



**1-6921 SERIES
CONTROL
VALVES**

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1-6921 SERIES CONTROL VALVES



The line of PARCOL 1-6921 series control valves provides the most versatile globe body type single seat available with solid plug and plug stem with heavy top guiding construction. They are particularly designed to solve special control problems related to process fluids which cannot stagnate inside the valve body and in particular into the bonnet section where possible sediments can cause corrosion, packing leaking and plug stem seizing. Typical applications: food and pharmaceutical industry (sterilized plants), urea, nitrates and similar plants.

1-6921 SERIES CONTROL VALVES

PARTICULAR FEATURES		ADVANTAGES
Body design	<ul style="list-style-type: none"> — large free-flow passages with smooth body contour — no dead zones inside the body 	<ul style="list-style-type: none"> — higher CV values — reduced erosion and contamination effects (sediments or scales) — high intrinsic ruggedness of casting
Solid plug and stem construction	<ul style="list-style-type: none"> — no dead zones inside the bonnet as the plug stem acts as the plug post 	<ul style="list-style-type: none"> — controlled fluid cannot stagnate into the bonnet — packing design which completely fills the packing box chamber without dead zones
	<ul style="list-style-type: none"> — higher stem diameter (1) — no screwed coupling between plug and stem 	<ul style="list-style-type: none"> — better alignment between plug and stem — increased plug rigidity and more efficient packing tightness — in some cases it is possible to obtain a partial plug balancing with top entry
Packing box chamber built into the valve body	<ul style="list-style-type: none"> — the distance between packing and valve body axis is very reduced — fluid temperature in contact with packing is the same existing inside the valve body 	<ul style="list-style-type: none"> — dead zones inside the bonnet are avoided — solidification of fluid inside the packing box is prevented

(1) For a good control a positioner shall be used, mainly with ANSI 600 rating

SPECIFICATIONS

BODY

- type : globe, single port and non reversible
- construction : from casting
- materials : from stock: ASTM A 216 WCB and ASTM A 351 CF8M on request; ASTM A 352 LCB, Cr Mo steel, ASTM A 351 CF8, ASTM A 351 CF3M and special stainless steel for urea service
- dimensions : 1", 1.1/2", 2", 3", 4", 6" - 1/2", 3/4" on request
- connections : - 3/4"–2" screwed ends ANSI B2.1
- socket weld ends up to 2"
- buttweld ends according to ANSI B16.25
- flanged ends according to UNI, ANSI and DIN norms
- ratings : - carbon or alloy steel-screwed or socket weld ends PN 10/ANSI 600
- carbon or alloy steel-flanges or buttweld ends PN 10/ANSI 150 through PN 100/ANSI 600
- steam jacket: carbon or stainless steel bodies may be supplied with jacket; standard rating PN 16 ANSI 150; higher ratings available on request
- flow direction: under the plug (bottom entry). The flow over the plug (top entry) is allowed only for material sub-classes 3/4/9/15/16

BONNET

- joint : stud bolted
- type : standard and plain for special services
- materials : the same as the bodies but rolled, forged or fabricated
- packing box: see fig. 2
- packing : solid pure teflon V-rings, compression adjustable or split-rings of braided graphited teflon yarn

PLUG

- construction: one piece with plug stem
- sizes : full or reduced as for CV table
- form : micro-flute for sizes up 1/4" and contoured for larger ones
- characteristic: linear, equal percentage or quick opening for all sizes
- guiding : top and part for micro-flute type and only top for contoured one
- materials : refer to «TRIM MATERIALS» table Standard construction AISI 316 with or without stellite coatings

SEAT RING

- type : screwed into the body
- materials : refer to «TRIM MATERIALS» table
- leakage : standard class IV according to IEC 534-4 (ANSI B16.104); class V on request

PACKING TYPES AND TEMPERATURE LIMITATIONS (1)

