

**TECHNICAL BULLETIN** 

# **MODEL 764P/PD** PRESSURE CONTROLLERS

# **OVERVIEW**

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<br/>setpoint.DiaphragmAvailable for corrosive
- Seals: fluids.
  Field Fasily changed from dir
- FieldEasily changed from directReversible: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.



## END CONNECTIONS 1/4" (DN8) NPT



COMMON APPLICATIONS

AIR, INERT GASES, LIQUIDS, STEAM



## **DESIGN PRESSURE**

764P CONTROLS PRESSURE BETWEEN 30" Hg VACUUM AND 2500 psig (760 mm Hg Vac. and 172.4 Barg)

764PD CONTROLS DIFFERENTIAL PRESSURES BETWEEN 1-150 psig (0.07-10.3 Barg)

#### **SPECIFICATIONS**



Pressure Range		Dianhragm	Diaphragm	O Bing Sool	Max. Static Pressure		
"Hg Vac./psig	(mm Hg Vac./Barg)	Diaphragm	Case	O-Ring Sear	psig	(Barg)	
2"-30" Hg Vac.	(50–760mm Hg Vac)	Beryllium Copper	Ductile Iron	Buna-N	050	(17.2)	
or 1 -30	or (.07-2.1)	316 SST Cover	316 SST	TFE	250		
20 – 100 or	(1.4 – 6.9) or	Beryllium Copper	Ductile Iron	Buna-N	200	(20.7)	
50 – 150	(3.5 – 10.3)	316 SST Cover	316 SST	TFE	300	(20.7)	
90 – 500	(6.2 – 34.5)	316 SST Cover	316 SST	TFE	750	(51.7)	
450 - 2500	(31.0 - 172.4)	316 SST Cover	316 SST	TFE	2750	(190)	

Control Housing Sub-Assembly:	Brass housing, Buna-N O-ring seals, SST adjusting screws, etc.
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 dia- phragm span.
Repeatability: Sensing	±0.2% of sensing diaphragm span.

Press	S	pan	
"HgVac/ psig	(mm HgVac Barg)	psig	(Barg)
2" – 30"Hg	(50 – 760mm Hg)	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

Diaphragm Span:

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)					2.1 Barg)	
Flow	Rate *	Prop.	Flow	Prop.		
SCFH	(M <sup>3</sup> /Hr)	Band %	SCFH	(M <sup>3</sup> /Hr)	Band %	
4.2	(0.12)	3	4.2	0.12	6	
50	(1.41)	20	80	2.27	40	

\* Mid-span at proper supply pressure.



TABLE 2MODEL 764PD PROCESS FLUID WETTED PARTS

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

FKM = Fluorocarbon Elastomer

Figure 2 MODEL 764PD

**OPTIONS** 

- Option -29: <u>Tapped Connection</u>. 1/4" NPT female connection on center of diaphragm case. NOTE: This feature has been updated and is now included with standard construction.
- Option-37: <u>Sanitary Pressure Controller.</u> See Bulletin 764P-37-TB for technical specifications.
- Option -55: <u>SPECIAL CLEANING</u>. Cleaned and packaged per Cashco Specifications #S-1134. Process side only. Suitable for oxygen service. Not available for Opt. -37.
- 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 process connection on the diaphragm seal 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 Fluorocar-
	bon Elastomer.
Fill Liquid:	Glycerine, Silicone
	or Halocarbon.



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

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

Diaphragm	Fill	Pressure		Temperature		
Seal Mat'l.	Liquid	psig	(Barg)	°F	(°C)	
	Glyc.		(172.4)	0-+400	(-17 to +204.8)	
TFE	Sil.	2500		-40 - +400	(-40 to +204.8)	
	H.C.			-40 - +300	(-40 to +149.2)	
	Glyc.		(34.5)	0-+400	(-17 to +204.8)	
Fluorocarbon	Sil.	500		-40 - +400	(-40 to +204.8)	
Elastonion	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 5200P Airset can be mounted to a control valve actuator. A 1-1/2" (38 mm) supply pressure gauge is included.

