Instructions-Parts

Medium Pressure Back Pressure Regulators

3A7681B

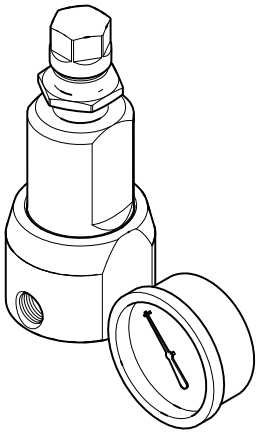
EN

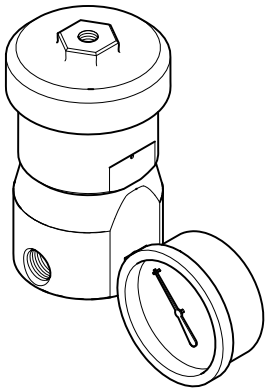
The back pressure regulator (BPR) controls fluid pressure and flow in circulation systems. For professional use only.

See page 2 for model information, including maximum working pressure and approvals.

Important Safety Instructions

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





Optional gauges are shown.

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Related Manuals

Manual in English	Description
3A4030	Intelligent Paint Kitchen
3A7709	Pneumatic Pump Control Module

Models

Part	Description	Flow Range	Regulated Fluid Pressure	Max. Fluid Inlet Pressure	Max. Air Working Pressure	Approvals
25T478	Back pressure regulator (BPR), low flow, medium press, pneumatic	0–5 gpm, 0–19 lpm	100–1000 psi (0.7–7 MPa, 7-70 bar)*	3000 psi (20.7 MPa, 207 bar)	100 psi (0.7 MPa, 7.0 bar)	CE Ex II 2 G Ex h IIB T6 Gb 0°C to 50°C **NOTE:** Type of Protection "h" applied is constructional safety "c."
25T477			250–2000 psi (1.7–13.8 MPa, 17-138 bar)			
25R490			250–3000 psi (1.7–20.7 MPa, 17–207 bar)			
25R491	Back pressure regulator (BPR), low flow, medium pressure, mechanical with locking nut		250–3000 psi (1.7–20.7 MPa, 17–207 bar)		------	

* Regulated range is 250–1000 psi (1.7–7 MPa, 17–70 bar) above 3 gpm (11 lpm).

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.

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:

- Use equipment only in well-ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking).
- Ground all equipment in the work area. See **Grounding** instructions.
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- **Stop operation immediately** if static sparking occurs or you feel a shock**.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

SKIN INJECTION HAZARD

High-pressure fluid from gun, 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. **Get immediate surgical treatment.**

- Do not spray without tip guard and trigger guard installed.
- Engage trigger lock when not spraying.
- Do not point gun at anyone or at any part of the body.
- Do not put your hand over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

⚠ 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.

TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read Safety Data Sheets (SDSs) to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

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.

Installation

The Typical Installation shown in Fig. 1 is only a guide to design a system. For assistance in designing a system to meet your needs, contact your Graco distributor.

Install the Back Pressure Regulator

Do not use PTFE tape on pipe threads. Such use could cause a loss of grounded continuity, which could lead to a fire or explosion caused by static. Also, if pieces of the tape break off, the function of the BPR could be affected.

1. Install the back pressure regulator (BPR) (A) in the Fluid Return Line (D) or circulation loop return line. See FIG. 1. Verify that the BPR is securely installed in a rigid piping system. If flexible fluid lines are used, the two 1/4 - 20 tapped mounting holes on the side of the regulator should be used to securely mount the regulator.

2. The BPR (A) has one 3/8 inch inlet port and one 1/4 inch gauge port. (The gauge port can be used as an optional inlet port for low flow applications.) The two outlet ports are 3/8 inch npt.

   Connect fluid lines to the inlet and outlet ports that are convenient for your installation. Make sure the fluid flow agrees with the IN and OUT markings on the BPR housing.

3. Install an accessory gauge, if used, in the 1/4 inch gauge port. Install plugs in the unused inlets and outlets.

4. If more than one spray station is used, install the BPR (A) in the Fluid Return Line (D) after the last spray station to maintain proper system pressures.

5. Install an air line to the top fitting on the BPR (A) for air piloted models. The Air Line (G) needs an Air Regulator (H) and Air Filter (not shown) to allow for the adjustment of the fluid pressure. The Air Filter is required to remove harmful dirt and moisture from the air supply. Install a Bleed Type Shut Off Valve (J) upstream of the air regulator.

