

APL 100

Service Instructions



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The pneumatic applicator complies with the following safety guidelines:

- CE** EG Low-Voltage Directive (2006/95/EC)
- EG Electromagnetic Compatibility Directive (2004/108/EG)
- EG Machinery Directive (2006/42/EG)



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1 Introduction

1.1 General Instructions

Important information and instructions in this document are designated as follows:



DANGER identifies an extraordinarily great and immediate danger which could lead to serious injury or even death.



WARNING identifies a possible danger which could lead to serious bodily injury or even death if sufficient precautions are not taken.



WARNING of cutting injuries.

Pay attention that cutting injuries caused by blades, cutting devices or sharp-edged parts are avoided.



WARNING of hand injuries.

Pay attention that hand injuries caused by closing mechanical parts of a machine/equipment are avoided.



WARNING of hot surfaces.

Pay attention so as not to come into contact with hot surfaces.



CAUTION indicates a potentially dangerous situation which could lead to moderate or light bodily injury or damage to property.



NOTICE gives you tips. They make a working sequence easier or draw attention to important working processes.



Gives you tips on protecting the environment.



Handling instruction



Optional accessories, special fittings

Date

Information in the display

1.2 General Safety Instructions



WARNING!

Danger of injury by inadvertent move out of the cylinder.

- ⇒ Disconnect the printer from the power supply before mounting the applicator.
- ⇒ Connect the compressed air only after mounting the applicator to the printer.
- Only connect the device to other devices which have a protective low voltage.
- Switch off all affected devices (computer, printer, accessories) before connecting or disconnecting.
- The device may only be used in a dry environment, do not expose it to moisture (sprays of water, mists, etc.).



WARNING!

In operation, moving parts are easily accessible. This applies especially for the zone, where the pad is moved between the starting and the labelling position.

- ⇒ During operation do not reach into that zone.
- ⇒ Keep long hair, loose clothes, and jewellery distant.
- ⇒ Before any manipulations in those areas, close the shutoff valve.



WARNING!

Other unauthorized work on or modifications to the device can also endanger operational safety.

Unauthorized interference with electronic modules or their software can cause malfunctions.

- ⇒ Perform only those actions described in this operating manual.
- ⇒ Work going beyond this may only be performed by trained personnel or service technicians.



WARNING!

The drawing in of items of clothing by moving parts can lead to injuries

- ⇒ If possible, do not wear clothing which could be caught by moving device parts.
- ⇒ Button or roll up shirt or jacket sleeves.
- ⇒ Tie or pin up long hair.
- ⇒ Tuck the ends of scarves, ties and shawls into your clothing or secure them with non-conductive clips.

1.3 Environmentally-Friendly Disposal

Manufacturers of B2B equipments are obliged to take-back and dispose old equipment which was manufactured after 13 August 2005. In principle, these old equipments may not be delivered to communal collecting points. They may only be organised used and disposed by the manufacturer. Valentin products accordingly labelled can therefore in future be returned to Carl Valentin GmbH.

Thereupon old equipment is professionally disposed.

Thereby Carl Valentin GmbH observes all obligations in the context of old equipment disposal in time and makes therewith the smooth selling of products furthermore possible. Please understand that we can only take-back equipment that is send free of carriage charges.

Further information on the WEEE directive is available on our website www.carl-valentin.de.

2 Product Description

2.1 Applicator Overview

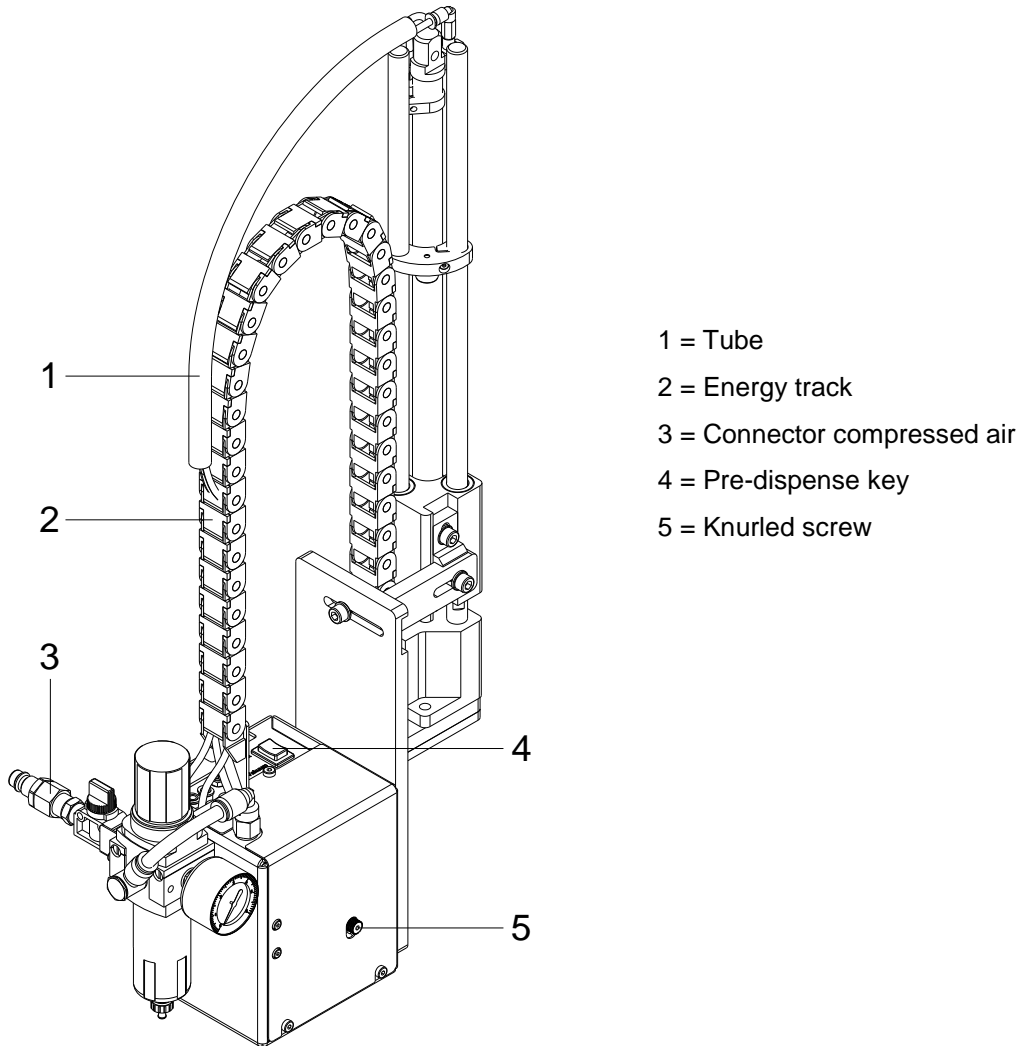


Figure 1

- 6 = Connector applicator - printer
- 7 = Pneumatic maintenance unit

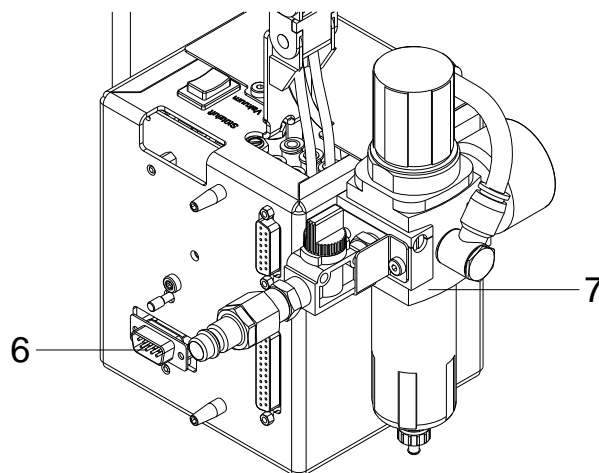


Figure 2

- 8 = Upper cylinder throttle valve
- 9 = Sensor start position
- 10 = Stopper
- 11 = Lift cylinder
- 12 = Lower cylinder throttle valve
- 13 = Labelling sensor
- 14 = Pad retainer
- 15 = Top plate (customized)
- 16 = Pad (customized)
- 17 = Blow tube

