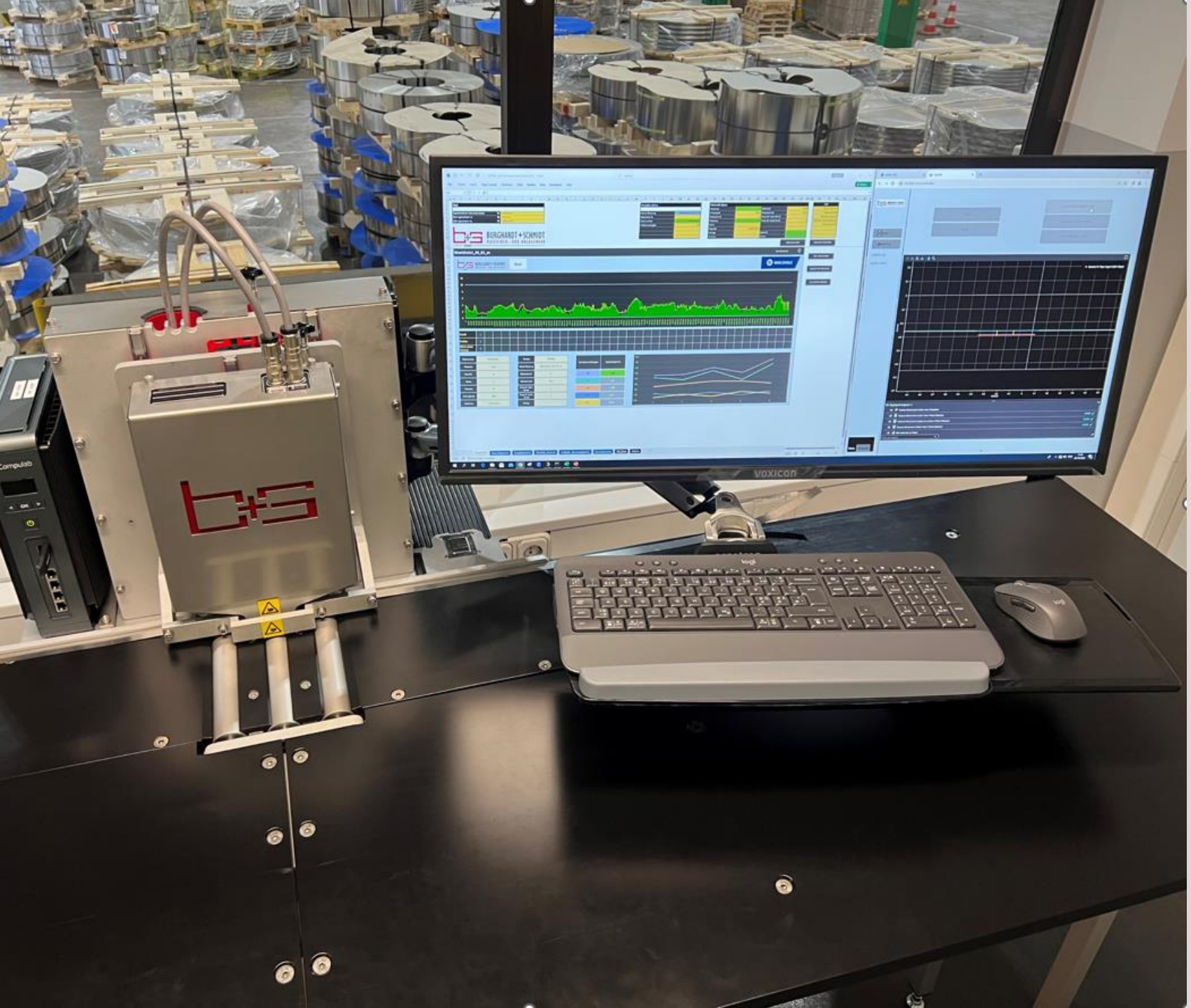
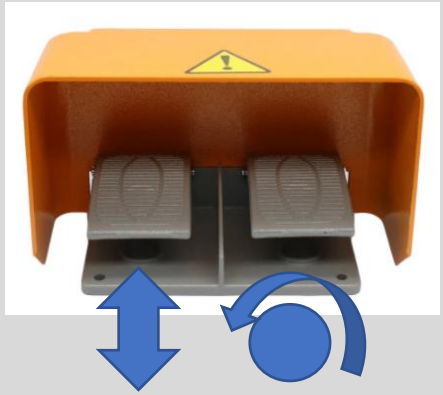


EP 100 + Operator manual

BURGHARDT+SCHMIDT
b+s group
GERMANY

Content

Safety information



- When using the system operator must follow company safety regulations and carefully read this instruction manual.

  It is recommended to use following, personal protection equipement:

  – Safety shoes **– Risk that heavy and sharp samples fall down !**
  – Safety glowes **– Risk for cutting due to sharp edges!**
  – Safety glasses **– Risk for eye damages when rotating the samples !**

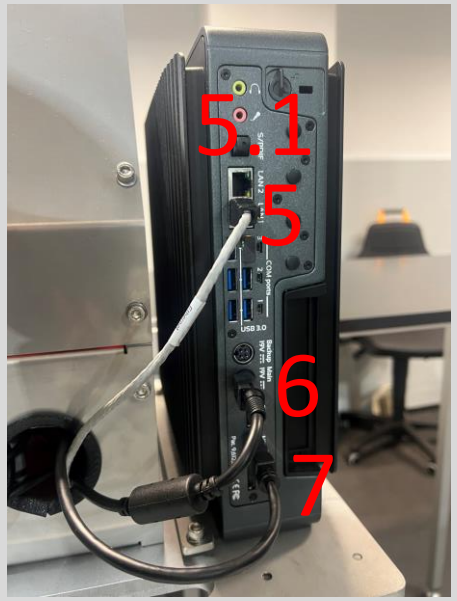
- The measuring system has a motorized lifting system for the upper guide rolls. System is lifted as long as the **left foot pedal** is pressed, when releasing the foot pedal they as lowered automatically. When releasing make sure you have no fingers under the upper guide roll frame, there is a minor risk of squezing your fingers**.**

- The measuring system has three driven lower guide rolls, that transports the sample as long as the **right foot pedal** is pressed. After the measuring head with its upper guide rolls has been lowered, remove the fingers from sample before pressing the right foot pedal. For wider samples it might be a need to support feeding slightly by holding the sample on the opposite edge to what is being measured.

