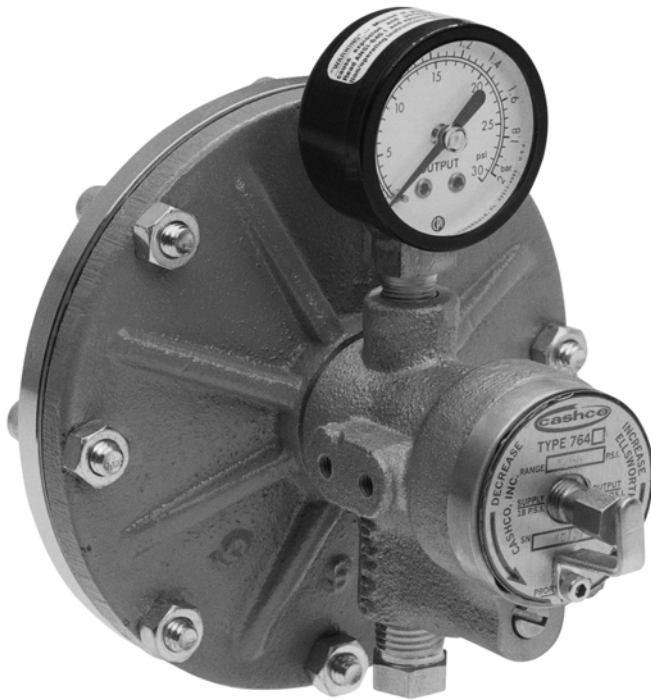




# MODEL 764P / PD

## PRESSURE CONTROLLERS



Model 764P

The Models 764P and 764PD are pneumatic pressure controllers. They measure the controlled or differential pressure and develop an output signal that varies linearly with changes in the controlled pressure. The 764P controls pressure between 30" Hg vacuum and 2500 psig (760 mm Hg Vac. and 172.4 Barg) using six ranges. The 764PD variation controls differential pressures between 1 and 150 psid (.07 and 10.3 Bard) using three ranges.

### FEATURES

- Adjustments:** Proportional band and setpoint.
- Diaphragm Seals:** Available for corrosive fluids.
- Field Reversible:** Easily changed from direct acting to reverse acting.
- Small Size:** Easily supported at process piping connection.
- Gauge:** 1-1/2" (38 mm) output signal gauge.

### APPLICATIONS

Suitable for use on air, inert gases, liquids and steam applications.

## SPECIFICATIONS

**Control Ranges: Model 764P**  
 2"-30" Hg Vac. (50-760 mm Hg Vac.)  
 1-30 psig (.07-2.1 Barg)  
 20-100 psig (1.4-6.9 Barg)  
 50-150 psig (3.5-10.3 Barg)  
 90-500 psig (6.2-34.5 Barg)  
 450-2500 psig (31.0-172.4 Barg)

**Model 764PD**  
 1-30 psid (.07-2.1 Bard)  
 20-100 psid (1.4-6.9 Bard)  
 50-150 psid (3.5-10.3 Bard)

**Sensing Diaphragm:** Beryllium copper, ASTM B194.  
 Alloy 25 – half hard is standard.  
  
 316 SST wetted parts – uses a 316 SST cover, or covers, on the beryllium copper diaphragm.

**Vent Screen:** Brass, 1/8" NPT (764P only).

**Diaphragm Casing Materials:**

Cast iron – ASTM A126, Class B.  
 316 SST – ASTM A479.

The non-pressurized lower diaphragm case of the 764P is cast iron on all units, except the 2500 psig (172 Barg) units use steel.

For process fluid wetted parts, see Table 1 for Model 764P. See Table 2 for Model 764PD.

**Maximum Static Pressure:**

See Tables 1 and 2.

