INSTRUCTIONS-PARTS LIST

GRACO

306-968
Rev. H
SUPERSEDES F

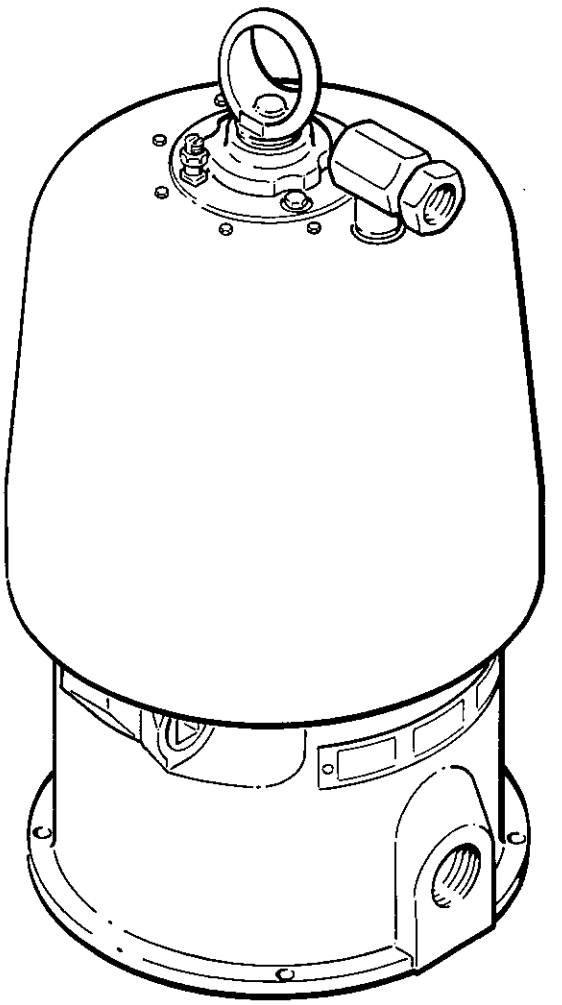
This manual contains **IMPORTANT WARNINGS** and **INSTRUCTIONS**
READ AND RETAIN FOR REFERENCE

10 INCH (255 mm)

KING® AIR MOTOR

90 psi (6 bar) MAXIMUM WORKING PRESSURE

Model 207-647 Series L



- ACCESSORIES on page 7.
- TECHNICAL DATA on back page.

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1444

WARNING

HIGH PRESSURE SPRAY CAN CAUSE SERIOUS INJURY.

FOR PROFESSIONAL USE ONLY. OBSERVE ALL WARNINGS.

Read and understand all instruction manuals before operating equipment.

FLUID INJECTION HAZARD

General Safety

This equipment generates very high fluid pressure. Spray from the gun, leaks or ruptured components can inject fluid through your skin and into your body and cause extremely serious bodily injury, including the need for amputation. Also, fluid injected or splashed into the eyes can cause serious damage.

NEVER point the spray gun at anyone or at any part of the body. NEVER put hand or fingers over the spray tip.

ALWAYS have the tip guard in place on the spray gun when spraying.

ALWAYS follow the **Pressure Relief Procedure**, below, *before* cleaning or removing the spray tip or servicing any system equipment.

NEVER try to stop or deflect leaks with your hand or body.

Be sure equipment safety devices are operating properly before each use.

Medical Treatment

If any fluid appears to penetrate your skin, get

EMERGENCY MEDICAL CARE AT ONCE.
DO NOT TREAT AS A SIMPLE CUT.

Tell the doctor exactly what fluid was injected. For treatment instructions, have your doctor call the

NATIONAL POISON CENTER NETWORK
(412)681-6669

Spray Gun Safety Devices

Be sure all gun safety devices are operating properly before each use. Do not remove or modify any part of the gun; this can cause a malfunction and result in serious bodily injury.

Safety Latch

Whenever you stop spraying, even for a moment, always set the gun safety latch in the closed or "safe" position, making the gun inoperative. Failure to set the safety latch can result in accidental triggering of the gun.

Diffuser

The gun diffuser breaks up spray and reduces the risk of injection when the tip is not installed. Check diffuser operation regularly. Follow the **Pressure Relief Procedure**, below, then remove the spray tip. Aim the gun into a metal pail, holding the gun firmly to the pail. Using the lowest possible pressure, trigger the gun. If the fluid emitted *is not* diffused into an irregular stream, replace the diffuser immediately.

Tip Guard

ALWAYS have the tip guard in place on the spray gun while spraying. The tip guard alerts you to the injection hazard and helps prevent accidentally placing your fingers or any part of your body close to the spray tip.

Trigger Guard

NEVER operate the gun with the trigger guard removed. The trigger guard reduces the risk of accidentally triggering the gun if it is dropped or bumped.

Spray Tip Safety

Use extreme caution when cleaning or changing spray tips. If the spray tip clogs while spraying, engage the gun safety latch immediately. ALWAYS follow the **Pressure Relief Procedure**, below, and then remove the spray tip to clean it.

