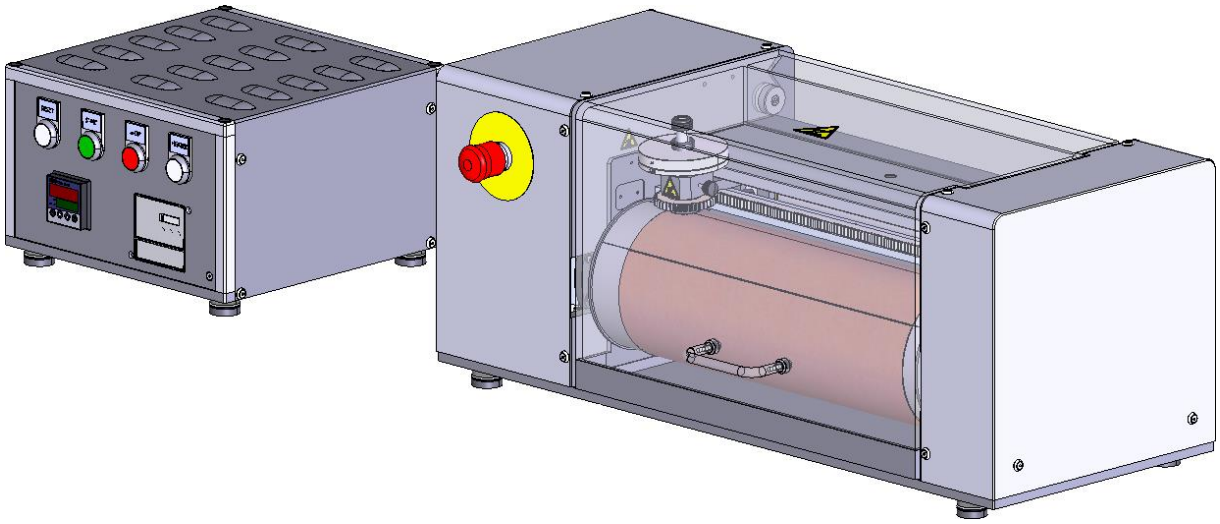
bareiss®

# Operating Instructions

English



Abrasion tester with
tempered drum

English

# Contents

English

# 1 General information

Although the information contained in these instructions has been carefully checked, no liability can be accepted for errors or completeness.

These operating instructions may not be reproduced in whole or in part in any form or translated into another language without prior written consent. The source language of these operating instructions is German. Keep for future use! Subject to technical changes!

## 1.1 Safety instructions

When using the abrasion tester with tempered drum, hereinafter referred to as the abrasion tester, the following instructions must be observed:

Attention!
All repair work must be carried out exclusively by trained Bareiss employees or service technicians authorized by Bareiss.

Attention!
Risk of squeezing and cutting between the toothed wheel and toothed rack when the protection cover is open and the START button is pressed.

The abrasion tester is equipped with safety devices such as safety switches and additional electrical interlocks. These must not be manipulated or bypassed.

The abrasion tester may only be used for the abrasion of elastomer specimens with the purpose of determining the resistance to abrasion.

The abrasion tester may only be used for abrasion tests in accordance with the current standards, *see "Ranges of application", chapter 2.3, page 5*.

The abrasion tester must be protected from air containing dust, oil, grease and metal dust, sources of heat (direct sunlight, radiators), humidity, moisture and vibration as well as against falling.

Only mild cleaning agents should be used for cleaning the abrasion tester in order to avoid surface damages. The cleaning cloth should be soft and lint-free

Attention!
Alcohol, gasoline, thinners or other highly flammable substances must not be used. The use of such substances can lead to fires.

## 1.2 Scope of standard delivery

(1) Abrasion tester
(2) Electronic unit
(3) 8 foot screws
(4) Adjustment gauge
(5) Power cord
(6) Additional weight 2,5 N / 5,0 N
(7) Cross-head screwdriver 153/PH2
(8) Pallet box
(9) Operating instructions Abrasion tester
(10) Operating instruct. Temperature controller
(11) DAkkS-calibration certificate

## 1.3 Delivery, Transport

Immediately after receipt, the completeness and intactness of the shipment must be checked by comparing it with the Delivery Note or the Order Confirmation.

Missing transport boxes must be claimed immediately from the carrier who delivered the goods.

Missing parts must be reported immediately to the manufacturer.

In case of transport damages, the carrier is to be informed immediately in writing and photos of the damaged parts are to be sent to Bareiss.

Damages to the packaging may indicate damages to the abrasion tester.

# 2 Abrasion tester

## 2.1 Overview electronic unit

(1) POWER-Switch (Toggle switch)
(2) Power supply socket
(3) RESET-button (monitored start)
(4) START-button
(5) STOP-button
(6) HEATER- Switch
(7) Temperature display
(8) Temperature controller
(9) Thermal fuse

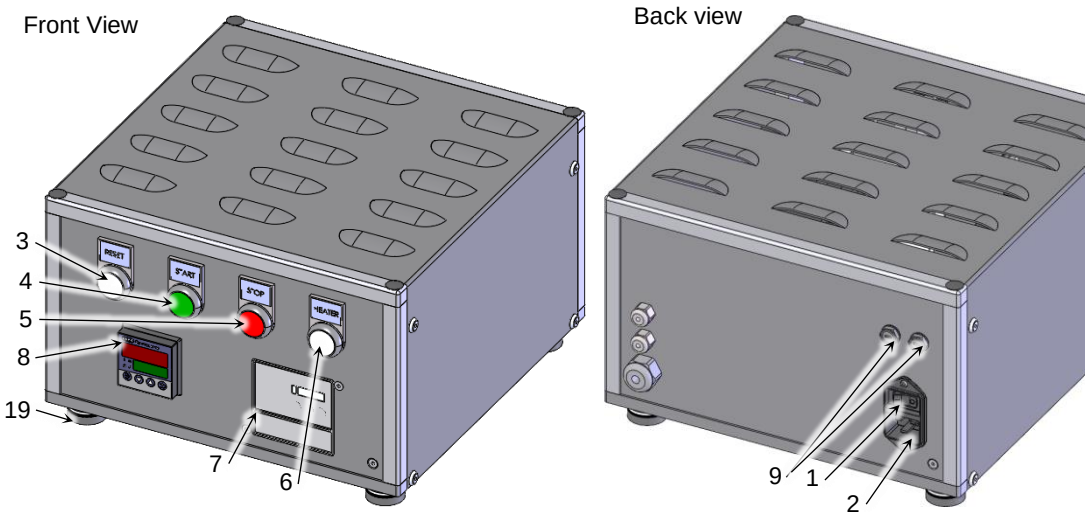



Abb. 1 Overview electronic unit

## 2.2 Overview Abrasion tester

(10) Emergency stop
(11) Protection cover
(12) Specimen holder and weight holder (contact pressure)
(13) Additional weights
(14) Toothed rack
(15) Toothed wheel
(16) Collection tray
(17) Stop
(18) Clamping screw
(19) Knurled foot
(20) Power supply heating module
(21) Infrared sensor
(22) Control signals

