

# Labotom-5

## Instruction Manual

**Original Instructions**



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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

Labotom-5 is designed for professional semi-automatic or manual metallographic preparation (wet abrasive cutting) of materials for further metallographic inspection and only

to be operated by skilled/trained personnel. The machine is designed to be used with Struers consumables specially for this purpose and this type of machine.

The machine is for use in a professional working environment (e.g. a materialographic laboratory).

**Do not use the machine for the following**

Cutting of materials other than solid materials suitable for materialographic studies. In particular, the machine must not be used for cutting of any type of explosive and/or flammable material (e.g. magnesium), or materials which are not stable during machining, heating or pressure.

The machine must not be used with cut-off wheels which are not compatible with the machine requirements (e.g. saw-blade or toothed cut-off wheels).

**Model**

Labotom-5

## 2.2 Safety devices

The machine is equipped with the following safety devices:

- Emergency stop
- Self-locking main safety guard
- Cut-off wheel guard

The locking mechanism is activated when you press the Start button to start a cutting process.

## 2.3 Safety precautions



**Read carefully before use**

### **Specific safety precautions - residual risks**

1. Ignoring this information and mishandling of the equipment can lead to severe bodily injuries and material damage.
2. The machine must be installed in compliance with local safety regulations.
3. The machine must be placed on a safe and stable support table which is able to carry at least 200 kg / 440.93 lb. All safety functions must be intact and in working order. If they are not, they must be replaced or repaired before the machine can be used.
4. The operator must read the safety precautions and Instruction Manual, as well as relevant sections of the manuals for any connected equipment and accessories. The operator must read the Instruction Manual and, where applicable, the Safety Data Sheets for the applied consumables.
5. Use only intact cut-off wheels. The cut-off wheels must be approved for min. 50 m/s.
6. Do not use the machine with saw-blade type cut-off wheels.

7. Do not use the machine for cutting materials that are flammable or unstable during the cutting process (e.g. combustible or explosive materials). Do not use the machine for cutting materials that are not suitable for materialographic cutting.
8. The workpiece must be securely fixed in a clamping device or similar. Large or sharp workpieces must be handled in a safe way.
9. Observe the current safety regulations regarding handling, mixing, filling, emptying, and disposing of coolant with additives. Avoid skin contact with the coolant additive.
10. Use of working gloves is recommended as workpieces may be both very hot and produce sharp edges. Wearing of gloves is also recommended when flushing and cleaning the machine.
11. Use of safety shoes is recommended when handling large or heavy workpieces.
12. Use of safety goggles is recommended when using the flushing gun. Only use the flushing gun for cleaning inside the cutting chamber.
13. Take care not to activate the flushing function accidentally.
14. Always mark or shield protruding workpieces if they extend outside the machine.
15. Mind the protruding safety catch when the safety guard is raised.
16. The cutting handle should be lowered slowly and carefully in order to avoid breaking the cut-off wheel.
17. Laser radiation. Do not stare into beam. Class 2 laser product.

#### **General safety precautions**

1. The use of an exhaust system is required as the cutting liquids, materials to be cut and cut-off wheels can emit harmful gasses, fumes, or dust. Always use an exhaust system to handle fumes when advised in the safety data sheets.
2. The machine emits moderate noise. However, the cutting process can be noisy depending on the nature of the workpiece. Use hearing protection if the exposure to noise exceeds the levels set by local regulations.
3. Prior to any service, switch off the machine and lock the main switch with a pad lock. The machine must be disconnected from the electrical power supply before any service. Wait 5 minutes until residual potential is discharged.
4. In case of fire, alert bystanders and the fire brigade. Cut off the power. Use a powder fire extinguisher. Do not use water.
5. Struers equipment must only be used in connection with and as described in the Instruction Manual supplied with the equipment.
6. The machine is designed to be used only with Struers consumables specifically designed for this purpose and this type of machine. 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.
7. Dismantling of any part of the equipment, during service or repair, should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.)

## 2.4 Safety messages

Struers uses the following signs to indicate potential hazards.



### **ELECTRICAL HAZARD**

This sign indicates an electrical hazard which, if not avoided, will result in death, or serious injury.



### **WARNING**

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



### **WARNING: LASER BEAM**

This sign indicates a laser beam hazard which, if not avoided, could result in minor, moderate, or serious injury.



### **CRUSHING HAZARD**

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



### **HEAT HAZARD**

This sign indicates a heat hazard which, if not avoided, can 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.



### **Emergency stop**

Emergency stop

### 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.

### 2.4.1 Safety messages in this manual



### **WARNING**

If there are visible signs of deterioration or damage to the safety guard, it must be replaced immediately.  
Contact Struers Service.



**WARNING**

Safety critical components must be replaced after a maximum lifetime of 20 years.  
Contact Struers Service.

**WARNING**

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

**WARNING**

The safety guard must be replaced immediately if the protective screen has been weakened by collision with projectile objects or if you see any visible signs of deterioration or damage. Contact Struers Service.

**WARNING**

The safety guard screen must be replaced every 5 years to ensure its intended safety. A label on the screen indicates when it must be replaced.

**Struers**  
PETG Safety Glass  
PETG Sicherheitsglas  
PETG Verre sécurit

**WARNING**

The safety guard must be replaced every 5 years to ensure its intended safety. A label on the screen indicates when the safety guard is due to be replaced.

**WARNING**

In case of fire, alert bystanders and the fire brigade.  
Use a powder fire extinguisher. Do not use water.

**WARNING**

If you are working with a round workpiece, make sure that it is securely fixed. If it is not, it can roll out of the cutting chamber and land on your feet.

**WARNING**

Wear gloves when flushing and cleaning the machine.

**WARNING**

Do not use acetone, benzol or similar solvents.

**ELECTRICAL HAZARD**

The machine must be earthed (grounded).  
Switch off the electrical power supply before installing electrical equipment.

**ELECTRICAL HAZARD**

Make sure that the actual electrical power supply voltage corresponds to the voltage stated on the name plate of the machine.  
Incorrect voltage can damage the electrical circuit.



**ELECTRICAL HAZARD**

The machine must always be protected by external fuses. See the electrical table for details on the fuse size required.



**ELECTRICAL HAZARD**

The pump of the recirculation cooling unit must be earthed (grounded). Make sure that the electrical power supply voltage corresponds to the voltage stated on the name plate of the pump. Incorrect voltage can damage the electrical circuit.



**ELECTRICAL HAZARD**

Disconnecting the unit from the electrical power supply must only be done by a qualified technician.



**HEAT HAZARD**

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



**CRUSHING HAZARD**

Take care of your fingers when handling the machine. Wear safety shoes when handling heavy machinery.



**CAUTION**

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



**WARNING: LASER BEAM**

Laser radiation. Do not stare into beam. Class 2 laser product.



**CAUTION**

Prolonged exposure to loud noises may cause permanent damage to a person's hearing. Use hearing protection if the exposure to noise exceeds the levels set by local regulations.



**CAUTION**

Risk of hand to arm vibration during manual preparation. Prolonged exposure to vibration may cause discomfort, joint damage or even neurological damage.



**CAUTION**

Do not use the machine with non-compatible accessories or consumables.



**CAUTION**

Always close the safety guard carefully to avoid injuries.

**CAUTION**

Always wear safety shoes when handling workpieces.

**CAUTION**

The machine is heavy. Always use a crane and lifting strap.

**CAUTION**

Avoid skin contact with the coolant additive.  
Do not start flushing until the flushing gun points into the cutting chamber.  
Only use the flushing gun for cleaning inside the cutting chamber.  
Always wear safety goggles while using the flushing gun.

**CAUTION**

Do not start flushing until the flushing gun points into the cutting chamber.

**CAUTION**

Always use goggles or a protective shield, and chemical-resistant gloves.

**CAUTION**

Avoid skin contact with the coolant additive.  
Always use goggles or a protective shield, and chemical-resistant gloves.

**CAUTION**

Do not start flushing until the flushing gun points into the cutting chamber.  
Only use the flushing gun for cleaning inside the cutting chamber.  
Always wear safety goggles while using the flushing gun.

## 3 Get started

### 3.1 Device description

Labotom-5 is a manual cut-off machine with an optional cooling and/or recirculation unit. It offers safe cutting of all stable, non-explosive metals. The machine is designed for wet abrasive cutting, and it should be equipped with a circulation system for cooling liquid.

The cutting process starts by securing the workpiece to the cutting table with clamping devices. The operator selects the cutting parameters and consumables (e.g. cut-off wheel).

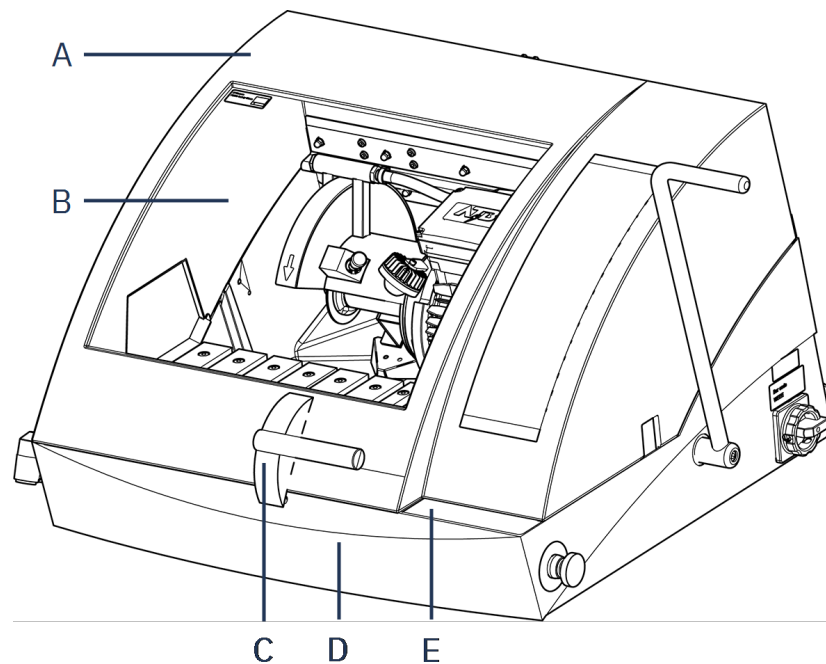
The safety guard locks when the operator starts the machine, and it remains locked for the duration of the cutting. When the cut-off wheel stops, the lock releases and the workpiece and the specimen can be removed.

In case of a power loss during a cutting process, use the special key to open the power-to-open safety guard. Finally, the category B emergency stop cuts the power to the cut-off wheel - the safety guard can be opened once the cut-off wheel comes to a standstill. The machine should be connected to an external exhaust system to remove fumes from the cutting process.

Labotom-5 can be fitted with an Extension tunnel (option) on the left side in case the operator needs to cut long workpieces.

