

LaboForce-100

Instruction Manual

Original Instructions



CE

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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 metallographic preparation (grinding or polishing) of materials for further metallographic inspection.

LaboForce-100 is intended to be used in combination with:

- LaboPol-30
- LaboPol-60
- LaboDoser-100

Do not use the device for the following

Other equipment than stated in the section "Intended use".

Model

LaboForce-100

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.

Specific safety precautions - residual risks

1. To prevent specimens from detaching from the specimen holder, make sure that the specimen or specimens are clamped securely in the specimen holder.
2. Protective footwear is recommended when you handle heavy specimen holders.

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. Consumables: only use consumables specifically developed for use with this type of materialographic machine. Alcohol-based consumables: follow the current safety rules for handling, mixing, filling, emptying, and disposing of alcohol-based liquids.
6. In case of fire, alert bystanders and the fire brigade. Disconnect the electrical power supply. Use a powder fire extinguisher. Do not use water.
7. This machine must be operated and maintained only by skilled/trained personnel.
8. Always switch off the electrical power supply and remove the plug or power cable before dismantling the machine or installing additional components.
9. The machine must be disconnected from the electrical power supply before any service. Wait 5 minutes until residual potential on the capacitors is discharged.
10. Struers equipment must only be used in connection with and as described in the Instruction Manual supplied with the equipment.
11. The machine is designed to be used only with Struers consumables specifically designed for this purpose and this type of machine.
12. 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.
13. 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.



CRUSHING HAZARD

This sign indicates a crushing hazard which, if not avoided, could result in minor, moderate, 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

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



WARNING

Do not use the machine with defective safety devices.



CRUSHING HAZARD

Keep your hands clear of the specimen holder or specimen mover plate when lowering the specimen mover.



CRUSHING HAZARD

Keep your hands clear of the flexible specimen holder when lowering the specimen mover.



CAUTION

To prevent specimens from detaching from the specimen holder, make sure that the specimen or specimens are clamped securely in the specimen holder.



CAUTION

Protective footwear is recommended when you handle heavy specimen holders.

**CAUTION**

To prevent specimens from detaching from the specimen holder, make sure that the specimen or specimens are covered completely by the flexible specimen holder.

**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**

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-100 is a control panel/specimen mover unit which can be mounted on the following machines for semi-automatic metallographic preparation (grinding/polishing): LaboPol-30 and LaboPol-60.

On the control panel screen the operator sets up the process parameters required, the grinding/polishing surface and the cooling fluid/abrasive suspension to be applied.

Cooling water is applied automatically when the operator opens the water tap. The operator applies other fluids manually, or automatically if LaboDoser-100 is installed.

A holding device for the preparation of specimens must be used with the specimen mover. The holding device holds a maximum of 6 specimens.

The operator decides which holding device should be used:

- A specimen holder, which is a fixture that secures the specimens.
- A specimen mover plate, where pressurized feet from the mover head keep the specimens in place.

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

The machine stops automatically.

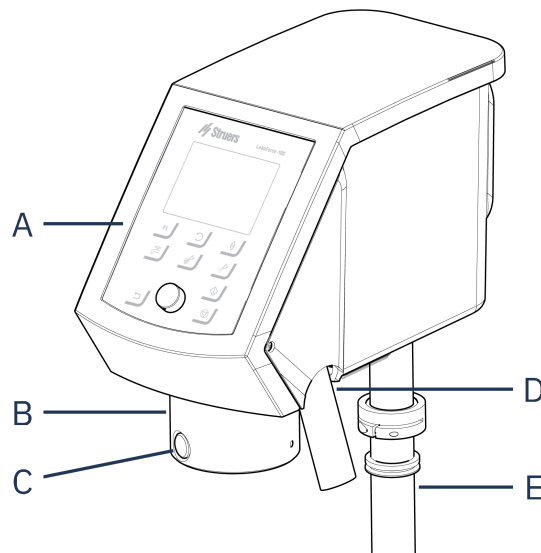
The operator cleans the specimens before the next preparation step or inspection.

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

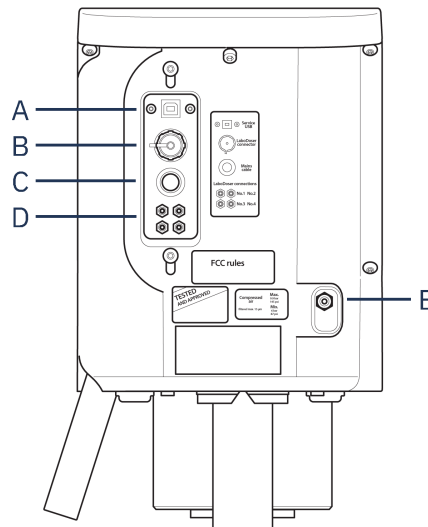
B Specimen mover head

C Release button

D Dosing block with nozzles

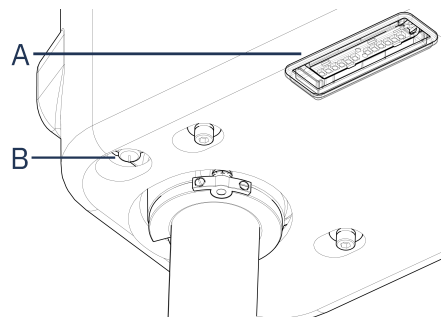
E Control panel column

Rear view



- | | |
|--------------------------|--------------------------------|
| A USB port | D LaboDoser connections |
| B LaboDoser port. | E Compressed air inlet |
| C Power port | |

Bottom view



- | | |
|--------------------|-------------------------------|
| A LED light | B Release outlet valve |
|--------------------|-------------------------------|

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-100
1	Connection piece. Diameter: 6 to 1/8"
1	Allen key with cross handle, 4 x 150
1	Spacing disc
1	Distance piece, to be used with flexible specimen holders
1	Instruction Manual set

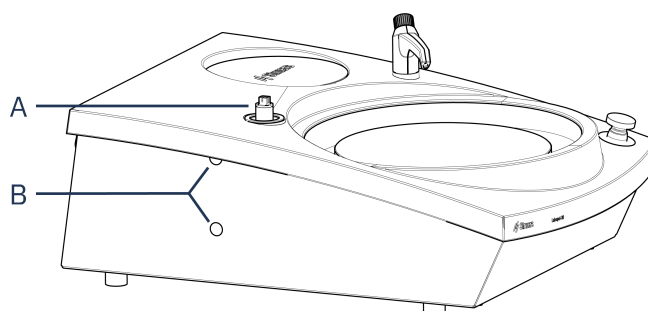
5.3 Mount the LaboForce-100 on a LaboPol


Note

The LaboForce-100 must be mounted securely on the LaboPol.


Note

Do not use the Turn/push knob to move LaboForce-100.

Procedure


A Support hole

B Fastening screws

1. Install the specimen mover in the support hole of the machine.
2. Use the Allen key to tighten the two fastening screws. Do not tighten the screws completely.
3. Cover the holes with the two cover caps.

5.4 Electrical connection to the machine


Hint

The communication cable in the support hole is not used for LaboForce-100.

The cable attached to LaboForce-100 provides a 24 V power supply and a data bus, which enables communication between the LaboForce-100 and the LaboPol.

1. Switch off the machine.
2. Connect the cable to the LaboForce-100 connector on the back of the machine.

5.5 Compressed air

Procedure

**Note**

The main air valve is not a part of the unit and must be installed and set before the specimen mover is installed.

**Note**

The air pressure must be between 6 bar (87 psi) and 9.9 bar (143 psi).

**Hint**

The specimen mover requires a continuous flow of compressed air through the regulator valve. A faint hissing sound does not mean that there is an air leak.

