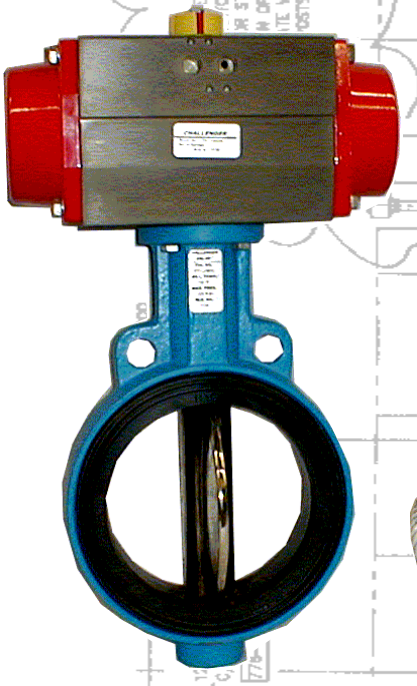
Challenger Valve

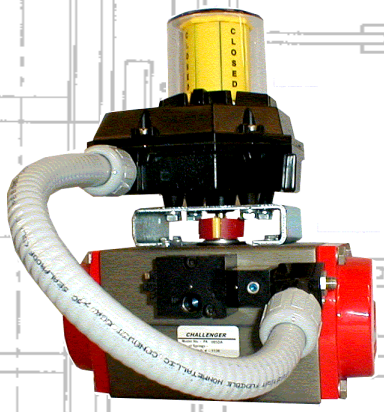
CHALLENGER

PNEUMATIC ACTUATORS & ACCESSORIES

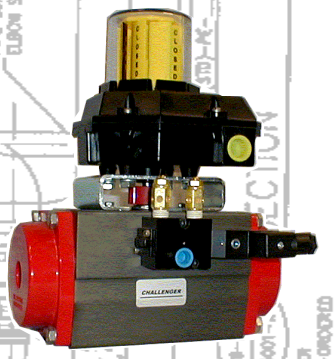


Series “P” Direct Mount Actuator

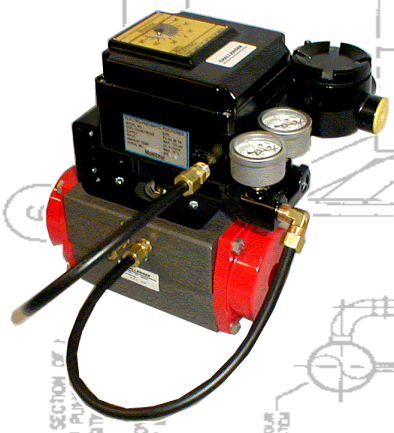
Universal Drive System



V.P.T. & Solenoid Pre-Wired

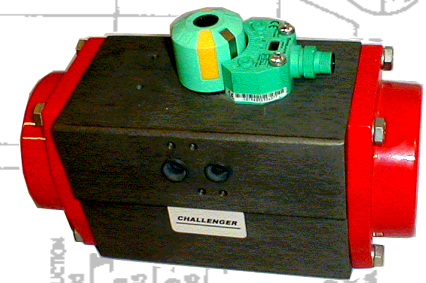


V.P.T., Solenoid & Open/Close Speed Controls



Electro Pneumatic Positioner

Bulletin No. PA-100



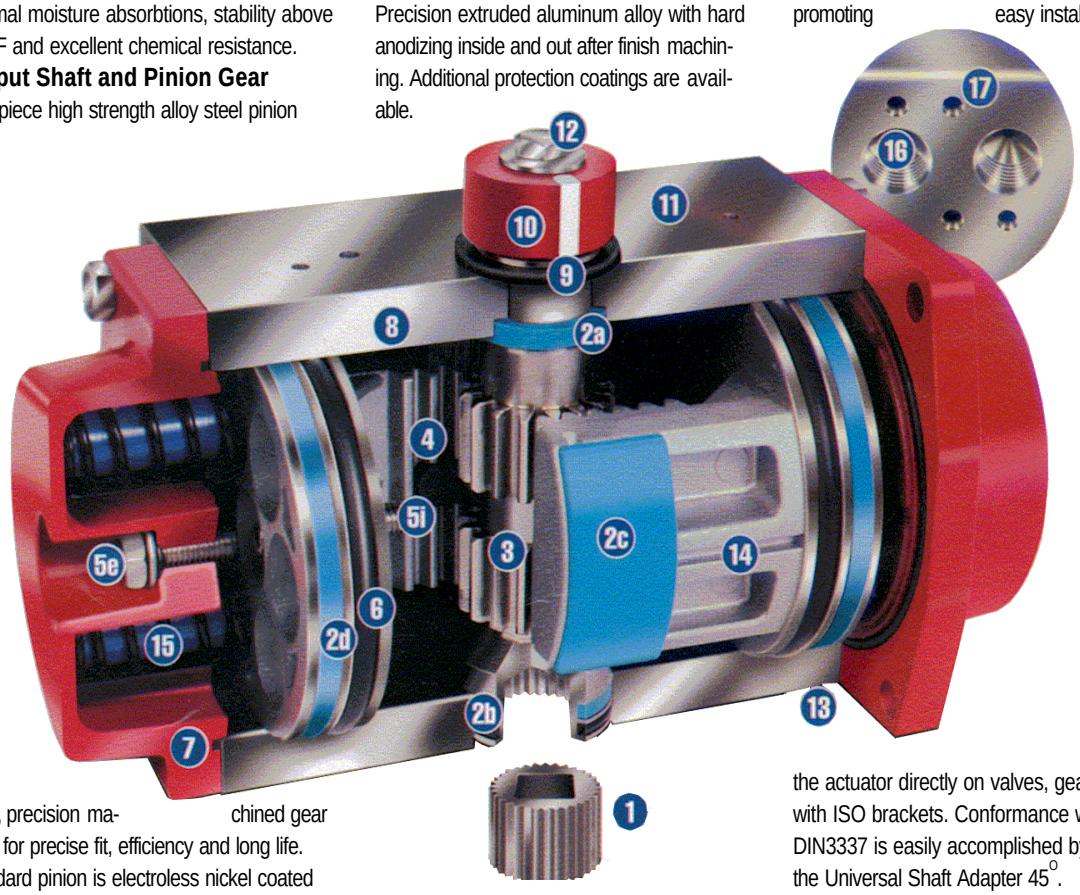
Scout V.P.T.

Challenger Valve

Bulletin No. PA-101

DESIGN FEATURES

1. **Unique Universal Shaft Adapter**
   Precision replaceable insert including variable internal geometry configuration meets any custom requirement. Standard insert is high strength FLN-4205. Optional stainless steel insert available.
2. **Bearings**
   Replaceable top (2a), bottom (2b), body (2c) and piston (2d) are manufactured of nylon 4-6. Benefits include low coefficient of friction, minimal moisture absorbtions, stability above 400°F and excellent chemical resistance.
3. **Output Shaft and Pinion Gear**
   One piece high strength alloy steel pinion shaft, precision machined gear teeth for precise fit, efficiency and long life. Standard pinion is electroless nickel coated for corrosion protection and is blow-out proof. Optional stainless steel pinion shaft available.
4. **Piston Guides**
   Piston guides maintain optimum piston position and prevent pinion shaft blowouts.
5. **Travel Stops**
   Provides for + or - 4 degrees travel adjustment in both directions, internal (5i) and external (5e).
6. **Piston Seals**
   Replaceable pressure containment seals of permanently lubricated Nitrile. Also available in Viton or other compounds for extreme temperature operation.
7. **Die Cast Aluminum End Caps**
   Same end cap serves double acting and spring return models. Cast in spring pockets allow standard double acting actuator conversion to spring return by simply adding unique preloaded spring cartridges. Polyester powder coat is standard with additional protections available.
8. **Extruded Aluminum Body**
   Precision extruded aluminum alloy with hard anodizing inside and out after finish machining. Additional protection coatings are available.

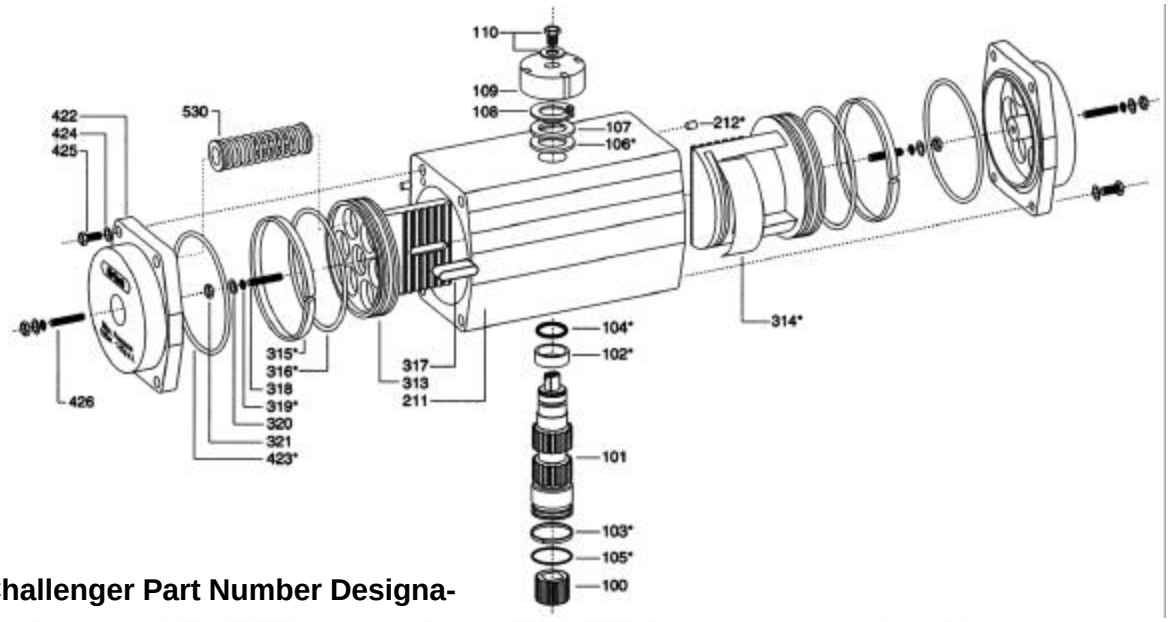


9. **Thrust Washers**
   Double thrust washers of 45% glass reinforced, heat stabilized PPA backed by stainless steel provides extra protection against vertical thrust.
10. **Position Indicator**
    Unique position indicator can be indexed to show alternate position. Plastic indicator inserts can be replaced with metal or magnetic targets for use with various proximity sensors.
11. **Accessory Mounting**
    Manufactured in accordance with international specification VDI/VDE 3845 NAMUR to provide standardized drilled and tapped standard mounting for accessories such as positioners and limit switches.
12. **NAMUR Slotted Shaft**
    In accordance with the international standard to provide a self centring positive drive for positioners and switches.
13. **Actuator Mounting**
    Manufactured in accordance with ISO 5211 promoting easy installation of the actuator directly on valves, gearboxes or with ISO brackets. Conformance with DIN3337 is easily accomplished by rotating the Universal Shaft Adapter 45°.
14. **Die Cast Pistons**
    Precision die cast pistons are multiguided through full face engagement with the pinion and piston guide. Full depth machined piston teeth provide engagement with minimum backlash.
15. **Pre-loaded Spring Cartridges**
    Converts a standard double acting actuator to a spring return actuator by simply removing end caps and adding the unique spring cartridges.
16. **Internal Porting**
    Large internal ports enhance quick operation

Challenger Valve

Bulletin No. PA-102

CONSTRUCTION AND OPERATION



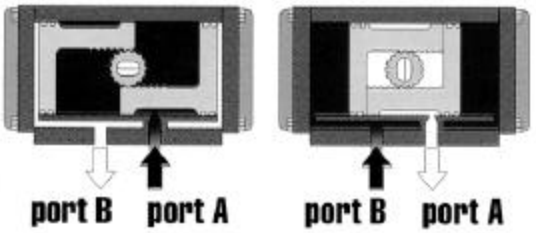
Challenger Part Number Designa-

Part #	Unit Qty.	Part Description	Material	Specifications	Optional Materials	Protection
100	1	Universal shaft adapter	Sintered metal	FLN-4205-40	Stainless Steel	
101	1	Drive shaft	Steel alloy	AISI 1144	Stainless Steel	Nickel plated
102*	1	Bearing (pinion top)	Nylon 46			
103*	1	Bearing (pinion bottom)	Nylon 46			
104*	1	'O' ring (pinion top)	Nitrile (NBR)		For extreme temperature	
105*	1	'O' ring (pinion bottom)	Nitrile (NBR)		For extreme temperature	
106*	1	Thrust bearing (pinion)	Polyphthalamide (PPA)			
107	1	Thrust washer (pinion)	Stainless steel	AISI 304		
108	1	Spring clip (pinion)	High alloy spring steel			Nickel plated
109••	1	Position indicator	Polyamide			
110••	1	Cap screw/washer	Stainless steel	18-8		
211	1	Body	Extruded aluminum alloy	ASTM 6063 T6		A, B, C, D, E, F
212*	2	Plug (transfer port)	Nitrile (NBR)		For extreme temperature	
313	2	Piston	Aluminum	ASTM B179-DIN 1725/5,		
314*	2	Bearing (piston back)	Nylon 46			
315*	2	Bearing (piston head)	Nylon 46			
316*	2	'O' ring (piston head)	Nitrile (NBR)		For extreme temperature	
317	2	Piston guide	Polyphthalamide (PPA)			
318	2	Screw (int. stroke adj.)	Stainless steel	18-8		
319*	4	'O' ring (screw seal)	Nitrile (NBR)		For extreme temperature	
320	4	Washer (seal)	Stainless steel	AISI 304		
321	4	Nut (stop adjustment)	Stainless steel	18-8		
422	2	End caps	Aluminum alloy	ASTM B179-DIN 1725/5		C, D, E, F
423*	2	'O' ring (end cap)	Nitrile (NBR)		For extreme temperature	
424	8	Washer (cap screw)	Stainless steel	18-8		
425	8	Cap screw (end cap)	Stainless steel	18-8		
426	2	Screw (ext. stroke adj.)	Stainless steel	18-8		
530	12 (max)	Spring (cartridge)	High alloy spring steel			Polyester powder coating

NOTES: (1) *Suggested spare parts for maintenance. (2) •• Optional. (3) Model PA270 Part No. 424 and 425 unit quantity is 12 pieces.

DIAGRAM 3

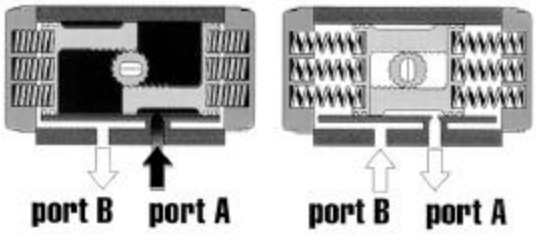
Double-Acting (TOP VIEW)



Air supplied to port A forces pistons apart and toward end positions with exhaust air exiting at port B. (A CCW rotation is obtained.)