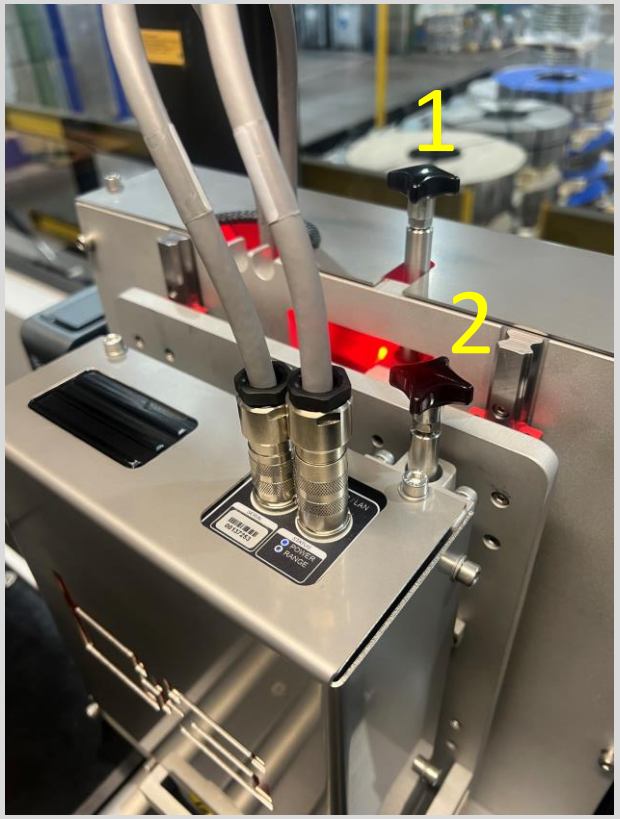
  Warning : There is a minor risk for squezing your fingers!!!!

Connections on the measuring system

- 1 – Power supply connector – Zentrale Anschluss von 120 -230 VAC / 6 A / 50 Hz
- 2 – Power supply connector to monitor.
- 3 – ON /OFF switch for LCI measuring head and monitor
- 4 – Speed regulator guide rolls
- 5 – **LAN 1** – Network connection to PC (from LCI measuring)
- 5.1 – **LAN 2** – Network connection to customer network
- 6 – Power supply PC
- 7 – HDMI connection to monitor

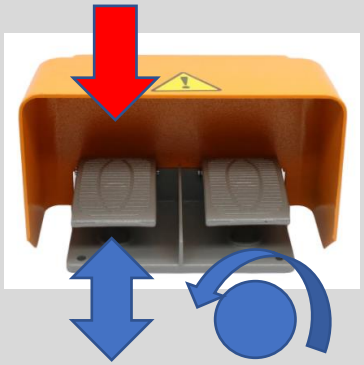


Adjustment of guide roll pressure



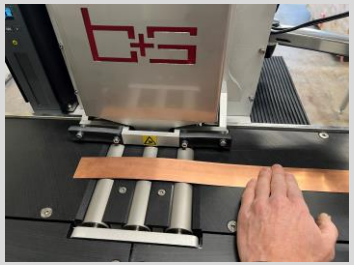
- 1 – Adjusts the pressure of the upper left and right guide roll.
  When rotating in **clockwise** guide roll pressure is **increased**
- 2 – Adjusts the pressure of the upper middle guide roll which is in connection with the measurig head.
  Wenn rotating **clockwise** guide roll pressure is **increased**

Thin and soft material might require less guide roll pressure to avoid deformation of the material.

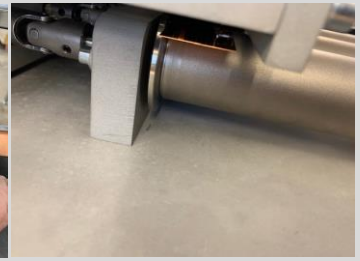


Insert the strip samples

- Press the left foot pedal to lift the measuring head and all upper guide rolls.



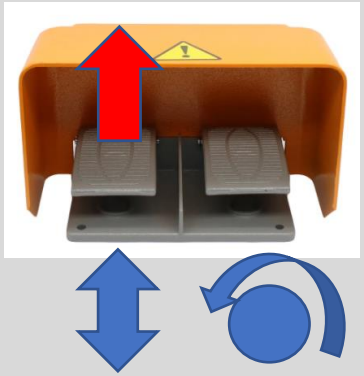
- Insert the strip sample against the rear flange on the ingoing table, make sure the beginning of the sample is located just outside the left guide roll.

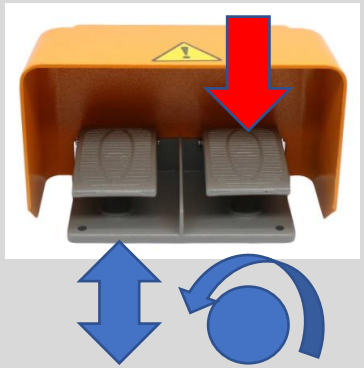


- Release the left foot pedal, measuring head and all guide rolls are now lowered via a linear motor

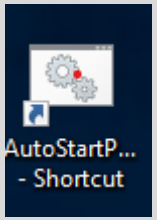
  Remove the hands from sample and press the right foot pedal to transport the strip sample underneath the measuring head. When measuring wider strip samples there migth be need to assist the strip feeding sligthly by pushing the sample, by holding the opposite edge to what is currently being measured.

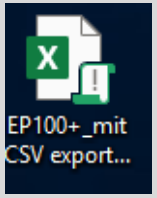
  Sample can be picked up at the exit side of the gauge once once it has been fed through the system.





