



 **CONTROLS SUPPLY CHAIN**
VALVES ACTUATORS INSTRUMENTATIONS

CL34 Series Commercial Regulator



Advanced Metering
and Regulation
Technology at Work

Features

- Constant Loaded pilot design ("fixed-factor" pressure control)
- Interchangeable brass orifice
- 78 in² of diaphragm area
- Spring-loaded Pilot internal relief valve assembly
- Field interchangeable pilot adjustment spring
- Controlled internal bleed hole eliminates pulsation
- Wide range of valve body sizes including NPT and Flange connections
- 16 different available assembly positions

Benefits

- Economical
- Light weight
- Accurate pressure control for "fixed-factor" measurement applications
- No special start-up procedures required
- Internal Monitor version eliminates the need for external relief valves or separate monitoring devices
- No special tools required for outlet pressure adjustment
- No minimum differential pressure requirement

Applications

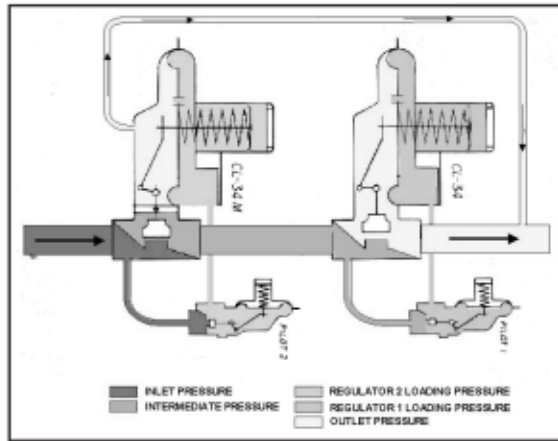
Appropriate for commercial and industrial applications where very accurate pressure control is required such as "fixed-factor" metering applications or large boiler and furnace applications.

Model Designations*

CL34- Internal Registration (no control line required)

CL34-M (See Figure 1)- Equipped with close and control line tap for remote downstream control (External registration)

Figure 1 - CL34 Operator/Monitor Pressure Schematic



CL34-IM (See page 7) - Equipped with an Internal Monitor orifice; Internal Registration (no control line required)

CL34-IMV (See page 7) - Equipped with an Internal Monitor Orifice plus Vent hole option for Monitor warning indication; Internal Registration (no control line required)

*All versions are available with either -1 or -2 pilot:
 - #1 pilot for 5" w.c. to 5 psig outlet pressure
 - #2 pilot for 1 psig to 60 psig outlet pressure

Principle of Operation (See Operating Schematic below)

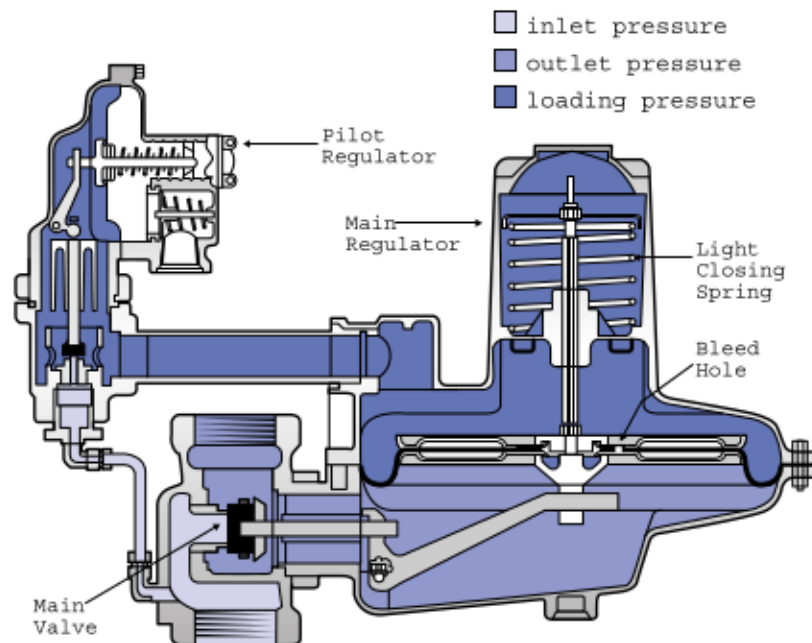
Inlet pressure connected by tubing to the pilot regulator, is utilized as supply pressure for pilot. Outlet pressure of the Pilot Regulator is applied to top of Main Regulator diaphragm. This Loading pressure is a constant pressure equal to the desired outlet pressure plus the pressure required to counter-balance the Light Closing Spring.

Increasing Load Condition- As load increases downstream, the outlet pressure in lower diaphragm chamber is reduced and constant pressure above the main diaphragm forces the diaphragm downward. This motion is transmitted through the Main Regulator lever to open the main valve to the proper position to meet the flow rate. Gas simultaneously begins to flow across the Bleed Hole, which momentarily reduces the loading pressure. The pilot diaphragm senses the reduced loading pressure and the pilot valve opens to maintain a constant loading pressure.

Decreasing Load Condition- When the flow rate is decreased, the outlet pressure tends to increase. The pressure increase is reflected in the lower diaphragm chamber increasing pressure below the main diaphragm, thereby decreasing the differential pressure across the main diaphragm. This allows the closing spring to move diaphragm upward, closing the main valve and throttling gas flow. The pilot then senses a pressure rise in the loading pressure chamber and closes its valve.

