



B31 Series Regulator

Light Commercial and Industrial Regulator

- ▶ Smooth control at widely varying inlet pressures
- ▶ Light weight
- ▶ Easy to install
- ▶ Rugged construction
- ▶ Protection from shock damage
- ▶ Unmatched overpressure protection with Internal Monitor plus Internal Relief (IMR) option
- ▶ No special tools required for outlet pressure adjustment
- ▶ Compliant with ANSI and AGA-GAMA Safety Standards.

Features

- Field Interchangeable orifice
- 27 sq. in. diaphragm area
- Spring-loaded internal relief valve assembly
- Interchangeable adjustment spring
- Controlled breather orifice
- Wide range of NPT valve body sizes



Applications

Use where inches of water column or pounds delivery is desired such as utility services, and small to medium sized furnaces and boilers. The rapid response of the B31 is particularly well suited for applications where sudden on/off loads could cause shock problems

Description

▶ B31N

The B31N is a spring-loaded, self-operated regulator with no internal relief (N) valve. This model can be used on low or intermediate inlet pressures where an internal relief or other type of over-pressure protection device is not required.

▶ B31R

The B31R is the internal relief valve (R) version of the B31 Series. The 1" internal relief valve provides exceptional relief capacity.

▶ B31IMN

The B31IMN is equipped with an Internal Monitoring (IM) device and no internal relief valve (N). This version is appropriate for applications where over-pressure protection is desired without the relief of gas to the atmosphere.

▶ B31IMR

The B31IMR is equipped with an Internal Monitoring (IM) device as well as a back-up Internal Relief Valve (R). This version is appropriate for applications where an added level of over-pressure protection is desired.

▶ B31IMRV

The B31IMRV is equipped with an Internal Monitoring (IM) device as well as a back-up Internal Relief Valve (R) and a Vent (V) hole in the sliding orifice. The Vent hole option allows the relief valve to "weep" gas to the atmosphere and signal monitor control in the event the main valve fails to control the downstream pressure.

▶ B31RAS

The B31RAS is equipped with a Low Pressure Shut-off valve and Internal Relief. The low-pressure shut-off valve will close if the flow through the regulator exceeds its maximum flow rate (See Capacity Table for shut-off flow values). The internal relief valve will open if the downstream pressure rises approximately 7" w.c. above the regulator's set point.

▶ Option Designations

N	No Internal Relief
R	Internal Relief
IMN	Internal Monitor with no Internal Relief
IMR	Internal Monitor with Internal Relief
IMRV	Internal Monitor with Internal Relief and Vent
HP	All models for outlet pressures >0.5 psig
RAS	Internal Relief with Low Pressure Shut-off valve

Correction factors for non-natural gas applications:

The B31 may be used to control gases other than natural gas.

To determine the capacity of the B31 for gases other than natural gas, it will be necessary to multiply the values within the capacity tables by a correction factor.

The table below lists the correction factors for some of the more common gases:

Gas Type	Specific Gravity	Correction Factor (CF)
Air	1.00	0.77
Butane	2.01	0.55
Carbon Dioxide (Dry)	1.52	0.63
Carbon Monoxide (Dry)	0.97	0.79
Natural Gas	0.60	1.00
Nitrogen	0.97	0.79
Propane	1.53	0.63
Propane-Air-Mix	1.20	0.71

To calculate the correction factor for gases not listed on the table above, it will be necessary to know the specific gravity of the gas and use it in the formula listed below:

$$\text{Correction Factor (CF)} = \sqrt{\frac{SG_1}{SG_2}}$$

Where:

SG_1 = Specific Gravity of the gas in which the capacity is published.

SG_2 = Specific Gravity of the gas to be controlled.

Construction

Actaris takes pride in delivering American made products with the utmost concern for safety, quality and customer satisfaction.

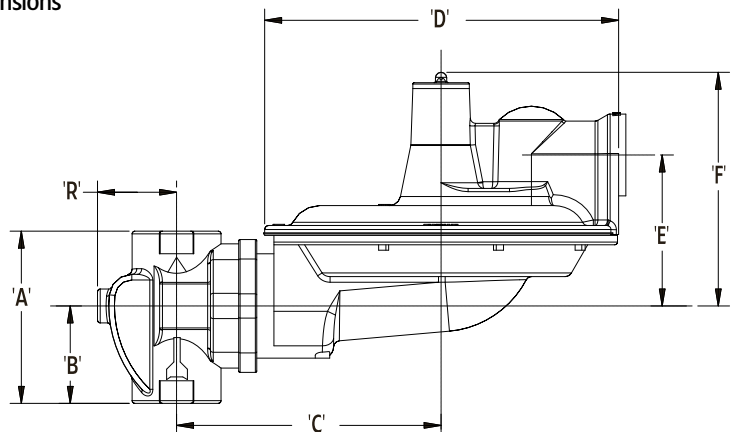
Material Construction:

Valve Body:	High tensile strength cast iron (ASTM A-126, Class A)
Orifice:	Aluminum - standard Brass - optional (ASTM B16, Alloy 360)
Valve Seat:	Buna-N or silicone (for temperatures below -20°F)
Valve Stem:	Aluminum
Lever Pin:	Stainless steel (Type 303)
Lever:	Zinc and dichromate plated steel (AISI C1010)
Upper Diaphragm Plate:	Zinc and dichromate plated steel (14 gauge steel)
Lower Diaphragm Plate:	Die cast aluminum (ASTM B-85 Alloy SC84A)
Diaphragm:	Buna-N and nylon reinforcing fabric
Vent Valve/Seat:	Neoprene
Vent Screen:	Stainless Steel (16 mesh)
Adjustment Ferrule:	Delrin; Die cast aluminum for HP ver. (ASTM CS43A)
Seal Cap:	Die cast aluminum (ASTM CS43A) or ABS plastic
Diaphragm Case:	Die cast aluminum (ASTM B85 -Alloy SC84A)
Internal monitor orifice:	Brass (ASTM B16 Alloy 360)

Shipping Weight:

8 Regulators per box Box weight: 52 lbs.

B31 Dimensions



B31 Dimensions (inches)									
Valve Body	A	B	C	D	E	F	G	H	R
3/4" & 1"	3-3/4	2-1/8	5-13/16	7-13/16	3-1/4	4-7/8	4-9/16	2-5/16	2-1/4
1-1/4"	4	2-1/8	5-13/16	7-13/16	3-1/4	4-7/8	4-9/16	2-5/16	2-1/4
3/4" x 1" 90° Angle Body		1-5/8	1-5/8	7-13/16	3-1/4	4-7/8	4-9/16	2-5/16	2-1/4

Specifications

Spring Data - Spring Color Outlet Pressure Range*

Spring Color		Outlet Pressure Range*		Outlet Pressure Range	
		Models N, R, & RAS		Models IMN & IMR	
Spring Data - B31		inches w.c.	(mbar)	inches w.c.	(mbar)
Brown	(p/n 762111)	4.5 to 5.5	(11.2 to 13.7)	4.5 to 5.5	(11.2 to 13.7)
Dark Green	(p/n 762117)	5.0 to 6.5	(12.4 to 16.7)	5.5 to 6.0	(13.7 to 14.9)
Gray	(p/n 762139)	4.0 to 9.0	(9.9 to 22.4)	4.5 to 8.5	(11.2 to 21.1)
Light Green	(p/n 762119)	5.5 to 8.0	(11.2 to 19.9)	6.0 to 7.5	(14.9 to 18.6)
Black	(p/n 762123)	7.3 to 11.0	(18.1 to 27.3)	6.0 to 9.0	(14.9 to 22.4)
Blue	(p/n 762127)	8.0 to 12.0	(19.9 to 29.8)	7.5 to 11.5	(18.6 to 28.6)
Silver	(p/n 762129)	11.0 to 16.0	(27.3 to 39.8)	8.0 to 14.5	(19.9 to 36.1)
Model - B31HP**		PSIG	(mbar)	PSIG	(mbar)
Red/Grey	(p/n 762025)	0.75 to 1.1	(51.7 to 75.8)	0.5 to 1.0	(34.5 to 68.9)
Yellow	(p/n 762131)	0.9 to 1.4	(62.0 to 96.5)	1.0 to 1.5	(68.9 to 103.4)
Red	(p/n 762135)	1.3 to 2.0	(89.6 to 137.9)	1.3 to 1.9	(89.6 to 131.0)
White	(p/n 762137)	1.75 to 2.5	(121 to 172)	1.5 to 2.5	(68.9 to 172.0)

*Spring Ranges are approximate and may vary by application.

