



GUIDANT

# Fusion4 Multistream Controller Loading

Safe, reliable, and accurate custody transfer preset controller



# Intuitive MSC-L Preset Controller

Terminal operators face significant pressure to increase throughput, accelerate loading times, minimize losses from metering errors and lower the cost of complying with legal metrology standards to maximize their return on terminal automation. Operators require technology that minimizes training requirements and maximizes safe, reliable and accurate control for custody transfer of petroleum products.

With over 90 years of innovative measurement solutions experience, Guidant is an industry leader offering the most advanced measurement solutions portfolio on the market.

Guidant's Fusion4 Multistream Controller for Loading (MSC-L) combines custody transfer approved preset loading control with sophisticated features and the world's most intuitive operator interface. A large 8" WVGA full-color display and icon-driven interface provide user-friendly monitoring and control for up to six loading arms. With quick start-up times, calibration wizards, diagnostic dashboards and onfield upgrades, Fusion4 MSC-L keeps the operation moving.

The scalable, modular design features expandable I/O and the widest selection of protocol libraries along with communication network capabilities enables seamless, cost-effective integration into your terminal automation system.

## Features and Benefits

### Flexible and Powerful

- Customizable prompt enable/disable
- 15+ language support
- Standalone mode
- 300 recipes for blending/additives
- 10,000 transaction logs
- 2,000 audit trail logs
- Straight, ratio, sequential, and side stream blending

### Precise and Compliant

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

### User Friendly

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

### Seamlessly Integrate

- Interfaces with Guidant's terminal automation systems (TAS)
- Allows third-party TAS interface via SLIP+, Modbus RTU, and Modbus TCP/IP
- Seven isolated serial RS485 communication ports
- Three 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

- HID Signo 20/40 card reader
- Local or remote authorization
- Driver and truck ID (1,000 each)
- Illegal access lockout
- Multilevel security with password protection

## Applications

- Tanker truck loading/unloading
- Railcar loading
- Aviation refueling
- Storage transfers
- Marine bunkering
- Pipeline transfers
- Transport bunkering
- LPG and LNG tanker truck loading



## One- to Six-Arm Configurations

Supports straight, ratio, side stream, and sequential product blends, along with internal/external additive injection control configurations

## 8" 16:9 Aspect Ratio, Full-Color WVGA

Human-centered, icon-driven, regional language loading screens; multiple diagnostics dashboards; load profile graphs; minimal driver training times faster navigation and rapid fault finding

## Flexible Communication Interfaces

Up to three Ethernet ports and up to seven serial port communication with a large built-in command library supporting FLEXCONN (proprietary), SLIP+, MODBUS RTU, MODBUS TCP/IP, and SMITH protocol interfaces

## Explosion-Proof Enclosure, RoHS Compliant, and Galvanically Isolated I/O

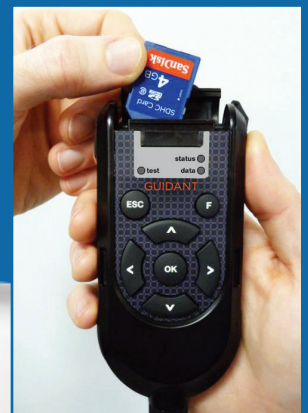
Global Ex approvals (ATEX, CSA, FM, PESO, IECEx, and UL Brazil) ensure safety in hazardous environments; lead-free components protect internal electronics for safer operation and better performance

## Colored Coded, Easy Extractable Connectors

Safer and faster cabling, ensuring correct card placement

## Optional Local Access Device (LAD)

Data transfer in hazardous areas; adjust parameters, reset alarms, and upgrade firmware safely in the field; rapid start-up with configuration file imports from other devices



# Take Control of Your Loading Operation

## Unique, Intuitive Fusion4 User Interface

Fusion4 MSC-L offers a unique user experience built for the way people work. Self-explanatory graphical on-screen icons make it uniquely intuitive to operate, drastically cutting training times and human error.

Users benefit from complete visibility and control of all major functions in the field with little or no training.

Tanker drivers can input and control their loading requirements quickly and simply. Real-time dynamic displays with status bar guidance and transfer progress status indicators provide at-a-glance monitoring of all loading operations.

## Setup and Maintenance

Starting up in under a minute, the MSC-L features live upgrades, calibration wizards and configurable I/O to assign functions to any input or output for faster installation and set-up.

