



up to Serial No. 9999

Barcode/Label printer MACH4

Service Manual

Edition 11/06

copyright by cab / 9008553 / Q49 / 1

All specifications about delivery, design, performance and weight are given to the best of our current knowledge and are subject to change without prior notice.

All rights reserved, including those of the translations.

No part of this manual nor any translation may be reproduced or transmitted in any form or by any means, for any purpose other than the purchaser's personal use, without the express written permission of cab Produkttechnik GmbH & Co KG Karlsruhe.



Gesellschaft für

Computer- und Automations-Bausteine mbH & Co KG

cab-Produkttechnik GmbH & Co KG

Postfach 1904 D-76007 Karlsruhe, Germany

Wilhelm-Schickard-Str. 14 D-76131 Karlsruhe, Germany

Telephone: +49 721 6626-0

Telefax: +49 721 6626-249

<http://www.cabgmbh.com>

E-mail: info@cabgmbh.com

Table of Contents

1	Important Information	4
1.1	General safety instructions	4
1.2	Protective devices	4
1.3	Handling electricity.....	5
1.4	Procedure in case of accidents.....	5
2	Replacing assembly units.....	6
2.1	Device Overview.....	6
2.2	Tools.....	7
2.3	Replacing the control panel	8
2.4	Replacing the cover	9
2.5	Replacing the outer casing	10
2.6	Replacing print mechanics.....	11
2.7	Replacing the CPU printed circuit board.....	12
2.8	Replacing the power unit	13
3	Settings and Adjustments	14
3.1	Measuring the rewind torques	14
3.2	Adjusting rewind torques	16
4	Block diagram.....	17
5	Index	18

1 Important Information

1.1 General safety instructions

This service manual is intended for use by qualified service and maintenance personnel. For more operation and configuration information, refer to the user or configuration manual.

Follow the general safety rules below:

- Keep the area around the device clean at all times!
- Work with safety in mind.
- Parts of device that are removed during the maintenance work must be put in a safe place.
- Avoid risks of tripping over.



DANGER!

Danger to life and limb from increased current flow through metal parts in contact with the device.

- ⇒ Do not wear clothing with metal parts.
- ⇒ Do not wear jewelry.
- ⇒ Do not wear spectacles with metal frames.



CAUTION!

Items of clothing drawn into the device by moving parts can lead to injuries.

- ⇒ Do not wear any items of clothing which could get caught by moving parts.

1.2 Protective devices



WARNING!

There is a risk of injury if protective devices are missing or defective.

- ⇒ Replace all protective devices (covers, safety notices, grounding cables etc) after maintenance work has been completed.
- ⇒ Replace parts that have become defective or unusable.

Wear protective goggles for:

- Knocking pins or similar parts in or out with a hammer.
- Using spring hooks.
- Inserting or removing springs, retaining rings or grip rings.
- Using solvents, cleansers or other chemicals.

1.3 Handling electricity

The following work may only be done by trained and qualified electricians:

- Work on electrical components.
- Work on an open device still connected to the mains supply.

General precautions before starting maintenance work:

- Find out where the emergency and power switches are so that they can be quickly thrown in an emergency.
- Disconnect the current supply before carrying out the following work:
 - Installing or removing power units.
 - Working in the immediate vicinity of open power supply components.
 - Mechanical check of power supply components.
 - Modifying circuits in the device.
- Test the zero potential of the device parts.
- Check the working area for possible sources of danger, such as wet floors, defective extension cables, defective protective conductor connections.

Additional precautions in the case of exposed voltages:

- Ask a second person to remain near the working site. This person must know where the emergency and power switches are, and how to switch the current off if danger arises.
- Only use one hand to work on electric circuits of devices that are switched on. Keep the other hand behind your back or in your pocket.
This prevents electricity from flowing through your own body.

1.4 Procedure in case of accidents

- Act calmly and with great care.
- Avoid danger to yourself.
- Switch off power.
- Request medical assistance.
- Give first aid, if necessary.

