

# Agile1500



# Move ahead



## The Culture of Automation

Designing advanced automation solutions means thinking about the industry in a new way, developing new scenarios, designing innovative products and creating ways to streamline production processes.

It requires more than technical competence; it requires a team of professionals whose vision is rooted in a culture of excellence. It also requires a combination of talent, passion and experience that unite to define new trends in automation.

**Here at Comau, our passion for our work reflects who we are.**

## Welcome Industry 4.0

**Industry 4.0** is an increasingly popular term identifying a platform that unifies information among participants in the entire value chain, from product inception to design, manufacturing, services and refurbishment. The end result is a system in which all processes are integrated and information is exchanged in real time.

The **Agile1500** AGV forms part of Comau's response to evolving market needs and is an important enabler within the Industry 4.0 paradigm. This fully **automated logistics technology** enables Comau to better support highly individualized, highly efficient production while safeguarding productivity and profitability across the entire manufacturing line.

### FUTURE CHALLENGES

- **Volatile** markets
- **Increasing customization** of production
- **Complexity** of product and **production processes**
- **Short life-cycle** of **products**



### FUTURE DEMAND

- **Growing demands** for **flexibility** and **reconfigurability**
- **Increasing customization** of production
- **Minimal use of resources**
- **Adaptive production systems**

## Agile1500

**Agile1500** is the first model within the Comau automated guided vehicles platform and is based upon Comau's open automation design approach. It is flexible enough to be deployed across a wide range of manufacturing and non manufacturing scenarios.

### Features

- High **performance** vehicle
- Best in class **payload to size ratio**
- **Modular** design
- **Multipurpose** applications can be implemented
- Multiple **navigation systems** are possible

### Benefits

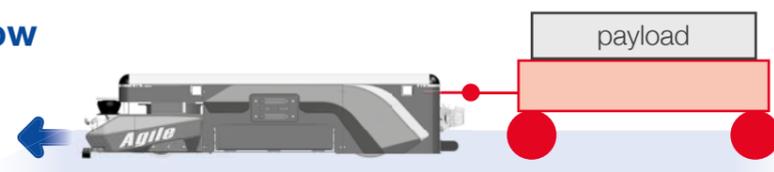
- Complete **reconfigurability** protects ROI and reduces TCO
- Full **compatibility** with other Kollmorgen-based AGV systems
- **Intuitive** programming interface
- Full connectivity and diagnostic: **Factory 4.0 ready**
- Human-robot **collaborative** (safe)
- Improved **safety** and ergonomics compared to traditional solutions
- **Simplified** maintenance



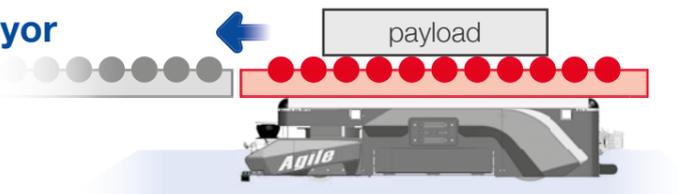
# Multipurpose vehicle

**Agile1500**, with its 1.5 ton maximum payload, can adapt to accommodate diverse manufacturing needs, factory layouts and multipurpose application possibilities. It is highly configurable and can be fitted with different performance accessories for each specific functionality (not supplied by Comau as a standard option).

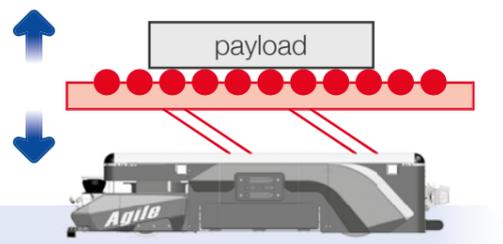
## Tow



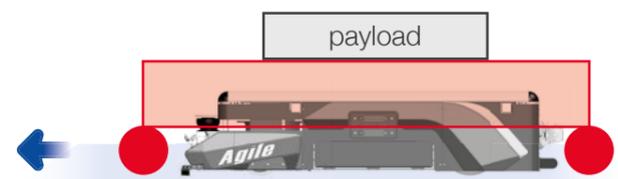
## Conveyor



## Lift



## Cart



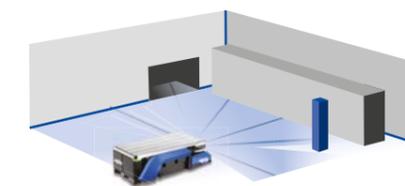
 = application functionality samples

## Navigation technologies

### Natural Navigation

Natural navigation uses measurements from the laser range sensor to **recognize natural landmarks** such as walls and other surfaces. This makes the production facility completely free of any reference installations including mirrors, reflectors, magnetic or colored elements.

This represents a highly flexible and reconfigurable choice for navigating in different environments.



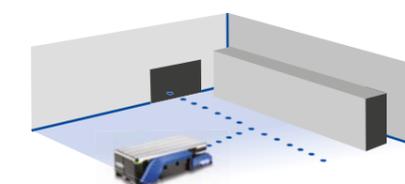
Laser Scanner

+

### Multi Navigation (optional)

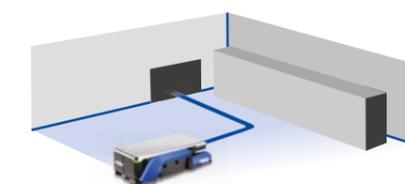
In addition, the **Agile1500** works with **multiple navigation systems** by combining natural navigation with a selected magnetic navigation option (spot or tape), and can switch from one to the other in real time: in magnetic navigation mode, the vehicle navigates by detecting magnets on the floor in areas where natural navigation can not work.

