

TECHNICAL SOURCE GUIDE

PNEUMATIC CYLINDERS AND THEIR USE AS PLATFORM LOCKS

By Roy Hoglund, Scenic and Lighting Designer, University of Wisconsin - Oshkosh

Pneumatic cylinders (actuators) have been used in platform control for the stage for over twenty years. However, many serious problems have plagued the users—the size of the cylinders was usually large and difficult to place inside of platforms, it was difficult to provide enough air supply pressure and volume to engage the cylinder without connecting a supply hose, and the high level of sound when pressure was released was a deterrent.

The Pancaked® Cylinder (a tradenamc used by Fabco-Air Inc.) is a short-stroke, large-bore pneumatic cylinder which addresses the problem of size. Its smallest cylinder, at 2-3/4" in length with a 1-1/2" bore, can produce 124 lbs. of push power using 60 lbs. of air pressure. This means that, typically, only two cylinders of this size are needed to secure a standard 4 x 8 fixed- castered platform. It is important to note that bore size and air pressure are directly related to the lift strength of a cylinder. Bore area in inches square multiplied by pounds per square inch in applied air pressure is the equation used to estimate the lift of a pneumatic cylinder.

The double-acting design of a pneumatic cylinder makes it necessary to have two air pressure lines connected to each cylinder. One line is used to deliver the air pressure to push the cylinder in one direction, and the other is the fine used to deliver the air pressure to retract the cylinder back to its starting position. The cylinder usually requires greater pressure to push the cylinder than is required to retract the cylinder.

Although cylinders are available in many different sizes and configurations, that which is typically used will have a rod with a female-threaded end to accommodate any number of attachments that may be required. For platform use, a foot with a rubber pad is desirable to prevent the foot of the rod from slipping when the cylinder is in the down or locking position. Single-acting cylinders have a spring retractor to return the cylinder to its original position after the air pressure has been released.

Manufacturers suggest that a non-rotating cylinder be used in cases where rotation of the unit is undesirable. The non-rotating cylinder has two rods within the unit guiding the cylinder travel. This prevents rotation when the cylinder is in the engaged position.

Another component required in the use of cylinders in platforms is a small high pressure air supply. Very small air supply containers, such as emergency air supply containers able to hold 1000 psi, can be acquired from some army surplus distributors. It is also possible to obtain more expensive versions, which hold lower psi, from medical supply distributors. The typical small, low psi container comes in cylinder or pancake shapes. The heights can range from 7-3/4" to 8" in a variety of lengths. The tank must be able to hold 124 psi and enough volume to accomplish the task desired.

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To create an avenue through which the pressurized air can travel, a plastic tube and fittings are necessary. The polyethylene plastic tube, which works best, and fittings should be rated at least to 120 lbs. of pressure and can usually be purchased from a hardware store or a local Grainger distributor. Typical fittings usually require an insert sleeve and a compression nut to lock the tube in place. It also requires small wrenches for installation in tight places.

Camozzi Pneumatics has a line of fittings, called Super-Rapid Pro Fit, which are designed with a spring-loaded collar that allows the plastic tube to be inserted into the fitting without using a wrench. To release the plastic tube, the spring-loaded collar is depressed and the tube is pulled out. These fittings, although more expensive than the usual fittings, can cut installation time in half.

Other items necessary in the installation of a pneumatic cylinder system for locking platforms in place are a two-position, four-way valve, an adjustable regulator, and a noise suppressor at the end of the air release line. Many of these items can be acquired from the same companies which sell the pneumatic cylinders. See illustration for typical design of pneumatic locks.

For exact sizes and psi requirements for your specifications, contact one of the manufacturers listed below.

American Cylinder Co.

Peotone, IL. 60468

Phone: (708) 258-3935

FAX: (708) 258-3980

Camozzi Pneumatics

P.O. Box 59974

11111 Zodiac Lane

Dallas, TX. 75229-1974

Phone: (214) 247-5411

FAX: (214) 247-5178

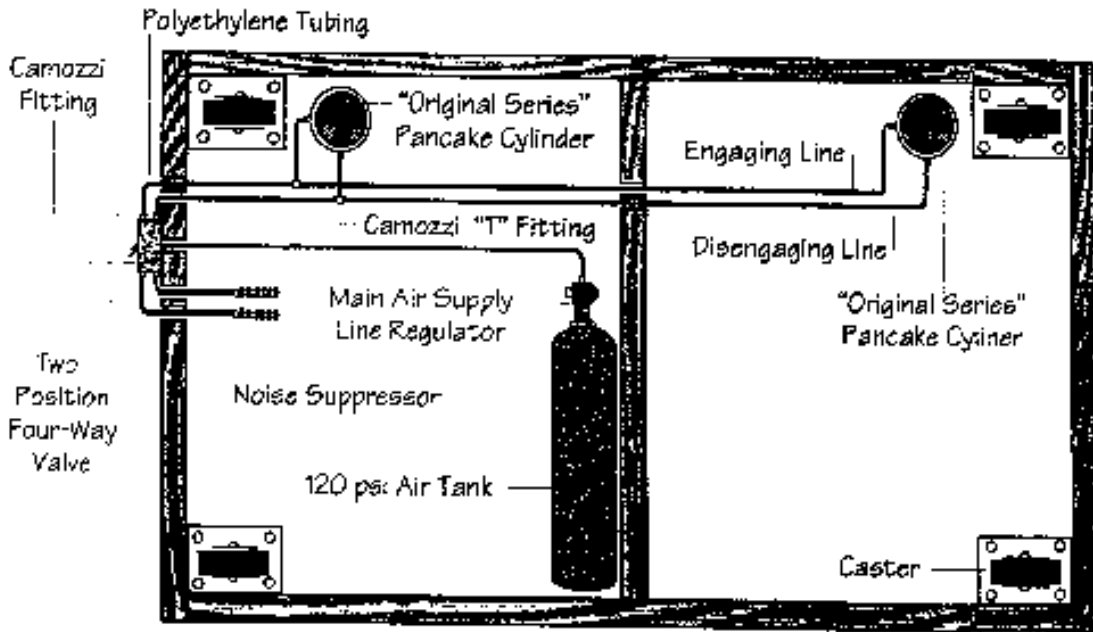
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Fabco-Air