2 Replacing assembly units

2.1 Device Overview

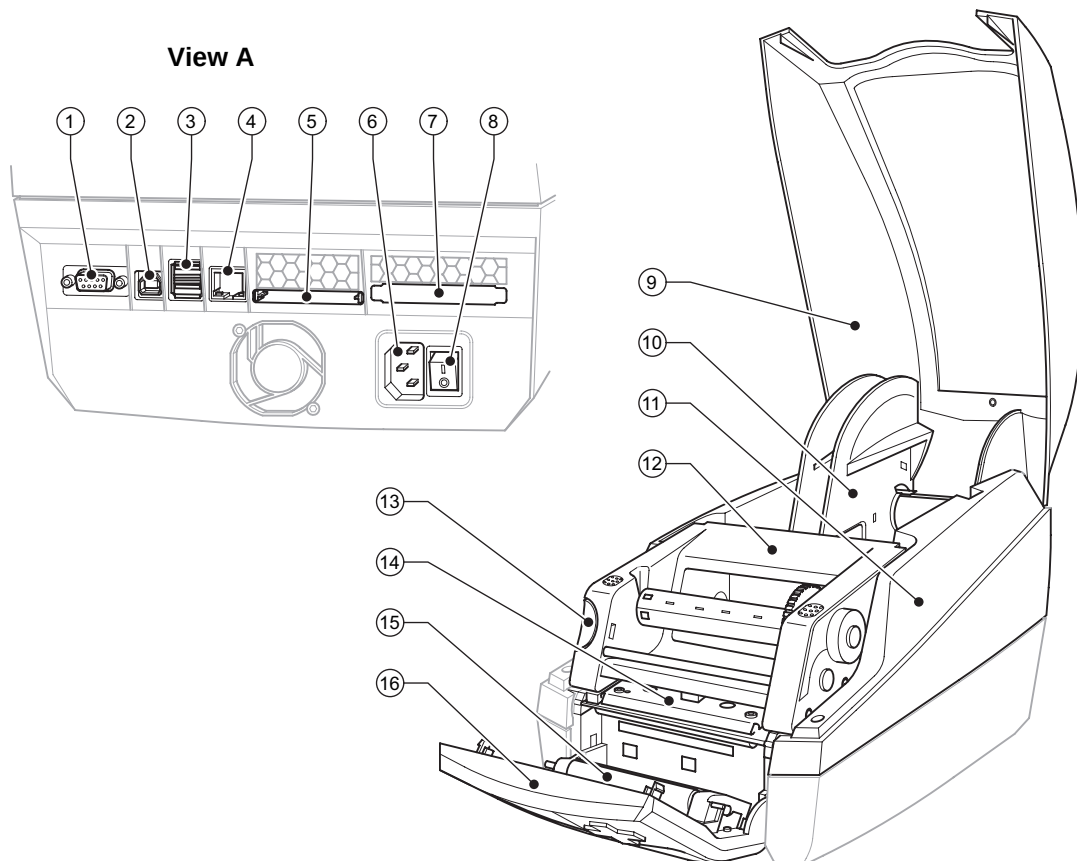


Fig. 1: Overview

- | | |
|---|---|
| 1 RS-232 serial interface | 10 Roller holder |
| 2 USB 2.0 High Speed Slave interface | 11 Covering hood |
| 3 Two USB master interfaces for keyboard and scanner | 12 Printhead assembly |
| 4 Ethernet 10/10 Base T interface | 13 Unlocking device |
| 5 CompactFlash card slot | 14 Printhead holder with printhead |
| 6 Power supply socket | 15 Transport locking roller |
| 7 PC card slot, type II | 16 Control panel |
| 8 Power switch | |
| 9 Cover | |

2.2 Tools

- Do not use any worn or damaged tools.
- Only use tools and testing devices that are suitable for the task at hand.

cab special tools:

- Tape holder test collar (cab item number: 5540932)
- Cylindrical dynamometer (spring scale), 0 - 10 N (cab item number: 5906108)

Standard tools:

- Screw driver Torx, size TX 10/200
- Hex screwdriver, straight, size 2.5
- Screwdriver with flat blade, size 4
- Flat-nose pliers

