



This manual contains important warnings and information.  
**READ AND KEEP FOR REFERENCE.**

INSTRUCTIONS

First choice when quality counts.™

Rev. E  
Supersedes Rev. A  
and PCNs B to D

## Dynamic Surge Suppressor

*For use with double-diaphragm pumps and low-pressure reciprocating pumps*

100 psi (0.7 MPa, 7 bar) Maximum Fluid Working Pressure

100 psi (0.7 MPa, 7 bar) Maximum Air Inlet Pressure

### Model 224-892, Series A

aluminum, with PTFE diaphragm

### Model 224-893, Series A

aluminum, with buna-N diaphragm

### Model 224-894, Series A

stainless steel, with PTFE diaphragm

### Model 224-895, Series A

stainless steel, with buna-N diaphragm

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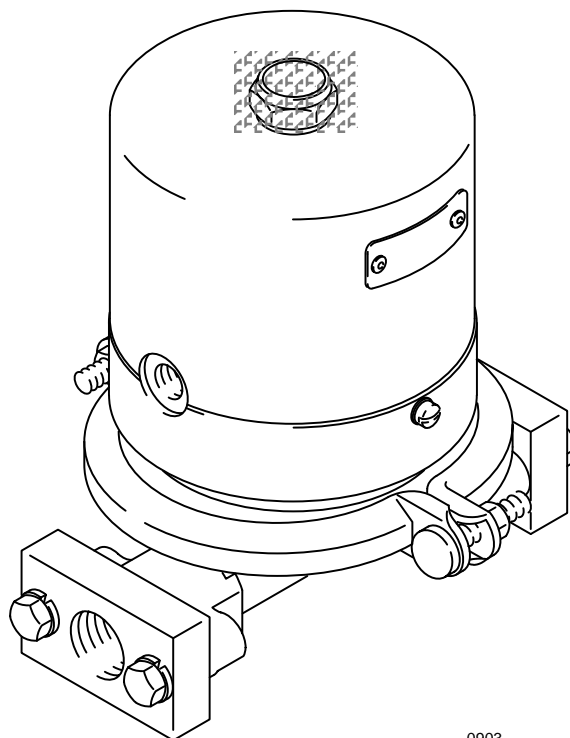
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## ⚠ WARNING

### Hazard of Using Fluids Containing Halogenated Hydrocarbons

Never use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in aluminum models 224-892 or 224-893. Such use could result in a chemical reaction, with the possibility of explosion, which could cause death, serious bodily injury, and/or substantial property damage.

Consult your fluid suppliers to ensure that the fluids being used are compatible with aluminum and zinc parts.



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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 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 not sure, 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 component in your system. See **Technical Data** on page 16.
- Use fluids and solvents that 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.
- 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



## TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.
- Graco does not manufacture or supply the reactive chemical components that may be used in this equipment and is not responsible for injury or property loss, damage, expense or claims (direct or consequential) that arise from the use of such chemical components.



## 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. See **Grounding** on page 4.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop pumping 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 pumped.
- Keep the work area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the work area.
- Extinguish all open flames or pilot lights in the work area.
- Do not smoke in the work area.
- Do not turn on or off any light switch in the work area while operating or if fumes are present.
- Do not operate a gasoline engine in the work area.
- Never use 1.1.1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.



## MOVING PARTS HAZARD

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

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing this surge tank, follow the **Pressure Relief Procedure** on page 4 to prevent the equipment from starting accidentally.

United States Government safety standards have been adopted under the Occupational Safety and Health Act. You should consult these standards—particularly the General Standards, Part 1910.

# Installation

## System Pressure

The maximum fluid working pressure of this surge suppressor is 100 psi (0.7 MPa, 7 bar) at 100 psi (0.7 MPa, 7 bar) incoming air pressure. **Never** exceed 100 psi (0.7 MPa, 7 bar) fluid or air pressure to the surge suppressor. **Do not** exceed the maximum working pressure of any component or accessory used in the system.

## Pressure Relief Procedure

### ⚠ WARNING

#### PRESSURIZED EQUIPMENT HAZARD

To reduce the risk of serious bodily injury, including splashing fluid or solvent in the eyes or on the skin, always follow this procedure before you check, adjust, clean, or repair any part of the system.

1. Close the air regulator by turning counterclockwise as far as possible.
2. Disconnect the air supply line to the surge suppressor.
3. Open the dispensing valve, if used.
4. Open the fluid drain valve to relieve all fluid pressure; have a container ready to catch the drainage.

## Fluid Compatibility

**Be sure** all fluids and solvents used are chemically compatible with the wetted parts and non-wetted parts shown in the **Technical Data** section on page 16. Failure of the diaphragm may cause non-wetted parts to be exposed to fluid. Always read the fluid and solvent manufacturer's literature before using them with this equipment.

## Grounding

### ⚠ WARNING

This equipment must be grounded. Read and carefully follow the text of **FIRE AND EXPLOSION HAZARD** on page 3 before operating the surge suppressor.

Static electricity is created by the fluid flowing through the pump and hose. If the equipment is not properly grounded, sparking may occur, and the system may become hazardous. Sparks can ignite fumes from solvents and the fluid being pumped, dust particles,

and other flammable substances, whether you are pumping 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 pumping immediately**. Do not use the system again until the problem has been identified and corrected.

To reduce the risk of static sparking, ground the pump, surge suppressor, and all other equipment used or located in the pumping area. Check your local electrical code for detailed grounding instructions for your area and type of equipment. **Ground all of this equipment:**

- *Pump:* See your separate pump instruction manual.
- *Surge suppressor:* Secure a ground wire (Y) to the surge suppressor with the grounding screw (Z) located on the side of the housing. See Fig. 1. Connect the clamp end of the ground wire to a true earth ground. To order a ground wire and clamp, order Part No. 208–950.
- *Air and fluid hoses:* Use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.
- *Air compressor:* Follow the manufacturer's recommendations.
- *All solvent pails used when flushing:* Follow the local code. *Use only metal pails*, which are conductive. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.
- *Fluid supply container:* Follow the local code.

