Load Computer

Load Computer Model 1010 CJ

The 1010 CJ Load Computer is a powerful and intelligent loading system, capable of simultaneously controlling the load procedure on a maximum of four arms.

The 1010 CJ is designed for loading gantries of petroleum refineries and oil marketing terminals, to manage the custody transfer of petrochemical products onto road tankers, railcars, aircraft and barges. The Load Computer makes standard provision for all measurement and control functions for the loading/unloading of products such as fuel, chemicals, bitumen, asphalt, LPG, etc. Utilising numerous functions, including flow measurement with pulse verification to API and ISO standards, temperature and volume correction and digital valve control. The 1010 CJ also delivers advanced functionality such as configurable I/O, touch key card readers and ‘Smart’ Additive connectivity to Honeywell Enraf injection systems.

Features

- Easy to Install, Configure, Operate, Maintain
- Customizable to suit customer needs
- Interface with Honeywell Experion TAS
- Stand-alone operation mode
- Simultaneously loading up to 4 arms
- Smart interface with Mini-Pak 3000 and Mini-Pak 6 controllers
- 16 Recipes for additives (4X per arm)
- Flash downloadable firmware
- User friendly configuration menu
- Configurable inputs and outputs
- Three isolated communication ports
- Large backlit LCD display (OIML)
- Adjustable display contrast
- 18 Key Alphanumeric keyboard
- Rugged Hall Effect push buttons
- Integrated Touch Key reader
- Honeywell NexWatch card reader
- Local or Remote Authorization
- Driver and Truck ID (2750 each)
- Diagnostics Program
- 5 Point Linearization
- Temperature and Pressure compensation to API
- MID Approved
- Transaction log (512 tractions)
- Illegal Access lockout
- Multi-level security (password protection)
- Compact and robust explosion proof enclosure
- Available in weatherproof enclosure (Nema 4x)
- Multi-Language GUI

1010A
Explosion Proof
Hazardous Area

1010W
Weather Proof
Non-Hazardous Area

Typical 1010Ax-CJ configuration

1010A

The 1010 is a powerful and intelligent loading system.

The model 1010CJ has advanced flow measurement and control functions, with precision flow measurement including pulse verification to API standards.

- Digital valve control
- Additive control outputs
- Pump demand outputs with programmable delays
- Overfill/Ground Input/Vapor Rec.
- Programmable Permissive Inputs
- Programmable Outputs (Alarms)
- Programmable Inputs (Pause/ Terminate)
- Emergency Stop
- Configurable I/O

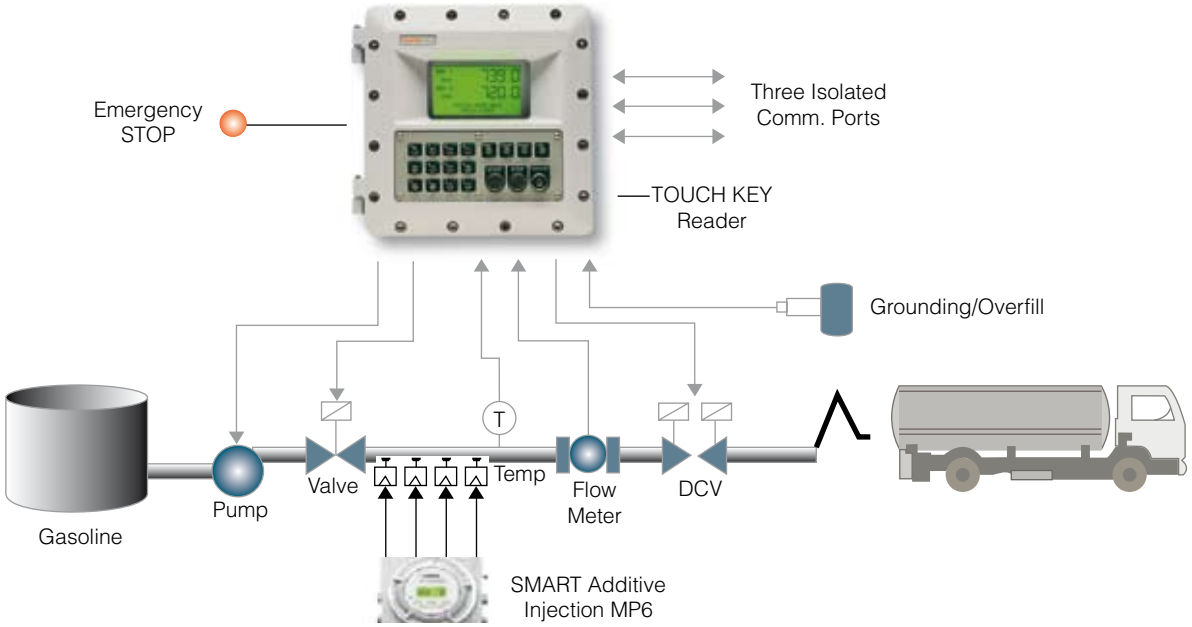
The digital valve control output enables the flow profile to be programmed to ramp up at the start of the load and to ramp down prior to the end of the load.

