



**Overview** Synthesis™ Multipump Control regulates the pressure of a fluid delivery system using a single drive that orchestrates a series of pumps. The program seamlessly integrates motor-control, logic, and process-control functions into a single, compact solution. With its sophisticated pump-modeling technology, the controller leverages the computing power of its digital signal processor (DSP) to provide superior control, optimal efficiency, and comprehensive protection for the pumping system.

### Features **Multiple Pumps**

The application can control from one to eight pumps. The speed of the master pump is controlled by the drive in response to system pressure feedback. The remaining pumps operate at a fixed speed and are controlled by the master using motor starters. As demand fluctuates within the system, the master stages the auxiliary pumps to maintain constant pressure and maximize efficiency.

### **Pump Curve**

UNICO's Pumping System Intelligence™ (PSI) technology mathematically models pump operation to achieve optimal performance, efficiency, and pump life. With just a few points from a pump's published performance curve, the drive can dynamically calculate key performance variables such as developed head, flow, and efficiency to determine the most efficient staging under all operating conditions. By knowing the pump curve, the controller inherently protects against end-of-curve, cavitation, deadheading, and other damaging conditions by avoiding them altogether.

### **Instinctive Tuning**

A sophisticated tuning feature automatically calculates the optimal closed-loop pressure gains by identifying the pressure and flow characteristics of the system. This eliminates the trial and error associated with tuning traditional systems and ensures stable performance without troublesome pressure overshoot or hunting.

### **Programmed Alternation**

The lead/lag relationship between pumps can be switched automatically based upon the number of times they have been started. This distributes pump and motor wear evenly to maximize reliability and prolong the life of the system.

### **Smooth Filling**

For systems that drain, a smooth-fill function ensures that lines fill smoothly to prevent cavitation and water hammer.

### **System Priming**

For systems requiring a jockey or priming pump, a priming sequence can be initiated whenever the master pump starts or goes off-line.



**Features** **Low-Flow Optimizer**

*(continued)*

Systems that have widely varying demand can waste energy and place undue wear on pumping equipment. The controller monitors the system, with or without a flow transducer, for minimum-flow conditions. If low flow is detected, pressure is boosted by a preset amount and all pumps are switched off to conserve energy and eliminate unnecessary cycling.

**NPSH Monitor**

The control continuously monitors suction pressure and automatically adjusts to ensure that the pump operates with adequate net positive suction head (NPSH) over its entire flow range. This prevents cavitation that can damage the pumping system.

**Pump Status Monitor**

The drive is equipped with a backlit liquid crystal display that continuously shows pump pressure, flow, speed, current, and power as well as the running and fault status of each pump in the system.

**Fault Tolerant**

The program is capable of automatically recovering from many types of fault conditions to ensure continuous operation in unattended installations. If a nuisance fault or power interruption occurs, the system will, depending upon user-selectable settings, attempt to clear the fault and restart automatically.

**Communications**

Several industry-standard serial protocols are available for communicating with a building automation system (BAS) or other controller, including Modbus RTU, ANSI, N2, LonWorks, and BACnet. A SCADA interface is optionally available for remote operation.

**Inputs & Outputs**

The following inputs and outputs are provided for interfacing the pump controller with the pumping system:

**Inputs**

- manual start
- manual enable
- auto enable
- no external fault
- setpoint 2 enable
- jockey pump OK
- fault reset
- pump 1 flow OK
- pump 2 flow OK
- pump 3 flow OK
- pump 4 flow OK
- pump 5 flow OK
- pump 6 flow OK
- pump 7 flow OK
- pump 8 flow OK
- pump 2 disable
- pump 3 disable
- pump 4 disable

**Inputs** *(continued)*

- pump 5 disable
- pump 6 disable
- pump 7 disable
- pump 8 disable

**Analog Inputs**

- pressure feedback
- suction feedback
- flow feedback
- manual speed potentiometer

**Outputs**

- pump 1 running
- pump 2 running
- pump 3 running
- pump 4 running
- pump 5 running
- pump 6 running
- pump 7 running
- pump 8 running
- jockey pump running
- pump 1 fault
- pump 2 fault
- pump 3 fault
- pump 4 fault
- pump 5 fault
- pump 6 fault
- pump 7 fault
- pump 8 fault

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