

AMR SOLUTION GUIDE

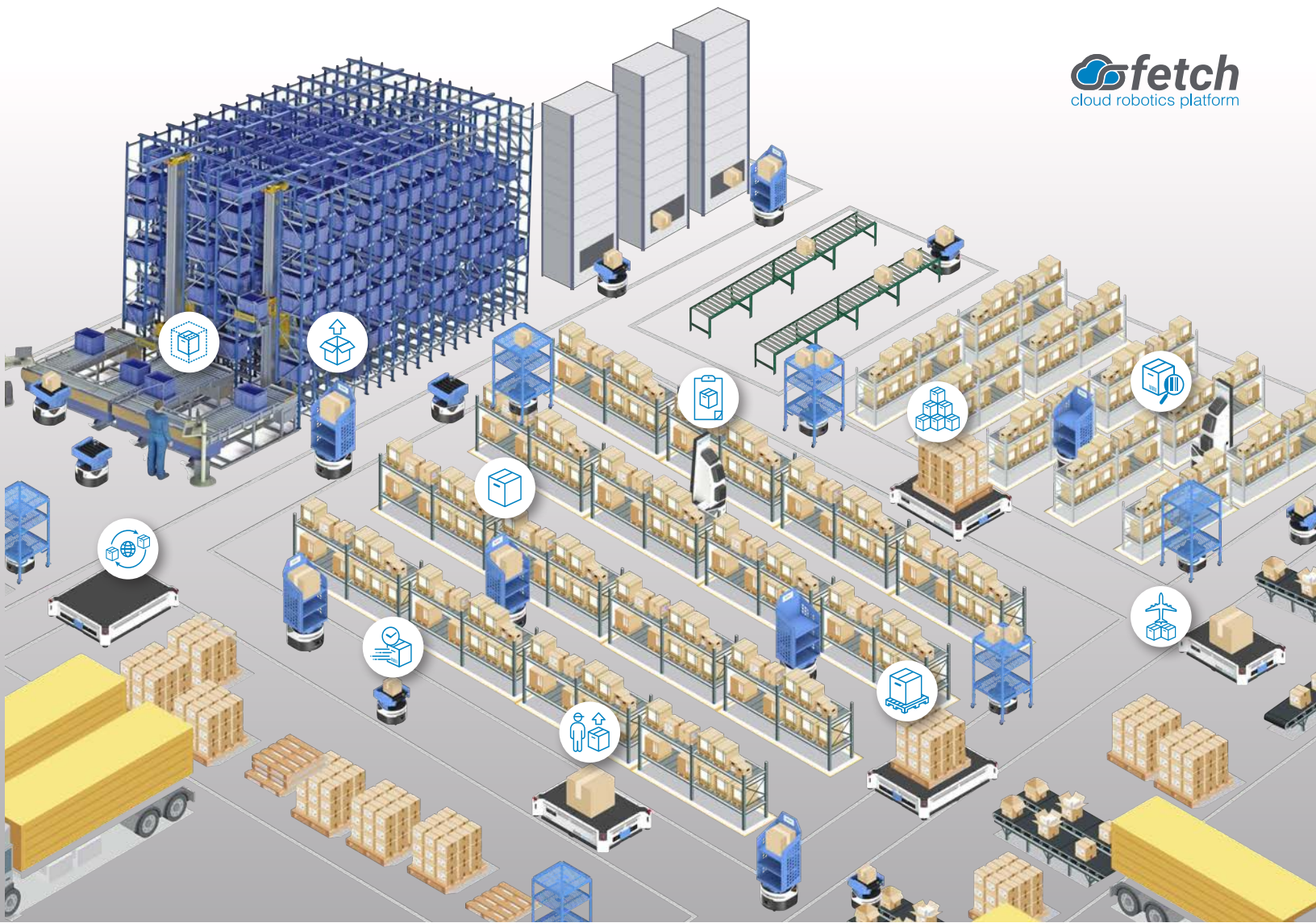
COMPLETE AUTONOMOUS
MOBILE ROBOT (AMR) SYSTEMS
DESIGNED FOR PRODUCTIVITY,
FLEXIBILITY, AND SAFETY
IN DYNAMIC WAREHOUSE
ENVIRONMENTS

 **fetch**
cloud robotics platform



fetchrobotics

500-1102



Deploy automation in hours

The Fetch Cloud Robotics Platform is the only solution that deploys safe, reliable, and versatile Autonomous Mobile Robots (AMRs) in manufacturing, warehouse, and distribution environments within hours. Safely transport mixed payloads up to 1500kgs (3300lbs), enhance existing manual cart based workflows, automate asset tracking with RFID technology, and more. Easily integrate controls and data from other systems and devices to create fully optimized, integrated facilities.



