stomdevice

Technician's instructions
KaVo ARCTICA Engine



Always be on the safe side.

KaVo. Dental Excellence.

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1 Technical Service

1.1 Technical hotline

International communication at KaVo level – a qualified team of competent contacts is available at your request.
Within the core service hours, a personal connection with qualified contacts is always guaranteed. You can reach us via e-mail outside of the core hours.



Service Hotline: +49 7351 56-2100
Service.Everest@kavo.com
User Hotline: +49 7351 56-2200
AWT.Everest@kavo.com

Please indicate the product serial number or version number of the product in all inquiries!
For further information, please visit: www.kavo.com

1.2 Hotline Repairs & Returns

Repair Hotline: +49(0)7351-56-1900
service.reparaturen@kavo.com

KaVo Dental GmbH
Repairs
Bahnhofstraße 18
D-88447 Warthausen

Hotline Returns: +49(0)7351-56-1800
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2 Dismounting and mounting the ARCTICA Engine

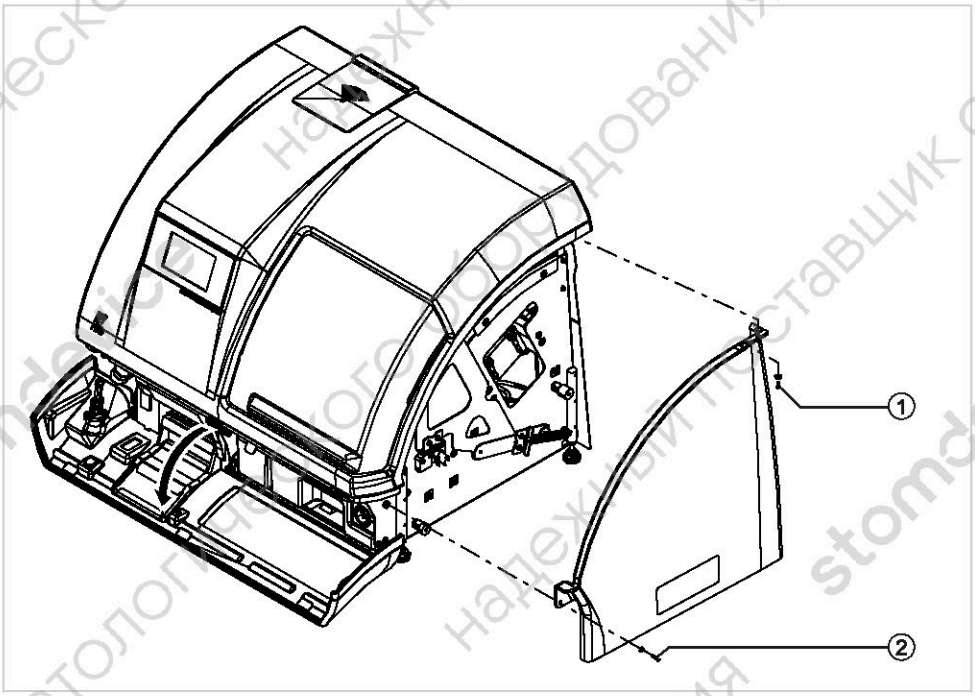


⚠ WARNING

Electrical shock from repairs of live parts.
Injury or death from electric shock.

- Before working on live parts, pull the power plug and disconnect the unit completely from the power connection so that the unit is without power.

2.1 Dismount and mount the right side panel



Disassembly

- Open the tool drawer.
- Remove the Allen screws with the universal tool (**Mat. no. 1.009.0859**) SW 2.5 ① and②.
- Release the side panel from the plug-in connector and remove.

Assembly

Note

Housing damage due to high torque during installation.

- Do not tighten housing screws with torque.
- Tighten the screws with 10 turns.

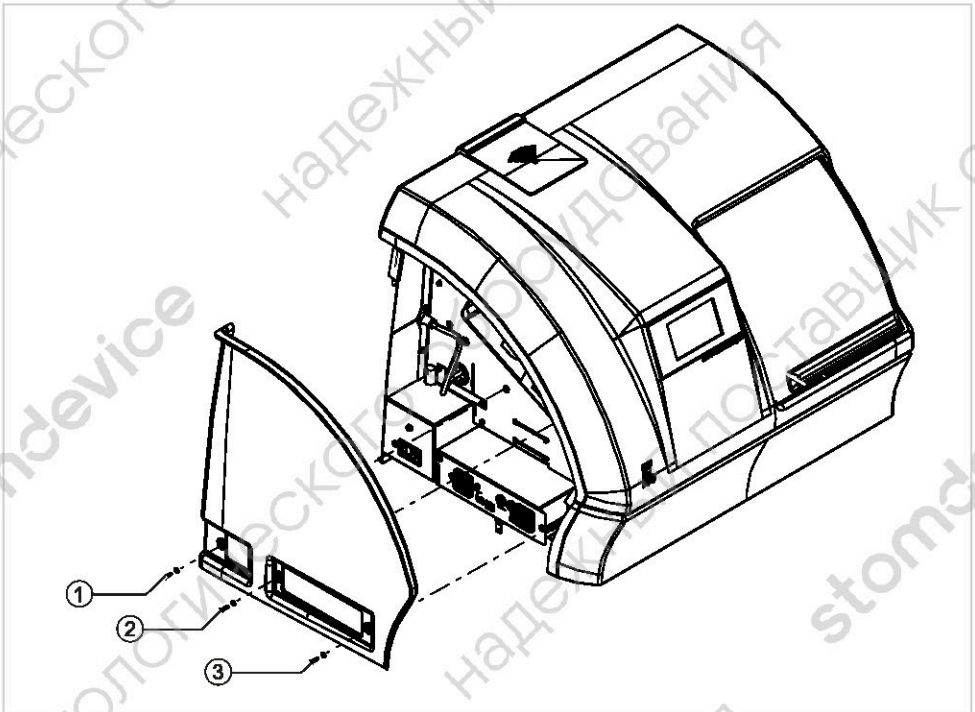
- Mount the side panel in reverse sequence

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2.2 Dismount and mount the left side panel

Dismounting

- Switch off the machine and disconnect from the power supply.
- Remove the network cable, power supply cable, and control cable of the handpiece or foot control from the electronics box.
- Remove the Allen screws with the universal tool (**Mat. no. 1.009.0859**) SW 2.5 ① to ③.



- Carefully remove the side panel.

Mounting

Note

The housing may be damaged if excessive torque is used during installation.

- Tighten the housing screws to be hand-tight only.
- Turn the screws 10 times to tighten them.

- To mount the side panel, proceed in reverse order.

2.3 Dismount and mount the housing

Note

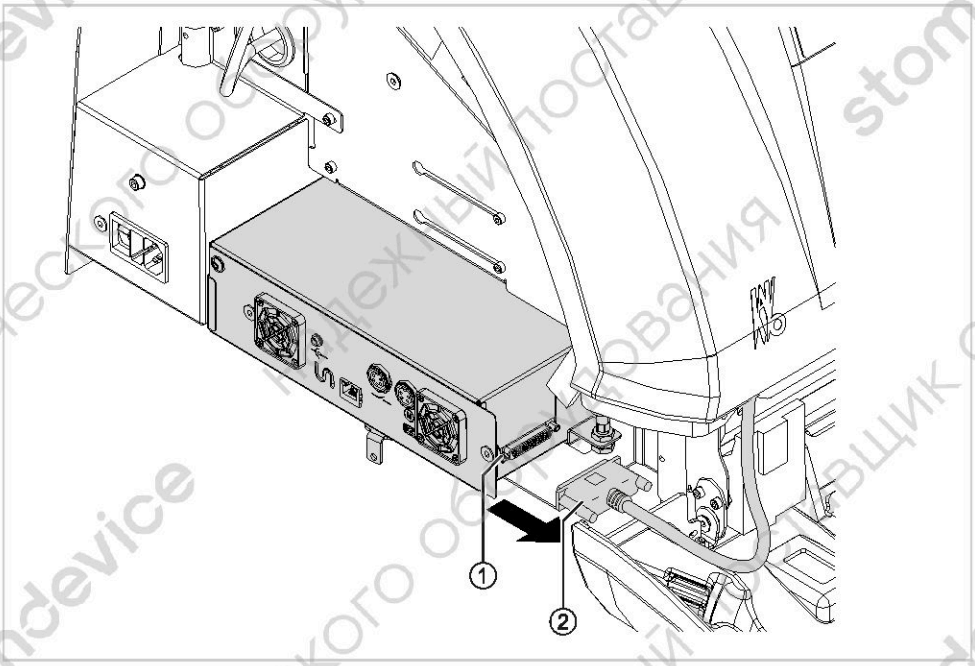
Damage to parts of the housing due to display cable being connected.

- Pull the housing upwards only after detaching the display cable from the electronics box.

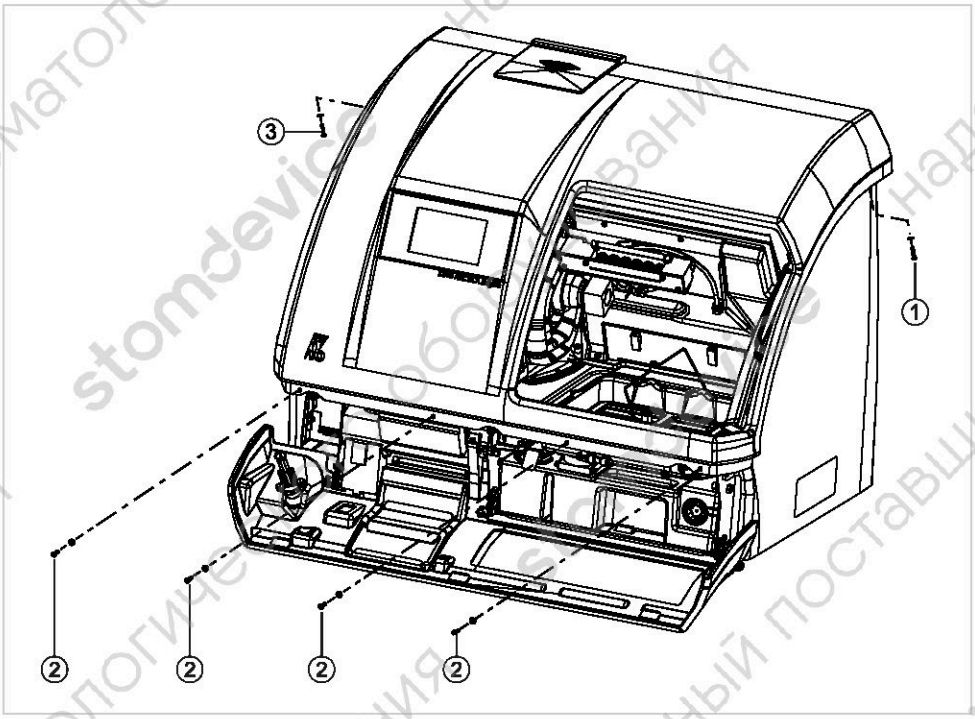
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Dismounting

- Remove the connection cable ② of the touch screen from the electronics box ①. For this purpose, undo the two screws on the plug.

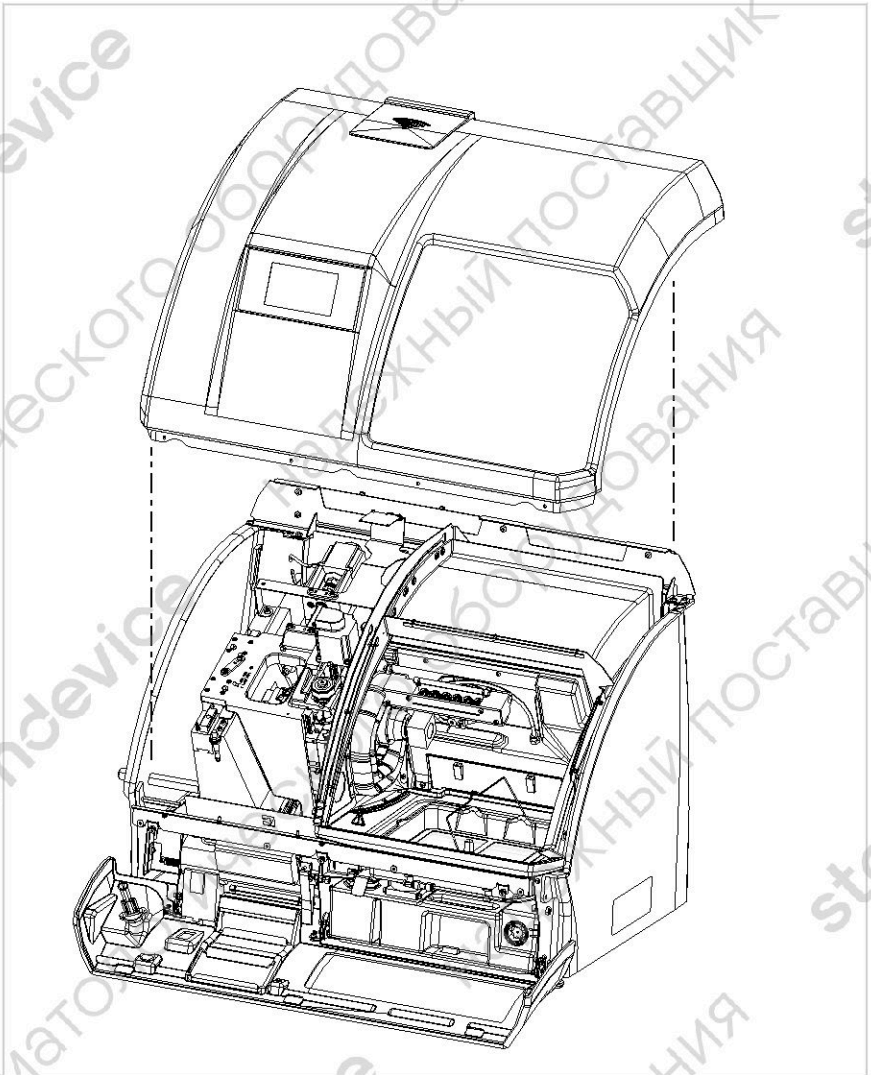


- Open the tool drawer. Remove the Allen screws ② with the universal tool (**Mat. no. 1.009.0859**) SW 2.5.
- Remove screws ① and ③.



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- Take off the housing by carefully pulling it in upward direction

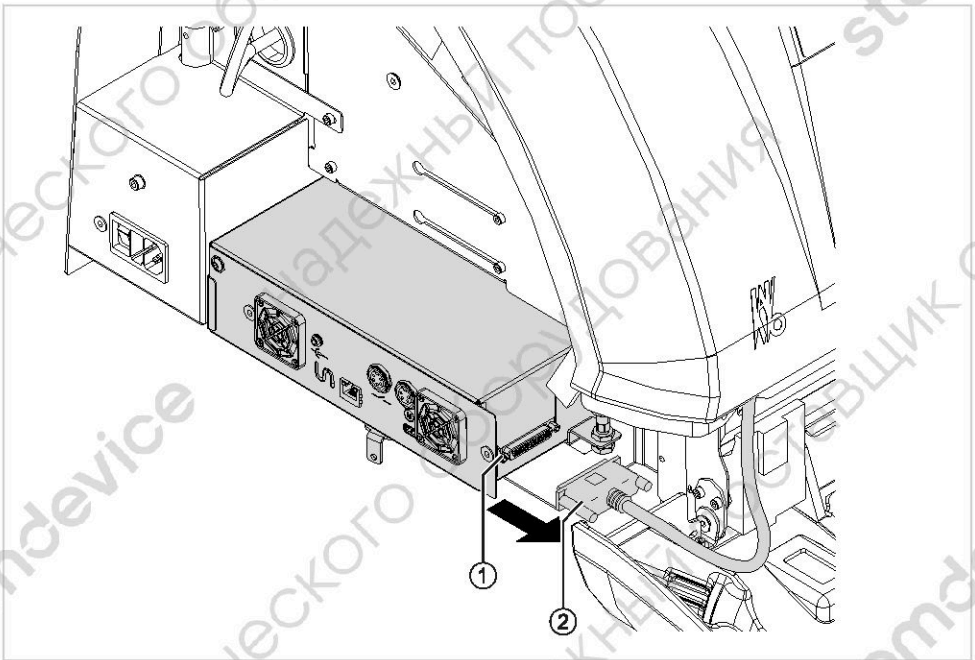


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2.4 Exchanging the touchscreen

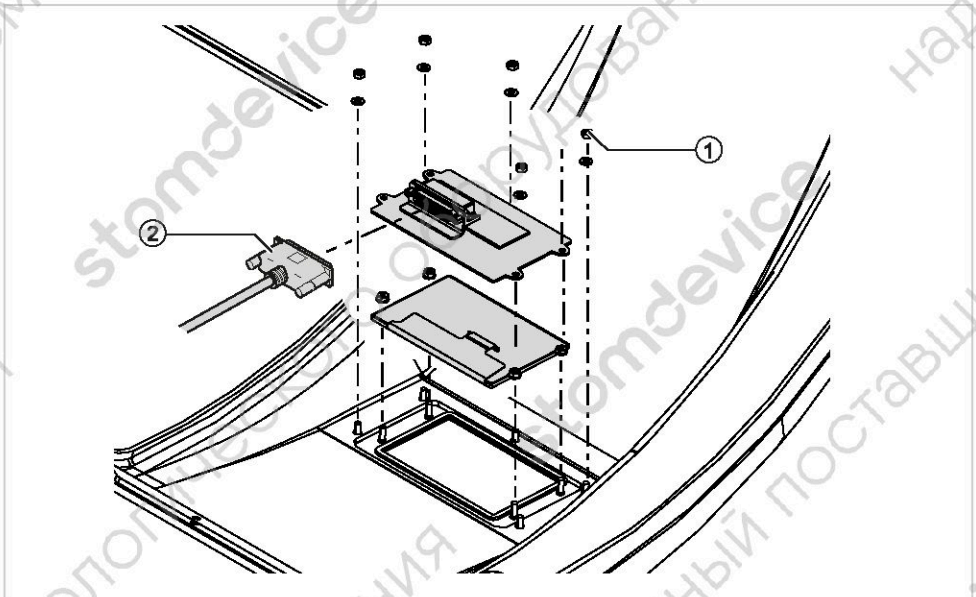
Dismounting

- Remove the connection cable of the touch screen ① from the electronics box ②. For this purpose, undo the two screws on the plug.



Dismount the touchscreen from the inside of the housing.

- Disconnect the electronics box ② from the display.
- Remove the nuts ① and take off the display.



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Mounting

Note

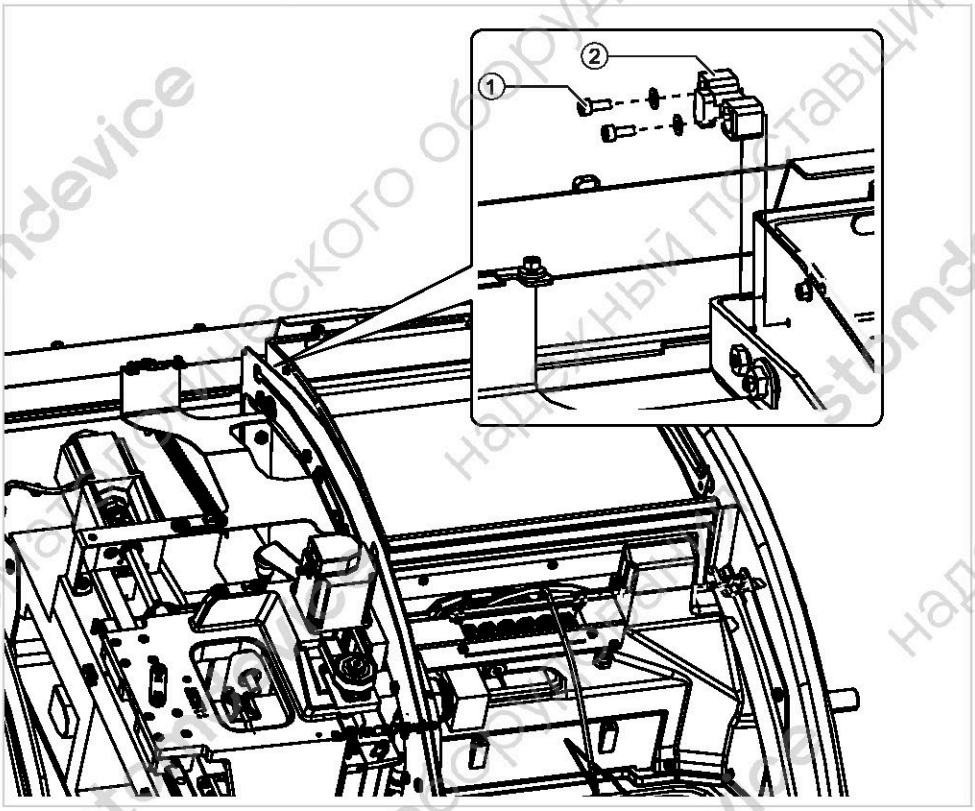
Damage to the touchscreen from over-tightening screws and nuts.
Tighten the nuts only lightly.

- To mount the touchscreen, proceed in reverse order.

2.5 Dismounting and mounting the guard door

Dismounting

- Remove two Allen screws ① of the rear door glider ② using the universal tool (**Mat. no. 1.009.0859**) SW 2.5.





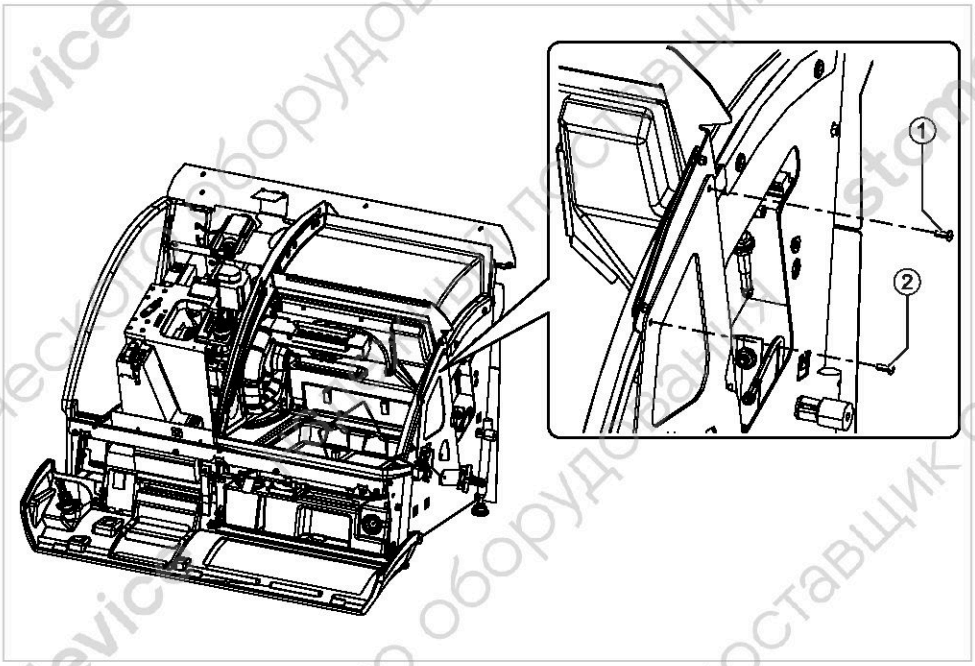
⚠ CAUTION

The door arm is spring-loaded.
Risk of injury during detachment of the mechanical components of the door.

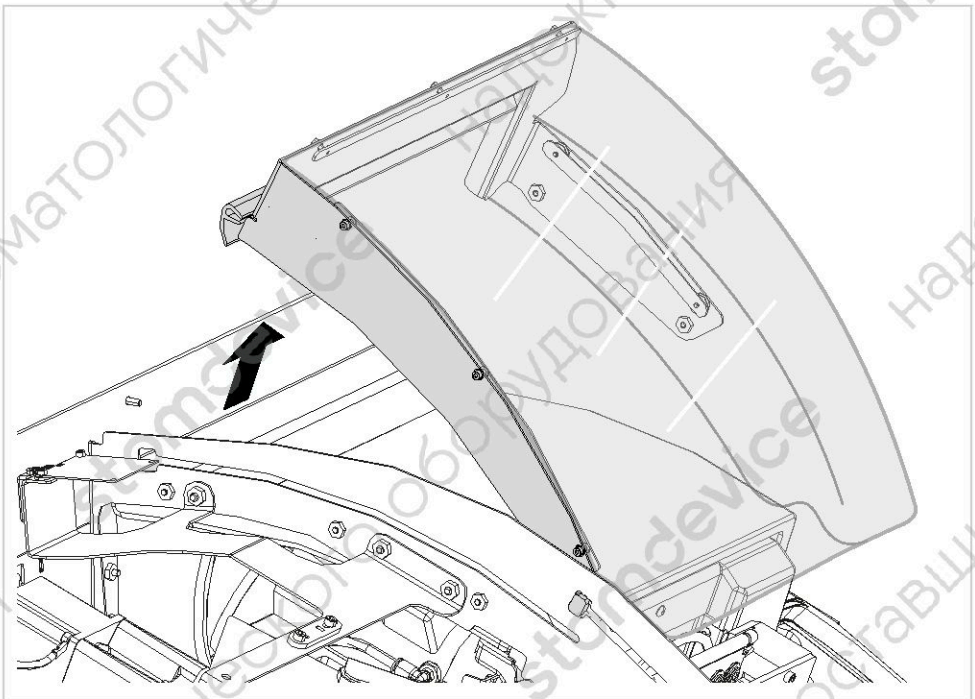
- Be mindful of the spring tension during the dismounting work.

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- Remove the Allen screws ① and ② with the universal tool (**Mat. no. 1.009.0859**) SW 2.5.

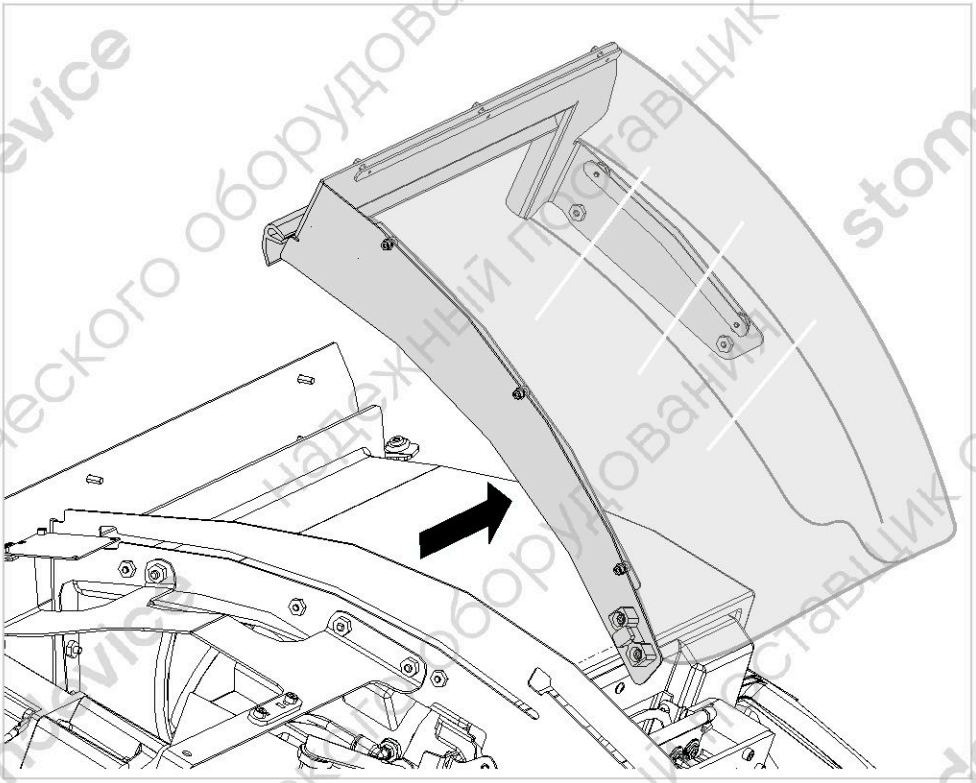


- Push the door to the rear-most position and slightly lift it on the rear such that the front door glider can be unhooked from the guide rail.



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- Unhook the door and front door glider from the guide rail.



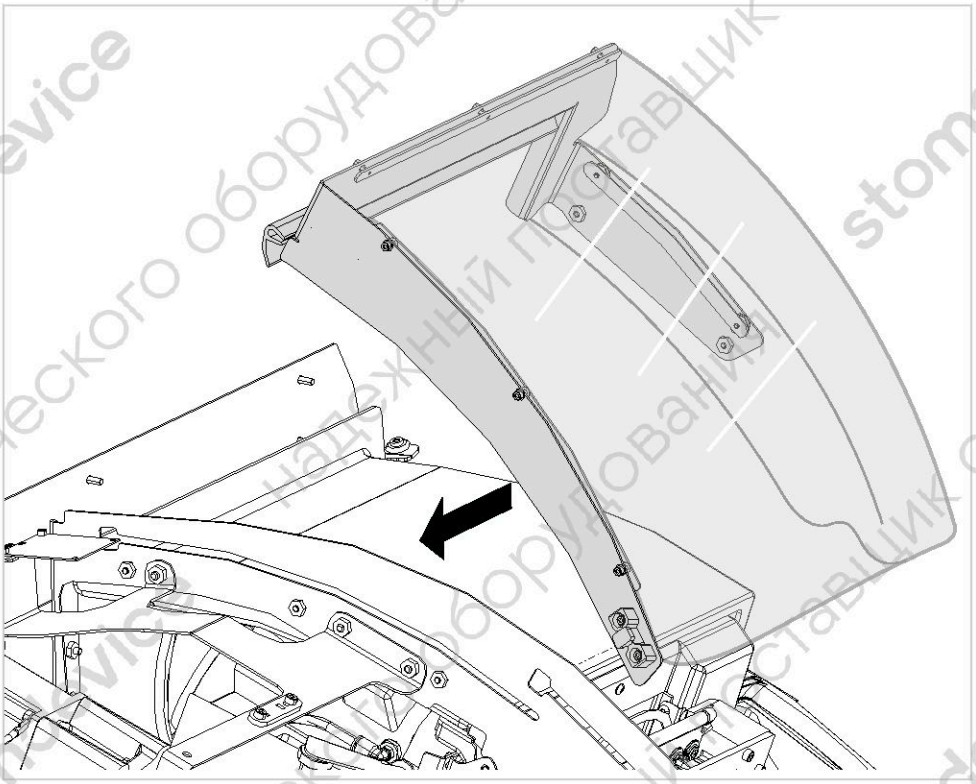
Mounting

Note

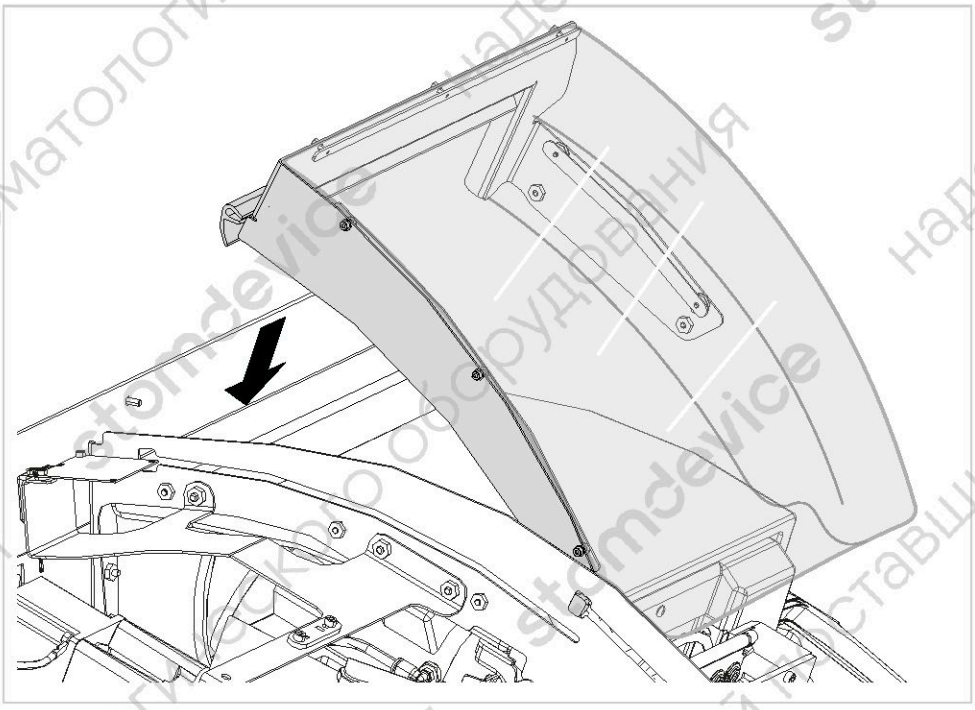
Damage to plastic parts during the mounting work.
Tighten the screws to be hand-tight only.

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- Slide the door into the front door glider.

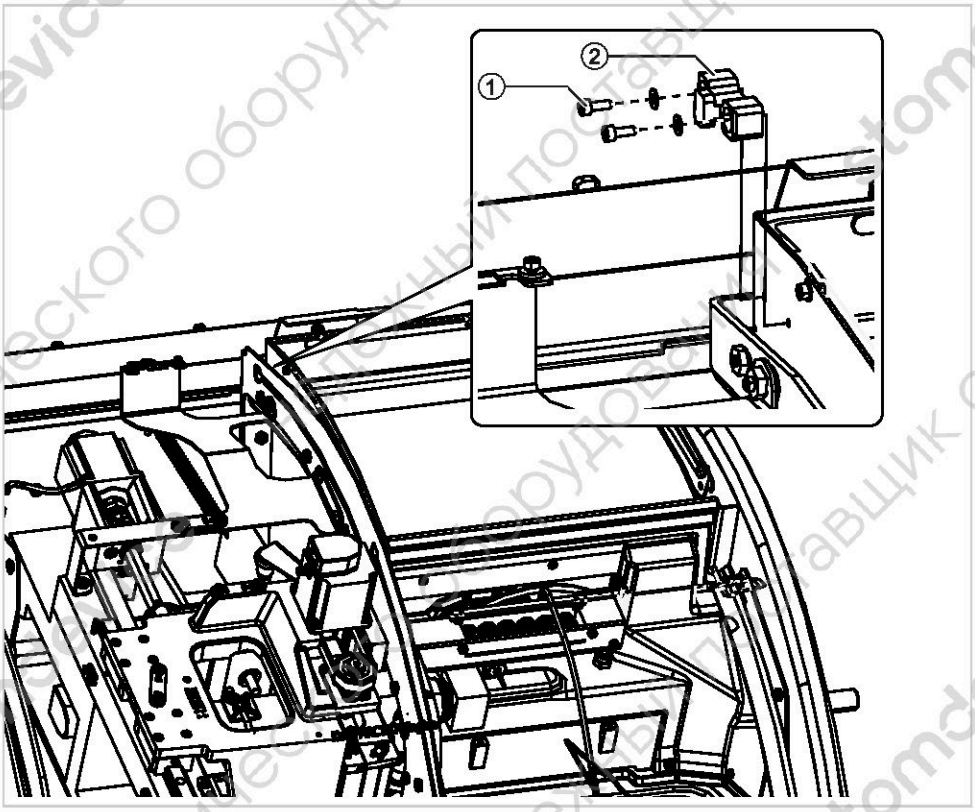


- Fold the door downward.

