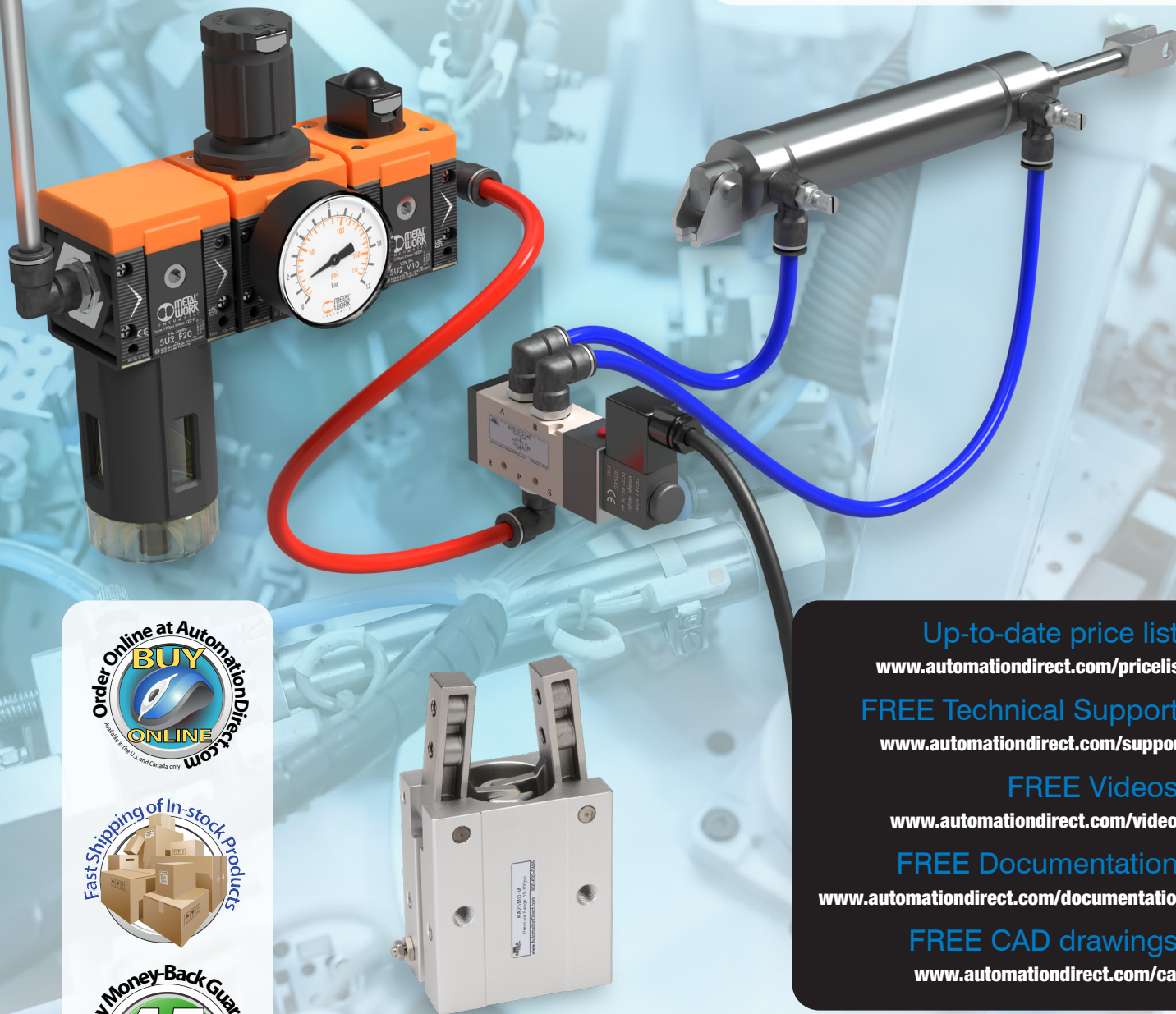


Pneumatics



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Basics of Pneumatic Systems

In manufacturing facilities, compressed air is so widely used that it is often regarded as the fourth utility after electricity, natural gas and water. Compared to electricity, compressed air is more expensive. However, lower up-front and maintenance costs make pneumatics the most popular and cost-effective choice for executing mechanical motion. It's hard to beat the simplicity and reliability of pneumatics.

Pneumatic systems are easier to design and use than their electrical counterparts in many applications because pneumatic cylinders and actuators provide a quick path to linear motion. These devices also provide significant force in a small space for clamping, positioning or holding a part in place.

Pneumatic components are also much more reliable than electrical devices as they are

less likely to fail and easier for a maintenance team to troubleshoot and repair so years of trouble-free use are expected. If pneumatic components do fail, many components such as air prep, valves, cylinders and other actuators are interchangeable with other brands so you can shop around for replacement components.

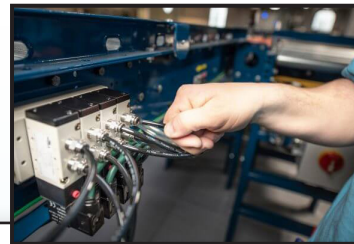
It is common to see modern machinery using pneumatics for basic motion that is controlled by electrical controls and solenoids. However, using devices such as pneumatic pushbuttons and limit switches, it is possible to have a machine powered and controlled entirely by compressed air.

All pneumatic systems will have certain basic components. The first is a compressor, and then a system to distribute the clean, dry air it produces.

Basic pneumatic components on automated machines include:



Air preparation system (shut-off/lock-out, combination filter/regulator, soft start valve, lubricator if needed)



Control valves and manifolds (manual, air pilot, solenoid-operated)



Air cylinders and actuators (rotary actuators and grippers)



Air connection components (push-to-connect fittings, tubing and hoses)



Pressure sensors

Pneumatic components you need, when you need them!

