Product sheet

Load Computer

Model 1010

Overview

The 1010 is a powerful and intelligent loading system designed to manage the loading of petroleums and chemicals onto road tankers, rail cars and barges. The 1010 offers the advantages of a robust explosion proof enclosure and large display. The rugged keyboard incorporating *Hall Effect* push buttons is extremely reliable in harsh conditions and can be easily operated with a gloved hand. A single 1010 is able to simultaneously control loading on up to 4 arms, with totals, flow rates, preset values and operator messages displayed on the backlite LCD display. An integrated Touch Key reader on the front facia provides a reliable and secure method to identify drivers and trucks without the need for additional card readers at the loading gantry.

Features

1-Arm to 4-Arm simultaneous loading

Large display

Rugged keyboard

Touch key or PIN authorisation

Temperature compensation to API Tables

Dual communication ports

Applications

The Model 1010 is available with a range of Applications Packs, consisting of application software and hardware designed to meet the specific requirements of:

- Petroleum truck loading
- Railcar loading
- Chemical loading
- Bitumen & asphalt loading
- LPG Loading
- Aircraft refuelling truck loading
- Chinese & other language displays

In addition, we has developed a number of special Application Packs to meet the needs of customers in different countries or where non-standard requirements exist.

The flexibility of the 1010 software and hardware means that the 1010 is able to meet a wide range of applications within the petroleum industry.

ENRAF

WE THINK TANK

The 1010 is available in three enclosure styles, to meet the demands of varying applications, customers and budgets.

1010A

The 1010A can simultaneously control the loading on up to 4 arms.

It features a large dot matrix display capable of displaying the totals on all arms, together with operator messages, preset values, flow rates and other operational information.

The 1010A also features an 18 key alphanumeric keyboard with an integrated Touch Key reader to provide driver and truck identification.

1010H

The 1010H has separate totaliser and message displays, together with a rugged 18 key numeric keyboard and integrated Touch Key reader.

With a large installation base and a wide range of application software, the 1010H has proven reliability in the field.

The 1010H will handle 1 or 2 arm loading using a single enclosure. With the addition of an expansion enclosure, 4 arms can be controlled, simultaneously.

1010L

The 1010L is a price competitive, single arm loading computer which has a unique 5 button keyboard and integrated Touch Key reader.

The 1010L features a large dot matrix display which will display the preset quantity, totals, flow rate and operator messages.

The 5 button keyboard provides simplified operator entry and allows preset values to be entered and loads to be fully controlled via the keyboard.

1010A

The 1010 is a powerful and intelligent loading system.

The Model 1010 has all the flow measurement and control functions expected of a leading preset. These include:

- Precision flow measurement, including Pulse verification to API and IS0 standards.
- Temperature measurement.
- Volume Correction to API tables for most petroleum products and to US and metric standards.
- Digital valve control.
- Additive control outputs.
- Pump demand outputs with programmable delays.
- Permissive inputs for overfill, vehicle ground and emergency stop.
- Pulse outputs.
- Other digital inputs/outputs specific to user requirements