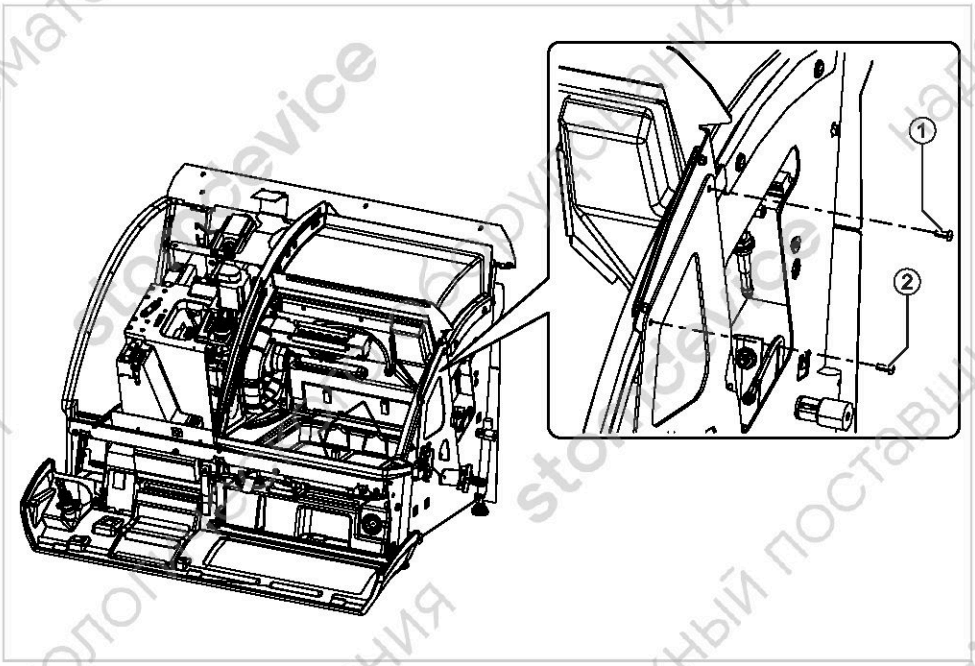


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- Fasten the Allen screws ① of the rear door glider ② using the universal tool (**Mat. no. 1.009.0859**) SW 2.5. Make sure to insert disc springs (**Mat. no. 0.253.6001**) and washers.



- Install the Allen screws ① and ② with the universal tool (**Mat. no. 1.009.0859**) SW 2.5 / 2.0 Nm.

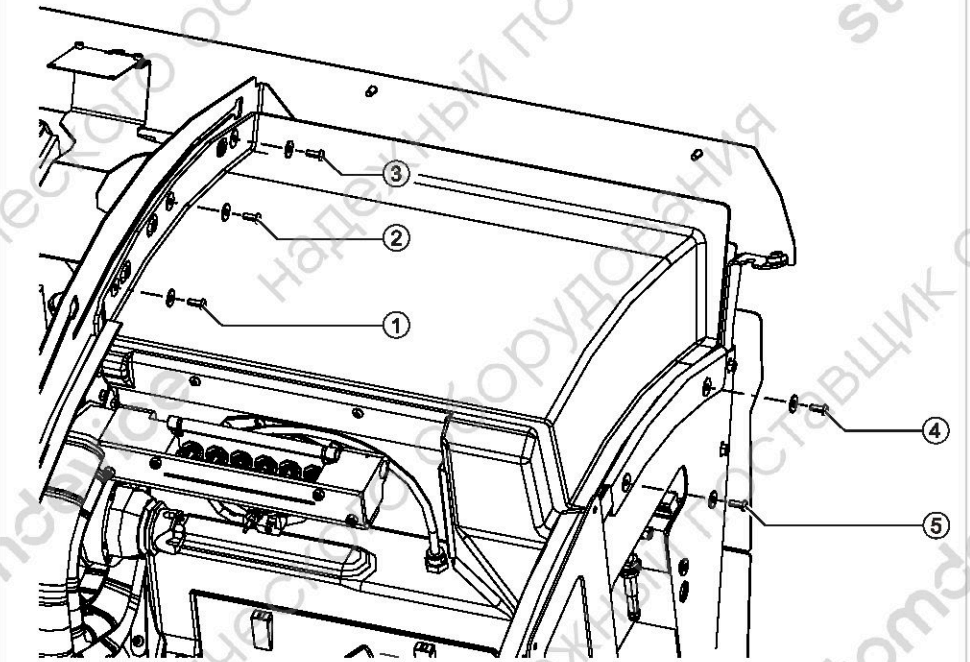


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2.6 Dismounting and mounting the spindle cover

Dismounting

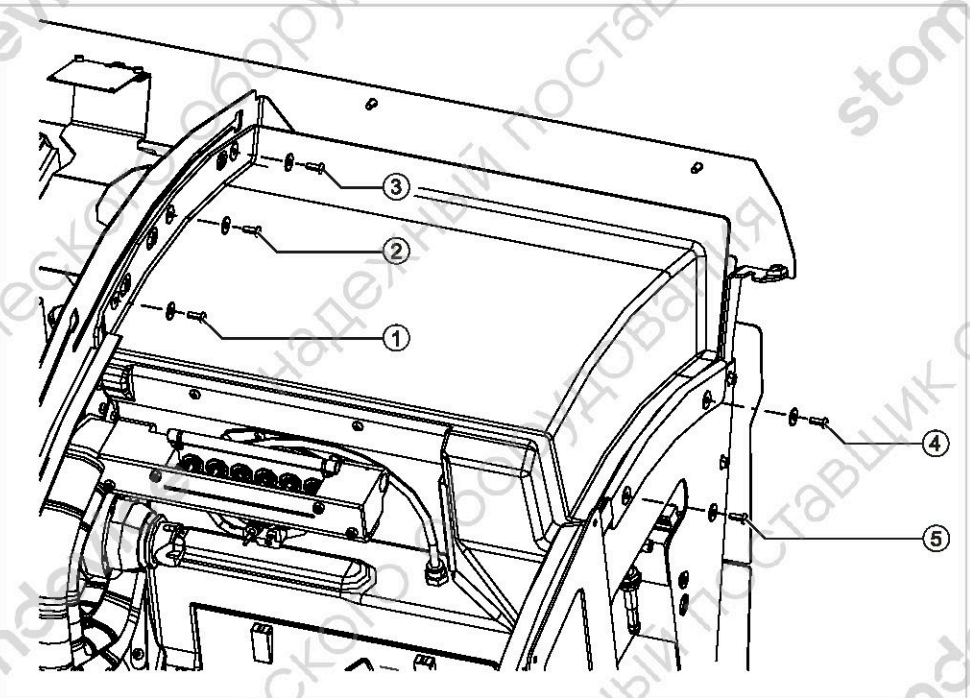
- Remove the Allen screws ① to ⑤ with the universal tool (**Mat. no. 1.009.0859**) SW 2.5, and take off the spindle cover.



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Mounting

- Install the spindle cover and secure it hand-tight with Allen screws ① to ⑤ using the universal tool (**Mat. no. 1.009.0859**) SW 2.5.



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3 Coolant lubricant pump

3.1 Dismounting the right side panel

See also: 2.1 Dismount and mount the right side panel, Page 5

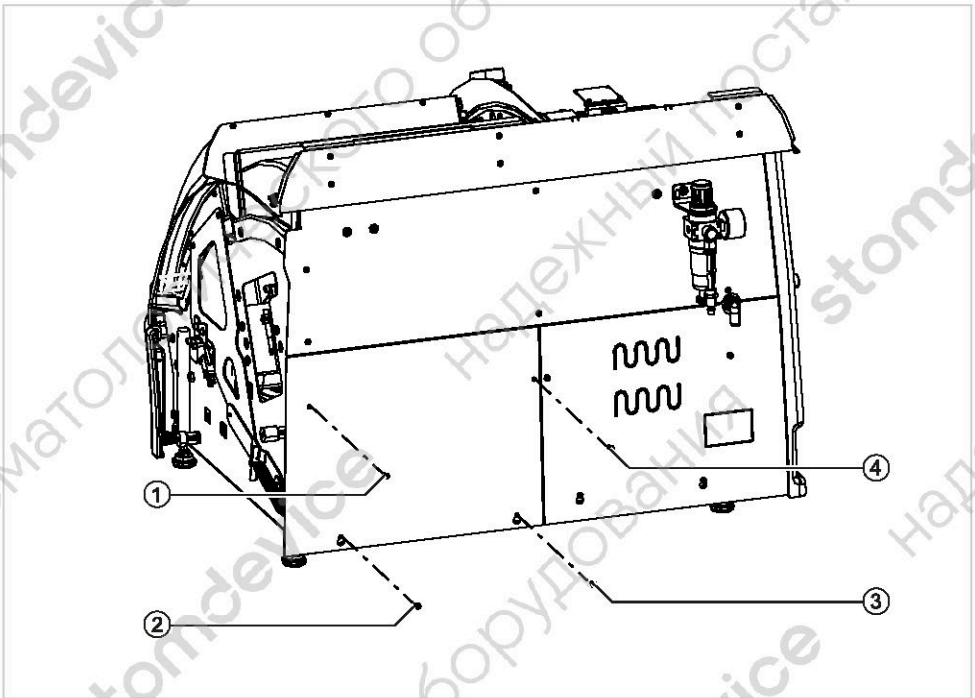
3.2 Dismounting and mounting the coolant lubricant pump

Dismounting

- Snap the locking lever for the coolant lubricant container upwards into the catch.

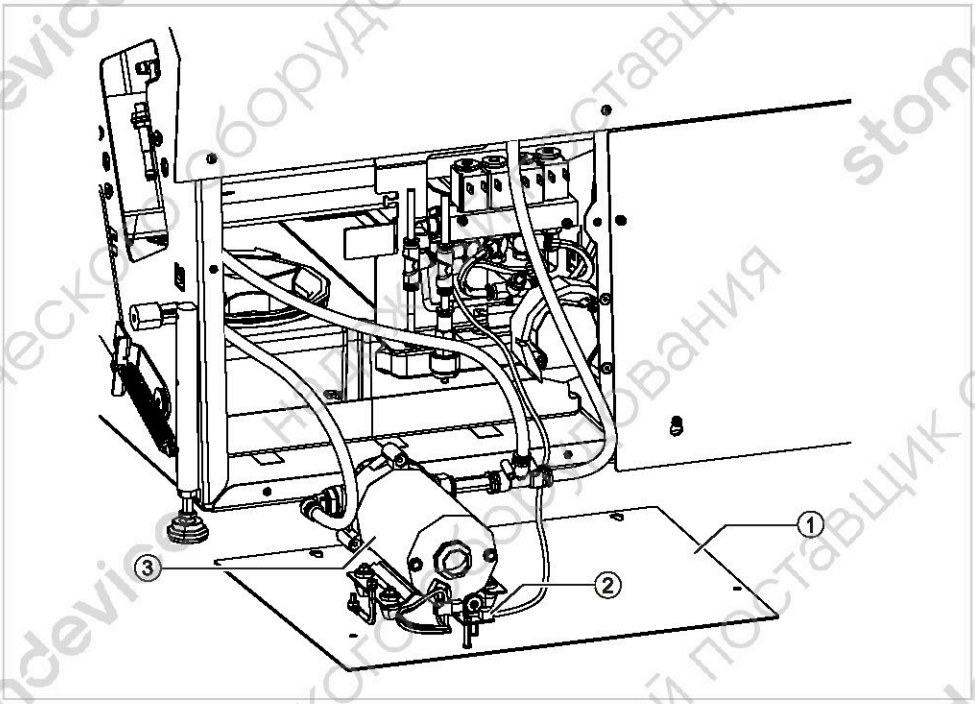
  The coolant lubricant circuit is interrupted.

- Remove the Allen screws ① and ④ with an all purpose tool (**Mat. no. 1.009.0859**) SW 2,5 and loosen Allen screws ② and ③.

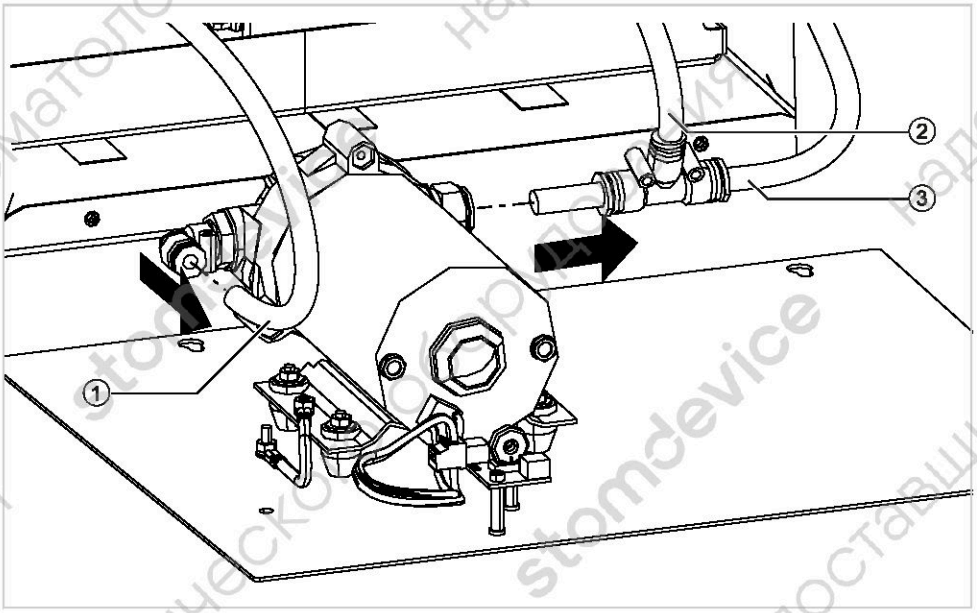


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- Unhinge the rear wall of the pump ① with the pump ③ and remove to the rear. Disconnect the power supply X28 ② from the printed circuit board of the pump above the pump.



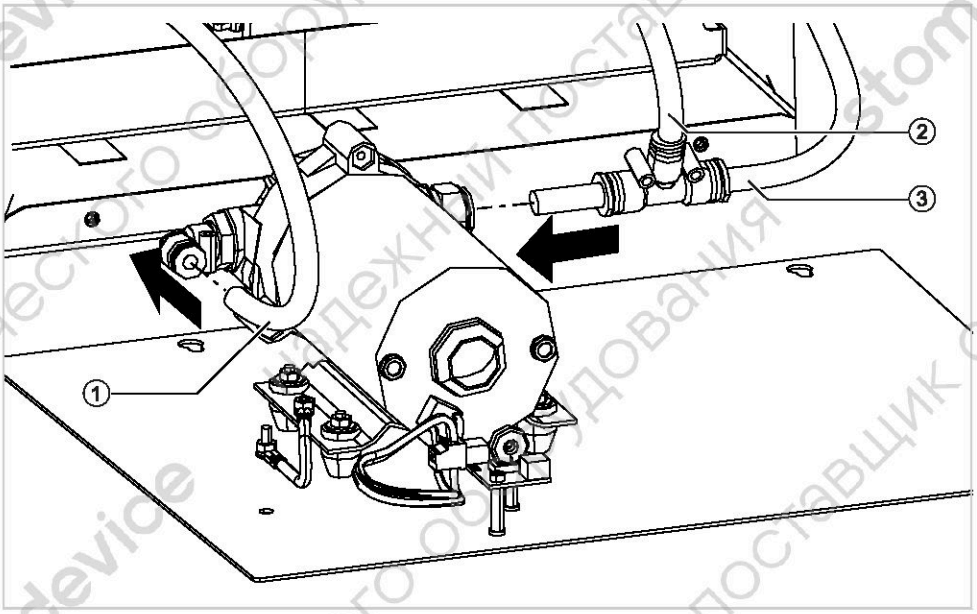
- Disconnect the supply hose ① and suction hose ③ with T-piece and filling hose ② from the pump. For this purpose, press the blue ring on the quick plug-in coupling and pull off the hose.



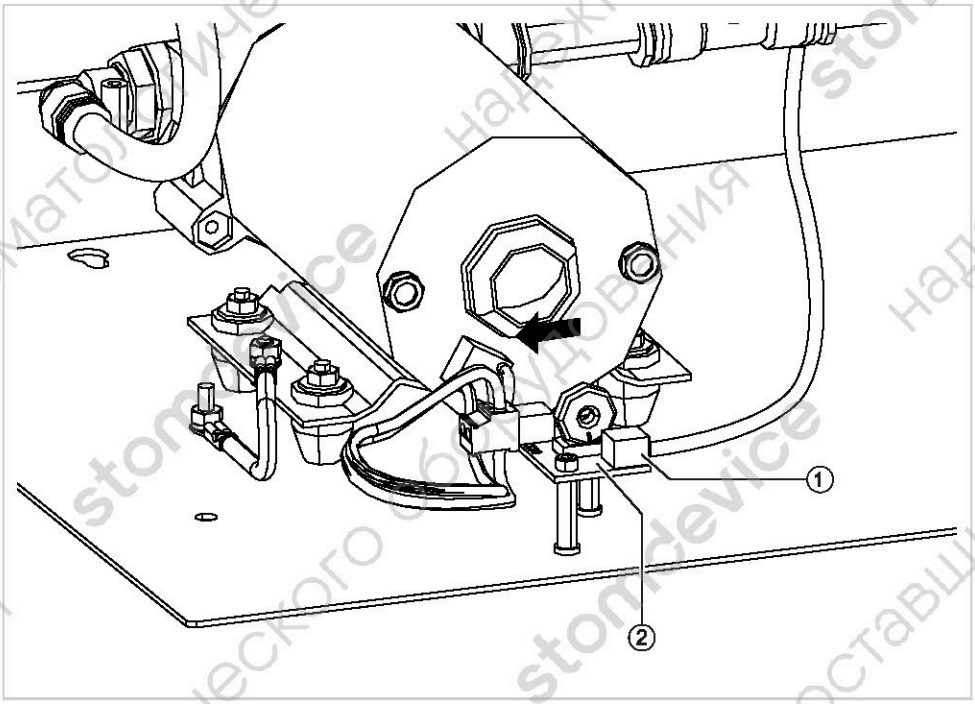
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Mounting

- Connect the supply hose ① and suction hose ③ with T-piece and filling hose ② to the pump. Make sure that the hose is clamped into the quick coupling.



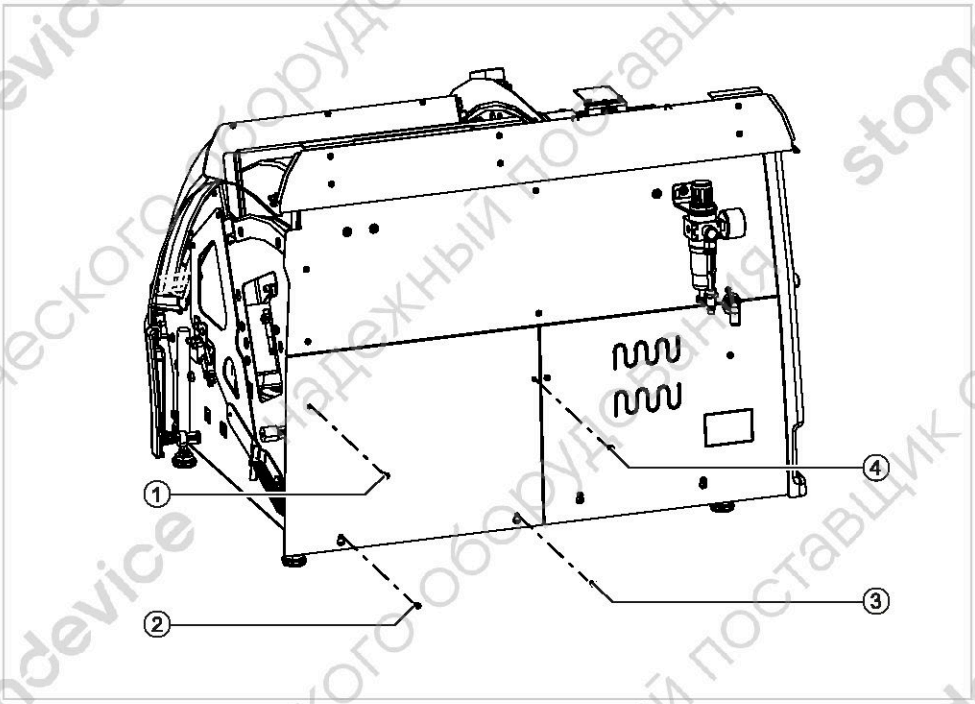
- Connect the power supply X28 ① to the printed circuit board ② of the pump.



- Hook the rear wall of the pump with the pump to the two Allen screws ② and ③.
- Fasten the Allen screws ① and ④ with the universal tool (**Mat. no. 1.009.0859**) SW 2.5.

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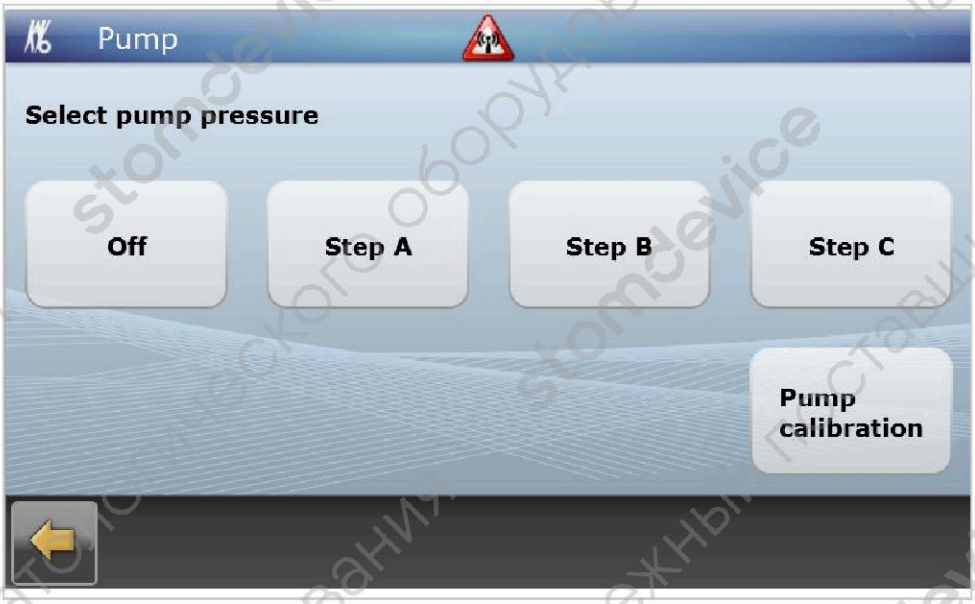
- Fasten the Allen screws ② and ③.
  Ensure that the hoses are not pinched or kinked during the mounting of the rear wall of the pump.



3.3 Calibrating the coolant lubricant pump

After exchanging the cooling lubricant pump, the pump must be calibrated and checked for leakage in the cooling lubricant circuit.

- Close the door of the machine.
- Tap the "Maintenance" > "Pump" > "Calibrate pump" buttons successively in the "Service" menu.

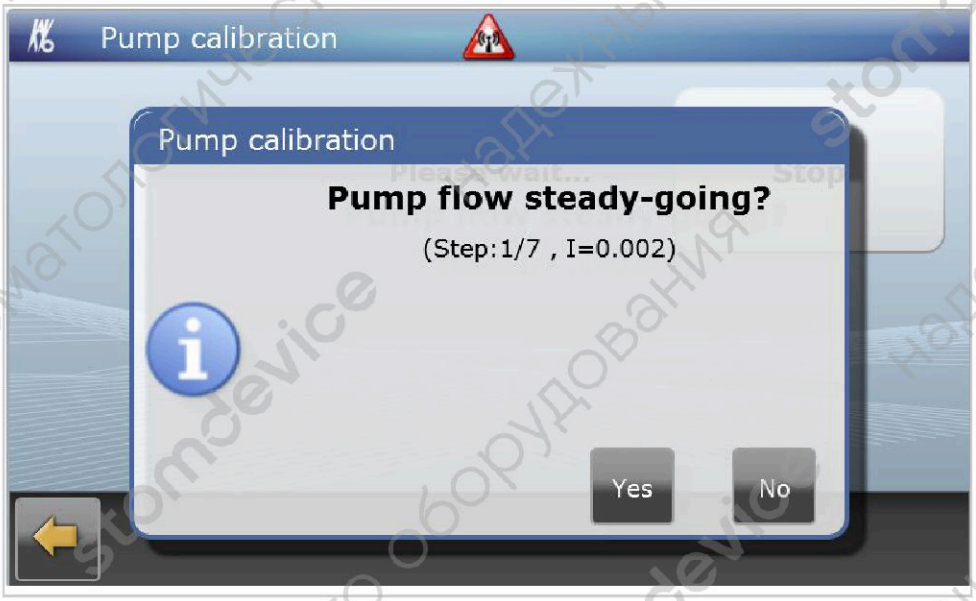


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- Touch the "Start" button.



- Verify that the coolant lubricant is being evenly sprayed by coolant nozzles. Confirm uniform spraying with the "Yes" button.



The calibration of the pump is completed in the initial step.

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- Confirm the end step 1 of the calibration with the "OK" button.



Three further calibrations will follow with different pump pressures.

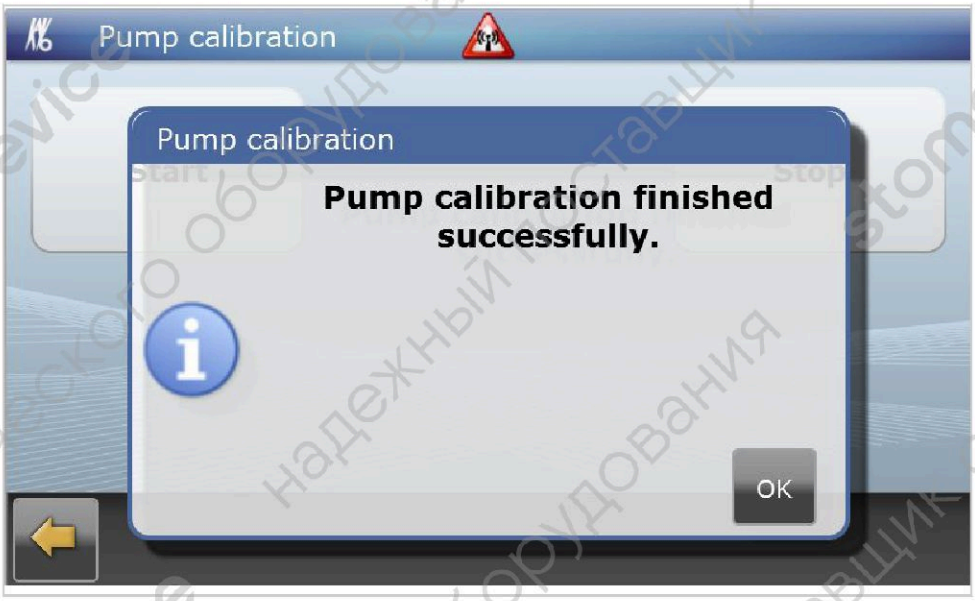
- In every calibration, check whether the coolant lubricant is being uniformly sprayed from all nozzles and confirm the confirm this in the messages menu according to the requirements.

- Confirm that the pump has been switched off with the "Yes" button.



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- Confirm successful calibration with the "OK" button.



The calilbration lasts around 5 min.

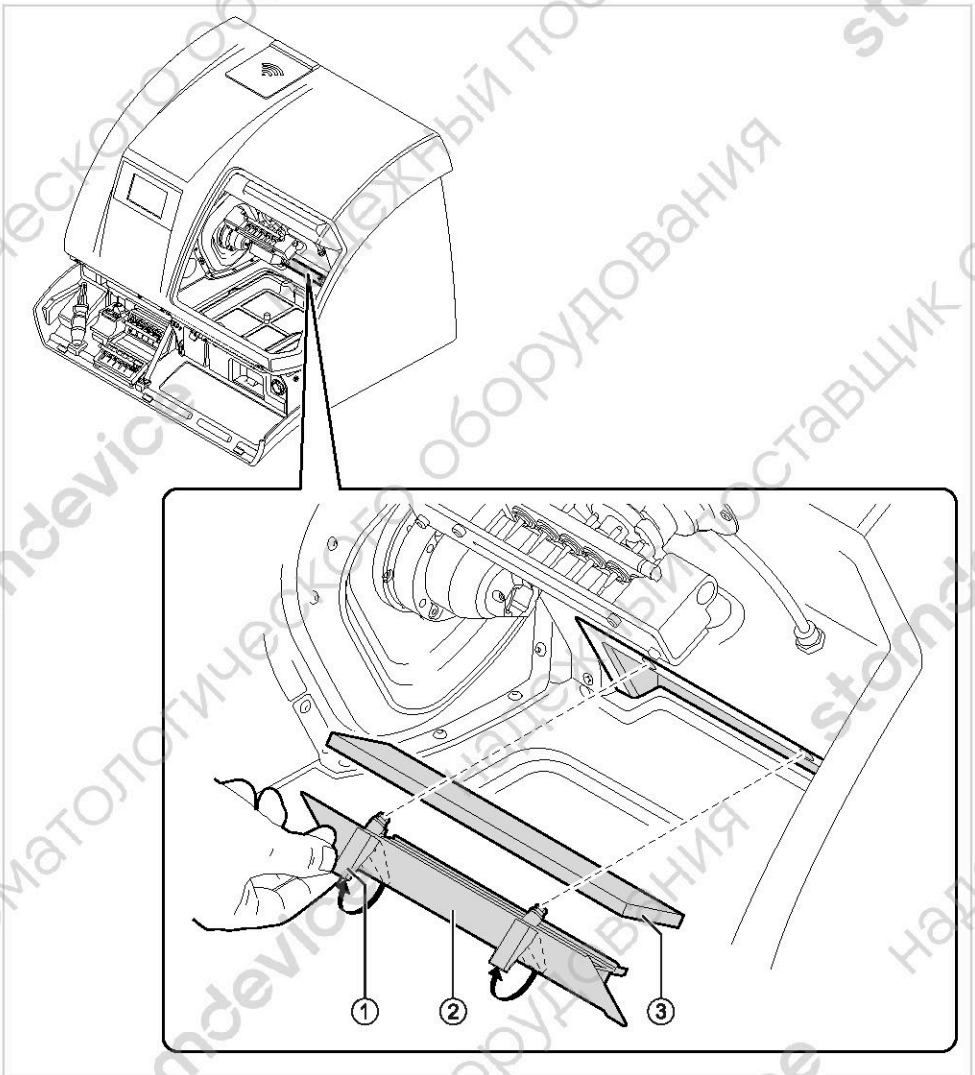
- Check the coolant lubricant circuit for leakage after the calibration.

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4 Aerosol exhaust

4.1 Exchanging the aerosol dust extractor filter

The filter of the aerosol dust extractor is located behind the cover, in the rear of the workspace.

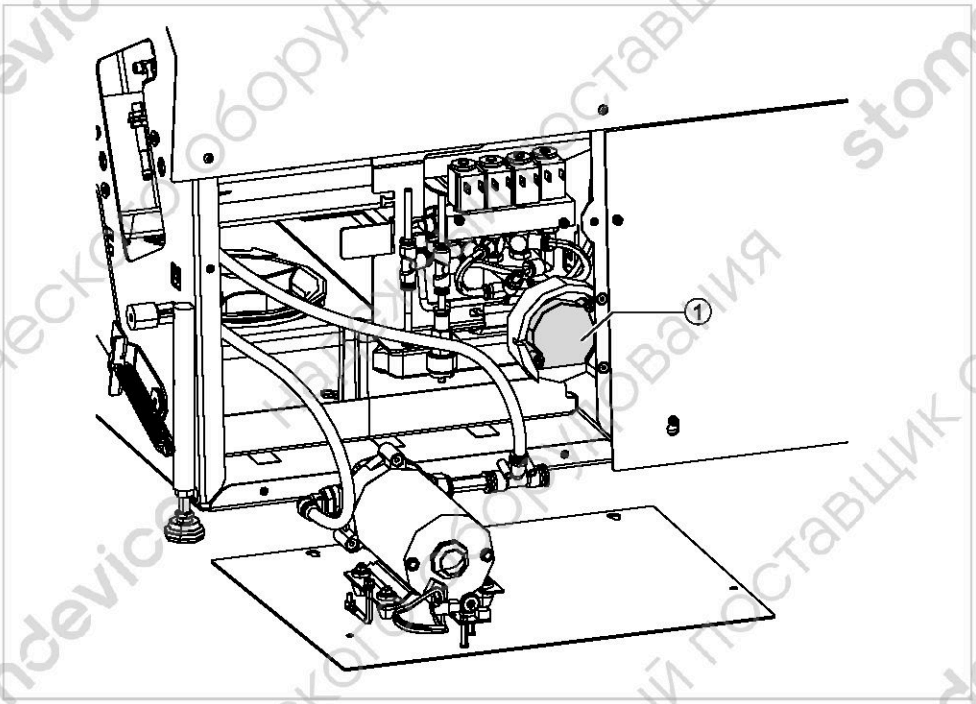


- Fold the squeeze-type closures ① upwards.
- Remove the cover ②.
- Exchange aerosol dust extraction filter ③.
- Put the cover ② on the filter holder once again.
- Fold the squeeze-type closures ① downwards again.

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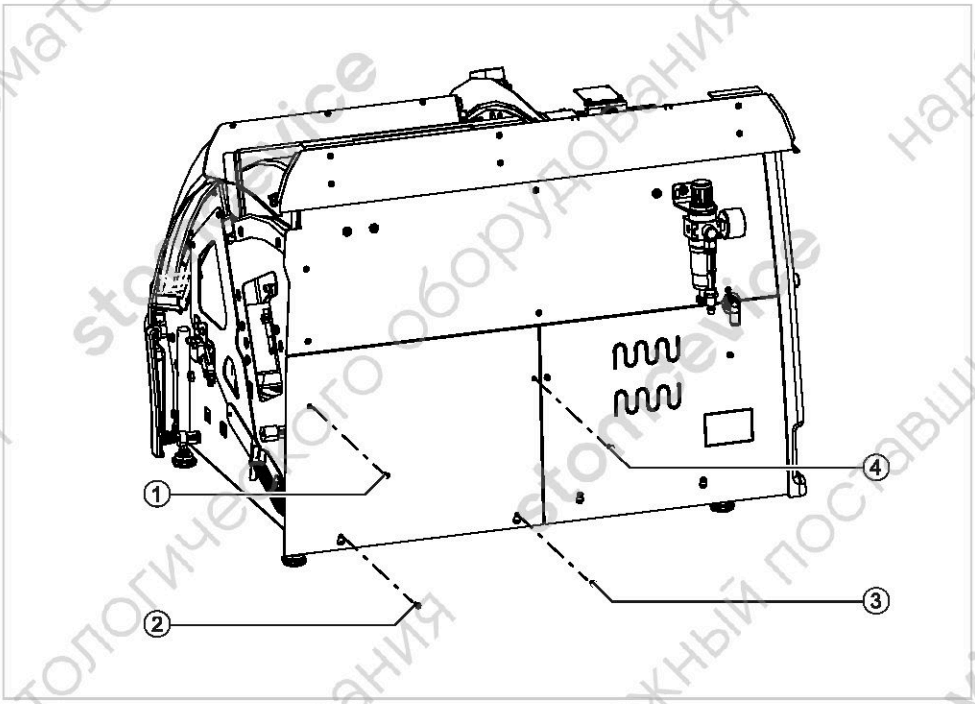
4.2 Replacing the fan

The fan is attached on the rear next to the coolant pump ①.