Most facilities have a plant air supply, so the machine pneumatic system starts with the air preparation unit to which the plant air is connected. Then the machine air prep feeds the pneumatic control, which then goes to actuators and air cylinders, the devices that create movement. Of course there are other devices in the mix such as pressure switches if pressure is being monitored. This is all connected with tubing/hoses and various fittings.

AutomationDirect has a large portfolio of pneumatic components, all at great prices and stocked at our local warehouses. Your production line does not have to be shut down for weeks or months while you wait for a replacement pneumatic component from your machine OEM or an overseas vendor. There is a good chance we have a direct replacement to fill your needs and can ship it to you much quicker to get your system up and running in no time.

FREE eBook Download
Pneumatics Practical Guide



NORGREN



Why buy pneumatics components from us?

At AutomationDirect we know that you have choices when it comes to pneumatics components. Many of these choices come with a high price tag, product availability issues or no one to talk to if you have a question. There are several advantages to purchasing your pneumatics components from AutomationDirect:



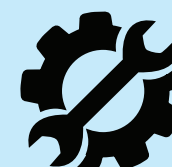
Price - As with all of our product lines, our prices are often well below the list prices of traditional automation suppliers. Our direct business model allows us to operate more efficiently than other suppliers and pass the savings on to you.



Availability - All of our pneumatic components are stocked in one of our local warehouses here in Georgia. That's correct, when we say we have them in stock, they are in our inventory and ready to be shipped to you. You will not have to wait months for a small fitting or solenoid valve to arrive nor will you have to order from several different sources just to get everything to complete your project. Our products are shipped out to you quickly. Not only do you get the parts you need, but you also get them fast too.



Free 2-day delivery for orders over \$49* - Not only is shipping free on orders over \$49, but you will also receive your order in 2 business days. **See Terms and Conditions for exceptions.*



Service - We give you options for self-service but at the same time, we are there when you need us. You can place your order online or call our customer service team. Have a technical question about one of our products or need help gathering up a bill of materials for one of your projects? You can call our free Technical Support.

Air preparation, where it all starts...

Air prep ensures downstream devices get the correct air cleanliness, pressure, lubrication and have a means of disconnecting pressure to a machine from the facility air supply. Air prep equipment includes disconnects (e.g. manual shut-off relief valves, isolation valves, etc.), air filtration, air

lubrication and pressure regulation. Whatever components you need for air preparation on your machine, AutomationDirect has them.



System Disconnects

An air system disconnect can be an isolation/lockout valve, a manual shut-off relief valve or a soft-start valve.



Soft-start valves

Soft-start valves are optional components that are activated with an electrical signal to gradually ramp up downstream pneumatic pressure. When the electrical signal is removed from the valve, it acts as a quick-dump valve.

Starting at \$91.00 (ASD-21-24D)



Manual shut-off relief valves

Manual shut-off relief valves are the most basic pneumatic disconnect component for isolating downstream equipment from upstream, and will also bleed or "relieve" downstream pressure.

Starting at \$38.50 (ARV-21)

Air Filtration Components

Ensure that the machine's compressed air supply is clean and dry. Contaminants in the airstream can wreak havoc on a pneumatic system over time. Air filters include particulate filters, coalescing filters and vapor removal filters.



Particulate air filters

Particulate air filters are good for removing dirt and metal particles, as well as some water.

Starting at \$21.50 (5U11F201)



Coalescing air filters

Coalescing air filters remove oil and even more water from the air supply.

Starting at \$62.00 (5U11D101)



Activated carbon filters (vapor removal)

Activated carbon filters remove oil vapor (odor) from the compressed air using a carbon filter.

Starting at \$90.00 (F82V-2AN-EPA)

Modular Pressure Switches



Modular pressure switches allow a control system monitor air pressure to see if it is over or under a certain value.

Starting at \$49.50 (5U11S101)

Air Regulators

Providing the correct air pressure for your machine or equipment is a very important task. This is accomplished using an air regulator. Air regulators decrease the incoming (high) pressure side of the incoming air to a specific pressure so that the correct air pressure is provided.



Standard air regulators

Standard air regulators are adequate for most applications and can adjust output air pressure to between 4 and 145 PSI.

Starting at \$27.00 (5U11R141)



Precision air regulators

Precision air regulators are used when precise air pressure is required for the equipment supplied by your air source. They can provide and maintain air pressure to within 0.05 PSI of the target pressure.

Starting at \$55.00 (BR-321)

Lubricators



Lubricators are sometimes required when older pneumatic equipment is used or for rotary air tools. Lubricators provide a small amount of light lubricating oil to the air supply to protect older equipment or allow some tools to operate properly.

Starting at \$27.00 (5U11L101)

FR Units



FR Units are standard filter/regulator units that combine the functionality of a filter and regulator into one component. Also available are precision filter regulator units. These units help save space and cost for your project.

Starting at \$35.50 (5U11B241)

Combination Air Prep Units

Combination air prep units are either a pre-assembled system of air prep components or a total air prep solution in one integrated unit.



Combination air prep assemblies

Combination air prep assemblies come pre-assembled with a manual shut-off valve, FR unit and lubricator all in one unit.

Starting at \$48.00 (5U11F20L101)



Total air prep units

Total air prep units contain all of the air prep equipment in one unit to save space and assembly time.

Starting at \$207.00 (TAP-1000)



Get your pneumatic system under control...

