JUMO LOGOSCREEN 700

TUS/SAT field testing device

Operating Instructions

JUMO

70653000T91Z001K000

V1.00/EN/2024-07-12

Further information and downloads

qr-706530-en.jumo.info

Table of contents

1 About this documentation

1.1 Applicable publications

In addition to this document, the quick start guide (brief instructions) 70653000T97... or the device's operating manual 70653000T90... must be observed. This applies in particular to the safety information included in these documents.

The quick start guide contains information including instructions on how to mount the device and set up the electrical connections. It also contains the order details and a list of technical data. The quick start guide is an excerpt from the operating manual.

A hard copy of the quick start guide is part of the scope of delivery of the device.

The operating manual and quick start guide are available to download (PDF files) from the manufacturer's website.

1.2 Purpose

This document describes how to use the JUMO LOGOSCREEN 700 paperless recorder as a TUS/SAT field test device (often referred to simply as the “device” or “test device” in the following).

1.3 Trademark information

All trademarks and trade and company names used are the property of their rightful owners or authors.

1.4 Symbols

Warning symbols

DANGER!

This symbol indicates that **personal injury from electrocution** may occur if the appropriate precautionary measures are not taken.

Note symbols

NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.

READ THE DOCUMENTATION!

This symbol, which is attached to the device, indicates that the associated **documentation for the device** must be **observed**. This is necessary to identify the nature of the potential hazard, and to take measures to prevent it.

2.1 Intended use

The described device is designed for TUS/SAT tests in an industrial environment as specified in the technical data (see quick start guide or operating manual). Other uses beyond those defined are not viewed as intended uses. The device has been manufactured in compliance with applicable standards and directives as well as the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, only use the device

- For the intended use
- When in good order and condition
- When taking the technical documentation provided into account

Risks resulting from the application may arise, e.g. as the result of missing safety provisions or incorrect settings, even when the device is used properly and as intended.

DANGER!

Device in the carrying case: the device is operated at a mains voltage up to 240 V.

This poses the risk of electrocution.

▶ Do not open the device. Only use the supplied power supply cable. Observe the information in the quick start guide or operating manual.

2.2 Qualification of personnel

This document contains the necessary information for the intended use of the device to which it relates.

It is intended for staff with technical qualifications who have been specially trained and have the appropriate knowledge in the field of measurement technology.

The appropriate level of knowledge and the technically fault-free implementation of the safety information and warnings contained in the technical documentation provided are prerequisites for risk-free mounting, installation, and startup as well as for ensuring safety when operating the described modules. Only qualified personnel have the required technical knowledge to correctly interpret and implement the safety information and warnings contained in this document in specific situations.

3 Description

The JUMO LOGOSCREEN 700 as a TUS/SAT field test device (extra code 949) is a high-precision documenting test device with up to 18 analog inputs for thermocouples and RTD temperature probes. Through the use of a special TC terminal with a built-in cold junction, the device meets the accuracy requirements according to AMS2750 and CQI. As such, the device is suitable for temperature uniformity surveys (TUS) and system accuracy tests (SAT) on heat treatment systems.

Use of the optional carrying case (extra code 970) is recommended if the device is intended for use as a mobile field testing device.

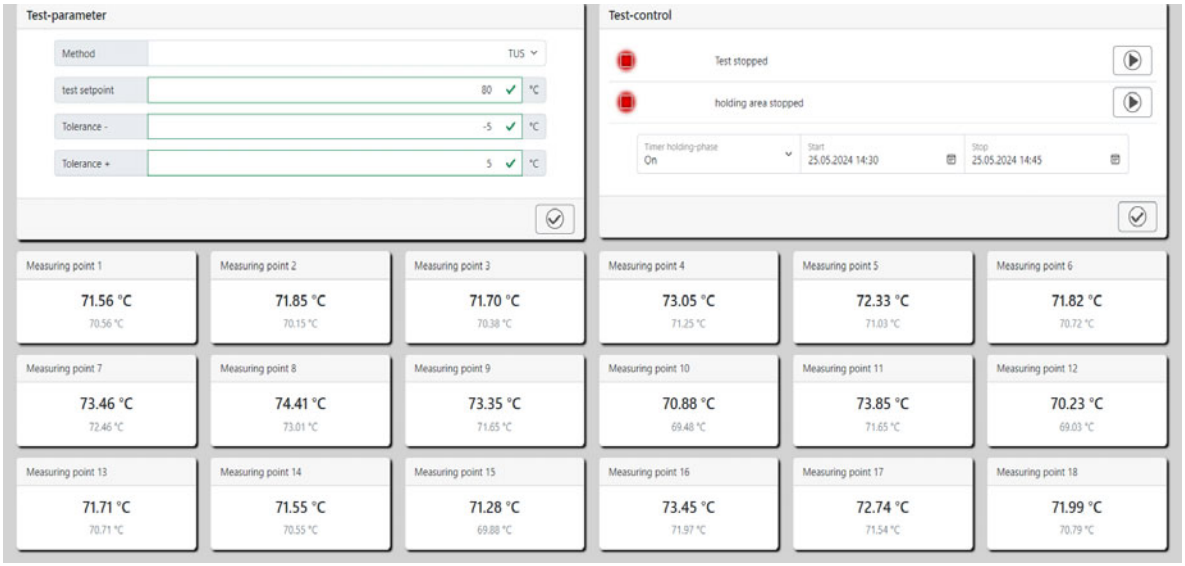
The specially created web application enables all measured values to be visualized and tests to be performed easily using a web browser. The web application can be used with all conventional web browsers (such as Google Chrome, Microsoft Edge, Mozilla Firefox). As such, the user can conveniently access the device from a PC, tablet, or smartphone. The Wi-Fi router, which is offered as an accessory, facilitates a connection to the device if no local network or Wi-Fi is available.

