

# MSA-10 and MSA-100 Air Operated Pump

332023B

EN

*For dispensing oil or grease up to NLGI#2 in series progressive lubrication systems. For professional use only.*

Not approved for use in explosive atmospheres or hazardous (classified) locations.

## Models:

### MSA-10 (562854)

MSA-10: 1450 psi (9.997 MPa, 99.97 bar) Maximum Working Pressure

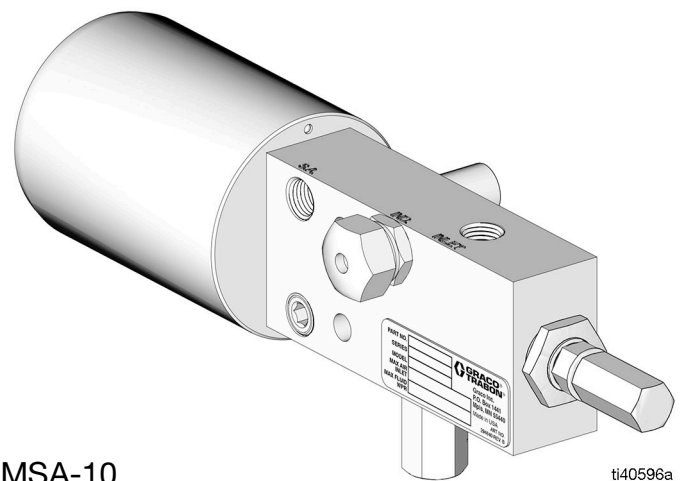
### MSA-100 (562855)

MSA-100: 3000 psi (20.68 MPa, 206.8 bar) Maximum Working Pressure



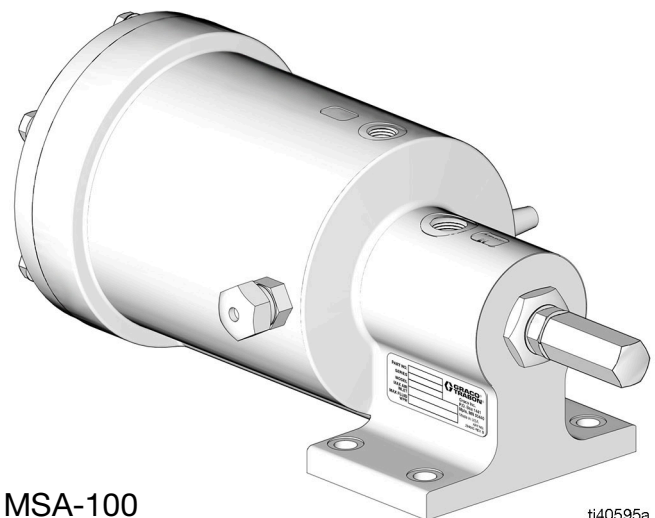
## Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment.  
Save these instructions.



MSA-10

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MSA-100

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# Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h2 style="margin: 0;">WARNING</h2>	
  	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not point dispensing device at anyone or at any part of the body.</li> <li>• Do not put your hand over the fluid outlet.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop dispensing and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses and couplings daily. Replace worn or damaged parts immediately.</li> </ul>
 	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well-ventilated area.</li> <li>• Eliminate all ignition sources, such as cigarettes and portable electric lamps.</li> <li>• Ground all equipment in the work area.</li> <li>• Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.</li> <li>• Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul>



# WARNING



## EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.



- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.



## PRESSURIZED ALUMINUM PARTS HAZARD

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Do not use chlorine bleach.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.



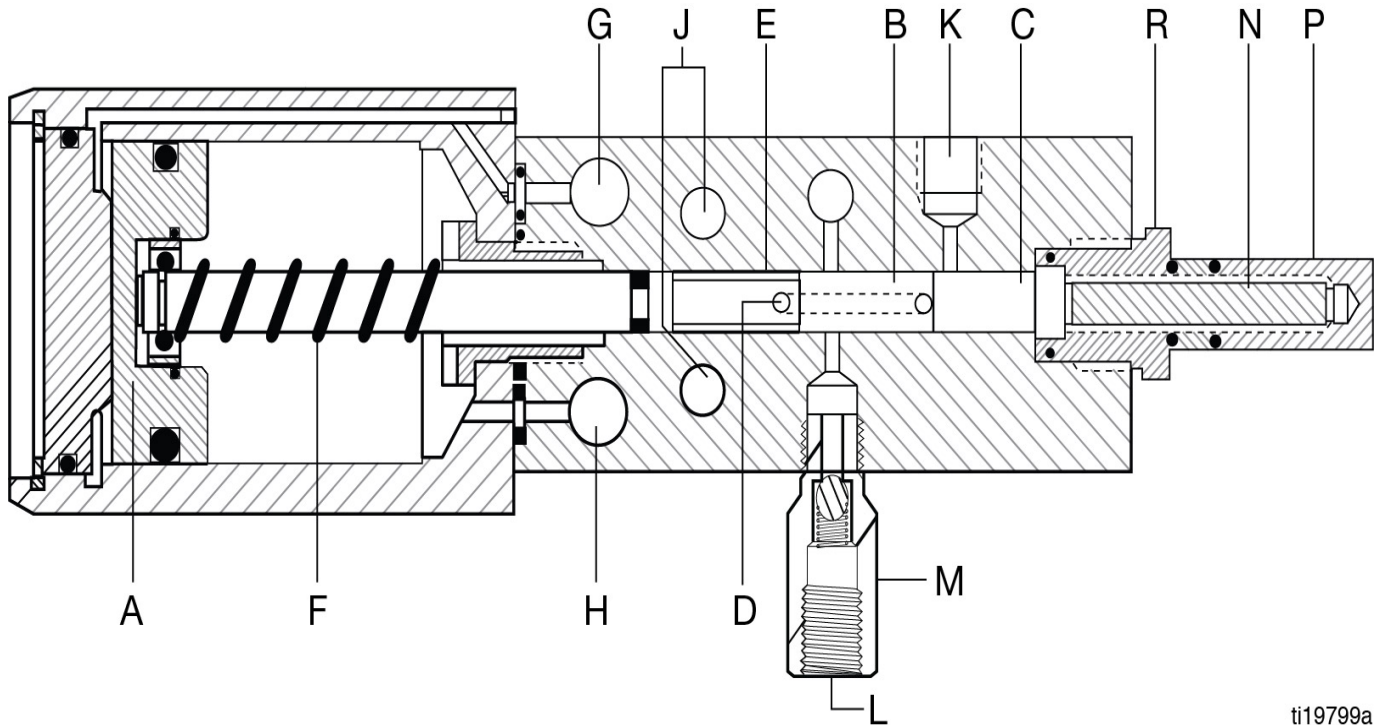
## PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