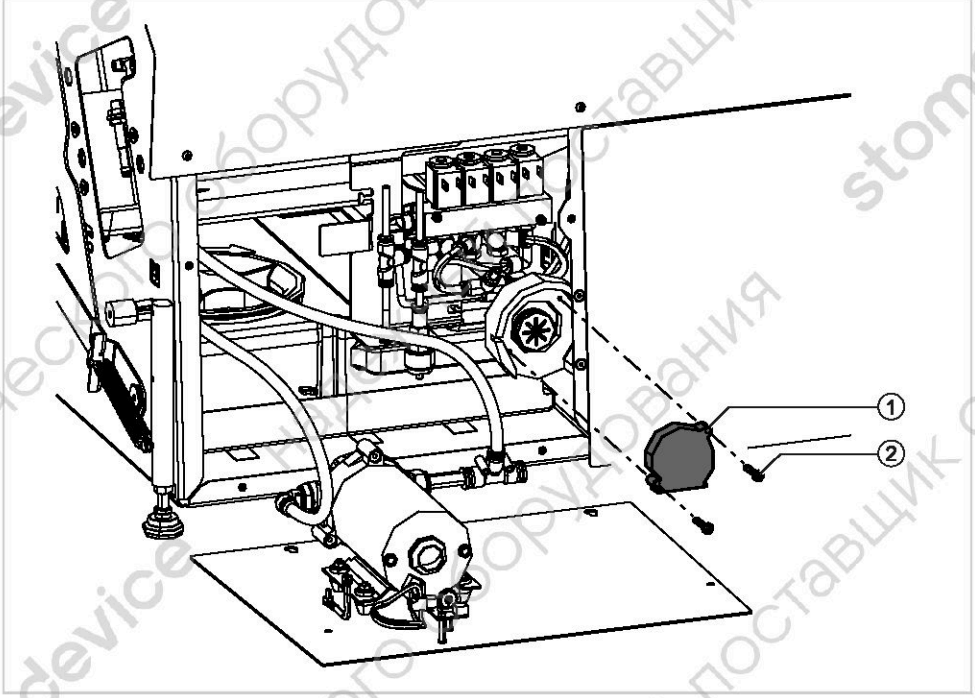
Dismounting

- Remove Allen screws ① and ④ with the universal tool (**Mat. no. 1.009.0859**) SW 2.5 and loosen Allen screws ② and ③.



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- Disconnect the radial fan from the power supply on the cable harness.
- Remove 2 screws ② and dismount the radial fan ①.



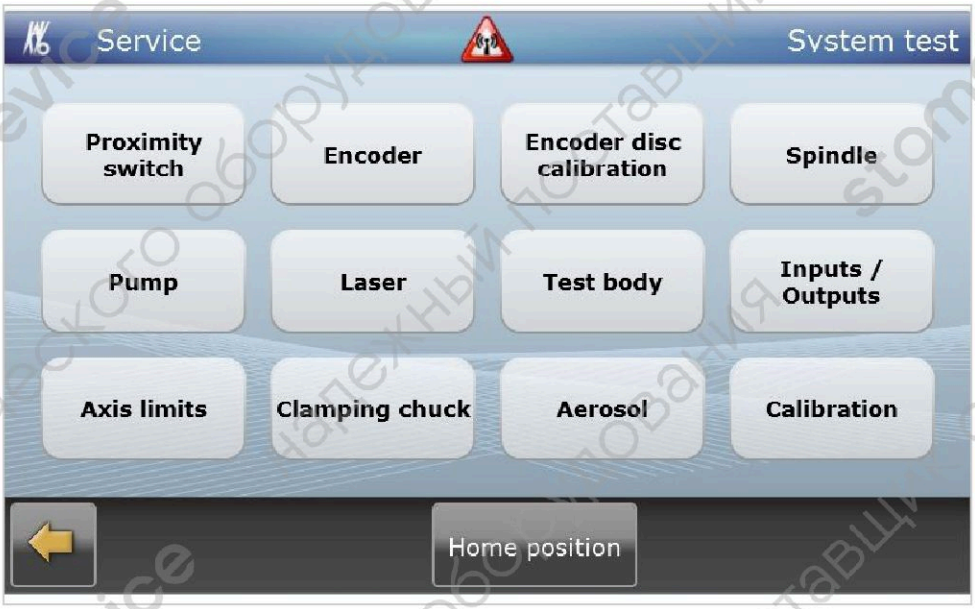
Mounting

- To mount the fan, proceed in reverse order.

4.3 Test of fan function

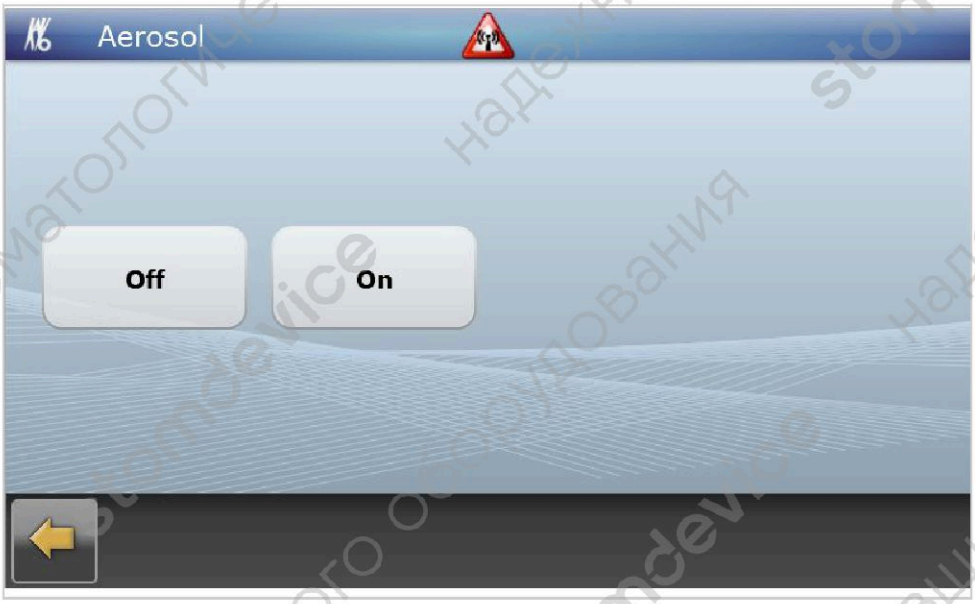
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- Tap the "Technician Service" > "Enter Password" > "System Test" > "Aerosol" buttons successively in the "Service" menu.



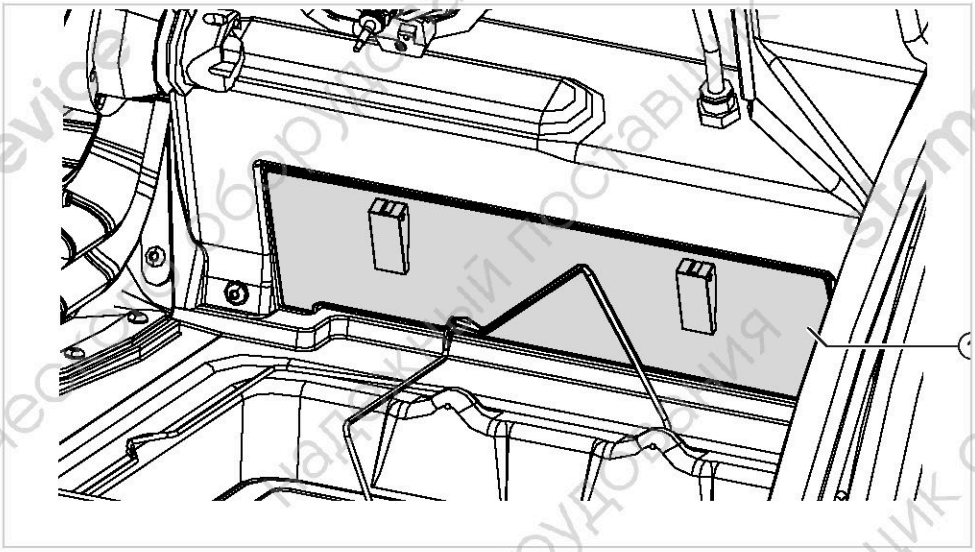
- Touch the "On" button.

  This starts up the fan.



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- Take off the aerosol cover.



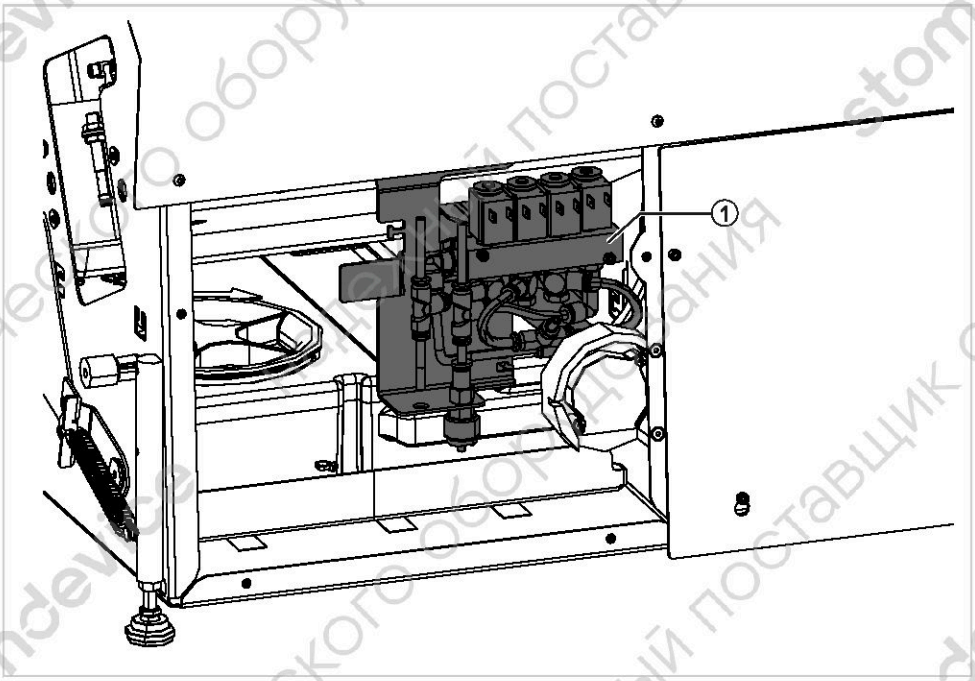
See also: 4.1 Exchanging the aerosol dust extractor filter, Page 24

- Check the suction power manually.

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5 Compressed air unit

The compressed air unit ① is on the rear, inside the machine, to the right and behind the aerosol dust extractor filter.



5.1 Dismounting the right side panel

See also: 2.1 Dismount and mount the right side panel, Page 5

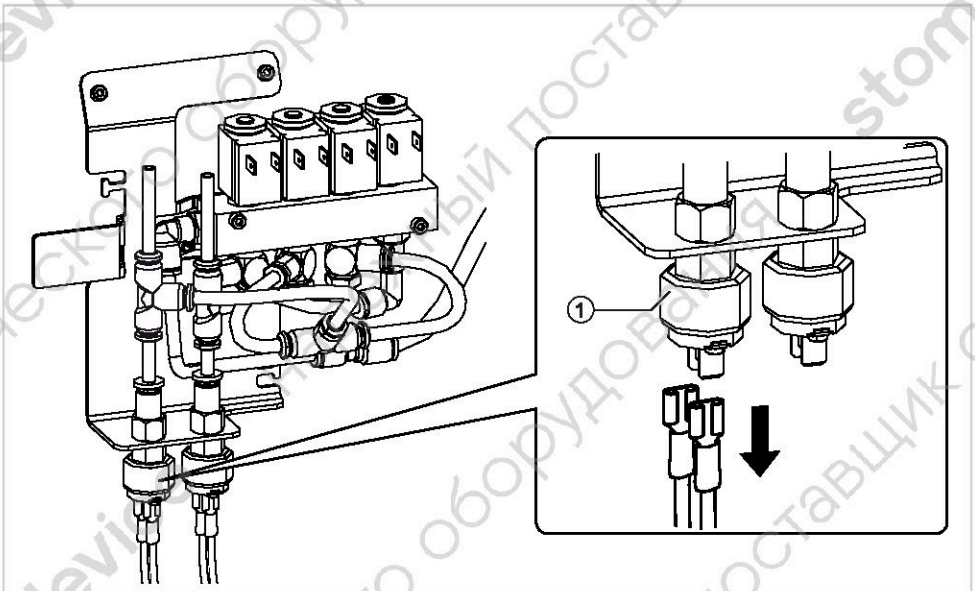
5.2 Dismounting the coolant lubricant pump

See also: 3.2 Dismounting and mounting the coolant lubricant pump, Page 17

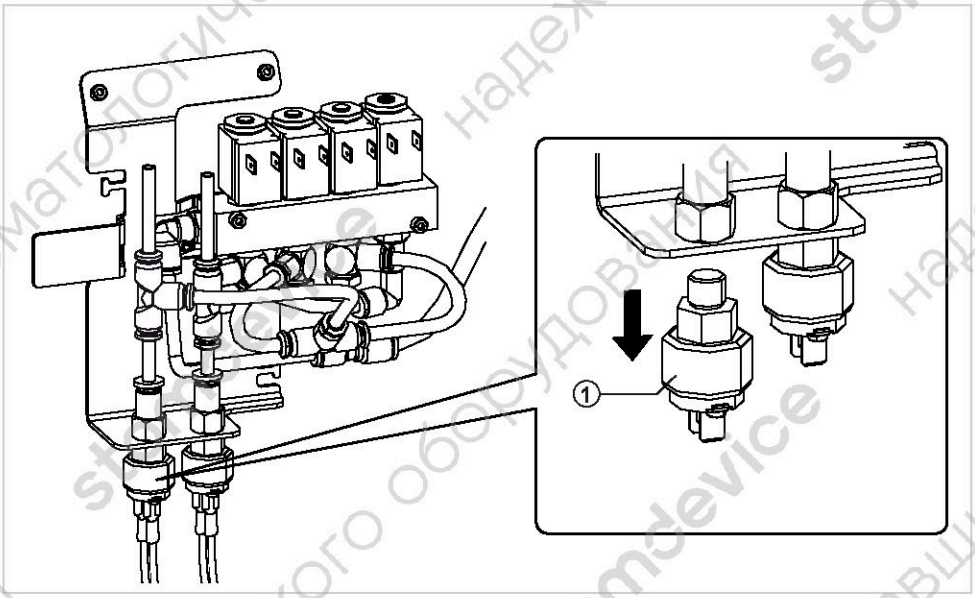
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5.3 Replacing the pressure switch of the spindle sealing air

- Disconnect the connection cable from the left pressure switch for spindle sealing air (0.3 bar) ① (**Mat. no. 1.008.4690**).



- Dismount the pressure switch of the spindle sealing air ① from the quick-plug coupling using fork wrench SW13.



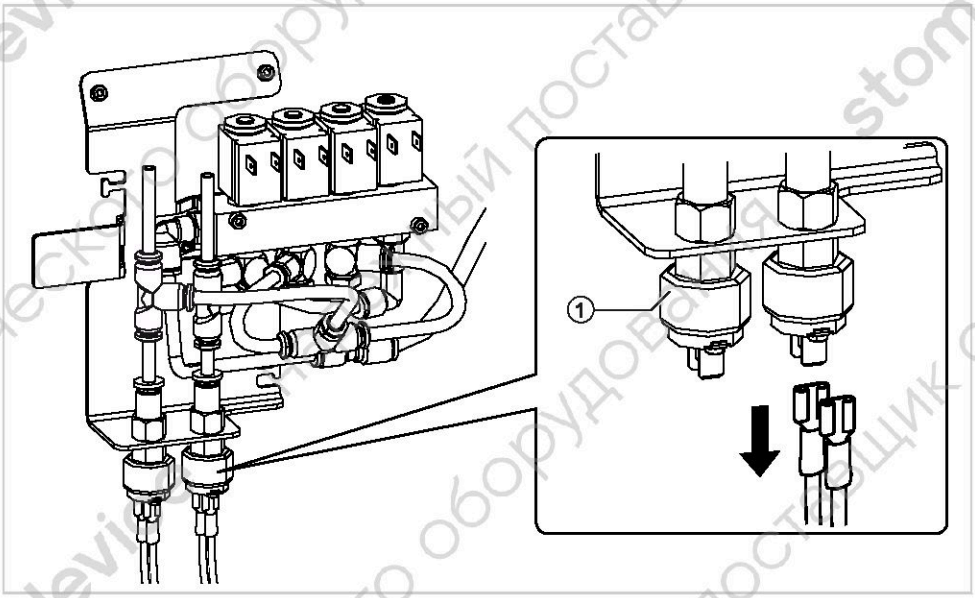
- To mount the pressure switch, proceed in reverse order.
- Secure the quick-plug coupling with Loctite 511.

The pressure switches are in pre-set condition at the time of delivery.

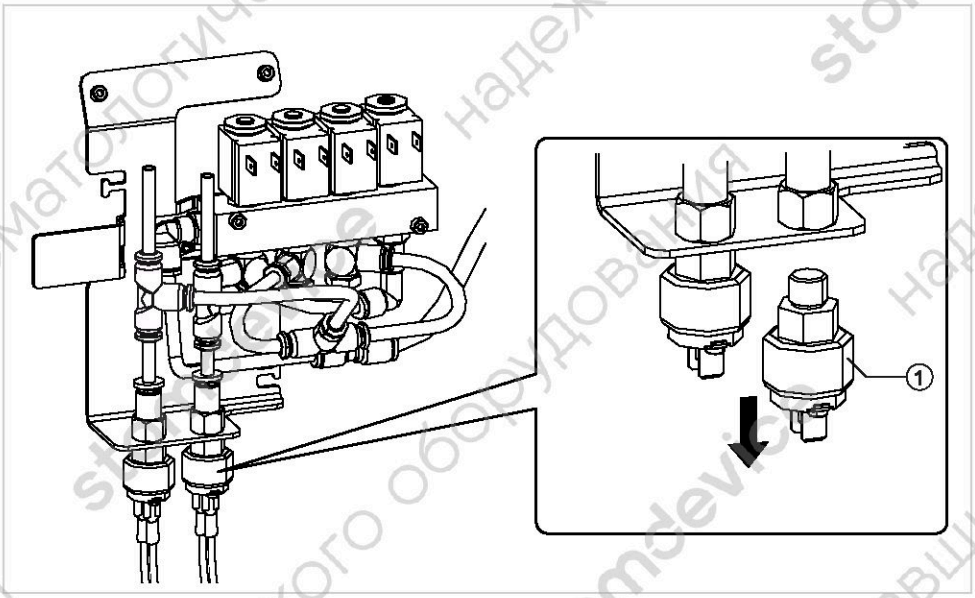
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5.4 Replacing the pressure switch for tool chuck air

- Disconnect the connection cable from the right pressure switch for tool chuck air (5 bar) ① (**Mat. no. 1.008.4691**).



- Dismount the pressure switch of the tool chuck air ① from the quick-plug coupling using fork wrench SW13.



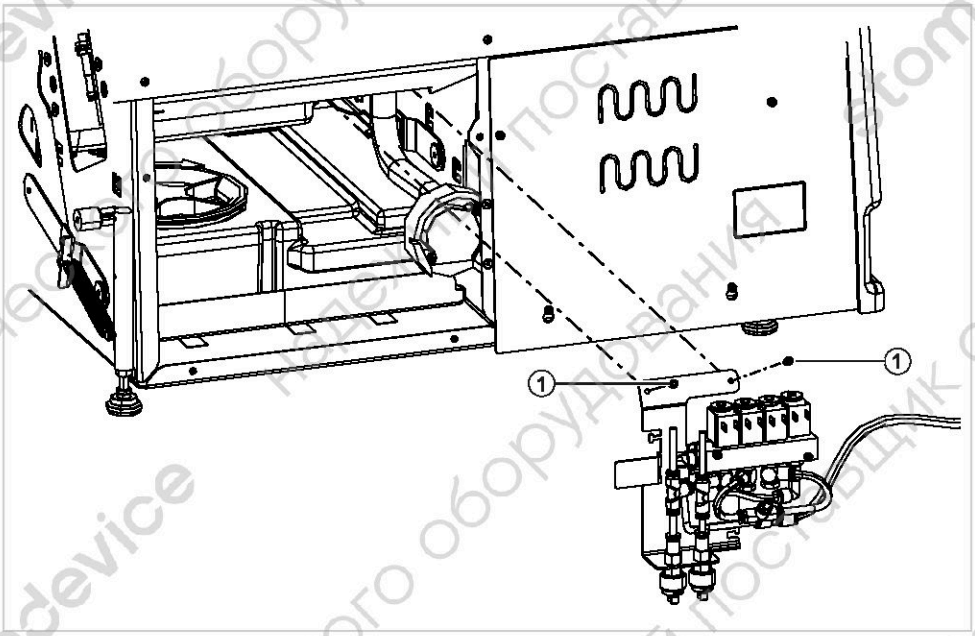
- To mount the pressure switch, proceed in reverse order.
- Secure the quick-plug coupling with Loctite 511.

The pressure switches are in pre-set condition at the time of delivery.

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5.5 Dismounting the entire compressed air unit

- Remove the cheese head screws ① and take the compressed air unit out of inside space of the machine.

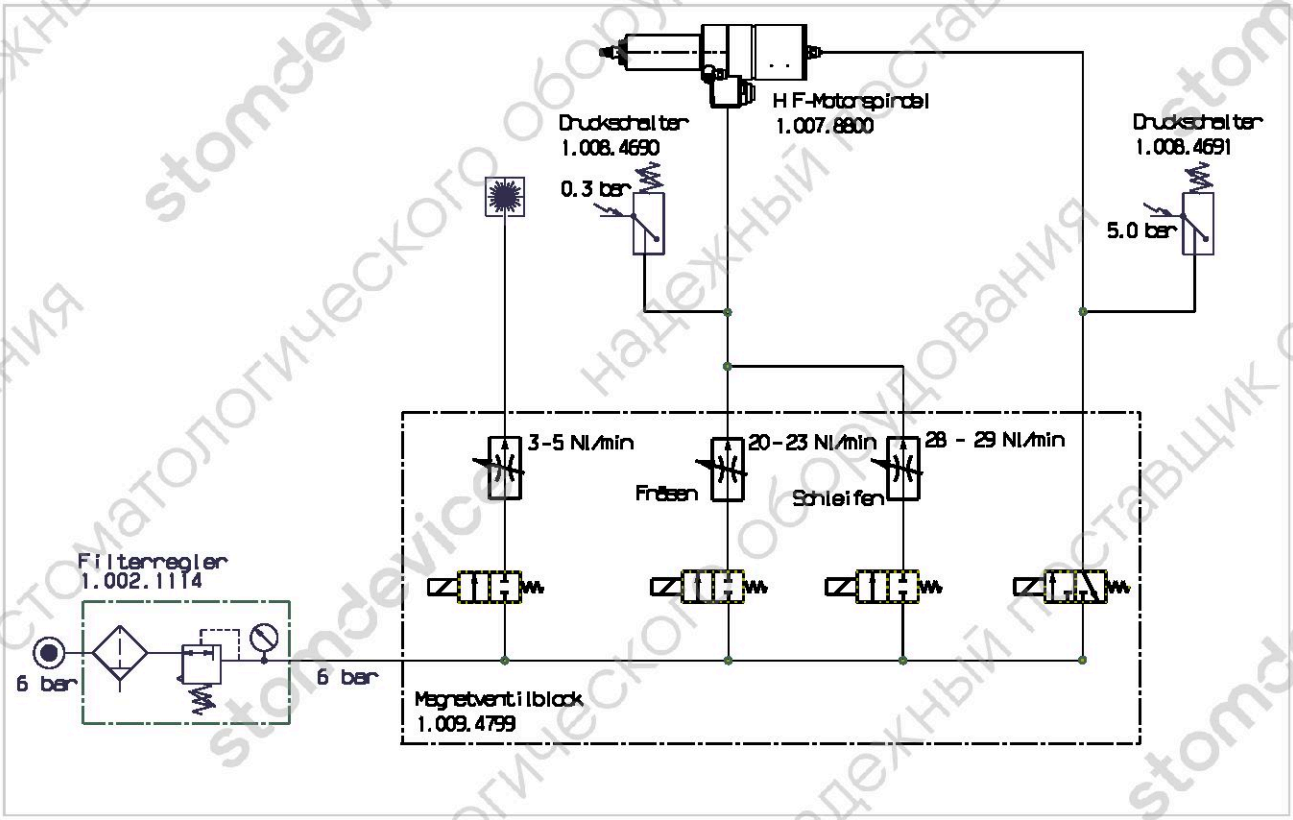


- Pull the compressed air hoses off the unit.
- Disconnect the power supply of the compressed air unit at the plug connector.

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5.6 Mounting the compressed air unit

- Connect the compressed air unit according to the wiring plan and mount it proceeding in reverse order.



5.7 Mounting the coolant lubricant pump

- To mount the coolant lubricant pump, proceed in reverse order.

5.8 Mounting the right side panel

- To mount the right side panel, proceed in reverse order.

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6 Electronics box



⚠ WARNING

Electrical shock from repairs of live parts.
Injury or death from electric shock.

- Before working on live parts, pull the power plug and disconnect the unit completely from the power connection so that the unit is without power.

6.1 Dismounting the left side panel

See also: 2.2 Dismount and mount the left side panel, Page 6

6.2 Data backup

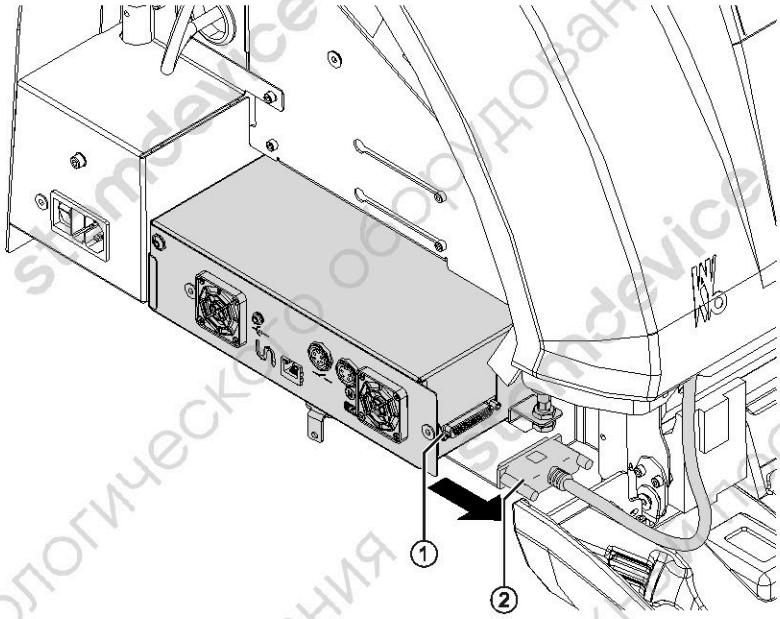
Machine parameters need to be saved prior to replacing the electronics box.

- Tap the "Maintenance" > "Software" > "Para->PC" buttons successively in the "Service" menu.

  This saves the machine parameters on the workstation.

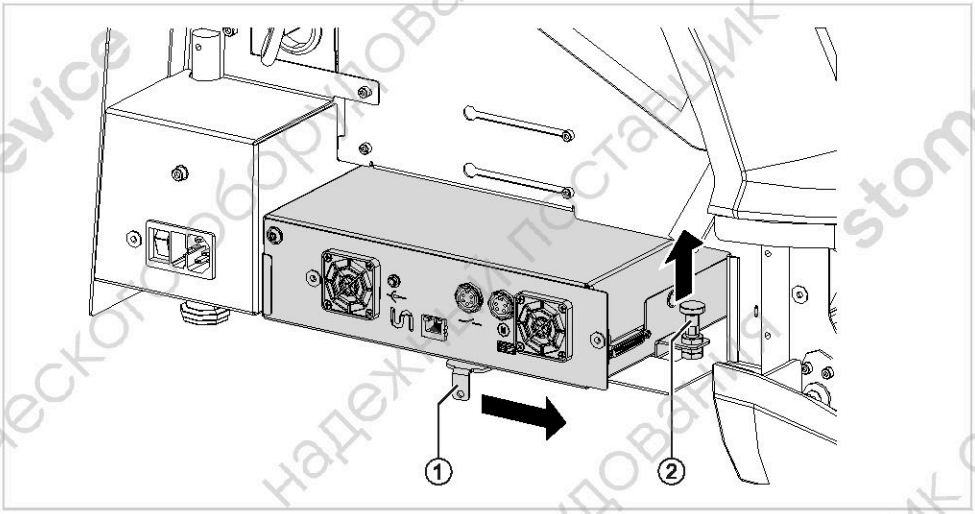
6.3 Dismounting the electronics box

- Remove the mains cable, power supply cable and control cable of the handpiece or foot control from the electronics box.
- Remove the connection cable ② to the touch screen from the electronics box ①.



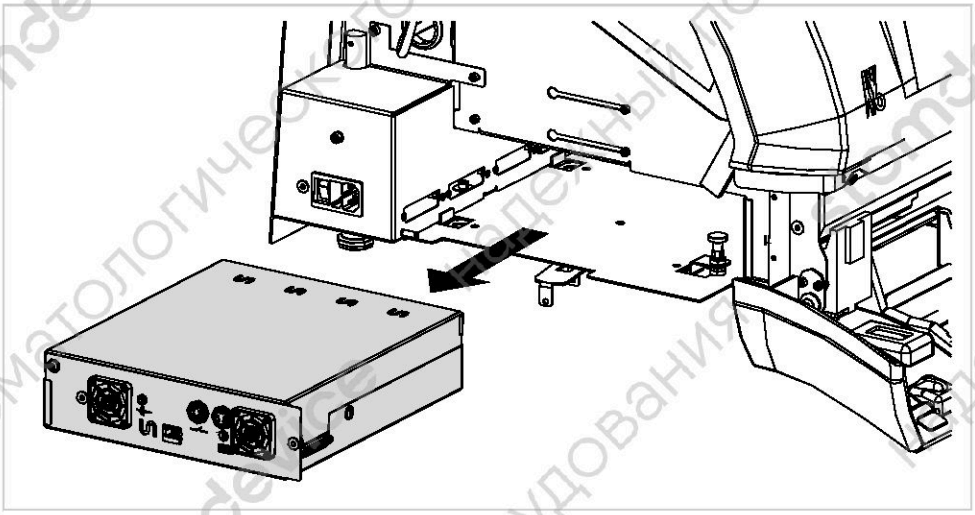
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- Draw the locking bolt ② upwards and draw the lever ① forwards.



The electronics box is unlocked.

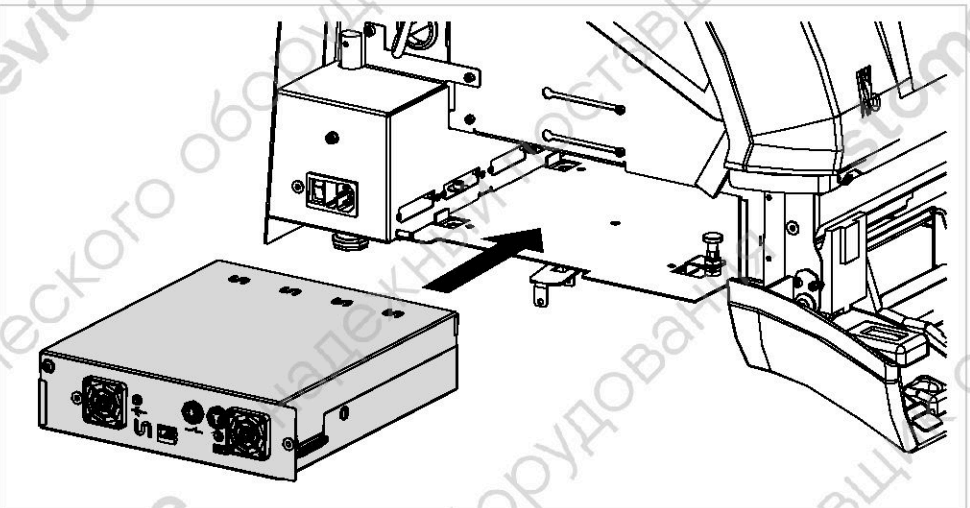
- Carefully remove the electronics box from the machine.



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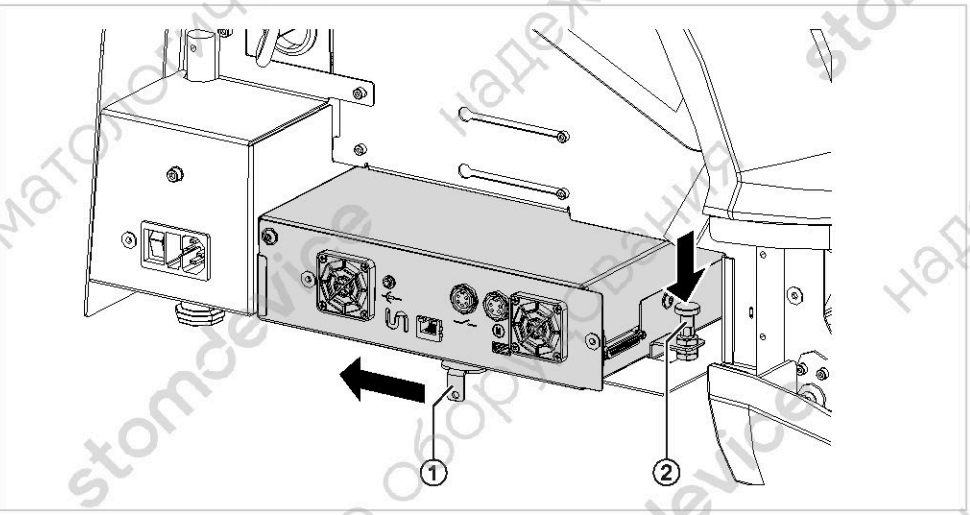
6.4 Mounting the electronics box

- Push the electronics box into the compartment as far as it will go.



Requirement
The electronics box must be pushed into the compartment to its end-position.

- Connect the electronics box to the machine. For this purpose, push the lever ① back until the latch pin ② engages completely.



- Re-connect the connection cable to the touch screen to the electronics box.

See also: 6.3 Dismounting the electronics box , Page 34

6.5 Mounting the left side panel

- To mount the left side panel, proceed in reverse order.

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6.6 Loading data

Machine parameters need to be re-loaded after replacing the electronics box.

- Tap the "Maintenance" > "Software" > "Para->MC" buttons successively in the "Service" menu.

  The machine parameters saved on the workstation are now loaded and saved in the electronics box of the ARCTICA Engine.



- Subject the machine to a functional check after loading the machine parameters.

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7 Mains adapter



⚠ WARNING

Electrical shock from repairs of live parts.
Injury or death from electric shock.

- Before working on live parts, pull the power plug and disconnect the unit completely from the power connection so that the unit is without power.