## 3.2 Overview

### Front view



**A** Safety guard

**B** PETG screen

**C** Handle for safety guard

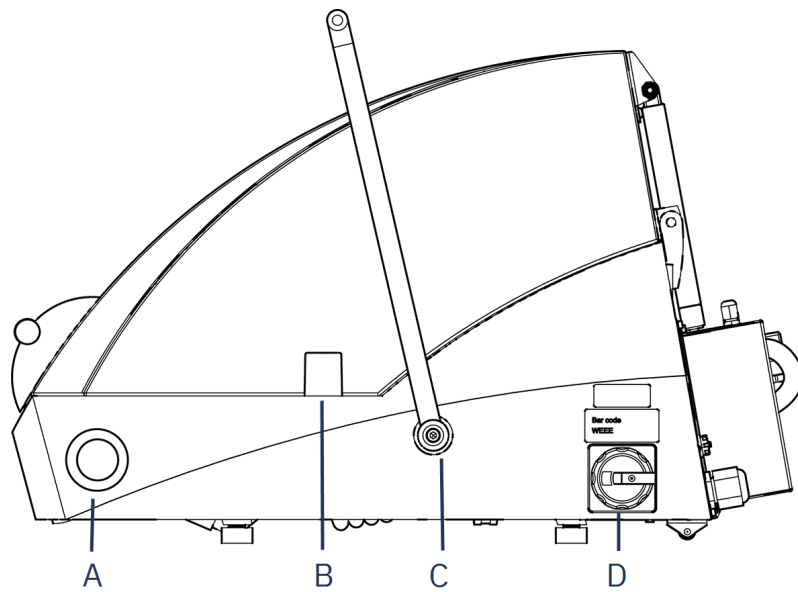
**D** Safety lock release

**E** Control panel



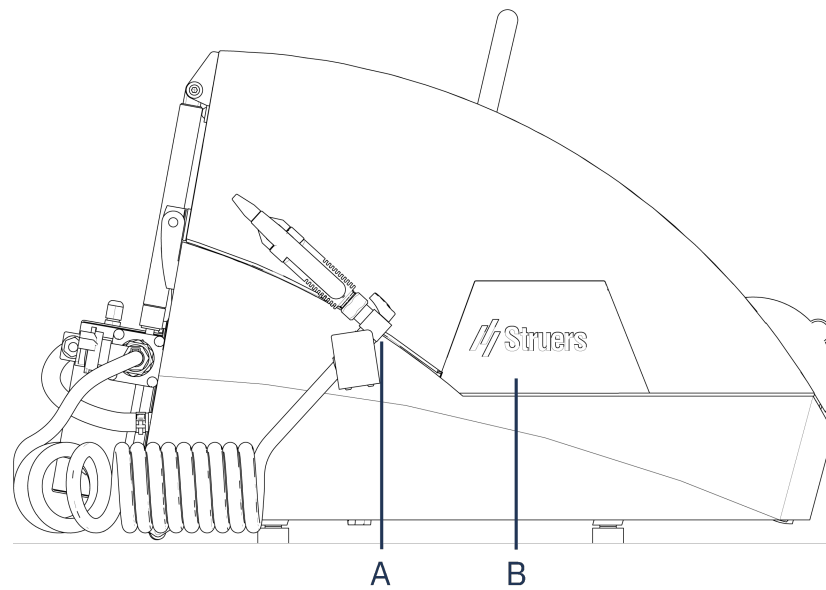
#### Note

To open the safety guard on Labotom-5 when the machine is not connected to a power supply and/or the main power switch is off, lift the front of the machine to access the safety lock release. Use the triangle key to release the safety lock. Remember to reactivate the safety lock release before operating the machine.

**Side view, right side**

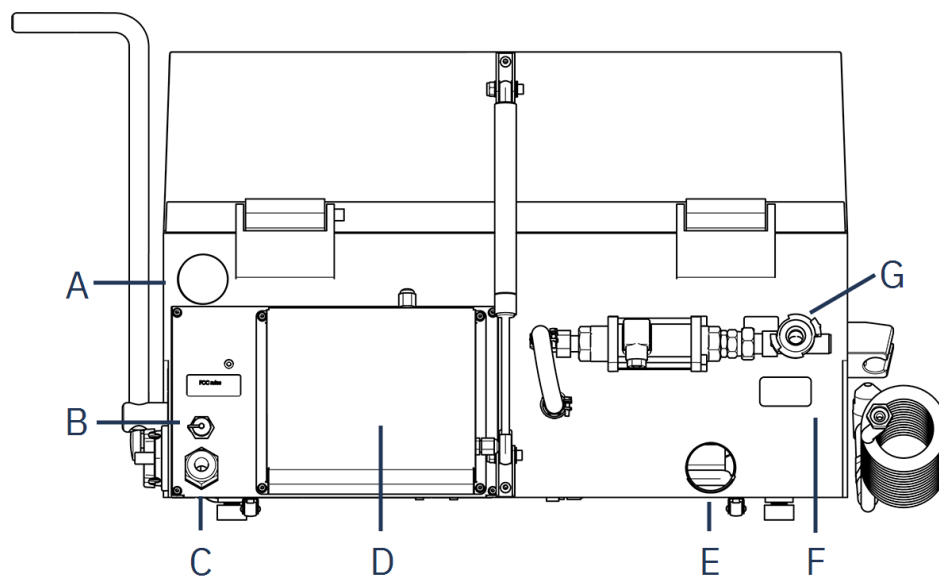
- |                                            |                               |
|--------------------------------------------|-------------------------------|
| <b>A</b> Emergency stop button             | <b>C</b> Cut-off wheel handle |
| <b>B</b> Opening for protruding workpieces | <b>D</b> Main switch          |

### Side view, left side



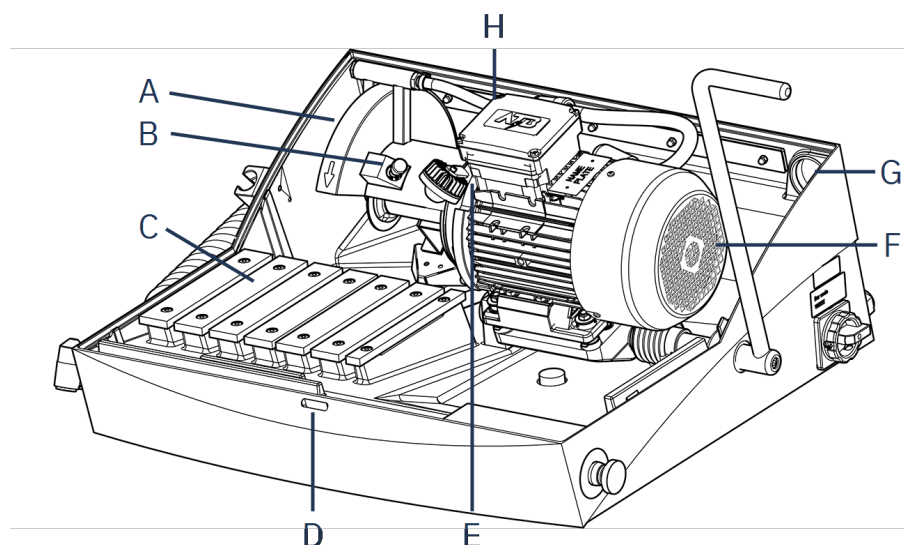
- A** Flushing gun      **B** Removable plate for mounting of extension tunnel (option)

### Rear view



- |                                               |                       |
|-----------------------------------------------|-----------------------|
| <b>A</b> Connection for exhaust               | <b>E</b> Water outlet |
| <b>B</b> Socket for cooling system connection | <b>F</b> Name plate   |
| <b>C</b> Electrical cable for power supply    | <b>G</b> Water inlet  |
| <b>D</b> Compartment for service technician   |                       |

### Inside the machine



- |                              |                                                         |
|------------------------------|---------------------------------------------------------|
| <b>A</b> Cut-off wheel guard | <b>E</b> Lamp                                           |
| <b>B</b> Spindle lock        | <b>F</b> Cutting motor                                  |
| <b>C</b> Cutting table       | <b>G</b> Connection for external fume extraction system |
| <b>D</b> Safety guard lock   | <b>H</b> Water outlet                                   |

## 3.3 Accessories and consumables

### Accessories

For information about the available range, see the Labotom-5 brochure:

- [The Struers Website](http://www.struers.com) (<http://www.struers.com>)

### Consumables

The machine is designed to be used only with Struers consumables specifically designed for this purpose and this type of machine.

Other products may contain aggressive solvents, which dissolve e.g. rubber seals. The warranty may not cover damaged machine parts (e.g. seals and tubes), where the damage can be directly related to the use of consumables not supplied by Struers.

For information about the available range, see: [The Struers Website](http://www.struers.com) (<http://www.struers.com>).

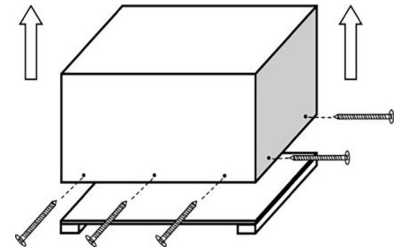
## 4 Installation

### 4.1 Unpack the machine


**Note**

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

1. Carefully open and remove the sides and the top of the packing crate.
2. Remove the 2 transport brackets that secure the machine to the transport pallet. Use a torque bit T30 key to remove the 8 coach bolts.



### 4.2 Check the packing list

Optional accessories may be included in the packing box.

The packing box contains the following items:

| Pcs. | Description                                                                           |
|------|---------------------------------------------------------------------------------------|
| 1    | Labotom-5                                                                             |
| 1    | Spanner, 24 mm, for changing the cut-off wheel                                        |
| 1    | Triangular key, for unlocking of the safety lock when not connected to the main power |
| 1    | Pipe for the exhaust                                                                  |
| 1    | Drain pipe                                                                            |
| 1    | Water outlet hose, 50 mm (2") dia., 2 m (6.6')                                        |
| 3    | Worm hose clamps                                                                      |
| 3    | Elbow pipes                                                                           |
| 1    | Filter tube connection kit                                                            |
| 10   | Filter tubes                                                                          |
| 1    | Manual set                                                                            |

### 4.3 Lift the machine


**CRUSHING HAZARD**

Take care of your fingers when handling the machine.  
Wear safety shoes when handling heavy machinery.



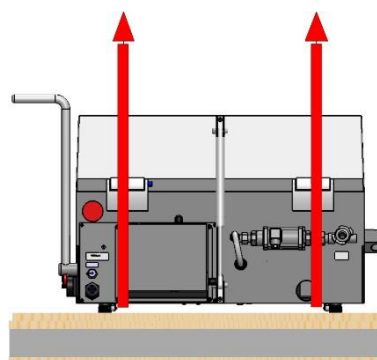
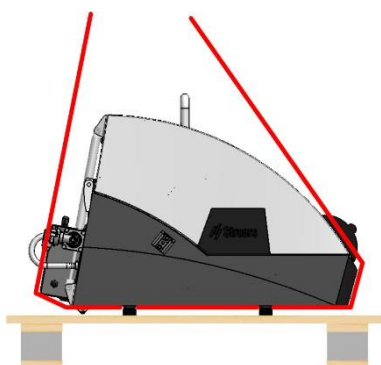
**CAUTION**

The machine is heavy. Always use a crane and lifting strap.

**Weight**

Labotom-5      75 kg (165 lbs)

1. Lift Labotom-5 with a crane by placing straps underneath the base of the machine, on the left side and on the right side.



2. Lift the machine onto the table.
3. Remove the straps.
4. To fine-tune the placement of the machine, lift the front and carefully move into place using the rollers.
5. Check that the machine is resting securely with all 4 rubber feet on the table.

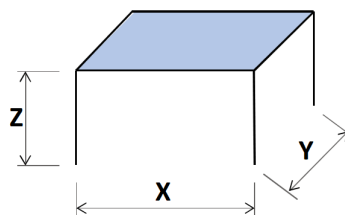
## 4.4 At the new location

**Recommended workbench dimensions**

**Z:**      80 cm / 31.5" (height)

**X:**      92 cm (36.2") (width)

**Y:**      90 cm (35.4") (depth)



The workbench must be able to carry at least 200 kg (440 lbs).

1. Install the machine close to the power supply, the exhaust system and the cooling system.
2. Install the machine in a room with sufficient light.

3. Place the machine on a rigid, stable workbench with a horizontal surface and an adequate height. You can easily adjust the position of the machine with the 2 wheels on Labotom-5 at the rear.
4. Make sure that the machine is level and that all 4 feet rest on the workbench.

### 4.5 Power supply

**ELECTRICAL HAZARD**

The machine must be earthed (grounded).  
Switch off the electrical power supply before installing electrical equipment.