**Warning: Springs are not interchangeable between B31 and B31HP.

Orifice Data - Wide Open Flow Coefficients and Maximum Pressure Data

Orifice Size	K-Factor (scfh/psi)	Maximum Operating Inlet Pressure All Models			Max. Emergency Inlet Pressure All Models All Outlet	Max. Emergency Outlet Pressure (Gas Containment)	
		in. w.c. Delivery	PSIG Delivery	PSIG Delivery		in. w.c. Delivery	PSIG delivery
		Pressure PSIG (mbar)	Pressure PSIG (mbar)	Pressure PSIG (mbar)		Pressure PSIG (mbar)	Pressure PSIG (mbar)
1/8"	30	125 (8.6)	175 (12.1)	300 (20.6)	18 (1.2)	60 (4.1)	
1/8" IM	35	125 (8.6)	175 (12.1)	300 (20.6)			
3/16"	71	125 (8.6)	175 (12.1)	300 (20.6)			
3/16" IM	68	125 (8.6)	175 (12.1)	300 (20.6)			
1/4"	127	125 (8.6)	125 (8.6)	300 (20.6)			
1/4" IM	112	125 (8.6)	125 (8.6)	300 (20.6)			
5/16"	193	100 (6.9)	100 (6.9)	150 (10.3)			
5/16" IM	138	100 (6.9)	100 (6.9)	150 (10.3)			
3/8"	290	65 (4.5)	60 (4.1)	150 (10.3)			
1/2"	500	40 (2.8)	40 (2.8)	100 (6.9)			

Wide-Open Flow Calculations

For wide-open orifice flow calculations use the following equations:

$$\text{For } P_1/P_2 < 1.89 \text{ use: } Q = K \sqrt{P_2 (P_1 - P_2)} \quad \text{For } P_1/P_2 > 1.89 \text{ use: } Q = \frac{KP_1}{2}$$

Where: P_1 = absolute inlet pressure (psia)
 Q = flow rate (scfh)

P_2 = absolute outlet pressure (psia)
 K = orifice coefficient (scfh/psi)

► Valve Body Sizes

Inlet	Outlet	Compact	90 Angle	Straight
1/2"	3/4"	-	-	X
1/2"	1"	-	-	X
3/4"	3/4"	-	X	X
3/4"	1"	-	X	X
3/4"	1-1/4"	-	-	X
1"	1"	-	X	X
1"	1-1/4"	-	-	X
1-1/4"	1-1/4"	-	-	X

X indicates that the valve body is available in that configuration.

Available Vent Sizes:

1/4", 3/8", 3/4" and 1"

Operating Temperature Range:

-20°F to 150° F (silicone seats available below -20° F)

Other Available Options:

- *Seal wire to indicate tampering
- *1/8" pipe plug tap on upstream side of valve body
- *Tamper-Proof (Torx Head) diaphragm case screws

B31 Series Light Commercial & Industrial Regulator - Models N, R

7" w.c. (17 mbar) Capacity Table (1" Droop)*

(Capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Inlet Pressure (PSIG)	Orifice Size					
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
8" w.c.			100	130	190	270
10" w.c.			110	160	240	300
12" w.c.		100	115	165	250	310
14" w.c.		110	170	190	330	440
16" w.c.		120	180	205	340	450
21" w.c.		130	230	255	410	575
24" w.c.	90	150	230	275	420	585
1	110	160	270	340	560	640
2	150	255	450	560	845	1120
3	190	325	560	770	1090	1470
5	260	470	830	1050	1400	1750
10	400	870	1470	1950	2200	2400
20	580	1020	1670	2120	2560	2650
30	700	1900	2550	2600	2680	2700
40	910	2300	2600	2630	2750	2760
50	1070	2370	2610	2670	2890	
60	1150	2420	2700	2720	2930	
70	1340	2500	2750	2770		
80	1490	2510	2750	2790		
90	1640	2510	2750	2790		
100	1890	2520	2770	2790		
125	2305	3420	2820			


Inlet Effect^a	0.1" w.c.	0.2" w.c.	0.3" w.c.	0.3" w.c.	0.4" w.c.	0.5" w.c.
Lock up^c	0.3" w.c.	0.5" w.c.	0.6" w.c.	0.8" w.c.	0.9" w.c.	1.0" w.c.


Note:

B- Change in outlet pressure for 10 PSIG inlet pressure change

C- Outlet pressure increase required for lock up

* Individual regulator performance may vary from data shown

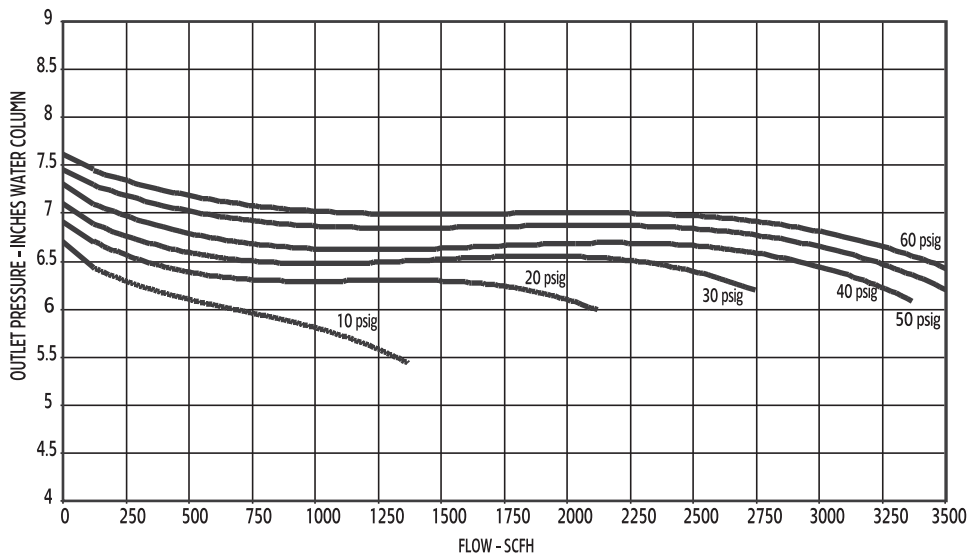
 Do Not operate orifice in shaded inlet pressure area.

 Inlet Pressure is too low to achieve desired outlet pressure.

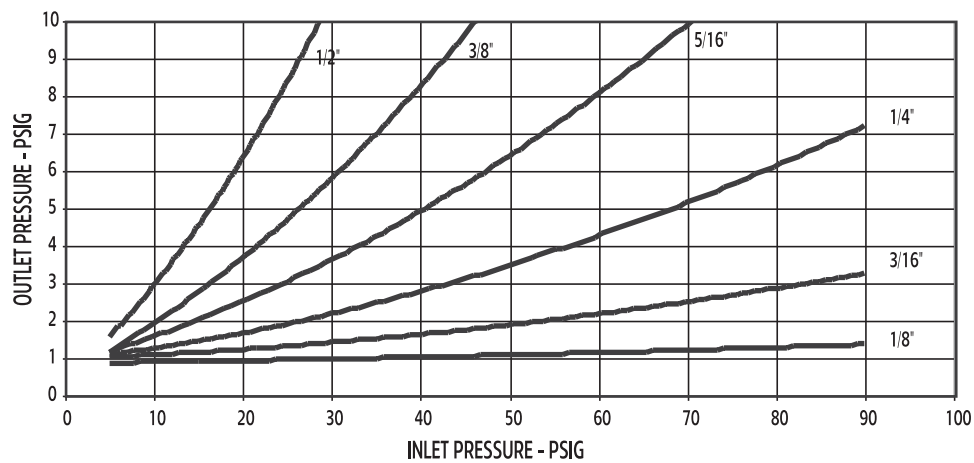
B31R Series Light Commercial & Industrial Regulator - Models N, R

7" w.c.

B31R REGULATOR PERFORMANCE
7" w.c. SET POINT



B31R RELIEF CURVES-LEVER DISCONNECT
7" w.c. SET POINT



Typical Performance Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size: 1-1/4" NPT
	Outlet Size: 1-1/4" NPT
	Orifice Size: 1/4"

Relief Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size: 3/4" NPT
	Outlet Size: 1" NPT
	Vent Size: 1" NPT

B31 Series Light Commercial & Industrial Regulator - Models N, R



14" w.c. (34 mbar) Capacity Table (2" Droop)*

(Capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Inlet Pressure (PSIG)	Orifice Size					
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
16" w.c.		90	130	170	185	260
21" w.c.	70	110	150	190	205	305
24" w.c.	80	120	160	225	225	340
1	100	145	200	240	290	410
2	120	210	300	380	475	630
3	155	270	375	500	580	820
5	210	380	560	660	800	1100
10	350	575	820	1000	1180	1500
20	510	810	1240	1300	1700	1550
30	615	1100	1500	1450	1550	1400
40	790	1350	1740	1550	1400	1300
50	1000	1530	1820	1500	1450	
60	1100	1950	1760	1400	1350	
70	1300	2030	1650	1350		
80	1350	2080	1600	1300		
90	1450	1860	1530	1275		
100	1520	2010	1580			

Inlet Effect^b	0.1" w.c.	0.2" w.c.	0.3" w.c.	0.4" w.c.	0.5" w.c.	0.6" w.c.
Lock up^c	0.4" w.c.	0.6" w.c.	0.7" w.c.	0.9" w.c.	0.9" w.c.	0.9" w.c.

