Autonomous Mobile Robot Industry Leader

TWINNY

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TWINNY

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Autonomous Mobile Robot Industry Leader

TWINNY

Autonomous Mobile Robot

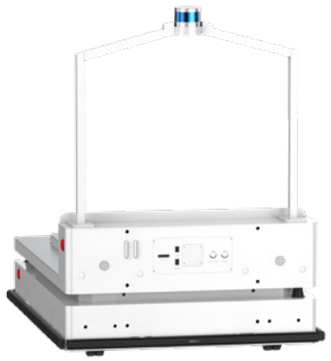
2022

TWINNY
Product Range

No additional infrastructures are required for indoor/outdoor Autonomous mobile robot, **NarGo Series.**
One second, one touch is enough with Target following robot, **TarGo Series.**

In hotel, high-rise building and hospital.
Indoor Autonomous mobile robot, NarGo60

In smartfarm, factory, logistics center.
Indoor Autonomous mobile robot, NarGo100



In factory, logistics center.
Indoor Autonomous mobile robot, NarGo500

In hospital, library.
Indoor Target following Robot, TarGo60

In factory, logistics center.
Indoor Target following Robot, TarGo100

In hotel, logistics center, mart.
Autonomous mobile + Follow me DualGo60

TWINNY
Upcoming Product

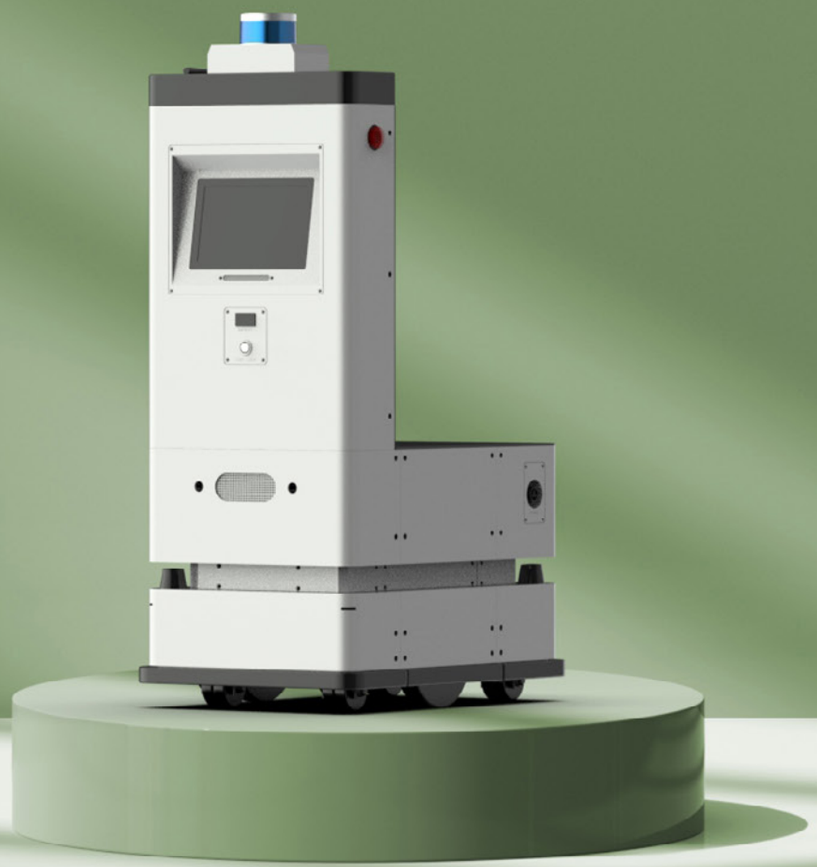
In apartment, park.
Outdoor Autonomous mobile robot

In logistics center.
Order Picking Robot

In hospital, hotel, office building.
Indoor F&B Robot

Small-sized autonomous mobile
robot carries up to 60kg

NarGo60



NarGo60

Without building any infrastructure, a small-sized autonomous mobile robot
can move freely in narrow and complex indoor environment.

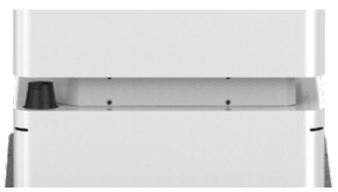
NarGo60 Features

- No QR code, beacon, UWB requried
- Ability to take an elevator
- Connectable with automatic door
- Gradability upto 3°
- Various customized design available
- Flexible driving in frequently changing environments
- Easy operation using the control system

NarGo60 Safety

Environment recognition using a 3D Lidar sensor

The 3D Lidar detection ranges are ±15°, 360°. It enables a robot to perform self-localization and detect movement of obstacles to move to plan more safely.



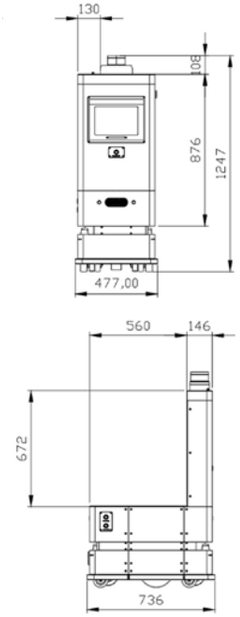
Environment recognition using 2D Lidar sensors

The two 2D Lidars cover 360° surroundings to detect movement of obstacles for keeping high-level of safety.

Emergency stop using bumper and pressure sensor

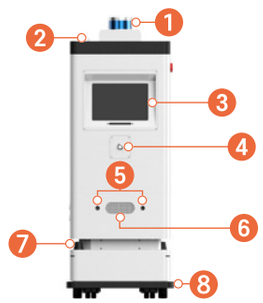
Emergency stop mechanism is in placed by receiving signals from the bumper.

