MODEL KPRH HIGH PRESSURE REGULATOR

The model KPRH is a direct-acting pressure reducing regulator for use with natural gas, air, and a variety of other gases. The outlet pressure is controlled by a diaphragm and adjustable spring that opens or closes the valve as the downstream flow demand changes. A decrease in flow demand will cause the downstream pressure to increase and consequently, the diaphragm will compress the spring. The positive movement of the diaphragm will move the seal closer to the orifice, thus restricting the flow and causing the downstream pressure to decrease. An increase in flow demand will cause the downstream pressure to decrease and the spring force will push the diaphragm and move the seal further away from the orifice. Moving the seal further from the orifice will result in an increase in flow and pressure. There are five orifice sizes and six springs available to cover a wide range of application conditions. With the correct orifice and spring combination, the Kenco model KPRH High Pressure Regulator will maintain a constant pressure downstream while meeting the flow demand.

FEATURES

- 1" NPT or 2" NPT process connections.
- 1/8" NPT spring housing vent port with vented plug.
- Five different orifice sizes to accommodate a wide range of flow requirements.
- Six different spring options cover a wide variety of outlet pressures.
- Up to 1500 PSI of inlet pressure.
- Orifice and seal holder come standard in 316 Stainless Steel.
- Inlet adapter machined from carbon steel bar stock.
- Body and diaphragm housing constructed of sturdy cast steel.
- Spring housing constructed of sturdy cast aluminum.
- Wetted pressure retaining components comply with NACE MR0175.

APPLICATIONS:

- Fuel Gas Scrubbers/Filters
- Separators
- Dehydration Systems
- Gas Gathering
- Farm Taps
- Flare and Burner Systems

OPERATING PARAMETERS

Maximum Inlet Pressure	Based on Orifice Size and Seal Material
Maximum Body / Diaphragm Housing Pressure Rating	550 PSI
Maximum Outlet Pressure	Determined by Spring Note: Actual set point cannot exceed the pressure range of the selected spring.
Maximum Body Overpressure	200 PSI Above Set Point Note: This applies to set points of 350 PSI or less. The body pressure must never exceed its rating of 550 PSI.
Minimum / Maximum Operating Temperature	-20 °F to 180 °F (0 °F to 180 °F if FKM is present)

PRODUCT SPECIFICATIONS

Inlet / Outlet Port Sizes	1" NPT or 2" NPT	
Outlet Pressure Ranges and Spring Color*	27-50 PSI	Red
	46-95 PSI	White
	90-150 PSI	Gray
	150-200 PSI	Green
	200-275 PSI	Blue
	275-500 PSI	Yellow
Orifice Sizes	1/8", 3/16", 1/4", 3/8" or 1/2"	

*Outlet pressure ranges 27-50 PSI and 46-95 PSI are factory set at 27 PSI and 46 PSI. All other outlet pressure ranges are factory set at 90 PSI. Since inlet pressures are application specific, startup outlet pressure may differ from factory setting.