Grounding

The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Install the BPR into piping that is properly grounded. Grounding provides an escape wire for the electric current.

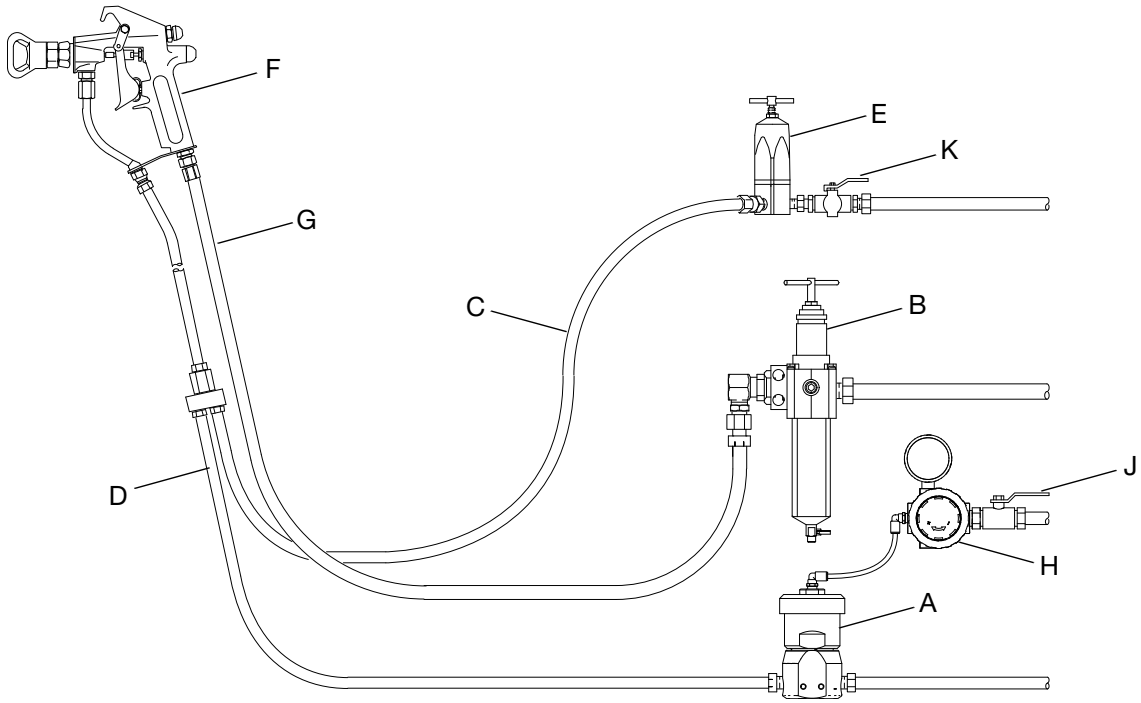


FIG. 1: Typical Installation: Single Circulating Spray Station

Key:

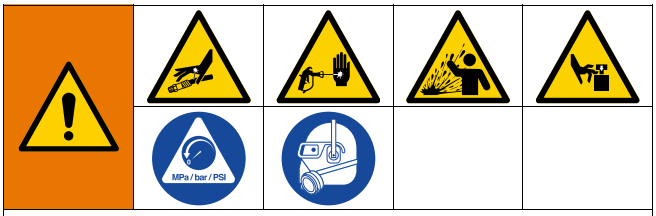
A Back Pressure Regulator (BPR)
B Air Filter/Regulator
C Fluid Supply Line
D Fluid Return Line
E Fluid Regulator
F Air-Assisted Airless Spray Gun
G Air Line
H Air Regulator (Pilot Air) (Air Filter not shown)
J Bleed Type Shut Off Valve (Air)*
K Shut Off Valve (Fluid)
L Drain Valve (not shown)*

* Required in your system.

Operation

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. Engage trigger lock.
2. Follow the recommended shut down procedure from the respective pump manual.
3. Close the Bleed Type Shut Off Valve (J) on the Air Regulator (H) to the pneumatic BPR to reduce fluid pressure to zero. Turn the adjusting screw on the mechanical BPR counterclockwise to reduce the fluid pressure to zero.
4. Disengage trigger lock.
5. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
6. Engage trigger lock.
7. Open the Drain Valve (L) (required in your system). Have a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to spray again.
9. If you suspect the spray tip or hose is clogged or that pressure has not been fully relieved:
   a. VERY SLOWLY loosen the tip guard retaining nut or the hose end coupling to relieve pressure gradually.
   b. Loosen the nut or the coupling completely.
   c. Clear the obstruction in the hose or tip.

