STAINLESS STEEL, WATERBASE-COMPATIBLE, HIGH PRESSURE
Fluid Pressure Regulators

For precise downstream pressure and flow control.

Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions. See page 2 for List of Models and Table of Contents.

Model 238890, 238892 (spring-operated)
Model 26A086 (acid compatible)

Model 238894 (air-operated)

U.S. Patent No. 4942899
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### List of Models

#### Spring-Operated Models

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Range</th>
<th>Maximum Fluid Inlet Pressure</th>
<th>Regulated Fluid Outlet Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>238889</td>
<td>with EZ Flush gauge port plug</td>
<td>Medium</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–3000 psi (3.4–21 MPa, 34–207 bar)</td>
</tr>
<tr>
<td>238890</td>
<td>with fluid pressure gauge</td>
<td>Medium</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–3000 psi (3.4–21 MPa, 34–207 bar)</td>
</tr>
<tr>
<td>238891</td>
<td>with EZ Flush gauge port plug</td>
<td>High</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>3000–5000 psi (21–34 MPa, 207–345 bar)</td>
</tr>
<tr>
<td>238892</td>
<td>with fluid pressure gauge</td>
<td>High</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>3000–5000 psi (21–34 MPa, 207–345 bar)</td>
</tr>
<tr>
<td>26A086</td>
<td>with gauge port</td>
<td>Medium</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500 – 3000 psi (3.4–21 MPa, 34–207 bar)</td>
</tr>
</tbody>
</table>

#### Air-Operated Models

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Range</th>
<th>Maximum Inbound Air Pressure</th>
<th>Maximum Fluid Inlet Pressure</th>
<th>Regulated Fluid Outlet Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>238893</td>
<td>with EZ Flush gauge port plug</td>
<td>Full</td>
<td>100 psi (0.7 MPa, 7 bar)</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–4000 psi (3.4–28 MPa, 34–276 bar)</td>
</tr>
<tr>
<td>238894</td>
<td>with fluid pressure gauge</td>
<td>Full</td>
<td>100 psi (0.7 MPa, 7 bar)</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–4000 psi (3.4–28 MPa, 34–276 bar)</td>
</tr>
<tr>
<td>244734</td>
<td>with EZ Flush gauge port plug</td>
<td>Full</td>
<td>100 psi (0.7 MPa, 7 bar)</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–4000 psi (3.4–28 MPa, 34–276 bar)</td>
</tr>
<tr>
<td>248090</td>
<td>with fluid pressure gauge (LASD)</td>
<td>Full</td>
<td>100 psi (0.7 MPa, 7 bar)</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–4000 psi (3.4–28 MPa, 34–276 bar)</td>
</tr>
<tr>
<td>255072</td>
<td>high resolution with pressure gauge</td>
<td>Full</td>
<td>100 psi (0.7 MPa, 7 bar)</td>
<td>6000 psi (41 MPa, 414 bar)</td>
<td>500–2700 psi (3.4–19 MPa, 34–190 bar)</td>
</tr>
</tbody>
</table>
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 kink or over bend the hose or use the hose to pull equipment.
- Do not exceed the maximum working pressure of the lowest rated component in your system. Do not exceed 6000 psi (41 MPa, 414 bar) maximum fluid inlet pressure of the regulator or the maximum working pressure of the lowest-rated component in your system.
- 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.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
**WARNING**

**SKIN INJECTION HAZARD**

Spray from the gun, leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. Get immediate surgical treatment.
- Do not point the gun at anyone or at any part of the body.
- Do not put your hand or fingers over the spray gun tip or extruder gun tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop dispensing.
- Follow the Pressure Relief Procedure on page 8 if the spray tip clogs and before cleaning, checking, or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Fluid hoses must have spring guards on both ends to help protect them from rupture caused by kinks or bends near the couplings.

**HALOGENATED HYDROCARBON HAZARD**

Never use 1,1,1–trichloroethane, methylene chloride, other halogenated hydrocarbon solvents, or fluids containing such solvents in these regulators. In the unlikely event that there is a diaphragm failure and the vent hole in the aluminum spring cap is plugged, a serious chemical reaction could occur, with the possibility of explosion, which could cause death, serious injury, and/or substantial property damage.