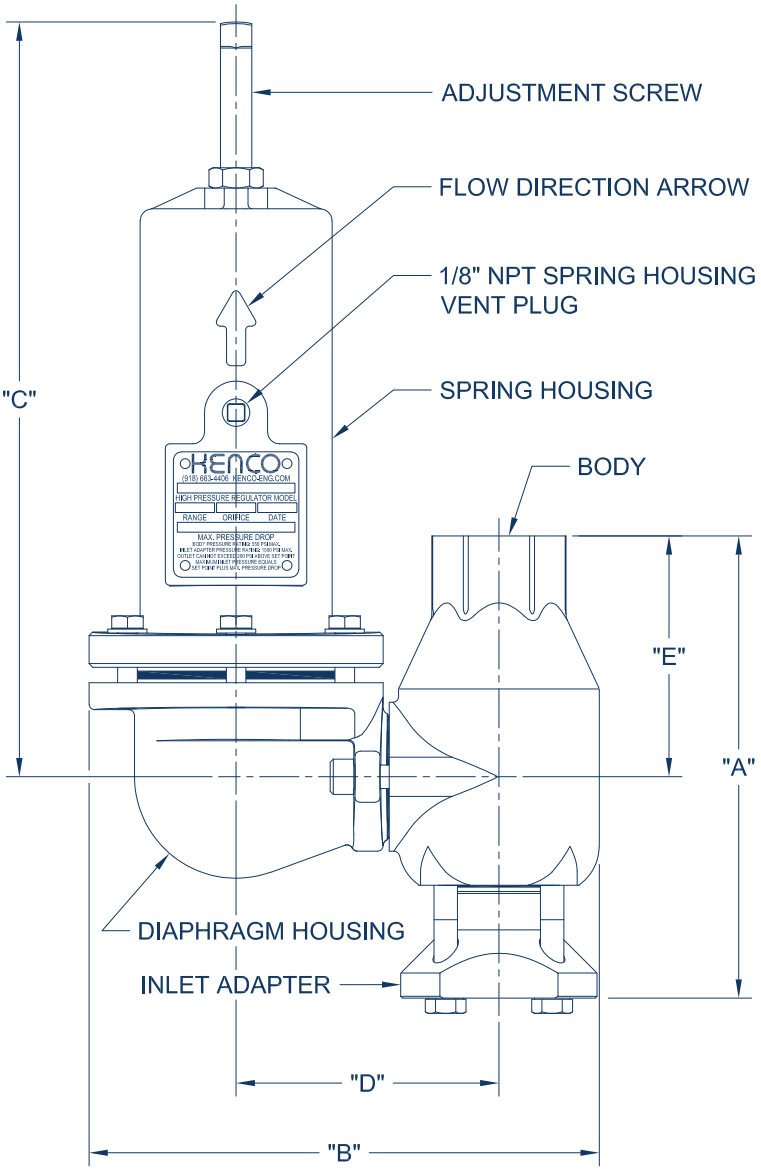
MATERIALS OF CONSTRUCTION

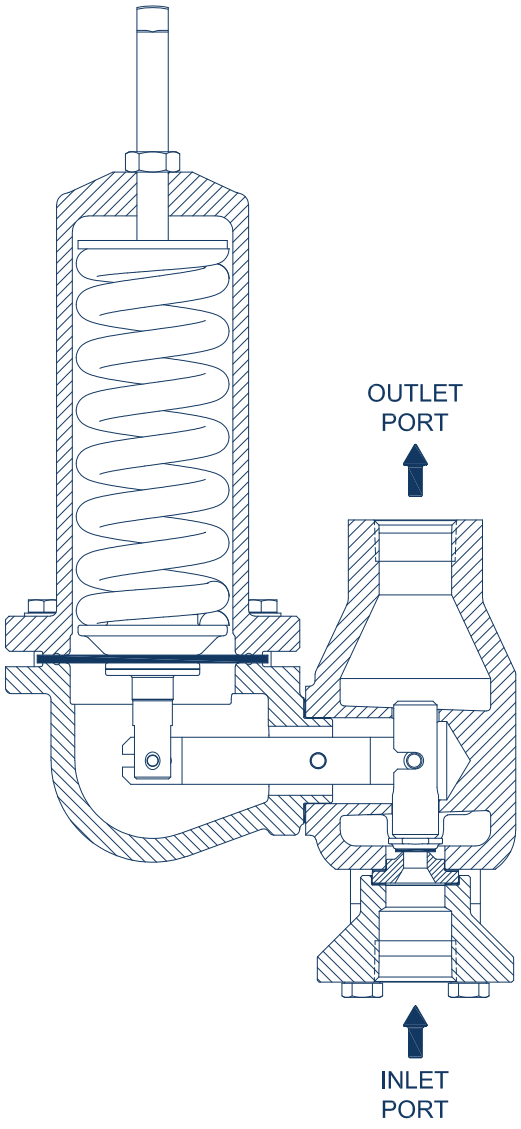
Body	ASTM A216 WCC Carbon Steel
Diaphragm Housing	ASTM A216 WCC Carbon Steel
Inlet Adapter	ASTM A105 Carbon Steel
Spring Housing	356 Cast Aluminum
Orifice and Seal Holder	316 Stainless Steel
Diaphragm	Neoprene or Fluorocarbon
Orifice Seal	Nitrile, Nylon, PTFE or Fluorocarbon
Gaskets	Flexible Graphite

