

LaboForce-50

Instruction Manual

Original Instructions



Doc. no.: 16357025-03_A-en
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1 About this manual



CAUTION

Struers equipment must only be used in connection with and as described in the Instruction Manual supplied with the equipment.



Note

Read the Instruction Manual carefully before use, and save it for future reference.



Note

If you want to view specific information in detail, see the online version of this manual.

2 Safety

2.1 Intended use

The device is for professional semi-automatic materialographic preparation (grinding or polishing) of materials for further materialographic inspection.

LaboForce-50 is intended to be used in combination with:

- LaboPol-20
- LaboPol-30
- LaboPol-60

Do not use the machine for the following Other equipment than stated in the section "Intended use".

Model LaboForce-50

2.2 Safety precautions



Read carefully before use

Ignoring this information and mishandling of the equipment can lead to severe bodily injuries and material damage.

General safety precautions

1. The machine must be installed in compliance with local safety regulations. All functions on the machine and any connected equipment must be in working order.
2. This device must be mounted securely on the machine.
3. The operator must read the safety precautions and Instruction Manual, as well as relevant sections of the manuals for any connected equipment and accessories.
4. If you observe malfunctions or hear unusual noises, switch off the machine and call technical service.
5. In case of fire, alert bystanders and the fire brigade. Disconnect the electrical power supply. Use a powder fire extinguisher. Do not use water.
6. This machine must be operated and maintained only by skilled/trained personnel.
7. Always switch off the electrical power supply and remove the plug or power cable before dismantling the machine or installing additional components.
8. The machine must be disconnected from the electrical power supply before any service. Wait 5 minutes until residual potential on the capacitors is discharged.
9. Struers equipment must only be used in connection with and as described in the Instruction Manual supplied with the equipment.
10. If the equipment is subjected to misuse, incorrect installation, alteration, neglect, accident or incorrect repair, Struers will accept no responsibility for damage to the user or the equipment.
11. Dismantling of any part of the equipment, during service or repair, should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.)

2.3 Safety messages

Struers uses the following signs to indicate potential hazards.



WARNING

This sign indicates a hazard with a medium level of risk which, if not avoided, could result in death, or serious injury.



CAUTION

This sign indicates a hazard with a low level of risk which, if not avoided, could result in minor, or moderate injury.

General messages



Note

This sign indicates that there is a risk of damage to property, or a need to proceed with special care.



Hint

This sign indicates that additional information and hints are available.

2.4 Safety messages in this manual



WARNING

Struers equipment must only be used in connection with and as described in the Instruction Manual supplied with the equipment.



WARNING

Do not use the machine with defective safety devices.
Contact Struers Service.



WARNING

Before you release the emergency stop, investigate the reason for activating the emergency stop and take any necessary corrective action.



CAUTION

Keep clear of rotating parts during operation.



CAUTION

When working at machines with rotating parts, take care to prevent clothes and/or hair from being caught by the rotating parts.

**CAUTION**

For manual preparation, use the Rotation switch to disable rotation of the specimen mover head.

**CAUTION**

Wear suitable gloves to protect fingers from abrasives and warm/sharp specimens.

**CAUTION**

When you perform manual grinding or polishing, be careful not to touch the disc.

**CAUTION**

Do not try to collect a specimen from the tray while the disc is rotating.

**CAUTION**

When the disc is rotating, make sure your hands are kept completely clear of its periphery and out of the splash bowl.

3 Get started

3.1 Device description

LaboForce-50 is a control panel/specimen mover unit which can be mounted on the following machines for semi-automatic materialographic preparation (grinding/polishing): LaboPol-20, LaboPol-30 and LaboPol-60.

The operator selects the grinding/polishing surface and the cooling fluid/abrasive suspension to be applied.

A holding device for the preparation of specimens must be used with the specimen mover. The holding device holds 4 specimens.

The specimen mover head has pressurized feet which can be adjusted individually to keep the specimens in place.

The operator decides which holding device should be used and the specimen force is adjusted individually on the pressurized feet from the mover head to keep the specimens in place.

The operator sets the rotation speed of the preparation disc before starting the process.

The operator starts the machine by pressing the Start button on the control panel.

Cooling water is applied automatically when the operator opens the water tap. The operator applies other fluids manually or by using a separate dosing unit.

The operator stops the machine by pressing the Stop button on the control panel.

