

PROPORTION *AR*



PSR Series Volume Boosters

Versatile and reliable, PSR series volume boosters (also known as pilot-operated regulators) can be used alone or paired with a pressure regulator to provide controlled pressure with a much higher flow rate.

Increase Productivity • Reduce Energy Costs • Reduce Cycle Times

Features

- Quick response
- Flows to 700 scfm
- High relief flow
- Balanced valve design
- Control pressures to 200 psig
- Non-air consuming in steady state
- Threaded relief port

Sizes



PSR2
1/4" Port



PSR3
3/8" Port



PSR4
1/2" Port



PSR6
3/4" Port



PSR8
1" Port



PSRA
1-1/4" Port



PSRB
1-1/2" Port

Not shown to scale

Installation and Operation

INSTALLATION

*Pilot signal: Proportion-Air control valve**

A. Proportion Air control valve & PSR volume booster ordered as an assembly:
(Refer to figure 2 for port locations)

1. Plug unused gage ports.
2. Connect primary air to the IN port of the PSR
3. Connect OUT port of PSR to process being controlled.
4. Install a muffler in the EXHAUST port to protect internal parts from contamination and to reduce noise.
5. Before turning on system pressure, make sure dome pressure is 0 psig. Turn on system pressure and increase the analog signal to Proportion-Air control valve until the desired downstream pressure of the PSR volume booster is reached.

B. Proportion Air control valve & PSR volume booster NOT ordered as an assembly:
(Refer to figure 2 for port locations)

1. Plug unused gage ports.
2. Plumb the output of the control valve to the pilot port of the PSR using 1/4" OD tubing.
3. Connect primary air to the IN port of both the PSR and the control valve.
4. Follow step 3, 4 & 5 in section A.

*An adjustable manual regulator can also be used as the pilot signal.

OPERATION

With pressure supplied to the volume booster supply port and no signal, the valve (B) is closed. Pressurizing the pilot port applies a load to diaphragm (A). This load causes the diaphragm, valve stem (C) and valve to move downward, allowing flow across the seat area between the valve and the body. Pressure in the output line is sensed below the diaphragm via the sense port (D), and offsets the load on the diaphragm. As output pressure rises, the valve, valve stem and diaphragm move upward until the area is closed, causing the pilot pressure load on the diaphragm and the pressure load under the diaphragm to be in balance.

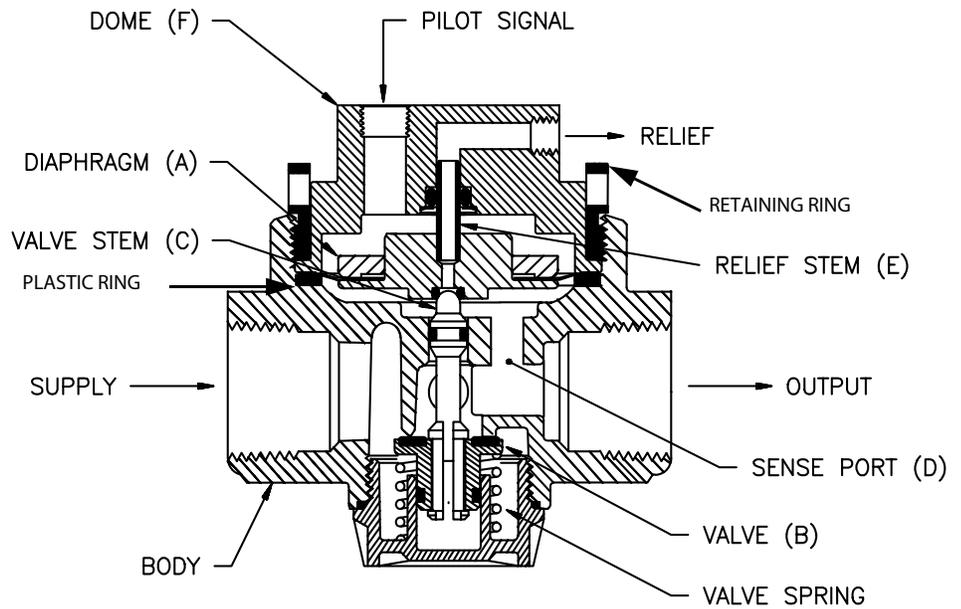


Figure 1

A reduced output pressure has now been obtained. Creating a demand downstream results in reduced pressure under the diaphragm. The load on the diaphragm causes the valve stem and valve to move downward, opening seat area and allowing air to flow to the output. The flow of output air is metered by the amount of opening. During low flow requirements, the size of the opening at the seat is small, while at high flows it is larger. The output pressure signal requires correction over the flow range to give constant pressure output when under flow conditions. The sense port causes this adjustment. Its location provides compensation to the output pressure signal transmitted to the diaphragm. This effect is called aspiration. The purpose is to maintain output pressure nearly constant over a wide range of flow demands.

Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm to move upward, opening the vent hole sealed between the diaphragm and valve stem, venting the excess pressure to atmosphere through the relief stem (E) and out the relief port on the dome (F).

PRE-LOAD PROCEDURE

For maintenance or repair

Remove retaining ring using span-wrench. Make sure there is grease on the diaphragm's relief stem (E). Place diaphragm (A) in the PSR body. Make sure diaphragm (A) is not pinched and is seated flat on the plastic ring inside the PSR body. Place dome (F) on the diaphragm (A). Place retaining ring on the body and hand turn it, leaving it one turn loose. Apply 5-10 psig of air to the pilot air signal port (it may make a slight "pop" sound). Tighten the retaining ring using a span-wrench then remove pilot air pressure.

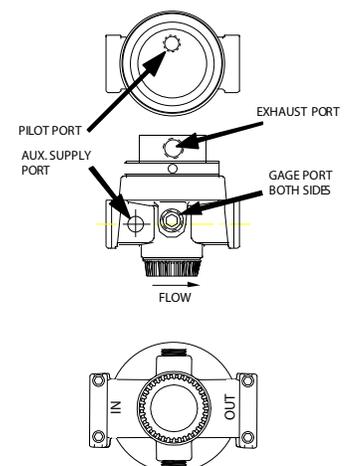


Figure 2

Technical Information

Specifications

Type Relieving diaphragm
 Max inlet pressure 300 psig
 Outlet pressure 0-200 psig
 Operating temperature 0-175 °F (-18-79 °C)
 Rec. filtration 40 micron nominal
 Flow capacity See graphs
 Relief flow capacity 19 SCFM max

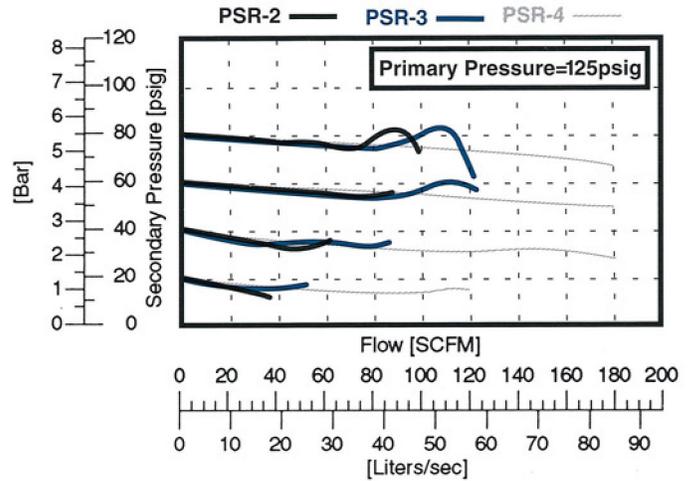
Materials

Body: Zinc (Aluminum on -6, -8)
 Dome: Aluminum
 Internal: Nylon, Brass, Aluminum, 302 SS
 Elastomers: Nitrile

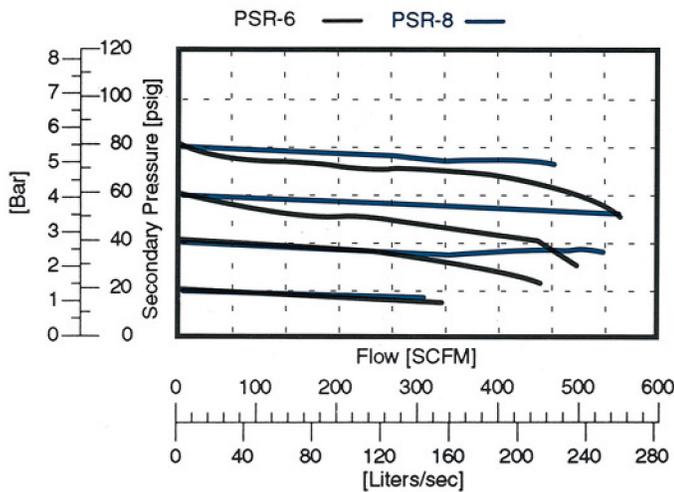
Weight

PSR2, -3, -4: 2.5 lbs (1.13 kg)
 PSR6, -8: 3.7 lbs (1.68 kg)
 PSRA, -B: 3 lbs (1.36 kg)

