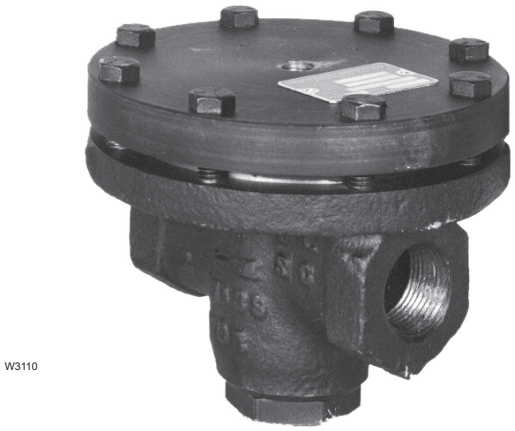
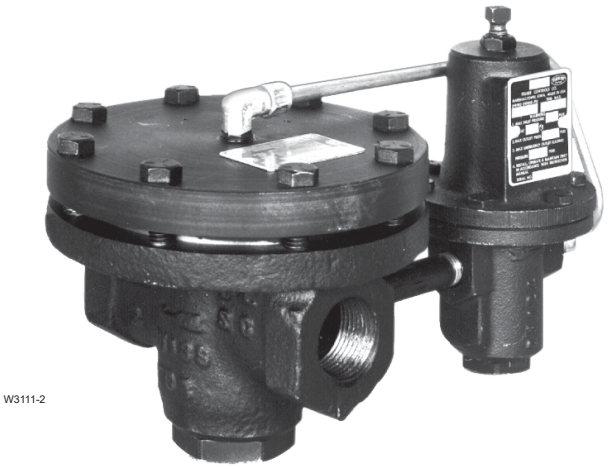
Type 92C Self-Powered Control Valve



TYPE 92C PRESSURE-LOADED CONTROL VALVE



TYPE 92C SELF-POWERED CONTROL VALVE WITH TYPE 6392 PILOT

Figure 1. *Type 92C Pressure Regulator*

Introduction

The Type 92C regulator (Figure 1) is an economical cast iron, steel, or stainless steel pressure-reducing regulator used in steam, liquid or hot air service. This regulator is available with a Type 6392 pilot for use as a pilot-operated regulator or without a pilot for use as a pressure-loaded regulator. The pilot-operated version uses inlet pressure as the operating medium; no separate air supply is required. The pressure-loaded version is used where remote adjustment of the regulator pressure setting is required; a Type 67, 1301F regulator or a Type 670 panel loader can be used as the loading regulator.

A Type 6492HM or 6492HTM safety override pilot is also available for the Type 92C. The Type 6392 pilot is used in a series installation with the Type 6492HM or 6492HTM safety override pilot installed on the upstream valve. The Type 6492HM or 6492HTM safety override pilot senses pressure downstream of the second valve, and prevents pressure from rising above safe operating pressure in the event the downstream valve fails. This system is approved by ASME B31.1-1989, 122.14.2.A, and can replace an ASME safety valve when vent piping is not practical and upstream pressure does not exceed 400 psig / 27.6 bar. Local codes and standards may require approval by an appropriate authority prior to installation.

Features

- **Shutoff Performance**—The machine-lapped, flat-face seating surfaces featured in the Type 92C regulator and Type 6392 pilot design have been time-proven to minimize seat leakage when downstream demand is zero and the regulator is shutoff.
- **Soft Seats—**When tight shutoff is required and service conditions permit their use, elastomer seats are available for ASME Class VI shutoff.

Specifications

Body Sizes and End Connection Styles
Cast Iron: 1/2, 3/4, 1 NPT
Steel or Stainless Steel: NPS 1/2, 3/4 or 1 / DN 15, 20 or 25, NPT; CL150 RF; CL300 RF; or PN 16/25/40

Maximum Allowable Inlet and Pilot Supply Pressures[1]
Cast Iron Construction: 250 psig / 17.2 bar
Steel and Stainless steel Construction: 300 psig / 20.7 bar

Regulator Pressure Drops[1]
Minimum: 15 psi / 1.0 bar
Maximum Operating: Do not exceed the pressure drops in the capacity tables
Maximum Emergency[2]
Cast Iron Construction: 250 psi / 17.2 bar
Steel and Stainless steel Construction: 300 psi / 20.7 bar

Outlet Pressure Range
See Table 1

Maximum Outlet Pressures[2]
Maximum Operating Outlet Pressure: 150 psig / 10.3 bar
Maximum Emergency Outlet (Casing) Pressure
Cast Iron Construction: 250 psig / 17.2 bar
Steel and Stainless steel Construction: 300 psig / 20.7 bar

Loading Pressure For Pressure-Loaded Regulator[2]
See Figure 5 to determine loading pressure Maximum allowable loading pressure[2] is 250 psig / 17.2 bar for cast iron construction and 300 psig / 20.7 bar for steel and stainless steel construction; the maximum allowable diaphragm differential pressure of 150 psi / 10.3 bar for cast iron, steel and stainless steel constructions must not be exceeded.

Orifice Sizes
NPS 1/2 / DN 15 Main Valve: 9/16 in. / 14 mm
NPS 3/4 and 1 / DN 20 and 25 Main Valves: 3/4 in. / 19 mm is standard; 9/16 in. / 14 mm is optional

Flow Capacity
See Capacity Information section

Flow and Sizing Coefficients
See Tables 2 and 3

Proportional Band
10%

Construction Materials
Type 92C Self-Powered Control Valve
Main Valve Body and Diaphragm Flange: Cast iron, Steel, or Stainless steel
Orifice and Valve Stem: Heat-treated 416 Stainless steel
Main Valve Plug (Metal Seat Construction): Heat-treated 416 Stainless steel
Main Valve Disk and Disk Holder (Elastomeric Seat Construction) Disk: Ethylenepropylene (EPR)
Disk Holder: Heat-treated 416 Stainless steel
Main Valve Diaphragms and Valve Plug Springs: Stainless steel
Stem Guides: Heat-treated 416 Stainless steel
Main Valve Plug Guides
Cast Iron Construction: Brass
Steel Construction: Heat-treated 416 Stainless steel

Type 6392 Pilot
Pilot Body and Pilot Spring Case: Cast iron, Steel or Stainless steel
Pilot Valve Plug (Metal Seat Construction): Heat-treated 416 Stainless steel
Pilot Valve Disk and Disk Holder (Elastomeric Seat Construction) Disk: Ethylenepropylene (EPR)
Disk Holder: Heat-treated 416 Stainless steel
Pilot Diaphragms: Stainless steel
Pilot Stem Guides: Heat-treated 416 Stainless steel
Pilot Valve Plug Guides
Cast Iron Construction: Brass
Steel Construction: Heat-treated 416 Stainless steel
Pilot Control Spring: 416 or 17-7PH Stainless steel
Pilot Inlet Screen: Stainless steel
Loading Pressure Tubing: Copper (used for pilot operated regulator only) or Stainless steel
Pilot Fittings: Brass or Stainless steel
Pilot Supply Line: Steel pipe nipple

Types 6492HM and 6492HTM Safety Override Pilots
Pilot Valve Body: WCC steel and CF8M Stainless steel
Valve Guide
For Steel Body: 416 Stainless steel
For Stainless steel Body: 316 Stainless steel
Valve Spring: 302 Stainless steel
Orifice
For Steel Body: 416 Stainless steel
For Stainless steel Body: 316 Stainless steel
Valve Stem
For Steel Body: 410/416 Stainless steel
For Stainless steel Body: 316 Stainless steel

1. Also see Installation section
2. Pressure/temperature limits in this Bulletin and any application codes must not be exceeded.

