User's Manual

English

Large Board Conveyor

This manual is intended for the inline device specified on the previous page. The manual contains information to assist the operator to start and operate the device properly, and to maintain it.
Hardware and software mentioned in this document are subjected to continuous development and improvement. Consequently, there may be minor discrepancies between the information in the document and the performance and design of the hardware and software. Specifications, dimensions and other statements mentioned in this document are subject to change without prior notice.

Conventions
In this manual angle brackets <> are used to indicate certain button or selector switch names.
Example: <Start> stands for the START button.

This manual comprises the following conveyor models

- 1000mm
- 1500mm
- 2000mm
- 2500mm

Printed in Sweden.

Contents

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1. Safety

Before starting the machine, it is necessary that the operator, foreman and any other personnel involved in the machine operation, maintenance or service understand and obey the following:

- Trained personnel must operate the machines only.
- Anyone operating this machine must obey all warning signs.
- Do not use chemicals or other substances that may have any influence on the operator or other personnel involved in the machine operation.
- Apart from weekly, monthly and yearly maintenance described in Chapter 5, *Maintenance,* the machine is to be serviced by authorised personnel only.
- All covers and shields must be intact, mounted and closed while the machine is in operation.
- Do not disable or disengage any safety switches or sensors.
- No hands or fingers are allowed in the vicinity of the moving parts of the machine.

Warning sign

The warning sign on the machine must be observed as this machine contains electrically live parts.

The warning sign on the machine is placed on the cover of the electric cabinet.

The sign must be kept clean and readable.

Figure 1-1 Electric shock

If the sign is missing, it must be replaced immediately.

The sign warns of electric shock. Units on which this sign is placed contain dangerous voltage levels. Power supply must be disconnected before opening the unit. Only authorised service personnel are allowed to operate the machine when the unit is open.

Warnings

Attention
Throughout the manual, this symbol is used to call your attention to commands that starts machine movements. The symbol refers to the warning signs, which must be obeyed to eliminate the risk of injury. If there are instructions accompanying this symbol, they must be followed.

Figure 1-2 Attention

2. Installation

The machine is delivered fixed on a pallet.

Site preparation

Prior to installing the conveyor, ensure that there is electric power available on the site. See requirements below.
Also, make sure the ambient conditions meet the requirements.

Ambient conditions

The ambient air must be clean.

Relative humidity

0 to 35°C	10 to 90 % noncondensing
35 to 60°C	10 to 60 % noncondensing

Allowed temperature

Operating:	5 to 40 °C (41 to 104 °F)
Storage:	-40 to 60 °C (-40 to 140 °F)

Dust and dirt

The machine does not require a clean-room environment but the level of dust and dirt must be kept as low as possible. The maintenance intervals are shortened by high temperature and by a dusty or dirty environment.

Technical data

Machine

Weight:	Depending on actual size.
Length:	See specification included in the contract.

Power supply

Voltage:	110 or 240 VAC (See wiring diagram for instructions on how to set the power supply for different mains voltages)
Frequency:	50/60 Hz
Power consumption:	max. 300 W

Lifting information
The machine can be lifted with a forklift truck. Put some wooden boards between the forks and the vertical frame parts.

Installation

Installation must be carried out by authorised service personnel.

Placing the unit
Ensure that the floor is sturdy. Place the machine on its site. To be able to install, maintain and service the conveyor, there must be a free space of one meter around it, except for other devices and machines included in the conveyor line.

Levelling
Level the complete line carefully along the conveyor belts. Use a spirit level across and along the conveyor belts when adjusting the feet of the machine. The machine must stay steady on all feet when the adjustment is finished.

Joining the units
The frameworks of the units can be joined and bolted together with four plates and screws.

Mains supply
Mains supply is to be connected by an authorised electrician.

The power supply must be adjusted to match the primary voltage. See wiring diagram in the electrical cabinet.

3. Product description

This chapter describes the conveyor. The description is divided into the following main sections:

- Main parts of the conveyor.
- Overview
- General function of the conveyor.
- Control system.

