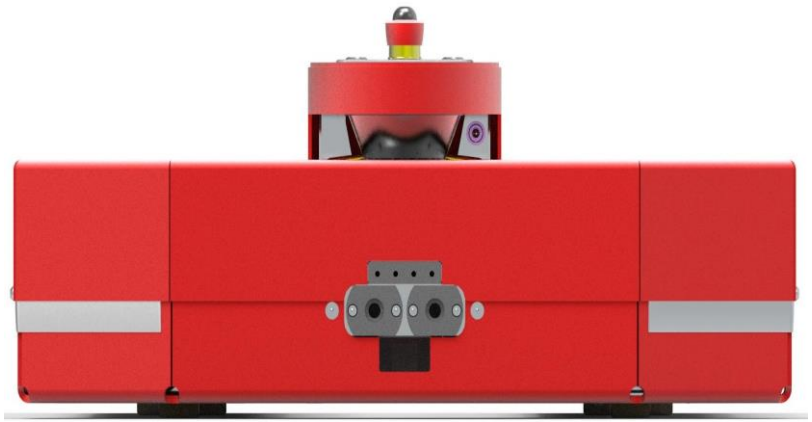
Karter

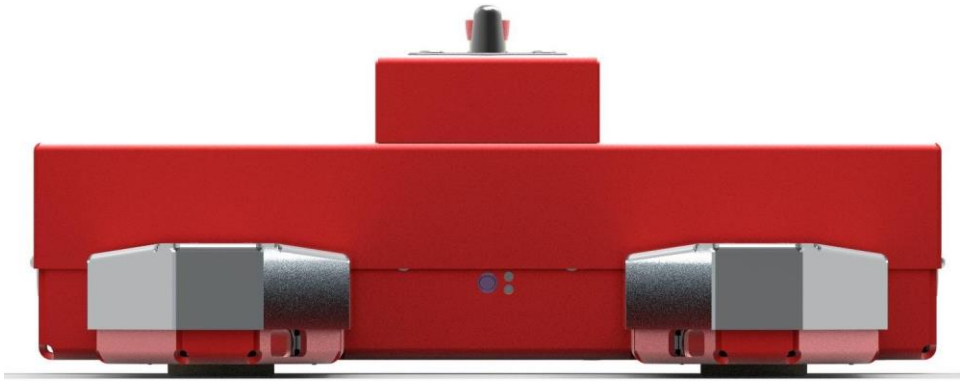
Autonomous Mobile Robot

Content



Karter Company

- Karter was founded 2021
- It is Karters mission is to be the preferred AMR supplier for horizontal transport
- Karter collaborates with BlueBotics for the ANT+ Natural Feature Navigation Technology
- Karters aim is to be flexible in design and meet customer requirements
- Karter has a broad network of partners



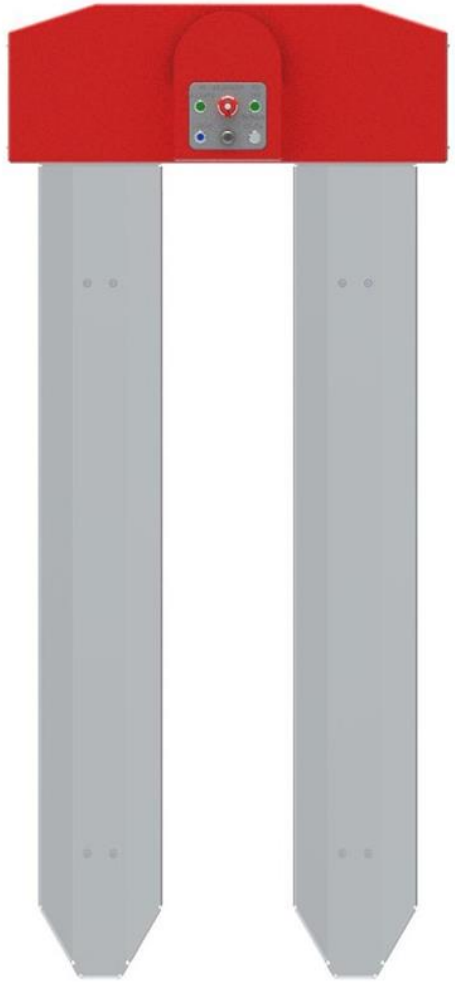
AMR - General

- Autonomous Mobile Robots (AMRs) will transport materials in a safe and reliable way
- Software and technical developments have made it easier to build, maintain and deploy AMRs.

