GUIDANT

1010CB Load Controller

Powerful, smart, and accurate for petroleum terminal loading operations

Flexible, Smart, and Easy to Use

The 1010CB Series Load Controller provides a wide range of functionality built for ease of use, low cost of ownership, and smart integration.

It also offers advanced functionalities, such as pulse verification per American Petroleum Institute (API) and International Organization of Standardization (ISO) standards. It contains industrial-standard temperature and volume corrections tables and precise loading control with digital control valve operations. The 1010CB can be flexibly integrated with site equipment through programmable I/O, provides secure driver/operator authentication via touch-key readers, and includes built-in capability to directly control additive injectors without needing extra modules.

Customize the 1010CB to your needs. Suitable for a wide range of petrochemical products, special application packs can be tailored for specific operating areas. You can use it in a stand-alone mode or integrate it into your terminal automation system for local or remote authorization of loading and unloading operations.

From custody transfer to road tankers, the 1010CB offers all of the measurement and control functions needed for chemicals, bitumen, asphalt, petroleum, liquefied natural gas (LNG), liquefied petroleum gas (LPG), and more.

Precision Control

Control the flow profile with digital valve control to ramp up at the start of a load and ramp down toward the end, while the field-proven, fine-tuning algorithm ensures accurate control for all major brands of digital control valves. Ten-point, non-linear correction means flow signals from a wide range of flow meters are measured accurately.

Built According to API MPMS Standards

An MID- and ATEX-approved design and precision flow measurement includes pulse verification to API standards.

Safe and Secure

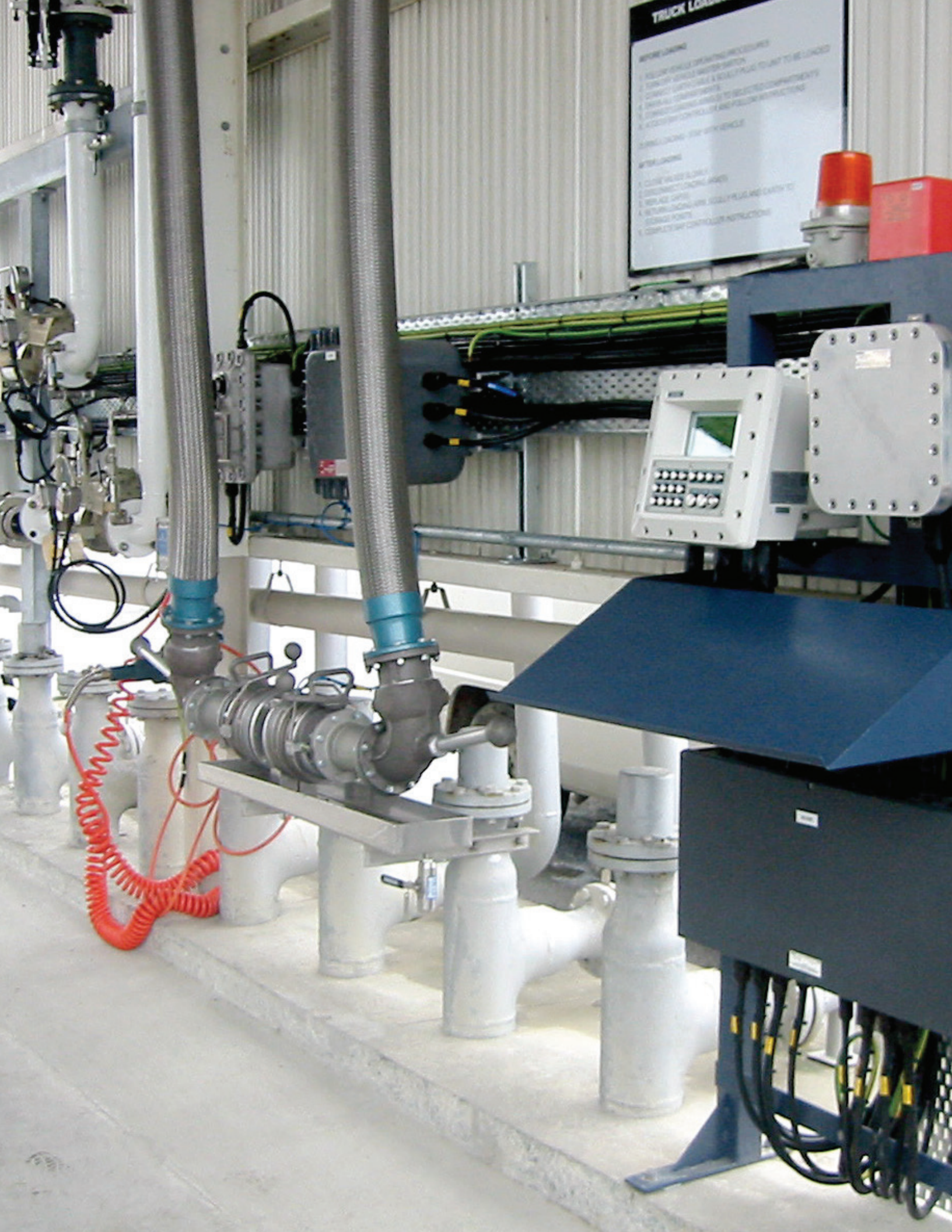
The touchkeys and reader are internationally certified for use in hazardous areas. Security functions include illegal-access lockout and multilevel security settings with password protection.