2.3 Replacing the control panel

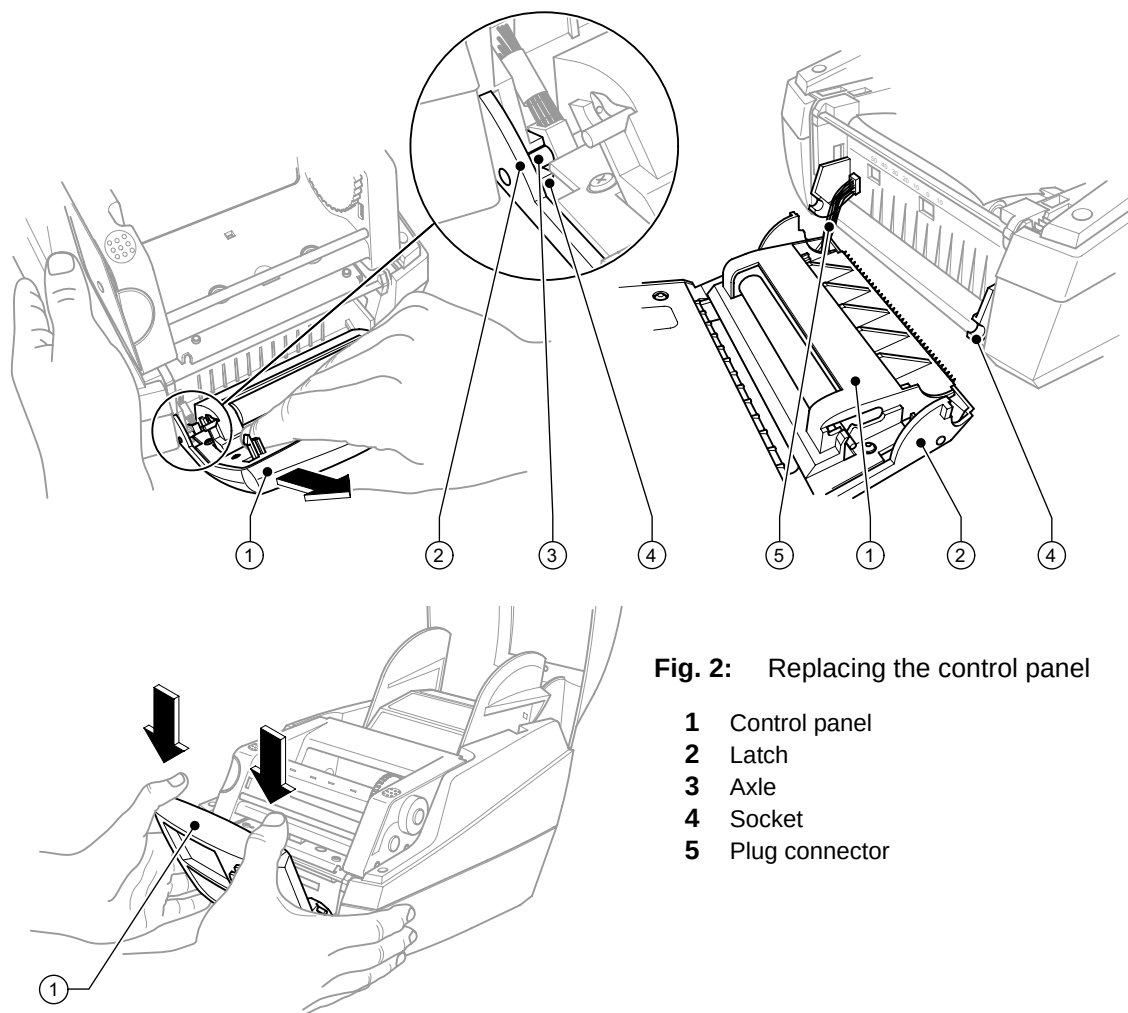


Fig. 2: Replacing the control panel

- 1 Control panel
- 2 Latch
- 3 Axle
- 4 Socket
- 5 Plug connector

1. Hinge down the control panel (1).
2. Hold the device with one hand, grip the control panel with the other hand, and remove one axle (3) from of its bearings (4) by pulling strongly.
3. Grip the control panel over the second axle, and pull it until the axle comes out of its bearings.

NOTE!
Ensure that the plug connector is not damaged.

4. Draw the lugs (2) alongside the bearings (4) out of the device.
5. Pull the plug (5) out of the printer, and put the control panel down in a safe place.
6. Plug (5) the new control panel into the printer.
7. Slide the lugs (2) past the sides of the bearings (4).
8. Tilt the control panel upwards a little.
9. Hook the axles (3) into their bearings.
10. Press firmly on the control panel until the axles audibly slot into their bearings.

2.4 Replacing the cover

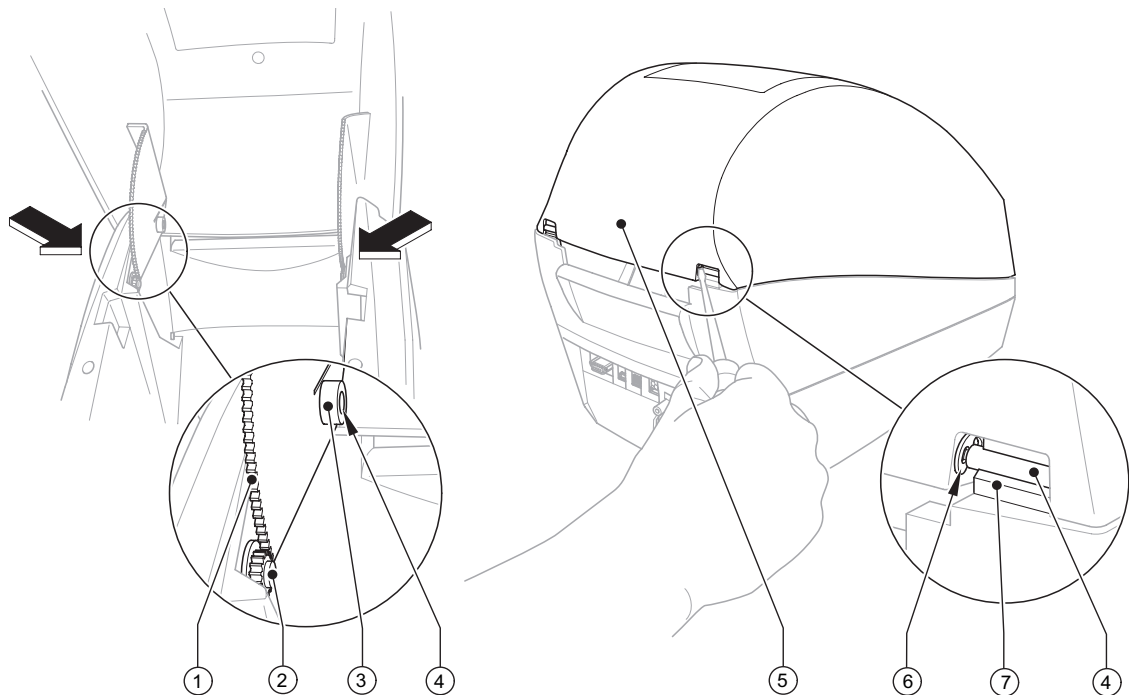


Fig. 3: Replacing the cover

- | | |
|--------------------------------|---------------------------------|
| 1 Toothed lug | 5 Cover |
| 2 Damping wheel | 6 Locking ring |
| 3 Hinged aperture cover | 7 Guide for outer casing |
| 4 Axle | |

1. Open the cover (5), remove the media hub and label stock.
2. Disconnect the damping mechanism by pressing both toothed lugs (1) towards the center of the device.
3. Press the cover further back until the axles (4) come out of the guide (7).
4. To fit the new cover, first remove the retaining rings (6) and the axles (4).
5. Place a new cover (5) on the casing, ensuring that the damping wheels (2) mesh with the toothed lugs (1).
6. Push both sides of the axles (4) into the hinged aperture (3) from the inside.
7. Close the cover.
8. Attach the retaining rings (6).