Adjusting the BPR

The BPR controls pressure upstream from the BPR.

Adjust the pump fluid pressure and the BPR for the best spraying combination and proper circulation of the fluid.

- The pneumatic pilot operated BPR fluid pressure is adjusted by increasing or decreasing the pilot air pressure. The fluid to air pressure ratio ranges from 10:1 to 30:1 depending on the model chosen for the application. See **Technical Specifications**, page 14.
- The mechanical operated BPR fluid pressure is adjusted by rotating the adjusting screw clockwise to increase fluid pressure and counterclockwise to decrease fluid pressure.

Maintenance

To reduce the risk of serious bodily injury, including fluid injection or splashing in the eyes or on the skin, always follow the **Pressure Relief Procedure** before adjusting, cleaning, repairing, or removing the BPR from the system.

Never completely remove the adjusting screw when system pressure is present.

Flush the Equipment

Flush the BPR whenever the rest of the system is flushed. Before flushing, fully open the BPR by reducing pilot air pressure to zero or turning the adjusting screw counterclockwise to reduce pressure to zero.

NOTE: Do not allow paint or solvent to remain in the system for a long time. Fluid could dry on the piston, causing leakage at the piston packing. If leakage occurs, disassemble and clean the BPR.

Cleaning

Regular cleaning and inspection, and lubrication of the BPR are necessary to keep the BPR working properly.

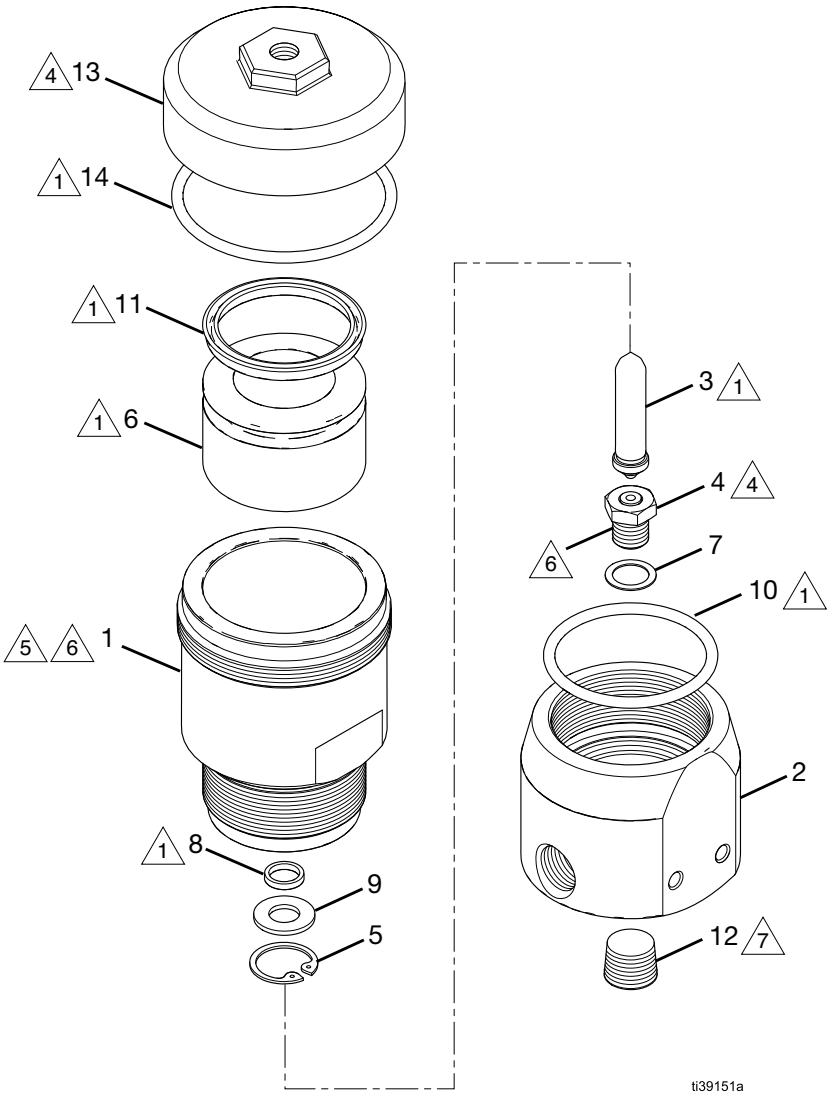
1. Follow the **Pressure Relief Procedure** on page 7.
2. Remove the BPR from the system.
3. Disassemble the BPR, referring to the parts drawings on pages 9 and 11. Clean and inspect all parts.