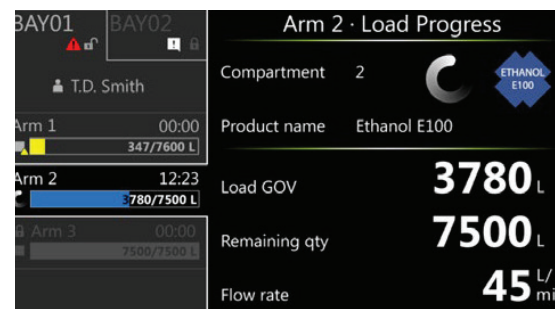
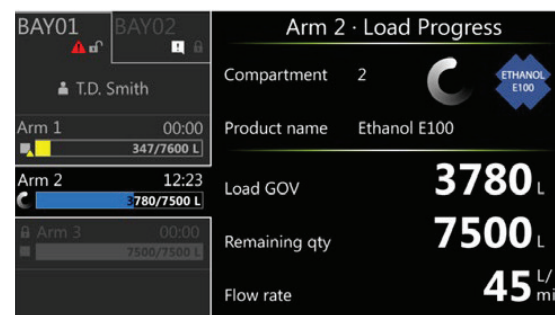
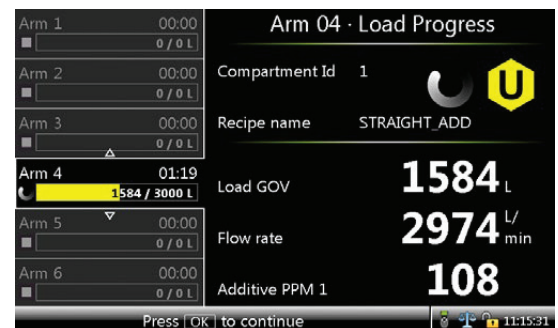
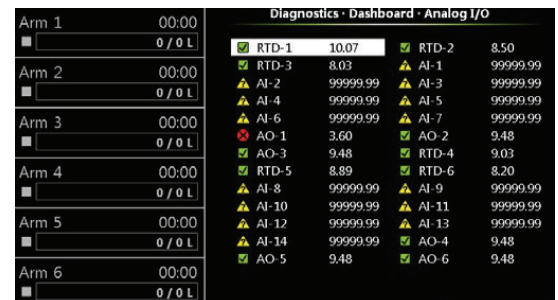
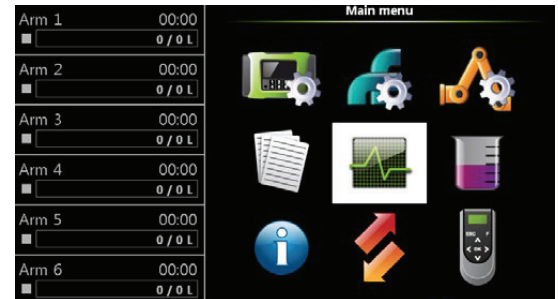
Real-time stream, I/O and system diagnostics keep the operation running smoothly, while the Fusion4 Portal software helps achieve the highest standards of reliability. Its features include remote monitoring, configuration and printing of all MSC transactions, alarms and communication status readings via Ethernet or Serial comms.

## Powerful Alarm Handling

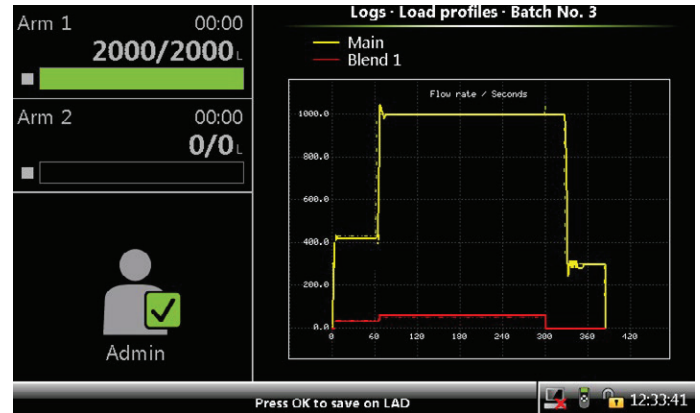
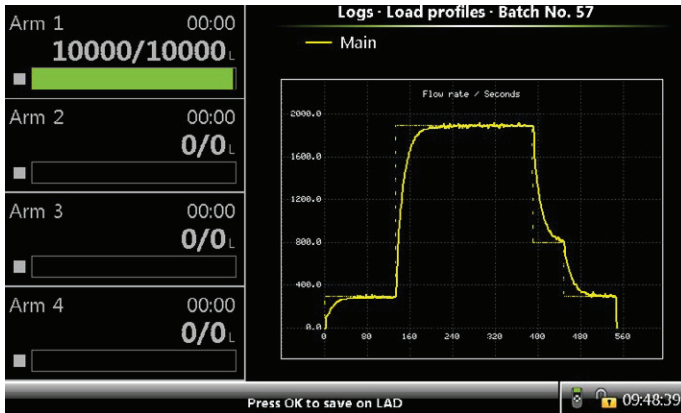
Fusion4's advanced alarm handling monitors nearly twice as many parameters as any other device, while its large color screen clearly annunciates and differentiates alarm conditions, for a safe, reliable operation. User-configurable alarms provide additional flexibility, allowing the operator to quickly select both the alarm conditions and define alarm messaging through the menu structure.

