

# Instructions/Parts List



## FOR 2:1 RATIO STANDARD PUMPS Standard Air Motor

307851L

EN

*180 psi (1.25 MPa, 12.5 bar) Maximum Air Working Pressure*

### **Model 204464, Series B**

For Pump Model 204456

### **Model 204722, Series C**

For Pump Models 206780, 208177, 223776, 223777, 218555, and 218556

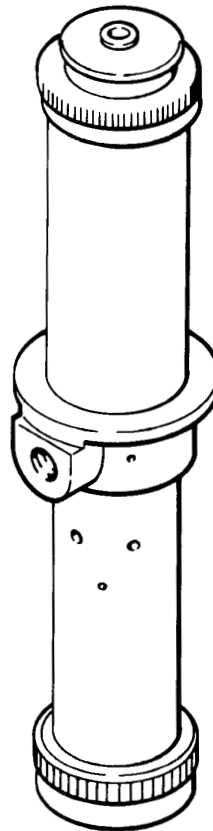
### **Model 223953, Series A**

For Pump Model 223954

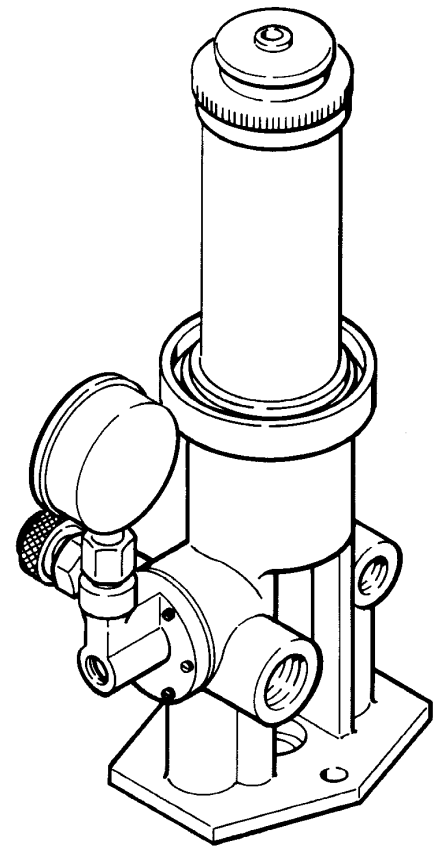


#### **Important Safety Instructions.**

Read all warnings and instructions in this manual. Save these instructions.



MODELS 204722 AND 223953



MODEL 204464

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# Symbols

## Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

## Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the corresponding instructions.

# WARNING



INSTRUCTIONS

## EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated system component. Refer to the **Technical Data** on page 14 for the maximum working pressure of this equipment.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not exceed the maximum working pressure of the lowest rated system component. This equipment has a **180 psi (1.25 MPa, 12.5 bar) maximum working pressure**.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# ! WARNING



## PRESSURIZED EQUIPMENT HAZARD

Spray from the gun/valve, hose leaks, or ruptured components can splash fluid in the eyes or on the skin and cause serious injury.

- Do not stop or deflect leaks with your hand, body, glove or rag.
- Follow the **Pressure Relief Procedure** on page 5 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; and install or clean the spray tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.



## MOVING PARTS HAZARD

Moving parts, such as the air motor piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 5 to prevent the equipment from starting unexpectedly.



## FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.

- Ground the equipment and the object being sprayed. Refer to **Grounding** on page 4.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying/dispersing immediately**. Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed/dispensed.
- Keep the spray/dispense area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray/dispense area.
- Extinguish all open flames or pilot lights in the spray/dispense area.
- Do not smoke in the spray/dispense area.
- Do not turn on or off any light switch in the spray/dispense area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray/dispense area.

# Installation

## Grounding

In a low pressure air spray system, static sparking is generally not a problem. However, some simple precautions should be taken to reduce the risk. Check your local electrical code for detailed grounding instructions for your area and type of equipment, and be sure to ground all of this spray/dispensing equipment.

1. *Pump: Air Motor Model 204464* – loosen the grounding lug locknut (W) and washer (X). Insert one end of a 12 ga. (1.5 mm<sup>2</sup>) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. See Fig. 1. Connect the other end of the wire to a true earth ground.

*Air Motor Models 204722 and 223953* – use a ground wire and clamp as instructed in your separate pump manual.

2. *Air compressor:* follow manufacturer's recommendations.
3. *Fluid hoses:* use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.
4. *Spray gun or dispensing valve:* grounding is obtained through connection to a properly grounded fluid hose and pump.
5. *Object being sprayed:* according to your local code.

6. *Fluid supply containers:* according to your local code.
7. *All solvent pails used when flushing,* according to your local code. Use only metal pails, which are conductive, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.
8. *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the spray gun/dispensing valve firmly to the side of a grounded metal pail, then trigger the gun/valve.

