

Autonomous Mobile Robots

HD-1500

Autonomous Mobile Robots that self-navigate to transport payloads up to 1500 kg

- Natural feature navigation:
Automatically plans efficient routes and prevents collisions;
capable of full reverse navigation
- Fleet management:
Operates in coordination with a fleet of up to 100 AMRs
- Easy deployment:
Installs quickly, without facility modifications



Ordering Information

Type	HAPS	Side Lasers	Charging Station	Pendant	Top Plate	Part Number
HD-1500	No	No	No			37480-00000
		Yes				37480-00010
		No	Yes	No	37480-00002	
		No	Yes		37480-10004	
	Yes	37480-10014				
	Single	No	No			37480-00100
		Yes				37480-00110
		No	Yes		37480-10104	
		Yes			37480-10114	
	Double	No	No			37480-00200
		Yes				37480-00210
		No	Yes		37480-10204	
		Yes			37480-10214	

Note: To ensure proper fleet management, please contact an OMRON representative before ordering AMRs to add to an existing fleet.

Note: The battery for the HD-1500 must be ordered separately (part number 68330-000). Before ordering lithium-ion batteries, please verify local shipping regulations to ensure compliance with applicable laws and restrictions.

Items Included With the AMR

Item	Description
Labels	Lifting, warning, and product labels
USB drive	Contains digital product documentation and software for operating the AMR
Printed Documentation	Printed manuals and guides for unpacking and operating the AMR
Lift Kit	Includes straps and hardware for lifting the AMR

Accessories and Optional Items

Item	Details	Part Number
EM2100 Appliance	Appliance that runs any Fleet Operations Workspace Solutions software. 120 day factory trial license included. Refer to Fleet Operations Workspace (FLOW) Licenses below for more information.	20271-900 (Primary Fleet Manager) 20271-901 (Secondary Fleet Manager) 20271-903 (Bundle with Fleet Simulator License)
Mobile I/O Box	Used with a Fleet Manager to summon an AMR to a goal or control connected devices with I/O	23419-802
Mobile I/O Box Power Supply	Recommended for purchase with the Mobile I/O Box	23419-812
Top Plate Kit	Upper plate kit of the AMR. It is not necessary for building a customer payload structure	68950-000

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Item		Details	Part Number
Pendant		Handheld, external input device for manually driving an AMR, typically used for map creation	68940-000L
Charging Station	Power Supply Box	Supplies power to the Docking Target or battery for charging purposes	73990-000
	Docking Target	A fixed object connected to the Power Supply Box that the AMR docks to for autonomous charging	68910-000
Battery*		Removable and rechargeable power source for the AMR	68330-000
Side Laser Kit		Includes side lasers, mounting kit, cables, and hardware	68945-010
Side Laser Extension Cable, Communication		One cable, 1 m length	22115-000F
		One cable, 2 m length	22117-000F
Side Laser Extension Cable, Power		One cable, 1 m length	22800-000F
		One cable, 2 m length	22802-000F
Wireless Antenna Extension Kit		Two cables, 2 m length each, two dipole antennas	68955-000
High Accuracy Positioning System (HAPS), single sensor		AMR Alignment using magnetic floor tape. Includes single HAPS sensor kit.	68925-010
High Accuracy Positioning System (HAPS), double sensor		AMR Alignment using magnetic floor tape. Includes double HAPS sensor kit.	68925-020
High Accuracy Positioning System (HAPS) magnetic tape		25 mm wide magnetic tape (South top side, 49 m roll)	14925-000

* Before ordering lithium-ion batteries, please verify local shipping regulations to ensure compliance with applicable laws and restrictions.