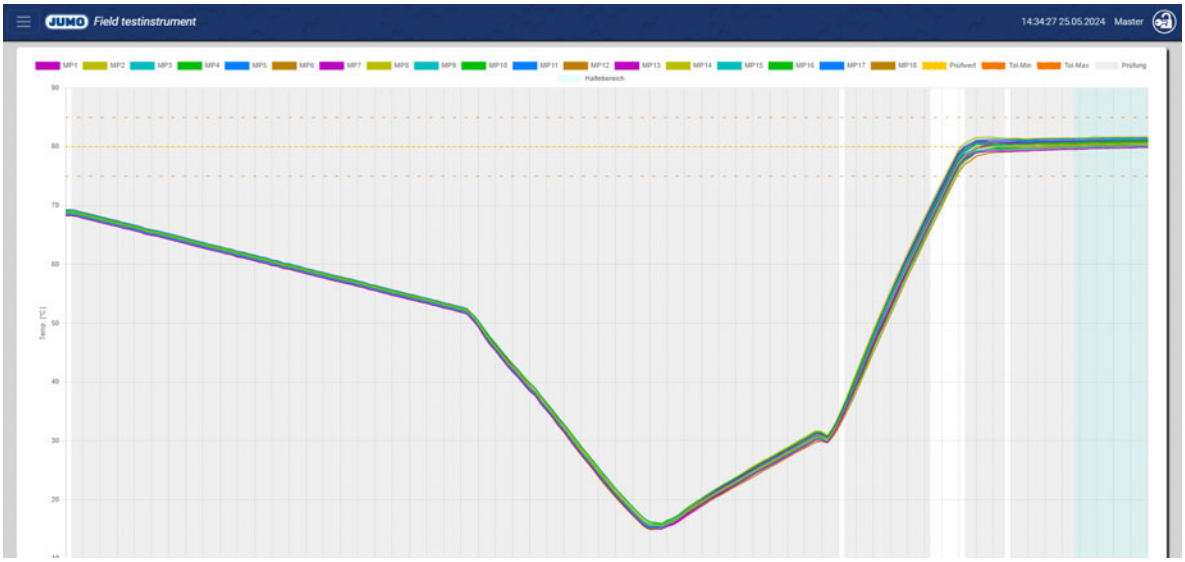
All measurement results are also visualized on the device.

All measured values are presented in a common process screen. The measured and corrected temperatures are displayed in each case. The corrected temperature is determined by taking into account the correction factors of the sensor and the device. The temperature curve is shown in a curve diagram.

Using the PC software JUMO PCC enables the recorded data to be extracted from the device, archived, and automatically processed to create a test report.

Web application





4 Startup

Mounting, connecting, and switching on the device

General procedure:

- Device in panel: mount the device and set up the electrical connections according to the quick start guide or operating manual.
- Device in carrying case: use the supplied power cable to connect the device to a suitable power socket.
- Setting up the LAN connection (Ethernet interface): connect the device to a local network or to the Wi-Fi router, which is available as an accessory (see below).
- Connect the sensors (also refer to the quick start guide or operating manual).

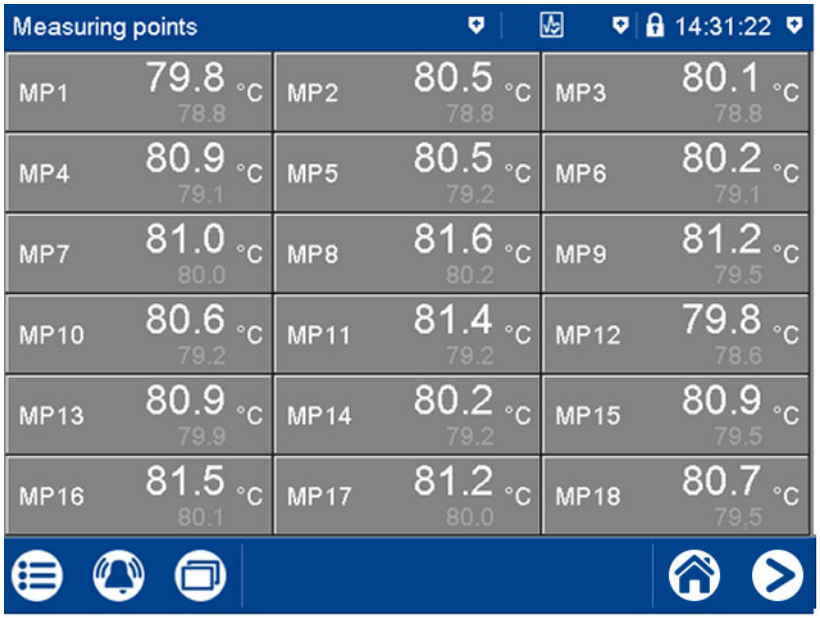
The photo below shows a device in a carrying case (rear view):

The special terminals for connecting thermocouples (TC terminals) are labeled with the number of the measuring point. In addition, on the left of the carrying case, underneath the nameplate, there is a sticker containing the measuring point numbers and slot designations (from top to bottom: slot 1 to slot 3). As such, the numbering of the measuring points is still recognizable if terminals without the respective labels are used.

In the case of devices not supplied in a carrying case, the nameplate and the sticker containing the measuring point numbers are located on the side of the housing.

Start picture on the device

After power on, the following start picture is displayed (example):



Checking the device configuration (optional)

Proceed as follows to check the sensor type and memory cycle:

1. Complete the user logon process (see operating manual: Operation > Main menu > Logon): user: Master; password: 9200.
2. Make sure the correct sensor type has been configured (see operating manual: Configuration > Analog inputs).
3. Make sure the required memory cycle has been configured (see operating manual: Configuration > Groups > Standard operation; default setting as TUS/SAT field testing device: 30 seconds).

Accessing the web application

The device is configured at the plant so that it automatically obtains its IP address from a DHCP server. If necessary, the IP address can also be issued manually (see operating manual: Configuration > Ethernet).

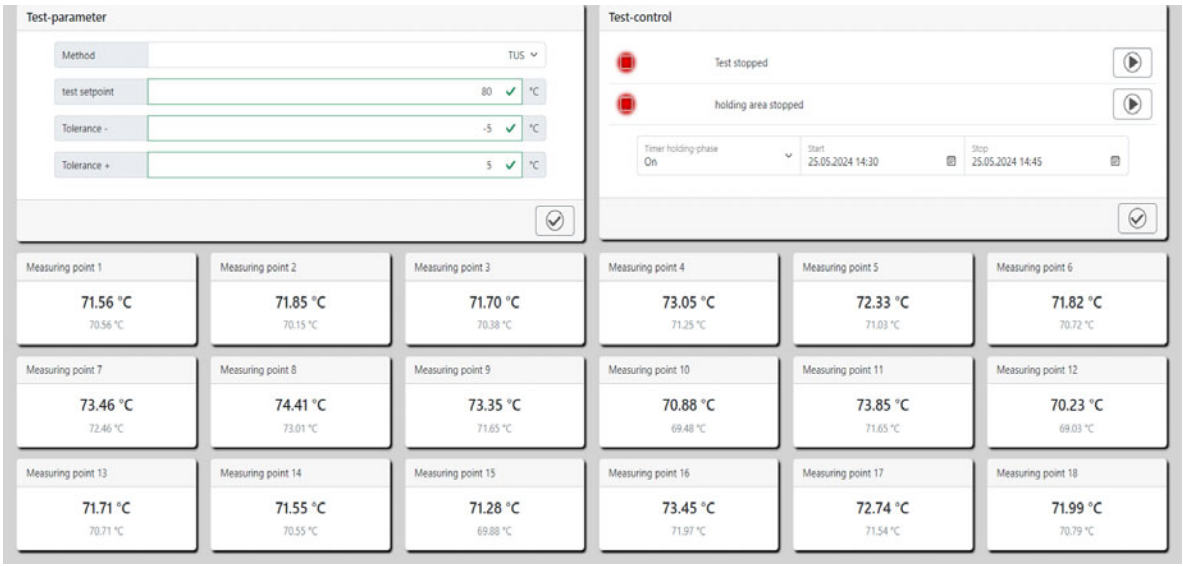
Process for accessing the web application:

1. On the device, access the IP address in the device menu (see operating manual: Operation > Main menu > Device info > Ethernet).
2. On the (mobile) end device, start the web browser.
3. To access the web application, enter the device's IP address in the address line of the web browser.

