FUSION4
MULTISTREAM CONTROLLER LOADING

The Safe, Reliable and Accurate Custody Transfer Preset Controller

Honeywell

INTUITIVE
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.

Honeywell Enraf'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. A 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.

APPLICATION FIELDS
- Tanker truck Loading/Unloading
- Railcar Loading
- Aviation Refueling
- Storage Transfers
- Marine Bunkering
- Pipeline Transfers
- Transport Bunkering
- LPG and LNG Tanker truck loading

1 TO 6 ARM CONFIGURATIONS
Support straight, ratio, sidestream 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

EXPLOSION PROOF ENCLOSURE, ROHS COMPLIANT & GALVANICALLY ISOLATED I/O
Global Ex approvals (ATEX, FM, CCOE, IECEx) ensure safety in hazardous environments. Lead-free components protect internal electronics for safer operation and better performance

FLEXIBLE COMMUNICATION INTERFACES
Up to 3 Ethernet ports and up to 7 serial port communication with a large built-in command library supporting FLEXCONN (proprietary), SLIP+, MODBUS RTU, MODBUS TCP/IP and FMC SMITH protocol interfaces

COLOR CODED, EASY EXTRACTABLE CONNECTORS
Safer and faster cabling, ensuring correct card placement

LOCAL ACCESS DEVICES [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

THE 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), Chinese, Japanese, Thai, French, Spanish, Portuguese, Italian, Dutch, German and Polish languages..

PROACTIVE CONTROL
FOR ON-SPEC BLENDS
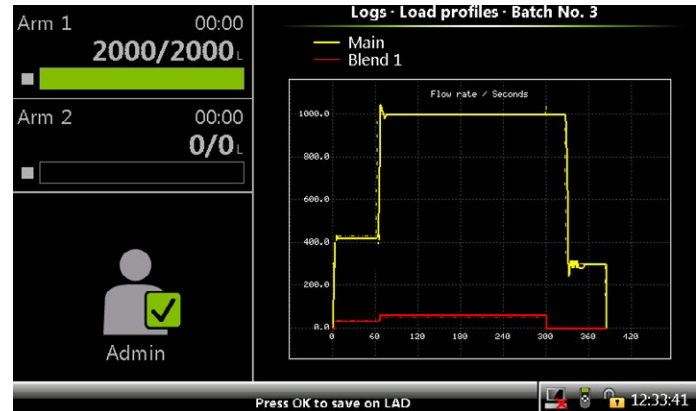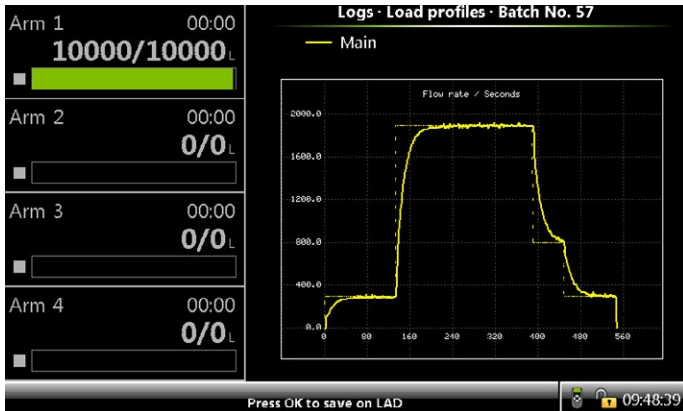
BEST IN-CLASS CONTROL ALGORITHM

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

- Provides dynamic setpoint control
- Uses a predefined flow profile

PRODUCT STREAM CONTROL VALVE TYPE

Fusion4 MSC-L can control digital, analog and 2 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