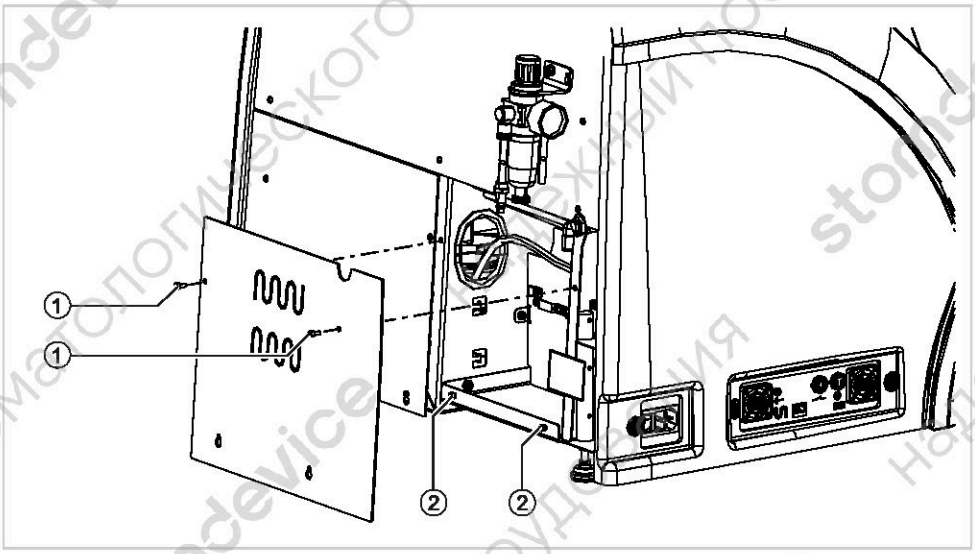
7.1 Dismounting the left side panel

See also: 2.2 Dismount and mount the left side panel, Page 6

7.2 Remove rear wall

Dismounting

- Remove the cheese head screws SW 3 ①, loosen ②, and take off the rear wall.

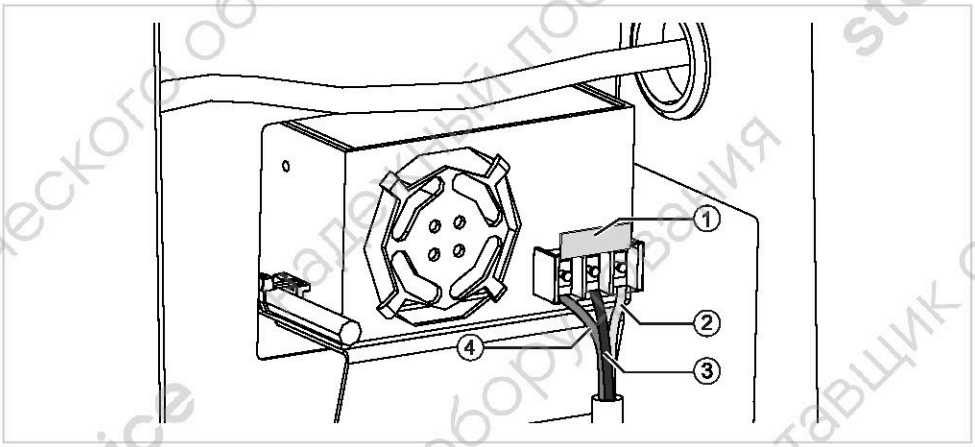


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7.3 Dismounting and mounting the power supply

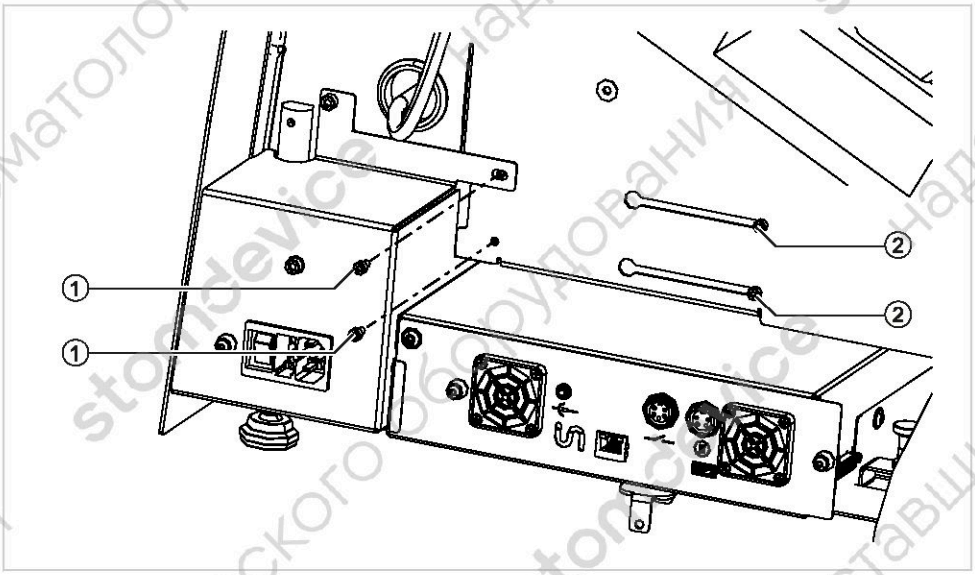
Dismounting

- Take off the protective cover ① on the front of the power supply and disconnect power supply cables X25 ②, ③ and ④.



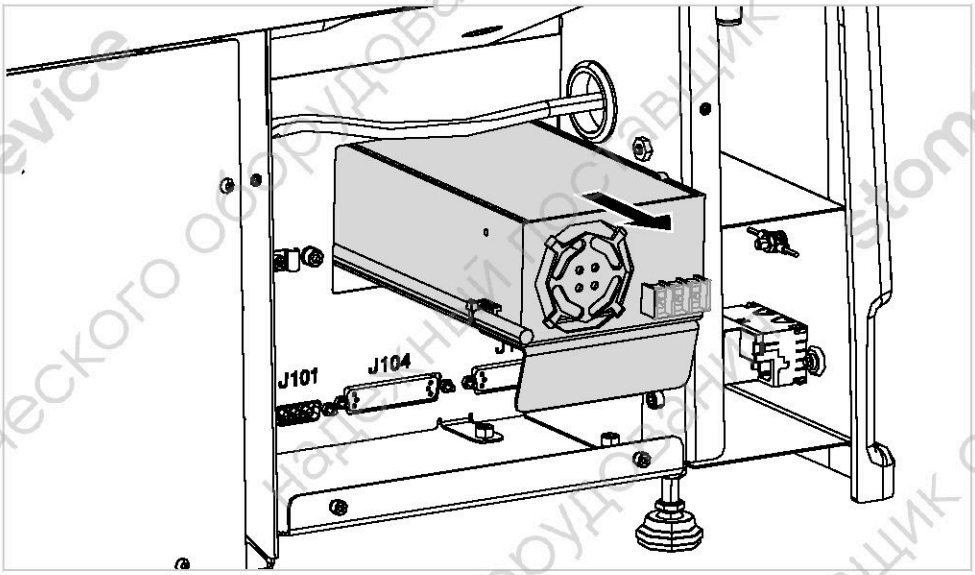
① Protective cover
② Cable, yellow/green, earthing
③ Cable, blue, connection N
④ Cable, brown, connection L

- Use the Allen key SW 3 to remove the cheese head screws ① on the left inner wall above the control unit and use Allen key SW 3 to loosen the cheese head screws ② on the left inner wall above the control unit.

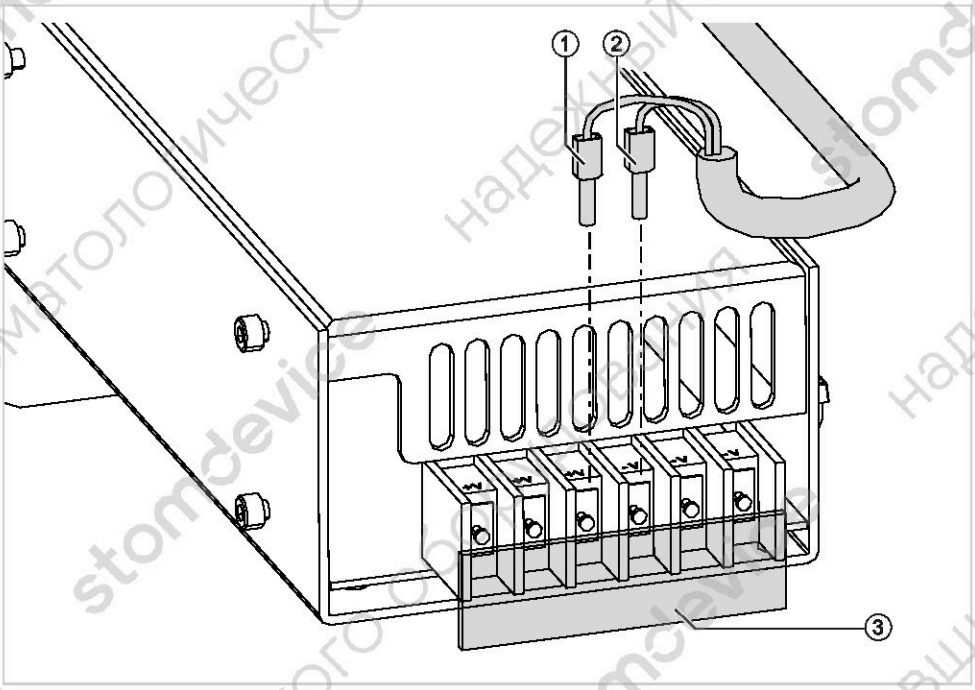


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- Pull out the power supply.



- Disconnect the cable tie on the power supply-side.
- Disconnect the protective cover ③ and cables ① and ② from the rear side of the power supply.



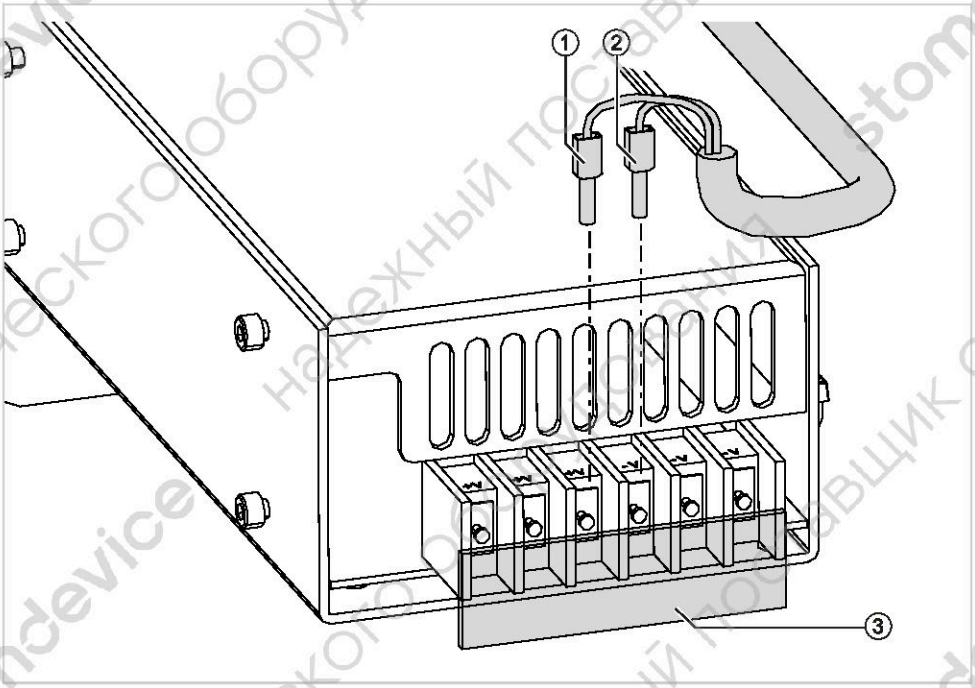
① Cable, brown, connection V+
② Cable, blue, connection V-
③ Protective cover

Mounting

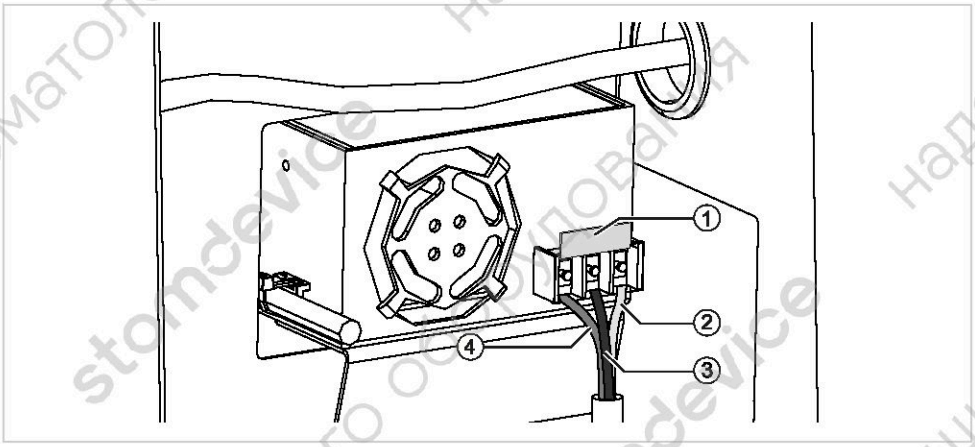
- To mount the power supply, proceed in reverse order.

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- Connect the brown cable ① to connection V+ and the blue cable ② to connection V- on the rear side of the power supply.
- Reattach the protective cover ③ and reinsert the power supply in the machine.



- Connect the yellow/green cable ② to earth, the blue cable ③ to N, and the brown cable ④ to L on the front of the power supply.
- Reattach the protective cover ①.



7.4 Mounting the rear wall and left side panel

- To mount the rear wall and left side panel, proceed in reverse order.

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8 Dismounting the spindle

8.1 Checking the filter regulator (compressed air)

The filter regulator for compressed air must be checked prior to each spindle exchange.

- Check the set pressure of 6 bar.
- If applicable, empty all condensate from the inspection window and clean it.
- Clean the compressed air hoses.

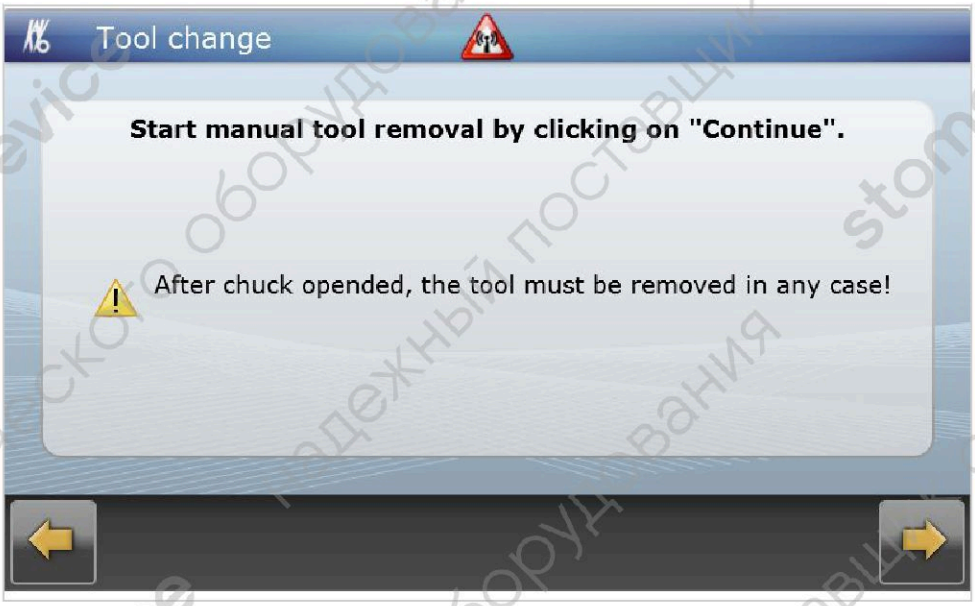
8.2 Removing tools manually

Tap the "Manual tool removal" button in the "Service" menu.



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- Confirm "Start manual tool removal" by touching the "Continue" button.

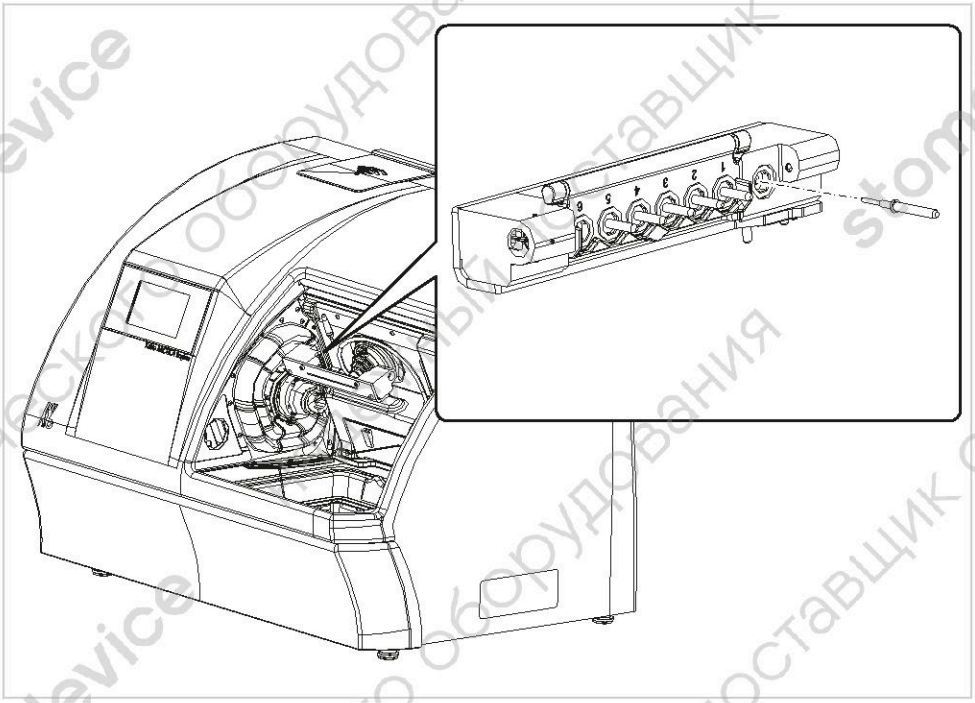


- Open the door and take out the tool magazine.
- Take the tool out of the chuck.
- If there is no tool in the chuck any longer, confirm by touching "OK".



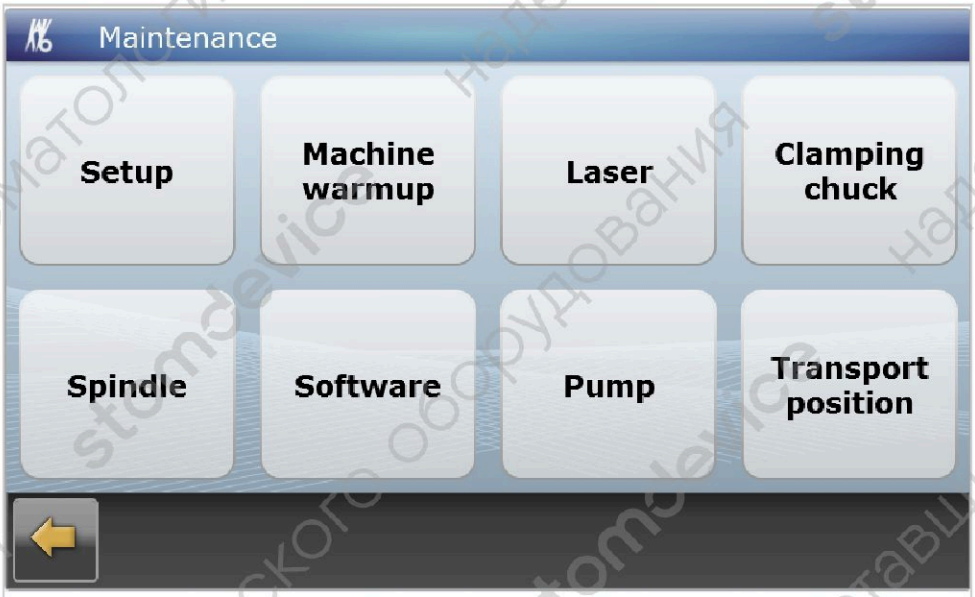
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- Insert the tensioning pin in the holder position on the tool holder.



8.3 Driving to chuck changing position

- Tap the "Maintenance" > "Chuck" buttons successively in the "Service" menu.



- Close the machine door and tap the "Chuck change position" button.

  This makes the machine drive to the chuck change position.

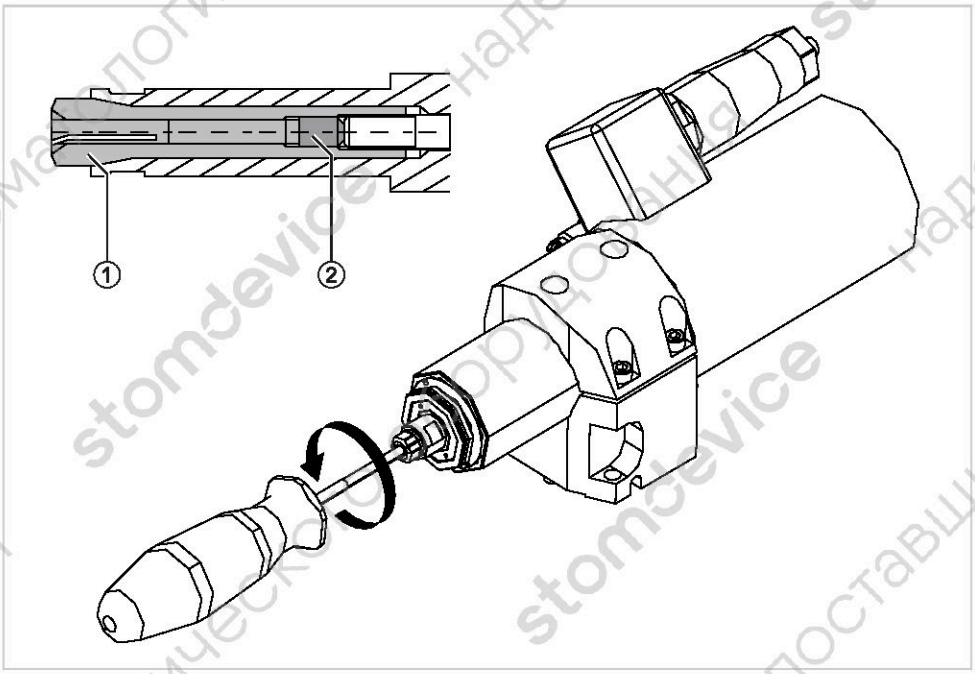
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8.4 Removing the chuck

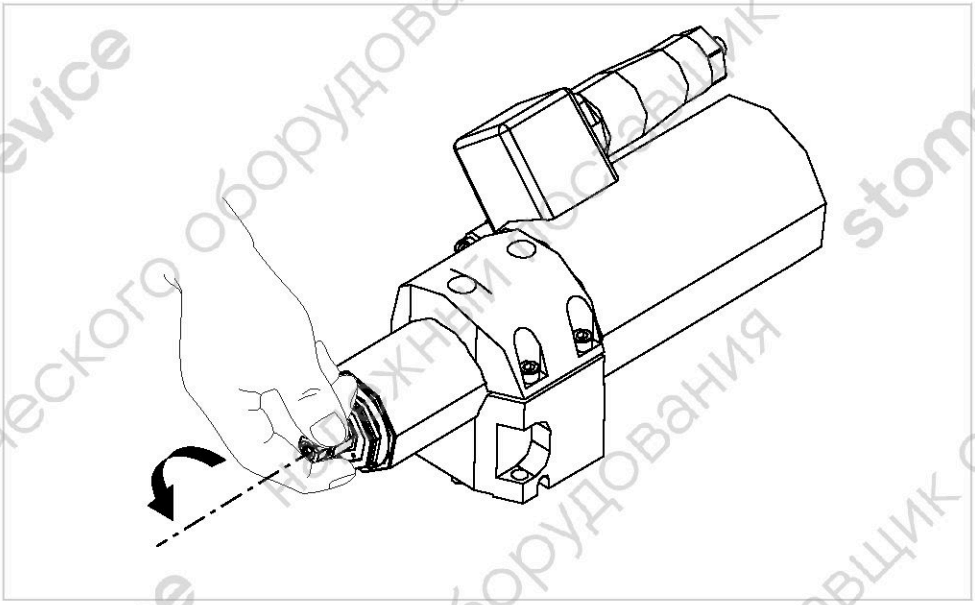
The inside of the chuck is protected from distortion or independent loosening by a grub screw.

- Loosen the grub screw ② on the inside of the chuck① with the universal tool (**Mat. no. 1.009.0859**) by making approx. 2 anticlockwise rotations.



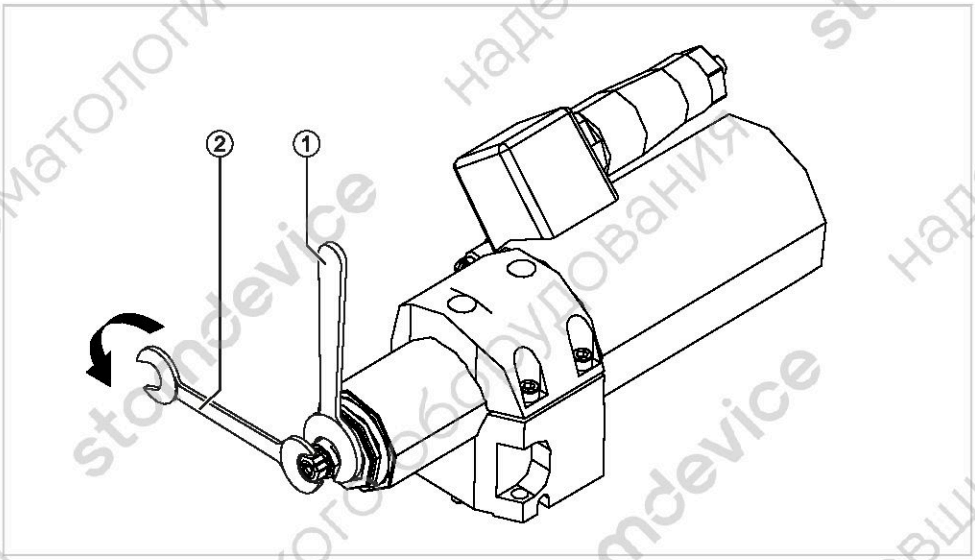
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- Screw out the chuck by hand.



If manual dismounting of the chuck is impossible, the two tools included in the delivery must be used to dismount the chucks.

- Position the fork wrench SW 13 ① on the double-flat of the spindle and dismount the chuck at the front hexagon socket using fork wrench SW 10 ② in an anticlockwise direction.



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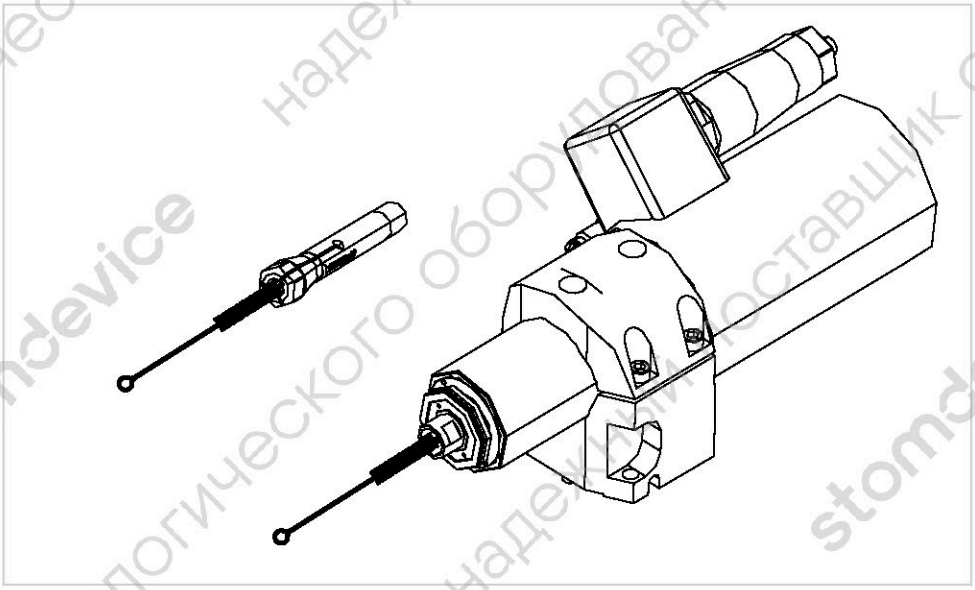
8.5 Cleaning the spindle and chuck

Note

Inappropriate cleaning of the spindle or chuck
Damage to the spindle or chuck

- Never use ultrasound, steam cleaner or compressed air.
- Ensure that no detergent agent (spray cleaner, grease solvent etc.) gets into the inside of the spindle.
- Only use the paintbrush and brush from the care set for cleaning.

- Clean the chuck mount and chuck with a brush or a paintbrush.



- Lightly oil the thread of the chuck.

8.6 Removing the housing

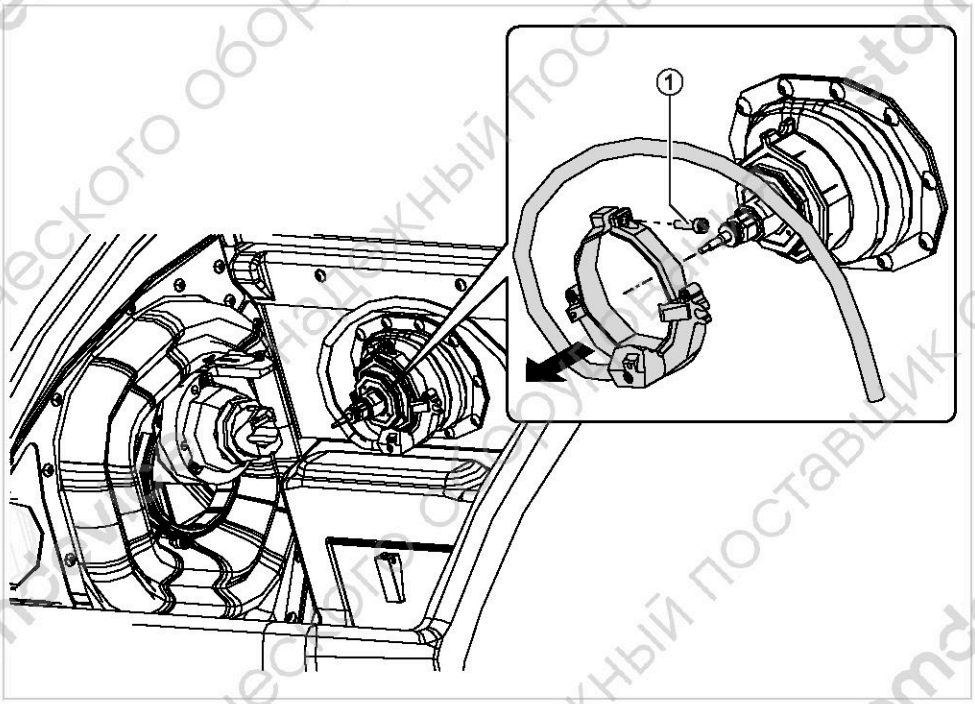
Switch off the machine and disconnect it from the power supply.

See also:
2.2 Dismount and mount the left side panel, Page 6
2.1 Dismount and mount the right side panel, Page 5
2.3 Dismount and mount the housing, Page 6
2.5 Dismounting and mounting the guard door, Page 10
2.6 Dismounting and mounting the spindle cover, Page 15

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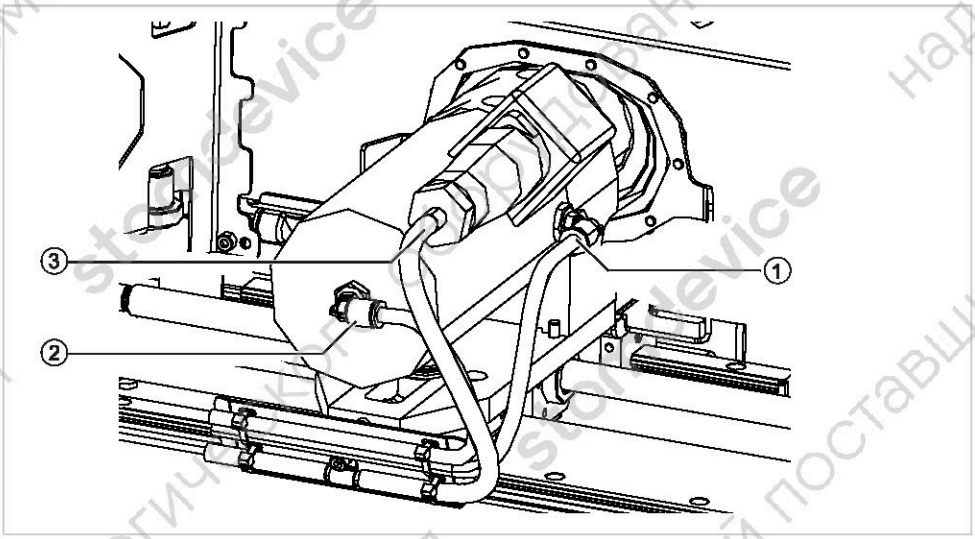
8.7 Dismounting the coolant manifold

- Loosen the Allen screw ① with the universal tool (**Mat. no. 1.009.0859**) 2.5 and detach the clamping from the bellows. Pull-off the coolant manifold towards the front.



8.8 Dismounting the spindle

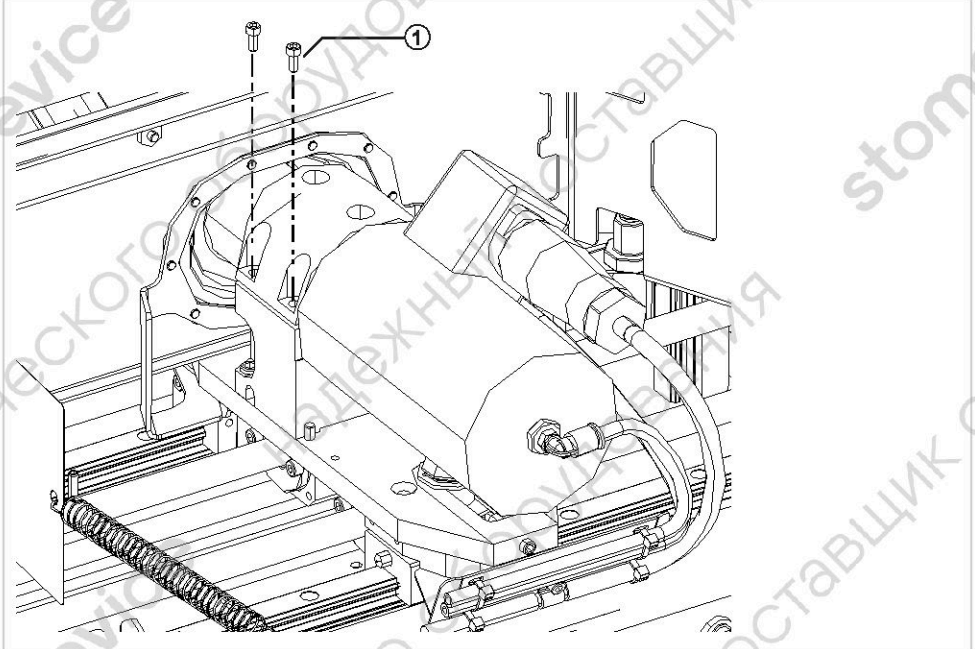
- Pull-off the compressed air hoses for spindle sealing air (blue) ① and tool chucking (black) ② by pressing on the plastic ring of the quick-plug coupling.



- Unscrew the power supply cable ③.

