Struers
Ensuring Certainty

Labotom-20

Instruction Manual

Original Instructions

CE

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Table of Contents

1 About this manual

Instruction Manuals

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.

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

2 Safety

2.1 Intended use

For professional manual wet abrasive cutting of materials for further material inspection and only to be operated by adult/skilled/trained personnel. The machine is intended only to be used with cooling fluids and cut-off wheels developed for this purpose and this 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 may not be used with cutting wheels which are not compatible with the machine requirements (e.g. saw-blade or toothed cut-off wheels).
Model	Labotom-20 Labotom-20 - for tunnels

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.

2.2.1 Labotom-20 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. All functions on the machine and any connected equipment must be in working order.
3. The operator must read the safety precautions and Instruction Manual, as well as relevant sections of the manuals for any connected equipment and accessories. The operator must read the Instruction Manual and, where applicable, the Safety Data Sheets for the applied consumables.
4. The machine must be placed on a safe and stable table with an adequate working height. The table must be able to carry at least the weight of the machine and the accessories.
5. Never look directly into the laser beam.
6. Always use intact cut-off wheels that have been approved for a minimum of: 60 m/s.
7. Do not use the machine with saw-blade type cut-off wheels.
8. Observe the current safety regulations regarding handling, mixing, filling, emptying and disposing of cooling fluids with additives. Avoid skin contact.
9. Wear suitable gloves to protect fingers from abrasives and warm/sharp specimens. Wear gloves when flushing and cleaning the machine.
10. Always wear safety shoes when handling workpieces.
11. Always mark or shield protruding workpieces if they extend outside the machine.

General safety precautions

1. The use of an exhaust system is recommended 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. The machine must be disconnected from the electrical power supply prior to any service.
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. 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.).

2.3 Safety messages

Signs used in 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.

DANGER
This sign indicates a hazard with a high level of risk 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.

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

General messages

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

Hint
This sign indicates that additional information and hints are available.

2.4 Safety messages in this manual

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

ELECTRICAL HAZARD
The machine must be earthed (grounded).
Make sure that the actual electrical power supply voltage corresponds to the voltage stated on the type plate of the machine.
Incorrect voltage can damage the electrical circuit.

ELECTRICAL HAZARD
For electrical installations with Residual Current Circuit Breakers
For Labotom-20 a residual current circuit breaker Type A, 30 mA is required (EN 50178/5.2.11.1).

For electrical installations without Residual Current Circuit Breakers
The equipment must be protected by an insulation transformer (double-wound transformer).
Contact a qualified electrician to verify the solution.
Always follow local regulations.

ELECTRICAL HAZARD
Disconnect the electrical power supply before installing electrical equipment.
Make sure that the actual electrical power supply voltage corresponds to the voltage stated on the type plate of the machine.
Incorrect voltage can damage the electrical circuit.

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 type 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.

CAUTION
Struers equipment must only be used in connection with and as described in the instruction manual supplied with the equipment.

CAUTION
Do not use Labotom-20 if it is damaged.

CAUTION
The safety devices must be tested at least once a year.

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

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

CAUTION
Make sure that the machine is level.

CAUTION
The machine must not operate when it is resting on its wheels.

CAUTION
Avoid skin contact with the cooling fluid additive.

CAUTION
The recirculation tank is very heavy when it is full.

CAUTION
The pressure of the cooling fluid supplied to the machine must be max: 9.9 bar (143 psi).

WARNING
Do not look directly into the laser beam.

CAUTION
Always wear safety shoes when handling workpieces.

3 Getting started

3.1 Device description

Labotom-20 is a manual cut-off machine designed for cutting materialograpic workpieces. The machine is designed for wet abrasive cutting of all stable and non-explosive metals. It must be equipped with a recirculation system for cooling liquid.

Labotom-20 for tunnels can be fitted with tunnels on each side or both sides in case the operator needs to cut long workpieces.

The cutting process starts by securing the workpiece to the cutting table with clamping tools. The equipment is equipped with a laser guide line for positioning of the workpiece.

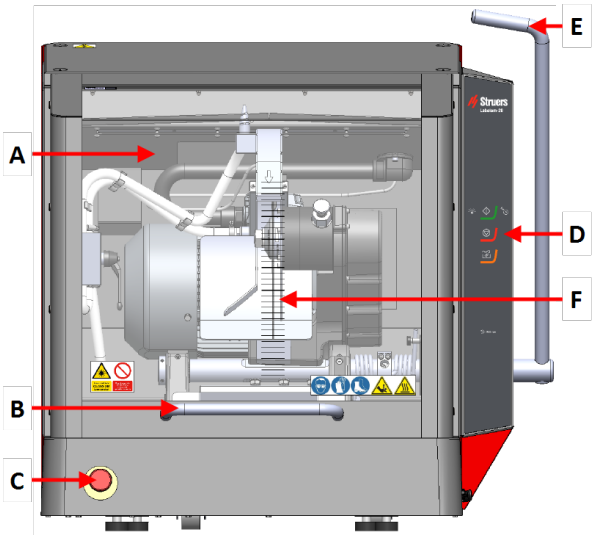
The operator closes the safety guard, which locks when the operator starts the machine. It remains locked for the duration of the cutting. The operator performs the cutting action by manually pulling the handle driving the cut-off wheel through the workpiece. The operator stops the machine and when the cut-off wheel stops, the safety guard lock releases and the workpiece can be removed.

In case of a power loss during a cutting process, the safety guard remains locked. To open the safety guard, use the special key to open the safety lock on the safety guard.

The machine can be connected to an external exhaust system to remove fumes from the cutting process.

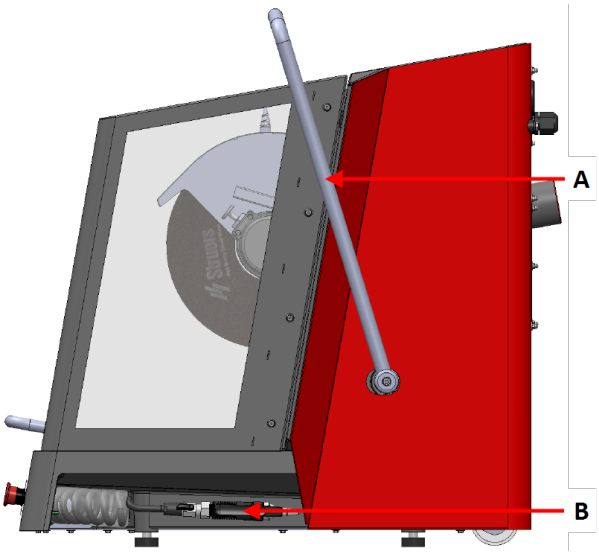
3.2 Overview

Front view



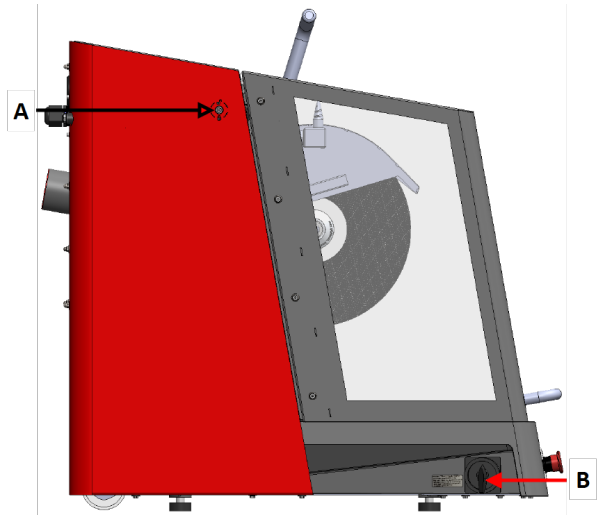
A Safety guard
B Handle for safety guard
C Emergency stop
D Control panel
E Cut-off wheel handle
F Cutting guiding lines

Side view



Right side

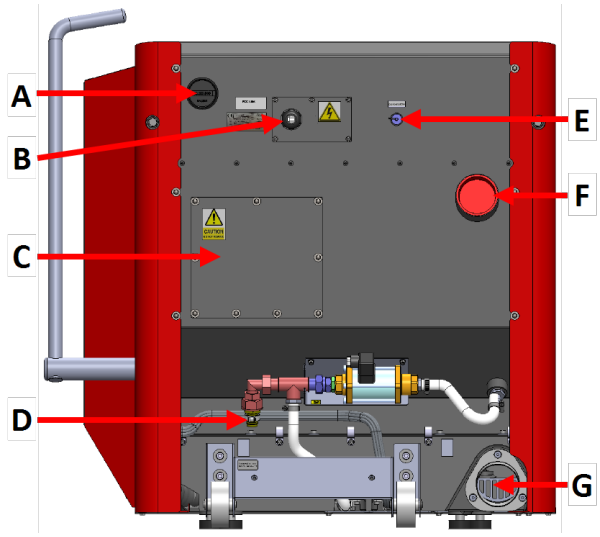
A Cut-off wheel handle
B Flushing gun



Left side

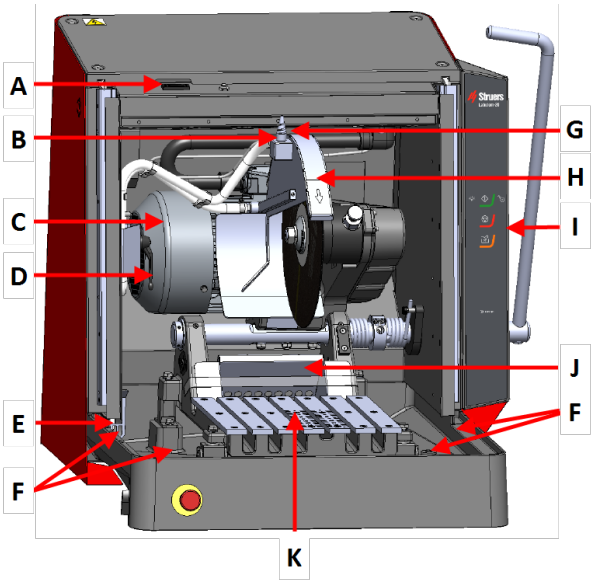
A Safety lock release
B Main switch

Rear view



A Motor turn-on counter
B Power socket
C Compartment for service technician
D Water connection
E Socket for cooling sytem connection
F Connection for exhaust
G Drain

Inside the machine



A Safety lock
B AxioWash
C Cutting motor
D AxioWash on/off
E Drain
F Connection for extension tunnels
G Line laser
H Cut-off wheel guard
I Control panel
J Specimen collector
K Cutting table

3.3 Struers knowledge

Materialographic cutting is where most micro-structure analysis begins.

A good understanding of the cutting process can help in selecting suitable clamping and cutting methods and thereby ensure the high-quality cut.

Minimizing cutting artifacts will help the remaining materialographic process and act as a good base for efficient and high-quality preparation.

Hint
For further information, see the section on Cutting on the Struers website.

3.4 Accessories and consumables

Accessories

For information about the available range, see the brochure for Labotom-20:

- The Struers Website (http://www.struers.com)

Consumables

The equipment 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 Consumables Catalogue (http://www.struers.com/Library)

4 Transport and storage

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

- Package the unit securely before transportation.

  Insufficient packaging could cause damage to the unit and will void the warranty. Contact Struers Service.

- Struers recommends that all original packaging and fittings are kept for future use.

4.1 Transport

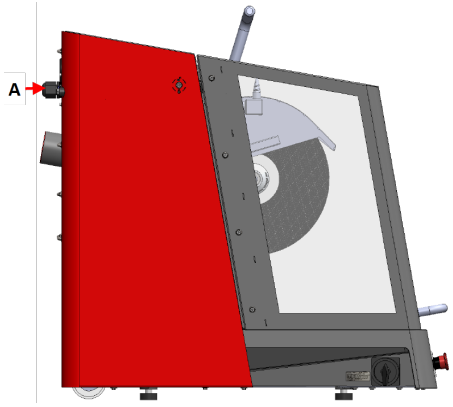
ELECTRICAL HAZARD
Disconnecting the unit from the electrical power supply must only be done by a qualified technician.

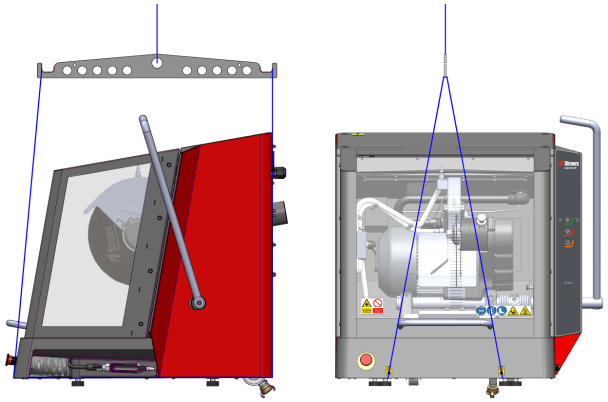
Note
Struers recommends that all original packaging and fittings are kept for future use.

Procedure

To transport the machine safely, follow these instructions.

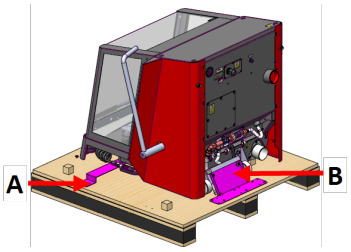
1. Disconnect the electrical power supply.
2. Disconnect the cooling system, if installed. See the instructions for the specific unit. Move the cooling system out of the way.
3. Disconnect the exhaust system.
4. Mount the two distance washers on the rear side of the machine. (**A**)
5. Place the lifting straps on the designated lifting points on the machine
6. Move the unit to its new position.



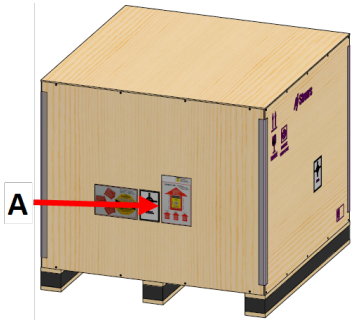


If the machine is bound for long-time storage or shipping

1. Screw the transport brackets into place. Use a torque bit T20 (**A**), and a 6 mm Allen key (**B**).



2. Place the accessories box and other loose items in the crate. To keep the machine dry, plastic wrap the machine and place a bag of desiccant (silica gel) with the machine.
3. Place the crate on the pallet.
4. Make sure that the front of the crate faces the safety guard (**A**).
5. Screw the screws into place to fasten the crate to the pallet. Use a screwdriver PH 2.



