



CARTER CONTROL SYSTEMS

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PRODUCT CATALOG

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High Speed Tray Sorter (HSTS)

The High Speed Tray Sorter (HSTS) system is composed of commercially available off the shelf components currently in production. This equipment is able to sort letter trays and flats tubs at a continuous speed of 50 trays per minute. The system is comprised of a series of powered roller conveyor sections for feed, induction, scanning and recirculation, a split-belt AC motor driven sortation conveyor with bidirectional (left and right diverts) pneumatic diverters, gravity runout conveyors for the divert lanes, all in concert with a barcode scanning array and system computer providing control, sortation decisions, tracking and reporting. Pre-defined lookup tables are used to determine sortation lane criteria. The split belt sorter technology allows for the maximization of runout lanes while keeping the overall footprint to a minimum. The sortation conveyor is typically used in concert with the elevated recirculation line to accommodate reprocessing for full lane conditions. The recirculation loop is accomplished via a pair of CCS Powered Spiral Conveyors™ (one Up and one Down) and overhead powered roller conveyor running above the sortation line and merging with the feed sections supplying the scanning/induction conveyor. The system is capable of handling all mail product types varying in weight with the maximum weight of a tray/tub not exceeding 70 pounds, noting that all tray/tubs must be sleeved/lidded and strapped.

This system is similar in nature to the LCTS in that it is used to process and sort product along a sequential path, with the exception of using a split-belt sortation conveyor instead of the love roller conveyor and pop-up bi-directional transfers instead of pusher diverts at the divert points. This technology allows for higher reliability at a high throughput rate. Product is inducted and bar-code scanned on powered roller conveyor sections prior to entry into the sortation conveyor section and tracked along the sortation conveyor to the appropriate runout lane. Both inline and recirculating system layouts are available. Recirculation is performed overhead in this design, which conserves floor space that would be consumed in a recirculating LCTS layout. CCS *Sortation, Operation and Report Tracking System* (SORTS) software package is used for real-time monitoring, configuration and maintenance support. Live interactive GUI is provided for ease of operations along with report generation and printout capability. Sort schemes are easily developed and importable if created offline. Lanes are definable to meet various processing and sortation needs including rejects that do not meet any criteria or unreadable. The system computer is housed in an environmental control console. Operator buttons and a pull cord E-Stop are standard, along with audible and visual startup and operational indicators. The design will accommodate up to 50 product/minute throughput rates with up to 95 possible runouts in a single-sided or double-sided layout. The system requires the use of 480VAC power and pressurized air for the automatic belt take-ups and transfers. The Main Control Panel (MCP) includes a main AC power disconnect and the pressurized air system includes pressure regulators and OSHA approved shutoff valves. Allen-Bradley controls configured over a DeviceNet network are used in the design.

Basic features include:

- 480VAC 3-Phase, 60 Hz, power source: Typically 100Amp capacity.
- Clean dry pressurized air source: 7 CFM @80 psi minimum
- Maximum Mail Product Weight: 70 pounds.
- Throughput Rate: 50 trays/minutes.

- Control Console: HP workstation computer – Microsoft Windows XP Professional operating platform, interactive GUI, with sortation scheme generation/alteration, and reporting/printing capabilities. Soft PLC design with DeviceNet™ architecture. Software supports up to 48 divert points (96 divert lanes).
- Feed and Induction Conveyors: Motorized roller conveyor – based on straight, curve and merge sections.
- Barcode Scanner Array: Standard – Two (2) Accu-Sort mini-cams with Mid Range Decoder unit to view and interrupt front or rear placed mail product labels. Optional - barcode scanner to read the tops of mail product (sleeves/lids) for D&R labels.
- Sortation Conveyor: Standard – Split belt with one (1) 5' long drive, one (1) auxiliary take-up, multiple intermediate beds, and one (1) end take-up for up to a 150' long section. Auxiliary (center) take-up is not required for a conveyor less than 100' long.
- Sortation Conveyor: Pull cord E-Stop and Jog Button.
- Divert Points: Bidirectional Transfers, 90°, pneumatic lift operation and AC motor driven transfer, with Jam and Confirmation sensors as well as local control panel. Two (2) transfers typical per each intermediate bed section.
- Runouts: Standard - Gravity skatewheel, 15' length, 30" width, 4' centers, each with manual tray stop. 6" drop from divert point to tray stop. Includes 80% full and 100% full runout lane sensors.
- Recirculation Conveyor: Motorized roller accumulation conveyor – straight, Up Spiral, Down Spiral, curves and merging sections.
- Power & Control Panels:
 - Power Distribution Panel
 - Main Control Panel (3) Standard – Sortation conveyor; scanner array induction conveyor and partial recirculation loop conveyors; and rest of recirculation loop conveyors. (1) Additional for each additional 150' of sortation conveyor.
 - Diverter Control Panel – One (1) for each diverter.
 - Scanner Interface Panel – One (1) at induction conveyor.
 - Encoder Panel – One (1) for each sortation conveyor section up to 150'.
 - Spiral Control Panel – One (1) for each spiral.
- AC Power Disconnects: One in each Main Control Panel and one for each Diverter transfer motor mounted adjacent to the Diverter control panel.
- Air Control: OSHA shutoff valves and multiple levels of pressure regulation.
- Stack Lights: At each divert point – One (1) Red/Blue Stack light for divert point JAMs/malfunctions and lane conditions for one of the runouts, plus one (1) Blue Stack light – for lane conditions of the second runout. (A lane condition of 80% full is indicated by Flashing Blue while a 100% full is indicated by Steady On blue; Jams are indicated by a Steady On Red and malfunctions by Flashing Red.

