

Cash Valve







Type G-4

**Pilot Operated
Pressure Reducing
Regulator for Steam,
Air and Gases**

Issued - March 2001
CAVMC-0512-US-0609
ISO 9001 Certified

Type G-4 - Pilot Operated Pressure Reducing Regulator

Description

	FIG 2042 - Bronze & Stainless Steel	FIG 2043 - Bronze & Stainless Steel	FIG 2044 Cast Iron	FIG 2046 Cast Steel
				
Size Range Ins	1/2 3/4 1 1 1/4 1 1/2 2	1/2 3/4 1 1 1/4 1 1/2 2	2 1/2 3 4 5 6	1/2 3/4 1 1 1/4 1 1/2 2 2 1/2 3 4 5 6
Maximum Inlet Press/Temp Ratings	Pressure/Temperature Ratings Are Strictly In Accordance With The Table Below.			
Reduced Pressure Range psig	5*-300	5*-300	5*-235 Air & Gases 5*-175 Steam	5-175
Flanges ANSI	NPT	CL150 and CL300 per ANSI B16.24	CL125 per ANSI B16.1	CL150 and CL300 per ANSI B16.5
*Note 1 to 5 psig reduced pressure available with low pressure top maximum inlet pressure 100psig				<ul style="list-style-type: none"> • (1/2") and (3/4") sizes restricted internals in 1" body. • (1 1/4") and (1 1/2") sizes restricted internals in 2" body.

Features

The G-4 regulator is a self-actuating pilot operated pressure reducing valve, and is the most versatile of its kind available. The G-4 handles a wide range of pressure reducing applications. Over 100 years of manufacturing experience under the IMI Bailey-Birkett, Ltd. trademark, and continuous improvement in design and performance provides Cash Valve G-4 users with the best regulator of its type.

- **Extremely Compact Design.** In general the G-4 is much smaller than other types of regulators for the same duty.
- **Constant Outlet Pressure** is maintained right up to the maximum rated capacity of the valve, and is unaffected by changes in the flow rate or inlet pressure.

- **Very High Flow Rates** can be achieved due to the full lift capability of the main valve assembly and the design of the valve body.
- **Positive Shut Off** is ensured by accurate guiding of the pilot and main valve assemblies. Non-metallic trims are available to give dead tight shut-off on air and gas applications.
- **Interchangeability** of the pilot valve component parts simplifies maintenance and allows for greater flexibility of spare parts.
- **The Finest Materials** are used throughout the construction of every G4 regulator and the highest standard of engineering skill is maintained by the

use of modern machinery and closely controlled manufacturing methods.

- **Available in Bronze, Cast Iron Stainless Steel and Steel** construction to allow for pressures up to 600 psi and temperatures up to 800°F.
- **Engineering Assistance** and additional technical service is available, including specially prepared parts kits to enable either routine servicing or complete overhauls to be carried out.
- **Outlet Pressure Regulation** up to 3" size $\pm 1/2\%$ ($\pm 1/2$ psig below 100 psig); Above 3" size $\pm 1\%$ (± 1 psig below 100 psig); Pressure rise to dead end = 1%.

Pressure Temperature Ratings

Material		End Connection	Pressure (psig)						
Description	ASTM Spec.	ANSI Class	0 to 150F	250F	300F	400F	450F	500F	750F
Cast Iron	A126 Class B	CL125 (Iron)	200	175	160	135	125	—	—
Bronze	B62 Alloy 836	CL150 (Bronze)	225	195	180	150	—	—	—
		CL300 (Bronze)	500	425	390	300	—	—	—
		CL250 (Bronze Threaded)	400	365	300	250	—	—	—
Carbon & Stainless Steel	A216 GR WCB A351 CF8 (304)	CL150 (Steel)	285	245	230	195	185	170	*
		CL300 (Steel)	740	660	655	630	615	590	500
		CL250 (Steel Threaded)	600	530	525	500	490	470	460

* 570F for 150 psig

Minimum Pressure Differential

The pressure differential is the difference between the inlet pressure and outlet (reduced) pressure. The minimum allowable pressure differential varies depending upon both the inlet pressure and the size of the valves

Valve Size	Inlet Press. Range (psig)	Minimum Press. Differential (psig)
1/2"-2"	10-50	5
	50-120	10
	120 PLUS	15
2 1/2"-4"	10-50	10
	50 PLUS	15
5"-6"	Refer to sales office	Refer to sales office

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Applications

Standard G-4 pressure regulators are fitted with stainless steel valves and seats to use on steam, air and gases up to a maximum temperature of 800°F.

