UTILITY SOLUTIONS GROUP

Model 441-S Regulator

Installation & Maintenance Manual

Contents

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Introduction

The Model 441-S is a balanced valve, spring type regulator. It is a general purpose unit, manufactured in various different pipe and inner valve sizes. Its basic design has been combined with sturdy construction to make it exceptionally dependable.

The Model 441-S has a fast, accurate response making it an excellent choice for monitoring where speed is a significant factor.

It is used most extensively for natural gas. However, it is equally effective when used for air, liquid propane gas (LPG), nitrogen, dry carbon dioxide (CO_2), and others.

Installation and Start-Up

1. Thoroughly purge inlet piping to remove dirt and debris which could damage the regulator or impair its operation.

NOTE: If this cannot be done, a filter or strainer should be installed ahead of the regulator. Ensure that regulator is free of any dirt or foreign matter that might have collected.

2. Place regulator in the line with high-pressure connected to the inlet side. On flanges, tighten bolts evenly.

NOTE: Ensure that shipping screens or covers, if used, are removed from the inlet and outlet.

Where required, the regulator may be inverted. It may also be installed in a vertical line. However, if installed in a vertical line, this could cause excessive wear to anti-friction bushing.

3. From the ½" union (**60**), extend pipe or tubing to the control connection into the outlet piping.

NOTE: Control piping should not be less than ½" in size and should be adequately protected against breakage. Regulators will go wide open if the control line is broken.

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.

NOTE: The regulator will work to deliver the adjusted pressure at the point in the outlet piping where the control connection is located. Control connection should be at least eight pipe diameters from the regulator and should be in as straight a run of pipe as possible.

CAUTION

Interior of both the control line and its connections should be clean and smooth to minimize turbulence. Remove any rough edges, welding debris, etc. Where outlet piping increases in size near the regulator, it is recommended to locate the control connection in the larger size. Keep pipe dope and all other foreign substances out of the control line.

The ½" union (60) contains a small orifice, approximately 1/16" diameter. This orifice should not be removed. Ensure this orifice is open and free of foreign material.

Regulators installed indoors or in a non-vented area must be vented to the outside.

For outdoor installations, it is recommended the regulator be installed so the regulator vent faces downward to avoid becoming obstructed.

CAUTION

The diaphragm case 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 chances for foreign material collecting in the vent side of the regulator diaphragm.

4. Check all connections for leaks.
5. Put the regulator into operation as follows: (see Typical Installation illustration on Page 10)
   a. Slowly open the downstream control line valve A.
   b. Slowly open the downstream block valve B.
   c. Very slowly open the upstream block valve C.
   d. Set the adjusting screw (**10**) for the required outlet pressure. Turn it clockwise to increase the pressure and counterclockwise to decrease it. Only make this adjustment when gas is actually flowing through the regulator.

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 outlet pressure during start-up to prevent an outlet pressure overload.

   e. After adjustment is complete, the lock-nut (**11**) should be tightened firmly and the seal cap (**1**) replaced.
6. To shut down, carefully close valves C, B, and A in that order.

Servicing and Adjustment

(See Illustrations on Page 6 for emboldened numbers.)

General Notes

1. Ensure the regulator is entirely depressurized before servicing.
2. A visual inspection of the valve can be made by removing inspection plates (**38**) from the sides of the body. These also provide greatly improved access to the valve when servicing or adjusting.
3. The valve and body parts are interchangeable with other Model 441 Regulators (441-57S, 441-X57, 441-VPC, 441-2100, etc.).
4. 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. Only use moly or silicone type lubricants. Avoid the use of petroleum base types. Lubricate the stem (**24**), guide (**50h**) and stem O-rings (**23**) and (**12n**) with dry silicone lubricant to help ensure free movement and a tight seal. An application of lubricant to other O-rings and the tetraseals in the regulator will also help ensure they seal.

CAUTION

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

Remove Valves

1. Remove seal cap (**1**), back off adjusting screw (**10**), remove housing cover (**5**), and remove spring (**14**).
2. Remove bottom inspection plate (**33**), and side plates (**38**).
3. Insert an Allen wrench through side inspection opening and loosen Allen screw (**50h**).
4. Unscrew lower valve assembly and remove through bottom opening, (**50h**) unscrews from (**24**).
5. Unscrew upper valve assembly and remove through side opening, (**50e**) or (**50j**) unscrews from (**24**).