# Component Identification

## MSA-10 Air Operated Pump



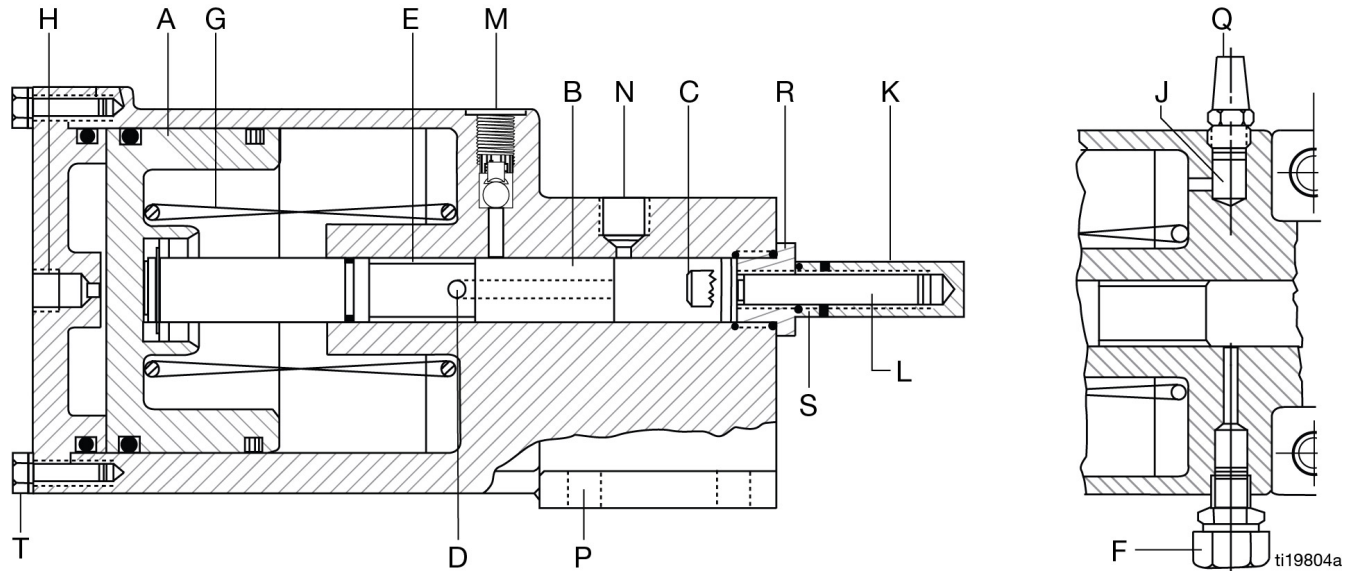
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**FIG. 1: Component Identification**

**Key:**

- |   |                      |   |                          |
|---|----------------------|---|--------------------------|
| A | Air piston           | N | Adjustment screw         |
| B | Pump piston          | P | Adjustment screw cap     |
| C | Chamber              | R | Adjustment screw housing |
| D | Outlet hole          |   |                          |
| E | Undercut             |   |                          |
| F | Piston return spring |   |                          |
| G | Single-acting port   |   |                          |
| H | Double-acting port   |   |                          |
| J | Mounting holes       |   |                          |
| K | Lube inlet           |   |                          |
| L | Lube outlet          |   |                          |
| M | External check valve |   |                          |

# MSA-100 Air Operated Pump



**FIG. 2: Component Identification**

**Key:**

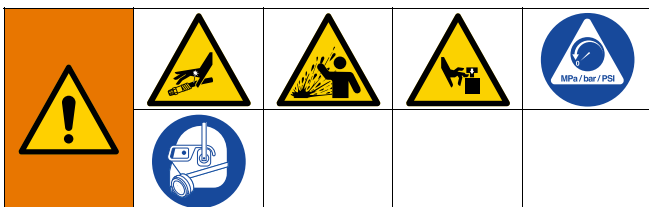
- |                                   |                            |
|-----------------------------------|----------------------------|
| A Air piston                      | Q Air muffler              |
| B Pump piston                     | R Adjustment screw housing |
| C Chamber                         | S Jam nut                  |
| D Outlet hole                     | T Screws                   |
| E Undercut                        |                            |
| F Rupture to atmosphere indicator |                            |
| G Piston return spring            |                            |
| H Single-acting port              |                            |
| J Double-acting port              |                            |
| K Adjustment cap                  |                            |
| L Adjustment screw                |                            |
| M Lube outlet                     |                            |
| N Lube inlet                      |                            |
| P Mounting holes                  |                            |

# Installation

## Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

1. Disable the pump’s pneumatic air supply.
2. Relieve pressure by slowly loosening the outlet connection fitting.

## General Information

Both the MSA-10 and MSA-100 are air-operated pumps with an adjustable volume output. They are designed for use in series progressive oil or grease lubrication systems.