For air and gas applications where a positive shutoff is essential, non-metallic trims are

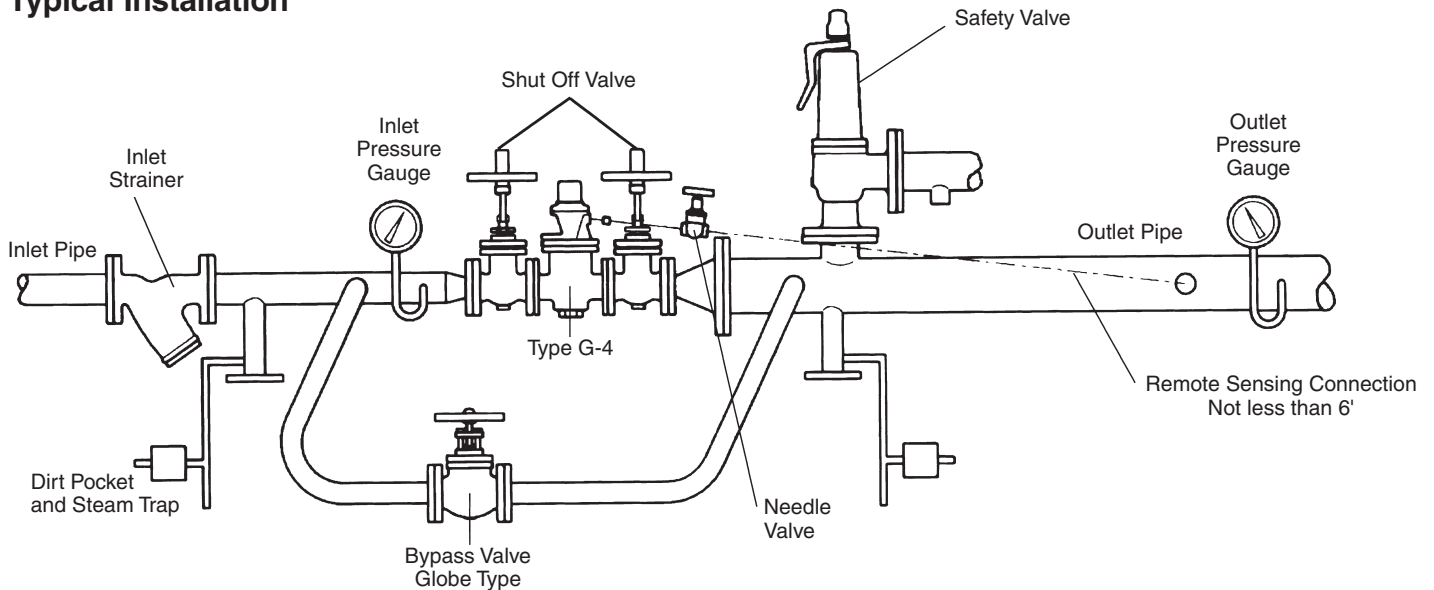
available for temperatures up to 395°F.

Typical Installations:

Here are but a few of the many possible installations for the Type G-4: Dryers, ovens, oil heaters, molding machines,

steam jacketed equipment, sterilizers, steam cookers, large capacity kilns, retorts, heat exchangers, paper and board machines, cookers, heating lines, steam driven auxiliaries — blowers, centrifugal pumps, centrifuges, etc.

Typical Installation



Operation Section View Of Valve

The G-4 regulator is primarily designed for use on steam although it works equally well with air and gases. It will maintain a constant pressure irrespective of variations in inlet pressure or steam demand from the system.