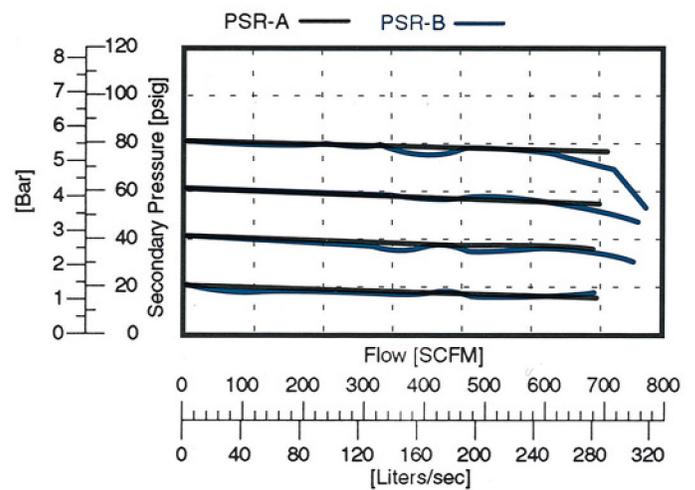
FLOW CHARACTERISTICS



FLOW CHARACTERISTICS



FLOW CHARACTERISTICS



Part Configuration

Example Part Number

| | | | | | |
|-----|---|---|---|---------|----|
| PSR | 4 | P | N | NR | EV |
| | 1 | 2 | 3 | OPTIONS | |

Section Reference

| 1 | Port Size | 2 | Paint Option |
|---|-----------|---|--|
| M | 1/8" | P | Painted Black |
| 2 | 1/4" | U | Unpainted (Ports 2, 3, 4, 6, & 8 only) |
| 3 | 3/8" | | |
| 4 | 1/2" | 3 | Thread Type |
| 6 | 3/4" | N | NPT |
| 8 | 1" | P | BSPP |
| A | 1-1/4" | | |
| B | 1-1/2" | | |

Options

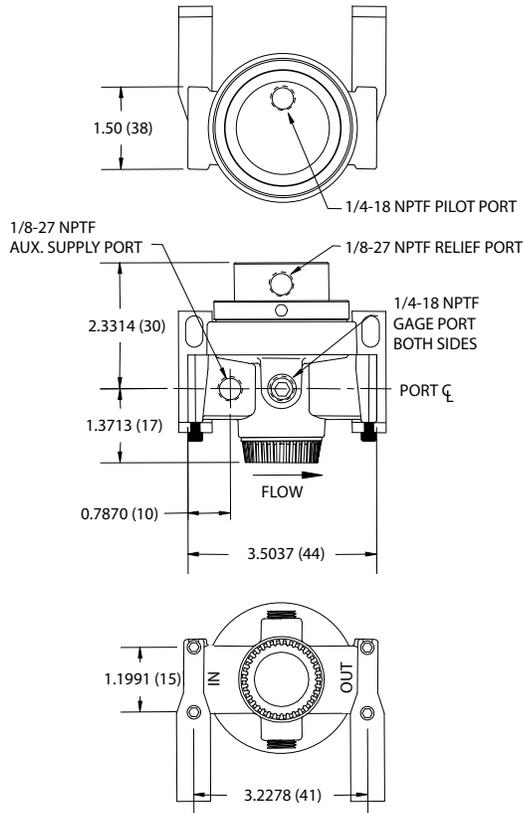
| | |
|----|--|
| NR | Non-Relieving |
| O2 | Oxygen Cleaned (Port sizes 2, 3 & 4 and Unpainted only) |
| O3 | Oxygen Cleaned for Non-Oxygen use (Port sizes 2, 3 & 4 and Unpainted only) |
| PT | Pitot Tube Installed (Port sizes 2, 3 & 4 only) |
| PL | Large Pitot Tube Installed (for PSR Port sizes 2, 3 & 4 with FQB2 series only) |
| EV | Viton Elastomers (Port sizes 2, 3 & 4 only) |