**Ambient Temperature Range:**

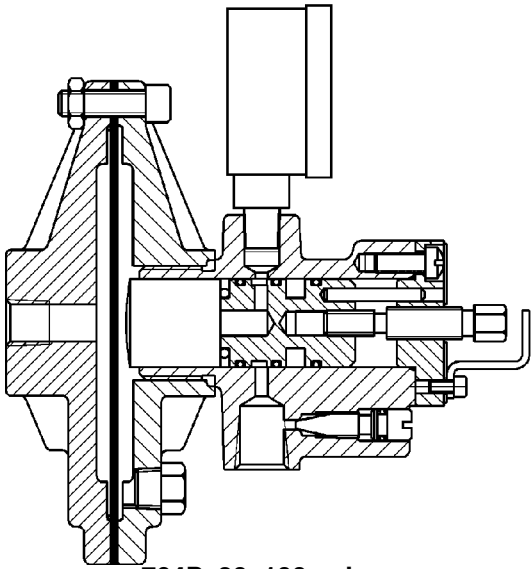
-20° to +180°F (-28.5° to +82.5°C).  
 Steam service requires a pigtail siphon in the sensing line to keep the diaphragm's O-ring seal cool.

**Control Housing Sub-Assembly:**

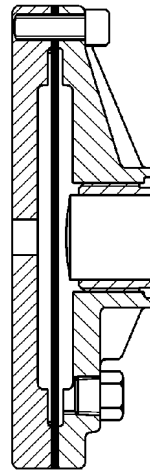
Brass housing, Buna-N O-ring seals, SST adjusting screws, etc.

Figure 1

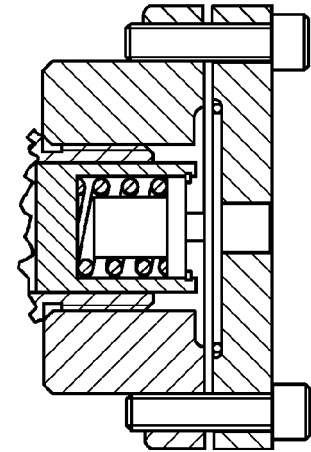
MODEL 764P



764P 20-100 psig  
 (2"-30" Hg Vac.,  
 1-30 psig and 50-150 psig are similar)



Diaphragm  
 Sub-Assembly  
 for 90-500 psig



Diaphragm Sub-Assembly  
 for 450-2500 psig

TABLE 1  
 MODEL 764P PROCESS FLUID WETTED PARTS

Pressure Range "Hg Vac./psig (mm Hg Vac./Barg)	Diaphragm	Diaphragm Case	O-Ring Seal	Max. Static Pressure	
				psig	(Barg)
2"-30" (50-760 mm) 1-30 (.07-2.1)	Beryllium Copper	Cast Iron	Buna-N	250	(17.2)
	316 SST Cover	316 SST	TFE	250	(17.2)
20-100 (1.4-6.9) 50-150 (3.5-10.3)	Beryllium Copper	Cast Iron	Buna-N	300	(20.7)
	316 SST Cover	316 SST	TFE	300	(20.7)
90-500 (6.2-34.5) 450-2500 (31.0-172.4)	316 SST Cover	316 SST	TFE	750	(51.7)
	316 SST Cover	316 SST	TFE	3000	(207)

**Output Signal:** 3–15 psig (0.2–1.03 Barg).  
6–30 psig (0.4–2.1 Barg).

**Supply Pressure:** 18–20 psig (1.2–1.4 Barg) for 3-15 psig output; 32–35 psig (2.2–2.4 Barg) for 6-30 psig output.

**Output Signal Gauge:** 0–30 psig (0–2.1 Barg) range for 3–15 psig output signal; 0–60 psig (0–4.1 Barg) for 6–30 psig output signal.

**Diaphragm Casing Connections:** 764P and 764PD – Upper case (center) – 1/4" NPT, lower case – 1/8" NPT.

**Supply and Output Signal Connections:** 1/4" NPT female pipe connections.

**Sensitivity:** Better than 0.05% of sensing diaphragm span.

**Repeatability:** ±0.2% of sensing diaphragm span.

**Sensing Diaphragm Span:**

Pressure Range		Span
"HgVac/psig (mm HgVac/Barg)		psig (Barg)
2"–30"	(50–760mm)	30 (2.1)
1–30	(.07–2.1)	30 (2.1)
20–100	(1.4–6.9)	100 (6.9)
50–150	(3.5–10.3)	100 (6.9)
90–500	(6.2–34.5)	500 (34.5)
450–2500	(31.0–172.4)	2500 (172.4)

