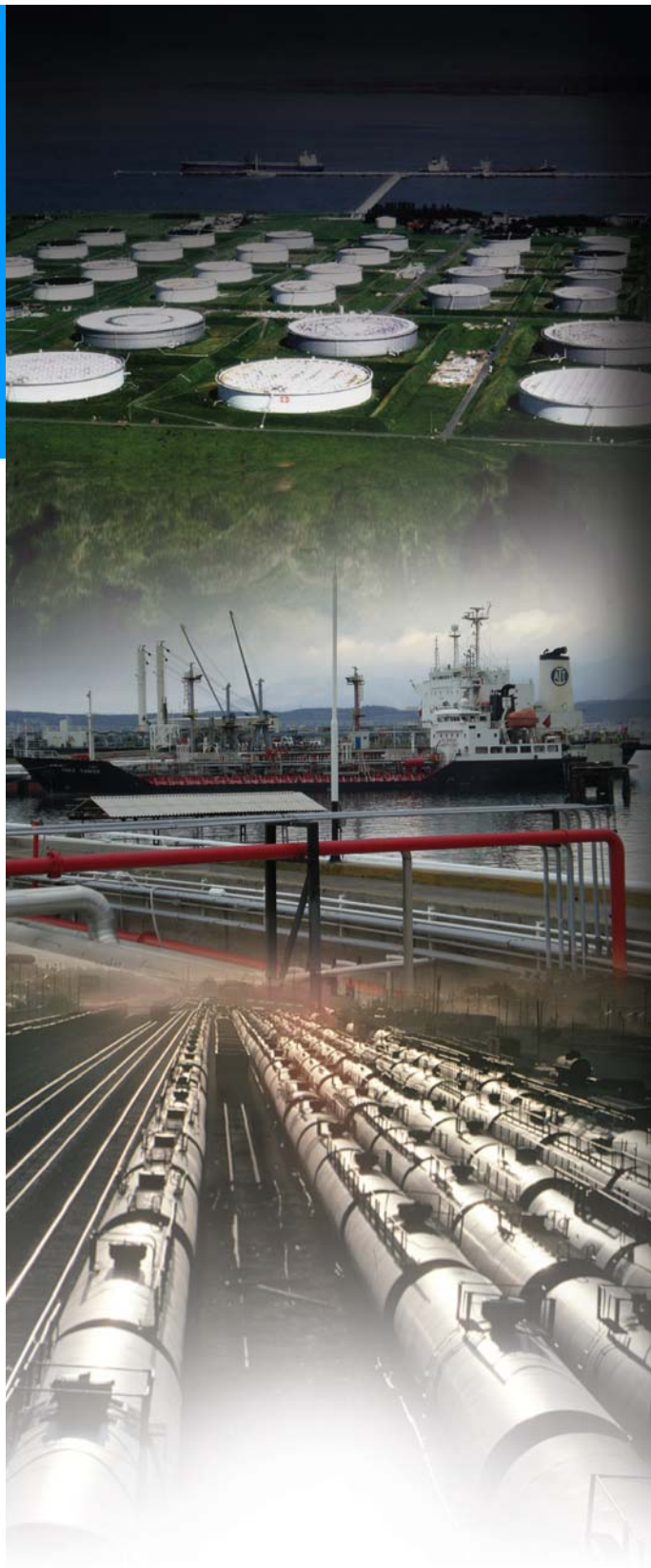
The DL8000 Preset Controller

The Ideal Device for Controlling and Measuring the Loading of Liquid Hydrocarbons into Transporting Tankers

Remote Automation Solutions

EMERSON
Process Management

Reliability, ruggedness, flexibility, and accuracy all in one package



Emerson Process Management has always had a strong presence in the liquids measurement and batch controller market. After success with *PetroCount* and *DanLoad 6000*, we now offer the new DL8000 Preset Controller. The DL8000 extends our product line and measurement capability to lead the industry by offering measurement in accordance with the latest API (American Petroleum Institute) recommendations. Contact your applications engineer or Emerson sales representative to discuss how we can help you to migrate your system to the next generation so that you can realize the benefits of the latest development in liquids measurement and batch control.

The DL8000 is a Preset Controller designed to manage the loading of hydrocarbon liquids into tank trucks, rail cars, ships, storage tanks, and other vessels loaded in batch style for transportation or storage.

Full connectivity to Emerson's DeltaV™ Process Control Systems with ROConnect enables the customer to drive maximum benefit from remote control and smart sensors and perform diagnostics using the Emerson Asset Management software. This investment improves productivity and reduces maintenance cost. Using Emerson's PlantWeb® Architecture, HART™ technology expands data retrieval beyond the typical SCADA and Process Parameters world of Modbus and into diagnostics data for performance and analysis, predictive maintenance, and equipment health analysis that adds value to the process control system. HART protocol is easily added to the DL8000 and with ROConnect for the ROC product line, the DL8000 is easily made a part of any Emerson PlantWeb architecture.

