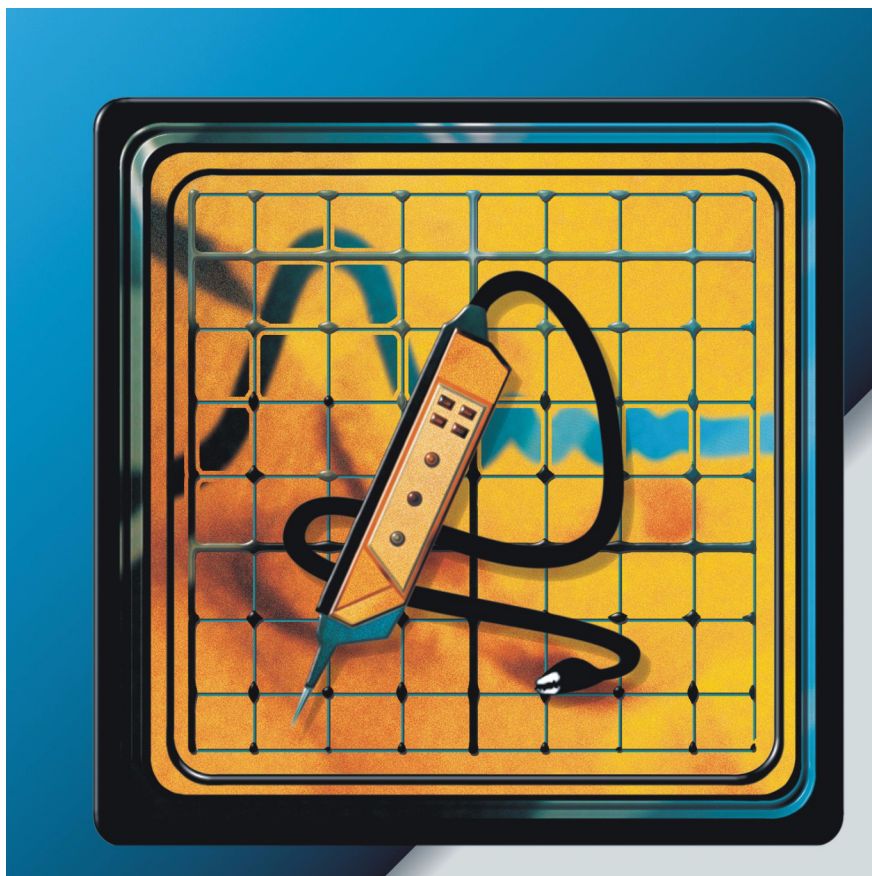


SIEMENS



Siplace S-27 HM

Service Manual

10/2005 US Issue

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(We have checked the contents of the printed documentation to ensure that it is in agreement with the hardware and software described therein. However, since discrepancies cannot be ruled out, we cannot assume responsibility for complete agreement. The information given in this printed documentation is however regularly reviewed and necessary corrections included in subsequent editions. We would appreciate any suggestions for improvements.)

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Order No.: 00193 530-02

Siemens AG

To be ordered from:

Siemens AG, Automation and Drives
Electronics Assembly Systems
Rupert-Mayer-Strasse 44
D-81359 Muenchen

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1 Introduction

1.1 General

1.1.1 How to get information

If you have any further questions concerning this manual or if you would like additional information on a particular topic, please get in touch with your local SIEMENS dealer or contact us directly at

Siemens AG, Automation and Drives
Electronics Assembly Systems
Rupert-Mayer-Str. 44
D-81359 Munich, GERMANY

1.1.2 SIPLACE on the World Wide Web (WWW)

We also have our own site on the Internet. Why not log onto our SIPLACE home page at <http://www.siplace.com>.

All the menus and other information are available in two languages: You can choose between the German and English versions.

The various headings contain information on

- our products
- services
- contacts, etc.

Registered customers can also access the SIPLACE User Group. There you can call up special information on our placement machines, such as

- technical documentation
- technical information
- spare parts lists, etc.

Registering for access to the User Group is sheer child's play:

- Click on the 'Register now' button
- Complete the registration form and just send it off.

You will then quickly receive access authorization with USER ID and a password.

1.2 Important notes on the user manual

1.2.1 Qualification and training of personnel

Personnel used for service must hold the relevant qualifications for the job. The user must keep tight control over their responsibilities, assignment and supervision. Any employee who does not have the relevant training must be trained and given appropriate instruction. If necessary the user of the machine can have training provided by the manufacturer/supplier.

In addition, the user must ensure that the employees have fully understood the contents of the service manual.

1.2.2 User classification

The operating software is structured so that certain functions or menus can only be used or called by appropriately trained personnel. There are three different classes of user:

- operator,
- line engineer and
- service engineer.

Access to each class may be password-protected.

Operators

The operator class consists of any person who has been trained in operation of the machine. These people are authorized to use any functions associated with operating the machine and may call up any menus needed to use the machine.

Line engineers

Line engineers have undergone special training and are authorized to carry out line engineer activities, such as creating set-up configurations, determining vision parameters, etc.

Service engineers

This class is intended for engineers from SIEMENS AG. They are trained to carry out servicing work and to upgrade and retrofit the placement system.

1.3 Danger notes



WARNING

- A thorough knowledge of the relevant part of this Service Manual is required before carrying out any work on the machine.
 - All work must be carried out by appropriately trained and qualified personnel.
 - All warning, caution and danger notes MUST be observed.
 - In addition, read through chapter 2 of the user manual carefully.
-

1.4 Liability of the manufacturer/supplier

We draw your attention to the fact that this service manual only contains descriptive and explanatory material and does not include any contractual conditions or undertakings. All obligations of Siemens AG proceed from the conclusion of the contract concerned, under which you have the machine described herein. This applies in particular to all statements regarding performance or service life and the agreed liability for faults or defects. The provisions of the contract regarding the liability for faults or defect are neither extended nor restricted by any statements in this service manual.

1.5 Revision index

	Manual	Issue
First Version	Service Manual S-23 HM	09/1999
Revision to	Service ManualS-27 HM	03/2003
Revision to	Service ManualS-27 HM	10/2005

2 Operational safety

2.1 Safety instructions

2.1.1 Conventions for the use of hazard symbols

This Manual contains notes that must be observed to guarantee your personal safety and to avoid damage to equipment. These notes are highlighted by warning triangles and are indicated as follows according to the level of risk:

DANGER  or  DANGER

as used in this Manual means that death, severe injury or considerable damage to equipment *will* occur if the danger instructions are not followed.

WARNING  or 

as used in this Manual means that death, severe injury or considerable damage to equipment *may* occur if the warning instructions are not followed.

CAUTION  or 

as used in this Manual means that slight injury or damage to equipment may occur if the caution instructions are not followed.

NOTE

as used in this Manual provides information on the product or indicates a part of the Manual that requires particular attention.

2.1.2 Qualified personnel

Qualified or adequately trained personnel means that these people are familiar with the setting up, operation and maintenance of automatic placement systems and add-on devices and are suitably qualified, e.g.

- have been trained, instructed or authorized to switch on and off, isolate, earth and identify electrical circuits and system components in accordance with normal safety standards.
- have been trained or instructed in the upkeep and use of appropriate safety equipment in accordance with normal safety standards.
- have received first aid training.

2.1.3 Use as prescribed

The product must only be used for its intended purposes as described in the catalogues and technical descriptions, namely the placement of SMD components, and only with the third-party equipment and components recommended or permitted by Siemens AG. Use for a different or extended purpose is not prescribed.

If the product is not used as prescribed, SIEMENS AG accepts no liability for any damage that may occur and does not guarantee that the components will work properly and without problems.

Use as prescribed also includes compliance with all the instructions in the user manual.

For the product to operate correctly and reliably, it must have been transported, stored, erected and assembled correctly and must be operated and maintained with care.

2.1.4 Failure to use as prescribed

Failure to use the product as prescribed can result in both danger to life and limb and material damage. For this reason any use that is not prescribed is not allowed. If the product is not used as prescribed, SIEMENS AG accepts no liability for any damage that may occur and does not guarantee that the components will work properly and without problems.

Examples of failure to use the product as prescribed:

- Placement of components that do not meet the permitted specification
- The use of component feeders that have not been approved
- The use of unauthorized accessories and additional modules

2.1.5 Important notes on operational safety

The following points **MUST** be observed in order to maintain operational safety:

2.1.5.1 General

- The operational safety of SMD automatic placement systems can be guaranteed only if the system is used as prescribed and in accordance with the instructions in the User/Service Manuals.
- Always follow any safety regulations specific to your country.
- Make sure that the warning labels are always clearly identifiable and always easily readable.
- Replace any damaged warning or notice labels. Replace any labels that are missing.
- The machine key for releasing the covers on the machine must be kept in a safe place where it is only accessible to qualified personnel.

NOTE

The machine owner, and only the machine owner, is responsible for the safekeeping of the machine key and for ensuring that it is handed over to authorized persons.

- If it is necessary to work on the machine and you do not have adequately trained personnel within your operation, always call in a SIEMENS AG service technician. SIEMENS AG will not accept liability for any damage or consequential damage that is the result of incorrect work.
 - If particularly hazardous situations are identified while the machine is in use, the machine owner must immediately notify the manufacturer in writing so that appropriate action can be taken to reduce the potential danger.
-



WARNING

In spite of all the safety precautions taken by the manufacturer, failure to use the system as prescribed can result in severe physical injury (e.g. from the moving gantry or lifting table) and/or considerable damage to equipment. For the machine to be safe, it must be used correctly by qualified personnel and all warnings must be observed. Some work on the machine (e.g. setting up) requires training that goes beyond the scope of this Manual.

2.1.5.2 Safety of operators and other persons

- Machine operators must only carry out work for which they have been adequately trained and with which they are totally familiar.
- NEVER open one of the protective covers if you are not totally familiar with the use and functioning of the machine! Do not open the protective covers during operation unless you are told to do so in this Manual or in the station software dialog.
- Only trained and qualified personnel may set the key switch to setup mode ("I").

During operation, do not set the key switch to the "I" position (setup mode) unless prompted to do so in this manual or by the station software.
- NEVER place your head or arms in the gantry and lifting table traveling range while the station is switched on!
- For your own safety, wear work clothes that conform to the guidelines of the professional association, i.e. no wide sleeves etc.
- Reduce the risks by not wearing scarves, chains or ties at your work post.
- People with long hair must wear a protective head covering.



WARNING

The system is electrically driven. When electrical devices are in use, certain parts carry dangerous voltage levels.

- Switch off at the main switch and disconnect the placement system from the power supply before carrying out any work on live components.
- Lock the systems as described in Section [2.8](#), page [52](#).

There is a risk of death, severe injury and/or considerable damage to equipment if these instructions are not followed.

2.1.5.3 Safety of plant and equipment

- Never make changes, however minor, unless you are totally aware of the effect they will have on the overall functioning of the system.
- The stations must always be set up, retooled and maintained by appropriately trained personnel.
- Only use SIEMENS AG original spare parts and authorized accessories. The use of other parts will affect safety and will invalidate the liability for any consequential damage.
- Do not make modifications to the safety equipment. In particular, NEVER bypass circuit-breakers or remove safety devices.

2.1.6 Safety instructions for laser units

Permission to operate components that are classified as lasers is withdrawn if

- mechanical damage to the unit is observed, or
- any work is done on the mechanical or electrical parts of the unit.
Even damaged or missing screw locking paint on laser components (e.g. cover plates, fasteners, adjusting potentiometer) counts as work.
- Only SIEMENS AG service engineers, or the machine owner's service engineers who have been trained by SIEMENS AG are allowed to replace laser components.
- Repairs to laser units are carried out at the SIEMENS AG factory exclusively.

2.1.7 Important notes on environmentally-friendly disposal of materials and components

SIPLACE systems are manufactured using only materials and parts that can be easily separated and disposed of in an environmentally-friendly way. Hazardous materials are not necessary for the installation, dismantling or operation of the system.

NOTE

The owner of the system has sole responsibility for the proper environmentally-friendly disposal of machines, working materials, consumables and wear parts.

→ Please observe your national statutory provisions for waste disposal and environmental protection.

2.2 Warning labels

2.2.1 Warning labels W201, W203, W204, and W206 on the machine

The warning labels are made from soft PVC film, and are abrasion-proof, light-fast and resistant to water and weathering.

Their design meets the requirements of ISO 3864-2 and ANSI Z535.4.

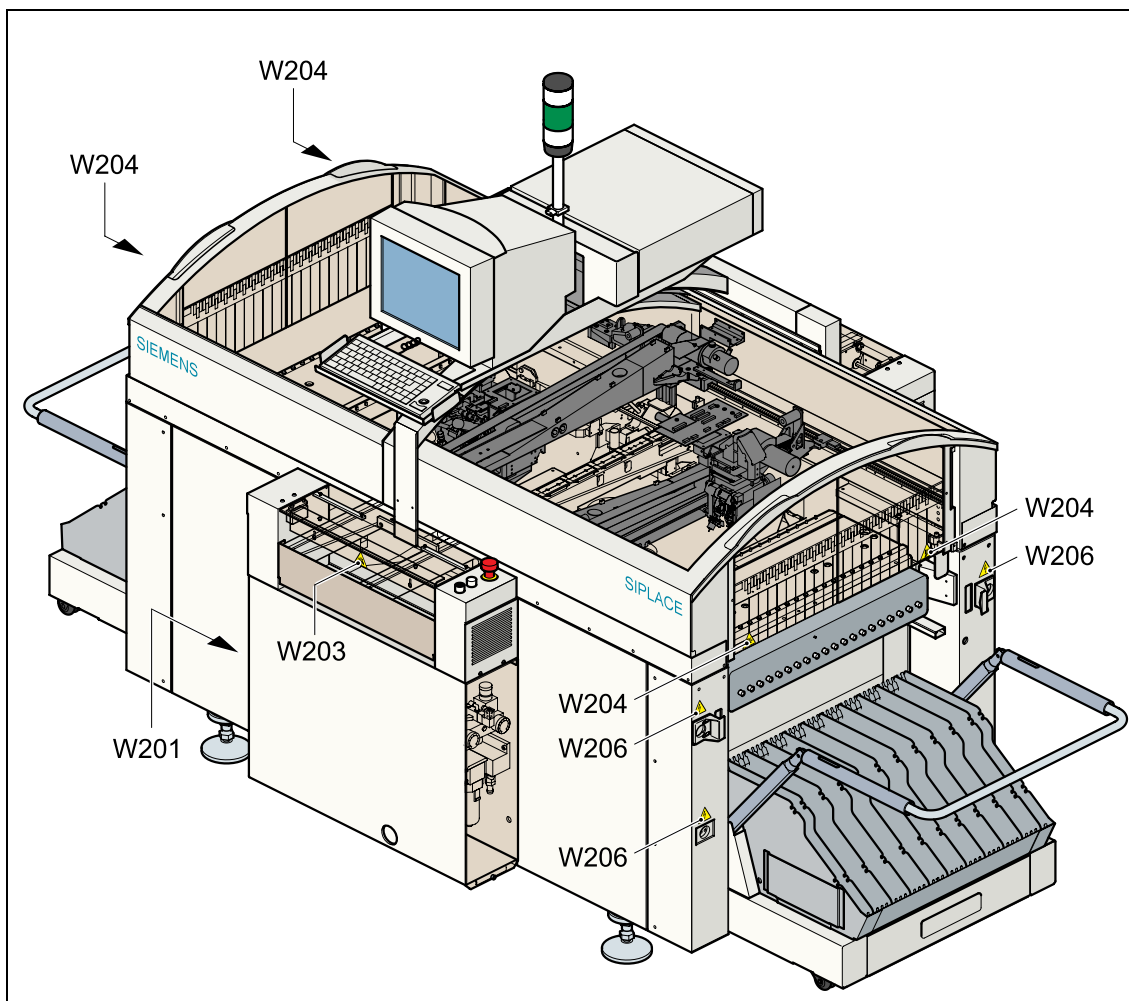


Fig. 2.2 - 1 Warning labels on the machine - part 1



WARNING

- Do not use abrasive cleaners or solvents for cleaning warning labels.
- Replace any damaged or illegible warning or notice labels.

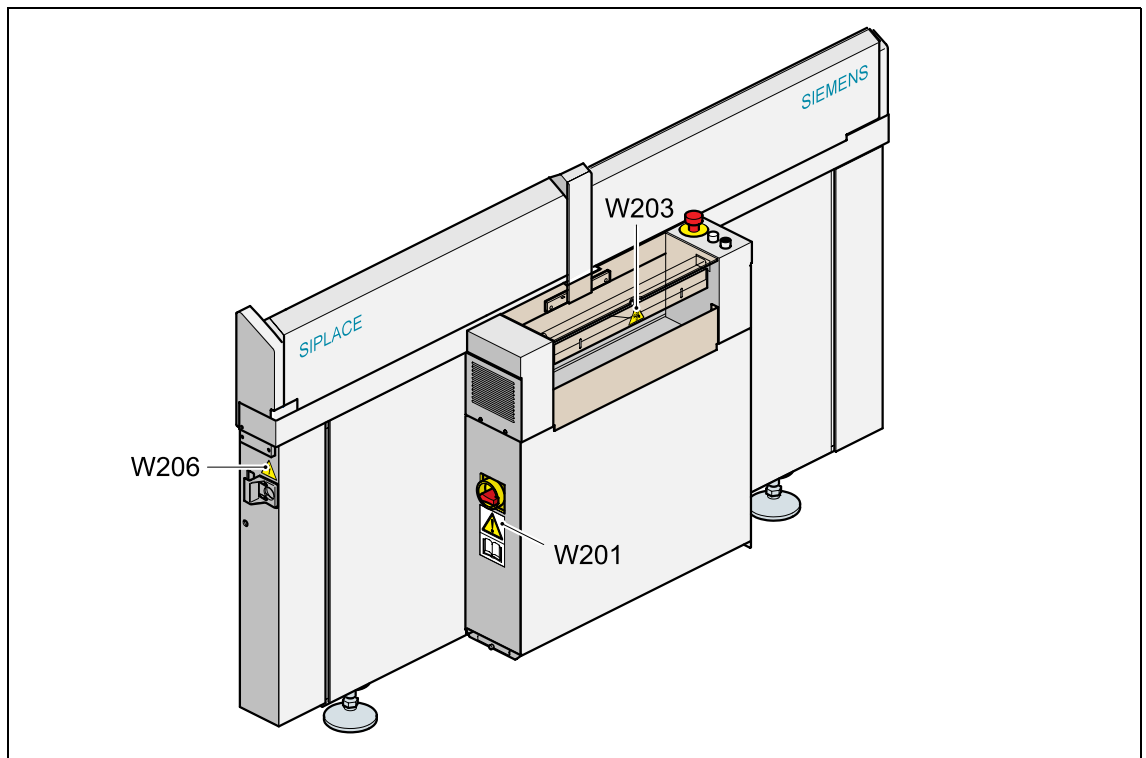


Fig. 2.2 - 2 Warning labels on the machine - part 2

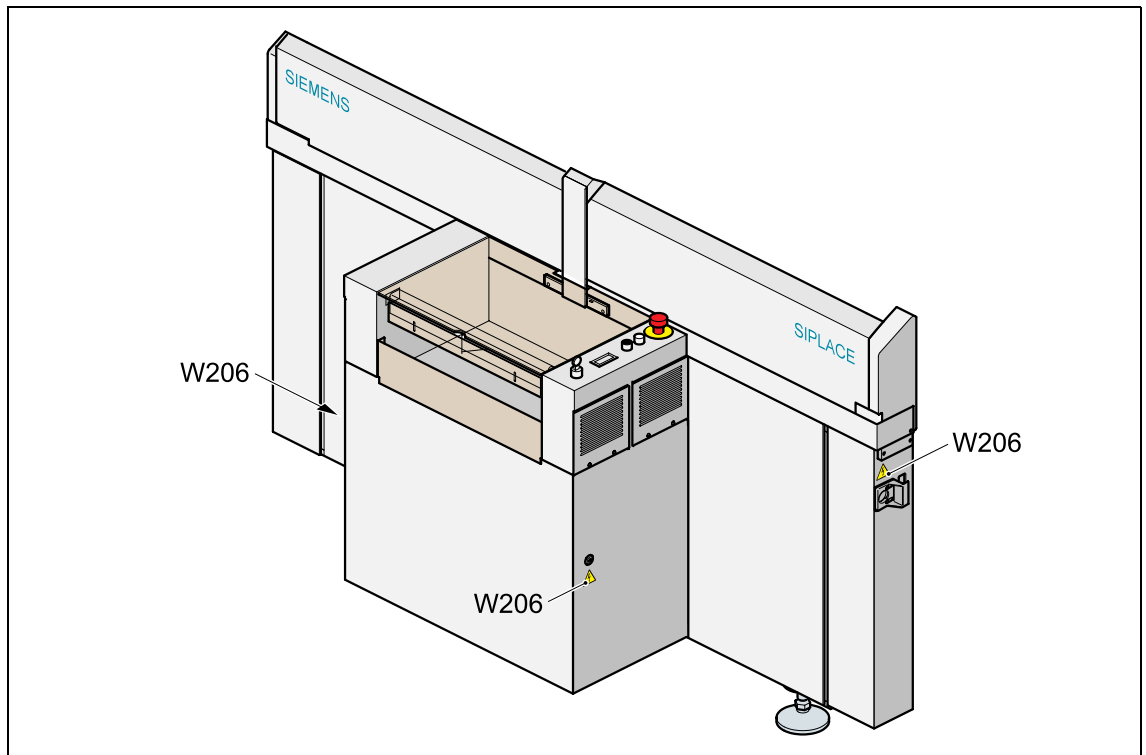
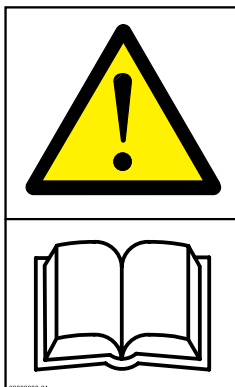


Fig. 2.2 - 3 Warning labels on the machine - part 3

2.2.1.1 Warning label W201



SAFE OPERATION OF THE MACHINE

Safe operation of the machine depends absolutely on the operator being familiar with the user manual and safety instructions and putting them into effect.

Pos. W201 in Fig. [2.2 - 1](#), item no. 03009338-01

2.2.1.2 Warning label W203



DANGER OF CRUSHING!

Reaching in here can lead to injuries to the arms and hands.

Do not reach into the machine while it is running

Pos. W203 in Fig. [2.2 - 1](#), item no. 03009342-01

2.2.1.3 Warning label W204



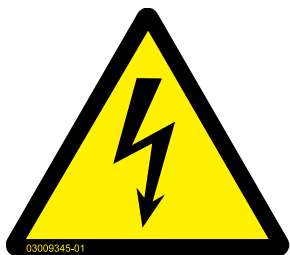
DANGER OF CRUSHING!

Reaching in here can lead to injuries to the arms and hands.

Do not reach into the machine while it is running

Pos. W204 in Fig. [2.2 - 1](#), item no. 03009343-01

2.2.1.4 Warning label W206



DANGEROUS VOLTAGES!

The labeled parts are still live when the main power switch is off.
Disconnect the machine from the mains before servicing it.

NAFTA region: RISK OF ELECTRIC SHOCK OR BURN!

Pos. W206 in Fig. [2.2 - 1](#), item no. 03009345-01

2.2.2 Warning label W205 on the tape cutter



RISK OF CUTTING!

Danger of cutting is present even when the machine is switched off

Pos. W205 in Fig. [2.2 - 1](#), item no. 03009343-01

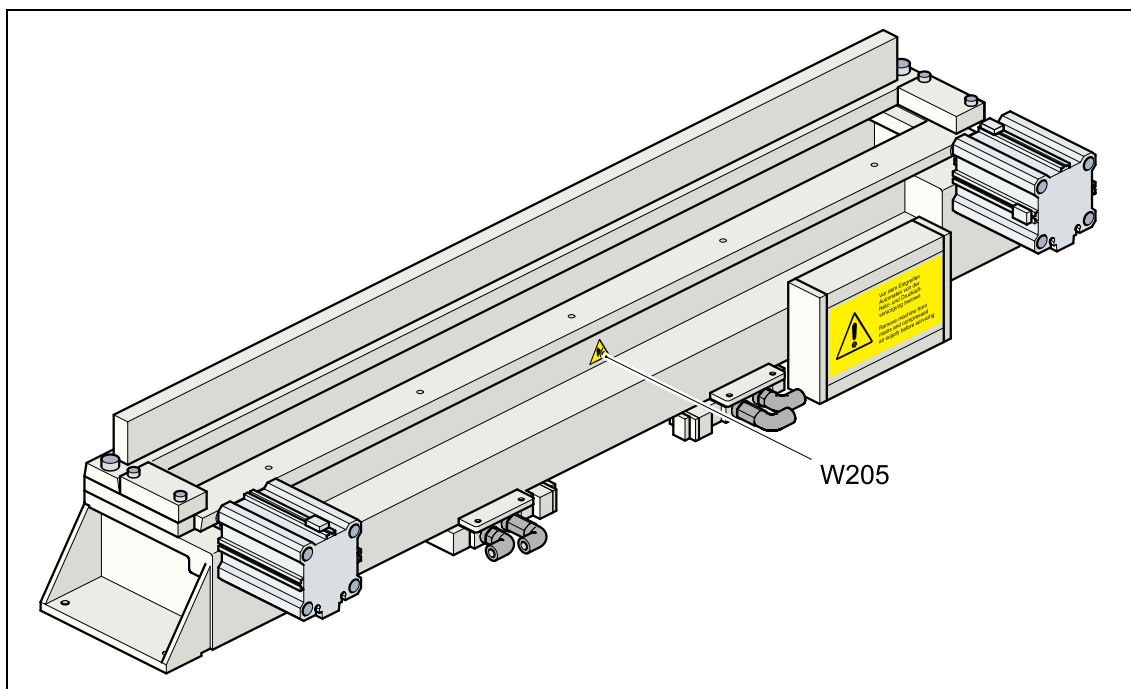


Fig. 2.2 - 4 Warning label W205 on the top of the tape cutter



WARNING

If you wish to do work on the tape cutter, you must disconnect the machine from the mains supply and the compressed air supply.

Wait until the operating pressure has dropped to 0 MPa.

2.2.2.1 Warning label W205 on the used tape channel and on the waste tape chute

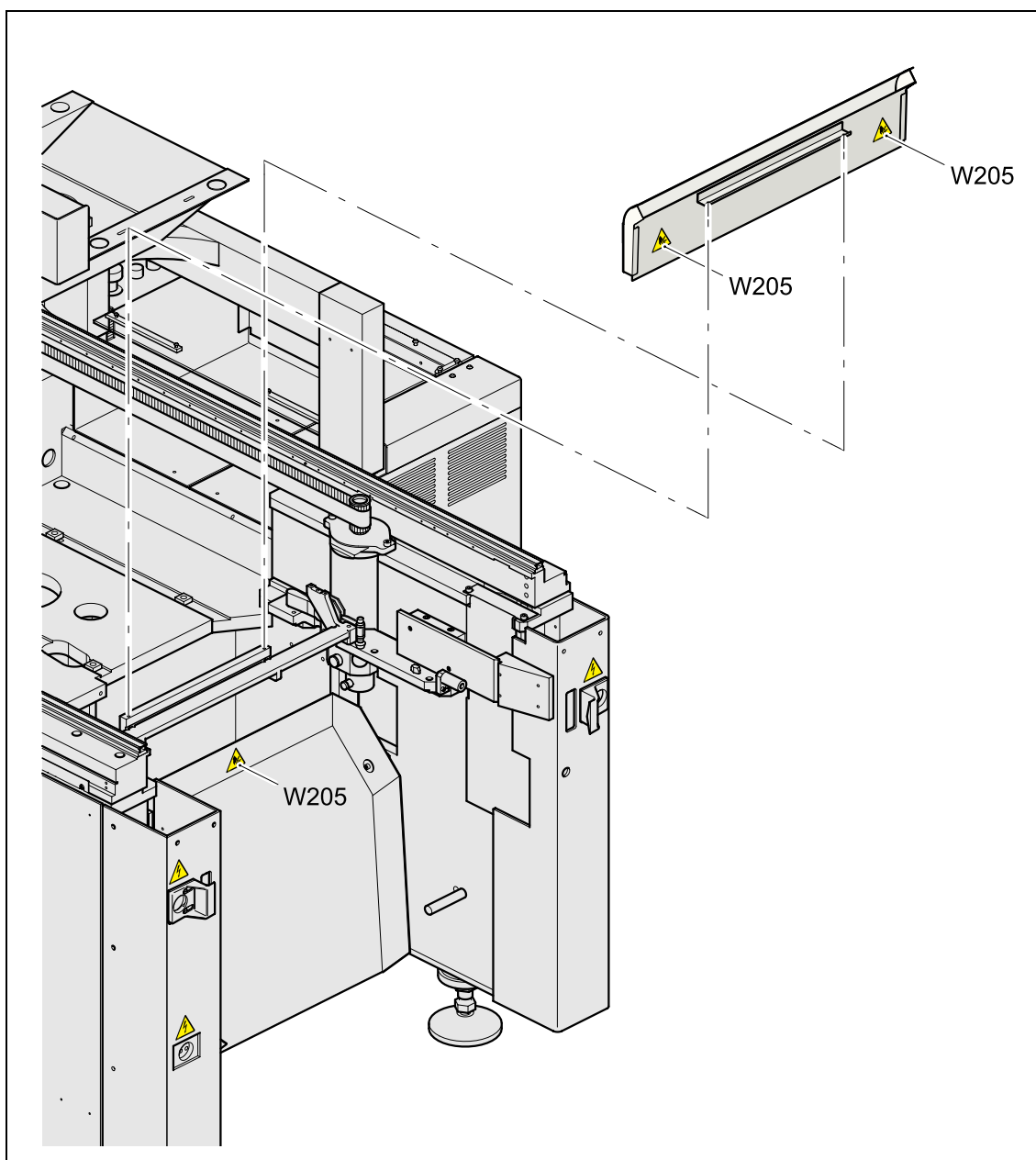
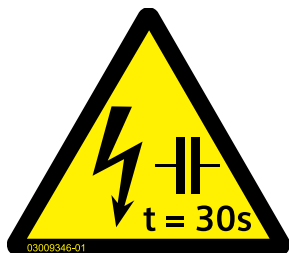


Fig. 2.2 - 5 Warning label W205 on the used tape channel and waste tape chute

2.2.3 Warning label W207 on the servo unit



MAIN POWER VOLTAGE!

Switch off the main power switch and wait 30 seconds until the capacitors have discharged.

NAFTA region: RISK OF ELECTRIC SHOCK OR BURN!

Pos. W207, item no. 03009346-01

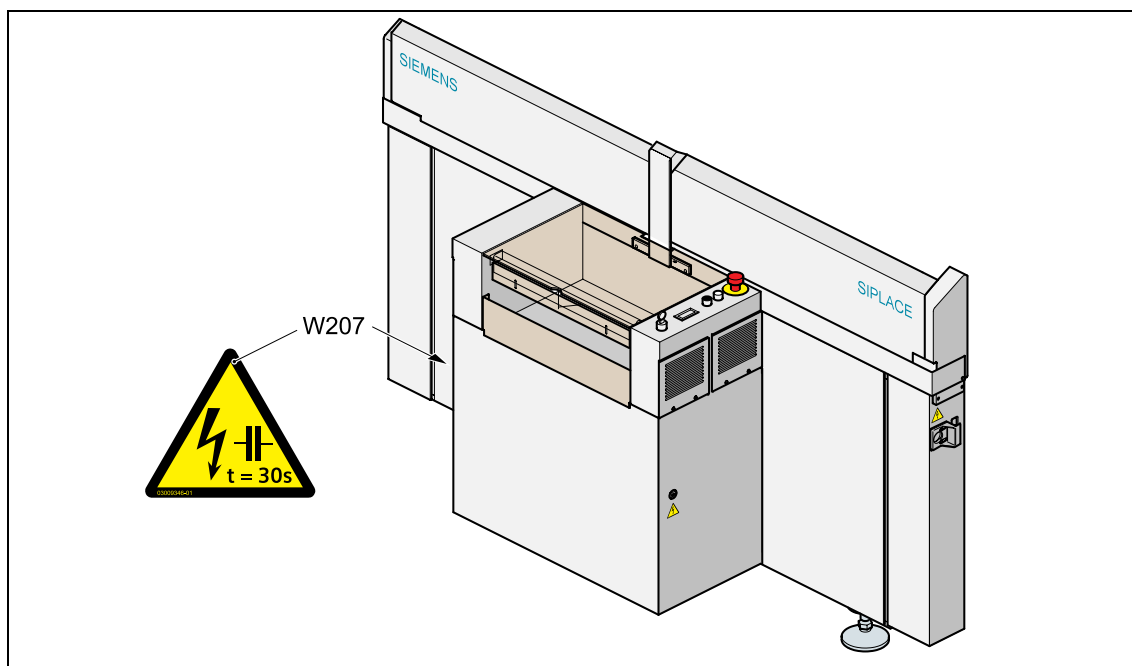
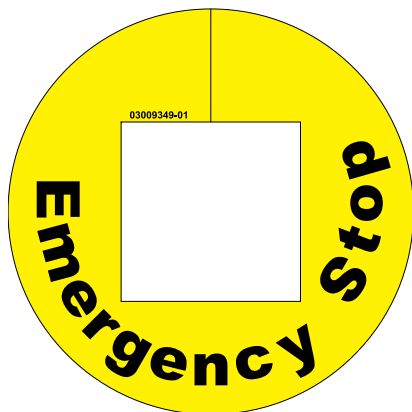


Fig. 2.2 - 6 Warning label W207 on the servo unit Macrodon panel

2.2.4 Warning label W110 on the EMERGENCY-STOP buttons



For Australia, Canada, Mexico and USA, warning label W110 is affixed to the mounting kit instead of the yellow ring on the EMERGENCY-STOP buttons.

Warning label W110, item no. 03009349-01

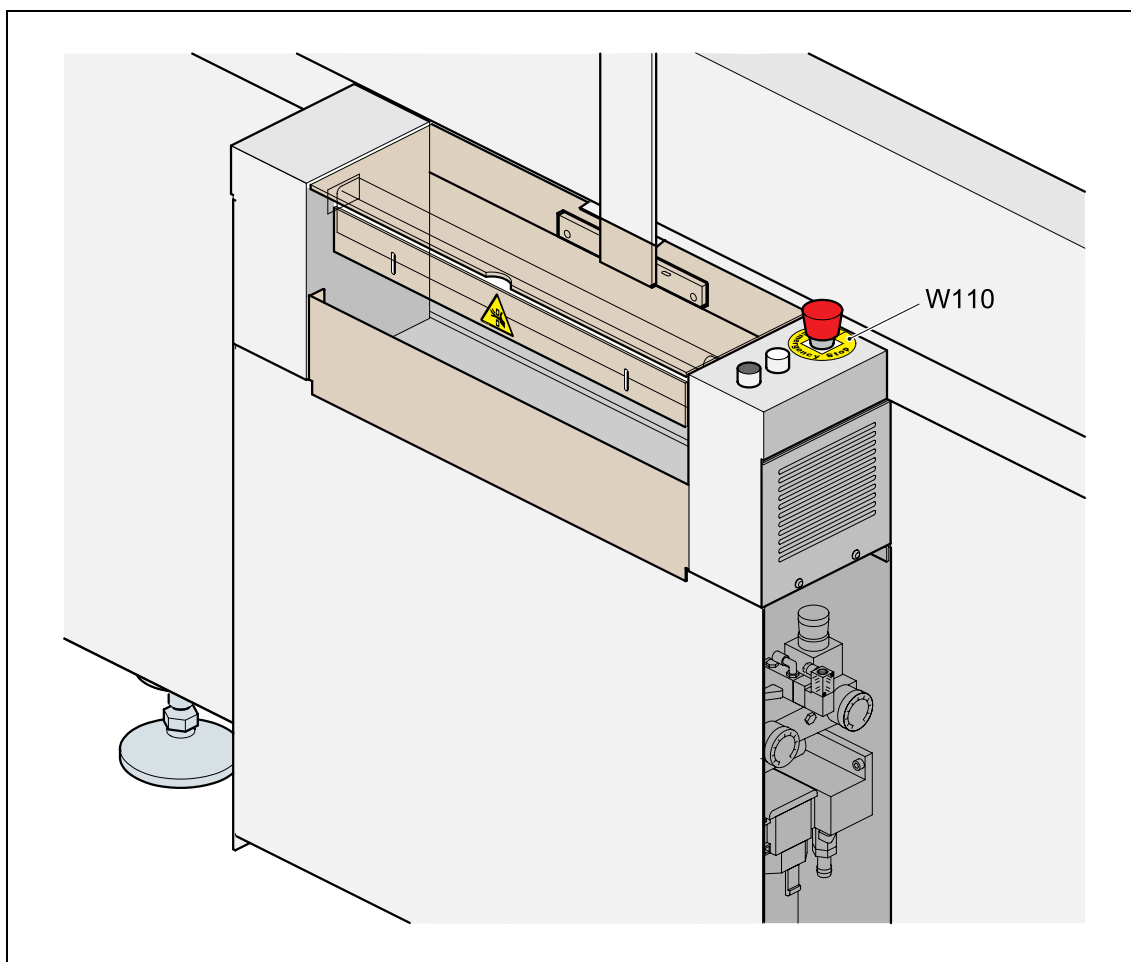


Fig. 2.2 - 7 Warning label W110 on the EMERGENCY-STOP buttons

2.2.5 Warning label "laser class 2" on the PCB conveyor



LASER RADIATION!

Do not look into beam

Laser class 2

Warning label "Laser class 2" on the PCB conveyor, item no. 03009347-01

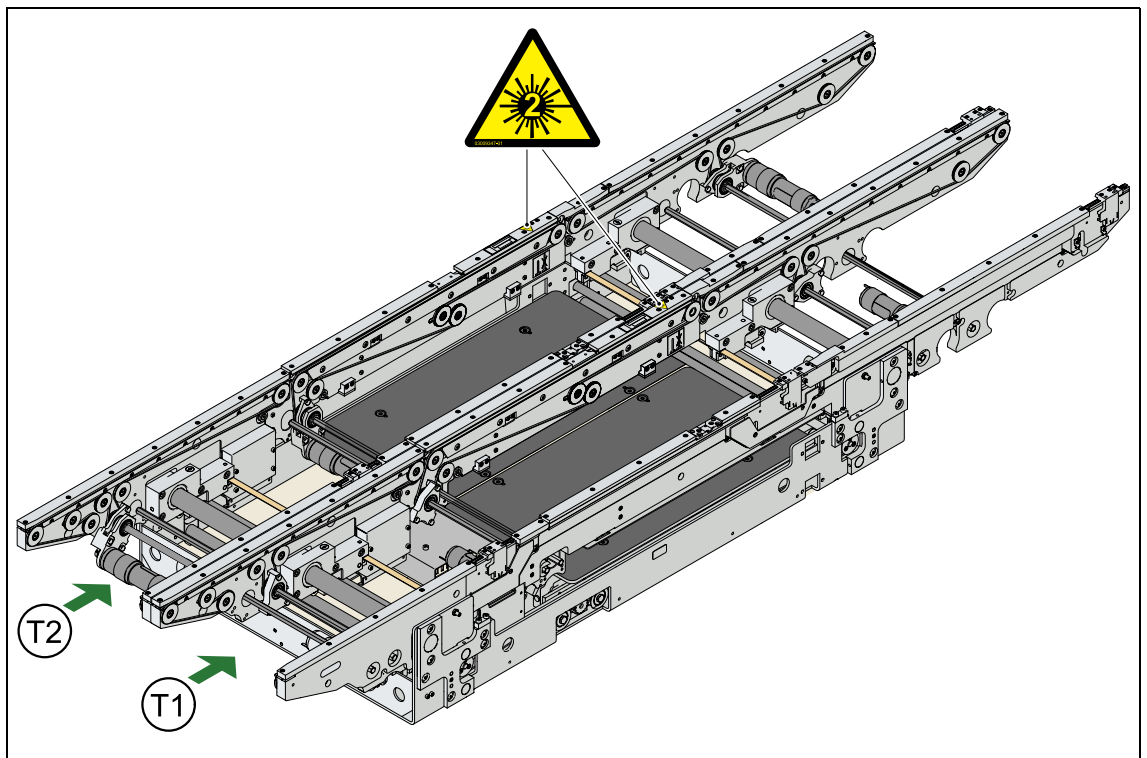


Fig. 2.2 - 8 Warning label "Laser class 2" on the PCB conveyor

2.3 Laser classification

2.3.1 Laser class 1

2.3.1.1 Classification of the whole machine



All installed camera systems and the whole machine when ready for operation are assigned to laser class 1.

The laser classes are determined according to DIN EN 60825-1.

PLEASE NOTE:

Modules in laser classes 1 and 1M are not identified.

2.3.1.2 Classification of the camera systems



The following camera systems are assigned to laser class 1:

- PCB multicolor camera

2.3.2 Laser class 1M

Do not look directly at this with optical instruments!



The following camera systems are assigned to laser class 1M:

- 24 x 24 component camera on the 12-segment Collect&Place head
- 39 x 39 component camera on the 6-segment Collect&Place head
- 16 x 16 DCA camera on the 6-segment or 12-segment Collect&Place head

2.3.3 Laser class 2

The following modules are assigned to laser class 2:

- Laser light barrier, placement area 1 in the PCB conveyor
- Laser light barrier, placement area 2 in the PCB conveyor
- PCB barcode scanner



Laser radiation

Do not look into beam!

2.3.4 Safety instructions for docking and undocking the component trolley



WARNING

- Never reach into the gaps between the component trolley and the placement system frame while the machine is running (item 1).
- Always check that the component trolley is docked on the placement system before connecting or disconnecting the power cable for the component trolley at the socket on the placement system (item 2).
- NEVER connect the connecting cable for the component trolley to the socket on the placement system and then operate the component trolley outside the machine via the compressed air control unit (item 3).

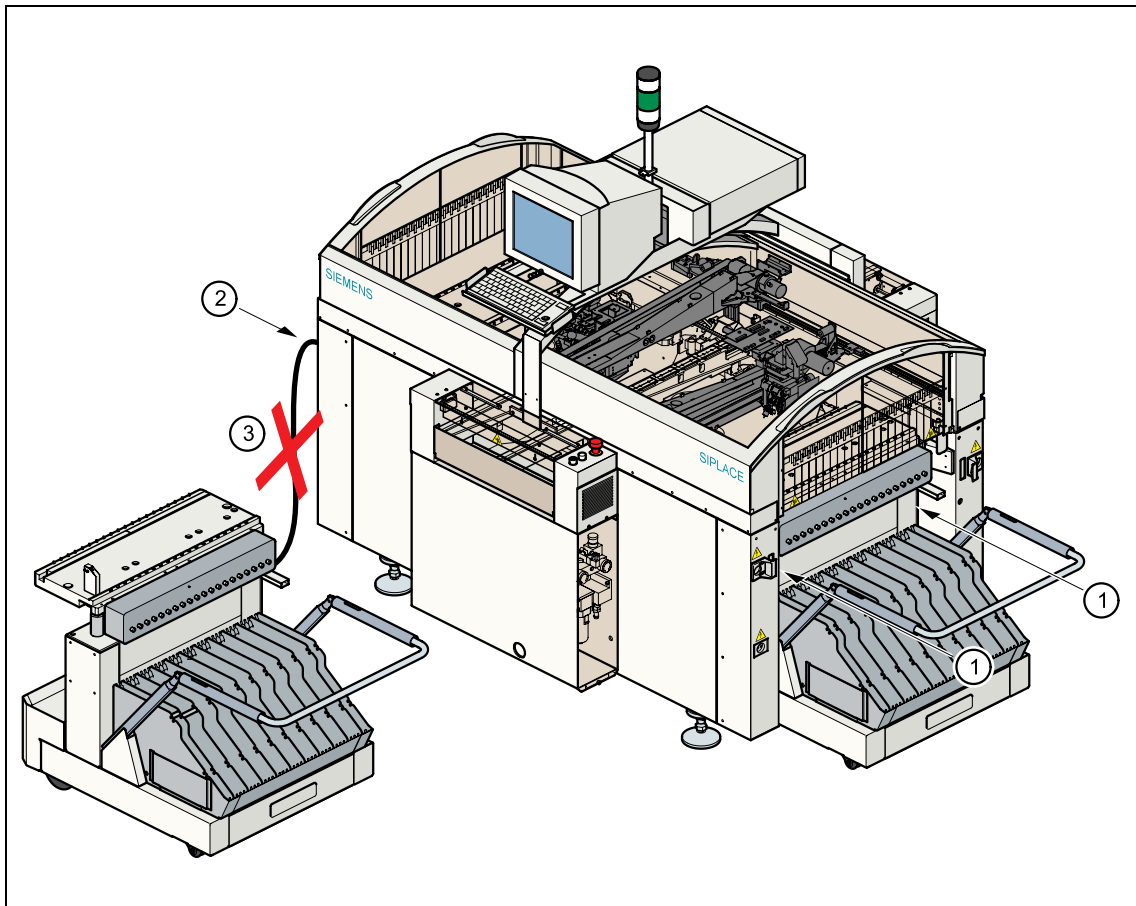


Fig. 2.3 - 1 Safety instructions on the component trolley

2.3.5 Safety instructions for lowering the component table bed



WARNING DANGER OF CRUSHING

When lowering the component trolley tray, never reach into the gap between the feeders and the used tape channel.

2.3.6 Safety instructions for changing the table height of component trolleys



WARNING DANGER OF CRUSHING

The component trolley must only be converted to modify the default height by trained service personnel.

Act with considerable care during the conversion process since the system contains large weights or compression springs (potential energy).

Converting the component trolley to suit a different line height

- Use the placement system's pneumatic controller to raise the table bed. Then insert a 120mm spacer block between the table bed and crossbeam, and lower the bed onto the block.
 - Dismantle the internal paneling.
 - Swivel the handle down. The latching disk swivels down as well.
 - Set the screw to the desired dimension and lock in place with the locknut.
-

PLEASE NOTE:

If you cannot loosen the adjusting screw far enough, the crossbeam must be raised.

- Fix the lifting device to the crossbeam.
 - *Carefully* open the crossbeam clamp.
 - Raise the crossbeam until the end of the tube projects approx. 1 mm out of the clamp.
 - Tighten the crossbeam clamp.
 - Then turn the adjusting screw to the desired dimension and lock in place with the locknut.
-

- Swivel the component trolley handle up. The latching disk will also swivel up.

PLEASE NOTE: If you cannot swivel the latching disk up to its end position, the crossbeam must be raised.

- Fix the lifting device to the crossbeam.
 - *Carefully* open the crossbeam clamp.
 - Raise the crossbeam until the end of the tube projects approx. 1 mm out of the clamp.
 - Tighten the crossbeam clamp.
 - Then turn the adjusting screw to the desired dimension and lock in place with the locknut.
-

- Then *carefully* open the crossbeam clamp.
- Lower the crossbeam until the adjusting screw comes into contact with the latching disk.
- Tighten the crossbeam clamp.
- Then check the distance between the crossbeam and floor.
- Refit the internal paneling.
- Raise the table bed and remove the spacer block.

2.3.7 Safety instructions for the changeable component feeder table

If you use a changeable component feeder table rather than a component trolley, then follow these safety instructions to prevent injury or damage to machines.



WARNING

If you have installed a changeable component feeder table, do not forget to secure it with the two M10 hexagon socket-head bolts (see items 1 and 2 in fig. [2.3 - 2](#)). If you do not do this, the component feeder table could tip over and the placement head could collide with the feeder as it approaches the feeder area.

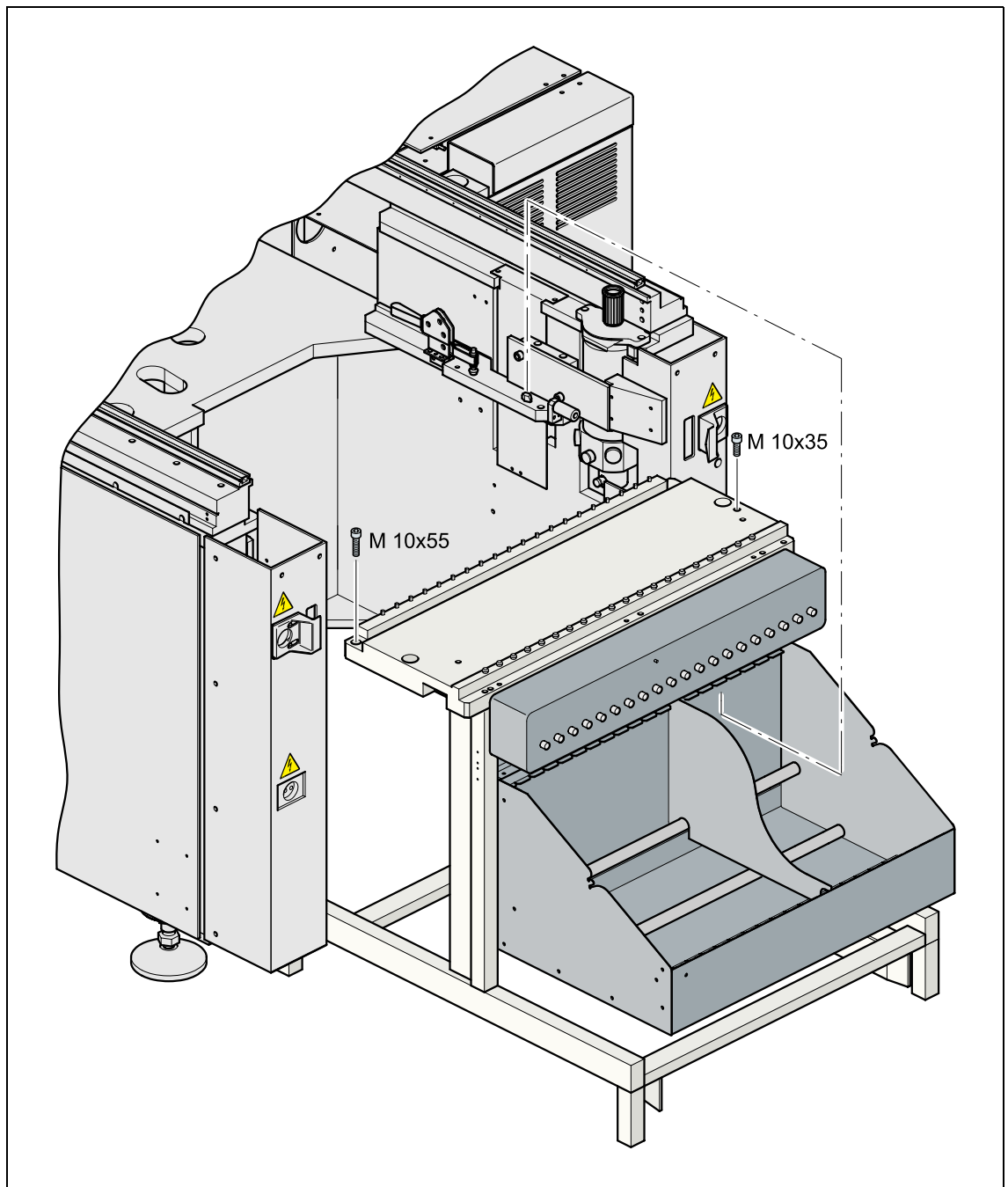


Fig. 2.3 - 2 *Securing the changeable component feeder table*

2.3.8 Safety instructions for opening the protective covers

To prevent any risk of injury when the protective covers on automatic placement machines are opened, the owner must instruct his operators to use the protective covers exactly as specified in the following description.



RISK OF TRAPPING FINGERS IF THE PROTECTIVE COVERS ARE OPENED OR CLOSED INCORRECTLY

When you open the protective covers, if you place one hand in one of the recessed grips (1) and place the other hand on the protective cover in order to guide it (item (5) in [2.3 - 3](#)), you risk trapping your fingers in the narrow gap (4) between the monitor traverse (3) and the protective cover (2).

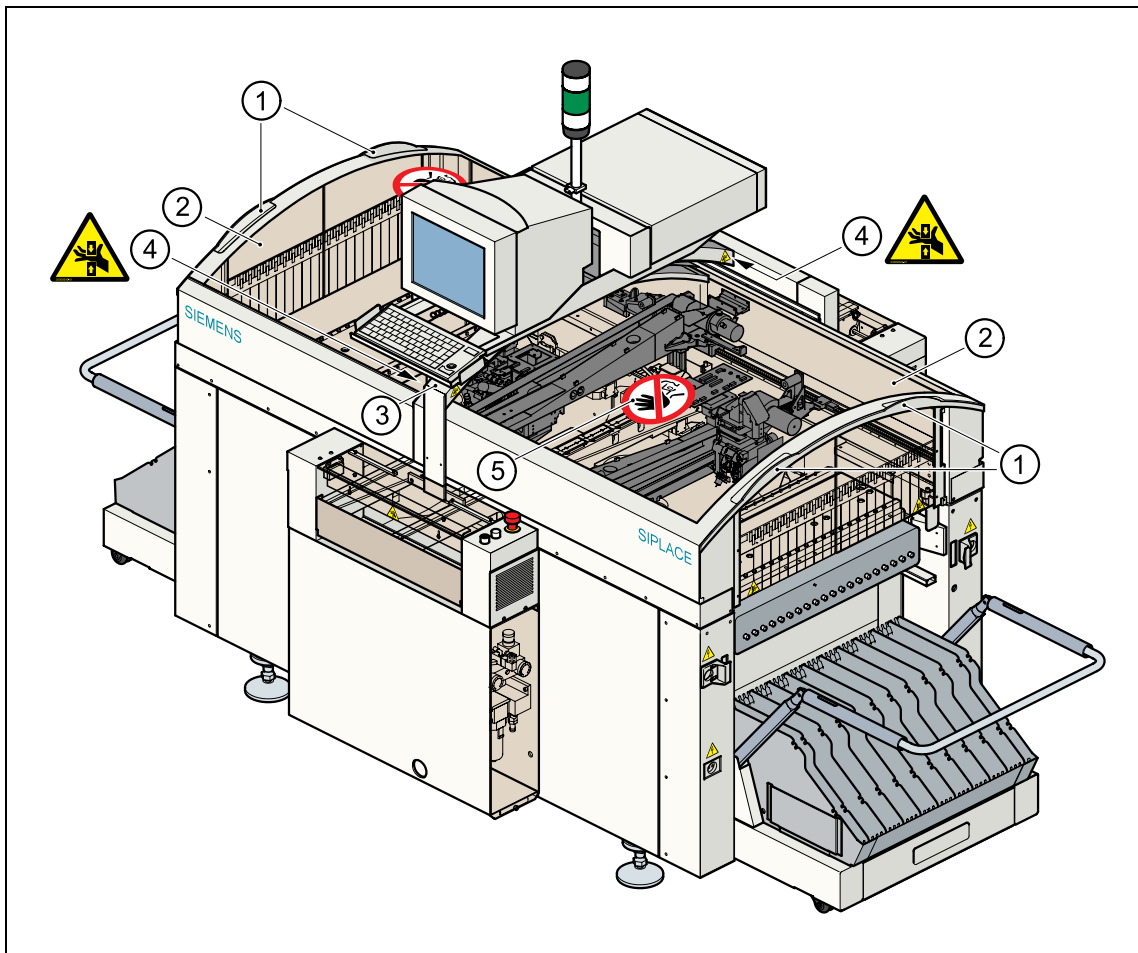


Fig. 2.3 - 3 Protective covers on the SIPLACE automatic placement machine

- (1) Recessed grips for opening and closing the protective covers
- (2) Protective cover
- (3) Monitor traverse

- (4) Narrow gap (between 4 and 10 mm) between the monitor traverse and protective cover



- (5) Do NOT place your hand on this surface!

Every protective cover on the automatic placement machine has two recessed grips (1).

PLEASE NOTE

To open or close the protective covers, hold the recessed grips with **both hands** (see point (1) in Fig. 2.3 - 4). This “two-handed operation” will prevent any risk of injuring your hands.

You will also avoid tilting the protective covers during opening or closing, which would place an excessive load on the guides.

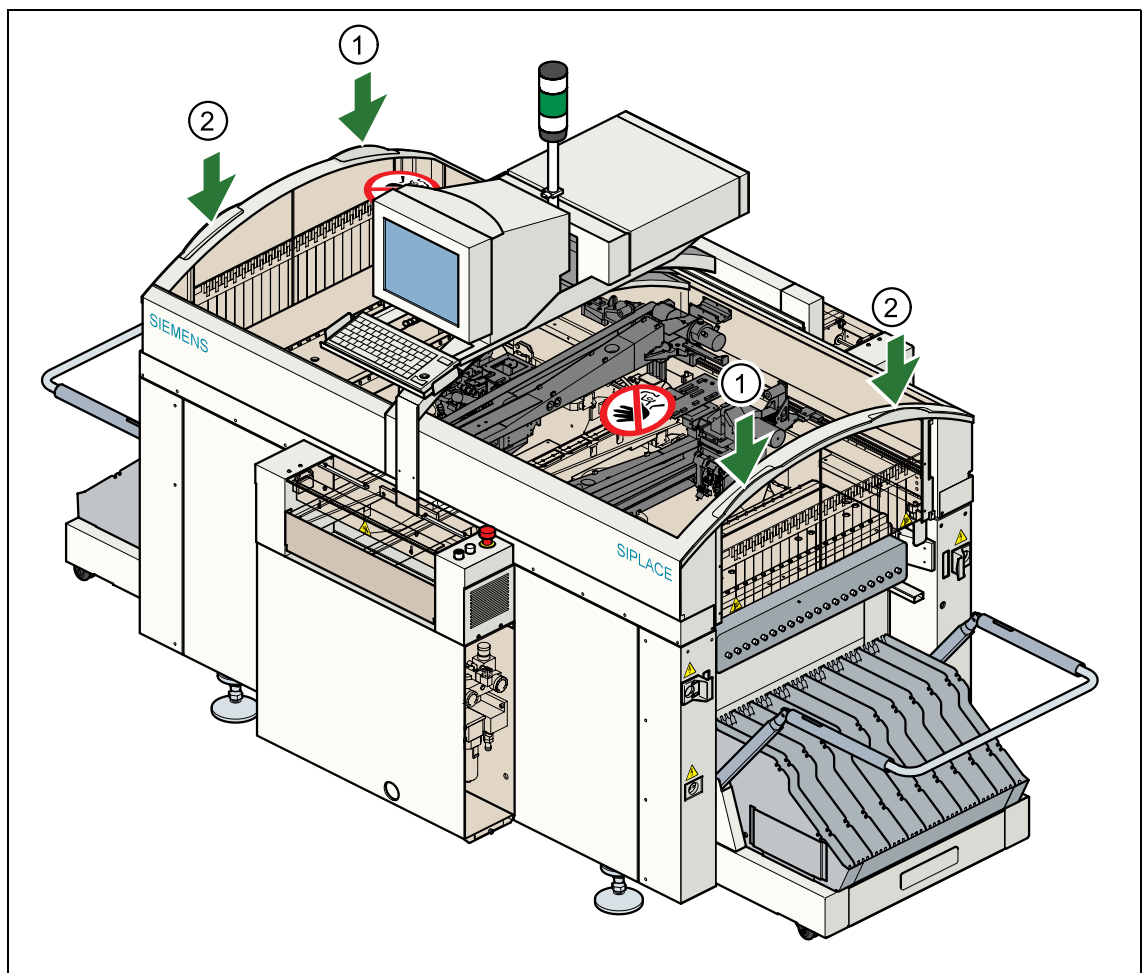


Fig. 2.3 - 4 Two-handed operation

- (1) Two-handed operation

2.3.9 Securing the placement machine to prevent it slipping

In areas with an earthquake risk, it is essential to secure the placement machine to prevent it slipping.

Two holes for M8 bolts are provided in the machine feet for this purpose.

→ Use the bolts to fix the placement machine to the floor as shown in the diagram below.

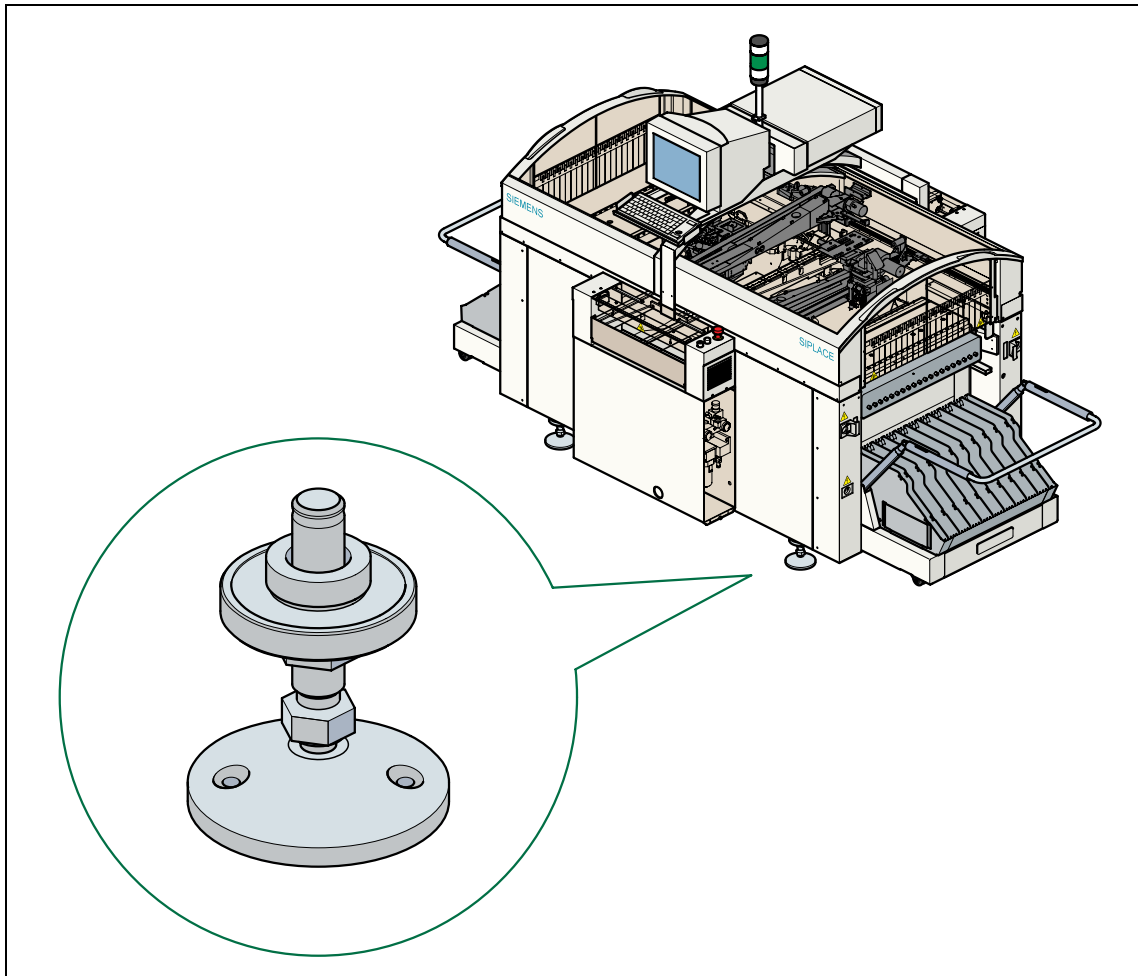


Fig. 2.3 - 5 Securing the placement machine to prevent it slipping

2.3.10 Safety instructions for processing capacitors based on powdered metal

There is a risk associated with processing capacitors based on powdered metal (e.g. tantalum). The risk is that

- an exothermic reaction, i.e. a sudden buildup of heat, may occur, if these components are damaged. If the ambient conditions are unfavorable, and depending on the capacitance, this buildup of heat can cause damage.
- This effect can occur when these components are cut.

Please contact your suppliers to clarify whether the components that you handle are affected.

In extremely rare cases, this risk can occur in the tape cutter of SIPLACE machines, with the remote possibility of causing a smoldering fire in the waste tape.

The ambient conditions are unfavorable if:

- (1) The components remain on the tape while the set tape cycle is checked (since the operator can cycle the feeder onward without removing components during this check).
- (2) The components remain on the tape, e.g. due to a tear in the cover foil.
- (3) The components remain on the tape, and the components or tape do not conform to the specification, thus increasing the pickup error rate.

Please follow the instructions given below to minimize the risk when placing capacitors based on powdered metal.

- (1) If the component tape is cycled onward manually, the operator must remove any components remaining in the tape pocket.
- (2) If the cover foil tears, the operator must remove any components remaining on the tape.
- (3) The waste tape container must be emptied regularly (recommended interval: every hour).



WARNING

To avoid the risk, it is essential to use only feeders that have been approved for placing such components, namely:

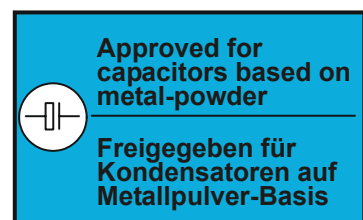
for model C/D

item no.: 00141118-01

for model E

item no.: 00141117-01

The feeders are labeled as shown below:



2.3.11 Safety instructions for docking and undocking the matrix tray changer

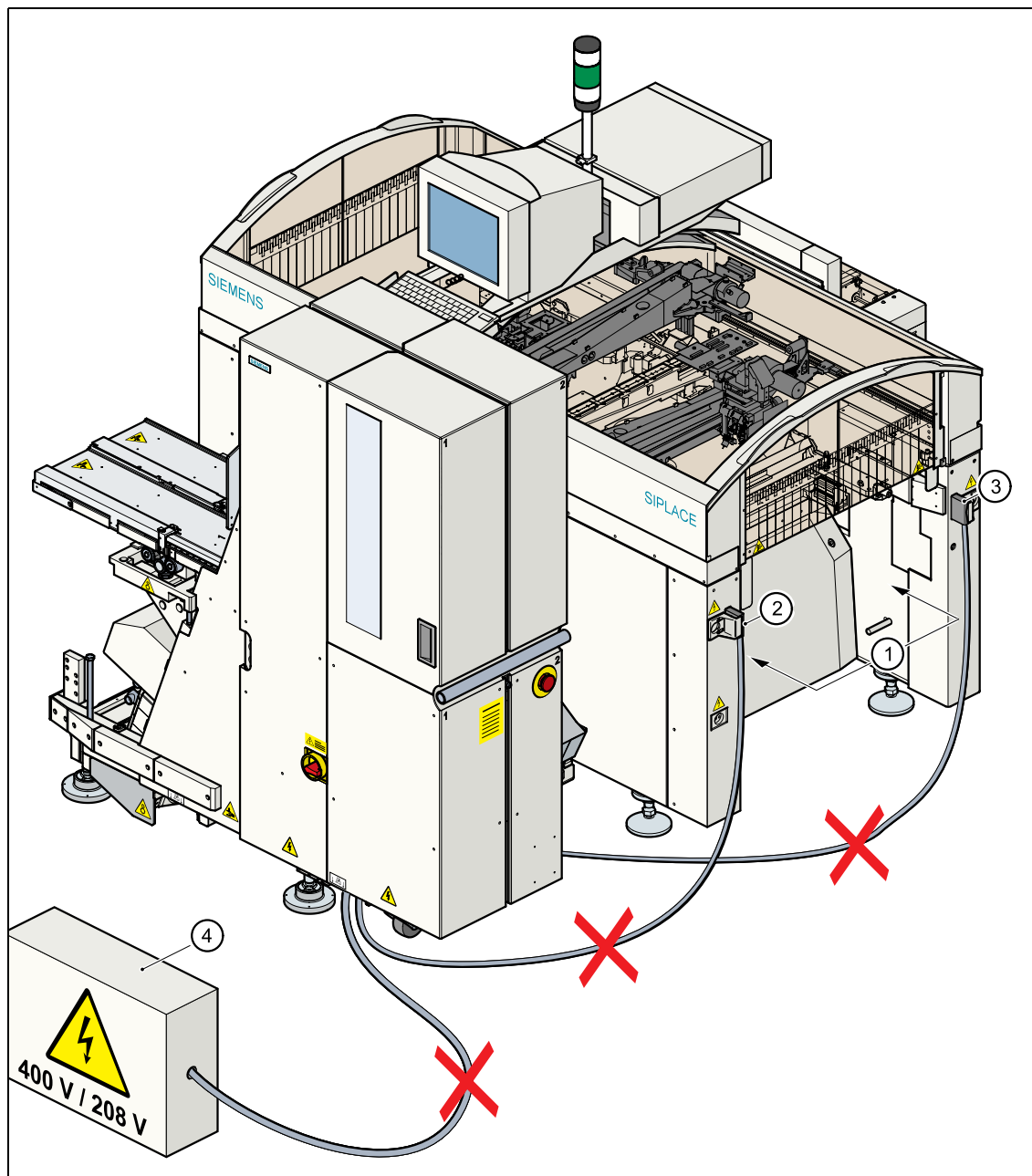


Fig. 2.3 - 6 Safety instructions for coupling and uncoupling the matrix tray changer

- (1) Gap when the matrix tray changer is coupled
- (2) Matrix tray changer control cable
- (3) Control cable for component feeder table
- (4) Power supply connection



WARNING

- NEVER place your hand in the gaps between the matrix tray changer and machine frame (item 1) while the machine is running.
 - Always couple the matrix tray changer to the machine before connecting or disconnecting the matrix tray changer control cable at the machine socket (item 2).
 - Always couple the matrix tray changer to the machine before connecting or disconnecting the control cable for the matrix tray changer's integral component feeder table at the machine socket (item 3).
 - Always couple the matrix tray changer to the machine before connecting or disconnecting the power cable from the external power supply (item 4).
 - NEVER operate the matrix tray changer if it is not coupled to the machine.
-

2.4 Safety equipment

2.4.1 Protective covers

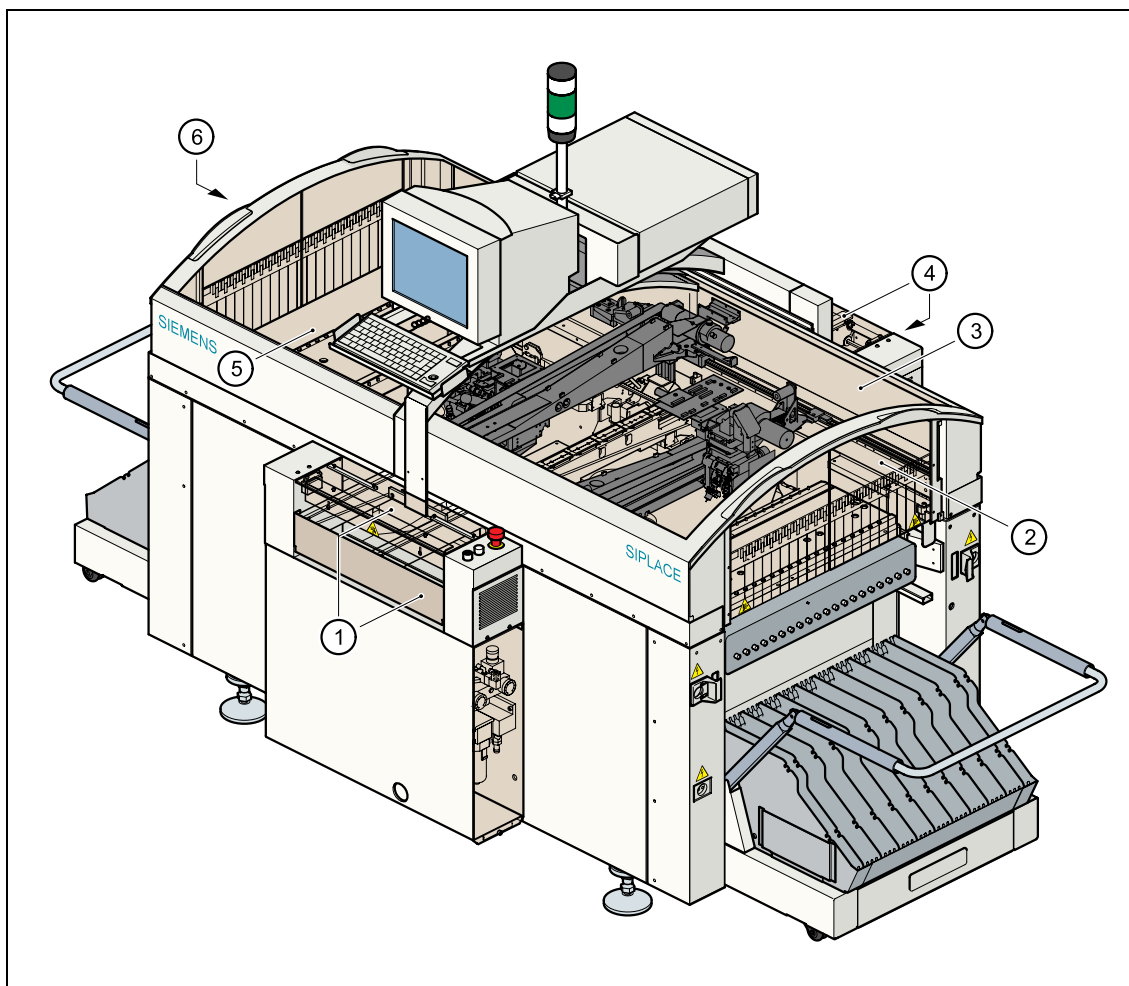


Fig. 2.4 - 1 Safety equipment in the placement machine

- (1) Cover and guard on the input belt
- (2) Safety panels, right-hand side
- (3) Protective cover
- (4) Cover and guard on the output conveyor
- (5) Protective cover
- (6) Safety panels, left-hand side

2.4.1.1 General

The gantry positioning range is covered by two protective covers. If you want to open the protective covers, first press the Stop button (item 1 in Fig. 2.4 - 2) or the emergency stop mushroom-head push-button (item 2 in Fig. 2.4 - 2). The power to the gantry axes will be switched off and the gantries will stop immediately.

If you open one of the protective covers or a guard on the incoming or outgoing conveyor, the power to the gantry axes will be switched off. They will stop immediately.

If the key switch is closed (position I), you can continue to pace the star at reduced speed while the protective covers are open.

Placement will stop if you press the emergency stop button. You can then either cancel or continue placement of the PCB. The protective covers at the sides can be opened in order to refill with components when the machine has stopped.



WARNING

The protective covers must only be opened, with the key switch closed (position I), by appropriately qualified and trained personnel.

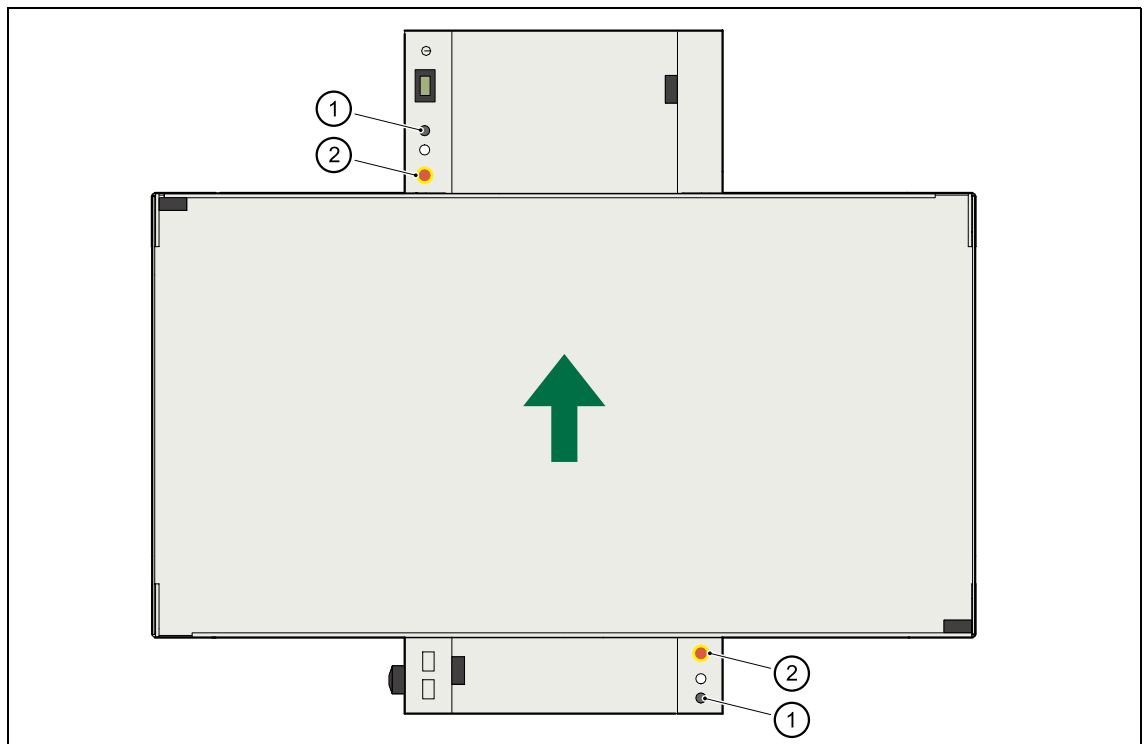


Fig. 2.4 - 2 Stop and EMERGENCY-STOP mushroom-head push buttons

- (1) Stop button
- (2) EMERGENCY-STOP mushroom-head push-button

2.4.2 Guard on the input/output belt



WARNING

The guard must always be set to the height of the PCB to be processed. Ensure that the gap between the guard and the safety bar is as small as possible.

Guards are fitted on the input and output belts of the PCB conveyor.

The height of the guard must be set using the slots so that the processed PCB can travel through.

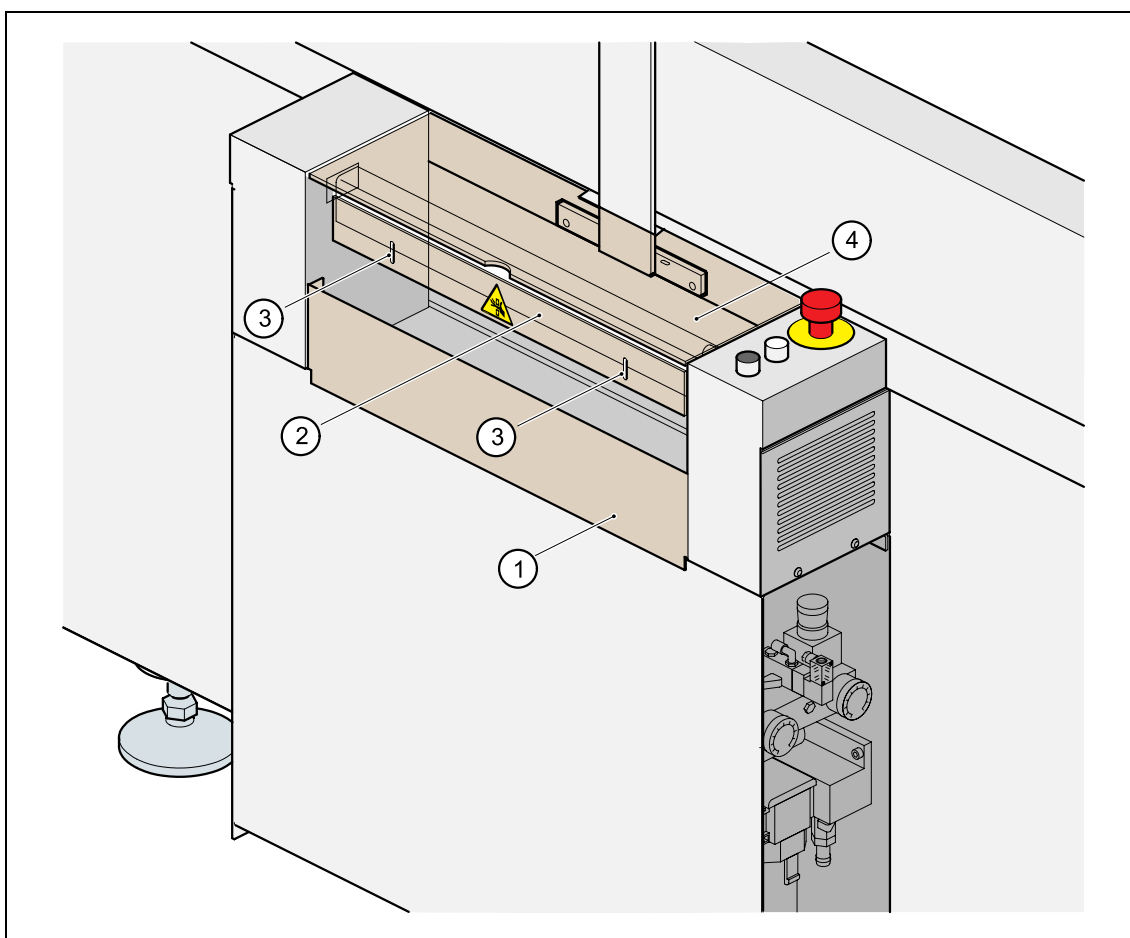


Fig. 2.4 - 3 Guard on the placement machine

- (1) Safety bar (fixed)
- (2) Guard (adjustable)
- (3) Slots for adjusting the height
- (4) Cover

2.4.3 EMERGENCY STOP mushroom-head push buttons, protective cover switches ...

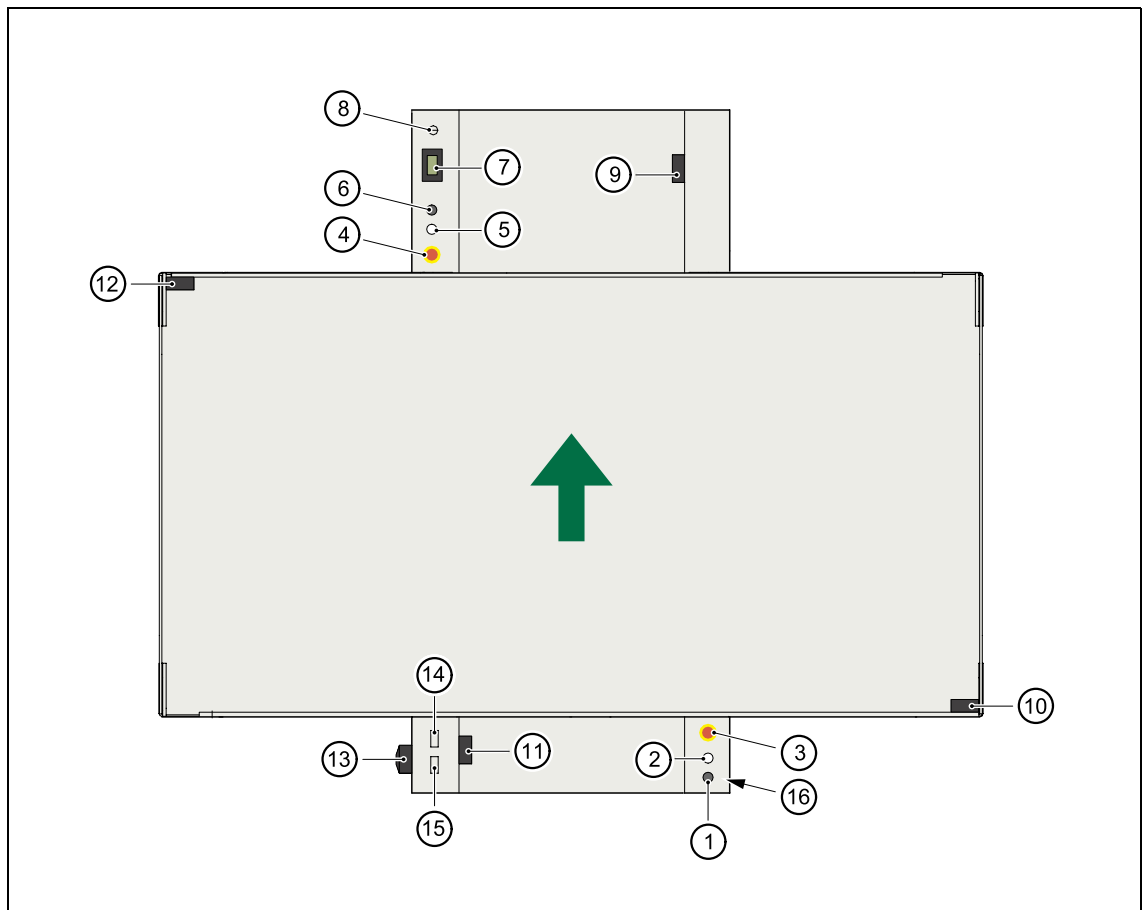


Fig. 2.4 - 4 Location of the buttons and protective contactor combinations K1, K2

- (1) Stop button
- (2) Start button
- (3) EMERGENCY-STOP mushroom-head push-button
- (4) EMERGENCY-STOP mushroom-head push-button
- (5) Start button
- (6) Stop button
- (7) Component counter
- (8) Key switch open: position 0 for normal mode
Key switch closed: position I for service purposes
- (9) Protective cover switch (output conveyor, 00303617-xx)
- (10) Protective cover switch (right, 00321417-xx)
- (11) Protective cover switch (input conveyor, 00303614-xx)

- (12) Protective cover switch (left, 00321416-xx)
- (13) Main power switch
- (14) Protective contactor combination K1
- (15) Protective contactor combination K2
- (16) Compressed air unit

2.4.3.1 Description of the functions

EMERGENCY-STOP mushroom-head push-button

When the emergency stop mushroom-head push-button is pressed (item 3 or item 4. in Fig. [2.4 - 4](#)), the motor voltage to the gantry axes is switched off. The gantry axes are no longer powered, and thus are not dangerous.

PLEASE NOTE

Placement is interrupted and can then either be continued or canceled once the system is working correctly again.

Protective cover switch

If one of the protective covers is opened (see item 9, 10, 11 or 12 in Fig. [2.4 - 4](#)), the gantry axes will stop immediately. They are no longer powered, and thus are not dangerous.

Key-operated switch:

If the key switch (item 8 in Fig. [2.4 - 4](#)) is closed (position I), the star can still be paced at low speed while the protective covers are open. The gantry axes are no longer powered, and thus are not dangerous.

PLEASE NOTE

The key switch remains open for normal mode, i.e. in the 0 position.



WARNING

The protective covers must only be opened, with the key switch closed (position I), by appropriately qualified and trained personnel.

2.4.3.2 Status messages and the action required

The following displays may appear in placement mode. If they appear, carry out the action specified in the third column.

<i>Status</i>	<i>Display on screen</i>	<i>Action required</i>
EMERGENCY STOP mushroom-head push-button pressed	Emergency stop pressed ... Machine stopped. Release button	Release the pressed EMERGENCY-STOP mushroom-head push-button (item 3 or 4 in Fig. 2.4 - 4)
	Press start button	Press the white start button (item 2 or 5 in Fig. 2.4 - 4)
Protective cover open	Close the cover	Close the protective cover (item 9, 10, 11 or 12 in Fig. 2.4 - 4)
	Press start button	Press the white start button (item 2 or 5 in Fig. 2.4 - 4)

Tab. 2.4 - 1 Screen display when the emergency stop mushroom-head push-button is pressed or the protective cover is open

2.4.4 Safety circuits

The SIPLACE automatic placement system has two separate safety circuits which are monitored by protective contactor combinations K1 and K2. Both protective contactor combinations are incorporated into the power supply (see items 14 and 15 in Fig. [2.4 - 4](#)).

WARNING



Automatic placement systems from the SIPLACE family are powered with 3 x 400 VAC (3 x 208 VAC for the U.S.A. version) $\pm 5\%$, 50/60 Hz main power voltage. This means that some parts of the system carry potentially lethal voltages - even when switched off at the main power switch. Death, serious injury or considerable damage may result if these automatic placement systems are handled incorrectly. Always follow the applicable accident prevention and DIN regulations (particularly EN 60204, part 1) and the applicable regulations in your own country. The guard over the power supply must ONLY be opened by appropriately qualified and trained personnel.

Protective contactor combinations K1 and K2 monitor the following circuits:

K1: EMERGENCY-STOP circuit, safety circuits for the component trolleys or waffle-pack changer, protective cover switches and the enable software signal
K2: EMERGENCY-STOP circuit, K1 protective contactor combination, software enable signal and key switch

K1 or K2 is triggered if any of these functions fail. The mains voltage to the heavy current transformer that supplies the gantry axis motors will be interrupted. The voltage to the star-type motor for the Collect&Place head is reduced from 70 V to 10V. The DP and DR axes of the placement heads continue to be supplied with 30V. The next diagram illustrates the various statuses of K1 and K2 and their effects on the axes and the PCB conveyor components.

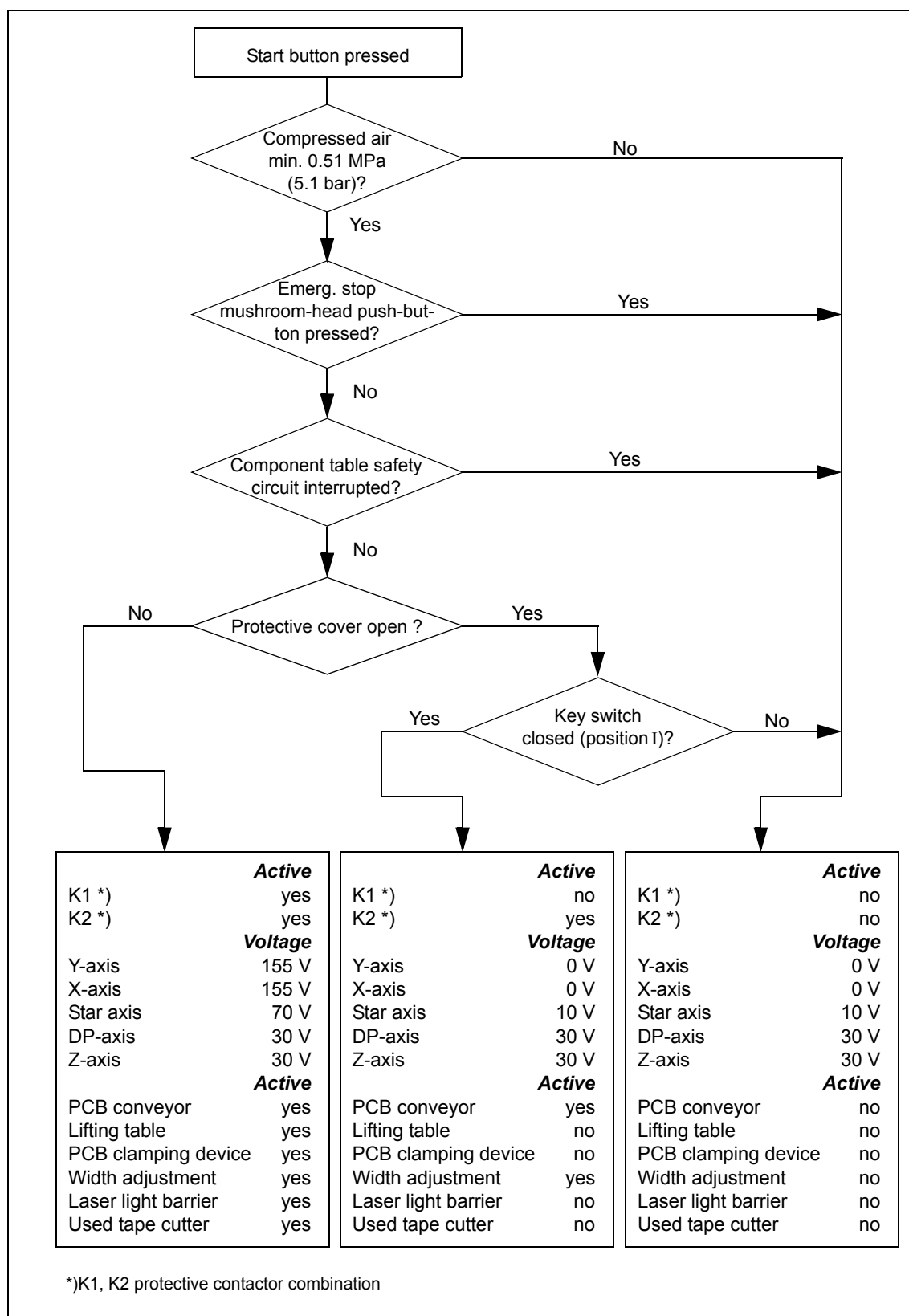


Fig. 2.4 - 5 Safety circuits

2.4.5 Guard on the component table locations



WARNING

All locations must be equipped with feeders in order to guarantee operational reliability. If there are not enough feeders available, a guard ("dummy feeder") must be fitted in place of the feeder. The following variants can be used:

Item no.00116820-01SIPLACE guard for 1 location

Item no.00116821-01SIPLACE guard for 6-10 locations

Item no.00116822-01SIPLACE guard for 11-20 locations

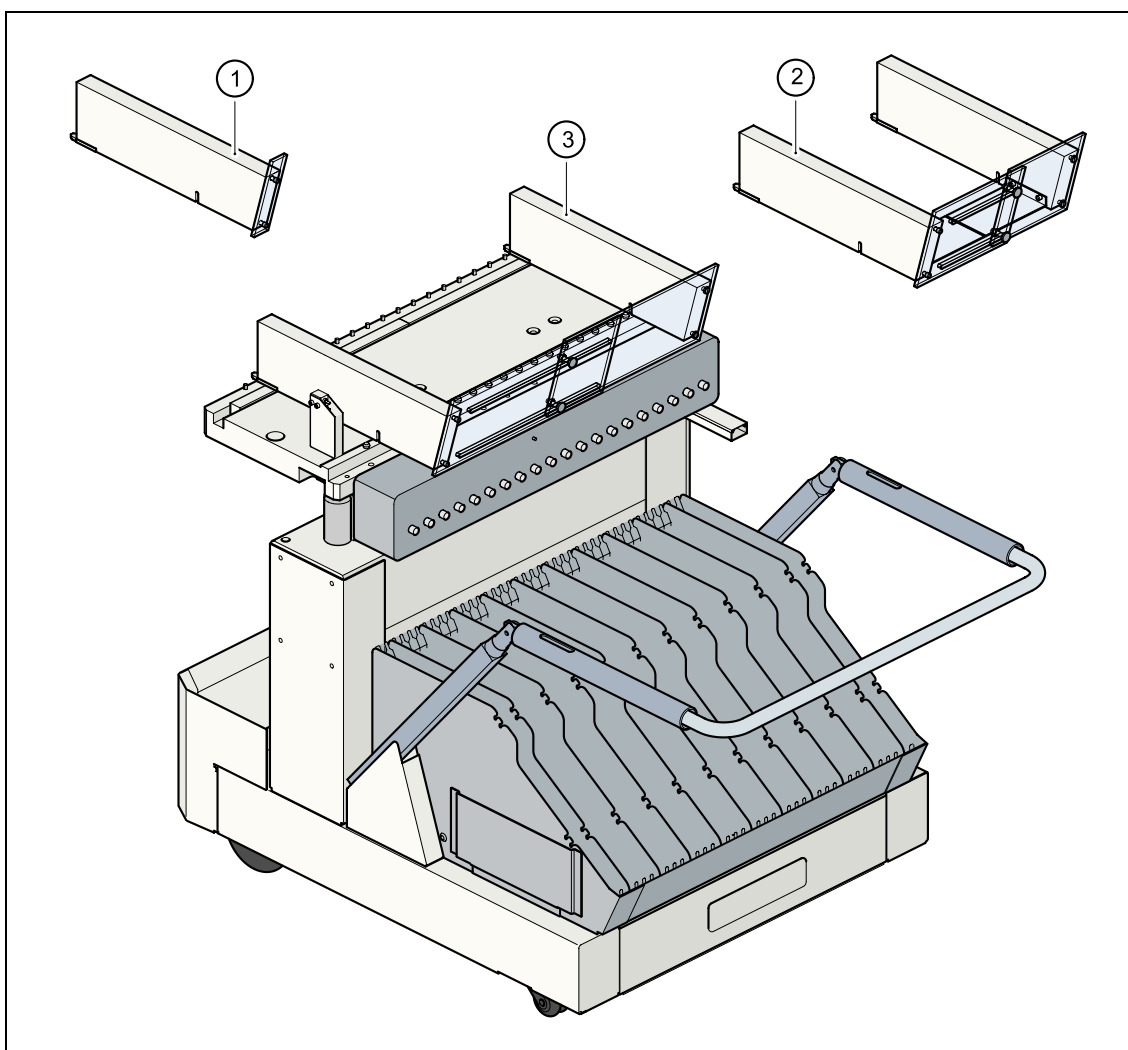


Fig. 2.4 - 6 Guard

- (1) Guard for 1 location
- (2) Guard for 6 to 10 locations
- (3) Guard for 11 to 20 locations

2.5 Residual voltages and discharge times in the machine

When the emergency stop mushroom-head push-button is pressed or the placement system is switched off, the electrolytic capacitors quickly discharge to safe residual voltage levels via switched resistors on the discharge board (00308443-xx).