4 Startup

Start picture in the web browser

After the web application has been successfully accessed, the following start picture is displayed (example):



Using the Wi-Fi router (optional)

The Wi-Fi router, which is available as an accessory, provides users with an easy way to set up a Wi-Fi so that the device can be accessed from a mobile end device (smartphone, tablet, laptop). This is of particular benefit if no local network/Wi-Fi is available.

NOTE!

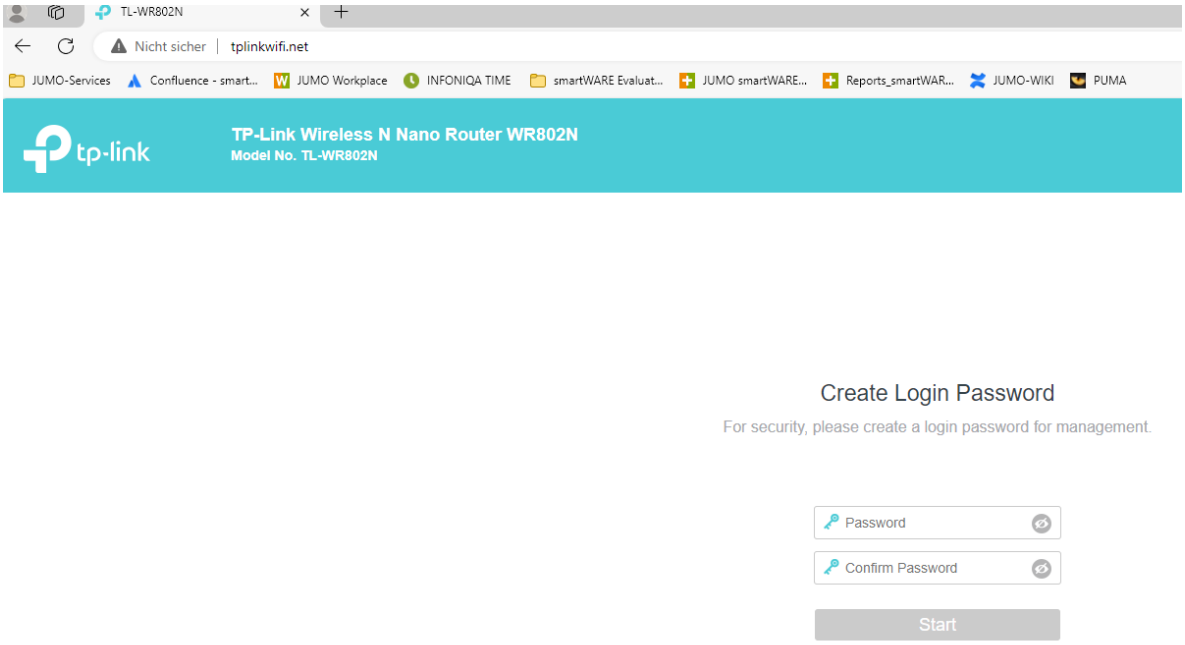
The instructions supplied with the router must also be observed when connecting and configuring the Wi-Fi router.

The Wi-Fi router must be connected and configured as follows. Observe the instructions supplied with the router here if necessary.

General procedure for using the Wi-Fi router:

- Set up the Wi-Fi router's power supply. To do this, connect the router with the device's USB host interface, for example.
- Connect the mobile end device to the router's Wi-Fi (SSID and password: see sticker on the router).
- On the mobile end device, start the web browser and open the router's user interface (http://tplinkwifi.net).
- Issue a login password for opening the router's user interface.
- In the settings menu, configure the router as an access point under “Operation Mode“.
- Save the change with “Save“ and confirm the message about restarting the router (Reboot) with “OK“.
- After the restart, open the user interface again if necessary to check the changed setting under “Operation Mode”. Then exit the user interface with “Logout”.
- Connect the device (Logoscreen 700) with the router's LAN/WAN port. The device gets its IP address from the router.
  Note: the device is configured at the plant so that it automatically obtains its IP address from a DHCP server.
- Use the mobile end device's web browser to access the web application for the device (Logoscreen 700) (see the section “Accessing the web application” above).

The following figures show the individual steps needed to configure the router's user interface.