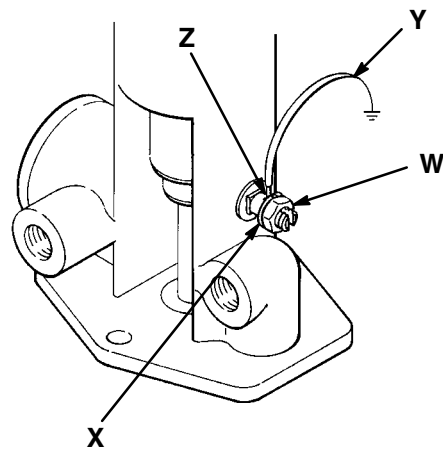
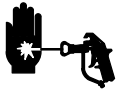


Fig. 1

# Operation

## Pressure Relief Procedure

### **WARNING**



#### **INJECTION HAZARD**

Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying/dispensing,
- check or service any of the system equipment,
- or install or clean the spray tip/nozzle.

1. Shut off the air to the pump. If your pump has a restrictor valve, close it also.

2. Close the bleed-type master air valve (required in your system).
3. Hold a metal part of the gun/valve firmly to the side of a grounded metal pail, and trigger the gun/valve to relieve pressure.
4. Open the drain valve (required in your system), having a container ready to catch the drainage.
5. leave the drain valve open until you are ready to spray/dispense again.

If you suspect that the fluid nozzle or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the hose end coupling and relieve pressure gradually, then loosen completely. Now clear the nozzle or hose.

# Service (Models 204722 and 223953)

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 5.

### Before You Start

- Have all necessary repair parts on hand. Recommended spare parts are marked with an asterisk (for example, 2\*).
- Use a compatible solvent to clean parts. Inspect parts for wear or damage and replace as needed.
- Flush the pump, if possible. Stop the pump at the bottom of its stroke. **Relieve the pressure** before servicing any part of the system.
- Disconnect the air and fluid hoses.

### Servicing the Air Motor

## WARNING

To reduce the risk of injury from trapped air pressure when servicing the air motor, always remove cylinder cap (13) from air cylinder (4) before removing air cylinder from base (9).

1. If your pump has a motor shield (B), unscrew the shield retaining screw (A) and lift the shield up and off the motor. See Fig. 2.
2. Unscrew the cylinder cap (13) from the cylinder (4). To remove the spring (3), pry gently under the coils in the direction of the helix. Check the spring (3) and gasket (12) and replace as necessary.
3. Unscrew the cylinder (4) from the air motor base (9) and lift the cylinder straight up off the air piston (15).
4. To unscrew the piston from the rod, refer to the piston detail in Fig. 2. Use a pliers (D) on the air exhaust plate (15e) and a wrench (C) on the piston rod (14).
5. Remove the three capscrews (15a) and disassemble the piston (15). Clean all parts in a compatible solvent and blow dry. Check for wear or damage and replace as necessary. If any valve plate spacers (15b) are damaged, replace all three to maintain the proper clearance between the valve plates (15d and 15e).
6. Remove the washer (6), lower spring (5), and gasket (7). Inspect for wear or damage and replace as necessary.
7. Disconnect the piston rod (14) from the pump connecting rod and pull the piston rod up out of the air motor base (9). Remove the o-ring (2\*). Inspect the o-ring and replace if necessary. Reconnect the piston rod (14) and the pump connecting rod.
8. Reinstall the gasket (7\*), spring (5\*), and washer (6). Reassemble the piston (15). Apply thread sealant to the screws (15a\*) and torque to 10–14 in-lb (1.3–1.6 N•m). Apply thread sealant to the threads of the piston rod (14) and carefully screw the piston (15) onto the rod. For final tightening, refer to step 4 and the piston detail in Fig. 2. When installed, there should be 0.032 in. (0.8 mm) minimum clearance between the washer (6) and the shoulder of the piston rod (14).
9. Reinstall the spring (3\*) and gasket (12\*) on the cylinder cap (13) and screw the cap onto the cylinder (4). Screw the cylinder into the air motor base (9).
10. Reinstall the air motor shield (B) and secure with the shield retaining screw (A).

# Service (Models 204722 and 223953)

- 1 Apply sealant
- 2 Torque to 10–14 in-lb (1.3–1.6 N•m)