  As a result investment and operational cost have decreased
- Main drivers for deploying AMRs:
  - increased safety
  - cost reduction
  - high availability
  - constant performance

Karter - In control

- Safe operation in manned areas
- Compact and agile
- In complete control of your processes
- Easy to configurate
- Navigation without extra infrastructure
- 10 minutes charging equals 8 hours of operation
- Communication by Wi-Fi



The Karter Approach

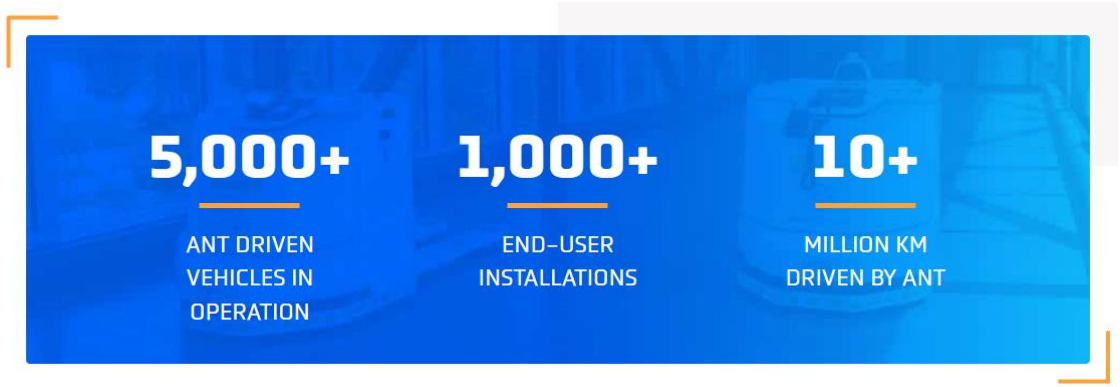
- Think ahead
- Understand your logistical challenge
- Provide a solution – Karter
  - Design
  - Production
  - Installation, integration and training
  - Maintenance
  - Service
- Tailor it to your logistical process

BLUEBOTICS
Your Vehicle Navigation Partner

BlueBotics

- With 23 years of innovation, BlueBotics offers unparalleled expertise and support for your automation needs.

- **Pioneers in Navigation**
- **Proven Performance**
- **Comprehensive Support**

