The demand for faster delivery, increased volume and seasonal peaks all impact the throughput of parcel and postal facilities. Singulation of packages in a single pass is an important process required for throughput optimization.

The challenge

Current systems imply large systems of roller conveyors, chutes and recirculation lines, all of which take up a valuable floor space and increase noise.

Our solution

Siemens developed advanced technology for singulation to handle throughput intelligently, gently and quietly, using less than 1/4th of the floor space of conventional systems. The Siemens singulator Visicon processes incoming bulk streams of packages in a continuous flow without recirculation and delivers them single-filed directly onto take-away conveyors for scanning and sortation.

It utilizes image processing and a special multibelt conveyor bed to singulate, align and gap parcels for sortation.

Visicon tracks and controls the conveying speed and orientation of each individual item. Visicon can be customized to accommodate different facilities and applications.
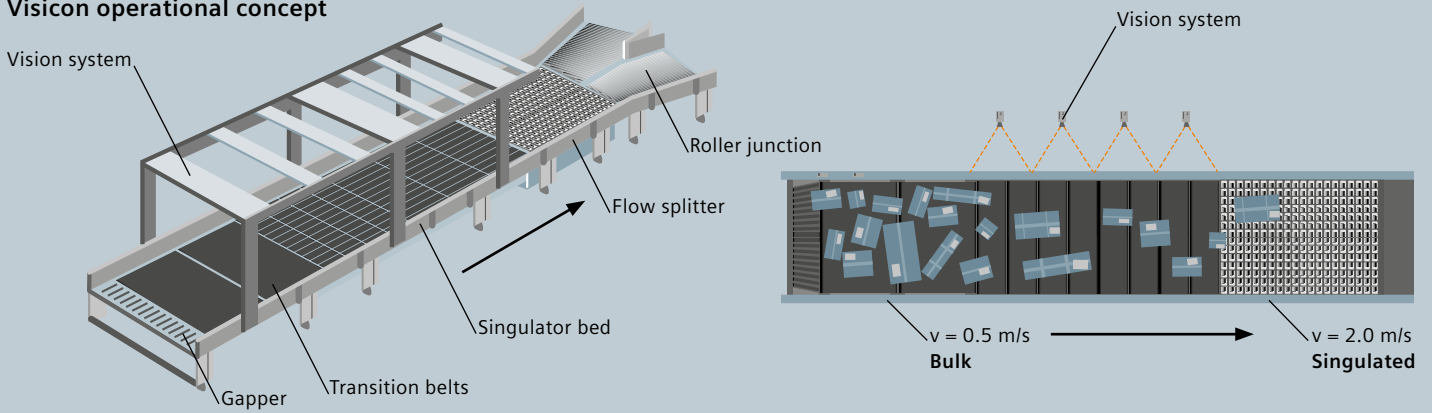
Siemens singulator Visicon features

- **Compact size** – needs only 1/4th of the floor space of conventional parcel singulators
- **High performance** – singulation of up to 9,000 items/hour
- **Low noise level** – less than 70 dB(A)
- **Continuous flow** – parcels can be aligned lengthwise or crosswise to help preserve minimum gaps
- **Flexible configuration** – single or dual take-away
- **Easy to maintain** – belt actuators used on Visicon are easy removable; calibration of the vision system is done following an easy step-by-step procedure; full diagnostics are built in the singulator's controls
- **Gentle handling** – no tumbling of parcels
- **Software-based control** – enables flexible specification of key singulation parameters such as gap size, discharge mode (single or dual) and others, dual take-away configuration provides redundancy
- **Implementation of additional functionalities possible** – like scanning, dimension capturing or subsequential weight capturing
- **Pretested and assembled modules** – allow for a short installation and commissioning time at the site

More Intelligence and Less Space – Singulator Visicon

The advanced technology solution for parcel and package singulation

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Visicon operational concept

Vision system

Roller junction

Flow splitter

Singulator bed

Gapper

Transition belts

Vision system

v = 0.5 m/s → v = 2.0 m/s
Bulk **Singulated**

Gapper

The gapper unit creates both lateral and longitudinal gaps between adjacent packages.

Transition belts

The first transition belt stabilizes the packages, followed by a light curtain recording the size and relative position of the packages. A second transition belt provides the distance and time for the package measuring.

Singulator bed

The singulator bed consists of a series of variable-speed belt actuators, each controlled by a servomotor. The actuators move independently and each parcel can be manipulated to optimize speed and orientation for singulation. The servomotors accelerate and decelerate each belt to pull parcels away from the incoming flow in a sequence determined by the main control algorithm and monitored by the vision system. Parcels can be aligned lengthwise or crosswise in order to optimize gaps and to move through the downstream system more smoothly.

Gaps are produced between the parcels at a nominal output speed, so that all sides of the parcels can be scanned in sorter applications.

Vision system

Central to the Visicon operation is the vision system which uses proven image processing for parcel tracking. The system detects, measures and tracks real-time position and orientation of parcels. It works in a closed loop with the singulator controls. The vision system's main sensors which provide accuracy and redundancy are the photo array and video cameras. The algorithm controller interface provides real-time visualization, mode status and diagnostic tools. There are also manual operation means for testing and for maintenance of individual components.

Flow splitter/roller junction

An optional steering wheel diverter moves parcels away from the center line of the singulator. Used with a roller junction, it can redirect the entire flow toward a single take-away conveyor or split the flow.

Technical data

Dimensions

Length	~ 6.4 m
Width	~ 2.4 m
Height	~ 2.3 m

Product spectrum

Parcels, cardboards, bundles, flyers, polybags (single layer)

Length	~ 150 – 1,200 mm
Width	~ 150 – 900 mm
Height	~ 20 – 900 mm
Weight	~ 0.5 – 50,000 g

Throughput   up to 9,000 items/hour
(dependent on configuration)

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