NOTE: If upper valve assembly is too large to remove through side opening, remove it through bottom opening by also removing outlet orifice (**29**), (remove cap screws (**26**) to remove orifice, and, if tight, jack out using cap screws in jacking holes).

The entire valve assembly may be removed intact through bottom opening by also removing orifice (**29**). This method leaves the lock-up adjustment undisturbed.

Use care when handling orifice gasket (**27**).

6. To disassemble upper and/or lower valve assembly, remove nuts (**50a**).

Replace and Adjust Valves

1. Assemble upper valve assembly parts (**50a**), (**50b**), (**50c**), (**50d**), (**50e**), (**50f**), (**50g**), and (**50j**). Assemble lower valve assembly parts (**50a**), (**50b**), (**50c**), (**50d**), and (**50h**)). Firmly tighten nuts (**50a**), then firmly tighten (**50i**) against (**50a**).
2. Insert upper valve assembly and screw into place by a few turns, (**50e**) or (**50i**) should be screwed together until it bottoms and then backed off one-half to one-full turn.
3. If orifice (**29**) was removed, reinstall it.
4. Inset lower valve assembly and screw into place by a few turns, (**50h**) screws into (**50e**).
5. Turn upper valve assembly so Allen screw (**50g**) is accessible through side inspection opening.
6. Make the valve lock-up adjustment as follows:
   a. Hold upper valve against its seat. This can be done by hand by reaching through side inspection opening.
   b. While holding the upper valve against its seat, screw lower valve assembly upwards until the lower valve also touches its seat. When both upper and lower valves are touching their seats they are correctly adjusted for tight lock-up.
   c. Firmly tighten Allen screw (**50g**). This locks the adjustment by evenly and tightly locking (**50h**) and (**50e**) together.

NOTE: If the entire valve assembly was removed intact and Allen screw (**50g**) has not been loosened, valve assembly may be reinstalled without making the lock-up adjustment.

Remove Orifices

1. Remove outlet orifice (**29**), (see steps 1 through 5 under section "Remove Valves").
2. Remove inlet orifice 28 as follows:
   a. Remove seal cap (**1**), back off adjusting screw (**10**), remove housing cover (**5**), and remove spring (**14**).
   b. Remove bottom inspection plate (**33**). Unscrew upper valve assembly (**50h**), (**50e**) or (**50i**) unscrews from (**24**).
   c. Remove diaphragm case assembly by first opening union (**60**) and removing cap screws (**34**).
   d. Remove cap screws (**26**) and remove inlet orifice (**28**). If orifice is tight, jack out cap screws in jacking holes. Use care with gasket (**27**).
   e. When replacing diaphragm assembly, the threaded connection between (**24**) and (**50e**) or (**50i**) should be screwed together until it bottoms and then backed off one-half to one-full turn

Servicing Diaphragm

1. Remove seal cap (**1**), back off adjusting screw (**10**), remove housing cover (**5**), and remove spring (**14**).
2. Remove bolts (**42**) and carefully remove upper diaphragm case (**43**).
3. Turn diaphragm assembly counterclockwise until diaphragm stem (**24**) unscrews from (**50e**) or (**50i**). Remove assembly and inspect diaphragm.
4. If a new diaphragm (**20**) is required, remove nut (**16**) and disassemble.
5. Reassemble diaphragm assembly parts (**16**), (**17**), (**18**), (**19**), (**20**), (**21**), (**22**), (**23**), and (**24**).
6. Screw diaphragm assembly back into place, (**24**) screws into (**50e**) or (**50i**) until it bottoms and then back it off one-half to one-full turn
7. Carefully reinstall upper diaphragm case (**43**).

NOTE: Diaphragm must not be pinched between upper case (**43**) and lower cases (**40**). Tighten bolts (**42**) evenly.

8. Replace spring and reassemble, (see steps 7 through 10 of section "Assemble 461-57S").

Changing Spring

(See "Spring Ranges" table on Page 10 for spring identification and selection.)