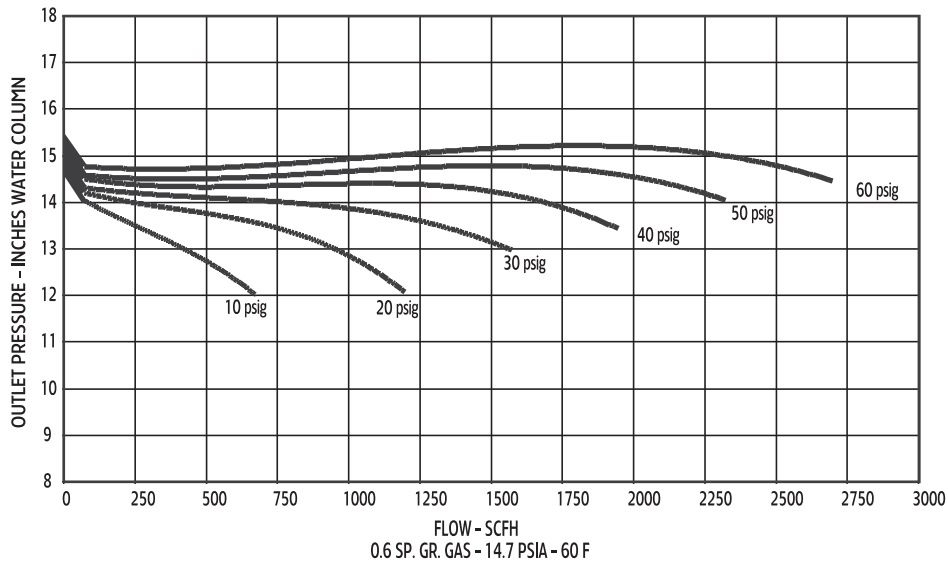
Note:
 B- Change in outlet pressure for 10 PSIG inlet pressure change
 C- Outlet pressure increase required for lock up

 Do Not operate orifice in shaded inlet pressure area.
 Inlet Pressure is too low to achieve desired outlet pressure.

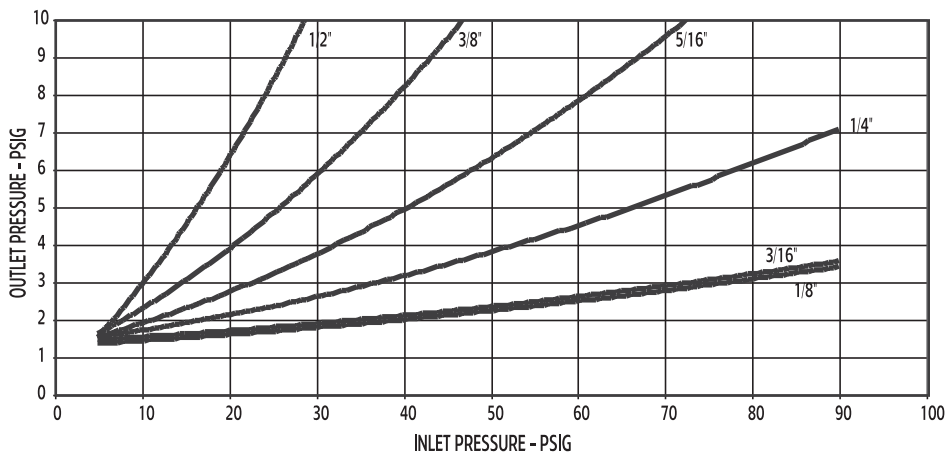
B31R Series Light Commercial & Industrial Regulator - Models N, R

14" w.c.

B31R REGULATOR PERFORMANCE 14" w.c. SET POINT



B31R RELIEF CURVES-LEVER DISCONNECT 14" w.c. SET POINT



Typical Performance Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size 3/4" NPT
	Outlet Size 1" NPT
	Orifice Size 3/16"

Relief Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size 3/4" NPT
	Outlet Size 1" NPT
	Vent Size 1" NPT

B31HP Series Light Commercial & Industrial Regulator - Models N, R

1 PSIG (69 mbar) Capacity Table (1% Absolute Droop)*

(capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Inlet Pressure (PSIG)	Orifice Size					
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
2	120	200	230	310	360	480
3	160	250	330	420	480	640
5	190	360	490	580	670	880
8	230	480	670	780	890	1260
10	310	550	730	900	1050	1370
15	410	690	980	1170	1350	1810
20	500	830	1150	1400	1600	2100
30	640	1120	1520	1760	2060	2150
40	780	1560	1920	2160	2280	2300
50	950	1610	2170	2360	2380	
60	1100	1800	2360	2530	2550	
75	1340	1960	2500	2680		
85	1510	2550	2850	2810		
100	1760	2870	3010	3100		
Inlet Effect^B	0.01 PSIG	0.02 PSIG	0.02 PSIG	0.03 PSIG	0.03 PSIG	0.04 PSIG
Lock up^C	0.04 PSIG	0.04 PSIG	0.04 PSIG	0.06 PSIG	0.06 PSIG	0.06 PSIG

1 PSIG (69 mbar) Capacity Table (2% Absolute Droop)*

Inlet Pressure (PSIG)	Orifice Size					
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
2	150	300	420	550	660	880
3	200	370	550	730	860	1190
5	250	540	770	990	1220	1630
8	330	700	1030	1360	1640	2200
10	370	800	1200	1560	1900	2410
15	470	1030	1600	2020	2380	3100
20	550	1250	1900	2420	2920	2400
30	700	1610	2490	3080	3300	3400
40	860	1980	3100	3420	4140	4200
50	1010	2300	3500	3640	4300	
60	1170	2680	3680	3940	4350	
75	1400	2940	3920	4220		
85	1600	3480	4250	4500		
100	1820	3930	4600	4600		

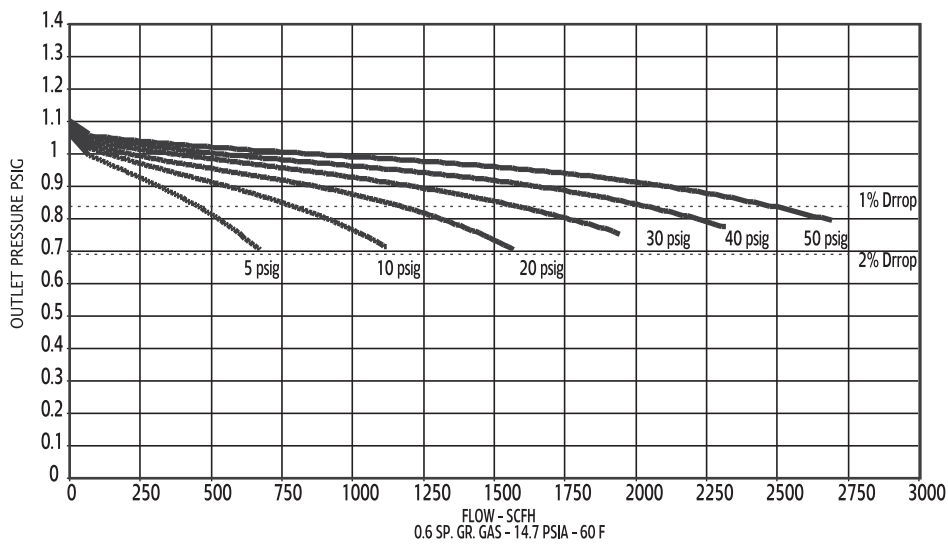
Note:
B- Change in outlet pressure for 10 PSIG inlet pressure change
C- Outlet pressure increase required for lock up

Do not operate this orifice at this inlet pressure.