The voltages can be tapped off at test sockets 001 - 009 on the voltmeter unit in the servo unit.



WARNING

Automatic placement systems from the SIPLACE family are powered with 3 x 400 VAC (3 x 208 VAC for the U.S.A. version) $\pm 5\%$, 50/60 Hz main power voltage. This means that some parts of the system carry potentially lethal voltages - even when switched off at the main power switch. Death, serious injury or considerable damage may result if these automatic placement systems are handled incorrectly. Always follow the applicable accident prevention and DIN regulations (particularly EN 60204, part 1). The guard over the servo unit must ONLY be opened by appropriately qualified and trained personnel.

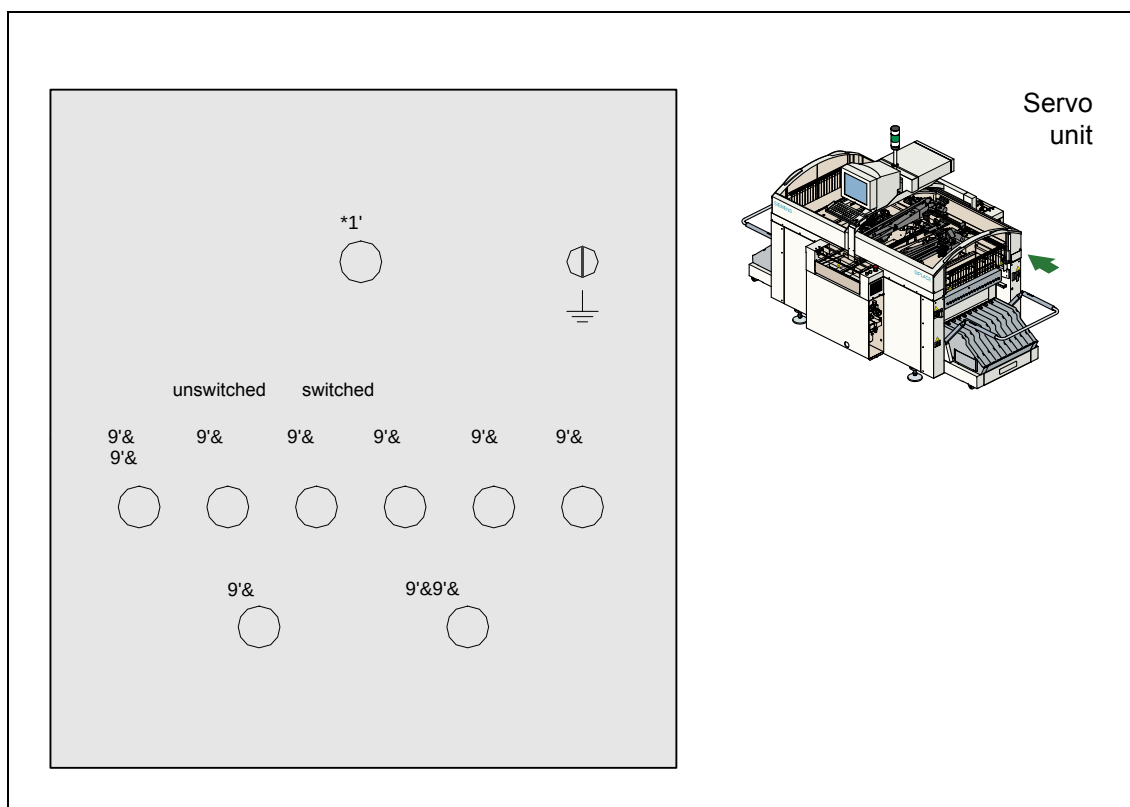


Fig. 2.5 - 1 Test sockets on the voltmeter unit in the servo unit

2.5.1 Operating voltages, residual voltages and discharge times after pressing the emergency stop mushroom-head push-button

Test socket 00X measured at 007 (GND)	Voltage in normal mode	Residual voltage after EMERG. STOP	Discharge times of electrolytic capacitors at 12 VDC
001	70 VDC	10 VDC	< 2 sec
002	30 VDC	30 VDC	–
003	30 VDC	< 12 VDC	< 2 sec
004	24 VDC	24 VDC	–
005	12 VDC	12 VDC	–
006	5 VDC	5 VDC	–
008	70 VDC	10 VDC	< 2 sec
009	155 VDC	10 VDC	< 1 sec

Tab. 2.5 - 1 Operating voltages, residual voltages and discharge times after pressing the emergency-stop mushroom-head push-button

2.5.2 Residual voltages and discharge times after switching off at the main switch

Test socket 00X measured at 007 (GND)	Residual voltage when main power switch is off	Discharge times of electrol. capacitors at 12 VDC
001	< 12 VDC	< 2 sec
002	< 12 VDC	< 2 sec
003	< 12 VDC	< 2 sec
004	0 VDC	–
005	0 VDC	–
006	0 VDC	–
008	< 12 VDC	< 2 sec
009	< 12 VDC	< 1 sec

Tab. 2.5 - 2 Residual voltages and discharge times after switching off at the main switch

CAUTION  To avoid losing data, evaluate the following criteria before switching off your automatic placement system (apart from in emergencies):

- Has the placement system finished transmitting machine, setup and panel data?
- Has the placement system finished processing the PCB?
- Has the placement system completed the run-up phase?
- Has the Windows NT operating system been shut down correctly?

2.6 Disabling the compressed air supply and discharging the pressure

The compressed air working pressure is set to 0.51 MPa (5.1 bar). It may fluctuate between 0.5 MPa (5.0 bar) and 0.53 MPa (5.3 bar). The position of the compressed air unit is indicated by item 5 in Fig. [2.6 - 1](#). The compressed air supply to the machine can be interrupted using the shutoff valve (item 1 in Fig. [2.6 - 1](#)).

- You must remove the cover plate to use the shutoff valve.
- Turn the lever on the shutoff valve (item 1 in Fig. [2.6 - 1](#)) from the vertical to the horizontal position.
- Watch the working pressure gauge (item 2 in Fig. [2.6 - 1](#)) and the pressure gauge for the compressed air supply to the stopper (item 4 in Fig. [2.6 - 1](#)). When the automatic placement system is switched on, the pressure discharges to 0 MPa (0 bar) within 1 minute.

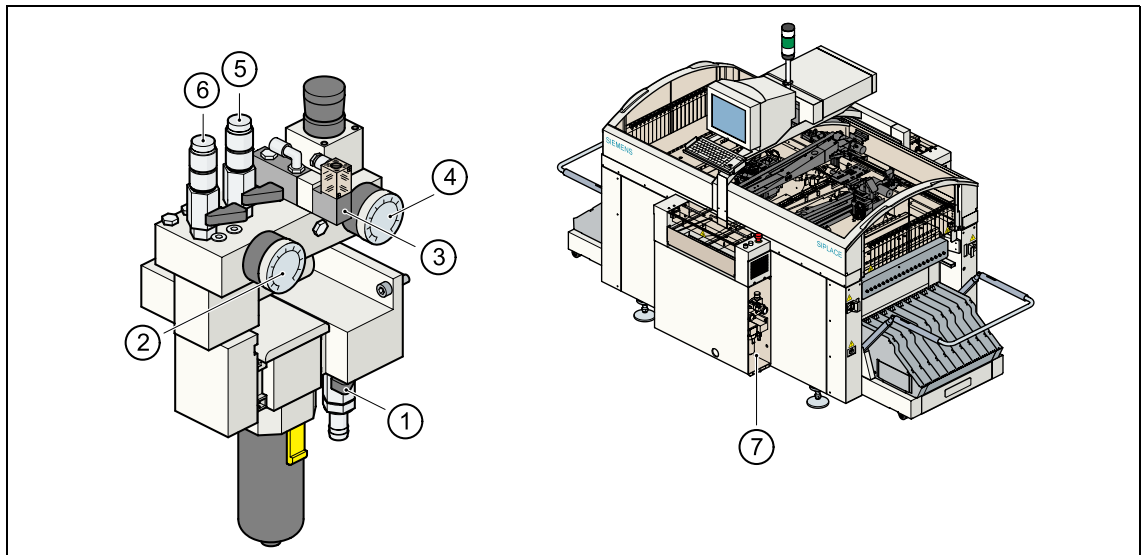


Fig. 2.6 - 1 Compressed air unit on the automatic placement system

- (1) Shutoff valve lever in the CLOSED position
- (2) Working pressure gauge
- (3) Solenoid valve for venting the tape cutter during an EMERGENCY STOP
- (4) Pressure gauge for the PCB stopper working pressure
- (5) Compressed air supply, gantry 2
- (6) Compressed air supply, gantry 1
- (7) Position of the compressed air unit

WARNING   Never disconnect compressed air lines while they are pressurized.

2.7 Energy state of the machine after switching off at the main switch



WARNING

Automatic placement systems from the SIPLACE family are powered with 3 x 400 V or 3 x 208 VAC (U.S.A. version) $\pm 5\%$, 50/60 Hz mains voltage. This means that parts of the system carry potentially fatal voltages - even when switched off at the main switch. Death, serious injury or considerable damage may result if these automatic placement systems are handled incorrectly. Always follow the applicable accident prevention and DIN regulations (particularly EN 60204, part 1). The guards over the control and servo units must ONLY be opened by appropriately qualified and trained personnel.

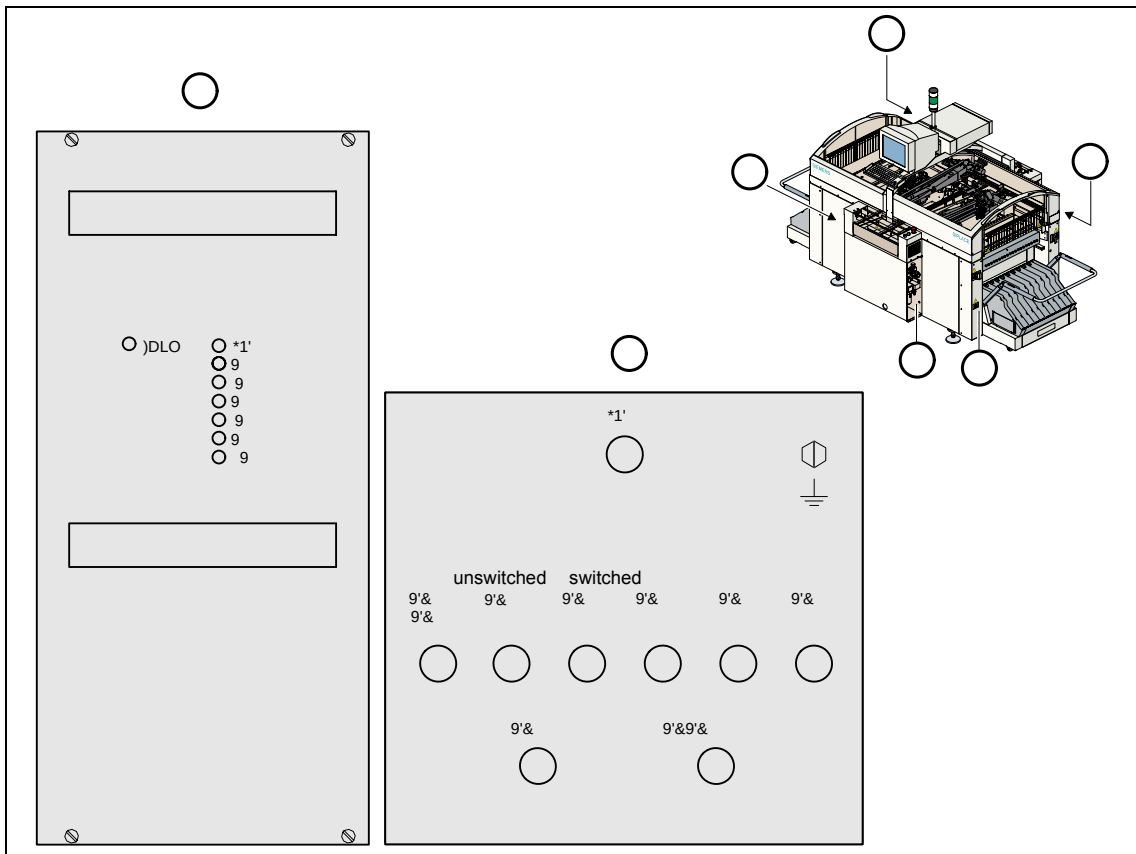


Fig. 2.7 - 1 Position of the control unit, servo unit, main switch, service socket and compr. air unit in the placement system

- | | |
|--------------------------------|--------------------------------------|
| (1) Main power switch Q1 | (2) Compressed air unit |
| (3) Service socket | (4) Servo unit |
| (5) Control unit | (6) Power supply in the control unit |
| (7) Measuring unit, servo unit | |

2.7.1 Placement system switched off at the main power switch, but still connected

The following table specifies the voltages of assemblies when the automatic placement system is switched off at the main switch, but still connected to the mains supply.

Assembly	Voltage	
Main power filter Z1 Terminals L1, L2, L3	3 x 400 VAC (3 x 208 VAC)	
Service socket	230 VAC(115 VAC)	
Main power switch Q1 Terminals 1, 3, 5 Terminals 2, 4, 6	3 x 400 VAC (3 x 208 VAC) 0 VAC	
Servo unit (item 7 in Fig. 2.7 - 1)		
Test socket 001	< 12 VDC	
Test socket 002	< 12 VDC	
Test socket 003	< 12 VDC	
Test socket 004	0 VDC	
Test socket 005	0 VDC	
Test socket 006	0 VDC	
Test socket 008	< 12 VDC	
Test socket 009	< 12 VDC	
GND 007		
Control unit (item 6 in Fig. 2.7 - 1)		
Test socket 5 V	0 VDC	
Test socket + 12 V	0 VDC	
Test socket - 12 V	0 VDC	
Test socket + 15 V	0 VDC	
Test socket - 15 V	0 VDC	
Test socket + 24 V	0 VDC	
GND		

Tab. 2.7 - 1 Voltages of assemblies when the automatic placement system is switched off at the main switch, but still connected to the main power

2.7.2 Placement system switched off at the main power switch and disconnected

The automatic placement system is unpowered, apart from slight residual voltages in the servo unit.

2.7.3 Compressed air conditions in the machine after switching off at the main power switch

When the system is switched off at the main power switch (item 1 in Fig. [2.7 - 1](#)) or if the power supply fails, the electrically-controlled main valve Y1 of the compressed air unit closes (Fig. [2.6 - 1](#), page [49](#)). The pressure will drop to 0 MPa (0 bar) within 5 seconds.

2.8 Lock out and tag out procedure

2.8.1 Purpose and scope

Before performing any maintenance work or service work, a procedure of locking and tagging must be followed. The procedure, when followed correctly eliminates the possibility of an employee being injured.

NOTE:

These procedures represent the minimum lock/tag out requirements for maintenance and servicing work. Any additional safeguards needed to complete work safely can be specified by facilities supervision, the safety officer, the safety committee and the health department.

2.8.2 Description

Whenever it becomes necessary to isolate, control and release energy, the following procedure is to be followed

1. Notify affected employees.
2. Shut down the equipment. Carry out all normal stopping procedures, such as
 - depressing the stop button
 - shutting down the station computer or
 - switching off the placement system at the main switch and
 - opening of toggle switches.
3. Isolate the equipment from all its energy sources such as
 - compressed air supply and
 - power supply.
4. Lock out the equipment.
 - Apply the lock and the lockout whenever possible.

- *Alternative: Tagging out*

If a machine can be locked out, it must be. However, there are situations where energy isolating devices cannot accommodate locks. In these cases, the energy isolating devices must be tagged to warn employees that the machine is de-energized for servicing. The tag must be securely fastened, it must be placed in a position visible to all and it may only be removed by the person who attached it.

5. Relieve stored energy Stored energy in the compressed air supply or electrical energy in electrolytic capacitors must be released by appropriate means.

- After switching off the placement machine wait until the voltages and the compressed air have discharged to be able work without any risk (see sections 2.5 and 2.6).

6. Verify the lock out.

- Testing the lock out can be done simply by pressing the start button.

7. The following steps must be taken to restore the machine to operation.

8. Check the area. Authorized employees should remove all of their tools and reinstall all guards.

9. Notify all affected employees. Before removing even one lock or tag, inform all workers in the area that the machine is going to be restarted.

10. Remove locks/tags Each authorized employee must remove his or her own lock. Each authorized employee will have his or her own lock.

11. Turn the machine on. Authorized workers should observe the equipment in operation to insure repairs were done correctly.

2.8.3 Testing

The maintenance or electrical person may test the circuits by energizing the circuit for a short period of time without voiding the lock out procedure provided. This may be done only when no other work is being performed by any other person on the equipment being tested.

It is extremely important that all remote start switches be tagged with the “Do Not Operate” tag to prevent inadvertent operation of the equipment during these periods.

2.8.4 Responsibilities

1. It shall be the responsibility of the maintenance and electrical personnel to make sure this procedure is adhered to.
2. It shall be the responsibility of the maintenance and electrical personnel’s immediate supervisor to instruct his personnel on this procedure.
3. It shall be the responsibility of the Safety Officer with assistance from the Safety Committee,

Health Service Department, and the various managers and Vice-presidents to administer the Lock Out / Tag Out Procedure.

2.8.5 Training

1. Employee training The safety regulations require training for every individual, of course every employee is not exposed to the same degree of danger or is involved with LO/TO as others are. So extensive training is not necessary for everyone.
2. To determine how much training to provide for each worker, the employees are divided into three groups. Each group has its own level of training.
3. Authorized employees
These workers actually install the locks and tags and do the maintenance or service work. So they must know the most about controlled energy. First, they must be able to recognize all energy sources and measure the amount of energy. Authorized employees must look for energy sources out of the realm of the obvious. These energy sources include electrical, mechanical, hydraulic, pneumatic, chemical, thermal and gravitational. Once these workers can recognize all energy sources they must be taught how to isolate, control, and release the energy without any risk.
4. Affected employees These are workers who operate the machinery or equipment that may be de-energized. Other employees who may be affected include those who work in an area that contain equipment that may be locked/tagged out. These employees have to be instructed about the nature of the energy control program. They must know why lock/tag out is important, what tags and locks look like and why they must not remove tags or locks.
5. All others As the name implies, any employee who is not affected or authorized fits into this category. These employees include office personal, engineers, managers, and upper management. Although they do not have a direct relationship to the machinery being locked or tagged, they have to receive some training.
6. To evaluate the lock/tag out procedure, the safety department will conduct periodic inspections. As part of the inspection the safety department will document that all facets of the procedure are followed. The safety department will follow up with formal classroom review or retraining of the LO/TO procedure.

2.8.6 Review

This procedure will be reviewed and amended as required but in no case less frequently than once a year.

2.9 Emissions and ergonomics of the touchscreen monitor

2.9.1 X-ray radiation

The X-ray radiation generated in the monitor is adequately shielded by the intrinsically safe cathode-ray tube. The local emissions are less than 1 S/h (micro-Sievert per hour). The accelerating voltage is limited by the device to a maximum of 26 kV.

The monitor conforms to the German Directive for protection against harmful X-ray radiation. The X-ray emissions from the monitor conformed to the DHHS Rules 21 CFR, subsection J on the date of manufacture and to the FCC Rules, part 15.

2.9.2 Ergonomics and electromagnetic emissions

The monitor fulfills the conditions for ergonomics (to ISO 9241-3) and safety (to EN 60950).

The low-frequency electromagnetic emissions fall below the MPR II guidelines issued by the Swedish Radiation Institute in Stockholm.

2.10 ESD guidelines

2.10.1 What does ESD mean?

Almost all of the modules in use today are equipped with highly integrated MOS blocks and components. The manufacturing techniques used mean that these electronic components are extremely sensitive to overvoltage and thus to electrostatic discharge.

The abbreviation for such modules is 'ESD' (Electrostatic Sensitive Device). 'ESD' is used internationally.

The following symbol on cabinet rating plates, racks or packaging indicates that components which are sensitive to electrostatic discharge have been used and thus that the modules concerned are also touch-sensitive.



ESDs can be destroyed by voltages and power levels that are far below the level that can be perceived by humans. Such voltages occur if a person touches a component or module without earthing themselves. Components that are exposed to such overvoltages do not generally appear to be defective immediately - incorrect behavior starts after the component or module has been in operation for some time.

2.10.2 Important measures to protect against static charging

- Most plastics can easily become charged and must therefore be kept away from at-risk components.
- Always ensure that people, the workplace and packaging are safely earthed when handling electrostatic sensitive components.

2.10.3 Handling ESD modules

Do not touch electronic modules unless it is absolutely essential to do so in order to carry out other work. If it is necessary, make sure that you do not touch the pins or printed conductors when you pick up flat modules.

Do not touch components unless

- you are constantly earthed by an ESD wrist strap or
- you are wearing ESD shoes or ESD shoe earthing strips on an ESD floor.

Always discharge yourself before you touch an electronic module. To do this, simply touch a conductive and earthed object immediately before you touch the module (such as unpainted parts of a switch cabinet, a water pipe, etc.).

Do not allow modules with chargeable and highly insulating materials to touch one another, e.g. plastic films, insulating table surfaces or items of clothing made from synthetic fibers.

Always place the modules on a conductive surface (table with an ESD coating, conductive ESD foam, ESD bag or container).

Do not bring modules near visual display units, monitors or televisions. Keep them at least 10 cm away from the screen.

2.10.4 Measurements and modifications to ESD modules

Do not take measurements on such modules unless

- the measuring device is earthed (e.g. via PE conductors) or
- you discharge the measuring head just before taking measurements with a potential-free measuring device (e.g. by touching an unpainted metal part of the controller casing).

→ Always use an earthed soldering iron if you carry out any soldering work.

2.10.5 Dispatching ESD modules

Always store modules and components in conductive packaging (e.g. metallized plastic bags or metal sleeves) and dispatch them in conductive packaging.

If the packaging is not conductive, place the modules in a conductive envelope before packaging. (Use ESD bags, domestic aluminum foil or paper, for example. NEVER use plastic bags or film).

If the module has integral batteries, ensure that the conductive packaging does not touch or short-circuit the battery terminals and, if necessary, first cover the terminals with insulating tape or material.

3 Power Supply

3.1 Position of the modules

The diagram below shows the position of the modules that generate or distribute the power needed to operate the placement system:

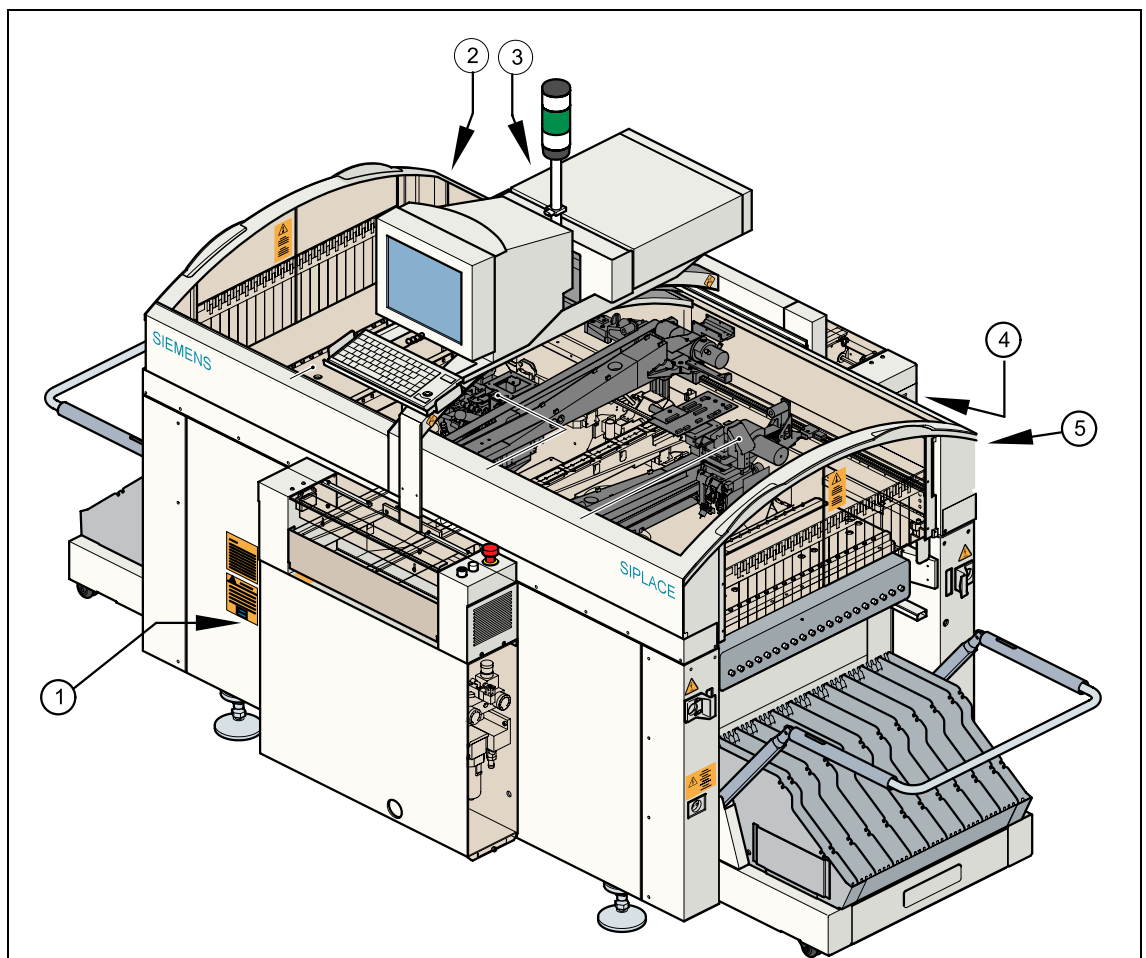


Fig. 3.1 - 1 Position of the power supply modules

Key

- | | |
|--------------------------------|---|
| (1) Power supply unit | (4) Servo unit |
| (2) Terminal panels - voltages | (5) Terminal panel - input/output distribution unit |
| (3) Control unit | |

3.2.1 Standard version used to SN 259 (00336812-04)

Fig. 3.2 - 2 Standard power supply unit - side view

Key

(1) Front view

Table of parts - side view

Pos.	Specification	Item No.
A1	Inrush current limiter board	00342988-01
V1	Rectifier 40A/800V	00323854-01
V2, V3	Rectifier 4.5A/800V	00323853-01
V4,V5	Compact rectifier 200V	00321450-01
T1	Transformer (single-phase) 4AM52	00329498-01
T2	Transformer (three phase a.c.)	00336811-01
F5.1	Fine-wire fuse 10A	00317195-01
F5.2	Fine-wire fuse 10A	00317195-01
F6.1	Fine-wire fuse 10A	00317195-01
F6.2	Fine-wire fuse 10A	00317195-01
F8.1	Fine-wire fuse 10A	00317195-01
F9.1	Fine-wire fuse 10A	00317195-01

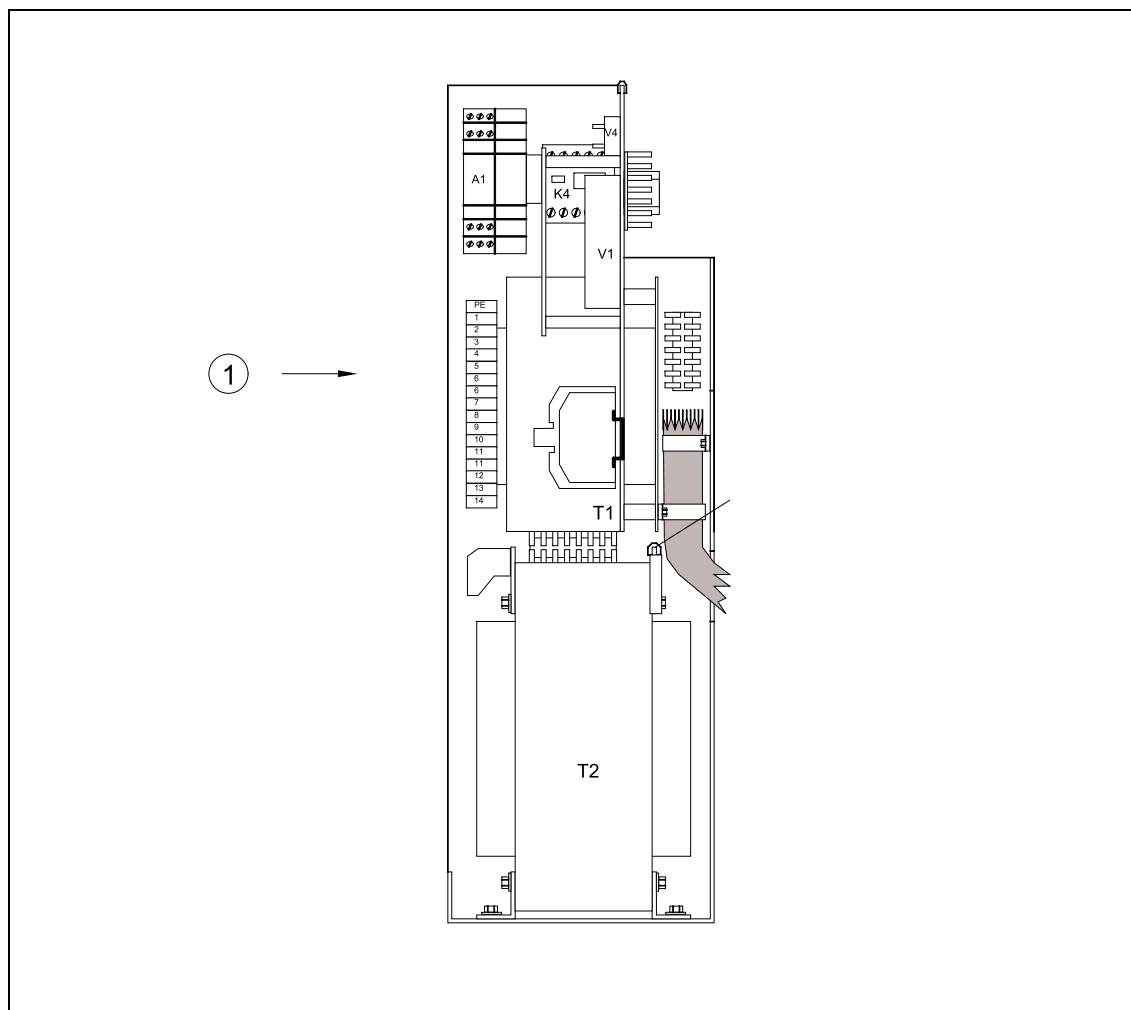


Fig. 3.2 - 3 Standard power supply unit - side view from the back

Key

(1) Side view

Parts - side view from the back

Pos.	Designation	Item No.
K4	Contactor	00343013-01

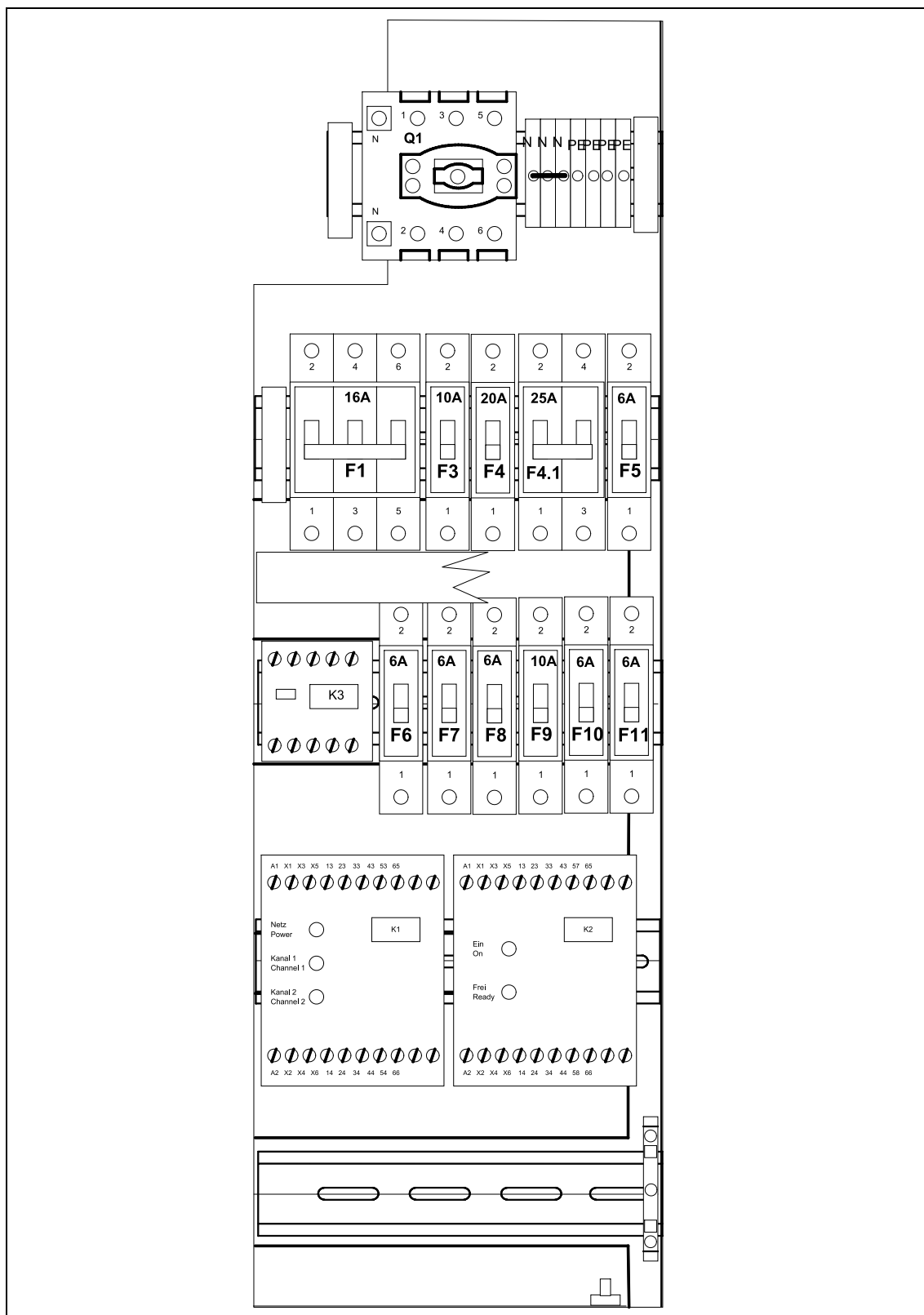


Fig. 3.2 - 4 Standard power supply unit - front view

Parts overview- front view

Pos.	Designation	Item No.
Q1	Main switch	00368782-01
F1	Miniature circuit-breaker 3 x 16A - AC	00307159-01
F3, F9	Miniature circuit-breaker 1 x 10A - AC	00307163-01
F4	Miniature circuit-breaker 1 x 20A - DC	00305019-01
F4.1	Miniature circuit-breaker 2 x 25A - DC	00372794-01
F5, F6, F8	Miniature circuit-breaker 1 x 6A - AC	00362661-01
F7, F10, F11	Miniature circuit-breaker 1 x 6A - DC	00302818-01
K1	Combined protective device 3TK28050AC2	00321067-01
K2	Combined protective device 3TK28040AC2	00320030-01

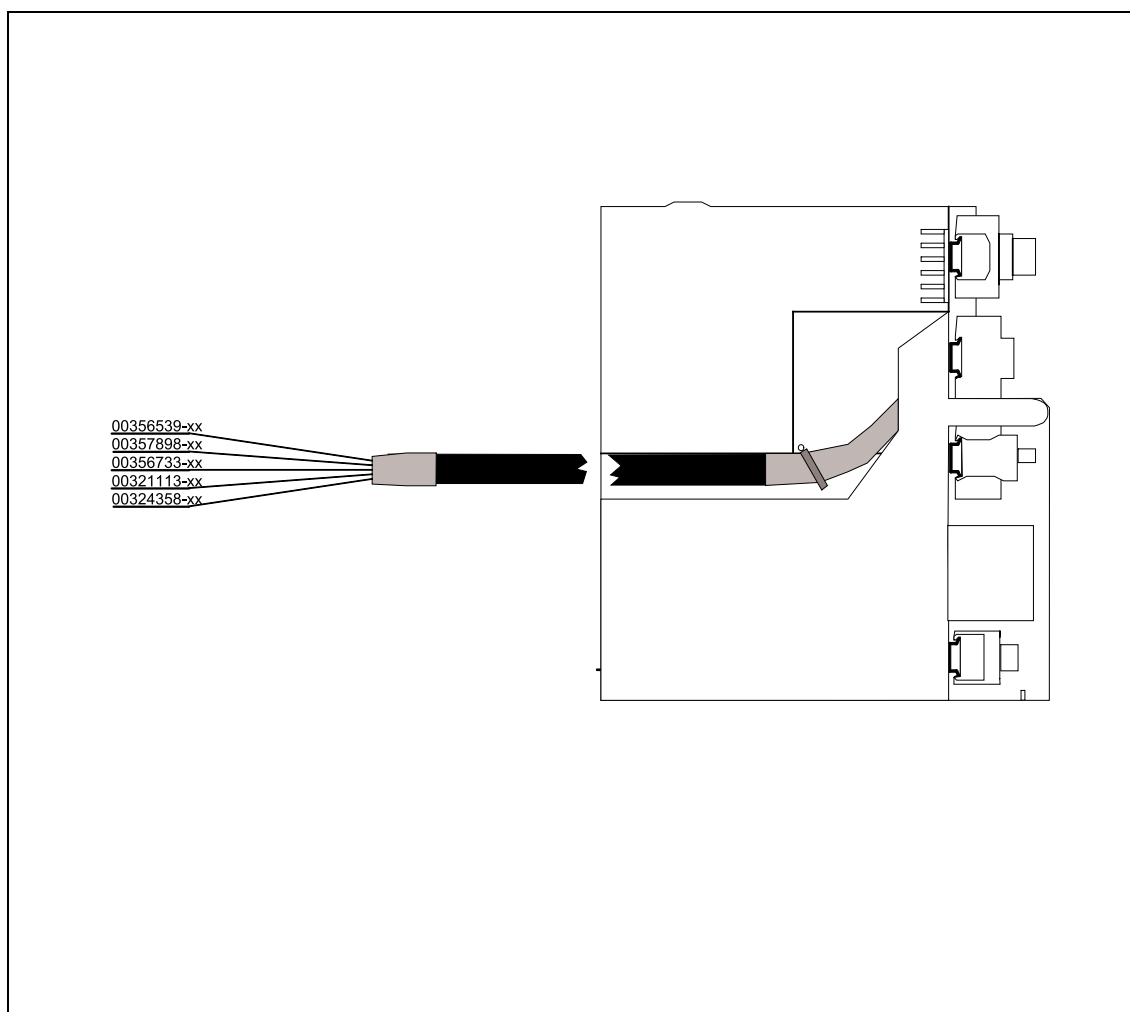


Fig. 3.2 - 5 Standard power supply unit - cables

Pos.	Designation	Item No.
1	Main power cable: main power filter - main switch	00356539-xx
2	Main power supply cable - terminal panel	00357898-01
3	Power supply grounding cable - terminal panel	00324358-02
4	Power supply cable - terminal panel	00321113-02
5	Power supply cable - terminal panel	00356733-01

3.2.2 Standard version used from SN 260 (00375503-01)

The power supply unit is located under a fixed cover (see [Abb. 3.2 - 6](#)).

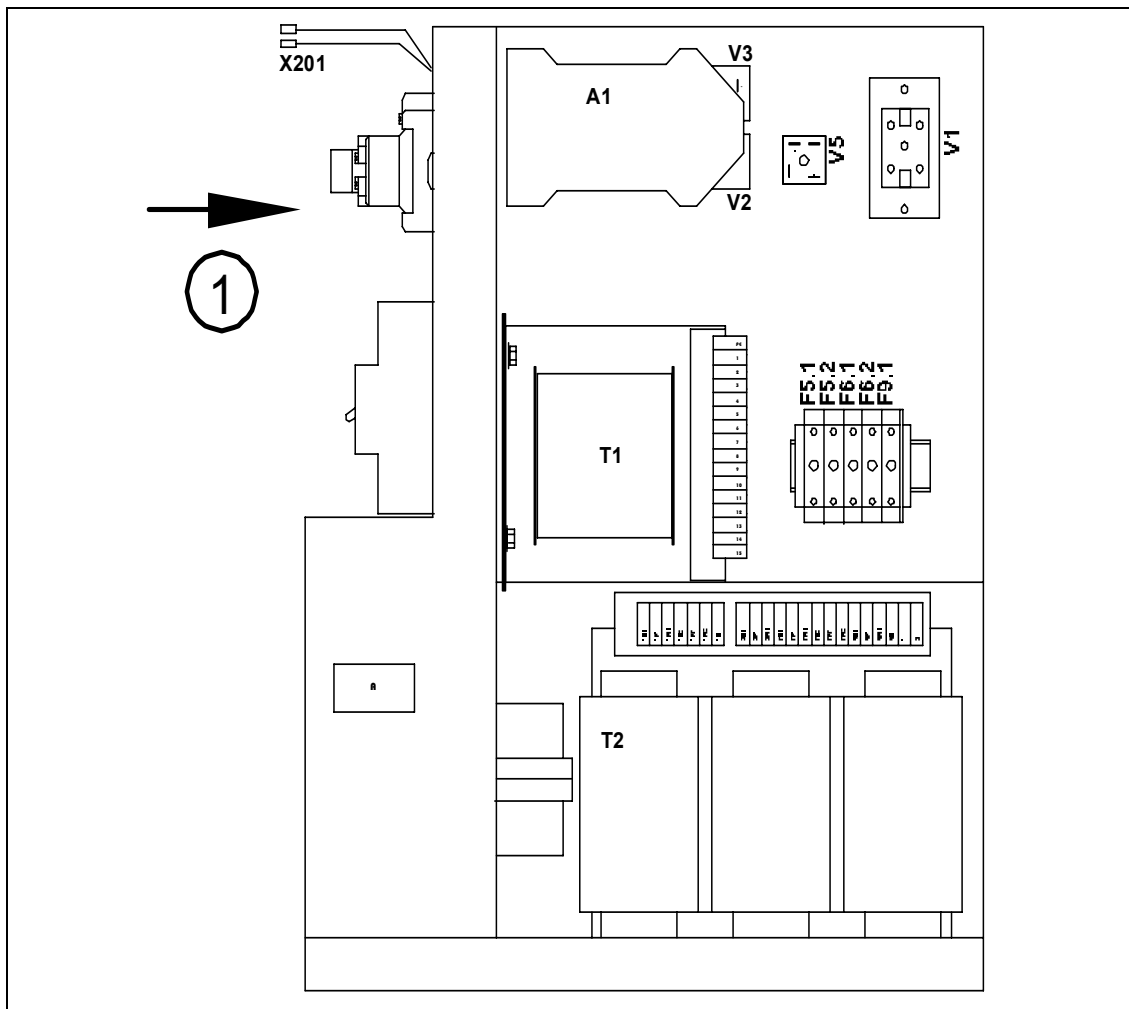


Abb. 3.2 - 6 Standard power supply unit - side view

Key

(1) Front view

Table of parts - side view

Pos.	Specification	Item No.
A1	Inrush current limiter board	00342988-01
V1	Rectifier 40A/800V	00323854-01
V2, V3	Rectifier 4.5A/800V	00323853-01
V5	Compact rectifier 200V	00321450-01
T1	Transformer (single-phase) 4AM52	00372773-01
T2	Transformer (three phase a.c.)	00362672-01
F5.1	Fine-wire fuse T 20A	00375476-01
F5.2	Fine-wire fuse T 20A	00375476-01
F6.1	Fine-wire fuse T 20A	00375476-01
F6.2	Fine-wire fuse T 20A	00375476-01
F9.1	Fine-wire fuse T 20A	00375476-01

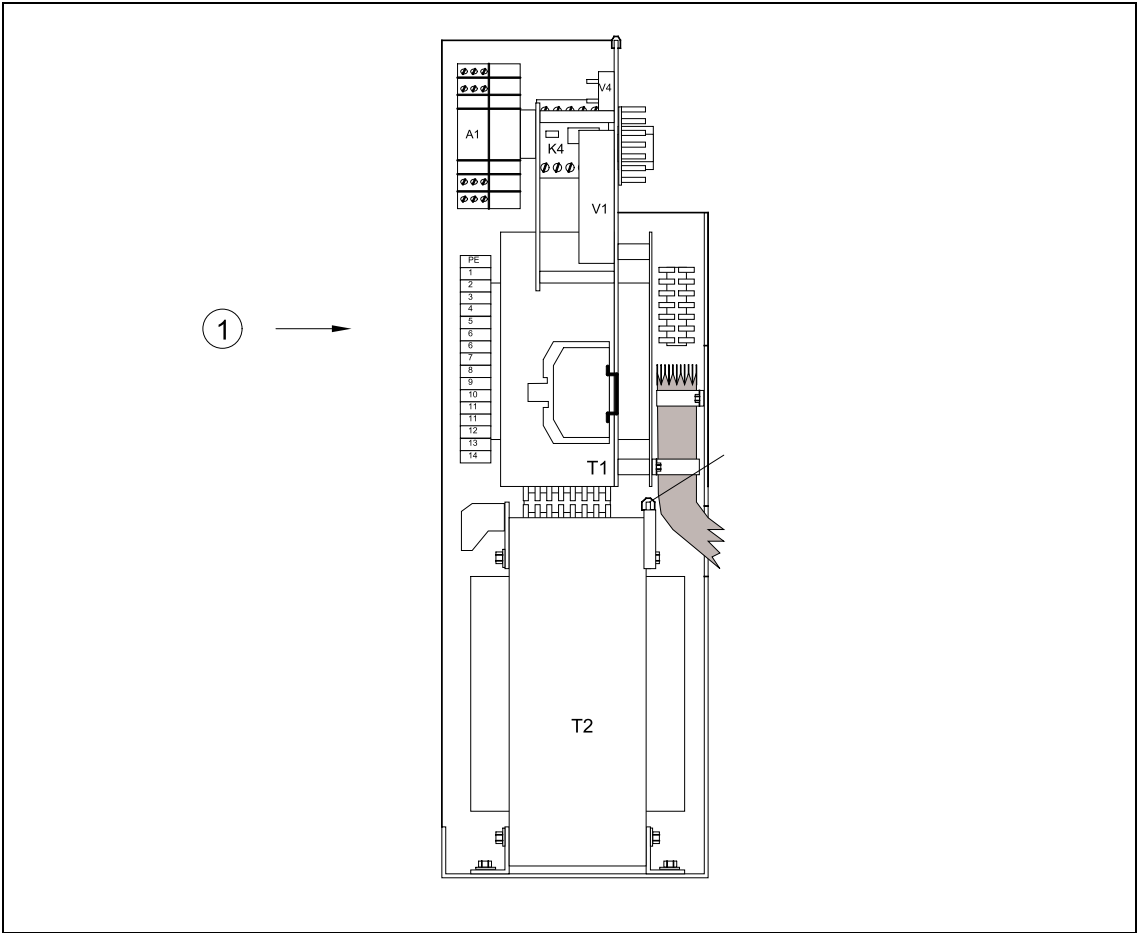


Abb. 3.2 - 7 Standard power supply unit - side view from the back

Key

(1) Side view

Parts - side view from the back

Pos.	Designation	Item No.
K4	Contactor	00343013-01

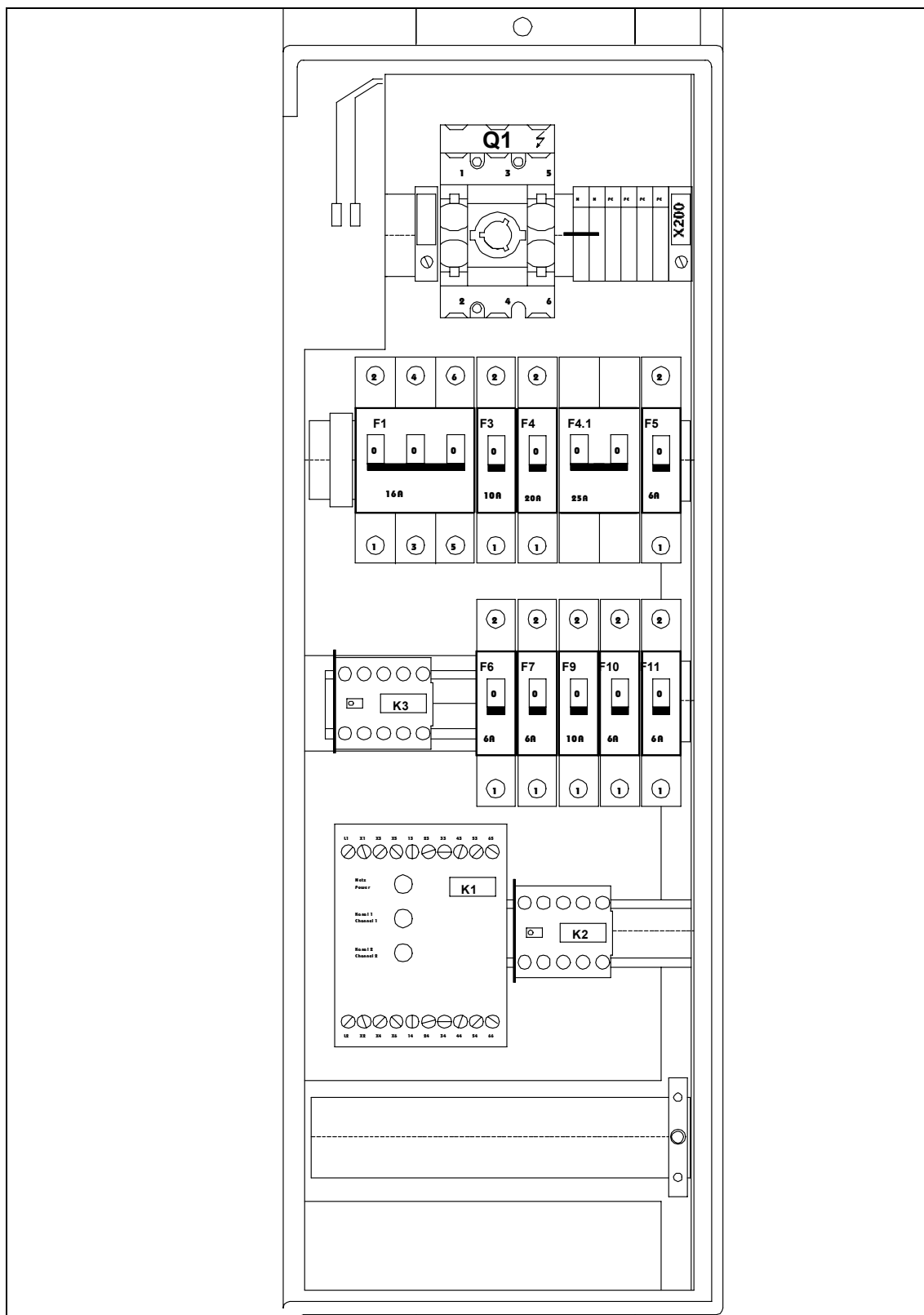


Abb. 3.2 - 8 Standard power supply unit - front view

Parts overview- front view

Pos.	Designation	Item No.
Q1	Main switch	00368782-01
F1	Miniature circuit-breaker 3 x 16A - AC	00307159-01
F3	Miniature circuit-breaker 1 x 10A - AC	00627163-01
F4	Miniature circuit-breaker 1 x 20A - ACDC	00625019-01
F4.1	Miniature circuit-breaker 2 x 25A - D- AC	00375475-01
F5, F6	Miniature circuit-breaker 1 x 6A - ACDC	00362661-01
F7, F10, F11	Miniature circuit-breaker 1 x 6A - DC	00622818-01
F9	Miniature circuit-breaker 1 x 10 A - ACDC	00624324-01
K1	Combined protective device 3TK28050AC2	00321067-01
K2	Contactactor 3RT10	00375508-01
K3	Contactactor 3TH2	00625027-01

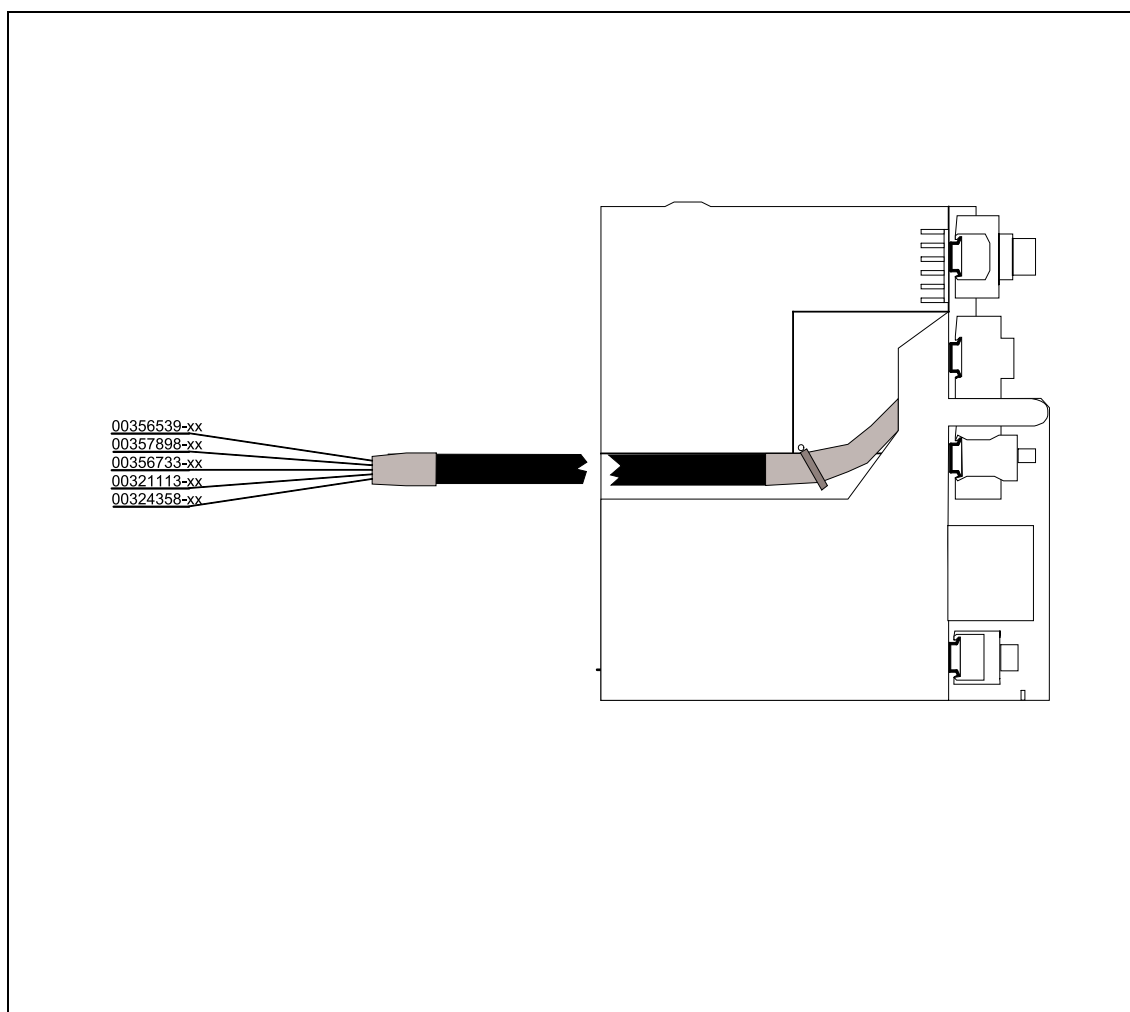


Abb. 3.2 - 9 Standard power supply unit - cables

Pos.	Designation	Item No.
1	Main power cable: main power filter - main switch	00356539-xx
2	Main power supply cable - terminal panel	00357898-01
3	Power supply grounding cable - terminal panel	00324358-02
4	Power supply cable - terminal panel	00321113-02
5	Power supply cable - terminal panel	00356733-01

3.2.3 Japanese version (00356395-04)

The power supply unit is located under a fixed cover (see [Fig. 3.1 - 1](#)).

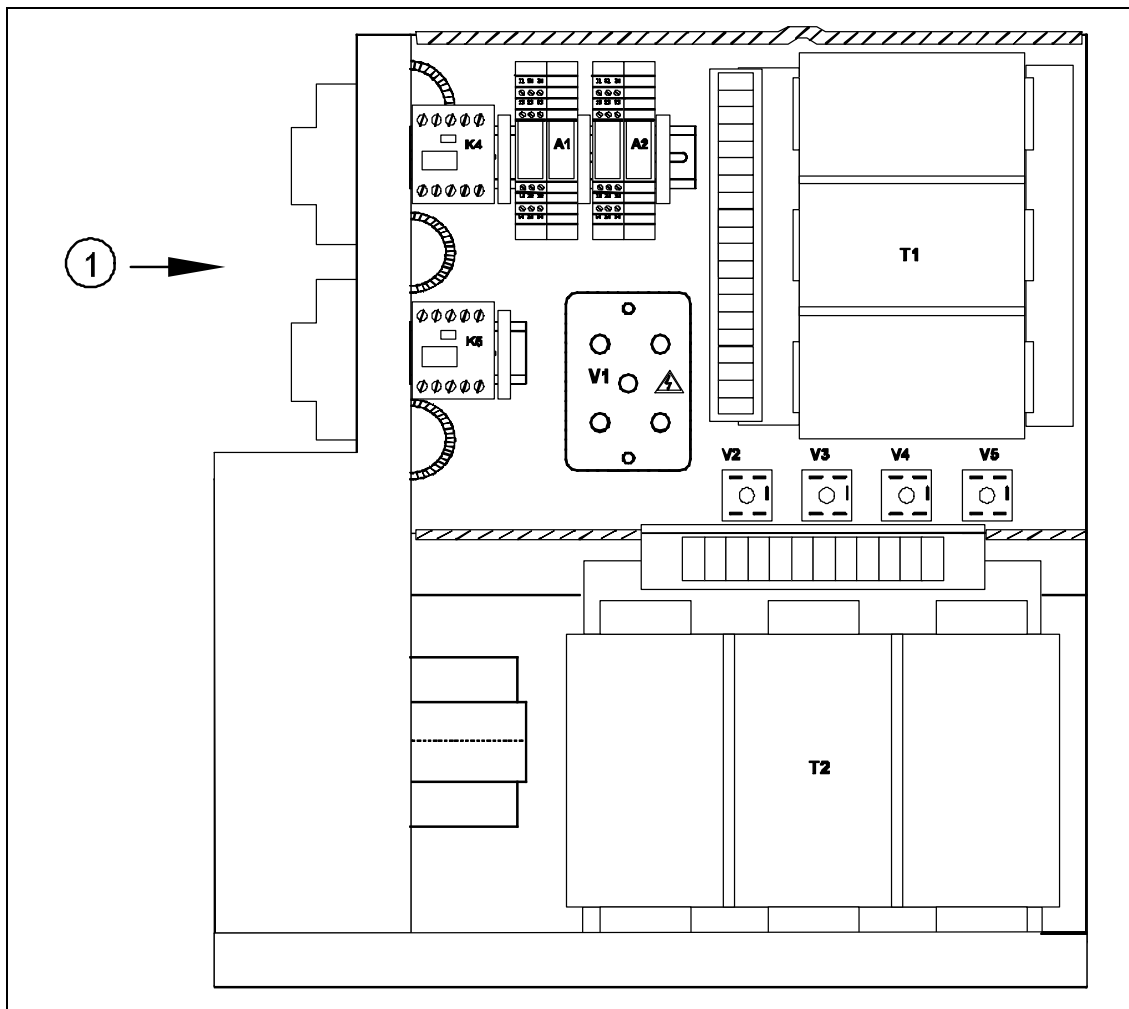


Fig. 3.2 - 10 Power supply unit - side view

Key

(1) Front view

Parts overview - side view

Pos.	Designation	Item No.
K4, K5	Contactor	00343013-01
A1, A2	Inrush current limiter board	00342988-01
V1	Rectifier 40A/800V	00323854-01
V2 to V5	Rectifier 4.5A/800V	00323853-01
T1	control-unit transformer	00369306-01
T2	Three-phase transformer	00362672-01

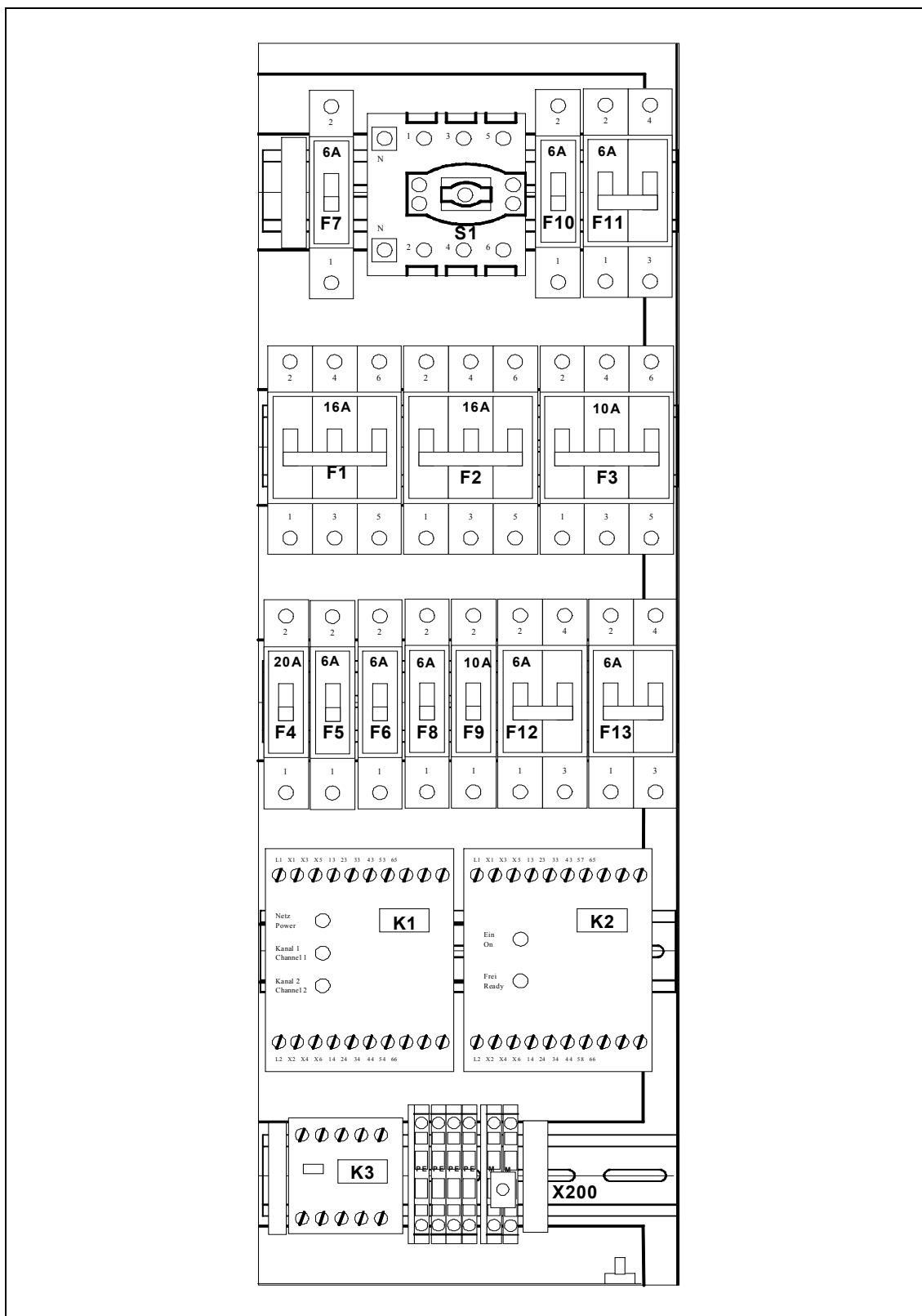


Fig. 3.2 - 11 Power supply unit - Front view

Parts overview - front view

Pos.	Designation	Item No.
Q1	Main switch	00362461-01
F1, F2	Miniature circuit-breaker 3 x 16A - AC	00307159-01
F3	Miniature circuit-breaker 3 x 10A - AC	00356397-01
F4	Miniature circuit-breaker 1 x 20A - DC	00305019-01
F5, F6, F8	Miniature circuit-breaker 1 x 6A - DC	00362661-01
F9	Miniature circuit-breaker 1 x 10A - DC	00304324-01
F7, F10	Miniature circuit-breaker 1 x 6A - AC	00348597-01
F11, F12, F13	Miniature circuit-breaker 2 x 6A - AC	00316397-01
K1	Combined protective device 3TK28050AC2	00321067-01
K2	Combined protective device 3TK28040AC2	00320030-01
K3	Contactor 30V DC	00305027-01

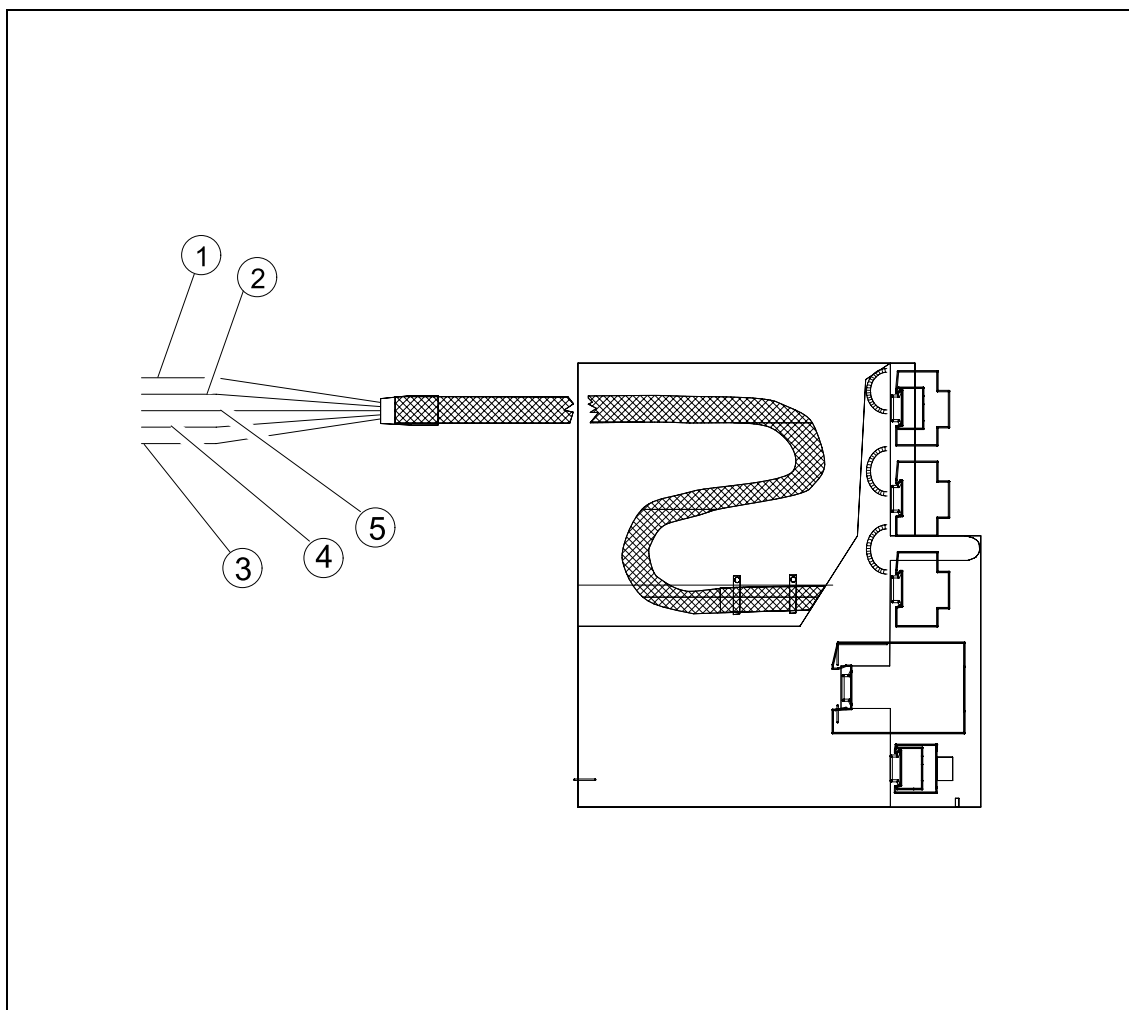


Fig. 3.2 - 12 Power supply unit - cables

Pos.	Designation	Item No.
1	Main power cable: power supply filter - main switch	00356539-01
2	Main power supply cable - terminal panel	00356540-01
3	Power supply grounding cable - terminal panel (earthing wire)	00324358-02 00359822-01
4	Power supply cable - terminal panel	00321113-02
5	Power supply cable - terminal panel	00356733-01

3.2.4 Description of the power supply functions

The placement system cannot be in placement mode until all the supply voltages have been enabled by the protective circuit. The following conditions must also be fulfilled:

- All four component change-over tables must be docked.
- All covers must be closed.
- Both emergency stop push-buttons must be released.
- All component flaps over the component tables must be closed.
- The software enable signal must have been sent.

3.2.5 Supply voltages - standard version

The power supply unit provides the following supply voltages:

- 150 VDC for the link circuits for the servo amplifier of the x and y axes
- 70/100 VDC for the lifting table/star
- 24 V DC for the tape cutter
- 30/34 VDC for the dp/z-axes and the width adjustment system
- 10 VDC for the star (slow-mode)

3.2.6 Supply voltages - Japanese version

The power supply unit provides the following supply voltages:

- 150 VDC for the link circuits for the servo amplifier of the x and y axes
- 70/100 VDC for the lifting table/star
- 24 V DC for the tape cutter
- 30/34 VDC for the dp/z-axes and the width adjustment system
- 12 VDC for the star
- 150VAD for the power supply unit power pack
- 230 VAD for the station computer and component tables
- 400 VDC for the WPC and component tables

3.2.7 Measuring voltages on the power supply unit

3.2.7.1 Safety instructions

DANGER  The placement system is supplied with 3 x 400 V~ (or 3 x 204 V~ / 3 x 230 V~ / 3 x 380 V~ / 3 x 415 V~) $\pm 5\%$, 50/60 Hz mains voltage.

- Consequently, parts of the system carry potentially lethal voltages, even when switched off at the main switch.
 - Incorrect handling of the placement system can therefore result in death or severe injury or considerable damage to equipment.
 - Measurements and repairs must always be carried out by appropriately qualified personnel.
 - Always follow the safety instructions in chapter 2 of this manual.
 - Always follow the applicable accident prevention and VDE regulations (particularly DIN EN 60 204, part 1) or the regulations specific to your country.
 - Before starting any repairs, switch off at the main switch and disconnect the placement system from the mains power supply.
 - Secure the system to prevent it being switched on again. If these instructions are not followed, it is possible to touch live parts, which could result in death or severe injury.
-

3.2.7.2 Tools and equipment required

- Digital voltmeter, class 1,5

Measuring ranges

AC voltage	750 V
Alternating current	40 A
DC voltage	300 V
Direct current	30 A
Resistance	200 Ohm - 20 MOhm

- Test cable with test probes or terminals
- S-27 HM detailed circuit diagrams, article number 00193426-02
- DIN 911 Allen key, size 6
- 3 mm key, double-bit, DIN 43668-J33, article number 00304191-01

3.2.7.3 Preparing the power supply unit for measurement

The power supply unit and main switch are located in the machine frame (see [Fig. 3.1 - 1](#)). In front of the unit there is a cover, fixed with a screw.

The unit is fixed to the machine frame with an M8 hexagon socket-head screw.

To measure the power supply, proceed as follows:

- Switch the placement system off at the main switch.
- Loosen the M8 lock screw on the underside.
- Pull the unit out as far as the stop.

WARNUNG  Make sure that the main power cable and supply lines do not become caught up in the placement system, otherwise the insulation will be damaged.

- Switch the placement system on at the main switch and start it up.

3.2.7.4 Measuring voltages on the front panel of the power supply unit

NOTE: The placement system must be started in order to take these measurements. This means that the protective covers and component flaps must be closed and the component tables docked. The emergency stop button must be released and the START button pressed. If this is not the case, the operating voltages will not be switched through to the servo amplifiers, lifting tables etc..

The inputs to the modules all have odd numbers and the outputs have even numbers.

In the case of fuses (F1 etc.), the input is always on the underside of the module, whereas with contactors (K1 etc.), it is always at the top.

NOTE

After triggering the miniature circuit-breakers F5, F6, F8 or F9 (see) always check the fine-wire fuses (see [Fig. 3.2 - 2](#)) F5.1, F5.2 or F6.1, F6.2 or F8.1 or F9.1.

3.2.8 Measuring voltages at rectifiers V1 to V5

To take measurements on rectifiers V1 and V5, you must first remove the perspex safety panel.

DANGER  RISK OF DEATH BY ELECTRIC SHOCK

- Switch the placement system off at the main switch.
 - Disconnect the placement system from the power supply.
 - Wait approximately 1 minute until the residual voltages have dropped to a safe level (electrolytic capacitor C1).
 - Loosen the two M5 fillister head screws on rectifiers V1 and V5.
 - Remove the perspex safety panel.
 - Switch the placement system on and start it up.
 - Measure the voltages.
-

NOTE: The placement system must have started, otherwise there will be no AC voltage (3 x 140 V~) at rectifier V1. V1 uses the 3 x 140 V~ to generate the 200 V- supply voltage for the servo amplifiers of the gantry axes and 100 V- for the servo amplifiers of the star axes. These 100 V- and 4 V- supplies are fed to the AC voltage inputs of rectifier V2. Rectifier V2 serves to "OR" the 4 V- and 100 V-supplies. If the placement system has not started, only 4 V- will be present at the positive pole of rectifier V2.

NOTE: Remember to replace the perspex safety panel over rectifiers V1 and V5 once the measurements have been completed.

DANGER  RISK OF DEATH BY ELECTRIC SHOCK

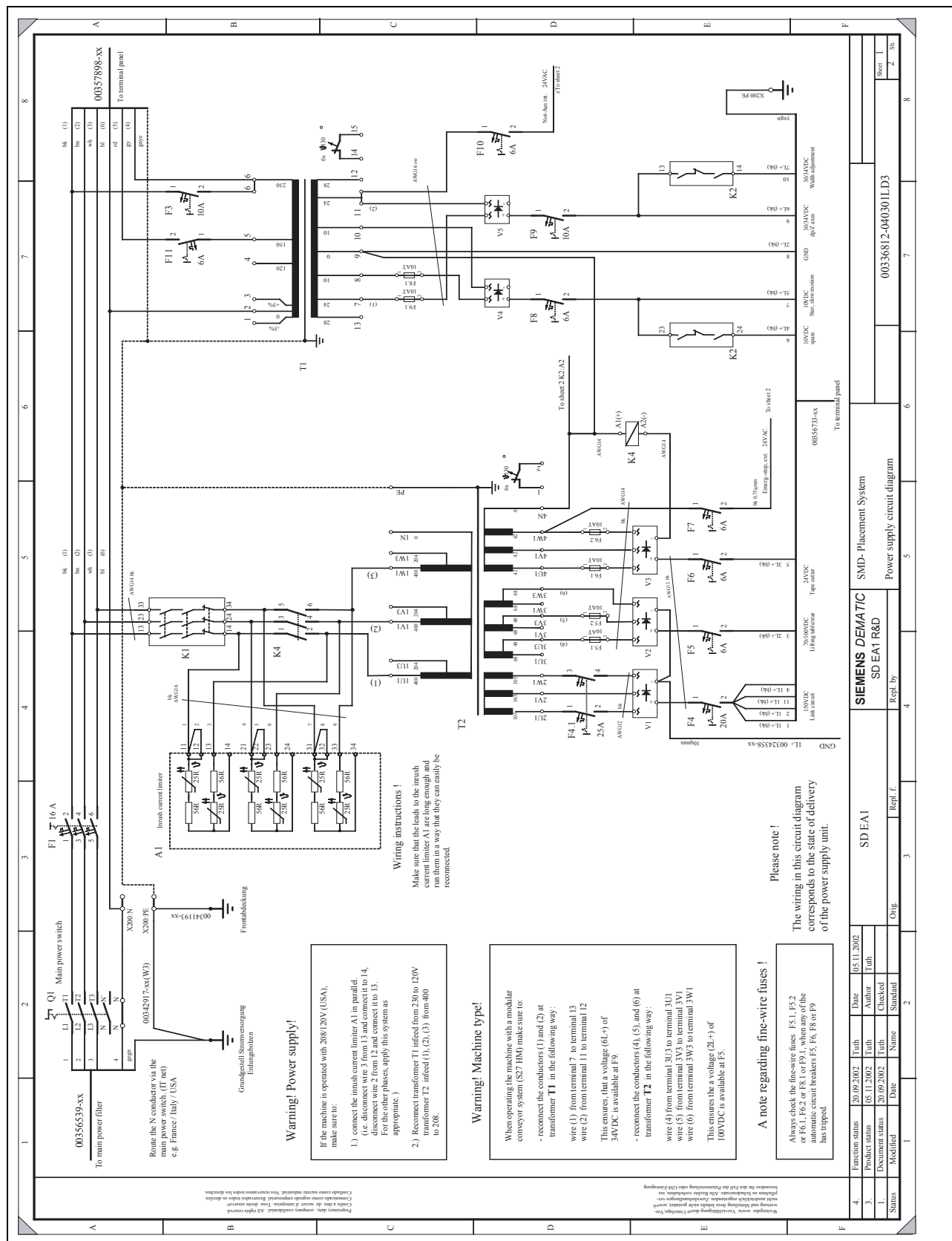
- Switch the placement system off at the main switch.
 - Disconnect the placement system from the power supply.
 - Wait approximately 1 minute until the residual voltages have dropped to a safe level (electrolytic capacitor C1).
 - Attach the perspex safety panel and fix in place with the M5 fillister head screws.
-

CAUTION 
Do not overtighten the fillister head screws otherwise the perspex panel might break.

3.3 Measuring power supply voltages

Please see below for power supply circuit diagrams. For detailed and comprehensive circuit diagrams please refer to the current versions of the SIPLACE S-27 HM detailed circuit diagrams.

NOTE
Observe the different versions of the power supply.









3.4 Servo unit

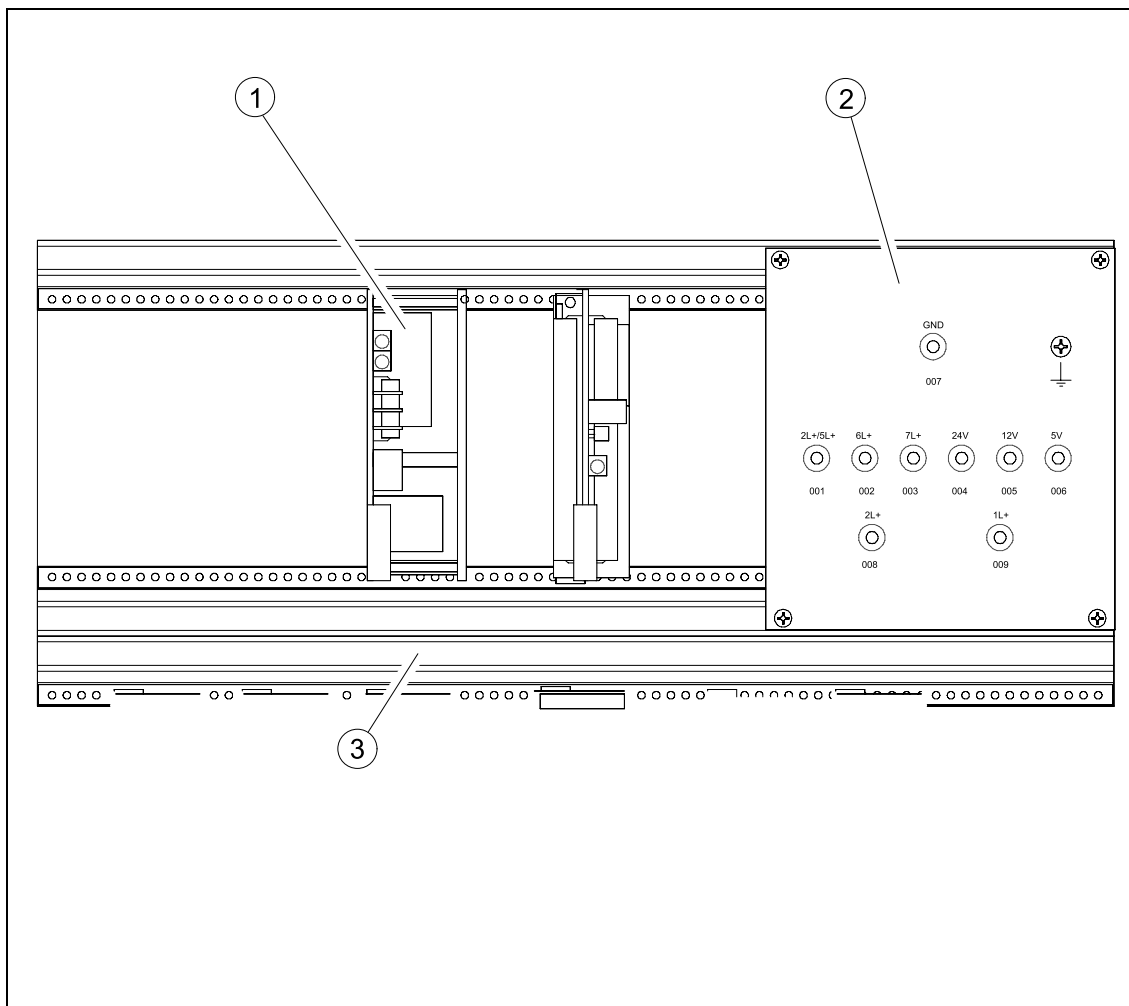


Fig. 3.4 - 13 Servo unit - voltage measuring unit and power pack

Key

- (1) Power pack
- (2) Voltage measuring unit
- (3) Servo unit - top part

The test sockets are shown in the block diagram "S-27 HM servo unit, front view, 00334810-XXXXXXTD3, page 1" of the detailed circuit diagrams.

The supply voltages for the servo unit's electronic circuits are generated from the supply integrated in the servo unit and can be tapped at the measuring points of the power supply unit (see S-27 HM servo unit, front view, 00334810-XXXXXXTD3, page 2 of the detailed circuit diagrams).

3.5 Control unit

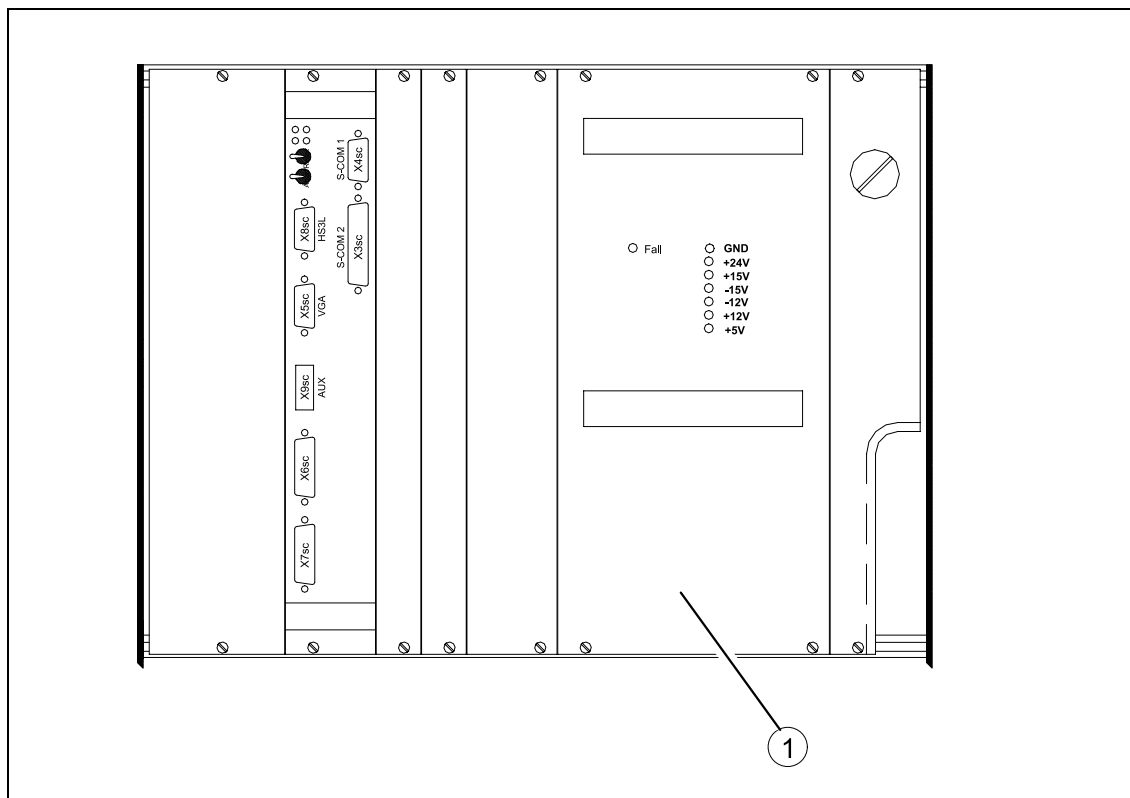


Fig. 3.5 - 14 Power pack in control unit

Key

(1) Power pack

When the main switch is switched on, the power pack in the control unit is supplied with 150 V AC by the power supply unit. The following voltages are then generated in the control unit

- + 5 V- to supply the digital electronic circuits
- ± 12 V- to supply the digital electronic circuits
- ± 15 V- to supply the analogue electronic circuits
- + 24 V- to supply the control circuits, relays etc.

The connection details are shown in the block diagram "S-27 HM control unit, front view, 00334808-XXXXXXTD3" of the detailed circuit diagrams.

3.6 Terminal panels - voltages

The connection details are shown in the block diagram "S-27 HM control unit, front view, 00334808-XXXXXXTD3" of the detailed circuit diagrams.

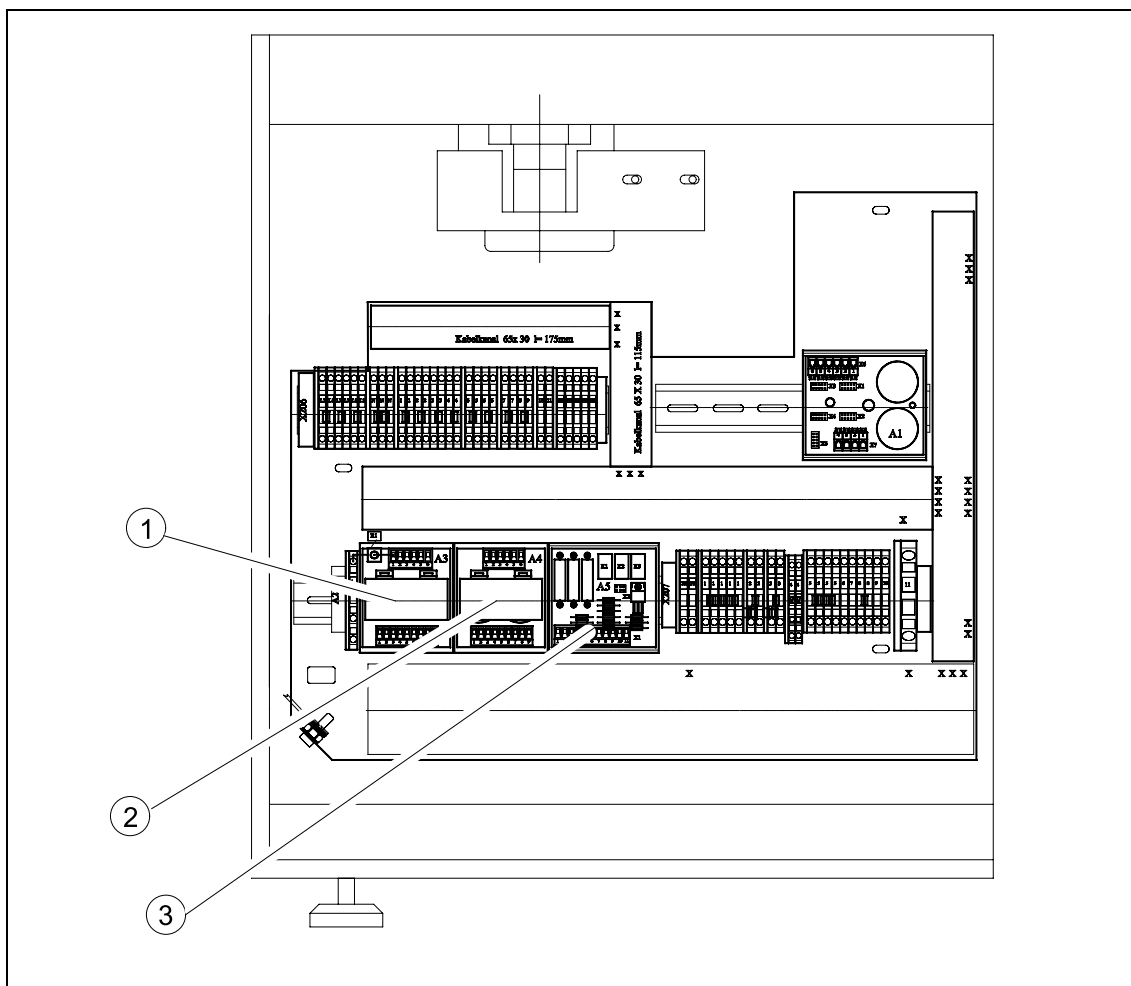


Fig. 3.6 - 15 Terminal panels - voltages

Key

- (1) Rectifier board 60 V
- (2) Rectifier board 30 V
- (3) Discharge board

3.7 Terminal panel - input/output distribution unit

The connection details are shown in the block diagram "S-27 HM control unit, front view, 00334808-XXXXXXTD3" of the detailed circuit diagrams.

