



Preferred Specifications

Document Number	Issue Date	Rev. Date
F-2871	01/20	04/24

AQUIS™ ULTRAFLOW

High-Capacity, Direct-Inject, Flow-Based Industrial Foam Proportioning System

DESCRIPTION:

Waterous AQUIS™ ULTRAFLOW is a high-capacity demand-based concentrate proportioning system. ULTRAFLOW is compatible with all current AFFF and non-fluorinated concentrates and utilizes magnetic flowmeters for precision concentrate to water ratio-control accurate within 2% over the full calibrated concentrate pump operating range. Electronic closed loop measurement and control of the concentrate injection rate relative to water flow provides precise concentrate to water ratios at up to sixteen (16) independent solution capable discharges.

This precision flow is unaffected by discharge hose length, hose size, elevation, nozzle type or incoming water pressure. Built in auto-prime feature makes sure no air gets trapped inside the concentrate discharge plumbing, eliminating the possibility of air lock. Utilizing a ruggedized, 8" or 15" daylight readable, touchscreen the pump operator has full control over each discharge with choice of plain water or solution at an adjustable ratio from .01% to 10% in 0.1% increments, with three (3) adjustable foam presets.

The ULTRAFLOW base system includes:

- One (1) Tellurus Touchscreen HMI
- One (1) Primary System Control Module
- One (1) Hydraulic Pump System
- One (1) Concentrate Pump
- One (1) Concentrate Pump Discharge Pressure Transducer

Each Discharge Line Assembly (DLA) Assembly includes:

- One (1) Discharge Control Node
- One (1) Magnetic Flowmeter
- One (1) Ratio Control Valve
- One (1) Concentrate Check Valve
- All associated control cables

OPERATION:

ULTRAFLOW operation is initiated with water flow in any of up to sixteen (16) solution capable discharges. Water flow is measured by a non-restricting paddle-wheel flowmeter plumbed in the discharge waterway. Concentrate injection is initiated by the Control Node in the Discharge Line Assembly (DLA) Assembly, DLA water flow is transmitted to the Primary System Control Module to begin direct injection of concentrate. The Primary Module activates the Hydraulic Pump System to drive the Concentrate Pump at a variable rate meeting total system demand. Each Discharge Line Assembly (DLA)'s Control Node monitors concentrate flow via Magnetic Flowmeter to provide closed-loop control of the Ratio Control Valve and maintain the precise adjustable ratio of concentrate to water flow. The Tellurus HMI Touchscreen provides continuous display of system operating parameters, continuous diagnostic monitoring, and control of all Discharge Line Assembly (DLA) operations.

All system components in direct contact with concentrate, not flushed and stored dry, are constructed of non-corrosive materials.

TELLURUS HMI TOUCHSCREEN:

The Tellurus 8" or 15" daylight readable Touch Control Panel HMI allows the pump operator to perform the following control and operation functions for each foam capable discharge:

1. Provide touchscreen control of proportioning rates
2. Display current flow-per-minute of water
3. Display total volume of water discharged during and after operations are completed
4. Display current flow-per-minute of concentrate
5. Display total amount of foam concentrate consumed
6. Display injection percentage
8. Allow three injection percentage set-points to be stored and selected

CONCENTRATE DISCHARGE LINE ASSEMBLY (DLA) ASSEMBLIES:

The Discharge Line Assembly (DLA) Assemblies come in two versions, 1-Inch Hand-Line Assembly or 2.0-Inch Full-Capacity Assembly.

1-Inch Hand-Line Assembly

The 1-Inch Hand-Line Assembly covers a lower flow rate for smaller discharges requiring less concentrate. Each Discharge Line Assembly (DLA) Assembly shall include one (1) Discharge Control Node, one (1) Magnetic Flowmeter, one (1) Ratio Control Valve, one (1) Inject Check Valve, one (1) CAN Bus Cable, one (1) Magnetic Flowmeter Cable, one (1) Water Flowmeter Cable, and one (1) Power Cable for Ratio Control Valve.