1. Fit the quick coupling on the compressed air hose and secure it with the hose clamp.
2. Connect the air inlet hose to the quick coupling.
3. Fit the other end of the air inlet hose into the compressed air inlet on the specimen mover.

5.6 The specimen mover

The specimen mover can be used with specimen mover plates for single specimens or specimen holders for multiple specimens.

5.6.1 Install a specimen holder or mover plate

**CAUTION**

To prevent specimens from detaching from the specimen holder, make sure that the specimen or specimens are clamped securely in the specimen holder.

**CAUTION**

Protective footwear is recommended when you handle heavy specimen holders.

**CRUSHING HAZARD**

Keep your hands clear of the specimen holder or specimen mover plate when lowering the specimen mover.

**Note**

When you work with specimen holders, make sure that the screws clamping the specimens do not stick out of the specimen holder.
Use different lengths of screws for specimens with different diameters.

**Hint**

The maximum height of specimens in the specimen holder is 32 mm. If the specimens exceed 32 mm, the specimen holder cannot be placed in the specimen mover head.

**Hint**

If you use a specimen holder, you do not need to adjust the height.

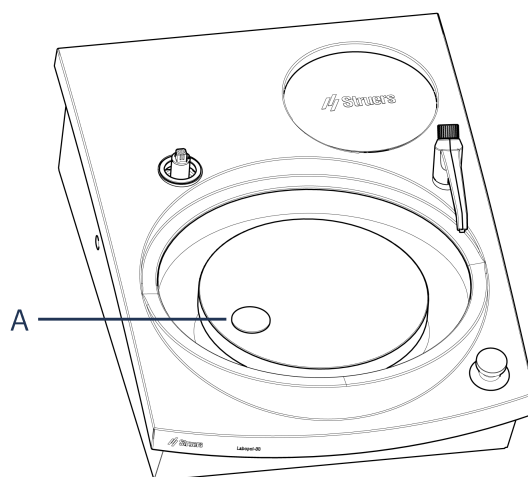
1. Press the Lower/Raise button to make sure that the specimen mover head is fully raised.
2. Press and hold the Release button on the specimen mover head.
3. Insert the specimen holder or mover plate and rotate it until the three pins are aligned with the holes in the specimen mover.
4. Push the specimen holder or mover plate upwards until it locks in position.
5. Release the button. Make sure that the specimen holder or mover plate is securely fixed.

5.6.2 Adjust the height of the specimen mover plate

**Note**

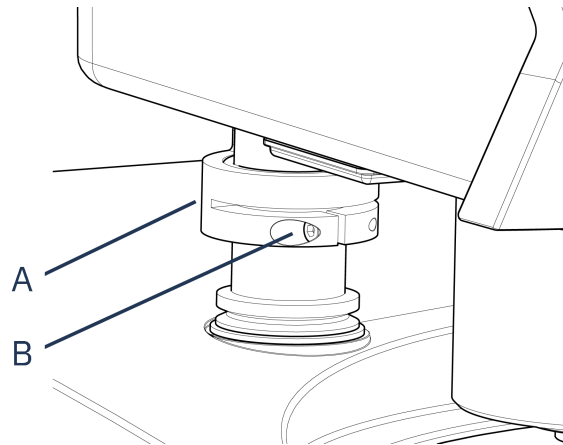
The following applies only when specimen mover plates are used.

1. With a specimen mover plate mounted, place a preparation surface on the preparation disc.
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

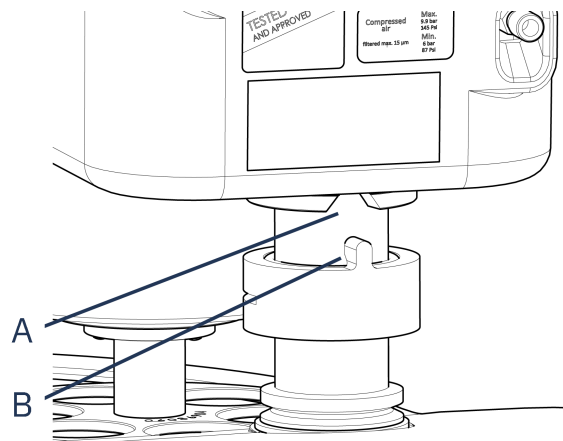
3. Place the supplied spacing disc on the preparation surface.



A Adjustment ring

B Fastening screw

4. Support the LaboForce-100 head and loosen the screw in the adjustment ring.
5. Press the Lower/Raise button to lower the specimen mover head. An error message will appear as the specimen mover head is not in contact with the adjustment ring.



A V-shaped groove

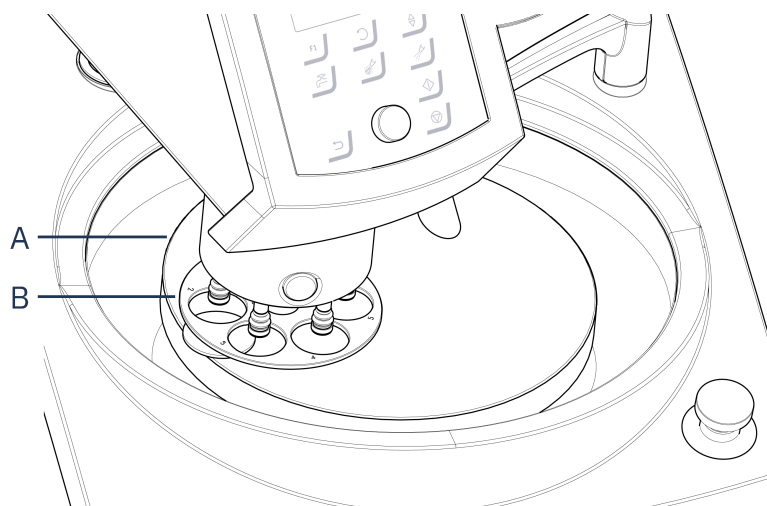
B Pin

6. Move the adjustment ring up until the pin fits into the V-shaped groove on the cabinet of the control panel.
7. Tighten the adjustment ring to fix it in this position.
8. Press the Turn/push knob to clear the error message.
9. Press the Lower/Raise button to raise the specimen mover head.

5.6.3 Adjust the horizontal position of the specimen holder or specimen mover plate

1. Replace the manual splash guard with a splash guard for semi-automatic preparation or splash guard for Wet grinding disc.

With an MD-disc

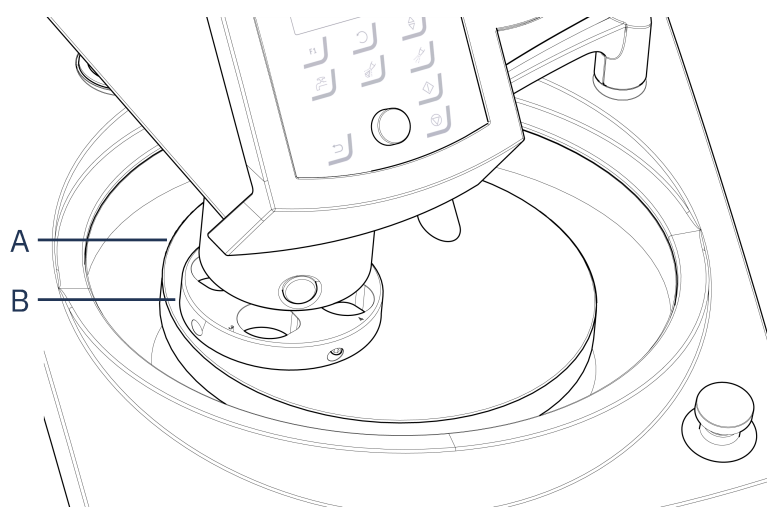


A Disc edge

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.