NEVER wipe off build-up around the spray tip until pressure is fully relieved and the gun safety latch is engaged.

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including injection, splashing in the eyes, or injury from moving parts, always follow this procedure whenever you shut off the pump, when checking or servicing any part of the spray system, when installing, cleaning or changing spray tips, and whenever you stop spraying. (1) Engage the gun safety latch. (2) Shut off the air to the pump. (3) Close the bleed-type master air valve (required in your system). (4) Disengage the gun safety latch. (5) Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure. (6) Engage the gun safety latch. (7) Open the drain valve (required in your system), having a container ready to catch the drainage. (8) Leave the drain valve open until you are ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, VERY SLOWLY loosen the tip guard retaining nut or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip or hose.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and materials, or using worn or damaged parts, can cause them to rupture and result in injection or other serious bodily injury, fire, explosion or property damage.

NEVER alter or modify any part of this equipment; doing so could cause it to malfunction.

CHECK all spray equipment regularly and repair or replace worn or damaged parts immediately.

Read and follow the material and solvent manufacturer's literature regarding the use of protective clothing and equipment.

System Pressure

The maximum safe air input pressure to this motor is governed by the lower displacement pump it is connected to. NEVER exceed 90 psi (6 bar) air pressure to the motor, and NEVER exceed the maximum working pressure stated on the pump. Refer to your separate pump instruction manual. Be sure all the accessories you add to the spray system are properly rated to withstand the maximum air and fluid working pressures of the pump.

Material Compatibility

BE SURE that all materials and solvents used are chemically compatible with the wetted parts shown in the Technical Data on the back cover. Always read the manufacturer's literature before using material or solvent in this pump.

FIRE OR EXPLOSION HAZARD

Static electricity is created by the high velocity flow of fluid through the pump and hose. If every part of the spray system is not properly grounded, sparking may occur, and the system may become hazardous. Sparking may also occur when plugging in or unplugging a power supply cord. Sparks can ignite fumes from solvents and the fluid being sprayed, dust particles and other flammable substances, whether you are spraying indoors or outdoors, and can cause a fire or explosion and serious bodily injury and property damage.

If you experience any static sparking or even a slight shock while using this equipment, STOP SPRAYING IMMEDIATELY. Check the entire system for positive grounding. Do not use the system again until the problem has been identified and corrected.

Grounding

To reduce the risk of static sparking, ground the pump and all other components used or located in the spray area. CHECK your local electrical code for detailed grounding instructions for your area and type of equipment and be sure to ground all of these components:

1. *Pump:* use ground wire and clamp as shown in Fig 1.
2. *Air and fluid hoses:* use only grounded hoses with a maximum of 500 feet (150 m) combined hose length to ensure grounding continuity. Refer to **Hose Grounding Continuity**, below.
3. *Air compressor:* follow the air compressor manufacturer's recommendations.
4. *Spray gun or dispensing valve:* obtain grounding through connection to a properly grounded fluid hose and pump.
5. *Object being sprayed:* according to local code.
6. *All solvent pails* used when flushing, according to local code. *Use only metal pails,* which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.

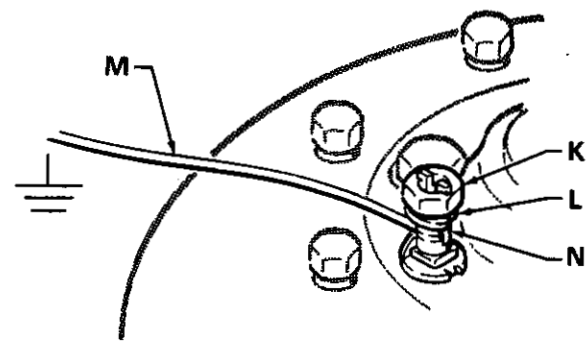


Fig 1

7. *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the gun firmly to the side of a *metal* pail, then trigger the gun.

To ground the pump, loosen the grounding lug locknut (K) and washer (L). Insert one end of the ground wire (12 ga minimum) (M) into the slot in the lug (N) and tighten the locknut securely. See Fig 1.

Connect the other end of the wire to a true earthen ground such as a steel building column or water pipe. Always check your local code. See ACCESSORIES on page 7 for an available ground wire and clamp.

Flushing Safety

Before flushing, be sure the entire system and flushing pails are properly grounded. Refer to **Grounding,** above. Follow the **Pressure Relief Procedure** on page 2, and *remove the spray tip from the gun.* Always use the lowest possible fluid pressure, and maintain firm metal to metal contact between the gun and the pail during flushing to reduce the risk of injection injury, static sparking and splashing.

HOSE SAFETY

High pressure fluid in the hoses can be very dangerous. If the hose develops a pinhole leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause an injection injury or other serious bodily injury or property damage.

ALL FLUID HOSES MUST HAVE SPRING GUARDS! The spring guards help protect the hose from kinks or bends at or close to the coupling which can result in hose rupture.