**ELECTRICAL HAZARD**

Make sure that the actual electrical power supply voltage corresponds to the voltage stated on the name plate of the machine.  
Incorrect voltage can damage the electrical circuit.

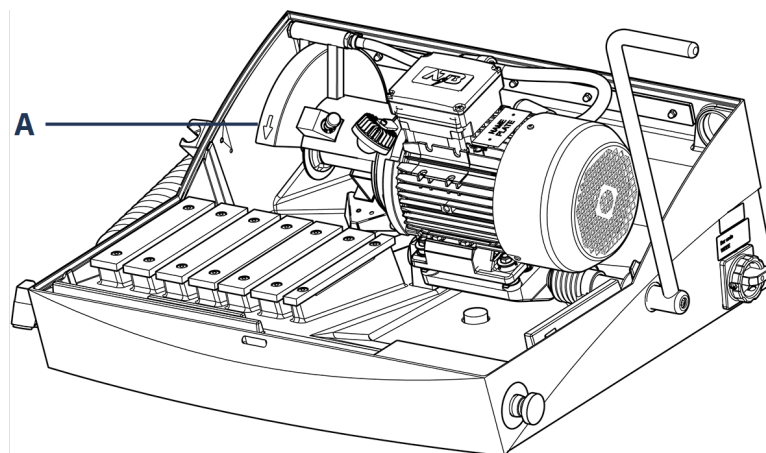
#### 4.5.1 Connection to the machine

Labotom-5 is factory-mounted with an electrical cable (3 m (9.8")).

Mount an approved plug on the cable or hard-wire into the power supply according to electrical specifications of your unit and local regulations:

| EU cable                     | UL cable                                |
|------------------------------|-----------------------------------------|
| L1: Brown                    | L1: Black                               |
| L2: Black                    | L2: Red                                 |
| L3: Black/Gray               | L3: Orange/Turquoise                    |
| Earth (ground): Yellow/Green | Earth (ground): Green (or Yellow/Green) |
| Neutral: Blue - Not used     | Neutral: White - Not used               |

Make sure that the cut-off wheel rotates in the correct direction as indicated on the cut-off wheel guard. If the direction of rotation is incorrect, switch 2 of the phases.



**A** Cut-off wheel guard

#### 4.5.2 Electrical data and external short circuit protection



##### **ELECTRICAL HAZARD**

The machine must always be protected by external fuses. See the table below for the fuse size required.

| Voltage/frequency   | Maximum load | Maximum external fuse |
|---------------------|--------------|-----------------------|
| 3 x 200 V-50 Hz     | 19.2 A       | 40 A                  |
| 3 x 200-210 V-60 Hz | 20.8 A       | 30 A                  |
| 3 x 220-230 V-50 Hz | 17.0 A       | 40 A                  |
| 3 x 220-240 V-60 Hz | 18.4 A       | 30 A                  |
| 3 x 380-415 V-50 Hz | 10.6 A       | 40 A                  |
| 3 x 380-415 V-60 Hz | 11.4 A       | 30 A                  |
| 3 x 460-480 V-60 Hz | 10.4 A       | 30 A                  |

#### 4.5.3 Residual Current Circuit Breaker (RCCB)



##### **Note**

Local standards can override the recommendations for the main electrical power supply cable. Always contact a qualified electrician to verify which option is suitable for the local installation setup.

##### **Requirements for electrical installations**

**With Residual Current Circuit Breakers (RCCB) - Required**

Type A, 30 mA or better

## 4.6 Connect the cooling system

To ensure optimal cooling, mount a recirculation cooling unit on the machine. This is sold separately.



### **ELECTRICAL HAZARD**

The pump of the recirculation cooling unit must be earthed (grounded). Make sure that the electrical power supply voltage corresponds to the voltage stated on the name plate of the pump. Incorrect voltage can damage the electrical circuit.



### **Note**

Before you connect the recirculation unit to the machine, you must prepare it for use. See the Instruction Manual for this unit.



### **Note**

Struers recommends that the flushing gun is operated at a pressure of max. 3 bar.



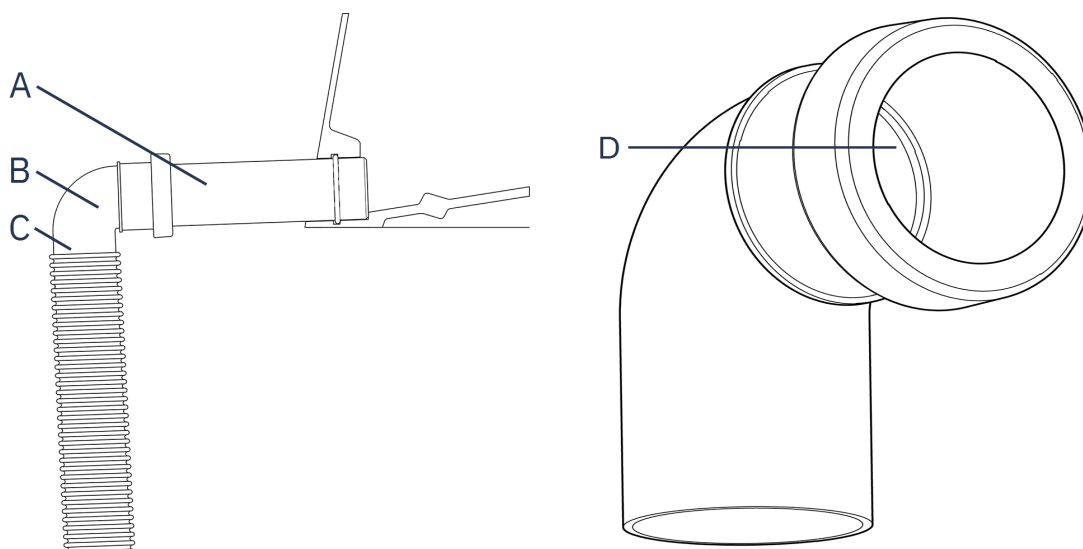
### **Note Consumables**

- Add a Struers anti-corrosion additive to the coolant.
- The use of Struers consumables is recommended.

Other products may contain aggressive solvents, which dissolve e.g. rubber seals. The warranty may not cover damaged machine parts (e.g. seals and tubes), where the damage can be directly related to the use of consumables not supplied by Struers.

#### 4.6.1 Connect the water outlet to the cooling system

1. Insert the drain pipe (A) in the water outlet on the back of the machine.
2. Mount the 90° elbow pipe (B).
3. Lubricate the sealing ring (D) on the elbow pipe with grease or soap to facilitate insertion.
4. Strip the steel spring from approx. 3 cm of the outlet hose (C) and cut it away. Bend the cut end towards the center of the hose. Mount the outlet hose onto the elbow pipe and clamp the stripped section using a hose clamp.
5. Check that the outlet hose slopes downwards when connected.
6. Insert the open end of the hose into mounting hole in the bracket on top of the Cooli filter unit. If necessary, adjust the length of the hose.
7. Connect the cooling unit to the power supply.



#### 4.6.2 Connect the water inlet from the cooling system

1. Connect the Cooli water inlet hose to the Cooli pump using the quick coupling.
2. Connect the other end of the hose to the quick coupling of the machine's water inlet.

#### 4.6.3 Connect the communication cable to the cooling system

- Connect the communication cable from the cooling system control unit to the control socket on the machine.

### 4.7 Connect to an exhaust system

Labotom-5 must be connected to an external exhaust system as workpieces may emit harmful or unpleasant gases when cut.

You can connect Labotom-5 to an exhaust system via a hole on the rear of the cabinet.

1. Remove the red plug from the exhaust hole.
2. Insert the pipe (50 mm (2") diameter) into the exhaust hole.

**Note**

Check that the end of the pipe is level with the wall of the Labotom-5 and does not protrude into the cutting chamber.

3. Mount the exhaust hose from your exhaust system onto the pipe.
4. Clamp the exhaust hose using a hose clamp.

**Specifications**

See the section [Technical Data Sheet ► 49](#).

### 4.8 Noise

For information on the sound pressure level value, see this section: [Technical Data Sheet ► 49](#).

**CAUTION**

Prolonged exposure to loud noises may cause permanent damage to a person's hearing.

Use hearing protection if the exposure to noise exceeds the levels set by local regulations.

**Handling noise during operation**

Different materials have different noise characteristics. To reduce the noise level, decrease the rotational speed and/or the force with which the cut-off wheel is pressed against the workpiece. Processing time may increase.

### 4.9 Vibration

For information on the total vibration exposure to hand and arm, see this section: [Technical Data Sheet ► 49](#).

**CAUTION**

Risk of hand to arm vibration during manual preparation.

Prolonged exposure to vibration may cause discomfort, joint damage or even neurological damage.

**Handling vibration during operation**

Manual cutting may cause vibrations in hand and arm. To lower the vibration, decrease the pressure or use a vibration-reducing glove.

Always use recommended Struers clamping solutions to reduce the source of vibration.

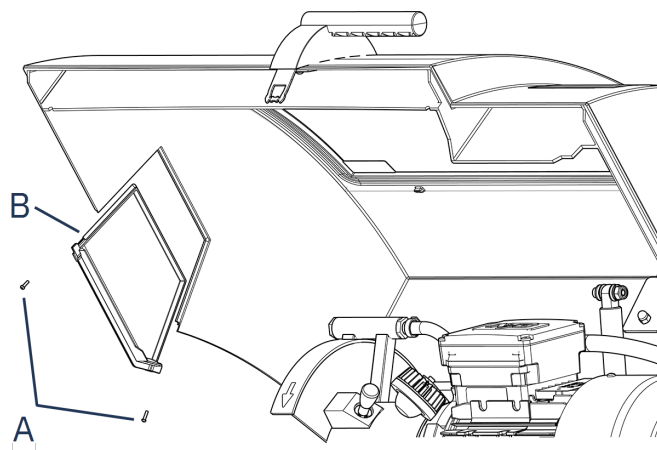
### 4.10 Extension tunnel (option)

An extension tunnel (option) can be useful if you are working with large workpieces.

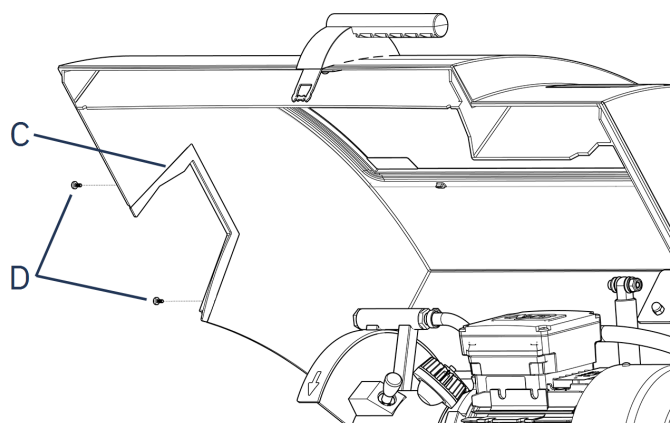
#### 4.10.1 Mount an extension tunnel

If you work with long specimens, it can be helpful to mount an extension tunnel (option) on Labotom-5 in the left-hand side.

