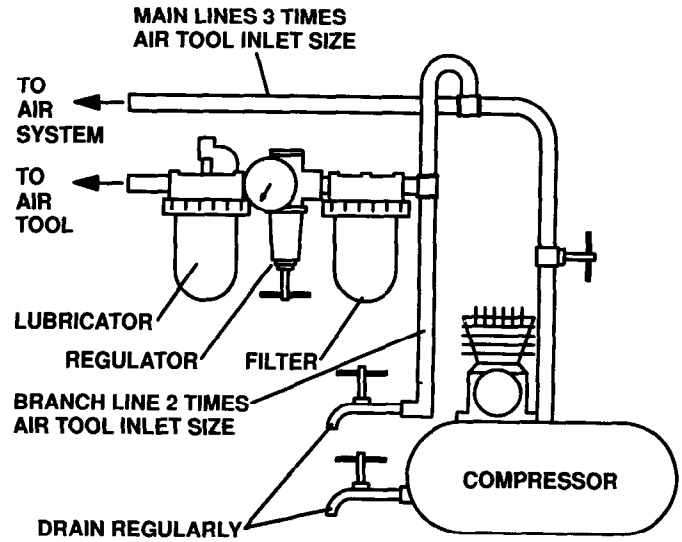
Be sure that the air supply lines and connectors are of proper size to provide a sufficient quantity of air to the tool.
Tool maintenance and repair shall be performed by authorized, trained, competent personnel. Tools, hose and fittings shall be replaced if unsuitable for safe operation and responsibility should be assigned to be sure that all tools requiring guards or other safety devices shall be kept in legible condition. Maintenance and repair records should be maintained on all tools. Frequency of repair and the nature of the repairs can reveal unsafe application. Scheduled maintenance by competent authorized personnel should detect any mistreatment or abuse of the tool and worn parts. Corrective action should be taken before returning the tool for use.

Disassembly should be done on a clean work bench with a clean cloth spread to prevent the loss of small parts. After disassembly is completed, all parts should be thoroughly washed in a clean solvent, blown dry with air and inspected for wear levels, abuse and contamination. Double sealed or shielded bearings should never be placed in solvent unless a good method of re–lubricating the bearing is available. Open bearings may be washed but should not be allowed to spin while being blown dry.

Upon reassembling, lubricate parts where required. Use 33153 grease, or equivalent, in bearings. Use 36460 lubricant for "O" ring assembly. When assembling "O" rings or parts adjacent "O" rings, care must be exercised to prevent damage to the rubber sealing surfaces. A small amount of grease will usually hold steel balls and other small parts in place while assembling.

When replacement parts are necessary, consult drawing containing the part for identification.

Always use clean, dry air. Dust, corrosive fumes and/or excessive moisture can damage the motor of an air tool. An air line filter can greatly increase the life of an air tool. The filter removes rust, scale, moisture and other debris from the air lines. Low air pressure (less than 90 p.s.i.g.) reduces the speed of the air tool. High air pressure (more than 90 p.s.i.g.) raises performance beyond the rated capacity of the tool and could cause injury. Shown below is a typical piping arrangement.



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

NOTICE

- Never apply excessive pressure by a holding device which may cause distortion of a part.
- Apply pressure evenly to parts which have a press fit.
- Apply even pressure to the bearing race that will be press fitted to the mating part.
- Use correct tools and fixtures when servicing this tool.
- Don't damage "O" rings when servicing this tool.
- Use only genuine ARO replacement parts for this tool. When ordering, specify part number, description, tool model number and serial number.