Note: All wetted pressure retaining components comply with NACE MR0175.

DIMENSIONAL INFORMATION

Inlet / Outlet Size	"A"	"B"	"C"	"D"	"E"
1" NPT	7.37"	8.14"	12.03"	4.19"	3.84"
2" NPT	7.88"	8.69"	12.03"	4.19"	4.08"





MAXIMUM INLET PRESSURES/ PRESSURE DROPS (PSI)

Orifice Size	Maximum Inlet Pressure*	Maximum Pressure Drop			
		Nitrile Orifice Seal	Nylon Orifice Seal	PTFE Orifice Seal	FKM Orifice Seal
1/8"	1500	600	1500	1500	200
3/16"	1500	600	1500	1500	200
1/4"	1500	600	1000	1000	200
3/8"	1000	500	500	500	200
1/2"	750	250	250	250	200

*The Inlet Pressure can never exceed the sum of the set point and Maximum Pressure Drop. For example, a KPRH with a 3/8" orifice, Nitrile Orifice Seal, and 90 PSI Outlet Pressure set point has a Maximum Inlet Pressure of 590 PSI.

ORIFICE SELECTION INSTRUCTIONS:

Select the correct orifice size by comparing the wide open flow capacity at the application conditions to the flow rate needed for the application. Using application conditions, calculate the flow rate ("Q") through each orifice size using the Universal Gas Sizing (Equation 1) and Wide Open Flow Coefficients below. Select the smallest orifice size that will meet the required flow rate needs. After selecting the orifice, make sure the application inlet pressure does not exceed the pressure rating listed in the Maximum Inlet Pressures table above.

UNIVERSAL GAS SIZING EQUATIONS

Equation to Determine Critical Flow*	IF $\left[\left(\frac{3417}{C1}\right)\sqrt{\frac{\Delta P}{P1}}\right] \geq 90^{\circ}$, Critical Flow will occur.
Equation 1 Flow Rate Equation for Non-Critical Flow Applications	$Q = \sqrt{\frac{520}{GT}}\ Cg\ P1\ SIN\left[\left(\frac{3417}{C1}\right)\sqrt{\frac{\Delta P}{P1}}\right]$ DEG
Equation 2 Flow Rate Equation for Critical Flow Applications	$Q = \sqrt{\frac{520}{GT}}\ Cg\ P1$
Reference	Fisher Controls International, Inc. (1977) *Control Valve Handbook* (2nd ed.)

*Note: if Critical Flow exists, use Equation 2.

VARIABLES

Q	Flow Rate (SCFH)
T	Gas Temperature @ Regulator Inlet (°Rankine)
G	Gas Specific Gravity
P1	Pressure @ Regulator Inlet (PSIA)
ΔP	Pressure Drop Across Regulator (PSIA)
Cg	Gas Sizing Coefficient
Cv	Liquid Sizing Coefficient
C1	Flow Coefficient

WIDE OPEN FLOW COEFFICIENTS

Orifice Size	Cg	Cv	C1
1/8"	12	0.5	24.0
3/16"	56	1.82	30.8
1/4"	76	2.56	29.7
3/8"	169	5.95	28.4
1/2"	277	8.7	31.8

Note: All flow coefficients were determined using lab tested data.

Important:

The KPRH High Pressure Regulator must always be used with overpressure protection.