NarGo60 Specifications

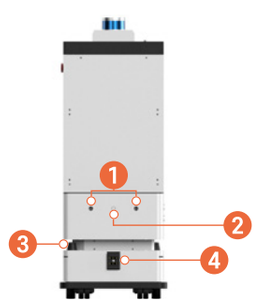


Classification	Specification
Size (LWH)	736 x 477 x 1,247 mm
Loading Compartment Size (LWH)	560 x 477 x 672 mm
Max. Speed	Max. 1.2 m/s
Load Capacity	Max. 60 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 3 hours
Operating Environment	Indoor
Operating Environment Temperature	5~40°C
Stop Resolution	Within ± 100 mm
Battery Capacity	1,260 Wh (25.2 V 50.0 Ah)
Battery Life Cycle	60% / 500 Times
Charging Method	Manual charge / *Automatic charge *(Application available upon request)
Sensor	3D Lidar, 2D Lidar, Ultrasonic sensor
Network	Wi-Fi, LTE
Max. Gradability	3°

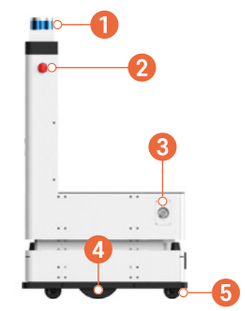
NarGo60 Components



① 3D Lidar
② Short Antenna(For LTE)
Long Antenna(For Wi-Fi)
③ Diplay
④ LED light
⑤ Ultrasonic sensor
⑥ Speaker
⑦ 2D Lidar
⑧ Bumper



① Ultrasonic sensor
② Camera for docking station
③ 2D Lidar
④ Charging port

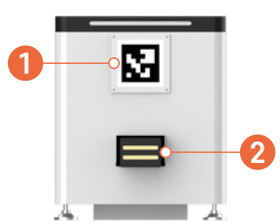


① USB port, HDMI port
② Emergency stop button
③ Manual charging port
④ Actuator
⑤ Castor

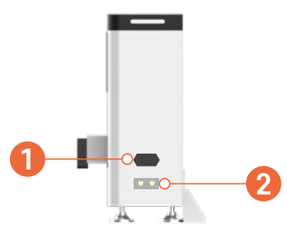
NarGo60 Specifications - Charging station

Size (LWH)
264 x 436 x 520 mm
Weight
10 kg

NarGo60 Components - Charging station



① LED light
② Charging station recognition marker



① Power cable
② Power connector

① Charging port

NarGo60 Deployment process

Begin	Analysis	Mapping	Manufacture	Delivery	Stabilization
On-site meeting	Process Analysis/ Plan	Mapping and Map modification	Check saftey and standard	On - site installation and test	A/S and on -site visit

Customization

TWINNY's autonomous mobile robot can be customized to suit your required usage, such as cafe type, bookshelf type, safety box, box type, etc.

| Cafe type

| Bookshelf type

| Box type

| Safety box

NarGo60 Usage

Hospital

Office

Medium-sized autonomous mobile
robot carries up to 100kg

NarGo100

NarGo100

Without building any infrastructure, a medium-sized autonomous mobile robot
can move freely in narrow and complex indoor environment.

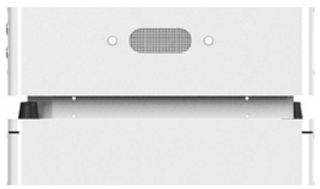
NarGo100 Features

- No QR code, beacon, UWB requried
- Connectable with automatic door
- Gradability upto 3°
- Various customized design available
- Flexible driving in frequently changing environments
- Easy operation using the control system

NarGo100 Safety

Environment recognition using a 3D Lidar sensor

The 3D Lidar detection ranges are ±15°, 360°. It enables a robot to perform self-localization and detect movement of obstacles to move to plan more safely.



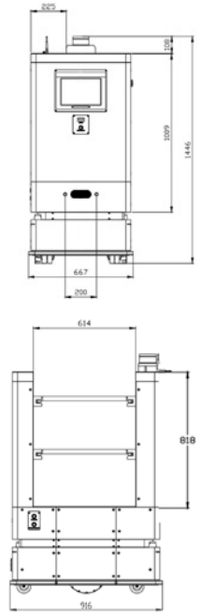
Environment recognition using 2D Lidar sensors

The two 2D Lidars cover 360° surroundings to detect movement of obstacles for keeping high-level of safety.

Emergency stop using bumper and pressure sensor

Emergency stop mechanism is in placed by receiving signals from the bumper.

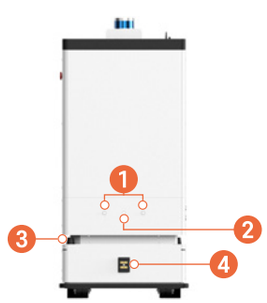
NarGo100 Specifications



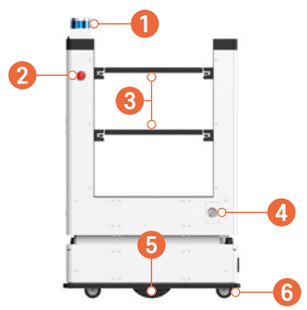
Classification	Specification
Size (LWH)	916 x 667 x 1,446 mm
Loading Compartment Size (LWH)	614 x 667 x 818 mm
Max. Speed	Max. 1.2 m/s
Load Capacity	Max. 100 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 3 hours
Operating Environment	Indoor
Operating Environment Temperature	5~40°C
Stop Resolution	Within ± 100 mm
Battery Capacity	1,260 Wh (25.2 V 50.0 Ah)
Battery Life Cycle	60% / 500 Times
Charging Method	Manual charge / *Automatic charge *(Application available upon request)
Sensor	3D Lidar, 2D Lidar, Ultrasonic sensor
Network	Wi-Fi, LTE
Max. Gradability	3°

NarGo100 Components

① 3D Lidar
② Short Antenna(For LTE)
Long Antenna(For Wi-Fi)
③ Diplay
④ LED light
⑤ Ultrasonic sensor
⑥ Speaker
⑦ 2D Lidar
⑧ Bumper



① Ultrasonic sensor
② Camera for docking station
③ 2D Lidar
④ Charging port

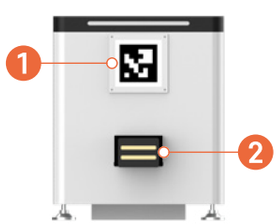


① USB port, HDMI port
② Emergency stop button
③ Shelf
④ Manual charging port
⑤ Actuator
⑥ Castor

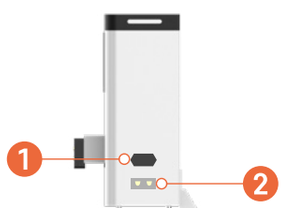
NarGo100 Specifications – Charging station

Size (LWH)
264 x 436 x 520 mm
Weight
10 kg

NarGo100 Components – Charging station



① LED light
② Charging station recognition marker



① Power cable
② Power connector

① Charging port

NarGo100 Deployment process

Begin	Analysis	Mapping	Manufacture	Delivery	Stabilization
On-site meeting	Process Analysis/ Plan	Mapping and Map modification	Check saftey and standard	On - site installation and test	A/S and on -site visit

Customization

TWINNY's autonomous mobile robot can be customized to suit your required usage, such as cafe type, bookshelf type, safety box, box type, etc.

