
INSTRUCTIONS FOR MODELS SSD, SSE & TSD GENERAL PURPOSE GAS REGULATORS

THIS BOOKLET CONTAINS PROPRIETARY INFORMATION OF
ADVANCED SPECIALTY GAS EQUIPMENT CORP. AND IS PROVIDED
TO THE PURCHASER SOLELY FOR USE IN CONJUNCTION WITH
MODELS SSD, SSE AND TSD REGULATORS.



IMPORTANT

These instructions are for experienced operators who know the general principles and safety precautions to be observed in handling specialty gases and operating pressure regulation 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 regulator. Do not attempt to install or operate this regulator 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 these regulators. 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 these regulators 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 these regulators, do not locate the regulators near open flames or any other source of ignition.
- If toxic or flammable gases are used with these regulators, 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 regulators 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 regulator failure and overpressurization.
- Never use oil or grease on these regulators. Oil and grease are easily ignited and may combine violently with some gases under pressure.
- Never connect a regulator to a supply source having a pressure greater than the maximum rated pressure of the regulator. Refer to Product Specifications (page 10) 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 Models SSD, SSE and TSD regulators are designed for use with non-corrosive gases or gas mixtures. These regulators are intended for applications where gas purity and inboard diffusion of air are not critical.

The Models SSD and SSE regulators are single stage regulators that reduce cylinder pressure in one step. They are intended for applications where the inlet pressure does not vary greatly. The Model TSD is a two stage regulator which provides constant delivery pressure for applications where the inlet pressure varies.

Models SSD, SSE and TSD regulators are available either with a Teflon® packed metering valve or a Series 50 direct reading flowmeter installed on the outlet.

OPTIONAL EQUIPMENT

Relief Valve – Installed on the delivery side of the regulator, the optional relief valve protects the regulator and downstream components from overpressurization. The relief valve has a ¼ in. NPT female port which can be connected to a vent system.

RV5571-25i	Relief Valve for SSD-15, SSE-15, TSD-15
RV5571-90i	Relief Valve for SSD-50, SSD-600 Series, SSE-600 Series, SSE-50, TSD-50 and TSD-750 Series
RV5571-135i	Relief Valve for SSD-125, SSE-125 and TSD-125
RV5571-275i	Relief Valve for SSD-250, SSE-250 and TSD-250

INSTALLATION

WARNING: Before attempting to install and operate these regulators, 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.

1. Inspect the regulator and cylinder valve for physical damage and contamination. Do not connect the regulator if you detect oil, grease or damaged parts. If the regulator is contaminated or damaged, contact your Advanced Specialty Gas Equipment Distributor to have the regulator properly cleaned or repaired (see "Repairs"). Contact your gas supplier if the cylinder valve is damaged or contaminated.

Note: Make sure that the components and materials used in this gas handling system are compatible with the gas and have the proper pressure rating.

2. Close the regulator by turning the pressure adjusting knob counterclockwise until it rotates freely. Close outlet metering valve or flow meter valve by turning hand knob clockwise.
3. Secure cylinder in place using a suitable restraining device recommended by your gas supplier (such as a Model SG6202 bench clamp, or Model SG6203 wall clamp).
4. If the process gas is nonhazardous, connect regulator directly to the cylinder valve. Securely tighten connection nut.

If the process gas is hazardous (flammable or toxic) connect a purge assembly between the cylinder valve and regulator. See instructions provided with the purge assembly for installation procedure.

5. Ensure that the delivery line is at atmospheric pressure before connecting regulator. Connect the regulator outlet to the delivery line.

Note: The use of joint compounds, pastes or lubricants other than Teflon® tape should be avoided since they may contaminate the regulator and process gas.

LEAK TESTING AND PURGING

1. If it is nonhazardous, use the process gas to leak test and purge the regulator and gas delivery system.
If the process gas is hazardous (flammable and/or toxic) use clean dry nitrogen as a purge gas to leak test and purge the regulator and gas delivery system.
2. Isolate downstream side of gas delivery system by closing instrument or process isolation valve.
3. Stand to one side of the regulator and slowly open the purge gas. Check inlet gauge for pressure into the regulator.
4. Open the regulator by turning the pressure adjusting knob clockwise until the desired pressure is indicated on the outlet gauge. Slowly open outlet metering valve or flowmeter control valve by turning knob counterclockwise until knob stops turning.
5. Leak check all connections with either a soap solution, such as Snoop[®] or a gas leak detector.
Note: These regulators do 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 system to vent pressure. Connect outlet of vent valve to a safe disposal area.
6. Purge entire system of air if the process gas is hazardous or sensitive to atmospheric contaminants.
7. Vent system to atmospheric pressure. Close system vent valve. Close regulator by turning pressure adjusting knob counterclockwise. Close outlet metering valve or flowmeter control valve by turning hand knob clockwise.