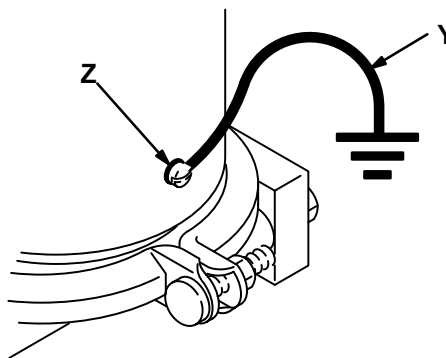
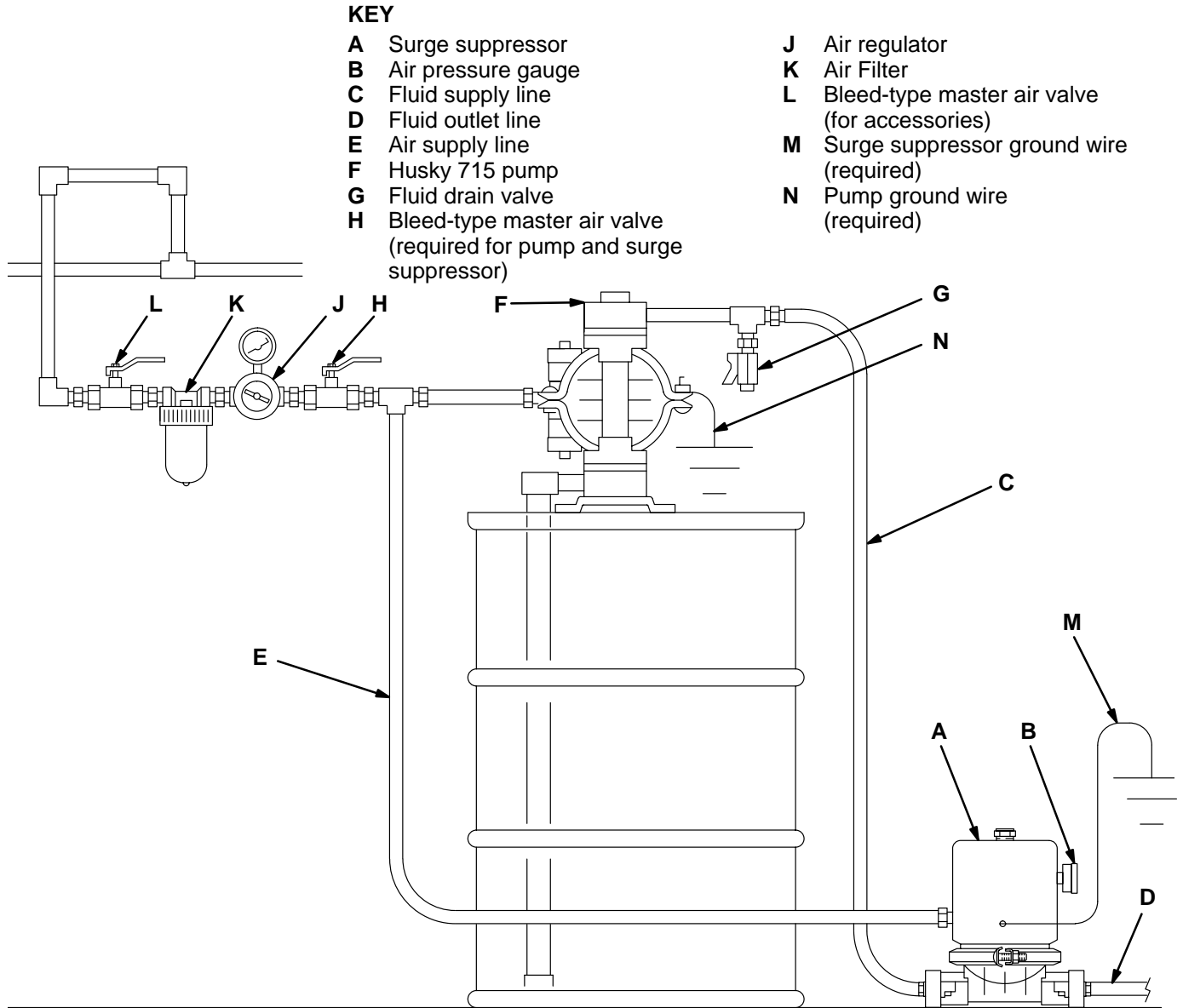


Fig. 1

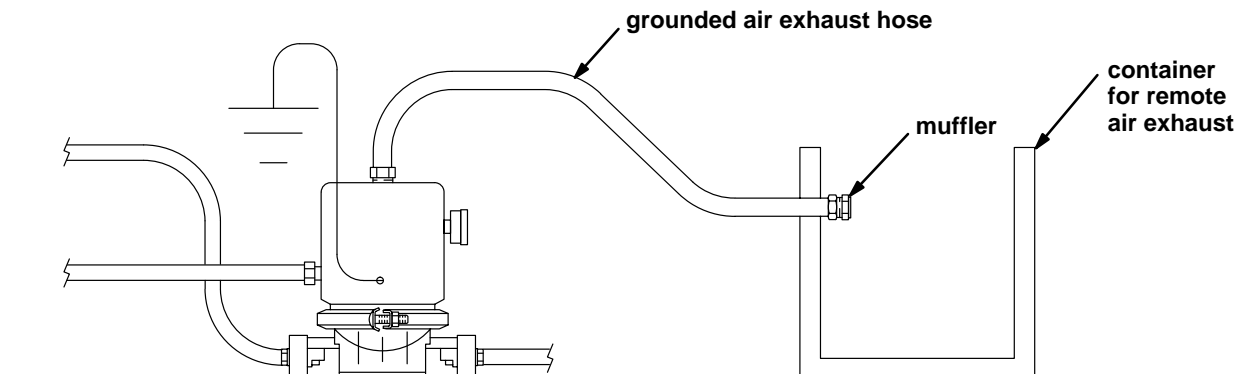
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# Installation

The installation shown below is only a guide for selecting and installing system components; it is not an actual system design. Contact your Graco distributor for assistance in planning a system to suit your needs.