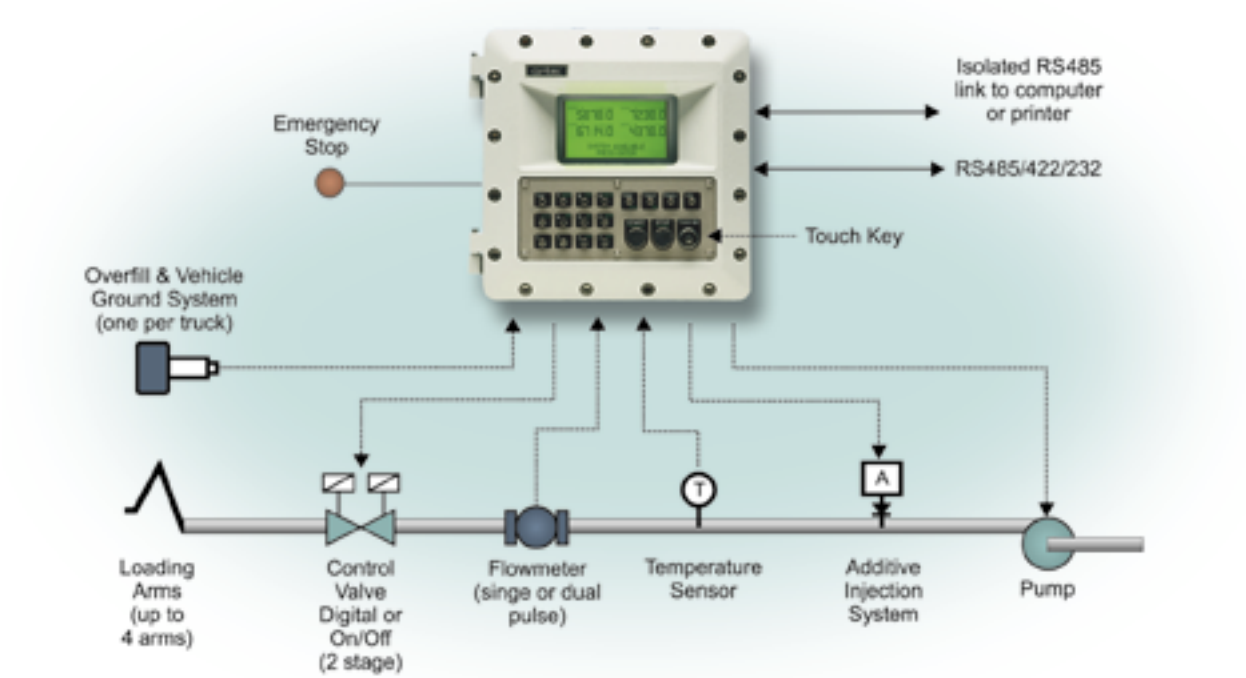
The digital valve control output enables the flow profile to be programmed to ramp up at the start of the load and to ramp down prior to the end of the load.

With our field proven fine-tuning algorithm, accurate control of flow rate is ensured for all major brands of digital control valves.

Five point linearity correction will ensure that flow signals from a wide range of flow meters will be measured with high accuracy.

The dual communications ports support RS232, 422 and 485 standards and can be used to communicate with computers and printers. The 1010 A features a fully isolated RS485 port, which provides high immunity in noisy environments.

The 1010 features a powerful diagnostic mode that simplifies commissioning and fault-finding. In this mode, each input and output can be individually tested or activated to ensure that the wiring and interface is correct, prior to running a complete load.



Typical 1010 A configuration

The Model 1010 can operate in a stand-alone mode or integrate with a terminal automation system.

Stand-Alone

In the Stand-Alone mode, the Model 1010 will provide complete control of the loading rack, including:

- Authorising drivers & vehicles.
- Prompting the driver to enter arm number, compartment number and preset quantity.
- Prompting and checking that the vehicle earth or overfill is connected.
- Simultaneous loading on up to 4 arms

The Model 1010 will manage all loading operations for single or multi-compartment vehicles and produce a bill of lading for the entire vehicle.

The last 200 vehicle loads are always stored in memory, so that tickets can be re-printed or transactions downloaded to a computer system at a later date.

Integrated System

Because the system is capable of authorising vehicles and generating prompts without reference to the automation system, the communication workload on the office computer is substantially less than if these functions were fully controlled by the automation system, as is the case with most other presets.

This means that the cost of developing software drivers and automation programs is greatly reduced.

The standard protocol used in the Model 1010 is SLIP, originally developed for the internet, because it provides a very reliable,
secure and efficient method to transfer information to the office computer system.

Touch Key Technology

Touch Key technology offers a rugged and secure method of identification for both drivers and vehicles.

