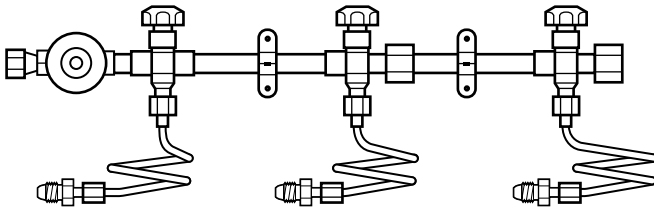

INSTRUCTIONS FOR HIGH PURITY SINGLE ROW (SR SERIES) AND DOUBLE ROW (TRB SERIES) MANIFOLDS

THIS BOOKLET CONTAINS PROPRIETARY INFORMATION OF
ADVANCED SPECIALTY GAS EQUIPMENT CORP. AND IS PROVIDED
TO THE PURCHASER SOLELY FOR USE IN CONJUNCTION WITH
SINGLE AND DOUBLE ROW MANIFOLDS.



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 these manifolds. Do not attempt to install or operate these manifolds 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.



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.

Because of the many potential hazards associated with gases, read the Material Safety Data Sheet for each gas you will be using.

- 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 these manifolds 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 these manifolds are 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 equipment failure and over-pressurization.
- 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 12) 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

Single Row (SR Series) Manifolds are used to connect two or more cylinders together for greater on-line storage capacity or higher flow rates. These single row, wall mounted manifolds are made of either Brass or Type 316 Stainless Steel construction and are supplied with the appropriate wall mounting brackets.

Double Row (TRB Series) Manifolds are used to connect four or more cylinders together for greater on-line storage capacity or higher flow rates. These double row, pedestal-mounted manifolds are made of Brass construction and are supplied with the appropriate mounting brackets.

Both SR and TRB Series Manifolds have diffusion resistant, diaphragm seal station valves to ensure that gas purity is maintained and allow for cylinder removal from a manifold without interrupting gas flow. Each manifold is designed of modular construction which allows field installation of additional stations without welding or soldering.

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. These switches are generally connected to the ends of the manifold headers.

- Model SG6540 General Service Pressure Switch
- Model SG6541 Explosion Proof Pressure Switch

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

- Model SG6550 Nema 4X Single Point Annunciator
- Model SG6551 Nema 1 Single Point Annunciator

Flashback Arrestors (SG6545) for acetylene service only – designed to be used on acetylene cylinders to prevent a flash or flame from entering the cylinder through a cylinder lead.

Flexible Hoses – double-braided (all metal) three foot stainless steel flexible hoses (available for cylinder leads) extend service life and provide ease of connecting cylinders.

Check Valves – prevent discharge of gas from manifold and pigtailed when changing cylinders.

Master Shut-Off Valve – allows manifold to be isolated from downstream system.

- Model SG5470i Installed master shut-off valve
for brass manifolds
- Model SG5475i Installed master shut-off valve
for Type 316 Stainless Steel manifolds

INSTALLATION

WARNING: Before attempting to install and operate this equipment, read and fully understand the safety precautions on page 2 in this booklet. Failure to follow the safety precautions may result in serious personal injury and/or damage to equipment.

Manifolds are shipped without cylinder leads connected to prevent damage to the leads. Single row manifolds over six stations long and double row manifolds over eight stations long are shipped in sections and require assembly.

1. To assemble 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 or cross. Connect the sections being careful not to chip or dislodge the O-Ring.
2. 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.
3. Securely mount the manifold on a wall or pedestal. Mounting dimensions are shown in Figs. 1 and 2 (see pages 6 and 7).
4. 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.
5. Connect a regulator or process line to the CGA outlet adaptor on the manifold. Double wrench where appropriate.
6. Optional pressure switches are normally installed adjacent to the end of the manifold and connected to the manifold header with $\frac{1}{8}$ inch tubing. When a pressure switch is purchased with a manifold, the end plug supplied with the manifold is tapped with $\frac{1}{8}$ inch NPT female threads for attachment of a male tube connector.
7. After the manifold system is installed and the downstream piping is connected, the entire system should be leak tested at the maximum working pressure.

