

SERIES 3000 BLANKET GAS REGULATORS

WHAT IS A BLANKET GAS REGULATOR?

A blanket gas regulator supplies an inert gas to prevent a vacuum from developing when liquid is removed from a tank, to maintain the desired blanket pressure when the temperature drops, and to prevent outside air from contaminating the tank or creating a flammable or explosive environment.

Model Numbers:

3011L, 3011H, 3011HP, 3020A, 3070, 3041L, 3041H, 3041HP

Features

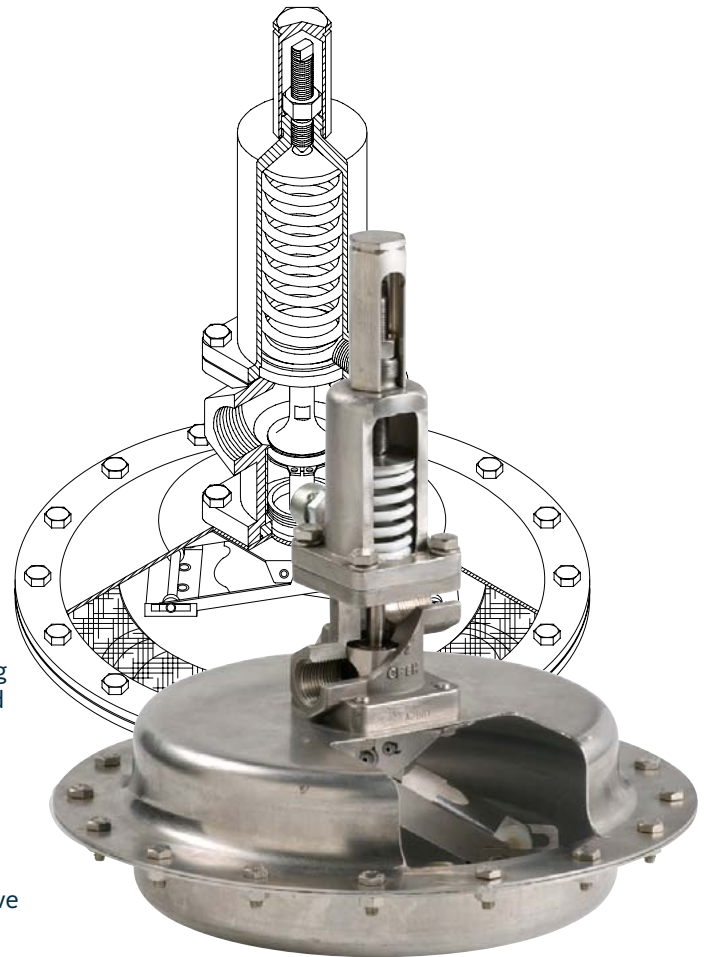
- Simple operation, spring-loaded “push-push” balanced piston design
- Bubble-tight shut-off
- Variable orifice, field-adjustable flow capacity
- Single stage regulator
- Setting ranges from 0.5 inWC to 15 psig
- Set pressure is field adjustable
- Modulating opening
- Minimal lockup and droop

Benefits

- Low maintenance cost
- Provides optimum gas blanketing of tank and product being stored
- Prevents evaporation of product and reduces corrosion of tank by providing blanketing gas in vapor space
- Prevents a flammable or explosive environment in the tank vapor space
- Ensures pressure is maintained in the vapor space of a storage tank
- Eliminates the need for a multiple regulator system or for complicated pilot operated blanketing

Materials

- Available in 316 stainless steel or other material by request



3011H cutaway shown

Why Gas Blanketing?

Blanket gas regulators from Groth Corporation ensure that a constant gas pressure is maintained in the vapor space of a storage tank. A blanket gas regulator supplies an inert gas to prevent a vacuum from developing when liquid is removed from a tank, to maintain the desired blanket pressure when the temperature drops, and to prevent outside air from contaminating the tank or creating a flammable or explosive environment. A blanket gas pressure as low as 0.5 inWC prevents outside air and moisture from entering the storage vessel and reduces evaporation of the stored product to a negligible amount. The end result: product conservation and significant reduction in tank emissions.