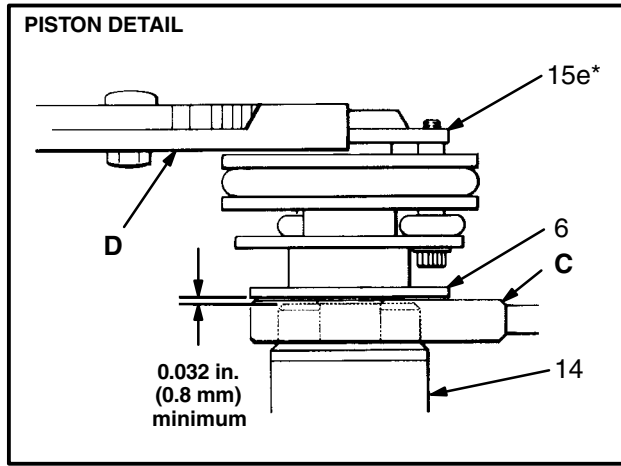
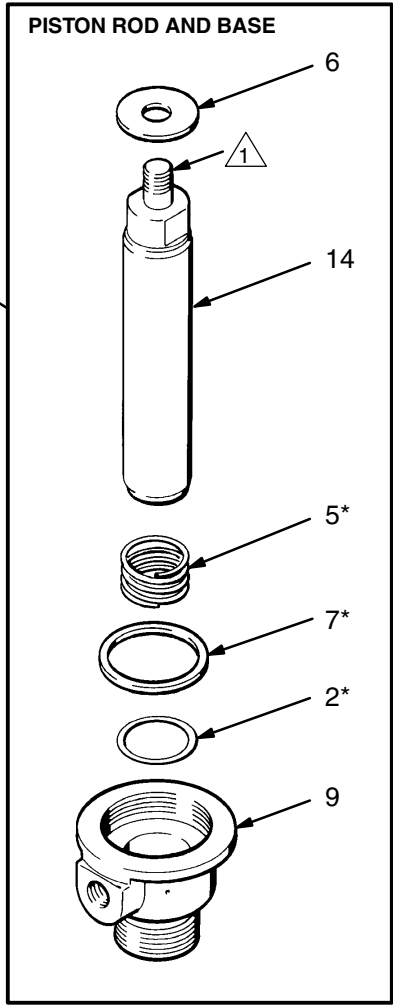
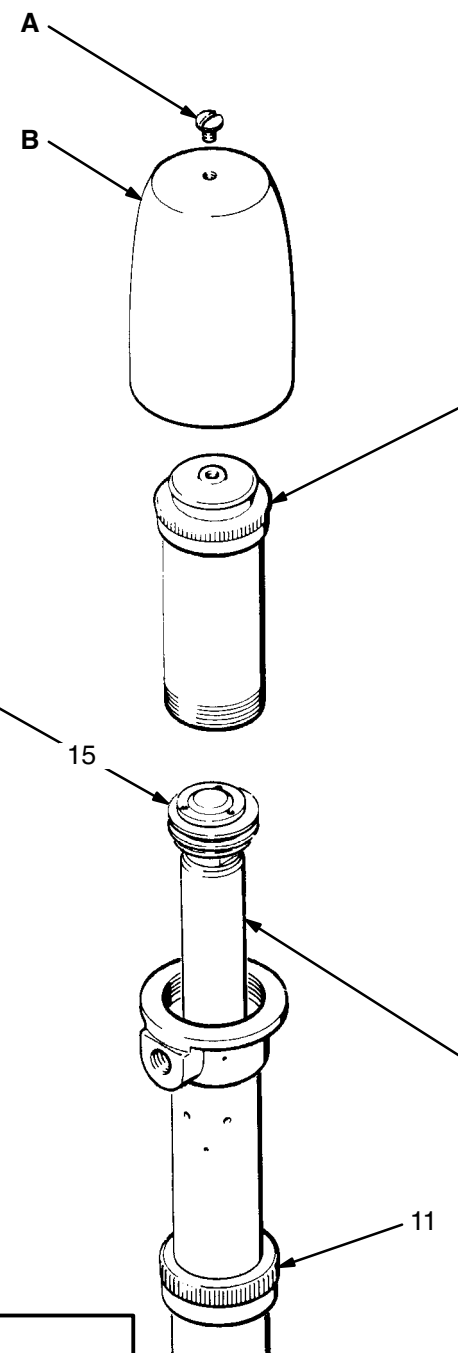
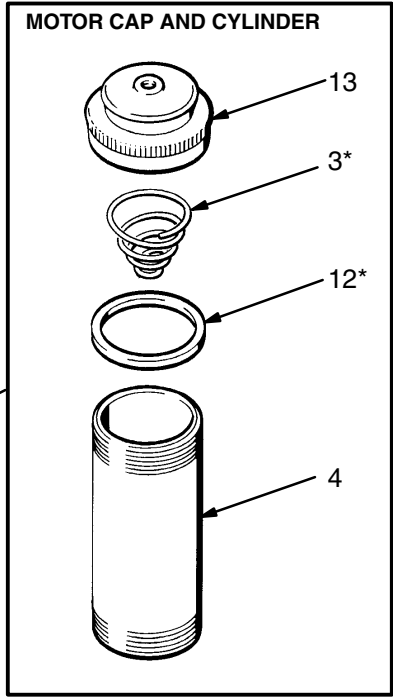
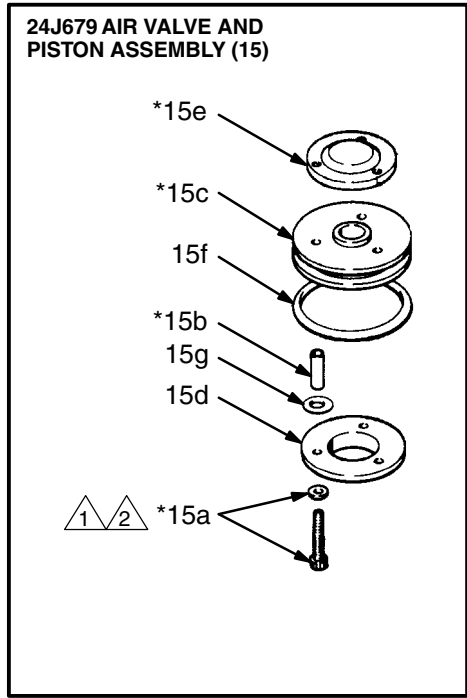


Fig. 2

# Service (Model 204464)

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 5.

### Before You Start

- Have all necessary repair parts on hand. Recommended spare parts are marked with an asterisk (for example, 15\*).
- Use a compatible solvent to clean parts. Inspect parts for wear or damage and replace as needed.
- Flush the pump if possible. Stop the pump at the bottom of its stroke. **Relieve the pressure** before servicing any part of the system.
- Disconnect the air and fluid hoses.