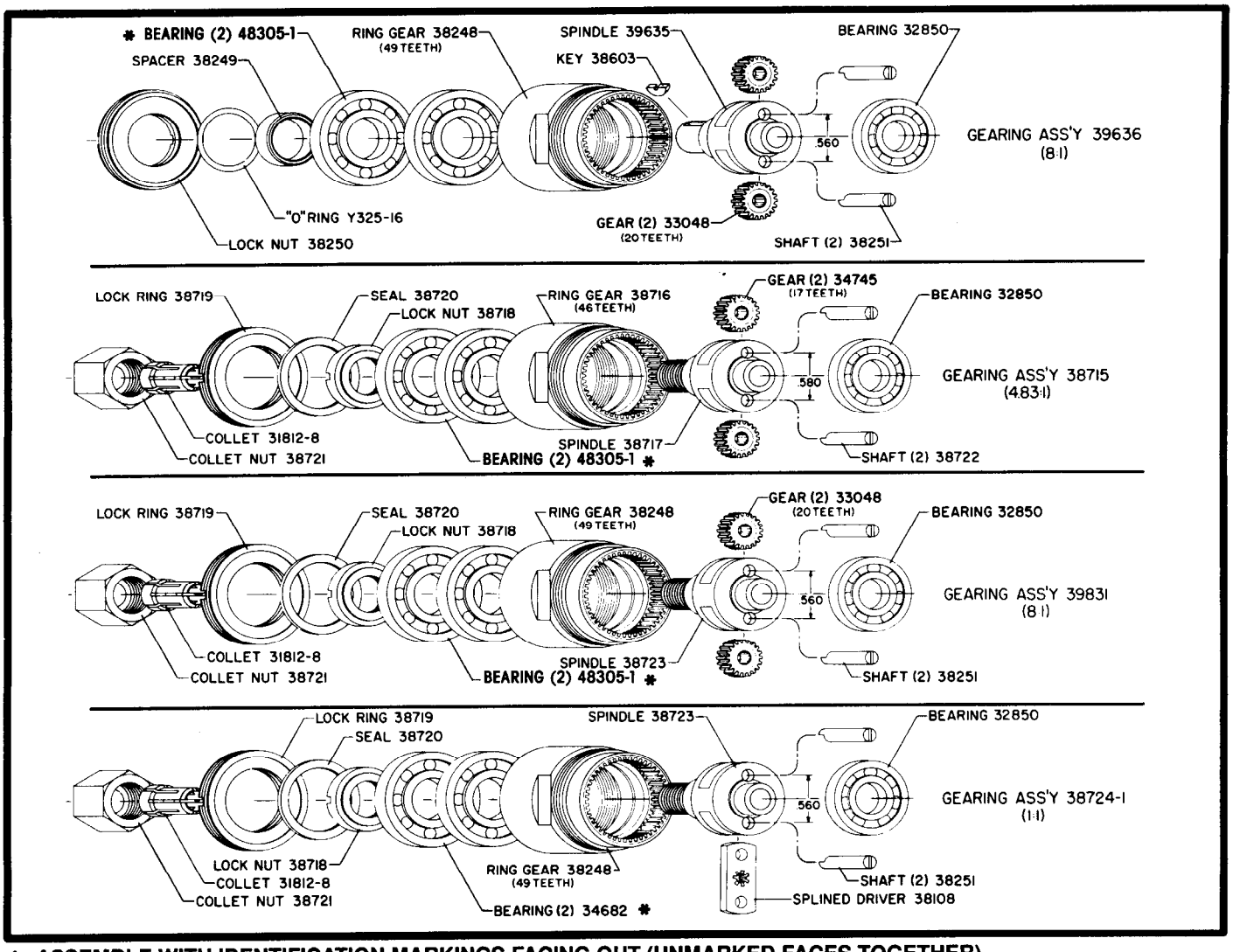
DRIVE GEARING DISASSEMBLY

_ Using wrenches on flats of ring gear of drive gearing assembly and ring gear of auxiliary gearing assembly or motor housing (38308), unthread and remove drive gearing assembly from tool.
_ Remove screw (39637) and key (38603), where applicable.
_ Remove collet nut (38721), collet (31812–8) and lock nut (38718).
_ Grasp ring gear in one hand and tap drive end of spindle with a soft face hammer; spindle and components will loosen from ring gear.
_ Gearing should not be disassembled further unless damage is evident, as Brinelling of the bearing races may occur, making replacement necessary.
_ To disassemble further, alternately tap ends of shafts, loosening bearing (32850).
_ Remove shafts, releasing gears.
_ Unthread and remove lock ring (38250 or 38719), releasing bearings (34682 or 48305–1).