## DETAIL A: Venting Exhaust Air to a Remote Container



0906

# Installation

## General Information

The surge suppressor uses air pressure and a diaphragm to maintain a consistent fluid outlet pressure from a double diaphragm or low-pressure reciprocating pump. During normal flow, the suppressor air pressure and fluid pressure are in equilibrium. A sharp increase in fluid pressure causes the air inlet port to open, increasing air pressure on the diaphragm and returning the system to equilibrium. Conversely, a sharp decrease in fluid pressure causes the air exhaust port to open, decreasing air pressure on the diaphragm and allowing the system to return to equilibrium.

## Installation

1. Read this entire manual before installing or operating the surge suppressor.
2. The surge suppressor fluid inlet must be connected to the pump's fluid outlet. **If the pump is aluminum or steel**, the surge suppressor may be plumbed directly to the outlet, using 3/4 npt fittings. **If the pump is acetal or polypropylene**, place the surge suppressor on the floor or some other solid, level surface near the pump, and connect the surge suppressor inlet to the pump outlet with a 3/4" ID hose and 3/4 npt fittings.

### CAUTION

Do not plumb the surge suppressor directly onto the fluid outlet of an acetal or polypropylene pump. Those pumps cannot support the weight of the suppressor and will suffer damage or rupture.

3. Connect an air line from the pump's air regulator to the air inlet of the surge suppressor. In systems using a 1:1 ratio pump, the air pressure supplied to the suppressor will be the same as that supplied to the pump.
4. Use a compatible, liquid thread sealant on all male threads. Tighten all connections firmly to avoid air or fluid leaks.

### CAUTION

To avoid pump damage, do not overtighten the fittings to the pump.

## Air Exhaust Ventilation

### WARNING

Be sure to read **TOXIC FLUID HAZARD** and **FIRE AND EXPLOSION HAZARD** on page 3, before operating this equipment.

Be sure the system is properly ventilated for your type of installation. When pumping flammable or hazardous fluids, you must vent the surge suppressor exhaust air to a safe place, away from people, animals, food handling areas, and all sources of ignition. If the diaphragm ruptures, the fluid will be exhausted along with the air. Place a container at the end of the air exhaust line to catch the fluid. See **Detail A** on page 5.

The minimum size for the air exhaust hose is 3/8 in. (10 mm) ID x 15 ft (4.6 m). If a longer hose is required, use a larger diameter hose.

1. Remove the muffler from the surge suppressor exhaust port. Install an exhaust hose in the exhaust port, and connect the muffler to the other end of the hose. Avoid sharp bends or kinks in the hose. See **Detail A** on page 5.
2. Place a container at the end of the air exhaust line to catch fluid in case the diaphragm ruptures.

### WARNING

**Never** operate the surge suppressor without the muffler or an air exhaust line installed in the air exhaust port. If the air exhaust port is left open and the diaphragm shaft works loose from the bolt, the shaft could be propelled out of the housing, causing injury.

# Operation and Maintenance

## Operating the Surge Suppressor

1. Be sure the system is properly grounded. Read and follow **FIRE AND EXPLOSION HAZARD**, on page 3.
2. Check all fittings to be sure they are tight. Be sure to use a compatible liquid thread sealant on all male threads, and do not overtighten the fittings into the pump.
3. Check that the muffler or air exhaust line is securely connected to the air exhaust port on the top of the housing.

### WARNING

**Never** operate the surge suppressor without the muffler or an air exhaust line installed in the air exhaust port. If the air exhaust port is left open and the diaphragm shaft works loose from the bolt, the shaft could be propelled out of the housing, causing injury.

4. Start the pump as explained in your separate pump manual. In systems using a 1:1 ratio pump, the air pressure supplied to the suppressor will be the same as that supplied to the pump.
5. Allow the pump to cycle slowly until all air is pushed out of the surge suppressor and lines, and the pump is primed. The system is now ready for normal operation.

### NOTES:

When using a pump with a ratio greater than 1:1, the air pressure supplied to the surge suppressor and the air pressure supplied to the pump must be at the same ratio as the pump to prevent overpressurization of the surge suppressor. See the following examples.

- In a system using a 2:1 ratio pump, air pressure supplied to the surge suppressor should be **twice** as high as air pressure to the pump. If the air pressure supplied to the pump is 50 psi (0.34 MPa, 3.4 bar), you should supply 100 psi (0.7 MPa, 7 bar) air pressure to the surge suppressor.
- In a system using a 4:1 ratio pump, air pressure supplied to the surge suppressor should be **four times** as high as air pressure to the pump. If the air pressure supplied to the pump is 25 psi (0.17 MPa, 1.7 bar), you should supply 100 psi (0.7 MPa, 7 bar) air pressure to the surge suppressor.

### WARNING

To prevent overpressurization of the surge suppressor, **never** exceed 100 psi (0.7 MPa, 7 bar) fluid inlet pressure or 100 psi (0.7 MPa, 7 bar) air inlet pressure. In systems using pumps with a ratio greater than 1:1, reduce the air inlet pressure to the pump as necessary to keep the fluid and air inlet pressures to the surge suppressor within these limits.

### CAUTION

In systems using pumps with a ratio greater than 1:1, fluid may escape into the surge suppressor air line and contaminate the air supply if the diaphragm fails. Installation of a check valve in the air line will prevent fluid contamination of the air line.