Start GoHMI and Excel evaluation

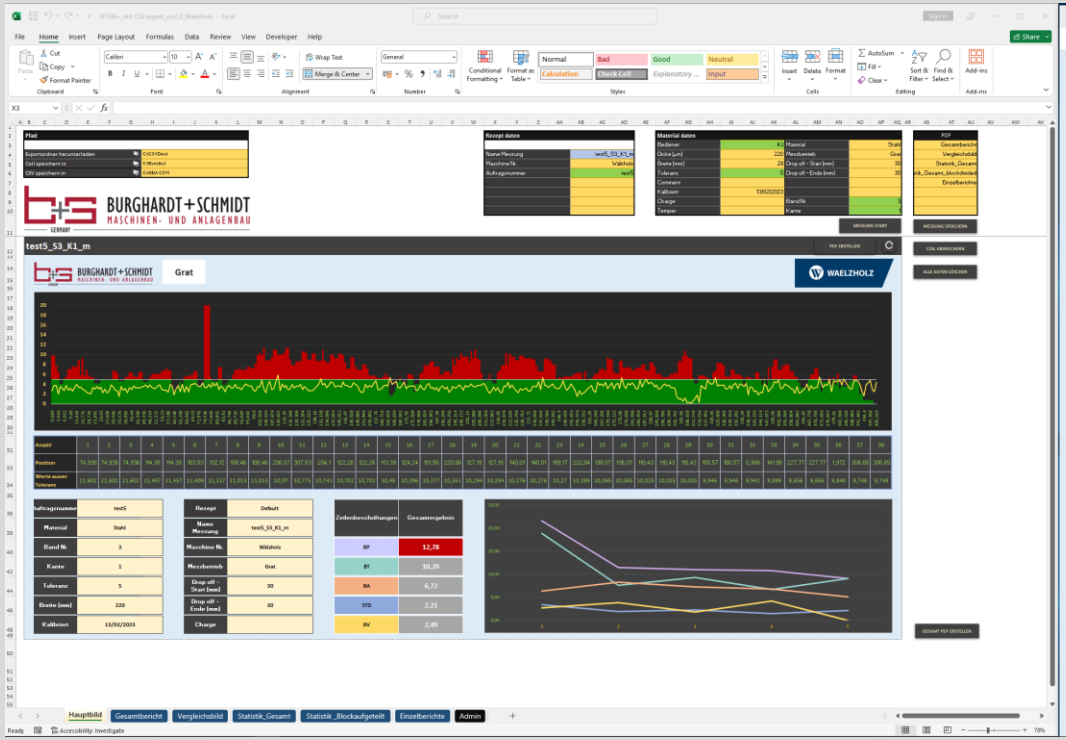


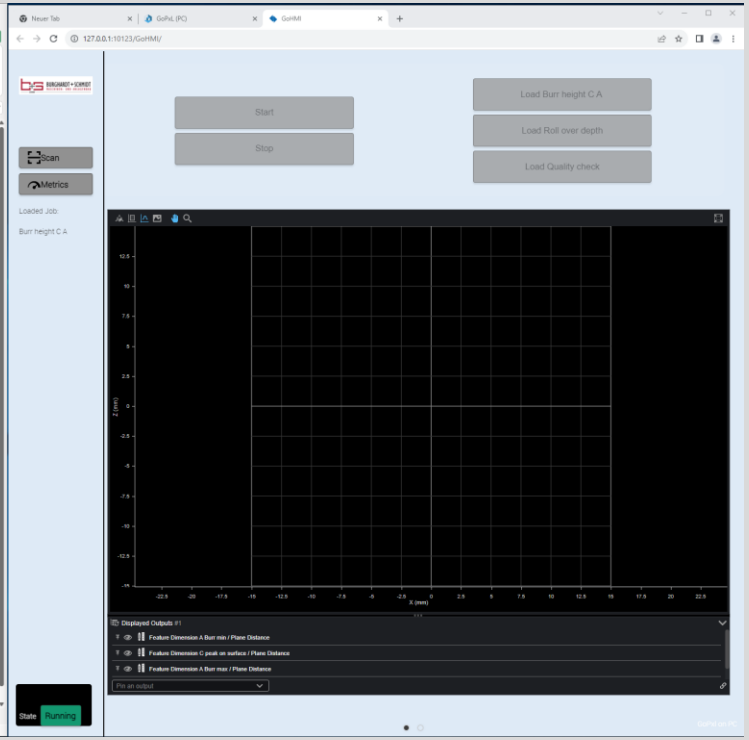


- **After new start of PC, double click on AutoStartPyScript.bat**
  Now GoHMI is started automatically which also establish connection to LCI measuring head.

- **Excel Evaluation** Doubel click on application **EP100 + ver 2.0 in the desktop** .
  Now both windows should appear as shown below.

- **Window size** It is possibel to adjst window sizes anyway you like, it also possible to only dipslay the Excel application which is the most common view.





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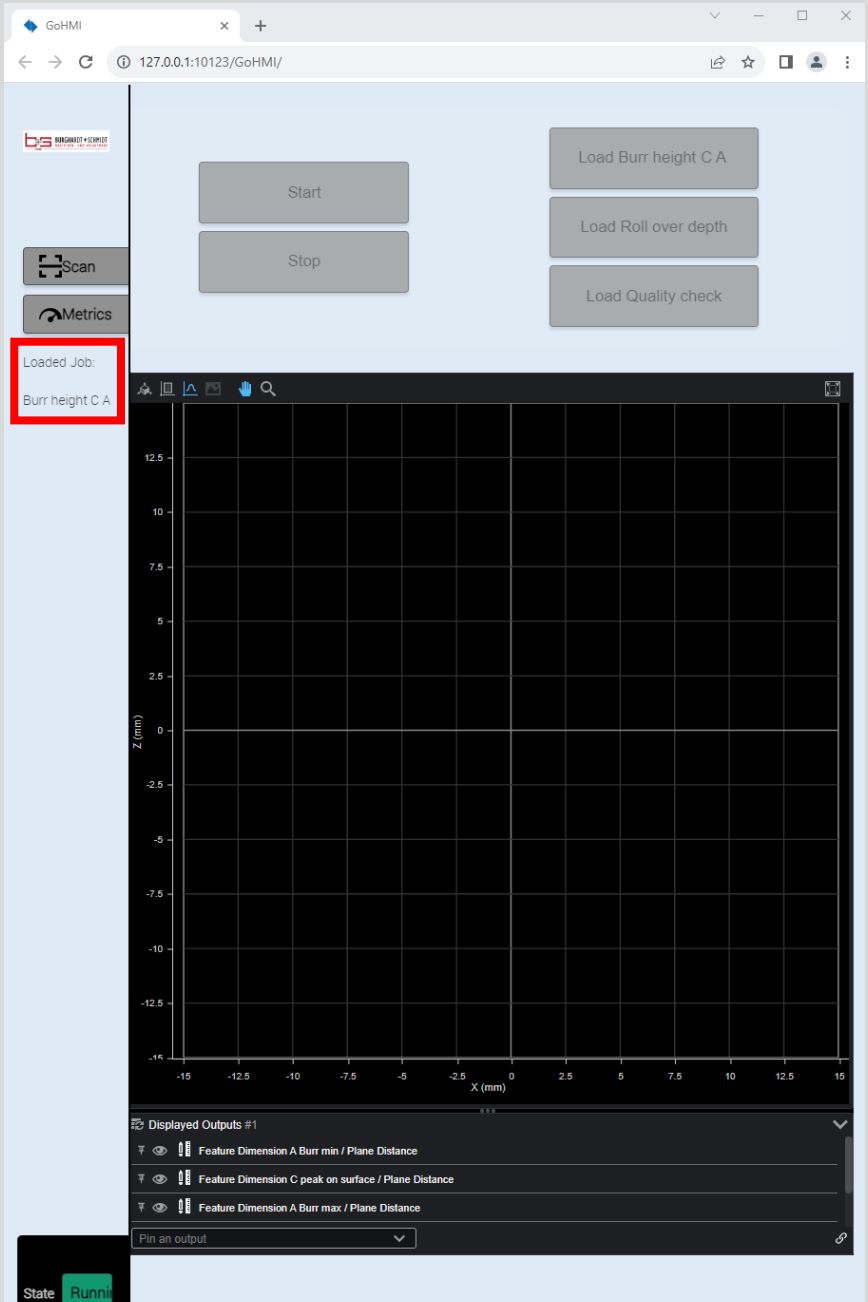
GoHMI



