

Model 046 Field Regulators

Construction and Design Features

Model 046 Family of Field Regulators

Based on years of operating experience, the Model 046 family of field regulators combines simplicity of design, rugged construction, exceptional performance and operational safety to provide a dependable, flexible and economical answer to pounds-to-pounds pressure regulation applications. Model 046 regulators are available with standard construction, an internal relief valve (IRV), blocked throat and control line tap for remote or monitor applications. Model 046 regulators are available with aluminum or cast iron diaphragm cases.

Typical applications for the Model 046 Field Regulators are:

- Farm taps
- Field Regulator Applications
- High Pressure Industrial Air or Gases
- Gas Blanketing Systems

Basic Models

Standard Regulator 046 and 046C

This is a non relief type regulator which requires separate over-pressure protection to safeguard the downstream system. Standard regulators are available in the configurations and trims found below. The regulator body is configured to provide increased capacity by means of an integral boost tube.

| | |
|-----------------------|--|
| Body | Ductile Iron |
| Valve trim | Poly-U Tan (standard), Buna-N or Vitron |
| Internal trim | Standard (brass) or stainless steel |
| External trim | Carbon Steel or stainless steel |
| Diaphragm case ... | Aluminum or cast iron |
| Cover cap | Plastic snap-on or cast iron with tetraseal (with or without seal wire and seal) provides sealed chamber for inside service. |
| Valve Material: | Poly-U Tan (90 duro), Buna-N (80 duro), Vitron (70 duro) |

| Spring Color | Outlet Pressure Range | Part Number |
|--------------|-----------------------|--------------|
| Yellow | 3-10 psig | 04600-21-00 |
| Aluminum | 8-20 psig | 04600-021-01 |
| White | 15-52 psig | 04600-021-02 |
| Green | 10-95 psig | 04600-021-05 |
| Tan | 50-125 psig | 04600-021-03 |
| Gray | 100-200 psig | 04600-021-04 |

Monitor Regulator 046-M and 046-CM

These regulators are identical to the 046C regulators respectively, except for the fact that they have no integral boost tube and have remote pressure sensing, requiring separate over-pressure protection to prevent damage to the downstream system.

Internal Relief Valve Regulator 046-2

This regulator has relief protection to prevent damage to internal parts and the downstream system. The relief valve is activated by internal over-pressurization of the outlet chamber above the set outlet pressure of the regulator. Integral IRV stops reduce relief pressure build-up for added safety. No integral boost tube.

| | |
|-----------------------|--|
| Body | Ductile Iron |
| Valve trim | Poly-U Tan (standard), Buna-N or Vitron |
| Internal trim | Standard (brass) or stainless steel |
| External trim | Carbon Steel or stainless steel |
| Diaphragm case ... | Aluminum only |
| Vent | 1" NPT for piping remote |
| Cover cap: | Plastic snap-on or cast iron with tetraseal (with or without seal wire and seal) provides sealed chamber for inside service. |
| Valve Material: | Poly-U Tan (90 duro), Buna-N (80 duro), Vitron (70 duro) |

| Spring Color | Outlet Pressure Range | Part Number |
|--------------|-----------------------|--------------|
| Yellow | 3-10 psig | 04600-21-00 |
| Aluminum | 8-20 psig | 04600-021-01 |
| White | 15-52 psig | 04600-021-02 |
| Green | 10-95 psig | 04600-021-05 |
| Tan | 50-125 psig | 04600-021-03 |

Internal Relief Valve Monitor Regulator 046-2M

This regulator is identical to the 046-2 except it has remote pressure sensing and relief protection through the remote control line to prevent damage to internal regulator parts. For full open capacity relief, separate over-pressure protection is required to prevent damage to the downstream system.

Environmental Conditions

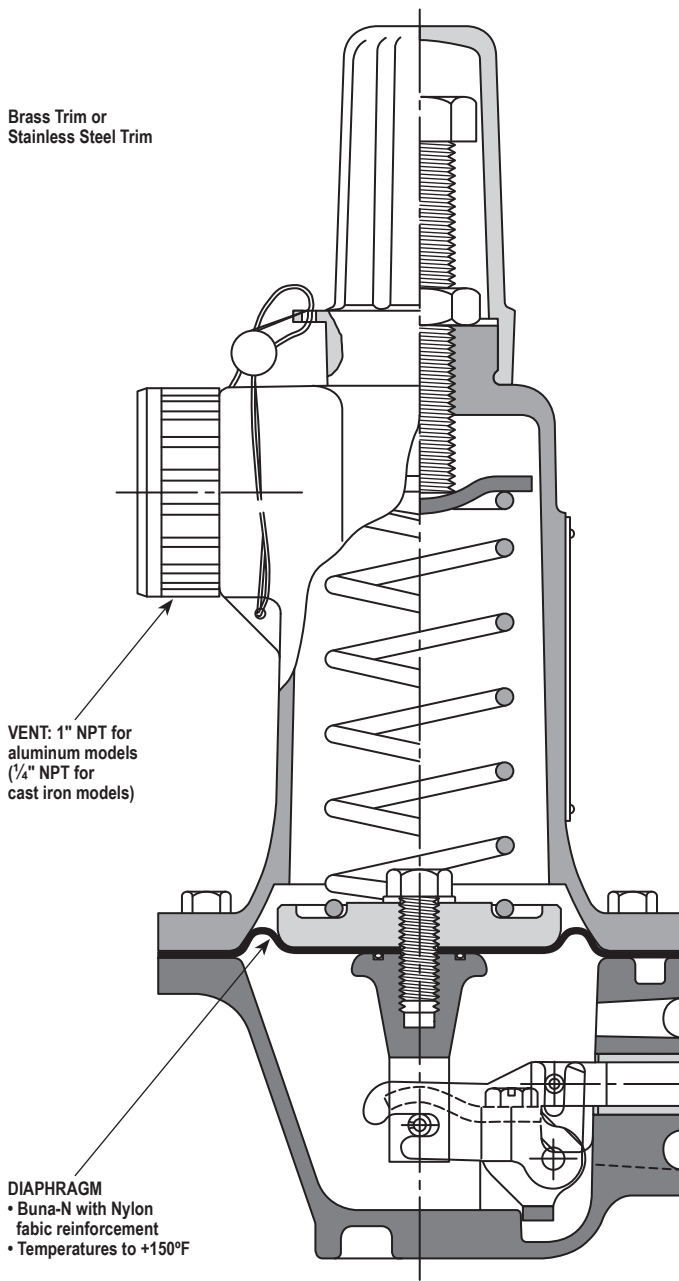
046 Regulators are designed for outdoor and indoor installation.