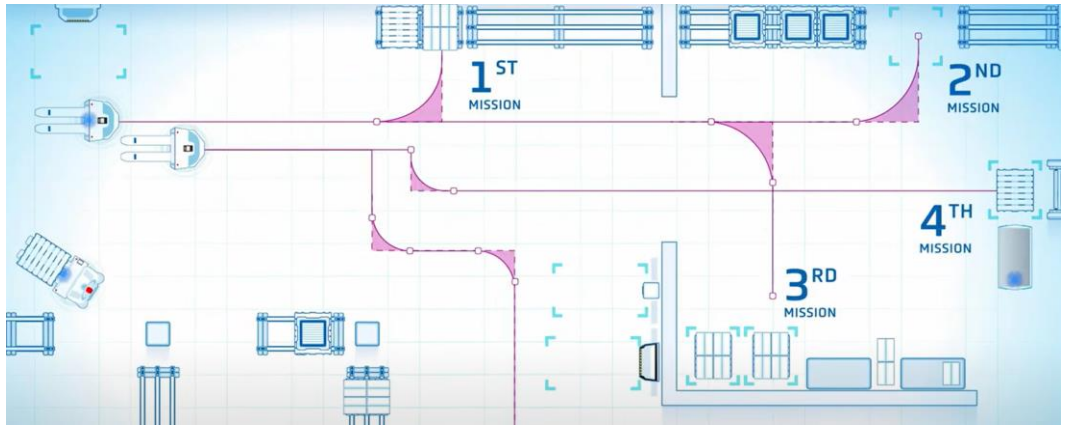


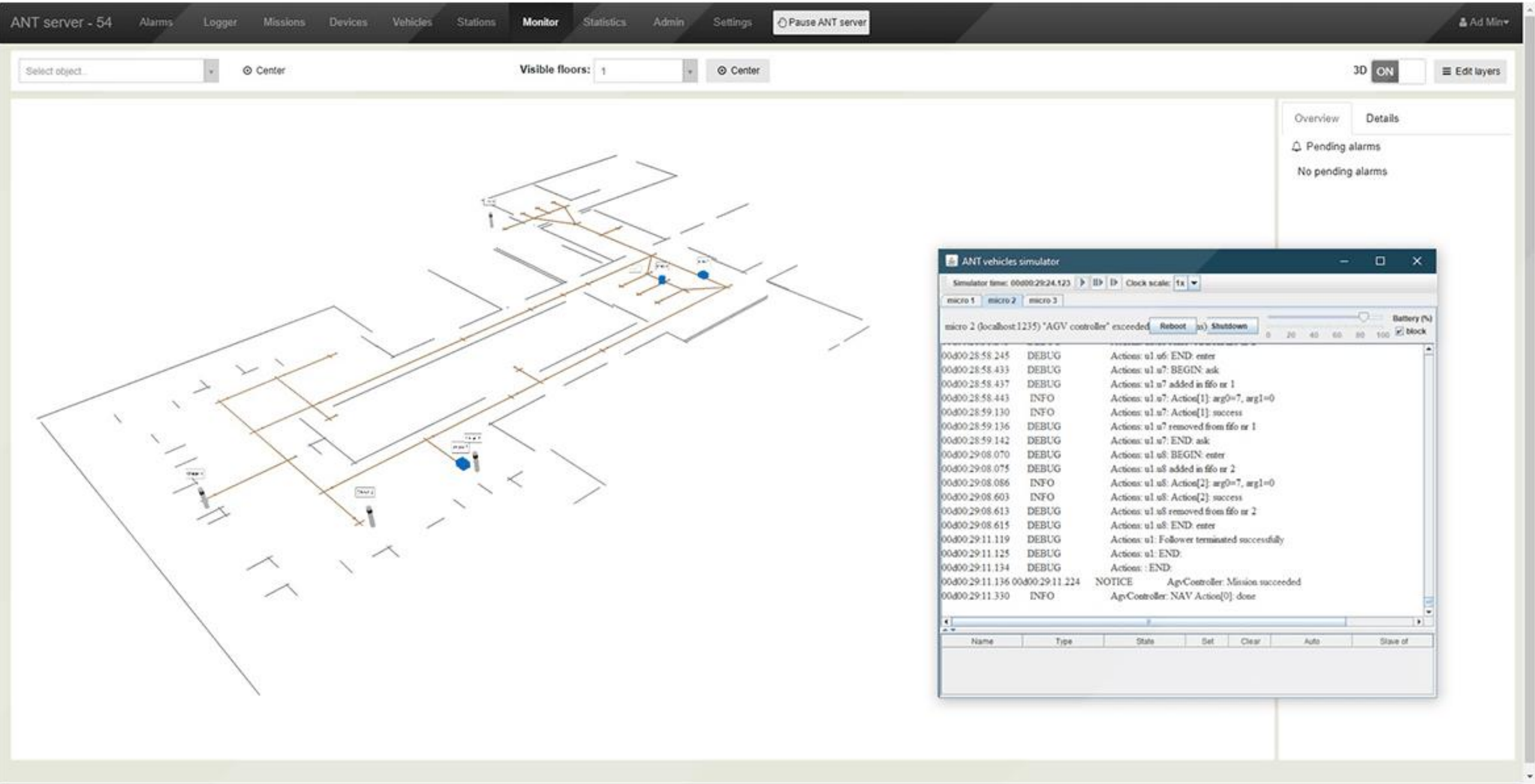
Swiss Made

BLUEBOTICS
Your Vehicle Navigation Partner

Karter & BlueBotics

- Karter partners with BlueBotics which brings together the best technologies of both worlds.
- **Quick & Easy to Learn**
- **Seamless Integration**
- **User Independence**




