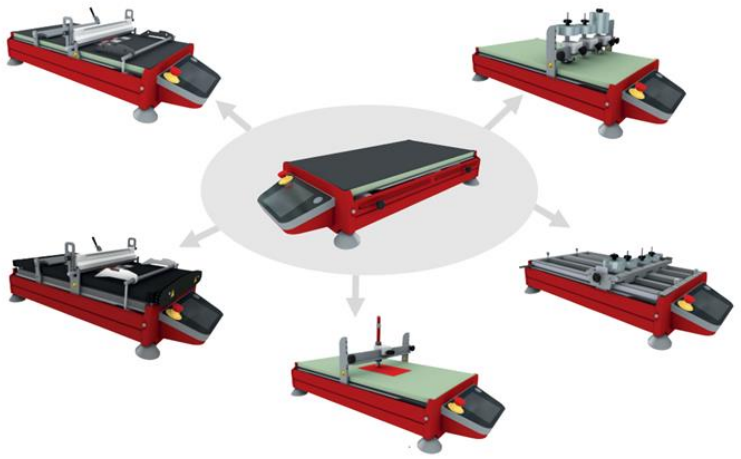
SCREENING EAGLE | proceq

ZAA2600

Versions
ZAA2600.A, ZAA2600.HA
ZAA2600.C
ZAA2600.SW

Automatic Film Applicator and Testing System

Instruction Manual



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Revision History

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1.5	Sept 23, 2021	PEGG Release version
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Content

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The content of this document is intellectual property of Proceq SA and prohibited to be copied neither in a photomechanical or electronic way, nor in excerpts, saved and/or be passed on to other persons and institutions.

The features described in this instruction manual represent the complete technology of this instrument. These features are either included in the standard delivery or available as options at additional costs.

Illustrations, descriptions as well as the technical specifications conform to the instruction manual at hand at the time of publishing or printing. However, Proceq SA policy is one of continuous product development. All changes resulting from technical progress, modified construction or similar are reserved without obligation for Proceq to update.

Some of the images shown in this instruction manual are of a pre-production model and/or are computer generated; therefore the design/features on the final version of this instrument may differ in various aspects.

The instruction manual has been drafted with the utmost care. Nevertheless, errors cannot be entirely excluded. The manufacturer will not be liable for errors in this instruction manual or for damages resulting from any errors.

The manufacturer will be grateful at any time for suggestions, proposals for improvement and references to errors.

Damages during carriage

On receipt of the goods, check for any visible damages on the packaging. If it is undamaged you may sign the receipt of the goods. If you do suspect by visual inspection that damage has occurred, make a note of the visible damage on the delivery receipt and request the courier to countersign it. Moreover, the courier service must be held responsible for the damage in writing.

If a hidden damage is discovered while unpacking, you have to inform and hold the courier liable immediately in the following way: “When opening the parcel we had to notice that … etc.“ This superficial checking of the goods has to be done within the time limit set by the carrier, which is normally 7 days. However, the period could vary depending on the courier. Hence, it is recommended to check the exact time limit when receiving the goods.

If there are any damages also inform your authorized Proceq agent or **Proceq SA** immediately.

Shipment

Should the device be transported again, it must be packaged properly. Preferably use the original packaging for later shipments. Additionally, use filling material in the package to protect the device from any shock during carriage.

To protect persons and the apparatus, proper care must be taken when lifting or carrying it. It is recommended to hold and carry the product on both sides of the housing. Always remove the glass plate / heating plate before lifting or tilting the device.

1 Safety notes

1.1 Symbols used

This note comprises instructions needed to follow directions, specifications, proper working procedure and to avoid data loss, damage or destruction of the instrument.

This note signifies a warning about dangers to life and limb if the apparatus is handled improperly. Observe these notes and be particularly careful in these cases. Also inform other users on all safety notes. Besides the notes in this instruction manual the generally applicable safety instructions and regulations for prevention of accidents must be observed.

1.2 Safety notes and hints

It is strictly forbidden to open the housing of the product. If not observed, all the guarantee and liability claims to Proceq SA will be void.

Place the device on a solid, even surface before operation.

Ensure that the separator (power socket) is accessible and that the instrument can be separated from the power supply at any time.

Never touch any moving parts during operation.

The side panels must always be mounted during operation.

Always wear safety glasses during operation.

Only connect the product to alternating current of a voltage of 100 – 240 V at 50 to 60 Hz. The voltage must correspond to the information given on the identification plate of the apparatus. The device may only be connected to sockets with a protective earth conductor.

Never use a damaged power cable. Only use power cable with protective earth conductor. Removable power cables must not be replaced by an insufficiently rated power cable. Only use the power cable provided by the manufacturer.

The product is constructed in accordance with the state of the art and is safe in use. However, dangers may arise from this apparatus if it is used improperly or used otherwise as intended by the manufacturer.

Depending on the coating material used, the test may only be carried out in a ventilated environment.

Das product is a multi-function device and is exclusively intended for use in various functions defined in this manual. Any other use is considered as being not in accordance with the intentions of the manufacturer and is conducted at the user's own risk. The manufacturer is not liable for any resulting damages.

Always unplug the power cable before assembling and/or converting the unit.

Every person operating or maintaining the product must have read and understood this instruction manual in its entirety, in particular the safety precautions and warnings.

Unauthorized modifications and changes of the product are not permitted.

Reproduction without permission is not allowed.

Before lifting or moving the apparatus, the glass plate must be removed to reduce the total weight. Tilting the device can lead to falling out of the glass plate.

All maintenance and repair not explicitly allowed and described in this manual, shall only be carried out by Proceq SA or an authorized Proceq partner, failure to comply voids warranty.

- **Proceq SA** refuses all warranty and liability claims for damages caused by usage of the product in combination with **non-original accessories**, or accessories from 3rd party suppliers.
- All local safety regulations apply for the operation of the product.

The following warning symbols can be seen on the device:

Danger of hand injury: Hands can be bruised, or otherwise injured.

Danger of electric shock

Risk of burning on hot surfaces. Touching such marked surfaces is prohibited.

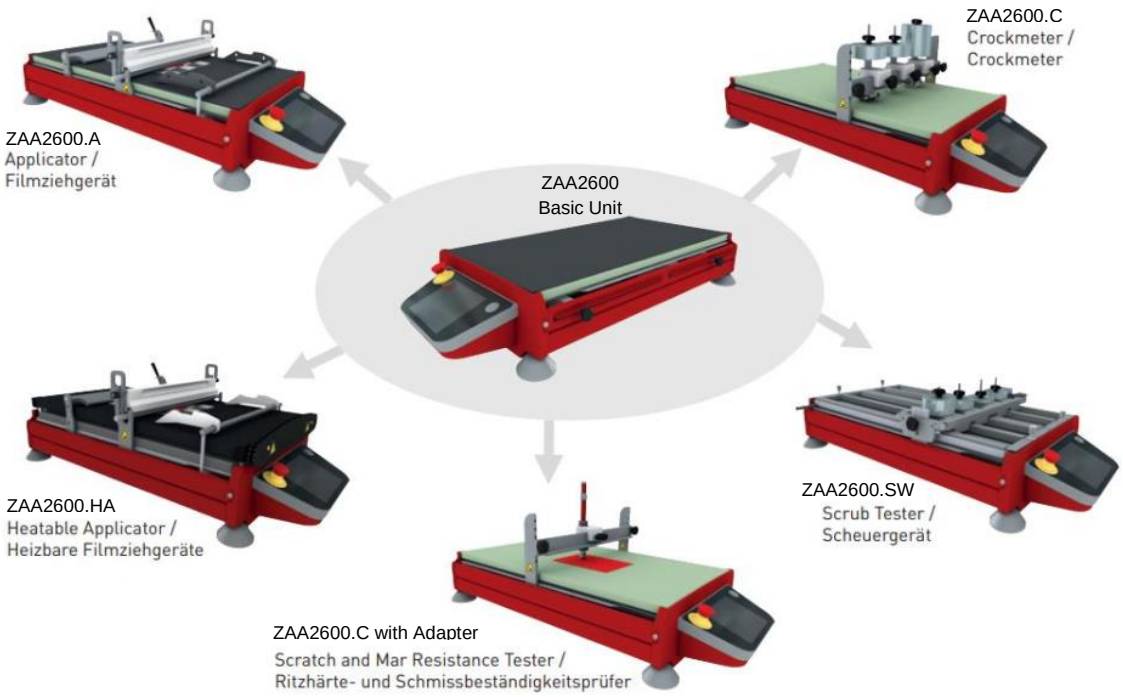
Risk of inflammation of substances through heat (heating plate).

2 Introduction

2.1 ZAA2600 – Automatic film application and testing system

The ZAA 2600 is an automatic laboratory equipment, with a high degree of flexibility.

Due to its modular setup, the ZAA2600 can be used as an automatic film applicator or an automated test system for linear abrasion tests (Crockmeter, Scrub Tester) and scratch resistance tests.



A touchscreen allows easy use and configuration for accurate and reproducible application of coating materials, adhesives and similar products with almost all film applicators.

It also allows a flexible and easy definition of the test setup.

2.2 Film application

Films with constant and well-defined thickness are a precondition for testing and analysis of coating materials and coatings. The properties of these materials and films are dependent on the film thickness.

It is important to notice, that the maximal achievable wet film thickness is not equal to the gap height selected on the application for physical reasons.

The following can serve a guideline for the selection of the gap height:

Gap height	Wet film thickness
15 µm – 100 µm	Approx. 50% of the gap height
100 µm – 300 µm	Approx. 60% of the gap height
300 µm – 500 µm	Approx. 80% of the gap height
More than 500 µm	Up to 90% of the gap height

For the selection of the appropriate gap height please also consider that the dry film thickness can be less than the wet film thickness. This is depending on the weight content of solids.

Various applicators with variable an fix gap heights are available as accessories.

2.3 Film Testing

The ZAA 2600 is an automatic linear abrasion tester with touchscreen and stepless adjustable stroke length for reproducible abrasion testing.

2.3.1 Crock Testing

Crock testing an internationally recognized test method to simulate the rubbing action generated by a human finger and forearm. Crock testing is used to evaluate the amount of color transferred from surfaces on a specific to other surfaces by rubbing.

Crock Testing methods are used to determine various surface parameters, such as

Colour fastness to rubbing (e.g. of textile material): refers to resistance criteria of a colour of a test sample against rubbing with another material. These criteria are resistance to change of colour characteristics and resistance of its colourants to adjacent material (transfer).

Abrasion resistance is the ability to withstand the frictional forces attempting to remove the surface material.

Resistance of solvents refers to a test method which compares amount of coating, which remains after a predefined number of rubbing strokes with a solvent applied on the material.

2.3.2 Scrub Testing

Scrub resistance is the ability of a dried paint film to resist wearing or degradation.

A scrub tester is used to generate a repeatable abrasion on the device under test. The degree of wear or degradation can then be visually assessed. Alternatively, the weight loss of the device under test can be determined.

ASTM test methods governing scrub resistance testing define the scrubbing with a nylon brush or cloth for a set number of cycles of washing/cleaning when using a nonabrasive or abrasive cleaning media as outlined in the methods, or another cleaner specified by the end user; i.e., common household cleaners.

2.3.3 Versions and features

Thanks to its modular construction, the automatic universal unit can be equipped with different kits for carrying out film applications, as well as scrub resistance testing, washability tests, crocking and scratch resistance tests.

The ZAA2600 is available in various configurations. Film applicators heatable or non-heatable, automatic crock tester, automatic scrub tester.

Applicators		ZAA2600.A	Automatic film applicator
		ZAA2600.HA	Automatic film applicator with heatable plate
Testers		ZAA2600.C	Automatic Crock Tester The ZAA 2600 is an automatic linear abrasion tester with touchscreen and stepless adjustable stroke length for reproducible rubbing tests Can also be used for scratch and mar testing using the ZHT2093 (Adapter required)
		ZAA2600.SW	Automatic Scrub Tester

2.4 Modification sets

As the ZAA2600 is a modular film application and testing system. Any ZAA2600 can be modified and expanded.

The following modification sets are available

ACC1284	modification set „Heatable Application“	
ACC1285	modification set „Crockmeter“	
ACC1286	modification set „Scrub Tester“	

2.5 Key Features

The ZAA2600 film application and testing system has the following features:

- Thanks to its modular construction, the automatic universal unit can be equipped with different kits for carrying out also scrub resistance, washability, crocking and scratch resistance tests as well as recording of the drying time.
- Upgrade can be achieved at any time by simply purchasing an add-on kit
- Scalability ensures upgrade possibility after initial purchase without returning the equipment.
- Easy to use.
- Compact design saves counter space.

ZAA2600.A/ZAA2600.HA Features

- Storage of various application profile settings such as application length and drawing speed.
- Adjustable application area with moveable start and stop positions.
- Reproducible, operator independent results.
- Optional modification set with special isolation for use with heatable vacuum plates or heating plates.
- Double sided glass plate for dual purpose operation: one side with printing blanket for wire-bar applicators and profile rods, on the other side glass surface for other applications. Easy to turn glass plate without any tool.
- Also suitable for use with different applicators up to the maximum outer width of 300 mm (11.81”), profile rods and wire-bar applicators with a minimum length of 340 mm (13.39”) and a maximum diameter of 13.5 mm (0.53”) in the support area.
- Applicable also for thick substrates up to 11 mm (0.43”).
- Optional precision-vacuumplate for fixing thin substrates of different size; the object to be held will be fixed absolutely plane by the suction power.

ZAA2600.C Features

- Up to 4 crockmeter tests can be carried out at the same time.
- Fast change of the friction finger sets.
- Storage of various crockmeter profile settings such as stroke length and number of cycles.
- Up to 4.5 kg (9.92 lbs) can be loaded
- Optional adapter for carrying out scratch and mar resistance tests

ZAA2600.SW Features

- Up to 4 wet and/or dry tests can be carried out at the same time.
- Customised tests can be carried out easily with the optional universal holder.
- Storage of various profile settings such as stroke length and number of cycles.
- Stroke speed (cycle speed) up to 100 double strokes per minute.
- Also appropriate for thick and curved samples.
- Up to 4.5 kg (9.92 lbs) can be loaded.

2.6 Scope of this document

This document is an instruction manual for the ZAA2600 automatic film application and testing system, which describes the correct use of the equipment.

This manual covers the film applicator models of the ZAA2600 series (ZAA2600 and ZAA2600.H) and the automatic film testers ZAA2600.C and ZAA2600.SW.

Therefore, it is possible that some pictures or functional descriptions may differ from your model.