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

**TOXIC FLUID HAZARD**

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.
Important Acid Catalyst Information

Regulator model 26A086 is designed for acid catalyst (“acid”) currently used in two–component, wood finishing materials. Current acids in use (with pH levels as low as 1) are more corrosive than earlier acids. More corrosion–resistant wetted materials of construction are required, and must be used without substitution, to withstand the increased corrosive properties of these acids.

**WARNING**

Acid is flammable, and spraying or dispensing acid creates potentially harmful mists, vapors, and atomized particulates. To help prevent fire and explosion and serious injury:

- Read and understand the fluid manufacturer’s warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to the acid.
- Use only genuine, manufacturer’s recommended acid–compatible parts in the catalyst system (hoses, fittings, etc.). A reaction may occur between any substituted parts and the acid.
- To prevent inhalation of acid mists, vapors, and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied–air respirator. Ventilate the work area according to instructions in the acid manufacturer’s SDS.
- Avoid all skin contact with acid. Everyone in the work area must wear chemically impermeable gloves, protective clothing, foot coverings, aprons, and face shields as recommended by the acid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. Wash hands and face before eating or drinking.
- Regularly inspect equipment for potential leaks and remove spills promptly and completely to avoid direct contact or inhalation of the acid and its vapors.
- Keep acid away from heat, sparks, and open flames. Do not smoke in the work area. Eliminate all ignition sources.
- Store acid in the original container in a cool, dry, and well–ventilated area away from direct sunlight and away from other chemicals in accordance with acid manufacturer’s recommendation. To avoid corrosion of containers, do not store acid in substitute containers. Reseal the original container to prevent vapors from contaminating the storage space and surrounding facility.

Moisture Sensitivity of Acid Catalysts

Acid catalysts can be sensitive to atmospheric moisture and other contaminants.

**Notice**

Acid build–up will damage the seals and reduce the performance and life of the regulator. To prevent exposing acid to moisture:

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. Never store acids in an open container.
- Use only moisture–proof hoses compatible with acids.
- Always lubricate threaded parts with an appropriate lubricant when reassembling.
WARNING

Do not use PTFE tape on pipe threads. Such use could cause a hazardous condition due to loss of grounding continuity. Also, if pieces of the tape break off, the function of the regulator could be affected.

Fig. 1

The installations shown in Fig. 1 are only a guide for selecting and installing a circulating or direct system; they are not actual system designs. Contact your Graco distributor for assistance in designing a system to suit your needs.

NOTE: Before you install the regulator, thoroughly flush the system to remove metal chips and other contaminants. A fluid filter (D) of 60-mesh or finer should always be installed upstream of the regulator.

Connections

Install the fluid regulator (G) in the spray gun fluid supply line (F), as shown in the typical installation drawings on this page. Connect only one spray gun or dispensing valve to each fluid regulator.

Apply pipe sealant to the male pipe threads, and connect the fluid supply line (F) to the fluid regulator’s 3/8 npt(f) inlet. Connect the line from the gun (J) to the fluid regulator’s 3/8 npt(f) outlet. Install the gauge or plug into the 1/4 npt(f) gauge port.

Make sure the direction of fluid flow agrees with the IN and OUT markings on the regulator body.

Flush the System

The regulator was tested in lightweight oil. Flush the entire system with a solvent compatible with the fluid being dispensed. Then test the system.

Mounting Bracket

A Mounting Bracket is available for mounting the regulator. Order Part 222515 for the bracket and mounting hardware.
Installation

Grounding the System

**WARNING**

**FIRE AND EXPLOSION HAZARD**

Before operating the fluid pressure regulator, ground the system as explained below.

*Pump:* Use a ground wire and clamp. Loosen the grounding lug locknut (W) and washer (X). Insert one end of a 1.5 mm² (12 ga) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. Connect the other end of the wire to a true earth ground. Order Part 237569 Ground Wire and Clamp.