5.6.4 Complete the adjustment



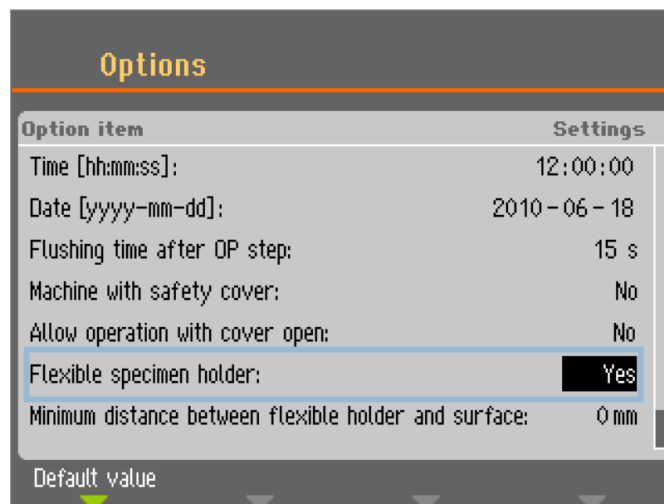
Hint

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.

5.7 The flexible specimen holder

1. From the **Main menu** screen select **Flexible specimen holder methods**.
2. If the menu item **Flexible specimen holder methods** is not available in the main menu, you must activate it in the software:
 - In the **Configuration** menu, select **Options**.



- Set **Flexible specimen holder** to **Yes**.

5.7.1 Install a flexible specimen holder


CAUTION

To prevent specimens from detaching from the specimen holder, make sure that the specimen or specimens are covered completely by the flexible specimen holder.


CRUSHING HAZARD

Keep your hands clear of the flexible specimen holder when lowering the specimen mover.

Procedure

Hint

Make sure that you use sufficient force according to the specimen size and Struers recommendations.
The Struers Metalog Guide methods are based on a specimen with an area of 7 cm².
Adjust the method according to your specific specimen area.


Hint

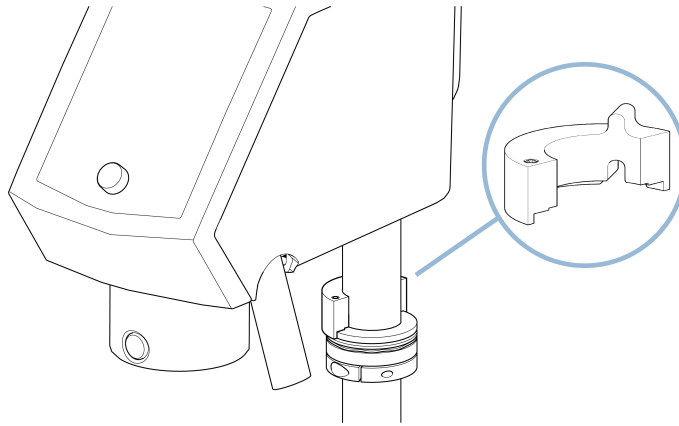
Make sure that the preparation surface is sufficiently wet before you start the preparation process.

1. Press the Lower/Raise button to make sure that the specimen mover head is fully raised.
2. Press the black button on the specimen mover head.
3. Insert the flexible specimen holder and rotate it until the three pins are aligned with the holes in the specimen mover.
4. Push the flexible specimen holder upwards until it locks into position.
5. Release the black button on the specimen mover head. Make sure that the flexible specimen holder is securely fixed.

5.7.2 Adjust the height of the flexible specimen holder

See the specific Instruction Manual for your machine.

Adjust the height of the ring to be able to use the flexible specimen holder with LaboForce-100.



- Attach the distance piece as shown in the illustration below.

**Note**

Make sure to remove the distance piece if you are going to work with mover plates or regular specimen holders again.

5.7.3 Adjust the horizontal position of the flexible specimen holder

1. Press the Lower/Raise button to lower the specimen mover head.
2. Loosen the 2 fastening screws holding the column of the control panel.
3. Place the flexible specimen holder in a position that does not allow the specimen to run more than 1 mm over the edge of the preparation disc.

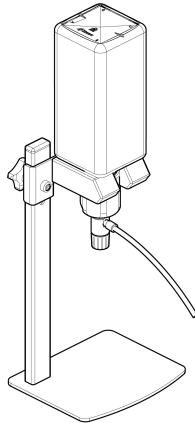
5.7.4 Use the flexible specimen holder

1. Place the specimen or specimens on the preparation surface.
2. Press the Lower/Raise button to lower the flexible specimen holder.
3. Make sure that no specimens protrude from the flexible specimen holder. If they do, raise the flexible specimen holder and adjust the specimens.
4. Repeat until all specimens are placed correctly.
5. Start the preparation process.
The preparation process stops automatically when the set preparation time has expired.
6. Clean the flexible specimen holder before the next preparation step.

5.8 LaboDoser-100 with LaboForce-100

See the LaboDoser-100 instruction manual.

5.9 LaboDoser-10 with LaboForce-100



If you are using LaboDoser-10 with LaboForce-100, a table stand is required.

6 Operate the device

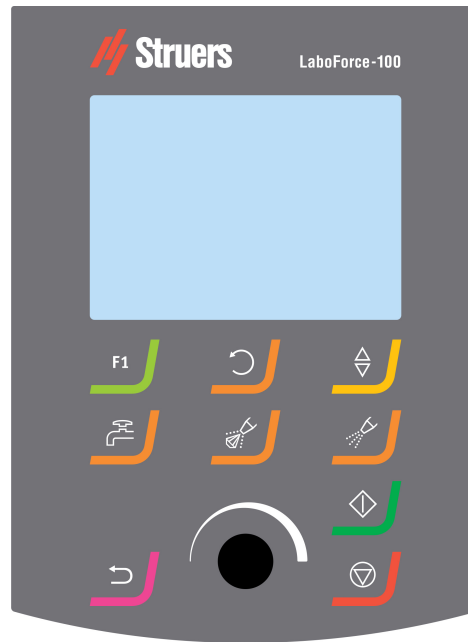
6.1 Control panel functions

**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.



Button	Function
	Function key Press this button to activate controls for various purposes. See the bottom line of the individual screens.
	Disc rotation Starts rotations of the disc (Spin function). Press this button again to stop the rotation.
	Lower/Raise Press this button to lowers and raise the specimen mover head when preparing single specimens or when adjusting positions of the specimen mover plate or specimen holder.
	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. Water switches off automatically after 5 minutes.
	Abrasive This function is only active when dosing units are installed. Manual override: Press this button to apply diamond suspension from the doser bottle.

Button	Function
	Lubricant This function is only active when dosing units are installed. Manual override: Press this button to apply lubricant from the doser bottle.
	Start Starts the preparation process.
	Stop Stops the preparation process.
	Escape Press this button to return to the previous screen or to cancel functions/changes.
	The turn/push knob - Turn the Turn/push knob to move the focus on the screen and change steps and setting. Press to toggle when only 2 options are available. - Press the Turn/push knob to select a function or save a selected setting.

6.2 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.

6.3 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 disc at high speed only:

- To dry the preparation surface.
- To dry the MD-Disc.



At 150 rpm

- To start the spin function, press the Disc rotation button.
- To stop the spin function, press the Disc rotation button again.

At 600 rpm

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

6.4 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.

6.5 The display

**Note**

The screens shown in this manual may differ from the actual screens in the software.

The display is the user-interface to the software.