Fetch Robotics AMRs carry a CE mark and meets regulatory requirements for product safety.

RIA R15.08

Fetch Robotics AMRs conform with R15.08 safety standards published by the RIA (Robotics Industry Association)



WARNING: This product uses components which emit invisible laser radiation. Incorrect use or observing the safety laser scanner through optical instruments (such as magnifying glasses, lenses, telescopes) may be hazardous for the eyes.

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About fetchrobotics

Fetch Robotics is an award-winning intralogistics automation company headquartered in Silicon Valley. We provide innovative, on-demand automation solutions for material handling and inventory management by combining mobile robotics with the power of the cloud to find, track, and move almost anything in any facility. Fetch Robotics' solutions and services are deployed in leading distribution, fulfillment, and manufacturing centers around the world, augmenting workforces to drive increased efficiency and productivity.



IEEE Robotics and Automation Award for Product Innovation 2020



Best Overall Robotics Company 2020

FAST COMPANY

World's Most Innovative Companies 2019



Most Successful & Innovative Supply Chain Projects 2019



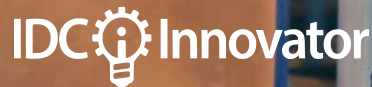
Technology Pioneer 2018



Top 25 Supply Chain Startups 2017



Innovation Award 2016



IDC Innovators for Warehouse Robotics 2016





tagsurveyor

Pinpoint your inventory multiple times per day

hmishelf

Transport packages, totes, & bins up to 78 kg

cartconnect100

Automatically pick up and drop off carts up to 57 kg

pallettransport1500

Move pallets up to 1500 kg throughout the facility

rollertop

Integrate with current conveyor infrastructure

cartconnect500

Transport cases and smaller pallets up to 272 kg



Fetch Cloud Robotics Platform

The Fetch Cloud Robotics Platform integrates a comprehensive suite of software and services with the industry's broadest range of autonomous mobile robots (AMRs) to deliver a powerful combination of on-demand warehouse automation, next generation data collection, and unified controls and data across your entire intralogistics ecosystem.

Fetch Autonomous Mobile Robots (AMRs)

Fetch has the broadest range of AMRs to find, track, and move just about anything. With on-demand automation, Fetch robots can be deployed into almost any facility in just hours, with no additional warehouse or IT infrastructure changes.

FetchCore Enterprise Software and Services

FetchCore Enterprise Software and Services is the foundational platform for deploying and fully integrating a broad range of automated workflows into warehouse operations. FetchCare support is included to provide 24/7 global coverage.

Fetch Solutions for Distribution, Fulfillment, and Manufacturing



Each / Case / Pallet Picking



JIT & Line Replenishment



Receiving & Putaway



ASRS / VLM Induction & Delivery



Staging & Consolidation



Cross-docking & Long Haul



Raw Material & WIP Movements



Returns Disposition



Packaging & Material Recycling



Cycle Counting & Physical Inventory



UNCOMPROMISING SAFETY

The only AMR Solution Provider that conforms to CE and RIA R15.08

After over 4 years of hard work and input from hundreds of industry experts, the Robotics Industry Association (RIA) has published the new American National Standard for safety requirements for industrial mobile robots, R15.08, an important step toward common guidelines in the growing sector of mobile robotics.

To ensure a facility is using the safest equipment, you should choose AMRs that meet all aspects of the new R15.08 safety standard, meaning that all hardware (bases and modular tops) and software comply. While many AMR manufacturers today comply with

the safety standard for the base robot, most have yet to conform the entire system, ensuring modular tops meet the standard as well. Both need to conform to the standard to truly address safety with the facility and allow full collaboration with humans.

At Fetch Robotics, we've worked diligently to ensure our entire commercial AMR product line not only conforms with the new R15.08 standard, but with the all the requirements for CE marking as well, so that you can confidently deploy on-demand automation knowing your workforce and facility will be safe and in compliance with the latest regulations.



Melonee Wise
CEO, Fetch Robotics
RIA Board of Directors
RIA Standards Approval Committee

cartconnect

The Industry's First Rolling Cart Autonomous Mobile Robot Solution

Key Benefits

- True collaborative autonomous mobile robot (AMR) solution that integrates into existing manual cart workflows
- Flexible FetchCart options support a wide range of workflows
- Maximum robot utilization by decoupling robots from carts
- Simple setup and control for associates through handheld devices or automation through fully configured schedules
- Recognized for safety (CE mark)



Warehouse Carts 2.0

The CartConnect AMR system features an advanced mobile robot that can autonomously pickup and drop off FetchCarts to any location within your facility. FetchCarts are available in three sizes - Standard, Tall, as well as a flexible cart Base option that allows you to customize the cart to suit your specific payload.