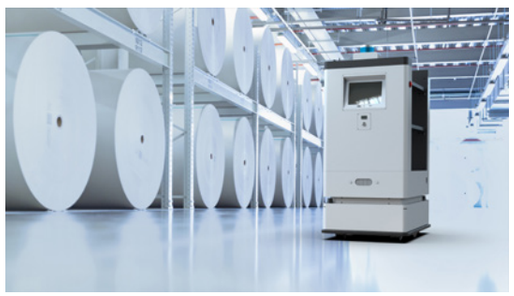
| Cafe type

| Bookshelf type

| Box type

| Safety box

NarGo100 Usage

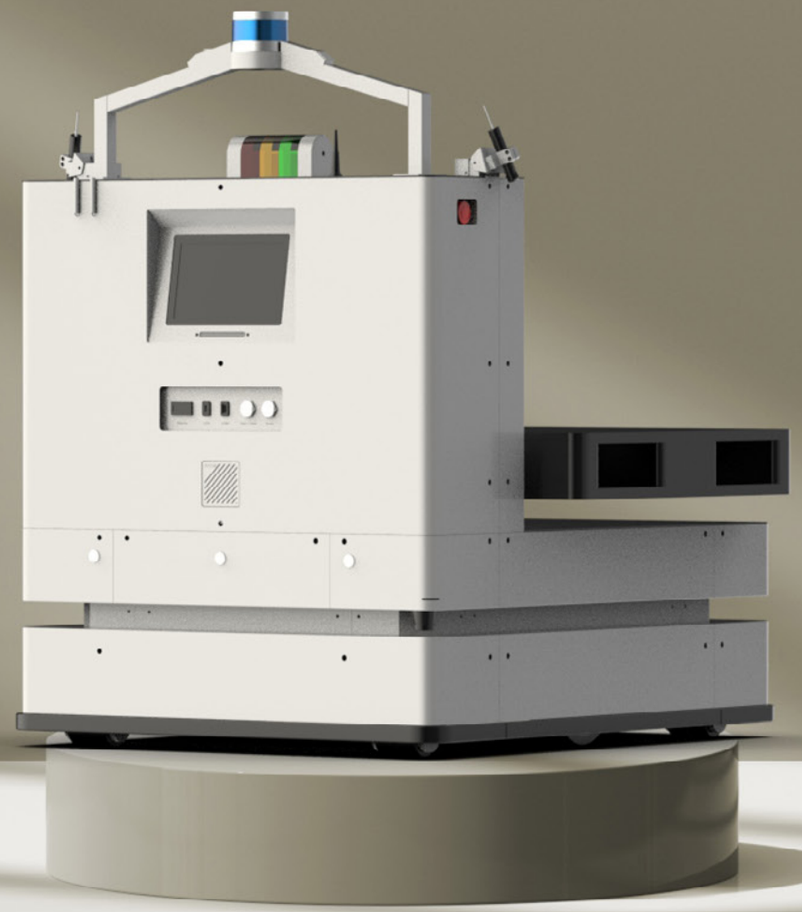


Factory

Logistics Center

Autonomous mobile robot for pallet delivery which can be applied in logistic centers and factories by connecting with a pallet station.

NarGo500



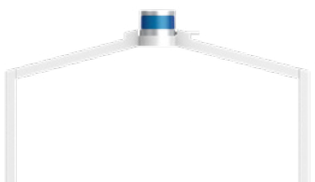
NarGo500

An autonomous mobile robot is suitable for transporting heavy goods in logistic centers and factories as it carries pallets by connecting with a pallet station.

NarGo500 Features

- No QR code, beacon, UWB requried
  (Magnetic tape installation required for docking to pallet loading-unloading station)
- A Pallet holder can be used to collaborate with forklifts
- Flexible driving in frequently changing environments
- Easy operation using the control system

NarGo500 Safety



Environment recognition using a 3D Lidar sensor

The 3D Lidar detection ranges are ±15°, 360°. It enables a robot to perform self-localization and detect movement of obstacles to move to plan more safely.

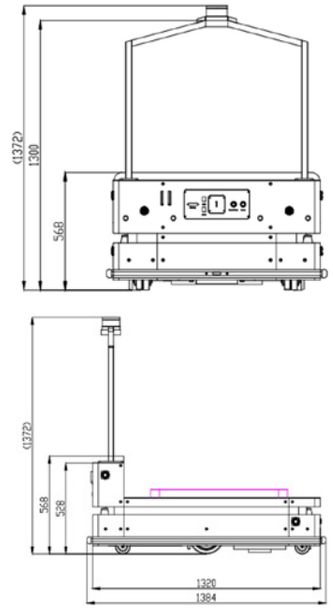
Environment recognition using 2D Lidar sensors

The two 2D Lidars cover 360° surroundings to detect movement of obstacles for keeping high-level of safety.

Emergency stop using bumper and pressure sensor

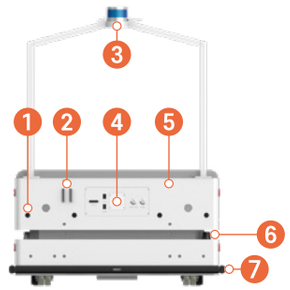
Emergency stop mechanism is in placed by receiving signal from the bumper.