Air supplied to port B forces pistons toward center with exhaust air exiting at port A. (A CW rotation is obtained.)

Spring Return (TOP VIEW)



Air supplied to port A forces pistons apart and toward end position compressing springs. Exhaust air exits at port B. (A CCW rotation is obtained.)

Air or electric failure allows springs to force pistons toward center position with exhaust air exiting at port A. (A CW rotation is obtained.)

TORQUE CHARTS

Double Acting Torque Ratings (lb.-in.)

Actuator Model	Air Supply in P.S.I. 20	60	80	100	120
PA050DA	72	108	144	180	216
PA063DA	130	194	259	324	389
PA075DA	274	411	548	685	822
PA085DA	416	623	831	1039	1247
PA100DA	650	975	1300	1625	1950

Actuator Model	Air Supply in P.S.I. 40	60	80	100	120
PA115DA	1075	1613	2151	2689	3226
PA125DA	1409	2114	2819	3524	4228
PA160DA	2771	4155	5548	6929	8310
PA200DA	5198	7797	10396	12995	15594
PA270DA	12631	18946	25261	31577	37892

Spring Return Torque Ratings (lb.-in.)

Actuator Model	Springs Per Piston	Air Supply in P.S.I. 40 Start	40 End	60 Start	60 End	80 Start	80 End	100 Start	100 End	120 Start	120 End	Spring Stroke Start	Spring Stroke End
PA050SR	2	52	45	86	77	125	116	160	151	194	186	30	21
	3	42	32	75	62	115	103	149	137	183	171	44	32
	4			64	48	105	90	139	122	172	156	58	43
	5					95	77	128	108	161	140	74	53
	6					85	64	117	93	150	125	89	64
PA063SR	2	96	79	157	137	225	208	287	269	350	330	54	35
	3	80	55	138	110	209	183	269	242	331	303	81	53
	4			120	82	193	159	252	216	313	276	107	71
	5					177	134	235	190	295	247	135	89
	6					160	109	218	163	276	220	161	106
PA075SR	2	208	165	337	288	482	439	614	568	747	699	118	72
	3	174	111	299	227	448	385	578	510	709	638	177	108
	4			262	167	415	330	542	452	673	577	236	144
	5					382	276	507	393	635	516	296	180
	6					349	222	472	336	598	455	355	216
PA085SR	2	319	247	515	434	736	664	937	860	1141	1059	185	106
	3	270	163	460	339	687	579	885	770	1086	964	277	159
	4			406	244	638	495	833	678	1031	869	369	212
	5					589	409	780	588	976	774	461	266
	6					540	326	728	497	915	677	553	319
PA100SR	2	491	392	796	685	1138	1039	1454	1349	1774	1654	280	171
	3	412	264	707	541	1058	911	1369	1212	1684	1510	419	258
	4			618	396	985	789	1282	1072	1593	1373	558	344
	5					903	659	1203	933	1501	1227	697	430
	6					822	529	1116	799	1410	1080	836	516
PA115SR	2	795	639	1300	1121	1871	1709	2389	2214	2902	2728	473	303
	3	657	419	1144	874	1733	1489	2240	1979	2746	2481	712	453
	4			979	628	1595	1277	2084	1744	2590	2234	947	604
	5					1448	1058	1935	1517	2435	1996	1186	755
	6					1310	838	1787	1282	2279	1748	1425	903
PA125SR	2	1066	847	1730	1483	2482	2254	3156	2920	3845	3597	611	369
	3	895	570	1538	1172	2311	1977	2973	2624	3652	3286	912	555
	4			1346	856	2140	1701	2790	2328	3460	2966	1213	739
	5					1969	1424	2615	2023	3268	2655	1522	921
	6					1790	1139	2424	1726	3076	2343	1823	1106
PA160SR	2	2091	1684	3396	2938	4858	4451	6198	5762	7543	7085	1177	735
	3	1749	1147	3012	2334	4516	3914	5832	5187	7158	6481	1761	1106
	4			2627	1721	4182	3377	5466	4603	6783	5877	2354	1478
	5					3840	2840	5100	4028	6398	5263	2938	1850
	6					3499	2295	4742	3452	6014	4659	3531	2222
PA200SR	2	3889	3141	6325	5483	9080	8332	11586	10784	14115	13273	2230	1416
	3	3238	2116	5593	4330	8429	7307	10888	9685	13382	12119	3346	2124
	4			4861	3176	7778	6281	10191	8587	12650	10966	4461	2832
	5					7128	5256	9494	7488	11918	9813	5576	3540
	6					6477	4231	8796	6390	11186	8659	6691	4248
PA270SR	2	9373	7616	15277	13300	21993	20235	28071	26188	34207	32230	5443	3531
	3	7754	5110	13456	10481	20374	17729	26336	23503	32385	29410	8169	5293
	4			11634	7671	18755	15223	24592	20818	30554	26591	10886	7054
	5					17127	12725	22858	18141	28733	23781	13612	8815
	6					15508	10219	21123	15456	26911	20962	16330	10585

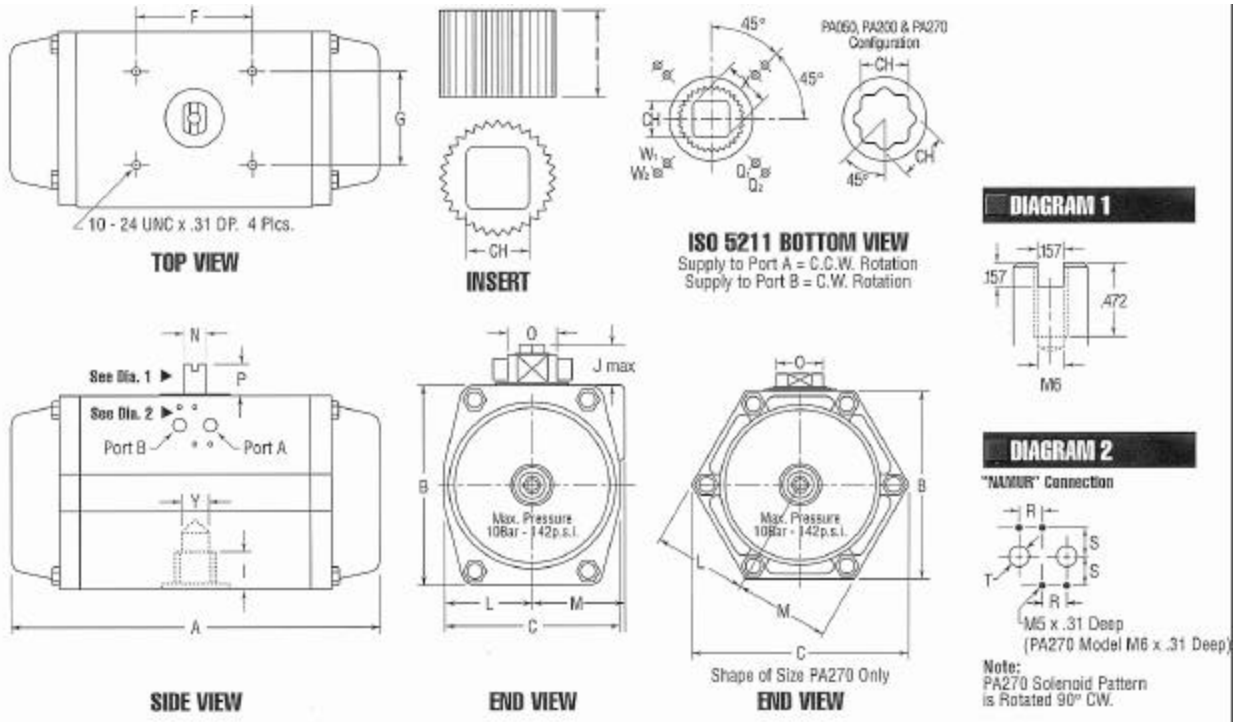
NOTES: 1. The above values are end torque output available to operate the valve after compressing the springs.
2. It is possible to have unequal number of springs on each piston (i.e. 3 & 4). To obtain the torque, interpolate between the two respective torque valves.

Out-put torque available when air supply fails.

Challenger Valve

Bulletin No. PA-104

ACTUATOR DIMENSIONS



CH Dimensions shown are preferred ISO 5211 sizes. Other sizes are available, consult factory.

SIZE	Double Acting / Spring Return	PA050DA / PA050SR	PA063DA / PA063SR	PA075DA / PA075SR	PA085DA / PA085SR	PA100DA / PA100SR	PA115DA / PA115SR	PA125DA / PA125SR	PA160DA / PA160SR	PA200DA / PA200SR	PA270DA / PA270SR
DIMENSIONS IN INCHES	A	5.43	6.04	7.96	9.05	10.7	12.13	14.17	18.26	22.6	26.93
	B	2.65	3.38	4.18	4.46	5.06	5.73	6.19	7.73	9.44	13.00
	C	2.28	2.87	3.35	3.85	4.33	5.04	5.51	6.92	8.66	13.78
	F	1.97/3.15	3.15	3.15	3.15	3.15	5.12	5.12	5.12	5.12	5.12
	G	.98/1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	I	.51	.749	1.029	1.029	1.2	1.2	1.2	1.38	2.0	2.0
	J MAX	1.0	1.0	1.0	1.0	1.0	1.38	1.38	1.38	1.38	1.38
	L	1.14	1.44	1.67	1.93	2.16	2.68	2.75	3.46	4.33	6.04
	M	1.45	1.73	1.93	2.08	2.48	2.52	2.87	3.58	4.33	6.32
	N	.31	.31	.55	.55	.55	1.06	1.06	1.06	1.26	2.16
	O	.47	.47	.70	.70	.70	1.42	1.42	1.42	1.66	3.15
	P	.78	.78	.78	.78	.78	1.18	1.18	1.18	1.18	1.18
	Q1/Q2	1.65	1.97	1.97/2.75	1.97/2.75	2.75/4.01	2.75/4.01	2.75/4.01	4.01/4.92	5.51	6.50
	R	.47	.47	.47	.47	.47	.47	.47	.47	.47	.65
	S	.63	.63	.63	.63	.63	.63	.63	.63	.63	.75
	T-NPT	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/2"
	W1 x Depth	1/4-20x.31	1/4-20x.33	1/4-20x.39	1/4-20x.39	5/16-18x.39	5/16-18x.39	5/16-18x.39	3/8-16x.47	5/8-11x.78	3/4-10x.90
	W2 x Depth	-----	-----	5/16-18x.47	5/16-18x.47	3/8-16x.47	3/8-16x.47	3/8-16x.47	1/2-13x.47	-----	-----
	CH	.433	.551	.669	.669	.866	.866	.866	1.063	1.417	1.811
	X Min.	.55	.71	.99	.99	1.11	1.11	1.11	1.42	1.89	2.37
	øY x Depth	-----	-----	.703x1.37	.844x1.37	1.0x1.81	1.0x1.81	1.43x2.2	1.65x2.2	2.0x4.0	2.5x4.0
	ISO 5211	F04	F05	F05-F07	F05-F07	F07-F10	F07-F10	F07-F10	F10-F12	F14	F16
	weight lbs. DA/SR6	2.3/2.8	3.4/3.9	6.3/6.9	9.1/10.1	13.4/15.2	19.3/22.4	26.9/30.4	50.4/56.5	97/115	198.5/247
	Actuator Speed open/close seconds DA	.5/.5	.5/.6	.5/.6	.5/.8	.7/.8	.8/1	1/1	1.2/1.5	3.5/4.5	5/5.5
	Actuator Speed open/close seconds SR	.5/.5	.6/.8	.6/1	.6/1.2	1/1.2	1.1/1.5	1.2/2	2/2.5	4.5/6	6/7
	Volume - cubic inch per cycle DA	13.4	27	37	56	98	159	220	483	855	1343
	Volume - cubic inch per cycle SR	7.9	10.5	14	21	40	61	92	196	366	610

The right to change or modify product design or product without prior notice is reserved.
All threads on top and bottom of actuator are U.N.C.

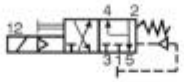
Challenger Valve

Bulletin No. SV-100A

SERIES 6519 NAMUR SOLENOID

Solenoid Valve with NAMUR adapter plate for direct field mounting onto actuators

5/2-way valve in de-energized position



3/2-way valve with exhaust recycling, in de-energized position, port 2 feed back internally

6519

5/2-3/2-Way, NPT¼-NAMUR, 28-115 PSI

- ✓ **One valve for all applications, 5/2 and 3/2-way functions in one**
- ✓ **Corrosion resistant**
- ✓ **Safety position by mechanical return spring**
- ✓ **High switch reliability**

The NAMUR flange layout enables a simple field mounting of the valve directly onto actuator drives.
The valve is an extremely reliable, diaphragm seat design which is manufactured from high quality plastic. It can be operated as either a 5/2 or 3/2 way function by the simple repositioning of the mounting plate.
Suitable for lubricated and non-lubricated air.

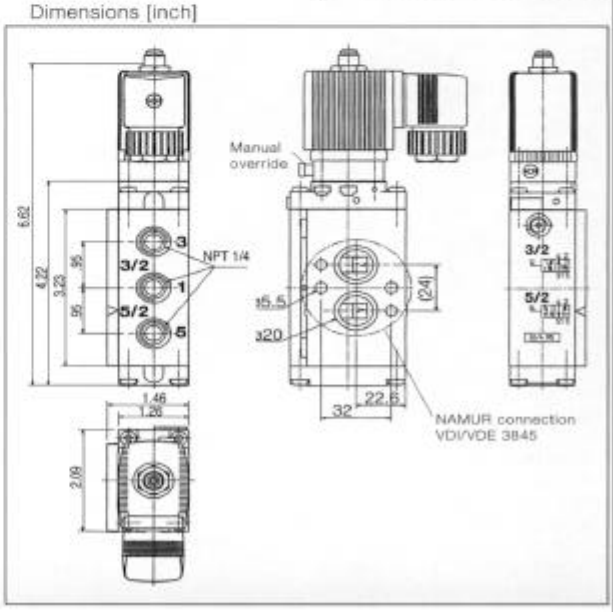
Technical Data

Pressure range	28 -115 PSI
Temperature media	-13 °F ... +140 °F
Ambient temperature	+140 °F, max.
Body material	Polyamide
Seal material	PB (NBR and PUR)
Coil material	Polyamide
Power consumption	2 W (for AC and DC)
Protection class with cable plug	IP 65 (standard delivery: cable plug 2508, DIN 43 650 A).

Installation
The valve is delivered ex-works in the 5/2-way function.
By rotating the adapter plate by 180°, the 3/2-way function is realized.
All valves are supplied with adapter plates, manual override, NPT1/4 connection sockets and NAMUR flange connection for mounting on the actuator drive.