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.

Three isolated communication ports (Port1: RS232/422/485; Port2: 232/485; Port3: 232/485, can be used to communicate with Terminal Automation Systems, SMART additive controllers, NexWatch card reader and printers. Isolated communication ports provide high immunity in noisy environments.

The 1010 features a powerful diagnostics 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.



Instrument Configuration:

#	Description	Physical Load Arms				Display/Screen (four numeric totals)
		Arm 1	Arm 2	Arm 3	Arm 4	
1	Single load arm	single	Not Available	Not Available	Not Available	Preset Deliv'd
2	Two load arms	single	single	Not Available	Not Available	Arm 1 Arm 2 Preset Preset
3	Three load arms	single	single	single	Not Available	Arm 1 Arm 2 Arm 3
4	Four load arms	single	single	single	single	Arm 1 Arm 2 Arm 3 Arm 4

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

Stand-Alone

In the Stand-Alone mode, the 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 512 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 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 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 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.

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 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	PIN/Touch Key/RFID/NexWatch
Truck Authorisation	PIN/Touch Key/RFID/NexWatch
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 999 s
Valve Type	Digital Digital/Two-stage
Slow Flow	800 l/m or g/m or g/m
Deadband	1 to 500 l/m or g/m
Response Time Factor	0.2 to 1.0
Slow Start Time	0 to 99 s
Prestop Quantity	0 to 999 litres or gals
Max. Preset Quantity	up to 9999999 litres or gals

Arm Input (for each arm)

Pulse Type (Flow meter)	Single or Dual
Dual Pulse cut-off freq.	0 to 99 Hz
K-factor - Linear	Single point 0.001 to 50000.0
- Non-linear	5 points 0.001 to 50000.0
Temp. Compensation	Temperature Volume correction as per the ASTM D1250-04
Fluid Temperature Range	-50 °C to 150 °C -58 °F to 302 °F
Pressure Compensation	0 to 9343kPa (0 to 1355 psi)
Flow rate at Full Flow	3000 l/m or g/m
Additive Output Pulse Rate	per 0 to 999 litres or gals
Overrun Correction Amount	250 liters or gals
Accumulated Total	0 to 99999999

Communications

Communications Device	TAS/printer/SMART Additive/ NexWatch
Load Scheduling	Standalone/Load Scheduling
Communication Mode	RS232/RS422/RS485 (RS422 Port1 only)
Baud Rate	300 to 38,400
Parity	None/Odd/Even
Stop Bits	1 or 2
Gantry Number or Unit Address	1 to 31

Outputs

Additive Injector Type	Piston or MP3000/MP6
Pulse Output	110/240 Vac
Additive Pulse	0.5 to 10 s
Number of injectors	Up to 4 SMART injectors per arm
Pump Off Delay	0 to 999 Seconds

Other Options

Initial Message	System Available, Connect System, Connect Overfill

All the ENABLE/DISABLE options:

Test Mode	Ask Load Number
Automated Proving	Simultaneous Arm Loading
Illegal Access	Multiple Loads Per Arm
Alarm on Fault	Ask Preset Quantity
Ask Compartment No	Max Preset Quantity
Ask Return Quantity	Deadman Timer

Other:

Keyboard Timeout	0 to 6000 seconds
Clear/Reconnect Timer	0 to 999 seconds
Auto High Flow Timer	0 to 300 seconds

Specifications

Physical

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

Key pad Buttons
Switches (1010A): Flameproof with heavy duty actuators. 1010A: 11 alphanumeric and 7 function keys.
Switches (1010W): Double actuator switches behind a membrane overlay.
1010W: 11 numeric and 7 function keys.
Material: Stainless Steel (1010A) / Mylar (1010W).
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: 302 mm (w) x 288 mm (h) x 326 mm (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 25 mm x 1.5 mm metric threaded holes or 2 x 1 1/4" and 1 x 1" NPT holes.

Touch Key
Materials: Stainless Steel & Delrin.

Operational

Power Requirements
95 to 135 Vac, 50/60 Hz.
190 to 260 Vac, 50/60 Hz.

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

Communications
Computer/Printer/MiniPak/NexWatch: RS232/RS422/RS485 (RS422 Port 1 only).