#### 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 bank 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.

SUPPLY

EXHAUST

(PORT A)

OUTPUT SIGNAL

SET POINT ADJUSTMENT

PROPORTIONA

ADJUSTMENT

BAND

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 5 Reverse Action 764PD

### **DIMENSIONS & WEIGHTS**



(764P Similar)







764P - SST CASE

	764P								764PD			
	Iron	Case	SST	Case	SST	Case	se SST Case		Iron Case		SST	Case
DIMENSION	2–30"   1–30, 2 50–15	Hg Vac 20–100, 0 psig	2–30"   1–30, 2 50–15	Hg Vac 20–100, 0 psig	90–50	0 psig	450–25	00 psig	1–30, 2 50–15	20–100, 0 psid	1–30, 2 50–15	0–100, 0 psid
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
С	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
WEIGHT		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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#### **MODELS 764P / PD PRODUCT CODER** 02/07/20

POS 1 & 2

POS 5

POS

3









<b>POSITIONS 1 &amp; 2 - MODEL TYPE</b>				
Description	CODE			
Model "764P" Pneumatic Controller *	CA			
Model "764PD" Pneu. Press. Diff. Controller	сс			
* Use Code "CA" for Opt-37 (Ref to 764P-37-TB for Specifications)				

POSITION 6 - CONTROL RANGES					
Pressure Range	CODE				
	764P				
2" to 30" Hg 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	Α			
20-100 psid	All	В			
50-150 psid	All	С			
* Only Selections for	or Opt-37. See Position	ı 10.			

#### **POSITION 3 - OUTPUT** Signal Output CODE 3-15 psig 1 \* Variable Output 2 6-30 psig 3 \* Used with 1000HP "Accelerator"

**POSITION 7 - SPECIAL CLEAN** 

Special Clean per Spec #S1134 Opt.-55

No

Yes - SST Casing 764P (Process Side Only) 764PD (High Process Side Only)

Not available for Opt-37

<b>POSITION 5 - MATERIALS</b>							
Const. Design	(Wetted) Casing	Diaphragm Material	Applic. Ranges	CODE			
	Ductile Iron	Be Cu	30" Vac. thru 150 psig	А			
764P	010 CCT	Be Cu with 316 SST Cover	30" Vac. thru 500 psig	в*			
	316 551	Be Cu with 316 SST Cover	450 thru 2500 psig	с			
76400	764PD Ductile Iron BeCu Diaph 316 SST Be Cu with 316 SST Cover		All	А			
704FD			All	D			
* Ohere de	Material O	lesting (second 07					

Standard Material Selection for Opt-37

POSITION 10 - CONNECTIONS						
	764P					
Process Connection	Process Applicable Opt. Connection Press. Range					
Std 1/4" NPT, Center of Upper Diaph Casing	All	Std.	А			
1" Tri-Clamp 0-30, 20-100, (Sanitary) 50-150		-37 *	s			
764PD						
Std 1/4" NPT, Center of Upper Diaph Casing	All	Std.	2			
* Special Cleaned per #S-1576.						

POSITION 11 - DIAPHRAGM SEAL FOR 764P ONLY (OPT-75)					
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	А
Silicone	1-2500	2	5	8	в
Halocarbon	1-2500	3	6	9	с
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	к	N
Silicone	1-500	E	н	L	Р
Halocarbon	1-500	F	J	М	R

#### POSITION 12 - AIRSET \* CODE Description No Airset 0 5200P Airset (Filter Regulator) Α 0-30 psig range (w/gauge) 5200P Airset (Filter Regulator) в 0-60 psig range (w/gauge) For Special Construction Contact х Cashco for Special Code \* Choose "0" when 764P or 764PD Controller and Airset are ordered with a Control Valve.

CODE

0

1

\* For information on ATEX see pages 13 & 14 on the IOM.

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