TL-WR802N
Nicht sicher
tplinkwifi.net
JUMO-Services
Confluence - smart...
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INFONIQA TIME
smartWARE Evaluat...
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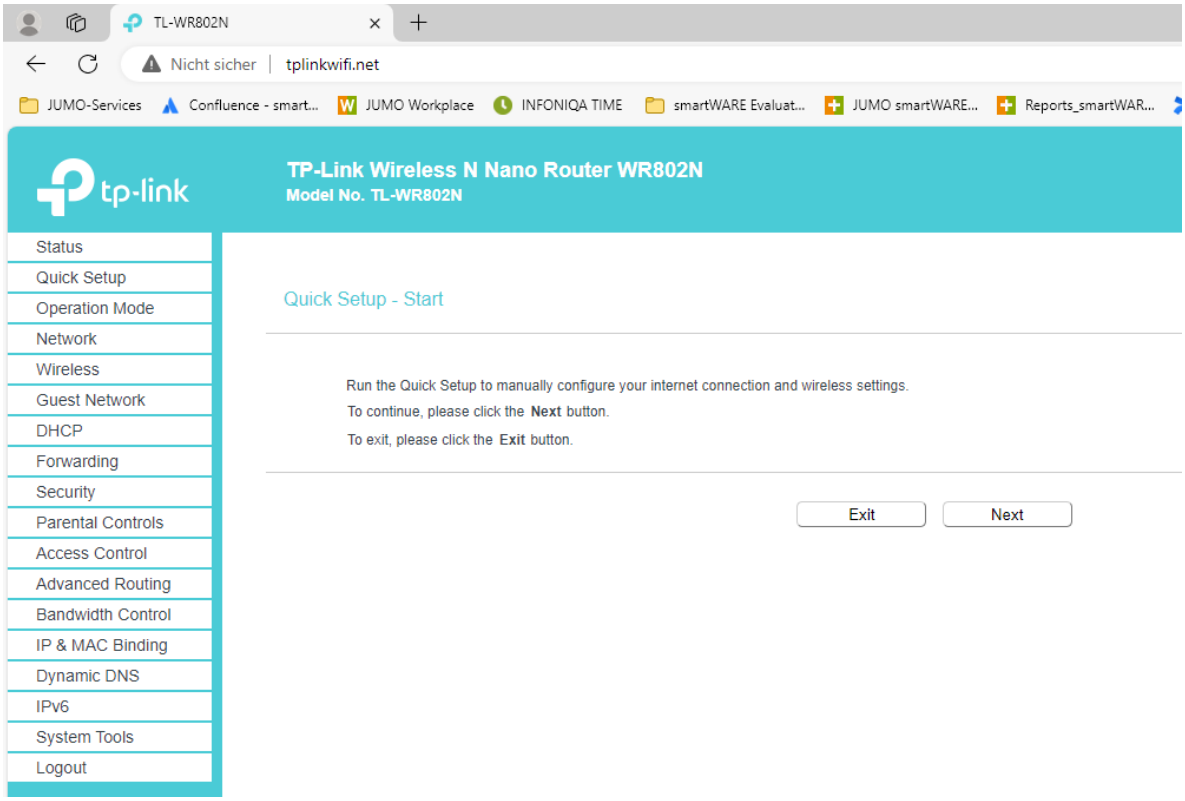
PUMA
tp-link
TP-Link Wireless N Nano Router WR802N
Model No. TL-WR802N
Create Login Password
For security, please create a login password for management.
Password
Confirm Password
Start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smartWARE Evaluat...
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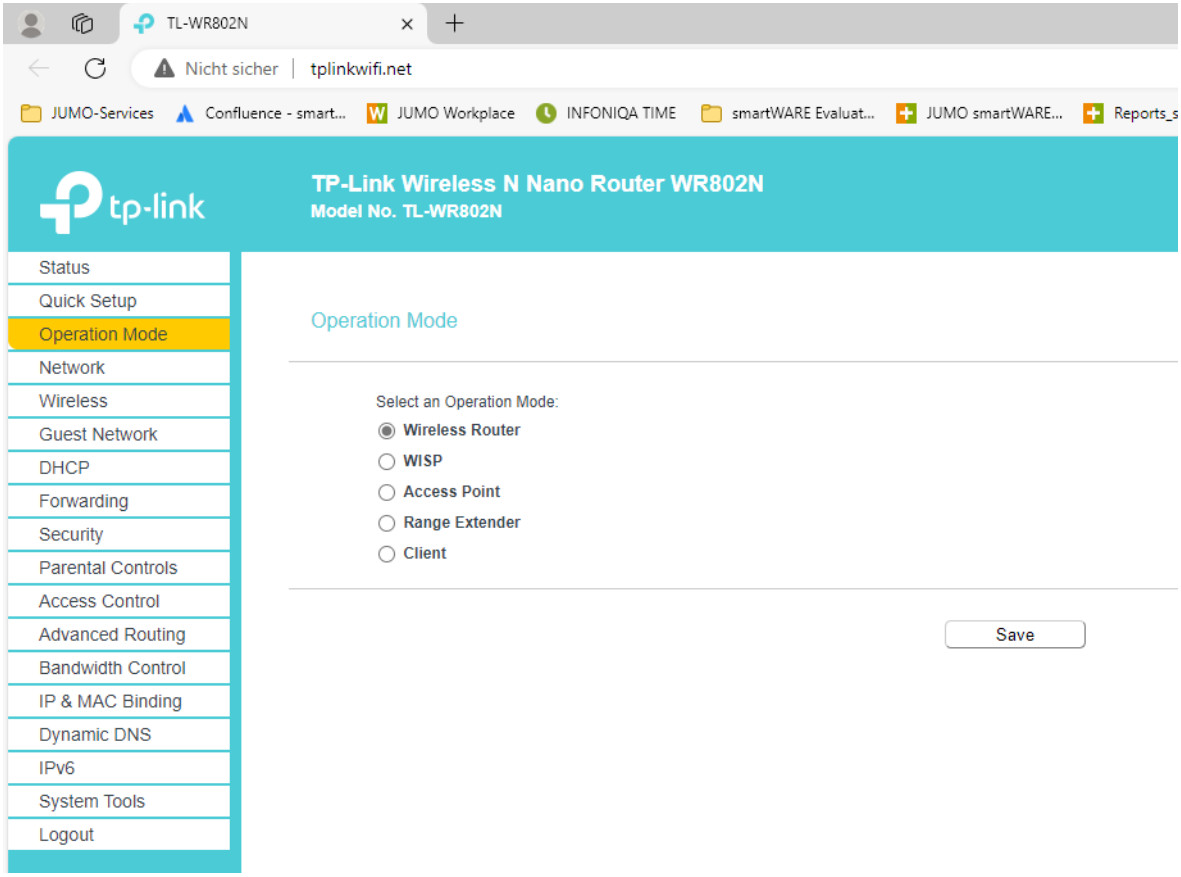
Reports_smartWAR...
tp-link
TP-Link Wireless N Nano Router WR802N
Model No. TL-WR802N
Status
Quick Setup
Operation Mode
Network
Wireless
Guest Network
DHCP
Forwarding
Security
Parental Controls
Access Control
Advanced Routing
Bandwidth Control
IP & MAC Binding
Dynamic DNS
IPv6
System Tools
Logout
Quick Setup - Start
Run the Quick Setup to manually configure your internet connection and wireless settings.
To continue, please click the Next button.
To exit, please click the Exit button.
Exit
Next

