
INSTRUCTIONS FOR HIGH PURITY, BACK-UP REGULATOR SYSTEMS (BRS SERIES)

THIS BOOKLET CONTAINS PROPRIETARY INFORMATION OF ADVANCED SPECIALTY GAS EQUIPMENT CORP. AND IS PROVIDED TO THE PURCHASER SOLELY FOR USE IN CONJUNCTION WITH HIGH PURITY, BACK-UP REGULATOR SYSTEMS (BRS SERIES).



IMPORTANT

These instructions are for experienced operators who know the general principles and safety precautions to be observed in handling specialty gases and operating specialty gas equipment. If you are not certain you fully understand the safety precautions for handling gases, we urge you to obtain and read the Material Safety Data Sheet (MSDS) for each gas being used.

Do not permit untrained persons to install, operate, or maintain this equipment. Do not attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your Advanced Specialty Gas Equipment Distributor.

Be sure this information reaches the operator. Your supplier has extra copies.



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SAFETY PRECAUTIONS

Protect yourself and others. Read and understand the following instructions before attempting to use this equipment. Failure to understand and follow these instructions could result in serious personal injury and/or damage to equipment.

- Know and understand the physical and chemical properties of the gas being used.
- Observe general precautions for the use of gases.
- Observe safety precautions for the gas being used.
- Read and follow precautions on cylinder labels.
- Never use this equipment with gases not compatible with the materials of construction. The use of gases not compatible with the materials of construction may cause damage to equipment or injury to personnel.
- If flammable gases are used with this equipment do not locate it near open flames or any other source of ignition.
- If toxic or flammable gases are used with this equipment, emergency equipment applicable to the gases in use should be available in the operating area.
- Many gases can cause asphyxiation by displacing oxygen in the atmosphere. Make certain the area where this equipment is operated is well ventilated. Provide a device to warn personnel of oxygen depletion in the work area.
- Do not release toxic or flammable gases in the vicinity of personnel. Use this equipment only in well ventilated areas. Vent gases to the outside atmosphere, and in an area away from personnel. Be sure that venting and disposal methods are in accordance with Federal, State and local requirements. Locate and construct vent lines to prevent condensation or gas accumulation. Be sure the vent outlet cannot be obstructed by rain, snow, ice, insects, birds, etc. Do not interconnect vent lines; if more than one vent is needed, use separate lines.
- Relief devices should be installed and properly vented in all gas handling systems to protect against regulator failure and overpressurization.
- Never use oil or grease with this equipment. Oil and grease are easily ignited and may combine violently with some gases under pressure.
- Never connect this equipment to a supply source having a pressure greater than the maximum rated pressure. Refer to the Product Specifications (page 16) for maximum inlet pressures.

MANUFACTURER STATEMENT

The information contained in this instruction booklet has been compiled by Advanced Specialty Gas Equipment Corp., (the Company), from what it believes are authoritative sources and is offered solely as a convenience to its customers. While the Company believes that this information is accurate and factual as of the date printed, the information including design specifications is subject to change without prior notice.

DESCRIPTION

The BRS Series System is designed to provide back-up gas supply where gas generators, compressors or house line gases are the primary source of process gas. The BRS Series allows supply systems to be turned off for service or maintenance without disturbing the pressure and gas flow to high purity applications. Unlike changeover systems, the Advanced BRS System automatically provides back-up gas on an as needed basis, buffering deficiencies in supply pressure. The system activates (backs-up) when the supply pressure drops below the BRS preset pressure and deactivates when the supply pressure rises above the preset pressure allowing for the primary source of gas to flow. Monitoring or operator adjustments are not required during the back-up activation or deactivation.

The BRS System design incorporates a two-stage regulator, line regulator and in-line check valves. Diaphragm seal valves allow for either supply pressure isolation or back-up cylinder isolation when a change of cylinders is required. Available in either brass or stainless steel construction, they are supplied entirely installed on a stainless steel panel providing for convenient, wall-mounted installation. The overall compact design allows for installation in areas where space is at a premium.