A Front of the crate

4.2 Storage

Note
Struers recommends that all original packaging and fittings are kept 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.

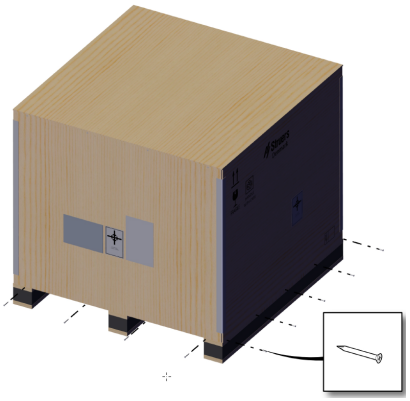
5 Installation

WARNING
Struers equipment must only be used in connection with and as described in the instruction manual supplied with the equipment.

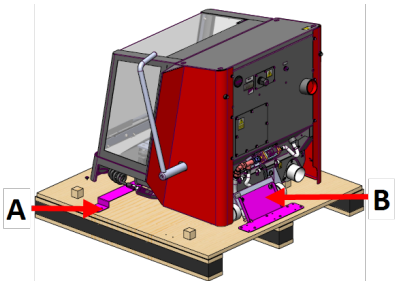
5.1 Unpacking

Note
Struers recommends that all original packaging and fittings are kept for future use.

1. Remove the screws and the crate. Use a screwdriver PH 2.



2. Use a Torque bit T20 to remove the transport bracket (**A**).
3. Use a Torque bit T20 to remove the screws on the pallet (**B**).
4. Use a 6 mm Allen key to remove the screws that fasten the machine to the bracket (**B**).
5. Remove the transport brackets.



5.2 Checking the packing list

Optional accessories may be included in the packing box.

The packing box contains the following items:

Pcs.	Description
1	Labotom-20
1	Open-end wrench, 300 mm, for changing the cut-off wheel
1	Triangular key, for opening the safety guard when the power is off.
1	Elbow pipe for water outlet
1	Drain hose, 2 m (79")
1	Hose clamp
1	Grate for outlet. Use only if you are cutting very small specimens.
1	Lifting console
1	Red plug for exhaust hole (if you are not using an exhaust system)
1	Manual set

5.3 Lifting

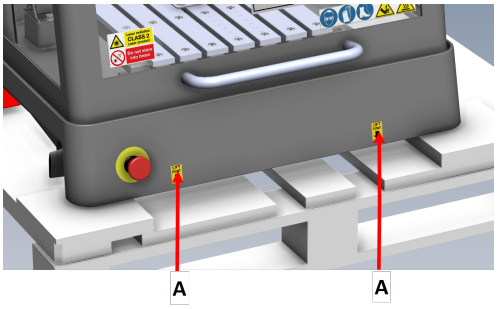
CRUSHING HAZARD
Take care of your fingers when handling the machine.
Wear safety shoes when handling heavy machinery.

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

1. Use a crane, the lifting console included in the package, and lifting straps to lift the machine.

   The crane must have a lifting capacity of minimum 250 kg (552 lbs).

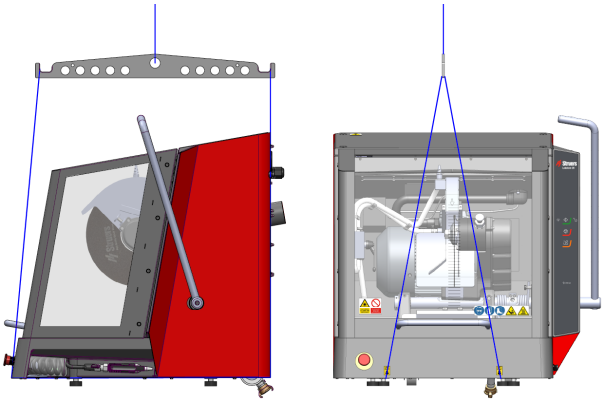
2. Place the lifting straps under the base of the machine, on both the right side and the left side. (**A**)



3. Place the front and back straps on the inner side of the feet.

   Be careful when placing the lifting straps, as these can damage the safety guard.

4. Make sure that the straps are parallel to each other and position the lifting bar so that both straps are kept apart below the lifting points.

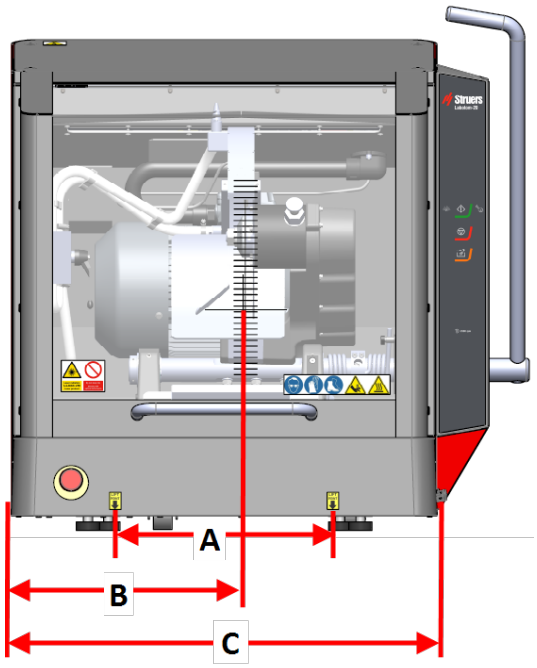


Center of gravity

A: 37.5 cm (14.7")

B: 40 cm (15.6")

C: 73.5 cm (29")

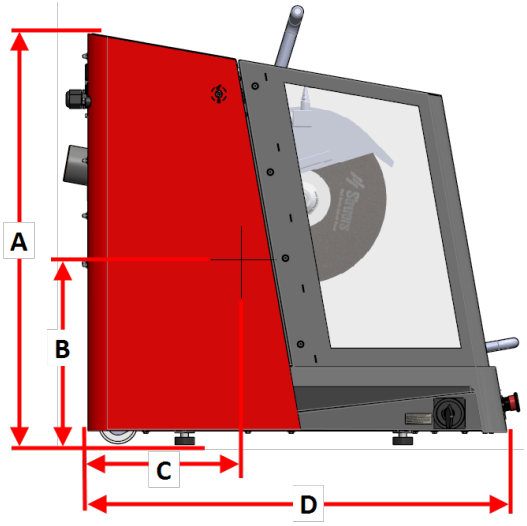


A: 90 cm (35.5")

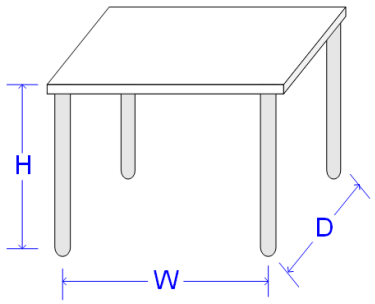
B: 38 cm (15")

C: 31.5 cm (12.4")

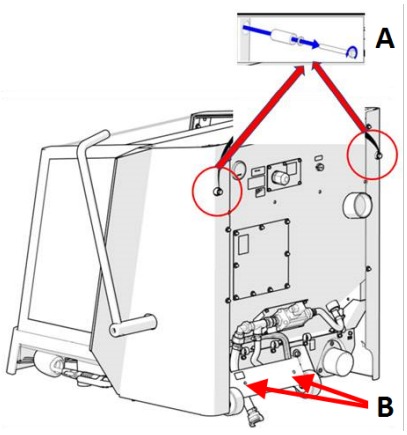
D: 86.5 cm (34")



At the new location

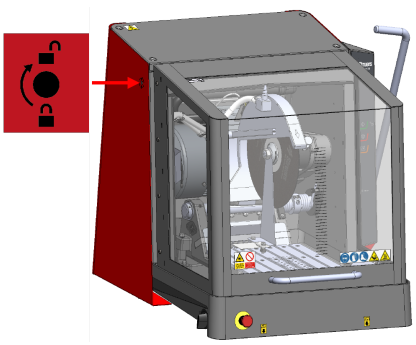
Recommended table dimensions		
Height **Width** **Depth**	Recommended: 80 cm (31.5") 92 cm (36.2") 90 cm (35.4")	
The table must be able to carry at least: 350 kg (772 lbs)		

1. Install the machine close to the power supply, the exhaust system and the cooling system.
2. Make sure there is enough room behind the machine for the inlet and outlet hose.
3. Install the machine in a room with sufficient light.
4. Place the machine on a rigid, stable workbench with a horizontal surface and an adequate height.
5. Make sure that the machine is level and that all four feet rest on the workbench.
6. Dismount the two distance washers (**A**) on the rear side of the machine and place them in their holders (**B**).

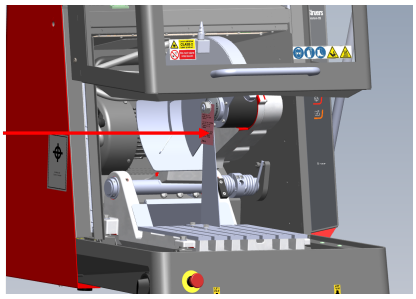


7. Unlock the safety guard by turning the triangular key clockwise.

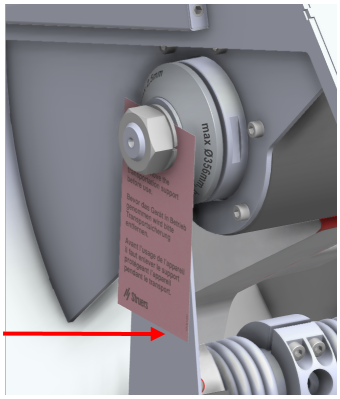
   See Checking the packing list ►17. Open the safety guard.
8. To reset the lock on the safety guard, turn the triangular key counter-clockwise.



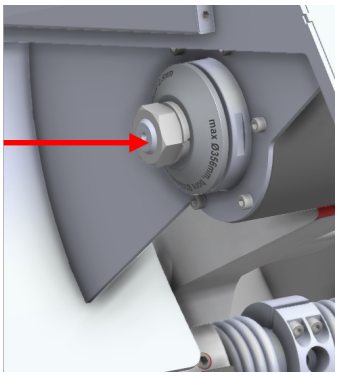
9. Open the safety guard and unscrew the fasteners that keep the transport bracket in place. Use a 30 mm (1.18") wrench, and a 13 mm (0.51") wrench.



10. Remove the transport bracket.



11. Place the M20 nut into place again.



12. Unpack the water hose by removing the cover foil and cable ties.

5.4 Power supply

ELECTRICAL HAZARD
Switch off the electrical power supply before installing electrical equipment.
Make sure that the actual electrical power supply voltage corresponds to the voltage stated on the type plate of the machine.
Incorrect voltage can damage the electrical circuit.

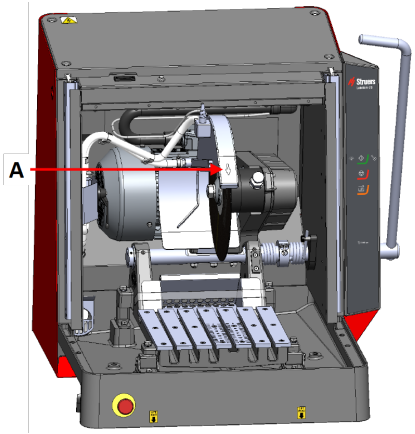
5.4.1 Connection to the machine

Procedure

1. Open the electrical connection box.
2. Connect the power cable as shown.

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

After installing the machine, make sure that the cut-off wheel rotates in the correct direction. The correct direction is indicated on the cut-off wheel guard (**A**).



5.4.2 Power supply cable - recommended specifications

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

Voltage/frequency: 3 x 200 V/50 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x 4 mm^2+ PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x 4 mm^2 + PE

Voltage/frequency: 3 x 220-230 V/50 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x 4 mm^2 + PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x 4 mm^2 + PE

Voltage/frequency: 3 x 380-415 V/50 Hz	
Min. fuse: **3 x 40 A**	Minimum cable size at minimum fuse: 5 x 2.5 mm^2+ PE
Max. fuse: **3 x 40 A**	Minimum cable size at maximum fuse: 5 x 2.5 mm^2 + PE

Voltage/frequency: 3 x 200-210 V/60 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x AWG8+ PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x AWG8 + PE

Voltage/frequency: 3 x 220-240 V/60 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x AWG8 + PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x AWG8 + PE

Voltage/frequency: 3 x 380-415V/60 Hz	
Min. fuse: **3 x 40 A**	Minimum cable size at minimum fuse: 5 x AWG12 + PE
Max. fuse: **3 x 40 A**	Minimum cable size at maximum fuse: 5 x AWG12 + PE

Voltage/frequency: 3 x 460-480 V/60 Hz	
Min. fuse: **3 x 40 A**	Minimum cable size at minimum fuse: 5 x AWG12 + PE
Max. fuse: **3 x 40 A**	Minimum cable size at maximum fuse: 5 x AWG12 + PE

Electrical data

The other end of the cable can be fitted with an approved plug or hard-wired into the power supply according to the electrical specifications and local regulations.

ELECTRICAL HAZARD
Labotom-20 must be protected with external fuses. See the table below for the fuse size required.

Voltage/frequency: 3 x 200 V/50 Hz	
Power, nominal load	S3 60%: 5.5 kW (7.4 hp) S3 15%: 7.5 kW (10 hp)
Number of phases	3 (3L + PE)
Power, nominal load	22.9 A
Power, Max. load	45.8 A
Ampere rating, largest motor	21.9 A

Voltage/frequency: 3 x 200-210 V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	27.1 A
Power, Max. load	54.2 A
Ampere rating, largest motor	26.1 A

Voltage/frequency: 3 x 220-230 V/50 Hz	
Power, nominal load	S3 60%: 5.5 kW (7.4 hp) S3 15%: 7.5 kW (10 hp)
Number of phases	3 (3L + PE)
Power, nominal load	20.1 A
Power, Max. load	40.2 A
Ampere rating, largest motor	19.1 A

Voltage/frequency: 3 x 220-240 V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	22.5 A
Power, Max. load	45 A
Ampere rating, largest motor	21.5 A

Voltage/frequency: 3 x 380-415V/50 Hz	
Power, nominal load	S3 60%: 5.5 kW (7.4 hp) S3 15%: 7.5 kW (10 hp)
Number of phases	3 (3L + PE)
Power, nominal load	12 A
Power, Max. load	24 A
Ampere rating, largest motor	11 A

Voltage/frequency: 3 x 380-415V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	13.4 A
Power, Max. load	26.8 A
Ampere rating, largest motor	12.4 A

Voltage/frequency: 3 x 460-480 V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	12.4 A
Power, Max. load	24.8 A
Ampere rating, largest motor	11.4 A

5.4.3 External short circuit protection

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

5.4.4 Residual Current Circuit Breaker (RCCB)

Note
Local standards can override the recommendations for the main electrical power supply cable. If needed, 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 (EN 50178/5.2.11.1) or better

5.5 Connecting the cooling system

To ensure optimal cooling, mount a recirculation unit on the machine.

