



Tool & Hoist Products

# OPERATOR'S MANUAL

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

## 2200 SERIES POWER MOTORS

SECTION M40  
MANUAL 42

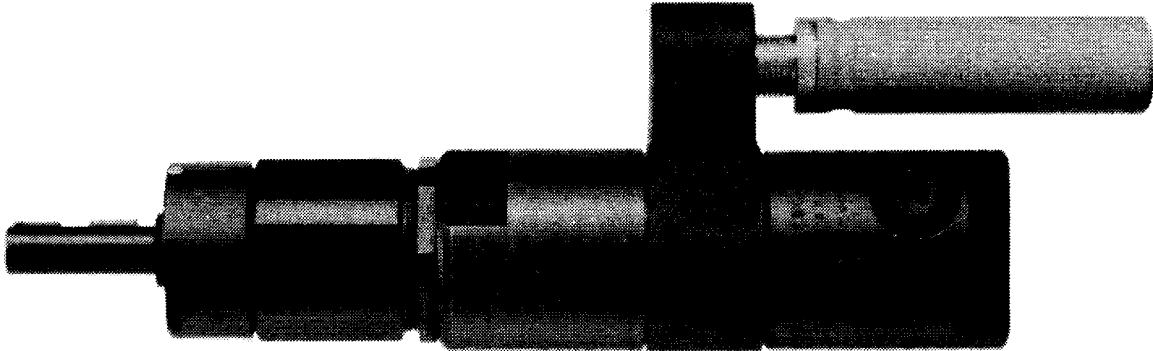
Released:  
Revised: 8-2-93  
Form: 160-2

Models 78( )(-)B and 78( )(-)1B

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

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### FEATURES:

- FORWARD AND REVERSIBLE ROTATION MODELS
- FREE SPEEDS FROM 250 TO 18,000 R.P.M. AVAILABLE
- FLUSH TYPE FITTING FOR LUBRICATION AND GEARING
- EXHAUST MANIFOLD AND MUFFLER
- 1/2 - 20 THREADED OR 1/2" KEYED DRIVE SPINDLE
- 1/4" N.P.T.F. AIR INLET AT BOTH SIDE AND REAR OF HEAD

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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) 672-0601.

**ARO Tool & Hoist Products**

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**INGERSOLL-RAND®**  
**PROFESSIONAL TOOLS**

**MODEL IDENTIFICATION**

**THREAD ON TYPE GEARING**

MODEL NO.	R.P.M. (FREE SPEED)	ROTATION	HEAD ASS'Y	MOTOR ASS'Y	GEARING		DRIVE SPINDLE	TOTAL REDUCTION
					DRIVE	AUXILIARY		
7800-B	18,000	FORWARD	34498	41522	40824	—	KEYED	DIRECT
7801-B	4,600	FORWARD	34498	41522	40822	—	KEYED	4:1
7802-B	2,500	FORWARD	34498	41522	40823	—	KEYED	7.43:1
7803-B	1,200	FORWARD	34498	41522	40822	40825	KEYED	16:1
7804-B	650	FORWARD	34498	41522	40823	40825	KEYED	29.7:1
7805-B	350	FORWARD	34498	41522	40823	40826	KEYED	55.2:1
7806-B	13,500	REVERSIBLE	34497	41523	40824	—	KEYED	DIRECT
7807-B	3,400	REVERSIBLE	34497	41523	40822	—	KEYED	4:1
7808-B	1,800	REVERSIBLE	34497	41523	40823	—	KEYED	7.43:1
7809-B	850	REVERSIBLE	34497	41523	40822	40825	KEYED	16:1
7810-B	450	REVERSIBLE	34497	41523	40823	40825	KEYED	29.7:1
7811-B	250	REVERSIBLE	34497	41523	40823	40826	KEYED	55.2:1
7812-B	350	FORWARD	34498	41522	41770	40826	THREADED	55.2:1
7813-B	650	FORWARD	34498	41522	41770	40825	THREADED	29.7:1
7814-B	18,000	FORWARD	34498	41522	41769	—	THREADED	DIRECT
7815-B	1,200	FORWARD	34498	41522	41771	40825	THREADED	16:1
7816-B	4,600	FORWARD	34498	41522	41771	—	THREADED	4:1
7817-B	2,500	FORWARD	34498	41522	41770	—	THREADED	7.43:1

**BOLT-ON TYPE GEARING**

MODEL NO.	R.P.M. (FREE SPEED)	ROTATION	HEAD ASS'Y	MOTOR ASS'Y	GEARING		DRIVE SPINDLE	TOTAL REDUCTION
					DRIVE	AUXILIARY		
7800-1B	18,000	FORWARD	34498	41522	40832	—	KEYED	DIRECT
7801-1B	4,600	FORWARD	34498	41522	40830	—	KEYED	4:1
7802-1B	2,500	FORWARD	34498	41522	40831	—	KEYED	7.43:1
7803-1B	1,200	FORWARD	34498	41522	40830	40833	KEYED	16:1
7804-1B	650	FORWARD	34498	41522	40831	40833	KEYED	29.7:1
7805-1B	350	FORWARD	34498	41522	40831	40834	KEYED	55.2:1
7806-1B	13,500	REVERSIBLE	34497	41523	40832	—	KEYED	DIRECT
7807-1B	3,400	REVERSIBLE	34497	41523	40830	—	KEYED	4:1
7808-1B	1,800	REVERSIBLE	34497	41523	40831	—	KEYED	7.43:1
7809-1B	850	REVERSIBLE	34497	41523	40830	40833	KEYED	16:1
7810-1B	450	REVERSIBLE	34497	41523	40831	40833	KEYED	29.7:1
7811-1B	250	REVERSIBLE	34497	41523	40831	40834	KEYED	55.2:1
7812-1B	350	FORWARD	34498	41522	40828	40834	THREADED	55.2:1
7813-1B	650	FORWARD	34498	41522	40828	40833	THREADED	29.7:1
7814-1B	18,000	FORWARD	34498	41522	40829	—	THREADED	DIRECT
7815-1B	1,200	FORWARD	34498	41522	40827	40833	THREADED	16:1
7816-1B	4,600	FORWARD	34498	41522	40827	—	THREADED	4:1
7817-1B	2,500	FORWARD	34498	41522	40828	—	THREADED	7.43:1

This Parts List and Service Instruction Manual is composed of four sections:

GENERAL DESCRIPTION AND OPERATION  
AIR AND LUBE REQUIREMENTS  
MAINTENANCE  
DISASSEMBLY AND REASSEMBLY OF TOOL

A complete Parts List will be found on the various drawings contained in this Manual.

This Manual is provided to serve as an aid in obtaining the maximum service from this tool.

After carefully reading this manual, file for future reference.

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## GENERAL DESCRIPTION AND OPERATION

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ARO "2200" Series Power Motors are designed for work requiring a stationary mounting and are available with either a keyed or threaded spindle, bolt-on or thread-on type gearing, forward or reversible rotation and with a variety of free speeds. The combination of type gearing, spindle type and free speeds appear as models on page 1.

All models have an adjustable exhaust manifold with

muffler, flush fittings for lubrication, 1/4" female n.p.t.f. air inlets and necessary hex socket screw plugs for closure of unused air inlets. Forward rotation models have an air inlet at side and rear of head and reversible models have two inlets at side and two inlets at rear of head. Keyed shafts are furnished with one set of shear Keys providing a torque limit of 60 ft. lbs. (82 N-m) for the protection of the gearing.

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## AIR AND LUBE REQUIREMENTS

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**AIR PRESSURE** of 90 p.s.i.g. (6 bar) at the air inlet of the tool is required for maximum motor efficiency. If necessary, an air regulator should be installed to maintain this pressure when tool is in operation.

**FILTERED AND OILED AIR** will allow the tool to operate more efficiently and yield a longer life to operating parts and mechanisms. A line filter capable of filtering particles larger than 50 microns should be used with a line oiler.