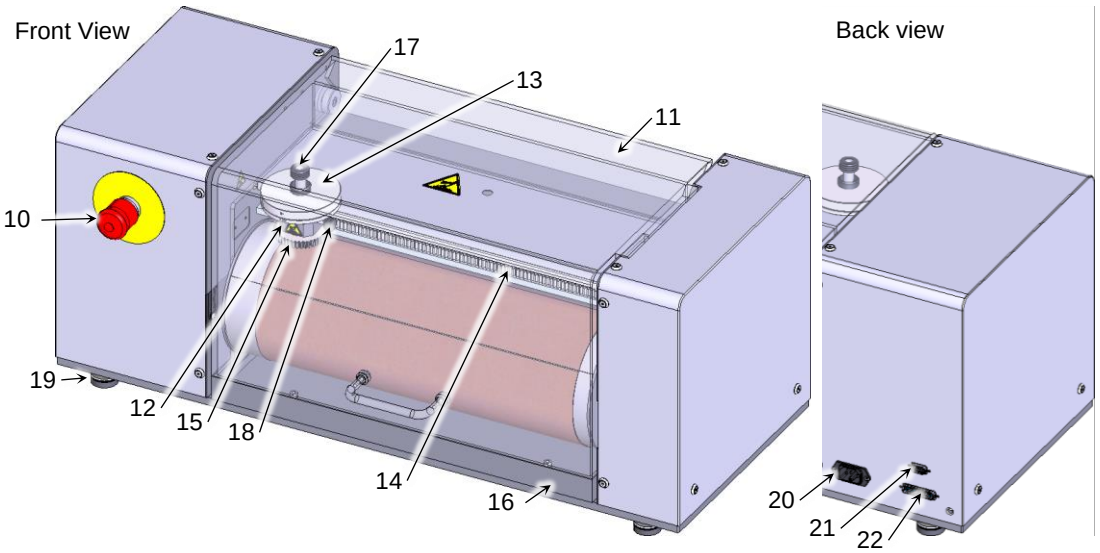



Abb. 2 Overview Abrasion tester

## 2.3 Ranges of application

| Measuring method | Range of application | Standards | Standard sample [mm] |
|---|---|---|---|
| Resistance against abrasion as a result of mechanical action on a surface | Elastomers and thermoplastic elastomers | ISO 4649:2017<br>DIN ISO 4649:2017<br>ASTM D 5963:2017 | Ø 16 x 8 |

## 2.4 Technical Details

| Contact pressure on specimen [N] | Abrasion distance of specimen [m] | Specimen thickness | Diameter of specimen [mm] |
|---|---|---|---|
| 2.5 / 5.0 / 7.5 / 10.0<br>12.5 / 15.0 / 17.5 / 20.0 | 40 / 20 | 6 - 13 | 16 |

## 2.5 Overview of warnings

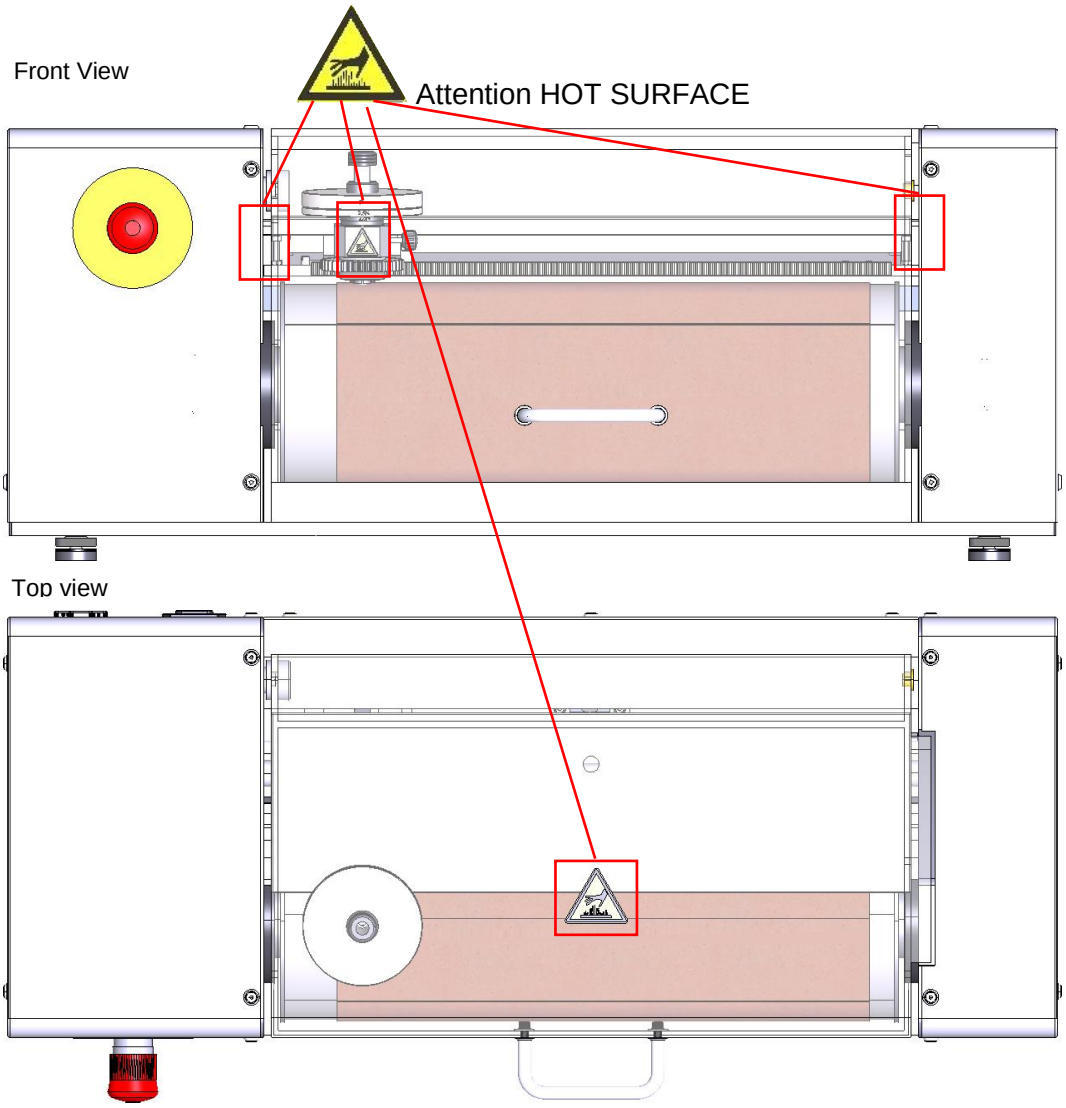



Abb. 3 Overview of warnings

# 3 Start-up

## 3.1 Unpacking

- Loosen the side screws (cross-head screws) of the cover and disassemble the cover of the pallet box.
- Cut all the retaining straps of the cartons in the opened pallet box.
- Take out all separately packed parts.
- For pre-assembly of the leveling feet, place two wooden squared lumber blocks (approx. 50x50 mm) at a distance of approx. 180 mm from each other on a suitable base.

Attention!
The carton with the electronic unit, which is placed on the abrasion tester, is weighing approx. 25 kg!

- Lift the Electronic Unit carefully out of the carton.
- Place the electronic unit on the wooden squared lumber blocks.
- Lift the pallet box a few centimeters in order to reach the transport screws on the bottom of the pallet box.
- Loosen and remove the four fixing screws on the bottom of the pallet box (hexagon socket size 10).
- For pre-assembly of the levelling feet, place two wooden squared lumber blocks (approx. 50x50 mm) at a distance of approx. 460 mm from each other on a suitable base.

Attention!
The abrasion tester has a weight of approx. 50 kg!

- Lift the abrasion tester carefully out of the pallet box.
- Place the abrasion tester on the squared lumbers.
- Keep the packing materials and boxes provided and use them when shipping - you will make the process easier for returns.

## 3.2 Check the contents of the package

Check the delivery for completeness and intactness,
*see "Delivery Note" or "Scope of standard delivery", chapter 1.2, page 3.*

## 3.3 Setting up the abrasion tester and the electronic unit

- Screw the 4 knurled screws (19, Fig. 1) into the threaded holes on the bottom of the abrasion tester.
- Carefully lift one side of the abrasion tester and pull out the wooden squared piece. Proceed in the same way with the other side.

Attention!
Danger of squeezing between the abrasion tester and the base plate when putting down the machine!

- Screw the 4 knurled screws into the threaded holes on the bottom of the electronics unit.
- Align the abrasion tester and the electronic unit with the knurled screws using a water balance.
- Connect the electronic unit with the abrasion tester (20/21/22, Fig. 1).
- Connect the Electronic Unit to the power supply at the power supply socket (2, Fig. 1) using the power cord.
  The abrasion tester is equipped with its own electronic thermal fuses (9) directly at the power supply connection.

English

## 3.4 Setting up with opened protective cover

Only a Tipp operation of the drum with reduced speed is possible.

### 3.4.1 Setting up and exchange of the abrasive test sheet

- Switch on the abrasion tester with the POWER switch (1, Fig. 1) on the rear of the electronic unit.
  The RESET button (3, Fig. 1) lights up white.
- Press the RESET button. A click is to be heard.

