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IMPEL™
INTRALOGISTIC

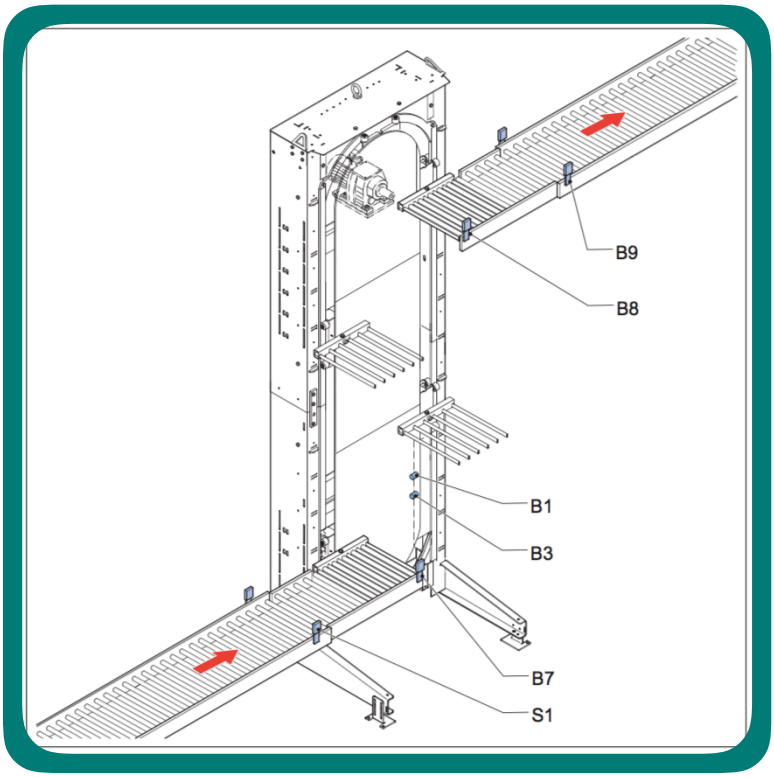
LOGI INTERNAL STIC SYSTEMS

GO, SHIFT, ESCALATE

Vertical Lifter - For Multi Floor Systems

Vertical Conveyor

Overview of Parts



A	Supply Conveyor
B	Infeed Conveyor
C	Lift Colum
D	Motor
E	Outfeed Conveyor
F	Output Conveyor
G	Product Carrier

General Overview

The IMPEL's **i-Track Vertical Lift Conveyor** is designed for the vertical transport of products. This vertical transport unit (or product lift) consists of a lift column, one or more product carriers and. depending on the purchased configuration, a dosing belt, output belt and shielding.

The vertical transport of products can be upwards as well as downwards, and depending on the configuration, even a combination of the two. The lift is always installed as part of a larger transport system in which products are automatically transported to the product lift as well as away from the product lift.

The Machine can consist of….

- Mechanical construction.
- Mechanical construction and electric sensors.
- Mechanical construction, electric sensors and cabling to the terminal module.
- Mechanical construction, electric sensors to the terminal module and a control box including control and software