## Multiple Language Support

Fusion4 MSC-L operational screens support English (US), English (UK), Mandarin, Japanese, Thai, French, Spanish, Portuguese, Italian, Dutch, German, and Polish languages.



# Proactive Control for On-Spec Blends



## Best-In-Class Control Algorithm

Fusion4 MSC-L implements the proportional integral with feed forward control for driving the set point of the control valve by:

- Providing dynamic setpoint control
- Using a predefined flow profile

## Product Stream Control Valve Type

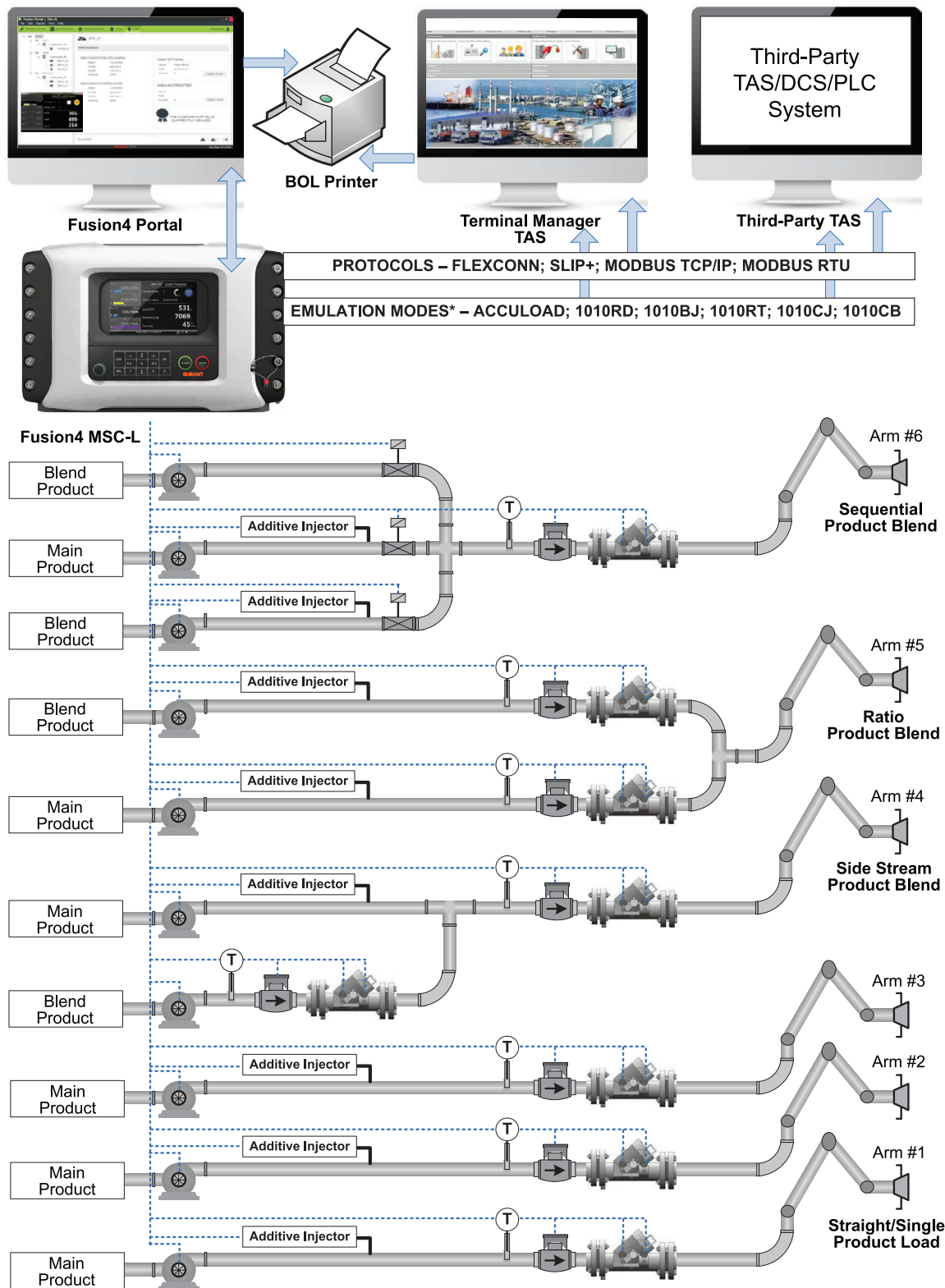
Fusion4 MSC-L can control digital, analog and two-stage control valves with a precision algorithm to fine tune the operational parameters for high accuracy and repeatability.