3 Scope of Delivery

3.1 Standard delivery

The following parts are included in the delivery of all versions:

- ZAA2600 Basic unit with touchscreen
- Reversible, double sided glass plate: printing blanket and glass surface
- 4 rubber feet
- spirit level
- power cable
- allen key 3 mm and 2.5 mm
- certificate of manufacturer
- instruction manual

ZAA2600.A	**ZAA2600.HA**	**ZAA2600.C**	**ZAA2600.SW**
Additional content ▪ polyester mat ▪ drawing unit ▪ clamping device ▪ weight lifter ACC1436 (set of 2)	Additional content ▪ isolation plate ▪ drawing unit ▪ clamping device ▪ weight lifter ACC1436 (set of 2)	Additional content ▪ tool holder	Additional content ▪ sample tray (ACC1508) ▪ 2 sample frames (ACC1510) ▪ tool holder (ACC1513) ▪ drain hose (ACC1502)

3.2 Accessories

3.2.1 Accessories to ZAA2600.A film applicators

	Description	
ACC121 ACC211	Precision-vacuumplates with a series of holes of 1 mm (0.04”) Precision-vacuumplates with a series of holes of 0.5 mm (0.02”)	
ACC039 ACC122	Vacuum pumps with hose – 230 V Vacuum pumps with hose – 115 V	
ACC378 ACC586	Profile rod Wire-bar film width: approx. 320 mm (12,6”), total length: 405 mm (15,94”), with 1 wet film thickness according to your choice	
ACC1348	fixing unit for profile rods and wire-bar applicators	
ZUA2000	Film applicators up to a maximum film width of 300 mm (11.81”)	
	Calibration and Certification ZAA 2600 (incl. Calibration Certificate)	
ACC1283	collecting device for wire-bar applicators and profile rods after application	

3.2.2 Accessories to ZAA2600.C Crockmeter

ACC1315	Friction finger set A acc. to EN ISO 21546 1 friction finger holder 1 friction finger A (22 mm x 22 mm / 0.87” x 0.87”) 1 set rubbing cloth clamp (ACC1350) 1 set of 2 pieces elastic strap (ACC1391) 10 pieces felt insert (ACC1351)	
ACC1344	Friction finger set B with Ø 16 mm (0.63”) for tests according to EN ISO 21546, AATCC test method 8, EN DIN 13523-11, EN ISO 105-X12, Volkswagen PV 3906 based on ASTM F1319 1 friction finger holder 1 friction finger B with Ø 16 mm (0.63“) 1 rubbing cloth clamping ring (ACC1520)	
ACC1345	Friction finger set C for tests according to: EN ISO 21546, BMW AA-0134 1 friction finger holder 1 friction finger C 1 set rubbing cloth clamp (ACC1350) 1 set of 2 pieces elastic strap (ACC1391) 2 sets cellular rubber (ACC1354)	
ACC1346	Weight for test force 9 N The test weight is only achieved with a Zehntner friction finger set.	
ACC1347	Weight for test force 22 N The test weight is only achieved with a Zehntner friction finger set.	
ACC1482	Weight 50 g	
ACC1484	Weight 100 g	
ACC1486	Weight 500 g	
ACC1352	Felt cloth	
ACC1353	Cotton rubbing cloth acc. to ASTM F1319 and ISO 105-F09	

3.2.3 Options for ZAA 2600.SW as well as ZAA 2600 equipped with ACC1286

ACC1460	Friction set for ASTM D2486 1 brush – ACC1481 1 weight – ACC1461 1 cushioning pad – ACC1492 1 holder 2 metal strips 250 µm – ACC1491	
ACC1462	Friction set for ASTM D3450 1 sponge – ACC1485 1 weight – ACC1463 1 holder	
ACC1464	Friction set for ASTM D4213 1 sponge – ACC1487 5 abrasive pads (3M Scotch Brite®) – ACC1483 1 weight – ACC1465 1 holder	
ACC1466	Friction set for ASTM D4828 1 sponge – ACC1485 1 weight – ACC1467 1 holder	
ACC1468	Friction set for ISO 11998 5 abrasive pads (3M Scotch Brite®) – ACC1483) 1 holder	
ACC1482	Weight 50 g	
ACC1484	Weight 100 g	
ACC1486	Weight 500 g	
ACC1469	Universal holder 1 holder 1 foam cushion – ACC1512 1 hard rubber cushion– ACC1577	

3.2.4 Accessories for ZAA2600.C for scratch and mar resistance tests

ZHT 2093	Pocket Hardness Tester with rubber wheels	
ACC1287	Adapter for scratch and mar resistance tests (Holder for ZHT 2093 and ZST 2095)	

3.3 Modification sets

As the ZAA2600 is a modular film application and testing system. The ZAA2600 can be modified and expanded.

The following modification sets are available

ACC1284	modification set „Heatable Application“	
ACC1285	modification set „Crockmeter“	
ACC1286	modification set „Scrub Tester“	
ACC1339	Modification set „Application“	

3.4 ZAA2600.HA

Depending on the properties of the material to be applied, the plate has to be heated in order to achieve optimal results.

The ZAA2600.HA for heatable applications is suited for such materials.

The ZAA2600.HA consists of a ZAA 2600.A

a modification set:

ACC1576 modification set "Heatable Application" for ZAA 2300 

and a heatable plate.

All available options for the heatable plate are listed below:

Precision-vacuumplates, heatable up to 150 °C		
ACC1505.230V	with holes of 1 mm (0.04”), 230 V	
ACC1505.115V	with holes of 1 mm (0.04”), 115 V	
ACC1509.230V	with holes of 0.5 mm (0.02”), 230 V	
ACC1509.115V	with holes of 0.5 mm (0.02”), 115 V	
Heating plates for temperature up to 150 °C		
ACC1477.230V	Version for 230 V mains supply	
ACC1477.115V	Version for115 V mains supply	

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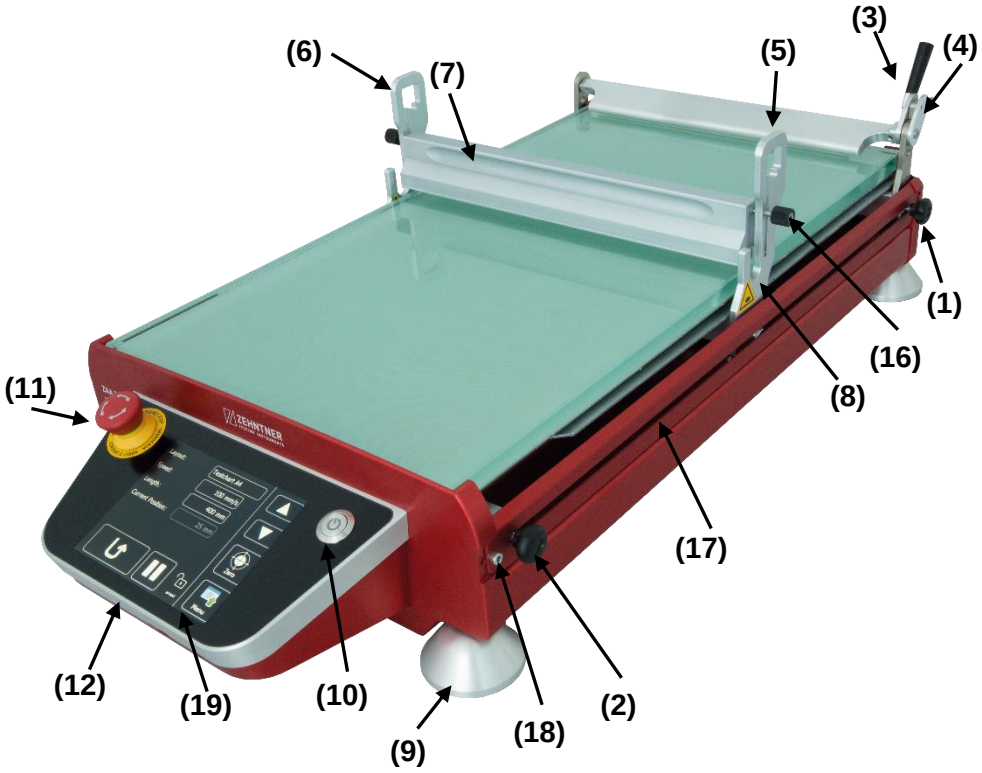
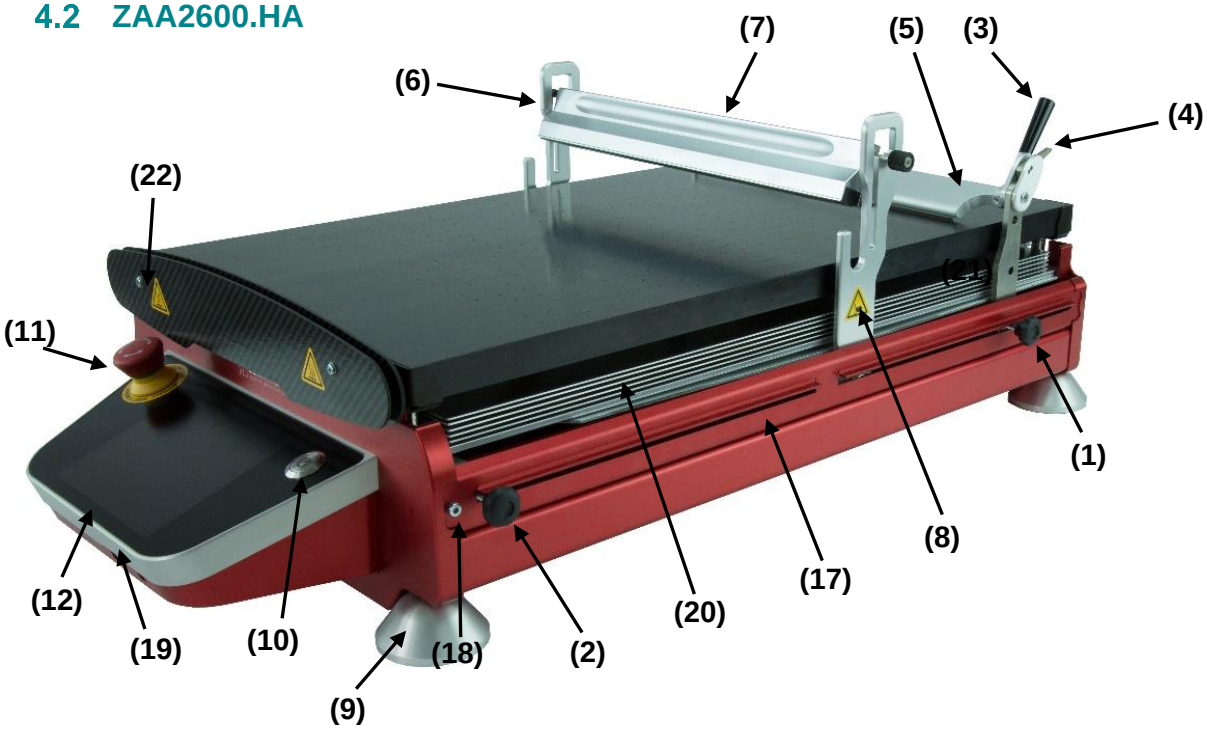
4 Device Overview

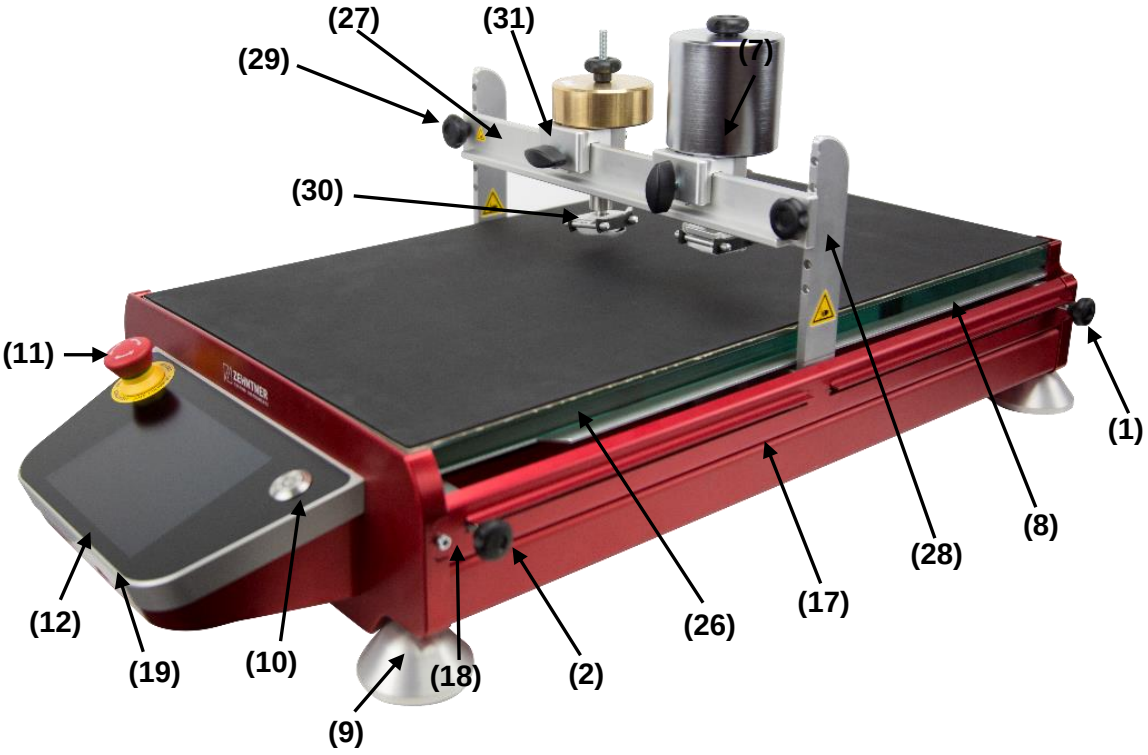
4.1 ZAA2600.A



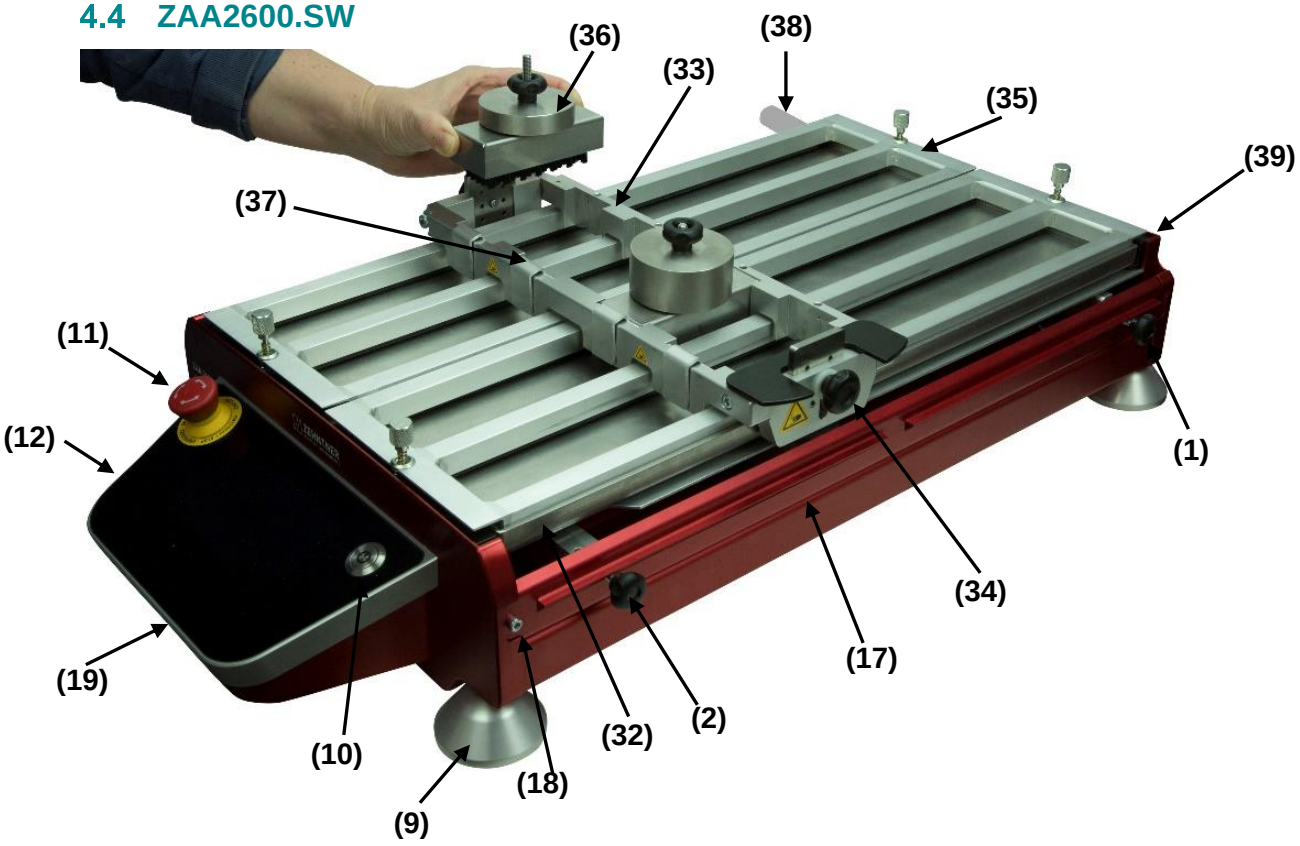
4.2 ZAA2600.HA



4.3 ZAA2600.C



4.4 ZAA2600.SW



(1) Start stop
(2) End stop
(3) Clamping grip
(4) Release lever
(5) Clamping device for the substrate
(6) Lifting and lowering device for weight (7)
(7) Weight
(8) Holding device for wire-bars and profile rods
(9) Levelling feet
(10) Power button
(11) EMERGENCY Stop button
(12) Touchscreen
(13) Power supply 100 V – 240 V / 50 Hz – 60 Hz
(14) Delay action fuse 0.8 A / 250 V
(15) Main switch (On / Off)
(16) Knurled screw
(17) Side panel
(18) Fixing screw of the side panel
(19) USB Port (for future use)
(20) Isolation plate (ZAA2600.HA only)
(21) Back heating plate holder (ZAA2600.HA only)
(22) Front heating plate holder (ZAA2600.HA only)
(23) Drawing unit
(24) Temperature controller connection (ZAA2600.HA only)
(25) Hose connection for vacuum (ZAA2600.HA only)
(26) Glass plate (ZAA2600.C only)
(27) Tool holder bridge (ZAA2600.C only)
(28) Tool holder side part (ZAA2600.C only)
(29) Height adjustment for tool holder (ZAA2600.C only)
(30) Friction finger set (ZAA2600.C only)
(31) Crock Tool holder (ZAA2600.C only)
(32) Sample Tray (ZAA2600.SW only)
(33) Scrub Tool holder (ZAA2600.SW only)
(34) Height adjustment for tool holder (ZAA2600.SW only)
(35) Sample frames (ZAA2600.SW only)
(36) Friction set (ZAA2600.SW only)
(37) Clip (ZAA2600.SW only)
(38) Drain hose (ZAA2600.SW only)
(39) Fixing bar (ZAA2600.SW only)