OPTIONAL EQUIPMENT

Pressure Switches – used to monitor line pressure and activate an external alarm (such as a Model SG6550, or SG6551 Annunciator – sold separately) when a certain predetermined pressure is reached.

Model SG6540

General Service Pressure Switch

Model SG6541

Explosion-Proof Pressure Switch

Annunciators – used in conjunction with pressure switches to provide both an audible alarm and visual indication of pressure switch activation.

Model SG6550

Nema 4x Single Point Annunciator

Model SG6551

Nema 1 Single Point Annunciator

Flexible Hoses – Double Braided (all metal) stainless steel flexible hoses (available for cylinder leads) extend service life and provide ease of connecting cylinders and dewars.

Check Valves – Prevent discharge of gas from manifold and pigtails when changing cylinders.

Purge/Vent Valves – allow for complete removal of entrapped air and moisture from the system upon start-up, or after a cylinder change-out thus maintaining the high purity nature of the system.

SG6680

(Set of 2) for Brass Systems

SG6681

(Set of 2) for Stainless Steel Systems

INSTALLATION

WARNING: Before attempting to install and operate this equipment, read and fully understand the safety precautions on page 3 in this booklet. Failure to follow the safety precautions may result in serious personal injury and/or damage to equipment.

The back-up regulator system can be used either with one cylinder by connecting the high pressure inlet lead directly to the cylinder or with two or more cylinders by connecting the inlet lead to the end of a single-row manifold. A typical layout for use with a single-row manifold is shown in Figure 1 (page 8).

Note: The BRS Series is factory preset to back-up at the pressure indicated in the product Specification Table (page 16). Contact your Advanced distributor if custom factory settings are required.

1. Securely mount the unit to a rack, wall or sturdy surface with bolts and washers (not included). Panel mounting dimensions are shown in Fig. 2 (page 9). The back-up system panel should be located such that the regulator gauges are at eye level with the operator (approximately 5-6 ft.). The high-pressure single row manifold outlet (or cylinder valve if a one-cylinder system is installed) should be located approximately 10 to 12 inches outward from the high pressure inlet side (Side B) of the back-up regulator.
2. Attach the low pressure supply line from the primary source of process gas (gas generator, compressor house line or dewar) to the 1/4" NPTF street elbow installed in the port of the low-pressure isolation valve (Side A).
3. Attach the flexible hose to the high pressure inlet side (Side B) of the back-up regulator by inserting the O-ring provided in the groove located in the valve inlet adapter.
4. Single-row manifolds are shipped without cylinder leads connected to prevent damage to the leads. Manifolds over four stations long are shipped in sections and require assembly.

To assemble single row manifold sections (if required), align the manifold sections and insert the O-Rings provided in the groove located in the threaded end of the pipe tee. Connect the sections being careful not to chip or dislodge the O-Ring.

To attach cylinder leads to the manifold, insert the small O-Rings in the groove of the station valves. Connect the cylinder leads (pigtailed) to the station valves being careful not to chip or dislodge the O-Ring.

5. Securely mount the manifold on a wall. Mounting dimensions for single-row manifolds are shown in Figure 3 (page 10).
6. Provide a means of securely supporting the cylinders connected to the system. The clamping brackets, chains, straps, etc. used must be capable of holding the cylinders in place to prevent them from falling.
7. If the system is sized for more than one cylinder, connect the high-pressure flexible hose inlet lead to the outlet of the single row manifold.
8. Close the two inlet isolation valves by turning the hand knobs fully clockwise. Close the line regulator on the BRS Series by turning the pressure adjusting knob counterclockwise until it reaches the stop. Do not turn the adjustment knob past the stop. Damage to the regulator could result.
9. After the back-up regulator system is installed and the downstream piping is connected, the system connections should be leak tested at the maximum working pressure.