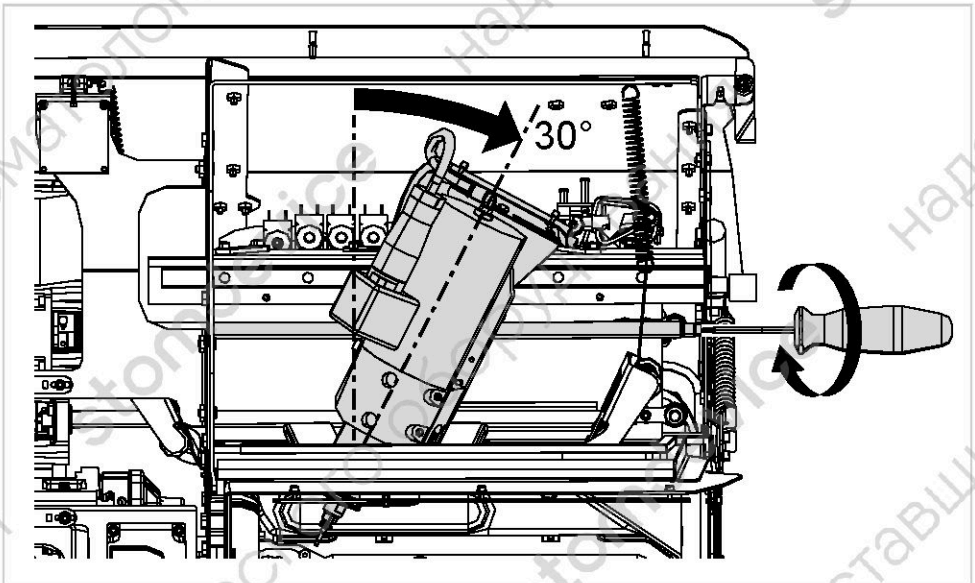
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- Remove the locking screws ① using the torque wrench, ARCTICA Spindle SW 4 (**Mat. no. 1.009.8812**).



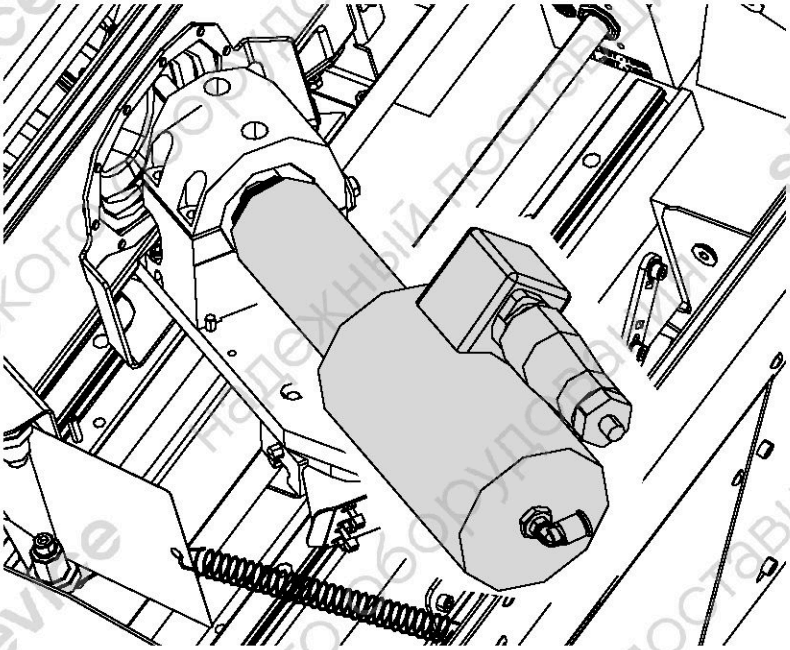
Drive the machine to the spindle change position

- Move the spindle shaft of the X axis with the torque wrench, ARCTICA Spindle (**Mat. no. 1.009.8817**) until the axis is tilted to the right by approx. 30°.



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- Carefully pull the spindle towards the back out of the chuck block while rotating it.



- Note the operating hours and serial number of the defective spindle in the service protocol and record it in the maintenance history of the machine.

Send spindle to KaVo Service

- Please return the defective spindle packaged in the case of the newly delivered spindle to KaVo. Address:

See also: 1.2 Hotline Repairs & Returns, Page 4

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9 Mounting the spindle

9.1 Note down the serial number

Note

Prior to mounting the spindle, the serial number and spindle dimension X of the new spindle need to be noted down for later recording.

- Read the data on the nameplate of the new spindle.
  SN_____ Spindle Dimension X _____

9.2 Cleaning the clamping surfaces

Note

Machine damage due to soiled clamping surfaces.

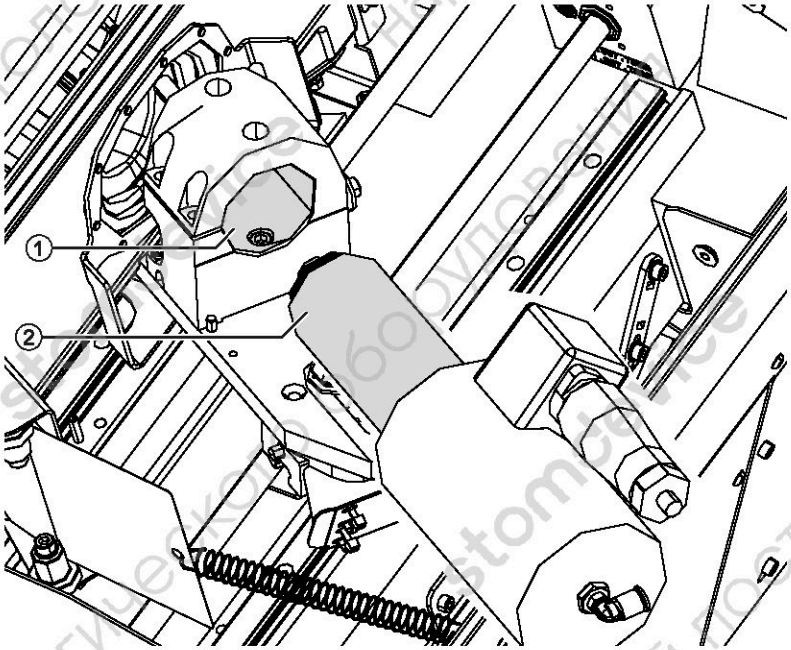
- Make sure that there is no dirt, chips, burrs, and coolant lubricant on any of the clamping surfaces.

Note

Machine damage due to cleaning with compressed air.

- Do not clean the machine with compressed air.

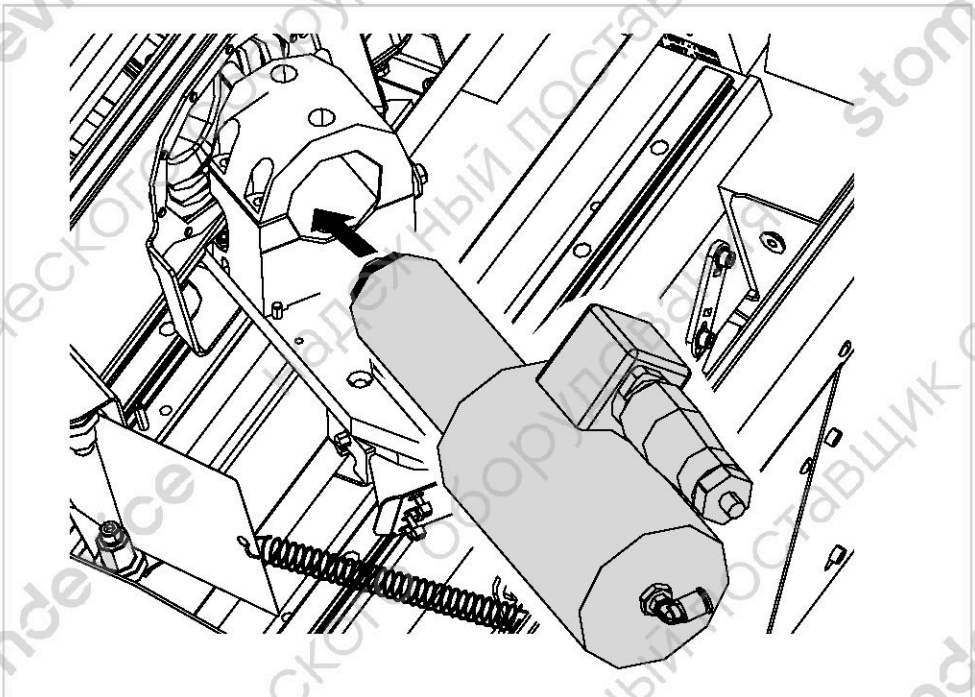
- Before assembly, clean the cylindrical clamping surface of the spindle ① and the clamping surface of the chuck block ②.



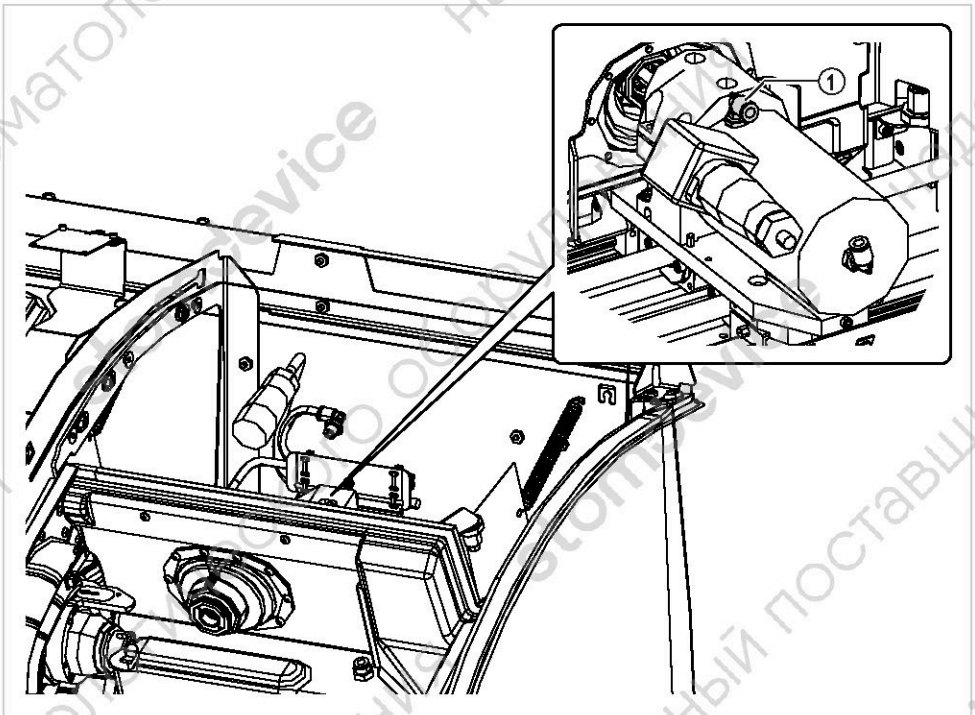
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9.3 Inserting the spindle in the machine

- Carefully insert the spindle to the stop into the chuck block while twisting it slightly.

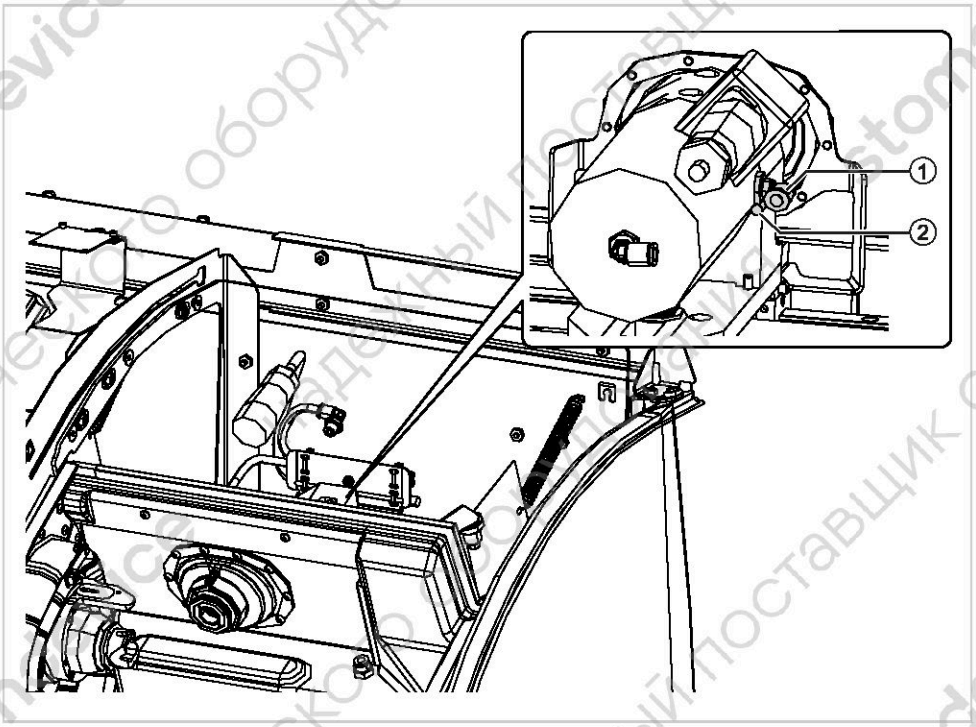


- Rotate the spindle such that the air connector on the jacket surface of the spindle ① is positioned vertically upright.

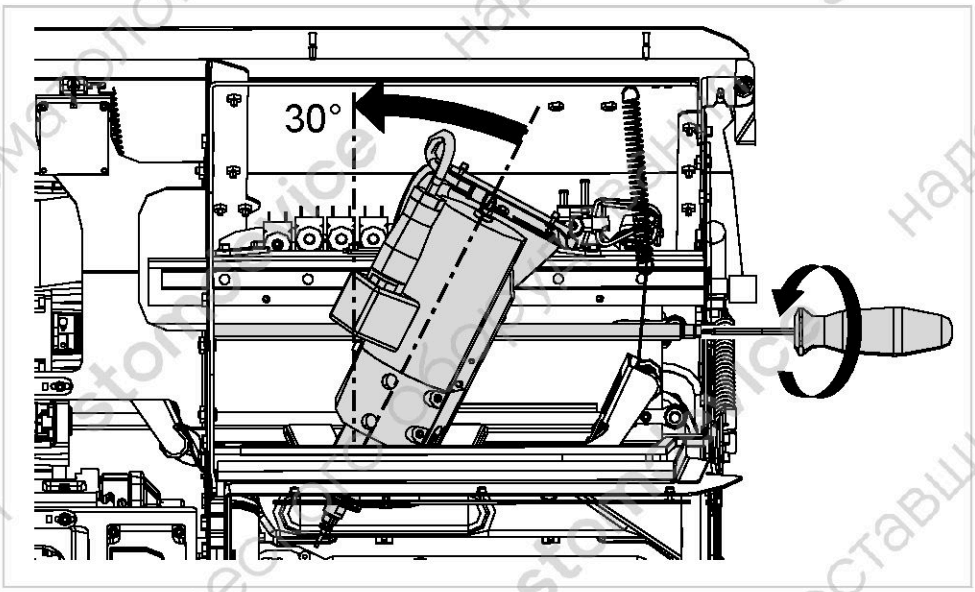


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- Rotate the spindle in clockwise direction until the air connector ① touches from above against the tensioning pin ②. Make sure that the spindle is in its correct position.

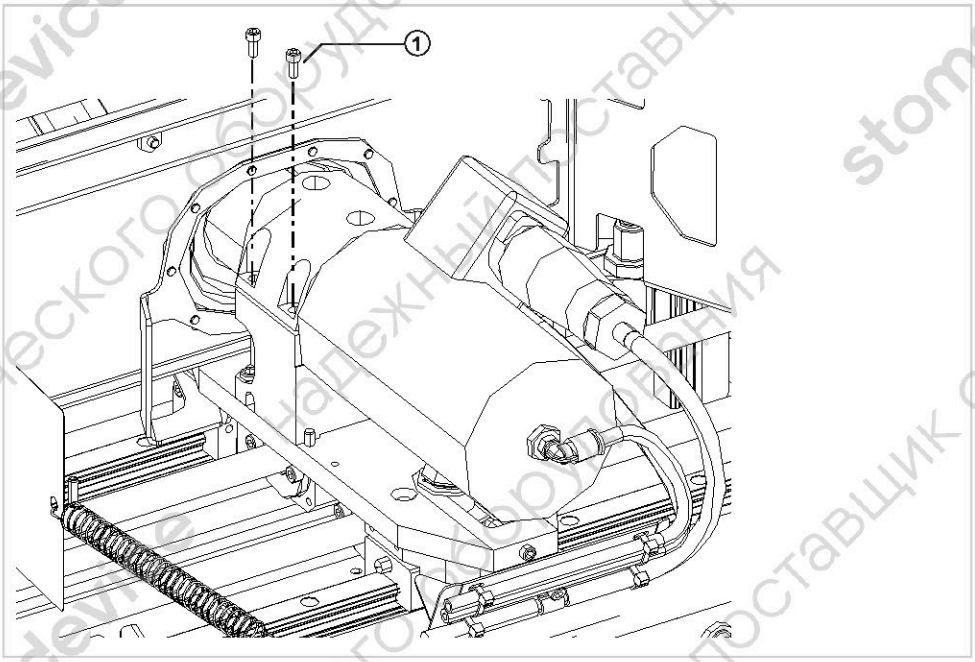


- Move the spindle shaft of the X axis with the torque wrench, ARCTICA Spindle (**Mat. no. 1.009.8817**) until the axis is tilted upright again.

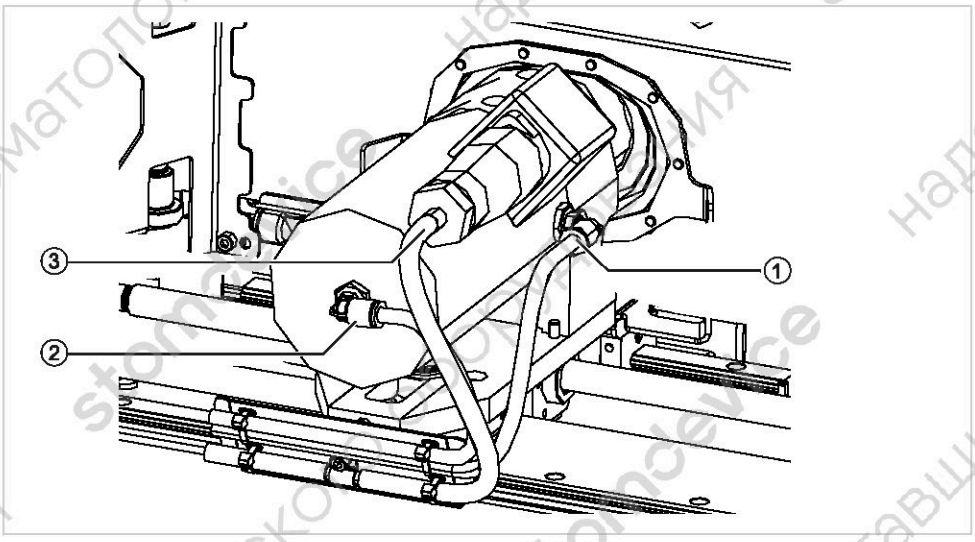


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- Clamp the chuck block with 2 cheese head screws ① using torque wrench ARCTICA Spindle (**Mat. no. 1.009.8817**) at a torque of 3.6 Nm and secure it with Loctite 241.



- Connect the spindle sealing air hose (blue) ① to the quick-plug coupling on the jacket surface.
- Connect the compressed air hose of the tool chuck (black) ② to the quick-plug coupling on the rear of the spindle.



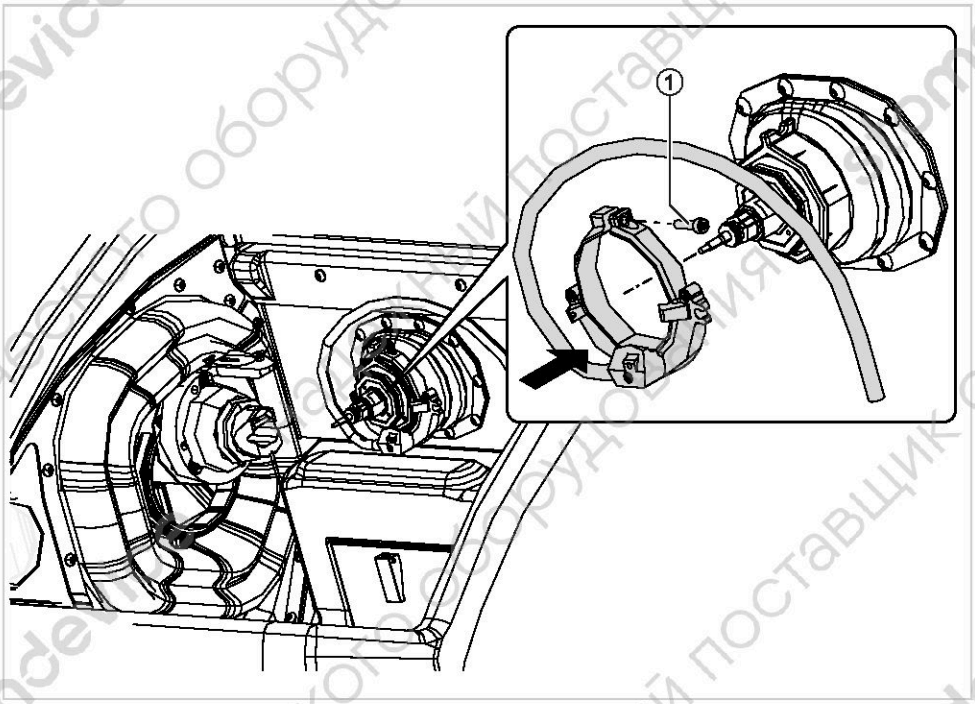
- Connect the power supply ③ to the spindle.

9.4 Mounting the coolant manifold

- Make sure that the bellows is correctly seated on the spindle.

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- With its chuck side facing upwards, guide the coolant manifold over the lug of the bellows and clamp it down using the screw ① and the universal tool (**Mat. no. 1.009.0859**).



9.5 Mount housing

- To mount the housing, proceed in reverse order.

See also:
2.6 Dismounting and mounting the spindle cover, Page 15
2.5 Dismounting and mounting the guard door, Page 10
2.3 Dismount and mount the housing, Page 6
2.1 Dismount and mount the right side panel, Page 5
2.2 Dismount and mount the left side panel, Page 6

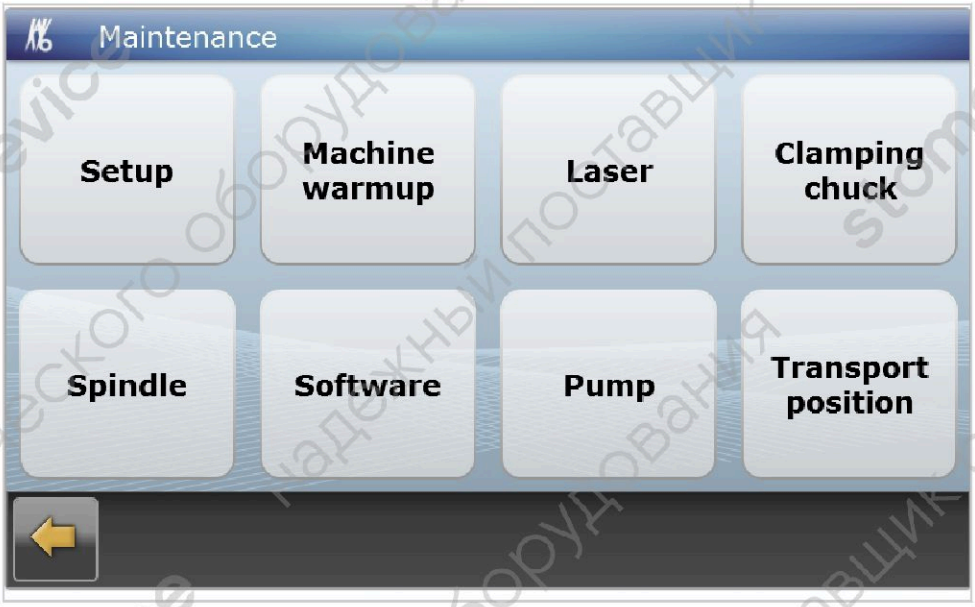
- Connect the machine to the power supply and to the network.
- Switch on the machine and perform a reference run.

9.6 Driving to chuck changing position

- Close the door of the machine.

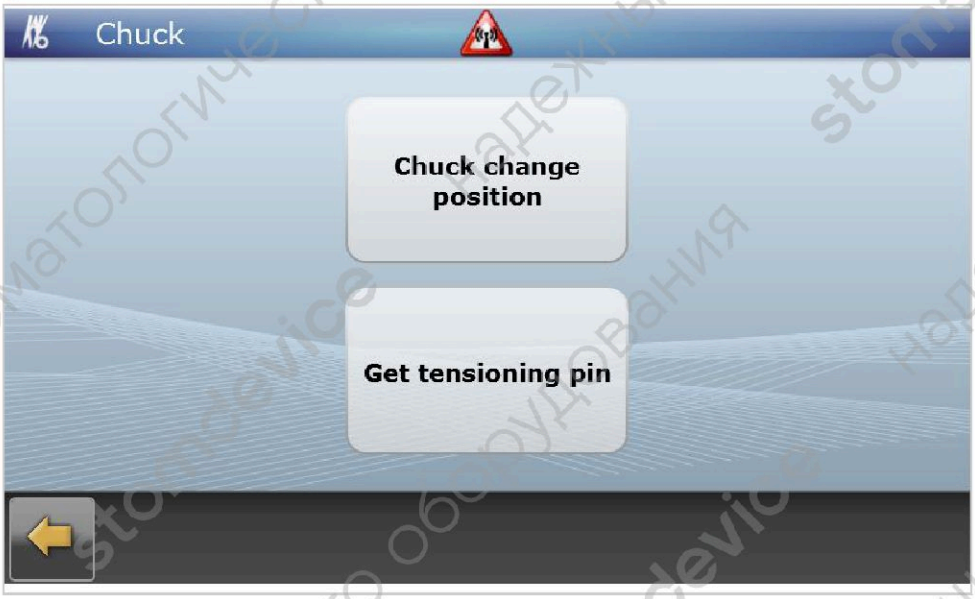
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- Tap the "Maintenance" > "Chuck" buttons successively in the "Service" menu.



- Tap the "Chuck change position" press button.

  This makes the machine drive down to the chuck change position.



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9.7 Removing the transport pin

- Tap the "Manual tool removal" button in the "Service" menu.



- Open the door of the machine and take out the transport pin.
- Touch the "Continue" button.



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- After removing the transport pin, confirm the message indicating that there is no longer a tool present in the chuck.



The transport pin can be returned together with the defective spindle.

9.8 Inserting the chuck

Note

Deformation of the chuck because a tool is missing at machine stand-still.

- Make sure that there is always a tool present in the chuck when the machine is at zero current or switched off.

Note

The chuck can be opened and closed pneumatically through the NC control only.
Loss of chuck retention force due to manual interventions.

- Never clamp tool into the spindle by hand. Always let tools be picked up from the cartridge automatically.

The retention force of the chuck is not ensured if any of the following irregular chuck conditions or irregular applications are evident:

- Use of tools not released by KaVo Dental
- Incorrect insertion of the chuck
- Non-compliance with maintenance instructions
- Chuck is not getting cleaned periodically
- Wear and tear and soiling

Inadvertently pulling the tool from the chuck during the milling process can lead to damage to the machine.

- After faulty applications, re-adjust or replace the chuck.

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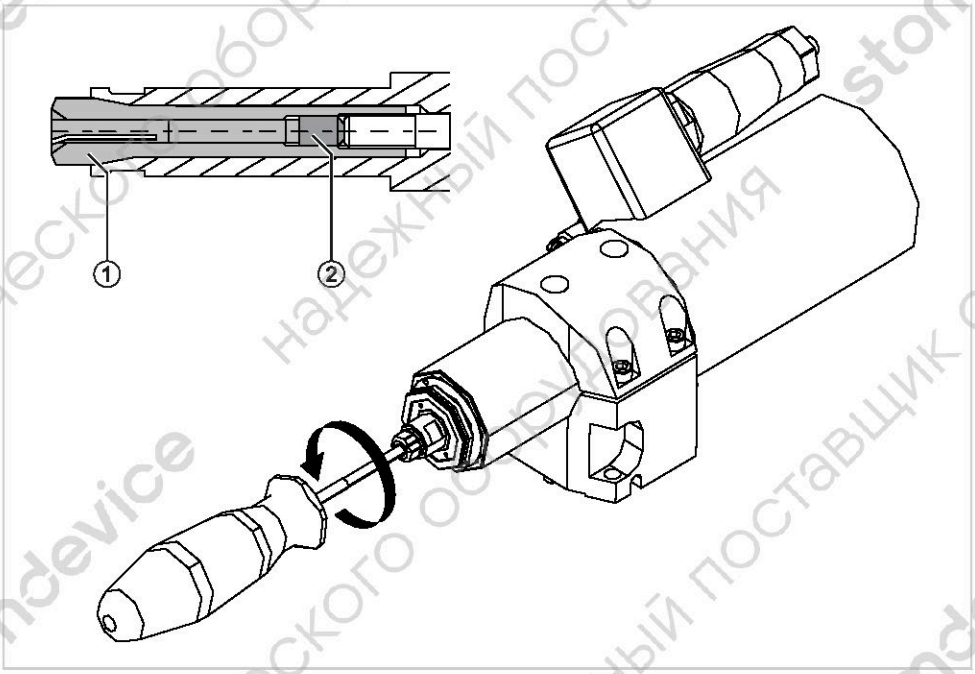
Distributed by:
KaVo Dental GmbH
Bismarckring 39
D-88400 Biberach
Tel. +49 7351 56-0
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Manufacturer:
Kaltenbach & Voigt GmbH
Bismarckring 39
D-88400 Biberach
www.kavo.com

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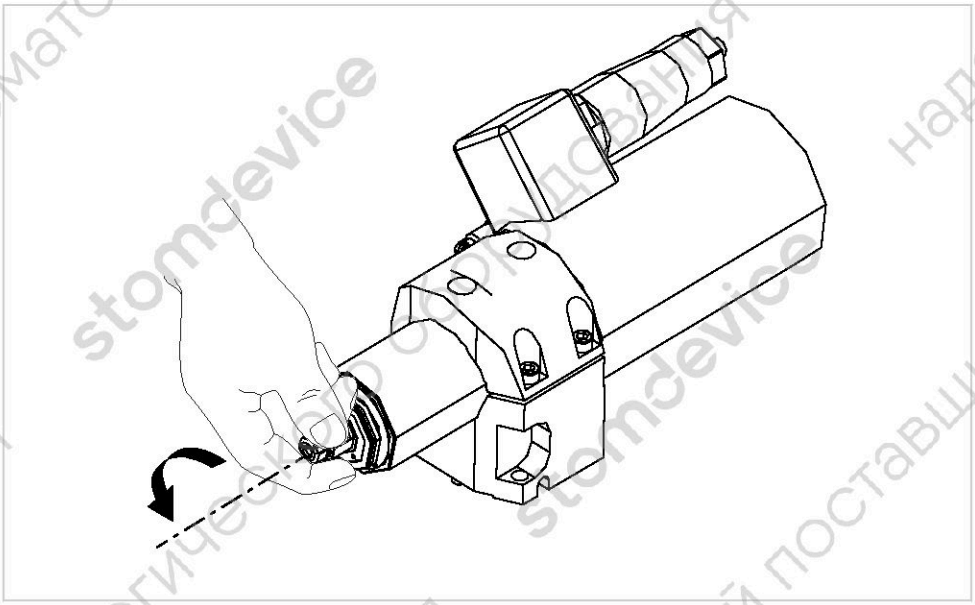
9.9 Mounting the chuck

- Prior to mounting the chuck, loosen the grub screw on the inside of the chuck using the universal tool (**Mat. no. 1.009.0859**) by approx. 2 counterclockwise turns.



- Screw the open chuck in to backstop.

Make sure that the chuck can always be mounted in the spindle freely by hand.



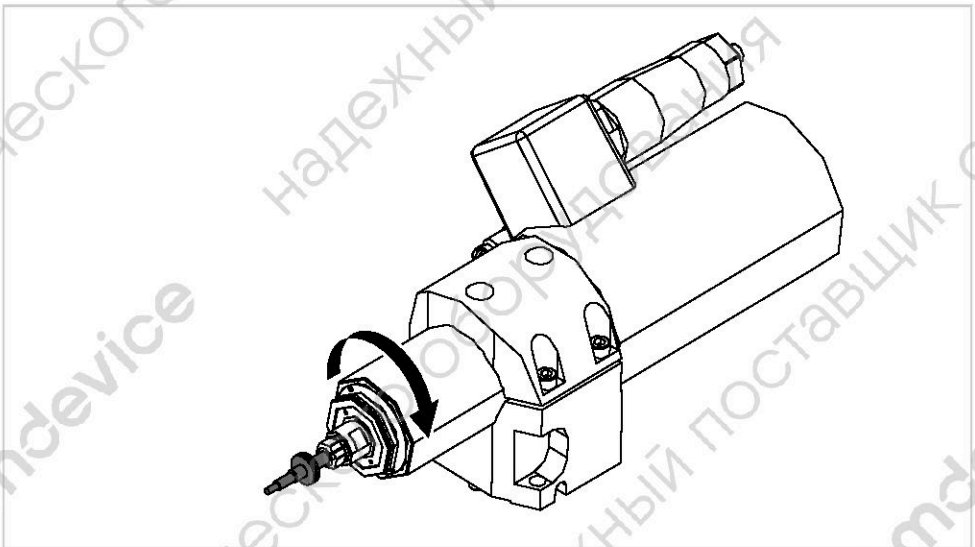
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If the chuck cannot be mounted freely by hand, the chuck and spindle need to be cleaned again.

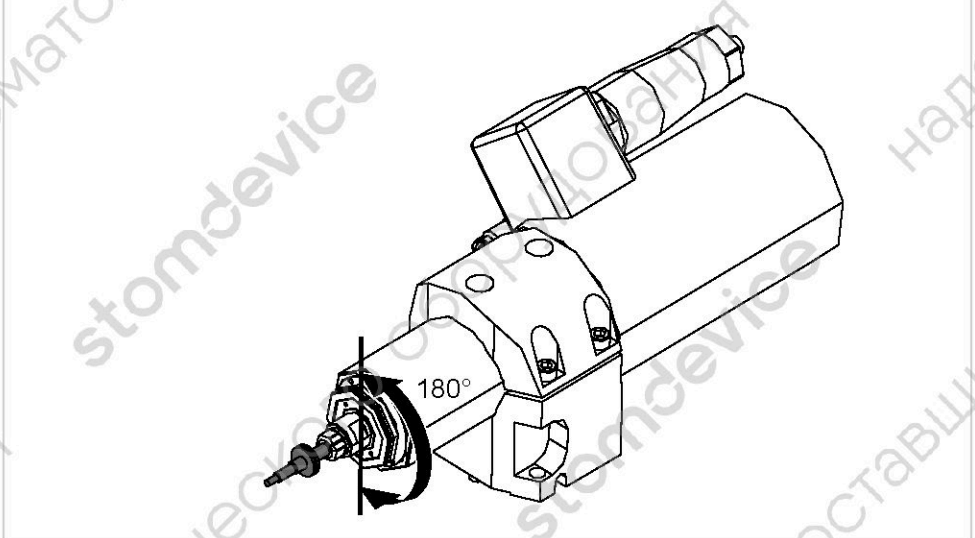
See also: 8.5 Cleaning the spindle and chuck, Page 47

9.10 Adjusting the chuck

- Insert the slotted pin tension spring into the chuck.
- Tighten the chuck by hand until the tool is slightly tensioned.