NOTICE

Use special care when handling the hard carbide portions of the piston (3) and seat (4). Damage causes poor operation and leakage.

Parts

25R490, 25T477, 25T478 Lower Flow Medium Pressure BPR, Pneumatic



1 Apply NLGI Grade 2 grease (Chevron SRI).

4 Torque to 175–200 in-lbs (20–23 N•m).

5 Torque to 60–70 ft-lbs (81–95 N•m).

6 Apply metal assembly paste to threads (Molykote® G-N paste).

7 Apply thread sealant.

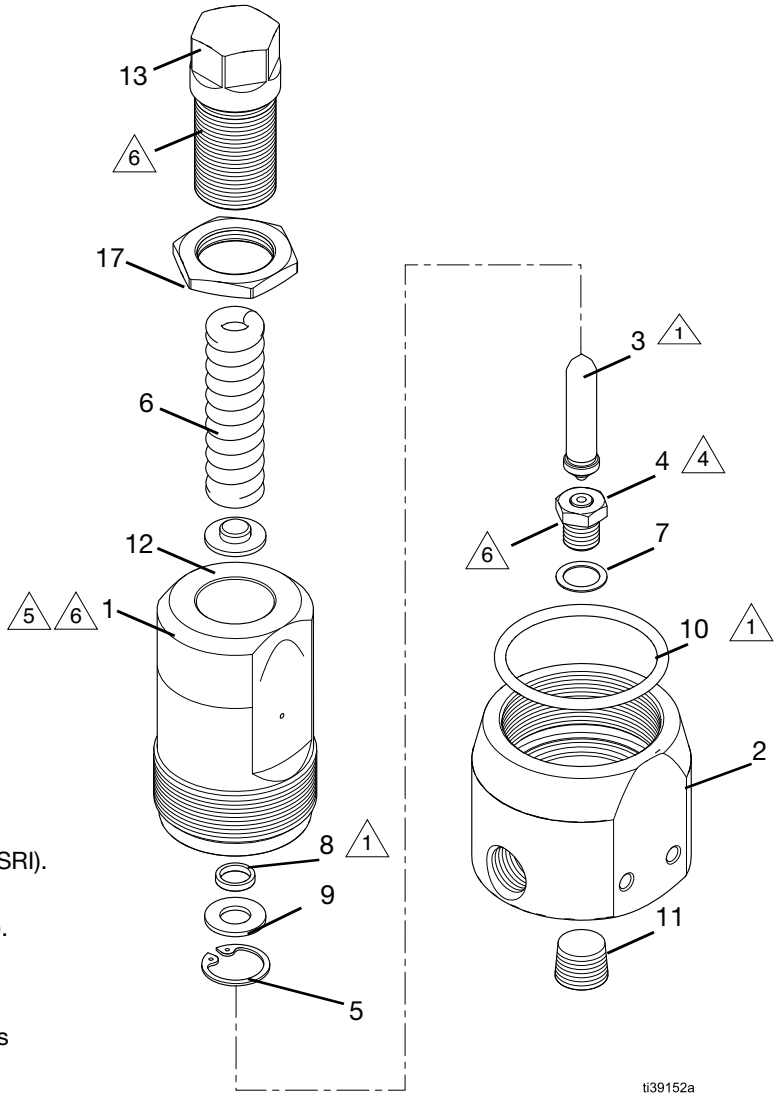
FIG. 2: Lower Flow Medium Pressure BPR, Pneumatic (25R490 shown)

