

## Autonomous Mobile Robots

# OL-450S Series

**Self-navigating, ultra-low, mobile robots that transport cages and carts with a combined payload up to 450 kg**

- Natural feature navigation:  
Automatically plans efficient routes and prevents collisions;  
capable of omni-directional navigation
- Fleet management:  
Scale deployment with AMR prioritization and multi-robot coordination, for manufacturing environments
- Easy integration:  
Installs quickly, without facility modifications
- Ultra-low design:  
Fits underneath roll cages and carts for autonomous transportation of existing storage solutions
- Wireless charging



## Ordering Information

| Model    | Lift Plate Length | Mast  | Ordering Code |
|----------|-------------------|-------|---------------|
| OL-450S2 | 771 mm            | 1.6 m | 37590-70000   |
|          |                   | None  | 37590-70009   |
| OL-450S3 | 851 mm            | 1.6 m | 37590-80000   |
|          |                   | None  | 37590-80009   |

**Note:** All AMRs in a fleet must have the same version of the FLOW Core software installed. Other considerations must be made when adding AMRs to a fleet. Contact your local OMRON representative for more information.

**Note:** The battery for the OL-450S Series AMR must be ordered separately (part number 28110-020). 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                | Warning and product labels                          |
| Printed Documentation | Printed guides for safety, unpacking and assembling |
| Lift Rings            | Hardware for lifting the AMR                        |
| Triangle Spanner Key  | Tool for removing the front skin                    |

## Accessories and Optional Items

| Item                                       | Details                                                                                                                                                                           | Ordering Code |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Battery*1                                  | Rechargeable power source for the AMR.                                                                                                                                            | 28110-020     |
| Stationary Electronics and Stationary Coil | Power supply box for charging the AMR battery. Includes the external charging coil for wireless charging, cables and covers. Power cable and mounting hardware are user supplied. | 28110-101     |
| Charging Ramp                              | Floor mounted wireless charging protective surface.                                                                                                                               | 28110-102     |
| Service Charger                            | Portable charger for use in an AMR power loss event. Includes cables for five different regions.                                                                                  | 28110-113     |
| Manual Mover                               | Used for moving unpowered AMRs.                                                                                                                                                   | 28110-501     |
| Mast                                       | 1.6 m mast.                                                                                                                                                                       | 28110-522     |
|                                            | 1.2 m mast.                                                                                                                                                                       | 28110-518     |

## OL-450S Series

| Item                              | Details                                                                                                    | Ordering Code |
|-----------------------------------|------------------------------------------------------------------------------------------------------------|---------------|
| Lift Bridge                       | Provides an alternate method to lower the lifting mechanism. Includes battery charger for European region. | 28110-503     |
| Lift Bridge Charger (Europe only) | Charger for charging the Lift Bridge. Rated for 220 - 240 VDC at 50 Hz.                                    | 28110-508     |
| Work Bench                        | Adjustable height table used for performing maintenance tasks.                                             | 28110-504     |
| Maintenance Kit 1                 | Cleaning wipes for scanners.                                                                               | 28110-506     |
| Maintenance Kit 2                 | Cleaning fluid for scanners.                                                                               | 28110-505     |
| 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     |

\*1 Before ordering lithium-ion batteries, please verify local shipping regulations to ensure compliance with applicable laws and restrictions.

