Daniel Measurement and Control

TERMINAL AUTOMATION SOLUTIONS

DANLOAD 6000™ ELECTRONIC PRESET

The DANLOAD 6000 Electronic Preset is a dual microprocessor-based batch controller for liquid product distribution at loading facilities. Applications include truck, rail, marine, aviation and pipeline. Designed to deliver precise preset amounts of product from tank storage or pipeline to vehicle or vessel, the Danload 6000 is user configurable to support a wide variety of functions required for today's market.

A generic, single-version product, the Danload 6000 controls straight or blended product loading with or without multiple additives and dyes. Blending operations can be configured as sequential or in-line using both proportional and integral algorithms, essential for accurate flow measurement and control with the fluctuating flow conditions found at the load rack. The standard temperature conversion algorithms for petroleum products are included and the unit is Weights and Measures approved for custody transfers. The open Modbus RTU communications interface means that the Danload 6000 can operate as a standalone unit or be integrated with the terminal automation system of your choice.

The Danload 6000 incorporates modern technology in a cost-effective, self-contained enclosure providing computer accuracy and reliability. Various plug-in cards provide the flexibility to meet specific user needs. Optional ticket printing and set-up 6000 configuration software are also available. Danload 6000 can be used with the Daniel control valve, turbine meter, additive injector panels and terminal automation software as part of the Daniel total system solution.

FEATURES

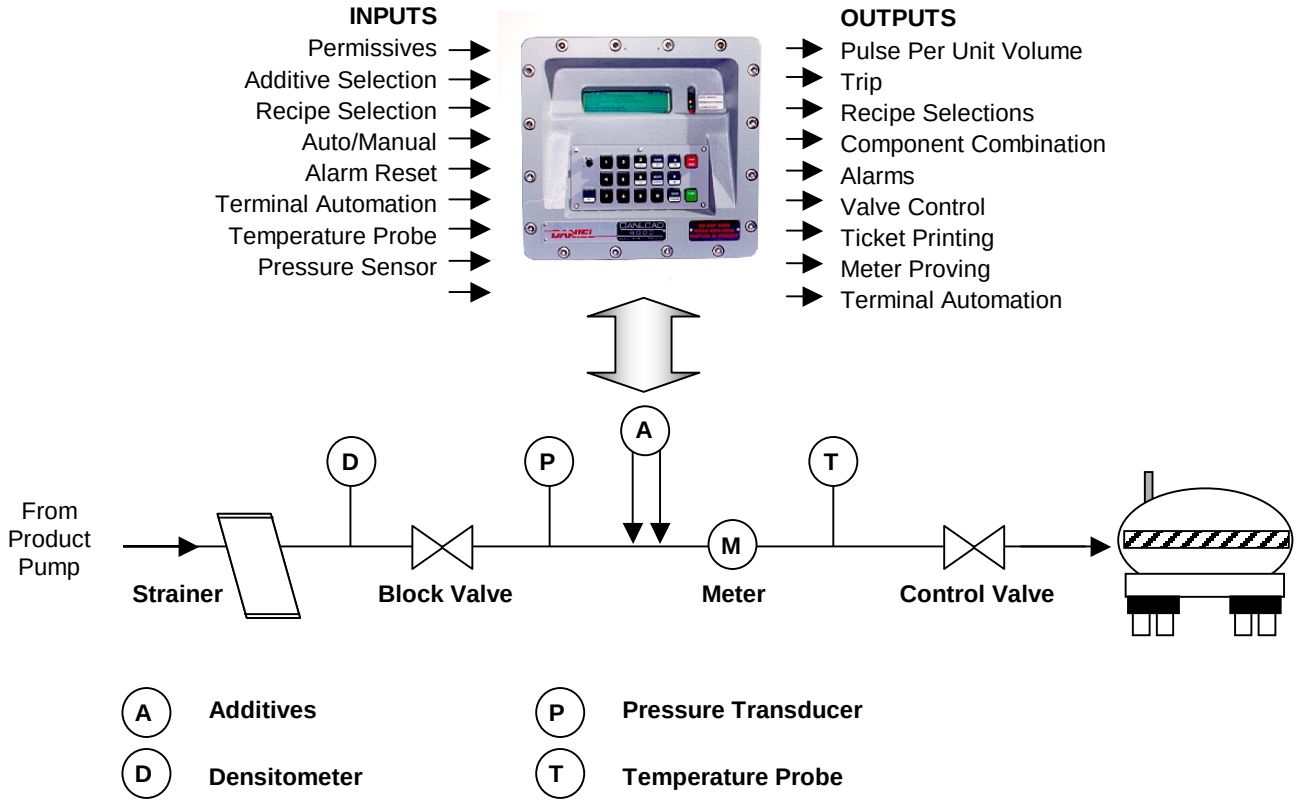
- ***Open communications interface*** using Modbus RTU protocol
- ***Self-contained NEMA 4 or NEMA 7 enclosure***
- ***Configurable flow control operations*** for straight or blended product loading either sequentially or in-line proportional/non-proportional
- ***Large, easy-to-read text/graphics display*** with automatic level adjustment for ambient light and temperature conditions