Attention!
While the cover is opened, the drum can be driven in Tip operation at a low speed.

**Setting up the abrasive test sheet**

For setting up the abrasion tester with a new abrasive test sheet, it is possible to drive the drum at low speed in tip mode.

- Open the protection cover (11).
- Pivot the specimen holder (12) to the rear.

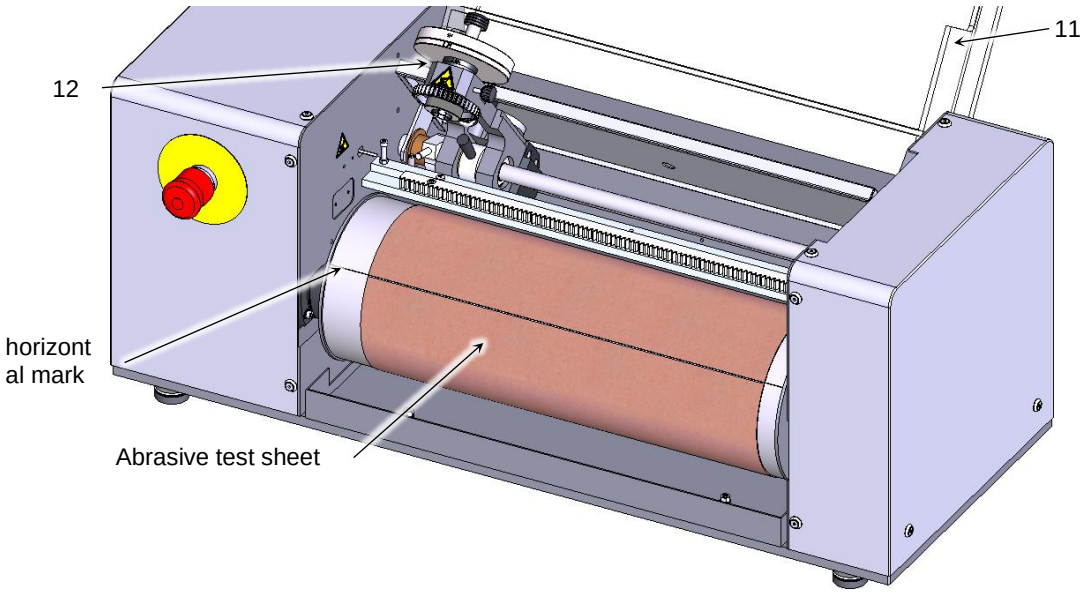



Abb. 4 Setting up and exchange of the abrasive test sheet

Attention!
Danger of squeezing at the cover plate.

The drum is rotated at a reduced speed by tapping the START button (4, Fig. 1) so that the relevant horizontal mark is easily accessible.

- Move the drum in tipping mode until the horizontal mark (butt joint) is reached.
- Glue 3 double-sided adhesive film strips onto the drum centrally positioned above the horizontal markings at a distance of 120° in the length direction.
  The 3 horizontal markings on the drum are for help.
  Be aware of the travel direction on the back of the abrasive test sheet.
- Place the test abrasive sheet aligned with the butt joint and fix it in place by pressing it onto the adhesive tape.
  By tapping the START key, the drum can be rotated step by step.
  The test abrasive sheet must be aligned with the vertical and horizontal markings.
- Keep the test abrasive sheet under tension.
- Move the drum to the next tape and press the test abrasive sheet onto the tape.

- Repeat this step.

Attention!
Danger of abrasion when installing the test abrasive sheet.
It must be ensured that the test abrasive sheet is in contact with the entire drum circumference.
The ends of the test abrasive sheet must not overlap at the butt joint.
The gap between the ends must not exceed 2 mm.

- Pivot the specimen holder to the front.
- Close the protective cover.
- Switch off the abrasion tester.

**Exchange of the test abrasive sheet**

- Open the protection cover (11, Fig. 4).
- Pivot the specimen holder (12, Fig. 4) to the rear.

Attention!
Danger of squeezing at the cover plate.
The drum is rotated at a reduced speed by tapping the START button (4, Fig. 1) so that the relevant horizontal mark is easily accessible.

- Loosen the test abrasive sheet at the butt joint.
- Hold the test abrasive sheet very firmly and rotate the drum by tapping the START button until the entire test abrasive sheet is removed.
- Dispose the test abrasive sheet.
  If the adhesive strips continue to stick, they can be used again.
  The adhesive strips can also be covered with additional adhesive strips.
  If the adhesive strips are uneven or heavily dirty, they must be removed by means of a suitable solvent.
  Then proceed as described under
  *"Setting up and exchange of the abrasive test sheet", chapter 3.4.1, page 7*.

## 3.5 Settings

### 3.5.1 Setting the abrasion distance 20 meters or 40 meters

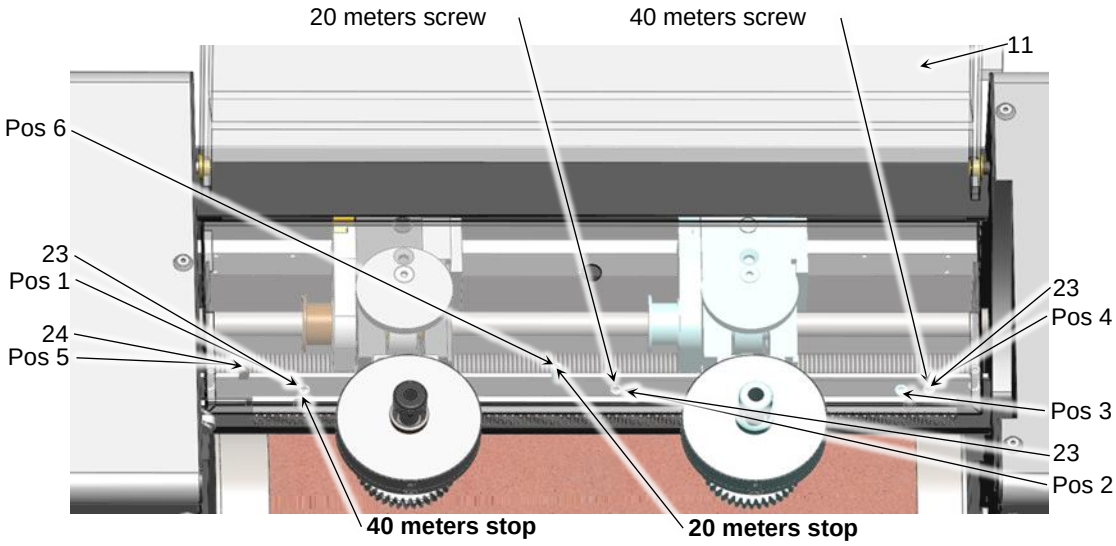



Abb. 5 Setting the abrasion distance 20 meters or 40 meters

The test run is usually stopped automatically after 40 m of friction travel.
In the case of relatively large mass losses (usually more than 400 mg after 40 m of friction travel), the test run may be stopped after about 20 m and the original height of the protruding part of the specimen of 2.0 mm ± 0.2 mm readjusted so that the remaining 20 m of the test run can be completed.
The thickness of the specimen must not decrease below 5 mm at any time.
If the loss of mass is more than 600 mg after 40 m, the friction travel must be reduced to 20 m. This must be noted in the test report.
The mass loss shall be related to 40 m friction travel by multiplication by 2.
The abrasion tester is switched off.

Attention!
Make sure that the stop pin (24) does not block the movement of the specimen grip.
Make sure that the specimen grip is always to the right of the stop pin.

- Open the protection cover.
- Pivot the specimen holder (12, Fig. 4) to the rear.

**Abrasion distance 40 m**

For adjusting the abrasion distance, pan head screws (23) serve as notches which are screwed into the threaded hole accordingly.

- Screw a pan-head screw into the drilled hole (Pos.1).
- Screw a pan-head screw into the drilled hole (Pos.3).
- Screw the stop pin (24) into the drilled hole (Pos.5).
- Pivot the specimen holder to the front.
- Close the protective cover.