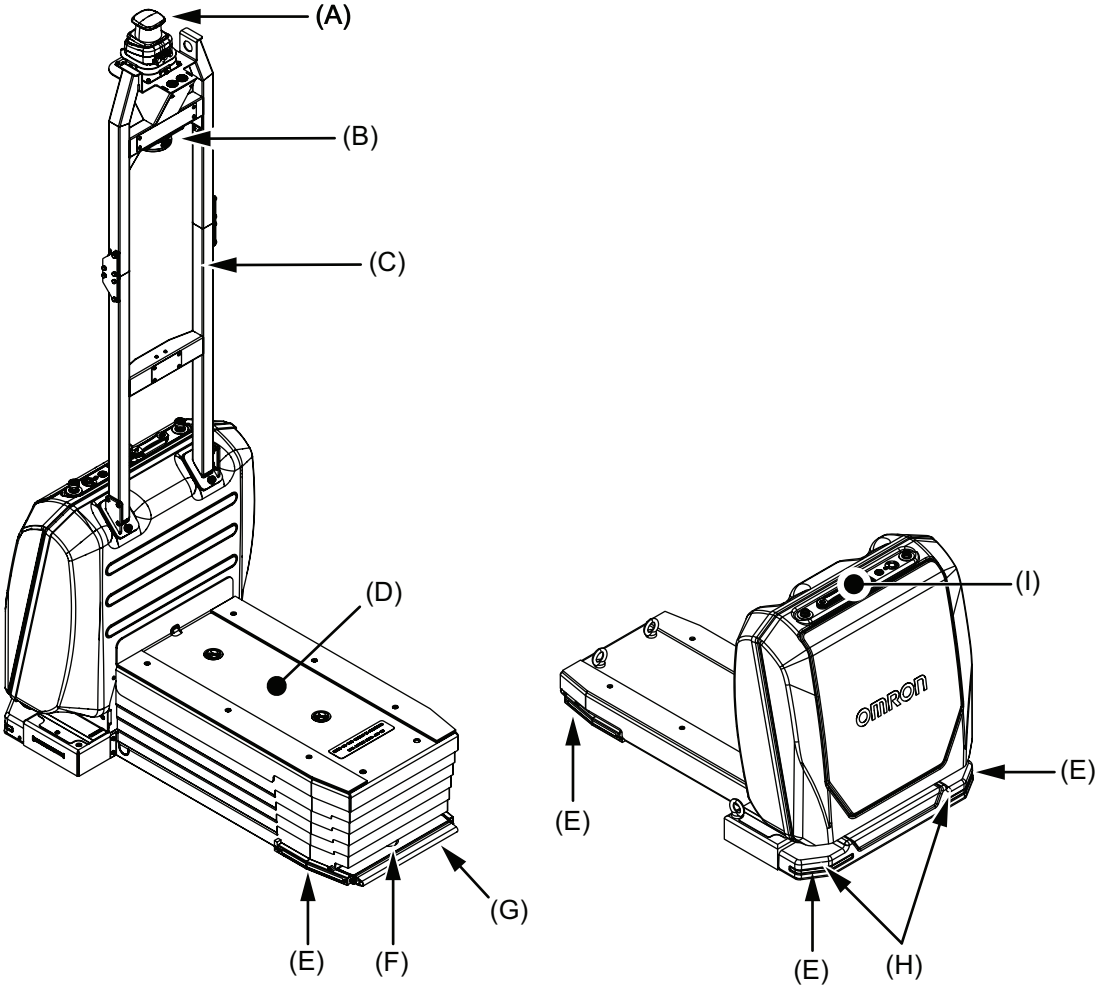
## Software Licenses

| Product Name                                                  | Applicable For        | Configuration                                                                                                                                                                                                                                                                    | Ordering Code |
|---------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Fleet Operations Workspace Core Fleet Manager License, 3 Year | Virtual Fleet Manager | Initial entitlement for a 3 year renewable FLOW Core license. Replace □□ with 01, 05, 10, 15, 20, 25, 30, 50 to indicate the number of AMRs licensed to connect. For 31 or more AMRs, use 50.                                                                                    | 30271-1□□*1   |
| Fleet Operations Workspace Core Fleet Upgrade                 |                       | Entitlement for fleet connection limit increase by one additional AMR (used for existing installations).                                                                                                                                                                         | 30271-001     |
| Fleet Operations Workspace Core Renewal                       |                       | Entitlement for a 1 year 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. For 31 or more AMRs, use 50.                                                                                           | 30271-2□□     |
| Unified Fleet License                                         |                       | Provides access to the Unified Fleet Object feature for tracking the position of external moving equipment (such as carts, forklifts, and third party AGVs) and integrating them into OMRON Fleet Manager logic. Also provides access to advanced TrafficLight sector functions. | 30271-601     |
| Fleet Operations Workspace iQ License (FLOW iQ)               |                       | Entitlement for a 1 year renewable FLOW iQ license.                                                                                                                                                                                                                              | 30271-701     |
|                                                               |                       | Entitlement for a 3 year renewable FLOW iQ license.                                                                                                                                                                                                                              | 30271-703     |
| Cell Alignment Positioning System (CAPS) License              | AMR                   | AMR Alignment using software-defined target. Entitlement for a perpetual CAPS license.                                                                                                                                                                                           | 20271-805     |
| Cycle Time Optimization License                               |                       | Enables reduced cycle times with fewer stops and path caching. Entitlement for a perpetual Cycle Time Optimization license.                                                                                                                                                      | 20271-905     |

\*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.