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 type plate of the pump.
Incorrect voltage can damage the electrical circuit.

CAUTION
The pressure of the cooling fluid supplied to the machine must be max. 9.9 bar (143 psi).

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.

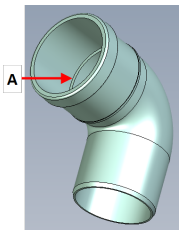
Note
Consumables

- Struers recommends adding a Struers anti-corrosion additive to the cooling water.
- 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.

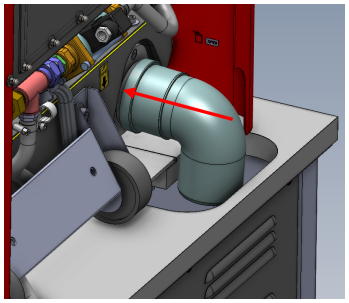
5.5.1 Connecting the drain outlet to the cooling system

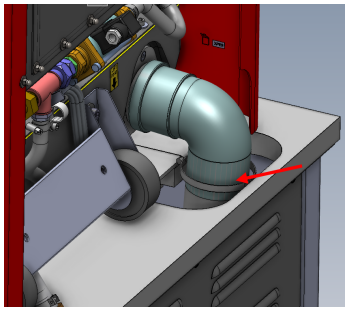
1. Lubricate the sealing ring (**A**) on the elbow pipe with soapy water to facilitate insertion.



2. Slide the elbow pipe onto the metal flange.
3. Place the tube so that it points downwards.
4. Connect the flex hose and secure it with a hose clamp.

   Use a 7 mm (0.27") wrench.



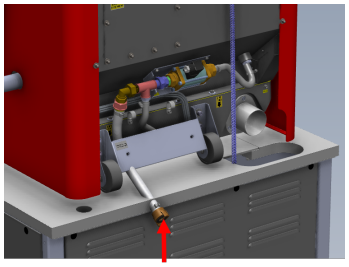


5. Connect the opposite end of the flex hose to the cooling system.

5.5.2 Connecting the water inlet from the cooling system

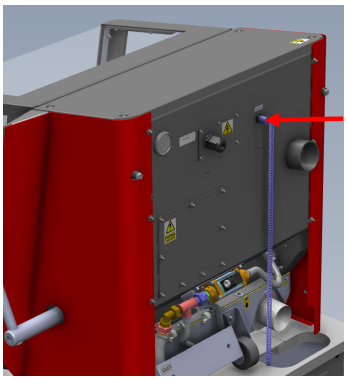
1. Connect the hose with quick coupling to the cooling system water pump.

Note
The cooling water pressure must not exceed 9.9 bar (143 psi)



5.5.3 Connecting the communication cable to the cooling system

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



5.6 Connecting to an exhaust system

Struers recommends that the machine is connected to an exhaust system.

You can connect Labotom-20 to an exhaust system via a hole on the rear of the cabinet. If you are not using an exhaust system, use the red plug supplied to cover the hole on the rear of the cabinet. See also: Checking the packing list ►17.

1. Mount the exhaust hose (Diameter: 75 mm (2.75")) from your exhaust system onto the pipe.
2. Clamp the exhaust hose using a hose clamp.

Specifications

See :Technical data ►1 .

5.7 Noise

For information on the sound pressure level value, see this section: Noise and vibration levels ►55

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.

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.

5.8 Vibration

For information on the total vibration exposure to hand and arm, see this section: Noise and vibration levels ►55

CAUTION
Risk of hand to arm vibration during manual cutting.
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.

5.9 Extension tunnels (option)

Extension tunnels (option) can be useful if you are working with large workpieces.

5.9.1 Mounting extension tunnels

If you work with long specimens, it can be helpful to mount extension tunnels on the machine.

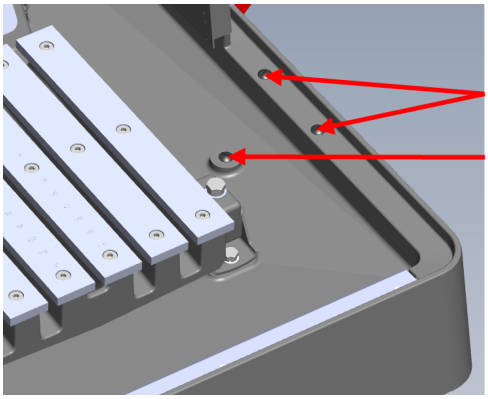
If the machine is ready to be used with extension tunnels, you can mount extension tunnels on one or both sides.

If the machine is not ready to be used with tunnels, you must have the safety guard replaced to be able to mount extension tunnels. Contact Struers Service.

CAUTION
Never use the machine without the blinders on the sides of the safety guard.

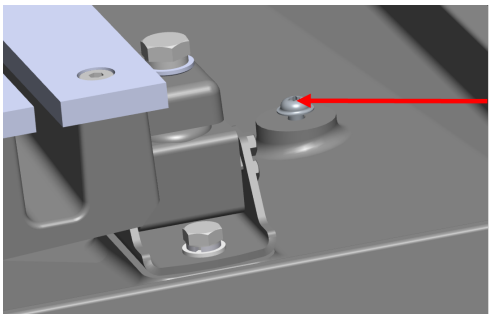
Mounting one or two extension tunnels on the machine

1. Remove the three set screws from the base on the right or left side of the machine, or both if you are installing extension tunnels on both sides.

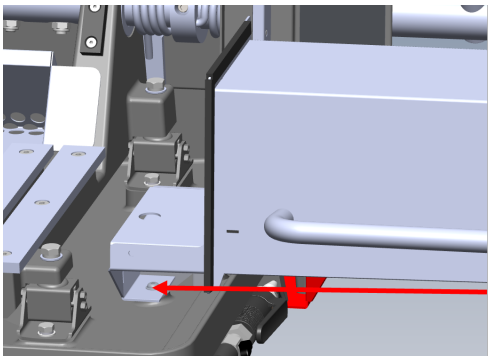


2. Mount the M6x12 screw on the tower inside the cutting chamber using a X30 bit.

   Do not tighten the screw. Keep a gap of 3-4 mm (0.11-0.15").

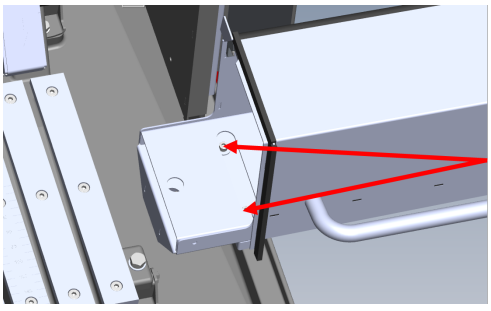


3. Place the extension tunnel inside the tower.
4. Move the extension tunnel to the side, and make sure that the screw is placed inside the slot.

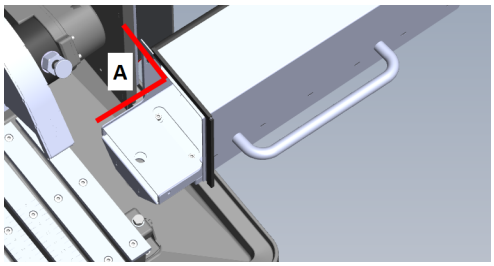


5. Mount the 2 washers and 2 M6x34 screws in the part of the extension tunnel that is inside the cutting chamber.

   Use a 5 mm (0.19") hexagonal bit.
6. Tighten the screws loosely.

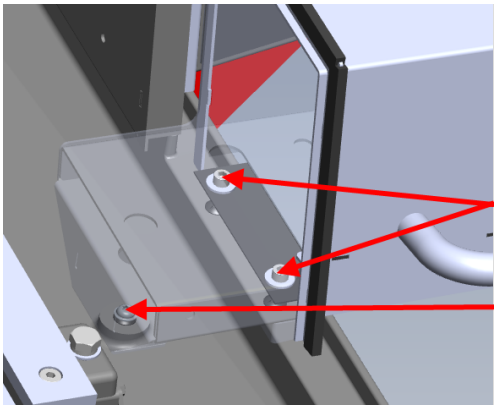


7. Make sure that the extension tunnel is positioned correctly using an angle measurement tool. The angle must be 90°.



A 90°

8. Tighten all 3 screws applying a 10 Nm force.



6 Operating the device

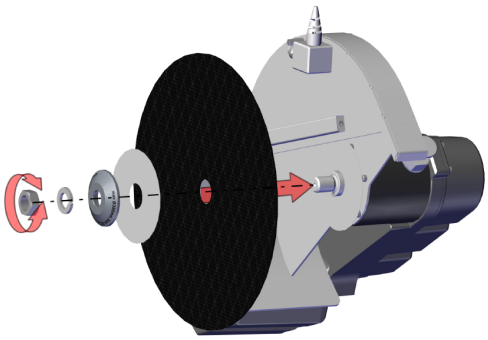
6.1 Cut-off wheels

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 Mounting and dismounting 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 spring washer, flange and cut-off wheel (if mounted).
6. Mount a new cut-off wheel, flange, spring 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 Al_2O_3/SiC between two 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.

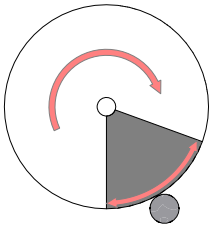
Clamping devices are ordered separately.

6.2.1 Positioning clamping devices

1. Always position clamping devices parallel to the cutting table.
2. Place the workpiece in the middle or slightly to the front of the cutting table.

   Lines on the table help you place the workpiece in the correct position.

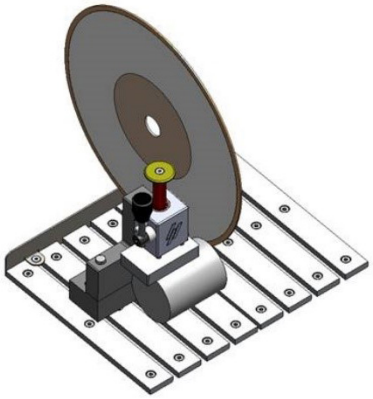
   You obtain the best results when the lower quadrant of the cut-off wheel enters the workpiece (the shaded area on the illustration).



6.2.2 Vertical quick clamping devices

1. Mount the vertical quick clamping device on the left side of the cutting table.
2. Place the workpiece on the cutting table.
3. Turn the handle on the clamping device to the vertical position.
4. Push the clamping device downwards on the workpiece and lock it in place by pulling the locking handle forward.

   The illustration shows a cylindrical workpiece secured with a vertical quick clamping device.

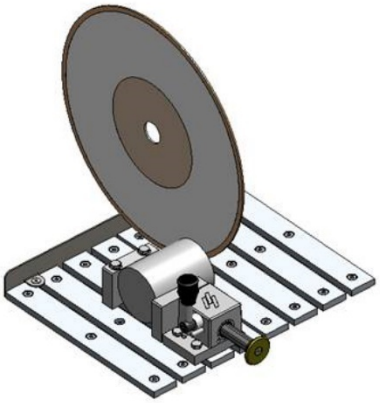


Note
Make sure that the nut on the cutting unit cannot come into contact with the clamping plate.

6.2.3 Mounting a quick clamping device and spring clamp

1. Mount the back stop for the quick clamping device on the left side of the cutting table. Make sure that the cut-out corner is placed to the right.
2. Mount the back stop for the spring clamp on the right side of the cutting table.
3. Place the workpiece in the middle or slightly to the front of the cutting table.
4. Push the back stops against the workpiece and use the spanner to tighten the screws.
5. Mount the quick clamping device on the left side of the cutting table, and the spring clamp on the right side.
6. Adjust the clamping devices until they fit the workpiece.
7. Use the spanner to tighten the screws.

   The illustration shows a cylindrical workpiece secured with a quick clamping device.



6.3 Line laser

WARNING
Do not look directly into the laser beam.

For more information on the line laser, see: Technical data ►1 .

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

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

In case the line laser is not aligned, you can adjust it by using the two screws on the cut-off wheel guard.

Note
The laser is aligned with the inner flange and not with the cut-off wheel due to the variation in the thickness of the cut-off wheels.

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
	**Start** Starts the machine. The cut-off wheel starts rotating and the cooling water pump is turned on. You cannot activate this function if the safety guard is open, or if the cutting motor is overloaded. Use this button to start AxioWash if you have turned the lever upwards.
	This icon indicates that AxioWash is activated when the machine is started.
	This icon indicates that cooling water is activated when the machine is started.
	**Stop** Stops the machine. The cut-off wheel stops rotating. Use this button to stop AxioWash. The cooling water pump is turned off.
	**Flush** Starts the cooling water pump. Press on the rear of the flushing gun to start and regulate flushing.

6.4.2 Clamping the workpiece

1. Use the flushing gun to clean the cutting table.
2. Make sure that the specimen collector is in place in order to collect the cut specimen and to protect the painted surface.
3. Place the workpiece under the clamp of a quick clamping device, on the left side of the cutting table.
4. Adjust the position of the clamping device so that the workpiece is placed in the middle of the cutting table.
5. Use the socket spanner to tighten the clamping device.
6. Lower the cut-off wheel to check the position.
7. Turn the handle on the clamping device to the vertical position.
8. Push the clamping device downwards on the workpiece and lock it in place pushing the locking handle forward. See: Vertical quick clamping devices ►33.

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.

6.4.3 Starting and stopping 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. Make sure that the specimen collector is in place in order to collect the cut specimen and to protect the painted surface.
3. Close the safety guard.
4. Press **Start**. The cut-off wheel starts rotating.

5. The cooling water starts to flow.

6. Carefully move the cut-off wheel towards the workpiece by pulling the cutting handle until it is in contact with the workpiece.
7. 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.
8. Increase the force and continue cutting. Adjust the speed at which the cut-off wheel is fed through the workpiece to suit the material and the cut-off wheel.