### Servicing the Air Motor

## WARNING



To reduce the risk of injury from trapped air pressure when servicing the air motor, always remove cylinder cap (13) from air cylinder (4) before removing air cylinder from base (9).

### Air Valve and Piston Repair

1. If your pump has a motor shield (B), unscrew the shield retaining screw (A) and lift the shield up and off the air motor. See Fig. 3.
2. Unscrew the cylinder cap (5) from the cylinder (21). To remove the spring (15), pry gently under the coils in the direction of the helix. Check the spring (15) and gasket (11) and replace as necessary.
3. Unscrew the cylinder (21) from the air motor base (20) and lift the cylinder straight up off the air piston (1).
4. To unscrew the piston from the rod, refer to the piston detail in Fig. 3. Use a pliers (D) on the air exhaust plate (1e) and a wrench (C) on the piston rod (3).
5. Remove the three capscrews (1a) and disassemble the piston (1). Clean all parts in a compatible solvent and blow dry. Check for wear or damage and replace as necessary. If any valve plate spacers (1b) are damaged, replace all three to maintain the proper clearance between the valve plates (1d and 1e).
6. Remove the washer (17), lower spring (16), and gasket (18). Inspect for wear or damage and replace as necessary.
7. Disconnect the piston rod (3) from the pump connecting rod and pull the piston rod up out of the air motor base (20). Remove the o-ring (12\*) and seal (7\*). Inspect and replace if necessary. Reconnect the piston rod (3) and the pump connecting rod.
8. Reinstall the gasket (18\*), spring (16\*), and washer (17). Reassemble the piston (1). Apply thread sealant to the screws (1a\*) and torque to 10–14 in-lb (1.3–1.6 N•m). Apply thread sealant to the threads of the piston rod (3) and carefully screw the piston (1) onto the rod. For final tightening, refer to step 4 and the piston detail in Fig. 3. When installed, there should be 0.032 in. (0.8 mm) minimum clearance between the washer (17) and the shoulder of the piston rod (3).
9. Reinstall the spring (15\*) and gasket (11\*) on the cylinder cap (5) and screw the cap onto the cylinder (21). Check that the shield bezel (22) is in place on the air motor base (20). Screw the cylinder into the base.
10. Reinstall the air motor shield (B) and secure with the shield retaining screw (A).



# Service (Model 204464)

-  Apply sealant
-  Torque to 10–14 in-lb (1.3–1.6 N•m)

