



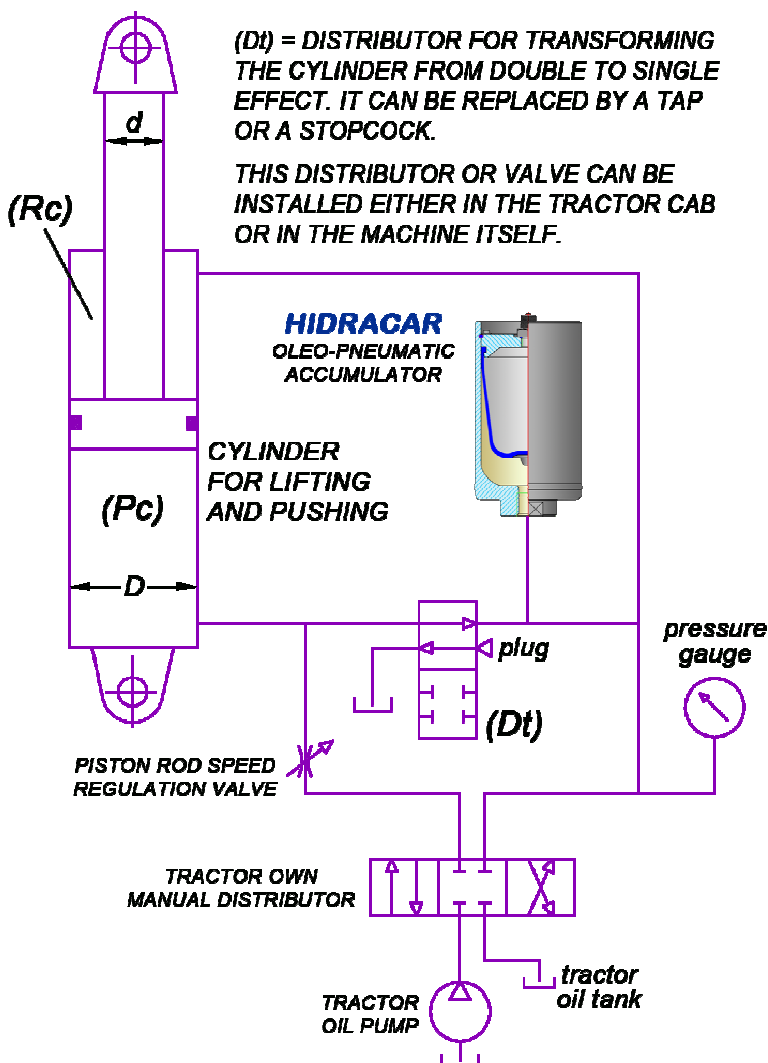
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## TRANSFORMATION OF A DOUBLE EFFECT CYLINDER INTO A SINGLE EFFECT ONE IN ORDER TO MAKE IT WORK EITHER AS A LIFTING CYLINDER OR AS A SHOCK ABSORBER, WITH AN OLEO-PNEUMATIC ACCUMULATOR ATTACHED

In some agricultural applications a double effect cylinder is needed in order to perform two different functions: Lifting a platform or structure and, at the same time, work as a shock absorber with an oleo-pneumatic accumulator attached.

The diagram below shows how this double function is implemented by the insertion of an ordinary valve or an oleo-hydraulic distributor, becoming a single effect cylinder when both its oil inlet and exit ports are interconnected.

It is a simple operation: To set or lift the platform, the tractor pump flow acts in the chamber (**Pc**) of the cylinder and, in this case, the distributor (**Dt**) must be in the closed position. For working as a shock absorber in conjunction with the accumulator, the distributor (**Dt**) must remain open, and this way the cylinder works as a single effect one.



This proposed solution avoids that, when the accumulator acts absorbing the variations of oil volume in the chamber (**Pc**) of the cylinder, a vacuum is produced inside the (**Vc**) chamber.

When the cylinder operates in single effect mode it is necessary to increase the pressure, as it will act upon the surface of the rod, which is smaller than the cylinder piston surface.

In order to obtain the same effort produced by a pressure **p** acting over the surface of the piston, the new pressure **P** should be:

$$P = (D^2/d^2) \times p$$

where  
and

**D** = piston diameter  
**d** = rod diameter

**ATTENTION!:** On opening the valve (**Dt**) the oil pressure inside the cylinder will increase and the platform it holds will move down a certain height depending on the accumulator size chosen.