

Mobile Robots LD Series



Autonomous Intelligent Vehicles (AIVs), self-mapping, self-navigation.

- Natural-feature navigation
Automatically plans routes to prevent collisions
- Fleet management
Supervises and coordinates the entire fleet of up to 100 vehicles
- Easy deployment
Short installation time: no facilities modifications





Ordering Information

Mobile Robots-LD Platform





| Appearance | Product Type | Product Name | Maximum Load | Maximum Speed | Configuration & Attachment | | Model |
|---|------------------|--------------|--------------|---------------|----------------------------|--|-------------|
|  | OEM | LD-60 | 60 kg | 1.8 m/s | Bundle | Battery, Docking Station, Battery Power Cable | 37030-00003 |
| | | | | | Starter kit | Battery, Docking Station, Battery Power Cable, Top Plate, Joystick, MobilePlanner Software Licence | 37030-10005 |
| | | LD-90 | 90 kg | 1.35 m/s | Bundle | Battery, Docking Station, Battery Power Cable | 37040-00003 |
| | | | | | Starter kit | Battery, Docking Station, Battery Power Cable, Top Plate, Joystick, MobilePlanner Software Licence | 37040-10005 |
|  | Cart Transporter | LD-105CT | 105 kg | 1.35 m/s | Bundle | Battery, Docking Station, Battery Power Cable | 37140-00013 |
| | | | | | Starter kit | Battery, Docking Station, Battery Power Cable, Acuity Localization, Joystick, MobilePlanner Software Licence | 37140-01015 |
| | | LD-130CT | 130 kg | 0.9 m/s | Bundle | Battery, Docking Station, Battery Power Cable | 37160-00013 |
| | | | | | Starter kit | Battery, Docking Station, Battery Power Cable, Acuity Localization, Joystick, MobilePlanner Software Licence | 37160-01015 |

Software/Controller





| Appearance | Product Name | Configuration & Attachment | Model |
|---|-------------------------|-------------------------------------|-----------|
|  | MobilePlanner | Installer (USB) * License dongle | 13495-200 |
|  | Enterprise Manager 1100 | License dongle | 11167-100 |

* .The latest version of MobilePlanner can be downloaded from Omron Adept Technologies Inc. website.
<http://www.adept.com/Robots-Mobile>

Options

| Appearance | Product Name | Specification | Configuration & Attachment | Model |
|---|----------------------------------|---------------|---|-----------|
|  | High Accuracy Positioning System | Single sensor | Sensor × 1, Mounting bracket × 1, Power connector × 1, RS-232 connector × 1, 25 mm wide magnetic tape South top side. 50 m roll | 13660-100 |
| | | Double sensor | Sensor × 2, Mounting bracket × 2, Power connector × 1, RS-232 connector × 2, 25 mm wide magnetic tape South top side. 50 m roll | 13660-000 |
| | | Magnetic tape | 25 mm wide magnetic tape South top side. 50 m roll | 14925-000 |
|  | Acuity Localization | - | Camera, Mounting Kit, Cables, Leveling kit | 13700-100 |
|  | Touchscreen | - | Touchscreen with bracket, Power supply with bracket, Power Cable, from core to power supply (33 cm in length), Power Cable, from power supply to touchscreen (183 cm in length), Ethernet Cable, between touchscreen and core (153 cm in length), Gasket, between touchscreen and AIV mounting surface, Software package, including touchscreen support | 13605-000 |
| - | Side Laser | Bundle | Laser × 2, Cable × 1 (Y Cable for 2 Laser) | 13456-000 |
| | | Kit | Laser × 2, Cable × 1 (Y Cable for 2 Laser), Mounting kit × 2, Metal Cover × 2 | 13456-100 |
|  | Call/Door Box | WiFi Wired | Call/Door Box, Cable | 13029-802 |