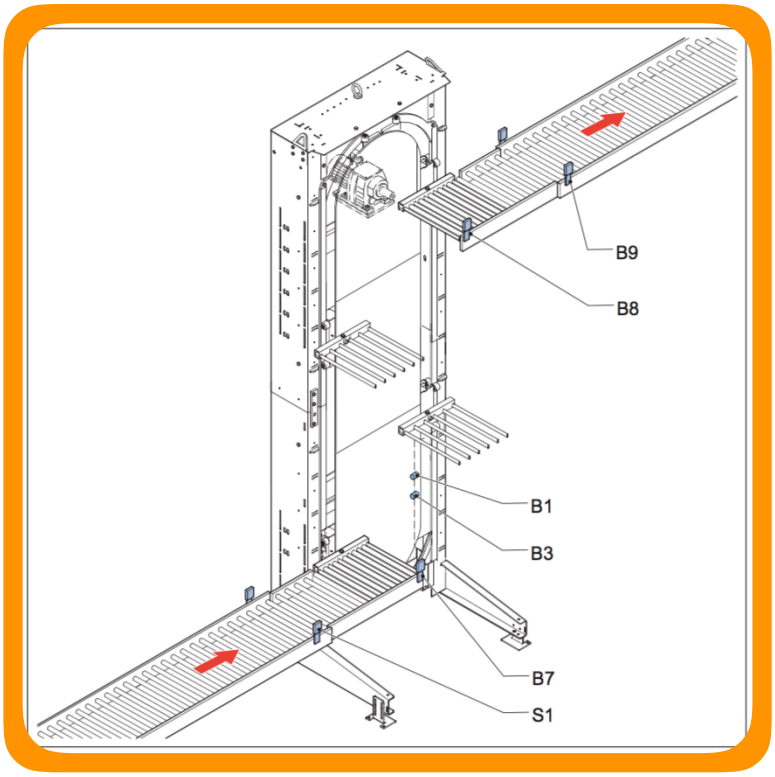
Vertical Conveyor

Motor

The motor drives the circulation of the vertical conveyor. For some configurations it may be necessary to control the motor with a frequency controller for controlled start/stop and optimum adjustment of the rotation speed to the supply speed. If a frequency controller is required, refer to the machine layout drawing. If a frequency controller is used, EMC directives must be observed and the device should be installed according to the manufacturer specifications.

The infeed/outfeed conveyor may also have a motor fitted. For specifications, refer to the machine layout drawing.

Working Principle with fixed conveyor



S1 **Supply Conveyor Sensor**

B7 **End of Infeed Conveyor Sensor**

B1 **Product Release Sensor**

B3 **Start time frame sensor**

B8 **Sensor for checking presence of production on the outfeed**

B9 **Sensor for checking if product has left on the outfeed**

The machine works according to a continuous principle in which the machine runs nonstop. However the machine can be used in start/stop mode. To set up the machine for start/stop mode you must consult IMPEL - Intralogistic for the required specifications.

Note:- *The description and working principle of the sensors applies to the infeed/out- feed conveyor on the machine. When infeed or outfeed takes place at several levels, more sensors are required. Refer to the machine layout drawing.*

Vertical Conveyor

Product Infeed

Products must always be fed into the machine one by one within the software specified time frame. This affects the infeed speed and acceleration. For specifications, refer to the machine layout drawing.

The available infeed time depends on:

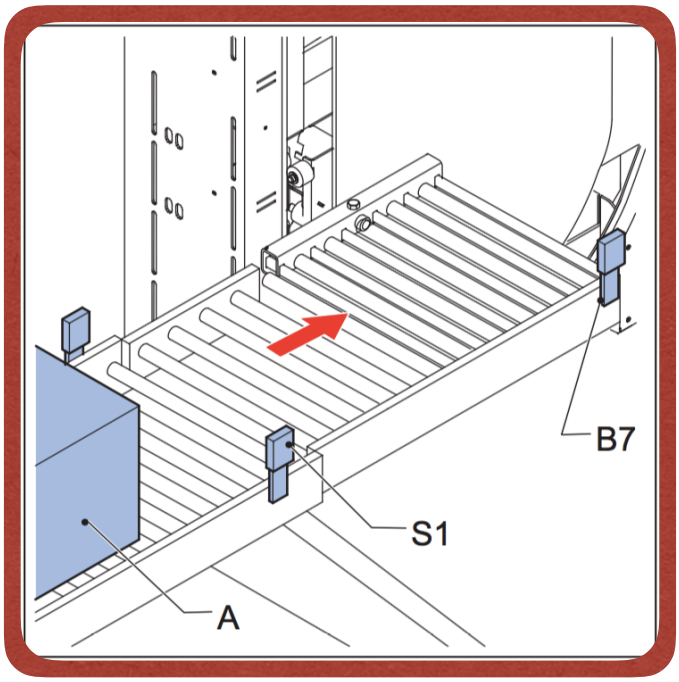
- The speed of the product carriers.
- The dimensions of the product carriers.
- The dimensions of the products
- The speed of the conveyors.

S1 Supply conveyor sensor

B7 End of infeed conveyor sensor

A Product

The product is fed in onto the supply conveyor and monitored by sensor S1. The sensor is located on the end of the supply conveyor. The product (A) will wait at this position until the product release sensor B1 (not shown in this figure) sends a release signal to infeed the product to the machine. Refer to sensor B7 as shown in the illustration at the start of section Products are supplied to the machine only when this release signal has been sent.



If a product backup occurs, the release to the infeed signal must be stopped to make sure further products are not infeed to the machine. It is still possible to discharge products that are still in the machine.