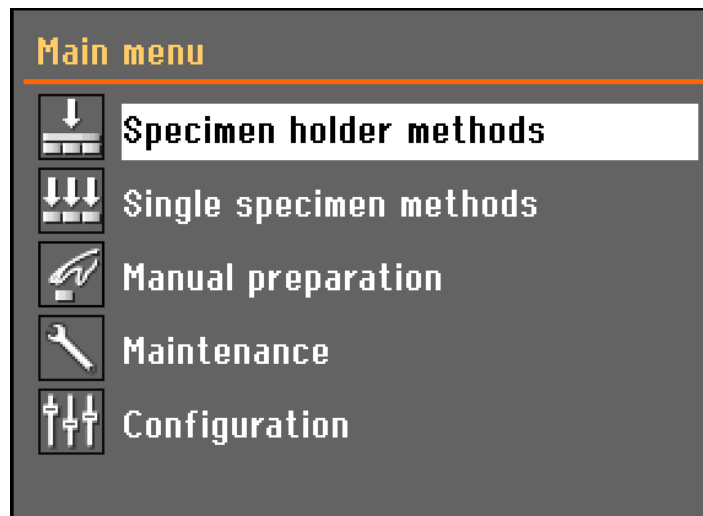
When you switch on the machine, the display shows the configuration and the version of the installed software.



Display areas

A Title bar	The title bar shows the function you have selected.
B Information fields	These fields show information about the selected function. In some fields you can select and change the value.
C Function key options	The functions shown depend on the screen that is displayed.

6.6 Main menu



From the **Main menu** you can choose between the following options:



Specimen holder methods



Single specimen methods



Manual preparation



Maintenance



Configuration

6.7 Change settings and text

Changing text

To change a text value, select the field for entering the text.



1. Press the turn/push knob to activate the text editor.
2. If needed, use the **Upper case/Lower case** arrow at the bottom of the screen to switch between upper case and lower case letters.
3. Enter the desired text.
4. Navigate to select **Save & Exit**.
5. Press the knob to exit the screen.

Change the settings

To change a setting, select the field for changing the setting.



1. Turn the Turn/push knob to go to the field where you wish to change the setting.
2. Press the Turn/push knob to enter the field.
 - **More than two options:**
Turn the Turn/push knob to scroll up or down in a list of values.
 - **Two options:**
Press the Turn/push knob to toggle between the options.

3. Navigate to select **Save & Exit**.
4. Press the knob to exit the screen.

6.8 Configuration

You can set a number of settings and parameters.

1. From the **Main menu**, select **Configuration**.
2. From the **Configuration** menu, select:
 - **User surface configuration** for setting specific parameters.
 - **Options** for general settings.

6.8.1 Start-up - the first time

Select language



1. Select the language you wish to use. If needed, you can change the language at a later date.
 - From the **Main menu** select **Configuration** > **Options** > **Language**.



2. Date

You will be prompted to set the date.



3. Time

You will be prompted to set the time.

Start-up - daily operation

When you switch on the machine, the screen that was shown when the machine was switched off is shown just after the start-up screen.

6.8.2 User surface configuration

In the **User surface configuration** screen you can create up to 10 user surfaces. From this screen you can also rename and delete user surfaces.



1. From the **Main menu** select **Configuration > User surface configuration**.
2. In the **User surface configuration** screen, press F1 to display a menu where you can create, rename, and delete user surfaces.
3. Select **Rename** to activate the text editor and enter a name of your choice.

6.8.3 The Options menu

From the **Options** menu you can access the following settings:

- **Display brightness**
- **Language**
- **Keyboard sound**
- **Units**
- **Time**
- **Date**
- **Operation mode**
- **Auto continue mode**
- **Time to fill empty tube**
- **Pump cleaning time**
- **Disc diameter**
- **Flexible specimen holder**

6.8.4 Operation mode

User levels

You can select three different user levels as operation mode.

Production

Methods	You can select and view methods.
Options	You can edit some settings.

Development

Methods	You can select, view and edit methods.
Options	You can edit some settings.

Configuration

Methods	You can select, view and edit methods. You can configure bottles.
Options	You can edit all settings.

Change the operation mode

To change the operation mode, do the following:

1. From the **Main menu** select **Configuration > Options > Operation mode**.
2. Enter the pass code. See [New pass code ► 30](#) [New pass code ► 30](#).
3. When the **Select operation mode** dialog is shown, select the desired operation mode and confirm your selection.

6.8.5 New pass code

When you access the menu, you will be prompted to enter a pass code. The default pass code is '2750'.

Change the pass code

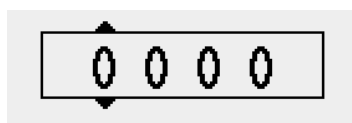
You can change the pass code from the **Operation mode** menu.

**Note**

Make a note of the new pass code.

To change the pass code, do the following:

1. From the **Main menu** select **Configuration > Options**.
2. Select the field for entering the pass code.



3. When the **Enter pass code** dialog is shown, enter the current pass code. The default pass code is "2750".
4. Change the pass code and confirm your selection.

6.8.6 Auto continue mode

You can set the machine to automatically continue to the next step in a method, as long as the consumables used are the same.

1. Select **Configuration > Options > Auto continue mode**.

Setting	Definition
Off	The machine pauses between each step.
Equal cons. except SiC	The machine automatically continues to the next step, but pauses when grinding with SiC Paper, which must be changed between the steps.
Always	The machine automatically continues to the next step.

6.8.7 Time to fill empty tube (LaboDoser-100)

You can set the time for filling the tube:

- If you have installed a new bottle.
- After the cleaning procedure.

Procedure

1. Select **Configuration > Options > Time to fill empty tube**.
2. If needed, set the time.
3. Confirm your selection.

6.8.8 Pump cleaning time (LaboDoser-100)

You can set the time for pumping water through the tubes during the cleaning procedure.

Procedure

1. Select **Configuration > Options > Pump cleaning time**.
2. If needed, set the time.
3. Confirm your selection.

6.8.9 Disc diameter

LaboForce-100 automatically recalculates process parameters such as time and dosing levels when a disc is changed from a 250 mm diameter disc to a 300 mm diameter disc, or vice versa. There is no need to adjust the method when another disc size is used.

Procedure

1. Select **Configuration > Options > Disc diameter**.
2. Select the size of the disc you wish to use.
3. Confirm your selection.

6.8.10 Return to the default value



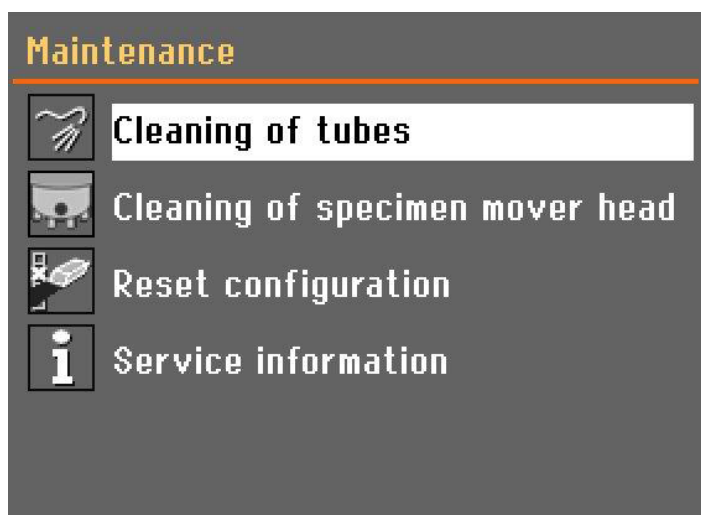
Hint

Make a note of the customized setting before you reset the setting to the default value.

To return a setting to the default value:

1. Mark the value you want to reset.
2. Press F1.

6.9 Maintenance menu



Cleaning of tubes



Cleaning of specimen mover head

See [The specimen mover head ► 42](#).



Reset configuration

See [Reset the configuration ► 33](#).



Service information

6.9.1 Reset the configuration



Hint

Make a note of all customized settings before you reset the configuration.