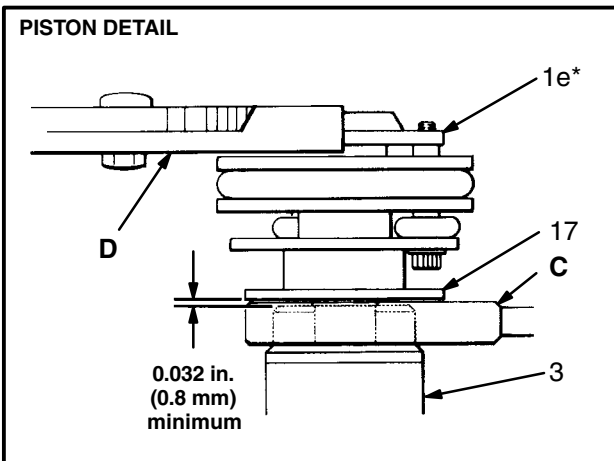
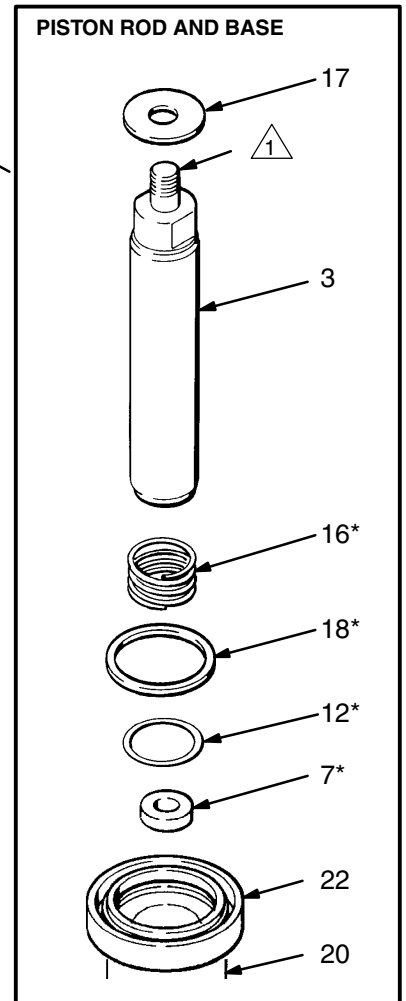
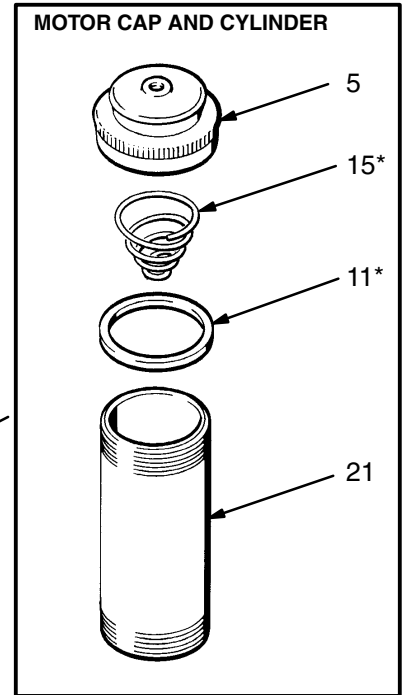
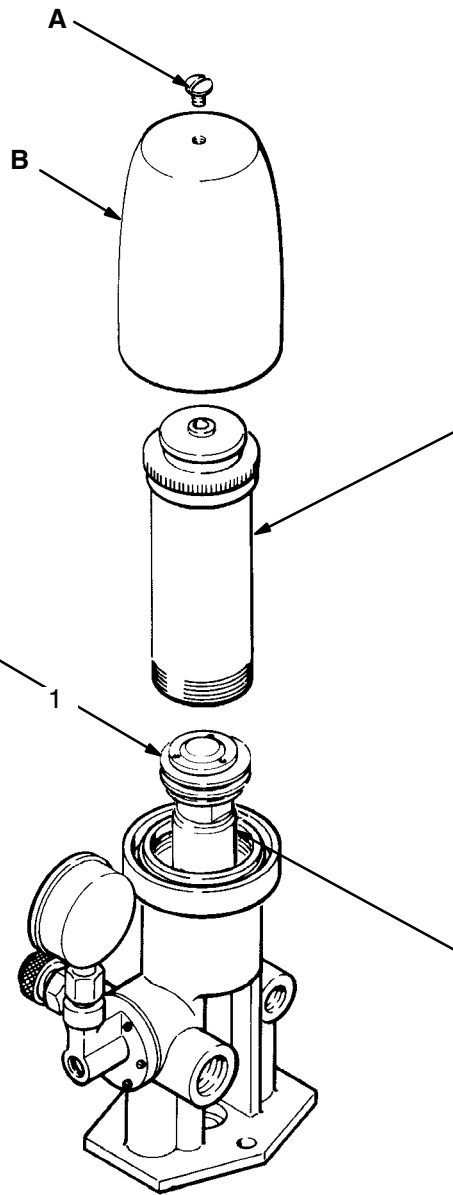
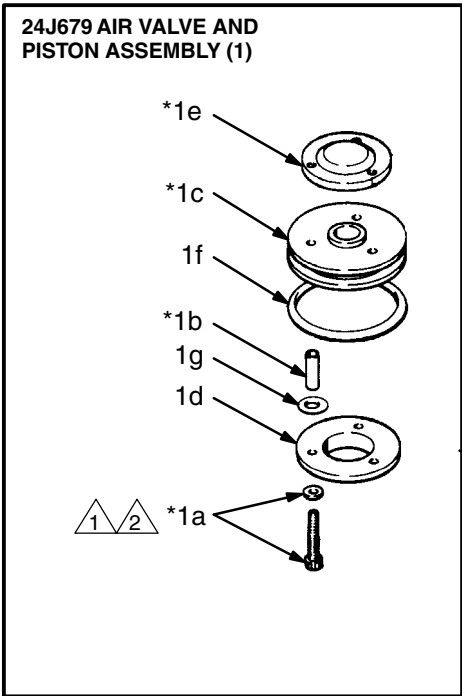


Fig. 3

# Service (Model 204464)

## Restrictor Valve Repair

1. Loosen the hex nut on the valve stem (6\*) and remove the stem and o-ring (14\*) from the base (20). See Fig. 4.
2. Use a screwdriver to remove the valve seat (23).
3. Clean and inspect all parts. Replace as necessary. Reassemble in the reverse order of disassembly.

## Fluid Pressure Gauge Repair

1. To recalibrate the gauge (2c), adjust the valve (6) so the gauge needle points to the first dial graduation mark above the zero stop. Refer to Fig. 5. Turn the calibration screw (2f) clockwise to increase and counterclockwise to decrease the setting. Do not remove the calibration screw from the housing. Any loss of oil results in lower sensitivity.
2. If the gauge needs frequent calibration or loses sensitivity, check the housing (2a) for oil leaks. Connections between the gauge and housing must be tight. If oil leaks around the calibration screw (2f), or the screw cannot be turned inward, disassemble and recharge, as explained in the following steps.

3. To recharge the gauge, remove the six screws (8) from the housing (2a). Clean and inspect the diaphragm inside the housing (2a). If the housing diaphragm has cracks or leaks, replace the housing (2a).
4. Remove the calibration screw (2f) and inspect the o-ring (2d\*) for damage. Replace if necessary.
5. Remove the gauge (2c) from the pulsation dampener (2b) carefully, to avoid all loss. Check the gauge with air pressure, and replace it if it is damaged.
6. Place the housing (2a), with its base face down, on a flat surface. Fill the housing with light machine oil, such as SAE 5W, through the calibration screw (2f) opening. When nearly full, place a finger over the gauge opening and fill the screw opening to overflowing. Install the screw (2f) and o-ring (2d\*) until flush, then turn in two full turns.
7. Place the housing in a vise with the gauge opening up and fill with oil to overflowing. Using thread sealant, tighten the gauge securely into the housing. If the gauge is fully charged, it should read 20 or 30 lb. Calibrate as explained in step 1.