- continued -

Specifications (continued)

Construction Materials (continued)
Types 6492HM and 6492HTM Safety Override Pilots (continued)
Diaphragm: 302 Stainless steel
Lower Spring Seat
For Type 6492HM: Aluminum
For Type 6492HTM: Steel or Stainless steel
Spring
For Type 6492HM: Steel
For Type 6492HTM: Stainless steel
Upper Spring Seat: Steel
Spring Case: Steel or Stainless steel
Pipe Plug: Steel or Stainless steel

Maximum Material Temperature Capabilities(1)
Metal Diaphragm and Seat
Cast Iron Construction: -40 to 406°F / -40 to 208°C
Steel Construction: -20 to 500°F / -29 to 260°C
Ethylenepropylene (EPR) Seat: -40 to 275°F / -40 to 135°C
Optional High-Temperature Steel or Stainless Steel Body: 650°F / 343°C

Pressure Registration
With Pilot: External
Without Pilot: Internal

Downstream Control Line Connection
1/4 NPT (internal) in pilot body (downstream control line not required for pressure-loaded regulator)

Loading Pressure Connection
1/4 NPT (internal) in main valve diaphragm flange (this connection is factory-piped to the pilot on pilot-operated regulator)

Pilot Spring Case Vent
3/32 in. / 2.4 mm drilled hole

Approximate Weights
Cast iron, Steel, or Stainless steel Body with Pilot: 20 lbs / 9 kg
Cast iron, Steel, or Stainless steel Body without Pilot: 16 lbs / 7 kg

1. Pressure/temperature limits in this Bulletin and any application codes must not be exceeded.

Table 1. *Outlet Pressure Ranges*

SPRING USAGE	OUTLET PRESSURE RANGE, psig / bar	SPRING PART NUMBER AND COLOR	SPRING WIRE DIAMETER, In. / mm	SPRING FREE LENGTH, In. / Imm
Standard use up to 500°F / 260°C	5 to 70 / 0.34 to 4.8	1E392627012, Green	0.170, / 4.3	2.00 / 50.8
	20 to 150 / 1.4 to 10.3	1E392727142, Red	0.207 / 5.3	1.94 / 49.3
High-Pressure and/or High Temperature over 500°F / 260°C	15 to 100 / 1.0 to 6.9	14B9941X012, Unpainted	0.192 / 4.9	1.96 / 49.8
	80 to 250 / 5.5 to 17.2	14B9940X012, Unpainted	0.282 / 7.2	

Table 2. *Flow Coefficients(1)*

ORIFICE SIZE, In. / mm	WIDE-OPEN FOR RELIEF SIZING			C_1	K_m
	C_g	C_s	C_v		
9/16 / 14	170	8.5	5	34	0.67
3/4 / 19	240	12	7.1		

1. $C_v = C_s \times 20 \div C1$

Table 3. *IEC Sizing Coefficients*

BODY SIZE, NPS / DN	ORIFICE SIZE, In. / mm					
	9/16 / 14			3/4 / 19		
	X_T	F_D	F_L	X_T	F_D	F_L
1/2 / 15	0.73	0.38	0.82	- - - -		
3/4 or 1 / 20 or 25		0.44		0.73	0.38	0.82

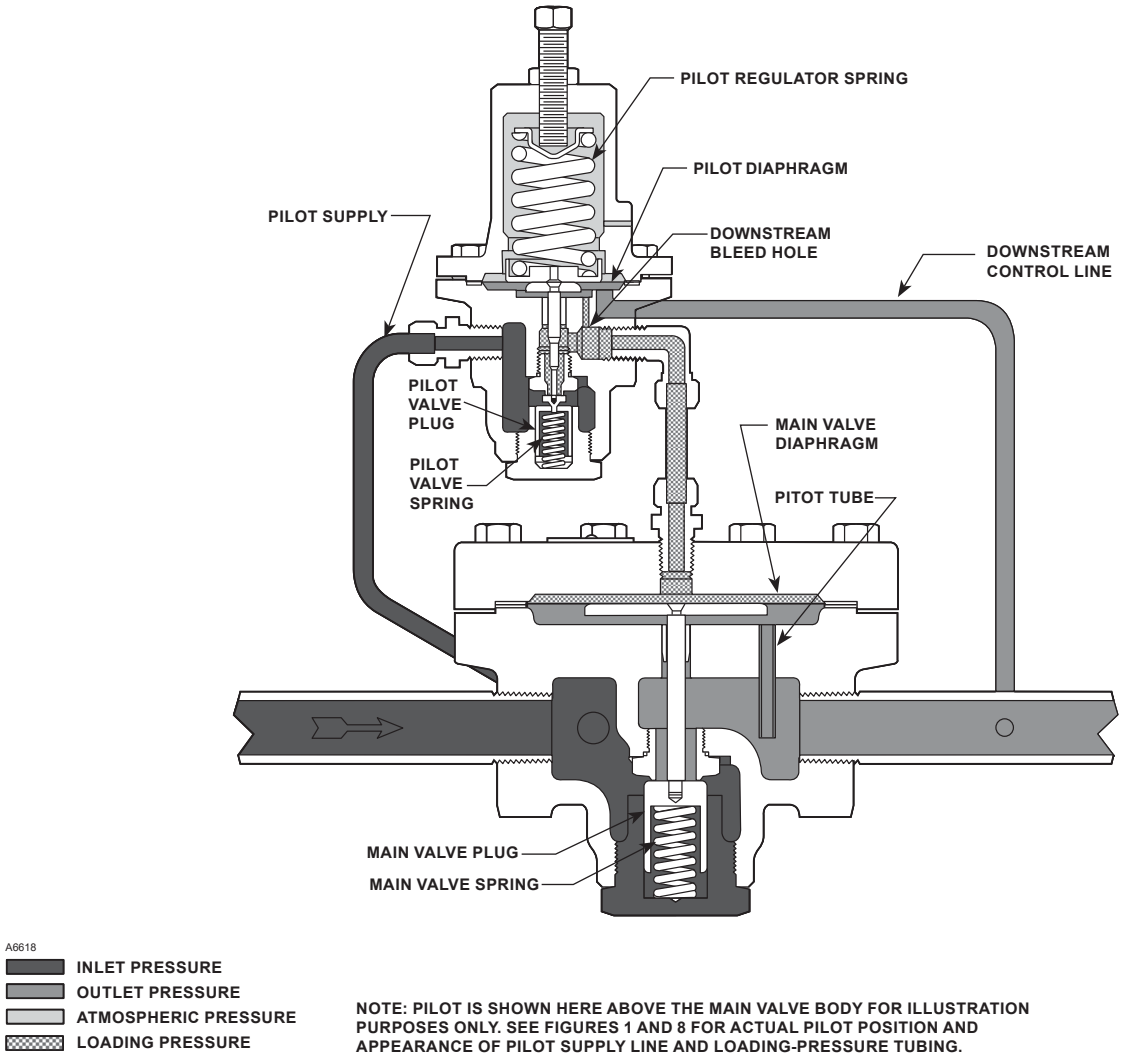


Figure 2. *Type 92C with Type 6392 Pilot Operational Schematic*

- **Equal Inlet and Outlet Pressure Ratings—** Eliminate the need for overpressure protection for the downstream side of the regulator.
- **Choice of Steel, Stainless steel or Iron Bodies—** Steel and stainless steel valve construction helps resist piping stresses commonly encountered in steam applications.
- **Ease of Installation—**Lightweight, compact construction is easy to install and requires a minimum space for installation. For pilot-operated regulators, supply pressure to the pilot is supplied from the inlet side of the main valve through piping furnished with the regulator.
- **Ease of Maintenance—**Main valve and pilot valve plug and seat can be removed for inspection or maintenance without disassembling piping connections and without removing the diaphragm. Pilot-inlet screen is easily removed with the seating parts for inspection and cleaning. Diaphragms can be removed without disturbing seating parts.
- **Ease of Conversion—**If application requirements change, the regulator can be converted from a pressure-loaded regulator to a pilot-operated regulator or vice-versa by adding or removing the pilot and pilot piping; no changes to the main valve construction are required.

