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.
Multipump Control for Fluid Delivery Systems

Features (continued)
Low-Flow Optimizer
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

Unico is a leading global innovator of motion-control solutions for industry. Founded in 1967, the company develops, manufactures, and services variable-speed drives, application-engineered drive products, integrated drive systems, and ancillary products that improve operations by increasing productivity, safety, and equipment life while lowering energy and maintenance costs.