Steam at inlet pressure passes through the inlet relay port (G) to the pilot valve (D). Both pilot and main valves (H) initially are closed by the action of the pilot and main valve springs (E & I).

The pilot valve is opened by clockwise rotation of the adjusting screw (A) which compresses the adjusting spring (B) and applies load to the topside of the diaphragm (C), pushing open the pilot valve. Steam at inlet pressure now passes through the pilot valve and a relay port (K) to the piston (F), which pushes open the main valve.

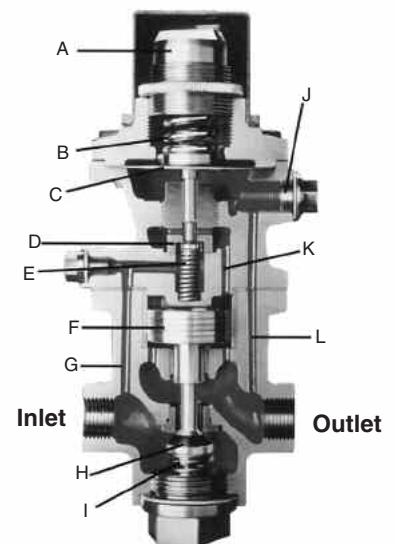
The inlet steam is reduced in pressure as it passes through the open main valve and seat to the valve outlet. At the same time

steam at outlet pressure passes up the relay port (L) to the underside of the diaphragm.

The opening of the main valve determines the outlet pressure and this in turn is controlled by the pilot valve. The outlet pressure is a result of balancing the action of the adjusting spring on the top of the diaphragm against the reduced pressure acting on the underside, thus controlling the opening of the pilot valve.

The sensitivity of the diaphragm and adjusting spring ensure that any variation in reduced pressure will cause the pilot valve to open or close sufficiently to move the piston and main valve between the fully open and closed positions. Thus the out-let pressure is accurately maintained under all operating conditions. Outlet pressure is increased by clockwise rotation of the adjusting screw, or decreased by counterclockwise rotation.

Section View



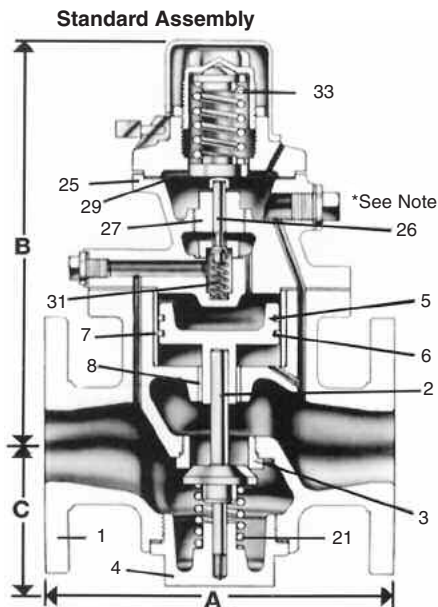
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|-----------------------|--------------------------------|
| A. Adjusting Screw | H. Main Valve |
| B. Adjusting Spring | I. Main Valve Spring |
| C. Diaphragm | J. Remote Control Port |
| D. Pilot Valve | K. Piston Relay Port |
| E. Pilot Valve Spring | L. Reduced Pressure Relay Port |
| F. Piston | |
| G. Inlet Relay Port | |