The Touch Keys produce a coded number, similar to a magnetic card, that can be read by the Model 1010. Unlike magnetic cards, however, the Touch Key numbers will not be corrupted through heavy use. Each key has a unique identification number laser etched into a microchip that will transmit the number when the key is momentarily pressed against the reader.

Driver or vehicle authorisation can be granted by the Model 1010 via a database of valid key numbers stored internal to the system. Alternatively, the key number can
be sent to the office automation computer for authorisation,

Touch Keys are available as a key ring tag in a number of colours or as a card, where the actual touch button is mounted on a plastic card or badge, of similar size to a magnetic card.

Standard Touch Keys do not have a battery and have an unlimited life span. The keys receive a very small amount of power from the reader, which is mounted on the front panel of the Model 1010. An intrinsically safe isolation barrier inside the Model 1010 limits the power to micro watts, and both the keys and the reader are internationally certified for use in hazardous areas.

Programmable Set-up Parameters

General

Driver Authorisation	Touch Key/PIN/None
Truck Authorisation	Touch Key/PIN/None
Password Protection	Multi-level password protection
Time and Date	Year/Month/Day/Hours/Minutes
Volume Decimals Display	0.1 or 1
Accumulated Totals	Gross/Net

Valve Control

No Flow Time out	0 to 999s
Valve Type	Digital Set/Stop or On/Off
Slow Flow	xxx l/m or g/m
Deadband	30 to 500 l/m or g/m
Response Time Factor	0.2 to 1.0
Slow Start Time	0 to 99s
Prestop Quantity	0 to 999 litres or gals
Max. Preset Quantity	up to 99999 litres or gals

Arm Input (for each arm)

Pulse Type (Flow meter)	Single or Dual
Dual Pulse cut-off freq.	0 to 99Hz
K-factor - Linear	Single point 0.001 to 50000.0
- Non-linear	5 points 0.001 to 50000.0
Cut-off Frequency	0 to 99Hz
Temp. Compensation	None/Jet Fuel/Gasoline/Diesel/ Crude Oil Calculations are exact to API Std. 2540
Fluid Temperature Range	-10 to 50°C
Flow rate at Full Flow	xxxx l/m or g/m
Additive Output Pulse Rate	per 0 to 9999 litres or gals
Overrun Correction Amount	xxx litres or gals
Accumulated Total	0 to 99999999

Communications

Communications Device	Computer or printer
Load Scheduling	Enable/Disable (Computer only)
Communication Mode	RS232/RS422/RS485
Baud Rate	300 to 28,800
Parity	Odd/Even
Stop Bits	1 or 2
Gantry Number or Unit Address	1 to 31

Outputs

Additive Injector Type	Piston or Contrec 1020 Intelligent Injector
Pulse Output	Open Collector or 110/240 Vac
Additive Pulse	0.5 to 10 S
Number of 1020 Injectors	Up to 4 injectors per arm
Pump Off Delay	0 to 999 Seconds

Other Options

Initial Message	System Available, Connect System, Connect Overfill
Deadman Timer	Enable/Disable
Illegal Access	Enable/Disable
Alarm on Fault	Enable/Disable
Ask Load Number	Enable/Disable
Ask Compartment Nr.	Enable/Disable
Ask Return Quantity	Enable/Disable
Ask Trip Number	Enable/Disable
Expansion Mode	Enable/Disable
Keyboard Time out	20 to 999 Seconds
Overfill/Earth Reconnect	20 to 999 Seconds

Specifications

Physical

Displays (1010A & 1010L)
Alphanumeric: 112mm x 62mm backlite dot matrix LCD. Note: Contrast can be adjusted via key pad.
Batch Total: 6 digit backlite LCD with automatic ranging. 17mm high (1 and 2 arm) or 10mm high (3 and 4 arm).

Displays (1010H)
Alphanumeric: 2 line x 16 character (9mm high) backlite. Note: Contrast can be adjusted via key pad.
Batch Total: 5 digit (10 mm high) backlite LCD with automatic ranging.