DRIVE GEARING ASSEMBLY

_ Lubricate gears liberally with ARO 33153 grease and assemble to spindle, securing with shafts. Align notch in shafts with step on spindle. NOTE: Gearing should contain approximately 1/16 oz. (1.8 g) of grease.
_ Pack bearing (32850) with ARO 33153 grease and assemble to spindle, pressing on inner race of bearing.
_ Pack bearings (34682 or 48305–1) with ARO 33153 grease and assemble into ring gear, pressing on outer race of bearings. NOTE: Assemble bearings with identification markings out (unmarked faces together).
_ Assemble seal (38720) or "O" ring (Y325–16) to groove in lock ring (38250 or 38719) and assemble to ring gear, securing bearings.
_ Assemble spindle and components into ring gear.
_ Models 7531–( ): Assemble spacer (38249), key (38603) and screw (39637) to spindle.
_ All other models: Assemble lock nut (38718) to spindle, securing spindle in ring gear. Assemble collet (31812–8) to spindle, securing with collet nut (38721).
_ Assemble drive gearing to tool, using wrenches on flats to tighten.

DISASSEMBLY/ASSEMBLY INSTRUCTIONS



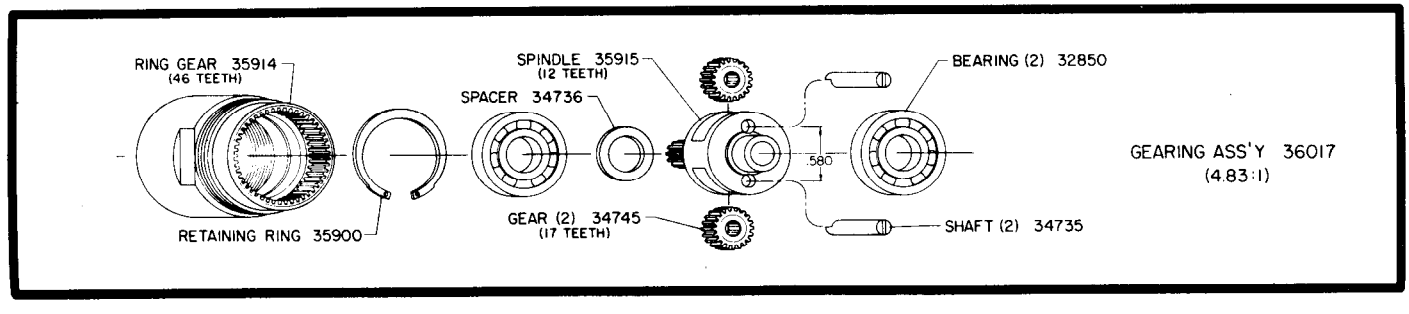
* **ASSEMBLE WITH IDENTIFICATION MARKINGS FACING OUT (UNMARKED FACES TOGETHER).**