Type G-4 - Pilot Operated Pressure Reducing Regulator

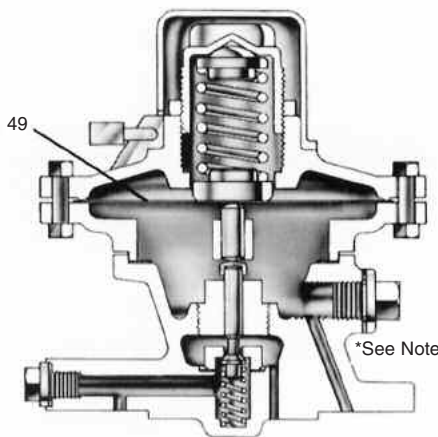
Specifications

Dimensions

	Fig 2042						Fig 2043						Fig 2044						Fig 2046					
Size	1/2	3/4	1	1 1/4	1 1/2	2	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	1	2	2 1/2	3	4	5	6
A	4 1/8	4 1/8	4 1/2	4 7/8	5 1/4	6 3/8	5 1/2	5 5/8	6 3/4	7	7 1/2	8 1/2	10	11 1/4	13 1/2	16	16 1/2	6 3/4	9	10	11 1/4	13 1/2	16	16 1/2
B	8	8 1/4	8 3/8	9 5/8	9 7/8	10 1/4	8	8 1/4	8 3/8	9 5/8	9 7/8	10 1/4	11 3/4	12	13 3/8	16 3/4	17 5/8	8 3/4	10 1/2	11 1/4	11 1/4	12 3/4	15 3/4	16 1/2
C	2 3/8	2 1/2	2 5/8	3	3 1/8	3 1/4	2 3/8	2 1/2	2 5/8	3	3 1/8	3 1/4	5 1/4	5 3/4	6 7/8	9	9 3/4	2 3/4	3 1/2	5 1/8	5 3/4	7	8 5/8	9 3/4
Wt.lb.	13.2	15.0	15.4	23.8	28.0	33.9	17.6	18.9	19.8	30.0	35.9	45.8	77.0	104.0	174.0	247.0	351.0	30.0	58.0	93.0	115.0	192.0	273.0	381.0



Low Pressure Top Assembly



Remote Control

*NOTE:

We recommend a remote sensing connection be fitted whenever:

1. The outlet pressure is below 55% of the inlet pressure.
2. A low pressure top assembly is fitted.
3. Difficult outlet pipework conditions occur.

Please refer to factory for more details.

Materials of Construction

Part No.	Part	Figure 2042 & 2043	Figure 2044	Figure 2046
1	Body	Bronze or Stainless Steel	Cast Iron	Cast Steel
2	Main Valve*	Stainless Steel	Stainless Steel	Stainless Steel
3	Main Valve Seat	Stainless Steel	Stainless Steel	Stainless Steel
4	Bottom Plug Cover	Manganese Bronze	Cast Iron/Aluminum Bronze	Stainless Steel
5	Piston	Brass	Brass	Steel
6	Piston Rings	Phosphor Bronze	Phosphor Bronze	Chrome Iron
7	Liner	Stainless Steel	Stainless Steel	Stainless Steel
8	Piston Guide	Stainless Steel	Stainless Steel	Stainless Steel (6" Mone®)
21	Main Valve Spring	Stainless Steel	Stainless Steel	Stainless Steel
25	Pilot Valve Top	Bronze	Bronze	Steel
26	Pilot Valve*	Stainless Steel	Stainless Steel	Stainless Steel
27	Pilot Valve Plug	Stainless Steel	Stainless Steel	Stainless Steel
29	Diaphragm	Stainless Steel	Stainless Steel	Stainless Steel
31	Pilot Valve Spring	Stainless Steel	Stainless Steel	Stainless Steel
33	Adjusting Spring	Steel	Steel	Steel
49	Diaphragm for low pressure top	Phosphor Bronze	Phosphor Bronze	N/A

Gaskets-Steam-Non Asbestos Material. Air & Gases-Teflon® (2" & below) Rubber Bonded Cork (2 1/2" & above)
 *Main and pilot valves are fitted with elastomeric inserts for use on air and gases when tight shut-off is required.

Note: For full parts list please refer to installation & maintenance instructions available on request.