Options
Hazardous area:
acc. to FM/CSA-Ex Div.1 T6

Dimensions [inch]



Challenger Valve

Bulletin No.
SV-100B

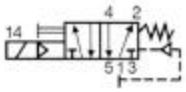
TECHNICAL DATA, SERIES 6519

Solenoid Valve, Pilot-Operated
with NAMUR Adapter Plate

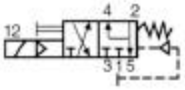
Type 6519 NAMUR

Technical Data Type 6519 NAMUR

5/2-way valve, in de-energized position, Pressure port 1 connected to port 2, Output 4 exhausted



3/2-way valve with exhaust recycling, in de-energized position, port 2 fed back internally



Valve Characteristics

Valve Function	Orifice [inch]	C_v	Pressure Range [PSI]	Port Connection
5/2 way	1/4	1.35	30 – 115	1/4 NPT and NAMUR flange
3/2 way	1/4	1.35	30 – 115	1/4 NPT and NAMUR flange

Operational Data (Armature)

Valve body	Polyamide (PA)
Sealing material	PB (NBR and PUR)
Media	Lubricated or non-lubricated compressed air, Instrument air, Nitrogen
Media temperature	–25 to +60°C (-14 to 140°F)
Ambient temperature	–25 to +60°C (-14 to 140°F)
Response times[3]	
Open (On)	25 ms
Close (Off)	40 ms
Port connection	1/4 NPT and NAMUR flange

[3] Measured at Connection 2; time from electrical switching to pressure increase to 90%, or pressure drop to 10% of operational pressure (115 PSI). The values given apply for both AC and DC; with the UC model, the switch-off time increases by 10 to 15 ms.

Operational Data (Drive)

Operating voltage	24 V/DC and 24 V/60 Hz 120 V/60 Hz 240 V/60 Hz
Voltage tolerance	±10%
Power consumption	2 W for DC and AC
Duty cycle	100% continuously rated
Coil insulation class	
UL recognized	Class B molded
UL listed	Class H molded
Electrical connection	• Cable plug Type 2508 for UR version • Conduit cable plug 2509 for UL version
Protection class	IP 65, NEMA 4 (with cable plug)
Ex approval	FM-Ex Div. 1 T6 CSA-Ex Div. 1 T6 (see data sheet 6519 NAMUR Ex)

Installation

The valve is delivered in the 5/2-way function. By rotating the adapter plate by 180°, the 3/2-way function is realised.

Mounting position	Any, preferably solenoid system upright.

Challenger Valve

Bulletin No. SV-101A

ALUMINUM CONSTRUCTION

SERIES C5 NAMUR

3-Way/4 Way Field Convertible Solenoid Valves

General Description

The Versa C5 NAMUR mount control valve is a high flow, 5-port, solenoid/pilot valve. It is designed to mount directly to any NAMUR actuator, thus reducing actuator response time and cost of tubing, fittings, brackets, and labor. Many adaptor kits are available for non-NAMUR actuators. Consult factory for kit availability.

The 5-port design allows the C5 NAMUR to be ordered as either 4-way (for double acting actuators) or 3-way (for spring return or fail-safe actuators). The function of this valve is field convertible utilizing no special tools, gaskets, or sealants. Relocation of a port plug converts a 3-way to a 4-way, or a 4-way to a 3-way. When the 4-way valve is converted to 3-way function, the unused exhaust port becomes an actuator vent into which a filter/muffler can be installed to prevent contaminents from entering either the valve or the actuator.

Single solenoid models (for 2-position control), or double solenoid models (for 2 or 3-position control) are available. Actuator positioning is possible with the use of 3-position valves since all Versa C5 NAMUR valves are leakfree/bubbletight. A complete selection of electrical connections, area classifications, and power requirements makes the most exacting and demanding specifications or applications easy to satisfy. Manual overrides are standard on all C5 NAMUR valves.

Materials

Valve body and plunger: anodized aluminum (for brass direct mount valve, consult factory)
Actuating Caps: solenoid— anodized aluminum
spring cap—synthetic resin

Valve seals: plunger and body— FKM/FPM (viton)
pilot piston— NBR (nitrile)
valve/actuator mounting O rings— NBR (nitrile)
Pilot Piston: synthetic resin
Screws: plated steel
Port plug: brass
Solenoid parts: sleeve, plunger & spring— 304 & 430F stainless steel
coils—epoxy encapsulated with 3 spade terminals (std) or 2 or 3 wire leads (opt)
coil cover (opt.-when applicable)—zinc chromate coated steel

Operating Pressures and Weights

Valve Type	Operating Pressure Range† Pneumatic	Approximate Weights	
		Ordinary Service	Hazardous Service
Single Solenoid/spring return (2-position)	15-115 psi (1-8 bar)	0.8 lbs. (363 g)	1.1 lbs. (500 g)
Double Solenoid/detented (2-position)	10-115 psi (0.7-8 bar)	1.2 lbs. (545 g)	1.8 lbs. (816 g)
Double Solenoid/spring centered (3-position)	15-115 psi (1-8 bar)	1.2 lbs. (545 g)	1.8 lbs. (816 g)

† Pressure ranges may change based on solenoid option. See page 6.
MPa = $\frac{\text{bar}}{10}$

For higher pressure applications, consult factory.

Porting Size

Inlet and exhaust — 1/4 NPT or G1/4
Cylinder ports — O ring seal per NAMUR standard (For non-NAMUR actuators, consult factory)

Flow Rates

Cv = 0.75 (Kv = 11) average for all ports (48 SCFM at 100 psi; 82 $Nm^3/_h$ at 7 bar).

Installation, Filtration and Lubrication

Valves have no limitations on mounting orientation.
40 to 50 micron filtration and general purpose lubricating oil ISO, ASTM viscosity grade 32 recommended.
Ambient temperature range 5°F (15°C) to 125°F (50°C).

C5 NAMUR Valve Product Number Selector

FUNCTION**	PORT SIZE	Cv (Kv)	Basic Valve Number			
			SINGLE SOLENOID/SPRING RETURN, 2 POSITION	DOUBLE SOLENOID/ DETENT, 2 POSITION	DOUBLE SOLENOID/SPRING CENTERED, 3 POSITION	
					Blocked Center	Exhaust Ports Open
4-way 5/2 & 5/3	1/4 NPT G1/4	.75 (11) .75 (11)	CGS-4232-NB1-(coil code) CGS-4292-NB1-(coil code)	CGG-4232-NB1-(coil code) CGG-4292-NB1-(coil code)	CXX-4233-NB1-(coil code) CXX-4293-NB1-(coil code)	CXX-4234-NB1-(coil code) CXX-4294-NB1-(coil code)
3-way 3/2 & 3/3	1/4 NPT G1/4	.75 (11) .75 (11)	CGS-3232-NB1-(coil code) CGS-3292-NB1-(coil code)	CGG-3232-NB1-(coil code) CGG-3292-NB1-(coil code)	CXX-3233-NB1-(coil code) CXX-3293-NB1-(coil code)	CXX-3234-NB1-(coil code) CXX-3294-NB1-(coil code)

* All valves include O ring interface seals and #10-24 mounting screws.
For #10-32 screws change NB1 to NB2. For M5 screws change NB1 to NB3.
** 3-way is the same valve as 4-way, but is provided with a relocated cylinder port plug.

Challenger Valve

Bulletin No.
SV-101B

SERIES E5 NAMUR
3-Way Solenoid Valves

General Description

The Versa E5 NAMUR mount control valve is an inexpensive, simple and effective 3-way direct-acting solenoid valve. It is designed to mount directly to any NAMUR actuator thus reducing cost of tubing, fittings, brackets and labor.

It is most effective on spring return or fail-safe actuators where high speed open or close is not important, but where cost is a factor. A threaded actuator vent port is standard.

Available as a 3-way, 2-position, direct solenoid, spring return only, and with most of the Versa solenoid options.

Materials

Valve body: anodized aluminum (for brass direct mount valve, consult factory)

Valve seals: body/plunger — NBR (nitrile)
valve/actuator mounting O rings — NBR (nitrile)

Screws: plated steel

Solenoid parts: sleeve, plunger & spring— 304 & 430F stainless steel
coils—epoxy encapsulated with 3 spade terminals (std) or 2 or 3 wire leads (opt)
coil cover (opt.-when applicable)—zinc chromate coated steel

Operating Pressures and Weights

Valve Type	Operating Pressure Range Pneumatic	Approximate Weights	
		Ordinary Service	Hazardous Service
Single Solenoid/spring return (2-position)	0-150 psi (0-10.3 bar)	0.6 lbs. (272 g)	0.9 lbs. (408 g)

Porting Size

Inlet and Vent	-1/4 NPT or G1/4
Exhaust	-#10-32 (1/8 NPT or G1/8 available)
Cylinder ports	-O ring seal for NAMUR standard (For non-NAMUR actuators, consult factory)

Installation, Filtration and Lubrication

Valves have no limitations on mounting orientation.
40 to 50 micron filtration and general purpose lubricating oil ISO, ASTM viscosity grade 32 recommended.
Ambient temperature range 5°F (15°C) to 125°F (50°C).

Flow Rates

Cv = 0.08 (Kv = 1.2) average for all ports
(5 SCFM at 100 psi; 8.5 $Nm^3/_h$ at 7 bar).

E5 NAMUR Valve
Product Number Selector

FUNCTION	PORT SIZE	Cv (Kv)	Basic Valve Number SINGLE SOLENOID/SPRING RETURN 2-POSITION
3-way 3/2	1/4 NPT G1/4	.08 (1.2) .08 (1.2)	**E5SM-3011-34-NB1-(coil code)** **E5SM-3071-34-NB1-(coil code)**

All valves include O ring interface seals and #10-24 mounting screws.
For #10-32 screws change NB1 to NB2.
For M5 screws change NB1 to NB3.

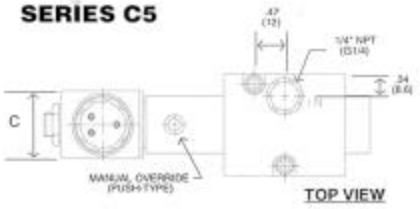
Challenger Valve

Bulletin No. SV-101C

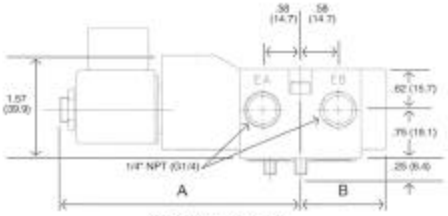
NAMUR Dimensions Shown as inch (mm)

Port markings shown are for valves with NPT threads. Port markings for valves with G threads are: (1) =IN; (2) = B; (3) = EB; (4) = A; (5) = EA. Option -PC is shown for reference.

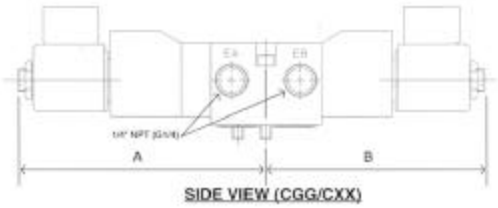
SERIES C5



TOP VIEW

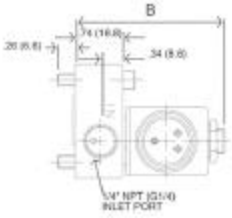


SIDE VIEW (CGS)

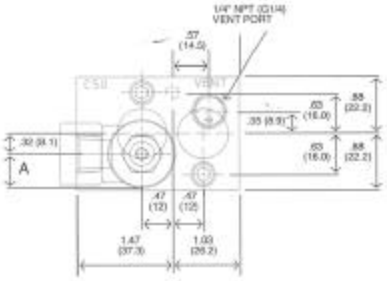


SIDE VIEW (CGG/CXX)

SERIES E5

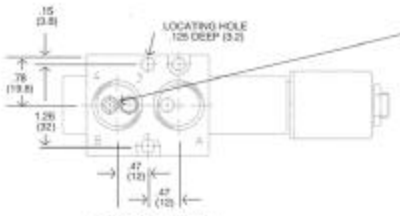


END VIEW



TOP VIEW

NAMUR DIMENSIONS: INCHES (mm)						
ValveType	Solenoid Option					
	STANDARD, -228L		-C50, -PC		-XX, -XN	
	A	B	A	B	A	B
E5	.44 (11.2)	2.31 (58.7)	.52 (13.2)	2.31 (58.7)	.73 (18.4)	2.39 (60.7)



BOTTOM VIEW

NOTE:

WHEN ORDERING A 4-WAY, (EXAMPLE: CGS-4232-NB1) THE PLUG IS IN POSITION "4", AS SHOWN.

WHEN ORDERING A 3-WAY, (EXAMPLE: CGS-3232-NB1) THE PLUG IS IN POSITION "3".

PORT EB(3) BECOMES VENT WHEN USED AS 3-WAY.

ANY VALVE MAY BE CONVERTED IN THE FIELD BY INTERCHANGING THE PLUG.

NAMUR DIMENSIONS: INCHES (mm)															
Valve Type	Solenoid Option														
	Standard, -228L			-027, -043			-C50, -PC			-XX, -XN			-XISP		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
CGS	3.71 (94.2)	1.31 (33.3)	.885 (22.5)	3.45 (87.6)	1.31 (33.3)	.875 (22.2)	3.71 (94.2)	1.31 (33.3)	1.04 (26.4)	3.79 (96.3)	1.31 (33.3)	1.45 (36.8)	3.53 (89.7)	1.31 (33.3)	1.15 (29.2)
CGG/CXX	4.21 (106.9)	3.71 (94.2)	.885 (22.5)	3.96 (100.6)	3.45 (87.6)	.875 (22.2)	4.21 (106.9)	3.71 (94.2)	1.04 (26.4)	4.29 (109.0)	3.79 (96.3)	1.45 (36.8)	4.03 (102.4)	3.53 (89.7)	1.15 (29.2)

Challenger Valve

Bulletin No. SV-101D

NAMUR Solenoid Options

	NAMUR OPTIONS		VOLTAGES & COIL CODES**		
			VALVE TYPE		
	DESCRIPTION	SUFFIX DETAIL*	C5	E5	NOMINAL COIL POWER
NON-HAZARDOUS SERVICE	Spade Terminals (standard) Strain Relief mini-DIN type connector, cord grip PG9 1/2 NPT conduit mini-DIN type connector 1/2 NPT conduit, watertight, NEMA 4	None -HC -HCC -228L	24V60 **(A024)** 12VDC **(D012)** 110V50 **(E110)**, 120V60 **(A120)** 24VDC **(D024)** 220V50 **(E220)**, 240V60 **(A240)** 48VDC **(D048)**		AC=8.5 W DC=10.5 W
	1/2 NPT conduit, general purpose, NEMA 1,2,3 1/2 NPT conduit, watertight, NEMA 4 & 4X	-C50 -PC			AC=6 W DC=7 W
	Spade Terminals, low power; (add -HC for micromini 8mm gap DIN style connector)	-027	6VDC **(D006)** 12VDC **(D012)** 24VDC **(D024)** 48VDC **(D048)**	not available	DC=0.75 W
	Spade Terminals, low power; (add -HC for micromini 8mm gap DIN style connector)	-043	24V50 **(E024)** 24V60 **(A024)** 110V50 **(E110)** 110V60 **(A110)** 12VDC **(D012)** 220V50 **(E220)** 220V60 **(A220)** 24VDC **(D024)** 240V60 **(A240)** 48VDC **(D048)**	not available	AC=4.0 VA @ 50Hz 3.2 to 4.3 VA @60 Hz DC=2.9 W
HAZARDOUS SERVICE	Flameproof, 1/2 NPT conduit, NEMA 7 & 9, UL listed, CSA approved -watertight, dusttight, NEMA 4, 4X, 7 & 9, UL listed, CSA approved Flameproof, M20x1.5 conduit Zone 1 & 2 INIEX approved per CENELEC	-XX -PC-XX -XN	24V60 **(A024)** 12VDC **(D012)** 110V50 **(E110)**, 120V60 **(A120)** 24VDC **(D024)** 220V50 **(E220)**, 240V60 **(A240)** 48VDC **(D048)**		AC=6 W DC=7 W
	Flameproof, low power, 1/2 NPT conduit, NEMA 7 & 9, UL listed	-LB-XX	12V60 **(A012)** 6VDC **(D006)** 24V60 **(A024)** 12VDC **(D012)** 48V60 **(A048)** 24VDC **(D024)** 120V60 **(A120)** 48VDC **(D048)** 240V60 **(A240)** 120VDC **(D120)**		AC or DC =1.8 W
	Intrinsically safe, strain relief mini-DIN type connector, cord grip PG 9 –Factory Mutual/CSA approved –PTB approved per CENELEC	-XISP	24VDC **(D024)**	not available	DC=1.6 W max

* Add option number to basic valve number as suffix.