AUXILIARY GEARING DISASSEMBLY

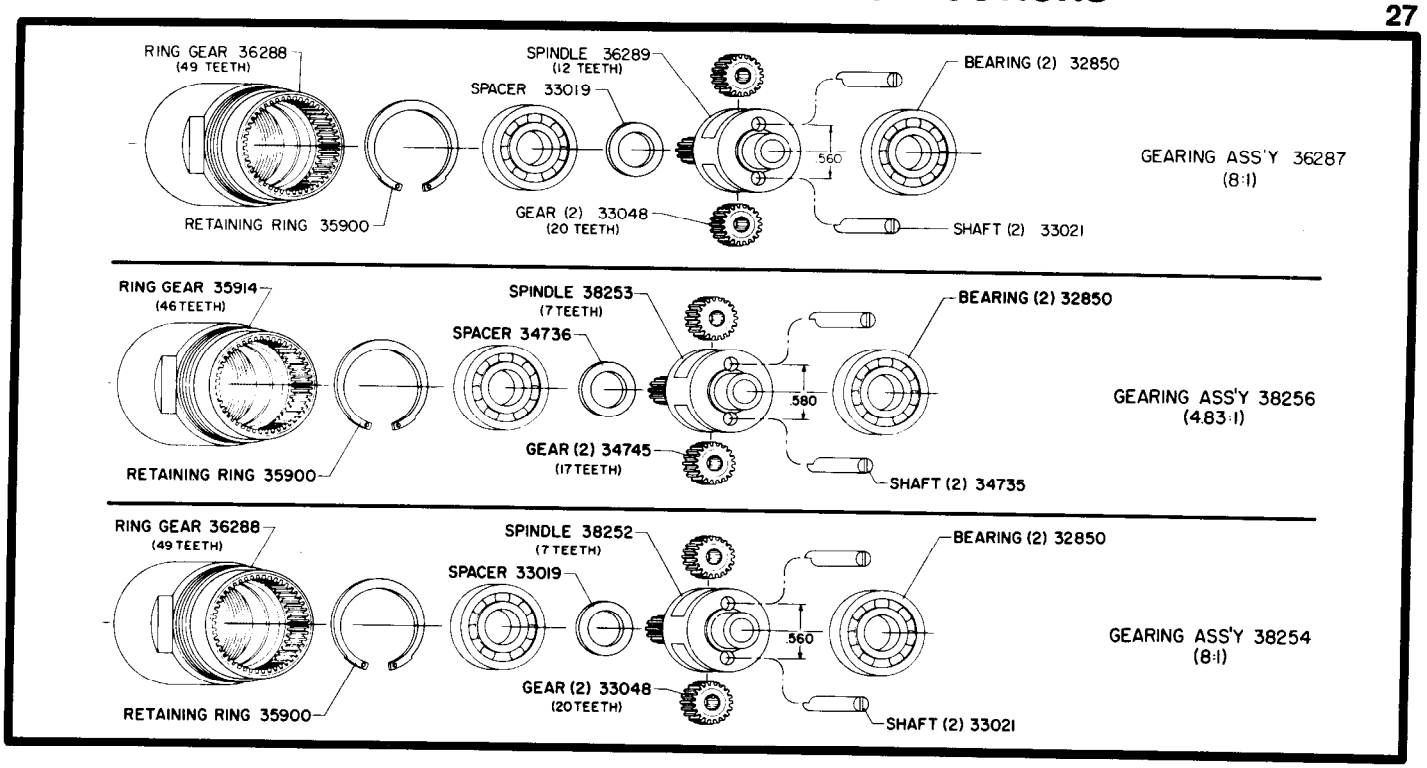
- _ Remove drive gearing from tool.
- _ Using wrenches on flats of ring gear and motor housing (38308), unthread and remove each auxiliary gearing assembly from tool.
- _ Grasp ring gear in one hand and tap splined end of spindle with a soft face hammer; spindle and components will loosen from ring gear.
- _ Gearing should not be disassembled further unless damage is evident, as Brinelling of the bearing races may occur, making replacement necessary.
- _ To disassemble, remove bearing (32850) and spacer from splined end of spindle.
- _ Remove shafts, releasing gears.
- _ To remove bearing (32850), insert shafts into spindle and alternately tap ends, loosening bearing.

AUXILIARY GEARING ASSEMBLY

- _ Assemble retaining ring (35900) to groove in ring gear.
- _ Pack bearings (32850) with ARO 33153 grease and assemble spacer and one bearing to splined end of spindle, pressing on inner race of bearing.
- _ Lubricate gears liberally with ARO 33153 grease and assemble to spindle, securing with shafts. Align notch in shafts with spacer. NOTE: Gearing should contain approximately 1/16 oz. (1.8 g) of grease.
- _ Assemble bearing (32850) to spindle, pressing on inner race of bearing.
- _ Assemble spindle and components into ring gear.
- _ Assemble ring gear to tool, using wrenches on flats to tighten.
- _ Assemble drive gearing to tool.