To reset all configuration parameters to their default factory settings:

1. From the **Main menu** select **Maintenance > Reset configuration**.
2. Restart the machine.
3. Reconfigure the settings.

7 The preparation process

7.1 Preparation modes

From the **Main menu** you can select three different preparation modes:



Specimen holder methods

Specimens are clamped in specimen holders and prepared.



Single specimen methods

Specimens are prepared as single specimens.



Manual preparation

Specimens are prepared manually.

The specimen holder methods and the single specimen methods are initially the same. When you create a method in one of these screens, the same method is automatically created in the other screen.

Except for the force to be applied, all method parameters are initially the same when a method is created. The relation between single specimen force and specimen holder force is 1 to 6. This means that 30 N in single specimen mode equals 180 N in specimen holder mode and vice versa.

If you subsequently change a method parameter such as time, the corresponding method will not be updated with the new values. This means that you can set up individual parameters based on specimen size and/or number.



Hint

If a preparation surface or suspension is changed in a method, this will be reflected in the corresponding method.

7.1.1 Select a preparation method

Method type



Specimen holder methods

Specimens are clamped in specimen holders and prepared.



Single specimen methods

Specimens are prepared as single specimens.

1. From the **Main menu** select a preparation method.
2. Open the method to see the individual preparation steps. The method contains four steps:
 - Surface
 - Suspension
 - Lubricant
 - Time

7.1.2 Edit a preparation method

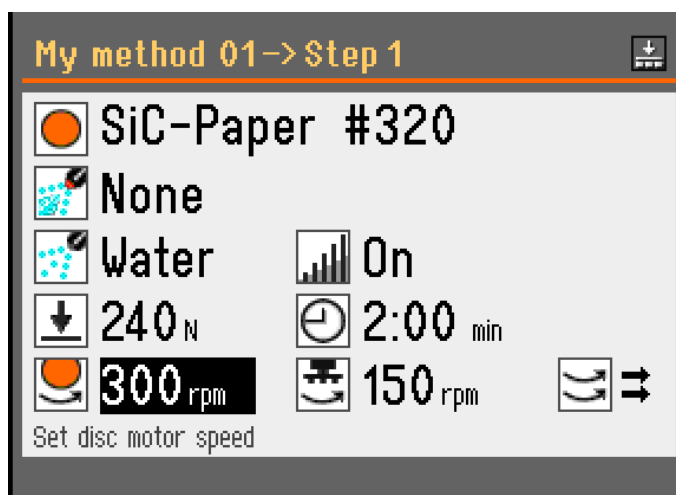
You can change all parameters to optimize the preparation method.

1. Select a preparation method from the **Main menu**.

The default settings for a typical preparation process are already set up:

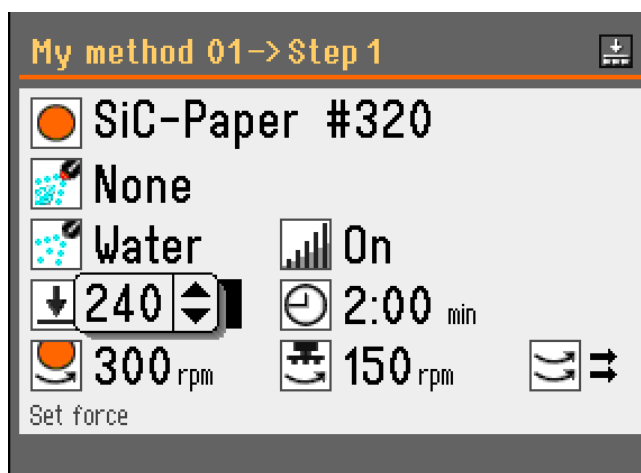
- **Step 1:** plane grinding.
- **Step 2:** fine grinding.

- **Step 3:** polishing.
 - **Step 4:** final polishing.
2. Open the individual steps to change the parameters.



3. Select a parameter.

An explanation for the selected parameter is displayed in the bottom left corner of the screen.



4. Set a value for the parameter.
5. Confirm the new value.
6. Press Esc to return to the previous screen.

7.1.3 Set the dosing levels (LaboDoser-100)

If LaboDoser-100 is installed, you can set dosing levels.

When suspensions and/or lubricants are used in a preparation step, you must first select the type of suspension or lubricant, and then the dosing level.

LaboForce-100 automatically recalculates process parameters such as time and dosing levels when a disc is changed from a 250 mm diameter disc to a 300 mm diameter disc, or vice versa. There is no need to adjust the method when another disc size is used. If you need to change the disc diameter, see [Disc diameter ► 31](#).

For **Level**, you can set two values: e.g. 2/7 (pre-dosing/dosing).



Option	Pre-dosing	Dosing	Increment
Dosing level	0 - 10	0 - 20	1

The pre-dosing level [e.g. 2]



This lubricates the surface to avoid running the specimens on a dry surface, which can cause damage.

The pre-dosing level is the amount of suspension or lubricant that is applied to the surface before the actual preparation step.



Hint

Applicable values depend on the frequency of use and surface types. For frequently used surfaces, use a lower value than for surfaces used infrequently.

The dosing level [e.g. 7]



This value is the dosing level throughout the preparation. This level is set according to the surface type:

- Soft, napped polishing cloths require more lubricant than hard, flat cloths or fine grinding discs.
- Fine grinding discs require a lower dosing level of abrasive than polishing cloths.

7.1.4 Add steps to a preparation method

Preparation methods can have up to 20 steps.

- Press F1 to add or delete steps.



Hint

Changes to the steps are saved automatically.
New steps are automatically added to the end of the list.

7.1.5 Add a preparation method

1. From the **Main menu**, select a preparation mode.
2. Press F1 to add, rename, or delete methods in the list.

**Hint**

You can save up to 3 methods.

7.1.6 Guidelines for grinding single specimens

**Note**

We recommend that you avoid using coarse abrasives when preparing single specimens. It is normally not necessary, and the use of coarse abrasives can result in uneven specimens.

If you need to grind using coarse abrasives, follow these guidelines to improve the planeness:

- The height of the specimen should be between 8 - 35 mm and should not exceed a specimen diameter multiplied by 0.7x.
Example: A specimen with a diameter of 30 mm should not be higher than $30 \times 0.7 = 21$ mm.
- Use the smallest grain size possible. However, remember that this will increase the overall preparation time.
- Use a mounting resin with a wear resistance similar to the wear resistance of the specimens.
- Use 150 rpm for both grinding disc and specimen mover.
- If you are using lower speeds, decrease the speed on both the disc and the specimen mover.
- Use co-rotation.
- Both the disc and the specimen mover head rotate counter-clockwise.
- Use low force.
- Position the specimen mover head so that the specimens do not pass over the center of the preparation disc.
- Lower the specimen mover plate as much as possible, but make sure that it does not come into contact with the preparation surface.

7.1.7 Manual preparation

**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.



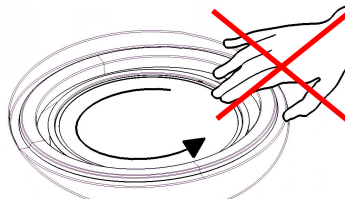
CAUTION

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



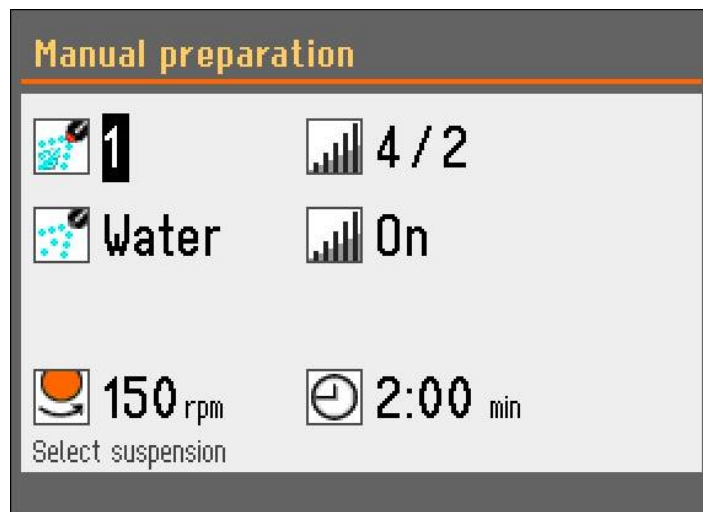
CAUTION

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.



