



®

CORPORATION

PILOT OPERATED RELIEF VALVE

1600 SERIES



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1600 SERIES

The Groth 1600 Series valves provide safe, dependable, and accurate low pressure and/or vacuum protection. Seals in accordance with API 2000 requirements for Pilot Operated Relief Valves. This design prevents fugitive emissions and conserves stored product. Rated flow at 10% overpressure provides the ability to operate closer to the tank MAWP, increasing the operating range of the process. This reduces the need for a large overpressure and saves product, which translates into profit. Flexibility in terms of film or o-ring seat and snap or modulating action allows product customization to specific application requirements. The Model 1662A incorporates a vacuum breaker.

Technical Details

- Sizes: 2" through 12" (50-300mm)
- Pressure Settings: 2.0 InWC to 15 psig
- Vacuum Settings: 7.0 InWC to 12 psig
- Standard Body Materials: Carbon Steel (WCB/CS), Stainless Steel (CF8M/316), Aluminum (356)
- Supply Media Temperature Range: -320° F to 300° F
- ISO 9001 Certified manufacturing process
- ATEX and PED Approval

Features

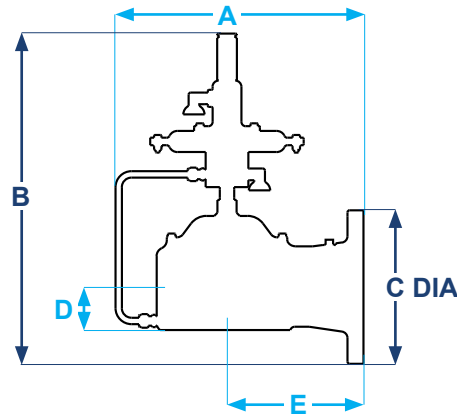
- Ease of precision settings
- Only the pilot needs to be set
- Remote pilot sensing option allows the pilot to sense the true system pressure
- Remote or manual blowdown available
- Main valve remains tight to set pressure.
- Full open at 10% overpressure
- Modulating action conserves product since valve opening is proportional to overpressure
- Noise is reduced since the valve only opens fully when required
- Soft seats seal tight to conserve product and minimize valve wear which improves reliability
- Reduces maintenance costs since the valve can be completely serviced without removal from its mounting
- Wide range of materials to meet most corrosive media and temperature applications at the lowest possible cost
- There is a size to meet your relieving capacity requirements without the need of expensive oversizing
- Groth pilot operated valves have more capacity for your money
- Setting range covers all atmospheric and low pressure storage tanks
- Wide setting range to meet your design requirements

Options

- 150# ANSI, PN10, PN16, JIS drilling classes available
- Pilot exhaust piped to discharge header
- Field test connection
- Manual blow down
- Conical film seat pallet
- Remote sense pickup
- Pilot supply filter

SPECIFICATIONS

| Inlet In (mm) | Outlet In (mm) | A In (mm) | B In (mm) | C In (mm) | D In (mm) | E In (mm) | Approx. Ship Wt. for Al Lbs (kg) |
|---------------|----------------|-------------|-------------|-------------|------------|-------------|----------------------------------|
| 2 (50) | 3 (80) | 11.75 (298) | 19.75 (502) | 7.50 (191) | 2.75 (70) | 6.00 (152) | 30 (14) |
| 3 (80) | 4 (200) | 14.75 (375) | 21.50 (546) | 9.00 (229) | 2.53 (64) | 8.00 (203) | 45 (20) |
| 4 (100) | 6 (150) | 18.00 (457) | 21.75 (552) | 11.00 (279) | 4.00 (102) | 10.00 (254) | 56 (25) |
| 6 (150) | 8 (200) | 21.25 (540) | 26.00 (660) | 13.50 (343) | 4.32 (110) | 12.00 (305) | 80 (36) |
| 8 (200) | 10 (250) | 25.50 (648) | 28.00 (711) | 16.00 (406) | 5.31 (135) | 14.00 (356) | 130 (59) |
| 10 (250) | 12 (300) | 31.75 (806) | 31.50 (800) | 19.00 (483) | 6.65 (169) | 18.00 (457) | 170 (77) |
| 12 (300) | 16 (400) | 36.50 (927) | 35.00 (889) | 23.50 (597) | 8.00 (203) | 20.10 (511) | 230 (104) |