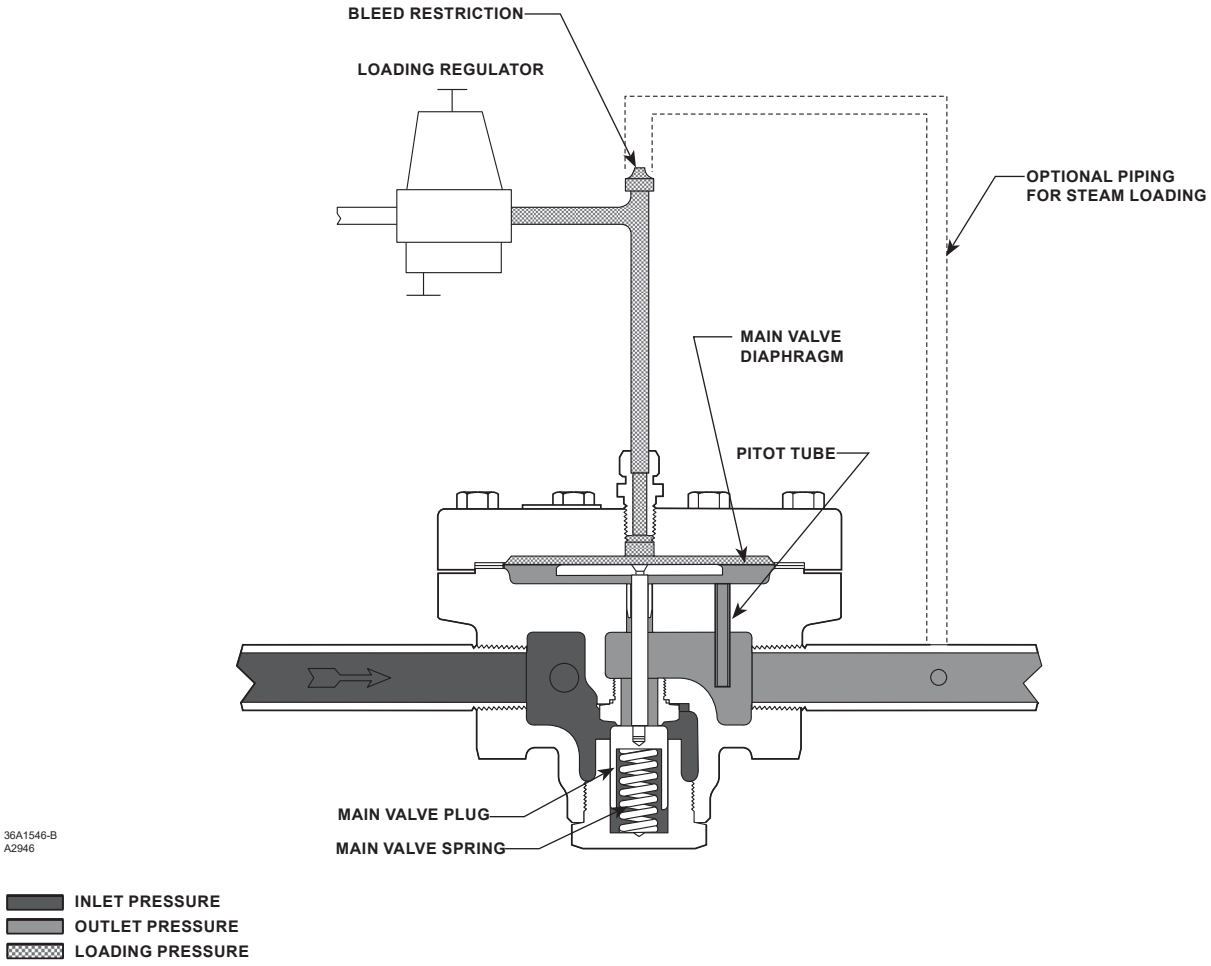


Figure 3. *Type 92C Pressure-Loaded Control Valve Operational Schematic*

Principle of Operation

Pilot-Operated Regulator

Refer to the schematic in Figure 2. Pilot supply pressure is piped from the inlet side of the main valve to the pilot inlet connection. Downstream pressure registers under the main valve diaphragm through the pitot tube under the pilot diaphragm through the downstream control line.

When downstream pressure decreases to a value below the setting of the pilot regulator spring, the pilot spring forces the pilot valve plug open, increasing the loading pressure on the top of the main valve diaphragm. The increased loading pressure on top of the main valve diaphragm and decreased downstream pressure under the main valve diaphragm force the main valve diaphragm and stem downward. This opens the main valve plug, and increases flow to the downstream system thus restoring downstream pressure to the setting of the pilot regulator spring.

When downstream pressure increases, it registers under the pilot diaphragm and overcomes the force of the pilot spring. This allows the pilot valve spring to close the pilot valve plug and causes excess loading pressure to bleed to the downstream system through the pilot bleed hole. At the same time, increased downstream pressure registers under the main valve diaphragm. The decreased loading pressure on top of the main valve diaphragm and increased downstream pressure under the main valve diaphragm force the main valve diaphragm upward. This allows the main valve plug spring close to the main valve plug, reducing flow to the downstream system.

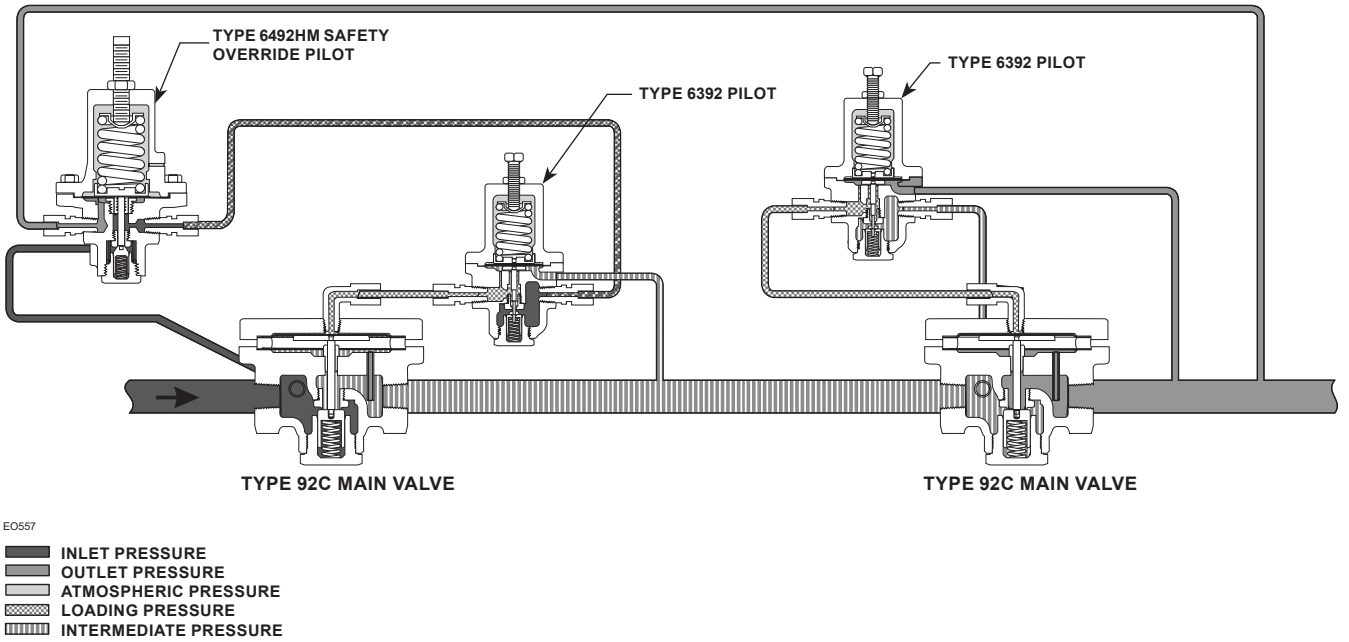


Figure 4. *Type 92C with Type 6492HM Safety Override Pilot Operational Schematic*

Table 4. *Type 6492 Safety Override Pilot Spring Ranges and Minimum Differential Pressures*

TYPE	SPRING RANGES, psig / bar	SPRING COLOR	MINIMUM PRESSURE AT WHICH MONITORING PILOT CAN BE SET, psig / bar
6492HM	10 to 30 / 0.69 to 2.1	Yellow	5 / 0.34 over normal distribution pressure
	25 to 75 / 1.7 to 5.2	Green	10 / 0.69 over normal distribution pressure
	70 to 150 / 4.8 to 10.3	Red	
6492HTM	80 to 250 / 5.5 to 17.2	Unpainted	- - - -
	15 to 100 / 1.0 to 6.9		

Pressure-Loaded Regulator

Refer to the schematic in Figure 3. With a pressure-loaded regulator, a remote, adjustable loading regulator provides loading pressure to the top of the main valve diaphragm. Downstream pressure registers under the main valve diaphragm through the pilot tube.