Key pad Buttons
Switches: Flameproof with heavy duty actuators.
1010A: 11 alphanumeric and 7 function keys.
1010H: 11 numeric and 7 function keys.
1010L: 5 function keys.
Material: Stainless Steel.
Weights & Measures Seal: A program access switch, located on the side of the enclosure, can be affixed with a lead seal to prevent tampering.

Enclosure
Dimensions: 302mm (w) x 288mm (h) x 326mm (d).
Material: Powder coated aluminium.
Sealing: IP66 (Nema 4X) weatherproof, fully O-ring sealed.
Mounting: Four 8 x 1.5mm metric or 5/16" UNF threaded holes top and bottom.
Weight: Single enclosure - 22.5 kg (approx).
Shipping weight - 23.0 kg (approx).
Cable Connection: Five 25mm x 1.5mm metric threaded holes or 2 x 1 1/4" and 1 x 1" NPT holes.

Touch Key/Smart Card Reader
Materials: Stainless Steel & Delrin.

Operational

Power Requirements
110 Vac +10% -15%, 50/60 Hz.
220 Vac +10% -15%, 50/60 Hz.

Operating Temperature (Ambient)
-10 to 60 °C (-40 °C with optional heater).

Operational (con'd)

Communications
Computer/Printer: RS232/RS422/RS485 (or isolated RS485 on the 1010A only).
Expansion Port: RS232/RS422/RS485. Port configuration may depend on the Application Pack.

Interference CE Compliance.

Inputs and Outputs

Flow Inputs
Input Frequency: 0 to 2000Hz. Single or dual (quadrature) inputs on each channel. 0 to 8000Hz optional (non OIML units only).
Note: Dual pulse is for pulse verification only and does not detect reverse flow.
Pulse Integrity: (Dual pulse only) If a pulse failure is detected the system will alarm and stop flow on that channel.
Note: This is in accord with API Standards Chapter 5, Section 5, AS2702 and ISO6551.
K-factor **- Linear:** Single point 0.001 to 50000.0
- Non-linear: 5 points 0.001 to 50000.0

Temperature Inputs
Input Signal: 4-20mA or 4 wire RTD.
Range: -10 to 50°C (standard).
Input Circuit: 12 Bit A/D converter.
Correction: To API Table 24B/54B for gasoline, diesel, Jet fuel and Table 24A/54A for crude oil.

Overfill and Ground Inputs
Switched input from floating contact.
Note: Relays on the overfill and ground systems must be floating (i.e. not connected to other circuits) and suitable for switching low voltage signals.

Emergency Stop Input
Switched input from floating contact.
Note: Switches or relays on this input must be floating (i.e. not connected to other circuits) and suitable for switching low voltage signals.

Inputs and Outputs (con'd)

Valve Control Outputs (2 stage on/off or digital control valves) Isolated Solid State Relays (SSRs) rated 1 A @I 240 Vac.
Min. contact voltage: 24 Vac.
Max. contact voltage: 265 Vac.
Optical Isolation: 2500 Vrms.
Current range: 0.02 to 1 A ac.
Max. surge current: 20 A ac.
Max. off-state leakage current: 20 mA ac.
Note: SSRs are not suitable for switching dc voltages.

Additive Outputs (one per loading arm)
Conventional Piston Injector: SSR rated 1A @ 240 Vac.
1020 Intelligent Additive Injector: Open collector transistor. 100 mA (max) and 28 Vdc (max).

Pump Demand Outputs (one per loading arm)
Electromechanical relay rated at 1A @ 240 Vac or 24 Vdc.

Alarm Outputs
1 x Electromechanical relay rated at 1A @ 240 Vac or 24 Vdc.

Power Outputs
12 Vdc for flow meters (150 mA max).
24 Vdc for temp. sensors (100 mA max).