No-Load (Lock-up) Condition- As load decreases to zero, the downstream pressure begins to rise, which stops the flow of gas through the bleed hole in the main diaphragm. At the same time, the pressure across the main diaphragm is equalized, which allows the closing spring to close the main valve. The upward movement of the main diaphragm causes the loading chamber pressure to increase slightly, which in turn causes the pilot to close

CL34 Operating Schematic



Specifications

Construction

Valve body	High tensile strength cast iron (ASTM A-126, Class A)
Orifice	Brass (standard), Aluminum available on main orifice only
Internal monitor orifice	Brass (ASTM B16, Alloy 360)
Valve seat	Buna-N or silicone (for temperatures below -20° F)
Valve stem	Plated steel (AISI 1215)
Valve stem bushing	Stainless steel
Lever pin	Stainless steel (Type 303)
Lever	Zinc and dichromate plated steel (AISI C1010)
Stem Guide	Stainless Steel
Upper diaphragm plate	Zinc and dichromate plated steel (14 gage steel)
Lower diaphragm plate	Die cast aluminum (ASTM B-85 Alloy SC84A)
Diaphragm	Buna-N and nylon reinforcing fabric
Vent screen	Stainless steel
Adjustment ferrule	Plated Steel
Main & Pilot Seal cap	Die cast aluminum (ASTM CS43A)
Diaphragm case	Die cast aluminum (ASTM B85 -Alloy SC84A)

Shipping Weight

1 Regulator per box
Weight per box: 34 lbs. (NPT versions) 42 lbs. (Flange versions)

Correction factors for non-natural gas applications

The CL34 may be used to control gases other than natural gas. To determine the capacity of the CL34 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	1.0	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:

$$\text{Correction Factor (CF)} = (SG_1/SG_2)^{1/2}$$

Where:

SG₁ = Specific Gravity of the gas in which the capacity is published.

SG₂ = Specific Gravity of the gas to be controlled.

Maximum Closing Spring Differential Pressure*

Closing Spring Color	MAX. DIFFERENTIAL PRESSURE ACROSS ORIFICE PSIG (BAR)*					
	7/8"	3/4"	5/8"	1/2"	3/8"	1/4"
Orange	18 (1.2)	21 (1.4)	30 (2.1)	50 (3.4)	75 (5.2)	200 (13.8)
Brown	40 (2.8)	60 (4.1)	90 (6.2)	140 (9.7)	275 (19.0)	---
Green**	55 (3.8)	80 (5.5)	120 (8.3)	200 (13.8)	---	---
Black	115 (7.9)	150 (10.3)	245 (16.9)	---	---	---

*The maximum recommended pressure differential and closing spring is based on a 2:1 safety factor

** IM versions available with Green Closing spring only

SPRING RANGE DATA

Models CL34-1 & CL34-1IM

(IM Versions available with Green Closing Spring only)

Pilot Spring Color	Closing Spring Color			
	ORANGE	BROWN	GREEN	BLACK
Green/White	4-6 in. w.c. (10-15 mbar)	---	---	---
Blue/White	7-13 in. w.c. (17-32 mbar)	5-10 in. w.c. (12-25 mbar)	5-9 in. w.c. (12-24 mbar)	---
Dark Green	13-17 in. w.c. (32-42 mbar)	12-13 in. w.c. (30-32 mbar)	---	---
Silver/White	0.5-1.25 (.03-.08)	0.5-1.1 (.03-.08)	0.5-1 (.03-.07)	6-19 in. w.c. (15-47 mbar)
Yellow/White	1.4-2.1 (1-.14)	1.4-2.0 (.09-.14)	1.3-1.9 (.09-.13)	1.1-1.5 (.08-.1)
Red/White	2.3-3.9 (16-.27)	2.2-3.7 (15-.25)	2.2-3.7 (15-.25)	2.0-3.4 (14-.23)
White	3.0-5.0 (0.2-.34)	3.0-5.0 (0.2-.34)	3.0-5.0 (0.2-.34)	3.0-5.0 (0.2-.34)

Model CL34-2

Pilot Spring	Range – psig (bar)	
Brown	0.75 - 2.5 (0.05) - (0.17)	
Purple	4.0 - 5.5 (0.28) - (0.38)	
Green	1.5 - 10 (0.10) - (0.69)	
Black	5 - 14 (0.34) - (0.97)	
Blue	9 - 30 (0.62) - (2.07)	
Silver	25 - 60 (1.72) - (4.14)	

Model CL34-2IM*

Pilot Spring	Range – psig (bar)	
Purple	4.0 - 5.5 (0.28) - (0.38)	
Green	1 - 8 (0.07) - (0.55)	
Black	9 - 11 (0.62) - (0.76)	
Green/White	7 - 17 (0.48) - (1.17)	
Blue	14 - 25 (0.97) - (1.72)	
Silver	29 - 60 (2.00) - (4.14)	

Orifice Data – Wide Open Flow Coefficients and Maximum Pressure Data

Orifice Size	K-Factor	Maximum Operating Inlet Pressure (PSIG)		Max. Emergency Inlet Pressure	Max. Emergency Outlet Pressure
		<1 psig Delivery Pressures	>1 psig Delivery Pressures	(PSIG)	(PSIG)
1/4"	125	100	175	300	66
3/8"	290	100	150	300	
3/8" IM	255	100	150	300	
1/2"	500	75	150	300	
1/2" IM	445	75	150	300	
5/8"	700	50	150	300	
5/8" IM	540	50	150	180	
3/4"	900	50	150	225	
3/4" IM	615	50	75	120	
7/8"	1200	30	150	170	

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

For P₁/P₂ < 1.89 use:

$$Q = K \sqrt{P_1(P_1 - P_2)}$$

For P₁/P₂ > 1.89 use:

$$Q = KP_1/2$$

Where:

P₁ = absolute inlet pressure (psia)

P₂ = absolute outlet pressure (psia)

Q = flow rate (scfh)

K = orifice coefficient (scfh/psi)

Maximum Capacity:

Available Pilot Vent Sizes:

Operating Temperature Range:

*Silicone valve seats available for applications below -20 F.