Ref.	Part	Description	Qty.
1	19Y871	(25R490) CYLINDER, REGULATOR, BP, MEDIUM PRESS, 30:1	1
	19B727	(25T477) CYLINDER, REGULATOR, BP, MEDIUM PRESS, 20:1	1
	19B728	(25T478) CYLINDER, REGULATOR, BP, MEDIUM PRESS, 10:1	1
2	19Y873	HOUSING, REGULATOR, BP, MEDIUM PRESS	1
3**	238932	PISTON, VALVE	1
4**	238933	SEAT, VALVE	1
5	113751	RING, RETAINING, INTERNAL	1
6	19Y810	(25R490) PISTON, AIR, ACTUATOR, REGULATOR, BP	1
	19B729	(25T477) PISTON, AIR, ACTUATOR, REGULATOR, BP, 20:1	1
	19B730	(25T478) PISTON, AIR, ACTUATOR, REGULATOR, BP, 10:1	1
7**	189817	GASKET	1
8**^	111796	SEAL, U-CUP	1
9	171885	WASHER	1
10**^	166985	PACKING, O-RING	1
11**	19B484	(25R490) SEAL, U-CUP, SYMETRIC, BEVEL, LITE	1
**	113249	(25T477) PACKING, U-CUP	1
**	112181	(25T478) SPACKING, U-CUP	1
12	101748	PLUG, PIPE SST	1
13	19Y872	(25R490) COVER, REGULATOR, BP, AIR, UPPER, MP	1
	19B731	(25T477, 25T478) COVER, REGULATOR, BP, AIR, MED PRESS	1
14	109458	(25R490) PACKING, O-RING	1
	156594	(25T477, 25T478) PACKING, O-RING	1
18	101970	PLUG, PIPE, HDLS, optional if gauge is not used (not shown)	1

** *These parts are included in Repair Kit 239000. Some parts may not be used.*

^ *These parts are included in Repair Kit 17M564. Some parts may not be used.*

25R491 Lower Flow Medium Pressure BPR, Mechanical



1 Apply NLGI Grade 2 grease (Chevron SRI).

4 Torque to 175–200 in-lbs (20–23 N•m).

5 Torque to 60–70 ft-lbs (81–95 N•m).

6 Apply metal assembly paste to threads (Molykote® G-N paste).

7 Apply thread sealant.

FIG. 3: 25R491 Lower Flow Medium Pressure BPR, Mechanical

Ref.	Part	Description	Qty.
1	19C099	CYLINDER, VALVE	1
2	19Y873	HOUSING, BPR, MEDIUM PRESS	1
3**	238932	PISTON, VALVE	1
4**	238933	SEAT, VALVE	1
5	113751	RING, RETAINING, INTERNAL	1
6	166986	SPRING, HELICAL	1
7**	189817	GASKET	1
8**^	111796	SEAL, U-CUP	1
9	171885	WASHER	1
10**^	166985	PACKING, O-RING	1
11	101748	PLUG, PIPE SST	1
12	166988	GUIDE, SPRING	1
13	20A104	ADJUSTER, SCREW, BPR, SPRING	1
14	101970	PLUG, PIPE, HDLS, optional if gauge is not used (not shown)	1
17	20A105	NUT, LOCK, REGULATOR, BPR	1