Conveyor main parts

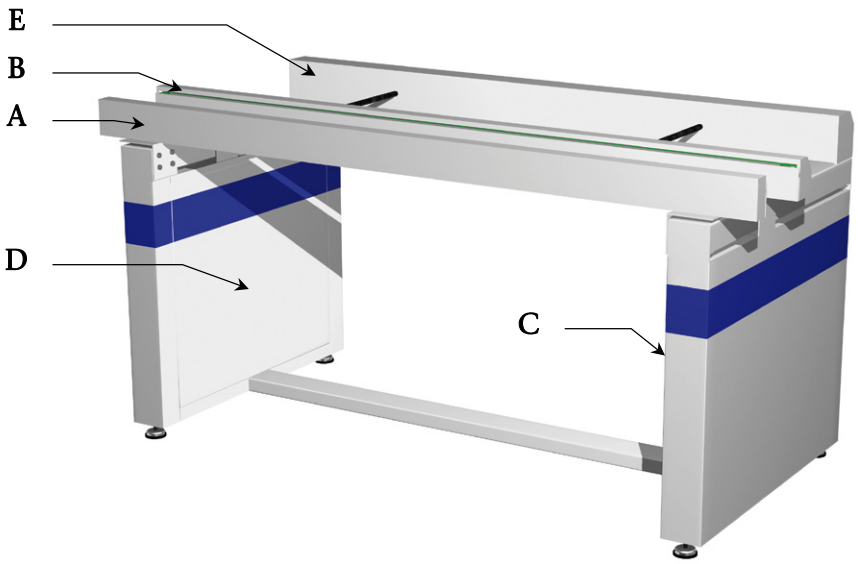

Figure 3-1 Main parts

The following main parts are pointed out in the figure above, by the letters.

Main parts

A. Fixed rail. (Normally front rail)
B. Moving rail.
C. Cabinet 1, electrical cabinet with power supply, logic's and relays.
D. Cabinet 2.
E. Conveyor motor cover.

Overview

The conveyor (C) consists of a solid steel framework and two conveyor rail assemblies. It is equipped with a hand control unit, an electrical cabinet, motorized width adjustment, and one conveyor belt motor for each belt segment. A board present sensor is positioned at the end of each belt segment.

General function

Standard conveyor:
The conveyor transfers boards from one machine to another. One PCB can be positioned on each belt segment of the C at a time.

When the C is ready to receive a PCB from the preceding unit, the C signals ”Ready” on the *Smema In* connector. Board transfer from the preceding unit to the conveyor starts when the preceding unit signals ”Board Available” (BA) and the C signals ”Ready” on the *Smema In* connector at the same time.

When a PCB activates the board present sensor on the last conveyor segment, the C signals ”BA” on the *Smema Out* connector. If the subsequent machine signals ”Ready” while the C signals ”BA” on *Smema Out* connector, the board is fed out from the conveyor.

The C can be used as a manual loading conveyor, if boards are placed anywhere on the conveyor activating a board present sensor.

Packing conveyor:
The conveyor transfers boards, one by one, from the preceding machine, and sends a pack (pcb-train) of boards to the subsequent machine. One PCB can be positioned on each belt segment of the C at a time, except on the last conveyor segment where the pack is built.

When the C is ready to receive a PCB from the preceding unit, the C signals ”Ready” on the *Smema In* connector. Board transfer from the preceding unit to the conveyor starts when the preceding unit signals ”Board Available” (BA) and the C signals ”Ready” on the *Smema In* connector at the same time.

When the board has passed the board present sensor on the last but one conveyor segment, the last conveyor segment immediately stops. When the pack of boards on the last conveyor segment reaches the ‘Pack-length sensor’, the pack

of boards is transported to the board present sensor located at the end of the last segment, and the C signals ”BA” on the *Smema Out* connector. If the subsequent machine signals ”Ready” while the C signals ”BA” on *Smema Out* connector, the pack of boards is fed out from the conveyor.

The C can be used as a manual loading conveyor, if boards are placed anywhere on the conveyor activating a board present sensor.

Unpacking conveyor:
The conveyor receives and separates a pack (pcb-train) of boards, and transfers boards, one by one, to the subsequent machine. One PCB can be positioned on each belt segment of the C at a time, except on the first segment where the pack is received.

When the C is ready to receive a pack of boards from the preceding machine, the C signals ”Ready” on the *Smema In* connector.
Board transfer from the preceding unit to the conveyor starts when the preceding unit signals ”Board Available” (BA) and the C signals ”Ready” on the *Smema In* connector at the same time.

When a pack is received at the first segment board present sensor, the speed of the first segment is lowered, and separation is achieved between the first and second segment. When a PCB activates the board present sensor located at the end of the last segment, the C signals ”BA” on the *Smema Out* connector. If the subsequent machine signals ”Ready” while the C signals ”BA” on *Smema Out* connector, the board is fed out from the conveyor.

The C can be used as a manual loading conveyor, if boards are placed anywhere on the conveyor activating a board present sensor.