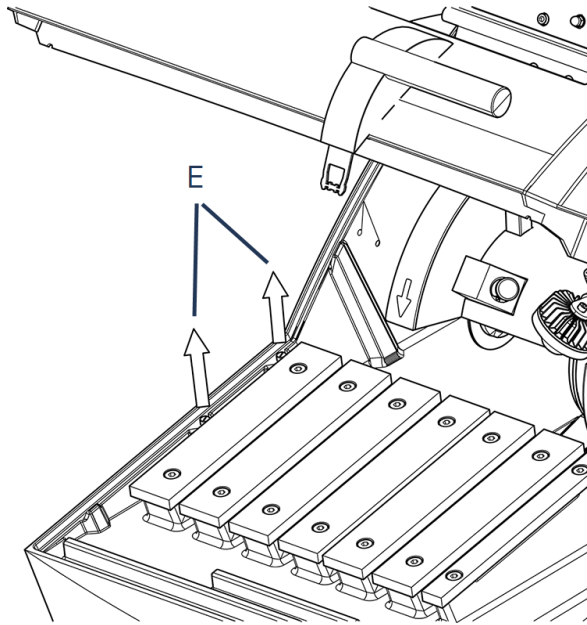
1. Remove the 2 screws (A) from the plate on the left-hand side of the cover.
2. Remove the plate (B).



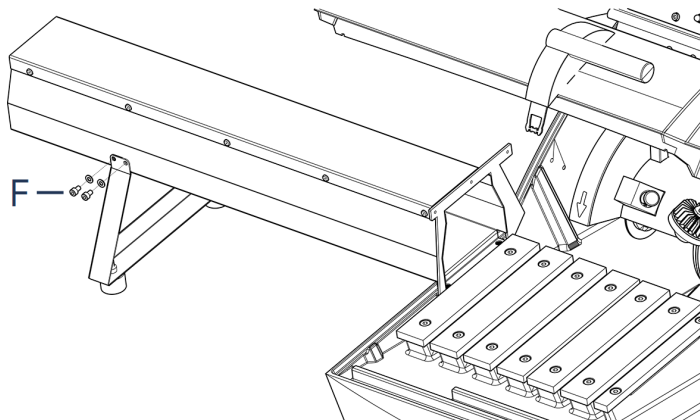
3. Insert the door blinder (C) and mark the 2 holes on the cabinet.
4. Mark 2 holes on the cabinet and drill 3 mm screw holes in the marked positions (D).
5. Fix the door blinder with the 2 screws (D).



6. Remove the 2 hole plugs (E) in the base of the cabinet.

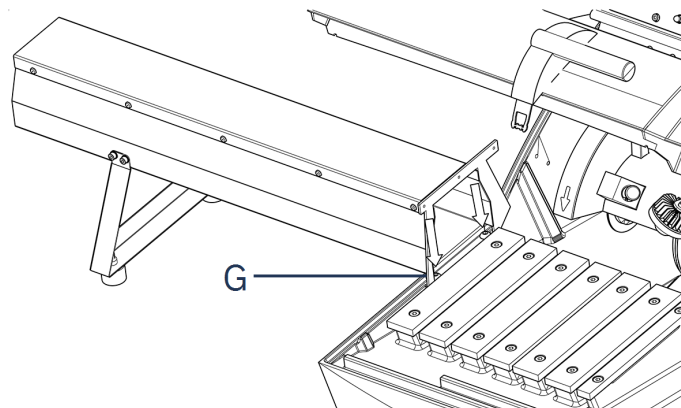


7. Fix the foot using the 4 M5 screws and washers (F).

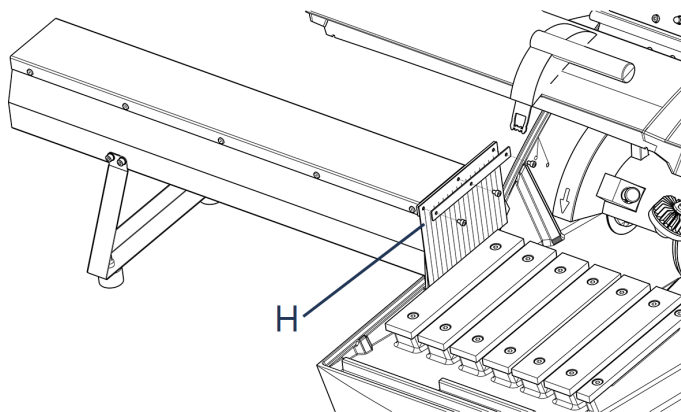




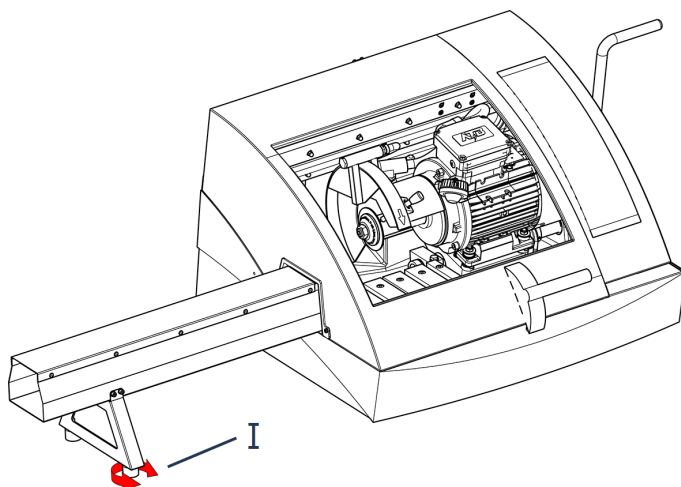
8. Mount the extension tunnel on the left hand side of the cutting chamber using the 2 M8 screws (G).



9. Mount the rubber curtain with the M4 screws (H).



10. Adjust the angle of the extension tunnel by turning the foot of the support (I) until it is completely level (use a spirit level).



## 5 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.

### 5.1 Transport



#### **ELECTRICAL HAZARD**

Disconnecting the unit from the electrical power supply must only be done by a qualified technician.



#### **CAUTION**

The machine is heavy. Always use a crane and lifting strap.



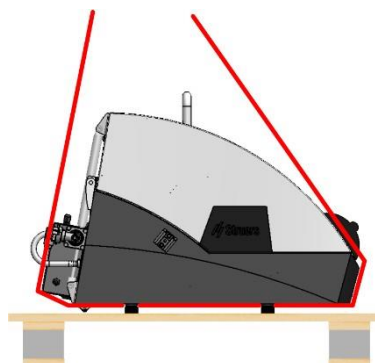
#### **Note**

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

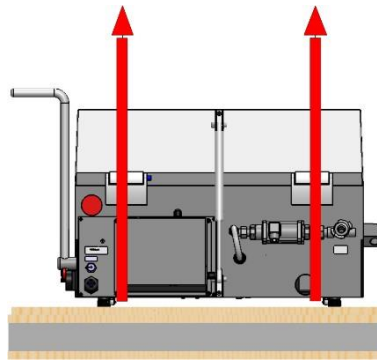
#### **Procedure**

To transport the machine safely, follow these instructions.

1. Disconnect the electrical power supply.
2. Disconnect the cooling system, if installed. See the instructions for the specific unit. Move the cooling system out of the way.
3. Disconnect the exhaust system.
4. Place the lifting straps on the inside of the rubber feet. Straps must be approved of at least twice the weight of the machine.



5. Lift Labotom-5 with a crane by placing straps underneath the base of the machine, on the left side and on the right side.



6. Move the unit to its new position.

#### **If the machine is bound for long-time storage or shipping**

1. Place the machine on the original pallet.
2. Secure the machine using the original transport brackets. Fasten the 8 coach bolts with a torque bit T30 key.
3. Build the crate.
4. Place the accessories box and other loose items in the crate.
5. To keep the machine dry, plastic wrap the machine and place a bag of dessicant (silica gel) with the machine.

## **5.2 Storage**



#### **Note**

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

- Disconnect the unit from the electrical power supply.
- Remove any accessories.
- Clean and dry the unit before storage.
- Place the machine and accessories in their original packaging.

# **6 Operate the device**

## **6.1 Cut-off wheels**



#### **CAUTION**

Do not use the machine with non-compatible accessories or consumables.

Cut-off wheels are ordered separately.

### 6.1.1 Selecting a cut-off wheel

For information on how to select the correct cut-off wheel, see the section on Cutting on the Struers website.

### 6.1.2 Mount and dismount a cut-off wheel

1. Push the cutting handle backwards until the cutting unit is in its rear-most position.
2. Press the pin for the spindle lock on the right side of the cut-off wheel guard.
3. Turn the cut-off wheel until the spindle lock clicks.
4. Remove the nut with the spanner.
5. Remove the washer, flange and cut-off wheel (if mounted)
6. Mount a new cut-off wheel, flange, washer and nut.
7. Tighten the nut securely with the spanner and release the spindle lock.

**Note**

The spindle on the machine is left-hand threaded.

**Note**

Place conventional cut-off wheels, such as  $\text{Al}_2\text{O}_3/\text{SiC}$  between 2 cardboard discs in order to protect the cut-off wheel and the flanges.  
For maximum precision with diamond or CBN cut-off wheels, do not use cardboard discs.

## 6.2 Clamping devices

**WARNING**

If you are working with a round workpiece, make sure that it is securely fixed. If it is not, it can roll out of the cutting chamber and land on your feet.

**CAUTION**

Do not use the machine with non-compatible accessories or consumables.

There are several types of clamping devices available as accessories. Most of these are mounted directly on the cutting table while others, especially for very small workpieces, need to be fixed on a stand using a dovetail holder. Find a few examples below for vertical quick clamping devices and quick clamping devices.

Clamping devices are ordered separately.

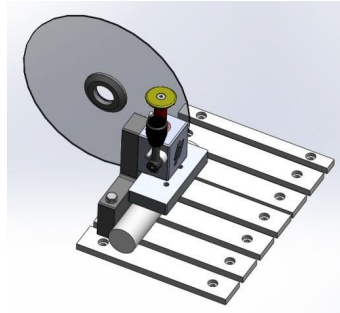
**Note**

When you fit clamping devices, make sure they do not come in contact with the cut-off wheel. If this happens, the clamping devices may be damaged.

### 6.2.1 Position clamping devices

- Always position clamping devices parallel to the cutting table. You can use a ruler to check that the clamping device is not at an angle to the cutting table.

### 6.2.2 Vertical quick clamping devices



#### For workpieces less than 40 mm dia.

- Mount the vertical quick clamping device at least 15 mm from the back of the cutting table for optimal cutting and for easy replacing of the cut-off wheel.

#### For workpieces larger than 40 mm dia.

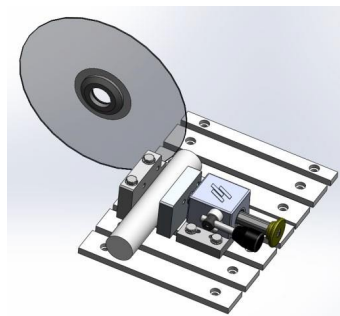
- Place the vertical quick clamping tool closer to the back.



#### Note

Make sure that the nut on the cutting unit cannot come into contact with the clamping plate.

### 6.2.3 Mount a quick clamping device



1. Mount the back stop for the quick clamping device on the left side of the cutting table. Do not tighten the screws.
2. Place the back stops where you need them. Tighten the screws with the spanner.
3. Mount the quick clamping device on the left hand side of the cutting table. Adjust their positions to fit the dimensions of the workpiece.

4. Tighten the screws with the spanner.

## 6.3 Line laser (option)

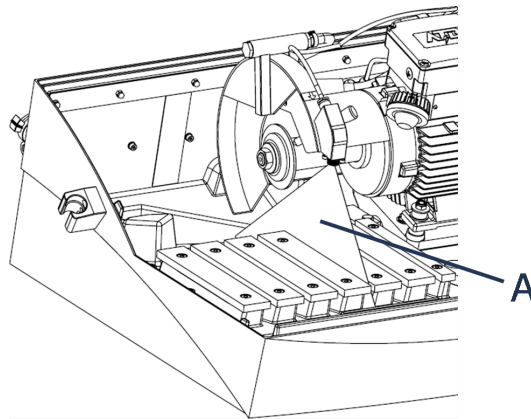


### **WARNING: LASER BEAM**

Laser radiation. Do not stare into beam. Class 2 laser product.

