LOGO!MAT eCart - Intelligent Transport System

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LOGO!MAT eCart - Direct Comparison

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eCart

The eCart System was specifically designed to connect a series of automated assembly and test stations. Typically, these systems are arranged with a small footprint in mind. In order to achieve this, buffering areas are positioned between stations and rework spurs are arranged outside of the compact main assembly area.

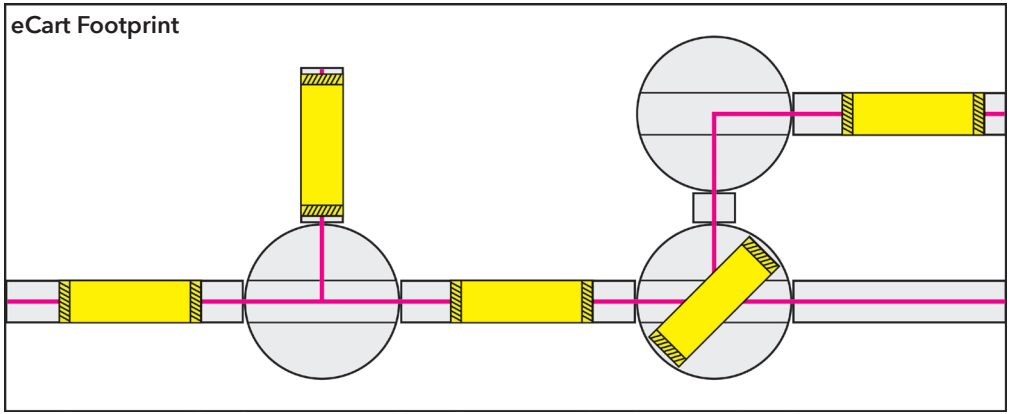
Advantages of the eCart:

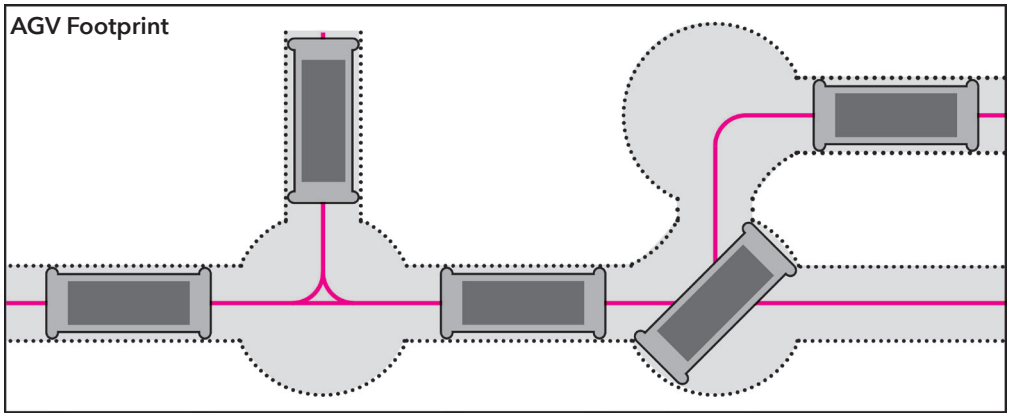
- Minimal space requirement and turn radius
- No need for PLS Scanner
- Short stopping distances
- Quick takt times for any production volume

AGV

AGVs can be used to connect a series of automated assembly and test stations, but are more specifically intended for use in logistics applications.

Although the production space used by an AGV system appears open, much of this space is kept clear out of necessity to prevent interference between PLS scanners. The layout must also take into account the size and turning radius of the vehicles. Additionally, other traffic crossing the production space forces AGVs to decelerate and stop, leading to increased traffic density and accumulation of vehicles. This translates into delays to the cycle times.