Easy to Use

Easy to install, configure, and operate. Configurable I/O, flash downloadable firmware, and a powerful diagnostics mode simplify commissioning and faultfinding. Each input and output can be individually tested or activated to ensure the wiring and interface are correct prior to running a complete load. It also features a user-friendly configuration menu, customizable features, and large backlit liquid crystal display (LCD).

Built to Last

The resilient design includes ruggedized truck-driver-proof buttons and a compact, robust explosion-proof enclosure. Additionally, the touchkey reader holds up to heavy use, unlike magnetic cards.



Typical 1010CB Configuration

Enclosure sealed to IP66 or NEMA 4x

Explosion-proof enclosure

USA/Canadian approved Class 1, Division 2, Groups C and D, T6 ATEX approved
Ex II 2G Ex db IIB T6 Gb
IECEx Ex db IIB T6 Gb

Large dot matrix LCD display with LED backlighting

Alphanumeric keyboard

Program setup switch (sealable)

NOTE: The touchkey reader is available as part of MSG selection.

Features and Benefits

Flexible and Powerful

- Customizable
- Simplified Mandarin language support
- Standalone mode
- 16 recipes for blending/additives
- 1,000 transaction logs
- 2,000 audit trail logs
- Straight, ratio, and sidestream blending
- Power resumes after power failure

Precise and Compliant

- Temperature, pressure, and density correction
- Built according to API MPMS standards

User Friendly

- Flash downloadable firmware
- Configurable I/O
- Large, backlit LCD with adjustable contrast
- 18 alphanumeric buttons

Integrated

- Interfaces with terminal automation systems
- Allows third-party TAS interfaces via SLIP+, Modbus RTU, and Modbus TCP/IP
- Three isolated serial RS485 communication ports
- Two TCP/IP (IEEE 802.3 10/100 Base-T standard) Ethernet ports

Resilient

- Rugged push buttons
- Explosion-proof NEC 500/505
- Flameproof ATEX and IECEx
- Diagnostics program

Secure

- Integrated touchkey reader
- Card readers
- Local or remote authorization
- Driver and truck IDs (2,750 each)
- Illegal-access lockout
- Multilevel security with password protection

Advanced Functions

Independent Operation

Stand-alone mode provides a low-cost loading system for unmanned bulk stations. The 1010CB can provide complete control of the loading rack, with simultaneous loading on up to two arms, including:

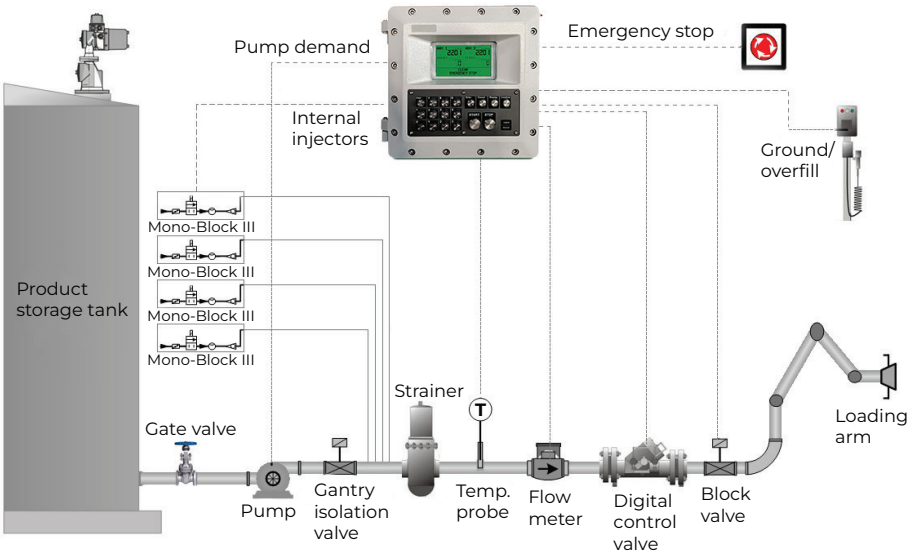
- Authorizing drivers and vehicles
- Prompting entries for arm or compartment number and preset quantities
- Prompting and checking connections for vehicle earths and overfill

When connection is needed, the 1010CB uses the SLIP+, Modbus RTU, and Modbus TCP/IP protocols for highly reliable, secure, and efficient information transfer.

A Touch More Reliable

The 1010CB Load Computer uses touchkey technology for secure, reliable, and resilient identification and access control.

Identification keys transmit a unique number laser etched onto their microchip that is read by the 1010CB when pressed against the touchkey reader. Authorization can be granted by the 1010CB against a database of valid key numbers stored internally or by the office automation computer. With no battery and an unlimited lifespan, touchkeys are available as a key ring tag in several colors or with the touch button mounted on a plastic card or badge.



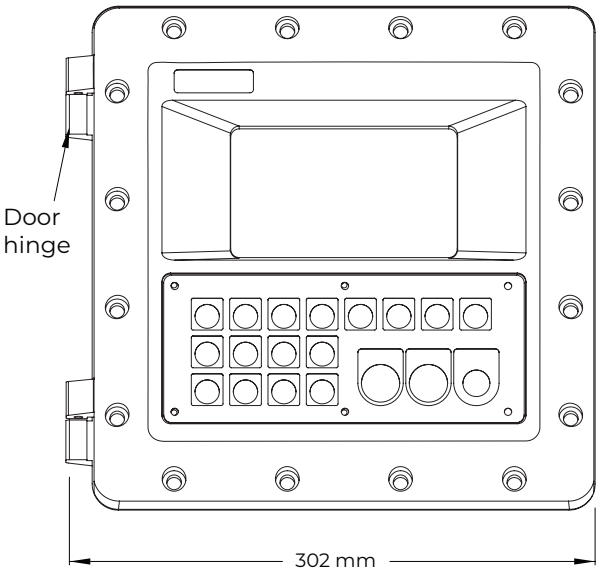
For reasons of safety and preference, many other components can be included. For the sake of simplicity, some components are not illustrated.

The 1010C features a wide range of advanced flow measurement and control functions for complete control of the loading and unloading operations:

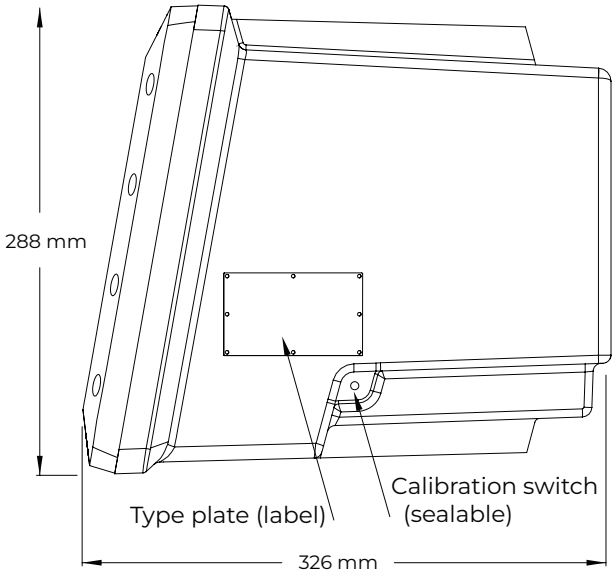
- Digital control valve
- Analog control valve
- Two-stage valve
- Up to four additives can be internally controlled
- Pump demand outputs with programmable delays
- Overfill/ground input
- Vapor-recovery permissive and, for LNG and LPG, configurable vapor-recovery meter support
- Programmable permissive inputs
- Programmable outputs (for alarms/receiver incremental tuning (RIT))
- Programmable inputs (for generic interlocks)
- Emergency stop function
- Configurable I/O