Inputs and Outputs

Flow Inputs
Input Frequency: 0 to 2000 Hz. Single or dual (quadrature) inputs on each channel.
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 accordance 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: 4-20 mA or 4 wire RTD.
Range: -50 C to 150 C/ -58F to 302F .
Input Circuit: 16 Bit A/D converter
Correction: To API Table 24B/54B for gasoline, diesel, Jet fuel and Table 24A / 54A for crude oil.

Volume Compensation
Temperature and Pressure Volume correction as per the ASTM D1250-04:
1. Refined (Tables 24B, 54B and 60B)
2. Crude Oils (Tables 24A, 54A and 60A)
3. Lube Oils (Tables 24D, 54D and 60D)

Pressure compensation according to MPMS 12.2.2 (M)
Temperature Volume correction as per the ASTM D1250-04:
4. Gasohol (using thermal expansion factor)
5. MTBE (using thermal expansion factor)

Generic thermal expansion factor based on the ASTM D1250-04 calculations:
6. Manual entry of expansion factor

Temperature Volume correction as per the Manual of Petroleum Measurement Systems (MPMS) for Light Hydrocarbon Liquids (Chapter 12.2.4).

Pressure Inputs
Input Signal: 4-20mA
Range: 0 to 9343kPa (0 to 1355 PSI equivalent)
Input Circuit: 16 Bit A/D converter

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.

Inputs and Outputs (con'd)

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.

Valve Control Outputs (2 stage on/off or digital control valves) Isolated Solid State Relays (SSRs)
rated 1 A @ 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.

Pump Demand Outputs (one per loading arm)
Electromechanical relay rated at 1A @ 240 Vac or 30 Vdc.

Alarm Outputs
1 x Electromechanical relay rated at 1A @ 240 Vac or 30 Vdc.

Power Outputs
12 Vdc for flow meters (250 mA max).
8-30 Vdc for temp. sensors (100 mA max).

Approvals

The 1010CJ complies with OIML R117-1 and MID international metrology approvals

Hazardous area approvals for the enclosure include:

- European Approval ATEX II2G EEx d IIB T6
- USA & Canadian CSAus/c for Class 1, Groups C&D, T6
- IECEx Ex d IIB T6

Approvals for the Touch Keys, Reader and barrier include:

- European Approval ATEX II2G EEx d [ia] IIB T6
- USA & Canadian CSAus/c for Class 1, Groups C&D, T4
- IECEx Ex d [ia] IIB T6

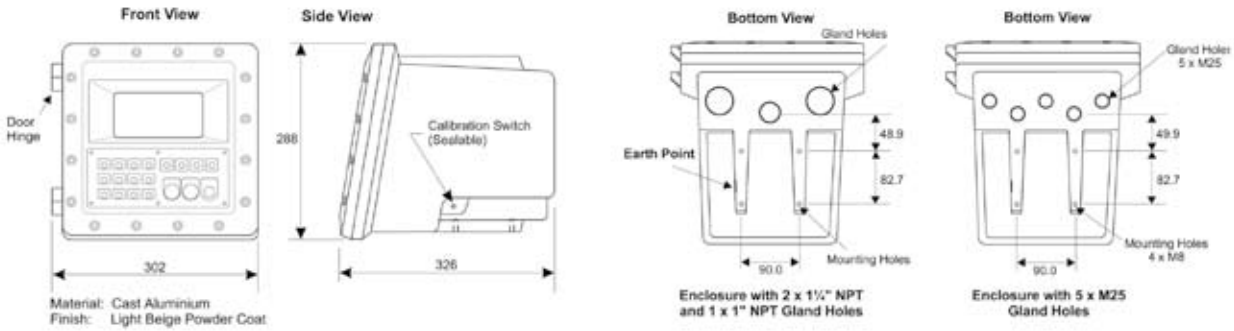
EMC standards

- EN50081 -1 & EN50081 -2, EN50082-1 & EN50082-2, EN61000-6-4 (2001)

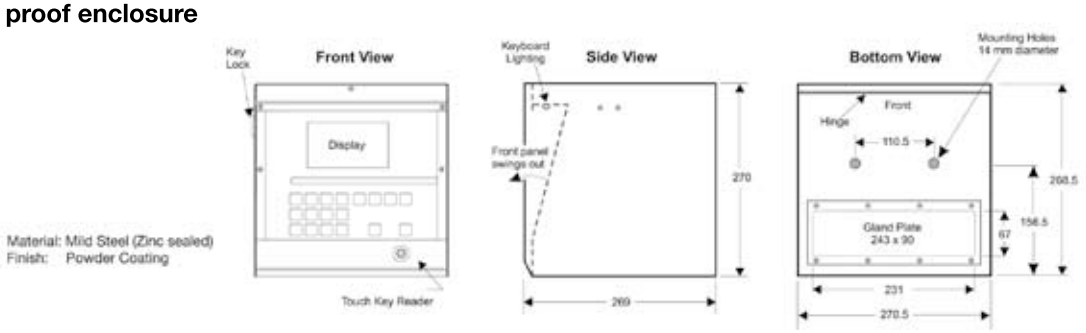
Important: Specifications are subject to change without notice.