** The coil code is shown within the parenthesis following the voltage. Add desired coil code to end of valve number.

Actuator Speed Chart

This chart represents approximate actuator operation times under average load conditions at 80 psi (5.5 bar). Due to differing designs of quarter-turn actuators, breakaway friction, loading, internal airflow, inlet piping, fittings and exhaust port options, the values shown are intended as an estimate. Faster or slower times may actually be achieved.

		ACTUATOR VOLUME in³ (cm³)									
	Valve Type	5 (82)	10 (164)	25 (410)	50 (820)	100 (1640)	150 (2460)	200 (3280)	400 (6560)	600 (9840)	1000 (16400)
ACTUATOR CYCLE TIME IN SECONDS	C5	.32	.36	.47	.63	.98	1.3	1.7	3.1	4.5	7.2
	E5	.46	.64	1.1	2.0	3.9	5.7	7.5	--	--	--

For double-acting actuators (open & close), use volumes from selected actuator specifications and the chart for estimated speed. The times indicated are per shift. For spring return actuators, use open volume to obtain time from chart. Actuator spring loading may affect shift time. Slower speeds (adjustable) can always be accomplished by using Versa's Bleed Control Valves in the control valve exhaust port

Challenger Valve

Bulletin No.
SB-100

VALVE POSITION TRANSMITTERS

DESIGN FEATURES

Why Switch To Our VPTs?

See for Yourself! Place a Moniteur Valve Position Transmitter next to a competitor and note the improvements that make it the finest on the market:

Indicator

- Indicator cover is free from decals or paint, which fade in the sun or during plant washdowns.
- Indicator is O-ring sealed from the environment.
- 100% change of indication with 360 degree visibility.
- Indicator cover has no flanges which could crack during installation or hard use.

Enclosure

- All housings are sealed with a compressed O-ring. On the thermoplastic enclosure, a raised lip on the enclosure cover assures optimum sealing.
- All inserts are cast into the enclosure during the molding process, assuring better resistance to tearout. Other designs have welded or glued-in inserts.
- All enclosure threads are “blind-tapped” to protect the threads from the environment.
- Shaft bushing is 20% longer for more secure and accurate shaft operation.
- Shaft is held into the bushing with an internal stainless steel lock ring, protected from the environment with an O-ring. Other designs use an external snap ring unprotected from dirt or corrosive air.
- Two conduit entries are standard.

Internal

- Switches and terminal strip are labelled for easier wiring.
- Mechanical switches are enclosed in a protective housing that safeguards against electric shock during cam setting. Other designs have exposed contacts.
- Terminal strip is angled 15 degrees for easier installation.

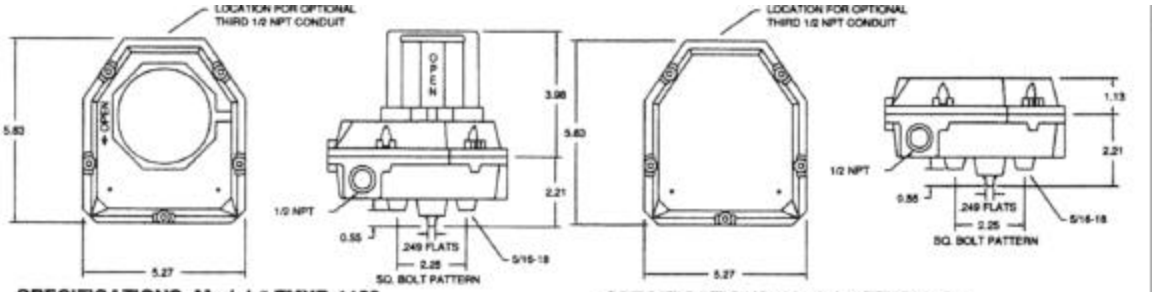
Electrical

- Mechanical switches are specified with higher operating forces offering better resistance to freeze up from cold or dirty environments.
- Moniteur offers a broad array or Non-Contact (proximity-type) switches better suited to today’s sophisticated process control systems. Choose Tungsten TTL switches for high current applications, or Rhodium and Bifurcated TTL for low voltage/low current DC applications.
- A wide variety of inductive sensors is available (NAMUR, PNP, NPN) to match nearly every control interface found in today’s modern process plants.

Challenger Valve

Bulletin No. SB-101

DIMENSIONS & ORDERING INFORMATION



SPECIFICATIONS- Model # FMYB-1120

HOUSING	Two 1/2" Conduits
SEALS	Buna N
MONITEUR	Yellow / Black
BEARING	Bronze
SHAFT	One Piece 303 SS
FASTENERS	Stainless Steel
SWITCHES	Mechanical SPDT 15A
NUMBER OF SWITCHES	Two
TERMINAL POINTS	Eight

SPECIFICATIONS- Model # FFNB-1120

HOUSING	Two 1/2" Conduits
SEALS	Buna N
MONITEUR	None
BEARING	Bronze
SHAFT	One Piece 303 SS
FASTENERS	Stainless Steel
SWITCHES	Mechanical SPDT 15A
NUMBER OF SWITCHES	Two
TERMINAL POINTS	Eight

ORDERING INFORMATION

Use coding scheme below to generate required model number.

L = GREEN / RED
G = GREEN / WHITE
R = RED / WHITE
B = BLUE / WHITE
Y = YELLOW / BLACK

O = 3 WAY PATH
T = 3 WAY PATH
F = 3 WAY PATH
S = 4 WAY PATH
U = USER DEFINED
N = NONE (FLAT COVER)

F = TWO CONDUITS
G = THREE CONDUITS
W = USER DEFINED
HOUSING STYLE

F = FLAT
M = MONITEUR
COVER STYLE

MONITEUR TYPE

B = BRONZE
M = MONEL
S = STAINLESS STEEL
G = GRAPHITE
U = USER DEFINED
BEARING

MODEL # = **FMYB - 1120**

SHAFT TYPE
1 = ONE PIECE SHAFT 303 STAINLESS STEEL
3 = ONE PIECE SHAFT 316 STAINLESS STEEL
5 = "NAMUR" ONE PIECE SHAFT 303 STAINLESS STEEL
7 = "NAMUR" ONE PIECE SHAFT 316 STAINLESS STEEL
9 = USER DEFINED

SWITCH TYPE
0 = NONE
1 = MECHANICAL SPDT 15A 125 / 250VAC
2 = NIMROD SENSOR SPDT 3A 110VAC - 2A 28VDC
3 = PRISM CONTACTS SPDT 1A 110VAC / 48VDC
4 = MECHANICAL DPDT 10A 125 / 250VAC
5 = GO SWITCH SPDT 2A 240VAC- 50 MA 24VDC
8 = P&F NJ2-V3
T = NIMROD TTL 1A 24VDC

NO. OF SWITCHES
0 = NONE
1 = ONE
2 = TWO
3 = THREE
4 = FOUR

SOLENOID VALVE
0 = NONE
1 = ASCO* EF8320G172 (110VAC)
2 = ASCO* EF8342C1 (110VAC)
3 = ASCO* IS8314C37 (24VDC)
4 = ASCO* IS8345E1 (24VDC)
6 = 1/2 FEMALE CONDUIT
7 = 3/4 MALE HUB
8 = 1/2 MALE HUB
9 = USER DEFINED
S = USER SUPPLIED

OPTIONS- *consult factory for options not listed here*

Resistance Outputs	0-150Ω, 0-1000Ω, 0-10,000Ω
Mil Amp Outputs	All standards, polarity independent
Seal Materials	Viton

* TRADEMARK OF AUTOMATIC SWITCH COMPANY, FLORHAM PARK, NJ

Challenger Valve

Bulletin No. SB-102

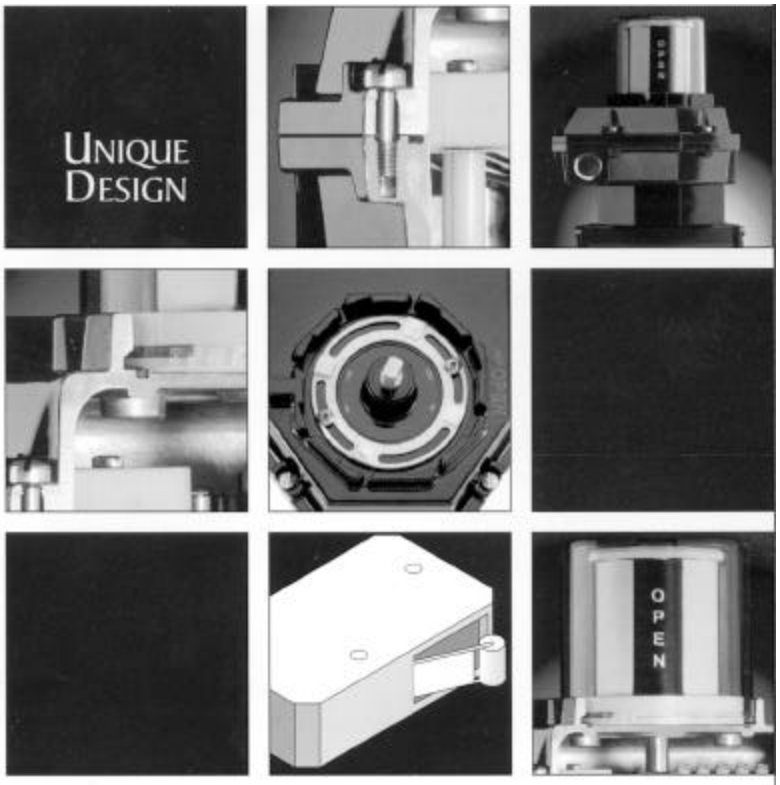
WATCHMAN - NEMA 4, 4X

All external Fasteners are corrosion resistant 316 ss and protected from other damage through the use of shrouds and seals, effectively preventing the screw threads from contact with the atmosphere.

The Moniteur Visual Indicator employs a compression seal to prevent condensation and contaminants from entering and obscuring the display.

All internal wiring is completely enclosed, preventing accidental grounding of live circuits.

The Moniteur Visual Indicator can be installed in any orientation on a valve. Once set the indicator can be removed, reinstalled or replaced and still retain the original factory settings.



The Shaft assembly uses an internal stainless steel LOC-RING, making it 10 times stronger than conventional designs.

An optional split shaft permits the cover and the MONITEUR Visual Indicator to be disassembled as a single unit. When the cover is removed and subsequently replaced, the indicator will continue to display the original factory settings.

Closely coupled sliding splines permit installation of up to 4 independent switches or sensors.

Shaft bearings are made of ultra-high-strength aluminum-nickel alloy, preventing galvanic corrosion between the bearings and the enclosure.

The shaft bearing length, nearly three times the shaft diameter, prevents the shaft/cam assembly from wobbling, insuring that the sensors will operate at the factory set positions.

Challenger Valve

Bulletin No.
SB-103

SENTINEL - NEMA 4, 4X, 7, 9

SENTINEL VALVE MONITORING SYSTEMS

Todays industrial marketplace continues to stress the importance of advanced process control technology. The benefits of this technology are rooted in precise valve performance data. The Sentinel VPT is an accurate, versatile valve position transmitter. All versions of the Sentinel meet the requirements of UL/CSA for operation in hazardous areas.

ENGINEERED FOR TODAYS ADVANCED TECHNOLOGY

The Sentinel valve position transmitter mounts to any rotary valve or actuator.

It is available with a variety of switch and sensor elements, including the NIMROD® series of non-contact switches. The NIMROD® TTL (transistor/transistor logic) is ideal for low power communication systems and intrinsically safe installations.

The Moniteur high visibility position indicator employs a compression seal to prevent water, ice, dust or chemical contaminants from entering the indicator mechanism.

All units are rated NEMA 4, 4X, 7 and 9 UL and CSA. Class I Groups C & D, Class 2 Groups E, F & G, Divisions 1 & 2. Sentinel with NIMROD® sensor complies with Groups A & B, Division 2.