Control system

Power switch
Use the Power switch to turn the conveyor off or on.
0: Conveyor off. All electrically controlled movements are stopped and mains supply is disconnected.

1: Conveyor on. (Production mode enabled.)

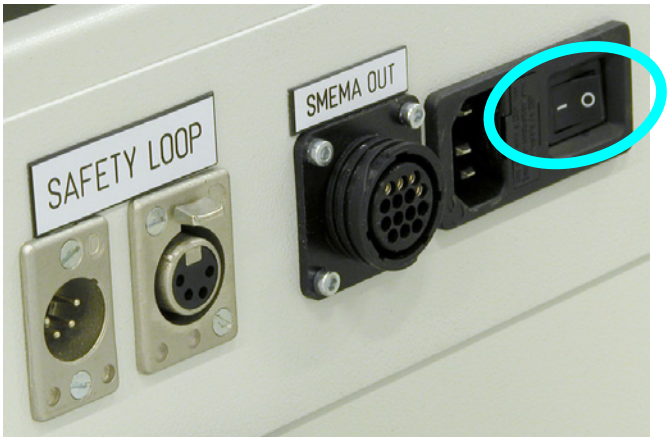

Figure 3-2 Power switch

Hand unit, manual width adjustment
Use the two upper buttons to manually adjust conveyor width. Press and hold a button to run the width motor and position the moving rail. The movement stops immediately if the control switch is released or the conveyor is turned off.

Figure 3-3 Hand unit buttons

Hand unit, automatic width adjustment (option)

Use the button marked 'AUTO' to turn automatic width adjustment off or on. An LED positioned above the button is lit when the function is ON.

OFF: Automatic width adjustment off.
Width information sent from previous machine is ignored. Manual width adjustments are enabled.

ON: Automatic width adjustment on.
Width is adjusted automatically based on width information received from previous machine, or based on width entered in the optional auto width control unit (K-017-0488). The two width adjustment buttons for manual width adjustments are disabled.

Automatic width adjustment must always be set to ON when the optional auto width control unit (K-017-0488) is connected to the conveyor.

Hand unit, board train, start of line, end of line (option)

Use the button marked 'BOARD TRAIN' to turn the packing/unpacking function off or on. An LED positioned above the button is lit when the function is ON.

OFF: Packing/unpacking function off. The conveyor works as a standard conveyor.

ON: Board train, start of line, or end of line function on. The packing conveyor builds a pack (PCB-train) of boards on the last conveyor segment. The number of boards in the pack is determined by the position of the 'Pack-length sensor' and board size. The unpacking conveyor separates a pack of boards from the first to second conveyor segment. The start of line conveyor separates a pack of boards on the last segment and the end of line conveyor builds a pack of boards, starting at the first or second conveyor segment.

Hand unit, inspection (option)

Use the button marked with an eye to turn inspection off or on. An LED positioned above the button is lit when the function is ON.

OFF: Inspection off.
No PCBs are stopped for inspection.

ON: Inspection on.
Each PCB is stopped for inspection.
To release the PCB when inspection is done, press the button marked 'OK'.

Pack-length sensor, packing conveyor

The position of the pack-length sensor determines the number of boards allowed in the pack (pcb-train). Move the sensor to desired position. Move the sensor towards the end of the conveyor to allow more boards in the pack.

Speed control, standard conveyor

This conveyor is equipped with one motor driver board for each belt motor, which enables individual speed control for all belt segments. Transport speed can be adjusted by turning trimmer A and/or trimmer C clockwise or counter-clockwise. Trimmer A adjusts speed on conveyor segment 1 and trimmer C adjusts speed on conveyor segment 2.