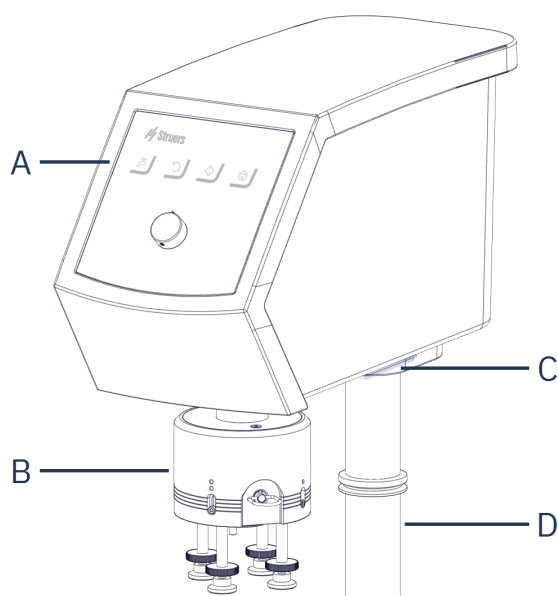
The operator cleans the specimens before the next preparation step or inspection.

The machine must always be used with the splash guard in place.

If the emergency stop is activated, the power to all moving parts is cut.

3.2 Overview

Front view



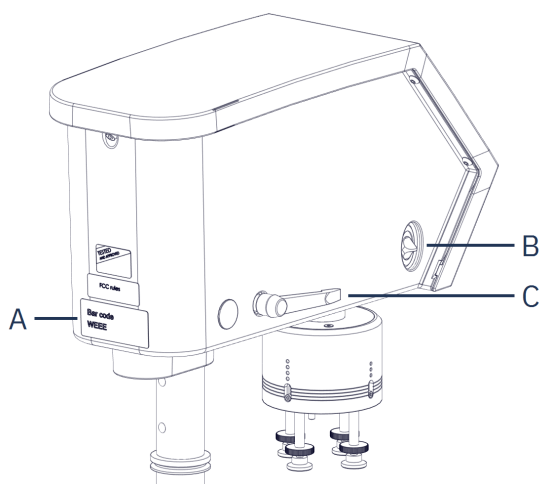
A Control panel

B Specimen mover head

C LED light

D Control panel column

Rear view

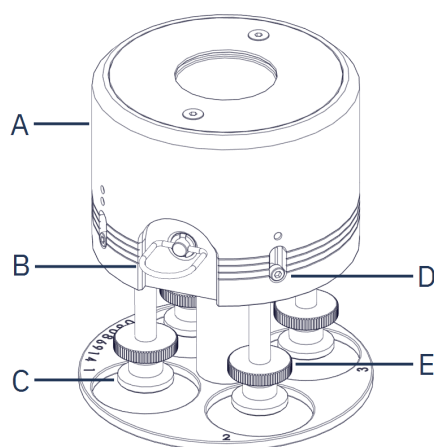


A Name plate

C Locking handle

B Rotation switch (specimen mover head)

The specimen mover



A Housing

D Force indicators

B Quick release ring

E Force adjustment screw

C Pressure feet

3.3 Control panel functions



Button	Function
	Disc rotation Starts rotations of the disc (Spin function).
	Water Manual override - Press the button to apply water. Water is applied when no process is running. - Press the button again to stop applying water.
	Start Starts the preparation process.
	Stop Stops the preparation process.
	Disc speed control

4 Transport and storage

If, at any time after the installation, you have to move the unit or place it in storage, there is a number of guidelines we recommend that you follow.

- Package the unit securely before transportation. Insufficient packaging could cause damage to the unit and will void the warranty. Contact Struers Service.
- We recommend that you use the original packaging and fittings.

4.1 Long-term storage or shipping

For instructions on how to prepare the unit for long-term storage or shipping, see the specific machine manual.

Pay special attention to the following:

- Disconnect the unit from the electrical power supply.
- Remove the unit.
- Place the unit and accessories in their original packaging.

5 Installation

5.1 Unpack the unit



Note

We recommend that you keep all original packaging and fittings for future use.

1. Cut the packing tape on the top of the box.
2. Remove the loose parts.
3. Remove the unit from the box.

5.2 Check the packing list

Optional accessories may be included in the packing box.

The packing box contains the following items:

Pcs.	Description
1	LaboForce-50
1	Spacer and 2 M4 screws for mounting on LaboPol-30 and LaboPol-60
1	Spacing disc

Pcs.	Description
1	Allen key for mounting the specimen mover plate
1	Instruction Manual set

5.3 Mount the LaboForce-50 on a LaboPol

**Note**

The LaboForce-50 must be mounted securely on the LaboPol.