NarGo500 Specifications

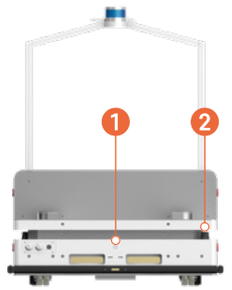


Classification	Specification
Size (LWH)	1,384 x 1,064 x 1,372 mm
Max. Speed	Max. 2.0 m/s
Load Capacity	Max. 500 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 3 hours
Operating Environment	Indoor
Operating Environment Temperature	5~40°C
Stop Resolution	Within ± 10 mm (With QR code)
Battery Capacity	3,024 Wh (50.4 V 60.0 Ah)
Battery Life Cycle	60% / 500 Times
Charging Method	Manual charge / *Automatic charge *(Application available upon request)
Sensor	3D Lidar, 2D Lidar, Ultrasonic sensor
Network	Wi-Fi, LTE

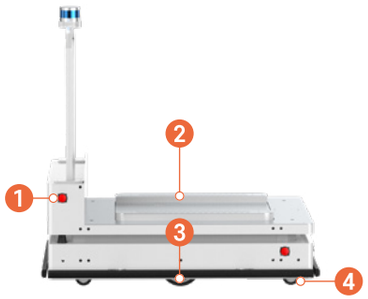
NarGo500 Components



① Ultrasonic sensor
② Antenna(For Wi-Fi)
③ 3D Lidar
④ Robot name plate
⑤ Antenna(For LTE)
⑥ 2D Lidar
⑦ Bumper

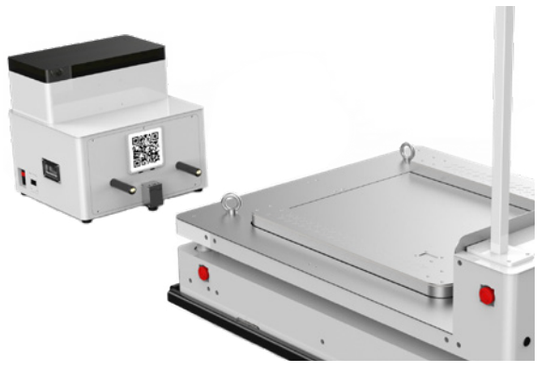


① Camera for docking station
② 2D Lidar

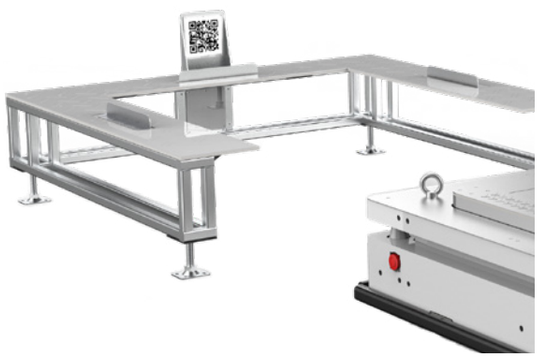


① Emergency stop button
② Pallet lift
③ Actuator
④ Castor

NarGo500 Specifications – Charging station, Pallet holder

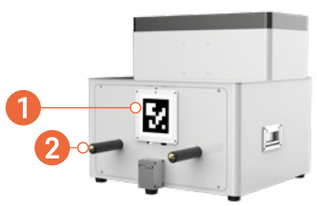


Size (LWH)
470 X 540 X 550 mm
Weight
30 kg

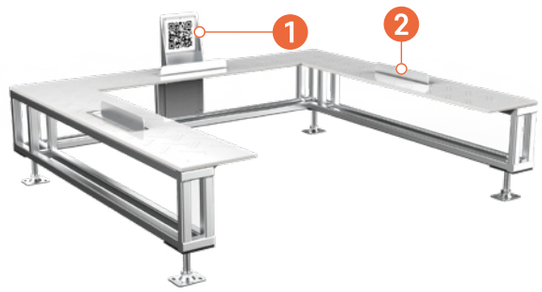


Size (LWH)
1,320 x 1,200 x 350 mm
Weight
80 kg

NarGo500 Components – Charging station, Pallet holder

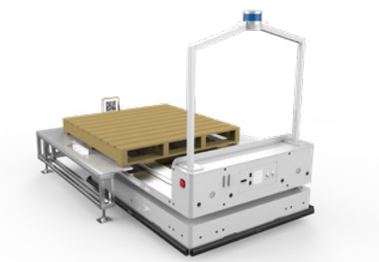


① Charging station recognition marker
② Charging port

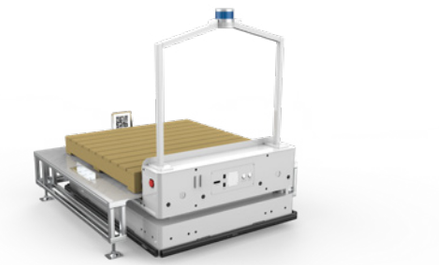


① Pallet checking marker
② Pallet location guide marker

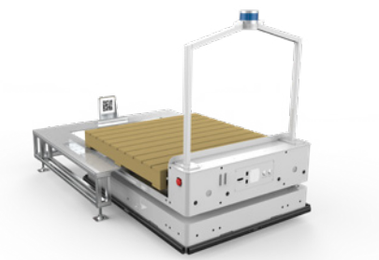
NarGo 500 Operation Method



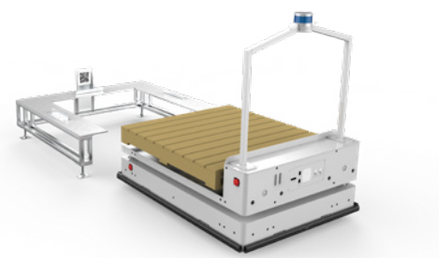
1. Detect a pallet holder marker



2. Pick up a pallet after docking



3. Lift down after docking



4. Move to destination

NarGo500 Deployment process

Begin	Analysis	Mapping	Manufacture	Delivery	Stabilization
On-site meeting	Process Analysis/ Plan	Mapping and Map modification	Check saftey and standard	On - site installation and test	A/S and on -site visit

NarGo500 Usage

Factory

Logistics Center

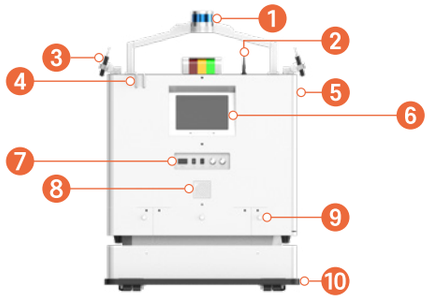
NarGo500 Forklift Type

Safe docking to a pallet station is possible by recognizing installed markers on a pallet holder and a conveyor.