Accessories

| Appearance | Product Name | Specification | Configuration & Attachment | Model |
|---|-----------------|---------------------------|--|-----------|
|  | Battery | - | - | 12072-000 |
|  | Docking Station | - | Docking Station, AC Power Cable | 12477-000 |
| | | Extended Wall mount | Docking Station, AC Power Cable, Extended Wall mount (for Cart Transporter) | 12477-050 |
|  | Joystick | - | - | 13558-000 |
| - | Breakout Cable | - | DB44HD Breakout Cable (D-SUB44 pin Cable for Digital I/O interface) | 14165-000 |
| - | Top Plate | Top cover for OEM type | - | 12944-000 |
|  | Cart | - | - | 75020-000 |

LD Series

Specifications

Mobile Robots-LD Platform General Specifications

| Item | OEM | | Cart Transporter | | Note |
|-----------------------|-----------------------------|--|------------------------------|--|---|
| | 37030-□□□□□ | 37040-□□□□□ | 37140-□□□□□ | 37160-□□□□□ | |
| Dimension (L × W × H) | 697 × 499 × 380 mm | | 686 × 1143 × 1392 mm * | | *. Height includes WiFi antenna. |
| Weight (with Battery) | 60 kg | | 79 kg (Vehicle)/22 kg (Cart) | | |
| Environment | Ambient temperature | 5 to 40 °C | | | |
| | Ambient humidity | 5 to 90 %RH (non-condensing) | | | |
| | Operating Environment | Indoor usage only, No excessive dust, no corrosive gas | | | direct sunlight may cause safety laser false positive |
| | IP rating | IP20 | | | |
| Cleanroom rating | Fed Class 100, ISO Class5 * | None | | *. For further Class, contact your Omron sales representative. | |

AIV (Autonomous Intelligent Vehicle) Specifications

| Item | OEM | | Cart Transporter | | Note | |
|------------------|---------------------------------|---|------------------|-------------------------------|--|--|
| | 37030-□□□□□ | 37040-□□□□□ | 37140-□□□□□ | 37160-□□□□□ | | |
| Floor Conditions | Floor Requirements | Level surface, Hard concrete or linoleum, (no water, no oil, no dirt) | | | | |
| | Minimum floor flatness | F _F 25 (* ACI 117 standard) | | | *. ACI 117 is the American Concrete Institute's standard for concrete floors. FF is flatness, FL is the level. Higher FF numbers represent flatter floors. FF25 is a fairly lenient specification. | |
| | Traversable step | 15 mm max. *1 | 10 mm max. *1 | 5 mm max. *2 | 5 mm max. *2 | *1. A speed of 250-300 mm/s and 250 mm/s, for the LD-60 and LD-90, is required for these steps. Faster or frequent driving over such steps or gaps will shorten the lifespan of the drivetrain components. Lower speeds may not traverse the step. Steps should have smooth, rounded profiles. |
| | Traversable gap | 15 mm max. | 15 mm max. | 5 mm max. *2 | 5 mm max. *2 | *2. The Cart transporter with a cart is capable of driving over a gap or step of 5mm at a speed of 250 mm/s, but this should not be regarded as normal use. Regular driving over such gaps or steps will shorten the lifespan of the drivetrain components. |
| | Climb grade | below 1 : 12 (60 kg max.) | | flat floor only | | |
| Navigation | Routing | Autonomous routing by localizing with Safety Scanning Laser based on environment mapping. | | | | |
| | Environmental map making method | Scanning with SLAM (Simultaneous Localization and Mapping) | | | | |
| Payload | Maximum Weight | 60 kg | 90 kg | 105 kg | 130 kg | |
| Mobility | Maximum speed | 1800 mm/s | 1350 mm/s | 1350 mm/s | 900 mm/s | |
| | Maximum rotation speed | 300°/s | 225°/s | 180°/s | | |
| | Stop position accuracy | ± 100 mm: Position * , ± 2°:Rotation | | | *. ±10 mm: Position, ±0.5°: Rotation with option. (High Accuracy Positioning System) | |
| Drive wheel | Materials | 2, Non-marking Nylon foam-filled rubber, non-conductive | | | | |
| | Size | 200 dia. × 50mm nominal | | | | |
| Passive Caster | Materials | 4, Conductive thermoplastic rubber on Polyolefin | | | | |
| | Size | 75 dia. × 41 mm nominal | | | | |
| Power | Battery | 22-29 VDC LiFePO4 | | | | |
| | Capacity | 60 Ah Battery cell nominal capacity | | | | |
| | Run time | 13 hours (continuous) approx. | | 12 hours (continuous) approx. | | with no payload condition |
| | Recharge Time | 3.5 hours (5:1 ratio) approx. | | | | |
| | Battery Life cycles | 2000 recharge cycles (Battery cell nominal) 16 hr/day, 5 days/wk | | | | |
| | Charging method | Automatic / Manual | | | | |
| | Auxiliary Power | 5 VDC±5 %, 1 A 12 VDC±5 %, 1 A 20 VDC±5 %, 1 A 22-30 VDC, 4A 22-30 VDC, 10A | | | 10 A switched and 10 A safe, Switched share the 10 A of current. | |
| Standard | Safety Standard | EN1525 / JIS D6802 / ANSI B56.5 | | | | |
| | Wireless | IEEE 802.11 a/b/g/n/ac | | | | |