Vertical Conveyor

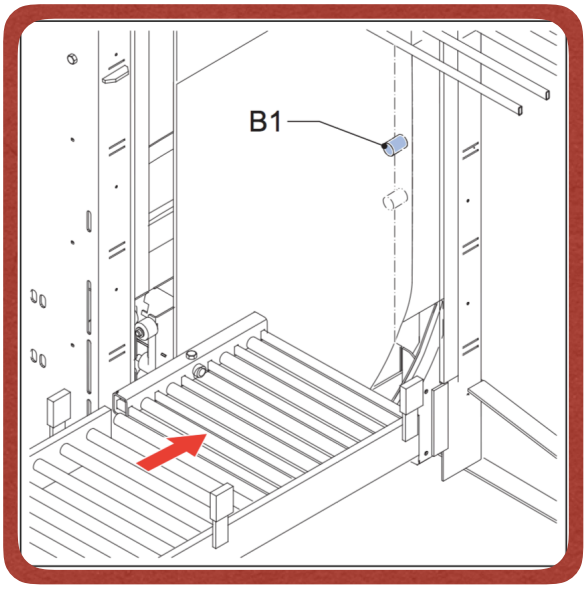
Monitoring products supplied to the infeed/outfeed conveyor

When a product has come off the supply conveyor this is detected by sensor S1. The transport to the infeed conveyor must stop. Sensor B7 detects the product when it is far enough onto the infeed conveyor. The infeed conveyor must also be stopped.

The transporter empty photocell monitors run-time. The run-time function checks to make sure a product does not take too long to move from the supply conveyor to the infeed conveyor.

Product Release Sensor

The product release sensor B1 is operated by each product carrier of the machine in the circular movement, after which a time frame is started. At the moment that this time frame is active, the infeed position is free and there is time to feed in a product to the infeed position.



This sensor must be mounted to the machine frame. The sensor must be set so that it is activated when the product carrier is just above the highest product at the infeed position. The time frame (set by software) must be long enough for feeding in the product at the utmost time without having to stop the machine. This implies that this time depends on the circulation speed of the product carriers and on the infeed speed of the product. This time frame must be set during the test phase.

Type to enter textIf a product backup occurs, the release to the infeed signal must be stopped to make sure further products are not infeed to the machine. It is still possible to discharge products that are still in the machine.

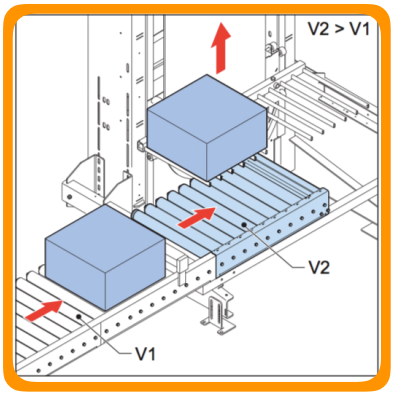
DANGER

When the machine has 1 product carrier, the lift has a failure when:

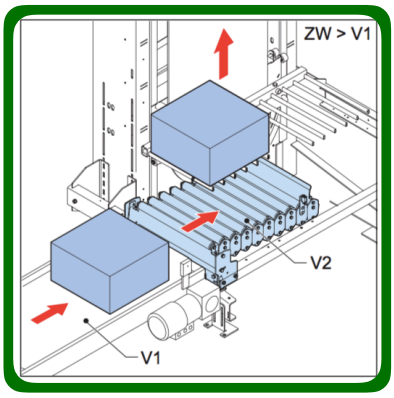
- **There is a product on the outfeed conveyor AND**
- **The product carrier reaches the sensor B3**

Vertical Conveyor

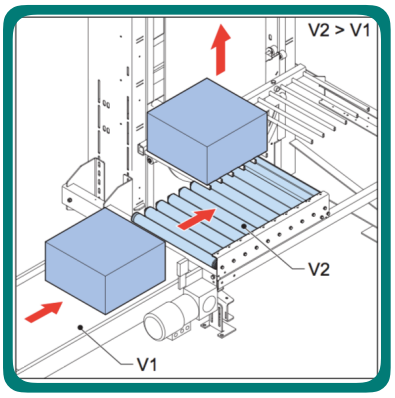
Note:- In the configurations illustrated below, the count photocell S1 must be mounted so the opening between products can be detected.