Specifications	<i>cartconnect</i>	<i>fetchcart base</i>	<i>fetchcart</i>	<i>fetchcart tall*</i>
Weight	74 kg (163 lbs)	20 kg (44 lbs)	34 kg (75 lbs)	38.5 kg (85 lbs)
Height	49.6 cm (19.5 in)	62 cm (24.5 in)	140 cm (55.1 in)	165 cm (65 in)
Base Footprint	52.7 cm (20.7 in) wide, 57.3 cm (22.6 in) diameter	83 cm (32.7 in) width, 83 cm (32.7 in) length	83 cm (32.7 in) width, 83 cm (32.7 in) length	83 cm (32.7 in) width, 83 cm (32.7 in) length
Shelf Width	-	83 cm (32.7 in)	83 cm (32.7 in)	83 cm (32.7 in)
Shelf Depth	-	83 cm (32.7 in)	83 cm (32.7 in)	83 cm (32.7 in)
Max Payload Weight	-	Up to 71 kg (156 lbs)	Up to 57 kg (125 lbs)	Up to 52.5 kg (115 lbs)
Max Speed	1.5 m/s (3.4 mph)	-	-	-
Turning Radius	Turn in place	Turn in place	Turn in place	Turn in place
Continuous Runtime	~9 hrs	-	-	-
Environment	Indoor	Indoor	Indoor	Indoor
Charging	Autonomous Docking	-	-	-
Charge Time	3 hrs to 90%	-	-	-
2D Laser Sensor	25 m (82 ft), 220 degrees (x1)	-	-	-
3D Camera	Yes (x2)	-	-	-

* Requires a risk assessment

Key Workflows



Case Picking



Replenishment /
Putaway



Raw Material
Delivery



ASRS Induction



E-Commerce
Fulfillment



Staging /
Consolidation



PRODUCT SPOTLIGHT:
FETCHCART BASE

Maximize Every Payload with Custom Carts



Move More Material Types

FetchCart Base serves as the starting point for designing your own customized material transport system and applying automation creatively & efficiently throughout your facility. You can accommodate a wide variety of payloads and maximize capacity per your application requirements. FetchCart Base uses the same reliable docking mechanism as our standard FetchCarts, so CartConnect100 AMRs interface seamlessly.

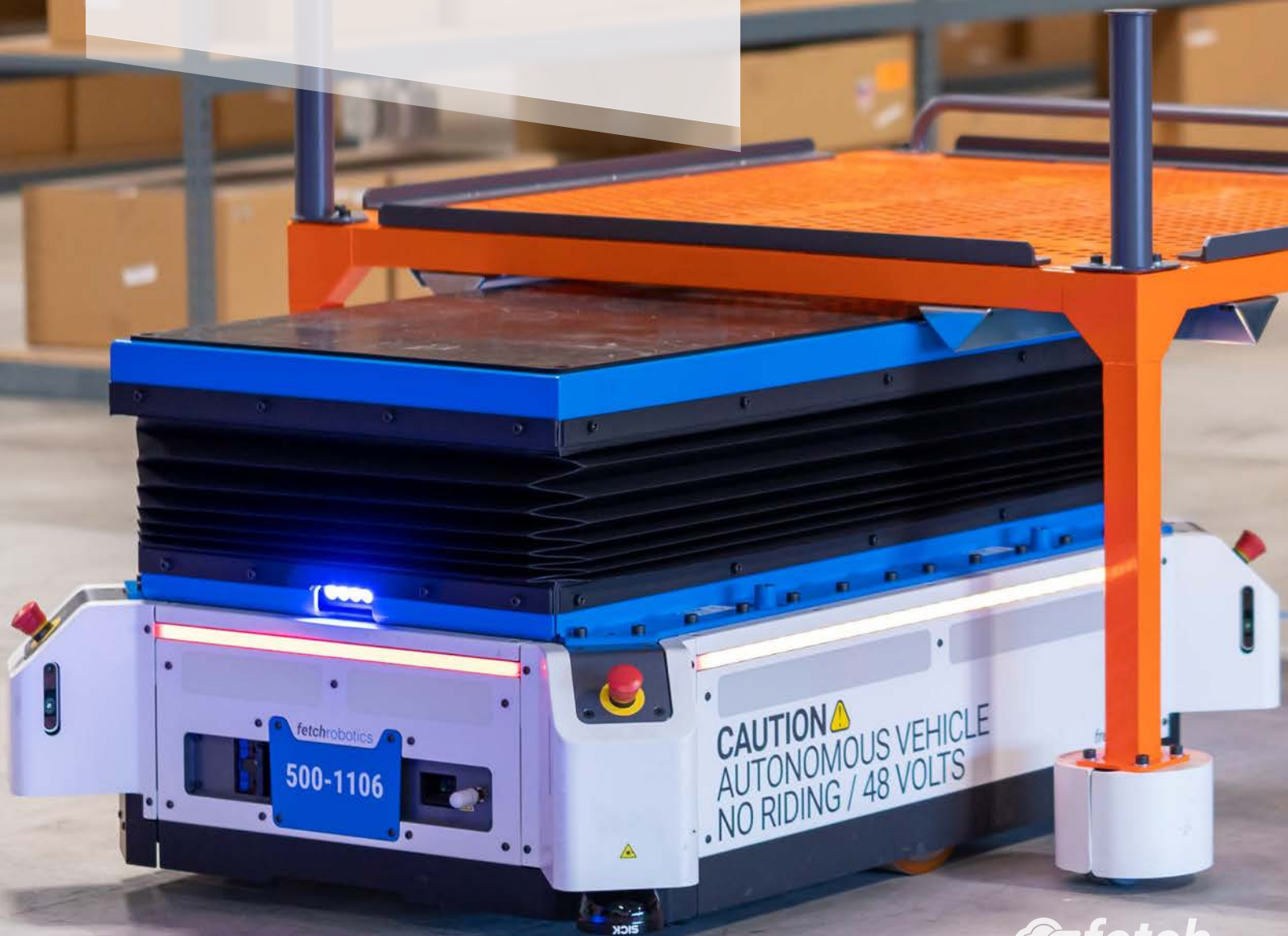
Some unique applications include: detrash and dunnage removal, parts and tools delivery, replenishment of packing materials, gravity feed racks for manufacturing work cells, and many more. Please contact Fetch Robotics for detailed specifications & measurements.