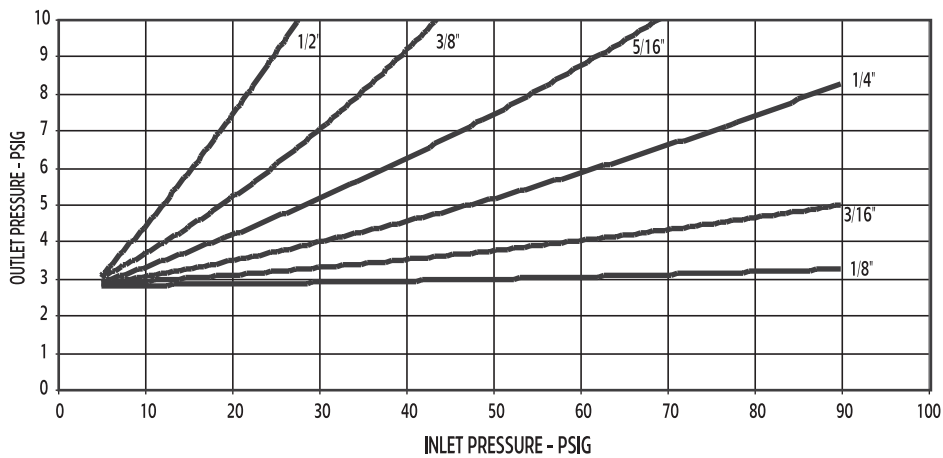
B31HP Series Light Commercial & Industrial Regulator - Models N, R

1 PSIG

B31R REGULATOR PERFORMANCE 1 PSIG SET POINT



B31R RELIEF CURVES-LEVER DISCONNECT 1 PSIG SET POINT



Typical Performance Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size 3/4" NPT
	Outlet Size 1" NPT
	Orifice Size 3/16"

Relief Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size 3/4" NPT
	Outlet Size 1" NPT
	Vent Size 1" NPT

B31HP Series Light Commercial & Industrial Regulators - Models N, R

2 PSIG (138 mbar) Capacity Table (1% Absolute Droop)*

(capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Inlet Pressure (PSIG)	Orifice Size					
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
3	100	120	190	210	230	280
5	140	160	260	320	350	450
10	250	290	500	550	600	700
20	450	500	800	900	1000	1200
30	550	600	1000	1200	1200	1400
40	650	800	1200	1300	1500	1600
50	800	900	1400	1600	1700	
60	900	1100	1500	1700	1700	
70	955	1150	1600	1700		
80	1100	1250	1700	1700		
90	1250	1320	1700	1700		
100	1400	1400	1700			
125	1600	1700	1700			

Inlet Effect^a	0.01 PSIG	0.02 PSIG	0.03 PSIG	0.04 PSIG	0.05 PSIG	0.06 PSIG
Lock up^c	0.04 PSIG	0.05 PSIG	0.05 PSIG	0.06 PSIG	0.06 PSIG	0.06 PSIG

2 PSIG (138 mbar) Capacity Table (2% Absolute Droop)*

Inlet Pressure (PSIG)	Orifice Size					
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
3	120	200	320	400	480	530
5	190	330	500	600	700	850
10	280	550	800	1000	1100	1320
20	550	900	1300	1500	1800	2000
30	700	1100	1700	2000	2100	2300
40	800	1400	2000	2300	2300	2700
50	1000	1700	2400	2500	2500	
60	1100	2000	2500	2620	2700	
70	1125	2100	2600	2850		
80	1300	2150	2800	2940		
90	1475	2250	2800	3000		
100	1700	2250	2810	3060		
125	2100	2420	2980			

Note:

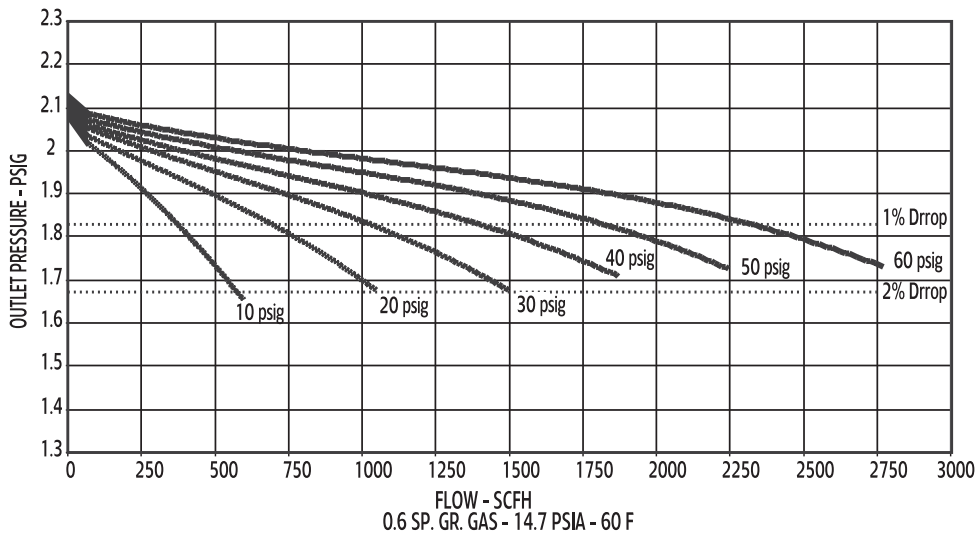
B- Change in outlet pressure for 10 PSIG inlet pressure change
C- Outlet pressure increase required for lock up

Do not operate this orifice at this inlet pressure.

B31HP Series Light Commercial & Industrial Regulators - Models N, R

2 PSIG Capacity Table (1% Absolute Droop)*

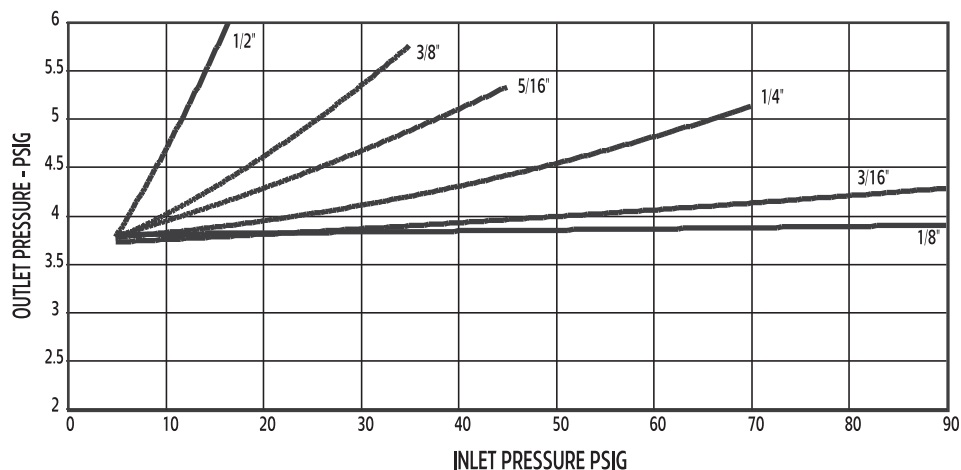
B31R REGULATOR PERFORMANCE
2 PSIG SET POINT



Typical Performance Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size 3/4" NPT
	Outlet Size 1" NPT
	Orifice Size 3/16"

B31R RELIEF CURVES-LEVER DISCONNECT
2 PSIG SET POINT



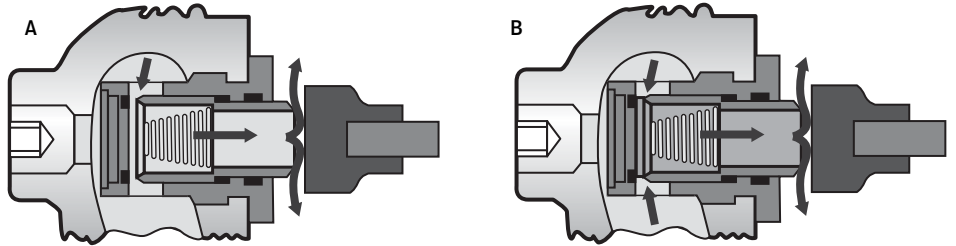
Relief Curves

Manufacturer:	Actaris
Type and Model:	B31R
Regulator:	Inlet Size 3/4" NPT
	Outlet Size 1" NPT
	Vent Size 1" NPT

Model B31IMR, B31IMRV, and B31IMN Internal Monitor (IM) Principle of Operation

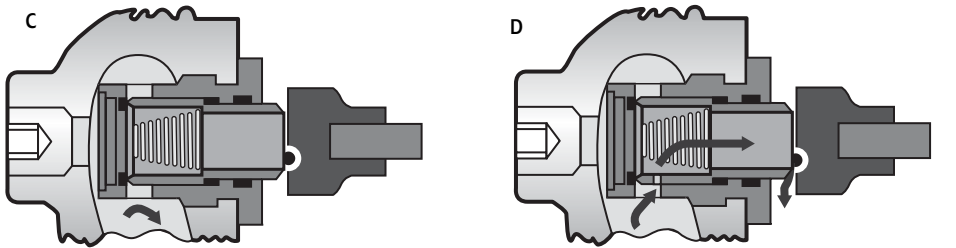
A. Standard regulator and upstream monitor orifice.

The internal monitor "IM" orifice performs like a standard regulator and monitor orifice, in that the monitor orifice is wide open under normal operation and the regulating orifice and valve seat actuate to control outlet flow and pressure. The regulator is free to lock up in the usual manner, with pressure increase to position the valve seat "bubble" tight against the regulating orifice face. However, both the monitor seat and the regulator seat may close together if the positive shock lock up exceeds the monitor spring setting.