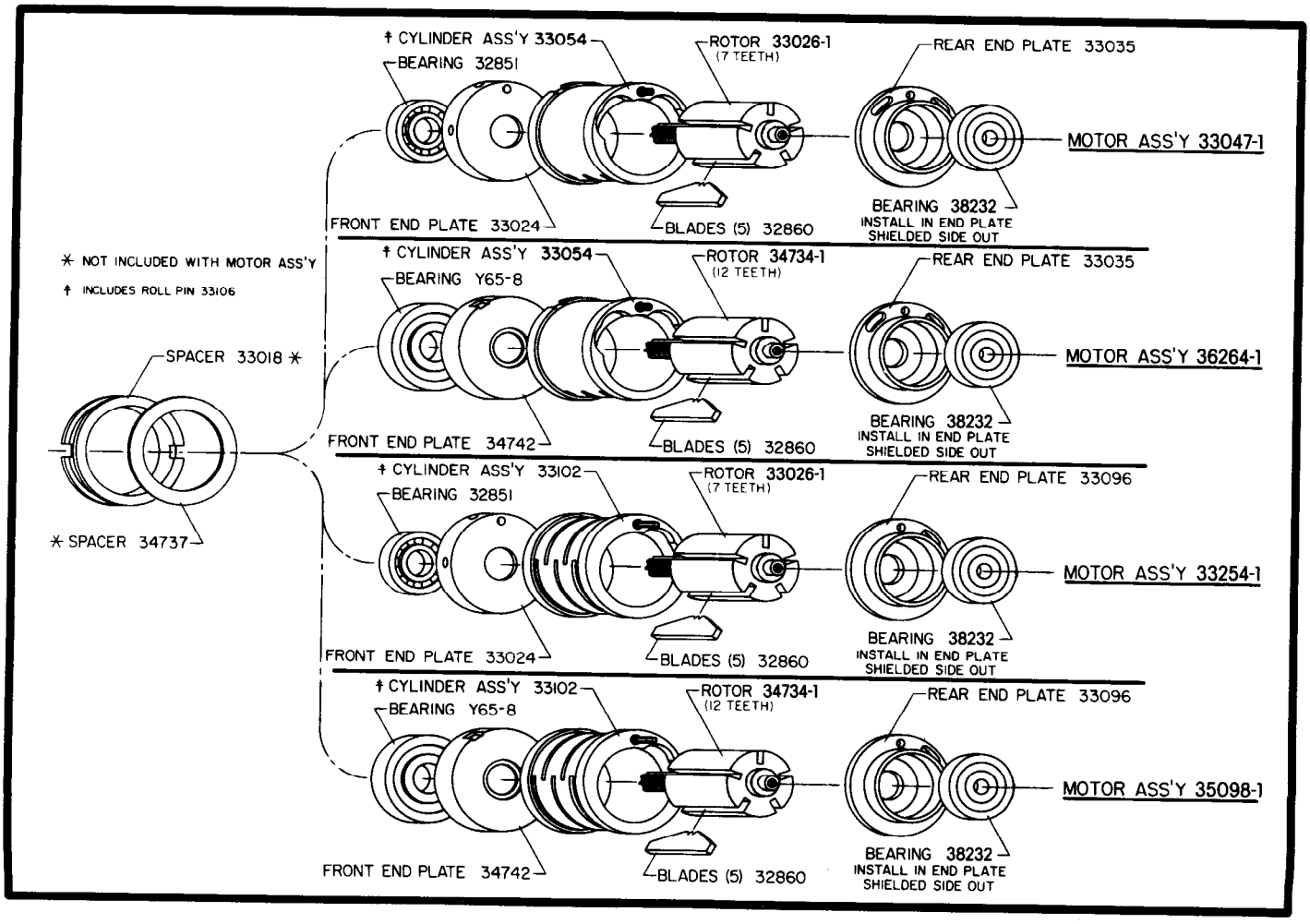


DISASSEMBLY/ASSEMBLY INSTRUCTIONS



MOTOR DISASSEMBLY

- The motor assembly can be removed from either end of motor housing (38308).
- To remove from "gearing" end, remove gearing and spacer (33018 and 34737) from tool.
- Tap front edge of housing with a soft face hammer to remove motor assembly.
- Grasp cylinder in one hand and tap splined end of rotor with a soft face hammer; motor will come apart.
- Remove bearing (38232) and rear end plate from rotor.