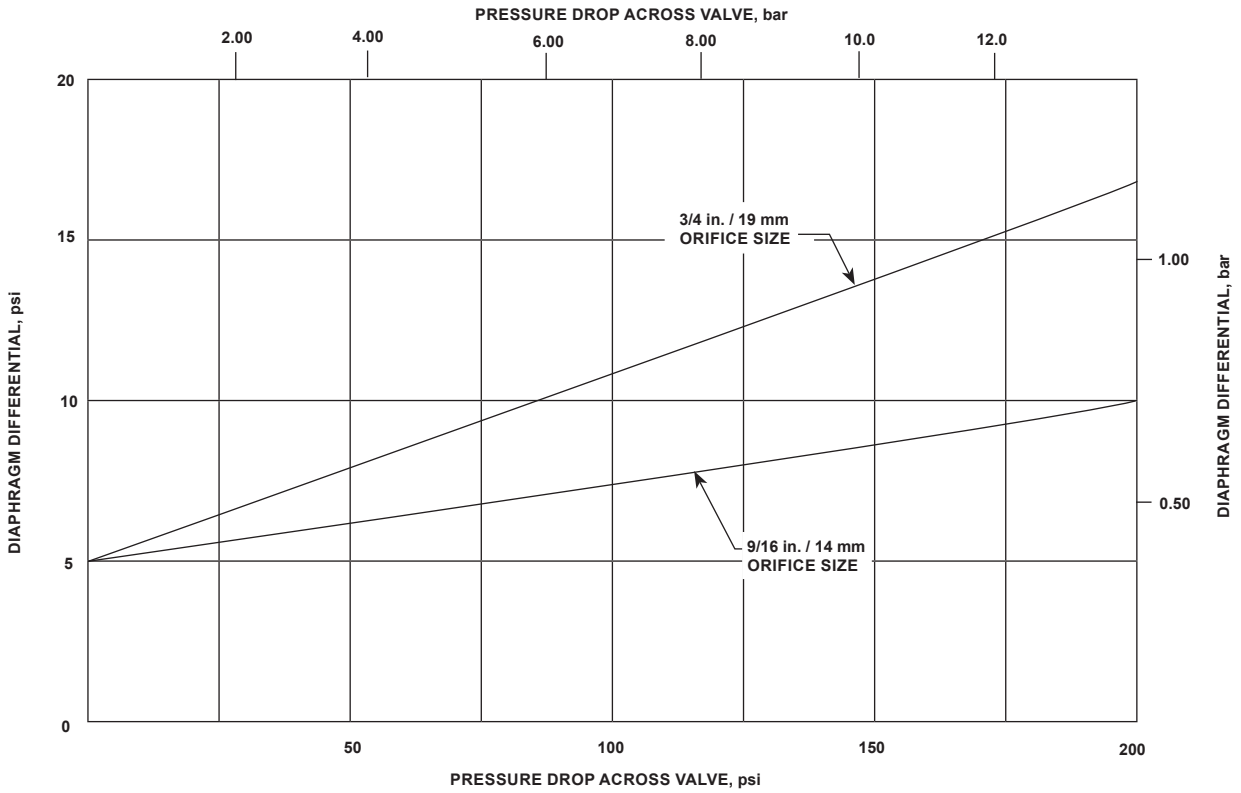
When downstream pressure decreases, it registers under the diaphragm and allows the stem and plug to move downward, thereby opening the valve to increase downstream pressure.

When downstream pressure increases, it registers under the diaphragm and forces the stem and plug to move upward. The upward force of the spring causes the valve to close, which decreases flow to the downstream system thus decreasing downstream pressure. In hot air service, supply air above the diaphragm becomes compressed and is vented to the atmosphere. If a steam supply is used, the steam is vented downstream.

Safety Override Pilot

Refer to the schematic in Figure 4. Once placed in operation, the upstream Type 6392 pilot senses the intermediate pressure between both valves and the Type 6492HM or 6492HTM pilot senses downstream pressure of the second valve. As demand for flow increases, intermediate pressure will fall causing the Type 6392 pilot to open. As the Type 6392 pilot valve opens, loading pressure to the main valve increases, opening the main valve.

The Type 6492HM or 6492HTM safety override pilot remains open because its setpoint is above the setpoint of the downstream valve. In the unlikely event that the downstream valve fails open, downstream pressure will rise above the downstream valve's setpoint. This pressure is sensed by the Type 6492HM or 6492HTM safety override pilot. As downstream pressure increases the safety override pilot closes, reducing loading pressure to



NOTE:
TO DETERMINE REQUIRED LOADING PRESSURE, ADD THE DIAPHRAGM DIFFERENTIAL PRESSURE TO THE DESIRED OUTLET PRESSURE SETTING.

Figure 5. *Diaphragm Differential Pressure for Pressure-Loaded Regulator*

the main valve, which positions the main valve to maintain downstream pressure as specified per ASME Boiler and Pressure Vessel Code, Section VIII.

In the event that the upstream valve fails, the downstream regulator will prevent downstream pressure from rising above safe operating levels.

It is recommended to install some type of warning system, such as a sentinel relief valve, to warn the operator that a valve has failed in the system. This will prevent prolonged operation with one valve, which could cause valve trim wear and noise associated with operation at high differential pressures.

When operating in most steam systems, valve setpoints should be in strict accordance to ASME Boiler and Pressure Vessel Code, Section VIII. The Type 6492HM or 6492HTM safety override pilot should be set at 10 psig / 0.69 bar or 10% above maximum downstream operating pressure of the second valve, whichever pressure is greater. For example, most HVAC systems operate at 15 psig / 1.0 bar, so the safety override pilot should be set no higher than 25 psig / 1.7 bar.

Installation

The Type 92C regulator should be installed and used in accordance with federal, state and local codes and regulations. Downstream overpressure protection should be provided by the user if the maximum inlet pressure exceeds the downstream pressure of the system. The pressure and temperature limitations in the Specifications section must be observed.

The Type 92C regulator may be installed in any orientation. However, on steam service the regulator should not be installed at the bottom of a tall vertical pipeline where condensate could collect and create a pressure head affecting regular performance.

A downstream control line is required for pilot-operated regulators; the control line is not furnished with the regulator. An adjustable loading pressure regulator and loading pressure piping are required for pressure-loaded regulators.

Capacity Information

Steam Capacities

Typical regulating capacities in pounds of saturated steam per hour are shown in Table 5 for pilot-operated regulators. A typical performance curve is shown in Figure 6. To determine capacities for pressure-loaded regulators, multiply the appropriate Table 5 value by the capacity factor listed in Table 7.

1. If the steam is saturated and the pressure drop across the regulator is critical (absolute outlet pressure equal to approximately one-half or less of the absolute inlet pressure), use the equation:

$$Q = (P_{1abs})\,(C_s)$$

where,

Q = Maximum flow capacity, pounds of saturated steam per hour

P_{1abs} = Absolute inlet pressure (gauge inlet pressure plus 14.7 psi)

C_s = Wide-open steam sizing coefficient (see Specifications section)

To convert capacity to kilograms per hours, multiply the capacity pounds per hour by 0.4536.

2. If the steam is superheated or if the pressure drop across the regulator is lower than critical (absolute outlet pressure greater than approximately 1/2 the absolute inlet pressure), use the sizing nomographs in Catalog 10.

Liquid Capacities

Table 6 gives regulating capacities in U.S. gallons per minute of water and in cubic meters per hour of water. To determine capacities for pressure-loaded regulators, multiply the approximate Table 6 value by the capacity factor listed in Table 7.

To determine regulating capacities at pressure settings not given in Table 6, or to determine wide-open capacities for relief sizing at any inlet pressure, use the Catalog 10 liquid sizing procedures in conjunction with the appropriate liquid coefficients (C_v and K_m, see Specifications section).

Liquid Sizing for Liquids Other than Water

where,

$$Q = C_v \sqrt{\frac{\triangle P}{G}}$$

Q = Flow in GPM

$\triangle P$ = Valve differential in psi

C_v = Valve sizing coefficient (see Table 6)

G = Specific Gravity

Example,

NPS 1 / DN 25 body

3/4 in. / 19 mm orifice size

Glycol (Specific Gravity) = 1.11

P_{inlet} = 150 psig / 10.3 bar

P_{out} (setpoint) = 50 psig / 3.4 bar

Capacity based on 10% Droop from setpoint

P_{out} at full flow = 50 psi / 3.4 bar setpoint - 5 psi

(0,35 bar) Droop = 45 psi / 3.1 bar

$\triangle P$ = 150 - 45 = 105 psi / 7.2 bar

C_v = 6.89 from Table 6

Q = 6.89 $\sqrt{\frac{105}{1.11}}$

= 67.0 GPM / 253,60 l/min Glycol

Maximum Allowable Pressure Drop for Liquid Service

Pressure drops in excess of allowable will result in choked flow and possible cavitation damage.