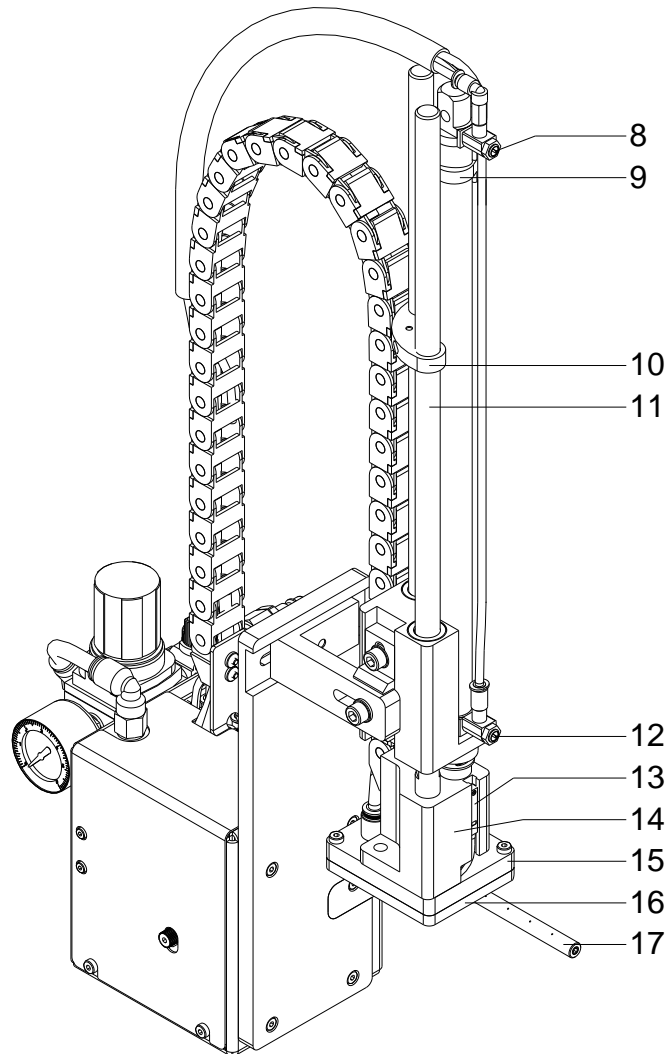
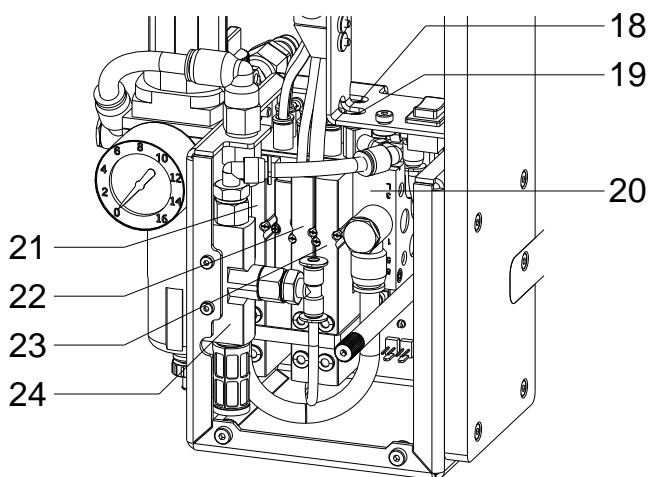


Figure 3



- 18 = Throttle valve vacuum
- 19 = Throttle valve support air
- 20 = Valve block
- 21 = Valve lift cylinder
- 22 = Valve blow air
- 23 = Valve vacuum / support air
- 24 = Vacuum generator

Figure 4

2.2 Sensor

Sensor labelling position

The contact of the pad onto the product or the reaching of the release position is detected by a Hall-sensor. For which purpose the displacement of the adapter bolt in relation to the sensor is used.

Sensor start position

The start position is the upper end position of cylinder and the position of the pad which takeover the label from printer. This position will be detected via a Hall-sensor in interaction with a magnet mounted inside cylinder.

Sensor vacuum

The correct transfer of a label will be checked by the vacuum sensor. It also checks that there is no longer a label on the pad in case of the return movement. This sensor is integrated to the PCB.

Sensor pressure

The pressure sensor controls the pressure air. This sensor is integrated to the PCB.

2.3 Pneumatic

Cylinder	<p>A cylinder with stroke of 100-400 mm is used for the transport of labels between the peel-off edge of the printer and the labelling position.</p> <p>The movement of cylinder is controlled by a control valve on the valve block.</p> <p>The speed of movement can be changed by two throttle valves mounted at cylinder.</p>
Pad	<p>The label will be transported by a pad. The pad must be appropriate to the size of label.</p> <p>During the label transport a vacuum is applied on the pad.</p> <p>In operating mode 'blow on' in the lower final position the label is applied by a high pressure.</p>
Vacuum generator	<p>The vacuum at the pad is produced by a vacuum generator. The vacuum generator is controlled by control valve on the valve block.</p> <p>The low pressure can be adjusted by a throttle valve.</p>
Blow tube	<p>Air is blown from below (supporting air) through a blow tube onto the label in order to support the transfer of the label from the printer to the pad. The blow tube is adjustable concerning the blowing direction.</p> <p>The supporting air is connected by the magnet valve (support air). The power of the supporting air can be adjusted by a throttle valve at the valve block.</p>
Pneumatic maintenance unit	<p>The pneumatic maintenance unit is offered as an option for the applicator. The important components of the pneumatic maintenance unit are a pressure reducer with manometer, a water separator with micro filter and a main connector for compressed air.</p>
Valve block	<p>The distribution of the compressed air to the various pneumatic units is made in the valve block.</p> <p>On the valve block is mounted the control valve for support air and vacuum with their throttle valves and the control valves for the lift cylinder and blow air.</p>

Control valves

**NOTICE!**

For adjustments of certain applicator functions it is possible to release the control valves in the pneumatic system.
The control valves are accessible only with dismantled cover.