Repair Kits

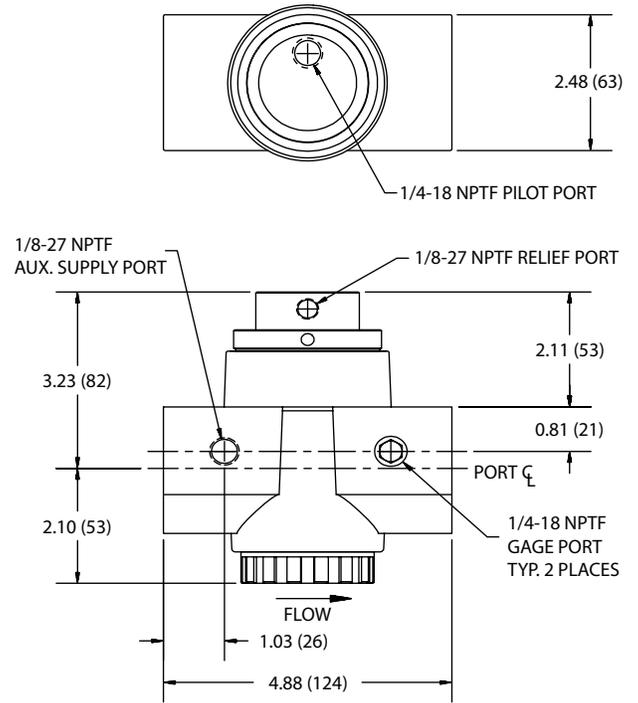
| | |
|------------|------------------------------|
| HA35-10BR | Valve Assembly PSR2, 3, 4 |
| HA37-237RM | Diaphragm PSR2, 3, 4 |
| HA37-198BM | Valve Assembly PSR6, 8, A, B |
| HA37-237R | Diaphragm PSR6, 8, A, B |

Dimensions

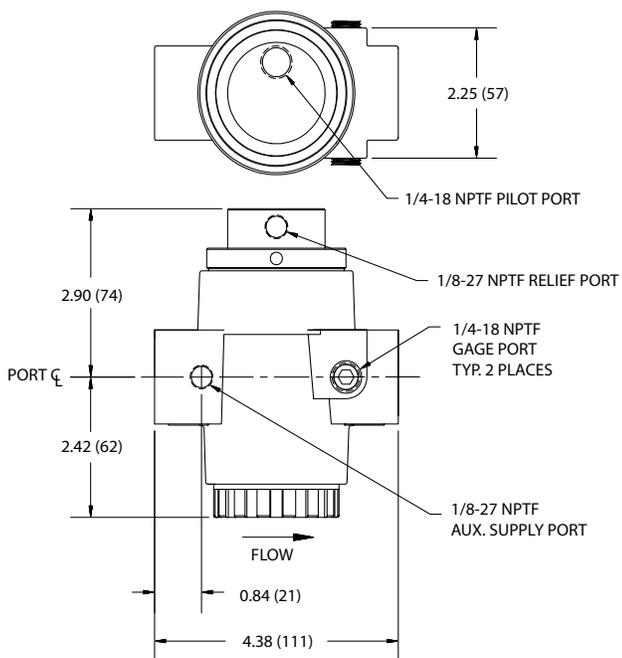
PSR2, -3, -4



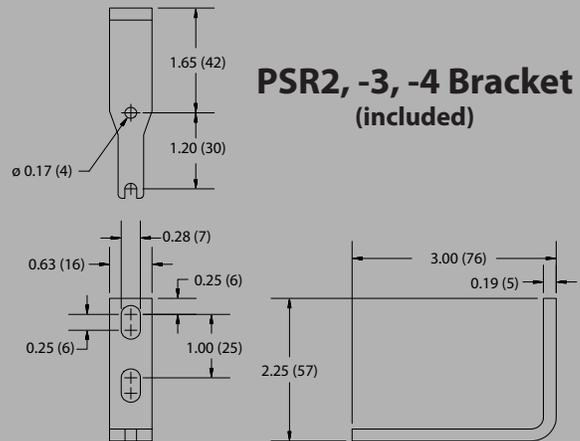
PSRA, -B



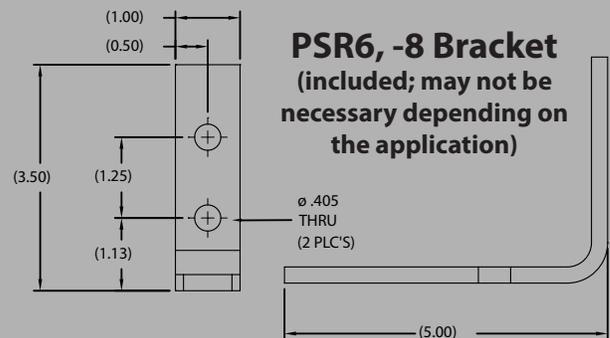
PSR6, -8



PSR2, -3, -4 Bracket (included)