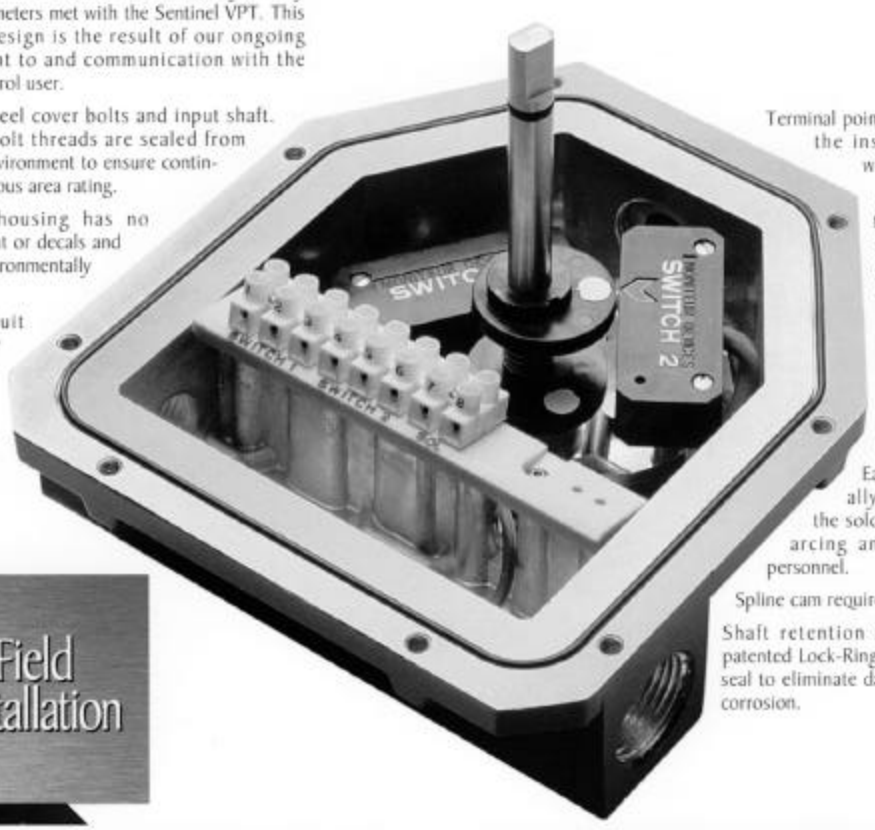
KEY PERFORMANCE FEATURES

Safety, ease of installation and reliability are key design parameters met with the Sentinel VPT. This patented design is the result of our ongoing commitment to and communication with the process control user.

Stainless steel cover bolts and input shaft. All cover bolt threads are sealed from corrosive environment to ensure continuous hazardous area rating.

Indicator housing has no external paint or decals and is 100% environmentally sealed.

Extra conduit entries for maximum versatility.



Field Installation

Terminal points are oriented toward the installer making field wiring effortless.

Permanently marked terminal points and switches allow for correct wiring and verification.

Wire guards on all terminal points permit the use of solid or stranded wire, from 28 thru 12 AWG.

Each switch is individually enclosed to isolate the solder points, to prevent arcing and ensure safety to personnel.

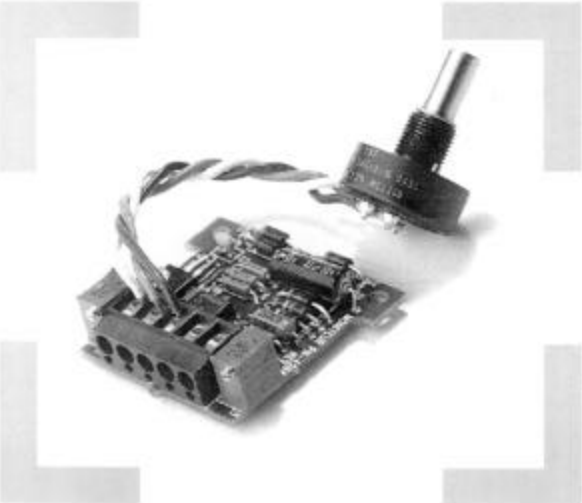
Spline cam requires no tools for setting.

Shaft retention system utilizes our patented Lock-Ring with outboard O-ring seal to eliminate damage, tampering and corrosion.

Challenger Valve

Bulletin No. SB-104

OPTIONAL VALVE POSITION SENSING



Moniteur VPTs can be supplied with current or resistive output that is used to determine the precise position of the valve. This output signal can be resistive (0-1000 ohm) or current (4-20 mA) and interfaces with most PLC and DCS systems such as HART, Device Net, ASI and others.

Moniteur incorporates state of the art potentiometers resistant to drift, vibration and environmental effects. As a result, feedback signals are more stable and consistent over time, resulting in accurate valve position indication.

Moniteur has also developed its own transmitter electronics for enhanced reliability and resistance to environmental effects. In addition, setting and adjusting the transmitter has been made simple with trimming pots located on the board.

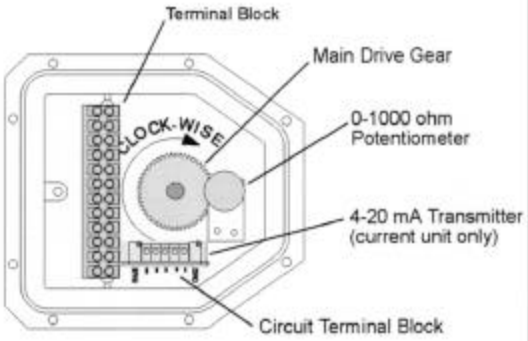
Applications

* Critical valve position applications, computer interface, or trend analysis. The current or resistive output option provides precise valve position indication. A continuous analog signal in resistive or current form provides 0-100% readout of valve position.
* Valve positioners and actuation equipment that require independent feedback signals.
* Additional monitoring of valve end-position. Up to two mechanical or non-contact switches, or inductive sensors can be provided in the same enclosure with the current or resistive output electronics.

Specifications - Current and Resistive Output Options

Current Output

Power Supply Rating	10 - 38 VDC loop power
Recommended Power Supply	24 VDC
Output Signal	4 - 20 mA
Operating Temperature	-20° to 175° F
Load Impedance	0 - 1000 ohms at 24 VDC
Max. Output	55 mA DC
Rotation Range	0 - 105° - minimum 40°
Linearity	+/- 1.0%
Hysteresis	0.55% of full scale
Repeatability	+/- 0.3% of full scale
Environmental protection	conformal coating



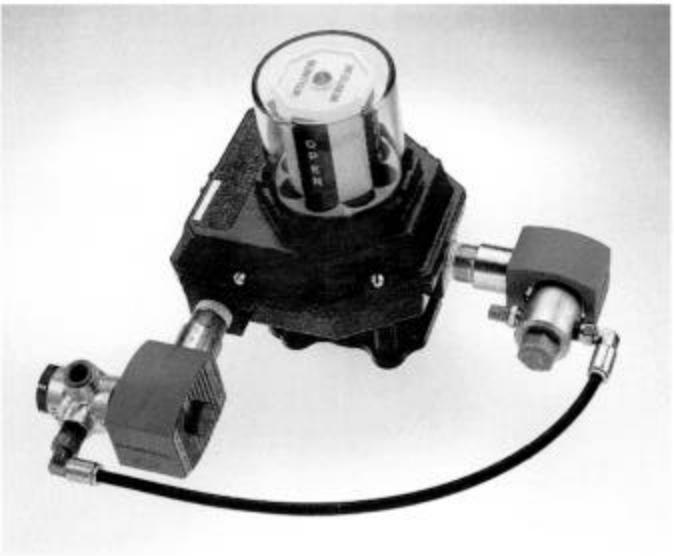
Resistive Output

Standard Output	1000 Ohms
Power rating @ 70 C	1 Watt
Contact Elements	Plastic
Rotational Life (full load)	200,000 cycles
Options	50 or 10,000 ohm

Challenger Valve

Bulletin No. SB-105A

TWO STAGE PACKAGE



The Moniteur DSS Two Stage Package is a complete unit incorporating two solenoid valves and specially configured limit switches designed for two-stage operation. The package mounts to most rotary pneumatic actuators and allows users to transform an automated valve into a two stage shutoff package. The most common applications are:

- Filling or metering vessels. By being able to reduce the flow rate at a given point during a filling operation, it is possible to more accurately and efficiently fill a vessel.
- Flow dampening. With the two stage package, valves can be partially closed rapidly and then completely closed gradually. This dramatically reduces shock to pipes and valves and water hammer.

Requirements

- Two voltage sources to power both solenoid valves (#1 and #2).
- Contact logic, which may be provided by flow meters, scales, level sensors, or PLCs
- Spring return pneumatic actuator with a clean air source

Features

- Dual flow rate positions for filling vessels or flow dampening
- Fully adjustable set points allow the user flexibility to determine proper stage switching
- Open / Closed limit switches provide additional valve end point monitoring
- Factory assembled and tested, saving users and assemblers time and money

Ordering Information - packages for spring return actuators*

Nema Rating	Package Model No.	3-Way Solenoid (ASCO®)	2-way solenoid (ASCO®)	Solenoid Voltage	Solenoid Body Material
7,9	DSS-AMYB-11B1	EF8320G184	EF8262G93	120 VAC-60Hz	Brass
4,4x	DSS-FMYB-11B1	8320G184	8262G93	120 VAC-60Hz	Brass

* Custom packages to your specifications available on request

Solenoid Valve Configuration*

3-Way Solenoid	Air Supply Port	Air to Actuator Port	To 2-way Exhaust Port	2-Way Solenoid	From 3-way Exhaust Port	Filter Exhaust Port
8320G184	2	1	3	8262G93	IN	OUT

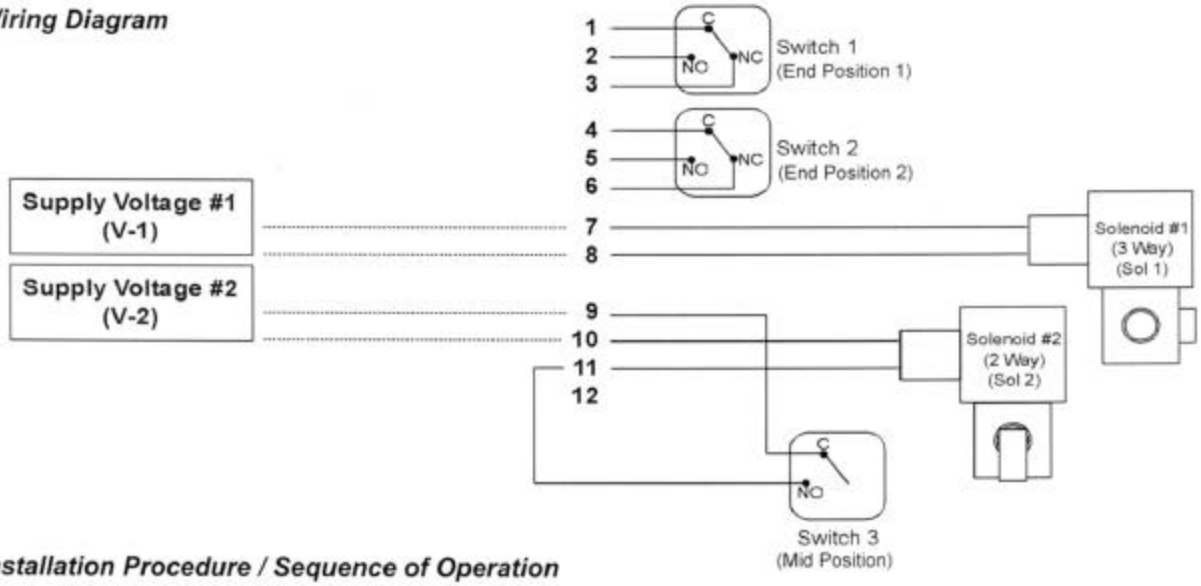
** Other solenoid valves can be supplied to your specifications

Challenger Valve

Bulletin No. SB-105B

TWO STAGE PACKAGE

Wiring Diagram



Installation Procedure / Sequence of Operation

Be sure voltage and air pressure supplied match solenoid specifications.

1. Mount limit switch package to the rotary actuator with an appropriate mounting bracket.
2. Connect power and clean filtered air to proper positions (see table on other side for standard valves). Ensure that all air connections are tight and all electrical connections are secured at their proper terminal points.
3. With no power to V-1 and V-2, the valve should be in the fully closed position (sequence #1)
4. Energize V-1 and V-2 (sequence #2), solenoid #1 (sol1) will energize allowing the air pressure to rotate the valve/actuator package to the fully open position.
5. De-energize V-1 and the package will rotate in the opposite direction until the white cam trips switch 3 (blue) and energizes solenoid #2 (sol2). This will stop the valve rotation at the set mid position. If the mid position is incorrect, estimate approximately how many degrees of rotation the cam needs to be adjusted. CAUTION - do not adjust cam until the unit is in the fully closed position, as the unit might rotate unexpectantly if the cam is adjusted under power.
6. Finally, de-energize V-2 (both V-1 and V-2 will be de-energized) and solenoid #2 (sol2) will De-energize and the valve/actuator package will rotate to the fully closed position. One full cycle has just been completed. If the mid set position requires adjustment, adjust the package now.
7. Repeat steps 4-6 to verify adjustment and/or re-adjust dribble position.

Do not adjust cams while cycling system as the unit might shift unexpectantly

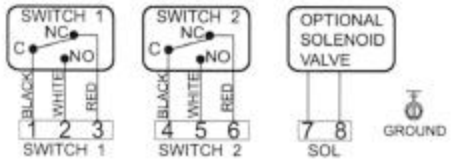
Stage No.	Flow Condition Required	Supply Volt. 1 (V-1)	Supply Volt. 2 (V-2)	Solenoid #1 (Sol 1)	Solenoid #2 (Sol 2)
1	Shut off	De-energize	De-energize	De-energize	De-energize
2	Full Flow	Energize	Energize	Energize	De-energize*
3	Reduced Flow	De-energize	Energize	De-energize	Energize
4	Shut off	De-energize	De-energize	De-energize	De-energize

* Solenoid #2 is de-energized through the limit switch

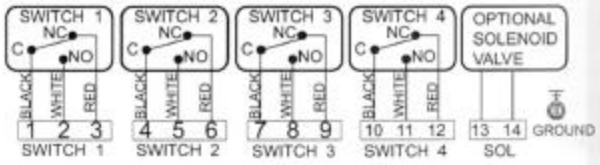
Challenger Valve

Bulletin No. SB-106A

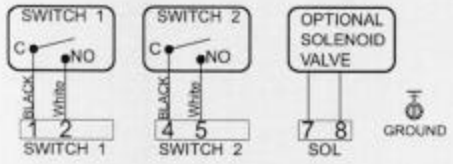
WIRING DIAGRAMS



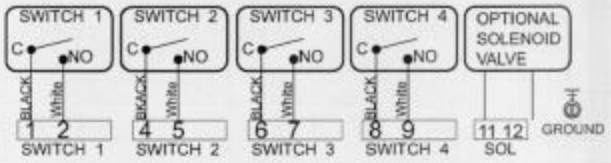
2 SPDT switches (Form C)
Cherry Mechanical
Tungsten TTL
Rhodium TTL



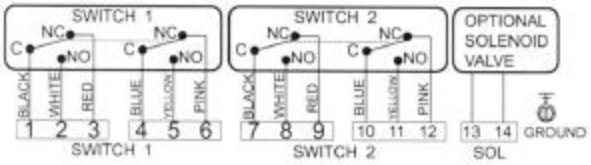
4 SPDT switches (Form C)
Cherry Mechanical
Tungsten TTL
Rhodium TTL