Pneumatic valves, also called directional control valves, are activated in a variety of ways including manually, solenoid-operated,

and air piloted. Pneumatic valves are operated to direct airflow to sequence operations in a pneumatic system.



starting at
\$31.00

Pilot Valves

Metal Work Series 70 and NITRA directional control pilot air valves are body-ported 3-port (3-way) or 5-port (4-way) spool valves that are actuated by pilot air.

- 1/8", 1/4", 3/8" or 1/2" NPT ports
- 3-port (3-way), 2-position, 5-port (4-way), 2-position, and 5-port (4-way), 3-position configurations
- Single valve or multiple manifold mounted valve applications

Standard Directional Control Valves

Metal Work Series 70 and NITRA standard directional control valves are body-ported spool valves available in 3-port (3-way) and 5-port (4-way) styles and are suitable for many general-purpose pneumatic control applications

- 1/8", 1/4", 3/8" or 1/2" NPT ports
- 2-position single solenoid, normally closed spring return and 2-position double solenoid available
- 2-position double solenoid, energize open/energize closed
- 3-position double solenoid, center closed or center exhaust
- NITRA models 24 VDC or 120 VAC solenoid coil
- Metal Work Series 70 models' coils are sold separately and support voltages of 12VDC, 24VDC, 24VAC, 110VAC, or 220VAC
- Can be used individually or mounted on optional manifolds
- Additional coil voltages possible with the purchase of a separate solenoid coil for NITRA models
- Internally and externally piloted model available



starting at
\$38.00

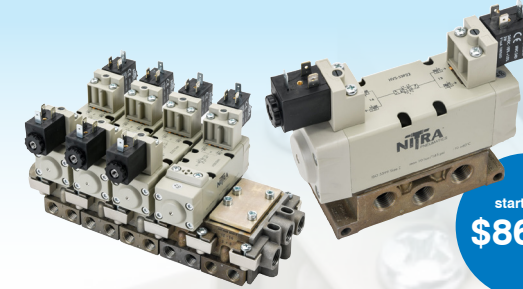


starting at
\$35.00

Stackable Directional Control Valves

Stackable directional control valves are 3-port, 2-position (3-way) poppet-style valves. These valves are great for lower-flow applications where saving space is a concern.

- 1/8" NPT ports
- 2-position, normally closed, spring return
- 24 VDC or 120 VAC solenoid coil
- Can be used individually or as a space-saving stackable system
- Additional coil voltages possible with the purchase of a separate solenoid coil



starting at
\$86.00

ISO 5599 Valves

NITRA ISO 5599 valves and other components are a robust directional control solution that conforms to the ISO 5599/1 standard. The ISO 5599/1 standard ensures that all components, regardless of manufacturer will be compatible and a perfect fit.

- ISO 5599/1 sizes 1 and 2 are interchangeable with all other brands meeting the ISO 5599/1 specification
- 5-port / 2-position and 5-port / 3-position valves available
- Order stand-alone bases or manifolds separately
- Solenoid coils sold separately in 12 & 24 VDC and 24, 110 & 220 VAC

Compact Modular Valves

NITRA compact modular valves offer unbeatable performance with the flexibility and modularity of multiple valves combined with sturdy mechanics and a high degree of environmental protection. The system offers flexibility from one to 16 valves, and input and output terminals for tubing of different sizes.

- Up to 16 valves (16 solenoids max) per manifold
- Mix valve sizes as needed
- 3-way/2-position, 5-way/2-position and 5-way/3-position valves available
- Selection of end and intermediate plates to cover a wide range of special applications
- Input terminals (left end plates) available for EtherNet/IP connections as well as multi-conductor cable (DB-25) connections
- Valves can be individually replaced
- IP65 (when NITRA DB25 cable used)
- 2 year warranty



starting at
\$85.00



starting at
\$39.50

Miniature Solenoid Valves

Miniature solenoid valves are an excellent choice for very low-flow applications where mounting space is very limited. Valves must be mounted to a compatible manifold (sold separately).

- 10mm and 15mm valve widths
- 2-way or 3-way normally closed configurations
- 3-way valves offered in latching versions
- 12 or 24 VDC solenoid coil
- Flying lead or pin-plug cable connections
- Manifolds sold separately



PAL Modular Electro-Pneumatic System

The Versatile PAL System - Your “Pneumatic Automation Link”

The Pneumatic Automation Link (PAL) system is an electro-pneumatic system that can contain both electrical I/O as well as a solenoid valve bank. In effect, a single assembly can combine solenoid valves of various types, digital or analog I/O and common power sources for all control components.

Using a limited variety of basic components, many different configurations can be built. Valves are compact yet have high flow ratings (Cv) and high performance. The system can be controlled by direct wiring if only pneumatic valves are used or via EtherNet/IP if a combination of electrical I/O and valves are part of your application. To simplify wiring and system design, DC power is connected through a central module using M8 connections. All PAL components come with an efficient diagnostic system.



Using the PAL System as a Modular Pneumatic Valve Bank

The Pneumatic Automation Link can be used as a valve bank without any field I/O. Valves can be controlled via an EtherNet/IP master, or by discrete control wiring through the conventional electrical modules.

Modular pneumatic valve bases support either 3 or 4 stations and 3, 4, 6 or 8 solenoids per base. Many valve configurations are available, including 3/2, 5/2 and 5/3 center closed.