Choked flow is the formation of vapor bubbles in the liquid flow stream causing a crowding condition at the vena contracta which tends to limit flow through the regulator. The vena contracta is the minimum cross-sectional area of the flow stream occurring just downstream of the actual physical restriction.

Cavitation and flashing are physical changes in the process fluid. The change is from the liquid state to the vapor state and results from the increase in fluid velocity at or just downstream of the greatest flow restriction, normally the regulator orifice.

To determine the maximum allowable pressure drop for water:

$$\triangle P(_{allow}) = K_m\,(P_1)$$

Where,

$\triangle P$ = Valve differential — psi

K_m = Valve recovery coefficient from Table 7

P_1 = Valve inlet pressure psia

To determine maximum allowable pressure drop for fluids other than water, see Fisher™ Catalog 10.

Table 5. *Steam Flow Capacities for Pilot-Operated Type 92C Regulator[1] (Based on 10% Proportional Band)*

OUTLET PRESSURE SETTING		INLET PRESSURE		CAPACITY (lbs/h[2] / kg/h OF SATURATED STEAM)				
				NPS 1/2 / DN 15 Main Valve	NPS 3/4 / DN 20 Main Valve		NPS 1 / DN 25 Main Valve	
psig	bar	psig	bar	9/16 in. / 14 mm Orifice Size	Standard 3/4 in. / 19 mm Orifice Size	Optional 9/16 in. /14 mm Orifice Size	Standard 3/4 in. / 19 mm Orifice Size	Optional 9/16 in. / 14 mm Orifice Size
5[3]	0.34[3]	20 25 30 50	1.4 1.7 2.1 3.4	170 / 77.1 200 / 90.7 240 / 109 250 / 113	230 / 104 280 / 127 340 / 154 440 / 200	180 / 81.7 210 / 95.3 270 / 122 310 / 141	300 / 136 380 / 172 410 / 186 680 / 308	200 / 90.7 230 / 104 280 / 127 410 / 186
		75 100 150	5.2 6.9 10.3	370 / 168 370 / 168 400 / 181	590 / 268 710 / 322 740 / 336	450 / 204 500 / 227 560 / 254	880 / 399 980 / 445 1000 / 454	500 / 227 600 / 272 660 / 299
10[3]	0.69[3]	25 30 50	1.7 2.1 3.4	210 / 95.3 240 / 109 360 / 163	300 / 136 390 / 177 600 / 272	220 / 99.8 280 / 127 410 / 186	360 / 163 430 / 195 680 / 308	250 / 113 300 / 136 450 / 204
		75 100 150	5.2 6.9 10.3	400 / 181 550 / 249 600 / 272	680 / 308 830 / 376 880 / 399	500 / 227 680 / 308 710 / 322	900 / 408 1100 / 499 1150 / 522	580 / 263 770 / 349 800 / 363
15[3]	1.0[3]	30 50 75 100 150	2.1 3.4 5.2 6.9 10.3	220 / 99.8 380 / 172 480 / 218 620 / 281 650 / 295	350 / 159 610 / 277 800 / 363 960 / 435 1100 / 499	260 / 118 430 / 195 570 / 259 750 / 340 780 / 354	410 / 186 720 / 327 930 / 422 1250 / 567 1300 / 590	280 / 127 480 / 218 620 / 281 830 / 376 880 / 399
20[3]	1.4[3]	35 50 75 100 150 200	2.4 3.4 5.2 6.9 10.3 13.8	240 / 109 380 / 172 550 / 249 700 / 318 800 / 363 1000 / 454	370 / 168 630 / 286 870 / 395 1150 / 522 1200/ 544 - - - -	270 / 122 430 / 195 630 / 286 800 / 363 900 / 408 1150 / 522	420 / 191 720 / 327 950 / 431 1300 / 590 1400 / 635 - - - -	290 / 132 480 / 218 670 / 304 900 / 408 1000 / 454 1300/ 590
30[3]	2.1[3]	50 75 100 150 200	3.4 5.2 6.9 10.3 13.8	330 / 150 550 / 249 700 / 318 950 / 431 1000 / 454	550 / 249 880 / 399 1150 / 522 1400 / 635 - - - -	400 / 181 630 / 286 800 / 363 1100 / 499 1200 / 544	570 / 259 950 / 431 1300 / 590 1600 / 726 - - - -	450 / 204 670 / 304 900 / 408 1200 / 544 1400 / 635
40[3]	2.8[3]	55 60 75	3.8 4.1 5.2	330 / 150 390 / 177 480 / 218	560 / 254 610 / 277 870 / 395	400 / 181 450 / 204 600 / 272	580 / 263 670 / 304 930 / 422	430 / 195 480 / 218 660 / 299
		100 150 200 250	6.9 10.3 13.8 17.2	700 / 318 1000 / 454 1100 / 499 1300 / 590	1150 / 522 1400 / 635 - - - - - - - -	800 / 363 1150 / 522 1300 / 590 1550 / 703	1300 / 590 1700 / 771 - - - - - - - -	900 / 408 1250 / 567 1500 / 680 1700/ 771
50	3.4	65 75 100 150 200 250[4]	4.5 5.2 6.9 10.3 13.8 17.2	370 / 168 480 / 218 700 / 318 1000 / 454 1200 / 544 1400 / 635	600 / 272 740 / 336 1100 / 499 1500 / 680 1800 / 816 - - - -	440 / 200 550 / 249 800 / 363 1200 / 544 1350 / 612 1700 / 771	650 / 295 820 / 372 1250 / 567 1900 / 862 2300 / 1043 - - - -	470 / 213 600 / 272 850 / 386 1300 / 590 1600 / 726 1850 / 839
60	4.1	75 80 100 150 200 250[4]	5.2 5.5 6.9 10.3 13.8 17.2	360 / 163 430 / 195 640 / 290 1000 / 454 1200 / 544 1500 / 680	630/ 286 700 / 318 1000/ 454 1500/ 680 2000/ 907 - - - -	400 / 181 500 / 227 700 / 318 1200 / 544 1500 / 680 1800/ 816	740 / 336 850 / 386 1200 / 544 1900 / 862 2600 / 1179 - - - -	450 / 204 550 / 249 800 / 363 1300 / 590 1700 / 771 2000 / 907
80	5.5	100 150 200 250	6.9 10.3 13.8 17.2	500 / 227 1000 / 454 1300 / 590 1500 / 680	900 / 408 1500 / 680 2000 / 907 - - - -	620 / 281 1200 / 544 1500 / 680 1800 / 816	950 / 431 1800 / 816 2500 / 1134 - - - -	730 / 331 1200 / 544 1700 / 771 2000 / 907

1. To determine capacities for pressure-loaded Type 92C regulators, multiply the printed value by the appropriate value shown in Table 7.
2. To convert capacity to kg/hr, multiply by 0.4536.
3. Capacities for outlet pressure settings lower than 50 psig / 3.4 bar are based on a 2 to 1 ratio of outlet pipe size to main valve body size.
4. 20 to 150 psig / 1.4 to 10.3 bar pilot control spring only (Red spring, 1E392727142).

