

1. MiR1350 specifications

Date: 2023-06-28

The product specifications in English are the most recently updated on the Support Portal.

See the latest updates [here](#).

General information

Designated use	For internal transportation of goods and automation of internal logistics
Type	Autonomous Mobile Robot (AMR)
Color	RAL 9005 / Jet Black
Product design life	5 years or 20 000 hours, whichever comes first
Disclaimer	Specifications may vary based on local conditions and application setup

Dimensions

Length	1 350 mm 53.1 in
Width	910 mm 35.8 in
Height	322 mm 12.7 in
Weight	247 kg 544.5 lbs
Ground clearance	25–27 mm 1.0–1.1 in
Load surface	1 304 x 864 mm 51.3 x 34 in
Wheel diameter (drive wheel)	200 mm 7.9 in
Wheel diameter (caster wheel)	100 mm 3.9 in


Payload

Maximum payload	1 350 kg 2 976 lbs
Footprint of payload	Equal to robot footprint. Contact MiR if a bigger payload footprint is required.
Payload placement	Place center of mass according to directions in the user guide.
Maximum lifting capacity with a MiR EU-/US-lift installed	1 250 kg 2 755 lbs

Speed and performance

Maximum speed (with maximum payload on a flat surface)	1.2 m/s (4.3 km/h) 3.9 ft/s (2.7 mph)
Maximum acceleration	No payload: 0.43 m/s ² 1.41 ft/s ² Maximum payload: 0.40 m/s ² 1.31 ft/s ²
Acceleration limits with maximum payload	0.40 m/s ² 1,3 ft/s ²
Operational corridor width	With default setup: 2 150 mm 84.6 in With minimized footprint and muted Protective fields: 1 200 mm 47.2 in
Operational corridor width for a 90° turn	With default setup: 2 200 mm 86.6 in With minimized footprint and muted Protective fields: 1 550 mm 61 in
Operational corridor width for a U-turn	2 300 mm 90.6 in With minimized footprint: 1 550 mm 61 in

	With default setup: 4 250 mm 167.3 in
Operational corridor width for two robots passing	With minimized footprint and muted Protective fields: 2 700 mm in 106.3 in
	With default setup: 2 850 mm 112.2 in
Operational width for pivoting	With minimized footprint and muted Protective fields: 1 850 mm 72.8 in

	Docking to L-marker: ± 3 mm 0.12 in on X-axis, ± 3 mm 0.12 in on Y-axis, $\pm 0.25^\circ$ yaw
	Docking to VL-marker: ± 2 mm 0.08 in on X-axis, ± 3 mm 0.12 in on Y-axis, $\pm 0.25^\circ$ yaw
	Docking to V-marker: ± 20 mm 0.79 in on X-axis, ± 20 mm 0.79 in on Y-axis, $\pm 2^\circ$ yaw
	Docking to Bar-marker: ± 10 mm 0.39 in on X-axis, ± 5 mm 0.19 in on Y-axis, $\pm 0.75^\circ$ yaw
Positioning accuracy (in controlled conditions)	<p> The positioning accuracy is tested under the following conditions:</p> <ul style="list-style-type: none">• Using a single robot without payload• On a site that is within the environmental requirements for the robot with good localization and no or few dynamic obstacles• On a flat, clean surface
Traversable gap and step tolerance	<p>Gap: maximum 29 mm 1.14 in at maximum 0.5 m/s 1,64 ft/s², from all angles</p> <p>Step: maximum 10 mm 0.39 in at maximum 0.5 m/s 1,64 ft/s² at maximum 40° angle with no payload, not recommended with maximum payload</p>

Operational doorway width	<p>With default setup: 2 050 mm 80.7 in</p> <p>With improved setup: 1 200 mm 47.2 in</p>
Minimum distance between chargers	1 100 mm 43.3 in
Time used when docking to or undocking from a VL-marker	<p>Docking time: up to 12 s</p> <p>Undocking time: up to 7 s</p> <p>(Offsets used: -0.75 m 29.5 in on X-axis, 0.2 m 7.9 in on Y-axis, 0° yaw)</p>
Time used when docking to or undocking from a V-marker	<p>Docking time: up to 39 s</p> <p>Undocking time: up to 5 s</p> <p>(Offsets used: -0.75 m 29.5 in on X-axis, 0.4 m 15.7 in on Y-axis, 0° yaw)</p>
Minimum distance between VL-markers	<p>Fast docking where the robot docks the moment it detects the marker: 30 mm 1.18 in</p> <p>Slow docking where the robot moves to the entry position before it docks to the marker: 20 mm 0.79 in</p>
Minimum distance between V-markers	<p>Fast docking where the robot docks the moment it detects the marker: 280 mm 11 in</p> <p>Slow docking where the robot moves to the entry position before it docks to the marker: 220 mm 8.7 in</p>
Minimum space around MiR Pallet Rack	<p>Default setup: 70 cm 27.6 in to the sides of the rack, 270 cm 126.3 in in front of the rack</p> <p>With minimized footprint: 30 cm 11.8 in to the sides of the rack, 240 cm 94.5 in front of the rack</p>

Active operation time with maximum payload	6 h 45 m
Active operation time with no payload	9 h 50 min
Standby time (robot is on and idle)	12 h 30 min