*Spray gun:* Ground through connection to a properly grounded fluid hose and pump.

*Fluid supply container:* Follow your local code.

*Object being sprayed:* Follow your local code.

*Solvent pails used when flushing:* Follow 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.

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

**Pressure Relief Procedure**

**WARNING**

**SKIN INJECTION HAZARD**

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. 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
- Check or service any of the system equipment
- Install or clean the spray tips

*Air and fluid hoses:* Use only electrically conductive hoses.

*Heaters, if used:* See the heater instruction manual.

*Air compressor:* Follow manufacturer’s recommendations.
Adjusting the System Pressure

⚠️ CAUTION

- The new system **must** be cleaned and tested thoroughly before admitting fluid to the regulator to avoid contaminants clogging or damaging the regulator.
- **Always** use the lowest possible air and fluid pressures for your application. High pressures can cause premature spray tip, regulator, and pump wear.

NOTE:

- The fluid pressure regulator controls pressure downstream from its outlet.
- If you are using an accessory fluid pressure gauge (H in Fig. 1), relieve the spray gun line pressure after you reduce the regulator pressure to ensure a correct gauge reading.

1. Make a note of the proper way to adjust pressure, from the following descriptions:
   - On a spring-operated regulator, turn the adjusting screw (10) **counterclockwise** to decrease pressure and **clockwise** to increase pressure to the spray gun or extruder gun.
   - On an air-operated regulator, increase supply air pressure to increase fluid pressure. Decrease supply air pressure to decrease fluid pressure. Supply air up to 100 psi (0.7 MPa, 7 bar). See the chart on page 22 for air versus fluid pressure.

NOTE: Air-operated regulator Models 238893 and 238894 are provided with an air supply regulator (31) to control the fluid set pressure. For increased sensitivity in pressure set point performance, an alternative air regulator, such as Part 206197, may be used. This alternative air regulator uses a sensitive diaphragm design to maintain a higher, more accurate air pressure setting.

2. Adjust the pump air pressure and fluid regulator for the desired spray pattern. Use the lowest possible air and fluid pressures for your application. For optimum performance, the inbound fluid pressure should be at least 500 psi (3.4 MPa, 34 bar) above the regulated fluid pressure.

**NOTE:** Do not exceed a 2000 psi (14 MPa, 138 bar) pressure drop between the regulator inlet and outlet. Excessive pressure drop will cause premature regulator component wear.

For example: With 3500 psi (24.5 MPa, 245 bar) to the regulator, the minimum regulated outlet pressure would be 1500 psi (10.5 MPa, 105 bar).

3. **In a circulating system,** also adjust the back pressure valve (K).

4. Record all the settings for future reference.

Cleaning the Regulator

**Do not** allow fluid to settle in the system.

Flush the regulator whenever the rest of the system is flushed (see page 10). Before you flush the system, follow the **Pressure Relief Procedure** on page 8, then completely decrease the regulated fluid pressure. See step 1 in Adjusting the System Pressure, at left.

Before you remove the regulator for thorough cleaning and inspection, follow the **Pressure Relief Procedure** on page 8. Then remove the regulator, clean it, and inspect all parts.
Operation

Flushing

- Flush before changing colors, before fluid can dry in the equipment, at the end of the day, before storing, and before repairing equipment.

- Flush at the lowest pressure possible. Check connectors for leaks and tighten as necessary.

- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.

1. Record the pressure adjustment setting of the fluid regulator before flushing.

2. Shut off the pump and relieve fluid pressure in the system by triggering the gun and opening the back pressure regulator or other bypass valve.

3. Never exceed the maximum working pressure of the lowest rated system component. Remove the gauge if the flushing pressure will exceed the gauge range.

4. Open the fluid regulator fully.
   - Spring Operated Regulators Only: Open the fluid regulator by turning the adjusting screw (10) fully clockwise.
   - Air Operated Regulator Only: Increase the air regulator setting to fully open the fluid regulator. You will have to reset the fluid regulator’s pressure setting after flushing.