For more information on the line laser, see: [Technical Data Sheet ► 49](#).

The laser beam indicates the position of the cut for a precise placement of the workpiece.



**A** Laser beam

The laser is automatically activated when the machine is switched on, and it is deactivated when you start the machine.

## 6.4 Basic operation



### **CAUTION**

Always close the safety guard carefully to avoid injuries.



### **CAUTION**

Always wear safety shoes when handling workpieces.



### **HEAT HAZARD**

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

### 6.4.1 Control panel functions

| Button/LED                                                                        | Function                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Start</b></p> <p>Starts the machine. The cut-off wheel starts rotating and the cooling water pump is turned on.</p> <p>You cannot activate this function if the safety guard is open, or if the cutting motor is overloaded.</p> |
|  | <p><b>Stop</b></p> <p>Stops the machine. The cut-off wheel stops rotating.</p> <p>The cooling water pump is turned off.</p>                                                                                                            |
|  | <p><b>Flush</b></p> <p>Starts the cooling water pump. Press on the rear of the flushing gun to start and regulate flushing.</p>                                                                                                        |

### 6.4.2 Clamping the workpiece

The most convenient method for clamping workpieces is using the Struers quick clamping device (sold separately).

1. Use the flushing gun to clean the cutting table.
2. Place the workpiece under the clamp of a quick clamping device, on the left side of the cutting table.
3. Adjust the position of the clamping tools if necessary.
4. Use the socket spanner to tighten the clamping device.
5. Lower the cut-off wheel to check the position of the cut.
6. Turn the handle on the clamping device to the vertical position.
7. Push the clamping device downwards on the workpiece and lock it in place pushing the locking handle forward. See : [Vertical quick clamping devices ► 29](#).



**Note**

Make sure that the workpiece is firmly and securely fixed in the clamping device. If it is not, the workpiece can loosen and cause the cut-off wheel to break and/or unintended deformations to the workpiece and accessories.

For best placing of the clamping device, see [Clamping devices ► 28](#).

#### Long work pieces

**Right-hand side:**

1. Place the workpiece without clamping it.

2. Position the workpiece so that it can pass through the rubber curtain when the cover is closed.
3. Check that the tilting cutting unit can pass when you cut.
4. Clamp the workpiece.

### Left-hand side:

Place the workpiece in the optional extension tunnel and clamp securely.

### 6.4.3 Start and stop the cutting process



#### **WARNING**

Wear gloves when flushing and cleaning the machine.



#### **HEAT HAZARD**

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

1. Switch on the machine.
2. Close the safety guard.
3. Press **Start**. The cut-off wheel starts rotating.



4. The cooling water starts to flow.
5. Carefully move the cut-off wheel towards the workpiece by pulling the cutting handle until it is in contact with the workpiece.
6. Make a small notch into the workpiece.

If a new cut-off wheel is used, position the cut-off wheel so that it just touches the workpiece until the edge of the cut-off wheel is worn equally around the entire diameter.

7. Pull the handle to continue cutting with force and speed suited to the material and the cut-off wheel.
8. Reduce the cutting force when the cut-off wheel has almost cut through the material.
9. When you finish cutting through the workpiece, return the cutting handle to the start position.
10. Press **Stop** to stop the cut-off wheel and the coolant.



11. Wait until the safety lock is released before you open the safety guard.



#### **Note**

Check that there is a steady flow of coolant from the nozzles.



**Note**

The safety guard on Labotom-5 has a safety guard lock. The motor will not start as long as the safety guard is open. Leave the safety guard open when the machine is not in use to let the cutting chamber dry completely. This can prevent corrosion from condensation.

**Emergency stop****Note**

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

1. To activate the emergency stop, press the red emergency stop button.
2. Before you release the emergency stop, investigate the reason for activating the emergency stop and take any necessary corrective action.
3. To release the emergency stop, turn the red emergency stop button clockwise.

## 7 Maintenance and service - Labotom-5

Proper maintenance is required to achieve the maximum up-time and operating lifetime of the machine. Maintenance is important in ensuring continued safe operation of your machine.

The maintenance procedures described in this section must be carried out by skilled or trained personnel.

**Safety Related Parts of the Control System (SRP/CS)**

For specific safety related parts, see the section "Safety Related Parts of the Control System (SRP/CS)" in the section "Technical data" in this manual.

**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 Daily

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

**WARNING**

Do not use acetone, benzol or similar solvents.

**Note**

Clean all accessible surfaces with a soft, damp cloth.  
Do not use a dry cloth as the surfaces are not scratch resistant.  
Never use alcohol to clean the lamp glass. Only use a damp cloth.  
Grease and oil can be removed with ethanol or isopropanol.

**Note**

Clean the cutting chamber with the flushing gun, especially the T-slot cutting table.

**Note**

Leave the safety guard open when the machine is not in use to let the cutting chamber dry completely. This can prevent corrosion from condensation.

### 7.1.1 Flushing gun

**CAUTION**

Avoid skin contact with the coolant additive.  
Do not start flushing until the flushing gun points into the cutting chamber.  
Only use the flushing gun for cleaning inside the cutting chamber.  
Always wear safety goggles while using the flushing gun.

1. Remove the flushing gun from the holder.
2. Point the gun into the flushing chamber.
3. Open the valve on the flushing gun.
4. To avoid splashing water while cleaning, use the valve located just before the flushing gun to reduce the maximum water pressure.
5. Select **Flush** to start the water pump.



6. Press the rear of the nozzle and clean the cutting chamber.
7. Press **Stop** to stop flushing.



8. Close the valve and place the flushing gun back in the holder.
9. Leave the safety guard open to allow the cutting chamber to dry and to avoid corrosion.

**Note**

Always place the flushing gun back in its holder after use.  
Do not use the flushing gun to clean the safety guard as this can result in water dripping when the safety guard is open.  
We recommend that the flushing gun is operated at a pressure of max. 3 bar.

### 7.1.2 Cleaning the cooling system

See the Instruction Manual for this unit.

### 7.1.3 Checking the safety guard



**WARNING**

The safety guard must be replaced immediately if the protective screen has been weakened by collision with projectile objects or if you see any visible signs of deterioration or damage. Contact Struers Service.

- Visually inspect the safety guard and screen for signs of wear and damage, e.g. dents, cracks or damage to the edge sealing.



**Note**

Leave the safety guard open when the machine is not in use to let the cutting chamber dry completely. This can prevent corrosion from condensation.

### 7.1.4 Checking the cut-off wheel guard

Visually inspect that the cut-off wheel guard is intact.

### 7.1.5 Checking the safety guard lock

You must check the safety guard lock tongue regularly for damage and to make sure that it fits perfectly in the locking mechanism.

- Check the safety guard lock tongue for correct function. It must slide unobstructed into the locking mechanism.

## 7.2 Weekly

### 7.2.1 Weekly cleaning

Clean the machine regularly to avoid damaging effects to the machine and the specimens from abrasive grains or metal particles.

1. Clean all painted surfaces and the control panel with a soft damp cloth and common household detergents.
2. Clean the safety guard with a soft damp cloth and a common household anti-static window cleaning agent. Never use harsh or aggressive cleaning agents.



**Note**

Make sure that no detergent or cleaning agent is flushed into the cooling unit tank, as this will cause excess foaming.

### 7.2.2 Cutting chamber

1. Remove the clamping devices.
2. Clean the cutting chamber thoroughly:

- Clean under the cutting table with the flushing gun and a brush to remove accumulated swarf behind the cutting unit.
- Wipe the gutter on the inside of the cutting chamber hood and remove accumulated swarf.

**Note**

Leave the safety guard open to allow the cutting chamber to dry and to avoid corrosion.

**Note**

Clean the cutting chamber thoroughly if Labotom-5 is not used for a longer period of time.

### 7.2.3 Cleaning the clamping devices

1. Clean and lubricate the clamping devices thoroughly.
2. Store the clamping devices in a dry place, or place them on the cutting table after cleaning.

### 7.2.4 Cooling system

- Check the level of the coolant after 8 hours of use or at least every week.
- Check, and if necessary, clean the filters.

## 7.3 Monthly

### 7.3.1 Replacing the coolant

**WARNING**

Do not use the machine with non-compatible accessories or consumables.

**CAUTION**

Avoid skin contact with the coolant additive.  
Always use goggles or a protective shield, and chemical-resistant gloves.

**CAUTION**

Do not start flushing until the flushing gun points into the cutting chamber.

**Note**

Only use the flushing gun for cleaning inside the cutting chamber.

- Replace the coolant at least once a month.

### 7.3.2 Maintaining cutting tables

- Replace the stainless steel bands if they are damaged or worn.

## 7.4 Annually

### 7.4.1 Inspecting the safety guard


**WARNING**

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

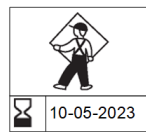

**WARNING**

The safety guard must be replaced immediately if the protective screen has been weakened by collision with projectile objects or if you see any visible signs of deterioration or damage. Contact Struers Service.


**WARNING**

The safety guard screen must be replaced every 5 years to ensure its intended safety. A label on the screen indicates when it must be replaced.

**Struers**  
PETG Safety Glass  
PETG Sicherheitsglas  
PETG Verre sécurit



The safety guard consists of a combined frame and PETG screen that protects the operator. If the safety guard or the screen is damaged, the safety guard must be replaced.

- Visually inspect the safety guard and the screen for signs of wear or damage (e.g. dents, cracks, damage to the edge sealing)


**Note**

Inspect the safety guard at regular intervals if you use the machine for more than one 7-hour shift a day.

### 7.4.2 Cleaning the nozzle on the flushing gun

1. Unscrew the nozzle on the flushing gun using a shifting spanner.
2. Rinse the nozzle under clean, running water.

## 7.5 Cut-off wheels


**CAUTION**

Do not use the machine with non-compatible accessories or consumables.

Cut-off wheels are ordered separately.

### 7.5.1 Testing cut-off wheels

Cut-off wheels must be tested before use.

**Testing an abrasive cut-off wheel for damage**

1. Visually inspect the surface for cracks and chips.

2. Mount the cut-off wheel, close the guard and let the wheel rotate with full speed.

If there is no visible damage and the cut-off wheel did not break during the high-speed test, it passed the test. If the cut-off wheel shows cracks, it is unsafe to use and must be replaced.

#### **Testing a diamond/CBN cut-off wheel for damage**

1. Let the cut-off wheel hang over your index finger.
2. With a pencil (not metal), gently tap the cut-off wheel around the edge.
3. The cut-off wheel passes the test if it gives a clear metallic tone when tapped. If the cut-off wheel sounds dull or muted, it is cracked and unsafe to use and must be replaced.

### **7.5.2 Storing conventional cut-off wheels**

Conventional cut-off wheels are sensitive to humidity. Therefore, do not mix new, dry cut-off wheels with used humid ones.

Store the cut-off wheels in a dry place, horizontally on a plane support.

### **7.5.3 Storing diamond and CBN cut-off wheels**

Follow these instructions carefully to maintain the precision of diamond and CBN cut-off wheels:

- Never expose the cut-off wheel to a heavy mechanical load or heat.
- Store the cut-off wheel in a dry place, horizontally on a plane support, preferably under light pressure.
- Clean and dry the cut-off wheel before storing to avoid corrosion. Use household detergents for cleaning.
- Dress the cut-off wheel regularly.

## **7.6 Test the safety devices**



#### **WARNING**

Do not use the machine with defective safety devices. Testing must be performed at least once a year.  
Contact Struers Service.



#### **Note**

Testing should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).

### 7.6.1 Emergency stop

#### Test 1

1. Start a cutting process.
2. Press the Emergency stop.
3. The cutting process and coolant stop. The Emergency stop is working correctly.
4. If the cutting process and coolant do not stop, press the **Stop** button.