**Proportional Band:**

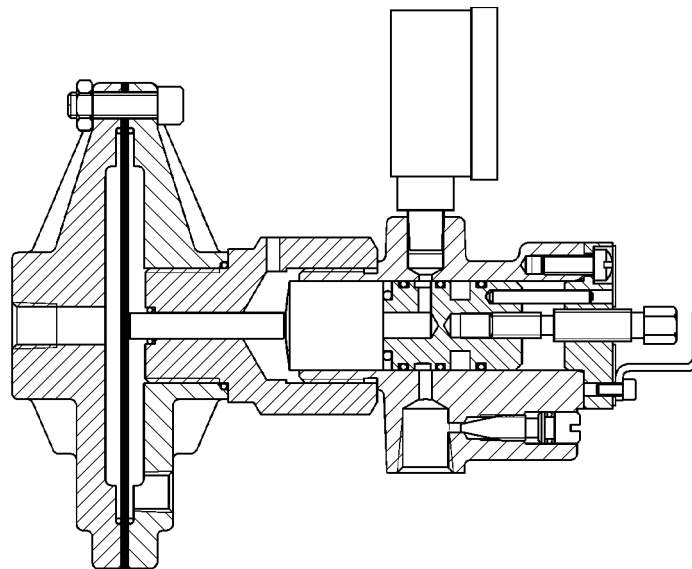
Adjustable 3–20% of sensing diaphragm span with 18–20 psig (1.2–1.4 Barg) supply. Proportional band doubles for 6-30 psig (0.4-2.1 Barg) output signal with 35 psig (2.4 Barg) supply pressure.

**Steady State Air Consumption:**

Output Signal					
3-15 psig (0.2-1.03 Barg)			6-30 psig (0.4-2.1 Barg)		
Flow Rate *		Prop. Band %	Flow Rate *		Prop. Band %
SCFH	(M <sup>3</sup> /Hr)		SCFH	(M <sup>3</sup> /Hr)	
4.2	(0.12)	3	4.2	0.12	6
50	(1.41)	20	80	2.27	40

\* Mid-span at proper supply pressure.

**Figure 2**  
**MODEL 764PD**



**TABLE 2**  
**MODEL 764PD PROCESS FLUID WETTED PARTS**

Differential Pressure Range	Diaphragm	Diaphragm Cases	Diaphragm Case Adapter & Pusher Post	O-Ring Seals	Max. Static Pressure
"Hg Vac/psid (mm Hg Vac/Bard)					psid (Bard)
1–30 (.07–2.1)	Beryllium Copper	Cast Iron	316 SST	Buna-N & FC Elast	250 (17.2)
20–100 (1.4–6.9)	Beryllium Copper	Cast Iron	316 SST	Buna-N & FC Elast	300 (20.7)
50–150 (3.5–10.3)	Beryllium Copper	Cast Iron	316 SST	Buna-N & FC Elast	300 (20.7)
1–30 (.07–2.1)	316 SST Cover	316 SST	316 SST	TFE & FC Elast	250 (17.2)
20–100 (1.4–6.9)	316 SST Cover	316 SST	316 SST	TFE & FC Elast	300 (20.7)
50–150 (3.5–10.3)	316 SST Cover	316 SST	316 SST	TFE & FC Elast	300 (20.7)

FC Elast = Fluorocarbon Elastomer

## OPTIONS

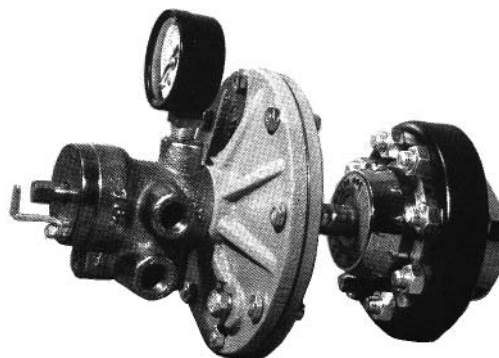
**Option -23:** Bracket Mounting. Utilizes a steel bracket with two steel machine screws for mounting the 764 controller to the actuator of a control valve or a fixed structural appendage.

**Option -29:** Tapped Connection. 1/4" NPT female connection on center of diaphragm case. **NOTE: This feature has been updated and is now included with standard construction.**

**Option -75:** Diaphragm Seals. An Ashcroft Type 300 diaphragm seal is available with the 764P to protect the sensing diaphragm from corrosive fluid attack. The diaphragm seal is close mounted to the 764P with a 1/4" steel pipe nipple. The lower housing process connection is 1/2" female NPT. (See Ashcroft Bulletin DS-1 for complete technical information.)