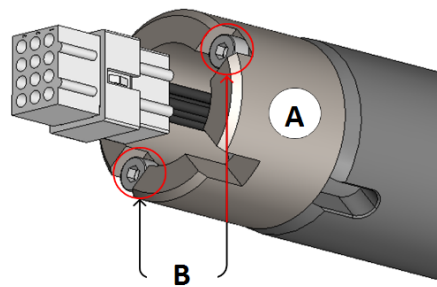
**Note**

Do not use the speed control knob on the control panel to move the unit.

Procedure

Install the LaboForce-50 in the connection hole of the LaboPol:

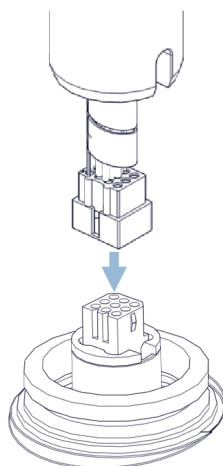
1. Remove the plastic disc protecting the communication cable.



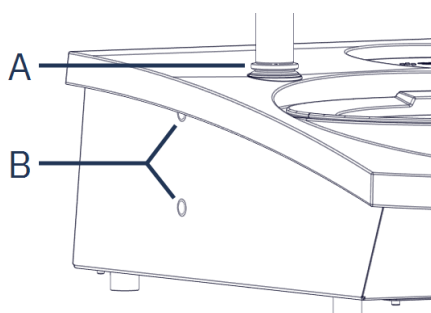
A Spacer

B M4 screws

2. Use the M4 screws to mount the spacer on the bottom of the column. (LaboPol-30 and LaboPol-60 only)



3. Connect the communication cable on the column to the connection port on the LaboPol.
4. Guide the column down into the connection hole.
5. Turn the column until the spacer sits securely in the connection hole.



A V-ring

B Fastening screws

6. Slide the black V-ring down the column until it covers the connection hole.
7. Use the Allen key to tighten the two fastening screws. Do not tighten the screws completely.
8. Cover the holes with the two cover caps.

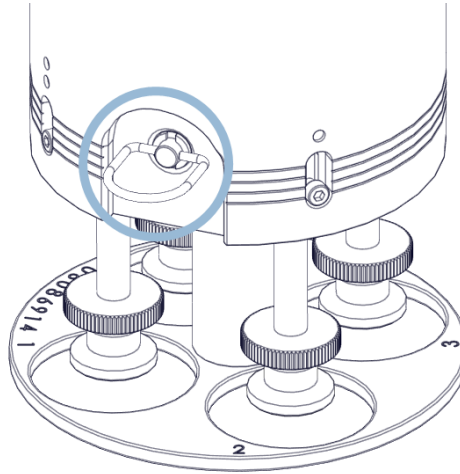
5.4 Adjust the specimen mover

5.4.1 Install a specimen mover plate

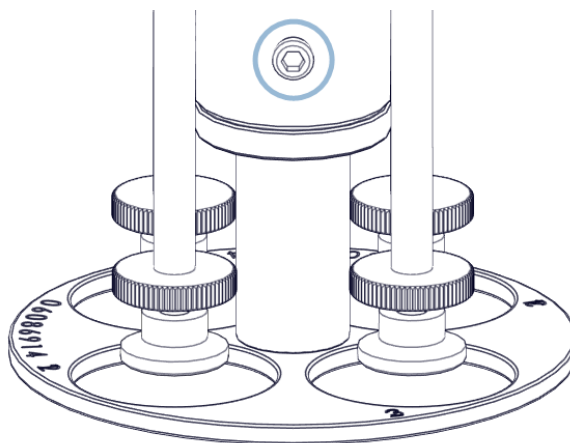
Before you adjust the specimen mover, you must insert a specimen mover plate.

For approved specimen mover plates, see:

1. Use the locking handle on the left side to unlock the specimen mover and let it move into upright position.



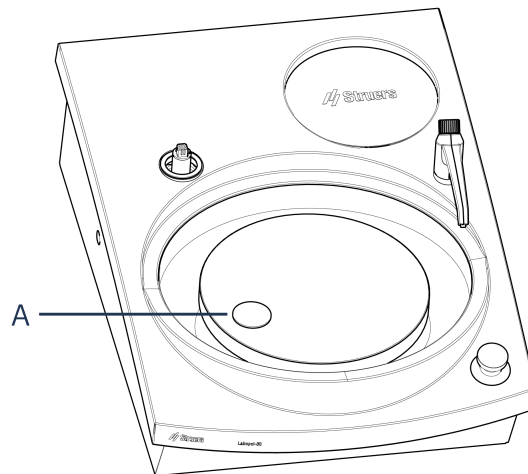
2. Pull the quick-release ring and lift the housing.
3. Insert a specimen mover plate and rotate it until the two pins are aligned with the holes in the specimen mover.