2.5 Replacing the outer casing



DANGER!

Danger to life and limb from electric shock!

⇒ **Disconnect the device from the mains supply before opening the outer casing.**

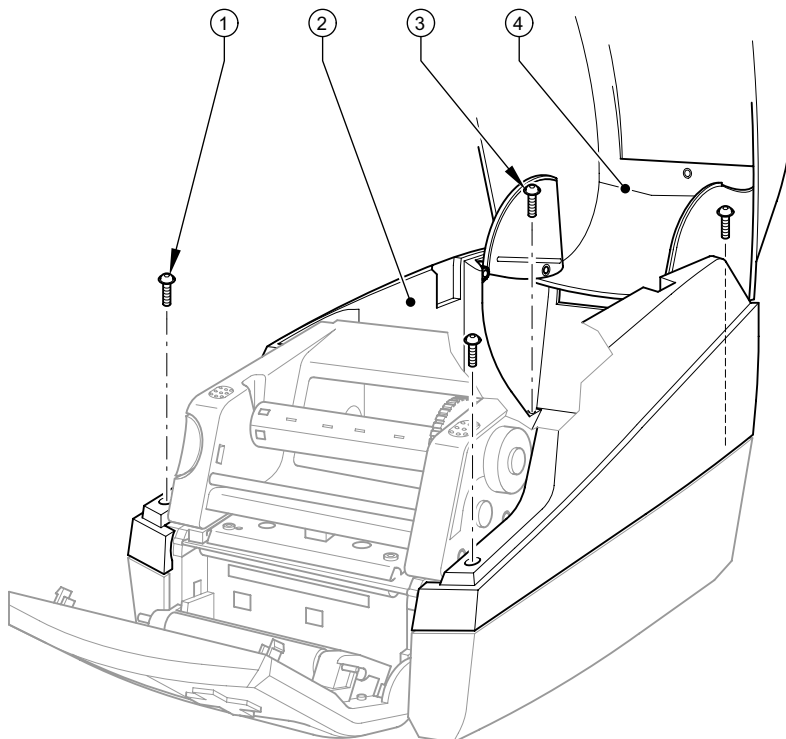


Fig. 4: Replacing the outer casing

- | | |
|-----------------------|---------------------|
| 1 Two screws | 3 Two Screws |
| 2 Outer casing | 4 Cover |

The outer casing can be removed complete with the cover.

1. Open the cover (4), remove the media hub and material.
2. Unscrew 2 screws (1) from the front of the casing.
3. Unscrew 2 screws (3) from the inside of the floor.
4. Remove the outer casing (2) together with the cover (4).

Mount the outer casing and cover in the reverse order. Hinge the printhead assembly up to make it easier to insert the parts.

2.6 Replacing print mechanics



DANGER!

Danger to life and limb from electric shock!

⇒ **Disconnect the device from the mains supply before opening the outer casing.**