OPERATION

WARNING: Never operate a regulator or flowmeter 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 the regulator by turning the pressure adjusting knob counterclockwise until it rotates freely.
2. Ensure that any purge and system vents are closed.
3. Slowly open cylinder valve to admit process gas to regulator.
4. Turn regulator pressure adjusting knob clockwise until desired delivery pressure is indicated on delivery gauge.

Note: Do not exceed maximum working pressure of downstream system components.

5. Slowly open outlet metering valve or flowmeter control valve and adjust the delivery pressure if necessary.
6. If the regulator is equipped with a flowmeter, adjust the flowmeter control valve to the desired flow rate.

SHUTDOWN

1. If regulator is not to be removed from service, close cylinder or process supply valve. Always keep cylinder or supply valve closed whenever the system is not in use.
2. Close regulator by turning pressure adjusting knob counterclockwise until it rotates freely. This will prevent a sudden pressure surge from damaging downstream components when gas flow is restarted.
3. Close outlet metering valve or flowmeter control valve by turning hand knob clockwise.

REMOVAL FROM SERVICE

1. Close cylinder or process supply valve. Always keep cylinder or supply valve closed whenever system is not in use.

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.

2. Vent the system until both pressure gauges read zero psig. If regulator was used with a hazardous gas, purge the regulator and entire system with clean dry nitrogen gas. Continue purging until the hazardous gas level in the system is below the TLV for the gas.
3. After purging and/or venting is complete, close regulator by turning pressure adjusting knob counterclockwise until it rotates freely.
4. Close outlet metering valve or flowmeter control valve by turning hand knob clockwise.

CAUTION: Always remove regulator and reinstall cylinder cap before moving cylinder.

5. Remove regulator from cylinder or supply line.

PERFORMANCE CHARACTERISTICS

Normal Operating Characteristics

- As flow is increased through a regulator, delivery pressure will drop (droop).
- As the inlet pressure to the regulator changes, the delivery pressure will vary (supply pressure effect). This effect is minimal in a two-stage regulator and more pronounced in a single-stage regulator.
- The difference in delivery pressure between flow and no-flow conditions is displayed on a regulator flow curve.

Abnormal Operating Characteristics

- Insufficient sealing of the valve seat assembly caused by foreign materials or wear will allow pressure to continue building in the low pressure chamber. The pressure rise may cease, or it may continue as a leak. If the latter occurs, the regulator must not be used until repaired.

CARE AND MAINTENANCE

Periodic checking of your regulator is essential to continued safe and satisfactory operation. How often you inspect will depend on the usage and type of gas.

It is recommended that regulators in non-corrosive gas service be inspected on at least a monthly basis and those in corrosive service at least once a week. We recommend that most regulators be serviced annually; those used in corrosive service may need servicing every six months. Generally, the valve seat assembly and diaphragm assembly will be replaced, especially if the regulator is used in corrosive gas service. It is even possible that some regulators must be scrapped if badly corroded.

Regulator Checking Procedure

1. Inspect gauges. The gauge(s) should read zero when all pressure has been relieved from the system.
2. Turn the pressure adjusting knob counterclockwise until it rotates freely. Close the regulator outlet valve. Slowly open the cylinder valve. The high pressure gauge should read the cylinder pressure.
3. Leave the regulator in the pressurized state for five or ten minutes. The delivery pressure gauge should not register any pressure increase. A pressure increase indicates internal valve assembly leakage. If a pressure increase is indicated, the regulator must be repaired to prevent damage to downstream equipment.
4. Next, turn the pressure adjusting knob clockwise and set a nominal delivery pressure. If you are unable to attain the normal delivery pressure setting, faulty operation is indicated. This condition may be attributed to blockage caused by a stuck valve seat within the regulator. If the set delivery pressure continues to rise above the set point, the regulator valve seat may be worn. This condition is called "creep"; and a regulator exhibiting this condition should be sent for repair.
5. Close the supply valve and isolate the regulator from the downstream system (this can be done by closing the outlet shutoff valve if the regulator is so equipped) and note the pressure on both the high and low pressure gauges. After five or ten minutes a drop in pressure on either gauge indicates a leak in the system. The leak may be at the CGA connection, any threaded port, through the diaphragm, pressure gauge, or through the regulator outlet valve. If the leak is at the valve connection, relieve all pressure from the regulator and then tighten. If the leak is elsewhere, the regulator must be repaired.

