ARO Tool Products

OPERATOR'S MANUAL

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

20 SERIES 45° DRILLS

SECTION M22
MANUAL 80
Released: 9-3-90
Revised: 11-10-95
Form: 3698-2

Models: DA023B-( )-( ) and DA025B-( )-( ).

⚠ 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 removing/installing bit, socket or device attached to tool or 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.
- Tool shaft can continue to rotate briefly after throttle is released.
- 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.

⚠WARNING

Repeated prolonged operator exposure to vibrations which may be generated in the use of certain hand-held tools may produce Raynaud's phenomenon, commonly referred to as Whitefinger disease. The phenomenon produces numbness and burning sensations in the hand and may cause circulation and nerve damage as well as tissue necrosis. Repetitive users of hand-held tools who experience vibrations should closely monitor duration of use and their physical condition.

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.

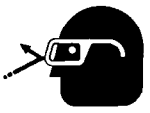
For parts and service information, contact your local ARO distributor, or the Customer Service Dept. of the Ingersoll-Rand Distribution Center, White House, TN at PH: (615) 672-0321, FAX: (615) 672-0801.

ARO Tool Products
Ingersoll-Rand Company
1725 U.S. No. 1 North • P.O. Box 8000 • Southern Pines, NC 28388-8000

ARO®
Part of worldwide Ingersoll-Rand

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

⚠ WARNING



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

⚠ WARNING

Wear hearing protection when operating 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

Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.

⚠ WARNING

Do not carry the tool by the hose.

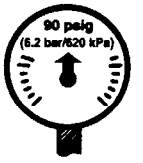
⚠ WARNING

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

⚠ WARNING

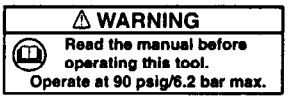
Do not overreach when operating this tool. Keep body stance balanced and firm.

⚠ WARNING



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

NOTICE



PN 48176–1 LABEL
(NON–EU MODELS)

PN 49883 LABEL
(–EU MODELS)

This label must appear on the tool at all times. If it is lost or damaged, a replacement label is available at no cost.

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.

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 160 HOURS OF TOOL OPERATION – Lubricate gearing. Pack bearings, coat shafts and lubricate gears with NLGI #1 "EP" grease (33153). Gearing should contain approximately 1/32 oz. (.9 g) of grease for single reduction and 3/64 oz. (1.3 g) of grease for double reduction. Angle housing section should contain approximately 1/8 oz. (3.5 g) of grease.

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.

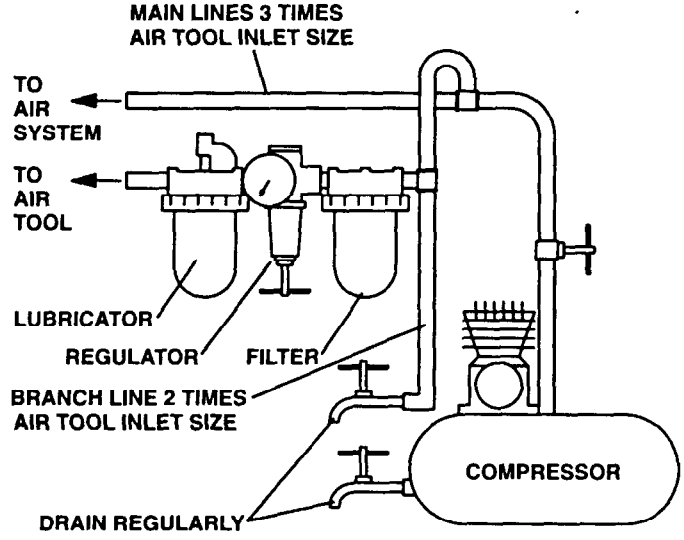
Tool maintenance and repair shall be performed by authorized, trained, competent personnel. Tools, hose and fittings shall be replaced if unsuitable for safe operation and responsibility should be assigned to be sure that all tools requiring guards or other safety devices shall be kept in legible condition. 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.