Operating temperature range, all materials: -20°F to +150°F

Higher temperature materials available. Contact your sales representative for application.

| | |
|-------------------------------------|--|
| Minimum Melting Temperature: | Casing: +700°F Ductile Iron Body: +1000°F |
| Inlet Pressure Range: | 5 to 1000 psig |
| Outlet Pressure Range: | 3 to 200 psig |

Pipe Sizes 3/4", 1" and 1 1/4" NPT



Valve Assembly Maximum Pressures -Non IRV Units

| Material | Differential | Inlet* |
|------------|--------------|-----------|
| Poly-U-Tan | 800 psig | 1000 psig |
| Buna-N | 400 psig | 600 psig |
| Viton | 250 psig | 300 psig |

Valve Assembly Maximum Pressures-IRV Units

| Material | Differential | Inlet* |
|------------|--------------|-----------|
| Poly-U-Tan | 800 psig | 1000 psig |
| Buna-N | 400 psig | 525 psig |
| Viton | 250 psig | 300 psig |

The maximum inlet pressure and valve material are determined by a review of pressure limitations on the spring, orifice, differential pressure (maximum inlet minus minimum outlet pressure), and the required inlet pressure.

*For best performance the differential should be limited to 800 psid; however, the regulator has handled higher differential pressures.

Maximum Inlet Pressure-Model 046 Regulator

| Orifice | Springs | | |
|---------|----------|-----------------------------|-----------|
| | Yellow | Aluminum, White, Green, Tan | Grey |
| 1/8" | 500 psig | 1000 psig | 1000 psig |
| 3/16" | 500 psig | 1000 psig | 1000 psig |
| 1/4" | 500 psig | 500 psig | 500 psig |
| 5/16" | 300 psig | 400 psig | 400 psig |
| 3/8" | 300 psig | 300 psig | 400 psig |
| 1/2" | 100 psig | 100 psig | 100 psig |

Capacity Tables – Models 046-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F)

| Outlet Pressure and Spring | Outlet Pressure psi | Inlet Pressure psi | 3/4", 1", 1 1/4" Pipe Size | 3/4" Pipe Size | | 1", 1 1/4" Pipe Size | |
|---|---------------------|--------------------|----------------------------|----------------|------|----------------------|-------|
| | | | Orifice | Orifice | | Orifice | |
| | | | 1/8 | 3/16 | 1/4 | 3/16 | 1/4 |
| Outlet Pressure 3 to 10 psi Yellow Spring 04600-021-00 | 5 | 10 | 325 | 700 | 893 | 700 | 893 |
| | | 15 | 450 | 782 | 1233 | 782 | 1233 |
| | | 20 | 540 | 935 | 1403 | 935 | 1530 |
| | | 30 | 690 | 1233 | 1650 | 1233 | 1725 |
| | | 40 | 714 | 1530 | 2213 | 1530 | 2250 |
| | | 50 | 850 | 1785 | 2325 | 1785 | 2850 |
| | | 75 | 1190 | 2213 | 2775 | 2213 | 3975 |
| | | 100 | 1530 | 2850 | 3263 | 2850 | 5175 |
| Outlet Pressure 10 to 95 psi Dark Green Spring 04600-021-05 | 10 | 15 | 177 | 265 | 355 | 265 | 355 |
| | | 20 | 232 | 347 | 464 | 347 | 364 |
| | | 25 | 276 | 413 | 553 | 413 | 553 |
| | | 50 | 456 | 682 | 775 | 682 | 775 |
| | | 75 | 633 | 805 | 1076 | 805 | 1076 |
| | | 100 | 689 | 1030 | 1377 | 1030 | 1377 |
| | | 150 | 990 | 1480 | 1747 | 1480 | 1747 |
| | | 200 | 1291 | 1703 | 2278 | 1930 | 2278 |
| | | 300 | 1670 | 2497 | 3340 | 2497 | 3340 |
| | | 500 | 2732 | 4085 | 4736 | 4085 | 5465 |
| Outlet Pressure 8 to 20 psi Aluminum Spring 04600-021-01 | 15 | 20 | 450 | 808 | 1360 | 808 | 1360 |
| | | 25 | 575 | 1020 | 1785 | 1020 | 1785 |
| | | 50 | 850 | 1785 | 2700 | 1785 | 2775 |
| | | 75 | 1190 | 2213 | 3638 | 2213 | 3900 |
| | | 100 | 1530 | 2850 | 4500 | 2850 | 5175 |
| | | 150 | 1950 | 4050 | 5265 | 4050 | 6435 |
| | | 200 | 2475 | 4615 | 6338 | 4615 | 6656 |
| | | 300 | 3600 | 6448 | 6820 | 6448 | 6993 |
| | | 400 | 4160 | 6850 | 7250 | 6850 | 8085 |
| | | 500 | 5200 | 7250 | 8690 | 7140 | 10065 |
| | | 750 | 5750 | 8000 | - | 8750 | - |
| 925 | 6200 | 8750 | - | 10200 | - | | |

Capacities are based on 20% droop.