## Flushing the System

Flush the system regularly, using a compatible solvent. Do not allow fluid to dry in the pump or surge suppressor. Always flush the pump and surge suppressor before storing them for any length of time.

Place the pump suction tube in the solvent container. Run the pump long enough to thoroughly clean it, the surge suppressor, hoses, and any guns or valves used in the system. Close the pump air regulator. Remove the suction hose from the solvent.

## Shutdown

Remove the suction hose from the fluid container and run the pump until the fluid is forced out of the system. Then shut off the air supply immediately.

# Troubleshooting

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 4.

### Relieve the pressure.

Check all possible problems and causes before disassembling the pump or surge suppressor.

PROBLEM	CAUSE	SOLUTION
Surge suppressor operates erratically	Clogged air line or air inlet	Inspect; clear.
	Air line connected to pressure gauge port	Connect air line to air inlet (see page 11).
	Clogged fluid supply line, fluid inlet or fluid outlet	Inspect; clear.
	Diaphragm (13 or 21†) ruptured	Replace. See page 9.
	Unbalanced air pressures between pump and surge suppressor	Ratio of air inlet pressure to surge suppressor and air inlet pressure to pump must be the same as pump ratio, but air pressure to surge suppressor must never exceed 100 psi (0.7 MPa, 7 bar). See page 7.
Air bubbles in fluid	Fluid supply line loose	Tighten.
	Diaphragm (13 or 21†) ruptured	Replace. See page 9.
	Manifold o-rings (16) leaking	Replace. See page 10.
Fluid in exhaust air	Diaphragm (13 or 21†) ruptured	Replace. See page 9.
	Diaphragm plates (12 or 32) loose or damaged	Tighten or replace. See page 9.
	Damaged shaft (11) or shaft o-rings (19)	Replace. See page 9.
Pump leaks air or fluid from cover (7)	V-clamp (6) is loose	Tighten V-clamp. See page 9.

† Ref. No. 21, PTFE diaphragm, is used only in Surge Suppressor Models 224–892 and 224–894.



# Service

## Servicing the Shaft O-Rings

1. Relieve the pressure.

### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 4.

2. Place a container under the surge suppressor, disconnect the hoses, and turn the surge suppressor on end to drain the fluid.
3. Remove the v-clamp (6). See the **Parts Drawing** on page 12.
4. Separate the housing (8) from the cover (7) to expose the diaphragm and shaft assembly. Pull the diaphragm and shaft out of the housing. See Fig. 2.
5. Remove the three o-rings (19) from the shaft (11).
6. Lubricate the three new o-rings (19\*) with lithium-based grease and install them in the grooves on the shaft.
7. Lubricate the inner diameter of the housing (8) with lithium-based grease. Slide the shaft and diaphragm assembly into the housing (8). Place the cover (7) on the housing (8).
8. Position the clamp (6) around the housing (8) and cover (7). Apply thread lubricant to the threads of the v-clamp, secure with the nuts, and torque to 6 to 10 ft-lb (1.4 to 13.6 N.m). See the **Parts Drawing** on page 12.

## Servicing the Diaphragm and Shaft

**NOTE:** Diaphragm Repair Kits are available. See page 14. Parts included in the kits are marked with asterisks. The kits include some parts which are not used on the surge suppressor. Use all the applicable parts in the kit for the best results.

1. Relieve the pressure.

### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 4.

2. Place a container under the surge suppressor, disconnect the hoses, and turn the surge suppressor on end to drain the fluid.
3. Remove the v-clamp (6). See the **Parts Drawing** on page 12.
4. Separate the housing (8) from the cover (7) to expose the diaphragm and shaft assembly. Pull the diaphragm and shaft out of the housing. See Fig. 2.
5. Hold the bolt (14) steady with a wrench. Wrap a rag around the shaft (11) to protect it, then unscrew the shaft from the bolt using locking pliers. Remove the nut (31), upper diaphragm plate (32\*), diaphragm (13), PTFE diaphragm (*Models 224–892 and 224–894 only*), lower diaphragm plate (12), and o-ring (15) from the bolt. Clean and inspect all parts for wear or damage.

# Service

6. Place the o-ring (15\*) on the bolt (14). Install the lower diaphragm plate (12), with the flat side facing down.
7. Install the diaphragm (13\*\*), making certain that the side marked AIR SIDE is facing up on the bolt. *On Models 224–892 and 224–894 only*, install the PTFE diaphragm (21\*\*) first, then the backup diaphragm (13\*\*).
8. Install the upper diaphragm plate (32\*) with the flat side facing up. Apply thread sealant to the bolt (14). Hold the bolt steady with a wrench, and screw the nut (31) onto the bolt (14). Torque to 5 to 7 ft-lb (7 to 10 N-m).
9. Wrap the shaft (11) with a rag to protect it, and use locking pliers to screw the shaft onto the bolt (14). Torque to 10 to 15 in-lb (1.1 to 1.7 N-m).
10. Lubricate the inner diameter of the housing (8) with lithium-based grease. Slide the shaft and diaphragm assembly into the housing (8). Place the cover (7) on the housing (8).
11. Position the clamp (6) around the housing (8) and cover (7). Apply thread lubricant to the threads of the v-clamp, secure with the nuts, and torque to 6 to 10 ft-lb (8 to 14 N.m). See the **Parts Drawing** on page 12.

## Servicing the Fluid Inlet and Outlet

**NOTE:** Repair Kits are available to service the internal parts of the fluid inlet and outlet. See page 14 for ordering information. Parts included in the kits are marked with three asterisks, for example (16\*\*\*). The kits include some parts which are not used on the surge suppressor. Use all the applicable parts in the kit for the best results.

1. **Relieve the pressure.**

### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 4.