TIGHTEN all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

NEVER use a damaged hose. Before each use, check entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. DO NOT try to recouple high pressure hose or mend it with tape or any other device. A repaired hose cannot contain the high pressure fluid.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses to move equipment. Do not use materials or solvents which are not compatible with the inner tube and cover of the hose. DO NOT expose Graco hose to temperatures above 180°F (82°C) or below -40°F (-40°C).

Hose Grounding Continuity

Proper hose grounding continuity is essential to maintaining a grounded spray system. Check the electrical resistance of your air and fluid hoses at least once a week. If your hose does not have a tag on it which specifies the electrical resistance, contact the hose supplier or manufacturer for the resistance limits. Use a resistance meter in the appropriate range for your hose to check the resistance. If the resistance exceeds the recommended limits, replace it immediately. An ungrounded or poorly grounded hose can make your system hazardous. Also read **FIRE OR EXPLOSION HAZARD,** above.

MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers or other body parts. NEVER operate the pump with the air motor shield removed. KEEP CLEAR of moving parts when starting or operating the pump. Before checking or servicing the pump, follow the **Pressure Relief Procedure** on page 2 to prevent the pump from starting accidentally.

IMPORTANT

United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards—particularly the General Standards, Part 1910, and the Construction Standards, Part 1926—should be consulted.

Locating Air Leaks

To locate an air leak, shut off the air supply and disconnect the hose. Screw the inlet union (2) out of the air manifold (21). Remove the shield (5). Screw the union back into the manifold. Connect the air hose and turn the air on. Use the checking methods listed in the Check Chart, below, to find where the air is leaking. Refer to Fig 2.

CHECK CHART

Stroke Position	Fig Ref. Points	Checking Method	Cause of Leakage
UP only (air valve housing down)	A	By feel	Blown air manifold gaskets (22)
	B	By feel	Blown air cylinder gasket (37)
	C	Squirt oil around wiper seal (50)	Worn throat packing (46)
DOWN only (air valve housing up)	D	By feel	Blown air manifold gaskets (22)
	E	Squirt oil around bearing (32)	Worn trip rod packing (35)
	F	Squirt oil around bearing (32)	Damaged trip rod bearing gasket (33)
BOTH	G	Squirt oil around valve (25)	Damaged valve ring (27)
	H	Hold paper strip over exhaust holes	Worn air piston packing (38)
	J	Squirt oil around valve plate (24)	Damaged valve plate seal (24)

Grounding

WARNING

For your safety, read the **FIRE OR EXPLOSION HAZARD** section on page 3 and ground your entire system as instructed there.

WARNING

Keep fingers out of the detent housing (14) to reduce the risk of pinching or amputating them.