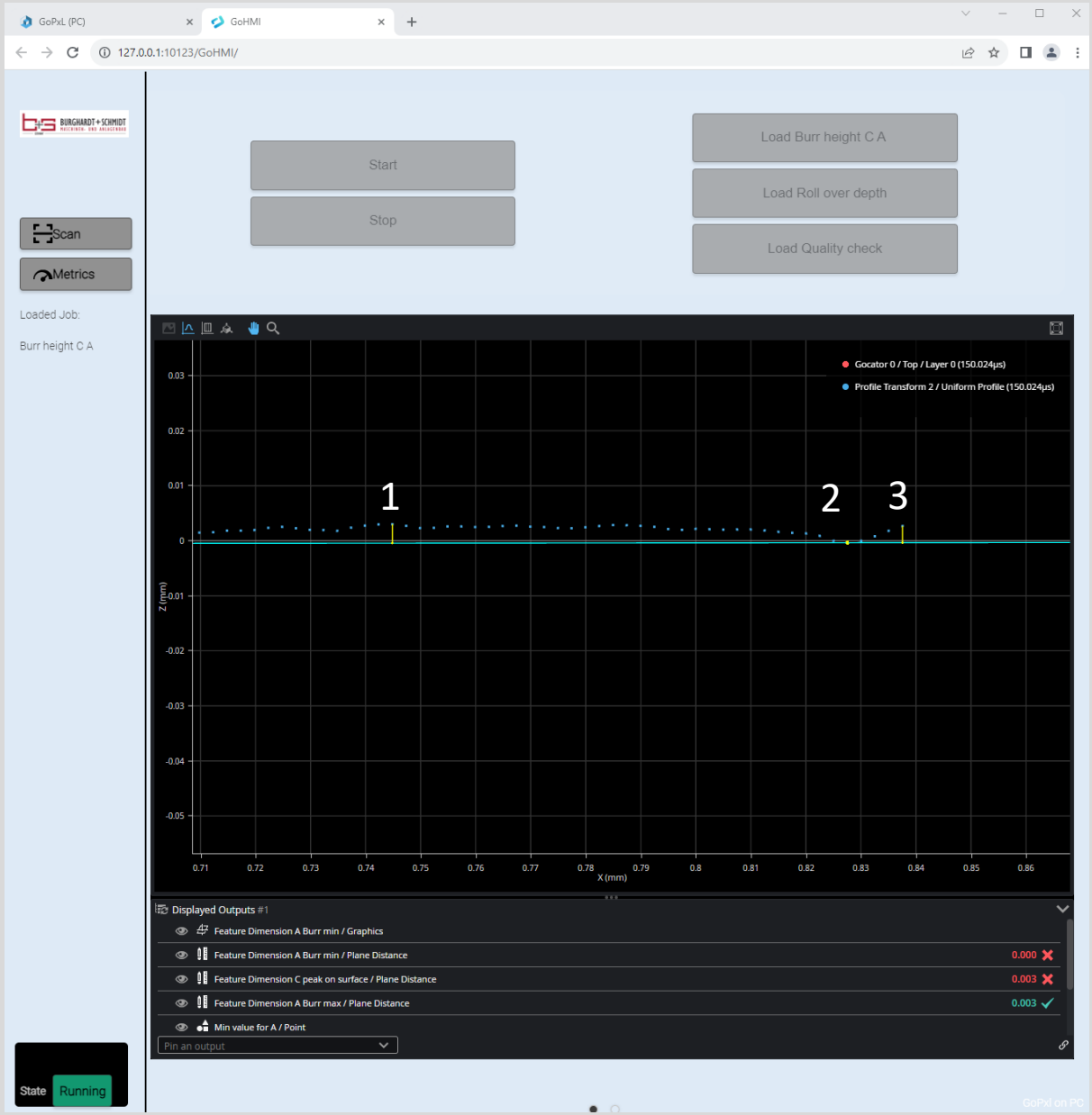
- **Funktions in the HMI window.**

- **Scan mode** - When clicking on **START** , scan mode is intiated which is shown on lower left corner in the picture.

- **Measuring mode**
  Load Burr heigth C – A for burr height measurement.
  Load Roll over depth for edge deformation, opposite side to burr side.
  Load Quality check with specimen is use to verify the measurement quality according to ISO standard using the supplied specimen.

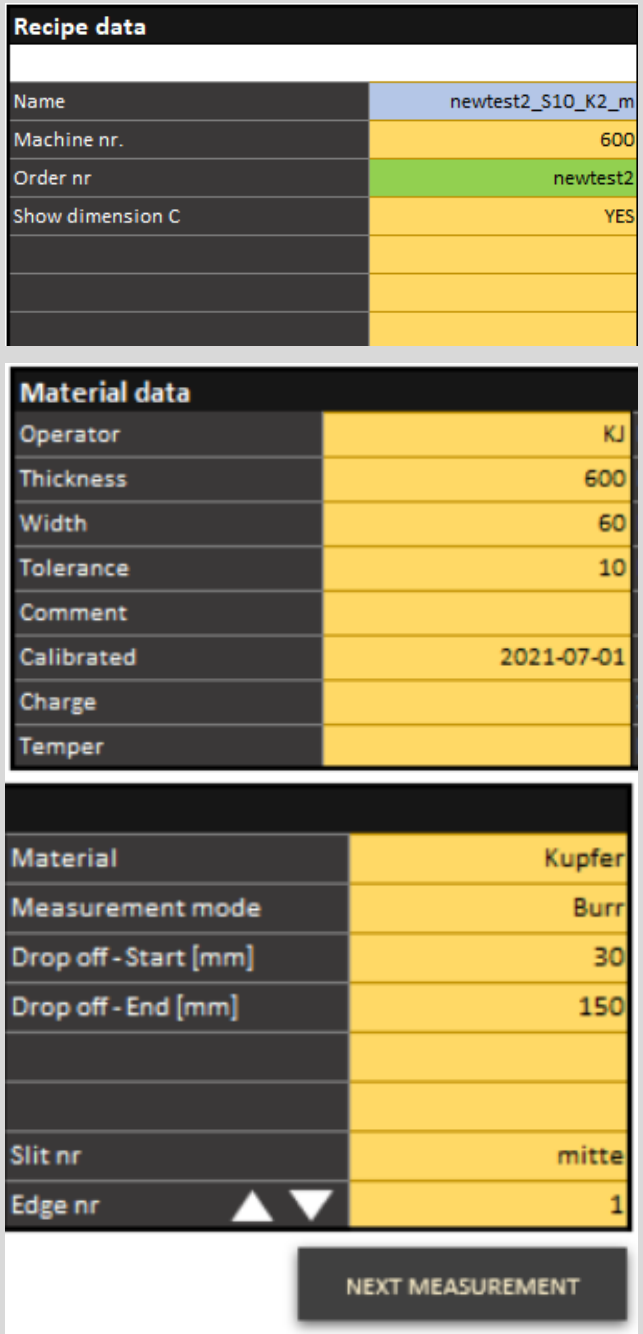
- **Indication of selected measuring mode**
  Red rectangle you can see the current active mode /loaded job

GoHMI - Profile presentation



During an ongoing measurement you can see the live profile .

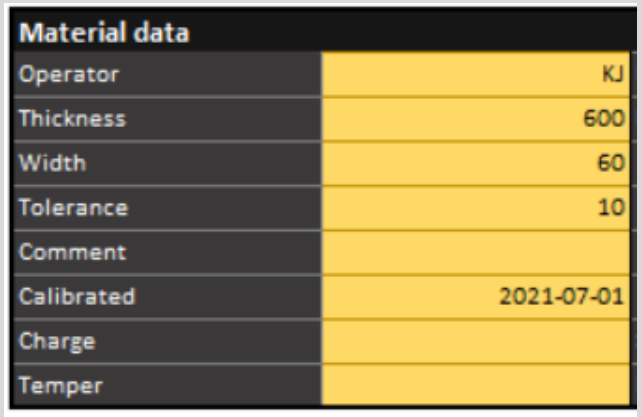
- **Profil curve** - Blue
- **1 Yellow dot** - **Current C value =** Deformation just before the Burr heigth . Is also shown as a numerical value below.
- **2 Yellow dot** - **Current Burr min =** Valley before the burr heigth . Is also shown as numerical below.
- **3 Yellow dot** - **Current burr heigth value =** Burr max A Is also shown as numerical value below.