	eCart	AGV	Roller/Chain Conveyor
Guidance	Self-driven cart, passive track system	Autonomous vehicle, no track system	Passive pallet, driven track system
Communication	NFC at Stop Units in the track system	Wi-Fi throughout	Sensors and RFID readers mounted to conveyor frame
Energy Supply	48V DC via power rail in track	Batteries	Fixed wiring
Safety Technology	Integrated safety bumpers, distance sensors, emergency stop capability	PLS Scanner required, safe emergency stop not possible using Wi-Fi	Reduced speed, double Stop Units, laser scanners not possible
Speed	Up to 0.4 m/sec	Up to 0.3 m/sec	Up to 0.2 m/sec
Stop Position Adjustment	Can be positioned or moved anywhere in the track system; no external personnel required	External personnel required	Can be positioned or moved anywhere in the track system; no external personnel required
Multi-Level Capability	Possible with elevator	Possible with elevator if certain conditions are met	Possible with elevator
Material Supply	Directly on floor or via platform	Directly on floor	Directly on floor or via platform
Commissioning & Maintenance	Quick and easy commissioning; minimal maintenance requirements	Complex commissioning; significant required maintenance	Quick and easy commissioning; minimal maintenance requirements
Cycle Times	Short cycle times	Longer cycle times	Short cycle times

LOGO!MAT eCart - Advantages

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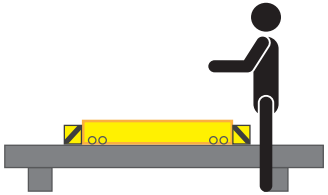
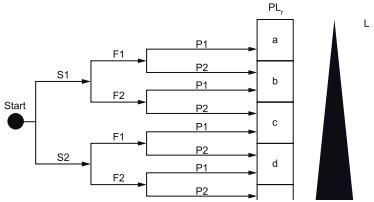
Safe Operation

Operator safety is a major concern when moving heavy objects at high speeds, and the eCart System was designed with this in mind. The propelling force for each eCart is preset to the minimum level necessary for movement. This can be precisely defined to ensure proper and repeatable acceleration out of all stop positions. The low propelling force allows you to stop an eCart with minimal effort, even without utilizing the cart's bumper or an external e-stop circuit. The eCarts are equipped with a safety bumper for each direction of travel. If either bumper is activated, the cart's active braking system immediately stops it.

The Performance Level D (PL-d) rating guarantees the highest level of operator safety. In case of a power outage or emergency stop scenario, the eCart's brakes actively stop its movement. You can even tie your smart tooling into this safety circuit so that its movement stops immediately as well.

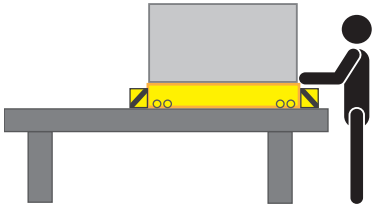
Externally triggered, two-channel emergency stop signals can be used to stop all movement in a defined area of the track. The eCarts will only drive when provided with 24V of energy that can be safely externally shut off, so when this signal is lost, all cart movements in the designated area will immediately stop. Moving toolings also use this signal and additionally stop their movements.





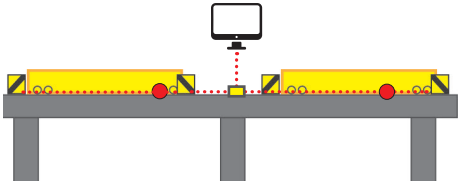
Limited Drive Torque

The drive torque of each eCart is electronically limited by the drive controller. The value is set as low as possible and can be adjusted for each eCart individually. The low driving force enables you to easily stop an eCart by hand, without the need to activate an e-stop or safety bumper.



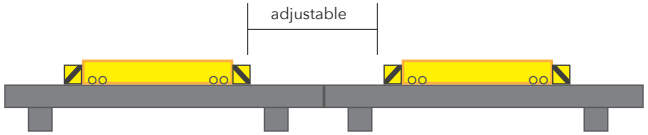
Data Communication

Each Stop Unit can be used to transfer data wirelessly. In addition, cart parameters can be changed automatically, and information can be transferred between the main PLC and the customer's tooling. This allows you to manipulate the workpiece's orientation while the line is running, for example. The integrated controls interface makes the eCart System simple and inexpensive to operate.



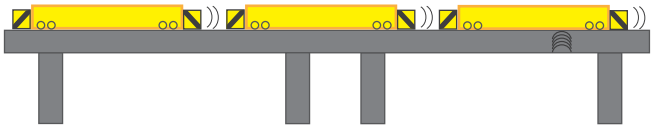
Adjustable Accumulation Distances

The minimum stopping distance between two eCarts is adjustable. When accumulating at a Stop Unit, the eCarts will automatically maintain this minimum distance.