Software Licenses

Product Name	Applicable For	Configuration	Part Number
Fleet Operations Workspace (FLOW) Core Fleet Manager License, 3 Year	Virtual Fleet Manager	Initial entitlement for a 3 year renewable FLOW Core license. Replace □□ with 05, 10, 15, 20, 25, 30, 50 to indicate the number of AMRs licensed to connect, where 50 represents an unlimited number of AMRs.	30271-1□□*1
Fleet Operations Workspace (FLOW) Core Fleet Upgrade		Entitlement for fleet connection limit increase by one additional AMR (used for existing installations).	30271-001
Fleet Operations Workspace (FLOW) Core Renewal		Entitlement for a 1 year (verify) renewal of the FLOW Core license. Replace □□ with a value of 05 to 30, or 50 to indicate the number of AMRs licensed to connect, where 50 represents an unlimited number of AMRs.	30271-2□□
Fleet Operations Workspace (FLOW) iQ License		Entitlement for a 1 year renewable FLOW iQ license.	30271-701
		Entitlement for a 3 year renewable FLOW iQ license.	30271-703
Primary Fleet Operations Workspace (FLOW) Core License, 1 Year	EM2100	Entitlement for a 1 year renewable Primary FLOW Core license, runtime and development, per AMR connection	20271-800*2
Primary Fleet Operations Workspace (FLOW) Core License, 5 Year		Entitlement for a 5 year renewable Primary FLOW Core license, runtime and development, per AMR connection	20271-806*2
Secondary Fleet Operations Workspace (FLOW) Core License, 1 Year		Entitlement for a 1 year renewable Secondary FLOW Core license per fleet, redundant runtime	20271-802*2
Secondary Fleet Operations Workspace (FLOW) Core License, 5 Year		Entitlement for a 5 year renewable Secondary FLOW Core license per fleet, redundant runtime	20271-807*2
License, Fleet Operations Workspace iQ		Entitlement for a 1 year renewable FLOW iQ license	20271-701
		Entitlement for a 5 year renewable FLOW iQ license	20271-705
Cell Alignment Positioning System (CAPS) License	AMR	AMR Alignment using software-defined target. Entitlement for a perpetual CAPS license	20271-805

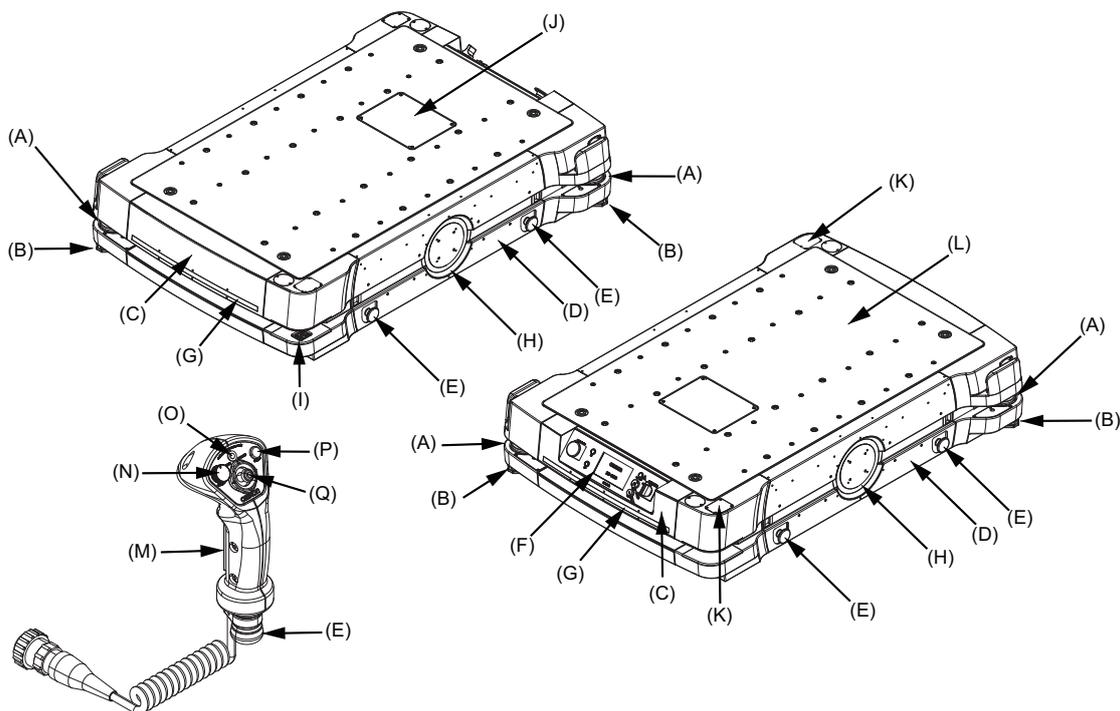
*1 After expiration of a FLOW Core Fleet Manager license, all Virtual Fleet Manager functionality will continue to operate without requiring subscription renewals. An active subscription will still be required to access subsequent software releases, including bug fixes, feature upgrades, and performance improvements.