- ***Easy to configure*** with top-down display menu
- ***Multi-language displays*** for over fourteen languages in same version
- **CALMON *calibration monitoring*** with turbine meters can be used to reduce the frequency of meter calibration requirements
- ***Additive accounting*** includes measurement and control of six additive streams with independent feed-back verification and clean line compensation
- ***Temperature/Pressure compensation*** per API, IP, or linear methods
- ***Standalone storage*** for over 2000 load transactions
- ***Status LED's on front panel*** for indicating alarm, operation mode and permissive power
- ***Two communications ports***, one RS485 and the other either RS232 or RS485, for supporting communications to additional terminal automation products

BENEFITS

- ***User-configurable transaction archiving*** to provide selectable data for transaction storage file
- ***Configurable data logging/printing options*** including meter ticket, batch summary, transaction summary, alarms, meter proving, program mode, power failure, weights and measures switch status, parameters modified and crash memory summary
- ***Multiple calibration settings*** to linearize up to four meter factors for increased accuracy
- ***Measurement methods*** for fixed flow rate/meter factors, or linearization between meter factors
- ***Dynamic, simultaneous display*** of over 200 data items for providing real-time display of dynamic flow parameters including product temperature, flow rate, blend percentage, additive amounts, pressure and density
- ***Optional secondary keypad with LCD display*** for two separate and distant display/keypads from one preset (double-sided loading) or remote control applications
- ***Control options*** for digital, two-stage and stem switch
- ***Meter-proving mode*** for pipe, tank, and master-meter proving
- ***User-configurable alarms*** for alarm reporting and action to be taken
- ***Low installation and wiring costs***
- ***Suitable for gasoline, LNG/LPG, asphalt and specialty chemical applications***
- ***Part of a total system solution*** when used with Daniel LR turbine meter, 1815 flow control valve and Daniel terminal automation software

Typical Load Rack Configuration



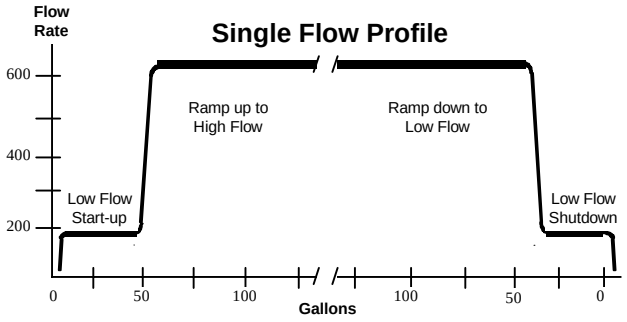
TYPICAL MANUAL MODE OPERATION

Loading begins with the operator entering up to a 6-digit preset volume, pressing ENTER and then pressing START. If the Danload 6000 has more than one recipe configured, the operator first selects the recipe using the up and down arrows on the keypad and then presses ENTER.

Once the START key is pressed, the Danload 6000 verifies that the eight configurable safety circuits (ground, overfill, ESD, vapor recovery, etc.) are satisfied before allowing loading to begin. If recipe selection inputs are configured, the input associated with the selected recipe is also verified. If the configured inputs are not satisfied, the operator receives a user-defined message describing the problem in the pre-selected language.

The Danload 6000 next determines the component percentages for the selected recipe. The loading sequence is initiated by turning on the associated component pump outputs and waiting for the user-defined line pack time to set line pressure before opening any flow control valve(s).