1. Remove seal cap (**1**), back off adjusting screw (**10**), remove housing cover (**5**), and remove spring (**14**).
2. Insert the new spring, ensuring it nests correctly onto part (**15**).
3. To complete reassembly, (see steps 7 through 9 of section "Assemble 441-S").

Assembling 441-S

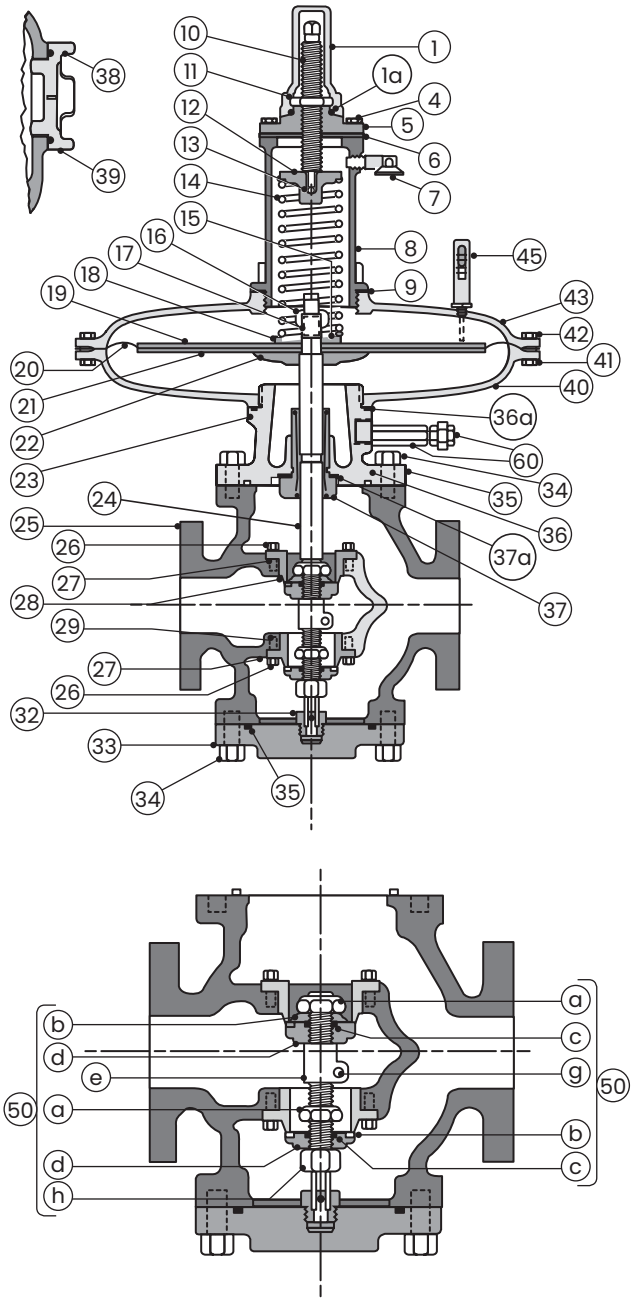
1. Install orifice (**28**) through top opening.
2. Install valve assembly and orifice (**29**), (see steps 1 through 6 under section "Replace and Adjust Valves" on Page 4).

NOTE: Do not screw (**50e**) or (**50i**) into (**24**) yet.