The lubricant can be supplied to both pumps by either a gravity feed reservoir or by a pressurized source, such as a bulk header that exerts up to 500 psi (3.45 MPa, 34.5 bar) at the pump inlet.

**NOTE:** When connected to a pressurized supply, backflow to supply must be permitted.

Both the MSA-10 and the MSA-100 are supplied as a single acting pump and can be field-converted to a double-acting pump.

**NOTE:** Typical installation requires a controller operated, directional air valve since the pump’s pneumatic piston requires venting on the return stroke to complete a fully cycle.

The pumps come standard with a rupture to atmosphere indicator rated to 1450 psi (10 MPa, 100 bar) and an outlet check valve. Higher pressure rating rupture discs can be purchased separately. If the indicator needs repairs due to a ruptured disc:

1. Remove the top nut from the indicator housing.
2. Remove the ruptured disc and replace with a new disc.
3. Replace the top nut, torque to 5 ft-lb (6.8 N•m).

# Mount the Pump

See FIG. 1 for reference letters used in this section.

## MSA-10 Air Operated Pump

1. Mount the pump to a flat, sturdy surface using two (2) 5/16 in. screws through the mounting holes (J).
2. Connect the lubrication inlet and outlet lines to the pump inlet (K) and outlet (L). Do not use PTFE type tape.
3. Connect the air supply line to the pump air inlet (G), which is marked "S.A." on the pump body. If a higher air flow creates a cycle rate that exceeds the maximum allowed, an inlet restrictor valve is required (P/N 563072).
  - When using the MSA-10 Air Operated Pump as a double-acting pump, remove the plastic vent plug from the double-acting inlet port (H), which is marked "D.A." on the pump body, and connect a second air supply line to that inlet.
4. Cycle the pump until all of the air is removed and the lubricant runs clear at the outlet.
5. Adjust the pump output:
  - a. Remove the adjustment screw cap (P).
  - b. Turn the adjustment screw (N):
    - Clockwise to reduce output
    - Counter-clockwise to increase output
  - c. When adjusted to desired amount, replace the adjustment screw cap (P).

## MSA-100 Air Operated Pump

See FIG. 2 for reference letters used in this section.

1. Mount the pump to a flat, sturdy surface using four (4) 3/8 in. screws through the mounting holes (P).
2. Connect the lubrication inlet and outlet lines to the pump inlet (N) and outlet (M).
  - Seal all of the pipe connections. Do not use PTFE type tape.
3. Connect the air supply line to the pump air inlet (H). If a higher air flow creates a cycle rate that exceeds the maximum allowed, an inlet restrictor valve is required (P/N 563072).
  - When using the MSA-100 Air Operated Pump as a double-acting pump, remove the air muffler from the double-acting inlet port (J), which is marked "D.A." on the pump body, and connect a second air supply line to that inlet.
  -
4. Cycle the pump until all of the air is removed and the lubricant runs clear at the outlet.
5. Adjust the pump output:
  - a. Remove the adjustment screw cap (K).
  - b. Turn the adjustment screw (L):
    - Clockwise to reduce output
    - Counter-clockwise to increase output
  - c. When adjusted to desired amount, replace the adjustment screw cap (K).

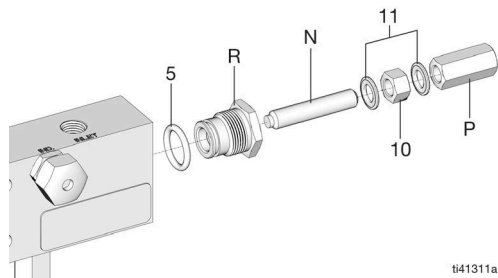
# Repair

## MSA-10 Air Operated Pump

**NOTE:** Use all parts of Pump Repair Kit 563912 for best results.

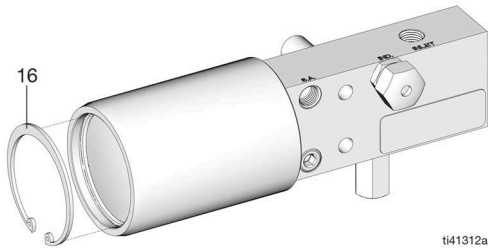
See page 12 for reference numbers used in this section

- 1 Remove the adjustment screw cap (P), jam nut (10), adjustment screw (N), washers (11), o-ring(5), and adjustment screw housing (R). Discard the washers (11) and o-ring(5).



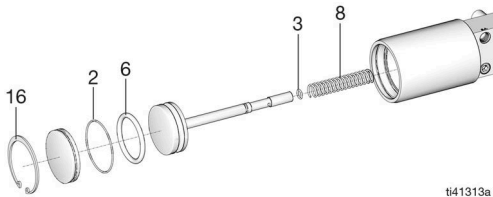
**FIG. 3**

- 2 Remove and discard the retainer ring (16).