- Up to 40 valve bases supported per system
- Conventional electrical modules have either 25-pin or 44-pin connection. All other electrical connections are M8 and M12 quick-disconnect
- The complete system, including all electrical and pneumatic components, is rated IP65
- Push-to-connect fittings are cartridge-style for easy replacement or changing the size of the fitting.
- Pneumatic system rated vacuum up to 145 psi



Using the PAL System for Field I/O

The Pneumatic Automation Link can be used as a field I/O system by itself. An EtherNet/IP slave bus coupler allows the system to be controlled remotely via EtherNet/IP master as well as a bus expansion coupler that allows the system's installation to be physically split up into parts while only using one connection to the master.

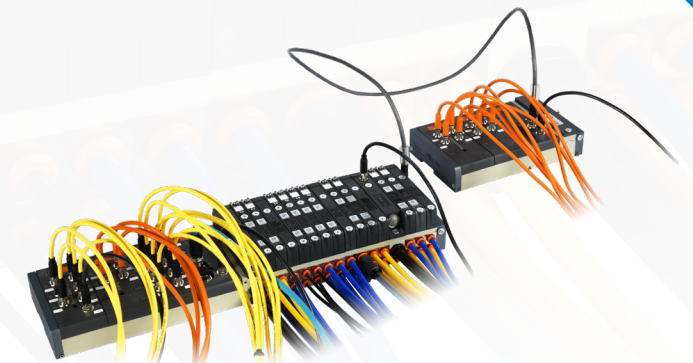
I/O modules for the NITRA PAL electro-pneumatic system include discrete DC input and output modules, analog modules in a variety of voltage and current ranges, and a temperature input module.

- Up to 20 digital input modules/128 digital input points supported per system
- Up to 20 digital output modules/128 digital output points supported per system
- Up to 4 analog input modules/16 analog input channels supported per system
- Up to 4 analog output modules/16 analog output channels supported per system
- IP65 rated equipment designed to be machine mounted
- Quick and simple wiring using M12 and M8 connections



Using the PAL System as an Electro-Pneumatic System

Using the PAL system as a complete electro-pneumatic system provides the most benefit to the designer and installer. With a large number of I/O and pneumatic valves supported, the possibilities of various configurations are practically endless. Add the fact that the PAL is machine mountable and IP65 rated and you have a very versatile, rugged, modular system that is easy to design, install and maintain.



Control your pneumatic process

Process (Pipeline) Solenoid Valves

NITRA pipeline valves allow ON/OFF control and/or mixing and diverting of process media such as air, oil, inert gas, water, and even some caustic materials. Both stacking and discretely plumbed NITRA pipeline valves offer 2 ports for ON/OFF control or 3 ports for mixing/diverting operations.

- Available in media-separated valves to prevent contact of media with metal
- 2-way diaphragm valves and 2- and 3-way poppet-style valves
- 1/8" to 1" FNPT ports
- 2-position, normally closed, spring return
- 24 VDC, 24 VAC, or 120 VAC solenoid coil
- DIN style wiring connector



starting at
\$28.00



starting at
\$6.25

Valve Cables & Connectors

Reduce wiring time with over-molded solenoid valve cables available in sizes to fit all NITRA directional solenoid valves. A range of options include 24V, 110V, and 230V operation, LED indication, and models with or without surge suppression. Field-wireable connectors are also available.

- 8mm DIN 43650C
- 9.4mm DIN style
- 10mm DIN 43650B
- 11mm DIN style
- 18mm DIN 43650A
- Miniature pin plug cables for miniature solenoids

Pneumatic Transducers

NITRA I/P transducers accept a 4-20mA current signal (I) from a controller and provide a proportional regulated pneumatic output pressure (P) to control pneumatic process equipment.



starting at
\$413.00

- Available in standard and compact form factors
- Integral volume booster for high-flow applications
- 4-20mA input compatible with PLCs and other controllers
- Several output pressure ranges applicable for industrial pneumatic and process control applications

Metal Work Regtronic pneumatic transducers convert an electronic signal into a regulated precision linear pneumatic output pressure. They offer a high air flow capacity and excellent linearity. Regtronic transducers also include a digital display, eliminating the need for a separate pressure gauge.



starting at
\$380.00

- Compact transducer housing
- 4-20mA, 0-5V, and 0-10V input compatible with PLCs and other controllers ; RS-232 communication and keypad control also supported
- Settable minimum and maximum pressure range up to a maximum of 145psi
- Internal dual solenoid design eliminates continuous supply air consumption
- 0-10VDC or 4-20mA output signal, plus (2) discrete outputs
- Models with M5, 1/8 NPT, or 1/4 NPT female pneumatic connections available

Manual Pneumatic Control Valves

Manually operated air valves are ideal for non-electrical operator-controlled applications.



starting at
\$31.00

Manual Air Valves

Metal Work Series 70 and NITRA pneumatic directional control manual valves include toggle style and rotary style hand lever valves, push-pull valves, and foot pedal valves. Foot pedal valves are 5-port (4-way) spool valves that are ideal for non-electrical operator control applications. Rotary-style valves are available in port sizes of 1/4" or 1/2" NPT . Push-pull valves are 1/8" or 1/4" NPT. Toggle style valves are 1/8", 1/4", or 1/2" NPT.

Pushbutton Manual Air Valves

Metal Work Series 70 and NITRA pushbutton valves actuate up to two 3-way or 4-way valves, or one valve and one to three electrical contact blocks. They fit in a standard 22mm hole, just like an electric pushbutton.

- Operator types include: pushbutton, mushroom, selector switch, & key switch
- 5/32" (4mm) Push-to-connect or 1/8" NPT fittings

starting at
\$2.75



Mechanically Operated Air Valves

Metal Work Series 70 and NITRA pneumatic limit switch valves allow purely mechanical actuation without the need for electrical signals.