5. Do not use the machine.
6. Contact Struers Service.

#### Test 2

1. Press the Emergency stop.
2. Press the Start button.



3. The machine must not be able to start the cutting process or coolant.
4. If the machine or coolant start, press the **Stop** button.



5. Do not use the machine.
6. Contact Struers Service.

### 7.6.2 Safety guard



#### WARNING

The safety guard must be replaced every 5 years to ensure its intended safety. A label on the screen indicates when the safety guard is due to be replaced.

The safety guard has a safety switch system to prevent the cut-off wheel from starting while the safety guard is open.

A locking mechanism prevents the operator from opening the safety guard until the cut-off wheel stops spinning.

### Testing the safety guard

#### Test 1

1. Open the safety guard.
2. Close the safety guard.
3. If the safety-catch does not slide unobstructed into the locking mechanism, do NOT use the machine.
4. Contact Struers Service.

### 7.6.3 Safety guard switch

#### Testing the safety guard switch

##### Test 1

1. Open the safety guard.
2. Press the Start button.



3. The cutting process and coolant cannot be started.
4. If the cutting process and/or coolant start, press the **Stop** button.



5. Do not use the machine.
6. Contact Struers Service.



### 7.6.4 Safety guard lock

#### Test 1

1. Close the safety guard.
2. Press **Start**. The machine starts the cutting process and coolant.



3. Try to open the safety guard. Do NOT use force. The safety guard is locked and cannot be opened.
4. If you can open the safety guard while the machine is running, press the **Stop** button.



5. Do not use the machine.
6. Contact Struers Service.

#### Test 2

1. Close the safety guard.
2. Press **Start** to start a cutting process. The machine starts the cutting process and coolant.



3. Press the **Stop** button.



4. The safety guard must remain locked for minimum 4 seconds after pressing the **Stop** button.
5. If you can open the safety guard before the 4 seconds have passed, close the safety guard again.
6. Do not use the machine.
7. Contact Struers Service.

### 7.6.5 Flushing function

#### Test 1

1. Open the safety guard.
2. Press **Flush** to activate the coolant pump and the flushing gun.



3. If the coolant starts to run from the cut-off wheel guard, press the **Stop** button.



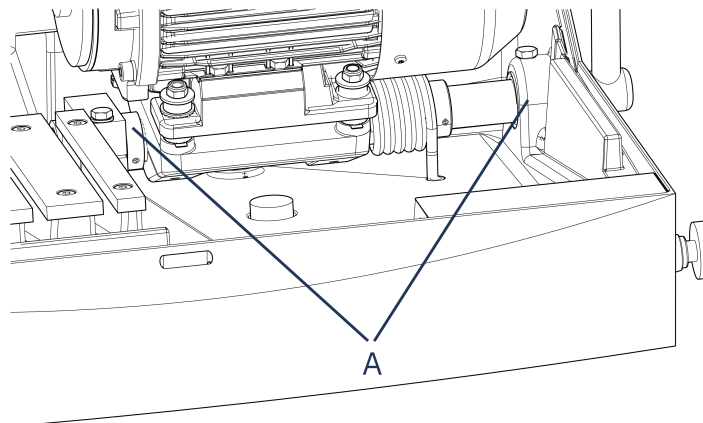
4. Do not use the machine.
5. Contact Struers Service.

## 7.7 Adjustments

### 7.7.1 Adjust the friction

The tilting cutting unit must offer a slight resistance when being moved. Too much friction can be tiring during operation. Too little friction can cause excessive vibrations during cutting.

- Use the 24 mm spanner to adjust the friction in the bearing (A).

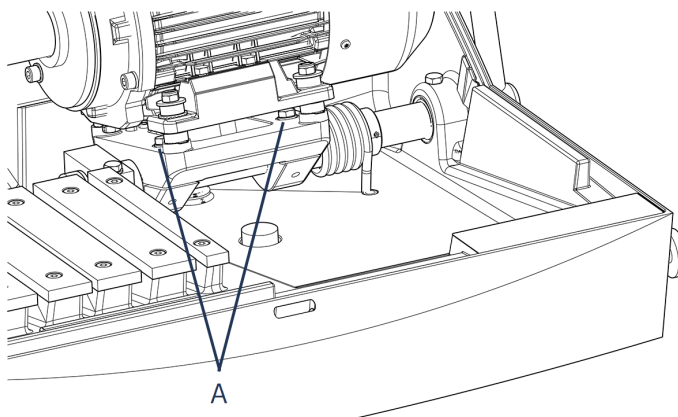


### 7.7.2 Adjust the cutting handle

The cutting handle is factory-mounted in a position which will suit most people when Labotom-5 is placed on a table or workbench 80 cm high.

To change the position:

1. Loosen the 2 screws (A). Take care not to displace the cutting motor axially.



2. Turn the handle to the desired position.
3. Tighten the screws.
4. Check that the cut-off wheel can pass through the middle of the slot in the cutting table.

## 8 Spare parts

For specific safety related parts, see the section "Safety Related Parts of the Control System (SRP/CS)" in the section "Technical data" in this manual.

### Technical questions and spare parts

If you have technical questions or when you order spare parts, state the serial number and the year of production. This information is stated in the name plate on 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).

## 9 Service and repair

Struers recommends that a regular service check be carried out after every 1500 hours of use.



### Note

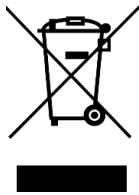
Service must only be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).  
Contact Struers Service.

**Service check**

We offer a range of comprehensive maintenance plans to suit the requirements of our customers. This range of services is called ServiceGuard.

The maintenance plans include equipment inspection, replacement of wear parts, adjustments/calibration for optimal operation, and a final functional test.

## 10 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.

**WARNING**

In case of fire, alert bystanders, the fire brigade and cut power. Use a powder fire extinguisher. Do not use water.

**Note**

The recirculation fluid will contain additive and cutting or grinding swarf. Do not dispose of the recirculation fluid into a main drain. Follow the current safety regulations for handling and disposal of swarf and additive for recirculation fluid.

Keep track of which metals you cut or grind and the amount of swarf produced.

Depending on which metals you cut or grind, it is possible that the combination of the metallic swarf from metals with a large difference in electropositivity, can result in exothermic reactions when favorable conditions are present.

**Examples:**

The following are examples of combinations which can result in exothermic reactions if a large amount of swarf is produced during cutting or grinding on the same machine, and when favorable conditions are present:

- Aluminum and copper.
- Zinc and copper.

# 11 Troubleshooting

## 11.1 The machine

| Error                               | Cause                                                                                                      | Action                                                                                                                                                                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The cut-off wheel does not rotate.  | The safety guard is open.                                                                                  | Close the safety guard. If the error remains, contact Struers Service.                                                                                                          |
|                                     | The safety lock has been deactivated.                                                                      | Reactivate the safety lock release before operating the machine.                                                                                                                |
|                                     | The cutting motor has been overloaded.                                                                     | Open the safety guard and let the machine cool down for at least 5-10 minutes.                                                                                                  |
| No cooling water                    | Valve on the rear of the machine is clogged or disconnected.                                               | Make sure that the valve is not clogged or disconnected.<br>If necessary, unscrew the valve and rinse it under running water.<br>If the error remains, contact Struers Service. |
|                                     | Electrical connection from machine to recirculation unit is open, or the recirculation unit is turned off. | Make sure that the recirculation unit is connected and on.                                                                                                                      |
|                                     | The water level in the recirculation unit is low.                                                          | Fill coolant in the recirculation unit.                                                                                                                                         |
| No water from the flushing gun      | The valve is closed.                                                                                       | Open the valve.                                                                                                                                                                 |
|                                     | The flushing gun is clogged.                                                                               | Clean the flushing gun with water and compressed air.<br>If the error remains, contact Struers Service.                                                                         |
| Rusty workpieces or cutting chamber | Insufficient additive for the coolant.                                                                     | Add more additive to the coolant. Make sure to use the correct concentration.                                                                                                   |
|                                     | The machine is left with closed safety guard.                                                              | Leave the safety guard open when you are not using the machine to let the cutting chamber dry.                                                                                  |

| Error                                                                                                                                                                                                                                                           | Cause                                                | Action                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------|
| Safety guard blurred                                                                                                                                                                                                                                            | Insufficient cleaning.                               | Clean with soapy water.                                                    |
| <div>  <p><b>Note</b><br/>Disconnect the drain pipe to the tank. The soapy water must not run into the recirculation water, as this will cause the water to foam.</p> </div> |                                                      |                                                                            |
| Quick clamping device cannot hold the workpiece                                                                                                                                                                                                                 | The clamping device is not balanced.                 | Adjust the two clamping column screws.                                     |
|                                                                                                                                                                                                                                                                 | Clamping heart worn.                                 | Contact Struers Service.                                                   |
| The laser line does not correspond to the place of cut                                                                                                                                                                                                          | The line laser is not aligned with the inner flange. | Adjust it with the 2 screws between the laser and the cut-off wheel guard. |
| <div>  <p><b>WARNING: LASER BEAM</b><br/>Laser radiation. Do not stare into beam. Class 2 laser product.</p> </div>                                                         |                                                      |                                                                            |

## 11.2 Cutting problems

| Error                                      | Cause                                                                                                | Action                                                                                                                                                                                                                                                                          |
|--------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discoloration or burning of the workpiece. | The hardness of the cut-off wheel is not appropriate for the hardness / dimensions of the workpiece. | Select another type of cut-off wheel.                                                                                                                                                                                                                                           |
|                                            | The force on the cut-off-wheel is too high.                                                          | Apply a lower force.                                                                                                                                                                                                                                                            |
|                                            | Inadequate cooling.                                                                                  | <p>Make sure that there is enough water in the recirculation cooling unit.</p> <p>Check the flow of water by pressing the Flush button.</p> <p>Check the flow of water from the recirculation cooling unit.</p> <p>Clean the coolant tube. If possible, use compressed air.</p> |

| Error                                              | Cause                                                              | Action                                                                                                                                                                              |
|----------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unwanted burrs                                     | Cut-off wheel too hard                                             | Select another type of cut-off wheel.                                                                                                                                               |
|                                                    | Too high force on the cut-off wheel near the end of the operation. | Reduce the cutting force near the end of the operation.                                                                                                                             |
|                                                    | Lack of support.                                                   | If possible, support the workpiece on both sides.                                                                                                                                   |
| The cutting quality is different from time to time | The coolant tube is clogged.                                       | Check the coolant flow by pressing the Flush button.<br>Check the flow of water from the recirculation cooling unit.<br>Clean the coolant tube.<br>If possible, use compressed air. |
|                                                    | Insufficient coolant.                                              | Refill the tank with water and add the additive.                                                                                                                                    |
| The cut bends to a side.                           | Initial cutting rate too fast.                                     | Let the cut-off wheel make a small notch into the workpiece before you make the actual cut.                                                                                         |
|                                                    | The force on the cut-off-wheel is too high.                        | Apply lower force.                                                                                                                                                                  |