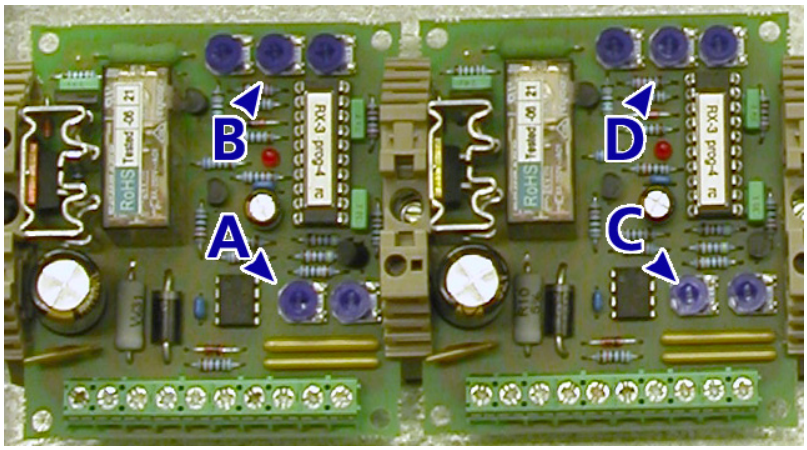

Figure 3-4 Motor driver boards

Speed control, packing conveyor

Speed control on the packing conveyor is used for building the pack (pcb-train) on the last conveyor segment. The speed of the last conveyor segment is reduced during segment-to-segment board transfers, allowing boards to be packed without leaving gaps.
Turn trimmer D clockwise or counter-clockwise to adjust “packing speed”.
This speed control is applicable only to the last conveyor segment, and is active only during internal board transfers.

Speed is not reduced during board transfers from a preceding machine, or to a subsequent machine.

Speed control, unpacking conveyor

Speed control on the unpacking conveyor is used for separating a pack (pcb-train) of boards between the first and second conveyor segment. The speed of the first conveyor segment is reduced during segment-to-segment board transfers, allowing the pack of boards to be separated into single boards. Turn trimmer B clockwise or counter-clockwise to adjust “separating speed”.
This speed control is applicable only to the first conveyor segment, and is active only during internal board transfers.

Speed is not reduced during board transfers from a preceding machine, or to a subsequent machine.

When very small boards are transported and separated, the speed must be set extremely low to achieve a satisfying board separation. The board present sensor on the first conveyor segment can also be moved slightly in the transport direction to increase reliability during separation.

4. Operation setup

1. Connect smema cables and mains supply cable.

2. Start the conveyor by switching the Power switch to ON position.

3. Set the width of the conveyor; see the section entitled *Control system* in the preceding chapter. Slide the PCB manually through the whole conveyor to test the width. The PCB should slide smoothly without getting stuck.

4. The conveyor is now ready for production.

5. Maintenance

The maintenance instructions in this chapter comprise weekly, monthly and yearly maintenance for the conveyor.

The maintenance is very important for a continuous operation without unintentional stops.

Follow the maintenance instructions carefully and keep the conveyor clean.

Lubricants
Unless others are stated, use the OKS 270 grease.

Grease should be applied in small amounts, just to give a thin film.

Specifications and part #'s for the lubricants are found at the end of this chapter.

Weekly

Clean the machine.
Keep the conveyor clean all over.

Clean all sensors.
Wipe off dust and dirt from all sensors using a soft cotton cloth. Clean the photo sensors at the end of each conveyor segment. If the sensors are not clean, the conveyor will not work properly.

All sensors are depicted in the document found in the control cabinet at delivery.

Monthly

Clean under the conveyor belts.
Clean the surfaces under the conveyor belts with a cloth lightly wet in alcohol, if needed.

Check the conveyor belt condition.
Check the conveyor belt condition and renew the belts if required. Work procedure for replacing conveyor belts is described in the chapter entitled *Service*.

Yearly

Threaded rods and linear bar(s) for width adjustment.
Apply a small amount of lubricant, (OKS 270), to the entire length of the rod and linear bar. Drive the conveyor assembly to both end positions.

Lubricant specifications

This section contains lubricant data for:

- OKS 270 grease

OKS 270

OKS 270 is the base lubrication grease for the machine.

Data
Full product name: OKS 270
Type: Grease paste
Colour: Whitish
Flash point: >210°C

Supplier in Sweden
TriboTec AB
Box 203
S-435 24 Mölnlycke, Sweden
Phone: Nat. 031-88 78 80 Int. +46 31 78 80
www.tribotec.se

Manufacturer
OKS Spezialschmierstoffe GmbH
Triebstraße 9
D-80993 München
Phone: Nat. 089-14 98 920 Int. +49 89 14 98 920
www.oks-germany.com

6. Service

This chapter contains the following service procedures:

- Exchange of conveyor belt drive motor.
- Exchange of conveyor belt rollers.
- Exchange of conveyor belt.
- Exchange of width adjustment motor.
- Setting of conveyor parallelism.

For other repair works, refer to drawings and information found in the electrical cabinet at delivery.

Exchange of conveyor belt drive motor

1. Disconnect the power supply at the mains plug.

2. Remove the conveyor motor cover, see figure 3-1 on page 8.

Figure 6-1 Cover removed

3. Make a note of the wire numbers and remove wires. Use a hammer and a driftpin to remove the shaft pin, and remove the three screws holding the motor.