- Startup Indicators: Audible – Electronic voice via speakers at console); Visual – Amber lanterns at each end of the sortation conveyor and indications on the GUI.
- E-Stop: Centralized pull-cord with Red lantern.
- Conveyor Supports: 12Ga. steel, 2-tiered for sortation + overhead recirculation conveyors.
- Control Networks: Ethernet linked to DeviceNet™ sub-networks handling specific sections of powered roller conveyor, spirals, and sortation conveyors; Ethernet interfaced with serial data for scanners.

In-Line Sorter

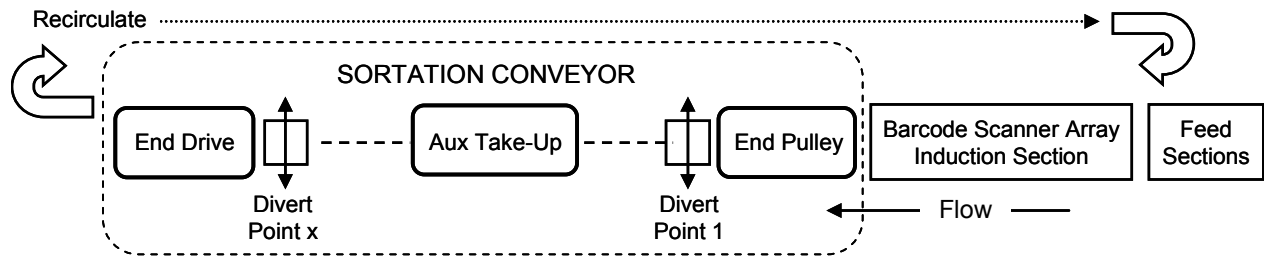
The basic In-Line version of the HSTS consists of a Barcode Scanner with data transmission system, a series of transport conveyor lengths, a series of pusher diverters and gravity run conveyors and a gravity run out reject line for the manual handling of trays back to the beginning of the line for a repeat pass through the scanner and sorter. Sorting can be done using both sides of the sorter length. For conditions during an E-Stop, within mechanical and physical limitations, product on the sorter will sort to the assigned runout after operations are resumed.

System Components:

- Operator Control Console
- Barcode Scanner Section
- Multiple Motorized Power Roller Conveyor sections (straight, curves, merges) for the In-feed lines
- Sortation Conveyor Sections consisting of AC powered End Drive, End Take-up and Intermediate Sections
- Bi-directional Transfer at each divert point
- Multiple Gravity Run out conveyor sections
- Single Gravity Run out Reject conveyor

Recirculating Sorter

An optional recirculating version of the HSTS consists of the same equipment as the In-Line version with the addition of an automatic motorized powered roller recirculating conveyor to return rejected trays back through the scanner for a repeat pass through the system thereby eliminating the manual handling process for rescanning trays. This design enables sortation from both the In-Line and return conveyor lengths. The recirculation loop is oriented overhead, directly above the sortation conveyor and makes use of a pair of CCS Powered Spiral Conveyors to elevate and return product flow to the sortation conveyor. Dual level supports are used to hold the elevated conveyor. For conditions of Jams/Malfunions, the system will recirculate all product inducted at the time of the Jam/Malfunions after operations are resumed.



System Components:

- Operator Control Console
- Barcode Scanner Section
- Multiple Motorized Power Roller Conveyor sections (straight, curves, merges) for the In-feed lines
- Sortation Conveyor Sections consisting of AC powered End Drive, End Take-up and Intermediate Sections
- Bi-directional Transfer at each divert point
- Multiple Gravity Run out conveyor sections
- Multiple Motorized Power Roller Conveyor sections for the overhead recirculating line
- Motorized Powered Spiral Conveyors™ elevate and return the flow for the recirculation portion.