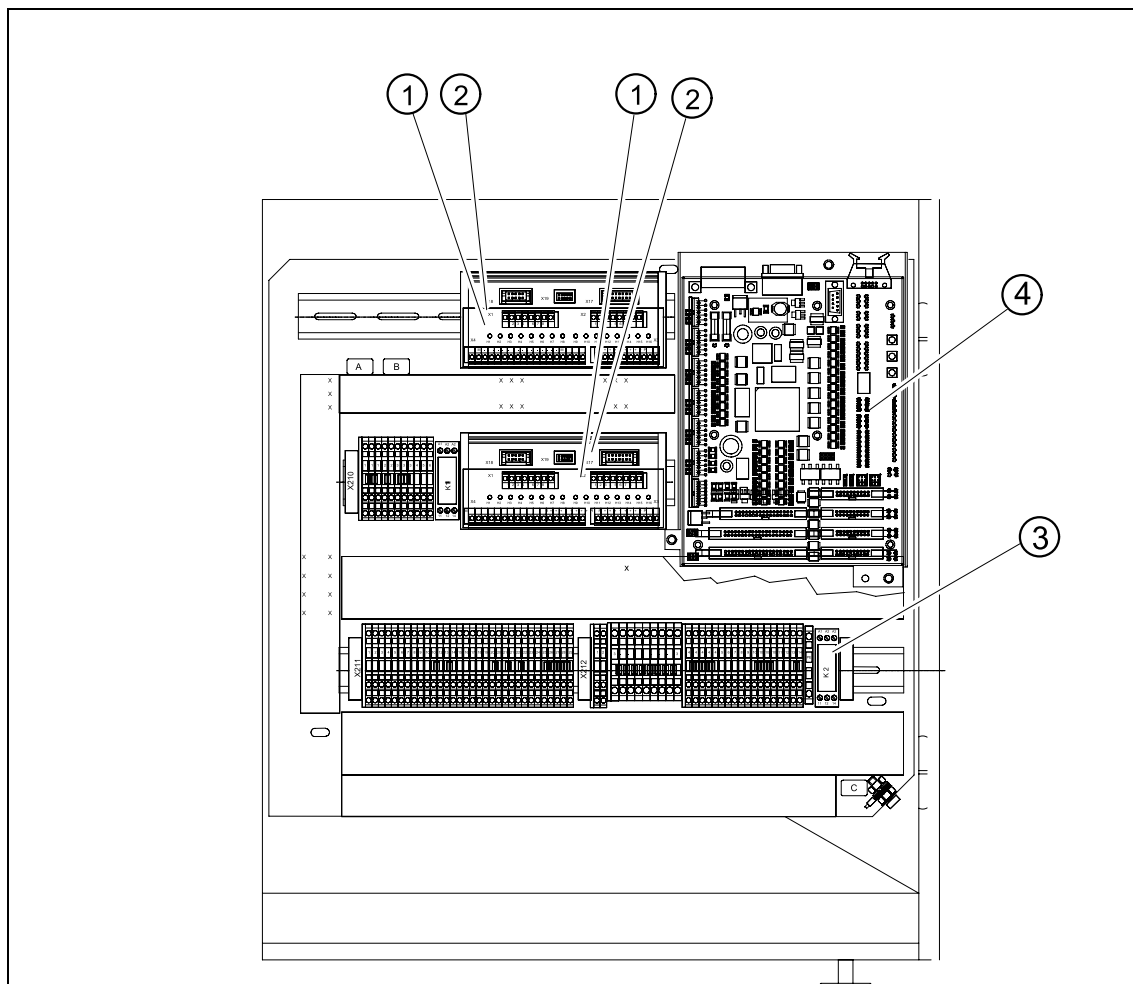


Fig. 3.7 - 16 Terminal panel - input/output distribution unit

Key

- | | |
|--------------------------------------|-----------------------------|
| (1) CAN input/output module | (3) Relay connector 24 V DC |
| (2) Terminal adapter for SLIO module | (4) Transportation control |

4 Gantries

4.1 Functions

The placement system is equipped with two gantries. These enable the two collect&place heads to be positioned in the x and y directions with great accuracy and independently of one another. Precise mechanical movement of the axes is produced by axis recirculating ball screw units.

High-precision positioning systems determine the positions of the x and y axes. To do this, the graduations on metal scales are optoelectronically scanned and the track signals sent to the axis control in the control unit.

A toothed belt is used to convert the rotary movement of the turning motors for the X- and Y-axes directly into a translatory movement of the placement head in the x and y direction.

4.2 Parts overview

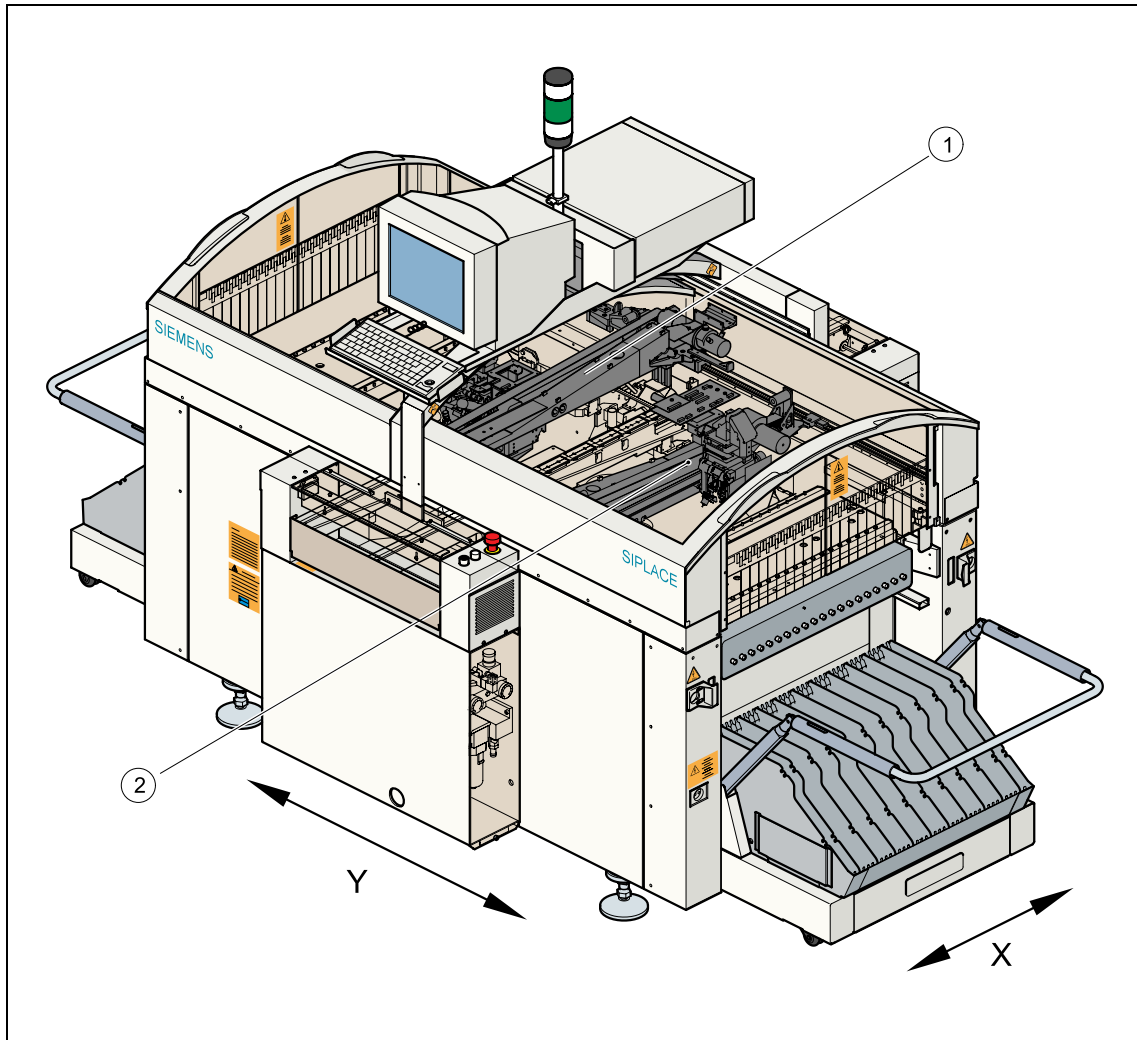


Fig. 4.2 - 1 Gantries on the placement system

Key

(1) Gantry 1

(2) Gantry 2

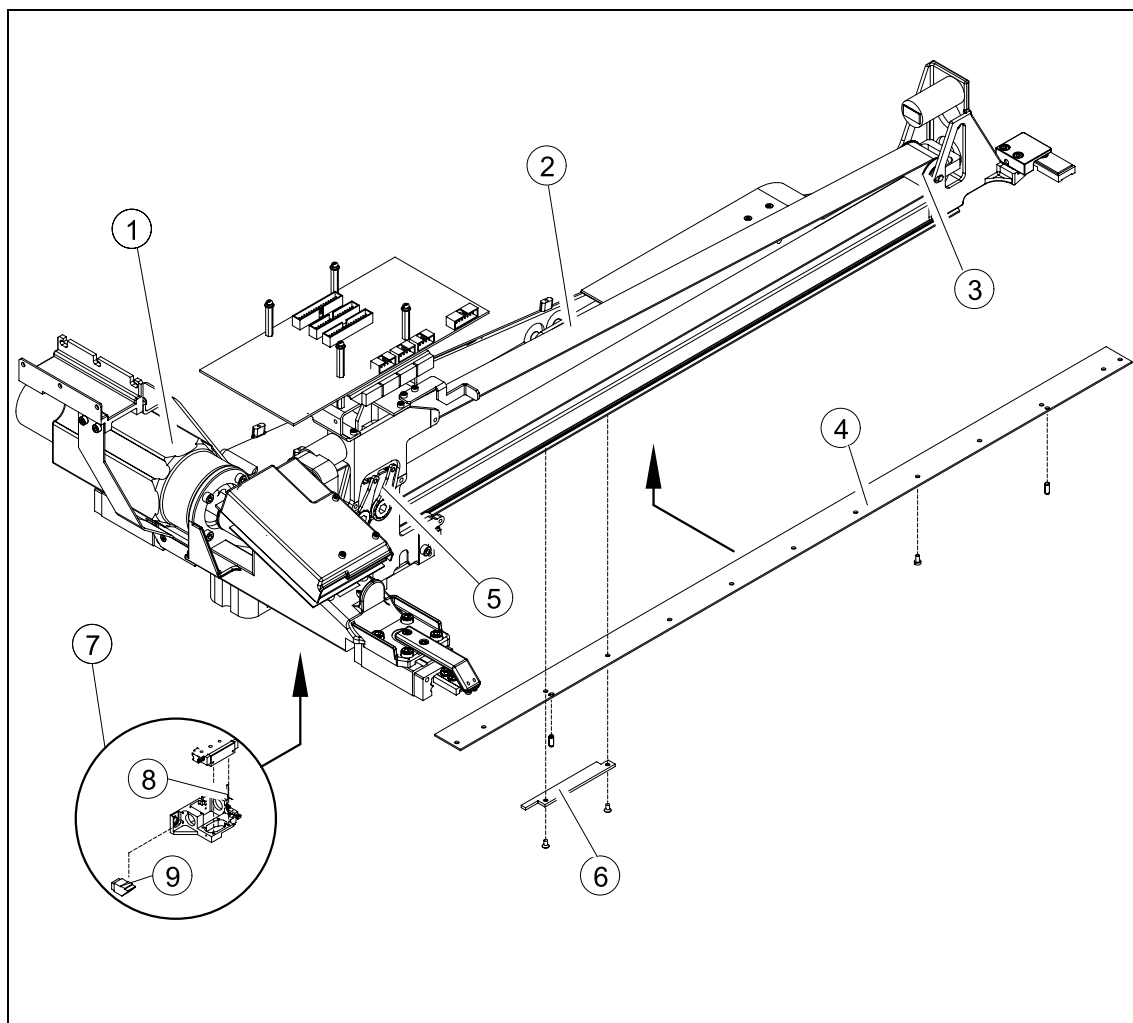


Fig. 4.2 - 2 Structure of the gantry - components on the X-axis

Key

- | | |
|-----------------------------------|--|
| (1) Motor X-axis | (2) Toothed belt X-axis |
| (3) Deflection pulley - complete | (4) X-axis scale |
| (5) Tensioning key for the X-axis | (6) Reference proximity switch strip |
| (7) Head mount | (8) X-axis end position proximity switch |
| (9) Digital scanning head, X-axis | |

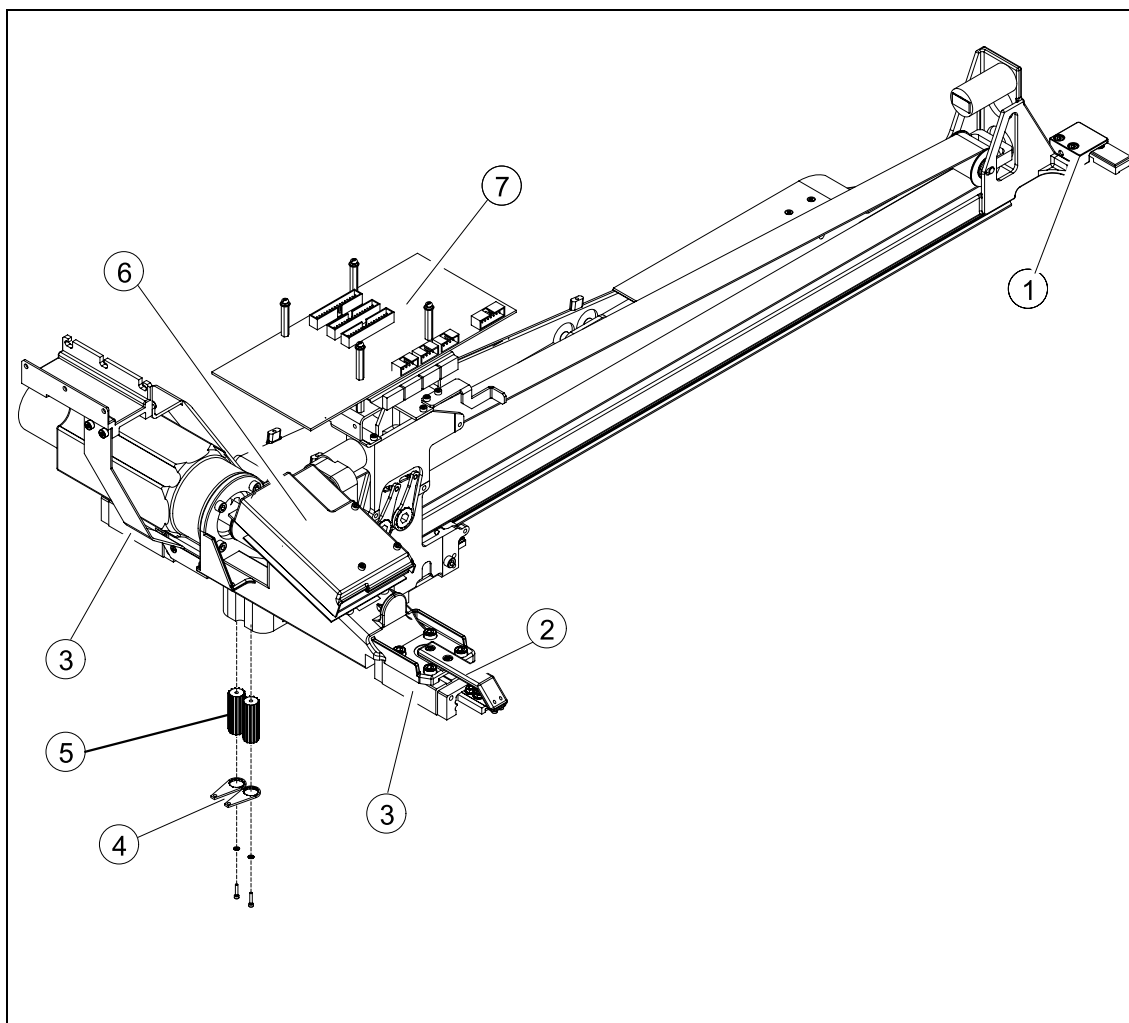


Fig. 4.2 - 3 Structure of the gantries - components of the Y-axis

Key

- | | |
|---|--|
| (1) Friction block, Y-axis | (2) Attenuation, Y-axis |
| (3) Guide slide, Y-axis | (4) Tensioning key, Y-axis |
| (5) Synchronizing disk for the Y-axis | (6) Conversion board for the main axis |
| (7) Gantry for the distributor head board | |

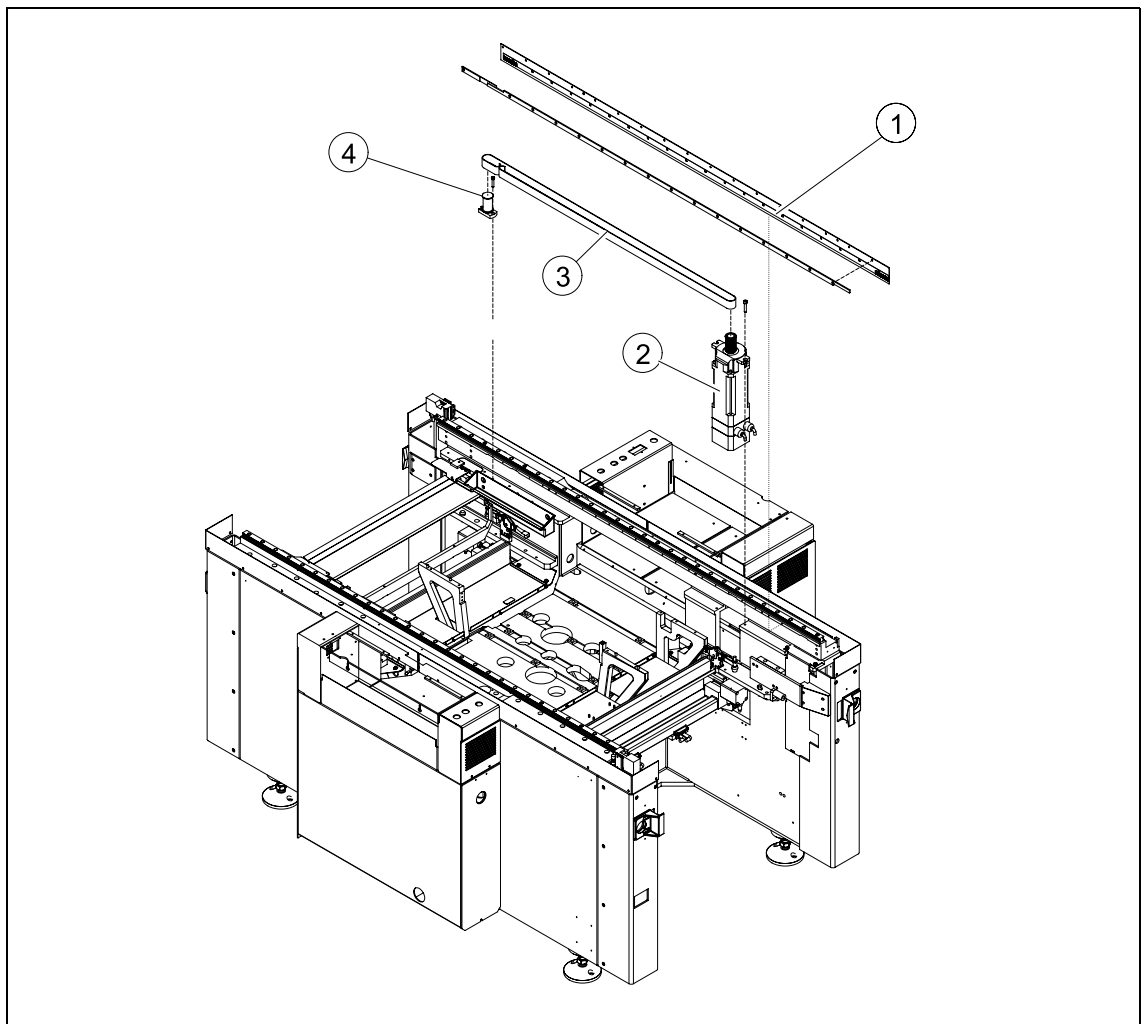


Fig. 4.2 - 4 Structure of the gantry - components of the Y-axis

Key

- | | |
|-------------------------|-----------------------|
| (1) Y-axis scale | (2) Y-axis motor |
| (3) Y-axis toothed belt | (4) Y-axis belt guide |

4.3 Points to do before starting servicing work...

- End all placement operations on the placement system.
- Switch the placement system off at the main switch.
- Wait until the operating system has shut down and the UPS has switched off.
- Disconnect the placement system from the power supply.
- Disconnect the placement system from the compressed air supply.
- Switch off the motor contactor in the power supply unit and secure the operating lever with a padlock.

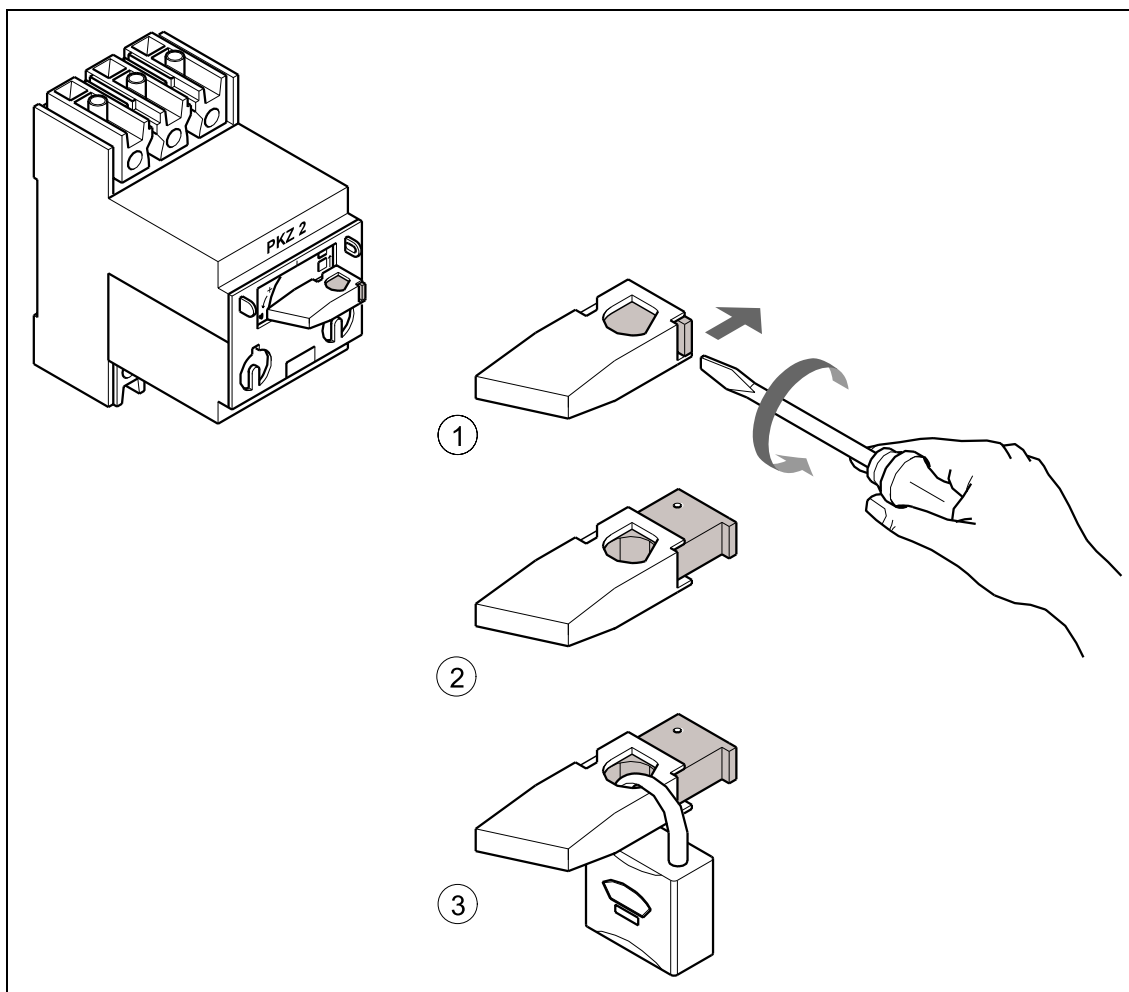


Fig. 4.3 - 1 Locking the motor contactor

- (1) Turn the operating lever (1) counter-clockwise.
- (2) Use the screwdriver to push the locking lug (2) out of the operating lever (1).
- (3) Secure the operating lever with a padlock (3).

- The Tag Out alternative

If a machine can be locked, it must be. However, there are situations where energy isolating devices can not accommodate locks. In these cases, the energy isolating devices must be tagged to warn employees that the machine is de-energized for servicing. The tag must be securely fastened, it must be placed in a position visible to all and it may only be removed by the person who attached it.

WARNING



To avoid damaging the collect&place head, ALWAYS observe the following points when moving the gantry:

- NEVER move the gantry by pushing with your hands against the collect&place head.
 - NEVER push the gantry while the Z-axis is lowered.
 - Take hold of the cast iron part of the X-axis - ideally near the X-axis toothed belt deflection pulley - and then move the gantry.
-

4.4 Replacing the X-axis scale (00329316-01)

4.4.1 Tools and Equipment

- Set of DIN 911 Allen keys
- Spacer gauge 0.4 mm, plastic
- SITEST program

4.4.2 Parts

X-axis scale, item number 00301086-01

4.4.3 Removing the X-axis scale

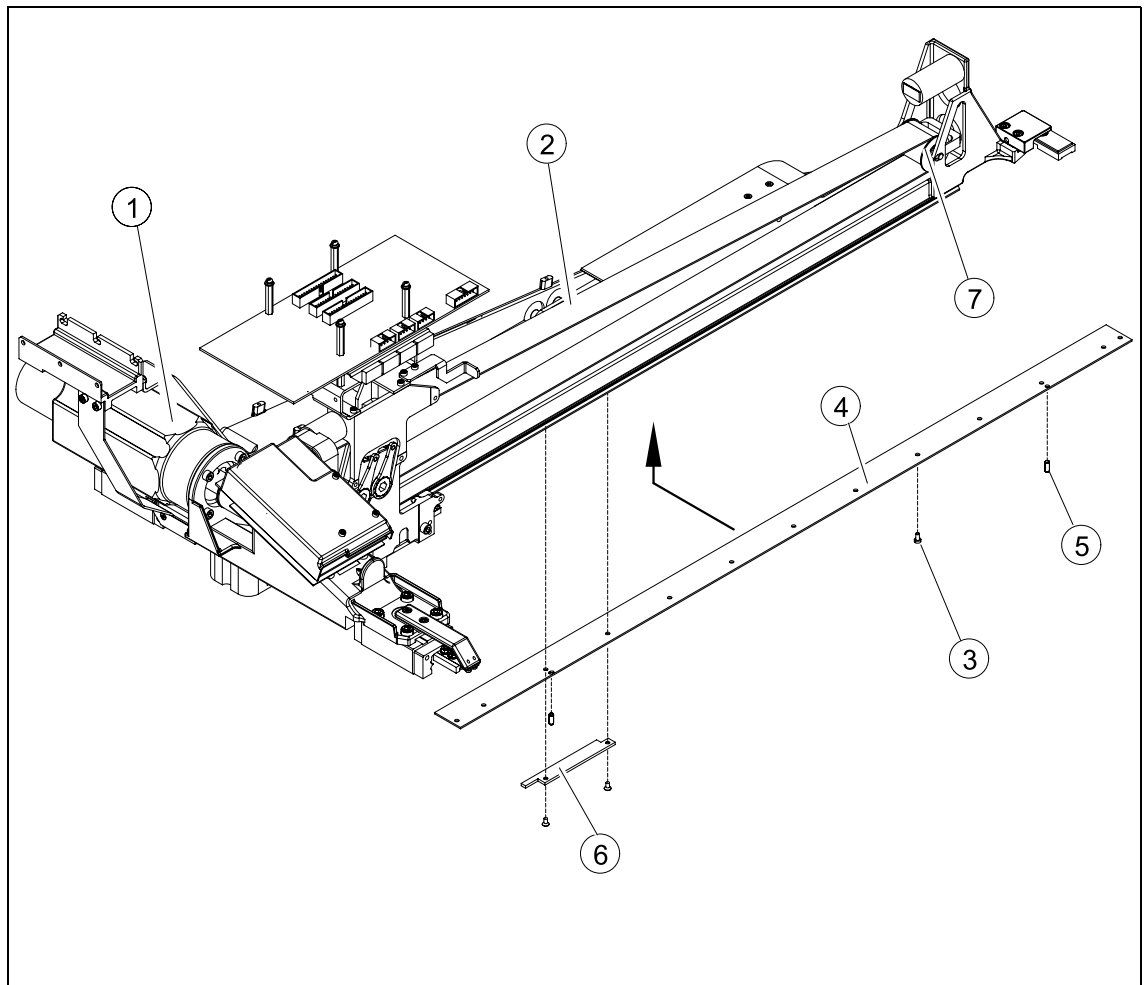


Fig. 4.4 - 1 Replacing the X-axis scale

Key

- | | |
|---|--------------------------------------|
| (1) X-axis motor | (2) X-axis toothed belt |
| (3) Fastening screws for the X-axis scale | (4) X-axis scale |
| (5) Locating pins | (6) Reference proximity switch strip |
| (7) Deflection pulley | |

- Switch the placement system off and secure it to prevent it being switched on again, as described in Section [4.3](#), page [96](#) onwards.
- Loosen the two M3x8 hexagon socket-head screws to remove the reference proximity switch strip (6) for the X-axis.

- Move the head mount across as far as the deflection pulley (7) in order to prevent any damage to the proximity switches.
- Loosen the 11 screws fastening the X-axis scale (3).
- Lift the scale (4) out of the locating pins (5) and remove it.

4.4.4 Installing the X-axis scale

- Carefully insert the scale onto the locating pins.

CAUTION



Do not touch the incremental tracks with bare fingers.

- Loosely tighten the 11 M2.5x5 hexagon socket-head screws with washers.
- Tighten the M2.5x5 hexagon socket-head screws.
- Use the spacer gauge to set the 0.4mm gap between the reference proximity switch strip and the scale.
- Use the two M3x8 hexagon socket-head screws to fix the X-axis reference proximity switch strip.

4.4.5 Settings

- Use the SITEST program to set the collect&place head and calibrate the gantry axes.

4.5 Replacing the X-axis tensioning key (00200468-02)

4.5.1 Tools and Equipment

- Set of DIN 911 Allen keys
- TSM belt tension measuring device, item number 00326015-01
- "Measuring belt tensions" operating instructions

4.5.2 Removing the tensioning key

- Switch the placement system off and secure it to prevent it being switched on again, as described in Section [4.3](#), page [96](#) onwards.
- Remove the placement head from the head mount (1). See also Chapter 7.5 in this Service Manual. You can now access the tensioning keys.
- To slacken the toothed belt
 - Undo the fastening screws (3) on the tensioning key (2)
 - And turn the tensioning key to loosen the toothed belt
- Lift the tensioning key off the synchronizing disk (4).

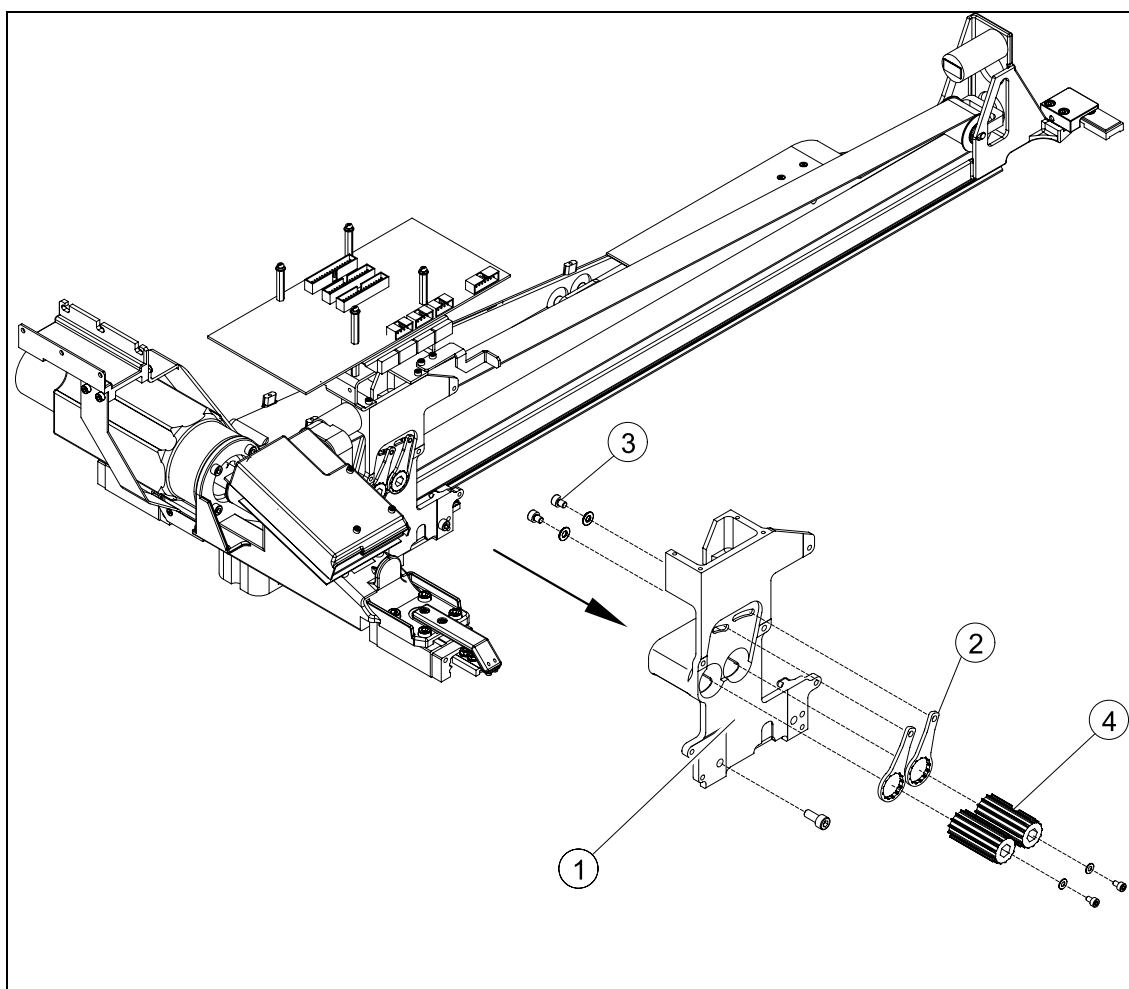


Fig. 4.5 - 1 Replacing the X-axis tensioning key

Key

- | | |
|---------------------|------------------------|
| (1) Head mount | (2) Tensioning key |
| (3) Fastening screw | (4) Synchronizing disk |

4.5.3 Installing the tensioning key

- Place the tensioning key on the synchronizing disk.
- Turn the synchronizing disk slightly until the fastening screw can be screwed in.
- Tension the toothed belt by turning the tensioning key clockwise and tightening the fastening screw.

4.5.4 Settings

- Push the head mount towards the X-axis motor, as far as the stop on the elastomeric spring.
- Set the belt tension. Please refer to the label on the machine for details of the settings.

CAUTION



Do not overstretch the toothed belt when adjusting the belt tension.

- Install the placement head. See also Chapter 7.5 of this Service Manual and perform the necessary settings.

4.6 Replacing the deflection unit (00330938-02)

4.6.1 Tools and Equipment

- Set of DIN 911 Allen keys
- TSM belt tension measuring device, item number 00326015-01
- "Measuring belt tensions" operating instructions
- Drift punch

4.6.2 Parts

Deflection unit X, item number 00330938-02

4.6.3 Removing the deflection unit

- Switch the placement system off and secure it to prevent it being switched on again, as described in Section [4.3](#), page [96](#) onwards.
- Remove the placement head from the head mount. See also Chapter 7.5 in this Service Manual. You can now access the tensioning keys.
- To slacken the toothed belt
 - Undo the fastening screws on the tensioning key,
 - And turn the tensioning key to loosen the toothed belt.
(See also Fig. [4.5 - 1](#)).
- Remove the tensioning key from the synchronizing disk. Pull the toothed belt out through the opening in the tension jack.
- Weave the toothed belt out of the deflection unit.
- Use the drift punch to carefully knock the axis (3) out of the clamping fixture (6) and remove the deflection unit.

NOTE

Make sure you do not lose the two disks (7). You will need these again during installation.

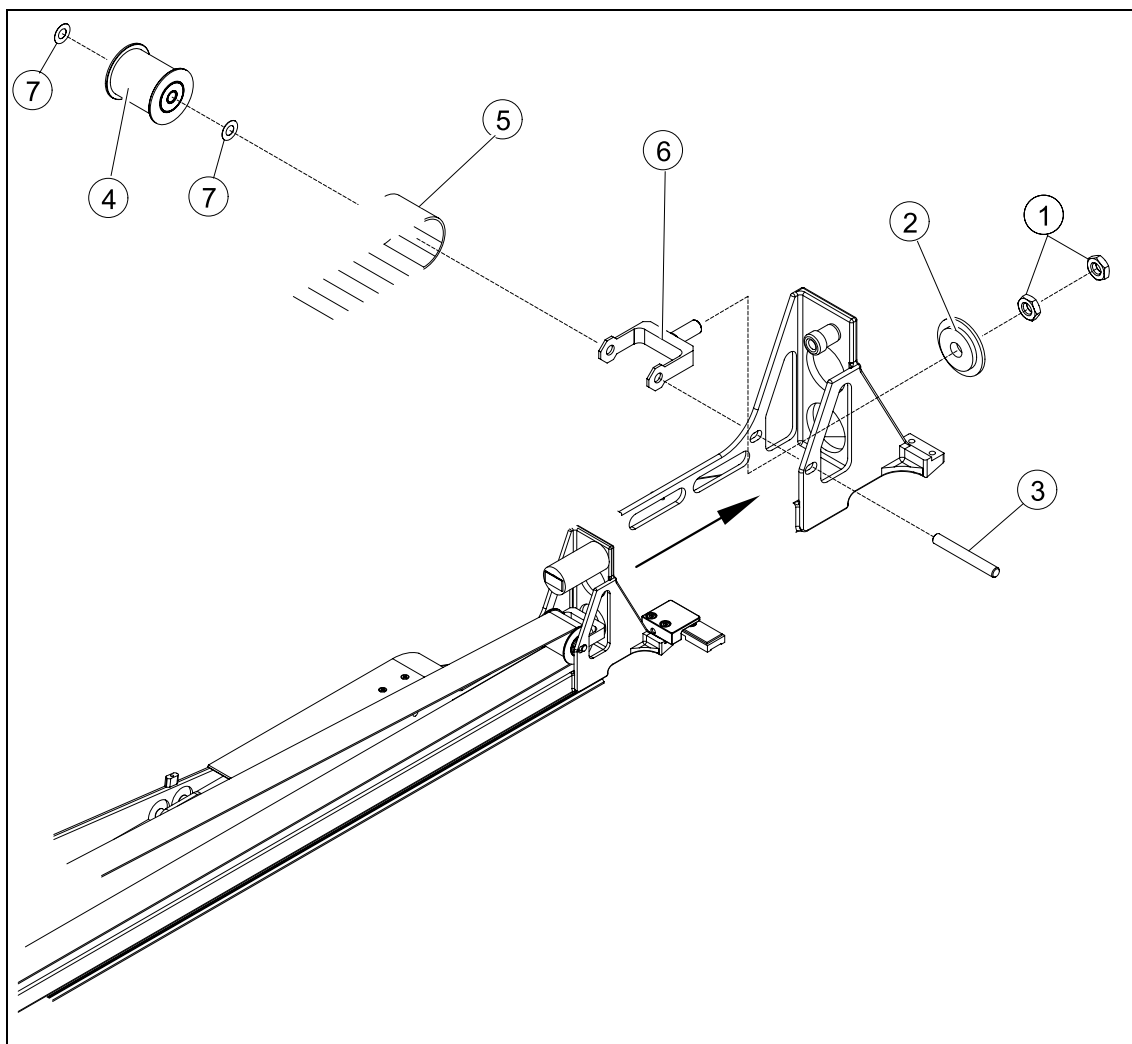


Fig. 4.6 - 1 Replacing the deflection unit

Key

- | | |
|-----------------------|-----------------------|
| (1) Nut incl. locknut | (2) Thrust washer |
| (3) Axis | (4) Deflection pulley |
| (5) Toothed belt | (6) Clamping fixture |
| (7) Disks | |

4.6.4 Installing the deflection unit

- Insert the new deflection pulley with the two disks into the clamping fixture and carefully knock the axis into the guidance.
- Place the toothed belt around the synchronizing disk of the deflection unit.
- Feed the toothed belt into the opening in the tension jack so that it runs approximately 270° around the long synchronizing disk.
- Place the tensioning key on the synchronizing disk (item 4 in Fig. [4.5 - 1](#)).
- Turn the synchronizing disk slightly until the fastening screw can be screwed in.
- Pre-tension the toothed belt by turning the tensioning key clockwise and tightening the fastening screw.

NOTE:

Position the deflection unit (item 1 in Fig. [4.6 - 2](#)) so that the axis (2) is in the center of the slot. This leaves enough room to later tension or relieve the tension on the toothed belt, without removing the placement head.

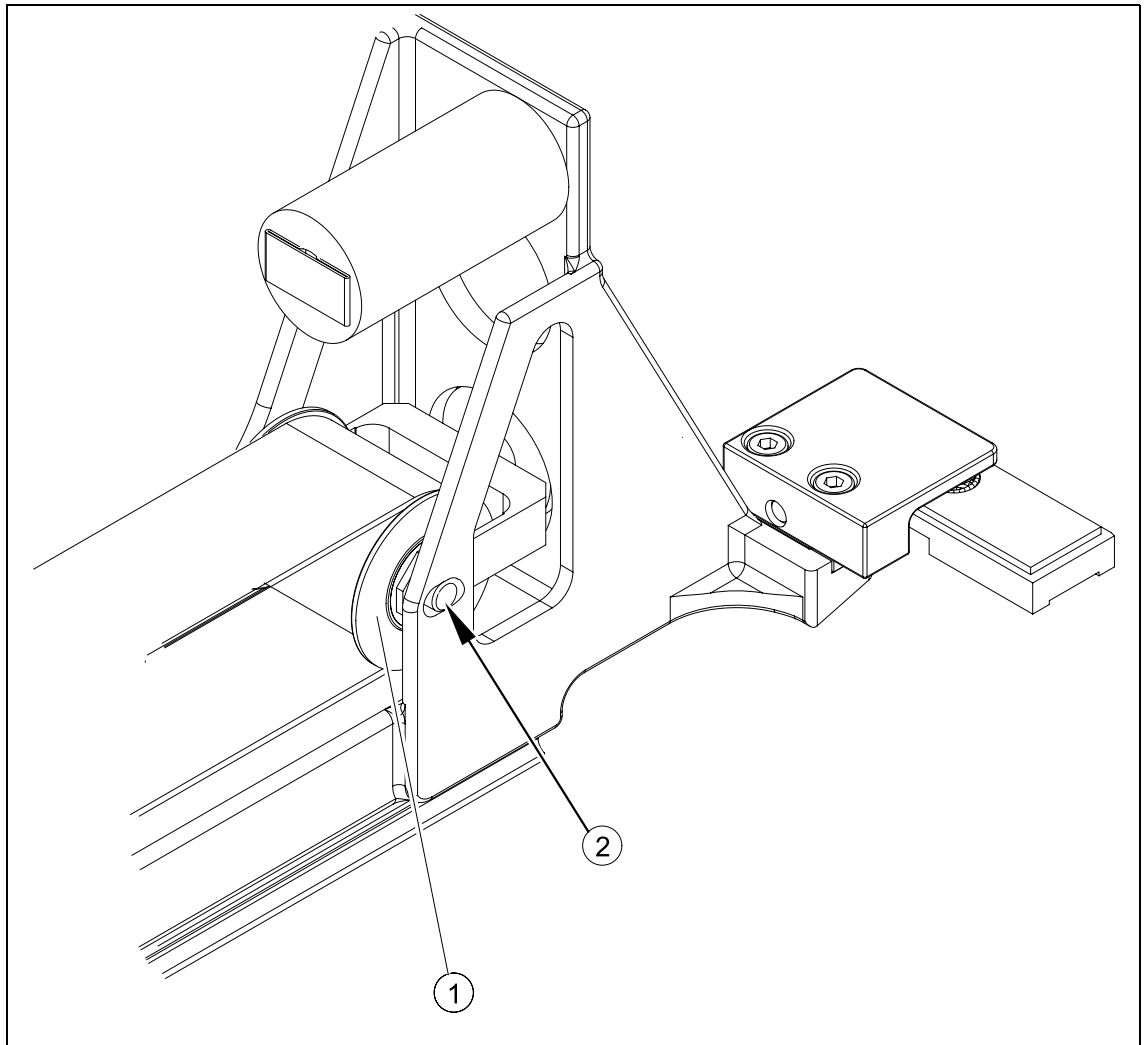


Fig. 4.6 - 2 Position of the deflection unit

Key

(1) Deflection unit

(2) Axis in the center of the slot

4.6.5 Settings

- Push the head mount towards the X-axis motor, as far as the stop on the elastomeric spring.
- Set the belt tension. Please refer to the label on the machine for details of the settings.

CAUTION



Do not overstretch the toothed belt when adjusting the belt tension.

- Fasten the nut on the thrust washer with the locknut.
- Install the placement head. See also Chapter 7.5 in this Service Manual and perform the necessary settings.

4.7 Replacing the X-axis toothed belt (00334180-02)

4.7.1 Tools and Equipment

- Set of DIN 911 Allen keys
- TSM belt tension measuring device, item number 00326015-01
- "Measuring belt tensions" operating instructions

4.7.2 Parts

Toothed belt, Synchroflex 50 ATS5-1205 E9-11, item number 00334180-02

4.7.3 Removing the X-axis toothed belt

- Switch the placement system off and secure it to prevent it being switched on again, as described in Section [4.3](#), page [96](#) onwards.
- Remove the placement head from the head mount. See also Chapter 7.5 in this Service Manual. You can now access the tensioning keys.
- To slacken the toothed belt
 - Undo the fastening screws of both tensioning keys,
 - And turn the tensioning key to loosen the toothed belt.
(See also Fig. [4.5 - 1](#)).
- Remove the tensioning key (1) from the synchronizing disk (2). Pull the toothed belt (3) out through the opening in the two tension jacks.
- Weave the toothed belt out of the deflection unit.
- Remove the toothed belt from the synchronizing disk of the X-axis motor unit.

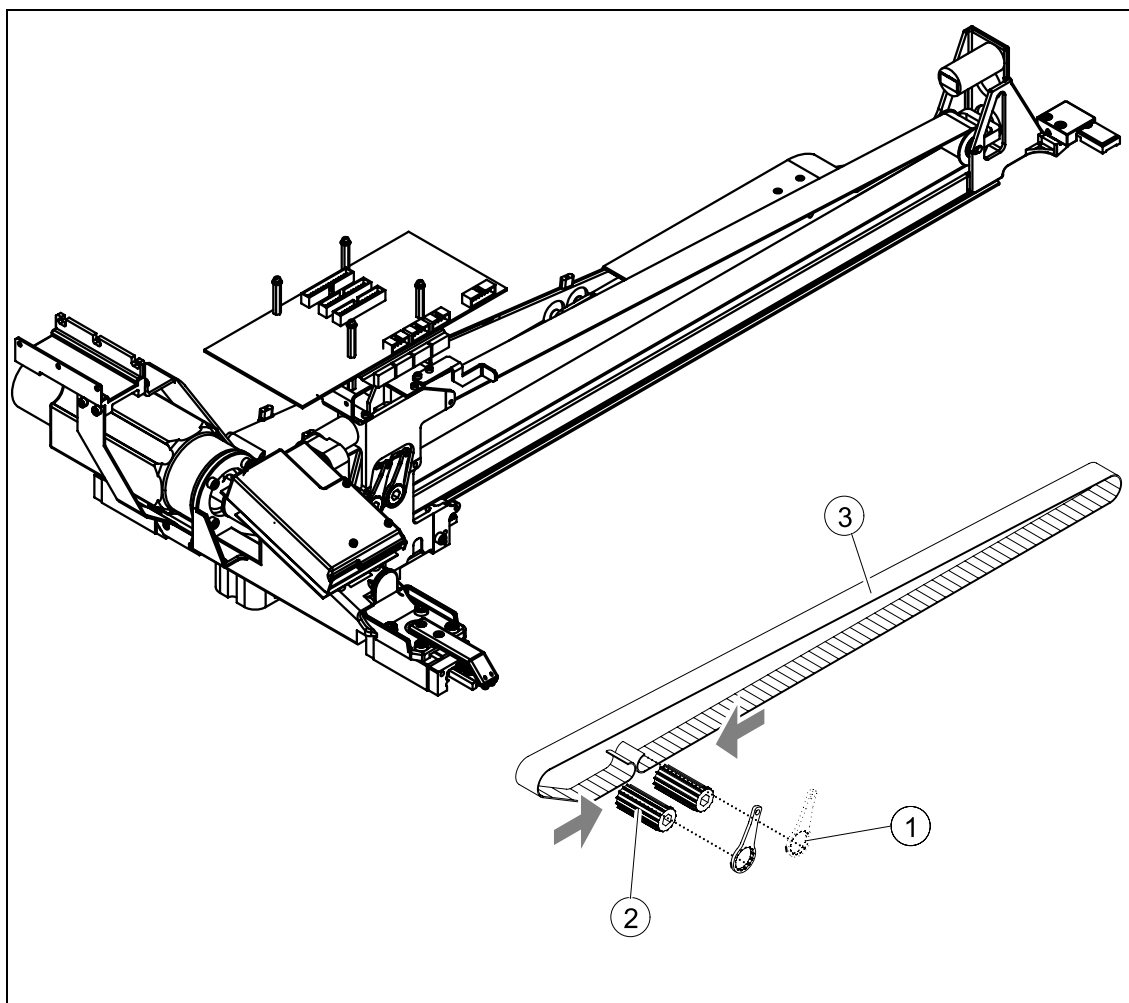


Fig. 4.7 - 1 Removing the X-toothed belt

Key

(1) Tensioning key

(2) Synchronizing disk

(3) Toothed belt

4.7.4 Installing the X-axis toothed belt

- Place the toothed belt around the synchronizing disk of the deflection unit.
- Feed the toothed belt into the deflection unit.
- Feed the two ends of the toothed belt into the openings in the tension jack so that the belt runs approximately 270° around the long synchronizing disk.
- Fit the two tensioning keys.

NOTE:

Position the deflection unit (item 1 in Fig. [4.6 - 2](#)) so that the axis (2) is in the center of the slot. This leaves enough room to later tension or relieve the tension on the toothed belt, without removing the placement head.

4.7.5 Settings

- Push the head mount towards the X-axis motor, as far as the stop on the elastomeric spring.
- Set the belt tension. Please refer to the label on the machine for details of the settings.



Do not overstretch the toothed belt when adjusting the belt tension.

- Install the placement head. See also Chapter 7.5 in this Service Manual and perform the necessary settings.

4.8 Replacing the X-axis motor unit (00334153-04)

4.8.1 Tools and Equipment

- Set of DIN 911 Allen keys
- Cable ties
- TSM belt tension measuring device, item number 00326015-01
- "Measuring belt tensions" operating instructions

4.8.2 Parts

X-axis motor unit, item number 00334153-04

4.8.3 Removing the X-axis motor unit

- Switch the placement system off and secure it to prevent it being switched on again, as described in Section [4.3](#), page [96](#) onwards.
- Cut the cable ties holding the X-axis motor cable.
- Remove the cable clamp of the flat ribbon cable.
- Unplug all the X-axis motor plugs from the X/Y distributor.
- Remove the board holder for the X/Y distributor.
- Remove the cable holder for the trailing cable.
- To slacken the toothed belt, undo the nut incl. locknut on the clamping fixture (see Fig. [4.6 - 1](#)).
- Remove the four fastening screws and pull out the X-axis motor unit.

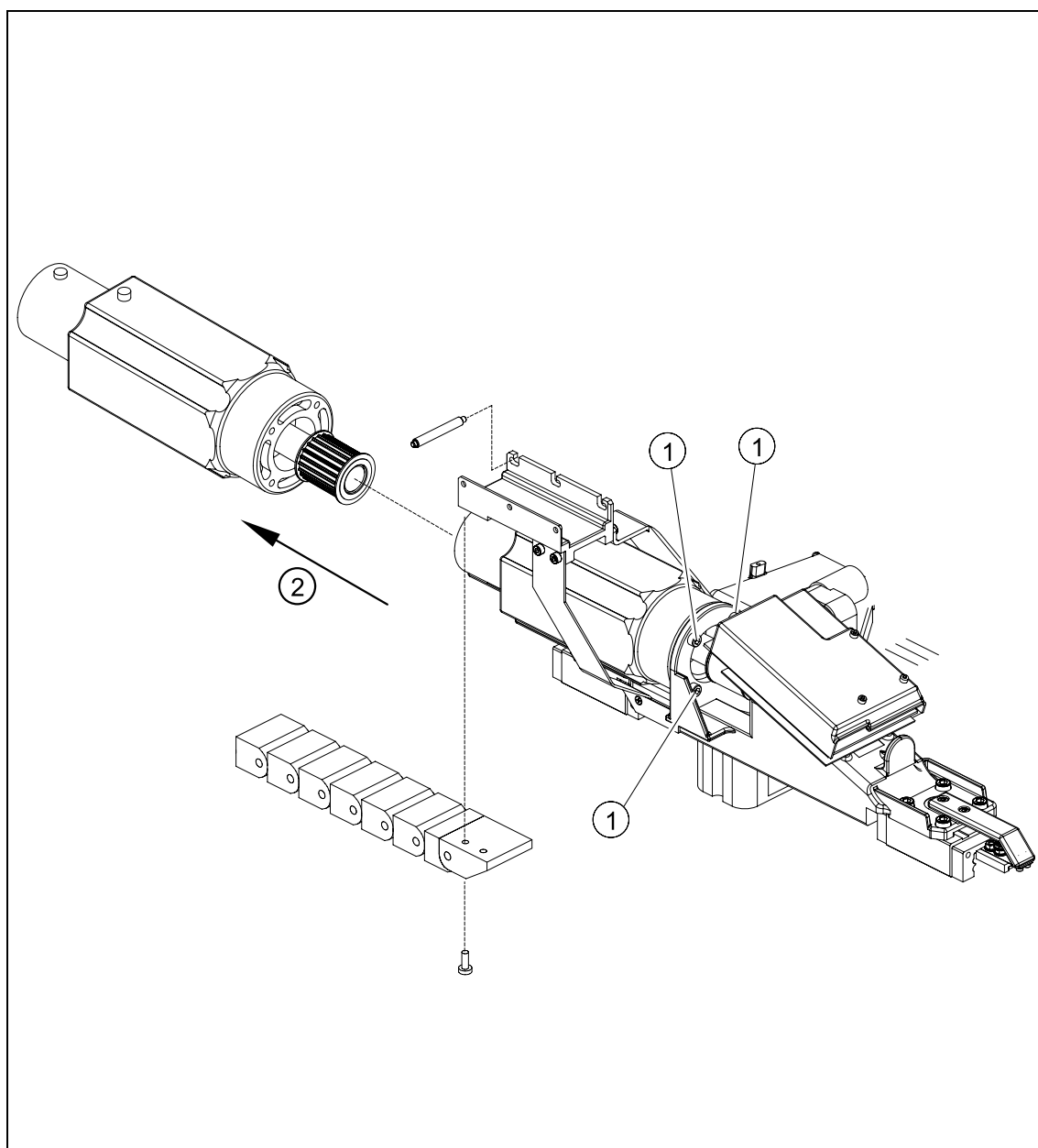


Fig. 4.8 - 1 Replacing the X-axis motor unit

- (1) Fastening screws for X-axis motor unit (2) Pulling out the motor unit

4.8.4 Installing the X-axis motor unit

- Carefully insert the X-axis motor unit as far as the stop, making sure that the toothed belt is run around the synchronizing disk and not damaged.
- Fasten the X-axis motor unit with the 4 screws.
- Fit the cable holder for the trailing cable.
- Fit the board holder.
- Plug all the X-axis motor plugs into the socket on the X/Y distributor.
- Use the cable clamp to fix the flat ribbon cable.
- Use cable ties to fix all cables.



Make sure that the cables are firmly seated. Otherwise, the high acceleration forces could cause the cable to slip out of position and shear through.

- Use the clamping device to pre-tension the X-axis toothed belt.
- Reconnect the fan motor.

4.8.5 Settings

- Push the head mount towards the X-axis motor, as far as the stop on the elastomeric spring.
- Set the belt tension. Please refer to the label on the machine for details of the settings.



Do not overstretch the toothed belt when adjusting the belt tension.

- Fasten the clamping device in place with the locknut (see Fig. [4.6 - 1](#)).

4.9 Replacing the Y-axis motor unit (00334154-04)

4.9.1 Tools and Equipment

- Set of DIN 911 Allen keys
- Cable ties
- TSM belt tension measuring device, item number 00326015-01
- "Measuring belt tensions " operating instructions"
- SITEST program
- Spirit level

4.9.2 Parts

Y-axis motor unit, item number 00334154-04

4.9.3 Removing the Y-axis motor unit

- Switch the placement system off and secure it to prevent it being switched on again, as described in Section [4.3](#), page [96](#) onwards.
- Remove the cover plate (1) on the machine base.
- Dismantle the nozzle changer and its complete bracket (2).
- Dismantle the cutter and the empty-table duct plus bracket, as described in Chapter [5](#) of this Service Manual.
- Undo and remove the two screws for the component table guidance (4).
- Undo and remove the fastening screws (fixed with loctite) for the component table base plate (5).
 - You can now access the Y-axis motor.
- Relieve the tension of the toothed belt with the aid of the Y-axis tensioning keys.
- Unplug the connection plug on the servo unit.
- Undo and remove the two fastening screws on the Y-axis motor.

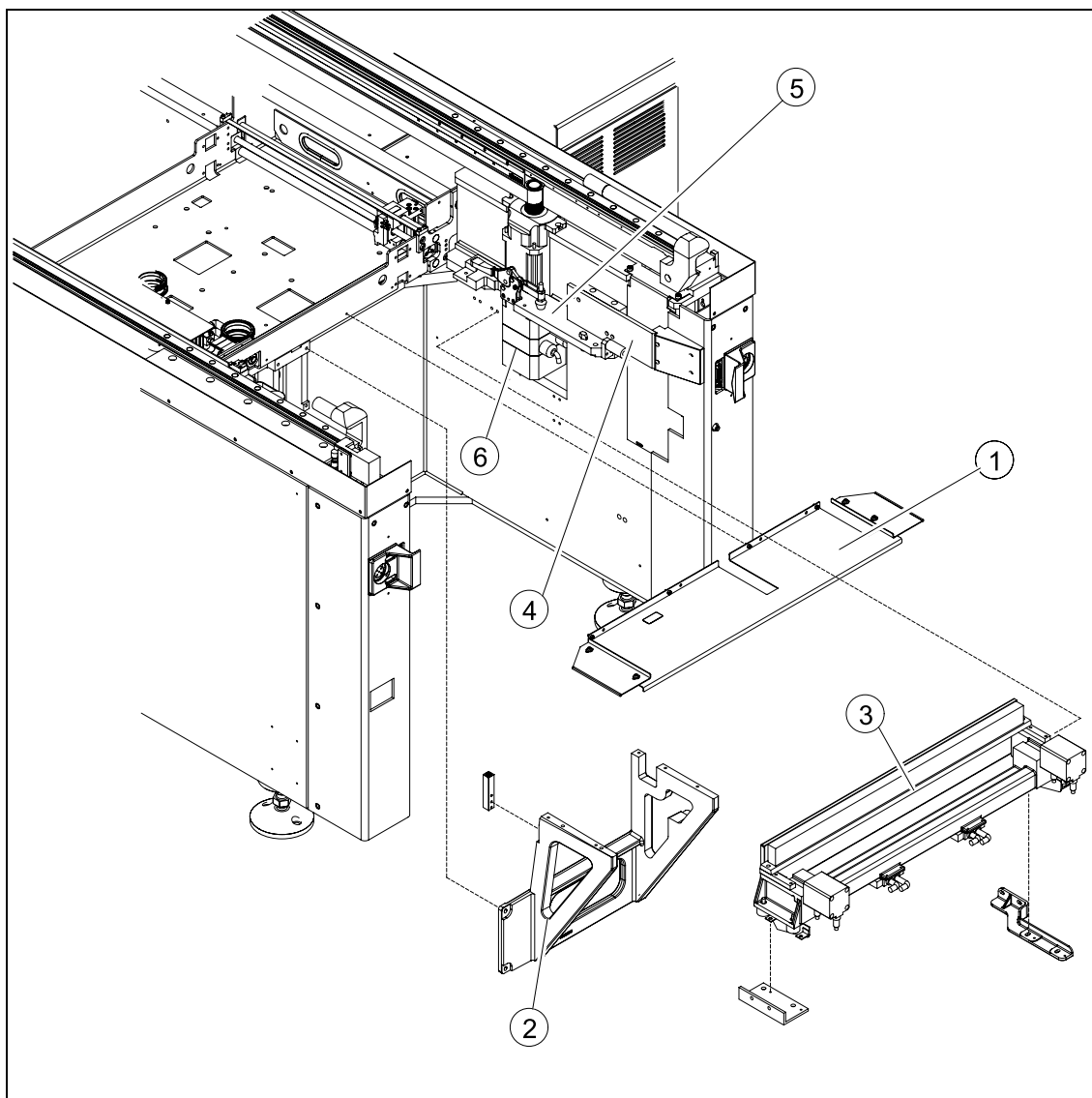


Fig. 4.9 - 1 Replacing the Y-axis motor unit

Key

- | | |
|--------------------------------|--------------------------------|
| (1) Cover plate | (2) Bracket for nozzle changer |
| (3) Cutter | (4) Component table guidance |
| (5) Component table base plate | (6) Y-axis motor |

4.9.4 Installing the Y-axis motor unit

- Carefully insert the Y-axis motor unit. Make sure that the toothed belt is run around the synchronizing disk and is not damaged.
- Fix the Y-axis motor unit with the fastening screws.
- Reconnect the electrical cables between the Y-axis motor unit and the servo unit.
- Use the Y-axis tensioning keys to pre-tension the toothed belt.
- Install the component table base plate, secure the fastening screws with loctite and assemble the component table guidance.
- Secure the screws of the component table base plate with loctite.
- Install the cutter and the empty-table duct plus bracket, as described in Chapter 5 of this Service Manual.
Please observe all safety instructions during this procedure.
- Install the nozzle changer. Adjust the position of the mount with a spirit level.
- Install the cover plate

4.9.5 Settings

- Set the belt tension. Please refer to the label on the machine for details of the settings.

CAUTION



Do not overstretch the toothed belt when adjusting the belt tension.

- Measure the nozzle changer with the SITEST test program.

NOTE

The position of the nozzle changer must be aligned with the aid of a spirit level.

5 Pneumatic Cutter and Empty-Tape Duct

5.1 Safety Instructions

DANGER 

The chapters "Operational Safety" in User Manual SIPLACE S-27 HM and in this Service Manual take precedence.

The machine SIPLACE S-27 HM is powered by
219/380 V +/- 5% or
230/400 V +/- 5% or
239/415 V +/- 5% or
117/204 V +/- 5% or
133/230 V +/- 5%,
50/ 60 Hz line voltage

Portions of the system therefore conduct dangerous electricity. Inside the machine frame this is true even while the master switch is turned off.

The machine has to be switched OFF and disconnected from the mains before you perform any work in the area of the cutter.

In addition, the compressed air supply must be turned off at the main valve of the compressed air unit in the machine frame and the compressed air lines must be bled by actuating the needle valve on the compressed air unit.

Always secure the machine against unauthorized reactivation, as described in the User Manual, chapter "Lock-Out and Tag-Out Procedure ...".

5.2 Parts

All spare parts are listed in the S-27 HM spare parts catalogue, with their article numbers and diagrams.

NOTE:

These instructions are only valid for the version 04 pneumatic cutter and the associated version 03 empty-tape duct.

One of the new features of cutter version 04 is a tape deflector which is installed over the movable blade (see [Fig. 5.4.2](#) -> 6).

5.3 Tools, Expendable Materials, Documentation

- Thick protective gloves
- Set of socket wrenches, cross-slotted screwdriver size 4,
- Open-end wrench, width across flats 10; slotted screwdriver size 1
- Torque wrench, Diagonal cutter, Sliding caliper
- Feeler gauge 0.05mm; 1.0mm; 1.5mm; 2.0mm; 2.50mm
- Straight-edge (for check of tape deflector)
- Mounting plate, Item no.: 00312731-01
- 2 large parallel clamps (or mounting plate, see above)
- Flat, sturdy work bench to fasten the removed cutter (or mounting plate, see above)
- Loctite no. 234, Item no.: 00334892-01
- Molykote paste, Item no. 02100335-01, 250 g, (preferred) or
ISOFLEX TOPAS NCA 52, Item. no. 00330850-01, tube 50 g
- Water-insoluble, fine-tip marker and a dry and clean cloth
- Current edition of SIPLACE S-27 HM spare parts catalogue and SIPLACE S-27 HM detailed circuit diagrams
- SITEST program and current SITEST operating manual
- Current edition of „S-27 HM Adjustment Instructions“ documentation

5.4 Overview of Mechanical Layout

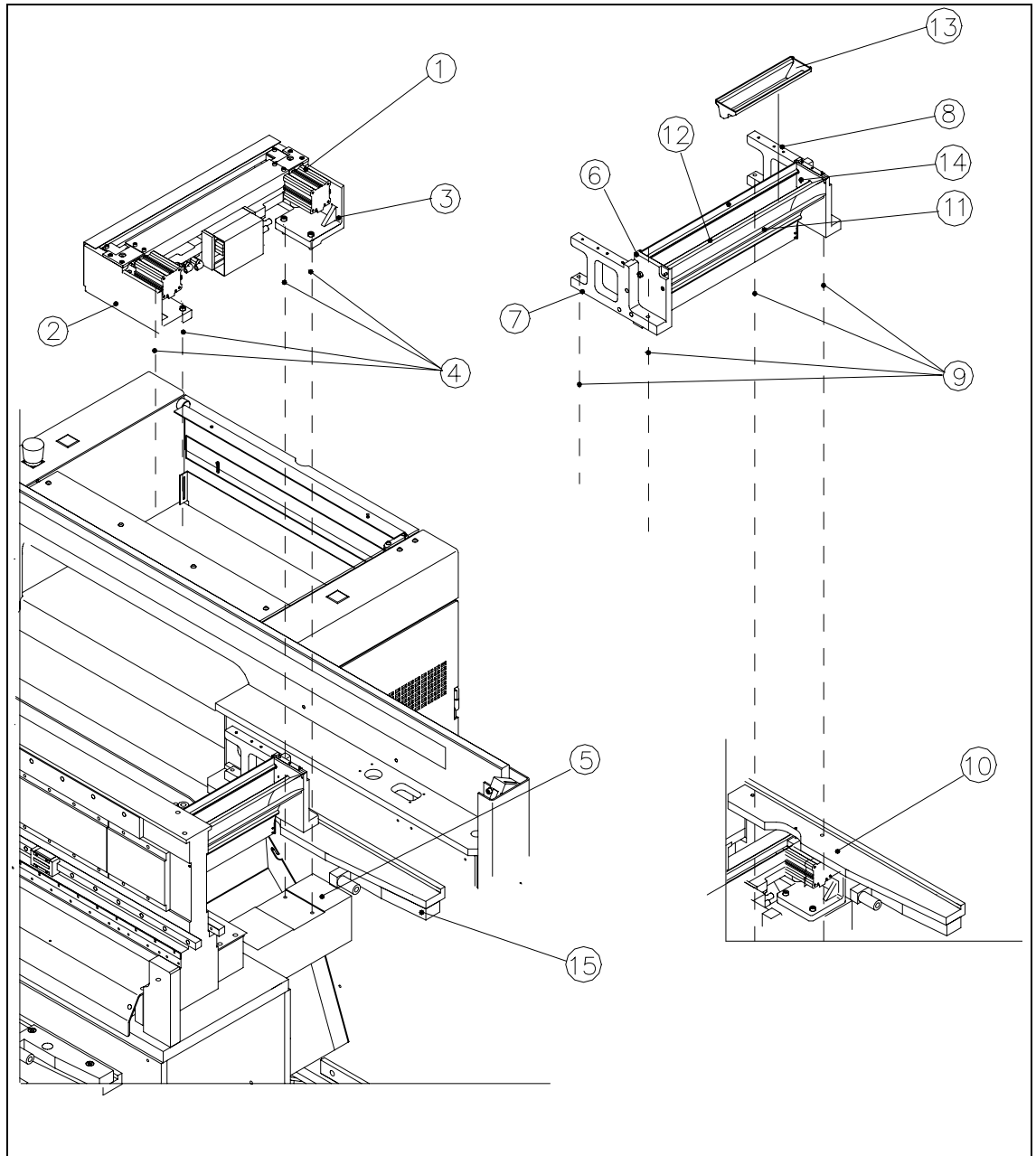


Fig. 5.4.1 Overview of Pneumatic Cutter Version 04 and Empty-Tape Duct Version 03

Key to [Fig. 5.4.1](#):

1. Pneumatic cutter S-27 HM
2. Retaining bracket for cutter, left
3. Retaining bracket for cutter, right
4. Fastening of the cutter,
2 socket hex head cap screws M6 x 25 each on left and right *)
Re-install any disks or plates that were previously removed.
5. Mounting surface for cutter on the machine frame
6. Empty-tape duct assembly
7. Side panel (left) of the empty-tape duct
8. Side panel (right) of the empty-tape duct
9. Fastening of "empty-tape duct assembly":
2 socket hex head cap screws M 4 x 16 each on left and right
10. Mounting surface for the "empty-tape duct assembly" on the machine frame
11. Baffle, inside
12. Baffle, outside
13. Reject box for nozzles
14. Reject box (profile)
15. Stop buffer assembly on left- and right-hand side of the machine frame,
Fastening: 2 socket hex head cap screws M8 each on left and right

*) Loosen these screws only when removing/installing the cutter (see [Section 5.6.1.1](#)).

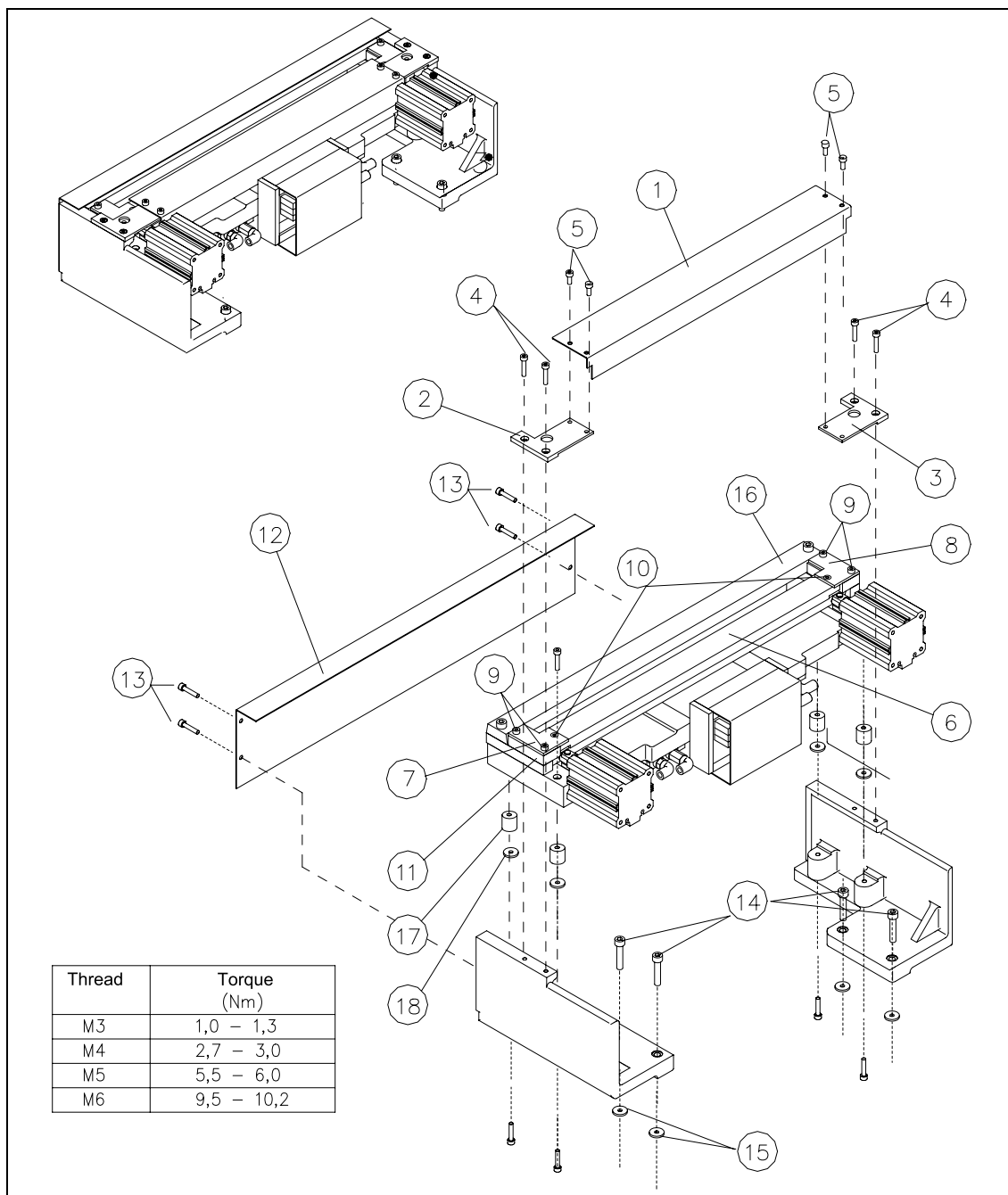


Fig. 5.4.2 Overview: Removing and Installing the Cover Plate and the Tape Deflector

CAUTION 

Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).

Key to [Fig. 5.4.2](#):

1. Cover plate
2. Cover plate holder, left
3. Cover plate holder, right
4. Screws to fasten the cover plate holder:
2 hexagon socket head screws M4 x 8 DIN 84 or 2 countersunk screws R M4 x 6 DIN 965 each
5. Screws to fasten the cover plate (incl. tape deflector) -> do not loosen!
6. Tape deflector (with moveable blade underneath)
7. Tape deflector holder, left
8. Tape deflector holder, right
9. Screws to fasten the tape deflector holders: 2 socket hex head cap screws M4 x 35 each on the left and right
10. Screws to fasten the tape deflector: 1 countersunk screw each -> do not loosen!
11. Holddowns (at left and right) with spacers inserted underneath them
12. Deflector plate
13. Screws to fasten the deflector plate: 4 socket hex head cap screws M4 x 8
14. Screws to fasten the cutter on the machine frame
4 socket hex head cap screws M 6 x 25 *)
15. Any disks or plates installed underneath
16. Stationary blade
17. Rubber-metal vibration damper
18. Any disks and spring washers installed underneath

*) Loosen these screws only when removing/installing the cutter (see [Section 5.6.1](#)).

5.5 Diagrams of Pneumatic System and Functional Sequence

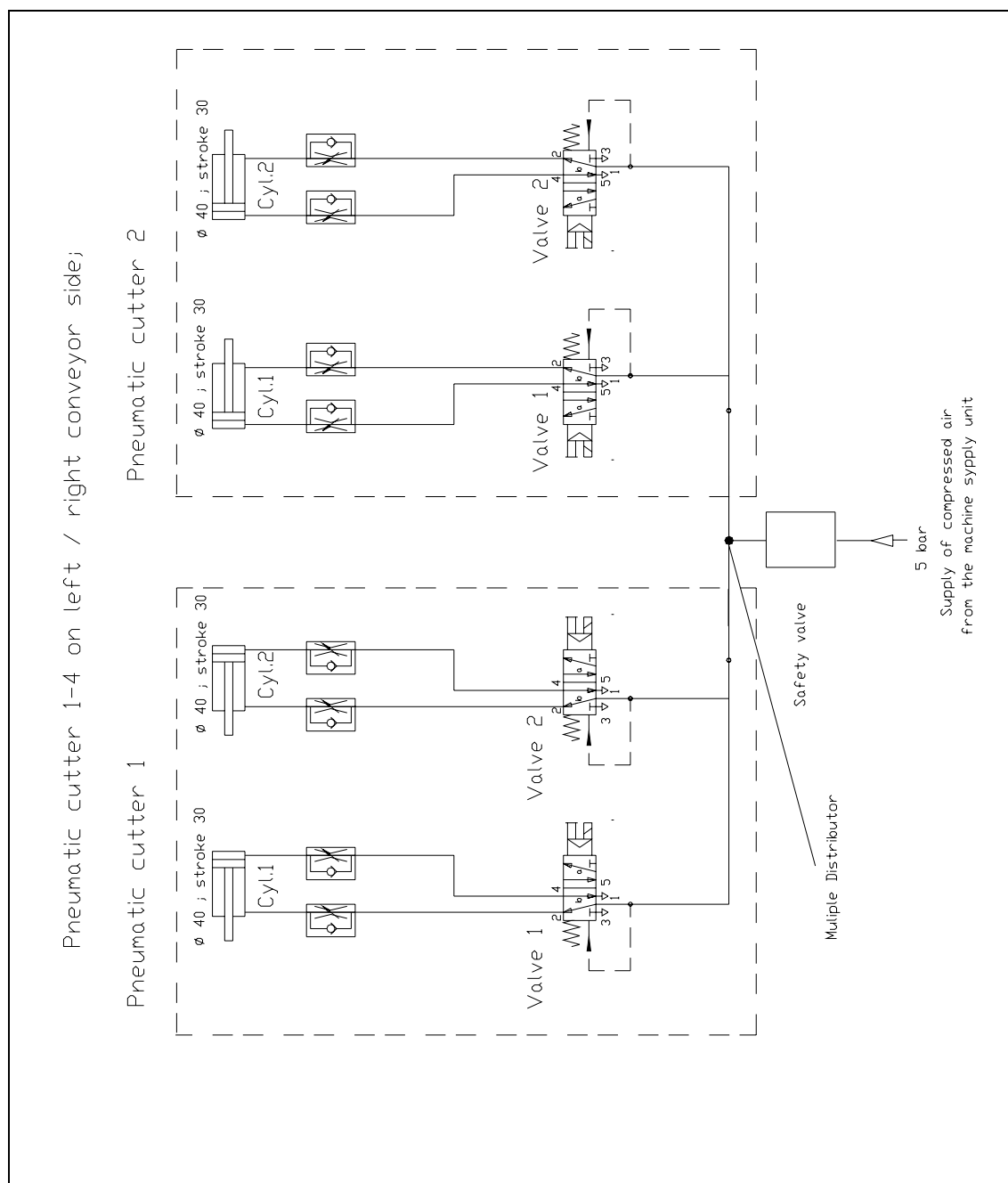


Fig. 5.5.1 Diagram of Pneumatic System: Cutter per Conveyor Side

5.6 Changing of parts

DANGER



Strictly adhere to the instructions in the DANGER text in [Section 5.1!](#)

WARNING



Wear appropriate thick protective gloves whenever working near the blades / the tape deflector.

High risk of injury exists from stationary blade and movable blade and the tape deflector of the cutter, even when the machine has been turned off.

Never reach into the pneumatic cutter from below or into the empty-tape duct from above, not even to resolve a problem (e.g., when tape is jammed).

5.6.1 Exchanging the Pneumatic Cutter

WARNING



Wear appropriate thick protective gloves.

When removing the cutter, hold it only on the left and right, on the outside.

Never support the cutter on your body, e.g., on your knees or thighs.

Do not place your feet under the cutter.

You could injury yourself severely or at least damage your clothing.

Make certain that no one can injury themselves on the cutter after it has been dismantled.

5.6.1.1 Removing the Cutter

- Turn the machine and then the compressed air ON.
- Disconnect the movable component changeover table from the machine and move it out of the machine.
- Turn the machine OFF, disconnect the machine from the mains and turn off the flow of compressed air at the compressed air unit. Actuate the needle valve on the compressed air unit to bleed the compressed air lines (see DANGER text in [Section 5.1](#)).
- Loosen the screws fastening the nozzle changer, lift it up somewhat and hold it in this position.
- Unplug the electrical cable and the pneumatic hose of the nozzle changer.
- Carefully put the nozzle changer down.
- Loosen the screws fastening the empty-tape duct assembly (see [Fig. 5.4.1](#)) and lift the duct out of the machine.



WARNING

There is always a risk of injuring yourself with the cutting edge of the blades.

For this reason, the deflector plate, the cover and the protective sheet (see [Fig. 5.4.2](#)) must be left mounted in place.

- Take the cover off the cable pit (see [Fig. 5.6.7](#) -> 5).
- Loosen the cutter's compressed air connection (Y-socket union: see [Fig. 5.6.3](#) -> 9) in the cable pit (see [Fig. 5.6.7](#) -> 5).
- Remove the cover from the control board (see [Fig. 5.6.5](#) -> 14).
- Unplug the plug-and-socket connection of the power supply and the drive on the control board (see [Fig. 5.6.5](#) -> 11, 10).
- Carefully undo the corresponding cable tie (left or right) on the outside of the control board box (see [Fig. 5.6.5](#) -> 15).
 - > Do not damage the cables in this process.
- Place the cover back on the control board and on the cable pit.
- Remove the tape chute (it is only hooked in).

This makes the cutter easier to access for removal.



WARNING

The area under the cutter must be clear (e.g., do not place your feet under it either).

- Undo the fasteners for the stop buffer assembly on left- and right-hand side of the machine frame (two M8 socket hex head cap screws on each side, see [Fig. 5.4.1](#) -> 15) under the surface supporting for the component table.
- Loosen the screws fastening the cutter to the machine frame (2 screws, M6, on the left and right retaining bracket, see [Fig. 5.4.1](#) -> 2, 3 and 4):
 - In exceptional cases, disks or plates may have been installed between the contact surface of the cutter on the machine frame and the cutter itself.
-> Save these disks / plates and re-install them later.
- Securely hold the cutter tight at both ends.
- Pull the cutter out away from the contact surfaces (on the machine frame) towards the outside of the machine (towards your body).
- Set the cutter down such that it does not pose a risk of injury to uninvolved personnel either. Put it in its own crate / container immediately.

5.6.1.2 Installing the Cutter

- Make certain that the following warning signs are on the cover plate over the movable blade. If not, install them (Item No.: see Section 5.2):
 - Adhesive Label with text " Disconnect machine from mains voltage and....",
 - Adhesive Label: Triangle warning symbol "Hand injury".

CAUTION



Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).

- If there were disks or plates inserted between the contact surface of the cutter on the machine frame and the cutter itself, re-install them now.
 - > The cutter must be shimmed to the same height at all contact points however.
- In the reverse order to disassembly, place the new pneumatic cutter (Item no.: see [Section 5.2](#)) on the contact surfaces of the machine frame and push it in to the threading position.
- To avoid dropping the cutter, insert all four M6 screws into the holes now:
 - Pull the cutter as far as possible away from the PCB conveyor for the time being.
 - Snug up the screws somewhat for the time being.
- Remove the cover from the control board of the new cutter.
- Make the plug-and-socket connections for the power supply and drive on the control board (al-location: see [Fig. 5.6.5](#) -> 11, 10).

- Use a cable tie to fasten the cables running to the cable pit to the fixing pedestal on the control board box (see [Fig. 5.6.5](#) -> 15).
The strain on the cables / plug-and-socket connections must be relieved (see [Fig. 5.6.7](#) -> 8).
- Remove the cover from the cable pit and make the compressed air connection to the machine at the Y-plug-in coupling (see [Fig. 5.6.3](#) -> 9).
- Place the cover back on the control board and the cable pit.
- Install the empty-tape duct assembly and check the entire length of the gap between the leading edge of the tape deflector and the "empty-tape baffle, inside", as described in [Section 5.6.6](#).
- If necessary, slide the cutter in the slots parallel to the direction of the PCB conveyor until you reach the TARGET distance 1.0 to 1.5 mm (see [Fig. 5.4.2](#) -> Detail).
- In this position tighten all 4 screws crosswise.
-> Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).
- Perform the appropriate "Final Steps" (see [Section 5.6.8](#)).

5.6.2 Replacing the articulated joint on the short-stroke cylinder (00348579-02)



Wear thick protective gloves.

You might cut yourself on the blades and the tape deflector.

Never reach into the pneumatic cutter from below or into the empty-tape duct from above.

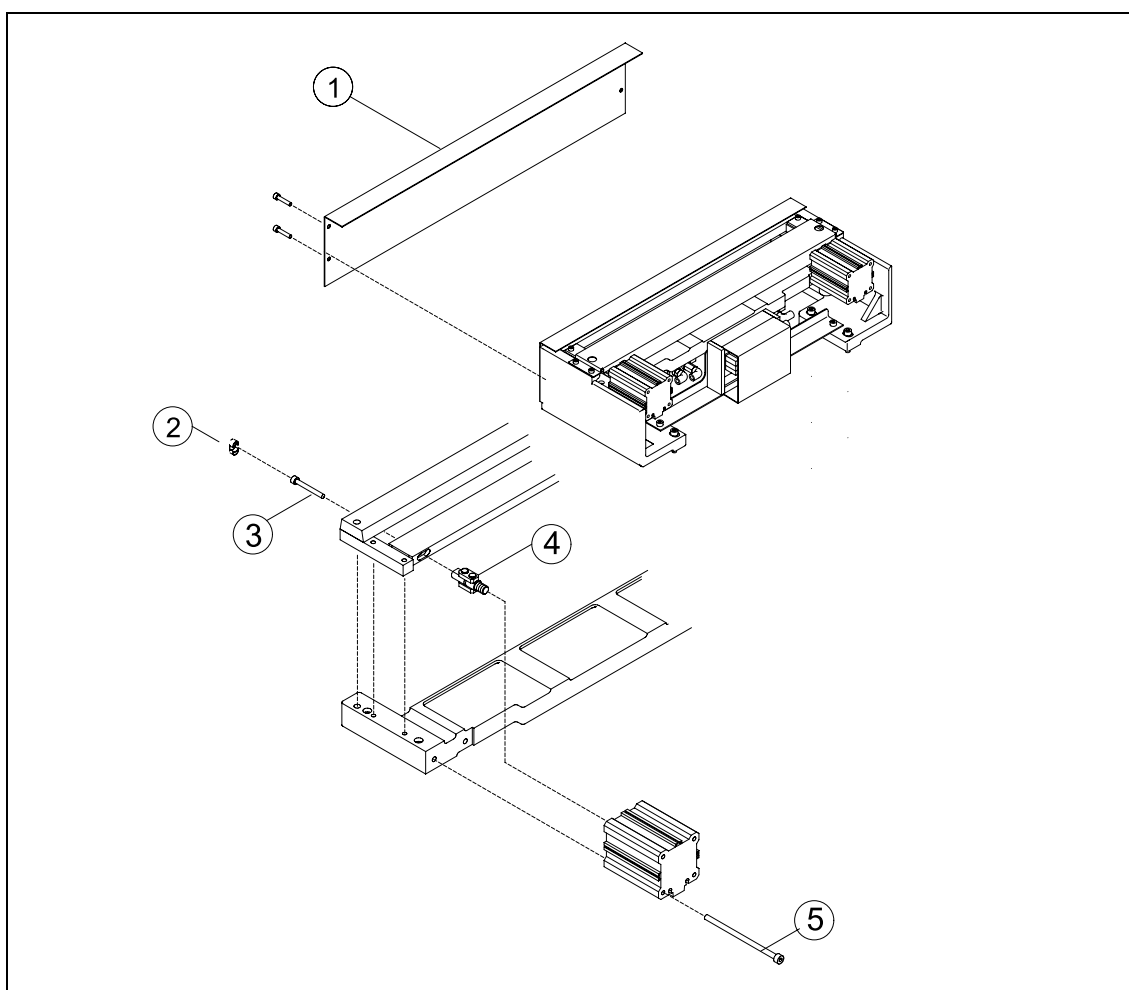


Fig. 5.6.1 Replacing the articulated joint on the short-stroke cylinder

Key to [Fig. 5.6.1](#)

- | | |
|---|--|
| (1) Deflector plate | (4) Articulated joint |
| (2) Cover | (5) Screws to fasten short-stroke cylinder |
| (3) Screws to fasten the moveable blade | |

- Remove the cutter from the machine, as described in [Section 5.6.1](#).
- Remove the deflector plate from the cutter.
- Loosen the screws holding the moveable blade.
- Loosen the compressed air connections on the short-stroke cylinder (see [Fig. 5.6.2](#).

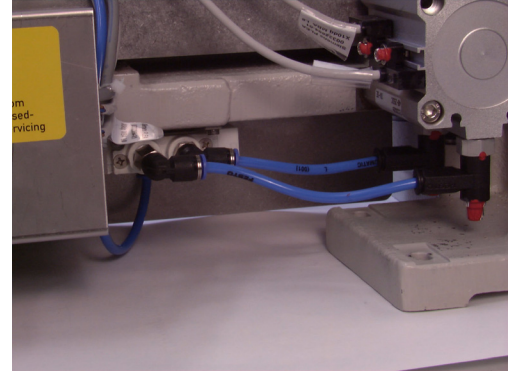
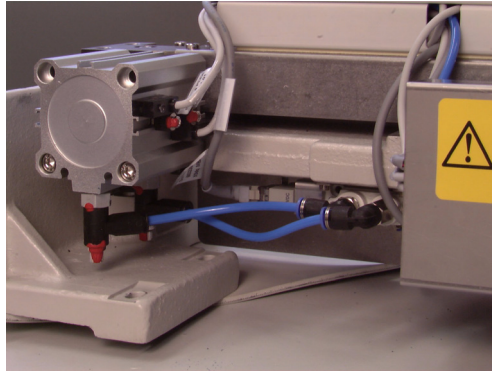


Fig. 5.6.2 *Compressed air connections*

- Using a fine-tip, water-insoluble marker, accurately mark the specified position of the proximity switch on the short-stroke cylinder.
- In addition, mark the allocation of the proximity switches to the short-stroke cylinder (position front/back).
- Loosen the screws fastening the two inductive proximity switches to the short-stroke cylinder (1 screw each: see [Fig. 5.6.3](#) -> 4, 5).
- Loosen the screws fastening the short-stroke cylinder (2 screws: see [Fig. 5.6.3](#) -> 5) and remove the cylinder, incl. the articulated joint screwed into it.
- Dismantle articulated joint from the cylinder by turning the open-end wrench (width across flats 10) on the surface indicated in [Fig. 5.6.4](#) -> 3).

NOTE:

The threaded pin is secured with Loctite no. 243, so it takes somewhat more strength to loosen it.