**FILTER-REGULATOR-LUBRICATOR (F-R-L)** assembly Model 128231-300 is recommended for use with this Air Tool. The capacity of the individual Filter-Lubricator is adequate to provide clean (40 micron) oiled and regulated air for the tool. The Filter-Regulator-Lubricator must be installed on the stationary air line, in that order, with the Lubricator nearest to the tool. **NEVER** mount the unit on the detachable flexible hose to the tool.

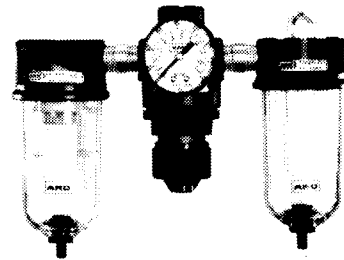
**FLUSH TOOL** with a solution of three parts cleaning solvent and one part light oil after each 40 hours of operation. After flushing, apply a small amount of Spindle Oil in air inlet and run free for one minute to insure proper lubrication.

**GEARING** should be grease lubricated to a minimum of once a month.

**CAUTION:** An excessive amount of lubricant in a tool will affect the speed and power. Gearing should contain approx. 1/4 oz. (7 g) of grease per set of planetary gearing.

**RECOMMENDED HOSE SIZE** - 5/16" (8 mm) nominal inside diameter.

**RECOMMENDED LUBRICANTS:** Spindle Oil (29665), 1 qt. (.9 liter) container for oiler and air inlet; Grease 33153, 5 lb. (2.3 kg) can for gears and bearings, "O" Ring Lubricant 36460, 4 oz. (113 g) tube for lubrication and installation of "O" Rings.



**MODEL 128231-300  
FILTER-REGULATOR-  
GAUGE-LUBRICATOR.**

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## MAINTENANCE

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**AIR TOOLS** are made of precision parts and should be handled with reasonable care when servicing. Excessive pressure exerted by a holding device may cause distortion of a part. Apply pressure evenly when disassembling (or assembling) parts which have a press fit. When removing or installing bearings, apply pressure to the bearing race that will be the press fit to the mating part; if this is not practiced, Brinelling of the bearing races may occur making replacement necessary. It is important that the correct tools and fixtures are used when servicing this Air Tool.

**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 and 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. When **REPLACEMENT PARTS** are necessary, consult drawing containing the part for identification.

**BEFORE 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 ORDERING PARTS**, be sure to list **PART NUMBER, PART NAME** and **MODEL NUMBER OF TOOL**. Use only genuine Aro replacement parts.

# DISASSEMBLY AND REASSEMBLY OF TOOLS

Before starting to disassemble or reassemble this tool (any part or completely) be sure to read Maintenance Section. To minimize the possibility of parts damage and for convenience, the steps for disassembly or reassembly listed on the following pages are recommended.

The basic sections and instructions for removing them from tool are as follows:

With tool disconnected from air service—

## GEARING SECTION

**DRIVE GEARING (THREAD-ON):** Remove accessory and keys from Spindle where applicable. Using wrenches on flats of gear housings unthread and remove drive gearing assembly.

**DRIVE GEARING (BOLT-ON):** Remove accessory and Keys from Spindle where applicable. Remove Cap Screws and Washers and remove drive gearing assembly.

**AUXILIARY GEARING (THREAD-ON):** Remove drive

gearing assembly. Using wrenches on flats of gear housing and motor housing, unthread and remove auxiliary gearing assembly.

**AUXILIARY GEARING (BOLT-ON):** Remove drive gearing assembly. Remove Cap Screws and Washers and remove auxiliary gearing assembly.

## MOTOR SECTION

The motor assembly may be removed from housing after removal of gearing. To remove motor assembly without removing gearing from tool, remove head assembly and remove motor out head end of housing (see Head Section).

## HEAD SECTION

Remove muffler from manifold. Place flats of head in a suitable holding device. Unthread and remove motor housing from head.

## TYPICAL CROSS-SECTION OF TOOL

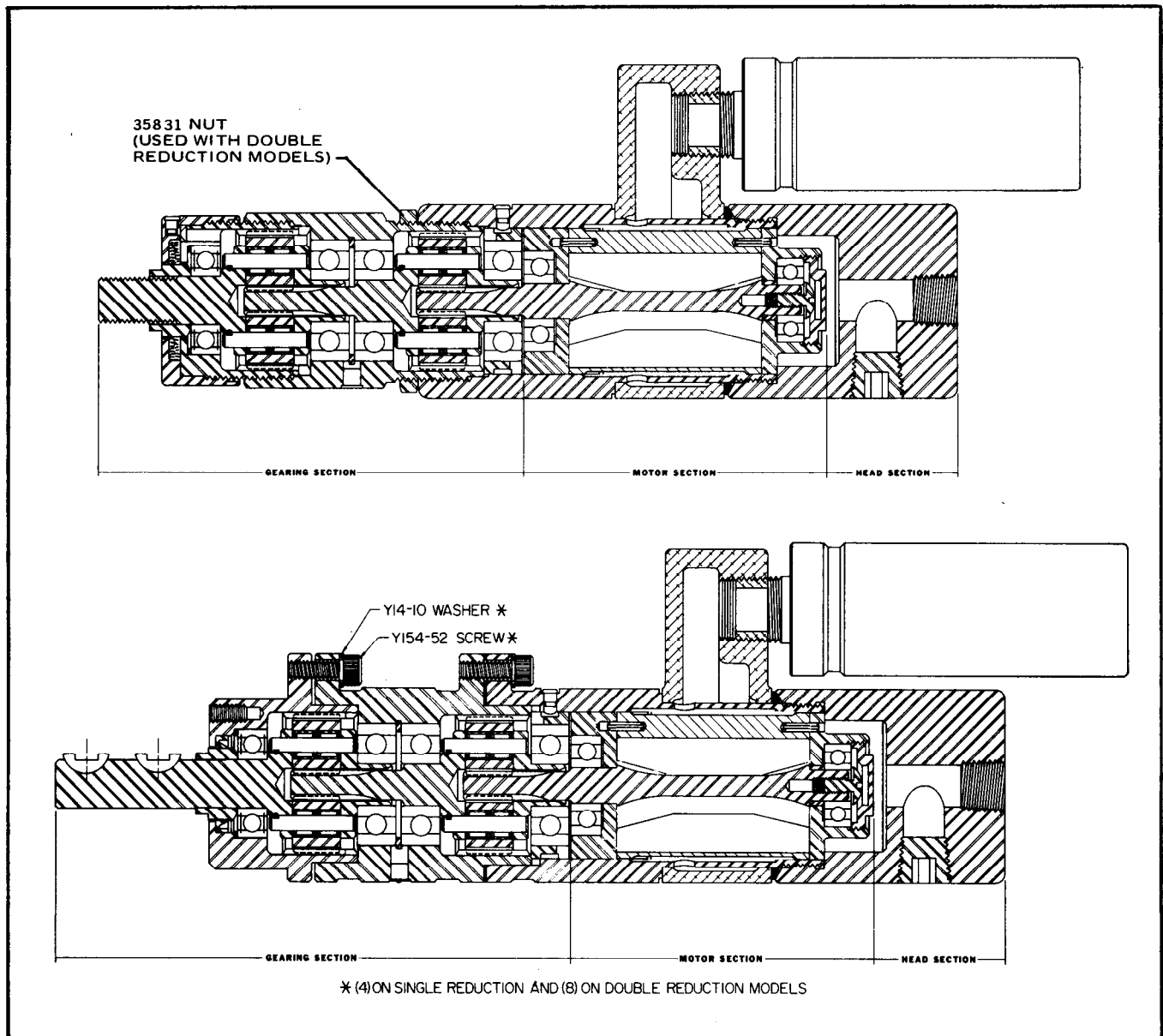


FIGURE 1

# GEARING SECTION

## DRIVE GEARING (THREAD-ON)

### DISASSEMBLY

- a. Grasp Ring Gear in one hand and tap drive end of Spindle with a non-metallic hammer; Spindle and components will loosen from ring gear.
- b. Gearing should not be disassembled further unless it is necessary to replace a part as Brinelling of the bearing races may occur making replacement necessary.
- c. To further disassemble - remove Bearing (33706), rotate Snap Ring so the open portion of the ring will allow the removal of Shaft, Remove Shaft releasing Gear. Repeat for removal of opposite Shaft and Gear.