ANT server - 54
Alarms
Logger
Missions
Devices
Vehicles
Stations
Monitor
Statistics
Admin
Settings
Pause ANT server
Ad Min
Select object...
Center
Visible floors:
1
Center
3D
ON
Edit layers
Overview
Details
Pending alarms
No pending alarms
ANT vehicles simulator
Simulator time: 00d00:29:24.123
Clock scale: 1x
micro 1
micro 2
micro 3
micro 2 (localhost:1235) "AGV controller" exceeded
Reboot
Shutdown
Battery (%)
block
00d00:28:58.245 DEBUG Actions: u1 u6: END: enter
00d00:28:58.433 DEBUG Actions: u1 u7: BEGIN: ask
00d00:28:58.437 DEBUG Actions: u1 u7 added in fifo nr 1
00d00:28:58.443 INFO Actions: u1 u7: Action[1]: arg0=7, arg1=0
00d00:28:59.130 INFO Actions: u1 u7: Action[1]: success
00d00:28:59.136 DEBUG Actions: u1 u7 removed from fifo nr 1
00d00:28:59.142 DEBUG Actions: u1 u7: END: ask
00d00:29:08.070 DEBUG Actions: u1 u8: BEGIN: enter
00d00:29:08.075 DEBUG Actions: u1 u8 added in fifo nr 2
00d00:29:08.086 INFO Actions: u1 u8: Action[2]: arg0=7, arg1=0
00d00:29:08.603 INFO Actions: u1 u8: Action[2]: success
00d00:29:08.613 DEBUG Actions: u1 u8 removed from fifo nr 2
00d00:29:08.615 DEBUG Actions: u1 u8: END: enter
00d00:29:11.119 DEBUG Actions: u1: Follower terminated successfully
00d00:29:11.125 DEBUG Actions: u1: END:
00d00:29:11.134 DEBUG Actions: : END:
00d00:29:11.136 00d00:29:11.224 NOTICE AgvController: Mission succeeded
00d00:29:11.330 INFO AgvController: NAV Action[0]: done
Name
Type
State
Set
Clear
Auto
Slave of

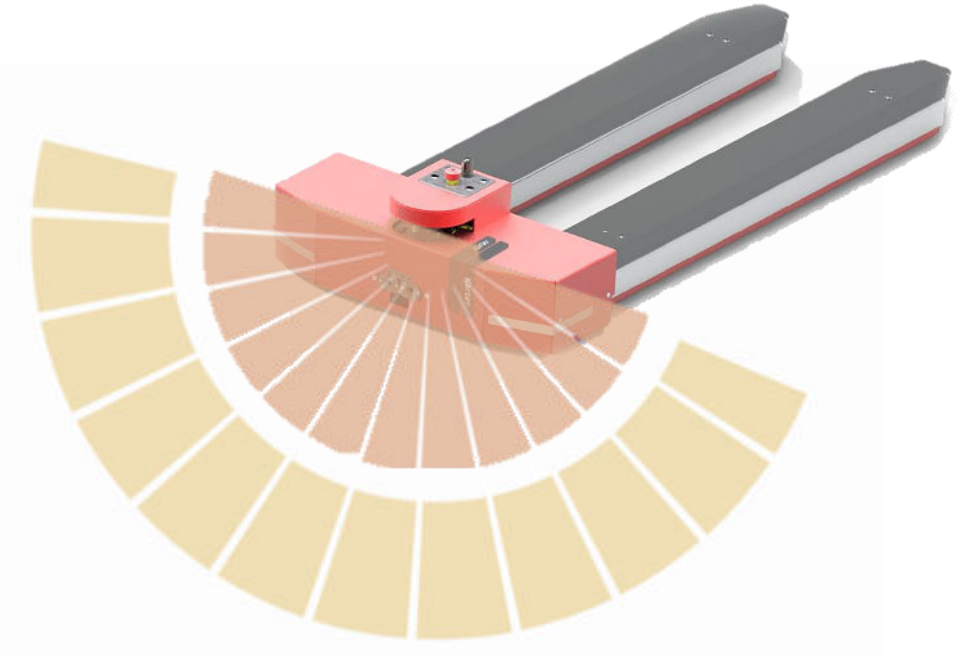
BLUEBOTICS
Your Vehicle Navigation Partner

BlueBotics

- The advanced capabilities of ANT Navigation Technology that ensure efficient and safe automation.
- **Advanced Capabilities**
  - **Robust Localization:** Accurate to ±1 cm / ±1°
  - **Optimized Path Follower:** Ensures efficient routing.
  - **Obstacle Avoidance:** Enhances safety by preventing collisions.
  - **Fleet Management:** Manages multiple vehicles for smooth operation and coordination.
  - **Mission Scheduling & Traffic Control:** Optimizes task assignments and vehicle traffic.