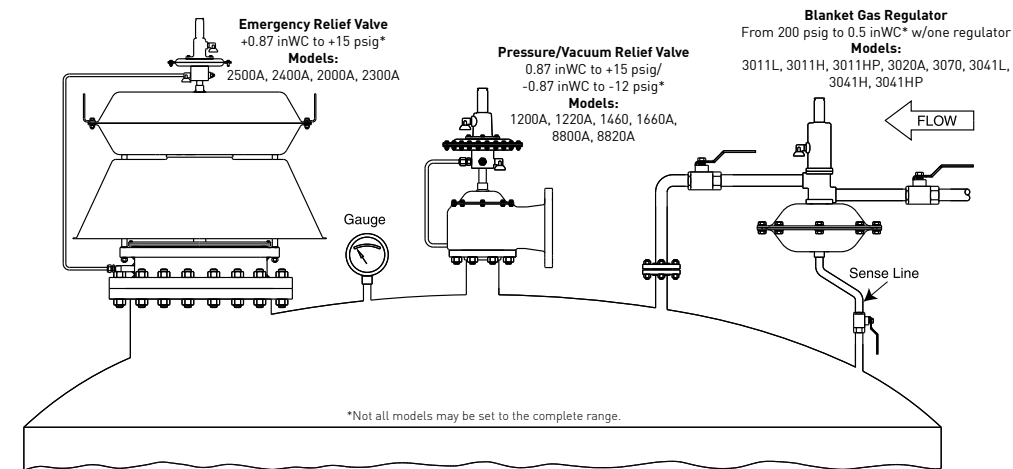
The simple design of a Groth blanket gas regulator eliminates the need for a multiple regulator system or complicated pilot operated blanketing valves. Groth units have totally balanced chambers to offer high accuracy and reliability, and ensure a leak-tight design without the need for a pilot valve to operate the unit, thus reducing maintenance costs.

Groth blanket gas regulators provide a controlled gas environment in storage tanks for the following applications:

- Refineries
- Chemical & Petrochemical Plants
- Liquid Bulk Storage Terminals
- Pulp & Paper Plants
- Food & Beverage Storage



3011H



Optimum Protection

For optimum protection of a tank and to meet all regulatory requirements, each tank should be protected by 1) a properly-sized blanket gas regulator, to maintain the vapor pressure in the tank, 2) a properly-sized pressure/vacuum relief valve or pilot operated valve, to release the vapor during pump-in or thermal expansion, and 3) a properly-sized emergency relief valve to protect against pressure rise due to external fire. Tank protection systems can be combined across multiple tanks, but careful consideration must be given to provide adequate relief and input capacity and to prevent fouling or clogging of system piping. Consult the factory for assistance in these situations.

A Groth blanket gas regulator will prevent evaporation or contamination of product by maintaining the proper atmosphere and pressure on the product stored in a tank. A Groth pressure/vacuum relief valve or pilot operated valve with vacuum relief will prevent vapor from escaping into the atmosphere until the set pressure is exceeded, and provide vacuum protection in case of a gas supply failure. The emergency relief valve will provide vessel protection under control system failure or external fire conditions. The complete system can be provided by Groth Corporation.

Benefits of storage tank blanketing are recognized by the following government regulations and industrial standards:

- API Standard 2000
- ISO 28300
- EPA Publication AP-42
- NFPA 69 - Standard on Explosion Prevention Systems
- OSHA Part 1910.110

OPTIONS

To complete your blanket gas system, Groth Corporation can provide a variety of additional devices for measuring, managing, and maintaining the cleanliness of your storage system:

- Gauges
- Purges
- Filters

Contact Groth Corporation or your local representative for more information.

Operation

The Groth blanket gas regulator maintains vapor pressure in a tank by opening the supply gas valve when tank pressure (through a sense port) falls below the specified set pressure. When tank pressure is at or above the set pressure, the plate diaphragm is held up by tank pressure. Through the force-multiplying actuator arms, the piston is held up against the spring pressure, and the supply valve is closed bubble-tight. When the tank pressure falls below the set pressure, the spring force overcomes the pressure. The piston moves down, and supply gas is released into the tank.

The actuating piston has identical effective areas on the lower piston seal and the o-ring. This balances the opening and closing forces caused by supply pressure; variable gas supply pressure will not have an effect on regulator operation, which eliminates the need for an external pilot control. Pressure against the diaphragm provides direct action against the spring. This “push-push” design provides maximum force to operate the regulator and to provide a bubble-tight seal.

The flow capacity can be limited by the rotatable orifice selector sleeve. Reducing the blanket gas flow capacity may reduce the need for excessive pressure relieving capacity on smaller tanks. The sleeve is field adjustable from 100% to 5% capacity, and can be locked down to prevent tampering.