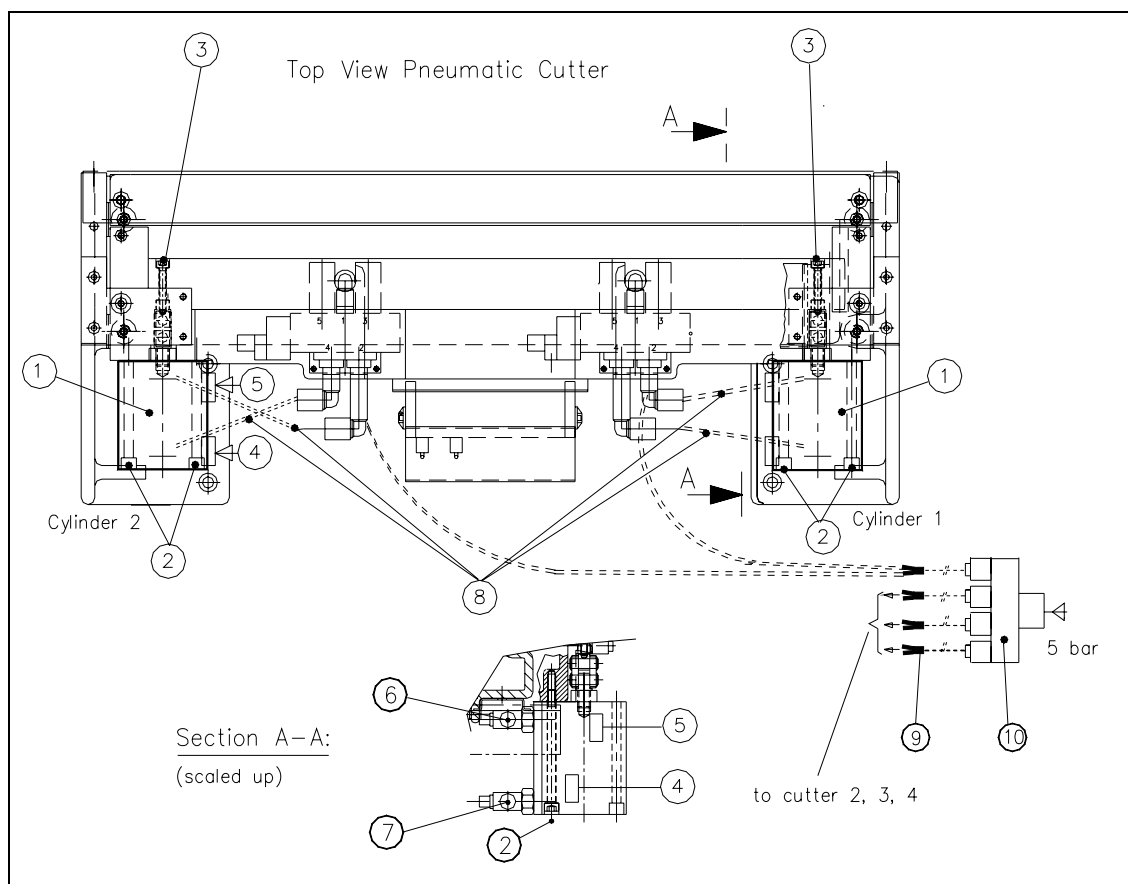


Fig. 5.6.3 Removing and Installing the Short-Stroke Cylinder

Key:

1. Short-stroke cylinders 1 and 2
2. Screws fastening the short-stroke cylinders: 2 socket hex head cap screws each, M5 x 65
3. Screws fastening the articulated joint (see also [Fig. 5.6.4](#))
4. Proximity switch (for position cylinder moved in). Fastener: 1 cross-slotted screw
5. Proximity switch (for position cylinder moved out). Fastener: 1 cross-slotted screw
6. One-way restrictor (for running cylinder out)
7. One-way restrictor (for running cylinder in)
8. Allocation of the compressed air connections, air hoses
9. Y-socket union (in the cable pit)
10. Multiple-Y-distributor on the safety valve (5 bar from compressed air unit)

5.6.2.1 Installing the articulated joint and short-stroke cylinder

WARNING 
You might cut yourself on the blades and the tape deflector.

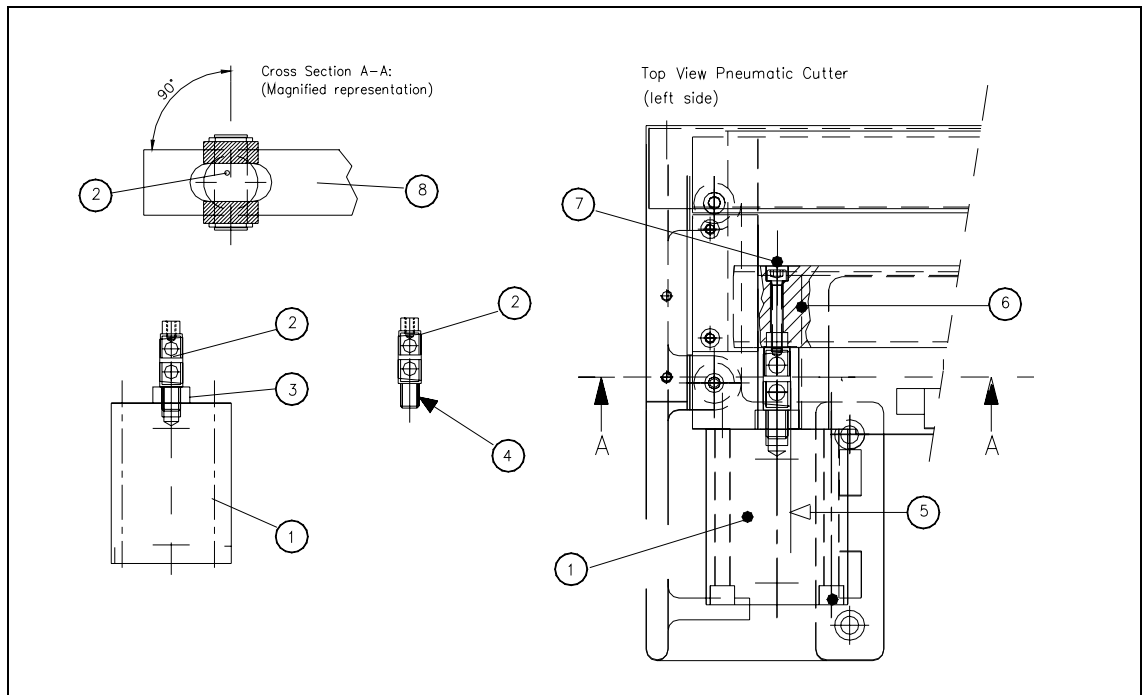


Fig. 5.6.4 Removing Articulated Joint, Installing It on New Master Cylinder and Bonding It in Place

Key to Fig. 5.6.4 (right):

1. Short-stroke cylinder (1 or 2)
2. Articulated joint (complete)
3. Wrench surface for disassembling the articulated joint
4. Secure articulated joint thread with Loctite no. 243
5. Open-end wrench surface of articulated joint
6. Slide surface of the movable blade
7. Screw fastening the articulated joint to the movable blade:
one M4 x 24 DIN 912 socket hex head cap screw each, strength 12.9, secured with Loctite no. 243

8. Movable blade with slot to prevent the articulated joint from turning if the articulated joint is damaged, use a (complete) new one (Item no.: see [Section 5.2](#)) or clean the residues of Loctite from the thread of the existing articulated joint pin.



CAUTION

Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).

- Apply a small amount of Loctite no. 243 (Item no.: see [Section 5.3](#)) to the thread.
- Take note of the following WARNING. If the enamel on the one-way restrictor is damaged use a new "short-stroke cylinder".



DANGER

One-way restrictors are not to be set on the machine. This is only permitted at the factory. For this reason the replacement short-stroke cylinder must always be installed, together with the new, already adjusted restrictors attached to it.

- Screw the articulated joint into the short-stroke cylinder.
- Turn the articulated joint into the mounting position (see [Fig. 5.6.4](#), diagram on the left). Once the cylinder is installed, the slot in the moveable blade prevents the articulated joint from turning.
- Copy the exact mounting position of the proximity switch to the short-stroke cylinder (feeler gauge, fine-tip marker).
- Install the prepared cylinder - complete with one-way restrictors - on the cutter, in the correct rotational position for the articulated joint.
- Fasten the cylinder in this position with the 2 screws M5x65 ([Fig. 5.6.3](#) -> 2) provided.
- Install the proximity switch (article no. see [Section 5.2](#)) precisely in the position you marked on the short-stroke cylinder with the permanent marker (see [Fig. 5.6.3](#) -> 4, 5).
- Connect the compressed air hoses to the one-way restrictor on the cylinder, in the correct allocation (see markings). For allocation details please refer to [Fig. 5.4.2](#) -> 6, 7, 8.
- Perform the following steps as described in [Section 5.6.2.1](#):
- Fasten the moveable blade to the articulated joint.
- Re-install the empty-tape duct on the machine frame (2 screws each on LH and RH, see [Fig. 5.4.1](#) -> 6, 9).
- Check the gap between the leading edge of the tape deflector and the "empty-tape baffle, inside", as described in [Section 5.6.6](#).
- Check the switching points of the proximity switches, as described in [Section 5.6.5](#).

NOTE:

If the tapes are not cut correctly even though the switching points are set properly and the short-stroke cylinder has been exchanged, complete with the one-way restrictor, the cause of the problem may be:

incorrect compressed air level/ leaking compressed air connection or Y-socket union, blade in poor condition, faulty solenoid valve or a break in the drive circuit of the solenoid valve.

→ Perform the appropriate "Final Steps" (see [Section 5.6.8](#)).

5.6.3 Exchanging the Control Unit

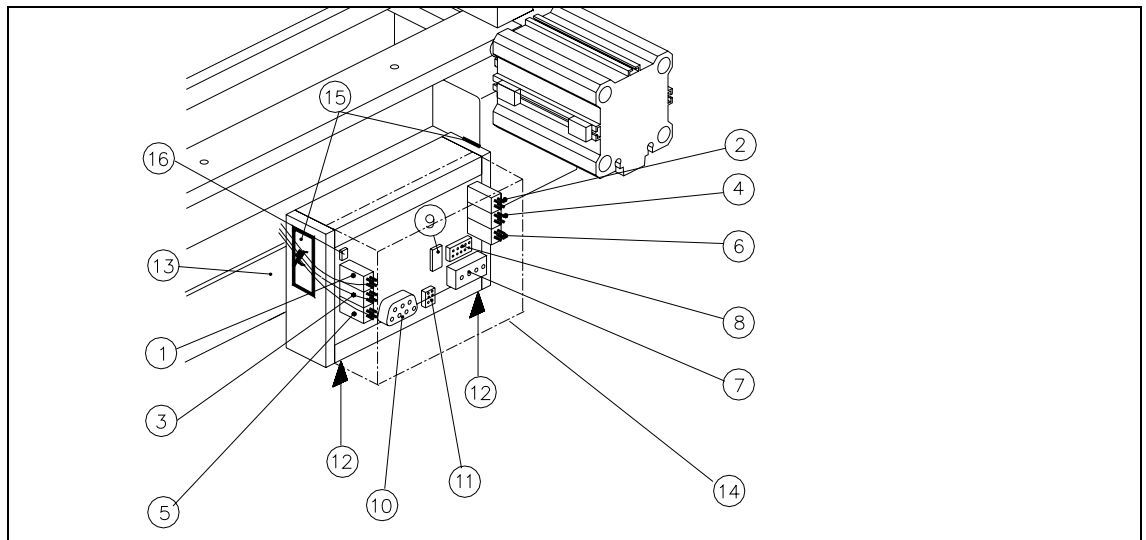


Fig. 5.6.5 *Exchanging the Control Unit, Allocation of the Plug-and-Socket Connections*

Key:

1. Drive of solenoid valve for cylinder 2 (left)
2. Drive of solenoid valve for cylinder 1 (right)
3. to the proximity switch on cylinder 2, FRONT
4. to the proximity switch on cylinder 1, FRONT
5. to the proximity switch on cylinder 2, BACK
6. to the proximity switch on cylinder 1, BACK
7. Cutter power supply (only busy on S-23 and F5)
8. Drive of cutter (only busy on S-23 and F5)
9. Service plug (to be used exclusively by Siemens)

10. CAN bus
11. Power supply
12. Spring-mounted elements to disconnect the control board box
13. Support bar
14. Cover
15. Fixing pedestal adhesive type (LH and RH) with cable tie
Relieve tensile stress on cable/plug-and-socket connections.
16. Coding plug



WARNING

You might cut yourself on the blades and the tape deflector.
Never reach into the pneumatic cutter from below or into the empty-tape duct from above.

The cutter remains installed in the machine.

- Turn the machine and then the compressed air ON.
- Disconnect the movable component changeover table from the machine and move it out of the machine.
- Turn the machine OFF.
- Remove the cover from the control board.
- Carefully undo the cable ties (left and right) on the outside of the control board box (see [Fig. 5.6.7](#) -> 10).
 - > Do not damage the cables in this process.
- Mark the allocation of all plug-and-socket connectors and disconnect all plug-and-socket connections on the control unit (see [Fig. 5.6.5](#)).
- Disconnect the control unit (box) from the support bar by pushing both of the spring-mounted elements away from the bar.
- Install the new control unit (Item no.: see [Section 5.2](#)), correctly rotated and positioned, on the bar and engage the unit.
- Mount an adhesive fixing pedestal for cable ties on the outside LH and RH side of the control board box (see [Fig. 5.6.6](#) for location).

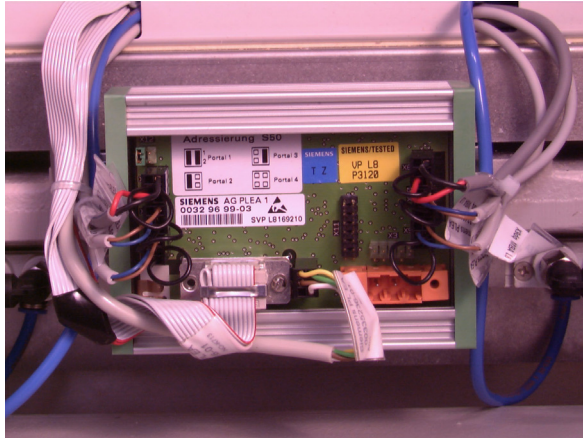


Fig. 5.6.6 Control Unit

- Restore all plug-and-socket connections in the correct allocation (see [Fig. 5.6.5](#)).
- Use a cable tie to fasten the cables running to the LH and RH side of the cable pit to the fixing pedestal (on control board box). The strain on the cables/plug-and-socket connections must be relieved (see [Fig. 5.6.7](#) -> 8).
- Place the cover back on the control board.
- Perform the appropriate “Final Steps” (see [Section 5.6.8](#)).

5.6.4 Exchanging the Solenoid Valve on Left or Right (and/or Cable)



WARNING

You might cut yourself on the blades and the tape deflector.

Never reach into the pneumatic cutter from below or into the empty-tape duct from above.

The cutter remains installed in the machine.

- Turn the machine and then the compressed air ON.
- Disconnect the movable component changeover table from the machine and move it out of the machine.
- Turn the machine OFF, disconnect the machine from the mains and turn off the flow of compressed air at the compressed air. Actuate the needle valve on the compressed air unit to bleed the compressed air lines (see DANGER text in [Section 5.1](#)).

Key to [Fig. 5.6.7](#) (right):

1. Solenoid valve for cylinder 1, incl. mounting strap
2. Solenoid valve for cylinder 2, incl. mounting strap
3. to the plug-and-socket connection of the appropriate solenoid valve
4. Screws for fastening the solenoid valve: 2 socket hex head cap screws each, M3 x 6
5. Cover of the cable pit
6. Compressed air hoses for cylinder 1
7. Compressed air hoses for cylinder 2
8. No strain on cable/plug-and-socket connections
9. Cover
10. Fixing pedestal, adhesive type, with cable tie (LH and RH)
11. Plug-and-socket connection on the solenoid valve

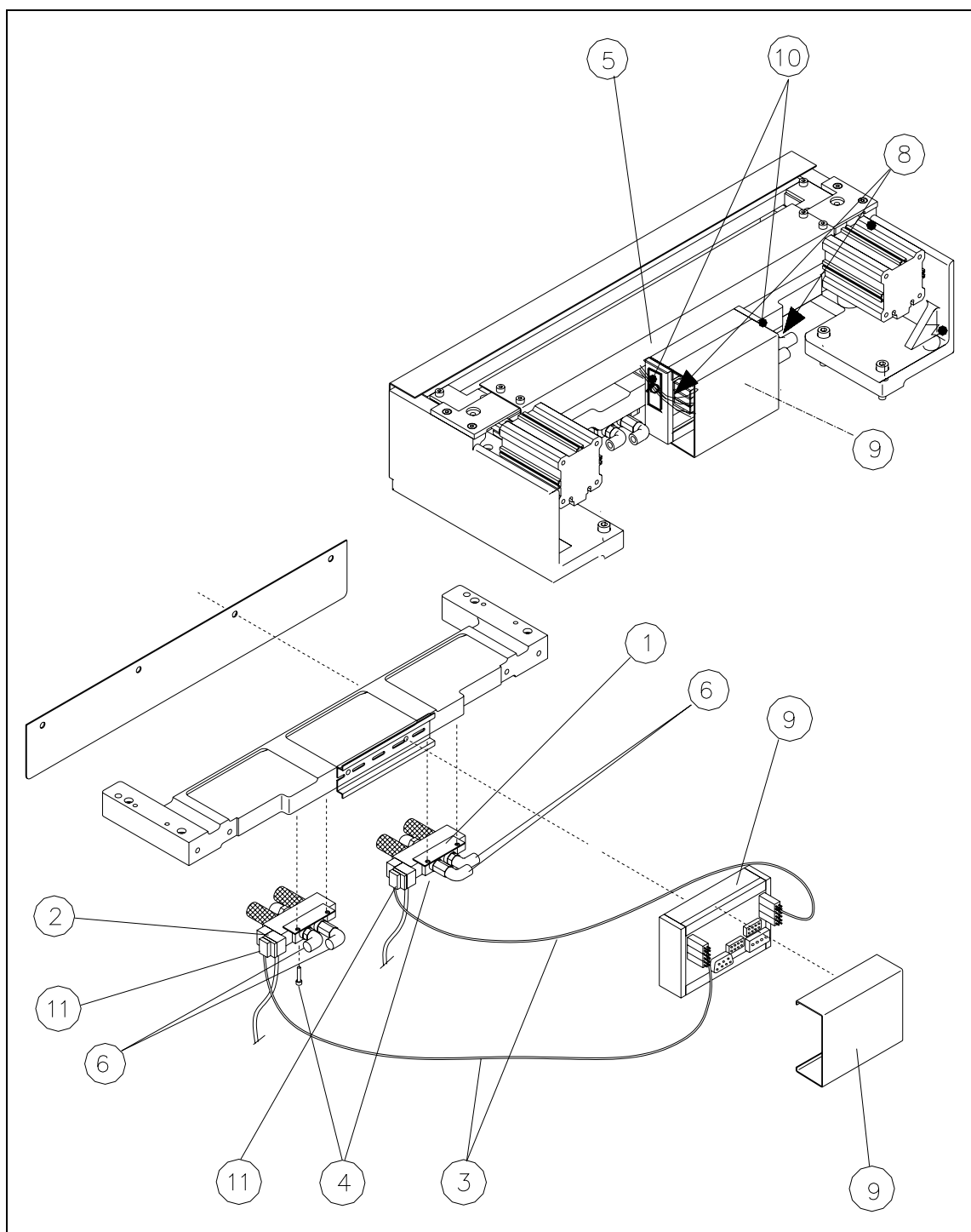


Fig. 5.6.7 *Exchanging the Solenoid Valve*

If the cable of the solenoid valve is faulty:

- Carefully undo the corresponding cable tie (left or right) on the outside of the control board box (see [Fig. 5.6.7](#) -> 10).
-> Do not damage the cables in this process.
- Remove the cover from the control board (see [Fig. 5.6.7](#) -> 9).
- Unplug the plug-and-socket connection of the cable "Control board for tape cutter - valve" of the appropriate solenoid valve on the control board (see [Fig. 5.6.5](#) -> 1, 2).
- Loosen the plug-and-socket connection of the cable "Control board for tape cutter - valve" of the appropriate solenoid valve (see [Fig. 5.6.5](#)).
- Take the cover off the cable pit (see [Fig. 5.6.7](#) -> 5).
- Remove the cable and run the new cable "Control board for tape cutter - valve" (Item no.: see [Section 5.2](#)). Push the excess lengths of cable into the cable pit.
- Make the plug-and-socket connection on the board (see [Fig. 5.6.5](#)) and on the solenoid valve with correct allocation (see [Fig. 5.6.7](#)).
- Place the cover back on the control board (see [Fig. 5.6.7](#) -> 9).
- Install the cover on the cable pit (see [Fig. 5.6.7](#) -> 5).
- Use a cable tie to fasten the cables running to LH and/or RH side of the cable pit to the fixing pedestal (on control board box).
The strain on the cable / plug-and-socket connections must be relieved (see [Fig. 5.6.7](#) -> 8).
- Perform the appropriate "Final Steps" (see [Section 5.6.8](#)).

If the solenoid valve is faulty:

- Undo the 2 compressed air connections on the one-way restrictors at the faulty solenoid valve (see [Fig. 5.6.7](#) -> 1, 2, 6).
- Unplug the plug-and-socket connection of the cable "Control board tape cutter - valve" on the faulty solenoid valve (see [Fig. 5.6.7](#) -> 11).
- Undo the screws fastening the faulty solenoid valve (2 M3 screws: see [Fig. 5.6.7](#) -> 4) and remove the solenoid valve.
- Mount the new solenoid valve (Item no.: see [Section 5.2](#)) in the correct position, as shown in [Fig. 5.6.7](#). Make the plug-and-socket connection at the solenoid valve:
 - > Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).
 - > The strain on the cable must be relieved (see [Fig. 5.6.7](#) -> 8).

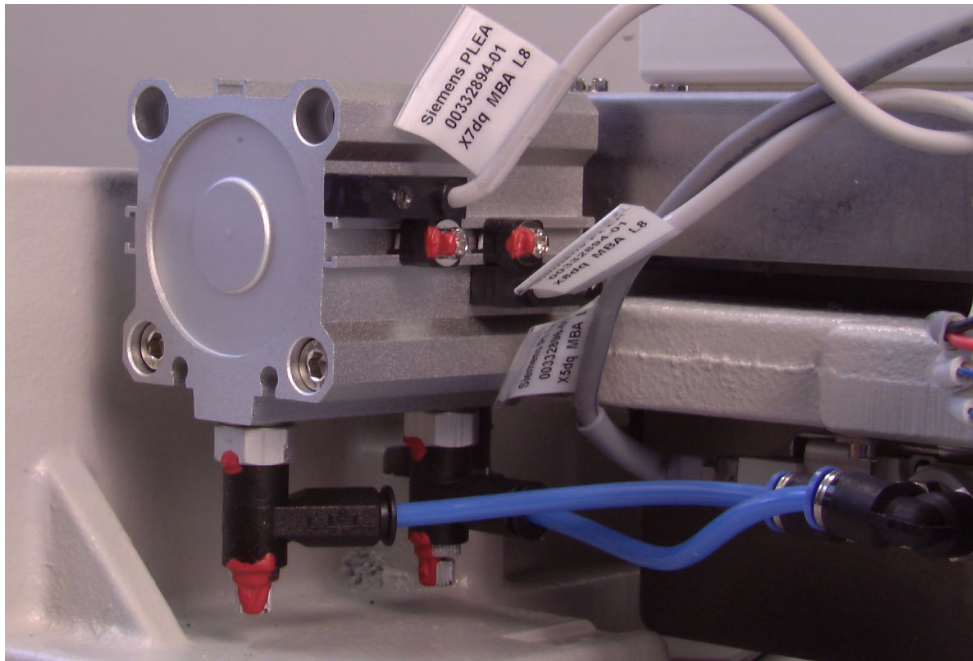
- Mount the short-stroke cylinder compressed air connections to the one-way restrictors on the solenoid valve with the correct allocation (see [Fig. 5.6.3](#) -> 6, 7, 8).
- Perform the appropriate "Final Steps" (see [Section 5.6.8](#)).

5.6.5 Exchanging the Inductive Proximity Switch

5.6.5.1 Removing the Proximity Switch

The cutter remains installed in the machine.

- Turn the machine and then the compressed air ON.
- Disconnect the movable component changeover table from the machine and move it out of the machine.
- Turn the machine OFF, disconnect the machine from the mains and turn off the flow of compressed air at the compressed air. Actuate the needle valve on the compressed air unit to bleed the compressed air lines (see DANGER text in [Section 5.1](#)).
- Remove the cover from the control board (see [Fig. 5.6.5](#) -> 14).
- Carefully undo the corresponding cable tie (left or right) on the outside of the control board box (see [Fig. 5.6.5](#) -> 10).
 - > Do not damage the cables in the process.
- Using a fine-tip permanent marker, precisely mark on the short-stroke cylinder the specified position of the proximity switch that is to be exchanged.
- Disengage the plug-and-socket connection of the faulty proximity switch on the control board (allocation: see [Fig. 5.6.5](#)).
 - If you loosen more than one of the plug-and-socket connection simultaneously, mark the allocation.
- Take the cover off the cable pit (see [Fig. 5.6.7](#) -> 5).
- Undo the screw fastening the proximity switch to the short-stroke cylinder (1 screw: see picture) and remove the proximity switch including the cable.



5.6.5.2 Installing the Proximity Switch

- Install the new proximity switch (Item no.: see [Section 5.2](#)) precisely in the position you marked on the short-stroke cylinder with the permanent marker.
 - > Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).
- Lay the cable in the cable pit and make the plug-and-socket connection to the proximity switch on the control board with correct allocation to the proximity switch left/right and front/back (see [Fig. 5.6.5](#)) -> Push the excess lengths of cable into the cable pit.
- Use a cable tie to fasten the cables running to the cable pit to the fixing pedestal on the control board box (see [Fig. 5.6.7](#) -> 10).
 - The strain on the cables / plug-and-socket connections must be relieved (see [Fig. 5.6.7](#) -> 8).
- Place the cover back on the control board (see [Fig. 5.6.7](#) -> 9).
- Install the cover on the cable pit (see [Fig. 5.6.7](#) -> 5).
- Perform the "Final Steps" including the substep "Load the SITEST program and initiate the cutting strokes" (see [Section 5.6.8](#)).

5.6.6 Exchanging the Empty-Tape Duct Assembly



WARNING

You might cut yourself on the blades and the tape deflector.

Never reach into the pneumatic cutter from below or into the empty-tape duct from above.

- Turn the machine and then the flow of compressed air ON.
 - Disconnect the movable component changeover table from the machine and move it out of the machine.
 - Turn the machine OFF, disconnect the machine from the mains and turn off the flow of compressed air at the compressed air. Actuate the needle valve on the compressed air unit to bleed the compressed air lines (see DANGER text in [Section 5.1](#)).
 - Loosen the screws fastening the nozzle changer, lift it up somewhat and hold it in this position.
 - Unplug the electrical cable and the pneumatic hose of the nozzle changer.
 - Carefully put the nozzle changer down.
 - Loosen the screws fastening the empty-tape duct assembly (see [Fig. 5.4.1](#) -> 11, 9) and lift the duct out of the machine.
 - If you only want to exchange the faulty baffle inside/outside and/or the reject box, proceed as indicated in [Section 5.6.7](#).
 - Screw the "empty-tape duct assembly" (Item no.: see [Section 5.2](#)) on the machine base (2 screws each on left and right, M4 x 16).
 - > Tighten the screws to the correct torque -> see Table in [Fig. 5.4.2](#).
-



WARNING

The following check can only be conducted from the bottom of the cutter after it has been installed in the machine. Wear thick protective gloves; there is a risk of injury from the blades and the edge of the tape deflector.

NOTE:

For the adjustments it is the best, if a second person is available

- With the feeler gauge, check:
 - The distance between the empty-tape baffle and the leading edge of the tape deflector must again be within the TARGET distance 1.0 to 1.5 mm over the entire length (see [Fig. 5.4.2](#) -> Detail).

If the gap is not OK.

- Loosen the screws holding the empty-tape duct once again and correct the position of the duct in the holes.
- If this is not enough, you may assume that the cutter was already not in the optimal position before the empty-tape duct was exchanged:
In this case, correct the position of the cutter in the slots of the retaining brackets in the manner described for the installation of the cutter in [Section 5.6.1.2](#).

5.6.7 Exchanging Baffles and / or Reject Box (Profile)

The "empty-tape duct assembly" has already been removed, as described in [Section 5.6.6](#).

- Undo the self-tapping M4 screws fastening the baffle or reject box that you want to dismantle (see detail in [Fig. 5.4.2](#), 13 to 18).
- Insert the new baffle inside/outside and /or the new reject box (Item no.: see [Section 5.2](#)) and fasten it with the self-tapping screws (see [Fig. 5.4.2](#) -> 13 to 18).
- Install the empty-tape duct assembly and check the gap between the leading edge of the tape deflector and the "empty-tape baffle, inside", as described in [Section 5.6.6](#).
- Perform the appropriate "Final Steps" (see [Section 5.6.8](#)).

5.6.8 Final Steps

CAUTION



Tighten the screws to the correct torque -> see Table, [Fig. 5.4.2](#).

- Make certain that each of the cables running out of the left and right of the control board box is again fastened to the fixing pedestal with cable tie.
The strain on the cables / plug-and-socket connections must be relieved ([Fig. 5.6.7](#) -> 8).
- Check the gap between the leading edge of the tape deflector and the "empty-tape baffle, inside", as described in [Section 5.6.6](#).
- Where applicable, mount the tape chute into the machine.
- From below mount the stop buffer assembly on the machine frame (two M8 socket hex head cap screws on left and right).
- If the nozzle changer is removed, stop the nozzle changer over the installation position and make the electrical and pneumatic connections.
- Mount the nozzle changer.
- Turn the compressed air back on at the main switch on the compressed air unit.

→ Move the changeover table back into the machine and connect it.

DANGER 

It is a basic rule that the SITEST program is only to be started by personnel who have been trained in its use at Siemens AG and are therefore authorized to start it.

When the SITEST program is used, additional, higher risk of an accident exists aside from the generally higher danger posed by the blades of the cutter.

The cutter and the empty-tape duct have to be completely assembled at all times.

The component changeover table must be moved into the machine and connected correctly.

Never move your hand near the cutter, neither from below nor from above (via the empty-tape duct), not even to resolve a problem.

When the SITEST program is running, you must always make certain that there is no 2nd person at the machine, i.e., that no 2nd person can trigger the cutting process or is within the operating area of the cutter.

Secure the area of the cutters appropriately to keep away other personnel.

The key switch remains locked (= normal mode = position "0").

One-way restrictors are not to be set on the machine. This is only permitted at the factory.

- Load the SITEST program and actuate the cutting strokes (see Operating Manual "SITEST Program").
- If the nozzle changer was removed:
Use SITEST program to calculate the position of the nozzle changer.
- Exit the SITEST program.
- Perform a visual check to make certain that all empty-tape ends are correctly guided downward in the empty-tape duct.
- Start the placement sequence.

6 Modular PCB conveyor system (used to SN 381)

NOTE

Before dismantling motors, light barriers etc. make sure that the problem is not due to poor connections. For connection details please see [Section 6.16](#) and [Section 6.17](#).

6.1 Introduction

The modular PCB conveyor system is used for both the HS-60 and S-27 HM. This service manual applies to both machine types. The differences between the two machines are mentioned in the relevant sections of this manual.

CAUTION



This service manual contains item numbers for the individual spare parts applicable to both the HS-60 and the S-27 HM. These are for general reference only. When identifying and ordering spare parts, you should always use the current version of the spare parts catalog for the machine concerned.

6.2 Safety instructions

DANGER



For all procedures, please observe the safety instructions described in [Chapter 2](#).

CAUTION



Customers must not undo any screws secured with loctite.

DANGER



The machines in the SIPLACE family operate on **3 x 400 V +/- 10%, 50/60 Hz** mains voltage. Consequently, portions of the system carry dangerous high voltage. Inside the machine base this is true **even when the main switch is switched off**.

For all work in the vicinity of the PCB conveyor, the machine must be **turned off and disconnected from the mains**. In addition, the **compressed air inlet** on the main valve of the compressed air unit in the machine base must be **turned off** and air must be bled from the compressed air lines by actuating the needle valve. Make sure you have properly secured the machine so that it can not be restarted by unauthorized personnel!

During assembly and disassembly of PCB conveyor components and the lifting table, there is a greater **danger of injury** through pinching, crushing or cutting off a body member, **even when the machine is turned off!**

During assembly and disassembly of conveyor components there is also a risk of unhealthy posture due to the physical positioning and the weight of these components.

Two people must be available for some of these jobs.

Always wear **strong protective gloves** when removing or installing the PCB conveyor!

When a dual conveyor is involved, there is a risk of having a body member pinched or crushed between the fixed side of conveyor 1 and the movable side of conveyor 2 when the conveyors are traveling at maximum width.

If the pneumatic cutter is removed to improve accessibility, you must also comply with the safety instructions in the chapter „Cutter, pneumatic...“ in the service manual.

There is additional, higher risk of accident when working with the SITEST program.

As a basic rule, **the SITEST program may only be started by personnel** who have been trained in its use at Siemens AG and are therefore **authorized to do so!**

The cutter must always be **completely installed** for work with the SITEST program and the component changeover table **must be moved in and correctly connected**.

Only **authorized** personnel are to have access to the key for the key-operated switch. As a final step, this switch must always be locked (= normal operation) and the key must be **locked away**.

6.3 Parts

For spare part item numbers and diagrams please refer to the S-27 HM spare parts catalog.

6.4 Tools, testing aids, documentation

- 1 set of Allen wrenches
- Slotted and cross-slotted screwdriver, size 1
- Small rubber mallet
- 1 diagonal-nosed wire cutters, small
- Cable ties
- Set of open-end wrenches, width across flats 5.5 and 8
- 1 digital voltmeter (class 1.5)
- Shim to adjust the guide rails.
- Caliper gauge and feeler gauge, 0.2 mm
- Various gauge blocks
- Current spare parts catalog for SIPLACE S-27 HM and folder of circuit diagrams for SIPLACE S-27 HM
- SITEST program including current operating instructions for SITEST program
- Current documentation „Adjusting instructions for S-27 HM“

6.5 Function

6.5.1 General

The standard machine is equipped as a single PCB conveyor. A dual PCB conveyor system is optionally available. Depending on individual requirements, either the left or right conveyor side can be selected as the fixed conveyor side.

During placement, the PCB is clamped in place from underneath. The gap between the upper side of the PCB and the placement head is not dependent on the thickness of the PCB and therefore remains constant. This has the following benefits:

- The placement rate no longer depends on the thickness of the PCB.
- The recognition of PCB fiducials is optimized.

The constant distance between the PCB upper edge and the PCB camera means that the PCB camera is always focussed clearly on the PCB surface. The PCB fiducial are always optimally displayed on the CCD chip of the PCB camera.

PCB conveyor systems are configured within the machine so that, with the 12-segment collect&place head, placement can be performed on components to a maximum height of 6 mm and, with the 6-segment collect&place head (S-27 HM), on components to a max. of 8.5 mm.

The transport height can be set to allow the machines to be integrated into lines with 830, 900, 930 or 950 mm transport height. Communication between the PCB conveyors of the individual machines is possible via either a SIEMENS or SMEMA interface.

PCB transport is monitored and controlled by light barriers, consisting of both a transmitter and receiver module:

- Once a PCB reaches the placement area, it is recognized by a light barrier and the speed of the conveyor belt is reduced.
- Approximately 100 ms later, the front edge of the slowly progressing PCB is detected by a laser beam and the PCB is stopped and clamped in place from underneath.

6.6 Overview

6.6.1 Single conveyor system

The HS-60 single conveyor system consists of an input conveyor, two placement areas, the intermediate conveyor and the output conveyor. The S-27 HM has only one placement area. In this case, the single conveyor system consists of input conveyor, placement area and output conveyor. Each conveyor system has automatic width adjustment and a lifting table for clamping the PCB in place.

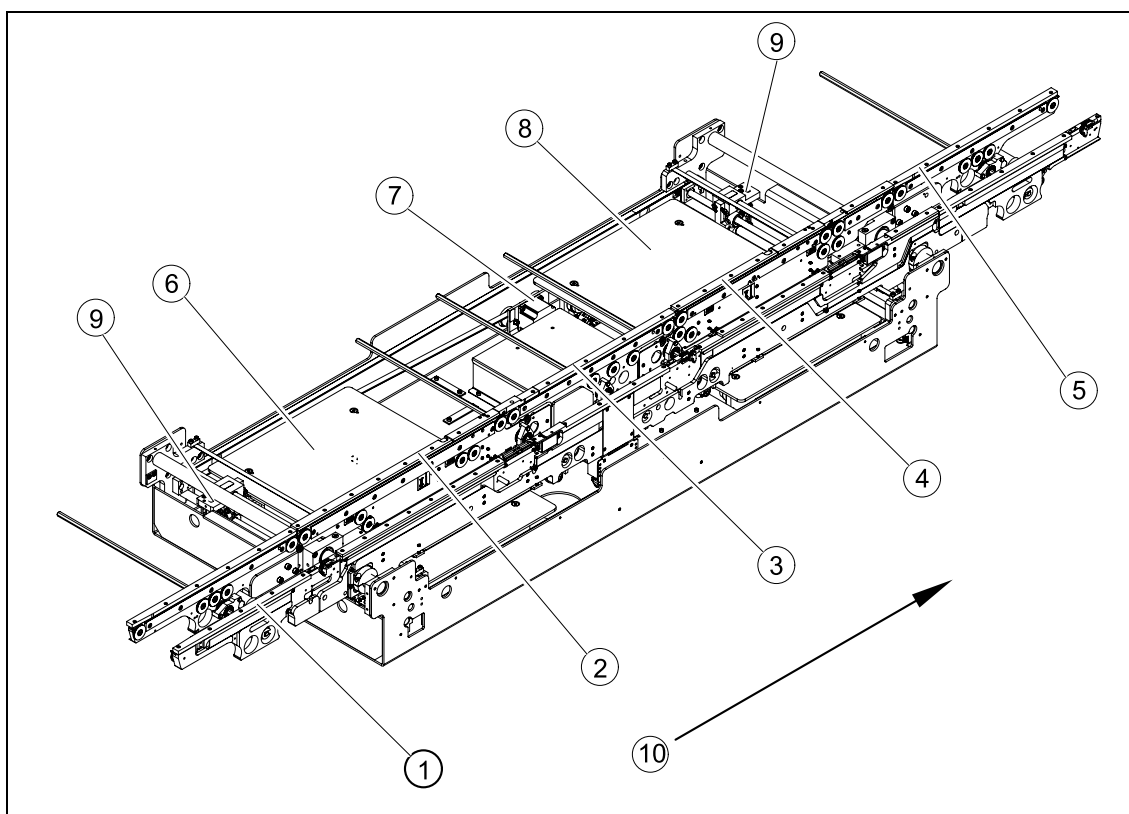


Fig. 6.6.1 Overview - modular conveyor system (single conveyor)

Key

- | | |
|---------------------------|---|
| (1) Input conveyor | (6) Lifting table placement area 1 |
| (2) Placement area 1 | (7) Width adjustment drive unit |
| (3) Intermediate conveyor | (8) Lifting table placement area 2 |
| (4) Placement area 2 | (9) Width adjustment for adjustment units 1 and 2 |
| (5) Output conveyor | (10) Direction of transport |

6.6.2 Dual conveyor system

The dual conveyor system has two conveyor tracks. In the standard model, the fixed conveyor side is on the right side of each track.

As in the case of the single conveyor system, the dual conveyor system consists of an input conveyor, two placement areas (HS-60 only), the intermediate conveyor (HS-60 only) and the output conveyor. The dual conveyor system has automatic width adjustment and a lifting table to clamp the PCB in place. See also [Fig. 6.6.1](#))

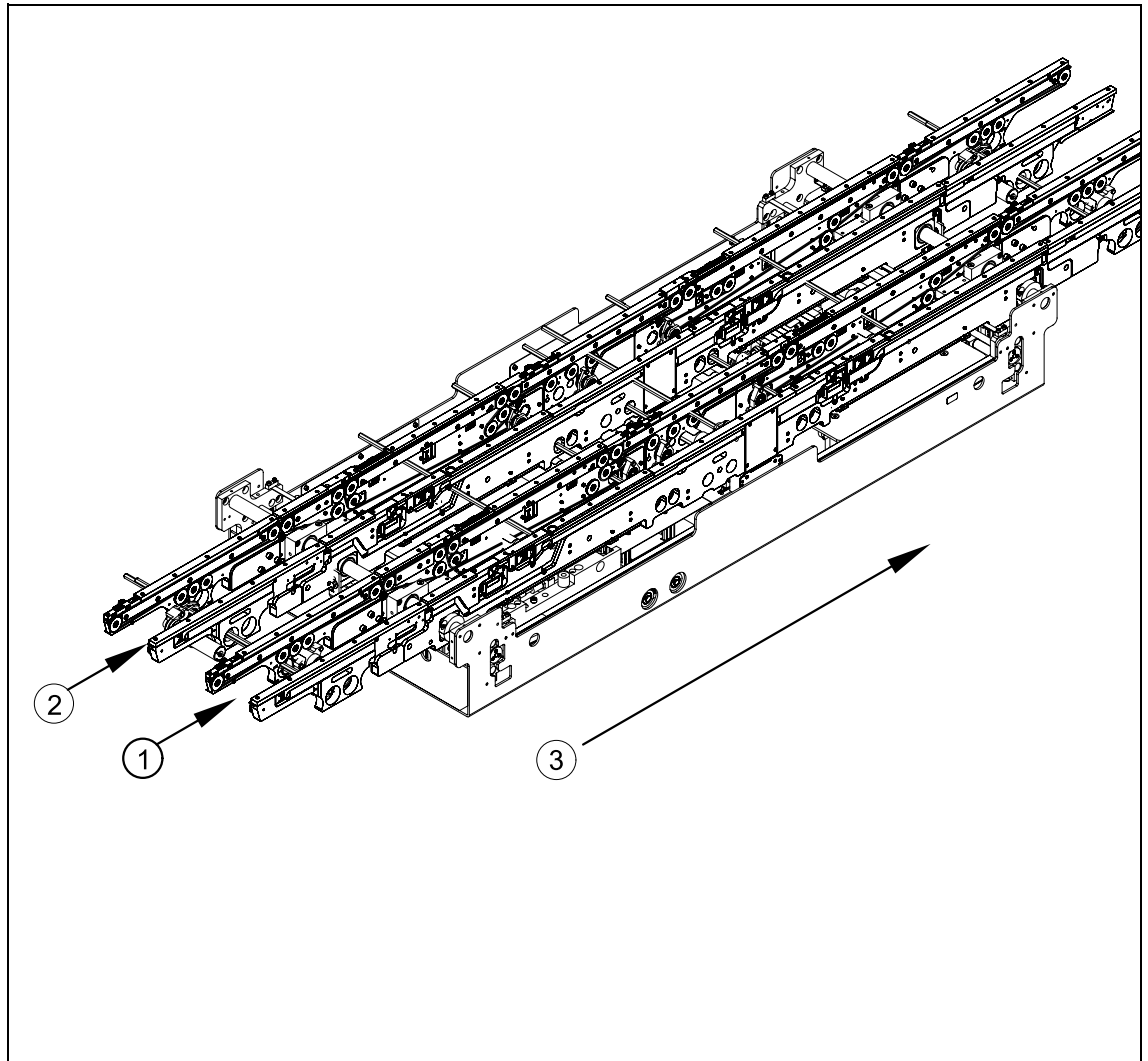


Fig. 6.6.2 Overview - modular conveyor system (dual conveyor)

Key

- | | |
|----------------------|----------------------------|
| (1) Conveyor track 1 | (3) Direction of transport |
| (2) Conveyor track 2 | |

6.7 Replacing the complete drive unit (00359284-02)

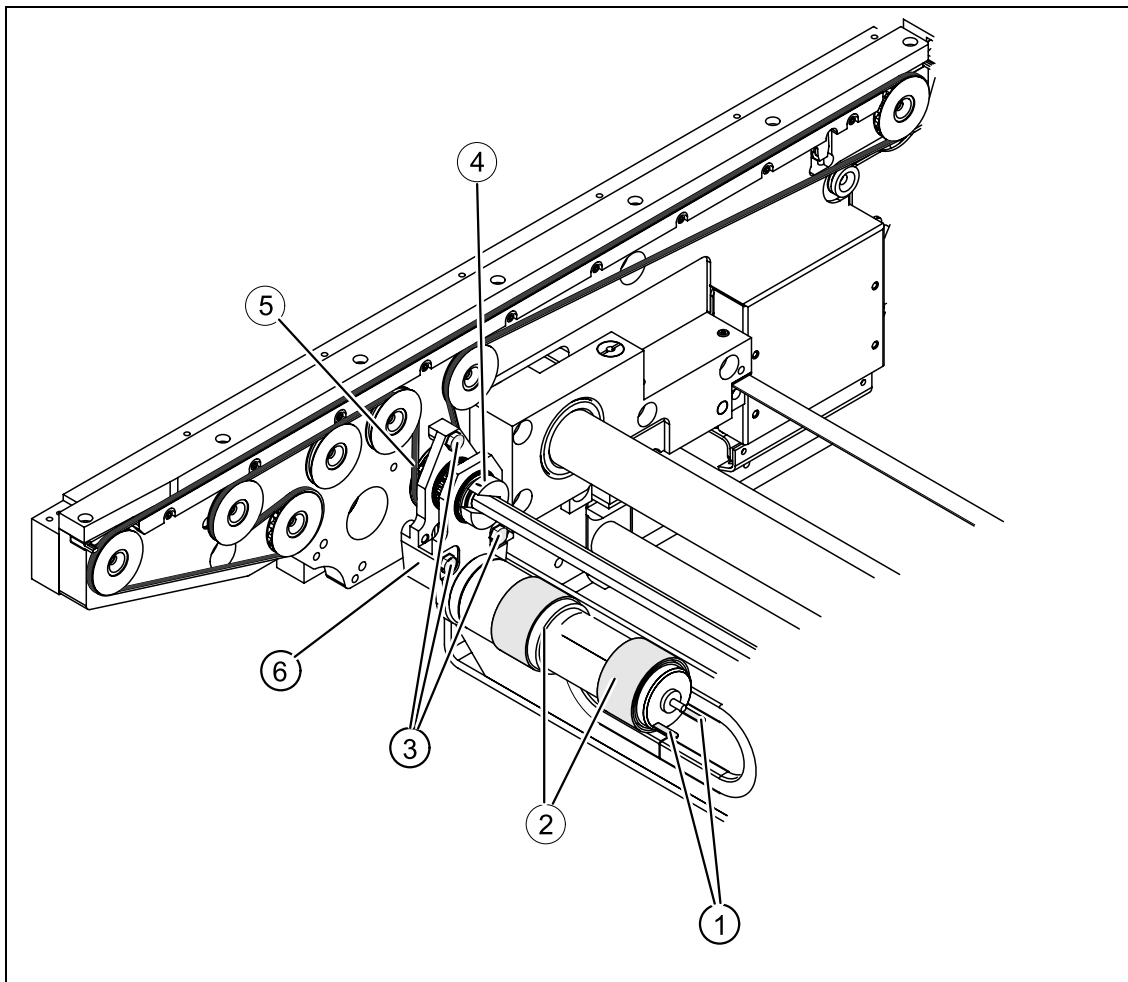


Fig. 6.7.3 Replacing the complete drive unit (00359284-02)

Key

- | | |
|-----------------------------|---------------------------|
| (1) Cable connections | (4) Clamping ring |
| (2) Heat-shrinkable sleeves | (5) Conveyor toothed belt |
| (3) Fastening screws | (6) Motor mount |

DANGER



Please observe the safety instructions in [Chapter 2](#).

CAUTION



The toothed belts must **not be stretched or kinked!**

6.7.1 Parts

- 00359284-02 drive unit

6.7.2 Removal

The DC geared motors, including the motor mounts of all 5 conveyor areas, are of like construction. Please bear in mind the following differences during assembly and disassembly.

- The motor mount is installed at an angle (tilted), according to the requirements of the installation site.
- Depending upon the installation position, the motor mount will either be fixed with a clamping ring or a circlip.

Conduct the procedures for replacement as described below:

→ **For disassembly at PCB conveyor 2 (dual conveyor):**

Move conveyor **1 only far enough apart**, that the outside of the fixed conveyor assembly of conveyor **2** and the screws fastening the motor are still accessible.

→ **For disassembly at the single conveyor or conveyor 1 of the dual conveyor:**

Move the conveyor to **maximum** width.

- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Mark the polarity of the cable connections (+ / -) - important for the direction of rotation!
- Disconnect the cable shoes from the motor terminals.
- The heat-shrinkable sleeves which hold the connecting cable in place must be stripped off the circumference of the DC geared motor.
- Remove the clamping ring (or circlip).
- Remove the 3 screws holding the motor mount in place.
- Carefully dismantle the motor mount and gently weave out the conveyor toothed belt.

NOTE:

The way in which the conveyor toothed belt is run around the belt guide depends upon the transport area concerned. Please observe this belt guidance during assembly.

NOTE:

If you have discovered a break in the motor cable during a continuity check, the motor cable must be woven out as far as the **conversion board of the conveyor side** (see circuit diagrams of the same name) and unplugged at the corresponding point. This may be somewhat complicated depending on the routing of cables inside the machine base.

You may wish to contact Siemens AG SMD Service regarding this work.

6.7.3 Installation

- Install the new drive unit in the reverse order.
- Please check: the **entire width** of the conveyor toothed belt must engage at all synchronizing disks and be run around the belt guide.
- Where applicable, install the guide rails on the conveyor component. Do not tighten this completely as it still needs to be adjusted.
- If guide rails have been loosened or remounted, you will need to readjust the **alignment of the guide rails** (see [Section 6.15](#)).
- Perform the „**Final steps including function check**“ (see [Section 6.18](#)).

NOTE:

After the new drive unit has been installed, you must make certain that the direction of rotation and the conveyor speed (motor voltage) are correct.

After reconnecting the geared motor, you will only need to check the direction of rotation.

6.8 Exchanging the DC geared motor of the relevant PCB conveyor drive (003009269-01)

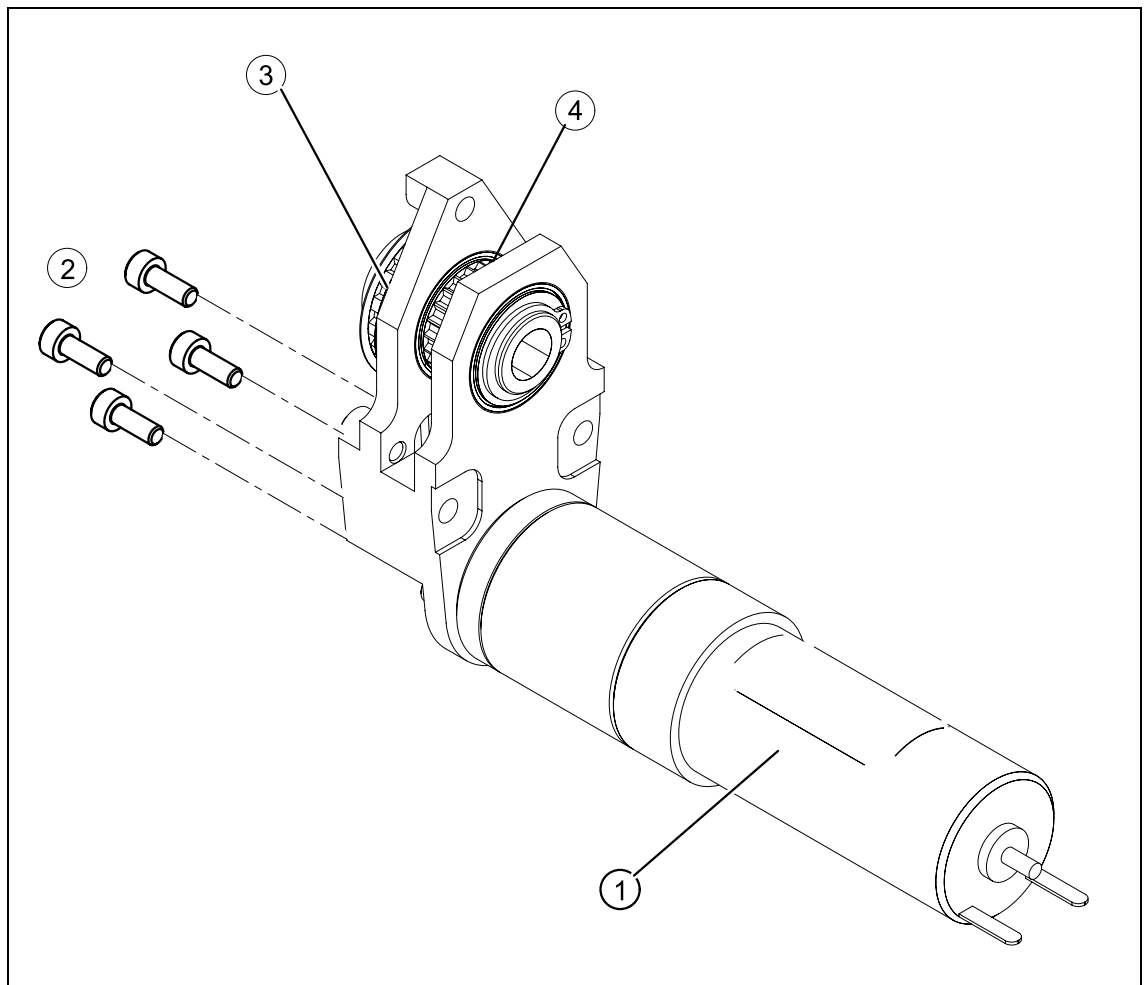


Fig. 6.8.4 *Exchanging the DC geared motor of the relevant PCB conveyor drive*

Key

- | | |
|----------------------|--|
| (1) DC geared motor | (3) Synchronizing disk (conveyor toothed belt) |
| (2) Fastening screws | (4) Synchronizing disk (toothed belt for PCB conveyor drive) |

DANGER



Please observe the safety instructions in [Chapter 2](#).

CAUTION



The toothed belts must **not be stretched or kinked!**

6.8.1 Removal

The DC geared motors, including the motor mounts of all 5 conveyor areas, are of like construction. Please bear in mind the following differences during assembly and disassembly.

- The motor mount is installed at an angle (tilted), according to the requirements of the installation site.
- Depending upon the installation position, the motor mount will either be fixed with a clamping ring or a circlip.

Conduct the procedures for replacement of all DC geared motors as described below:

- Remove the complete drive unit, as described in [Section 6.7](#).
- Working from the fixed exterior side of the conveyor, undo the screws fastening the DC geared motor (4 hexagonal socket-head screws, see [Fig. 6.8.4](#)).
- Tilt the DC geared motor with its synchronized disk a little, so that the small toothed belt of the drive comes free of the synchronizing disk and then pull the motor out.

Please note:

- **The toothed belt** on the motor pinion must **not be stretched or kinked during this process**.
- The synchronizing disk on the motor shaft must be moved out in such a manner that it does not get caught in the toothed belt.

NOTE:

If you have discovered a break in the motor cable during a continuity check, the motor cable must be woven out as far as the **conversion board of the conveyor side** (see circuit diagrams of the same name) and unplugged at the corresponding point. This may be somewhat complicated depending on the routing of cables inside the machine base. You may wish to contact Siemens AG SMD Service regarding this work.

6.8.2 Installation



CAUTION

The toothed belt must **not be stretched or kinked!**

- Install the new DC geared motor in the reverse order
The **entire width** of the toothed belt must engage at the top and bottom synchronizing disk.
- Fix the DC geared motor with the 4 M3 hexagonal socket-head screws (see [Fig. 6.8.4](#)).
- Install the complete motor unit as described in [Section 6.7.3](#).
- Perform the „**Final steps including function check**“ (see [Section 6.18](#)).

NOTE:

After the new drive unit has been installed, you must make certain that the direction of rotation and the conveyor speed (motor voltage) are correct.

After reconnecting the geared motor, you will only need to check the direction of rotation.

6.9 Replacing the toothed belt of the relevant PCB conveyor drive (00355553-01)

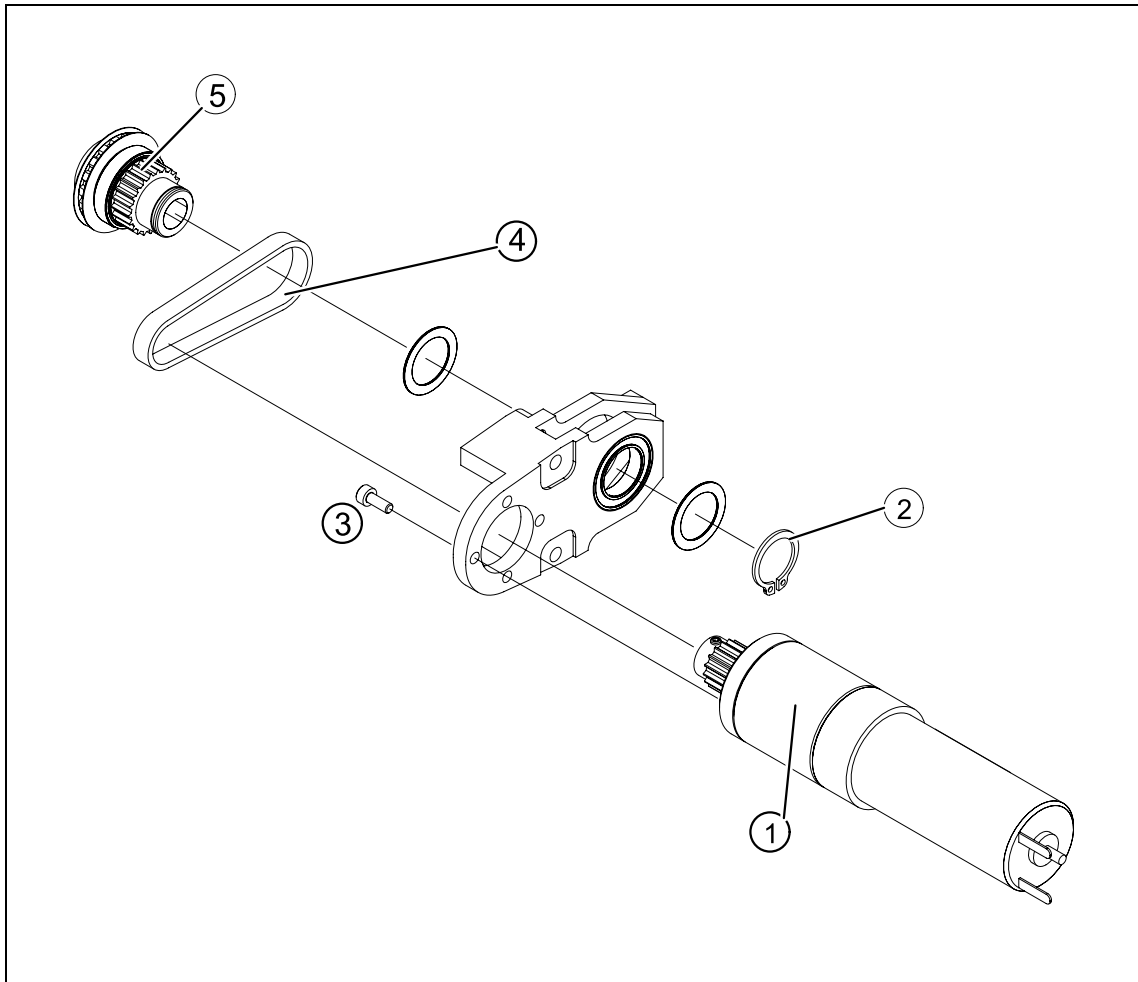


Fig. 6.9.5 Replacing the toothed belt of the relevant PCB conveyor drive

Key

- | | |
|--------------------------|------------------------|
| (1) DC geared motor | (4) Toothed belt |
| (2) Circlip | (5) Synchronizing disk |
| (3) 4 x fastening screws | |

DANGER



Please observe the safety instructions in [Chapter 2](#).

CAUTION



The toothed belt must **not be stretched or kinked!**

6.9.1 Removal

The DC geared motors, including the motor mounts of all 5 conveyor areas, are of like construction. Please bear in mind the following differences during assembly and disassembly.

- The motor mount is installed at an angle (tilted), according to the requirements of the installation site.
- Depending upon the installation position, the motor mount will either be fixed with a clamping ring or a circlip.

Conduct the procedures for replacement of all toothed belts as described below:

- Remove the complete drive unit, as described in [Section 6.7](#)
- Working from the fixed exterior side of the conveyor, undo the screws fastening the DC geared motor
(4 hexagonal socket-head screws, see [Fig. 6.8.4](#)).
- Tilt the DC geared motor with its synchronized disk a little, so that the small toothed belt of the drive comes free of the synchronizing disk and then pull the motor out.
Please note:
 - **The toothed belt** on the motor pinion must **not be stretched or kinked**.
 - The synchronizing disk on the motor shaft must be moved out in such a manner that it does not get caught in the toothed belt.
- Remove the circlip and shim, see [Fig. 6.9.5](#).
- Use a small rubber mallet to carefully knock the synchronizing disk out of the motor mount.
- Remove the toothed belt from the mount.

6.9.2 Installation



The new toothed belt must **not be stretched or kinked!** during the following procedure.

- Insert the new toothed belt into the motor mount and place the belt around the synchronizing disk of the geared motor.
- Place the toothed belt around the synchronizing disk of the conveyor toothed belt and insert the synchronizing disk in its mount.
- Use a rubber mallet to carefully knock the synchronizing disk into position.
- Loosely fasten the DC geared motor with the 4 M3 hexagonal socket-head screws. The **entire width** of the toothed belt must engage at the top and bottom synchronizing disk.
- Install the complete motor unit as described in [Section 6.7.3](#).
- Perform the „**Final steps including function check**“ (see [Section 6.18](#)).

NOTE:

After the new drive unit has been installed, you must make certain that the direction of rotation and the conveyor speed (motor voltage) are correct.

After reconnecting the geared motor, you will only need to check the direction of rotation.

6.10 Replacing the conveyor toothed belt (00364847-01)

DANGER



Please observe the safety instructions in [Chapter 2](#).

NOTE

The following diagrams apply for the standard conveyor system (fixed side - right). The mount is installed on one side of the conveyor, while the DC geared motor is mounted on the other side.

6.10.1 Parts

- 00356851-01 Synchroflex toothed belt for input-, output- or intermediate conveyor
- 00356850-01 Synchroflex toothed belt for placement area 1 + 2

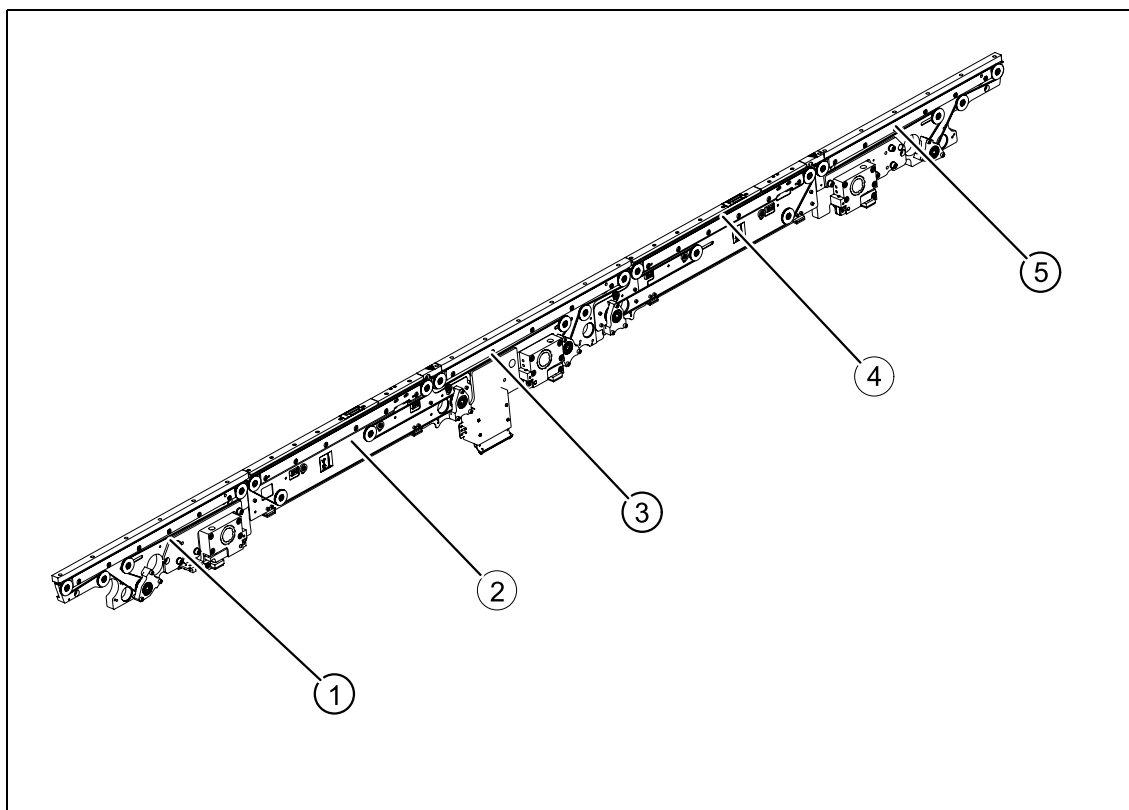


Fig. 6.10.6 Overview of conveyor toothed belt (example with mounting))

Key

- | | |
|--|-----------------------------------|
| (1) Input conveyor | (4) Placement area 2 (HS-60 only) |
| (2) Placement area 1 | (5) Output conveyor |
| (3) Intermediate conveyor (HS-60 only) | |

6.10.2 Replacing the conveyor toothed belt

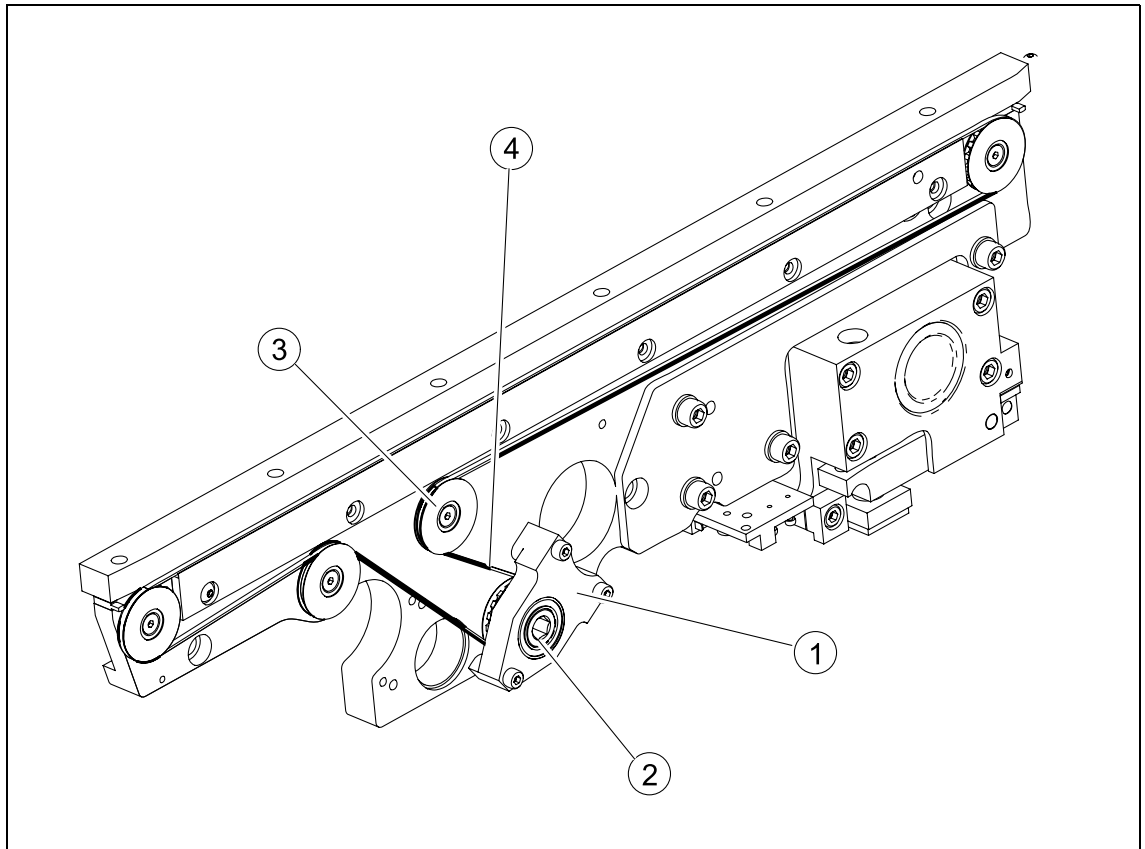


Fig. 6.10.7 Replacing the conveyor toothed belt (example with mounting)

Key

- | | |
|------------------------------|---|
| (1) Motor mount | (3) Deflection pulley with slot (not visible) |
| (2) Clamping ring or circlip | (4) Conveyor toothed belt |

6.10.2.1 Removal

The way in which the conveyor toothed belt is run around the deflection pulley depends upon the transport area concerned. Please observe this belt guidance during assembly and disassembly. Please also observe the following differences during assembly and disassembly work.

- The drive unit is installed at an angle (tilted), according to the requirements of the installation site.
- Depending upon the installation position, the drive unit will either be fixed with a clamping ring or a circlip.
- The mount is installed on one side of the conveyor, while the DC geared motor is mounted on the other side.

Conduct the procedures for replacement as described below:

- Move the PCB conveyor to the position which gives you best access to the conveyor belt.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- If the **drive unit** is installed, remove it as described in [Section 6.7](#).
- If the **mount** is installed, remove the clamping ring or circlip on the mount and the 3 screws fastening the mount in place (see [Fig. 6.10.7](#)).
- Loosen the deflection pulley with the slot and relieve the tension on the belt.
- Carefully extract the mount or the drive unit, while also gently weaving out the conveyor toothed belt.

6.10.2.2 Installation



CAUTION

The new toothed belt must **not be stretched or kinked!**

- Feed the new toothed belt into the drive unit and weave around the deflection pulleys.
- Insert the drive unit with the conveyor toothed belt and fasten the mount or the drive unit.
Please refer to [Section 6.7.3](#) for installation instructions for the drive unit.
- Adjust the belt tension as described in [Section 6.10.3](#).

6.10.3 Adjusting the tension of the conveyor toothed belt

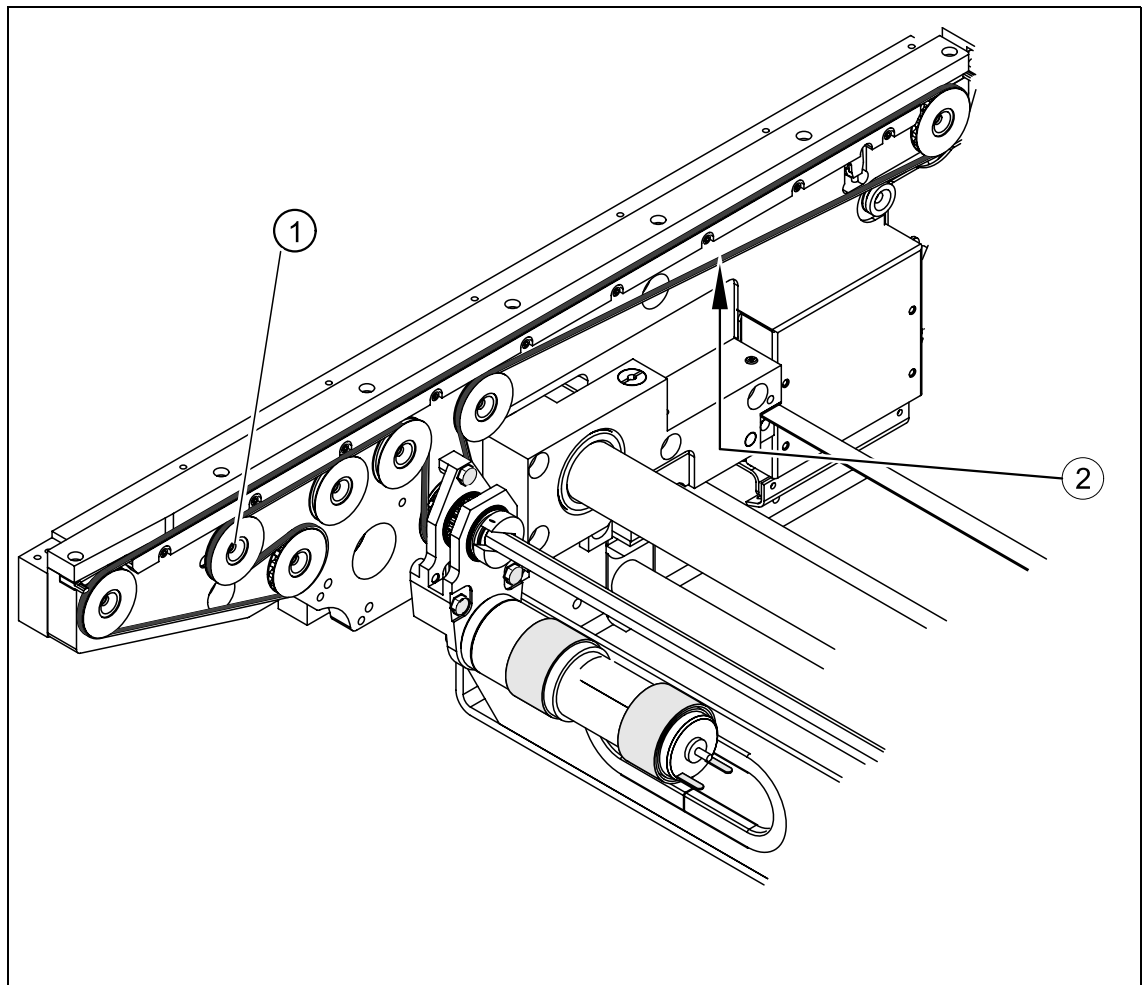


Fig. 6.10.8 Example for adjusting belt tension

Key

- (1) Deflection pulley with slot
- (2) Measuring point of belt tension measuring device (Strand center)

- The deflection pulleys, around which the conveyor toothed belt is run at approximately 180°, are fastened at a slot. The tension of the conveyor toothed belt can be adjusted at this slot.
- Position the measuring point of the belt tension device at the strand center (i.e. the longest distance between the two deflection pulleys) of the conveyor toothed belt.
- Set the tension of the conveyor toothed belt according to the following values.

6.10.3.1 Belt tension HS 60 for conveyor track 1 (single and dual conveyor)

- Input conveyor: 170 Hz +/- 17 Hz
- Placement area 1: 70 Hz +/- 7 Hz
- Intermediate conveyor: 147 Hz +/- 15 Hz
- Placement area 2: 70 Hz +/- 7 Hz
- Output conveyor: 170 Hz +/- 17 Hz

6.10.3.2 Belt tension HS 60 for conveyor track 2 (dual conveyor)

- Input conveyor: 170 Hz +/- 17 Hz
- Placement area 1: 70 Hz +/- 7 Hz
- Intermediate conveyor: 118 Hz +/- 12 Hz
- Placement area 2: 70 Hz +/- 7 Hz
- Output conveyor: 170 Hz +/- 17 Hz

6.10.3.3 Belt tension S 27 HM (single and dual conveyor)

Fixed conveyor side (DC motors)

- Input conveyor: 110 Hz +/- 5 Hz
- Placement area: 100 Hz +/- 5 Hz
- Output conveyor: 100 Hz +/- 5 Hz

6.10.3.4 Belt tension S 27 HM (single and dual conveyor)

Movable conveyor side

- Input conveyor: 95 Hz +/- 5 Hz
- Placement area: 110 Hz +/- 5 Hz
- Output conveyor: 150 Hz +/- 5 Hz

6.11 Lifting table

DANGER



Please observe the safety instructions in [Chapter 2](#).

6.11.1 Function

Depending on the model (single or dual conveyor), each placement area has one or two independently functioning lifting tables in use. The lifting table is driven indirectly via a pneumatic cylinder, with magnetic valve control. Different PCB thicknesses are automatically compensated. Movement along the Z-axis is measured at four points on the lifting table plate. A position measuring system determines the lifting path. The top position of the lifting table is recognized by the position measuring system and a Piezo force transducer (see also [Section 6.11.6](#)). The bottom position of the lifting table is identified by the position measuring system and the end position proximity switch on the pneumatic cylinder.

NOTE:

The standard space under the PCB is 40 mm. The previously used PCB supports are no longer suitable.

6.11.2 Replacing the lifting table (00358653-04))



Please observe the safety instructions in [Chapter 2](#).

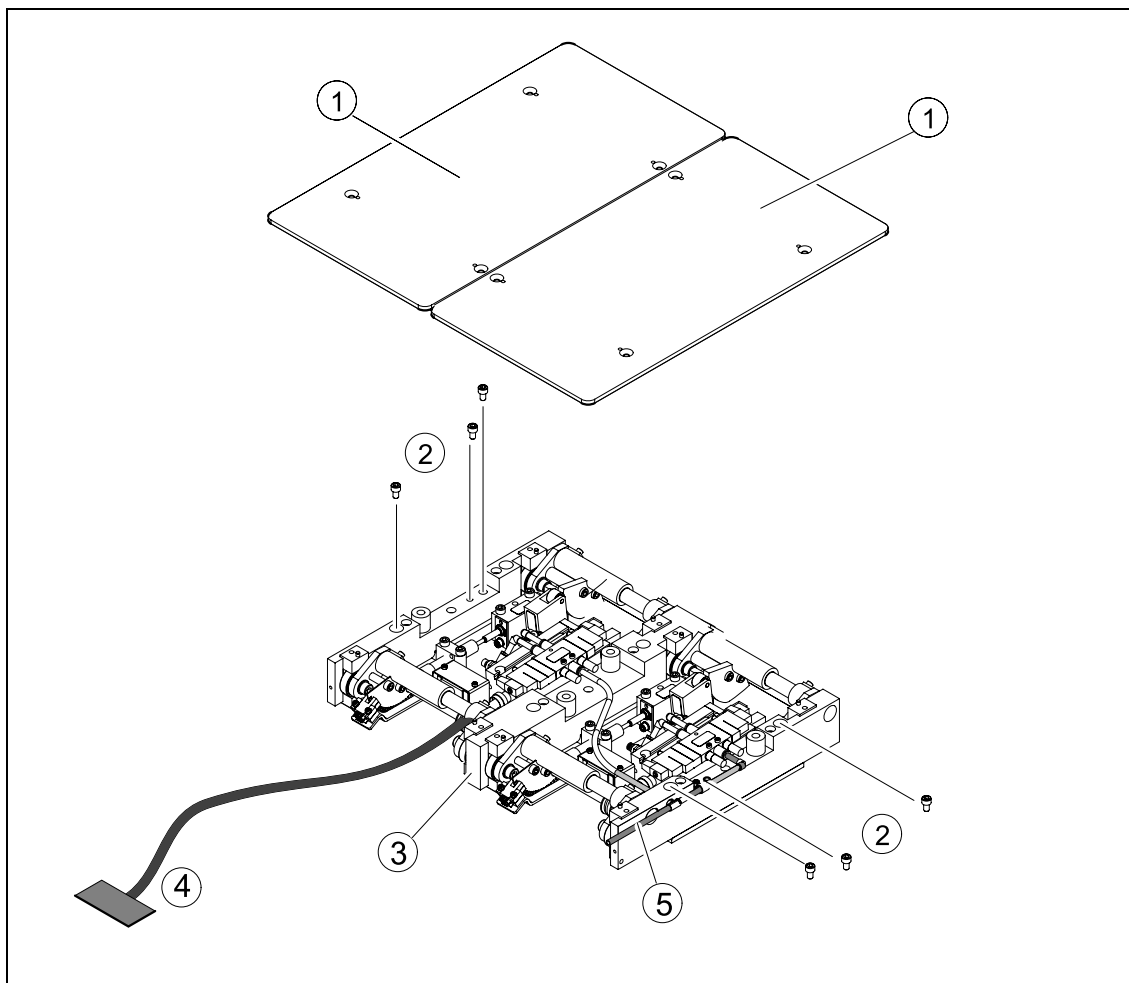


Fig. 6.11.9 Replacing the lifting table

Key

- | | |
|---|---|
| (1) Lifting table plate | (4) Connection cable for lifting table unit |
| (2) Fastening screws for the lifting table unit | (5) Pneumatic connections |
| (3) Lifting table unit | |

6.11.2.1 Parts

- 00358653-04 Lifting table unit for single conveyors
- 00358654-04 Lifting table unit for dual conveyors

6.11.2.2 Removal

- For single conveyor systems, move the PCB conveyor to its maximum position, giving you the best access to the lifting table unit.

NOTE:

For dual conveyor systems, you will need to move the conveyor track 1 to the minimum position and then move the fixed side of the conveyor track 2 mechanically.

- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- For dual conveyor systems, you will need to mechanically release and then move the fixed side of conveyor track 2, to enable you to lift the lifting table out of the machine.
- To do this, undo the screw fastening the brake in place (see [Section 6.12](#)). Slightly loosen (do not unscrew fully) the grub screw in the fastening screw.
- Remove the fastening screw. Take care not to lose the spring inside.
- Move the side of the conveyor on the fixed side so that you can lift the lifting table out of the machine.
- Undo the screws fastening the lifting table plate and remove the lifting table from the lifting table unit.
- Undo the 6 screws fastening the lifting table unit.
- Remove the cover of the conveyor conversion board and unplug the lifting table connection cable.
- Remove the pneumatic connection from the vacuum valve.
- Carefully lift the lifting table out of the locating pins.

6.11.2.3 Installation

- Lift the lifting table into the machine and insert it onto the locating pins.
- Insert the fastening screws.
- Plug in the electrical and pneumatic cables.
- Carefully place the lifting table plate onto the lifting table unit and tighten the fastening screws diagonally so that the lifting table is not tilted.
- Check the speed of the lifting table and the PCB clamping function. Adjust where necessary.
See also [Section 6.11.7.2](#))

6.11.3 Replacing and adjusting the silencer (00358684-05)

The silencer moves the lifting table gently upwards. It prevents the PCBs being clamped in with too much impact.

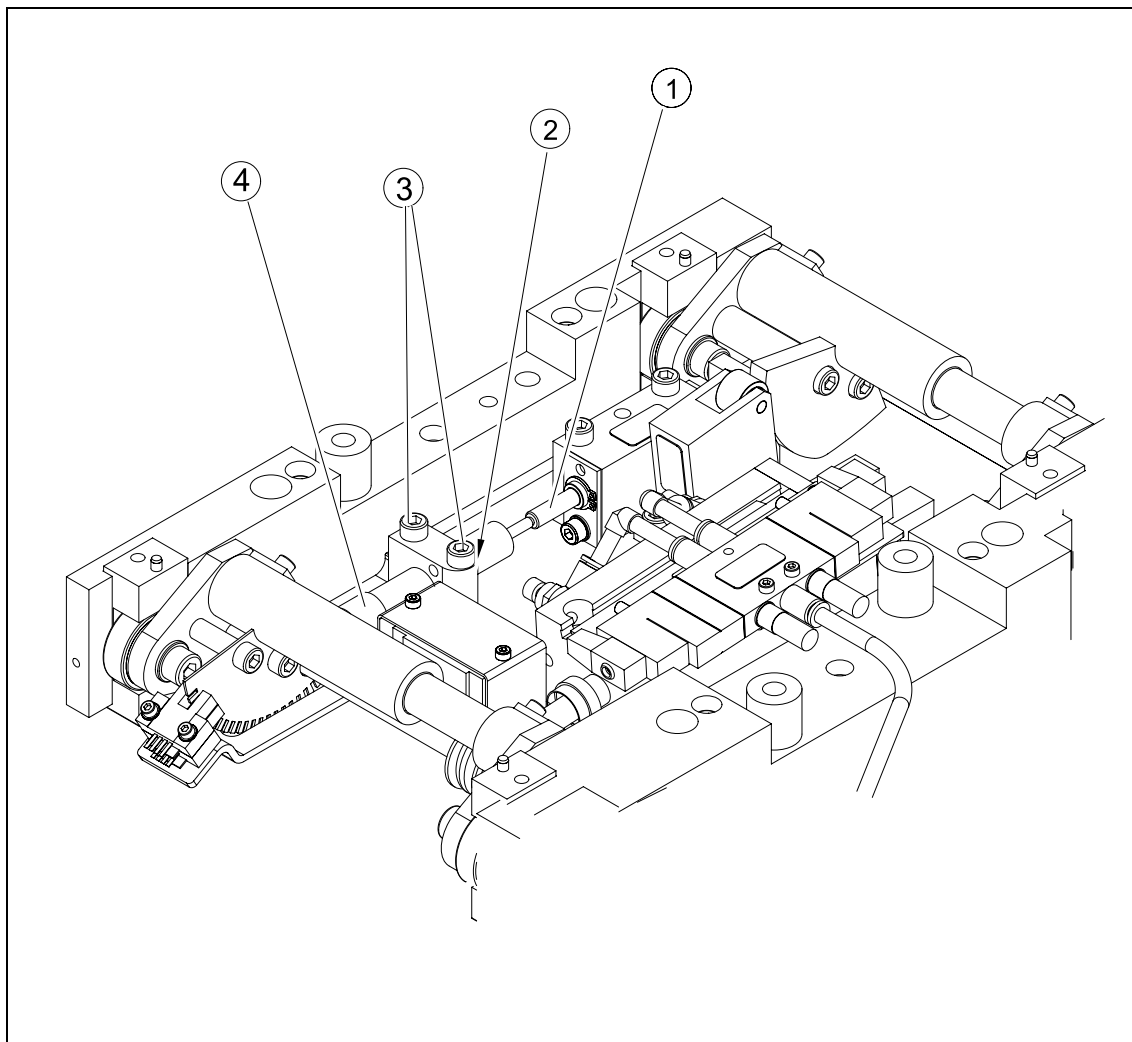


Fig. 6.11.10 Replacing and adjusting the silencer

Key

- | | |
|--------------|----------------------|
| (1) Actuator | (3) Fastening screws |
| (2) Locknut | (4) Handle |

6.11.3.1 Removal

- Move the PCB conveyor to the position which allows you best access to the lifting table unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit. See also [Fig. 6.11.9](#)
- Undo the two screws fastening the silencer.
- Undo the locknut. Take the silencer by its handle and twist it out of the mounting block.

6.11.3.2 Installation and adjustment

- Insert and twist the new silencer into the mounting block until the slide just touches the actuator, so that the lifting table can be gently moved upwards.
- Secure this position with the locknut.
- Install the lifting table.
- Check whether the silencer has been fixed onto the mounting block with the locknut and that the silencer slide has a gap of approx. 0.1 - 0.2 mm to the actuator (untriggered mode). In this basic position, the lifting table should move gently upwards and activate the clamping sensor in the conveyor side.
- If this is not the case, loosen the locknut and turn the silencer approx. one rotation into the mounting block.
- Start the SITEST program and move the lifting table upwards.
- The lifting table must move gently upwards and activate the clamping sensor.
You should not hear the PCB clamping device loudly locking into place and no clamping device errors messages should be issued.
- Check the speed of the lifting table and correct where necessary (see also [Section 6.11.7.2](#)).

6.11.4 Replacing the solenoid valve (00358663-02)

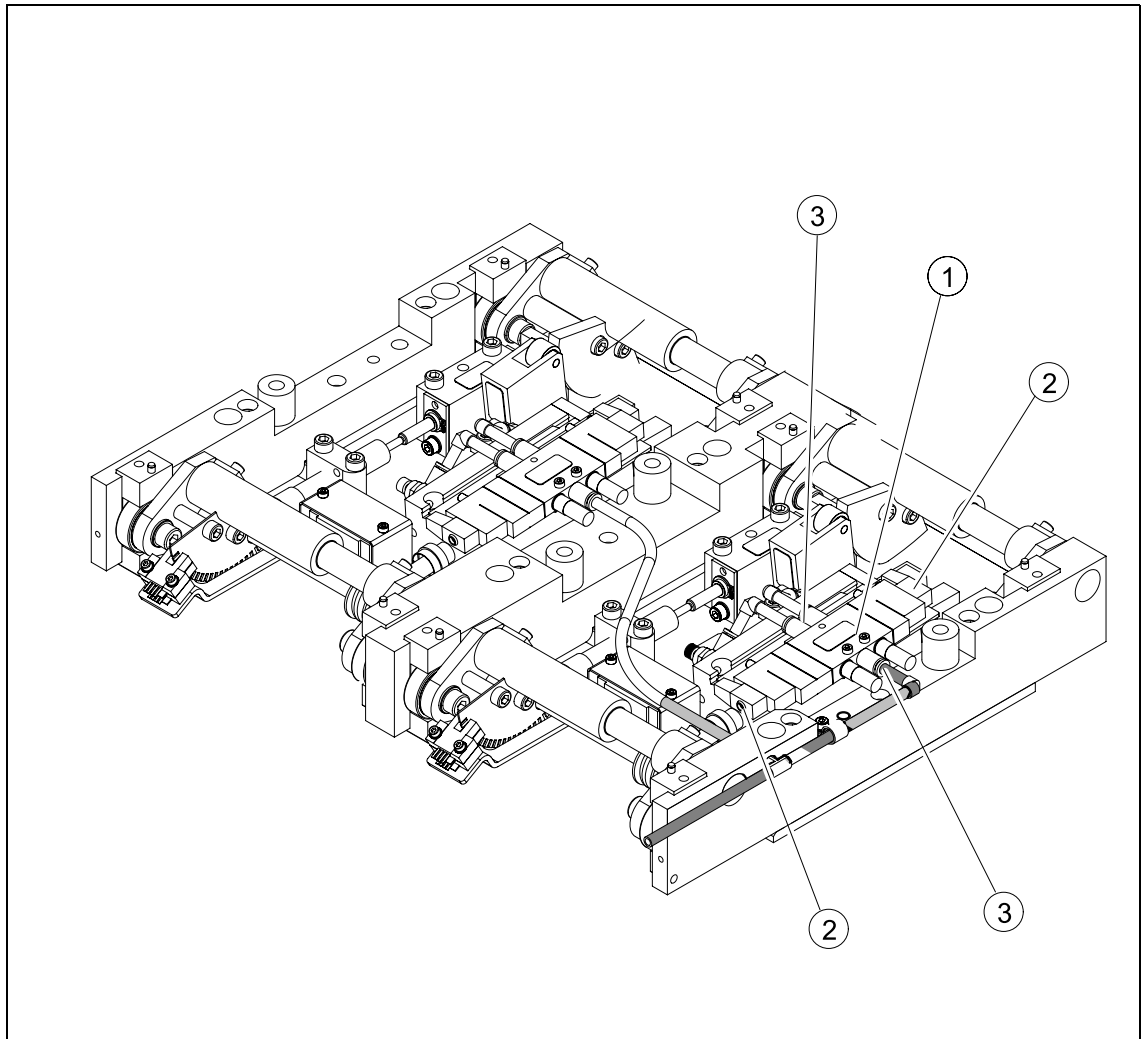


Fig. 6.11.11 Replacing the 5/3 solenoid valve

Key

- (1) Solenoid valve with 2 fastening screws
- (2) Connection plug
- (3) Pneumatic connections

- Move the PCB conveyor to the position which gives you the best access to the lifting table unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.

- Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit. See also [Fig. 6.11.9](#)
- Switch off the compressed air supply and release the air at the filter of the pneumatic unit.
- Undo the screws fastening the connection plug and unplug.
- Remove the pneumatic connections.
- Install the new solenoid valve and reconnect the electrical and pneumatic systems.
- Check the speed of the lifting table and correct where necessary (see also [Section 6.11.7.2](#)).

6.11.5 Replacing the fork light barrier (00363079-01)

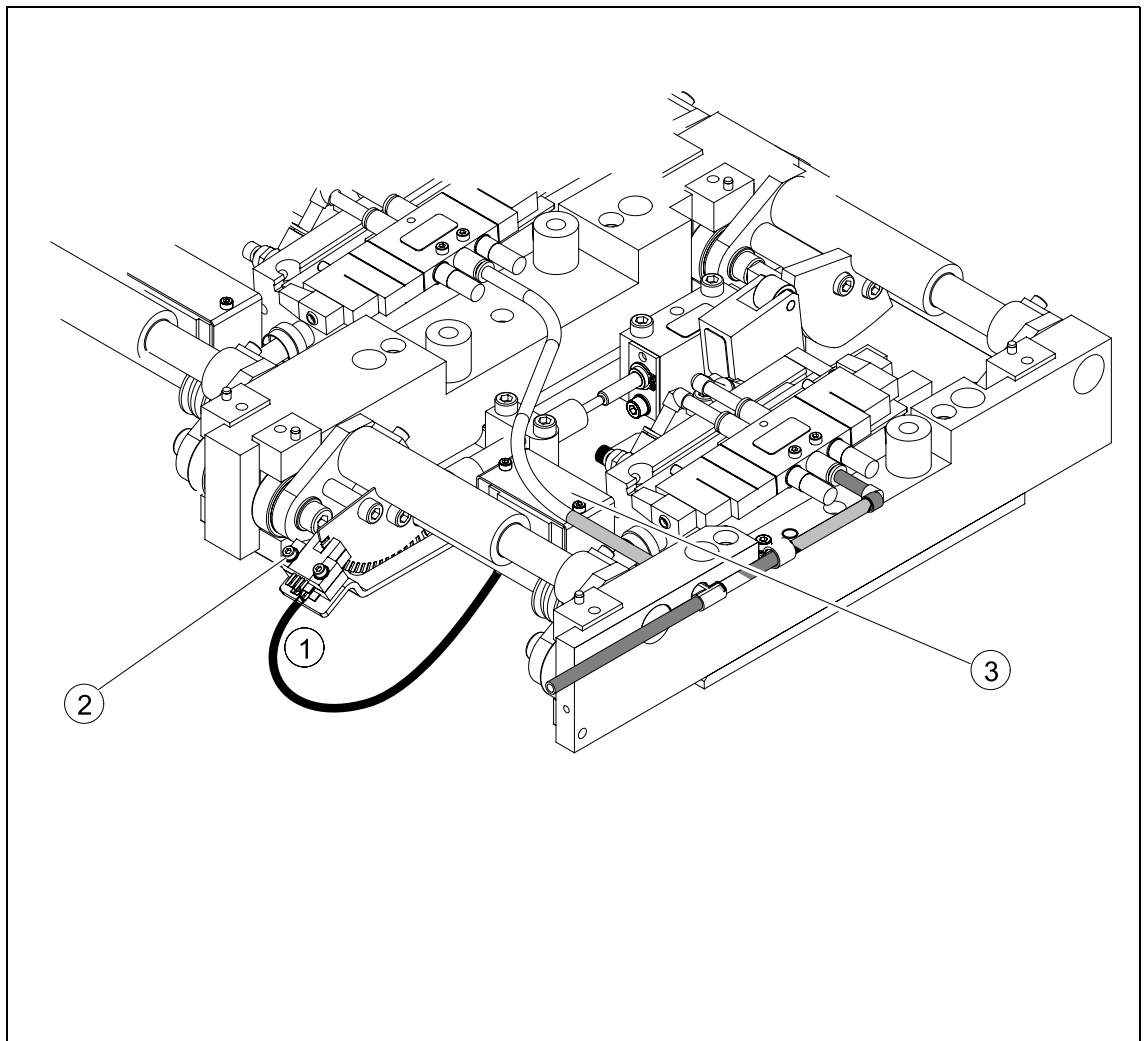


Fig. 6.11.12 Replacing the fork light barrier

Key

- | | |
|---|---|
| (1) Connection cable for the conversion board of the lifting table | (3) Conversion board of the lifting table (under the cover) |
| (2) 2 x fork light barrier (position measuring system tracks A + B) | |

6.11.5.1 Parts

- 00363079-01 light barrier for track A - dual conveyor
- 00363080-01 light barrier for track B - dual conveyor
- 00363111-01 light barrier for track A - single conveyor
- 00363113-01 light barrier for track B - single conveyor

6.11.5.2 Removal

- Move the PCB conveyor to the position which gives you the best access to the lifting table unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit. See also [Fig. 6.11.9](#)
- Undo the two screws fastening the fork light barrier.
- Remove the cover from the conversion board of the lifting table.
- Unplug the conversion board of the lifting table.
- Install the new fork light barrier and reconnect the system to the electrical supply.