*2 Expiration of a 1 year subscription license without renewal will result in cessation of the EM2100 fleet management functions of the OMRON AMR solution until the license is renewed. This does not apply to Virtual Fleet Manager.

After five consecutively licensed years (either one 5 year license or five 1 year licenses), all EM2100 fleet management functions will continue to operate without requiring subsequent subscription renewals. An active subscription will still be required to access new software releases, including bug fixes, feature upgrades, and performance improvements.

Note: To upgrade to the latest version of the FLOW Core software, contact your local OMRON representative. Please note that an active subscription is required for access to software upgrades.

Features and Components



Item	Description	Item	Description
A	Safety Laser Scanner	J	User Access Panel
B	Low Laser	K	Wireless Antennas
C	Front / Rear Skin	L	Payload Mounting Surface (Top Plate shown)
D	Side Skin	M	Three-position Enabling Switch
E	E-STOP Button*	N	Speed Control
F	Operator Panel	O	Power Indicator LED
G	Light Strip	P	Goal Button
H	Light Disc	Q	Directional Control Stick
I	Charging Contacts		

* An additional E-STOP button is provided on the Operator Panel.

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Specifications

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Item		Details
Weight (with Battery)		506.5 kg
Environment	Ambient temperature	5 to 40°C
	Storage temperature	-20 to 60°C
	Ambient humidity	5 to 95% (non-condensing)
	Operating environment	Indoor usage only, no excessive dust, no corrosive gas or liquid
	Altitude	2000 m maximum
	Ingress Protection Class	IP20
	Enclosure Rating	Type 1
	Cleanroom Rating	ISO 6 / Class 1000
Floor Conditions	Floor requirements	No water, no oil, no dirt
	Minimum floor flatness	F _F 25 (ACI 117 standard)
	Traversable step^{*1}	10 mm max.
	Traversable gap	20 mm max.
	Maximum Slope	Max. 1.8° / 3% incline
	Minimum floor compressive strength	5 Mpa
	Minimum coefficient of friction	0.6
Navigation	Routing	Autonomous routing by localizing with safety scanning laser, based on environment mapping
	Environmental map-making method	Scan by driving the AMR through the environment, and upload the scan data to the MobilePlanner
	Low Lasers	Two Low Lasers are provided to detect obstacles below the scanning plane of the Safety Laser Scanners.
	Side Lasers (optional)	Two optional Side Lasers can be added for object detection in the vertical plane.
Visual Indicators		Light discs are located on the sides of the AMR. Light strips are located on the front and back of the AMR. Additional indicators can be added.
Maximum Payload Capacity		1500 kg
Mobility	Run Time^{*2}	12.5 h (no payload), 9 h (full payload)
	Maximum translational speed (forward and reverse)	1800 mm/s
	Maximum rotational speed^{*3}	60 °/s
	Swing radius	982 mm
	Turn radius	0 mm
	Maximum translational acceleration	900 mm/s ²
	Maximum rotational acceleration/deceleration	150 °/s ²
	Maximum moment of inertia	490 kg·m ²
	Stop position repeatability (single AMR)^{*4}	To a position: ±50 mm To standard target: ±25 mm, ±2° With HAPS: ±8 mm, ±0.4° With CAPS: ±8 mm, ±0.5°
	Stop position repeatability (Fleet)^{*4}	To a position: ±70 mm To standard target: ±35 mm, ±2° With HAPS: ±10 mm, ±0.75° With CAPS: ±16 mm, ±0.5°
Drive wheels	Materials	Non-marking, static dissipative polyurethane on steel rim
Passive casters	Materials	Non-marking polyurethane on cast iron rim.
Auxiliary Power	Unregulated	48 to 57 VDC (52.8 nominal); 50 A fused
	Regulated	23.0 to 25.2 VDC; two channels fused at 1.85 A
Standards	AMR	EN ISO 12100, EN ISO 13849-1, EN 60204-1, ISO 10218-1/CSA Z434, UL 3100, EN 61000-6-2, EN 61000-6-4
	Battery	UL2271, UN 38.3
	Charging Station	UL1012/CSA C22.2.107.2, EN 61204-7 used in conjunction with EN 62477-1
	Wireless	IEEE 802.11 a/b/g