Loading Ring Position:

M & D Models:

All other Models:

Other Available Options:

60,000 scfh (see capacity tables)

3/4"

-20 F to 150 F*

0 degrees

<50 psig inlet pressure - 15 degrees (6 notches)

>50 psig inlet pressure - 21 degrees (8 notches)

- Seal wire to indicate unapproved tampering

- 1/8" pipe plug tap on upstream side of valve body

- Pilot supply line filter (contact factory for details)

- Stainless steel supply line fittings

- Internal Monitor Test Tap

(See pg. 11 for schematic)

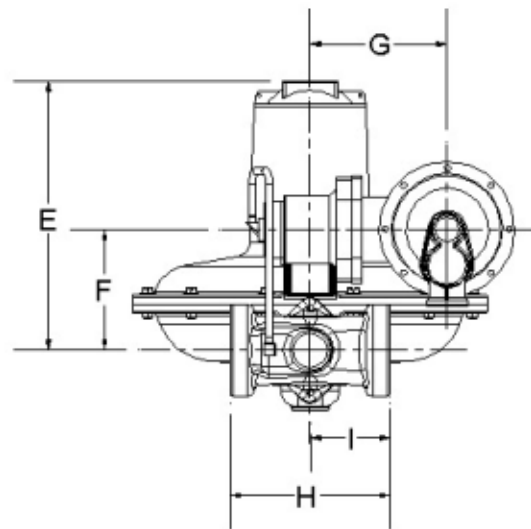
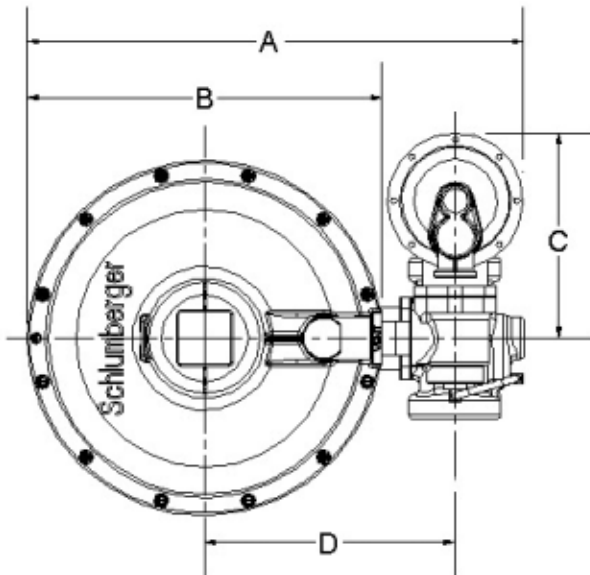
VALVE BODY SIZES

Inlet	Outlet	Screwed (NPT)	Flanged (ASA 125)
1-1/4"	1-1/4"	Y	--
1-1/4"	1-1/2"	Y	--
1-1/4"	2"	Y	--
1-1/2"	1-1/2"	Y	--
1-1/2"	2"	Y	--
2"	2"	Y	Y
3"	3"	--	Y

Y indicates that the valve body is available in that configuration

DIMENSIONS

Valve Body Type	A	B	C	D	E	F	G	H	I
NPT (all sizes)	19-5/16"	12-3/4"	7-5/16"	8-11/16"	10"	4-5/16"	4-7/8"	5-3/4"	2-7/8"
Flanged (all sizes)	20-1/2"	12-3/4"	7-5/16"	8-11/16"	10"	4-5/16"	4-7/8"	10"	5"



Capacity Data (1% Absolute Droop) Models CL34-1, CL34-2, CL34-1M, & CL34-2M

(see Page 8 for Capacity Data for IM versions)