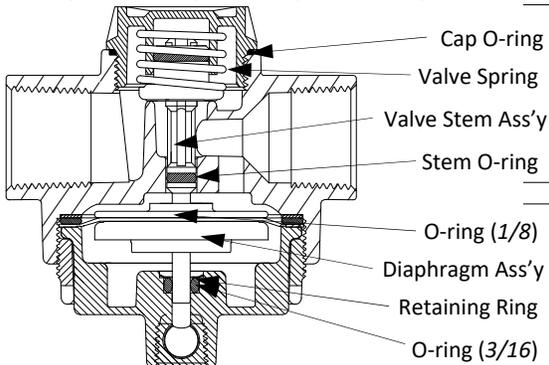
PSR6, -8 Bracket (included; may not be necessary depending on the application)



*Sizes A and B do not require brackets

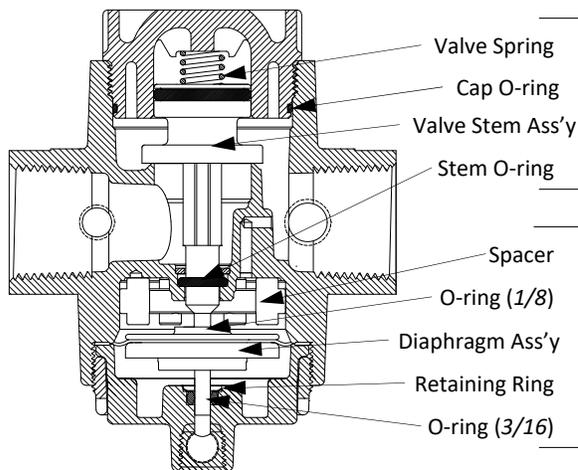
Repair Kits

PSR-2, PSR-2U, PSR-3, PSR-3U, PSR-4, PSR-4U



| MISCELLANEOUS KITS / PARTS | | |
|----------------------------|---------------------|-------------|
| KEY | DESCRIPTION | PART NUMBER |
| 1 | Valve Ass'y kit | HA35-10BR |
| 2 | Diaphragm Ass'y kit | HA37-237RM |

PSR-6, PSR-6U, PSR-8, PSR-8U



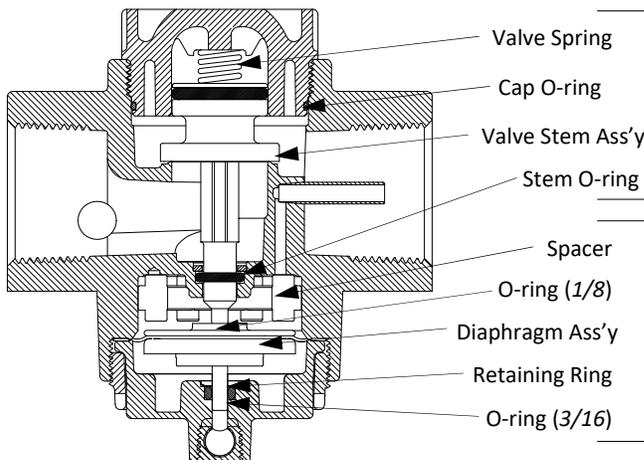
Replacement instructions for **spacer** in the diaphragm assembly kit:

- 1: Orientate spacer so stand-offs do not block hole drilled in bottom of head.
- 2: Press spacer into head.

The spacer does not need to be replaced. It is only needed if one is not already installed.

| MISCELLANEOUS KITS / PARTS | | |
|----------------------------|---------------------|-------------|
| KEY | DESCRIPTION | PART NUMBER |
| 1 | Valve Ass'y kit | HA37-198BM |
| 2 | Diaphragm Ass'y kit | HA37-237R |

PSR-A, PSR-AU, PSR-B, PSR-BU



Replacement instructions for **spacer** in the diaphragm assembly kit:

- 1: Orientate spacer so stand-offs do not block hole drilled in bottom of head.
- 2: Press spacer into head.