NOTE: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables – Models 046-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

| Outlet Pressure and Spring | Outlet Pressure psi | Inlet Pressure psi | 3/4", 1", 1 1/4" Pipe Size | 3/4" Pipe Size | | 1", 1 1/4" Pipe Size | |
|---|---------------------|--------------------|----------------------------|----------------|------|----------------------|-------|
| | | | Orifice | Orifice | | Orifice | |
| | | | 1/8 | 3/16 | 1/4 | 3/16 | 1/4 |
| Outlet Pressure 8 to 20 psi Aluminum Spring 04600-021-01 | 20 | 25 | 500 | 893 | 1658 | 893 | 1658 |
| | | 30 | 640 | 1148 | 1800 | 1148 | 1800 |
| | | 50 | 850 | 1785 | 2850 | 1785 | 2850 |
| | | 75 | 1190 | 2213 | 3713 | 2213 | 3975 |
| | | 100 | 1530 | 2850 | 4355 | 2850 | 5175 |
| | | 150 | 1950 | 4050 | 5525 | 4050 | 6435 |
| | | 200 | 2475 | 4615 | 6500 | 4615 | 6656 |
| | | 300 | 3600 | 6448 | 6848 | 6448 | 6993 |
| | | 400 | 4160 | 6850 | 7384 | 6850 | 8085 |
| | | 500 | 5200 | 7140 | 7760 | 7140 | 10065 |
| | | 750 | 5750 | 8500 | - | 8750 | - |
| 925 | 6200 | 8750 | - | 10200 | - | | |
| Outlet Pressure 10 to 95 psi Dark Green Spring 04600-021-05 | 25 | 30 | 575 | 835 | 1117 | 835 | 1117 |
| | | 50 | 850 | 1446 | 1934 | 1446 | 1934 |
| | | 75 | 1190 | 1775 | 2374 | 1775 | 2374 |
| | | 100 | 1530 | 2271 | 3038 | 2271 | 3038 |
| | | 150 | 1950 | 3264 | 4366 | 3264 | 4366 |
| | | 200 | 2475 | 3689 | 4935 | 4256 | 4935 |
| | | 300 | 3600 | 5160 | 6123 | 5409 | 6123 |
| | | 400 | 4160 | 5484 | 6310 | 6252 | 6457 |
| | | 500 | 5200 | 5719 | 6740 | 6536 | 6740 |
| | | 750 | 5980 | 7082 | - | 7486 | - |
| | | 925 | 6200 | 8592 | - | 8592 | - |
| Outlet Pressure 15 to 52 psi White Spring 04600-021-02 | 30 | 35 | 640 | 1148 | 1725 | 1148 | 1725 |
| | | 40 | 780 | 1403 | 2100 | 1403 | 2100 |
| | | 50 | 833 | 1785 | 2625 | 1785 | 2625 |
| | | 75 | 1190 | 2213 | 3750 | 2213 | 3750 |
| | | 100 | 1530 | 2850 | 4800 | 2850 | 4800 |
| | | 150 | 1950 | 4050 | 5520 | 4050 | 5520 |
| | | 200 | 2475 | 4615 | 5800 | 4615 | 6000 |
| | | 300 | 3600 | 5928 | 6080 | 6448 | 7000 |
| | | 400 | 4800 | 6165 | 6975 | 6850 | 8050 |
| | | 500 | 5200 | 6800 | 8050 | 7650 | 10150 |
| | | 750 | 5750 | 8000 | - | 8750 | - |
| 925 | 6200 | 8750 | - | 10200 | - | | |

Capacities are based on 20% droop.

NOTE: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables – Models 046-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

| Outlet Pressure and Spring | Outlet Pressure psi | Inlet Pressure psi | ¾", 1", 1¼" Pipe Size | ¾" Pipe Size | | 1", 1¼" Pipe Size | |
|--|---------------------|--------------------|-----------------------|--------------|-------|-------------------|-------|
| | | | Orifice | Orifice | | Orifice | |
| | | | ⅜ | ⅜ | ¼ | ⅜ | ¼ |
| Outlet Pressure Range 15 to 52 psi White Spring 04600-021-02 | 40 | 45 | 760 | 1377 | 2175 | 1377 | 2175 |
| | | 50 | 765 | 1658 | 2550 | 1658 | 2550 |
| | | 75 | 1190 | 2213 | 3900 | 2213 | 3900 |
| | | 100 | 1530 | 2850 | 4485 | 2850 | 4485 |
| | | 150 | 1950 | 4050 | 5445 | 4050 | 6435 |
| | | 200 | 2475 | 4615 | 5734 | 4615 | 6656 |
| | | 300 | 3600 | 6448 | 6660 | 6448 | 6993 |
| | | 400 | 4800 | 6850 | 7252 | 6850 | 8085 |
| | | 500 | 5200 | 7140 | 7910 | 7140 | 10065 |
| | 750 | 5750 | 8000 | - | 8750 | - | |
| | 925 | 6200 | 8750 | - | 10200 | - | |
| | 50 | 60 | 867 | 1828 | 2963 | 1828 | 2963 |
| | | 75 | 1148 | 2138 | 3938 | 2138 | 3938 |
| | | 100 | 1496 | 2850 | 4485 | 2850 | 4485 |
| | | 150 | 1950 | 4050 | 5940 | 4050 | 6435 |
| | | 200 | 2475 | 4615 | 6016 | 4615 | 6656 |
| | | 300 | 3600 | 6448 | 6650 | 6448 | 6993 |
| | | 400 | 4160 | 6850 | 8000 | 6850 | 8085 |
| | | 500 | 5200 | 7140 | 8575 | 7140 | 10065 |
| 750 | | 5750 | 8750 | - | 8750 | - | |
| 925 | 6200 | 9280 | - | 10200 | - | | |
| Outlet Pressure Range 10 to 95 psi Dark Green Spring 04600-021-05 | 75 | 80 | 1012 | 1955 | 2588 | 1955 | 2588 |
| | | 90 | 1233 | 2175 | 3188 | 2175 | 3188 |
| | | 100 | 1428 | 2588 | 3675 | 2588 | 3675 |
| | | 150 | 1875 | 4050 | 5110 | 4050 | 5110 |
| | | 200 | 2475 | 5325 | 6305 | 5325 | 6305 |
| | | 300 | 3600 | 6760 | 7100 | 6760 | 7100 |
| | | 400 | 4800 | 7535 | 7854 | 7124 | 7480 |
| | | 500 | 5200 | 7990 | 8050 | 7650 | 7820 |
| | | 750 | 6555 | 8750 | - | 8750 | - |
| 925 | 6975 | 10150 | - | 10880 | - | | |

Capacities are based on 20% droop.