**FIG. 4**

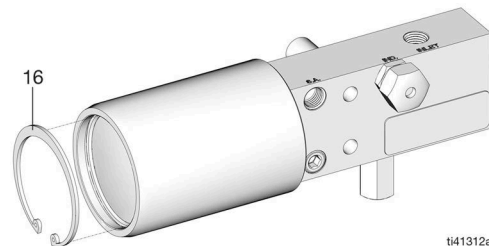
- 3 With a brass or aluminum rod, carefully push the pump piston (B) toward the back of the pump to remove the pump and air piston assemblies.
- 4 Carefully remove and replace the o-rings (2), (3), (6), and return spring (8).



**FIG. 5**

- 5 Clean the pump body and its parts with a mild solvent.

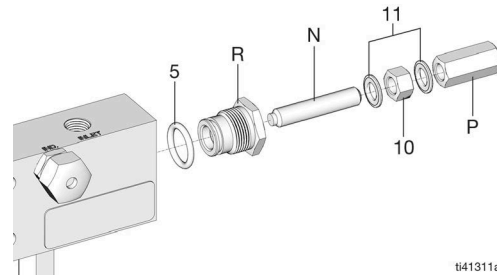
- 6 Lubricate the o-rings and the inside of the air piston bore with a light coat of grease.
- 7 Insert the pump and air piston assemblies back into the pump housing.
- 8 Install the retaining ring (16).



**FIG. 6**

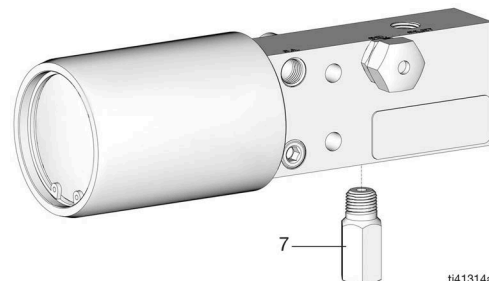
- 9 Reassemble the adjustment screw cap (P), jam nut (10), adjustment screw (N), washers (11), o-ring (5), and adjustment screw housing (R).

- 10 Torque the adjustment screw housing to 100 ft-lb (135.6 N•m)



**FIG. 7**

- 11 Remove and replace the check valve (7).



**FIG. 8**

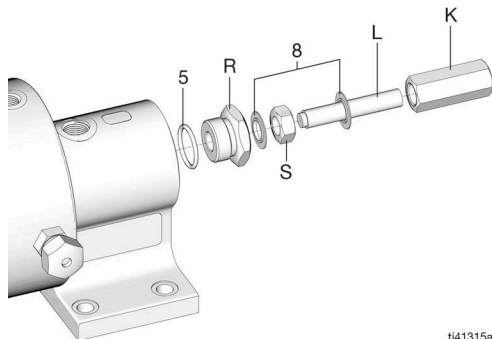


# MSA-100 Air Operated Pump

**NOTE:** Use all parts of Pump Repair Kit 563913 for best results.

See page 14 for reference numbers used in this section

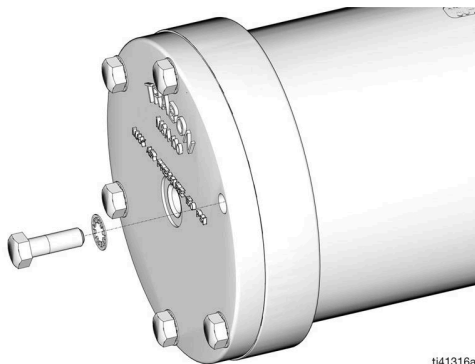
- 1 Remove the adjustment screw cap (K), jam nut (S), adjustment screw (L), washers (8), o-ring (5), and adjustment screw housing (R). Discard the washers (8) and o-ring (5).



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**FIG. 9**

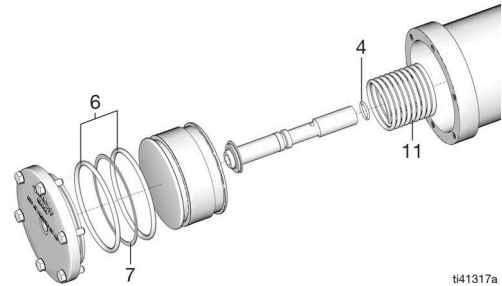
- 2 Loosen and remove the screws (T) to remove the back plate cover.
- 3 With a brass or aluminum rod, carefully push the pump piston(B) towards the back of the pump to remove the pump and air piston assemblies.



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**FIG. 10**

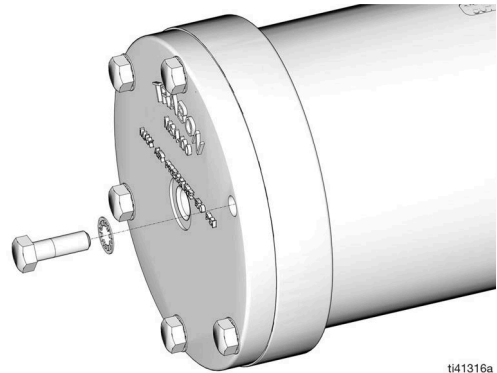
- 4 Carefully remove the PTFE backup ring (7), o-rings (4), (6), and return spring (11).



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**FIG. 11**

- 5 Reassemble parts (7), (4), (6), and (11) using the new parts from the kit
- 6 Clean the pump body and its parts with a mild solvent.
- 7 Lubricate the o-rings and the inside of the air piston bore with a light coat of grease.
- 8 Insert the pump and air piston assemblies back into the pump housing, then install the back cover plate.
- 9 Torque the screws (T) to 12 ft-lb(16.3 N•m).