   You can use the guiding lines on the safety guard to help you keep a constant cutting speed. See also: Overview ►12.
9. Reduce the cutting force when the cut-off wheel has almost cut through the material.
10. When you finish cutting through the workpiece, return the cutting handle to the start position.
11. Press **Stop** to stop the cut-off wheel and the cooling water.

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

Note
If you are working with large or very hard workpieces, you will need a certain amount of strength to cut through.

Note
The safety guard on Labotom-20 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.

Note
You cannot open the safety guard until the safety lock is released - this takes 5 seconds after you have pressed the **Stop** button.

7 Maintenance and service - Labotom-20

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 type plate of the machine.

7.1 Daily

To ensure a longer lifetime for your machine, Struers strongly recommends regular cleaning.

Clean all accessible surfaces with a soft, damp cloth.

Note
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.

WARNING
Do not use acetone, benzol or similar solvents.

7.1.1 Using the flushing gun

CAUTION
Avoid skin contact with the cooling fluid 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 when you have finished using it.
Do not use the flushing gun to clean the safety guard as this can result in water dripping when the safety guard is open.

7.1.2 Cleaning the cutting chamber using AxioWash

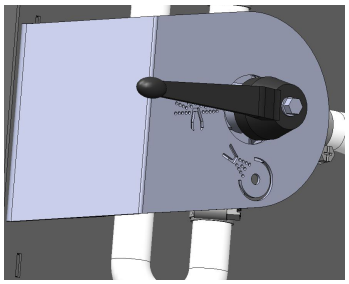
CAUTION
Avoid skin contact with the cooling fluid additive.

Note
Clean the cutting chamber thoroughly if you are not going to use the machine for a longer period of time.

Note
Only use AxioWash for cleaning the cutting chamber.

Note
You do not need to remove the cut-off wheel or the clamping tools while using AxioWash.

1. Open the safety guard.
2. Move the lever to the horizontal position.
3. Close the safety guard.



4. Press the **Start** button.

The motor starts and water is sprayed through the AxioWash nozzle.

5. Move the handle for the cut-off wheel up and down to optimize the cleaning of the cutting chamber.
6. Press **Stop** button when you want to stop the cleaning process.

7. Open the safety guard.
8. Move the lever back to the horizontal position.

7.1.3 Cleaning the cooling system

See the Instruction Manual for this unit.

7.1.4 Checking the safety guard

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

Note
If the safety guard screen is damaged or if there are visible signs of deterioration, it must be replaced immediately. Contact Struers Service.

7.1.5 Checking the cut-off wheel guard

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

7.1.6 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. For heavy duty cleaning, use a heavy duty cleaning agent such as Solopol Classic.
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.

7.2.3 Cleaning the clamping tools

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

7.2.4 Cooling system

- Check the level of the cooling water after 8 hours use or at least every week.

7.3 Monthly

7.3.1 Replacing the cooling fluid

CAUTION
Avoid skin contact with the cooling fluid additive.
Do not start flushing until the flushing gun points into the cutting chamber.
Always use goggles or a protective shield, and chemical-resistant gloves.

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

- Replace the cooling fluid at least once a month.

7.3.2 Maintaining cutting tables

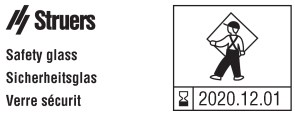
- Replace the stainless steel bands if they are damaged or worn.

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



The safety guard consists of a metal frame and a composite material screen that protects the operator. If the safety guard is damaged, it will be weakened and offer less protection.

Replacing the screen in the safety guard

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.

7.4.2 Cleaning the nozzle on the flush gun

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

7.5 Cut-off wheels

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. Use household detergents for cleaning.
- Dress the cut-off wheel regularly.

7.6 Testing safety devices

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

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.

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 cooling water stop. The Emergency stop is working correctly.
4. If the cutting process and cooling water 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 cooling water.
4. If the machine or cooling water 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.

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

Testing the safety guard

Test 1

1. Open the safety guard.
2. Make sure that the safety guard stays up in the highest position.
3. If the safety guard does not stay open in the highest position, close the safety guard.
4. Do NOT use the machine.
5. Contact Struers Service.

7.6.3 Safety guard switch

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.

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

Testing the safety guard switch

Test 1

1. Open the safety guard.
2. Press the **Start** button.
3. The cutting process and cooling water cannot be started.
4. If the cutting process and/or cooling water start, press the **Stop** button.
5. Do NOT use the machine.
6. Contact Struers Service.

7.6.4 Safety guard lock

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.

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

Test 1

1. Close the safety guard.
2. Press **Start**. The machine starts the cutting process and cooling water.
3. Try to open the safety guard. 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 cooling water.

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.

Test 3

1. Close the safety guard.
2. Press **Start** to start a cutting process.

3. Press **Stop**.

   There is a 5 second delay after you press **Stop**, and until the safety guard unlocks. If you can open the safety guard while the cut-off wheel is still rotating, do NOT use the machine.
4. Contact Struers Service.

7.6.5 Testing the flushing function

Test 1

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

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

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

8 Spare parts

Technical questions and spare parts

If you have technical questions or when you order spare parts, state the serial number. The serial number is stated on the type plate of the unit.

For further information, or to check the availability of spare parts, contact Struers Service. Contact information is available on Struers.com.

9 Service and repair

Struers recommends that a service check be carried out after 6600 cuts. You can see how many cuts have been performed on the motor turn-on counter. See also Overview ►12.

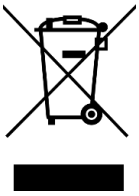
Note
Service must only be performed by a Struers engineer or a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).
Contact Struers Service.

Service check

Struers offers 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.

11 Troubleshooting - Labotom-20

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. If necessary, unscrew the valve and rinse it under running water. 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 cooling fluid 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. If the error remains, contact Struers Service.
Rusty workpieces or cutting chamber	Insufficient additive for cooling fluid.	Add more additive for cooling fluid. 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.

Error	Cause	Action
Safety guard blurred	Insufficient cleaning.	Clean with soapy water. **Note** The soapy water must not run into the recirculation water, as this will cause the water to foam.
Quick clamping device cannot hold the workpiece	The clamping device is not balanced.	Adjust the two clamping column screws. See Clamping devices ►32
	Clamping heart worn.	Contact Struers Service.
The line laser is not aligned	Adjust it by using the two screws on the cut-off wheel guard.	**WARNING** Do not look directly into the laser beam.

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.	Make sure that there is enough water in the recirculation cooling unit. Check the flow of water from the recirculation cooling unit.

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	Cooling water tube clogged.	Clean the cooling water tube.
	Insufficient cooling water.	Refill the tank with water and add cooling 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.
The cut-off wheel breaks	Incorrect mounting of the cut-off wheel.	Make sure that the hole has the correct diameter. Make sure that there is a cardboard washer on both sides of the cut-off wheel (Conventional cut-off wheels only). Make sure that the nut is tightened securely.
	Incorrect clamping of the workpiece.	Make sure that only one side of the workpiece is clamped securely. The other side should only be fixed lightly. Use support tools if the geometry of the workpiece makes support necessary.
	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.	Make sure that there is enough water in the recirculation cooling unit. Check the cooling water hoses.

Error	Cause	Action
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 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.	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 cut-off wheel vibrates during cutting.	Incorrect clamping of the workpiece.	Make sure that only one side of the workpiece is clamped securely. The other side should only be fixed lightly. Use support tools if the geometry of the workpiece makes support necessary.
	The cut-off wheel is too soft for the task.	Select a harder cut-off wheel.
	Not enough cutting force.	Exert more force on the cut-off wheel.
	Cutting force too high.	Reduce the force on the cut-off wheel.
	Worn bearings.	Contact Struers Service.
	Certain workpieces can be difficult to clamp adequately and may result in resonance and vibration.	Contact Struers Service.
The workpiece breaks when clamped.	The workpiece is brittle.	Place the workpiece between two polystyrene plates. 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 for cooling fluid.	Make sure that the concentration of additive is correct.

Error	Cause	Action
Cutting chamber shows signs of corrosion.	The workpiece is made of Copper/ Copper Alloy.	Use the correct additive for cooling fluid.

12 Technical data

12.1 Technical data

Capacity	Height x Length	95 x 200 mm (3.7" x 10")
	Diameter	110 mm (4.7”)
	Cutting length	305 mm (12")
Cut-off wheel	Diameter	350 mm (14")
	Arbor diameter	32 mm (1.3”)
Cut-off wheel motor	Rotational speed	2500 rpm
	Height adjustment of cut-off wheel	–
Cutting table	Width	340 mm (13.4”)
	Depth	313 mm (12.3“)
	T-slots	T-slot with exchangeable T-slot plates, 10 mm (4 pcs. + 3. pcs.)
	Feed speed	Manual control
Laser		Class 2M
Software and electronics	Controls	Touch pad
	Display	N/A
Safety standards		See the Declaration of Conformity
Operating environment	Surrounding temperature	5 - 40 °C (41 - 104 °F)
	Humidity	35 - 85 % RH non-condensing

Power supply 1	Voltage/frequency	3 x 200 V (50 Hz)
	Power supply	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	5.5 kW (7.4 hp)
	Power S3 15 %	7.5 kW (10 hp)
	Current, nominal load	22.9 A
	Current, max.	45.8 A
	Current, max. largest motor	21.9 A
Power supply 2	Voltage/frequency	3 x 200 - 210 V (60 Hz)
	Power supply	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	6.6 kW (8.8 hp)
	Power S3 15 %	8.5 kW (11.4 hp)
	Current, nominal load	27.1 A
	Current, max.	54.2 A
	Current, max. largest motor	26.1 A
Power supply 3	Voltage/frequency	3 x 220 - 230 V (50 Hz)
	Power supply	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	5.5 kW (7.4 hp)
	Power S3 15 %	7.5 kW (10 hp)
	Current, nominal load	20.1 A
	Current, max.	40.2 A
	Current, max. largest motor	19.1 A

Power supply 4	Voltage/frequency	3 x 220 - 240 V (60 Hz)
	Power supply	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	6.6 kW (8.8 hp)
	Power S3 15 %	8.5 kW (11.4 hp)
	Current, nominal load	22.5 A
	Current, max.	45 A
	Current, max. largest motor	21.5 A
Power supply 5	Voltage/frequency	3 x 380 - 415V (50 Hz)
	Power supply	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	5.5 kW (7.4 hp)
	Power S3 15 %	7.5 kW (10 hp)
	Current, nominal load	12 A
	Current, max.	24 A
	Current, max. largest motor	11 A
Power supply 6	Voltage/frequency	3 x 380 - 415V (60 Hz)
	Power supply	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	6.6 kW (8.8 hp)
	Power S3 15 %	8.5 kW (11.4 hp)
	Current, nominal load	13.4 A
	Current, max.	26.8 A
	Current, max. largest motor	12.4 A

Power supply 7	Voltage/frequency	3 x 460 - 480 V (60 Hz)
	Power inlet	3 (3L + PE)
	Power S1	N/A
	Power S3 60%	6.6 kW (8.8 hp)
	Power S3 15 %	8.5 kW (11.4 hp)
	Current, nominal load	12.4 A
	Current, max.	24.8 A
	Current, max. largest motor	11.4 A
Cooling system	Option	Cooling System 4
Exhaust	Recommended capacity	150 m^3/h (5300 ft^3/h) at 0 mm (0") water gauge.
Advanced features	X-table, manual	Option
	X-stand, manual	N/A
	Rotary stand	N/A
Safety Circuit Categories/Performance Level	Emergency stop	PL c, Category 1 Stop category 0
	Safety guard	PL d, Category 3 Stop category 0
	Safety guard lock	PL a, Category B Stop category 0
	Unintended start of recirculation fluid	PL c, Category 1 Stop category 0
Residual Current Circuit Breaker (RCCB)		Type A, 30 mA (or better) is required
Noise level	A-weighted sound emission pressure level at workstations	LpA = 72 dB(A) (measured value). Uncertainty K = 4 dB
Vibration level	Declared vibration emission	a_{hd} = 0.5 m/s^2 (measured value). Uncertainty K = 0.2 m/s^2

Dimensions and weight	Width	89 cm (35.2")
	Width (one tunnel)	Left: 134 cm (53"). Right: 141 cm (55.5").
	Width (two tunnels)	170 cm (67")
	Depth (with plug)	94 cm (37")
	Height (guard closed)	90 cm (35.5")
	Height (guard open)	122 cm (48")
	Weight	225 kg (496 lbs)

12.2 Safety Circuit Categories/Performance Level

Safety Circuit Categories/Performance Level	
Emergency stop	PL c, Category 1 Stop category 0
Safety guard	PL d, Category 3 Stop category 0
Safety guard lock	PL a, Category B Stop category 0
Unintended start of fluid	PL c, Category 1 Stop category 0

12.3 Noise and vibration levels

Noise level	**A-weighted sound emission pressure level at workstations**	L_{pA} = 72 dB(A) (measured value) L_{pC} = N/A dB(C) (measured value) L_{wA} = N/A dB(A) (measured value) Uncertainty K = 4 dB Measurements made in accordance with EN ISO 11202
Noise level: The figures quoted are emission levels and are not necessarily safe working levels. While there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required. Factors that influence the actual level of exposure of the workforce include characteristics of the work room, the other sources of noise, etc., i.e. the number of machines and other adjacent processes. Also, the permissible exposure level can vary from country to country. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.		

Vibration emission value	a_{hd} = 0.5 m/s^2 (measured value). Uncertainty K = 0.2 m/s^2 Measurements made in accordance with EN ISO 20643:2008. Vibration declaration made in accordance with EN 12096:1997.

12.4 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.