TYPE OF PACKING	DESCRIPTION	TEMPERATURE LIMITS °C	
		STANDARD BONNET (2)	PLAIN BONNET (3)
VTC	Solid glass loaded teflon V-rings, compression adjustable	-10 ÷ +170	-100 ÷ +270
TFG	Split-rings of braided graphited teflon yarn	-10 ÷ +200	-100 ÷ +300
GRF	Solid rings of pure graphite	-10 ÷ +600	-100 ÷ +600

- (1) Fluid temperature at valve inlet
- (2) Values given for continuous service and with all types of fluids
- (3) Values suitable for continuous gas service

FLOW COEFFICIENTS Cv - Flow under the plug

DN in.	Port in.	Seat diam. mm	Stroke mm	Plug type (1)	THROTTLING PLUG - EXPONENTIAL CHARACTERISTIC (2) (3)											Disk Max Cv 100%
					Max Cv 100%	travel %										
						90%	80%	70%	60%	50%	40%	30%	20%	10%	5%	
1	1	23	17	C	12.9	9.9	6.6	4.0	2.6	1.74	1.14	0.75	0.50	0.33	0.26	14.5
	3/4	19	17	C	10.4	7.8	5.1	3.0	2.0	1.35	0.90	0.60	0.40	0.27	0.22	11.3
	1/2	15	17	C	5.5	4.0	2.7	1.85	1.27	0.87	0.59	0.41	0.28	0.19	0.16	7.5
	3/8	12	17	C	2.7	1.88	1.31	0.92	0.64	0.45	0.31	0.22	0.15	0.11	0.09	4.8
	1/4	12	17	F	1.25	0.89	0.64	0.46	0.33	0.23	0.17	0.12	0.09	0.06	0.05	--
	3/16	10	17	F	0.60	0.45	0.34	0.26	0.19	0.14	0.11	0.08	0.06	0.05	0.04	--
	1/8	8	17	F	0.30	0.23	0.18	0.14	0.11	0.08	0.06	0.05	0.04	0.03	0.03	--
1.1/2	1.1/2	35	25	C	29	21	14.2	8.7	5.7	3.6	2.4	1.52	0.98	0.63	0.52	33
	1.1/4	28	25	C	22	15.8	10.2	6.1	4.0	2.6	1.67	1.09	0.70	0.45	0.36	25
	1	23	25	C	15.1	10.3	6.6	4.4	2.9	1.86	1.21	0.78	0.51	0.33	0.26	18
2	2	45	25	C	46	37	26	16.1	9.5	6.3	4.1	2.7	1.77	1.15	0.91	53
	1.1/2	35	25	C	33	25	17.3	10.8	7.3	5.0	3.4	2.3	1.55	1.06	0.82	38
	1.1/4	28	25	C	24	16.5	10.4	6.2	4.0	2.6	1.69	1.09	0.71	0.46	0.36	26
3	3	72	34	C	110	87	63	42	28	18.9	12.7	8.5	5.7	3.9	1.64	130
	2.1/2	60	34	C	88	68	46	27	15.1	9.4	5.9	3.7	2.3	1.37	1.13	105
	2	45	34	C	58	42	27	16.7	10.7	6.9	4.4	2.8	1.82	1.17	0.93	67
4	4	86	45	C	187	158	127	95	71	50	32	19.0	9.6	4.0	2.7	200
	3	72	45	C	138	107	72	40	22	13.8	8.6	5.3	3.3	2.1	1.70	148
	2.1/2	60	45	C	107	78	48	26	15.9	9.8	6.1	3.7	2.3	1.44	1.07	117
6	6	130	60	C	388	334	271	201	151	105	68	40	20	8.0	5.1	440
	5	110	60	C	312	264	211	158	119	83	55	32	16.1	6.5	4.0	354
	4	86	60	C	232	188	142	110	82	57	37	22	11.0	4.3	2.7	264

- (1) C = contoured, F = flatted
- (2) Rangeability can be calculated as Cv (100%) / Cv (5%)
- (3) For linear characteristic interpolate between Cv (5%) and Cv (100%) of the corresponding exponential plug. Linear characteristic is available up to 3" port.