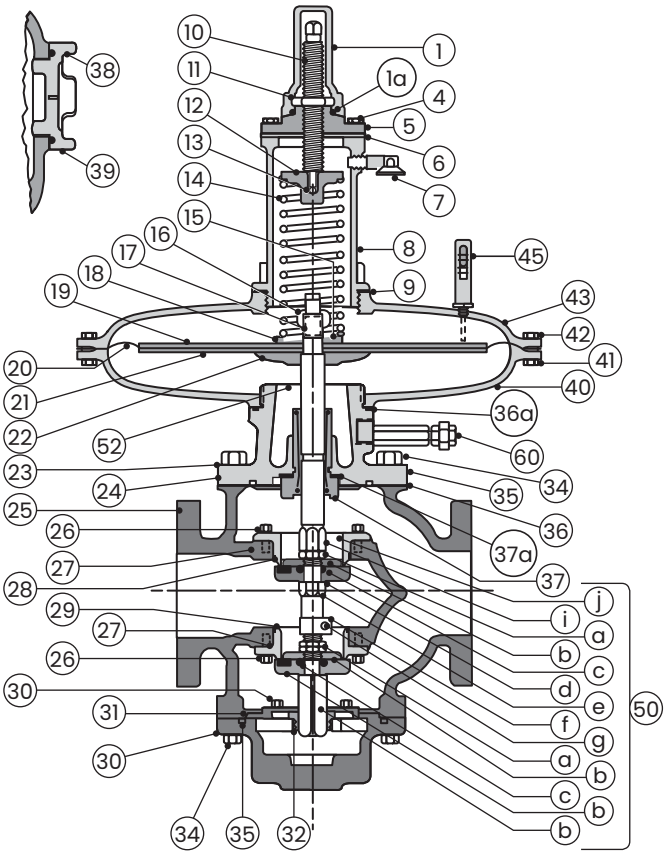
3. Install centerpiece (**36**) and lower diaphragm case (**40**).
4. Install diaphragm assembly and upper case (**43**), (see steps 5 through 7 under "Service Diaphragm" on Page 4).
5. Replace bottom plate (**33**). Line up bottom end of (**50h**) into (**31**) and/or (**32**), then rotate bottom plate either driection to first matching bolt hole position.
6. Insert the spring ensuring it nests correctly onto part (**15**).
7. Insert top spring button (**12**), ensuring it is nested correctly on the spring.
8. Install housing cover (**5**). Ensure ball (**13**) is in place and the lower end of adjusting screw (**10**) goes in the hole in button (**12**).
9. Set adjusting screw (**10**) for desired outlet pressure, firmly tighten nut (**11**), and replace seal cap (**1**).

Model 441-S Illustrations

2" and 3" Model 441-S



4" Model 441-S



Model 441-S Condensed Parts List

2" and 3" Models

Illustration Number	Description	Part Number
32	Guide Bushing with Pin, Brass	090-16-385-01
	Guide Bushing with Pin, Stainless Steel	090-16-385-03
34	Hex Cap Screw, ½" – 13 × 1 ¼"	910106
35	Tetraseal (or O-ring), 4 ⅜" × 4 ⅝"	904085
36a	Tetraseal, 4" × 4 ¼"	904084
37	Centerpiece, Stem Bushing	090-16-373-00
37a	Aluminum Seal Ring	090-26-178-00
39	Tetraseal (or O-ring), 3 ¼" × 3 ½"	904078
50	Valve Assembly, 1 ¾", Brass Trim, Buna-N (Black, 50-55 Duro)	090-16-515-27
	Valve Assembly, 1 ¾", Stainless Trim, Buna-N (Black, 50-55 Duro)	090-16-515-50
	Valve Assembly, 1 ½", Brass Trim, Buna-N (Black, 50-55 Duro)	090-16-515-31
	Valve Assembly, 1 ½", Stainless Trim, Buna-N (Black, 50-55 Duro)	090-16-515-51
50a	Valve Retaining Nut, ⅝" – 18	905564
50b	Valve Retainer, Standard, Steel, 1 ¾"	090-16-018-00
	Valve Retainer, Standard, Stainless Steel, 1 ¾"	090-16-018-30
	Valve Retainer, V-Port Wings, Stainless Steel, 1 ¾"	090-16-012-53
	Valve Retainer, Standard, Steel, 1 ½"	090-16-018-01
	Valve Retainer, Standard, Stainless Steel, 1 ½"	090-16-018-31
	Valve Retainer, V-Port Wings, Steel, 1 ½"	090-16-012-52
	Valve Retainer, V-Port Wings, Stainless Steel, 1 ½"	090-16-012-55
50c	O-ring, ⅝" × 13⁄16"	934012
50d	Molded Valve, 1 ¾", Buna-N (Black, 50-55 Duro)	090-16-315-00
	Molded Valve, 1 ½", Buna-N (Black, 50-55 Duro)	090-16-315-01
	Molded Valve, 1 ¾", Polyurethane (Red, 65-75 Duro)	090-16-315-02
	Molded Valve, 1 ½", Polyurethane (Red, 65-75 Duro)	090-16-315-03
50e	Female Valve Stem, Brass	090-16-116-00
	Female Valve Stem, Stainless Steel	090-16-116-01
50g	Adjustment Clamp Screw, Soc. Hd. Screw, #10 – 24 × ½" Lg.	903486
	Adjustment Clamp Screw, (1 ½" valve only)	090-16-046-01
50h	Male Valve Stem, Brass	090-16-016-01
	Male Valve Stem, Stainless Steel	090-16-016-02

