

## Unified Services FuelVu Series Diesel Fuel Polishing & Tier-Level Fuel Monitor System

### **FuelVu Overview**

- Polishing and maintenance system for fuel oil in bulk, long-term storage
- For permanent, on-site installation, indoor
- Comprehensive system: pump, filter and water removal elements, controller
- Fully automated
- 2 thru 7 gpm
- 5 micron final filtration
- 15 PPM water removal
- Single tank operation – ideal for generator base tank applications that see little use other than routine maintenance
- Outdoor, heated enclosure (optional)
- ISO Particle counter for fuel tier level monitoring (optional)

The FuelVu combines several elements to form a comprehensive, integrated, automated system:

- Multi-stage, progressive particulate filtration and water removal
- Integrated, high-performance pump
- Flow control and monitoring devices
- Digital, user-programmable controller

The FuelVu uses a progressive filtration and conditioning regime:

1. Coarse straining through 40 mesh washable screen
2. Final filtration through 5 micron disposable media filter
3. Water coalescing to 15 PPM.
4. Water separation and collection with alarm

Fuel circulation and transfer is accomplished via an on-board, high-performance, cast-aluminum, positive-displacement gear pump direct-driven via an industrial, heavy-duty motor. The pump combines high vacuum prime maintenance with linear flow versus pressure performance. An integral pressure relief valve is included. Drive motors are NEMA class industrial type, conservatively applied and include ball-bearings, class H insulation, continuous duty ratings.

The FuelVu includes shutoff ball valves, check valves, differential pressure gauge and differential pressure sensors across the filtration element.

The UL508 listed and labeled industrial control panel features PLC-based digital control and touch-panel operator interface. The controller provides full automatic operation of the system and is operator field programmable to set filtration cycle duration, time of day, day of week operation. Filtration cycle can be programmed by overall run time or the system can determine the run time simply by entering the tank gallon capacity and the start time. Manual override capability is included. The controller monitors flow, differential pressure across each filtration element and water level in the separator collection vessel. Filtration cycle and filter element maintenance history logs are provided. Operational alarms and alarm logs are likewise generated. The controller is MODBUS network compatible for integration to remote Building Automation Systems or generator control switchgear.

## **System Includes**

- Indoor, wall-mountable open component construction with 1-inch NPT connections
- Aluminum powder-coated frame construction allows for ease of installation due to low weight @ 100 lbs approx..
- On-board, integrated digital controller, UL508. See Controller Section
- Inlet, outlet ball-type shutoff valves
- Check valve
- Pressure/compound gauge
- Pressure transducers and water detector. See Controller Section
- Circulation pump choices of 2, 4 or 7-GPM @ 0.33 HP, 120/1/60, TEFC
- Filtration elements:
  - Strainer, 40 mesh
  - Final filter, 5 micron
  - Water coalescer
  - Water separator rated at 15 PPM

## **Controller, UL508 Listed, Type-1 enclosed:**

1. PLC-based digital controller
  - a. MODBUS, ETHERNET communications
2. Touch-panel operator interface
3. Time of day, day of week, interval programmable timing
4. Analog-to-digital inputs for:
  - a. Pressure differential across filter
  - b. Pressure differential across coalescer
5. Point-sensing inputs for:
  - a. Leak sensing
  - b. Coalescer water detection
  - c. Tank level (optional)
6. Display of the following data:
  - a. Pressure differentials as above
  - b. Filtration history
  - c. Leak alarm
  - d. Service filter alarm
  - e. Service coalescer alarm
  - f. Audible alarm horn
7. User programmable
  - a. Filtration cycle, as above
  - b. Delivery history
  - c. Fuel quality history (optional)
8. User I/O to touch-panel
  - a. System HOA switch
  - b. Alarm reset pushbutton
  - c. Programming entry keypad
  - d. Alarm programming screen
9. Control devices
  - a. Pump motor starter
  - b. Control power fuses
  - c. Terminal blocks
10. Heated control box with thermostatic control – (optional)