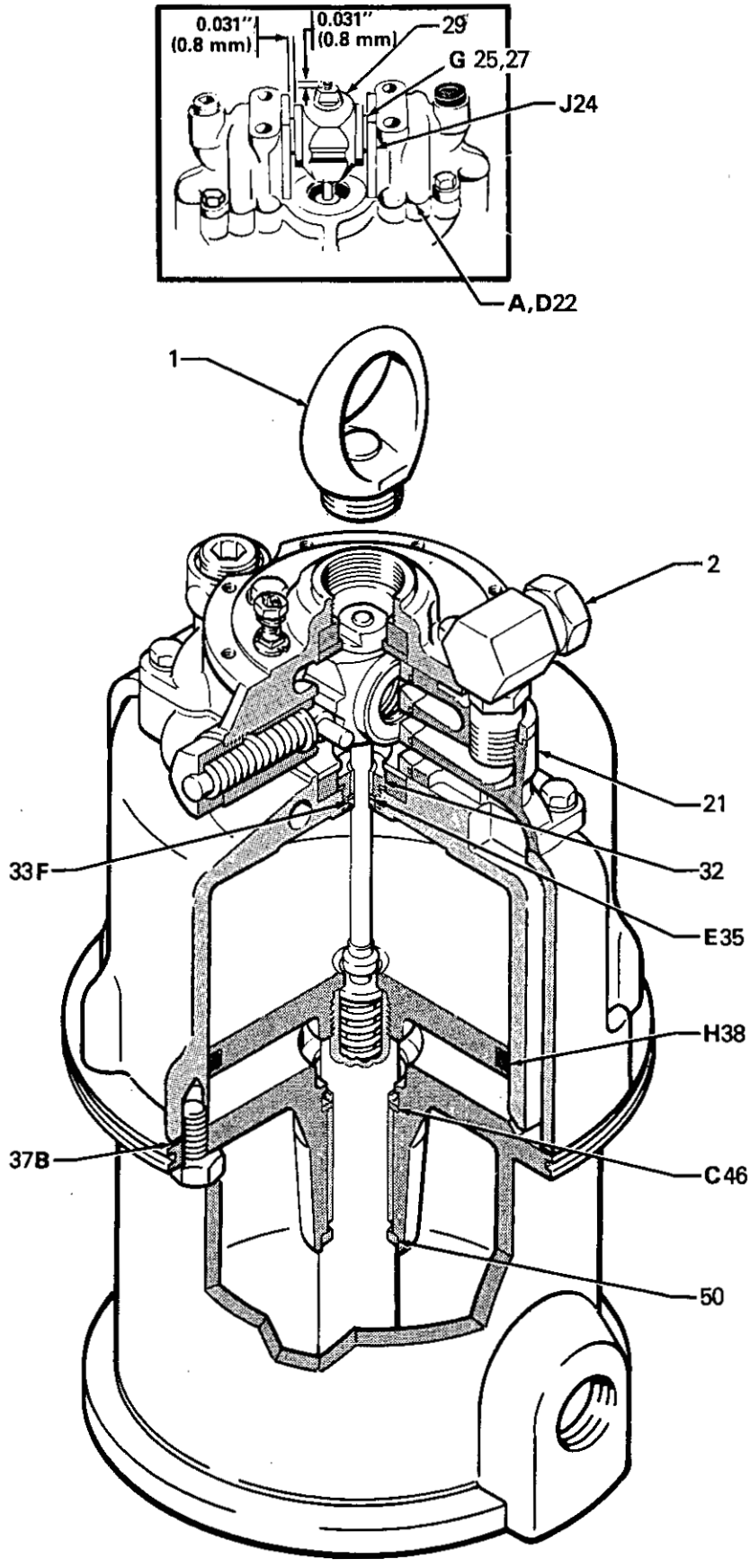


Fig 2

WARNING

To reduce the risk of serious bodily injury, including injection; splashing in the eyes; or injury from moving parts, ALWAYS follow the **Pressure Relief Procedure** on page 2 before servicing the air motor.

Disconnect all hoses, rods, tubes, controls, etc. from the air motor as necessary to provide ease in servicing. Clamp the base (49) securely. Remove the union (2) and the eight screws (3) and lockwashers (4). Remove the shield (5).

Refer to Fig 3. Remove the detent spring retainers (9), springs (10), guides (11) and plungers (12). Inspect the parts for wear or damage, and replace parts as necessary.

CAUTION

HANDLE THE SPRINGS CAREFULLY. Scratches or nicks will cause early spring failure.

Remove the four screws (7) and lockwashers (8) holding the detent housing (14) to the air manifolds (21). Lift the housing off the manifolds. Don't drop the detent rollers (13); take them out of the housing and check the rollers and axles (56) for wear and damage. If either the roller or axle is worn or damaged, replace both; they are a matched set. Remove the rubber pad (15) and washer (16), and check them carefully for damage.

Pull the valve housing (29) up, and remove the valves (25) and springs (28). Take the nut (17) and washer (18) off the trip rod (40). Pull the valve housing off the hub (31). Grip the trip rod below the housing hub (31) with a padded pliers, and screw the hub off the trip rod.

CAUTION

Take special care to avoid damaging the plated surface of the trip rod. Special Tool, No. 207-579 is available. See ACCESSORIES on page 7.

Remove the two mounting screws (19) of one manifold (21) only, and remove the manifold. Check the valve plates (24). When attaching a new valve plate to the manifold, be sure the mating surfaces of the plate and manifold are completely clean. Handle the plate carefully.

Remove the washer (16) and rubber pad (15) from the cylinder (36). Screw the trip rod bearing (32) out of the cylinder and carefully pull it up off the trip rod. Check the packing (35), washer (34) and gasket (33) and replace them if necessary. Grease the packings before installing them in the cylinder.

Remove the twelve screws (51) holding the air cylinder (36) to the base (49). Pull the cylinder *straight* up off the piston. If the cylinder is stuck to the base, use a plastic hammer to break it loose. Be careful not to tilt the cylinder since this could damage the smooth inner surface. Check the piston o-ring (38) for wear or damage and replace if necessary.

Lift the piston and tube (39) from the base. Inspect the v-block throat packing (46) and back-up washer (47) in place. If replacement is necessary, remove the old packing and back-up washer, and carefully tuck in a new back-up washer and packing into the throat cavity. The lips of the v-packing must face up towards the piston. Pack light, water-proof grease into the cavity above the wiper seal (50) and thoroughly lubricate the packing before reassembling.