2" Models

Illustration Number	Description	Part Number
16	Hex Cap Screw, ¼" – 20 × ½" Lg., 120,000 tensile	910001
18	O-ring, for Orifices	904832
28	1 ¾" Inlet Orifice, Plated Steel	090-16-028-00
	1 ¾" Inlet Orifice, Stainless Steel	090-16-028-50
	1 ½" Inlet Orifice, Plated Steel	090-16-028-01
	1 ½" Inlet Orifice, Stainless Steel	090-16-028-51
29	1 ¾" Outlet Orifice, Plated Steel	090-16-029-00
	1 ¾" Outlet Orifice, Stainless Steel	090-16-029-50
	1 ½" Outlet Orifice, Plated Steel	090-16-029-01
	1 ½" Outlet Orifice, Stainless Steel	090-16-029-51

3" Models

Illustration Number	Description	Part Number
16	Hex Cap Screw, ¼" – 20 × ½" Lg., 120,000 tensile	910001
18	O-ring, for Orifices	904832
28	2 ⅛" Inlet Orifice, Plated Steel	090-20-028-00
	2 ⅛" Inlet Orifice, Stainless Steel	090-20-028-50
	1 ¾" Inlet Orifice, Plated Steel	090-20-028-02
	1 ¾" Inlet Orifice, Stainless Steel	090-20-028-52
	1 ½" Inlet Orifice, Plated Steel	090-20-028-03
	1 ½" Inlet Orifice, Stainless Steel	090-20-028-53
29	2 ⅛" Outlet Orifice, Plated Steel	090-20-029-00
	2 ⅛" Outlet Orifice, Stainless Steel	090-20-029-50
	1 ¾" Outlet Orifice, Plated Steel	090-20-029-02
	1 ¾" Outlet Orifice, Stainless Steel	090-20-029-52
	1 ½" Outlet Orifice, Plated Steel	090-20-029-03
	1 ½" Outlet Orifice, Stainless Steel	090-20-029-53
50		090-20-515-30
		090-20-515-50
		090-20-515-40
		090-20-515-60
50b		090-20-018-30
		090-20-012-51
50d		090-20-315-00
		090-20-315-02

Condensed Parts List (Continued)

4" Models

Illustration Number	Description	Part Number
26	Hex Cap Screw, ⅜" – 16 × ¾" Lg., 120,000 tensile	910053
27	O-ring, for Orifices	905583
28	3" Inlet Orifice, Plated Steel	090-22-028-00
	3" Inlet Orifice, Stainless Steel	090-22-028-50
	2 ⅛" Inlet Orifice, Plated Steel	090-22-028-02
	2 ⅛" Inlet Orifice, Stainless Steel	090-22-028-52
	1 ¾" Inlet Orifice, Plated Steel	090-22-028-01
	1 ¾" Inlet Orifice, Stainless Steel	090-22-028-51
29	3" Outlet Orifice, Plated Steel	090-22-029-00
	3" Oulet Orifice, Stainless Steel	090-22-029-50
	2 ⅛" Oulet Orifice, Plated Steel	090-22-029-02
	2 ⅛" Oulet Orifice, Stainless Steel	090-22-029-52
	1 ¾" Oulet Orifice, Plated Steel	090-22-029-01
	1 ¾" Oulet Orifice, Stainless Steel	090-22-029-51
30	Hex Cap Screw, ⅜" – 16 × 1" Lg.	910055
31	Spin Stop Plate	090-22-040-01
32	Guide Bushing, Brass	090-22-074-00
	Guide Bushing, Stainless Steel	090-22-074-01
34	Hex Cap Screw, ⅝" – 11 × 1 ½"	910157
	Hex Cap Screw, ⅝" – 11 × 1 ¾", for Ductile Bottom Plate	910158
35	Tetraseal (or O-ring), 6 ¼" × 6 ½"	904080
36a	Tetraseal (or O-Ring), 4" × 4 ¼"	904084
37	Centerpiece Stem Bushing	090-16-373-02
37a	Aluminum Seal Ring	090-26-178-00
39	Tetraseal (or O-ring), 4 ¼" × 4 ½"	904083
50	Valve Assembly, 3", Brass Trim, Buna-N (Black, 50-55 Duro)	090-22-515-30
	Valve Assembly, 3", Stainless Trim, Buna-N (Black, 50-55 Duro)*	090-22-515-50
50a	Valve Retaining Nut, ¾" – 16	090-22-034-00
50b	Valve Retainer, Standard, Iron, 3"	090-22-018-03
	Valve Retainer, Standard, Stainless Steel, 3"	090-22-018-00
	Valve Retainer, V-Port Wings, Iron, 3"	090-22-012-20
	Valve Retainer, V-Port Wings, Stainless Steel, 3"	090-22-012-40
	Valve Retainer, Standard, Iron, 2 ⅛"	090-22-018-01
	Valve Retainer, Standard, Stainless Steel, 2 ⅛"	090-22-018-31
	Valve Retainer, V-Port Wings, Stainless Steel, 2 ⅛"	090-22-012-51
	Valve Retainer, Standard, Stainless Steel, 1 ¾"	090-22-018-34