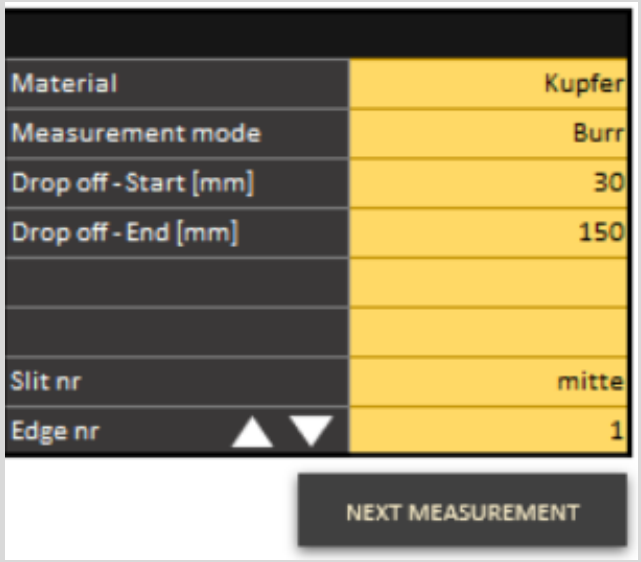


Preset and material data in control panel tab

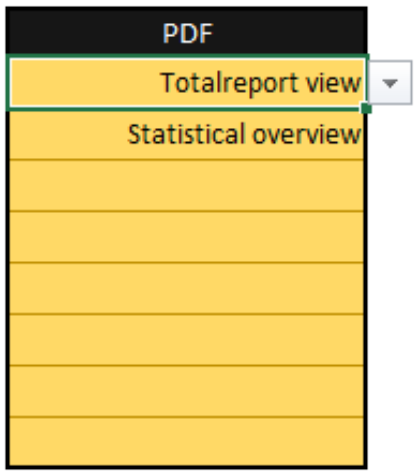
- **Name** – Here is the actual name of the measurment presented. It consists of **Coilnumber_Slitnr_Edge_number_m** and is generated automatically (not possible to modify this field)
- **Machine** – Only as information for the protocol.
- **Order nr** - Order number or unique mother coil number.
- **Show C value** - YES = yellow line is displayed along with burr heigth curve
- **Slit Nr.** – Numbering of slit or labelling as operator side, center, drive side
- **Edge Nr.** – Edge number, can be changed by arrow up and down or manually modified to a numerical number 1 – 4 .
- **Operator** – Only as information for the protocol
- **Thickness/ Width** – Only as information for the protocol
- **Tolerance** – Generates a graphical tolerance line in all protocols, for **Measuring mode Height** is must be positive number. For **Measuring mode Depth** it should also be a postive number that automatically will be considered as a **negative value**
- **Calibrated** – Only as information for the protocol, when last calibration was performed. (This information must be entered manually)
- **Charge** – Only as information for the protocol.
- **Temper** – Only as information for the protocol.
- **Dropp off Start, End** – After a measurement we blend out measuring data in the beginning and at the end of the strip sample wiht corresponding strip length values in [mm], this helps to avoid that poorly cross cuts of the samples falsifies the measurement data.

Next measurement under same coil number





- Press left FOOT PEDAL and insert new sample into the system, let go of FOOT PEDAL to lower guides rolls.
- Enter **Slit nr :** a **name** or a **numerical value**.
- Enter **Edge nr :** a numerical value or by clicking on the white arrows UP /DOWN so select correct number. Click on **NEXT MEASUREMENT** and then press the right foot pedal to start the acutual measurement
- Once strip has passed through the system, let go of FOOT PEDAL to start evaluation process.
- Click on STORE MEASUREMENT if you want to store it. If you don´t want to store measurement, simply repeat all steps above.



Additional functions under setup

- **STORE MEASUREMENT** – Stores the actual measurement transferes the result to Total report and all other TABS…
- **GENERATE TOTAL REPORT** – Generates PDF Dokumens according to preselected reports in yellow field under **PDF.**
- **STORE COIL**– Stores all individual measurements under the preset coilnumber.
- **ERASE ALL DATA** – Erases all data from all tabs. This must be done when changing Coil number, otherwise data from next coil will be added to previous Coil number.

Additional functions in Setup

- **Download export folder** – This should not be changed !
  Path must be **C:\Focalspec\Pilotcore\Data….**.
  Date changes automatically . (Year\Month\Day
  When Year changes it is necessary to add a new Year under C:\Focalspec\Pilotcore\Data, in addition
  the path must be updated to new actual \Year\ Month \ Day \ after that it runs automatically.

- **Save Coil in**– This Path can be freely adjusted to where you want to save the coils. If you know that connection to your server is slow
  it makes sense to store locally and then copy the results on a regular basis to the server. Otherwise storage process might be very slow.

- **Save CSV in** - This Path can be freely adjusted to where you want to save the statistical results for all measurements under one
  order or mother coil number.

Total - Report

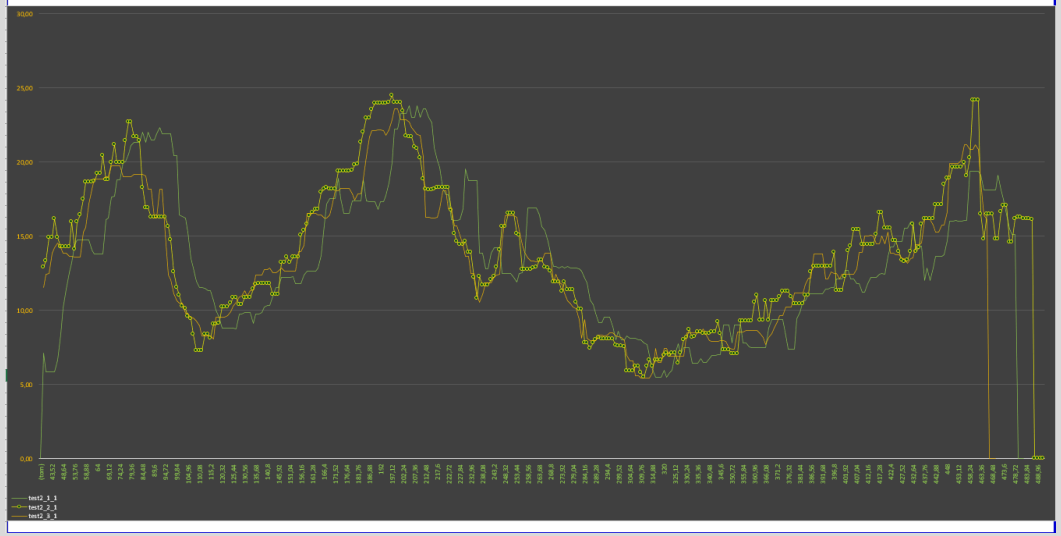
- All measurements under the Coil- Nummer are displayed after one another to get an overview of all measurements.