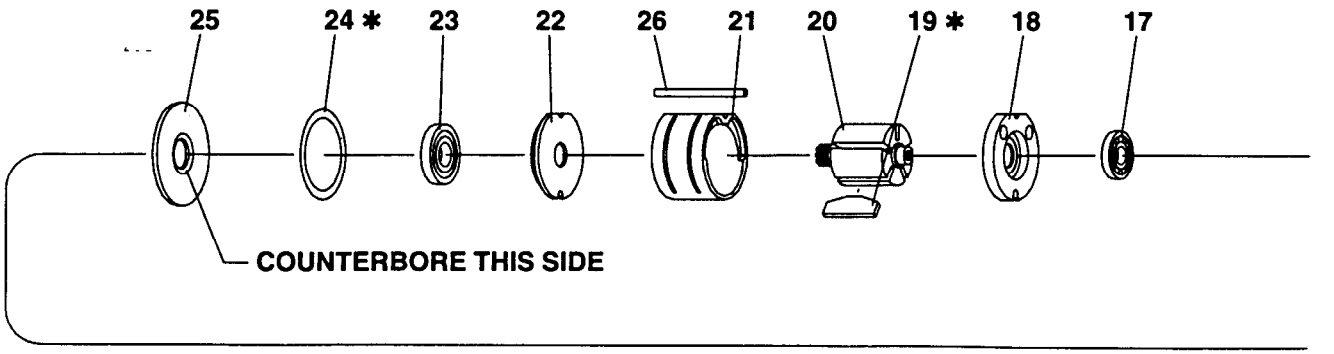
Disassembly should be done on a clean work bench with a clean cloth spread to prevent the loss of small parts. After disassembly is completed, all parts should be thoroughly washed in a clean solvent, blown dry with air and inspected for wear levels, abuse and contamination. Double sealed or shielded 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.

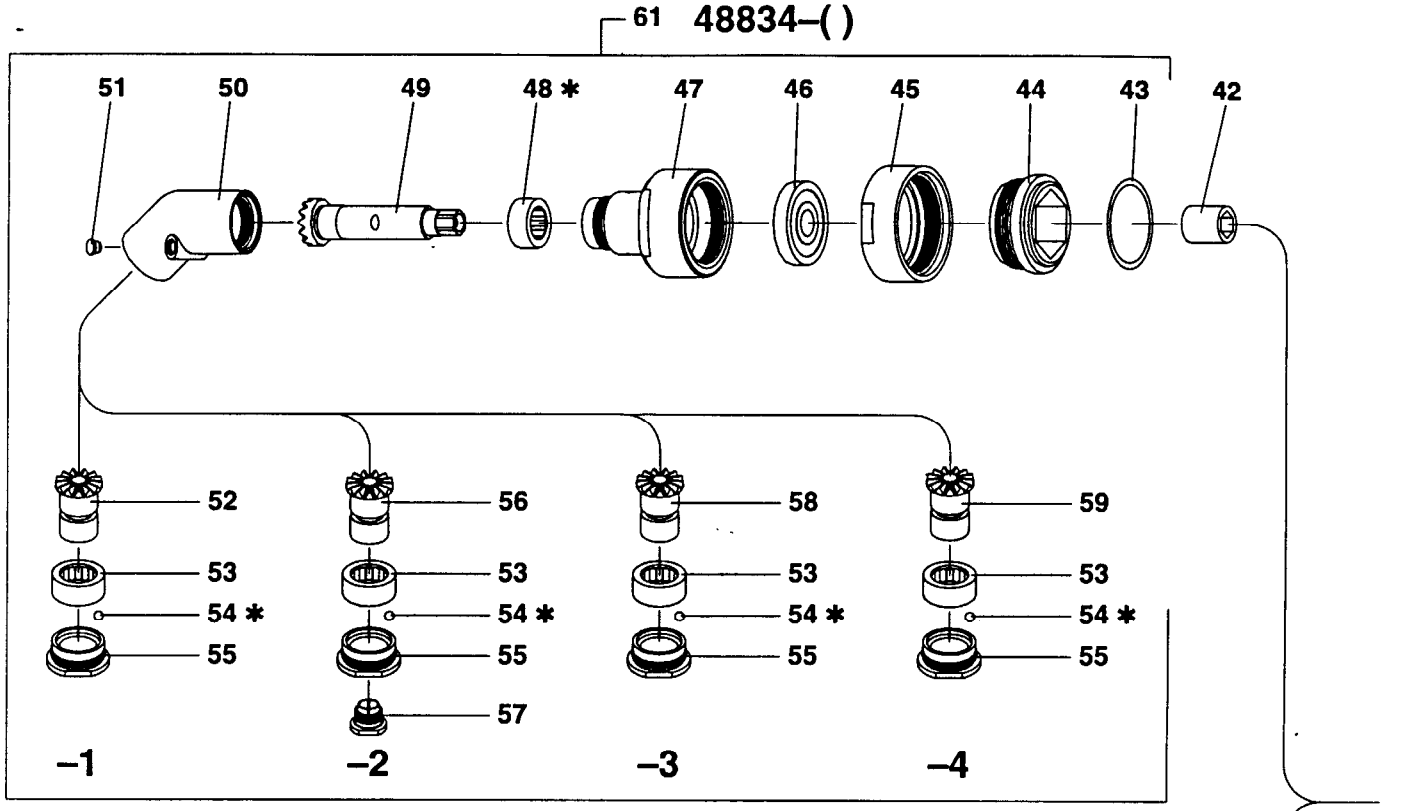
Upon reassembling, lubricate parts where required. Use 33153 grease, or equivalent, in bearings. Use 36460 lubricant for "O" ring assembly. When assembling "O" rings or parts adjacent "O" rings, care must be exercised to prevent damage to the rubber sealing surfaces. A small amount of grease will usually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