Technical Specifications

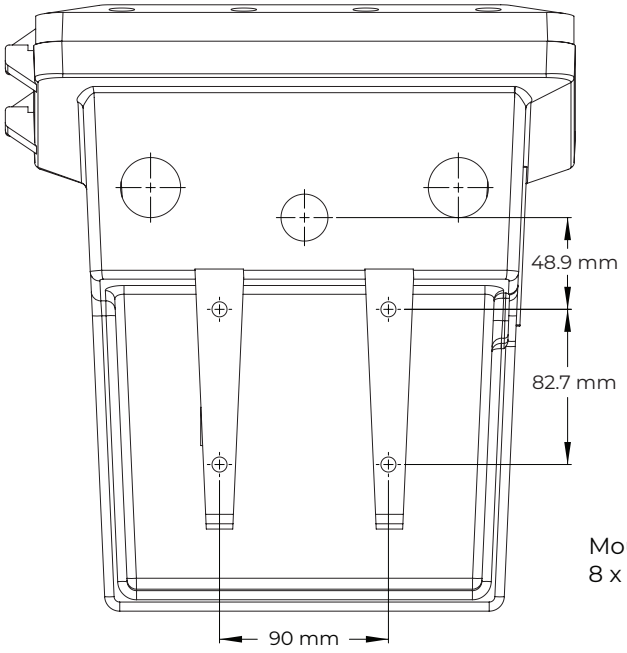
Dimensional Drawings



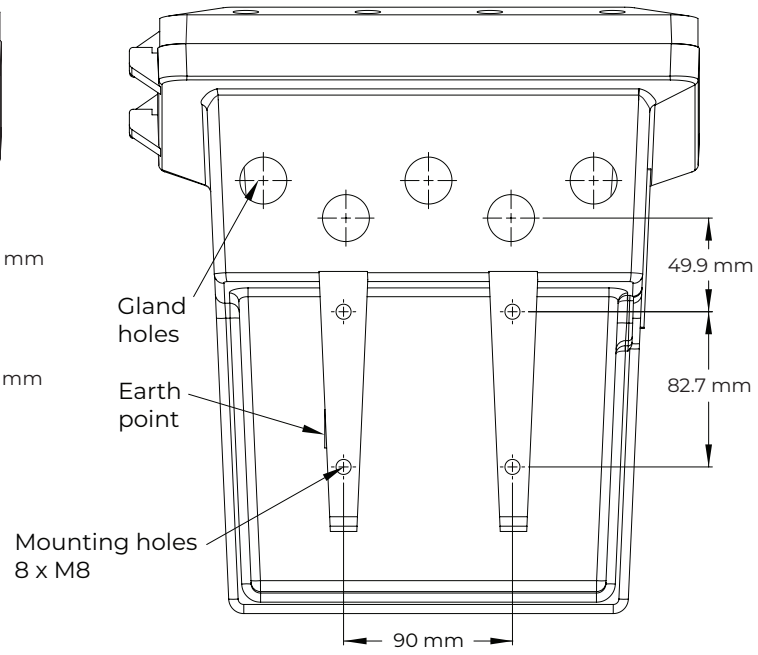
Front View



Side View



Enclosure with two 1 1/4-inch NPT
and one 1-inch NPT gland holes



Enclosure with 5 x M25 gland holes

Bottom View

Identification Code

POSITION	
1-5	MODEL
1010A	Graphical display, explosion-proof enclosure
6	NUMBER OF LOADING ARMS
A	One-arm load computer controlling four internal additive injectors (total)
B	One-arm ratio/blending load computer controlling four internal additive injectors (total)
C	One-arm sidestream-blending load computer controlling four internal additive injectors (total)
D	Two-arm load computer controlling four internal additive injectors (total)
E	Two-arm load computer, each with ratio blending and two internal additive injectors per arm
F	Two-arm load computer, one straight product, and one sidestream blending, controlling four internal additive injectors (total)
K	One-arm load computer, LNG/LPG with configurable vapor return meter
7-10	POSITION 7–SEPARATOR, POSITION 8 AND 9—APPLICATION PACK, POSITION 10—SEPARATOR
— C B	Application Pack
—	
11	AUTHORIZATION
1	None/next watch card reader interface/PIN (user selectable)
2	Touchkey
12	GLANDS, APPROVAL, AND HEATER
A	IECEx-approved for five metric glands
M	ATEX-approved for five metric glands
N	ATEX-approved for five metric glands and heater
13	POWER SUPPLY
1	110 volts alternating current (VAC)
2	240 VAC
3	Direct current (DC)
14	DISPLAY TYPE
N	Dot matrix
15	WEIGHTS AND MEASURES APPROVAL
0	None
3	MID (OIML R117-1)
16	EX APPROVALS
1	Serial (up to three)
2	Ethernet (up to two) and serial (up to three)

Typical Identification Code

1	0	1	0	A	A	—	C	B	—	1	M	2	N	3	1

Accessories

PART NUMBER	DESCRIPTION
TK1010-BLUE	Touchkey read-only memory (ROM) on blue holder
TK1010-GREEN	Touchkey ROM on green holder
TK1010-YELLOW	Touchkey ROM on yellow holder

Programmable Set-up Parameters

