Consumer and Corporate Affairs | Consommation et corporations

Standards | Normes

NOTICE OF APPROVAL
AVIS D'APPROBATION

G - 109 - ?

Ottawa, April 27, 1976

FISHER CONTROLS COMPANY
PILOT OPERATED PRESSURE REGULATORS, TYPE 199

This Approval is supplementary to that portion of the Notice of Approval G-109, dated May 29, 1975 which deals with the Type 199 pilot operated pressure regulator.

Apparatus

Maximum Inlet Pressure:	as listed in Table 1
Outlet Pressure Range:	as listed in Tables 2, 3 and 4
Maximum Flow, 0.6 specific gravity gas:	as listed in Tables 2, 3 and 4
Main Orifice Diameters, inches:	1/2, 3/8, 1/4
Main Body Connections, NPT:	1-1/4",1"

Approval is hereby granted for the use of the above named pressure regulator in Pressure Factor Measurement installations.

There are three documents published by the manufacture which pertain to the Type 199:

1) Fisher Controls Bulletin 71.2:199 dated February, 1971
2) Fisher Controls PS Sheet 71.2:199:A dated November 1, 19
3) Addendum PS Sheet 71.2:199:B dated December 20, 1975 which states that all of the capacities listed in PS Sheet 71.2:199:A are for 0.6 S.G. gas and not for air.

Description

The Series 199 regulator is a pilot operated type, (sometimes referred to as a pilot loaded type). There are two important elements to this type of regulator: the main operating diaphragm and the loading pilot. (See Figure 1).

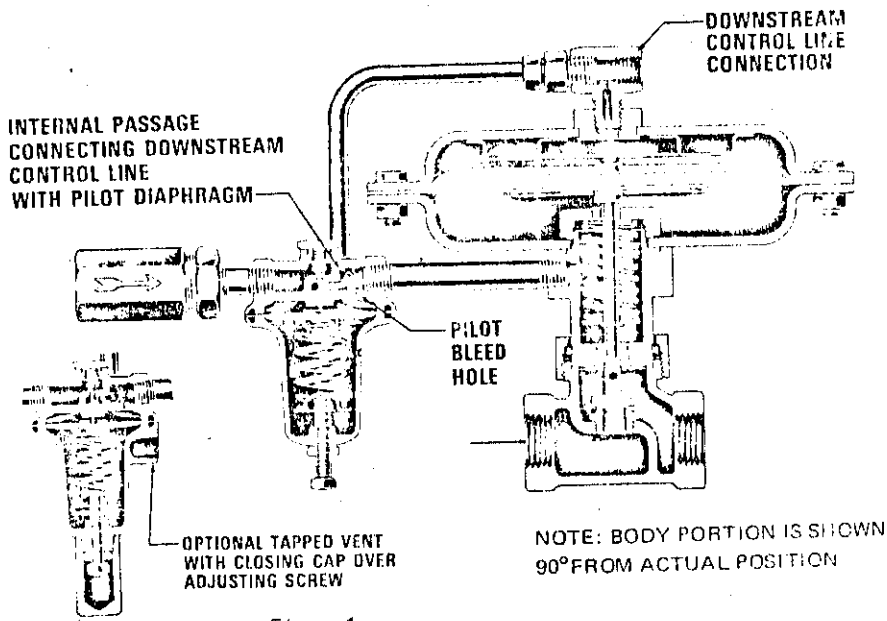

Figure 1.

CROSS SECTIONAL VIEW

The standard orifice in the Type 199 is 1/2". Two additional orifices are available for higher inlet pressures and lower flows.

Orifice	Max. Inlet Pressure
1/2"	60 psig
3/8"	90 psig
1/4"	125 psig

These are based on downstream piping being expanded so piping pressure loss is negligible.

TABLE 1

MAXIMUM INLET PRESSURES

Capacity chart for 1" Type 199 1/2" orifice, 1" downstream piping. Based ±1% offset of absolute outlet pressure. Outlet pressure setting made at 200 SCFH for each inlet.

Inlet Pressure PSIG	OUTLET PRESSURE 2 PSIG	5 PSIG	10 PSIG	20 PSIG	30 PSIG	40 PSIG	50 G
5	2580	-	-	-	-	-	
10	4128	3612	-	-	-	-	
15	4773	5418	3999	-	-	-	
20	4773*	5547	6192	-	-	-	
25	4773	5547*	6450	4902	-	-	
30	4773	5547	6450*	7224	-	-	
35	4773	5547	6450	8772	5805	-	
40	4773	5547	6450	9030	8514	-	
45	4773	5547	6450	9030*	9804	6192	
50	4773	5547	6450	9030	10578	9030	
55	4773	5547	6450	9030	10578*	10707	6
60	4773	5547	6450	9030	10578*	12255	9

* Flow limited by pipe loss.