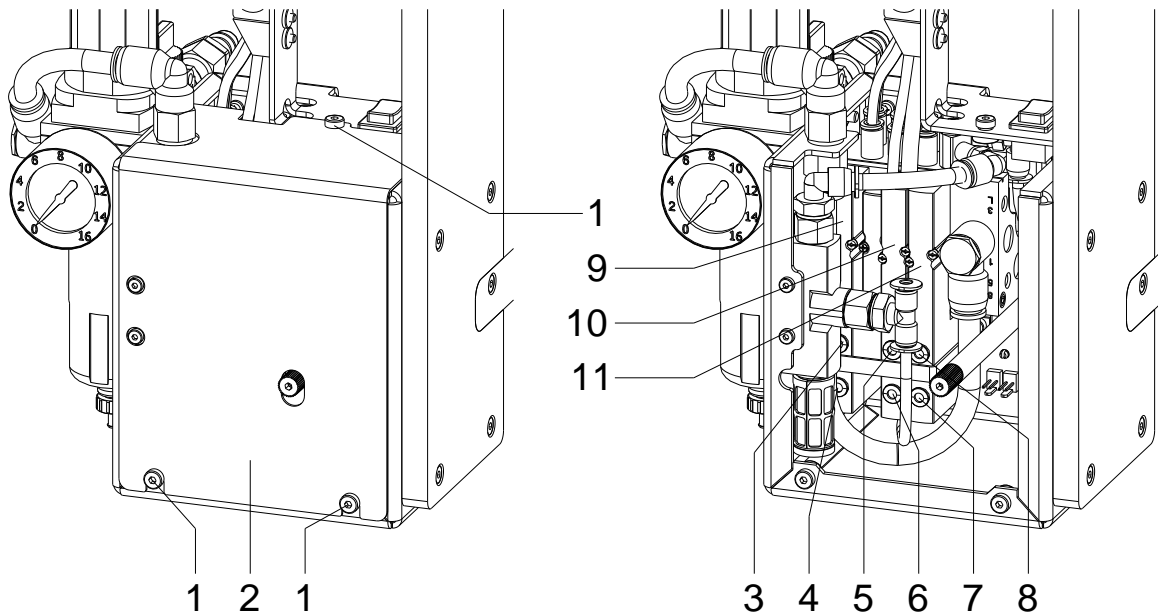


Figure 5

- ⇒ Loosen screws (1) and remove cover (2).
- ⇒ The compressed air control valves can be controlled manually with integrated switch (3 - 8).

3-way valve (9) to control the lift cylinder

If the printer is switched on the valve will be controlled by electronics and the tamp will hold in the upper end position (home position). If the valve is switched the tamp will move in the lower end position (labelling position). In normal labelling operation the movement back in the upper end position will start by a signal from the labelling sensor.

**NOTICE!**

The switching by hand of this valve has only a result in case of a switched off printer.

Switching the valve by hand over switch 3 the tamp will move down up to the lowest possible position because no control is made by the sensor.

Switching the valve by hand over switch 4 the tamp will move up.

Double 2-way valve (10) for blow air

In the operation mode 'Blow on' the label will blow up to the product.

In the operating modes 'Stamp on' and 'Roll on' the blow air is switched on for a short time after each application to avoid contaminations within the vacuum channels.

For all described functions both valves will be controlled parallel.

By pressing the keys 5 or 6 the blow air is only switched on by one of both internal valves.

Double 2-way valve (11) for vacuum / supporting air

The two internal valves serve the vacuum nozzle for connecting an in this way for creating the negative pressure at the tamp and independent of this for connecting the support air at the blow tube for the label transfer.

By pressing switch 7 the vacuum is switched on and by pressing switch 8 the supporting air is switched on.

3 Maintenance and Cleaning

3.1 Tools

For Assemblies	Tools	Size
Cylinder plunger	Combination wrench	5.5 mm
Throttle valve		9.0 mm
Guide rod		10.0 mm
L-connector (valve block in maintenance guiding)		14.0 mm
Lift cylinder		20.0 mm
Valve block, energy track	Hexagon wrench	2.0 mm
PCB		2.5 mm
Adjustment guiding block		5.0 mm
Throttle valves	Screwdriver for slotted screws	2.5 mm
Valves on the valve block	Crosstip screwdriver	PH 0
Sensors (labelling sensor + sensor start position)		PH 2
Works at PCB	Wrist grounding	
Pressure measurement	Manometer	to approx. 5 bar
Cloth soft brush, multi purpose cleaner (without solvent)		

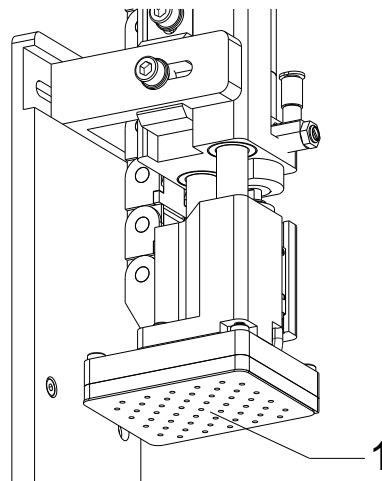
3.2 Cleaning



CAUTION!

Abrasive cleaning agents can damage the applicator!

⇒ Do not use abrasives or solvents to clean the outer surface of the label printer.



- ⇒ Clean the outside surfaces with multipurpose cleaner.
- ⇒ Remove dust particles and label splits with a soft brush or a vacuum cleaner.
- ⇒ The ideal takeover and handling of the label can be achieved by cleaning the surface of slide foil (1) at regular intervals.

Figure 6

4 Replacing Components



WARNING!

Risk of injury by uncontrolled functions of the applicator.

- ⇒ Disconnect the printer power supply.
- ⇒ Close the compressed air supply before the work.

4.1 Dismantling the Cover



NOTICE!

Dismantle the cover to arrive the components installed on the carrier plate.

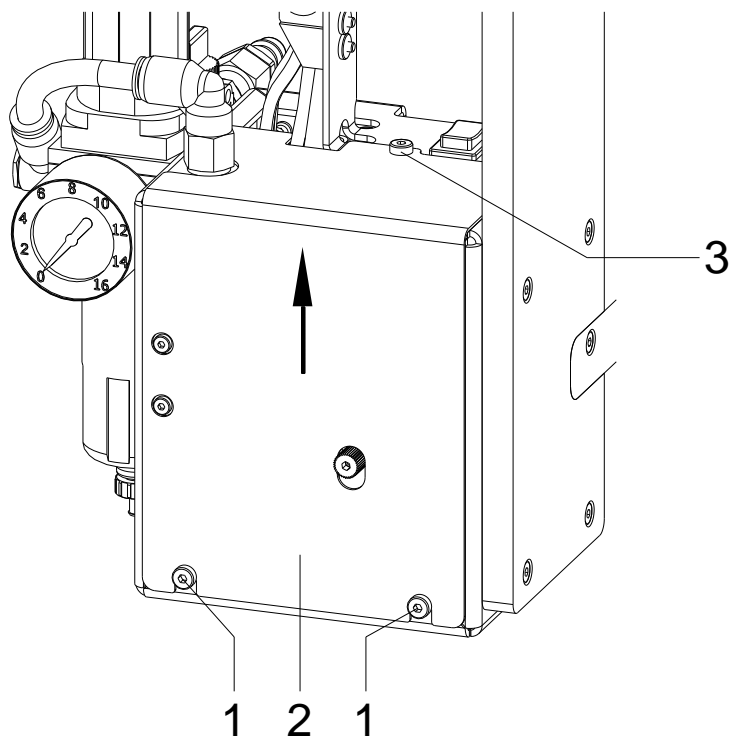


Figure 7

1. Loosen screw (1).
2. Remove screw (3).
3. Remove the cover (2) in direction of arrow.



NOTICE!

