Automatic Guided Vehicles
AGV Comprehensive Catalog

Irreplaceable Technical Capability
Meidensha AGVs solve the problem!
We will provide the best AGV for you

Meidensha AGVs
Our technical capability has been cultivated over our long history. Founded in 1897 as "Meiden Motors" the motor and control technology that we have accumulated in over 120 years is irreplaceable. We support motors, control devices and guidance technology, the core technologies at the heart of AGVs.
We have experience and know-how from working together with a wide variety of industries that require high-level transportation technology. We support "monozukuri" in Japan over the years by providing AGVs. We make full use of our experience as we have continually responded to the harsh operating conditions, frequent line changes, and high demand for reliability.

With an open AGV interface and full line of system support tools, we provide AGVs that are easy to use.

**AGV Features**

- **Excellent Traveling Control**
  - Excellent steering control allows our AGVs to smoothly travel even steep curves and gently carry loads with little lateral shaking.
  - Without any stationary steering of the drive wheels by powered wheels steering, vehicle height is kept low.

- **Excellent Guidance Systems**
  - We provide various guidance systems from traditional magnet guidance systems to the latest multi-guidance system so that you can utilize the system best suited to the environment at your site.
  - The multi-guidance system is a proprietary guidance system that achieves both autonomous travel adopting a SLAM system and a stopping accuracy of 110 mm.
  - AGV travel is controlled according to route data. Created on a PC, route data is configured using over 200 types of commands.
  - Using a command mark system, the simple model AGV Kit provides a user interface that allows you to configure a system on your own.

- **Excellent User Interface**
  - The AGV travels by detecting its position and orientation by using laser radar to scan for reflector installed in the ceiling and walls. This keeps down dust caused by construction because guide wires do not need to be buried.
  - Allows creating and changing the traveling route using CAD software running on a PC.
  - Does not require laying a guide path, Requires installation of reflectors on the ceiling and walls.

<table>
<thead>
<tr>
<th>Transport Weight and Applicable AGV Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>We provide the best AGV for your Transport system needs for goods weight from 150 kg to maximum 6000 kg.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guidance Systems</th>
<th>System description</th>
<th>Features</th>
<th>Supported models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic guidance system</td>
<td>In some cases, a course is created by burying magnetic rods along the course or applying magnetic tape to the floor. The AGV detects the magnetism and follows the guide path.</td>
<td>Requires burying magnetic rods or laying magnetic tapes.</td>
<td>Platform type, Forklift type, Low platform type, All kit type</td>
</tr>
<tr>
<td>Laser guidance system</td>
<td>The AGV travels by detecting its position and orientation by using laser radar to scan for reflector installed in the ceiling and walls.</td>
<td>Requires installation of reflectors on the ceiling and walls.</td>
<td>Platform type, Forklift type</td>
</tr>
<tr>
<td>Multi guidance system</td>
<td>The AGV drives autonomously by using a laser range finder to measure the surrounding environment. This system provides high precision positioning by using both magnet and laser guidance.</td>
<td>Allows the automatic generation of a map and creation of a traveling route on the map using a PC.</td>
<td>Platform type of 3MC series</td>
</tr>
</tbody>
</table>

Notes:
- The maximum load of kit type is subject to change by the units' weight.
### Features

- **Excellent traveling performance**
  - The carrier comes in the roller table (2 serial, 3 serial, and 2 stage-type), lifter, and push-pull type, useful in a variety of applications.
  - These models support options such as automatic battery charging, destination orders using a wireless LAN, and intersection control.

- **Simple operation**
  - Operation is simple using a touch panel.
  - Displays AGV operating status, I/O monitor, and errors.

### Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>2ACB2.5</th>
<th>2ACB5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load capacity</td>
<td>250kg</td>
<td>500kg</td>
</tr>
<tr>
<td>Guidance system</td>
<td>Magnetic rod and magnetic tape, Laser, and Multi</td>
<td>Magnetic rod and magnetic tape, Laser</td>
</tr>
<tr>
<td>Driving, Steering system</td>
<td>Front/rear wheel drive, Front/rear wheel steering</td>
<td>Front wheel drive, Front wheel steering</td>
</tr>
<tr>
<td>Max. Rated speed</td>
<td>60m/min</td>
<td>60m/min</td>
</tr>
<tr>
<td>Min. turning radius</td>
<td>850mm</td>
<td>730mm</td>
</tr>
<tr>
<td>Stopping accuracy</td>
<td>±10mm</td>
<td>±10mm</td>
</tr>
<tr>
<td>Vehicle weight</td>
<td>250kg</td>
<td>60kg</td>
</tr>
</tbody>
</table>

### Sample applications

- **Lifter type transfer machine**
  - Transfer castings with a compact lifter transfer machine.
- **Two-stage, two-level conveyor transfer machine**
  - Transfer a lot of works at once using a two-stage, two-level conveyor.
- **Roller conveyor transfer machine**
  - Transfer works while preventing slipping with special rollers.
- **Elevator type transfer machine**
  - Position the vehicle using an elevator and transfer with high accuracy using an elevator slide arm.

### Platform, All directional type

#### ACBM

**All directional type**

Most suitable for transportation in a narrow space.

- **Features**
  - This AGV is of the Front/Rear wheel driving and steering type.
  - Traveling forward/backward, traverse slantwise, and spin turn is possible.
  - Traveling is possible in a narrow space.
  - Because it is possible to be moved to all direction, the cycle time can be shortened.

- **Specifications**
  - **Type** ACBM2.5
  - **Load capacity** 250kg
  - **Guidance system** Magnetic rod and magnetic tape, Laser
  - **Driving, Steering system** Front/Rear wheel driving and Steering type
  - **Traveling direction** All direction and Spin turn
  - **Max. Rated speed** 60m/min
  - **Vehicle size** W755×H1360×D1400mm

### Sample applications

- **Two-stage conveyor transfer machine**
  - Transfer three works at once using a three-stage conveyor.
- **Two-stage, two-level conveyor transfer machine**
  - Transfer a lot of works at once using a two-stage, two-level conveyor.
- **Elevator type roller conveyor transfer machine**
  - With a roller conveyor that goes up and down, this vehicle transfers works on the conveyor to a different conveyor level.
- **Elevator type transfer machine**
  - Lifts up to 220kg and moves in 120m/min.
- **Lift type transfer machine**
  - Lifts up to 220kg and moves in 120m/min.
- **Chain conveyor transfer machine**
  - Securely transfers heavy loads by using a chain conveyor.
**Features**
- Even along a passage of 2450mm in width, it is possible to gain access to the destination without changing the posture.
- A 180° spin-turn is possible in a passage of 3000mm in width.
- Since the brushless motor is adopted for the driving unit, properties of cleanliness and maintainability have been improved.
- Every direction has obstacle sensor and bumpers in order to secure high safety.

**Specifications**

<table>
<thead>
<tr>
<th>Type</th>
<th>3ML-M11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load capacity</td>
<td>1100kg (Cargo center 600mm, deviation from the center of gravity ±50mm)</td>
</tr>
<tr>
<td>Guidance system</td>
<td>Magnetic rod and Magnetic tape, Laser</td>
</tr>
<tr>
<td>Driving, Steering system</td>
<td>Front/Rear wheel driving and steering type</td>
</tr>
<tr>
<td>Traveling direction</td>
<td>Forward/Backward, Sideways, and Spin turn</td>
</tr>
<tr>
<td>Max. Rated speed</td>
<td>60m/min (Sideways 30m/min)</td>
</tr>
<tr>
<td>Max. Elevating height</td>
<td>1000mm, or 1800mm for optional</td>
</tr>
<tr>
<td>Max. Elevating speed</td>
<td>250mm/sec</td>
</tr>
<tr>
<td>Reach stroke</td>
<td>1350mm</td>
</tr>
<tr>
<td>Reach speed</td>
<td>250mm/sec</td>
</tr>
<tr>
<td>Min. turning radius</td>
<td>1500mm (Forward/Backward 15m/min)</td>
</tr>
<tr>
<td>Stopping accuracy</td>
<td>Vehicle base ±10mm, Fork end ±30mm</td>
</tr>
<tr>
<td>Transport pallet size</td>
<td>Max.1200x1200mm</td>
</tr>
<tr>
<td>Vehicle size</td>
<td>W2278xL1748xH1173mm</td>
</tr>
<tr>
<td>Vehicle weight</td>
<td>2050kg</td>
</tr>
<tr>
<td>Voltage</td>
<td>Automatic battery charging system 48V 150Ah</td>
</tr>
</tbody>
</table>

**Description of operation**

1. Approach without turning.
2. Insert fork portion with reach operation.
3. Lift pallet with lift operation.
4. Place pallet onto the AGV and begin transporting.

