

# Hybrid Air / Oil Systems Plus

There seems to be a good deal of competition between those who prefer hydraulic systems and those who prefer pneumatics. One of the tricks that pneumatics has up its sleeve is a hybrid system where air over oil gives the features of a hydraulic system without the cost or complexity.

Figure 1 below shows one such air/oil system. The advantages are great.

1. Air pressure forces oil through the P. O. Check at high flow and the pump is on as well.
2. When the cylinder contacts the load the small pump adds pressure but little volume to bring the pressure up to approximately 1200 psig quickly.
3. On return the PO Check is piloted to allow flow back into the air/oil reservoir. The cylinder returns rapidly.

This is just one of the methods of combining the advantages of air and oil to get the best of both worlds.

1. Cylinders with dual air/oil systems may be held in mid stroke by the blocking oil.
2. Air/Oil systems give smooth and consistent travel with no jerking.
3. A simple pump or intensifier can be supplied from the existing reservoir.
4. Fewer devices with less energy lost to heat are advantages.

Not all air/oil systems are used at high pressure. If they are, be sure to use plumbing and components rated for the hydraulic pressure in the high pressure part of this system. Some air/oil systems use oil in both ends of the cylinder and some use separate reservoirs for each end.

One word of caution. Occasionally Murphy's Law prevails and the cylinder does not have enough force. Our reaction was to add an Air/Air or Air/Oil pressure booster rather than start from scratch. In both cases we bent support structures instead of powering through. Mechanical or design flaws may not always be corrected by brute force.

Hopefully these topics from off the beaten path will help you think of another way to use compressed air. Unique actuators give compressed air additional ways to "Git-R-Done."

Air bags (rubber donuts between metal plates) may be useful for high force, simplicity and durability. Bull bags, very large heavy plastic bags, can develop enough force to raise your car with only the pressure from the exhaust pipe. Long tubular bladders contained within a frame (so they do not pop like a balloon) are used to press various items with thousands of pounds of force. With compressed air using only conventional cylinders with air pressure is not necessary.