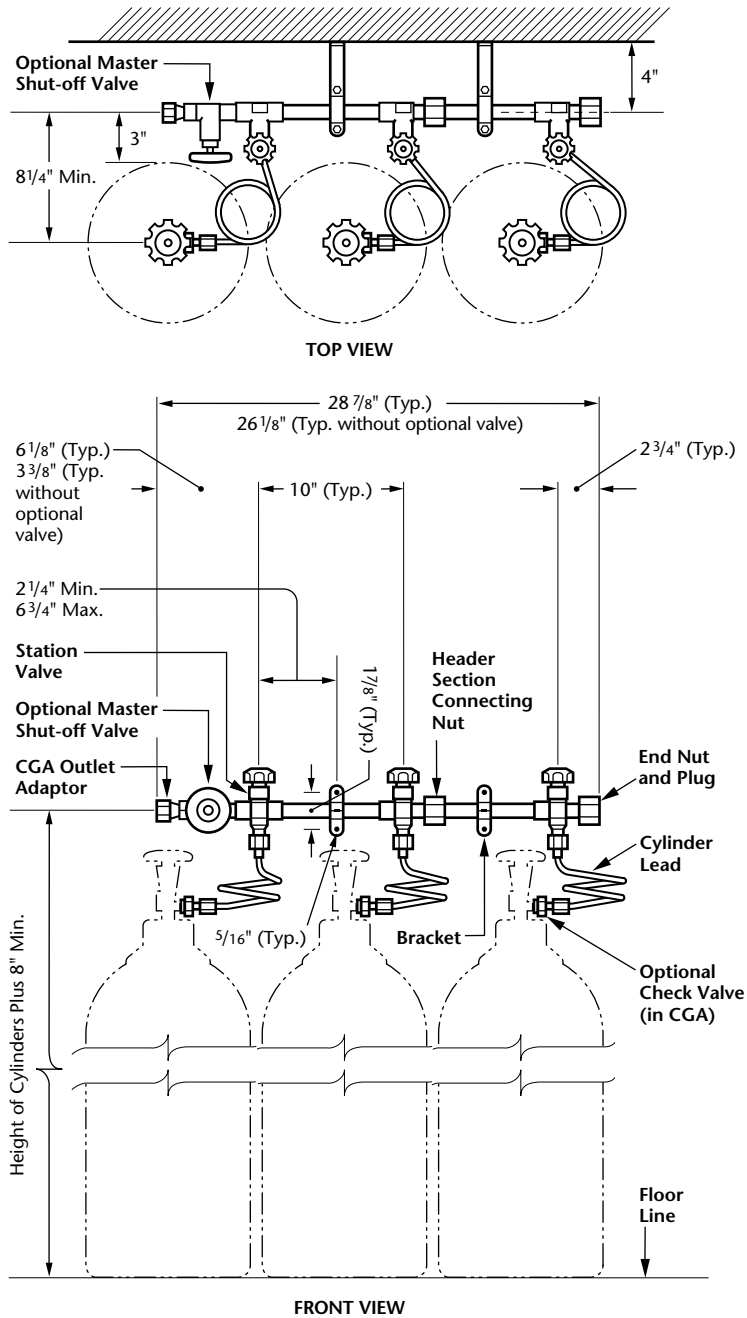


Figure 1 – Typical Installation of a Single Row (SR Series) Manifold

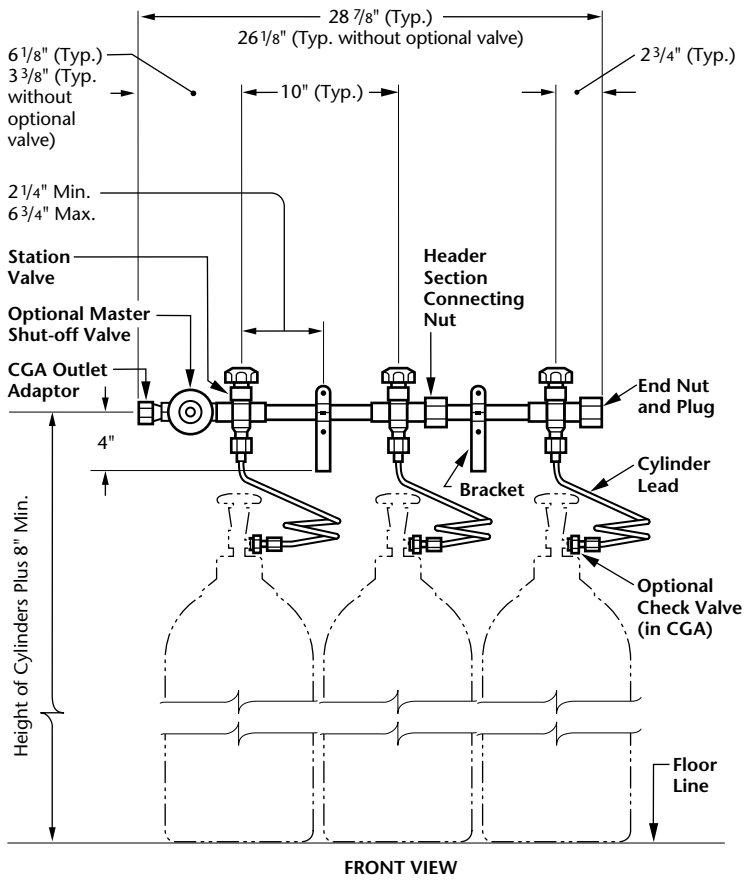
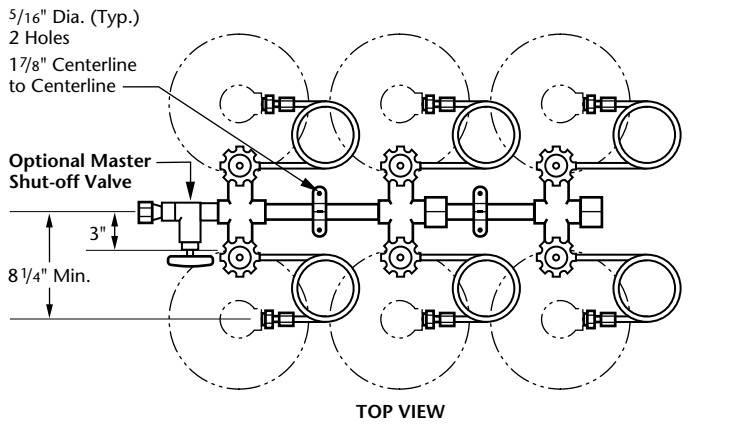


