Part No. 49999-044
04562716
Edition 4
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Power Motors

2200 Series
Models 78( )( )-B and 78( )( )-1B

Operation and Maintenance Information

Save These Instructions

Ingersoll Rand

⚠ WARNING

General Product Safety Information

- **Read and understand this manual before operating this product.**
- **It is your responsibility to make this safety information available to others that will operate this product.**
- **Failure to observe the following warnings could result in injury.**

⚠ WARNING

- **Always operate, inspect and maintain this motor in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).**
- **For safety, top performance and maximum durability of parts, operate this motor at 90 psig (6.2 bar/620 kPa) air pressure at the inlet with 5/16" air supply hose.**
- **Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this motor or before performing any maintenance on this motor.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Keep hands, loose clothing and long hair away from rotating end of motor.**
- **Always wear eye protection when operating or performing maintenance on this motor.**
- **Always wear hearing protection when operating this motor.**
- **Anticipate and be alert for sudden changes in motion during start up and operation of any motor.**
- **Motor shaft may continue to rotate briefly after throttle is released.**
- **Do not lubricate motor with flammable or volatile liquids such as kerosene, diesel or jet fuel.**
- **Do not remove any labels. Replace any damaged label.**
- **Use accessories recommended by Ingersoll Rand.**
- **This motor is not designed for working in explosive atmospheres.**
- **This motor is not insulated against electric shock.**

NOTICE

- The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased Motor performance and increased maintenance, and may invalidate all warranties.
- **Ingersoll Rand** is not responsible for customer modification of motors for applications on which **Ingersoll Rand** was not consulted.
- Repairs should be made only by authorized, trained personnel. Consult your nearest **Ingersoll Rand** Authorized Servicenter.
- It is the responsibility of the employer to place the information in this manual into the hands of the operator.

Safety Symbol Identification

Wear Respiratory Protection

Wear Eye Protection

Wear Hearing Protection

Read Manuals Before Operating Product

(Dwg. MHP2598)

Safety Information - Explanation of Safety Signal Words

⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.
NOTICE	Indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

Model Identification

Thread-on Type Gearing

Model No.	rpm (Free Speed)	Rotation	Head Assembly	Motor Assembly	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.	rpm (Free Speed)	Rotation	Head Assembly	Motor Assembly	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

General Description and Operation

"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 as shown in the table above.

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. lb. (82 N-m) for the protection of the gearing.

Air and Lube Requirements

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 C28221-800 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.

Maintenance

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 33 153 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.

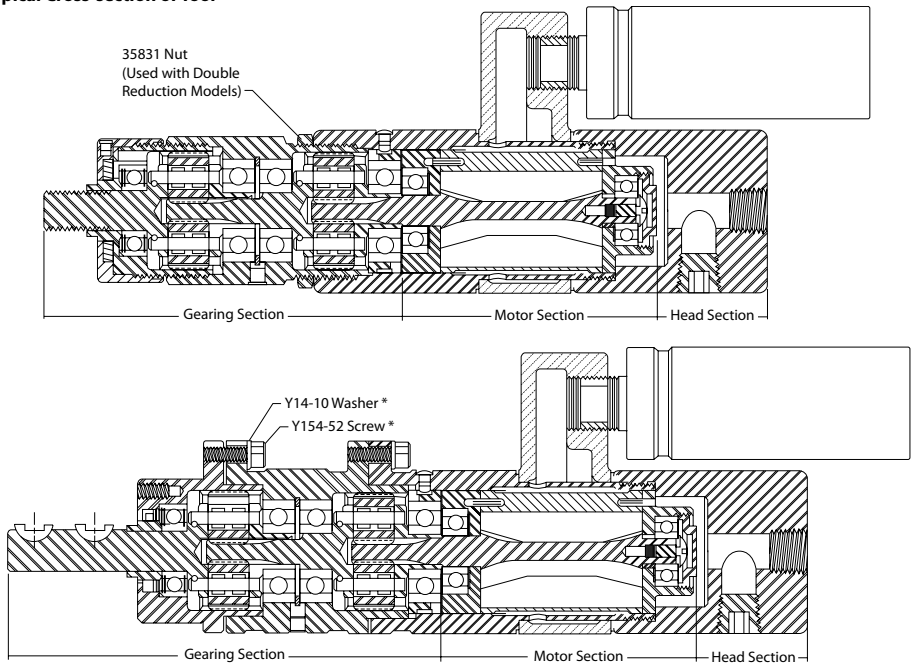
Motor Section

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



* (4) on Single Reduction and (8) on Double Reduction Models

Figure-01

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.