5. Supply solvent to the system. Set pump to the lowest possible pressure, and start pump.

6. Flush until thoroughly clean.

7. Adjust the fluid regulator to the desired setting.
   - Spring Operated Regulators Only: Turn the adjustment screw (10) counterclockwise to return to the desired pressure setting.
   - Air Operated Regulator Only: Adjust the air regulator to return to the desired fluid pressure setting.
### Troubleshooting

**WARNING**

To reduce the risk of serious bodily injury, including skin injection, splashing in the eyes or on the skin, or injury from moving parts, always follow the **Pressure Relief Procedure** on page 5 whenever the pump is shut off, before installing, cleaning, adjusting, removing, or servicing the valve or any part of the system, and whenever you stop dispensing.

**NOTE:** Check all possible solutions in the chart below before you disassemble the regulator.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pressure regulation</td>
<td>Damaged diaphragm</td>
<td>Replace diaphragm.</td>
</tr>
<tr>
<td></td>
<td>Leaking or dirty seat</td>
<td>Replace cartridge, or clean seat.</td>
</tr>
<tr>
<td>No fluid flow</td>
<td>Damaged valve actuator</td>
<td>Replace valve actuator.</td>
</tr>
<tr>
<td>Pressure creeps above setting</td>
<td>Metal chip or contamination between ball and seat</td>
<td>Replace cartridge, or clean seat area.</td>
</tr>
<tr>
<td></td>
<td>Damaged diaphragm</td>
<td>Replace diaphragm.</td>
</tr>
<tr>
<td></td>
<td>Damaged o-ring or improper seal</td>
<td>Replace the o-ring under the seat.</td>
</tr>
<tr>
<td></td>
<td>Damaged or clogged air regulator or line (air-operated regulator only)</td>
<td>Clear obstruction in line. Service regulator if necessary.</td>
</tr>
<tr>
<td></td>
<td>Leaking or dirty seat</td>
<td>Replace cartridge, or clean seat.</td>
</tr>
<tr>
<td></td>
<td>Large change in inlet pressure</td>
<td>Stabilize regulator inlet pressure.</td>
</tr>
<tr>
<td>Pressure drops below setting</td>
<td>Empty/clogged supply line</td>
<td>Fill/flush supply line.</td>
</tr>
<tr>
<td></td>
<td>Damaged or clogged air regulator or line (air-operated regulator only)</td>
<td>Clear obstruction in line. Service regulator if necessary.</td>
</tr>
<tr>
<td></td>
<td>Using valve beyond its rated flow capacity</td>
<td>Install valve for each spray gun or dispensing valve.</td>
</tr>
<tr>
<td></td>
<td>Large change in inlet pressure</td>
<td>Stabilize regulator inlet pressure.</td>
</tr>
<tr>
<td>Fluid leaks from spring housing</td>
<td>Loose fluid housing</td>
<td>Tighten the four cap screws.</td>
</tr>
<tr>
<td></td>
<td>Damaged diaphragm</td>
<td>Replace diaphragm.</td>
</tr>
<tr>
<td>Chatter</td>
<td>Excessive pressure differential between pump and gun</td>
<td>Reduce pump pressure to not more than 2000 psi (14 MPa, 138 bar) greater than required gun pressure.</td>
</tr>
<tr>
<td></td>
<td>Excessive flow rate</td>
<td>Reduce fluid flow through regulator. Connect only one spray gun or dispensing valve to each fluid regulator.</td>
</tr>
</tbody>
</table>
Service

Service Kits

For the Fluid Diaphragm Repair Kit, order Part 238747. Parts included in this kit are marked with an asterisk, for example (7*), in the Parts Drawings and Lists on pages 15 and 17.

For the Cartridge Repair Kit, order Part 238748 for all models except 248090. Parts included in this kit are marked with a dagger, for example (3†), in the Parts Drawings and Lists on pages 15 and 17.

For the Cartridge Repair Kit for 248090, order Part 248098. Parts included in this kit are marked with a checkmark, for example (3/C0110), in the Parts Drawings and Lists on pages 15 and 17.