Before starting the normal operation mount the cover again.

4.2 Sticking slide foil onto the pad

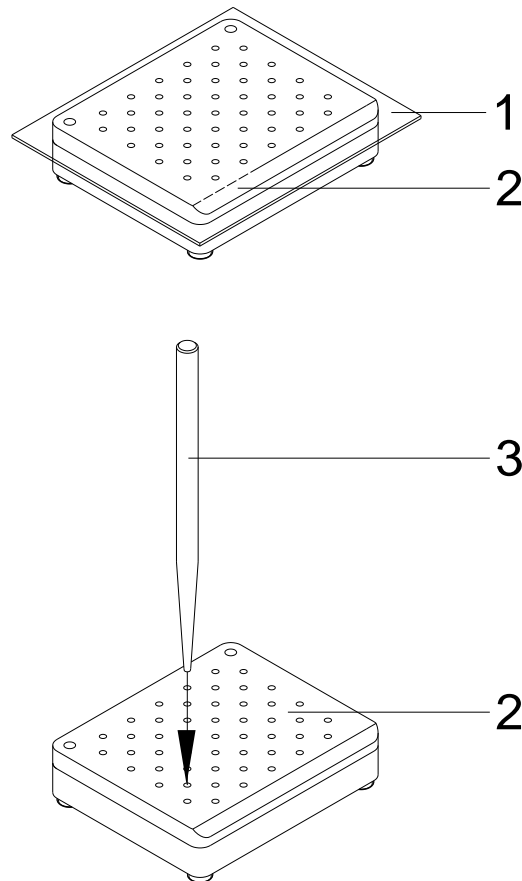


Figure 8

1. Dismount the pad unit (2).
2. Remove the slide foil (1) completely.
3. Clear the surface from remains of glue.
4. Remove covering foil from the slide foil (1).
5. Put the slide foil (2) with its adhesive side onto the pad (1). Press the slide foil firmly on the pad.
6. Cut off overlapping parts of the slide foil (1) according to the broken line of the pad (2).
7. Punch the slide foil (1) on the pad (2) using the punch pin (3) appropriate to the hole pattern on the wearing slide foil.
8. Punch the hole completely by turning the pin.
9. Mount the pad unit (2).

4.3 Replacing valves



WARNING!

Risk of injury by uncontrolled functions of the applicator.

- ⇒ Disconnect the printer power supply.
- ⇒ Close the compressed air supply before the work.

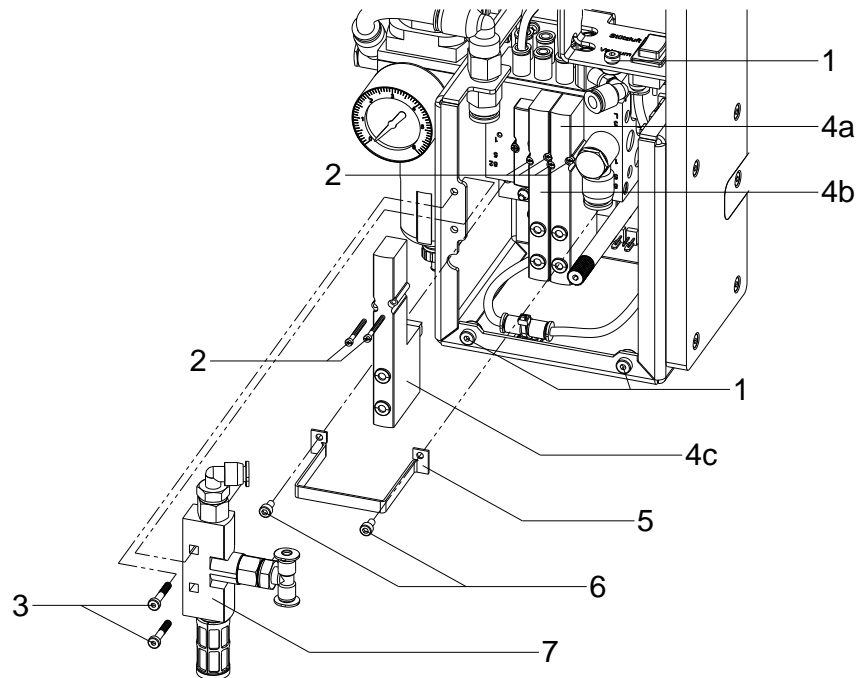


Figure 9

1. Loosen screws (1) and remove the cover.
2. Loosen screws (3) of the vacuum generator (7) and remove the vacuum generator (7). It is not necessary to pull the tubes from vacuum generator (7).
3. Loosen screws (6) of the bracket (5) and remove the bracket (5).
4. Loosen screw (2) of the valve (4 a, b or c) and remove the valve from the front.
5. Attach the new valve and make sure that the gasket is in the right position.
6. Mount the bracket (5) and tighten the screws (3).
7. Attach the vacuum generator (7) and tighten screws (3).
8. Replace possibly removed tubes.
9. Mount the cover.

4.4 Replacing PCB

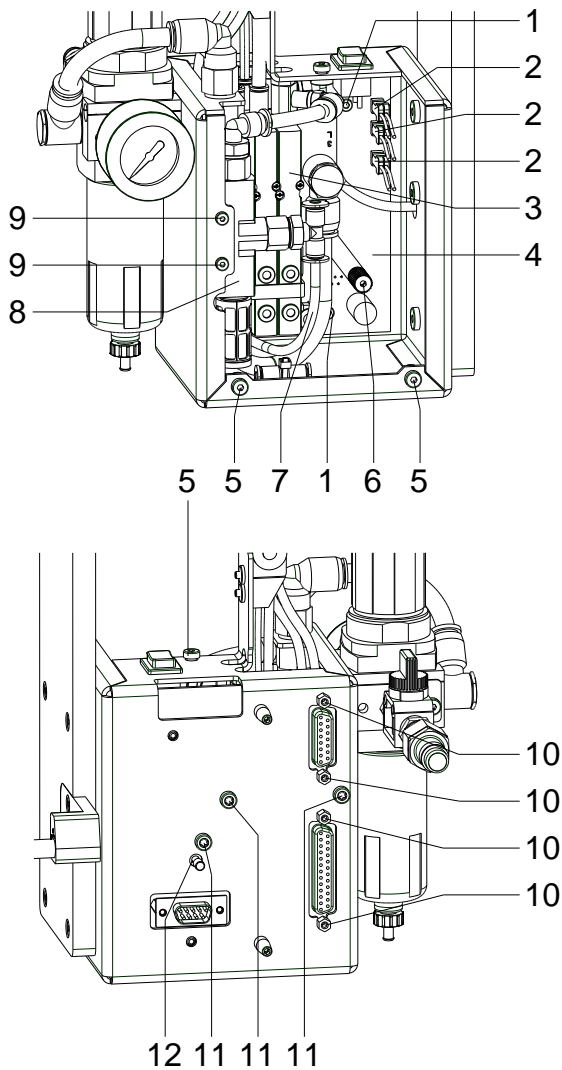


Figure 10

1. Unscrew three screws (5) and dismantle the cover.
2. Dismount the applicator from the printer.
3. Remove the lock washer (12) from the knurled screw.
4. Pull the knurled screw (6), turn it counter clockwise until the thread interlocks and then unscrew the knurled screw.
5. Loosen screws (9) of vacuum nozzle (8). Remove tube (7) and remove the vacuum nozzle (8).
6. Remove three cylinder screws with torx (11).
7. Swing the valve block (3) as far as possible from the housing. If necessary, remove the individual tube.