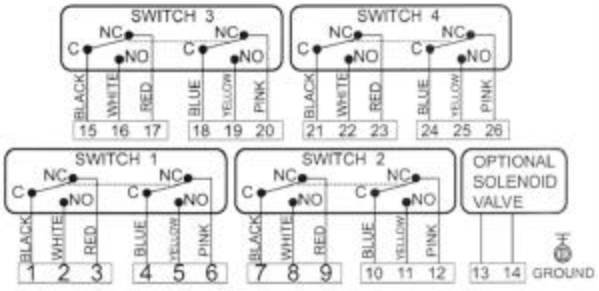
2 SPST switches (Form A)
Bifurcated TTL



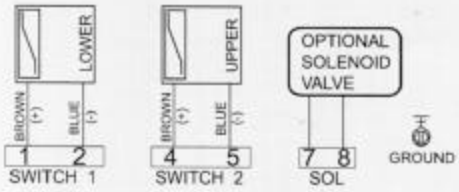
4 SPST switches (Form A)
Bifurcated TTL



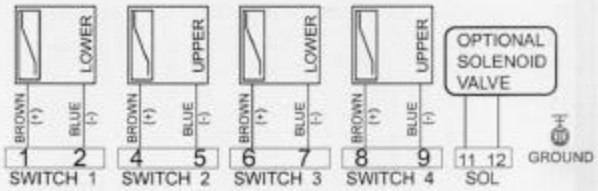
2 DPDT switches (Form ZZ)
ITW



4 DPDT switches (Form ZZ)
ITW



2 - 2-wire Inductive Sensors
any type

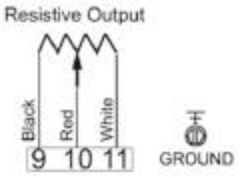


4 - 2-wire Inductive Sensors
any type

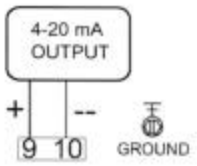
Challenger Valve

Bulletin No. SB-106B

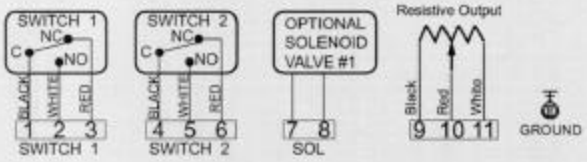
WIRING DIAGRAMS CONTINUED



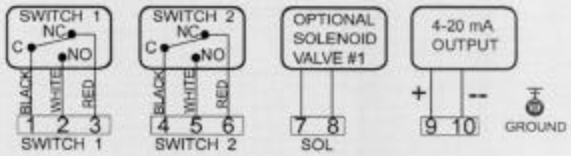
Resistive Output
0 - 1000 ohm
0 - 50 ohm



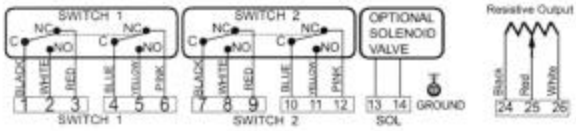
Current Output
4 - 20 mA



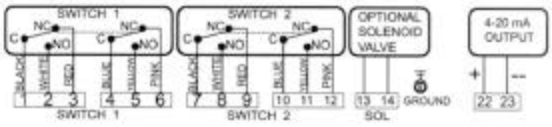
2 SPDT switches (Form C)
with Resistive Output
Cherry Mechanical
Tungsten TTL
Rhodium TTL



2 SPDT switches (Form C)
with Current Output
Cherry Mechanical
Tungsten TTL
Rhodium TTL



2 DPDT switches (Form ZZ)
with Resistive Output
ITW



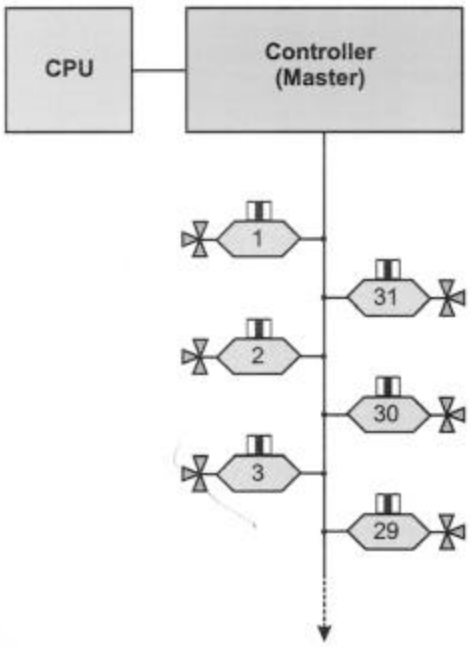
2 DPDT switches (Form ZZ)
with Current Output
ITW

Challenger Valve

Bulletin No.
SB-107A

ASI VALVE NETWORKING

A Typical ASi Network



What Is Valve Networking?

Traditional plant installation requires each device to be connected and wired directly to a central control location and power supply. With a valve network, all of the valve accessories (limit switches, solenoid valve, etc.) are centrally connected to each other, sharing communication and power. This method greatly simplifies the installation and maintenance of these devices.

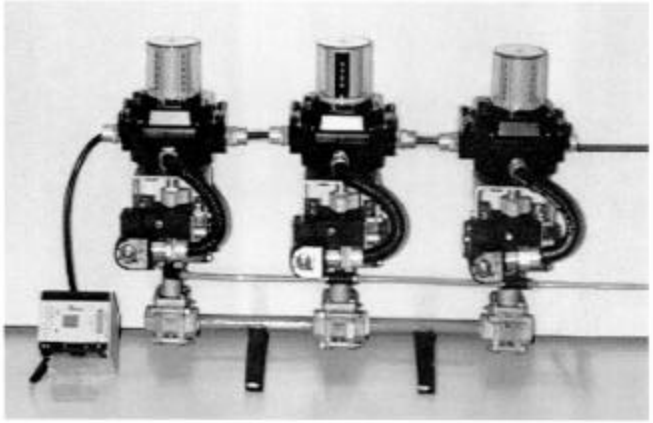
Many new communication protocols have been developed to network plant devices as this technology advances. Among them are DeviceNet, Profibus, and Modbus. These protocols are used for applications requiring two-way communication between devices - for example, allowing a control valve to adjust instantly with on-board temperature or flow sensors - without the involvement of the central plant control system. These "higher-end" protocols are not the most cost-effective for on-off process valves with their simpler requirements.

The ASi (Actuator - Sensor Interface)

The ASi protocol was specifically developed for applications which require on-off or "binary" feedback. It was designed to be a low cost complement to more sophisticated protocols for lower levels of plant automation. It is the digital replacement for traditional parallel wiring. This technology was developed by a consortium of 11 European companies with the intention of creating a standard. Today, over 100 companies worldwide offer products that are ASi compatible.

ASi Can Work In Your Plant

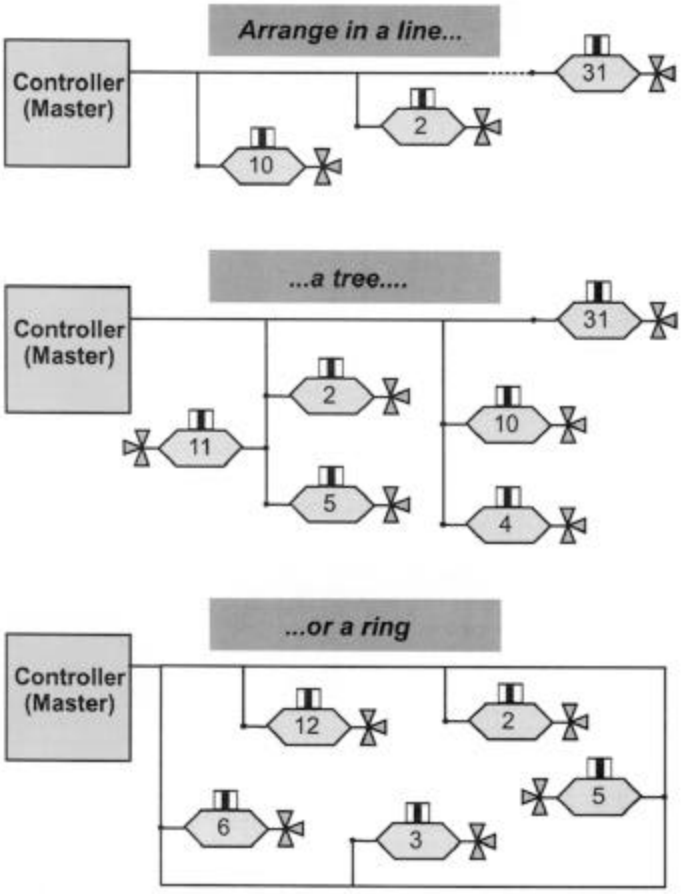
ASi networks can connect directly with your plant process control system or interface with more sophisticated protocols such as DeviceNet or Profibus with a device called a gateway. The overall cost savings as much as 40% when compared with traditional cabling methods. The photo at right shows a small ASi network consisting of three process valves connected to a controller. The following page will provide more details on how to set up an ASi network.



Challenger Valve

Bulletin No. SB-107B

ASI VALVE NETWORKING CONTINUED



Flexible Network Configuration

An ASi network allows the wiring structure to match the physical needs of your system layout. A network can be branched in a line, tree or ring (see figures at left), allowing new slaves or valve monitors to be placed in any position.

Cable

This network does not require special cabling, although dedicated ASi cabling is available to simplify installation. Total cable length must be less than 300 ft. (100m) *including* all branches. When a longer wiring length is necessary, the cable can be extended for another 300 ft. (100m) using a repeater. Up to two repeaters are allowed for a total cable length of 900 ft. (300m).

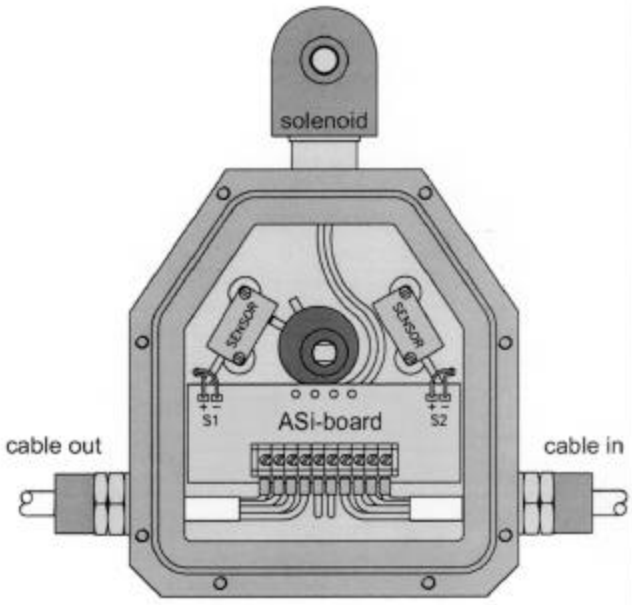
Automated Valves - The Slaves

Each valve monitor includes two position sensors or switches, an ASi module and a solenoid valve. Both limit switches and the solenoid valve connect to the ASi module inside the unit. The ASI module controls the solenoid valve and the feedback of the position sensors through the network.

Addressing the Valves

An ASi network can operate with a maximum of 31 valve monitors or "slaves". The node or address is stored in memory on the board once it has been programmed by the master or handheld programmer. The master calls the slaves in series and receives their responses. When all the slaves have been called, the master repeats the cycle again. Total cycle time for the system to address all 31 slaves is 5 ms.

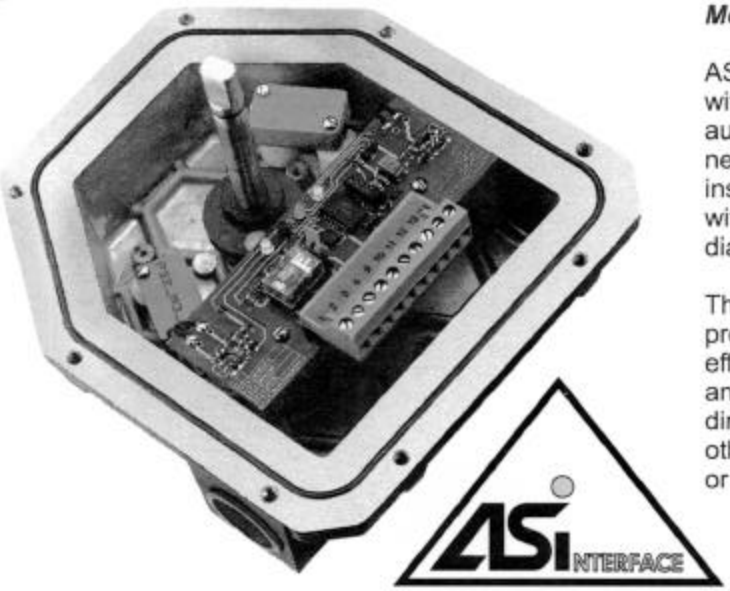
Moniteur Devices can assist you in implementing an ASi valve network. Contact you local Moniteur representative for details and find out how easy ASi is.



Challenger Valve

Bulletin No. SB-107C

ASI VALVE NETWORKING CONTINUED



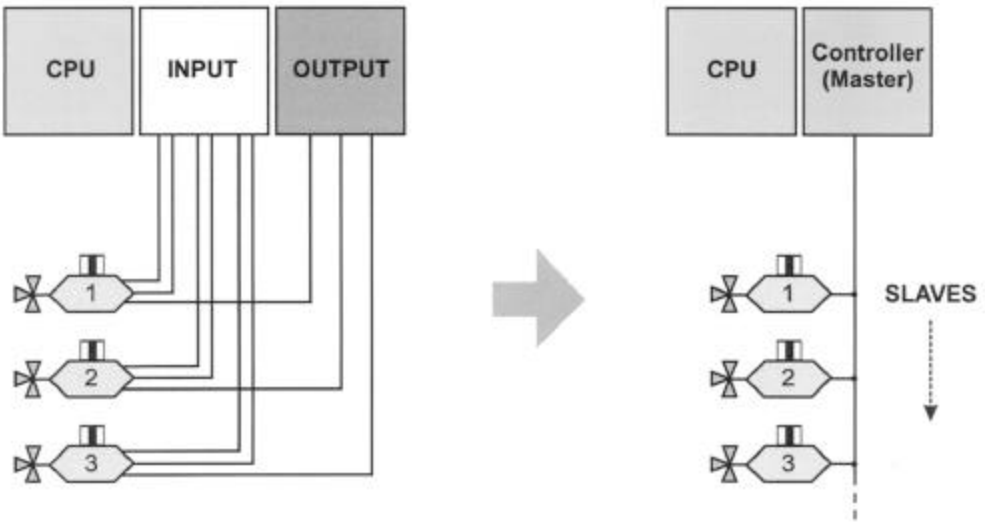
Moniteur ASi Valve Position Transmitters

ASi makes it simple. Equipping Moniteur VPTs with an ASi interface card adapts your on/off automated valves to an advanced ASi valve network. Money and time will be saved as installation and maintenance are streamlined with reduced wiring and improved system diagnostics.

The ASi network protocol was developed to provide industry with a simple and cost effective method of networking on/off sensors and devices. An ASi network can interface directly with your plant's PLCs or through other protocols such as DeviceNet, Fieldbus or Profibus via a gateway.