cartconnect500

Autonomous Cart Transport Solution for Large Payloads

Key Benefits

- Safely transport case goods, totes, boxes, and smaller palletized loads up to 600 lbs in dynamic warehouse environments
- Detachable, industrial-grade cart improves pick and putaway efficiency by eliminating manual travel with a pallet jack or forklift
- Case pick-to-cart with Autonomous Mobile Robot (AMR) pickup, delivery, and drop off
- Customize distribution & manufacturing workflows from anywhere with FetchCore™ cloud software
- No additional infrastructure required





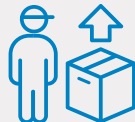
Specifications

	<i>cartconnect500</i>	<i>fetchcart 500</i>
Weight	505 kg (1111 lbs)	91 kg (200 lbs)
Height	67.2 cm (26.46 in) with lift retracted, 818 cm (32.20 in) with lift extended	69.1 cm (27.2 in)
Base Footprint Length	145.2 cm (57.18 in)	151.1 cm (59.49 in)
Base Footprint Width	102.5 cm (40.36 in)	151.4 cm (59.61 in)
Cart Deck Length	-	135.5 cm (53.35 in)
Cart Deck Width	-	135.5 cm (53.35 in)
Maximum Payload Weight	362.9 kg (800 lbs)	272 kg (600 lbs)
Maximum Speed	1.5 m/s (3.4 mph)	-
Minimum Aisle Width	2.6 m (8.5 ft)	3 m (9.8 ft) with robot
Battery	Lithium Iron Magnesium Phosphate	-
Nominal Continuous Runtime	~9 hrs	-
Charging	Autonomous Docking	-
Charge Time	1 hr to 90%	-
2D Laser Sensor	2x SICK, 30 m (98 ft), 275 degrees	-
3D Camera	360 degree coverage (x8 cameras)	-
Audio	100 dB	-

Key Workflows



Case Picking



Replenishment /
Putaway



Raw Material
Delivery




ASRS Induction



E-Commerce
Fulfillment



Staging /
Consolidation



INCREASING MANUFACTURING PRODUCTIVITY WITH AMRs

The Manufacturing Industry is Entering a time of Sea Change

Chronic labor shortages have plagued the Manufacturing Industry for years with no real end in sight. COVID-19 not only exacerbated this problem in the short term by reducing the availability of the existing workforce, but also in the long term as Manufacturers need more resilience and flexibility into their operations by reshoring their manufacturing operations and their corresponding supply chain.

Automation, and specifically autonomous mobile robots (AMRs), can assist in the implementation of lean manufacturing, especially by helping remove the wastes from manufacturing processes. While the introduction of AMRs in isolation can assist with lean manufacturing, the true value comes from introducing AMRs as part of Smart Factory and Industry 4.0 initiatives where sensors, machines, AMRs, and manufacturing systems will be connected and can interact with one another using standard Internet-based protocols. This enables production processes to be optimized and leverage fully integrated AMRs helping to create flow between processes, remove non-value added activities, and do this through pull-based integration with manufacturing systems. As a result, today's insular manufacturing cells will be replaced by fully automated, integrated production lines enabling manufacturers to produce higher quality products at reduced costs.



freight500/1500

Large and Palletized Payload Transport

Key Benefits

- Improves pallet pick and putaway by dramatically reducing manned travel
- Reduces forklift dependency, traffic, and incidents
- Safe, smooth movement with zero blind-spot sensor coverage
- High duty cycles enabled by fast charge capability



Industry Leading Payload Capacities

The Freight500 and Freight1500 autonomous mobile robot (AMR) bases greatly expand the possible AMR applications in industrial facilities. Freight500 handles cases and smaller pallets while the Freight1500 handles up to US standard 40 in x 48 in pallets.