Higher Confidence with Precise Measurement

New and improved – the next generation electronic preset controller

The Emerson DL8000 Preset Controller is based on the popular and high performing ROC800-Series remote operations controller. This new design delivers accurate measurement and reliable control, local or remote, via Ethernet or serial (Modbus) communications.

The preset is capable of double precision math. Computations are made in accordance with Institute of Electrical and Electronic Engineers (IEEE) standards and utilize double-precision floating point math to minimize meter-tometer differences, make volume corrections highly precise, and avoid premature roll-over of totalizers.

Features

The DL8000 now provides support for ethanol volume correction based on either the OIML-R22 (1973) or ABNT NBR 5992 standards. Configuring a unit for ethanol product measurement is simple, requiring only the selection of ethanol fluid type, the selection of the preferred standard volume correction and a user-entered mass percentage of ethanol for the ethanol/water mixture.

The DL8000 features a straight forward, fill-in-the-blanks approach to configuration and covers a wide variety of liquids including crude oil, refined products, special application products, lubricating oils, and light hydrocarbons.

The DL8000 is packaged in a Class 1 Division 1 explosion proof enclosure or a Class 1 Division 2 enclosure. The DL8000 carries approvals from the NTEP National Test and Evaluation Program under the US National Council on Weights and Measures, and CSA/UL approval.

Improve Measurement Integrity

The DL8000 calculates volume flow thoroughly and precisely, exceeding the capabilities of other presets. We do this by:

1. Correcting volume measurements for changes in temperature in accordance with the American Petroleum Institute (API) MPMS Chapter 11.1, 2004 tables, ASTM-D1250-80, ASTM D-1250-04, API 2540-80, and ISO 91.2.

2. Correcting for changes in pressure in accordance with the American Petroleum Institute (API), MPMS sections 11.2.1, 11.2.2, 11.2.1(M), 11.2.2(M) for Automatic Pressure Compensation.

3. Correcting for changes in density using density signals in the form of a frequency signal, a 4–20 mA signal, or through digital communications.

4. Checking for pulse fidelity in a dual pulse meter by monitoring the dual pulse inputs for integrity in accordance with API Manual of Petroleum Measurement Standards, Chapter 5.5, level B.

5. Performing linearization of Meter factors or K factors using up to 12 points to ensure accuracy over the entire range of flow measurement.

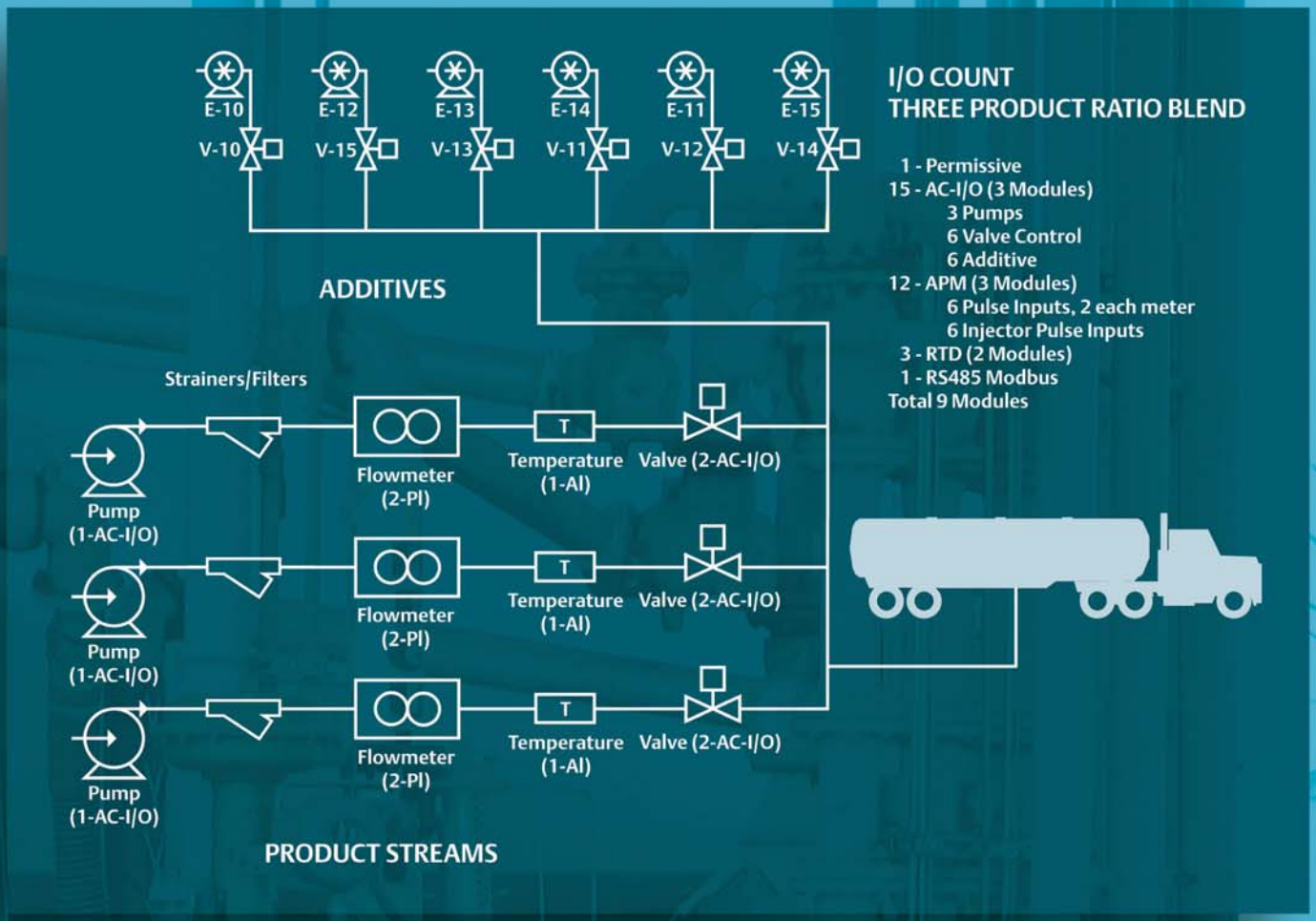
This gives the DL8000 the ability to measure a wider variety of hydrocarbon liquids more precisely.