Parts

Safety related part	Manufacturer/Manufacturer description	Manufacturer catalog no.	Electrical ref.	Struers catalog no.
Emergency stop	Omron Latching mushroom head	A22NE-M-N	SGC1	2SA10500
Emergency stop	Omron Mounting Latching mushroom head	A22NZ-H-02	SGC1	2SA41700
Emergency stop	Omron Switch block 1NC	A22NZ-S-P1BN	SGC1.1 SGC1.3	2SB10111
Safety relay unit	Omron	G9SB-3012-A	KFA3	2KS10006
Motor contactor	Omron	J7KN-40-24VAC	QA4 QA5	2KM74011
Contactor aux NC	Omron	J73KN-B-01	QA4.1 QA5.1	2KH00137
Safety guard lock	Schmersal Solenoid interlock	AZM161SK-12/12RK-024	KJ1	2SS00121

Safety related part	Manufacturer/Manufacturer description	Manufacturer catalog no.	Electrical ref.	Struers catalog no.
Magnetic safety sensor	Schmersal	BNS-120-02z	BE1	2SS00130
Power plug-in relay	Omron	G2R-1-S24VAC(S)	KFA1	2JK20124
Solid state multifunctional timer	Omron	H3DS-ML AC/DC	KFB1	2KT00003
Coaxial selenoid valve	ASCO Series 287 Brass body 2/2 NC, G3/8 D_10, Complete 24V DC	SCG287A001.24/50	QM1	2YM10046
Front window	Struers			16930363
Cut-off wheel guard	Struers			16930275
Extension tunnel	Struers Right side			16930036
Extension tunnel	Struers Left side			16930037

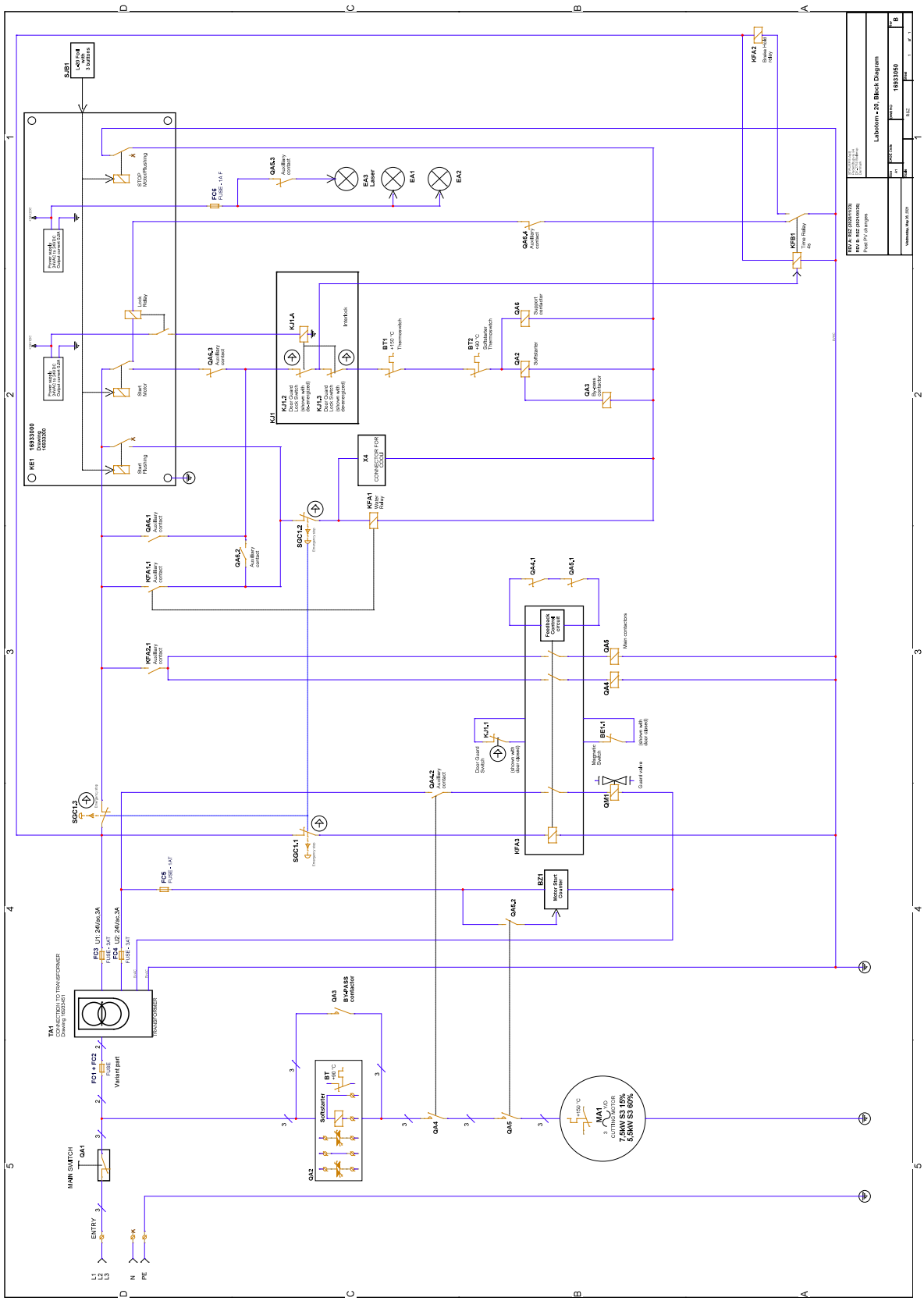
12.5 Diagrams

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

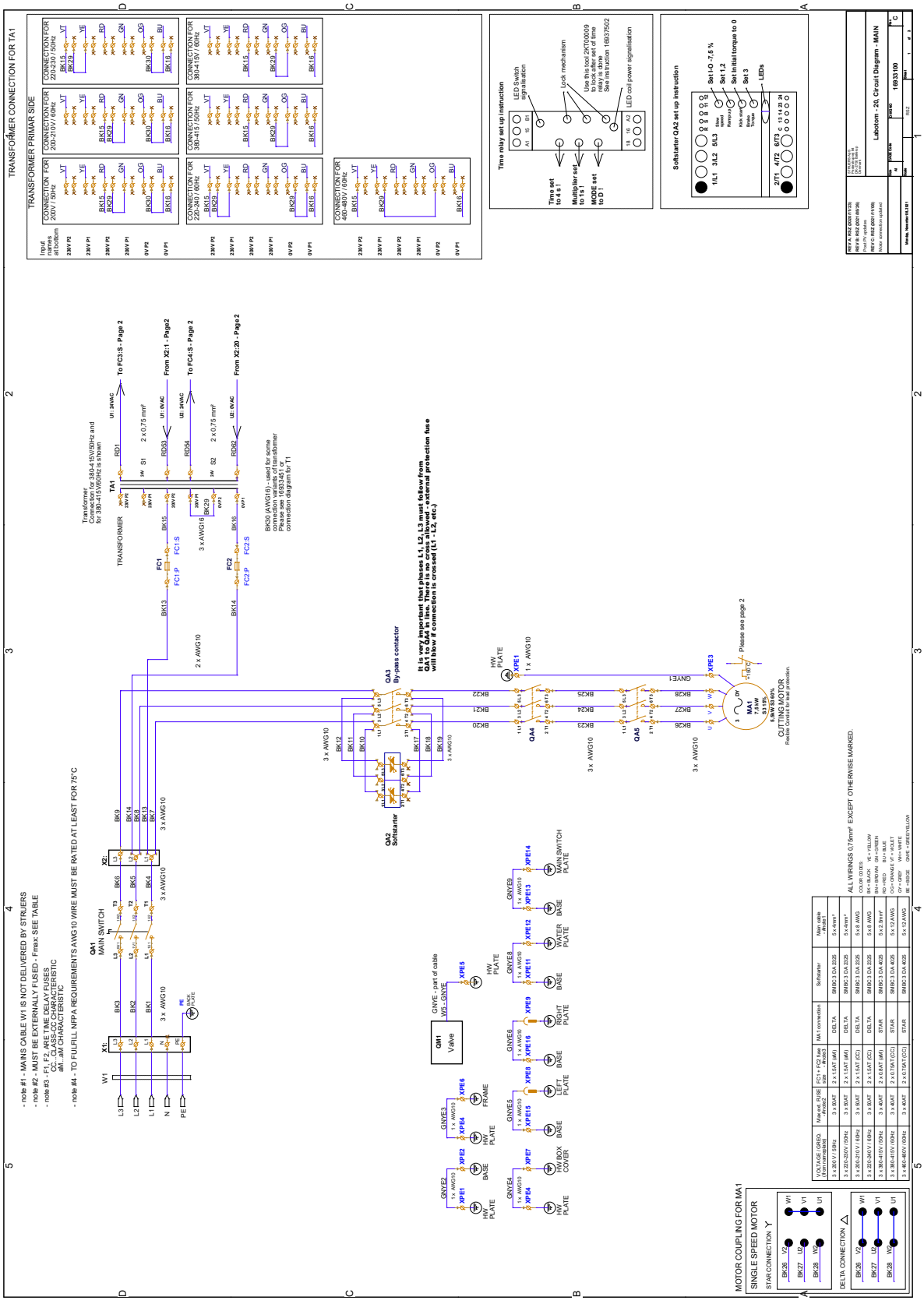
12.5.1 Diagrams Labotom-20

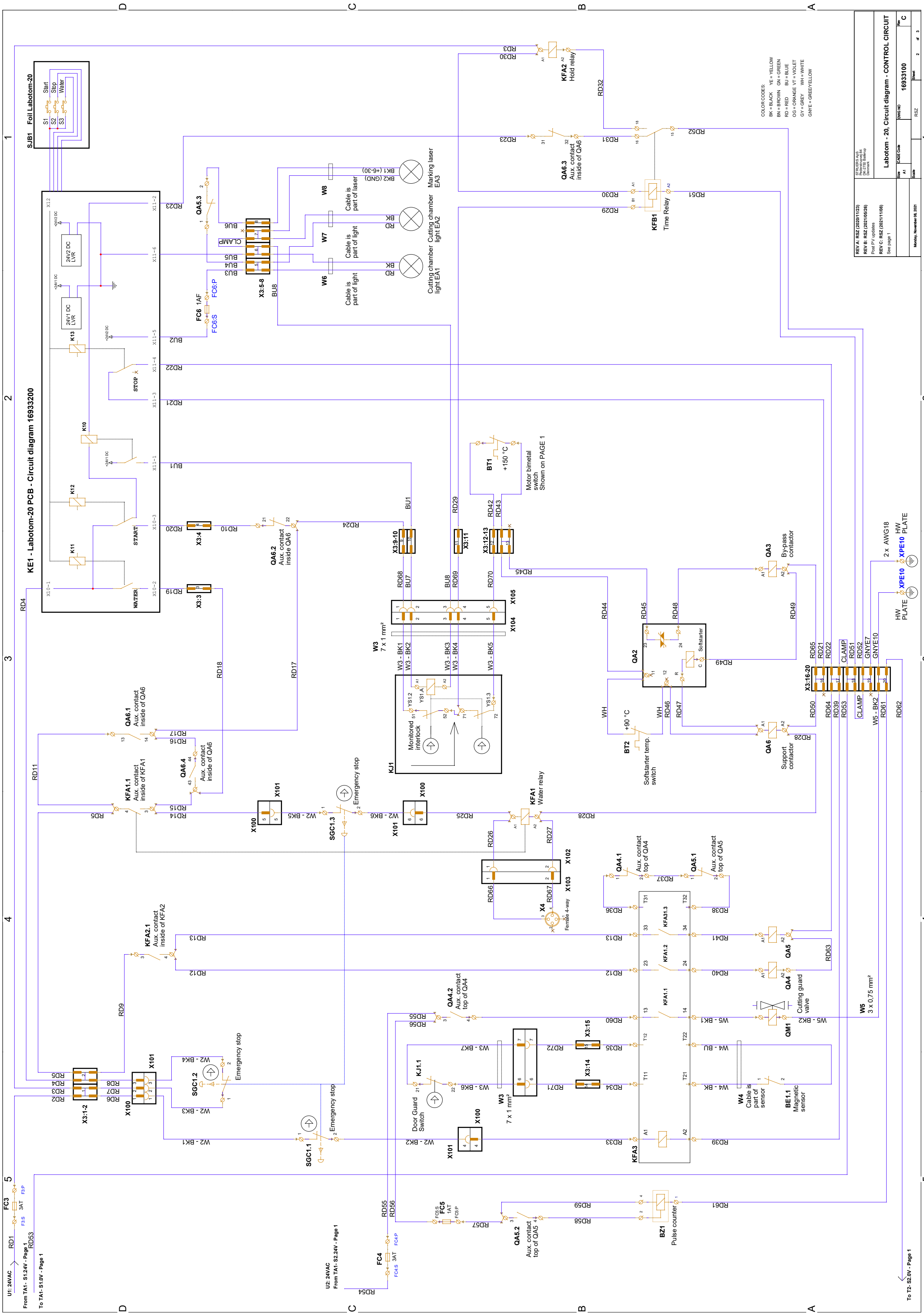
Title	No.
Block diagram	16933050 B ▶58
Circuit diagram, 3 pages	16933100 C ▶59
Water diagram	16931002 A ▶62