- continued -

Table 5. *Steam Flow Capacities for Pilot-Operated Type 92C Regulator[1] (Based on 10% Proportional Band) (continued)*

OUTLET PRESSURE SETTING		INLET PRESSURE		CAPACITY (lbs/h[2] / kg/h OF SATURATED STEAM)				
				NPS 1/2 / DN 15 Main Valve	NPS 3/4 / DN 20 Main Valve		NPS 1 / DN 25 Main Valve	
psig	bar	psig	bar	9/16 in. / 14 mm Orifice Size	Standard 3/4 in. / 19 mm Orifice Size	Optional 9/16 in. / 14 mm Orifice Size	Standard 3/4 in. / 19 mm Orifice Size	Optional 9/16 in. / 14 mm Orifice Size
100	6.9	125	8.6	600 / 272	1000 / 454	750 / 340	1100 / 499	850 / 386
		150	10.3	850 / 386	1500 / 680	1000 / 454	1600 / 726	1200 / 544
		200	13.8	1300 / 590	2200 / 998	1600 / 726	2400 / 1089	1700 / 771
		250	17.2	1600 / 726	2400 / 1089	2000 / 907	3000 / 1361	2100 / 953
		300	20.7	2000 / 907	- - - -	2400/ 1089	- - - -	2500 / 1134
125	8.6	150	10.3	700 / 318	1000 / 454	800 / 363	1200 / 544	850 / 386
		200	13.8	1200 / 544	2100 / 953	1400 / 635	2200 / 998	1500 / 680
		250	17.2	1600 / 726	2400 / 1089	2000 / 907	3000 / 1361	2100 / 953
		300	20.7	2000 / 907	3000 / 1361	2400 / 1089	3600 / 1633	2500 / 1134
150	10.3	175	12.1	800 / 363	1100 / 499	900 / 408	1400 / 635	950 / 431
		200	13.8	1000 / 454	2000 / 907	1100 / 499	2000 / 907	1300 / 590
		250	17.2	1500 / 680	2300 / 1043	1800 / 816	2800 / 1270	1900 / 862
		300	20.7	2000 / 907	3000 / 1361	2400 / 1089	3600/ 1633	2500 / 1134

1. To determine capacities for pressure-loaded Type 92C regulators, multiply the printed value by the appropriate value shown in Table 7.
2. To convert capacity to kg/hr, multiply by 0.4536.

Table 6. *Water Flow Capacities and Regulating C_v Values for Type 92C Regulator[1] (Based on 10% Proportional Band)*

OUTLET PRESSURE SETTING		INLET PRESSURE		NPS 1/2 / DN 15 MAIN VALVE			NPS 3/4 / DN 20 MAIN VALVE						NPS 1 / DN 25 MAIN VALVE					
				9/16 in. / 14 mm Orifice Size			Standard 3/4 in. / 19.1 mm Orifice Size			Optional 9/16 in. / 14 mm Orifice Size			Standard 3/4 in. / 19.1 mm Orifice Size			Optional 9/16 in. / 14 mm Orifice Size		
psig	bar	psig	bar	GPM	m^3/h	C_v	GPM	m^3/h	C_v	GPM	m^3/h	C_v	GPM	m^3/h	C_v	GPM	m^3/h	C_v
5[2]	0.34	20	1.4	12	2.73	3.13	17	3.86	4.23	13	2.95	3.31	22	5.00	5.62	14	3.18	3.68
		25	1.7	14	3.18	3.11	20	4.54	4.36	15	3.40	3.27	27	6.13	5.91	16	3.63	3.58
		30	2.1	16	3.63	3.26	23	5.22	4.61	19	4.32	3.66	28	6.36	5.56	19	4.32	3.80
		50	3.4	15	3.41	2.28	27	6.13	4.02	19	4.32	2.83	42	9.54	6.21	25	5.68	3.75
		75	5.2	20	4.54	2.43	32	7.27	3.87	25	5.68	2.95	48	10.90	5.77	28	6.36	3.28
		100	6.9	19	4.32	1.90	36	8.18	3.64	25	5.68	2.56	49	11.14	5.03	30	6.81	3.08
		150	10.3	17	3.86	1.43	32	7.27	2.64	24	5.45	2.00	43	9.77	3.57	28	6.36	2.36
10[2]	0.69	25	1.7	14	3.18	3.47	20	4.54	4.95	15	3.40	3.63	24	5.45	5.94	17	3.86	4.13
		30	2.1	16	3.63	3.39	25	5.68	5.50	18	4.10	3.95	28	6.36	6.07	19	4.32	4.23
		50	3.4	21	4.77	3.32	35	7.95	5.54	24	5.45	3.79	40	9.10	6.28	27	6.13	4.15
		75	5.2	21	4.77	2.63	36	8.18	4.47	27	6.13	3.29	48	11.00	5.91	31	7.04	3.81
		100	6.9	27	6.13	2.82	41	9.31	4.26	33	7.50	3.49	54	12.27	5.64	38	8.63	3.95
		150	10.3	25	5.68	2.14	37	8.40	3.14	30	6.81	2.54	49	11.14	4.11	34	7.72	2.86
15[2]	1.0	30	2.1	13	2.95	3.31	21	4.77	5.26	16	3.63	3.91	25	5.68	6.17	17	3.86	4.21
		50	3.4	22	5.00	3.57	35	7.95	5.73	24	5.45	4.04	41	9.31	6.76	27	6.13	4.51
		75	5.2	25	5.68	3.17	41	9.31	5.28	30	6.81	3.76	48	10.91	6.14	32	7.27	4.09
		100	6.9	30	6.81	3.18	46	10.50	4.93	36	8.18	3.85	60	13.64	6.42	40	9.10	4.26
		150	10.3	27	6.13	2.32	46	10.50	3.93	33	7.50	2.79	54	12.27	4.64	37	8.40	3.14
20[2]	1.4	35	2.4	14	3.18	3.32	21	4.77	5.12	15	3.41	3.74	24	5.45	5.81	17	3.86	4.01
		50	3.4	21	4.77	3.66	34	7.72	6.07	23	5.22	4.14	39	8.86	6.94	26	5.91	4.62
		75	5.2	28	6.36	3.66	44	10.00	5.79	32	7.27	4.19	48	10.91	6.32	34	7.72	4.46
		100	6.9	33	7.50	3.60	54	12.27	5.92	37	8.40	4.12	61	13.87	6.69	42	9.54	4.63
		150	10.3	33	7.50	2.86	49	11.14	4.29	37	8.40	3.21	57	12.96	5.00	41	9.31	3.57
		200	13.8	37	8.40	2.74	- - - -	- - - -	- - - -	43	9.77	3.15	- - - -	- - - -	- - - -	48	10.91	3.56

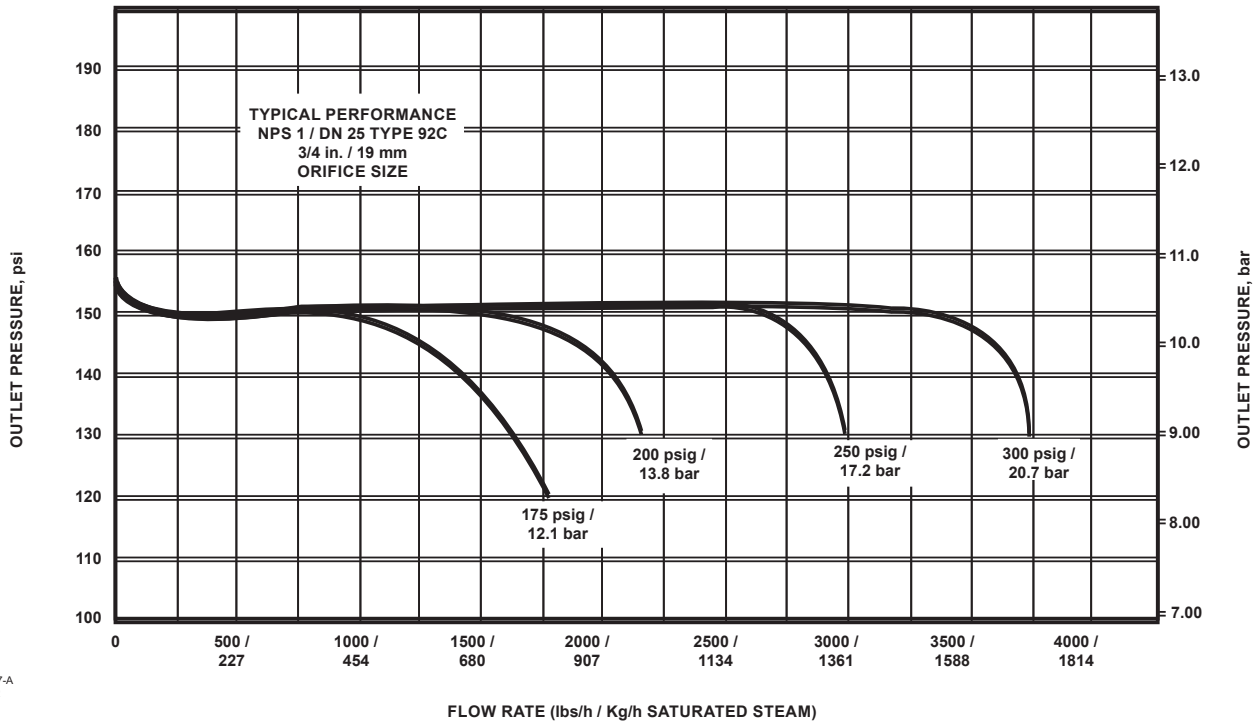
1. To determine capacities for pressure-loaded Type 92C regulators, multiply the printed value by the appropriate value shown Table 7.
2. Capacities for outlet pressure settings lower than 50 psig / 3.4 bar are based on a 2 to 1 ratio of outlet pipe size to main valve body size.