DISASSEMBLY/ASSEMBLY INSTRUCTIONS

MOTOR ASSEMBLY

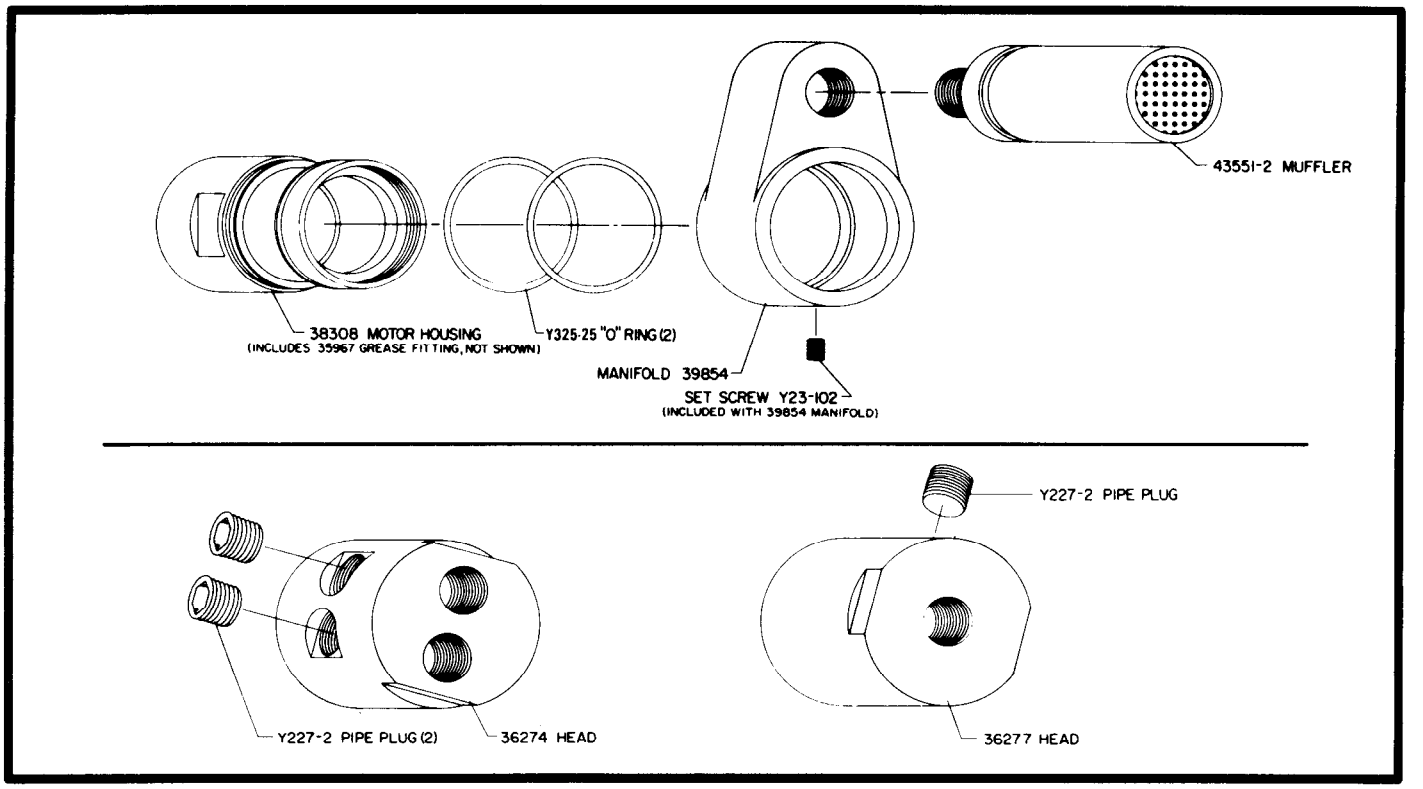
- _ Pack bearings with ARO 33153 grease before assembly.
- _ Assemble bearing (38232) to rear end plate, pressing on outer race of bearing. NOTE: Assemble with shielded side out.
- _ Assemble rear end plate to rotor, pressing on inner race of bearing.
- _ Coat five rotor blades (32860) with ARO 29665 spindle oil and assemble to rotor slots – straight side out.
- _ Coat i.d. of cylinder with ARO 29665 spindle oil and assemble over rotor to rear end plate, aligning roll pin (33106) with hole in end plate.
- _ Assemble bearing (32851 or Y65–8) to front end plate, pressing on outer race of bearing.
- _ Assemble front end plate to rotor, pressing on inner race of bearing. Be sure motor does not bind.
- _ Assemble motor assembly into motor housing (38308), aligning roll pin (33106) with .078" diameter x 5/16" deep hole. NOTE: On forward rotation models, align three air inlet holes in housing cap (36277) with air inlet slot in rear end plate (33096).
- _ Assemble spacers (34737 and 33018) into motor housing (38308).
- _ Assemble gearing to tool.

