UTILITY SOLUTIONS GROUP

Model 257-S Relief Valve

Installation & Maintenance Manual

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Introduction

Safe practice in the transmission, distribution and utilization of gas requires a device to limit line pressure to a predetermined safe maximum, preventing overpressurization of the system. Mechanical failure, accidents or foreign matter in the lines may render other types of safeguards inoperative and cause a dangerous overpressurization of the system.

Leaking bypass valves occasionally will permit pressure to build during off-peak hours. Pressure regulators with damaged valves or orifices are not able to effect a shutoff when required, thereby permitting a possibly dangerous overpressure condition.

The most reliable safeguard is a device that will open as necessary and discharge to atmosphere enough of the excess to maintain a safe pressure in the system.

The most beneficial and commonly used device is a mechanical relief valve, correctly installed at a safe dispersal point and set to discharge to atmosphere when line pressure exceeds a predetermined set-point.

Compact and easy to install, the relief valve offers an economical installation with large relieving capacity. It automatically closes when the pressure returns to normal. Many times, a small relief valve can be used advantageously with a larger relief valve. The smaller relief valve can be set for a lower discharge pressure to take care of minor pressure fluctuations without the necessity of venting a large amount of gas to atmosphere through the larger relief valve.

Operation

The operation of Utility Solutions Group Safety Relief Valves is beneficial and simple. They are installed in a vertical line with the outlet usually connected to a rigid discharge stack with a suitable protective cap. A soft-seated valve is exposed to line pressure and, under normal conditions, is held tightly closed by the force exerted by the spring. When line pressure increases sufficiently to overcome the closing force, the relief valve opens to discharge gas. The relief valve automatically closes after pressure returns to normal.

Installation and Start-Up

1. Thoroughly purge inlet piping to remove dirt and debris that could damage the relief valve or impair its operation.

NOTE: Ensure that the inside of the relief valve and piping are free of dirt, foreign matter and other debris.

2. Install the relief valve. Ensure flow through the relief valve is in the correct direction. High-pressure connects to the inlet side. Be sure that shipping screens, pins, and covers are removed.

NOTE: On flanges, tighten bolts evenly. On screwed connections, apply pipe dope to male threads only.

CAUTION

It is the user's responsibility to ensure that all regulator vents and/or vent lines exhaust to a non-hazardous location away from ANY POTENTIAL sources of ignition. Where vent lines are used, it is the user's responsibility to ensure that each regulator is individually vented and that common vent lines ARE NOT used.

3. Install Vent Tubing, ensuring it is properly routed to vent to the atmosphere in a safe location.

NOTE: The vent tubing must be ¼-inch or larger and routed to a safe location. The outlet of the vent piping must allow for the free and unobstructed passage of air and gas and must be protected against the potentials listed in the instructions.

WARNING

The vent connection is an escape path for flammable gas and it must be located and/or piped so that potential discharge occurs in a safe area away from buildings, open flames, collection areas, arcing devices, etc.

CAUTION

Relief valves that are installed indoors or in a non-vented area must be vented to the outside. Vent piping must be routed to a non-hazardous location, away from any potential sources of ignition. For outdoor installations, it is recommended that the relief valve be installed so the potential for water or other foreign matter entering the relief valve and interfering with the proper operation is avoided.

4. Put the relief valve into operation by very slowly opening the upstream block valve A (see illustration on Page 7).

CAUTION

Turn gas on very slowly. If an outlet stop valve is used, it should be opened first. Do not overload diaphragm with a sudden surge of inlet pressure. Monitor the overload outlet pressure during start-up to prevent an outlet pressure overload.

5. Check all connections for leaks.
6. Set adjusting screw (**10**) for the required relief pressure. Turn it clockwise to increase the pressure and counter-clockwise to decrease it. Only make this adjustment when gas is flowing through the relief valve. After adjustment is complete, lock-nut (**11**) should be tightened firmly and seal cap (**1**) replaced..
7. To shut down, carefully close valve A (see illustration on Page 7).

CAUTION

Keep pipe dope and all other foreign substances out of the relief valve. The vent must be positioned to protect against flooding, drain water, ice formation, traffic, tampering, etc. The vent must be protected against nest-building animals, bees, insects, etc. to prevent vent blockage and minimize the chances for foreign material to collect in the vent side of the diaphragm.