Advantages of ASi Valve Networking

* **Simplified Plant Wiring** - Automated valves can be inter-connected in any configuration to suit your needs. Utilizing only 2 or 4 wires eliminates the wiring "spaghetti" of older schemes.
* **Reduced Installation Costs** - Wiring and installation time are reduced with equipment utilizing quick-disconnect pin-style connectors.
* **Increased System Reliability** - Components require less maintenance and are designed to work "one way" only. Built-in diagnostic functions allow components to be continuously monitored.
* **Faster Start-Up** - Set-up is simpler and diagnostic functions speed troubleshooting.



Challenger Valve

Bulletin No. SB-107D

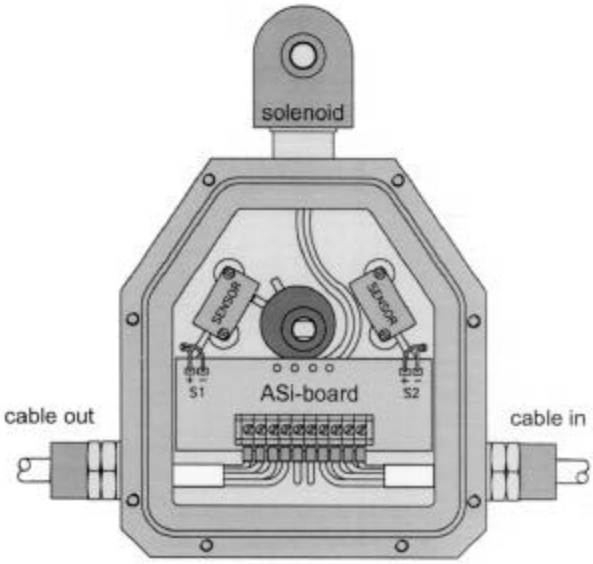
ASI VALVE NETWORKING CONTINUED

Available Configurations

Moniteur offers a variety of ASi interface cards to meet specific customer needs.

1) 2-wire, 2-sensor with solenoid power output capability of 2W @ 24VDC.
2) 2-wire, 4-sensor with solenoid power output capability of 2W @ 24VDC.
3) 4-wire, 2-sensor with an additional relay on the board to control separately powered 120 VAC, 220 VAC or 24 VDC solenoid valves. This version is shown at right with the wiring schematic below.

Contact your Moniteur sales representative for more details and ordering information.



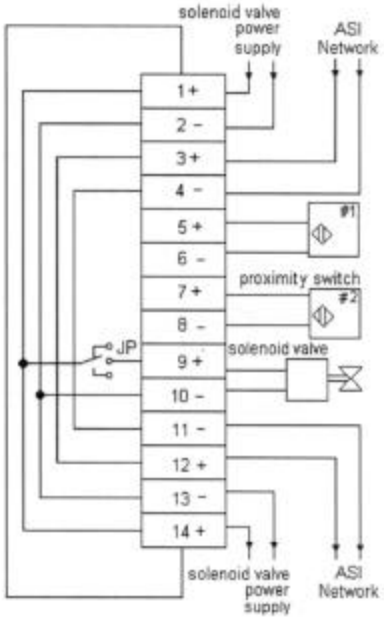
ASi Interface card specifications

Indication		ASi transmitter with local LEDs
Hazardous area		For division 1 and 2 areas

Standard ASi addressing board

Power:	voltage	30Vdc (ASi standard)
	current	<30mA
	indication	green led
Communication:	type	slave
	addressing	1 to 31 (0 from factory)
	cycle time	less than 5ms
ASI configuration:	Bit D0	proximity switch #2
	Bit D1	proximity switch #1
	Bit D2	ready signal
	Bit D3	output relay
	Bits P0, P1, P2, P3	not used
	IO code	IO = 1H
	ID code	ID = FH
Input:	type	Namur, by DIN 19234 or mechanical switch
	voltage	8Vdc ± 5% - ripple 5%
	current	active <1mA, not active >3mA
	indication	yellow led (each input)
	protection	reverse polarized
Available Output:	type	1 relay
	relay contact	programmable to NO or NC
	voltage	120VAC, 220 VAC or 24 VDC
	current	1A
	indicator	red led

Typical Wiring Diagram



Challenger Valve

Bulletin No. SB-108A

SCOUT VPT

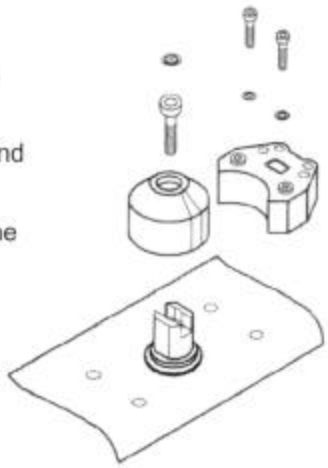
Moniteur's new Scout VPT series provides cost effective low profile position sensing for actuators utilizing NAMUR accessory mounting. These advanced sensors are available in both PNP and NAMUR output versions for compatibility with today's modern plant control systems.

Principle of Operation

* Simple in concept, the Scout VPT is easy and quick to assemble. The Position Transmitter "puck" mounts directly to the NAMUR accessory output shaft of your actuator. The double sensor block mounts to the accessory holes of the actuator. There is no adjustment or calibration required once the VPT has been installed.
* All Scout VPTs use Inductive Sensors. Inductive sensors are "solid state" (without moving parts) and are the most reliable of sensing methods, with a MTBF over 20 million cycles. Inductive Sensors have three parts of operation - the oscillator, triggering circuit and switching amplifier. The oscillator generates a high-frequency electromagnetic field in the sensor's target area. When a ferrous metal target enters the electromagnetic field (target area), eddy currents created in the target by the oscillator increase the load on the oscillator. At a specific load, the trigger circuit senses the reduction in oscillation and signals the switching amplifier to change the signal. Inductive Sensors consume electric power to operate, and must have approvals to be used in hazardous areas (see table below).
* NAMUR inductive sensors operate without the amplifier circuitry in the sensor, allowing use in all hazardous areas, provided the required signal amplifier is installed externally in the safe area.

Applications

* Compact valve position indication for applications where minimal space is available.
* Intrinsically Safe. NAMUR Inductive Sensors are rated Intrinsically Safe and must be used with an approved current and voltage limiting barrier.
* To locally ascertain valve position, the SCOUT Sensors include lights in the housing.



Mounting

* The position indicator kit includes the target puck and all mounting hardware for NAMUR standard actuators. See diagram at right.

Specifications - SCOUT Inductive Sensors

Sensor	Operation	Supply Voltage	Load Current / Target Absent	Load Current / Target Present	FM Approval
VFNN-0K20	PNP	5-60 VDC	< 0.7 mA	4-100 mA	-
VFNN-0820	NAMUR	5-25 VDC	< 1 mA	3 - 15 mA	**Intrinsically Safe****

Challenger Valve

Bulletin No.
SB-108B

SCOUT VPT CONTINUED

Intelligent Part Number System

V	F	N	N	-	0	K	2	0	-	1
Series	*Cover*	*Moniteur*	*Bearing*		*Shaft*	*Switch*	*Quantity*	*Conduit*		*Mounting*

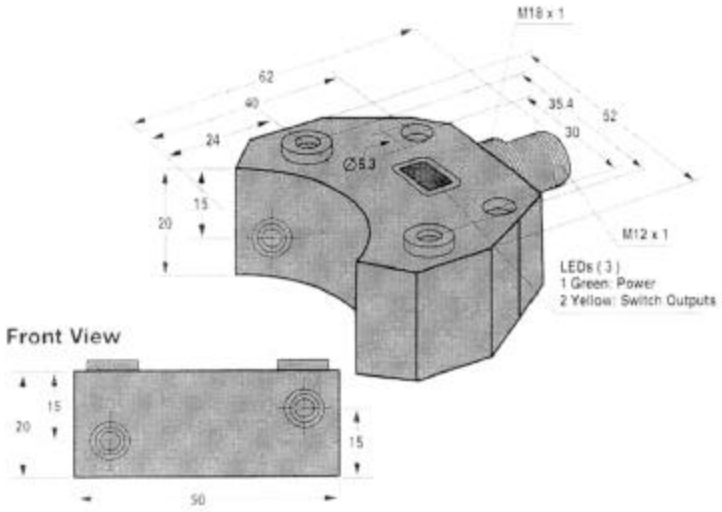
Base unit includes: Double Sensor Module, SS Mounting Hardware, Target Puck For 80 x 30 x 20 Actuator, Male "Micro" Connector

Description	Code
Series: Scout	V
Cover Flat Cover	F
Moniteur No Indicator	N
Bearing No Bearing	N
Shaft No Shaft	N

Description	Code
Switch Type (2 switches) PNP Inductive	K
NAMUR Inductive	8
Switch Quantity	2
Conduit DIN Micro (Male)	0
Mounting 80 x 30 x 20	1
80 x 30 x 30	2
130 x 30 x 30	3
130 x 30 x 50	4

See Moniteur Scout Mounting Selection Guide

Dimensions



Challenger Valve

Bulletin No. RP-100A

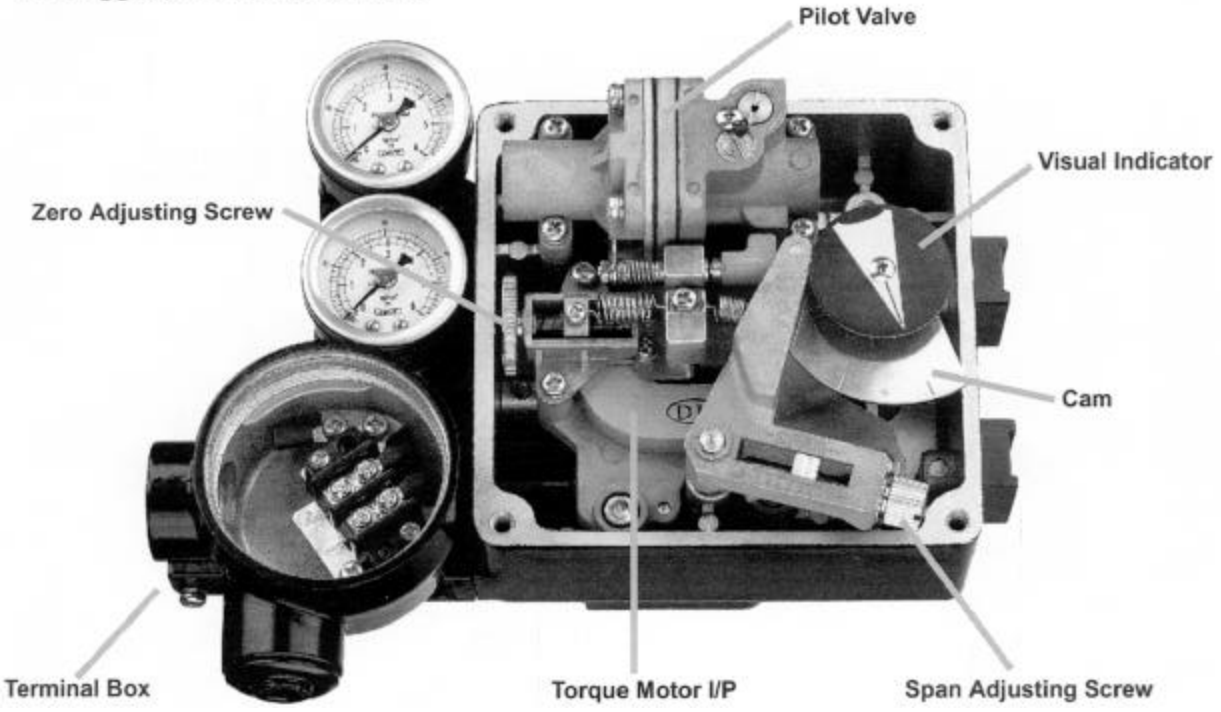
SERIES 40 ROTARY POSITIONER

A Solid Workhorse You Can Depend On For Consistent, Reliable Control

Moniteur's Series 40 pneumatic (3-15psi) and electro-pneumatic (4-20mA) positioners are advanced control devices which provide unparalleled stability in difficult environments.

- **Rugged Aluminum Housing With a Triple Corrosion-Resistant Interior and Exterior Coating** stands up to harsh environments
- **Reduced Bleed Pilot Valve** reduces air consumption by more than 50%
- **Precise Calibration** with simple SPAN and ZERO adjustments.
- **Unique Magnetic 4-20 mA I/P Converter** provides automatic compensation for supply pressure, atmospheric pressure and ambient temperature changes, and is unaffected by EMF.
- **Precision Zero-Hysteresis Coupling System** provides superior accuracy and repeatability by eliminating "slop".
- **Extremely Vibration Resistant Design** maintains consistent performance in poor conditions - no resonance effects from 5 - 200Hz
- **Stainless Steel Gauges Standard**
- **Optional Limit Switches and 4-20mA Feedback**
- **Each Positoner Performance Tested -** Test results included in the box with each positioner guarantee consistent performance

All Rugged, Metal Parts Inside



Challenger Valve

Bulletin No. RP-100B

SERIES 40 SPECIFICATIONS

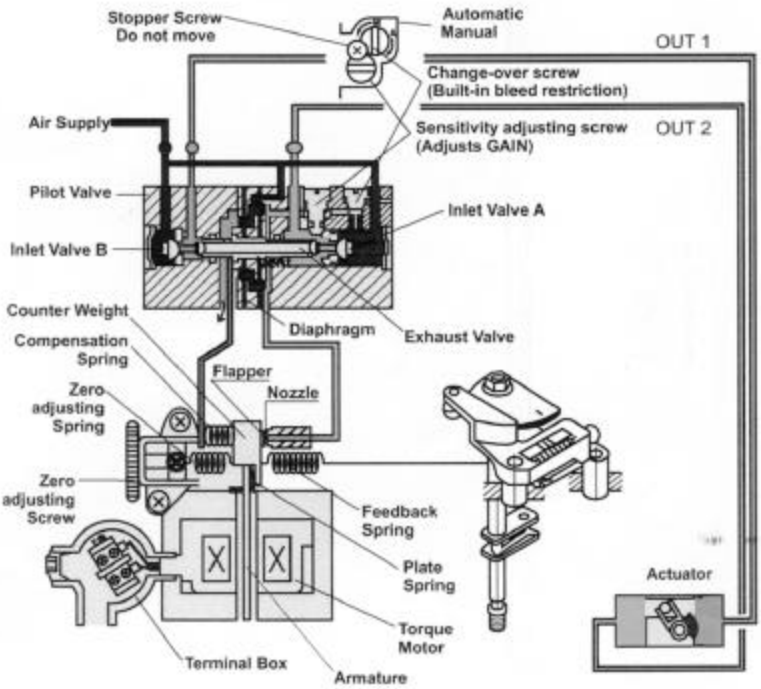
Specifications -3-15 psi Pneumatic

Input Signal	3 - 15 psig Split Range Available
Impedance	N/A
Stroke Range:	0 - 90°
Supply Range:	20 to 100 PSIG
Air Delivery:	7 SCFM
Air Consumption:	0.26 SCFM
Operating Temperature:	-4° to +158° F
Linearity	+/- 2%
Hysteresis	1% max.
Sensitivity	+/- 0.5%
Repeatability	+/- 0.5%
Pneumatic Connections:	1/8 NPT - Gauge Ports 1/4 NPT - Supply / Outlet
Enclosure:	Designed to NEMA 4, 4X
Enclosure Weight:	Approx. 4.8 lbs.