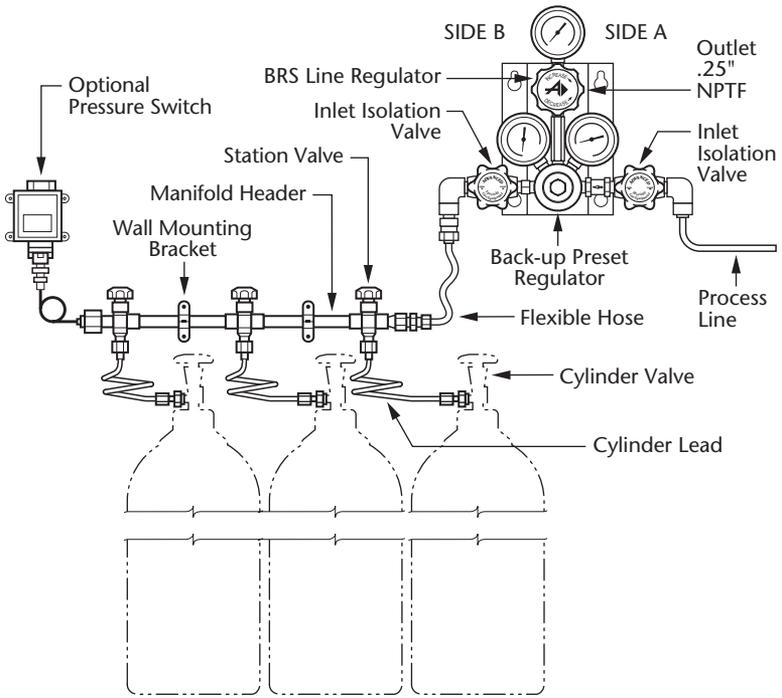


Figure 1 – Typical Installation of BRS Series System with Single Row Manifold and Optional Pressure Switch

