CONVEYING TECHNOLOGY
LOADING TECHNOLOGY
PALLETIZING TECHNOLOGY
PACKAGING TECHNOLOGY
SORTATION AND
DISTRIBUTION SYSTEMS

Belt Tray Sorter
with contactless
energy supply
The BEUMER Belt Tray Sorter with contactless energy supply and linear induction motor drive is the high-capacity system for sorting a variety of products, including:

- Letter trays, packets and small envelopes in the postal and courier industry
- Shoeboxes and apparel in the footwear and clothing industry
- Plastic film wrapped products with high-friction (sticky) surfaces as in mail-order companies and the newspaper distribution industry
- Unstable and sensitive products, such as frozen foods, cakes and dairy products
- Other industries with extreme variation in product types, shapes and frictional behavior such as baggage handling for airports or freight centers

These and many other industries can benefit from the high-speed but gentle sortation of their products through the distribution chain. The BEUMER Belt Tray Sorter with contactless energy supply sorts items safely and gently to the right destination, irrespective of size, shape or surface characteristics of the product handled.
The outstanding features of the BEUMER Belt Tray Sorter are:

- Power supply on demand due to contactless energy supply, no additional generators or batteries required
- Modular design, mechanical components field-proven in all types of industry and applications
- A control system featuring standard, commercially available components rather than proprietary and sole sourced
- Low maintenance, easy access, a Belt Tray with 50 % fewer component parts
- Wide range of applications, designed for ambient temperatures between –30°C and +45°C (–22°F – 115°F)
- 80% reduction in maintenance costs compared to conventional bus bar power supply systems
- Low life cycle costs because of maintenance-free carriage assembly
- Heavy-duty carriage connection, ball-joint type bearing, lubricated for life
- Positive (mechanical) braking system for controlled stop of the sorter during power outage or other loss of primary power supply
- Quality assurance conforms to DIN ISO 9001 standard
As with all models in the BEUMER family of fine sorting machines, the Belt Tray Sorter is engineered in modules:

**Belt Tray**

The operating principle for the Belt Tray Sorter is a series of reversing belt conveyors which operate perpendicular to the sorter direction of travel. To induct a product, the specific crossbelt is activated. The item is transferred at a controlled velocity. The opposite process is effected during the discharge. The belt is activated in the direction of the discharge and the product is smoothly transferred to the destination.

The BEUMER Belt Tray Sorter has 50% fewer components than other crossbelt sorters. The gaps between pulleys and adjacent belt trays are minimized. Product damage, jams and system downtimes are significantly reduced by this unique belt tray design.
Each belt tray is driven by a standard DC-motor. The required energy is supplied by a traveling-medium frequency to direct current converter (MF / DC converter).

BEUMER has designed belt conveyors since its foundation in 1935. During the design phase quantities and types of mechanical components are kept to a minimum.

Frame and Track
The frame profiles with integrated track rails are extruded from anodized aluminum. Safety covers, photocells and other components are attached conveniently at any position along the frame.

Carriage
Maintenance-free carriages made of die-cast aluminum are assembled to form a continuous, closed loop. Support and guide rollers are polyurethane with integral, sealed and lifetime lubricated bearings. The carriages are connected by high-strength bolts and universal-type joints for simple assembly and disassembly.

Drive
The linear induction motors (LIM) which propel the sorter have no moving parts. Low noise levels are assured. Force components which normally impose additional wear on the carriage rollers are canceled by the double-sided vertically positioned drives. Power loss and the need for frequent adjustments that are typical for single-coil, horizontal LIM-arrangements are avoided.

Brakes
In normal operation, deceleration and stopping is effected by a direct current dynamic brake. In addition and if required, one or more mechanical brakes with adjustable braking force can be mounted to the frame.

Safety Covers
Top, side and bottom covers are of molded, synthetic material. The lightweight covers are easily removed to allow maintenance access to all areas of the sorting machine.
Contactless Energy Supply

An outstanding feature of the BEUMER Belt Tray Sorter is the unparalleled system for contactless energy supply. In the past, electrical power has been transmitted to an active/traveling conductor by maintaining a continuous connection between the moving pick-up device and a static passive supply line, often called a busbar system. It is still used for electric overhead trolleys and some conventional crossbelt sorters. Some alternative designs produce energy as the carriage assembly is pushed by, equipping the support rollers with a generator. The energy produced is stored on the moving unit by means of batteries.

The transfer or production of electrical energy with moving contactors results in sparking. This is a disadvantage of all contact-line transmission systems. The power pick-up device is a frequent wear part and high maintenance costs for contactor or battery systems are the consequence. The actual as well as environmental cost of battery disposal should also be considered. The BEUMER Belt Tray Sorter avoids these additional labor, environmental and material costs by transferring energy from an energized cable to the traveling conductor through the air. By converting electrical power into a medium frequency current, the electrical energy can be transmitted from the static power supply to the flying transformer over an air gap of approximately 20 millimeters (3/4 inch) or “thumb clearance“.