**Sample applications**

- When the item to be conveyed is located on the floor.
- When the item to be conveyed is located on a frame.
- When the item to be conveyed is located on a rack.

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**Full flat low-platform type**

**Lift type Low-platform AGV**

This Lift type low-platform AGV is suitable to customers who do not want to modify their existing carts.

**Features**
- Carts do not need to be modified because they are lifted and carried by the lift transfer unit.
- Attachments can be customized to match the shape of the carts.
- This AGV is strong enough to transfer 350kg, so it can also be used to transport heavy objects.
- The forward and backward function allow it to be loaded into an elevator.

**Specifications**

<table>
<thead>
<tr>
<th>Type</th>
<th>3MS-3.5S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load capacity</td>
<td>350kg</td>
</tr>
<tr>
<td>Guidance system</td>
<td>Magnetic rod and Magnetic tape</td>
</tr>
<tr>
<td>Driving, Steering system</td>
<td>Front wheel drive, Front wheel steering</td>
</tr>
<tr>
<td>Traveling direction</td>
<td>Forward/Simple Backward (straight-line) / Spin turn</td>
</tr>
<tr>
<td>Max. Rated speed</td>
<td>60m/min (Backward 30m/min)</td>
</tr>
<tr>
<td>Stopping accuracy</td>
<td>±10mm</td>
</tr>
<tr>
<td>Working time</td>
<td>1h (Continuous with auto-charge feature)</td>
</tr>
<tr>
<td>Vehicle size</td>
<td>W380xH180xD1650mm</td>
</tr>
<tr>
<td>Cage cart dimensions</td>
<td>W800—1100xD600—1100mm</td>
</tr>
<tr>
<td>Secure width of 440mm or more for vehicle body to slide under</td>
<td></td>
</tr>
<tr>
<td>Distance between bottom plate and floor: Cage truck set condition: Positioning accuracy ±10mm</td>
<td></td>
</tr>
<tr>
<td>Storage battery</td>
<td>Lithium-ion battery</td>
</tr>
</tbody>
</table>

**Wireless battery charger option**

- Power receiving coil and unit built in to the AGV
- Resilient against mispositioning and easy to install.

**Description of operation**

- The AGV can go under commercial trucks thanks to its thin, low body.
- Built-in lifter: Truck modification is not required because the AGV lifts up as it carries the truck frame.
- Lift up cage truck and transport it.

**Sample applications**

- Goes under the bottom of the commercial truck.
- Trucks can be stored next to each other.
- The truck at the head of the line can be taken away one at a time.
Simple how to use!

- The AGV offered meets arbitrary requirements, from a basic unit to a completed vehicle.
- Start/Stop operation is simple with a single button.
- Since an external I/O circuit is released to be open, any customer can establish a favorable system.

Flexible interaction possible with layout change!

- Stick a magnetic tape to the floor surface. That’s all. By taking such an easy action, a traveling route can be easily set up.
- When markers are installed on the floor, operation control for acceleration and deceleration can be accomplished easily.
- Using a simplified backward traveling function, various running routes can be established.

Expansibility that is attractive!

- A wireless controller option can be used to provide call in control, dispatch control and standby control.
- There are two control systems available according to applications.

Command mark system:

- Relative address system: Command markers are stuck to the floor for simple control. Operation is programmed for each mark on the floor for complicated operation control.

