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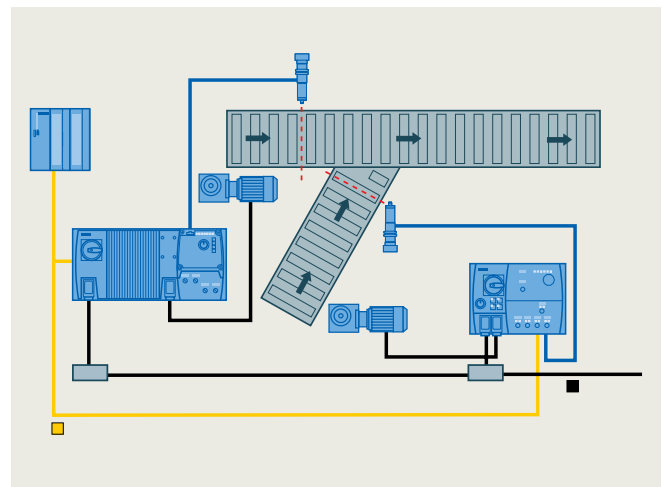
# Material handling

## Application definition

Material handling could be considered a simple term for a fairly sophisticated set of applications. Regardless of the level of intricacy, the ultimate goal is to move a physical object from point A to point B. In addition, all material handling systems require a few simple things: reliability, predictability, compactness and flexibility. Conveyor systems are the foundation for material handling systems, and are designed to meet these requirements. These systems are used in a number of industries such as warehousing, receiving, packaging, shipping and production, while incorporating a sequence of operations to make sure each of the aforementioned occur flawlessly.

## Explanation of the process

There are many types of conveyor systems and configurations used across various applications. One of the most common conveyor systems used in conjunction with variable frequency drives (VFDs) is the roller conveyor. The figure opposite illustrates a high-speed roller conveyor system used in a cross-docking (no warehouse) application for logistics. Products can pass through the system from either the long horizontal conveyor or be merged via the short angled conveyor. A programmable automation controller with sensors handle sequencing, prevent collisions and move product at a varying speeds through the system. Most of the products flowing through the system are transported from an incoming shipping vehicle directly to another for outgoing shipment via this setup. Incorporating a cross-docking setup streamlines the supply chain and in many cases can incorporate products of all shapes and sizes. The core goal of cross-docking is warehouse minimization while accurately controlling the flow of goods.



Application challenge		Siemens answer
Reliable: systems need to be running at maximum throughput with little or no downtime in order to increase productivity and lower cost.	➔	Reliable: compact removable memory cards make hardware field replacement easy. No need for a laptop or expensive technician to get back up and running.
Flexible: varying shapes, sizes and weights can affect timing and performance of the overall system. The system must be "smart" enough to adjust seamlessly.	➔	Flexible: SINAMICS drives offer a single commissioning tool to unlock the widest range of applications — from basic roller tracks up to multi-axis high-bay racking units.
Predictable: as cross-docking systems have no warehouse, timing is everything. In a large or small operation, the goods need to be where they should be 100% of the time.	➔	Predictable: SINAMICS drives incorporate common PLC functions for both logic and position control right at the drive. Capable and intelligent drives with fast response time increase accuracy.
Compact: cross-docking is a space-saving method, and the incorporation of similar measures for the various systems supporting this is important. Reduce space however possible.	➔	Compact: modular and machine mountable drive variants offer high power and drive density in a small footprint.
Economical: highly capable systems need to come at a cost that will allow users to compete in the global marketplace.	➔	Economical: feature-rich, yet easy-to-setup, use and maintain. Value-positioned drives come standard with macros to shorten programming time and diagnostics to reduce downtime.
Sustainability: these systems are highly utilized as opposed to typical conveyor setups, and energy sustainability is paramount to minimize operating costs.	➔	Sustainable: SINAMICS drives are capable of energy recovery thus eliminating the need for a braking resistor. All excess energy is either reused or restored to the line versus lost.

### Siemens vs. competition

- Siemens is the industry leader with basic positioning in a machine mountable IP65 protected standard drive.
- Energy recovery with regeneration capability is possible in both servo and general purpose drive variants.
- Siemens offers the widest power range in a single drive family — from drives with fractional horsepower to megawatts for large applications.
- There is a single commissioning tool for all drive types. Servo, vector and V/hz have one common software package across all platforms.
- Extensive diagnostics are included for free — no need to purchase adders to get diagnostics.
- MMC Cards reduce downtime and allow for easy field replacement.
- Drives are seamlessly integrated into the most comprehensive automation and drives family in the world, making a totally integrated automation solution.
- Siemens offers you it's global support network bringing together more than 130 countries.



SINAMICS V20



SINAMICS G120D



SINAMICS G120C



SINAMICS G120