

P3 Series Pneumatic Actuators



for Chemline ball valves up to 6"
for Chemline butterfly valves up to 10"

MATERIAL: 316 Stainless Steel

SERIES: P3SR – Spring Return
P3DA – Double Acting

CONTROL PRESSURE: 40 to 120 psi

OUTPUT TORQUES: Spring Return: up to 2,422 in.-lb.
(AT 80 PSI AIR) Double Acting: up to 5,757 in.-lb.



**P3 Series on Type 21
True Union Ball Valve**



**P3 Series on Type 57
Butterfly Valve**

Chemline **P3 Series** are quarter turn pneumatic actuators specially chosen for all sizes of ball and butterfly valves. These actuators are designed to withstand highly corrosive environments, underwater and marine applications. All offer long cycling life.

Normal working temperatures are –32°C to 90°C. They may be actuated with air or non-aggressive fluids up to 120 psi pressure.

P3 Series is one in a range of actuators specially selected for ball and butterfly valves. Hardware kits are available for mounting of actuators in the field. Also offers complete actuated valves, fully assembled and bench tested.

Features

Multiple Approvals and Compliances

- EAC
- DNV-GL
- SIL¹

Application Diversity

- Industrial process
- Submersion
- Off-shore service

Quality Built for Long Cycling Life

- Rated for over 1 million cycles
- Molybdenum grease-impregnated O-rings
- PTFE impregnated piston wear pads and wear rings
- Double O-ring shaft seals
- Minimum backlash with no play between parts
- Massive tooth engagement between racks and pinion

Corrosion Resistant

- 316 Stainless Steel

Standard Mounting Dimensions

- ISO 5211 bottom bolt circles and drives allow direct mounting to most valves
- NAMUR solenoid pad and VDI/VDE 3845 top shaft allow for mounting of all standardized accessories
- Standardized actuator mounting kits are available for many valve makes

Compact, Simple Design

- Dual-opposed rack and pinion design supplies high torque for its size and weight
- Air porting is integral, keeps design clean and simple