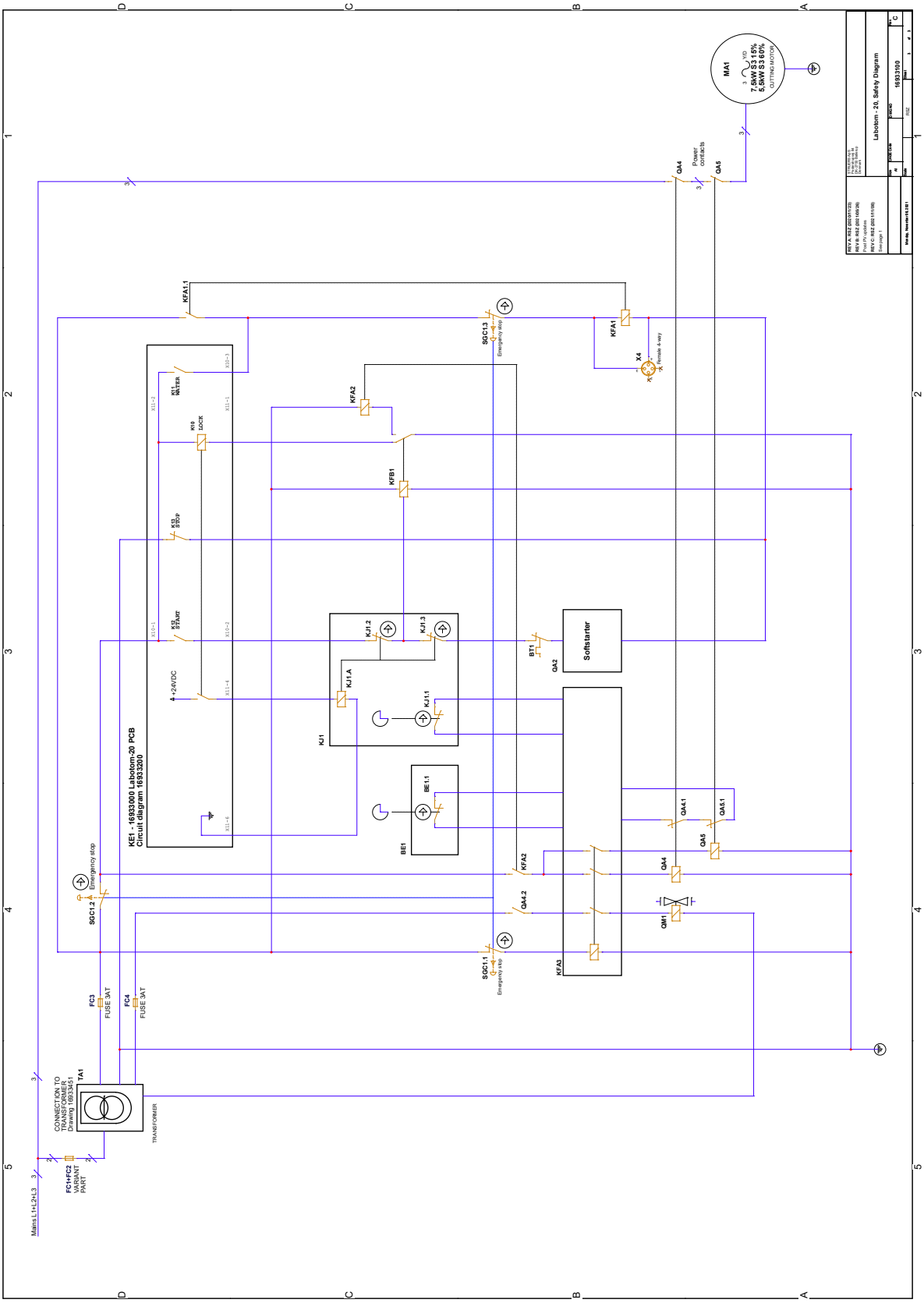
16933050 B



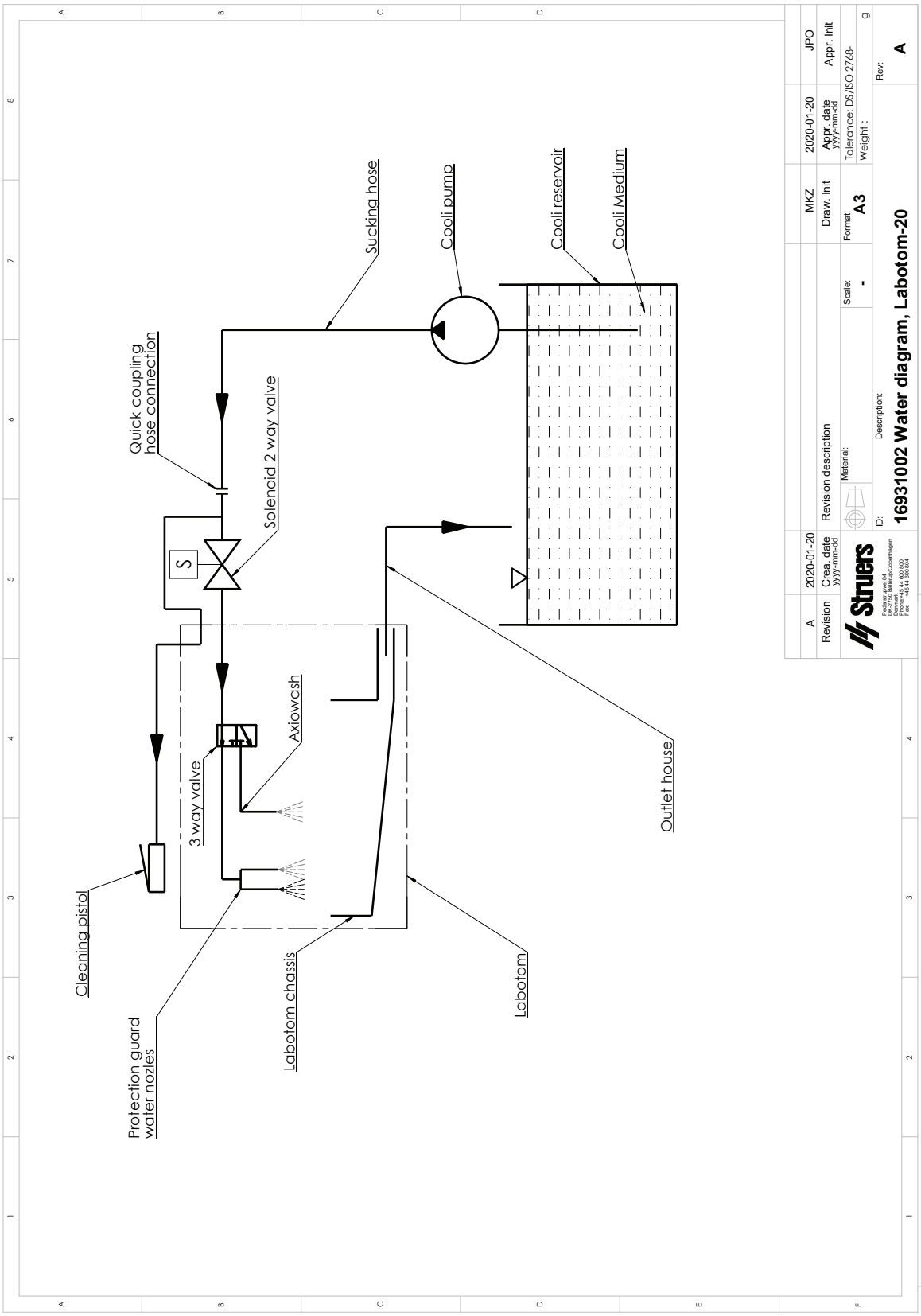
16933100 C


TRANSFORMER CONNECTION FOR TA1
TRANSFORMER PRIMAR SIDE
Time relay set up instruction
Softstarter QA2 set up instruction
Labotom - 20, Circuit Diagram - MAIN
16933100
- note #1 - MAINS CABLE W1 IS NOT DELIVERED BY STRUERS
- note #2 - MUST BE EXTERNALLY FUSED - Fmax: SEE TABLE
- note #3 - F1, F2, ARE TIME DELAY FUSES
CC: CLASS CC CHARACTERISTIC
dM: dM CHARACTERISTIC
- note #4 - TO FULFILL NFPA REQUIREMENTS AWG 10 WIRE MUST BE RATED AT LEAST FOR 75°C
It is very important that phases L1, L2, L3 must follow from QA1 to QA4 in line. There is no cross allowed - external protection fuse will blow if connection is crossed (L1 - L2, etc.)
MOTOR COUPLING FOR MA1
SINGLE SPEED MOTOR
STAR CONNECTION Y
DELTA CONNECTION Δ
ALL WIRINGS 0.75mm² EXCEPT OTHERWISE MARKED.


KE1 - Labotom-20 PCB - Circuit diagram 16933200
SJB1 Foil Labotom-20
Labotom - 20, Circuit diagram - CONTROL CIRCUIT
16933100


MA1
7.5kW S3 15%
5.5kW S3 60%
CUTTING MOTOR
Labotom - 20, Safety Diagram
16933100
KE1 - 16933000 Labotom-20 PCB
Circuit diagram 16933200
Softstarter
Emergency stop
TRANSFORMER
CONNECTION TO TRANSFORMER Drawing 16934161
FUSE 3AT
Power contacts
Remote 4-way
Mains L1+L2+L3
FC1+FC2 VARIANT PART

16931002 A


Sucking hose
Cooli pump
Cooli reservoir
Cooli Medium
Quick coupling hose connection
Solenoid 2 way valve
S
3 way valve
Axiowash
Outlet house
Cleaning pistol
Protection guard water nozles
Labotom chassis
Labotom
A
Revision
2020-01-20
Crea. date yyyy-mm-dd
Revision description
Material:
Scale:
-
Format:
A3
MKZ
Draw. Init
2020-01-20
Appr. date yyyy-mm-dd
JPO
Appr. Init
Tolerance: DS/ISO 2768-
Weight :
g
Rev:
A
ID:
Description:
16931002 Water diagram, Labotom-20
Struers
Pederstrupvej 84
DK-2750 Ballerup
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 801
Copenhagen

12.6 Legal and regulatory information

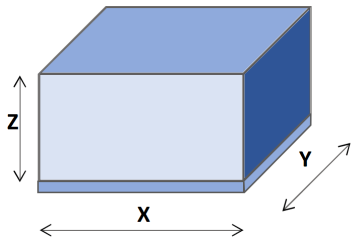
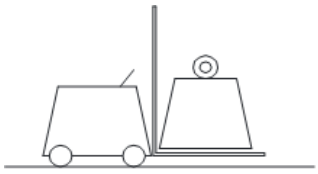
FCC notice

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.

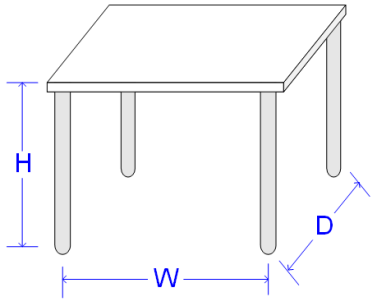
13 Pre-installation checklist

13.1 Packaging specifications

X:	110 cm (43.3")	
Y:	110 cm (43.3")	
Z:	103 cm (40.6")	
Weight	274 kg (604 lbs). The weight is stated on the crate.	

13.2 Location

Place the machine on a stable and level surface, which can support the weight of the machine.

Recommended table dimensions		
Height **Width** **Depth**	Recommended: 80 cm (31.5") 92 cm (36.2") 90 cm (35.4")	
The table must be able to carry at least: 350 kg (772 lbs)		

A workbench designed for Struers cut-off machines is available as an accessory. The recirculation cooling unit fits into a compartment in the table unit.

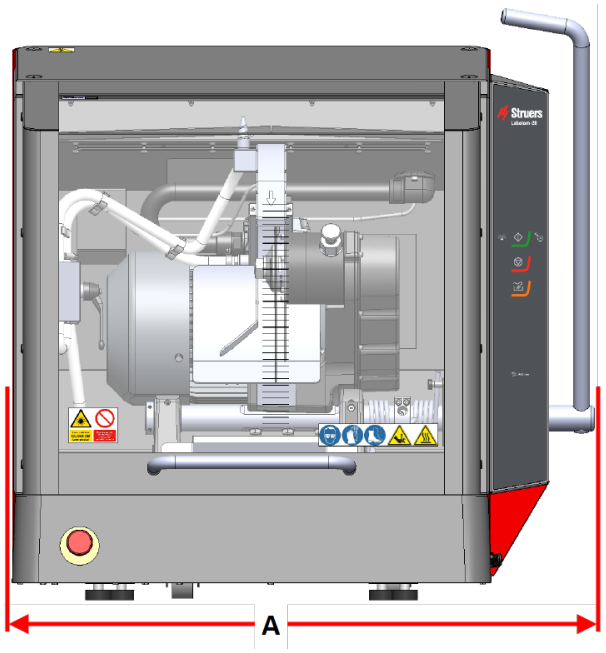
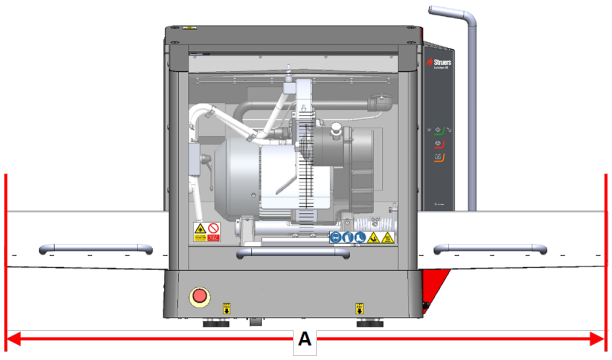
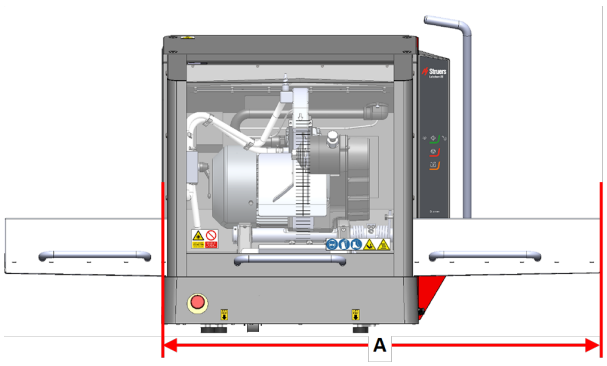
For other workbenches, make sure that there is enough space under/at the side of the table for a recirculation cooling unit.

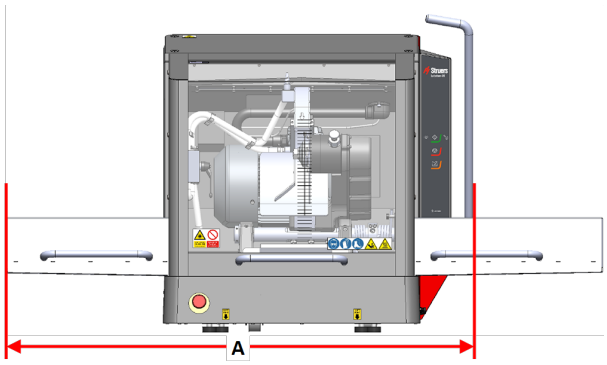
Illumination

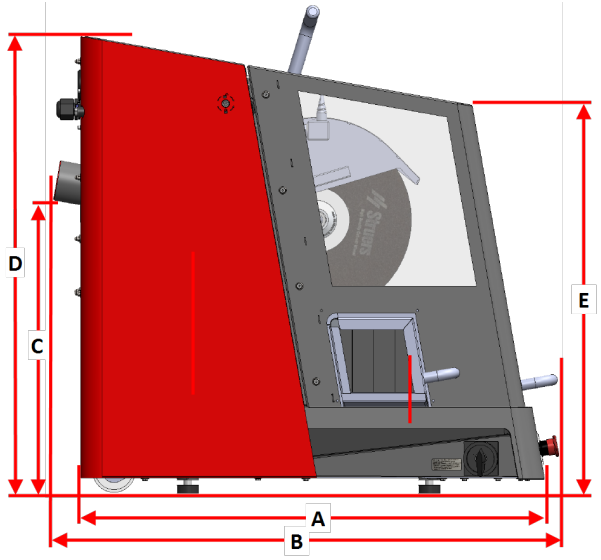
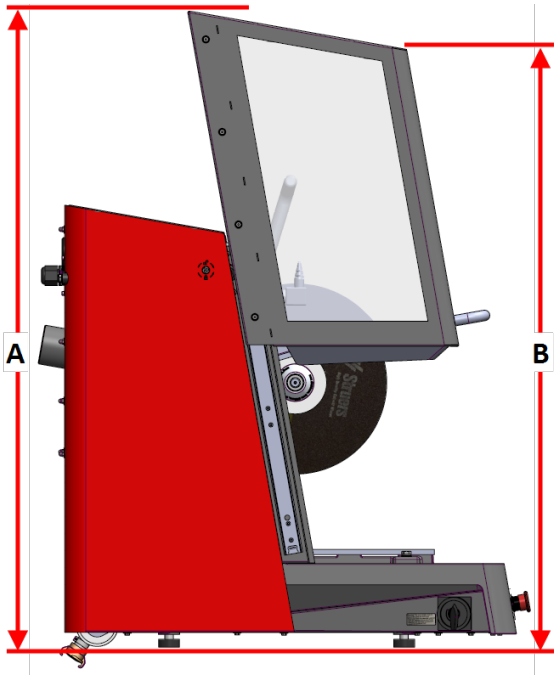
Make sure that the machine is adequately lit up. A minimum of 300 Lumen is recommended to illuminate the controls and other work areas.