Built for Reliability and Lower Operation Cost

- **Flow properties calculations based on the latest American Petroleum Institute (API) recommendations for best accuracy and repeatability**
- **Sequential and ratio blending of up to four products**
- **Measurement and control of injected additives**
- **Capable of double-precision math, reducing meter-to-meter differences and avoid early totalizer rollover**
- **Corrections for temperature, pressure, and density**
- **Modern electronics with an excellent reliability history**

- User-friendly interface designed for the truck driver or station operator
- Easily configurable for different liquids and for batch loading and reporting
- Built-in surge protection
- Wide-ranging communications capability including Ethernet, EIA232, and EIA485
- Optical isolation of I/O for circuit protection
- AC sensing of permissive circuits for safe loading
- AC or DC control of pumps and valves
- Fully programmable for PLC (Programmable Logic Controller) tasks using the FST (Function Sequence Tables) or any of the languages defined by IEC standard 61131-3 using Emerson's DS800 Programming tool with ladder logic, function block diagrams, structured text, instruction lists, or sequential function chart programming
- Multiple languages available for display
- Archival storage of 450 alarms and 200 transactions with up to four batches per transaction
- Storage of the last 1000 weights and measures events
- Integral Weights and Measures switch
- Independent permissive sensing of AC power
- Digital valve control with automatic high flow rate recovery
- Independent temperature compensation methods for individual products
- User-entered vapor pressure for light hydrocarbons
- Electrical isolation and built-in surge control, protecting electronics from lightning and user wiring errors
- Selection of a standard reference temperature as 60°F, 15°C, 20°F, or user selectable
- Explosion-proof enclosure
- Optional NEMA 4 enclosure, Class 1, Division 2

Three Product Ratio Blend



The DL8000 is capable of performing all blending, measurement, control, and monitoring needed to provide highly productive and rapid operations for most common loading configurations used in the industry.

The flow diagram above illustrates an installed DL8000 performing ratio blending and additive injection for three products flowing simultaneously. This device is also capable of sequential blending and other more simplified applications such as single product streams.

Expandable Configuration Options

The Emerson DL8000 Preset offers great flexibility and I/O expansion capability. As your system needs grow, you can include additional I/O to expand the capabilities of the system, reducing the per measurement cost and easily increasing the number of valves, pumps, products, and additives to be controlled.

The following input modules are available:

AC I/O Module – The module has 6 channels and each channel can be configured as an input or output channel for sensing AC signals or providing AC power for pump and valve control.

APM Module – The Advanced Pulse Module has four inputs that can be configured for two sets of paired pulses from a dual pulse turbine or positive displacement meter and provide pulse integrity measurements as recommended by API MPMS Chapter 5.5, level B,C, and E.