**Abrasion distance 20 m**

For an abrasion distance of 20 m, the left or the right half of the test abrasive sheet can be used.

- Using the **left half**, screw the pan head screw into the drill hole (Pos.1) and the other pan head screw into the drill hole (Pos.2).
- Screw the stop pin into the drill hole (Pos.5).
- Using the **right half,** screw the pan head screw into the drill hole (Pos.2) and the other pan head screw into the drill hole (Pos.4).
- Screw the stop pin into the drill hole (Pos.6).
- Pivot the specimen holder to the front.
- Close the protective cover

## 3.6 Setting the specimen holder for Method A or B

For both methods, the result can be expressed as relative volume loss or abrasion resistance index.

### 3.6.1 Method A / fixed test specimens

This procedure separates the toothed rod (14) and the toothed wheel (15).

- Open the protection cover (11).
- Pivot the specimen holder (12) to the rear (12).
- Loosen the 2 screws (23) of the toothed rod at position [B].
- Move the toothed rod above the threaded holes of position [A] and press it against the edge.
- Fasten the toothed rod with the screws at position [A]. Tighten the screws firmly.
- Tighten the clamping screw (18) firmly so that the specimen cannot rotate.
- Move the specimen holder to the start position and pivot the specimen holder down.
- Close the protection cover.

Attention!
In the fixed specimen operating mode, the clamping screw must be tightened.

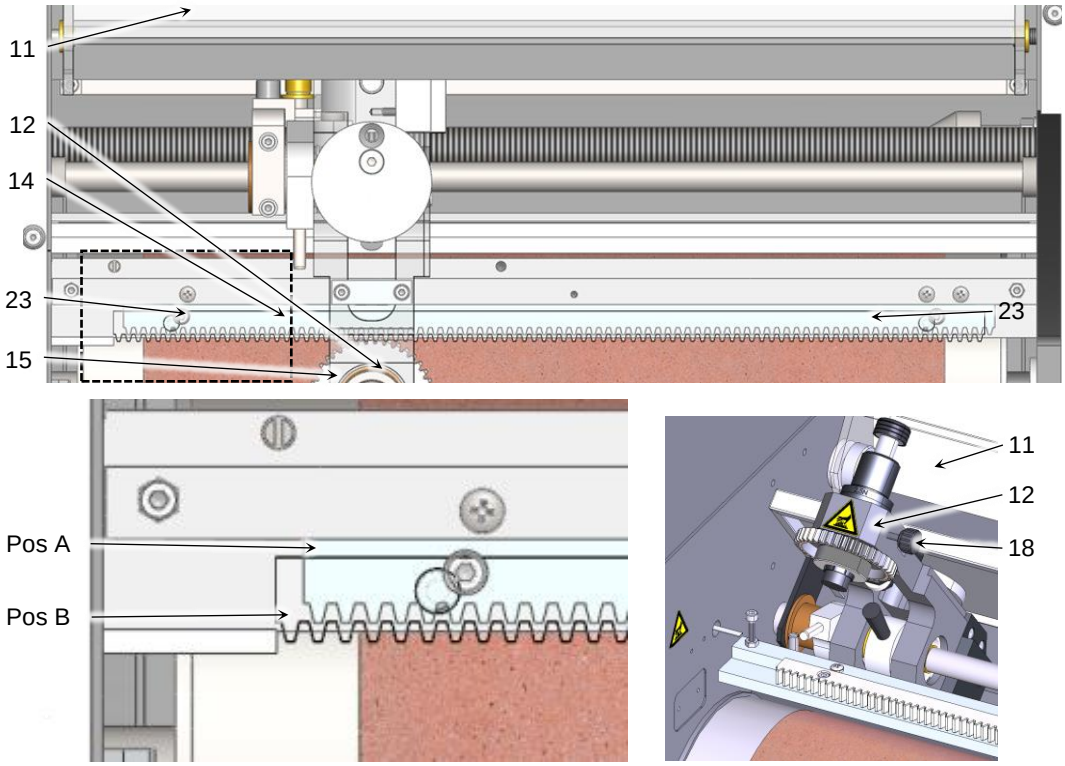



Abb. 6 Setting the specimen holder for Method A or B

### 3.6.2 Method B / rotating test specimen

For this procedure, the toothed rod (14) and the toothed wheel (15) are connected.

- Open the protection cover (11).
- Pivot the specimen holder (12) to the rear.
- Loosen the 2 screws (23) of the toothed rod at position [A].
- Move the toothed rod above the threaded holes of position [B] and fasten it at the front threaded holes.
- Fasten the toothed rod with the screws at position [B]. Tighten the screws firmly.
- Loosen the clamping screw (18), so that the test specimen can rotate.

- Move the specimen holder to the start position and pivot the specimen holder down.
- Close the protection cover.

Attention!
In the operating mode with rotating specimen, the clamping screw must not be tightened.

## 3.7 Setting the contact force

Attention!
According to the standards, the contact force must be maintained constant during the test.
Depending on the specimen, it may be necessary to vary the contact force. Possible combinations can be found in the following table.

| Specimen holder 2,5 N | Additional weight 2,5 N | Additional weight 5 N | Additional weight 10 N (optional) | Contact pressure weight N |
|---|---|---|---|---|
| X | -- | -- | -- | 2,5 |
| X | X | -- | -- | 5 |
| X | -- | X | -- | 7,5 |
| X | X | X | -- | 10 |
| X | -- | -- | X | 12,5 |
| X | X | -- | X | 15 |
| X | -- | X | X | 17,5 |
| X | X | X | X | 20 |

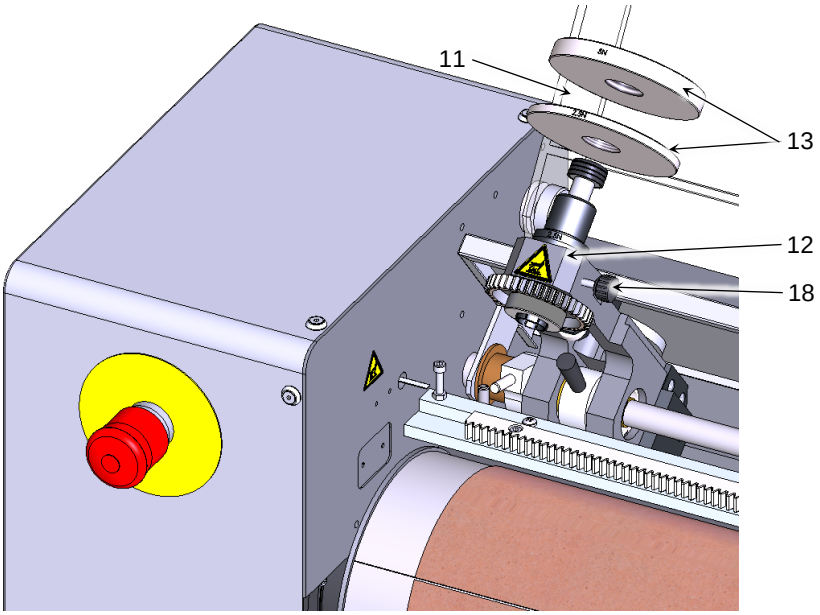



Abb. 7 Setting the contact force

- Open the protection cover (11).
- Fix the clamping screw (18).
- Screw the required additional weights (13) onto the specimen holder (12) as far as possible.
- Close the protection cover.

## 3.8 Preparation of the test specimens

Attention!
The specimens must have a diameter of 16 ±0.2 mm.
The specimen thickness must be at least 6 mm.
Specimens with a minimum thickness of 2 mm shall be glued to each other until a minimum thickness of 6 mm is reached.
A specimen with a thickness < 2 mm is glued to a base specimen with a hardness of 80 IRHD or steel.
A circular cutter is prescribed for the required accuracy.