4 Startup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TP-Link Wireless N Nano Router WR802N
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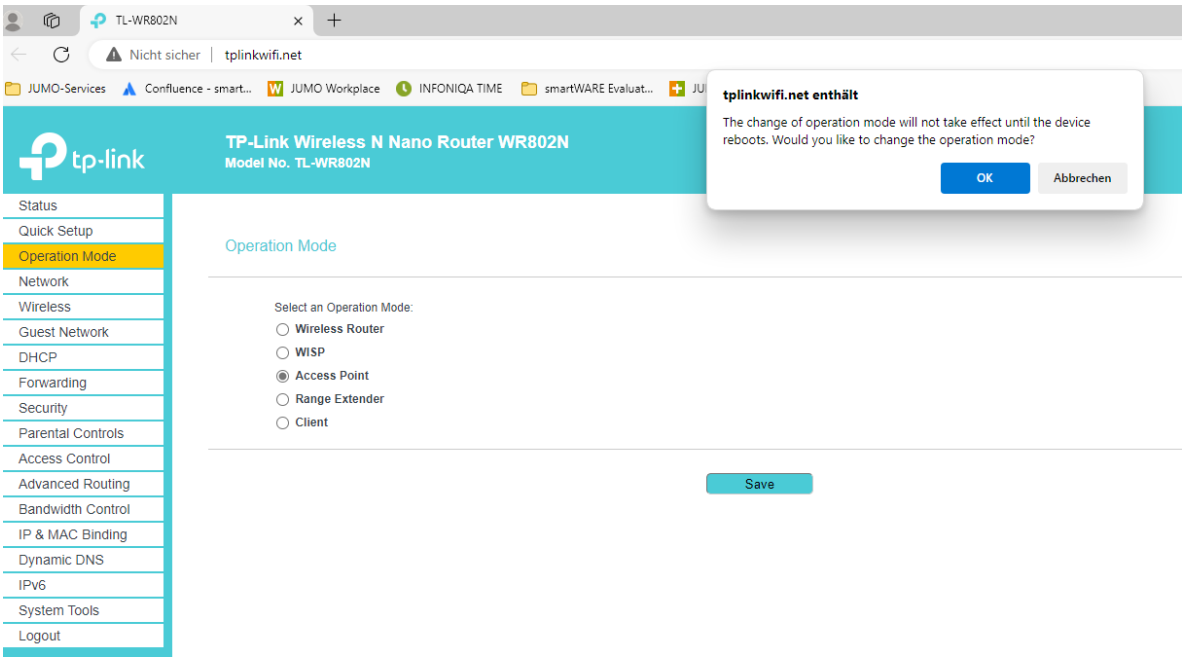
Status
Quick Setup
Operation Mode
Network
Wireless
Guest Network
DHCP
Forwarding
Security
Parental Controls
Access Control
Advanced Routing
Bandwidth Control
IP & MAC Binding
Dynamic DNS
IPv6
System Tools
Logout
Operation Mode
Select an Operation Mode:
Wireless Router
WISP
Access Point
Range Extender
Client
Save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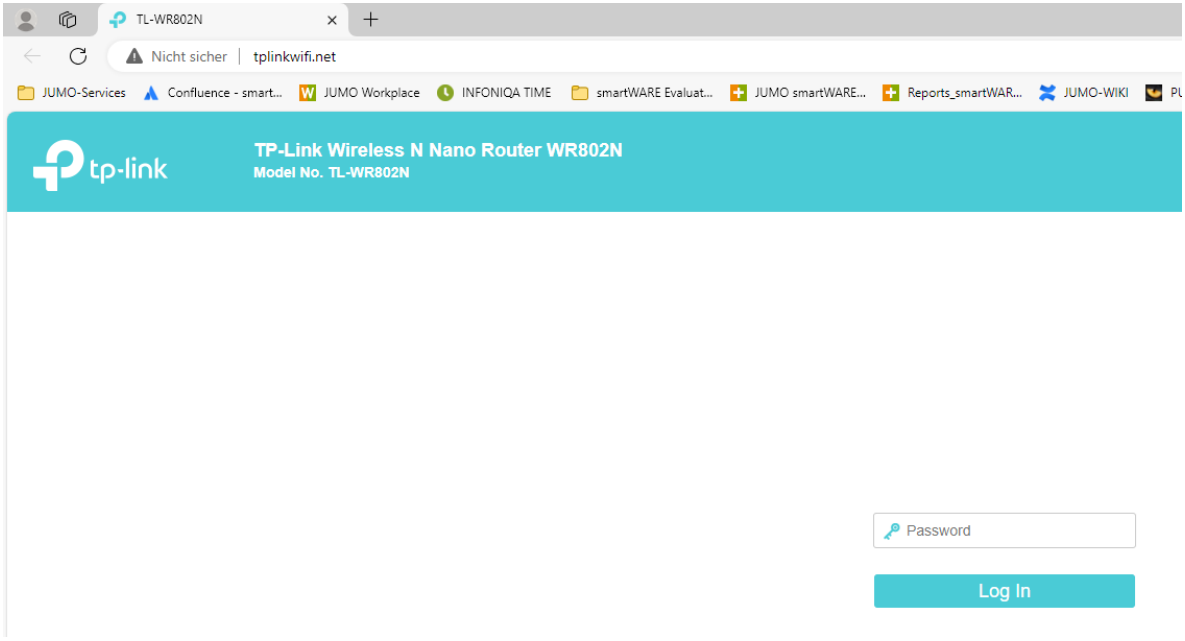
JUMO-Services
Confluence - smart...
JUMO Workplace
INFONIQA TIME
smartWARE Evaluat...
tplinkwifi.net enthält
The change of operation mode will not take effect until the device reboots. Would you like to change the operation mode?
OK
Abbrechen
tp-link
TP-Link Wireless N Nano Router WR802N
Model No. TL-WR802N
Status
Quick Setup
Operation Mode
Network
Wireless
Guest Network
DHCP
Forwarding
Security
Parental Controls
Access Control
Advanced Routing
Bandwidth Control
IP & MAC Binding
Dynamic DNS
IPv6
System Tools
Logout
Operation Mode
Select an Operation Mode:
Wireless Router
WISP
Access Point
Range Extender
Client
Save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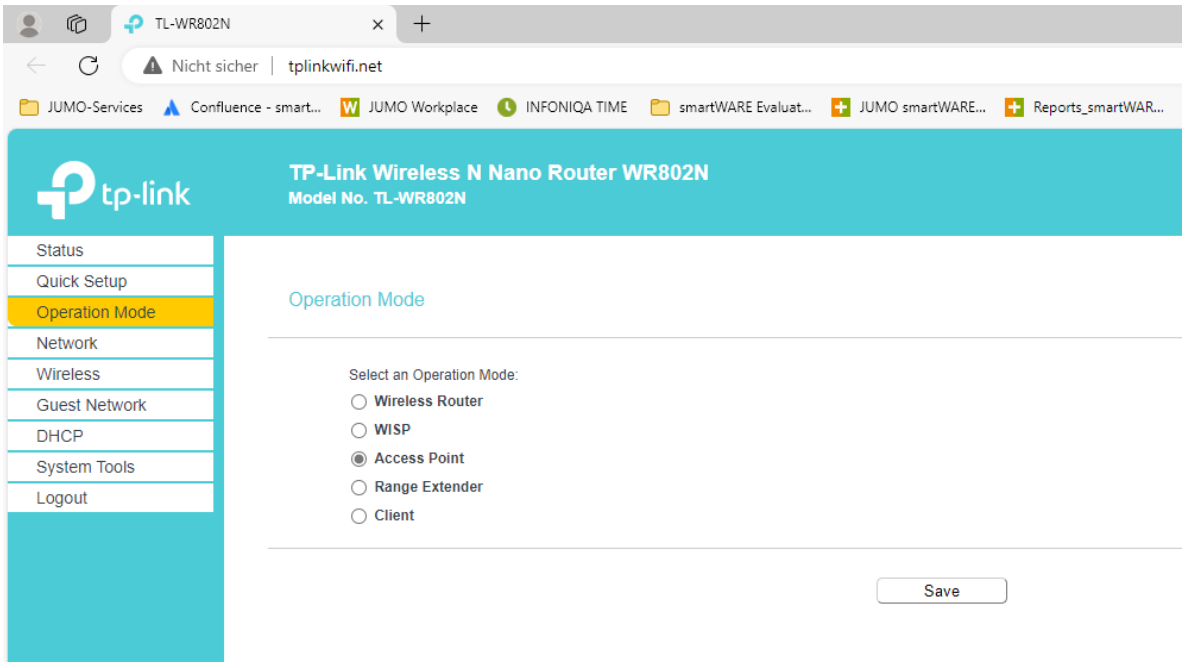
JUMO-WIKI
tp-link
TP-Link Wireless N Nano Router WR802N
Model No. TL-WR802N
Password
Log In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JUMO Workplace
INFONIQA TIME
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TP-Link Wireless N Nano Router WR802N
Model No. TL-WR802N
Status
Quick Setup
Operation Mode
Network
Wireless
Guest Network
DHCP
System Tools
Logout
Operation Mode
Select an Operation Mode:
Wireless Router
WISP
Access Point
Range Extender
Client
Save