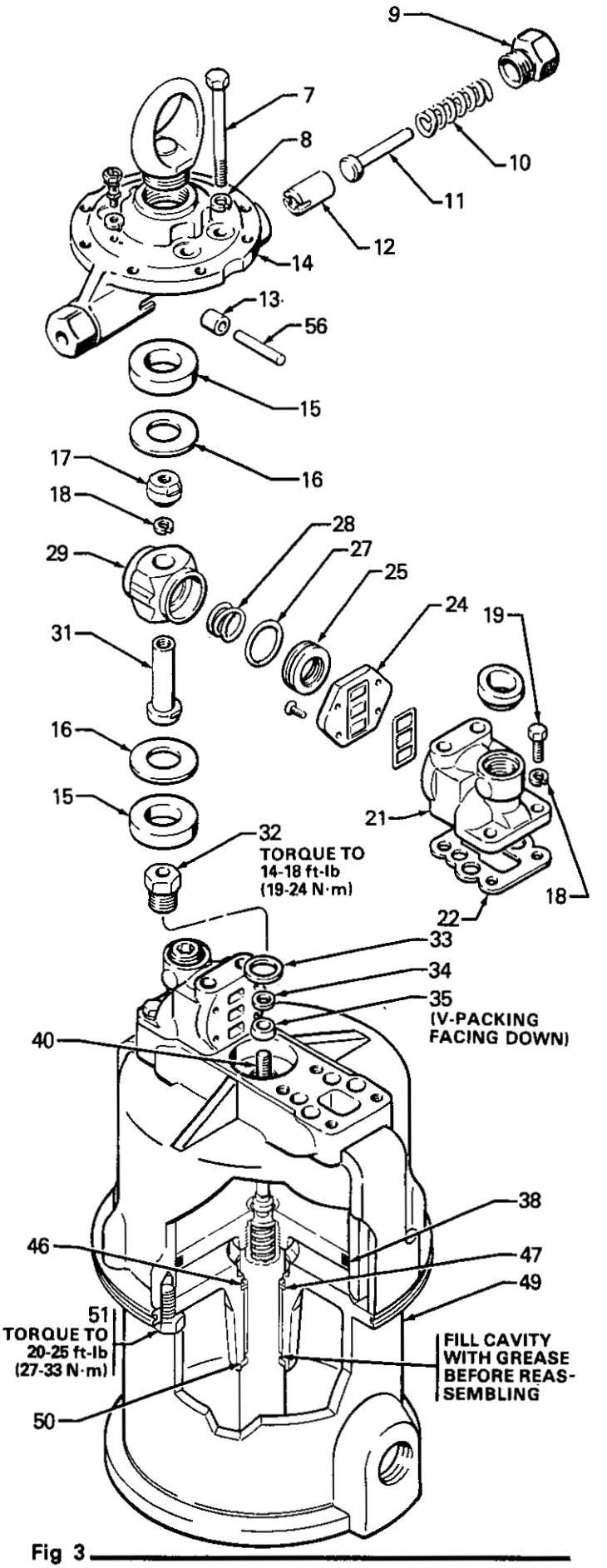


Fig 3

CAUTION

Handle the trip rod and spring carefully. The spring surface must be free of nicks or scratches.

To inspect or replace the trip rod (40), clamp the hex part of the piston (39) in a vise and unscrew the stud (45) from the piston tube. Don't damage the polished surface of the tube.

Whenever the trip rod (40) is removed from the piston tube (39) or a new trip rod is being installed, check to make sure the distance between the inside shoulders of the spring guides (P) is EXACTLY 5.5 in. (139.7 mm). See Fig 4.

If the spring guide(s) (P) is removed or the setting is not exactly 5.5 in. (139.7 mm), or if any part of the trip rod is damaged, the entire trip rod assembly (40) must be replaced.

CAUTION

DO NOT attempt to readjust the spring guides (P)! Readjustment could cause air motor failure.

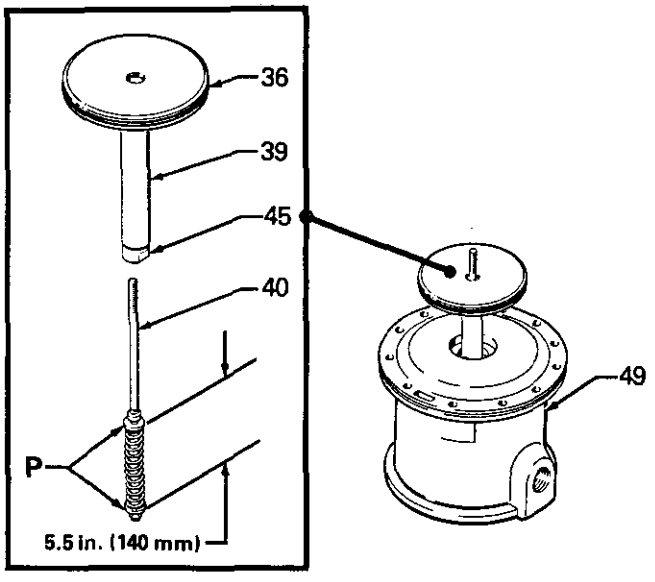


Fig 4

Lubricate the spring and guides with light waterproof grease. Pack the grease into the cavity tube of the air piston (39). Use thread sealer on the threads of the stud (45) and torque to a minimum of 150 ft-lb (203 N·m).

Before installing the air cylinder, (36) check to see that the gasket (37) is in place and the trip rod bearing (32) is removed from the cylinder top. Carefully place the cylinder (36) over the piston (39).

CAUTION

DO NOT tilt or force the cylinder since this could damage the smooth inner cylinder wall.

Be sure the floating o-ring seal is in place before bolting the cylinder (36) to the base (49). Be sure the air inlet is in line with the fluid outlet.