Inlet Pressure (psig)	Outlet Pressure	Orifice Size											
		1/4"	3/8"	1/2"	5/8"	3/4"	7/8"						
		Capacity in 1000 ft ³ /hr (meter ³ /hr) Base Conditions: 14.7 psia, 60-F, 0.6 S.G. Gas											
2	7" w.c.	0.6	(17)	1.4	(40)	2.5	(71)	3.5	(99)	4.5	(127)	6.1	(173)
	11" w.c.	0.5	(14)	1.3	(37)	2.4	(68)	3.3	(93)	4.4	(125)	5.8	(164)
	1 psig	0.4	(11)	1.1	(31)	1.9	(54)	2.7	(76)	3.5	(99)	4.5	(127)
	1.5 psig	0.3	(8)	0.8	(23)	1.4	(40)	1.9	(54)	2.5	(71)	3.4	(96)
3	7" w.c.	0.79	(22)	1.8	(51)	3.1	(88)	4.4	(125)	5.5	(156)	7.5	(212)
	11" w.c.	0.78	(22)	1.7	(48)	3	(85)	4.3	(122)	5.4	(153)	7.3	(207)
	1 psig	0.72	(20)	1.6	(45)	2.8	(79)	3.9	(110)	5.1	(144)	7	(198)
	2psig	0.5	(14)	1.1	(31)	2	(57)	2.8	(79)	3.6	(102)	4.8	(136)
5	7" w.c.	1.05	(30)	2.4	(68)	4.1	(116)	5.8	(164)	7.5	(212)	10	(283)
	11" w.c.	1	(28)	2.3	(65)	4	(113)	5.7	(161)	7.3	(207)	9.8	(278)
	1 psig	0.9	(25)	2.2	(62)	3.9	(110)	5.4	(153)	7	(198)	9.3	(263)
	2 psig	0.8	(23)	2	(57)	3.5	(99)	4.9	(139)	6.3	(178)	8.3	(235)
	3" psig	0.7	(20)	1.7	(48)	2.9	(82)	4.1	(116)	5.3	(150)	7	(198)
10	7" w.c.	1.5	(42)	3.5	(99)	6	(170)	8.4	(238)	10.9	(309)	14.5	(411)
	11" w.c.	1.4	(40)	3.4	(96)	5.9	(167)	8.3	(235)	10.7	(303)	14.3	(405)
	1 psig	1.4	(40)	3.4	(96)	5.8	(164)	8.2	(232)	10.5	(297)	14	(397)
	2 psig	1.4	(40)	3.3	(93)	5.7	(161)	8	(227)	10.1	(286)	13.5	(382)
	5 psig	1.2	(34)	2.8	(79)	4.9	(139)	6.9	(195)	8.9	(252)	11.7	(331)
	8 psig	0.8	(23)	1.9	(54)	3.3	(93)	4.7	(133)	6	(170)	8	(227)
15	1 psig or less	1.8	(51)	4.2	(119)	7.2	(204)	10	(283)	13	(368)	17.5	(496)
	2 psig	1.8	(51)	4.2	(119)	7.2	(204)	10	(283)	13	(368)	17	(482)
	5 psig	1.7	(48)	4	(113)	6.9	(195)	9.7	(275)	12.5	(354)	16.7	(473)
	8 psig	1.5	(42)	3.6	(102)	6.2	(176)	8.7	(246)	11	(312)	15	(425)
	10 psig	1.3	(37)	3.1	(88)	5.5	(156)	7.7	(218)	9.9	(280)	13	(368)
20	13 psig	0.9	(25)	2.1	(59)	3.7	(105)	5.1	(144)	6.6	(187)	8.8	(249)
	5 psig or less	2.1	(59)	4.9	(139)	8.5	(241)	12	(340)	15.4	(436)	20	(567)
	10 psig	1.9	(54)	4.5	(127)	7.8	(221)	10.9	(309)	14	(397)	18.5	(524)
	15 psig	1.5	(42)	3.5	(99)	6	(170)	8.5	(241)	10.8	(306)	14.5	(411)
30	18 psig	1.2	(34)	2.8	(79)	4.9	(139)	6.9	(195)	8.9	(252)	11.5	(326)
	11 psig or less	2.7	(76)	6.3	(178)	11	(312)	15.4	(436)	19.8	(561)	26	(737)
	15 psig	2.6	(74)	6	(170)	10.5	(297)	14.7	(416)	18.7	(530)	25	(708)
	20 psig	2.3	(65)	5.4	(153)	9.3	(263)	13	(368)	16.7	(473)	22	(623)
40	25 psig	1.7	(48)	4	(113)	7	(198)	9.8	(278)	12.5	(354)	16.8	(476)
	16 psig or less	3.3	(93)	7.8	(221)	13.5	(382)	18.8	(533)	24	(680)	32	(907)
	20 psig	3.2	(91)	7.5	(212)	13	(368)	18	(510)	23	(652)	31	(878)
	30 psig	2.6	(74)	6	(170)	10.5	(297)	14.7	(416)	18.7	(530)	25	(708)
50	35 psig	1.9	(54)	4.5	(127)	7.8	(221)	11	(312)	14	(397)	18.5	(524)
	22 psig or less	4	(113)	9.3	(263)	16	(453)	22	(623)	28	(793)	38	(1076)
	30 psig	3.7	(105)	8.7	(246)	15	(425)	21	(595)	27	(765)	36	(1020)
	40 psig	2.9	(82)	6.7	(190)	11.5	(326)	16	(453)	21	(595)	28	(793)
60	45 psig	2.1	(59)	4.9	(139)	8.5	(241)	12	(340)	15	(425)	20	(567)
	26 psig or less	4.6	(130)	10	(283)	18.5	(524)	25	(708)	33	(935)	44	(1246)
	40 psig	4.1	(116)	9.5	(269)	16.5	(467)	23	(652)	29	(822)	39	(1105)
	50 psig	3.1	(88)	7.3	(207)	12.5	(354)	17.5	(496)	22	(623)	30	(850)
75	55 psig	2.3	(65)	5.4	(153)	9.3	(263)	13	(368)	16.5	(467)	22	(623)
	37 psig or less	5.5	(156)	12	(340)	21	(595)	29	(822)	38	(1076)	51	(1445)
	40 psig	5.3	(150)	12	(340)	21	(595)	29	(822)	38	(1076)	51	(1445)
	50 psig	5	(142)	11	(312)	20	(567)	28	(793)	36	(1020)	48	(1360)
100	60 psig	4	(113)	9.6	(272)	16	(453)	23	(652)	30	(850)	40	(1133)
	50 psig or less	7.1	(201)	16	(453)	28	(793)	39	(1105)	51	(1445)	65	(1841)
125	60 psig or less	8	(227)	20	(567)	34	(963)	48	(1360)	60	(1700)	80	(2266)

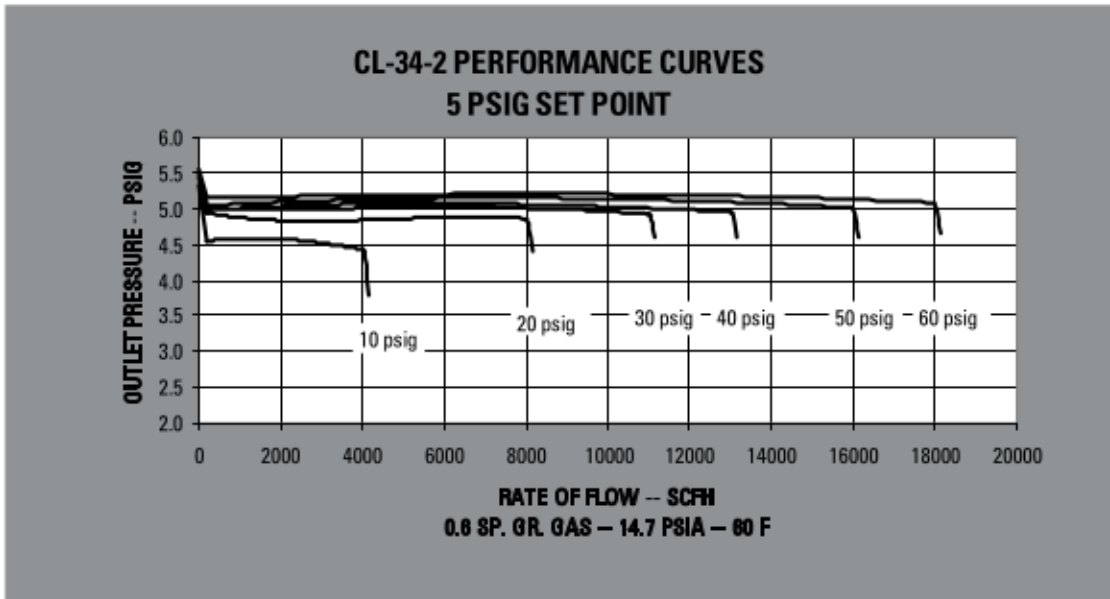
Shaded area not recommended for <1 psig (69 mbar) Outlet pressure

CL34 TYPICAL PERFORMANCE CURVES

5 PSIG SET POINT

(at 40 psig inlet pressure and 200 scfh flow rate)

Type and Model CL34-2
 Regulator: Inlet Size 2" NPT
 Outlet Size 2" NPT
 Orifice Size 1/2"