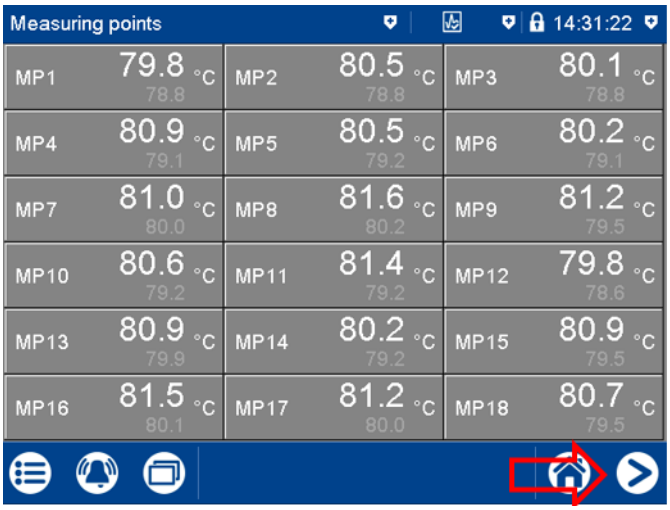
5 Operation

NOTE!

For TUS tests, we recommend performing all steps with the web application. While some steps can be performed directly on the device (see “Control” process screen), all of the data required for the test report can only be input in the web application.

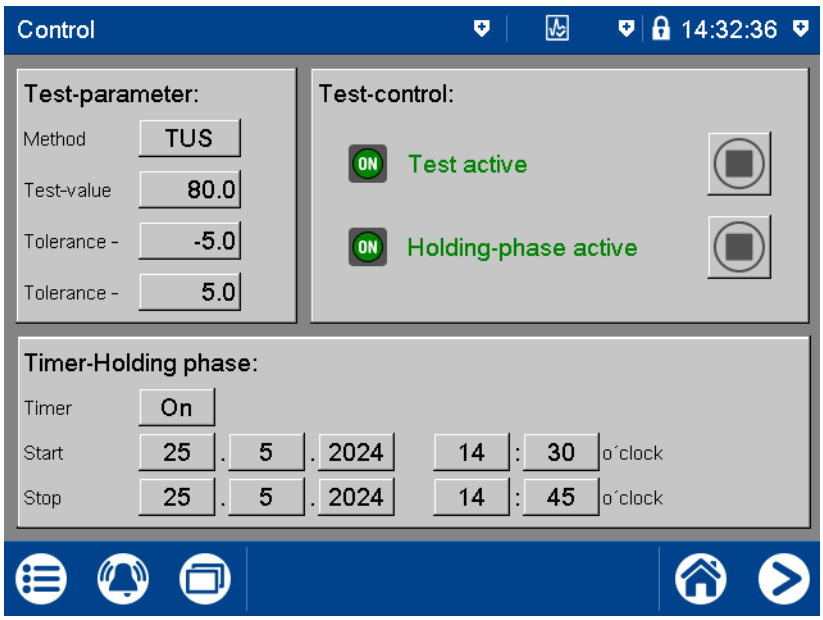
The SAT test can only be performed with the web application.

User interface on the device



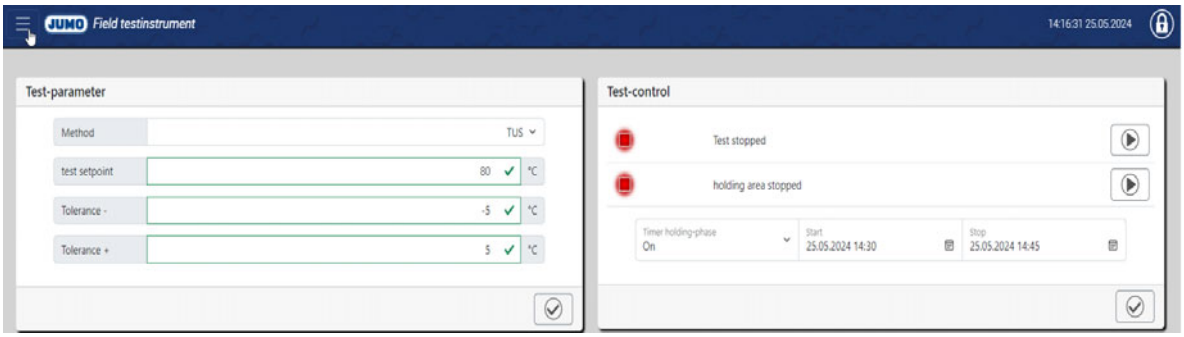
The start picture shows the corrected value (large, at the top) and the uncorrected measured value for each measuring point.

Clicking on the arrow in the bottom right of the start picture takes you to the “Control” process screen.

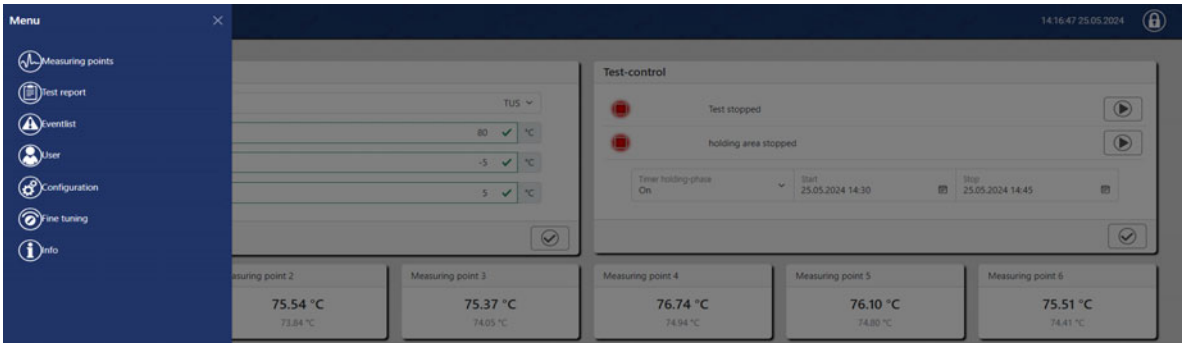


In the “Control” process screen, you can set up all the specifications required for the test (method, test value (setpoint value), tolerance values) and perform the test (starting the test and holding phase, stopping the holding phase and test). The settings for the timer function to control the holding phase can also be configured here.