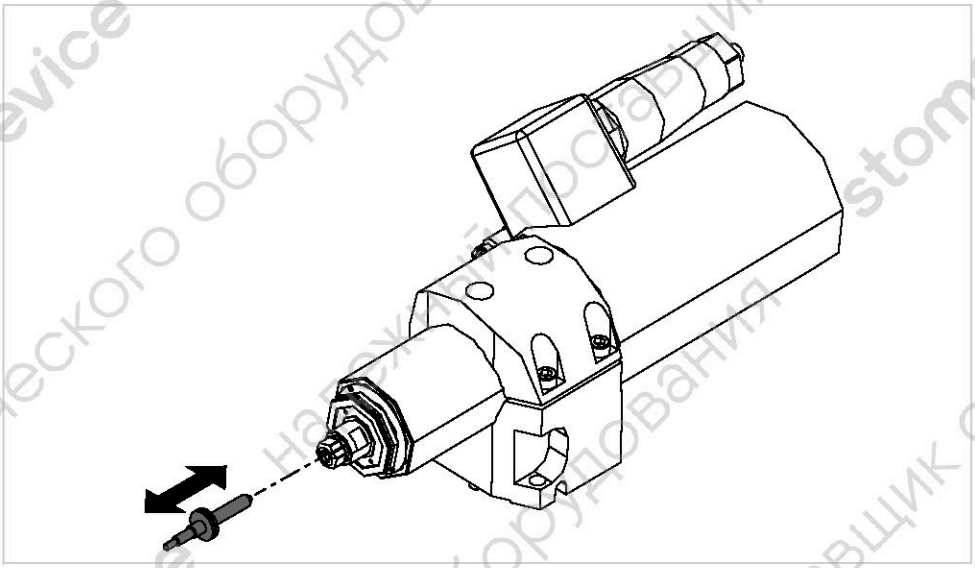
- From this position, turn the chuck by half a rotation in an anticlockwise direction.



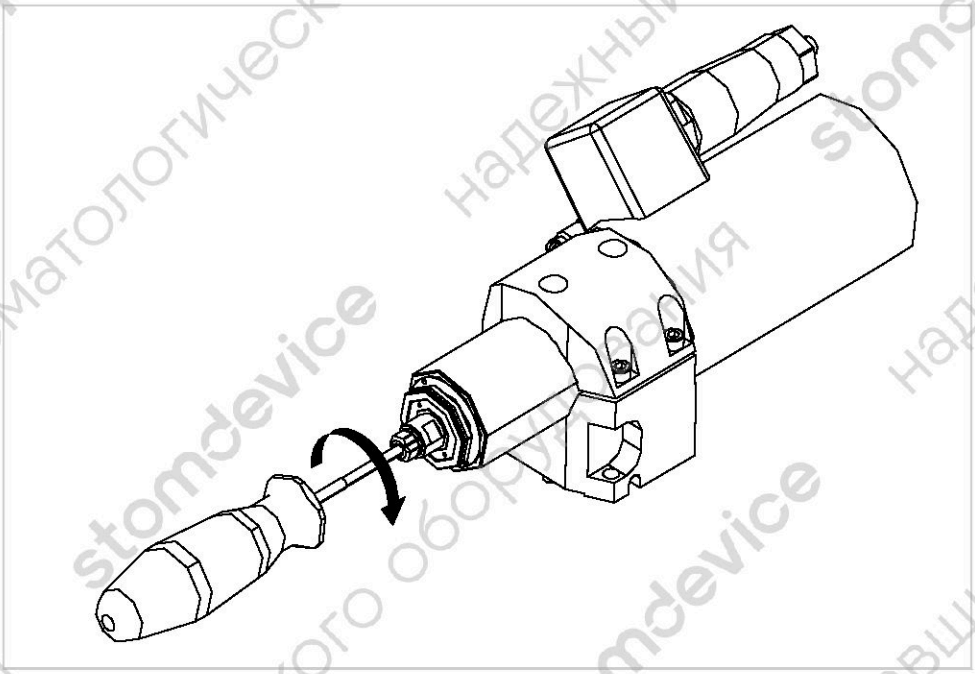
- Remove the slotted pin tension spring.

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- Check and ensure that the slotted pin tension spring can be inserted smoothly into the opened chuck.



- Hold the position of the chuck and tighten the grub screw to 2 Nm torque with the general purpose tool (**Mat. no. 1.009.0859**). Ensure that the position of the chuck is not changed.



Note

Loss of chuck retention force due to manual use of tools.

- Never clamp tool into the spindle by hand.

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9.11 Automatic clamping of tensioning pin

- Make sure that the tensioning pin is placed at position 0 of the tool magazine.
- Close the door of the machine.
- Tap the "Maintenance" > "Chuck" > "Get Tensioning Pin" buttons successively in the "Service" menu.



This makes the machine get the tensioning pin and perform a laboratory measurement.

9.12 Carry out the spindle warm up

Once the spindle mounting process is completed, a single spindle test run needs to be performed.

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- Tap the "Maintenance" > "Technician Service" > "System Test" > "Spindle" > "Spindle Warm-up" buttons successively in the "Service" menu.

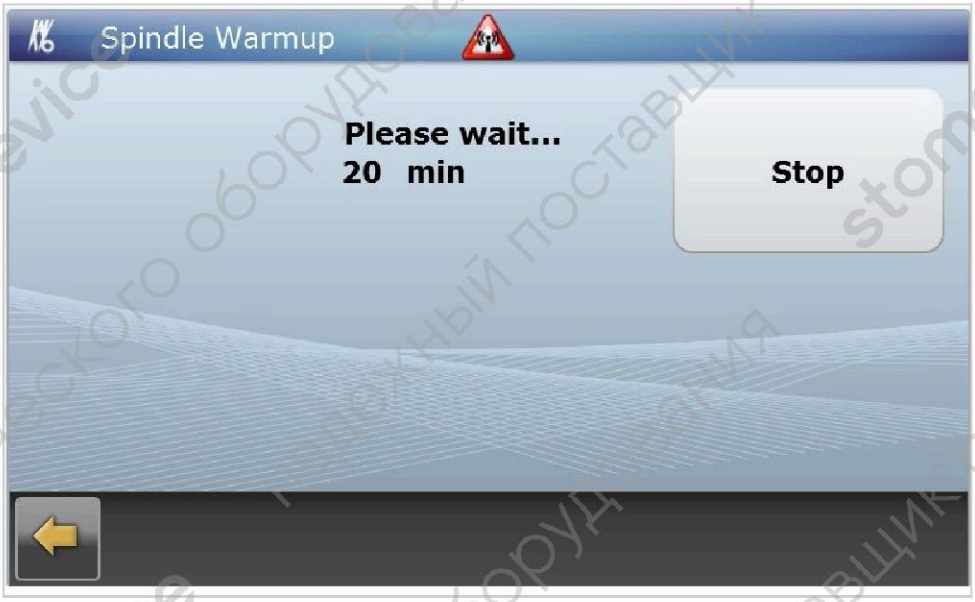


- Touch the "Start" button.



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The spindle warm-up takes approx. 15 minutes to complete.



- Confirm that the end of the spindle warm-up has been reached using the "OK" button.

9.13 Entering spindle parameters

- Tap the "Maintenance" > "Technician Service" > "System Test" > "Spindle" buttons successively in the "Service" menu.



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- Touch the "Spindle Exchange" button.



- Enter the serial number and touch the "Continue" button.



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- Enter the spindle dimension in mm and touch the "Continue" button.



- Touch the "Start" button in the "Spindle Current Calibration" menu.



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- Check the direction of rotation of the spindle:
  Seen from the front, the spindle must rotate in counterclockwise direction.
  Confirm the direction of rotation of the spindle by touching the "OK" button.



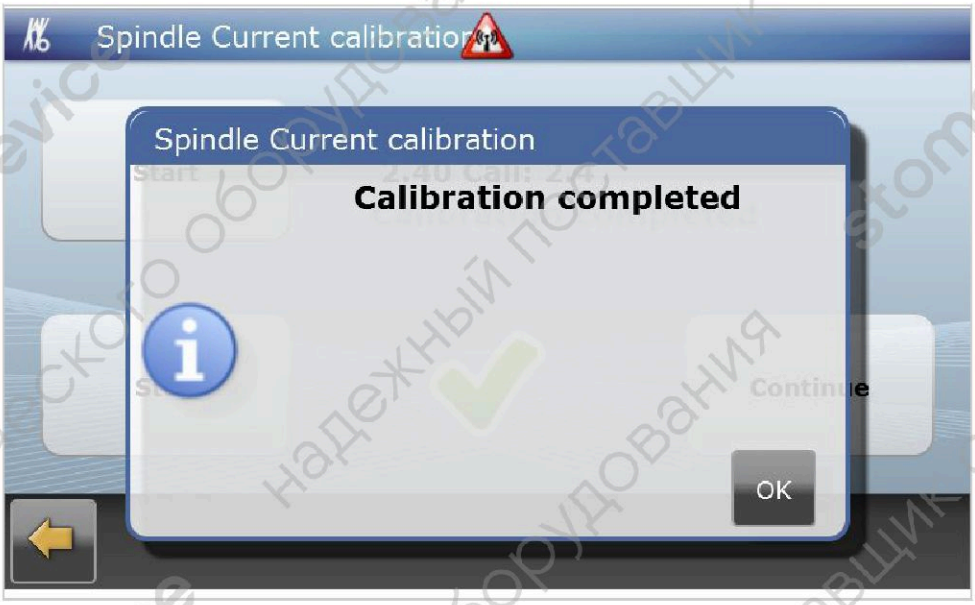
The spindle is then started at the following speeds:
10,000 rpm; 20,000 rpm; 35,000 rpm; 50,000 rpm.

- Confirm the speed display by touching the "OK" button.



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- Confirm the end of the calibration by touching the "OK" button.



9.14 Calibrating the machine

The machine must be calibrated after successful spindle assembly.

See also: 15 Calibrating the machine, Page 91

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10 Lasers

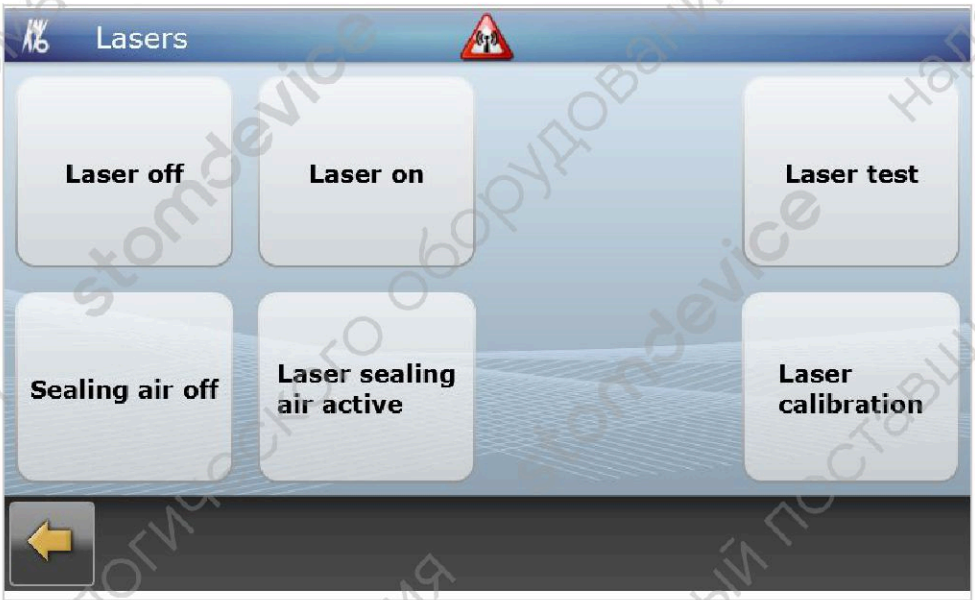
Note
The ARCTICA cleaning kit (**Mat. no. 1.009.5925**) is required to clean the laser.

10.1 Perform a laser test

- Tap the "Technician Service" > "Enter Password" > "System Test" > "Laser" buttons successively in the "Service" menu.



- Tap the "Laser test" press button.



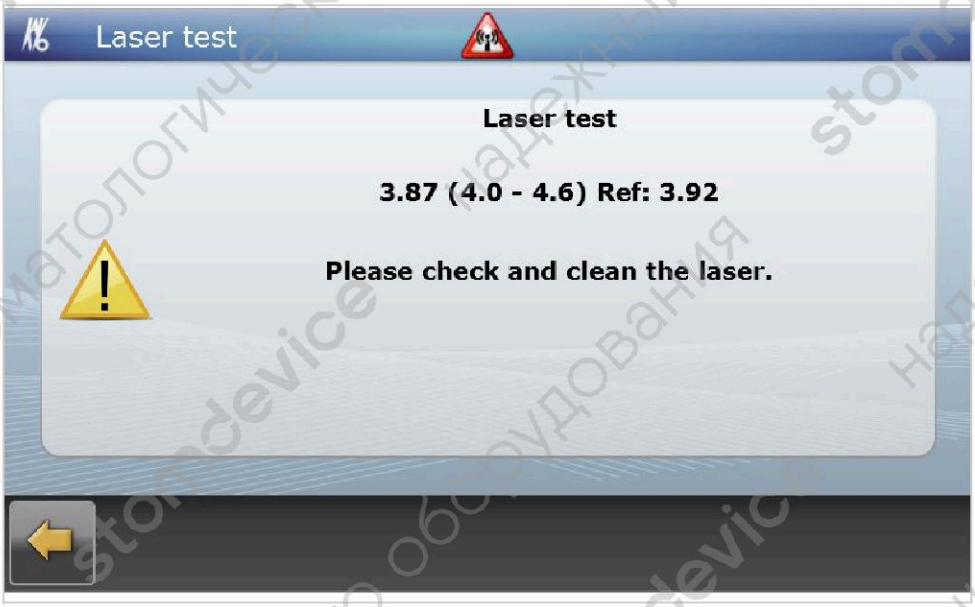
Laser, laser sealing air, and spindle sealing air are activated. The voltage of the laser transmitter and laser receiver is checked during the laser test. The laser

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voltage must be between 4.0 V and 4.6 V. The following message is displayed, if the laser voltage is within the tolerance range:



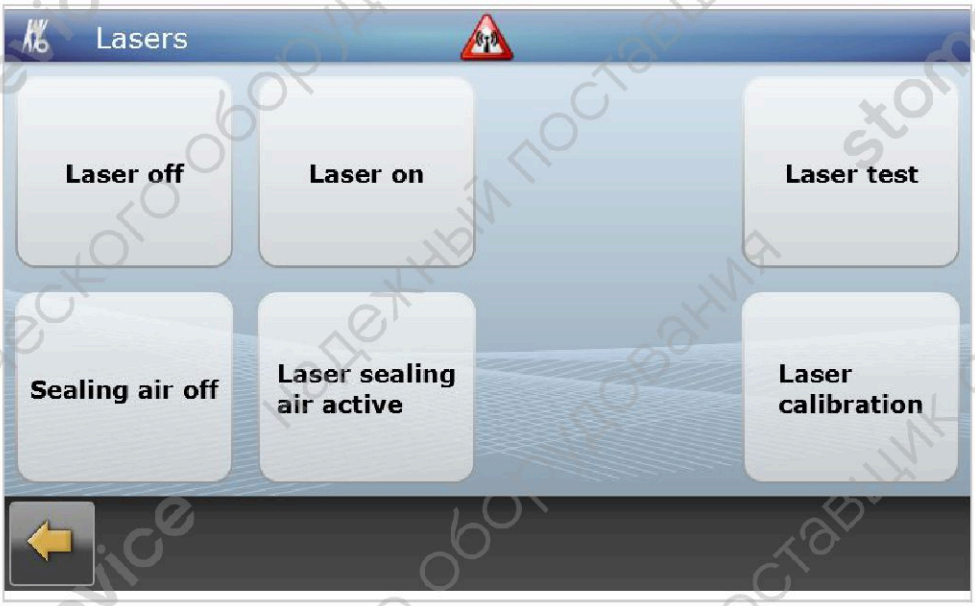
The laser lenses must be cleaned, if the laser voltage is outside the tolerance range. The following message is displayed:



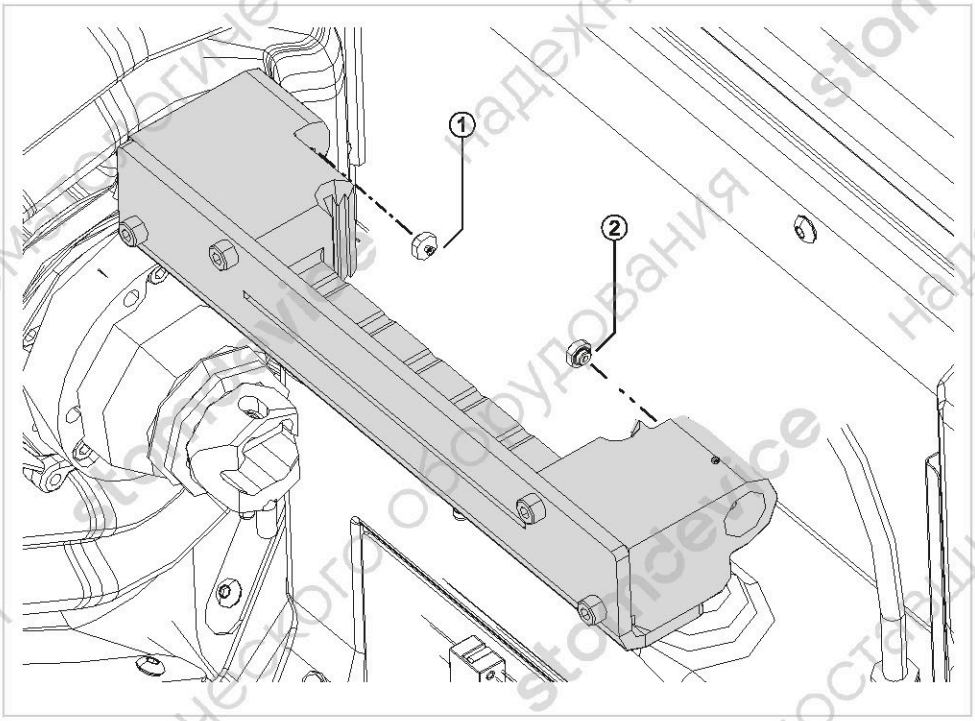
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10.2 Dismount and clean the laser nozzles

- Make sure that "Laser sealing air activated" is displayed.



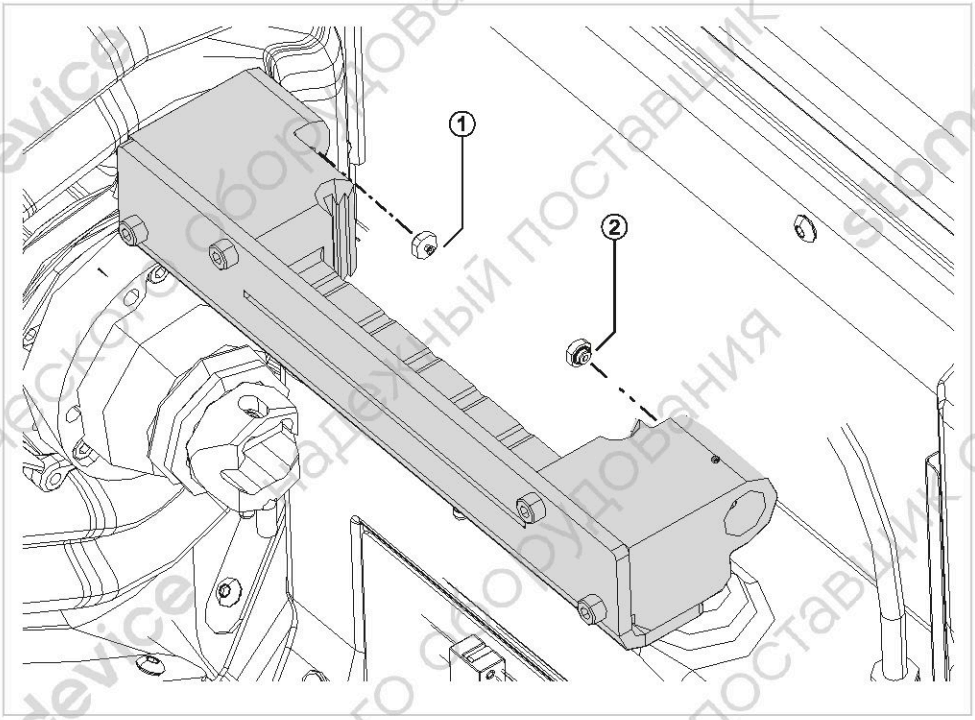
- Dismount the laser nozzles ① and ② from the tool holder using the tool for the laser measurement sleeve (**Mat. no. 1.009.5778**).



- Check the O-rings of the laser nozzles and replace them if required.

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- Clean the laser nozzles outside the KaVo ARCTICA Engine.



10.3 Cleaning the laser lenses

The laser nozzles need to be dismounted to be able to clean the laser lenses.

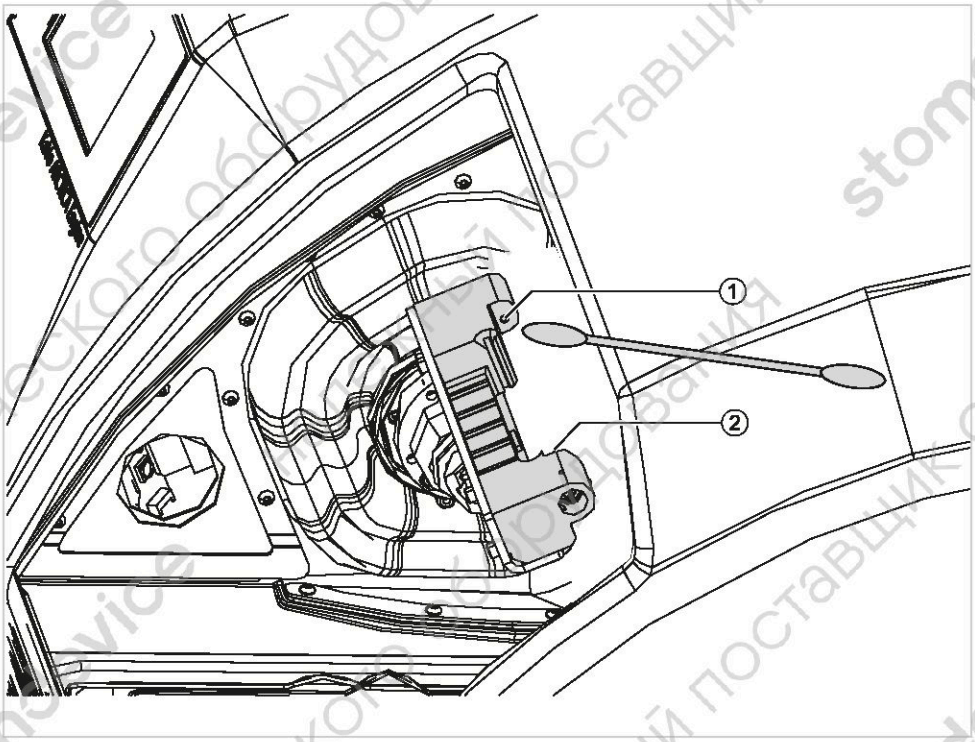
Note

Damage to the laser lenses due to the use of compressed air.

- Do not clean the laser lenses with compressed air.
- Never use compressed air inside the working space of the Kavo ARCTICA Engine.

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- Clean the laser lenses ① and ③ with micro-brush ② (**Mat. no. 1.009.5779**) and optics cleaning agent(**Mat. no. 1.009.5780**).



10.4 Mounting the laser nozzles

- To mount the fan laser nozzles, proceed in reverse order.
- Perform a laser test.

  The laser test must be successful.

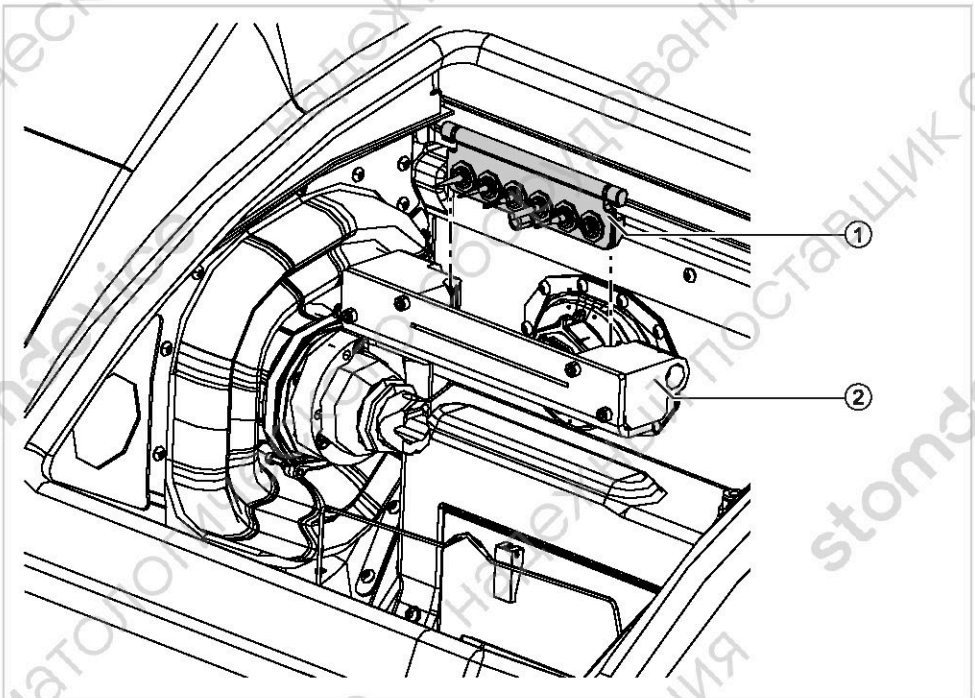
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11 Tool magazine holder

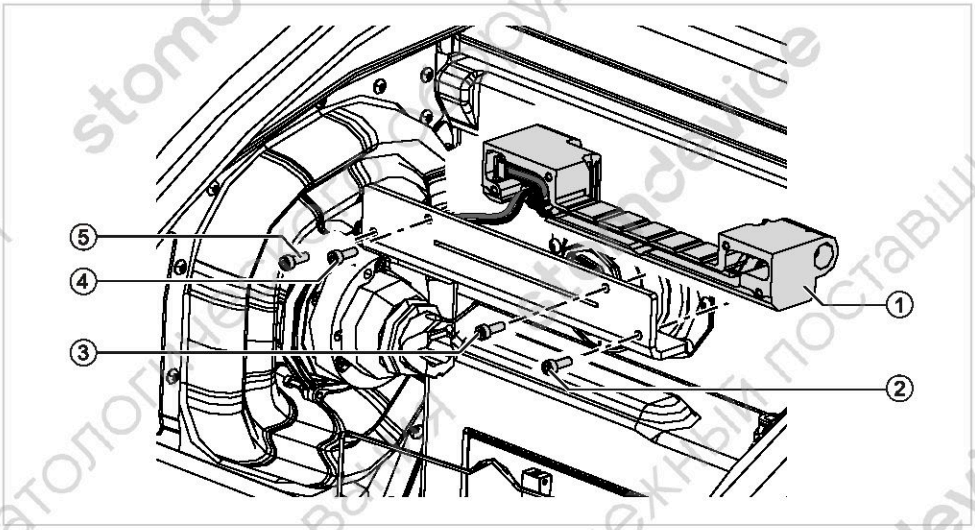
11.1 Dismounting the tool magazine holder

If a tool measurement cannot be performed and laser cleaning was not successful, the tool magazine holder needs to be replaced.

- Switch off the machine.
- Open the door of the machine.
- Take out tool magazine ① in upward direction from the tool magazine holder ②.

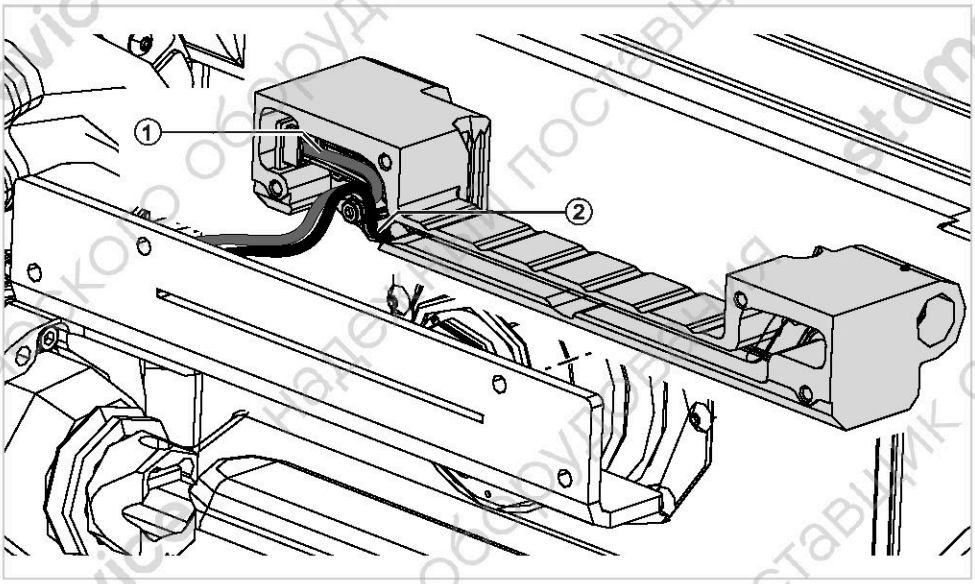


- Take off screws ② to ⑤ and loosen the tool magazine holder ① from the sheet metal bracket.



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- Disconnect the voltage supply and earthing cables ① and the sealing air cable ② and take out the tool magazine holder.

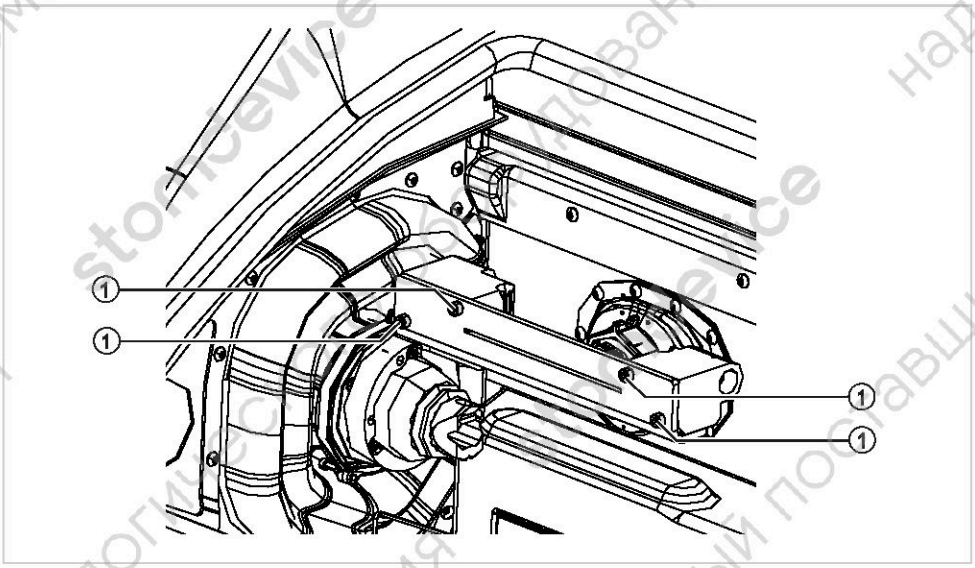


11.2 Mounting the tool magazine holder

Note

Mounting the tool holder, please make sure that the voltage supply and sealing air cables do not get clamped between the holder and the sheet metal bracket.

- Clean the holder of the tool magazine holder thoroughly.
- To mount the tool magazine holder, proceed in reverse order. Secure the screws ① with Loctite 241.

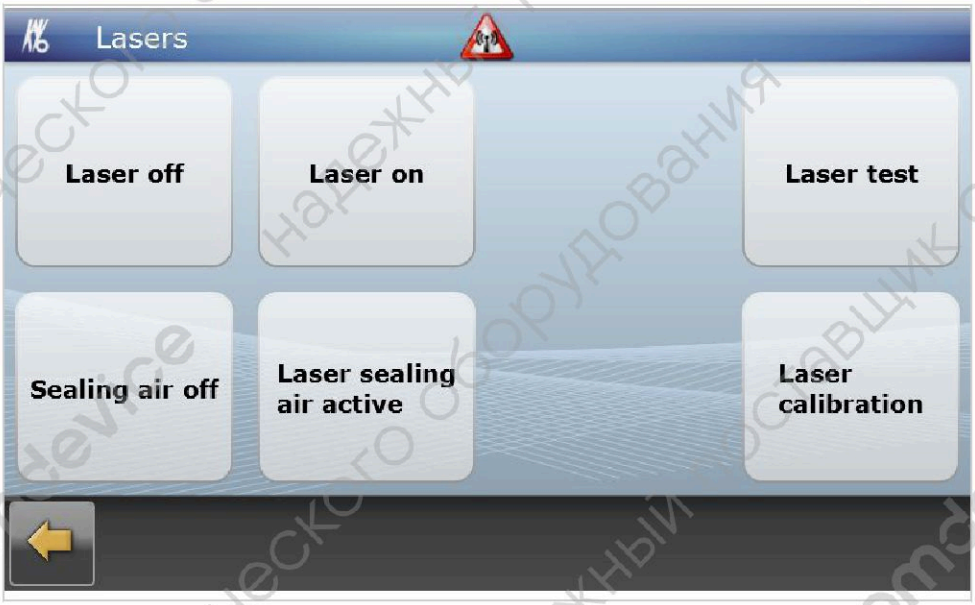


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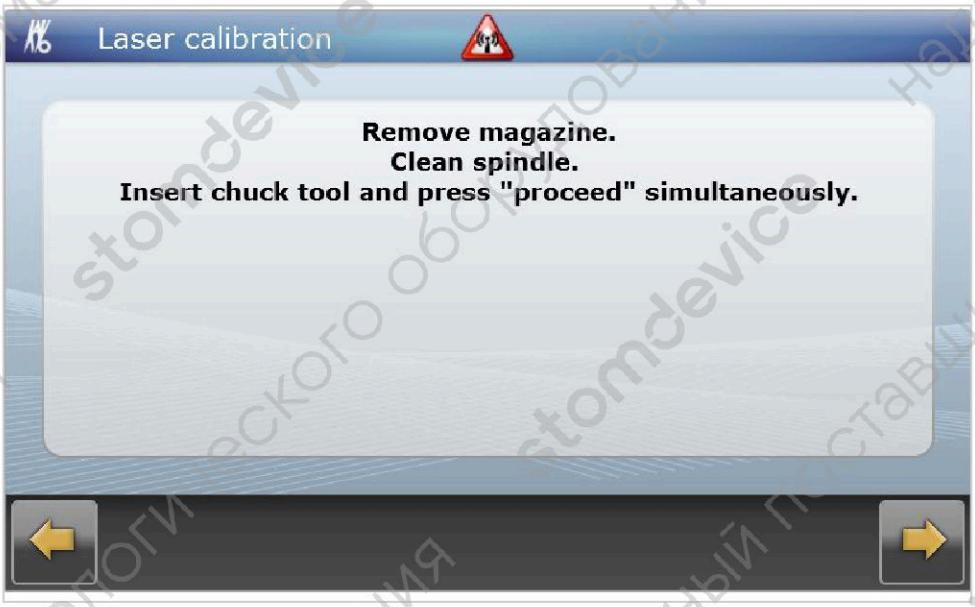
11.3 Calibrating the tool holder magazine and laser

The calibration unit (**Mat. no. 1.009.2538**) is needed as a measuring tool in the calibration of the tool magazine holder and laser. The calibration unit consists of a measuring mandrel and a sleeve.