Safety Standards and Features

- Our AMRs meet ISO 3691-4 safety requirements. This ensures our systems are safe, reliable, and ready for integration into various industrial environments
- **Basic Safety Features:**
  - **Safety Scanner**
  - **Safety Sensor under Fork**
  - **Safety PLC**
  - **Audible Alerts**
  - **Reduced Speed in Reverse**



Safety Standards and Features

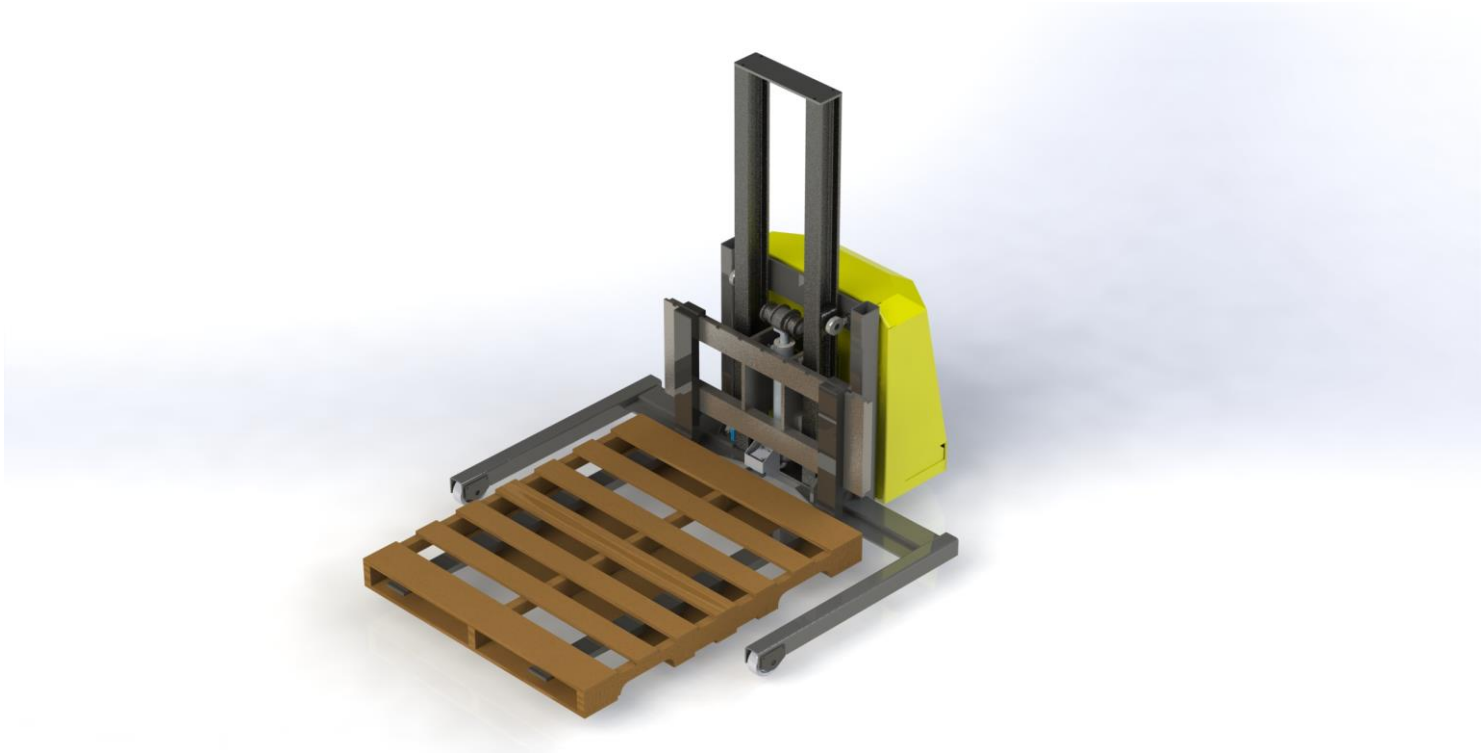
- These advanced features further mitigate risks and enhance workplace safety beyond basic compliance
- **Enhanced Safety Features:**
  - **Blue Light Indicators**
  - **Additional Safety Scanners**
  - **Safety Bumpers**