Figure 6-2 Screws and shaft pin

4. Remove the old motor and mount the new one with the three screws. Mount the shaft pin and the two motor wires.

5. Mount the conveyor motor cover.

Exchange of conveyor belt rollers

1. Turn the conveyor off.

2. Remove cover on both sides of the conveyor rail.

Figure 6-3 Covers removed

3. Remove the drive belt from the belt roller that is to be exchanged and replace the old belt roller.

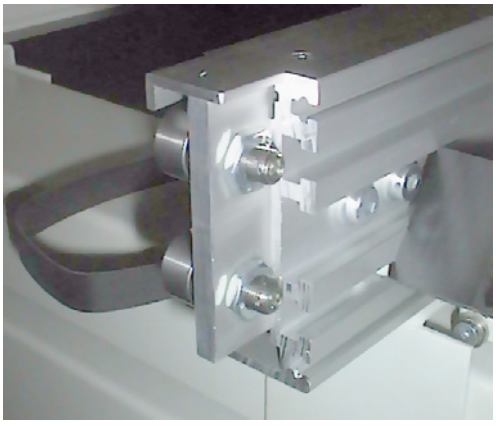

Figure 6-4 Belt rollers

4. Put the conveyor belt back in place and mount both conveyor rail covers.

Exchange of conveyor belt

1. Turn the conveyor off.
2. Remove the inside conveyor rail cover.
3. Remove the conveyor belt by pulling it to the side.
4. Fit the new belt by pushing it in place from the side.
5. Mount the inside conveyor rail cover.
6. Turn the conveyor on.

Exchange of width adjustment motor

1. Disconnect the power supply at the mains plug.
2. Unscrew and remove the two M8 screws holding the width motor cover, using a 5 mm Allen key.

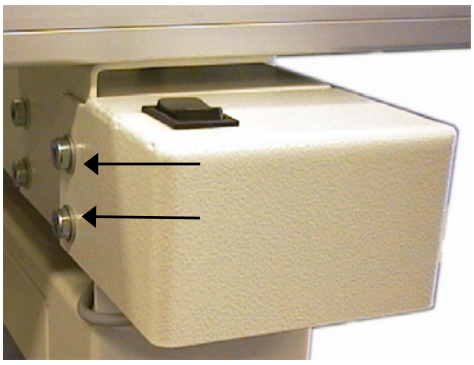

Figure 6-5 Width motor cover

3. Move the cover aside to make the motor wires visible, and disconnect them from the motor.

Figure 6-6 Width motor wires

4. Unscrew and remove the four M3 screws holding the width motor using a 2,5mm Allen key.

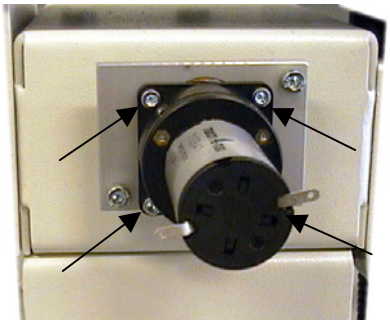

Figure 6-7 Width motor screws

5. Unscrew the setscrew on the motor shaft under the linear unit, using a 1,5mm Allen key.

6. Pull the width adjustment motor out, and replace it with the new one.

7. Replace the four M3 screws holding the width motor and the setscrew on the motor shaft.

8. Reconnect the motor cables; replace the cover and the two M8 screws holding it.

9. Connect the power supply at the mains plug.

Conveyor parallelism adjustment

1. Turn the conveyor off.
2. Remove the inside conveyor rail cover.
3. Loosen the four M8 screws that hold the conveyor rail and adjust parallelism by slightly pushing the conveyor profile in desired direction.

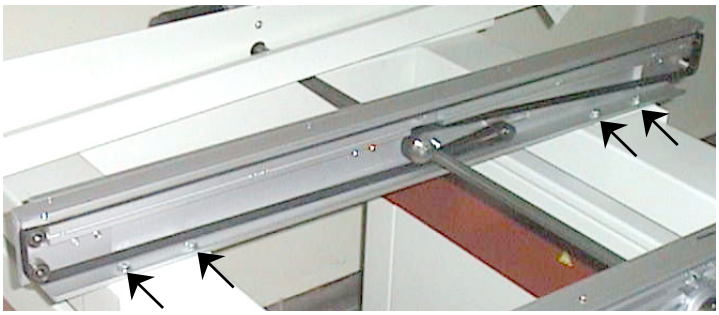

Figure 6-8 Conveyor parallelism

4. Tighten the screws when parallelism is achieved.
5. Mount the inside conveyor rail cover.
6. Turn the conveyor on.