Illustration Number	Description	Part Number
50c	O-Ring, ¹³⁄₁₆" × 1"	904173
50d	Molded Valve, 3", Buna-N (Black, 50-55 Duro)	090-22-315-00
	Molded Valve, 2 ⅛", Buna-N (Black, 50-55 Duro)	090-22-315-01
	Molded Valve, 1 ¾", Buna-N (Black, 50-55 Duro)	090-22-315-04
	Molded Valve, 3", Polyurethane (Red, 65-75Duro)	090-22-315-02
	Molded Valve, 2 ⅛", Polyurethane (Red, 65-75Duro)	090-22-315-03
	Molded Valve, 1 ¾", Polyurethane (Red, 65-75Duro)	090-22-315-05
50e	Female Valve Stem, Brass	090-22-016-40
	Female Valve Stem, Stainless Steel	090-22-016-41
50f	Adjustment Clamp Ring, Stainless Steel	090-22-043-02
50g	Adjustment Clamp Screw, Soc. Hd. Screw, ¼" – 20 × ¾" Lg.	903494
50h	Male Valve Stem, Stainless Steel	090-22-116-01
50i	Stem Extension, Stainless, (20" Diaphragm Only)	090-22-058-40
	Stem Extension, Stainless, (18" and smaller diaphragms)	090-22-058-41
52	Travel Stop, for 3" Valves	090-22-040-51
	Travel Stop, for 2 ⅛" and 1 ¾" valves	090-22-040-55

All Models

Illustration Number	Description	Part Number
1a	Tetraseal (or O-Ring) 1 ¾" × 2"	904092
4	Hex Cap Screw, ⁵⁄₁₆" – 18 × ¾"	910028
6	Spring Cage Cover Gasket	090-16-066-30
7	Vent Cap, ¼" NPT	137-02-505-02
9	Spring Cage Gasket	090-16-066-60
13	Thrust Bearing, ⅜" Diameter Stainless Steel Ball	930510
16	Hex Steel Nut, ⅝" – 18	905993
18	Seal Gasket, (2 used)	014-76-179-03
20	7" Diaphragm	090-78-150-21
	10" Diaphragm	090-70-150-20
	12" Diaphragm	090-71-150-20
	14" Diaphragm	090-72-150-20
	16" Diaphragm	090-73-150-20
	18" Diaphragm	090-74-150-20
	20" Diaphragm	090-75-150-20
23	O-ring, ¹¹⁄₁₆" I.D., ⅞" O.D.	934013
24	Diaphragm Connecting Stem, Stainless Steel	090-16-058-00
41	Hex Steel Nut, ⅜" – 16	920853
42	Hex Cap Screw, ⅜" – 16 × 1 ⅜" Lg.	903568
45	Travel Indicator Assembly	Contact USG Rep

Overpressurization Protection

Methods of overpressuirzation protection include relief valves, monitor regulators, shutoff devices, or similar mechanisms. These protect the downstream piping system and the regulator's low-pressure chambers against overpressurization due to possible regulator malfunction or failure to achieve complete lockup. The allowable outlet pressure is the lowest of the maximum pressures permitted by federal codes, state codes, and other applicable standards.