	Item	Details
Signal Interfaces	Wireless	Two integrated wireless antennas
	Ethernet port	Two RJ-45 ports included for maintenance and access to the internally mounted NX102 unit.
	Digital I/O	Eight PNP (sourcing) inputs Eight PNP (sourcing) outputs
	Analog I/O	Four -10 to +10 VDC analog inputs Four -10 to +10 VDC analog outputs
	Audio	Digital audio out
Safety Features	Safety Scanning Lasers	Two Safety Scanning Lasers are included to provide a 360° detection area around the AMR. The scanning plane is positioned 175 mm above the floor. Lasers are rated as Class 1, eye-safe, PLd Safety per ISO 13849-1.
	E-STOP Buttons	Five E-STOP buttons are located on the AMR (sides and Operator Panel). Additional E-STOP buttons can be added to the payload structure.
	Audible Indicators	Two speakers are included. Additional buzzers can be added.
	Emergency Stop Interface	Dual channel emergency stop inputs and outputs.
	Safety Outputs	Dual channel safety outputs.
	Protective Stop Interface	Dual channel protective stop inputs.
Operator Panel	Display	7-inch diagonal LCD.
	Controls	<ul style="list-style-type: none"> • E-STOP button • ON/OFF buttons • Brake release button • Pendant port • Maintenance port • Main disconnect switch

*1 A speed of 500 mm/s in the forward direction and 400 mm/s in the reverse direction is recommended for traversing steps. Routine driving over steps should be avoided. Lower speeds may not traverse the step. Faster or frequent driving over steps and gaps will shorten the lifespan of the drivetrain components. All steps should have smooth, rounded profiles.

*2 Auxiliary power draw will impact these times.

*3 The maximum rotational speed is reduced to 45 °/s when the AMR is traveling at speeds over 300 mm/s.

*4 Stop position repeatability values were obtained using default AMR parameters and a map created by the HD AMR.

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MobilePlanner Software Requirements

MobilePlanner, PC	Operating System	Windows 10 (32-bit/64-bit version)
	CPU	1.5 GHz dual-core CPU recommended
	Main Memory	1.5 GB min. (4 GB min. recommended)
	Hard Disk	At least 200 MB of available space
	Video Memory	256 MB min.
MobilePlanner, Tablet Edition	Operating System	Android OS, Version 9 or newer, minimum 2 GB of RAM
		iOS, Version 10 or newer
Supported Languages		English, German, Japanese, French, Italian, Korean, Spanish, Simplified Chinese and Traditional Chinese.

Virtual Fleet Manager Software Minimum Hardware Requirements

Fleet Size / AMR Count	Small / ≤ 5	Medium / ≤ 15	Large / ≤ 30	X-Large / ≤ 100
Virtual CPU	2 cores		4 cores	
Clockspeed	4GHz	8 GHz	12 GHz	16 GHz
Virtual RAM	8 GB	16 GB	24 GB	32 GB
Virtual Disk	512 GB			1 TB
FLOW software version	Minimum FLOW Core 4.0			

Note: The PC/IPC/Server is supplied by the user.

EM2100 Appliance

Weight	9.1 kg
Mounting method	1U rack mount in a standard 19-inch equipment rack
Power Supply	100 to 240 VAC (typical 100 W)
Power Consumption	200 W max.
Operating Temperature	10 to 35°C
Storage Temperature	-25 to 60°C
Operating Humidity	8 to 90%, non-condensing
Storage Humidity	5 to 95%, non-condensing
Ingress Protection Class	IP20
Main Memory	32 GB DDR3
Storage	60 GB SSD
Archive Storage	4 TB HDD
Communication port	10/100/1000 Ethernet × 4, USB × 4, VGA
Status Display	Multi-segment LCD

Charging Station

Maximum Current	Input current: 25 A Output current: 120 A (nominal)
Input Voltage	3-phase 200 to 240 VAC, 50/60 Hz (Delta/Wye) 380 to 415 VAC, 50/60 Hz (Wye only)
Output voltage	40 to 57 VDC
Power Consumption	7.75 kW
Maximum Power Output	6.84 kW
Humidity	5 to 95%, non-condensing
Ambient Operating Temperature	5 to 40°C
Storage Temperature	-20 to 60°C
Ingress Protection Class	IP20 (IP10 for charging pads)
Pollution degree	2
Equipment Class	1
Weight	Power Supply Box: 108 kg Docking Target: 27.5 kg
Docking Target Mounting	To floor and/or wall