6.11.6 Replacing the PCB clamping device sensor BB1/BB2 (00368272-01)

6.11.6.1 Function

The sensor indicates that the lifting table has activated the PCB clamping device.

The PCB is raised for placement and pressed against the PCB hold-down device (guide rail at the side). As the lifting table moves upwards, the supporting plates on the sides raise the PCB with the complete conveyor drive and clamp it in place. This enables the placement level to remain constant, irrespective of the PCB thickness i.e. the placement height of the PCB remains unchanged.

PCBs up to a length of 460 mm are clamped down in the relevant processing areas. No clamping takes place in the input and output conveyors. PCBs with lengths between 460 mm and 510 mm lie on the conveyor belt and are only supported in the placement area by the lifting table.

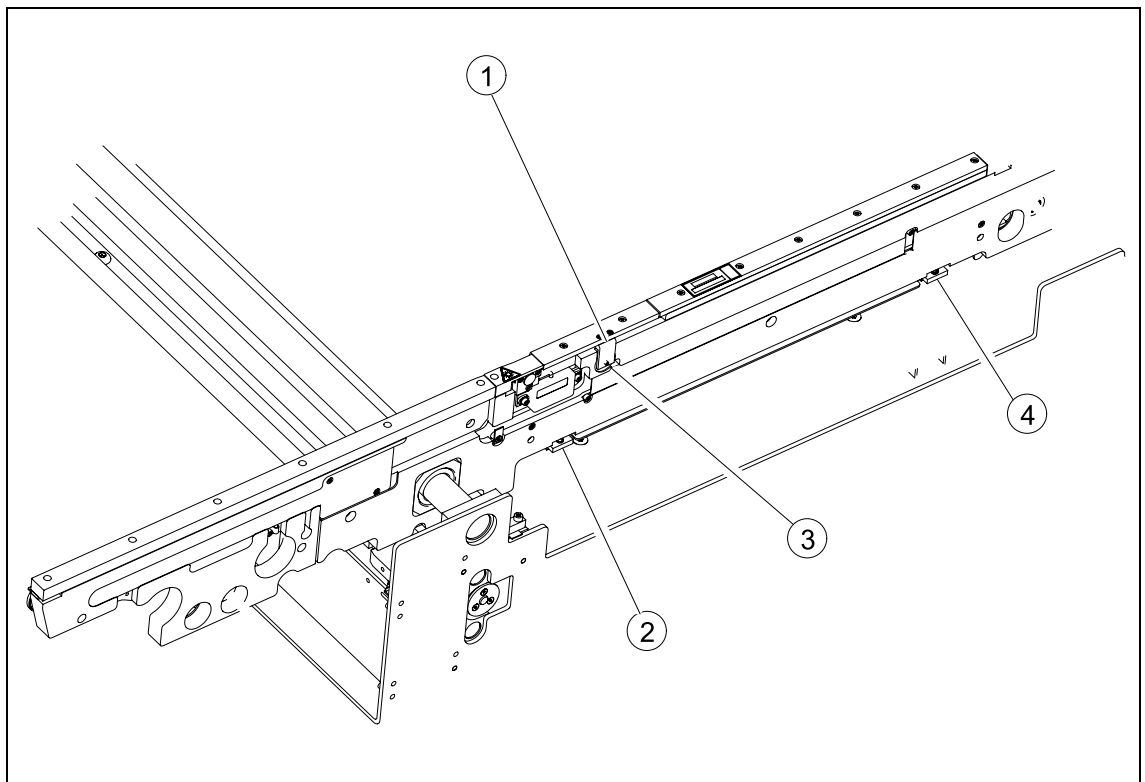


Fig. 6.11.13 Replacing the PCB clamping device sensor BB1/BB2

Key

- | | |
|---|-------------------------|
| (1) Cover with two fastening screws (behind the sensor) | (3) Grub screw |
| (2) Clamping actuator 1 | (4) Clamping actuator 2 |

6.11.6.2 Parts

- 00368272-01 PCB clamping device sensor BB1
- 00368273-01 PCB clamping device sensor BB2

6.11.6.3 Removal and installation

- Move the PCB conveyor to the position which gives you the best access to the sensor.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the two screws fastening the cover and remove the sensor.
- Weave out the connection cable and unplug it at the relevant conversion board for the conveyor side. (See also [Fig. 6.16.33](#)).
- Place the new sensor in the area provided and replace the cover.
- Reconnect the electrical supply.
- Adjust the clamping device sensor (see also [Section 6.11.6.4](#)).

6.11.6.4 Adjusting the clamping device sensor

The clamping actuators (see [Fig. 6.11.13](#)) are arranged set so that **clamping actuator 1** activates the clamping device sensor first.

- To adjust the clamping device sensor, first loosen the grub screw. Then position the grub screw so that it just touches the contact.
- When slight pressure is applied to the grub screw with the thumb, the input clamping sensor should react. (SITEST -> I/O menu 3 conveyor 1 or I/O menu 4 conveyor 2, in each case on the left under Reserve).



CAUTION

If the grub screw is over-tightened, the clamping device sensor could be destroyed.

Please check:

To rule out any unevenness on the lifting table, the clamping device sensor is checked for functionality with and without the PCB and along the entire transport path. The clamping device sensor settings are checked in continuous lifting table operation. If the clamping device sensor does not react to the moving lifting table, an error message will be issued.

6.11.7 Replacing the complete lifting table cylinder (00358703-01)



Before performing adjustment work press the emergency STOP to ensure that the lifting table has been secured against movement.

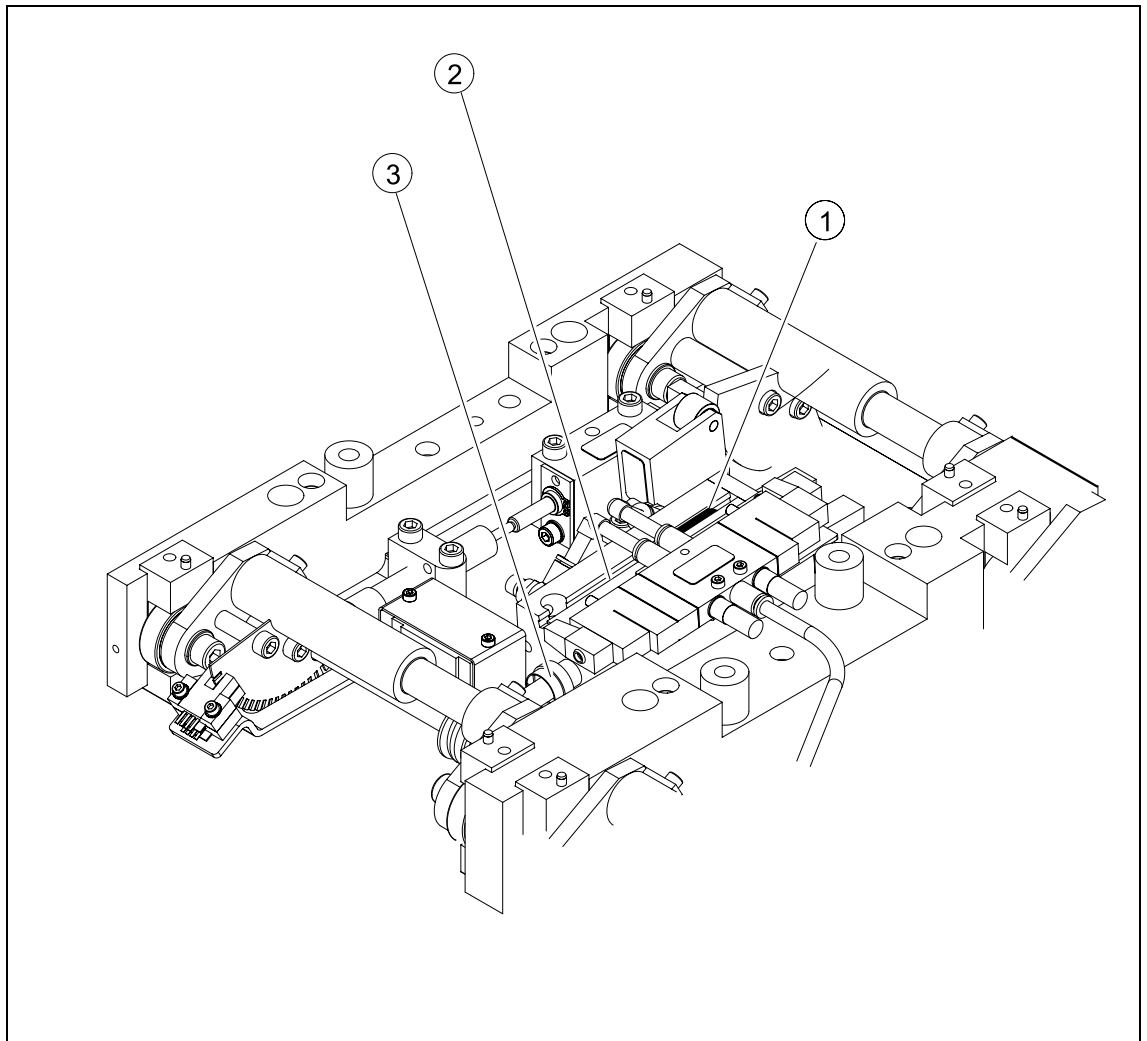


Fig. 6.11.14 Replacing the complete lifting table cylinder

Key

- | | |
|-----------------------------------|-----------------------------|
| (1) End position proximity switch | (3) Piston rod with locknut |
| (2) Lifting table cylinder | |

6.11.7.1 Removal/installation

- Move the PCB conveyor to the position which gives you the best access to the lifting table
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Switch off the compressed air supply.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit. See also [Fig. 6.11.9](#)
- Undo the fastening screws for the solenoid valve (see also [Fig. 6.11.11](#)) and remove it from the lifting table cylinder.
- Loosen the grub screw at the end position proximity switch and push the end position proximity switch out of the lifting table cylinder guide rail.
- Loosen the locknut on the piston rod and twist the piston rod out until it releases itself from the actuator.
- Undo and remove the two screws fastening the lifting table cylinder.
- Insert and fasten the new lifting table cylinder and install the piston rod.
- Move the lifting table by hand to its end position.
- Switch the machine on.
- Push the end position proximity switch into the guide rail until the LED lights up.
- Fix this position with the grub screw.
- Install the solenoid valve and the lifting table plate.
- Check the speed of the lifting table and correct where necessary (see also [Section 6.11.7.2](#)).

6.11.7.2 Adjusting the speed of the lifting table (service personnel only)

NOTE

The lifting table must be installed on the lifting table unit!

- Connect the service notebook to the conveyor control via the serial port.
- Open **Start => Programs => Accessories** and select the function **Hyperterminal**.
- Create a new connection.
- Select **COM 1** => OK
- Select **57600 Bits/second** => OK
- Select protocol => **No** => OK

→ A hyperterminal window will open => Press the **Enter key** => and the main conveyor menu will appear.

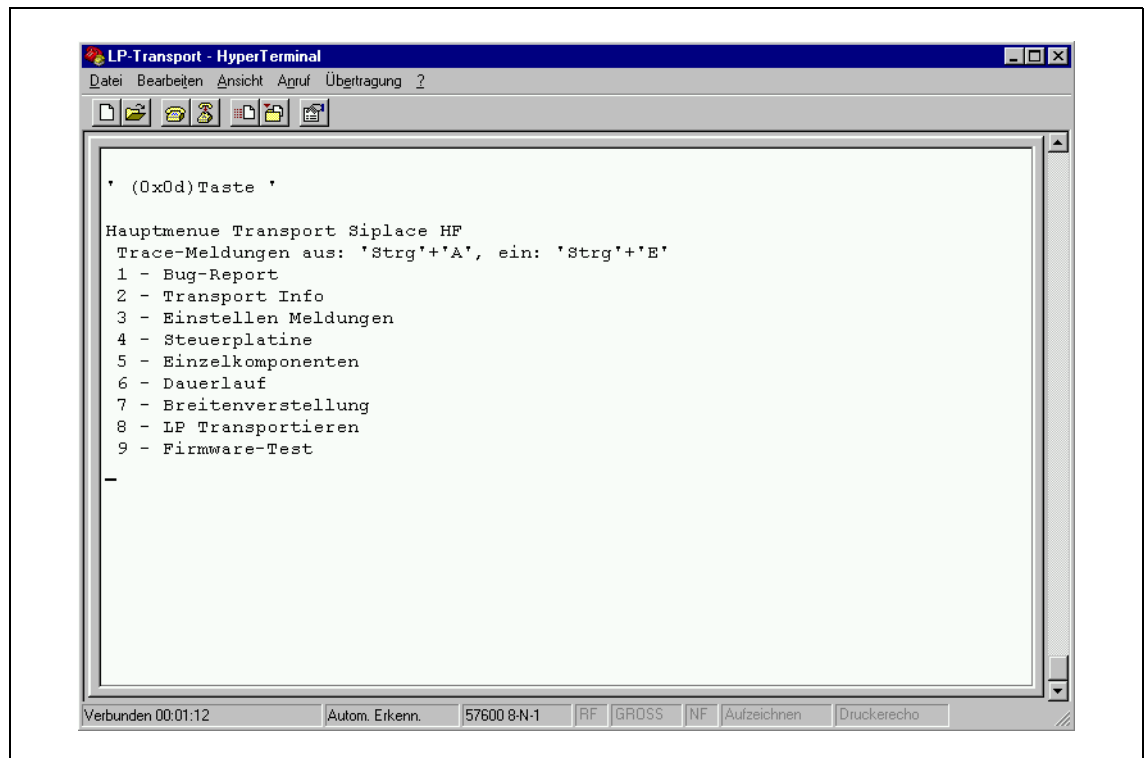


Fig. 6.11.15 Main menu "Test software conveyor"

- Select => **3** "Einstellen Meldungen" from the menu.
- Select "Standard Einstellungen" => Exit the menu with " **0** = Ende ".
- Select => **5** "Einzelkomponenten" from the menu.
- Select => **2** "Hubtisch" from the menu.
- Select => " **a** ", *Auswahl Hubtisch* (BB1, BB2 track 1 or track 2) from the menu.
- Press " **Strg+E** " to issue TSP reports.
- Select **2** or **3** from the menu, to move the lifting table upwards or downwards.

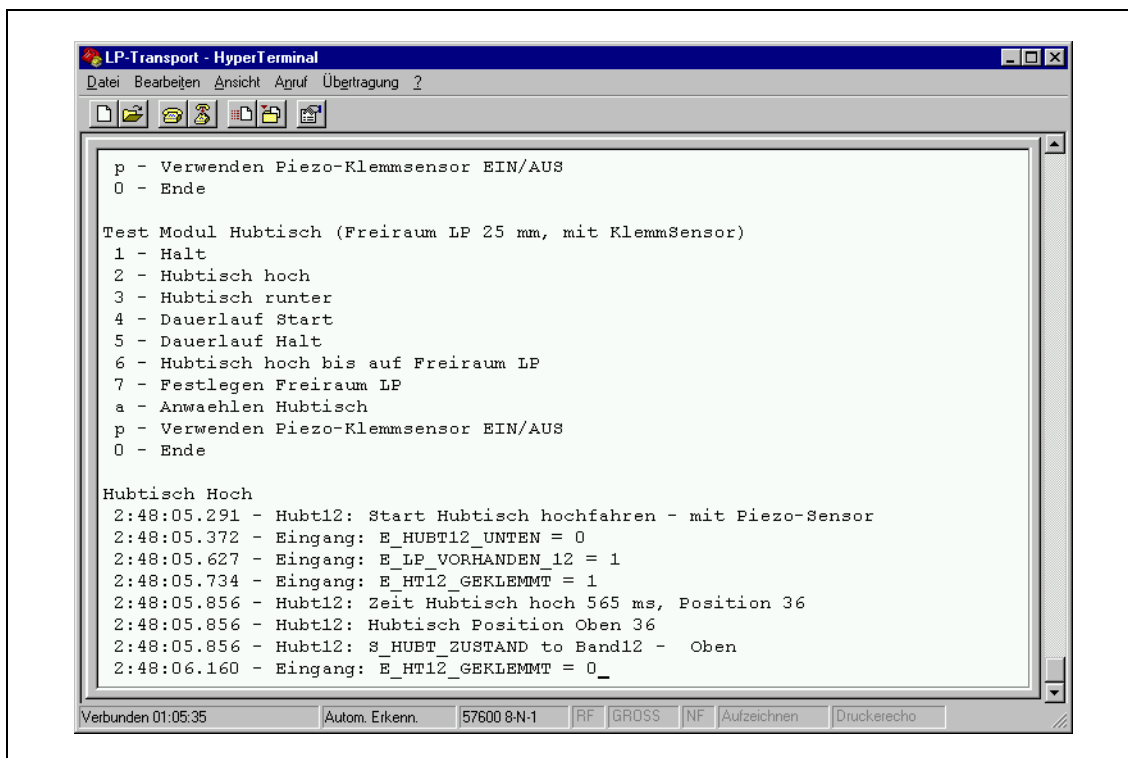


Fig. 6.11.16 Issuing times for the lifting table

→ Adjust the valves on the lifting table cylinder to give the following values:

- Lifting table upwards: 500ms +/- 20ms
- Lifting table downwards: 480ms +/- 20ms

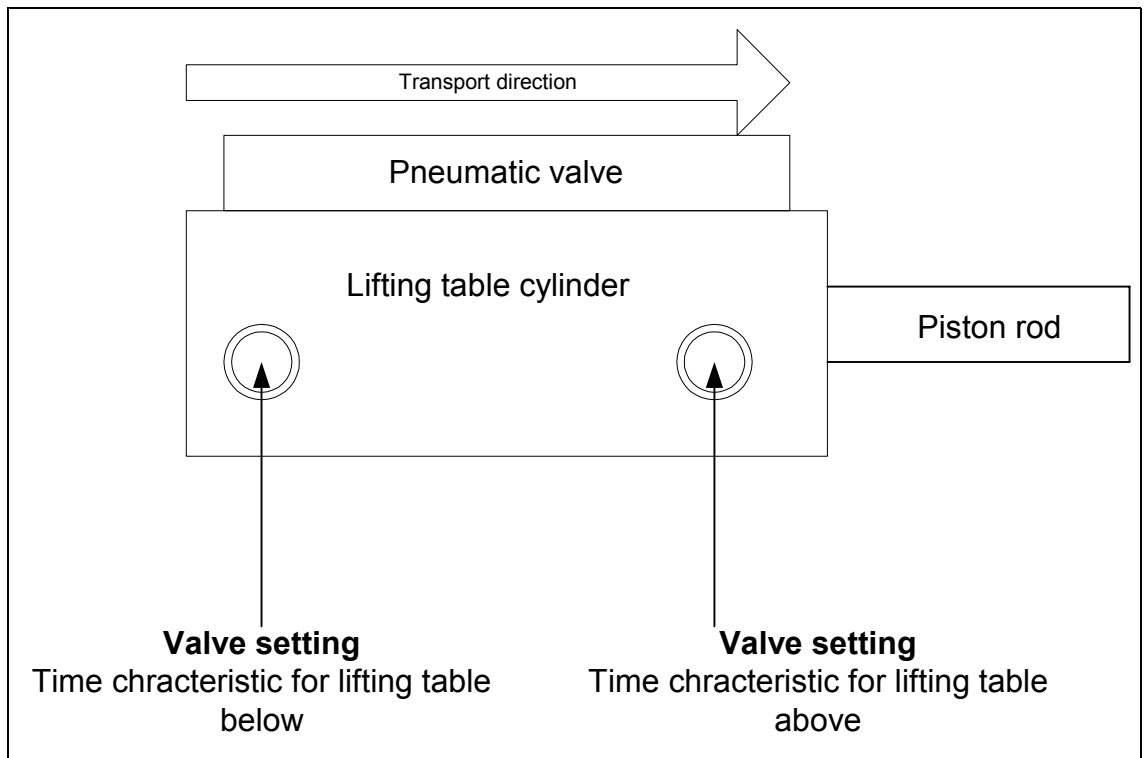


Abb. 6.11 - 17 Adjustment valves on the lifting table cylinder

- Rotating adjustment valve to the left: increases the lifting table travel time
- Rotating adjustment valve to the right: reduces the lifting table travel time

6.12 Setting the fixed conveyor side (single and dual conveyor)

NOTE

After undoing the conveyor side fixtures you **MUST** check the settings for the fixed conveyor side. If these values are not correctly set for single or dual conveyers, this could cause the placement nest to shift out of position. This could again lead to errors in the fiducial recognition.

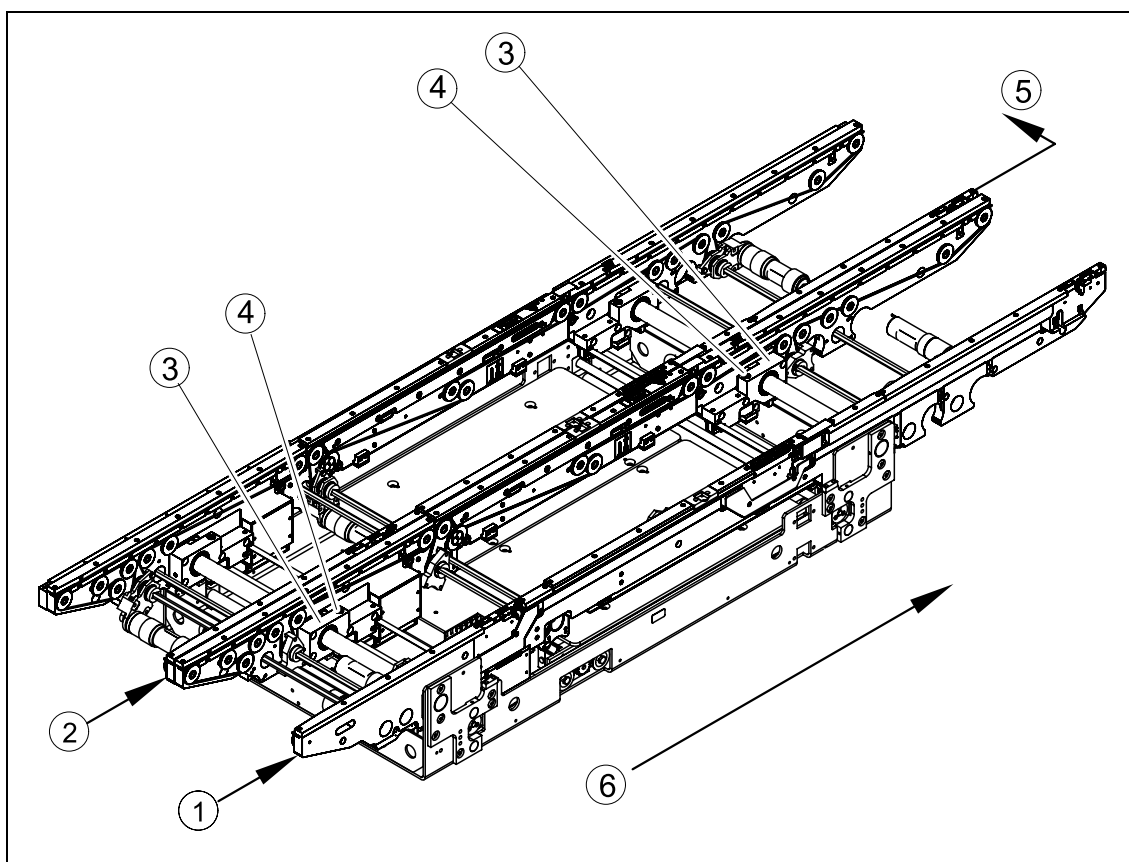


Fig. 6.12.18 Moving fixed conveyor side for conveyor track 2 (in example of S-27 HM)

Key

- | | |
|-----------------------------------|--|
| (1) Fixed side - conveyor track 1 | (4) Fastening screw |
| (2) Fixed side - conveyor track 2 | (5) Moving the fixed side - conveyor track 2 |
| (3) Side flange with grub screw | (6) Direction of travel |

NOTE:

It is not normally necessary to adjust the fixed conveyor side. An exception to this rule is when service work requires prior movement of the fixed conveyor side.

Procedure:

- Undo the fastening screw(1) (s. [Fig. 6.12.19](#)) on the side flange.
 - The fastening screw also has a (1) hexagon socket-head grub screw, which you will need to loosen slightly - **do not** unscrew it fully!

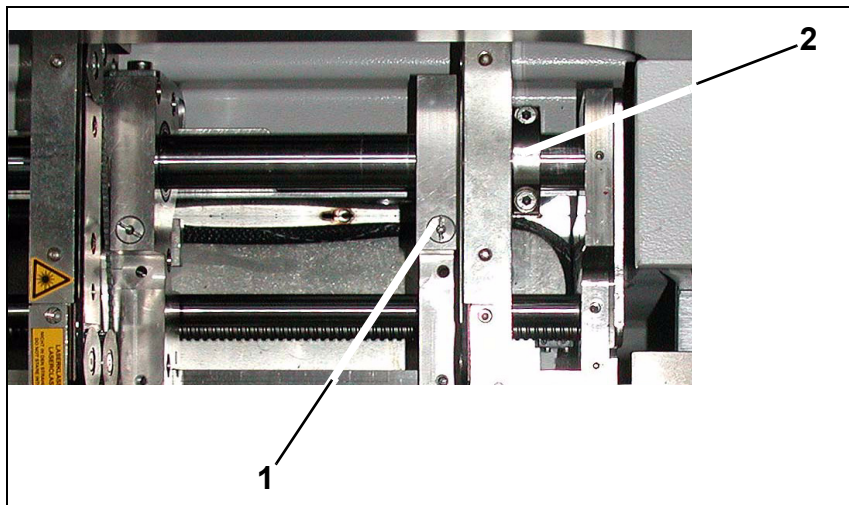


Fig. 6.12.19 Modular transport details

- Remove the fastening screw (1). Make sure you do not lose the spring inside.
- Push the fixed transport side as far as to the stop ring (2) (s. [Fig. 6.12.19](#)).
- Check the measurements in line with [Fig. 6.12.20](#).
- Insert the spring and tighten the screw fastening the brake.
- First fasten one side flange with the fastening screw and check the measurements on both sides. Both conveyor sides must run parallel to one another
- Fasten the second side flange with the fastening screw and check the measurements again.
- Test run the PCB conveyor to a distance of 216 mm and move the test PCB (item no. 00359535-01) in the PCB conveyor. The PCB must be moved through the entire PCB conveyor system.

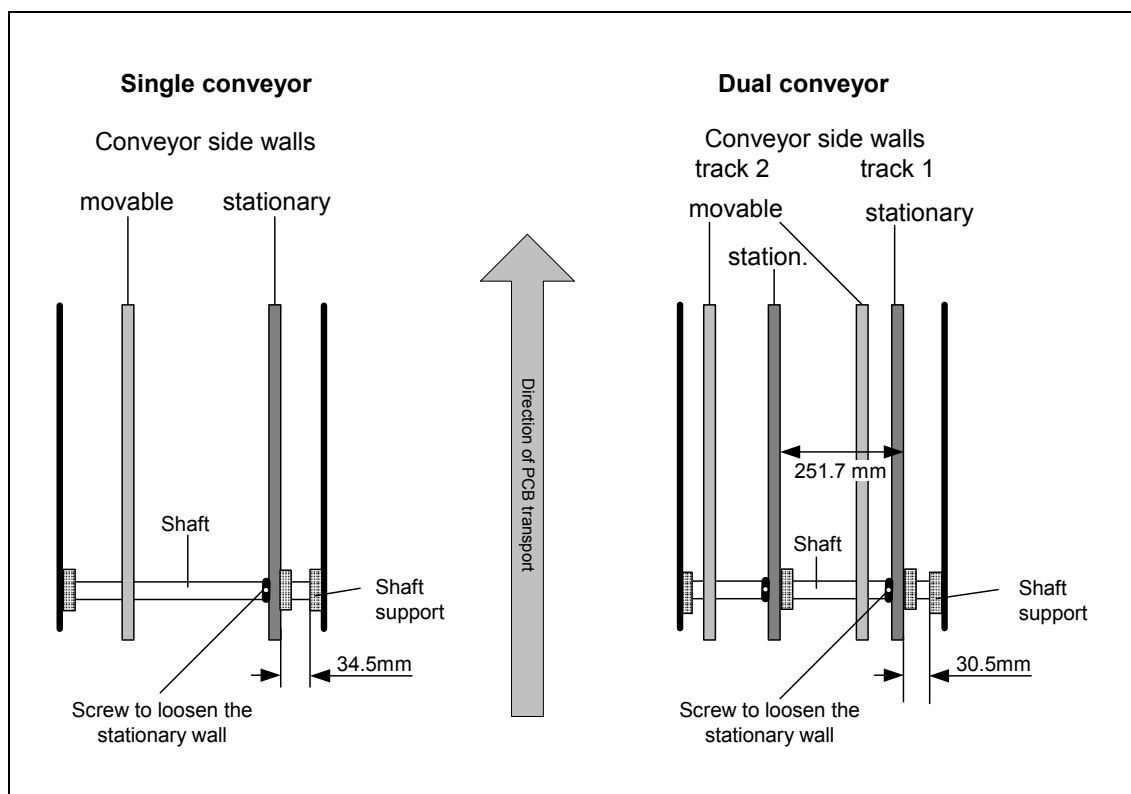


Fig. 6.12.20 Setting the "fixed conveyor side" HS-60, S-27 HM

6.13 Width adjustment

DANGER



Please observe the safety instructions in [Chapter 2](#).

6.13.1 Function

The width adjustment system is motor-driven with program control. For dual conveyor systems, differing widths can be set for the two conveyor tracks. The width adjustment uses a stepping motor, meaning that the PCB width can be set independently of other machine components (e.g. the Y-gantry).

The conveyor width set is fixed to a steel strip, with the help of a clamping device.

The PCB width is adjusted via two adjustment units (pneumatic cylinders), installed under the input or output conveyor.

- The stepping motor moves the two adjustment units synchronously through the use of ball screws and a toothed belt.
- To adjust the PCB width, the two adjustment units are positioned under the conveyor side concerned. The exact position is determined with the help of an end position proximity switch on the relevant adjustment unit.
- The pneumatically operated fixing pins mechanically connect the conveyor side with the adjustment unit. The conveyor side is unclamped (on the steel strip).
- After the new PCB width has been set, the conveyor side is reclamped and the adjustment unit fixing pins are disconnected.

For dual conveyor systems, the widths of the transport paths are set one after the other (only one drive unit for both conveyor tracks). Maximum and minimum PCB widths are monitored by the end position switch. If the two conveyor sides of any one conveyor track are not parallel to one another, this will be automatically corrected during width adjustment. The two adjustment units are then moved under the conveyor side concerned. The adjustment unit first reaching its position under the conveyor side fixes this. Travel continues until the second adjustment unit has also reached its position and fixed the conveyor side.

The conveyor track has now been corrected and the two conveyor sides should be parallel. If necessary, the correct PCB width can now be set.

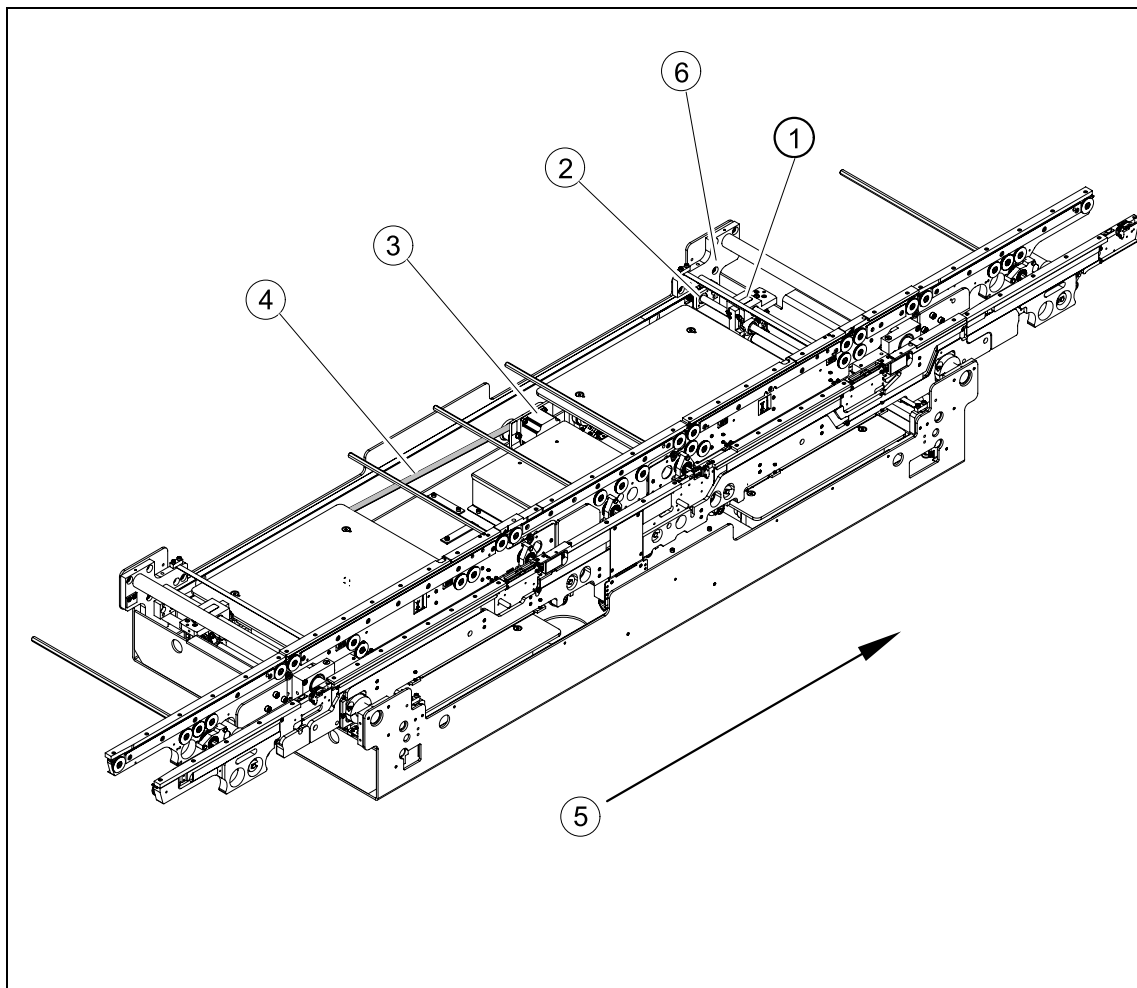


Fig. 6.13.21 Overview of width adjustment (example shows the HS-60)

Key

- | | |
|-------------------------------------|---|
| (1) Adjustment unit | (4) Toothed belt for the width adjustment drive |
| (2) Synchronizing disk with spindle | (5) Direction of travel |
| (3) Width adjustment stepping motor | (6) Bearing flange |

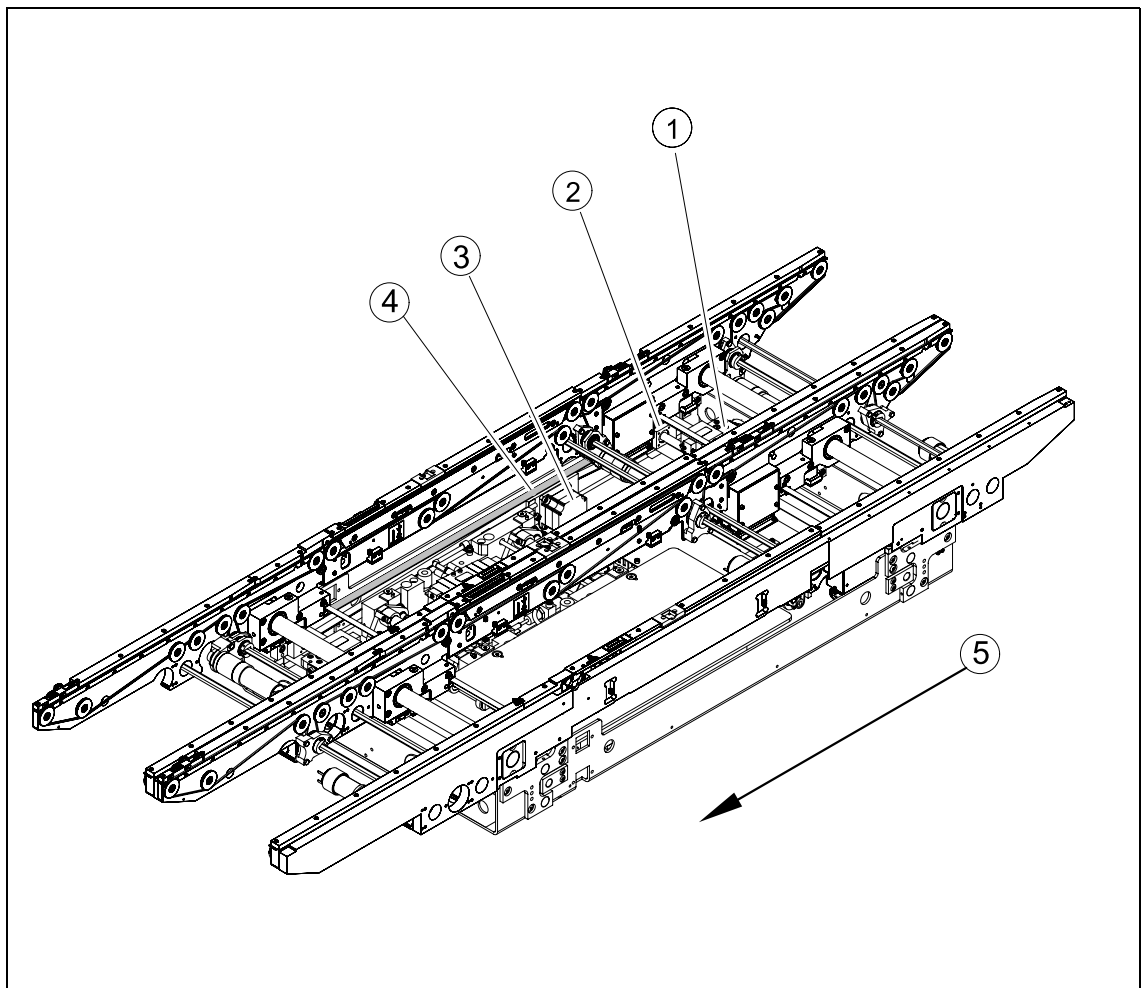


Fig. 6.13.22 Overview of width adjustment on the S-27 HM

Key

- | | |
|-------------------------------------|---|
| (1) Adjustment unit | (4) Toothed belt for the width adjustment drive |
| (2) Synchronizing disk with spindle | (5) Direction of travel |
| (3) Width adjustment stepping motor | |

CAUTION



The bearing flange for the HS-60 (see [Fig. 6.13.21](#)) and S-27 HM MUST NOT be loosened or adjusted. This would prevent the PCB conveyor from functioning and it would need to be completely replaced.

6.13.2 Replacing the stepping motor of the width adjustment system (00367174-02)

DANGER 

Please observe the safety instructions in [Chapter 2](#).

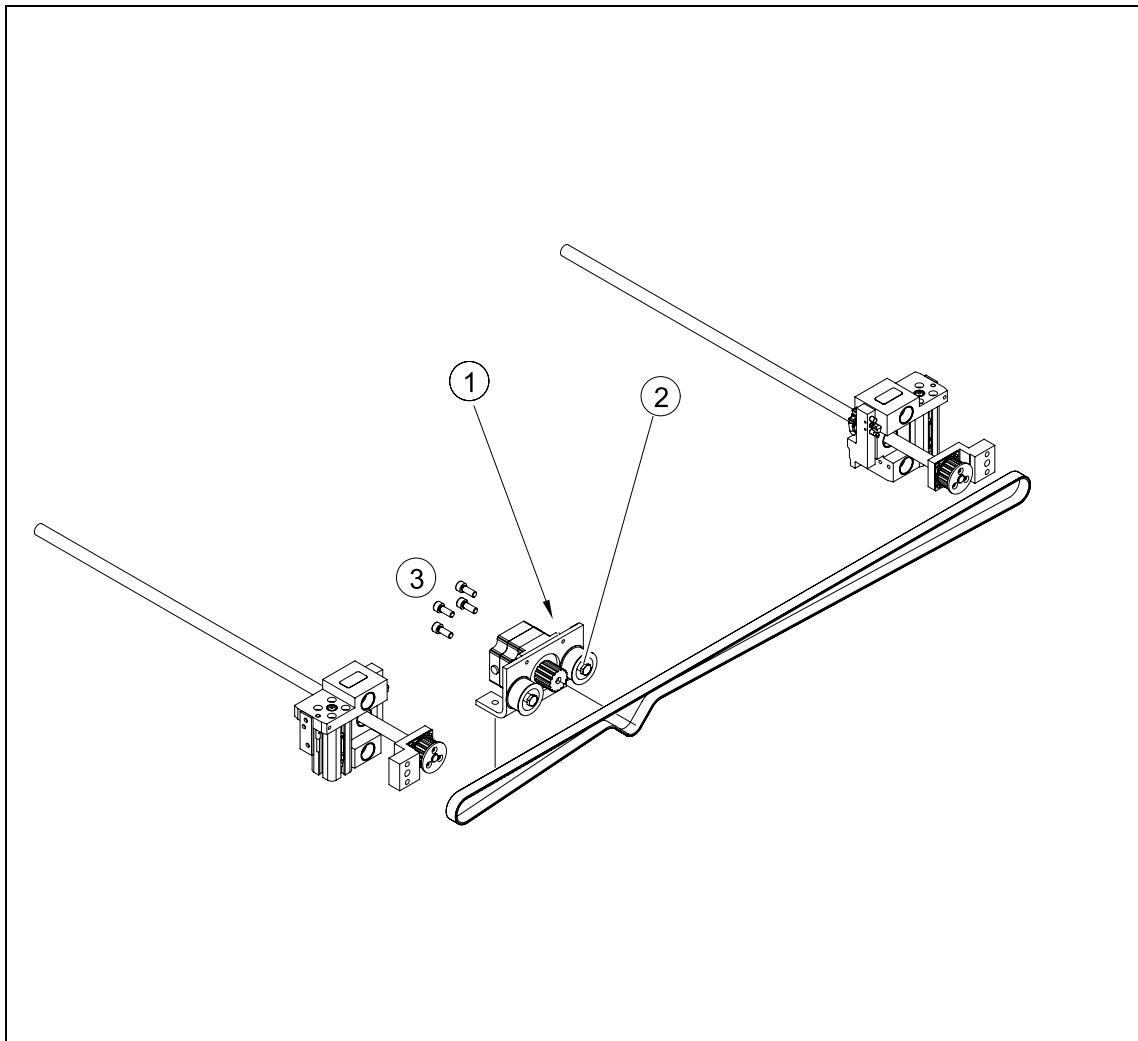


Fig. 6.13.23 Replacing the stepping motor of the width adjustment system

Key

- (1) Loosening the eccentric axle on the deflection pulley
- (2) Locknut on the eccentric axle
- (3) Screws fastening the stepping motor

6.13.2.1 Removal/installation



CAUTION

During the following removal and installation of the motor, the toothed belt for the width adjustment drive must **not be stretched or kinked!**

- Move the PCB conveyor to the position which allows you best access to the stepping motor of the width adjustment system.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit. See also [Fig. 6.11.9](#).
- Loosen the eccentric axle on the deflection pulley and relieve the tension on the drive belt.
- Remove the 4 fastening screws and then lift out the stepping motor.
- Unplug the connection cable in the cable duct.
- Install the new stepping motor and reconnect the system to the electricity supply.
- Tension the drive belt as described in [Section 6.13.3](#).

6.13.3 Replacing a toothed belt for the drive of the width adjustment system (00356841-01)

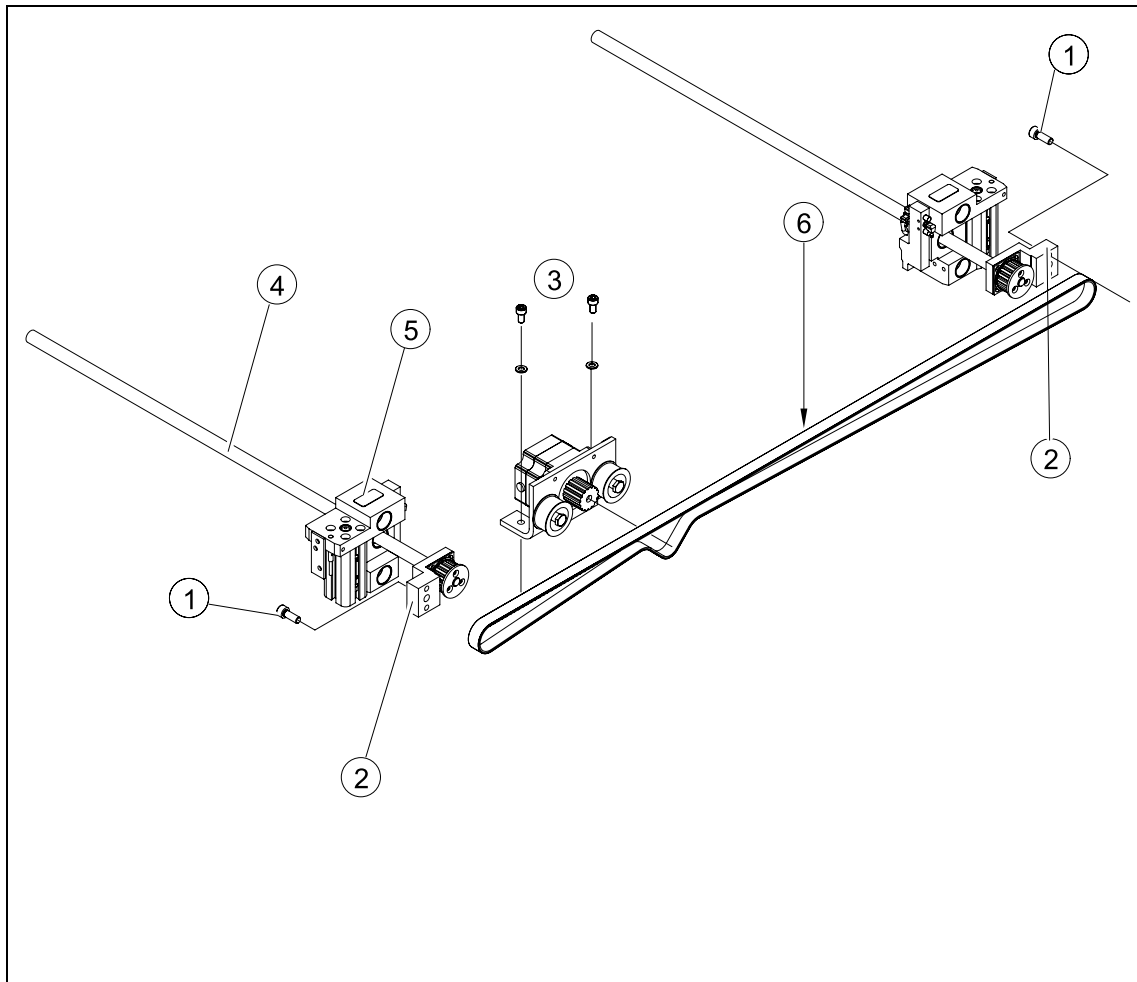


Fig. 6.13.24 Replacing a toothed belt for the drive of the width adjustment system

Key

- | | |
|---|--|
| (1) Fastening screw on spindle block | (4) Spindle |
| (2) Spindle block with synchronizing disk | (5) Adjustment unit |
| (3) Stepping motor on flange | (6) Measuring point of belt tension measuring device (Strand center) |

6.13.3.1 Removal/installation

- Move the PCB conveyor to the position which allows you best access to the width adjustment system.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit. See also [Fig. 6.11.9](#)
- Loosen the eccentric axle of the deflection pulley and relieve the tension on the toothed belt of the width adjustment system drive (see also [Fig. 6.13.25](#)).

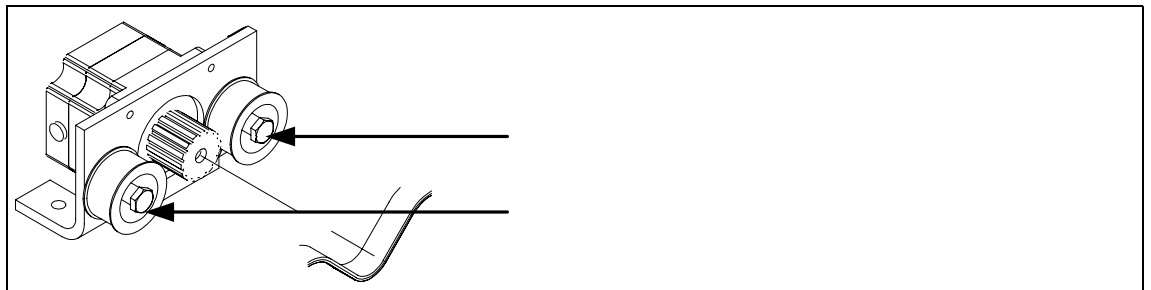


Fig. 6.13.25 Loosening the eccentric axle on the deflection pulley

- Undo the two fastening screws on the stepping motor flange and weave the toothed belt out of the drive.
- Undo the fastening screws on the spindle block of the input or output conveyor and lift the spindle block out of the locating pins. You can now remove the toothed belt from the synchronizing disk.
- Undo the second spindle block and remove the toothed belt.



CAUTION

The new toothed belt must **not be stretched or kinked!**

- Place the new toothed belt on the two synchronizing disks for the spindle block and run over the deflection pulley into the drive unit.

- Set the parallelism of the adjustment unit to the fixed side.
 - Manually turn the spindle and place any gauge block between the adjustment unit and the conveyor side.
 - Turn the spindle until both adjustment units reach this limit.
 - Check the distance on both sides with this gauge block.
- Tension the toothed belt (see also [Fig. 6.13.24](#)) on the eccentric axle until it engages fully with the teeth of the synchronizing disk.
Please check: The **entire width** of the toothed belt must be engaged on the synchronizing disk and must also run along the entire length of the deflection pulley.

6.13.3.2 Setting the tension of the toothed belt for the width adjustment system drive

- Position the measuring point of the belt tension measuring device at the strand center (i.e. the longest distance between two synchronizing disks) of the toothed belt (see also [Fig. 6.13.24](#)).
- Set the belt tension according to the following values.
 - Width adjustment: 24 Hz (+/- 2 Hz)

6.13.4 Replacing the limit switches for the end position of the width adjustment system (00365108-02)

DANGER



Please observe the safety instructions in [Chapter 2](#).

Limit switch in the input conveyor:

In the vicinity of the input conveyor, there are 4 limit switches under the conveyor sides. The limit switch is designed to prevent the conveyor sides hitting one another or the conveyor base.

Limit switch in the output conveyor:

In the vicinity of the output conveyors, there are 2 limit switches for the adjustment unit. They serve to secure the transport area and to initialize the adjustment unit during width adjustment.

6.13.4.1 Parts

- 00365002-03 Limit switch on the mounting tray
- 00365108-02 Limit switch for width adjustment 1
- 00365109-02 Limit switch for width adjustment 2
- 00362345-01 Limit switch for width adjustment - on the conveyor side

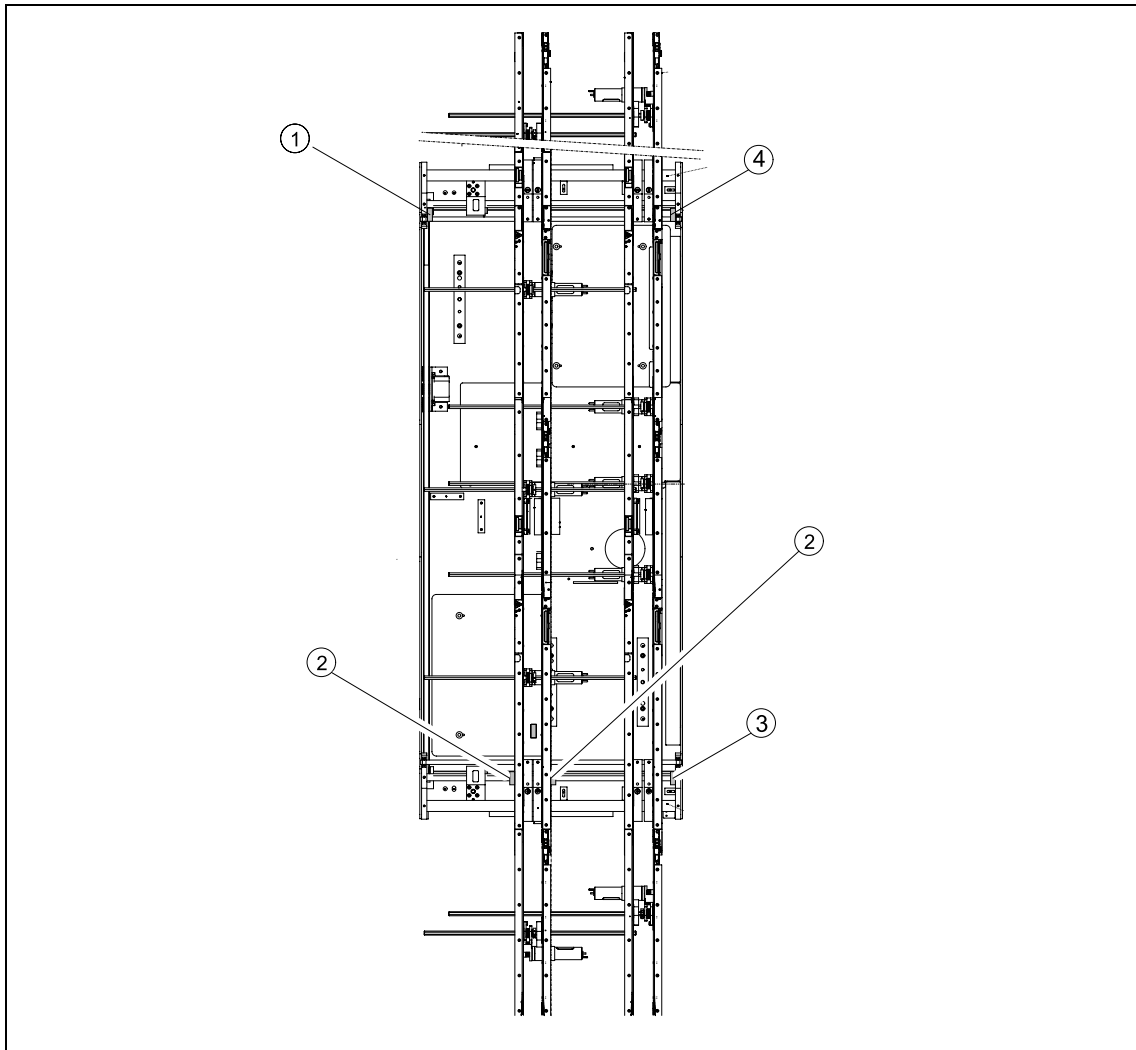


Fig. 6.13.26 Replacing the limit switch for the width adjustment system (*example shows HS-60*)

Key

- | | |
|---|---|
| (1) Limit switch on the mounting tray | (3) Limit switch for width adjustment 1 |
| (2) Limit switch for width adjustment 1 or 2 for dual conveyors | (4) Limit switch for width adjustment 2 |

6.13.4.2 Removal/installation

NOTE:

The limit switches are pre-assembled and include cables.

However, if the limit switch itself is faulty, the wiring can also be unsoldered/soldered right at the switch in question.

→ Unsolder the connection wires on the faulty limit switch (see also [Section 6.16](#) and [Section 6.17](#)).

→ Undo and remove the two screws on the faulty limit switch.

NOTE:

If you have discovered a break in the limit switch cable during a continuity check, the cable must be woven out as far as the **conversion board of the mounting tray** (see circuit diagrams of the same name) and unplugged at the corresponding point. (see also [Section 6.16](#) and [Section 6.17](#)).

This may be somewhat complicated depending on the routing of cables inside the machine base.

You may wish to contact Siemens AG SMD Service regarding this work.

→ Install the new limit switch and re-solder the connection wires with the **correct allocation**.

6.13.4.3 Checking the position of the limit switch

→ Check the minimum and maximum width for the relevant machine type and the parallelism of the conveyor sides.

6.13.5 Adjustment unit for the width adjustment system

The position of the adjustment unit in the width adjustment system is shown in [Fig. 6.13.21](#)

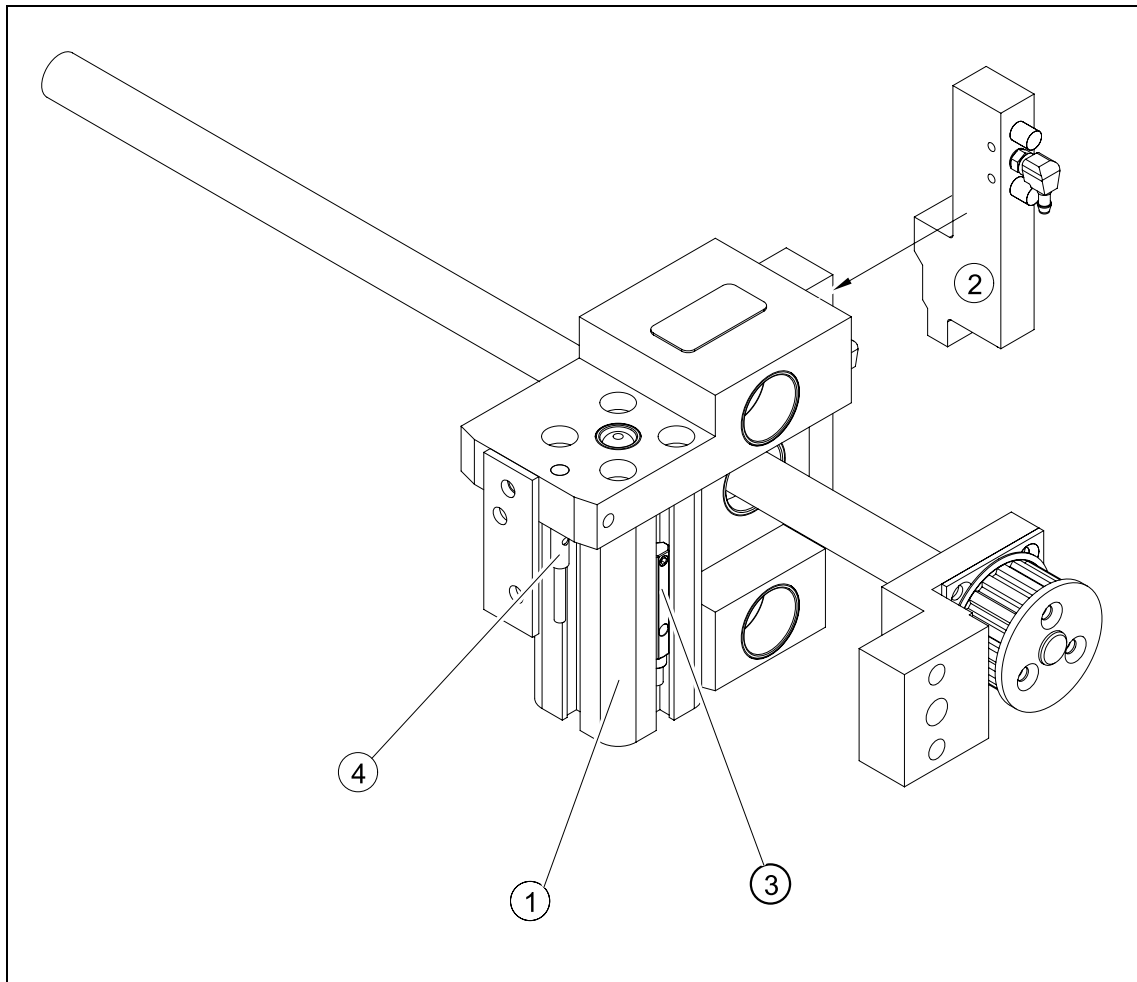


Fig. 6.13.27 Overview of the adjustment unit for the width adjustment system

Key

- | | |
|---------------------------|--|
| (1) Short-stroke cylinder | (3) Proximity switch |
| (2) Solenoid valve | (4) Proximity switch for the adjustment unit |

6.13.5.1 Replacing the valve of the adjustment unit (00363779-01)

Parts

- 00363779-02 Adjustment unit valve 1
- 00363780-02 Adjustment unit valve 2

- Move the PCB conveyor to the position which allows you best access to the adjustment unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Switch off the compressed air supply.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo and remove the screw fastening the connection plug (see also [Fig. 6.13.27](#)).
- Disconnect from the pneumatic system.
- Undo the two fastening screws and remove the valve from the short-stroke cylinder.

NOTE:

If you have discovered a break in the connection cable during a continuity check, the cable must be woven out as far as the **conversion board of the mounting tray** (see circuit diagrams of the same name) and unplugged at the corresponding point. (see also [Section 6.16](#) and [Section 6.17](#)). This may be somewhat complicated depending on the routing of cables inside the machine base. You may wish to contact Siemens AG SMD Service regarding this work.

- Install the new valve and reconnect to the electrical and pneumatic systems.

6.13.5.2 Replacing the proximity switch for width adjustment systems 1+2 (00363777-01)

The proximity switch on the adjustment unit cylinder should operate when the adjustment unit pin is pushed out by the pneumatic cylinder and therefore connected to the conveyor side. This signal enables the motor of the width adjustment system.

Parts

- 00363777-01 Proximity switch for width adjustment system 1
- 00363778-01 Proximity switch for width adjustment system 2

- Move the PCB conveyor to the position which allows you best access to the adjustment unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Switch off the compressed air supply.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Loosen the grub screw on the proximity switch (see also [Fig. 6.13.27](#)) and move the proximity switch out of the lifting table guide rail.
- Extract the connection cable as far as the conversion board of the mounting tray.
- Run the connection cable for the new proximity switch.
- Insert the new proximity switch into the guide rail.
- Switch the machine on.

NOTE

The width adjustment system proximity switch is set adjusted in engaged mode.

- Move the width adjustment system until the proximity switch switches - LED (H36/H37) lights up.
Engage the cylinder - i.e. the cylinders are moved to the upper limit by the controls.
- Set the proximity switch so that the LED lights up when it is in engaged mode.
- Fix the position of the proximity switch with the grub screw.

6.13.5.3 Replacing the proximity switch for adjustment units 1+2 (00363775-01)

The proximity switch serves as a signal for controlling the pneumatic valve of the adjustment unit. Once the switching point has been reached, the conveyor side is connected via the short-stroke cylinder.

Parts

- 00363775-01 Proximity switch adjustment unit 1
- 00363776-01 Proximity switch adjustment unit 2

- Move the PCB conveyor to the position which allows you best access to the adjustment unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Switch off the compressed air supply.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Loosen the grub screw on the clamping device (see also [Fig. 6.13.27](#)) and extract the connection cable as far as the conversion board of the mounting tray.
- Insert the new proximity switch and reconnect to the electricity supply.
- Fix the proximity switch with the grub screw. The proximity switch must be level with the adjustment unit housing.
- The switching point is set at the actuator on the conveyor side.
Move the adjustment unit to under the conveyor side (see also [Fig. 6.13.28](#)).
- Place a gauge block of 2/10mm on the adjustment unit, press the actuator onto the gauge block and tighten the screw.

NOTE

This setting must be performed at all conveyor sides.

6.13.5.4 Replacing the actuator for the width adjustment system (00355533-02)

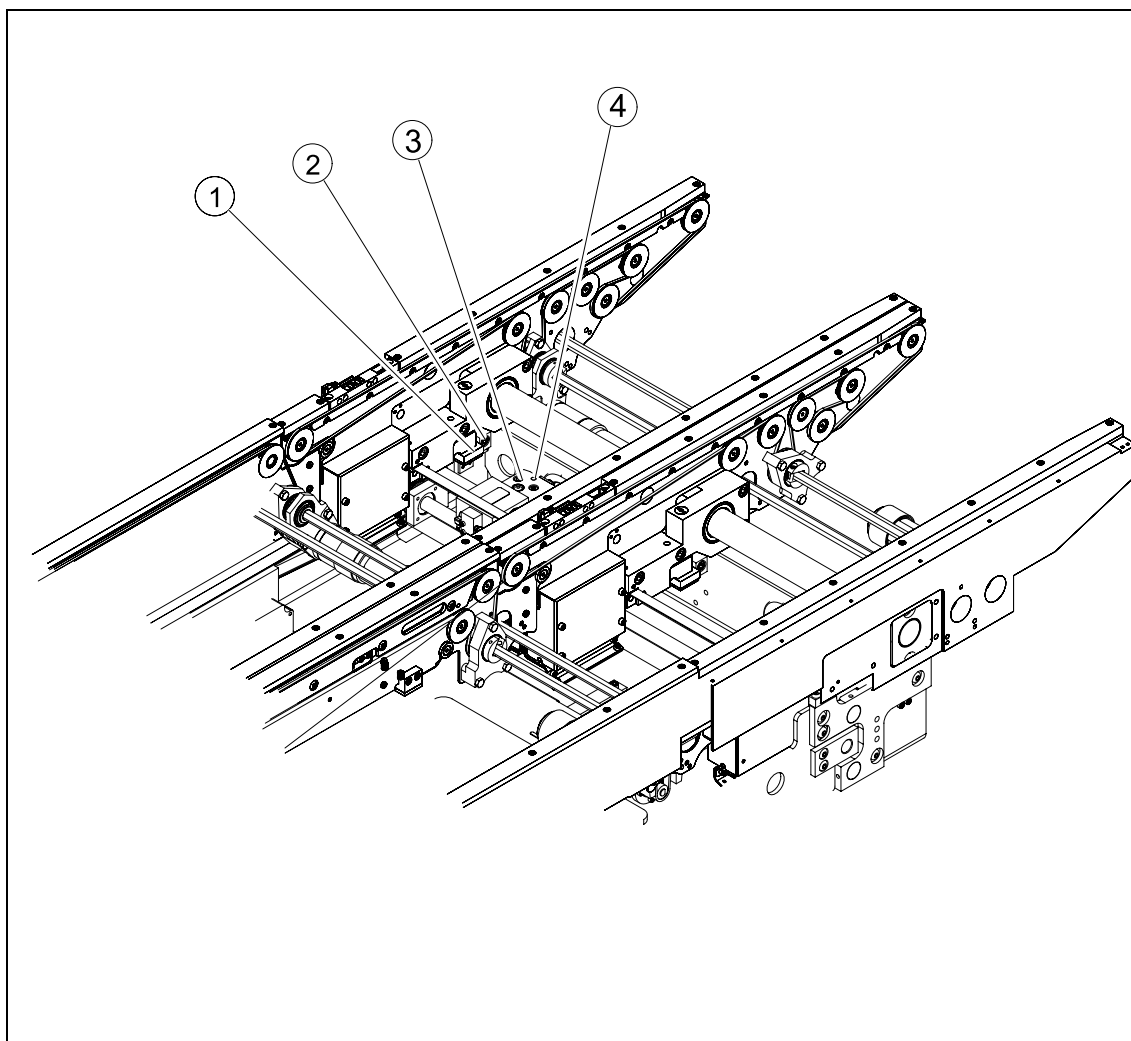


Fig. 6.13.28 Replacing the actuator for the width adjustment system

Key

- | | |
|----------------------------------|--|
| (1) Actuator | (3) Adjustment unit |
| (2) Fastening screw for actuator | (4) Proximity switch for adjustment unit |

- Move the PCB conveyor to the position which allows you best access to the adjustment unit.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Switch off the compressed air supply.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.

- Undo and remove the screw fastening the actuator. (see also [Fig. 6.13.28](#)).
- Install the new actuator and screw in loosely.
- The switching point is set at the actuator on the conveyor side.
Move the adjustment unit to under the conveyor side.
- Place a gauge block of 2/10mm on the adjustment unit, press the actuator onto the gauge block and tighten the screw.

6.14 Light barriers and stopper for scanning the PCB positions along the transport routes

6.14.1 Function

The positions of the PCBs are scanned with the help of light barriers (transmitter and receiver modules). The light barriers are installed above the conveyor belt and *feel* along the length of the conveyor belt.

The light barrier signal stops the PCBs on the input conveyor, intermediate conveyor (HS-60 only) and output conveyors. The light barrier in the placement area can be moved 50 mm against the direction of transport to guarantee secure positioning of the PCB.

In the placement area the light barrier triggers the **braking procedure** via a DC motor. The software regulates a constant time interval for the slow travel towards the laser light barrier.

6.14.2 Replacing the light barriers for transmitter and receiver modules (from 00370063-01)

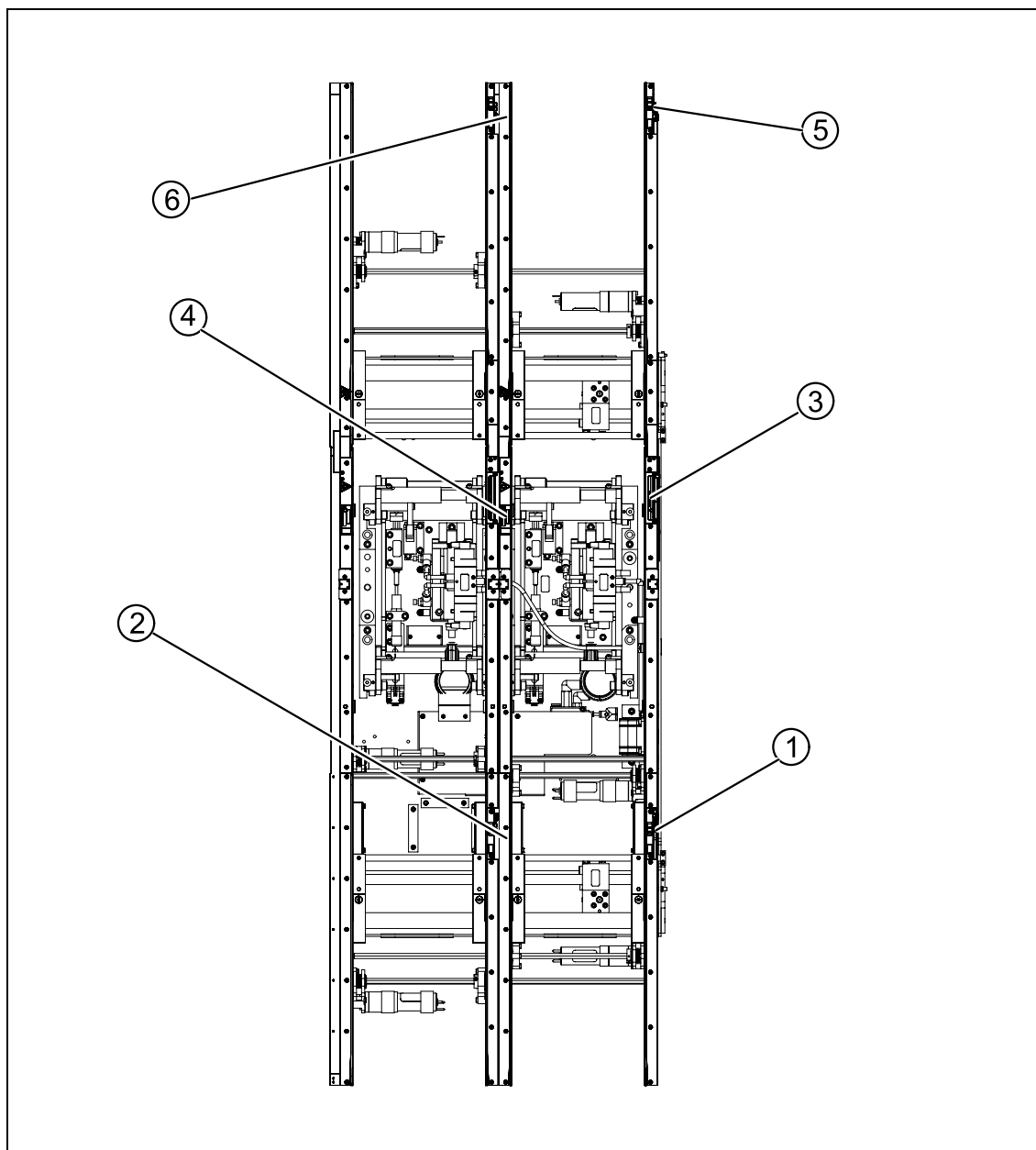


Fig. 6.14.29 Light barriers for transmitter and receiver modules (example shows S-27 HM)

Key

- | | |
|-----------------------------------|------------------------------------|
| (1) Transmitter on input conveyor | (4) Receiver on placement area |
| (2) Receiver on input conveyor | (5) Transmitter on output conveyor |
| (3) Transmitter on placement area | (6) Receiver on output conveyor |

6.14.2.1 Parts

NOTE

Please note the different item numbers for the individual light barriers. These are for the different lengths of the connection cable.

Please refer to the relevant spare parts catalogue for the different S-27 HM item numbers.

- 00370063-01 Light barrier transmitter input conveyor
- 00370064-01 Light barrier transmitter placement area1
- 00370065-01 Light barrier transmitter intermediate conveyor (HS-60 only)
- 00370066-01 Light barrier transmitter placement area 2 (HS-60 only)
- 00370067-01 Light barrier transmitter output conveyor
- 00370068-01 Light barrier receiver input conveyor
- 00370069-01 Light barrier receiver placement area1
- 00370070-01 Light barrier receiver intermediate conveyor (HS-60 only)
- 00370071-01 Light barrier receiver placement area 2 (HS-60 only)
- 00370072-01 Light barrier receiver output conveyor

6.14.2.2 Important instructions for replacing the light barrier

- The transmitter is installed on the fixed side of standard conveyor models, while the receiver is on the moveable side.
- Check whether it would be helpful to feed in the new cable with the aid of the old one, as least in some areas.
- The connection plug is equipped with contacts, which are pressed onto the wires. You may find it helpful to remove the contacts from the connection plug, in order to run the cable better through openings.
- For replacement purposes, the connection cable must be woven out as far as the relevant conversion board of the conveyor side. This may be somewhat complicated depending on the routing of cables inside the machine base.
Either contact Siemens AG SMD Service regarding this work or proceed as follows:

6.14.2.3 Exchanging the transmitter or receiver for placement area 1 + 2

General/function

- Switch on the laser light barrier
- The travel profile to brake the PCB starts

The light barrier in the placement area can be moved within a range of 50 mm. it is not necessary to move the light barrier in order to reduce the speed of the PCB, so that it stops securely at the laser light barrier. In its standard form, the light barrier is installed in the direction of conveyor input, giving the maximum distance between the light barrier and laser. The software automatically learns the slow travel of the PCB of approx. 100 ms up to the laser light barrier. Once the travel profile for braking the PCB has begun, the PCB will be reliably stopped at the laser light barrier after a maximum of 100 ms.

Receiver

- Undo the screw fastening the light barrier.
- Pull the side cover plate out of its guidance.
- Undo and remove the 7 fastening screws from the guide rail.
- Carefully remove the plate beneath and weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position.
- Insert the cover plate and install the guide rail.
While doing this, press the PCB take-up upwards and tighten the 7 fastening screws.

Transmitter

- Undo the 2 screws on the guide rail. You can now access the light barrier.
- Undo and remove the two screws fastening the light barrier.
- Weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position and install the guide rail.

6.14.2.4 Changing the receiver for the input or output conveyor

Transmitter

NOTE

The transmitter on the input and output conveyors is freely accessible. The bracket must be loosened and the screws fastening the light barrier removed.

- Loosen the bracket and remove the screws fastening the light barrier.
- Weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position.

Receiver

- Remove the screws fastening the light barrier.
- Undo and remove the 6 screws fastening the guide rail.
- Check whether it is possible to weave out the connection cable with its plug.

NOTE

Otherwise check whether you can run the cable through the opening by removing the contacts in the connection plug.

- Relieve the tension on the conveyor belt, if necessary and remove the deflection pulley at the opening, so that the cable can be woven out
- Weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position.
- Install the deflection pulley and conveyor toothed belt. Tension the belt (see also [Section 6.10.3](#)).

6.14.2.5 Removing and installing the light barrier for the intermediate conveyor

Receiver

- Undo the screw fastening the light barrier.
- Pull the side cover plate out of its guidance.
- Undo and remove the 7 fastening screws from the guide rail
- Carefully remove the plate beneath and weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position.
- Insert the cover plate and install the guide rail. While doing this, press the PCB take-up upwards and tighten the 7 fastening screws.

Transmitter

NOTE

The transmitter on the input and output conveyors is freely accessible. The bracket must be loosened and the screws fastening the light barrier removed.

- Loosen the bracket and remove the screws fastening the light barrier.
- Weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position.

6.14.3 Replacing the laser light barriers for stopper positions (00364782-01)

6.14.3.1 Functions

The PCB is stopped in the placement area with the aid of a laser light barrier. As soon as the light barrier detects the front edge of an approaching PCB, the PCB is stopped. This method avoids the impact previously caused when the PCB reached the stopper.

The position accuracy of the stopped PCB is $\pm 0,5$ mm.

The S-27 HM is designed for the placement of longer PCBs but it does not have 2 stopping positions as in the case of HS-60. The situation is therefore different in the S-27 HM, as the machine gantry has a larger travel range and can reach any position on the PCB. The PCB does not need to be moved to the second stopping position in order to perform placement work on the rear area of the PCB.

DANGER



The laser light barrier emits class 2 laser beams. These do not require any additional safety measures!

However, DO NOT expose your eyes to the laser beam!

Since laser beam deviation is at its greatest during maximum conveyor width, we recommend a comparison at maximum conveyor width.

NOTE

After setting the laser light barrier you must check or re-teach the laser light barrier!

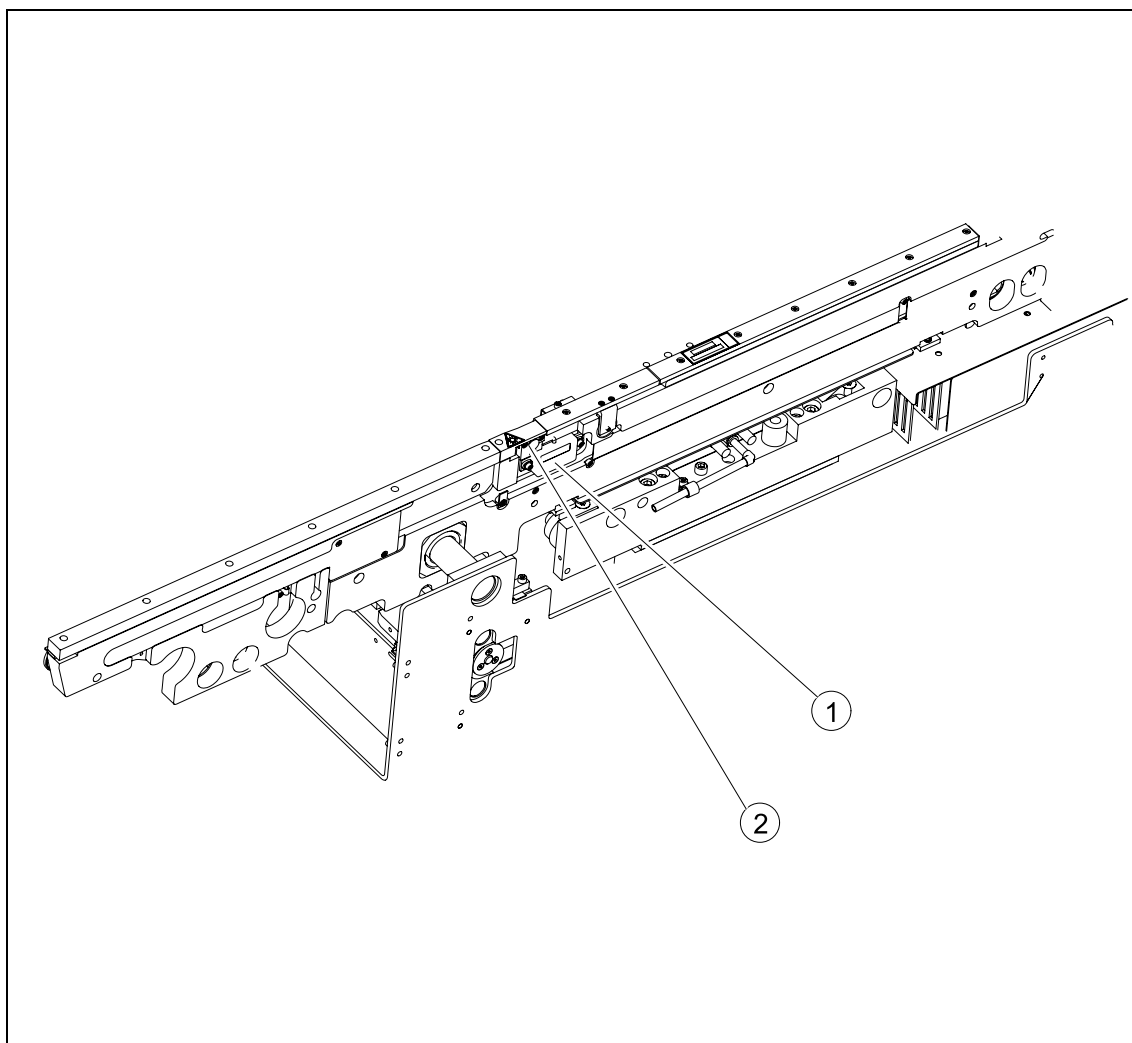


Fig. 6.14.30 *Laser light barrier for stopper positions*

Key

- | | |
|--|--|
| (1) Transmitter module (amplifier) with 2 screws | (2) Transmitter module (round laser diode) with 3 screws |
|--|--|

6.14.3.2 Parts

- 00364782-01 Laser light barrier for transmitter module BB1
- 00364782-01 Laser light barrier for transmitter module BB2

6.14.3.3 Removal/installation

NOTE

Since laser beam deviation is at its greatest during maximum conveyor width, we recommend a comparison at maximum conveyor width. For laser diode settings, use the input/output function of the SITEST program to activate the laser diode.

- Move the PCB conveyor to the position which allows you best access to the laser light barrier.
- Move the Y-gantries into the area outside the PCB conveyor.
- Turn the machine off at the main switch and disconnect the machine from the mains voltage.
- Make sure the machine has been properly secured to prevent it being switched on again during servicing.
- Undo the 2 fastening screws on the large transmitter module and the 3 fastening screws on the small transmitter module.
- Weave out the connection cable as far as the relevant conversion board of the conveyor side.
- Unplug the conversion board of the conveyor side.
- Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- Fix the new light barrier in the original position.
- Switch the machine on.

6.14.3.4 Setting and checking the laser light barrier for the stopper positions

- Set the maximum conveyor width.
- Activate the relevant laser diode via the SITEST input/output function.
- Check the path of the laser beam. To do this, you might want to make the laser beam visible with the help of a piece of white paper or a light-colored PCB (see [Fig. 6.14.31](#)).
- Use the three adjustment screws to set the laser beam to the middle of the receiver.
- Check the placement nest and re-teach it, if necessary.

NOTE:

When you move the paper, the beam should follow the edge of the PCB as accurately as possible. Any deviation to the left or right should be kept to a minimum.

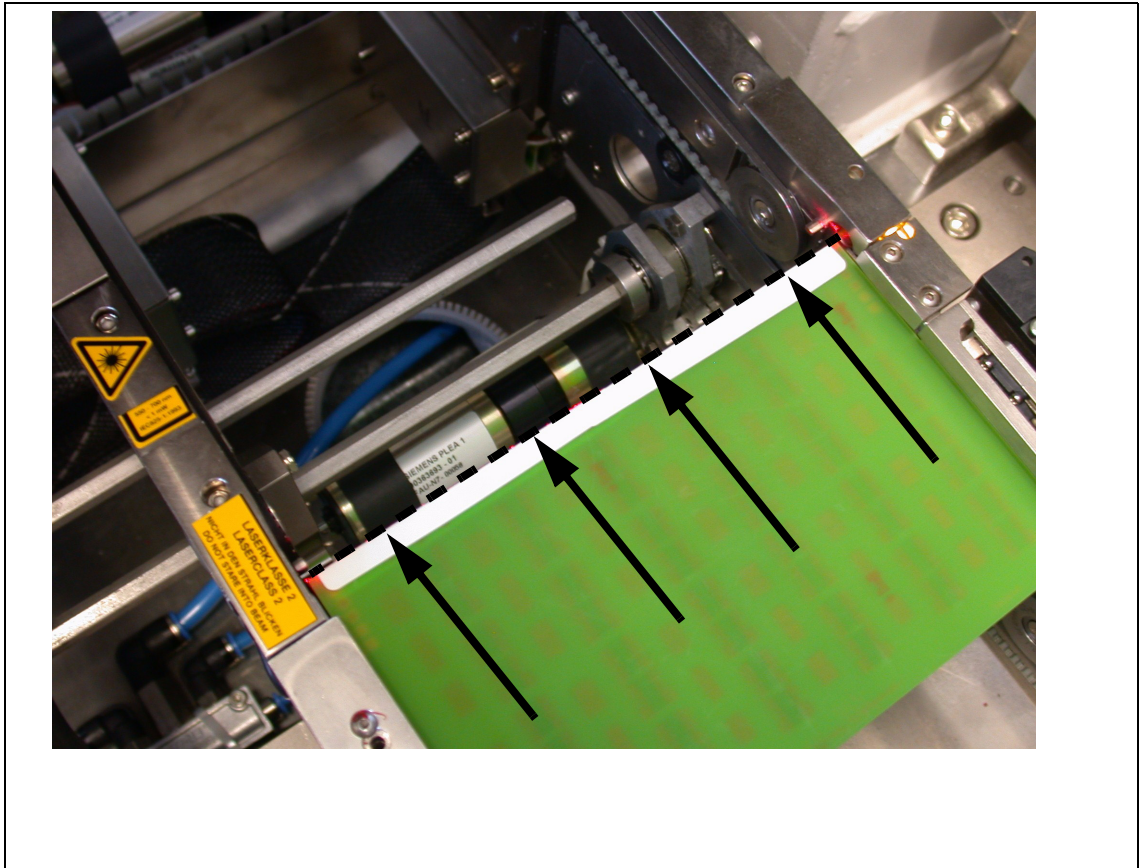


Fig. 6.14.31 Setting the laser beam

6.14.4 Setting the light barriers in the placement area

Function:

- Switch on the laser light barrier
- Start the PCB braking procedure, see [Fig. 6.14.32](#).

The light barrier in the placement area can be moved within a range of 50 mm. This function was designed for PCBs with recesses on the side, to ensure that they are stopped by the laser light barrier. In its standard version, the light barrier is installed in the direction of conveyor input, giving the greatest distance between the light barrier and laser. The software automatically sets the *slow travel of the PCB* so that it takes approx. 100 ms until it reaches the laser light barrier.

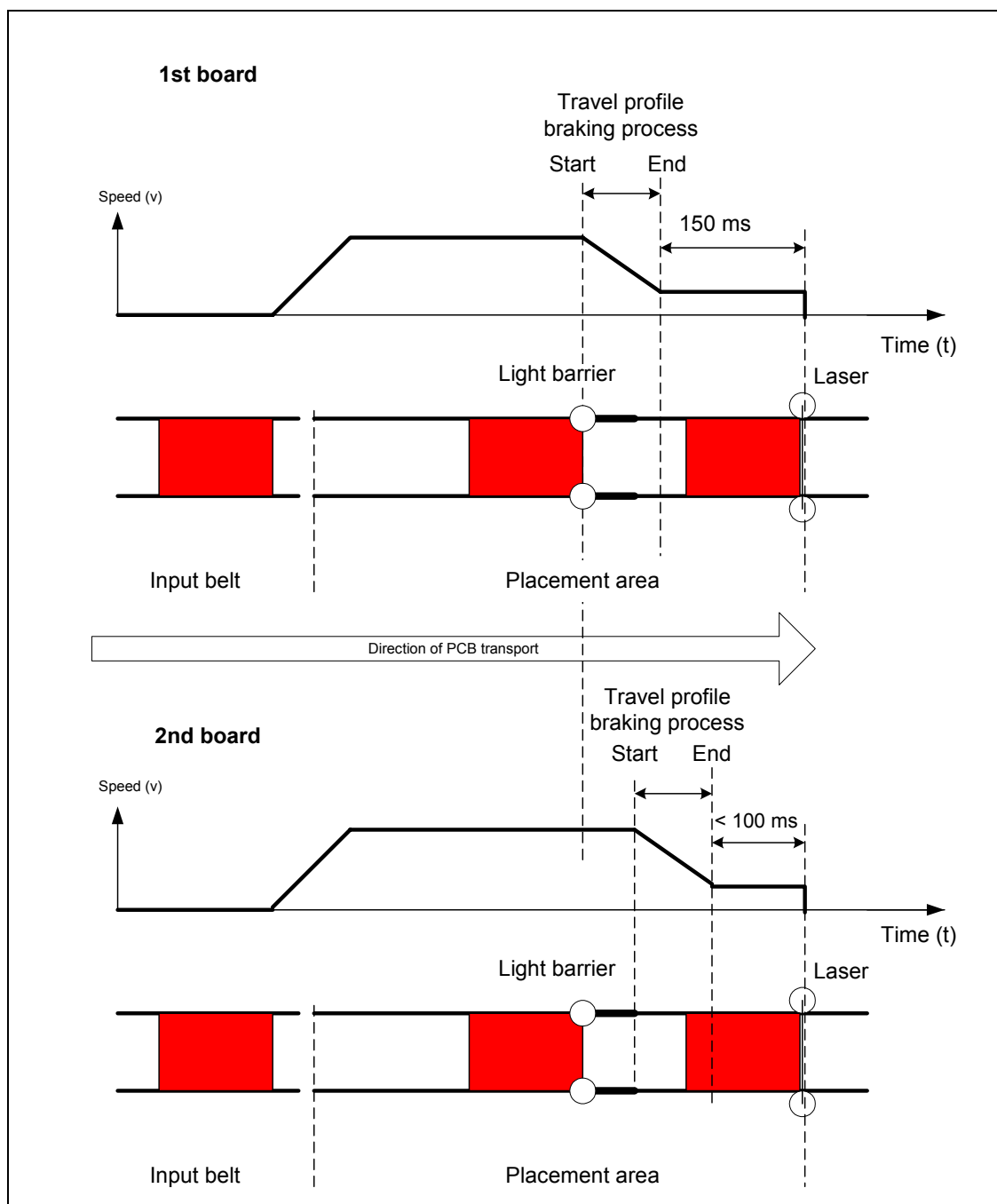


Fig. 6.14.32 Diagrams $v(t)$, PCB braking procedure

The travel profile to brake the PCB (see [Fig. 6.14.32](#)) is initiated at the correct moment to ensure that the PCB is stopped at the laser light barrier after a maximum of 100ms. The *automatic learning* process at the beginning of the travel profile ensures that the stopper position is reached in a constant time, irrespective of the PCB weight. The transport time remains constant.

6.15 Checks to be performed after mechanical work on the conveyor system

DANGER



Please observe the safety instructions in [Chapter 2](#).