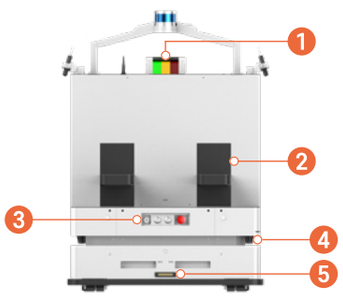
NarGo500 Forklift Type Specifications

Classification	Specification
Size (LWH)	1,200 x 930 x 1,330 mm
Max. Speed	Max. 1.0 m/s
Load Capacity	500 kg / Max. 600 kg
Operation Hours	Max. 4.5 hours
Charging Hours	Under 2.5 hours
Operating Environment	Indoor
Operating Environment Temperature	5~40˚C
Stop Resolution	Within ± 10 mm (With QR code)
Battery Capacity	3,530 Wh (50.4 V 60.0 Ah)
Battery Life Cycle	60% / 500 Times
Charging Method	Manual charge / *Automatic charge *(Application available upon request)
Sensor	3D Lidar, 2D Lidar, Ultrasonic sensor
Network	LTE + Wireless LAN

NarGo500 Forklift Type Components



① 3D Lidar
② LTE Router
③ Line Laser
④ WLan
⑤ Emergency stop button
⑥ Diplay
⑦ Operation part (Battery Guage, USB Port, HDMI Port, Brake, Start/Stop)
⑧ Buzzer
⑨ Sonic sensor
⑩ Bumper

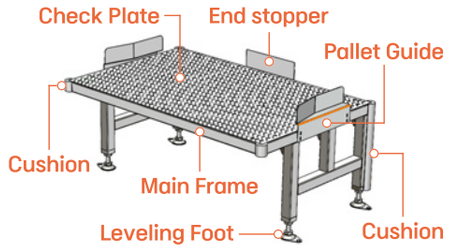


① Patlite
② Pallet sensor
③ Operation part (Manual Charge, PC Power, Main Power, EMS)
④ 2D Lidar
⑤ Charging port

NarGo500 Forklift Type Features

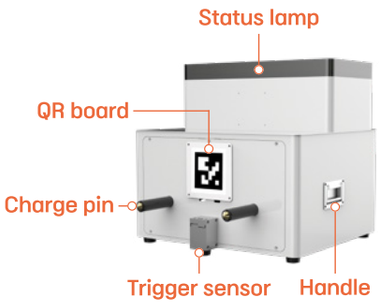
- A loading method similar to forklift is advantageous to introduce in factories and logistic centers
- Loading and unloading are possible, replacing forklift and personnel
- Connectable with existing system
- Multiple pallet types available
- Designed smaller version of existing lift type for narrow space

Pallet holder Specifications



Size (LWH)	750 x 1,200 x 550 mm
Frame	Square Pipe 50 x 50
Top Plate	SUS304 Check Plate
Load Capacity	600 kg
Pallet to Width Tolerance	± 50 mm
Frame to AMR Tolerance	± 80 mm

Charging station Specifications



Size (LWH)	470 X 540 X 550 mm
Charge voatage (V) Charge current (A)	50 V 25 A
Operating temp.	-20℃ ~ +40℃
Capacity (W)	1500 W
Status lamp	• Flashing: Waiting mode • Red: Charging mode • Green: Charging completed
Safety	• Short Circuit Protection • Over Current Protection • Overcharge Protection • Miss-insertion Prevention • Pre-Charge Support • BMS/PCM Enable and Disable

Free up your hands

TarGo60

TarGo60

One second, one touch is enough with TarGo60.

TarGo60 Features

- Robust target following technology without any additional device
- Follow the target through size, color, motion and location information
- Easy operation for anyone to use
- Manual operation button
- Customization available
- Triple safety system equipped with RGBD camera, Laser distance measurement sensor, and Ultrasonic sensor

TarGo60 Safety

Target recognition using a RGBD camera

Trajectory planning that leads safe and precise movement.

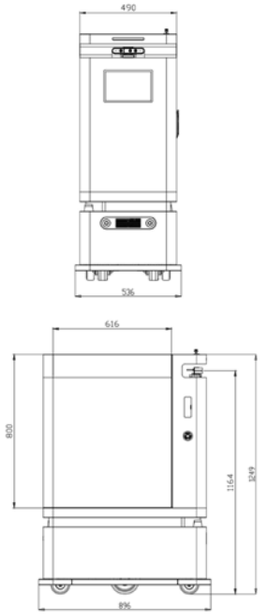
Environment recognition using 2D Lidar sensors

The two 2D Lidars cover 360° surroundings to detect movement of obstacles for keeping high-level of safety.

Emergency stop using bumper and pressure sensor

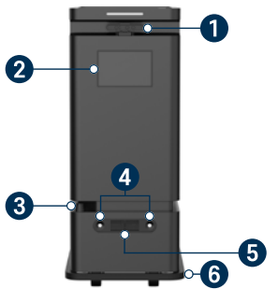
Emergency stop mechanism is in placed by receiving signal from the bumper.

TarGo60 Specifications

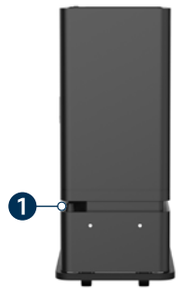


Classification	Specification
Size (LWH)	896 x 536 x 1,248 mm
Loading Compartment Size (LWH)	616 x 536 x 800 mm
Max. Speed	Max. 1.2 m/s
Load Capacity	Max. 60 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 3 hours
Operating Environment	Indoor
Operating Environment Temperature	5~40°C
Battery Capacity	1,260 Wh (25.2 V 50.0 Ah)
Battery Life Cycle	60% / 500 Times
Charging Method	Manual charge
Sensor	RGBD camera, Ultrasonic sensor
Max. Gradability	3°

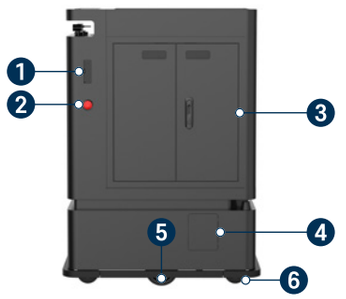
TarGo60 Components



① RGBD camera
② Diplay
③ 2D Lidar
④ Ultrasonic sensor
⑤ Speaker
⑥ Bumper



① 2D Lidar



① Manual button
② Emergency stop button
③ Stowage
④ Operation part
(Manual carging port, power button, etc)
⑤ Actuator
⑥ Castor

Best-selling product of TWINNY

TarGo100

TarGo100

One second, one touch is enough with TarGo100.

TarGo100 Features

- Robust target following technology without any additional device
- Follow the target through size, color, motion and location information
- Easy operation for anyone to use
- Manual operation button
- Customization available
- Triple safety system equipped with RGBD camera, Laser distance measurement sensor, and Ultrasonic sensor

TarGo100 Safety

Target recognition using a RGBD camera

Trajectory planning that leads safe and precise movement.