P.O. Box 5159
Gainesville, FL 32602
Phone: (904) 373-3578
FAX: (904) 375-8024

Numatics Actuator

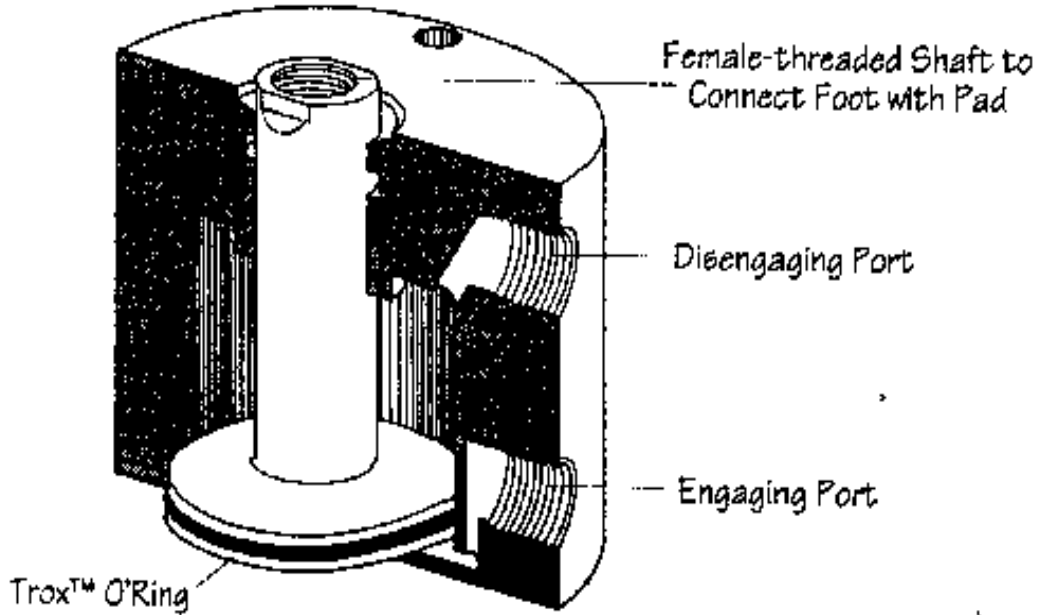
7106 Crossroads Blvd.
Suite 216
Brentwood, TN. 37027
Phone: (615) 370-4440
FAX: (615) 370-0538



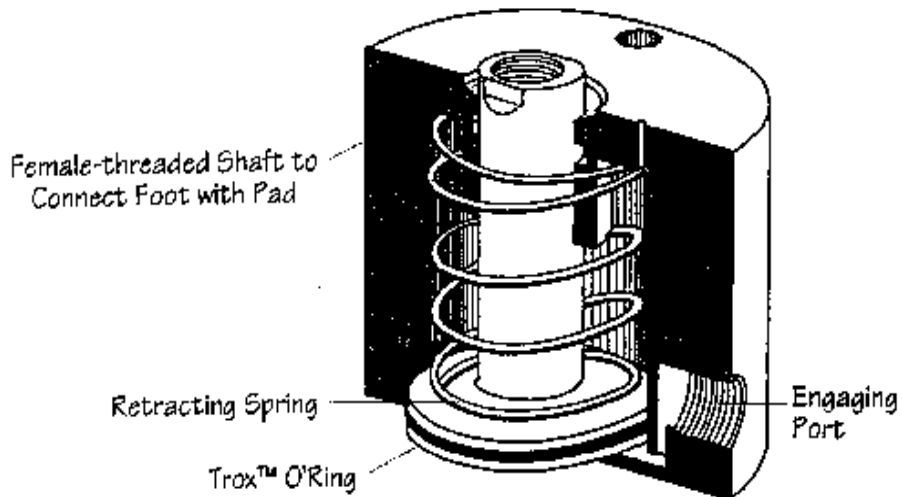
BASIC LAYOUT OF PANCAKE PISTON STOPS FOR A PLATFORM

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CUTAWAY DIAGRAMS OF CYLINDERS



"Original Series" C-221X Pancake Cylinder



"Original Series" C-2210 Spring Retracted Pancake Cylinder

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