### REASSEMBLY

- a. To reassemble Gears and Bearings to Spindle, reverse the procedure of disassembly. NOTE: after assembling Gears and Shafts to Spindle rotate Snap Ring securing both Shafts in place.
- b. Assemble Washer (47590), Wave Washer (47589) components to Ring Gear. (see lube requirements page 2).
- c. Assemble Seal (37774) to Nose Housing (38379) and assemble Spacer (33697) and Nose Housing to Ring Gear.

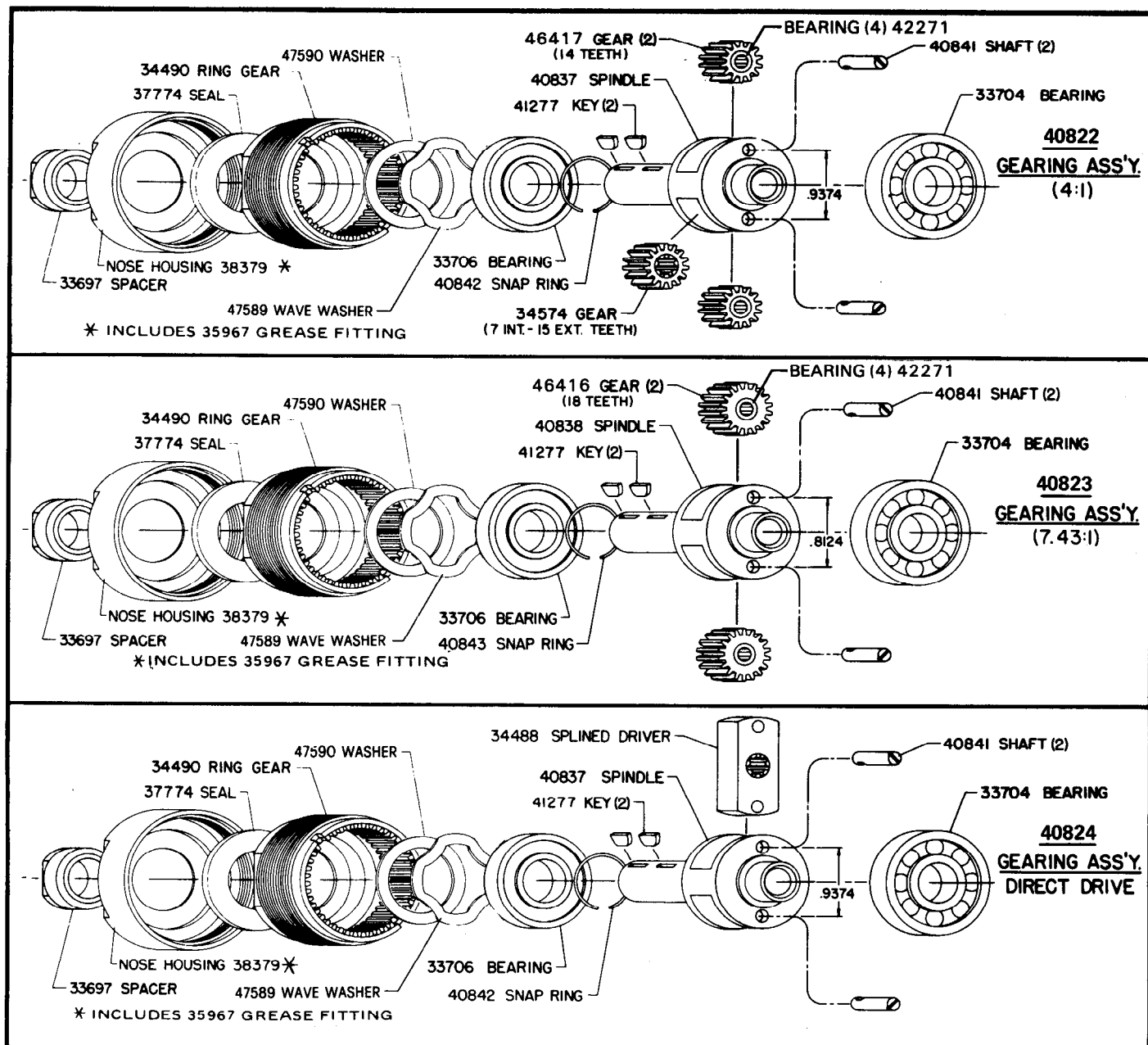


FIGURE 2

# GEARING SECTION

## DRIVE GEARING (THREAD-ON)

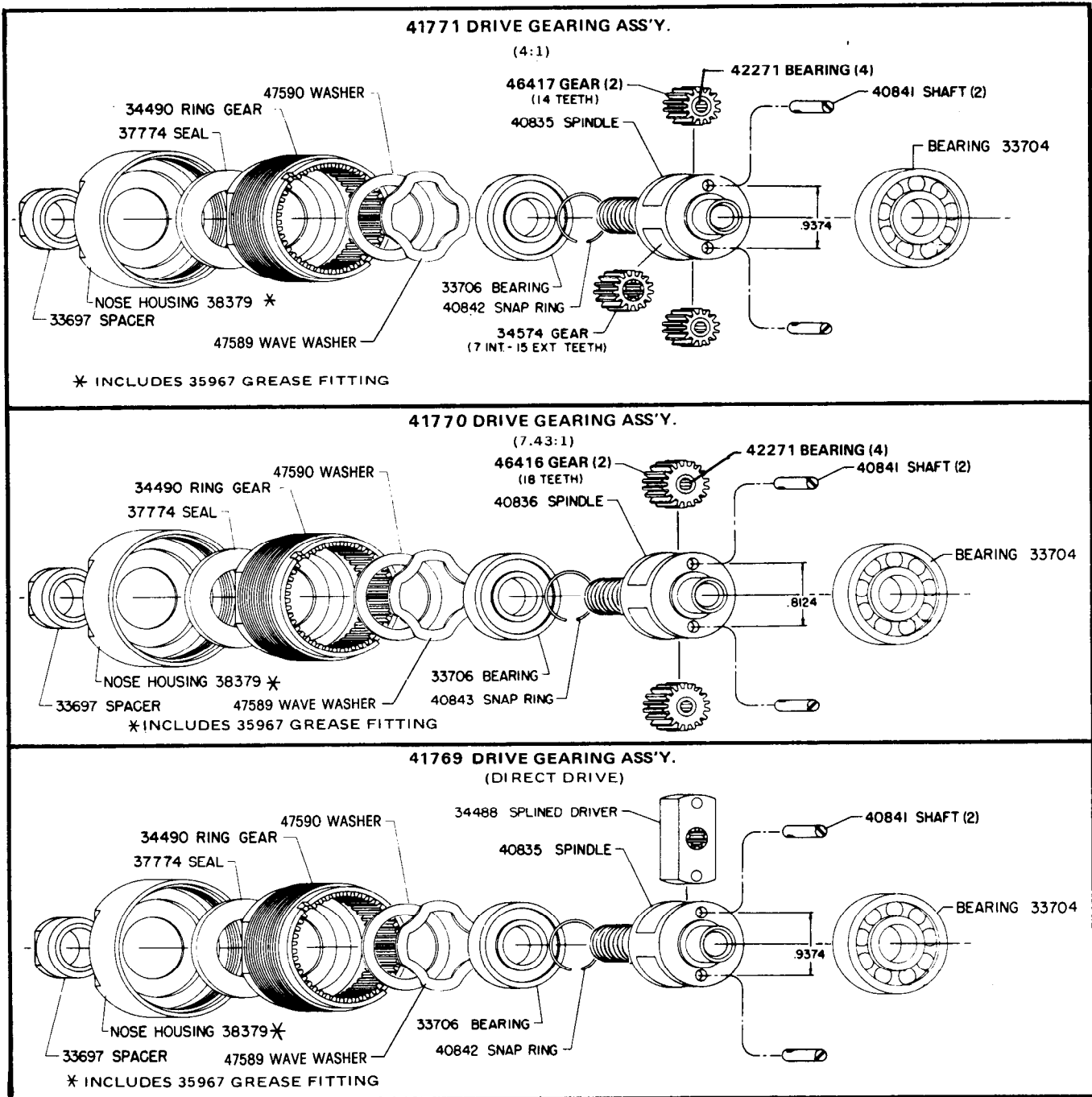


FIGURE 3

DISASSEMBLY

- a. Grasp Ring Gear in one hand and tap drive end of Spindle with a non-metallic hammer; Spindle and components will loosen from ring gear.
- b. Gearing should not be disassembled further unless it is necessary to replace a part as Brinelling of the bearing races may occur making replacement necessary.
- c. To further disassemble – remove Bearing (33706), rotate Snap Ring so the open portion of the ring will allow the removal of Shaft, remove Shaft releasing Gear. Repeat for removal of opposite Shaft and Gear.

REASSEMBLY

- a. To reassemble Gears and Bearings to Spindle, reverse the procedure of disassembly. NOTE: after assembling Gears and Shafts to Spindle rotate Snap Ring securing both Shafts in place.
- b. Assemble Seal (37389), Washer (47590), Wave Washer (47589) Spindle with components to Ring Gear, (see lube requirements page 2). Assemble Spacer (33697).