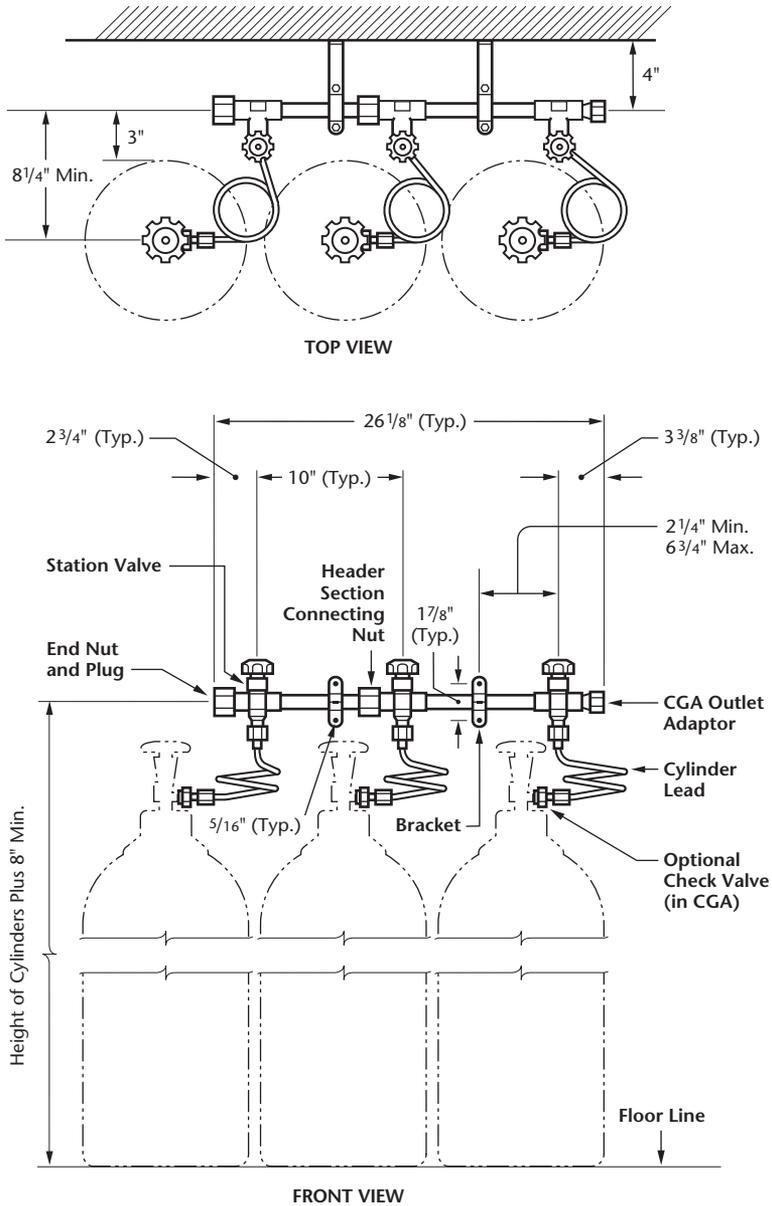


Figure 3 – Mounting Dimensions for a Single Row Manifold used on the Left Side of a Back-up Regulator System

LEAK TESTING AND PURGING

1. Connect cylinders to cylinder leads and CGA connectors provided.

CAUTION: Cylinder leads with integral CGA check valves can be pressurized with system pressure only up to the check valve seat. The CGA connection will not be pressurized with a purge gas supplied from a downstream source.

2. Use the back-up process gas to leak test and purge the system. If the process gas is hazardous (flammable, toxic and/or corrosive) or sensitive to atmospheric contaminants, use clean dry nitrogen as a purge gas to leak test and purge the back-up system.
3. Isolate downstream side of the back-up regulator system by closing a downstream process isolation valve.
4. Stand to the side of the back-up regulator and slowly open the purge gas from the high pressure inlet side (Side B) of the back-up regulator. Open the high pressure isolation valve located on the left side of the back-up regulator and check inlet gauge for pressure into the regulator.

Note: By opening the high pressure isolation valve, cylinder pressure enters the preset back-up regulator, automatically reducing the pressure to the designated preset pressure of the BRS model.

5. Open the low pressure isolation valve located on the right side (Side A) of the back-up regulator. Notice the pressure rise on the inlet gauge indicating the main supply line is providing a higher pressure to the system than the pressure supplied by the preset back-up regulator. If no rise in pressure is indicated, increase the main supply line pressure to provide a minimum of 25 psig above the preset pressure.
6. Open the line regulator by turning the pressure adjusting knob clockwise until the desired pressure is indicated on the outlet gauge.
7. With cylinder(s) connected but with the cylinder valves closed, leak check all connections with either a soap solution, such as Snoop® or a gas leak detector.

Note: The line regulator on the BRS System does not vent downstream system pressure when the pressure adjusting knob is turned counterclockwise to reduce delivery pressure. For applications where atmospheric constituents could contaminate your gas system, install a vent valve on the downstream side of the back-up regulator to vent pressure. Connect outlet of vent valve to a safe disposal area.

8. Purge both right and left sides of the back-up system if the process gas is hazardous or sensitive to atmospheric contaminants.
9. Vent the system to atmospheric pressure. Close the high pressure isolation valve by turning the hand knob fully clockwise. Close the line regulator by turning hand knob counterclockwise until it reaches the stop.

OPERATION

WARNING: Never operate a gas handling system under any circumstances if it is leaking or otherwise malfunctioning. DO NOT repair any leaks while system is under pressure. Damage to equipment and/or injury to personnel may result.

1. Close both Side A and B isolation valves by turning the hand knobs fully clockwise. Close the line regulator by turning the pressure adjusting knob counterclockwise until it reaches the stop.
2. Ensure that any purge or system vents are closed.
3. Isolate downstream side of the back-up regulator system by closing the downstream process isolation valve.

WARNING: Never connect this equipment to a supply source having a pressure greater than the maximum rated inlet pressure marked on the product. Refer to the Product Specifications (page 16) for maximum inlet pressures.

4. Slowly open the low pressure isolation valve located on Side A of the BRS. This is the on/off control for the primary source of process gas (gas generator, compressor house line or dewar). Check the inlet gauge (Side A) for pressure into the regulator.
5. Slowly open the high pressure isolation valve located on Side B of the BRS. This is the on/off control for the back-up gas supply. Check the inlet gauge (Side B) for pressure into the regulator.