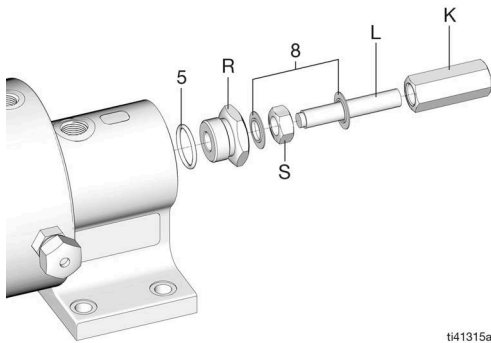


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**FIG. 12**

- 10 Reassemble the adjustment screw cap (K), jam nut (S), adjustment screw (L), washers (8), o-ring (5), and adjustment screw housing (R).

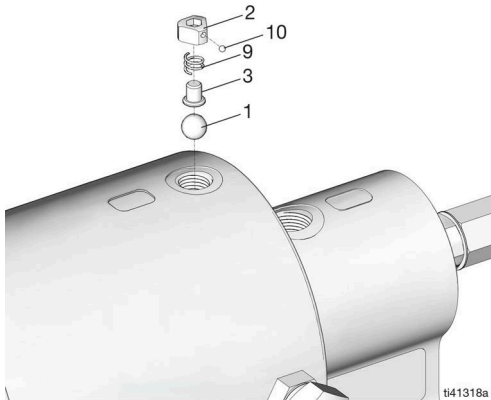
- 11 Torque the adjustment screw housing to 100 ft-lb (135.6 N•m).



**FIG. 13**

ti41315a

- 12 Remove the fitting (2) from lube outlet (M).
- 13 Discard the ball bearing (1), fitting (2), retainer spring (3), check valve compression spring (9), and 3/32 nylon ball (10).
- 14 Reassemble parts (1), (2), (3), (9), and (10) in reverse order using the new parts from the kit.
- 15 Install fitting (2) to a depth of .580" from the top surface.

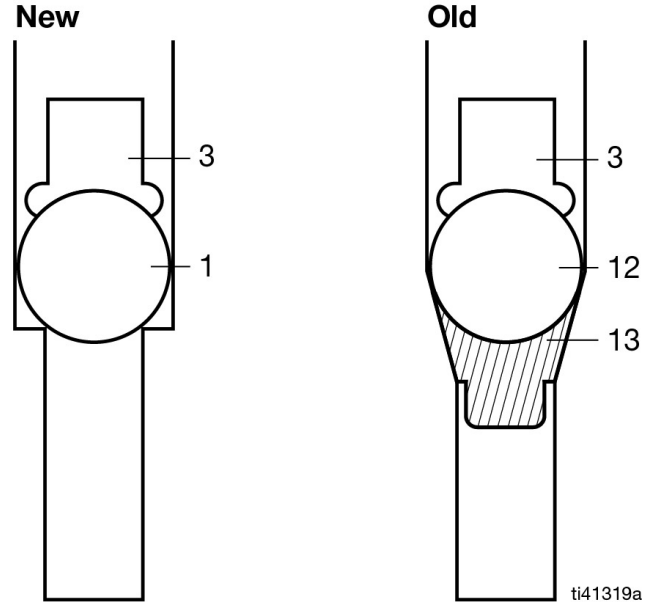


**FIG. 14**

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**NOTE:**

For pumps that came with a Viton ball, do not use steel ball (1) and retainer (3). Use Viton ball (12) and poppet (13).



**FIG. 15**

ti41319a

# Recycling and Disposal

## End of Product Life

At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Perform the **Pressure Relief Procedure**.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Deliver remaining product to a recycling facility.