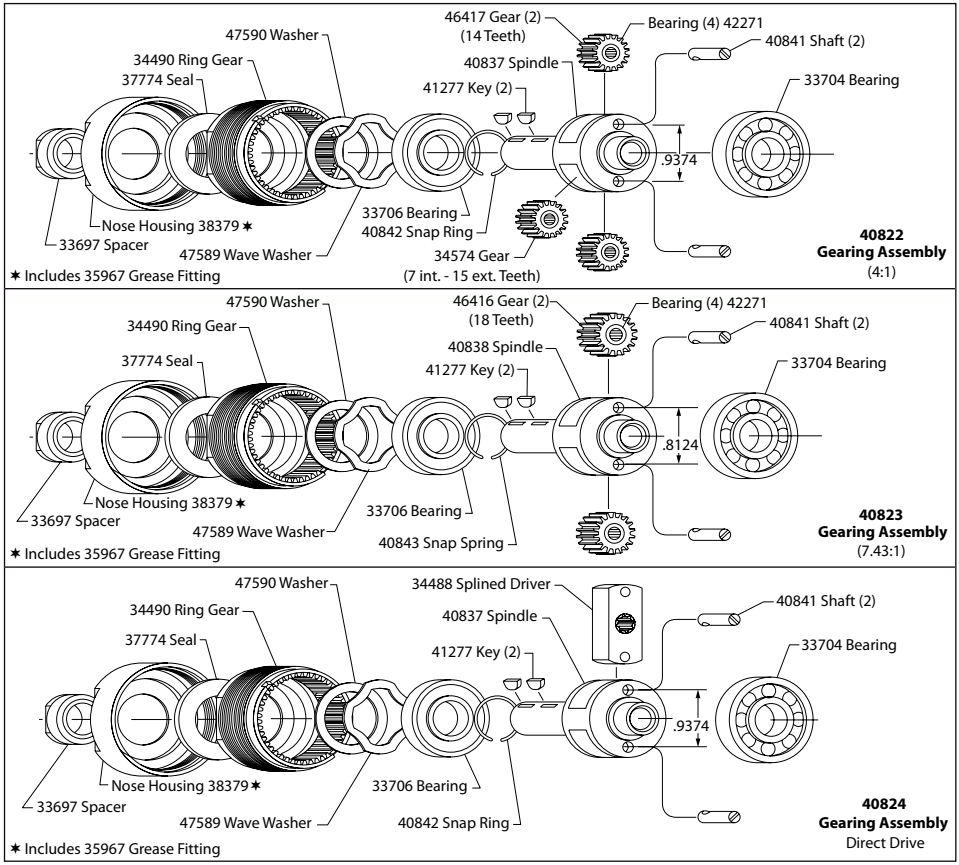
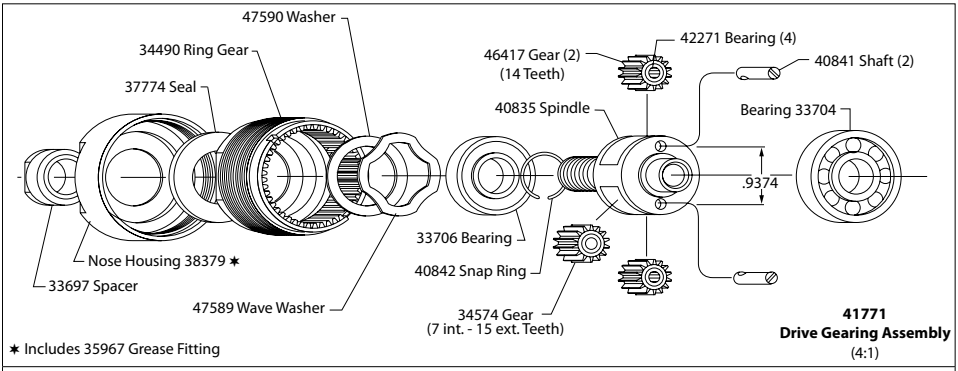
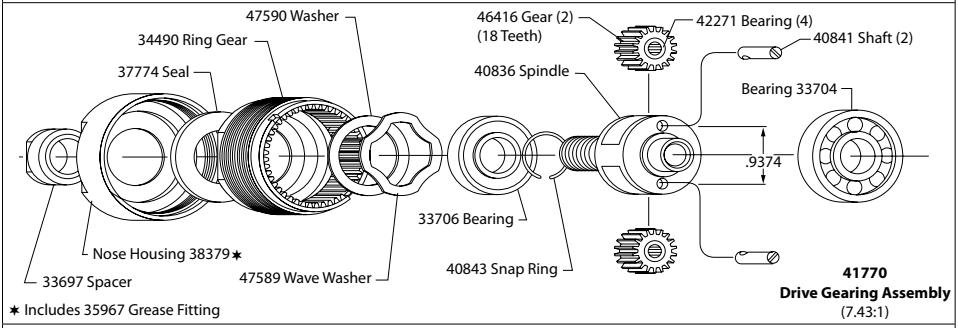