Zero Force Accumulation

The Stop Units require no physical contact with the carts, and the carts approach and exit the Stop Unit areas smoothly. An unlimited number of carts can be accumulated at any of the Stop Units with no buildup of force and no wear and tear on the system. The cart's drive motor automatically shuts off when it comes to a stop, so no energy is consumed in an accumulation scenario. Each cart is equipped with an adjustable laser distance sensor that ensures it will approach and stop at a preset distance away from the cart in front of it. The eCarts accelerate and decelerate smoothly within your desired parameters, ensuring that your part is not affected by any kinetic forces when approaching or leaving a station.



LOGO!MAT eCart - Advantages

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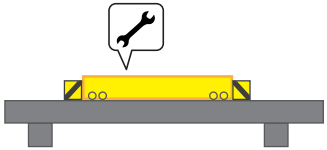
Minimal Maintenance Requirements

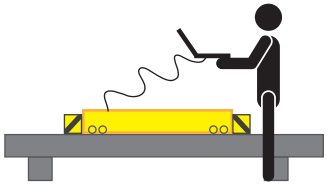
There are no moving parts in the straight track sections and the power rail lies safely tucked beneath the conveyor frame, where it is protected from dirt and debris. This ensures that the track system is nearly maintenance-free. In addition, the power rail concept means that there is no need to charge or replace batteries in the carts. In the unlikely event of a fault in one of the eCarts, the track section itself is not affected. The defective eCart can be removed from the line for diagnostics and repair without interrupting the rest of your production.



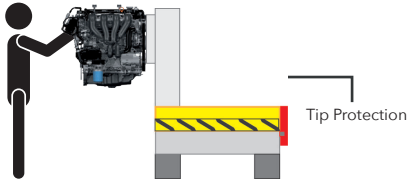
Manual Cart Removal

Each eCart features comprehensive self-diagnostics to proactively detect required maintenance or upcoming faults. This means that an eCart can be removed from the line for inspection or maintenance before a fault even occurs.

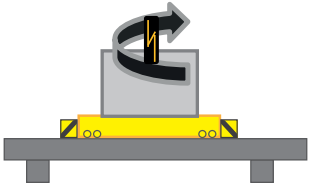
- An optional remote control can manually drive the eCarts
- Carts can be manually moved, if power is lost or shut off
- Production can continue if a faulty cart is removed from the line
- Carts can be easily reintroduced to the line



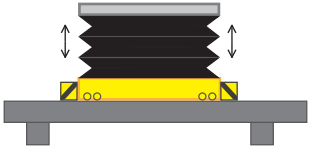
Tip Protection
Using optional hold-down bars and support rollers, the eCart System is capable of safely transporting large, over-hanging parts with uneven centers of gravity.



Power for your Tooling
Each eCart can be equipped with 48V/10A DC auxiliary energy to power your tooling device. This enables you to control your smart tooling while the cart is in operation.



Scissor Lift
The integrated Scissor Lift allows you to lift your part up to 300 mm. This can be used to place parts onto an external structure with indexing points for precise positioning or high torque operations.
The Scissor Lift also enables you to adjust the height of your workpiece while the part is moving between stations. This allows you to optimize the ergonomics of each manual workstation.



Energy Efficiency
The eCart system only consumes energy when it is in motion. As soon as an eCart stops at a Stop Unit or in an accumulation situation, its drive motor shuts off. The eCart's Stop Units are completely electric with no need for pressurized air. In comparison to conventional conveyor systems this translates into energy savings of at least 80%.