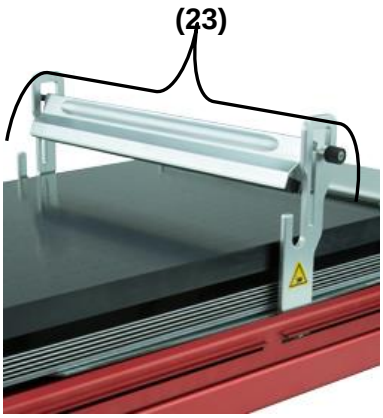


Fig 1: ZAA2600.HA

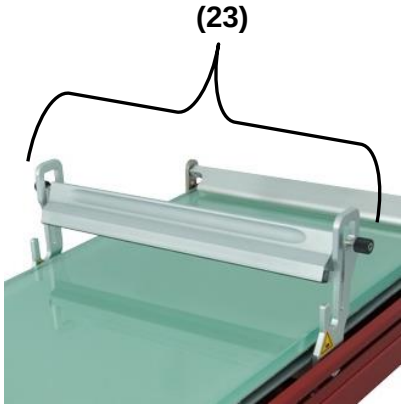


Fig 2: ZAA2600.A

Fig 3: Back side detail

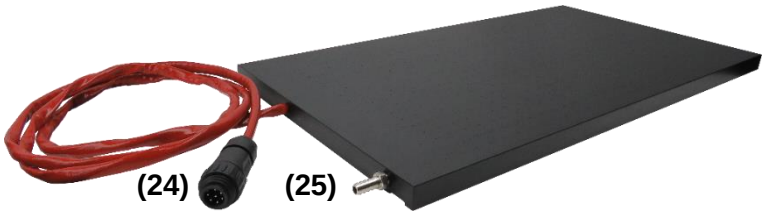


Fig 4: Heatable vacuum plate

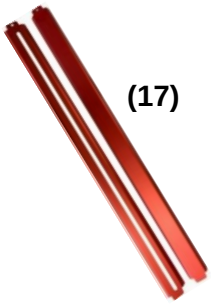
5 Assembly and starting up

5.1 Initial Assembly

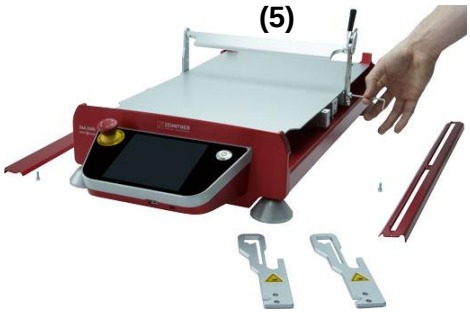
Before the first use the apparatus has to be assembled or converted for use with the desired options.

5.1.1 Assembly of ZAA2600.A

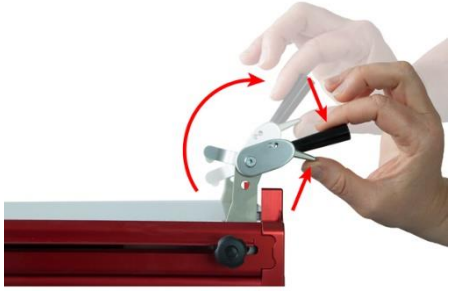
- Loosen and remove the start stop (1) and the end stop (2).
- Remove the side panel (17), by removing the fixing screws (18).



- Mount the clamping device (5) and the holding device (8) with the four supplied Allen screws.

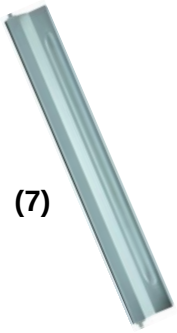


- Reassemble both side panels (17), the one with the slit on the right side, the other on the left side.
- Refasten the previously removed fixing screws of the start (1) and end stop (2).
- Make sure that the four black rubber feet are mounted.
- Open the clamping device (5), by pressing the release lever (4) and the clamping grip (3) together, then tilt the clamping grip (3) backwards. The clamping device (5) can be moved to the back at the same time.



- Place the glass plate into the device with the required surface up. Use the printing blanket when working with a wire-bar applicator or profile rod, the glass surface when working with a gap applicator.

- Insert the weight (7) into the guides of the holding device (8) with the black rubber part forward-facing first one side of the weight then the other as shown below.



- Rotate the weight (7) so that the black rubber part faces down, then fix it with the two knurled screws (16).

To protect persons and the apparatus, proper care must be taken when lifting or carrying it. It is recommended to hold and carry the ZAA 2600 on both sides of the housing. Always remove the glass plate before lifting or tilting the device.

5.1.2 Assembly of ZAA2600.HA

Before the first use the apparatus has to be assembled or converted for use with the desired options. ZAA 2600 Basic unit:

- Remove the four black rubber feet.

- Remove the screws of the adjustable start stop (1) and end stop (2).
- Remove the side panels (17) by loosening and removing the Allen screws (18).
- Assemble the clamping device (5) and holding device (8) with the delivered Allen screws.

- Reassemble both side panels (17), the one with the slit on the right side, the other on the left side.
- Refasten the screws of the adjustable start (1) and end stop (2).

- Open the clamping device (5), by pressing the release lever (4) and the clamping grip (3) together until you hear a click, then tilt the clamping grip (3) backwards.

- Place the isolation plate (20) into the device.

- Assemble the back heating plate holder (21) and the front heating plate holder (22) with the 4 provided Allen screws.

- Move the clamping device (5) and holding device (8) to the back part of the unit.
- Insert the glass plate / heating plate in the device by first guiding the cable under the clamping device (5).

- Insert the weight (7) into the guides of the holding device (8) with the black rubber part facing forward first one side of the weight then the other as shown below.

- Rotate the weight (7) so that the black rubber part faces down, then fix it with the two knurled screws (16).

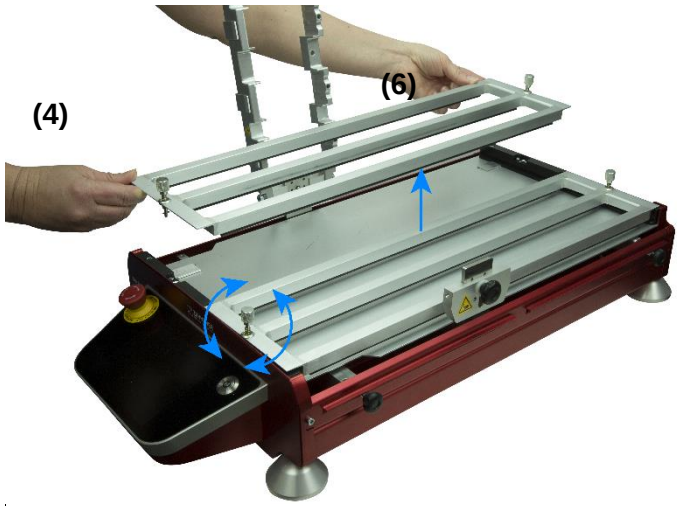
- Connect the ACC1477 temperature controller as described in the separate instruction manual.

To protect persons and the apparatus, proper care must be taken when lifting or carrying it. It is recommended to hold and carry the ZAA 2600 on both sides of the housing. Always remove the glass plate before lifting or tilting the device.

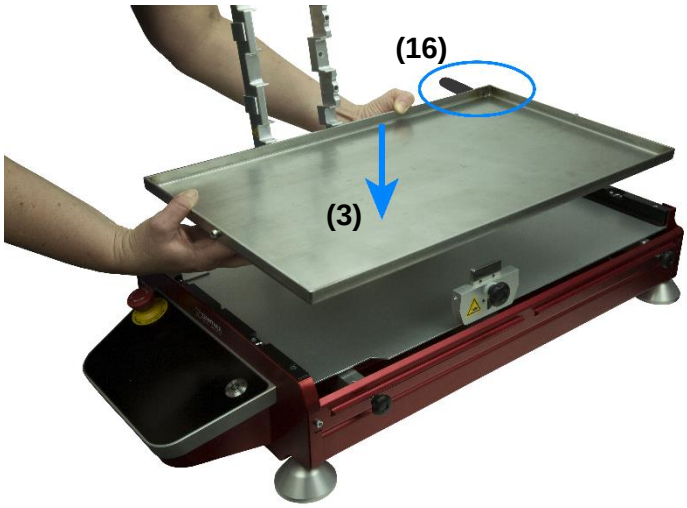
5.1.3 Assembly of ZAA2600.SW

Before the first use the apparatus has to be assembled or converted for use with the desired options:

- Fold up the tool holder (4).
- Loosen the screws of the sample frames (6) with a quarter-turn and remove the sample frames (6).



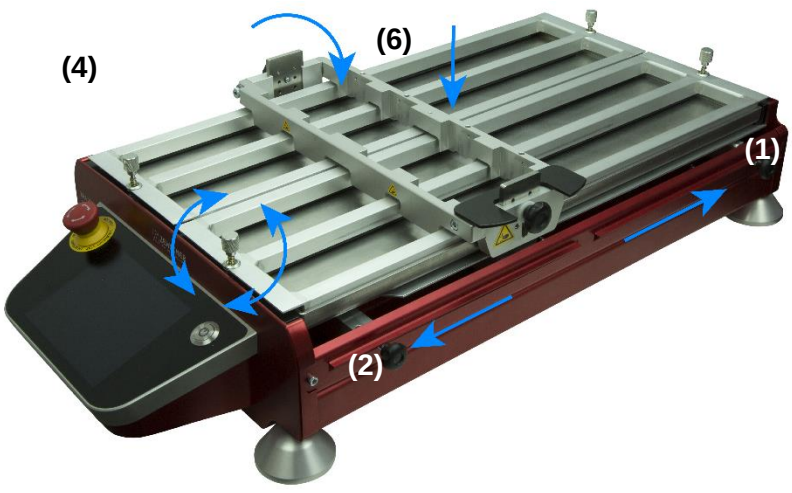
- Place the sample tray (3) in the unit. The drain lead-out has to be at the back part of the unit.



- Fix the drain hose (16) to the drain lead-out.

The drain hose (16) has to lead the liquid outwards. The hose must not point into the unit. When using the device with liquids the drain hose (16) must be mounted.

- Place the sample frames (6) in the unit and while pressing them down fix the screws with a quarter-turn.
- Fold down the tool holder (4).



- Move the start stop (1) backwards and the end stop (2) forward as far as possible. Fasten their screws.

To protect persons and apparatus, proper care must be taken when lifting or carrying it. It is recommended to hold and carry the ZAA 2600 on both sides of the housing. Always remove the sample tray before lifting or tilting the device.

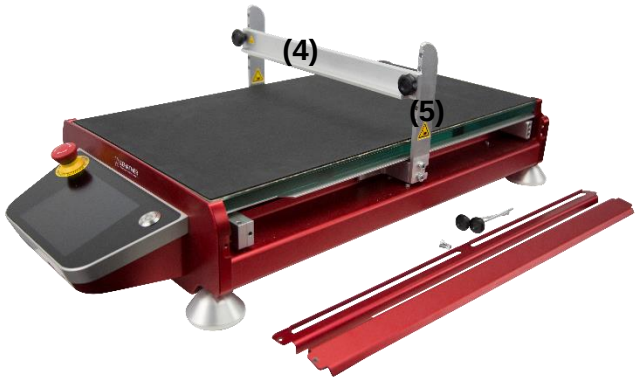
5.1.4 Assembly of the ZAA2600.C

Before the first use the apparatus has to be assembled or converted from another application:

- Check if the four rubber feet are mounted.
- Place the glass plate (3) with the required side facing up in the unit.

- Remove the start stop (1) and the end stop (2).
- Loosen the fixing screws of the side panels (16) and remove the side panels (15).

- Mount the tool holder-side parts (5) and the tool holder bridge (4).



- Remount the side panels (15), the one with slit on the right side, the other one on the left side.
- Remount the start stop (1) and the end stop (2).
- Move the start stop (1) backwards and the end stop (2) forward as far as possible. Fasten the screws of the stops (1) and (2).

To protect persons and the apparatus, proper care must be taken when lifting or carrying it. It is recommended to hold and carry the ZAA 2600 on both sides of the housing. Always remove the glass plate before lifting or tilting the device.

5.2 Disassembly

In order to prevent damage during transport the ZAA2600 needs to be disassembled back to the basic unit.

These steps are also required done before mounting another modification set.

5.2.1 Disassemly of ZA2600.A and ZAA2600.HA

Always switch off the device and unplug the power cable before dissembling.

To prevent transport damage, the weight (7) and the clamping (5) and holding devices (8) must be disassembled as follows:

- Remove the temperature controller (ZAA2600.HA only)
- Loosen and remove the knurled screw (16) to remove the weight (7). First turn the weight upwards by 90 ° and – in reversed order as at the assembly -–first take one side of the weight then the other out of the guides.
- Remove the screw of the start stop (1) and end stop (2).
- Remove the side panels (17), by loosening and removing the fixing screws (18).

- Remove both holding device (8) and the clamping device (5) by unscrewing their fixing screws.
- Remove the clamping device (5), the inserted plate, the back heating plate holder (21) and the front heating plate holder (22). (ZAA2600.HA only)
- Remove the isolation plate (20). (ZAA2600.HA only)
- Remove the glass plate.
- Mount both side panels (17) again, the one with slit on the right side, the other one on the left side.
- Refasten the previously removed screws of the start- (1) and end stop (2).
- Slide both stops (1 & 2) to the middle of the device.
- Screw in the four black rubber feet. (ZAA2600.HA only)
- Only transport the device in its original packaging.

Disassembled device before and after transport:

5.2.2 Disassembly ZAA2600.SW

⚠ Always switch off the device and unplug the power cable before dissembling.

To prevent transport damage, the device must be disassembled as follows:

- Fold up the tool holder (4) and loosen the screws of the sample frames (6) with a quarter-turn.
- Remove the sample frames (6) and afterwards the sample tray (3).
- Replace the sample frames (6) and fix them again, fold down the tool holder (4).
- Move the tool holder (4) to the centre of the device.
- Move the start stop (1) and the end stop (2) to the centre of the device as well and fasten them with their screws.

Shipping condition:

No friction sets must be inserted into the tool holder (4) for shipping.

5.2.3 Disassembly of the ZAA2600.C

Always switch off the device and unplug the power cable before dissembling.

To prevent transport damage, the device must be disassembled as follows:

- Remove all friction finger sets from the tool holder bridge (4).
- Remove the start stop (1) and the end stop (2).
- Loosen the fixing screws of the side panels (16) and remove the side panels (15).
- Remove the tool holder bridge (4) and the tool holder side parts (5).
- Remount the side panels (15), the one with slit on the right side, the other one on the left side.
- Remount the start stop (1) and the end stop (2), move them to the centre of the device and fasten them.
- Remove the glass plate.

Shipping condition:

The glass plate (3) must be removed for shipping.

5.3 Startup

Connect the device to a power socket with the supplied power cable and turn on the main switch (15).

Switch on the device by pressing the power button (10). The device will be ready after a short start-up phase.