| Error                                                | Cause                                       | Action                                                                                                                                                                                                                                 |
|------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The cut-off wheel breaks                             | Incorrect mounting of the cut-off wheel.    | <p>Make sure that the hole has the correct diameter.</p> <p>Make sure that there is a cardboard washer on both sides of the cut-off wheel (Conventional cut-off wheels only).</p> <p>Make sure that the nut is tightened securely.</p> |
|                                                      | Incorrect clamping of the workpiece.        | <p>Make sure that only one side of the workpiece is clamped securely. The other side should only be fixed lightly.</p> <p>Use support tools if the geometry of the workpiece makes support necessary.</p>                              |
|                                                      | Not enough support of the workpiece.        | Support the free end of the workpiece.                                                                                                                                                                                                 |
|                                                      | Cut-off wheel too hard.                     | Use a softer cut-off wheel.                                                                                                                                                                                                            |
|                                                      | The force on the cut-off-wheel is too high. | Apply a lower force on the cut-off wheel.                                                                                                                                                                                              |
|                                                      | Inadequate cooling.                         | <p>Make sure that there is enough water in the recirculation cooling unit.</p> <p>Check the cooling water hoses.</p>                                                                                                                   |
| The cut-off wheel wears down too quickly             | The force on the cut-off-wheel is too high. | Apply a lower force on the cut-off wheel.                                                                                                                                                                                              |
|                                                      | The cut-off wheel is too soft for the task. | Select a harder cut-off wheel.                                                                                                                                                                                                         |
|                                                      | The machine vibrates.                       | Contact Struers Service.                                                                                                                                                                                                               |
| The direction of the cut-off wheel rotation is wrong | Incorrect electrical connection.            | Switch 2 of the phases.                                                                                                                                                                                                                |



| Error                                                | Cause                                                                                       | Action                                                                                                                                                                                                                                            |
|------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The cut-off wheel does not cut through the workpiece | Incorrect choice of cut-off wheel.                                                          | Select an appropriate cut-off wheel for your task.                                                                                                                                                                                                |
|                                                      | Cut-off wheel worn.                                                                         | Replace the cut-off wheel.                                                                                                                                                                                                                        |
|                                                      | The cut-off wheel gets caught in the workpiece because of internal stress in the workpiece. | Support the workpiece and clamp it on both sides of the cut-off wheel allowing the cut to stay open.<br><br>Make a relief cut: Cut about halfway through the workpiece. Turn the workpiece 180° and position the cut approx. 1 - 2 mm off-center. |
| The workpiece breaks when clamped.                   | The workpiece is brittle.                                                                   | Place the workpiece between two polystyrene plates.<br><br>Always cut brittle workpieces very carefully.                                                                                                                                          |
| The workpiece is corroded                            | The workpiece has been left in the cutting chamber for too long.                            | Leave the safety guard open when you leave the machine.                                                                                                                                                                                           |
|                                                      | Insufficient additive in the coolant.                                                       | Make sure that the concentration of additive is correct.                                                                                                                                                                                          |
| Cutting chamber shows signs of corrosion.            | The workpiece is made of Copper/ Copper Alloy.                                              | Use the correct additive for the coolant.                                                                                                                                                                                                         |

## 12 Technical data

### 12.1 Technical Data Sheet

|                            |                                    |                                   |
|----------------------------|------------------------------------|-----------------------------------|
| <b>Capacity</b>            | Height x Length                    | 42 x 120 mm (1.7" x 4.7")         |
|                            | Diameter                           | 90 mm (3.5")                      |
|                            | Cutting length                     | 135 mm (5.3")                     |
| <b>Cut-off wheel</b>       | Diameter                           | 250 mm (10")                      |
|                            | Arbor diameter                     | 32 mm (1.26")                     |
| <b>Cut-off wheel motor</b> | Rotational speed                   | 2910 rpm (50 Hz)/3520 rpm (60 Hz) |
|                            | Height adjustment of cut-off wheel | -                                 |

|                                 |                                            |                                                                |
|---------------------------------|--------------------------------------------|----------------------------------------------------------------|
| <b>Cutting table</b>            | Width                                      | 316 mm (12.4")                                                 |
|                                 | Depth                                      | 225 mm (8.9")                                                  |
|                                 | T-slots                                    | T-slot with exchangeable T-slot plates, 10 mm (6 pcs. + 1 pc.) |
|                                 | Feed speed                                 | Manual control                                                 |
| <b>Laser</b>                    |                                            | Option (Laser class 2)                                         |
| <b>Software and electronics</b> | Controls                                   | Button foil                                                    |
|                                 | Display                                    | -                                                              |
| <b>Safety standards</b>         |                                            | See the Declaration of Conformity                              |
| <b>Operating environment</b>    | Surrounding temperature                    | 5 - 40 °C (41 - 104 °F)                                        |
|                                 | Humidity                                   | 35 - 85 % RH non-condensing                                    |
| <b>Power supply 1</b>           | Voltage/frequency                          | 3 x 200 V (50 Hz)                                              |
|                                 | Power inlet                                | 3L + (N) + PE                                                  |
|                                 | Power S3 60%                               | 2.2 kW (3 hp)                                                  |
|                                 | Power S3 15 %                              | 3.2 kW (4.3 hp)                                                |
|                                 | Current, nominal load                      | 9.6 A                                                          |
|                                 | Current, max.                              | 19.2 A                                                         |
|                                 | Ampere rating of the largest motor or load | 8.6 A                                                          |
| <b>Power supply 2</b>           | Voltage/frequency                          | 3 x 200 - 210 V (60 Hz)                                        |
|                                 | Power inlet                                | 3L + (N) + PE                                                  |
|                                 | Power S3 60%                               | 2.2 kW (3 hp)                                                  |
|                                 | Power S3 15 %                              | 3.2 kW (4.3 hp)                                                |
|                                 | Current, nominal load                      | 10.4 A                                                         |
|                                 | Current, max.                              | 20.8 A                                                         |
|                                 | Ampere rating of the largest motor or load | 9.4 A                                                          |

|                       |                                            |                         |
|-----------------------|--------------------------------------------|-------------------------|
| <b>Power supply 3</b> | Voltage/frequency                          | 3 x 220 - 230 V (50 Hz) |
|                       | Power inlet                                | 3L + (N) + PE           |
|                       | Power S3 60%                               | 2.2 kW (3 hp)           |
|                       | Power S3 15 %                              | 3.2 kW (4.3 hp)         |
|                       | Current, nominal load                      | 8.5 A                   |
|                       | Current, max.                              | 17 A                    |
|                       | Ampere rating of the largest motor or load | 7.5 A                   |
| <b>Power supply 4</b> | Voltage/frequency                          | 3 x 220 - 240 V (60 Hz) |
|                       | Power inlet                                | 3L + (N) + PE           |
|                       | Power S3 60%                               | 2.2 kW (3 hp)           |
|                       | Power S3 15 %                              | 3.2 kW (4.3 hp)         |
|                       | Current, nominal load                      | 9.2 A                   |
|                       | Current, max.                              | 18.4 A                  |
|                       | Ampere rating of the largest motor or load | 8.2 A                   |
| <b>Power supply 5</b> | Voltage/frequency                          | 3 x 380 - 415 V (50 Hz) |
|                       | Power inlet                                | 3L + (N) + PE           |
|                       | Power S3 60%                               | 2.2 kW (3 hp)           |
|                       | Power S3 15 %                              | 3.2 kW (4.3 hp)         |
|                       | Current, nominal load                      | 5.3 A                   |
|                       | Current, max.                              | 10.6 A                  |
|                       | Ampere rating of the largest motor or load | 4.3 A                   |

|                          |                                            |                                                |
|--------------------------|--------------------------------------------|------------------------------------------------|
| <b>Power supply 6</b>    | Voltage/frequency                          | 3 x 380 - 415 V (60 Hz)                        |
|                          | Power inlet                                | 3L + (N) + PE                                  |
|                          | Power S3 60%                               | 2.2 kW (3 hp)                                  |
|                          | Power S3 15 %                              | 3.2 kW (4.3 hp)                                |
|                          | Current, nominal load                      | 5.7 A                                          |
|                          | Current, max.                              | 11.4 A                                         |
|                          | Ampere rating of the largest motor or load | 4.7 A                                          |
| <b>Power supply 7</b>    | Voltage/frequency                          | 3 x 460 - 480 V (60 Hz)                        |
|                          | Power inlet                                | 3L + (N) + PE                                  |
|                          | Power S3 60%                               | 2.2 kW (3 hp)                                  |
|                          | Power S3 15 %                              | 3.2 kW (4.3 hp)                                |
|                          | Current, nominal load                      | 5.2 A                                          |
|                          | Current, max.                              | 10.4 A                                         |
|                          | Ampere rating of the largest motor or load | 4.2 A                                          |
| <b>Cooling system</b>    | Option                                     | Cooling System 3                               |
| <b>Exhaust</b>           | Recommended capacity                       | 50 m <sup>3</sup> /h (1766 ft <sup>3</sup> /h) |
| <b>Advanced features</b> | X-table, manual                            | N/A                                            |
|                          | X-stand, manual                            | N/A                                            |
|                          | Rotary stand                               | N/A                                            |

|                                                    |                                                                |                                                                                                                       |
|----------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Safety<br/>Circuit/Performance<br/>Level</b>    | Main drive<br>emergency stop                                   | PL c                                                                                                                  |
|                                                    | Safety guard safety<br>interlock                               | PL e                                                                                                                  |
|                                                    | Safety guard safety<br>interlock lock                          | PL c                                                                                                                  |
|                                                    | Safety guard safety<br>interlock lock<br>afterrun              | PL b                                                                                                                  |
|                                                    | Safety guard safety<br>interlock lock power<br>failure         | PL c                                                                                                                  |
|                                                    | Coolant emergency<br>stop                                      | PL c                                                                                                                  |
|                                                    | Cutt-off wheel guard<br>cooling outlet<br>protection           | PL c                                                                                                                  |
| <b>Residual Current Circuit<br/>Breaker (RCCB)</b> |                                                                | Type A, 30 mA (or better) is required                                                                                 |
| <b>Noise level</b>                                 | A-weighted sound<br>emission pressure<br>level at workstations | LpA = 70.5 dB(A) (measured value).<br>Uncertainty K = 4 dB(A)<br>Measurements made in accordance<br>with EN ISO 11202 |
| <b>Vibration level</b>                             | Declared vibration<br>emission                                 | Total vibration exposure to upper parts<br>of the body does not exceed 2.5 m/s <sup>2</sup> .                         |
| <b>Dimensions and weight</b>                       | Width (main body)                                              | 70 cm (27.6")                                                                                                         |
|                                                    | Width (with handle<br>and flushing gun)                        | 96 cm (37.8")                                                                                                         |
|                                                    | Width (one tunnel)                                             | Left: 132 cm (52")                                                                                                    |
|                                                    | Width (two tunnels)                                            | N/A                                                                                                                   |
|                                                    | Depth                                                          | 76 cm (30")                                                                                                           |
|                                                    | Height (guard<br>closed, handle<br>included)                   | 53 cm (20.8")                                                                                                         |
|                                                    | Height (guard open)                                            | 90 cm (35.4")                                                                                                         |
|                                                    | Weight                                                         | 75 kg (165 lbs)                                                                                                       |

## 12.2 Safety Related Parts of the Control System (SRP/CS)


**WARNING**

Safety critical components must be replaced after a maximum lifetime of 20 years.  
Contact Struers Service.


**Note**

SRP/CS (safety-related parts of a control system) are parts that have an influence on safe operation of the machine.


**Note**

Replacement of safety critical components must only be performed by a Struers engineer or a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).  
Safety critical components must only be replaced by components with at least the same safety level.  
Contact Struers Service.


**Note**

Replace the PETG screen after a lifetime of 5 years.