Figure-02


47590 Washer
34490 Ring Gear
37774 Seal
46417 Gear (2)
(14 Teeth)
42271 Bearing (4)
40841 Shaft (2)
40835 Spindle
Bearing 33704
.9374
33706 Bearing
40842 Snap Ring
Nose Housing 38379 ✶
33697 Spacer
47589 Wave Washer
34574 Gear
(7 int. - 15 ext. Teeth)
41771
Drive Gearing Assembly
(4:1)
✶ Includes 35967 Grease Fitting


47590 Washer
34490 Ring Gear
37774 Seal
46416 Gear (2)
(18 Teeth)
42271 Bearing (4)
40841 Shaft (2)
40836 Spindle
Bearing 33704
.9374
33706 Bearing
40843 Snap Ring
Nose Housing 38379 ✶
33697 Spacer
47589 Wave Washer
41770
Drive Gearing Assembly
(7.43:1)
✶ Includes 35967 Grease Fitting

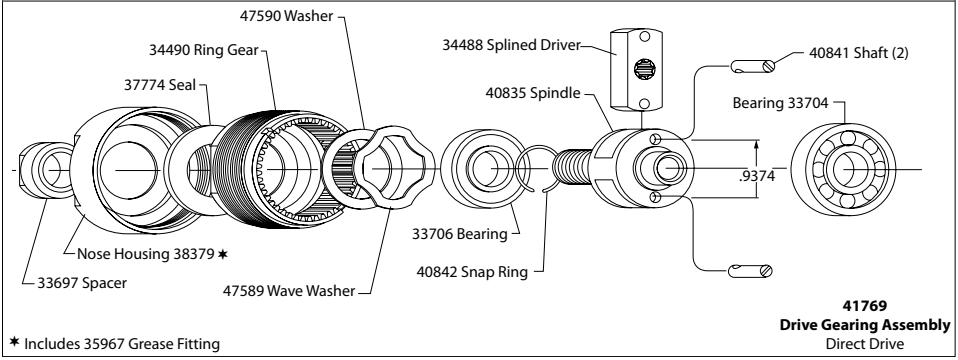

47590 Washer
34490 Ring Gear
37774 Seal
34488 Splined Driver
40841 Shaft (2)
40835 Spindle
Bearing 33704
.9374
33706 Bearing
40842 Snap Ring
Nose Housing 38379 ✶
33697 Spacer
47589 Wave Washer
41769
Drive Gearing Assembly
Direct Drive
✶ Includes 35967 Grease Fitting

Figure-03

Drive Gearing (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 (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 3). Assemble Spacer (33697).