VALVE CONTROL	
No Flow Time Out	0 to 999 seconds
Valve Type Digital	Digital, analog, and two stage
Slow Flow	200 to 800 liters per minute (l/min) or US gallons per minute (USGPM)
Deadband	1 to 500 l/min or USGPM
Response Time Factor	0.2 to 1.0
Prestop Quantity	0 to 9999999 liters (l) or US gallons (US gal)
Max Preset Quantity	0 to 9999999 l or US gal
STREAM CONTROL	
Blending Type	Straight, ratio, and side stream blending
ARM INPUT (FOR EACH ARM)	
Pulse Type (Flow Meter)	Single or dual
Dual Pulse Cut-off Freq.	0 to 99 hertz (Hz)
K-Factor	• Linear: Single point 0.001 to 50000.0 • Non-linear: 10 points 0.001 to 50000.0
Temperature Correction	Temperature volume correction as per the ASTM D1250-04
Fluid Temperature Range	-58 to 302 °F (-50 to 150 °C) and for LNG -328 to 122 °F (-200 to 50 °C)
Pressure Correction	0 to 15168.47 kilopascal (kPa) (based on commodity group selection)
Density Correction	331.7 to 1163.86 kilograms per cubic meter (kg/m³) (based on commodity group selection)
Flow Rate at Full Flow	3,000 l/min or US gallon per minute USGPM
Additive Output Pulse Rate	per 0 to 999 l or US gal
Pre-Batch Stop Quantity	250 l or US gal
Accumulated Total	0 to 99 999 999
COMMUNICATIONS	
Communication Device	TAS, NexWatch, WeighBridge (ASCII protocol)
Protocol	SLIP+, MODBUS RTU, or MODBUS TCP/IP
Communication Mode	Ethernet/RS232/RS485 (RS232 Port 1 only)
Baud Rate	300 to 38400 baud (Bd)
Parity	None, odd, or even
Stop Bits	1 or 2
Gantry Number of Unit Address	1 to 127
OUTPUTS	
Additive Injector Type	Internal additives
Pulse Output	110 or 240 VAC
Number of Injections	Up to four internal injectors per arm
OTHER OPTIONS	
Customizable Initial Messages	• System available • Connect ground or overfill • Connect vapor recovery

All 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 number • Maximum preset quantity • Ask return quantity • Deadman timer • Ask truck number • Ask loading type (top or bottom)