### Parts

| Safety related part               | Manufacturer/Manufacturer description | Manufacturer catalog no. | Electrical ref. | Struers catalog no. |
|-----------------------------------|---------------------------------------|--------------------------|-----------------|---------------------|
| Emergency stop                    | Schlegel NC contact                   | MTO                      | S1-S3           | 2SB10071            |
| Emergency stop                    | Schlegel mushroom head                | Rondex RV 22             | S1-S3           | 2SA10400            |
| Emergency stop                    | Schlegel contact holder               | MHR-3                    | S1-S3           | 2SA41603            |
| Safety relay unit                 | Omron                                 | G9SB-3012-A              | KS1             | 2KS10006            |
| Power plug-in relay               | Omron                                 | G2R-1-S24VAC(S)          | K1              | 2KL20124            |
| Motor contactor                   | Omron                                 | J7KN 18D 01 24VAC        | K2, K4          | 2KM71801            |
| Safety guard lock                 | Schmersal Solenoid interlock          | AZM 170SK-02/01ZRK-2197  | YS1             | 2SS00023            |
| Safety hinge                      | Pizzato                               | HP AB052D-KAM            | SS1             | 2SS48085            |
| Solid state multifunctional timer | Omron                                 | H3DS-ML                  | KT1             | 2KT00003            |

| Safety related part    | Manufacturer/Manufacturer description | Manufacturer catalog no. | Electrical ref. | Struers catalog no.  |
|------------------------|---------------------------------------|--------------------------|-----------------|----------------------|
| Coaxial selenoid valve | ASCO                                  | SCG287A001.24/50         | QM1             | 2YM10046             |
|                        | AWEMAR (Alternate)                    | 270A0020/10/M0G38 F 2400 |                 | 2YM10047 (Alternate) |
| Working zone guard     | Struers safety guard with PETG glass  | N/A                      | N/A             | 16040021             |

## 12.3 Diagrams Labotom-5

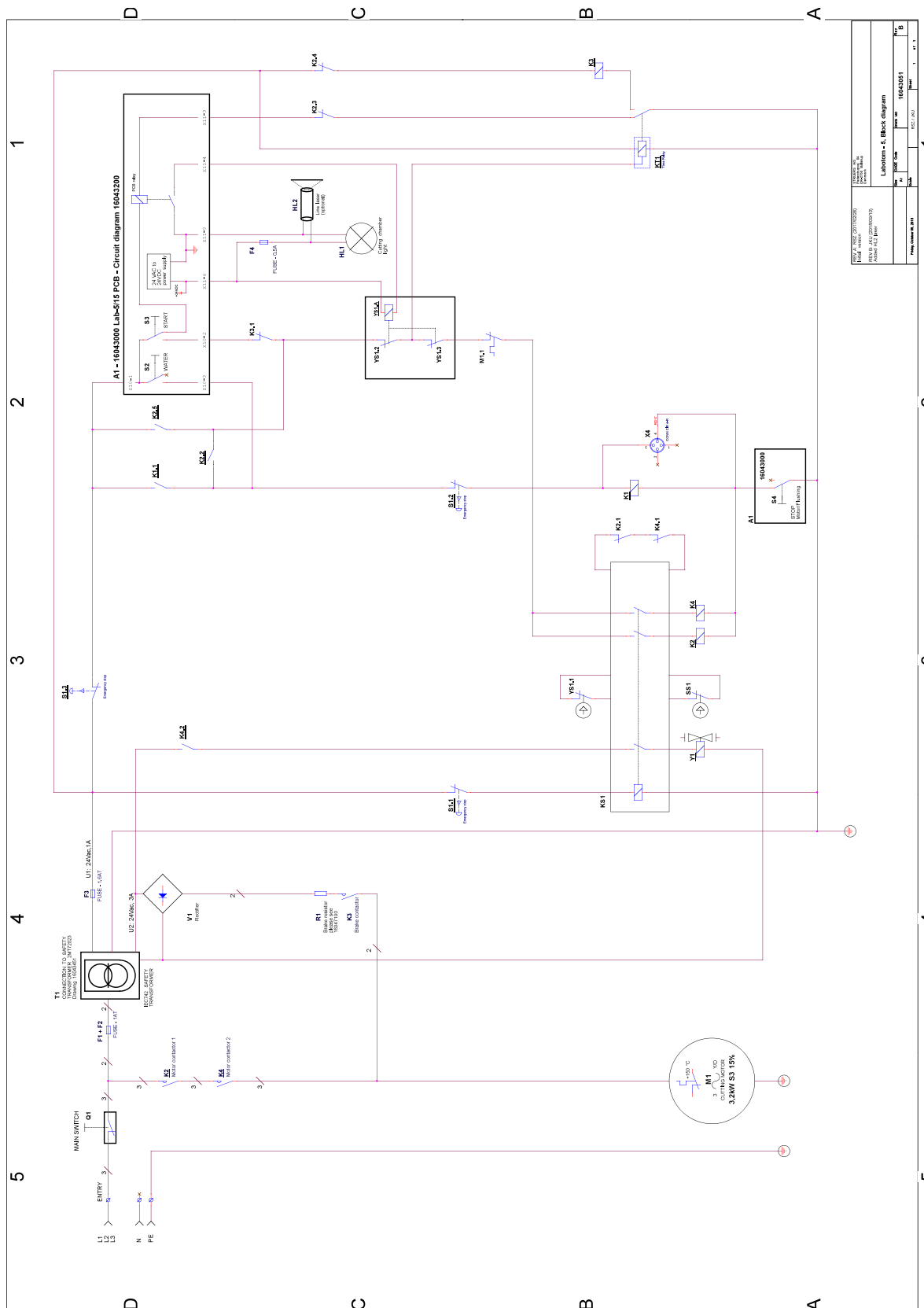


### Note

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

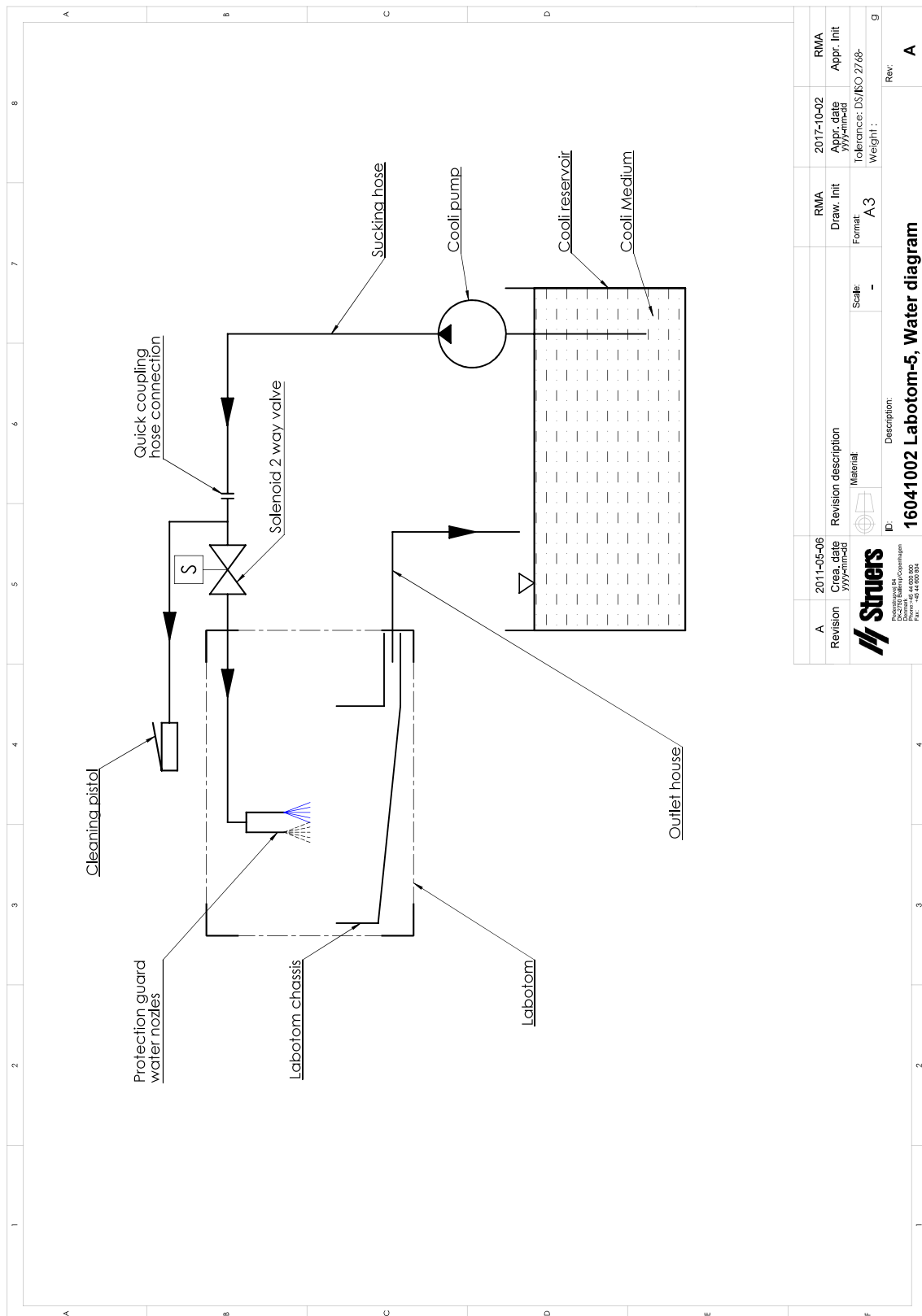
| Title           | No.                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|
| Block diagram   | <a href="#">16043051</a> ► 56                                                                                            |
| Water diagram   | <a href="#">16041002</a> ► 57                                                                                            |
| Circuit diagram | See the diagram number on the name plate of the equipment, and contact Struers Service via <a href="#">Struers.com</a> . |

**16043051**





16041002



|                                  |                                                                   |                                 |                                                                                                                    |                     |                        |                                    |                       |                   |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| <div>A</div> <div>Revision</div> | <div>2011-05-06</div> <div>Crea. date</div> <div>yyyy-mm-dd</div> | <div>Revision description</div> | <div>Material</div> <div></div> | <div>Scale: -</div> | <div>Format: A 3</div> | <div>Tolerance: DS/ISO 2768-</div> | <div>Weight : g</div> | <div>Rev: A</div> | <div>16041002 Labotom-5, Water diagram</div> | <div><div><div>Product 16041002</div><div>Labotom-5</div><div>Water diagram</div><div>Part number 16041002</div><div>Part name Labotom-5</div><div>Part description Water diagram</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 16041002</div><div>Part drawing 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## 12.4 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.

## 13 Manufacturer

Struers ApS  
Pederstrupvej 84  
DK-2750 Ballerup, Denmark  
Telephone: +45 44 600 800  
Fax: +45 44 600 801  
[www.struers.com](http://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 Conformity

|              |                                                                                                                                      |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Manufacturer | Struers ApS • Pederstrupvej 84 • DK-2750 Ballerup • Denmark                                                                          |
| Name         | Labotom-5                                                                                                                            |
| Model        | N/A                                                                                                                                  |
| Function     | Cut-off machine                                                                                                                      |
| Type         | 0604                                                                                                                                 |
| Cat. no.     | Labotom-5<br>06046229, 06046235, 06046246, 06046254, 06046230,<br>06046236, 06046247<br>Accessories equipment:<br>06046903, 06046912 |
| Serial no.   |                                                                                                                                      |



Module H, according to global approach



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

|                             |                                                                                                                                                         |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2006/42/EC</b>           | EN ISO 12100:2010, EN ISO 13849-2:2012, EN ISO 13849-1:2015, EN ISO 13850:2015, EN ISO 16089:2015, EN 60204-1:2018, EN 60204-1-2018/Corr.:2020          |
| <b>2011/65/EU</b>           | EN 63000:2018                                                                                                                                           |
| <b>2014/30/EU</b>           | EN 61000-6-2:2005/Corr.:2005, EN 61000-6-2:2005, EN 61000-6-3:2007, EN 61000-6-3-A1:2011, EN 61000-6-3-A1-AC:2012, EN 61000-3-3:2013, EN 61000-3-2:2014 |
| <b>Additional standards</b> | NFPA 79, FCC 47 CFR Part 15 Subpart B                                                                                                                   |

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Date: [Release date]

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