- Varieties include plunger, plunger with roller, whisker, and thru-panel mounting options
- 5/32" (4mm) Push-to-connect or 1/8" NPT fittings



starting at
\$21.00

Miniature Manual Air Valves

NITRA miniature manual valves offer a simple, convenient method for directional control and other pneumatic valve applications. All valves can be thru-panel mounted for a very clean-looking operator interface.

- Pushbutton or toggle operator styles
- Aluminum or Stainless Steel body styles
- 3-port/2-position, 3-port/3-position and 5-port/2-position action
- Momentary (spring return) or maintained operation



starting at
\$28.00

Metal Work Regtronic vs NITRA NCP

Series	Input	Max Supply Pressure (psi)	Regulation Range (psi)	Flow Capacity*	Exhaust Rate*	Unit of Measure	Output Signal	Linearity	Hysteresis	Repeatability	Calibration	Air Consumption
Regtronic	0-5V, 0-10V, 4-20mA, RS232, manual	159.5	0.725-145	0.35 cfm @ 91psi up to 60cfm @ 91psi	~0.32 cfm up to ~53cfm	bar, Mpa, psi	0-10VDC or 4-20mA* PNP/NPN	0.5% FS	0.2% FS	0.2% FS	Pushbuttons and integral digital display	None in steady state
NCP (high pressure)	4-20mA	100	3-15* 3-27* 6-30*	12cfm @ 100psi	~2cfm	psi	none	0.75% FS	1% FS	0.5% FS	Manual potentiometers & separate pressure gauge	0.07 scfm midrange typical
NCP (low pressure)		150	2-60* 3-120*	20cfm @ 150psi	~7cfm			1.5% FS	0.5% FS			0.03-0.05 scfm midrange typical

* Model dependent



Create movement in your pneumatic system with pneumatic actuators

Pneumatic actuators convert pneumatic fluid power into mechanical motion.

Pneumatic Air Cylinders

Pneumatic air cylinders are the most popular pneumatic actuator style. They use compressed air acting on a piston inside a cylinder to move a load.



starting at
\$19.50

Non-Repairable Round Body Cylinders

Non-repairable air cylinders are the most common style used in industrial applications. There's no maintenance required with these cylinders, just millions of trouble-free cycles.

- Interchangeable with other common brands of round body cylinders
- Available bore sizes: 7/16" to 2"
- Excellent selection of stroke lengths
- Single-acting (spring return) and double-acting models
- Nose, pivot and double-end mounting options
- Type 304 stainless steel body with high-strength aluminum alloy end caps
- Also available in all stainless with Teflon-based rod and pivot bushings
- Factory lubricated for long, maintenance-free operation
- 250 psi operating pressure
- Models available with magnetic piston for position indication

Compact Air Cylinders

This series of compact stainless steel round body cylinders are great for applications where space is a concern.

- Interchangeable with other common brands of compact round body cylinders
- Bore sizes from 9/16" to 3"
- Excellent selection of stroke lengths
- Double-acting
- Type 304 stainless steel cylinder body with high-strength aluminum alloy end caps

starting at
\$59.00



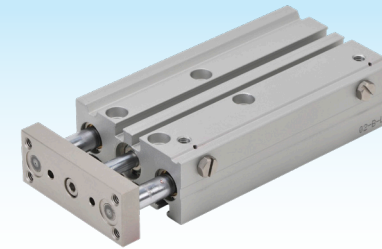
starting at
\$231.00



NFPA Tie Rod Air Cylinders

This series of heavy-duty cylinders meets applications where abusive conditions exist. Cushioned cylinders are also available to provide end-of-stroke deceleration at both ends.

- Interchangeable with other common brands of heavy-duty cylinders
- Bore sizes from 1½" to 4"
- Stroke lengths from 1" to 32"
- Double-acting
- Cushioned cylinder models available
- PTFE coated cast iron bushing
- High tensile ground and polished hard chrome plated steel piston rod
- High tensile steel torqued tie rods to allow flexure



starting at
\$159.00

Dual Guide Rod Air Cylinders

Dual guide rod cylinders are ideal for applications that require precise alignment or have large side loads. These cylinders feature dual guide rods, bronze bushings, extruded aluminum housing and switch mounting tracks.

- Interchangeable with other common brands of guide rod cylinders
- Bore sizes from 12mm to 63mm
- Stroke lengths from 10mm to 250mm
- Double-acting
- Maximum operating pressure of 142 psi
- Non-rotate tolerance of +/-0.10° or less

ISO 15552 Air Cylinders

ISO 15552 air cylinders are suitable for equipment requiring full metric dimensions. These cylinders are constructed with drawn anodized aluminum bodies, die-cast heads with chromed piston rods, and extruded in longitudinal slots for inserting retractable sensors.

- All aluminum body and end caps
- Piston is self-lubricating technopolymer and includes a plastoferrite magnet
- Interchangeable with other common brands of ISO 15552 cylinders
- Bore sizes from 32mm to 100mm
- Double-acting
- Stroke lengths from 25mm to 600mm
- Adjustable cushions on both ends



starting at
\$69.00



starting at
\$40.00

Compact Metric Extruded Air Cylinders

Space-saving, compact air cylinders in metric sizes meet a broad range of limited space applications. These high-quality cylinders are constructed with hard anodized extruded aluminum bodies and end caps.

- Bore sizes from 12mm to 100mm
- Stroke lengths from 5mm to 100mm
- Double-acting
- Magnetic piston for position location

Rodless Air Cylinders

Rodless cylinders perform the same function as rodded cylinders but instead of pushing/pulling a load with a rod attached to a piston, the load is carried alongside the piston and does not require the space needed to extend/retract a rod.

