

Special Vent Hole Positioning Allows for Faster Cylinder Response

Challenge:

Agricultural equipment designs often require actuators to respond very quickly. Sorting machines in particular have stringent speed requirements. These machines maximize the “good” product flowing past the sorting device while identifying and rejecting anything considered unacceptable, such as unripened product, field waste, dirt, rocks, etc. If the actuators operating the rejecting devices don’t return “on time”, rejectable product mixes with good product, costing farmers valuable time and money to sort by hand.

Single acting, spring return cylinders are often used to operate rejection devices on sortation equipment. Standard single acting cylinders have a vent hole on the body to allow air from the rod side of the piston to vent to atmosphere as the cylinder extends (See figure 1). Once the directional valve shifts and the cylinder attempts to retract via the enclosed spring force, the pressure built up behind the piston is forced to exhaust back through the cylinder body and air tubing and out the vent in the valve (See figure 2). The need to exhaust this built up back pressure in the cylinder and tubing slows the retraction of the cylinder, increasing overall cycle time to reset the rejection device driven by the cylinder rod.

Solution:

Recognizing the problem caused by the back pressure, Bimba added an additional vent hole located behind the position of the piston when the cylinder rod is fully extended. This prevents the build-up of back pressure in the cylinder and supply tubing by providing an exhaust path to atmosphere once the cylinder rod is fully extended. (See figure 3). The absence of back pressure returns the cylinder rod to its fully retracted position faster, reducing the cycle time to reset the rejection device. This allows it to reach its home position and be ready to reject the next undesirable object from the sortation product flow.

Benefits:

- **Faster retraction speed.**
- **Reduced cycle time from reject (rod extend) to reset (rod retracted).**
- **Minimizes misses of unacceptable product.**

Other Applications:

- **Packaging**
- **Gate Valves (open/close)**
- **Labeling Equipment**

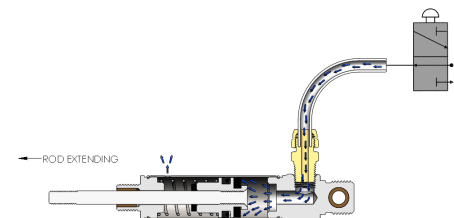


Figure 1.

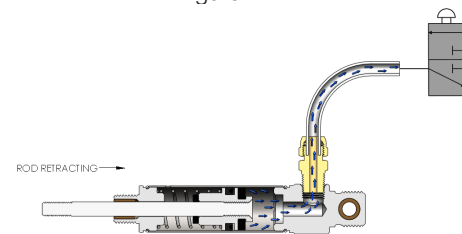


Figure 2.

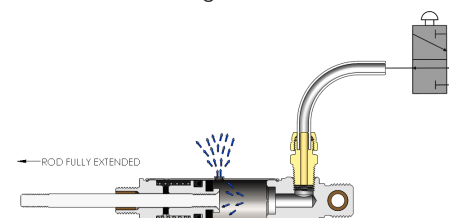


Figure 3.

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