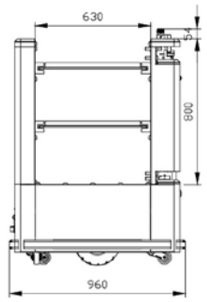
Environment recognition using 2D Lidar sensors

The two 2D Lidars cover 360° surroundings to detect movement of obstacles for keeping high-level of safety.

Emergency stop using bumper and pressure sensor

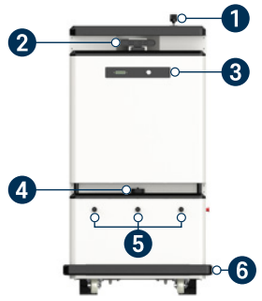
Emergency stop mechanism is in placed by receiving signal from the bumper.

TarGo100 Specifications

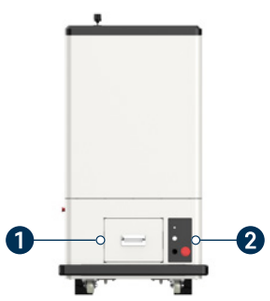


Classification	Specification
Size (LWH)	960 x 690 x 1,295 mm
Loading Compartment Size (LWH)	630 x 690 x 800 mm
Max. Speed	Max. 1.2 m/s
Load Capacity	Max. 100 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 3 hours
Operating Environment	Indoor
Operating Environment Temperature	5~40°C
Battery Capacity	25.2 V 36.0 Ah
Battery Life Cycle	60% / 500 Times
Charging Method	Manual charge
Sensor	RGBD camera, Ultrasonic sensor
Max. Gradability	3°

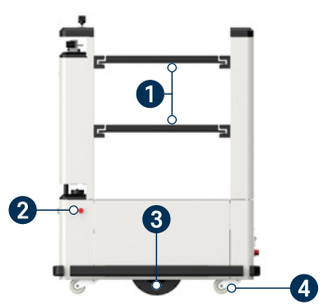
TarGo100 Components



① Joystick
② RGBD camera
③ Diplay
④ Ultrasonic sensor
⑤ Laser distance measurement sensor
⑥ Bumper



① Battery
② Rear control panel



① Shelf
② Emergency stop button
③ Actuator
④ Castor

The combination of autonomous mobile technology
and target following technology

DualGo60 & 300

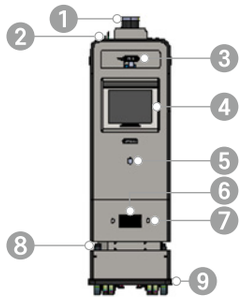
DualGo60

Mode selection is available depends on your usage between
autonomous mobile function & target following function.
It makes your transportation of goods more convenient.

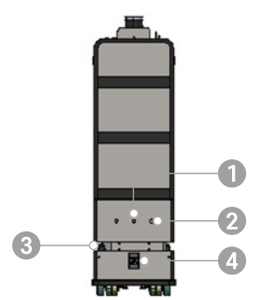
DualGo60 Specifications

Size (LWH)	788 x 477 x 1371 mm
Max. Speed	Max. 1.57 m/s
Load Capacity	Max. 60 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 2 hours
Operating Environment	Indoor/Outdoor
Operating Environment Temperature	5~40°C
Max. Gradability	3°
Battery Capacity	25.2 V 36 Ah
Battery Life Cycle	60% / 500 Times
Charging Method	Automatic charge
Sensor	3D Lidar, 2D Lidar, Ultrasonic, IMU

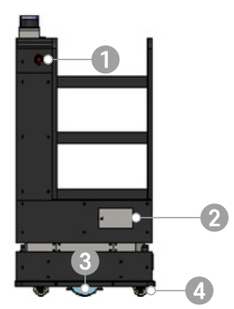
DualGo60 Components



① 3D Lidar
② Short Antenna(For LTE)
Long Antenna(For Wi-Fi)
③ RGBD camera #1
④ Diplay
⑤ RGBD camera #2
⑥ Speaker
⑦ Ultrasonic sensor
⑧ 2D Lidar
⑨ Bumper



① Camera
② Ultrasonic sensor
③ 2D Lidar
④ Charging port



① Emergency stop button
② Operation part
(Manual carging port, power button, etc)
③ Actuator
④ Castor

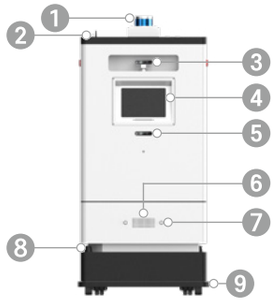
DualGo300

Mode selection is available depends on your usage between autonomous mobile function & target following function.
It makes your transportation of goods more convenient.

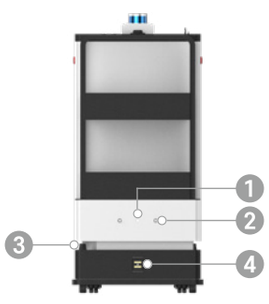
DualGo300 Specifications

Size (LWH)	1030 x 838 x 1553 mm
Max. Speed	Max. 1.57 m/s
Load Capacity	Max. 300 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 2 hours
Operating Environment	Indoor/Outdoor
Operating Environment Temperature	5~40˚C
Max. Gradability	3˚
Battery Capacity	25.2 V 60 Ah
Battery Life Cycle	60% / 500 Times
Charging Method	Automatic charge
Sensor	3D Lidar, 2D Lidar, Ultrasonic, IMU

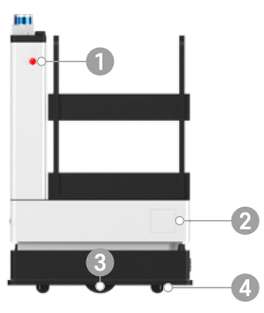
DualGo300 Components



① 3D Lidar
② Short Antenna(For LTE)
Long Antenna(For Wi-Fi)
③ RGBD camera #1
④ Diplay
⑤ RGBD camera #2
⑥ Speaker
⑦ Ultrasonic sensor
⑧ 2D Lidar
⑨ Bumper