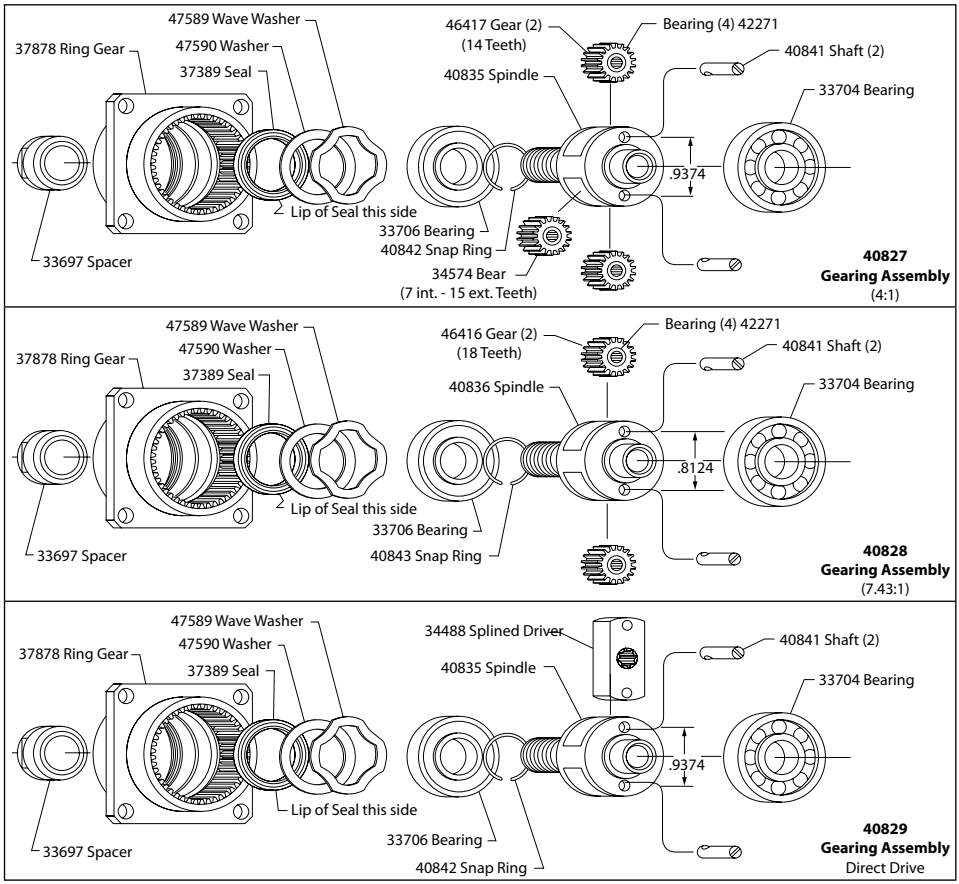


Figure-04

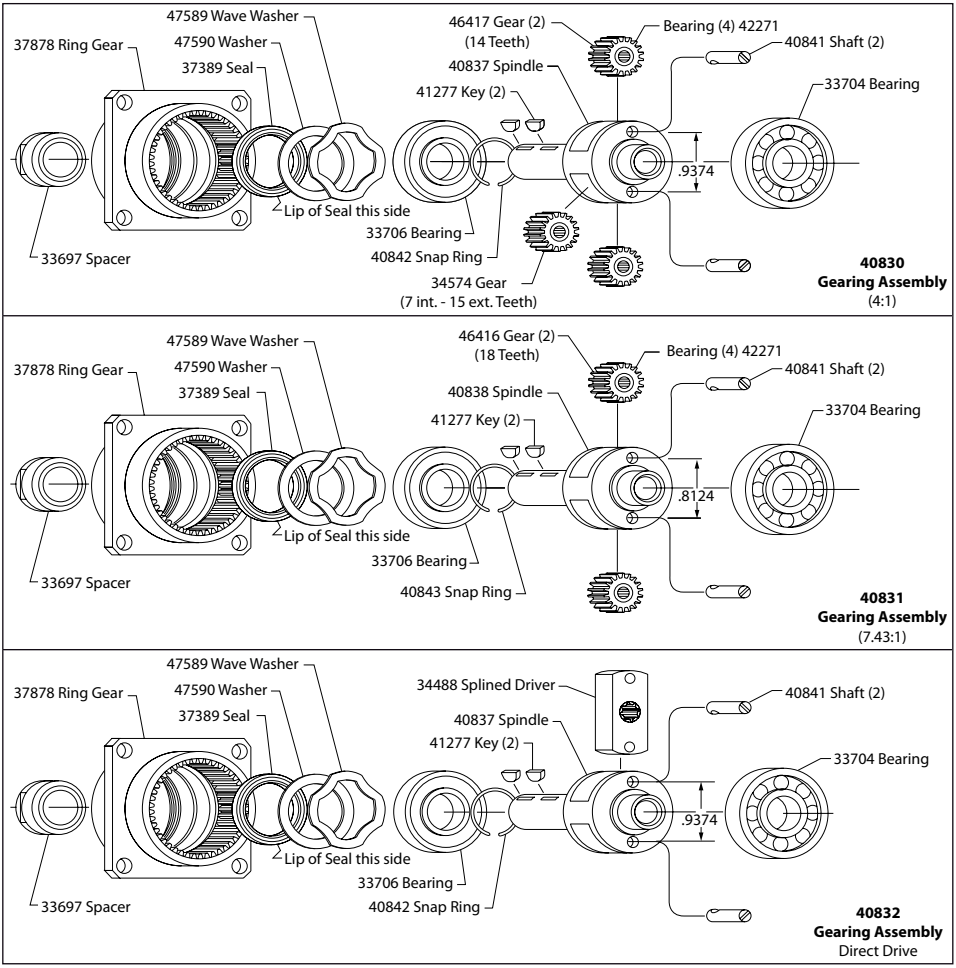


Figure-05

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 3).