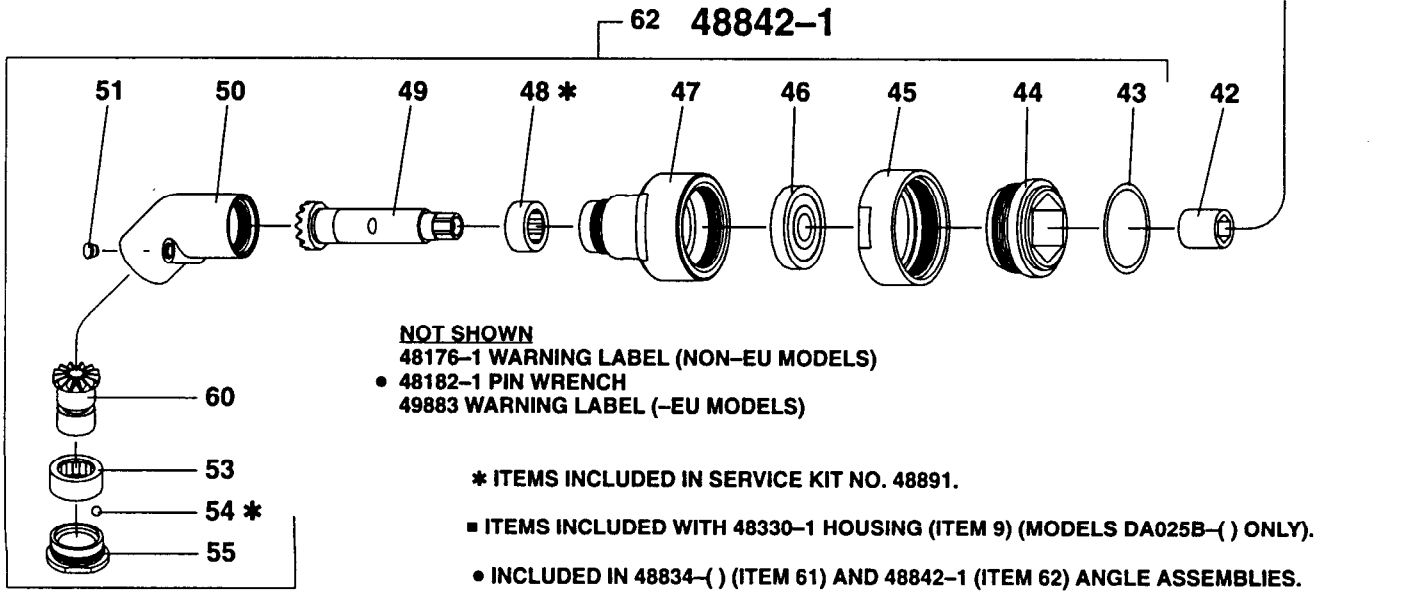
When replacement parts are necessary, consult drawing containing the part for identification.