Due to the selected frequency of the current, a very high transmission efficiency of 98 % is realized. At the belt tray, the transmitted medium frequency current is changed to DC power by the MF / DC converter. This converter is equipped with an intelligent power output to control the DC motor of the Belt Tray.
Contactless Data Transmission

Stationary infrared (IR)-data transmitters are located along the sorter loop, generally where the belt tray performs actions like loading or discharging. The (IR)-data transmitter sends control commands for each sort item, specifying the individual handling characteristics like footprint, shape or weight.

Each belt tray is equipped with a control unit. The control unit comprises an infrared (IR)-data transceiver and a microprocessor. The control unit processes the control commands captured by the (IR)-data transceiver and adjusts acceleration, deceleration and speed of the belt tray through the MF / DC converter and belt tray motor. The control unit monitors the status of each belt tray as well.

A stationary belt tray check module, equipped with infrared (IR)-data transceiver and microprocessor is installed strategically, for instance shortly before the induction group, at the sorter loop. This module receives function and status reports from each belt tray’s control unit for further processing.
BEUMER Sort Control (BSC)

The control of all machine-relevant functions relies on a standard, off-the-shelf, programmable logic controller (PLC). This real-time system, service supported worldwide, executes control commands for all the mechanical elements of the sorter and its periphery such as product induction conveyors, code reading devices (scanners) and the outputs. It also processes the signals from all sensors and status monitoring units of the Sorter.

The BSC system comprises decentralized input/output (I/O) devices, communicating by means of a standard PROFI-/ASI-bus local area network (LAN).
BEUMER System Server (BeSS)

The BeSS is a PC-based Windows server, attending to the upper level control of the sorting process.

Its major tasks are to:

- communicate, if required, with a management data acquisition computer, often called HOST, over a multitude of available network standards and protocols.
- provide the human-machine-interface (HMI) by means of menu driven color graphic displays and easy to use keyboard, securely protected by a multi-level password system. The operator interface may be further enhanced by adding a hardened industrial grade computer mouse, touchpanel screens or other input devices.
- provide extensive data logging tools for statistics, maintenance and error corrections.
- transmit data files to the HOST for further detailed processing, also with standard office software.
- serve as the sort allocation computer (SAC) for the BSC over the local area network. A huge amount of freely selectable sorting tables can be downloaded, edited and stored on the BeSS.
- ensure historical archive of system operations for reporting integrity in the event of communication interruptions with the HOST.
Merits of the BEUMER Belt Tray Sorter

As with all products in the BEUMER family of sorting equipment, the discharge sequence of the BEUMER Belt Tray Sorter is 100% controlled, safeguarding the gentle handling of products with the minimal affect of gravity. The directed, horizontal discharge path with the assisted power of the belt tray makes it possible to use smaller, closely stacked destinations allowing significant space savings.

As the discharge sequence is initiated without external operation, destinations can be realized in the sorter areas, which were unsuitable in the past, e.g. in curve areas.
Thanks to the contactless data and power transmission, the BEUMER Belt Tray Sorter incorporates the utmost in flexibility.

The system can adapt rapidly to varying requirements in operating „throughput rate“ or „individual product requirements“ associated with seasonal peaks in the business cycle.

As the belt tray induct and discharge speed can be adjusted for each individual item (providing a multitude of different ramps, tailored to your product), impact resulting in product damage and noise development is kept to a minimum. By individually adjusting the start position of each discharge sequence, higher filling rates density of products) can be achieved in the after-sort accumulation areas. It is even possible to separate heavy items from lightweight (fragile) ones within the same output selection. Belting materials and surface textures can be formulated to the specific product requirements.

The extensive use of proven technologies and reliable components the BEUMER Belt Tray Sorter provides high reliability with a cost of maintenance that can be 80% less than that of conventional crossbelt sorters.

The unique contactless energy supply system keeps operating costs at a minimum – and the modular design concept means that systems can be configured to ideally suit your building’s floor space without having to compromise on system performance.

Tomorrow’s sorting and distribution tasks require precise, experienced attention to mechanical design and system implementation. BEUMER is prepared to act globally with our well-balanced range of products, our worldwide presence and an established tradition of excellence and integrity that is passed on from one generation of workers to the next.
For many years BEUMER has delivered sortation and distribution systems to businesses all over the world. We provide system solutions from stand alone machines to fully integrated material handling systems. Our customers appreciate our proven, well-engineered technology as much as the reliability of our project management teams.

BEUMER – your professional partner