The spacer does not need to be replaced. It is only needed if one is not already installed.

| MISCELLANEOUS KITS / PARTS | | |
|----------------------------|---------------------|-------------|
| KEY | DESCRIPTION | PART NUMBER |
| 1 | Valve Ass'y kit | HA37-198BM |
| 2 | Diaphragm Ass'y kit | HA37-237R |

SAFETY PRECAUTIONS

Please read the following safety information before installing or operating any Proportion-Air, Inc. equipment or accessories. To confirm safety, observe 'ISO 4414: Pneumatic Fluid Power - General rules relating to systems' and other safety practices.

WARNING

Improper operation could result in serious injury or loss of life!

1. PRODUCT COMPATIBILITY

Proportion-Air, Inc. products and accessories are for use in industrial pneumatic applications with compressed air media. The compatibility of the equipment is the responsibility of the end user. Product performance and safety are the responsibility of the person who determined the compatibility of the system. Also, this person is responsible for continuously reviewing the suitability of the products specified for the system, referencing the latest catalog, installation manual, Safety Precautions and all materials related to the product.

2. EMERGENCY SHUTOFF

Proportion, Inc. products cannot be used as an emergency shutoff. A redundant safety system should be installed in the system to prevent serious injury or loss of life.

3. EXPLOSIVE ATMOSPHERES

Products and equipment should not be used where harmful, corrosive or explosive materials or gases are present. Unless certified, Proportion-Air, Inc. products cannot be used with flammable gases or in hazardous environments.

4. AIR QUALITY

Clean, dry air is not required for Proportion-Air, Inc. products. However, a 40 micron particulate filter is recommended to prevent solid contamination from entering the product.

5. TEMPERATURE

Products should be used with a media and ambient environment inside of the specified temperature range of 32°F to 158°F. Consult factory for expanded temperature ranges.

6. OPERATION

Only trained and certified personnel should operate electronic and pneumatic machinery and equipment. Electronics and pneumatics are very dangerous when handled incorrectly. All industry standard safety guidelines should be observed.

7. SERVICE AND MAINTENANCE

Service and maintenance of machinery and equipment should only be handled by trained and experienced operators. Inspection should only be performed after safety has been confirmed. Ensure all supply pressure has been exhausted and residual energy (compressed gas, springs, gravity, etc.) has been released in the entire system prior to removing equipment for service or maintenance.

CAUTION

Improper operation could result in serious injury to people or damage to equipment!

1. PNEUMATIC CONNECTION

All pipes, pneumatic hose and tubing should be free of all contamination, debris and chips prior to installation. Flush pipes with compressed air to remove any loose particles.

2. THREAD SEALANT

To prevent product contamination, thread tape is not recommended. Instead, a non-migrating thread sealant is recommended for installation. Apply sealant a couple threads from the end of the pipe thread to prevent contamination.

3. ELECTRICAL CONNECTION

To prevent electronic damage, all electrical specifications should be reviewed and all electrical connections should be verified prior to operation.

EXEMPTION FROM LIABILITY

1. Proportion-Air, Inc. is exempted from any damages resulting from any operations not contained within the catalogs and/or instruction manuals and operations outside the range of its product specifications.

2. Proportion-Air, Inc. is exempted from any damage or loss whatsoever caused by malfunctions of its products when combined with other devices or software.

3. Proportion-Air, Inc. and its employees shall be exempted from any damage or loss resulting from earthquakes, fire, third person actions, accidents, intentional or unintentional operator error, product misapplication or irregular operating conditions.

4. Proportion-Air, Inc. and its employees shall be exempted from any damage or loss, either direct or indirect, including consequential damage or loss, claims, proceedings, demands, costs, expenses, judgments, awards, loss of profits or loss of chance and any other liability whatsoever including legal expenses and costs, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.

WARRANTY

Proportion-Air, Inc. products are warranted to the original purchaser only against defects in material or workmanship for eighteen (18) months from the date of manufacture. The extent of Proportion-Air's liability under this warranty is limited to repair or replacement of the defective unit at Proportion-Air's option. Proportion-Air shall have no liability under this warranty where improper installation or filtration occurred.

PROPORTION

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Handcrafted in the USA

ISO 9001-2015 Certified