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.







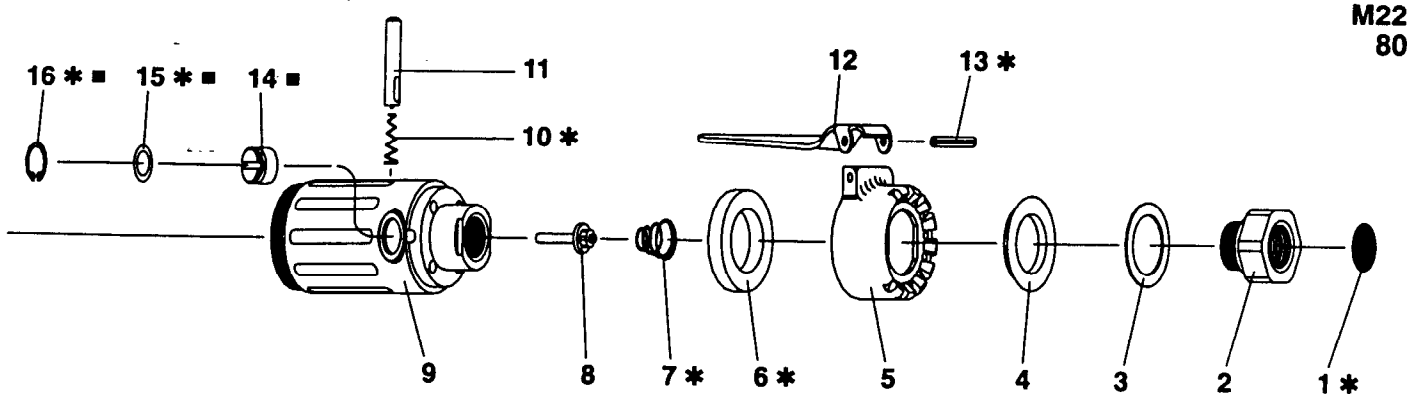


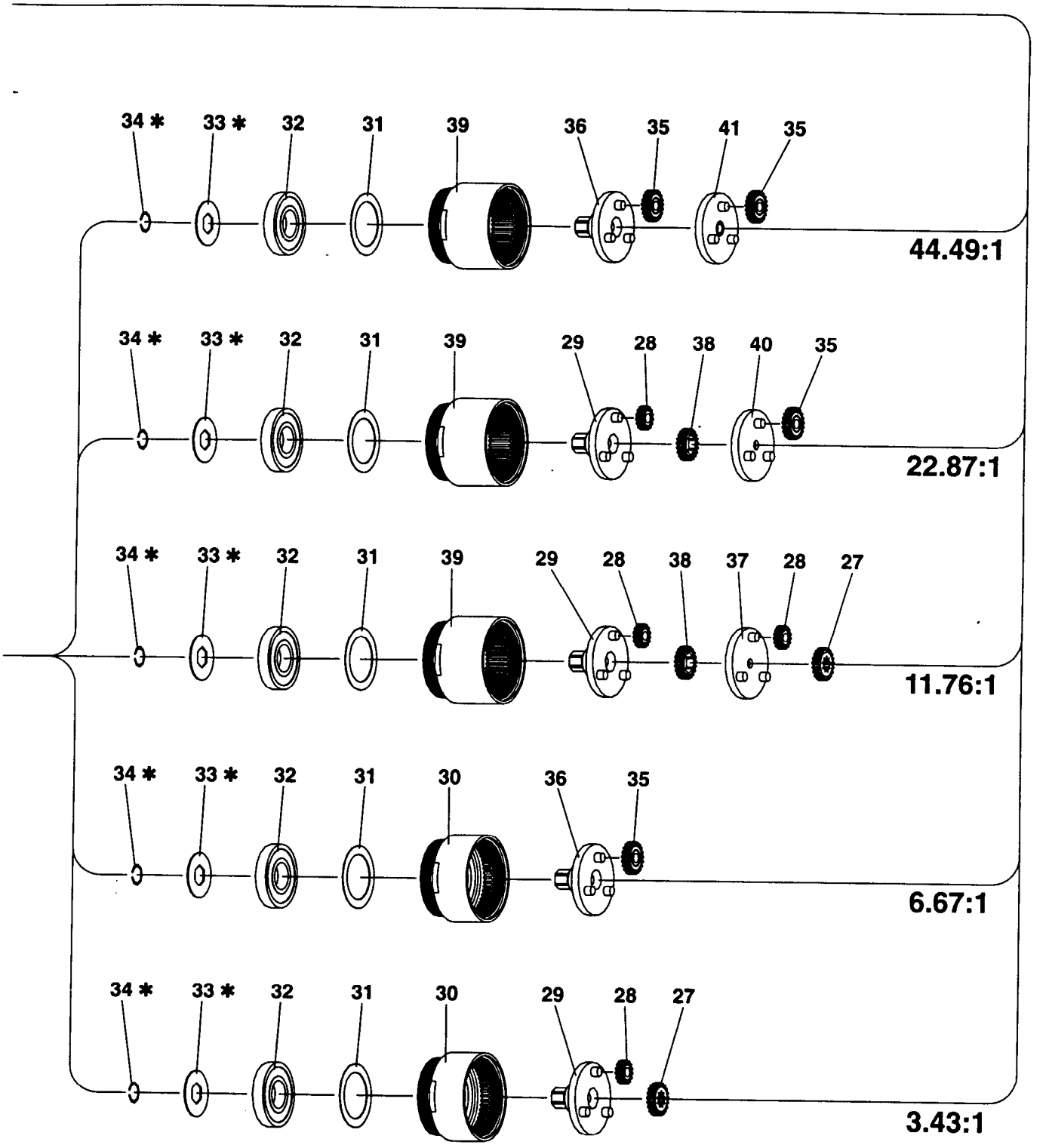
NOT SHOWN
48176–1 WARNING LABEL (NON–EU MODELS)
• 48182–1 PIN WRENCH
49883 WARNING LABEL (–EU MODELS)

* ITEMS INCLUDED IN SERVICE KIT NO. 48891.

■ ITEMS INCLUDED WITH 48330–1 HOUSING (ITEM 9) (MODELS DA025B–( ) ONLY).

• INCLUDED IN 48834–( ) (ITEM 61) AND 48842–1 (ITEM 62) ANGLE ASSEMBLIES.


16 * ■
15 * ■
14 ■
11
10 *
12
13 *
9
8
7 *
6 *
5
4
3
2
1 *


34 *
33 *
32
31
39
36
35
41
35
44.49:1
34 *
33 *
32
31
39
29
28
38
40
35
22.87:1
34 *
33 *
32
31
39
29
28
38
37
28
27
11.76:1
34 *
33 *
32
31
30
36
35
6.67:1
34 *
33 *
32
31
30
29
28
27
3.43:1