5.4 Shutdown

Turn off the device by pressing the power button (10). The display will turn off and the device is powered down. Before removing the power cable, turn off the main switch (15).

6 Film Application

6.1 Preparation

Before the apparatus is prepared for application, you should have decided:

- which type of applicator you will be using
- which substrate you will be using
- which base plate you will be using
    - glass plate
    - precision vacuum plate
    - heatable precision vacuum plate (only versions with special isolation plate)
    - heating plate (only versions with special isolation plate) or

If using a wire-bar or profile rod, use the printing blanket side of the glass plate. For other applicators, use the glass plate with the glass surface up.

⚠ Depending on the coating material used, the test may only be carried out in a ventilated environment.

⚠ Heating of substances can lead to risk of explosion, implosion or the release of toxic or flammable gases. If heating of a product can lead to the release of hazardous substances, it is necessary to use an appropriate extraction system.

⚠ During operation, the distance to walls and to other objects must be at least 10 cm.

6.2 Application with wire-bar or profile rod

- Place the device on a solid, even surface.
- Level the apparatus using the included spirit level. To do so, place the spirit level on the glass plate and adjust the levelling feet (9) until the ZAA 2600 is levelled perfectly. The glass plate must be firmly in place.
- Make sure that the printing blanket side of the glass plate is facing up.
- Ensure that the printing blanket is covered with the polyester mat.
- Set the „Moving Mode" to „Single", by tapping on „Menu" and „Setup" on the touchscreen. "Single" mode is indicated with a straight arrow ↓ on the main screen.
- Lift up the weight (7) and hinge it into the top position.

Set the start stop (1) as follows:

- Move the open clamping device (5) and the holding device (8) to the back of the apparatus.
- Place your substrate (e.g. test chart / film) at the desired position on the glass plate and fix it with the clamping device (5), by pulling on the clamping grip (3).
- Move the holding device (8) to the start stop (1) or to the desired starting position using the ▲ button on the touchscreen.
- Press the „Zero" button Zero on the touchscreen to set the start position.

Hint: Small substrates can also be fixed with a piece of adhesive tape.

If the device had been shut down, the starting position has to be set again after the next switch-on.

Set the end stop (2) as follows:

- Loosen the screw of the end stop (2).
- Position the end stop (2) behind the desired drawing area and lock it with the screw. (The end stop (2) has a safety function.)
- Set the drawing length using the touchscreen (refer to chapter 0 “Film application: Setting the drawing length” on page 61).
- Place the wire-bar or profile rod into the holding device (8).
- Lower the weight (7) until it sits on the wire-bar / profile rod and holds it in place.
- Hint: Place a piece of paper at the end of your substrate to absorb any excess coating material.
- Set the desired drawing speed on the touchscreen (refer to chapter 10.1.6 “Settings
- Film application: Setting the drawing speed” on page 61).
- Apply the desired quantity of coating material on the substrate in front of the applicator rod.
- Start the drawing procedure by tapping the arrow ↓ on the touchscreen.

The ZAA 2600 will now move the drawing unit (20) forward and draw a uniform film on the substrate. The drawing unit (20) will automatically stop when it reaches the end position defined on the touchscreen.

- Lift the weight (7) and hinge it into the top position.
- Remove and clean the applicator rod.
- Move the drawing unit (20) back to the initial position by tapping on ↑ on the touchscreen. The drawing unit (20) moves back either to 0 mm position or to the start stop (1).
- Remove the substrate.

Should the applicator rod rotate during the application, use the optional ACC1348 fixing unit for profile rods and wire-bar applicators (see chapter 6.2.2 on page 37)

6.2.1 Using the optional collecting device ACC1283

Using the collecting device, the application steps required when working with wire-bar applicators and profile rods will be reduced significantly.

When using the collecting device, the applicator rod is lifted automatically off the substrate after application and the drawing unit (20) moves back to the starting position automatically. The applicator rod can then be easily removed and cleaned.

Use the collecting device as follows:

- Make sure that the printing blanket side of the glass plate is facing up.
- Ensure that the printing blanket is covered with the polyester mat.
- Set the „Moving Mode" to „Reverse", by tapping on „Menu" and „Setup" on the touchscreen. The „Reverse" mode is indicated by a bent arrow on the main screen.
- Lift the weight (7) and hinge it into the top position.

Set the starting position as follows:

- Place your substrate (e.g. test chart / film) at the desired position on the glass plate and fix it with the clamping device (5), by pulling on the clamping grip (3).
- Move the drawing unit (20) to the start stop, by pressing the „Manual back" button .
- Zero the device by tapping the „Zero" button on the touchscreen.
- Place the applicator rod into the holding device (8).

Adjust the collecting device as follows:

- Place the collecting device into the end stop (2) by sliding the mounting pins of the device into the holes of the end stop (2). Lock the collecting device in place by applying a light pressure to it. Proper locking is indicated by a click.

- Position the end stop (2) behind the desired drawing area and lock it with the screw. (The end stop (2) has a safety function.)
- The end of the drawing area is defined by the two side parts of the collecting device as shown on the picture below.

- Set the drawing length using the touchscreen. Set the drawing length to the maximum on the touch screen to ensure the collecting device to lift the applicator rod properly.
- Lower the weight (7) until it sits on the applicator rod and holds it in place.
- Hint: Place a piece of paper at the end of the substrate to absorb any excess coating material.
- Set the desired drawing speed on the touch screen (see chapter 10.1.6 “Settings
- Film application: Setting the drawing speed” on page 61).
- Apply the desired quantity of coating material on the substrate in front of the applicator rod.
- Start the application procedure by tapping the arrow button  on the touch screen

6.2.2 ACC1348 Fixing unit for profile rods and wire-bar applicators

- Place the profile rod or wire-bar applicator into the holding device (8).
- Fix the optional ACC1348 fixing unit on the sides of the applicator rod as shown below:

6.3 Application with gap applicator

- Make sure that the glass plate is mounted with its glass surface facing up. Alternatively a precision-vacuumplate can be used.

Set the start stop (1) as follows:

- Place your substrate (e.g. test chart / film) at the desired position on the glass plate and fix it with the clamping device (5), by pulling on the clamping grip (3). Keep in mind that the gap applicator will be placed in front of the weight (7).

  Hint: If the substrate is too small to use the clamping device (5), use a piece of adhesive tape or an optional precision-vacuumplate to fix it.

- Lower the weight (7) to the bottom position and move the holding device (8) to the clamping device (5).
- Set your gap applicator to the desired gap height and place it on the substrate at the desired starting position of the application area.
- Move the drawing unit (20) to the desired starting position behind the gap applicator using the ▼ button.
- Set the starting position by tapping the „Zero“ button on the touch screen.

Refer to the separate manuals of the applicators you are using (e.g. ZUA 2000) for any applicator specific considerations.

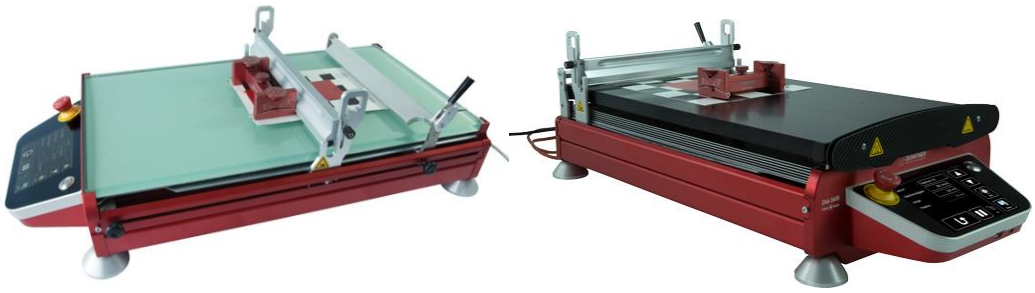
Hint: Place a piece of paper at the end of the substrate to absorb any excess coating material.

Set the end stop (2) as follows:

- Loosen the screw of the end stop (2).
- Position the end stop (2) behind the desired drawing area and lock it by refastening the screw. (The end stop (2) has a safety function.)
- Set the drawing length using the touchscreen.

Refer to the separate instruction manuals of the applicator you are using (e.g. ZUA 2000) for any applicator specific considerations.

- Hint: Place a piece of paper at the end of the substrate to absorb any excess coating material.
- Return the drawing unit (20) to the start position.
- Set the desired drawing speed on the touch screen (refer to chapter 10.1.6 “Settings
- Film application: Setting the drawing speed” on page 61).
- Apply the desired quantity of coating material on the substrate in front of the application blade.
- Start the application procedure by tapping the „draw“ button. When using a gap applicator this can be either in “Single” ↓ mode or in „Reverse“ ↳ mode.

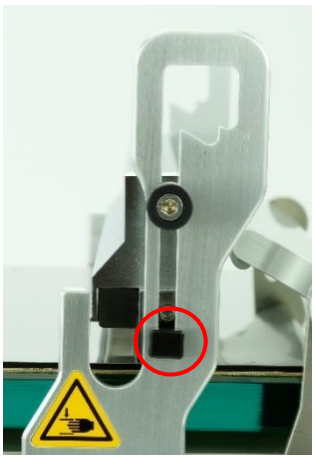


- Remove and clean the gap applicator.

- If working in “Single” mode, return the drawing unit (20) to the start position by tapping the ↑ on the touch screen. In „Reverse“ mode ↺ the drawing unit (20) returns to the start position automatically.
- Remove your substrate. If the device is not needed for further applications, switch it off with the main switch (10).

For substrates between 4 mm and 11 mm thickness, use the included weight lifter. To install, remove the weight (7) and place the weight lifter in the holding device (8) with the top marker facing up, then place the weight (7) back in the holding device (8).

If the weight (7) has to be lifted even more, place the weight lifter with the top marker facing down in the holding device (8). The resulting height difference can be seen below:



7 Scrub test

7.1 Preparation

Before the apparatus is prepared for scrub tests, you should have decided:

- according to which standard the scrub test should be carried out
- which friction set you will be using
- if an even or a curved sample will be inserted

Up to 4 identical or different friction sets can be used at the same time, depending on the friction material, the sample surface, the speed and the test load.

The highest possible test load is depending on the friction material, the sample surface and the speed.

The provided delivered glass plate is used for application as well as with the modification sets.

Generally, the scrub tester can be used with the glass plate, though it is recommended to use the scrub tester with the sample tray for scrub tests.

The following needs to be considered:

- the thickness of the sample will be reduced due to the maximal height of the tool holder (4)
- no liquids must be used.

7.2 Use of the friction sets

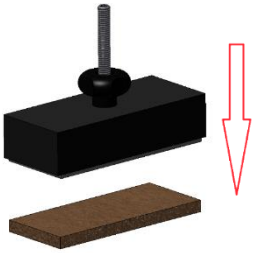
For an overview on the available friction sets and the content please see section 3.2.3.

The weight of the friction sets will only be reached if the knurled nut is mounted.

To avoid ejection of weights they have to be screwed to the holder.

Use of the ACC1468 friction sets for ISO 11998

Press the abrasive pad firmly onto the Velcro surface of the holder.



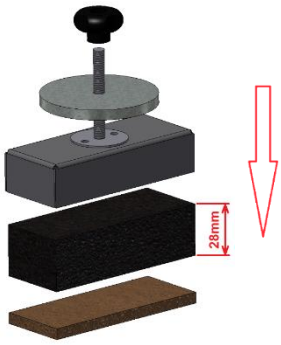
No additional weight is needed for tests according to ISO 11998.

Spare abrasive pads: ACC1483

Spare Velcro: ACC1511

Use of the ACC1464 friction sets for ASTM D4213:

Slide on the weight for ASTM D4213 and screw it in place.

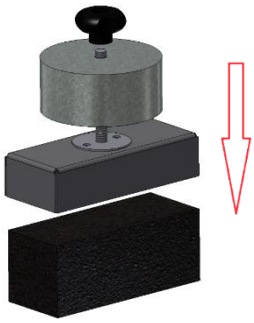


- Use a sponge of 95 x 38 x 28 mm (3.74 x 1.5 x 1.1”) (ACC1487).
- Insert the sponge into the holder with the largest surfaces facing up and down.
- Place the abrasive pad on the sponge. (The pad will only be placed.)

Spare sponge: ACC1487

Spare abrasive pad: ACC1483

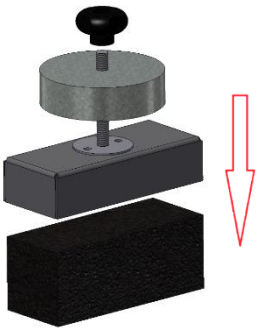
Use of the ACC1462 friction sets for ASTM D3450:



- Slide on the weight for ASTM D3450 and screw it in place.
- Use a sponge of 95 x 38 x 38 mm (3.74 x 1.5 x 1.5”) (ACC1485).
- Insert the sponge into the holder.

Spare sponge: ACC1485

Use of the ACC1466 friction sets for ASTM D4828:

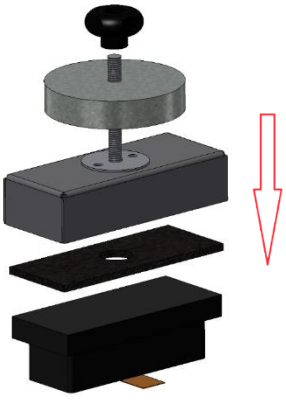


Slide on the weight for ASTM D4828 and screw it in place.

- Use a sponge of 95 x 38 x 38 mm (3.74 x 1.5 x 1.5”) (ACC1485).
- Insert the sponge into the holder.

Spare sponge: ACC1485

Use of the ACC1460 friction sets for ASTM D2486:



Slide on the weight for ASTM D2486 and screw it in place.

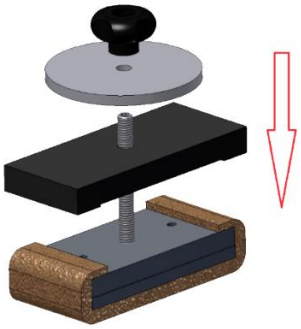
- Place the cushion pad (with holes)-in the holder.
- Insert the brush bristles down into the holder.
- The metal strip shown is interlocked with the substrate according to ASTM D2486.

Spare brush: ACC1481

Spare cushion pad: ACC1492

Spare metal strip: ACC1491

Use of the ACC1469 universal holder



- Clamp the abrasive medium between the two blocks.
- Slide on the selected additional weight and screw it in place.

Spare foam cushion: ACC1512

Spare hard rubber cushion: ACC1577

For tests on **medium hard surfaces** (e.g. plastic plate) it is recommended to equip the holder only with the hard rubber cushion.

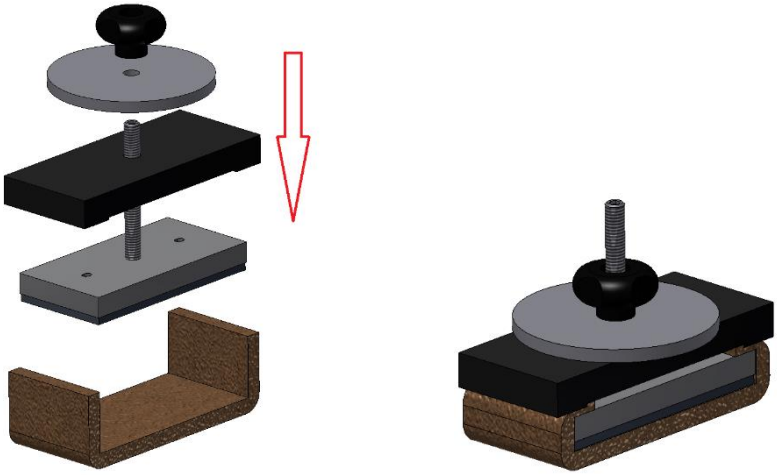


Fig 5: Mounting for medium hard surfaces

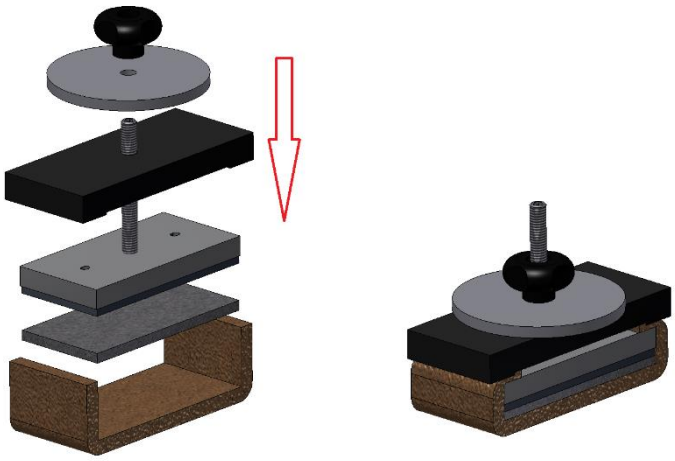


Fig 6:Mounting for hard surfaces

For tests on **hard surfaces** (e.g. painted steel plate), it is recommended to mount the supplied foam cushion between the hard rubber cushion and the abrasive. As a result, the abrasive is better adapted to the substrate.