## Minimizing Inaccuracy, Maximizing Control

- Industry-leading and field-proven control algorithms, built on 40+ years loading, blending and additive control experience
- Unique PI-FF control algorithm for precision tuning capabilities optimize valve control and reduce valve wear
- Recalculation of blend stream accuracy following interrupted loading to ensure on-spec deliveries
- Load profile graphs are generated on screen for real-time visualization of flow control elements, increasing the speed and precision of set-up
- Unique legal meteorology certified BOL printing capability via the Fusion4 Portal software
- Easier configuration, with remote configuration using Fusion4 Portal and in the field with LAD upload. Features free-form user-defined IO functions, configurable batch set-up workflow and programmable alarms.



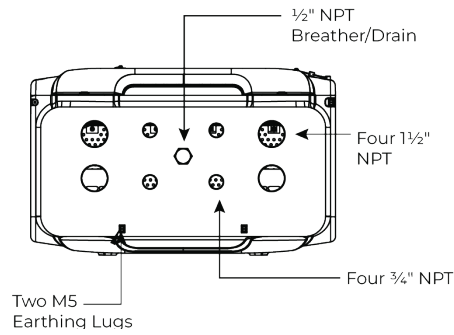
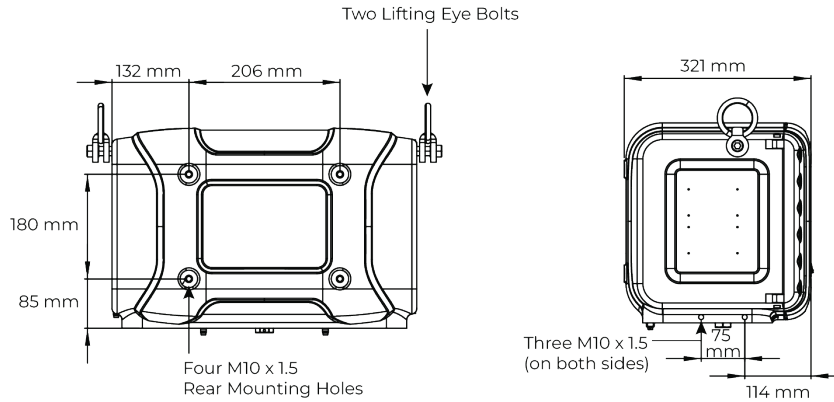
# Typical Fusion4 MSC-L Configuration



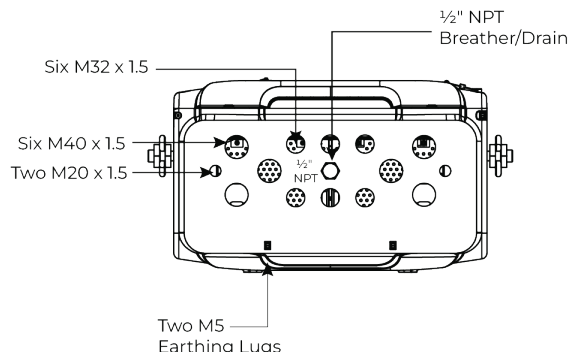
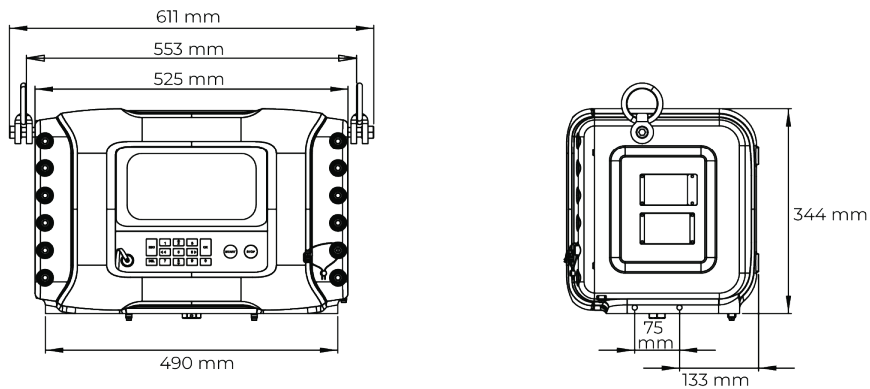
\* Please check for appropriate Emulation Firmware version supported from local Guidant Sales representatives.  
 \*\* Pictorial representation showing basic setup and additional I/O instruments might be needed based on selected application or site requirements.