**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    | 360-degree Scanner*1 | B    | LED Signal Lamp*1     |
| C    | Mast*1               | D    | Lifting Plate         |
| E    | Light Strips         | F    | Rear Scanner          |
| G    | Rear Bumper          | H    | Front Safety Scanners |
| I    | Control Strip        |      |                       |

\*1 Optional equipment.

Specifications

| Item                  |                              | Details                                                                                     |                                        |
|-----------------------|------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------|
| Model                 |                              | OL-450S2                                                                                    | OL-450S3                               |
| Weight (with Battery) |                              | 201 kg with mast / 188 kg without mast                                                      | 205 kg with mast / 192 kg without mast |
| Environment           | Ambient Temperature          | 5 to 40°C                                                                                   |                                        |
|                       | Storage Temperature          | -20 to 60°C                                                                                 |                                        |
|                       | Operating / Storage Humidity | 5% to 95% (non-condensing)                                                                  |                                        |
|                       | Operating Environment        | Indoors only, no excessive dust, no corrosive gas                                           |                                        |
|                       | Altitude                     | 2000 m (max.)                                                                               |                                        |
|                       | Pollution degree             | 2                                                                                           |                                        |
|                       | Ingress Protection Class     | IP20                                                                                        |                                        |
|                       | Dust / Smoke                 | < 11.7 mL / m <sup>2</sup> of dust with a particle size < 40 μm, avoid dusty or smoky areas |                                        |
|                       | Enclosure Rating             | NEMA Type 2                                                                                 |                                        |
|                       | Atmospheric                  | Non-hazardous environments (no explosive gas or oil mist)                                   |                                        |

## OL-450S Series

| Item                |                                                   | Details                                                                                                    |                    |
|---------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------|
| Model               |                                                   | OL-450S2                                                                                                   | OL-450S3           |
| Floor Conditions    | Ground Clearance                                  | 10 mm                                                                                                      |                    |
|                     | Minimum Floor Flatness                            | NEN 2747-2001 / flatness category 5, DIN 18202 Group 3                                                     |                    |
|                     | Minimum Levelness                                 | FL25 (per ACI 117 standard)                                                                                |                    |
|                     | Electrical Conduction                             | Maximum floor resistance 1 GΩ                                                                              |                    |
|                     | Abrasion Resistance                               | NEN 2743-1999 / Abrasion resistance 1                                                                      |                    |
|                     | Maximum Step Traversal                            | No step traversal permitted                                                                                |                    |
|                     | Maximum Gap Traversal*1                           | 10 mm                                                                                                      |                    |
|                     | Maximum Slope                                     | Flat surfaces only                                                                                         |                    |
|                     | Minimum Floor Compressive Strength                | 9.9 MPa, NEN-EN 206-1: 2014 / strength category C25 / 30                                                   |                    |
|                     | Minimum Coefficient of Friction                   | Static coefficient of friction $\mu_s \geq 0.6$<br>Dynamic coefficient of friction $\mu_d \geq 0.4$        |                    |
| 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 MobilePlanner                  |                    |
| Lifting             | Lifting Capacity                                  | 450 kg                                                                                                     |                    |
|                     | Lifting Height                                    | 308 mm                                                                                                     |                    |
|                     | Lifting Speed                                     | 40 mm/s                                                                                                    |                    |
| Mobility            | Run Time                                          | Full payload: approximately 7 hours<br>No payload: approximately 11 hours                                  |                    |
|                     | Swing Radius                                      | 685 mm                                                                                                     |                    |
|                     | Turn Radius                                       | 750 mm                                                                                                     |                    |
|                     | Maximum Translational Speed (forward and lateral) | 1200 mm/s                                                                                                  |                    |
|                     | Maximum Reverse Speed                             | 300 mm/s                                                                                                   |                    |
|                     | Maximum Translational Acceleration                | 750 mm/s <sup>2</sup>                                                                                      |                    |
|                     | Maximum Translational Deceleration                | 1000 mm/s <sup>2</sup>                                                                                     |                    |
|                     | Maximum Rotational Speed                          | 65°/s                                                                                                      | 35°/s              |
|                     | Maximum Rotational Acceleration                   | 165°/s <sup>2</sup>                                                                                        | 85°/s <sup>2</sup> |
|                     | Maximum Rotational Deceleration                   | 165°/s <sup>2</sup>                                                                                        | 85°/s <sup>2</sup> |
|                     | Maximum Moment of Inertia                         | 100 kg·m <sup>2</sup>                                                                                      |                    |
|                     | Stop Position Repeatability (Single AMR)*2        | To a position: $\pm 160$ mm, $\pm 7^\circ$<br>With CAPS: $\pm 6$ mm, $\pm 0.6^\circ$                       |                    |
|                     | Stop Position Repeatability (Fleet)*2             | To a position: $\pm 160$ mm, $\pm 7^\circ$<br>With CAPS: $\pm 10$ mm, $\pm 0.8^\circ$                      |                    |
| Drive Wheels        | Materials                                         | Steel with Vulkollan (polyurethane) tread                                                                  |                    |
| Standards           | AMR                                               | EN ISO 12100, EN ISO 13849-1, EN IEC 60204-1, EN ISO 3691-4 (except clause 4.12), EN61000-6-2, EN61000-6-4 |                    |
|                     | Battery                                           | UN 38.3                                                                                                    |                    |
|                     | Stationary Electronics and Stationary Coil        | EN 60335-2-29, EN 62311, EN 55011, EN 61000-6-2, UL 1564, CAN/CSA C22.2 107.2                              |                    |
|                     | Wireless                                          | IEEE 802.11 a/b/g                                                                                          |                    |
| Regulatory Markings | AMR                                               | KC, CE, RCM                                                                                                |                    |
|                     | Stationary Electronics and Stationary Coil        | CE, cMETus                                                                                                 |                    |
|                     | Battery                                           | CE                                                                                                         |                    |
| Safety Features     | Safety Scanners                                   | 2 Front Safety Scanners, 29 zone sets, selected based on velocity. Lasers are rated as Class 1/M, eye-safe |                    |
|                     | E-Stop Buttons                                    | 2 buttons on Control Strip                                                                                 |                    |
|                     | Rear Bumper                                       | Stops AMR when rear bumper is depressed by physical contact                                                |                    |
|                     | Audible Indicators                                | Audible warning buzzer, programmable through MobilePlanner                                                 |                    |
| Visual Indicators   | LED Light Strips                                  | Shows direction of movement and operational status, located on front and rear of AMR                       |                    |
|                     | LED Signal Lamp                                   | Shows direction of movement and operational status, located on mast*3                                      |                    |