F_L AND x_T COEFFICIENTS - FLOW UNDER THE PLUG

DN in.	Port in.	travel 100%		travel 10 %			
		F _L	x _T	EXPONENTIAL		LINEAR	
				F _L	x _T	F _L	x _T
1	1	0.90	0.61	0.97	0.90	0.97	0.88
	3/4	0.89	0.61	0.97	0.90	0.97	0.87
	1/2	0.90	0.65	0.97	0.89	0.97	0.87
	3/8	0.92	0.67	0.97	0.89	0.97	0.88
	1/4	0.90	0.66	0.98	0.90	0.97	0.88
	3/16	0.93	0.69	0.98	0.89	0.97	0.88
	1/8	0.94	0.70	0.98	0.89	0.97	0.88
1.1/2	1.1/2	0.90	0.61	0.97	0.90	0.97	0.88
	1.1/4	0.89	0.62	0.97	0.90	0.97	0.87
	1	0.89	0.63	0.97	0.90	0.97	0.88
2	2	0.90	0.61	0.97	0.90	0.97	0.88
	1.1/2	0.89	0.62	0.97	0.89	0.96	0.87
	1.1/4	0.88	0.62	0.97	0.90	0.97	0.88
3	3	0.91	0.62	0.97	0.89	0.97	0.88
	2.1/2	0.90	0.63	0.97	0.90	0.97	0.88
	2	0.89	0.63	0.97	0.90	0.97	0.88
4	4	0.90	0.60	0.97	0.90	--	--
	3	0.89	0.62	0.97	0.90	0.97	0.88
	2.1/2	0.89	0.63	0.97	0.90	0.97	0.88
6	6	0.90	0.61	0.97	0.90	--	--
	5	0.90	0.63	0.97	0.90	--	--
	4	0.88	0.62	0.97	0.90	--	--

MAX ALLOWABLE Δp - bar (1) (2) (3)

Size in.	Port in.	Stem diam. mm	Seat diam. mm	Travel mm	DIAPHRAGM CATEGORY 1			DIAPHRAGM CATEGORY 2			DIAPHRAGM CATEGORY 3			CYLINDER					
					390	450	600	390	450	600	390	450	600	160	200	300	450		
					1	1	16	23	17	21			52			100			
3/4	19	31				77					100								
1/2	15	50				100					100								
3/8	12	80				100					100								
1/4	12	80				100					100								
3/16	10	100				100					100								
1/8	8	100				100					100								
1.1/2	1.1/2	19	35	25	6.9	13		21	34		63	97		23	39				
	1.1/4		28		11	21		34	54		99	100		36	62				
	1		23		17	31		50	80		100	100		54	92				
2	2	19	45	25	4	7.7		13	20		38	58		13	24				
	1.1/2		35		6.9	13		21	34		63	97		23	39				
	1.1/4		28		11	21		34	54		99	100		36	62				
3	3	25.4	72	34		2.3	5.9		7.7	14		22	40		8.7	23			
	2.1/2		60			3.5	8.6		11	21		32	57		12	33			
	2		45			6.5	15		20	37		58	100		23	59			
4	4	34.9	86	45			3.3			9.4		27		5.3	15				
	3		72			4.9			14		39		7.8	22					
	2.1/2		60			7.3			20		57		11	32					
6	6	41.3	130	60			1.1			3.9		12		6.5	15				
	5		110			1.7			5.5		16		9.1	21					
	4		86			2.9			9.2		27		15	35					

- (1) The above max differentials were calculated with valve closed and downstream atmospheric pressure
- (2) The values were limited to 100 bar and the actual body rating could be more limiting
- (3) The max differentials are valid for the seat leakage class IV and for all packing types