MODEL 1660A PRESSURE RELIEF CAPACITY

Air Flow Capacity at 10% Overpressure
1000 Standard Cubic Feet per Hour at 60° F

| Set Pressure (P _s) | | Size In (mm) | | | | | | |
|--------------------------------|--------------------|--------------|--------|---------|---------|---------|----------|----------|
| InWC | oz/in ² | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 2.00 | 1.16 | 5.46 | 12.0 | 20.9 | 46.8 | 81.9 | 129 | 185 |
| 4.00 | 2.31 | 7.73 | 17.1 | 29.5 | 66.3 | 116 | 182 | 262 |
| 6.00 | 3.47 | 9.48 | 20.9 | 36.2 | 81.3 | 142 | 223 | 322 |
| 8.00 | 4.62 | 11.0 | 24.2 | 41.9 | 94.0 | 165 | 258 | 372 |
| 10.0 | 5.78 | 12.3 | 27.1 | 46.9 | 105 | 184 | 289 | 417 |
| 15.0 | 8.66 | 15.1 | 33.3 | 57.7 | 129 | 227 | 356 | 512 |
| 20.0 | 11.6 | 17.5 | 38.6 | 66.8 | 150 | 262 | 412 | 594 |
| 25.0 | 14.4 | 19.6 | 43.3 | 75.0 | 168 | 294 | 462 | 666 |

Air Flow Capacity at 10% Overpressure
1000 Standard Cubic Feet per Hour at 60° F

| Set Pressure (P _s) | Size In (mm) | | | | | | |
|--------------------------------|--------------|--------|---------|---------|---------|----------|----------|
| psig | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 1 | 20.7 | 45.7 | 79.0 | 177 | 311 | 488 | 702 |
| 2 | 29.8 | 65.8 | 114 | 255 | 447 | 702 | 1011 |
| 3 | 37.1 | 81.9 | 142 | 318 | 557 | 875 | 1260 |
| 4 | 43.6 | 96.1 | 166 | 373 | 654 | 1027 | 1478 |
| 5 | 49.4 | 109 | 189 | 424 | 742 | 1165 | 1677 |
| 6 | 54.9 | 121 | 210 | 471 | 824 | 1294 | 1863 |
| 8 | 65.1 | 144 | 248 | 557 | 976 | 1533 | 2207 |
| 10 | 74.4 | 164 | 284 | 638 | 1117 | 1754 | 2525 |
| 12 | 83.2 | 184 | 318 | 713 | 1249 | 1961 | 2825 |
| 14 | 91.6 | 202 | 350 | 785 | 1375 | 2159 | 3109 |
| 15 | 95.7 | 211 | 366 | 820 | 1436 | 2255 | 3247 |

MODEL 1660A PRESSURE RELIEF CAPACITY

Air Flow Capacity at 10% Overpressure
1000 Normal Cubic Meters per Hour at 0° C

| Set Pressure (P _s) | | Size In (mm) | | | | | | |
|--------------------------------|------|--------------|--------|---------|---------|---------|----------|----------|
| mmWC | mb | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 50 | 4.90 | 0.16 | 0.35 | 0.60 | 1.34 | 2.35 | 3.69 | 5.31 |
| 100 | 9.80 | 0.22 | 0.49 | 0.85 | 1.90 | 3.33 | 5.22 | 7.52 |
| 150 | 14.7 | 0.27 | 0.60 | 1.04 | 2.33 | 4.08 | 6.41 | 9.23 |
| 200 | 19.6 | 0.31 | 0.69 | 1.20 | 2.69 | 4.72 | 7.41 | 10.7 |
| 300 | 29.4 | 0.42 | 0.93 | 1.61 | 3.62 | 6.34 | 9.95 | 14.3 |
| 400 | 39.2 | 0.46 | 1.02 | 1.76 | 3.95 | 6.93 | 10.9 | 15.7 |
| 500 | 49.0 | 0.50 | 1.11 | 1.92 | 4.30 | 7.52 | 11.8 | 17.0 |
| 600 | 58.8 | 0.54 | 1.19 | 2.06 | 4.63 | 8.10 | 12.7 | 18.3 |

