

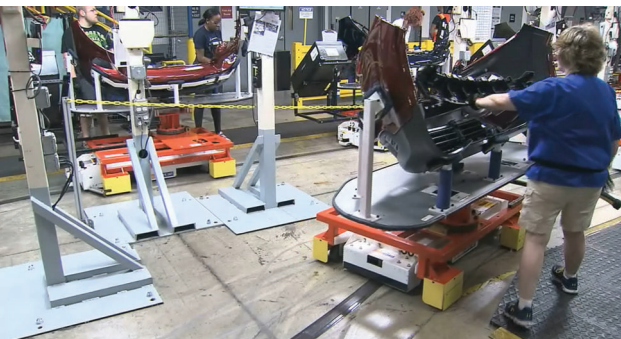


AGV Assembly Line Systems



DAIFUKU

JERVIS B. WEBB COMPANY



DAIFUKU

The World's Largest Material Handling Company

OUR LEGACY

The SmartCart® Automatic Guided Vehicle (AGV) is a flexible and cost-effective assembly line solution from Daifuku's Jervis B. Webb Company. With a rich history in assembly, the Jervis B. Webb Company is the best choice for your organization.

Assembly lines are our legacy. In 1920, Jervis B. Webb engineered, manufactured and commissioned the first automotive assembly line with Henry Ford. Since then, Daifuku's Jervis B. Webb Company has been continuously seeking innovative solutions for assembly production. Webb has successfully implemented material handling solutions with over nine decades of experience, providing robust and reliable AGVs since 1962.

As the inventors of the SmartCart Automated Guided Vehicle, we have proven successful solutions with over 5,000 assembly AGVs used for various applications.



BENEFITS TO AN AGV ASSEMBLY LINE

- Faster ROI than other automated assembly lines
- Ability to solve ergonomic issues of assembly
- Integrates easily with MES Systems
- Meets International ANSI safety standards
- Assembly lines adopt to any available floor space
- No permanent barriers or obstacles
- Meets requirements of Lean Manufacturing
- Works well with robotic automation
- Encourages "Just in Time" parts delivery
- Easily scalable by adding or subtracting vehicles
- Long life span with minimal maintenance
- Promotes green energy technology
- Proven technology of over 50 years
- Low total cost of ownership for users
- Customers can change and modify themselves without assistance
- Proven to be safe, reliable and predictable over and over again
- Assembly Line can change products with new tooling
- Accepts lift deck, turntables and slew bearings
- Can be used to run product tests
- Maximizes production floor space



PICK YOUR ASSEMBLY LINE STYLE

We can accommodate any style of assembly to fit your specific needs. Choose a solution that works best for you.

Index and Dwell (I&D): if your desire is to give line operators a stationary work environment, vehicles can stop in the middle of a station, allow work to be done, and then index to the next station. Speeds can be set between 5 and 160 feet per minute, truly allowing you to choose the best option for your needs.

Continuous Moving Line (CML): if you are looking for more of a traditional assembly line, you may simulate this by setting vehicle speed to as slow as 1.5 feet per minute up to 20 feet per minute.

Creep and Dwell: when CML is desirable but the speed is less than that of minimum CML speed, the system can be set up to Index and Dwell, using a CML speed for the index space. This can provide a virtual line rate of inches per minute.

PICK YOUR INTEGRATION METHOD

SAM to PLC Host Interface - Simplistic interface giving the PLC the ability to:

- Release vehicles from stations
- Set destination and route of vehicles
- Hold system
- Control the vehicle sleep schedule

Assembly Manager Software on SAM:

- Ability to switch between I&D or CML
- Unit serial number tracking
- Test work cells
- Repair areas
- Shift schedules and break management
- Vehicle sleep schedule
- Live assembly PLC interface
- Assembly reports

Index & Dwell or Creep & Dwell

- Takt time management
- Asynchronous advance
- Synchronous advance
- Work cell group
- Early release

Continuous Moving Line

- Takt Time Management via:
 - Work cell length
 - Catch up speeds
- With laser bumper
- With laser and patented virtual bumper