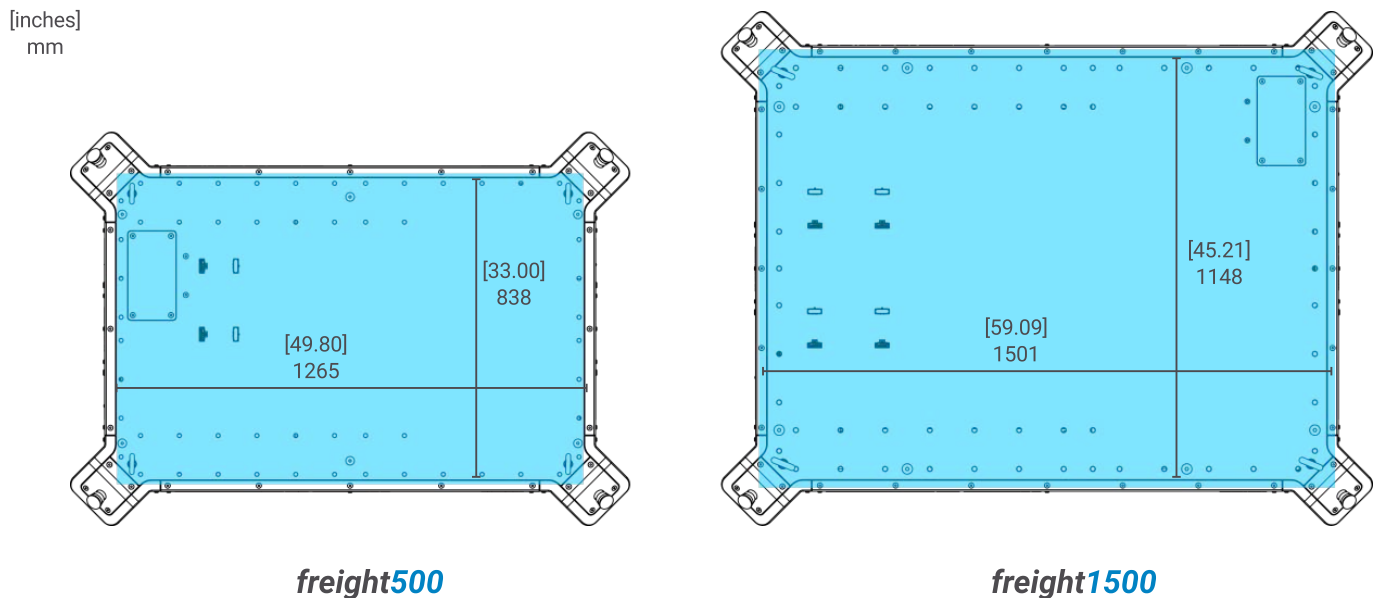
Industry Leading Safety Features

Freight500 and Freight1500 feature Fetch Robotics' industry-leading dynamic obstacle avoidance technology as well as a certified hardware-based safety system that conforms to both CE and RIA R15.08 requirements, allowing these large AMRs to operate safely around associates and vehicles.

Freight500 / 1500 Max Payload Height



Freight500 / 1500 Max Payload Dimensions





Specifications

	<i>freight500</i>	<i>freight1500</i>
Weight	301 kg (663 lbs)	471 kg (1037 lbs)
Height	35.6 cm (14.0 in)	35.6 cm (14.0 in)
Base Footprint	102.5 cm (40.36 in) W, 145.2 cm (57.18 in) L	133.5 cm (52.57 in) W, 168.8 cm (66.47 in) L
Maximum Payload Weight	500 kg (1100 lbs)	1500 kg (3300 lbs)
Maximum Speed	1.5 m/s (3.4 mph)	1.5 m/s (3.4 mph)
Turning Radius	Turn in place	Turn in place
Battery	Lithium Iron Magnesium Phosphate	Lithium Iron Magnesium Phosphate
Nominal Continuous Runtime	~9 hrs	~9 hrs
Charging	Autonomous Docking	Autonomous Docking
Charge Time	1 hr to 90%	1 hr to 90%
2D Laser Sensor	2x SICK, 30 m (98 ft), 275 degrees	2x SICK, 30 m (98 ft), 275 degrees
3D Camera	360 degree coverage (x8 cameras)	360 degree coverage (x8 cameras)
Audio	100 dB	100 dB
Top plate mounting points	38	67
Environment	Indoor	Indoor