FUSION4 PORTAL

BOL PRINTER

TERMINAL MANAGER TAS

3rd PARTY TAS / DCS / PLC system

3rd PARTY TAS

FUSION4 MSC-L

PROTOCOLS – FLEXCONN; SLIP+; MODBUS TCP/IP; MODBUS RTU

EMULATION MODES* – ACCULOAD; 1010RD; 1010BJ; 1010RT; 1010CJ; 1010CB

BLEND PRODUCT

Additive Injector

MAIN PRODUCT

Additive Injector

BLEND PRODUCT

ARM #6

SEQUENTIAL PRODUCT BLEND

Additive Injector

BLEND PRODUCT

ARM #5

RATIO PRODUCT BLEND

Additive Injector

MAIN PRODUCT

Additive Injector

MAIN PRODUCT

ARM #4

SIDE STREAM PRODUCT BLEND

BLEND PRODUCT

ARM #3

Additive Injector

MAIN PRODUCT

ARM #2

Additive Injector

MAIN PRODUCT

ARM #1

Additive Injector

MAIN PRODUCT

STRAIGHT / SINGLE PRODUCT LOAD

* Please check for appropriate Emulation Firmware version supported from local Honeywell Sales representatives

** Pictorial representation showing basic setup and additional I/O instruments might be needed based on selected application or site requirements

FEATURES AND BENEFITS

FLEXIBLE AND POWERFULL

- Customizable prompt Enable/Disable
- 15+ language support
- Standalone mode
- 300 recipes for blending/additives
- 10000 transaction logs
- 2000 audit trail logs
- Straight, ratio, sequential and side stream blending

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 keys

SEAMLESSLY INTEGRATE

- Interfaces with Honeywell terminal automation systems (TAS)
- Allows 3rd Party TAS interface via SLIP+, Modbus RTU and Modbus TCP/IP
- 7 Isolated serial RS485 communication ports
- 3 TCP/IP (IEEE 802.3 10/100 Base-T standard) Ethernet ports

RESILIENT

- Rugged push buttons
- Explosion proof NEC 500/505
- Flame-proof ATEX & IECEx
- Diagnostics program

SECURE

- Honeywell NexWatch DR4208 card reader
- Local or remote authorization
- Driver and truck ID (1000 each)
- Illegal access lockout
- Multi-level security with password protection

LICENSE VS INPUT/OUTPUT

	MSC-L1	MSC-L2	MSC-L3	MSC-L1D	MSC-L2D	MSC-L3D	HARDWARE
	1 LOAD ARM	2 LOAD ARM	3 LOAD ARM	1 LOAD ARM	2 LOAD ARM	3 LOAD ARM	• MSC-L any license includes 1 CAN HMI board for display, keypad and LAD interface by default.
Number # or Arm BackPlane	1	1	1	1	1	1	• Optional Selectable IO CAN IN-OUT card on 1 Arm Backplane based on Site IO requirement.
Nor. CAN PSF	1	1	1	1	1	1	• Arm configurable for Blend and Additive configurations. Dual bay / swing only for MSC-LxD Licenses.
Nor. CAN ARM board	1	1	1	1	1	1	• Distribution of pulses for product vs additive based on site conditions

	IO TYPE	PI - S / PI - D	PULSE OUTPUT	DO -SSR	DO-EMR	DI-AC	DI-DC	RTD	AI	AO	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 ARM	3 LOAD ARM	4 LOAD ARM	5 LOAD ARM	6 LOAD ARM	• MSC-L any license Includes 1 CAN HMI board for display, keypad and LAD interface by default.
Number # or Arm BackPlane	2	2	2	2	2	2	• Optional Selectable IO CAN IN-OUT card on 1 Arm backplane & 2 Arm Backplane based on Site IO requirement.
Nor. CAN PSF	2	2	2	2	2	2	• Arm configurable for blend and additive configurations. Dual bay / swing only for MSC-XL1 to MSC-XL4.
Nor. CAN ARM board	2	2	2	2	2	2	• Distribution of pulses for product vs additive based on site conditions

	IO TYPE	PI - S / PI - D	PULSE OUTPUT	DO -SSR	DO-EMR	DI-AC	DI-DC	RTD	AI	AO	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 SET-UP PARAMETERS

SYSTEM CONFIGURATION » DEVICE » GENERAL » IDENTIFICATION	
Site name	Text string of max 20 char
Device Name	Text string of max 8 char
Device Address	0-997, 200 (default)

SYSTEM 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); 1010BJ; 1010CJ; 1010CB; 1010RT; Accuload
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 (upto 3 ports) / RS485 2wire (upto 6 ports) / RS485 4wire (upto 1 Ports)
Baudrate	1200-128000Bd; 9600Bd(default)
Turn around delay	0 ms - 1000 ms; (default = 100 ms)
Modbus byte order	Little endian (default); Big endian