# Parts

## MSA-10 Air Operated Pump

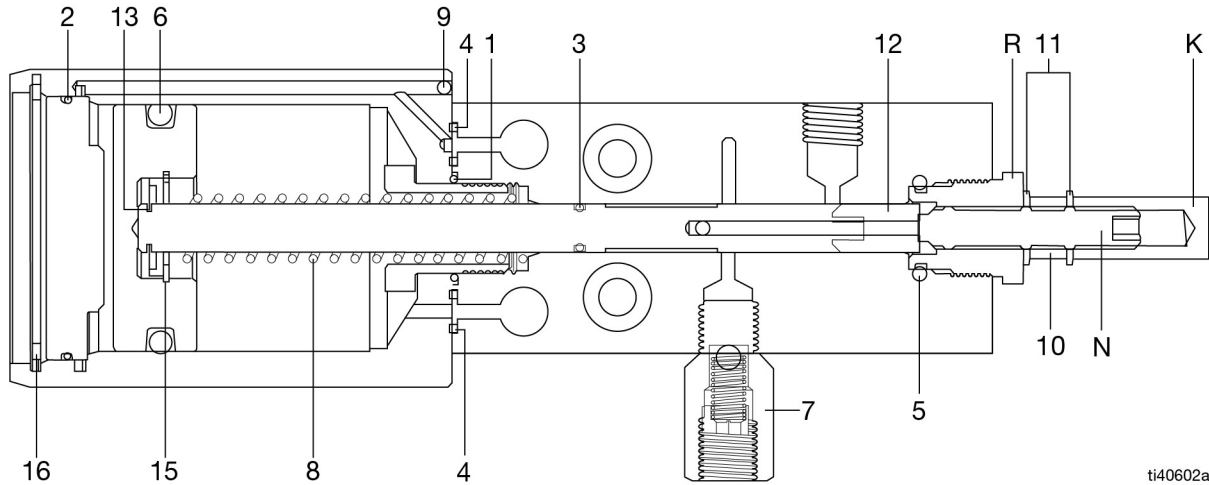


FIG. 16

### Part Number/Description

Ref.	Part	Description	Qty.
1*	555648	O-ring	1
2*	555651	O-ring	1
3*	555715	O-ring	1
4*	555716	O-ring	2
5*	556545	O-ring	1
6*	556597	O-ring	1
7*	563207	VALVE, check, 1/4 npt, 5000	1
8*	557571	SPRING, piston, AL-50 pump	1
9*	555364	BALL, 440 SST, .125 grade 100	1
10*	106292	NUT, hex	1
11*	122001	SEAL, washer, 3/8 stat-o-seal	2
12*	122003	SCREW, set, dog, 3/8-24 x 2.0	1
13*	122004	RING, retainer, -37 e-ring ext	1
14*	555435	PIN, .125 dia. x .250 lg (not shown)	1
15*	555563	RING, retainer, -90 basic int	1
16*	555566	RING, retainer, -244 basic int	1
	563072	Air inlet restrictor, not shown	1

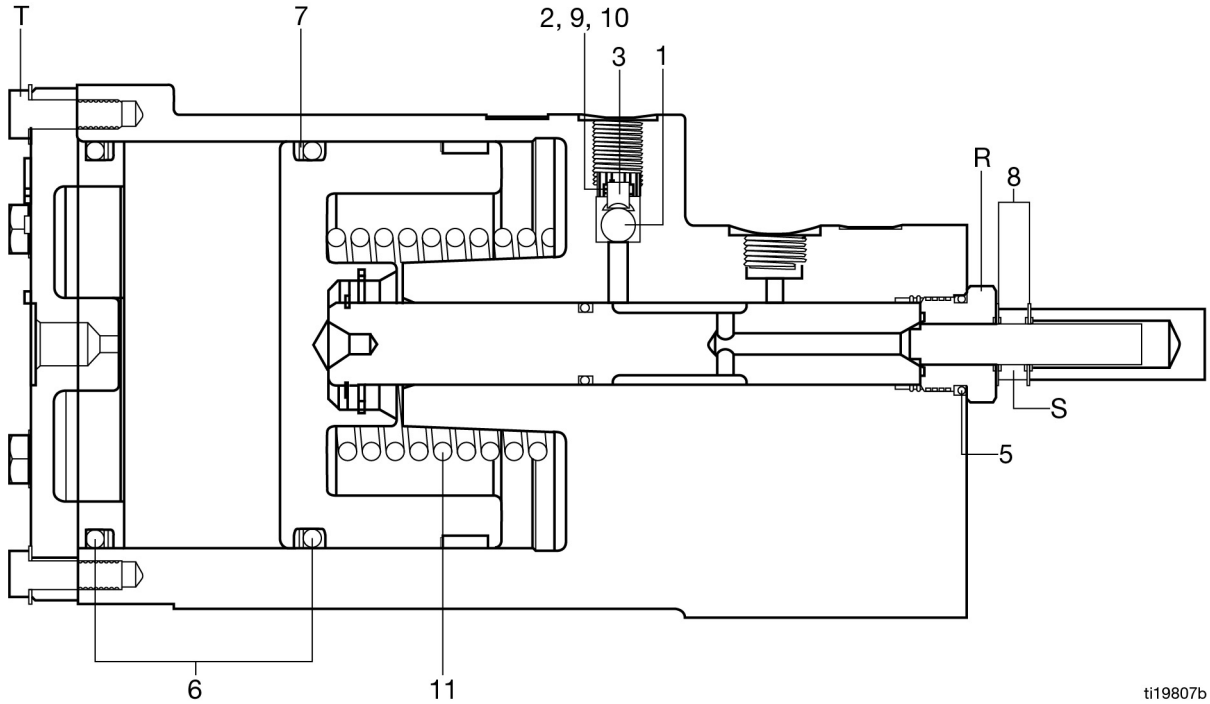
\* Parts included in Kit 563912 (purchase separately).

Rupture disc kits for different pressure ratings can be purchased separately:

1450 psi (10 MPa, 100 bar) Part No. 563962

2950 psi (20.3 MPa, 203 bar) Part No. 563966

# MSA-100 Air Operated Pump



ti19807b

FIG. 17

## Part Number/Description

Ref.	Part	Description	Qty.
1*	101947	BALL, bearing	1
2*	131495	FITTING, keeper, 1/4 NPSF	1
3*	556503	RETAINER, spring	1
4*	555688	O-ring, -115 Viton-A 75 DURO	1
5*	555689	O-ring, -118 Viton-A 75 DURO	1
6*	556566	O-ring, -345 Viton-A 75 DURO	2
7*	556591	RING, backup -048 PTFE	2
8*	556708	SEAL, washer, 1/2 stat-o-seal	2
9*	556952	SPRING, compression, check valve	1
10*	131468	BALL, 3/32 nylon	1
11*	557542	SPRING, piston rtn MSA-100	1
12*◆	556334	BALL, 3/8 Viton 70 DURO (not shown)	1
13*◆	557060	Poppet (not shown)	1
	563072	Air inlet restrictor (not shown)	1

\* Parts included in Kit 563913 (purchase separately).  
 ◆ Parts only used in older style MSA-100 pumps (Series B or older) instead of Part 101947.  
 Rupture disc kits for different pressure ratings can be purchased separately:  
 1450 psi (10 MPa, 100 bar) Part No. 563962  
 2950 psi (20.3 MPa, 203 bar) Part No. 563966