OVER 50 YEARS OF AGV EXPERIENCE

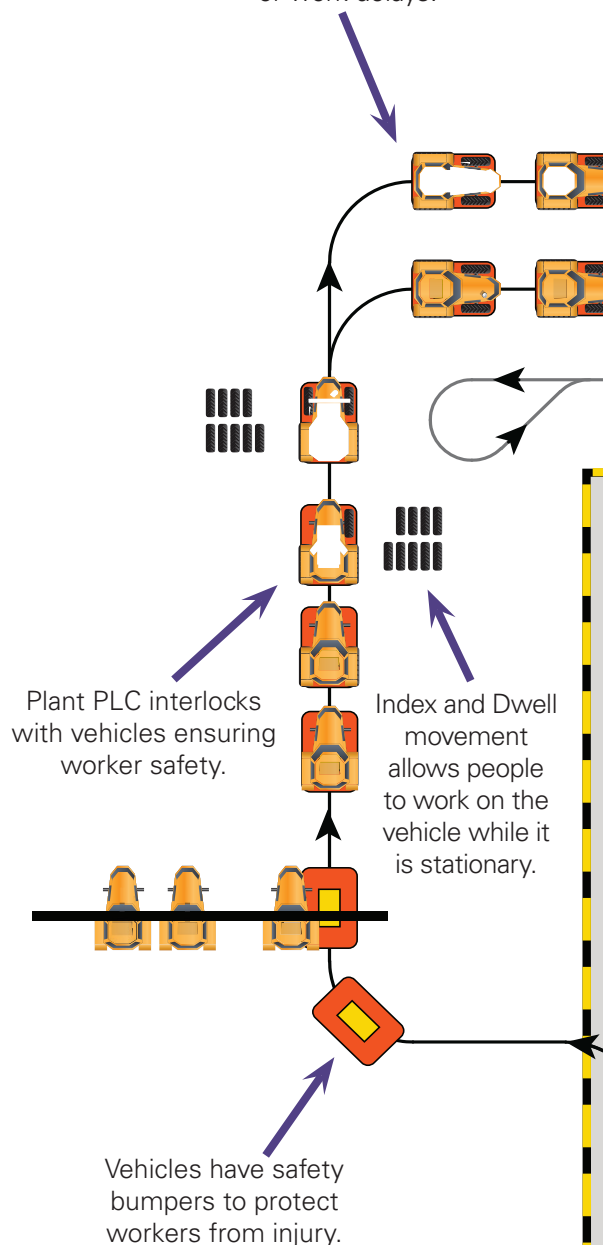
The ideal assembly line is meant to be flexible with the ability to expand or contract to suit the frequently changing work and product requirements. SmartCart® AGVs provide this flexibility in a constantly changing environment.

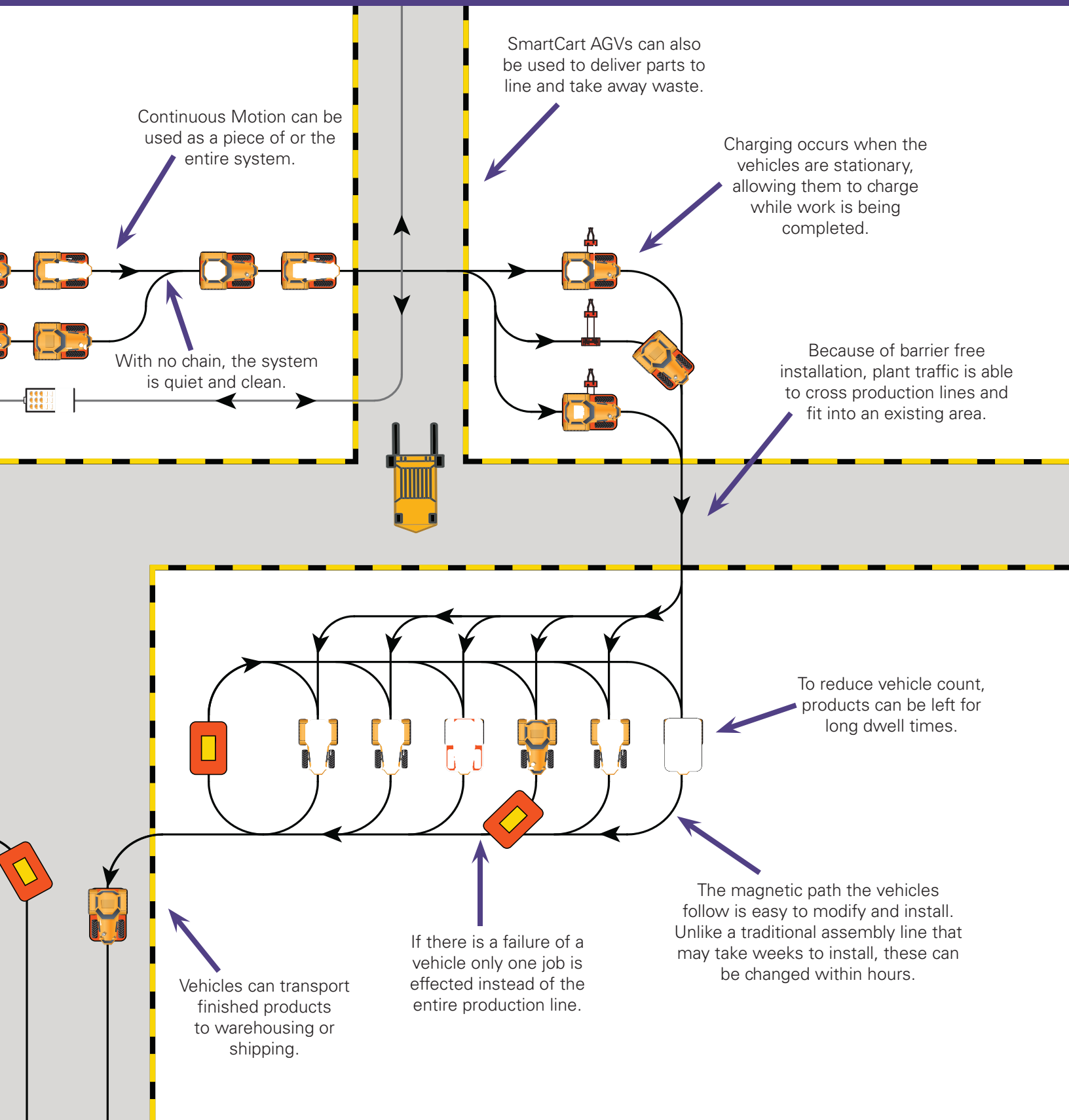
The SmartCart AGV is the most versatile, flexible and expandable assembly system available. The AGV system is easily reduced, reconfigured, relocated and expanded with little or no production downtime. There are no building modifications required with SmartCart AGVs, allowing the changes to happen quickly and efficiently so you can get your products moving again.