MULTIPLYING COEFFICIENTS OF MAX ΔP

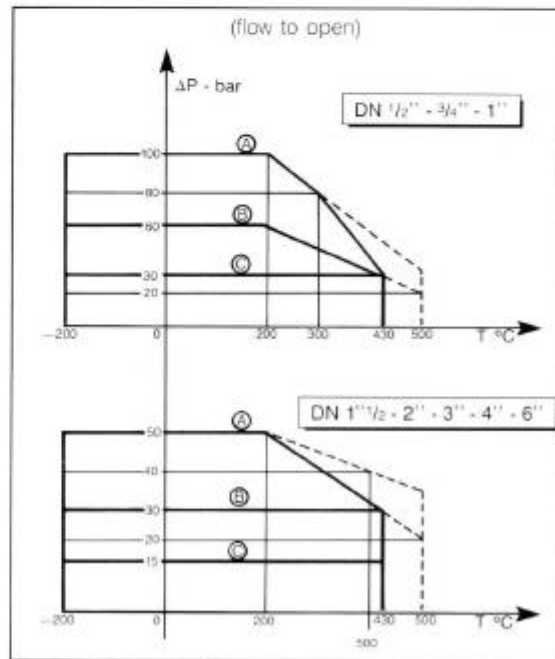
DIAPHRAGM ACTUATOR	CATEGORY 1			CATEGORY 2				CATEGORY 3		
Flow action	TO OPEN			TO OPEN				TO OPEN		
Air action	TO OPEN	TO CLOSE		TO OPEN		TO CLOSE		TO OPEN	TO CLOSE	
Supply (psi)	20	20	35	20	35	20	40	35	35	35
Spring range (psi)	3-15	3-15	6-30	9-15	6-30	3-9	6-30	15-30	18-30	3-15
Coefficient	1	1	1	1.5	1	1.5	1.33	1	1.2 (★)	1.2

(★) Only for type 600 with travel ≤60 mm

CYLINDER ACTUATOR	SINGLE ACTION							DOUBLE ACTION	
	AIR TO OPEN			AIR TO CLOSE					
Supply (bar)	3.5	4	4.5	5	3.5	4	Pa	15	Pa
Spring range (bar)	1.5-3	2-3.5	2.5-4	3-4.5	0.5-2	1-2.5	P ₁ -P ₂	—	—
Coefficient	1	1.33	1.66	2	1	1	★	1	★★

★ Coefficient = (Pa - P₂) / 1.5
 ★★ Coefficient = Pa / 1.5

PRESSURE/TEMPERATURE CAPABILITIES



- Ⓐ - CLOSED VALVE - ALL FLUIDS
- Ⓑ - OPEN VALVE - COMPRESSIBLE FLUIDS
- Ⓒ - OPEN VALVE - INCOMPRESSIBLE FLUIDS

NOTE — The above curves account only for the plug stability and the tightness of seat ring-to-body coupling
 — They are independent from materials ratings and actuators performance
 — The dotted lines refer to welded seat ring assembly

Item	Description
1	BODY
2	BONNET
3	STUD
4	NUT
5	PLUG
6	SEAT
8	GASKET
9	GUIDE BUSHING
17	PACKING FLANGE
23	STUD
24	NUT
27	PACKING

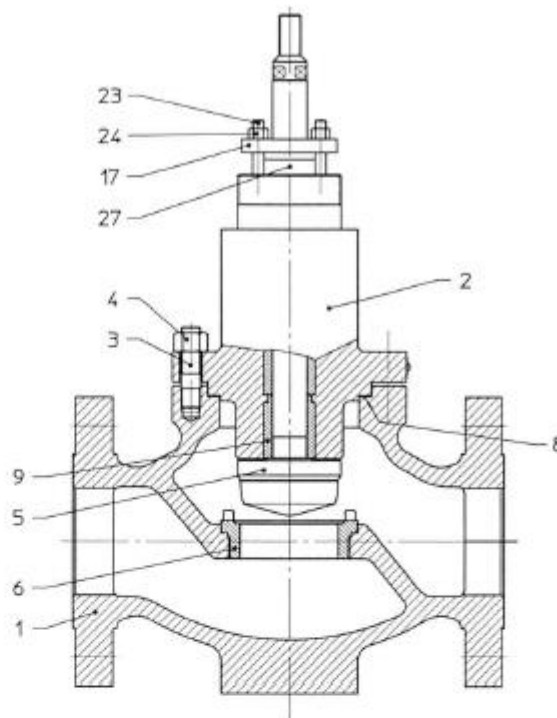


Fig. 1

Item	Q.ty	Description	Material
252	1	FOLLOWER	AISI 316 + TEFLON
263	1	UPPER PACKING RING	GLASS LOADED TEFLON
264	8	PACKING RING	GLASS LOADED TEFLON
265	1	LOWER PACKING RING	GLASS LOADED TEFLON
266	1	BUSHING	GLASS LOADED TEFLON
267	1	BUSHING	GLASS LOADED TEFLON