The 1-inch diameter Discharge Line Assembly (DLA) Assemblies shall have an operational range of concentrate flow ranging from 0.1 GPM (.38L/min) to 26.4 GPM (100 L/min). Example: with 3% concentrate ratio at a minimal concentrate flow of 0.1 GPM (.38 L/min), the Discharge Line Assembly (DLA) will service a water flow of 3.3 GPM (12.6 L/min). Using 3% concentrate ratio at a maximum concentrate flow of 26.4 GPM (100 L/min), the Discharge Line Assembly (DLA) will service a water flow of 880 GPM (3300 L/min).

NOTE: In a 160, 300 or 500 GPM (606, 1135.6, 1893 L/min) capable system the minimum flow is possible from a single discharge only when used in conjunction with the Low-Flow Option.

2.0-Inch Full Capacity Assembly

The 2.0-Inch Full-Capacity Assembly provides for up to the maximum Concentrate Pump flow of 237.8 GPM (900 L/min) from a single discharge. Each Discharge Line Assembly (DLA) Assembly shall include one (1) Discharge Control Node, one (1) Magnetic Flowmeter, one (1) Ratio Control Valve, one (1) Inject Check Valve, one (1) CAN Bus Cable, one (1) Magnetic Flowmeter Cable, one (1) Water Flowmeter Cable, and one (1) Power Cable for Ratio Control Valve.

The 2.0-inch diameter Discharge Line Assembly (DLA) Assemblies shall have an operational range of concentrate flow ranging from 1.3 GPM (5 L/min) to 237.8 GPM (900 L/min). Example: with 3% concentrate ratio at a minimal concentrate flow of 1.3 GPM (5 L/min), the Discharge Line Assembly (DLA) will service a water flow of 43.3 GPM (164 L/min). Using 3% concentrate ratio at a maximum concentrate flow of 237.8 GPM (900 L/min), the Discharge Line Assembly (DLA) will service a water flow of 7926.7 GPM (30000 L/min).

NOTE: In a 160, 300 or 500 GPM (606, 1135.6, 1893 L/min) capable system the minimum flow is possible from a single discharge only when used in conjunction with the Low-Flow Option.

2.0-Inch Hi Flow Full Capacity Assembly

The 2.0-Inch Hi Flow Full-Capacity Assembly provides for up to the maximum Concentrate Pump flow of 373 GPM (1400 L/min) from a single discharge. Each Discharge Line Assembly (DLA) Assembly shall include one (1) Discharge Control Node, one (1) Magnetic Flowmeter, one (1) Ratio Control Valve, one (1) Inject Check Valve, one (1) CAN Bus Cable, one (1) Magnetic Flowmeter Cable, one (1) Water Flowmeter Cable, and one (1) Power Cable for Ratio Control Valve.

The 2.0-inch diameter Discharge Line Assembly (DLA) Assemblies shall have an operational range of concentrate flow ranging from 26 GPM (98 L/min) to 373 GPM (1400 L/min). Example: with 3% concentrate ratio at a minimal concentrate flow of 26 GPM (98 L/min), the Discharge Line Assembly (DLA) will service a water flow of 866 GPM (3275 L/min). Using 3% concentrate ratio at a maximum concentrate flow of 373 GPM (14000 L/min), the Discharge Line Assembly (DLA) will service a water flow of 12400 GPM (47000 L/min).

NOTE: In a 160, 300 or 500 GPM (606, 1135.6, 1893 L/min) capable system the minimum flow is possible from a single discharge only when used in conjunction with the Low-Flow Option.

PRIMARY SYSTEM CONTROL MODULE:

A Primary System Control Module is used to aggregate concentrate flow through each Discharge Line Assembly (DLA) Assembly adjusting the Concentrate Pump speed to best meet total system demand. The system module also provides continuous monitoring of system performance, self-diagnostics, and reporting of warning and alarm conditions via the Tellurus HMI Touchscreen.

HYDRAULIC PUMP SYSTEM:

The Hydraulic Pump System meets all applicable SAE and DOT standards and provides power to drive the Concentrate Pump.

This appropriately sized power system includes:

- One (1) Hydraulic Pump
- One (1) Hydraulic Motor
- One (1) Hydraulic Oil Cooler with Temperature Controller
- One (1) Hydraulic Reservoir with Filtering System

CONCENTRATE PUMP:

The positive displacement Concentrate Pump pressurizes the concentrate for direct injection at each Discharge Line Assembly (DLA) Assembly. This concentrate gear pump is rated for up to 160, 300 and 500 GPM (606, 1135.6, 1893 L/min) at a maximum operating pressure of up to 300 PSI (20.7 BAR). The Concentrate Pump is driven by the Hydraulic Motor under direct control of the Primary System Control Module. The concentrate pump turns at a variable speed to ensure that the correct proportion of concentrate selected by the pump operator is injected into the water discharge stream by the Discharge Line Assembly (DLA).