SYSTEM CONFIGURATION » DEVICE » ALARMS	
Alarm action	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 # » CONTROL SETTINGS	
Loading type	Ratio (default); Side stream; Unloading; Straight with VRU; Sequential

ARM CONFIGURATION » ARM # » RECIPES	
No. 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 Chinese; Japanese; Polish; Portuguese; Italian; Thai;

TECHNICAL SPECIFICATIONS

APPROVALS	FUSION4 MSC	
ATEX	II 2 G Ex db [ia] IIB T6 Gb	
IECEx	Ex db [ia] IIB T6 Gb	
FM	Class1 Div1 Group C&D T6	
CSA/C$_{UL}$	Class1 Div1 Group C&D T6	
CCOE	Ex db [ia] IIB T6 Gb	
INMETRO	Ex db [ia] IIB T6 Gb	

ENVIRONMENTAL	ATEX/IECEX	FM/CSA
Operating Temperature	-40 ºC to +65 ºC	-40 ºF to +185 ºF
Storage Temperature	-40 ºC to +85 ºC	-40 ºF to +185 ºF
Protection Class	IP66	NEMA 4X
Humidity	5% - 95% Non-Condensing	5% - 95% Non-Condensing

MATERIAL		
Enclosure	Aluminum, Anodized	Aluminum, Anodized

CONNECTIONS		
Cable entries	6xM40, 6xM32, 2xM20	4x 1 1/2" NPT, 4x 3/4" NPT

ELECTRICAL		
Voltage	88 to 264 Vac	88 to 264 Vac
Flow Meter Inputs	24 x 10 kHz input Configurable as 12 dual PI	24 x 10 kHz input Configurable as 12 dual PI
DC Inputs (max)	60	60
AC Inputs (max)	12	12
DC Outputs (max)	4	4
DC/AC - EMR Outputs (max)	40	40
AC - SSR Outputs (max)	40	40
Analog Inputs (max)	14	14
Analog Outputs (max)	6	6
RTD's (max)	6	6
RS 485 Comms Ports (max)	7	7
Ethernet Ports	3	3

INTERFACING		
Serial Protocols	FlexConn, Modbus RTU, Slip+, FMC Smith	
Ethernet Protocols	FlexConn TCP/IP, Modbus TCP/IP	
Display	8" Super WVGA color TFT 16:9 aspect ratio LCD screen	
Languages	English (US), English (UK), Chinese (Simplified), Japanese, French, Spanish, Portuguese, Italian, Dutch, German and Polish	
Handheld Devices	Fusion4 LAD (local access device)	

WEIGHTS		
MSC-L	approx 53 kg	approx 115 lb

Accessories

Part Number	Descripton
323-1392002	Fusion4 LAD FM (Local Access Device)
323-1392003	Fusion4 LAD CSA (Local Access Device)
323-1392004	Fusion4 LAD ATEX & IECEx (Local Access Device)

IDENTIFICATION CODE FOR ATEX/IECEX/CCOE/INMETRO

CV 1–6 Model Key

(H) (E) (L) (C) (8) (3) Fusion4 MSC-L METRIC

CV 7 EncloSURE

(A) MSC-ENCLOSURE

CV 8 Firmware

(L) Loading

CV 9	**Licenses & I/O**
Pos 1	Licenses
(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
Pos2	I/O
(0)	Not Required
(1)	1 x CAN-IN-OUT board
(2)	2 x CAN-IN-OUT board
(3)	3 x CAN-IN-OUT board
(4)	4 x CAN-IN-OUT board

CV 10 Mounting Options

(0) Not required

CV 11	**Field Entry Plugs and Breather**
Pos 1	Breather
(0)	Not Requested
(A)	Breather
Pos2	Field Entry Plugs
(0)	Not Required
(1)	3 x M32 & 3 x M40 & 1 x M20 Exd Blanking plugs (Half)
(2)	6 x M32, 6 x M40 & 2 x M20 Exd Blanking plugs (Full)