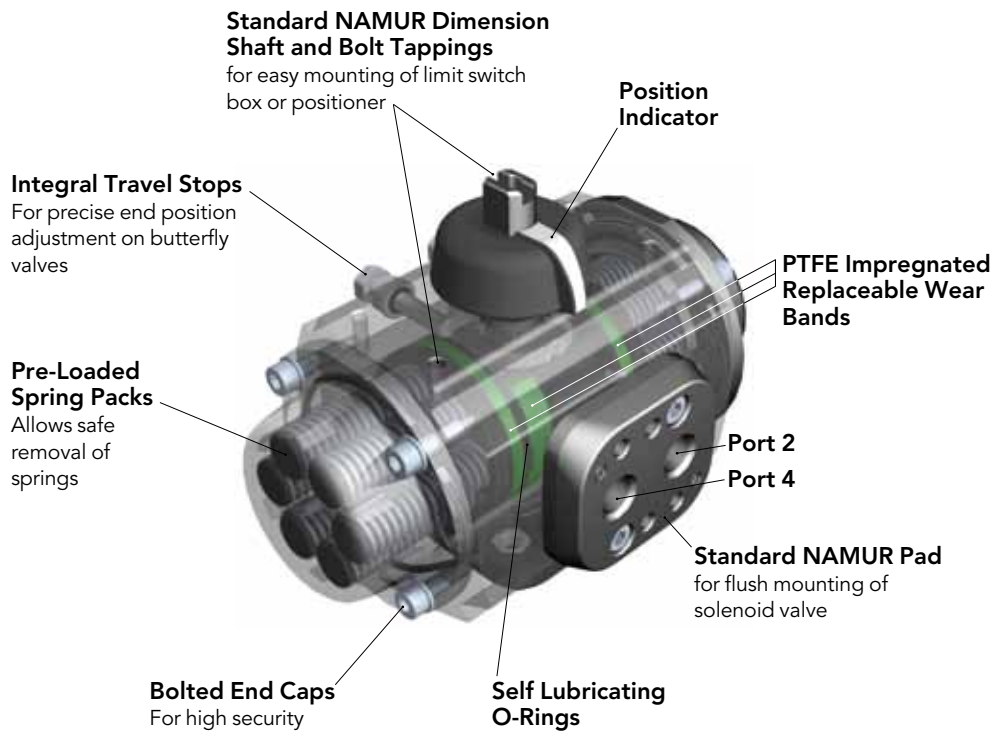
Integrated Travel Stops

- Permit adjustment of last 5 degrees of either open or closed position travel

Safety Spring Set

- Prevent dangerous release of spring tension during disassembly

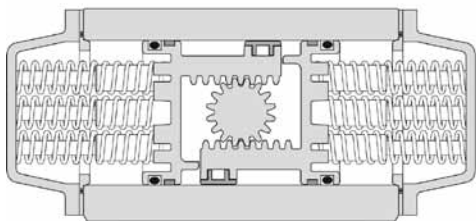
¹ Refer to SIL certificate for specific SIL rating



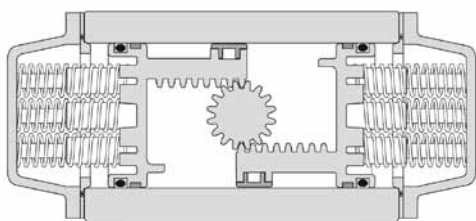
OPERATION—SPRING RETURN MODELS

Spring Cycle: Provided left port (4) is exhausted, the springs move pistons inward, turning the shaft 90° clockwise, as viewed from top of actuator.