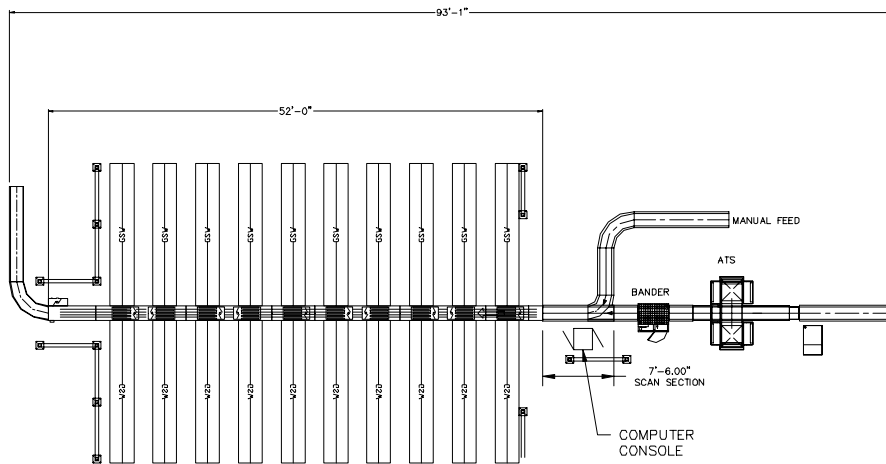
Beyond 150' Sortation Conveyor Length

The requirement for additional divert points are accommodated in the design by the basic software and additions to hardware. The software is already configured to support the increase requirement. The physical design requires an increase in the hardware components required to support the extra capability. A general overview of required additions is as follows (for each extra divert point):

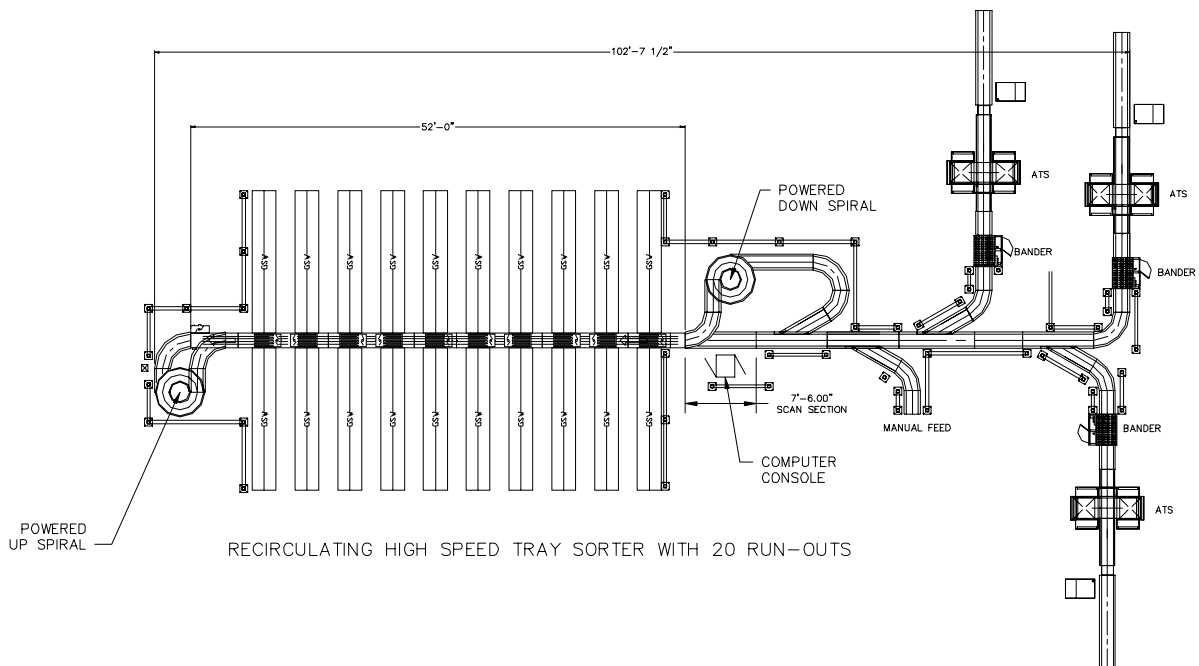
- Bidirectional Diverter.
- Additional diverter panel and associated power and control cabling and connections with pressurized air.
- Red/Blue Stack light for divert point JAMs/malfunctions and lane Full (80 or 100%) conditions for one of the runouts.
- Blue Stack light – for lane Full (80 or 100%) conditions of the 2nd runout.
- Skatewheel Runouts with manual tray stop and lane condition sensors.
- Increased length to the cable tray under the sortation conveyor, straight recirculation conveyor, and additional supports as needed.

Adding divert points beyond 150' requires a second end drive and end pulley section to be added to the sortation conveyor to handle these additional diverts. The additional sortation conveyor section will also include its own MCP, encoder panel, diverter panels and controls to support mail product movement through that section conveyor. This keeps the system modular and not requiring a different design of the base MCP to accommodate the additional sortation sections. The computer control system tracks mail product within each section using sortation conveyor encoder signals from that section and handle induction from the first section into the next. The system software is such that it can support the additional divert points/runouts configurations and graphical representations, as well as data and reporting requirements.

Typical layouts are shown on the following pages. Other custom designed configurations are available for unique customer applications.



IN-LINE HIGH SPEED TRAY SORTER WITH 20 RUN-OUTS



RECIRCULATING HIGH SPEED TRAY SORTER WITH 20 RUN-OUTS