LOGO!MAT eCart - Applications

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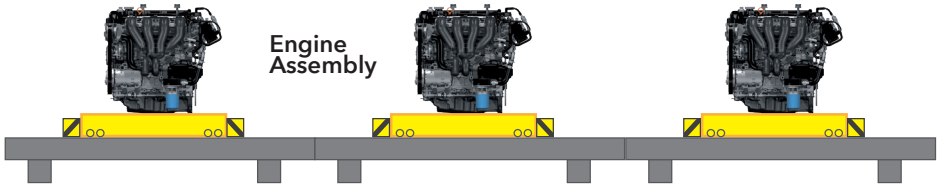
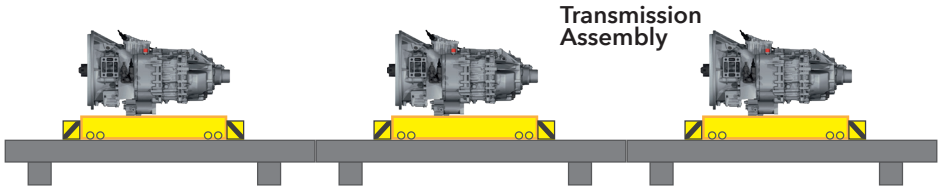
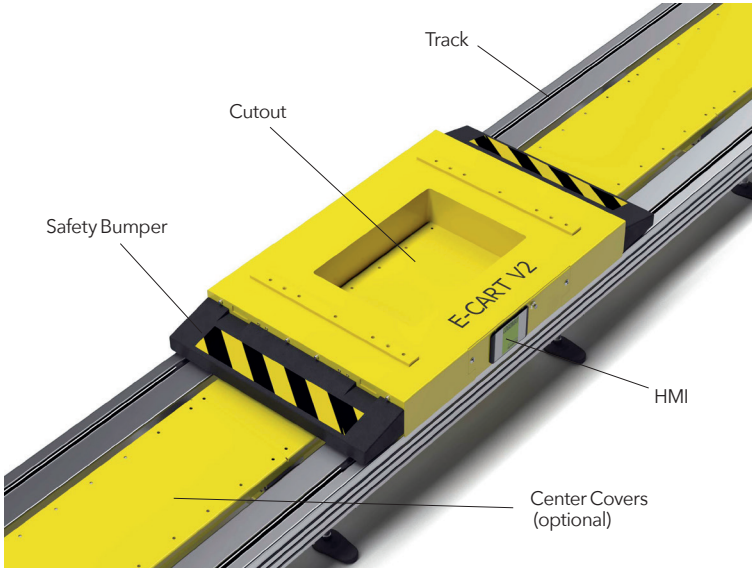




The **LOGO!MAT eCart System** is a state-of-the-art conveyor system with self-driven, smart carts that are guided on a passive track. It is developed to be highly flexible for use in automated assembly and test environments, such as component assembly in electro-mobility. Thanks to the modular rail structure, future expansions and reworks can be easily implemented. The LOGO!MAT eCart is Industry 4.0 ready and is characterized by minimal maintenance requirements, high availability, and great reliability.

The **Performance Level D (PL-d) rating** of the eCart System ensures operator safety, even when working with heavy loads moving at high speeds. Each eCart is equipped with an obstacle detection system, which senses other carts in its path and stops itself at a preset distance away. The eCarts also feature safety bumpers that use a two-channel active braking system to immediately, safely stop the cart upon impact with an obstacle.

The **integrated self-diagnostic system** proactively detects and communicates warnings and faults. This enables you to automatically divert an eCart to a reject spur for maintenance before a failure occurs.



eCart - Technical Data

The eCart is an electrically powered, intelligent part carrier with self-diagnostic functionality and predefined attachment points for tooling. Its four wheels are precisely guided along round steel shafts, and 48V DC energy is provided by a power rail tucked safely below the track.

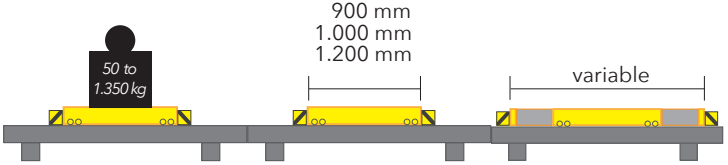
It features an integrated 4.3" color touchscreen as the interface for status information, diagnostics, parameter adjustments, etc. Safety bumpers that stop the cart immediately upon contact are mounted on each end of the eCart, and extended bumpers are available for longer work pieces.

In the event of a power outage, emergency stop situation, or activation of a bumper or other safety element, the safety circuit triggers an immediate stop of all cart movements.