Note: By opening the high pressure isolation valve, cylinder gas enters the back-up regulator automatically reducing the pressure to the preset (back-up) pressure setting of the BRS. A check valve, located between the regulator and the low pressure isolation valve (Side A), prevents the reverse flow of regulated gas from the back-up side to the primary supply line.

6. Open the line regulator by turning the pressure adjusting knob clockwise until the desired pressure is indicated or maximum pressure is obtained on the outlet gauge. Open the downstream process isolation valve to allow gas to flow from the back-up regulator system to the use point.

The system is now in operation. Flow will be from primary side as long as the primary supply pressure is greater than the BRS preset pressure setting. The system activates (backs-up) when the primary supply pressure drops below the BRS preset pressure and deactivates when the supply pressure rises above the preset pressure allowing for the primary source of gas to flow. The built-in line regulator on the BRS Series eliminates fluctuation in supply pressure and insures a constant delivery pressure to the use point.

CYLINDER REPLACEMENT

1. Close the high pressure isolation valve located on Side B of the BRS.
2. Close all cylinder valves and manifold station valves (if single row manifolds are used in the system).

WARNING: Hazardous gases must be discharged into a safety vent. Be sure to use a venting procedure that is environmentally acceptable and complies with Federal, State and local requirements.

3. Nonhazardous gases may be vented by carefully loosening the cylinder lead connector(s).
If a hazardous gas is in use, vent inlet leads through a safety vent or the optional purge/vent valve. Purge the leads with clean dry nitrogen gas. Continue purging until the hazardous gas level is below the TLV for the gas.
4. Disconnect exhausted cylinder(s) and replace with full cylinder(s).
5. If the gas connected to the manifold is nonhazardous, use it to leak test and purge the cylinder lead. If the process gas is hazardous (flammable, toxic and/or corrosive) or sensitive to atmospheric contaminants, use clean dry nitrogen as a purge gas to leak test and purge the cylinder lead.
6. Slowly open cylinder valve(s) (and manifold station valves, if applicable). Open the high pressure isolation valve located on Side B of the BRS and check inlet gauge for pressure into the regulator. The high pressure gas supply is now ready for back-up activation as required.

REPAIRS

If a back-up regulator system leaks or malfunctions, take it out of service immediately. Do not attempt to repair these systems. Repairs should be made only by Advanced Specialty Gas Equipment Corp., who have the special tools, test equipment and trained personnel required to make a safe repair. Tampering with the back-up system voids the warranty. Contact your Advanced Specialty Gas Equipment Distributor to arrange for repair.

Repairs to back-up systems after the initial warranty period has expired are chargeable to the customer. Upon receipt at the factory, the back-up system will be inspected and you will be contacted with a repair estimate. No item will be repaired until approval is received. There will be an evaluation charge assessed for equipment not repaired. All repairs should be arranged through your Advanced Specialty Gas Equipment Distributor.

Note: All equipment being returned must be purged of all hazardous materials using a clean, dry inert gas (e.g. Dry Nitrogen) prior to return.