Procedure

1. From the **Main menu**, select **Manual preparation**.
2. If LaboDoser-100 is installed, you can select:
 - The suspension bottle number.
 - The dosing level.
 - The lubricant bottle number.
 - The dosing levels or water.
3. Set **Speed** for the disc rotation speed.
4. Set **Time** for the preparation time.

7.2 Start and stop the preparation process

Start the preparation process


WARNING

Do not use the machine with defective safety devices.


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.

Process Method 01			
Surface	Susp.	Lub.	Time [min]
1 SiC-Paper #320	-	Water	1:56
2 MD-Largo	1	4	3:00
3 MD-Dac	2	4	3:00
4 MD-Nap	3	-	1:00


Note

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

1. Select the desired preparation method, and if needed the desired step.
2. Press the Start button on the control panel to start the preparation.
The disc will start turning at the pre-set speed, and dosing will start.
The step being performed is highlighted in green on the screen.

Pause the preparation process

1. To pause the process, press the Stop button.
The step being paused is highlighted in orange on the screen.



The process is paused. The icon is shown on the display.

2. To continue the preparation, press the Start button.

Stop the preparation process

The process stops automatically when the set preparation time has expired.

1. To stop the process before the set preparation time has expired, press the Stop button.

The step being stopped is highlighted in orange on the screen.



The process is paused. The icon is shown on the display.

2. To stop the preparation completely, press the Stop button again.

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.

8 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.

8.1 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.

8.2 Clean the tubes (LaboDoser-100)

Clean the tubes and easy connectors when you switch between different types of diamond suspensions/lubricants.

**Hint**

If the equipment is not to be used for a prolonged period of time, Struers recommends that you clean the tubes.

Procedure

Cleaning of tubes		
Bottle No.	Status	Selected
1	Clean	No
2	Used	Yes
3	Clean	No
4	Clean	No

▼ Start cleaning

1. From the **Main menu** select **Maintenance > Cleaning of tubes**.
2. Select the tubes you wish to clean.
Bottle No.: Identification of the bottle in the doser.
Status: **Clean** or **Used**.
Selected: **No** or **Yes**.
3. Press F1 to start the cleaning process.
4. Follow the on-screen instructions.

8.3 Daily

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

8.4 Weekly

- Clean the control panel with a soft damp cloth and common household detergents.

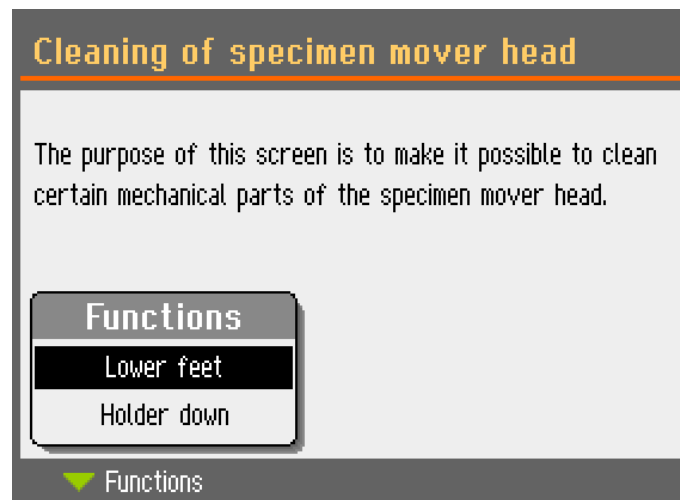
8.4.1 The specimen mover head

Cleaning

LaboForce-100 is equipped with a function for cleaning the feet that apply the force on the specimens and also for cleaning the lock that secures the specimen mover plate for single specimens.

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

Clean the pressure feet and pistons applying the force on the specimens and specimen holder.

Procedure

1. Press the release outlet valve to drain the water/oil filter. See the section [Empty the water/oil filter ► 43](#).
2. From the **Main menu** select **Maintenance > Cleaning of specimen mover head**.
3. Press F1 to activate one of the functions:

Functions	
Lower feet	The pistons can be cleaned or lubricated.
Raise feet	Moves the feet back into operating position.
Holder up	Moves the specimen mover head up for cleaning.
Holder down	Moves the specimen mover head back into operating position.

**Note**

Never force any of the movements. If the components do not move as they should, contact Struers Service.

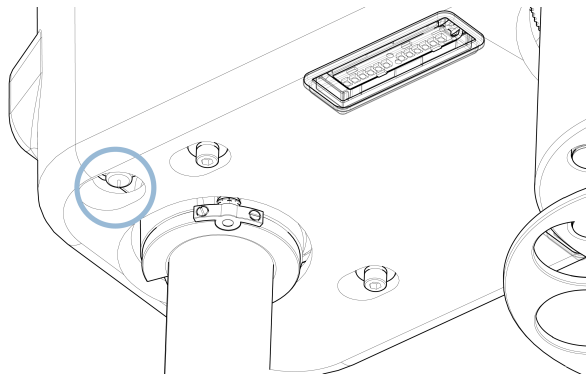
8.5 Monthly

8.5.1 Empty the water/oil filter

The specimen mover is fitted with a water/oil filter that removes excessive amounts of water and oil from the compressed air supply.

Empty the filter on a regular basis.

Procedure



1. Locate the release outlet valve at the bottom of the specimen mover head.
2. Hold a cloth under the release outlet valve and press the valve to empty the water/oil filter.

8.6 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).

8.7 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.

8.7.1 Service check



Information about total operation time and servicing of the machine is displayed on the screen at start-up.

After 1500 hours of operation time, a pop-up message will appear to alert the operator that the recommended service interval has been exceeded.

- Contact Struers Service.

Service information

LaboForce-100 provides extensive information about the condition of the various components.



Hint

The service information menus and screens are in English only. Use the names and terms shown on the screen when you communicate with your local service technician or Struers Service.

Service information is read-only information. Machine settings cannot be changed or modified.

- From the **Main menu** select **Maintenance > Service functions**.

In the **Service functions** screen you can access a number of screens:

- **Device information**
- **Statistics**
- **Inputs**
- **Outputs**
- **Voltage and temperature monitor**
- **Functional tests**
- **Adjustment and calibration**

Service information can be used in cooperation with Struers Service for remote diagnostics of the equipment.

8.8 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.

9 Troubleshooting

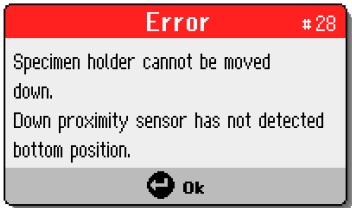
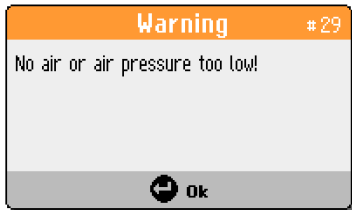
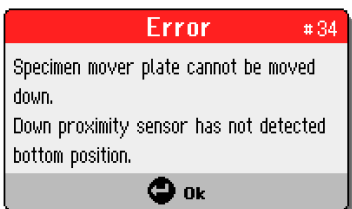
Error	Cause	Action
Specimen holder plate vibrates.	Specimen holder plate unbalanced.	Replace specimen holder plate.
	Specimen holder plate screws loose.	Tighten specimen holder plate screws.
The preparation disc runs unevenly or stops.	Force too high.	Reduce the force.
The preparation disc stops.	Frequency inverter has stopped the equipment.	Switch the equipment off. Wait for a few minutes then restart the equipment.
		If the error remains: Contact Struers Service.
The column starts to turn.	Column screws loose.	Tighten the screws immediately.
Uneven specimens.	Specimens are wider than the radius of the preparation disc.	Use smaller specimens.
	Specimens are passing over the center of the disc.	Reposition the horizontal position of the control panel.
Continuous, irregular wear on a grinding/polishing surface.	Coupling on the specimen holder is worn.	Replace the coupling.