Item	Q.ty	Description	Material
252	1	FOLLOWER	AISI 316
255	3	PACKING RING	GRAPHITE
266	1	BUSHING	AISI 316
274	6	INTERMEDIATE RING	GRAPHITE

Item	Q.ty	Description	Material
252	1	FOLLOWER	AISI 316 + TEFLON
254	7	PACKING RING	GRAPHITED TEFLON
266	1	BUSHING	GLASS LOADED TEFLON
267	1	BUSHING	GLASS LOADED TEFLON

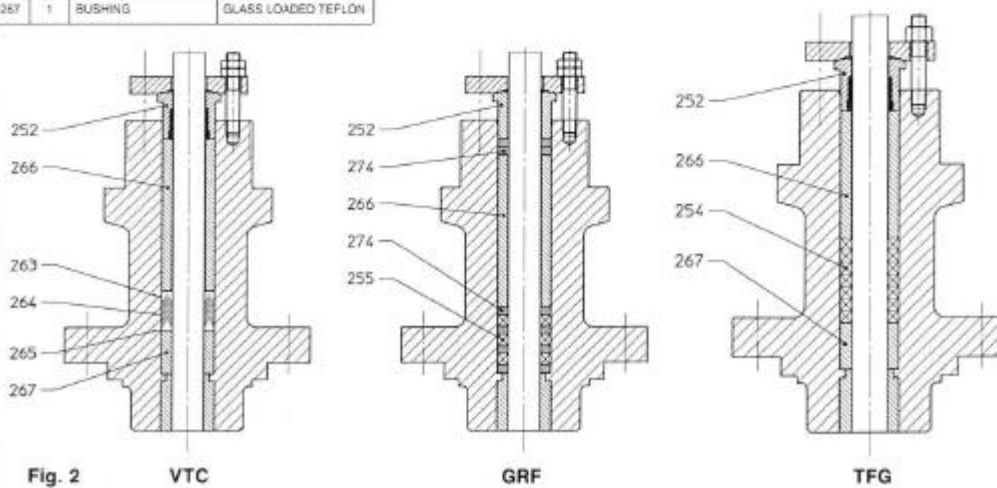


Fig. 2

MATERIAL CLASSES

BASIC CLASS	Item	Name	A	F	G	H
	1	BODY	A 216 WCB	A 352 LCB	AISI 316	AISI 316L
	2	BONNET	A 105	AISI 316	AISI 316	AISI 316L
	3	STUD	A 193 B7	AISI 304		
	4	NUT	A 194 4	AISI 304		
	5	PLUG AND STEM ASSEMBLY	SEE SUB-CLASS			
	6	SEAT	SEE SUB-CLASS			
	8	GASKET	SYNTHETIC COMPOUND (2)			
	9	GUIDE BUSHING	SEE SUB-CLASS			
	17	PACKING FLANGE	AISI 304			AISI 316L
	23	STUD	AISI 304			AISI 316L
	24	NUT	AISI 304			
	27	PACKING	SEE FIG. 2			

SUB-CLASS	Item	5		6	9
	Name	Plug	Stem	Seat	Guide bushing
	01	AISI 316	AISI 316	AISI 316	AISI 416
	02	AISI 316 seat joint stellite		AISI 316 stellite	
	04	AISI 316 fully stellite	AISI 316 stellite	AISI 316 fully stellite	
	09	17-4-PH H900	17-4-PH H900	17-4-PH H900	
	10	AISI 316	AISI 316 (1)	AISI 316	S 21800
	11	AISI 316 seat joint stellite		AISI 316 stellite	
	12	AISI 316 fully stellite		AISI 316 fully stellite	
	13	MONEL K 500	MONEL K 400	MONEL K 500	
	14	AISI 316L	AISI 316L	AISI 316L	HASTELLOY C276
	16	HVD1 (3)	HVD1 (3)	HVD1 (3)	HVD1 (3)