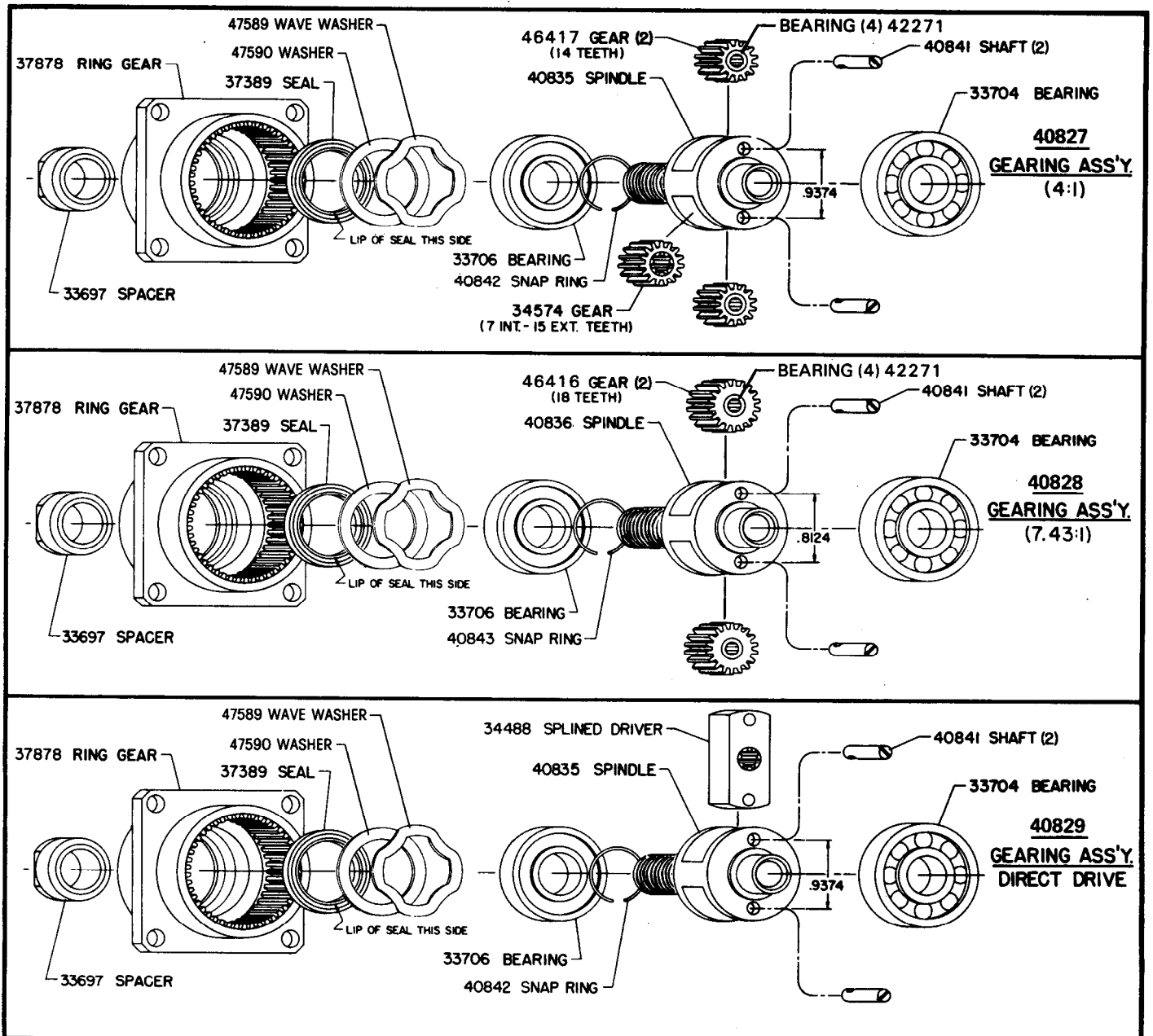


FIGURE 4

## DRIVE GEARING (BOLT-ON)

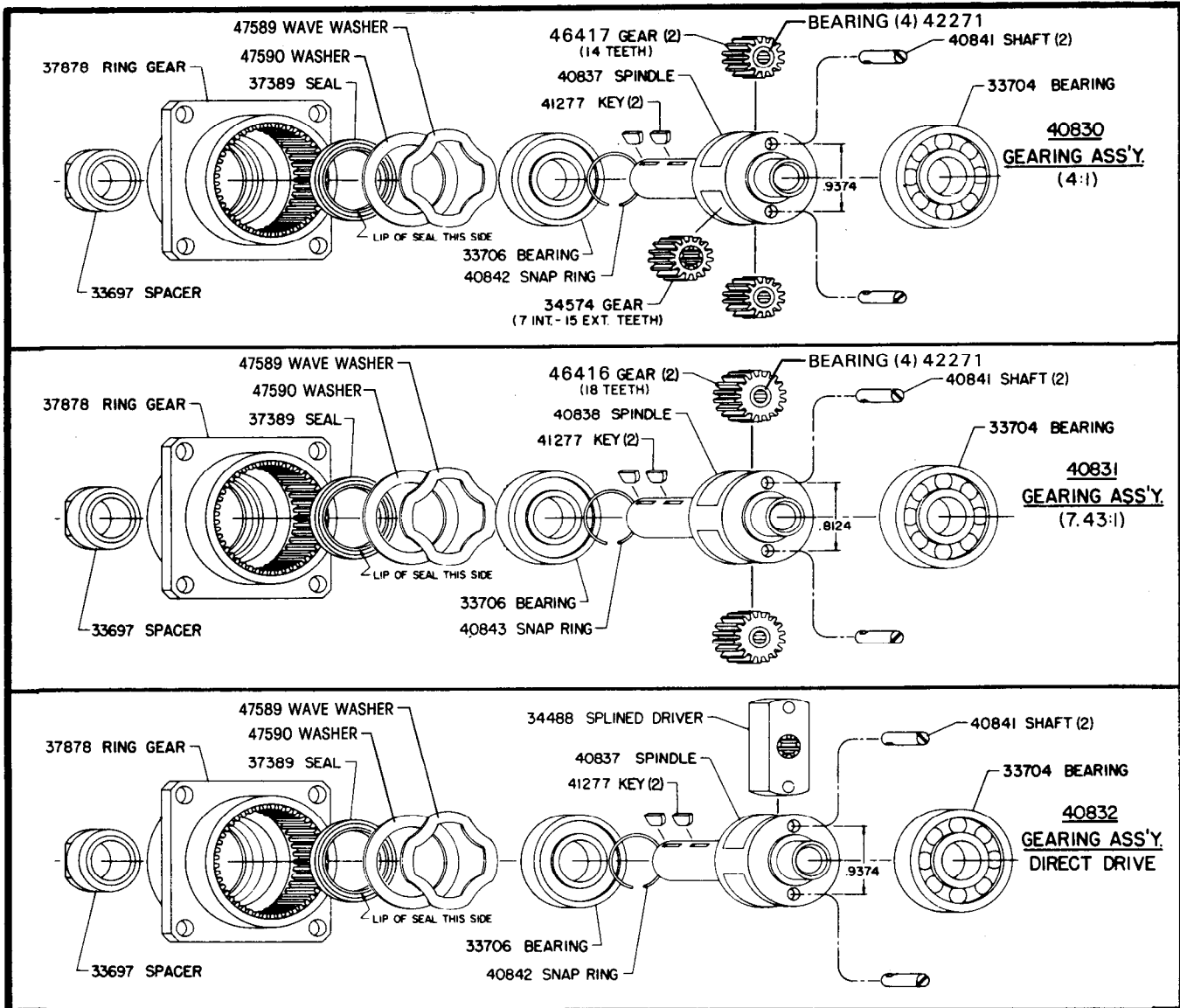


FIGURE 5

## AUXILIARY GEARING (THREAD-ON) (BOLT-ON)

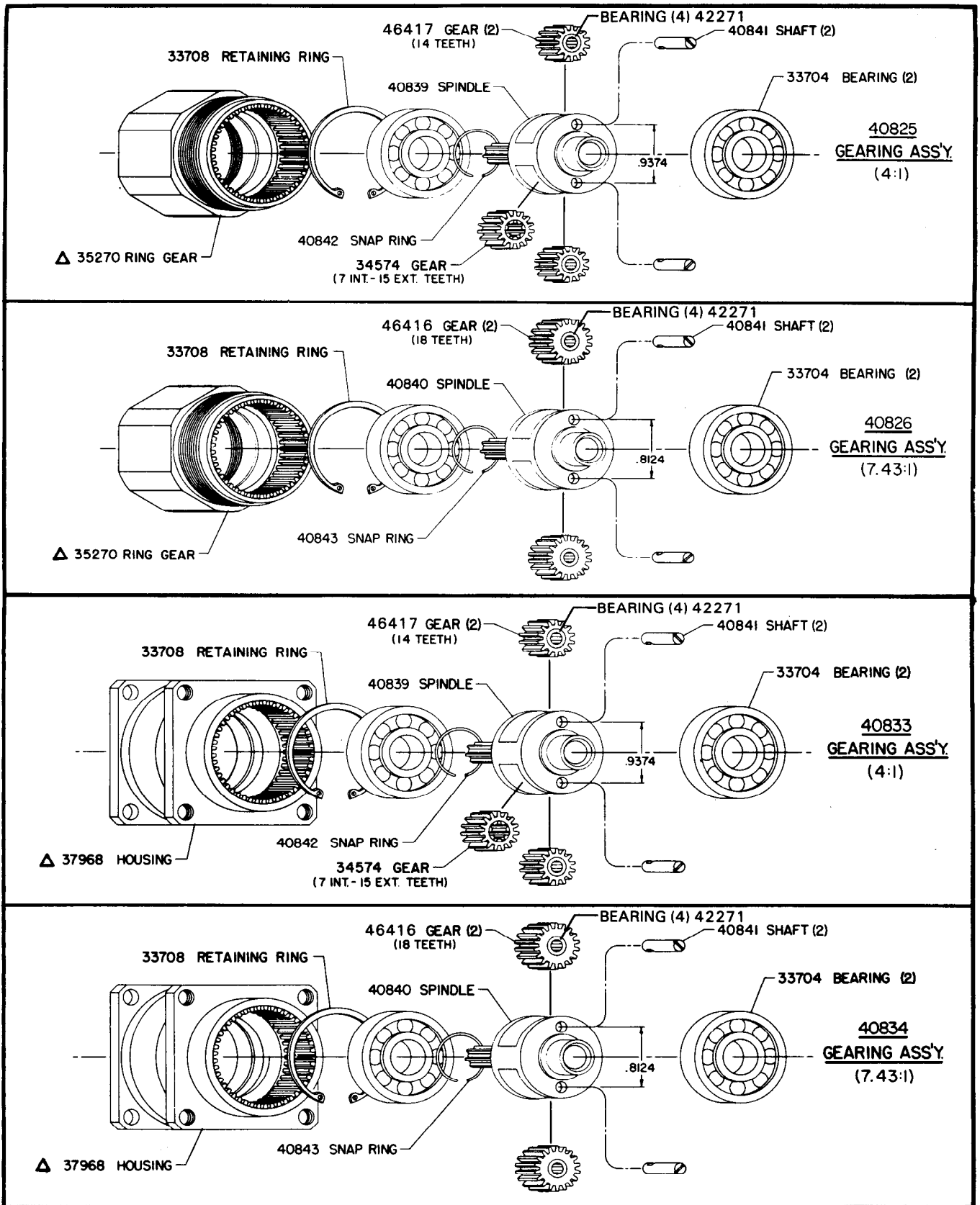
### DISASSEMBLY

- a. Grasp Ring Gear in one hand and tap drive end of Spindle with a non-metallic hammer; Spindle and components will loosen from ring gear.
- b. Gearing should not be disassembled further unless it is necessary to replace a part as Brinelling of the bearing races may occur making replacement necessary.
- c. To further disassemble – remove Bearing (33704), rotate Snap Ring so the open portion of the ring will allow the removal of Shaft, remove Shaft releasing Gear. Repeat for removal of opposite Shaft and Gear.

### REASSEMBLY

- a. To reassemble Gears and Bearings to Spindle, reverse the procedure of disassembly. NOTE: after assembling Gears and Shafts to Spindle rotate Snap Ring securing both Shafts in place.
- b. Assemble Spindle and components to Ring Gear. (see lube requirements page 2).





△ INCLUDES 35323 GREASE FITTING

FIGURE 6

# MOTOR SECTION

## DISASSEMBLY

- Remove nut (33694) and sems fastener (33700).
- Grasp cylinder in one hand and tap drive end of rotor with a soft face hammer; motor will come apart.

## ASSEMBLY

NOTE: Pack bearings with ARO 33153 grease, or equivalent, and coat i.d. of cylinder with ARO 29665 spindle oil upon assembly.

- Assemble bearings into end plates, pressing on outer race of bearings. NOTE: Bearing (33709) is a flush face bearing. Assemble into end plate with flush face of bearing towards end plate (lettering on bearing facing away from end plate. See figure 7.

- Assemble end plate (33710 or 34485), with bearing, to rotor.
- Assemble cylinder over rotor to end plate (33710 or 34485).
- Assemble blades (41520) to rotor.
- Assemble end plate (33712 or 34486), with bearing (33705), to cylinder and rotor.
- Assemble sems fastener (33700) and nut (33694) to motor. NOTE: Torque fastener to 28 in. lbs and nut to 9 – 12 ft lbs.
- Insure rotor does not bind (if motor binds, tap splined end lightly with a soft face hammer to loosen) and assemble, with spacers (33699 and 33711), to tool.