- Double acting with magnetic piston
- Front and rear adjustable cushions
- Tapped end caps mount
- Bore sizes from 16mm to 40mm bore
- Stroke lengths from 100mm to 1000mm



starting at
\$239.00

Pneumatic Air Cylinder Accessories



Air Cylinder Mounting Hardware

Air cylinder mounting hardware includes cylinder rod clevis mounts, cylinder rod eyes, rear clevis brackets, rear pivot eyes, flange mounts, cylinder mounting nuts, cylinder mounting brackets and rod nuts.

NFPA Tie Rod Cylinder Seal Repair Kits

Air cylinder seal kits are available for all NITRA NFPA tie rod cylinders to make them perform like new.



Cylinder Position Switches

With nine styles (including IP69K) that fit most major cylinder brands including all NITRA cylinders, rotary actuators, and grippers, these switches are manufactured with solid-state reliability for longer life. Compact and easy to mount on round body, tie rod, and extruded body cylinders, they have LED switch status indication and offer an integral cable with M8 or M12 wiring connector or wire leads.



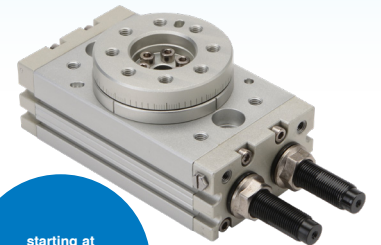
Pneumatic Rotary Actuators and Grippers

Pneumatic rotary actuators and grippers are additional types of pneumatic actuators to perform different mechanical functions besides just linear motion.

Pneumatic Rotary Actuators

Pneumatic rotary actuators are an excellent choice for many automation applications, available in four body sizes with or without shock absorbers. All are double-acting and have an adjustable travel range from zero to 190 degrees. Anodized aluminum bodies include integral mounting slots for position switches. A durable ball bearing hub, integrated piston magnets, and switch tracks are all standard.

- Four body sizes (10, 20, 30, 50 lb-in @ 80 psi)
- Anodized aluminum bodies
- Available with rubber bumpers or shock absorbers
- Position switch ready with integral mounting slots
- Zero to 190 degrees adjustable rotation



starting at
\$383.00

Pneumatic Grippers

Pneumatic grippers are an excellent choice for many automation applications. Grippers are available in seven different body sizes with parallel jaws or six different body sizes with angled jaws. Anodized aluminum bodies include integral mounting slots for position switches.

- Side mount grip and end mount grip versions
- Bore sizes from 6mm to 40mm
- Double-acting or single-acting N.O. or N.C.
- Anodized aluminum bodies
- Position switch ready with integral mounting slots



starting at
\$130.00



Vacuum Products for Pick-and-Place Applications

Vacuum products offer an innovative way to safely pick up and move a load in applications such as pick and place. Products

available include suction cups, ejectors, spring plungers, couplers, and end-of-arm tooling for a connection to a robot arm.

End-of-Arm Tooling Kits

End-of-arm tooling starter kits include enough components needed to create a single-beam or dual-beam end-of-arm tool for a vacuum pick-and-place application to connect on the end of a robot arm. Kits are simple to save time and money but still allow a degree of customization. Simply cut the structural rail to the desired lengths, determine the location of the suction cups then assemble the unit and add the robot interface flange for your brand of robot or drill your own using the included blank robot flange and you are ready to go.

- End-of-arm tooling components are used to create end-of-arm tooling that connects to a robot arm
 - Robot flanges available to connect to Fanuc, Rethink, Universal, and Yaskawa robot arms
 - End-of-arm tooling components can be purchased in a complete kit or be customized by purchasing components separately

Vacuum Components

Offer an innovative way to safely pick up and move a load.

- Vacuum suction cups available in flat and bellowed styles made from Elastodur, silicone, or Nitrile in sizes up to 78mm
- Vacuum ejectors are available in several connection styles with a high suction rate of up to 860 l/min
- Spring plungers for vacuum cup mounting to aid in moving products of variable sizes have cup connections of M5, G1/8, and G1/4
- Couplers available in G1/8 and G1/4



Robot not included

- Starter kits are easily assembled
- Includes structural rail, connectors, cup mounts, vacuum tubing, vacuum cups, fittings, basic ejector, flange for Universal robot, and blank robot flange
- Can be built to use internal or external vacuum
- Additional robot flanges are available to connect to Fanuc, Rethink, Universal, and Yaskawa robot arms
- Single profile kit minimum active 20 pound-force load (90 N), maximum active 78 pound-force load (350 N)
- Double profile kit minimum active 56 pound-force load (250 N), maximum 140 active pound-force load (625 N)



Image of single-beam kit unassembled



Complete Your Pneumatic Project with These Connection Components

Plastic Push-to-Connect Fittings & Unions*



- Large selection of different air fitting configurations
- Accepts tubing sizes 1/8 - 1/2 inch & 4mm - 16mm
- #10-32 through 1/2 NPT; "R" and "G" metric threads also available
- Tough thermoplastic fitting bodies, stainless steel tube gripping claws, nickel-plated threads with pre-applied Teflon sealant (O-ring on #10-32 threads)
- Threaded Elbow and Tee fitting bodies can be rotated after installation
- Working pressure: -29.5" Hg to 150 psi

Brass Push-to-Connect Fittings & Unions*



- Large selection of different air fitting configurations
- Accepts tubing sizes 5/32 - 1/2 inch & 4mm - 12mm
- #10-32 through 1/2 NPT; 1/8 through 1/2 inch R-thread, and G-thread
- Hybrid Imperial to Metric conversion fittings
- Nickel-plated brass bodies, nickel-plated brass threads with pre-applied sealant
- Nickel-plated brass release sleeve
- Threaded Elbow and Tee fitting bodies can be rotated after installation
- Working pressure: 0-300 psi
- Temperature range 0-175F