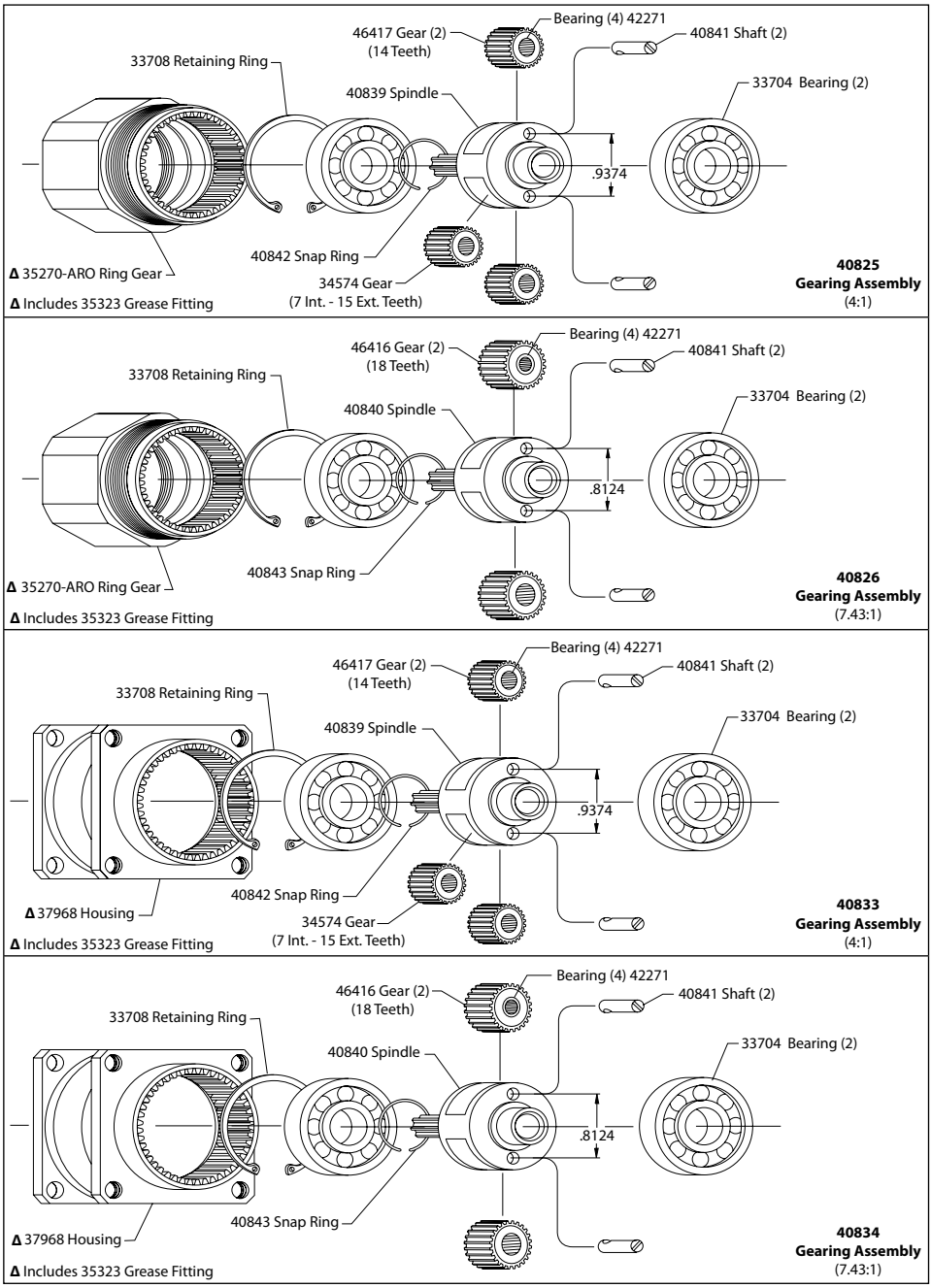

Bearing (4) 42271
46417 Gear (2)
(14 Teeth)
40841 Shaft (2)
33708 Retaining Ring
40839 Spindle
33704 Bearing (2)
.9374
40842 Snap Ring
Δ 35270-ARO Ring Gear
34574 Gear
(7 Int. - 15 Ext. Teeth)
Δ Includes 35323 Grease Fitting
40825
Gearing Assembly
(4:1)
Bearing (4) 42271
46416 Gear (2)
(18 Teeth)
40841 Shaft (2)
33708 Retaining Ring
40840 Spindle
33704 Bearing (2)
.8124
40843 Snap Ring
Δ 35270-ARO Ring Gear
Δ Includes 35323 Grease Fitting
40826
Gearing Assembly
(7.43:1)
Bearing (4) 42271
46417 Gear (2)
(14 Teeth)
40841 Shaft (2)
33708 Retaining Ring
40839 Spindle
33704 Bearing (2)
.9374
40842 Snap Ring
Δ 37968 Housing
34574 Gear
(7 Int. - 15 Ext. Teeth)
Δ Includes 35323 Grease Fitting
40833
Gearing Assembly
(4:1)
Bearing (4) 42271
46416 Gear (2)
(18 Teeth)
40841 Shaft (2)
33708 Retaining Ring
40840 Spindle
33704 Bearing (2)
.8124
40843 Snap Ring
Δ 37968 Housing
Δ Includes 35323 Grease Fitting
40834
Gearing Assembly
(7.43:1)

Figure-06

Motor Section

Disassembly

a. Remove nut (33694) and sems fastener (33700).
b. 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 33153 grease, or equivalent, and coat i.d. of cylinder with 29665 spindle oil upon assembly.

a. 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).
b. Assemble end plate (33710 or 34485), with bearing, to rotor.
c. Assemble cylinder over rotor to end plate (33710 or 34485).
d. Assemble blades (41520) to rotor.
e. Assemble end plate (33712 or 34486), with bearing (33705), to cylinder and rotor.
f. Assemble sems fastener (33700) and nut (33694) to motor.