CV 12	**Ex Approvals**
(A)	ATEX
(B)	IECEx
(C)	CCOE (India)
(G)	INMETRO

CV 13	**Future Option**
(0)	None

CV's	①	②	③	④	⑤	⑥	⑦	⑧	⑨①	⑨②	⑩	⑪①	⑪②	⑫	⑬	
	H	E	L	C	8	3	A	L	A	1	0	0	2	A	0	ATEX Sample Modeling Code
	H	E	L	C	8	3	A	L	○	○	0	○	○	○	0	Your ATEX Modeling Code

* Not Applicable for CV9-1 Selection A, B and C

IDENTIFICATION CODE FOR FM/CSA/INMETRO

CV 1–6 Model Key

H	E	L	C	8	7	Fusion4 MSC-L NPT

CV 7 Enclosure
- A — MSC-ENCLOSURE

CV 8 Firmware
- L — Loading

CV 9 Licenses & I/O

Pos 1 Licenses
- 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

Pos2 I/O
- 0 — Not Required
- 1 — 1 x CAN-IN-OUT board
- 2 — 2 x CAN-IN-OUT board
- *3 — 3 x CAN-IN-OUT board
- *4 — 4 x CAN-IN-OUT board

CV 10 Mounting Options
- 0 — Not required

CV 11 Field Entry Plugs and Breather

Pos 1 Breather
- 0 — Not Requested
- A — Breather

Pos2 Field Entry Plugs
- 0 — Not Required
- 3 — FM Full Set - 4 x 1¼", 4 x 1" Exd Blanking Plugs

CV 12 Ex Approvals
- E — FM
- F — CSA
- G — INMETRO

CV 13 Future Option
- 0 — None

CV's	1	2	3	4	5	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	0	3	E	0	ATEX Sample Modeling Code
	H	E	L	C	8	7	A	L	○	○	0	○	○	○	0	Your ATEX Modeling Code

* Not Applicable for CV9-1 Selection A, B and C

DISCOVER MORE PRODUCTS IN THE FUSION4 PORTFOLIO

FUSION4 MULTIPAK

A complete off-the-shelf additive solution that integrates the industry standard Injector Block known as MONOBLOCK III or MONOBLOCK II+.

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

For more information visit
https://www.honeywellprocess.com/en-US/explore/products/terminal-operations/loading-automation/additive-injection-systems/Pages/fusion4-multipak.aspx

FUSION4 PORTAL

Fusion4 Portal software brings together wide-ranging remote monitoring and supervisory capabilities for all Fusion4 devices on a single, integrated dashboard. Users can select the modules they need to print transaction (Bill of Lading), monitor real-time audit trails for simpler reconciliation, and adjust parameter settings to get operations up and running quicker.