- Statistical curves show following values :
  Ba – Average of all average values in each of the 5 blocks per measurement.
  Bp – Average of all max values in each of the 5 blocks per measurement
  Bt – Mitt Average of all max.-min. values in each of the 5 blocks per measurement
  Bv – Average of all min values in each of the 5 blocks per measurement
  Std – Standard deviation pro Messung

- *Export PDF – Generates a PDF of the actual TAB Total Report.*

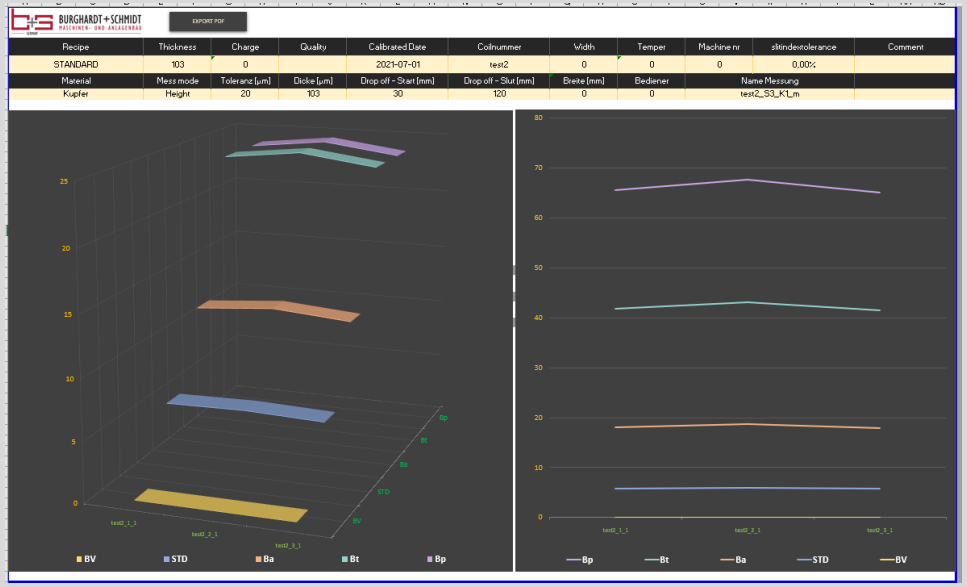
Comparison view

Recipe	Thickness	Charge	Quality	Calibrated Date	Coilnummer	Width	Temper	Machine nr	slitindextolerance	Comment
STANDARD	103	0		2021-07-01	test2	0	0	0	0,00%	
Material	Mess mode	Toleranz [µm]	Dicke [µm]	Drop off - Start [mm]	Drop off - Slut [mm]	Breite [mm]	Bediener	Name Messung		
Kupfer	Height	20	103	30	120	0	0	test2_S3_K1_m		



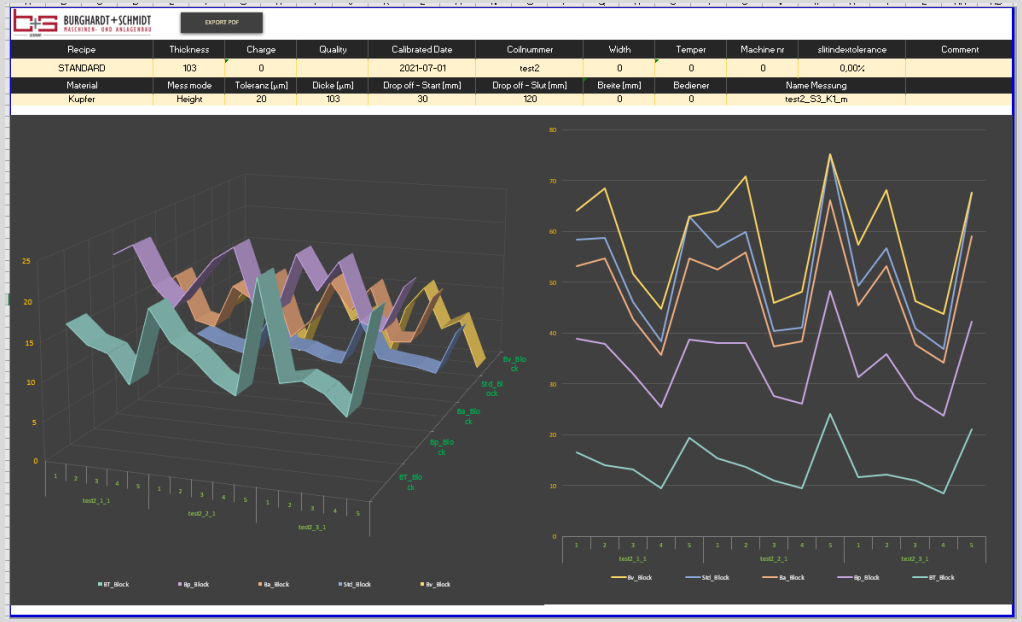
- Here are all measurements displayed over one another to verify if there is trend.
- *Export PDF – Generates a PDF of the actual TAB Comparison view.*

Statistical overview



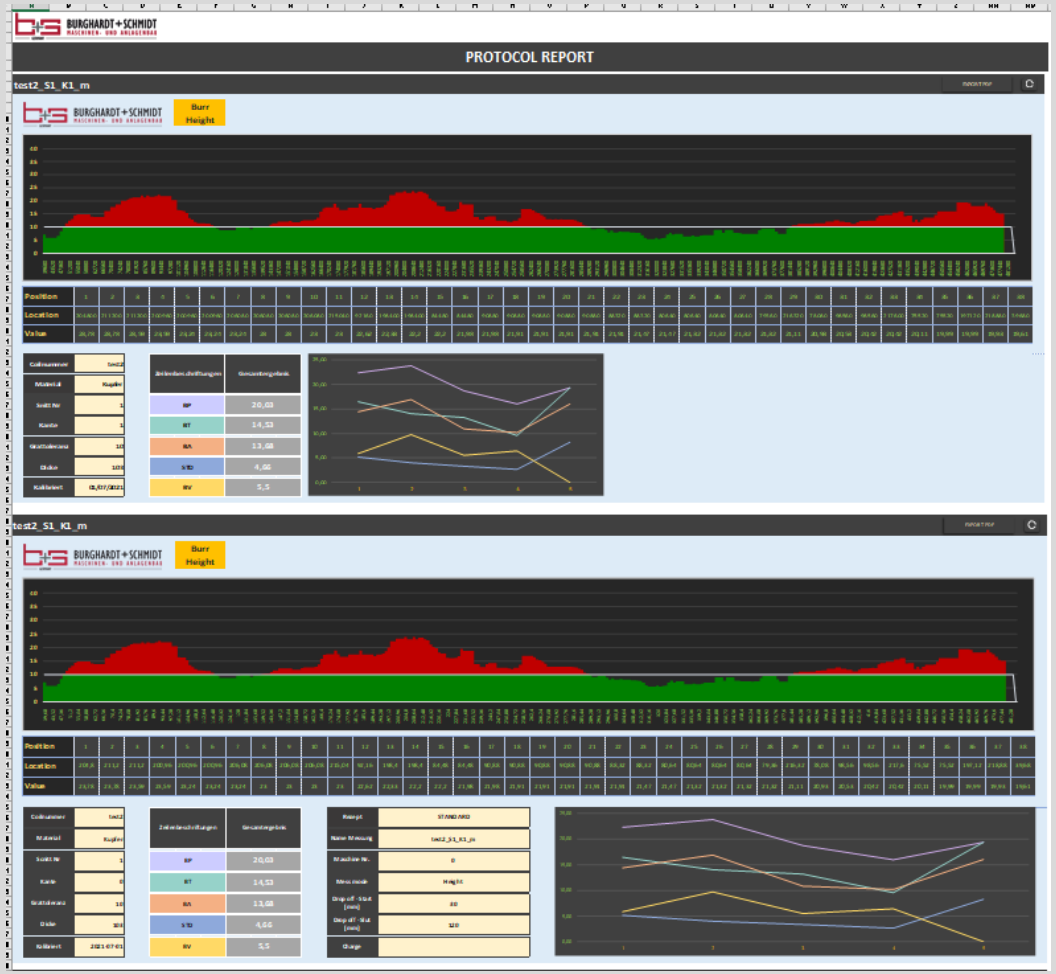
- Shows a trend over all statistical values under one coil number.
- *Export PDF – Generates a PDF of the actual TAB Statistical overview*