Reverse Rotation Models: See "HEAD SECTION" for assembly of motor assembly to tool.

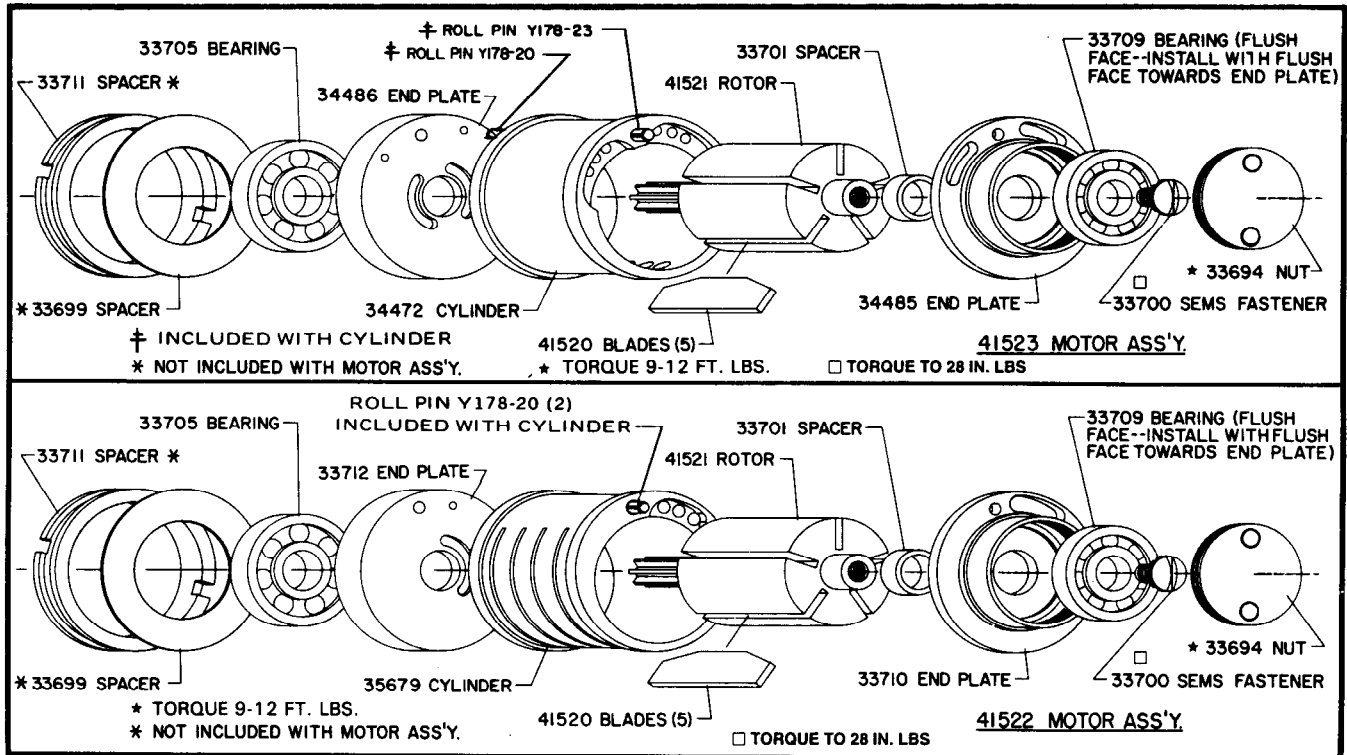


FIGURE 7

## MOTOR HOUSING & EXHAUST MANIFOLD

### DISASSEMBLY

- To remove Manifold, remove head and "O" Ring (Y325-129) and slip manifold off housing.

### REASSEMBLY

- Assemble Manifold and "O" Ring (Y325-129) to housing. NOTE: On models with bolt-on type gearing it may be necessary to use one or more Gaskets (42338) to prevent binding of motor assembly when bolting motor housing to gearing.