To convert from a spring-operated to an air-operated regulator, order the Air-Operated Conversion Kit, Part 238749. Parts included in this kit are marked with a double dagger, for example (37‡), in the Parts Drawings and Lists on pages 15 and 17.

NOTE: To convert from a medium-pressure-range, spring-operated model to a high-pressure-range, spring-operated model (or vice versa), order the appropriate spring (11) from the Parts List on page 16.

Installing the Air-Operated Conversion Kit

(See Parts Drawings on pages 15–17)

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 8.

2. On the spring-operated regulator, turn the adjusting screw (10) counterclockwise until it is loose enough to fully relieve the spring tension.

3. Use a strap wrench or an equivalent wrench to loosen and remove the spring cover (2), spring retainers (6 and 27), and spring (11).

4. Place the stabilizing spring (22) of the air-operated regulator on the piston rod (6). Install the conversion kit assembly onto the backing plate (8). Torque to 15 to 20 ft-lb (20 to 27 N•m).

5. Plumb an air line up to the 1/4 npt(m) threads of the nipple (35) on the air regulator.

6. Flush the system (see page 10), and set the regulator pressure by following the procedure in Adjusting the System Pressure on page 9.
Service

Replacing the Fluid Diaphragms

See Fig. 3, and follow the steps below. For parts that are not called out in Fig. 3, see the Parts Drawing on page 15.

1. **Relieve the pressure**, and remove the regulator from the fluid line.

   ![Diagram of regulator components]

   **WARNING**

   To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the Pressure Relief Procedure on page 8.

2. Turn the adjusting screw (10) *counterclockwise* until it is loose to fully relieve the spring tension.

3. Remove the four base housing screws (9) from the base housing (4), and pull the base housing free of the backing plate (8).

4. Remove the diaphragm and valve actuator subassembly (1, 7, 12, 13, and 19).

5. Clean and inspect the bore in the backing plate (8) for wear, and replace it if necessary.

6. Remove the o-ring (17) from the groove in the base housing (4), clean and inspect the base housing, and replace if necessary.

7. Install a new o-ring (17) in the groove in the base housing (4).

8. Lightly lubricate the backing plate (8) bore and plunger (7) with a lithium-based grease.

9. Install the new, pre-assembled diaphragm subassembly into the backing plate (8).

   **NOTE:** The diaphragms will have a bow in them before you install them.

10. Align the holes in the diaphragms with the backing plate (8).

11. Install the backing plate/diaphragms assembly over the base housing (4). Hold the backing plate (8) tightly against the base housing, and install the four base housing screws (9).

12. Torque the base housing screws (9) first to 20 to 25 ft-lb (27 to 34 N·m), then to 30 to 35 ft-lb (41 to 48 N·m) in the sequence shown in Fig. 3.
Service

Replacing the Cartridge

See Fig. 3, and follow the steps below. For parts that are not called out in Fig. 3, see the Parts Drawing on page 15.

**CAUTION**

Handle the hard carbide parts, which are the ball (16), valve actuator (1), and valve seat (14), carefully to avoid damaging them.

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 8.

2. Remove the cartridge assembly by loosening the valve housing (5) with a 6 mm hex wrench and pulling the cartridge assembly out of the base housing (4).

**NOTE:** The retaining nut (3) often loosens when removing the cartridge assembly from the base housing. Be sure to re-torque as described in step 4.

3. Inspect and clean the internal walls of the base housing (4).

**NOTE:** Be careful that you do not scrape or gouge the internal walls of the base housing, because they are sealing surfaces.

4. Re-torque the retaining nut (3) to 140 to 160 in-lb (16 to 18 N\(\cdot\)m).

**NOTE:** You must re-torque the retaining nut before you install it in the base housing in step 5.

5. Install the new cartridge assembly in the base housing (4), and torque the valve housing (5) to 30 to 35 ft-lb (41 to 48 N\(\cdot\)m).