- Tap the "Maintenance" > "Technician Service" > "System Test" > "Lacer Calibration" buttons successively in the "Service" menu.



- Follow the instructions on the display:
  Take out the magazine.
  Clean the face of the spindle.
  Insert the calibration pin in the chuck and click on "Continue".



- Close the door of the machine.

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- Use the "Start" button to initiate the laser calibration.



The calibration takes approx. 10 min to be completed.

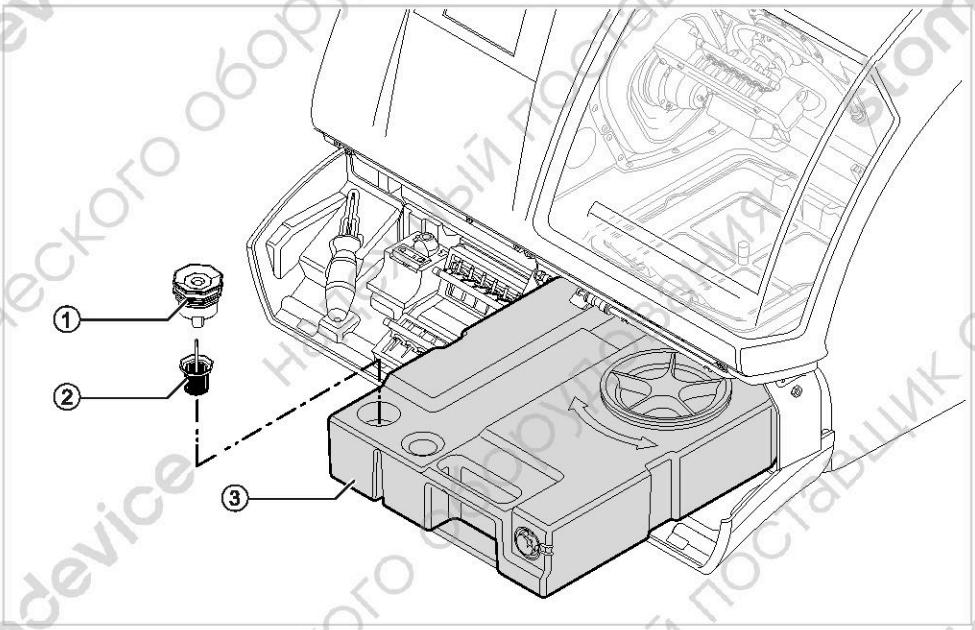
11.4 Calibrating the machine

See also: 15 Calibrating the machine, Page 91

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12 Maintenance plan according to maintenance schedule

12.1 Cleaning and replacing the filter of the coolant lubricant container



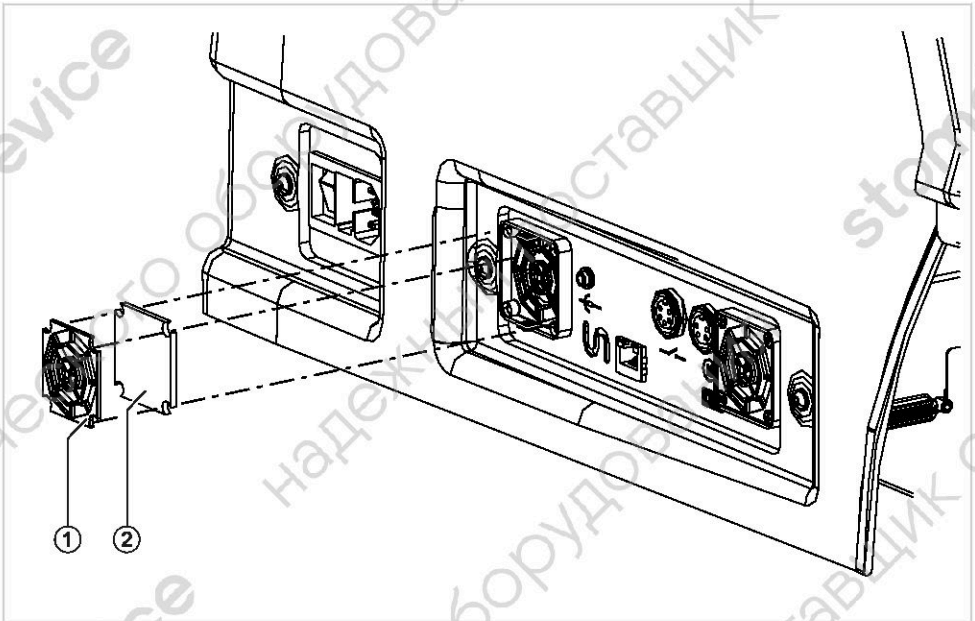
- Pull the coolant container ③ out of the machine.
- Dismantle the filter holder ① (**Mat. no. 1.008.6460**) with sieve ② (**Mat. no. 1.008.0712**) and O-ring 43x4 (**Mat. no. 0.236.0134**).
- Clean the sieve under running water or replace it.
- Lubricate the O-ring 43x4 with Molykote or replace it.
- Re-install the filter holder ① with sieve ② and O-ring 43x4.
- Re-insert the coolant container ③ in the machine.

12.2 Clean the filter of the electronics box and exchange

The electronic box is equipped with two fans. The filters of the fan can be exchanged from outside without dismantling the housing.

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- Switch off the machine.



- Insert a screwdriver below the filter frame ① and lever the filter frame from the filter housing.
- Clean the filter frame ① under running water.
- Exchange filter ②.
- Insert filter frame ① once again.

12.3 Exchanging the aerosol dust extractor filter

See also: 4 Aerosol exhaust, Page 24

12.4

12.5 Replacing the door seal

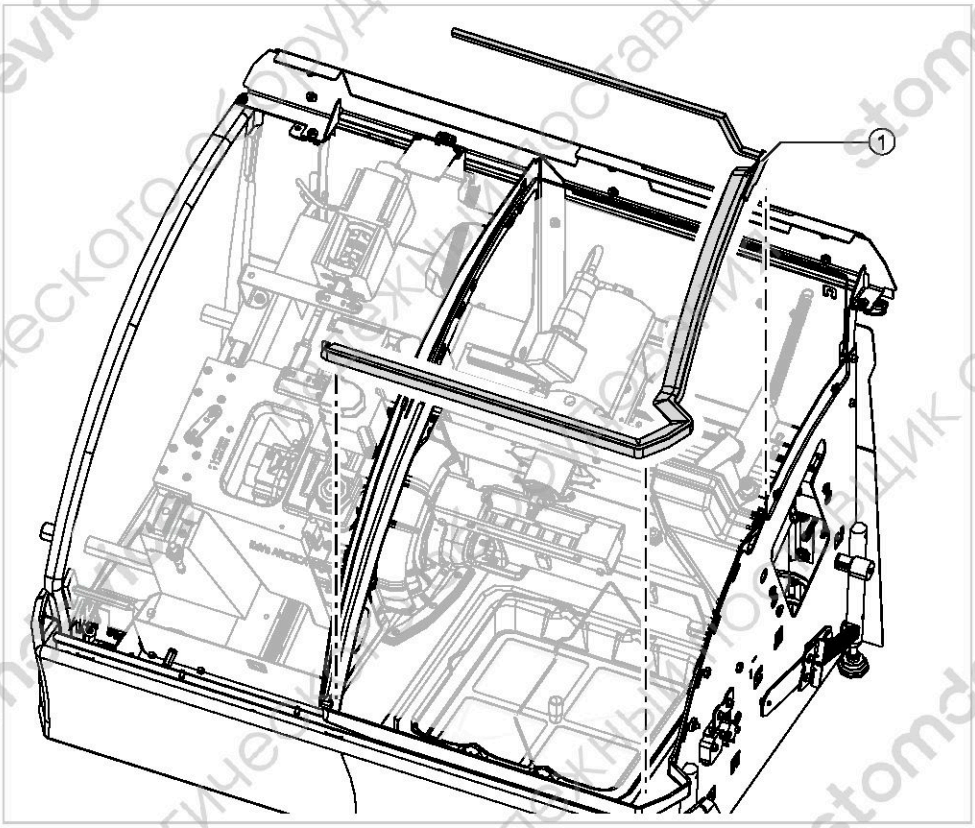
Dismount housing parts

See also:
2.2 Dismount and mount the left side panel, Page 6
2.1 Dismount and mount the right side panel, Page 5
2.3 Dismount and mount the housing, Page 6
2.5 Dismounting and mounting the guard door, Page 10
2.6 Dismounting and mounting the spindle cover, Page 15

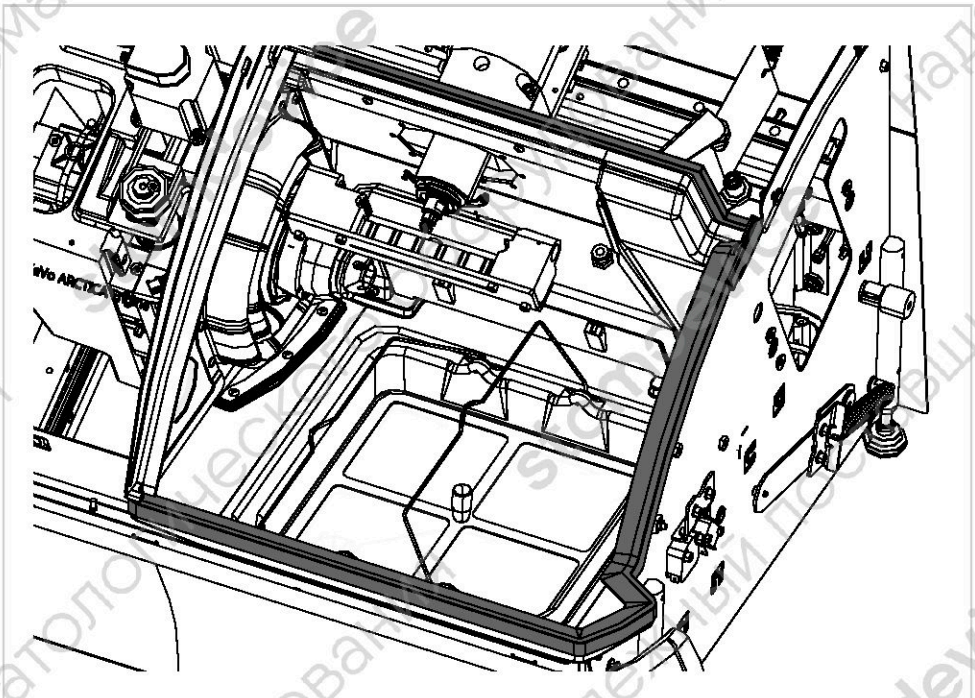
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Replacing the seal of the working space

- Dismount the seal of the working space ①.



- Remove any residual adhesive and silicone.
- Install the new seal of the working space and seal it with silicone.



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Mount housing parts

- To mount the housing parts, proceed in reverse order.

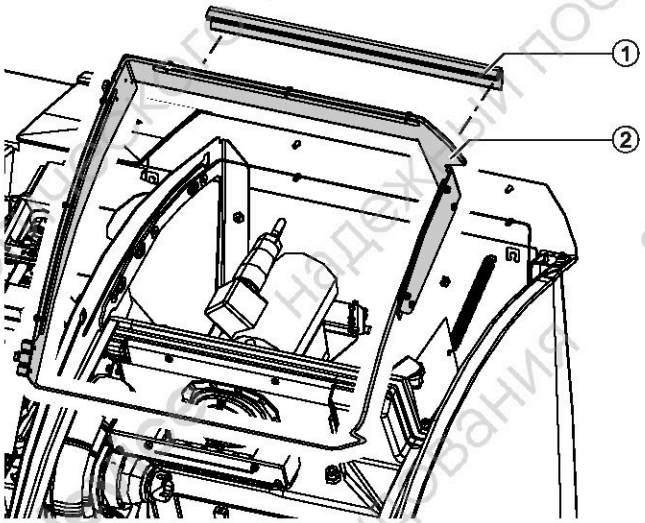
12.6 Replacing the sealing lip of the door

Dismount housing parts

See also:
2.1 Dismount and mount the right side panel, Page 5
2.2 Dismount and mount the left side panel, Page 6
2.3 Dismount and mount the housing, Page 6
2.5 Dismounting and mounting the guard door, Page 10

Replacing the sealing lip of the door

- Please the sealing lip of the door ① on the back side of the door ②.



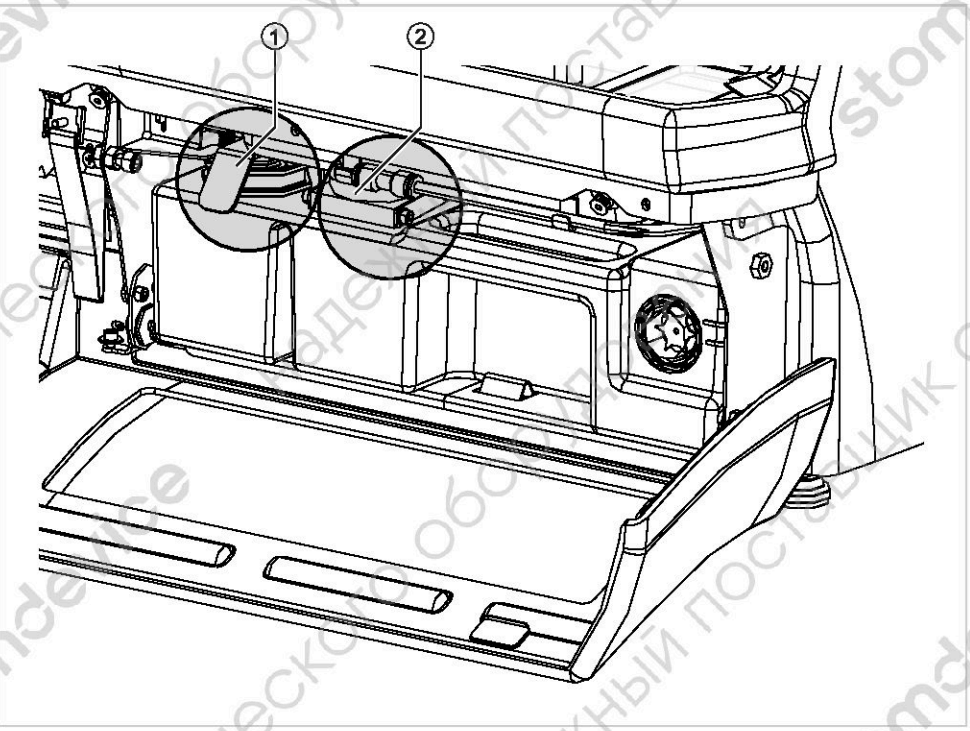
Mount housing parts

- To mount the housing, proceed in reverse order.

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12.7 Replacing the seals of intake pipe and coolant discharge pipe

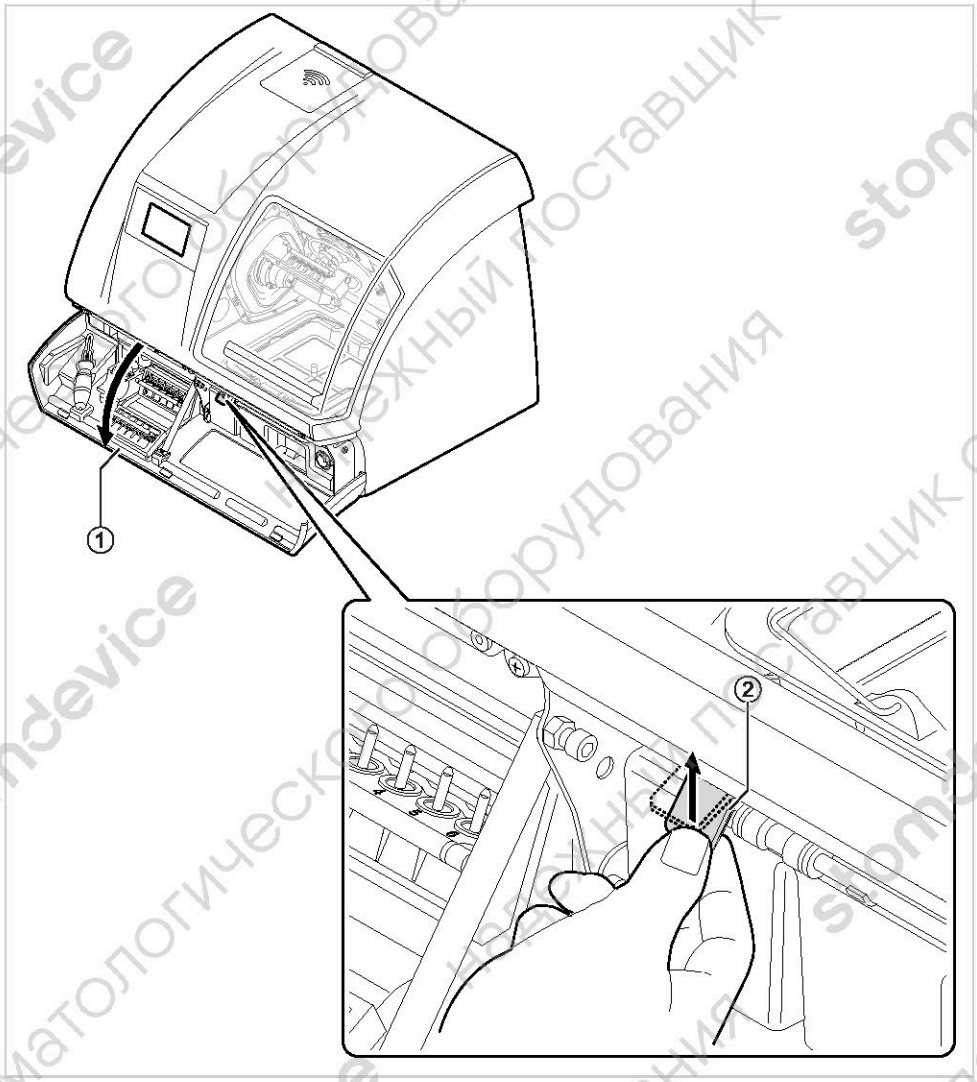
The seals of the intake pipe ① and coolant discharge pipe ② are situated above the coolant container.



- Open the tool drawer ①.

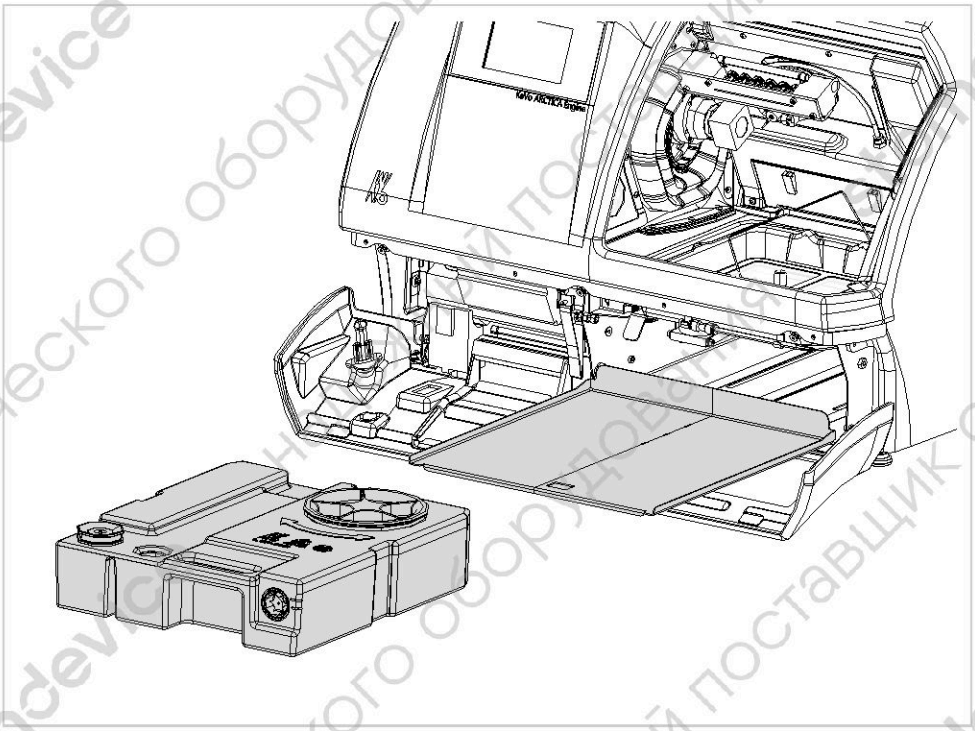
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- Snap the locking lever ② upwards into the catch.



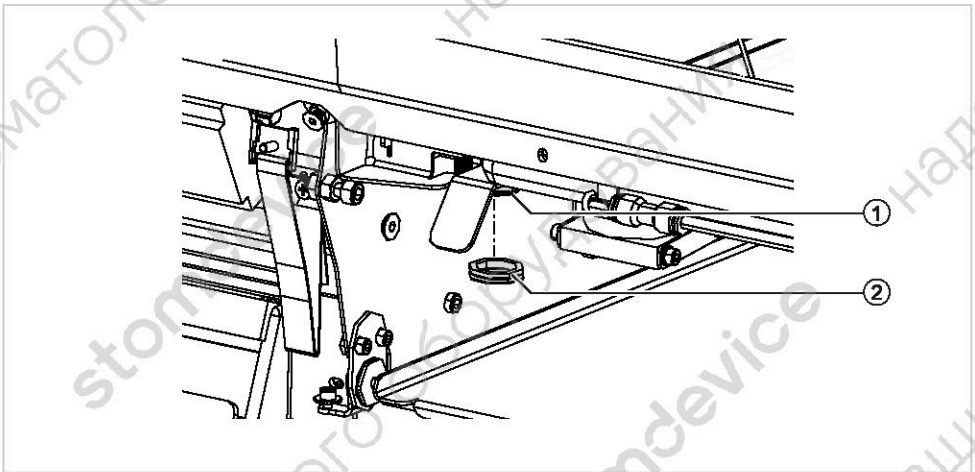
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- Pull out the coolant container towards the front and remove it from the support panel.



Replace the seal of the intake pipe

The seal of the intake pipe ② is glued to the intake pipe ①.

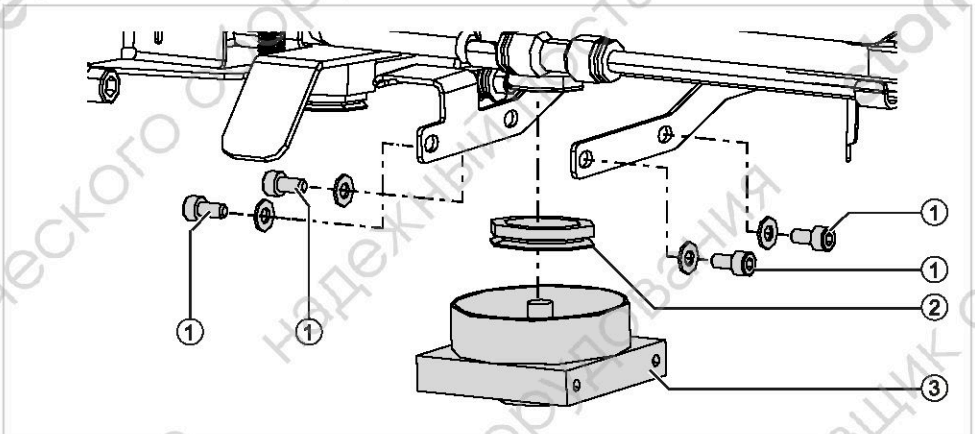


- Pull the seal off the intake pipe ② and remove any residual adhesive and any other residues from the adhesive surface of the intake pipe.
- Fix the new seal ② in place on the upper planar surface of the intake pipe ① using Loctite 454. Make sure not to contaminate the lower sealing surface with adhesive.

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Replacing the seal of the coolant discharge pipe

- Take off 4 screws ①.
- Dismount the coolant discharge unit ③ in downward direction.
- Remove the seal ② from the seal holder and clean the seal holder.



- Fix the new seal in place on the upper planar surface of the discharge pipe using Loctite 454. Make sure not to contaminate the lower sealing surface with the adhesive.
- Re-mount the coolant discharge pipe.

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13 Working space covers

13.1 Dismounting and mounting the B axis bellows

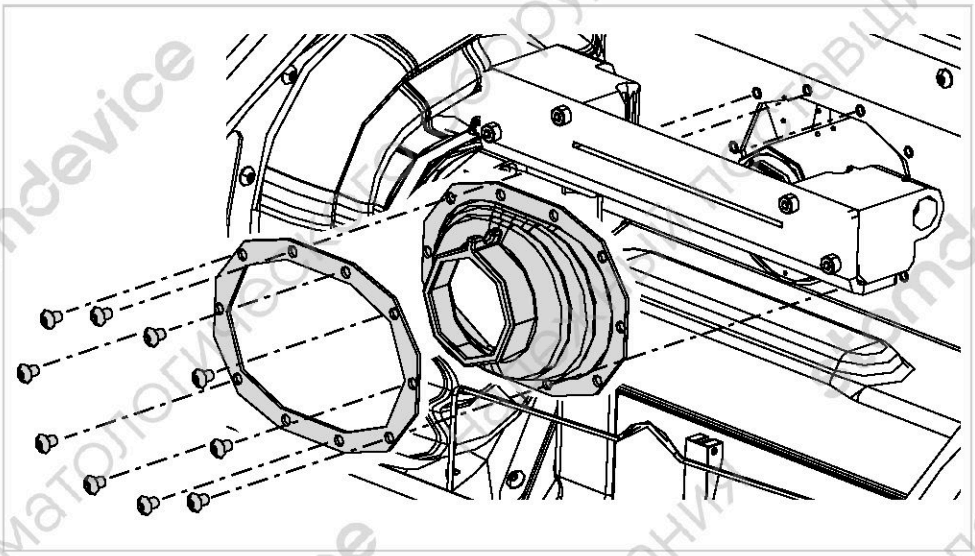
Dismounting the coolant manifold

- Dismounting the coolant manifold.

See also: 8.7 Dismounting the coolant manifold, Page 48

Dismounting the B axis bellows

- Remove 10 Allen screws using the universal tool (**Mat. no. 1.009.0859**) SW 2.5.
- Pull the frame and the bellows off the spindle.



Mounting the B axis bellows

- To mount the B-axis bellows, proceed in reverse order.
- Secure the Allen screws with Loctite 241 and a torque of 2 Nm.

Mounting the coolant manifold

- To mount the coolant manifold, proceed in reverse order.

13.2 Dismounting and mounting the A axis bellows

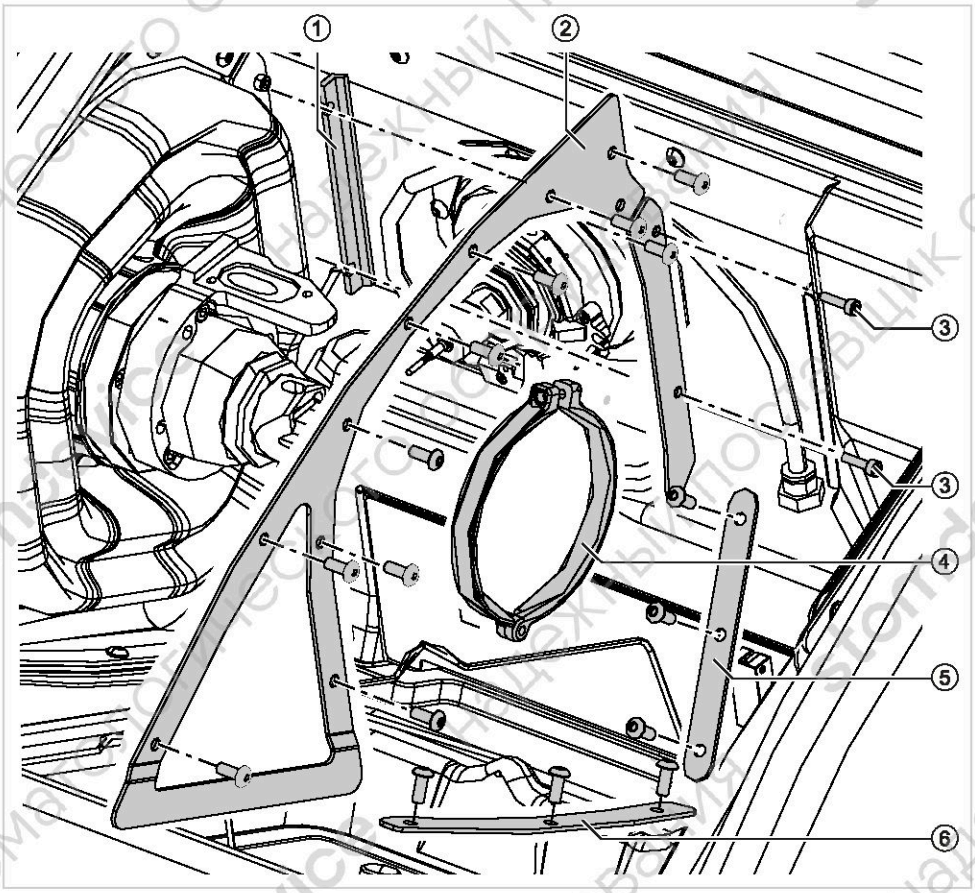
Note

For dismounting the bellows, the tool magazine holder must not have be dismounted.

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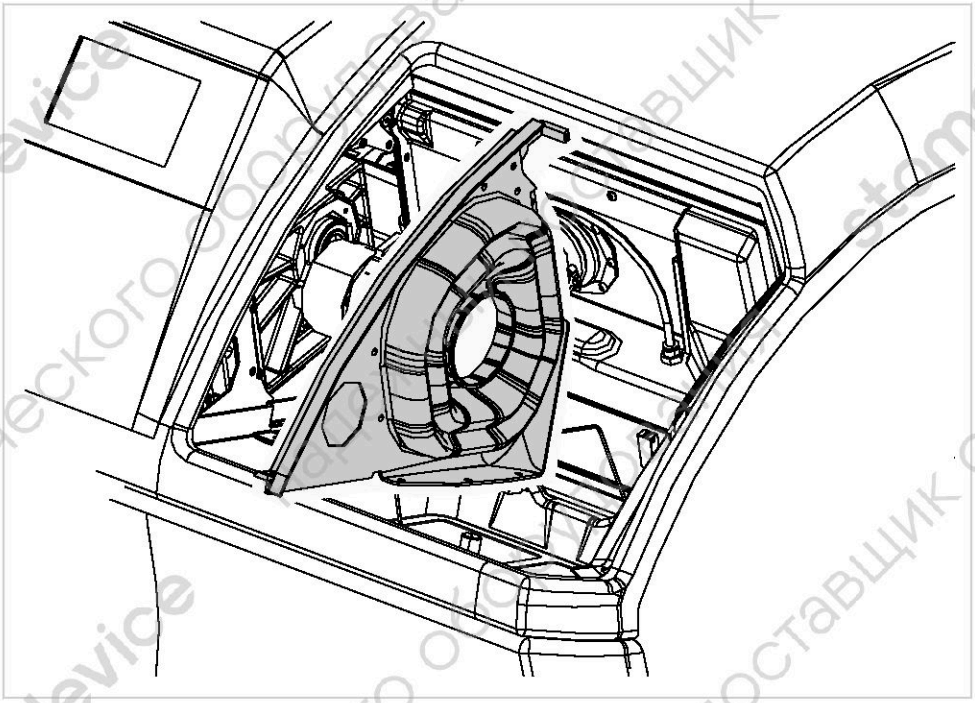
Dismounting

- Dismount the plastic ring ④ for clamping the bellows. For this purpose, loosen the upper Allen screw of the plastic ring (Allen key SW 2.5).
- Dismount 3 frame segments ②, ⑤, and ⑥ including 16 screws on the outside of the bellows (Allen key SW 2.5 ball-head).
- Dismount the wiper lip ① and frame segment ② with 2 screws ③ (Allen key SW 2.5 ball-head).

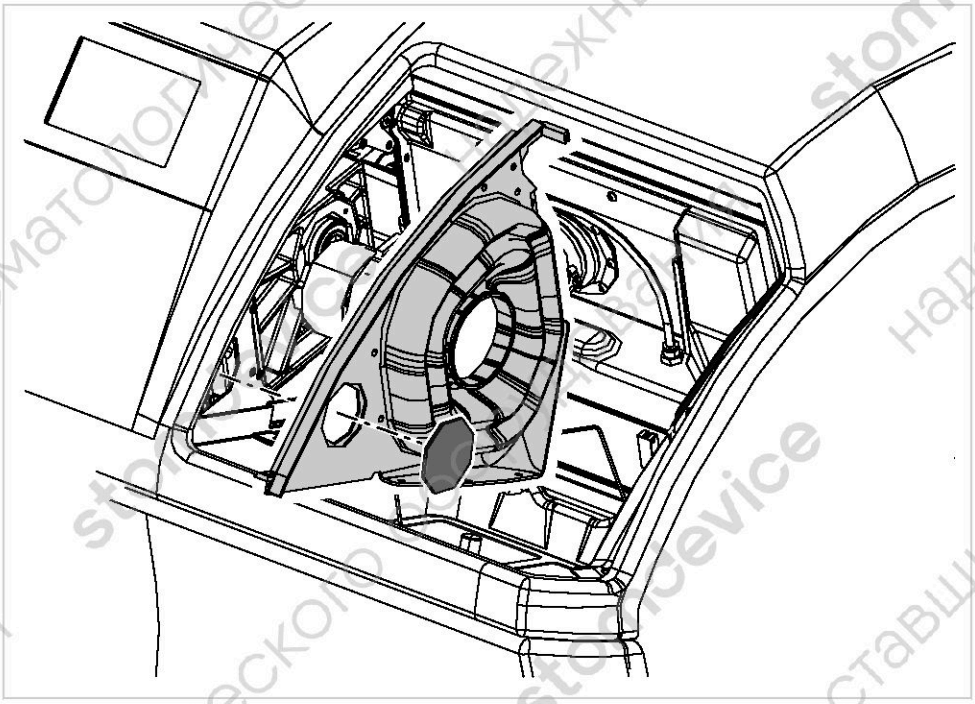


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- Take the bellows off the A axis.



- Take the window of the working space lighting off the bellows by hand.