Servicing and Adjustment

General Notes

1. Ensure both the inlet and outlet chambers of the relief valve are entirely depressured before servicing.
2. Carefully note the location and position of disassembled parts to be certain reassembly is correct. Inspect each one carefully and replace those that are worn or damaged or otherwise unsatisfactory.
3. Use lubricants sparingly and with care to avoid exposing tacky surfaces to the gas stream. Such surfaces could cause dirt accumulation on close-clearance parts.

NOTE: Use moly or silicone type lubricants. Avoid the use of petroleum based types. An application of silicone based lubricant to the other O-rings and the Tetraseals in the relief valve will also help ensure their proper seal.

CAUTION

Relief valves are overpressure control devices with numerous moving parts subject to wear and are dependent upon particular operating conditions. To ensure continuous satisfactory operation, a periodic inspection schedule must be adhered to with the frequency of inspection determined by the severity of service and applicable laws and regulations.

Changing Spring

1. To change spring (**14**), close valve A (see illustration on Page 7), remove cap (**1**), loosen lock-nuts (**11**). Turn adjustment screw (**10**) counterclockwise to decompress spring assembly, remove cap screws (**4**), cover cap (**5**), spring ferrule (**12**), and ball bearing (**13**).
2. Remove spring (**14**) and install new spring. To install, reverse the procedure noted above.
3. Open valve A (see illustration on Page 7). Set relief valve set-point. To increase, turn spring adjusting screw (**10**) clockwise, counterclockwise to decrease. Check for leakage and reseal. Tighten adjustment screw lock-nuts (**11**) firmly. Modify badge information.

Servicing Diaphragm

1. To service diaphragm (**20**) and/or valve (**41**), complete step 1 of section "Changing Spring", remove spring (**14**), cap screws (**26**), nuts (**27**) and upper case (**8**).
2. Remove valve, diaphragm and stop plate and stem assembly from body. To change diaphragm, remove nut (**16**), upper diaphragm pan (**19**), and diaphragm and gasket assembly (**20**). Install new diaphragm and gasket by reversing procedure.

Servicing Valve

To service valve, remove roll pin (**40**). Remove and install new valve (**41**). Reverse procedure.

CAUTION

The seating surface of valve (41) should not be damaged during assembly. Stem (43) should be carefully placed into bushing (37) prior to carefully pushing the valve, diaphragm, stop plate and stem assembly into place.

Servicing Guide Bushing

To service guide bushing (**45**), complete the steps in "Service Diaphragm" above, remove set screws (**48**) and pull guide bushing assembly out of body. Reverse procedure to reinstall.

Servicing Valve Disc

To service valve disc (**44**), complete "Servicing Guide Bushing" above, remove bottom cap (**35**) and retaining screws (**44c**), and remove valve disc assembly (**44**) through the body. Reverse procedure to install.

Temperature Limits

The Model 257S Relief Valve can be used for flowing temperatures from -20°F to 150°F.

Buried Service

The Model 257S Relief Valve is not recommended for buried (underground) service.