# Dimensions

## MSA-10 Air Operated Pump

Shown in inches (mm)

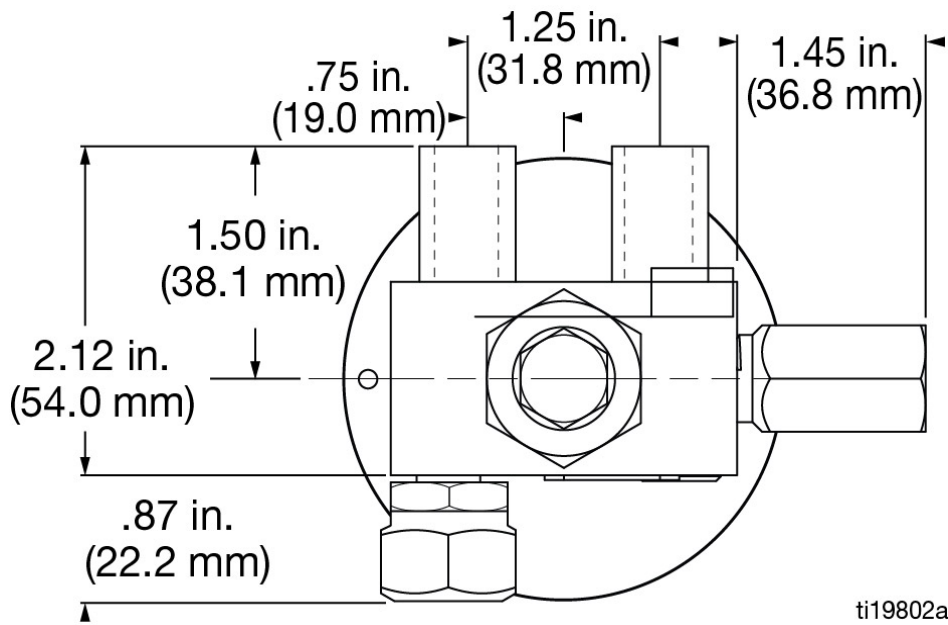


FIG. 18

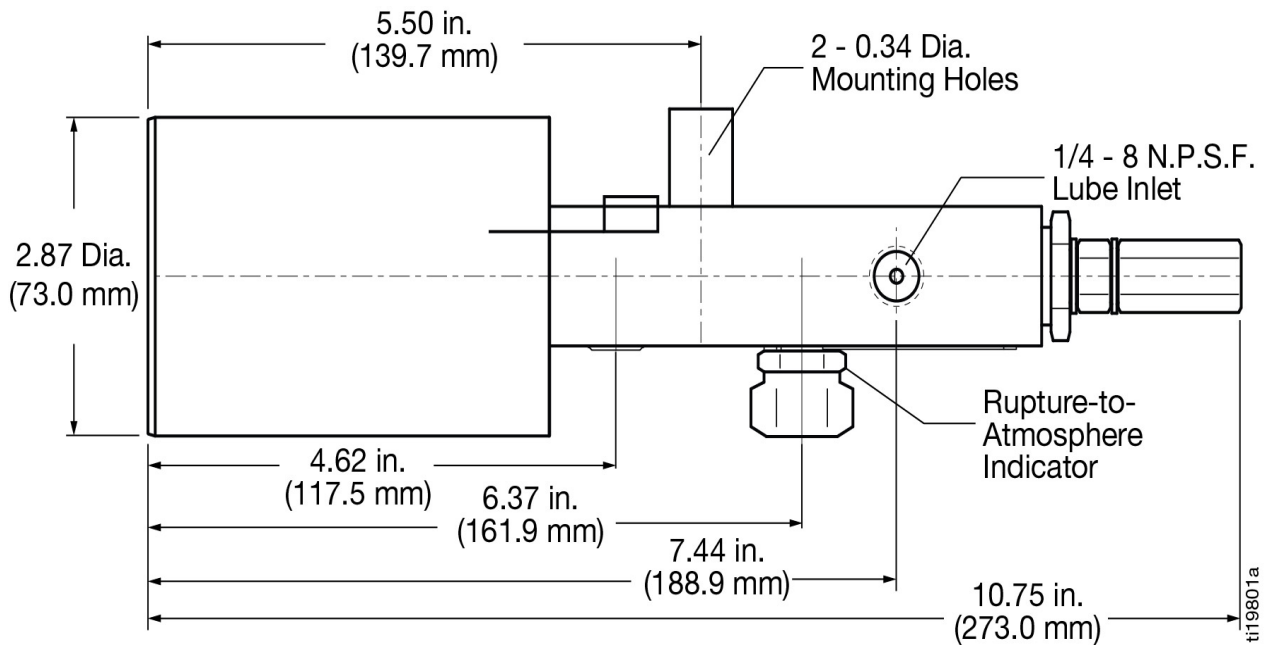
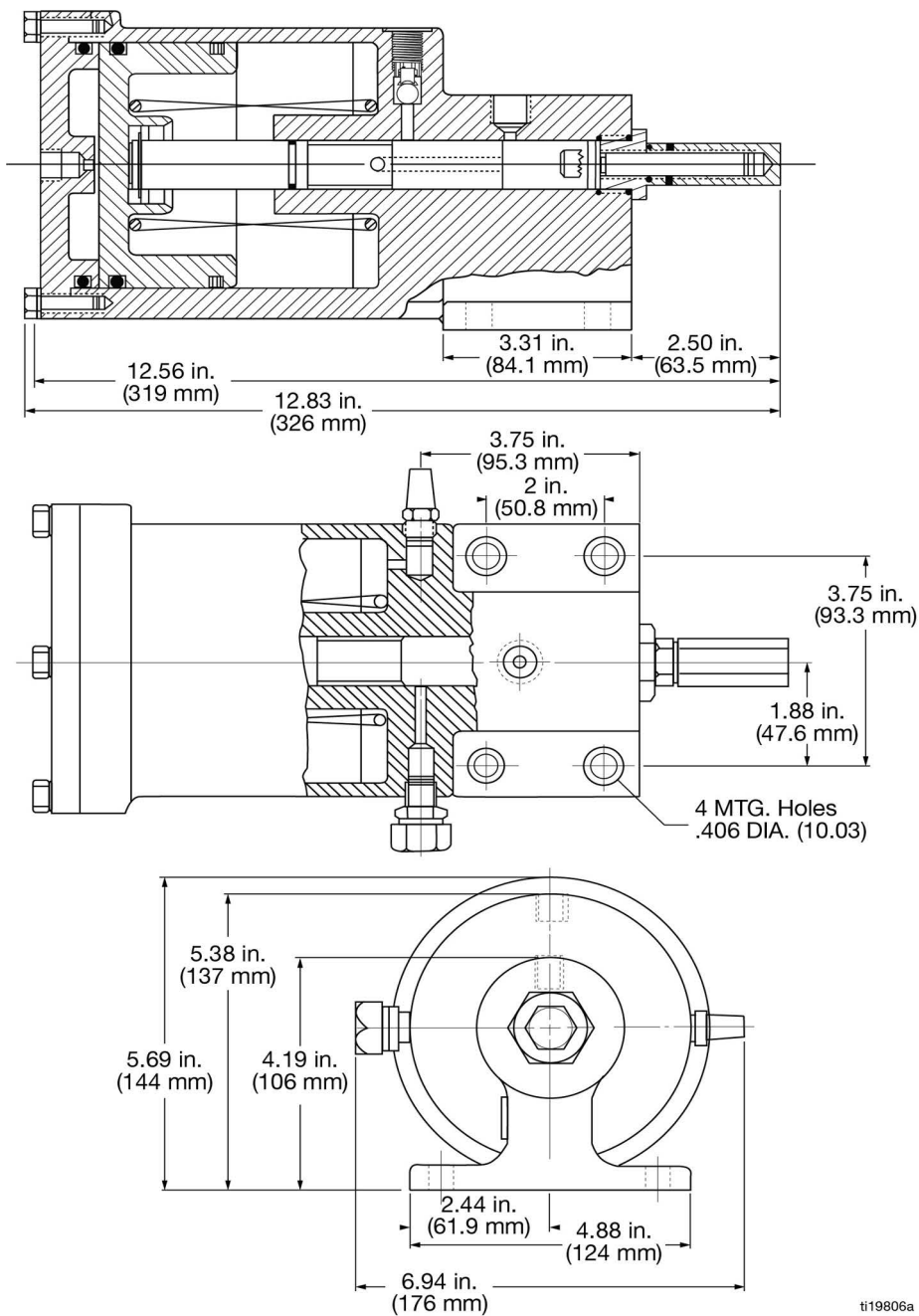