B. Standard regulator orifice failed; upstream monitor orifice control.

If the main valve seat fails to control the gas flow and pressure due to foreign matter between the seat and orifice face, or if the seat is eroded, the internal monitor orifice automatically goes into operating position at a slightly higher outlet pressure. Any time the pressure on the large main diaphragm exceeds the power of the fixed monitor spring and the adjusted pressure of the main spring, this increase in outlet pressure causes the main valve seat to push against the sliding orifice, compressing the monitor spring and positioning the monitor orifice to control the gas flow. The IM orifice now functions as a monitor regulator and will continue to monitor as long as the main seats fail to control at the normal adjusted outlet pressure. However, if the gas load demand is increased beyond the Internal Monitor's capacity, the outlet pressure is reduced to normal adjusted pressure and the regulator resumes normal regulation.



□ inlet pressure ■ outlet pressure

C. Main orifice failed - upstream monitor orifice "lock-up".

If the demand for gas is decreased to zero flow during monitor operation, the sliding orifice continues to close until its orifice is in the gas tight position (monitor lock up) against the BUNA-N monitor valve seat. Outlet pressure required for Internal Monitor "lock-up" is shown in Internal Monitor Lock Up Table.

D. "V" Option - vents small volume of gas to atmosphere through relief valve.

On installations where a small volume of over-pressure gas can be safely vented to atmosphere, the advantage of both relief valve and monitor safety can be combined. The monitor limits overpressure buildup to a low-pressure increase, and relief valve vents gas to atmosphere to indicate that the main valve has failed and the regulator is on monitor operation.

Main Spring Color	Outlet Pressure	IM Lock Up Pressure Models B31 IMN & IMR	Vent Relief Pressure Model B31IMRV With Green Relief Spring
Brown	5.0" w.c. (12.4 mbar)	10.0" w.c. (24.9 mbar)	14.8" w.c. (36.8 mbar)
Dark Green	6.0" w.c. (14.9 mbar)	12.0" w.c. (29.8 mbar)	15.8" w.c. (39.3 mbar)
Light Green	7.0" w.c. (17.4 mbar)	12.5" w.c. (31.1 mbar)	16.6" w.c. (41.3 mbar)
Black	8.0" w.c. (19.9 mbar)	13.5" w.c. (33.5 mbar)	17.5" w.c. (43.5 mbar)
Blue	9.0" w.c. (22.4 mbar)	14.5" w.c. (36.1 mbar)	19.5" w.c. (48.5 mbar)
Silver	11" w.c. (27.4 mbar)	17.0" w.c. (42.3 mbar)	22.6" w.c. (56.2 mbar)
Red/Grey	20" w.c. (49.7 mbar)	27.0" w.c. (67.2 mbar)	1.2 PSIG (82.7 mbar)
Yellow	1 PSIG (69 mbar)	1.3 PSIG (89.6 mbar)	1.5 PSIG (103 mbar)
Red	1.5 PSIG (103 mbar)	1.75 PSIG (121 mbar)	2.0 PSIG (138 mbar)
White	2.0 PSIG (138 mbar)	2.3 PSIG (159 mbar)	3.5 PSIG (241 mbar)

B31 Series Light Commercial & Industrial Regulator - Models IMN, IMR, IMRV

7" w.c. (17 mbar)

Capacity Table (1" Droop)*

capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Orifice Size

Inlet Pressure (PSIG)	1/8"	3/16"	1/4"	5/16"
1	95	165	270	340
2	150	255	450	550
3	190	325	560	670
5	260	470	800	900
10	400	840	1220	1400
15	450	1050	1600	1850
25	670	1350	2200	2500
40	960	1880	2500	2500
60	1280	2500	2500	2500
75	1530	2500	2500	2500
90	1850	2500	2500	2500

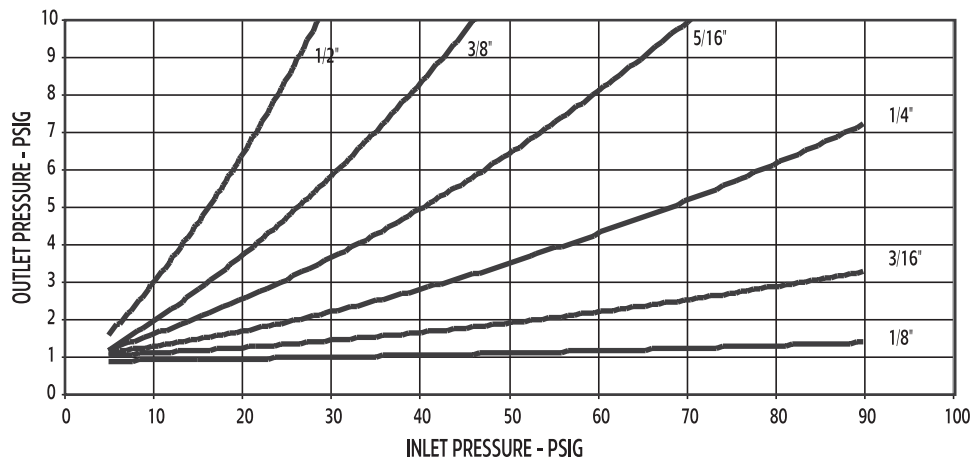
Lock up ^c	0.3" w.c.	0.5" w.c.	0.6" w.c.	0.8" w.c.
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Note:

C- Outlet pressure increase required for lock up

B31 IMR RELIEF CURVES-LEVER DISCONNECT

7" w.c. Set Point



Relief Curves

Manufacturer:	Actaris
Type and Model:	B31 IMR
Regulator: Set Point	7" w.c. @ 50 scfh
	Spring Light Green

B31 Series Light Commercial & Industrial Regulator - Models IMN, IMR, IMRV

14" w.c. (34 mbar) Capacity Table (2" Droop)*

(capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Inlet Pressure (PSIG)	Orifice Size			
	1/8"	3/16"	1/4"	5/16"
1	100	130	195	235
2	130	230	315	400
3	170	290	420	530
5	240	410	575	700
10	370	650	900	1100
15	470	880	1240	1550
25	600	1300	1840	2300
40	840	1780	2900	3550
60	1120	2400	4000	4700
75	1350	2900	4700	5750
90	1600	3400	5300	6500

Lock up ^c	0.4" w.c.	0.6" w.c.	0.7" w.c.	0.9" w.c.
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2 PSIG (138 mbar) Capacity Table (1% Absolute Droop)*

Inlet Pressure (PSIG)	Orifice Size			
	1/8"	3/16"	1/4"	5/16"
3	110	165	200	225
5	170	250	320	425
8	225	300	400	475
10	265	400	500	550
15	380	525	680	1080
20	450	625	1050	1250
30	630	925	1430	1825
40	750	1000	1950	2200
50	950	1350	2350	3000
60	1180	1600	2600	3375
75	1380	1800	3250	3800
85	1550	1900	3700	4000
100	1700	2100	4000	4000
125	2000	2300	4000	4000

Lock up ^c	0.04 PSIG	0.05 PSIG	0.05 PSIG	0.06 PSIG
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Note:
C- Outlet pressure increase required for lock up

B31 Series Light Commercial & Industrial - Models IMN, IMR, IMRV

2 PSIG (138 mbar)

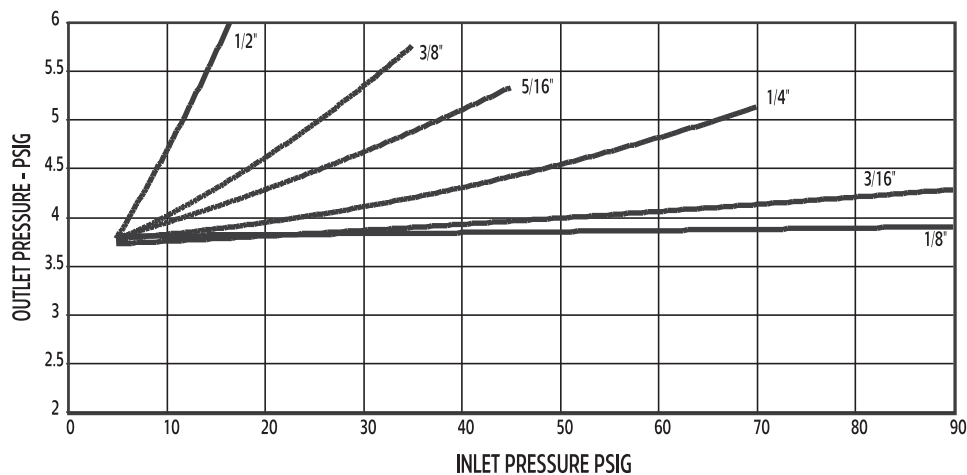
Capacity Table (2% Absolute Droop)*

(capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

Orifice Size

Inlet Pressure (PSIG)	1/8"	3/16"	1/4"	5/16"
3	140	250	300	350
5	220	400	520	600
8	310	425	650	890
10	360	650	750	1050
15	450	925	1150	1425
20	550	1100	1450	1750
30	710	1400	1980	2400
40	850	1800	2500	3000
50	1050	2100	3000	3700
60	1200	2450	3400	4000
75	1425	2700	3950	4000
85	1600	2850	4000	4000
100	1800	3000	4000	4000
125	2225	3200	4000	4000