### Materials

Upper Housing: Steel.  
 Lower Housing: 316SST, Carpenter 20, Monel 400 or Hastelloy C.  
 Clamps & Bolts: Steel.  
 Diaphragm Seal: TFE or Fluorocarbon Elastomer.  
 Fill Liquid: Glycerine, Silicone or Halocarbon.



**Figure 3**  
764P-75 with Diaphragm Seal

**TABLE 3**  
**DIAPHRAGM SEAL –**  
**PROCESS PRESSURE/TEMPERATURE**

Diaphragm Seal Mat'l.	Fill Liquid	Pressure psig (Barg)	Temperature °F (°C)
TFE	Glyc.	2500 (172.4)	0–+400 (-17 to +204.8)
	Sil.		-40–+400 (-40 to +204.8)
	H.C.		-40–+300 (-40 to +149.2)
Fluorocarbon Elastomer	Glyc.	500 (34.5)	0–+400 (-17 to +204.8)
	Sil.		-40–+400 (-40 to +204.8)
	H.C.		-40–+300 (-40 to +149.2)

## ACCESSORIES

**Volume Booster:** 1:1 ratio for improving the stroking speed of diaphragm motor valves when no positioner is used. Incorporates a stabilizing bypass needle valve between input and output (Moore Products – Model 61H).

**Air Filter Regulator:** Model 5100P is nipple mounted to the supply port with a 1/4" NPT brass nipple. A 1-1/2" (38 mm) supply pressure gauge is included.

**Mounting on a Control Valve:** Factory mounted, using a bracket and impolene tubing, on the Ranger, Premier, Model 987, Model 964, Model 988 and Model 2266 valves with or without positioners. The 764P/PD can be pipe nipple mounted on the same valve actuator casings listed above when used without positioners.

## PRINCIPLE OF OPERATION

The 764 controllers employ laminar flow to produce the 3–15 psig (nominal 0.2–1.0 Barg) output signal. Laminar flow eliminates the need for range springs, levers, pivots and other parts that produce friction and lost motion.

The sensing diaphragm in the 764P and 764PD, has a high spring rate and any change in the sensed pressure produces a minute diaphragm movement which strokes the sensor plate. The sensor plate, in turn, throttles the flow of instrument air through the sensor to develop the 3–15 psig (0.2–1.0 Barg) output signal.

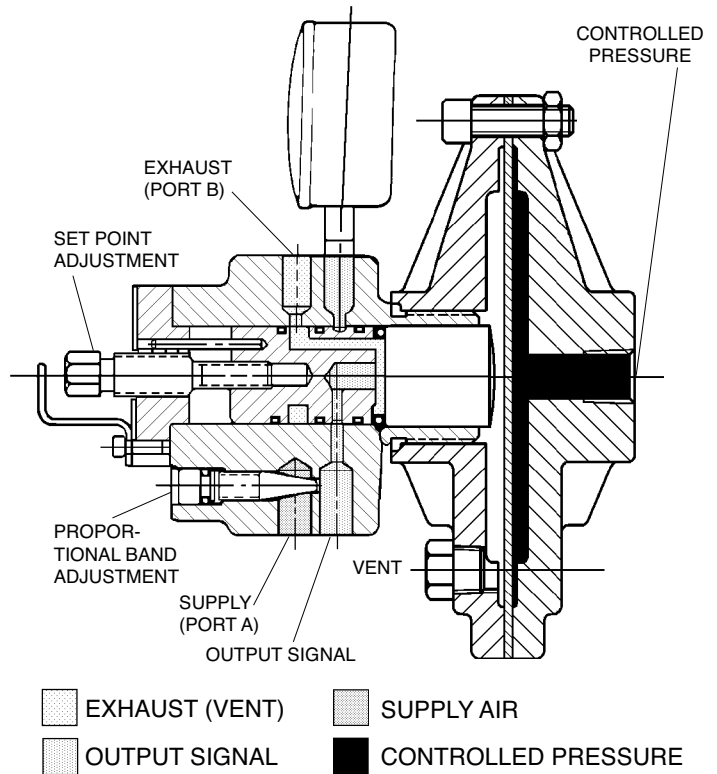
On direct acting controllers (see Figure 4) the supply air enters PORT A and passes through the proportional band restriction. With an increase in the controlled pressure the flow through the sensor is reduced which increases the output signal. The proportional band restriction regulates the flow rate of supply air into Port A. PORT B is the exhaust port.