4. Push the specimen mover plate upwards and use the Allen key to tighten the screw to secure it in position.
5. Make sure that the specimen mover plate is securely mounted.
6. Lower the housing back into position.

5.4.2 Adjust the height of the specimen mover plate

1. Use the locking handle on the left side to unlock the specimen mover and let it move into upright position.
2. Select the thickest preparation surface to be used and place it on the preparation disc. Usually, this will be SiC Foil on an MD-Gekko disc, or SiC Paper on an MD-Fuga disc, or an MD-Alto.

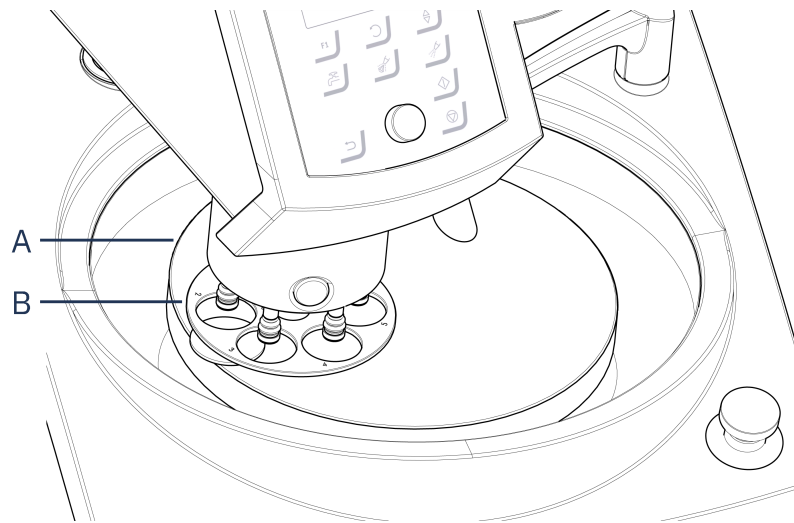


A Spacing disc

3. Place the supplied spacing disc on the preparation surface.
4. Support the specimen mover head and loosen the 2 fastening screws that hold the column.
5. Lift and support the specimen mover.
6. Press the specimen mover head down as far as possible.
7. Use the locking handle to lock the specimen mover head in operating position.
8. Lower the column until the specimen mover plate rests on the spacing disc.
9. Adjust the horizontal position of the specimen mover plate.

5.4.3 Adjust the horizontal position of the specimen mover plate

With an MD-disc

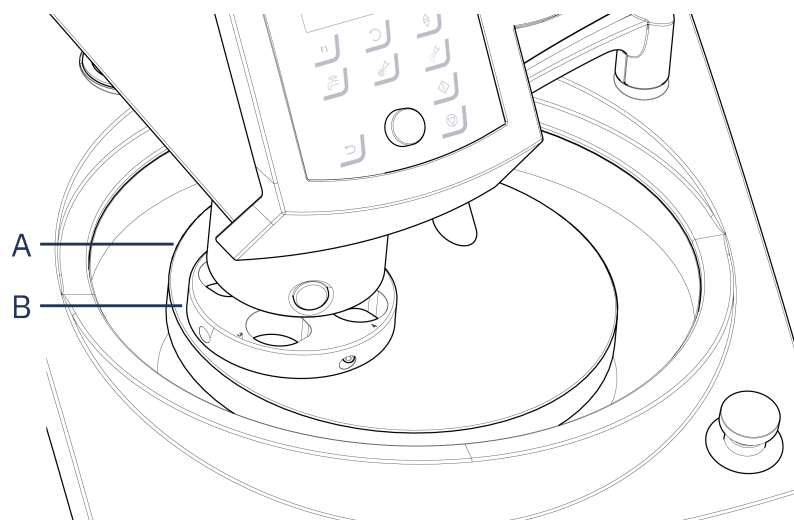


A Disc edge

B Specimen mover plate

1. Move the specimen mover head to the right.
2. Place the specimen mover plate in a position that allows the specimen to run 3-4 mm over the edge of the preparation disc.

With a wet grinding disc



A Metal ring

B Specimen holder

1. Move the specimen mover head to the right.

2. Place the specimen mover plate in a position 2 - 3 mm from the metal ring.

**Note**

The column can only be turned slightly. Do not force it.