B31 IMR RELIEF CURVES-LEVER DISCONNECT 2 PSIG SET POINT

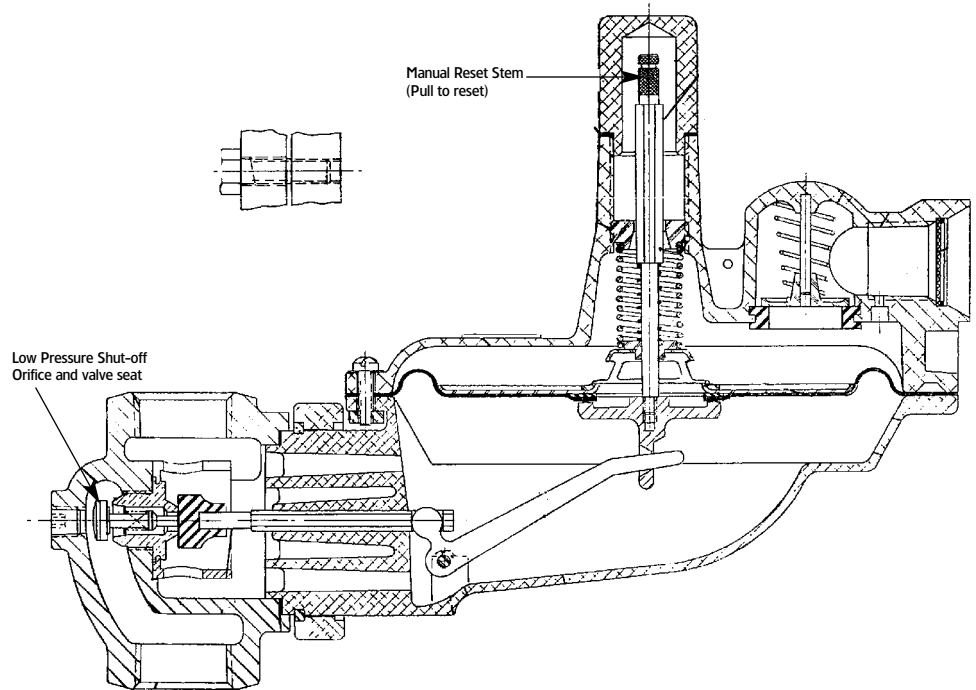


Relief Curves

Manufacturer:	Actaris
Type and Model:	B31 IMR
Regulator: Set Point	2 PSIG. @ 50 scfh
	Spring White

B31RAS Series Light Commercial & Industrial Regulators

Model B31RAS (Relief and Low-Pressure Shut-Off)



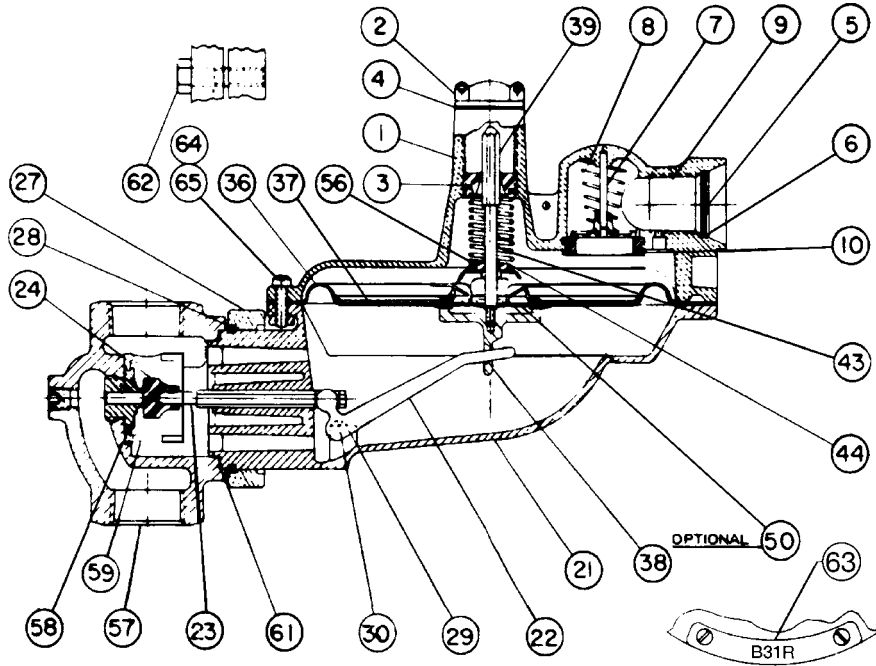
7" w.c. (17 mbar) Capacity Table (1" Droop)*

(capacities in SCFH of 0.6 S.G. gas; Base condition of 14.7 psia and 60°F)

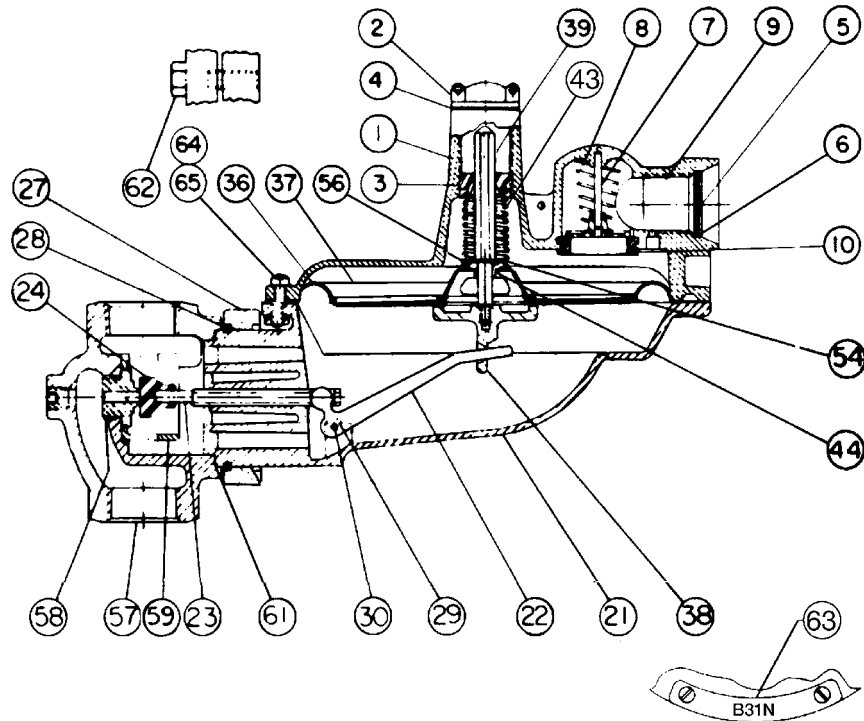
Orifice Size

Inlet Pressure (PSIG)	3/16"		1/4"		5/16"	
	Flow at 1/2" droop	Shut-off Flow rate (scfh)	Flow at 1" droop	Shut-off Flow rate (scfh)	Flow at 1" droop	Shut-off Flow rate (scfh)
1	137	150	175	180	150	160
2	210	225	270	275	230	240
5	300	325	370	370	425	430
10	500	525	510	510	640	650
15	600	600	825	660	840	850
20	625	650	950	830	1030	1040
25	750	775	1100	960	1180	1190
30	875	900	1050	1100	1310	1320
40	1000	1050	1400	1400	1510	1660
50	1350	1400	1650	1660	1540	1970
60	1400	1450	1750	1790	1590	2250
70	1740	1850	2250	2260	1550	2320
80	1940	2080	2510	2530	1525	2430
90	2150	2300	2775	2800	1410	2520