The Concentrate pump is a rotary gear style bronze positive displacement TRIDENT GP160, 300 or 500 concentrate pump, rated at maximum operating pressure of 300 PSI (20.7 BAR). Pump design and construction materials allow the pump to run dry without damage up to 10 minutes.

Construction features of pump include:

- Ball-style Bearings (no bushings)
- Timing Gears (to prevent rotor contact)
- Solid Stainless Steel Rotor Shafts

CONCENTRATE TANK RE-FILL AND TRANSFER:

Concentrate Tank Re-Fill and Transfer functions are available for operator control from the Tellurus HMI Touchscreen. The HMI allows simultaneous control of CAN enabled transfer valves for routing of concentrate flow to on-board tank, off-board outlet and discharge line assemblies.

Concentrate Tank Re-Fill and Transfer include:

- One (1) Concentrate Control Node
- Two (2) Magnetic Flowmeters
- Two (2) Control Valves
- Two (2) Inject Check Valves
- Two (2) Magnetic Flowmeter Cables
- Three (3) Power Cables to Concentrate Transfer Valves

NOTE: Tank Refill, Transfer, and Concentrate Discharge may be used simultaneously; however, the rate of flow will be determined by Concentrate Transfer Valve positions, with maximum aggregate not to exceed concentrate pump capacity.

ULTRAFLOW SYSTEM COMPONENTS:

- One (1) Tellurus Touchscreen HMI – 8” or 15”
- One (1) Primary System Control Module
- One (1) Hydraulic Pump
- One (1) Hydraulic Motor
- One (1) Hydraulic Oil Cooler with Temperature Controller
- One (1) Hydraulic Reservoir with Filtering System
- One (1) 160 GPM @ 300 PSI (606 L/min @ 20.7 bar), 300 GPM @ 300 PSI (1135.6 L/min @ 20.7 BAR) or 500 GPM @ 300 PSI (1893 L/min @ 20.7 bar) Concentrate Pump
- One (1) Concentrate Pump Discharge Pressure Transducer
- Discharge Control Nodes (one per solution capable discharge outlet)
- Magnetic Flowmeters (one per solution capable discharge outlet)
- Ratio Control Valves (one per solution capable discharge outlet)
- Check Valves (one per Ratio Control Valves)
- Paddlewheel Flowmeters, solution capable outlet waterway (one per discharge, sized for discharge flow capability)
- Primary Control and Power Cables, one set (1) each
- Ratio Control and Power Cables (one set per solution capable discharge outlet)

OEM SUPPLIED COMPONENTS:

- Hydraulic Hoses and Couplings
- Hydraulic Pressure Gauge
- Hydraulic Temperature Gauge
- Concentrate Hoses and Piping

LOW-FLOW OPTION:

The Low-Flow option allows the ULTRAFLOW system to operate below the lowest available capacity of the Concentrate Pump by by-passing excess differential flow back to the pump inlet.

When enabled, this feature is handled automatically by the Primary System Control Module with the inclusion of the following additional components:

- One (1) Low-Flow Control Node
- One (1) Magnetic Flowmeter
- One (1) Ratio Control Valve
- One (1) CAN Bus Cable
- One (1) Magnetic Flowmeter Cable
- One (1) Power Cable to Ratio Control Valve

MANUAL OVERRIDE OPTION:

The Manual Override option provides a mechanism for by-passing the ULTRAFLOW control system to operate the Concentrate Pump in a fixed concentrate pressure or proportional water pressure. When override is active, Ratio Control Valves will be un-powered and can be manually operated to adjust concentrate injection into selected discharges.

Manual Override Option includes the following additional components:

- One (1) Manual Override Panel Switch
- One (1) Override Logic Controller
- One (1) Override Power Relay
- One (1) Water Pump Discharge Pressure Transducer
- One (1) Associated Power and Control Cables