MODEL NUMBER	R.P.M.	HOUSING ASS'Y (ITEM 9)	GEARING REDUCTION	ANGLE ASSEMBLY	DRIVE DESCRIPTION
DA023B–5–C	500	46722	44.49:1	48834–2	3/16" COLLET
DA023B–5–D	500	46722	44.49:1	48834–3	#10 – 32 FEMALE THREAD
DA023B–5–E	500	46722	44.49:1	48834–4	5/16 – 24 FEMALE THREAD
DA023B–5–T	500	46722	44.49:1	48834–1	1/4 – 28 FEMALE THREAD
DA023B–11–C	1100	46722	22.87:1	48834–2	3/16" COLLET
DA023B–11–D	1100	46722	22.87:1	48834–3	#10 – 32 FEMALE THREAD
DA023B–11–E	1100	46722	22.87:1	48834–4	5/16 – 24 FEMALE THREAD
DA023B–11–T	1100	46722	22.87:1	48834–1	1/4 – 28 FEMALE THREAD
DA023B–21–C	2100	46722	11.76:1	48834–2	3/16" COLLET
DA023B–21–D	2100	46722	11.76:1	48834–3	#10 – 32 FEMALE THREAD
DA023B–21–E	2100	46722	11.76:1	48834–4	5/16 – 24 FEMALE THREAD
DA023B–21–T	2100	46722	11.76:1	48834–1	1/4 – 28 FEMALE THREAD
DA023B–37–C	3700	46722	6.67:1	48834–2	3/16" COLLET
DA023B–37–D	3700	46722	6.67:1	48834–3	#10 – 32 FEMALE THREAD
DA023B–37–E	3700	46722	6.67:1	48834–4	5/16 – 24 FEMALE THREAD
DA023B–37–T	3700	46722	6.67:1	48834–1	1/4 – 28 FEMALE THREAD
DA023B–73–C	7300	46722	3.43:1	48834–2	3/16" COLLET
DA023B–73–D	7300	46722	3.43:1	48834–3	#10 – 32 FEMALE THREAD
DA023B–73–E	7300	46722	3.43:1	48834–4	5/16 – 24 FEMALE THREAD
DA023B–73–T	7300	46722	3.43:1	48834–1	1/4 – 28 FEMALE THREAD
DA025B–5–C	500	48330–1	44.49:1	48842–1	9/32 – 40 FEMALE THREAD
DA025B–11–C	1100	48330–1	22.87:1	48842–1	9/32 – 40 FEMALE THREAD
DA025B–21–C	2100	48330–1	11.76:1	48842–1	9/32 – 40 FEMALE THREAD

CANCELLED MODELS

MODELS WITH –EU SUFFIX ARE "EC" COMPLIANT MODELS.

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Screen	33911
2	Inlet Adapter	46377
3	Spacer	47205
4	Washer	46371
5	Exhaust Cap	46366–1
6	Muffler Pad	48199–1
7	Spring	41654
8	Valve Rod Assembly	46354
9	Housing Assembly	See table
10	Spring	46374
11	Throttle Pin	46296–1
12	Lever	46326
13	Roll Pin	Y178–28
14	Restrictor	48322–1
15	"O" Ring	Y325–10
16	Retaining Ring	Y147–3
17	Ball Bearing	41643
18	Rear End Plate	46245
19	Blade (5 req'd)	46301
20	Rotor	46338–2
21	Cylinder	48200–1
22	Front End Plate	47718
23	Ball Bearing	Y65–10
	MOTOR ASSEMBLY (includes items 17 thru 23)	48225–1
24	"O" Ring	Y325–116
25	Spacer	46305
26	Locating Pin	47719–2
27	Sun Gear 3.43:1 ratio (21 teeth)	46561
28	Planet Gear (3 or 6 req'd) 3.43:1 ratio (15 teeth)	46904
29	Spindle 3.43:1 ratio	47742
30	Ring Gear (single reduction)	46322
31	Spacer	46496
32	Ball Bearing	Y65–13
33	Washer	47694
34	Snap Ring	Y142–2
35	Planet Gear (3 or 6 req'd) 6.67:1 ratio (21 teeth)	46875
36	Spindle 6.67:1 ratio	47741
37	Carrier Assembly 3.43:1 ratio	46493
38	Sun Gear 3.43:1 ratio (21 teeth)	46560
39	Ring Gear (double reduction)	46323
40	Carrier Assembly 6.67:1 ratio	46336
41	Carrier Assembly 6.67:1 ratio	46720
42	Coupling	48184–1
43	"O" Ring	Y325–19
44	Adapter	48186–1
45	Lock Nut	48185–1
46	Ball Bearing	Y65–8
47	Angle Body	48196–1
48	Needle Bearing	46222
49	Pinion	48836–1
50	Housing	48833–1
51	Grease Fitting	35967
52	Gear (1/4 – 28 female thread)	48837–1
53	Roller Bearing	44424
54	Ball (11 req'd)	Y16–203
55	Sleeve	48840–1
56	Gear	48838–1
57	Collet Insert	43497–169
58	Gear (#10 – 32 female thread)	48841–1
59	Gear (5/16 – 24 female thread)	48839–1
60	Gear (9/32 – 40 female thread)	48843–1
61	Angle Assembly	See table
62	Angle Assembly (see table)	48842–1
	SERVICE KIT: includes items 1, 6, 7, 10, 13, 15, 16, 19, 24, 33, 34, 48 and 54	48891

DISASSEMBLY/ASSEMBLY INSTRUCTIONS

- 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.