HEAD AND MANIFOLD DISASSEMBLY

- _ Unthread and remove head, using wrenches on flats of head and motor housing (38308).
- _ Loosen set screw (Y23–102) and slide manifold off motor housing, allowing removal of "O" rings (Y325–25).

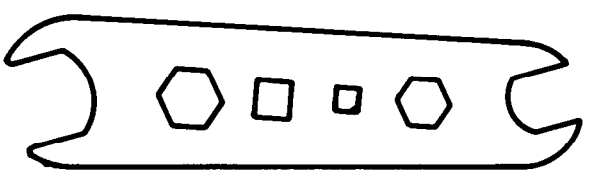
HEAD AND MANIFOLD ASSEMBLY

- _ Grease "O" rings (Y325–25) with ARO 36460 lube and assemble to grooves in motor housing (38308).
- _ Assemble manifold (39854) to motor housing, securing with set screw (Y23–102).
- _ Place head in a vise, with "motor end" in an upright position.
- _ Place motor assembly on head, aligning roll pin (33106) with hole in head (see "MOTOR ASSEMBLY").
- _ Assemble motor housing (38308) over motor assembly and secure to head, using wrenches on flats to tighten.
- _ Assemble spacers (34737 and 33018) and gearing to tool.

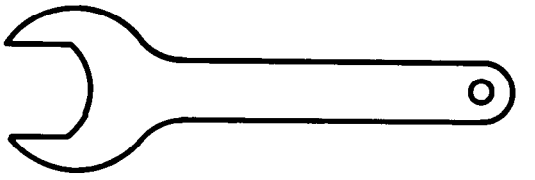


WRENCHES FURNISHED WITH MILL MOTORS ONLY

(MODELS 7533–2–B, 7534–2–B, 7535–2–C, 7536–2–B AND 7537–2–C)