Maximum Emergency Pressures

NOTE: Ensure this entire section is clearly understood before using any of the following data.

The maximum inlet pressure the Model 441-S Regulator may be subjected to under abnormal conditions without causing damage to the regulator is:

Maximum Inlet Pressure ..... 125 psi

The maximum outlet pressures the Model 441-S Regulator may be subjected to under abnormal conditions without causing damage to the regulator is are:

10" Diaphragm ..... Set-point + 4 psi
12" Diaphragm ..... Set-point + 3 psi
14" Diaphragm ..... Set-point + 2 psi
16" Diaphragm ..... Set-point + 1 psi
18" Diaphragm ..... Set-point + 1 psi
20" Diaphragm ..... Set-point + 1 psi

NOTE: Set-point is defined as the outlet pressure a regulator is adjusted to deliver.

The maximum pressure that can be safely contained by the diaphragm case is:

10" Diaphragm ..... 15 psi
12" Diaphragm ..... 10 psi
14" Diaphragm ..... 10 psi
16" Diaphragm ..... 5 psi
18" Diaphragm ..... 5 psi
20" Diaphragm ..... 5 psi

NOTE: Safely contained means no leakage as well as no bursting.

If any of the above pressure limits are exceeded, the regulator must be taken out of service and inspected. Damaged or otherwise unsatisfactory parts must be repaired or replaced.

Maximum Inlet Pressures

Regulator Body Type	441-S Body Material	Maximum Working Body Pressure	Maximum Inlet Pressure
Threaded	Cast Iron	250 psi	100 psi
Flanged ANSI 125 lb. FF	Cast Iron	175 psi	
Flanged ANSI 250 lb. RF	Ductile Iron	575 psi	
Flanged ANSI 300 lb. RF	Cast Steel	720 psi	

Other Gases

The Model 441-S regulators are mainly used with natural gas. However, they perform equally as well with liquid propane gas (LPG), nitrogen, dry carbon dioxide (CO_2), air and others. When using with other gases, the regulator 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.

Monitoring

The Model 441-S Regulator makes an excellent monitor. It can act as a standby regulator installed in series, which assumes control if a failure in the operating regulator permits the outlet pressure to exceed the set-point. It can be located in either the upstream or the downstream position.

When a Model 441-S Regulator is used to monitor a regulator with an identical inner valve (another 441 Regulator), the total maximum capacity through both regulators can be figured at 70% of the capacity of one regulator alone. This applies with the monitor located either upstream or downstream.