Air Flow Capacity at 10% Overpressure
1000 Normal Cubic Meters per Hour at 0° C

| Set Pressure (P _s) | Size In (mm) | | | | | | |
|--------------------------------|--------------|--------|---------|---------|---------|----------|----------|
| barg | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 0.07 | 0.61 | 1.35 | 2.34 | 5.24 | 9.18 | 14.4 | 20.8 |
| 0.10 | 0.63 | 1.39 | 2.40 | 5.39 | 9.44 | 14.8 | 21.4 |
| 0.20 | 1.05 | 2.31 | 3.99 | 8.96 | 15.7 | 24.6 | 35.5 |
| 0.30 | 1.38 | 3.04 | 5.27 | 11.8 | 20.7 | 32.5 | 46.8 |
| 0.40 | 1.67 | 3.68 | 6.38 | 14.3 | 25.1 | 39.4 | 56.7 |
| 0.50 | 1.93 | 4.26 | 7.38 | 16.6 | 29.0 | 45.5 | 65.6 |
| 0.60 | 2.06 | 4.55 | 7.87 | 17.7 | 30.9 | 48.6 | 69.9 |
| 0.70 | 2.20 | 4.85 | 8.40 | 18.8 | 33.0 | 51.8 | 74.6 |
| 0.80 | 2.34 | 5.17 | 8.95 | 20.1 | 35.2 | 55.2 | 79.5 |
| 0.90 | 2.49 | 5.49 | 9.50 | 21.3 | 37.3 | 58.6 | 84.4 |
| 1.00 | 2.69 | 5.94 | 10.3 | 23.1 | 40.4 | 63.5 | 91.4 |

MODEL 1662A VACUUM RELIEF CAPACITY

Air Flow Capacity at 10% Over-Vacuum
1000 Standard Cubic Feet per Hour at 60° F

| Set Vacuum (P _s) | | Size In (mm) | | | | | | |
|------------------------------|--------------------|--------------|--------|---------|---------|---------|----------|----------|
| InWC | oz/in ² | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 3.00 | 1.73 | 6.66 | 14.7 | 25.5 | 57.1 | 100 | 157 | 226 |
| 3.50 | 2.00 | 6.82 | 15.1 | 26.1 | 58.5 | 102 | 161 | 232 |
| 4.00 | 2.31 | 7.69 | 17.0 | 29.4 | 65.9 | 115 | 181 | 261 |
| 6.00 | 3.47 | 9.41 | 20.8 | 35.9 | 80.6 | 141 | 222 | 319 |
| 8.00 | 4.62 | 10.8 | 23.9 | 41.4 | 93.0 | 163 | 256 | 368 |
| 10.0 | 5.78 | 12.1 | 26.7 | 46.3 | 104 | 182 | 285 | 411 |
| 12.0 | 6.93 | 13.3 | 29.2 | 50.6 | 114 | 199 | 312 | 450 |
| 16.0 | 9.27 | 15.3 | 33.7 | 58.3 | 131 | 229 | 360 | 518 |
| 20.0 | 11.6 | 17.0 | 37.6 | 65.0 | 146 | 255 | 401 | 578 |
| 25.0 | 14.4 | 19.0 | 41.9 | 72.5 | 163 | 285 | 447 | 644 |