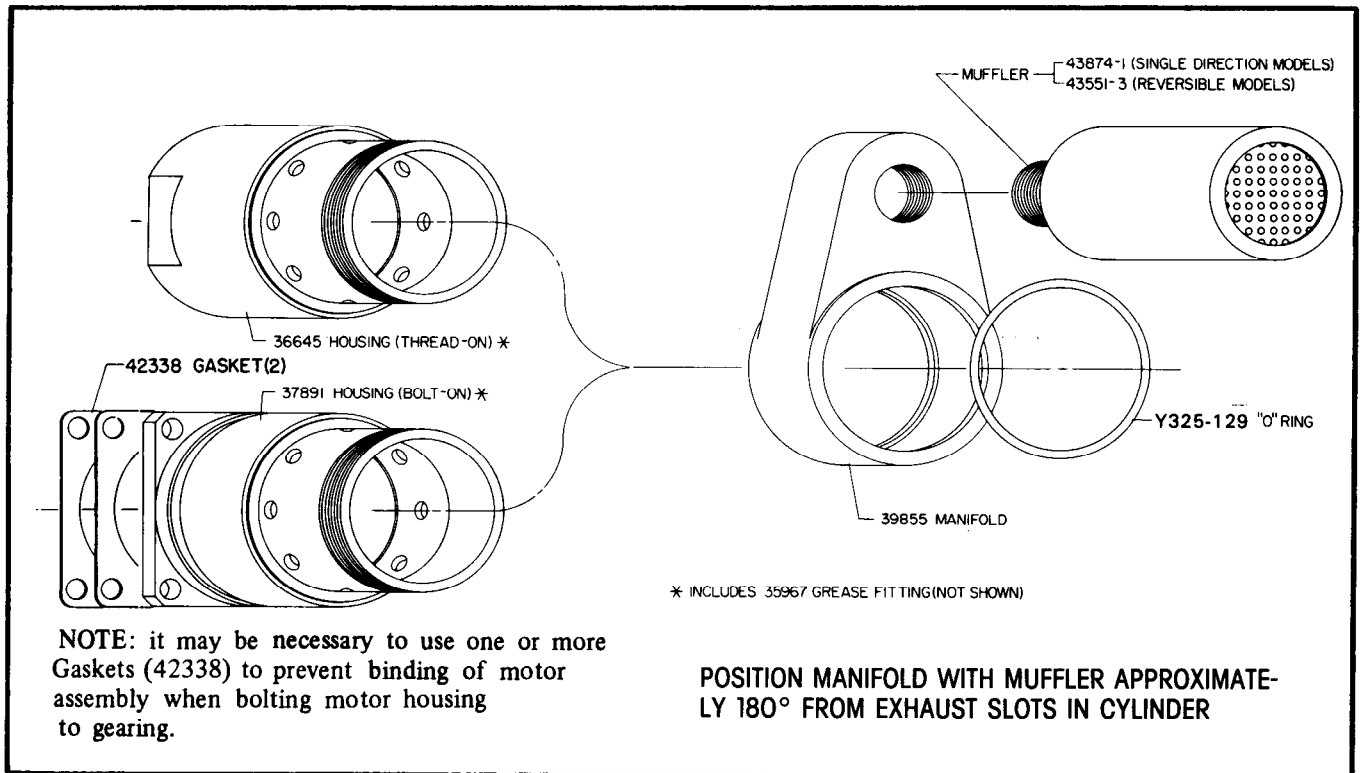


FIGURE 8

HEAD SECTION

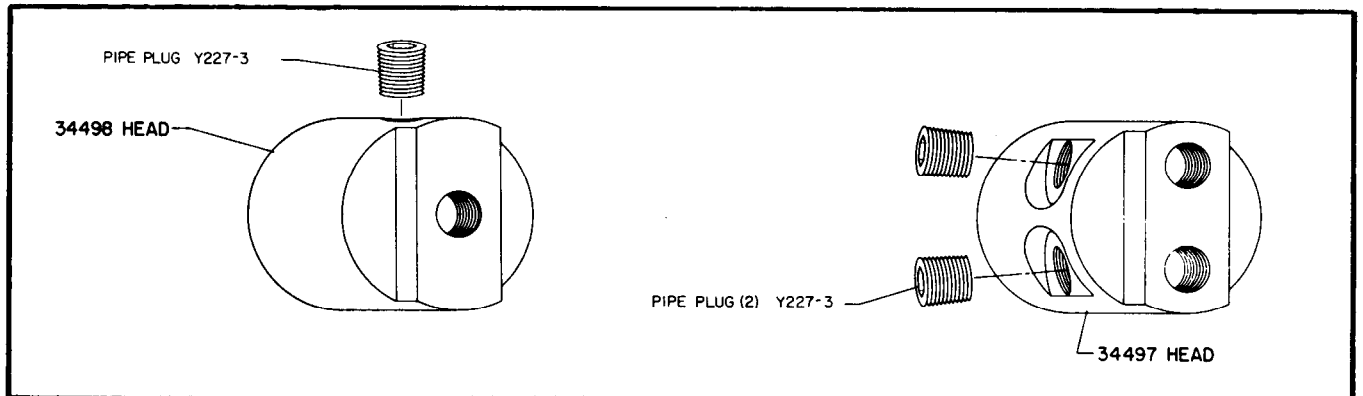
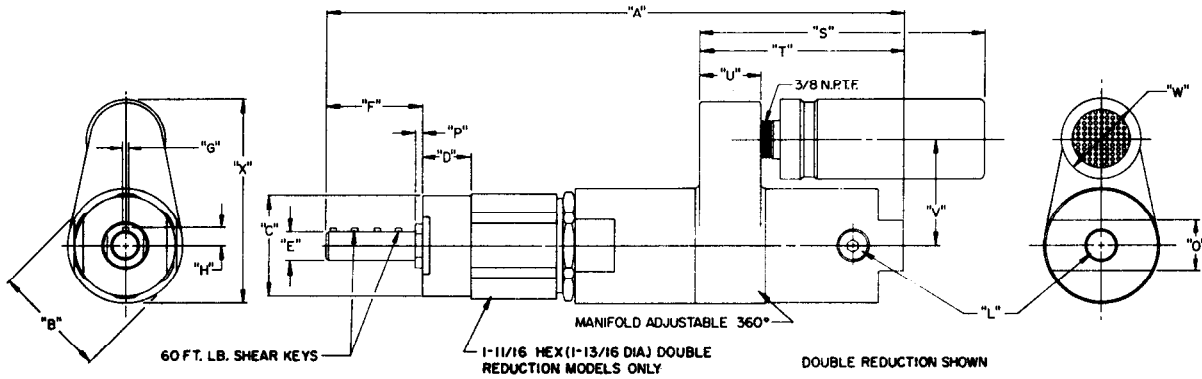


FIGURE 9

When assembling Head or Motor Section to models having reversible rotation motor assemblies the following method of assembly is recommended.

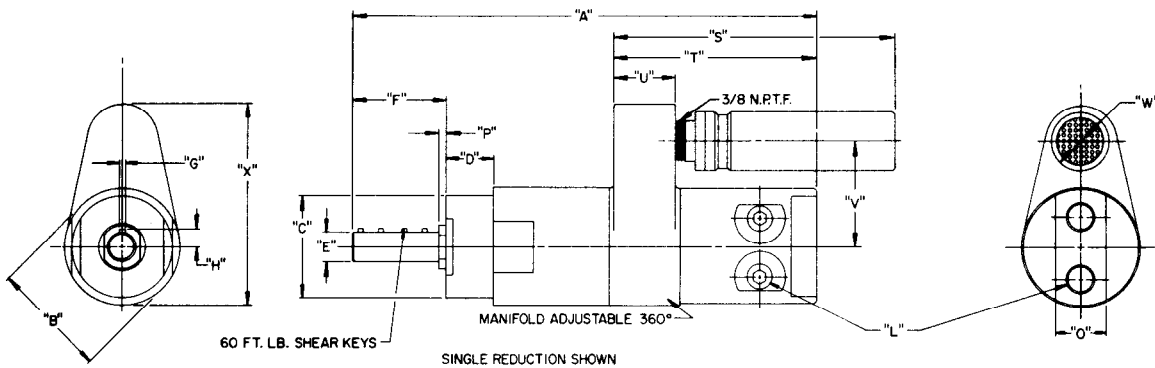
Place Head (flats of head) in a suitable holding device with threaded end in an upright position. Place motor assembly on head aligning Roll Pin that extends through end plate with locating hole in head (center hole of 7 holes). Slip motor housing (with manifold and "O" Ring attached) over motor and secure to head. Assemble Spacers (33699), (33711) and gearing to tool.

# DIMENSIONAL DATA



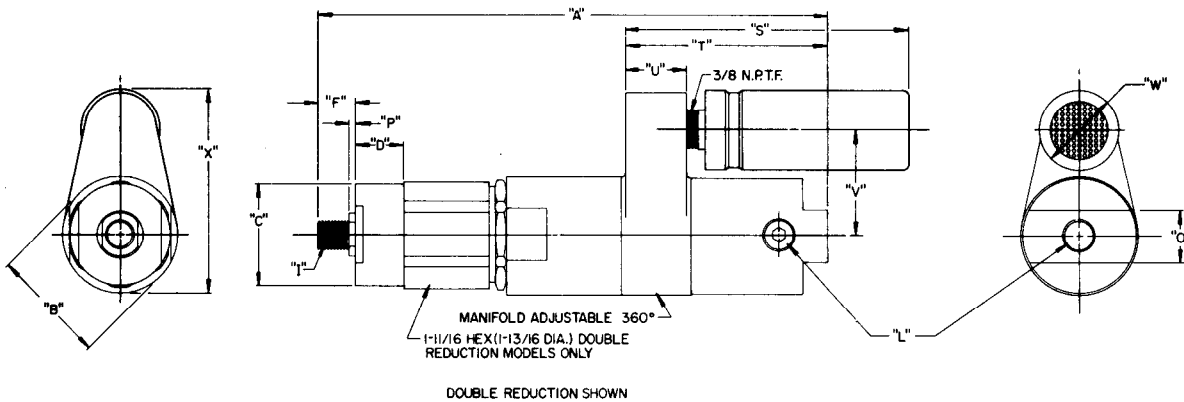
MODELS	GEAR REDUCTION	A
7800-B, 7801-B, 7802-B	SINGLE	8 (203MM)
7803-B, 7804-B, 7805-B	DOUBLE	9-3/4 (248MM)

	B	C	D	E	F	G	H	L	O	P	S	T	U	V	W	X
INCHES	2	1.740 1.760	.818 .838	.4990 .4996	1.588 1.646	.125 .126	.299 .309	1/4 N.P.T.F.	7/8	.046 .158	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
MM	51	44.196 44.704	20.777 21.285	12.674 12.687	40.335 41.808	3.175 3.200	7.594 7.848	AIR INLET	22	1.168 4.013	124	89	27	46	35	89



MODELS	GEAR REDUCTION	A
7806-B, 7807-B, 7808-B	SINGLE	8 (203MM)
7809-B, 7810-B, 7811-B	DOUBLE	9-3/4 (248MM)