Flow Capacity

Required flow capacity should be determined by using API 2000 | ISO 28300 or the relevant sizing standard. To find the rated capacity for your application, please refer to Table 1, Flow Capacity. Capacity is listed as a function of supply pressure for three typical blanket gases: CO₂, nitrogen, and natural gas. The flow capacities in the table are achieved with the 100% orifice selection. For reduced capacity, multiply the table values by the reduced percentage.

Table 1 Flow Capacity (Applies to Models 3011H, 3011HP, 3020A, 3041L, 3041H, and 3041HP. Consult factory for Model 3070)

Supply Pressure	Flow Capacity 1/2"						Flow Capacity 1"						
	Carbon Dioxide		Nitrogen		Natural GAS 0.6 SG		Carbon Dioxide		Nitrogen		Natural GAS 0.6 SG		
	psig	barg	SCFH	NCMH	SCFH	NCMH	SCFH	NCMH	SCFH	NCMH	SCFH	NCMH	
5	0.34	2160	61	2810	80	3660	104	4600	130	5800	164	7400	209
10	0.69	3250	92	4230	120	5490	155	7100	201	8800	249	11300	320
15	1.03	4370	124	5690	161	7390	209	9200	260	11500	325	14600	413
20	1.38	5130	145	6680	189	8680	246	11200	317	14000	396	17900	507
30	2.07	6630	188	8630	244	11210	317	15100	427	18900	535	24000	679
40	2.76	8140	230	10590	300	13760	389	18800	532	23600	668	30000	849
50	3.45	9650	273	12560	355	16320	462	22500	637	28200	798	35800	1013
60	4.14	11160	316	14520	411	18860	534	26000	736	32600	923	41500	1174
80	5.52	14180	401	18440	522	23950	678	33000	934	41300	1169	52600	1489
100	6.89	17200	487	22370	633	29060	822	40000	1132	50100	1418	63700	1803
120	8.27	20210	572	26290	744	34150	966	47000	1330	58800	1664	74800	2117
140	9.65	23230	657	30220	855	39250	1111	53900	1525	67500	1910	85900	2431
160	11.0	26240	743	34140	966	44340	1255	60900	1723	76300	2159	97000	2745
180	12.4	29260	828	38060	1077	49440	1399	67900	1922	85000	2406	108100	3059
200	13.8	32280	914	41990	1188	54540	1543	74900	2120	93700	2652	119200	3373

Note: Unless otherwise specified, the orifice selector sleeve is factory set at 100% capacity.

Table 2 Positive Pressure Model Selection Guides

Set Pressure	1/2" BGR Supply Pressure psig / barg			
	5 to 51 0.3 to 3.4	>51 to 101 3.5 to 6.9	>101 to 151 7.0 to 10.3	>151 to 200 10.4 to 13.8
0.5 inWC to 0.99 inWC 1.2 to 2.5 mbarg				3011L
1.0 inWC to 1.49 inWC 2.5 to 3.7 mbarg	3011H			
1.5 inWC to 1.99 inWC 3.7 to 5.0 mbarg				
2.0 inWC to 8.0 inWC 5.0 to 20 mbarg				

Table 3 Negative Pressure Model Selection Guides

Set Pressure	1/2" BGR Supply Pressure psig / barg			
	5 to 51 0.3 to 3.4	>51 to 101 3.5 to 6.9	>101 to 151 7.0 to 10.3	>151 to 200 10.4 to 13.8
-0.5 inWC to -0.99 inWC -1.2 to -2.5 mbarg				3041L
-1.0 inWC to -1.49 inWC -2.5 to -3.7 mbarg	3041H			
-1.5 inWC to -1.99 inWC -3.7 to -5.0 mbarg				
-2.0 inWC to -8.0 inWC -5.0 to -20 mbarg				

Set Pressure	1" BGR Supply Pressure psig / barg			
	5 to 51 0.3 to 3.4	>51 to 101 3.5 to 6.9	>101 to 151 7.0 to 10.3	>151 to 200 10.4 to 13.8
0.5 inWC to 0.99 inWC 1.2 to 2.5 mbarg				3011L
1.0 inWC to 1.49 inWC 2.5 to 3.7 mbarg	3011H			
1.5 inWC to 1.99 inWC 3.7 to 5.0 mbar	3011HP			
2.0 inWC to 6.49 inWC 5.0 to 16 mbarg				
6.5 inWC to 1.99 psig 16 to 140 mbarg				
2.0 to 15 psig 0.14 to 1.03 barg	3020A			