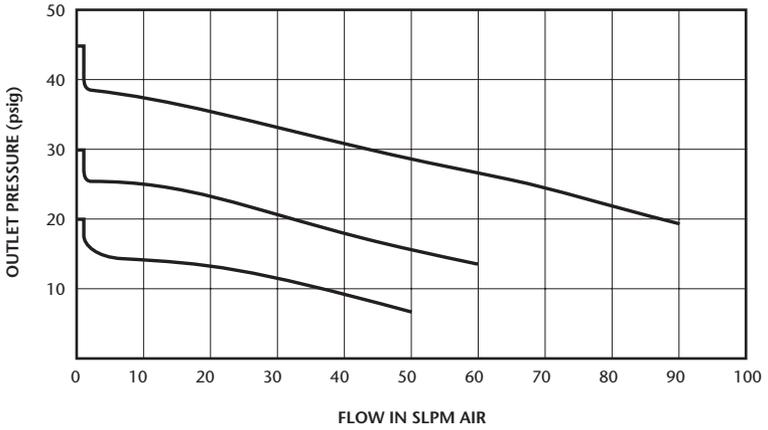


Figure 4 – Typical Performance Models BRS-B-50 and BRS-S-50

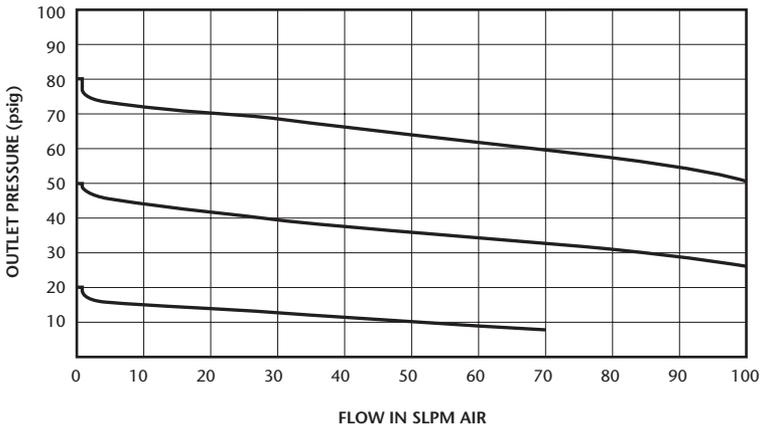


Figure 5 – Typical Performance Models BRS-B-100 and BRS-S-100

SPECIFICATIONS

| | |
|------------------------------------|--|
| Maximum Inlet Pressure | |
| Low Pressure Supply (Side A) | See Table 1 |
| High Pressure Back-up (Side B) | 3000 psig |
| Flow Capacity: | |
| BRS-X-50 | 30 slpm N ₂ |
| BRS-X-100 | 60 slpm N ₂ |
| Inlet Pressure Gauges (dual scale) | |
| High Pressure Back-up | 0–4000 psig / 0–275 bar |
| Low Pressure Supply | See Table 1 |
| Minimum Inlet Pressure | 50 psig |
| Delivery Pressure Range | See Table 1 |
| Delivery Pressure Gauge | See Table 1 |
| Gauge Size | 2" Dial |
| Flow Coefficient | |
| Two-stage Back-up Regulator | C _V = 0.06 |
| Line Regulator | C _V = 0.15 |
| Operating Temperature Range | -40°F to +140°F |
| Inlet Connections | |
| High Pressure Back-up Side | 3 ft. stn. stl. flexible hose with CGA connection as specified |
| Low Pressure Supply Side | 1/4" NPT female |
| Outlet Connection | 1/4" NPT female |
| Approximate Weight | 10 lbs. |

Table 1**Low Pressure Supply (Side A – Right)**

| Part Number | BRS Preset Pressure* (psig) | Max. Inlet Pressure (psig) | Inlet Gauge (dual scale) (psig) | (bar) |
|-------------------------------|--------------------------------------|-------------------------------------|---------------------------------------|-------|
| Brass System | | | | |
| BRS-B-50-(CGA) | 50 | 85 | 0–100 | 0–7 |
| BRS-B-100-(CGA) | 100 | 180 | 0–200 | 0–14 |
| BRS-B-100D-(CGA) | 100 | 360 | 0–400 | 0–27 |
| Stainless Steel System | | | | |
| BRS-S-50-(CGA) | 50 | 85 | 0–100 | 0–7 |
| BRS-S-100-(CGA) | 100 | 180 | 0–200 | 0–14 |
| BRS-S-100D-(CGA) | 100 | 360 | 0–400 | 0–27 |

Delivery Pressure

| Part Number | Adjustable Range (psig) | Gauge (dual scale) (psig) | (bar) |
|-------------------------------|-------------------------------|---------------------------------|-------|
| Brass System | | | |
| BRS-B-50-(CGA) | 4–45 | 0–100 | 0–7 |
| BRS-B-100-(CGA) | 5–90 | 0–200 | 0–14 |
| BRS-B-100D-(CGA) | 5–90 | 0–200 | 0–14 |
| Stainless Steel System | | | |
| BRS-S-50-(CGA) | 4–45 | 0–100 | 0–7 |
| BRS-S-100-(CGA) | 5–90 | 0–200 | 0–14 |
| BRS-S-100D-(CGA) | 5–90 | 0–200 | 0–14 |

* Contact your Advanced distributor if custom factory settings are required.
Advanced also offers custom systems for high flow and high pressure back-up applications.