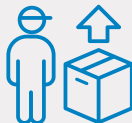
Key Workflows



Case Picking



Pallet
Movements



Putaway



Crossdocking /
Consolidation



Packing &
Pallet Recycling

pallettransport1500

Automate Pallet Movements
Throughout the Facility

Key Benefits

- Safely transport full pallets up to 48"x48" with 2500 lbs capacity in dynamic warehouse environments
- Eliminate manual travel with a pallet jack or forklift and increase safety by automating putaway, replenishment, crossdocking, returns, and more
- Case pick-to-robot with Autonomous Mobile Robot (AMR) pickup, delivery, and drop off using Pallet Transfer Station
- Customize distribution & manufacturing workflows from anywhere with FetchCore™ cloud software





pallettransport1500 Specifications

Weight	798 kg (1759 lbs)	Charging	Autonomous docking
Height with Lift Retracted	672 mm (26.46 in)	Charge Time	1 hr to 90%, plus 3 hrs for remaining 10%
Height with Lift Extended	818 mm (32.20 in)	2D Laser Sensors	2x SICK, 30 m (98 ft), 275 degrees
Width	1335 mm (52.57 in)	3D Depth Cameras	8x cameras, 360 degree coverage
Length	1688 mm (66.47 in)	Robot Visibility	Illuminated LED band
Max Pallet Dimensions	1219 mm x 1219 mm (48 in x 48 in)	Wireless	Integrated 802.11ac & 802.15.1 (Bluetooth 4.0)
Max Payload Weight	1136 kg (2500 lbs)	Audio	100 dB maximum
Max Speed	1.5 m/s (3.35 mph)	Environment	Indoor, ADA compliant
Turning Radius	Turn in place	Min Aisle Width at Max Speed (1.5 m/s)	2890 mm (113.78 in)
Battery	4x Lithium iron magnesium phosphate	Min Aisle Width at Min Speed (0.3 m/s)	2370 mm (93.31 in)
Nominal Continuous Runtime	~9 hrs	Min Aisle Width for a 2-Robot Lane	5780 mm (227.56 in)

Key Workflows

Distribution & Fulfillment



Putaway
Transport pallets from receiving docks to storage



Detrash
Remove gaylords and containers for collected corrugated, dunnage



Replenishment
Transport cases and pallets from storage to forward picking



Crossdocking
Transport pallets directly from inbound to outbound shipments



Case Picking
Build mixed pallets, transport to stretch wrap and shipping



Returns
Sort returned items to pallets and transfer to dispositioning



Kitting & Sequencing
Build kits from raw and send to the production line



Lineside Delivery
Issue raw materials to assembly lines or work cells in bulk

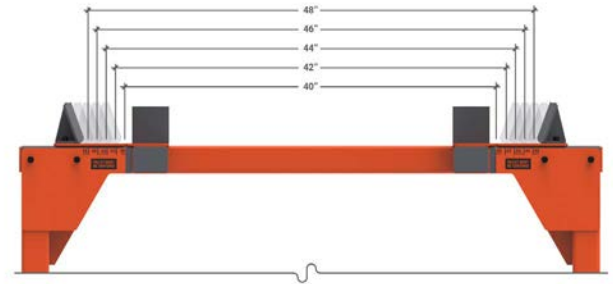


End of Line Handling
Transport finished goods from production to storage or shipping

Manufacturing



PRODUCT SPOTLIGHT:
PALLET TRANSFER STATION



Pallet Transfer Station Specifications

Height	778.01 mm (30.6 in)
Width	1689 mm (66.5 in)
Depth	1498.6 mm (59 in)

Width and Depth Adjustment Range

Width	1016 mm (40 in), 1066.8 mm (42 in), 1117.6 mm (44 in), 1168.4 mm (46 in), 1219.2 mm (48 mm)
Depth	1016 mm (40 in), 1066.8 mm (42 in), 1117.6 mm (44 in), 1168.4 mm (46 in), 1219.2 mm (48 mm)



Minimum Space Requirements

Total Area Width	2938 mm (115.67 in)
Total Area Length	4839 mm (190.51 in)



