



Chapter 13

PNEUMATIC DEVICES

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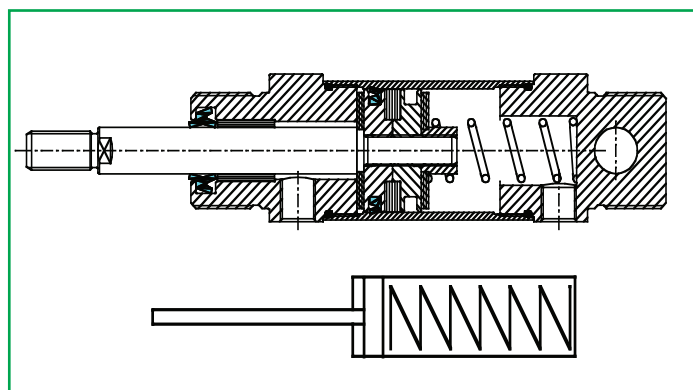
OPERATING PNEUMATIC ELEMENTS

The operating pneumatic elements (actuators) are the final bodies of a system that carry out mechanic work and perform many operations. The actuators that carry out displacements or rotations with alternative movements are called cylinders.



The figures reported herein show the two versions of single-acting cylinders, the first one above is the thrust type and the second one is the tension type with their respective graphic symbols.

We remind that single-acting cylinders are limited in their stroke, because the presence of the springs does not allow unlimited lengths due to their nature, and must be lodged inside the cylinder, except for certain particular cases where they have a small bore with short strokes.



13.4 DOUBLE-ACTING CYLINDERS

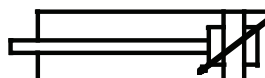
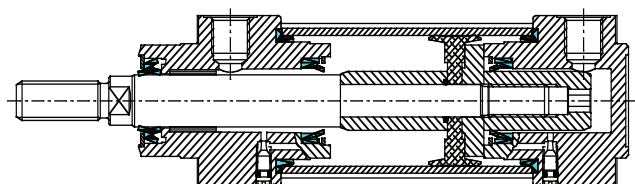
This type of actuator produces both thrust and tension forces sending pressure alternatively to the two sides of the piston. As previously said, the thrust and tension forces have different values.

They carry out different kinds of operations and, in this case, the load may be bound to the rod. It is possible to move the applied load controlling the speed easily by means of proper device sizing.

Cylinders usually have the task of stopping the load entrusted to the covers, that represent the gauge block of the stroke limiter.

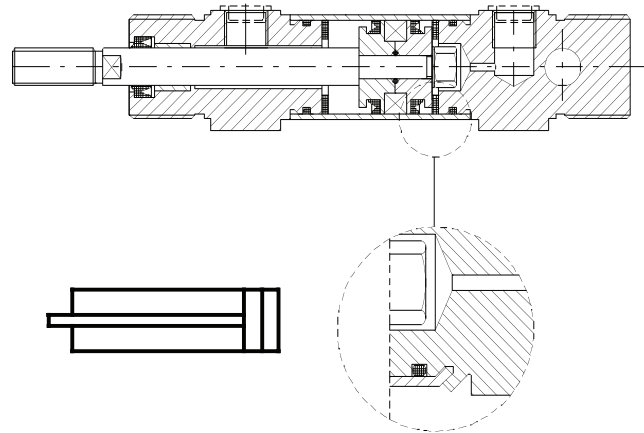


Cushioned double-action
with air-cushion





Cushioned double-action with elastic/rubber bumper



The figures show two different systems for absorbing the final kinetic energy, in order that the covers may not suffer any damages during impact. The most effective system is made of an air-cushion that slows down the piston's stroke in the last centimeters. In small cylinders, or when the speeds involved are not high, spring washers may be used at the sides of the piston. The strokes in double-acting cylinders may be considerably large, providing that they are compatible with the mechanic application.

13.5 AIR-CUSHION ABSORBER

Pneumatic cylinders are able to produce high speeds, and therefore, the impact forces at stroke end may be considerable. As previously said, the impact of the stroke limiter (adjuster) is tempered using an air-cushion that reduces piston speed near the end of the stroke.