| Item | OEM | | Cart Transporter | | Note |
|--------------------|-----------------------|--|------------------|---|---|
| | 37030-□□□□□ | 37040-□□□□□ | 37140-□□□□□ | 37160-□□□□□ | |
| Safety Features | Safety Scanning Laser | 1 at front (199 mm above floor) | | | 250°, 15 m range , Class 1, eye-safe PLd Safety per ISO13849 |
| | Emergency Stop | 1 at Operator panel | | 1 at HMI post touchscreen, 1 at Operator panel | |
| | Rear sonar | 2 at rear, 2 m range | | | Each pairs is one emitter and one receiver, working together |
| | Front Bumper | 1 at front of platform, 2pairs of sensors | | | |
| | Low Front Laser | 1 at front of platform (63.5 mm above floor) | | | 270°, 4 m range, Class 1, eye-safe |
| | Side Laser | Option * | | 2 on horizontal tubes of HMI post 270° 4m range, Class 1 , eye-safe | *. 2 on sides of payload structure, user-mounted |
| | Flash light | Light Disc in each side | | Light Disc in each side, Beacon on HMI post | |
| | Speaker | 3.5", 80 W max. | | | Speech synthesis embedded |
| Operator Interface | Screen / Touch panel | 3.5 in. TFT 320 × 240 pixels, 256 K color screen | | 7.0 in. TFT LCD touch panel , 18/24 bit RGB | |
| | Button | ON Button: Green, OFF Button: Red, Brake-release button: Orange, Keypress (Disabled OFF Button) | | ON Button: Green, OFF Button: Red, Brake-release button: Orange, Keypress (Disabled OFF Button), Latch Button, Unlatch Button | |
| User I/F | Wireless | IEEE 802.11 a/b/g/n/ac | | | |
| | Ethernet port | 1 × User LAN , 1 × Maintenance LAN, Auto-MDIX | | | |
| | Serial | RS-232 × 2, CAN Bus B × 1 | | | |
| | Digital I/O | 16 inputs, 16 outputs | | | |
| | Analog I/O | 8 inputs (0 to 30 V), 4 outputs (0-20 V) | | | |
| | Audio | Digital Audio Out, Audio In / Audio Out | | | |
| Cart Latching | Latching method | Not available | | Automatic | |

LD Series

MobilePlanner

| | |
|-----------------------------|--|
| Model | 13495-200 |
| Operating system | Windows 7 (32-bit/64 bit version) / Windows 8 (32-bit/64-bit version) / 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. |
| Display | XGA 1024 × 768, 16 million colors |
| Communications ports | USB port (for license key) |
| Supported languages | Japanese, English |

