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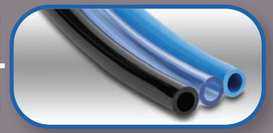

#1 Value in pneumatics

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Pneumatic Directional Control Solenoid Valves

- AVP Series 3-port, 2-position, body ported / stacking
- AVS-3 Series 3-port, 2-position, body ported
- AVS-5 Series 5-port, 2-position, body ported / manifold
- AVS-5 Series 5-Port, 3-position, body ported / manifold
- BVS, BVM Series 3-port, 2-position, modular solenoid valves / manifolds

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Pneumatic Air Preparation (FRL - Filters, Regulators, Lubricators)

- AF Series filters
- AR Series regulators
- AL Series lubricators
- AFR Series combination filter and regulators
- ARV Series manual shut-off pressure relief valves
- Pneumatic air preparation (FRL) accessories

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Air Cylinders and Position Switches

NITRA A-series air cylinders include bore sizes from 7/16" to 2" and stroke lengths from 1/2" to 18" to meet a broad range of applications. Mounting options include nose, pivot and double-end styles. C-series compact cylinders include bore sizes from 9/16" to 3" and stroke lengths from 1/4" to 4" to meet applications where space is an issue. Both series are dimensionally interchangeable with leading cylinder manufacturers.

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Polyurethane (PUR) Tubing

- 5/32" to 1/2", 6mm to 12mm diameters
- Black, blue , clear, red, yellow, and clear blue
- 100-foot and 500-foot package sizes
- Shore A 98 hardness
- Strong, flexible and kink resistant
- Made in the USA

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Nylon 12 Tubing

- Inch and metric tubing sizes available
- Black, blue , natural, red and yellow
- 100-foot and 500-foot package sizes
- High working pressure and temperature/chemical resistance
- Made in the USA

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Bonded Straight Polyurethane Tubing

- 5/32" to 1/2", 6mm to 12mm diameters
- 50-foot package size
- Shore A 98 hardness
- Bonding process maintains tubing geometry
- Double and triple bonded styles
- Made in the USA

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Polyurethane Coiled Tubing - Single and Bonded Multi-Tube

- Inch and metric sizes available
- Contrasting colors on double and triple coils
- Three working lengths for each size
- Shore A 98 hardness
- Strong, flexible and kink resistant
- Made in the USA

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Polyurethane Hoses

- 1/4" and 3/8" inside diameters
- 25 and 50-foot packages
- Clear blue color
- Lighter weight compared to rubber hose
- Straight and coiled styles
- Made in the USA

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Fittings and Flow Control

- Bulkhead union fittings
- Union straight fittings
- Union reducers
- Union tee and elbow fittings
- Stop, check and manual hand valves
- Meter-in, meter-out and inline flow control

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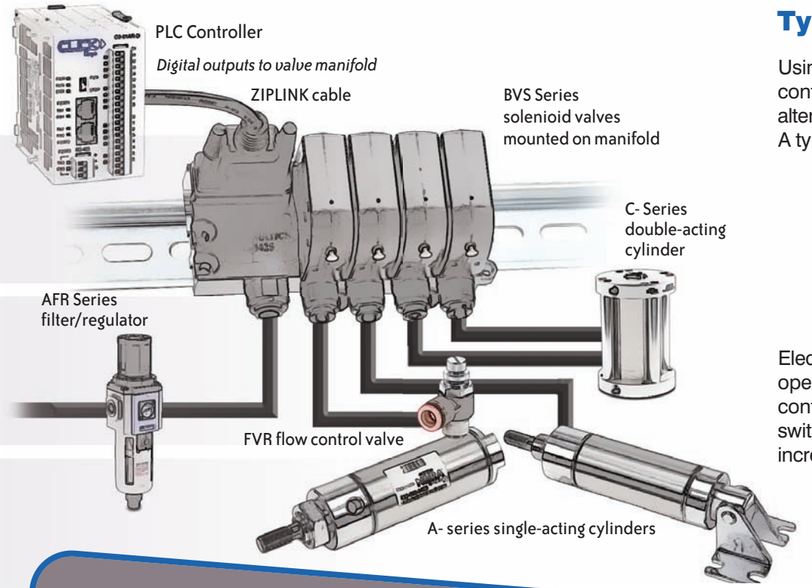
Typical pneumatic control system