Use the Universal Gas Sizing Equation 1 to size for the appropriate relief valve.

ORDERING GUIDE

REQUESTED BY: _____ COMPANY: _____

ADDRESS: _____ CITY: _____ STATE: _____ ZIP: _____

PHONE: _____ FAX: _____ EMAIL : _____

KPRH — [ ] — [ ] —

Model:
KPRH = Kenco High Pressure Regulator

Process Connections:
1 = 1" NPT
2 = 2" NPT

Outlet Pressure Range (Spring Color):
050 = 27-50 PSI (Red)
095 = 46-95 PSI (White)
150 = 90-150 PSI (Gray)
200 = 150-200 PSI (Green)
275 = 200-275 PSI (Blue)
500 = 275-500 PSI (Yellow)

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Orifice Size:
125 = 1/8"
188 = 3/16"
250 = 1/4"
375 = 3/8"
500 = 1/2"

Orifice Seal Material:
B = Nitrile
N = Nylon
T = PTFE
V = FKM (Fluorocarbon)

Diaphragm Material:
N = Neoprene
V = FKM (Fluorocarbon)

• **Example Order Designation: KPRH-1-150-375-B-N** is a Kenco High Pressure Regulator with 1" NPT Process Connections, 90-150 PSI Outlet Pressure Range, 3/8" Orifice, Nitrile Orifice Seal and Neoprene Diaphragm.

SEAL REPAIR KITS

Part Number	Contents
KPRH-B-N-RK	Nitrile Orifice Seal, Neoprene Diaphragm and Flexible Graphite Gaskets
KPRH-N-N-RK	Nylon Orifice Seal, Neoprene Diaphragm and Flexible Graphite Gaskets
KPRH-T-N-RK	PTFE Orifice Seal, Neoprene Diaphragm and Flexible Graphite Gaskets
KPRH-V-V-RK	FKM Orifice Seal, FKM Diaphragm and Flexible Graphite Gaskets
KPRH-N-V-RK	Nylon Orifice Seal, FKM Diaphragm and Flexible Graphite Gaskets
KPRH-T-V-RK	PTFE Orifice Seal, FKM Diaphragm and Flexible Graphite Gaskets

Note: Refer to Kenco website for complete parts list and installation instructions.

ORIFICE/SPRING REPAIR KITS

Part Number	Contents
KPRH-ORIFICE-125-RK	1/8" Orifice, Orifice Gaskets and Diaphragm Housing Gasket
KPRH-ORIFICE-188-RK	3/16" Orifice, Orifice Gaskets and Diaphragm Housing Gasket
KPRH-ORIFICE-250-RK	1/4" Orifice, Orifice Gaskets and Diaphragm Housing Gasket
KPRH-ORIFICE-375-RK	3/8" Orifice, Orifice Gaskets and Diaphragm Housing Gasket
KPRH-ORIFICE-500-RK	1/2" Orifice, Orifice Gaskets and Diaphragm Housing Gasket
KPRH-SPRING-050-RK	27-50 PSI Spring (Red)
KPRH-SPRING-095-RK	46-95 PSI Spring (White)
KPRH-SPRING-150-RK	90-150 PSI Spring (Gray)
KPRH-SPRING-200-RK	150-200 PSI Spring (Green)
KPRH-SPRING-275-RK	200-275 PSI Spring (Blue)
KPRH-SPRING-500-RK	275-500 PSI Spring (Yellow)

Represented by:

Kenco Sales Offices:

Headquarters
10001 E. 54th St.
Tulsa, OK 74146
phone 918.663.4406
fax 918.663.4480
www.kenco-eng.com
email: info@kenco-eng.com

Baton Rouge Office
11616 Industriplex, Suite 7
Baton Rouge, LA 70809
phone 225.755.1912
fax 225.755.1913
www.kenco-eng.com
email: kenco-la@kenco-eng.com

97192 3-13-26

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