Note: Torque fastener to 28 in. lbs and nut to 9 - 12 ft lbs.

g. 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.

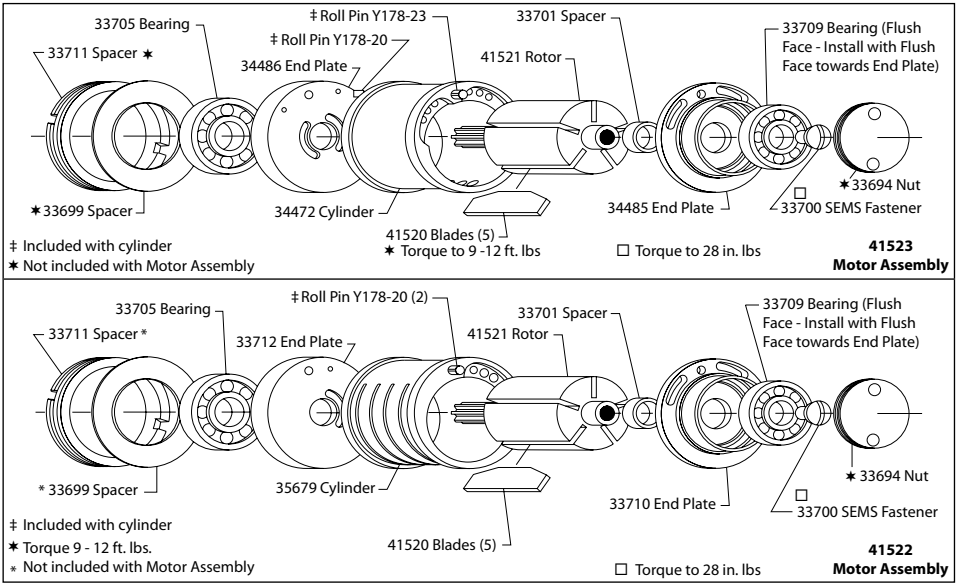


Figure-07

Motor Housing and Exhaust Manifold

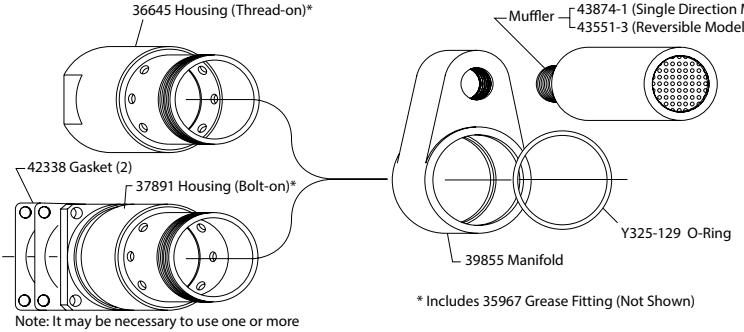
Disassembly

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

Reassembly

a. 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.



Note: It may be necessary to use one or more Gaskets (42338) to prevent binding of motor assembly when bolting motor housing to gearing.

* Includes 35967 Grease Fitting (Not Shown)