5.4.4 Complete the adjustment

**Hint**

Allen key and cover caps are included in the package.

1. Tighten the 2 fastening screws firmly.
The specimen mover will now remain in position.
2. Cover the holes with the two caps.

6 Operate the device

6.1 Water tap

Apply water automatically

Water is applied when a process is running.

- During grinding, open the nozzle on the water tap to apply water.
- During polishing, close the nozzle on the water tap.

**Note**

Close the water tap before you start a polishing process.

For optimal results and to avoid splashing, position the water tap between the center and the left edge of the polishing disc.

Apply water manually



- To start applying water, press the Water button and open the water tap.
- To stop applying water, press the Water button or close the water tap.

6.2 The spin function



CAUTION

Keep clear of rotating parts during operation.



CAUTION

When working at machines with rotating parts, take care to prevent clothes and/or hair from being caught by the rotating parts.



Note

Use the spin function to rotate the preparation disc at high speed only:

- To remove water from the surface of the disc.
- To remove water from an MD-Disc or a SiC Foil/SiC Paper before you remove it.
- To dry an MD-Disc or an MD-Chem cloth.



- To start the spin function, press and hold the Disc rotation button.
- To stop the spin function, release the Disc rotation button.

6.3 The splash guard

Manual preparation

The splash guard for manual preparation is supplied with the machine.

Semi-automatic preparation

- Use the splash guard for semi-automatic preparation.

Wet grinding (for plain-back SiC paper)

- Use the splash guard for the Wet Grinding Disc.

6.4 Insert a specimen

1. Lift the pressure feet on the force adjustment screw to make room for the specimen.
2. Place the specimen in one of the holes of the specimen mover plate and lower the pressure feet.

Each position is marked for easy identification of the individual specimen.

For taller specimens

1. Pull the quick-release ring and lift the housing.
2. Lift the pressure feet up as far as possible.
3. Lower the housing back into position.

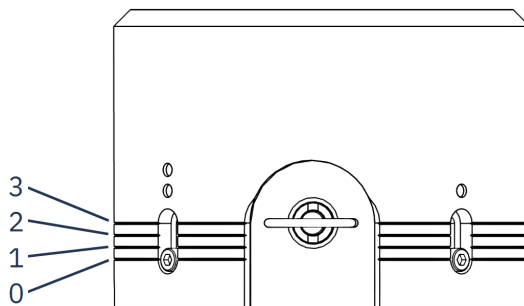
6.5 Adjust the force



Hint

Do not use maximum force at the same time as maximum speed.

- To adjust the force, turn the force adjustment screw.
- The indicators on the housing correspond to the force in Newton.



Indicator	Force
0	0 - 5 N
1	10 N
2	20 N
3	30 N

6.6 Manual preparation



CAUTION

For manual preparation, use the Rotation switch to disable rotation of the specimen mover head.



CAUTION

Wear suitable gloves to protect fingers from abrasives and warm/sharp specimens.



CAUTION

When you perform manual grinding or polishing, be careful not to touch the disc.



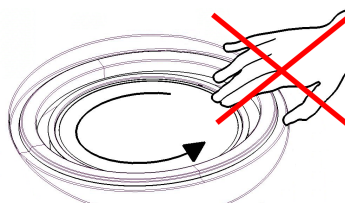
CAUTION

Do not try to collect a specimen from the tray while the disc is rotating.



CAUTION

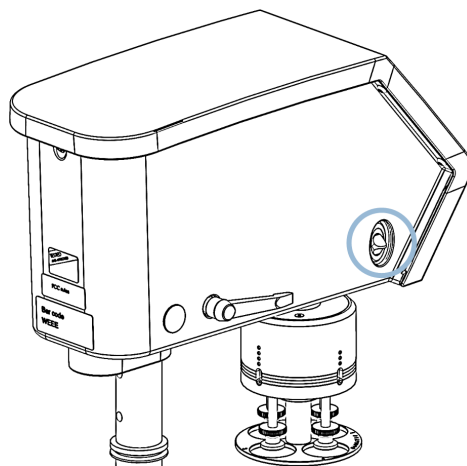
When the disc is rotating, make sure your hands are kept completely clear of its periphery and out of the splash bowl.



If you cannot prepare a specimen by using a standard specimen mover plate or specimen holder, you can prepare it manually.

When you perform manual preparation, you hold the specimen in your hand and press it firmly onto and across the preparation surface.

6.6.1 Rotation of the specimen mover head



- For manual preparation, use the Rotation switch to disable rotation of the specimen mover head.