Product infeed with 2 driven conveyors



Product infeed with 1 driven and 1 gravity conveyor



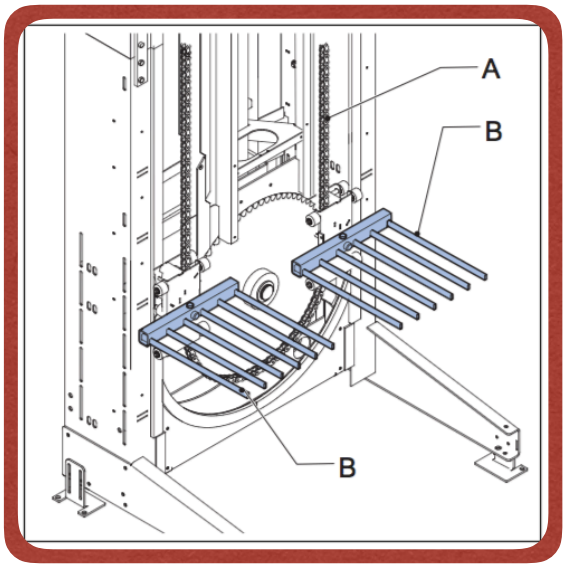
Product infeed with 1 driven conveyor

Product Transportation

- A Chain system
- B Product carrier

The continuously circulating chain system (A) takes along one or more product carriers (B). These product carriers have a fork-like shape, allowing them to move between the infeed and outfeed conveyors.

Impact forces occur when picking up and putting down the product because the product is abruptly brought to speed. If required, the infeed and outfeed conveyors can be positioned on a slight incline for picking up and putting down the product more smoothly. This will by nature be the case with a gravity conveyor.

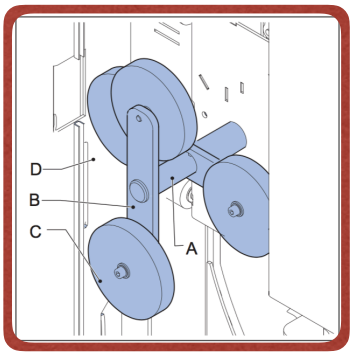


As the infeed is discontinuous, buffering product at the supply may be necessary in some cases. If this is not possible and stops of the infeed are undesired, the rotation speed of the machine can be brought in line with the speed of the infeed using a frequency controller.

Vertical Conveyor

Keeping the product carriers horizontal

Rear side

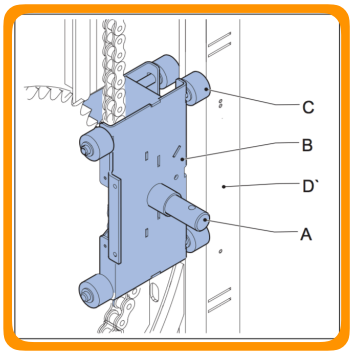


During transportation, the product carriers are kept horizontal by a circulation system.

- A Shaft
- B Guide
- C Wheels of the guide
- D Guide bars

The product carrier has been mounted to a shaft (A) that has been coupled to a guide (B) with 4 wheels (C). The wheels of the guide run below and above along guide bars (D) that keep the product carrier horizontal as seen from the front of the machine.

Front side



- A Shaft
- B Trolley
- C Wheels of the Trolley
- D Frame

Between the product carrier and the guide there is the trolley (B) with wheels (C) on both sides of the frame (D). The trolley keeps the product carrier horizontal as seen from the side of the machine.

Product outfeed

The product must be taken from the outfeed conveyor in time to ensure a continuous running of the machine. This places demands on the outfeed speed and the outfeed acceleration. See the layout drawing.

The Available outfeed time depends on:

- The Speed of the product carriers.
- The dimensions of the product carriers.
- The dimensions of the products.
- The Speed of the Conveyors.

Vertical Conveyor

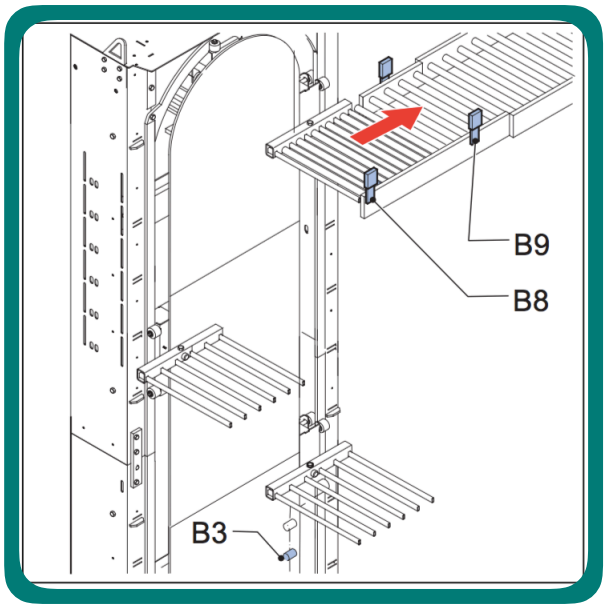
Monitoring of the passage of the product carrier