Sizes and Capacities

	Weight Capacity	Standard Dimensions
eCart 600:	50 - 600 kg	900 x 600 mm
eCart 700:	50 - 1.350 kg (Optionally up 2.000 kg)	1.000 x 700 mm
eCart 900:	50 - 1.350 kg (Optionally up 2.000 kg)	1.200 x 900 mm

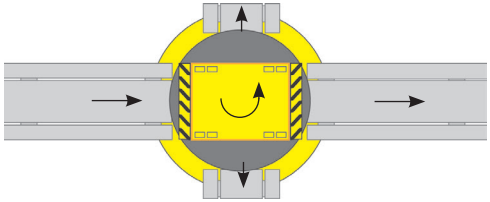
Extended bumpers for long workpieces



LOGO!MAT eCart - System Components

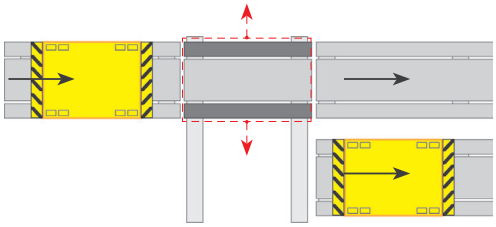
Track

The passive conveyor track has no moving parts and is completely maintenance free. It also functions as the mounting frame for Stop Units, Locate Units, and the integrated power rail. The power rail provides 48V DC energy to the Carts as well as to your powered tooling. The low profile version is only 220 mm tall, about the height of an a verage step. The entire track system is walkable allowing operators to access your work piece from every side. The elevated version of the track can be built with or without the walkable center covers.



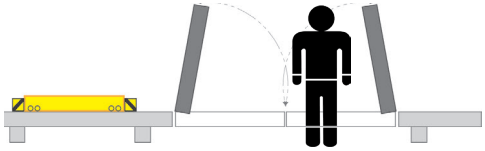
Track Rotate Unit

In place of Corners, Intersections, Diverters, and Junctions, a standardized Track Rotate Unit is utilized. An electrical drive motor powers the rotation and positioning of the Track Rotate Unit. Each Track Rotate can have up to four attachment points for adjoining tracks. In addition, it can be used as an idling spot for a cart. The integrated "Rotate Controller" controls all of its movements and signals automatically. The requested stop positions are taught through web visualization. The main PLC just has to define the stop positions over the customer's BUS system. This helps avoid collisions since the unit will only execute feasible stop position requests.



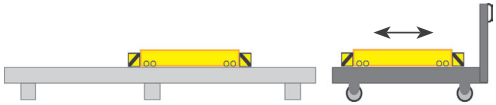
Shuttle

The Shuttle moves an entire track section laterally between up to four stationary tracks. If used to connect two parallel track sections with the same direction of travel, the cart's orientation will remain unchanged. The Shuttle can also be used to bring the cart to an offline spur next to the main line or as an idling spot. If it is used to replace a 180° turn, the cart will travel backwards after it is transferred onto the parallel conveyor track. The integrated "Shuttle Controller" controls all of its movements and signals automatically. The requested stop positions are taught through web visualization. The main PLC just has to define the stop positions over the customer's BUS system. This helps to avoid collisions since the unit will only execute feasible stop position requests.



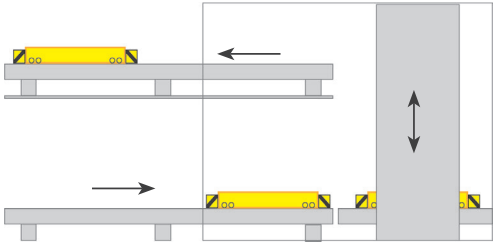
Lift Gate

The Lift Gate is a section of track that can be raised, allowing operators and material to enter a closed conveyor loop. The Gate is available in a manual or an electric version. The integrated "Lift Gate Controller" controls all of its movements and signals automatically. The customer controls must only give the "open/closed" command over their BUS system.



Manual Docking Cart

With the Manual Docking Cart, an eCart can be easily removed from or reintroduced to the line. Once the Manual Cart is locked to the docking station at the end of the conveyor track, the eCart can be manually pushed onto the Cart and transferred to an external operator or maintenance station.



Elevator

Elevators can be used to transfer eCarts weighing up to 3,300 lbs. from one level of track to another. The eCart drives onto the Elevator track section which is then lifted or lowered to interface with another level of track. The Elevator is equipped with a web visualization and its own controls that tie into the main BUS system. The Elevator also features safety controls, including sensors and gap controls.