NOTE: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables – Models 046-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

| Outlet Pressure and Spring | Outlet Pressure psi | Inlet Pressure psi | ¾", 1", 1 ¼" Pipe Size | ¾" Pipe Size | | 1", 1¼" Pipe Size | | ¾", 1" Pipe Size | | 1¼" Pipe Size | |
|--|---------------------|--------------------|---------------------------|--------------|-------|-------------------|-------|------------------|------|---------------|-------|
| | | | Orifice | Orifice | | Orifice | | Orifice | | Orifice | |
| | | | ⅛ | ⅜ | ¼ | ⅜ | ¼ | ⅝ | ⅜ | ⅝ | ⅜ |
| Outlet Pressure Range 50 to 125 psi Tan Spring 04600-021-03 | 100 | 110 | 1394 | 2625 | 3835 | 2625 | 3835 | 4095 | 5135 | 4095 | 5135 |
| | | 125 | 1700 | 3225 | 4745 | 3225 | 4745 | 5208 | 5720 | 5208 | 5720 |
| | | 150 | 1875 | 4050 | 5642 | 4050 | 5642 | 6215 | 6439 | 6215 | 6439 |
| | | 200 | 2475 | 4615 | 6000 | 4615 | 6000 | 6480 | 6755 | 6480 | 6755 |
| | | 300 | 3600 | 6240 | 6512 | 6448 | 6512 | 8295 | 8663 | 8295 | 9940 |
| | | 400 | 4800 | 7535 | 8050 | 6850 | 8050 | 10378 | - | 10920 | - |
| | | 500 | 5200 | 8500 | 10080 | 7140 | 10080 | - | - | - | - |
| | | 750 | 5750 | 8750 | - | 8750 | - | - | - | - | - |
| | 925 | 6200 | 10150 | - | 10200 | - | - | - | - | - | |
| | 125 | 135 | 1666 | 3150 | 4940 | 3150 | 4940 | 6175 | 6270 | 6175 | 6270 |
| | | 150 | 1755 | 3750 | 5642 | 3750 | 5642 | 6600 | 6750 | 6600 | 6750 |
| | | 200 | 2475 | 4615 | 6656 | 4615 | 6656 | 7600 | 7927 | 7720 | 8260 |
| | | 300 | 3600 | 6448 | 6993 | 6448 | 6993 | 7997 | 9993 | 9056 | 11104 |
| | | 400 | 4800 | 6850 | 8085 | 6850 | 8085 | 9800 | - | 11936 | - |
| | | 500 | 5200 | 7140 | 9440 | 7140 | 10065 | - | - | - | - |
| | | 750 | 5750 | 8750 | - | 8750 | - | - | - | - | - |
| 925 | | 6200 | 9280 | - | 10200 | - | - | - | - | - | |

Capacities are based on 20% droop.

NOTE: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables – Models 046-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F)

| Outlet Pressure and Spring | Outlet Pressure psi | Inlet Pressure psi | ¾" Pipe Size | | | 1" Pipe Size | | | 1¼" Pipe Size | | |
|--|---------------------|--------------------|--------------|------|-------|--------------|-------|-------|---------------|-------|------|
| | | | Orifice | | | Orifice | | | Orifice | | |
| | | | 5/16 | 3/8 | 1/2 | 5/16 | 3/8 | 1/2 | 5/16 | 3/8 | 1/2 |
| Outlet Pressure Range 3 to 10 psi Yellow Spring 04600-021-00 | 5 | 10 | 1190 | 1318 | 1615 | 1318 | 1785 | 1950 | 1318 | 1785 | 1950 |
| | | 15 | 1530 | 1658 | 1838 | 1828 | 2100 | 2625 | 1828 | 2100 | 2625 |
| | | 20 | 1743 | 1800 | 2138 | 1913 | 2550 | 3638 | 1913 | 2550 | 3825 |
| | | 30 | 1950 | 2288 | 2663 | 2625 | 3525 | 4193 | 2625 | 3675 | 4680 |
| | | 40 | 2550 | 2663 | 3300 | 3675 | 4200 | 5720 | 3675 | 4500 | 6600 |
| | | 50 | 2625 | 3000 | 3413 | 4650 | 4988 | 6468 | 4650 | 5850 | 6750 |
| | | 75 | 3150 | 3375 | 4013 | 6150 | 6375 | 7123 | 6375 | 8100 | 7030 |
| | | 100 | 3750 | 4013 | 4575 | 6793 | 6890 | 7250 | 7950 | 8550 | 8820 |
| | | 125 | 4238 | 4538 | | 7930 | 8450 | | 8450 | 11700 | |
| Outlet Pressure Range 10 to 95 psi Dark Green Spring 04600-021-05 | 10 | 15 | 443 | 523 | 699 | 443 | 523 | 699 | 443 | 523 | 699 |
| | | 20 | 580 | 685 | 778 | 580 | 685 | 778 | 580 | 685 | 778 |
| | | 25 | 690 | 815 | 926 | 690 | 815 | 926 | 690 | 815 | 926 |
| | | 50 | 968 | 1143 | 1527 | 968 | 1143 | 1527 | 968 | 1143 | 1527 |
| | | 75 | 1344 | 1587 | 1871 | 1344 | 1587 | 1871 | 1344 | 1587 | 1871 |
| | | 100 | 1720 | 1792 | 2394 | 1720 | 1792 | 2394 | 1720 | 1792 | 2394 |
| | | 150 | 2180 | 2576 | | 2180 | 2576 | | 2180 | 2576 | |
| | | 200 | 2844 | 3359 | | 2844 | 3359 | | 2844 | 3359 | |
| | | 300 | 4170 | 4269 | | 4170 | 4269 | | 4170 | 4269 | |
| Outlet Pressure Range 8 to 20 psi Aluminum Spring 04600-021-01 | 15 | 20 | 1575 | 1988 | 2588 | 1613 | 2175 | 3000 | 1613 | 2175 | 3000 |
| | | 25 | 2063 | 2738 | 3338 | 2175 | 2775 | 4125 | 2175 | 2775 | 4125 |
| | | 50 | 3900 | 4050 | 4875 | 4500 | 4940 | 5675 | 4500 | 4940 | 5700 |
| | | 75 | 4258 | 4453 | 6435 | 5395 | 5775 | 5920 | 5395 | 5940 | 6660 |
| | | 100 | 5103 | 5655 | 7118 | 6360 | 6486 | 6790 | 6360 | 6750 | 7630 |
| | | 150 | 6338 | 6955 | | 7500 | 8033 | | 7500 | 8400 | |
| | | 200 | 6780 | 7440 | | 8190 | 8640 | | 8190 | 9450 | |
| | | 300 | 7343 | 8388 | | 10150 | 10675 | | 10150 | 12800 | |
| | | | 400 | 7728 | | 11900 | | 12160 | | | |
| | 20 | 25 | 1950 | 2588 | 3082 | 1950 | 2588 | 3185 | 1950 | 2588 | 3185 |
| | | 30 | 2475 | 3150 | 3480 | 2550 | 3225 | 3630 | 2550 | 3225 | 3630 |
| | | 50 | 4088 | 4453 | 5623 | 4650 | 5070 | 5850 | 4650 | 5070 | 5850 |
| | | 75 | 4518 | 5330 | 6241 | 5525 | 6156 | 6309 | 5525 | 6480 | 6660 |
| | | 100 | 5298 | 6210 | 6655 | 6360 | 6750 | 6965 | 6360 | 6750 | 8050 |
| | | 150 | 6210 | 7095 | | 6600 | 7567 | | 6600 | 7770 | |
| | | 200 | 6765 | 7550 | | 6825 | 8698 | | 6825 | 9450 | |
| 300 | | 7065 | 8145 | | 10150 | 11375 | | 10150 | 14000 | | |
| | | 400 | 7695 | | 11900 | | 13300 | | | | |