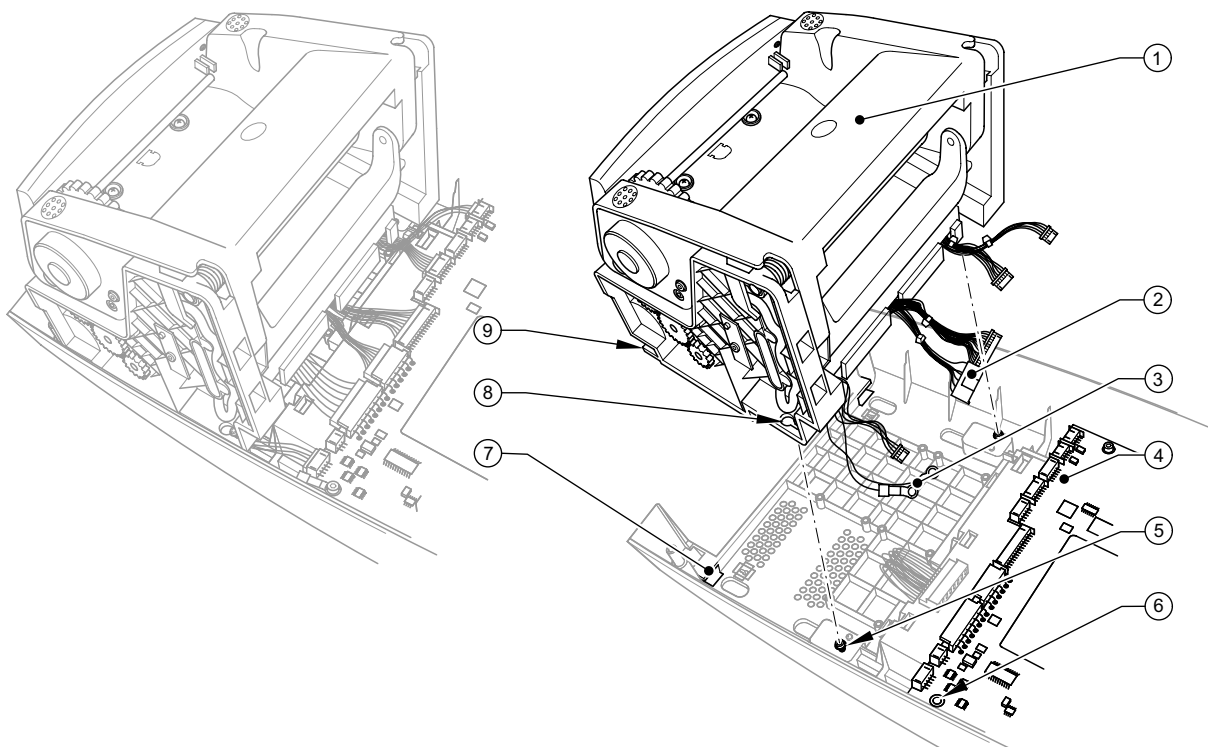


Fig. 5: Replacing print mechanics

- | | | | |
|---|-------------------|---|----------------|
| 1 | Print mechanics | 6 | Screw |
| 2 | Cable | 7 | Floor guide |
| 3 | Grounding cable | 8 | Elongated hole |
| 4 | CPU circuit board | 9 | Lug |
| 5 | Screw | | |

1. Remove the outer casing together with the cover (see section 2.5 on page 10).
2. Disconnect the print mechanism cable (2) from the CPU printed circuit board (4).
3. Disconnect the grounding cable (3) from the CPU printed circuit board (4) by unscrewing screw (6).
4. Loosen the two screws (5). Slide the print mechanics (1) back a little until the elongated holes (8) can be lifted off the two screws (5). Pull the lower lugs (9) out of the floor guides (7) and put the print mechanics down in a safe place.
5. Slide the lower lugs (9) of the new printing mechanism into the floor guides (7), press down, and slide forward until it slots into the projections alongside the screws. Tighten both screws (5).
6. Attach the grounding cable (3) to the CPU printed circuit board (4) with screw (6).
7. Connect cable (2) to the CPU printed circuit board (see section 2.7 on page 12).
8. Remount the outer casing together with the cover (see section 2.5 on page 10).

2.7 Replacing the CPU printed circuit board



DANGER!

Danger to life and limb from electric shock!

⇒ **Disconnect the device from the mains supply before opening the outer casing.**

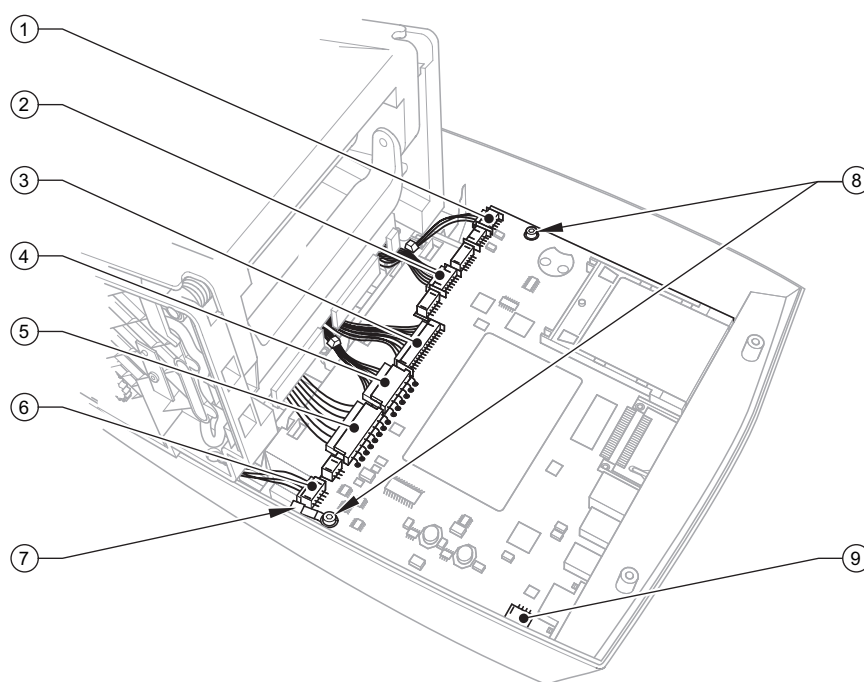


Fig. 6: Replacing the CPU printed circuit board

- | | |
|---|-------------------------------|
| 1 Control panel cable | 6 Stepping motor cable |
| 2 Sensors cable | 7 Grounding cable |
| 3 Cable for printhead power supply | 8 Screw |
| 4 Printhead signal cable | 9 Fan cable |
| 5 Power unit cable | |

1. Save the printer configuration on a CompactFlash card, please refer to the configuration manual. Pull all memory modules out of their slots.
2. Remove the outer casing (see section 2.5 on page 10).
3. Disconnect cables (1) to (6) from the CPU printed circuit board.
4. Loosen both screws (8) and the grounding cable (7).
5. Disconnect the fan cable (9) and remove the CPU printed circuit board.
6. Reassemble in the reverse order.
7. Perform a firmware update as required.
8. Load the printer configuration from a memory module, or set the printer configuration on the control panel, please refer to the configuration manual.

2.8 Replacing the power unit



DANGER!

Danger to life and limb from electric shock!