* Fused at 150 A

High Accuracy Positioning System

Ingress Protection		IP64
Environment		-40 to 85°C
Magnetic Tape	Width	25 mm
	Orientation	South up
Markers (Magnetic Tape)	Width	25 mm
	Length	300 mm min. for 500 mm/s drive speed
	Orientation	North up
	Separation from tape	20 to 30 mm
Protective covering tape (recommended)		Mighty Line Safety Floor Tape, Solid (102 mm width)
Stop Position Repeatability*	Single AMR	±8 mm position, ±0.4° rotation
	Fleet	±10 mm position, ±0.75° rotation

* Stop position repeatability values were obtained using default AMR parameters and a map created by the HD AMR.

Cell Alignment Positioning System (CAPS)

Stop Position Repeatability - Single AMR*	±8 mm position, ±0.5° rotation
Stop Position Repeatability - Fleet*	±16 mm position, ±0.5° rotation
Type	Software license

* Stop position repeatability values were obtained using default AMR parameters and a map created by the HD AMR.

Pendant

Ambient Operating Temperature	0 to 40°C
Storage Temperature	-20 to 65°C
Humidity	5 to 95%, non-condensing
Altitude	2000 m
Ingress Protection Class	IP30

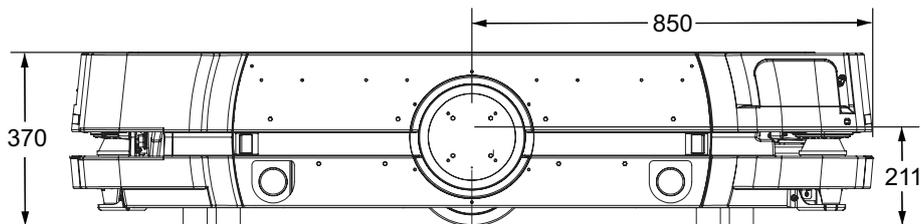
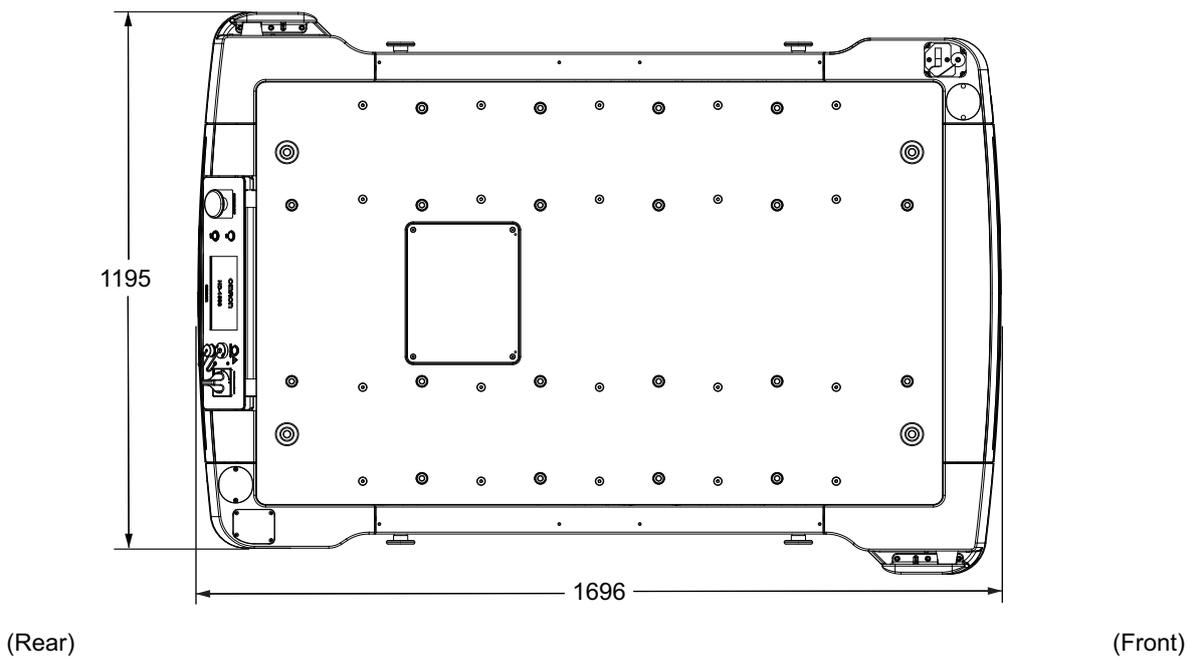
Battery