Air Cycle: Air pressure to right port (2) moves pistons outward, compressing springs and turning the shaft 90° counter-clockwise, as viewed from top of actuator.



Spring End or Air Start Cycles



Spring Start or Air End Cycles

Standard ISO 5211 Bolt Pattern for mounting to valve



ISO 5211 Bolt Circles
on all sizes

ISO 5211 Star Drive Socket
for mounting flexibility on butterfly valves

technical

WORKING TEMPERATURES:

-32 to 90°C (-25 to 175°F)

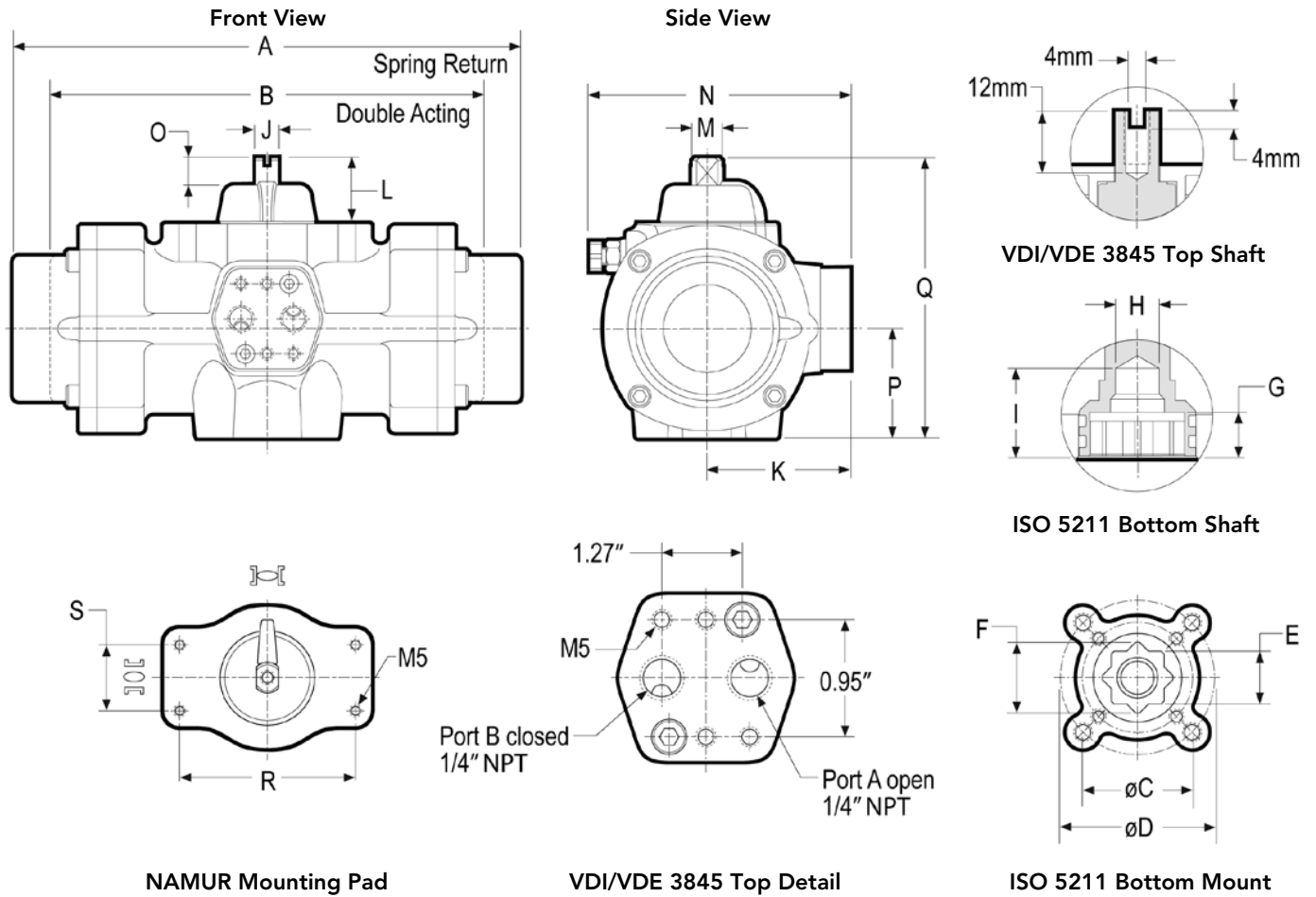
CONTROL PRESSURE:

Control pressure range is minimum 40 to maximum 120 psi

CONTROL MEDIA:

Compressed air only should be used

P3 Series Pneumatic Actuators

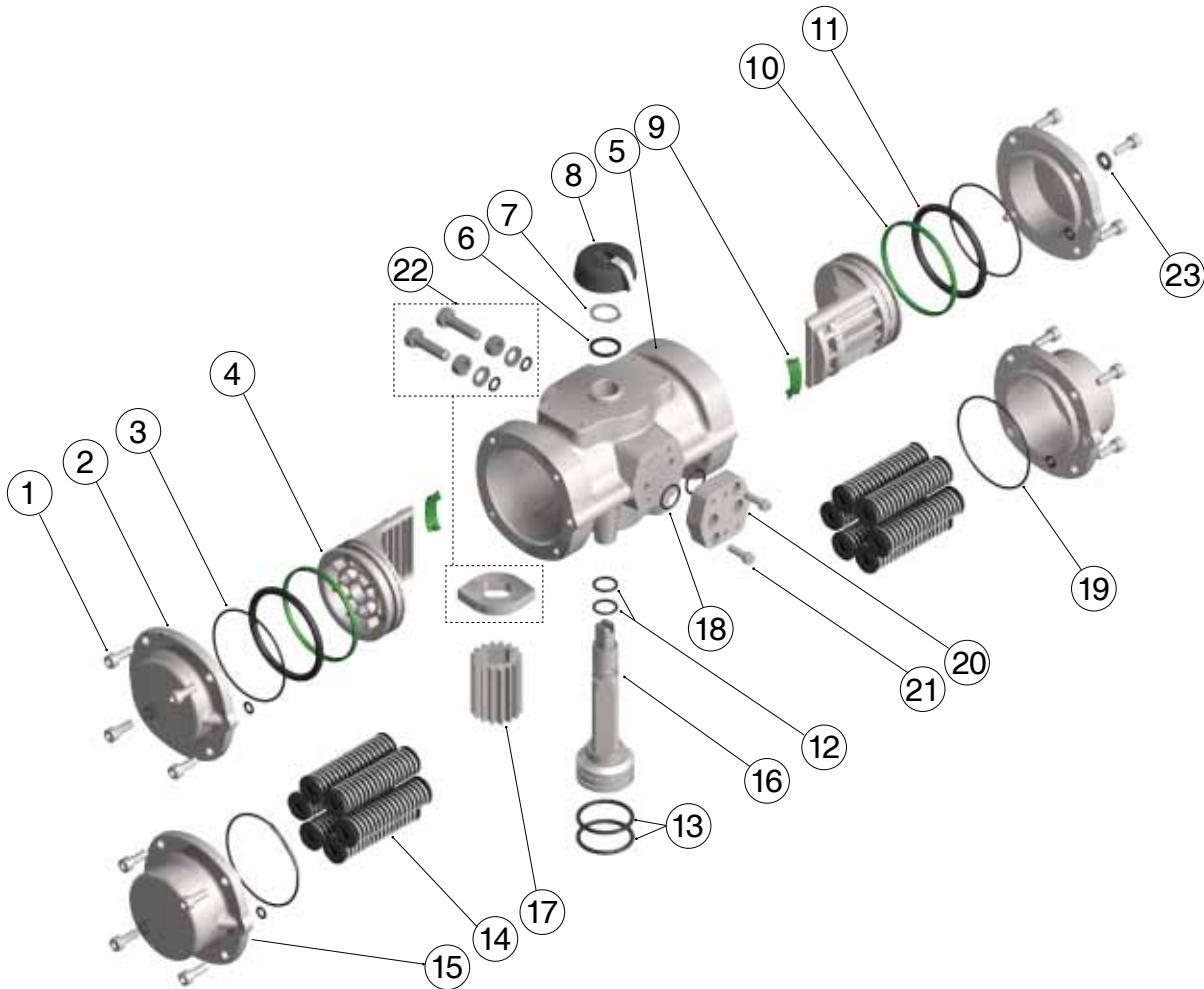


DIMENSIONS INCHES

Size	Item No. DA SR		A SR	B DA	ISO 5211 Bottom Mount						ISO 5211 Bottom Shaft				
					C			D			E	F	G	H	I
					Dia.	Thread	Depth	Dia.	Thread	Depth					
00	P3D00	P3S00	6.30	5.47	1.97 (F05)	M6	0.71	-	-	-	0.55	0.75	0.59	0.57	1.18
10	P3D10	P3S10	9.09	7.80	1.97 (F05)	M6	0.67	2.76 (F07)	M8	0.79	0.67	0.91	0.59	0.59	1.18
20	P3D20	P3S20	12.13	10.12	1.97 (F05)	M6	0.71	2.76 (F07)	M8	0.91	0.87	1.14	0.75	0.87	1.26
30	P3D30	P3S30	18.80	13.76	2.76 (F07)	M6	0.91	4.02 (F10)	M8	1.06	1.18	1.57	1.18	1.06	1.65
40	P3D40	P3S40	23.54	23.54	4.02 (F10)	M10	1.06	4.92 (F12)	M12	1.20	1.42	1.93	1.49	1.38	2.00

DIMENSIONS INCHES

Size	Item No. DA SR		N	O	P	Q	VDI/VDE 3845 Top Shaft				VDI/VDE 3845 Top Detail	
							J	K	L	M	R	S
00	P3D00	P3S00	3.58	2.17	1.77	4.37	0.39	0.43	1.18 (ISO-2)	0.54	3.15	1.18
10	P3D10	P3S10	4.43	2.58	1.96	4.96	0.39	0.43	1.18 (ISO-2)	0.54	3.15	1.18
20	P3D20	P3S20	5.47	3.19	2.80	6.31	0.63	0.43	1.18 (ISO-2)	0.86	3.15	1.18
30	P3D30	P3S30	7.30	4.06	3.78	8.31	0.63	0.43	1.18 (ISO-2)	0.86	3.15	1.18
40	P3D40	P3S40	8.77	5.11	4.55	10.71	1.26	1.10	1.97 (ISO-4)	1.77	5.11	1.18



PARTS

▲ Recommended Spare Parts

No.	Part	Size	Pcs.	Materials
1▲	Allen Screw	0 to 20, 40	8	316 Stainless Steel
		30	12	
2	Double Acting Cap	00 to 30	2	CF8M Stainless Steel
3▲	Cap O-Ring	00 to 40	2	Nitrile Buna-N
4	Piston	00 to 20	2	Polyaramide
		30, 40	2	Aluminum Alloy coated with cataphoresis
5	Cylinder	00 to 40	1	CF8M Stainless Steel
6	Washer	00 to 40	1	Polyamide 6
7	Spring Clip	00 to 40	1	Stainless Steel
8	Position Indicator	00 to 40	1	Polyamide
9	Piston Guide	00 to 20	2	Polyacetal
		30, 40	4	Polyacetal
10	Guide Ring	00 to 20	2	Polyacetal
		30, 40	2	PTFE-Bronze
11▲	Piston O-Ring	00 to 20	2	Nitrile Buna-N
		30, 40	4	
12▲	Upper Shaft O-Ring	00 to 40	2	Nitrile Buna-N