Vibrations may occur during tests on rubber-like surfaces (e.g. soft-touch painting). In such cases it is recommended to remove all rubber elements (foam cushion, hard rubber cushion as well as the adhesive film).

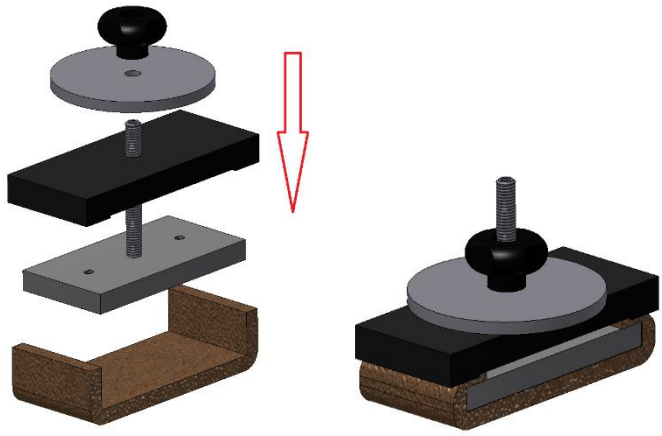


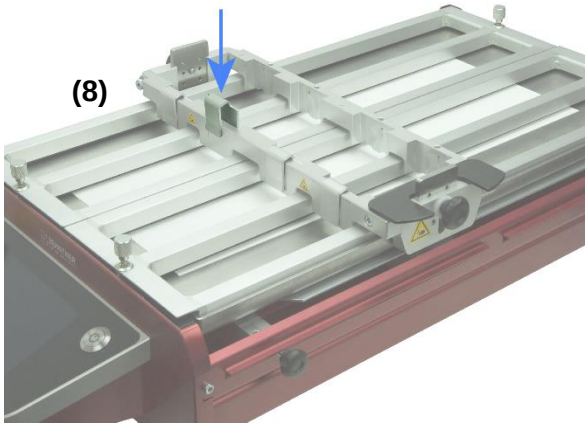
Fig 7: Mounting for rubber-like surfaces

7.3 Carry out a scrub test

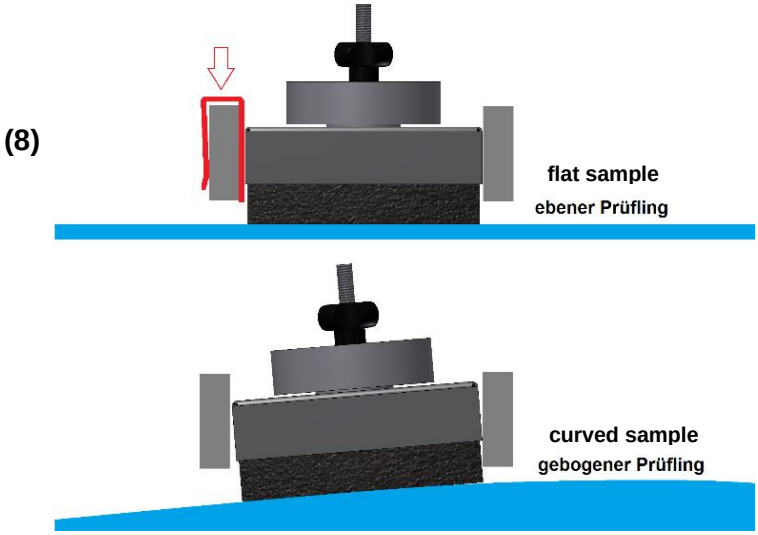
The side panels (17) must always be mounted during operation.
Never touch any moving parts during operation.
Depending on the abrasives used, the test may only be carried out in a ventilated environment.

- Place the device on a solid, even surface.
- Level the apparatus using the included spirit level. To do so, place the spirit level on the sample tray and adjust the levelling feet (9) until the ZAA 2600 is levelled perfectly. The sample tray must be firmly in place.
- Fold up the tool holder (4).
- Open the screws of the sample frames (6) with a quarter-turn and remove the sample frames (6).
- Place the sample.

- Replace the sample frames (6) in the unit and while pressing them down fasten the screws with a quarter-turn.
- Fold down the tool holder (4).
- When testing flat samples mount the clips (8). They ensure stable running of the friction sets.



In case of curved samples, the clips (8) must be removed.

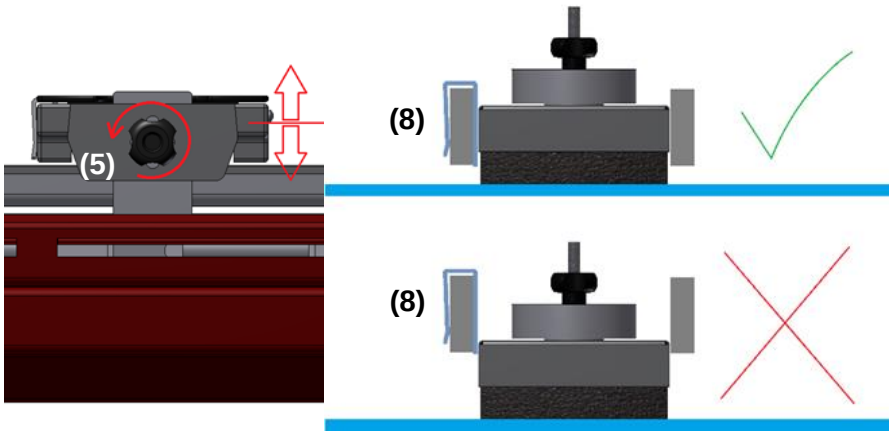


The clips (8) have to be mounted even in case of curved samples if exceeding one or both of the following parameters in order to avoid ejection of the friction sets at high speed and load:
- speed: 80 double stroke / min
- weight of the friction sets: 600 g

- Move the tool holder (4) either with ▲ or manually to the back part of the sample.
- Press the „Zero“ button Zero on the touchscreen to set the start position.
- Note: Do not zero directly at the start stop (1), but at least ca. 3 mm in front.
- Moisten the chosen friction set according to standard and place it in the tool holder (4).

Maximum load: 4.5 kg (99.21 lbs) (2 x 22 N).

- Check the height of the sample frames (6) and adjust it with the screw (5) if necessary.



- Set the number of double strokes and stroke length on the touchscreen.

Set the scrub length so that the testing head stays on the sample for the complete stroke length.

Do not lean over the unit during operation.

- Start the scrub test by tapping on the display.
- Prepare the evaluation and test report according to standard.

8 Crockmeter tests

8.1 Introduction

CROCK TESTING is an internationally recognized test method to simulate the rubbing action generated by a human finger and forearm. Crock testing is used to evaluate the amount of color transferred from surfaces on a specific to other surfaces by rubbing.

Crock Testing methods are used to determine various surface parameters, such as

Color fastness to rubbing (e.g. of textile material): refers to resistance criteria of a colour of a test sample against rubbing with another material. These criteria are resistance to change of colour characteristics and resistance of its colorants to adjacent material (transfer).

Abrasion resistance is the ability to withstand the frictional forces attempting to remove the surface material.

Resistance of solvents refers to a test method which compares amount of coating, which remains after a predefined number of rubbing strokes with a solvent applied on the material.

For Crock testing Proceq offers the model ZAA2600.C Automatic Crockmeter and the ZAA2600.SW Automatic Scrub Tester. The ZAA2600. can be used for Crock testing on test samples with a maximum thickness of 72mm. The ZAA2600.SW however can only be used for samples with a thickness of up to 15mm.

8.2 Friction finger and weight selection

As there are a wide field of materials and abrasion tests, which can be performed with a Crockmeter, there are international standards which describe the procedures and the material.

In order to carry out Crockmeter tests, at least

- friction finger set and
- weight are required
- and an abrasive material

is required.
Please find below an overview of the equipment and accessories for the execution of a Crockmeter test according to the most common standards

AATCC Test method 8-2007 - Testing the colorfastness to crocking of textiles

ACC1344 **Friction Finger Set B** with a diameter of 16mm (0.63”)
ACC1346 **Weight for test force 9N**
ACC1353 **Cotton Rubbing Cloth**

AATCC Gray Scale or AATCC Chromatic Transference Scale as well as white AATCC Blotting Paper (can be ordered at www.aatcc.org)

ASTM D6279 – Test Method for rub abrasion mar resistance of high gloss coatings

ACC1344 **Friction Finger Set B** with a diameter of 16mm (0.63”)
ACC1346 **Weight for test force 9N**
ACC1352 **felt cloth** or similar Friction pad made of felt or paper

Based on ASTM F1319 – Test Method for Determination of abrasion and smudge resistance of images produce from business copy products

ACC1344 **Friction Finger Set B** with a diameter of 16mm (0.63”)
ACC1482 **Weight 50g**
ACC1484 **Weight 100g**
ACC1353 **Cotton Rubbing Cloth**
Densitometer in accordance with ANSI IT2.17
Emery paper

BMW AA-0134 – Test Method for Dry scratch resistance test using Crockmeter

ACC1345 **Friction Finger Set C**
ACC1346 **Weight for test force 9N**
Glossmeter (e.g. ZG8000 from Proceq)
Friction Material according to agreement

To test clear paint, sandpaper by 3M (type “281Q Wetordry™ Production™ Polishing Paper”) is used in qualities of 9 micrometers.

DIN EN 13523-11 – Test Method for testing resistance to solvents (rubbing test) of coil coated metals

ACC1344 **Friction Finger Set B** with a diameter of 16mm (0.63”)
ACC1346 **Weight for test force 9N**
ACC1353 **Cotton Rubbing cloth**
(other materials like textiles or felt washers are allowed, though lead to other results)
Solvent

ISO 21546 – Test Method for testing coating materials and coatings

This standard is allowing various configurations:

Friction fingers Weights	Set A, Set B or Set C with the corresponding weight (see below): determined by the chosen Friction finger set
Abrasive Material	Various are allowed e.g. ACC1353 Cotton rubbing cloth Furthermore, the additional use of a felt cloth or another cloth can be agreed. It is possible to use an abrasive medium. Soft, lint-free cloth, if necessary with solvent. For testing automobile clear coating material, you require additionally ACC1352 Felt Cloth.
Evaluation	Glossmeter in accordance with DIN EN 2813 (e.g. Proceq ZGM1130 or ZG8000) with measuring template. Alternatively a device for measuring haze or the brightness can be used.

ISO 21546 with Friction Finger A (for flat test samples)

ACC1315 **Friction Finger Set A** (22mm x 22mm, 0.87 x 0.87”)
The test load (wear) onto the coating is uniform over the whole cuboid in crocking direction.
ACC1347 **Weight for test force 22N**

ISO 21546 with Friction Finger B (for flat test samples)

ACC1344 **Friction Finger Set B** (Diameter 16mm/0.63”)
The test load (wear) onto the coating is in the middle of the cylinder.
ACC1346 **Weight for test force 9N**

ISO 21546 with Friction Finger C (for curved test samples)

ACC1344 **Friction Finger Set B** (Diameter 16mm/0.63”)
The test load (wear) onto the coating is uniform over the whole cylinder in crocking direction.
ACC1346 **Weight for test force 9N**

8.3 Preparation

Before the apparatus is prepared for crocking tests, you should have decided:

- according to which standard the crocking test should be carried out
- which friction finger set, friction material and/or friction medium if necessary you will be using
- on the number of double strokes
- on the evaluation procedure
- on the time between the friction stress and the evaluation of the friction lane

Up to 4 identical or different friction sets can be used at the same time, depending on the friction material, the sample surface, the speed and the test load.

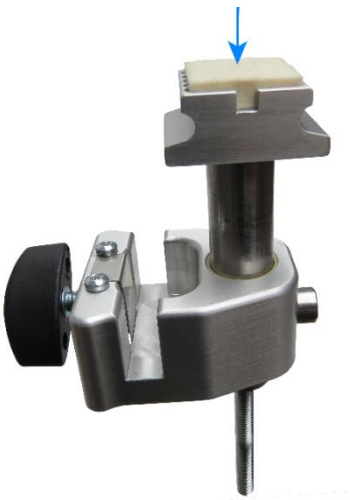
The highest possible test load is depending on the friction material, the sample surface and the speed.

8.4 Mounting the friction finger sets

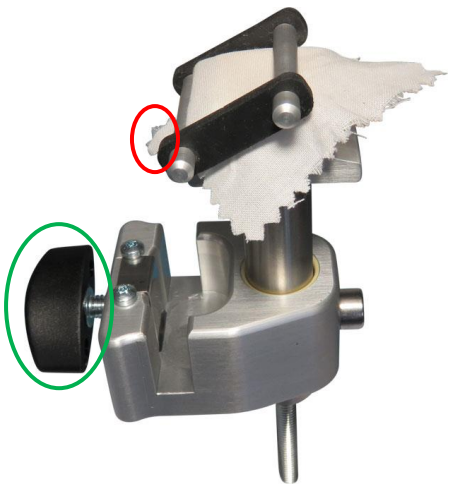
To carry out crocking tests, at least one friction finger set and one weight are needed. Some standards or test procedures require additional equipment and auxiliary material.

For available options for crockmeter tests please refer to section 8.2.

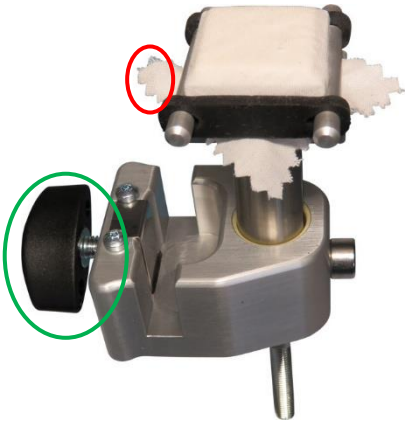
8.4.1 Mounting the friction finger set A



1) Place the felt stamp.



2) Place the rubbing cloth on the felt stamp with one corner (circled in red) facing the holder screw (circled in green).



3) Clamp the rubbing cloth smoothly.

4) Slide on the weight and screw it in place.

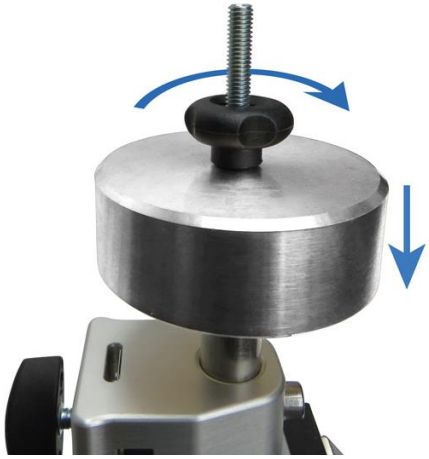
If your friction finger set does not look like picture 3, meaning one corner of the ACC1353 rubbing cloth (circled in red) does not face the holder screw (circled in green), you need to redo step 2.

The test load of 22 N will only be reached if the knurled nut is mounted.

To avoid ejection of weights (accidentally falling down) they have to be screwed to the holder.

8.4.2 Mounting the friction finger set B

1) Compress the ring to enlarge it's diameter and push it over the rubbing cloth.



2) Slide on the weight and screw it in place.

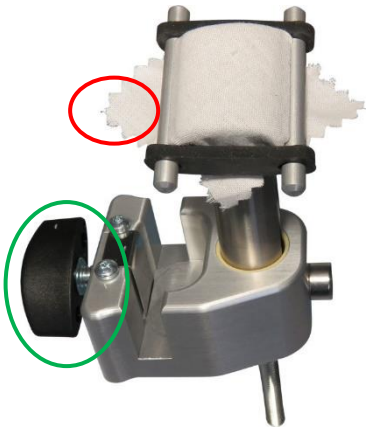
The test load of 9 N will only be reached if the knurled nut is mounted.