Type	Lithium-Ion (LiFePO4)
Voltage	48 to 57 VDC (52.8 nominal)
Capacity	68 Ah nominal
Recharge Time	21 min. (20% to 80% charge)
Charge Cycles	Approximately 8000 cycles*
Charging Method	Automatic or manual
Ambient Operating Temperature	5 to 40°C
Storage Temperature	-20 to 60°C (less than 2 weeks) -20 to 35°C (more than 2 weeks)
Humidity	5 to 95%, non-condensing
Altitude	4500 m, operating 15240 m, transporting
Ingress Protection Class	IP20
Weight	69.5 kg

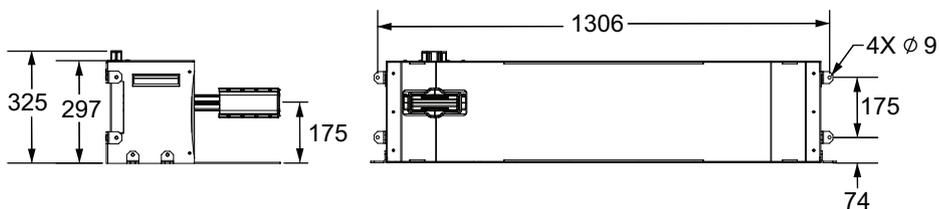
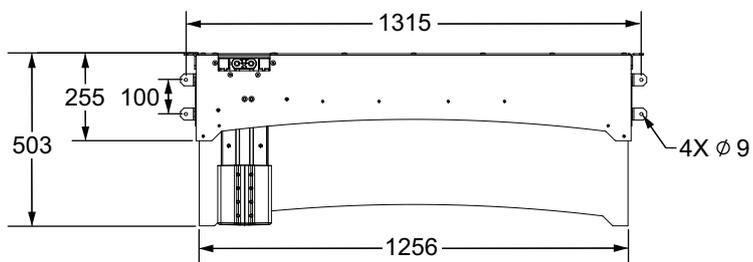
* Approximately 80% of nominal battery capacity will be available after using the battery at 100% depth of discharge, at a temperatures of 23°C, charging and discharging at a 1C rate.