Enterprise Manager 1100

| | |
|---------------------------------|---|
| Model | 11167-100 |
| Dimensions- W × D × H | 426.0 × 438.4 × 42.4 mm |
| Weight | 6.8 kg |
| Mounting method | 1U rack mount in a standard 19-inch equipment rack |
| Power Supply | 100-240 VAC * |
| Power Consumption | 200W max. |
| Operating Temperature | 10 to 35 °C |
| Storage Temperature | -25 to 60 °C |
| Operating Humidity | 8 to 90 %RH, non-condensing |
| Storage Humidity | 5 to 95 %, non-condensing |
| Chassis protection class | IP20 (NEMA Type 1) |
| CPU | Intel® Xeon® CPU |
| Main Memory | 4 GB DDR3 |
| Storage | 32 GB SSD |
| Communication port | 10/100/1000 Ethernet × 4, USB × 4, VGA |

*. typical 100 W

High Accuracy Positioning System

| | | |
|------------------------------------|-----------------------------|---|
| Model | 13660-□00 | |
| Sensor | Depth | 30 mm |
| | Width | 160 mm |
| | Rating | IP64 |
| | Environment | -40 to 85 °C |
| | LEDs | Power, Tape present, Left marker, Right marker |
| 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 | 15 - 30 mm |
| Connections | Front sensor | RS232-1 (/dev/ttyUSB9) on the core |
| | Rear sensor | RS232-2 (/dev/ttyUSB10) on the core |
| | Power, both sensors | Aux Power, using the included splitter cable |

Acuity Localization

| | |
|--------------------------|--|
| Model | 13700-□00 |
| Field of View | 140° |
| Power Input | 12 VDC (±10%) supplied from platform, through power connector |
| Power Consumption | 3.3 W maximum |

Touchscreen

| | |
|--------------------------|--|
| Model | 13605-000 |
| Touch Panel | PCAP touch sensor, 5 simultaneous touches, black bordered cover lens |
| TFT Display | TFT LCD panel, 18/24 bit RGB parallel interface. 7.0 in. WVGA - Wide Viewing Angles, 5-Touch |
| Backlight | Constant current LED supply |
| Power Input | 5 VDC supplied through power connector |
| Power Consumption | 6.5 W maximum |

Joystick

| | |
|------------------|-----------|
| Model | 13558-000 |
| Weight | 550 g |
| IP rating | IP56 |

Call/Door Box

| | |
|------------------------------|--|
| Model | 13029-802 |
| Dimensions- W × D × H | 141.4 × 74.7 × 30 mm |
| Weight | 190 g |
| Mounting method | Mount to the provided wall frame with four screws |
| Power Supply | 12 VDC |
| Power Consumption | 0.5 A, 6 W typical |
| WiFi | 802.11 a/b/g/n/ac |
| Communication port | Ethernet |
| I/O | Input × 2, Output × 2 (30 VDC, 2 A max) |

Battery

| | |
|----------------------|---|
| Model | 12072-000 |
| Run-time | 13 hours., no payload |
| Weight | 17 kg |
| Voltage | 22-30 VDC |
| Capacity | 60 Ah (Battery cell nominal) |
| Recharge time | 3.5 hours, approx. |
| Life time | 2000 times 80% DOD (Battery cell nominal), 16 hrs/day, 5 days/wk 4 years, approx., 19/7 (full-time) |

Docking Station

| | |
|------------------------------|--|
| Model | 12477-0□0 |
| Current | 8 A ** |
| Contacts | 2 |
| Power | 100 to 240 VAC, 50 to 60 Hz |
| Power consumption | 800 W |
| Humidity | 5 to 95 % non-condensing |
| Temperature | 5 to 40 °C |
| Dimensions- W × D × H | 349 × 369 × 315 mm (495 × 495.5 × 317 mm) *2 |
| Weight | 8.2 kg |
| Mounting | Wall bracket, directly to floor, or on floor with floor plate |
| Indicators | Power on - blue Charging - yellow |
| Connector | For out-of-platform battery charging |