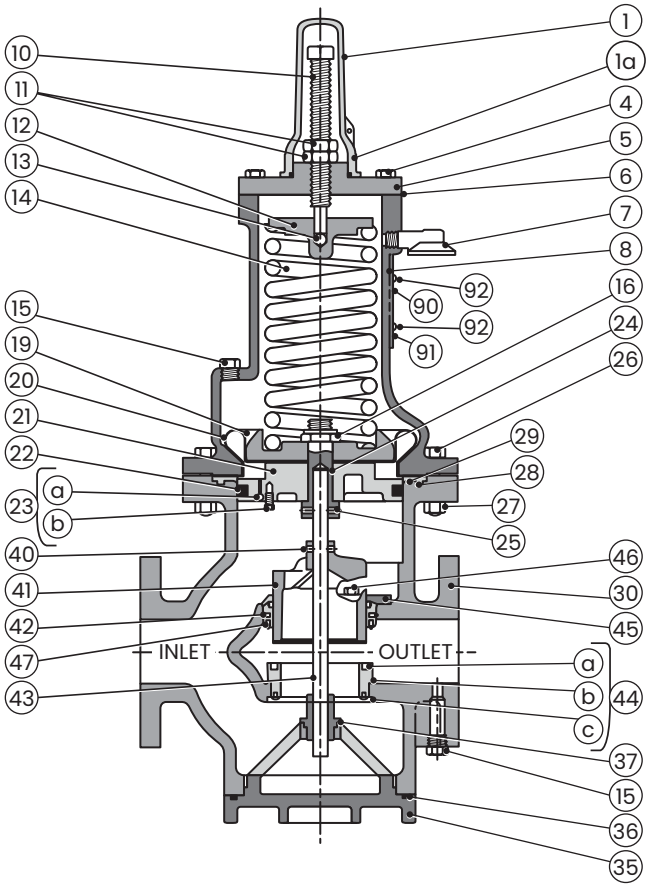
Model 257S Parts List

2", 3", and 4" Models

Illustration Number	Description	Part Number
1	Seal Cap	090-00-005-02
1a	Tetraseal (or O-ring) 1 ¾" x 2"	904092
4	Hex. Cap Screw 5/16" – 18 x 1" Gr. 5, (8 used)	910030
5	Housing Cover, ductile	091-16-380-00
6	Housing Cover, Gasket	091-00-066-30
7	Vent Cap, ¼" NPT	137-02-505-03
8	Upper Diaphragm Case	091-00-003-00
10	Spring Adjusting Screw	090-16-007-02
11	Hex. Steel Jam Nut, ⅝" – 11, (2 used)	921407
12	Top Spring Button	091-00-009-00
13	Thrust Bearing, ⅜" dia. Stainless Steel Ball	930510
14	Spring, Yellow (2 to 4 psi)	091-00-021-05
	Spring, Gray (4 to 8 psi)	091-00-021-04
	Spring, Blue (8 to 12 psi)	091-00-021-03
	Spring, Red (12 to 24 psi)	091-00-021-02
	Spring, Brown (24 to 48 psi)	091-00-021-01
	Spring, Black (48 to 65 psi)	091-00-021-00
	Spring, White (65 to 100 psi)	091-00-021-08
15	¼" NPT Sq. Hd. Steel Pipe Plug, (4 used)	906055
16	Elastic Stop Nut, ¾" – 16	903958
19	Diaphragm Plate, Upper	091-00-010-01
20*	Diaphragm and Gasket Assembly, 5" Roll-Out	115-16-350-60
21	Piston	115-16-022-70
22	O-ring, 4 ⅞" × 5 ⅜"	934055
23	23a, Stainless Steel Ball, ¼" dia.	930506
	23b, Truss Hd. (#8 – 32 × ⅜")	950426
24	Diaphragm Stud	115-16-058-60
25	Roll Pin, 3/16" × 1 ⅛" lg.	901699
26	Hex. Steel Bolt, ⅜" – 16 × 2 lg., Gr. 5, (8 used)	910059
27	Hex. Steel Nut, ⅜" – 16, (8 used)	920853
28	Tetraseal 6 ¼" × 6 ½"	904080
29	Piston Stop Ring	115-16-037-60
35	Bottom Inspection Plate	115-16-004-60
36	Tetraseal 5 ¼" × 5 ½"	904205
37	Bushing, Stainless Steel	115-16-085-52
40	Roll Pin, 3/16" × ⅞" lg.	904229
90	Nameplate	090-00-086-03
91	Nameplate	115-16-086-60
92	Rd. Hd. Type-U Drive Screw, #4 × 3/16" lg., (4 used)	903004

* Always install with cloth side and gasket toward spring.

2" and 3" Model 257S Relief Valve



Model 257S Parts List (Continued)

2" Model

Illustration Number	Description	Part Number
30	2" Body, Flanged ANSI 125 lb., FF	115-16-001-62

3" Model

Illustration Number	Description	Part Number
30	3" Body, Flanged ANSI 125 lb., FF	115-20-001-62