Dimensions

HD-1500 AMR



Docking Target

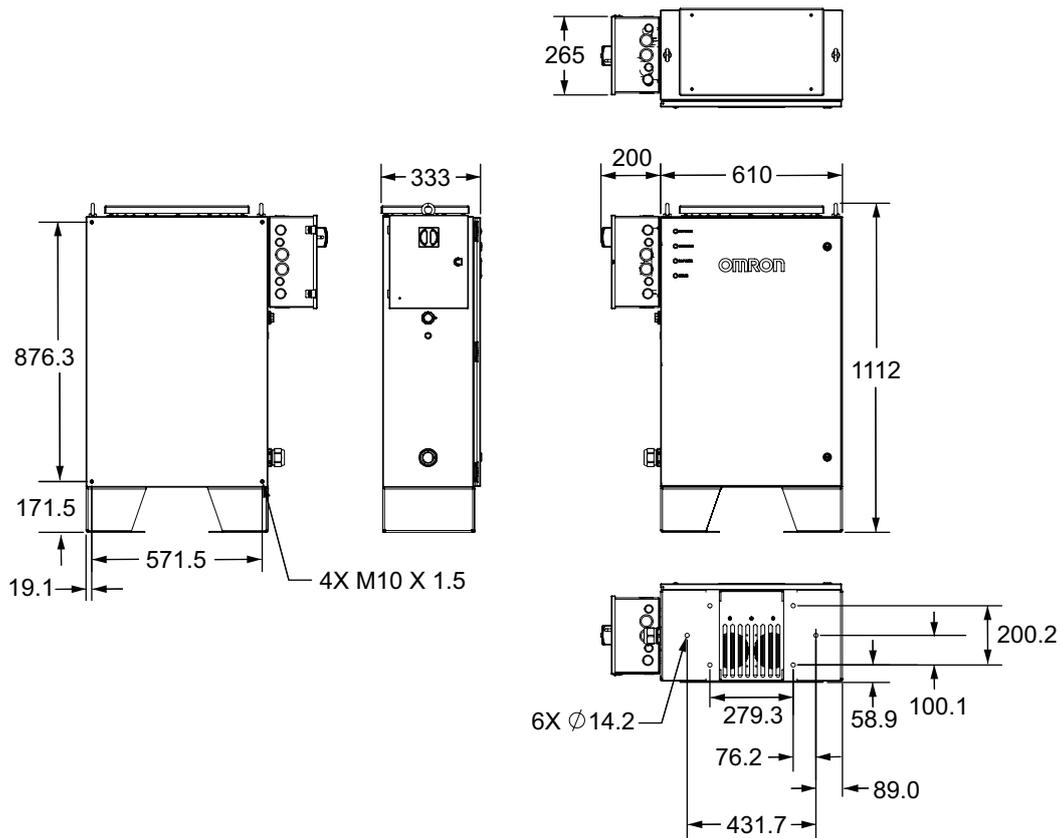


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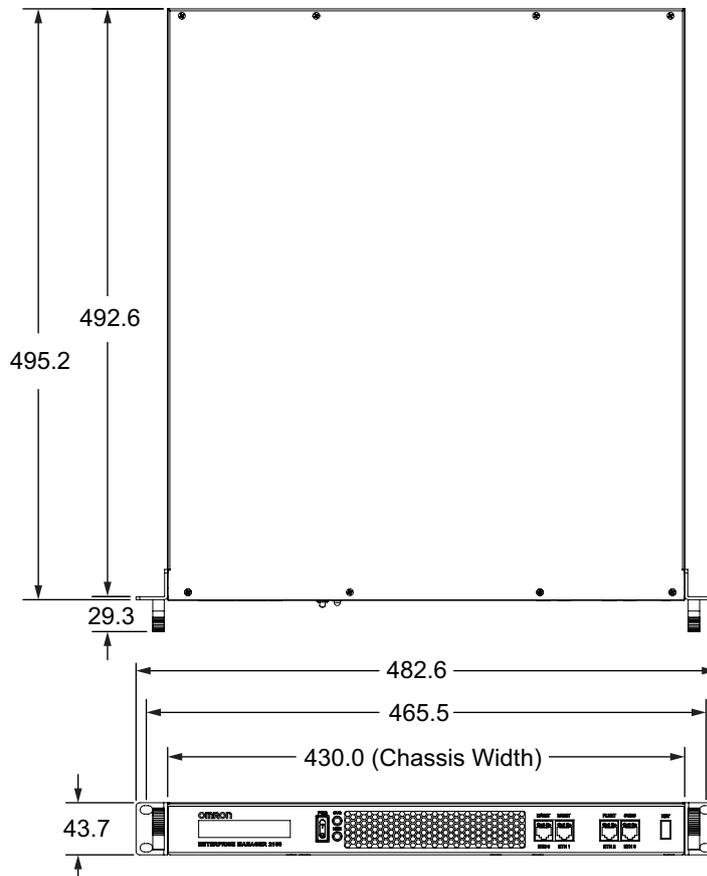
Dimensions

(Unit: mm)

Power Supply Box



Fleet Manager EM2100 Appliance



Related Manuals

Manual No.	Title
I614	Mobile Robot Software Suite User's Guide
I617	Advanced Robotics Command Language Reference Manual
I618	Advanced Robotics Command Language Enterprise Manager Integration Manual
I634	EM2100 Installation Manual
I615	Enterprise Manager User Guide (this covers the EM1100, not the EM2100)
I635	Fleet Operations Workspace Core User's Manual
I636	Fleet Operations Workspace Core Migration Manual
I637	Fleet Operation Workspace Core Integration Toolkit User Manual
I665	Fleet Operations Workspace iQ User's Manual
I649	Fleet Simulator User's Manual
I695	Virtual Fleet Manager Installation Guide
I645	HD-1500 Platform User's Manual
I647	Mobile Robot HD Safety Manual
I677	Mobile I/O Box User's Manual

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Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Note: Do not use this document to operate the Unit. This document describes AMR functionality supported with FLOW v2.0.

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