\*1: A 10 mm gap cannot be traversed at speeds greater than 750 mm/s.

\*2: Stop position repeatability values were obtained using default AMR parameters and a map created by the OL-450S Series AMR.

\*3: Optional equipment.

**Charging Station**

|                                      |                                                         |
|--------------------------------------|---------------------------------------------------------|
| <b>Maximum Input Current</b>         | 16 A                                                    |
| <b>Input Voltage</b>                 | 200 to 240 VAC, 50 to 60 Hz, single phase               |
| <b>Output Voltage</b>                | 15 VDC to 60 VDC (28 VDC nominal)                       |
| <b>Power Consumption</b>             | 3.3 kW                                                  |
| <b>Maximum Output Current</b>        | 60 A                                                    |
| <b>Maximum Output Power</b>          | 3 kW                                                    |
| <b>Relative Humidity</b>             | 0 to 95% non-condensing                                 |
| <b>Charging Method</b>               | Wireless (primary), wired (secondary)                   |
| <b>Ambient Operating Temperature</b> | -10 to 40°C                                             |
| <b>Storage Temperature</b>           | -20 to 55°C                                             |
| <b>Ingress Protection</b>            | Stationary Electronics: IP20<br>Stationary Coil: IP68   |
| <b>Altitude</b>                      | 2000 m maximum                                          |
| <b>Pollution Degree</b>              | 1                                                       |
| <b>Equipment Class</b>               | Class A                                                 |
| <b>Weight</b>                        | Stationary Electronics 5.9 kg<br>Stationary Coil 2.8 kg |