Spacing for Multiple Stations

Keep Clear Area (Left and Right)	625 mm (24.89 in)
Spacing in Between Stations	1250 mm (49.21 in)

hmishelf

All-In-One Transport & Operator Interface

Key Benefits

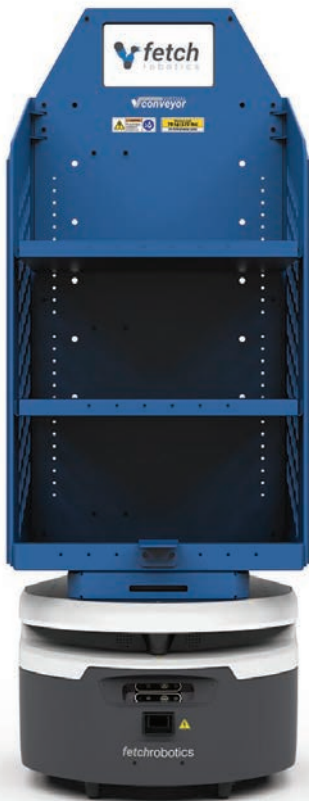
- Quickest deployment solution
 - Set up and use in hours, redeploy easily
 - Ideal for small and medium payloads
 - Configurable shelving for various bin, tote, and package sizes
 - Reduce associate travel time, increase productivity in low dwell time and high volume environments
 - Simple operation with built-in, easily configured touchscreen



Transport for Packages, Totes, and Bins

HMIShelf robots set the standard for commercial ready autonomous mobile robots (AMRs) transporting material in busy warehouse and manufacturing environments. The most advanced collaborative AMRs, like the Fetch HMIShelf robots, have the ability to plan optimal point-to-point travel while

navigating around obstacles. HMIShelf robots have numerous additional enhancements to safely avoid moving obstacles such as forklifts and carts. Integrated touch screens and adjustable shelving make HMIShelf robots an easy and flexible way to offload material transport tasks.



Specifications

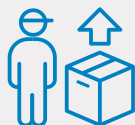
hmishelf

Weight	90 kg (198.5 lbs)
Height	151.6 cm (59.7 in)
Base Footprint	57.3 cm (22.6 in) diameter
Shelf Width	52.2 cm (20.5 in)
Shelf Depth	42.1 cm (16.5 in)
Maximum Payload Weight	78 kg (172 lbs)
Maximum Payload Height	76.3 cm (30.0 in)
Maximum Speed	1.5 m/s (3.4 mph)
Turning Radius	Turn in place
Nominal Continuous Runtime	~9hrs
Environment	Indoor
Charging	Autonomous Docking
Charge Time	3 hrs to 90%
2D Laser Sensor	25 m (82 ft), 220 degrees (x1)
3D Camera	Yes (x2)

Key Workflows



Order Picking



Assembly & QA



ASRS Induction



Rush Orders



Returns Processing

rollertop

Flexible Automation Addition to Fixed Conveyors

Key Benefits

- Automate loading and unloading of totes and bins from conveyors or ASRSs
- Flexibly extend existing conveyor workflows
- Automatically trigger induction or deduction via Fetch Robotics' FetchCore™ software
- Integrate existing conveyor controls with FetchCore using optional IIoT smart gateway

Coexist with Current Conveyor Infrastructure

Conveyor systems have dramatically increased industrial efficiency for many years. However, these fixed assets are hard to adapt to today's ever-changing material transport requirements. Fetch Robotics' RollerTop solution brings adaptability and increased levels of automation in these conveyor environments.

SICK TDC Smart Gateway

The SICK Telematic Data Collector (optional, sold separately) is a networked industrial I/O device that serves as a bridge between the FetchCore and other industrial equipment such as conveyors, doors, and air showers. Automate hand-offs between RollerTop robots and active powered conveyors by connecting a SICK TDC to any conveyor controller.

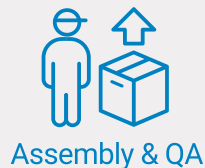
Specifications

rollertop

Weight	85 kg (187 lbs)
Top of Roller Height	45.7 cm (18 in) - 91.4 cm (36 in), adjustable in 0.25 in increments
Maximum Payload Weight by Height	5.3 kg - 80.0 kg (11.68 lb - 176lb) depending on riser setting and CG
Base Footprint	72.5 cm (28.5 in) diameter
Cargo Dimensions	40.6 cm (15.98 in) width, 60.9 cm (23.98 in) depth, 45.0 cm (17.72 in) height
Maximum Speed	1.5 m/s (3.4 mph)
Turning Radius	Turn in place
Nominal Continuous Runtime	~9 hrs
Environment	Indoor
Charging	Autonomous Docking
Charge Time	3 hrs to 90%
2D Laser Sensor	25 m (82 ft), 220 degrees (x1)
3D Camera	Yes (x2)



Key Workflows



tagsurveyor

Mobile RFID Asset Tracker

Key Benefits

- Automated, accurate, frequent, cost-efficient cycle counting and inventory tracking
- No facility downtime during cycle counting or physical inventory
- Powerful data visualization to locate misplaced inventory
- Reporting tools provide actionable insights on discrepant inventory counts
- Perform multiple full counts per day
- Real-time accuracy
- Eliminates human error



Pinpoint Your Inventory Multiple Times Per Day

Lost or misplaced inventory can cost millions of dollars in expedites, re-orders, and write-offs, as well as wasted hours searching for inventory. Manual counts are time consuming and error-prone. Tagging assets with RFID immediately improves inventory tracking, increases accuracy, and saves time.