NOTICE!

Do not forget the connecting position for the re-installation!

8. Remove four hexagon head bolts (10) of both Sub-D connectors.
9. Remove connector (2) from PCB.
10. Unscrew two screws (1) and then remove PCB (4).
11. Remove tube (7) from the vacuum sensor of PCB (4).
12. Attach a tube (7) to the vacuum sensor of the new PCB (4).
13. Mount again the PCB (4) and apply the connectors (2).
14. Swing carefully the valve block (3) again into position and ensure the connection with PCB (4).
15. Fix again the valve block (3) and insert the before loosened tubes if necessary.
16. Mount again the vacuum nozzle (8).
17. Mount again the knurled screw (6).
18. Fix the applicator to the printer and mount the cover.

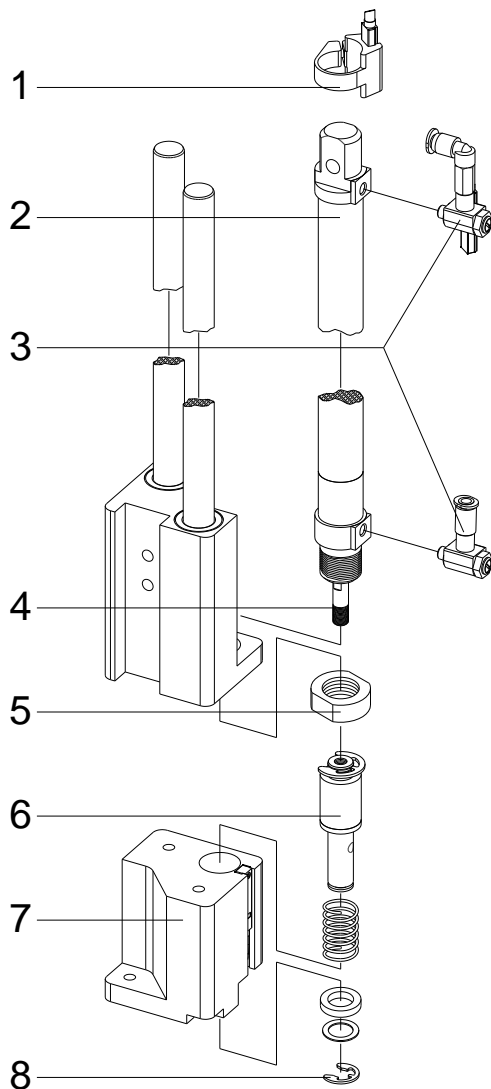
4.5 Replacing Cylinder



WARNING!

Risk of injury by uncontrolled functions of the applicator.

- ⇒ Disconnect the printer power supply.
- ⇒ Close the compressed air supply before the work.



1. Dismantle sensor start position (1) with mounting clip and pull off the tubes from cylinder (2).
2. Unscrew throttle valves (3) from cylinder.
3. Remove locking washer (8) and the other both flat washers.
4. Pull the guiding with mounted pad downwards from the adapter bolt (6) and remove the spring.
5. Hold the adapter bolt (6) at the inserted drilling and loosen the plunger (4) from adapter bolt (6) with a combination wrench 5.5 mm.
6. Loosen screw nut (5) and remove cylinder.
7. Insert the new cylinder (2) and fix it with screw nut (5).
8. Screw the adapter bolt (6) to the plunger (4).
9. Insert the spring into the guiding (7) and press the guiding upwards. Press the adapter bolt against the guiding.
10. Attach the washers and fix these by the locking washer (8).
11. Mount throttle valves (3) again.
12. Mount sensor start position (1) and tubes again.

Figure 11

4.6 Replacing Sensors at the Cylinder



WARNING!

Risk of injury by uncontrolled functions of the applicator.

- ⇒ Disconnect the printer power supply.
- ⇒ Close the compressed air supply before the work.

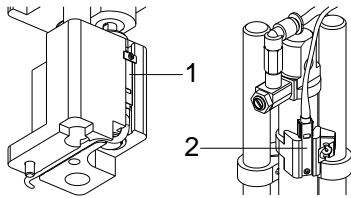


Figure 12

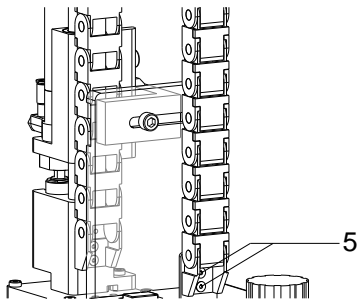


Figure 13

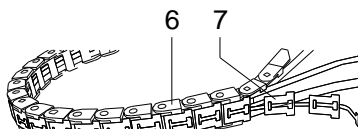


Figure 14

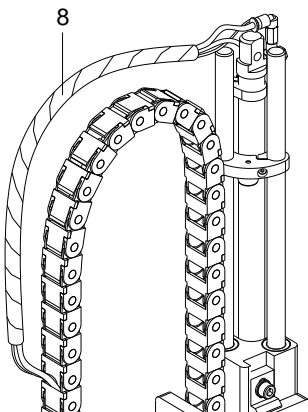


Figure 15

Replacing sensor labelling position (1)

1. Dismantle the cover (see chapter 4.1, page 17)
2. Detach the connector of sensor (1).
Slot CON 6.
3. Loosen screws (5) to dismantle the energy track to one side.
4. Loosen the T-formed parts (7) from the U-formed parts (6) of the energy track (see Figure 14).
5. Remove the sensor of the energy track.
6. Insert the new sensor in the energy track.
7. Close the energy track again. Press the U-formed parts (6) in the T-formed parts (7).
8. Mount again the energy track and tighten the screws (5).

Replacing sensor start position (2)

1. Dismantle the cover (see chapter 4.1, page 17)
2. Detach the connector of sensor (2).
Slot CON 8.
3. Unwrap spiral cable (8) from the cable and tubes.
4. Replace the sensor start position after dismantling at the cylinder.
5. Wrap the spiral cable (8) again to the cable and tubes.



NOTICE!

After replacing a sensor its new position is to be adjusted (see chapter 5.1, page 23).

5 Troubleshooting

5.1 Sensor Labelling Position / Sensor Start Position

The sensor labelling position and the sensor start position show the activation by a LED integrated in the sensor. This LED glows in case of activation.