- Clamp the circular cutting device (25) in a pillar drilling machine.
- Place the cutting pad consisting of an elastomer plate (30) and a cardboard on the table of the pillar drilling machine.
- Place the plate material (29) on the cutting support.
- Switch on the pillar drilling machine.
- Cut a specimen (28) out of the plate material at a speed of 200 - 300 rpm.
  The circular cutter (26) should penetrate the cardboard only a little bit (maximum 1 mm).
  During the cutting out process, the circular cutting knife must be cooled and lubricated with a cooling lubricant (glycerin / water mixture) in order to prevent it from damage.
- Switch off the pillar drilling machine.
- Eject the specimen through the ejection slot (27) using a hex key.

Attention!
Never try to remove the specimen with your fingers - risk of injury from the circular cutter blade.

25 circular cutting device
26 circular cutting knife
27 ejection slots
28 specimens
29 plate material
30 cutting pads

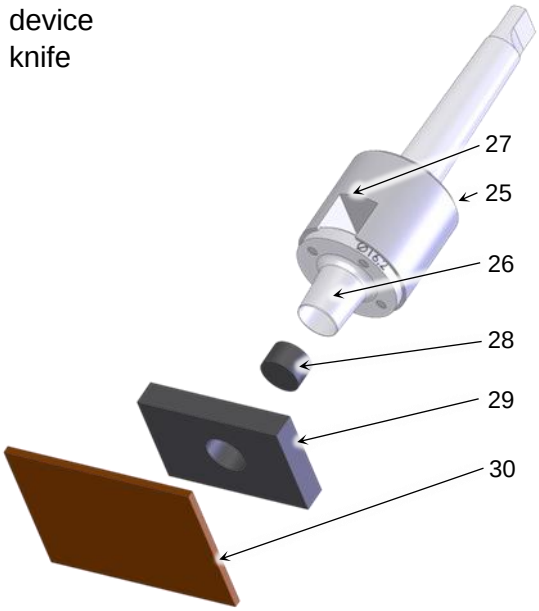



Abb. 8 Preparation of the test specimens

English

## 3.9 Heating module

In addition to the described functions of the standard equipment, the heating module is suitable for heating the drum of the abrasion tester. Via the temperature controller you can put in set temperature. Please take note that it will take some time before the required temperature has fully penetrated the specimen.

Attention!
The abrasion tester may be hotter than its surroundings. Do not place any temperature-sensitive or flammable items onto or into the machine.
Cooling down can take considerably longer than heating up - the abrasion tester does not have any active cooling.

Attention!
If you change the preset parameters of the abrasion tester, you are acting with Gross Negligence and the warranty will be voided.

### 3.9.1 Operating modes and settings of the heating module

**HEATER – Switch turned on (lights white)**

- Switch on the heating module with the POWER button (1, Fig. 1) on the rear side of the electronic unit.
  The RESET-button (3, Fig. 1) lights white.
- Press the RESET-button. A click can be heard.
- Set a temperature setpoint via the arrow keys (31) at the temperature controller (8).
  The set value changes all the faster the longer the button is pressed.
  The value is automatically stored.
  The temperature set value (32) is controlled immediately.
  The actual temperature value (33) informs the operator about the current surface temperature.
  Collect experiences how long the reached actual temperature value must be held after the set value has been reached - in order to ensure the heating or cooling of all parts and the specimen.
- Switch on the heating module with the HEATER switch (6).
  The heating control is active immediately.

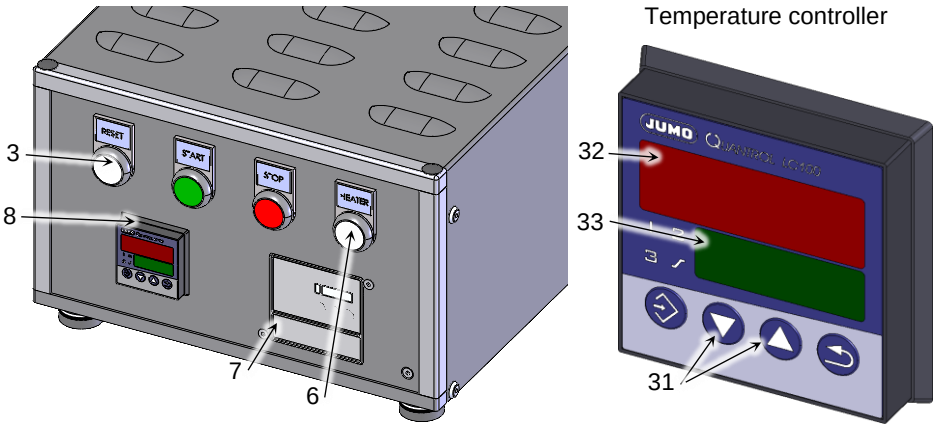



Abb. 9 Additional functions of the operating elements im Heating operation

**HEATER – Switch turned off**

The heating module is switched off and the unit operates as a standard abrasion tester.
If necessary, with the previously heated temperature.

# 4 Abrasion test

## 4.1 Loading and Removing the Specimen

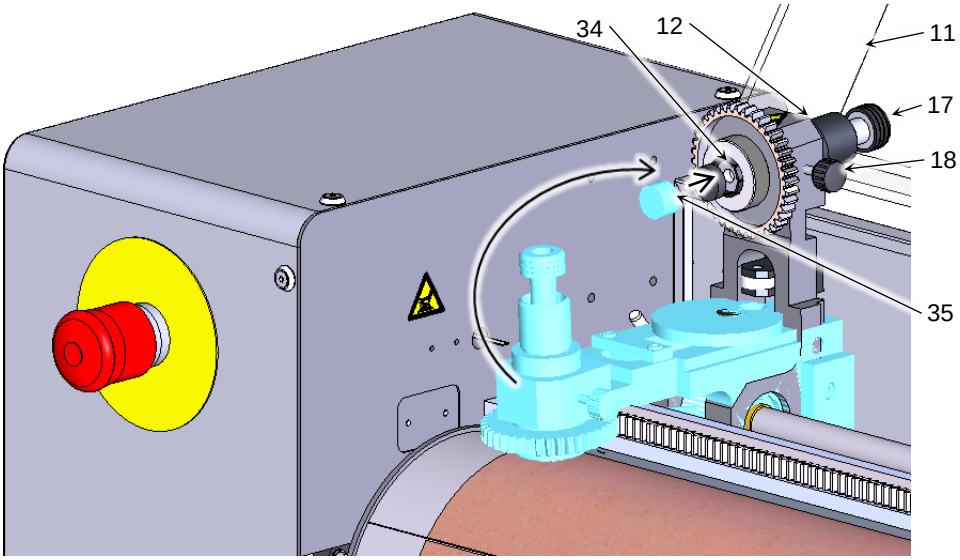



Abb. 10 Loading and Removing the Specimen

Attention!
According to DIN ISO 4649, the abrasiveness of the test abrasive sheet must be determined with a test specimen made of a reference elastomer before and after each test series, *see "Checking the abrasiveness", chapter 4.2.1, page 15*.
Weigh the specimen before and after the abrasion test with an accuracy of 1 mg.

- Open the protection cover (11).
- Pivot the specimen holder (12) to the rear and lower it.
- Place the specimen from the "Standard reference elastomer No. 1 for the fixed specimen" or from the "Standard reference elastomer No. 2 for the rotating specimen" into the adjustment gauge (35) so that it points out of it.
- Insert the specimen into the clamping sleeve (34) until the adjustment gauge is in contact with the clamping sleeve.
- Adjust the stop (17) so that the specimen protrudes 2 mm ± 0.2 mm.
- The adjustment gauge is magnetic and can be fixed on the housing of the abrasion tester.
- Fix the specimen in this position with the clamping sleeve.
- Set the specimen holder to its start position 0 (on the left of the stop) and pivot the specimen holder down.
- Loosen the clamping screw (18) again if required.
- Close the protection cover.

## 4.2 Preparation of the test abrasive sheet

Attention!
According to the standards, the abrasiveness of the test abrasive sheet must be checked with a reference elastomer before and after each series of tests.
A balance with appropriate measuring accuracy, available as an accessory, is suitable for determining the weight of the reference elastomer specimen.
The difference in mass of the reference elastomer specimen before and after the abrasion test is a measure of the abrasiveness of the test abrasive sheet.

### 4.2.1 Checking the abrasiveness

- Set up the abrasion tester according to the standard, for example, with the weight of 10 N, with an abrasion distance of 40 m and with the fixed specimen.