Using thread sealer, install the twelve screws (51) in the base. Torque the screws to 20-25 ft-lb (27-33 N·m). Install the gasket (33) on the trip rod bearing. Carefully twist the bearing down over the trip rod and tighten it securely into the cylinder. Place the rubber pad (15) and washer (16) into the cylinder top.

Grease and install the valve housing hub (31), housing (29), lockwasher (18) and nut (17) on the trip rod. Adjust the hub and nut until 0.031 in. (0.8 mm) of the rod projects, then lock it in place. See Fig 2 on page 5.

Place the springs (28) and air valve rings (25), with the o-rings (27) installed, into the valve housing (29). Install the air manifold (21) and gasket (22) into the cylinder. Be sure the air manifolds are properly aligned and spaced. Special tool no. 168-513 is available. See ACCESSORIES on page 7. Operating clearance must not be more that 0.031 in. (0.8 mm). Check to be sure the housing moves up and down freely. Then tighten the shorter screws (19) holding the manifold to the cylinder.

Replace the washer (16) and pad (15). Before installing the detent housing (14), grease the detent rollers (13) and plungers (12) and place them into the housing. Line up the roller axles with the plunger slots. The grease will hold the parts in place while installing the springs (10), guides (11), and plugs (9).

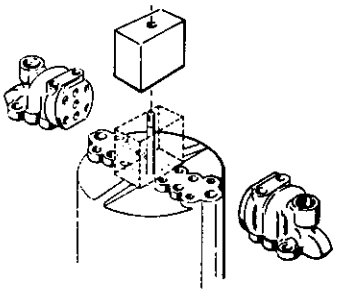
Install the remaining air motor parts following a procedure reverse from the disassembly. Connect the air motor to the displacement pump. Remount the pump and connect the air and fluid lines.

If the grounding wire was disconnected before servicing, be sure to reconnect it before operating the pump.

ACCESSORIES (Must be purchased separately)

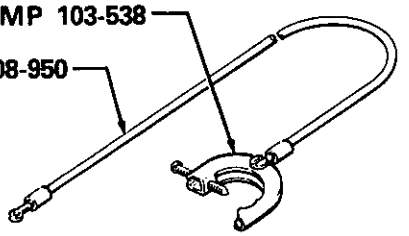
ALIGNMENT TOOL 168-513
For correctly aligning and spacing air manifolds.

Position tool on trip rod as shown. Install manifolds loosely. Hold manifolds against block and tighten. Remove block. Assemble the pump.



GROUNDING CLAMP 103-538

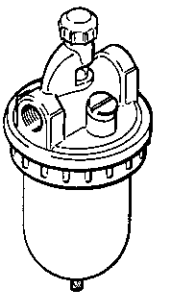
GROUND WIRE 208-950
25 ft (7.6 m) lg



SPECIAL TOOL 207-579
Padded pliers

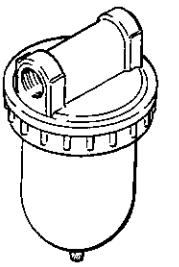
AIR LINE OILER
250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