Web application user interface

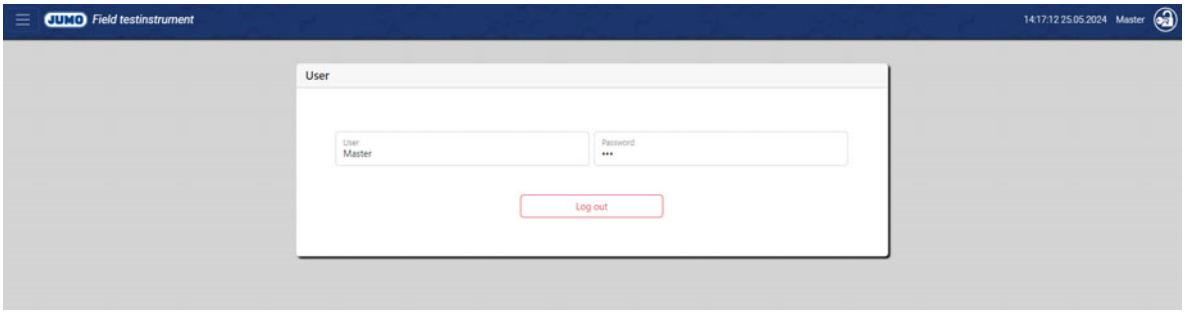


The menu can be opened with the menu button (top left of the start picture).



The following functions are available in the menu:

- Measuring points: displaying the measuring points and curve diagram, starting and stopping the test
- Test report: entering data for use in the test report (e.g., furnace type, serial number, customer)
- Event list: displaying a list of events that occurred during the test (e.g., start of the test, probe not in tolerance range)
- User: entering the user name and password for logging on to the web application (user name: Master; password: 9200)
  The user must logon to be able to enter correction factors.
  After successful logon, the user name appears in the top right of the window (here: Master):



- Configuration: entering the correction factors for the sensor and device (referred to here as test device)
  Please refer to the calibration certificate provided by JUMO for the correction factors.
- Fine adjustment: entering the values for the fine adjustment (default setting configured by JUMO).
- Info: displaying information on the web application (version, license information)

6 Correction factors

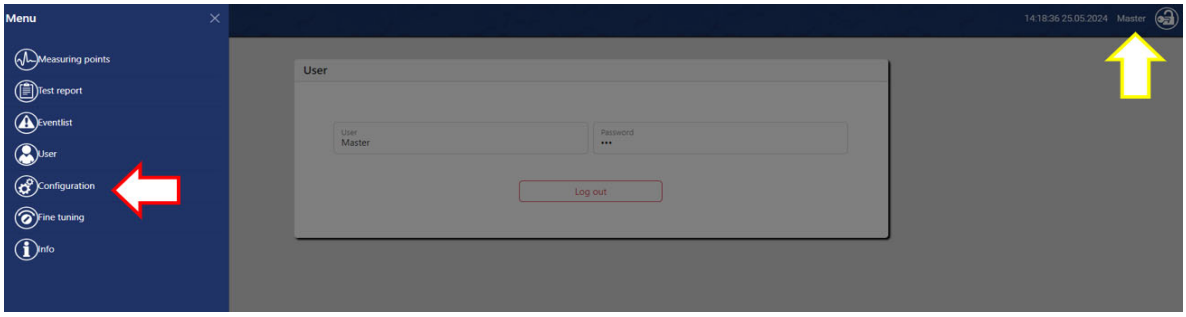
To determine the correct temperature value with the measurement technology, the temperature value measured by the sensor must be corrected. For this purpose, two correction factors have to be taken into account for each measuring point, specifically the sensor's correction factor and the test device's correction factor for the measuring point affected. Please refer to the calibration certificate provided by JUMO for both correction factors.

The correction factors must be entered before starting the test. A user must be logged on for this purpose.

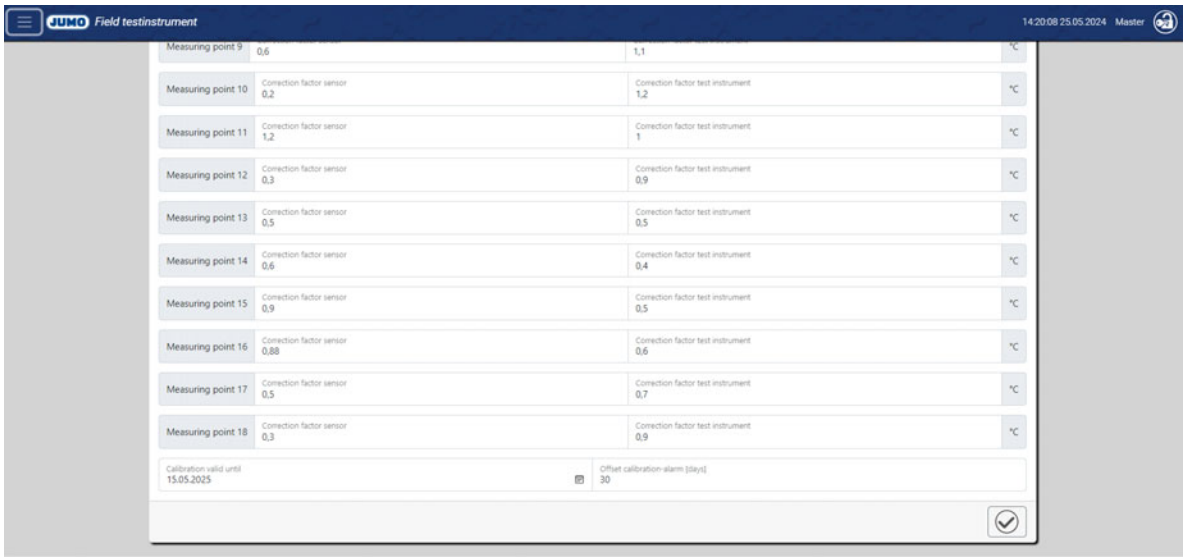
Entering correction factors

Process when the user is already logged on (here: user “Master”):

1. In the menu, select the “Configuration” option.



2. For each measuring point, enter the sensor's correction factor and the test device's correction factor.



To conclude, save all inputs with the “Tick” button (bottom right).

The purpose of a TUS test is to document the temperature uniformity inside a furnace, for example. For this purpose, the temperature values of the individual measuring points must be within a tolerance range both sides of the setpoint value within a certain period. This period (holding phase), the setpoint value, and tolerance range must be specified by the user.