Air Flow Capacity at 10% Over-Vacuum
1000 Standard Cubic Feet per Hour at 60° F

| Set Vacuum (P _s) | Size In (mm) | | | | | | |
|------------------------------|--------------|--------|---------|---------|---------|----------|----------|
| psig | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 1 | 19.9 | 44.0 | 76.1 | 171 | 299 | 470 | 676 |
| 2 | 27.7 | 61.0 | 106 | 237 | 415 | 652 | 938 |
| 3 | 33.2 | 73.2 | 127 | 284 | 498 | 781 | 1125 |
| 4 | 37.4 | 82.5 | 143 | 320 | 561 | 881 | 1268 |
| 5 | 40.7 | 89.8 | 155 | 349 | 610 | 959 | 1380 |
| 6 | 43.2 | 95.3 | 165 | 370 | 648 | 1018 | 1466 |
| 7 | 45.0 | 99.3 | 172 | 386 | 675 | 1060 | 1527 |

MODEL 1662A VACUUM RELIEF CAPACITY

Air Flow Capacity at 10% Over-Vacuum
1000 Normal Cubic Meters per Hour at 0° C

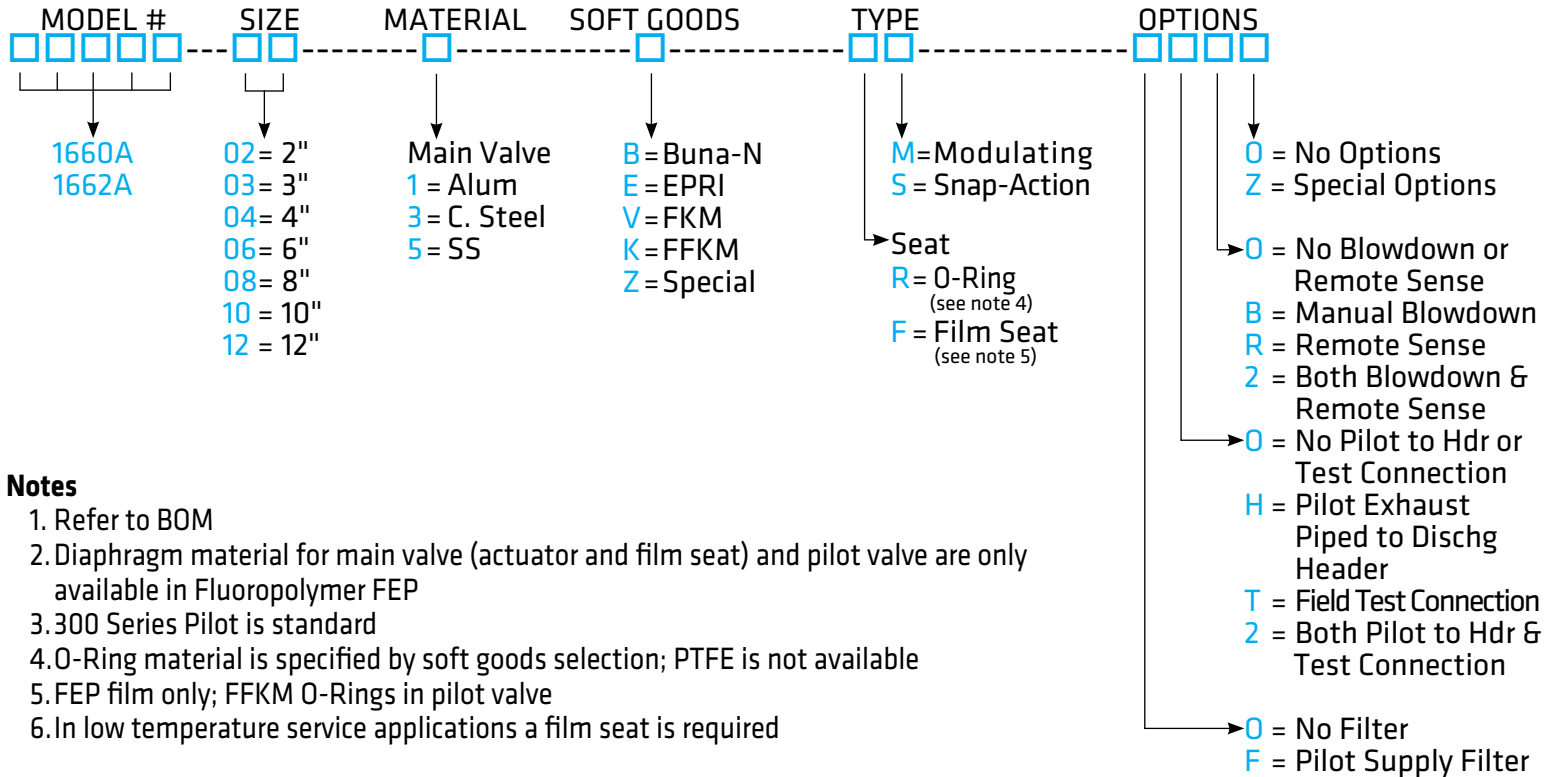
| Set Vacuum (P _s) | | Size In (mm) | | | | | | |
|------------------------------|------|--------------|--------|---------|---------|---------|----------|----------|
| mmWC | mb | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 75 | 7.35 | 0.19 | 0.42 | 0.74 | 1.65 | 2.89 | 4.54 | 6.53 |
| 100 | 9.8 | 0.22 | 0.49 | 0.85 | 1.90 | 3.33 | 5.24 | 7.54 |
| 150 | 14.7 | 0.27 | 0.60 | 1.04 | 2.33 | 4.08 | 6.40 | 9.22 |
| 200 | 19.6 | 0.31 | 0.69 | 1.20 | 2.69 | 4.70 | 7.39 | 10.6 |
| 250 | 24.5 | 0.35 | 0.77 | 1.34 | 3.00 | 5.25 | 8.25 | 11.9 |
| 300 | 29.4 | 0.38 | 0.84 | 1.46 | 3.28 | 5.75 | 9.02 | 13.0 |
| 400 | 39.2 | 0.44 | 0.97 | 1.68 | 3.78 | 6.62 | 10.4 | 15.0 |
| 500 | 49.0 | 0.49 | 1.09 | 1.88 | 4.21 | 7.38 | 11.6 | 16.7 |
| 600 | 58.8 | 0.54 | 1.19 | 2.05 | 4.61 | 8.07 | 12.7 | 18.2 |