Using pneumatics to perform mechanical motion in a control system can be a low-cost, safe and flexible alternative to hydraulics or even electrical components. A typical pneumatic system consists of:

- Air preparation devices to properly prepare the compressed air (filter, regulate and lubricate)
- Solenoid valves and their mounting manifolds to translate electrical command signals into an air-operated force
- Hose and tubing to move the air signal from the valves to mechnical motion devices
- Fittings that control and distribute the air signals as needed

Electrical output signals from a controller such as a PLC operate the solenoid valves to perform automatic control. Feedback devices such as cylinder position switches (signal sensed by the controller's inputs) can increase positioning accuracy and repeatability.

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Pneumatics FAQs

Q. What cylinder bore size should be used for my application?

A. Follow these steps to determine an appropriate cylinder bore size:

1. Evaluate the force (in pounds) needed to move the maximum load. To account for friction add another 25% as a rule of thumb.

2. Determine the minimum air pressure (in psi) that will be available at the cylinder. Keep in mind the available pressure at the cylinder will likely be less than the system pressure due to pressure drops in the air lines, fittings, valves, etc.

3. The following formula is used to calculate the required area of a cylinder piston:

A = F / P F is force in pounds P is pressure in psi A is area of the cylinder piston in square inches

Using the force from Step 1 and the pressure from Step 2, calculate the minimum piston area required and select a cylinder bore size with a piston area equal to or greater than the calculated value from the table below.

NITRA Cylinder Piston Area (square inches)	0.15	0.25	0.4	0.6	0.9	1.2	1.7	3.1

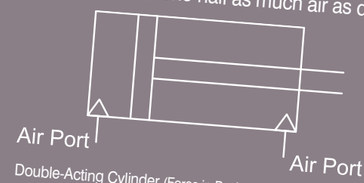
NITRA Cylinder Bore Size (inches)	7/16	9/16	3/4	7/8	1-1/16	1-1/4	1-1/2	2

Q. What is the difference between double acting and single acting spring return cylinders?

A. Double acting cylinders have two air connection ports. One of the ports will extend the cylinder rod and provide power in the "push" direction and the other port will retract the rod and provide power in the "pull" direction. Double acting cylinders are controlled by 4-way directional control valves and are a better choice when it is necessary to control cylinder speed.

Single acting spring return cylinders have one air connection port to extend the cylinder rod and provide power in the "push" direction. An internal spring retracts the cylinder rod in the "pull" direction. With only a spring (no air pressure) to retract the cylinder rod, very little power is available in the "pull" direction. Single acting cylinders use about one-half as much air as double acting cylinders and are operated by 3-way valves.

Single-Acting Cylinder with Spring Return (Force in Push Direction)



Double-Acting Cylinder (Force in Push and Pull Direction)

5 Reasons AUTOMATIONDIRECT.com is the #1 Value in Automation

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1 Our prices are low, we can't help it!

Our prices are well below the list price of more traditional automation companies because, with our direct business model and focus on efficiency, AUTOMATIONDIRECT has the lowest overhead in the industry. We pass the savings on to you by offering high-quality products at low prices.

2 Our service is exceptional.

Independent surveys completed by readers of Control Design magazine placed us at the top of the list for service *(in multiple product categories)* ten years in a row in their Readers' Choice awards *(2001-2010)*. Other surveys by magazines such as Control Engineering and Control have echoed the results.

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5 We guarantee it.

We want you to be pleased with every order. That's why we offer a 30-day money-back guarantee on almost every stock product we sell, including our software *(see Terms and Conditions for certain exclusions).*

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