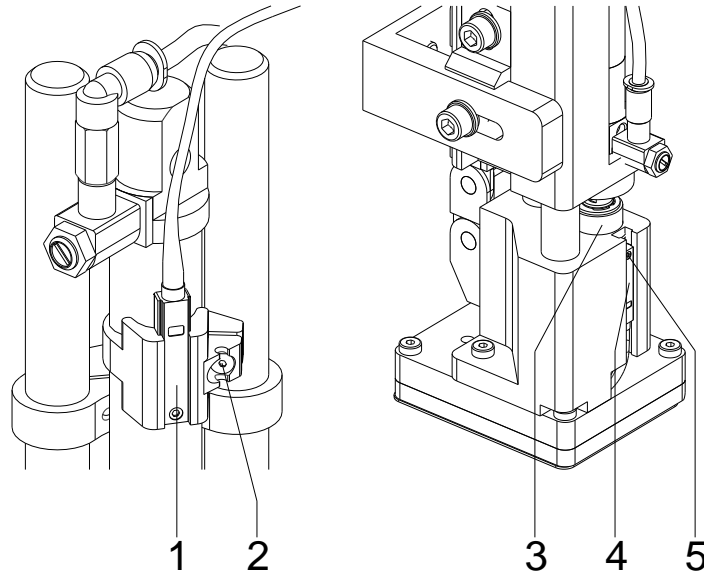


Figure 16

Adjusting sensor start position (1)

1. Loosen the locking ring by loosen the screw (2).
2. Open the compressed air supply.
3. Switch on the printer and the cylinder is moved to the maximum position (upper end position).
4. Move the locking ring with sensor (1) so that the LED at the sensor glows.
5. Fix the sensor position by tightening the screw (2) of locking ring.

Adjusting sensor labelling position (4)

1. Loosen the screw (5) at the sensor and switch on the printer.
2. Adjust the sensor (4) in a way that it is activated if the adapter pin (3) was pressed approx. 5 mm into the pad component. Up to the pressing of adapter pin into the pad component the LED glows at the sensor.
In the activating condition the LED goes out.

5.2 Functions of LEDs in the Applicator Electronics

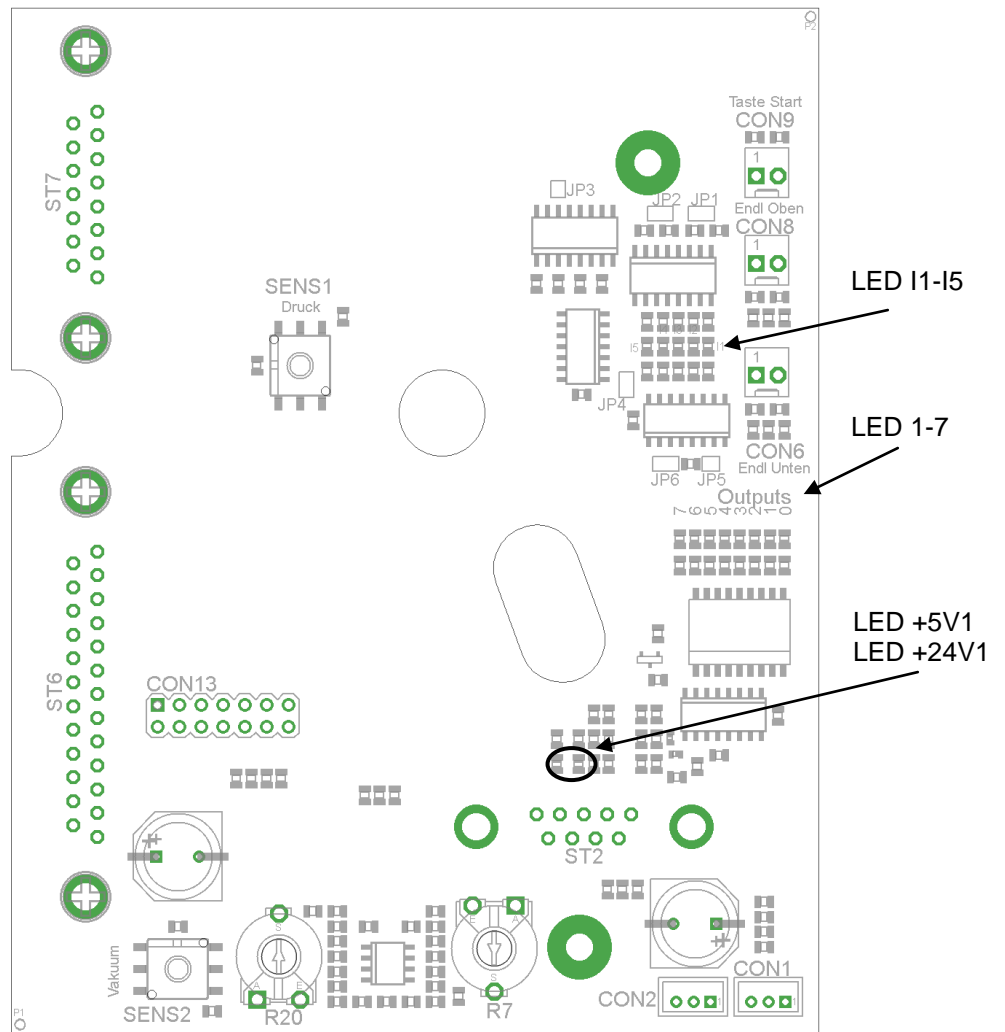


Figure 17

LED	Color	Description	LED On	LED Off
I1	red	Pre-dispense key	Key pressed	Key not pressed
I2	red	Sensor start position	Pad in start position	Pad not in start position
I3	red	Sensor labelling position	Pad in labelling position	Pad not in labelling position
I4	red	Sensor compressed air	No compressed air	Compressed air available
I5	red	Sensor vacuum	No vacuum at pad	Vacuum at pad
1	red	Lift downwards	Valve active	Valve not active
2	red	Lift upwards	Valve active	Valve not active
3	red	no function	-	-
4	red	no function	-	-
5	red	Blow air	Valve active	Valve not active
6	red	Support air	Valve active	Valve not active
7	red	Vacuum	Valve active	Valve not active
+5V1	red	Input voltage +5V	Voltage existing	No voltage
+24V1	red	Input voltage +24V	Voltage existing	No voltage

5.3 Pressure Measuring



NOTICE!

Use a manometer with a measuring scale to 5 bar for measuring the pressure.

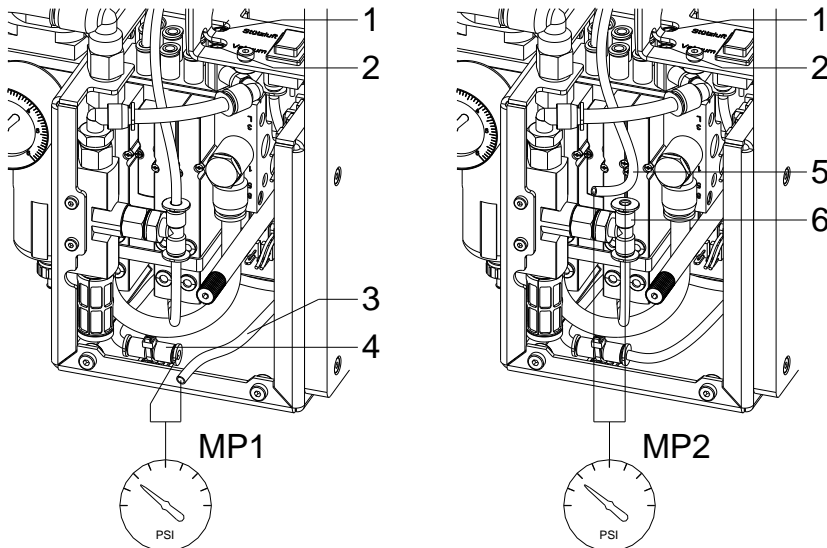


Figure 18

Measuring point 1: Support air (reference value 2.0 bar)

1. Dismantle the cover and interconnect manometer to measuring point 1.
Measuring point 1: Tube (3) - Connector (4).
2. Open the air supply and activate the valve manually to measure the pressure.
3. If required adjust the pressure at throttle valve 'support air' (1).
4. Mount the cover again.