# Technical Specifications

## Dimensional Drawings of MSC-L NPT Assembly



## Dimensional Drawings of MSC-L Metric Assembly



# License vs Input/Output

	MSC-L1	MSC-L2	MSC-L3	MSC-L1D	MSC-L2D	MSC-L3D	Hardware
	1 Load Arm	2 Load Arms	3 Load Arms	1 Load Arm	2 Load Arms	3 Load Arms	
Number of Arm Backplane	1	1	1	1	1	1	<ul style="list-style-type: none"> <li>MSC-L any license includes 1 CAN HMI board for display, keypad, and LAD interface by default</li> <li>Optional selectable I/O CAN IN-OUT card on 1 Arm backplane based on site I/O requirement</li> <li>Arm configurable for blend and additive configurations; dual bay/swing only for MSC-LxD Licenses</li> <li>Distribution of pulses for product vs additive based on site conditions</li> </ul>
Number of CAN PSF	1	1	1	1	1	1	
Number of CAN ARM Board	1	1	1	1	1	1	

	I/O Type	PI-S/PI-D	Pulse Output	DO-SSR	DO-EMR	DI-AC	DI-DC	RTD	AI	A0	Comms [RS485]	Ethernet
Optional	License L1-L3 Standard I/O	12/6	2	12	0	0*	0*	3	7	1	5	2
	+1 CAN IN-OUT	12/6	2	16	10	3	15	3	7	2	5	2
	+2 CAN IN-OUT	12/6	2	20	20	6	30	3	7	3	5	2

\* Arm Card Free Pulse input terminals can be configurable for DI interface

	MSC-XL1	MSC-XL2	MSC-XL3	MSC-XL4	MSC-XL5	MSC-XL6	Hardware
	1 Load Arm	2 Load Arms	3 Load Arms	4 Load Arms	5 Load Arms	6 Load Arms	
Number of Arm Backplane	2	2	2	2	2	2	<ul style="list-style-type: none"> <li>MSC-L any license includes 1 CAN HMI board for display, keypad, and LAD interface by default</li> <li>Optional selectable I/O CAN IN-OUT card on 1 Arm backplane based on site I/O requirement</li> <li>Arm configurable for blend and additive configurations; dual bay/swing only for MSC-XL1 to MSC-XL4</li> <li>Distribution of pulses for product vs additive based on site conditions</li> </ul>
Number of CAN PSF	2	2	2	2	2	2	
Number of CAN ARM Board	2	2	2	2	2	2	

	I/O Type	PI-S/PI-D	Pulse Output	DO-SSR	DO-EMR	DI-AC	DI-DC	RTD	AI	A0	Comms [RS485]	Ethernet
Optional	License XL1 - XL6 Standard I/O	24/12	4	24	0	0*	0*	6	14	2	7	3
	+1 CAN IN-OUT	24/12	4	28	10	3	15	6	14	3	7	3
	+2 CAN IN-OUT	24/12	4	32	20	6	30	6	14	4	7	3
	+3 CAN IN-OUT	24/12	4	36	30	9	45	6	14	5	7	3
	+4 CAN IN-OUT	24/12	4	40	40	12	60	6	14	6	7	3