- continued -

Table 6. *Water Flow Capacities and Regulating C_v Values for Type 92C Regulator[1] (Based on 10% Proportional Band) (continued)*

OUTLET PRESSURE SETTING		INLET PRESSURE		NPS 1/2 / DN 15 MAIN VALVE			NPS 3/4 / DN 20 MAIN VALVE						NPS 1 / DN 25 MAIN VALVE					
				9/16 in. / 14 mm Orifice Size			Standard 3/4 in. / 19.1 mm Orifice Size			Optional 9/16 in. / 14 mm Orifice Size			Standard 3/4 in. / 19.1 mm Orifice Size			Optional 9/16 in. / 14 mm Orifice Size		
psig	bar	psig	bar	GPM	m³/h	C_v	GPM	m³/h	C_v	GPM	m³/h	C_v	GPM	m³/h	C_v	GPM	m³/h	C_v
30[2]	2.1	50	3.4	17	3.86	3.47	28	6.36	5.78	20	4.54	4.20	29	6.59	5.99	23	5.22	4.73
		75	5.2	26	6.00	3.78	42	9.54	6.02	30	6.81	4.31	45	10.23	6.50	32	7.27	4.58
		100	6.9	31	7.04	3.66	51	11.59	5.99	36	8.18	4.16	58	13.18	6.77	40	9.09	4.68
		150	10.3	38	8.63	3.40	56	12.73	5.01	44	10.00	3.93	63	14.32	5.72	48	10.91	4.29
		200	13.8	36	8.18	2.74	- - - -	- - - -	- - - -	43	9.77	3.29	- - - -	- - - -	- - - -	50	11.36	3.84
40[2]	2.8	55	3.8	15	3.41	3.51	26	5.91	5.96	19	4.32	4.26	27	6.13	6.17	20	4.54	4.58
		60	4.1	18	4.09	3.66	28	6.36	6.73	21	4.77	4.23	31	7.04	6.29	22	5.00	4.51
		75	5.2	21	4.77	3.44	39	8.86	6.23	27	6.13	4.30	42	9.54	6.66	30	6.81	4.73
		100	6.9	30	6.81	3.72	49	11.14	6.10	34	7.72	4.25	55	12.50	6.90	38	8.63	4.78
		150	10.3	38	8.63	3.59	54	12.27	5.03	44	10.00	4.13	65	14.77	6.11	48	10.91	4.49
		200	13.8	39	8.86	3.02	- - - -	- - - -	- - - -	46	10.46	3.58	- - - -	- - - -	- - - -	53	12.05	4.11
		250	17.2	42	9.54	2.89	- - - -	- - - -	- - - -	50	11.36	3.44	- - - -	- - - -	- - - -	55	12.50	3.78
50	3.4	65	4.5	16	3.63	3.55	26	5.91	5.75	19	4.32	4.22	28	6.36	6.23	20	4.54	4.51
		75	5.2	20	4.54	3.71	31	7.04	5.71	23	5.22	4.25	35	7.95	6.33	25	5.68	4.63
		100	6.9	28	6.36	3.83	45	10.23	6.02	32	7.27	4.38	51	11.59	6.84	34	7.72	4.65
		150	10.3	37	8.40	3.62	56	12.73	5.44	45	10.23	4.35	71	16.14	6.89	48	10.91	4.71
		200	13.8	41	9.31	3.30	62	14.09	4.95	46	10.46	3.71	79	17.96	6.32	55	12.50	4.40
		250[3]	17.2	45	10.23	3.11	- - - -	- - - -	- - - -	54	12.27	3.78	- - - -	- - - -	- - - -	59	13.41	4.11
60	4.1	75	5.2	14	3.18	3.15	25	5.68	5.51	16	3.63	3.50	30	6.81	6.47	18	4.10	3.93
		80	5.5	17	3.86	3.36	28	6.36	5.47	20	4.54	3.91	34	7.72	6.64	22	5.00	4.30
		100	6.9	25	5.68	3.66	39	8.86	5.72	27	6.13	4.01	47	10.68	6.87	31	7.04	4.58
		150	10.3	36	8.18	3.67	54	12.27	5.50	43	9.77	4.40	68	15.46	6.97	47	10.68	4.77
		200	13.8	40	9.09	3.31	67	15.23	5.52	50	11.36	4.14	87	19.78	7.18	57	12.96	4.69
		250[3]	17.2	47	10.68	3.34	- - - -	- - - -	- - - -	56	12.73	4.01	- - - -	- - - -	- - - -	62	14.09	4.45
80	5.5	100	6.9	18	4.09	3.36	32	7.27	6.06	22	5.00	4.17	36	8.18	6.39	26	6.00	4.91
		150	10.3	34	7.72	3.82	51	11.59	5.73	41	9.31	4.59	61	13.86	6.88	41	9.31	4.59
		200	13.8	41	9.31	3.65	63	14.32	5.61	48	10.91	4.21	79	17.96	7.01	54	12.27	4.77
		250	17.2	45	10.23	3.36	- - - -	- - - -	- - - -	54	12.27	4.04	- - - -	- - - -	- - - -	60	13.64	4.48
100	6.9	125	8.6	19	4.32	3.28	32	7.27	5.47	24	5.45	4.10	38	8.64	6.02	28	6.36	4.65
		150	10.3	27	6.13	3.48	48	10.91	6.15	32	7.27	4.10	51	11.59	6.56	38	8.63	4.92
		200	13.8	39	8.86	3.75	67	15.23	6.34	48	10.91	4.61	73	16.59	6.92	51	11.59	4.90
		250	17.2	46	10.46	3.63	69	15.68	5.45	57	12.96	4.54	86	19.55	6.81	60	13.64	4.77
		300	20.7	55	12.50	3.77	- - - -	- - - -	- - - -	66	15.00	4.53	- - - -	- - - -	- - - -	68	15.46	4.72
125	8.6	150	10.3	21	4.77	3.37	29	6.59	4.81	24	5.45	3.85	35	7.95	5.77	25	5.68	4.09
		200	13.8	34	7.72	3.65	60	13.64	6.39	40	9.10	4.26	63	14.32	6.70	43	9.77	4.57
		250	17.2	44	10.00	3.73	66	15.00	5.59	55	12.50	4.66	82	18.64	6.99	57	12.96	4.90
		300	20.7	52	11.82	3.83	79	17.96	5.74	63	14.32	4.59	94	21.37	6.89	66	15.00	4.79
150	10.3	175	12.1	22	5.00	3.44	30	6.81	4.73	24	5.45	3.87	38	8.63	6.02	26	6.00	4.08
		200	13.8	27	6.13	3.33	54	12.27	6.67	30	6.81	3.67	54	12.27	6.67	35	7.95	4.33
		250	17.2	39	8.86	3.64	60	13.64	5.58	47	10.68	4.37	73	16.59	6.80	49	11.14	4.61
		300	20.7	50	11.36	3.91	75	17.05	5.87	60	13.64	4.70	91	20.68	7.05	63	14.32	4.89

1. To determine capacities for pressure-loaded Type 92C regulators, multiply the printed value by the appropriate value shown Table 7.
2. Capacities for outlet pressure settings lower than 50 psig / 3.4 bar are based on a 2 to 1 ratio of outlet pipe size to main valve body size.
3. 20 to 150 psig / 1.4 to 10.3 bar pilot control spring only (Red spring, 1E392727142).



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NOTES:
1. INLET PRESSURE IS NOTED ON EACH CURVE.
2. TO CONVERT FLOW TO Kg/h, MULTIPLY BY 0.4536.