Approvals

The Model 1010 complies with international metrology approvals including:

- European approvals to the OIML R117 standards with certification through NMI and PTB
- US NIST approval
- Canadian approval
- South African SABS
- Australian NSC

Hazardous area approvals for the enclosure include:

- European Approval Cenelec EEx d IIB T6
- USA & Canadian CSAus/c for Class 1, Groups C &, D

Approvals for the Touch Keys, Reader and barrier include:

- European Approval Cenelec EEx d [ia] IIB T5
- USA & Canadian CSAus/c for Class 1, Groups C & D

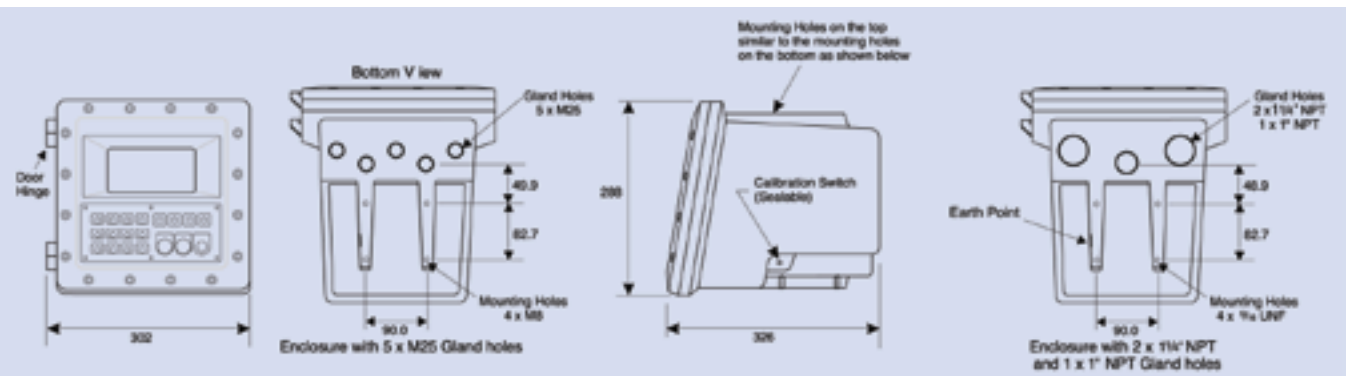
CE & EMC standards

- EN50081 -1 & EN50081 -2, EN50082-1 & EN50082-2

Important: Specifications are subject to change without notice.

Note that some specifications may vary depending on the application. Refer to the Application Pack Briefs for more details.

Dimensional drawing



Metric threads

USA threads

Identification code

Pos 1, 2, 3, 4 Model	
1 0 1 0	Load computer

Pos 5 Style	
H	18 numeric keys & separate totaliser displays
A	18 alphanumeric keys, dot matrix display
W	5 keys and dot matrix display (only if Pos 6 = 1)

Pos 6 Number of loading arms	
1	One arm loading system
2	Two arm loading system
3	Three arm loading system
4	Four arm loading system

Pos 7	
-	

Pos 8, 9 Application pack	
B A	For description see application pack brief

Pos 10	
-	

Pos 11 Authorisation	
0	None or PIN
2	Touch key
3	Other

Pos 12 Glands, Approvals			
A	SAA approved with 5x M25	M	ATEX with 5x M25
C	CSA us/c 2x 1.25" & 1x1"	N	ATEX as above with heater
D	CSA as above with heater	L	No gland holes

Pos 13 Power supply	
1	110 Vac
2	220 Vac
3	DC Volts

Pos 14 Display type & units of measure	
N	Dot matrix display - programmable units
L	Separate totaliser displays with liters
G	Separate totaliser displays with gals
K	Separate totaliser displays with kgs
P	Separate totaliser displays with lbs

Pos 15 Metrology approval	
0	None
1	Australian NSC
2	Canadian Weights & Measures
3	OIML R117 (NMI)
4	USA NIST

1	0	1	0	H	2	-	B	A	-	0	M	2	N	0	Typical identification code
1	0	1	0			-			-						Your identification code

We at Enraf are commited to excellence

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