Trim Selection	Duty		Trim
	Standard Valve	Steam	Stainless Steel
		Compressed air, carbon dioxide, nitrogen, hydrogen, helium	Nitrile
Oxygen Fig. 2043/3 only	Oxygen, methane	Viton®	

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Specifications

Springs

Valve Size	
1/2" - 4"	5 and 6**
1 - 5	5 - 20
5 - 50 (Yellow)	10 - 50
10 - 100 (Black)	40 - 100
40 - 150 (White)	50 - 175
50 - 200 (Green)	
100 - 300 (Red)	

*Not Color Coded

A special Low Pressure Top assembly should be fitted for outlet pressures from 1 up to 5 psig. Low Pressure Tops are available for valves up to 4" size. Larger valves are not suitable for outlet pressures of less than 5 psig.

The Low Pressure Top is supplied as a complete conversion unit for fitting to the existing pilot valve assembly. It incorporates a large diaphragm, thus

providing a greater effective area and improved sensitivity to very low outlet pressure conditions.

NOTE: It is advisable to select a spring which will ensure that there is at least 10% extra adjustment available above the required reduced set pressure. The spring with the lowest pressure range should be used whenever possible.

Capacities

Steam - Pounds per Hour												
Inlet Press.	Outlet Press.	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
Flow Coefficient (C _v)		2.1	4.3	7.1	10.7	15.6	26.8	42.9	53.4	95.6	138.7	197.5
25	20	122	249	410	625	904	1555	—	—	—	—	—
	15	142	290	478	728	1053	1810	2903	3620	6940	9393	13379
	5	151	308	507	773	1118	1921	3082	3843	6889	9971	14202
50	45	160	327	540	823	1189	2044	—	—	—	—	—
	25	254	518	853	1300	1880	3231	5183	6463	11586	16769	23884
	5	254	518	853	1300	1880	3231	5183	6463	11586	16769	23884
75	65	240	490	807	1230	1778	3057	—	—	—	—	—
	60	274	560	923	1407	2034	3496	5401	6735	12073	17474	24887
	40	351	717	1182	1801	2603	4475	7178	8951	16045	23223	33076
100	5	351	717	1182	1801	2603	4475	7178	8951	16045	23223	33076
	90	275	562	926	1411	2039	3505	—	—	—	—	—
	85	318	650	1071	1632	2360	4056	5984	7463	13377	19362	27576
125	55	453	924	1522	2319	3352	5762	9241	11524	20657	29899	42583
	5	453	924	1522	2319	3352	5762	9241	11524	20657	29899	42583
	110	356	728	1199	1827	2641	4540	6486	8088	14499	20985	29888
150	65	555	1133	1866	2844	4111	7067	11334	14134	25334	36668	52225
	10	555	1133	1866	2844	4111	7067	11334	14134	25334	36668	52225
	5	555	1133	1866	2844	4111	7067	11334	14134	25334	—	—
200	135	391	798	1315	2004	2897	4980	6850	8543	15313	22164	31568
	80	659	1344	2215	3375	4878	8385	13448	16771	30061	43509	61968
	10	659	1344	2215	3375	4878	8385	13448	16771	30061	43509	61968
250	5	659	1344	2215	3375	4878	8385	13448	16771	30061	—	—
	185	440	898	1479	2254	3258	5600	7096	8850	15863	—	—
	175	550	1122	1848	2816	4071	6998	10044	12525	22451	33150	47200
300	110	852	1738	2863	4363	6306	10841	17386	21682	38864	56250	80114
	40	852	1738	2863	4363	6306	10841	17386	21682	38864	56250	80114
	235	492	1003	1653	2519	3641	6260	7378	9200	16492	—	—
350	175	941	1920	3162	4818	6964	11972	19200	23944	42918	62420	88913
	135	1054	2151	3544	5401	7806	13418	21519	26836	48103	69622	99159
	100	1054	2151	3544	5401	7806	13418	21519	26836	48103	69622	99159
400	55	1054	2151	3544	5401	7806	13418	21519	26836	48103	69622	99159
	285	542	1105	1821	2775	4011	6895	7619	9501	17030	—	—
	175	904	2527	4163	6344	9170	15762	25279	31525	56507	81935	116696
450	165	1255	2560	4218	6427	9289	15968	25609	31936	57244	82854	118004
	100	1255	2560	4218	6427	9289	15968	25609	31936	57244	82854	118004
	75	1255	2560	4218	6427	9289	15968	25609	31936	57244	82854	118004

These capacities are based on a 3% variance from the regulator's set point.