Capacities are based on 20% droop.

NOTE: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables – Models 046-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

| Outlet Pressure and Spring | Outlet Pressure psi | Inlet Pressure psi | ¾" Pipe Size | | | 1" Pipe Size | | | 1¼" Pipe Size | | | |
|--|--|--------------------|--------------|------|------|--------------|-------|-------|---------------|-------|------|------|
| | | | Orifice | | | Orifice | | | Orifice | | | |
| | | | 5/16 | 3/8 | 1/2 | 5/16 | 3/8 | 1/2 | 5/16 | 3/8 | 1/2 | |
| Outlet Pressure Range 10 to 95 psi Dark Green Spring 04600-021-05 | 25 | 30 | 1394 | 1647 | 1941 | 1394 | 1647 | 1941 | 1394 | 1647 | 1941 | |
| | | 50 | 2130 | 2516 | 3361 | 2130 | 2516 | 3361 | 2130 | 2516 | 3361 | |
| | | 75 | 2964 | 3502 | 4677 | 2964 | 3502 | 4677 | 2964 | 3502 | 4677 | |
| | | 100 | 3793 | 4481 | 5187 | 3793 | 4481 | 5187 | 3793 | 4481 | 5187 | |
| | | 150 | 4724 | 5581 | | 4724 | 5366 | | 4724 | 5581 | | |
| | | 200 | 6161 | 6382 | | 5877 | 6158 | | 5687 | 6158 | | |
| | | 300 | 6533 | 6896 | | 6255 | 6568 | | 6255 | 6568 | | |
| | | 400 | 6779 | | | 7328 | | | 7328 | | | |
| Outlet Pressure Range 15 to 52 psi White Spring 04600-021-02 | 30 | 35 | 1988 | 2625 | 3300 | 1988 | 2625 | 3375 | 1988 | 2625 | 3375 | |
| | | 40 | 2438 | 3300 | 4050 | 2438 | 3300 | 4275 | 2438 | 3300 | 4275 | |
| | | 50 | 3188 | 4200 | 4485 | 3188 | 4200 | 4940 | 3188 | 4200 | 4940 | |
| | | 75 | 4613 | 5135 | 5818 | 4725 | 5525 | 5750 | 4725 | 5525 | 5750 | |
| | | 100 | 5056 | 5520 | 7118 | 5146 | 6156 | 6400 | 5146 | 6156 | 6400 | |
| | | 150 | 5798 | 6016 | | 6200 | 6930 | | 6200 | 7425 | | |
| | | 200 | 6188 | 6510 | | 6720 | 7525 | | 6720 | 8600 | | |
| | | 300 | 6335 | 6825 | | 8225 | 10080 | | 8225 | 11025 | | |
| | 400 | 7350 | | | 9920 | | | 10850 | | | | |
| | 40 | 45 | 2475 | 3600 | 4425 | 2475 | 3600 | 4500 | 2475 | 3600 | 4500 | |
| | | 50 | 3000 | 4350 | 4550 | 3000 | 4350 | 4680 | 3000 | 4350 | 4680 | |
| | | 75 | 4800 | 5298 | 5800 | 4838 | 5590 | 5875 | 4838 | 5590 | 5922 | |
| | | 100 | 5115 | 5985 | 6048 | 5160 | 6600 | 6864 | 5160 | 6600 | 7140 | |
| | | 150 | 5850 | 6674 | | 6500 | 8460 | | 6500 | 8460 | | |
| | | 200 | 5940 | 6900 | | 7350 | 9080 | | 7350 | 9400 | | |
| | | 300 | 6825 | 7665 | | 9100 | 10448 | | 9100 | 12075 | | |
| | | 400 | 7857 | | | 11900 | | | 11900 | | | |
| | 50 | 80 | 3713 | 4095 | 4758 | 3713 | 4095 | 5340 | 3713 | 4095 | 5518 | |
| | | 75 | 4355 | 5340 | 5580 | 4485 | 5785 | 5940 | 4485 | 5785 | 6075 | |
| | | 100 | 5766 | 6105 | 6405 | 5820 | 6500 | 6700 | 5820 | 6500 | 6845 | |
| | | 150 | 6251 | 6384 | | 7250 | 7980 | | 7250 | 7980 | | |
| | | 200 | 6455 | 6510 | | 7980 | 8295 | | 7980 | 8925 | | |
| | | 300 | 7665 | 8155 | | 9800 | 10780 | | 9800 | 12000 | | |
| | | 400 | 9100 | | | 11900 | | | 11840 | | | |
| | Outlet Pressure Range 10 to 95 psi Dark Green Spring 04600-021-05 | 75 | 80 | 2850 | 3750 | 4063 | 2850 | 3750 | 4063 | 2850 | 3750 | |
| | | | 90 | 3525 | 4536 | 4615 | 3525 | 4725 | 4615 | 3525 | 4725 | |
| | | | 100 | 4050 | 4940 | 5233 | 4050 | 4940 | 5233 | 4050 | 4940 | |
| | | | 150 | 5298 | 6600 | | 5298 | 6240 | | 5298 | 6240 | 4518 |
| 200 | | | 6726 | 7065 | | 6490 | 6751 | | 6490 | 6800 | 6136 | |
| 300 | | | 7203 | 7567 | | 7203 | 7567 | | 6920 | 8064 | 6510 | |
| 400 | | | 8119 | | | 7577 | | | 7980 | | | |

Capacities are based on 20% droop.