On reverse acting controllers (see Figure 5) the supply enters PORT B (not Port A). With an increase in the controlled pressure the supply air flowing through the sensor decreases, which reduces the output signal. The proportional band restriction regulates the flow of exhaust through Port A.

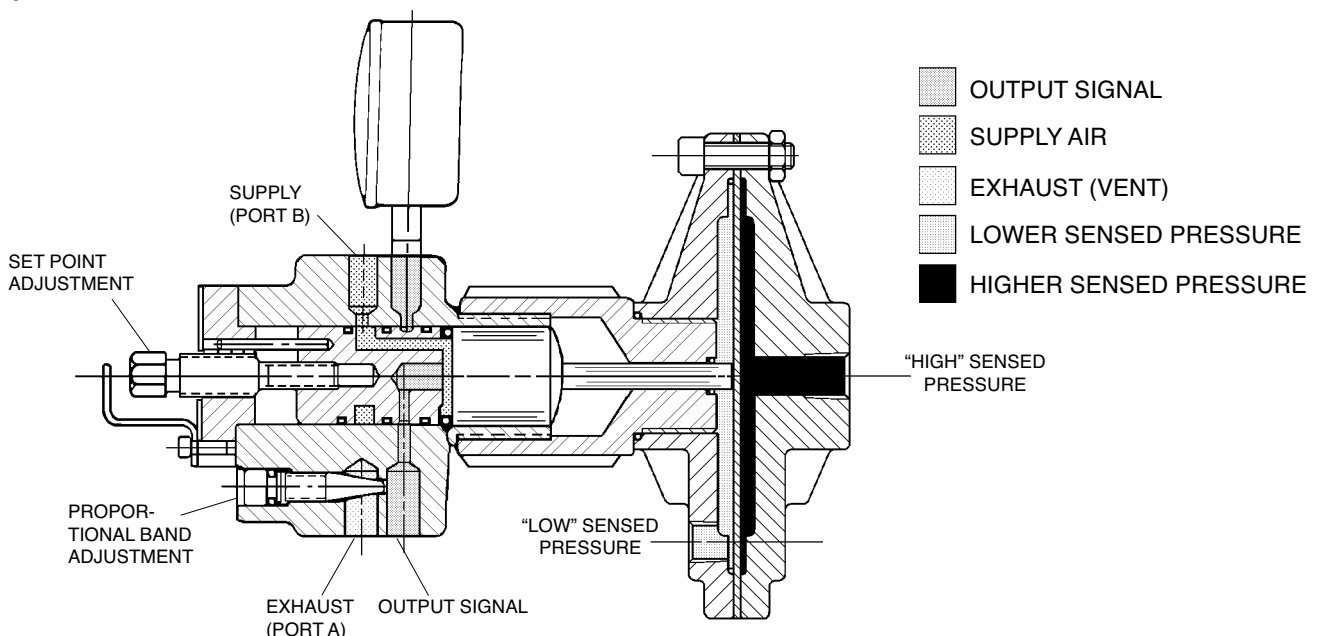
Closing the proportional band adjusting screw reduces the proportional band. Opening the screw increases the proportional band.

The set point adjustment positions the sensor so the diaphragm must deflect its maximum for its highest controlled pressure and hardly deflects for the lowest controlled pressure.

Using a 764P/PD controller to produce a 6–30 psig (0.4–2.1 Barg) output signal operates similarly, but at higher air consumption levels.