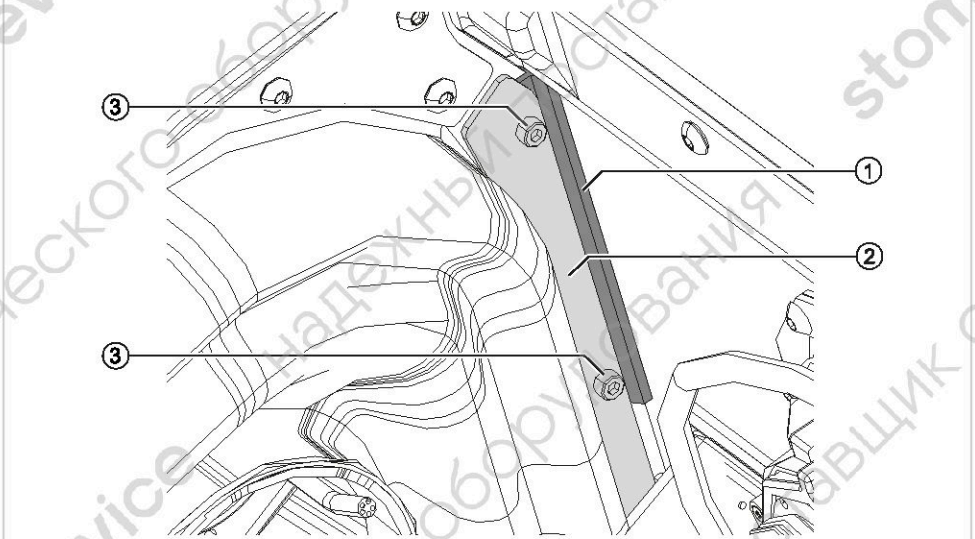
Mounting

- To mount the bellows, proceed in reverse order.

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Note

Make sure that the wiper lip ① is sealed against the rear wall. Only then proceed with mounting the frame segment ② with screws ③. Only then, sealing against coolant lubricant and chips is ensured.



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14 Interior space lighting

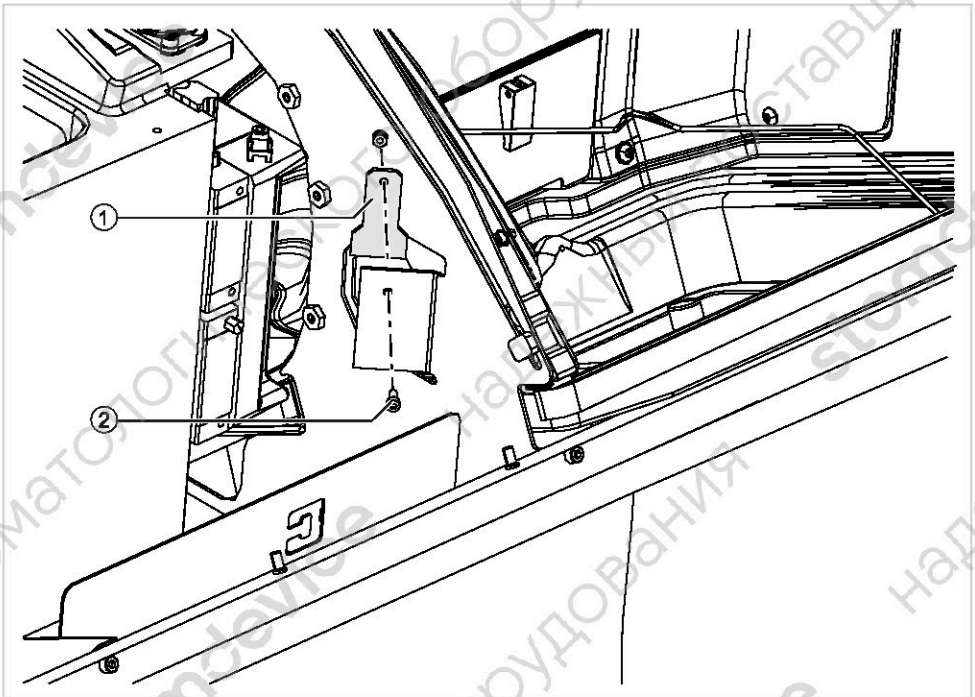
The interior space lighting is situated on the left side below the display. The illumination unit cannot be accessed from the working space.

Dismount housing parts

See also:
2.1 Dismount and mount the right side panel, Page 5
2.2 Dismount and mount the left side panel, Page 6
2.3 Dismount and mount the housing, Page 6

Replacing the illumination unit

- Disconnect the LED illumination unit ① from the mains supply.
- Take off screw ② and dismount the LED illumination unit ①.



- To mount the new illumination unit ①, proceed in reverse order.

Mount housing parts

- To mount the housing parts, proceed in reverse order.

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15 Calibrating the machine

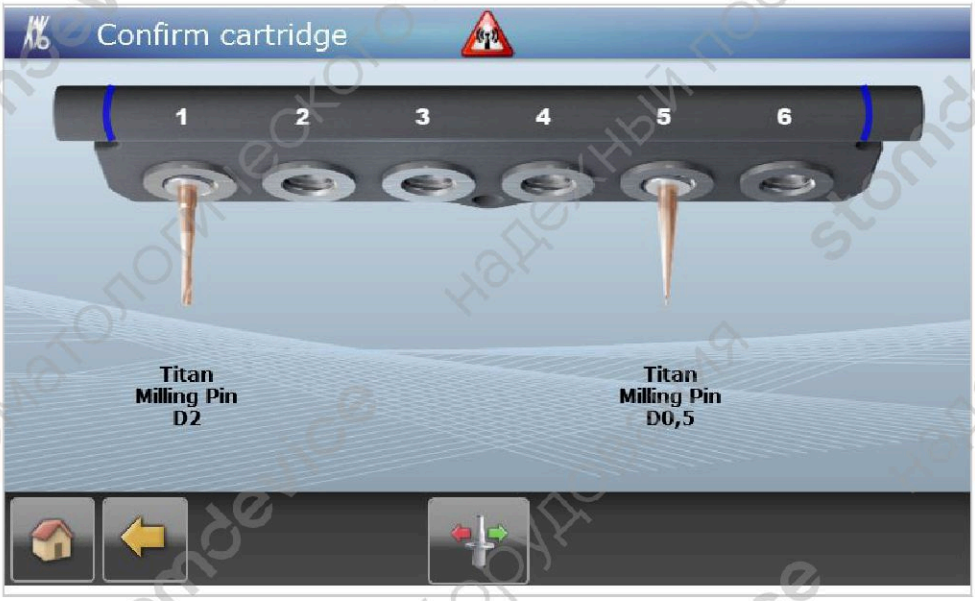
The machine must be calibrated after replacing the spindle.

ARCTICA Test Body Set (order no. 1.009.6916):
- Titanium Milling Pin D 2 (**Mat. no. 1.008.7097**)
- Titanium Milling Pin D 0.5 (**Mat. no. 1.008.7098**)
- Outside micrometer (**Mat. no. 1.002.5839**)
- Outside micrometer holder (**Mat. no. 1.002.5840**)
- KaVo ARCTICA C-Cast B70/20 (**Mat. no. 1.008.7466**)
- ARCTICA Tool magazine (**Mat. no. 1.009.0718**)

Blank for test body production: ARCTICA C-Cast-Blank (B70/20)
(**Mat. no. 1.008.7466**)

15.1 Configuring the tool magazine

- Insert Titanium Milling Pin D 2 in position 1 in the tool magazine.
- Insert Titanium Milling Pin D 0.5 in position 5 in the tool magazine.
- Insert the tool magazine in the tool holder.



15.2 Inserting the blank

- Insert the ARCTICA C-Cast-Blank (B70/20) in tool holder until it reaches the stop.
- Fix the blank in place using the universal tool (**Mat. no. 1.009.0859**) at a torque of 2 Nm.

15.3 Starting the test body programme

- Close the door of the ARCTICA Engine.

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- Touch the "Service" button.



- Touch the "Service Technician" button.

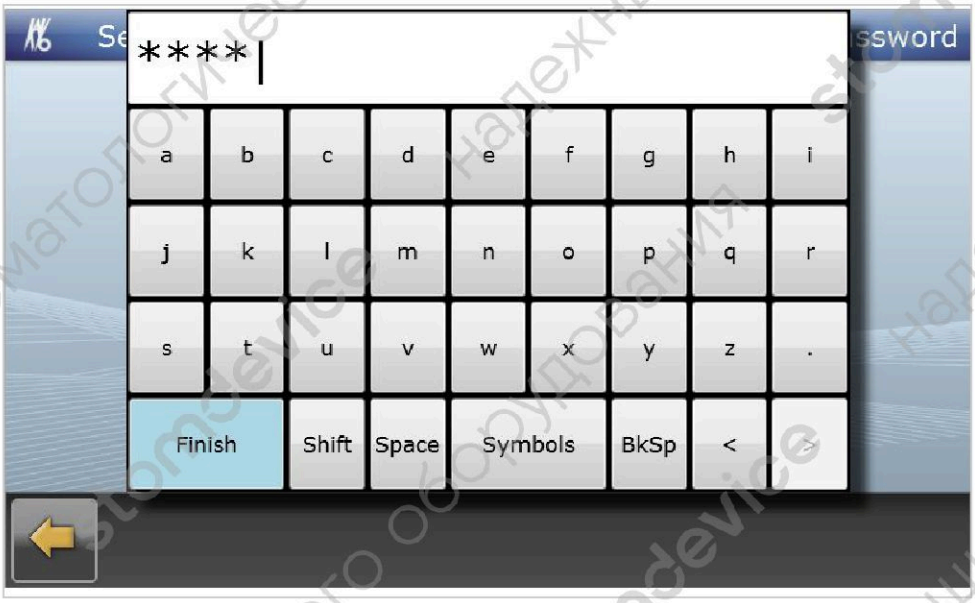


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The "service" menu includes functions that are available to KaVo-trained technicians exclusively. The menu is password-protected from unauthorised access.

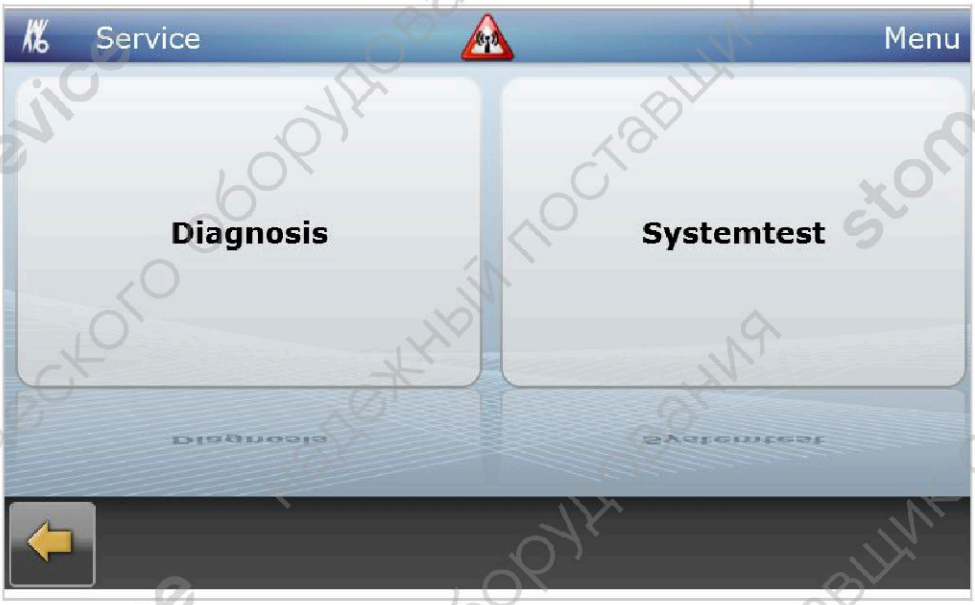


- Enter password.
- Enter the password using the letter keys block.
- Touch the "Finish" button.

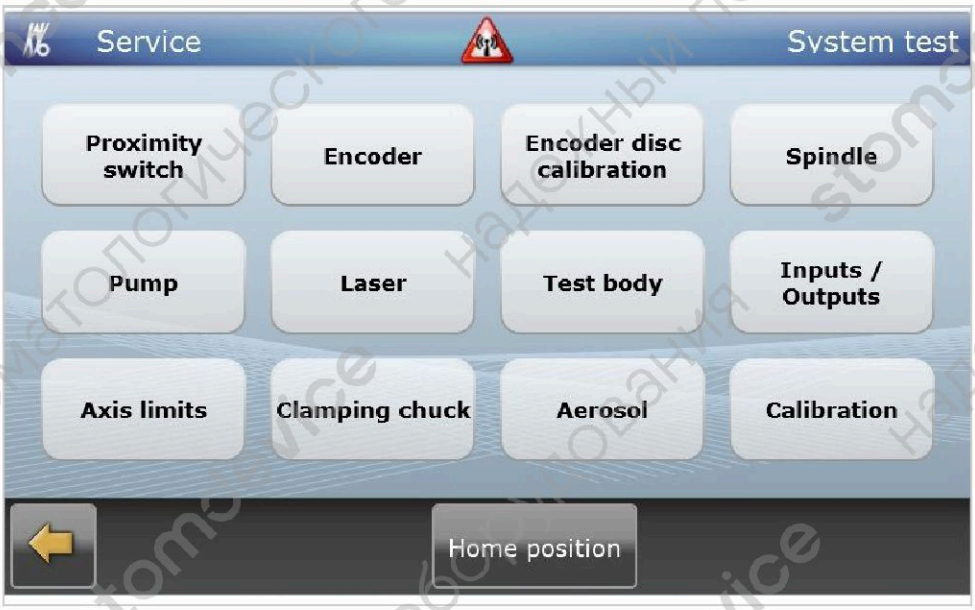


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- Touch the "System test" button.

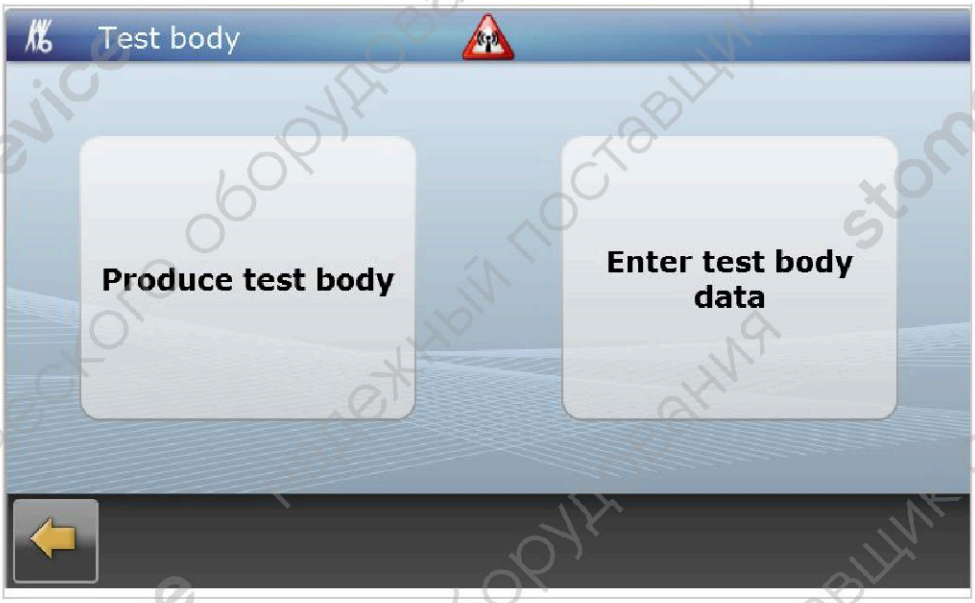


- Touch the "Test body" button.



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- Touch the "Produce test body" button.

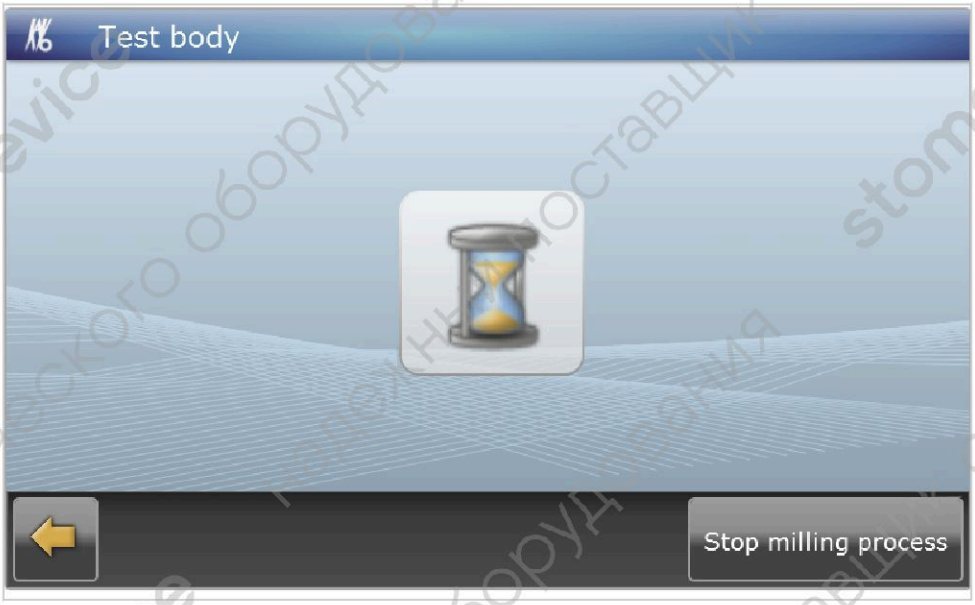


- Touch the "Start" button.



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The test body is produced automatically.



The production takes approx. 20 minutes to complete.

- Open the door of the KaVo ARCTICA Engine and take out the blank.

15.4 Measuring the test body

Note

Incorrect measuring values.
Incorrect measuring values can lead to collision inside the machine.

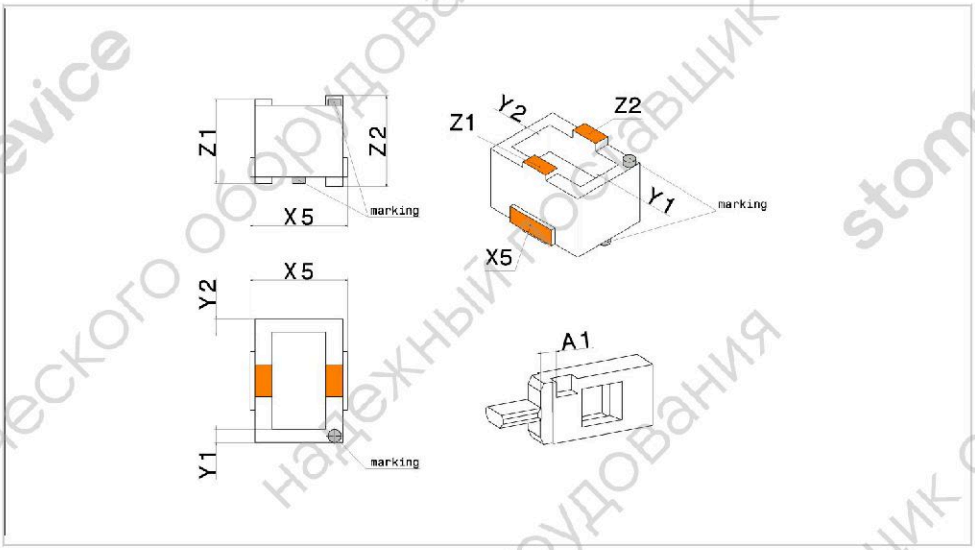
- Take note of the two markers when you define the measuring positions.
- Make sure that no errors are made during the measurement or transfer of the measured values.

- Brake the test body off the blank.

- Clean the measuring surfaces of the outside micrometer (**Mat. no. 1.002.5839**).
- Close the outside micrometer and make sure that the display shows 0.000.

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- Measure the 5 dimensions of the test body and enter them in the table.



① Marker on the side on the top

② and ③ marker in the middle on the bottom

Test body dimensions	Specified size	Actual
Z1	13.00	
Z2	14.00	
X5	15.00	
Y1	2.00	
Y2	2.00	
A1	10.00	

15.5 Enter test body data

Note

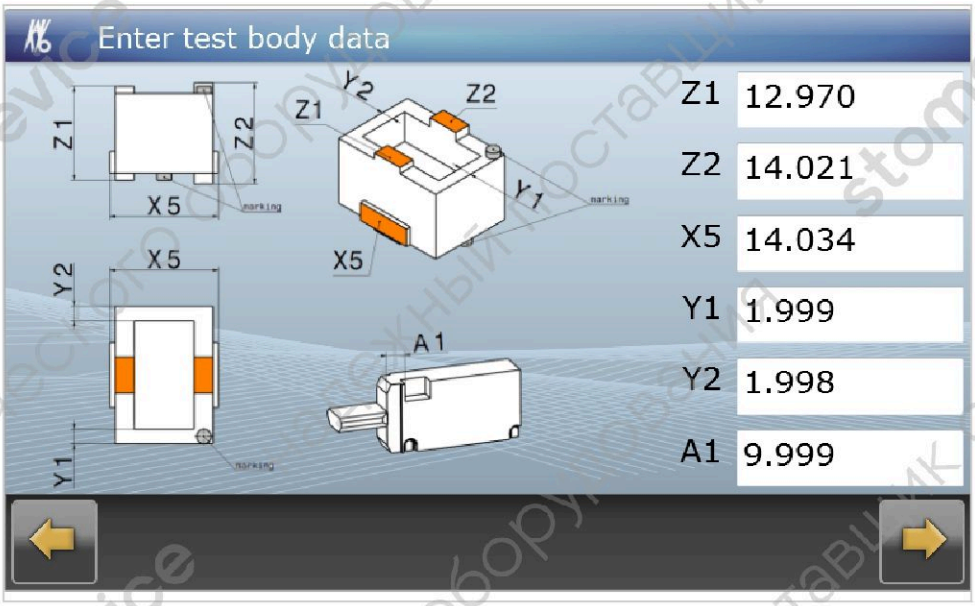
Incorrect entry of test body data
Incorrect entries can lead to collision inside the machine.

- Check the entered values again before you save them.

- Touch the "Enter test body data" button.

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- Enter the data from the protocol in the table. Touch numbers button for this purpose.



- Use the numeric keys to enter the measured values in millimetres and three decimal places.



- Check the entered values again.
- Close the door of the ARCTICA Engine.
- Touch the "Continue" button to save the data.

The machine performs an automatic correction and then drives to the basic position. The calibration is completed as soon as the inside light switches to white. After an automatic check of the set values and completed correction, the display shows:

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No need to produce another test body. Calibration is completed. and the data is secured.

If the set values are not within the permissible tolerance range, the following message is displayed:

The calibration must be repeated.

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16 Carry out a safety check

- Perform the measurements after each repair or every 12 months in accordance with DIN VDE 0701-0702.
- Use testers in accordance with DIN VDE 0404 (VDE 0404) for all measurements.
- Record the test in the test log.

The following tests have to be carried out:
- Visual inspection
- Measuring the protective earth conductor resistance
- Measuring the insulation resistance
- Measuring the protective earth conductor current
- Functional test

16.1

16.2

16.3 Tests

16.3.1 Visual inspection

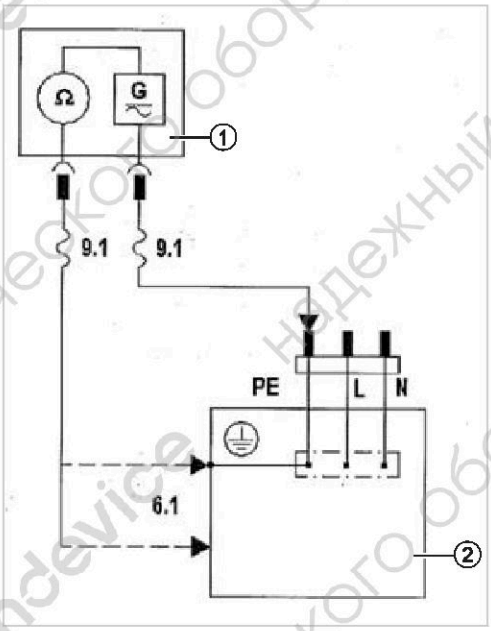
- Make sure that none of the housing parts contributing to the electrical safety is damaged.

The following tests have to be carried out:
- Damage to power cables (**Mat. no. 0.223.4142**)/(**Mat. no. 1.009.0586**)/(**Mat. no. 1.009.0587**)
- Damage to insulations (**Mat. no. 0.223.4142**)/(**Mat. no. 1.009.0586**)/(**Mat. no. 1.009.0587**)/(**Mat. no. 1.008.2143**)
- Original KaVo power cable is being used
- Condition of the power plug (**Mat. no. 0.223.4142**)
- Defective protection against bending (**Mat. no. 1.009.0586**)/(**Mat. no. 1.009.0587**)
- Defective strain relief (**Mat. no. 1.009.0586**)/(**Mat. no. 1.009.0587**)
- Damage to housing and protective covers (**Mat. no. 1.007.8846**)/(**Mat. no. 1.008.1960**)
- Condition of fan air filter (**Mat. no. 1.008.6639**)
- Operability of power switch (**Mat. no. 1.008.1960**)
- Legibility of all printing and symbols related to safety (**Mat. no. 1.008.9445**)/(**Mat. no. 1.009.5878**)
- Signs of overloading or inappropriate use/operation
- Original KaVo fuse is being used (**Mat. no. 1.008.6566**)
- Signs of non-permissible interventions or modifications
- Contamination, corrosion or aging with a non-permissible impact on safety
- Contamination or clogging of cooling features serving for opening
- Absence of leakage in coolant lubricant container and coolant lubricant cycle
- Absence of leakage in compressed air cycle
- Damage to/function of pressure reducer

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16.3.2 Measuring the protective earth conductor resistance

- Threshold: R ≤ 0.3 Ω
- Test voltage: 4 V < U0 < 24 V
- Test current: I > 0.2 A



Test set-up

① Measuring equipment ② KaVo ARCTICA Engine

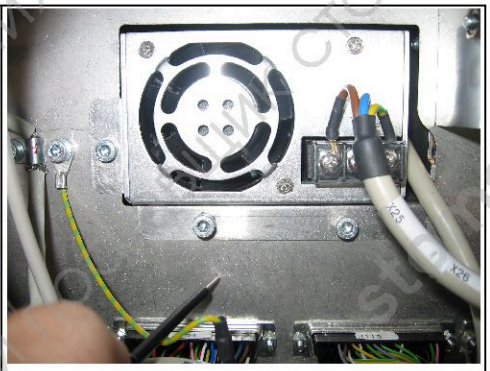
- **6.1**: touchable conductive part(s) that is/are not connected to the protective earth conductor
- **9.1**: measuring cables to the protective earth conductor and to touchable conductive parts connected to the protective earth conductor

- ► Connect measuring cables to the KaVo ARCTICA Engine.
- ► Switch on the test equipment and test the test equipment.
- ► Switch on the KaVo ARCTICA Engine.
- ► Start the test.
- ► Enter the serial number of the ARCTICA.
- ► Test the measuring points of the protective earth conductor test consecutively.

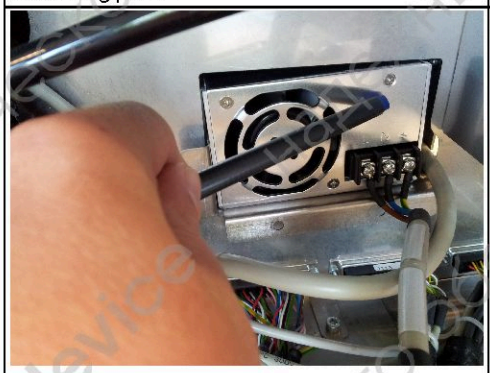
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Measuring point 1



Measuring point 2

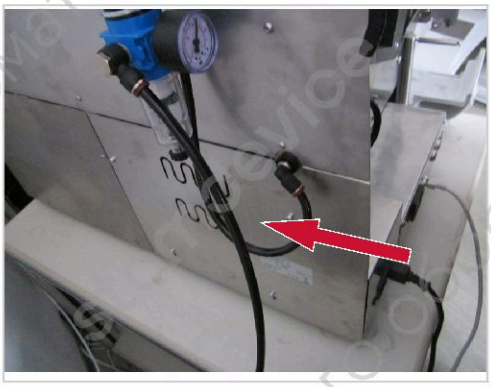


Measuring point 3



Measuring point 4

If any maintenance or repair work is performed inside the mains voltage area, i.e. if the rear wall of the electronics unit (**Mat. no. 1.008.0150**) is opened, the entire protective earth conductor test must be carried out.
If the intervention affects only the control unit (machine control components **Mat. no. 1.008.0563**), it is sufficient to carry out the protective earth conductor test on measuring point 1 only.

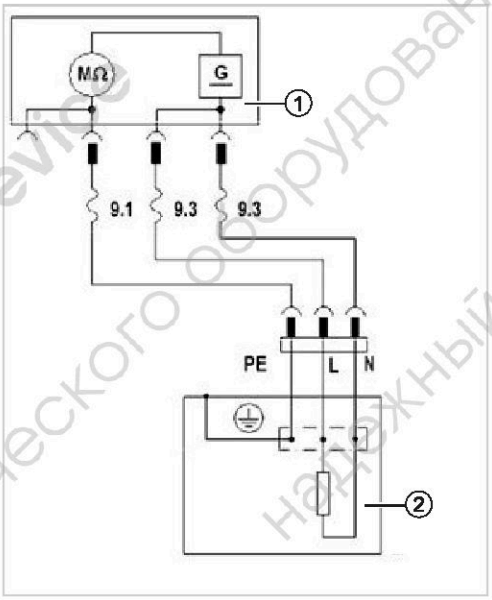


Rear wall of the electronics unit

16.3.3 Measuring the insulation resistance

- Test voltage: U = 1500 V AC + 5 %, sinusoidal, 50 Hz
- Test current: I > 1 mA
- Threshold: R ≤ 1 MΩ
- Duration of test: ≥ 5 s

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Test set-up

① Measuring equipment ② KaVo ARCTICA Engine

9.1 and **9.3**: measuring cables

- Connect measuring cables to the KaVo ARCTICA Engine.
- Switch on the KaVo ARCTICA Engine.
- Switch on the test equipment and test the test equipment.
- Enter the serial number of the ARCTICA.
- Start the test.

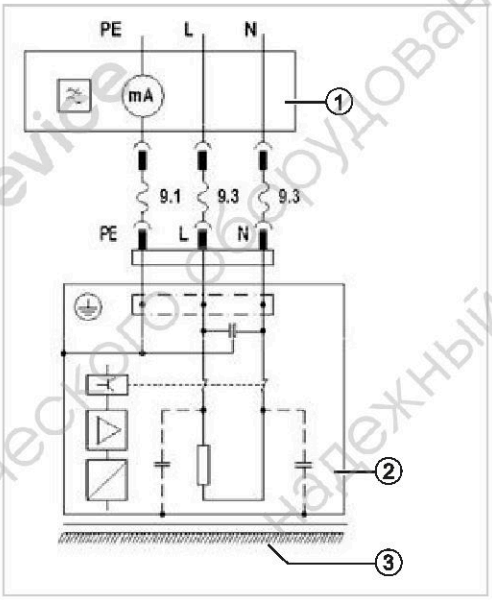
16.3.4 Measuring the protective earth conductor current

Threshold values: I ≤ 3.5 mA

Two measuring methods can be used:

- Direct measurement: No part of the KaVo ARCTICA Engine may be connected to earth potential.
- Equivalent leakage current measurement: Use only if the earlier measurement of insulation resistance produced a positive result.

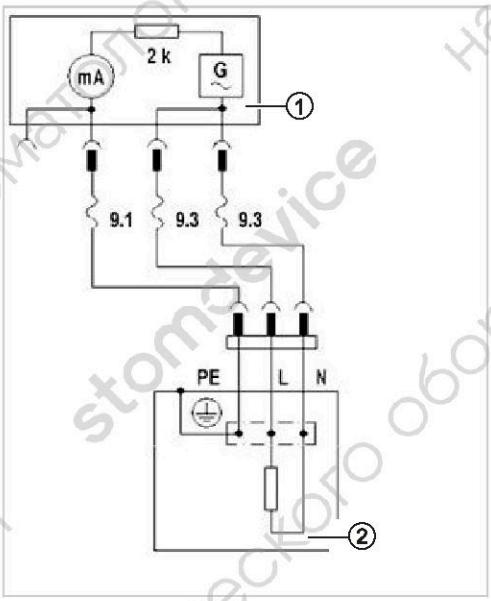
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Measuring set-up: Direct measuring method

① Measuring equipment
② KaVo ARCTICA Engine
③ Earth

- **6.1**: touchable conductive part(s) that is/are not connected to the protective earth conductor
- **9.1** and **9.2**: measuring cables to the protective earth conductor and to touchable conductive parts connected to the protective earth conductor



Measuring set-up: Equivalent leakage current measurement

① Measuring equipment
② KaVo ARCTICA Engine

9.1 and **9.3**: measuring cables

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16.3.5 Functional test

- After any repair, run a function check of the device.

16.4 Evaluation

The device passes the test if it passes all individual parts of the test.

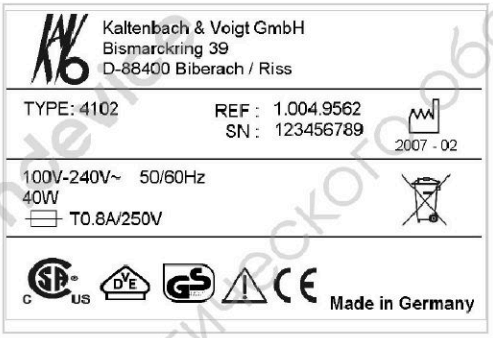
- Label the KaVo ARCTICA Engine accordingly once it passes the test.

or

- Label the KaVo ARCTICA Engine clearly if it fails the test.

16.5 Documentation

- Document the test and serial number in the test log.
- The serial number is shown on the nameplate of the KaVo ARCTICA Engine.



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Prüfprotokoll
Prüfung nach Instandsetzung oder Wiederholungsprüfung
Prüfgrundlage DIN VDE 0701-0702:2008

Auftraggeber:	Dental Labor XYZ XYZ Straße 1 XXXXX XYZ-Hausen	Auftrags-Nr.: Auftragnehmer:	210XXXXXXX KaVo Dental GmbH Bismarckring 39 88400 Biberach

Gerät / Art:	4102
Hersteller:	Kaltenbach und Voigt GmbH
Serien - Nr.:	123456789
Ref. - Nr.:	1.004.9562

Prüfintervall:	12 Monate		
Letzte Prüfung:	2010.12.08	nächste Prüfung:	2011.12.08
Prüfer:	Hr. Abc		
Messgerät:	Ultra 701/702 S; Serien-Nr.: ? Softwareversion ?	nächste Kalibrierung:	2011/10
Prüfung vom:	2010.12.08 - 10:10:36		
Auswertung:	701/702 S PC-Soft 1.1 win32 (Automatisch)	Software Version kann dem Ausdruck entnommen werden	

	i.O.	nicht i.O.
Sichtprüfung:		
Funktionsprüfung:		

Messbereich		Messwert	Grenzwerte	i.O.	nicht i.O.
R-PE	(Schutzleiterwiderstand)	0,08 Ohm	0,30 Ohm	X	
R-ISO	(Isolationswiderstand)	>19,99 MOhm	1 MOhm	X	
I-ABL (I-SL)	(Schutzleiterstrom)	0,00 mA	3,50 mA	X	
I-ABL (I-BR)	(Berührungsstrom)	0,00 mA	0,50 mA	X	

Bei Messmitteln, bei denen ein Messprotokoll ausgedruckt wird muss dieses dem Prüfprotokoll angeheftet werden.

Bemerkung: Scanner arbeitet ohne Probleme, guter Allgemeinzustand

Ergebnis: Der Prüfling hat die Prüfung bestanden!

Prüfer:	Verantwortlicher Person des Auftraggebers:
XYZ-Hausen, 08.12.2010, Hr. Abc	XYZ-Hausen, 08.12.2010
Ort, Datum, Unterschrift, Stempel	Ort, Datum, Unterschrift, Stempel

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