2. Place a container under the surge suppressor, disconnect the hoses, and turn the surge suppressor on end to drain the fluid.
3. Remove the bolts (2), lockwashers (3), and nuts (1) holding one manifold (9) to the cover (7). Repeat for the other side. See Fig. 2.
4. Pull the two o-rings (16), guide (18) and stop (17) out of the cover (7). Repeat for the other side. Clean and inspect all parts for wear or damage.
5. Push one o-ring (16\*\*\*) all the way into the cavity of the cover (7). Install the stop (17\*\*\*) with the beveled side facing inward. Install the guide (18\*\*) with the flat end facing inward, then install the second o-ring (16\*\*\*) around the outer edge of the guide. Repeat for the other side.
6. Install the manifold (9) on the cover (7) with the chamfer facing outward. Secure with the bolts (2), lockwashers (3), and nuts (1). Torque to 3 to 6 ft-lb (4 to 8 N.m). Repeat for the other side.

# Service

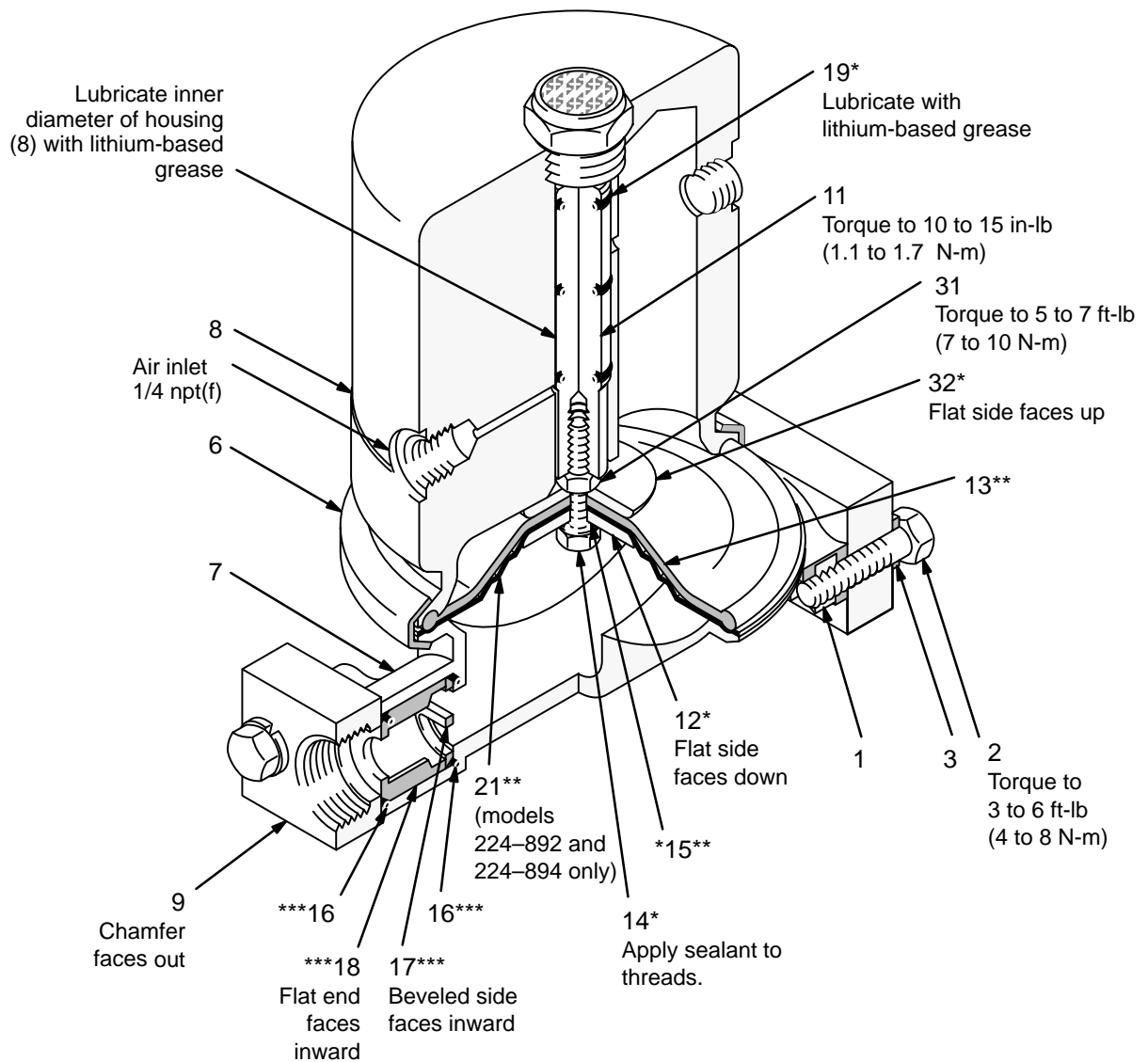


Fig. 2

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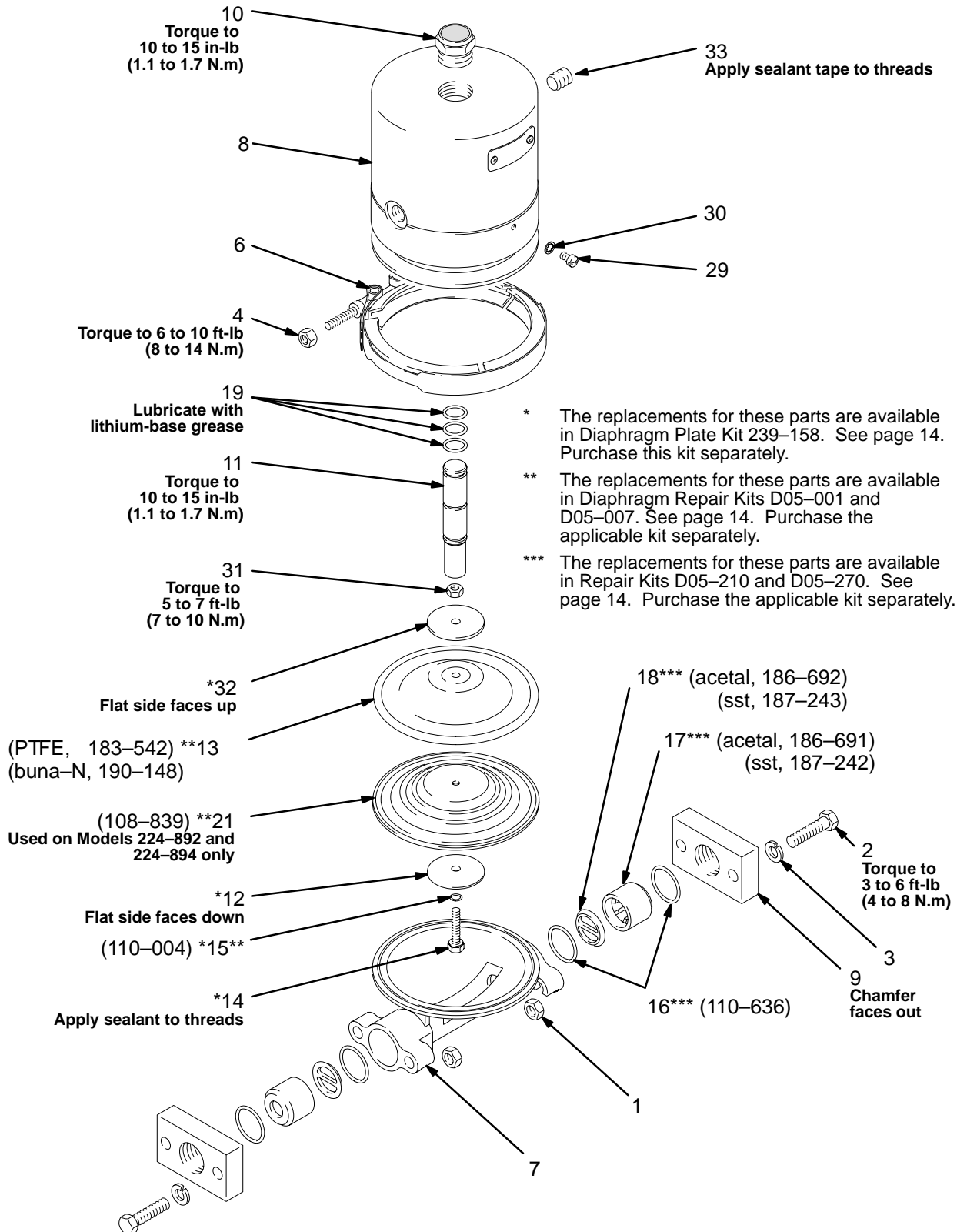
# Parts Drawing

Model 224–892, Series A, aluminum surge suppressor with PTFE diaphragm

Model 224–893, Series A, aluminum surge suppressor with buna–N diaphragm

Model 224–894, Series A, stainless steel surge suppressor with PTFE diaphragm

Model 224–895, Series A, stainless steel surge suppressor with buna–N diaphragm



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# Parts Lists

**Model 224–892, Series A**  
aluminum surge suppressor with PTFE diaphragm

**Model 224–893, Series A**  
aluminum surge suppressor with buna–N diaphragm