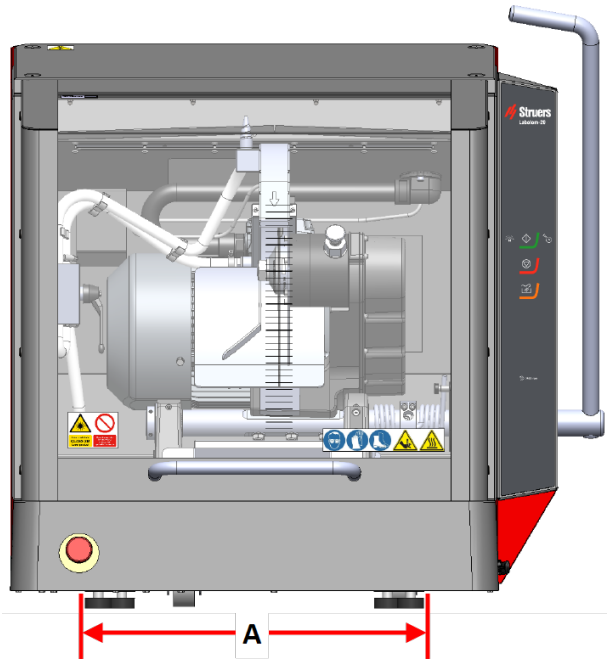
Ambient conditions		
Operating environment	Surrounding temperature	5-40°C/40-105°F
	Humidity	35-85 % RH non-condensing

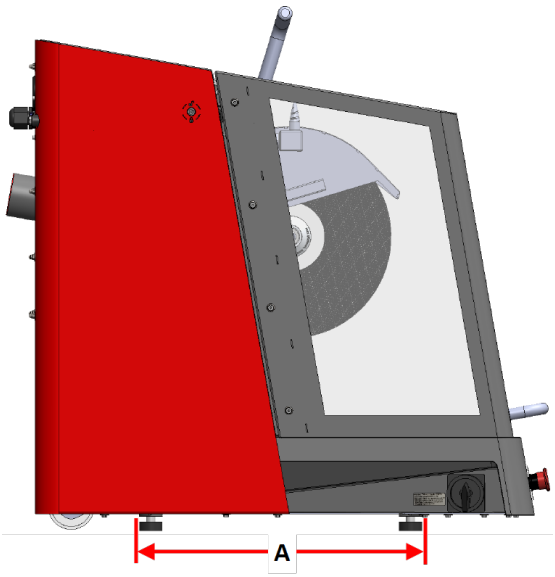
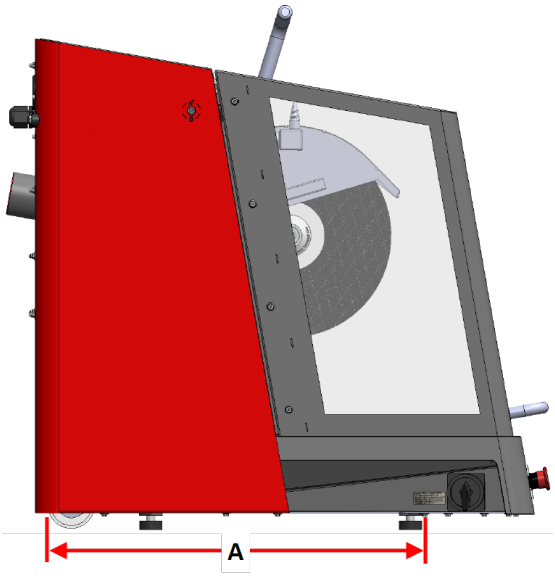
13.3 Dimensions

Front view		
A:	89 cm (35")	
A:	170 cm (67")	
A:	141 cm (55.5")	

Front view		
A:	134 cm (53")	

Side view		
A: **B:** **C:** **D:** **E:**	86 cm (34") 94 cm (37") 54 cm (21.3") 90 cm (35.5") 72 cm (28.3")	
A: B:	121 cm (47.6") 114 cm (45")	

Footprint - Front view		
A:	51 cm (20")	

Footprint - Side view		
A:	43 cm (19.3")	
A:	53 cm (21")	

13.4 Recommended space

Space in front of the machine

- Make sure that there is enough room in front of the machine. 100 cm (40”)

Space at the sides of the machine

- Recommended space at the sides of the machine. 100 cm (40")

Space at the rear of the machine

- Make sure that there is enough room behind the machine for the inlet and outlet hoses.

13.5 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.
- Struers recommends that all original packaging and fittings are kept for future use.

13.5.1 Long-term storage or shipping

Note
Struers recommends that all original packaging and fittings are kept for future use.

- Clean the machine and all accessories thoroughly.
- Disconnect the unit from the electrical power supply.
- Disconnect the water inlet and the water outlet.
- Disconnect the cooling system, if installed. See the instructions for the specific unit.
- Place the machine and accessories in their original packaging.
- Secure the boxes on a pallet with straps.

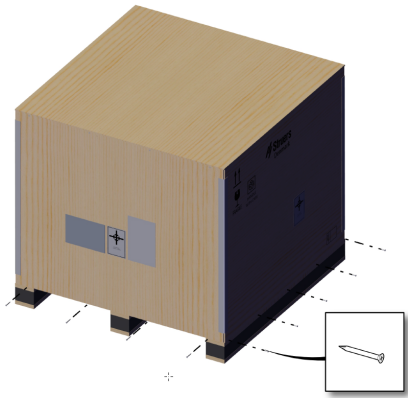
At the new location

At the new location, make sure that the facilities required are in place.

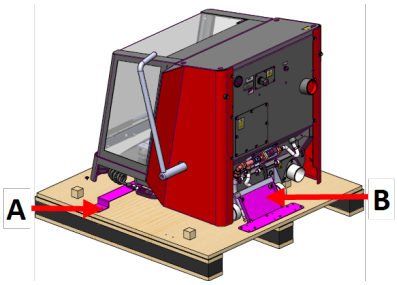
13.6 Unpacking

Note
Struers recommends that all original packaging and fittings are kept for future use.

1. Remove the screws and the crate. Use a screwdriver PH 2.



2. Use a Torque bit T20 to remove the transport bracket (**A**).
3. Use a Torque bit T20 to remove the screws on the pallet (**B**).
4. Use a 6 mm Allen key to remove the screws that fasten the machine to the bracket (**B**).
5. Remove the transport brackets.



13.7 Lifting

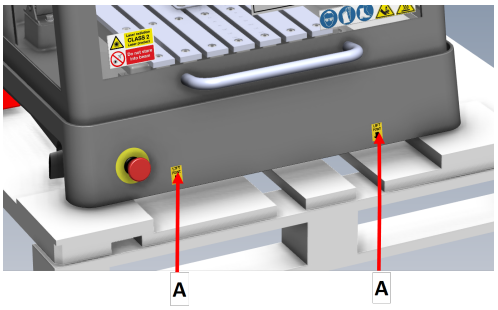
CRUSHING HAZARD
Take care of your fingers when handling the machine.
Wear safety shoes when handling heavy machinery.

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

1. Use a crane, the lifting console included in the package, and lifting straps to lift the machine.

   The crane must have a lifting capacity of minimum 250 kg (552 lbs).

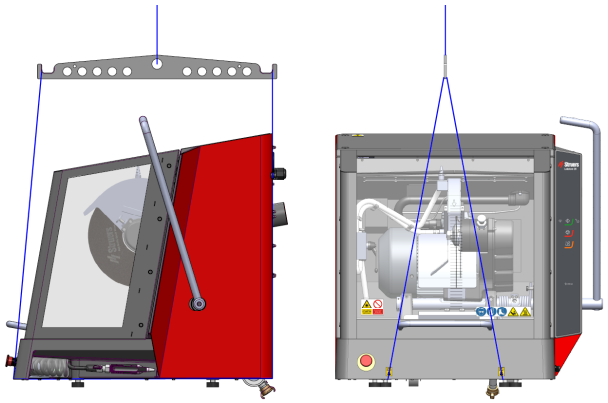
2. Place the lifting straps under the base of the machine, on both the right side and the left side. (**A**)



3. Place the front and back straps on the inner side of the feet.

   Be careful when placing the lifting straps, as these can damage the safety guard.

4. Make sure that the straps are parallel to each other and position the lifting bar so that both straps are kept apart below the lifting points.

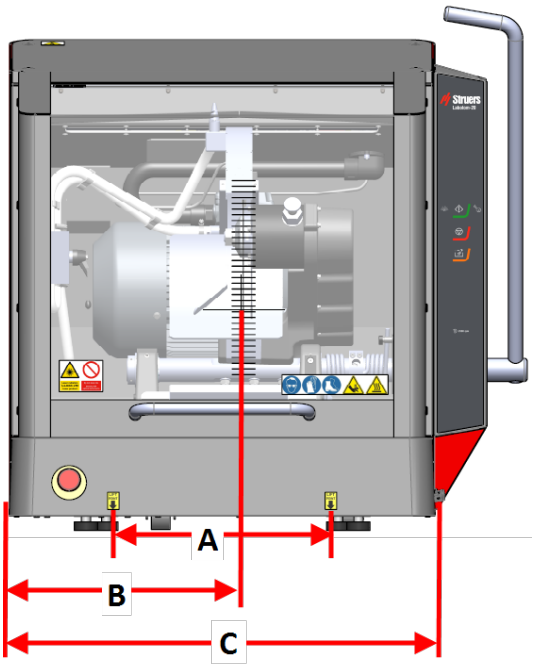


Center of gravity

A: 37.5 cm (14.7")

B: 40 cm (15.6")

C: 73.5 cm (29")

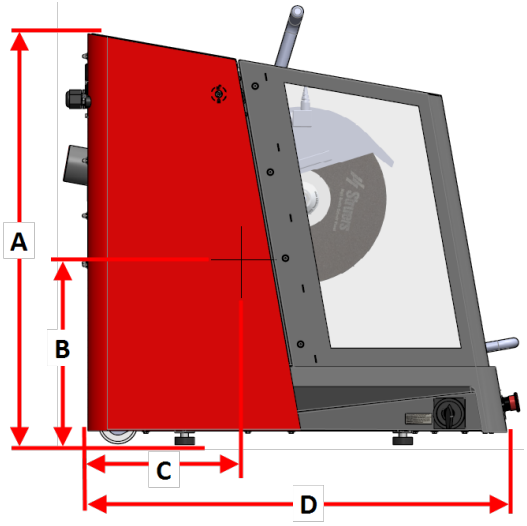


A: 90 cm (35.5")

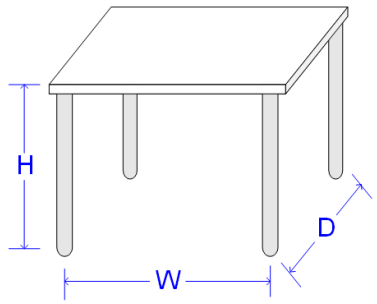
B: 38 cm (15")

C: 31.5 cm (12.4")

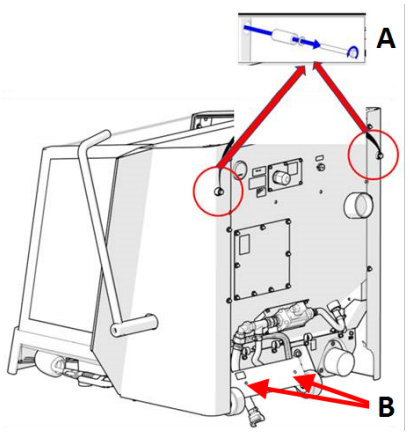
D: 86.5 cm (34")



At the new location

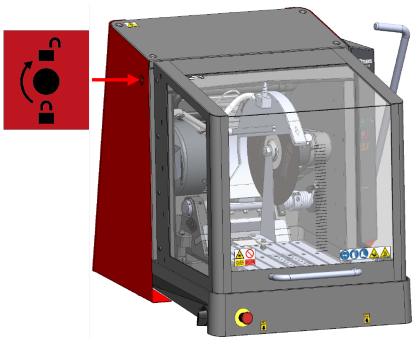
Recommended table dimensions		
Height **Width** **Depth**	Recommended: 80 cm (31.5") 92 cm (36.2") 90 cm (35.4")	
The table must be able to carry at least: 350 kg (772 lbs)		

1. Install the machine close to the power supply, the exhaust system and the cooling system.
2. Make sure there is enough room behind the machine for the inlet and outlet hose.
3. Install the machine in a room with sufficient light.
4. Place the machine on a rigid, stable workbench with a horizontal surface and an adequate height.
5. Make sure that the machine is level and that all four feet rest on the workbench.
6. Dismount the two distance washers (**A**) on the rear side of the machine and place them in their holders (**B**).

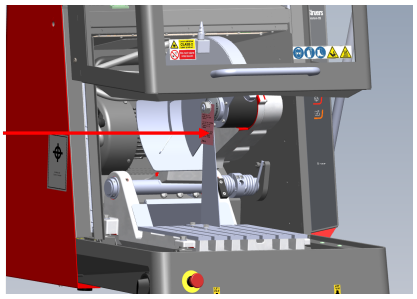


7. Unlock the safety guard by turning the triangular key clockwise.

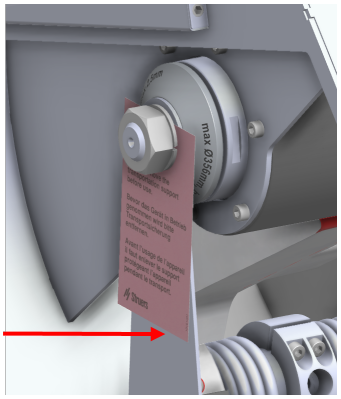
   See Checking the packing list ►17. Open the safety guard.
8. To reset the lock on the safety guard, turn the triangular key counter-clockwise.