Measuring point 2: Vacuum (reference value -0.6 bar)

1. Dismantle the cover.
2. Cover the suction plate at the pad hermetically.
3. Interconnect manometer to measuring point 2.
Measuring point 2: Tube (5) - Connector (6) at vacuum generator.
4. Open the air supply and activate the valve manually to measure the pressure.
5. If required adjust the pressure at throttle valve 'vacuum' (2).
6. Mount the cover again.



CAUTION!

Masfunction at label takeover from dispenser edge to pad.
Not enough vacuum / air de support.

⇒ After the pressure measuring reconnect all connectors and check the interference fit of the tubes.

5.4 Error Indications

Error	Cause	Solution
Insufficient vacuum on pad	In cyclical operation the control valve 'vacuum' is not controlled. Defective applicator PCB.	Change applicator PCB.
	No pressure at the output of throttle valve 'vacuum' or the pressure cannot be adjusted.	Adjust and/or change the throttle valve.
	No vacuum at output of vacuum generator.	Change the sound absorber if it is soiled. Change the vacuum generator if it is defect.
	Leaking vacuum chain.	Measuring as described in chapter 5.3, page 25. Check the transmission elements and replace them if necessary.
	Insufficient vacuum at the pad. Suction channels at pad or slide foil clotted.	Clean the suction channels and/or change the slide foil.
Fault in cylinder movement	The condition of valve control is not indicated with the LED at the valve connector.	Check the connections.
	Defective applicator PCB.	Change applicator PCB.
	No pressure at the output of miniature pressure regulator or the pressure cannot be adjusted.	Adjust and/or change the miniature pressure regulator.
	No pressure at the output of one of the throttle valves at cylinder or the pressure cannot be adjusted.	Adjust and/or change the throttle valve.

Error	Cause	Solution
Loss of blow air	The valve is not activated. The LED at valve does not glow. Defective applicator PCB.	Change applicator PCB.
	Insufficient pressure at pad with an activated valve. Defective pneumatic tubes.	Replace pneumatic tubes.
Loss of applicator function	Compressed air failure.	Check connections.
	Defective applicator PCB.	Change applicator PCB.
Loss of support air	Valve is not controlled. Defective applicator PCB.	Change applicator PCB.
	Insufficient pressure at blow tube with an activated valve. Defective pneumatic tubes.	Change pneumatic tubes.
	Defective or wrong adjusted throttle valve.	Adjust and/or change the throttle valve.
Permanent error at label transfer via pad	Faulty pad position in transfer position to the peel off edge of the printer.	Correct position (backward edge of pad approx. 1 mm above the peel off edge of printer).
	Insufficient or missing vacuum.	Adjust vacuum at throttle valve.
	Support air does not blow exactly the label to the pad.	Adjust the blow tube. Adjust pressure of support air via throttle valve 'support air'. Adjust switch on delay.

6 Block Diagram

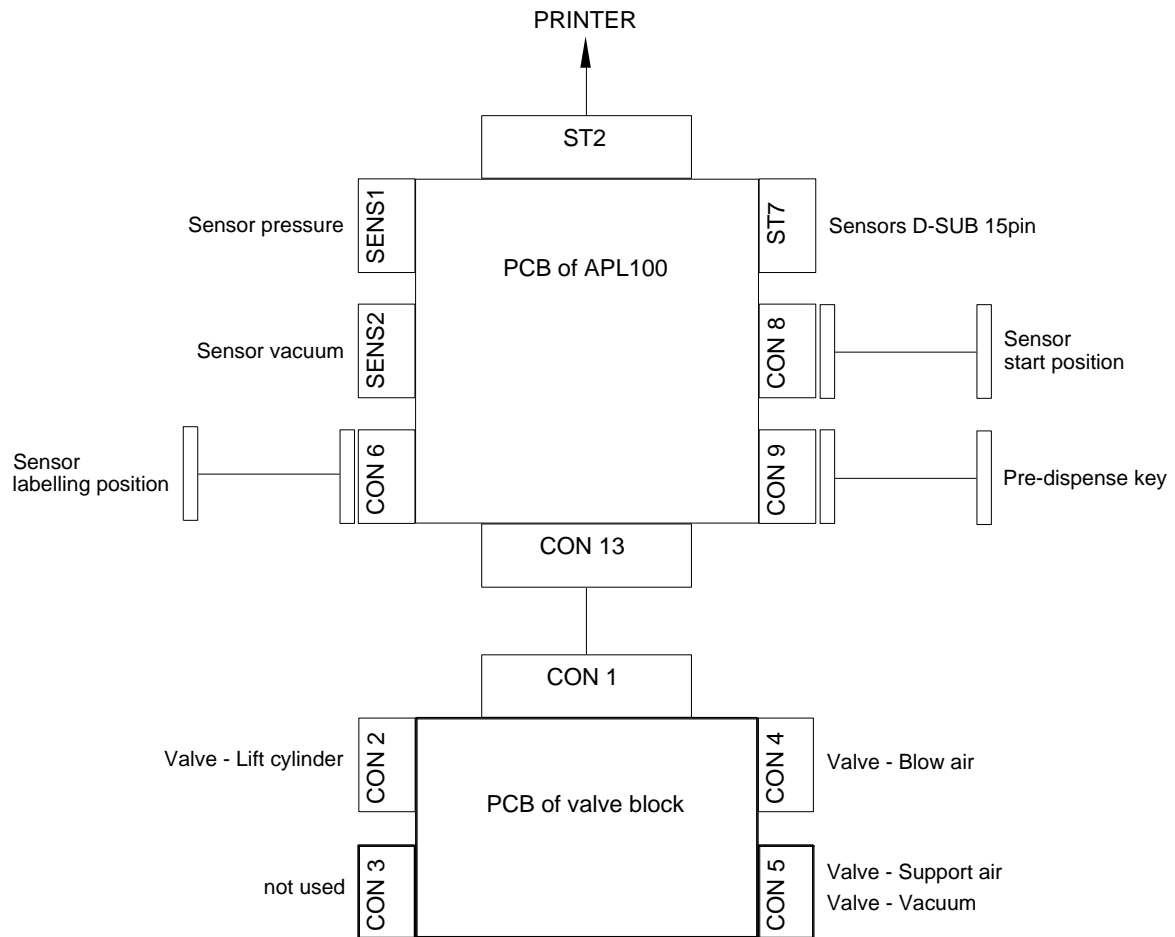
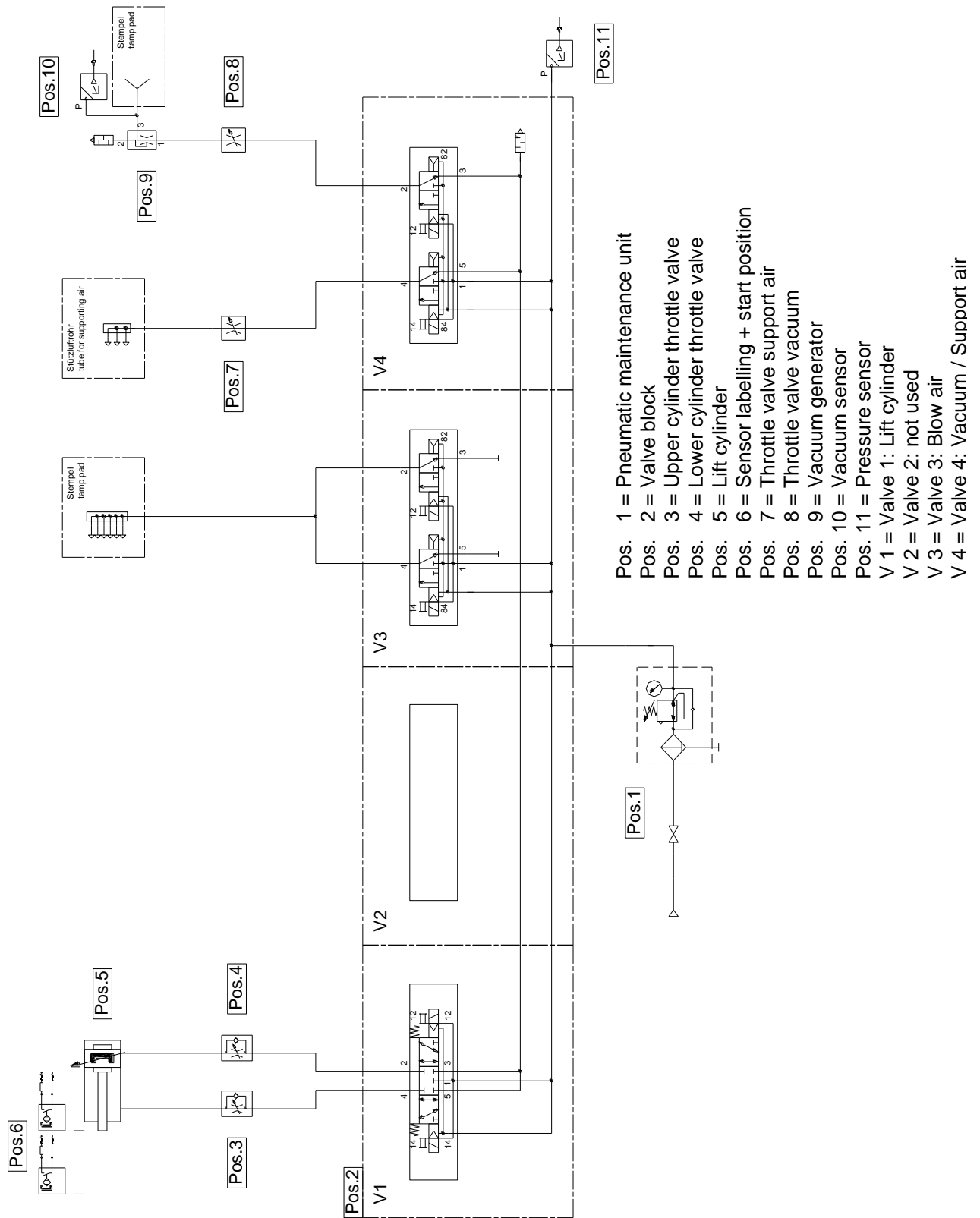