NOTE: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Full Open Capacity

Use the following formulae for calculating the full open capacity of 046 regulators. Do not use full open capacity when sizing one of these regulators for an application. Instead, use the capacity tables:

1. $Q = K\sqrt{P_o(P_i - P_o)}$ (for $\frac{P_i}{P_o}$ less than 1.894)
2. $Q = \frac{KP_i}{2}$ (for $\frac{P_i}{P_o}$ greater than 1.894)

Q = maximum capacity of the regulator (in SCFH of 0.6 specific gravity natural gas).
 K = the "K" factor, the regulator constant (see table below)
 P_i = **absolute** inlet pressure (psia)
 P_o = **absolute** outlet pressure (psia)

| | Orifice Size: | | | | | |
|------------|---------------|-------|------|-------|------|------|
| Decimal | .12" | .18" | .25" | .31" | .37" | .50" |
| Fractional | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" |
| K | 33 | 74 | 132 | 206 | 292 | 520 |

Overpressurization Protection

The downstream piping system and the low pressure chambers of the regulator need to be protected against overpressurization caused by 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, Sensus Bulletin RDS-1498 or other applicable standards.

The method of overpressurization protection can be a relief valve, monitor regulator, automatic shutoff device, or other mechanism with similar function.

Periodic Inspection

Regulators are pressure control devices with numerous moving parts which are subject to wear that is dependent on particular operating conditions. To ensure continuous satisfactory operation, a periodic inspection schedule must be followed, with the frequency of inspection determined by the severity of service and applicable laws and regulations. See bulletin IN-G-REG-1312 for field service instructions.

Maximum Emergency Pressure

Maximum Inlet Pressure

The maximum pressure to which the inlet of the regulator may be subjected under abnormal conditions, without causing damage to the regulator is:

The Maximum Allowable Inlet Pressure + 100 psig.

Maximum Outlet Pressure

The maximum outlet pressure to which the diaphragm can be subjected without causing internal damage is:

Outlet Pressure Set Point + 100 psig.

The maximum outlet pressure to which the diaphragm can be subjected without leakage or rupture is:

Maximum Total Outlet Pressure is 400 psig.

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

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

Other Gases

Model 046 Regulators are mainly designed for service in natural gas applications. However, these regulators will perform equally well when regulating the pressure of nitrogen, dry CO₂ air and other industrial gases.

| 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 |

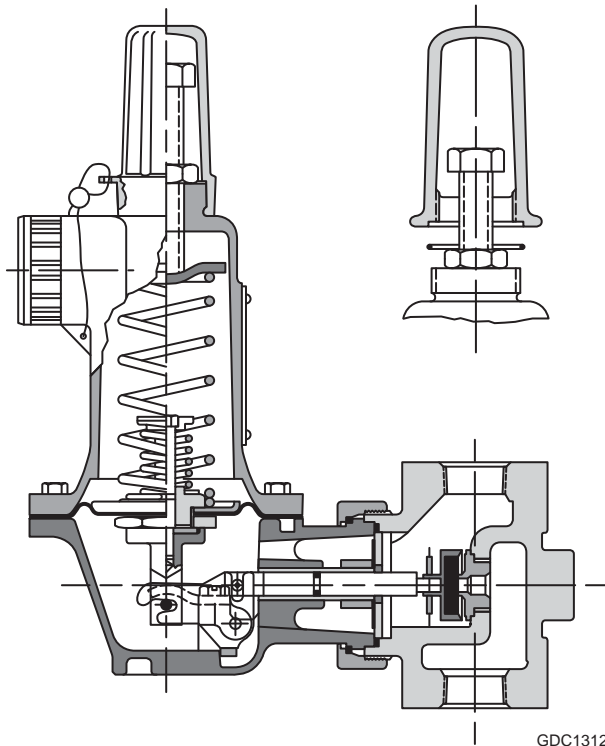
For other non-corrosive gases use the following formula:

$$\text{CORRECTION FACTOR} = \sqrt{\frac{0.60}{\text{Specific gravity of the gas}}}$$

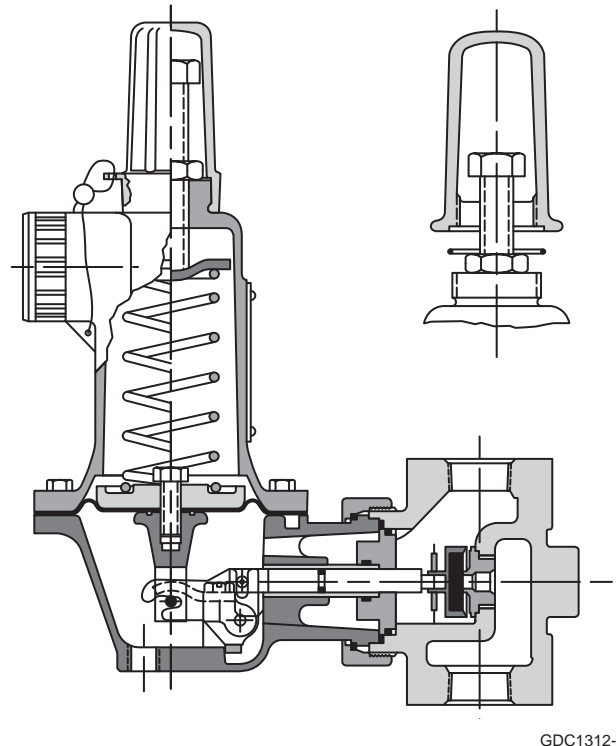
For use with gases not listed above, please contact your Sensus representative or Industrial Distributor for recommendations.