Each input can also be configured as a single pulse input from devices generating single pulse stream outputs such as single pulse turbine meters, positive displacement meters, coriolis meters, or ultrasonic flow meters. The pulse inputs can support up to 5Khz inputs.

One channel can be configured as a pulse output to feed a totalizer.

In all configurations, the APM has high speed interrupt-driven detector switch inputs for use in proving applications. This interrupt is used in the pulse accumulation between the detectors as well as the pulse interpolation calculations for use with small volume provers. The APM's detector input channels can be used with individually wired detector switches or detector switches that are wired in series from the prover on the same cable. The detector inputs can be used with relays, open collector/open drain type solidstate switches, and other two-state devices.

The APM module is equipped to accept densitometer frequency or pulse inputs on the third pulse input from a densitometer to measure live density.

RTD Module - The Resistance Temperature Detector (RTD) module has 2 channels, each capable of accepting a 3- or 4-wire RTD input.

Analog Input Modules - Each AI module is a 4-channel device, capable of accepting four 4 to 20 mA signals, or four 1 to 5 Vdc signal from an analog sensor.

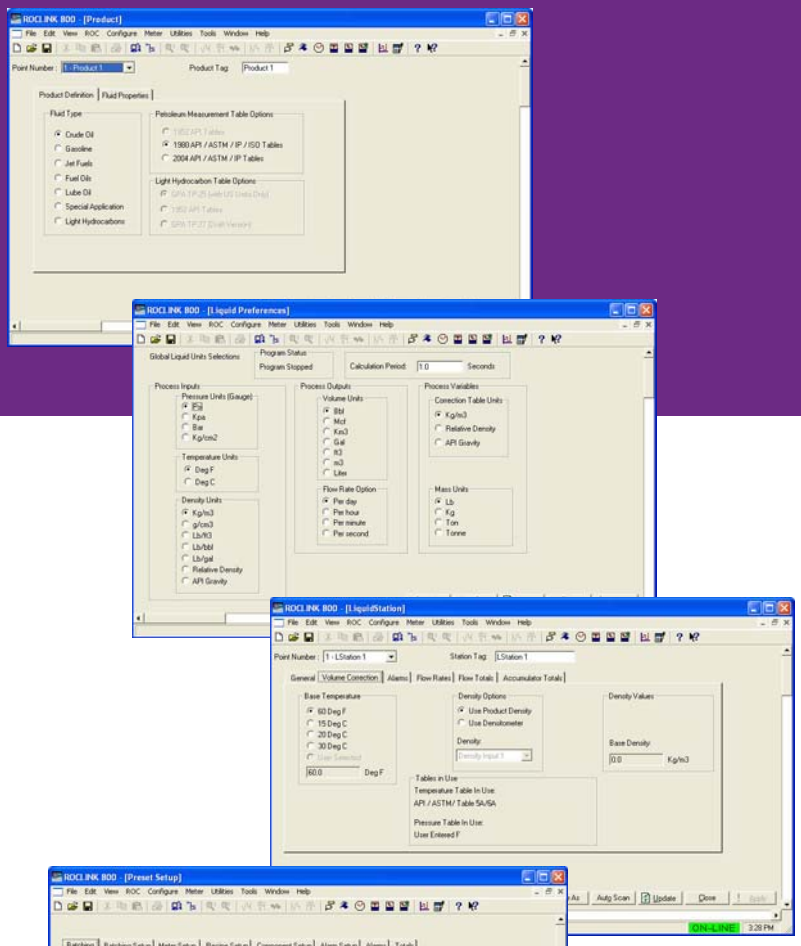
Analog Output Module – Each AO module is capable providing up to four 4 to 20 mA or 1-5 Vdc control signals.

Power Options - There are options for 120/250 Vac, 24 Vdc or 12Vcd input power.

DC I/O - There are up to 8 channels per module of discrete DC input sensing and up to 5 channels per module of DC output control options.

Communications module – There are modules for EIA232, EIA422/485, and dial-up modem.

Flexible Configuration Tools Improve Productivity



Flexible Configuration Tool

The DL8000 can be configured using Emerson's Windows-based ROCLINK™ 800 software package. ROCLINK 800 runs on almost any laptop or desktop personal computer and uses a simple fill-in-the-blanks approach to selecting product, measurement device, blending scheme, and other setup and configuration parameters.

You can perform configuration and data retrieval on-site or remotely over an Ethernet or serial communications connection. The remote capability can be a tremendous cost saver by reducing the need for on-site travel. Help screens are provided and are accessed either from the Help menu or in a context- sensitive fashion. This makes it easy to obtain information on almost any topic.

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