ANGLE HOUSING DISASSEMBLY

_ Using wrenches on flats of ring gear and lock nut (45), unthread and remove angle housing section from tool – LEFT HAND THREADS.
_ To disassemble angle housing section, grasp housing (50) lightly in a vise. Using a wrench on flats of body (47), unthread body from housing – LEFT HAND THREADS.
_ Do not remove pinion (49) from housing unless damage is evident. To remove pinion, grasp pinion in a vise and tap housing with a soft face hammer.
_ Unthread and remove adapter (44) – LEFT HAND THREADS – releasing bearing (46).
_ To disassemble drive section, unthread sleeve (55) – LEFT HAND THREADS – and pull drive assembly from housing (50). Do not disassemble further unless damage is evident. NOTE: Drive assembly contains 11 small balls which will fall out if drive assembly is disassembled.

ANGLE HOUSING ASSEMBLY

_ Lubricate bearings upon assembly.
_ Assemble bearing (53) to gear.
_ Apply a small amount of grease to groove in gear, then assemble 11 balls (54) to groove.
_ Assemble gear to sleeve (55), securing balls (54) in groove in gear.
_ Assemble sleeve (55) and components to housing (50) – LEFT HAND THREADS.
_ Assemble bearing (46) and lock nut (45) to body, securing with adapter (44) – LEFT HAND THREADS.
_ Assemble bearing (48) to pinion (49).
_ Assemble pinion (49) to housing (50).
_ Assemble housing (50) to body (47) – LEFT HAND THREADS.
_ Assemble coupling (42) to pinion and assemble "O" ring (43) to adapter (44). NOTE: "O" ring is to be free of oil and grease. Assemble angle section to tool, securing with lock nut (45) – LEFT HAND THREADS.

GEARING DISASSEMBLY

_ Remove angle section from tool.
_ Remove ring gear (30 or 39) using a wrench on flats.
_ Remove snap ring (34) and washer (33).
_ Remove spindle(s) and gears from ring gear. NOTE: Keep gears grouped with mating spindle when disassembling double reduction gearing.
_ Do not remove bearing (32) or spacer (31) unless damage is evident.
_ To remove bearing (32) and spacer (31) from ring gear, press on spacer (31) from inside splined end of ring gear.
_ Do not remove gear (38) from carrier assembly unless damage is evident. Gear (38) is press fit onto carrier assembly.

GEARING ASSEMBLY

_ Assemble spacer (31) and bearing (32) into ring gear, pressing on outer race of bearing.
_ Coat shafts of spindle with ARO 33153 grease.
_ Assemble gears to shafts of mating spindle.
_ Lubricate sets of gears liberally with ARO 33153 grease (approximately 1/32 oz. per reduction).
_ Assemble carrier assembly to spindle assembly for models with double reduction gearing.
_ Assemble spindle(s) and gearing into ring gear. Rotate spindle and gears to align gear teeth with splines of ring gear.
_ Assemble washer (33) to spindle, securing with snap ring (34).
_ Thread ring gear (30 or 39) to tool, tightening with wrench on flats.
_ Assemble angle housing section to tool.

MOTOR DISASSEMBLY

_ Remove angle housing section and gearing from tool.
_ Remove spacer (25) and "O" ring (24).
_ Tap front edge of housing to remove motor assembly. Locating pin (26) should also come out.
_ Tap splined end of rotor (20) with a soft face hammer; motor will come apart. NOTE: Bearing (23) is light press fit on rotor.
_ Remove end plate (18) and bearing (17) from rotor.