*1. Thermal fuse in AC power switch (10 A Time-lag fuse at switch for legacy dock)

*2. () for with Floor plate

Cart

| | |
|------------------------------|--------------------------------|
| Model | 75020-000 |
| Dimension (L × W × H) | 592 × 846 × 480 mm |
| Weight | 23 kg |
| Rating | ESP rated |
| Passive Casters | 2 front, 2 rear, spring-loaded |
| Caster diameter | 100 mm nominal |
| Caster Brakes | at 2 rear casters |

Components and Functions

OEM

Operator Panel

Power ON/OFF, Emergency Stop, Brake Button with 3.5 inch color monitor

WiFi
IEEE 802.11 a/b/g/n/ac

Top Plate (Option)

Upper plate come with Starter Kit. It is not necessary for building customer payload.

Rear Sonar

Obstacle sensor to detect rear side based on Sonar.

Safety Scanning Laser

Safety rated Laser using for SLAM (Simultaneous localization and mapping). It is also used for safety functionality.

Light Discs

Status indicator. Located both side

Front Bumper

Stop when it hits obstacle

Low Front Laser

Obstacle sensor to detect low profile object in the forward direction.



Cart Transporter

Operator Panel

- 7" Color touchscreen. (Status, Goal input)
- WiFi antenna×2
- Emergency Stop
- Power ON/OFF
- Brake Button
- Latch/Unlatch buttons for Cart
- Beacon
- Acuity Localization (Option)

Rear-facing Laser

Obstacle laser scanner to detect rear side.

Side Laser

Obstacle laser scanner to detect vertically

Cart

Automatically latch/unlatched cart with manual break. Latching/Unlatching can be controlled by Software.