**Battery**

|                                         |                                       |
|-----------------------------------------|---------------------------------------|
| <b>Type</b>                             | Lithium-ion (LiFePO4)                 |
| <b>Voltage</b>                          | 25.6 VDC                              |
| <b>Capacity</b>                         | 42 Ah nominal                         |
| <b>Recharge Time</b>                    | 25 min. (from 20% to 80%)*1           |
| <b>Charge Cycles</b>                    | Approx. 6000 cycles*2*3               |
| <b>Duty Cycle (depth of discharge)</b>  | 80%                                   |
| <b>Charging Method</b>                  | Wireless (primary), wired (secondary) |
| <b>Ambient Charging Temperature</b>     | 10 to 40°C                            |
| <b>Discharging temperature</b>          | 0 to 50°C                             |
| <b>Storage Temperature</b>              | -20 to 60°C                           |
| <b>Humidity (operating and storage)</b> | 10 to 90%, non-condensing             |
| <b>Altitude</b>                         | 2000 m                                |
| <b>Ingress Protection</b>               | IP54                                  |
| <b>Weight</b>                           | 20 kg                                 |

\*1: Charging time can vary based on battery cell temperature and state of charge to prolong battery life.

\*2: Approximately 80% of nominal battery capacity will be available after using the battery at 100% depth of discharge.

\*3: Under the following conditions:

- Temperature: 15 to 50°C
- Relative humidity: 25% to 85%

**MobilePlanner Software Requirements**

|                              |                  |                                                                                                                 |
|------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------|
| MobilePlanner PC             | Operating System | Windows 10 (64-bit version), Windows 11                                                                         |
|                              | CPU              | 1.5 GHz dual-core CPU recommended                                                                               |
|                              | Main Memory      | 1.5 GB min. (4 GB min. recommended)                                                                             |
|                              | Hard Disk        | At least 400 MB of available space                                                                              |
|                              | Video Memory     | 256 MB min.                                                                                                     |
|                              | Display          | XGA 1024 x 768, 16 million colors minimum                                                                       |
| 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, Polish, Simplified Chinese and Traditional Chinese |

**Virtual Fleet Manager Software, Minimum Hardware Requirements**

| <b>Fleet Size / AMR Count</b> | Small<br>≤ 5          | Medium<br>≤ 15 | Large<br>≤ 30 | X-Large<br>> 30*1 |
|-------------------------------|-----------------------|----------------|---------------|-------------------|
| <b>Virtual CPU</b>            | 2 Cores               |                | 4 Cores       |                   |
| <b>Clock Speed (per core)</b> | 2 GHz                 | 4 GHz          | 3 GHz         | 4 GHz             |
| <b>Virtual RAM</b>            | 8 GB                  | 16 GB          | 24 GB         | 32 GB             |
| <b>Virtual Disk</b>           | 512 GB                |                |               | 1 TB              |
| <b>FLOW Software Version</b>  | Minimum FLOW Core 4.0 |                |               |                   |

\*1: Contact your local OMRON representative for fleets larger than 100.

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

**Service Charger**

|                                      |                                            |
|--------------------------------------|--------------------------------------------|
| <b>Input Voltage</b>                 | 100 to 240 VAC, 50 / 60 Hz                 |
| <b>Input Current (max.)</b>          | 7.5 A                                      |
| <b>Output Voltage</b>                | 24 VDC Nominal<br>27.75 VDC Maximum        |
| <b>Maximum Output Current</b>        | 7 A                                        |
| <b>Charge Time</b>                   | 72 minutes (from 0 to 20% state of charge) |
| <b>Ambient Operating Temperature</b> | 10 to 40°C                                 |
| <b>Humidity</b>                      | 0 to 95% non-condensing                    |
| <b>Weight</b>                        | 2.9 kg                                     |
| <b>Dimensions (L x W x H)</b>        | 252 mm x 179 mm x 120 mm                   |

**Version Information**

The details in this document apply to products operating with the following hardware and software versions.