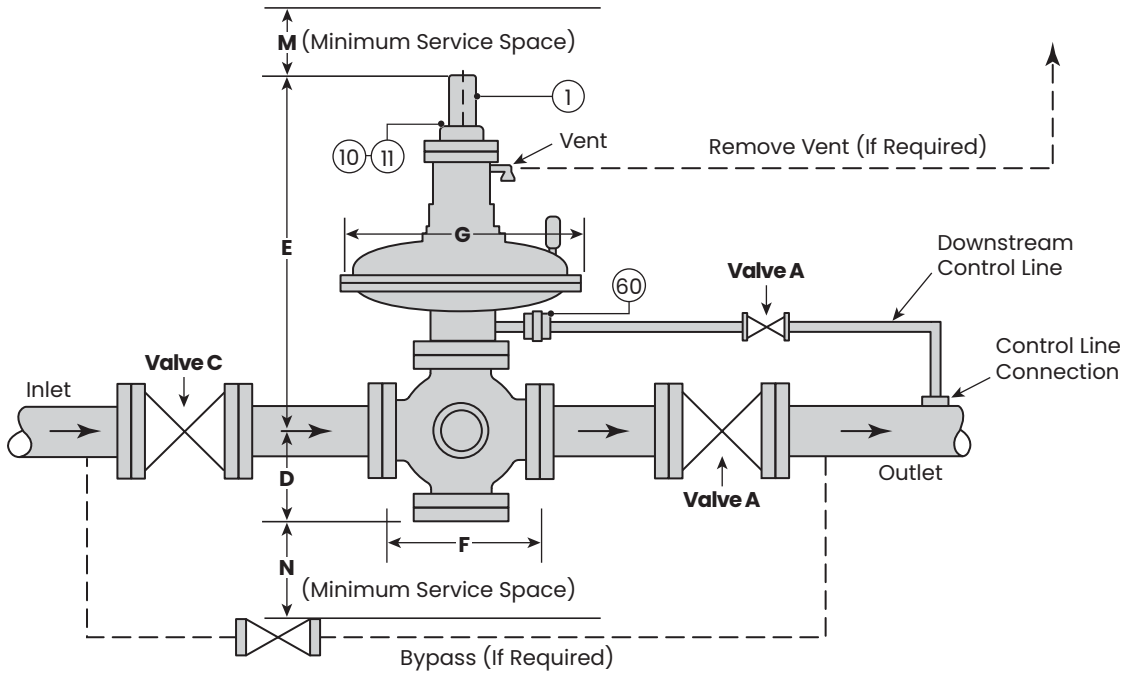
Temperature Limits

The Model 441-S Regulator can be used for flowing temperatures from -20°F to 150°F.

Buried Service

The Model 441-S Regulator is not recommended for buried service.

Typical Arrangement and Dimensions



Pipe Size of 441-S	D	E	G	M	N
2"	6"	24"	See Spring Ranges Table Below	5"	7"
3"	6"	24"		5"	7"
4"	9 ½"	26"		5"	8"

Regulator Body Type	F (Face to Face)		
	2" Pipe	3" Pipe	4" Pipe
Threaded	10"	-	-
Flanged ANSI 125 lb.	10"	11 ¾"	13 ⅞"
Flanged ANSI 250 lb.	10 ½"	12 ½"	14 ½"
Flanged ANSI 300 lb.	10 ½"	12 ½"	14 ½"

Spring Ranges

Spring Color	Diaphragm Size -Nominal I.D. (O.D. in parenthesis is dimension "G" in table above)					
	20" (23 ⅛")	18" (20 ⅝")	16" (18 ⅝")	14" (16 ⅜")	12" (14 ¾")	10" (13 ⅛")
Aluminum	4 ¼" to 6" w.c.	4 ¼" to 4 ¾" w.c.	5 ¼" to 7" w.c.	7" to 10 ½" w.c.	8 ½" to 13" w.c.	-
Green	4 ¾" to 7" w.c.	4 ¾" to 6 ½" w.c.	7" to 10 ½" w.c.	8 ½" to 12" w.c.	10 ½" to 17" w.c.	-
Yellow	5 ¼" to 8 ½" w.c.	6" to 10 ½" w.c.	8 ½" to 15 ½" w.c.	10 ½" to 17" w.c.	12" to 23" w.c.	-
Gray	8 ¼" to 13" w.c.	10 ½" to 17" w.c.	14" w.c. to 1 psi	17" w.c. to 1 ¼ psi	21" w.c. to 1 ½ psi	1 ¼ to 2 psi
Blue	9 ½" to 20" w.c.	16 ½" to 21" w.c.	21" w.c. to 1 ¾ psi	21" w.c. to 2 psi	1 ¼ to 2 ½ psi	1 ½ to 3 ¼ psi
Red	-	-	-	1 ½ to 3 ¾ psi	1 ¾ to 4 psi	2 ½ to 6 psi
			Compatible Diaphragm Sizes for 2" Model 441-S			
		Compatible Diaphragm Sizes for 3" Model 441-S				
	Compatible Diaphragm Sizes for 4" Model 441-S					

NOTE: Springs are colored for identification. When shipped, the regulator is equipped with the lightest spring suitable for the maximum outlet pressure specified on order. If outlet pressure conditions change, replace spring accordingly to table below for best operation. For best performance use the largest diaphragm for the spring and pipe size selected.

For pressures below 4" w.c. install the Model 441-S upside down.

UTILITY SOLUTIONS GROUP

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