TABLE 2

CAPACITIES ARE IN SCFH FOR 0.6 S.G. GAS

Capacity chart for 1" Type 199, 3/8" orifice, 1" outlet piping. Based ±1% offset of absolute outlet pressure. Outlet pressure setting made at SCFH for each inlet.

Inlet Pressure	Outlet Pressure 2 PSIG	5 PSIG	10 PSIG	20 PSIG	25 PSI
5	1675	-	-	-	-
10	2710	2320	-	-	-
15	3610	3225	2451	-	-
20	4130	4255	3610	-	-
25	4515	4960	4900	3955	-
30	4515	5420	5420	4385	3485
40	4515	5420	6965	6450	5935
60	4515	5420	7225	8770	9030
90	4515	5420	7225	8770	9030

Inlet Pressure	Outlet Pressure 40 PSIG	60 PSIG	70 PSIG	80 PSIG
45	3355	-	-	-
50	5160	-	-	-
60	7740	-	-	-
70	9800	6450	-	-
75	10700	7740	3870	-
80	11610	9030	6190	-
85	12250	10190	7870	4990
90	12900	11350	8770	6965

TABLE 3

CAPACITIES ARE IN SCFH FOR 0.6 S.G. GAS

Capacity Chart for 1" Type 199, 1/4" orifice, 1" outlet piping. Based on ±1% offset of absolute outlet pressure. Outlet pressure setting made at 250 SCFH for each outlet.

Inlet Pressure	Outlet Pressure				
	2 PSIG	5 PSIG	10 PSIG	20 PSIG	25 PSIG
5	903	-	-	-	-
10	1419	1226	-	-	-
15	1806	1677	1161	-	-
20	2064	2064	2064	-	-
25	2322	2322	2322	1548	-
30	2709	2709	2709	2193	1806
40	3354	3354	3354	3225	3096
60	4515	4644	4644	4644	4644
75	4515	5418	5547	5547	5547
100	4515	5418	6966	6966	6966
125	4515	5418	6966	6966	8256

Inlet Pressure	Outlet Pressure			
	40 PSIG	60 PSIG	80 PSIG	100 PSIG
45	1305	-	-	-
50	2710	-	-	-
60	4000	-	-	-
75	5290	4000	-	-
85	6065	5160	2580	-
90	6320	5935	3870	-
100	6965	6710	5290	-
110	7610	7350	5935	4130
125	8385	8000	7740	6970

Spring 1K7485 in pilot for 80 and 100 psig settings.

TABLE 4

CAPACITIES ARE IN SCFH FOR 0.6 S.G. GAS

The pilot senses the downstream (controlled) pressure via the control line and uses the upstream pressure of the gas to "load-up" the main operating diaphragm in response to any change in downstream pressure. The complete operating sequence is detailed in manufacturer's bulletin number 71.2:199 dated February 1971. Supplementary bulletin, PS Sheet 71.2:199:A lists capacities for the 1/2 inch, 3/8 inch and 1/4 inch orifice mounted in the 1 inch N.P.T. body. These capacity tables apply also to the regulators with the main body connections of 1-1/4 inch.

It is to be noted that bulletin 71.2:199 indicates somewhat larger capacities than those given in bulletin 71.2:199:A. The former capacities were based on the downstream piping being expanded to a larger diameter than the body size so that piping pressure loss would be negligible. In contrast, PS Sheet 71.2:199:A has reduced these capacities on the assumption that 1 inch downstream piping will be used with a 1 inch body size. Therefore, the capacities listed in PS Sheet 71.2:199:A apply only to the 1 inch and 1-1/4 inch body sizes, when either is used with 1 inch or larger downstream piping. For the 3/4 inch body size it is necessary to refer to Circular G-109 with the realization that the outlet piping must be expanded if the larger flows will be encountered and that only the 1/2 inch orifice is approved for use with the 3/4 inch body size.

Note: Figure 1 shows that an optional pilot style is available. It can be supplied with a tapped vent for the pilot spring chamber and a closing cap over the pilot adjusting screw.

Tables 2, 3 and 4 list the capacities of each orifice for 0.6 specific gravity gas in standard cubic feet per hour. When checking the regulator's capacity at given conditions, the lowest inlet pressure and the maximum capacity of the installation in which the regulator is mounted should be used in conjunction with these capacity tables.

For the maximum allowable inlet pressures for each orifice size refer to Table 1.

Approval granted to:

Fisher Controls Company of Canada Limited,
Woodstock, Ontario.

J.L. Armstrong, P. Eng.
Chief, Standards Laboratory,

D.L. Smith, P. Eng.
Chief, Electricity & Gas Division,

Metrology and Laboratory Services

Ref: GL 1147-57/F206-176