To avoid ejection of weights (accidentally falling down) they have to be screwed to the holder.

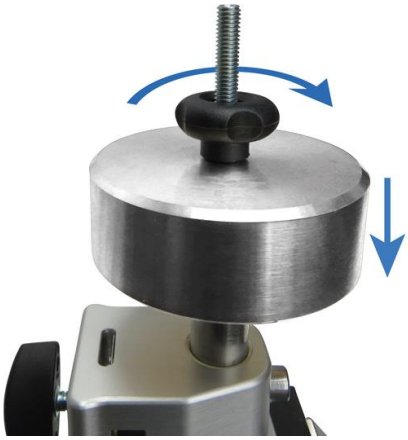
8.4.3 Mounting the friction finger set C

1) Check the cellular rubber for damages.

2) Place the rubbing cloth on the cellular rubber with one corner (circled in red) facing the holder screw (circled in green).



3) Clamp the rubbing cloth smoothly.



4) Slide on the weight and screw it in place.

If your friction finger set does not look like picture 3, meaning one corner of the ACC1353 rubbing cloth (circled in red) does not face the holder screw (circled in green), you need to redo step 2.

The test load of 9 N will only be reached if the knurled nut is mounted.

To avoid ejection of weights (accidentally falling down) they have to be screwed to the holder.

8.5 Carry out Crockmeter tests

Never touch any moving parts during operation.

The side panels must always be mounted during operation.

Do not lean over the unit during operation.

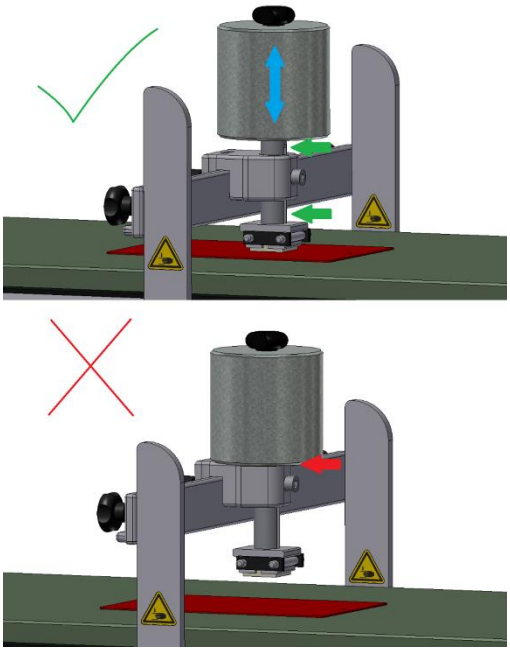
Risk of injury: Never hold the sample by hand during operation. It has to be fixed with an appropriate means, e.g. double sided adhesive tape.

Crockmeter tests are carried out in machine mode „Crock/Scrub“. Press menu on the touchscreen -> Setup -> Machine mode, choose „Crock/Scrub“, the sign appears in the display.

- Place the device on a solid, even surface.
- Level the apparatus using the included spirit level. To do so, place the spirit level on the sample tray and adjust the levelling feet (8) until the ZAA 2600 is levelled perfectly. The glass plate must be firmly in place.
- Place the sample.
  - Use the glass plate with the glass side facing up for very thin samples.
  - Use the glass plate with the printing blanket facing up for thicker samples.

Fix the samples with a double sided adhesive tape on the glass plate in order to get homogeneous friction lanes.

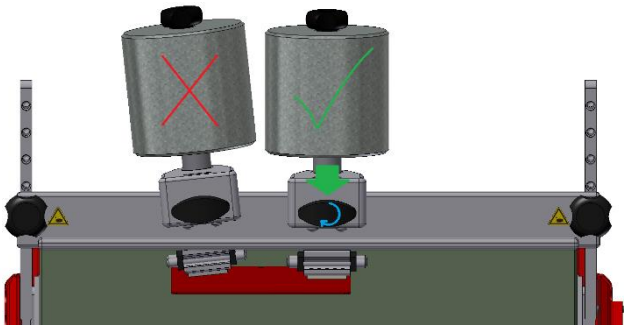
- Move the tool holder (18) either with ▲ or manually to the back position of the sample.
- Mount the chosen friction finger set (see chapter 8.4 “Mounting the friction finger sets” as from page 49.
- Adjust the correct height of the tool holder-bridge (4) with the height adjustment for tool holder (6).



The friction finger must be able to move up and down – as shown on the picture – it must not sag.

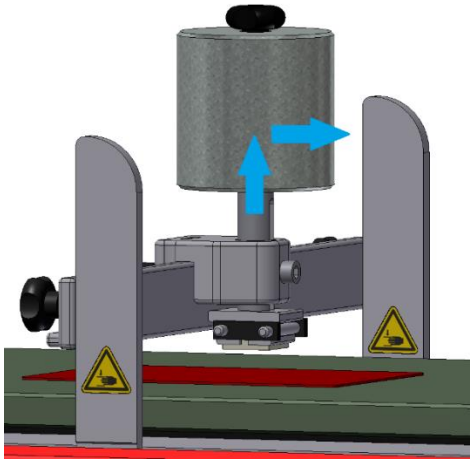
Make sure that the tool holder-bridge (4) is mounted horizontally. It must not be tilted.

- Fix the friction finger set onto the tool holder-bridge (4) and fasten it with the screw. The holder has to bear on the bridge horizontally.



The holder has to be vertical when fixing it.

- If necessary, adjust the position of the friction finger set above the sample by lifting the weight and pushing the tool holder-bridge (4).



- Press the „Zero“ symbol  on the touchscreen to set the start position.
  Note: Do not zero directly at the start stop (1), but at least ca. 3 mm in front.
- Set the number of double strokes and stroke length on the touchscreen. (refer to chapter **Error! Reference source not found.** “**Error! Reference source not found.**” on page **Error! Bookmark not defined.**).

Set the right stroke length: The testing head has to remain on the sample over the whole stroke length.

Check the correct fit of the friction finger set before starting the procedure.

Do not lean over the unit during operation in order to avoid touching the tool holder (18).

- Start the crocking procedure by tapping on the symbol  .
- Create the evaluation and test report according to the standard.

9 Scratch and mar resistance tests

9.1 Preparation

To carry out scratch and mar resistance tests, at least one scratching set is needed. Some standards or test procedures require additional equipment and auxiliary material.

For available options for scratch and mar resistance tests please refer to chapter 3.2.4 “Accessories for ZAA2600.C for scratch and mar resistance tests” on page 18.

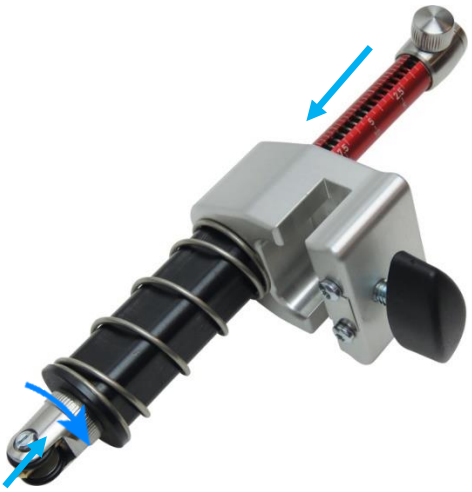
9.2 Mounting the scratching and mar resistance sets

For further information on operation please refer to the instruction manual of the ZHT 2093.

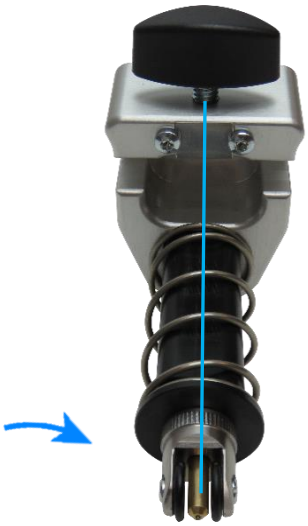
- Loosen the head by turning it anti-clockwise.

- Remove the spring.

- Choose the required spring (See separate manual.)
- Insert the plastic pin delivered with the adapter into the spring on the side of the marking.
- Insert the spring with the pin ahead into the grip.



- Insert the grip into the black telescope bar of the adapter (ACC1287).
- Screw the head onto the grip and fasten it.



- Turn the head clockwise until the wheels point in the direction of movement in relation to the grip.

9.3 Carry out scratch and mar resistance tests

Never touch any moving parts during operation.
The side panels (15) must always be mounted during operation.
Risk of injury: Never hold the sample by hand during operation. It has to be fixed with an appropriate means, e.g. double sided adhesive tape.

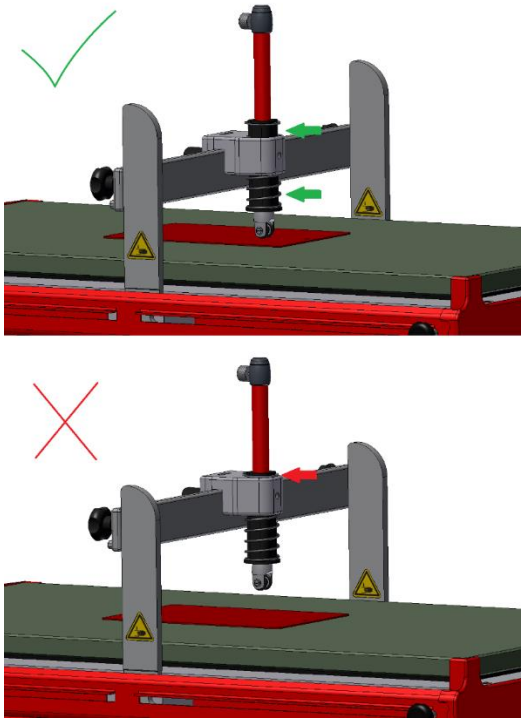
Scratch tests are carried out in machine mode „Applicator“ in moving mode „Single“. Go to the menu on the touchscreen -> select Setup, set the machine mode to „Applicator“, visible through an arrow ↓ on the touchscreen.

- Place the device on a solid, even surface.
- Level the apparatus using the included spirit level. To do so, place the spirit level on the sample tray and adjust the levelling feet (8) until the ZAA 2600 is levelled perfectly. The glass plate must be firmly in place.
- Place the sample.
- For very thin samples use the glass plate with the glass side facing up.
- For thicker samples use the glass plate with the printing blanket facing up.

In order to get straight scratch marks fix the samples with a double sided adhesive tape.

- Move the tool holder (18) either by tapping the symbol  or by hand to the back part of the sample.
- Pre-assemble the chosen scratching tool see section 3.2.4.

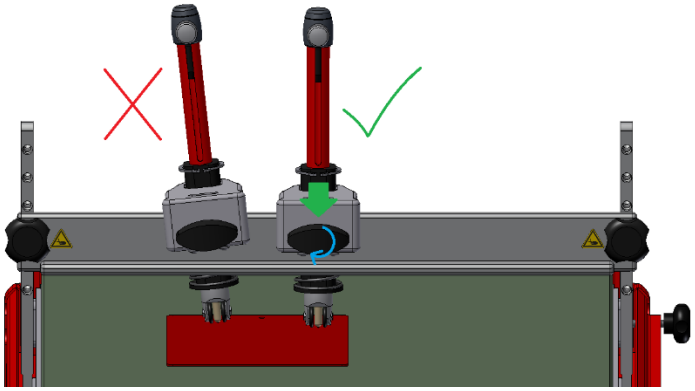
- Adjust the height of the tool holder-bridge (4) with its height adjustment (6).



The scratching tool has to bear on the wheels and must not be at the telescopic stop.

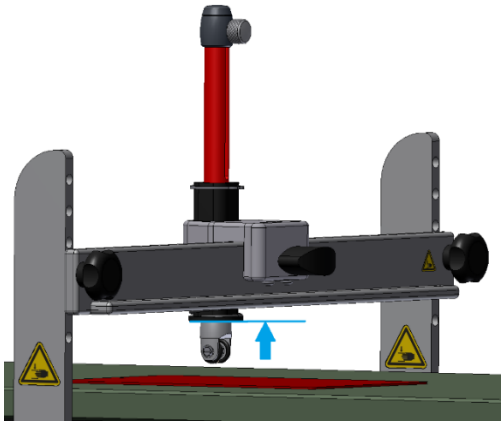
Make sure that the tool holder-bridge (4) is mounted horizontally. It must not be tilted.

- Fix the scratching set onto the tool holder-bridge (4) and fasten it with the screw. The holder has to bear on the bridge horizontally.



The holder has to be vertical when fixing it.

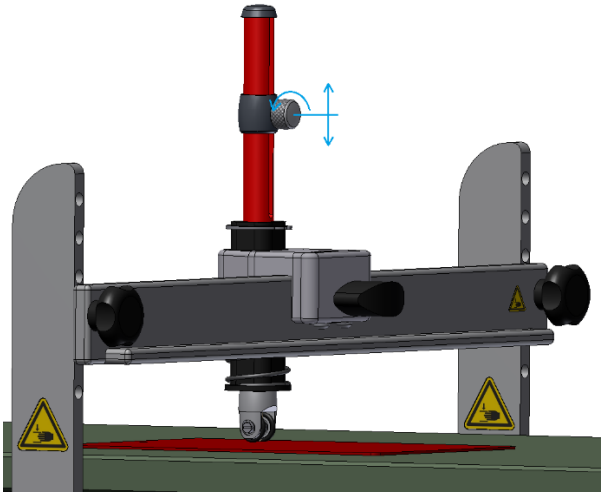
- If necessary, adjust the position of the scratching set above the sample by lifting the adapter and moving it on the tool holder-bridge (4).



- Press the „Zero“ symbol  on the touchscreen to set the start position.

Note: Do not zero directly at the start stop (1), but at least ca. 3 mm in front.

- Set the spring load.



- Set the stroke length on the display (see section 10.1.6, *Setting the Stroke Length*).

⚠ Set the right scratching length: The testing head has to remain on the sample over the whole stroke length.
⚠ Check the correct fit of the scratching set before starting the procedure.
⚠ Do not lean over the unit during operation in order to avoid touching the tool holder (18).

- Start the scratching test by tapping on the symbol ↓.
- Create the evaluation and test report according to the standard.

10 Operation and Menu

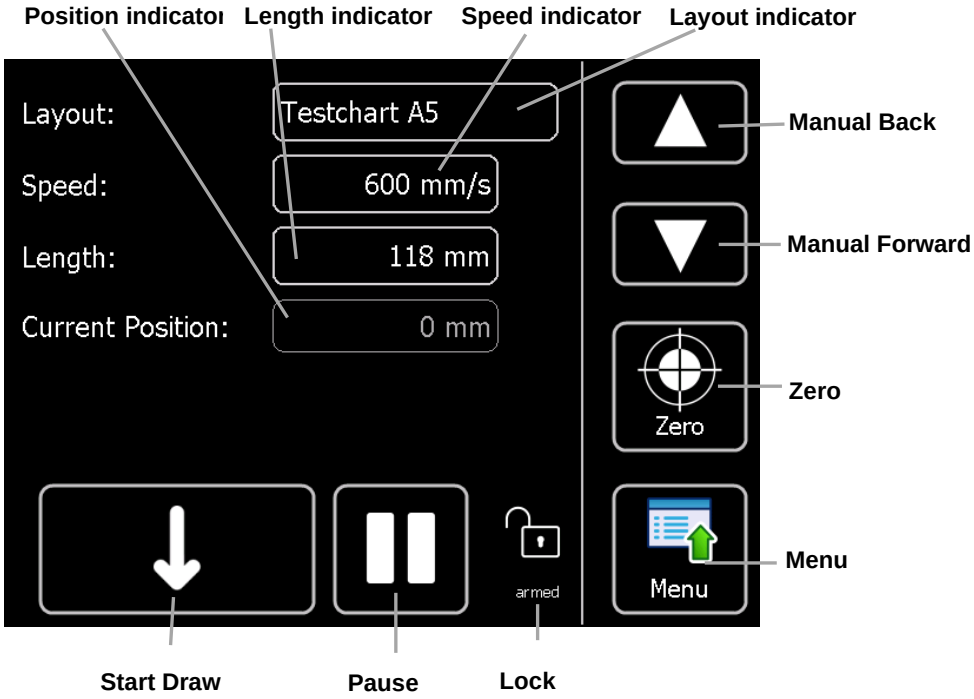
10.1 Main screen

The ZAA 2600 is equipped with a capacitive touch screen with a glass front. The touch screen is configured to allow operation with gloves up to 1 mm thickness.