Parts List



► B31R Reference Schematics



► B31N Reference Schematics

Parts List

Item No.	Part No.	Quantity Required per Regulator Model						Description
		N	R	HP	IMN	IMR	IMRV	
1								Upper Diaphragm Case - Specify Vent Pipe Size
	753104		1					Vent - 1/4" Pipe
	753107			1				Vent - 1/4" Pipe/HP
	753127		1			1	1	Vent - 3/8" Pipe
	753154		1			1	1	Vent - 3/4" Pipe (Standard)
	753157			1				Vent - 3/4" Pipe/HP (Standard)
	753204		1			1	1	Vent - 1" Pipe
	753207			1				Vent - 1" Pipe/HP
2	760053	1	1		1	1	1	Seal Cap
	760055			1				Seal Cap (HP)
3	760215	1	1		1	1	1	Adjustment Screw - Celcon
	760217			1				Adjustment Screw - Aluminum
4	765503	1	1	1	1	1	1	"O" Ring
5								Vent Screen - Specify Vent Size
	762935	1	1	1	1	1	1	For All Vents Except 1" - Wire Mesh
	762933		1	1		1	1	For 1" Vent - Wire Mesh
6								Vent Screen Ret. Ring - Specify Vent Size
	75572701	1	1	1	1	1	1	For all Vents Except 1"
	75579101		1	1		1	1	For 1" Vent
7								Vent Valve Disc Pin - Specify Vent Size
	754806	1	1	1	1	1	1	For All Vents Except 1"
	75483401		1	1		1	1	For 1" Vent
8	762601	1	1	1	1	1	1	Vent Valve Spring
9	765181	1	1	1	1	1	1	Vent Valve Disc
10	765685	1	1	1	1	1	1	Vent Valve Seat
21								Lower Diaphragm Case - Specify
	752104	1	1	1				5.5:1 Ratio - 3/4" & 1" Valve Bodies
	752124	1	1	1				4:1 Ratio - 1-1/4" Valve Bodies
	752324				1	1	1	Lower Diaphragm Case - 4:1 Ratio
22								Valve Linkage Lever - Specify
	761235	1	1	1				5.5:1 Ratio
	761231	1	1	1				4:1 Ratio
	761241				1	1	1	Valve Linkage Lever 4:1 Ratio
23	754021	1	1	1	1	1	1	Valve Stem - Aluminum
24	765021	1	1	1				Valve Seat - Buna-N 75 D. Durometer
	765025	1	1	1				Valve Seat - Celcon (less than 20°F)
	765027				1	1	1	Valve Seat - Buna-N 85-95 Durometer (Hard)
	765011	1	1	1				Valve Seat - Use with 1/2" x 9/16" Orifice, 80 Durometer
25	761711				1	1	1	Deflector Ring
27	751913	1	1	1	1	1	1	Valve Body Retainer Plate
28	755725	1	1	1	1	1	1	Retainer Plate Snap Ring
29	755141	2	2	2	2	2	2	Valve Linkage Pin Scre, 8 -32 x 5/16
30	754831	1	1	1	1	1	1	Valve Linkage Pin
36	766121	1	1	1	1	1	1	Diaphragm
37	76102601	1	1	1	1	1	1	Upper Diaphragm Plate
38	756043	1	1	1	1	1	1	Lower Diaphragm Plate
39	754303	1			1			Stop Stem - "N" Versions Only
	754301		1	1		1	1	Stop Stem - "R" Versions Only
43	762101		1	1		1	1	Relief Spring - 7" W.C. Above Set
44	75490601	1	1	1	1	1	1	Stop Stem Guide Bushing

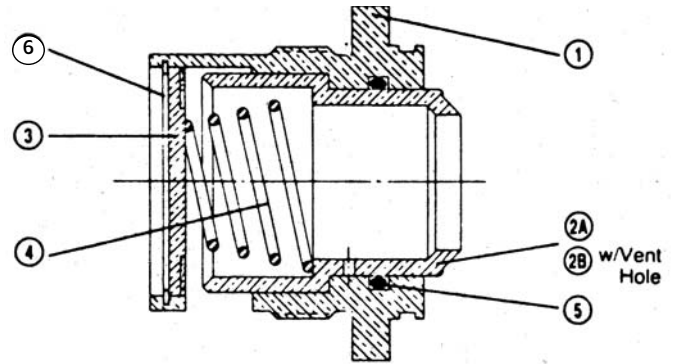
Parts List - Continued

Item No.	Part No.	Quantity Required per Regulator Model						Description
		N	R	HP	IMN	IMR	IMRV	
50	765775		1	1		1	1	Diaphragm Gasket (Optional)
54	755801	1			1			Diaphragm Plate Washer
56		1	1		1	1	1	Adjustment Spring - Specify
	762111							Brown 4.5 - 5.5 w.c.
	762117							D. Green 5.0 - 7.0 w.c.
	762119							L. Green 5.5 - 8.0 w.c.
	762123							Black 7.0 - 11.0 w.c.
	762127							Blue 8.0 - 12.0 w.c.
	762129							Silver 11.0 - 16.0 w.c.
			1					Adjustment Spring - Specify
	762018							Red/Blue 0.75 - 1.1 psig
	762025							Red/Gray 0.5 - 0.9 psig
	762131							Yellow 1.1 - 1.5 psig
	762135							Red 1.3 - 2.0 psig
	762137							White 1.75 - 2.5 psig
57		1	1	1	1	1	1	Valve Body - Specify Type and Size
								Straight
	750054							3/4" x 3/4"
	750057							3/4" x 3/4" with 1/8" NPT Pipe Plug
	750063							3/4" x 1"
	750065							3/4" x 1" with 1/8" NPT Pipe Plug
	750072							1" x 1"
	750075							1" x 1" with 1/8" NPT Pipe Plug
	750104							3/4" x 1-1/4"
	750107							3/4" x 1-1/4" with 1/8" NPT Pipe Plug
	750113							1" x 1-1/4"
	750116							1" x 1-1/4" with 1/8" NPT Pipe Plug
	750128							1-1/4" x 1-1/4"
	750131							1-1/4" x 1-1/4" with 1/8" NPT Pipe Plug
								90° Angle Body
	750042							3/4" x 3/4"
	750044							3/4" x 1"
	750046							1" x 1"
58		1	1	1	1	1	1	Orifice-Aluminum Specify Size*(For Brass Orifice, Additional Charge)
	757213							1/8" Diameter
	757219							3/16" Diameter
	757225							1/4" Diameter
	757231							5/16" Diameter
	757237							3/8" Diameter
	757451							1/2" Diameter
59	761753	1	1	1	1	1	1	Loading Ring
61	765753	1	1	1	1	1	1	Valve Body Gasket
62	755375	2	2	2	2	2	2	Retainer Plate Screw-Hex Hd Cad.Plate Steel-5/16"-18x1-1/8" Lg.
63	769151	1	1		1	1	1	Blank 2-Hole Badge
	769051			1				Blank 1-Hole Badge (Specify Information To Be Stamped)
64	755304	8	8	8	8	8	8	Case Screw - Hex Head, Dacromet Coated, 1/4" - 20
65	755513	8	8	8	8	8	8	Case Screw Nut - Square - Steel 1/4" - 20
94	755785				1	1	1	Deflector Retaining Ring - Circular Int.

IM Orifice Assembly Schematic

Torque Specifications	
Margin Screws	27-30 in. lbs.
Retainer Plate Screws	85-115 in lbs.
Orifice, Std.	450-500 in. lbs
Orifice, IM	300 in. lbs.

Special Tools	
799051	Spring Adjustment Wrench
799017	Orifice Socket



Item No.	Internal Monitor (IM) Orifice Assembly Numbers								Description	Part Number
	759003	759007	759011	759015	759001	759005	759009	759013		
1	1	1	1	1	1	1	1	1	Stationary Orifice	757001
2A					1				1/8" Diameter - Sliding Orifice	757015
2A						1			3/16" Diameter - Sliding Orifice	757017
2A							1		1/4" Diameter - Sliding Orifice	757019
2A								1	5/16" Diameter - Sliding Orifice	757011
2B	1								1/8" Diameter - Sliding Orifice w/Vent Hole	757021
2B		1							3/16" Diameter - Sliding Orifice w/Vent Hole	757023
2B			1						1/4" Diameter - Sliding Orifice w/Vent Hole	757025
2B				1					5/16" Diameter - Sliding Orifice w/Vent Hole	757013
3	1	1	1	1	1	1	1	1	Anchor Plate	759022
4	1	1	1	1	1	1	1	1	Cut Off Spring	762611
5	1	1	1	1	1	1	1	1	"O" Ring	765519
6	1	1	1	1	1	1	1	1	Retaining Ring	755733

Vent Lines for Regulators

When constructing vent lines to be attached to regulators installed indoors, a few basic rules must be followed:

1. Never use pipe sizes smaller than the vent size itself; anything smaller will restrict the flow of gas. If a long run must be used, it is advisable to increase the pipe one size every ten feet in order to keep the flow restriction as low as possible.
2. Keep the length of vent line as short as possible to minimize the restriction as well as reduce the tendency for the vent piping to cause pulsation of the regulator.
3. Support the vent pipe so there is no strain on the regulator diaphragm case.
4. Always point the end of the vent pipe located outside the building in the downward position to reduce the possibility of rain, snow, sleet etc. from entering the pipe. A bug screen should be installed in the end of the pipe.
5. The terminus of the vent line must not be located near windows, fans, etc. See the installation instructions furnished with the regulator.
6. All applicable codes and regulations must be adhered to.
7. Vent pipe may cause regulator pulsation. If this situation occurs, please consult your regulator representative or the factory.
8. It is strongly recommended that a separate vent line be run for each regulator; a header with other devices installed in it can cause regulator malfunction.
9. If approved by the authority having jurisdiction, the vent lines may be manifolded in accordance with accepted engineering practices to minimize backpressure in the event of diaphragm failure.