Specifications - 4-20 mA Electro-Pneumatic

Input Signal	4 - 20 mA @ 24 VDC Split Range Standard
Impedance	250 +/- 15 ohms
Stroke Range:	0 - 90°
Supply Range:	20 to 100 PSIG
Air Delivery:	7 SCFM
Air Consumption:	0.15 SCFM
Operating Temperature:	-4° to +158° F
Linearity	+/- 2%
Hysteresis	1% max.
Sensitivity	+/- 0.5%
Repeatability	+/- 0.5%
Pneumatic Connections:	1/8 NPT - Gauge Ports 1/4 NPT - Supply / Outlet
Enclosure:	Designed to NEMA 4, 4X
Enclosure Weight:	Approx. 6.5 lbs.

Principle Of Operation - Rotary Positioner



As the signal current from the controller increases, the plate spring of the torque motor works as a pivot. As the armature receives this rotary torque in the counter-clockwise direction, the counter-weight is pushed to the left, the clearance between the nozzle and the flapper will increase, and the nozzle back pressure will decrease. As a result, the exhaust valve of the pilot valve moves to the right, the output pressure of OUT1 increases (as OUT 2 decreases) to move the valve actuator.

The movement of the actuator in turn rotates the feedback shaft and spring. The actuator stays in the position where the spring force is balanced with the force generated by the input current in the torque motor. The compensation spring is for the direct feedback of the motion of the exhaust valve, and is connected to the counter weight to enhance the stability of the loop. The zero point is adjusted by changing the zero adjustment spring tension.

Challenger Valve

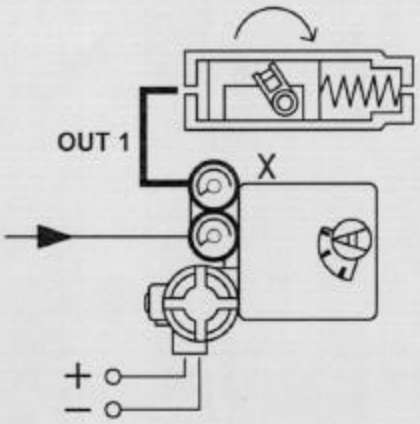
Bulletin No.
RP-100C

SERIES 40 PIPING CONFIGURATIONS

Piping Configurations - Rotary Positioner

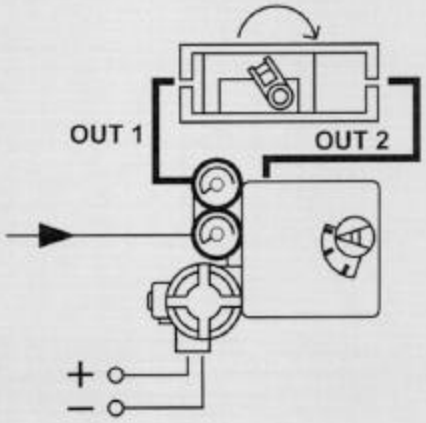
***Direct Acting** - Actuator Stem Rotates **Clockwise** As Input Signal Increases*
*Cam should be set with **DA** upwards*

Spring-Return Actuators



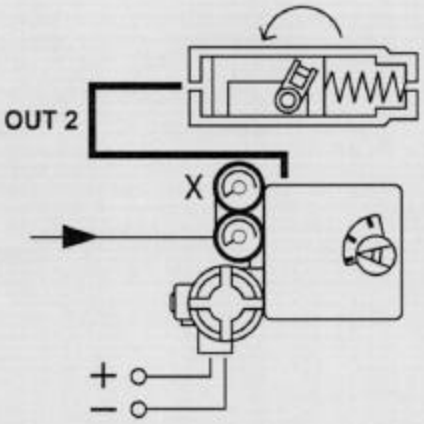
OUT 2 Port must be plugged

Double-Acting Actuators



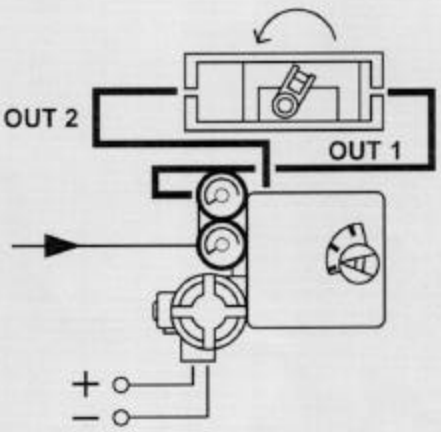
***Reverse Acting** - Actuator Stem Rotates **Counter-Clockwise** As Input Signal Increases*
*Cam should be set with **RA** upwards*

Spring-Return Actuators



OUT 1 Port must be plugged

Double-Acting Actuators



Challenger Valve

Bulletin No. RP-100D

SERIES 40 DIMENSIONS & ORDERING INFORMATION

Intelligent Part Number System

4	0	N	-	E	1	N	-	S	F
Series		*Shaft*		*Rating*	*Pilot*	*Feedback*		*Guages*	*Indicator*

Description	Code
Series:	
Pneumatic	40
Electro-Pneumatic	41
Shaft	
Rotary NAMUR	N

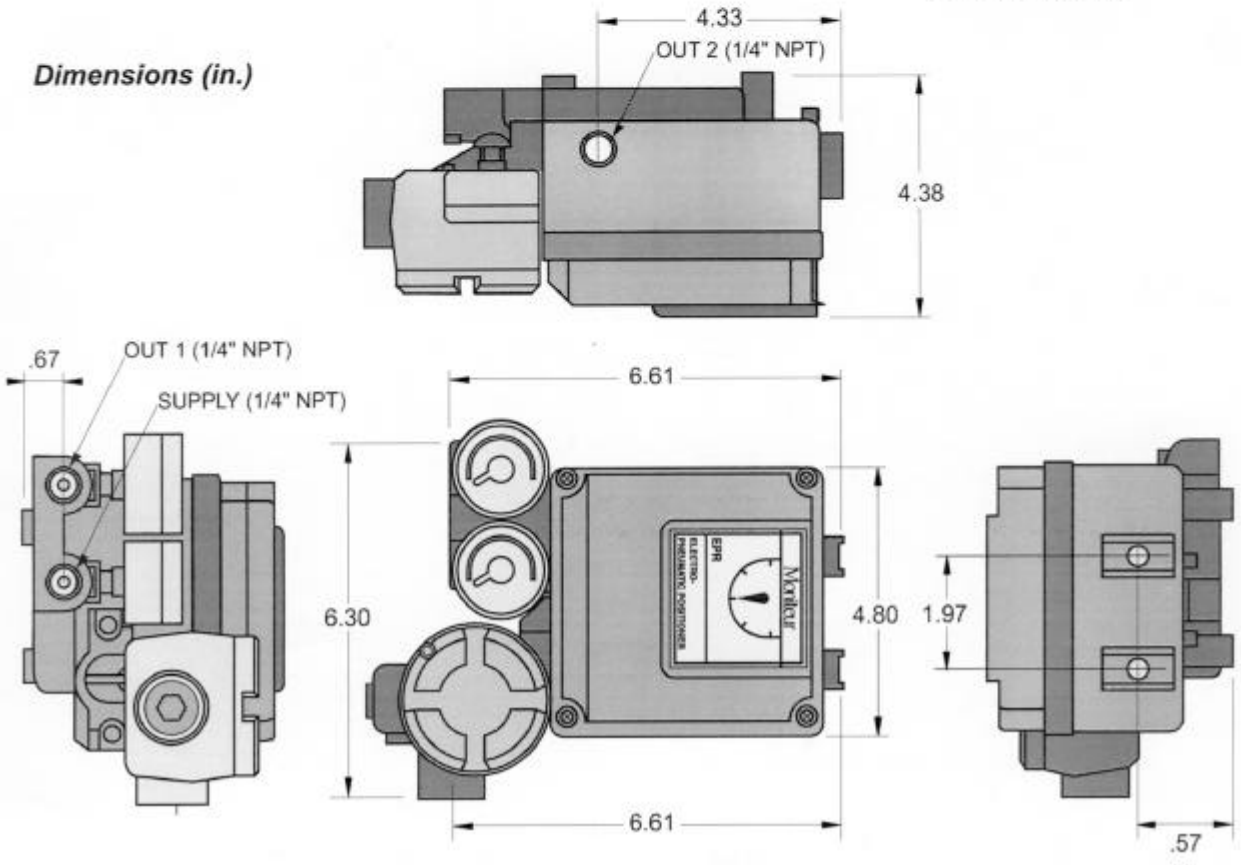
Description	Code
Electrical Ratings	
Standard / None	S
Ex md IIT6	E
Intrinsically Safe	I*
Pilot Valve	
Standard Orifice	1
Small Orifice	2
Extra-Small Orifice	3

Description	Code
Position Feedback	
None	N
4-20 mA	T
2 SPDT Limit Switches	S
Gauges	
None	N
Standard	S
Indication	
Flat Dial	F
Dome*	D

Positioners include: linear feedback cam, 7 SCFM spool valve, gauges and a NAMUR output coupler

*delayed availability

Dimensions (in.)



Challenger Valve

Bulletin No. SP-100A

SERIES 50 SMART POSITIONER

Moniteur's Series 50 SIPART Electropneumatic "Smart" Positioner is nothing less than the most advanced and accurate positioner in the world. Its advanced technology brings these unique benefits to the process industries:

True Zero Bleed Technology - Piezoelectric air switching technology vastly reduces plant air consumption while providing more accurate control.

Auto Commissioning of the Valve/Actuator - At the touch of a button, the SIPART's microprocessor cycles the control valve and adjusts itself automatically, providing high quality control even under unfavorable operating conditions.

On Board Keypad - All functions are controlled with just three keys, including setting the valve characteristic, adjusting the stroke, accessing valve diagnostics and many more.

Digital Readout of Valve Position

Local Operation including Auto-Manual Operation

On-Board Valve Diagnostics

Same Positioner for linear or rotary actuators

Intrinsically Safe and Explosion-Proof models available

HART Protocol and **PROFIBUS** modules available

Principle of Operation

The SERIES 50 SIPART electro-pneumatic positioner works in a completely different way than conventional I/P positioners. Comparison of the setpoint and the actual value takes place electronically with a microcontroller. If the microcontroller detects a deviation, it uses a 5-way switch procedure to control internal piezoelectric valves, which in turn regulate the flow of air into the actuating chambers. When connected to a loop powered 2-wire system, the SERIES 50 draws its power exclusively from the 4-20mA setpoint signal. The SERIES 50 delivers a level of accuracy and consistency not previously obtainable.

Below: *The SERIES 50 with the cover off. Just three keys access all of the pre-programmed functions.*

Industry Approvals:

FM / CSA
Class 1, Division 2,
Intrinsically Safe

Challenger Valve

Bulletin No. SP-100B

SERIES 50 DIMENSIONS & ORDERING INFORMATION

Intelligent Part Number System

5	1	S	R	-	0	0	0	S
Series		*Type*			*Hart*	*Alarm*	*Feedback*	*Gauges*

Description	Code
Series: Series 50	
IEC Zone 1	50
FM/CSA Div. 2	51
FM/CSA Ex-Proof	52
Type	
Single Acting	SR
Double Acting	DA

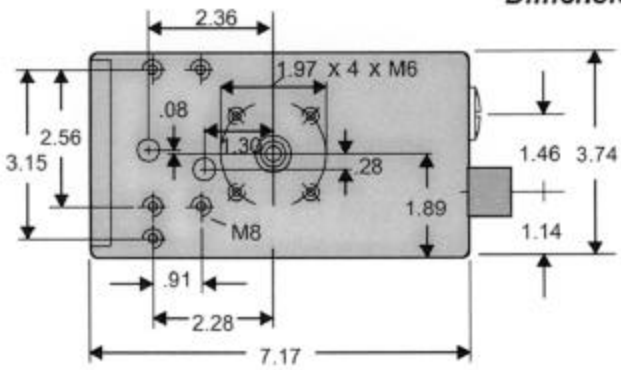
Description	Code
Hart Module	
None	0
With Module	1
Alarm Module	
None	0
With Module	1

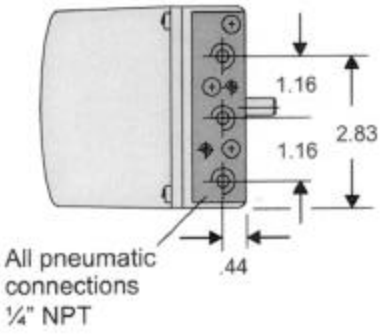
Description	Code
Position Feedback	
None	0
4-20 mA	1
Gauges	
None	N
With Gauges (SR)	S
With Gauges (DA)	D

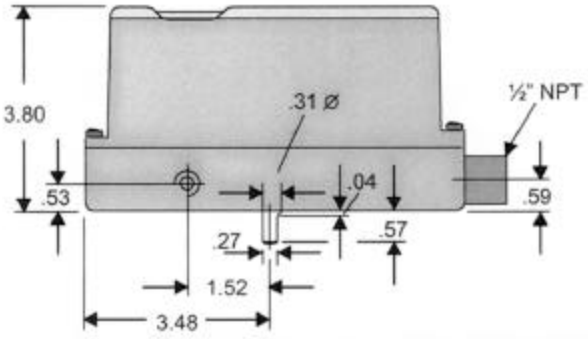
Specifications

Mounting Position:	Any, exhaust / shaft not upwards	Temperature Range:	-22° F to +176° F
Linear - Travel Range:	3 to 130 mm	Vibration Resistance:	8g at 100 Hz
Angle of Feedback Shaft:	16° to 90°	Enclosure Protection:	Nema 4, 4x
Rotary - Angle of Rotation:	30° to 100°	Enclosure Material:	Fiber-reinforced Macrolon
Connection - electric:	1/2" NPT	Pressure Display Block:	Anodized Aluminum
Connection - pneumatic:	1/4" NPT	Input:	4 to 20 mA
Controller: Five Way Switch:	Self-Adjusting	Current to maintain:	>3.6mA
Response Time:	1.5 secs.	Required load voltage:	10V, 11V w/HART

Dimensions







Mounting kits

Linear, 2 to 35 mm stroke	BKT-PS101
Lever for > 35 to 130 mm stroke	BKT-PS102
Rotary*, NAMUR 80 x 30 x 20	BKT-PS001
NAMUR 80 x 30 x 30	BKT-PS002
NAMUR 130 x 30 x 30	BKT-PS003
NAMUR 130 x 30 x 50	BKT-PS004

**Rotary kits include precision zero-hysteresis coupler*