6.7 Start and stop operation



WARNING

Do not use the machine with defective safety devices.
Contact Struers Service.



CAUTION

When working at machines with rotating parts, take care to prevent clothes and/or hair from being caught by the rotating parts.



CAUTION

Keep clear of rotating parts during operation.



Note

We recommend that you use an exhaust system when alcohol-based suspension or lubricants are used.

Start the machine

1. Set the speed control to the desired disc speed.



2. Press the Start button.
Operation starts.
3. If needed, adjust the disc speed.

Stop the machine



- Press the Stop button.

Emergency stop



WARNING

Before you release the emergency stop, investigate the reason for activating the emergency stop and take any necessary corrective action.



Emergency stop

Activating the emergency stop on the machine will stop all movable parts.

**Emergency stop**

Do not use the emergency stop for operational stop of the machine during normal operation.

- Press the emergency stop button to activate an emergency stop.
- Turn the emergency stop button to release the emergency stop.

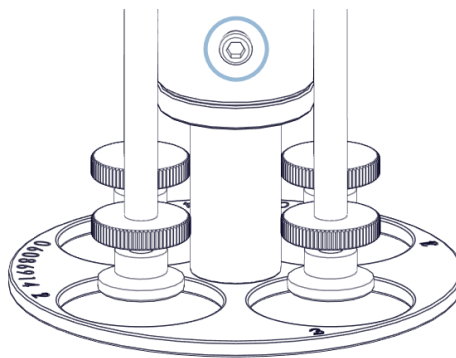
6.8 Remove the specimens

1. To release the specimens, pull the quick-release ring.
2. When you have removed the specimens, lower the spring housing back into position.

6.9 Change the specimen mover plate

If you wish to prepare specimens of another diameter, use a different specimen mover plate. The specimens must fit the holes in the specimen mover plate.

1. Use the locking handle on the left side to unlock the specimen mover and let it move into upright position.
2. Pull the quick-release ring and lift the housing.
3. Loosen the screw and remove the specimen mover plate.
4. Insert a specimen mover plate and rotate it until the two pins are aligned with the holes in the specimen mover.



5. Push the specimen mover plate upwards and use the Allen key to tighten the screw to secure it in position.
6. Make sure that the specimen mover plate is securely mounted.
7. Make sure that the specimen mover plate is in a horizontal position.
8. If needed, adjust the position of the specimen mover plate. See [Adjust the horizontal position of the specimen mover plate ► 16](#)
9. The specimen mover plate must be positioned to allow the specimen to run 3 - 4 mm over the edge of the preparation disc.
10. Lower the housing back into position.

7 Maintenance and service

Technical questions and spare parts

If you have technical questions or when you order spare parts, state serial number and voltage/frequency. The serial number and the voltage are stated on the name plate of the machine.

7.1 General cleaning

To ensure a longer lifetime for your machine, we strongly recommend regular cleaning.

**Note**

Do not use a dry cloth as the surfaces are not scratch resistant. Grease and oil can be removed with ethanol or isopropanol.

**Note**

Do not use acetone, benzol or similar solvents.

If the machine is not to be used for a long period of time

- Clean the machine and all accessories thoroughly.

7.2 Daily

- Clean all accessible surfaces with a soft, damp cloth.

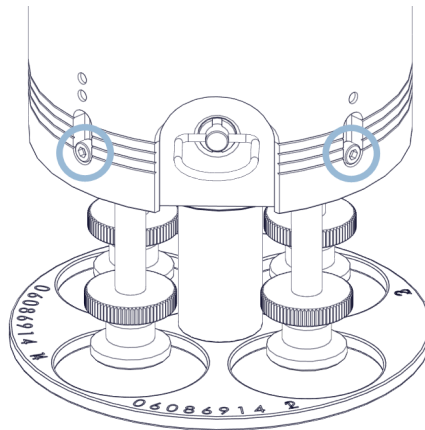
7.3 Weekly

- Clean all accessible surfaces with a soft damp cloth and common household detergents.

7.4 Monthly

7.4.1 Pressure feet

The force on the pressure feet is generated by friction pins held in place by the screws in the spring housing.



- Use an Allen key to tighten the screws.

7.5 Spare parts

Technical questions and spare parts

If you have technical questions or when you order spare parts, state serial number and voltage/frequency. This information is stated on the name plate of the machine.

For further information, or to check the availability of spare parts, contact Struers Service. Contact information is available on [Struers.com](https://www.struers.com).

7.6 Service and repair

We recommend that a regular service check be carried out yearly or after every 1500 hours of use.