Set Pressure	1" BGR Supply Pressure psig / barg			
	5 to 51 0.3 to 3.4	>51 to 101 3.5 to 6.9	>101 to 151 7.0 to 10.3	>151 to 200 10.4 to 13.8
-0.5 inWC to -0.99 inWC -1.2 to -2.5 mbarg				3041L
-1.0 inWC to -1.49 inWC -2.5 to -3.7 mbarg	3041H			
-1.5 inWC to -1.99 inWC -3.7 to -5.0 mbarg	3041HP			
-2.0 inWC to -6.49 inWC -5.0 to -16 mbarg				
-6.5 inWC to -1.99 psig 16 to 140 mbarg				

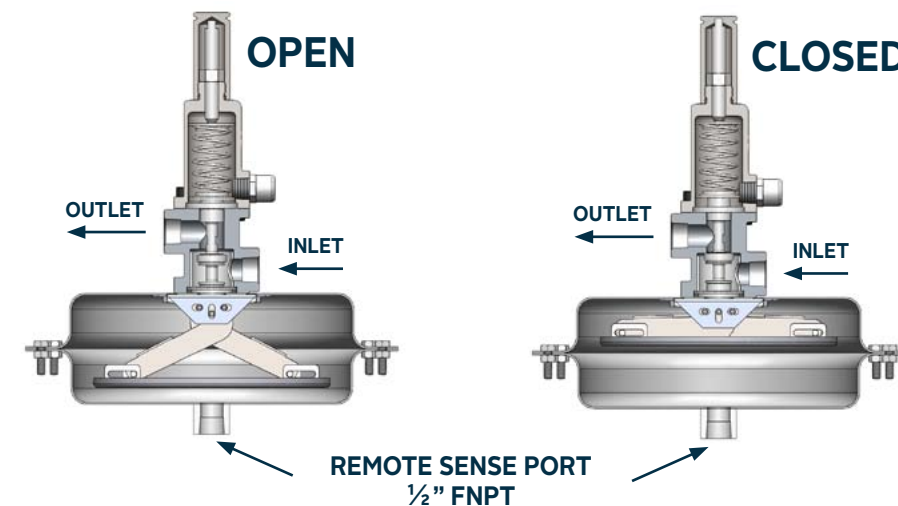


Table 4 Min/Max Pressures

1/2" Blanket Gas Regulator

Model Number	Minimum Setting	Maximum Setting	Maximum Allowable Working Pressure (MAWP)	Maximum Supply Pressure (MSP)	Shipping Weight
	inWC mbarg	inWC mbarg	psig barg	psig barg	lb kg
3011L	0.5 1.2	1.0 2.5	2.0 0.13	200 13.8	13 5.9
3041L	-0.5 -1.2	-1.0 -2.5	2.0 0.13	200 13.8	13 5.9
3011H	0.5 1.2	0.7 1.7	8.0 0.55	50 3.4	10 4.5
	0.7 1.7	8.0 20	8.0 0.55	200* 13.8*	10 4.5
3041H	-0.5 -1.2	-0.7 -1.7	8.0 0.55	50 3.4	10 4.5
	-0.7 -1.7	-8.0 -20	8.0 0.55	200* 13.8*	10 4.5

* Minimum set pressure for 3011H with 200 psig supply pressure is 1 inWC.

Table 5 Spring Ranges

1/2" Blanket Gas Regulator

Model No.	Max Supply	Min Setting	Max Setting	Spring Range
	psig barg	inWC mbarg	inWC mbarg	
3011L/ (3041L)	200 13.8	0.5 1.2	0.79 1.9	2
	200 13.8	0.8 2.0	1.0 2.5	3
	50 3.4	0.5 1.2	0.69 1.6	4
	200 13.8	0.7 1.7	1.69 4.1	2
3011H/ (3041H)	200 13.8	1.7 4.2	2.99 7.4	3
	200 13.8	3.0 7.5	4.49 111	4
	200 13.8	4.5 11.2	8.0 20.0	5