B3 Start time frame sensor

B8 Sensor for checking presence of product on the outfeed

B9 Sensor for checking if product has left the outfeed (on falling edge)

Sensor B3 has been mounted into the machine. This sensor is operated by each product carrier in the circulating movement. After this a time frame will start. At the end of this time frame it is checked whether the passage where the product carrier passes the putting down position is free from product. This is checked by sensors B8 and B9



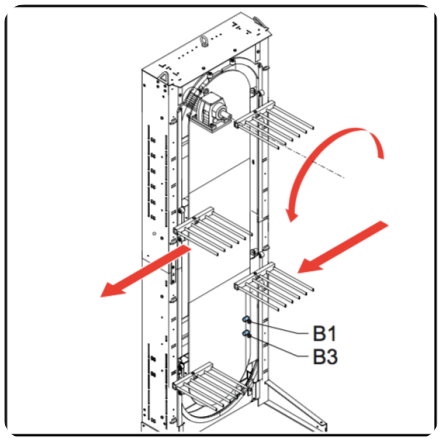


Fig. 1Ascending carrier

B1 Product release sensor

B3 Start time frame sensor

The infeed conveyor is on the lower position and the outfeed conveyor is on the higher position. The products are transported from the lower to the higher position.

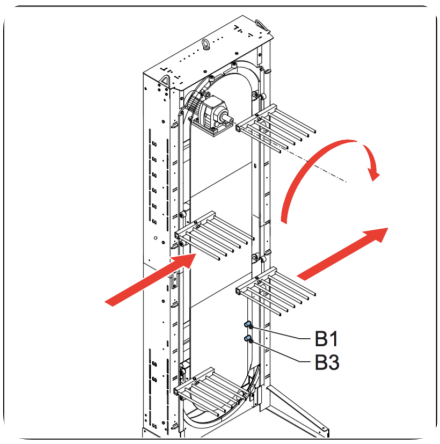


Fig. 2 Descending carrier

The infeed conveyor is on the higher position and the outfeed conveyor is on the lower position. The products are transported from the higher to the lower position.

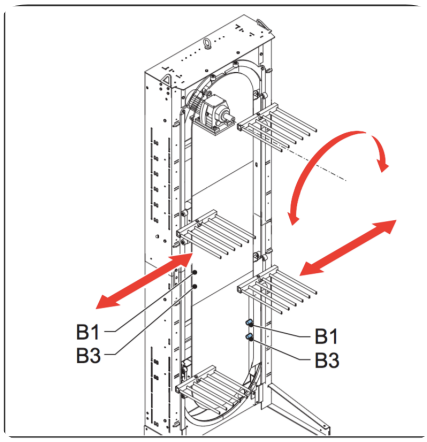


Fig. 3 Descending / Ascending carrier

The descending / ascending carrier can operate in 2 directions. There are 2 sets of sensors, 1 set to operate to the left direction and 1 set to operate to the right direction.

Vertical Conveyor

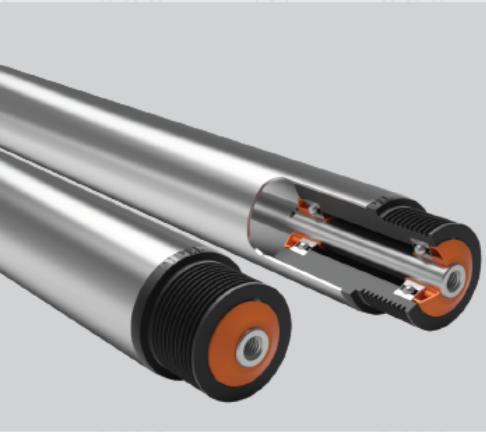
How Vertical Lift Conveyors increase plant efficiency

- Provide Multi-level transportation in minimum space - Product travels straight up and down, no incline required.
- Cut floor space requirements up to 90%
- Utilise vacant air space above the floor level. Ideal for operations that are automatic or require little or no supervision.
- Open up Mezzanines and balconies to more effective use.
- Transport up and over machinery, aisles or other obstacles… avoid expensive production changes.
- Clear floor areas for more efficient flow of fork lifts, pedestrian traffic, etc.
- Provide a high flexibility in plant layout.

Information required for quotation.

- Description of products including size, weight and contact surface.
- Maximum handling rate (quantity per minute)
- Infeed and discharge elevations
- Plant electrical requirements.
- Special Conditions, such as extreme temperature, moisture, etc.
- Direction of travel (up, down, reversible)

GO. SHIFT. ESCALATE



MOD APPROCH ULAR

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