When the machine is started up, the display shows information about total operation time and the machines service information.

After 1500 hours of operation time, the display will show a message reminding the user that a service check should be scheduled.



Note

Service must only be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).
Contact Struers Service.

7.7 Disposal



Equipment marked with a WEEE symbol contains electrical and electronic components and must not be disposed of as general waste.

Contact your local authorities for information on the correct method of disposal in accordance with national legislation.



For disposal of consumables and recirculation fluid, follow local regulations.

8 Troubleshooting

Error	Cause	Action
The specimen mover head does not rotate.	Switch is set to "off".	If rotation is required, set the switch to "on".
Specimen holder plate vibrates.	Specimen holder plate screws loose.	Tighten specimen holder plate screws.
	Specimen holder plate unbalanced.	Replace specimen holder plate.
The preparation disc runs unevenly or stops.	Force too high.	Reduce the force.
The preparation disc stops.	Frequency inverter has stopped the equipment.	Switch the equipment off. Wait for a few minutes then restart.
		If the error remains: Contact Struers Service.
The specimen mover starts to turn.	Column screws loose.	Tighten the screws immediately.
Bad or unusual preparation results from the same method.	Pressure foot turns by itself, leading to differing forces.	Increase friction by tightening the screws in the housing. See the section "Maintenance".
Uneven specimens.	Specimens are passing over the center of the disc.	Reposition the horizontal position of the control panel.

9 Technical data

9.1 Technical data

	Motor output	40 W
	Torque at 150 rpm	> 2.6 N·m
	Rotational speed	150 rpm
	Rotational direction	Off / Counter-clockwise
	Force, individual specimens	5 - 30 N
	Force, Specimen holder	NA
Safety standards		See the Declaration of Incorporation
REACH		For information about REACH, contact your local Struers office.
Operating environment	Surrounding temperature	5 - 40°C (41 - 104°F)
	Humidity	< 85% RH non-condensing
Storage and transport conditions	Surrounding temperature	-20 - 60°C (-4 - 140°F)
	Humidity	< 85% RH non-condensing
Power supply		LaboForce-50 is connected directly to LaboPol
		1-phase (N+L1+PE) or 2-phase (L1+L2+PE)
		The electrical installation must comply with Installation Category II
Safety Circuit Categories/Performance Level	Emergency stop	PL c, Category 1
		Stop category 0
Residual Current Circuit Breaker (RCCB)		Type A, 30 mA (or better) is recommended
Water supply	Pressure, tap water	1 to 9.9 bar (14.5 to 143 psi)
	Water inlet	Diameter: ½" or ¾"
	Water outlet	Diameter: 32 mm (1¼")

Noise level	A-weighted sound emission pressure level at workstations	LpA = 63 dB(A) (measured value). Uncertainty K = 4 dB
Vibration level	Declared vibration emission	N/A
Dimensions and weight	Width	40 cm (15.7")
	Depth	67.3 cm (26.5")
	Height	28 cm (8.7")
	Weight	22 kg (49 lbs)