Figure 19

7 Pneumatic plan



- Pos. 1 = Pneumatic maintenance unit
- Pos. 2 = Valve block
- Pos. 3 = Upper cylinder throttle valve
- Pos. 4 = Lower cylinder throttle valve
- Pos. 5 = Lift cylinder
- Pos. 6 = Sensor labelling + start position
- Pos. 7 = Throttle valve support air
- Pos. 8 = Throttle valve vacuum
- Pos. 9 = Vacuum generator
- Pos. 10 = Vacuum sensor
- Pos. 11 = Pressure sensor
- V 1 = Valve 1: Lift cylinder
- V 2 = Valve 2: not used
- V 3 = Valve 3: Blow air
- V 4 = Valve 4: Vacuum / Support air

Figure 20

8 Terminal Diagram of PCB

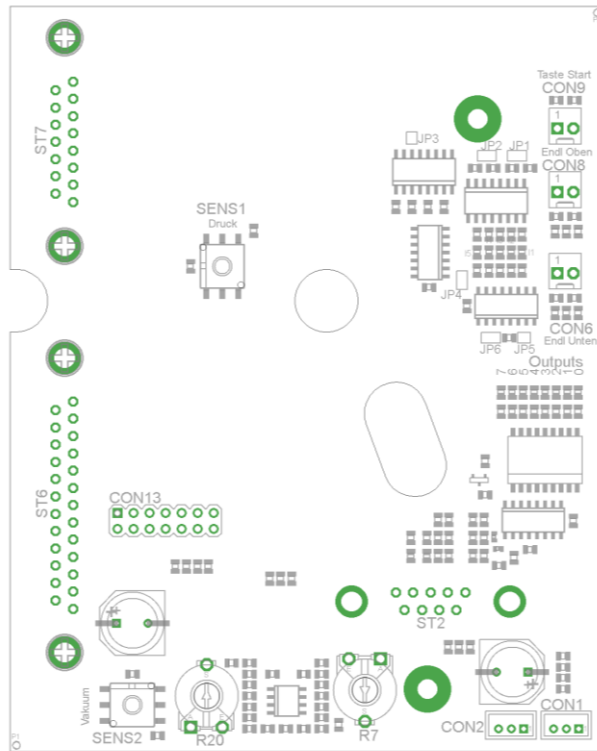


Figure 21

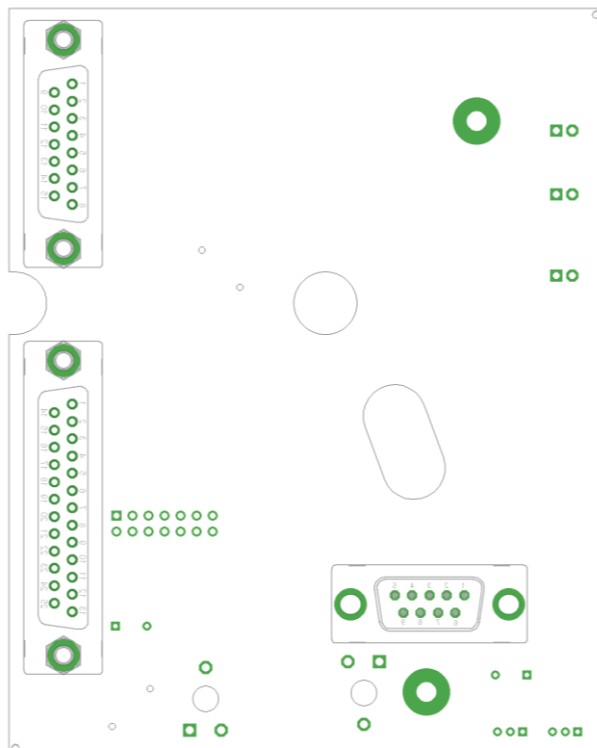


Figure 22

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