Statistics block divided



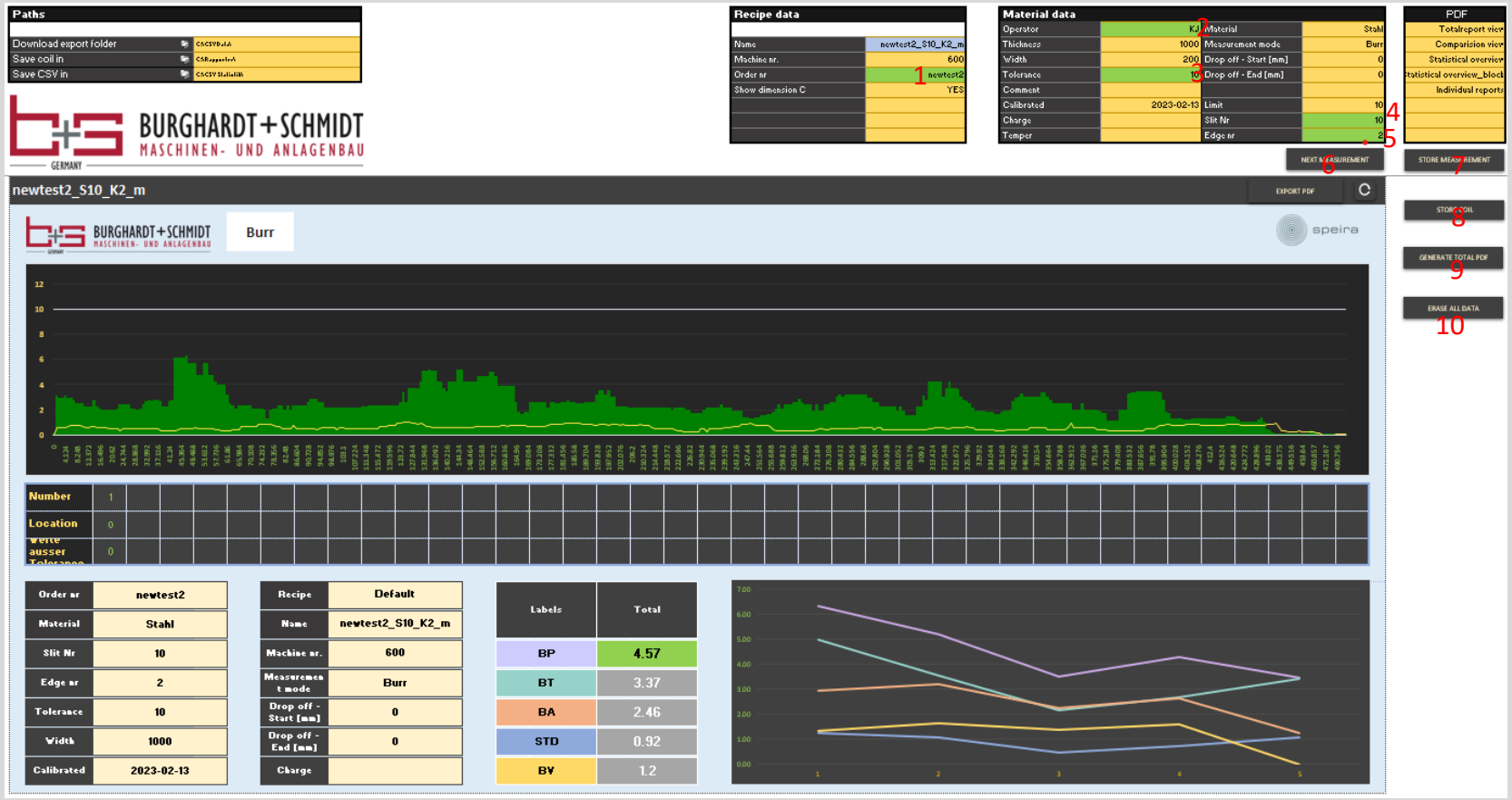
- Shows a trend over the Statistical values divided in each of the 5 blocks under one coil number.

Indiviual reports



- Shows all individual reports after one another as a hard copy.
  A PDF of all reports can be generated under PDF in Control Panel.

Quick work flow guide



New order

10 - Erase all data

1 – Order nr / mother coil nr

2 - Operator

3 - Tolerance

4 – Slit nr

5 – Edge nr

Left pedal –> insert sample->release pedal

6 – Next measurement

Right pedal – start sample feeding-> release pedal at the end of strip sample

7 – Store measurement

Next measurement

4 – Slit nr.

5 – Edge nr.

Left pedal –> insert sample-> release pedal

6 – Next measurement

Right pedal –> start sample feeding-> release pedal at the end of sample

7 – Store measurement

Store and close order

8 – Store coil

9 – Generate PDF

10 – Erase all data

Statistical calculation

$$Ba_{block} = \frac{1}{n}\sum_{i=1}^{n} y_i \quad | \quad Ba = \frac{1}{blocks}\sum_{i=1}^{blocks} Ba_i \quad | \quad blocks = 5$$

Ba – average of Burr Height values.

$$Bv_{block} = min\ y_i \quad | \quad Bv = \frac{1}{blocks}\sum_{i=1}^{blocks} Bv_i \quad | \quad blocks = 5$$

Bv – average of Burr Height minima.

$$Bp_{block} = max\ y_i \quad | \quad Bp = \frac{1}{blocks}\sum_{i=1}^{blocks} Bp_i \quad | \quad blocks = 5$$

Bp – average of Burr Height maxima.

$$Bt_{block} = max\ y_i - min\ y_i \quad | \quad Bt = \frac{1}{blocks}\sum_{i=1}^{blocks} Bt_i \quad | \quad blocks = 5$$

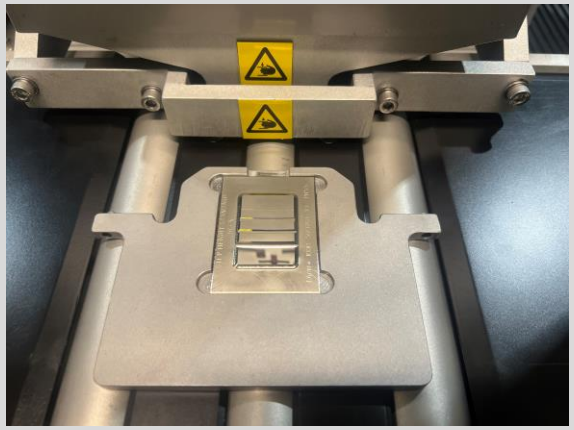
Bt – average of Burr Height maxima - minima.