\* Arm Card Free Pulse input terminals can be configurable for DI interface

# Programmable Setup Parameters

Stream Configuration> Device> General> Identification	
Site Name	Text string of maximum 20 characters
Device Name	Text string of maximum 8 characters
Device Address	0-997, 200 (default)
Stream Configuration> Device> General> Units	
Units of Preset	GOV (default); GSV; Mass
Units of Temperature	Degree Celsius (default); Degree Fahrenheit
Units of Pressure	Pascal (default); Kilo Pascal; Pounds per Square Inch; PSI large; Bar
Units of Density	Kilogram per Cubic Meter (default); Degrees API; Pounds per Cubic Feet; Relative Density at 60 F; Kilogram per liter
System Configuration> Device> General> Settings	
Bay Type	License dependent Single bay; Dual bay
Emulation Type	None (default) (for optional protocols, consult the factory)
Loading Type	Top (default); Bottom
System Configuration> Device> Communication	
Communications Device	Terminal Automation Solution/NexWatch Cardreader/NEDAP RFID/Mettler Toledo WeighBridge
Communication Protocol	SLIP+, Modbus RTU, Modbus TCP/IP, FlexConn (default)
Communication Mode	Ethernet (up to three ports) / RS485 2-wire (up to six ports) / RS485 4-wire (up to one port)
Baudrate	1200-128000 Bd; 9600 Bd (default)
Turn Around Delay	0 ms - 1000 ms; (default = 100 ms)
Modbus Byte Order	Little endian (default); Big endian
System Configuration> Device> Alarms	
Alarm Actions	Disabled; Display (default); Display shutdown; Display pause
Next Scheduled Service	Year-Month-Day (01-01-25 default)
Deadman Status	Enable; Disable (default)
System Configuration> Authorization> Setup	
Authorization Mode	No verification; Local verification (default); Remote verification
Authorization Type	None; PIN (default); NexWatch; Nedap
System Configuration> Device> Prompts	
Prompt Value Range	Disabled; Optional; Mandatory
Prompt Entity	User identification; Carrier identification; Vehicle identification; Trailer identification; Load number identification; Compartment identification; Return quantity entry; Preset entry; Preset unloading entry; Contract identification; Batch details prompt
Arm Configuration> Arm Number> Control Settings	
Loading type	Ratio (default); Side stream; Unloading; Straight with VRU; Sequential
Arm Configuration> Arm Number> Control Settings	
Number of Steams per Recipe	1 Mainstream, 3 Blendstream, and 6 additive streams
Total Number of Recipe/Arm	50
Total Number of Recipe per Device	300
Other Options	
Factored Pulse Out	1 Pulse / Unit (default); 10 Pulses / Unit; 100 Pulses / Unit; 1000 Pulses / Unit
Valve Type	None (default); DCV; Two stage valve; ACV; Simulated DCV
User Display Language	Display language for the running screens. English UK; English US (default); French; German; Dutch; Spanish; simplified Mandarin; Japanese; Polish; Portuguese; Italian; Thai

# Approvals

Ex Approvals	Protection	Certificate
ATEX (EU)	II 2 G Ex db [ia] IIB T6 Gb	DEKRA 12ATEX0101X
IECEX (International)	Ex d [ia] IIB T6	IECEX DEK 12.0021X
FM (USA)	Class I, Division 1, Groups C and D, T6	FM18US0123
CSA (Canada)	CL I Div 1 Gr C&D T6/Zone 1 Ex d [ia] IIB T6 Gb	File Number 305885
PESO	Ex d [ia] IIB T6 Gb	Pending
UL-Brazil (Brazil)	Ex d [ia] IIB T6 Gb	UL-BR 25.1434X

## Weights and Measures

NMI Netherlands Evaluation Certificate TC8537; Evaluated to OIML R-117 Recommendations for Accuracy Class 0.5  
 NMI Australia S689  
 GOI (India) - Pending  
 MID (EU) - Pending  
 NCWM (USA) - CC 14-064  
 Measurement Canada - NOA AV-2471C

	SI Units	Imperial Units
<b>Environmental</b>		
Operating Temperature	-40 to 65 °C	-40 to 185 °F
Storage Temperature	-40 to 85 °C	-40 to 185 °F
Protection Class	IP66	NEMA 4X
Humidity	5 to 95% noncondensing	5 to 95% noncondensing
<b>Materials</b>		
Enclosure	Aluminum, anodized	Aluminum, anodized
<b>Connections</b>		
Cable Entries	Six M40, six M32, and two M20	Four 1 1/2" National Pipe Thread (NPT) Four 3/4" NPT
<b>Electrical</b>		
Voltage	88 to 264 volts alternating current (VAC)	88 to 264 VAC
Flow Meter Inputs	24 x 5-kHz input configurable as 12 dual PI	24 x 5-kHz input configurable as 12 dual PI
DC Inputs (maximum)	60	60
AC Inputs (maximum)	12	12
DC Outputs (maximum)	4	4
DC/AC - EMR Outputs (maximum)	40	40
AC - SSR Outputs (maximum)	40	40
Analog Inputs (maximum)	14	14
Analog Outputs (maximum)	6	6
RTDs (maximum)	6	6
<b>Interface</b>		
Serial Protocols	FlexConn, Modbus RTU, Slip+, Smith Meter	
Ethernet Protocols	FlexConn TCP/IP, Modbus TCP/IP	
Display	8-inch video graphics array (WVGA) color thin-film transistor (TFT) liquid crystal display	
Languages	English (US and UK), French, German, Spanish, Dutch, Mandarin, Japanese, Polish, Italian, and Portuguese	
Handheld Devices	Fusion4 LAD	
<b>Weight</b>		
MSC	Approximately 53 kilograms (kg)	Approximately 115 pounds (lb)