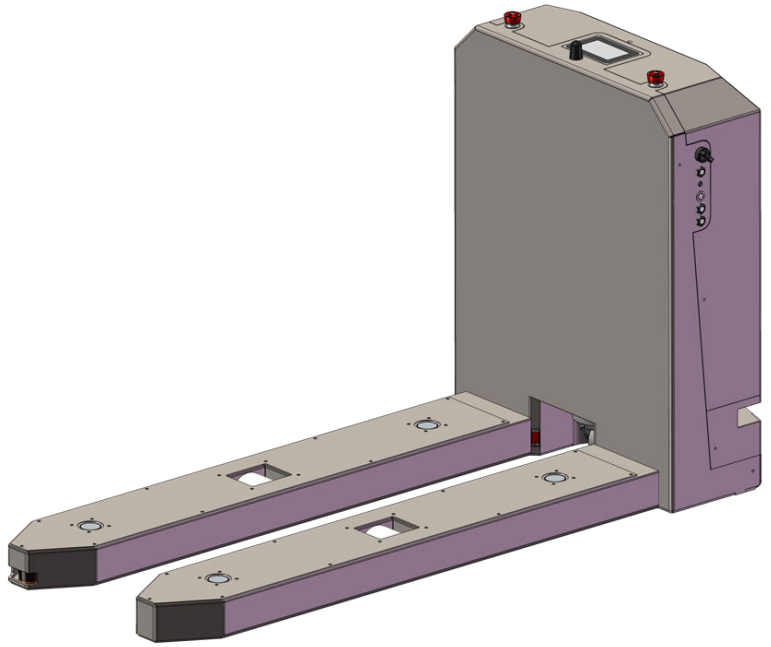
Current Models

- Kompakt
- Lyft
- Mono

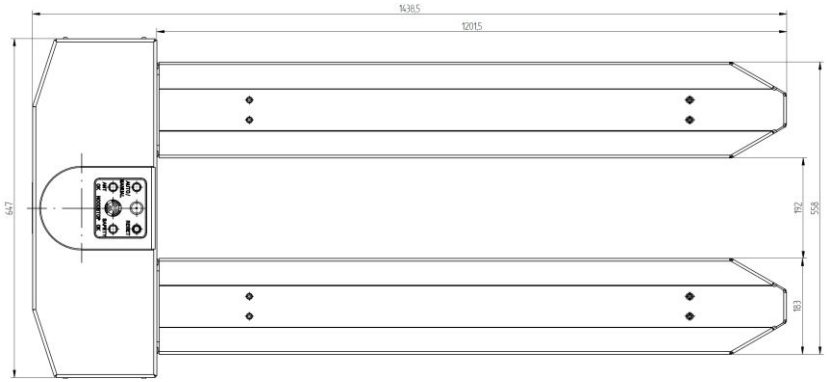
Karter – Custom Design

New Models

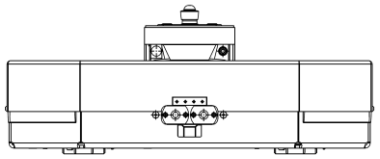




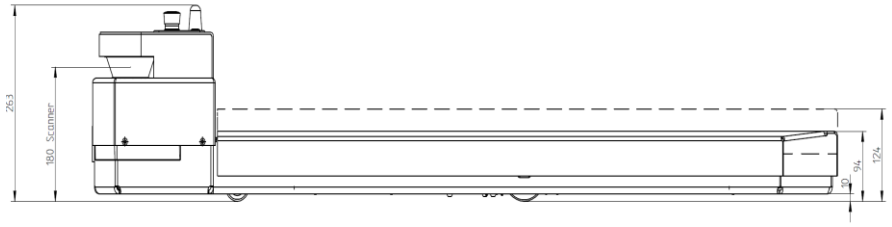
Karter Kompakt - Dimensions



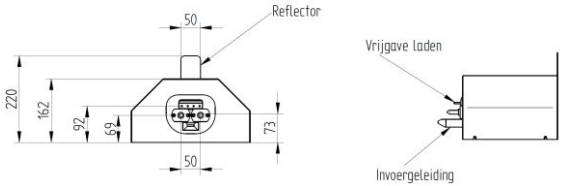
Top view



Front view



Side view



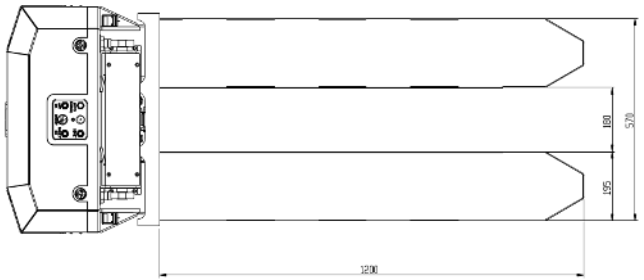
Docking station

Weight of the vehicle	120 kg
Weight without battery	103 kg
Width of the vehicle	648 mm
Length of the vehicle	1440 mm
Length of the forks	1200 mm
Height of the vehicle	275 mm