Ref No.	Part No.	Description	Qty
1	100–307	NUT, hex; 3/8–16 unc–2b	4
2	100–003	BOLT, cap, hex hd; 3/8–16 unc–2a x 1.5" long	4
3	111–203	LOCKWASHER; 3/8" size	4
4	112–499	NUT, hex; 5/16 18–8; silver-plate sst	1
6	189–540	V-CLAMP; sst	1
7	185–622	COVER; aluminum	1
8	187–476	HOUSING; aluminum	1
9	187–477	MANIFOLD; aluminum	2
10	111–530	MUFFLER	1
11	187–475	SHAFT; acetal	1
12	191–837*	PLATE, diaphragm, fluid side; sst	1
13	183–542**	DIAPHRAGM, backup; polyurethane; <i>used on Model 224–892 only</i>	1
	190–148**	DIAPHRAGM; buna–N; <i>used on Model 224–893 only</i>	1
14	113–901*	SCREW, cap, hex hd; 1/4–20 unc–2a x 1.25" long; sst	1
15	*110–004**	O-RING; PTFE	1
16	110–636***	O-RING; PTFE; <i>used on Model 224–892 only</i>	4
	110–636***	O-RING; buna–N; <i>used on Model 224–893 only</i>	4
17	186–692***	STOP, ball; acetal	2
18	186–691***	GUIDE, ball; acetal	2
19	111–532	O-RING; buna–N	3
21	108–839**	DIAPHRAGM; PTFE; <i>used on Model 224–892 only</i>	1
29	100–264	SCREW, machine, pan hd; 10–24 unc–2a x 5/16" long	1
30	100–718	LOCKWASHER, int tooth; no. 10	1
31	102–025	NUT, hex; 1/4–20; sst	1
32	191–741*	PLATE, diaphragm, air side; SST	1
33	100–721	PLUG, pipe, headless; 1/4 npt	1

\* The replacements for these parts are available in Diaphragm Plate Kit 239–158. See page 14. Purchase the kit separately.

\*\* The replacements for these parts are available in Diaphragm Repair Kits D05–001 and D05–007. See page 14. Purchase the applicable kit separately.

\*\*\* The replacements for these parts are available in Repair Kits D05–210 and D05–270. See page 14. Purchase the applicable kit separately.