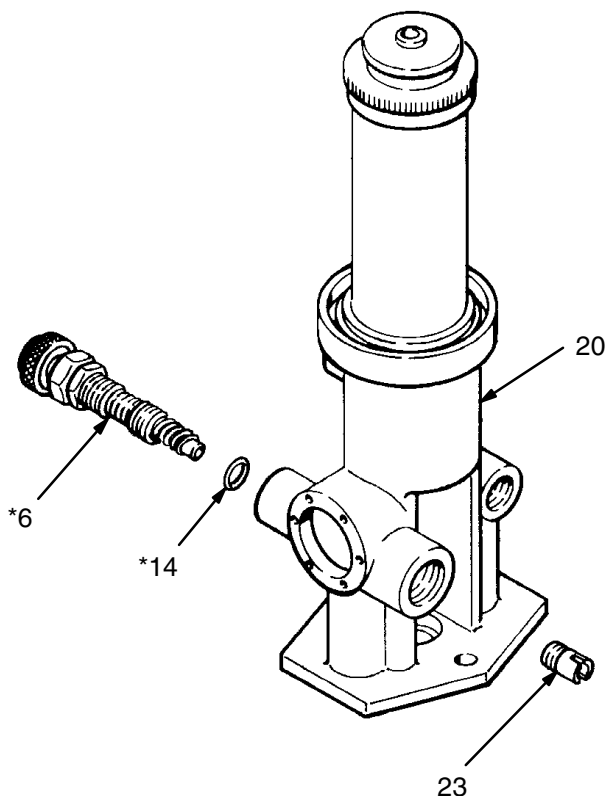


Fig. 4

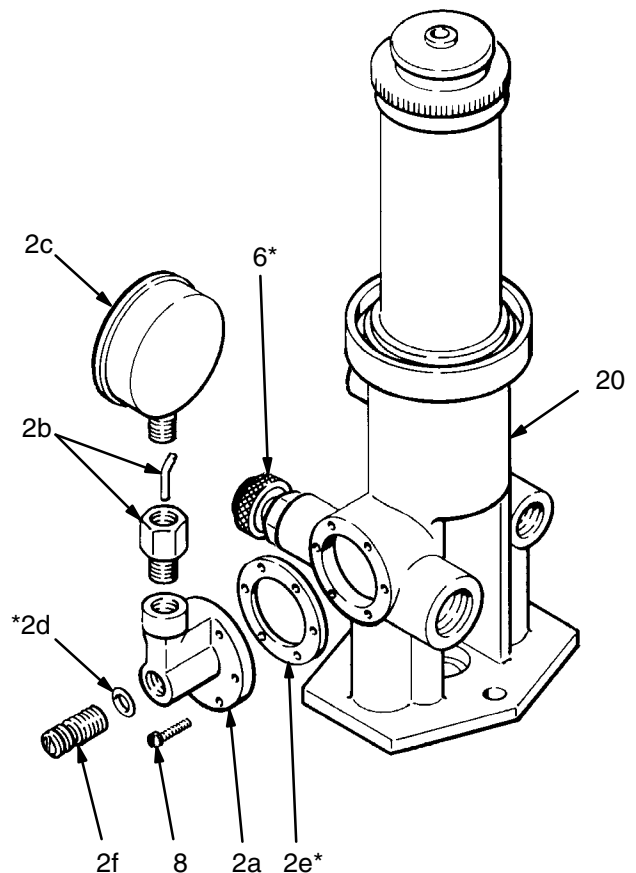


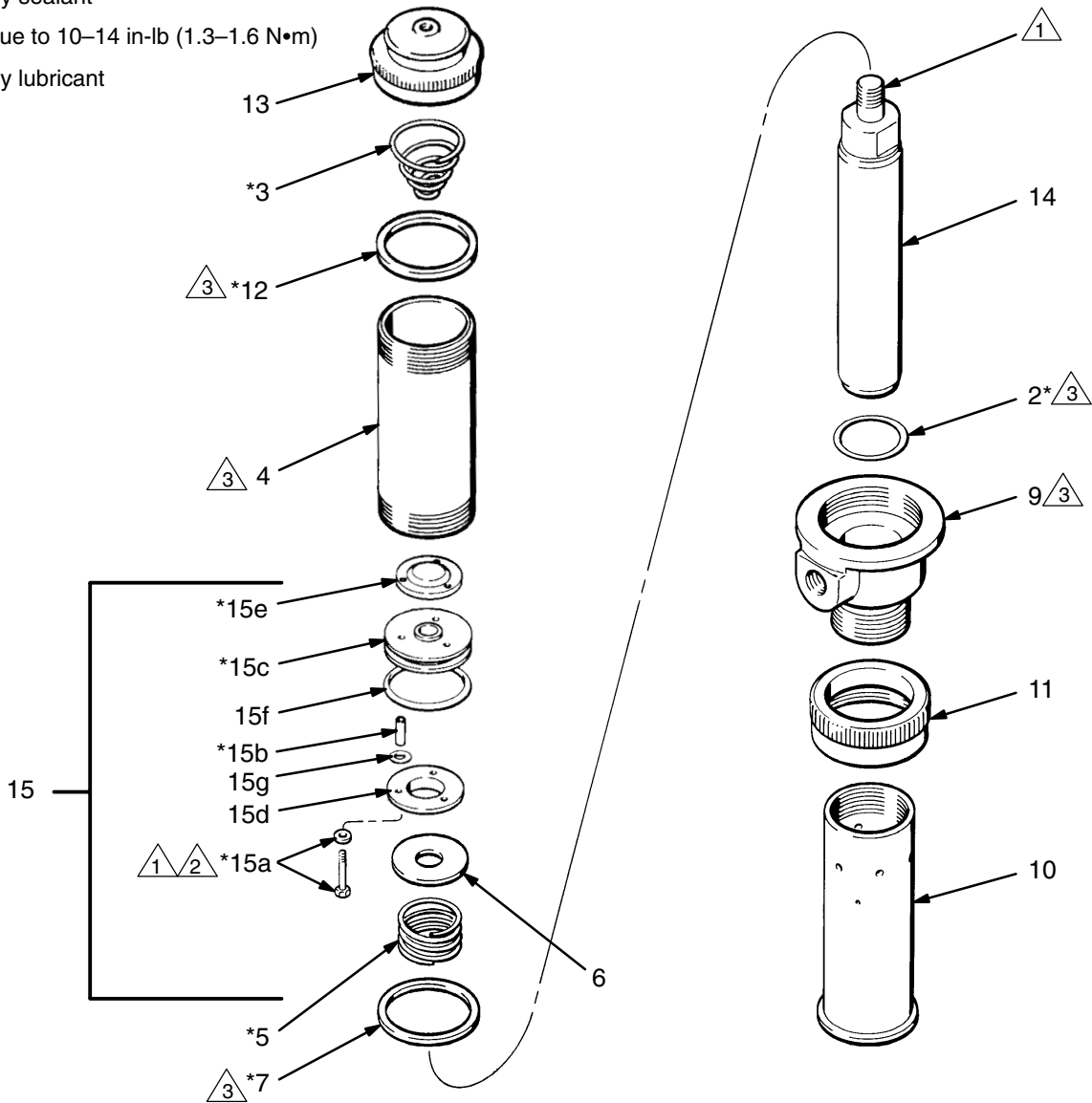
Fig. 5

# Parts (Models 204722 and 223953)

1 Apply sealant

2 Torque to 10–14 in-lb (1.3–1.6 N•m)



3 Apply lubricant

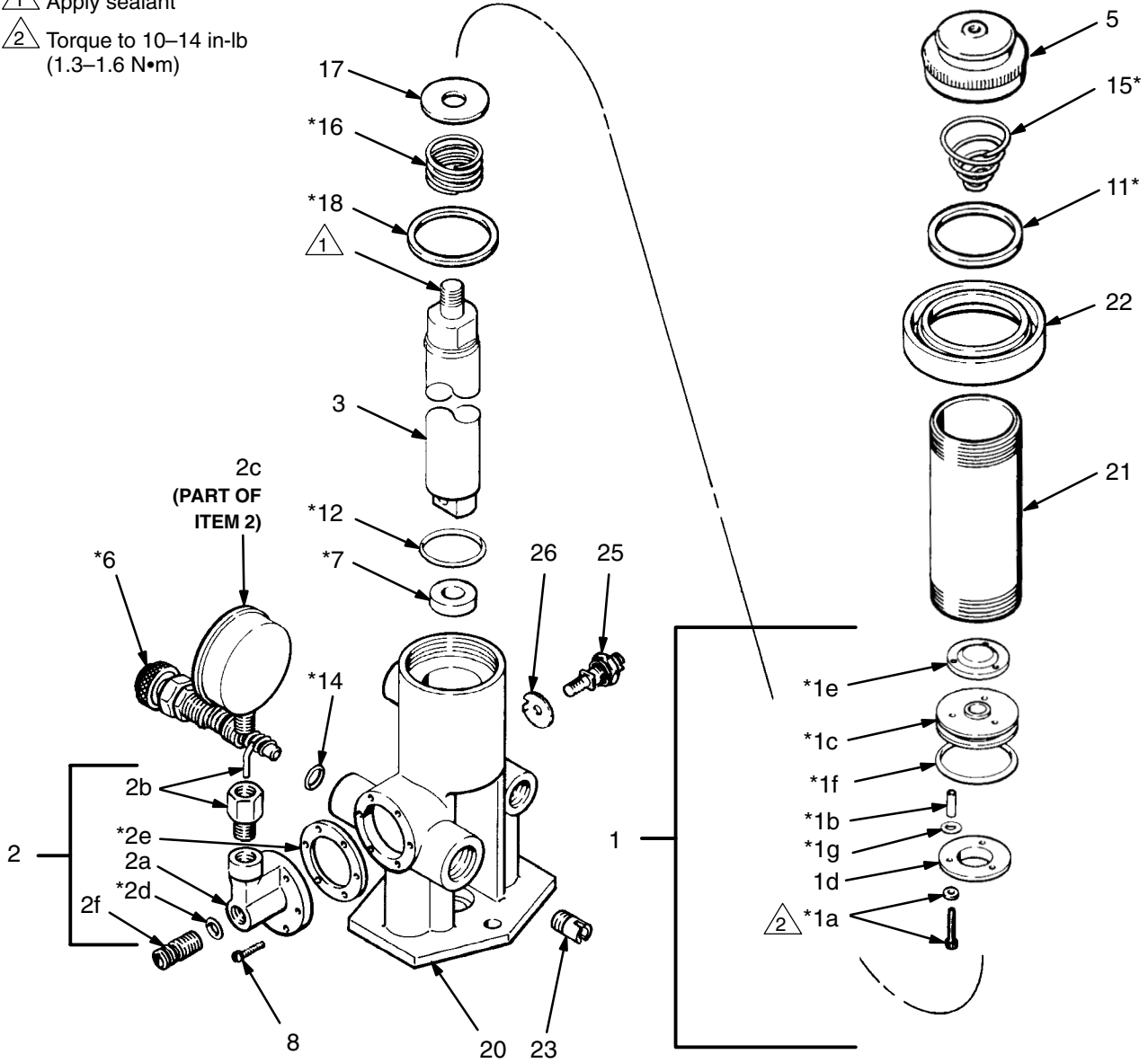


Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
2*	156698	O-RING, nitrile rubber	1	15	24J679	AIR VALVE & PISTON ASSY	1
3*	157630	SPRING, compression, tapered	1			Includes items 15a–15g	1
4	157632	CYLINDER, air (Model 204–722)	1	15a*	220884	. SCREW, socket hd cap; No. 6–32; 1" (25 mm) lg; with copper gasket	3
	186565	CYLINDER, air (Model 223–953)	1	15b*	181485	. SPACER, valve plate	3
5*	157633	SPRING, compression	1	15c*	189210	. PISTON, air	1
6	157872	WASHER, valve	1	15d	181487	. PLATE, air intake valve	1
7*	158109	GASKET; rubber	1	15e*	162729	. PLATE, air exhaust valve	1
9	161770	BASE, air motor	1	15f	108357	. O-RING; fluorocarbon elastomer	1
10	24J675	HOUSING, connecting rod	1	15g	108358	. O-RING; fluorocarbon elastomer	3
11	16J720	RING, connecting	1				
12*	162989	GASKET; neoprene rubber	1				
13	204465	CAP, air motor	1				
14	24J678	ROD, piston	1				

\* Recommended Tool Box spare parts. Keep these parts on hand to reduce down time.

# Parts (Model 204464)

- 1  Apply sealant
- 2  Torque to 10–14 in-lb (1.3–1.6 N•m)