REPAIRS

If a regulator leaks or malfunctions, take it out of service immediately.

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

Non-Warranty Repairs should be made by a qualified repair technician. Repairs are also available by Advanced Specialty Gas Equipment Corporation through your distributor. Upon receipt at the factory, the regulator 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	See Table 1
Inlet Pressure Gauge	See Table 1
Delivery Pressure Range	See Table 1
Delivery Pressure Gauge	See Table 1
Gauge Size	2 in. dial
Operating Temperature Range	
Regulators with flowmeters	+32°F to +165°F
Regulators without flowmeters	-40°F to +165°F
Flow Coefficient	
Regulator	
SSD & SSE Models	$C_V = 0.18$
TSD Model	$C_V = 0.15$
Outlet Valve	$C_V = 0.4$
Flow Capacity	See Figures 1-2
Supply Pressure Effect	
SSD & SSE Models	0.2 psi per 100 psi
TSD Model	0.04 psi per 100 psi
Inlet Connections	
SSD & TSD Models	CGA 296, 320, 326, 346, 350, 540, 580, 590 or 660 as ordered
SSE Model	CGA 300, 510 or 660 as ordered
Outlet Connections	
Regulators with flowmeters	½ in. NPT female on flowmeter
Regulators without flowmeters	¼ in. NPT male on outlet valve
Relief Valve (optional)	¼ in. NPT female vent connection
Weight (approx.)	
SSD & SSE Models	4 lbs.
TSA Model	5 lbs.
Flowmeter	See Model FM4350 in Series 50 Flowmeter instruction booklet