⇒ **Disconnect the device from the mains supply before opening the outer casing, and wait at least one minute to allow the power unit to discharge.**

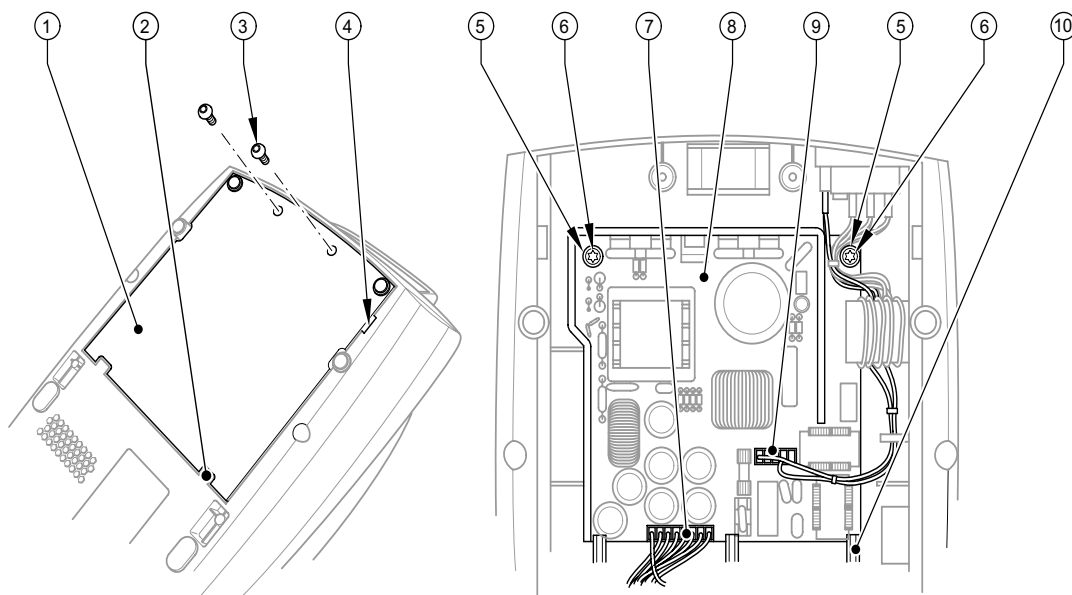


Fig. 7: Replacing the power unit

- | | |
|---------------------------|----------------------------|
| 1 Power unit cover | 6 Plastic washer |
| 2 Base tub latch | 7 Power unit cable |
| 3 Screw | 8 Power supply unit |
| 4 Recess | 9 Mains input plug |
| 5 Screw | 10 Floor lug |

1. Turn the printer and place it on a suitable underlay.
2. Loosen the two screws (3).
3. Insert a screwdriver into the recess (4), lift and remove the cover (1).
4. Unplug the mains input (9) and power unit (7) cables.
5. Remove 2 screws (5) and the plastic washers (6).
6. Remove the power unit [8].
7. Slide a new power unit (8) under the 3 floor lugs (10), and slot the power unit PCB, with the drill holes for the screws (5), into the corresponding projections. Then fix in place with the 2 screws (5) and 2 plastic washers (6).
8. Plug the mains input (9) and power unit (7) cables back in again.
9. Hook the cover (1) into the lugs of the base tub (2), and fixate with 2 screws (3).

3 Settings and Adjustments

3.1 Measuring the rewind torques

The winding torques on the rewind hub and ribbon supply hub are measured by determining the tensile force on the test collar mounted on the tape holder.

The physical relation between torque and traction is as follows:

$F = M / r$
F: Traction [N],
M: Rewind torque [Ncm],
r: Radius of test collar (30 mm)

The specified values for the winding torque and the resulting tensile force on the test collar are:

		Rewind torque M	Traction F
Friction clutch on the ribbon rewinder	Fig. 8 A	14.4 - 17.4 Ncm	4.8 - 5.8 N
Brake on ribbon rewinder	Fig. 8 B	2.4 - 3.6 Ncm	0.8 - 1.2 N
Friction clutch on the transfer ribbon unwinding unit	Fig. 8 C	3.9 - 4.5 Ncm	1.3 - 1.5 N