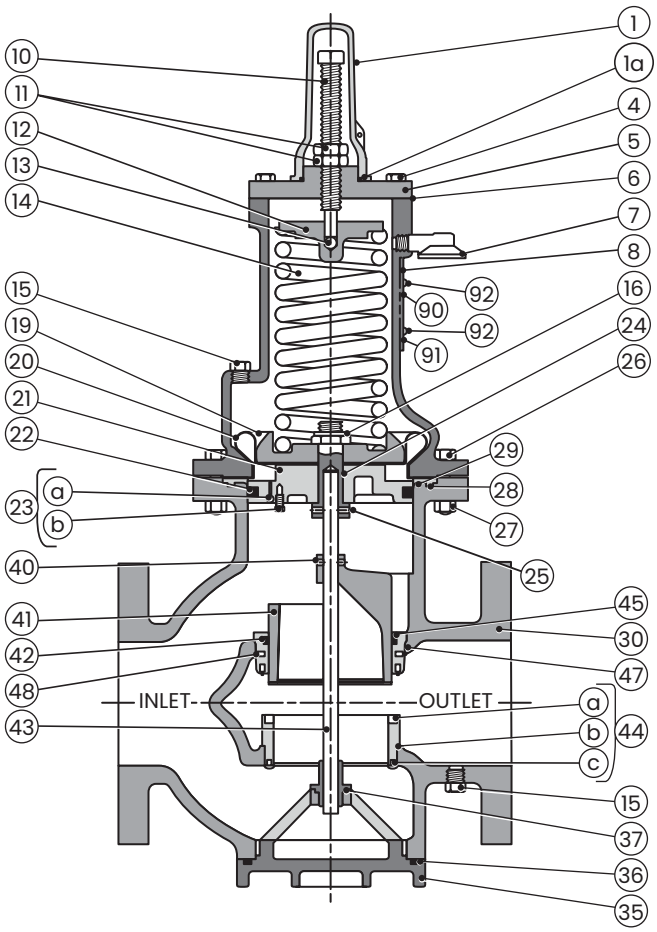
2" and 3" Model

Illustration Number	Description	Part Number
41	Valve	115-16-011-62
42	O-ring, 2 ⅞" × 3 ¼"	934039
43	Valve Stem	115-16-016-60
44	44a Valve Disc (Molded)	115-16-315-00
	44b O-ring, 2 ¹³⁄₁₆" × 3"	950647
	44c Ref. Sc. (#8 – 32 × ³⁄₁₆")	950648
44	For replaceable orifice and valve design, 2" after SN D49877 and 3" after SN D49759:	
	44a Valve and Disc Assembly	115-16-315-00
	44b O-ring, 11 ³⁄₁₆" × 3"	950647
	44c Ret. Screw #8 – 32 × ³⁄₁₆"	950648
44	For non-replaceable orifice design, 2" before SN D49878 and 3" before SN49760:	
	44a Valve Disc, Polyurethane Orange	115-16-017-65
45	Valve Guide Assembly	115-16-373-00
46	Mounting Bolt, 4 Used	950463
47	O-ring, 3 ¼" × 3 ½"	934314

4" Model

Illustration Number	Description	Part Number
30	4" Body, Flanged ANSI 125 lb., FF	115-16-001-62
41	Valve	115-22-011-61
42	O-ring, 3 ⅞" × 4 ¼"	934047
43	Valve Stem	115-22-016-62
44	For replaceable orifice and valve design, 4" after SN D50065:	
	44a Valve Disc (Molded)	115-22-315-00
	44b O-ring, 4" × 4 ³⁄₁₆"	902779
	44c Ret. Screw #8 – 32 × ³⁄₁₆"	950648
44	For replaceable orifice and valve design, 4" after SN D50066:	
	44a Valve Disc, Polyurethane Orange	115-22-017-65
	45 Valve Guide Assembly	115-22-373-00
	47 O-ring, 4 ½" x 4 ¹¹⁄₁₆"	906832
	48 Retaining Screw, (4 Used)	950662

4" Model 257S Relief Valve



Other Gases

Model 257S Relief Valves are mainly used on natural gas services; however, this relief valve will perform equally well on other gases. When using Model 250-DW and 250-S Relief Valves on other gases, the relief valve capacities must be adjusted using the following correction factors:

Type of Gas	Correction Factor
Air (Specific Gravity 1.0)	0.77
Propane (Specific Gravity 1.53)	0.63
1350 BTU Propane-Air Mix (Specific Gravity 1.20)	0.71
Nitrogen (Specific Gravity 0.97)	0.79
Dry Carbon Dioxide (Specific Gravity 1.52)	0.63