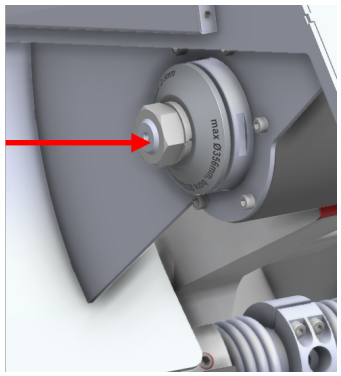
9. Open the safety guard and unscrew the fasteners that keep the transport bracket in place. Use a 30 mm (1.18") wrench, and a 13 mm (0.51") wrench.



10. Remove the transport bracket.



11. Place the M20 nut into place again.



12. Unpack the water hose by removing the cover foil and cable ties.

13.8 Power supply

ELECTRICAL HAZARD
Switch off the electrical power supply before installing electrical equipment.
Make sure that the actual electrical power supply voltage corresponds to the voltage stated on the type plate of the machine.
Incorrect voltage can damage the electrical circuit.

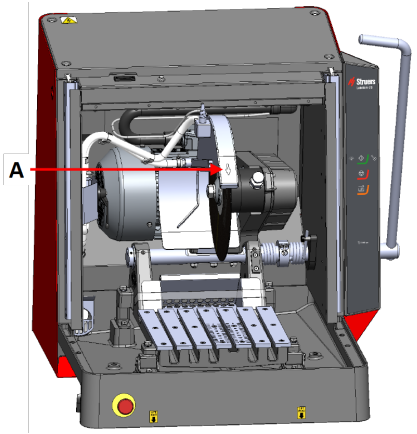
13.8.1 Connection to the machine

Procedure

1. Open the electrical connection box.
2. Connect the power cable as shown.

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

After installing the machine, make sure that the cut-off wheel rotates in the correct direction. The correct direction is indicated on the cut-off wheel guard (**A**).



13.8.2 Power supply cable - recommended specifications

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

Voltage/frequency: 3 x 200 V/50 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x 4 mm^2+ PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x 4 mm^2 + PE

Voltage/frequency: 3 x 220-230 V/50 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x 4 mm^2 + PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x 4 mm^2 + PE

Voltage/frequency: 3 x 380-415 V/50 Hz	
Min. fuse: **3 x 40 A**	Minimum cable size at minimum fuse: 5 x 2.5 mm^2+ PE
Max. fuse: **3 x 40 A**	Minimum cable size at maximum fuse: 5 x 2.5 mm^2 + PE

Voltage/frequency: 3 x 200-210 V/60 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x AWG8+ PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x AWG8 + PE

Voltage/frequency: 3 x 220-240 V/60 Hz	
Min. fuse: **3 x 50 A**	Minimum cable size at minimum fuse: 5 x AWG8 + PE
Max. fuse: **3 x 50 A**	Minimum cable size at maximum fuse: 5 x AWG8 + PE

Voltage/frequency: 3 x 380-415V/60 Hz	
Min. fuse: **3 x 40 A**	Minimum cable size at minimum fuse: 5 x AWG12 + PE
Max. fuse: **3 x 40 A**	Minimum cable size at maximum fuse: 5 x AWG12 + PE

Voltage/frequency: 3 x 460-480 V/60 Hz	
Min. fuse: **3 x 40 A**	Minimum cable size at minimum fuse: 5 x AWG12 + PE
Max. fuse: **3 x 40 A**	Minimum cable size at maximum fuse: 5 x AWG12 + PE

Electrical data

The other end of the cable can be fitted with an approved plug or hard-wired into the power supply according to the electrical specifications and local regulations.

ELECTRICAL HAZARD
Labotom-20 must be protected with external fuses. See the table below for the fuse size required.

Voltage/frequency: 3 x 200 V/50 Hz	
Power, nominal load	S3 60%: 5.5 kW (7.4 hp) S3 15%: 7.5 kW (10 hp)
Number of phases	3 (3L + PE)
Power, nominal load	22.9 A
Power, Max. load	45.8 A
Ampere rating, largest motor	21.9 A

Voltage/frequency: 3 x 200-210 V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	27.1 A
Power, Max. load	54.2 A
Ampere rating, largest motor	26.1 A

Voltage/frequency: 3 x 220-230 V/50 Hz	
Power, nominal load	S3 60%: 5.5 kW (7.4 hp) S3 15%: 7.5 kW (10 hp)
Number of phases	3 (3L + PE)
Power, nominal load	20.1 A
Power, Max. load	40.2 A
Ampere rating, largest motor	19.1 A

Voltage/frequency: 3 x 220-240 V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	22.5 A
Power, Max. load	45 A
Ampere rating, largest motor	21.5 A

Voltage/frequency: 3 x 380-415V/50 Hz	
Power, nominal load	S3 60%: 5.5 kW (7.4 hp) S3 15%: 7.5 kW (10 hp)
Number of phases	3 (3L + PE)
Power, nominal load	12 A
Power, Max. load	24 A
Ampere rating, largest motor	11 A

Voltage/frequency: 3 x 380-415V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	13.4 A
Power, Max. load	26.8 A
Ampere rating, largest motor	12.4 A

Voltage/frequency: 3 x 460-480 V/60 Hz	
Power, nominal load	S3 60%: 6.6 kW (8.8 hp) S3 15%: 8.5 kW (11.4 hp)
Number of phases	3 (3L + PE)
Power, nominal load	12.4 A
Power, Max. load	24.8 A
Ampere rating, largest motor	11.4 A

13.8.3 External short circuit protection

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

13.8.4 Residual Current Circuit Breaker (RCCB)

Note
Local standards can override the recommendations for the main electrical power supply cable. If needed, 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 (EN 50178/5.2.11.1) or better

13.9 Safety specifications

Safety Circuit Categories/Performance Level	
Emergency stop	PL c, Category 1 Stop category 0
Safety guard	PL d, Category 3 Stop category 0
Safety guard lock	PL a, Category B Stop category 0
Unintended start of fluid	PL c, Category 1 Stop category 0

13.10 Water supply

Water inlet

Note
New water pipe installations:
Leave the water to run for a few minutes to flush any debris from the pipe before connecting the machine to the water supply.

The machine is supplied with a 2 m (6.5") pressure hose with GEKA coupling to connect the machine to the water supply.

Water supply specifications	
Water pressure	1 to 9.9 bar (14.5 to 143 psi)1 - 9.9 bar (14.5 - 143 psi)
Hose supplied	20 cm/23.7"
Tube connection	Gekka connection: 3/4".

A recirculation unit is recommended.

Water outlet - drain

Water outlet specifications	
Hose supplied	60 cm (23.6") with an outlet under the machine
Water outlet diameter	75 mm (2.9")

13.11 Exhaust

Recommended

Minimum capacity: 150 m^3/h (5297 ft^3/h) at 0 mm (0") water gauge.

13.12 Cooling System

The use of a Struers cooling system is recommended.

Required

Struers recommends adding a Struers anti-corrosion additive to the cooling water.

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.

14 Manufacturer

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

Responsibility of the manufacturer

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

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

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

Based on: 16937900 A

Struers
Ensuring Certainty

Struers ApS
Pederstrupvej 84
DK-2750 Ballerup, Denmark

Declaration of Conformity

EU / UE / EL / EC / EE / ES / EÚ / AB
Manufacturer / Производител / Výrobce / Producent / Hersteller / Κατασκευαστής / Fabricante / Tootja / Valmistaja / Fabricant / Proizvođač / Gyártó / Fabbricante / Gamintojas / Ražotājs / Fabrikant / Producent / Fabricante / Producătorul / Výrobca / Proizvajalec / Tillverkare / 販売元 / 제조사 / Produsent / Изготовитель / İmalatçı / 制造商

Декларация за съответствие	Vaatimustenmukaisuusvakuutus	Verklaring van overeenstemming	適合宣言書
Prohlášení o shodě	Déclaration de conformité	Deklaracja zgodności	적합성 선언서
Overensstemmelseserklæring	Izjava o sukladnosti	Declaração de conformidade	Samsvarserklæring
Konformitätserklärung	Megfelelőségi nyilatkozat	Declarație de conformitate	Заявление о соответствии
Δήλωση συμμόρφωσης	Dichiarazione di conformità	Vyhlásenie o zhode	Uygunluk Beyanı
Declaración de conformidad	Atitikties deklaracija	Izjava o skladnosti	符合性声明
Vastavusdeklaratsioon	Atbilstības deklarācija	Intyg om överensstämmelse	

Name / Име / Název / Navn / Name / Όνομα / Nombre / Nimetus / Nimi / Nom / Naziv / Név / Nome / Pavadinimas / Nosaukums / Naam / Nazwa / Nome / Denumirea / Názov / Ime / Namn / 名前 / 제품명 / Наименование / Adı / 名称	Labotom-20
Model / Модел / Model / Model / Modell / Μοντέλο / Modelo / Mudel / Malli / Modèle / Model / Modell / Modello / Modelis / Modelis / Model / Model / Modelo / Modelul / Model / Model / Modell / モデル / 모델 / Modell / Модель / Model / 型号	Labotom-20 Labotom-20 for tunnels
Function / Функция / Funkce / Funktion / Funktion / Λειτουργία / Función / Funktsioon / Toiminto / Fonction / Funkcija / Funkció / Funzione / Funkcija / Funkcija / Functie / Funkcja / Função / Funcția / Funkcia / Funkcija / Funktion / 機能 / 기능 / Funksjon / Назначение / Fonksiyon / 功能	Manual cut-off machine.
Type / Тип / Typ / Type / Typ / Τύπος / Tipo / Tüüp / Tyyppi / Type / Tip / Típus / Tipo / Tipas / Tips / Type / Typ / Tipo / Tipul / Typ / Tip / Typ / 種類 / 유형 / Type / Тип / Tür / 类型	Labotom-20 06936129, 06936130, 06936135, 06936136, 06936146, 06936147, 06936154 Labotom-20 for tunnels 06936229, 06936230, 06936235, 06936236, 06936246, 06936247, 06936254
Serial no. / Сериен номер / Výrobní číslo / Serienummer / Seriennummer / Σειριακός αριθμός / N.º de serie / Seerianumber / Sarjanro / No de série / Serijski broj / Sorozatszám / N. seriale / Serijos Nr. / Sērijas Nr. / Serienr. / Numer seryjny / N.º de série / Nr. serie / Výrobné č. / Serijska št. / Serienummer / シリアル番号 / 일련번호 / Serienr. / Серийный номер / Seri no. / 序列号	

CE
Module H, according to global approach

en	We declare that the product mentioned is in conformity with the following directives and standards:	es	Declaramos que el producto mencionado cumple con las siguientes directivas y normativas:	it	Dichiariamo che il prodotto citato è conforme ai seguenti standard e direttive:	pt	Declaramos que o produto mencionado está em conformidade com as seguintes normas e diretivas:	ja	弊社はこの指定製品が以下の指令および基準に適合することを宣言します。
bg	Декларираме, че посоченият продукт е в съответствие със следните директиви и стандарти:	et	Kinnitame, et nimetatud toode vastab järgmistele direktiividele ja standarditele:	lt	Pareiškiame, kad nurodytas gaminys atitinka šias direktyvas ir standartus:	ro	Declarăm că produsul menționat este în conformitate cu următoarele directive și standarde:	ko	해당 선언서 상의 제품은 다음 지침 및 기준에 적합함을 선언합니다.
cs	Tímto prohlašujeme, že uvedený výrobek je v souladu s následujícími směrnicemi a normami:	fi	Vakuutamme, että mainuttu tuote on seuraavien direktiivien ja standardien mukainen:	lv	Mēs apstiprinām, ka minētais produkts atbilst šādām direktīvām un standartiem:	sk	Vyhlasujeme, že uvedený výrobok je v súlade s týmito smernicami a normami:	no	Vi erklærer at produktene som er nevnt er i samsvar med følgende direktiver og standarder:
da	Vi erklærer herved, at det nævnte produkt er i overensstemmelse med følgende direktiver og standarder:	fr	Nous déclarons que le produit mentionné est conforme aux directives et normes suivantes :	nl	Wij verklaren dat het vermelde product in overeenstemming is met de volgende richtlijnen en normen:	sl	Potrjujemo, da je omenjeni izdelek v skladu z naslednjimi direktivami in standardi:	ru	Настоящим заявляем, что указанная продукция отвечает требованиям перечисленных далее директив и стандартов:
de	Wir erklären, dass das genannte Produkt den folgenden Richtlinien und Normen entspricht:	hr	Izjavljujemo da je spomenuti proizvod sukladan sljedećim direktivama i standardima:	pl	Oświadczamy, że wymieniony produkt jest zgodny z następującymi dyrektywami i normami:	sv	Vi intygar att den angivna produkten överensstämmer med följande direktiv och standarder:	tr	Belirtilen ürünün aşağıdaki direktiflere ve standartlara uygun olduğunu beyan ederiz:
el	Δηλώνουμε ότι το εν λόγω προϊόν είναι σύμφωνο με τις ακόλουθες οδηγίες και πρότυπα:	hu	Kijelentjük, hogy jelen termék megfelel a következő irányelveknek és szabványoknak:					zh	我们特此声明上述产品符合以下指令和标准：

2006/42/EC	EN ISO 12100:2010, EN ISO 13849-1:2015, EN ISO 13849-2:2012, EN ISO 13850:2015, EN ISO 13857:2008, EN ISO 16089:2015, EN 60204-1:2018
2011/65/EU	EN 63000:2018
2014/30/EU	EN 61000-3-2:2014, EN 61000-3-3:2013, EN 61000-3-11:2000, EN 61000-3-12:2011, EN 61000-6-2:2005, EN 61000-6-2-AC:2005, EN 61000-6-3:2007, EN 61000-6-3-A1:2011, EN 61000-6-3-A1-AC:2012
1907/2006/EU (REACH)	
Additional standards	NFPA 79, FCC 47 CFR Part 15 Subpart B

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