LOGO!MAT eCart - System Components

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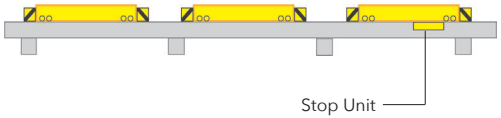
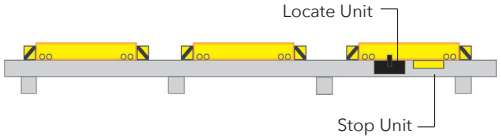


Stop Unit

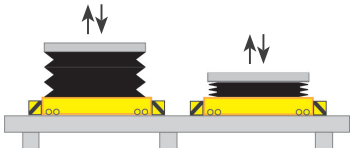
The Stop Unit is fully electric and brings the eCart to a gentle, controlled stop with no physical contact.

Stop Units are equipped with three communication antennae and a presence sensor. Also included is a communication unit that connects the Stop Unit to your main controls via the Stop Unit Gateway. The Stop Units enable you to communicate in both directions between the eCarts and your main PLC. It is also possible to add a Locate Unit to any of your Stop Units.



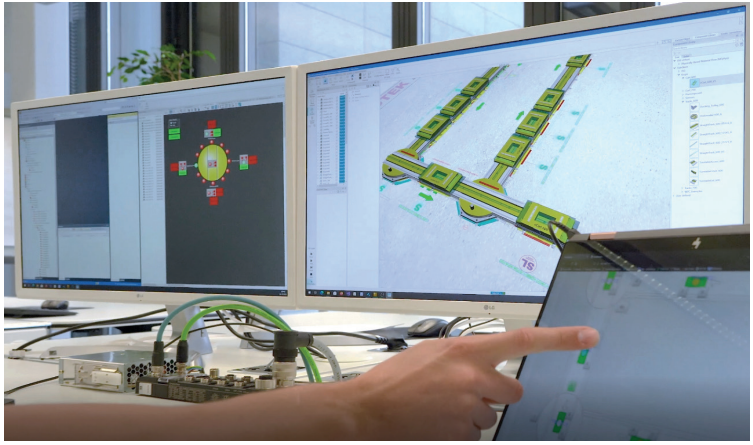
Locate Unit

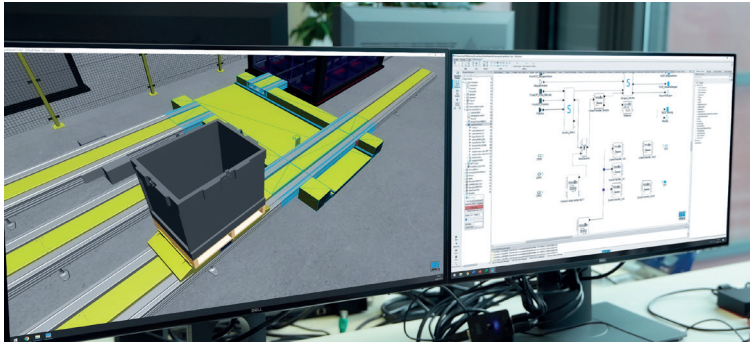
The electrically actuated Locate Unit is a mechanical pin that indexes into the eCart and locks it in place. Use of a Locate Unit with a Stop Unit gives you positioning accuracy of ±0.6mm in the travel direction. The unit is mounted to a base plate which is safely tucked below the track rails.



Scissor Lift

The Scissor Lift is a hydraulic lifting platform with a maximum stroke of 300 mm that can be used with parts up to 2,750 lbs. The controls are integrated into the eCart and streamlined so that all signals to and from the Scissor Lift are exchanged via the standardized Stop Unit interface.





Virtual Commissioning

Virtual commissioning is far more than just a process simulation. It is based on real controls interfaces and displays real time behavior of the components. A digital version of all of our eCart components can be found in the ISG Twinstore, so you can easily develop a perfect rendering of your conveyor layout. Once you have your ISG Virtual model, you can connect it to your real PLC to set up the main controls and flow of your assembly line. The program allows you to commission your system before it even hits the floor, meaning that once it is mechanically installed, it can be up and running in no time.