9.2 Diagrams

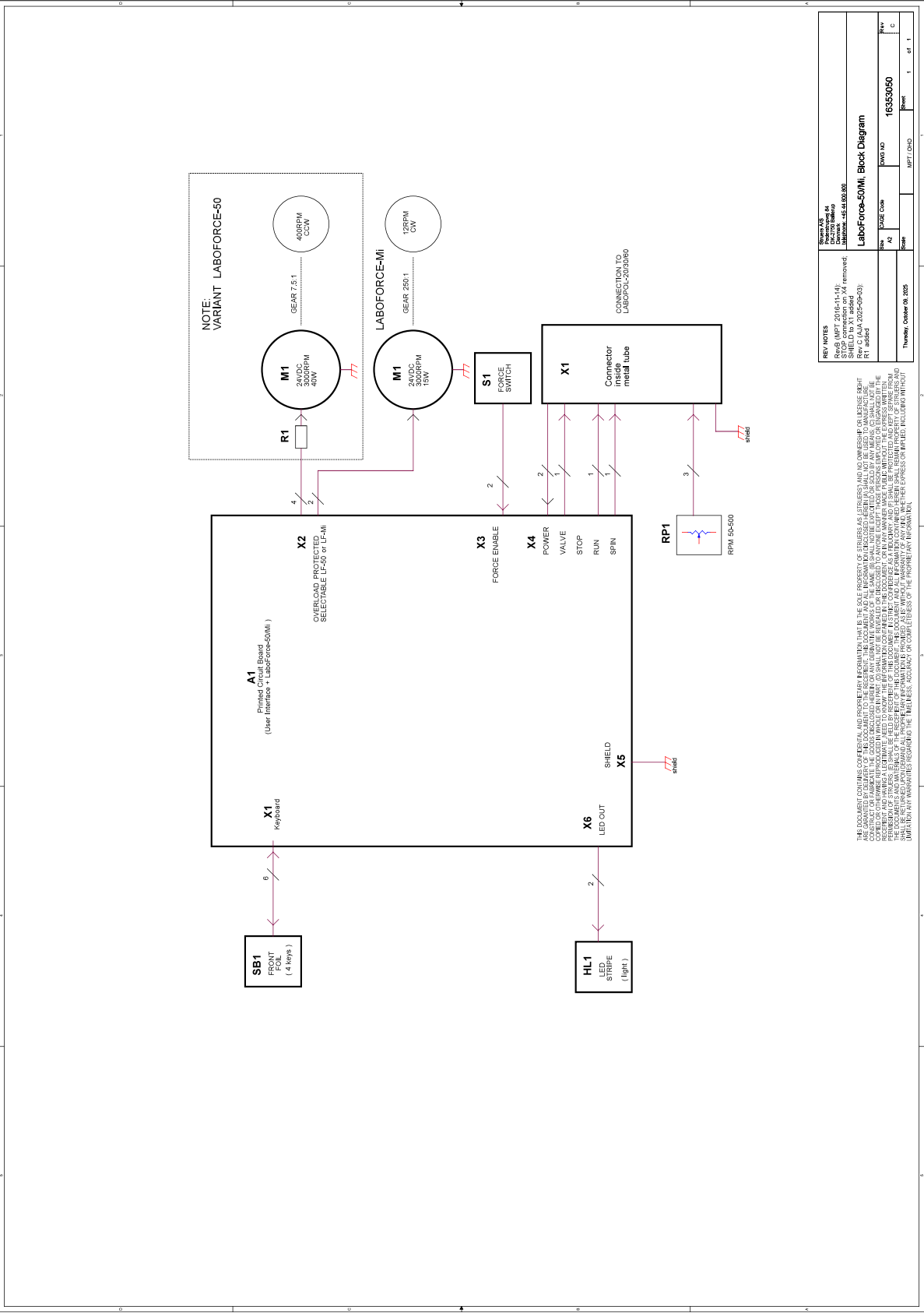
**Note**

If you want to view specific information in detail, see the digital version of this manual.

9.2.1 Circuit diagram

See the diagram number on the name plate of the equipment, and contact Struers Service via [Struers.com](https://www.struers.com).

9.2.2 Block diagram - 16353050 C



9.3 Legal and regulatory information

FCC notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

10 Manufacturer

Struers ApS
Pederstrupvej 84
DK-2750 Ballerup, Denmark
Telephone: +45 44 600 800
Fax: +45 44 600 801
www.struers.com

Responsibility of the manufacturer

The following restrictions should be observed, as violation of the restrictions may cause cancellation of Struers legal obligations.

The manufacturer assumes no responsibility for errors in the text and/or illustrations in this manual. The information in this manual is subject to change without notice. The manual may mention accessories or parts not included in the supplied version of the equipment.

The manufacturer is to be considered responsible for effects on safety, reliability, and performance of the equipment only if the equipment is used, serviced, and maintained in accordance with the instructions for use.

Declaration of Incorporation of Partly Completed Machinery

Manufacturer	Struers ApS • Pederstrupvej 84 • DK-2750 Ballerup • Denmark
Name	LaboForce-50
Function	Grinding/Polishing machine
Type	635
Cat. no.	06356127

The above listed machinery is only intended to be used with Struers machinery and consumables, and shall not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with this regulation, where appropriate.

LaboPol-20, LaboPol-30, LaboPol-60

Serial no.



Module H, according to global approach

EU

We declare that the product mentioned is in conformity with the following legislation, directives and standards:

2006/42/EC	EN ISO 12100:2010, EN ISO 13849-2:2012, EN ISO 13849-1:2015, EN 60204-1:2018. EN 60204-1-2018/Corr.:2020
2011/65/EU	EN 63000:2018
2014/30/EU	EN 61000-6-3:2007, EN 61000-6-1:2007, EN 61000-6-3-A1:2011, EN 61000-6-3-A1-AC:2012, EN 61000-3-3:2013, EN 61000-3-2:2014
Additional standards	NFPA 79, FCC 47 CFR Part 15 Subpart B

Authorized to compile technical file/
Authorized signatory

Date: [Release date]

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