**NOTE:** The valve seat (14) is double sided and may be reversed for extended life. The o-rings (15, 18 and 20) and ball (16) must be replaced.
Parts Drawing
Models 238889, 238890, 238891, 238892, and 26A086

238889 with EZ Flush gauge port plug
238890 with fluid pressure gauge
26A086 with 316 17–4 wetted parts for acid applications

Spring-Operated Regulator
500 to 3000 psi (3.4 to 21 MPa, 34 to 207 bar)
Regulated Fluid Outlet Pressure

Torque to 140 to 160 in-lb (16 to 18 N·m).

Torque Sequence for Regulator Base Housing Screws (9)

Apply lithium-based grease when reassembling.
Apply a fluid-compatible grease to aid in reassembly.
# Parts List

## Models 238889, 238890, 238891, 238892, and 26A086

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
<th>Ref.</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>*</td>
<td>ACTUATOR</td>
<td>1</td>
<td>18†</td>
<td>107079</td>
<td>O-RING, packing; PTFE 019</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>238858</td>
<td>COVER, spring</td>
<td>1</td>
<td>19</td>
<td>*</td>
<td>O-RING, packing; PTFE 013</td>
<td>1</td>
</tr>
<tr>
<td>3†</td>
<td>191577</td>
<td>NUT, spring retainer for Model 26A086</td>
<td>1</td>
<td>19</td>
<td>109450</td>
<td>O-RING, packing; PTFE 016</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17M079</td>
<td>NUT, spring retainer</td>
<td>1</td>
<td>20†</td>
<td>107079</td>
<td>SPRING, compression for Model 26A086</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>191578</td>
<td>BASE HOUSING; sst</td>
<td>1</td>
<td>4</td>
<td>17M080</td>
<td>BASE HOUSING; sst</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17M078</td>
<td>SPRING, compression for Model 26A086</td>
<td>1</td>
<td>5†</td>
<td>191579</td>
<td>VALVE HOUSING; sst</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17M080</td>
<td>BASE HOUSING; sst</td>
<td>1</td>
<td>6</td>
<td>191580</td>
<td>RETAINER, spring, guide</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17M080</td>
<td>BASE HOUSING; sst</td>
<td>1</td>
<td>7</td>
<td>*</td>
<td>PLUNGER, spring</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>191583</td>
<td>PLATE, backing</td>
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* Included in Fluid Diaphragm Repair Kit 238747 (Models 238889, 238890, 238891, and 238892) and Fluid Diaphragm Repair Kit 17M565 (Model 26A086)
† Included in Cartridge Repair Kit 238748 (Models 238889, 238890, 238891, and 238892) and Cartridge Repair Kit 17M566 (Model 26A086)

† To convert to a higher or lower pressure range, order one of the following compression springs:

- 113625: 500 to 3000 psi (3.4 to 21 MPa, 34 to 207 bar)
- 113626: 3000 to 5000 psi (21 to 34 MPa, 207 to 345 bar)
Parts Drawing
Models 238893, 238894, 248090, and 255072

238893 with EZ Flush gauge port plug
238894 with fluid pressure gauge
248090 with fluid pressure gauge for LASD material
255072 High Resolution
Air-Operated Regulator
100 psi (0.7 MPa, 7 bar)
Maximum Inbound Air Pressure
500 to 4000 psi (3.4 to 28 MPa, 34 to 276 bar)
Regulated Fluid Outlet Pressure

Torque to 25 to 30 in-lb (2.8 to 3.4 N·m).
Torque to 140 to 160 in-lb (16 to 18 N·m).
Torque to 15 to 20 ft-lb (20 to 27 N·m).
Torque to 30 to 35 ft-lb (41 to 48 N·m).
Torque first to 20 to 25 ft-lb (27 to 34 N·m), then to 30 to 35 ft-lb (41 to 48 N·m) in the sequence shown in DETAIL at left.
First torque to 30–33 in-lb (3.4–3.7 N·m) in alternating pattern then torque to 68–72 in-lb (7.7–8.1 N·m) in alternating pattern.
Apply lithium-based grease when reassembling.
Torque to 75 to 80 in-lb (8.4 to 9.0 N·m).