Dimensional drawing

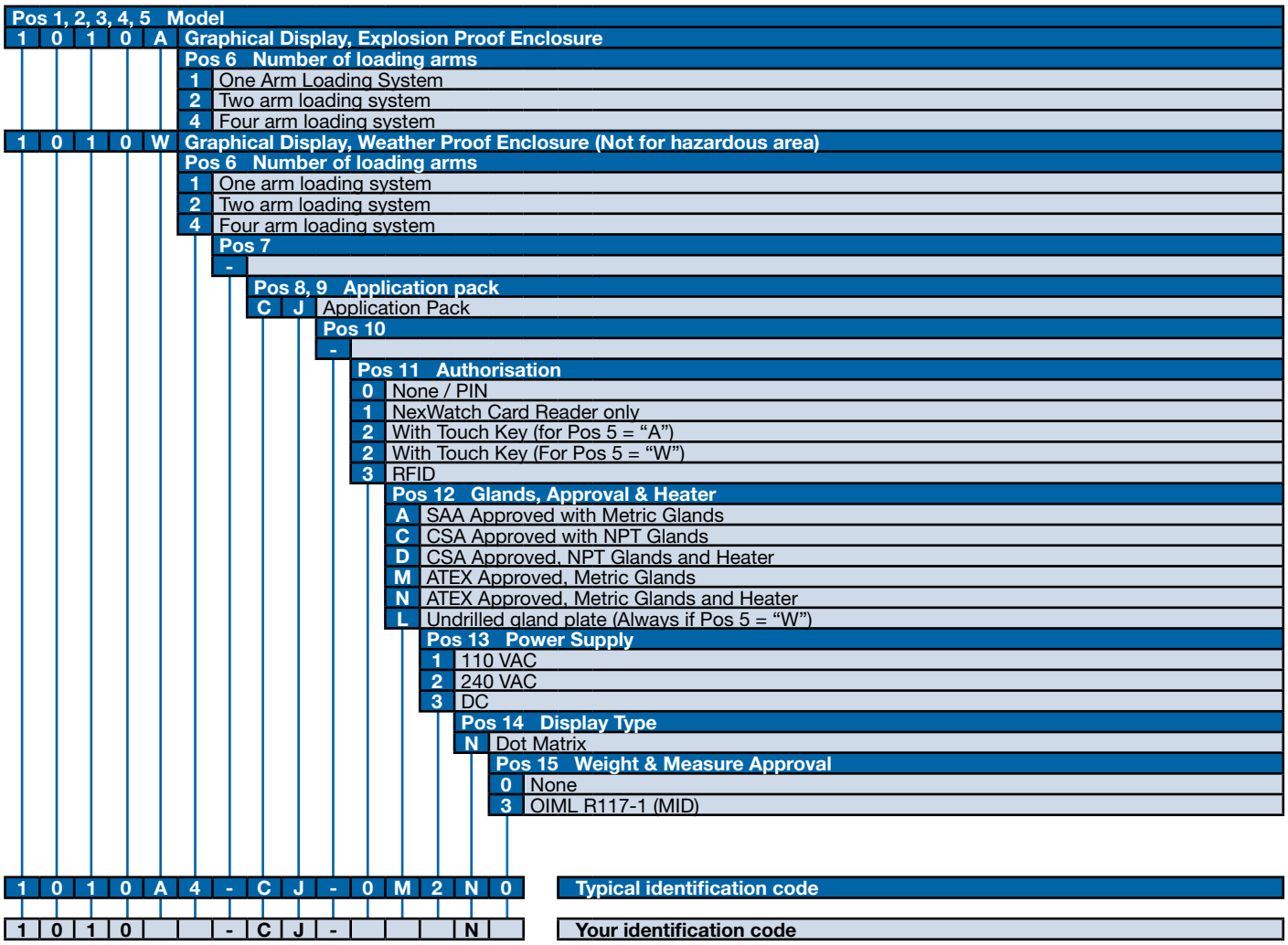
Explosion proof enclosure



Weather proof enclosure



1010Ax-CJ Load Computer



1	0	1	0	A	4	-	C	J	-	0	M	2	N	0	Typical identification code
1	0	1	0			-	C	J	-				N		Your identification code