NOTE: Model 046 Field Regulators are not suitable for use with sour gases, high purity gases or liquid service. 046 Field Regulators are not suitable for buried (underground) service.

046-2 Regulator with Internal Relief Valve



046-M Monitor Regulator



046-2 and 046-2M field regulators have internal relief protection (IRV) to prevent damage to internal parts and the downstream system caused by regulator malfunction or failure to achieve complete lockup. The relief valve is activated by internal overpressurization of the outlet chamber above the set outlet pressure of the regulator. For added safety, integral IRV stops reduce relief pressure build-up. The 046-2M can be utilized as a monitor regulator. It has remote pressure sensing and relief protection through the control line.

Internal Relief Valves, like all relief valves, must be carefully checked for adequate capacity. IRV's only have full capacity relief capability when the inlet pressure to the regulator is low enough and the regulator orifice is small enough. If either one, or both, are too large, the IRV will not be capable of full capacity relief and will not be able to prevent the outlet pressure from exceeding the maximum allowable limit.

Full open IRV capacity can be calculated from the formula:

$$Q = \frac{KP_o}{2} \text{ for 0.6 specific gravity gas, where}$$

K = 600 (the IRV constant) and

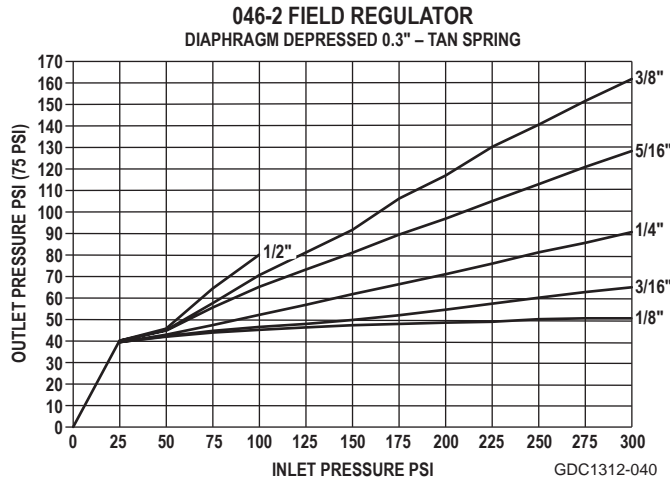
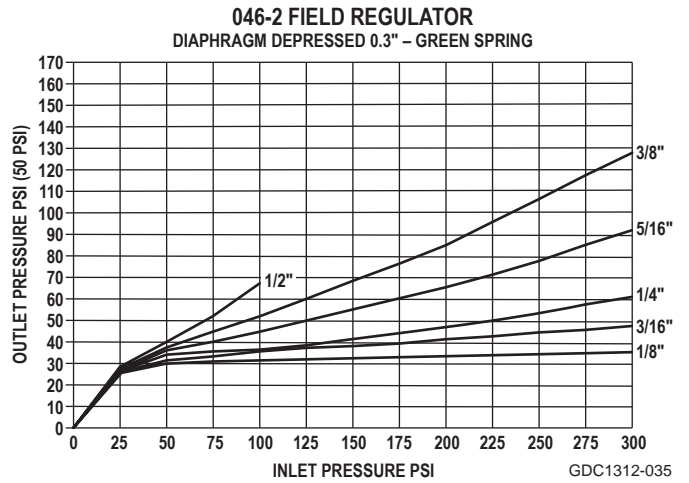
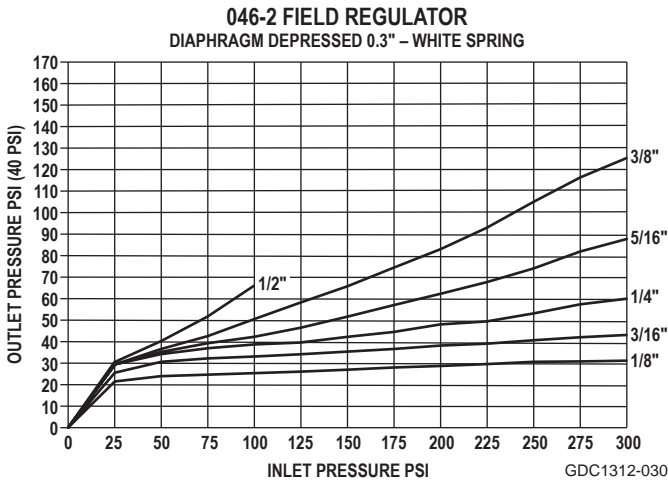
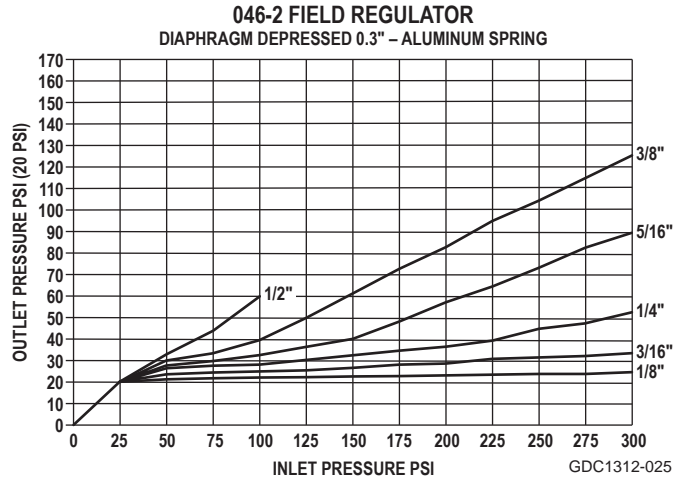
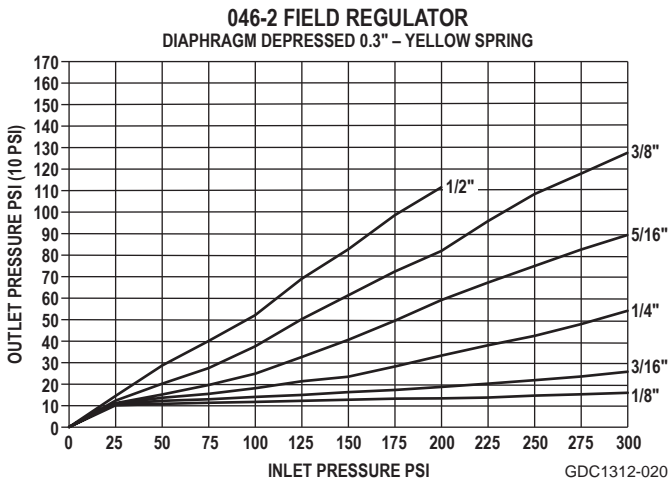
P_o = absolute outlet pressure (psia)

See graphs on page 17 for more information.

