

Model 1010

Load Computer



Features

- 1-Arm to 4-Arm simultaneous loading
- Large Display
- Rugged Keyboard
- Touch Key or PIN Authorisation
- CENELEC and USA/Canadian Hazardous Area approval
- Temperature Compensation to API Tables
- Dual Communication Ports
- Fully Programmable with a sealable metrology switch

Overview

The 1010 is a powerful and intelligent loading system designed to manage the loading of petroleum and chemicals onto road tankers, rail cars and barges.

The 1010 offers the advantages of a robust explosionproof enclosure and large display. The rugged keyboard incorporating *Hall Effect* pushbuttons 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, flowrates, preset values and operator messages displayed on the backlite LCD display.

An integrated Touch Key reader on the front fascia provides a reliable and secure method to identify drivers and trucks without the need for additional card readers at the loading gantry.

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, Contrec 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.



Model 1010

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



1010 A

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, flowrates 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.



1010 H

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.



1010 L

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, flowrate 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.



1010 A

Functionality

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 ISO 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.

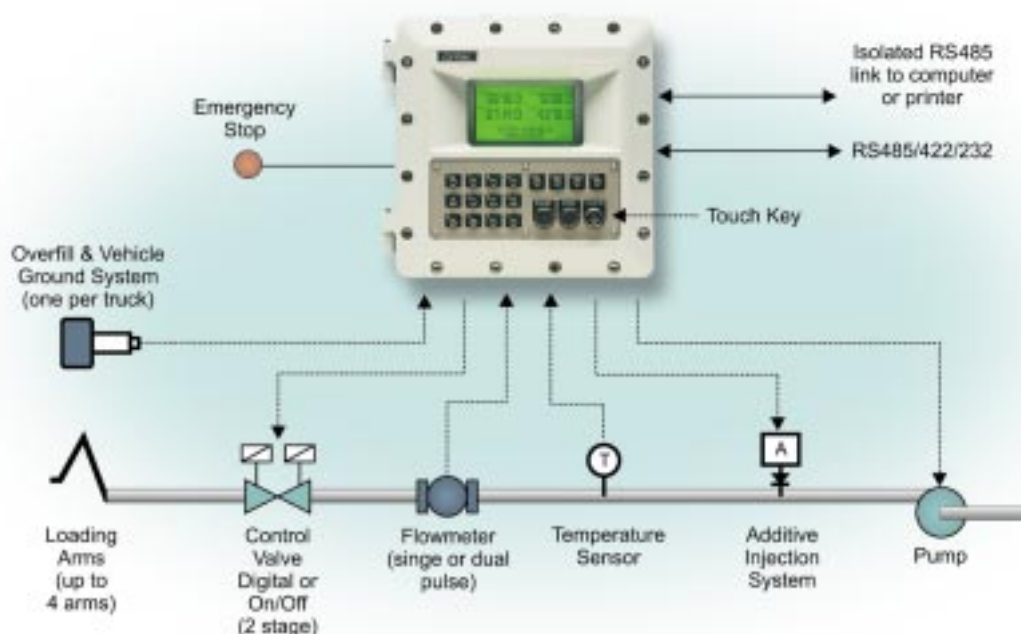
The digital valve control output enables the flow profile to be programmed to ramp up at the start of the load and to ramp down prior to the end of the load.

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

Five point linearity correction will ensure that flow signals from a wide range of flowmeters 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 1010A 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

Model 1010

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

Standalone

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 microwatts, 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 Timeout | 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 |
| Maximum Preset Quantity | up to 99999 litres or gals |

Arm Input (for each arm)

| | |
|------------------------------|--|
| Pulse Type (Flowmeter) | Single or Dual |
| Dual Pulse cut-off frequency | 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 |
| Temperature Compensation | None/Jet Fuel/Gasoline/Diesel/Crude Oil Calculations are exact to API Std. 2540 |
| Fluid Temperature Range | -10 to 50°C |
| Flowrate 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 110/240V ac |
| Additive Pulse | 0.5 to 10s |
| 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 Number | Enable/Disable |
| Ask Return Quantity | Enable/Disable |
| Ask Trip Number | Enable/Disable |
| Expansion Mode | Enable/Disable |
| Keyboard Timeout | 20 to 999 Seconds |
| Overfill/Earth Reconnect | 20 to 999 Seconds |



Specifications



Physical

Displays (1010A & 1010L)

Alphanumeric: 112 x 62mm backlit dot matrix LCD.

Note: Contrast can be adjusted via keypad.

Batch Total: 6 digit backlit 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) backlit.