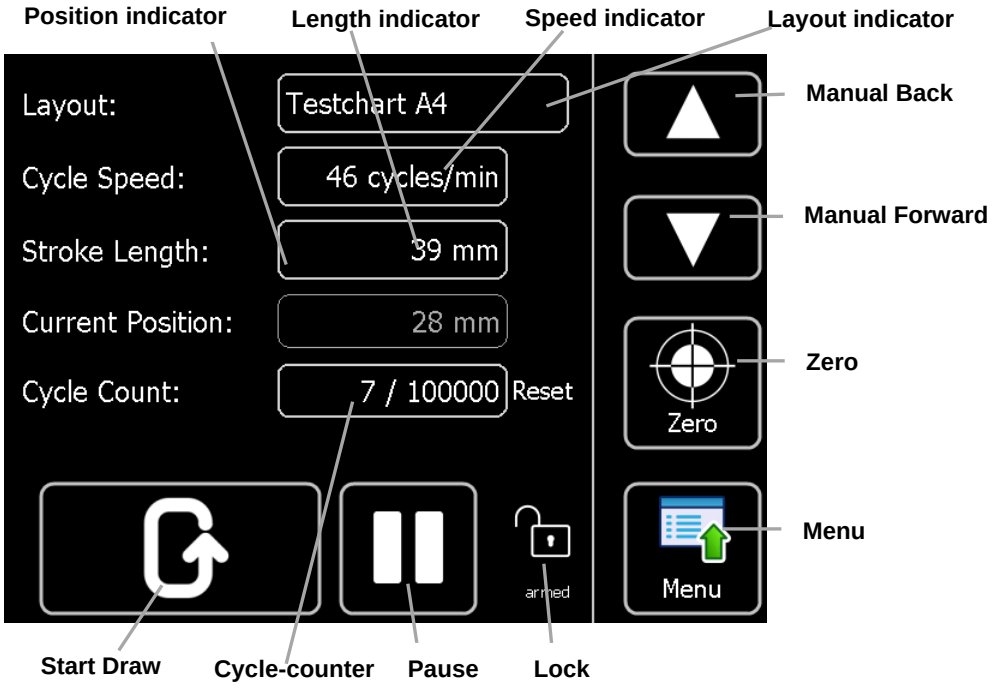
The most important settings can be accessed directly from the main screen. The menu is used for any additional settings.

The main screen content is depending on the currently set function.

Main screen for Film application:



Main screen for Film application:



10.1.1 Manual moving

The drawing unit (20) can be moved using the „Manual forward“ and „Manual back“ buttons.

If one of these buttons is pressed, the drawing unit (20) starts to move slowly.

If the button is pressed and held for more than a second, the speed will increase.

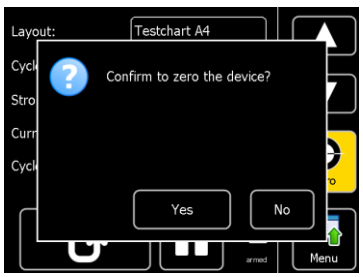
Alternatively the drawing unit (20) can also be moved by hand by applying forward or backward pressure at the middle of the weight (7).

10.1.2 Zero the unit

Film application: Zero the drawing unit

The current position of the drawing unit (20) can be set to 0 by pressing the „Zero“ button.

Film testing: Zero the scrub tester



The current position of the tool holder (4) can be set to 0 by pressing the „Zero“ symbol Confirm the appearing message with „yes. Should this button be pressed accidentally during the procedure, you can abort the zeroing process by pressing “no”.

Note: Do not zero directly at the start stop (1), but at least ca. 3 mm in front.

10.1.3 Start

Film application: start the draw

The application procedure is started by pressing the „Draw“ button.

Depending on the drawing mode selected, the draw button shows a straight arrow for “Single” mode or a curved arrow for “Reverse” mode.

Film testing: start the scrubbing/crocking

The scrubbing/crocking procedure starts when pressing the „Scrubbing“ button .

The meter counts the double strokes made. The scrubbing procedure stops automatically when the set number of double strokes has been reached.

One double stroke equates to one forward and backward movement of the tool holder (4).

10.1.4 Pause

The application process can be interrupted by pressing the „Pause“ button.
The drawing process continuous when the „Draw“ button is pressed again.

10.1.5 Select Layout

The layout indicator shows the name of the currently selected layout. A layout is a renameable memory slot storing a drawing speed and a drawing length. This is especially useful for recurring tasks where the same speed and length are required.

The current layout can be selected by tapping the layout field.

10.1.6 Settings

Film application: Setting the drawing speed

The drawing speed can be set by tapping the Speed field. A slider will appear on the right side of the screen to change the value. The value can also be changed by using the and buttons.

The adjusted value of the drawing speed will automatically be saved in the currently selected layout.

Film application: Setting the drawing length

The drawing length can be set by tapping the Length field. A slider will appear on the right side of the touch screen to change the value. The value can also be changed by using the and button.

The adjusted value of the drawing length will automatically be saved in the currently selected layout.

If the drawing area is defined through the manual stops (1 & 2), the drawing length should be set to a high value, e.g. 400 mm. The drawing process will no longer be defined by the set length and will automatically stop when it reaches one of the stops.

Film Testing: Setting the cycle speed

The double stroke speed can be set by tapping the Speed field. A slider will appear on the right side of the touch screen to change the value. The value can also be changed by using the + and − button.

The preset double stroke speed will automatically be saved in the currently selected layout.

Film Testing: Setting the stroke length

The stroke length can be set by tapping the Length field. A slider will appear on the right side of the touch screen to change the value. The value can also be changed by using the + and − button.

The preset stroke length will automatically be saved in the currently selected layout.

10.1.7 Position

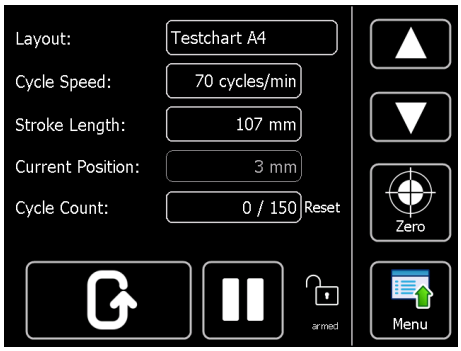
The position field shows the current position of the drawing unit (20) relative to the previously defined zero position.

10.1.8 Menu

The menu can be opened using the „Menu“ button. Various settings can be changed from here.

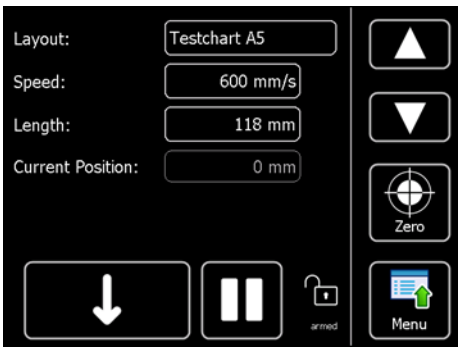
As the ZAA2600 is an universal film application and test system, the unit perform film application as well as various film testing, if equipped with the appropriate modification set.

E.g. crocking, scrubbing or scratching tests can also be made with the device. These functions are always integrated in the menu, however they are not working without the modification sets.



If you see this screen, the device is in film testing mode (scrubbing/crocking). Go back to the application mode as follows:

Open the menu , select „Setup“and „Machine Mode“, then tap „Applicator“.



If you see this screen, the device is in film application mode. Go back to the scrubbing mode as follows:

Open the menu  , select „Setup“and „Machine Mode“, then tap „Scrubbing“.

10.1.9 Movement lock

The movement lock blocks all movement commands of the drawing unit (20). It can be activated and deactivated by tapping the lock button.

If the button is in the „armed“  setting, all functions are active.

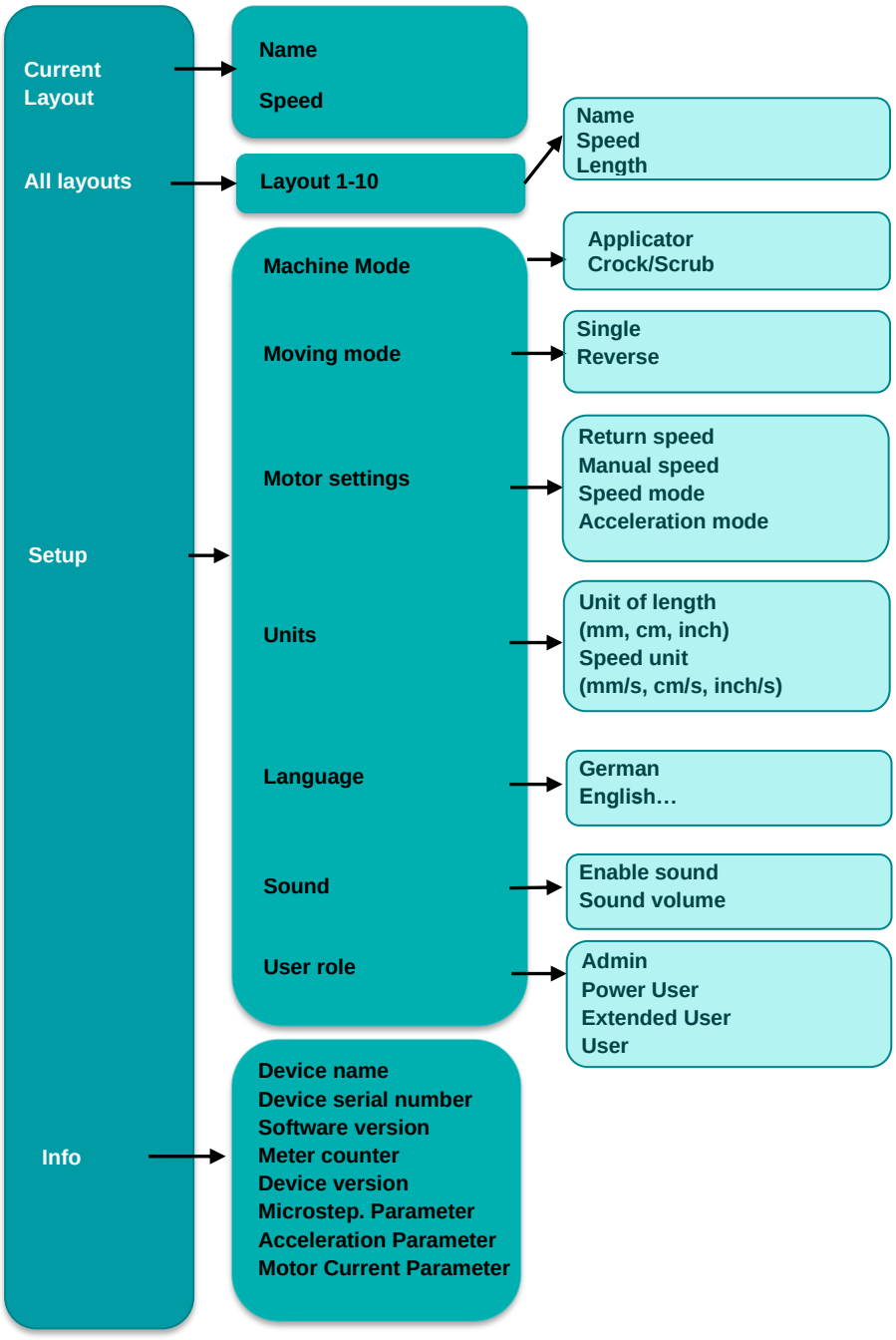
If the button is in the „locked“  setting, the functions „Draw”, “Manual forward” and “Manual back” are locked.

The „locked“ setting prevents the moving of the drawing unit (20) when touching the screen accidentally.

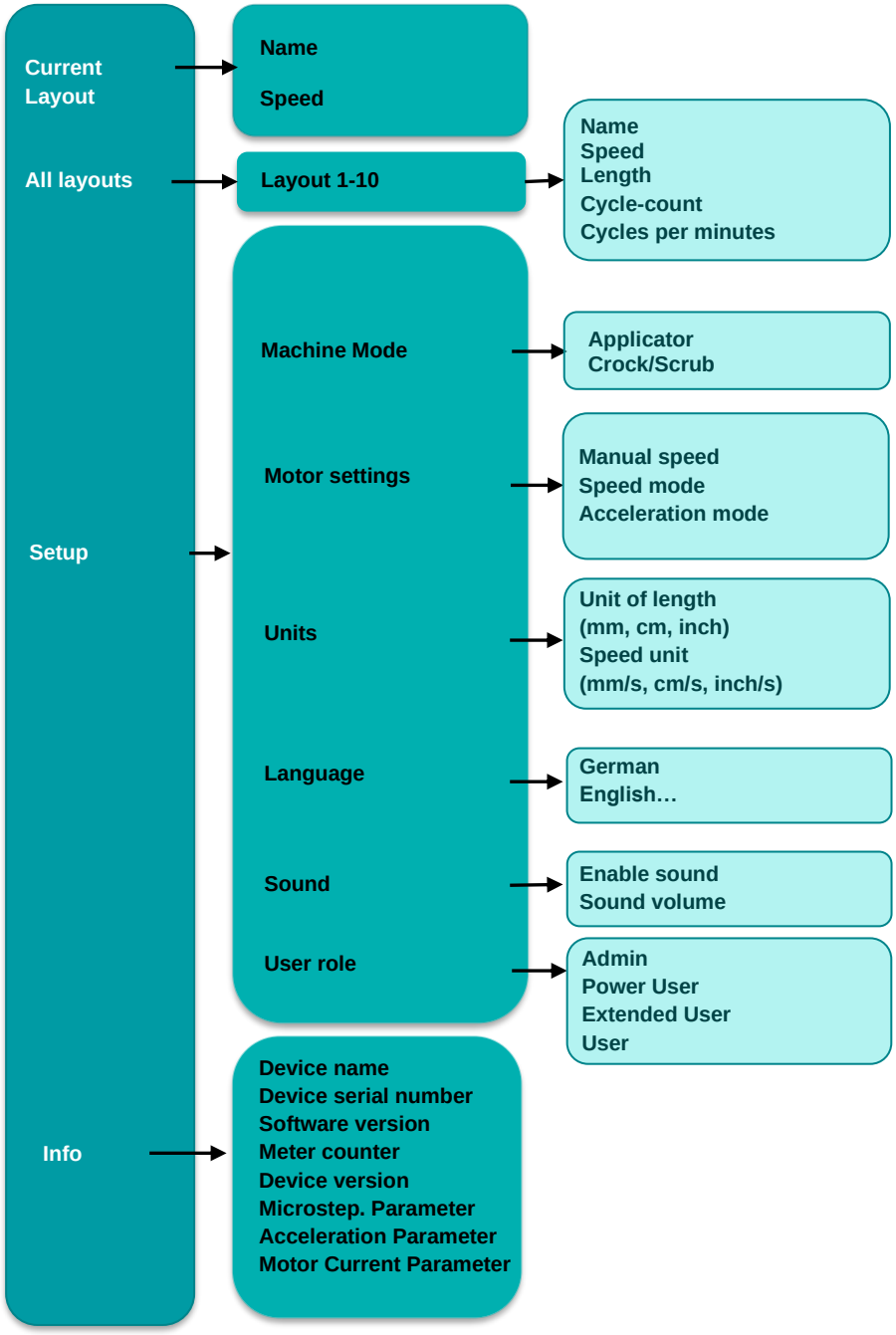
10.2 Menu structure

The menu structure is different, depending on the operation mode of the unit (film application/film testing).

10.2.1 Menu Structure – Film Application mode



10.2.2 Menu Structure – Film Testing (Scrubbing/Crocking) mode



Open the menu by pressing the „Menu“ button.

Go back a level by pressing the „Back“ button.

Return to the main screen by pressing the „Home“ button.

10.3 Using layouts

Layouts are memory slots with a custom set name which hold a saved application profile (drawing speed and length). Using layouts for recurring tasks, these parameters can easily be saved and recalled at a later point.