** *These parts are included in Repair Kit 239000. Some parts may not be used.*

^ *These parts are included in Repair Kit 17M564. Some parts may not be used.*

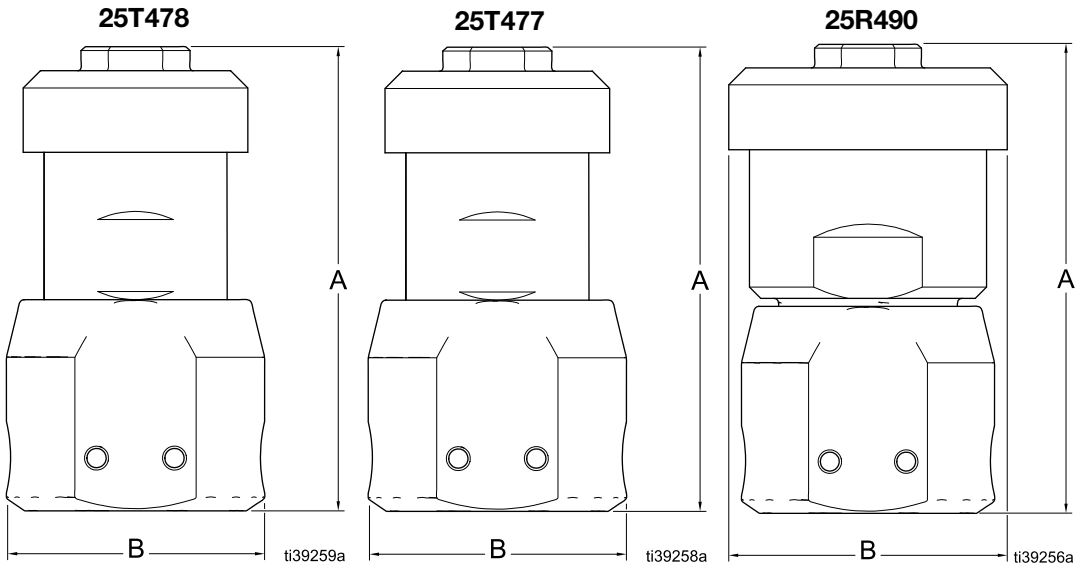
Accessories

Stainless Steel Gauges

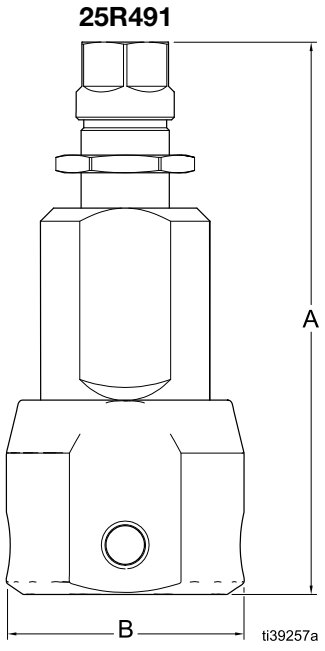
Part Number	Inlet	Maximum WPR			Wetted Parts	Case Description	Case & Dial Diameter (in/mm)	Mount Style
		psi	bar	MPa				
105770	1/4 in. npt(m)	1000	69	6.9	Brass	SST liquid filled	2.5 (64)	Bottom
17L706	1/4 in. npt(m)	3000	200	20	SST	SST liquid filled	2.5 (64)	Bottom

Dimensions

Air Operated Type



Mechanical



Part	Description	A	B
25T478	Air Operated Type	4.84 in. (123 mm)	2.38 in. (60 mm)
25T477		4.84 in. (123 mm)	2.38 in. (60 mm)
25R490		4.84 in. (123 mm)	2.38 in. (60 mm)
25R491	Mechanical Type	6.25 in. (159 mm)	2.38 in. (60 mm)

Technical Specifications

Medium Pressure Back Pressure Regulator		
	US	Metric
Maximum fluid inlet pressure	3000 psi	21 MPa, 207 bar
Maximum air pressure (Air Operated Type)	100 psi	0.7 MPa, 7 bar
Regulated fluid pressure range		
25T478 (10:1)	100–1000 psi*	7–70 bar*
25T477 (20:1)	250–2000 psi	17–138 bar
25R490 (30:1)	250–3000 psi	17–207 bar
25R491 (mechanical)		
Flow range	0–5 gpm	0–19 lpm
Maximum fluid temperature	122°F (50°C)	
Maximum recommended viscosity	200–250 cP (depending on flow rate)	
Inlet/Outlet Sizes		
Air inlet size	1/4 in. npt(m)	
Gauge port size	1/4 in. npt(f)	
Inlet (all models)	(1) 3/8 in. npt(f), (1) 1/4 in. npt(f) gauge port	
Outlet size (all models)	(2) 3/8 in. npt(f)	
Weight		
25T478 (10:1)	4.0 lb	1.8 kg
25T477 (20:1)	3.7 lb	1.7 kg
25R490 (30:1)	4.7 lb	2.1 kg
25R491 (mechanical)	4.5 lb	2.0 kg
Noise		
Sound pressure level at maximum flow rate	Less than 75 dB(A)	
Materials of Construction		
Wetted parts	Stainless steel, tungsten carbide, PTFE, acetal homopolymer	

* Regulated range is 250–1000 psi (1.7–7 MPa, 17–70 bar) above 3 gpm (11 lpm).

Molykote® is a registered trademark of the Dow Corning Corporation.

California Proposition 65

CALIFORNIA RESIDENTS

⚠ **WARNING:** Cancer and reproductive harm – www.P65warnings.ca.gov.

Notes

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.

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For patent information, see www.graco.com/patents.
TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.
Toll Free Phone Number : 1-800-328-0211

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Original instructions. This manual contains English. MM 3A7681
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