Maximum speed forward	4 km/h*
Maximum speed backward	1.44 km/h
Maximum accelaration	0.2 m/s^2
Maximum decellaration	0.5 m/s^2
Ground clearance	10 mm
Maximum inclination	1 %
Turning circle Ø	1.7 m
Maximum detection distance main scanner	40 m
Detection angle main scanner	215 °
Maximum detection distance pallet tracker	2300 mm
Detection angle pallet tracker	95 °
Maximum lifting weight	1500 kg**
Lifting height	37 mm
Battery capacity	50 Ah
Recharging time (20% -> 80%)	10 min
Voltage	24 V

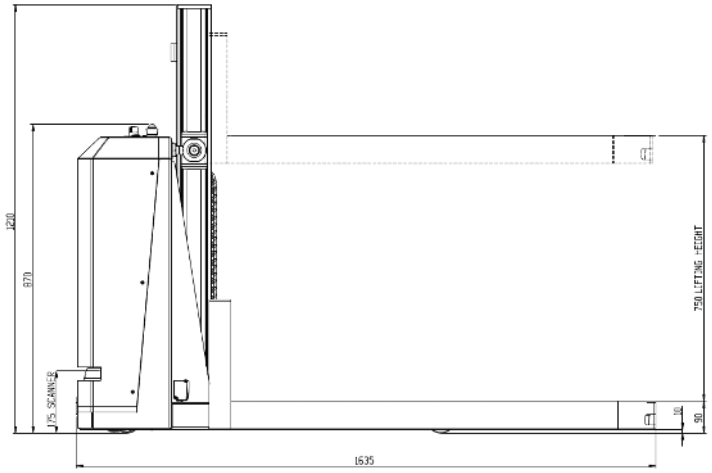
* optional either 2 or 4km/h forward speed