**Model 224–894, Series A**  
stainless steel surge suppressor with PTFE diaphragm

**Model 224–895, Series A**  
stainless steel surge suppressor with buna–N diaphragm

Ref No.	Part No.	Description	Qty
1	100–307	NUT, hex; 3/8–16 unc–2b	4
2	100–003	BOLT, cap, hex hd; 3/8–16 unc–2a x 1.5" long	4
3	111–203	LOCKWASHER; 3/8" size	4
4	112–499	NUT, hex; 5/16 18–8; silver-plate sst	1
6	189–540	V-CLAMP; sst	1
7	187–241	COVER; stainless steel	1
8	187–476	HOUSING; aluminum	1
9	187–564	MANIFOLD; stainless steel	2
10	111–530	MUFFLER	1
11	187–475	SHAFT; acetal	1
12	191–837*	PLATE, diaphragm, fluid side; sst	1
13	183–542**	DIAPHRAGM, backup; polyurethane; <i>used on Model 224–894 only</i>	1
	190–148**	DIAPHRAGM; buna–N; <i>used on Model 224–895 only</i>	1
14	113–901*	SCREW, cap, hex hd; 1/4–20 unc–2a x 1.25" long; sst	1
15	*110–004**	O-RING; PTFE	1
16	110–636***	O-RING; PTFE; <i>used on Model 224–894 only</i>	4
	110–636***	O-RING; buna–N; <i>used on Model 224–895 only</i>	4
17	187–243***	STOP, ball; stainless steel	2
18	187–242***	GUIDE, ball; stainless steel	2
19	111–532	O-RING; buna–N	3
21	108–839**	DIAPHRAGM; PTFE; <i>used on Model 224–894 only</i>	1
29	100–264	SCREW, machine, pan hd; 10–24 unc–2a x 5/16" long	1
30	100–718	LOCKWASHER, int tooth; no. 10	1
31	102–025	NUT, hex; 1/4–20; sst	1
32	191–741*	PLATE, diaphragm, air side; SST	1
33	100–721	PLUG, pipe, headless; 1/4 npt	1

\* The replacements for these parts are available in Diaphragm Plate Kit 239–158. See page 14. Purchase the kit separately.

\*\* The replacements for these parts are available in Diaphragm Repair Kits D05–001 and D05–007. See page 14. Purchase the applicable kit separately.

\*\*\* The replacements for these parts are available in Repair Kits D05–210 and D05–270. See page 14. Purchase the applicable kit separately.

# Repair Kits

*Repair Kits must be purchased separately.*  
Use only genuine Graco parts and accessories.

The Ref. No. shown in the kits below correspond to the reference numbers used in the **Parts List** on page 13. For the best results, use all the parts in the kit, even if the old parts still look good.

## PTFE Diaphragm Kit D05001

For Models 224–892 and 224–894. Includes enough parts to service the surge suppressor twice.

Ref	No.	Part No.	Description	Qty.
	13	183–542	DIAPHRAGM, backup; polyurethane	2
	15	110–004	PACKING, o-ring	2
	16	110–636	PACKING, o-ring	8
	⌘	191–779	BEARING; acetal	2
	⌘	113–704	PACKING, o-ring; Viton®	2
	21	108–839	DIAPHRAGM; PTFE	2

⌘ These parts are not used with the surge suppressor.

## Buna-N Diaphragm Kit D05007

For Models 224–893 and 224–895. Includes enough parts to service the surge suppressor twice.

Ref	No.	Part No.	Description	Qty.
	13	190–148	DIAPHRAGM; buna-N	2
	15	110–004	PACKING, o-ring	2
	16	110–636	PACKING, o-ring	8
	⌘	191–779	BEARING; acetal	2
	⌘	113–704	PACKING, o-ring; Viton®	2

⌘ These parts are not used with the surge suppressor.

## PTFE Ball Repair Kit D05210

For Model 224–892 only. Includes enough parts to service the surge suppressor twice.

Ref	No.	Part No.	Description	Qty.
	15	110–004	PACKING, o-ring	2
	16	110–636	O-RING; PTFE	8
	17	186–691	GUIDE, ball; black acetal	4
	18	186–692	STOP, ball; black acetal	4
	⌘	108–639	BALL; 0.75"; PTFE	4

⌘ These parts are not used with the surge suppressor.

## Buna-N Ball Repair Kit D05270

For Model 224–893 only. Includes enough parts to service the surge suppressor twice.

Ref	No.	Part No.	Description	Qty.
	15	110–004	PACKING, o-ring	2
	16	110–636	PACKING, o-ring	8
	17	186–691	GUIDE, ball; black acetal	4
	18	186–692	STOP, ball; black acetal	4
	⌘	108–944	BALL; 0.75"; buna-N	4

⌘ These parts are not used with the surge suppressor.

## PTFE Ball Repair Kit D05310

For Model 224–894 only. Includes enough parts to service the surge suppressor twice.

Ref	No.	Part No.	Description	Qty.
	15	110–004	PACKING, o-ring	2
	16	110–636	O-RING; PTFE	8
	17	187–242	GUIDE, ball; stainless steel	4
	18	187–243	STOP, ball; stainless steel	4
	⌘	108–639	BALL; 0.75"; PTFE	4

⌘ These parts are not used with the surge suppressor.

## Buna-N Ball Repair Kit D05370

For Model 224–895 only. Includes enough parts to service the surge suppressor twice.