Stainless Steel Push-to-Connect Fittings*



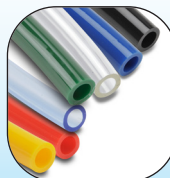
- For high-temperature and other harsh environments
- 316 stainless bodies
- 303 gripping collets
- Viton® O-rings
- Threaded Elbow and Tee fitting bodies can be rotated after installation
- Working pressure: -29.5" Hg to 290 psi

*NITRA push-to-connect fittings are compatible with:

- Nylon tubing
- PTFE tubing
- FEP tubing
- Polyurethane tubing
- LLDPE Polyethylene tubing

Tubing

Polyurethane (PUR) Tubing



- Inch and metric sizes available
- Seven standard colors: Black, blue, clear, red, yellow, and clear blue
- UV stabilized available in dark green
- 100 foot and 500 foot package sizes
- Strong, flexible and kink resistant



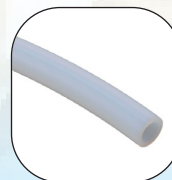
Nylon 12 Tubing



- Inch and metric sizes available
- Five colors – black, blue, natural, red and yellow
- High working pressure and temperature/chemical resistance



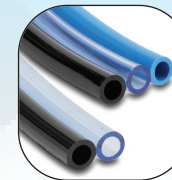
PTFE Tubing



- Inch and metric sizes available
- Natural color
- High working pressure and temperature/chemical resistance



Bonded Straight Polyurethane Tubing



- Inch and metric sizes available
- Contrasting colors
- Bonding process maintains tubing geometry
- Strong, flexible and kink resistant



Coiled Polyurethane Tubing - Single and Bonded Multi-Tube



- Inch and metric sizes available
- Contrasting colors on double and triple coils
- Three working lengths for each size
- Strong, flexible and kink resistant



Hose

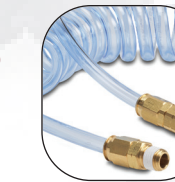
Reinforced Polyurethane Hose



- 1/4" and 3/8" inside diameters
- 25 and 50-foot package lengths available
- Clear blue color
- Lighter weight compared to rubber hose
- Strong, flexible and kink resistant
- NPT threaded or quick-disconnect couplings



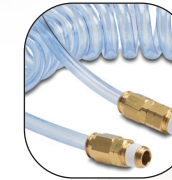
Polyurethane Coiled Hose



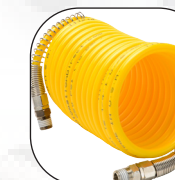
- 1/4" and 3/8" inside diameters
- 8, 12 and 16-foot working lengths
- Clear blue color
- Shore A 98 hardness
- Strong, flexible and kink resistant
- NPT threaded or quick-disconnect couplings



Reinforced Polyurethane Coiled Hose Nylon Coiled Hose



- 1/4" and 3/8" inside diameters and two fitting sizes available
- 8, 12, and 16-foot working lengths
- Clear blue color
- Shore A 85 hardness
- Strong, flexible and kink resistant
- NPT threaded or quick-disconnect couplings



- Heavy duty nylon has low moisture absorption rate
- Coiled hose allows operator freedom of movement and uncluttered work area
- Lightweight and economical
- Replacement swivel fittings available



Hybrid PVC Hose



- 1/4" and 3/8" inside diameters
- 25 and 50 foot hose lengths with fittings
- 100, 250 and 500 foot bulk lengths
- Works with air or water
- Strong, flexible and kink resistant

Hose Clamps



A hose clamp is designed to secure a hose/tubing over a fitting by compressing it against the fitting's barb, preventing air in the line from leaking at the connection site.

- Interlocking and adjustable styles
- Plated steel and stainless steel models
- Models for hose sizes up to 1.362 inches in diameter



Complete Your Pneumatic Project with These Connection Components

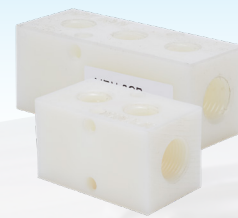
Pneumatic Manifolds

Aluminum and Stainless Steel



- Inlets range from 1/8" NPT to 1" NPT
- 2 to 20 outlets from #10-32 to 1/2" NPT
- Max input pressure 500, 1000, or 3500 psi depending on model
- 2-year warranty

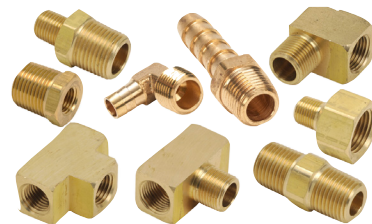
Polypropylene and Nylon



- 2 to 10 stations
- Variety of port sizes
- Maximum input pressure:
 - PP - 150 psi
 - Nylon - 200 psi
- 2-year warranty



Brass Threaded Fittings & Hose Barbs



- Machined from yellow brass bar stock or forging
- Work with water, oil, air and other gases
- Maximum pressure 800 psi

Specialty Fittings

Convenient push-to-connect fittings create miniature versions of popular system components, including regulators, gauges, flow controls, quick exhaust, and hand valves. Special-purpose fittings can be plumbed into a machine either permanently or for temporary use.