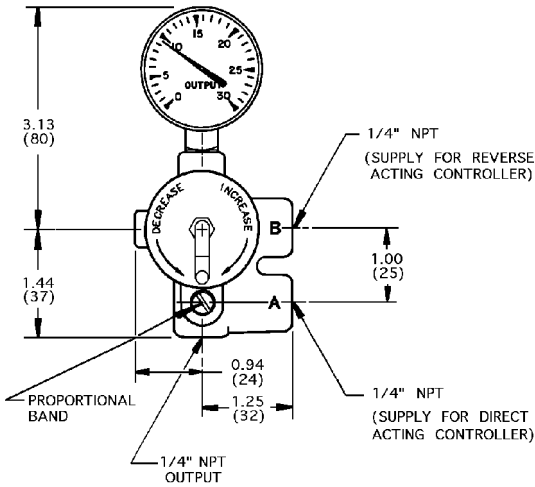


**Figure 4**  
Direct Action 764P

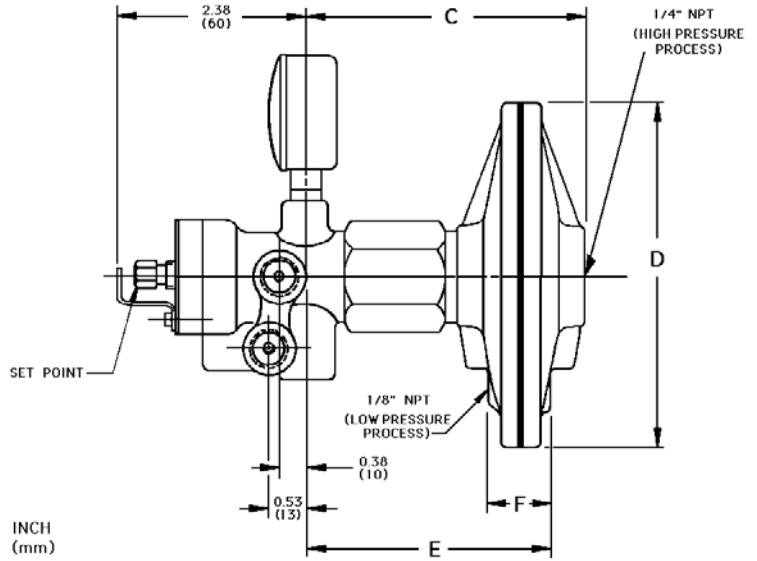


**Figure 5**  
Reverse Action 764PD

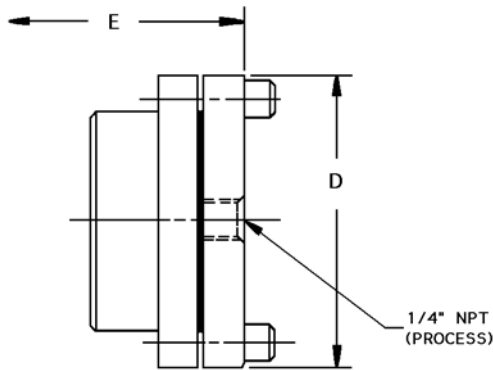
## DIMENSIONS & WEIGHTS



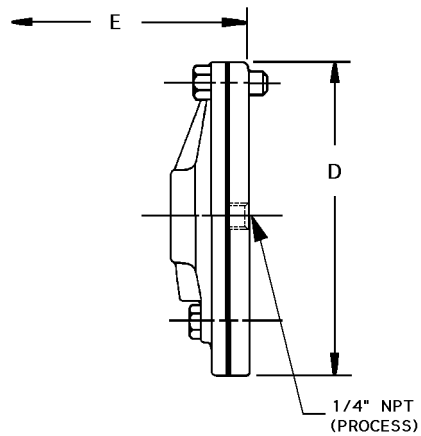
**764P and 764PD**



**REPRESENTATIVE OF 764PD WITH CI CASE**  
(764P Similar)



**REPRESENTATIVE OF 764P**  
450–2500 psig



**764P - SST CASE**

DIMENSION	764P								764PD			
	CI Case		SST Case		SST Case		SST Case		CI Case		SST Case	
	2–30" Hg Vac 1–30, 20–100, 50–150 psig		2–30" Hg Vac 1–30, 20–100, 50–150 psig		90–500 psig		450–2500 psig		1–30, 20–100, 50–150 psid		1–30, 20–100, 50–150 psid	
	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
C	2.28	58	NA	NA	NA	NA	NA	NA	3.72	94	NA	NA
D	4.75	121	4.75	121	3.75	95	3	76	4.75	121	4.75	121
E	1.84	47	1.75	44	1.75	44	2.03	52	3.28	83	3.19	81
F	NA	NA	NA	NA	NA	NA	NA	NA	.88	22	.69	17
<b>WEIGHT</b>	5.25 lbs. 2.38 kg.								5.93 lbs. 2.69 kg.			

