

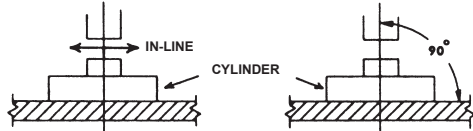
# TECH DATA - MINIATURE SHORT STROKE PNEUMATIC CYLINDERS

## SHORT STROKE CYLINDER

MACK AUTOMATION presents an expansive line of proprietary products for the automation and automatic processing industries. These products are unique in concept, of advanced design and manufactured to the highest quality standards for universal application in equipment destined to improve quality, increase production and reduce manufacturing cost.

## MOUNTING RECOMMENDATIONS

SHORT STROKE CYLINDERS should be centered with the thrust line of the work load within a few thousands of an inch and square within a fraction of degree. Mount an oil/mist unit upstream for internal lubrication. Where such devices are not practical, replace seals & lubricate internal parts at regular intervals. SERVICE KITS are available with seals & Factory approved lubricant.



## CYLINDER CALCULATIONS

In most cases, force output from a cylinder can be calculated with more precision than predicting load requirements for it's application. A good "rule of thumb" is to select a cylinder which gives a force at least 130% of the estimated operating load.

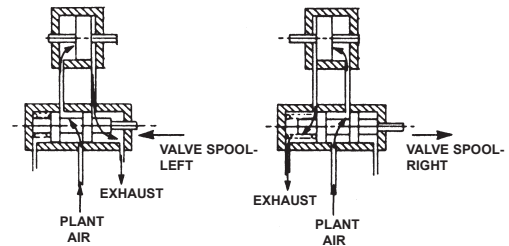
Force output from a cylinder is constant over the full range of travel and is simply the product of operating pressure times the effective area of the piston.  $\text{FORCE (lbs)} = \text{PRESSURE (psi)} \times \text{NET AREA (sq. in.)}$  MACK AUTOMATION engineering specifications include piston head and rod diameters (with net areas) together with maximum operating pressure to aid in these calculations.

All products have the appropriate safety factor but - **DO NOT EXCEED THE MAXIMUM OPERATING PRESSURE.**

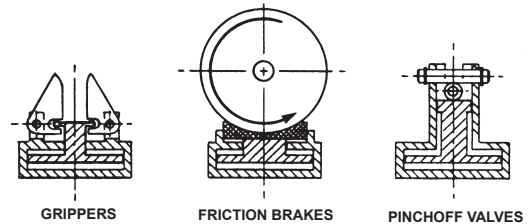
The effect of seal friction can usually be ignored except for small cylinders operating at low pressure. There is a phenomenon called "stiction" with exceptionally high break-away friction when cylinders stand idle for long periods. Seal friction will quickly return to a much lower level following the first few cycles.

When planning control circuits using plant air, a design operating pressure of **80 PSI** should be used since higher pressure may not be available when drain is heavy on the overall system. Pressure in a branch line can be reduced with a pressure regulator.

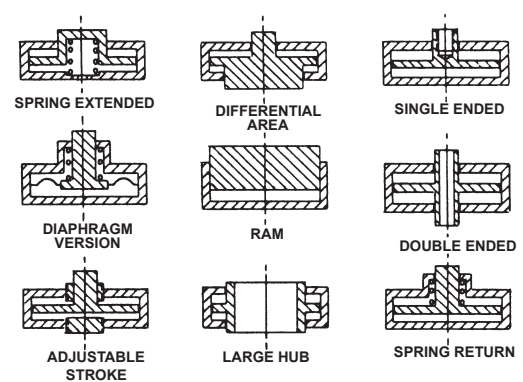
## SIMPLE FOUR WAY CONTROL CIRCUIT



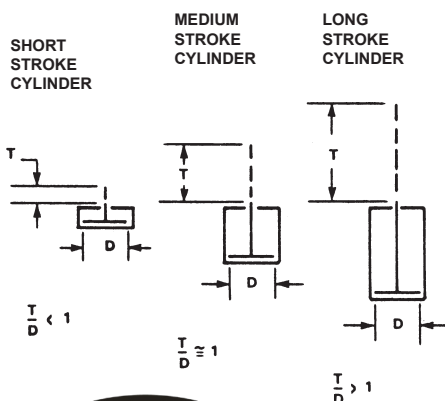
## SHORT STROKE CYLINDERS IN SPECIALIZED CONFIGURATIONS



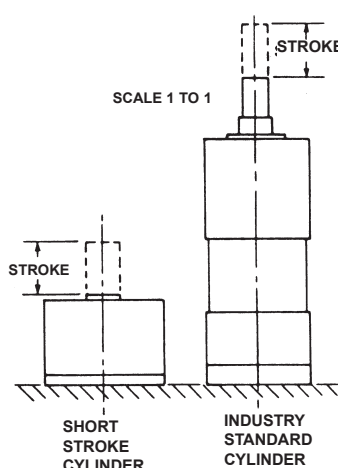
## SHORT STROKE CYLINDERS IN CONVENTIONAL CONFIGURATIONS



## CYLINDER CLASSIFICATION



## ENVELOPE COMPARISON



## SHORT STROKE CYLINDERS TYPICAL APPLICATIONS