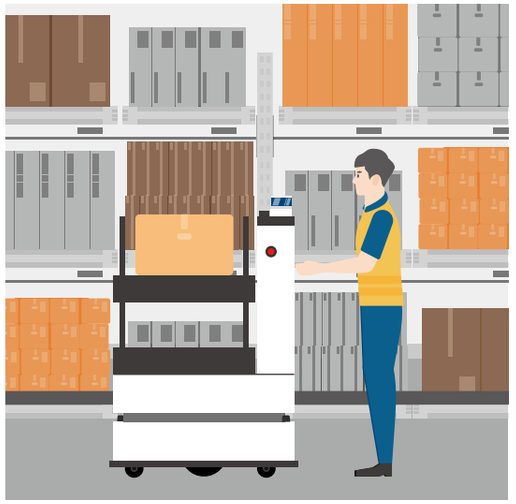


① Camera
② Ultrasonic sensor
③ 2D Lidar
④ Charging port



① Emergency stop button
② Operation part
(Manual carging port, power button, etc)
③ Actuator
④ Castor

DualGo60 & 300 Applications



1. Activate the 'Following Target mode ' of DualGo with one touch to follow the worker.

2. Worker loads goods on DualGo and moves.

3. When the work is done, it switches to 'Autonomous mobile' mode automatically.

4. DualGo goes to the point where goods needed by itself.

TWINNY's outdoor autonomous mobile robot,
Order picking robot, and Indoor F&B robot

will soon come into your daily life

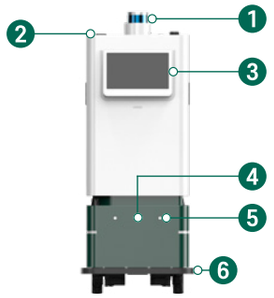
Outdoor autonomous mobile robot

An autonomous mobile robot that finds its own destination even in diversified outdoor environments.
Now let the robot delivers your food and goods.

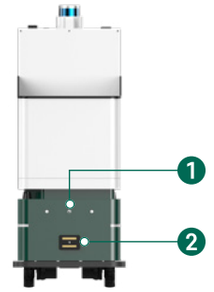
Outdoor autonomous mobile robot Specifications

Size (LWH)	900 x 550 x 1390 mm
Max. Speed	Max. 1.3 m/s
Load Capacity	Max. 60 kg
Operation Hours	Max. 8 hours
Charging Hours	Under 2 hours
Operating Environment	Indoor/Outdoor
Operating Environment Temperature	5~40°C
Max. Gradability	10°
Stop Resolution	Within ± 10 mm (With QR code)
Battery Capacity	25.2 V 52.8 Ah
Battery Life Cycle	60% / 3,000 ~ 4,000 Times
Charging Method	Automatic charge
Sensor	3D Lidar, 2D Lidar, Ultrasonic, IMU

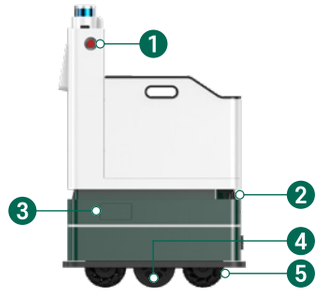
Outdoor autonomous mobile robot Components



① 3D Lidar
② Short Antenna(For LTE)
Long Antenna(For Wi-Fi)
③ Diplay
④ Speaker
⑤ Ultrasonic sensor
⑥ Bumper



① Camera
② Charging port



① Emergency stop button
② 2D Lidar
③ Operation part
(Manual carging port, power button, etc)
④ Main wheels
⑤ Castor

Order picking robot

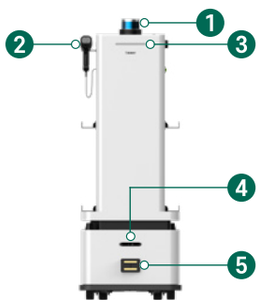
Autonomous mobile robot that designed for order picking in logistics centers. Pickers can monitor picking status and picking items.

Order picking robot Specifications

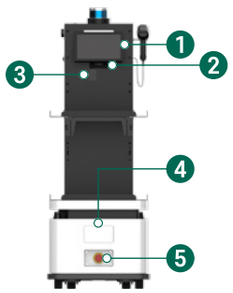
Size (LWH)	Under 700 mm x 550 mm x 1600 mm
Max. Speed	Max. 1.5 m/s
Load Capacity	Max. 100 kg
Stowage	1 to 5 shelve(s) The bottom shelf carries up to max. 100 kg, The rest of shelves carries 20 kg and above
Battery	Max. 8 hours (with max load 100 kg, 60% motor operation)
Charging Method	Automatic charging station(using marker-based charging station), wire charging is supported
Charging Hours	Less than 3 hours with charging station and wire charging
Sensor	3D Lidar, 2D Lidar, Depth camera, Bumper sensor, Camera, Cliff sensor
Network	Wi-Fi, LTE

※ Robot specifications and release date can be changed.

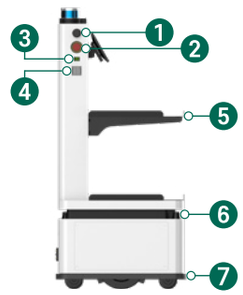
Order picking robot Components



① 3D Lidar
② Barcode reader
③ LED light
④ Depth camera
⑤ Charging port



① Diplay
② Embed ded scanner
③ Part for USIM change
④ Operation part
(Manual carging port, power button, etc)
⑤ Reset button



① LTE Antenna
② Emergency stop button
③ Manual button
④ Speaker
⑤ Shelf
⑥ 2D Lidar
⑦ Bumper

Indoor F&B robot

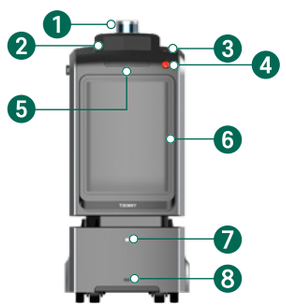
It can be deployed for various carrying purpose in indoor environments such as high-rise buildings, hospitals and hotels.