Ref	No.	Part No.	Description	Qty.
	15	110–004	PACKING, o-ring	2
	16	110–636	PACKING, o-ring	8
	17	187–242	GUIDE, ball; stainless steel	4
	18	187–243	STOP, ball; stainless steel	4
	⌘	108–944	BALL; 0.75"; buna-N	4

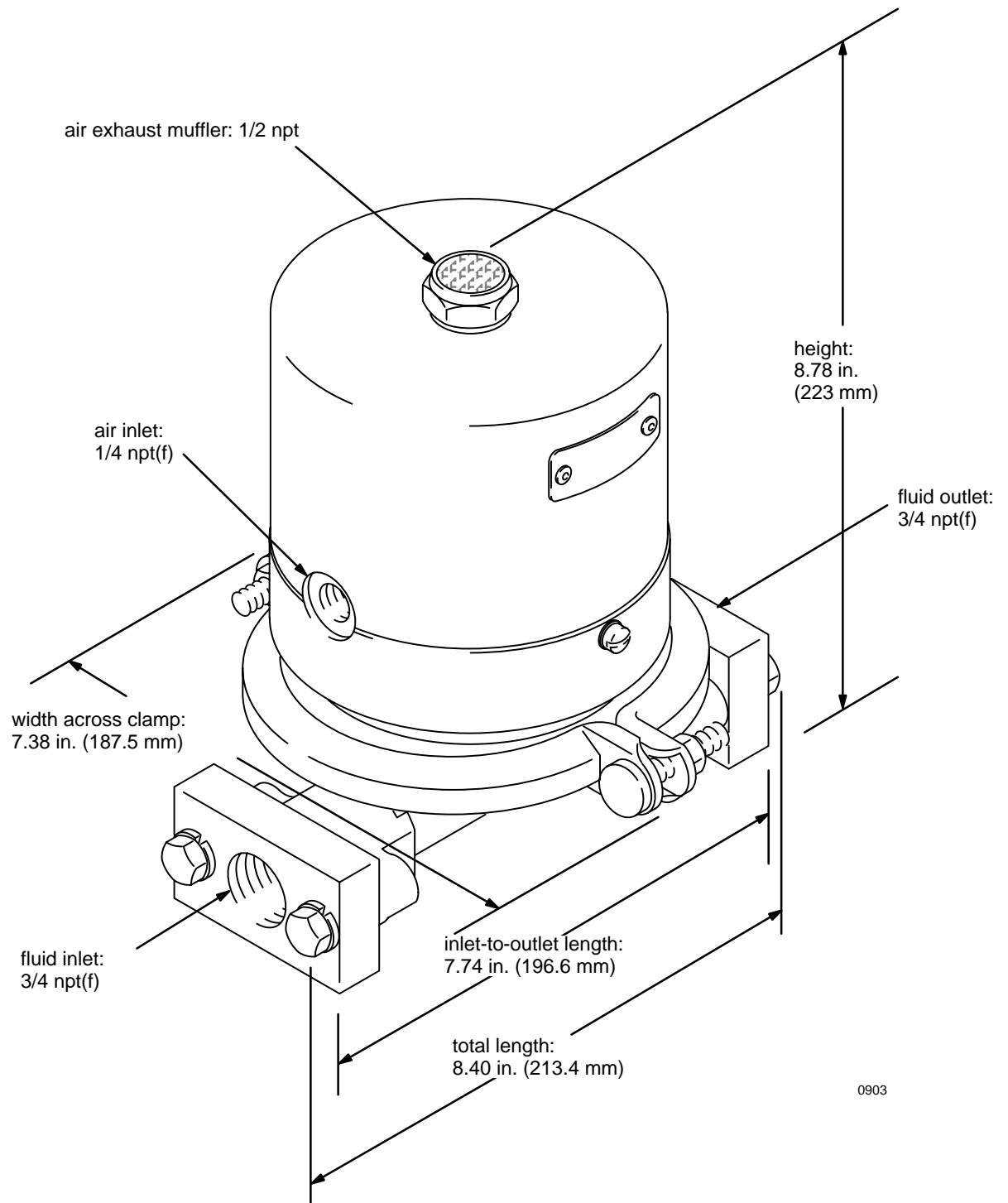
⌘ These parts are not used with the surge suppressor.

## Diaphragm Plate Kit 239–158

For all models.

Ref	No.	Part No.	Description	Qty.
	12	191–837	PLATE, diaphragm, fluid side	1
	14	113–901	SCREW, flange, hex-head; 1/4–20 x 1.25	1
	15	110–004	PACKING, o-ring; PTFE	1
	32	191–741	PLATE, diaphragm, air side	1

# Dimensional Drawing



# Technical Data

Maximum fluid working pressure .....	100 psi (0.7 MPa, 7 bar)
Air pressure operating range .....	25 to 100 psi (0.18 to 0.7 MPa, 1.75 to 7 bar)
Maximum free flow delivery .....	16 gpm (60 l/min)
Air inlet .....	1/4 npt(f)
Air exhaust .....	1/2 npt(f)
Fluid inlet. ....	3/4 npt(f)
Fluid outlet .....	3/4 npt(f)
Wetted parts .....	<i>Model 224–892:</i> acetal, aluminum, PTFE, 316 stainless steel <i>Model 224–893:</i> acetal, aluminum, PTFE, buna–N, 316 stainless steel <i>Model 224–894:</i> 316 stainless steel, PTFE <i>Model 224–895:</i> 316 stainless steel, buna–N, PTFE
Non-wetted Parts .....	<i>Models 224–892 and 224–894:</i> acetal, aluminum, buna–N, polyurethane, bronze, plated steel, polyester (labels) <i>Models 224–893 and 224–895:</i> acetal, aluminum, buna–N, bronze, plated steel, polyester (labels)
Weight .....	<i>Models 224–892 and 224–893:</i> 10 lb (4.6 kg) <i>Models 224–894 and 224–895:</i> 14 lb (6.4 kg)

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## Manual Change Summary

This manual went from Rev. A to Rev. E to make the following changes:

- PCNs B through D are incorporated into this revision.
- A new air-side diaphragm plate is added. See Ref. No. 32 in the **Parts List**.
- The quantity of Ref. No. 12, diaphragm plate, is changed from 2 to 1, and the Part No. is changed from 186–265 to Part No. 191–837.
- Newly configured kits are explained and listed on pages 12 through 14.
- Diaphragm Plate Kit 239–158 is added on page 14.



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[illegible]

[illegible]

# 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 by an authorized Graco distributor 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.

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