Specifications

<table>
<thead>
<tr>
<th>Light-duty class (MK2)</th>
<th>Heavy-duty class (MK3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard type</td>
<td>High-speed type</td>
</tr>
<tr>
<td></td>
<td>High-speed type</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>250kg</td>
<td>350kg</td>
</tr>
<tr>
<td>350kg</td>
<td>350kg</td>
</tr>
<tr>
<td>350kg</td>
<td>350kg</td>
</tr>
<tr>
<td>175kg</td>
<td>135kg</td>
</tr>
<tr>
<td>30m/min</td>
<td>60m/min</td>
</tr>
</tbody>
</table>

- Permissible load: 1000 kg
- Rated speed: 30m/min
- Temperature: 0-40°C, Relative humidity: 20-80%
- Road surface lap differences: 6mm (15m/min speed)
- Road surface undulations: 10mm, Groove width not more than 20mm

1) Note 1: The permissible load includes vehicle. The permissible weight also varies depending on the traveling resistance of caster wheels.
2) Note 2: The allowable load given for lateral travel and spin turning is for when solid-elastic membrane is used for the caster wheels.
3) Note 3: When the AGV is fully charged and moving a standard empty home
4) Maximum speed during travel/turning is 20 m/min.
5) Maximum speed during simple backward travel is 15 m/min.
6) Note 4: Maximum speed during travel/turning is 15 m/min.
7) Note 5: Lateral travel and spin turning should be done on a non-sloping surface.

![Example of basic unit installation](image-url)
Mixed flow production with large variety achieved.

Assembly pallets and parts trays are loaded on AGVs, and unit part assembly work is done on the AGVs. AGVs run at a creeping speed of 1.5 meters per minute, and assembly work proceeds without stopping. By AGVs continuously traveling, time loss for transporting work is reduced. Moreover, the transport route is selected from model information recorded to RFID-mounted on assembly pallets for automatic operation.

1 Effects of introduction
① Flexible response to fluctuations in production volume and changes to layouts
② Achievement of optimal and efficient transport per model, which was difficult to achieve with assembly conveyors
③ Achievement of mixed flow production with large variety by processes that use creeping speed type AGV and RFID

2 System composition
| Location introduced to | AGV Kit heavy-duty class MK3 special assembled vehicle |
| Model name             | Creeping speed 1.5 m/min Ordinary speed 30 m/min |
| Travelling speed       | Assembly pallets, parts trays |
| Transport items        | Up to 500 kg |
| Transport weight       | 1 system control board, 8 automatic battery chargers, 3 wireless LAN access paints |

50 AGV Kit special assembled vehicles

3 System operation
① Work is received on assembly pallet
② Parts trays are received
③ Assembly is done while creeping speed traveling
④ Diverges are controlled by model information on RFID
⑤ Assembly is done while creeping speed traveling
⑥ Work where assembly and inspection are completed is delivered to next process
⑦ Inspection process is managed by model information on RFID Destination controlled according to passing or failing inspection

24-hour-a-day automated operation made possible.

This automated transport system automatically supplies machining lines with materials and processing work. It applies AGVs that can travel in all directions, enabling reduced travelling space requirements and tight turning. The system control panel constantly communicates with the AGVs by wireless LAN, identifying where the AGVs are and their status to prevent collisions between AGVs and efficiently give transport instructions after unloading work.

1 Effects of introduction
① Achievement of automatic transport of pallets holding materials and processing work
② Ability to operate fully automated 24 hours a day thanks to automated battery charging
③ Minimal impact of broken down vehicles due to function to automatically generate detours when vehicles break down

2 System composition
| Location introduced to | Machining line |
| Model name             | Platform type AGV 3MC-M10 |
| Travelling speed       | Max. speed 60 m/min |
| Transported items      | Material/processing work pallet |
| Transport weight       | Up to 1,000 kg |
| Travel directions      | All directional travel (forward, backward, sideways, and spin turn) |
| Ground equipment       | 1 system control board, 4 automatic battery chargers, 13 wireless LAN access points |

3 System operation
① Automatically battery charging and waiting for instructions at unloading station
② Transport request received from upper system and transport instructions given to AGV wirelessly
③ Moved to turnout station at error in on-ground conveyor that is preventing movement
④ Following vehicle instructed to take detour route when and AGV has stopped on the travel route due to error
⑤ 24-hour-a-day operation enabled by automatic battery charging and optimum route instruction
⑥ Automatically battery charging and waiting for instructions at unloading station
**AGV introduction example 3**

**Cage truck shipping line**

**Easy automation of transport without need to modify existing cage trucks.**

With this system, cage trucks are transported automatically without intervention by workers on the shipping line where products are transported by cage trucks. AGVs are low-platform type, and they slide underneath cage trucks and lift them up to transport them, meaning no modifications need to be made to cage trucks. And as they can pass underneath cage trucks, they can transport in order from the first one in a line, thereby reducing the space needed for cage truck holding areas.