Position Manifold with Muffler approximately 180° from Exhaust slots in Cylinder

Figure-08

Head Section

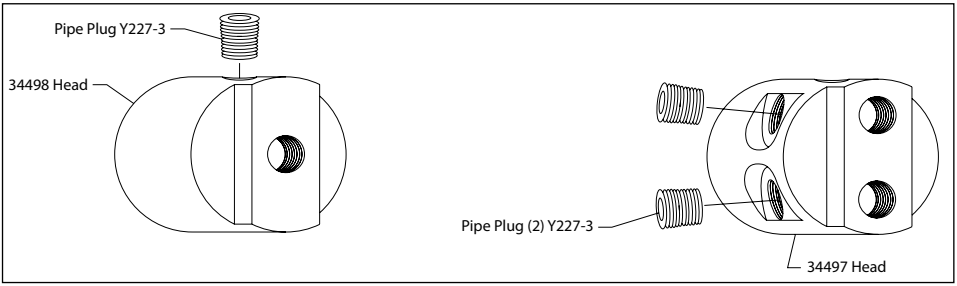
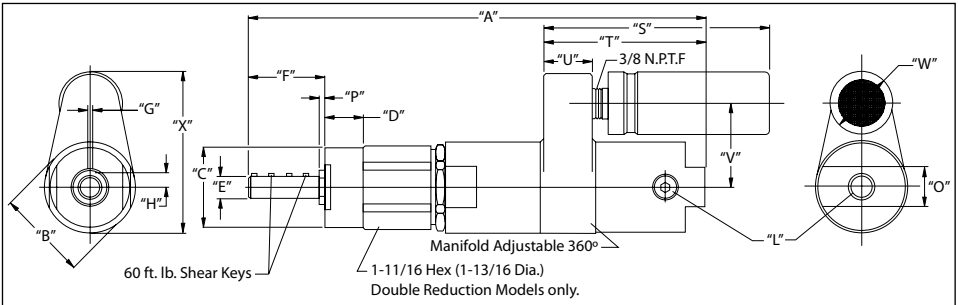


Figure-09

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.

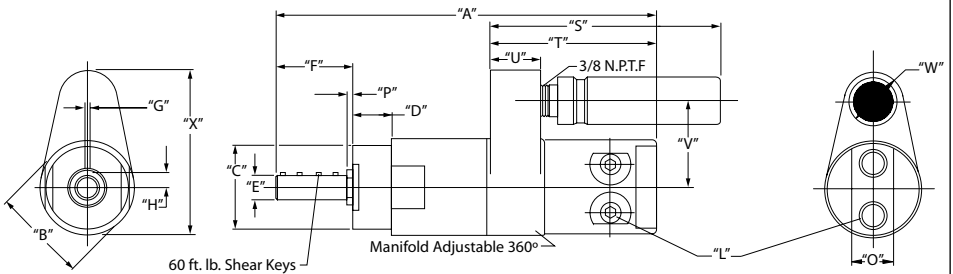
Dimensional Data



Double Reduction Shown

Models	Gear Reduction	A
7800-B, 7801-B, 7802-B	Single	8 (203MM)
7803-B, 7804-B, 7805-B	Double	9-3/4 (248MM)

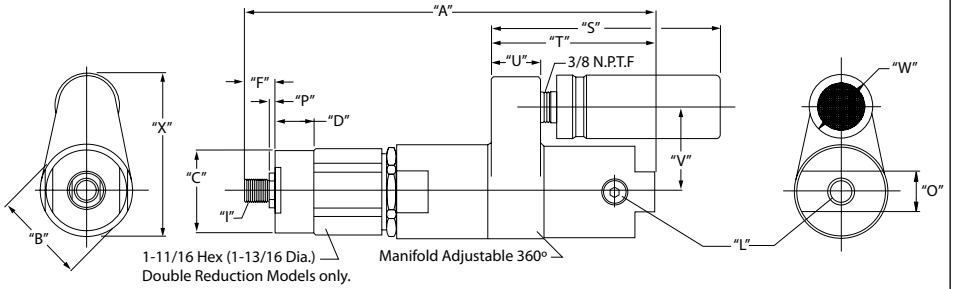
	B	C	D	E	F	G	H	L	O	P	S	T	U	V	W	X
Inches	2	1.740	.818	.4990	1.588	.125	.299	1/4 N.P.T.F Air Inlet	7/8	.046	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
		1.760	.838	.4995	1.648	.126	.309			.158						
mm	51	44.196	20.777	12.674	40.335	3.175	7.594		22	1.168	124	89	27	46	36	89
		44.704	21.285	12.687	41.808	3.200	7.848			4.013						



Single Reduction Shown

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	.818	.4990	1.588	.125	.299	1/4 N.P.T.F Air Inlet	7/8	.046	4-7/8	3-1/2	1-1/16	1-13/16	1	3-7/16
		1.760	.838	.4995	1.648	.126	.309			.158						
mm	51	44.196	20.777	12.674	40.335	3.175	7.594		22	1.168	124	89	27	46	25	87
		44.704	21.285	12.687	41.808	3.200	7.848			4.013						



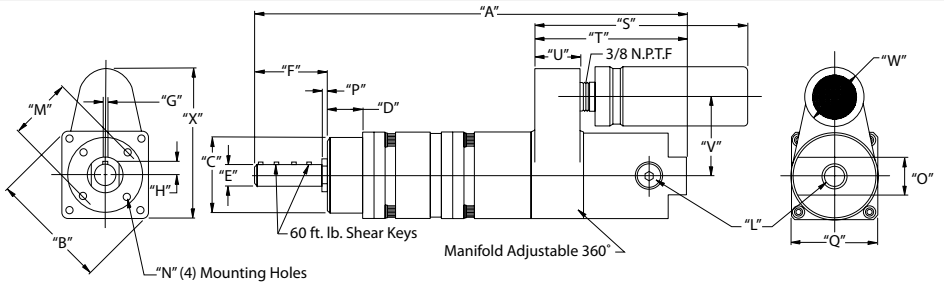
Double Reduction Shown

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	.818	.619	1/2-20 UNF-2A Thd	1/4 N.P.T.F Air Inlet	7/8	.046	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
		1.760	.838	.677				.158						
mm	51	44.196	20.777	15.722			22	1.168	124	89	27	46	35	89
		44.704	21.285	17.195				4.013						