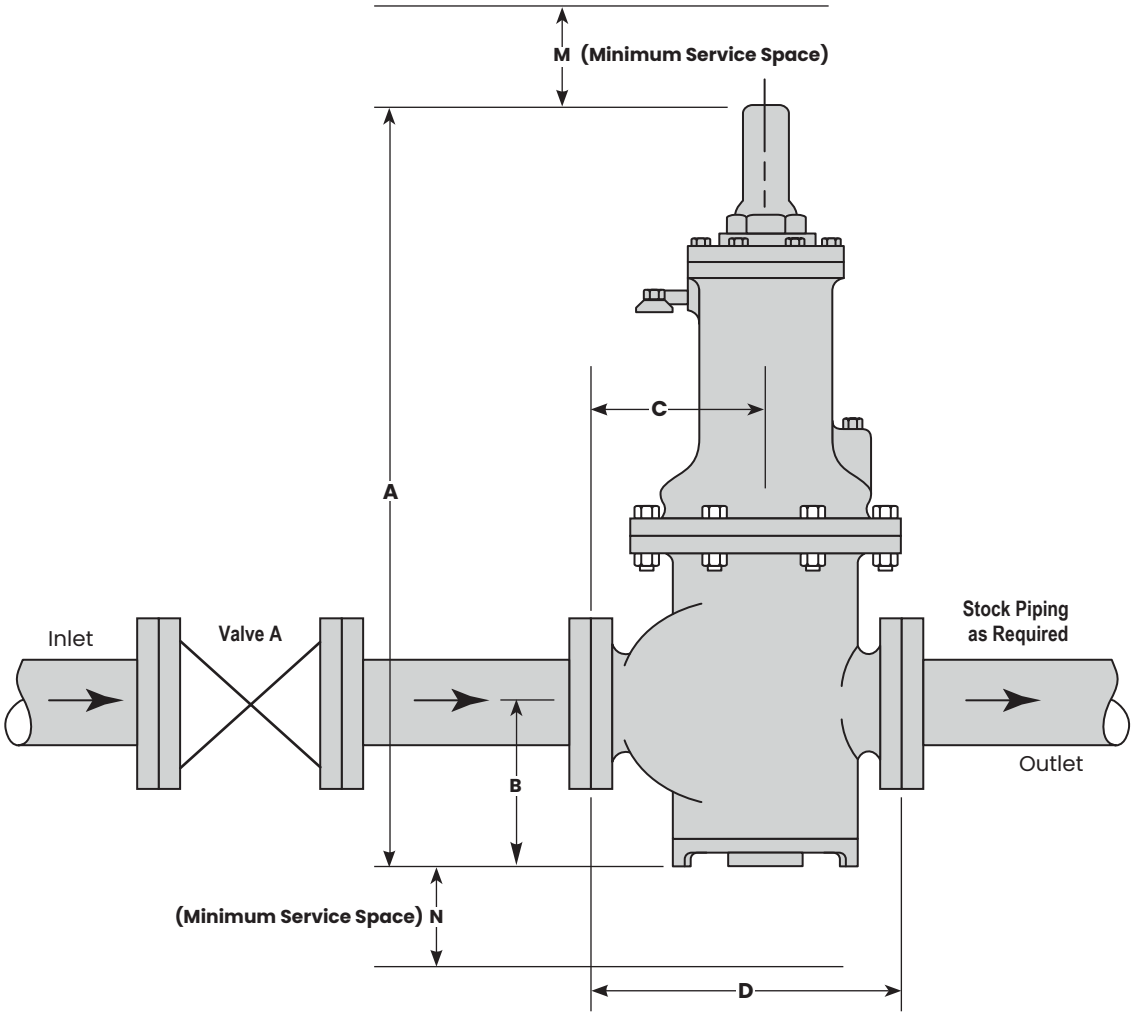
For other non-corrosive gases, use the following formula:

$$\text{Correction factor} = \sqrt{\frac{0.60}{\text{Specific gravity of the gas}}}$$

For use with gases not listed above, please contact your Utility Solutions Group Representative or Authorized Distributor for recommendations.

Typical Arrangement and Dimensions

(Indoor or Outdoor Installation)



Dimensions

Size	A	B	C	D	M	N	Weight (lbs)
2″	24 ¼″	5 ⅜″	5 ⅜″	10″	5″	5″	95
3″	24 ¾″	5 ⅜″	6 ½″	11 ¾″	5″	5″	105
4″	26 ½″	5 ⅞″	6 ¾″	12 ½″	5″	5″	125

Relief Pressure Adjustment Range

2″	3″	4″
2 to 4 psi	Yellow	091-00-021-05
4 to 8 psi	Gray	091-00-021-04
8 to 12 psi	Blue	091-00-021-03
12 to 24 psi	Red	091-00-021-02
24 to 48 psi	Brown	091-00-021-01
48 to 65 psi	Black	091-00-021-00
65 to 100 psi	White Spring nested inside Black Spring	091-00-021-00 091-00-021-08

NOTE: Do not exceed maximum pressure of each spring.

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