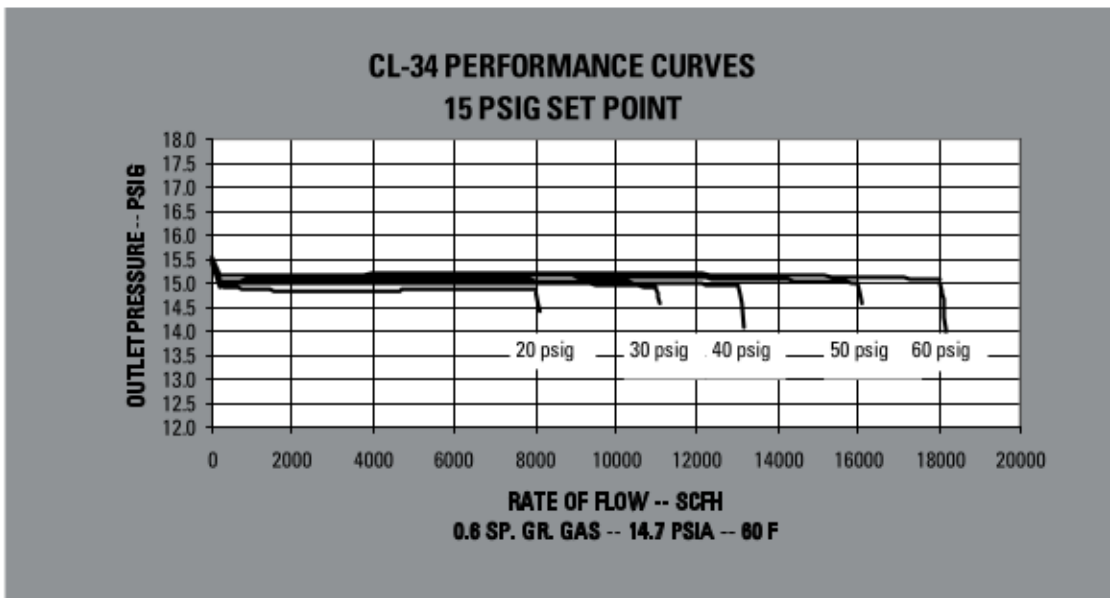


CL34 TYPICAL PERFORMANCE CURVES

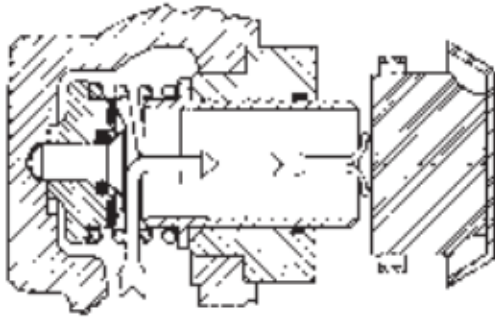
15 PSIG SET POINT

(at 40 psig inlet pressure and 200 scfh flow rate)

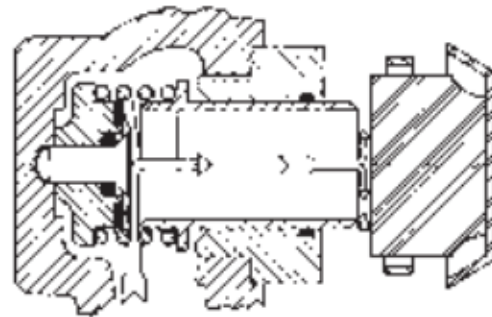
Type and Model CL34-2
 Regulator: Inlet Size 2" NPT
 Outlet Size 2" NPT
 Orifice Size 1/2"



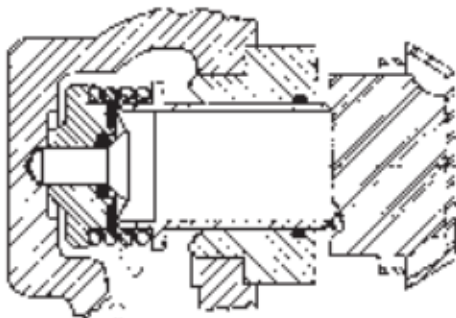
INTERNAL MONITOR PRINCIPLE OF OPERATION - MODELS CL34IM & CL34IMRV



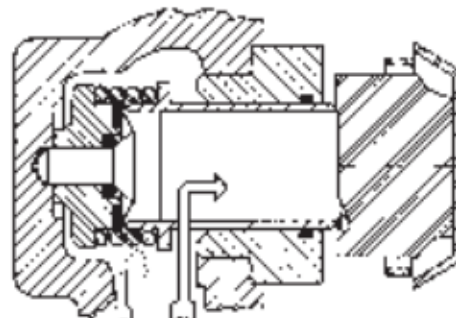
A. Standard Regulator and upstream monitor orifice.



B. Standard Regulator orifice failed — upstream monitor orifice control.



C. Standard Regulator orifice failed — upstream monitor orifice in No Flow.



C1. IMRV — Vent small volume to atmosphere. (See tables below for pressure build-up** and vented gas flow.)

Internal Monitor Principle of Operation

- A. **Normal Operation** - 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. **Monitor Operation** - 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 (SEE INTERNAL MONITOR LOCK-UP PRESSURE TABLE). Any time the pressure on the large main diaphragm exceeds the force 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 positions the monitor orifice to control the gas flow. The IM orifice now functions as a monitor regulator and will continue to monitor so long as the main seats fails 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.

- C. **Monitor "Lock-Up"** - However, 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 Pressure Table.
- D. **"V Option"** - On installations where a small volume of over-pressure gas can

be safely vented to atmosphere, the advantage of both internal relief valve and monitor safety can be combined. As the Internal Monitor closes, the vent hole in the sliding orifice allows a slow leak of gas to the downstream which causes the pilot's relief valve to open. The combined effect allows the monitor to hold overpressure buildup to a low-pressure increase, and PILOT relief gas vented to atmosphere indicates that the main valve has failed and the regulator is on monitor operation.