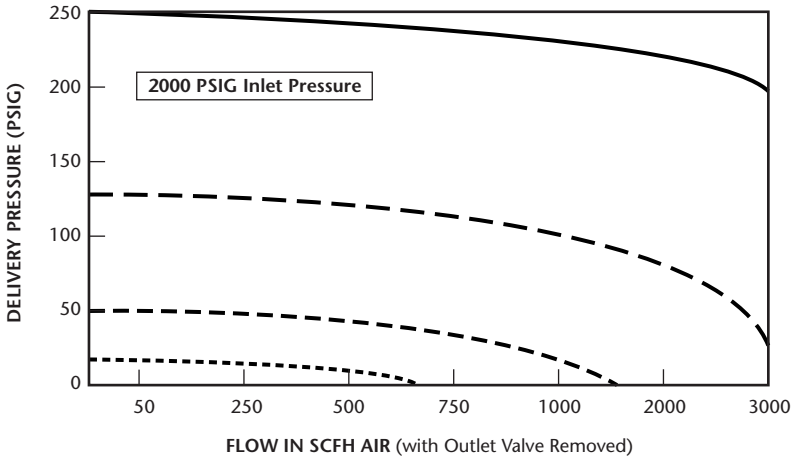


Figure 1 - Typical Performance
Model SSD and SSE

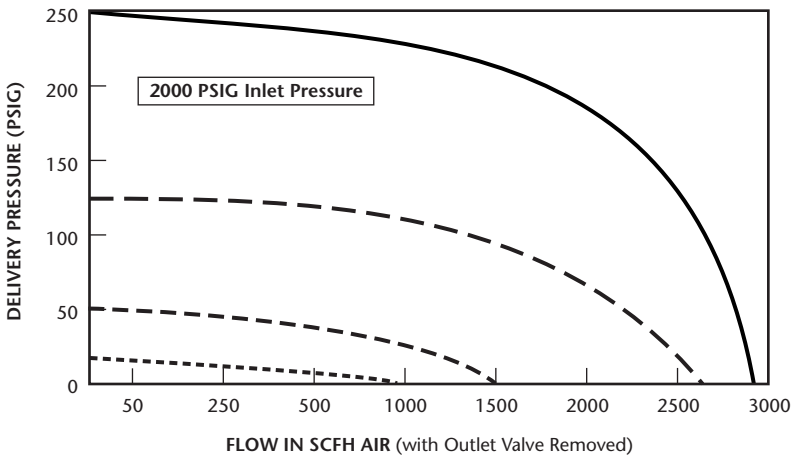


Figure 2 - Typical Performance
Model TSD

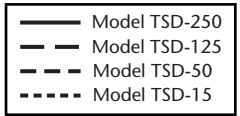


Table 1, Regulators without Flowmeters**Inlet Pressure**

Part No.	Max.	Gauge (dual scale)	
		(psig)	(bar)
SSD-15-(CGA)	3000	0-4000	0-275
SSD-50-(CGA)	3000	0-4000	0-275
SSD-125-(CGA)	3000	0-4000	0-275
SSD-250-(CGA)	3000	0-4000	0-275
SSE-15-(CGA)	300	0-400	0-27
SSE-50-(CGA)	300	0-400	0-27
SSE-125-(CGA)	300	0-400	0-27
SSE-250-(CGA)	300	0-400	0-27
TSD-15-(CGA)	3000	0-4000	0-275
TSD-50-(CGA)	3000	0-4000	0-275
TSD-125-(CGA)	3000	0-4000	0-275
TSD-250-(CGA)	3000	0-4000	0-275

Delivery Pressure

Part No.	Range	Gauge (dual scale)	
		(psig)	(bar)
SSD-15-(CGA)	2-15	0-30	0-2
SSD-50-(CGA)	4-50	0-100	0-7
SSD-125-(CGA)	10-125	0-150	0-10
SSD-250-(CGA)	20-250	0-400	0-27
SSE-15-(CGA)	2-15	0-30	0-2
SSE-50-(CGA)	4-50	0-100	0-7
SSE-125-(CGA)	10-125	0-150	0-10
SSE-250-(CGA)	20-250	0-400	0-27
TSD-15-(CGA)	2-15	0-30	0-2
TSD-50-(CGA)	4-50	0-100	0-7
TSD-125-(CGA)	10-125	0-150	0-10
TSD-250-(CGA)	20-250	0-400	0-27

Note: Insert applicable CGA connection number to complete part number. Example: TSD-15-580.

Table 2, Regulators with Flowmeters

Part No. Model SSD	Part No. Model SSE	Part No. Model TSD	Flowmeter Range (air at 70°F & 14.7 psia)
SSD-600-(CGA)	SSE-600-(CGA)	TSD-750-(CGA)	8-50 sccm
SSD-601-(CGA)	SSE-601-(CGA)	TSD-751-(CGA)	5-85 sccm
SSD-602-(CGA)	SSE-602-(CGA)	TSD-752-(CGA)	40-440 sccm
SSD-603-(CGA)	SSE-603-(CGA)	TSD-753-(CGA)	100-950 sccm
SSD-604-(CGA)	SSE-604-(CGA)	TSD-754-(CGA)	0.2-1.8 slpm
SSD-605-(CGA)	SSE-605-(CGA)	TSD-755-(CGA)	0.4-3.6 slpm
SSD-606-(CGA)	SSE-606-(CGA)	TSD-756-(CGA)	0.5-7.0 slpm
SSD-607-(CGA)	SSE-607-(CGA)	TSD-757-(CGA)	1-13 slpm
SSD-608-(CGA)	SSE-608-(CGA)	TSD-758-(CGA)	6-24 slpm
SSD-609-(CGA)	SSE-609-(CGA)	TSD-759-(CGA)	4-44 slpm

Notes: All regulators with flowmeters have a delivery range of 4–50 psig and are equipped with 0–100 psig pressure gauge on the delivery side.

Insert applicable CGA connection number to complete part number.

Example: SSD-605-580

MATERIALS OF CONSTRUCTION

Body

SSD & SSE Models

TSD Model

Outlet Valve and Gauges

Bonnet

Other Metal Parts Exposed to Gas

Regulator Seat and Seals

Diaphragm(s)

Flowmeter

Brass Bar Stock

Brass Forging

Brass

Painted Zinc

Brass and Stainless Steel

Teflon®

Neoprene

See Model FM4350 in Series 50
Flowmeter instruction booklet

WARRANTY

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