Figure 2 – Typical Installation of a Double Row (TRB Series) Manifold

LEAK TESTING AND PURGING

CAUTION: Care should be exercised when bending cylinder leads to connect them to cylinders. Brass is especially subject to work hardening and may fail if continuously re-bent.

1. Connect cylinders to manifold using the cylinder leads and connectors provided.

CAUTION: Cylinder leads containing check valves can be pressurized with system pressure only up to the check valve seat. The threaded joints on the pigtail, including the CGA connection will not be pressurized with the process gas.

2. Use the 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 manifold.
3. Isolate downstream side of manifold by closing downstream process isolation valve or regulator outlet valve.
4. Stand to one side of the manifold and slowly open the purge gas valve. Slowly open each station valve to pressurize the manifold and cylinder leads with the purge gas. Use regulator inlet gauge (if applicable) to check manifold pressure.
5. With cylinders connected but with the cylinder valves closed, leak check all connections with either a soap solution, such as Snoop[®] or a gas leak detector. If a leak is detected, vent system to atmospheric pressure and repair. Do not repair any leaks while system is under pressure.
6. Purge entire system of air if the process gas is hazardous or sensitive to atmospheric contaminants.
7. Vent system to atmospheric pressure. Close downstream process isolation valve or regulator outlet valve.

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 downstream process isolation valve and/or regulator outlet valve on downstream system.
2. Ensure that any purge or system vents are closed.
3. Close station valves for cylinders that are to be used as the reserve. Open station valves for cylinders to be used.

Note: Failure to close station valves for cylinders originally in service will result in gas flow from the full cylinders to the empty cylinders. This may cause a drop in working pressure. Check valves (optional) can be installed in the cylinder leads to prevent this interflow between cylinders.

4. Slowly open cylinder valves on all cylinders connected to the manifold.
5. Open downstream process isolation valve and/or regulator outlet valve and adjust delivery pressure of downstream regulator.
6. To switch to reserve cylinders, close station valves for cylinders in service. Open station valves for reserve cylinders.

CYLINDER REPLACEMENT

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.

1. Exhausted nonhazardous gas cylinders may be replaced while operating the manifold on the reserve cylinders. Close the station valves and cylinder valves for the cylinders to be replaced. Carefully loosen the cylinder lead connectors and allow trapped gas in the cylinder leads to escape. When the cylinder leads are completely vented, disconnect the leads and replace the empty cylinders.

If a hazardous gas is in use, close downstream process isolation valve and/or regulator. Close all cylinder valves. Open all station valves. Vent manifold through a safety vent. Purge the manifold and cylinder leads with clean dry nitrogen gas. Continue purging until the hazardous gas level is below the TLV for the gas. Close all station valves. Disconnect the leads and replace the empty cylinders.

2. If the gas to be connected to the manifold is nonhazardous, that gas may be used to leak test by opening the cylinder valve and permitting gas to fill the cylinder lead.

If the gas to be connected to the manifold 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 manifold. Stand to one side of the manifold and slowly open the purge gas valve. Slowly open each station valve to pressurize the manifold and cylinder leads with the purge gas. Use regulator inlet gauge (if applicable) to check manifold pressure.