Power

Battery type	Lithium-ion
Charging time with MiR Charge 48V	10%–90%: 46 min 72°F at an ambient temperature of 22°C 72°F
Charging time with cable charger	10%–90%: 1 h 10 min
Charging options	MiR Charge 48V, Battery Charger 48V 12A, Cable Charger Lite 48V 3A
Charging current, MiR Charge 48V	Up to 35 A depending on battery temperature and constant voltage ramping down towards end of charge cycle
Number of full charging cycles	Minimum 3 000 cycles ⓘ The minimum number of full charging cycles before the battery capacity drops below 80% .
Battery voltage	47.7 V nominal, minimum 42 V, maximum 54 V
Battery capacity	1.63 kWh (34.2 Ah at 47.7 V)

	With no payload
	15 min charging = 3 h runtime (1:12 charging to runtime ratio)
	30 min charging = 6 h 15 min runtime (1:12.5 charging to runtime ratio)
Charging ratio and runtime for	With maximum payload:
	15 min charging = 2 h 15 min runtime (1:9 charging to runtime ratio)
	30 min charging = 4 h 50 min runtime (1:9.6 charging to runtime ratio)

Environment

Environment	For indoor use only
	5–40°C 41–104°F (the maximum ambient temperature only apply up to 1 h)
Ambient temperature range, operation	<p>ⓘ The following climatic conditions from ISO3691-4 section 4.1.2 apply to the robot:</p> <ul style="list-style-type: none"> • Maximum average ambient temperature for continuous use is 25°C 77°F • Maximum ambient temperature for short term use (up to 1 h) is 40°C 104°F • Lowest average ambient temperature for continuous use in normal indoor conditions is 5°C 41°F • Lowest average ambient temperature for <u>continuous</u> use in cold (1–4 °C 33.8–39.2°F) indoor conditions is 1°C 33.8°F.
Ambient temperature range, storage	0–50°C 32°F–122°F
Humidity	10–95% non-condensing
IP rating	IP 52

Floor conditions	No water, no oil, no dirt
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Maximum altitude	2 000 m 6 561 ft
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Compliance

EMC	EN61000-6-2, EN61000-6-4, (EN12895)
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Safety standards for industrial vehicles	CE, EN1525, ANSI B56.5, ISO3691-4, RIA15.08, 13 safety functions according to ISO 13849-1, certified by TÜV Rheinland
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Safety

Personnel detection safety function	Triggered when obstacles or people are detected too close to the robot
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Emergency stop	Four emergency stop buttons, one in each corner. Emergency stop connector in electrical interface and joystick interface.
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Overspeed avoidance	Prevents the robot from driving faster than the predefined safety limit
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Manual control in robot interface	Token-based system for accessing the manual control. The robot issues only one token at a time.
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Safe guarded stop	Yes
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Safe load position	Triggered if the speed exceeds 0.3 m/s 1 ft/s while the lift/carrier is being lowered or raised
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Communication

Wi-Fi (internal PC)	Internal computer: 2.4 GHz and 5 GHz, 2 external antennas
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Safety I/O connections	6 digital inputs, 6 digital outputs
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Ethernet	M12 plug, 4p. 10/100 Mbit Ethernet with Modbus protocol, adapter for external antenna
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Aux. power for top applications	Yes
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Ethernet switch	MikroTik switch. Connect to the switch through the Rj45 Ethernet port on the front-right corner shield.
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Aux. safety functions	Yes
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General purpose I/O	Yes
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Top module

Power for top modules	Yes
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Sensors

SICK safety laser scanners	2 pcs, microScan3 (front and rear), give 360° visual protection around the robot
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	2 pcs, 3D camera Intel RealSense™ D435
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	FoV height: 1 800 mm 70.9 in
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3D cameras	FoV distance in front of robot: 1 200 mm 47.2 in
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	FoV horizontal angle: 114°
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	FoV minimum distance in front of robot for ground view: 250 mm 9.8 in
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Proximity sensors	8 pcs
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Light conditions	Must comply with the requirements for the Intel RealSense D435 camera
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Lights and audio

Audio	Speaker
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Signal and status lights	Indicator lights on four sides, eight signal lights (two on each corner)
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Maintenance

Maintenance

Maintenance hatches on four sides of the robot

Service intervals

6 months or according to user guide

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Designated use

Designated use	Monitoring MiR robots' operations over time
Performance metrics	Completed missions, distance driven, and uptime
Troubleshooting information	Errors, emergency stops, and battery level over time
Heatmaps	Wi-Fi coverage, high robot occupancy, localization score

Requirements

Site requirements	MiR Fleet and internet connection
MiR Fleet software version	2.13.0.2 software or higher
Installation file size	300 MB
CPU	Dual core processor with minimum 2.1 GHz clock
RAM	Minimum 8 GB
Permanent storage	Minimum 128 GB SSD
Network	Stable, high-speed internet connection
Supported operating systems	Ubuntu 18.04 LTS, Ubuntu Server 18.04 LTS, Debian 9, CentOS 7, Redhat Enterprise Linux 7.4
Virtualization software	Docker CE/EE version 18.09.01 or higher