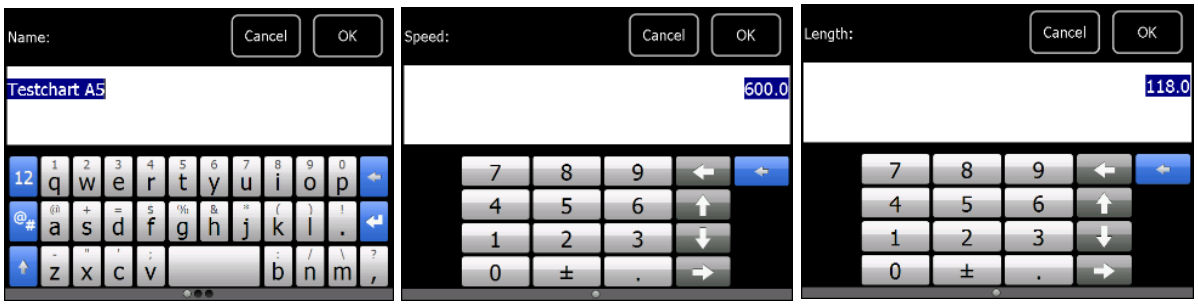
There are 10 layout slots available. Layout settings can be changed as follows:

10.3.1 Selecting a layout

The current layout can be selected by tapping the layout field on the main screen.

10.3.2 Editing the selected layout

To edit the currently selected layout, choose „Selected layout“ in the menu. The parameters „Name“, „Speed“ and „Length“ can be adjusted by tapping the values, entering the desired adjustment and confirming it with “OK”.



Return to the main screen by tapping the „Home“ button.

The speed and length settings can also be changed directly from the home screen. To adjust the values tap on the speed, respectively on the length field and either use the slider or the + and − buttons. These settings will be saved automatically in the selected layout.

10.3.3 View and edit all layouts

To show all existing layouts, select „All layouts“ in the menu. A list of all saved layouts will be displayed. The active layout will be shown as “selected”.

To change the name or settings of a layout, tap the relevant entry in the list. The values can then be changed in the same way as described in chapter 10.3.2.

10.4 Motor settings

Various settings for the drive motor can be changed via „Settings“ -> „Motor settings“ in the menu.

10.4.1 Return speed

Return speed sets the speed at which the holding device (8) returns automatically to the zero position after application when in „Reverse“ mode. (only applicable in Film Application mode)

10.4.2 Manual speed

Manual drive speed sets the speed at which the drawing unit (20) moves when using the „manual back“ or “manual forward” buttons.

10.4.3 Speed mode

There are two speed modes:

Normal 0 – 300 mm/s:	The normal speed mode is appropriate for most uses.
Fast 0 – 600 mm/s:	The fast mode is for applications requiring high drawing speed.

If not specifically required otherwise, it is recommended to use the „Normal“ speed mode for most applications.

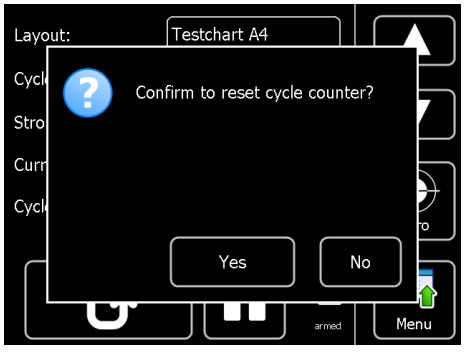
10.4.4 Acceleration mode

There are three different acceleration modes:

Normal	The normal mode is appropriate for most uses.
Increased	The increased acceleration is for uses where the top drawing speed needs to be reached quickly.
High	The high acceleration mode is only appropriate for uses with very high speed, requiring the top drawing speed to be reached as fast as possible. High acceleration mode can lead to a jerk at the start of the drawing process.

If it is not specifically required otherwise, it is recommended to use the „Normal“ acceleration mode for most applications.

10.4.5 Reset cycle counter



With the „Reset“ button the cycle counter (double stroke counter) will be reset. This cannot be undone.

If the „Reset“ button has been tapped this message appears which has to be either confirmed or rejected.

Only in Film Testing (Scrub/Crock) Mode.

10.5 Status messages

10.5.1 Overload

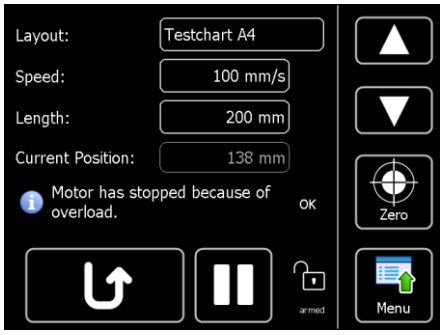


Figure 1:Main screen - Film Applicator

"Motor has stopped because of overload. “This message is only an information, you can tap either on “OK” or move forward with or (respectively). Should this message be displayed repeatedly during application, the applicator/scrubbing/crocking resistance is probably too high.

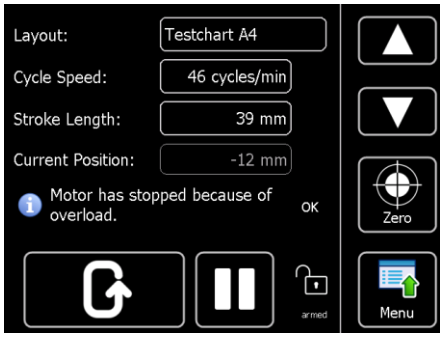
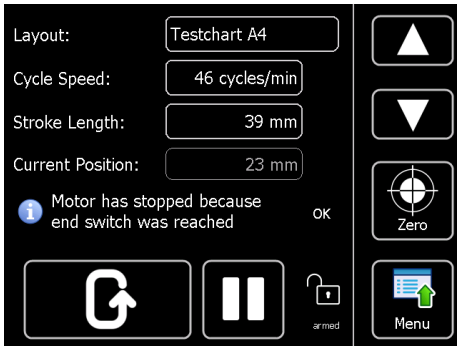


Figure 2: :Main screen - Film Applicator

A possible solution could be to increase the acceleration mode. Select “Setup” and “Motor Settings”, then “Acceleration mode” and tap „Elevated“ in the menu.

10.5.2 End switch

This message can only appear in film testing (scrubbing/crocking):

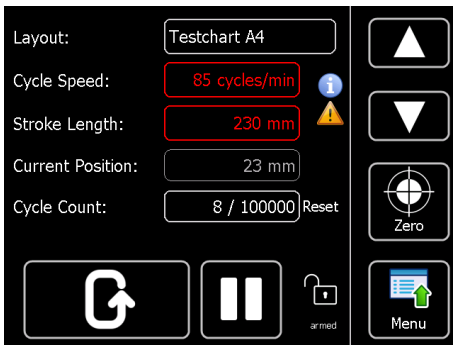


„Motor has stopped because end switch was reached“. The preset stroke length exceeds the position of the end switch. It is recommended to always move the end stop (2) completely to the front and the start stop (1) completely to the back part of the device.

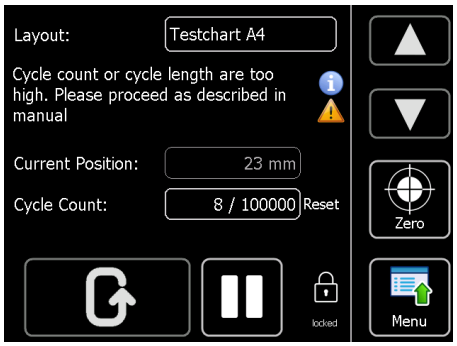
Solution: Move the end stop (2) completely to the front of the device and press „OK“ or „Scrubbing“ afterwards.

10.5.3 Cycle speed and stroke length cannot be set

This message can only appear in film testing (scrubbing/crocking):

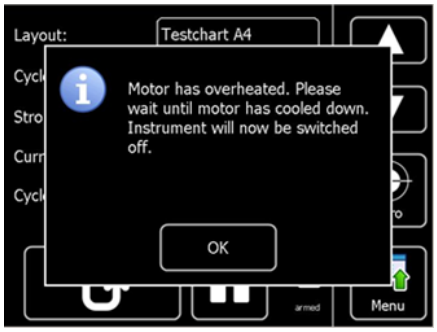


The fields for cycle speed and stroke length are marked red. After tapping on the information symbol a message will appear that either the cycle counts or the cycle speed are too high.



Solution: The motor cannot reach the preset number of double strokes with the preset stroke length and speed. Either the double stroke (cycle) speed or the stroke length has to be reduced. Alternatively, the acceleration mode or speed mode of the motor can be adjusted. For this see section 10.4.

10.5.4 The motor is overheated



If the motor of the unit is overheated, this message appears and the current action will be interrupted automatically until the motor has cooled down. Confirm the message with OK, the device switches off. Let the device cool down before switching it on again. Arrange for enough ventilation around the device. The unit must not be operated outside of the allowed temperature range.

10.5.5 Lubrication the guide rods

After a service performance of about 2’000 km a message will appear at startup reminding you of to lubricate the guide rods. Carry out the lubrication as described in section 15.3.

To switch off the reminder until the next interval choose “Do not show this message again” and close with OK.

10.6 Emergency Stop function

Pressing the Emergency Stop button (11) immediately stops the motor. The power supply of the motor is interrupted so that the drawing unit (20) can be moved by hand.

The touch screen and control unit of the ZAA 2600 remain active since only the power supply is interrupted.

To unlock the Emergency Stop button, turn it counterclockwise.

The following message will be displayed after unlocking the Emergency Stop:

The Zero position must be reset. Move the drawing unit (20) to the desired starting position and press the „Zero” 

button.

11 Turning the glass plate of a ZAA2600.A

- Make sure that the adjustable start stop (1) and the drawing unit (20) are positioned in the very back of the device and that the clamping device (5) is released.

- Lift the weight (7) and hinge it into the top position of the holding device (8).
- Carefully lift the glass plate at the front edge and pull it out of the apparatus.

- Turn the plate over and carefully place it back into the holder with the required side facing up.

12 Removing the heating plate of a ZAA2600.HA

If the glass plate is needed for application, the heating plate has to be removed. Change the plate as follows:

- Make sure that the adjustable start stop (1) and the drawing unit (23) are positioned in the very back of the device and that the clamping device (5) is released.
- Lift the weight (7) and hinge it into the top position (6) of the holding device (8).
- Carefully lift the heating plate at the front edge and pull it out of the apparatus.

- Carefully place the glass plate into the holder with the required side facing up. Use the printing blanket when working with a wire-bar applicator or profile rod, the glass surface when working with a gap applicator.

13 Converting from applicator into basic unit

Thanks to its modular construction, the automatic universal unit can be equipped with different kits for carrying out also, scrub resistance, washability, crocking and scratch resistance tests as well as recording of the drying time.

Before mounting an optional modification set, the device has to be converted to basic unit.

To reach the basic unit condition follow the instructions of section 5.2.1.

14 Converting from basic unit into applicator

In order to prepare the device for the application mode follow the instructions of section 5.

⚠ Always unplug the power cable before assembling and/or converting the unit.

15 Maintenance and Cleaning

15.1 Maintenance and cleaning work that can be carried out by the user

Only the following maintenance and cleaning work shall be carried out by the user:

- Outer cleaning of the apparatus (see section 15.2)
- Periodical lubrication of the guide shafts (see section 15.3)
- Replacing of the fuse (see section 15.4)
- Inspection (see section 15.5

All other maintenance and repair work shall only be carried out by **Proceq SA** or an authorized Proceq Partner otherwise all guarantee and liability claims are void.

15.2 Cleaning

In order to ensure a perfect function, the film applicator should be kept as clean as possible. Remove eventual stains of coating materials or adhesives immediately before they can dry. Later they can often only be removed with difficulty.

15.2.1 Cleaning of the apparatus

Use commercially available cleaning agents such as cleaning agent for glass, alcohol or benzine.

Do ***not*** use acetone, strong acids or alkaline liquids!

15.2.2 Cleaning of the printing blanket

Use only cleaning agents which do not affect the printing blanket.

Do ***not*** use solvents containing ketone such as acetone, or nitro-cellulose diluents.

Before cleaning the ZAA 2600, always switch off the apparatus and unplug it. Never immerse the apparatus in water or other liquids: Danger of short circuit.

While cleaning, take care that no cleaning liquid penetrates the interior of the apparatus. The function of electrical or mechanical components could be impaired.

The edge of the printing blanket of the glass plate must not get wet.

If the device has to be disinfected, do not use disinfectants that contain sodium hydroxide.

Never touch the hot plate, always wait until the heating plate has cooled.

15.3 Lubrication of the guide rods

From time to time it can be necessary to lubricate the guide rods with some sewing machine oil or something similar.

Before lubricating the guide rods of the ZAA 2600, always switch off the apparatus and unplug it.

No oil shall be sprayed into the apparatus. The function of electrical or mechanical components could be impaired.

For lubrication proceed as follows:

- Remove the inserted plate (see section 12).
- Remove both side panels (17) with the Allen key.
- Turn the apparatus carefully on one side so that the side opening of the cover becomes accessible.
- Put some drops of sewing machine oil on your finger and spread it over the whole length of the guide rods.
- Repeat this for the other side of the apparatus.
- Adjust the start stop (1) at the very beginning and the end stop (2) at the very end and let the apparatus run back and forth several times, so that the oil gets evenly distributed over the whole length of the rods.
- Remount the side panels (17), the one with slit on the right side, the other one on the left side.
- Place the plate again.

15.4 Replacing the fuse

If the apparatus cannot be switched on), this could be due to a defect fuse. You can replace the fuse yourself by opening the fuse holder (14) on the back of the apparatus between the main switch (15) and the power supply socket (13) carefully using a screw driver or a similar tool.

Before replacing the fuse of the ZAA 2600, always switch off the apparatus and unplug it.

Replace the fine fuse (14) only by an equivalent fuse of the same type with the same specification.
Observe that the inscription at the connection caps of the fuse corresponds to one of the following designations:

- T 0.8 A / 250 V
- T 800 mA / 250 V
- T 800 / 250 V.

- Clamp the new fuse into the fuse holder (14) and put it back in its place.

Should it still be impossible to switch on the apparatus, please contact **Proceq SA** or an authorized Proceq Partner.

15.5 Inspection

The instrument should be checked for proper condition by a qualified electrician at an interval of 2 years. Alternatively, this test may also be performed by **Proceq SA** or an authorized Proceq Partner.

16 Technical Specification

Drawing speed	1-500 mm/s (0.04“ – 16.69”), stepless adjustable
Resolution	1 mm/s (0.04”/s)
Tolerance of drawing speed	±1 %,
Touchscreen display	5.7“, TFT (LCD) colour, VGA resolution, LED backlight
Material	*Housing* red anodized aluminium *Glass plate* glass *Printing blanket* rubber coated cotton *Polyester mat* Polyester
Dimensions apparatus (LxWxH):	695 x 355 x 240 mm (27.36 x 13.98 x 8.27”)
Dimensions glass plate (LxWxH)	553 x 300 x 15 mm (21.77 x 11.81 x 0.59”)
Weight	**without glass plate** 17.6 kg (35.2 lbs) **with glass plate** 24 kg (48 lbs)
Application length	up to ≈393 mm (15.47“)
Application width	up to 300 mm (11.81”)
Power supply	115 VAC –230 VAC ± 10 %, 50 Hz / 60 Hz
Power consumption	108 W
Fuse power supply	0.8A / 250 VAC delay-action
Standards	depending on used accessories: ASTM D823
Warranty	2 years
Ambient Conditions *Operating*	*Temperature range:* 5°C to +40°C (41 °F to 104 °F) *Relative humidity:* 20% to 80%, no condensation *Sunlight:* Do not expose to strong sunlight for long period
Storage and transport	*Temperature range:* -20°C to +85°C (-68 °F to 185 °F) *Relative humidity:* 20% to 80%, no condensation *Sunlight:* Do not expose to strong sunlight for long period
Excess voltage category	Cat II (according to EN 61010-2-030)
Degree of soiling	2 (according to EN 61010-1) For indoor use only.
Protection class	1 (according to EN 61140)
Altitude	up to 2.000 m above sea level

For indoor use only.

For safety and liability information, please download at
https://www.screeningeagle.com/en/about-us/gtc-and-certificates

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