Capacity Data (1% Absolute Droop)

Models CL34-1IM & CL34-2IM

Inlet Pressure (psig)	Outlet Pressure	Orifice Size							
		3/8"		1/2"		5/8"		3/4"	
Capacity in 1000 ft ³ /hr (meter ³ /hr) Base Condition: 14.7 psia, 60-F, 0.6 S.G. Gas									
2	7" w.c.	1.3	(37)	2.3	(65)	2.8	(79)	3.1	(88)
	11" w.c.	1.2	(34)	2.2	(62)	2.6	(74)	3.0	(85)
	1 psig	1.0	(28)	1.7	(48)	2.1	(59)	2.4	(68)
	1.5 psig	0.7	(20)	1.3	(37)	1.5	(42)	1.7	(48)
3	7" w.c.	1.6	(45)	2.8	(79)	3.5	(99)	3.9	(110)
	11" w.c.	1.5	(42)	2.7	(76)	3.4	(96)	3.8	(108)
	1 psig	1.4	(40)	2.5	(71)	3.1	(88)	3.6	(102)
	2psig	1.0	(28)	1.8	(51)	2.2	(62)	2.5	(71)
5	7" w.c.	2.2	(62)	3.7	(105)	4.6	(130)	5.2	(147)
	11" w.c.	2.1	(59)	3.6	(102)	4.5	(127)	5.1	(144)
	1 psig	2.0	(57)	3.5	(99)	4.3	(122)	4.9	(139)
	2 psig	1.8	(51)	3.1	(88)	3.9	(110)	4.4	(125)
	3" psig	1.5	(42)	2.6	(74)	3.3	(93)	3.7	(105)
10	7" w.c.	3.2	(91)	5.4	(153)	6.7	(190)	7.6	(215)
	11" w.c.	3.1	(88)	5.3	(150)	6.6	(187)	7.5	(212)
	1 psig	3.1	(88)	5.2	(147)	6.5	(184)	7.4	(210)
	2 psig	3.0	(85)	5.1	(144)	6.4	(181)	7.1	(201)
	5 psig	2.5	(71)	4.4	(125)	5.5	(156)	6.2	(176)
	8 psig	1.7	(48)	3.0	(85)	3.8	(108)	4.2	(119)
15	1 psig or less	3.8	(108)	6.5	(184)	8.0	(227)	9.1	(258)
	2 psig	3.8	(108)	6.5	(184)	8.0	(227)	9.1	(258)
	5 psig	3.6	(102)	6.2	(176)	7.8	(221)	8.8	(249)
	8 psig	3.2	(91)	5.6	(159)	7.0	(198)	7.7	(218)
	10 psig	2.8	(79)	5.0	(142)	6.2	(176)	6.9	(195)
	13 psig	1.9	(54)	3.3	(93)	4.1	(116)	4.6	(130)
20	5 psig or less	4.4	(125)	7.7	(218)	9.6	(272)	10.8	(306)
	10 psig	4.1	(116)	7.0	(198)	8.7	(246)	9.8	(278)
	15 psig	3.2	(91)	5.4	(153)	6.8	(193)	7.6	(215)
	18 psig	2.5	(71)	4.4	(125)	5.5	(156)	6.2	(176)
30	11 psig or less	5.7	(161)	9.9	(280)	12.3	(348)	13.9	(394)
	15 psig	5.4	(153)	9.5	(269)	11.8	(334)	13.1	(371)
	20 psig	4.9	(139)	8.4	(238)	10.4	(295)	11.7	(331)
	25 psig	3.6	(102)	6.3	(178)	7.8	(221)	8.7	(246)
40	16 psig or less	7.0	(198)	12.2	(346)	15.0	(425)	16.8	(476)
	20 psig	6.8	(193)	11.7	(331)	14.4	(408)	16.1	(456)
	30 psig	5.4	(153)	9.5	(269)	11.8	(334)	13.1	(371)
	35 psig	4.1	(116)	7.0	(198)	8.8	(249)	9.8	(278)
50	22 psig or less	8.4	(238)	14.4	(408)	17.6	(499)	19.6	(555)
	30 psig	7.8	(221)	13.5	(382)	16.8	(476)	18.9	(535)
	40 psig	6.0	(170)	10.3	(292)	12.8	(363)	14.7	(416)
	45 psig	4.4	(125)	7.6	(215)	9.6	(272)	10.5	(297)
60	26 psig or less	9.0	(255)	16.6	(470)	20.0	(567)	23.0	(652)
	40 psig	8.5	(241)	14.9	(422)	18.4	(521)	20.3	(575)
	50 psig	6.6	(187)	11.2	(317)	14.0	(397)	15.4	(436)
	55 psig	4.9	(139)	8.4	(238)	10.4	(295)	11.5	(326)
75	37 psig or less	10.8	(306)	18.9	(535)	23.2	(657)	26.6	(754)
	40 psig	10.8	(306)	18.9	(535)	23.2	(657)	26.6	(754)
	50 psig	9.9	(280)	18.0	(510)	22.4	(635)	25.2	(714)
	60 psig	8.6	(244)	14.4	(408)	18.4	(521)	21.0	(595)
100	50 psig or less	14.4	(408)	25.0	(708)	31.0	(878)		
125	60 psig or less	18.0	(510)	31.0	(878)	38.0	(1076)		

Shaded area not recommended for <1 psig (69 mbar) Outlet pressure
Do not use this orifice at this inlet pressure

Internal Monitor Lock-up Pressure Data*

	Pilot Spring Color	Outlet Pressure Set Point	IM Lock-up Pressure
With CL34-1 Pilot	Blue/White	7" w.c.	15.0" w.c.
	Silver/White	11" w.c.	19.0" w.c.
	Silver/White	1 psig	1.3 psig
	Red/White	2 psig	2.3 psig
	Red/White	3 psig	3.4 psig
	White	5 psig	5.5 psig
With CL34-2 Pilot	Green	1 psig	1.4 psig
	Green	2 psig	2.5 psig
	Green	3 psig	3.5 psig
	Green	5 psig	5.6 psig
	Green	8 psig	8.6 psig
	Black	10 psig	10.6 psig
	Green/White	10 psig	10.6 psig
	Green/White	15 psig	15.6 psig
	Blue	15 psig	15.6 psig
	Blue	20 psig	20.6 psig
	Blue	25 psig	25.7 psig
	Silver	30 psig	31.2 psig
	Silver	35 psig	36.5 psig
	Silver	40 psig	41.5 psig
	Silver	50 psig	51.5 psig
Silver	60 psig	61.7 psig	

*The Internal Monitor Lock-up Pressure refers to the outlet pressure necessary to close the Internal Monitor valve in the event there is no downstream demand.