A low-flow start volume can be configured to further dissipate any static build-up after the ground connection. The Danload 6000 dispenses this volume at the defined low-flow rate before switching to the user-defined high-flow rate.



As loading proceeds, meter pulses are totalized for the loaded product based on meter, component or recipe using either the gross or temperature corrected volume.

Throughout the loading process, the Danload 6000 display maintains the recipe name, preset volume, loaded and remaining volumes, unit of measure, date and time and a graphical display of the batch volume loaded. A message line is also displayed to inform the operator of operation and alarm conditions. Safety circuits are continuously monitored and if any become disengaged, an alarm message is displayed and loading stopped.

For digital valve control, the Danload 6000 monitors flow and modulates the flow control valve to maintain the required flow rate throughout the loading process. This assures precise and accurate flow measurement and keeps flow rates within the limits of the meters and valves.

If additive injection is configured, the Danload 6000 controls, totalizes and verifies additives based on the user-configured parameters.

Sample Screen

Premium Gasoline	06/01/98	11:13	55%
Loaded	**554**	Gross	
Preset	1000	Gal	
Remaining	446	Gal	
Transaction Total	1554	Gal	
Load in Progress			

At any time, the operator can view configured dynamic data elements on the display without losing vital load information.

The operator can halt the loading process at any time by pressing the STOP key. This signals the Danload 6000 to close all valve(s). The batch load can be restarted by simply pressing the START key, or ended by pressing the STOP key, again.

A user-defined "low-flow stop volume" can be configured to prevent hydraulic shock when closing the flow control valve(s). ***The Danload 6000 automatically averages the last five valve closure times to assure a smooth and continuous shutoff at the preset volume.***

Clean line flush volumes for blended products and/or additives can be configured to assure product quality by preventing cross-contamination for the next batch.

When the Danload 6000 is in "Auto" mode, all loading functions such as recipe selection, preset volume, additive and transaction authorization are controlled by the terminal automation system.

The Danload 6000 supports any metering and valve equipment, but can also be provided as part of the Daniel total system solution for maximum benefit.

GENERAL SPECIFICATIONS

Operating temperature with case heater:	-40°F to 149°F (-40°C to 65°C)
without case heater:	-4°F to 149°F (-20°C to 65°C)
Storage temperature:	-4°F to 158°F (-20°C to 70°C)
Relative humidity:	5 to 95 % non-condensing

Radiated emissions:

- FCC (CFR 47) Class A digital device
- CCA LMB-EG-08 section 3.6.3.4
- RF interference: 10V/M for 20 MHZ to 500 MHZ
- CE Mark (European Community) tested to:
  EN50081 Part 2, 1994 Generic Emissions Standards
  EN50082 Part 2, 1995 Generic Immunity Standards

ENCLOSURE SPECIFICATIONS

Explosion proof (NEMA 7, Class 1, Groups C & D) and weatherproof (NEMA 4X)

Size: 12.78 in. (325 mm) high, 14 in. (356 mm) wide, and 14.13 in. (359 mm) deep

Weight: 75 lbs. (34 kg)

Also available with optional shallow enclosure

Materials: Cast aluminum body, stainless steel fasteners, and non-glare glass display window. Materials meet the guidelines of listed approval agencies and are selected to minimize corrosion in field conditions.

Mounting: Provisions are made for mounting the unit from the back or bottom of the enclosure.

Cable Entries for standard enclosure:
Located in bottom
1 ea. Threaded 2” NPT or M50 x 1.5 mm
2 ea.Threaded 1” NPT or M25 x1.5 mm

APPROVALS

Electrical

NEMA 7 for Class 1, Division 1, Groups C and D areas. Specifically,

- US (USA):
  File no. Ex 071295-152246
- CSA: (Canadian):
  File no. LR96859-9
  Eex d IIB T6. Specifically,
- CENELEC (European):
  File no. ISSep.103.1123
- SABS (South Africa):
  File no. 787/85668/K671

The NEMA 4X, weatherproof enclosure is intended for use in non-hazardous unclassified areas.

Type Approvals

NIST (USA), CCA (Industry Canada)
NMI (Holland), Service de la Metrology (Belgium)
PTB (Germany), EAM (Switzerland)
GUM (Poland), Slovenia, SABS (South Africa)

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