Indoor F&B robot Specifications

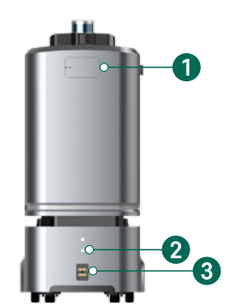
Size (LWH)	Under 550 mm x 500 mm x 1250 mm
Max. Speed	Max. 1.0 m/s
Load Capacity	Max. 40 kg
2 layers of stowage	• Top stowage: Food containers, coffee holders (350 x 350 x 230) • Bottom stowage: Box (410 x 310 x 280) / Small cooler (400 x 300 x 400) • Customization range: Shelving type, no shelving type, cup holder type
Locking and release system	System control (Automatic)
Door opening and closing system	System control (Automatic)
Battery	Max. 8 hours (with max load 40 kg, 60% motor operation) ※ Using battery which satisfy UL 2271, KS B IEC 62133-1, KS B ICE 62133-2 condition
Charging Method	Automatic charging station(using marker-based charging station), wire charging is supported
Charging Hours	Less than 2.5 hours with charging station and wire charging, Fast charging is supported
Sensor	3D Lidar, 2D Lidar, Cliff sensor, Bumper sensor, Camera
Network	Wi-Fi, LTE

※ Robot specifications and release date can be changed.

Indoor F&B robot Components



① 3D Lidar
② Diplay
③ Reset button & Manual button
④ Emergency stop button
⑤ Speaker
⑥ Stowage
⑦ Dash camera
(covers 4 directions)
⑧ ToF sensor

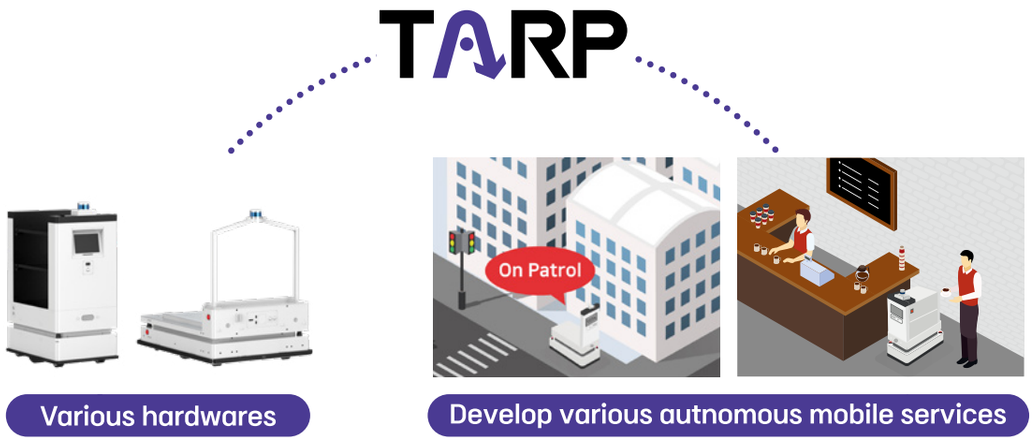


① Operation part
(Manual carging port, power button, etc)
② Docking camera
③ Charging port

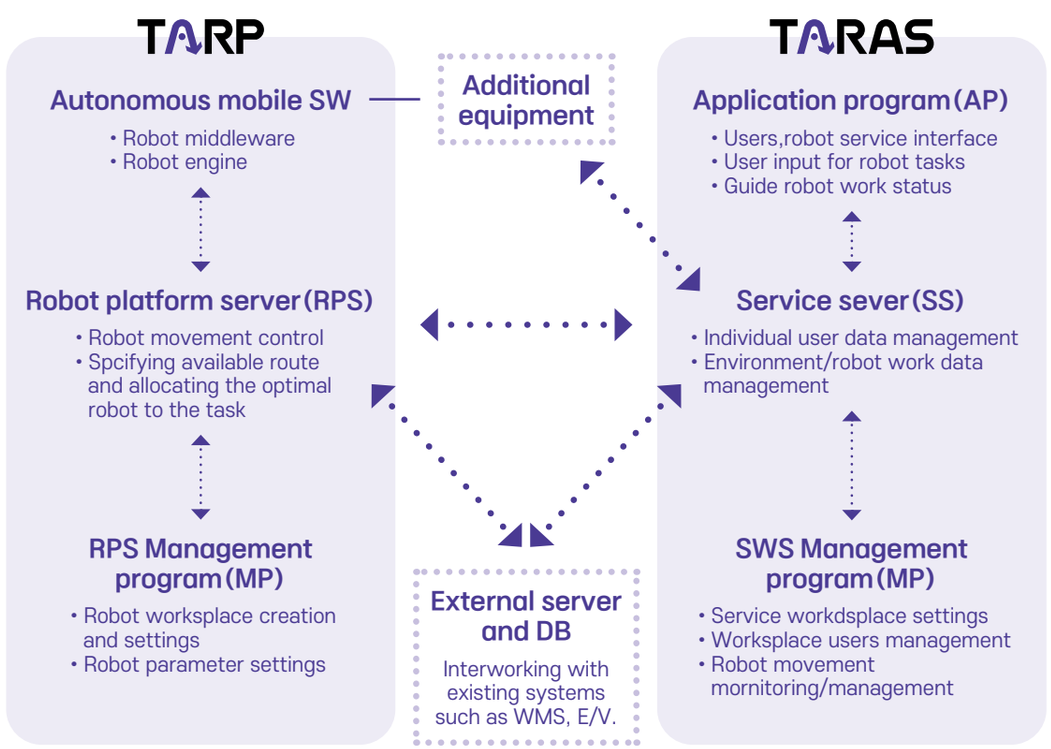
① LTE Antenna
② LED light
③ 2D Lidar
④ Bumper

TARP & TARAS, TWINNY Autonomous Mobile Robot Platform

A software platform that supports various service developments
by modularizing autonomous mobile robot technology,
multi robot control and automatic task planning.



TARP & TARAS



The types of TWINNY server

1.Cloud server

Users can access virtual servers in the cloud online anytime, anywhere and use whatever they want.

Scalability

Server creation and deletion are quick, so it is easy to attach and detach the virtual server as needed.

Cost saving

Cheaper than the cost of building a real server.

Security

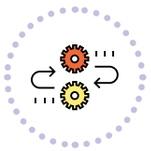
Because it is not a personal server and computer storage method, external intrusion is concerned.

2. Local server

- It is a server type to prevent loss of important information due to external intrusions such as hackers.
- A method of operating the server separately.

Specifications

No need for infrastructure

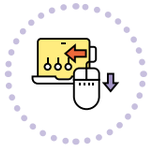


Interworking with existing systems

Possible to customize application system

Specifying available route and designated point

Identifying status and location of all robots and allocate the optimal robot to the task



Managing and controlling multiple robots in real time