## Modeling Code for Metric Cable Entries

Characterization Value (CV)		Availability	
<b>CV 1 through 6</b>	<b>Model</b>		
HEL83	Fusion4 MSC-L Metric	↓	
<b>CV 7</b>	<b>Enclosure</b>		
A	MSC Enclosure	.	.
<b>CV 8</b>	<b>Firmware</b>		
L	Loading	.	.
<b>CV 9</b>	<b>Licenses and I/O Expansion</b>		
<b>Position 9-1</b>	<b>Licenses</b>		
A	MSC-L1	.	.
B	MSC-L2	.	.
C	MSC-L3	.	.
X	MSC-L1D	.	.
Y	MSC-L2D	.	.
Z	MSC-L3D	.	.
D	MSC-XL1	.	.
E	MSC-XL2	.	.
F	MSC-XL3	.	.
G	MSC-XL4	.	.
H	MSC-XL5	.	.
J	MSC-XL6	.	.
<b>Position 9-2</b>	<b>I/O</b>		
0	Not required	.	.
1	1 x CAN-IN-OUT board	.	.
2	2 x CAN-IN-OUT board	.	.
3	3 x CAN-IN-OUT board (not applicable for CV9-1 selection A, B, and C)	b	b
4	4 x CAN-IN-OUT board (not applicable for CV9-1 selection A, B, and C)	b	b
<b>CV 10</b>	<b>Mounting Options</b>		
0	Not required	.	.
<b>CV 11</b>	<b>Field Entry Plugs and Breather</b>		
<b>Position 11-1</b>	<b>Breather</b>		
0	Not required	.	.
A	Breather	.	.
<b>Position 11-2</b>	<b>Field Entry Plugs</b>		
0	Not required	.	.
1	Three M32, three M40, and one M20 Ex d blanking plugs (half)	.	.
2	Six M32, six M40, two M20 Ex d blanking plugs (full)	.	.
<b>CV 12</b>	<b>Ex Approvals</b>		
A	ATEX	.	.
B	IECEX	.	.
C	PESO (India)	.	.
G	UL-Brazil	.	.
<b>CV 13</b>	<b>Future Option</b>		
0	None	.	.

### ATEX Sample Modeling Code

CV 1 through 6						7	8	9-1	9-2	10	11-1	11-2	12	13
H	E	L	C	8	3	A	L	A	1	0	0	2	B	0

## Modeling Code for NPT Conduit Entries

Characterization Value (CV)		Availability	
<b>CV 1 through 6</b>	<b>Model</b>		
HELC87	Fusion4 MSC-L NPT		↓
<b>CV 7</b>	<b>Enclosure</b>		
A	MSC Enclosure	.	.
<b>CV 8</b>	<b>Firmware</b>		
L	Loading	.	.
<b>CV 9</b>	<b>Licenses and I/O Expansion</b>		
<b>Position 9-1</b>	<b>Licenses</b>		
A	MSC-L1	.	.
B	MSC-L2	.	.
C	MSC-L3	.	.
X	MSC-L1D	.	.
Y	MSC-L2D	.	.
Z	MSC-L3D	.	.
D	MSC-XL1	.	.
E	MSC-XL2	.	.
F	MSC-XL3	.	.
G	MSC-XL4	.	.
H	MSC-XL5	.	.
J	MSC-XL6	.	.
<b>Position 9-2</b>	<b>I/O</b>		
0	Not required	.	.
1	1 x CAN-IN-OUT board	.	.
2	2 x CAN-IN-OUT board	.	.
3	3 x CAN-IN-OUT board (not applicable for CV9-1 selection A, B, and C)	b	b
4	4 x CAN-IN-OUT board (not applicable for CV9-1 selection A, B, and C)	b	b
<b>CV 10</b>	<b>Mounting Options</b>		
0	Not required	.	.
<b>CV 11</b>	<b>Field Entry Plugs and Breather</b>		
<b>Position 11-1</b>	<b>Breather</b>		
0	Not requested	.	.
A	Breather	.	.
<b>Position 11-2</b>	<b>Field Entry Plugs</b>		
0	Not required	.	.
3	FM Full Set - 4 x 1½", 4 x 1" NPT Blanking Plugs		.
<b>CV 12</b>	<b>Ex Approvals</b>		
E	FM		.
F	CSA		.
G	INMETRO/UL-Brazil	.	.
<b>CV 13</b>	<b>Future Option</b>		
0	None		