FIG. 19

### MSA-100 Air Operated Pump

Shown in inches (mm)



ti19806a

# Technical Specifications

MSA-10 Air Operated Pump		
	US	Metric
Output per Stroke	0.040-0.120 cu.in	0.66-1.97 cm <sup>3</sup>
Max Pump Stroke Per Min		
Single-Acting	15	
Double-Acting	60	
Operating Pressure		
Air inlet	40-150 psi	0.28-1.03 MPa, 2.76 - 10.4 bar
Max Lube Inlet*	500 psi	3.45 MPa, 34.5 bar
Max Lube Outlet	3000 psi with standard 1450 psi Rupture-To-Atmosphere Indicator	207 bar with standard 100 bar Rupture-To-Atmosphere Indicator
Lubricant	Oil or Grease up to NLGI#2	
Air to Lube Ratio	25:1	
Wetted Parts	Steel, NBR, polyurethane, aluminum	

MSA-100 Air Operated Pump		
	US	Metric
Output per Stroke	0.4-0.8 cu.in	6.57-13.11 cm <sup>3</sup>
Max Pump Stroke Per Min		
Single-Acting	15	
Double-Acting	30	
Operating Pressure		
Air inlet	60-140 psi	0.41 MPa -1.0 MPa, 4-10 bar
Max Lube Inlet*	500 psi	3.45 MPa, 34.5 bar
Max Lube Outlet	3000 psi with standard 1450 psi Rupture-To-Atmosphere Indicator	207 bar with standard 100 bar Rupture-To-Atmosphere Indicator
Lubricant	Oil or Grease up to NLGI#2	
Air to Lube Ratio	25:1	
Wetted Parts	Steel, nylon, FKM, bronze, aluminum	

*All trademarks or registered trademarks are the property of their respective owners.*

\* When connected to pressurized supply, back-flow to supply must be permitted; alternatively, a small accumulator or three (3) ft. of 1/2 in. ID hose can be connected to lube inlet of pump.

## California Proposition 65

### CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm – [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).





# Graco Standard Warranty

Graco warrants all equipment referenced in this document 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.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

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, 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**

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# Graco Information

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

**Phone:** 612-623-6928 or **Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

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Original instructions. This manual contains English. MM 332023

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Revision B, May 2022