## FuelVu Options:

- 1) FVU-020 ISO Particle Counter for fuel tier level monitoring
  - a. **Diagnostic self-check start-up time:** 5 seconds
  - b. **Measurement Period:** 5 to 180 seconds
  - c. **Reporting interval through RS232:** 0 to 3600 seconds
  - d. **Digital LED display update time:** Every second
  - e. **Limit relay output:** Changes occur +/- 1 ISO code at set limit (Hysteresis ON) or customer set (Hysteresis OFF)
  - f. **4-20mA output signal:** Continuous
  - g. **Principle of operation:** Laser diode optical detection of actual particulates
  - h. **Reporting codes:** ISO 7 – 21, NAS 0 – 12, (AS 00 – 12 contact FuelVu) will also report less than ISO 7, subject to the statistical uncertainty defined in ISO4406:1999, shown in the RS232, reporting results as appropriate e.g “>6”
  - i. **Calibration:** By recognized on-line methods, confirmed by the relevant International Standards Organization procedures
  - j. **Calibration recommendation:** 12 months
  - k. **Performance:** +/- 1 ISO Code (dependent on stability of flow)
  - l. **Reproducibility / Repeatability:** Better than 1 ISO Code
  - m. **Power requirement:** Regulated 9 to 40Vdc
  - n. **Maximum current draw:** 150mA
  - o. **Hydraulic connection:** M16 x 2 hydraulic test points (5/8” BSF for aggressive version)
  - p. **Flow range through the device:** 40 to 140 ml/min (optimum flow = 60ml/min)
  - q. **Online flow range via System 20 inline sensors:**
    - Size 0 = 6 to 25 l/min - (optimum flow = 15 l/min)
    - Size 1 = 24 to 100 l/min - (optimum flow = 70l/min)
    - Size 2 = 170 to 380 l/min - (optimum flow = 250l/min)
  - r. **Required differential pressure across Inline Sensors:** 5.8 psi (0.4 bar) minimum
  - s. **Viscosity range:** 10 to 500 cSt
  - t. **Temperature:**
    - Operating environment:** -20°C to +60°C (-4°F to +140°F)
    - Storage:** -40°C to +80°C (-40°F to +176°F)
    - Operating fluid:** 0°C to +85°C (+32°F to +185°F)
  - u. **Working pressure:** 2 to 420 bar (30 to 6,000 PSI)
  - v. **Moisture sensor calibration:** ±5% RH (over compensated temperature range of +10°C to +80°C)
  - w. **Operating humidity range:** 5% RH to 100% RH
  - x. **Moisture sensor stability:** ±0.2% RH typical at 50% RH in one year
  - y. **Certification:** IP66 rated, EMC/RFI – EN61000-6-2:2001 & EN61000-6-3:2001
  - z. **Materials:** User friendly construction
  - aa. **Dimensions:** 7.2” x 6.1” x 3.4” (182mm x 155mm x 86mm)
  - bb. **Weight:** 2.9 lbs. (1.3 kg)
- 2) FVU-030 Outdoor enclosure with internal cabinet heater and thermostat
  - a. **Enclosure Material:** 14-Gauge steel construction with wall flanges or pad-mounting feet
  - b. **Enclosure Color:** Powder Coated 49 Gray
  - c. **Enclosure Rating:** Type 3R
  - d. **Leak Sensor:** Interior bottom leak containment with leak sensor and alarm
  - e. **Outside Mounting Dimensions:** 56.5” wide x 55.5” tall x 15.75” deep
  - f. **Weight:** 250 lbs
  - g. **Exterior Cabinet Plumbing Connections:** 0.75” NPT
  - h. **Cabinet Heater:** Explosion-proof rated @ 1200 Watt, 120/1/60
  - i. **Heater Circulating Fan with Thermostat** settable at 32-140F with high-temp cutout

- 3) FVU-040 FBO indoor cold environment coalescent heater
  - a. For indoor use when a full cabinet enclosure is not desired
  - b. 120 Volt cartridge heater adapts directly to FBO canister water containment bowl
  - c. 45-watt with internal thermostat and explosion-proof rated
  
- 4) FVU-050 1-Micron final filter element
  - a. For those desiring finer final particle removal than our standard 5-micron element
  - b. Same Racor element construction at a 1-micron rating
  
- 5) FVU-060 Tank level sensor or display and alarms
  - a. Installed in tank to provide continuous monitoring of tank level – viewed in gallons or liters
  - b. Full Stainless steel construction works with any grade of fuel oil and bio fuels
  - c. 2" NPT or larger tank opening required
  - d. ¼" tank level resolution for tanks up to 48" deep (1.0" for taller tanks thru 96")
  - e. 4-20 mA or 0-5VDC linear signal output
  - f. Accuracy @ +/- 2%
  - g. Max operating temp @ 250F
  - h. Allows programmable set-points on the FuelVu controller to trigger alarms at desired levels
  - i. Alarms and levels can be conveyed over the communication network port
  - j. Eliminates the need for a separate tank gauging system
  
- 6) FVU-070 Magnetic in-line fuel conditioner installed
  - a. Drastically reduces particle sizes in diesel fuel
  - b. Stops growth of micro-organisms
  - c. Improves fuel stability thru molecular cluster breakdown
  - d. Magnetic steel construction with aluminum exterior housing
  
- 7) FVU-080 Leak sensor
  - a. Stainless steel construction of fitting, stem and float for any fuel oil grade
  - b. ½" NPT tank opening or larger
  - c. Settable as N.O. or N.C.
  - d. Maximum operating temp @ 300F
  - e. Offered in both horizontal and vertical configurations depending on tank construction
  - f. Leak alarm displayed locally on FuelVu panel and conveyed over the network connection
  - g. Eliminates the need for a separate tank gauging system
  
- 8) FVU-100 Low or High Level Alarm/Overfill sensor
  - a. Stainless steel construction of fitting, stem and float for any fuel oil grade
  - b. ½" NPT tank opening or larger
  - c. Settable as N.O. or N.C.
  - d. Maximum operating temp @ 300F
  - e. Offered in both horizontal and vertical configurations depending on tank construction
  - f. Can be used as a fuel in vent detector as well
  - g. Leak alarm displayed locally on FuelVu panel and conveyed over the network connection
  - h. Eliminates the need for a separate tank gauging system