Typical CL34IM Installation - No External Relief Valve or Monitor Regulator required



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 pilot diaphragm casing may be mounted in any position relative to the body through a full 360° angle.
- F. When the regulator is installed OUTDOORS, the PILOT vent must always be positioned so that rain, snow, moisture or foreign particles cannot enter the vent opening. It is recommended that the pilot 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 pilot vent should be located away from building eaves, windows opening, 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 pilot 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 PILOT'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 (single regulator)

- 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. However, the outlet pressure may be adjusted by removing the seal cap on top of the PILOT spring housing (**WARNING: DO NOT REMOVE THE MAIN SPRING HOUSING SEAL CAP WHILE UNDER PRESSURE**).
- E. Using a large flat-head screwdriver, rotate the pilot adjustment ferrule (screw) clock-wise to raise the outlet pressure and counter-clockwise to lower the outlet pressure.
- F. After the desired outlet pressure is achieved, replace the PILOT seal cap and recheck for leaks. The regulator is now ready for operation.

CL34 Operator and Monitor Installation & Start-up Procedure

(Refer to Operator/Monitor Pressure Schematic below)

Principle of Operation: The Operator/Monitor installation is designed to protect against over-pressurization of downstream piping and equipment in the event the normally throttling

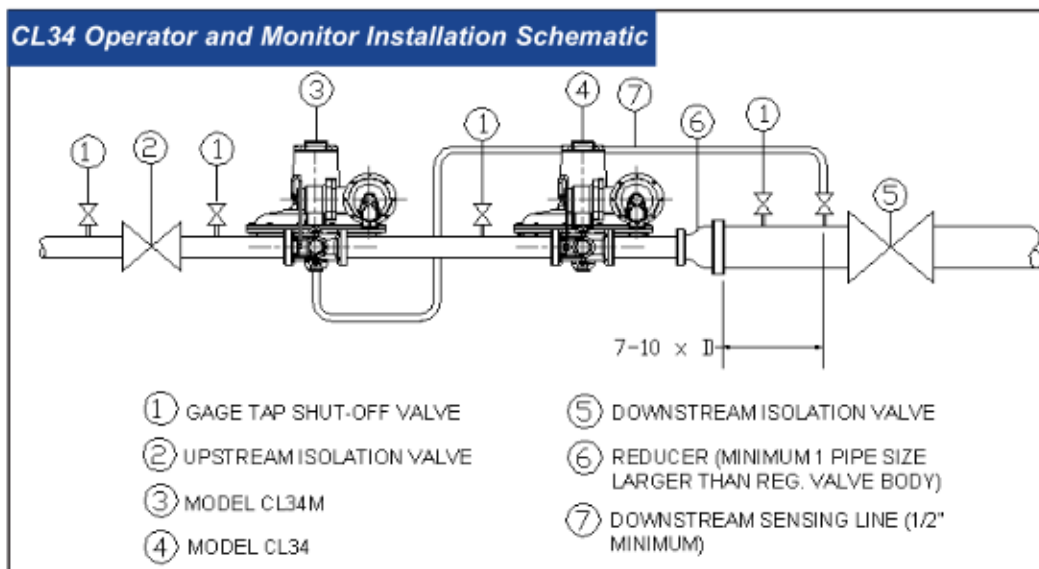
regulator (Operator) cannot function properly. In any Operator/Monitor installation the Operator will be the regulator with the lower set point and the Monitor will be the regulator with the higher set point. The upstream regulator must always be an "M" version with an o-ring sealed valve stem and a threaded connection on the lower diaphragm case for a downstream sensing line*.

In the event the Operator cannot function properly, the downstream pressure will rise to the set point of the Monitor at which time the Monitor will begin throttling at its set point. For example, suppose the Operator has a set-point of 10 psig and the Monitor has a set-point of 11 psig. Since both regulators are attempting to regulate the pressure at the same location (downstream of the second regulator) the Monitor will remain "wide-open" during normal operation because the Operator is limiting the downstream pressure to 10 psig. If the Operator fails to control the pressure at 10 psig, the downstream pressure will rise to 11 psig and the Monitor will begin regulating.

Start-Up Procedure

(refer to Operator/Monitor Installation Schematic):

1. A pressure gage should be installed between the downstream regulator (Item 4) and the downstream shut-off valve (Item 5).
2. With the downstream shut-off valve (Item 5) closed, slowly PARTIALLY open the upstream shut-off valve (Item 2). **WARNING: OPENING THE UPSTREAM SHUT-OFF VALVE TOO QUICKLY COULD RESULT IN AN UNSAFE CONDITION.** Check all connections for leaks. The downstream pressure should rise to a value slightly higher than the pre-set value of the regulator with the highest set-point.
3. **Monitor set-point adjustment:** To adjust the set-point of the monitor, induce some amount of flow through both regulators (CL Series



regulators are set at the factory with 200 scfh of 0.6 S.G. gas).

- Remove the Pilot Spring Cap of the Operator (**Do not remove the main spring cap**). Using a large flat-head screwdriver, slowly rotate the threaded adjustment ferrule clockwise. Continue to rotate the ferrule until the outlet pressure is greater than the desired Monitor set pressure. In some cases, this may require the temporary use of a heavier pilot spring (see spring range tables-pg. 3).
- Remove the Pilot Spring Cap of the Monitor (**Do not remove the main spring cap**). Rotate the adjustment ferrule until the desired Monitor set pressure is reached (rotate clockwise to increase pressure; counter-clockwise to decrease pressure).
- Decrease the flow through both regulators to zero then return the flow to the previous value. If the downstream pressure has changed from the desired value, repeat Step 5. Replace the Pilot Spring Cap of the Monitor.
- Operator set-point adjustment:** To adjust the set-point of the Operator, rotate the adjustment ferrule counter-clockwise until the desired downstream Operator set pressure is reached.
- Decrease the flow through both regulators to zero then return the flow to the previous value. If the downstream pressure has changed from the desired value, repeat Step 7. Replace the Pilot Spring Cap of the Operator.
- Both regulators are now set for continuous operation.