PARTS

▲ Recommended Spare Parts

No.	Part	Size	Pcs.	Materials
13▲	Lower Shaft O-Ring	00 to 40	2	Nitrile Buna-N
14	Preloaded Safety Springs Set	00 to 40	1	DIN-17223-C coated with cataphoresis
15	Spring Return Cap	00 to 40	2	CF8M Stainless Steel
16	Shaft	00 to 40	1	316 Stainless Steel
17	Gear	10 to 40	1	Aluminum Alloy coated with cataphoresis
18	Plate O-Ring	00 to 40	2	Nitrile Buna-N
19	Cap O-Ring	00 to 40	2	Nitrile Buna-N
20	Pneumatic Connection Plate	00 to 40	1	CF8M Stainless Steel
21	Plate Allen Screw	00 to 40	2	316 Stainless Steel
22	Travel Stop Assembly	10 to 40	2	304 SS nuts & bolts, 303 SS bushings, Nitrile O-rings
23	Washer	40	8	316 Stainless Steel

P3 Series Pneumatic Actuators



TORQUE – DOUBLE ACTING INCH POUNDS

Model No.	Supply Pressure (psi)					Model No.	Supply Pressure (psi)				
	40	60	80	100	120		40	60	80	100	120
P3D00	93	147	201	256	309	P3D30	1,825	2,804	3,789	4,770	5,757
P3D10	263	417	571	725	880	P3D40	4,708	7,124	9,549	11,963	14,392
P3D20	622	978	1,334	1,689	2,045						

TORQUE – SPRING RETURN INCH POUNDS

Model No.	Number of Springs	Spring		Supply Pressure (psi)									
				40		60		80		100		120	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
P3S00	1	62	42	50	31	105	85	159	139	213	194	–	–
	2	93	66	–	–	81	54	136	108	190	163	244	217
	3	116	91	–	–	56	31	110	85	164	139	218	193
	4 ¹	141	100	–	–	47	6	101	60	155	115	210	169
P3S10	1	166	115	147	97	302	252	457	407	612	561	–	–
	2	248	175	–	–	241	169	396	323	550	477	704	632
	3	358	253	–	–	164	60	318	214	473	368	627	523
	4 ¹	412	286	–	–	131	5	286	159	440	313	594	468
P3S20	1	371	223	399	251	755	607	1,111	963	1,467	1,319	–	–
	2	593	346	–	–	632	384	987	740	1,342	1,095	1,698	1,451
	3	816	494	–	–	483	162	839	518	1,195	874	1,551	1,229
	4 ¹	915	569	–	–	410	64	766	419	1,121	774	1,476	1,130
P3S30	1	831	484	1,338	992	2,321	1,975	3,304	2,958	4,287	3,941	–	–
	2	1,315	831	992	508	1,975	1,490	2,957	2,473	3,940	3,455	4,922	4,438
	3	1,799	1,246	–	–	1,558	1,005	2,543	1,989	3,527	2,973	4,511	3,957
	4 ¹	2,422	1,592	–	–	1,216	385	2,199	1,368	3,182	2,351	4,165	3,334
P3S40	1	2,437	1,566	3,141	2,271	5,561	4,691	7,981	7,110	10,400	9,530	–	–
	2	4,003	2,785	1,923	705	4,341	3,123	6,760	5,542	9,178	7,960	11,597	10,378
	3	5,569	3,829	–	–	3,295	1,554	5,717	3,977	8,140	6,399	10,562	8,822
	4 ¹	6,787	4,351	–	–	2,780	344	5,200	2,764	7,620	5,183	10,040	7,603