For more information visit
https://www.honeywellprocess.com/en-US/explore/products/terminal-operations/loading-automation/software-systems/Pages/fusion4-portal.aspx
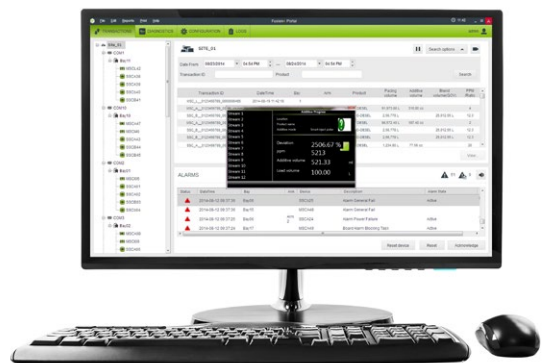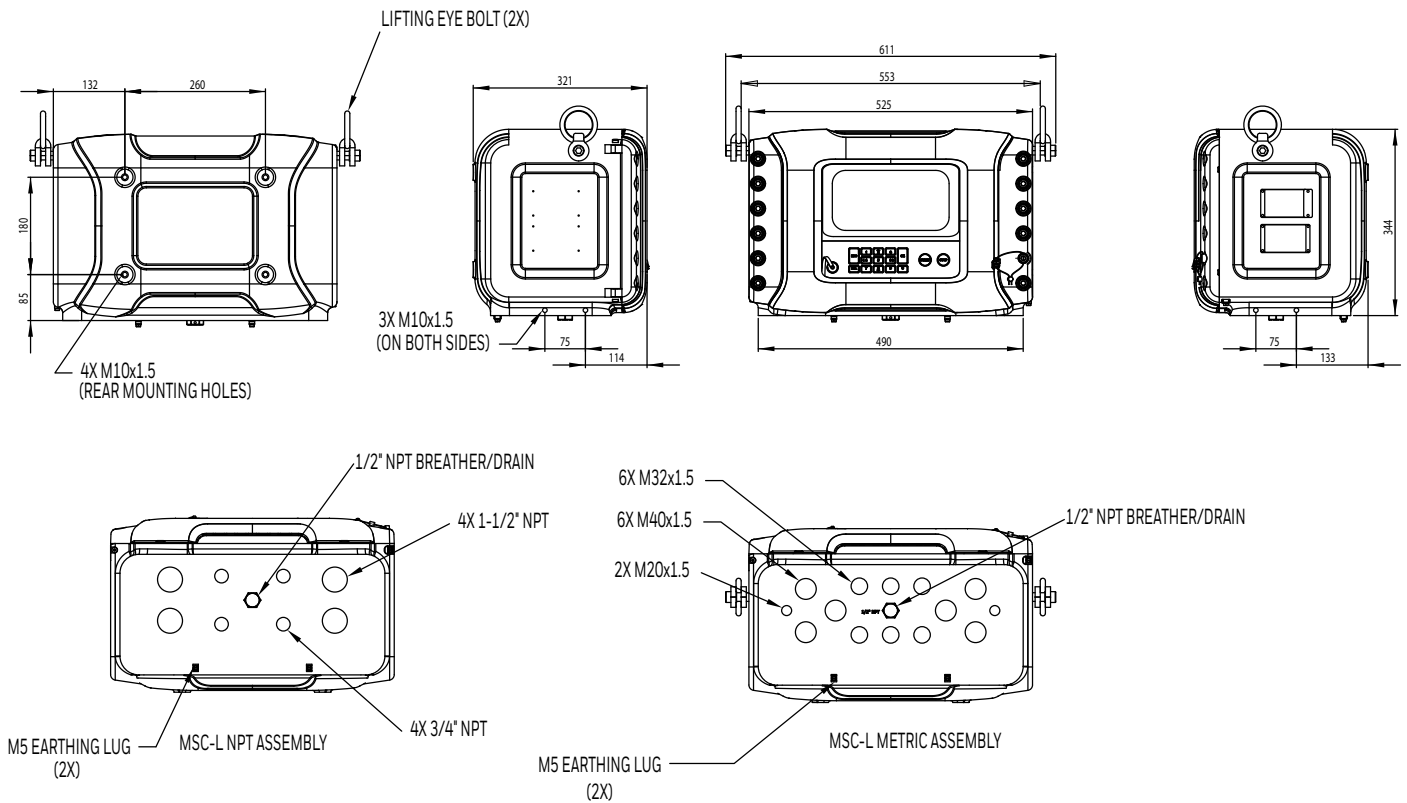
EXPERION® TERMINAL MANAGER

Experion® Terminal Manager is an advanced application that handles receipt and dispatch of liquid and gaseous products at bulk storage terminals. The software uses Honeywell's state-of-the-art SCADA/DCS, Experion® PKS, as its platform, providing field integration, monitoring and control of terminal operations.

Experion Terminal Manager is highly scalable and provides a structured and standardized approach to the challenges facing a wide range of terminal operators, from small independent marketing terminals to refinery terminal operations. The system can be extended with a comprehensive range of related Honeywell solutions, becoming a one-stop-shop for all terminal automation needs.

DIMENSIONAL DRAWING

LIFTING EYE BOLT (2X)

132 260

180

85

4X M10x1.5
(REAR MOUNTING HOLES)

321

3X M10x1.5
(ON BOTH SIDES)

75

114

611

553

525

490

344

75

133

1/2" NPT BREATHER/DRAIN

4X 1-1/2" NPT

M5 EARTHING LUG
(2X)

MSC-L NPT ASSEMBLY

4X 3/4" NPT

6X M32x1.5

6X M40x1.5

2X M20x1.5

1/2" NPT BREATHER/DRAIN

M5 EARTHING LUG
(2X)

MSC-L METRIC ASSEMBLY

Dimensions are in mm

For More Information

To learn more about Honeywell's Enraf
portfolio, visit www.honeywellenraf.com or
contact your Honeywell account manager.

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THE
FUTURE
IS
WHAT
WE
MAKE IT

Honeywell