- Check the distance between the top edge of the conveyor belt and the top of the guide rail.
This measurement should be 6 mm.
- Check the distance between the top edge of the conveyor belt and the top of the guide rail at the clamping sensor.
This measurement should be 5.8 mm.
- Check the distance between the actuator clamping device (lifting table) and the top edge of the belt.
This measurement should be 94.2 mm for the HS-60.
This measurement should be 74.2 mm for the S-27 HM.
- Check the distance between the actuator clamping device (lifting table) and the top edge of the belt at the clamping sensor.
This measurement should be 94.4 mm for the HS-60.
This measurement should be 74.2 mm for the S-27 HM

TIP

Move one PCB into the placement area and clamp the PCB in place. Now measure the distance between the top edge of the lifting table (rubber stop) and the bottom edge of the PCB. This height should be exactly 94 mm for the HS-60 and 74 mm for the S-27 HM.

NOTE

The actuator under the clamping sensor must be mounted 0.2 - 0.3 mm lower to guarantee reliable actuation of the clamping sensor.

- Push one PCB manually through the entire PCB conveyor system and make sure that **it moves easily through the entire system**.
Place a PCB in the previous station at the input point and transport it with the relevant functions through all 5 transport areas - all the way to the next PCB or to the output point.

6.16 Overview of the electrical components

6.16.1 Conversion board of the conveyor side (00359424-01)

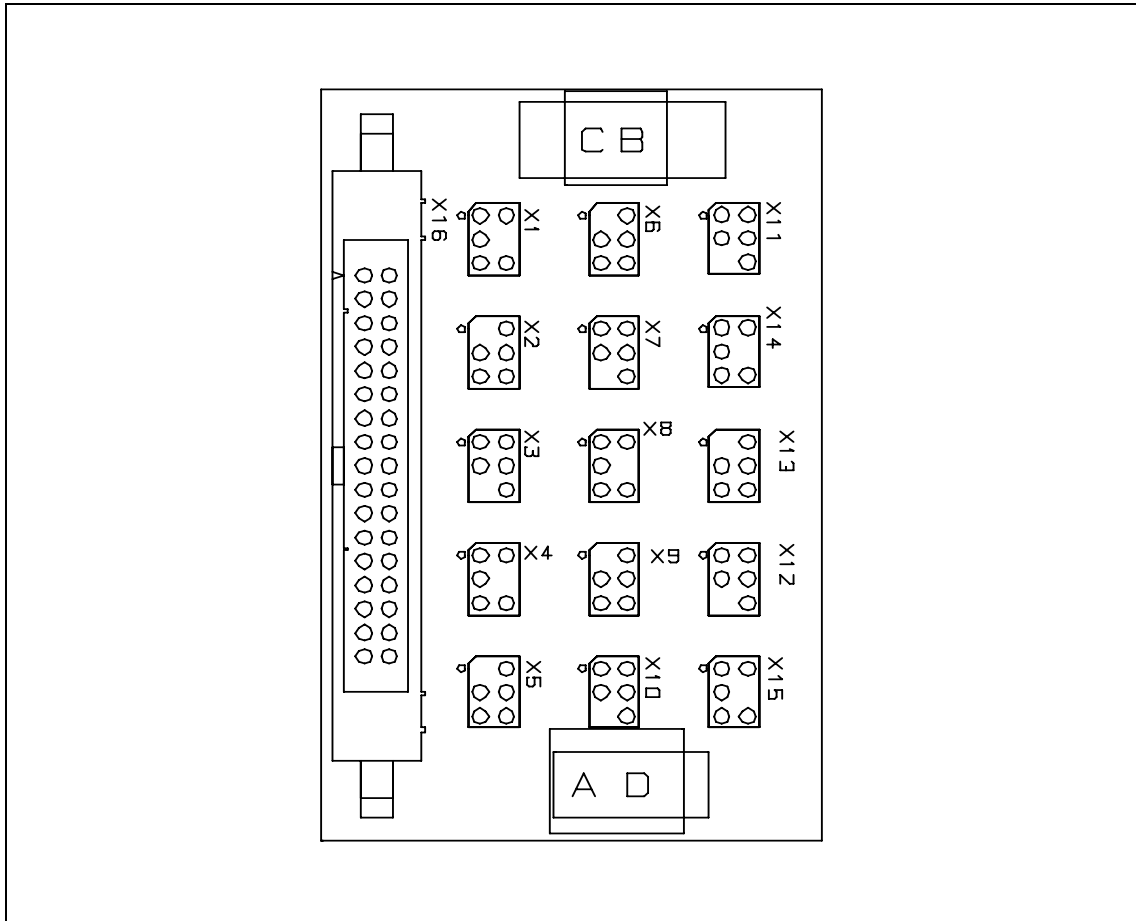


Fig. 6.16.33 Conversion board of the conveyor side (00359424-01)

6.16.2 Conversion board of the conveyor system (00359425-01)

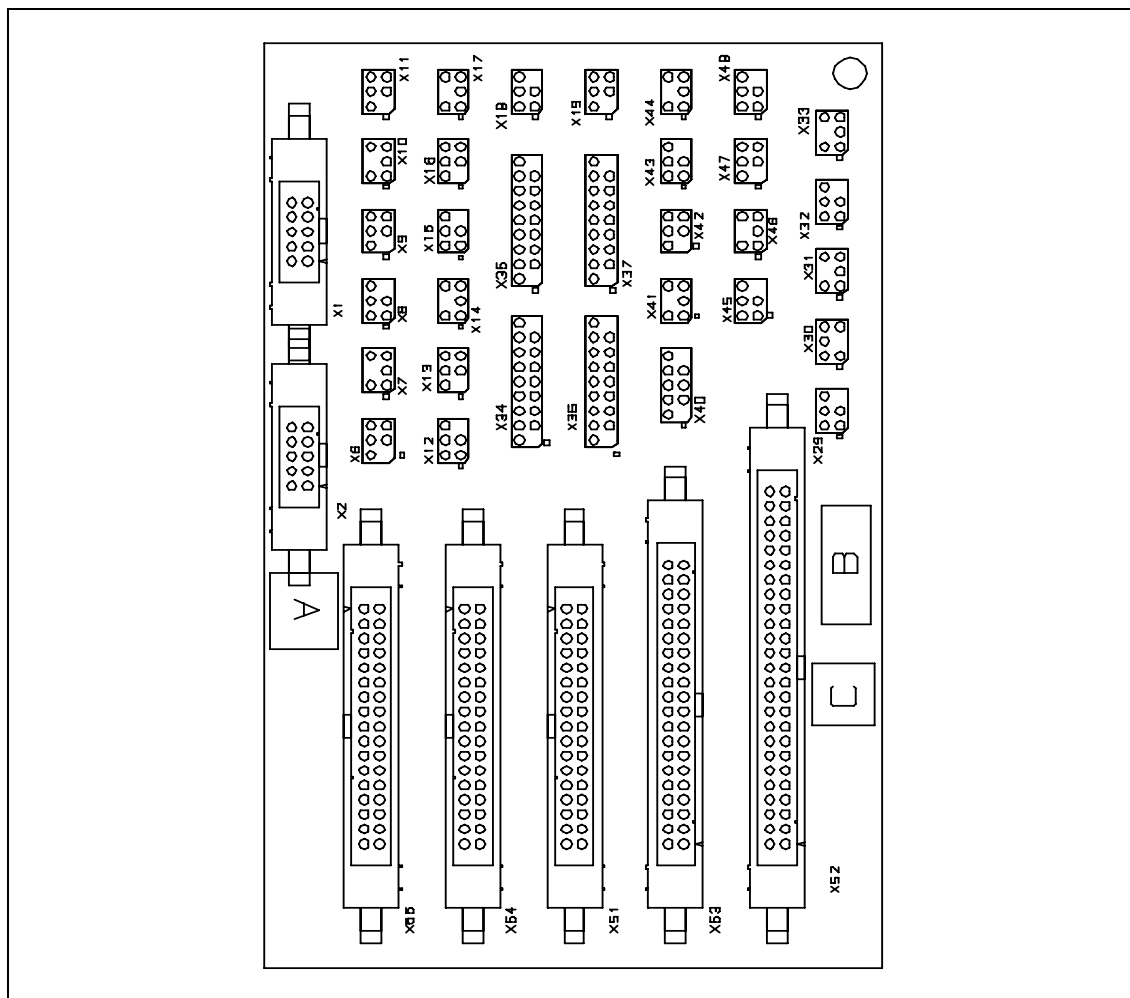


Fig. 6.16.34 Conversion board of the conveyor system (00359425-01)

6.16.3 Transport control TSP 301 for HS-60 (00370397-01)

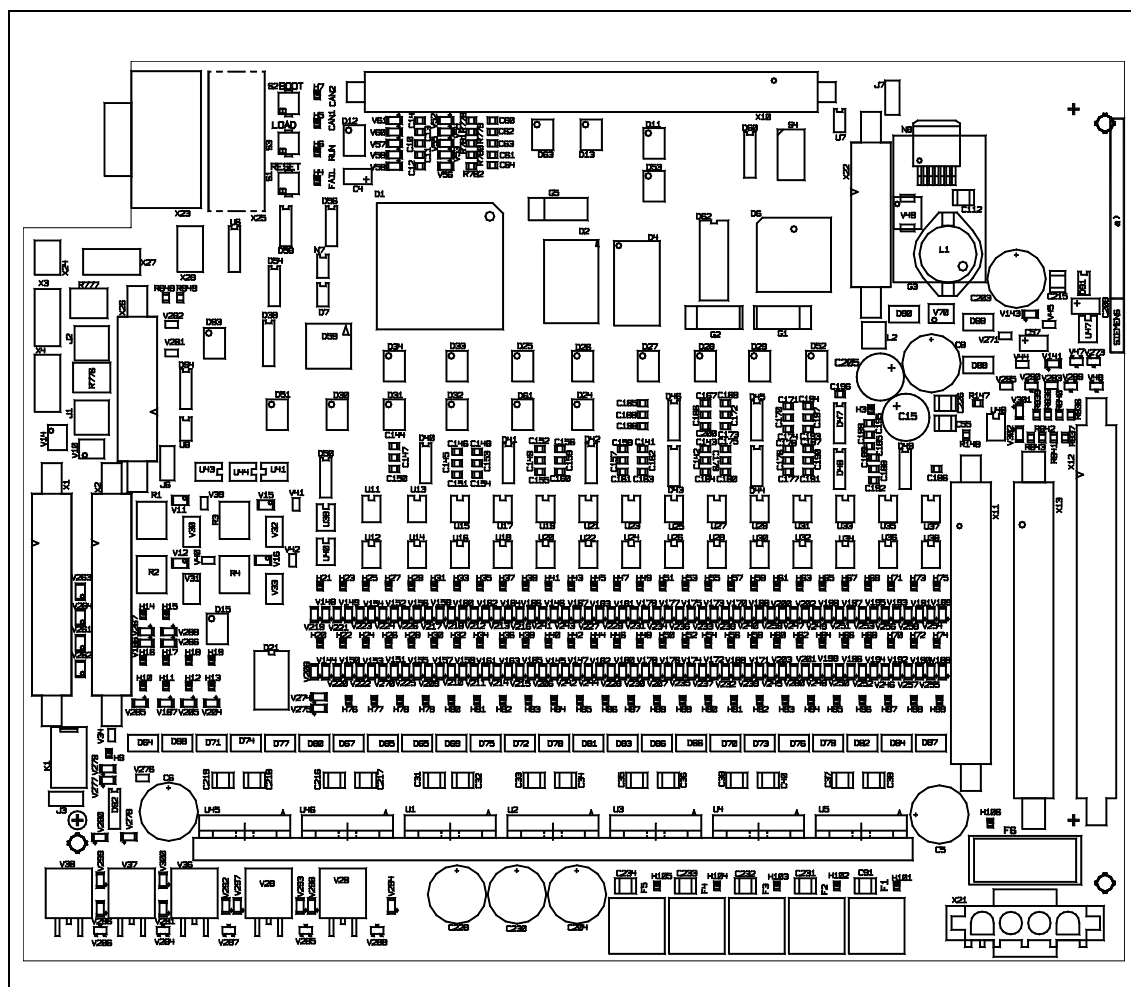


Fig. 6.16.35 *Transport control TSP 301 (00370397-01)*

6.16.3.1 Extension card TSP 301E for dual conveyors (00370398-01)

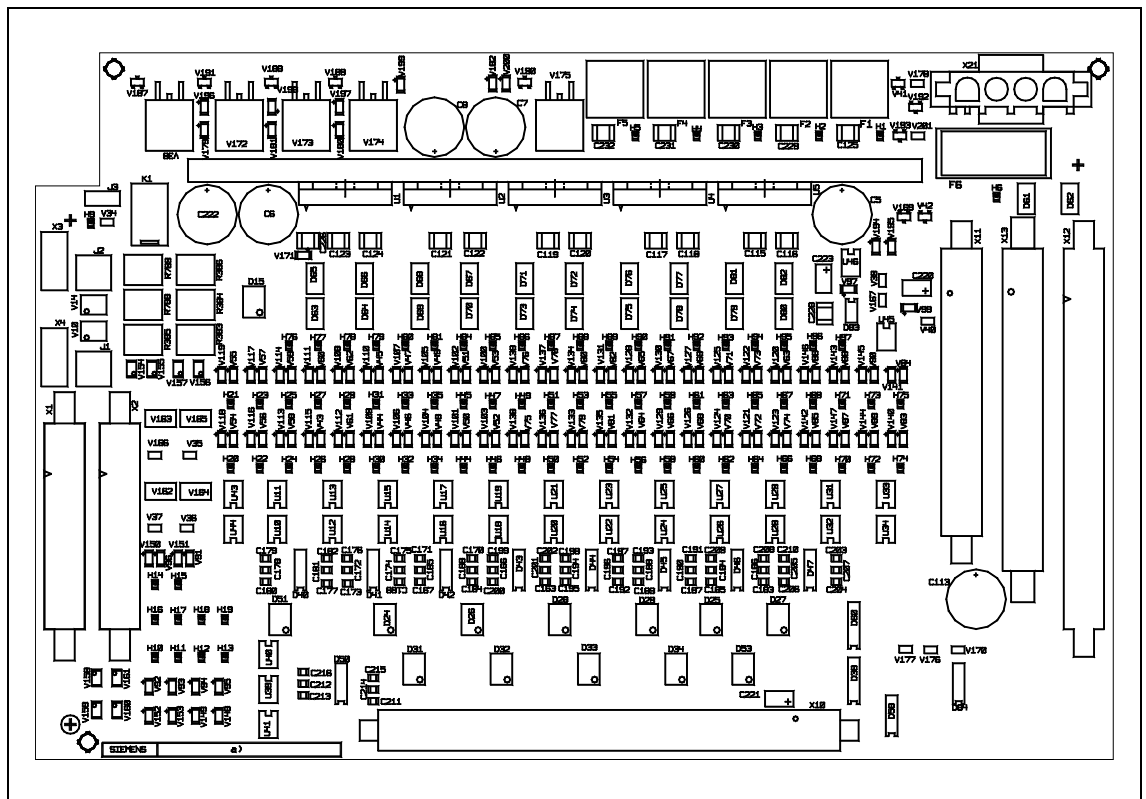


Fig. 6.16.36 Extension card TSP 301E for dual conveyors (00370398-01)

6.16.4 Transport control TSP 201 for S-27 HM (00358068-01)

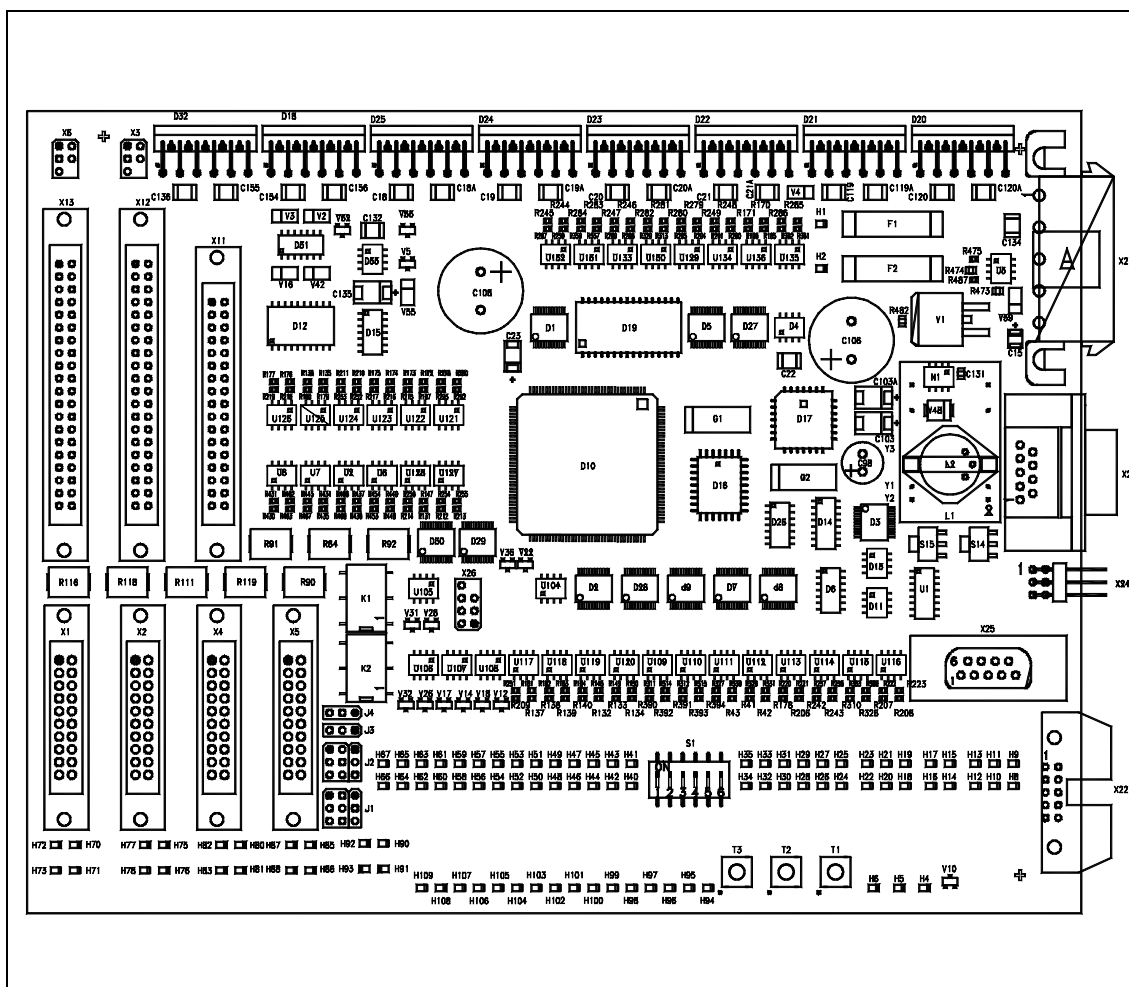


Fig. 6.16.37 Transport control TSP 201 (00358068-01)

6.16.5 Conversion board of the lifting table (00362766-01)

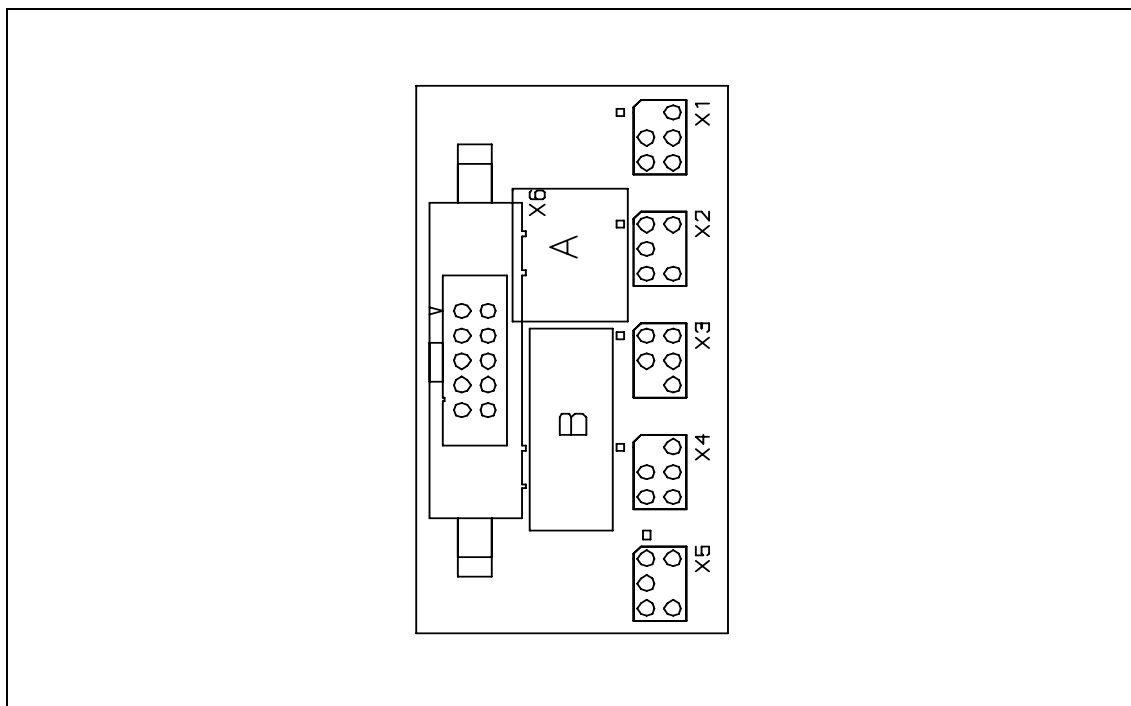


Fig. 6.16.38 Conversion board of the lifting table (00362766-01)

6.17 Block diagrams for modular transport

Please refer to this summary of the block diagrams when disconnecting/connecting the electrical connections and plugs for the limit switch, laser light barriers etc.) and for the motors.

CAUTION

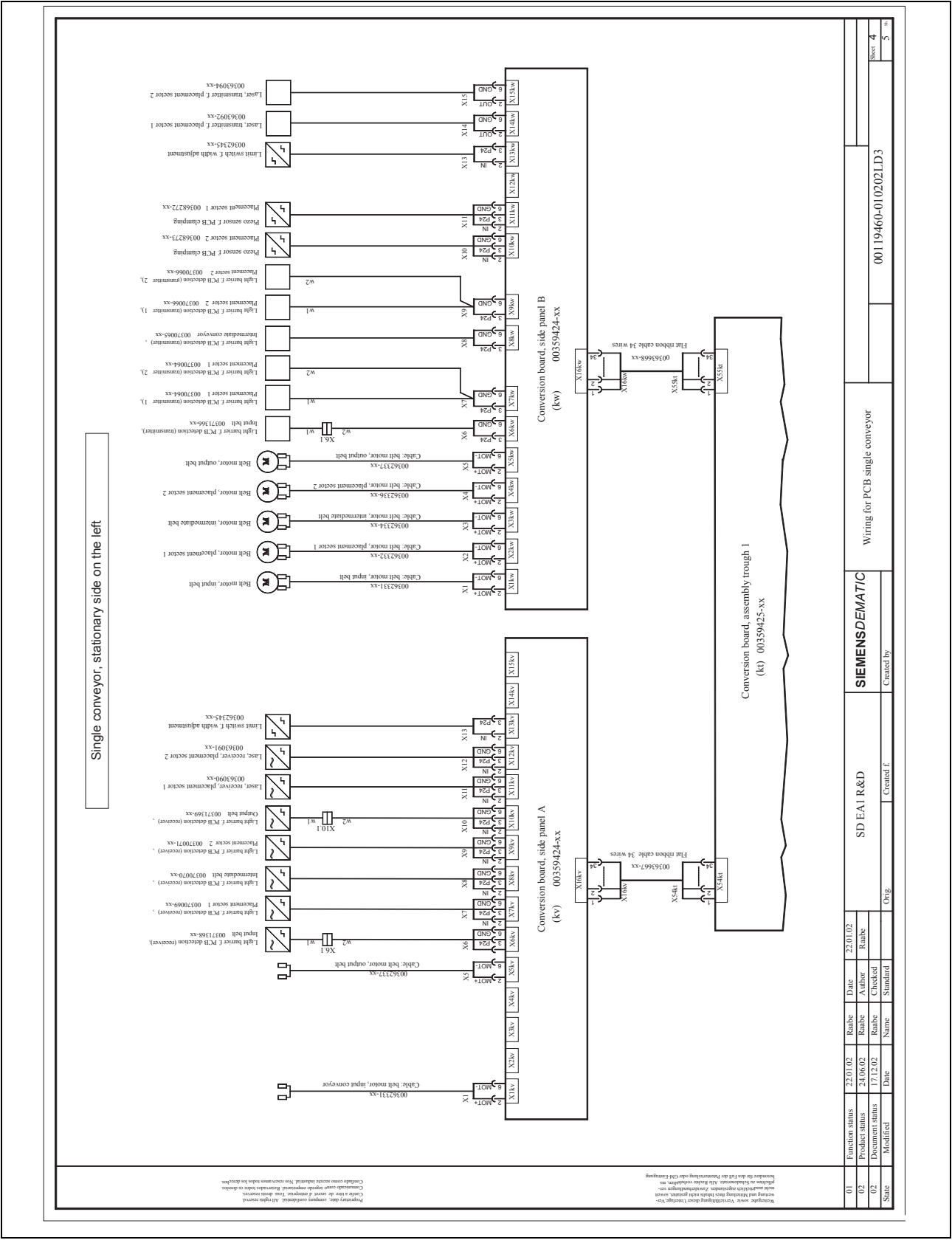


This service manual contains block diagrams for the HS-60 which may also appear useful for general reference about the S-27 HM. The detailed and complete circuit diagrams can be found in the folder of circuit diagrams for the relevant machine.

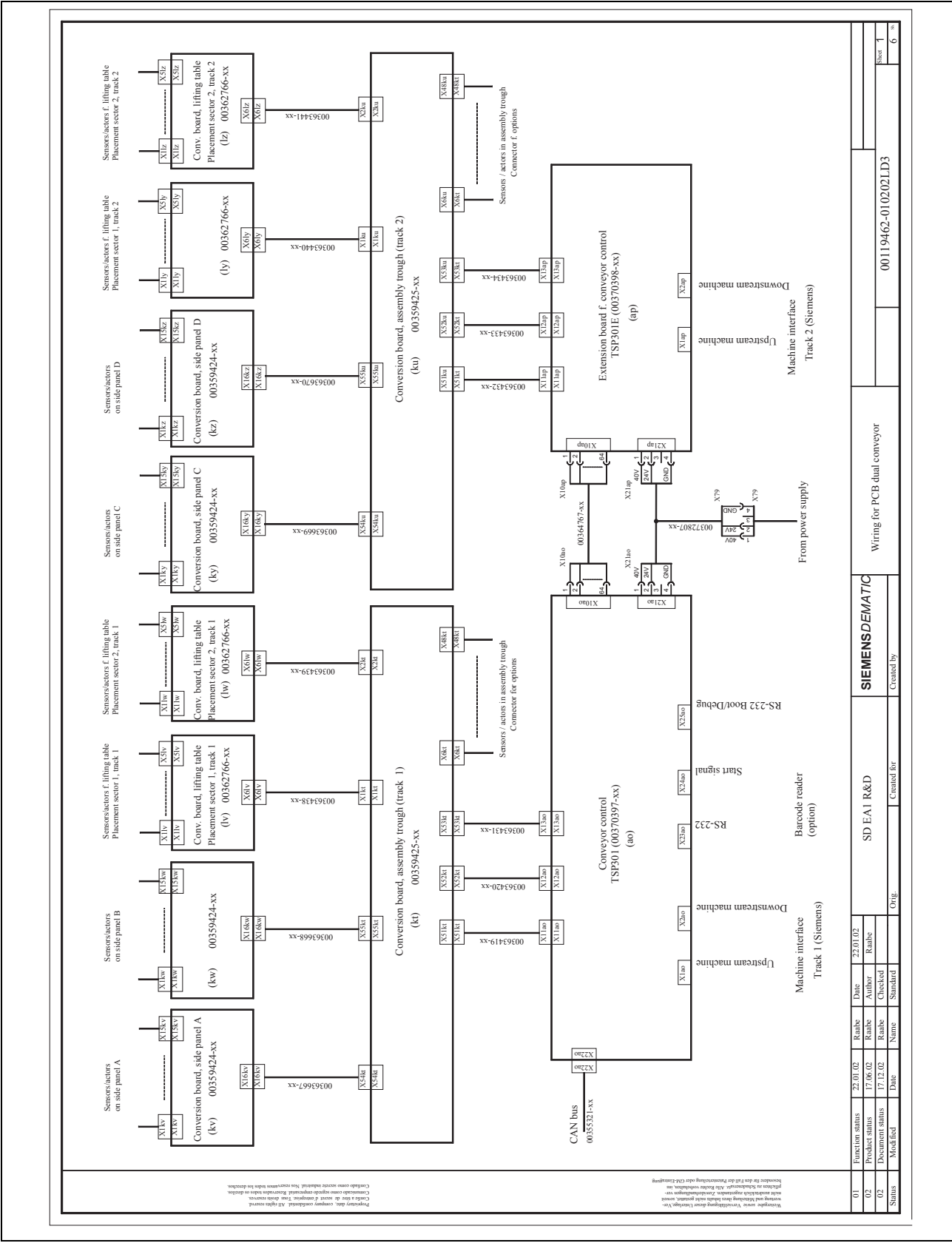


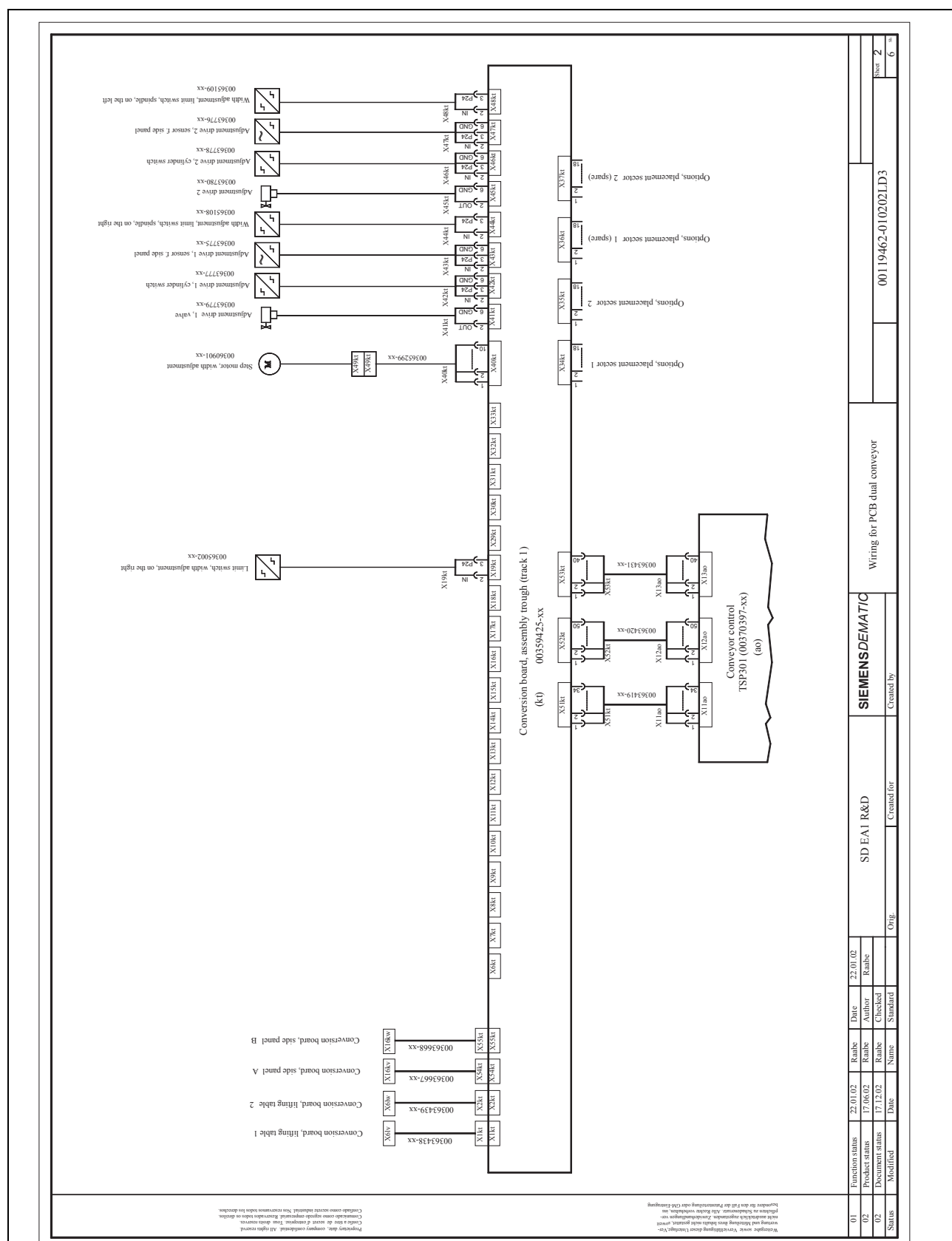




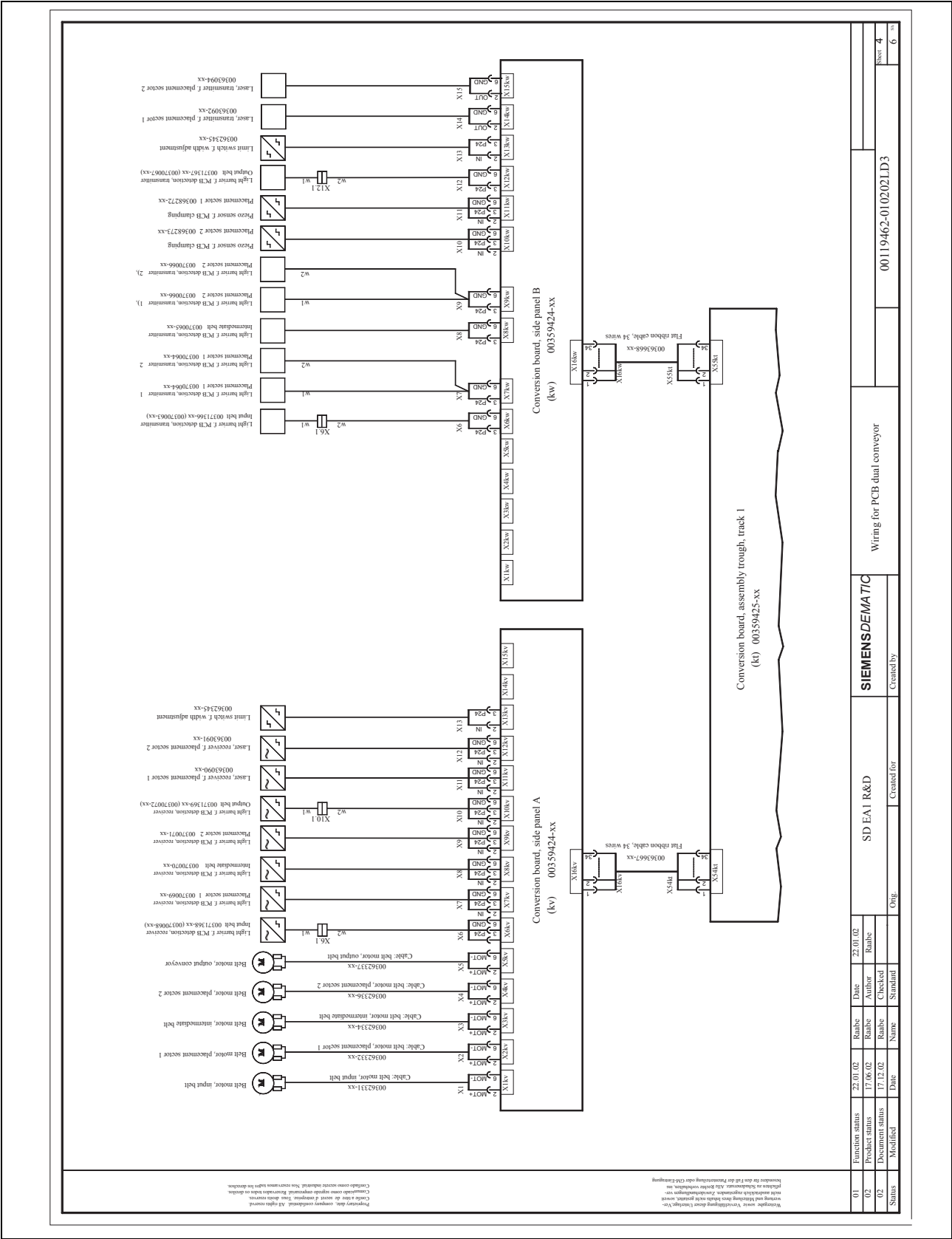
















6.18 Final steps and functions test

DANGER



During the following functions test, adhere **strictly** to the safety instructions in [Chapter 2](#).

- **If the cutter has been removed**, you will have to reinstall it, as described in the service manual, Chapter „Cutter, pneumatic“ (see safety instructions in the above mentioned chapter).
- **If the nozzle changer has been removed**, you will have to recalculate the nozzle changer positions after the changer has been reinstalled (SITEST program).
- Remove all tools etc. from the **working area of the machine**.
- Carry out all necessary adjustments and a functions test, **depending on how the problems were solved**:
 - with the station software, transport menu / width adjustment system,
 - with the aid of the SITEST program and according to the „Setting Instructions for S-27 HM“.

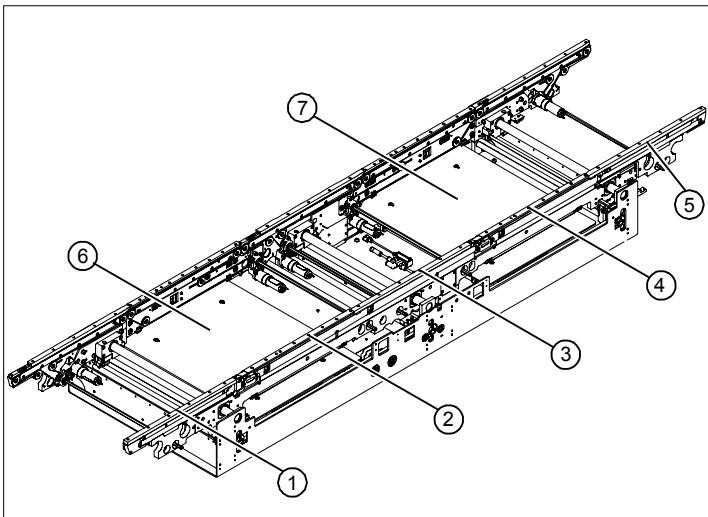
7 Modular PCB Conveyor System (used from SN 382)

The service work for the modular conveyor system is described using the HS-60 as example. All graphics and overviews show the HS-60. All service work applies for the S-27 HM as well. In the case that there should be differences for the S-27 HM as, e. g., the belt tensions, this will be included additionally.

7.1 Module Overview

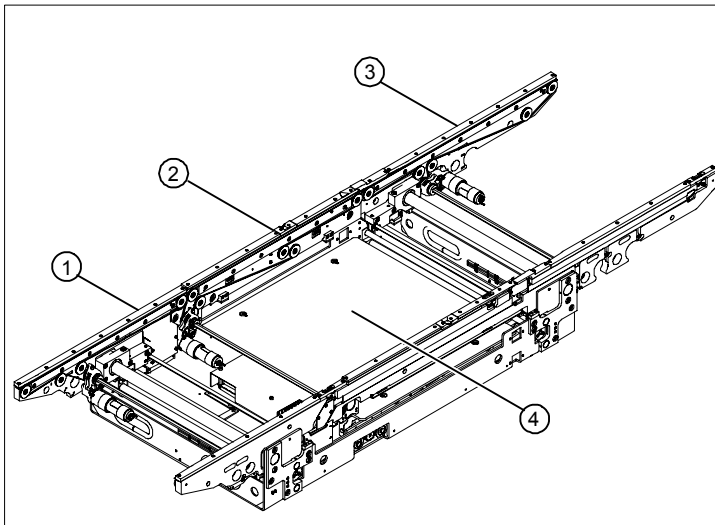
The modular conveyor system for the HS-60 consists of an input conveyor, two placement areas, the intermediate conveyor and the output conveyor. The S-27 HM has one placement area only. So, the single conveyor system for the S-27 HM consists of an input conveyor, a placement area and the output conveyor. Each conveyor system has automatic width adjustment and a lifting table to clamp the PCB in place. The standard machine is equipped as a single PCB conveyor. A dual PCB conveyor system is optionally available. Depending on individual requirements, either the left or right conveyor side can be selected as the fixed conveyor side.

Modular PCB Conveyor System HS-60



1. Input conveyor
2. Placement area 1
3. Intermediate conveyor
4. Placement area 2
5. Output conveyor
6. Lifting table - placement area 1
7. Lifting table - placement area 2

LP-Transport modular S-27 HM



1. Input conveyor
2. Placement area
3. Output conveyor
4. Lifting table unit

7.2 Service Work



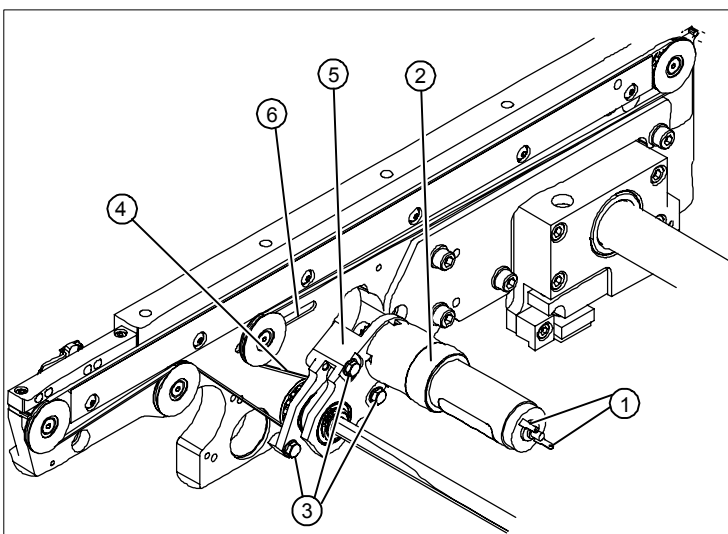
WARNING: Nonobservance of these safety instructions may cause injury to personnel and damage to the machine!

The service work described in this manual may only be performed by specially trained service technicians, with appropriate qualifications and expertise.

- Please observe the safety instructions in the Operating Manual for all service work!

7.2.1 Replacing the Complete Drive Unit [00359284-xx]

Overview

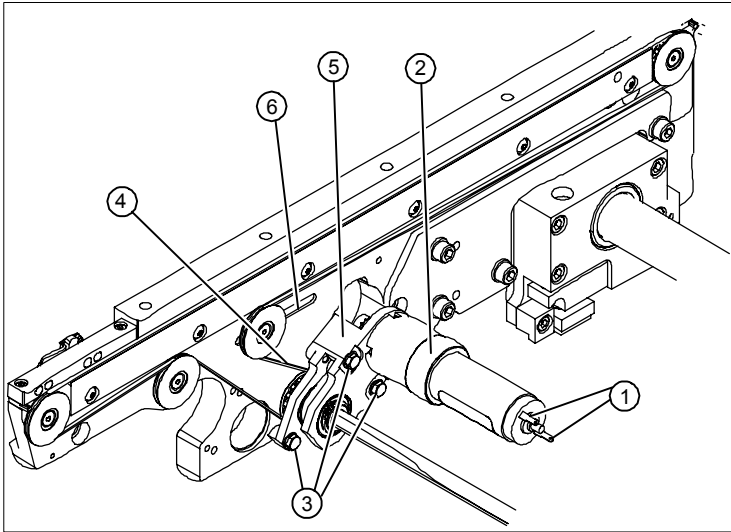


1. Cable connections
2. Heat-shrinkable sleeve
3. Fastening screws
4. Conveyor toothed belt
5. Motor mount
6. Slot

The DC geared motors, including the motor mounts of all 5 conveyor areas, are of like construction. Please bear in mind the following differences during assembly and disassembly:

- The motor mount is installed at an angle (tilted), according to the requirements of the installation site.

Disassembly



- ▶ Move the side parts of the conveyor system apart until the motor fixture screws (3) are accessible. This may differ, according to the conveyor type and area concerned.
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Mark the polarity (+ / -) of the cable connections (1) - important for the direction of rotation!
- ▶ Disconnect the cable shoes from the motor terminals (1).
- ▶ Strip the heat-shrinkable sleeve, (2) used to fasten the connection cable, from the circumference of the DC geared motor.

Tip

If necessary, loosen the deflection pulley at the slot (6). This will make it easier to unthread the motor mount.

See also „Adjusting the Tension of the Conveyor Toothed Belt“.

- ▶ Remove the 3 screws (3) holding the motor mount in place (5).
- ▶ Push the hexagonal shaft back and carefully remove the motor mount (5). At the same time, carefully unthread the conveyor toothed belt.



Attention: Do not damage the toothed belt!

The toothed belts must not be stretched or kinked!

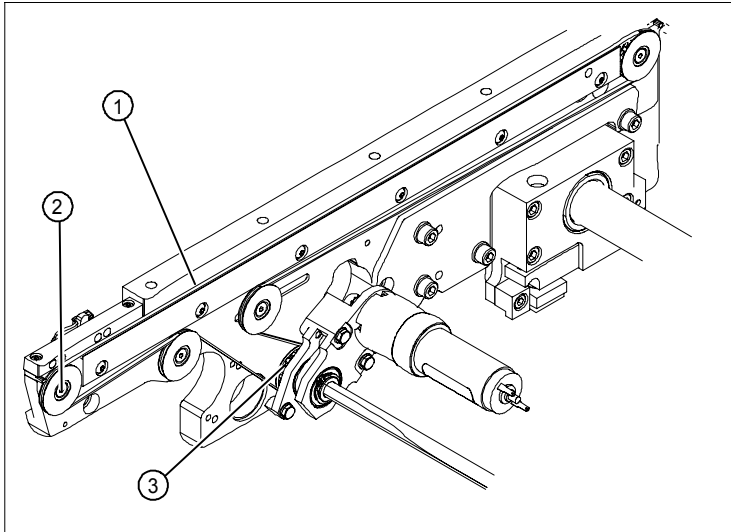
NOTE:

The way in which the conveyor toothed belt is run around the belt guide depends upon the transport area concerned. Please observe this belt guidance during assembly.

If you have discovered a break in the motor cable during a continuity check, the motor cable must be unthreaded as far as the conversion board of the conveyor side (see circuit diagrams of the same name) and unplugged at the corresponding point. This might be somewhat complicated depending on the routing of cables inside the machine base.

You may wish to contact Siemens AG SMD Service regarding this work.

Installation



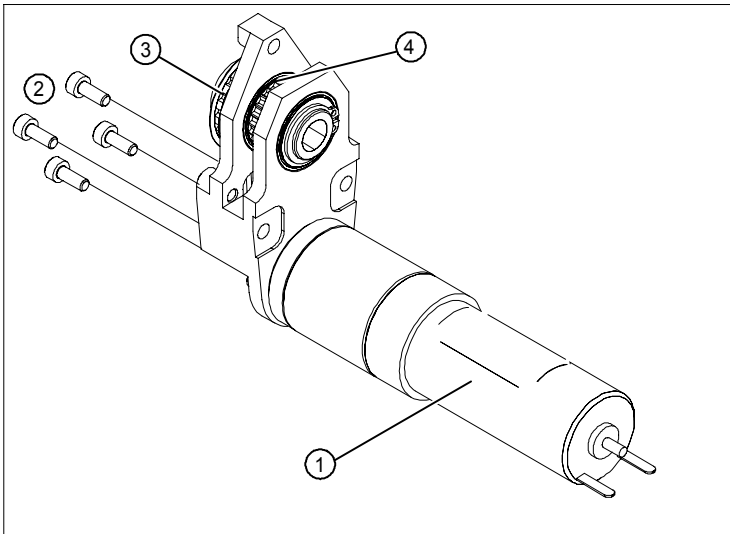
- ▶ Install the new drive unit in the reverse order.
- ▶ Please check:
 - The entire width of the conveyor toothed belt **(1)** must engage at all toothed wheels **(2)** and be run around the belt guide **(3)**.
 - Perform the **Final steps including function test** .

NOTE:

After the new drive unit has been installed, you must make certain that the direction of rotation and the conveyor speed (motor voltage) are correct. After reconnecting the geared motor, you only need to check the direction of rotation.

7.2.2 Replacing the DC Geared Motor [03009269-xx]

Overview

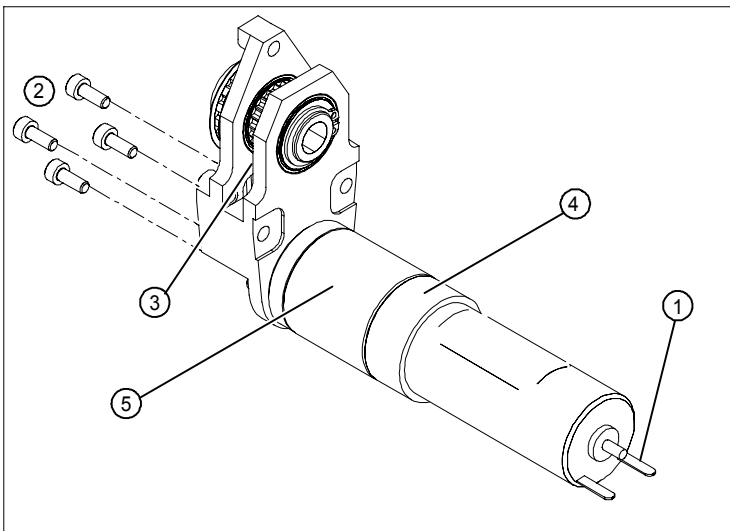


1. DC geared motor
2. Fastening screws
3. toothed wheel (conveyor toothed belt)
4. Toothed disk (toothed belt for PCB conveyor drive)

The DC geared motors, including the motor mounts of all 5 conveyor areas, are of like construction. Please bear in mind the following differences during assembly and disassembly:

- The motor mount is installed at an angle (tilted), according to the requirements of the installation site.

Disassembly



- ▶ Move the PCB conveyor to a position in which the fastening screws (2) are accessible.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Mark the polarity (+ / -) of the cable connections (1) - important for the direction of rotation!
- ▶ Disconnect the cable shoes from the motor terminals (1).
- ▶ Strip the heat-shrinkable sleeve, (4) used to fasten the connection cable, from the circumference of the DC geared motor.
- ▶ Working from the exterior side of the conveyor, (2) undo the screws fastening the DC geared motor (5).
- ▶ Tilt the DC geared motor (5) a little, so that the small toothed belt (3) comes free of the toothed wheel.



Attention: Do not damage the toothed belt!

The toothed belts must not be stretched or kinked!

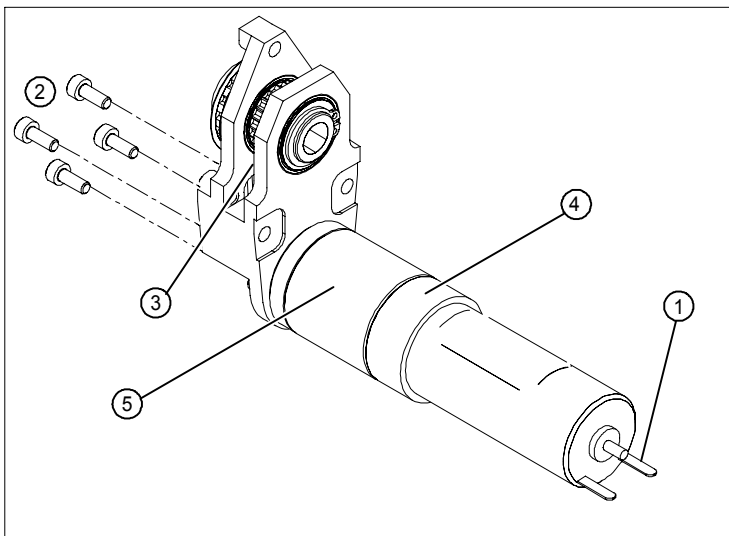
- ▶ Pull the DC geared motor out.
- ▶ Please note:
 - The toothed wheel on the motor shaft must be moved out in such a manner that it does not get caught in the toothed belt.

NOTE:

If you have discovered a break in the motor cable during a continuity check, the motor cable must be unthreaded as far as the conversion board of the conveyor side (see circuit diagrams of the same name) and unplugged at the corresponding point.

This might be somewhat complicated depending on the routing of cables inside the machine base. You may wish to contact Siemens AG SMD Service regarding this work.

Installation



Attention: Do not damage the toothed belt!

The toothed belts must not be stretched or kinked!

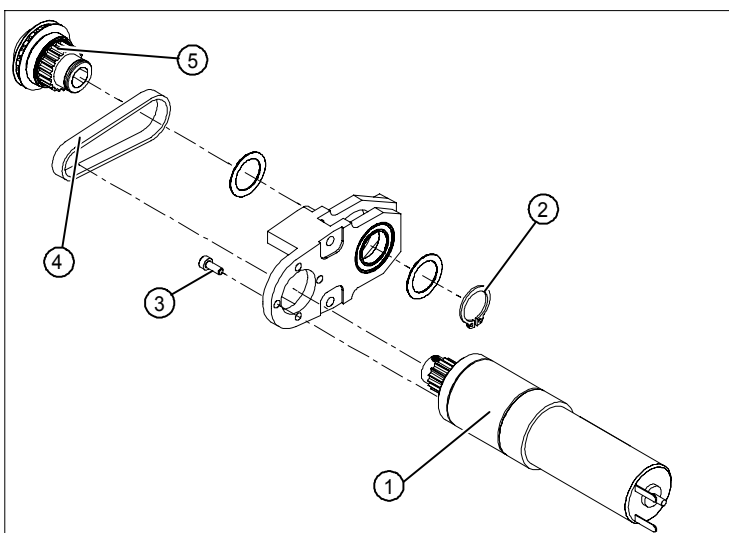
- ▶ Install the new DC geared motor (5) in the reserve order.
3The entire width of the toothed belt must engage at the top and bottom toothed wheels.
- ▶ Fix the DC geared motor (5) with the 4 M3 hexagonal socket-head screws (2).
- ▶ Tension the toothed belt (3) by moving the DC geared motor in the fastening holes. The belt tension must be between 10 and 15 N.
- ▶ Reconnect to the electrical system (1) and secure the connection cable with a heat-shrinkable hose (4).

NOTE

After the geared motor has been installed, you must make certain that the direction of rotation and the conveyor speed (motor voltage) are correct.

7.2.3 Replacing the Toothed Belt of the Drive Unit [00355553-xx]

Overview

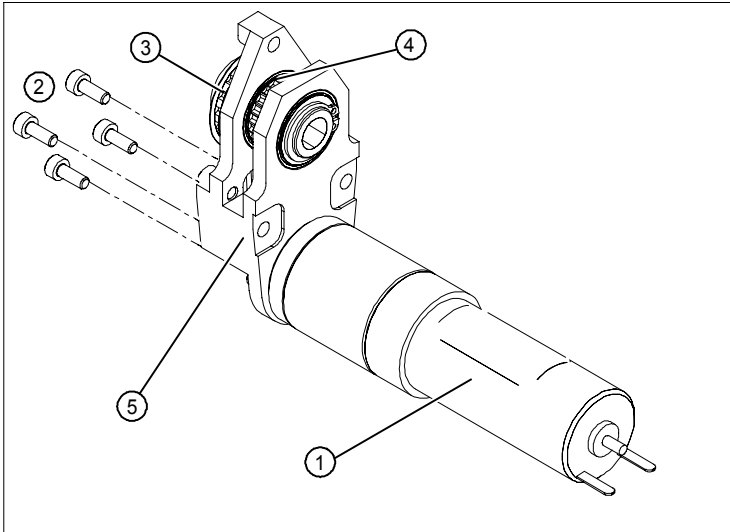


1. DC geared motor
2. Circlip
3. 4 x fastening screws
4. Toothed belt
5. toothed wheel

The DC geared motors, including the motor mounts of all 5 conveyor areas, are of like construction. Please bear in mind the following differences during assembly and disassembly:

- The motor mount is installed at an angle (tilted), according to the requirements of the installation site.

Disassembly



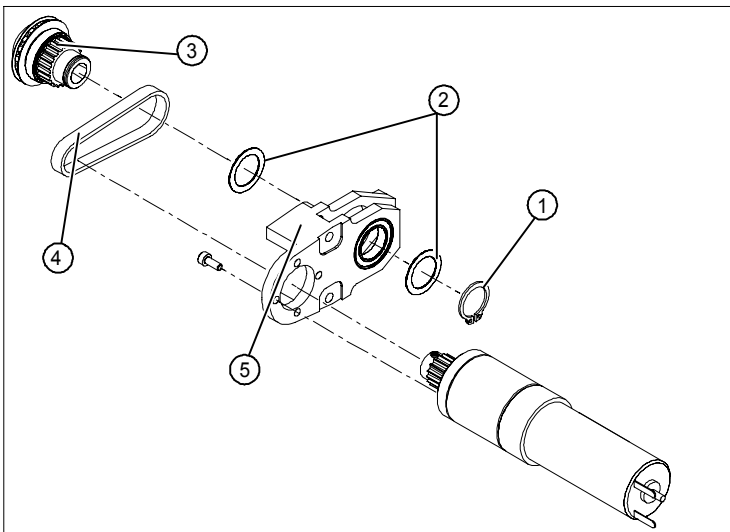
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Remove the complete drive unit (5).
- ▶ Loosen the screws (2) holding the DC geared motor (1).
- ▶ Tilt the DC geared motor (1) with its toothed wheel (4) a little, so that the small toothed belt comes free of the toothed wheel.



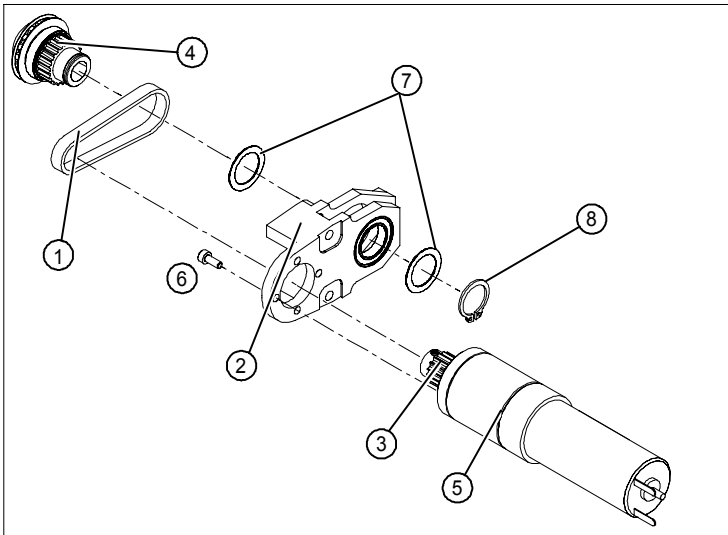
Attention: Do not damage the toothed belt!

The toothed belts must not be stretched or kinked!

- ▶ Pull the DC geared motor out.
- ▶ Please note:
 - The toothed wheel on the motor shaft must be moved out in such a manner that it does not get caught in the toothed belt.



- ▶ Remove the circlip (1) and the shims/washers (2).
- ▶ Use a small rubber mallet to carefully knock the toothed wheel (3) out of the motor mount (5).
- ▶ Remove the toothed belt (4) from the mount.



Attention: Do not damage the toothed belt!

The toothed belts must not be stretched or kinked!

- ▶ Insert the new toothed belt **(1)** into the motor mount **(2)** and place the belt around the toothed wheel **(3)** of the geared motor.
- ▶ Place the toothed belt around the toothed wheel **(4)** of the drive shaft and insert the toothed wheel in its mount.
- ▶ Use a rubber mallet to carefully knock the toothed wheel into position.
- ▶ Install the shim/washer **(7)** and the circlip **(8)**.
- ▶ Loosely fasten the DC geared motor **(5)** with the 4 M3 hexagonal socket-head screws **(6)**. The entire width of the toothed belt must engage at the top and bottom toothed wheels.
- ▶ Tension the toothed belt **(1)** by moving the DC geared motor in the fastening holes. The belt tension must be between 10 and 15 N.
- ▶ Install the complete motor unit.

NOTE

After the drive has been installed, you must make certain that the direction of rotation and the conveyor speed (motor voltage) are correct.

7.2.4 Replacing the Conveyor Toothed Belt [00359917-xx]

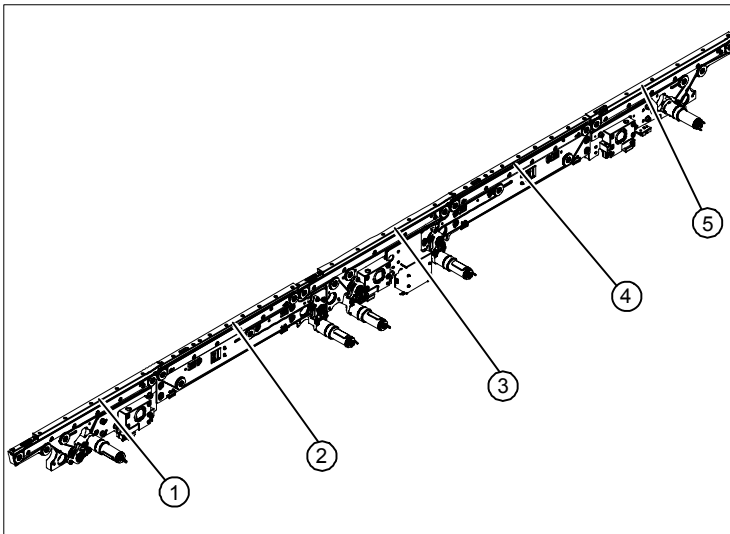
Parts for HS 60

- [00359917-xx] Synchroflex toothed belt 1315 long for input- and output conveyor
- [00364847-xx] Synchroflex toothed belt 1160 long for placement areas 1 + 2
- [00356851-xx] Synchroflex toothed belt 990 long for intermediate conveyor

Parts for S27

- [00364847-xx] Synchroflex toothed belt 1160 long for input conveyor
- [00359917-01] Synchroflex toothed belt 1315 long for output conveyor and placement area

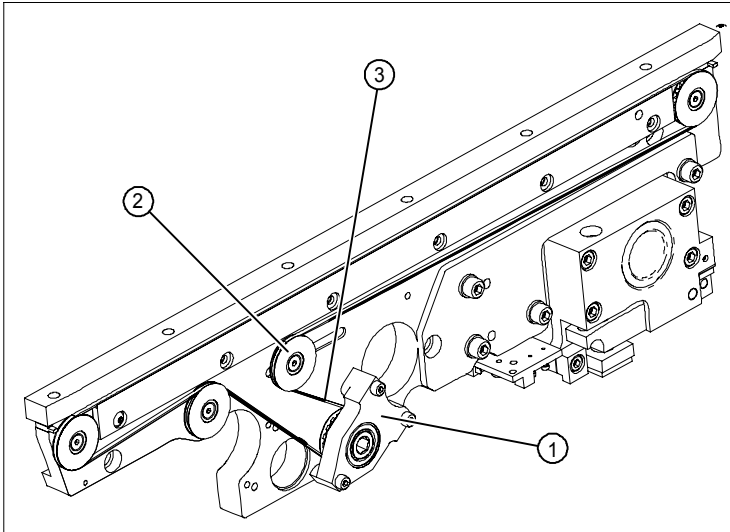
Overview



NOTE The following diagrams apply to the standard conveyor system (fixed side - right). Depending upon the installation procedure, the drive unit will either be fixed with a clamping ring or a circlip.

1. Input conveyor
2. Placement area 1
3. Intermediate conveyor
4. Placement area 2
5. Output band

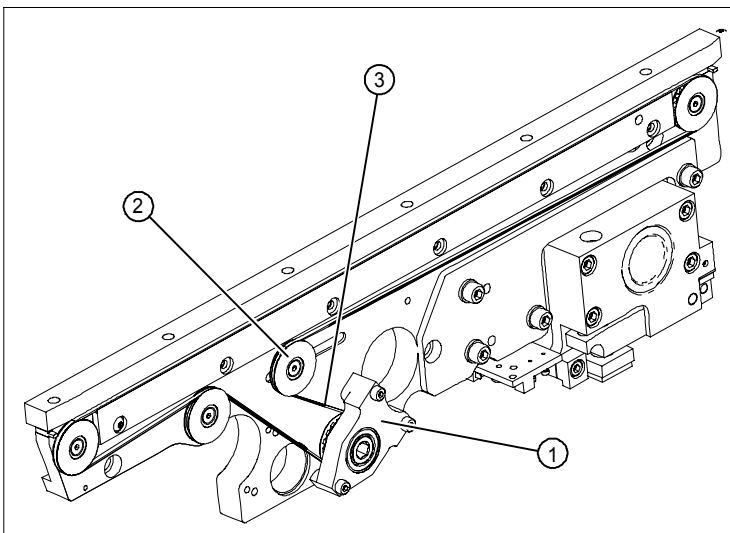
Disassembly



1. Tape drive (mount)
2. Deflection pulley with slot
3. Conveyor toothed belt

The way in which the conveyor toothed belt is run around the deflection pulley depends upon the transport area concerned. Please observe this belt guidance during assembly and disassembly. Please also bear in mind the following differences during assembly and disassembly:

- The drive unit is installed at an angle (tilted), according to the requirements of the installation site.
- Respective to conveyor side, either the tape drive (mount) or the drive unit with DC geared motor is mounted.
- ▶ Move the PCB conveyor to the position which gives you best access to the conveyor belt
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.



- ▶ Loosen the deflection pulley (2) with the slot and relieve the tension on the conveyor toothed belt (3).

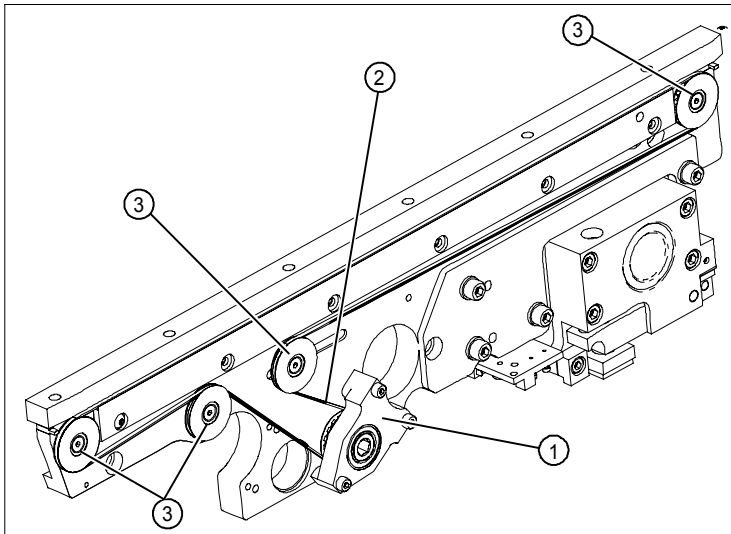


Attention: The deflection pulleys have been assembled with sliding nuts.

The screw for the deflection pulley should be loosened only! If the screw is removed, the sliding nut will fall behind the conveyor cheek side cover. You then need to dismantle the cover to retrieve the nut.

- ▶ If the drive unit is installed, remove it
- ▶ If the tape drive (mount) (1) is installed, remove the 3 fastening screws.
- ▶ Carefully pull off the tape drive (mount) (1) or the drive unit, while also gently unthreading the conveyor toothed belt (3).

Installation



Attention: Do not damage the toothed belt!

The toothed belts must not be stretched or kinked!

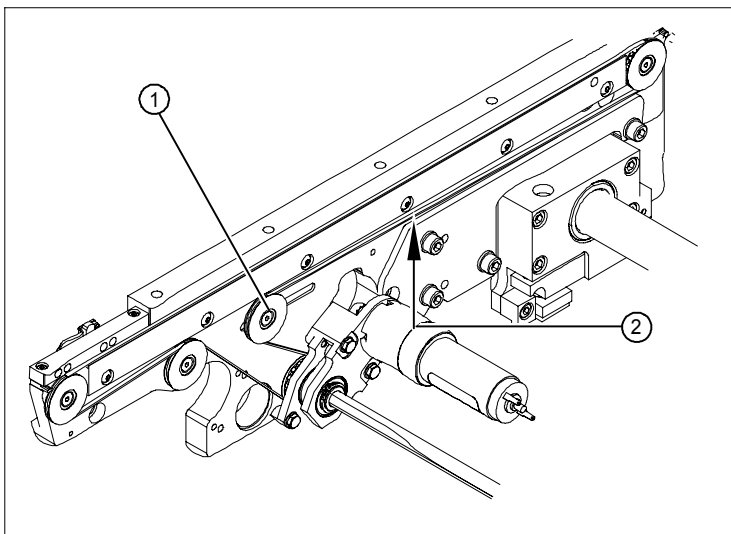
- ▶ Feed the new conveyor toothed belt (2) into the drive unit and weave it round the deflection pulleys (3).
- ▶ Insert the tape drive (mount)(1) or drive unit with the conveyor toothed belt (2) and fasten.

NOTE:

When replacing the belt on the passive side (tape drive without drive unit), set the track width to 50 mm. The tape drive must be aligned towards the active side, allowing smooth axial movement of the hexagonal shafts.

- ▶ Tighten the fastening screws.
- ▶ Adjust the belt tension.

7.2.4.1 Adjusting the tension of the conveyor toothed belt



1. Deflection pulley with slot
 2. Measuring point of the belt tension measuring device (strand center)
- ▶ The deflection pulley, around which the conveyor toothed belt is run, is fastened at a slot. The tension of the conveyor toothed belt can be adjusted at this slot.
 - ▶ Position the measuring point of the belt tension device at the strand center (i.e. the longest distance between the two deflection pulleys) of the conveyor toothed belt.
 - ▶ Set the tension of the drive toothed belt according to the following values.

NOTE

The tension frequencies per area may vary according to the different belt guides. The belt tension always remains the same.

Belt tension HS60 for track 1 (single and dual conveyor)	
Input conveyor	90 Hz +/- 9 Hz
Placement area 1	72 Hz +/- 7 Hz
Intermediate conveyor	144 Hz +/- 14 Hz
Placement area 2	90 Hz +/- 9 Hz
Output conveyor	90 Hz +/- 9 Hz

Belt tension HS60 for track 2 (dual conveyor)	
Input conveyor	90 Hz +/- 9 Hz
Placement area 1	72 Hz +/- 7 Hz
Intermediate conveyor	115 Hz +/- 12 Hz
Placement area 2	90 Hz +/- 9 Hz
Output conveyor	90 Hz +/- 9 Hz

Belt tension S-27 HM (single and dual conveyor) for track 1	
Input conveyor	100 Hz +/- 10 Hz
Placement area 1	105 Hz +/- 10 Hz
Output conveyor	105 Hz +/- 10 Hz

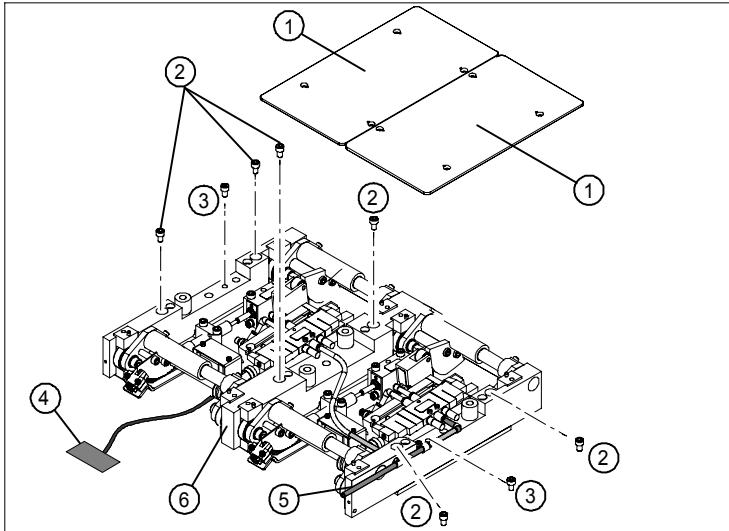
Belt tension S-27 HM (dual conveyor) track 2	
Input conveyor	89 Hz +/- 9 Hz
Placement area 1	109 Hz +/- 11 Hz
Output conveyor	122 Hz +/- 12 Hz

7.2.5 Replacing the Lifting Table Unit [00358653-xx]

Parts

- (00358653-xx) Lifting table unit for single conveyors
- (00358654-xx) Lifting table unit for dual conveyors

Disassembly



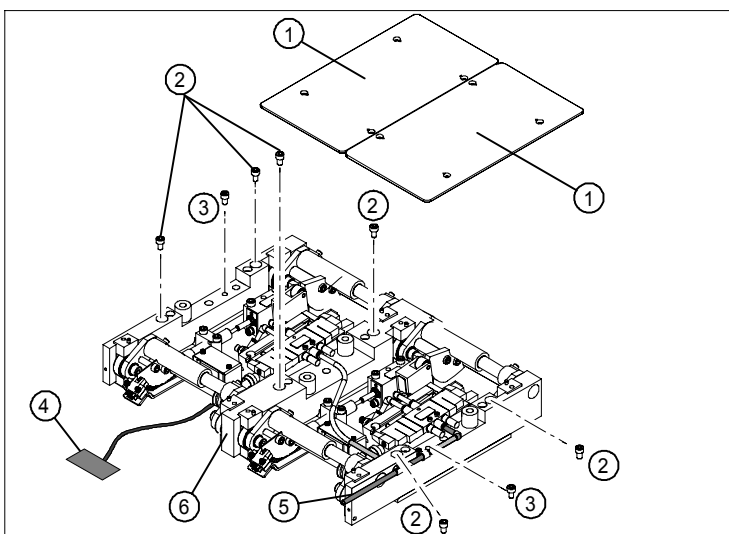
1. Fastening screws for the lifting table plate
 2. 6 x fastening screws for the lifting table (M8 x 100)
 3. 2 x fastening screws for the lifting table (M8 x 50)
- Move the PCB conveyor to a suitable position from which you have best access to the lifting table unit.
 - Undo the screw fastening the lifting table plate (1) and remove the lifting table plate from the lifting table unit.
 - Undo the screws (2) and (3) fastening the lifting table unit.
 - Remove the cover on the conveyor conversion board and unplug the connection cable (4) from the lifting table unit.
 - Unplug the compressed air connection (5).
 - Carefully lift the lifting table (6) off of the locating pins.



Attention: Heavy machine part!

When removing the lifting table, remember it is heavy (17.5 kg).

Installation

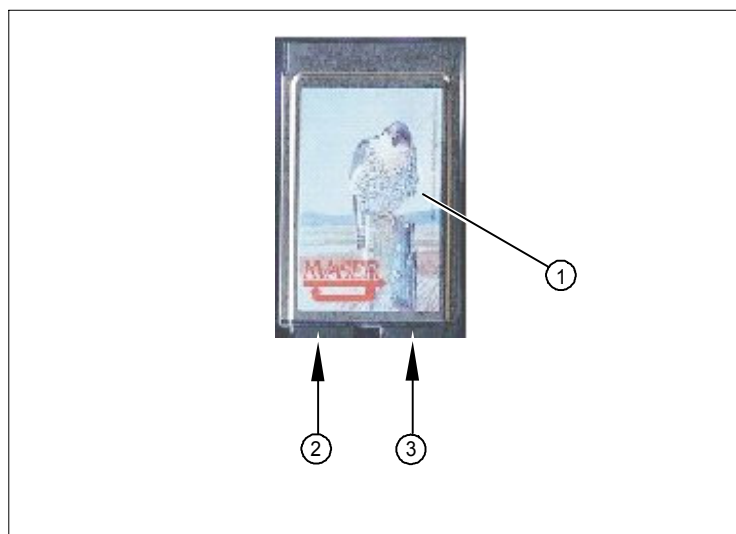


- Lift the lifting table unit (6) into the machine and position it on the locating pins.
- Screw in the fastening screws (2) and (3).
- Reconnect to the electrical (4) and pneumatic (5) systems.
- Check the lifting table speed and the functionality of the PCB clamping device, without the lifting table plate.
- Set the values according to the following table.
- Carefully place the lifting table plate (1) onto the lifting table unit and tighten the fastening screws diagonally, so that the lifting table plate does not stick.
- Check the lifting table speed once the lifting table plate has been installed.

7.2.5.1 Adjusting the speed of the lifting table

Parts

- Transport software (item no. 00322132-xx)
- Kvaser card



1. Kvaser card

2. Channel 1

3. Channel 2

- ▶ Use the Kvaser card (1) to connect the service notebook via the CAN Bus interface to the conveyor control.
- ▶ Start the conveyor software (LP_TSPMenu.exe).
- ▶ In the dialog box **Einstellungen** select the relevant conveyor and machine type **HS60** or **S-27 HM** aus.
- ▶ Confirm your choice with **Übernehmen**.
- ▶ Confirm the message **Einstellung übernommen** with **OK**.
- ▶ Click on the **CAN-Karte** button.
- ▶ Select the channel to be used with the Kvaser card: channel 1 (2) or channel 2 (3).
- ▶ Confirm your setting with **Übernehmen**.
- ▶ Confirm the message **Einstellung übernommen** with **OK**.
- ▶ In the **Komponenten** menu, select the function **Hubtisch**. The **Hubtisch** dialog box will open.

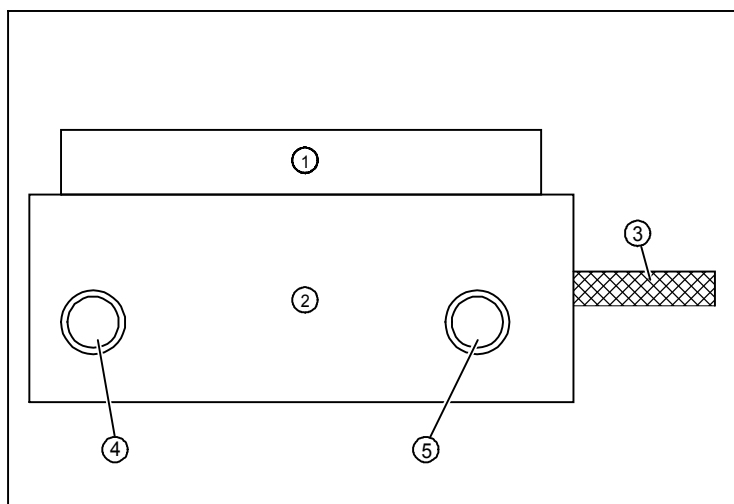
Precondition:

- That the machine is switched on
- That the safety covers are closed
- That the control unit is switched on
- ▶ Select the lifting table you wish to check or adjust. Click on the **Up** and **Down** buttons.

The time will be shown in front of the buttons.

- The  symbol shows the state "Lifting table down" (LED on the lifting table pneumatic cylinder).
- The  symbol shows the state "Lifting table up" (lifting table measuring system --> number of counting pulses was counted correctly).

Issuing times for the lifting table



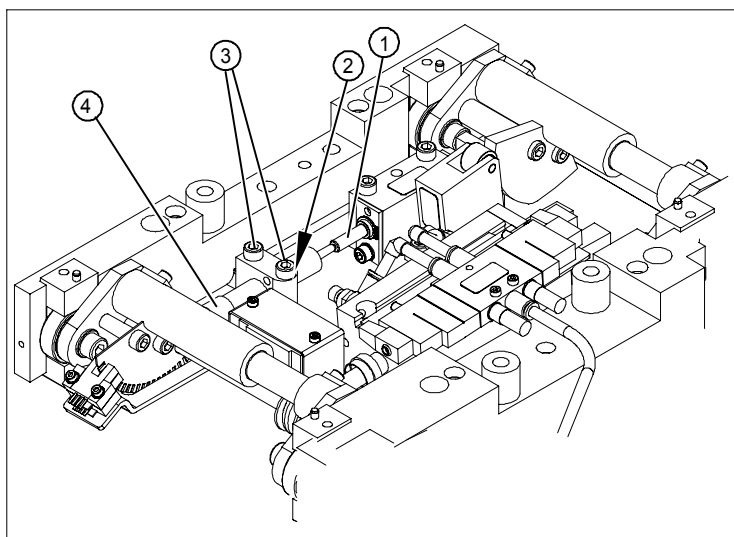
1. Direction of transport
 2. Pneumatic valve
 3. Lifting table cylinder
 4. Piston rod
 5. Adjustment valve – time characteristic for "lifting table down"
 6. Adjustment valve - time characteristic for "lifting table up"
- Adjust the valves on the lifting table cylinder (**5 / 6**) so that the following values are achieved.

	Move upwards	Move downwards	Tolerance
Without lifting table plate	540 ms	540 ms	+/- 20 ms
With lifting table plate	500 ms	480 ms	+/- 20 ms

7.2.6 Replacing the Lifting Table Stabilizer [00358684-05]

Overview

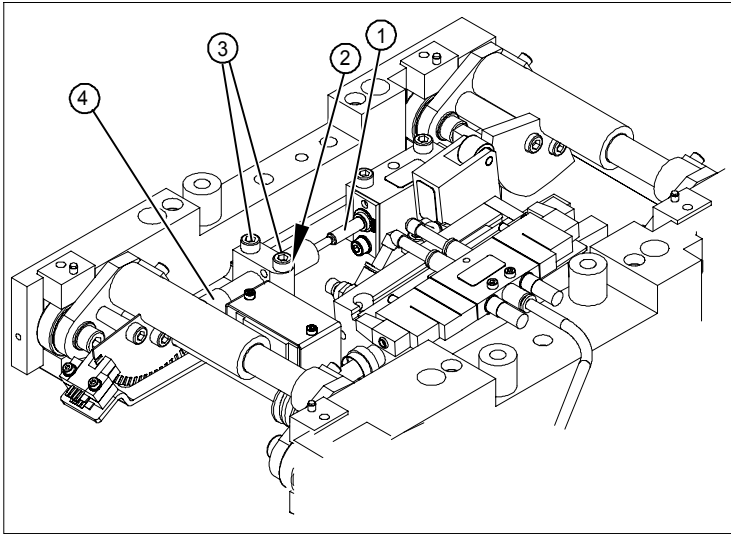
The stabilizer enables the lifting table to be moved gently upwards. It prevents the PCBs from being clamped in with too much impact.



1. Actuator
2. Locknut
3. Fastening screws
4. Handle

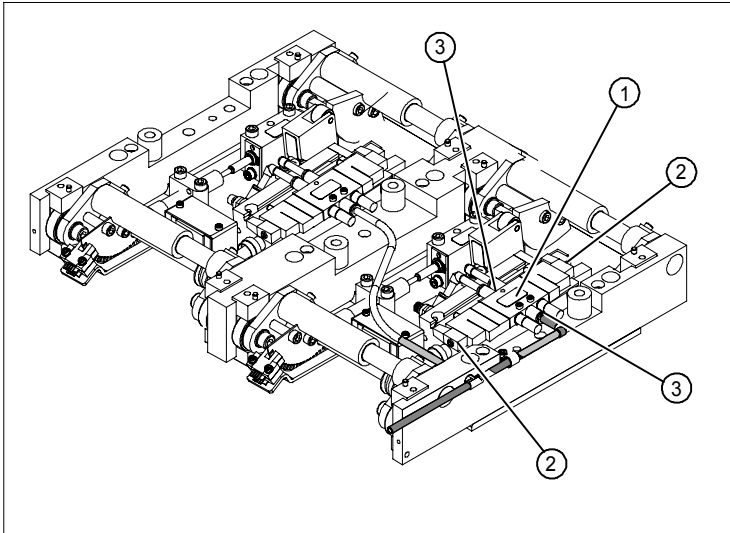
- ▶ Move the PCB conveyor to the position which allows you best access to the lifting table.
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit.
- ▶ Undo the two screws **(3)** holding the stabilizer.
- ▶ Undo the locknut (2) and take the stabilizer by its handle, **(4)** twisting it out of the mounting block.

Installation and adjustment



- ▶ Insert and twist the new stabilizer into the mounting block until the slide just touches the actuator **(1)**, so that the lifting table can be gently moved upwards.
- ▶ Secure this position with the locknut **(2)**.
- ▶ Check whether the stabilizer has been fixed onto the mounting block with the locknut and that the stabilizer slide has a gap of approx. 0.1 mm to the actuator (gap in untriggered mode). With this basic setting, the lifting table should move gently upwards.
- ▶ If this is not the case, loosen the locknut and turn the stabilizer approx. one rotation into the mounting block.
- ▶ Install the lifting table plate.
- ▶ Start the SITEST program and move the lifting table upwards.
- ▶ The lifting table should move gently upwards. You should not hear the PCB clamping device loudly locking into place and no clamping device error messages should be issued.
- ▶ Check the speed of the lifting table and correct where necessary.

7.2.7 Replacing the Lifting Table Solenoid Valve [00358663-xx] Removal/Installation



1. Solenoid valve with 2 fastening screws
2. Connection plug
3. Compressed air connections

- ▶ Move the PCB conveyor to the position which gives you best access to the lifting table.
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit.

NOTE

You may wish to completely dismantle the lifting table, to give you better access to the solenoid valves.



Attention: Heavy machine part!

When removing the lifting table, remember it is heavy (17.5 kg).

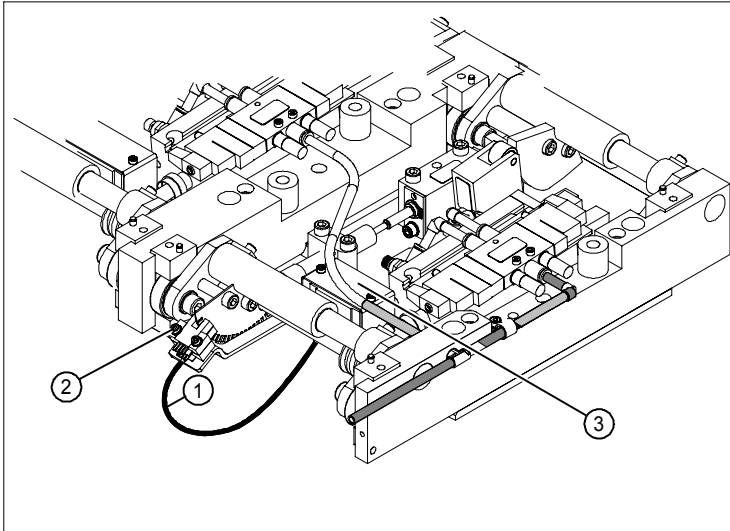
- ▶ Switch off the compressed air supply and release the air at the pneumatic unit filter.
- ▶ Undo the screws fastening the connection plug and then unplug it.
- ▶ Remove the pneumatic connections.
- ▶ Install the new solenoid valve and reconnect the electrical and pneumatic systems.
- ▶ Install the complete lifting table into the machine again.
- ▶ Check the speed of the lifting table and correct where necessary.

7.2.8 Replacing the Lifting Table Fork Light Barrier [00363079-xx]

Parts

- Light barrier for track A – dual conveyor (00363079-xx)
- Light barrier for track B – dual conveyor (00363080-xx)
- Light barrier for track A – single conveyor (00363111-xx)
- Light barrier for track B – single conveyor (00363113-xx)

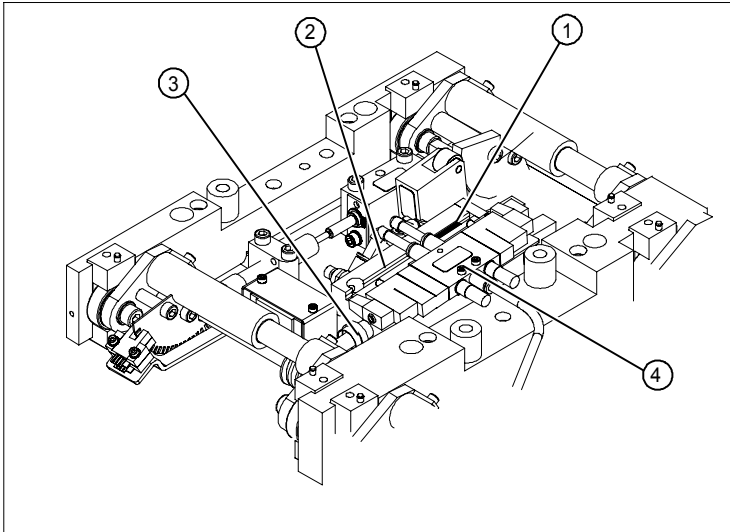
Removal/Installation



1. Connection cable for the conversion board of the lifting table
 2. 2 x fork light barrier (position measuring system, tracks A + B)
 3. Conversion board of the lifting table (under the cover)
- ▶ Move the PCB conveyor to the position which gives you best access to the lifting table.
 - ▶ Move the Y-gantries into the area outside the PCB conveyor.
 - ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit.
 - ▶ Undo the two screws (2) fastening the fork light barrier.
 - ▶ Remove the cover from the conversion board of the lifting table (3).
 - ▶ Unplug the lifting table conversion board.
 - ▶ Install the new fork light barrier and reconnect to the electrical system.

7.2.9 Replacing the Complete Lifting Table Cylinder [00358703-xx]

Overview

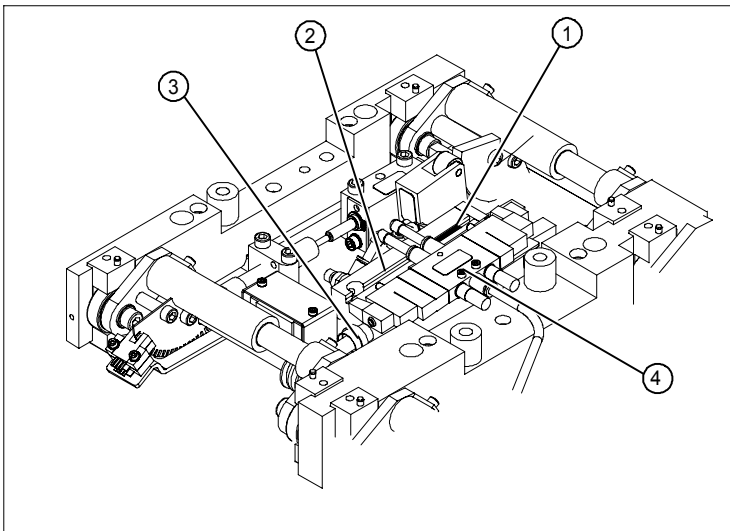


DANGER OF CRUSHING: Press the EMERGENCY STOP!

Before performing adjustment work you must ensure that the lifting table has been secured against movement.

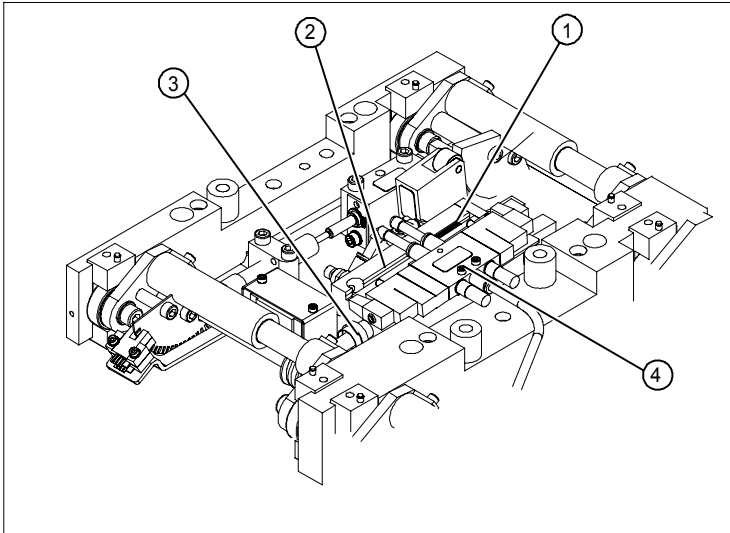
1. End position proximity switch
 2. Lifting table cylinder
 3. Piston rod with locknut
 4. Solenoid valve
- ▶ Move the PCB conveyor to the position which gives you best access to the lifting table.
 - ▶ Move the Y-gantries into the area outside the PCB conveyor.
 - ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Switch off the compressed air supply.

Disassembly



- ▶ Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit.
- ▶ Undo the fastening screws for the solenoid valve (4) and remove it from the lifting table cylinder.
- ▶ Loosen the grub screw at the end position proximity switch (1) and push the end position proximity switch out of the lifting table cylinder guide rail (2).
- ▶ Loosen the locknut on the piston rod (3) and twist the piston rod out until it releases itself from the actuator.
- ▶ Undo and remove the two screws fastening the lifting table cylinder (2).