DETAIL
Torque Sequence for Regulator Base Housing Screws (9)

DETAIL OF MODEL 248090

06287
# Parts List

## Models 238893, 238894, 248090, and 255072

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
<th>Ref. No.</th>
<th>Part No.</th>
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* Included in Diaphragm Housing Repair Kit 16P596.
19

Parts Drawing
Model 244734

244734 with EZ Flush gauge port plug
Air-Operated Regulator, Full Range
100 psi (0.7 MPa, 7 bar)
Maximum Inbound Air Pressure
500 to 4000 psi (3.4 to 28 MPa, 34 to 276 bar)
Regulated Fluid Outlet Pressure

1 Torque to 25 to 30 in-lb (2.8 to 3.4 N·m).
2 Torque to 140 to 160 in-lb (16 to 18 N·m).
3 Torque to 15 to 20 ft-lb (20 to 27 N·m).
4 Torque to 30 to 35 ft-lb (41 to 48 N·m).
5 First torque to 30–33 in-lb (3.4–3.7 N·m) in alternating pattern then torque to 69–72 in-lb (7.7–8.1 N·m) in alternating pattern.
6 Apply lithium-based grease when reassembling.
7 Torque first to 20 to 25 ft-lb (27 to 34 N·m), then to 30 to 35 ft-lb (41 to 48 N·m) in the sequence shown in DETAIL at right.
8 Torque to 75 to 80 in-lb (8.4 to 9.0 N·m).
# Parts List
## Model 244734

<table>
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<th>Ref. No.</th>
<th>Part No.</th>
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* Included in Fluid Diaphragm Repair Kit 238747
† Included in Cartridge Repair Kit 248098
‡ Included in Air-Operated Conversion Kit 238749
◆ Included in Diaphragm Housing Repair Kit 16P596.
## Technical Data

<table>
<thead>
<tr>
<th>Model 238890</th>
<th>Model 238892</th>
<th>Models 238894, 248090, and 255072</th>
<th>Model 244734</th>
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<td>spring operated, with fluid pressure gauge</td>
<td>air operated, with fluid pressure gauge</td>
<td>air operated, with pressure sensor ports</td>
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<td><strong>Model 26A086</strong></td>
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<td>air operated, with pressure sensor ports</td>
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### Maximum fluid inlet pressure
- Model 238890: 6000 psi (41 MPa, 414 bar)
- Model 238892: 6000 psi (41 MPa, 414 bar)
- Models 238894, 248090, and 255072: 6000 psi (41 MPa, 414 bar)
- Model 244734: 6000 psi (41 MPa, 414 bar)

### Regulated fluid outlet pressure range
- Model 238890: 500–3000 psi (3.4–21 MPa, 34–207 bar)
- Model 238892: 3000–5000 psi (21–34 MPa, 207–345 bar)
- Models 238894, 248090, and 255072: 500–3000 psi (3.4–21 MPa, 34–207 bar)
- Model 244734: 500–4000 psi (3.4–28 MPa, 34–276 bar)

### Maximum inbound air pressure
- Model 238890: 100 psi (0.7 MPa, 7 bar)
- Model 238892: 100 psi (0.7 MPa, 7 bar)
- Models 238894, 248090, and 255072: 100 psi (0.7 MPa, 7 bar)
- Model 244734: 100 psi (0.7 MPa, 7 bar)

### Fluid inlet/outlet size
- Model 238890: 3/8 npt(f)
- Model 238892: 3/8 npt(f)
- Models 238894, 248090, and 255072: 3/8 npt(f)
- Model 244734: 1/2 npt(f) for 248090

### Gauge port size
- Model 238890: 1/4 npt(f)
- Model 238892: 1/4 npt(f)
- Models 238894, 248090, and 255072: 1/4 npt(f)
- Model 244734: 1/4 npt(f)

### Fluid pressure gauge
- Model 238890: 0–3000 psi (0–21 MPa, 0–207 bar)
- Model 238892: 0–5000 psi (0–34 MPa, 0–345 bar)
- Models 238894, 248090, and 255072: 0–5000 psi (0–34 MPa, 0–345 bar)
- Model 244734: —