OEM
OEM with Cart Latching plate

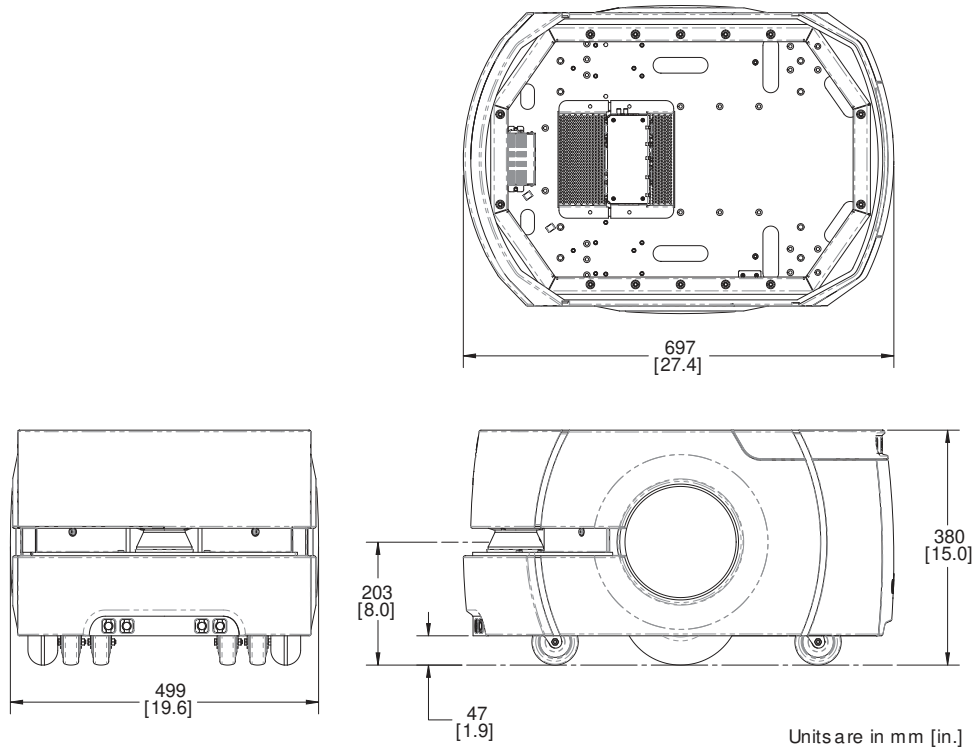
LD Series

Dimensions

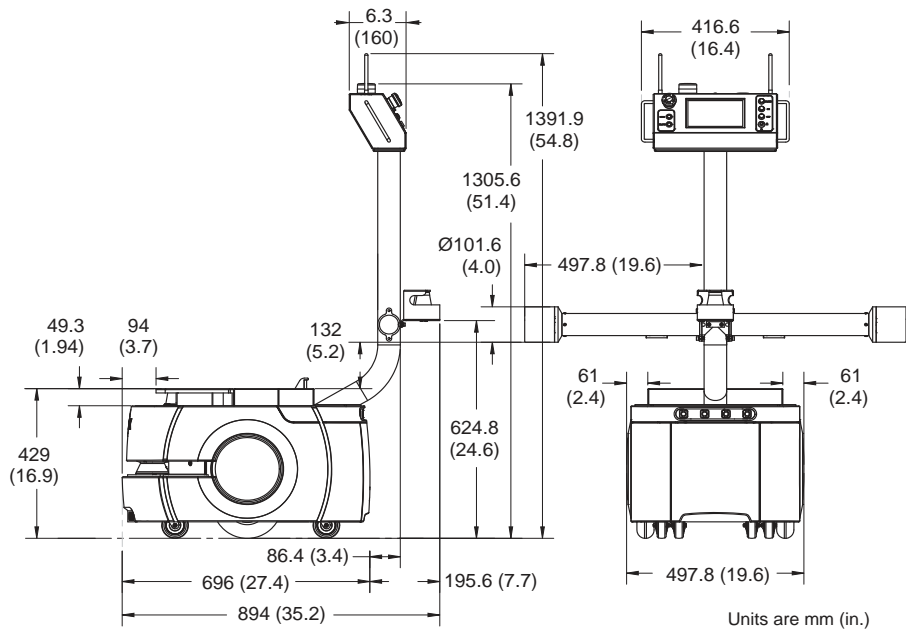
CAD data can be downloaded from Omron Adept Technologies Inc. website.
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Mobile Robots-LD Platform