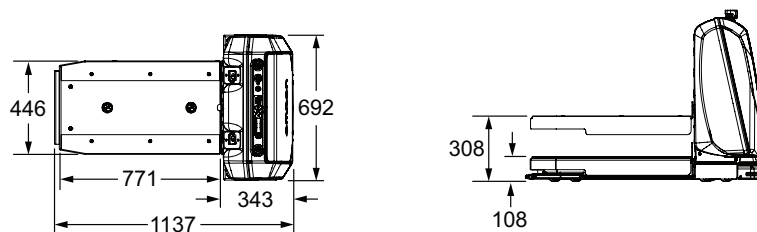
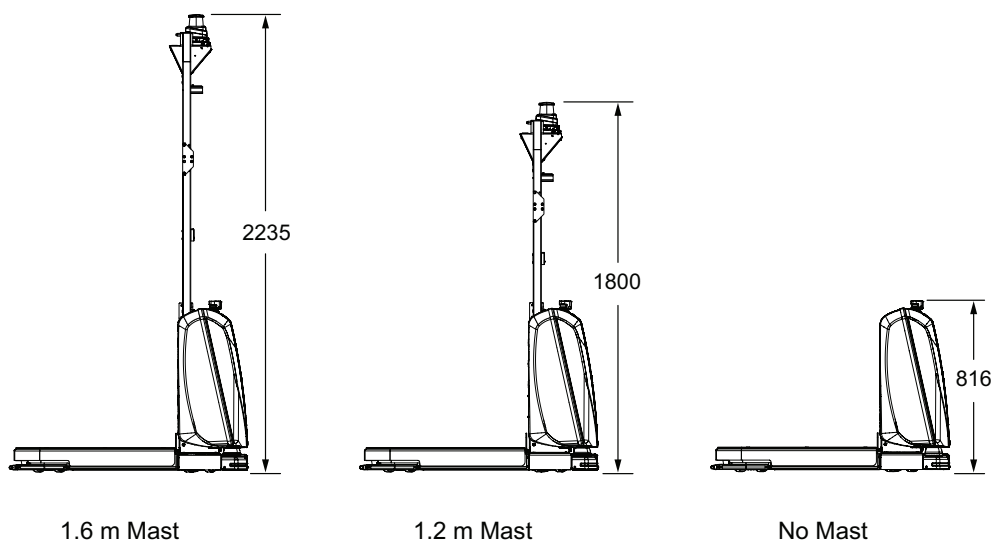
- AMR Version 2.1.0
- FLOW Core Software Version 5.3
- Battery Version V1

## OL-450S Series

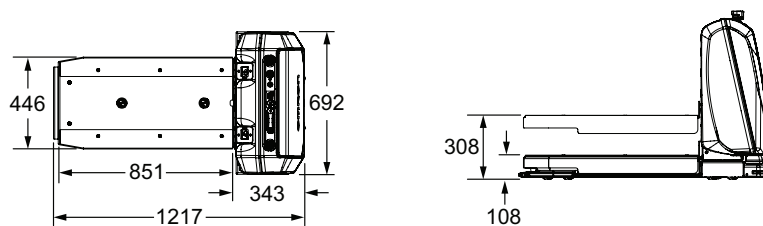
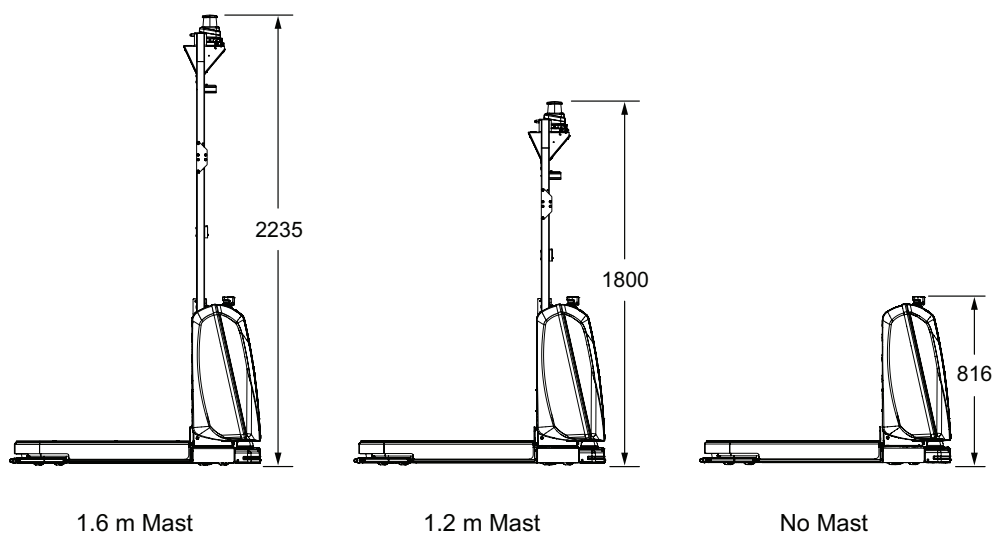
### Dimensions

(Unit: mm)