3011L

1" Blanket Gas Regulator

Model Number	Minimum Setting	Maximum Setting	Maximum Allowable Working Pressure (MAWP)	Maximum Supply Pressure (MSP)	Shipping Weight Lb (kg)
3011L	0.5 inWC 1.3 mbarg	2.0 inWC 5 mbarg	2 psig 0.13 barg	200 psig 13.8 barg	33 15
3011H	0.5 inWC 1.3 mbarg	6.5 inWC 16 mbarg	8 psig 0.55 barg	200 psig 13.8 barg	24 11
3011HP	6.5 inWC 16 mbarg	2.0 psig 0.14 barg	25 psig 1.7 barg	200 psig 13.8 barg	24 11
3020A	2.0 psig 0.14 barg	10 psig 0.68 barg	75 psig 5.1 barg	200 psig 13.8 barg	15 7
3070	0.5 inWC 1.3 mbarg	15 psig 1.03 barg	* *	* *	* *
3041L	-0.5 inWC -1.3 mbar	-2.0 inWC -5 mbarg	2 psig 0.13 barg	200 psig 13.8 barg	33 15
3041H	-0.5 inWC -1.3 mbar	-6.5 inWC -16 mbarg	8 psig 0.55 barg	200 psig 13.8 barg	29 13
3041HP	-6.5 inWC 16 mbarg	-2.0 psig -0.14 barg	25 psig 1.7 barg	200 psig 13.8 barg	24 11

NOTE: When spring ranges overlap, select the lighter spring. *Consult the factory.

1" Blanket Gas Regulator

Model No.	Max Supply	Min Setting	Max Setting	Spring Range
	psig barg	inWC mbarg	inWC mbarg	
3011L/ (3041L)	200 13.8	0.5 1.2	0.79 1.69	3
	200 13.8	0.8 1.7	0.99 2.49	4
	200 13.8	1.0 2.5	1.99 5.0	5
	50 3.4	0.5 1.2	0.99 2.49	1
3011H/ (3041H)	100 6.9	1.0 2.5	1.49 3.69	2
	150 10.3	1.5 3.7	1.99 4.99	3
	200 13.8	2.0 5.0	3.49 8.69	4
	200 13.8	3.5 8.7	6.49 16.19	5
3011HP/ (3041HP)	200 13.8	2.0 5.03	3.2 1034	4
	200 13.8	3.3 8.35	5.0 138	5
3020A	200 13.8	5.1 138	7.2 221	6
	200 13.8	7.3 503	15.0 1034	7

Notes:

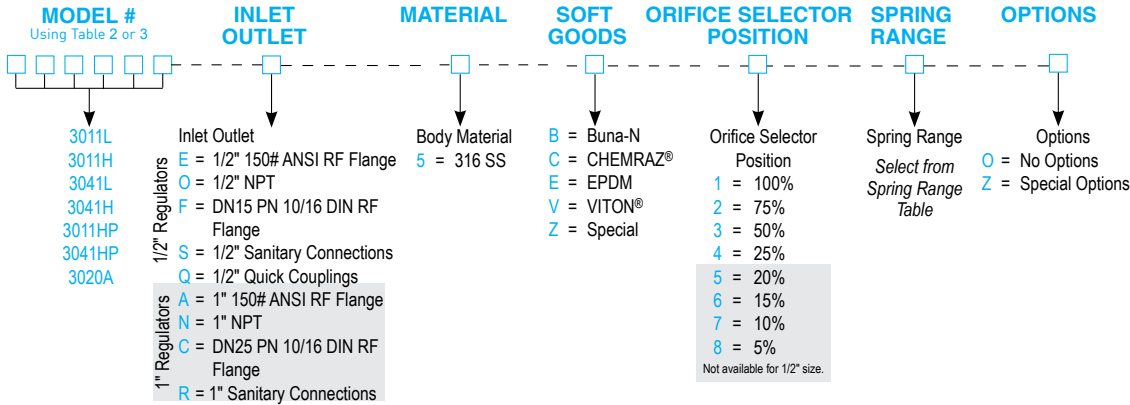
- When spring ranges overlap, select the lighter spring
- Min/Max setting applicable to both pressure and vacuum (vacuum model when used)
- Consult the factory for regulators with settings less than -2 psig

HOW TO ORDER

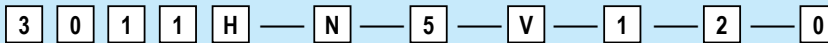


How to Order Standard BGRs

For easy ordering, select proper model number



EXAMPLE



Indicates a Model 3011H Regulator with 1" NPT body connections, 316 SS construction, VITON® elastomers, full capacity orifice, set pressure range from 1.0 inWC to 1.5 inWC and no special requirements.

Notes:

- Include model number when ordering
- For special options, consult factory
- See flow table for available sizes
- Consult the factory for regulators with settings less than -2 psig
- Actuator diaphragm is only available in TEFLON® PFA



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