** either 1000kg with 4km/h forward speed or 1500kg with 2km/h forward speed

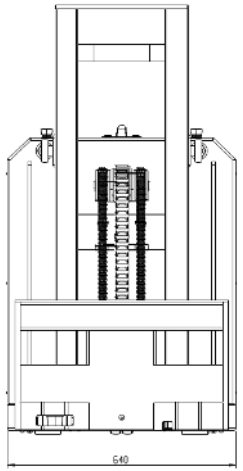
Karter Lyft - Dimensions



Top view



Side view



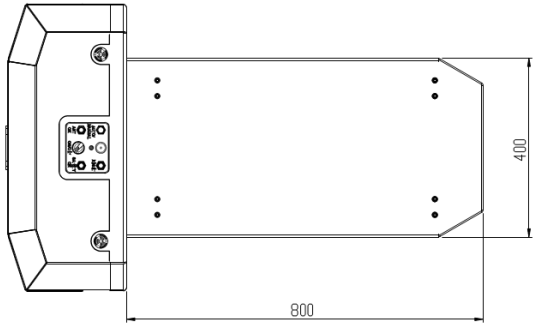
Back view

Weight of the vehicle	350 kg
Weight without battery	333 kg
Width of the vehicle	640 mm
Length of the vehicle	1640 mm
Length of the forks	1200 mm
Height of the vehicle	1210 mm
Maximum speed forward	4 km/h*
Maximum speed backward	1.44 km/h
Maximum accelaration	0.2 m/s^2
Maximum decellaration	0.5 m/s^2
Ground clearance	10 mm
Maximum inclination	1 %
Turning circle Ø	2.1 m
Maximum detection distance main scanner	40 m
Detection angle main scanner	180 °
Maximum detection distance pallet tracker	2300 mm
Detection angle pallet tracker	95 °
Maximum lifting weight	1000 kg**
Lifting height	1000 mm
Battery capacity	50 Ah
Recharging time (20% -> 80%)	10 min
Voltage	24 V

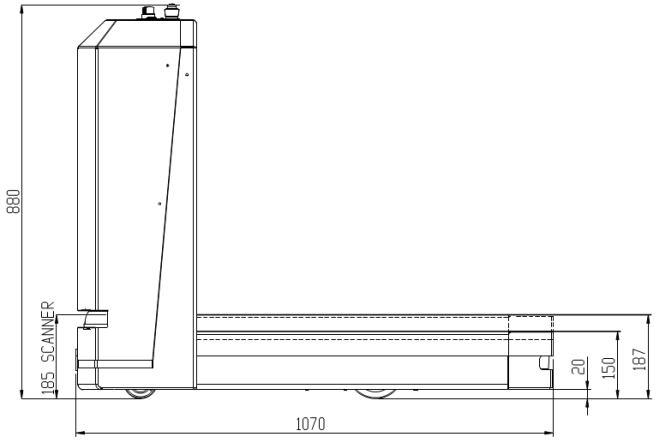
* optional either 2 or 4km/h forward speed

** either 800kg with 4km/h forward speed or 1000kg with 2km/h forward speed

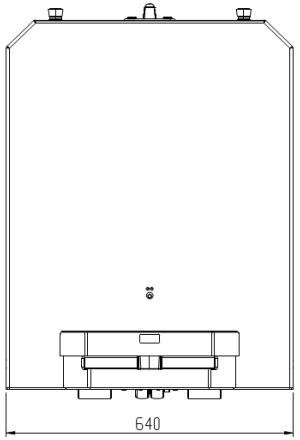
Karter Mono - Dimensions



Top view



Side view



Back view

Weight of the vehicle	210 kg
Weight without battery	193 kg
Length of the vehicle	1070 mm
Width of the vehicle	640 mm
Height of the vehicle	880 mm
Length of the fork	800 mm***
Width of the fork	400 mm***
Height of the fork	150 mm***
Maximum speed forward	4 km/h*
Maximum speed backward	1.44 km/h
Maximum accelaration	0.2 m/s^2
Maximum decellaration	0.5 m/s^2
Ground clearance	20 mm
Maximum inclination	2 %
Turning circle Ø	1.5 m
Maximum detection distance main scanner	40 m
Detection angle main scanner	180 °
Maximum detection distance pallet tracker	2300 mm
Detection angle pallet tracker	95 °
Maximum lifting weight	1500 kg**
Lifting height	37 mm
Battery capacity	50 Ah
Recharging time (20% -> 80%)	10 min
Voltage	24 V

* optional either 2km/h or 4km/h forward speed

** either 1000kg with 4km/h forward speed or 1500kg with 2km/h forward speed

*** Variation possible in consultation with Karter

Reference – Use Cases

- We have experience across different sectors, handling various loads and applications.
- **Food**
  - Solution: Karter Lyft
  - Process: Transport of full pallets weighing up to 500kg to designated areas within the bakery facility; replenishment with empty pallets as needed.
- **Pharma**
  - Solution: Karter Lyft
  - Process: Customized lift height customized to 1500mm for precise movement of tanks to and from production lines.
- **Automotive**
  - Solution: Karter Kompakt
  - Process: Seamless transport of components to assembly lines; return of assembled products to the factory floor.
  - Integration: Integrated with Toyota Forklift for vertical picking and subsequent Karter pick up.
- **Metal Works**
  - Solution: Karter Mono
  - Process: Transport of trolleys loaded with metal parts to assembly locations