Field Check of the Monitor:

- To check the operation of the Monitor regulator, remove the Pilot Spring Cap of the Operator.
- Push down on the Pilot Stem until the downstream pressure rises to the set-point of the Monitor. The Monitor will begin throttling, thus assuring its proper operation. If the pressure continues to rise above the Monitor set-point, the monitor is not functioning properly. Consult the factory if necessary.

Loading Ring Adjustment Function:

The purpose of the loading ring (Figure 1) and deflector ring is to draw gas from the underside of the diaphragm. The objective is to lower pressure under the diaphragm as the spring loses compression. The loss in spring compression occurs as the diaphragm drops to open the valve. Lowering of the pressure under the diaphragm relative to the downstream pressure strokes the valve open, thus delivering more gas to the downstream and effectively raising (or boosting) the pressure.

The CL34 is equipped with a ported metal loading ring (Figure 1). It is a heat-treated spring steel stamping with two beads (Figure 2) which fit into a groove on the orifice. The orifice also has a radial notched shoulder into which a tip (Figure 2) on the ring rests. This locks the ring from turning after it has been positioned.

Adjustment:



Figure 1-Loading Ring

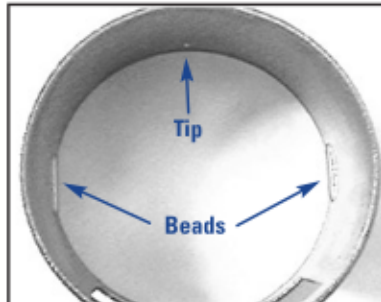


Figure 2-Loading Ring Retention

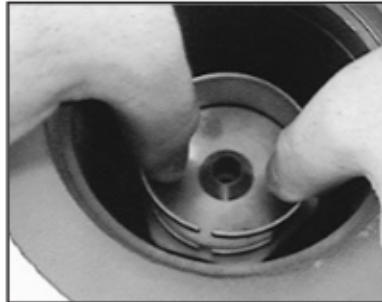


Figure 3-Removing the Loading Ring

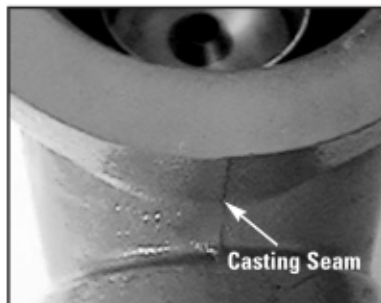


Figure 4-Aligning the Loading Ring

- Remove the pilot supply line by loosening the two compression fittings.
- Next, remove the diaphragm case from the valve body by loosening the two retainer plate bolts.
- Remove the loading ring from the orifice by spreading the loading ring slightly with both

thumbs (Figure 3). Insert the loading ring on the orifice with the center of the loading ring opening (Figure 1) aligned with the casting seam (Figure 4). The loading ring is now in the 0° position.

4. Recommended Loading Angles:

M & D Models: 0 degrees

All other Models:

- For <50 psig inlet pressure - 15 degrees (6 notches);
- For >50 psig inlet pressure - 21 degrees (8 notches)

For angles other than those recommended above, divide the desired angle by 2.5 and round this number up to the nearest whole number (Example: 10.4 = 11 notches). This is the required number of notches the loading ring must be turned. The loading ring may be adjusted either clock-wise or counter-clock-wise.

- Using two thumbs as shown in Figure 3, rotate the loading ring the required number of notches.
- Replace the diaphragm case and pilot supply line. SLOWLY open the upstream valve and check for any leaks. The regulator is now ready for operation.

Internal Monitor (IM) Shut-off Test Procedure

(for models with IM test tap on valve body)

- The valve body is provided with a 1/8" NPT plug on the inlet. This plug seals off an opening into the chamber formed by the IM seal and the sliding orifice on one end and the main orifice and seat on the other end. Whenever there is no demand for gas, the main seat and the Internal Monitor seat should both close to form a positive seal.
- In order to positively check the condition of the IM orifice, it is necessary to perform a

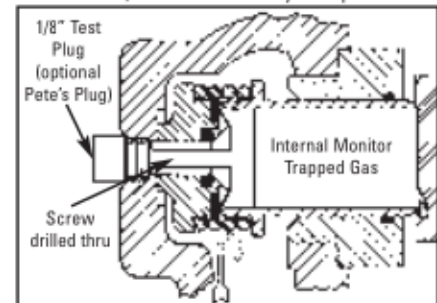


Fig. 5-Internal Monitor Test Tap Schematic

controlled back-pressure of the regulator. Back-pressure the regulator with enough pressure to cause the pilot to relieve.

- Remove the IM test plug on the valve body. Using a soap solution, form a bubble over the pipe plug hole. A satisfactory unit will allow a small amount of gas to escape, then will shut off tight. An unsatisfactory unit will allow gas to escape continuously.
- If a leak is present, further investigation of the entire orifice system is necessary to pinpoint the leak source. Consult the factory.



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 chart below)
7. Other Options:
 - Seal wire to indicate unapproved tampering
 - 1/8" pipe plug tap on upstream side of valve body
 - Pilot supply line filter (contact factory for details)
 - Stainless steel supply line fittings
 - Internal Monitor Test Tap (See pg. 11 for schematic)

Warranty

Actaris U.S. Gas, Inc., 970 Highway 127 North, Owenton, Kentucky 40359-9802, 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. 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.

The 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, 970 Highway 127 North, Owenton, Kentucky 40359-9802.

SAFETY NOTES:

- A. The maximum inlet pressure for this regulator is dependent upon the size of the orifice and model designation.
- B. When these models are used on liquid petroleum gases, they should be restricted to second-stage pressure reduction in the gaseous phase.

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 established under public laws 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.

CL34 Assembly Positions