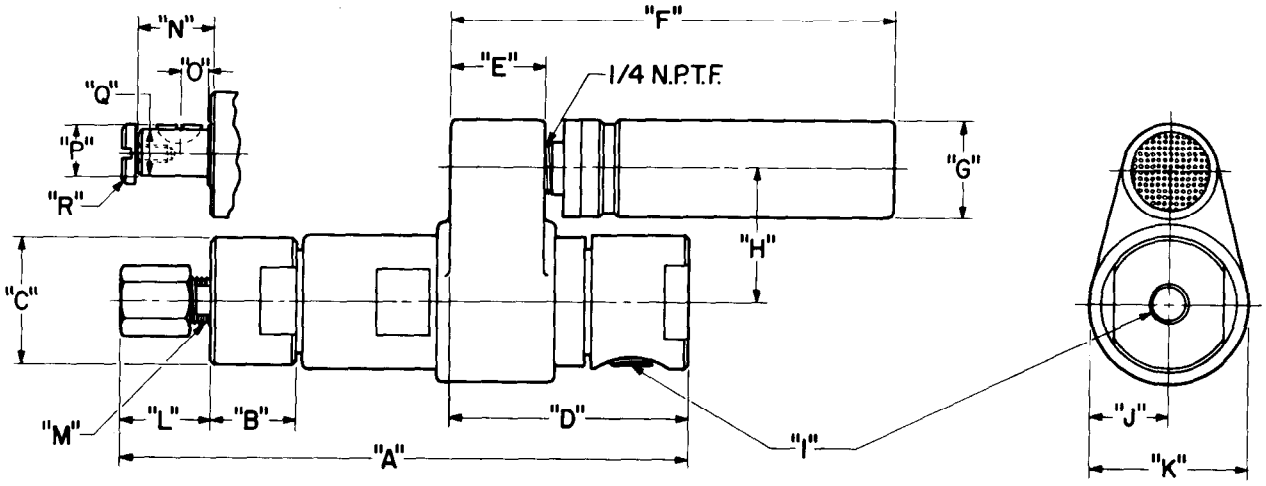


37167 GENERAL PURPOSE FLAT WRENCH



30470 13/32" OPEN END FLAT WRENCH

DIMENSIONAL DATA



SINGLE GEAR REDUCTION SHOWN

MODELS	GEAR REDUCTION	"A"
7535-2-C, 7536-2-B, 7537-2-C	1	5-15/16 (151 mm)
7533-2-B, 7534-2-B	2	7 (178 mm)
7531-E, 7531-8-E	3	7-27/32 (199 mm)
7531-1-E, 7531-2-E, 7531-3-E, 7531-6-E	4	8-29/32 (226 mm)
7531-4-E	5	9-31/32 (252 mm)

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Inches	.875	1.312	2-15/32	31/32	4-9/16	1	1-3/8	1/8 N.P.T.F. Air Inlet	13/16	1-5/8	15/16	1/2-20 UNF-2 TH'D.	.760	9/32	.548	.4998	#10-24 Nylon Insert Screw
mm	22.225	33.325	63	25	116	25	35		21	41	24		19.304	7	13.919	12.6949	

TROUBLE SHOOTING

LISTED BELOW ARE SOME OF THE MOST COMMON CAUSES FOR THE POWER MOTOR TO MALFUNCTION. MALFUNCTIONS BEYOND THE SCOPE OF THIS MANUAL SHOULD BE BROUGHT TO THE ATTENTION OF YOUR ARO REPRESENTATIVE OR RETURN THE TOOL TO THE FACTORY FOR REPAIR.

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
LOW SPEED OR FAILURE TO OPERATE.	1. INADEQUATE AIR SUPPLY.	1. CHECK AIR SUPPLY FOR CORRECT REGULATOR ADJUSTMENT (90 P.S.I.G. MAX. WHEN TOOL IS OPERATING).
	2. MOTOR AND/OR GEARING NOT BEING PROPERLY LUBRICATED.	2. REFER TO AIR AND LUBE REQUIREMENTS, PAGE 2.
	3. CLOGGED MUFFLER.	3. REPLACE MUFFLER.
	4. CLOGGED AIR INLET(S) TO MOTOR. STICKING, BADLY WORN OR BROKEN ROTOR BLADES OR BEARING IN MOTOR.	4. DISASSEMBLE, CLEAN, INSPECT. REPLACE BADLY WORN OR BROKEN ROTOR BLADES OR BEARINGS. REFER TO MOTOR DISASSEMBLY/ASSEMBLY, PAGES 5 AND 6.
	5. BADLY WORN BEARINGS OR GEARS IN GEARING SECTION.	5. DISASSEMBLE, CLEAN, INSPECT. REPLACE WORN OR DAMAGED PARTS. LUBRICATE. REFER TO GEARING DISASSEMBLY/ASSEMBLY, PAGES 3, 4 AND 5.

TYPICAL CROSS SECTION OF TOOLS