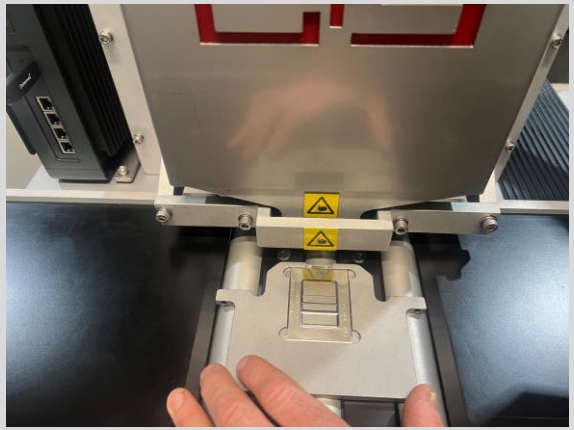
$$std_{block} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i - mean_{block})^2} \quad | \quad std = \frac{1}{blocks}\sum_{i=1}^{blocks} std_i$$

$$blocks = 5$$

Std – average of standard deviations of Burr Height values.

- Ba – Average of all average values in all 5 blocks per measurement.
- Bp – Average of all max values in all 5 blocks per measurement.
- Bt – Average of all max.-min. values in all 5 blocks per measurement.
- Bv – Average of all min. values in all 5 blocks per measurement.
- Std – Standard deviation per measurement.



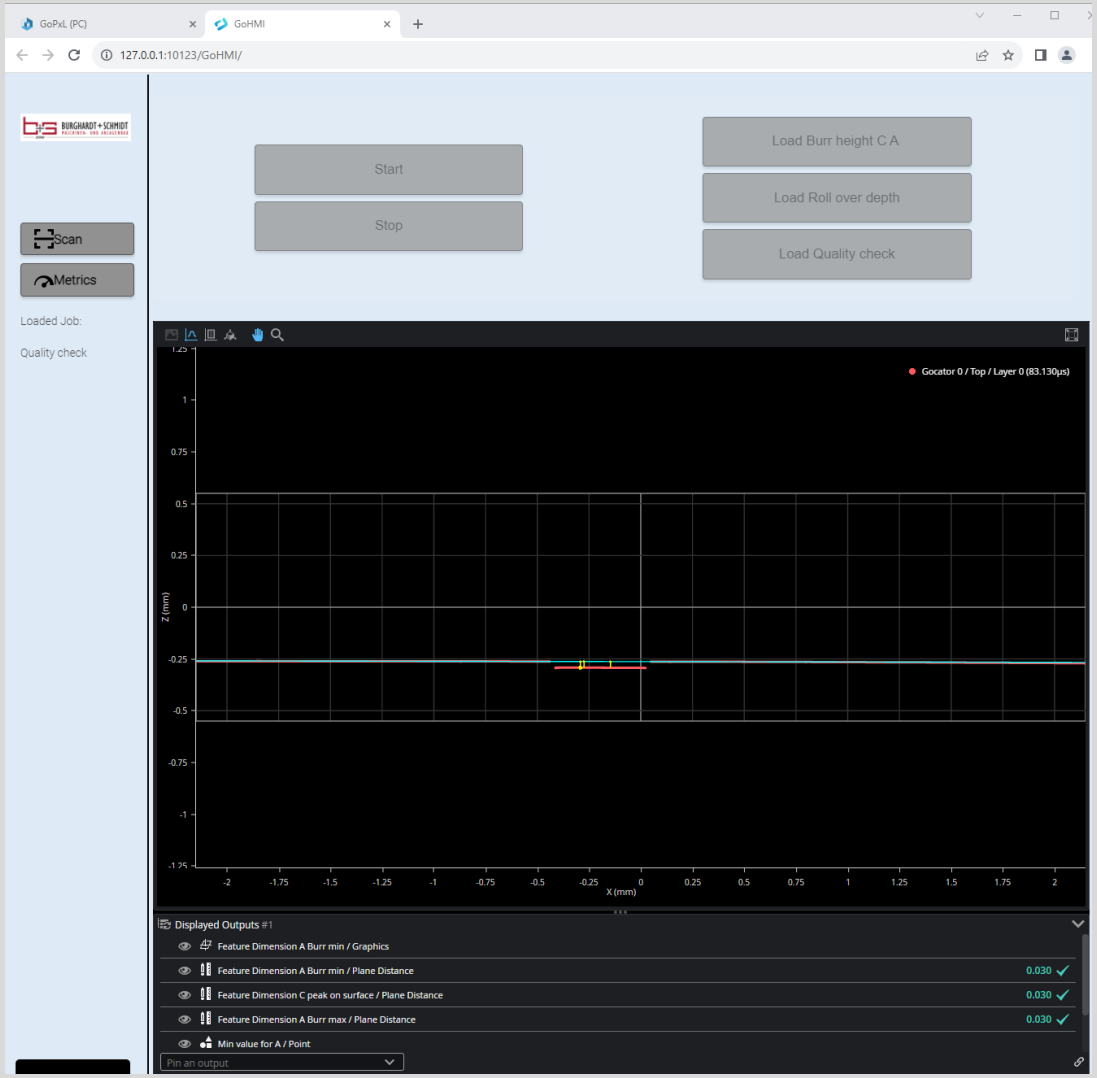


Preparation for calibration

- Place the specimen in the specimen holder with 30 µm groove closest to measuring head.
- Press left pedal to lift measuring head

- Move in calibration plate with specimen under the measurement head until it reaches the flange on the guide rolls and then close upper rolls so center roll rests on the calibration holder and release the left pedal to lower head again.

Quality check with Specimen



In Excelapplication

- In Excel application store last coil **STORE COIL** then press **ERASE ALL DATA** to clear Excel for quality check.
- Under **ORDER NR** – State any name that can be related to a quality check and then press **NEXT MEASUREMENT**.

In GoHMI

- Press **Load Quality check with specimen** , now a time based measurement sequence is started wiht 10 measurements per second. After approx ca: 10 seconds press **Load Burr height C A** to interupt time based scanning .

In Excelapplikation

- Now are all measurement values displayed graphically.
- When pressing **STORE COIL system store teh protocol under given name** , after that press GENERATE PDF, if you want, finally press **ERASE ALL DATA** to prepare Excel for normal measurement again.

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Maintenance

- The system does not require much maintenance, there are only a few parts that that must be kept clean.

- The Optik at bottom part of measuring head should be cleaned with a dry cloth same type that you use when cleaning reading glasses.
  To do that properly you must remove the holder for the middle roll. The rest of the mechanics an be cleaned with WD 40 or CRC 5-56 or similar penetrating fluid oil.
- In case there is a minor noise from toothbelt then please apply a few drops of silicon
  liquid on the inner teath of the belt.

Software achitecture