- Manual hand valves
- Miniature gauges
- Miniature regulators
- Pressure indicators
- Stop valves
- Check valves



- Meter-in flow control
- Meter-out flow control
- Inline flow control
- Shuttle valves
- Bleed valves
- Pilot operated check valves

Exhaust Silencers



Pneumatic exhaust silencers (pneumatic mufflers) are available in brass cone, brass flat, plastic, and high-flow aluminum styles, with NPT, R (BSPT) or M5 threaded connections. Add these to the exhaust ports of NITRA directional control solenoid valves to reduce noise.

- Maximum pressure = 150 psi
- Inch (NPT) and metric (BSPT) sizes
- Four exhaust silencer styles are available: bronze cone, bronze flat, plastic cylindrical and aluminum cylindrical

Quick-Disconnect Couplings

Pneumatic quick-disconnect couplings allow easy changing of tools or hose connections. Couplings (female) and plugs (male) are available in three of the most popular styles: IND (Industrial Interchange), ARO, and Truflate (automotive style).



- Plugs and air line couplings for 1/4-inch and 3/8-inch hose sizes
- Male or female NPT threaded connection on opposite end in a range of sizes
- Available in steel or chrome-plated steel
- Thread sealant supplied on all male fittings
- Maximum pressure of 250 psi
- Air couplings and plugs are sold separately

Swivel Air Fittings



Pneumatic quick-disconnect swivel fittings help prevent kinking, twisting, and unwanted torque forces acting on air hose connections caused by the constant movement of pneumatic equipment or frequent tool changes. Over time, these movements can lead to hose degradation and possible failure. Swivel fittings allow for circular rotation to relieve the strain placed on air hose/tubing at the connection point.

- Two independent-rotation points for a full 360° circular rotation and 45° angled rotation
- Lightweight, streamlined design
- Chrome-plated steel construction for long service life
- Industrial Interchange, ARO210 and Truflate style plugs
- Maximum pressure of 145 psi

Air Jets

NITRA brass pneumatic air jets are useful for numerous applications including cooling, chip removal, moving small parts, etc.

- 30 possible air jet combinations
- Several component options
- 35-piece kit available
- Made in USA



Buy air jet parts individually, or choose the handy AJS-35 kit. The kit contains multiple pieces of the nozzles, bases, retaining nuts, and holding clamps offered. Enough parts to make numerous custom assemblies.

Pneumatic Blow Guns

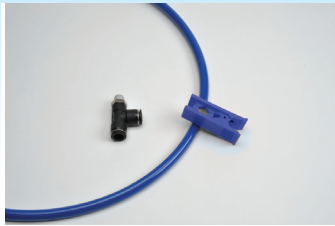
- Maximum input pressure 120 psi
- Connection: 1/4 female NPT thread size on inlet
- 12-month warranty





Pneumatic Fitting Instructions and Caution Information

Assembly Instructions

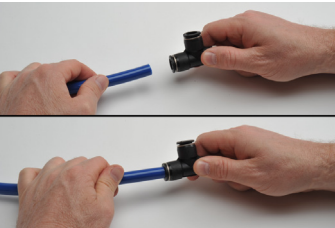


Prepare the NITRA tubing for cutting and make sure to have the proper tubing cutters like the NITRA TC-12 or TC-20.

(If cutting bonded tubing, carefully split the tubes with a knife and then pull apart as needed.)

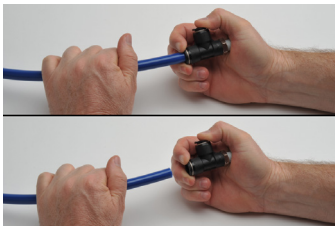


Cut the NITRA tubing at a right angle with the axis using a standard tube cutter. After cutting the tubing, make sure to check the cut end for an even cut with no debris.



Insertion of the NITRA tubing into fittings

- Make sure the tube is inserted fully into the fitting.
- Pull the tube gently to make sure it does not release.
- If the tube end is damaged or deformed, leakage or unexpected tube release may occur. Make sure to check tubing end thoroughly.



Removing the NITRA tubing from fittings

- Make sure the pressure in the tube is zero before releasing the tube from the fittings.
- To release the tubing, press the release ring at the end of the fitting and pull the tube with one hand.
- Inspect the released tube end and make a clean cut if it is damaged or deformed.

Common Precautions for Tubing and Fitting Products

Warnings:

- Do not use fittings with media other than air.
- Avoid installing with tubing under tension or with excessive bends.
- Do not use the product where weld spatters occur as fire may occur.
- Product damage or air leakage may occur at places where there is excessive rotation or vibration of the fittings.
- Use caution in water as the product may be damaged by surge pressure.
- Do not use the product where it is directly exposed to fluids such as cutting oil, lubricating oil, and coolant oil.

Cautions:

- Assemble the tubing only after cleaning away impurities such as dust and excess debris.
- Fitting products are recommended for air systems only. Avoid using for other purposes.
- When using tubing other than NITRA brand with NITRA fittings, be sure the tubing OD conforms to the tolerances in Table 1 below.

Table 1 - Tolerance of the Outer Diameter of the Tube

Tube Specifications	ø5/32 [ø4]	ø1/4 [ø6]	ø5/16 [ø8]	ø3/8 [ø10]	ø1/2 [ø12]
Permissible tolerance	+ 0.005 [+/- 0.13]				

Pneumatic Tubing Cutter

Part Number	Description	Pcs/Pkg	Wt (lb)	Price
TC-12	NITRA pneumatic tubing cutter for use with 1/8 to 1/2 inch and 4 to 12 mm outside diameter flexible plastic tubing.	1	0.1	\$5.75
TC-20	NITRA pneumatic heavy duty tubing cutter for use with polyurethane, nylon and other flexible tubing up to 2 inch [50mm] outside diameter.	1	0.2	\$12.00



TC-12



TC-20