1. **Effects of introduction**
   - Cage truck received on third floor, transported to the stock area, and then automatically transported to the shipping lane on the first floor
   - Ability to use without modifying existing cage trucks means reduced total costs at introduction
   - Space needed for stowing cage trucks is reduced, so the customer can make the maximum use of its work area

2. **System composition**
   - **Location introduced to**: Lined stock area and shipping sorting area
   - **Model name**: Lift type low-platform AGV 3MS-3.5
   - **Travelling speed**: Max. speed 60 m/min
   - **Transported items**: Cage trucks loaded with products
   - **Transport weight**: Up to 350 kg
   - **Ground equipment**: 1 system control board, 1 status monitoring panel, 2 automatic battery chargers, 1 cage truck positioner, 3 wireless LAN access points

3. **System operation**
   - **Cage truck loaded with products is received from the previous process**
   - Cage trucks are temporarily placed lined up in stock area
   - Cage truck is transported to vertical conveyor via positioner
   - In direct mode, cage truck is transported to pre-shipping lane directly without going via stock area
   - Truck driver loads and ships from pre-shipping lane
   - Cage truck is lowered from 3rd floor to 1st floor by vertical conveyor, sorted, and transported to pre-shipping lane

**AGV introduction example 4**

**Food production line**

**Contribution made to automation of manned forklift work.**

This system automatically supplies production lines with pallets loaded with containers, caps, and other materials. Manned forklift work was automated with two types of AGV—side-fork type AGV for cargo sorting in warehouses and towing truck AGV for production lines. Pallets loaded with materials are removed by side-fork type AGV and unloaded to special towing truck AGV, and the AGV tow them to the production line.

1. **Effects of introduction**
   - Automation of manned forklift work by two types of AGV
   - Achievement of automatic stocking and shipping by linkage with automated warehouse
   - Cost reduction by automating nighttime work (three-shift support)

2. **System composition**
   - **Location introduced to**: Material storage warehouse, food production line
   - **Model name**: Side-fork type AGV 3ML-M11, AGV Kit MKS special towing truck
   - **Travelling speed**: Max. speed 60 m/min
   - **Transported items**: Pallets loaded with materials
   - **Transport weight**: Up to 800 kg
   - **Ground equipment**: 1 system control board, 2 automatic battery chargers, 1 wireless LAN access point

3. **System operation**
   - Pallet loaded with materials is unloaded to AGV Kit MKS towing truck
   - Side-fork type AGV receives pallet loaded with materials from automated warehouse
   - AGV Kit automatically transports towing truck to production line
   - 24-hour-a-day continuous operation is enabled by adopting automatic battery changing
   - Empty pallet collection truck is towed and returned to automated warehouse

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**Stock area**

**Pre-shipping stock area**

**Materials pallet storage area**

**Production line area**

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Introduction to AGV Factory

- AGV Factory is an exhibition space set up at the Nagoya Works.
- Four types of AGV with differing features are on permanent display.
- Features of vehicles with different guide methods and demonstrations of two trucks working in tandem to deliver cargo can be viewed.

Exhibit 1: AGV Kit travels on double loop course according to destination instructions.

Exhibit 2: AGV equipped with small collaborative robot travels autonomously, taking cases from a shelf and transporting them to the next process.

Exhibit 3: Laser-guided side-fork type AGV transports pallets placed on the floor to a conveyor.

Exhibit 4: Platform type AGV transports between processes, from previous process conveyor to following process conveyor.

Exhibit 5: Video exhibit shows examples of introducing AGVs.

To sign up for a tour, please use the inquiry form at "AGV Navi" on the Meidensha website. (Please do not sign up if you are in the same industry.)

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