Note: Contrast can be adjusted via keypad.

Batch Total: 5 digit (10mm high) backlit LCD with automatic ranging.

Keypad 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.

Materials: 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 1.5 mm 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

Material: Stainless Steel & Delrin.

Operational

Power Requirements

110V ac +10% -15%, 50/60Hz.

220V ac +10% -15%, 50/60Hz.

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 (ie. 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 (ie. 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 1A @ 240V ac.

Min. contact voltage: 24V ac.

Max. contact voltage: 265V ac.

Optical Isolation: 2500Vrms.

Current range: 0.02 to 1A ac.

Max. surge current: 20A ac.

Max. off-state leakage current: 20mA ac.

Note: SSRs are not suitable for switching dc voltages.

Additive Outputs (one per loading arm)

Conventional Piston Injector: SSR rated 1A @ 240V ac.

1020 Intelligent Additive Injector: Open collector transistor.

100mA (max) and 28 Volt dc (max).

Pump Demand Outputs (one per loading arm)

Electromechanical relay rated at 1A @ 240V ac or 24V dc.

Alarm Outputs

1 x Electromechanical relay rated at 1A @ 240V ac or 24V dc.

Power Outputs

12V dc for flowmeters (150mA max).

24V dc for temp. sensors (100mA 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 CSA_{US/CA} 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 CSA_{US/CA} for Class 1, Groups C & D

CE & EMC standards

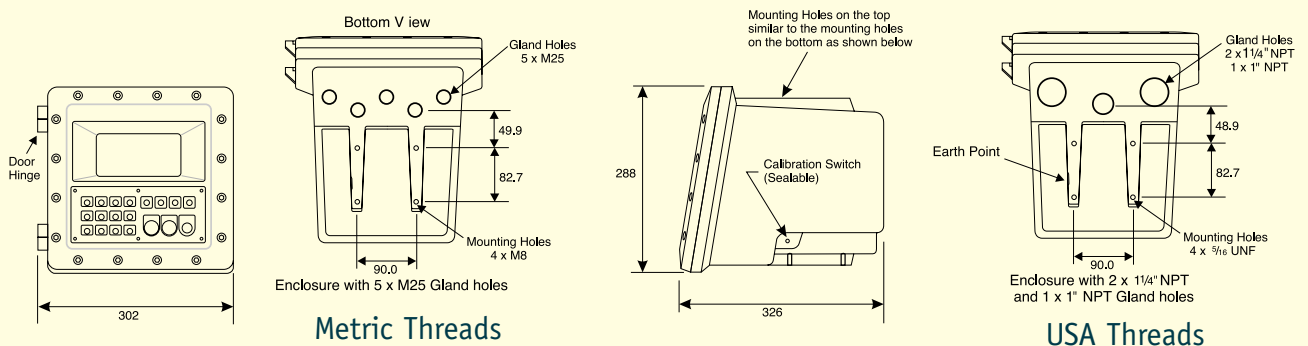
- ▶ EN50081-1 & EN50081-2, EN50082-1 & EN50082-2

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 Diagrams

Load Computer



Product Codes

| Model | | Supplementary Code | | | | | | Description |
|---|--------------|--------------------|-------------|----------------------------|-----------------------|-----------------------|---|----------------------|
| 1010 | | - - | | | | | | Load Computer |
| Style | H A L | | | | | | 18 numeric keys & separate totaliser displays 18 alphanumeric keys, dot matrix display 5 keys and dot matrix display | |
| Number of Arms | 1 to 4 | | | | | | Number of Loading Arms | |
| Application Pack | | B A B L etc. | | | | | Application Pack - refer to Application Pack Brief | |
| Authorisation | | | 0 2 3 | | | | None or PIN Touch Key Other | |
| Glands, Approvals and Heater Option for the Enclosure | | | | A C D M N L | | | SAA Approved with 5 x M25 CSA ^{USC} 2 x 1.25" & 1 x 1" CSA as above with heater Cenelec with 5 x M25 Cenelec as above with heater No gland holes | |
| Power Supply | | | | | 1 2 3 | | 110 VAC 220 VAC DC Volts | |
| Display Type and Units of Measure | | | | | N L G K P | | Dot Matrix Display - programmable units Separate totaliser displays with litres Separate totaliser displays with gals Separate totaliser displays with kgs Separate totaliser displays with lbs | |
| Metrology Approval | | | | | | 0 1 2 3 4 | None Australian NSC Canadian Weights & Measures NMI OIML R117 USA NIST | |

Typical Part Number: 1010A4-BA-2M2N0

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