Flow simulations, process optimization, rework planning, and debugging are just a few of the major benefits of having a digital twin version of your project. This advanced commissioning platform reduces the time and cost associated with installing a new system or reworking an existing one.

By virtually commissioning your system in advance, you can show up to the customer's site with a runoff-ready system.

For more information on the capabilities and benefits of virtual commissioning, reach out to our sales team today!

LOGO!MAT eCart - Intelligent Transport System

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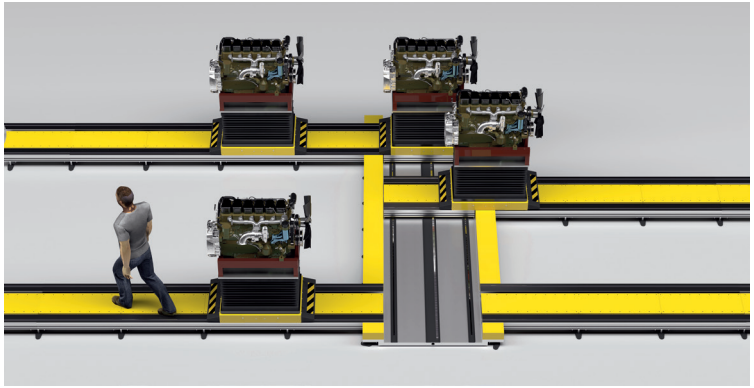
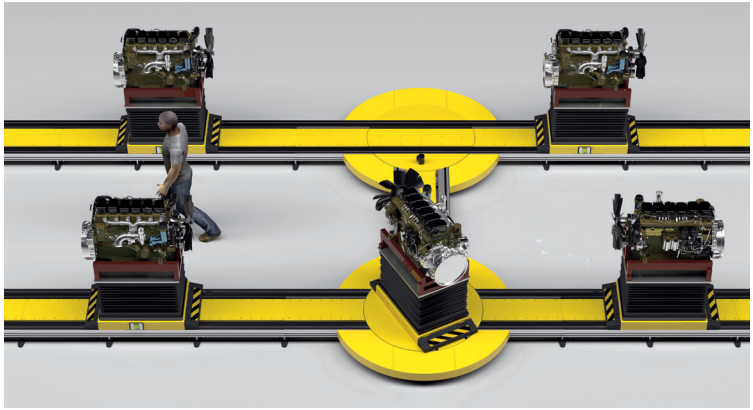
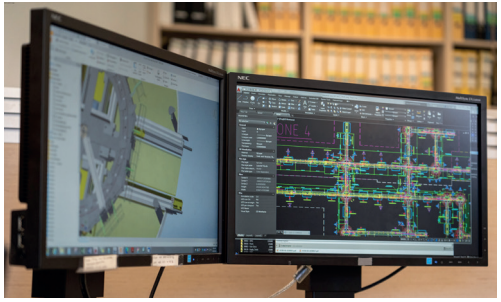




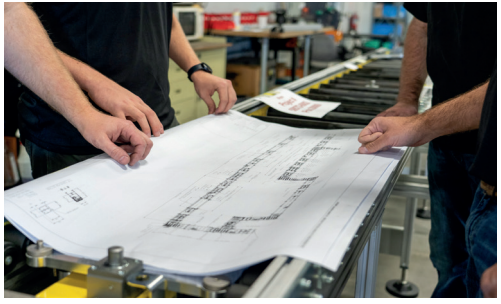

eCART 10
STOP

LOGO!MAT eCart - Contact



The LOGO!MAT Planning Tool is specially tailored to LOGO!MAT Conveyor Systems and includes drawing blocks of all our standard components. The tool enables customers to quickly design and develop a layout of their assembly line using a standard CAD program. The system can be built as planned because the planning blocks factor in spacing and other requirements for LOGO!MAT Systems.

Our excellent customer service starts in the project planning phase and carries through to installation and beyond. With years of experience in the conveyor industry, we can help you find the most efficient and cost-effective solution for your assembly needs. Constant communication between our project engineers and your team ensures a successful project on both ends.



We manufacture all of our components in-house, and each one is tested before leaving our shop. Our customers are welcome to visit our facility for a buy-off prior to the shipment of their system. We also have technicians available for support with installation, commissioning, maintenance, or training for your system.

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