Attention!
For testing the abrasiveness of the test abrasive sheet, the abrasion test must be carried out with the fixed specimen.

- Switch on the electronic unit with the POWER switch (1, Fig. 1) on the rear.
  The RESET button (3, Fig. 1) lights up.
- Press the RESET button. A click can be heard.
- The automatic standard abrasion process can be interrupted after the start at any time by pressing the STOP button (5, Fig. 1).
- Insert the specimen as described in *"Loading and Removing the Specimen", chapter 4.1, page 14*.
- Start the abrasion test with the START button (4, Fig. 1).
  After the selected abrasion distance has been reached, the abrasion testing machine is automatically switched off.
- Open the protection cover (11, Fig. 2).
- Remove the specimen from the specimen holder (12, Fig. 2).
- Weigh the specimen.

Attention!
For abrasion tests, only use test abrasive sheets whose abrasiveness is within the tolerance described in the standard.
Carry out at least three test runs - the average value of the weight measurements is used to evaluate the abrasiveness of the test abrasive sheet.

- Evaluate the determined abrasion of the reference elastomer:
  Abrasion too low: Replace and calibrate test abrasive sheet.
  Abrasion too high: Calibrate test abrasive sheet.

Attention!
Do not carry out tests with a worn or too sharp test abrasive sheet for relevant measurements, otherwise the measured values will be incorrect.

### 4.2.2 Calibration of the test abrasive sheet

This is required if the abrasion is > 220 mg for a fixed specimen or >150 mg for a rotating specimen.
The abrasion range for a fixed specimen - "Method A" is between 220 and 180 mg.
The abrasion range for rotating specimen - "Method B" is between 165 and 135 mg.
Depending on the procedure, set up the abrasion testing machine according to the standard with the weight of 10 N at an abrasion distance of 40 m and with fixed specimen for procedure A or rotating specimen for procedure B.

- Load the abrasion tester with the adjustment steel specimen.
  Using the abrasive steel specimen, the test abrasive sheet is blunted.

Attention!
If necessary, repeat the abrasion test with the reduced load weight of 2.5 N.

- Clean the test abrasive sheet thoroughly.
- Check the abrasiveness of the test abrasive sheet with the reference elastomer, *see "Checking the abrasiveness", chapter 4.2.1, page 15.*
- Clean the abrasion tester after each abrasion test, *see "Cleaning", chapter 6.1.2, page 20.*

## 4.3 Standard operation

- Switch on the electronic unit with the POWER switch (1, Fig. 1) on the rear.
  The RESET button (3, Abb. 1) lights up.
- Press the RESET button. A click can be heard.
  The automatic standard abrasion process can be interrupted after the start at any time by pressing the STOP button (5, Fig. 1).
- Insert the specimen as described in *"Loading and Removing the Specimen", chapter 4.1, page 14*.
- Start the abrasion test with the START button (4, Fig. 1).
  After the selected abrasion distance has been reached, the abrasion testing machine is automatically switched off.
- Open the protection cover (11, Fig. 2).
- Remove the specimen from the specimen holder (12, Fig. 2).
- Set the sample holder back to its start position 0 (to the left of the stop).
- Close the protection cover.
- Switch off the Electronic Unit at the POWER switch.

Attention!
The abrasion tester must be cleaned after each abrasion test,
*see "Cleaning", chapter 6.1.2, page 20*.

### 4.3.1 Standard function of the Operating panels

**POWER-Switch O I** The toggle switch (1) is for switching the electronic unit on and off.

**RESET-button** The Illuminated RESET button (3) indicates the status of the electronic unit (On / Off).

**STOP-button** The STOP button (5) can be used to STOP any automatic abrasion test operation immediately.

**START-button** The START button (4) is used to start various processes in relation to the drum drive, depending on the operating mode.

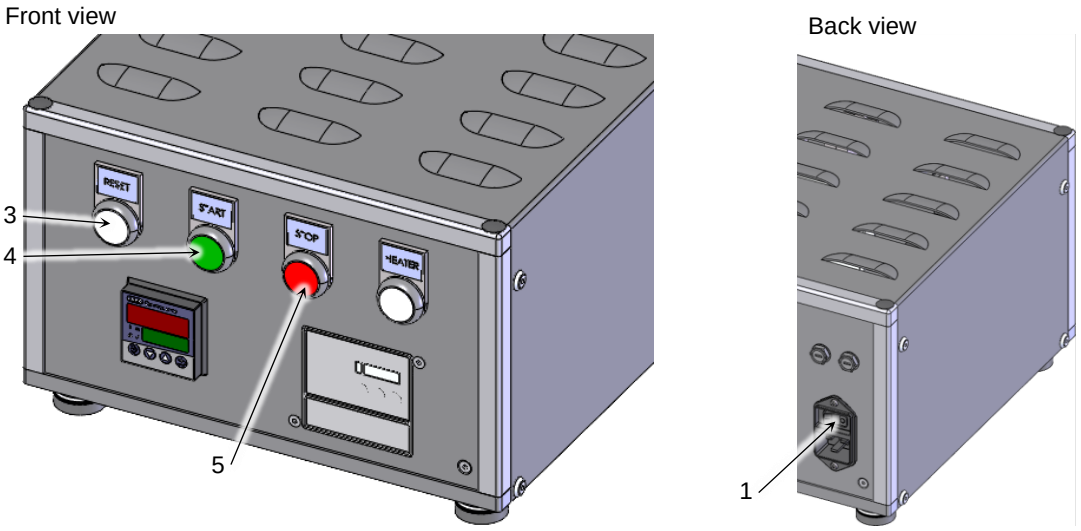



Abb. 11 Standard function of the Operating panels

## 4.4 Heating operation

Attention!
If the HEATER switch (6, Fig. 1) is illuminated, the abrasion tester is in the heating mode.
Note that only the drum temperature is controlled - heating up the abrasion tester or specimen may take a considerably longer time.

- Setting the heating module,
  *see "Operating modes and settings of the heating module", chapter 3.9.1, page 13*.
  Wait until the required temperature is reached.
  The automatic abrasion test with heating, is working like the standard operation of the abrasion test, *see "Standard operation", chapter 4.3, page 16*.

### 4.4.1 Additional functions of the operating elements

| | |
|---|---|
| **HEATER-Switch** | the HEATER switch (6) activates the temperature control of the abrasion tester. |
| **Temperature controller** | the actual value and the set value are displayed on the temperature controller (8). |

# 5 Calculation

The results may be expressed either as relative volume loss or as abrasion resistance index.
The average value of the mass losses of the tested elastomer, $\Delta m_t$, and the reference elastomer, $\Delta m_r$, is calculated on the basis of separate analyses.

## 5.1 Relative Volume Loss, $\Delta V_{rel}$

The relative volume loss, $\Delta V_{rel}$, in mm³, is defined by the following formula:

$$\Delta V_{rel} = \frac{\Delta m_t \times \Delta m_{const}}{P_t \times \Delta m_r}$$

| | |
|---|---|
| $\Delta m_t$ | the mass loss of the tested elastomer, in mg |
| $\Delta m_{const}$ | the defined mass loss of the reference elastomer, in mg |
| $P_t$ | the density of the tested elastomer, in mg/mm³ |
| $\Delta m_r$ | the mass loss of the reference elastomer, in mg |
| Comment: | The Standard reference elastomer No. 1 is usually used in the relative volume loss specification. |

The average value of the relative volume loss must be calculated.

## 5.2 Abrasion resistance index $I_{AR}$

The abrasion resistance index ARI, $I_{AR}$, in %, is defined by the following formula:

$$I_{AR} = \frac{\Delta m_r \times P_t}{\Delta m_t \times P_r} \times 100$$

| | |
|---|---|
| $\Delta m_r$ | the mass loss of the reference elastomer, in mg |
| $P_r$ | the density of the reference elastomer, in mg/mm³ |
| $\Delta m_t$ | the mass loss of the tested elastomer, in mg |
| $P_t$ | the density of the tested elastomer, in mg/mm³ |

The average value of the abrasion resistance index must be calculated.