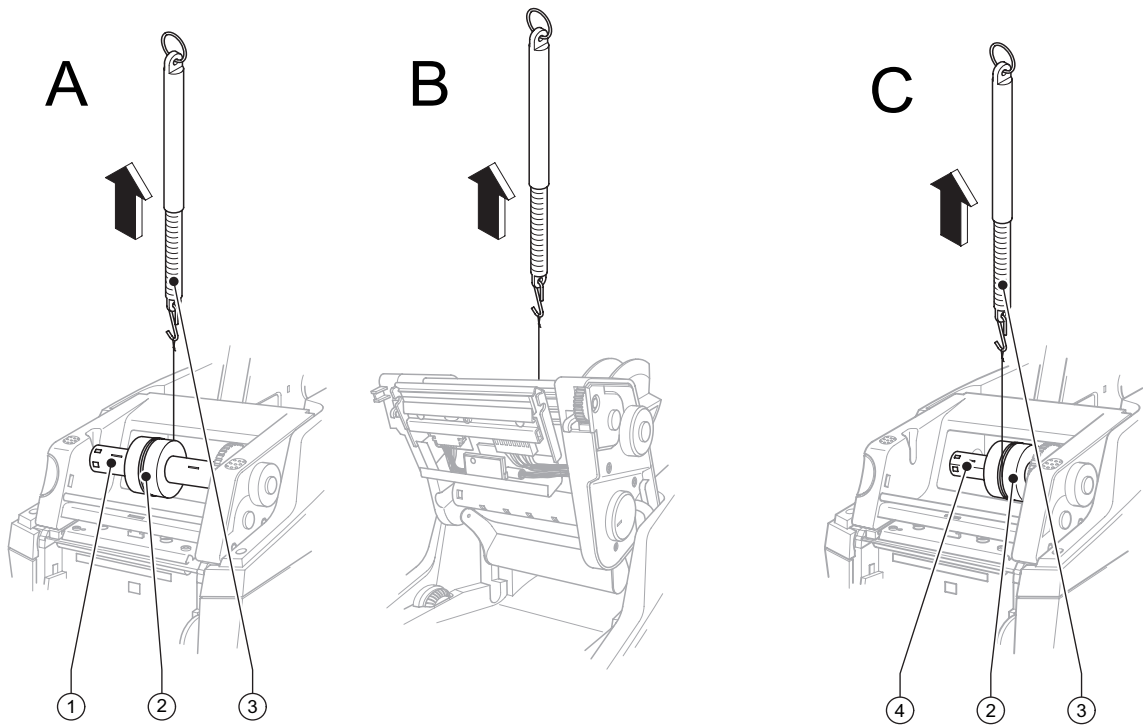


Fig. 8: Measuring the winding torques on the rewind hub and ribbon supply hub

- 1** Ribbon rewind hub

2 Test collar
- 3** Spring scale

4 Ribbon unwinding unit

Measuring the torque of the coupling and brake on the rewind hub:

1. Wind the cord several times round the test collar (see fig. 8 A) and mount it on the tape holder on the rewind hub (1). The spring lugs of the tape holder must slot into the smaller slot in the test collar.
2. Attach a spring scale [10 N] (3) to the end of the cord, raise it vertically until the test collar starts to turn.
3. Allow the cord to unwind at least one full turn from the test collar, and read off the tensile force F for the coupling on the spring scale.
4. Reset the winding torque of the coupling if it differs from the specified value (see section 3.2 on page 16.)
5. Disconnect the rewind hub (1) from the drive in order to measure the winding torque for the brake. Press the release button, hinge up the printhead assembly, repeat the measuring procedure (see Fig. 8 B.)
6. If the winding torque of the brake differs from the specified value, the parts involved must be replaced, they cannot be reset.

Measuring the torque of the coupling on the supply hub:

1. Wind the cord several times round the test collar (see fig. 8 C) and mount it on the tape holder on the supply hub (4). The spring lugs of the tape holder must slot into the smaller slot in the test collar.
2. Measure the winding torque for the coupling of the supply hub, and set it in the same way as on the rewind hub.

3.2 Adjusting rewind torques



DANGER!

Danger to life and limb from electric shock!

⇒ **Disconnect the device from the mains supply before opening the outer casing.**

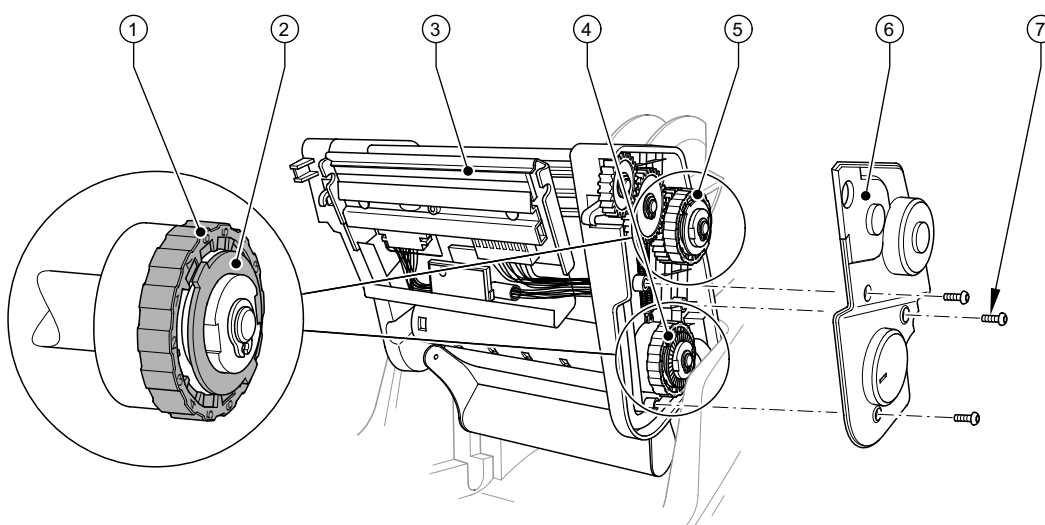


Fig. 9: Adjusting rewind torques

- | | |
|-----------------------------------|-------------------------------------|
| 1 Knurled ring | 5 Rewind hub friction clutch |
| 2 Locking device | 6 Cover |
| 3 Printhead assembly | 7 Screw |
| 4 Unwinder friction clutch | |

1. Hinge up the printhead assembly (3), unscrew screw (7), and remove the cover (6).
2. Press the knurled ring (1) of the friction clutch towards the casing wall, turn it into the desired position and release. Ensure that the locking lugs have been fully inserted into the recesses of the knurled ring.
3. Measure the winding torque again, compare it with the specified value, and correct if necessary. Repeat until the measured winding torque lies within the tolerance range.
4. Reattach the cover (6) with 3 screws (7).