3. With cylinders connected but with the cylinder valves closed, leak check all connections with either a soap solution, such as Snoop[®] or a gas leak detector. If a leak is detected, vent system to atmospheric pressure and repair. Do not repair any leaks while system is under pressure.
4. If the process gas is hazardous or sensitive to atmospheric contaminants, use clean dry nitrogen to purge the entire system of air. Vent system to atmospheric pressure. Close downstream process isolation valve or regulator outlet valve. Refer to the "Operation" section of this booklet to continue operation with the replacement cylinders.

SHUTDOWN

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.

1. Close all cylinder valves.
2. Vent the system pressure to 0 psig. Hazardous gases must be vented thru a safety vent. Nonhazardous gases may be vented by carefully loosening one or more cylinder lead connectors and allow trapped gas in the cylinder leads to escape.
3. If a hazardous gas was used, purge the manifold and cylinder leads with clean dry nitrogen gas. Continue purging until the hazardous gas level is below the TLV for the gas.

REPAIRS

If the any part of the manifold leaks or malfunctions, take it out of service immediately. Do not attempt to repair the manifold. Repairs should be made by Advanced Specialty Gas Equipment Corp. who have the special tools, test equipment and trained personnel required to make a safe repair. Contact your Advanced Specialty Gas Equipment Distributor to arrange for repair.

Warranty Repairs are only available through Advanced Specialty Gas Equipment Corp., and will be performed at no charge for parts and labor. For information on warranty, see the last page of this instruction booklet.

Non-Warranty Repairs are available through your distributor. Upon receipt at the factory, the manifold will be inspected and you will be contacted by your distributor with a repair cost estimate. No item will be repaired until approval is received. There will be an evaluation charge assessed for equipment not repaired.

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.

SPECIFICATIONS

Maximum Inlet Pressure	3000 psig
Flow Coefficient (each station valve)	
Brass Systems	$C_V = 0.25$
Stainless Steel Systems	$C_V = 0.30$
Inlet Connections	CGA connection as specified
Outlet Connection	CGA connection as specified, suitable for direct mounting of a pressure regulator

MATERIALS OF CONSTRUCTION

	Brass Systems	Stn. Stl. Systems
Metal Parts	Brass	Type 316 Stn. Stl.
Seals	Teflon [®]	Teflon [®]
Check Valve Seats	EPDM	Viton [®]
Station Valve Seats	PCTFE	PCTFE
Station Valve Body	Brass	Type 316 Stn. Stl.

REPLACEMENT PARTS

Master Shut-Off Valve

for brass systems	SG5470
for stainless steel systems	SG5475

Teflon® O-Ring Kits (package of 25 O-Rings)

for connection between pigtail & station valve for header connections	SG6081
SRB & TRB Series	SG6082B
SRS Series	SG6082S

Replacement Pigtails, Rigid Type

brass without check valves	SG6640-(CGA)
brass with check valves	SG6641-(CGA)
stainless steel without check valves	SG6642-(CGA)
stainless steel with check valves	SG6643-(CGA)

Replacement Pigtails, Flexible Type

without check valves	SG6638-(CGA)
with check valves	SG6639-(CGA)

Replacement Station Valves

brass	0202-5083A
stainless steel	not available

Repair Kit for Station Valve

for brass valves	0202-3079A
for stainless steel valves	0202-3076A

Additional Stations – for adding stations to the following existing Single Row Manifolds

brass system with rigid pigtails without check valves	SG6660-(CGA)
brass system with rigid pigtails with check valves	SG6661-(CGA)
brass system with flexible pigtails without check valves	SG6662-(CGA)
brass system with flexible pigtails with check valves	SG6663-(CGA)
stainless steel system with rigid pigtails without check valves	SG6664-(CGA)
stainless steel system with rigid pigtails with check valves	SG6665-(CGA)
stainless steel system with flexible pigtails without check valves	SG6666-(CGA)
stainless steel system with flexible pigtails with check valves	SG6667-(CGA)

Additional Stations – for adding stations to the following existing Double Row Manifolds (Each additional station increases manifold capacity by two cylinders)

brass system with rigid pigtails without check valves	SG6668-(CGA)
brass system with rigid pigtails with check valves	SG6669-(CGA)
brass system with flexible pigtails without check valves	SG6670-(CGA)
brass system with flexible pigtails with check valves	SG6671-(CGA)

Note: Insert applicable CGA connection number to complete part number. Example: SG6667–580.

WARRANTY

Advanced Specialty Gas Equipment Corp., (the Company), warrants to the initial purchaser of each manifold 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 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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