Installation

- ▶ **A.** Make certain all shipping plugs are removed from the inlet, outlet and vent of any regulator before installation.
- ▶ **B.** When installing the regulator, the inside of the piping and the regulator inlet and outlet are to be clean, free of dirt, pipe dope and other debris to prevent entry into the regulator which could cause loss of pressure control.
- ▶ **C.** The pipe joint sealant should be applied on the male threads of the pipe. Do not use any pipe joint material on the female threads of the regulator or it could become lodged in the regulator causing possible loss of pressure control.
- ▶ **D.** Gas must flow through the valve body of the regulator in the same direction as the arrow cast on the body, or the outlet side of the regulator may be overpressured and damaged.
- ▶ **E.** The diaphragm casing may be mounted in any of four (4) positions relative to the body.
- ▶ **F.** When the regulator is installed OUTDOORS, the vent must always be positioned so that rain, snow, moisture or foreign particles cannot enter the vent opening. It is recommended that the vent be positioned to face downward so as to avoid entry of water or other matter which could interfere with the proper operation of the regulator. The vent should be located away from building eaves, window openings, building air intakes and above the expected snow level at the site. The vent opening should be inspected periodically to insure it does not become blocked by foreign material.
- ▶ **G.** When the regulator is installed INDOORS, the vent must be piped to the outside atmosphere while using the shortest length of pipe, the least number of elbows, and having as large a pipe diameter as the vent size or larger. USING VENT PIPE ANY SIZE SMALLER THAN THE VENT CONNECTION WILL LIMIT THE REGULATOR'S INTERNAL RELIEF VALVE CAPACITY. The outlet end of the pipe must be protected from moisture and the entrance of foreign particles. The regulator should be specified by the user with the size vent and pipe threads desired to make the vent pipe connection.

START-UP PROCEDURE

- ▶ **A.** A pressure gauge should be mounted downstream of the regulator to monitor the downstream pressure.
- ▶ **B.** With the downstream valve closed, slowly open the inlet valve. The outlet pressure should rise to slightly greater than the set-point.
- ▶ **C.** Be sure there are no leaks and all connections are tight.
- ▶ **D.** The regulator has been preset at the factory to match specifications given when it was ordered. The outlet pressure may be adjusted by removing the seal cap on top of the spring housing and adjusting the ferrule or screw inside the spring housing using a ratchet with a socket and an extension. With a small amount of gas flowing through the regulator, rotate the ferrule clock-wise to raise the outlet pressure and counter-clockwise to lower the outlet pressure.
- ▶ **E.** After the desired outlet pressure is achieved, replace the seal cap, recheck for leaks. The regulator is ready for operation.

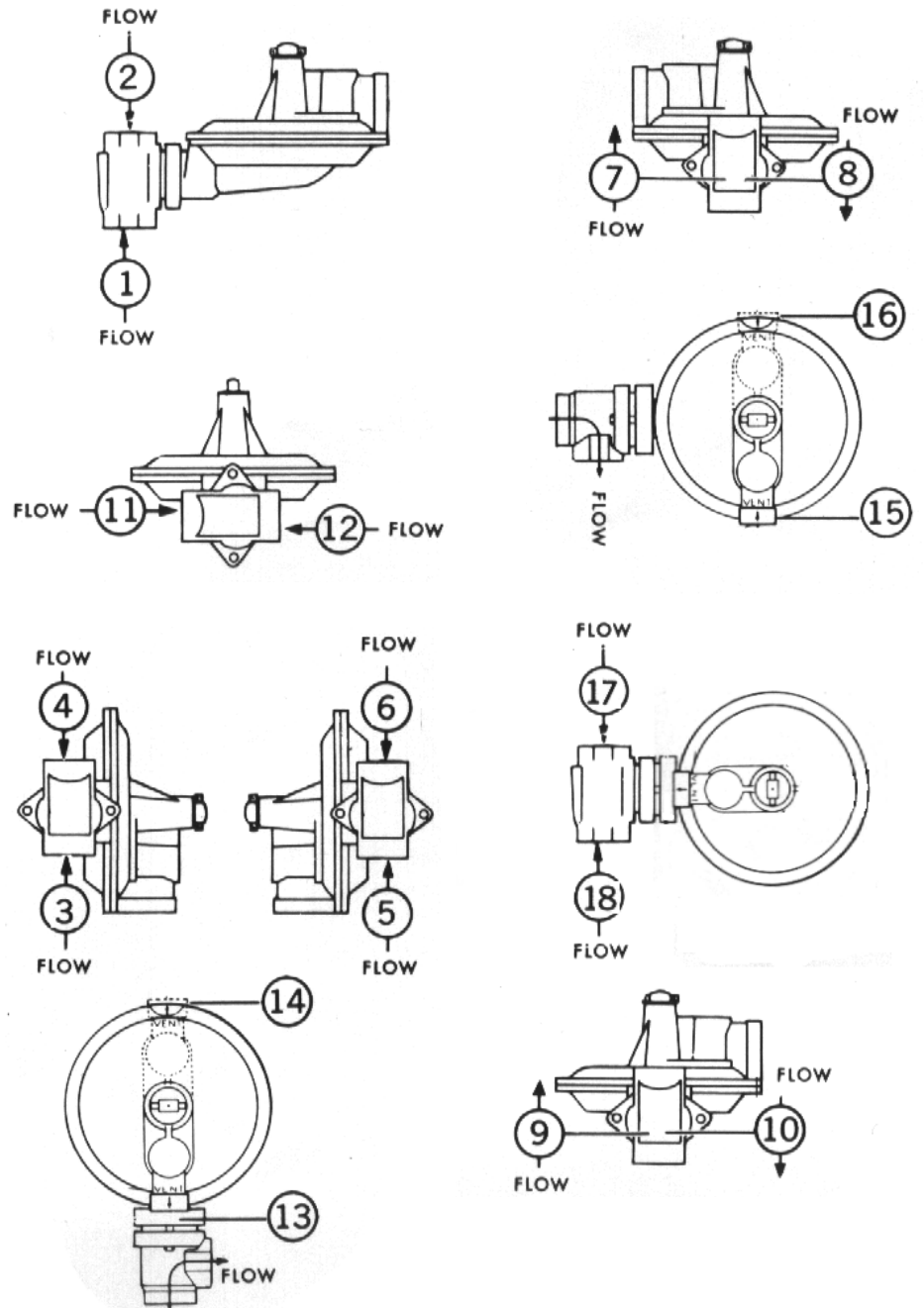
SAFETY WARNING:

- This product, as of the date of manufacture, is designed and tested to conform to all governmental or industry safety standards then existing as may apply to the manufacturer.
- ▶ The purchaser and user of this product are warned that compliance with the manufacturer's instructions and procedures is required in order to avoid the hazards of leaking gas resulting from improper installation, start-up or use of this product, and further, that all area fire control, building codes or other safety regulations which regulate or concern the application, installation, operation or general use of this product should be complied with.
 - ▶ In order to insure the safe and proper operation of this product, the manufacturer recommends that this product be installed by a qualified installer.

SAFETY NOTES:

- ▶ **A.** The maximum inlet pressure for this regulator is dependent upon the size of the orifice and model designation. The non-relief models are limited to 60 PSIG maximum inlet pressure unless additional safety devices are used as outlined in DOT code, OPS, Part 192, section 192.197.
- ▶ **B.** When these models are used on liquid petroleum gases, they should be restricted to second-stage pressure reduction in the gaseous phase.

Assembly Positions



► Position 13-15 are achieved with the 90° Angle Body

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Limited Warranty

Actaris U.S. Gas, Inc., 970 Highway 127 North, Owenton, Kentucky 40359-9302, warrants this gas product against defects in materials and workmanship for the earlier of one (1) year from the date the product is shipped by Actaris or a period of one year from the date the product is installed by Actaris at the original purchaser's site. During such one-year period, provided that the original purchaser continues to own the product, Actaris will, at its sole option, repair any defects, replace the product or repay the purchase price.

- This warranty will be void if the purchaser fails to observe the procedures for installation, operation or service of the product as set forth in the Operating Manual and Specifications for the product or if the defect is caused by tampering, physical abuse or misuse of the product.

► Ordering Information

Specify:

1. Inlet and Outlet Connection Size and Type
2. Model Number
3. Outlet pressure desired
4. Inlet pressure range
5. Type of gas and maximum capacity required
6. Assembly position number (see diagram on the left)
7. Vent size
8. Special requirements such as tagging, 1/8" pipe plug tap, seal wire, etc.

• ACTARIS SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING THOSE OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES WILL ACTARIS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER.

- Actaris' liability for any claim of any kind, including negligence and breach of warranty for the sale and use of any product covered by or furnished, shall in no case exceed the price allocable to the product or part thereof which gives rise to the claim.
- In the event of a malfunction of the product, consult your Actaris Service Representative or Actaris U.S. Gas, Inc., 970 Highway 127 North, Owenton, Kentucky 40359-9302.

See Actaris Terms and Conditions of Sale for the full and complete terms of the limited warranty.

► Reference Information

-Product Overview, JOB

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