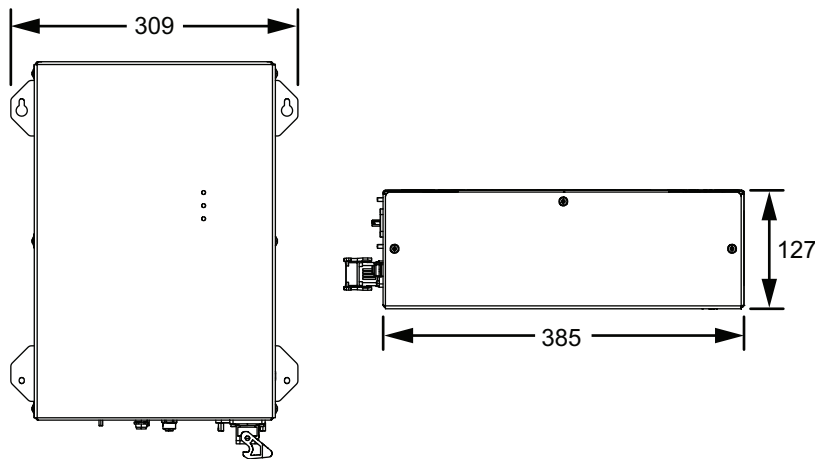
#### OL-450S2



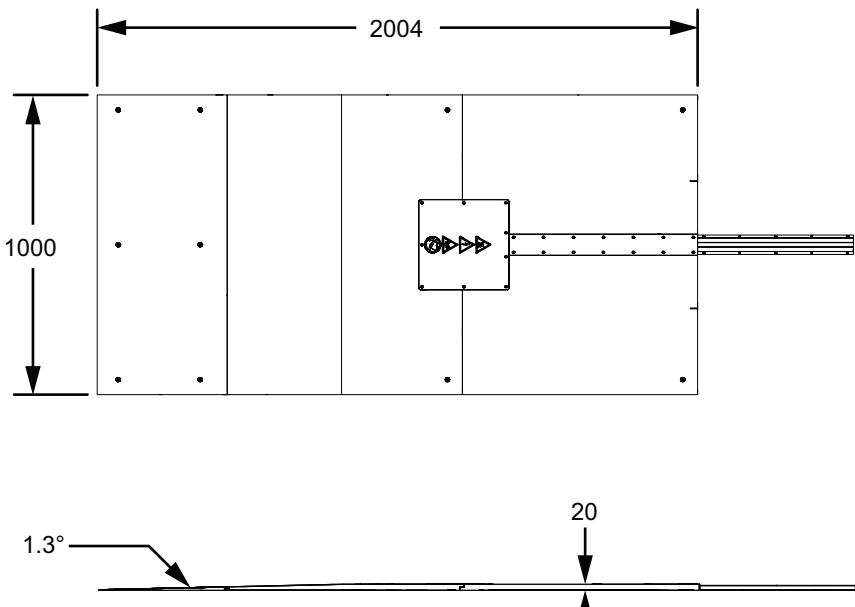
#### OL-450S3



Stationary Electronics Dimensions



Charging Ramp Dimensions



## OL-450S Series

### Related Manuals

| Catalog Number | Manual Title                                                                                       |
|----------------|----------------------------------------------------------------------------------------------------|
| I614           | Mobile Robot Software Suite User's Guide                                                           |
| I617           | Advanced Robotics Command Language AMR Reference Guide                                             |
| I618           | Advanced Robotics Control Language Fleet Manager AMR Integration Guide                             |
| I635           | Fleet Operations Workspace Core User's Manual                                                      |
| I636           | Fleet Operations Workspace (FLOW) Migration Guide                                                  |
| I637           | Fleet Operation Workspace Core Integration Toolkit User's Manual                                   |
| I665           | Fleet Operations Workspace iQ User's Manual                                                        |
| I677           | Mobile I/O Box User's Manual                                                                       |
| I695           | Virtual Fleet Manager Installation Guide                                                           |
| M109           | AMR (Autonomous Mobile Robot) OL-series User's Manual                                              |
| M110           | AMR (Autonomous Mobile Robot) OL-series Safety, Unpacking, and Assembly Guide                      |
| M111           | AMR (Autonomous Mobile Robot) OL-series Charging Station Safety, Unpacking, and Installation Guide |
| M112           | AMR (Autonomous Mobile Robot) OL-series Battery Safety, Unpacking, and Installation Guide          |

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## **Change in Specifications.**

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

## **Errors and Omissions.**

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**Note: Do not use this document to operate the Unit.**

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**25345-520C**