Basic class	Materials classes availability								Size	
	Sub-class									
	01	02-04	09	10	11-12	13	14	16		
A	A 216 WCB	-30 + 340	-30 + 340	-30 + 430			-30 + 430		1/2" - 3" 4" - 8"	
		-30 + 150	-30 + 150							
F	A 352 LCB				-45 + 340	-45 + 340	-45 + 340		1/2" - 3" 4" - 8"	
					-45 + 150	-45 + 150				
G	AISI 316				-200 + 400	-200 + 450	-200 + 340 -200 + 150	-200 + 300	1/2" - 3" 4" - 8"	
H	AISI 316L							-200 + 300	-30 + 200 -30 + 100	1/2" - 3" 4" - 8"
Usual application		STD application			Compatibility with NACE standards			For Urea service		

(1) Stem in 17-4-PH H1150 for NACE standards

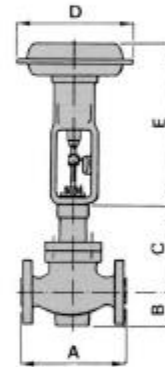
(2) Armoured graphite over 300°C and for rating over PN 100, ANSI 600

(3) Ni Cr Mo hardened Stainless steel, corrosion resistant to urea compounds.

OVERALL DIMENSIONS - mm

SIZE in.	FACE-TO-FACE A										
	Screwed	FLANGED						BUTT-WELDING ENDS (BW)			SOCKET-WELDING ENDS (SW)
		ANSI 600	ANSI 150 RF	ANSI 150 RJ	ANSI 300 RF	ANSI 300 RJ	ANSI 600 RF	ANSI 600 RJ	ANSI 150	ANSI 300	ANSI 600
1	210	184	197	197	210	210	210	210	210	210	210
1.1/2	251	222	235	235	248	251	251	251	251	251	251
2	286	254	267	267	283	286	289	286	286	286	286
3	—	298	311	318	334	337	340	337	337	337	—
4	—	352	365	368	384	394	397	394	394	394	—
6	—	451	464	473	489	508	511	473	473	508	—

SIZE in.	DIMENSION B						DIMENSION C	
	FLANGED			BUTT-WELDING AND SOCKET-WELDING ENDS			PLAIN BONNET	EXTENDED BONNET
	ANSI 150	ANSI 300	ANSI 600	ANSI 150	ANSI 300	ANSI 600	ANSI 150 ÷ 600	ANSI 150 ÷ 600
1	65	65	73	65	65	65	155	230
1.1/2	82	82	89	82	82	89	191	291
2	87	87	102	87	87	102	192	292
3	110	110	120	92	92	92	229	347
4	132	132	142	107	107	107	259	377
6	167	170	185	167	170	185	305	445



MASS OF BODIES - kg

SIZE in.	PLAIN BONNET			EXTENDED BONNET		
	ANSI 150	ANSI 300	ANSI 600	ANSI 150	ANSI 300	ANSI 600
1	12	12	17	15	15	20
1.1/2	23	24	30	26	27	33
2	29	30	43	34	35	48
3	50	60	70	56	66	76
4	75	95	110	82	102	117
6	120	130	150	130	140	160

- The mass is referred to ANSI body flanged with full size port.
- To obtain the total valve mass add actuator mass.
- ANSI 150 dimensions also apply to PN 10, 16
- ANSI 300 dimensions also apply to PN 25, 40
- ANSI 600 dimensions also apply to PN 64, 100
- Tolerances on face-to-face "A" ± 1.5 mm.

DIAPHRAGM ACTUATORS

TYPE	D	E		MASS - kg	
		DIRECT	REVERSE	DIRECT	REVERSE
310	325	410	495	16	19
390	400	510	660	29	39
450	480	585	750	48	63
600	630	755	955	100	130
600MM	630	870	1070	110	140