### Maximum flow (in 65 cp material)
- Model 238890: 2 gpm (7.6 lpm)
- Model 238892: 2 gpm (7.6 lpm)
- Models 238894, 248090, and 255072: 2 gpm (7.6 lpm)
- Model 244734: 2 gpm (7.6 lpm)

### Maximum fluid viscosity
- Model 238890: up to 15,000 cp
- Model 238892: up to 15,000 cp
- Models 238894, 248090, and 255072: up to 15,000 cp
- Model 244734: up to 15,000 cp

### Maximum operating temperature
- Model 238890: 120° F (50° C)
- Model 238892: 120° F (50° C)
- Models 238894, 248090, and 255072: 120° F (50° C)
- Model 244734: 120° F (50° C)

### Weight (with gauge)
- Model 238890: 7.0 lb (3.2 kg)
- Model 238892: 7.0 lb (3.2 kg)
- Models 238894, 248090, and 255072: 11.7 lb (5.3 kg)
- Model 244734: 11.7 lb (5.3 kg)

### Fluid diaphragms
- Model 238890: PTFE with TPE backing
- Model 238892: PTFE with TPE backing
- Models 238894, 248090, and 255072: PTFE with TPE backing
- Model 244734: PTFE with TPE backing

### Wetted parts (all models)
- Model 238890: 304, 316, 17–4 passivated SST; nickel– and cobalt–bound tungsten carbide, PTFE for all models; ceramic for models 248090, 244734, and 255072 only.
- Model 238892: 304, 316, 17–4 SST, PTFE
- Models 238894, 248090, and 255072: 316, 17–4 SST, PTFE
- Model 244734: 316, 17–4 SST, PTFE

### Wetted parts (Model 26A086)
- Model 238890: 304, 316, 17–4 passivated SST; nickel– and cobalt–bound tungsten carbide, PTFE for all models; ceramic for models 248090, 244734, and 255072 only.
- Model 238892: 304, 316, 17–4 SST, PTFE
- Models 238894, 248090, and 255072: 316, 17–4 SST, PTFE
- Model 244734: 316, 17–4 SST, PTFE

### Adjustment tool (spring-operated models)
- Model 238890: 6 mm hex wrench
- Model 238892: 6 mm hex wrench
- Models 238894, 248090, and 255072: —
- Model 244734: —
Technical Data

Air Requirements for Air-Operated Regulators
(Model 238893, 238894, 248090, and 255072)

The following table shows the approximate air pressure needed to regulate the air-operated regulator to a given fluid outlet pressure.

<table>
<thead>
<tr>
<th>Air Pressure</th>
<th>Regulated Fluid Outlet Pressure</th>
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<td>28</td>
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<tr>
<td>49</td>
<td>0.34</td>
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<tr>
<td>70</td>
<td>0.48</td>
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<tr>
<td>90</td>
<td>0.62</td>
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<tr>
<td>100</td>
<td>0.68</td>
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Performance Chart

Fluid Pressure Regulators,
Models 238889 through 238894 and 248090 and 26A086

Test Conditions
Regulators tested in oil at 70°F (21°C) and at 6000 psi (41 MPa, 414 bar) inbound fluid pressure.

Key
- 65 cp oil
- 3000 cp oil
Dimensional Drawings

Models 238889 and 238891 with port plug
Models 238890, 238892, and 26A086 with gauge *(spring operated)*

A Height: 8.9 in. (225 mm)
B Diameter of base housing: 2.65 in. (70 mm)

Model 238893 with port plug
Model 238894 with gauge
Models 248090 and 255072 with gauge and 1/2 npt inlet and outlet ports *(air operated)*

A Height: 10.0 in. (254 mm)
B Diameter of diaphragm cover: 7.0 in. (179 mm)

Model 244734 *(air operated)*

A Height: 8.1 in. (206 mm)
B Diameter of diaphragm cover: 7.0 in. (179 mm)
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.

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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.

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612–623–6921
612–378–3505 Fax

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For patent information, see www.graco.com/patents.

Original instructions. This manual contains English. MM 308647

Graco Headquarters: Minneapolis
International Offices: Belgium, China, Japan, Korea

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