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Specifications - Capacities

Type G-4 Air (SCFM) Capacity Information												
Inlet Pressure	Outlet Pressure	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
Flow Coefficient (C _v)		2.1	4.3	7.1	10.7	15.6	26.8	42.9	53.4	95.6	138.7	197.5
25	20	38	79	130	199	288	495	—	—	—	—	—
	15	45	93	153	234	338	582	934	1165	2088	3022	4304
	5	48	99	163	249	360	620	994	1240	2224	3218	4584
50	45	49	100	165	251	363	625	—	—	—	—	—
	25	80	164	271	413	597	1026	1646	2053	3680	5326	7586
	5	80	164	271	413	597	1026	1646	2053	3680	5326	7586
75	65	73	150	247	377	544	936	—	—	—	—	—
	60	85	174	286	436	631	1085	1670	2083	3733	5404	7696
	40	111	227	374	570	823	1416	2271	2832	5077	7349	10466
	5	111	227	374	570	823	1416	2271	2832	5077	7349	10466
100	90	82	168	276	421	609	1047	—	—	—	—	—
	85	96	197	325	496	717	1283	1802	2247	4028	5831	8305
	55	142	289	477	727	1050	1806	2897	3612	6475	9372	13349
	5	142	289	477	727	1050	1806	2897	3612	6475	9372	13349
125	110	108	220	363	553	799	1374	1894	2412	4225	6260	8915
	65	175	357	589	897	1297	2229	3576	4459	7994	11570	16479
	10	175	357	589	897	1297	2229	3576	4459	7994	11570	16479
	5	175	357	589	897	1297	2229	3576	4459	7994	—	—
150	135	116	237	390	595	861	1480	1936	2442	4412	6441	9174
	80	206	421	693	1056	1527	2625	4210	5250	9411	13622	19401
	10	206	421	693	1056	1527	2625	4210	5250	9411	13622	19401
	5	206	421	693	1056	1527	2625	4210	5250	9411	—	—
200	185	128	262	432	659	952	1637	1987	2478	4443	—	—
	175	166	338	557	850	1228	2111	2987	3725	6677	9877	14082
	110	268	547	901	1374	1986	3414	5476	6829	12241	17717	25234
	40	268	547	901	1374	1986	3414	5476	6829	12241	17717	25234
250	235	190	286	472	720	1040	1788	2030	2546	4480	—	—
	175	292	596	928	1496	2163	3718	5963	7437	13330	19390	27620
	135	330	674	1111	1693	2447	4207	6747	8414	15082	21829	31091
	100	330	674	1111	1693	2447	4207	6747	8414	15082	21829	31091
	55	330	674	1111	1693	2447	4207	6747	8414	15082	21829	31091
300	285	152	310	511	757	1126	1901	2075	2600	4502	—	—
	175	387	790	1301	1983	2867	4928	7904	9857	17668	25623	36494
	165	392	801	1320	2011	2907	4998	8015	9996	17917	25993	36935
	100	392	801	1320	2011	2907	4998	8015	9996	17917	25993	36935
	75	392	801	1320	2011	2907	4998	8015	9996	17917	25993	36935

These capacities are based on a 3% variance from the regulator's set point.

Gas	Oxygen	Nitrogen	Hydrogen	Helium	CO ₂	Argon	Methane
Factor	1.05	0.98	0.26	0.37	1.24	1.18	0.74

To find valve capacities for gases at ambient temperatures multiply required flow rate by Approximate factor. Use chart above for valve capacity.

How To Order

Specify Cash Valve Type G-4 and state: 1. Pipe Size; 2. End Connections; 3. Inlet Pressure; 4. Outlet Pressure range and setting; 5. Maximum flow rate desired. 6. Service; 7. Trim; 8. Body Material; 9. Operating Temperature; 10. For remote sensing-order remote control adapter.

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