The numbers on the knurled ring are not setting values. They are used for orientation when setting the magnitude of the rewind torque.

⇒ 1: Minimum rewind torque, 7: Maximum rewind torque

4 Block diagram

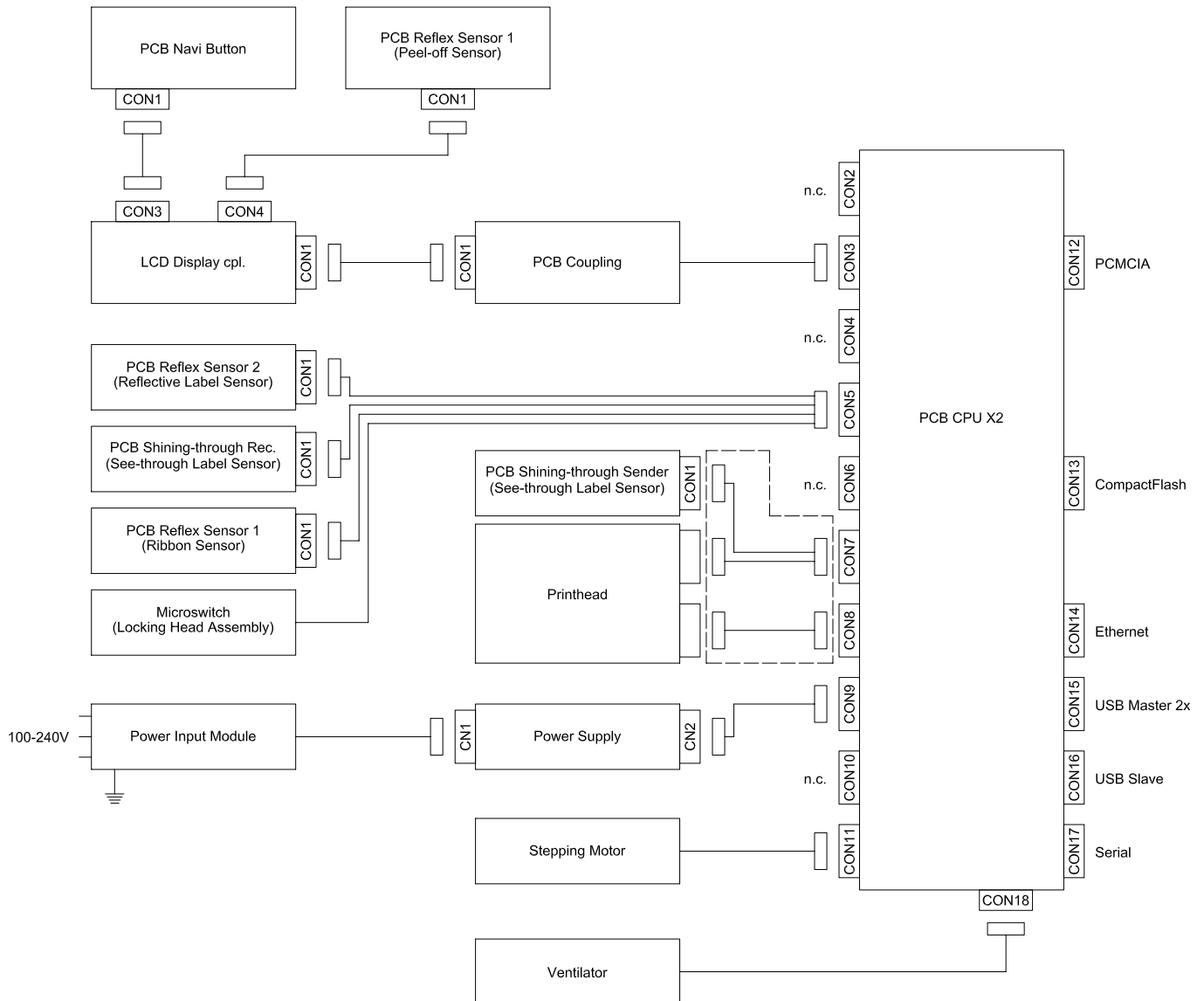


Fig. 10: Block diagram

5 Index

A

Adjusting the rewind torques16

B

Block diagram17

Brake ribbon rewind hub15

C

Clutch of the ribbon unwinding unit15

CompactFlash card6

Control panel6

Coupling ribbon rewind hub15

Cover6

Covering hood6, 10

D

Damping wheel9

E

Ethernet interface6

F

Friction clutch16

G

General safety instructions4

H

Handling electricity5

I

Important information4

M

Maintenance work5

Measuring the rewind torques14

P

Power supply socket6

Power switch6

Printhead6

Printhead assembly6

Printhead holder6

Procedure in case of accidents5

Protective devices4

R

Replacing assembly units6

Replacing control panel8

Replacing print mechanics11

Replacing the cover9

Replacing the covering hood 10

Replacing the CPU PCB 12

Replacing the power unit 13

Rewind torque, set values 14

Ribbon rewind hub 14

Ribbon unwinding unit 14

Roller holder 6

RS-232 serial interface 6

S

Spring scale 7, 14

T

Test collar 7, 14

Tools 7

Torque 14

Traction 14

Transport locking roller 6

U

Unlocking device 6

USB interface 6