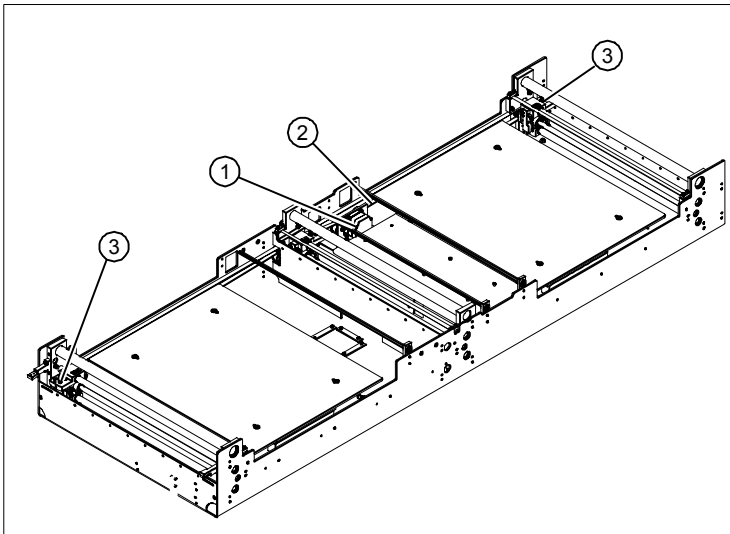
Installation



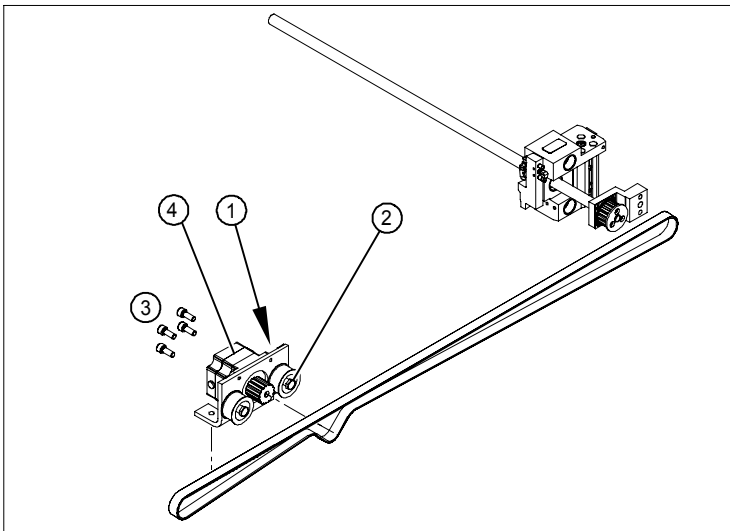
- ▶ Insert and fasten the new lifting table cylinder **(2)** and install the piston rod **(3)**.
- ▶ Move the lifting table by hand to its end position.
- ▶ Switch the machine on.
- ▶ Push the end position proximity switch **(1)** into the guide rail until the LED lights up.
- ▶ Fix this position with the grub screw.
- ▶ Install the solenoid valve **(4)** and the lifting table plate.
- ▶ Check the speed of the lifting table and correct where necessary.

7.2.10 Replacing the Stepping Motor of the Width Adjustment System [00367174-xx]

Overview



1. Width adjustment stepping motor
2. Toothed belt for the drive
3. Adjustment unit 1 and 2



1. Loosening the eccentric axle on the deflection pulley
2. Locknut on the eccentric axle
3. Fastening screws for stepping motor
4. Stepping motor

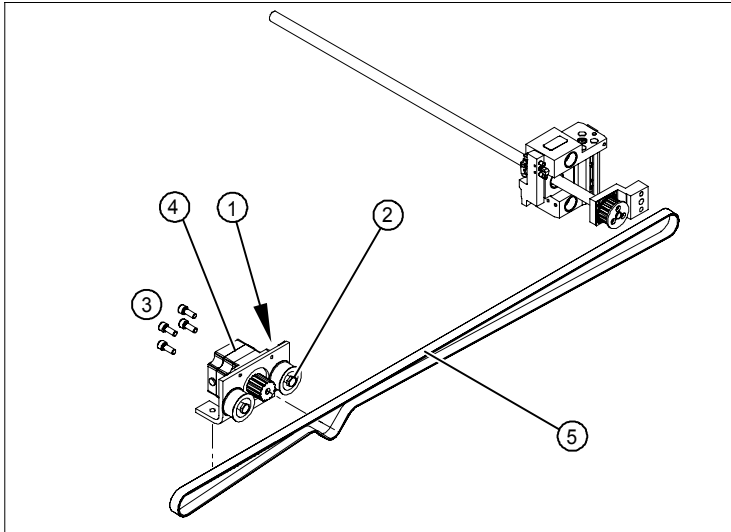


Attention: Do not damage the toothed belt!

During the following removal and installation of the motor, the toothed belt for the width adjustment drive must not be stretched or kinked!

- Move the PCB conveyor to the position which gives you best access to the stepping motor of the width adjustment system.
- Move the Y-gantries into the area outside the PCB conveyor.
- Switch off the machine and secure it to prevent unauthorized reactivation.

Removal/Installation



- ▶ Undo the screws fastening the lifting table plate and remove the lifting table plate from the lifting table unit.
- ▶ Loosen the eccentric axle (1) on the deflection pulley and relieve the tension on the drive toothed belt (5).



Attention: Toothed belt must not come off!

When relaxing the toothed belt, make sure the belt does not come off (skip) the toothed wheels at the 2 adjustment units. This would cause incorrect alignment of the adjustment units. Secure these positions with a suitable tool (screw clamp etc.)

- ▶ Remove the 4 fastening screws (3) and then lift out the stepping motor (4).
- ▶ Unplug the connection cable in the cable duct.
- ▶ Install the new stepping motor and reconnect the system to the electrical system.
- ▶ Tension the drive toothed belt.
Position the measuring point of the belt tension device at the strand center (i.e. the longest distance between two toothed wheels) of the conveyor toothed belt.
- ▶ Set the tension of the drive toothed belt according to the following values.

Belt tension- width adjustment system	
Toothed belt for the drive	24 Hz +/- 2 Hz

Please also refer to ...

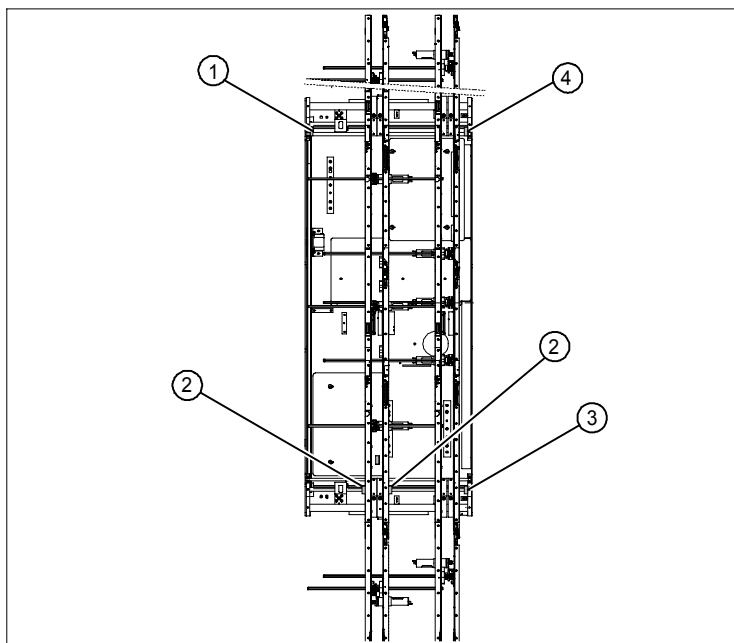
- Adjusting the tension of the conveyor toothed belt [-> 247]

7.2.11 Replacing the Limit Switch for the End Position Width Adjustment System [00365108-xx]

Parts

- Limit switch on the mounting tray (00365002-xx)
- Limit switch for width adjustment 1 (00365108-xx)
- Limit switch for width adjustment 2 (00365109-xx)
- Limit switch for width adjustment - on the conveyor side (00362345-xx)

Overview



1. Limit switch 1 for width adjustment system of the adjustment unit
2. Limit switch for width adjustment system (for side)
3. Limit switch for conversion board (for side)
4. Limit switch 2 for width adjustment system of the adjustment unit

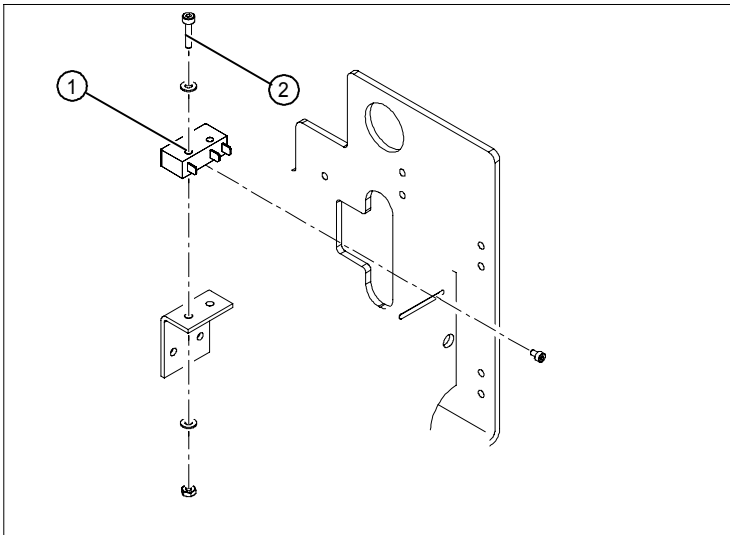
Limit switch on the input conveyor:

In the vicinity of the input conveyor there are 4 limit switches under the conveyor sides. The limit switch is designed to prevent the conveyor sides hitting one another or the conveyor base.

Limit switch on the output conveyor:

In the vicinity of the output conveyors, there are 2 limit switches for the adjustment unit. They serve to secure the transport area and to initialize the adjustment unit during width adjustment.

Removal/Installation



NOTE

The limit switches are preassembled and include cables.

However, if the limit switch itself is faulty, the wiring can be unsoldered/soldered right at the switch in question.

- ▶ Unsolder the connection wires on the faulty limit switch (1).
- ▶ Undo and remove the two screws (2) fastening the defect limit switch and remove the switch.

NOTE

If you have discovered a break in the limit switch cable during a continuity check, the cable must be unthreaded as far as the conversion board of the mounting tray and unplugged at the corresponding point.

This might be somewhat complicated depending on the routing of cables inside the machine base.

You may wish to contact Siemens AG SMD Service regarding this work.

Install the new limit switch and re-solder the connection wires in the correct allocation.

Checking the position of the limit switch:

- ▶ Check the minimum and maximum width of the relevant machine type and the parallelism of the conveyor sides.

7.2.12 Replacing the Solenoid Valve for the Adjustment Unit [00369014-xx]

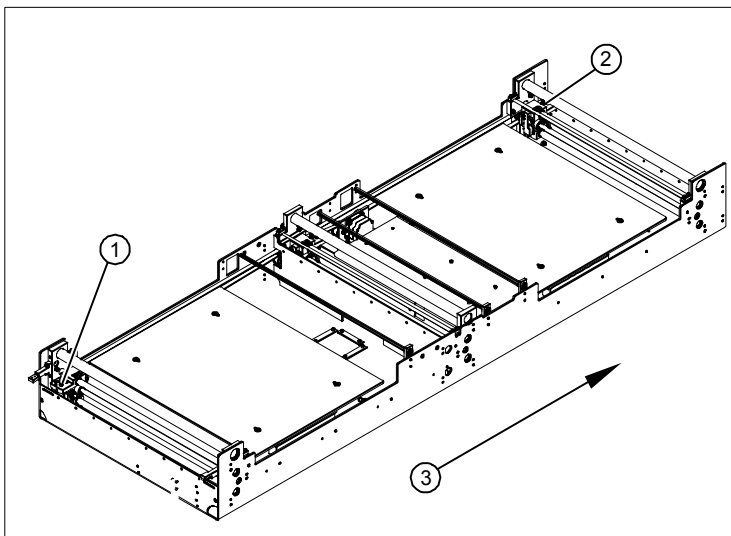
Parts HS-60

- Solenoid Valve for the Adjustment Unit 1 (00363779-xx)
- Solenoid Valve for the Adjustment Unit 2 (00363780-xx)

Parts S-27 HM

- Solenoid Valve for the Adjustment Unit 1 (00363266-xx)
- Solenoid Valve for the Adjustment Unit 2 (00363270-xx)

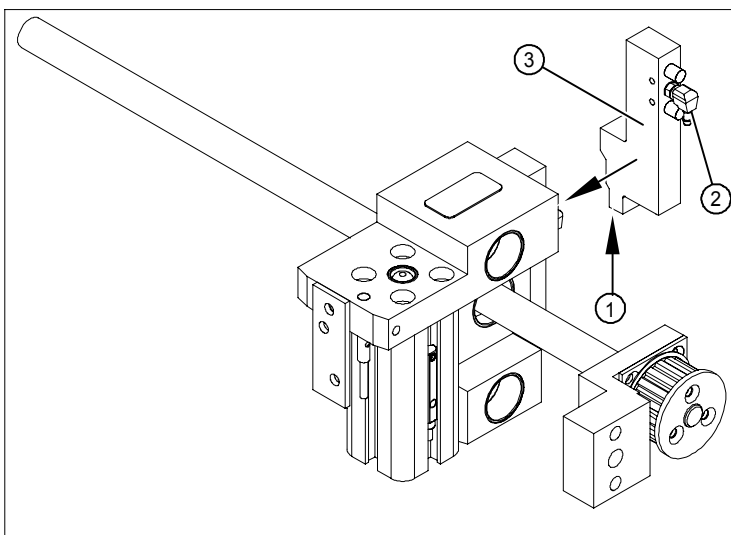
Overview



1. Adjustment unit 1
2. Adjustment unit 2
3. Direction of transport

- ▶ Move the PCB conveyor to the position which gives you best access to the adjustment system.
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Switch off the compressed air supply.

Removal/Installation



- ▶ Remove the compressed air connections (2).
- ▶ Undo the two fastening screws and remove the solenoid valve (3) from the short-stroke cylinder.
- ▶ Unthread the connection cable (1) as far as the relevant assembly tub conversion board and unplug.

NOTE

This might be somewhat complicated depending on the routing of cables inside the machine base. You may wish to contact Siemens AG SMD Service regarding this work.

- ▶ Install the new solenoid valve (3) and reconnect the system to the electrical (1) and pneumatic (2) supplies.

7.2.13 Replacing the Cylinder Switch for the Adjustment Unit [00369016-xx]

Parts HS-60

Cylinder Switch for the width adjustment system 1 (00363267-xx)

Cylinder Switch for the width adjustment system 2 (00363291-xx)

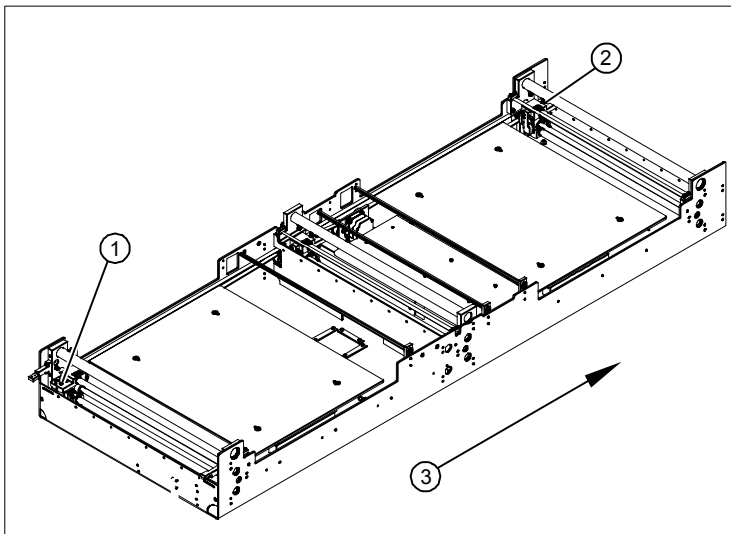
Parts S-27 HM

Cylinder switch for adjustment unit 1 (00363267-xx)

Cylinder switch for adjustment unit 2 (00363291-xx)

Overview

The cylinder switch on the adjustment unit cylinder should operate when the adjustment unit pin is pushed out by the pneumatic cylinder and therefore connected to the conveyor side. This signal enables the motor of the width adjustment system.



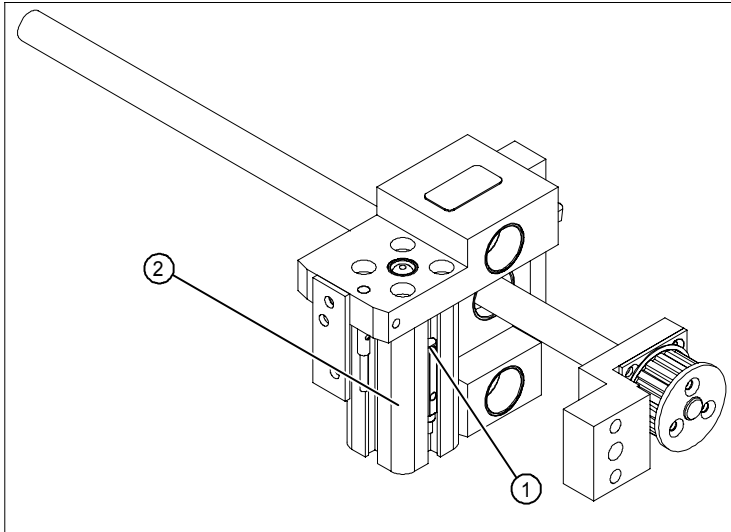
1. Adjustment unit 1

2. Adjustment unit 2

3. Direction of transport

- ▶ Move the PCB conveyor to the position which gives you best access to the adjustment system.
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Switch off the compressed air supply.

Removal/Installation



- ▶ Loosen the grub screw at the cylinder switch (1) and push the cylinder switch out of the adjustment unit guide rail (2).
- ▶ Unthread the connection cable as far as the conversion board of the mounting tray.
- ▶ Run the connection cable of the new cylinder switch (2).
- ▶ Insert the new cylinder switch into the guide rail.
- ▶ Switch the machine on.

NOTE

The width adjustment system cylinder switch is set/adjusted in engaged mode.

- ▶ Move the width adjustment system until the cylinder switch switches - LED (H36/H37) lights up.
Engage the cylinder - i.e. the cylinders are moved to the upper limit by the controls.
- ▶ Set the cylinder switch so that the LED lights up when it is in engaged mode.
- ▶ Fix the position of the cylinder switch (2) with the grub screw.

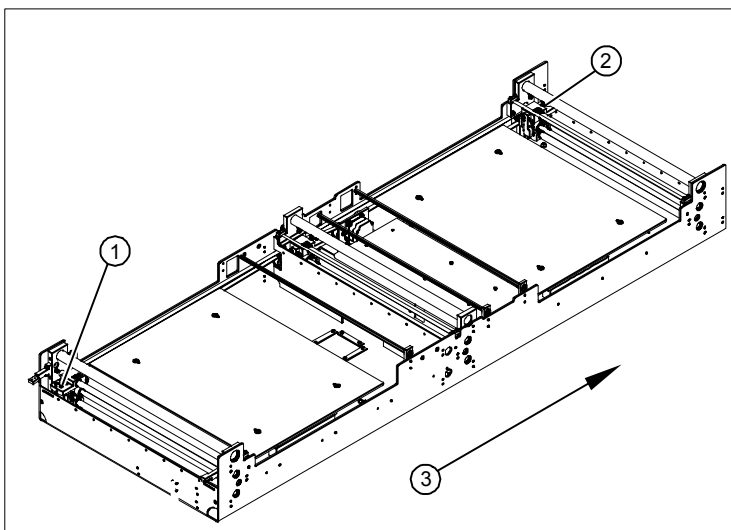
7.2.14 Replacing the Proximity Switch for the Adjustment System [00363268-xx]

Parts

- Proximity switch for adjustment unit 1 (00363268-xx)
- Proximity switch for adjustment unit 2 (00363292-xx)

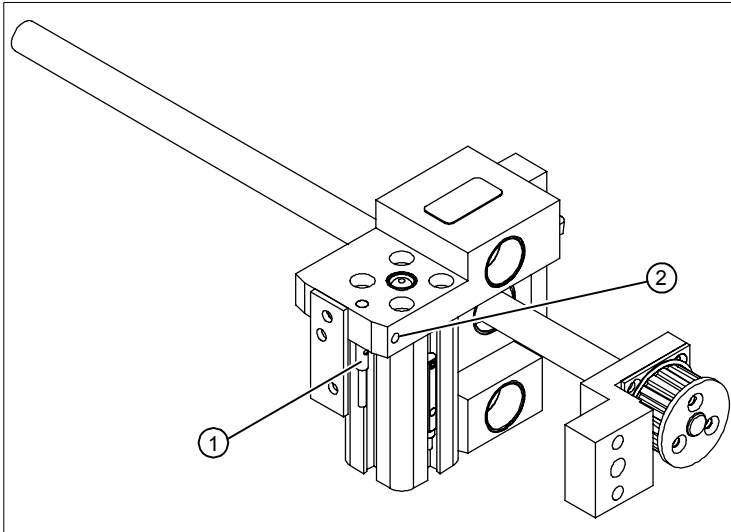
Overview

The proximity switch serves as a signal for controlling the pneumatic valve of the adjustment unit. Once the switching point has been reached, the conveyor side is connected via the short-stroke cylinder.



1. Adjustment unit 1
 2. Adjustment unit 2
 3. Direction of transport
- ▶ Move the PCB conveyor to the position which gives you best access to the adjustment system.
 - ▶ Move the Y-gantries into the area outside the PCB conveyor.
 - ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Switch off the compressed air supply.

Removal/Installation



- ▶ Loosen the grub screw on the clamping device (1) and unthread the connection cable as far as the conversion board of the mounting tray.
- ▶ Install the new proximity switch and reconnect the system to the electrical system.
- ▶ Fix the proximity switch with the grub screw.
- ▶ The grub screw has to be tightened with a tightening torque of 20 Ncm (+ 3Ncm). The proximity switch has to lie flat with the housing (2) for the adjustment unit.

The switching point is set at the actuator on the conveyor side:

- ▶ Move the adjustment unit until it is under the conveyor side.
- ▶ Place a 4/10mm gauge block on the adjustment unit, press the actuator onto the gauge block and tighten the screw.

NOTE

This setting must be performed at all conveyor sides.

- ▶ Use the SITEST program to calibrate the conveyor sides.

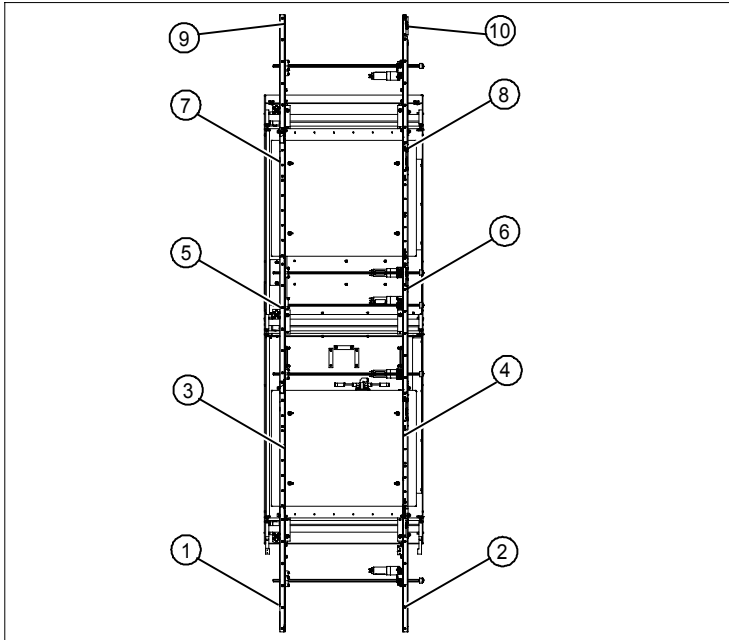
7.2.15 Replacing the Light Barriers for Transmitter and Receiver Modules [00370063-xx]

Parts

Please note the different item numbers for the individual light barriers - these are for the different lengths of the connection cable.

Please refer to the Siplace HS-60 or S-27 HM spare parts catalogue for the different item numbers.

Overview



1. Transmitter at input conveyor
2. Receiver at input conveyor
3. Transmitter at placement area 1
4. Receiver at placement area 1
5. Transmitter at intermediate conveyor
6. Receiver at intermediate conveyor
7. Transmitter at placement area 2
8. Receiver at placement area 2
9. Transmitter at output conveyor
10. Receiver at output conveyor

Important instructions for replacing the light barrier

- The transmitters are installed on the moveable side of conveyor models, while the receivers are on the fixed side (applies to the standard conveyor system, fixed side - right).
- Check whether it would be helpful to feed in the new cable with the aid of the old one, at least in some areas.
- The connection plug is equipped with contacts, which are pressed onto the wires. You may find it helpful to remove the contacts from the connection plug, in order to run the cable better through openings.
- For replacement purposes, the connection cable must be unthreaded as far as the relevant conversion board of the conveyor side. This might be somewhat complicated depending on the routing of cables inside the machine base.

You may wish to contact Siemens AG SMD Service regarding this work or proceed as follows.

7.2.15.1 Replacing the transmitter or receiver for placement areas 1 + 2

Receiver

- ▶ Remove the stop rail.
- ▶ Remove the short guide rail.
- ▶ Dismantle the holder and the receiver.
- ▶ Dismantle the receiver from the holder.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Fix the receiver at the holder.
- ▶ Fix the holder together with the receiver at the base in such a way that the holder lies flat on the base.
- ▶ Mount the short guide rail and align it.
- ▶ Mount the stop rail.

Transmitter

- ▶ Dismantle the holder and the receiver.
- ▶ Dismantle the receiver from the holder.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Fix the new light barrier in the original position.

7.2.15.2 Replacing the transmitter or receiver for the input or output conveyor

Receiver

NOTE

The transmitters on the input and output conveyors are freely accessible. The bracket must be loosened and the screws fastening the light barrier removed.

- ▶ Remove the stop rail.
- ▶ Remove the short guide rail.
- ▶ Dismantle the holder and the receiver.
- ▶ Dismantle the receiver from the holder.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Fix the receiver at the holder.
- ▶ Fix the holder together with the receiver at the base in such a way that the holder lies flat on the base.
- ▶ Mount the short guide rail and align it.
- ▶ Mount the stop rail.

Transmitter

NOTE

Otherwise check whether you can run the cable through the opening by removing the contacts in the connection plug.

- ▶ Dismantle the holder and the receiver.
- ▶ Dismantle the receiver from the holder.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Fix the new light barrier in the original position.

7.2.15.3 Replacing the Light Barrier for the Intermediate Conveyor

Transmitter

- ▶ Dismantle the holder and the receiver.
- ▶ Dismantle the receiver from the holder.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Fix the new light barrier in the original position.

Receiver

NOTE

The transmitter on the intermediate conveyor is freely accessible. The bracket must be loosened and the screws fastening the light barrier removed.

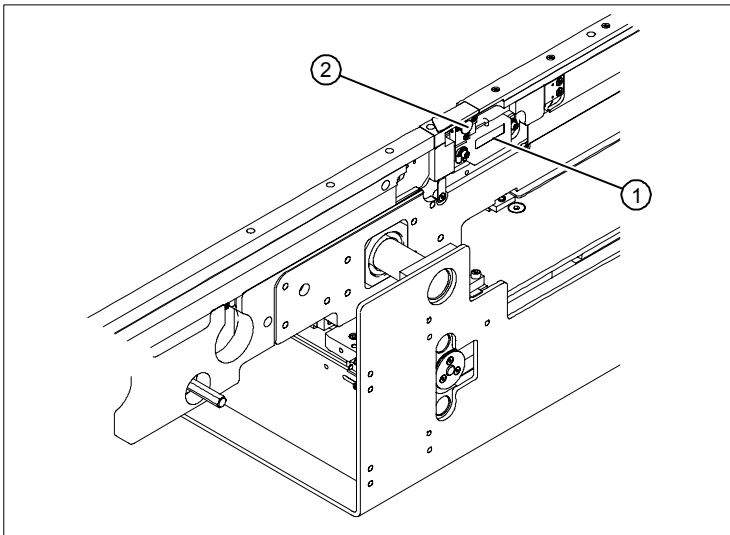
- ▶ Remove the stop rail.
- ▶ Remove the short guide rail.
- ▶ Dismantle the holder and the receiver.
- ▶ Dismantle the receiver from the holder.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Fix the receiver at the holder.
- ▶ Fix the holder together with the receiver at the base in such a way that the holder lies flat on the base.
- ▶ Mount the short guide rail and align it.
- ▶ Mount the stop rail.

7.2.16 Replacing the Laser Light Barriers for Stopper Positions [00370385-xx]

Parts

- Laser light barrier transmitter module BB1 complete (00370385-xx)
- Laser light barrier transmitter module BB2, complete (00370386-xx)
- Laser light barrier receiver module BB1 (00365772-xx)
- Laser light barrier receiver module PA2 (00365774-xx)

Overview



1. Transmitter module (amplifier) with 2 screws
2. Transmitter module (round laser diode) with 3 screws



LASER: The laser light barrier emits class 2 laser beams (from its transmitter).

You therefore do not require additional protective measures!

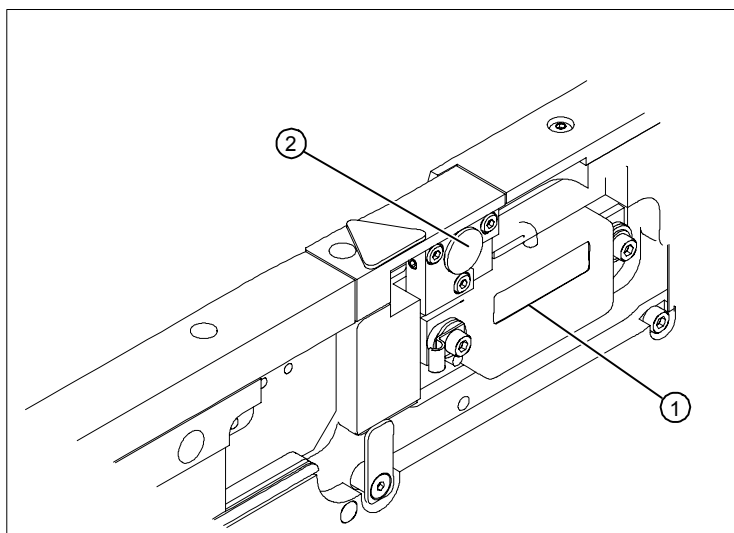
- ▶ Keep your eyes away from the laser beam!

NOTE

After setting the laser light barrier you must check or re-teach the PCB reference corner!

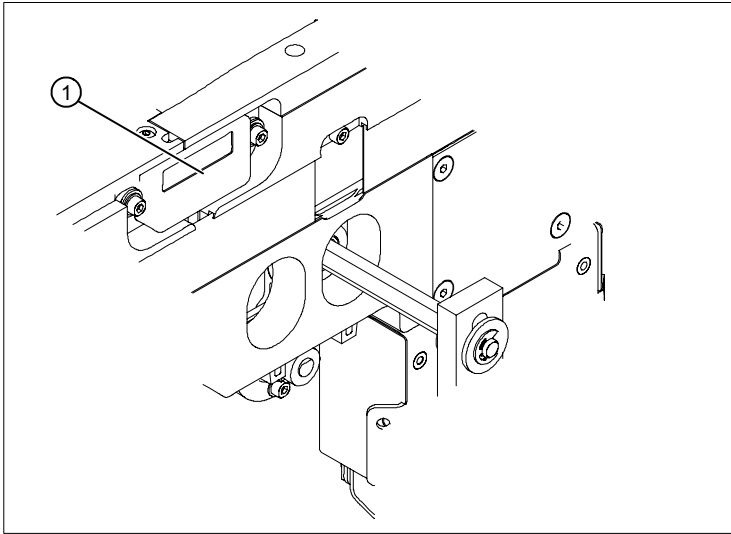
- ▶ Move the PCB conveyor to the position which gives you best access to the laser light barrier.
- ▶ Move the Y-gantries into the area outside the PCB conveyor.
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.

Removal/installation of complete transmitter module



- ▶ Undo the 2 fastening screws on the large transmitter module **(1)** and the 3 fastening screws on the small transmitter module **(2)**. Make sure you do not lose the O-rings.
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board on the conveyor side to the electrical system.
- ▶ Fix the new transmitter module in the original position.
- ▶ Make sure that the 3 O-rings are placed on the 3 fastening screws.
- ▶ Switch the machine on.
- ▶ Move the side parts of the conveyor system apart to maximum width.
- ▶ Turn the 3 fastening screws to align the transmitter diode centrally to the receiver. The entire height of the laser beam must hit the receiver. Please also refer to the adjustment instructions.

Removal /installation of receiver module

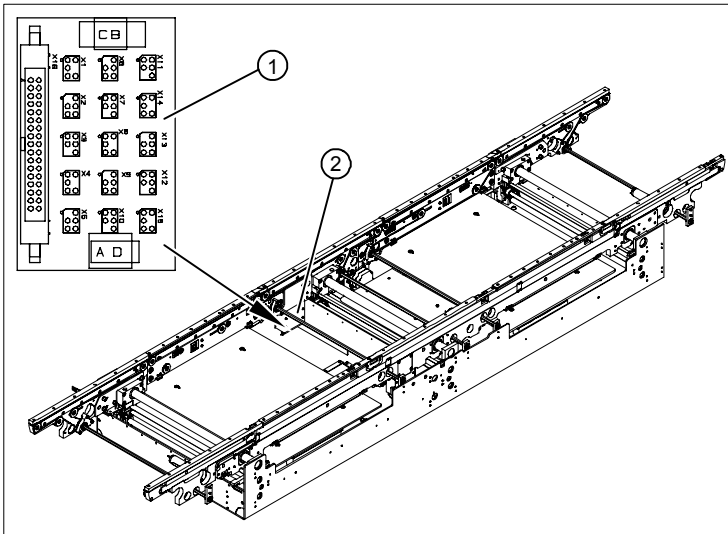


- ▶ Undo the 2 screws fastening the receiver module (1).
- ▶ Unthread the connection cable as far as the relevant conversion board of the conveyor side.
- ▶ Unplug the conversion board of the conveyor side.
- ▶ Rerun the connection cable accordingly and reconnect the conversion board of the conveyor side to the electricity supply.
- ▶ Install the new receiver module in the original position.
- ▶ Switch the machine on.
- ▶ Move the side parts of the conveyor system apart to maximum width.
- ▶ Turn the 2 fastening screws to align the receiver centrally to the transmitter diode. The entire height of the transmitter diode laser beam must hit the receiver. Please also refer to the adjustment instructions.

7.2.17 Overview of the Electrical Components

7.2.17.1 Conversion board of the Conveyor Side [00359424-xx]

Overview



1. Conversion board of the conveyor side
2. Cover

The conversion boards for the conveyor sides (1) are situated on the respective conveyor sides, under a cover (2).

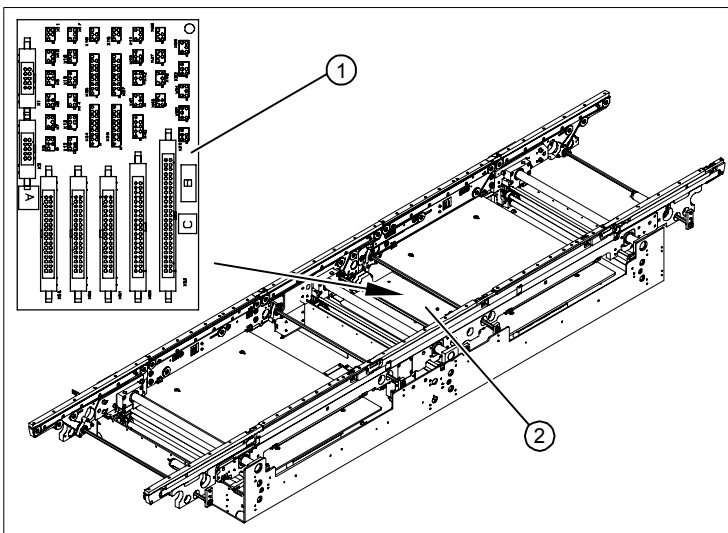
For terminal assignment details, please refer to the current version of the SIPLACE HS-60 respectively S-27 HM detailed circuit diagrams.

7.2.17.2 Conveyor Conversion Board [00359425-xx]

Parts

- HS-60 Conversion board (00359425-xx)
- S-27 HM Conversion board (00359426-xx)

Overview



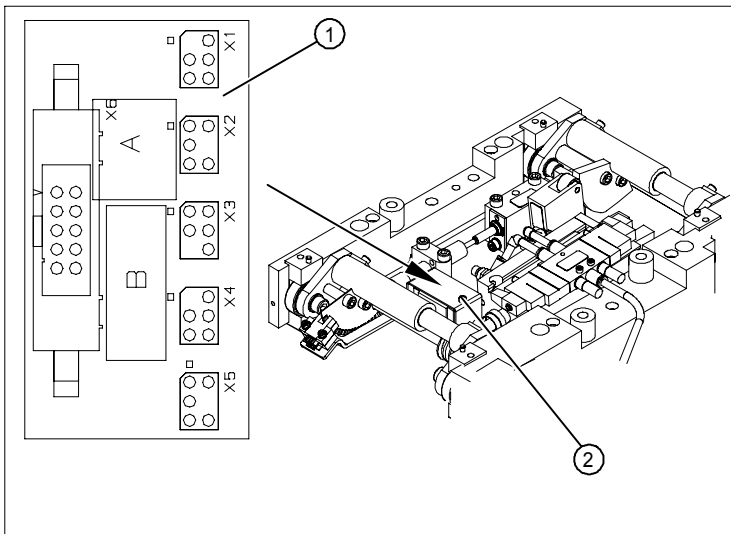
1. Conveyor conversion board
2. Cover

The conveyor conversion board (1) is situated in the vicinity of the intermediate conveyor, under the cover (2).

For terminal assignment details, please refer to the current version of the SIPLACE HS-60 respectively S-27 HM detailed circuit diagrams.

7.2.17.3 Conversion board of the Lifting Table [00362766-xx]

Overview



1. Lifting table conversion board

2. Cover

The lifting table conversion board (1) is situated on the lifting table unit, under the cover (2).

For terminal assignment details, please refer to the current version of the SIPLACE HS-60 respectively S-27 HM detailed circuit diagrams.

7.2.17.4 Conveyor Control TSP 301 [00370397-xx]

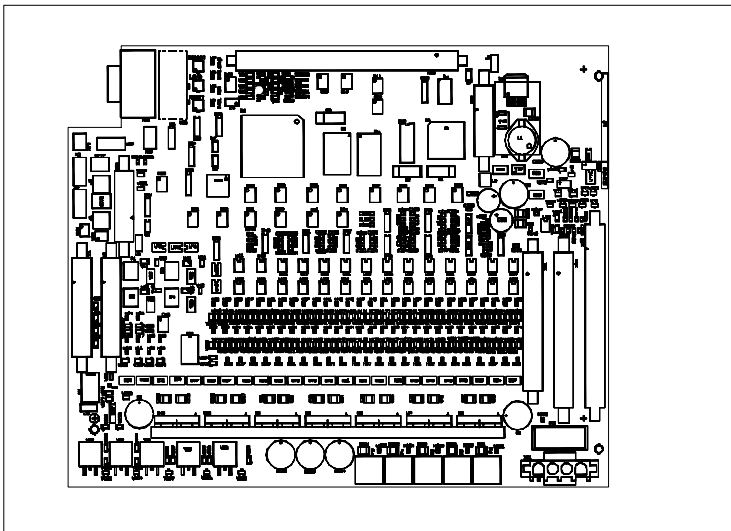
Parts

- HS-60 conveyor control TSP 3201 (00370397-xx)
- S-27 HM conveyor control TSP 201 (00360305-xx)

NOTE

For S-27 HM from SN 382 the clamping sensor n/a. The DIP switch 3 on the conveyor control system must be set to **OFF**.

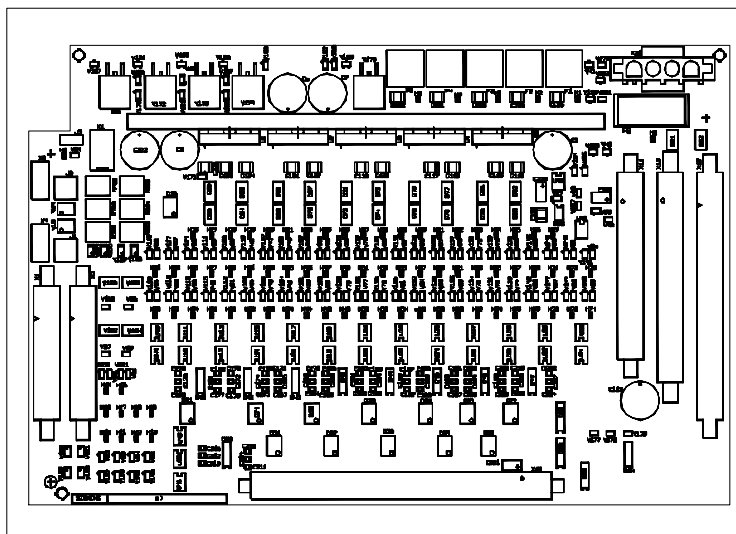
Overview



For terminal assignment details, please refer to the current version of the SIPLACE HS-60 respectively S-27 HM detailed circuit diagrams.

7.2.17.5 Extension Controller Board TSP 301E for Dual Conveyors [00370398-xx]

Overview

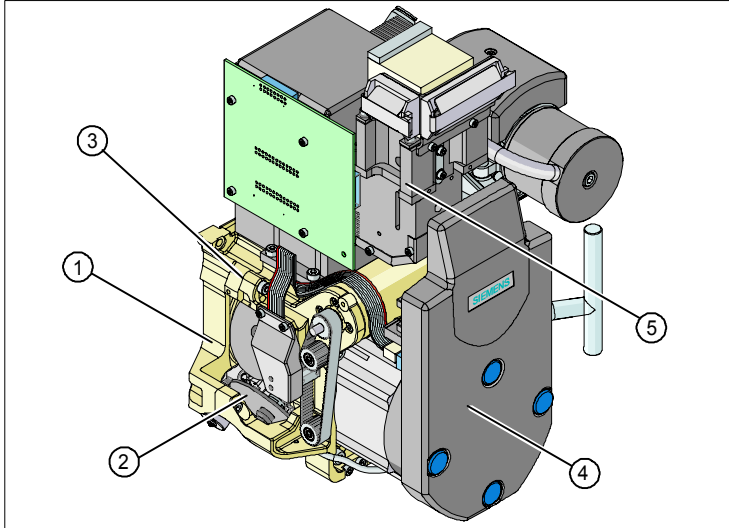


For terminal assignment details, please refer to the current version of the SIPLACE HS-60 respectively S-27 HM detailed circuit diagrams.

8 Collect+Place Head DLM2

8.1 Module Overview

Overall



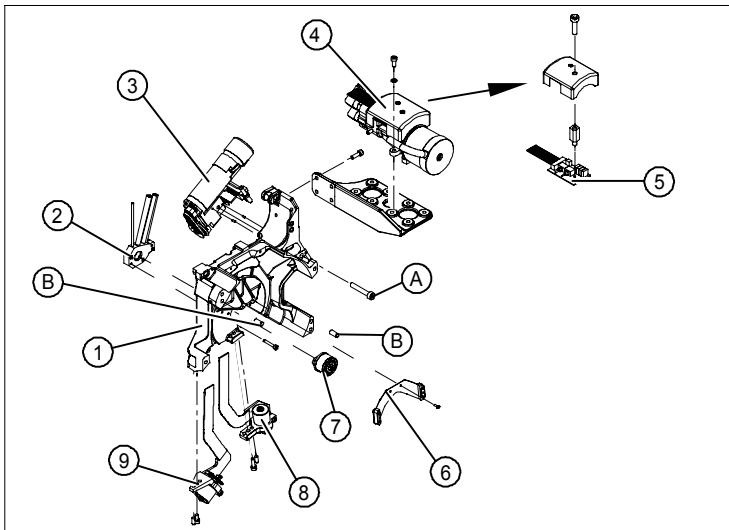
- Collect+Place Head DLM2/12 [00367770-xx]
- Collect+Place Head DLM2/6 [00367020-xx]

NOTE

We have not included diagrams of both placement head types. The structure, functionality and service work described in this manual applies principally to the DLM2 C+P head with 6 and 12 segments.

1. Back Part, Complete
2. Star, fitted with 12 or 6 sleeves
3. Front part, complete
4. Subdistributor
5. Component camera

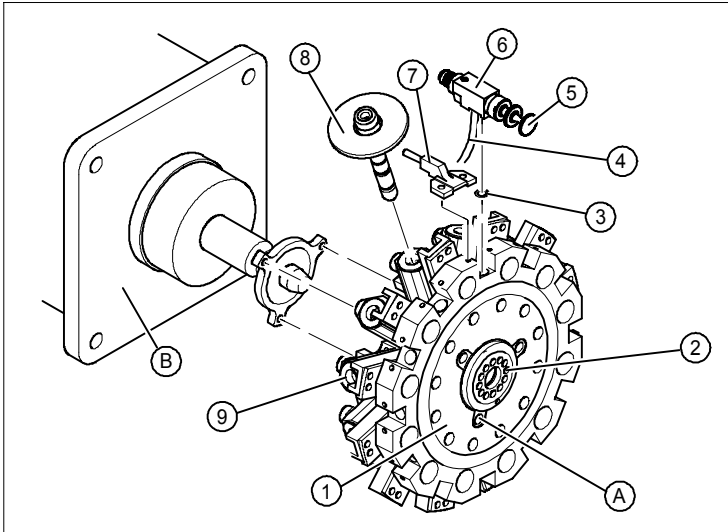
8.1.1 Back Part, Complete Overview



The back part of the collect+place head is fixed with four hexagon socket-head screws (A) to the gantry head plate. Two parallel pins (B) are used to center the front part of the collect+place head.

1. Back part /DLM2
2. Vacuum distributor
3. Turning station
4. Vacuum generator/ DLM2
5. Vacuum measurement board SP6/12
6. Brake for star
7. Distributor piece
8. "Placement circuit" valve positioning drive
9. "Reject circuit" valve positioning drive

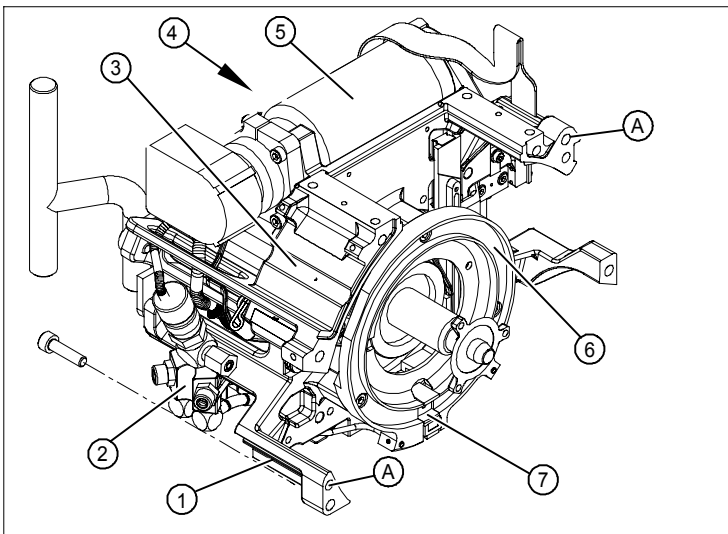
8.1.2 Star, Fitted Overview



The star is fixed to the drive shaft of the star motor **(B)** with three M3x8 hexagon socket-head screws **(A)**.

1. Star
2. Distributor plate for distributing the vacuum between the individual segments
3. 12 O-rings
4. 12 connecting hoses / DLM2
5. 12 valve plungers, complete, SP-12
6. 12 valves, SP-12
7. 12 forced air inlets
8. 12 sleeves
9. 12 segments

8.1.3 Front Part, Complete Overview

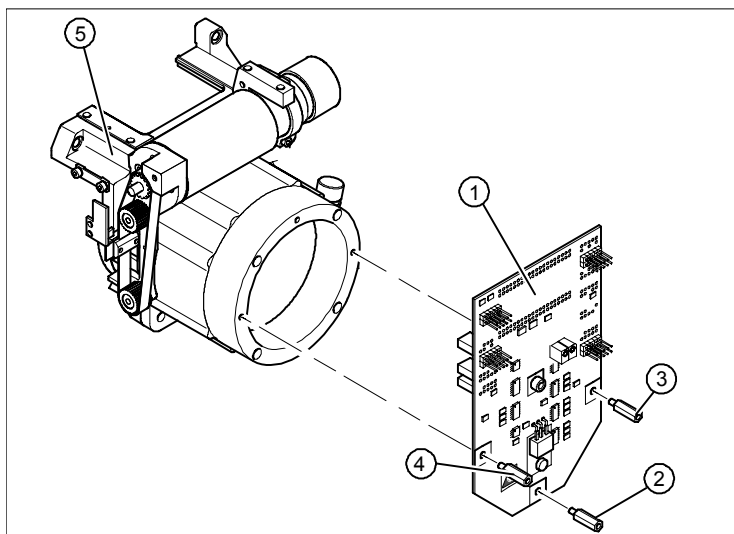


The front part is centered by two holes **(A)**, into which the parallel pins of the back part engage. The front is fixed to the back part with four M4x16 hexagon socket-head screws.

1. Casing / DLM2
2. Forced air unit/ DLM2
3. RSF - digital rotary encoder/ DLM2 (beneath the board with the safety cover)
4. Star drive, digital/ DLM2
5. Z-axis drive
6. Raceway for the 12 ball bearings on the segments
7. Snap jaws to raise or lower the sleeves

8.1.4 Subdistributor

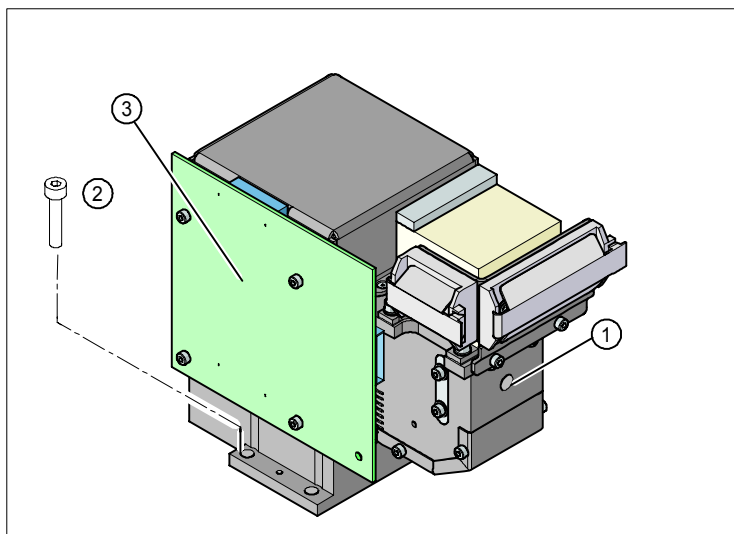
Overview



1. Subdistributor
2. Spacer bolt M3x10
3. Spacer bolt M3x7
4. Spacer bolt M3x9
5. Front part of the collect+place head

8.1.5 Component Camera 24 x 24

Overview



1. Component camera - Type 28
2. Fastening screws
3. Illumination control board

8.1.6 Overview of Settings

Description	Tools	Values
Assembly of star on star motor shaft.	Adjustment with power pack and zero point gage for star.	Check the magnetic neutral position with SITEST. Maximum deviation: 95 digits.
Determine zero point correction factor of star.	Zero point correction gage	Enter result of zero point correction with SITEST at „Positions“.
Star encoder resolution.	None	Switch set to 25
DP axis Incremental encoder setting - distance to segment disk.	Test probes 1.4 mm – 1.6 mm	Distance 1.5 mm.
Valve positioning drive settings.	Feeler gage 0.2 mm (325445-xx)	0.2 mm distance from plunger to valve housing.
Light barrier Z-axis down.	Test probe 1.0 mm	Distance 1.0 mm.
Z-terminal block belt		Tension jack must lie on the belt teeth at the top and bottom.
Z-axis belt tension.	Belt tension measuring device	Belt tension 270-290 Hz (+/- 5 Hz).
Z top stop	Gage for Z end position stop Star gage (03019865-xx)	Correct position for automatic zero point identification.
blast air tube on star.	Sight check	Check distance between incremental encoder and blast air tube.
Setting blast air supply.	Feeler gage	blast air tube must extend approx. 0.7 mm above the circular arc guide.
blast air - placement setting	Compressed air measuring device	150 mbar at an open 9x4 nozzle.

8.2 Service Work



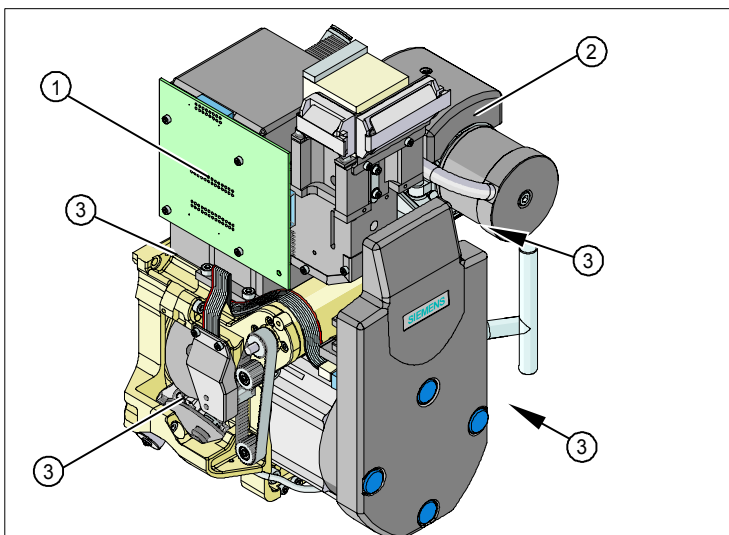
WARNING: Nonobservance of these safety instructions may cause injury to personnel and damage to the machine!

The service work described in this manual may only be performed by specially trained service technicians, with appropriate qualifications and expertise.

► Please observe the safety instructions in the Operating Manual for all service work!

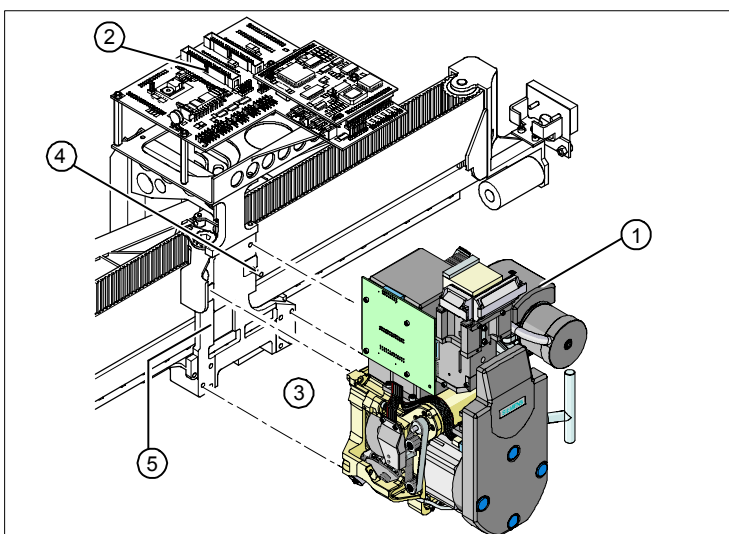
8.2.1 Replacing the Collect+Place Head 6/12 [00367281-xx]

Overview



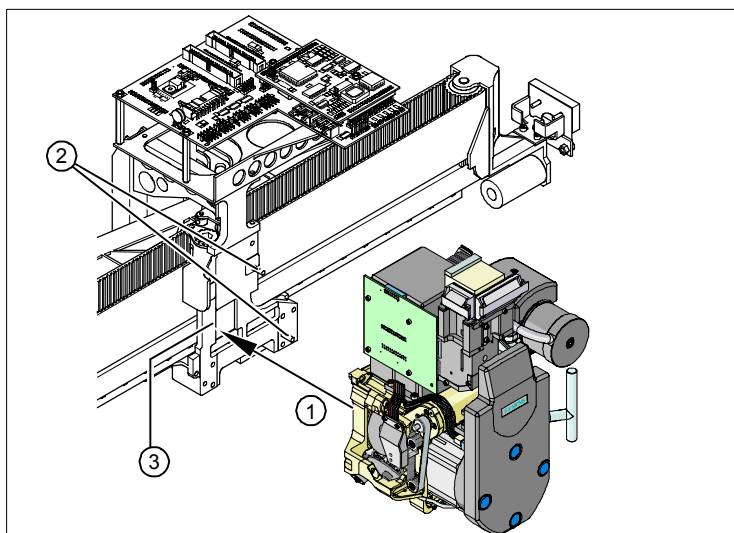
1. Illumination controller
2. Pneumatic distributor
3. 4 x fastening screws

Disassembly

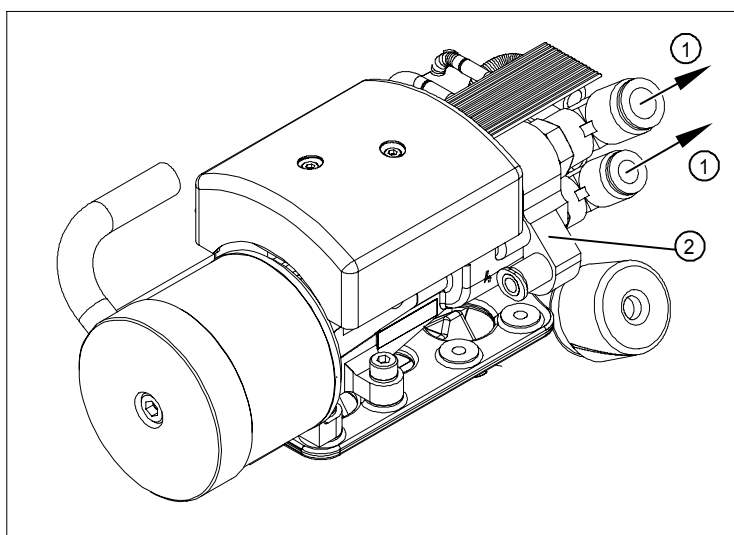


- Remove the compressed air hoses from the pneumatic coupling of the pneumatic distributor (1).
- Undo the plug-and-socket connections to the collect+place head board (2).
- Undo the 4 screws (3) fastening the collect+place head.
- Carefully pull the collect+place head away from the parallel pins (4) on the head mount (5) and remove the collect+place head from the placement system.

Installation



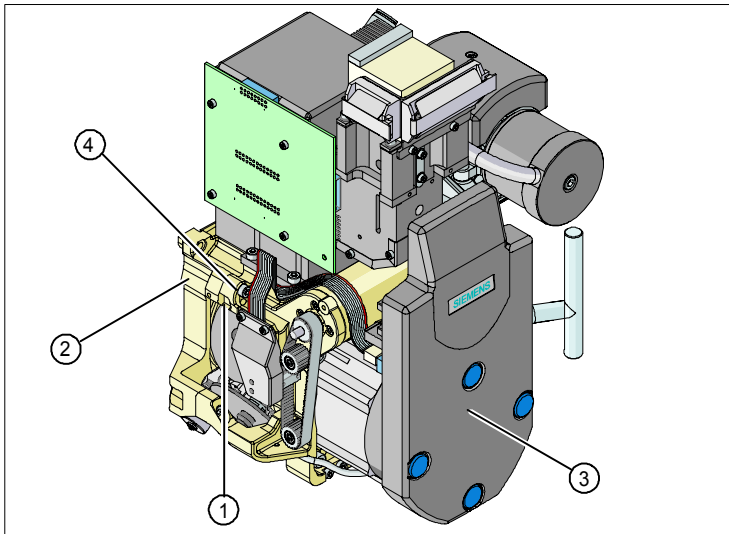
- ▶ Carefully move the collect+place head towards the head mount (3).
- ▶ Make sure that the parallel pins (2) on the head mount slide into the holes in the back part of the collect+place head.
- ▶ Carefully push the collect+place head towards the head mount until it lies flat against it.
- ▶ Fix the collect+place head with the 4 screws provided (1).



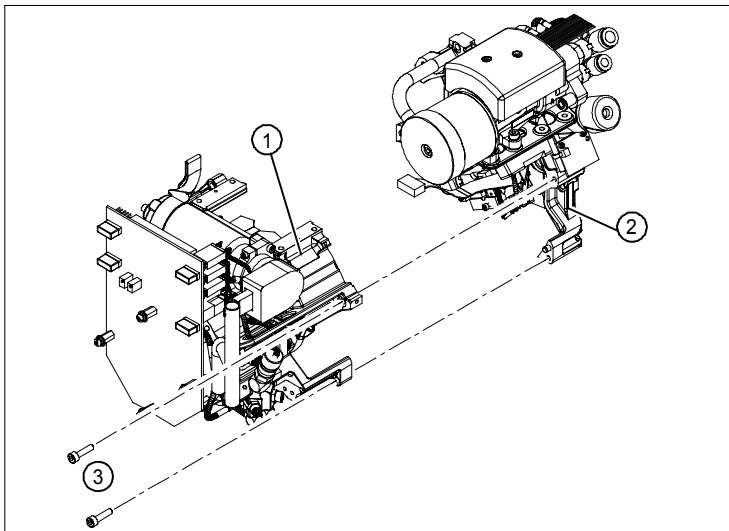
- ▶ Connect the compressed air hoses (1) to the pneumatic coupling on the pneumatic distributor (2).
- ▶ Reconnect to the electricity system.
- ▶ Use the SITEST program to calibrate the collect+place head.

8.2.2 Replacing the Front Part of the Collect+Place Head [00367769-xx]

Disassembly



1. Front part
 2. Back part
 3. Intermediate distribution board (under the cover)
 4. 4 x fastening screws
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Remove the connecting cable plugs from the sockets on the head interface.
 - ▶ Remove the pneumatic hose.



- ▶ Undo the four fastening screws (3).



Attention: Hold on to the placement head!

When you undo the last screw, hold the collect+place head so that it does not accidentally drop off the back part.

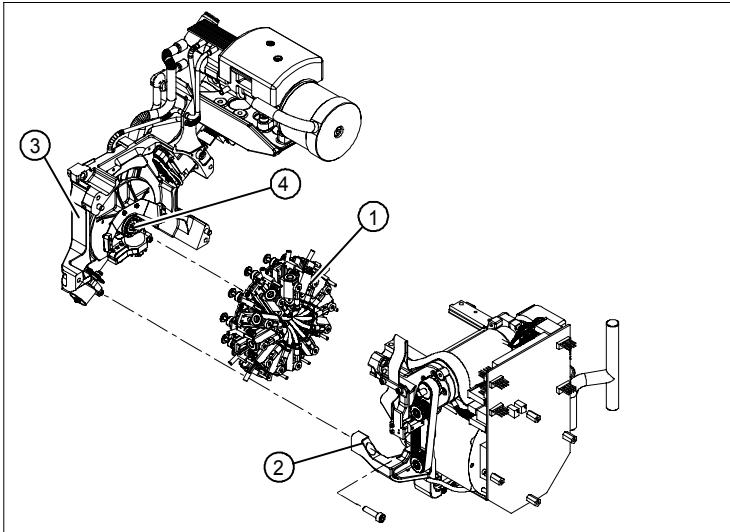


Attention: Make sure the star position is correct!

When you remove the front part of the collect+place head, make sure that the star is pivoted roughly 15° away from the vertical sleeve position. Otherwise the valve plunger will remain attached to the valve positioning drive.

- ▶ Lift the front part of the collect+place head (1) away from the parallel pins on the back part (2) and place it on a soft, clean surface.

Fitting the front part of the collect+place head



- ▶ Grease the O-rings with Unisilikon.
- ▶ Push the small O-ring onto the tube.
- ▶ Position the large O-ring onto the connecting piece (4).
- ▶ Check that the O-rings are seated correctly.
- ▶ Insert the distributor block into the back part (3).
- ▶ Place the front part (2) on the back part (3) so that the parallel pins are aligned with the holes in the front part.
- ▶ Carefully push the front part against the back part until it lies flat against the back part.
- ▶ Tighten the four fastening screws.
- ▶ Reconnect to the electrical system.



Attention: Check how the cables are run!

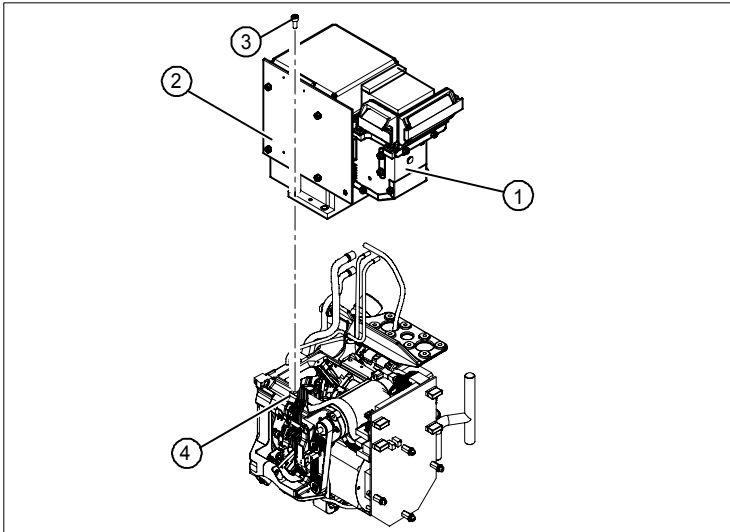
Make sure that the folded part of the ribbon cable for the "Z-axis up" light barrier is pushed back under the illumination board.

- ▶ Use the SITEST program to calibrate the collect+place head.

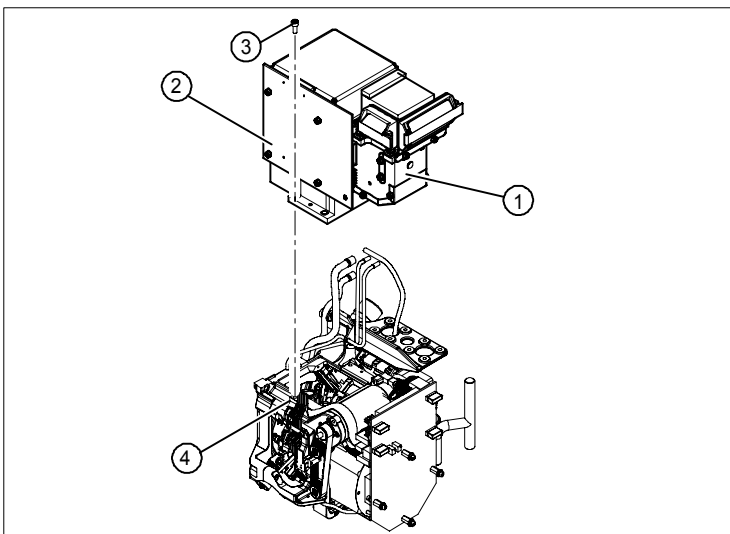
8.2.3 Replacing the Component Camera [00336791-xx]

Removal/Installation

The component camera must be replaced as a complete unit. This consists of the lens system, camera, amplifier, illumination planes and "illumination controller" board.

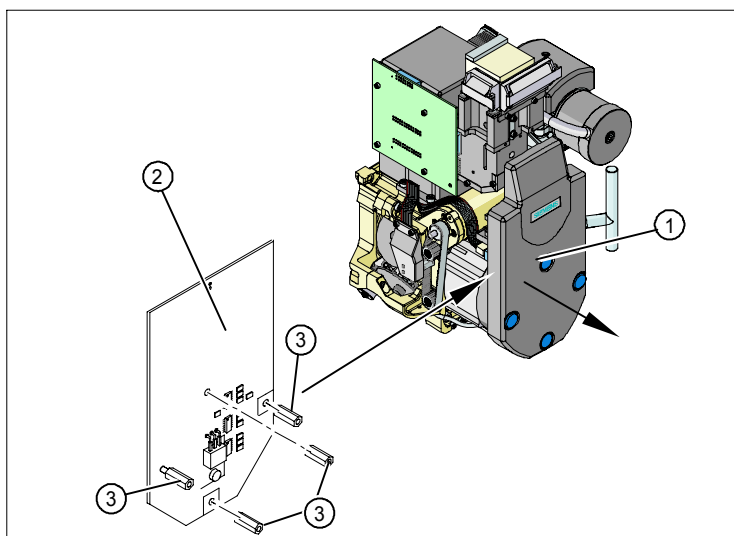


- ▶ Dismantle the front part of the collect+place head (4).
- ▶ Remove the ribbon cable plug from the socket on the "component illumination control" board (2).
- ▶ Undo the four screws (3) holding the component camera.
- ▶ Carefully detach the component camera (1).



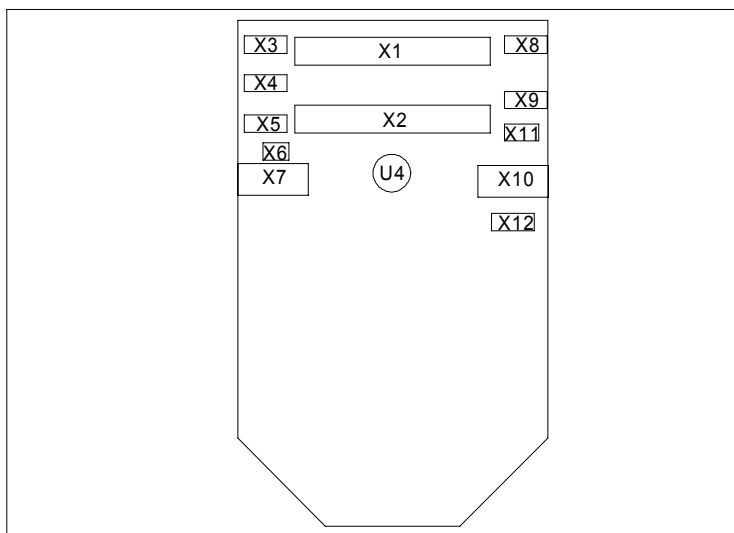
- ▶ Make sure that all contact surfaces are clean.
- ▶ Place the holes in the camera on the parallel pins (4).
- ▶ Carefully position the camera on the collect+place head, until the camera plinth lies flat on the contact surface of the front part of the collect+place head.
- ▶ Fix the camera in place with the four screws provided (3).
- ▶ Connect the ribbon cable to the socket on the "component illumination board" (2).
- ▶ Install the front part of the collect+place head (4).
- ▶ Start the placement system.
- ▶ Use the SITEST program to calibrate the component camera.

8.2.4 Replacing the Subdistributor [00330648-xx]



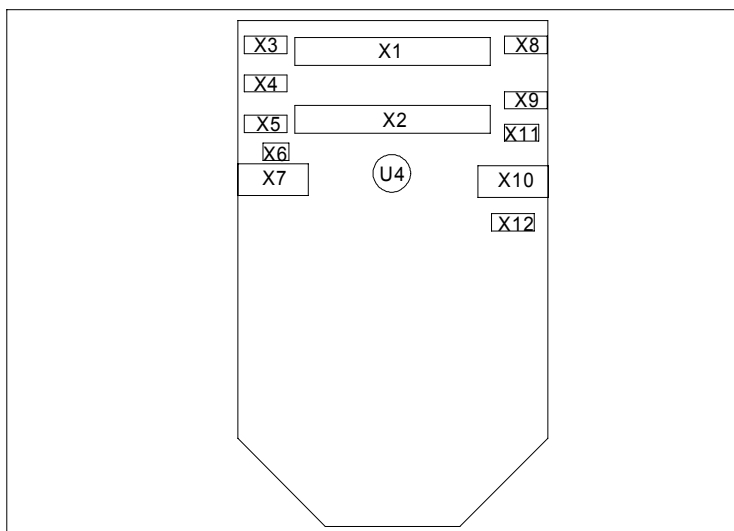
Disassembly

- ▶ Please observe the ESD regulations for the following work and use an ESD ground strap.
- ▶ Loosen and remove the four fastening screws and take off the cover (1).
- ▶ Undo the four spacer bolts (3) and tilt the intermediate distribution board (2) slightly.



Installation

- ▶ Carefully remove the hose from the pressure sensor (U4).
- ▶ Remove the plugs from their sockets on the board. Refer to the respective detailed circuit diagrams.
- ▶ Remove the intermediate distribution board.

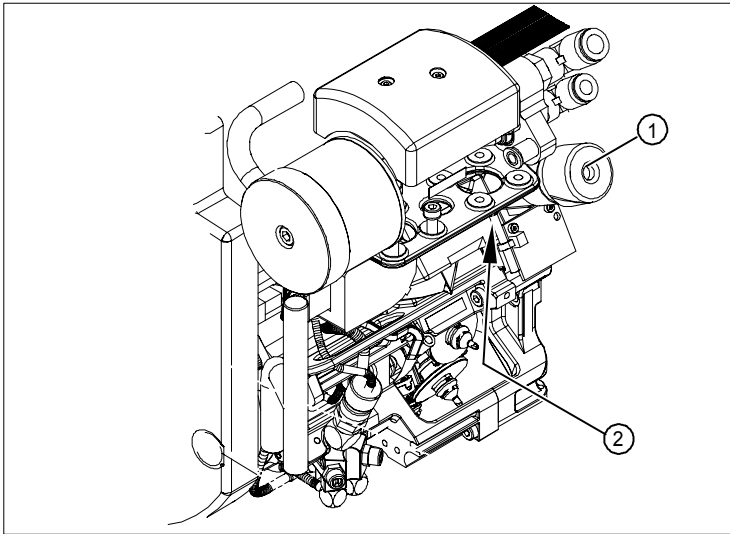


- ▶ Restore connections **X1.....X12**.
- ▶ Push the hose onto the pressure sensor tube(**U4**).
- ▶ Fasten the intermediate distribution board.

NOTE:

No settings are required.

8.2.5 Replacing the Turning Station [00341780-xx]



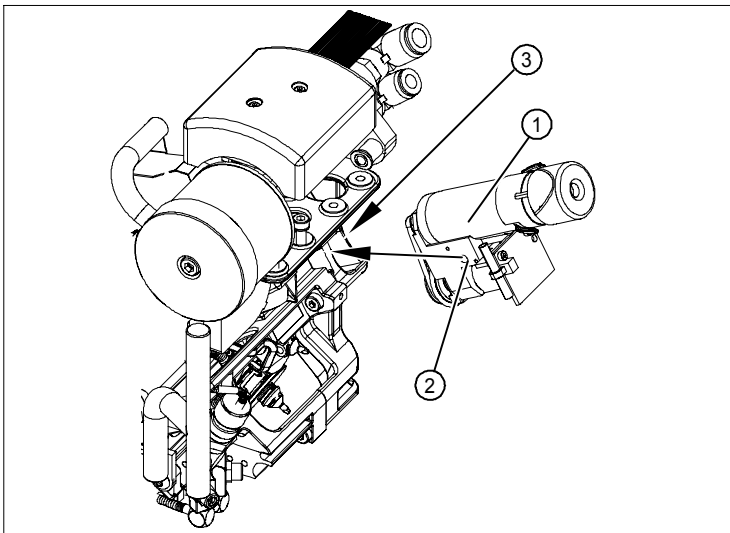
1. Turning station / DLM2
2. Fastening screw for turning station

NOTE:

The head does not need to be removed when dismantling the turning station.

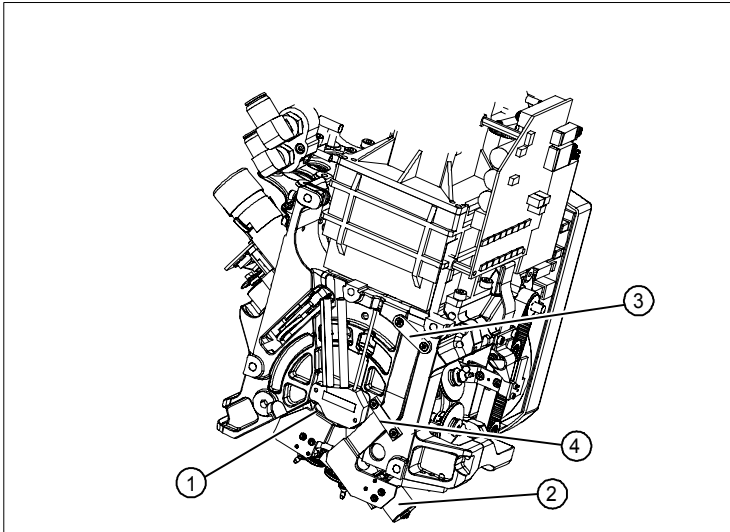
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
- ▶ Remove the motor cable and ribbon cable from the slots on the head adapter.

Removal/Installation

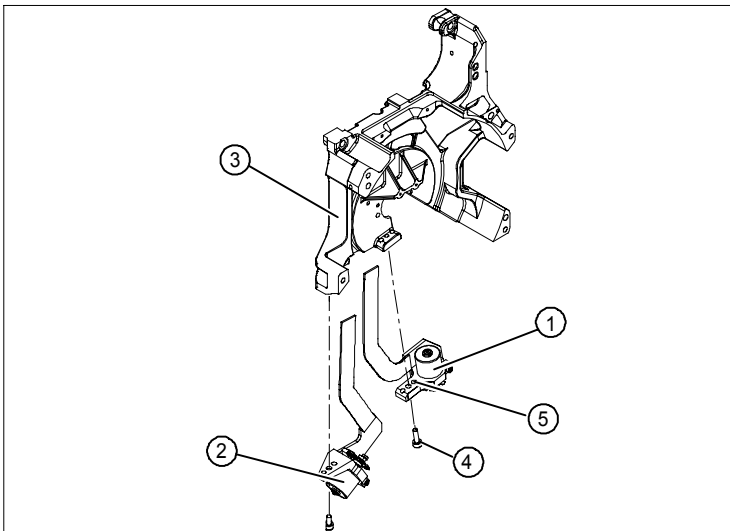


- ▶ Move the collect+place head to a suitable position.
- ▶ Undo the screws fastening the turning station (2).
- ▶ Carefully lever the turning station (1) off the locating pins and gently pull it (1) out.
- ▶ Make sure that the contact surfaces on the turning station and back part (3) are clean.
- ▶ Insert the turning station holes (1) onto the parallel pins.
- ▶ Carefully push the turning station towards the front part until it reaches the stop.
- ▶ Fasten the turning station with the screw provided (2).
- ▶ Plug the cable into the slots on the head adapter. Make sure the cables are run correctly.
- ▶ Switch the placement system on and start it up.
- ▶ Use the SITEST program to run a function test.

8.2.6 Replacing the Valve Positioning Drive for the Placement Circuit [00368075-xx] Disassembly

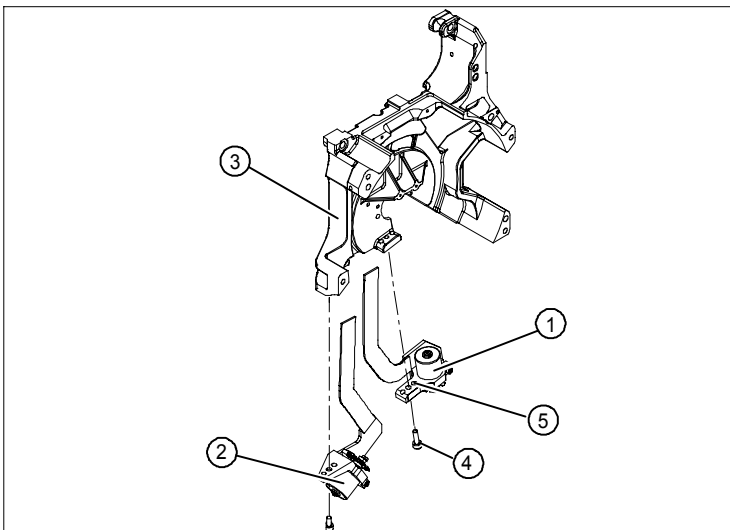


1. Valve positioning drive for the placement circuit [00368075-xx]
 2. Valve positioning drive for the reject circuit [00349432-xx]
- ▶ Remove the collect+place head from the head plate.
 - ▶ Undo the two M2x6 Phillips screws on the ribbon cable clamp(3) and (4).

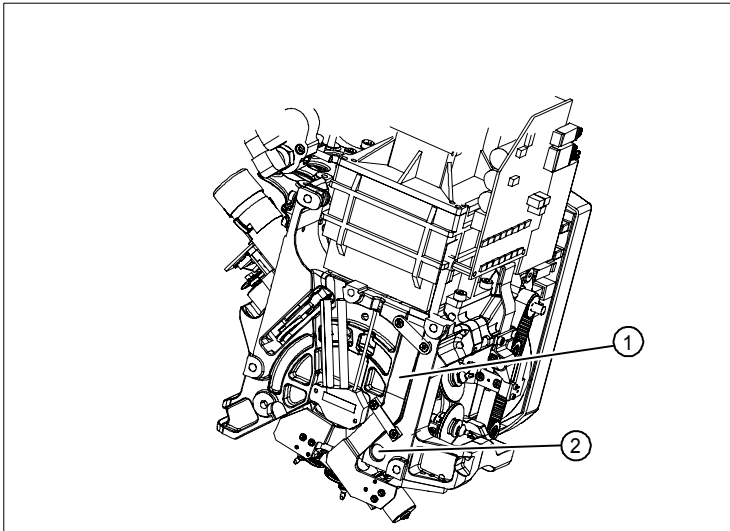


1. Valve positioning drive for the placement circuit [00368075-xx]
 2. Valve positioning drive for the reject circuit [00349432-xx]
- ▶ Undo the fastening screw (4).
 - ▶ Carefully remove the valve positioning drive (1) or (2).

Installation



- ▶ Insert the valve positioning drive. Make sure that it is seated correctly on the parallel pins(5).
- ▶ Loosely tighten the hexagon socket-head screw (4)
- ▶ Use the cable clamps to fix the ribbon cable in position. Make sure that the ribbon cables are not squashed.

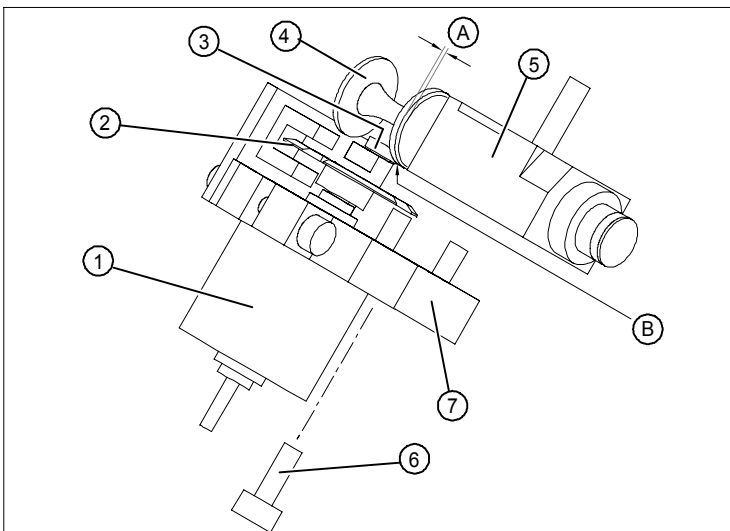


Attention: Check how the cables are run!

Check that the ribbon cables are laid correctly **(1)**.

- The flat ribbon cable for the two valve positioning units must be run outside the holes **(2)**. Otherwise, it will be damaged when the collect+place head is fitted onto the head plate.

Mechanical adjustment

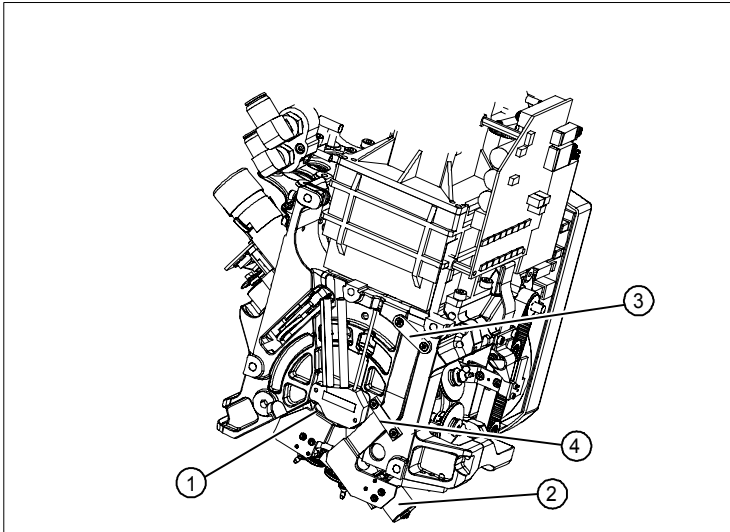


1. Stepping motor
2. Incremental plate
3. Deep-groove ball bearings
4. Valve plunger
5. Valve casing
6. M3x10 hexagon socket-head screw
7. Valve positioning drive (flange)

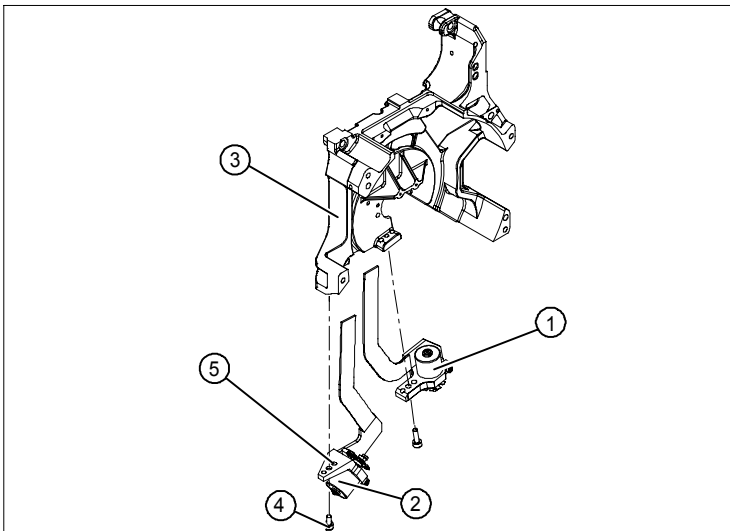
- Use the feeler gauge to set the distance between the valve plunger and valve casing to 0.2 mm **(A)**.
- Turn the incremental plate **(2)** until the deep-groove ball bearings **(3)** point towards the valve casing.
- Move the valve positioning drive **(7)** so that the deep-groove ball bearings **(3)** come into contact with the valve plunger **(4)** at position **(B)**.
- Use the hexagon socket-head screw to fix the adjustment unit in this position **(6)**.
- Attach the collect+place head to the head plate.
- Use the SITEST program to test that the valve positioning drive is functioning correctly.
- Use the SITEST program to calibrate the collect+place head.

8.2.7 Replacing the Valve Positioning Drive for the Reject Circuit [00349432-xx]

Disassembly

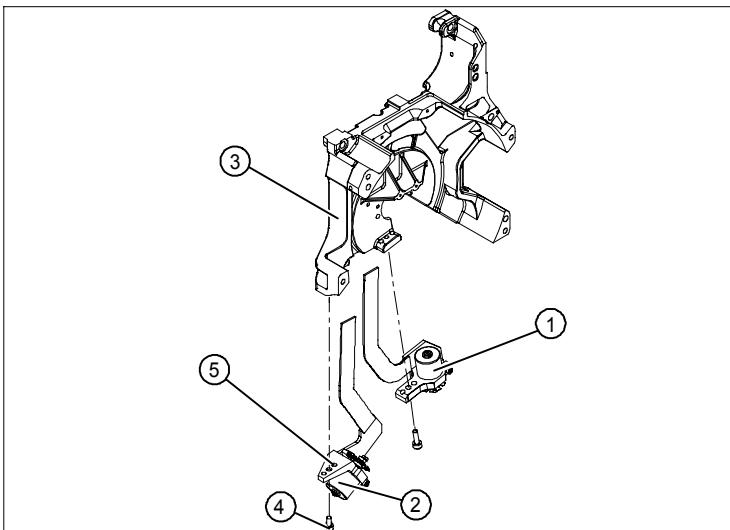


1. Valve positioning drive for the placement circuit [00368075-xx]
 2. Valve positioning drive for the reject circuit [00349432-xx]
- ▶ Remove the collect+place head from the head plate.
 - ▶ Undo the two M2x6 Phillips screws on the ribbon cable clamp (3) and (4).

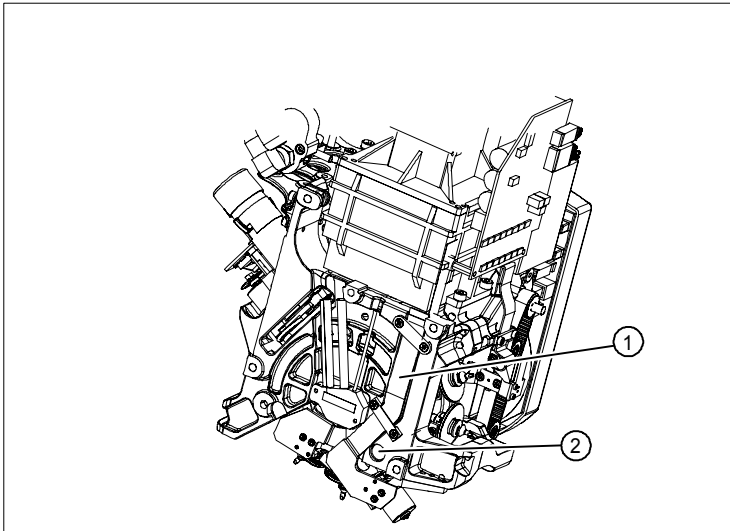


1. Valve positioning drive for the placement circuit [00368075-xx]
 2. Valve positioning drive for the reject circuit [00349432-xx]
- ▶ Undo the fastening screw (4).
 - ▶ Carefully remove the valve positioning drive (2)

Installation



- ▶ Insert the valve positioning drive. Make sure that it is seated correctly on the parallel pins (5).
- ▶ Loosely tighten the hexagon socket-head screw (4)
- ▶ Use the cable clamps to fix the ribbon cable in position. Make sure that the ribbon cables are not squashed.

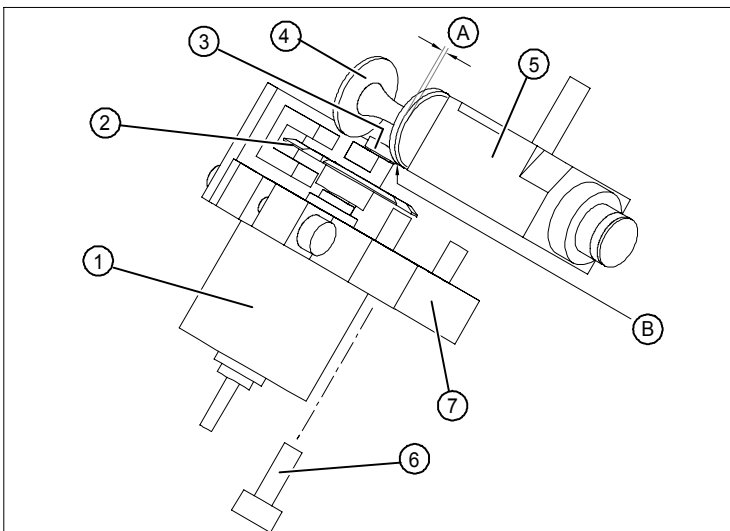


Attention: Check how the cables are run!

Check that the ribbon cables are laid correctly **(1)**.

- ▶ The flat ribbon cable for the two valve positioning units must be run outside the holes **(2)**. Otherwise, it will be damaged when the collect+place head is fitted onto the head plate.

Mechanical adjustment

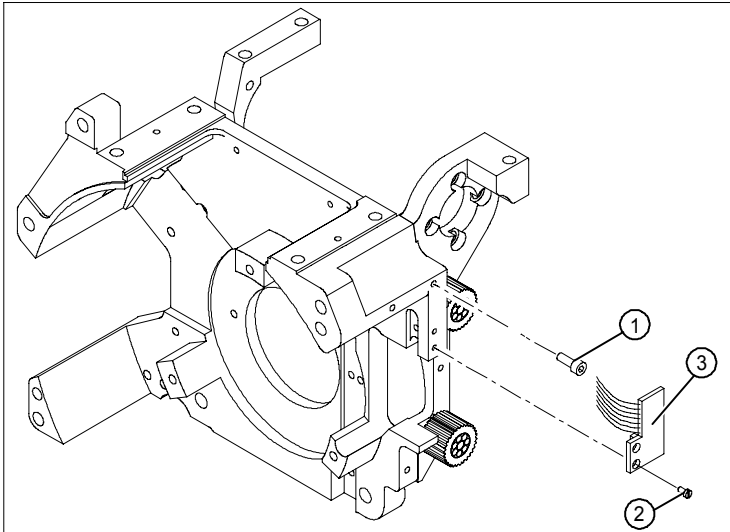


1. Stepping motor
2. Incremental plate
3. Deep-groove ball bearings
4. Valve plunger
5. Valve casing
6. M3x10 hexagon socket-head screw
7. Valve positioning drive (flange)

- ▶ Use the feeler gauge to set the distance between the valve plunger and valve casing to 0.2 mm **(A)**.
- ▶ Turn the incremental plate **(2)** until the deep-groove ball bearings **(3)** point towards the valve casing.
- ▶ Move the valve positioning drive **(7)** so that the deep-groove ball bearings **(3)** come into contact with the valve plunger **(4)** at position **(B)**.
- ▶ Use the hexagon socket-head screw to fix the adjustment unit in this position **(6)**.
- ▶ Attach the collect+place head to the head plate.
- ▶ Use the SITEST program to test that the valve positioning drive is functioning correctly.
- ▶ Use the SITEST program to calibrate the collect+place head.