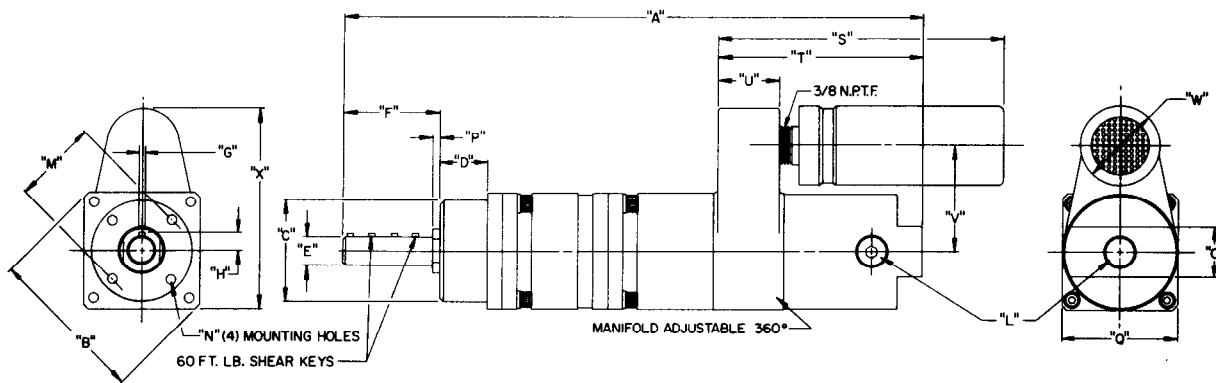
	B	C	D	E	F	G	H	L	O	P	S	T	U	V	W	X
INCHES	2	1.740 1.760	.818 .838	.4990 .4996	1.588 1.646	.125 .126	.299 .309	1/4 N.P.T.F.	7/8	.046 .158	4-7/8	3-1/2	1-1/16	1-13/16	1"	3-7/16
MM	51	44.196 44.704	20.777 21.285	12.674 12.687	40.335 41.808	3.175 3.200	7.594 7.848	AIR INLET	22	1.168 4.013	124	89	27	46	25	87



MODELS	GEAR REDUCTION	A
7814-B, 7816-B, 7817-B	SINGLE	7 (178MM)
7812-B, 7813-B, 7815-B	DOUBLE	8-7/8 (225MM)

	B	C	D	F	I	L	O	P	S	T	U	V	W	X
INCHES	2	1.740 1.760	.818 .838	.819 .877	1/2-20 UNF-2A TH'D.	1/4 N.P.T.F. AIR INLET	7/8	.046 .158	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
MM	51	44.196 44.704	20.777 21.285	15.722 17.195			22	1.168 4.013	124	89	27	46	35	89

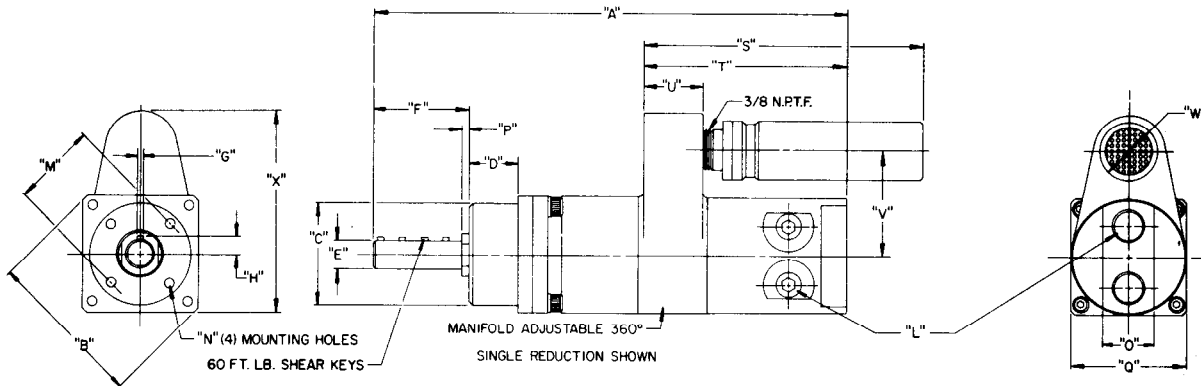
DIMENSIONAL DATA



DOUBLE REDUCTION SHOWN

MODELS	GEAR REDUCTION	A
7800-1B, 7801-1B, 7802-1B	SINGLE	8-1/8 (206MM)
7803-1B, 7804-1B, 7805-1B	DOUBLE	9-29/32 (252MM)

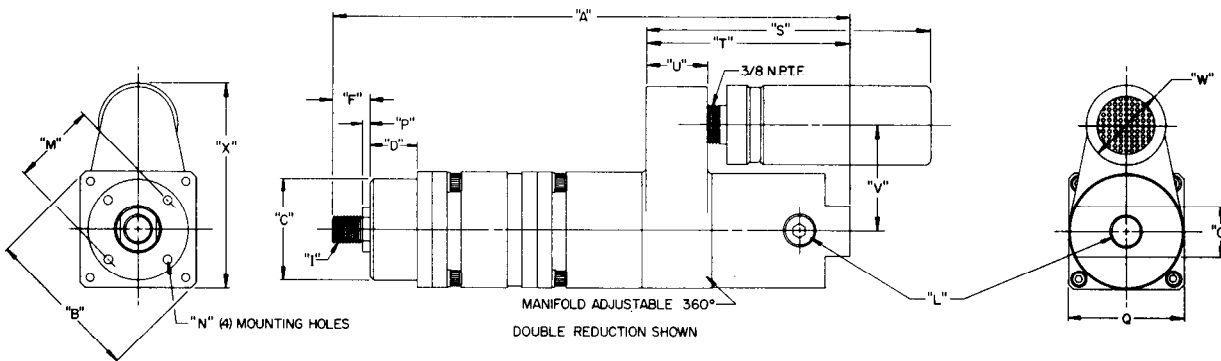
	B	C	D	E	F	G	H	L	M	N	O	P	Q	S	T	U	V	W	X
INCHES	2-11/16	1.7490 1.7495	.781 .812	.4990 .4995	1.615 1.653	.125 .126	.299 309	1/4 N.P.T.F.	1.432 1.442	10-24 UNC-2B TH'D.	7/8	.113 .165	2	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
MM	68	44.4246 44.4373	19.837 20.624	12.674 12.687	41.021 41.986	3.175 3.200	7.594 7.848	AIR INLET	36.372 36.626	22	22	2.870 4.191	51	124	89	27	46	35	89



SINGLE REDUCTION SHOWN

MODELS	GEAR REDUCTION	A
7806-1B, 7807-1B, 7808-1B	SINGLE	8-1/8 (206MM)
7809-1B, 7810-1B, 7811-1B	DOUBLE	9-29/32 (252MM)

	B	C	D	E	F	G	H	L	M	N	O	P	Q	S	T	U	V	W	X
INCHES	2-11/16	1.7490 1.7495	.781 .812	.4990 .4995	1.615 1.653	.125 .126	.299 309	1/4 N.P.T.F.	1.432 1.442	10-24 UNC-2B TH'D.	7/8	.113 .165	2	4-7/8	3-1/2	1-1/16	1-13/16	1"	3-7/16
MM	68	44.4246 44.4373	19.837 20.624	12.674 12.687	41.021 41.986	3.175 3.200	7.594 7.848	AIR INLET	36.372 36.626	22	22	2.870 4.191	51	124	89	27	46	25	87



DOUBLE REDUCTION SHOWN

MODELS	GEAR REDUCTION	A
7814-1B, 7816-1B, 7817-1B	SINGLE	7-5/32 (182MM)
7812-1B, 7813-1B, 7815-1B	DOUBLE	8-15/16 (227MM)

	B	C	D	F	I	L	M	N	O	P	Q	S	T	U	V	W	X
INCHES	2-11/16	1.7490 1.7495	.781 .812	.646 .684	1/2-20 UNF-2A TH'D.	1/4 N.P.T.F.	1.432 1.442	10-24 UNC-2B TH'D.	7/8	.113 .165	2	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
MM	68	44.4246 44.4373	19.837 20.624	16.408 17.373		AIR INLET	36.372 36.626	22	22	2.870 4.191	51	124	89	27	46	35	89







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