# 6 Maintenance

It is recommended that the abrasion tester is carefully inspected and maintained.

Attention!
Do not use a damaged or dirty abrasion tester - the measuring results may be incorrect.

During the maintenance, which can be carried out by the user, the following work is possible:

- Carry out a regular cleaning of the abrasion tester,
  *see "Cleaning", chapter 6.1.2, page 20*.
- Make a visual inspection for damages and function of the abrasion tester.
- Contact the manufacturer if the abrasion tester shows signs of damage or malfunction, *see "Contact details", last page.*

## 6.1 Lubrication schedule, cleaning and test abrasive sheet

### 6.1.1 Lubrication schedule

Attention!
A proper lubrication of the abrasion tester requires prior cleaning of the components.
For proper lubrication of the components, use the lubricant AVIA RSU slideway oil.

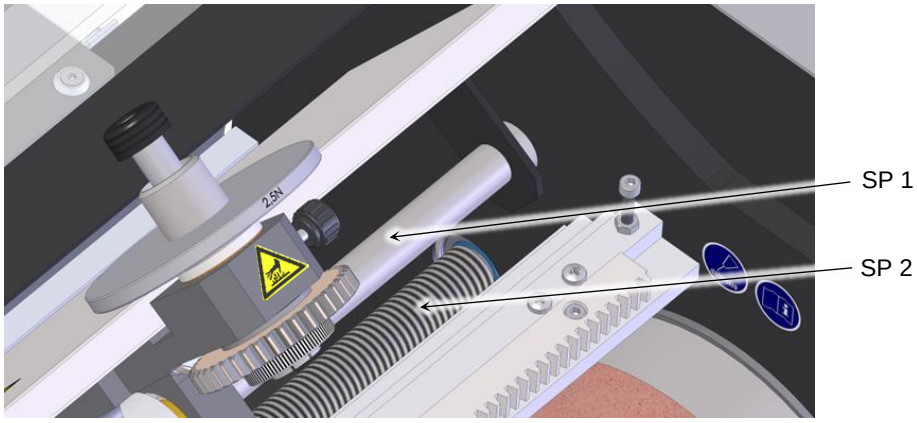



Abb. 12 Lubrication schedule

| No. | Description | Lubricant (Type) | Interval |
|---|---|---|---|
| SP 1 | Guiding shaft | AVIA RSU slideway oil | 1 week<br>or if needed |
| SP 2 | Spindle | | |

Attention!
Remove all excess lubricant and drips immediately and clean the abrasion tester.

### 6.1.2 Cleaning

Attention!
All cleaning work must only be carried out on the abrasion tester when switched off.
Defective electrical components may be under voltage and therefore life threatening.
The abrasion tester must not be cleaned wet.

Attention!
If the abrasion tester was in the heating mode before the cleaning work, parts of the machine may be hot, danger of burning.

- The abrasion tester must be cleaned after each abrasion test.
  In order to allow an easier removal of larger quantities of abrasion dust, the collecting tray is removed while the protection cover is open.
- The whole abrasion tester must always be cleaned - it is by no means sufficient to clean only the collection tray.
- Only mild cleaning agents should be used for cleaning the abrasion tester in order to avoid surface damages.
- Use a soft plastic brush or paint brush for cleaning the test abrasive sheet.
- The cleaning cloth must be soft and lint-free.
- Clean the periphery around the abrasion tester, too.

Attention!
The use of alcohol, gasoline, thinner or other highly flammable substances can lead to fires.

- After the cleaning has been carried out, inspect the entire device for damages.

**Cleaning of pyrometer**

- Loosen the screws (34) of the cover plate (35) and disassemble it.
- Keep the screws and the cover plate in a suitable place.
- Carefully brush off the dust from the pyrometer.

Attention!
Do not use cleaning agents.

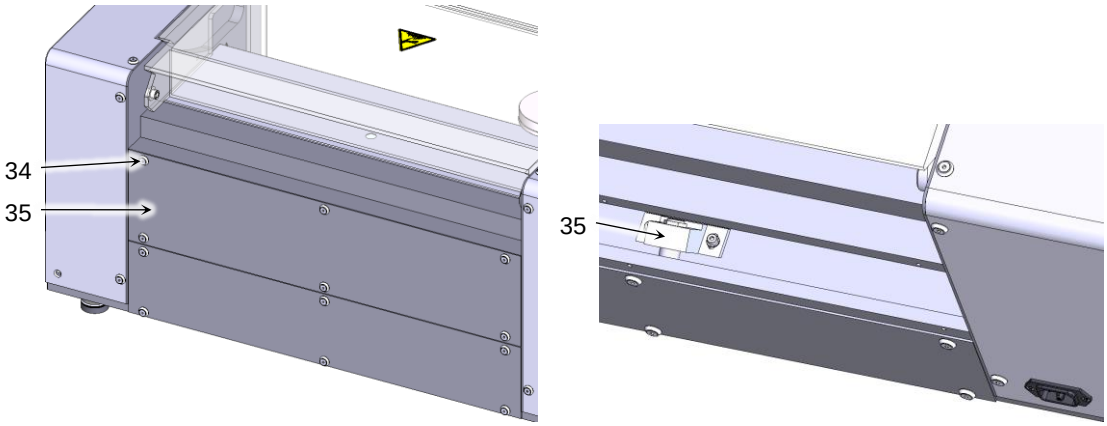



Abb. 13 Cleaning of pyrometer

### 6.1.3 Setting up and exchange of the abrasive test sheet

*see "Setting up and exchange of the abrasive test sheet", chapter 3.4.1, page 7.*

# 7 Procedure for troubleshooting

| Malfunction | Cause | Procedure |
|---|---|---|
| The abrasion tester shows no reaction or only a short reaction when switched on | No power supply | Check power supply |
| | | Check fuse |
| | | Plug in power cord |
| | Cable fracture of the connecting cable between the electronic unit and the drum unit | Visual inspection of the electrical connections |
| Electrical stroke | Humid environment | Do not operate in a humid environment between |
| Burning on the hot drum | Pyrometer dirty (due to abrasion particles) | *see "Cleaning the pyrometer", chapter 6.1.2, page 22* |
| | Malfunction of the power part of the heater | Contact the manufacturer |
| | Malfunction of the temperature controller | Contact the manufacturer |
| | Pyrometer measures too low temperature | If necessary, check the position and dirtiness of the pyrometer, contact the manufacturer. |
| | Pyrometer has fallen out | Contact the manufacturer |
| Abrasion test is faulty | The specimen is placed incorrectly | *see "Loading and Removing the Specimen", chapter 4.1, page 14* |
| The abrasion is higher than required | The abrasiveness of the test abrasive sheet is too high | Reduce the abrasiveness with steel sample |
| | The contact pressure is too high (applied weights) | Reduce the weight accordingly |
| The abrasion is lower than required | The abrasiveness of the test abrasive sheet is too low | Replace the test abrasive sheet |
| | The contact pressure is too low (applied weights) | Increase the weight accordingly |
| The abrasion is irregular | The test abrasive sheet is dirty | Remove remaining material from the test abrasive sheet |
| The abrasion is faster than required | Position screw is not attached at 20m | Check position screw and attach it at 20 m |
| The abrasion is slower than required | Position screw is attached at 20m | Check position screw and attach it only at 40 m |
| The specimen rotates | The toothed rod is not positioned correctly | Re-position the toothed rod (direction " rear ") *see "Method A / fixed test specimens", chapter 3.6.1, page 10.* |
| The specimen does not rotate | The toothed rod is not positioned correctly | Re-position the toothed rod (direction "front") *see "Method B / rotating test specimen", chapter 3.6.2, page 10.* |
| High friction noises are audible. | The specimen is not clamped. | Stop abrasion test |
| | | Clamp the specimen |
| | The maintenance is bad | Follow the maintenance instructions |

- If the listed procedures do not eliminate the malfunction, the maintenance of the abrasion tester is necessary.
- If you have any questions about service and troubleshooting, please contact the company Bareiss Prüfgerätebau GmbH by phone, fax or e-mail, *see "Contact details", last page*.