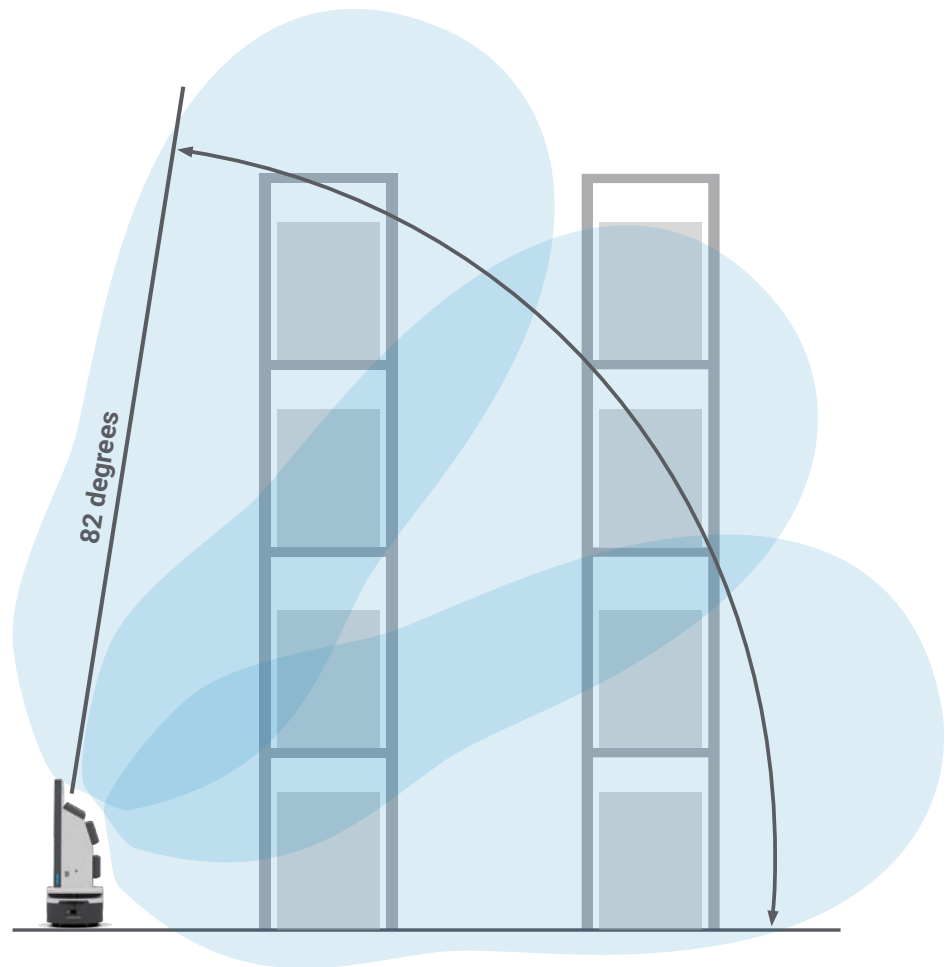
With the TagSurveyor solution, warehouses and manufacturing facilities can increase the frequency of inventory counts from once a month to multiple times a day, even with the largest operations. Facilities across both the private and public sector use TagSurveyor to keep track of assets.

Robot Specifications

Weight	91 kg (200 lbs)
Height	1.3 m (4 ft 5 in)
Footprint	57.3 cm (22.6 in) diameter
Maximum Speed	1.5 m/s (3.4 mph)
Turning Radius	Turn in place
Runtime	~9 hrs
Environment	Indoor
Charging	Autonomous
Charge Time	3 hrs to 90%
2D Laser Sensor	25m (82 ft), 220 degrees (x1)
3D Camera	Yes (x2)

RFID Specifications

Output Power	Up to 4W EIRP (Equivalent Isotropic Radiated Power)
Antennas	Circular Polarized Antennas (x3)
Antennas Gain	4.4 dB (+/- 1 dB)
Carrier Frequency	902.75 - 927.25 MHz
RFID Protocol	EPC UHF Class 1 Gen 2, ISO 18000-C
Read Range	Up to 7.6 m (25 ft)*



*Read range, coverage, and sensitivity will vary based on environment, tag placement, and tag density.

Key Workflows



Cycle Counting




Physical Inventory Check



Find Inventory



Asset Tag Tracking



DISCOVER HOW CLOUD ROBOTICS CAN WORK FOR YOU.

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cloud robotics platform

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