### FM Sample Modeling Code

CV 1 through 6						7	8	9-1	9-2	10	11-1	11-2	12	13
H	E	L	C	8	7	A	L	A	1	0	A	3	E	0

### Accessories—LAD ATEX, FM, IECEx, PESO, and UL Brazil

Part Number	Description
323-1392002	Fusion4 LAD FM
323-1392004	Fusion4 LAD ATEX, IECEx, and PESO
323-1392005	Fusion4 LAD UL-Brazil

# Discover More Products in the Fusion4 Portfolio

## Fusion4 MultiPak

Fusion4 MultiPak is a complete, off-the-shelf additive solution that integrates the industry's most-used additive injection block—Mono-Block—with an additive injection skid for the most complex applications.

Fusion4 MultiPak is the perfect solution for a number of chemical dosing applications, including truck loading additives, rail loading additives, and aviation fuel additive operations. The Fusion4 MultiPak station integrates additive injector panels with the Fusion4 MSC-A on a free-standing frame, providing rapid installation and reduced commissioning time.



## Fusion4 Portal

The Fusion4 Portal software suite brings together wide-ranging remote monitoring and supervisory capabilities for all Fusion4 devices in a single, integrated dashboard.

Available as a modular package, you can bundle the functional modules you need to print transactions (bills of lading), monitor real-time audit trails, and optimize settings to get your operations up and running quicker.





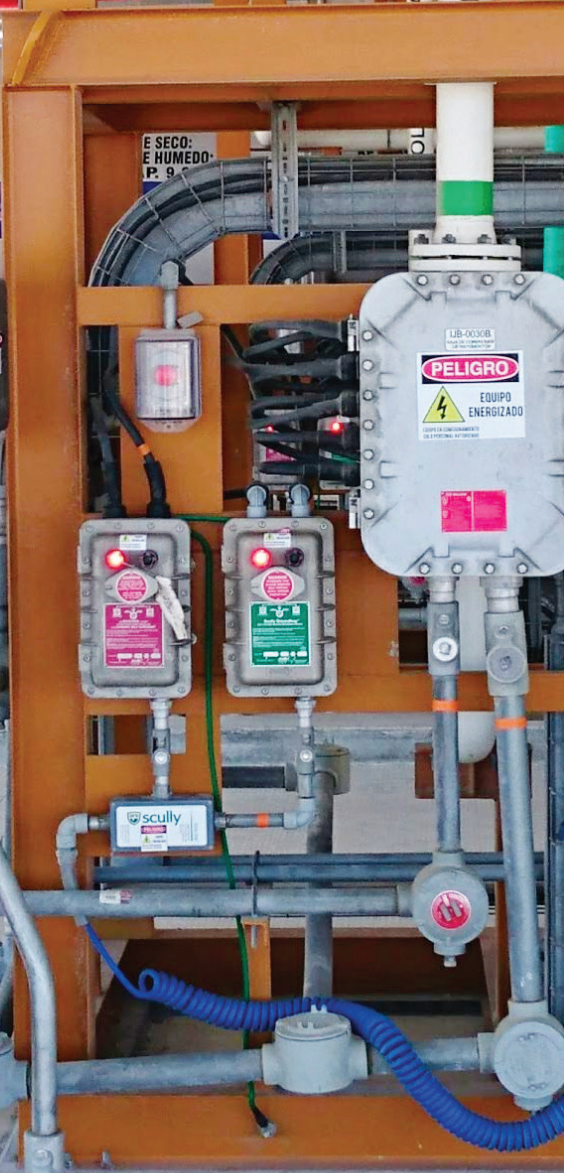
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**PELIGRO**  
EQUIPO  
ENERGIZADO

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## 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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### Corporate Website

[GuidantMeasurement.com](https://GuidantMeasurement.com)

### Guidant Knowledge Base

[KB.GuidantMeasurement.com](https://KB.GuidantMeasurement.com)

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