Air Flow Capacity at 10% Over-Vacuum
1000 Normal Cubic Meters per Hour at 0° C

| Set Vacuum (P _s) | Size In (mm) | | | | | | |
|------------------------------|--------------|--------|---------|---------|---------|----------|----------|
| barg | 2 (50) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) |
| 0.07 | 0.58 | 1.29 | 2.23 | 5.01 | 8.77 | 13.8 | 19.8 |
| 0.10 | 0.69 | 1.53 | 2.65 | 5.94 | 10.4 | 16.3 | 23.5 |
| 0.15 | 0.84 | 1.85 | 3.20 | 7.17 | 12.6 | 19.7 | 28.4 |
| 0.20 | 0.95 | 2.10 | 3.63 | 8.15 | 14.3 | 22.4 | 32.3 |
| 0.30 | 1.12 | 2.48 | 4.30 | 9.64 | 16.9 | 26.5 | 38.2 |
| 0.40 | 1.24 | 2.75 | 4.75 | 10.7 | 18.7 | 29.3 | 42.2 |
| 0.50 | 1.32 | 2.91 | 5.04 | 11.3 | 19.8 | 31.1 | 44.8 |

HOW TO ORDER

For easy ordering, select proper model numbers



Notes

1. Refer to BOM
2. Diaphragm material for main valve (actuator and film seat) and pilot valve are only available in Fluoropolymer FEP
3. 300 Series Pilot is standard
4. O-Ring material is specified by soft goods selection; PTFE is not available
5. FEP film only; FFKM O-Rings in pilot valve
6. In low temperature service applications a film seat is required

Example

1 6 6 0 A - 0 6 - 3 - V - R S - 0 0 R 0

Indicates a 6" Model 1660A with carbon steel body and "O-Ring" seat using FKM soft goods with snap-action pilot with remote pilot sense connection and no specials.



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