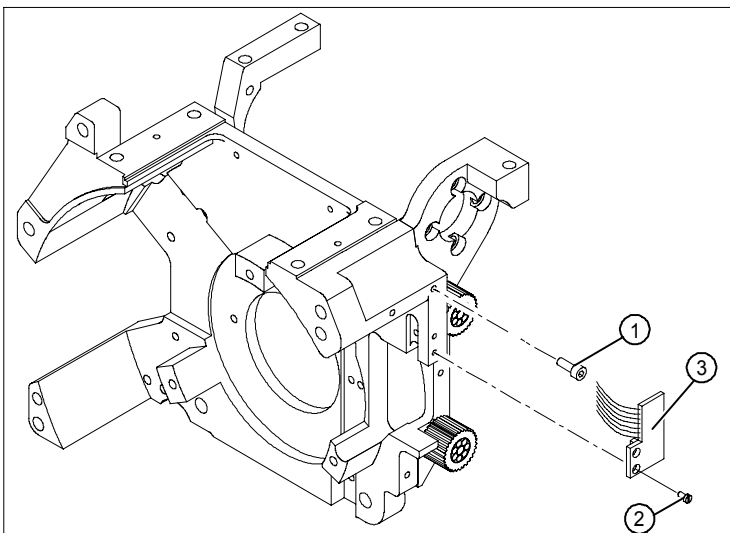
8.2.8 Replacing Light Barrier "Z-axis Up" [00347297-xx]

Disassembly



1. 2 x M2.0x4 hexagon socket-head screws
 2. 2 Phillips screws (1.6x3)
 3. Light barrier board "Z-axis up"
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Remove the plug from the socket on the intermediate distribution board.
 - ▶ Undo the two M2.0x4 hexagon socket-head screws (1) and remove the ribbon cable clamp.
 - ▶ Loosen the two M1.6x3 Phillips screws (2).
 - ▶ Remove the "Z-axis up" light barrier board (3) together with its cable.

Installation



- ▶ Use the two M1.6x3 Phillips screws (2) to fix the "Z-axis up" light barrier board (3).
- ▶ Connect the ribbon cable plug to the socket on the intermediate distribution board.
- ▶ Use the ribbon cable clamp and the two hexagon socket-head screws (1) to fix the ribbon cables.

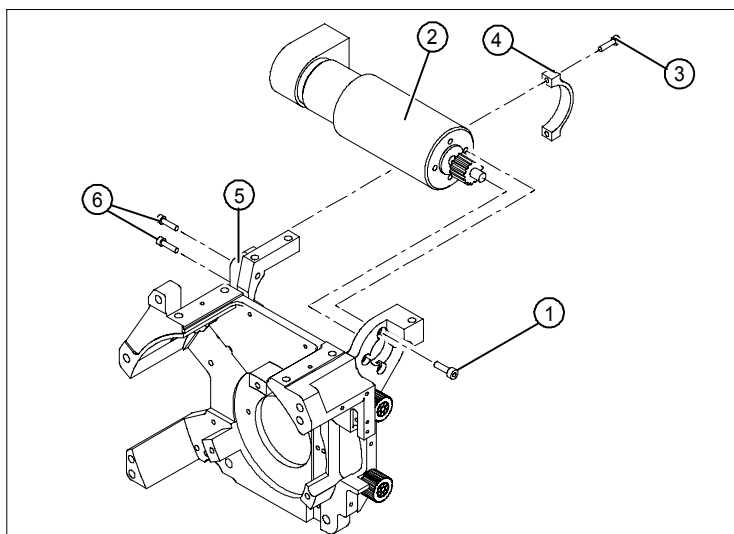


Attention: Check how the cables are run!

Make sure that the ribbon cable is not squashed in the guide channel. Make sure that you push the folded part of the flat ribbon cable for the "Z-axis up" light barrier back under the illumination board.

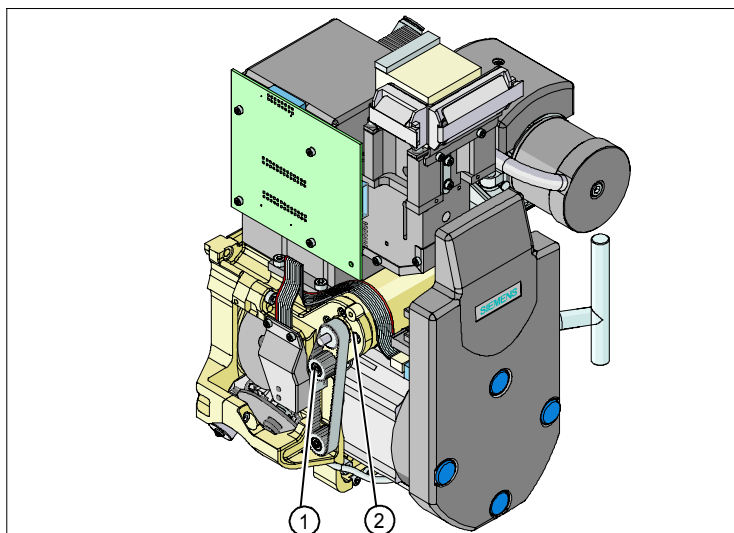
8.2.9 Replacing the Z-axis Drive [00341011-xx]

Disassembly



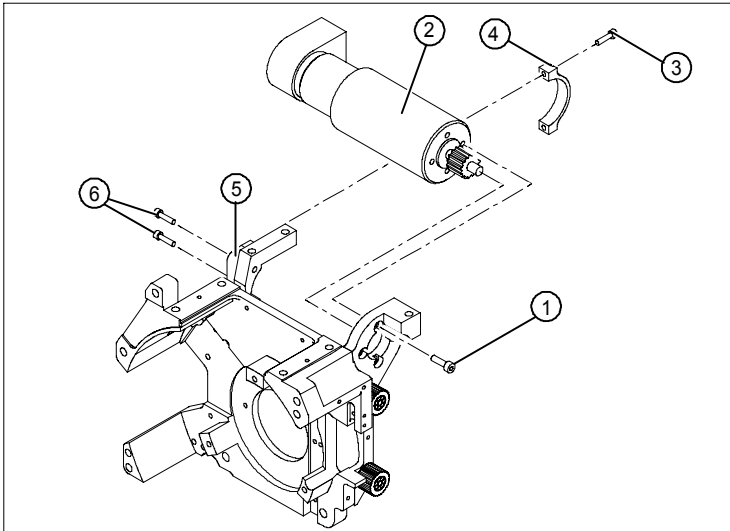
1. 4 x M3x5 hexagon socket-head screws with locking varnish
 2. Z-axis drive
 3. 2 x M2.5x12 hexagon socket-head screws
 4. Motor clamp fitting 2 /DLM2
 5. Motor clamp fitting /DLM2
 6. 2 x M3x14 hexagon socket-head screws
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Remove the plug from the sockets on the intermediate distribution board.
 - ▶ Undo the four M3x5 hexagon socket-head screws with locking varnish (1).
 - ▶ First undo the upper M2.5x12 hexagon socket-head screw (3) of the motor clamp fitting 2 (4), then the lower one.
 - ▶ Undo the two M3x14 hexagon socket-head screws (6) on the motor clamp fitting (5).
 - ▶ Carefully remove the Z-axis drive (2) together with the cables.

Installation



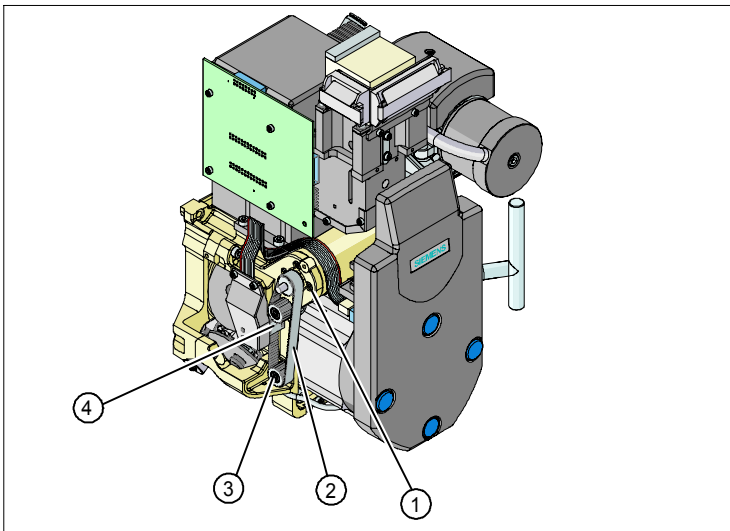
- ▶ Insert the Z-axis drive (2).
- ▶ Make sure that the teeth of the toothed belts engage in the teeth of the motor pinion (1)
- ▶ Use the four M3x5 hexagon socket-head screws to fit the Z-axis drive.
- ▶ Tension the Z-axis toothed belt by pushing the Z-axis drive unit upwards.
- ▶ Use the belt tension measuring device to check the tension of the toothed belt (see setting instructions).

	Before continuous operation Frequency in Hz	After continuous operation Frequency in Hz
Toothed belt T2 /DLM2 on the Z-axis	280 +/- 10	280 +/- 10

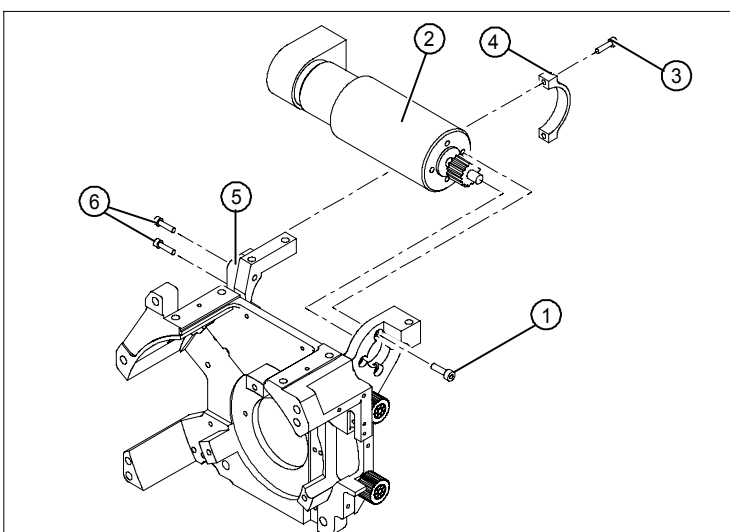


- ▶ Tighten the two M3x14 hexagon socket-head screws (6) for fixing the motor clamp (5).
- ▶ Tighten the two M2.5x12 hexagon socket-head screws (3) for fixing the motor clamp 2 (4).
- ▶ Now tighten the hexagon socket-head screws on the Z-axis drive unit and the motor clamp.
- ▶ Check the Z-axis top stop with the adjustment gage.

8.2.10 Replacing the Toothed Belt of the Z-axis [00334936-xx] Disassembly

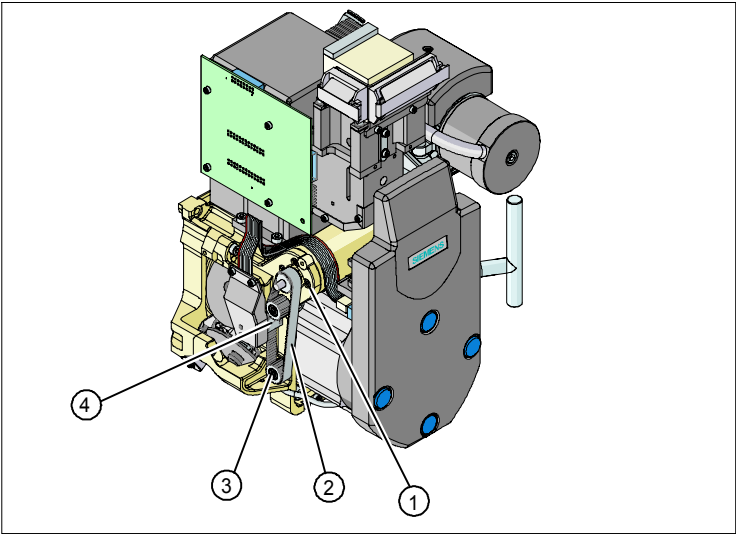


1. Z-axis drivestop
 2. Z-axis toothed belt
 3. 2 x deflection wheel / DLM2
 4. Tension jack
- ▶ Switch off the machine and secure it to prevent unauthorized reactivation.
 - ▶ Loosen the two screws fastening the tension jack (3).



- ▶ Undo the two M2.5x12 hexagon socket-head screws (3) on the motor clamp fitting (4).
- ▶ Undo the two M3x14 hexagon socket-head screws (6) on the motor clamp fitting (5).
- ▶ Loosen the four M3x5 hexagon socket-head screws (1).
- ▶ Remove the toothed belt.

Installation



- Place the new toothed belt over the pinion of the Z-axis drive and the deflection wheels.

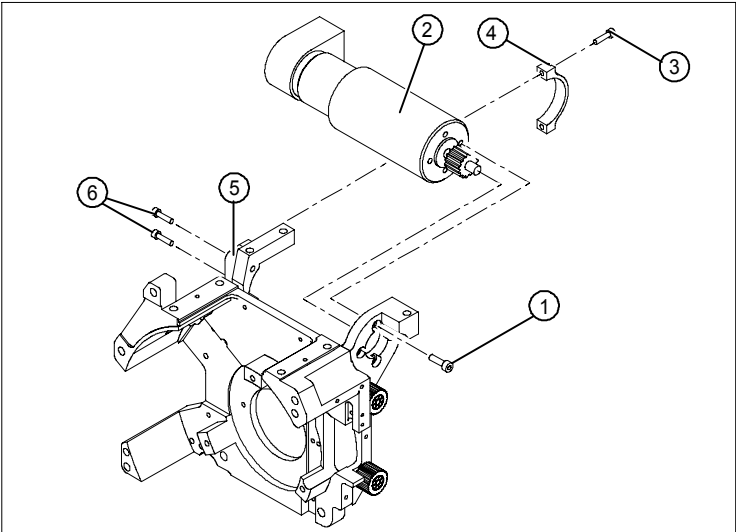
NOTE

Make sure that the teeth of the toothed belts engage in the teeth of the pinion and deflection pulleys.

- Fit the tension jack (4) with the two fastening screws, to the toothed belt.

NOTE

Make sure that both ends of the tension jack lie on the teeth of the toothed belt.

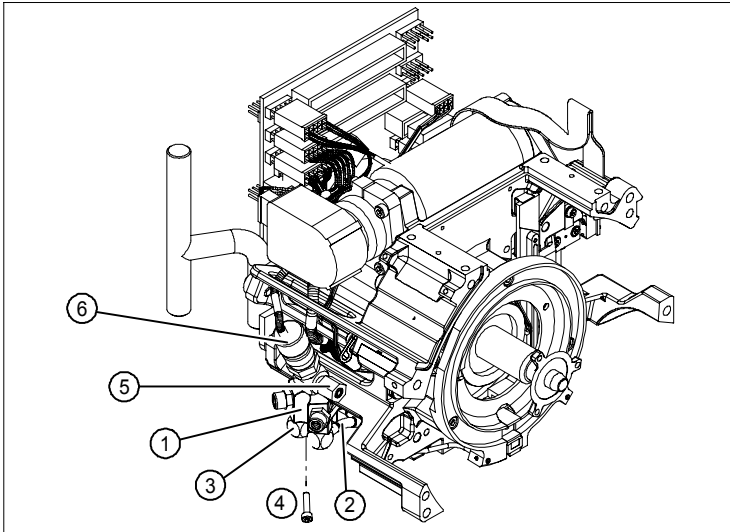


- Loosely tighten the four M3x5 hexagon socket head screws (1) on the Z-axis drive unit (2).
- Tension the Z-axis toothed belt by pushing the Z-axis drive unit upwards.
- Use the belt tension measuring device to check the tension of the toothed belt (see setting instructions).
- Tighten the two M3x14 hexagon socket-head screws (6) for fixing the motor clamp (5).
- Tighten the two M2.5x12 hexagon socket-head screws (3) for fixing the motor clamp 2 (4).
- Now tighten the hexagon socket-head screws on the Z-axis drive unit and the motor clamp.
- Check the Z-axis top stop with the adjustment gage.

	Before continuous operation Frequency in Hz	After continuous operation Frequency in Hz
Toothed belt T2 / DLM2 on the Z-axis	280 +/- 10	280 +/- 10

8.2.11 Replacing the Forced Air Unit [00367793-xx]

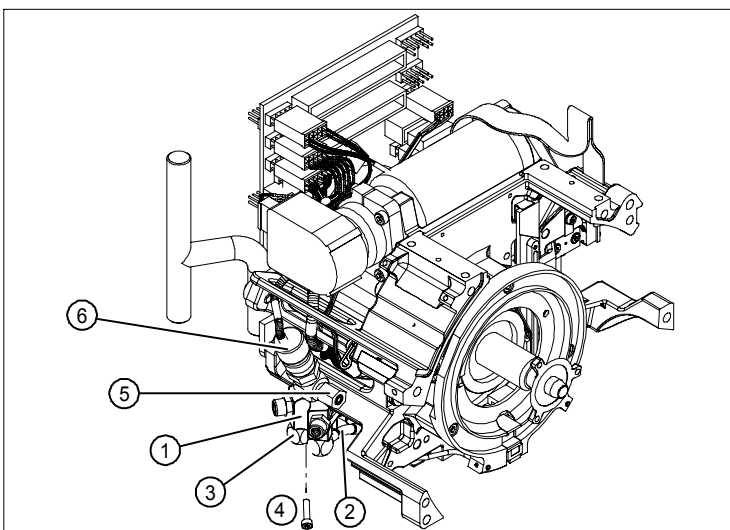
Disassembly



1. Forced air unit / DLM2
2. To the "placement circuit" compressed air tube and the compressed air sensor on the intermediate distribution board
3. To the "reject circuit" compressed air tube
4. M3x20 hexagon socket-head screw
5. SW8 union nut for the compressed air connection
6. "Forced air" micro-relay valve

- ▶ Remove the cable plug from the socket on the intermediate distribution board.
- ▶ Detach the black compressed air hose from the plug-in coupling on the vacuum distributor.
- ▶ Dismantle the intermediate distribution board.
- ▶ Detach the compressed air sensor.
- ▶ Detach the compressed air hose for the placement position (2) from the "placement circuit" compressed air tube.
- ▶ Detach the compressed air hose for the reject position (3) from the "reject circuit" compressed air tube.
- ▶ Undo the M3x20 hexagon socket-head screw.
- ▶ Remove the forced air unit (1).
- ▶ Loosen the union nut (5) and detach the compressed air supply hose.

Installation



- ▶ Reconnect the hoses.
- ▶ Use the hexagon socket-head screw (1) to fasten the forced air unit.
- ▶ Connect the plug to the socket on the intermediate distribution board.



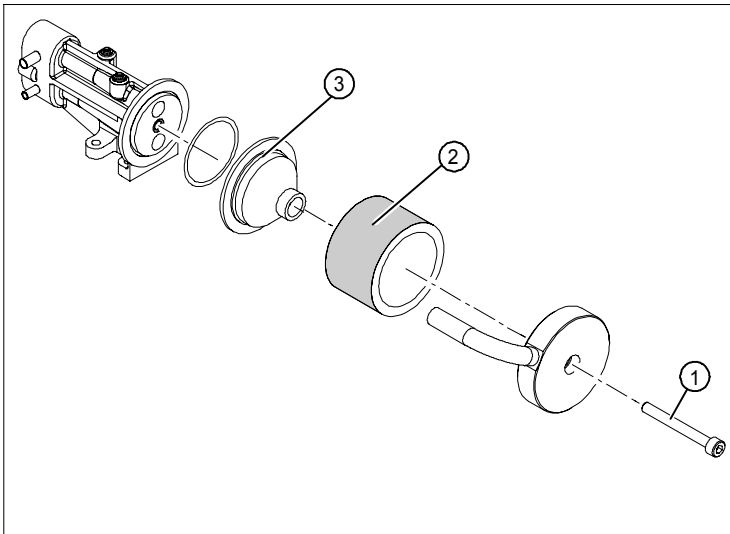
Attention: Risk of injury!

Risk of injury from the compensating tube when the hose is pushed onto the measuring tube!

- ▶ Fit the intermediate distribution board.

8.2.12 Replacing the Silencer [03003134-xx]

Removal/Installation



1. Fastening screw

2. Silencer

3. Pre-silencer

► Loosen and remove the fastening screw (1).

► Turn the silencer (2) counterclockwise to remove it.

► Remove the pre-silencer (3) from the silencer.

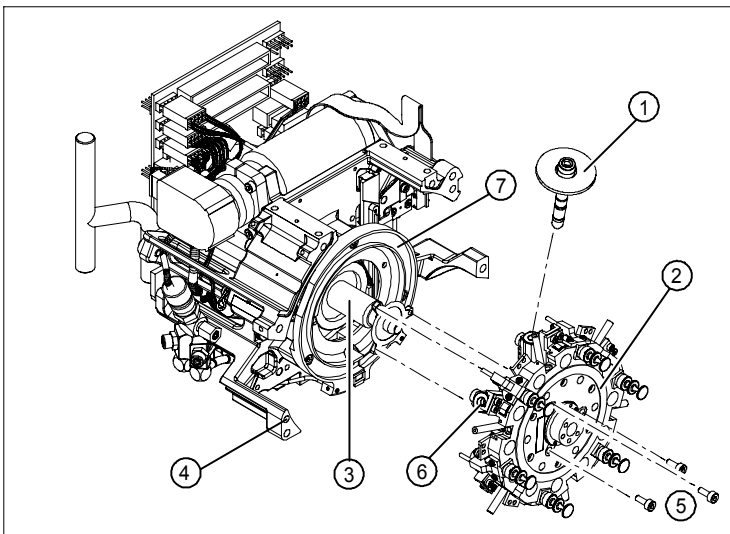
NOTE

Always wear gloves when handling new silencers.

► Insert the pre-silencer and the screw provided and fasten the silencer.

8.2.13 Replacing the Star [00341181-xx]

Disassembly



1. Sleeve

2. Star, mounted/ DLM2

3. Star drive

4. Collect+Place Head - front part

5. 3 x M3x8 hexagon socket-head screws

6. Segment

7. Raceway

► Dismantle the front part of the collect+place head.

► Place the front part of the collect+place head on the tray.

NOTE

Wear laboratory gloves when you remove the sleeves from the star.

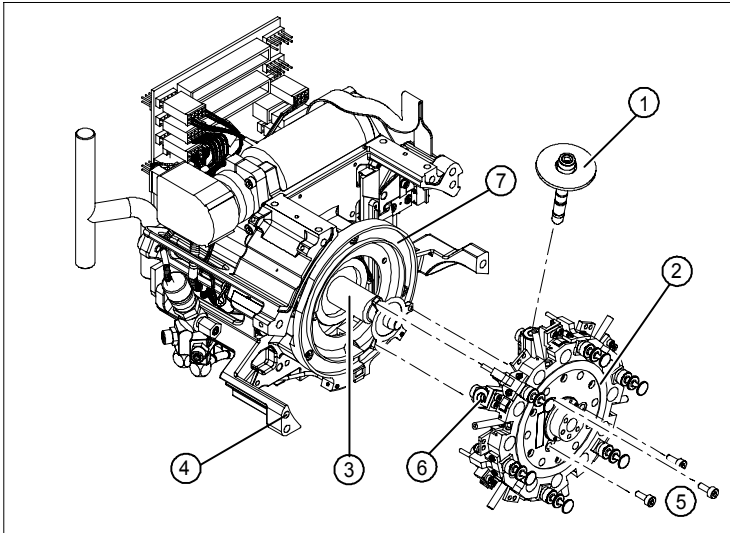
► Remove all sleeves (1) and place them in a sleeve box or on a clean, soft surface.

► Undo the three M3x8 hexagon socket-head screws (5).

► Raise the star slightly.

► Use a rotary movement to lift the star up and off.

Installation



NOTE

Remove any remaining sleeves before fitting the star.

Wear laboratory gloves when removing the sleeves.

- ▶ Push all the segments **(6)** slightly outwards.
- ▶ Insert small Allen keys (e.g. size 2) into the holes for the star fastening screws **(5)**.
- ▶ Hold the star over the star drive shaft **(3)**, so that the Allen keys slide into the threaded holes in the star drive.
- ▶ Insert the star.

NOTE

Make sure that the vacuum hoses of the segments are not squashed.

- ▶ Push all the segments inwards so that the segment ball bearings slide into the raceway **(7)**.
- ▶ Check that the star is seated flat on the drive shaft.
- ▶ Loosely tighten the three M3x8 hexagon socket-head screws on the star so that the screws can still move slightly in the fixing holes.

8.2.13.1 Adjusting the star with respect to the star's magnetic neutral position

When adjusting the star, the aim is to make sure the vertically aligned segment axis of segment No. 1 corresponds with the magnetic rest position of the star stepping motor.

- ▶ To do this, insert the gauge pin into the gauge for the star and into the hole in segment no. 1, until it reaches the stop.
- ▶ Pull the motor line plug of the star motor off the socket on the intermediate distribution board and connect the motor line to the power supply.
- ▶ Connect the power supply unit to the mains power.
- ▶ Tighten the three M3x8 hexagon socket-head screws on the star and remove the gauge pin.
- ▶ To do this, re-insert the gauge pin into the star gauge and insert into the hole in the segment, until it reaches the stop.
- ▶ Disconnect the power pack from the power source.
- ▶ Please check:
 - That the gauge pin can be inserted easily.
 - That the star does not rotate out of its current position as a result.

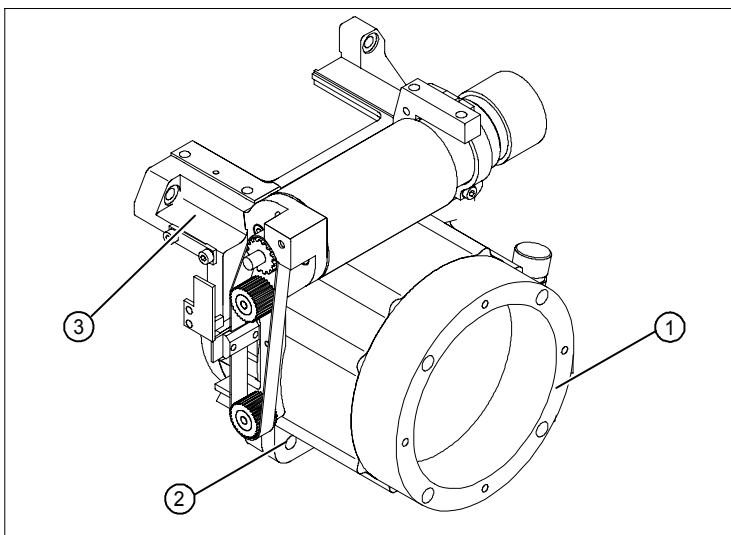
If both of these conditions are fulfilled, the star has been fitted correctly.

- ▶ Repeat the adjustment procedure if the gauge pin does not slide easily into the hole.



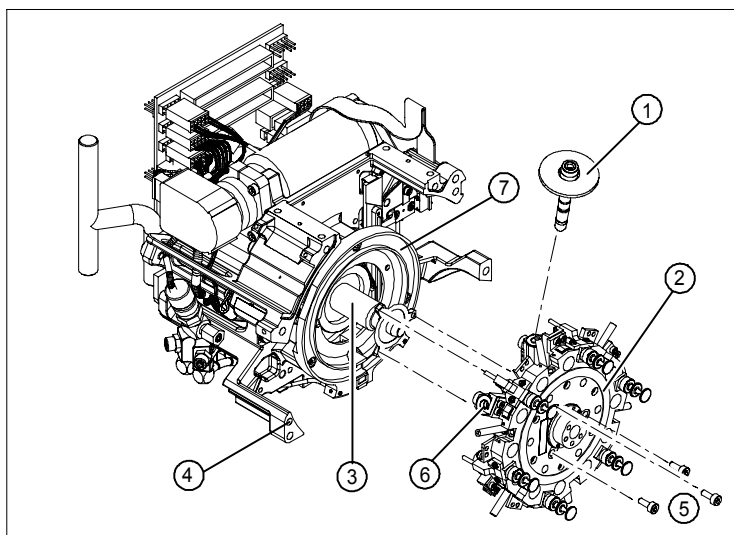
Attention: The power pack operating time is limited!

The maximum operating time of the power pack for the star motor is five minutes. Do NOT exceed this time. If you have to disconnect the power pack from the power source because it has been operating for five minutes, always insert the gauge pin before switching the power pack back on again.



- ▶ If you still can not fit the star in the magnetic neutral position of the star motor, follow the instructions below:

1. Star drive, digital/ DLM2
 2. 4 x M5x16 hexagon socket-head screws
 3. Collect+Place Head - front part
- ▶ Loosen the four M5x16 hexagon socket-head screws (2) for fixing the star drive (1) and turn the star drive in the direction that will allow the star to be adjusted with respect to the magnetic neutral position.
 - ▶ Tighten the four hexagon socket-head screws.



- ▶ Loosen the three M3x8 hexagon socket-head screws **(5)** for fixing the star again and repeat the adjustment procedure.

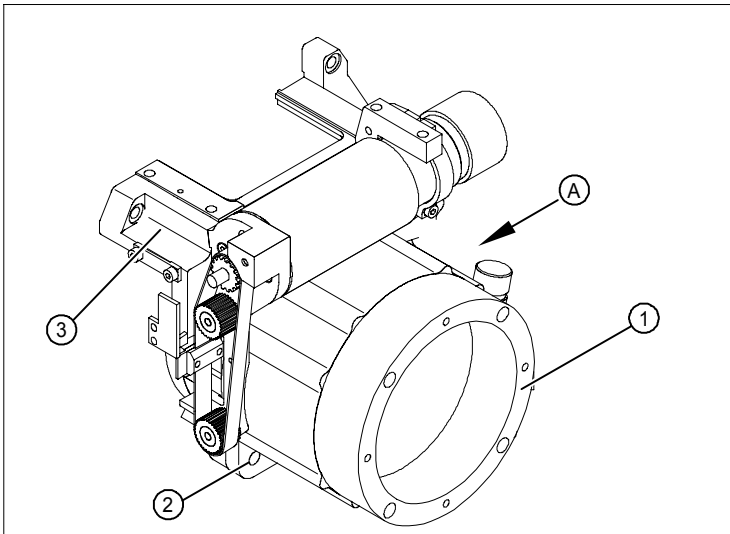
NOTE:

The star is fitted correctly if it no longer moves out of position when the gauge pin is removed, after the star drive has been disconnected from the power supply.

- ▶ Remove the gauge for the star.
- ▶ Insert the power cable plug connector for the star drive into the socket on the intermediate distribution board. The plug connector is an anti-rotation connector.
- ▶ Fit the front part of the collect+place head onto the back part of the collect+place head.
- ▶ Check the magnetic neutral position.

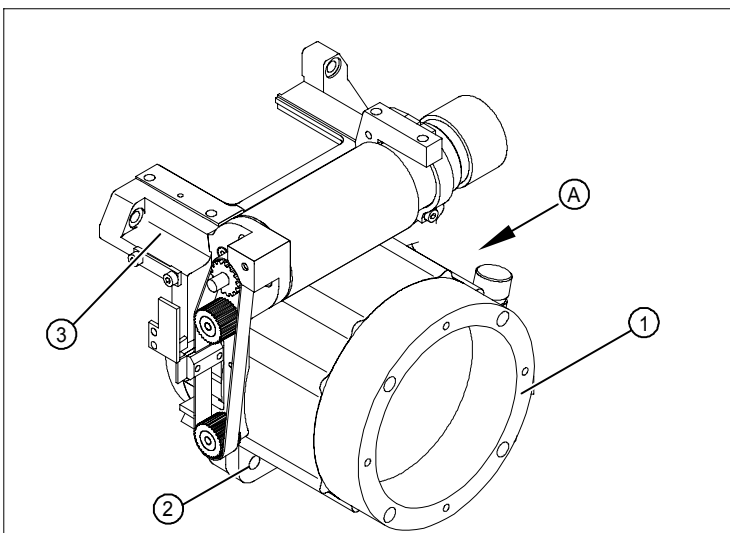
8.2.14 Replacing the Star Drive [00368077-xx]

Disassembly



1. Star drive, digital / DLM2
 2. 4 x M5x16 hexagon socket-head screws
 3. Front part of the collect+place head
- (A) Connecting cable for the star drive on this side.
- Dismantle the intermediate distribution board.
 - Dismantle the front part of the collect+place head.
 - Dismantle the star.
 - Undo the four M5x16 hexagon socket-head screws (2).
 - Lift the star drive off the front part of the collect+place head.

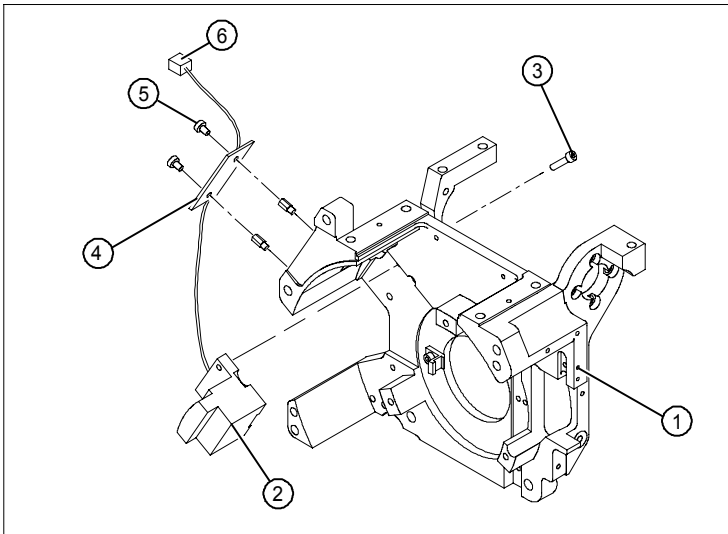
Installation



- Place the star motor onto the front part of the collect+place head, so that the star drive connection cable points to the position marked (A).
- Fix the star drive in place with the four M5x16 hexagon socket-head screws (2).
- Fit and adjust the star.
- Fit the front part of the collect+place head.

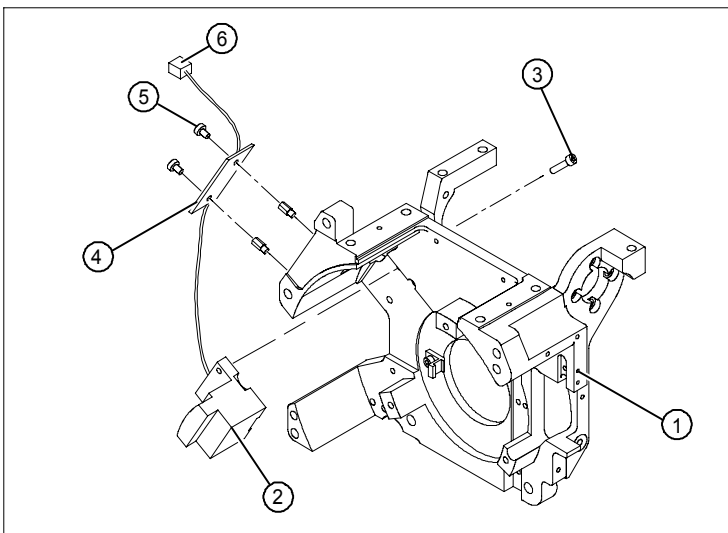
8.2.15 Replacing the RSF Digital Rotary Encoder [00335990-xx]

Disassembly

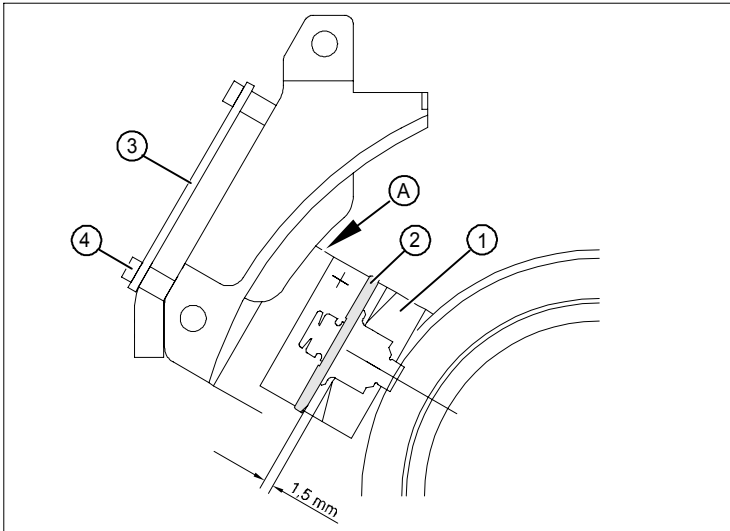


1. Front part of the collect+place head
 2. RSF digital rotary encoder 12/DLM2
 3. 2 x M2.5x8 hexagon socket-head screws 2 x
 4. RSF board, type 950
 5. 2 x M2.5x4 hexagon socket-head screws 2 x
 6. Plug connector in the slot on the intermediate distributor
- ▶ Dismantle the front part of the collect+place head.
 - ▶ Dismantle the star.
 - ▶ Remove the black blanking cap over the RSF board (4).
 - ▶ Remove the plug connector (6) from the socket on the intermediate distribution board.
 - ▶ Undo the two M2.5x4 hexagon socket-head screws (5) for fixing the RSF board.
 - ▶ Undo the two M2.5x8 hexagon socket-head screws (3) and remove the digital encoder.

Installation



- ▶ Insert the new rotary encoder and initially fix loosely in place with the two M2.5x8 hexagon socket-head screws (3).
- ▶ Insert the sleeve into the star and turn the star, with the sleeve, until it reaches the rotary encoder.
- ▶ Fix the star in this position using the gauge for the star.



- ▶ Adjust the rotary encoder so that the distance between the rotary encoder window and the incremental disk on the sleeve is **1.5 mm**. Proceed as follows:



Attention: Sensitive component!

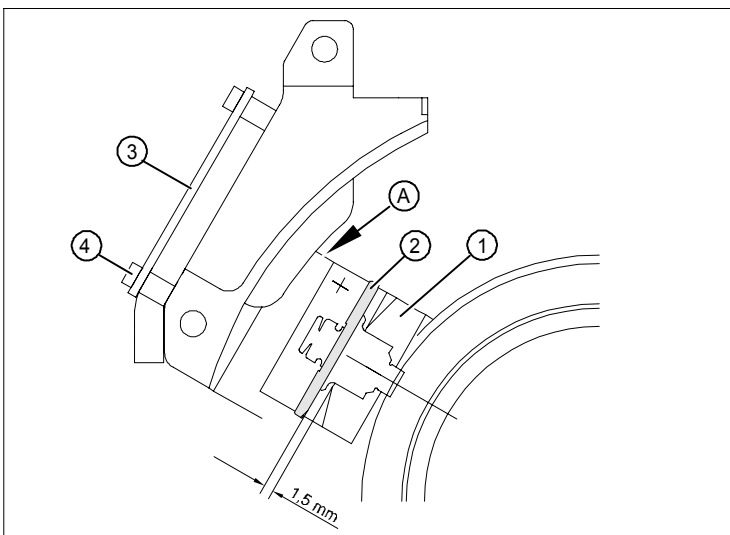
RISK OF BREAKING THE INCREMENTAL DISK

- ▶ Carefully push the tapered end of the test probe between the window of the incremental encoder (1) and the incremental disk (2).
- ▶ Loosen the fixing screws for the incremental encoder, if you can not push the test probe in easily.

NOTE:

The test probe has a blunt and a tapered end. Only push the tapered end of the test probe between the incremental encoder and incremental disk of the sleeve, to avoid scratching the disk and thus causing counting errors.

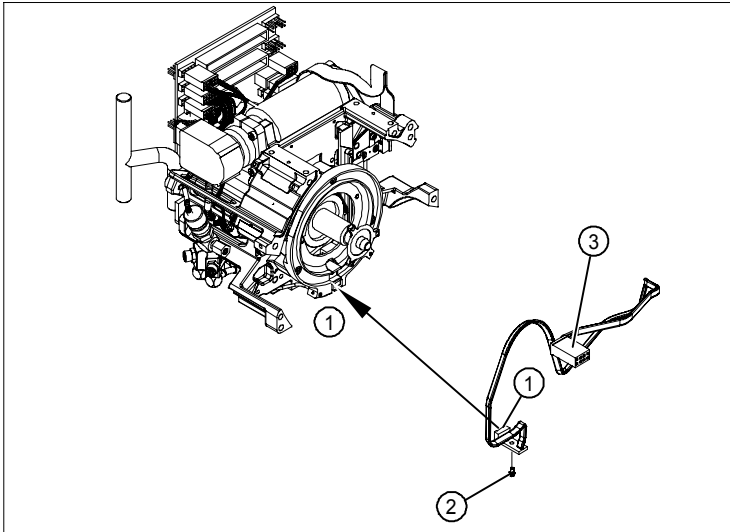
- ▶ Carefully push the rotary encoder towards the incremental disk and along the stop edge (A) until the test probe lies flat against the incremental disk (2) and the window of the rotary encoder (1).



- ▶ Fix the rotary encoder in place using the two M2.5x8 hexagon socket-head screws.
- ▶ Carefully pull the test probe out of the gap.
- ▶ Remove the gauge for the star.
- ▶ Remove the sleeve from the star.
- ▶ Use the two M2.5x4 hexagon socket-head screws (4) to fasten the RSF board (3).
- ▶ Connect the plug connector to the socket on the intermediate distribution board.
- ▶ Place the black blanking cap over the RSF board.
- ▶ Fit and adjust the star.
- ▶ Fit the front part of the collect+place head.
- ▶ Use the SITEST program to check that the rotary encoder is working correctly.

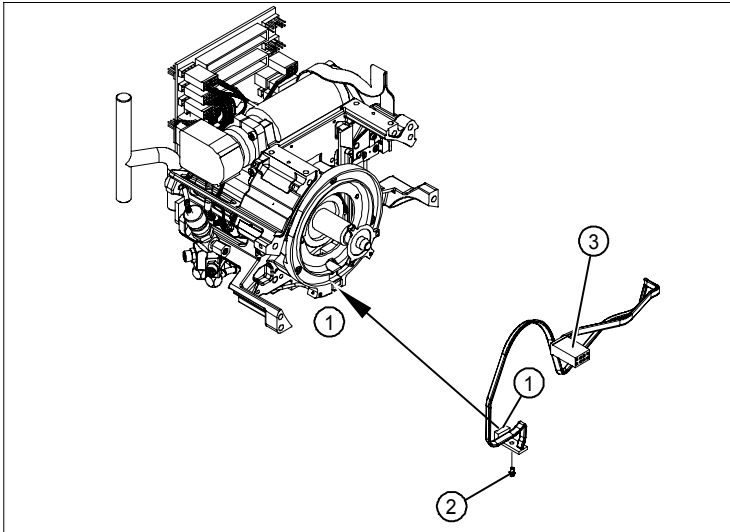
8.2.16 Replacing the "Z-axis Down" Sensor [00321524-xx]

Disassembly



1. "Z-axis down" sensor
 2. Fixtures for sensor
 3. Plug for intermediate distributor
- ▶ Dismantle the front part of the collect+place head.
 - ▶ Place the front part of the collect+place head on the tray.
 - ▶ Dismantle the star.
 - ▶ Remove the plug from the socket on the intermediate distribution board.
 - ▶ Push the Z-axis down.
 - ▶ Loosen the screws holding the sensor (2).
 - ▶ Remove the cable clamps on the driver arm and star motor.
 - ▶ Carefully pull the sensor and cable out of the front part of the collect+place head and remove the plug (3) from the socket on the intermediate distribution board.

Installation



- ▶ Thread the sensor cable from the Z-axis into the front part of the collect+place head.
- ▶ Fix the sensor (1) in position with the screw provided (2) and initially screw loosely into the jaw of the Z-axis.
- ▶ Fix the cable into place with the cable clamps.
- ▶ Check how the cable is run inside the front part of the collect+place head:
 - If the Z-axis has been pushed right out, the cable should lie loosely around the housing for the star drive shaft. The cable must NOT be pulled tight.
 - If the Z-axis is pushed right in, the cable should run freely inside the front part of the collect+place head, without touching the rotary encoder for the DP axis.



Attention: Check how the cables are run!

If the radius of the curvature is too small, the Z-axis could jam or the light barrier cable could break.

- ▶ Once the cable is run in line with the required conditions, fix it in place with the angled clips.
- ▶ Connect the cable plug to the socket on the intermediate distribution board.

Adjusting the "Z-axis down" sensor

- ▶ Set the distance between the white sleeve ring and the light barrier to 0.95 -1.15 mm.
 - Use a test probe or drill (diameter **1.0 mm**).
 - Check the distance with a test probe or drill (diameter **1.2 mm**). – This drill should **not** fit!
- ▶ Fix the light barrier in place with the two screws provided.
- ▶ Fit and adjust the star.
- ▶ Fit the front part of the collect+place head.
- ▶ Use the SITEST program to check that the sensor is working correctly.

8.2.17 Replacing the Complete Z-axis [03001959-xx]

NOTE

We recommend replacing the complete Z-axis DLM2 after approx. 100 million placements.

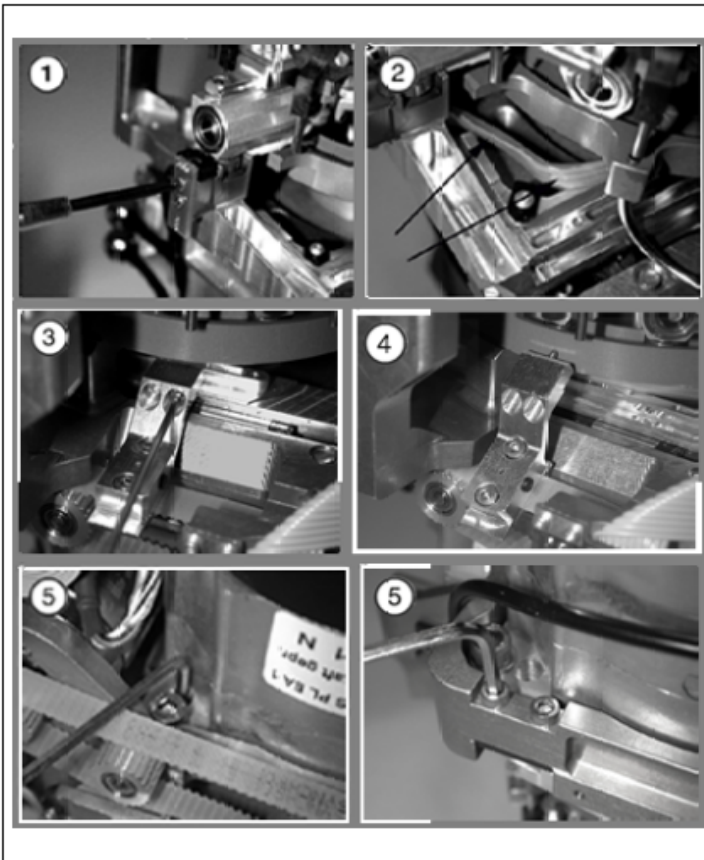


Diagram 1

- Dismantle the light barrier under the Z-axis by loosening the two M1.6x3 DIN 84 screws.

Diagram 2

- Carefully pull the cable out of the cable duct until it lies loosely.

Diagram 3

- Loosen the connection between the driver arm and driver bracket by removing the two M2x14 DIN 912 screws.

Diagram 4

- Pull the driver arm, together with the centering pin, out of the driver bracket and move the driver arm into the stop position in the race-way.

Diagram 5

Remove the three screws holding the Z-axis in place (2x M3x14, 1x M3x4).

Installation

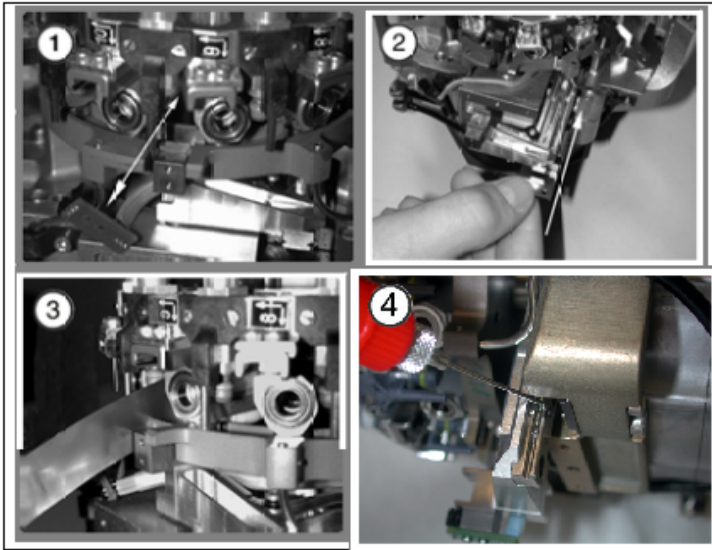


Diagram 1

- ▶ Rotate the star into the position shown and then pull the Z-axis out of the guide by holding on to its assembly plate.
- ▶ Clean the contact surface with SIPLACE cleaning tips and ethanol.

Diagram 2

- ▶ Push the new Z-axis guide into the groove provided.
- ▶ Press the reference edge (inner side) of the Z-axis into the groove and fix the Z-axis with the screws provided.

Diagram 3

- ▶ Use the feeler gauge to check the distance between the jaw and the groove of the raceway. The permissible gap is between 0.2 and 0.3 mm. Readjust the jaw if necessary.
- ▶ Reassemble the placement head as follows.

NOTE

The board must be fitted centered to the jaws. Make sure that the board does not rub against the frame (check with gauge if necessary).

Complete the following step at every second service interval for the head:

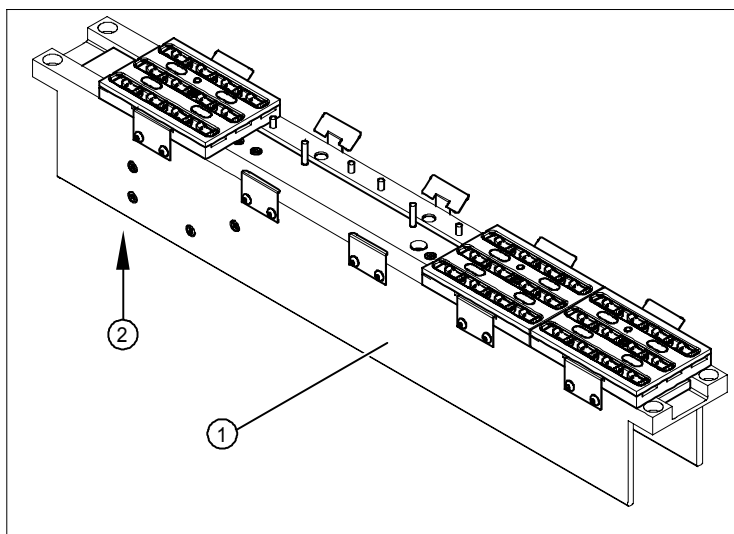
Diagram 4

- ▶ Use the grease gun to apply a small amount of oil [00367071-xx] to the hole provided. Make sure that too much oil does not ooze out of the hole.

NOTE Where dirt is not excessive, the oil can be directly applied to the rail.

8.2.18 Replacing the Control Board for the Nozzle Changer 6/12 [00317353-xx]

Overview

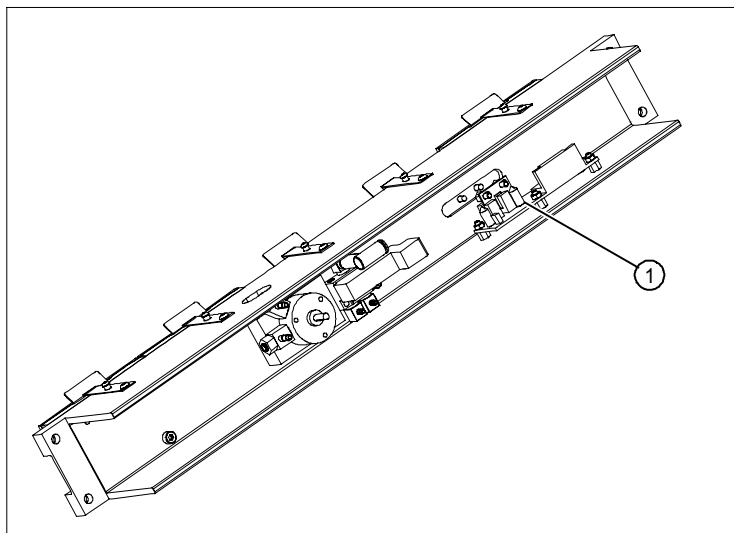


1. Nozzle changer 12 segments
2. Control board (installed on the underside)

NOTE:

The control board is also used for the 6-segment nozzle changer.

- ▶ Remove the nozzle changer from the machine. The control board is situated on the underside of the nozzle changer.



- ▶ Disconnect the control board (1) from the electrical system.
- ▶ Undo the fastening screws and remove the control board.
- ▶ Install the new control board and reconnect to the electrical system.
- ▶ Install the nozzle changer in the machine.
- ▶ Measure the nozzle changer with SITEST.

9 Movable Component Changeover Table

9.1 Safety Instructions

DANGER



The chapters "Operational Safety" in User Manual SIPLACE S-27 HM and in this Service Manual take precedence.

These SIPLACE machines are powered by 120V / 208V +/- 5% (US version) or 3 x 230V/400V +/-5% 50/ 60 Hz line voltage.

Therefore portions of the system are carry dangerously high voltages! In specific modules inside the machine base the voltage is present even when the main switch is turned off.

Handling the machines improperly or touching portions thereof which are conducting high voltage may result in death or serious physical injury as well as extensive property damage.

Obey the applicable accident prevention regulations, DIN standards and special safety codes of your country at all times. DIN EN 60204 must be adhered to during all work inside the machine base.

The customer is prohibited from attempting to resolve any problems whatsoever with the power supply unit (transformer), therefore:

Only the Siemens service engineer is permitted to exchange the cables "Power component table" and "Transformer-Power supply" (see [Fig. 9.5.3](#)).

The Siemens service engineer is the only one permitted to adjust / change the voltage on the basis of internal Siemens retrofitting instructions.

Furthermore, only the Siemens service engineer is permitted to adjust the height of the component changeover table on the basis of internal Siemens retrofitting instructions.

While working with the SITEST program, comply with the instructions in the DANGER text in [Section 9.5.6](#) "Final Steps".

DANGER: Disc of placement head CRASH



With all of the SIPLACE machines the Y- gantry must always be moved / pushed out of the area of the component changeover table before changing tables.

This must be accomplished before actuating the compressed air switch in order to raise the table. Otherwise there will be a risk that the placement head may crash!!

WARNING



Parts of your body may be pinched, crushed or severed by the component changeover table if:

- the height is incorrectly set (setting for SMEMA's height only by Siemens service engineer: see Siemens in-house "Retrofit Instructions"),
- a feeder module tips over or falls,
- the component changeover table which has been moved out of the machine tips over.

Aside from this, comply with the special safety instructions in the pertinent section below.

CAUTION



Improper actions while lowering or raising the handle of the component changeover table may give rise to a risk of minor injury due to being pinched, etc., by the handle.

For this reason, always hold the handle with both hands.

9.2 Parts

Quantity	Designation	Item No.	Comments
– 1	Component changeover table	00116226-01	
– 1	Bellows cylinder series 1916-09	00343720-01	Total of 2 units
– 1	Guide castor	00341942-01	Total of 2 units
– 1	Fixed castor	00341918-01	Total of 2 units
– 1	Communications unit 80, incl. cable "Control signals, component table SMD" without individual activation	00316265-04	Total of 1 units if needed
– 1	Tape container knockout spindle	00343770-01	
– 1	Bowden cable	00342324-02	Total of 2 units
– 1	Cable tie L x W = 140 x 3.6mm	00805141-01	Total of 5 units
– 1	Fixing pedestal, self-adherent	00805103-01	Total of 2 units

9.3 Tools

- Set of Allen wrenches
- Sliding caliper (for bowden cable)
- Diagonal cutter (for cable tie)
- 2 Open-end wrenches, width across flats 8 (for bowden cable)

9.4 Overview of Mechanical Construction

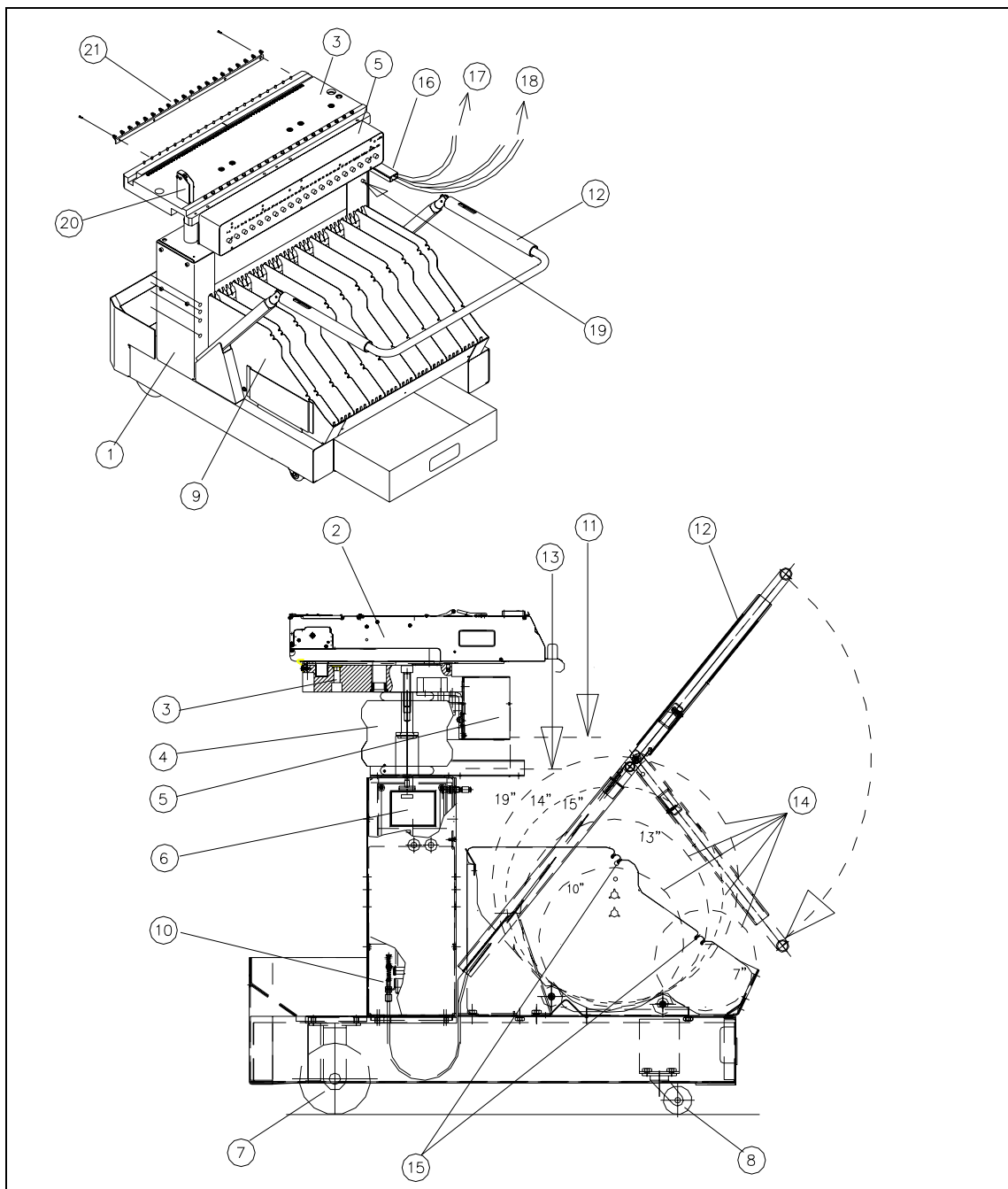


Fig. 9.4.1 Overview: Layout and Exchangeable Parts of the Movable Changeover Table

Key to [Fig. 9.4.1](#):

1. Movable component changeover table S-27 HM (without feeders)
2. Feeder modules or dummy modules **)
3. Component table plate
4. Bellows cylinder for height adjustment *)
5. Communications unit 80, without individual activation *)
6. Power supply unit / transformer, component table
7. 2 Fixed castors *)
8. 2 Guide castors *)
9. Tape container
10. Bowden cable *)
11. Component table in "top" position" (= position to connect / disconnect)
12. Handle, can be bent after the activator tube has been pushed up.
13. Component table in "bottom" position (= position when connected)
14. Insertable tape reels: 7", 10", 15 ", 17", 19"
15. Knockout spindle for tape reels (if needed) *)
16. Cable duct
17. Compressed air connection of "component table air supply" to the pneumatic system of the component table (operating pressure)
18. Compressed air connection of "component table air supply" (optional)
19. Cable "Power, component table" (not a spare part)
and cable "Control signals, component table SMD" (not a spare part)
20. Actuating lever for compressed air: Lifting / lowering the component table

*) Item No.: see [Section 9.2](#)

**) Option, Item No.: 00345462-01

9.5 Resolving Problems

DANGER



Parts of your body may be pinched, crushed or severed by the component changeover table (see [Section 9.1](#)).

No substantial lateral force is to be exerted on the component changeover table after it has been disassembled (danger that it might tip over), therefore:

- Do not lean against it and do not brace any items against it.
- Place the component changeover table on a horizontal surface and secure it to prevent it from starting to roll away all by itself.

Once the component changeover table has been moved out of the machine, NEVER connect the plugs to the machine frame (= not use as intended = DANGER!).

Moving the component changeover table out of the machine leaves the cutter (etc.) accessible: This increases the risk of injury on the cutter's movable or stationary blades even while the machine is switched off.

NEVER reach into the cutter from below or into the empty-tape duct from above, not even to resolve a problem (e.g., jammed tape) involving the disassembly of the component changeover table.

WARNING



It is a basic rule that the following sequence is to be adhered to when disconnecting and connecting the plug-and-socket connections of the changeover table:

-> When unplugging the connectors:

Always pull out the round plug (power supply) first on the right-hand side of the component table and only

afterwards the square plug (interface connector).

-> When plugging in the connector:

Proceed in the reverse order (plug in interface connector first, then the power supply connector).

If, by way of exception, the connectors have to be unplugged while the machine is ON, after you unplug the power supply connector you must wait until the 30 V indicator goes out before unplugging the interface connector.

9.5.1 Preparatory Steps

- Turn the machine ON. The compressed air is attached.
- Cut the tapes between the front of the module and the empty-tape duct.
- Clock the tapes back.
- First, unplug the connector on the cable "Power, component table" and then unplug the connector on the cable "Power, component table" on corresponding side of the machine frame.
- For the time being, the compressed air connection to the machine frame must be retained.
- Lift the component table (actuating lever on left side of table).
- Disconnect the compressed air connection on the corresponding side of the machine frame (quick-release coupling).
- Move the component changeover table out of the machine, as described in the User Manual (hold the handle with both hands!).
After disconnection the component changeover table is at the position "TOP".
- If a empty, movable component changeover table is available, first proceed as follows:
 - Pull out the plug-and-socket connections of all of the feeder modules on the faulty component changeover table.
 - Place the feeder modules incl. the tape wheel and Knockout spindles (see [Fig. 9.4.1](#) -> 2, 14, 15) on new the component table in accordance with the specifications for set-up optimization, insert the tapes and check the allocation of component / track (component bar code scanner).
If there is an external set-up location available, carry out the setting up and inspection there (see also [Section 9.5.6](#) "Final Steps").
 - Connect the new component changeover table to the machine, as described in the User Manual.
 - Resolve the problems with the dismantled component changeover table as indicated in the pertinent section below.
- If no other component changeover table is available, continue as follows after resolving the problems as required:
 - When exchanging the bellows cylinder:
Take the feeder modules from the changeover table and place them on a clean surface. In this case, the tape reels can remain in the container.
 - When exchanging the guide castors and fixed castors:
Same steps as above when exchanging the bellows cylinder.
In addition, remove all of the tape reels from the container and put them down in order.
 - When exchanging the communications unit or the bowden cable:
The feeder modules do not have to be dismantled.

9.5.2 Exchanging the Bellows Cylinder

DANGER 

By way of exception, it may be unable to lift the component table automatically and therefore to disconnect it - because the bellows cylinder is faulty. If this occurs, contact Siemens SMD Service and discuss how to proceed, taking safety considerations into account.

The table is very heavy and the sticking component table may be released suddenly while it is being lifting manually, posing a high risk of injury by crushing.

WARNING 

Parts of your body may be crushed, pinched or severed by the component changeover table! The component table has to be in the top position (= position after disconnecting, [Fig. 9.5.1](#)) when exchanging the bellows cylinder. The component table is securely held in the "top" position mechanically, regarding of the bellows cylinder.

The component changeover table is dismantled and prepared, as described in [Section 9.5.1](#).

- Disconnect the pneumatic hose at the quick-release coupling of the faulty bellows cylinder (see [Fig. 9.5.1](#) -> 4, 6). The 2nd pneumatic hose (for 2.3 bar) is not connected.
- Undo the screws fastening the faulty bellows cylinder from the component top and bottom (total of 3 screws, see: [Fig. 9.5.1](#) -> 2, 4, 5, size 6 Allen wrench). During this process, take the washer enclosed (see -> 5).

Key to [Fig. 9.5.1](#):

1. Component table in top position
2. Fasteners for bellows cylinder: 2 Socket hex head cap screws M 8 x 50
3. Component table plate
4. Bellows cylinders (2 units)
5. Bellow cylinder fasteners: 2 washers, 8.4 DIN 125-A, 2 Socket hex head cap screws M 8 x 16
6. Quick-release coupling, compressed air supply (operating pressure)

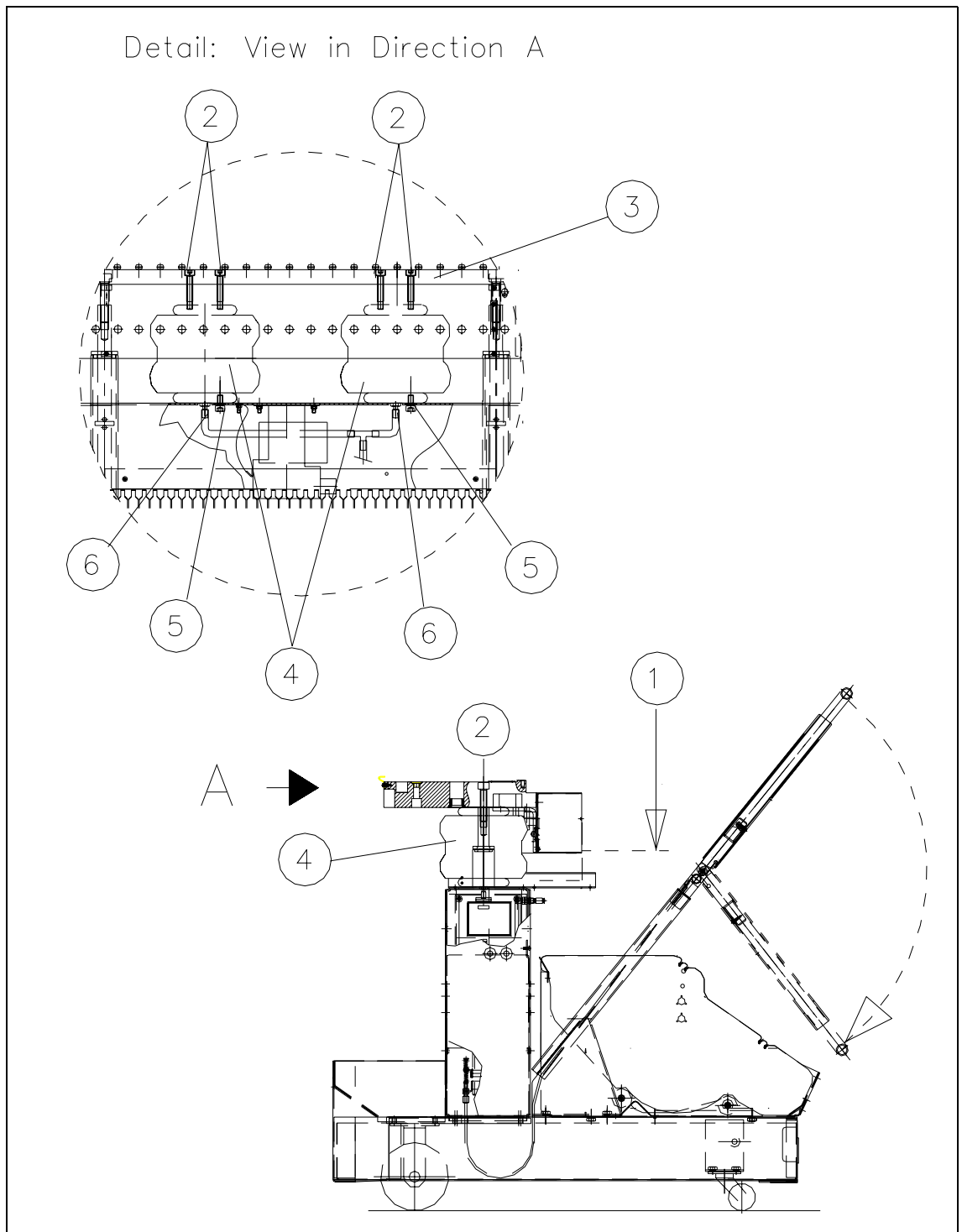


Fig. 9.5.1 *Exchanging the Bellows Cylinder(s)*

- Remove the bellows cylinder.
- Insert the new bellows cylinder (Item No.: see [Section 9.2](#)) and fasten the cylinder securely from top and bottom (total 3 screws, see [Fig. 9.5.1](#) -> 2, 5).
- Connect the pneumatic hose (for operating pressure) to the quick-release coupling of the bellows cylinder and tighten the hex nut (see [Fig. 9.5.1](#) -> 6).
- If you do not have to exchange any further parts, perform the appropriate "Final Steps" (see [Section 9.5.6](#)).

9.5.3 Exchanging Fixed Castor(s) and/or Guide Castor(s)

The component changeover table is dismantled and prepared, as described in [Section 9.5.1](#).



The component changeover table has to be laid on its side to remove the fixed castor and/or guide castor. Two people are required because the component changeover table is very heavy.

- Enlist the aid of a 2nd strong person and set the component changeover table on the side. (see [Fig. 9.5.2](#) -> 1).
- Undo the screws fastening the fixed castor and/or guide castor to be exchanged (size 6 Allen wrench: see [Fig. 9.5.2](#)).
- Install the new guide castor(s) and/or the fixed castor(s) (Item No.: see [Section 9.2](#)) and refastening each of them with 4 socket hex head cap screws.
- With the aid of a 2nd strong person set the component changeover table back up.
Secure the component changeover table to prevent it from starting to roll away all by itself.
- When you have no more parts that must be exchanged, perform the appropriate "Final Steps" (see [Section 9.5.6](#)).

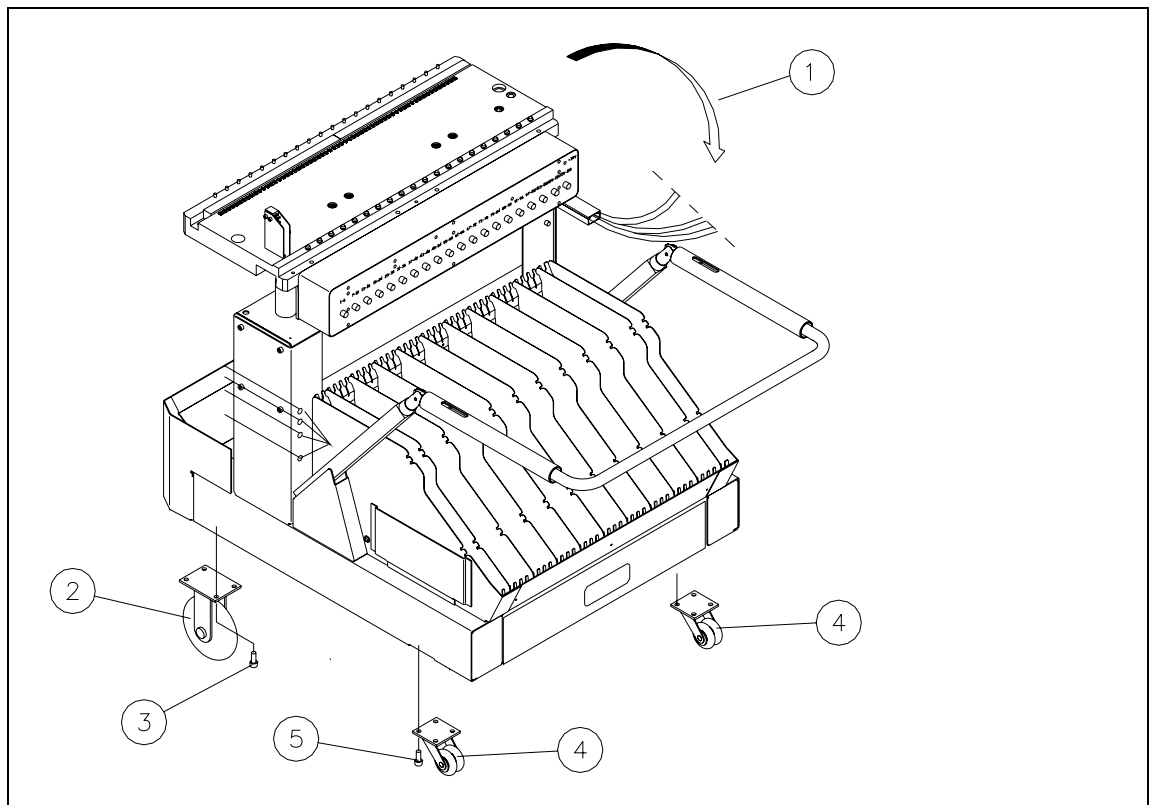


Fig. 9.5.2 *Exchanging Fixed Castor(s) or /and Guide Castor(s)*

Key:

1. Lay the component table on the side (2nd person required) before removing the rollers.
2. Fixed castors (2 units)
3. 8 Socket hex head cap screws M8 x 16
4. Guide castor (2 units)
5. 8 Socket hex head cap screws M8 x 16

9.5.4 Exchanging the Communications Unit

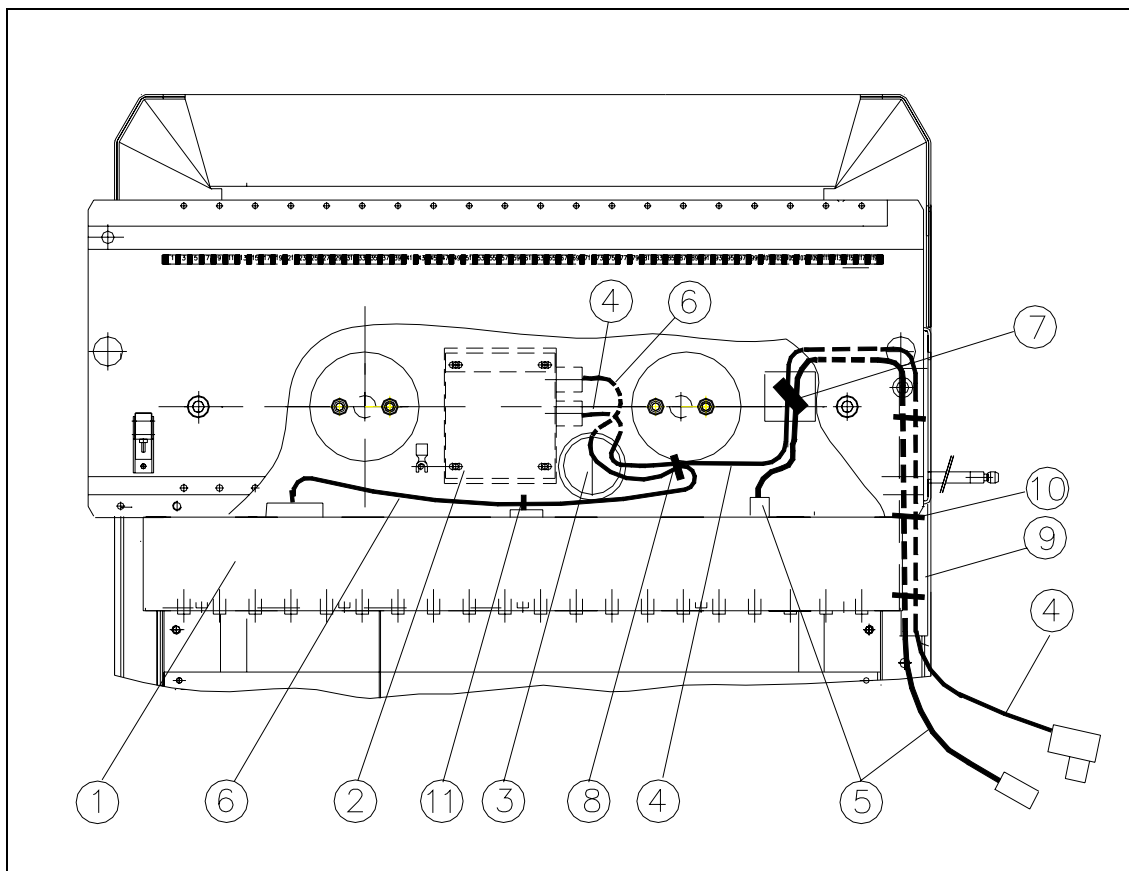


Fig. 9.5.3 Overview: Cable Guide at the Component Changeover Table

Key:

1. Communications unit
2. Power supply unit, transformer
3. Cable gland
4. Cable "Power, component table" (machine frame -> power supply unit)
5. Cable "Control signals, component table" (machine frame -> back of communications unit)
6. Cable "Transformer - power supply" (transformer -> back of the communications unit)
7. Cable tie with fixing pedestal, self-adherent (fastened with: 2 oval head cap screws M3 x 8)
8. Cable tie
9. Cable duct
10. 3 Cable tie in the cable duct
11. Cable tie with fixing pedestal, self-adherent

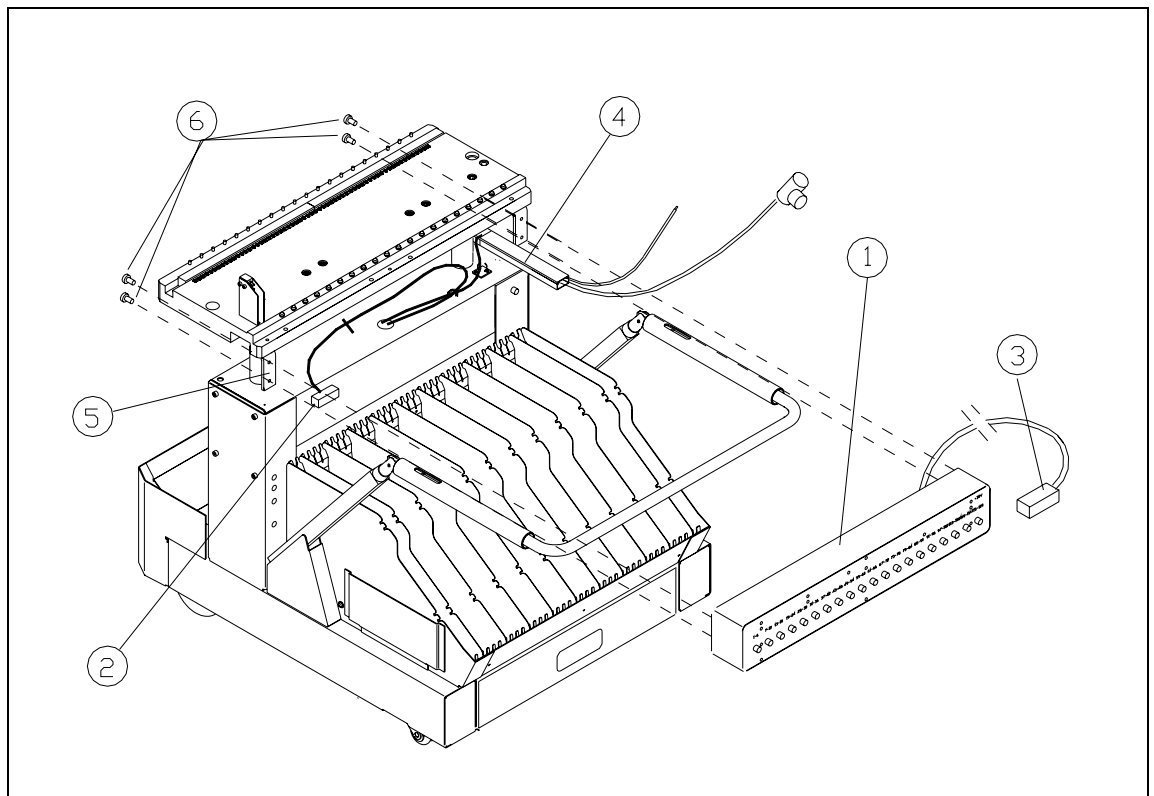


Fig. 9.5.4 *Exchanging: Communications Unit; View in Direction "Component Table Termination Panel"*

Key:

1. Communications unit
2. Plug-and-socket connection of cable "Transformer - power supply"
3. Cable "Control signals, component table SMD" (spare communications unit incl. cable)
4. Cable duct
5. Retaining brackets for communications unit, on left and right
6. Fastening screws for the communications unit: 4 M4 x 10 socket hex head cap screws

NOTE:

The cable "Control signals, component table SMD" is only to exchange incl. the communications unit.

→ Perform the "Preparatory Steps" (see [Section 9.5.1](#)).
It is not necessary to dismantle the feeder modules.

→ Remove the 3 cable ties in the cable duct and the cable tie of the fixing pedestal on the top of the frame (see [Fig. 9.5.3](#) -> 7, 10).

- Unplug the connector of the cable "Transformer -> power supply" at the back of the communications unit (see [Fig. 9.5.4](#) -> 2).

NOTE:

If necessary, enlist the aid of a 2nd person.

- Holding the communications unit, loosen its LH and RH fastening screws on the retaining brackets under the table plate (2 screws: see [Fig. 9.5.4](#) -> 5, 6).
- Remove the communications unit incl. the cable "Control signals, component table SMD".
- Place the new communications unit (Item No.: see [Section 9.2](#)) to the two retaining brackets and tighten the screws to fasten it.
- Connect the cable "Transformer -> power supply" at the back of the communications unit (see [Fig. 9.5.4](#) -> 2).
- Run the cable "Control signals, component table SMD" in the cable duct and attach the 5 cable ties (see [Fig. 9.5.3](#) -> 7, 10, 11). Item No. of the cable tie: see [Section 9.2](#).
->The strain on the plug-and-socket connections must be relieved.
- When you have no more parts that must be exchanged, perform the appropriate "Final Steps" including using SITEST to check the table function (see [Section 9.5.6](#)).

9.5.5 Exchanging the Bowden Cable

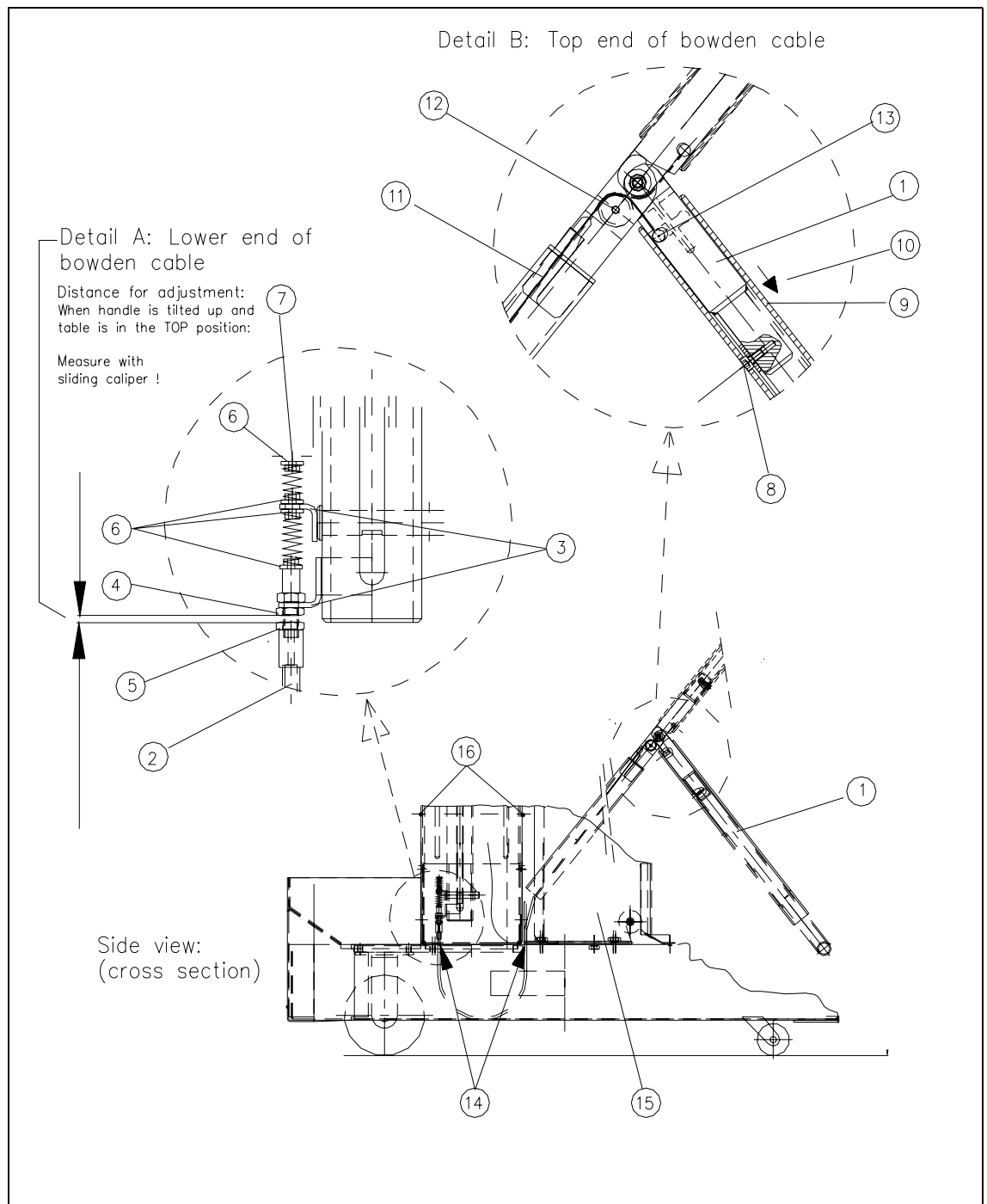


Fig. 9.5.5 Removing / Installing the Bowden Cable

Key to [Fig. 9.5.5](#):

1. Table in starting position "Top". Handle bent
2. Bowden cable, lower end in frame of the component changeover table
3. Retaining bracket, top and bottom
4. M6 hex nut to fasten the Bowden cable
5. M6 hex nut to adjust the Bowden cable
6. Teflon flange
7. End piece of Bowden cable (bottom)
8. Stop of activator tube left / right: one M4 socket hex head cap screw
9. Activator tube
10. Direction in which activator tube is moved
11. Bowden traction cable
12. Little plastic wheel to divert direction of Bowden traction cable
13. End piece of Bowden cable (top)
14. For the Bowden cable: Cutouts in the bottom part of the changeover table
15. Tape container
16. Screws to fasten internal cover: two M4 socket head hex cap screws

The component changeover table is dismantled and prepared, as described in [Section 9.5.1](#). After being disconnected the component table is already in the required position "Top".

→ Use sliding calipers to ascertain the exact distance between the bottom hex nut on the retaining bracket and the adjusting nut for the Bowden cable (see [Fig. 9.5.5](#): Detail A -> 4, 5) and record this dimension.

NOTE:

This distance/dimension must be restored after the new Bowden cable is installed.

- Simultaneously slide the actuator tube up to the stop on both sides and lower the handle (see [Fig. 9.5.5](#) -> 1, 9).
-> This relieves the tension on the Bowden cable.
- It may be necessary to move the tape container to gain access to the 2nd fastening screw for the internal cover on the frame (see [Fig. 9.5.5](#) -> 16):

- To do so, loosen the screws fastening the tape container to the frame (4 round head screws on the container base plate, size 6 Allen wrench),
- Move the tape container slightly (or lift out the container).
- Loosen the screws fastening the internal cover on the frame (two M4 socket hex head cap screws: see [Fig. 9.5.5](#) -> 16). Remove the internal cover.
- The next step is to relieve the tension on the bottom end piece of the Bowden cable (see [Fig. 9.5.5](#), Detail A):
To do so, loosen the locknut (hex nut: see [Fig. 9.5.5](#) -> 4; size 8 metric open-end wrench) on the bottom retaining bracket.
- Loosen the screw on the bottom of the lowered handle (see [Fig. 9.5.5](#), Detail B -> 8). The activator tube will slide all the way to the end of the handle (-> 9, 10).
- Disengage the Bowden traction cable at the handle's point of rotation by pulling the little plastic wheel, including the cable, out toward the inside of the handle (see [Fig. 9.5.5](#) -> 11, 12).
- Push the "Top" end piece (using a pin, for example) toward the inside of the handle and out of the slot (see [Fig. 9.5.5](#): Detail B -> 13).
- From below, thread the Bowden cable out of the cutouts in the frame of the changeover table (see [Fig. 9.5.5](#) -> 14).
Pull both ends of the Bowden cable down and out of the cutouts in the bottom part of the changeover table.
- Install the new Bowden cable (Item No.: see [Section 9.2](#)) by executing the steps in reverse order to disassembly:
 - From below, thread the Bowden cable up into the cutouts in the bottom part of the changeover table. Run the end with the pressure springs to the retaining brackets and the other end up through the hole in the handle.
 - Engage the Bowden cable on the 2 small retaining brackets down in the frame.
 - To fasten the Bowden cable, tighten the hex nut under the bottom retaining bracket (see [Fig. 9.5.5](#): Detail A -> 4).
 - For the time being, just hand-tighten the hex nut below the hex nut in the preceding step (see [Fig. 9.5.5](#): Detail A -> 5).
 - Push the "Top" end piece into the slot in the lowered handle (see [Fig. 9.5.5](#): Detail B -> 13).
 - Lay the top end of the Bowden traction cable into the groove around the circumference of the little plastic wheel and insert this wheel.
 - Push the actuator tube back in the direction of the handle's point of rotation and hold the actuator tube in this position.
 - From the bottom of the handle, screw the M4 socket head hex cap screw back in (see [Fig. 9.5.5](#), Detail B -> 8).

- The table is still in the "Top" position.
Swing up the handle (see [Fig. 9.4.1](#) -> 12).
This places tension on the Bowden cable.
- The Bowden cable is then adjusted:
 - Turn the bottom hex nut (see [Fig. 9.5.5](#), Detail A -> 5) to adjust the Bowden cable until the you have restored the exact distance measured between it and the hex nut above it prior to disassembly.
 - Fix the bottom hex nut in this position with a locknut.
- Mount the internal cover on the frame of the component changeover table (two M4 socket head hex cap screws).
- If necessary, insert the tape container and screw it tight (4 round-head screws, size 6 Allen wrench).
- When you have no more parts that must be exchanged, perform the appropriate "Final Steps" (see, [Section 9.5.6](#)).

9.5.6 Final Steps

- Check the contact surface for the feeder modules on the component table:
If necessary, clean the surface, as described in the User Manual in the chapter "Maintenance".
- Place the feeder modules incl. the tape reels on new the component changeover table in accordance with the specifications for set-up optimization.
If the "External set-up location" is available, perform there the set-up incl. inserting the tapes.
- Connect all feeder modules to the relevant jack of the communications unit (component table termination panel).
- Turn the machine ON. The compressed air is attached. Move the changeover table back into the machine and connect it, as described in the User Manual.

DANGER



The component changeover table which has been moved into the machine must always be completely equipped with feeder modules or dummy modules (see User Manual and Service Manual, chapters "Operational Safety").

- Make the plug-and-socket connection of the "Cable component table" at the machine frame.
- If this has not been done yet, insert the tapes now and check the allocation of feeder module and component (component bar code scanner).
- Clock / transport the first component into the pick-up position. VISUALLY CHECK the front of the module to see if all tapes move smoothly into the empty-tape duct.

DANGER



As a fundamental rule, the SITEST program is to be started only by personnel who have been trained in its use by Siemens and are therefore authorized to do so.

The cutter must also be completely assembled for the work with the SITEST program.

The changeover table must be moved into the machine and correctly connected.

The component changeover table which has been moved into the machine must always be completely equipped with feeder modules or dummy modules (see User Manual and Service Manual, chapters "Operational Safety").

The key switch remains locked (= normal mode = position "0").

- After exchanging the communications unit:
 - Note the DANGER text regarding the SITEST program.
 - Load the SITEST program and check the component table functions.
- Exit the SITEST program.
- Start the placement process.

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