Figure 6. *Typical Performance Curve for Pilot-Operated Regulator*

Table 7. *Capacity Factors for Pressure-Loaded Type 92C Regulators with 3 to 5 psi / 0.21 to 0.35 bar Droop*

MAIN VALVE SIZE, NPS / DN	ORIFICE SIZE		CAPACITY FACTOR FOR PRESSURE LOADED REGULATORS
	In.	mm	
1/2 / 15	9/16	14	0.50
3/4 / 20	9/16	14	0.65
	3/4	19	0.60
1 / 25	9/16	14	0.80
	3/4	19	0.75

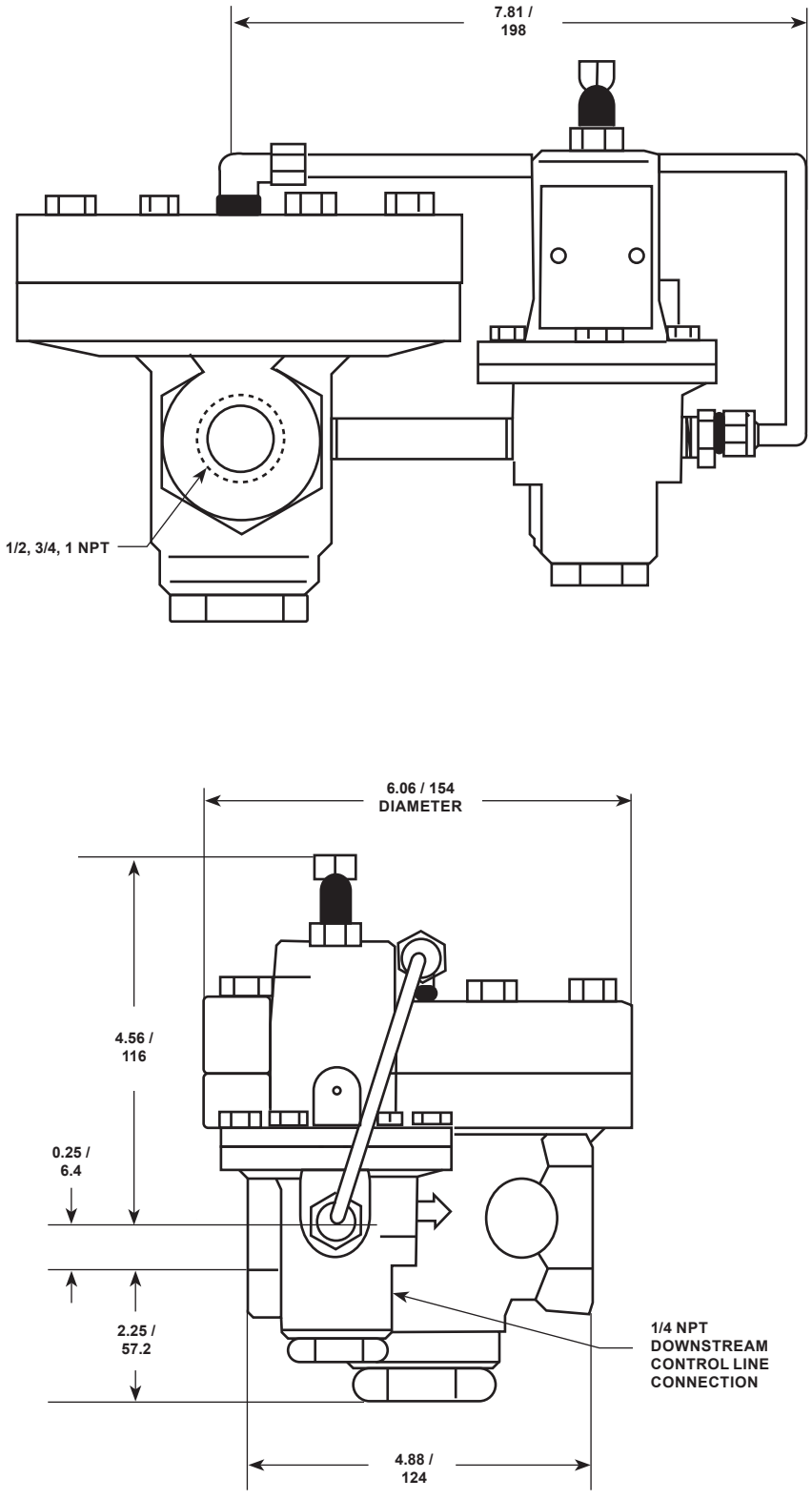

Figure 7. *Dimensions*

Ordering Information

When ordering, specify:

Application

1. Range of temperatures
2. Range of inlet pressures (maximum, normal, minimum)
3. Outlet pressure setting
4. Range of flow rates (maximum, normal, minimum controlled)
5. Body size
6. Alternate materials offered in Specification section.

Regulator

Refer to the Specifications section on pages 2 and 3. Review the descriptions to the right of each specification and indicate the desired choice wherever there is a selection to be made.

Be sure to specify the type of regulator desired (pilot-operated Type 92C regulator with Type 6392 pilot or pressure-loaded Type 92C regulator without pilot). Refer to separate bulletins for information on loading regulators for use with pressure-loaded Type 92C regulators.

Ordering Guide

Type (Select One)

☐ Type 92C Pilot-operated

☐ Type 92C Pressure loaded

☐ Type 92C with Safety Override Pilot

Body Size (Select One)

☐ NPS 1/2 / DN 15***

☐ NPS 3/4 / DN 20***

☐ NPS 1 / DN 25***

Body Material and End Connection Style (Select One)

Cast iron

☐ NPT***

WCC Steel

☐ NPT***

☐ CL150 RF**

☐ CL300 RF**

☐ PN 16/25/40*

Stainless steel

☐ NPT**

☐ CL150 RF**

☐ CL300 RF**

☐ PN 16/25/40*

Orifice Size (Select One)

☐ 9/16 in. / 14 mm***

☐ 3/4 in. / 19 mm (not available for NPS 1/2 / DN 15 body size)***

Seat Construction (Select One)

☐ 416 Stainless steel metal seat***

☐ Ethylenepropylene (EPR) seat**

Gaskets (Select One)

☐ Composition (up to 500°F / 260°C)***

☐ Graphite (over 500°F /260°C)**

Tubing and Fittings (Select One)

☐ Copper tubing and brass fittings***

☐ Stainless steel tubing and fittings**

Outlet Pressure Range (Select One)

Standard Spring

☐ 5 to 70 psig / 0.34 to 4.8 bar***

☐ 20 to 150 psig / 1.4 to 10.3 bar***

Spring for Use Over 500°F / 260°C

☐ 15 to 100 psig / 1.0 to 6.9 bar***

☐ 80 to 250 psig / 5.5 to 17.2 bar***

- continued -

Ordering Guide (continued)

Override Pilot Spring Ranges (if applicable) (Select One)

Type 6492HM

☐ 10 to 30 psig / 0.69 to 2.1 bar

☐ 25 to 75 psig / 1.7 to 5.2 bar

☐ 70 to 150 psig / 4.83 to 10.3 bar

Type 6492HTM

☐ 15 to 100 psig / 1.0 to 6.9 bar

☐ 80 to 250 psig / 5.5 to 17.2 bar

Pressure Loading Supply (Optional)

☐ Yes (Type 670 panel loader)**

Main Valve Replacement Parts Kit (Optional)

☐ Yes, send one replacement parts kit to match this order.

Pilot Replacement Parts Kit (Optional)

☐ Yes, send one replacement parts kit to match this order.

Regulators Quick Order Guide	
* * *	Standard - Readily Available for Shipment
* *	Non-Standard - Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

Steam Specification Worksheet

Application: _____

Tag Number: _____

Valve Type: ☐Direct-Operated ☐Pilot-Operated ☐Pressure loaded ☐Differential

Body Material: ☐Steel ☐Iron ☐Stainless steel

Inlet/Outlet End Connection Style:
☐NPT ☐CL150 RF Flange
☐CL250 RF Flange ☐CL300 RF Flange
☐CL600 RF Flange ☐PN 16/25/40

Inlet/Outlet Pipe Size: _____ Inches (mm)

Steam Conditions:

	Maximum	Normal	Minimum
Inlet Pressure (psig/bar)			
Inlet Temperature (°F/°C)			
Outlet Pressure (psig/bar)			
Flow (lbs/h or kg/h)			

Performance Required:

Accuracy Requirements: ☐ ≤10% ☐ ≤20% ☐ ≤30% ☐ ≤40%

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