# Parts (Model 204464)

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
1	24J679	AIR VALVE & PISTON ASSY Includes items 1a–1g	1	5	204465	CAP, air motor	1
1a*	220884	. SCREW, socket hd cap; No. 6–32; 1" (25 mm) lg; with copper gasket	3	6*	204496	VALVE, restrictor	1
1b*	181485	. SPACER, valve plate	3	7*	101389	SEAL; leather	1
1c*	189210	. PISTON, air	1	8	101174	SCREW, fillister hd machine; no. 8–32 x 1" (25 mm) lg	6
1d	181487	. PLATE, air intake valve	1	11*	162989	GASKET; neoprene rubber	1
1e*	162729	. PLATE, air exhaust valve	1	12*	156698	O-RING, nitrile rubber	1
1f	108357	. O-RING; fluorocarbon elastomer	1	14*	157250	O-RING, nitrile rubber	1
1g	108358	. O-RING; fluorocarbon elastomer	3	15*	157630	SPRING, compression, tapered	1
2	203093	FLUID REGULATOR & GAUGE Includes items 2a–2d	1	16*	157633	SPRING, compression	1
2a	202789	. HOUSING, fluid gauge	1	17	157872	WASHER, valve	1
2b	203228	. DAMPENER, pulsation	1	18*	158109	GASKET; rubber	1
2c	101180	. GAUGE, fluid pressure	1	20	158879	BASE, air motor	1
2d*	154594	. O-RING; nitrile rubber	1	21	158896	CYLINDER, air	1
2e*	157127	. GASKET, diaphragm; vellumoid	1	22	161253	BEZEL, shield	1
2d	158293	. SCREW, calibration	1	23	161306	SEAT, restrictor valve	1
2e*	157127	. GASKET, diaphragm; vellumoid	1	25	104029	CLAMP, electric grounding	1
2f	158293	. SCREW, calibration	1	26	104582	WASHER, tab	1
3	219091	TUBE, displacement	1				

*\* Recommended Tool Box spare parts. Keep these parts on hand to reduce down time.*

# Technical Data

Category	Data
Maximum Inbound Air Pressure	180 psi (1.25 MPa, 12.5 bar)
Air Inlet Size	1/4 npt(f)
Effective Piston Area	1.6 sq. in. (10 cm <sup>2</sup> )
Effective Piston Diameter	1.4 in. (35.2 mm)
Stroke Length	<i>Models 204464 &amp; 204722: 4 in. (101.6 mm)</i> <i>Model 223953: 3 in. (76.2 mm)</i>



# The Graco Warranty

Graco warrants all equipment listed in this manual which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special extended or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, gas engines, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

## **FOR GRACO CANADA CUSTOMERS**

The parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

# Graco Phone Number

**TO PLACE AN ORDER**, contact your Graco distributor, or call to identify the nearest distributor.

**Phone:** 612-623-6921 **or Toll Free:** 1-800-328-0211, **FAX:** 612-378-3505

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

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**Graco Headquarters:** Minneapolis

**International Offices:** Belgium, China, Japan, Korea

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