This cost-effective assembly solution has been implemented across various industries proving success for our customers. No matter what product you are creating, we have the ability to customize an assembly solution that works for you.

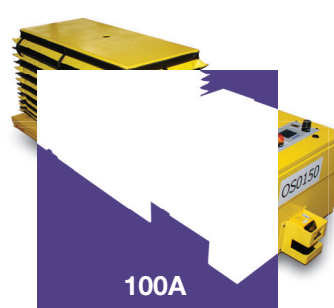
Since the invention of the SmartCart automated guided vehicle, we have installed over 15,000 AGVs in various industries. From automotive, to recreational vehicles, appliances, and small items, we have a solution for it all. Take a closer look at some of the key benefits to creating an AGV assembly line.

Patented “virtual bumpers” allow for a defined amount of space needed around the vehicle to ensure production is not hindered when vehicles stop for safety or work delays.





STANDARD FEATURES



Load Capacity (Alt Capacity)	1500#	750#	2500# (4000#)
Smallest Width	34"	28"	36" (42")
Smallest Length	50"	76"	86" (105")
Height (Without LHF)	•	•	•
Lowest Flat Deck Height	16"	6"	6"
Lowest Top of Lift Height	20"	11"	11"
90 degree Turn Radius	24"	24"	24" (48")
180 degree Turn Radius	30"	30"	30" (60")
Min / Max speed,	7 - 160 FPM	7 - 160 FPM	1.5 - 160 FPM
I = Index, CML = Continuous	I	I	I, CML
Charging (Max.)	80 amp	80 amp	140 amp

Optional features available across the Assembly vehicle product line include: HMI Panel Display • Radio •

SAM

System Automation Manager

A Robust, Easily-configured
Control System for Automatic
Guided Vehicles (AGVs)



			
250A	M300TT	500A	1000A
2500#	3500#	5000#	10,000# (22,000#)
60"	54"	60"	67.5"
80"	72"	46"	65"
10.4"		9.3"	16"
11"	20"	11"	16"
11"	23"	11"	16"
60"	24"	60"	72"
60"	32"	60"	96"
1.5 - 120 FPM	1.5-160 FPM,	2 - 120 FPM	2 - 120 FPM
I, CML	I, CML	I, CML	I,CML
140 amp	140 amp	140 amp	180 amp

Lift Control Foot Pedals • Lift Decks • Sleep/Auto Wake • Wheel Brushes • External Manual Brake Release

Benefits of SAM Include:

Graphical User Interface (GUI)

All vehicles displayed on one screen allowing users to visually see when vehicles need attention.

Comprehensive Reports

Reports include historical data, vehicle status, alarms, activity logging, faults and customized production.

Centralized Vehicle Management

SAM talks to each vehicle every second via wireless Ethernet (Wi-Fi). Communication to the host (PLC or MES) system is constantly maintained via a hardwire connection. Functions available include:

Traffic Management

SAM monitors the location and destination of all vehicles.

Dynamic Routing

SAM considers vehicle congestion and faulted vehicles when determining a vehicle's route.

Assembly Management

SAM offers an assembly manager that includes two configurations - index & dwell, and continuous moving line. Each option uses Takt timers and an interface with workcell PLCs to coordinate releasing of vehicles.

Easy Integration

SAM software is designed for use in integrated systems. The Kepware® OPC PLC interface can be integrated with any OPC platform. SAM software keeps track of all requests, executes them and reports status through the process until completion.

SMART HANDLING UNIVERSITY

With us, you have the ability to focus more time on your product instead of how to build it. Our SmartCart AGV is a product that integrators and customers can use with little or no outside assistance. We allow for a high level of end user ownership, giving you the tools to control your own system. With training and documentation, the SmartCart AGV can be modified and reconfigured without requiring Webb support.

Our Smart Handling University course will provide the foundational knowledge for utilizing CartTools® to program simple or complex reliable systems. Additionally, an in depth discussion of CartTools commands and programing best practices are taught.

Upon completion of the course, individuals leave with full working knowledge on how to effectively and efficiently program any type of SmartCart product and system and will be able to make any changes at any time on their own.



Established in 1919 Jervis B. Webb Company specializes in the design, engineering, installation and support of innovative material handling systems used in the automotive, airport, beverage, warehousing, and manufacturing industries. As a subsidiary of Daifuku Co., Ltd., we form one of the largest material handling companies in the world, providing the widest range of solutions in the industry for companies around the globe.

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