Where "(CGA)" is indicated above, insert appropriate Compressed Gas Association connection number to complete the part number. Example: BRS-B-50-590. Order by complete part number.

MATERIALS OF CONSTRUCTION

Regulator Bodies

- Brass Systems
- Stainless Steel Systems

- Brass Bar Stock
- Type 316 SS Bar Stock

Diaphragms

- Type 316 Stainless Steel

Gauges

- Brass Systems
- Stainless Steel Systems

- Brass
- Type 316 Stainless Steel

Bonnets

- Brass Systems
- Stainless Steel Systems

- Brass
- 300 Series Stainless Steel

Other Metal Parts Exposed to Gas

- Brass Systems
- Stainless Steel Systems

- Brass and Stainless Steel
- Type 316 Stainless Steel

Seats and Seals

- Teflon®

Check Valve Seats

- L.P. Inlet
- CGA Nipple
 - Brass Systems
 - Stainless Steel Systems

- Viton®
- EPDM
- Viton®

Isolation and Vent Valves

- Body
 - Brass Systems
 - Stainless Steel Systems
- Diaphragms
- Seats

- Brass Bar Stock
- Type 316 SS Bar Stock
- Type 316 Stainless Steel
- PCTFE

WARRANTY

Advanced Specialty Gas Equipment Corp.,(the Company), warrants to the initial purchaser of each back-up regulator system described herein, that such equipment will be free from defects in material and workmanship which result in breakdown or failure under normal use during a period of 12 months from date of shipment by the Company if used and maintained according to Advanced Specialty Gas Equipment written instructions. Purchaser is aware that this equipment is designed for specific applications and that using this equipment with the wrong or improperly purged gas or at the wrong pressure may damage or corrode the unit and cause personal injury. This warranty does not cover damage or malfunction due to contamination or corrosion. Purchaser must confirm that this equipment is compatible with the gas being passed through it. If there is any doubt about compatibility, consult your Advanced Specialty Gas Equipment Corp. distributor.

The Company's liability under this warranty shall be limited to the repair, or at its option, replacement or refund of the purchase price, of such equipment which proves to be defective, provided; however, that this warranty shall only apply if the purchaser (1) gives the Company written notice within ten (10) days after discovery of such defect, (2) immediately on discovery of the claimed defect, discontinues all use of such equipment, and (3) returns such equipment freight prepaid to plant of manufacture.

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE SPECIFIED HEREIN. NO WARRANTIES BY ADVANCED SPECIALTY GAS EQUIPMENT CORP. (OTHER THAN WARRANTY OF TITLE AS PROVIDED IN THE UNIFORM COMMERCIAL CODE) SHALL BE IMPLIED OR OTHERWISE CREATED UNDER ANY APPLICABLE LAW, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

No claim against the Company of any kind, whether as to equipment delivery or for nondelivery of equipment and whether or not based on contract, warranty, negligence, strict liability in tort or otherwise, shall be greater in amount than the purchase price of the equipment in respect of which such claim is made. Without limiting the generality of the foregoing, Advanced Specialty Gas Equipment Corp. shall not be liable for any special, indirect, or consequential damage, such as failure of parts resulting from corrosion.

If it is determined by Advanced Specialty Gas Equipment Corp. that the equipment is to be repaired or replaced under the terms of this warranty, the cost of returning said equipment to the initial purchaser will be paid by the Company. If, however, equipment returned to the Company in connection with a claim under this warranty is found by the Company not to be defective hereunder, then such equipment will be returned to the initial purchaser, shipping charges collect, and additionally, a service charge will be paid by the purchaser to the Company to cover the cost of handling and testing such equipment.



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