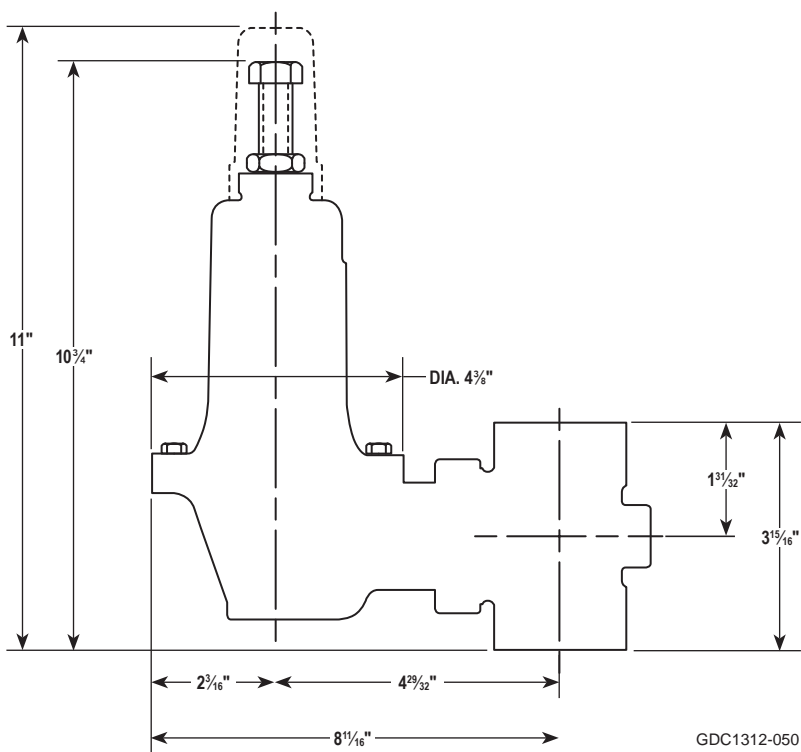
The 046-M, 046-2M and 046-CM field regulators have a blocked throat and a stem seal. They are designed for remote pressure sensing. These regulators have no integral boost tube and require separate overpressure protection to prevent damage to the downstream system. They are intended to be used as the upstream regulator in a monitor set (see illustration), or for other applications requiring a control line. Pipe sizes are 3/4", 1", and 1 1/4". Maximum inlet pressure is 1000 psi. For capacities see tables.

When an 046 is used to monitor another 046 with an identical inner valve, the total maximum capacity through both regulators is approximately 70% of the capacity of a single regulator. This applies whether the monitor is installed upstream or downstream.

IRV Relief Buildup – Regulator Blocked Open



Dimensions



| Model | Body Material | Diaphragm Case | Internal Relief Valve | Maximum Inlet Pressure ² | Outlet Pressure Range |
|---------------------|--|----------------|-----------------------|-------------------------------------|-----------------------|
| 046 | Ductile Iron (ASTM A395-71 gr 60-40-18) | Aluminum | No | 1000 psig | 3 to 200 psig |
| 046-M ¹ | | | No | 1000 psig | |
| 046-2 | | | Yes | 1000 psig | 3 to 125 psig |
| 046-2M ¹ | | | Yes | 1000 psig | |
| 046-C | Cast Iron | No | 1000 psig | 3 to 200 psig | |
| 046-CM ¹ | | No | 1000 psig | | |

¹ Regulator requires a control line.

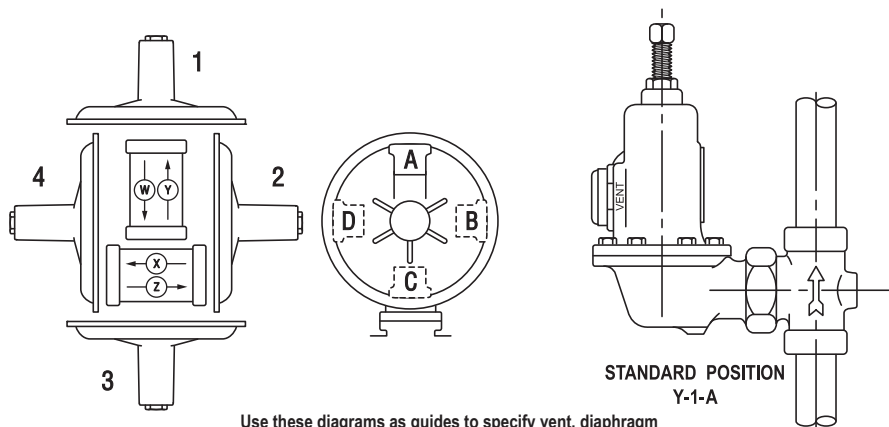
² Maximum inlet pressure is limited by orifice size, spring ranges and valve material (see tables on page 3).

For specific maximum allowable inlet pressures, see tables on pages 1 and 2 and capacity tables.

How to Order

When ordering, please specify the following:

1. Model Number
2. Pipe Size
3. Orifice Size
4. Inlet Pressure (max. and min., if available)
5. Outlet Pressure Setting
6. Spring Part Number
7. Capacity Required (SCFH)
8. Type or Specific Gravity of Gas
9. Mounting Position



Use these diagrams as guides to specify vent, diaphragm case and body arrangement. When mounting position is not specified, position Y-1-A will be supplied.

GDC1312-010

Model 046 Field Regulators

Construction and Design Features



Authorized Distributor:

All products purchased and services performed are subject to Sensus' terms of sale, available at either <http://na.sensus.com/TC/TermsConditions.pdf> or 1-800-METER-IT. Sensus reserves the right to modify these terms and conditions in its own discretion without notice to the customer.

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