English

# 8 Disposal and Return

## 8.1 Disposal

Please dispose of recyclable materials in an environmentally friendly manner. Old devices can be disposed of via suitable recycling collection points.
Please note that electrical / electronic parts (e.g., cables, boards) must be must be disposed of separately.
The plastic packaging tape, steel fixing clip, the foil, the foam and the plastic cable binders can be recycled.
If you do not recycle yourself, the manufacturer of the equipment will do it for you. Send us your device with the note " Recycle this device".

## 8.2 Info for Return

- The abrasion tester must be tested extensively before being returned, e.g., a defect or malfunction could be existing.
- For repair or calibration works the shipment of the complete abrasion testing machine is necessary.
- If you have any questions, you can contact us by phone / fax / e-mail at any time.
- In order to avoid further questions, a precise error description as well as the S/N are necessary.
- The manufacturer does not accept any responsibility and is not liable for incidents resulting from non-compliance with or disregard of the operating instructions.
- If the original packing materials and boxes are not used for transport, this can lead to considerable transport damages.
- For returns, please use the "Service Form" available for you to download from our website.

# 9 Technical Data and Accessories

## 9.1 Technical Data

| | | |
|---|---|---|
| **Abrasion Tester** | | |
| Dimensions of the specimen | Ø16 mm x 6 mm bis Ø16 mm x 15 mm | |
| Clamping length of specimen | Maximal 13 mm | |
| Contact pressure on specimen (Standard) | 2,5 N; 5,0 N; 7,5 N; 10,0 N | |
| Abrasion distance or Rotations of the drum | - 20 m / 42 U - 40 m / 84 U | |
| RPM of the rotating specimen | 0,9 U/min | |
| RMP of the drum | 40 U/min | |
| Feed rate | 4,2 mm/U | |
| Peripheral speed | 0,32 m/s | |
| Inclination angle of the specimen holder | 3° | |
| Diameter of the drum | 150 mm | |
| Width of the drum | 460 mm | |
| Protection class | IP 20 | |
| **Power supply** | | |
| Standard<br>Input Electrical Connection Data (Operation) | 230 V<br>50 Hz<br>16 A | |
| Heating module of Abrasion Tester<br>Input Electrical Connection Data (Operation) | 230 V<br>50 Hz<br>16 A | |
| **Test abrasive sheet** | | |
| Dimensions in mm | 472,5 (-0/+2) x 400,0 | |
| Grain size | 60 | |
| **Additional weight 10 N** | | |
| Contact pressure on specimen | 12,5 N; 15,0 N; 17,5 N; 20,0 N | |
| | **Dimensions (WxDxH) in mm** | **Weight in kg** |
| Abrasion Tester | 790 x 315 x 325 | ca.55 |
| Electronic unit | 312 x 320 x 210 | ca.25 |
| Pallet Box | 830 x 630 x 610 | 14 |

English

## 9.2 Accessories, Spare parts, Devices

| Description | Article number |
|---|---|
| **Accessories** | |
| Reference elastomer No. 1 (Method A)<br>SO 4649, ASTM D 5963 (DIN 53516); 181 x 181 x 8 mm, 365 g | k57-00001 |
| Reference elastomer No. 2 (Method B)<br>ISO 4649, ASTM D 5963 (DIN 53516); 181 x 181 x 8 mm, 333 g | k57-00002 |
| Circular cutting device - Morse taper shaft MK2<br>- Circular cutting knife Ø 16,2 mm | fm05004 |
| Circular cutting device - Clamping shaft Ø 10 mm<br>- Circular cutting knife Ø 16,2 mm | fm05004-1 |
| Abrasion steel sample | fm00514 |
| Adjustment gauge | 12002070 |
| Additional weight10 N | fm05006 |
| Vacuum cleaner with adapter for vacuum cleaner connection (cleaning device) | fe05005 |
| Vacuum cleaner connector - mechanics (cleaning device)<br>with cleaning brushes 1 set of 10 | fm05007 |
| Electronic precision balance | On demand |
| Dust cover for abrasion tester | k52-00105 |
| **Spare parts** | |
| Set of test abrasive sheets and special tape<br>5 sheets à 474 x 402 mm<br>1 roll 50 x 0.1 mm for fixing the test abrasive sheet | fm05002 |
| A set of Test abrasive sheets untested<br>5 sheets of 474 x 402 mm | fm05015 |
| Special tape<br>1 roll 50 x 0,1 mm for fixing the test abrasive sheet | k28-00050 |
| Cleaning brushes<br>1 set of 10 pieces | k29-00001 |
| Thermal fuse of Abrasion Tester T 3,15 A; 6,3 x 32 mm | k11-04179 |
| Additional weight 2,5 N | 11018146 |
| Additional weight 5 N | 11018147 |
| Circular cutting knife Ø 16,2 mm | k68-05000 |
| **Optional Abrasion Tester** | |
| Abrasion tester with tempered drum | fe05006 |
| Abrasion tester Standard | fe05000 |
| Abrasion tester with connection for the vacuum cleaner for automatic vacuum cleaning | fe05000-01 |

# 10 Warranty and Guarantee

For the duration of the warranty, please have a look at our GTC's. (www.bareiss.de)

Attention!
No warranty claim can be made for damages or defects caused by:

- Improper handling, e.g., during transport, operation, connection and start-up
- Improper use
- Carelessness
- Disregard of the operating instructions
- Disregard of the maintenance instructions
- Interventions on the abrasion tester by unauthorized persons
- Removing the type plates

English

# 11 EU-Conformity

## EU – Declaration of conformity

according to the

| | | | |
|---|---|---|---|
| EU- Measuring equipment Directive | 2014/32/EU | EU-Abl. L 96/149 | of 26.02.2014 |
| EC Machinery Directive | 2006/42/EC | EU-Abl. L 157/24 | of 09.06.2006 |
| Low voltage Directive | 2014/35/EU | EU-Abl. L 96/357 | of 29.03.2014 |
| EMC DIRECTIVE | 2014/30/EU | EU-Abl. L 96/79 | of 29.03.2014 |
| RoHS 2 Directive | 2011/65/EU | EU-Abl. L 174/88 | of 01.07.2011 |

**Manufacturer and address:** Bareiss Prüfgerätebau GmbH
DAkkS-Kalibrierlaboratorium
Breiteweg 1
DE-89610 Oberdischingen

**Authorized person for documentation:** Mr. Harald Glöggler, see address of the manufacturer

**Product designation:** **Abrasion tester**

**Type:** **Standard**
**Standard with tempered drum**

**Serial No.:** see Type plate

We herewith confirm that the above-mentioned device has been developed, designed and manufactured in accordance with the guidelines, mentioned in this declaration.

National standards and specifications applied:

| | |
|---|---|
| DIN EN ISO 12100:2011 | Machinery safety -<br>General principles for design -<br>Risk evaluation and Risk reduction |
| DIN EN 61010-1:2011 | Safety requirements for electrical measuring, control, regulation and laboratory equipment -<br>Part 1: General requirements |
| DIN EN 61326-1:2013 | EMC requirements for electrical measuring, control and laboratory equipment<br>Part 1: General requirements |

Bareiss Prüfgerätebau GmbH
Oberdischingen — Place

2020-12-04 — Date

H. Glöggler

Harald Glöggler
Authorized person for documentation

# List of Figures



English

## IMPRESSUM

**Bareiss Prüfgerätebau GmbH**
**DAkkS-Calibration Laboratory**
Breiteweg 1
89610 Oberdischingen
Germany
Fon: +49 7305 96 42-0
Fax: +49 7305 96 42-22
info@bareiss.de | www.bareiss.de

**Bareiss Shanghai Limited**
Room B503
No. 268 Tongxie Rd.
Changning District
Shanghai 200335
China
Fon: +86 21 6887 5055
china@bareiss.cn | www.bareiss.cn

**Bareiss USA Inc.**
8 Glenn Willow Drive
Suite 2
Asheville, NC 28704
USA
Fon : +1 828 301 3729
Fax : +1 828 676 3719
info@bareiss-usa.com | www.bareiss-usa.com

Deutsche Akkreditierungsstelle D-K-15206-01-00