MOTOR ASSEMBLY

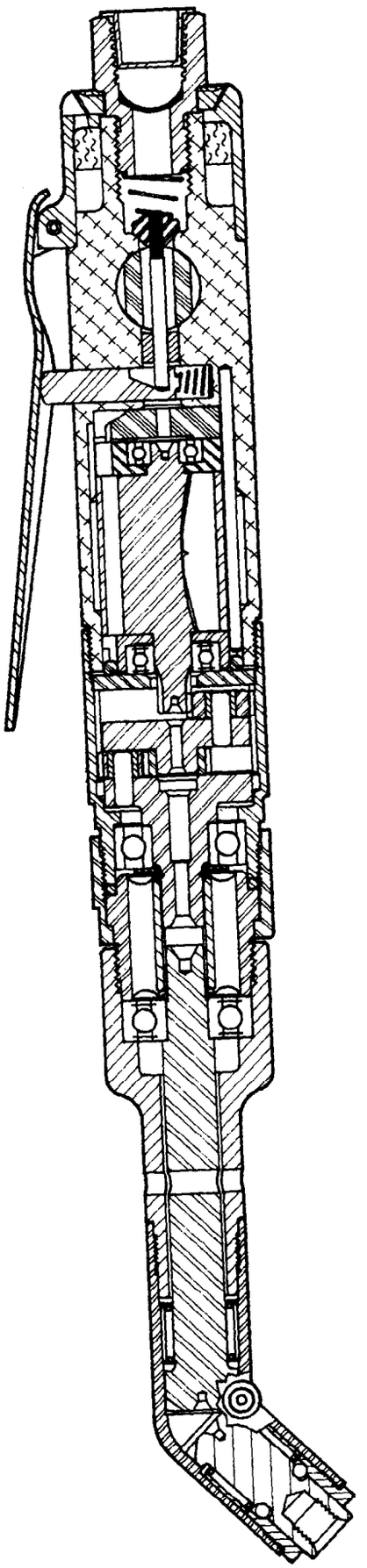
_ Lubricate bearing (17) with ARO 33153 grease.
_ Assemble bearing (17) to end plate (18), pressing on outer race of bearing.
_ Assemble end plate (18) to rotor, pressing on inner race of bearing.
_ Coat five rotor blades (19) with ARO 29665 spindle oil and assemble to rotor slots – straight side out.
_ Coat i.d. of cylinder (21) with ARO 29665 spindle oil and assemble over rotor. NOTE: Air inlet slots in end of cylinder must be aligned with two air inlet holes in end plate (18).
_ Assemble bearing (23) to end plate (22), pressing on outer race of bearing.
_ Assemble end plate (22) to rotor, pressing on inner race of bearing. Be sure rotor turns without binding.
_ Insert locating pin (26) into .081" diameter blind hole at bottom of motor cavity in housing.
_ Align notches of end plates and cylinder and install motor into housing, aligning notches with locating pin (26).
_ Grease and assemble "O" ring (24) to end plate.
_ Assemble spacer (25) to motor, with counterbore facing motor.
_ Assemble gearing and angle housing section to tool.

HOUSING DISASSEMBLY

_ Clamp air inlet adapter (2) in a smooth face vise.
_ Unthread housing (9) with a strap type wrench.
_ Remove spacer (3), washer (4), exhaust cap (5), muffler pad (6), spring (7) and valve rod (8). CAUTION: Do not remove or adjust rubber portion of valve rod (8), as it is preset at the factory.
_ Remove screen (1) from inlet adapter.
_ Remove throttle pin (11) and spring (10).
_ Models DA025B–( ) – Do not remove restrictor (14) unless damage is evident.

HOUSING ASSEMBLY

_ Lubricate throttle pin (11) with ARO 29665 spindle oil.
_ Install spring (10) and throttle pin (11) into housing. NOTE: Align slot in throttle pin with air inlet holes in housing.
_ Install valve rod assembly (8) into housing. NOTE: Throttle pin (11) should not pull out when valve rod (8) is seated properly.
_ Install muffler pad (6) to exhaust cap.
_ Install exhaust cap (5) to housing, aligning lever with throttle pin (11).
_ Assemble spring (7), washer (4) and spacer (3) to tool, securing with inlet adapter (2).
_ Clean and replace screen (1) in inlet adapter (2).
_ Models DA025B–( ) – Grease and assemble "O" ring (15) to restrictor (14) and assemble to housing (9), with opening of restrictor positioned towards motor. Secure restrictor with retaining ring (16).



PN49999–180