

# MIR250

## Technical specification



<b>General information</b>	
Designated use	For internal transportation of goods and automation of internal logistics
Type	Autonomous Mobile Robot (AMR)
Color	RAL 7011 / Iron Gray
Color - ESD version	RAL 9005 / Jet Black
Cover material	Polycarbonate, Lexan Resin 221R
Product design life	Five years or 20 000 hours, whichever comes first
Disclaimer	Specifications may vary based on local conditions and application setup
<b>Dimensions</b>	
Length	800 mm   31.5 in
Width	580 mm   22.8 in
Height	300 mm   11.8 in
Ground clearance	25 - 28 mm   1.0 - 1.1 in
Weight (without battery or payload)	83 kg   183 lbs
Load surface	800 x 580 mm   31.5 x 22.8 in
Wheel diameter (drive wheel)	200 mm   7.9 in
Wheel diameter (caster wheel)	125 mm   4.9 in
Dimensions for mounting top modules	Robot footprint. Contact MiR if a bigger top module is required.
Top plate	Anodized aluminum, 5 mm   0.2 in
<b>Payload</b>	
Maximum payload	250 kg   551 lbs
Acceleration limits with payload	0.3 m/s <sup>2</sup>
Footprint of payload	Robot footprint. Contact MiR if a bigger payload footprint is required.
Payload placement	Place center of mass according to directions in the user guide
<b>Speed and performance</b>	
Active operation time with maximum payload	13 hours at 22°C   72°F, from 100 to 0% power in the robot interface and with no top module
Active operation time with no payload	17.4 hours at 22°C   72°F, from 100 to 0% power in the robot interface and with no top module
Traversable gap and sill tolerance	0-20 mm   0.8 in. Above 20 mm   08 in: Instructions must be followed. Above 30 mm   1.2 in: Not recommended, risk of personal injury. Above 50 mm   2 in: Prohibited

Operational doorway width	With default footprint and SICK safety configuration: 1 300 mm   52 in. With default footprint and SICK safety configuration and muted protective fields: 800 mm   32 in. With dynamic footprint and SICK safety configuration: 950 mm   38 in
Minimum size of detectable object (scanner)	20 mm   0.79 in at 1 000 mm   39.4 in distance. 70 mm   2.76 in at 2 500 mm   98.4 in distance
Maximum speed (with maximum payload on a flat surface)	2.0 m/s   4.4 mph
Docking types	Forward and reverse, and sideways docking to L-markers
Operational corridor width for a 90° turn	With default footprint and SICK safety configuration: 1 500 mm   60 in. With default footprint and SICK safety configuration and muted protective fields: 950 mm   37.4 in. With dynamic footprint and SICK safety configuration: 1 250 mm   50 in
Operational corridor width	1 350 mm   53.1 in. With dynamic footprint and SICK safety configuration: 1 000 mm   39.4 in
Operational corridor width for a 180° turn	With dynamic footprint and SICK safety configuration: 1 250 mm   49.2 in
Maximum incline/decline	+/- 5 % at 0.5 m/s
Minimum distance to achieve maximum speed	9.5 m   31.2 ft
Standby time (robot is on and idle)	22 h
<b>Power</b>	
Charging options	MiR Charge 48V, Cable Charger, Cable Charger Lite 48V 3A
Charging time with MiR Charge 48V, 10% to 90%	52 minutes
Battery capacity	1.63 kWh (34.2 Ah at 47.7V)
Battery type	Lithium ion
Battery voltage	47.7 V nominal, min 41 V, max 54 V
Charging an empty battery	Only possible with the cable charger. To dock to MiRCharge 48V, the robot requires at least 3 % battery (or equal to 10 minutes of operating time).
Charging current, MiR Charge 48V	Up to 35 A depending on battery temperature and constant voltage ramping down towards end of charge cycle.
Minimum number of full charging cycles	3 000 cycles
Cable charger	Robot cannot drive with cable charger connected and charging
Charging ratio and runtime for 10 min charging	1:16 (2 hours and 40 minutes runtime with maximum payload)
Charging ratio and runtime for 20 min charging	1:14 (4 hours and 30 minutes runtime with maximum payload)
Charging ratio and runtime for 30 min charging	1:12 (6 hours and 5 minutes run time with maximum payload)
Charging ratio and runtime for 60 min charging	1:10 (10 hours and 20 minutes runtime with maximum payload) Fully charged
Charger communication	The robot communicates with MiRCharge 48V through CAN interface. Charging starts only when the robot connection is present
Battery dimensions	546 mm   21.5 in in length, 204 mm   8 in width, 76 mm   3 in in height
Battery weight	14 kg   30 lbs
Charging time with cable charger	10% to 90%: 1 hour and 10 minutes
<b>Environment</b>	
Ambient temperature (operation)	5°C to 40°C   41°F to 104°F according to ISO3691-4 section 4.1.2
Ambient temperature (storage)	1 month: -10°C to 60°C   14°F to 140°F. 3 months: -20°C to +45°C   14°F to 140°F
Humidity	10-85% non-condensing
Maximum altitude	2 000 m   6 561 ft
Environment	For indoor use only
IP class	IP21
<b>Compliance</b>	
EMC	EN61000-6-2, EN61000-6-4, (EN12895)
Safety standards for industrial vehicles	CE, EN1525, ANSI B56.5, ANSI R15.08
<b>Safety</b>	
Personnel detection safety function	Triggered by a human or other obstacle in the path of travel.
Emergency stop	Triggered by pressing the Emergency stop button.