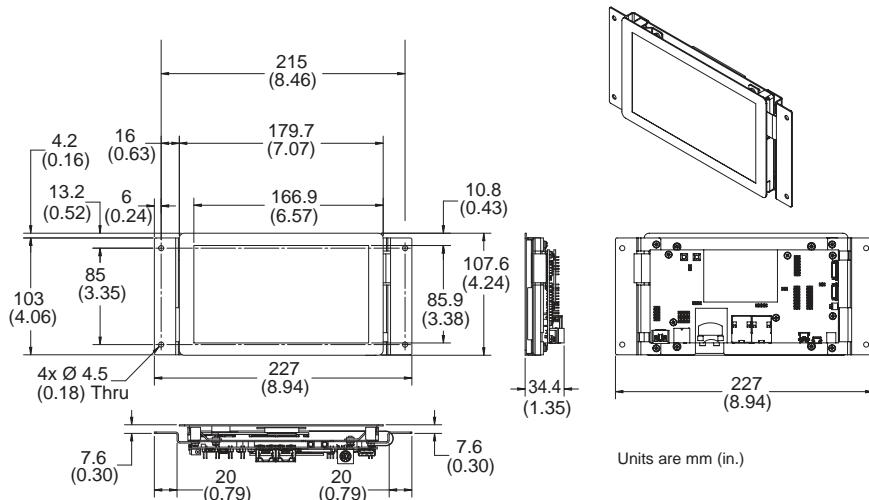
OEM



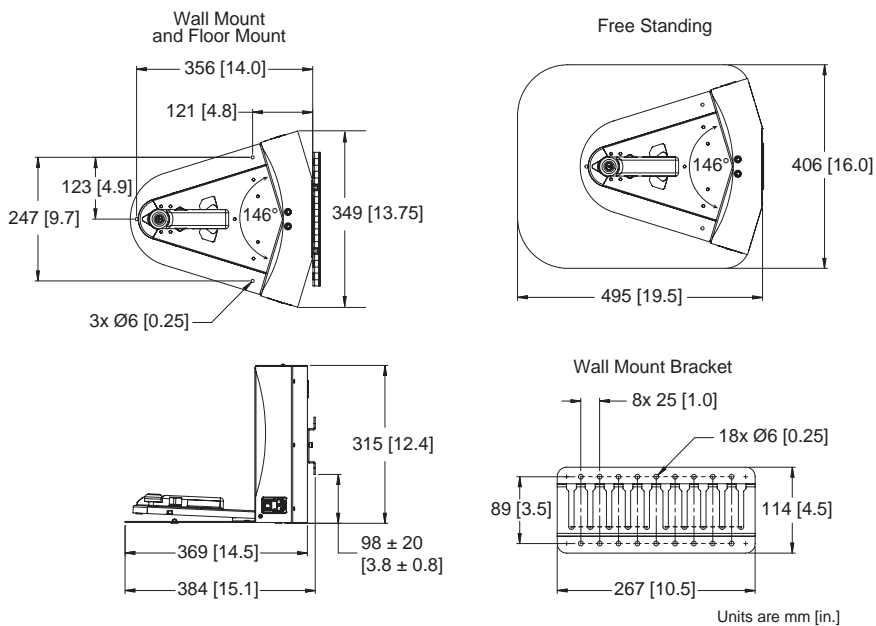
Cart Transporter



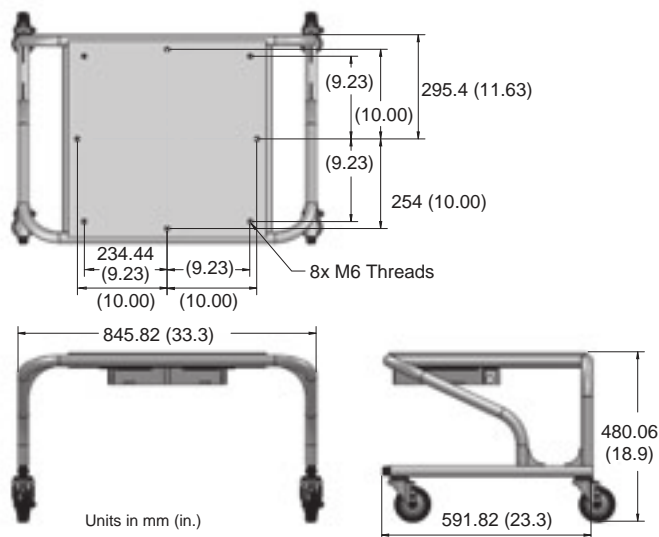
Touchscreen



Docking Station



Cart



LD Series

Related Manuals

| Manual No. | English title |
|------------|---|
| I611 | Mobile Robots LD Platform User's Guide |
| I612 | Mobile Robots LD Cart Transporter User's Guide |
| I613 | Mobile Robots LD Platform Peripherals Guide |
| I614 | Mobile Robots Software Suite User's Guide |
| I615 | Enterprise Manager 1100 User's Guide |
| I616 | Mobile Robot Safety Guide |
| I617 | Advanced Robotics Command Language Reference Guide |
| I618 | Advanced Robotics Command Language Enterprise Manager Integration Guide |

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