214-848 1/2 npt inlet & outlet
214-849 3/4 npt inlet & outlet



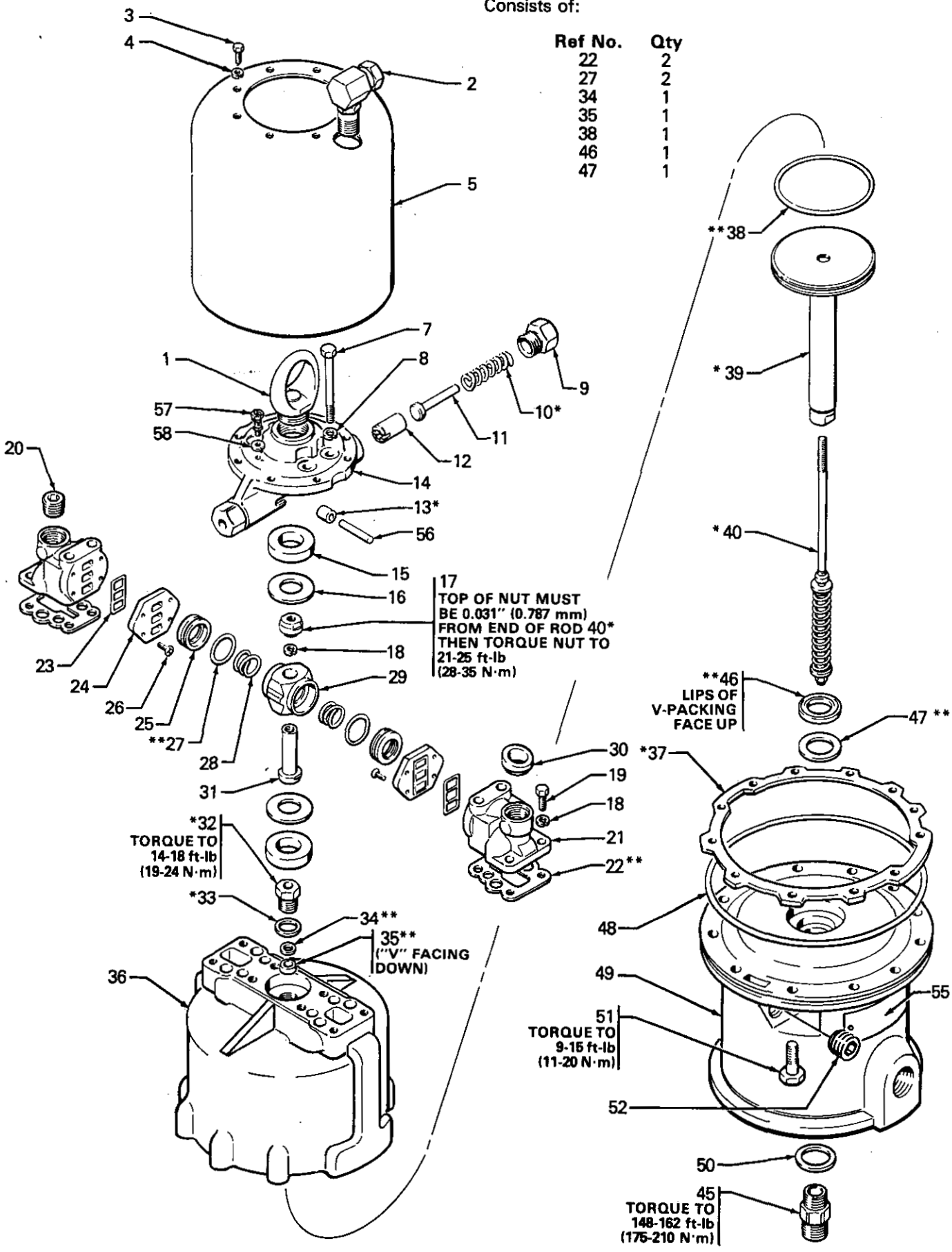
AIR LINE FILTER
250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

106-149 1/2 npt inlet & outlet
106-150 3/4 npt inlet & outlet



207-730 Repair Kit
(Must be purchased separately)
Consists of:

Ref No.	Qty
22	2
27	2
34	1
35	1
38	1
46	1
47	1



PARTS LIST

REF NO.	PART NO.	DESCRIPTION	QTY
1	180-952	RING, lift	1
2	207-648	UNION, adapter; 90°; 3/4 npt(m) × 3/4 npsm(f) swivel	1
3	100-333	SCREW, hex hd cap; 1/4-20 × 1/2"	8
4	100-016	LOCKWASHER, spring; 1/4"	8
5	168-188	SHIELD, air motor	1
7	101-713	SCREW, hex hd cap; 7/16-14 × 3-1/2"	4
8	100-052	LOCKWASHER, spring; 7/16"	4
9	161-587	RETAINER, detent spring	2
10	*161-589	SPRING, compression, detent	2
11	161-588	GUIDE, spring, detent	2
12	169-583	PLUNGER, roller	2
13	*169-585	ROLLER	2
14	177-664	HOUSING, detent	1
15	161-577	PAD, dampening; rubber	2
16	161-576	WASHER, flat; steel	2
17	161-586	NUT, trip rod; 3/8-24	1
18	100-133	LOCKWASHER, spring; 3/8"	5
19	100-101	SCREW, hex hd cap; 3/8-16 × 1"	4
20	102-726	PLUG, pipe, socket; 3/4 npt	1
21	168-187	MANIFOLD, air	2
22	**168-183	GASKET, manifold; rubber impregnated cellulose	2
23	168-184	SEAL, valve plate; rubber	2
24	169-584	PLATE, air valve; stainless steel	2
25	168-182	VALVE, air director; acetal	2
26	101-716	SCREW, flat hd mach; No. 10-24 × 1/2"	8
27	**156-698	O-RING, nitrile rubber	2
28	*161-575	SPRING, compression	2
29	161-585	HOUSING, air valve	1
30	168-185	GROMMET, air inlet; rubber	1
31	161-590	HUB, valve housing	1
32	*204-649	BEARING, trip rod	1
33	*150-647	GASKET, flat; copper	1
34	**161-559	WASHER; leather	1
35	**161-560	PACKING, v-block; polyurethane	1
36	168-191	CYLINDER, air motor	1
37	*168-189	GASKET, cylinder; rubber impregnated cellulose	1
38	**102-727	O-RING; nitrile rubber	1
39	*218-962	PISTON, air motor	1
40	214-852	TRIP ROD ASSY	1
45	168-180	STUD, piston tube	1
46	**161-562	V-PACKING; nitrile rubber	1
47	**161-563	WASHER, back-up; leather	1
48	102-737	O-RING, nitrile rubber	1
49	207-649	BASE, air motor	1
50	161-569	SEAL, plain enclosed	1
51	100-017	SCREW, hex hd cap; 1/2-13 × 1/2"	12
52	102-725	PLUG, pipe; socket; 1-1/4 npt	1
55	172-451	PLATE, instruction	1
56	*169-586	AXLE, detent	2
57	104-029	LUG, grounding	1
58	104-582	WASHER, tab	1

**Recommended "tool box" spare parts. Keep on hand to reduce down time.*

***Supplied in repair kit 207-730.*

Order parts by name and series letter of the assembly for which you are ordering.