Overspeed avoidance	Prevents the robot from driving faster than the predefined safety limit
<b>Communication</b>	
I/O connections	4 digital inputs, 4 digital outputs (GPIO), 1 Ethernet port, 1 Auxiliary emergency stop
WiFi (router)	2.4 GHz 802.11 g/n, 5 GHz 802.11 a/n/ac
WiFi (internal PC)	WiFi adapter: 2.4 GHz and 5 GHz, 2 internal antennas
Ethernet	M12 plug, 4p. 10/100 Mbit Ethernet with Modbus protocol, adapter for external antenna
Safety I/O connections	6 digital inputs, 6 digital outputs
<b>Top module</b>	
Power for top modules	48 V (41-54 V, nom 47.7 V), 10 A combined. 24 V/2 A.
<b>Sensors</b>	
SICK safety laser scanners (two pcs.)	nanoScan3 (front and back) 360° visual protection around robot
3D camera (two pcs.)	3D camera Intel RealSense D435. FoV: Detects objects 1 800 mm / 70.9 in high at a distance of 1 200 mm / 47.2 in in front of the robot. 114° total horizontal view. Ground view, minimum distance from robot: 250 mm / 9.8 in
Proximity sensors	8 pcs
<b>Lights and audio</b>	
Audio	Speaker
Status lights	LED light band
Signal lights	8 pcs, 2 on each corner
<b>Maintenance</b>	
Maintenance	Maintenance hatches on four sides of the robot
Service intervals	6 months or according to user guide

<b>General information</b>	
Designated use	For fully-automated pick-up and delivery of carts
Type	Hook for MiR250
Color	RAL 7011 - Iron Gray
Product design life	5 years or 20 000 hours, whichever comes first
Cover material	Aluminum
Disclaimer	Specifications may vary based on local conditions and application setup
<b>Dimensions</b>	
Weight with MiR250 (without battery or payload)	188 kg   414 lbs
Gripping height	80—350 mm   3.1—13.8 in
<b>Payload</b>	
Maximum payload incl. cart	Up to 500 kg   1100 lbs
Minimum cart weight	Cart must be able to deliver a torque of minimum 50 Nm   36.8 ft-lb
<b>Performance</b>	
Operational corridor width	With maximum payload and a 700 mm × 1 150 mm   27.6 in × 45.3 in cart: 2 250 mm   88.6 in
Operational corridor width for a 90° turn	With maximum payload and a 1 280 mm × 800 mm   50.4 in × 31.5 in cart: 2 450 mm   96.5 in
Operational corridor width for a 180° turn	With maximum payload and a 1 280 mm × 800 mm   50.4 in × 31.5 in cart: 2 700 mm   106.3 in
Operational corridor width for two robots passing	With default setup: 3 600 mm   141.7 in. With improved setup: 3 000 mm   118.1 in
Operational doorway width	With default footprint, maximum payload, and a 700 mm × 1 150 mm   27.6 in × 45.3 in cart: 1 700 mm   66.9 in
Active operation time with maximum payload	10 h 15 min
Active operation time with no payload	14 h 7 min
Standby time (robot is on and idle)	90—10%: 16 h 6 min
Time needed for placing and picking up a cart	Placing cart: 18 sec (17—19 sec). Picking up cart: 48 sec (46—51 sec)
Acceleration limits with maximum payload	Recommended 40% of maximum acceleration, approximately 0.4 m/s <sup>2</sup>   1.3 ft/s <sup>2</sup>
Maximum incline/decline	1% with maximum payload and 40% acceleration. 5% with 300 kg   661 lbs, maximum 0.5 m/s   1.6 ft/s
<b>Power</b>	
Charging ratio	1:12 (with maximum payload)
Number of full charging cycles	Minimum 3 000
<b>Environment</b>	
Ambient temperature range, operation	5—40 °C   41—104 °F according to ISO3691-4 section 4.1.2

Ambient temperature range, storage	1 month: -20—60 °C   -4—140 °F. 3 months: -20—+45 °C   -4—113 °F
Environment	For indoor use only
Maximum altitude	2 000 m   6 561 ft
IP Class	IP21
<b>Sensors</b>	
3D Camera	1 Intel RealSense D435
<b>Safety</b>	
Emergency stop	Triggered by pressing the Emergency stop button.
<b>Compliance</b>	
Safety standards for industrial vehicles	CE, EN1525, ANSI B56.5, ANSI R15.08
EMC	EN61000-6-2, EN61000-6-4, (EN12895)
<b>Maintenance</b>	
Maintenance covers	2 inner and 2 outer covers
Service intervals	6 months or according to user guide
Actuator life cycle	Height adjustment actuators: 1 year. Gripping actuators: 2 years