Figure-10

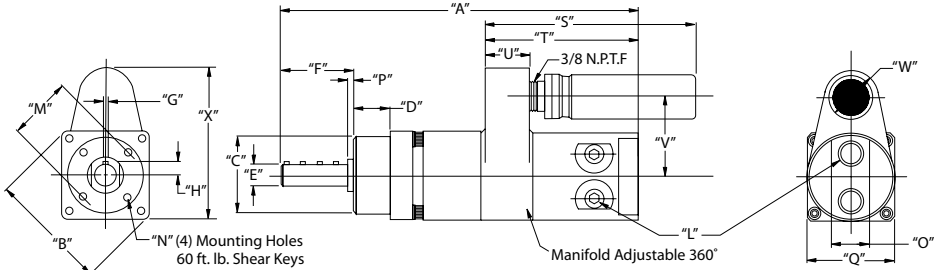
Dimensional Data



Double Reduction Shown

Models	Gear Reduction	A
7800-1B, 7801-1B, 7802-1B	Single	8-1/8 (208MM)
7803-1B, 7804-1B, 7805-1B	Double	9-29/32 (252MM)

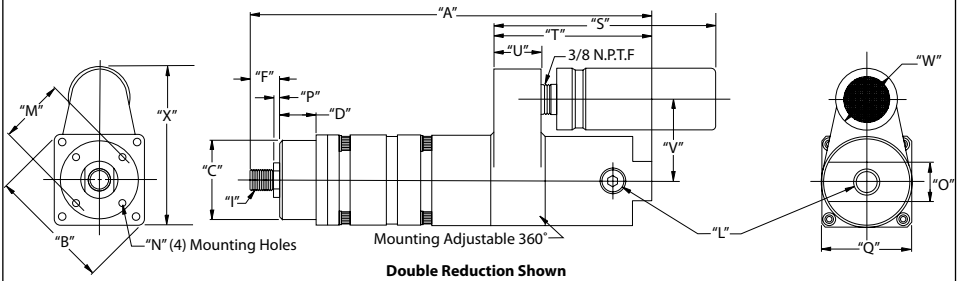
	B	C	D	E	F	G	H	L	M	N	O	P	Q	S	T	U	V	W	X
Inches	2-11/16	1.7490	.781	.4990	1.615	.125	.299	1/4 N.P.T.F Air Inlet	1.432	10.24 UNC-28 Th'd	7/8	.113	2	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
		1.7495	.812	.4995	1.653	.126	.309		1.442			.165							
mm	68	44.4246	19.837	12.674	41.021	3.175	7.594		36.372		22	2.870	51	124	89	27	46	36	89
		44.4373	20.624	12.687	41.986	3.200	7.848		36.626			4.191							



Single Reduction Shown

Models	Gear Reduction	A
7806-1B, 7807-1B, 7808-1B	Single	8-1/8 (208MM)
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	.781	.4990	1.615	.125	.299	1/4 N.P.T.F Air Inlet	1.432	10.24 UNC-28 Th'd	7/8	.113	2	4-7/8	3-1/2	1-1/16	1-13/16	1	3-7/16
		1.7495	.812	.4995	1.653	.126	.309		1.442			.165							
mm	68	44.4246	19.837	12.674	41.021	3.175	7.594		36.372		22	2.870	51	124	89	27	46	25	87
		44.4373	20.624	12.687	41.986	3.200	7.848		36.626			4.191							



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	.781	.646	1/2-20 UNF-2A Th'd	1/4 N.P.T.F Air Inlet	1.432	10.24 UNC-28 Th'd	7/8	.113	2	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
		1.7495	.812	.684			1.442			.165							
mm	68	44.4246	19.837	16.408			36.372		22	2.870	51	124	89	27	46	35	89
		44.4373	20.624	17.373			36.626			4.191							

Figure-11

Parts and Maintenance

When tool life has expired, it is recommended that the tool be disassembled, degreased and parts separated by material for proper recycling.

Manuals can be downloaded from ingersollrandproducts.com.

Refer all communications to the nearest **Ingersoll Rand** office or distributor.

Notes:

ingersollrandproducts.com