¹Standard Spring set

WEIGHTS, AIR CONSUMPTIONS AND CYCLE TIMES

Size	Item No.	Weight Lbs.	Double Acting				Spring Return				
			Air Consumption (li) ²		Cycle Time (Sec.)		Item No.	Weight Lbs.	Air Consumption (Standard litres) ²	Cycle Time (Sec.)	
			Open Port A	Close Port B	Open Port A	Close Port B				Open Port A	Close Port B
00	P3D00	4.85	0.15	0.18	0.15	0.15	P3S00	5.73	0.15	0.20	0.20
10	P3D10	10.36	0.35	0.45	0.25	0.25	P3S10	12.35	0.35	0.30	0.30
20	P3D20	13.01	0.80	1.05	0.40	0.40	P3S20	21.83	0.80	0.50	0.50
30	P3D30	39.46	2.10	1.90	0.60	0.60	P3S30	56.00	2.10	1.20	1.20
40	P3D40	84.66	5.30	5.30	1.20	1.20	P3S40	126.99	5.30	2.00	2.00

²1 Liter = 61.02 cubic inches

For all P series actuators

Accessories are supplied mounted to actuators and bench tested, or separately.

SOLENOID VALVES

Pilot solenoid valves control air supply air in and out of pneumatic actuators to open and close the valve and are electrically actuated. They are usually but not always mounted directly to the actuator. V Series Solenoid Valves are CSA/UL approved and designed for multi-million cycle life. These mount flush to P Series or any other NAMUR compliant pneumatic actuator. They are robust, reliable and corrosion resistant, offering high air flows and fast response. The same valve functions as both 5/2 way (for double acting actuators) and 3/2 way (for spring return actuators). Simply flip over the base plate which changes porting configurations. A screw type manual override is standard. Construction is glass reinforced polyamide body, nitrile seals, nickel plated ports and screws, and epoxy encapsulated coil. The electrical connection is a 3-pin DIN plug with 1/2" NPT for conduit connection. Grommet (cable gripper) and LED grommet (glows to indicate power) version plugs are also available. Versions are available in different voltages, also in intrinsically safe and explosion proof designs.



Solenoid Valves

LIMIT SWITCHES

Limit switches are for On and/or Off valve position feedback. YT Series Limit Switch Boxes are CSA/UL approved 2-position units which are easily mounted to P Series or any other NAMUR compliant rotary actuator. They are compact and robust, featuring quick-setting switch cams, high visibility position indicator beacon and a quick-access cover. Dual 1/2" NPT conduit entries and an 8-position terminal strip allow for wiring of a solenoid valve through the box. The standard model has an epoxy coated aluminum housing and single-pole double-throw switches rated for multi million cycles. An intrinsically safe version is available with inductive proximity switches. Also available are hazardous area enclosures. Another series is available with various BUS modules.



Limit Switches

DECLUTCHABLE GEAR OVERRIDE

The MO Series Manual Declutchable Gear Override allows manual valve/actuator operation of actuated valves in case supply pressure fails. The unit is mounted between the actuator and the valve mounting bracket. For normal powered operation the worm gear is disengaged by moving the lever bar upwards. Construction is epoxy coated cast iron housing with aluminum or welded steel hand wheel. These rugged units are suitable for indoor and outdoor use. The self-locking worm gear design offers safe and easy operation, positive manual positioning and long life.



Declutchable Gear Override

POSITIONERS

Valve positioners control actuator-valve position, responding to a signal from a process controller, usually electronic (most often 4–20mA) or sometimes pneumatic (3–15 psi). YT Series positioners are easy to mount directly to P Series actuators and other NAMUR compliant rotary actuators. They have epoxy coated aluminum enclosures and are also available in 316 stainless steel. All available models are attractively priced:

- **YT1200R 3–15 psi Pneumatic** – a conventional all-mechanical positioner
- **YT1000R 4–20 mA Electro-Pneumatic** – an electronic positioner designed for vibration resistance, better control and easy calibration
- **YT3300R 4–20 mA Smart** – a fully digital positioner with intelligent functions like auto calibration, PID control, also theoretical and user defined characterized output. Options include alarms (switch or relay output), 4–20 mA transmitter for position feedback and HART digital communication protocol.



Positioners

AIR FILTER/REGULATOR

A filter/regulator is required to protect pneumatic equipment with small orifices from clogging due to debris and to protect from corrosion or fouling due to excess oil or condensed water in the air supply. Chemline includes an air filter/regulator with all positioners mounted to actuators. Chemline recommends they also be supplied with all pilot solenoid valves. The F/R-A is a one-piece air filter/regulator and pressure gauge with a GRP plastic body, polycarbonate filter bowl and polyethylene filter element. The filter bowl has a manual drain valve.



Air Filter/Regulator