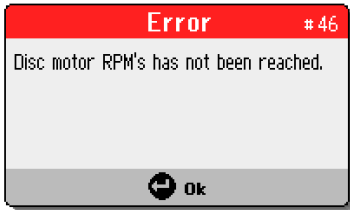
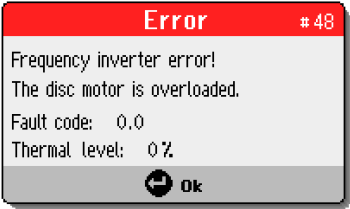
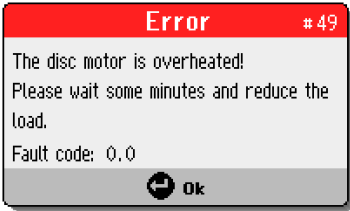
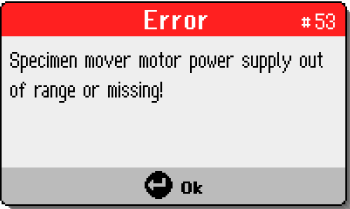
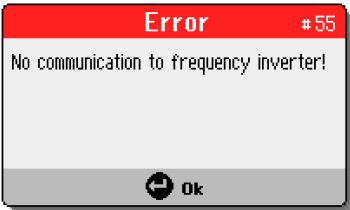
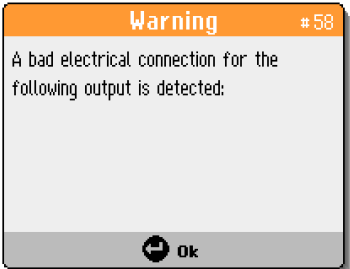
9.1 Messages and errors

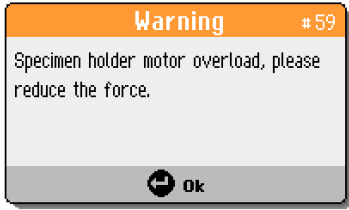
Messages provide information about the machine's status and minor errors.

Errors must be corrected before operation can continue.

- Press Enter to acknowledge the error or message.

#	Error Message	Explanation	Action
3	 Fatal error #3 Machine failed during Power On Self Testing. Please reboot the machine. If the problem persists please contact Struers technical support Reason: #__ - Unknown error Ok	Failure of internal communication on start-up.	Restart the machine. If the error remains, contact Struers Service. Make a note of the Reason number.
28	 Error #28 Specimen holder cannot be moved down. Down proximity sensor has not detected bottom position. Ok		Make sure that there are no obstacles preventing the movement of the specimen holder. Check the pneumatic system. If the error remains, contact Struers Service.
29	 Warning #29 No air or air pressure too low! Ok	Pressure of the compressed air supply is too low.	Check the compressed air supply.
30	 Error #30 Pressure regulating error! Ok	Pressure of the compressed air supply is too high/low.	Check the compressed air supply. Restart the machine. If the error remains, contact Struers Service.
34	 Error #34 Specimen mover plate cannot be moved down. Down proximity sensor has not detected bottom position. Ok		Make sure that there are no obstacles preventing the movement of the specimen mover plate. Check the pneumatic system. If the error remains, contact Struers Service.

#	Error Message	Explanation	Action
46		Disc motor will not rotate or cannot reach the set rpm. Polishing process is paused.	Restart the process. If the error remains, contact Struers Service.
48			Wait for the disc motor to cool. Reduce the force and continue the preparation process.
49			Wait for the disc motor to cool. Reduce the force and continue the preparation process.
50		An error in the frequency inverter is detected.	Restart the machine. If the error remains, contact Struers Service. Please make a note of the Fault code.
53			Restart the machine. If the error remains, contact Struers Service.
55			Restart the machine. If the error remains, contact Struers Service.
58			Restart the machine. Make a note of the output. If the error remains, contact Struers Service.

#	Error Message	Explanation	Action
59			Reduce the force or/and increase the specimen rpms. Restart the process. If the error remains, contact Struers Service.
26		The pneumatic head with specimen mover plate is not down when the process is started. Appears if method is started in single specimen mode (SS) and mover plate is not lowered.	Lower the pneumatic head. Restart the process.

10 Technical data

10.1 Technical data

Specimen mover	Specimen holder	
	Max. weight	4 kg (8.8 lbs) incl. specimens
	Force	10 - 50 N single specimen 30 - 300 N specimen holder
	Force accuracy	± 5 N up to 50 N, ± 10 N on higher values
	Rotational speed	
	in process	50 - 150 rpm
	Rotational direction	Counter-clockwise, Clockwise
	Motor	180 W
Software and electronics	Display	TFT color, 320 x 240 dts, LED backlight
Features	Methods	Included: 3 Struers Metalog Guide methods.
		Custom made: 10

Safety standards		See the Declaration of Incorporation
REACH		For information about REACH, contact your local Struers office.
Operating environment	Surrounding temperature	
	During operation	5 - 40 °C (41 - 104 °F)
	Humidity	< 85% RH non-condensing
Compressed air supply	Pressure	6 - 9.9 bar (87 - 143 psi)
	Recommended quality	Class-5.6.4, as specified in ISO 8573-1
Power supply	Voltage/frequency	1 x 24 V
	Power inlet	Connected directly to LaboPol
	Power	
	Nominal load	180 W
	Current	
	Nominal	5 A
	Max.	8 A
	Current, largest load	4.5 A
Dimensions and weight	Width	20.3 cm (8")
	Depth	43.3 cm (17")
	Height	57.4 cm (22.6")
	Height (with open cover)	
	Weight	20.5 kg (45.2 lbs)
Noise level	A-weighted sound emission pressure level at workstations	See the LaboPol technical data.
Vibration level	Declared vibration emission	N/A

