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The controller can react to five different external conditions and inform the user that the corresponding condition has occurred. The five different alarm conditions are:

Lost Prime: The pump has lost its prime and does not pump fluid anymore.

Leak Detect: Fluid has been detected in either of the two air chambers of the pump.

Service Needed: The number of cycles programmed as the service interval for the pump has been reached.

Signal Range: The analog input signal received falls outside the programmed range.

Max Rate: The cycle or flow rate programmed for the pump cannot be maintained. This can be due to, among others, to excessive back pressure, a cycle rate in excess of the pump's capabilities, a high fluid viscosity that slows down its flow or reduced air pressure. Each alarm condition can be configured to either inform the user of its presence only or also to stop the pump.

CALIBRATION

The pump can be calibrated for units other than cycles per minute. If units other than cycles per minute are selected, the pump will have to be calibrated for the desired units, such as gallons per minute or liters per minute.

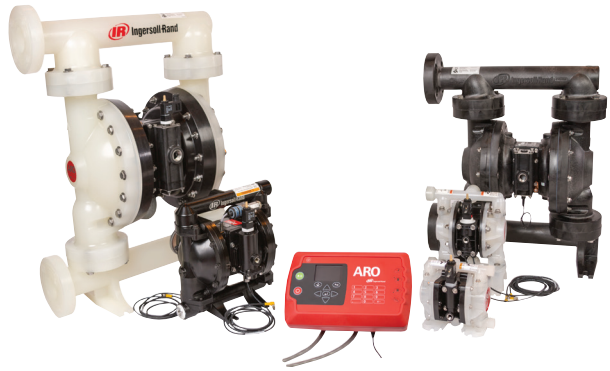
Upon initial calibration, the operator will select a flow rate required for the process that the pump will serve. The pump will begin running and when the calibrating vessel is full the operator stops the pump and enters the actual volume pumped. The controller internally performs the calculation of the volume per stroke the connected pump delivers.

This procedure assures knowledge of the exact volume per stroke by the controller, regardless of the size of the pump being controlled, and eliminates the need of the operator to perform any manual calculations or the inclusion of compensation factors due to operating conditions; the controller is able to perform all of this internally.

ADVANCED LEAK-DETECTION CAPABILITIES

The ability to detect leaks – preventing equipment damage and production downtime – has historically been a reactive process. Essentially, leaks are dealt with after external symptoms are detected, by which time losses have increased dramatically. Not only can product be lost and equipment severely damaged, but an operator's health could be put at risk if the fluid leaked is dangerous.

That's why ARO developed a controller which incorporates advanced leak detection capabilities into a multi-pump controller,



allowing the system to self-monitor, therefore reducing the time it takes to react to a fluid leak. Leak-detection sensors are installed on each side of the pump and produce a signal when they detect fluid in the air chamber; the controller is setup to receive these signals and trigger an alarm.

Leak detection functionality can be added to the pump at the time of purchase or easily installed at a later date if deemed necessary.

CONCLUSION

ARO's closed-loop control system provides the marketplace with a system that is both easier to use and more economical than previous offerings. The differentiating factors of a touch-and-walk-away pump controller system include closed-loop control, advanced leak detection capabilities and an end-of-stroke sensor solution that allows greater flexibility and accuracy for the end user.

ARO's closed-loop system achieves dispensing repeatability within 1% and its remote operating capabilities allow for safer monitoring. Additional safety features include remote triggers that can perform auto-shutdowns and send critical operating data and service alerts to operators to notify them of predictive maintenance. These elements work together to increase productivity and reduce downtime, all while positively impacting a company's bottom line.

TARGET INDUSTRIES

From mixing chemicals to cleaning water to combining fluids and beyond, smart, efficient air control systems touch a variety of industries throughout the world, including:

- Chemical processing
- Waste water treatment
- Car wash dispensers
- Electronics
- Nuclear power
- Pharmaceutical
- Pulp and paper
- Water treatment
- Paint/ink/coatings
- Agriculture
- Ceramics
- Dry cleaning
- Pet food
- Printing
- Steel