Specifications

PHYSICAL	
Enclosure Dimensions	302 millimeters (mm) x 288 mm x 326 mm (WxHxD)
Material	Powder coated aluminum
Sealing	IP66 (NEMA 4X) weatherproof, fully O-ring sealed
Mounting	Four 8 x 1.5 mm metric or 5/16-inch unified national fine (UNF) threaded holes top and bottom
Weight	Single enclosure: 22.5 kilogram (kg) (approx.); Shipping weight: 23.0 kg (approx.)
Cable Connection	Five 25 mm x 1.5 mm metric threaded holes
OPERATIONAL	
Power Requirements	95 to 135 VAC, 50/60 Hz; 190 to 260 VAC, 50/60 Hz
Operating Temperature (Ambient)	-10 to +60 °C (without optional heater) -20 to 60°C (with optional heater)
Communications	Card reader: Ethernet/RS232/RS485 (RS232 Port 1 only) Weigh bridge (ASCII Protocol)
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 stops flow on that channel. Note: This is in accordance with API Standards Chapter 5, Section 5, AS2702and lSO6551, Level B.
K-Factor	• Linear: Single point 0.001 to 50000.0 • Non-linear: 10 points 0.001 to 50000.0
Temperature Inputs: Input Signal	4-20 milliampere (mA) or four-wire resistance temperature detector (RTD)
Range	-58 to 302 °F (-50 to 150 °C) and for LNG -328 to 122 °F (-200 to +50 °C)
Input Circuit	16-bit analog-to-digital (A/D) converter
Volume Correction	Temperature and pressure volume correction per API MPMS Chapter 11.1: 1. Refined (Tables 24B, 54B, and 60B) 2. Crude oils (Tables 24A, 54A, and 60A) 3. Lube oils (Tables 24D, 54D, and 60D) Temperature volume correction as per API MPMS Chapter 11.1, Special Application: 1. Gasohol (using thermal correction factor) 2. Methyl tert-butyl ether (MTBE) (using thermal correction factor) Generic thermal correction factor based on the ASTM D1250-04 calculations: 1. Manual entry of correction factor temperature volume correction as per the Manual of Petroleum Measurement Systems (MPMS) for Light Hydrocarbon Liquids (Chapter 11.2.4)
Pressure/Density: Input Signal	4-20 mA
Range	Input based on commodity group
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 (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 (not connected to other circuits) and suitable for switching low voltage signals
Valve Control Outputs	(Two-stage on/off or digital control valves) isolated solid state relays (SSRs) rated 1 ampere (amp) at 240 VAC Note: SSRs are not suitable for switching DC voltages · Contact voltage: Minimum 24 VAC and maximum 265 VAC · Optical isolation: 2500 voltage regulator modules (VRM) · Current range: 0.02 to 1 amp · Maximum surge current: 20 amp · Maximum off-state leakage current: 20 mA · Analog control valve: 1 x 4-20 mA output
Additive Injector Outputs	SSR rated at 1 amp at 240 VAC (one per product)
Pump Demand Outputs	Electromechanical relay rated at 1 amp at 240 VAC or 30 VDC (one per loading arm)
Alarm Outputs	Electromechanical relay rated at 1 amp at 240 VAC or 30 VDC
Power Outputs	12 VDC for flow meters (maximum of 250 mA); 8-30 VDC for temperature sensors (maximum of 100 mA)
APPROVALS	
The 1010Ax-CB complies with OIML R117-1 and MID international metrology approvals.	Hazardous area approvals for the enclosure include: · European Approval Ⓔx II 2G Ex db [ia] IIB T6 Gb · IECEx Ex db IIB T6 Gb Approvals for the touchkeys, reader, and barrier include: · European Approval Ⓔx II 2G Ex db [ia] IIB T6 Gb · USA and Canadian CSAus/c for Class 1, Groups C and D, T6 · IECEx Ex db [ia] IIB T6 Gb
EMC STANDARD	
EN50081-1 & EN50081-2, EN50082-1 & EN50082-2, EN61000-6-4 (2001)	

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacture that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.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START
STOP
START
STOP

About Guidant

As the undisputed leader in liquid and gas custody transfer solutions with the largest global install base, Guidant's legacy is built on more than 90 years of expertise, accuracy, reliability, and best-in-class technologies. We are a private company focused on the measurement solutions business, serving emerging and established energy markets across the globe.

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