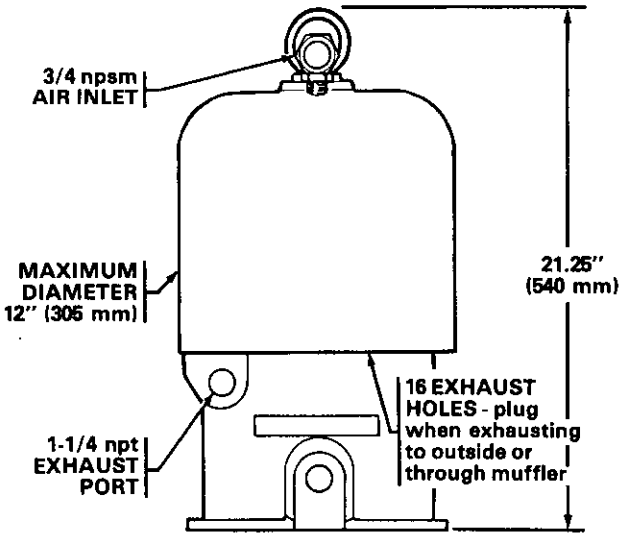
SERVICE INFORMATION

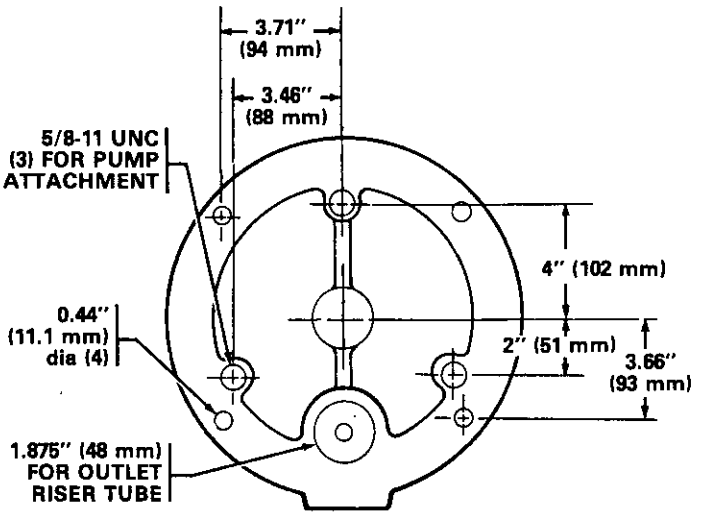
Listed below by the assembly changed are OLD, NEW, ADDED and DELETED parts.

ASSEMBLY CHANGED	PART STATUS	REF NO.	PART NO.	NAME
207-647 Air Motor	OLD		161-551	Ring
	NEW	1	180-952	Ring
	DELETED	55	172-461	Plate
	ADDED	55	172-451	Plate

INTERCHANGEABILITY NOTE: NEW part replaces OLD part listed directly above it.

DIMENSIONAL DRAWING





BOTTOM VIEW

TECHNICAL DATA

Air inlet pressure	:	90 psi (6 bar) max.
Effective piston area	:	78.5 sq. in. (506 cm^2)
Size	:	10 in. (255 mm) dia
Stroke	:	4.75 in. (120 mm)
Air Valves	:	SST plate; sliding acetal ring
Valve housing	:	Balanced, opposing seals and detent rollers
Seals and packings	:	Nitrile rubber
Recommended max speed	:	50 cycles/min
Weight	:	75 lb (34 kg)
Air inlet	:	3/4 npsm

THE GRACO WARRANTY

Graco Inc. warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship under normal use and service. This warranty extends to the original purchaser for a period of 12 months from the date of purchase and applies only when the equipment is installed and operated in accordance with written factory recommendations. This warranty does not cover damage or wear which, in the reasonable judgment of Graco, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-Graco parts, faulty installation or tampering.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective for examination by Graco to verify 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 workmanship or material, repairs will be made at a reasonable charge and return transportation will be charged.

THIS LIMITED WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES (EXPRESS OR IMPLIED) INCLUDING WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND OF ANY NON-CONTRACTUAL LIABILITIES INCLUDING PRODUCT LIABILITIES BASED ON NEGLIGENCE OR STRICT LIABILITY. EVERY FORM OF LIABILITY FOR DIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS IS EXPRESSLY EXCLUDED AND DENIED.

EQUIPMENT NOT COVERED BY GRACO WARRANTY. Accessories or components of equipment sold by Graco that are not manufactured by Graco (such as electric motors, switches, hose, etc.) are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making such claims.

Factory Branches:Atlanta, Dallas, Detroit, Los Angeles, West Caldwell (N.J.)
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