Typically used in pallet aisles, corridors and for piggy-back AGVs



Magnetic Sensor and Spot Magnet

or

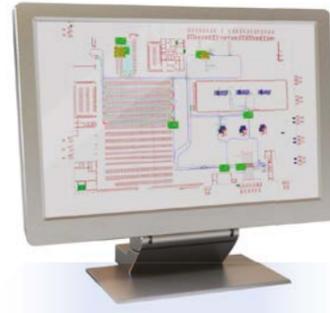


Magnetic Sensor and Tape Magnet

## Software

### System Manager

It controls the whole AGV system, handles transport orders, allocates vehicles, and selects routes for the different transport assignments. Transport orders are generated through digital I/O or via operator interface (CWay), or are received from a host system (ERP, MES, WMS, etc).



### CWay

CWay is the operating interface for the AGV system. It provides an easy way of ensuring that the system works as intended. Order parameters can be modified, and orders can be started or cancelled. CWay is available with multilanguage support and an AGV simulator interface.

## Hardware

### Vehicle Controller

It is the heart of the vehicle and supports reliable 24/7 operation.

It can provide a flexible communication solution through CAN/CANopen, Ethernet, RS232/422/485, WLAN and IO. The software functions supervise everything from navigation of the vehicle to communication with the AGV system controller and interfacing sensors and actuators.



## Safety

### Laser Scanner

The laser range sensor is in charge of detecting any obstacles approaching the AGV. It can adjust the depth of its sight according to the vehicle speed. As a result, it can react properly by decelerating or arresting the AGV's motion before a collision can occur.



### Safe Speed Module

This safety device is in charge of monitoring the speeds and the decelerations commanded by the vehicle controller in order to guarantee the safe behavior of the AGV.



### Safe PLC

The logic of all the safety features is managed by the Safe PLC, which is connected to the Laser Scanner, Safe Speed Module, safety relays and to the vehicle controller.



## Technical specifications

### SIZE AND WEIGHT

External dimensions (LxWxH) [mm]	1404 x 680 x 330
Weight [Kg]	350

### SPEED AND PERFORMANCE

Maximum payload [Kg]	1500
Maximum speed [m/s]	1.7 (in natural navigation)
Positioning repeatability [mm]	+/-10
Maximum towing force [N]	2400*
Maximum grade [%]	1
Operating environment	Indoor

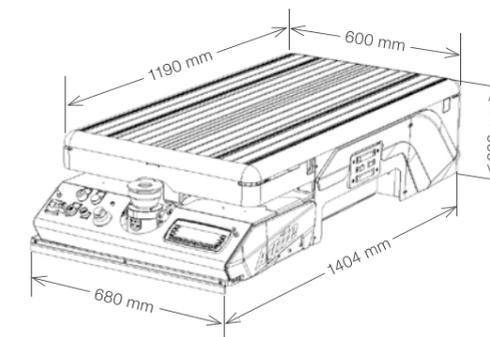
### BATTERY AND POWER SYSTEM

Battery type	Maintenance-free Lead
Battery characteristics [V] - [Ah]	24 - 205

### IMPLEMENTS INTERFACING AND COMMUNICATION

Power supply	24 Vdc Power, 24 Vdc Auxiliary
Communication	CANopen fieldbus

(\*): friction 0.5 / 350 kg on vehicle plate



## Options



• **Manual charging-battery charger:** the battery charger can be plugged either to the vehicle or to the additional battery pack.



• **Vehicle lifting bars:** through the lifting bars is possible to lift the vehicle from the floor either to do maintenance.

• **Battery trolley:** this make easier to drag the battery pack and to replace it in the vehicle - this option is highly recommended.



• **Additional battery pack + battery support:** the additional battery pack is an useful option in case the charging strategy will be the battery swap. The battery support is a dropping station for the batteries that have to be left in charge.

• **Multi navigation:** natural navigation + magnetic navigation: the vehicle basic configuration includes the natural navigation, the multi navigation can be included on demand.

• **Backward motion:** to move in reverse an additional rear bumper must be added. Although a bumper is installed, the maximum speed in reverse is approximately 250 – 300 mm/s.



• **Manual control device MCD8 HS:** To make the vehicle move manually. It is similar to a robot teach pendant but one single device could be used for more vehicles. It has got also the dead man functionality.



• **Sick programming cable for laser scanner:** since the laser scanner on board is programmable, a programming cable might be needed.

• **Automatic charging station:** is composed by a battery charger, a docking station and contacts plates on the vehicle side. This make possible the vehicle to approach autonomously the docking station and go to charging when the battery level is low.

• **Lithium batteries:** are the best choice in case of big fleet (>10 vehicles) and multiple shifts applications.

- Recharging time: 4-5 times shorter than lead
- Opportunity charging allowed
- Lifecycle up to 2000 cycles

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