10.2 Diagrams

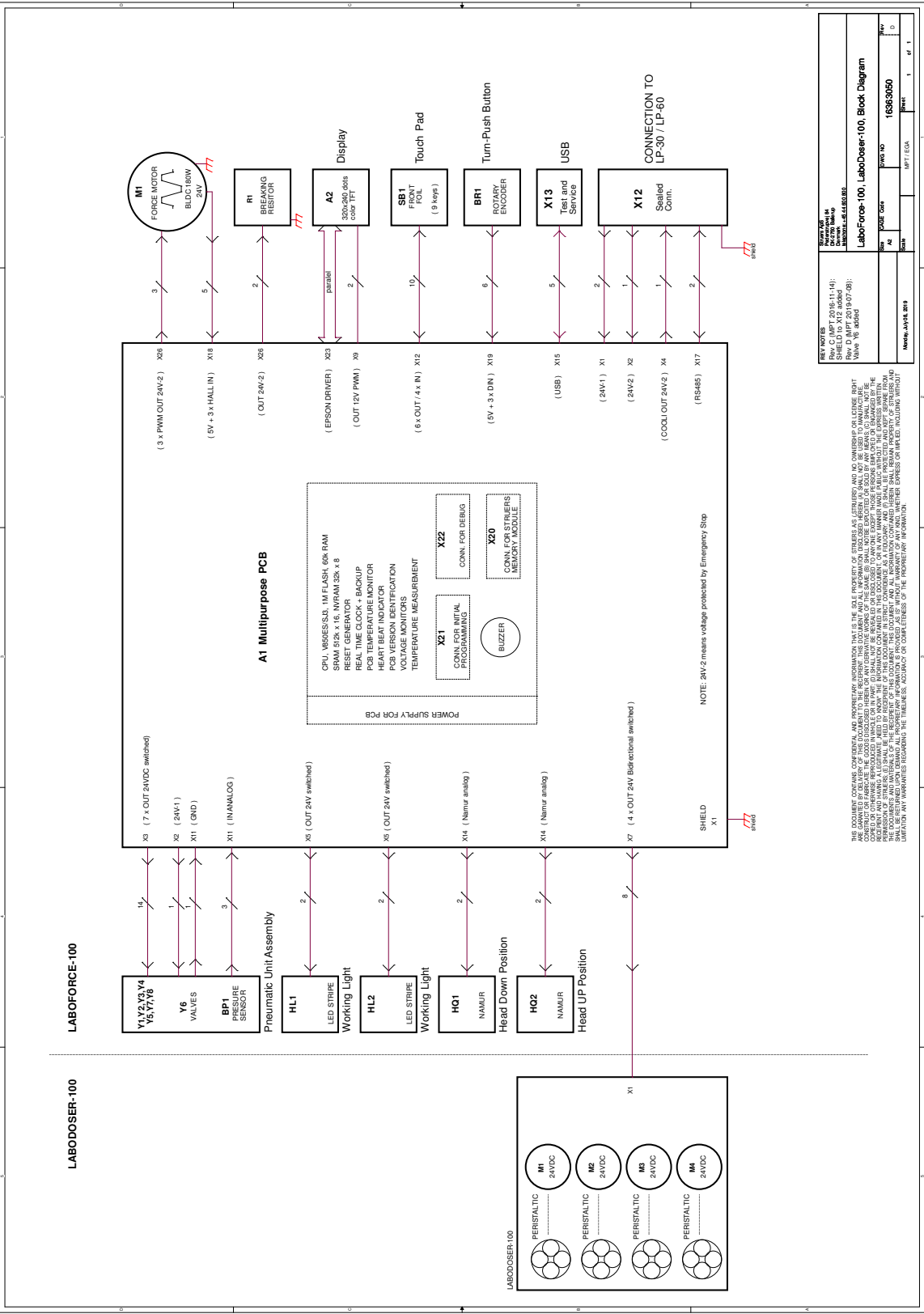
**Note**

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

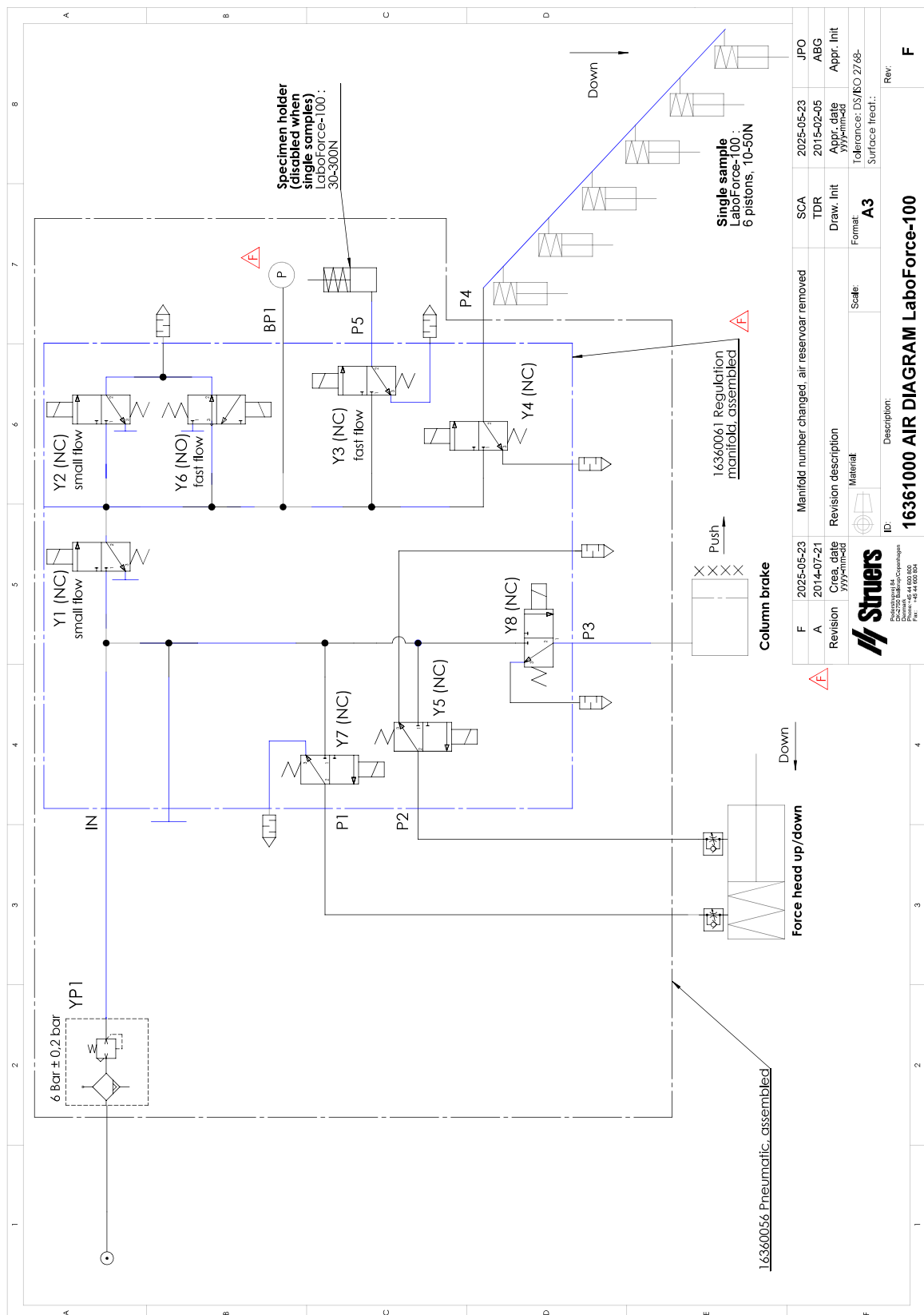
10.2.1 Circuit diagram

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

10.2.2 Block diagram - 16363050 D



10.2.3 Air diagram - 16361000 F



10.3 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.

11 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-100
Model	N/A
Function	Specimen mover for LaboPol-30/LaboPol-60
Type	636
Cat. no.	06366127

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.

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]

en For translations see
bg За преводи вижте
cs Překlady viz
da Se oversættelser på
de Übersetzungen finden Sie unter
el Για μεταφράσεις, ανατρέξτε στη διεύθυνση
es Para ver las traducciones consulte
et Tõlked leiate aadressilt
fi Katso käännökset osoitteesta
fr Pour les traductions, voir
hr Za prijevode idite na
hu A fordítások itt érhetők el
it Per le traduzioni consultare
ja 翻訳については、
lt Vertimai patalpinti
lv Tulkojumus skatīt
nl Voor vertalingen zie
pl Aby znaleźć tłumaczenia, sprawdź
pt Consulte as traduções disponíveis em
ro Pentru traduceri, consultați
se För översättningar besök
sk Preklady sú dostupné na stránke
sl Za prevode si oglejte
zh 翻译见

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