The diaphragm casing assembly screws onto the pilot housing assembly and the 1/8" NPT tapped hole for the 764PD "Low" process connection will probably be located at positions other than shown in these views.

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## NOTES

# PRODUCT CODE

08/23/04

Const. Design	(Wetted)	Materials	Applic. Ranges	CODE
764P	Standard	CI Casing BeCu Diaph.	30" Vac. thru 150 psig	A
	316 SST	SST Casing 316 SST Diaph.	30" Vac. thru 500 psig	B
		SST Casing 316 SST Diaph.	450 thru 2500 psig	C
764PD	Standard	CI Casing BeCu Diaph	All	A
	316 SST	SST Casing 316 SST Diaph.	All	D

764P			
Process Connection	Applicable Press. Range	Opt.	CODE
Std. - 1/4" NPT, Center of Upper Diaph Casing	All	Std.	A
1" Tri-Clamp (Sanitary)	0-30, 20-100, 50-150	-37 *	S
764PD			
Std. - 1/4" NPT, Center of Upper Diaph Casing	All	Std.	2

Special Construction	CODE
	X
Description	CODE
No Airset *	0
5100P Airset (Filter Regulator) 0-30 psig range (w/gauge)	A
5100P Airset (Filter Regulator) 0-60 psig range (w/gauge)	B

Signal Output	CODE
3-15 psig	1
* Variable Output	2
6-30 psig	3

\* Used with 1000HP "Accelerator"

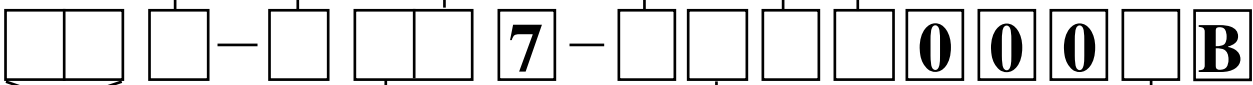
Special Cleaned per #S1134 (-55 Opt.)	CODE
No	0
Yes (Wetted Parts Only)	1

Valve Mounting	CODE
None	0
Pipe Nipple Mounted <sup>1</sup> (Models 2266, 988 & 964 only)	1
764P/PD + Airset <sup>2</sup> 764P (Shared Airset)	9

<sup>1</sup> Shipped loose; must be interconnected in the field.  
<sup>2</sup> Use of a "9" code requires that a "99 Coder" sheet be completed.

When ordering a valve per one of Cashco's special drawings, the code "X" and the 5-digit number following override all other options. Otherwise, proceed with the following.

**Model 764P/PD Pressure Controllers**



Description	CODE
Model "764P" Pneumatic Controller	CA
Model "764PD" Pneu. Press. Diff. Controller	CC

Painting	CODE
Standard	0
Epoxy Paint 764P/PD	1
Epoxy Paint 764P/PD + Accessories	2

Pressure Range	Applicable Wetted Construction	CODE
764P		
2" to 30" Vac.	All	1
1-30 psig	All	2
20-100 psig	All	3
50-150 psig	All	4
90-500 psig	316 SST	5
450-2500 psig	316 SST	6
764PD		
1-30 psid	All	A
20-100 psid	All	B
50-150 psid	All	C

None		CODE			
		0			
Teflon Diaphragm Seal					
Fill Liquid	Applic. Ranges (psig)	Diaph. Seal Lower Housing Material			
		316 SST	Carp. 20	Mon. 400	Hast. C.
		CODE	CODE	CODE	CODE
Glycerin	1-2500	1	4	7	A
Silicone	1-2500	2	5	8	B
Halocarbon	1-2500	3	6	9	C
Fluorocarbon Elastomer Diaphragm Seal					
Fill Liquid	Applic. Ranges (psig)	Diaph. Seal Lower Housing Material			
		316 SST	Carp. 20	Mon. 400	Hast. C.
		CODE	CODE	CODE	CODE
Glycerin	1-500	D	G	K	N
Silicone	1-500	E	H	L	P
Halocarbon	1-500	F	J	M	R