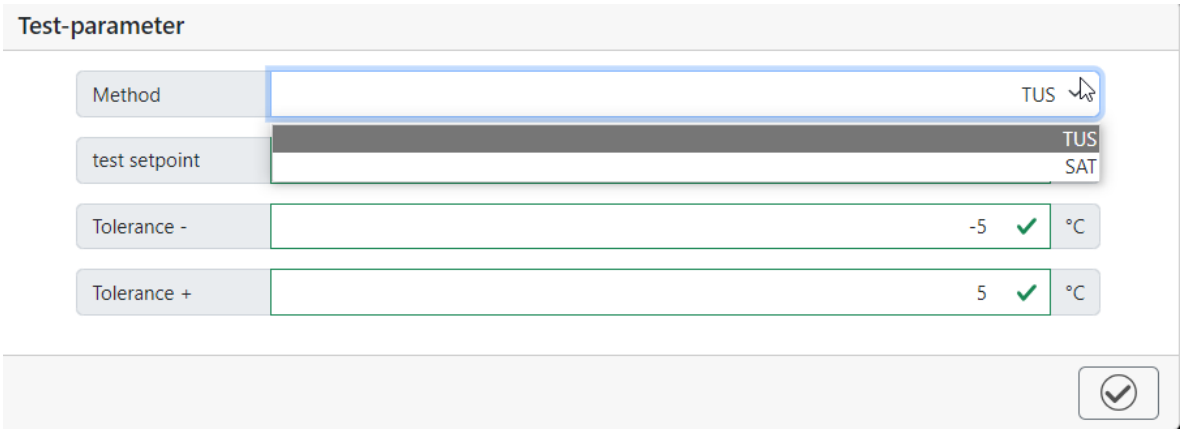
Up to 18 measuring points can be evaluated at the same time during one test.

7.1 Starting the test

Starting the test and holding phase

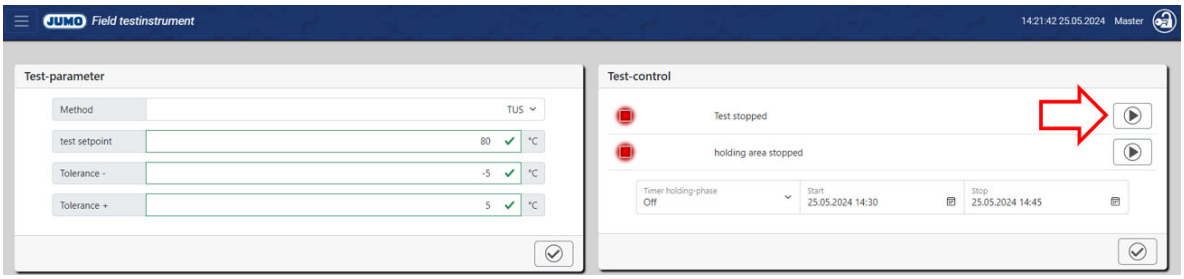
Process:

1. Select the TUS method, enter the test setpoint value and tolerance values according to the AMS or CQI process table, and then save the settings with the “Tick” button:

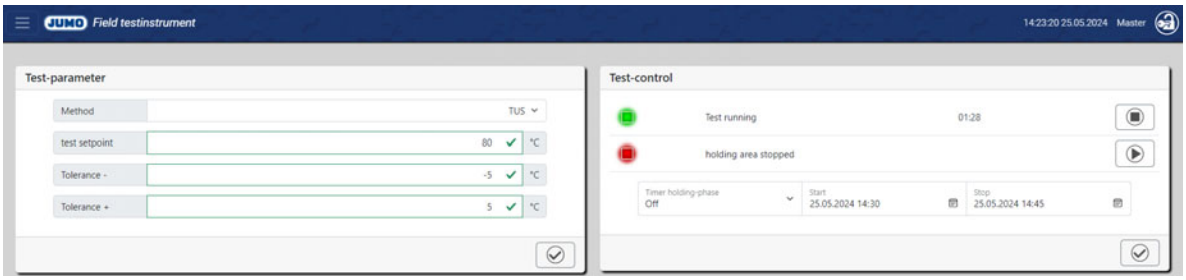


Important: the “Tick” button must be pressed for the amended settings to be effective.

2. Starting the test:

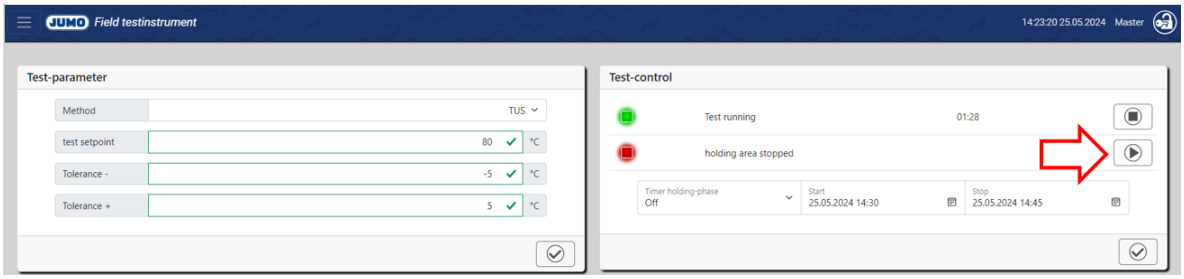


The test is running (green symbol, text “Test running”) and the warm-up phase starts:



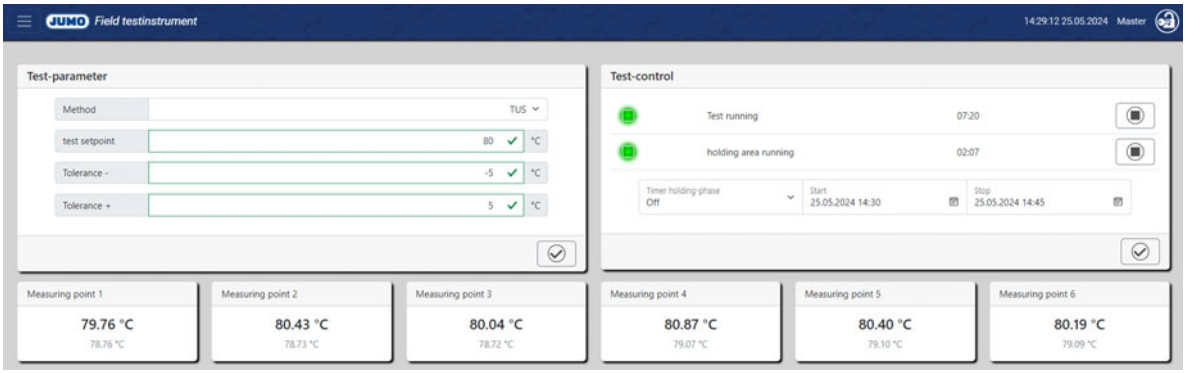
The current runtime from the start of the test is displayed.

3. Wait until all measured values are at a stable level within the tolerance range (here: 80 °C +/- 5 °C).
4. Starting the holding phase:



Confirm the query (not shown here) as to whether the holding phase should be started.

The holding phase is running (green symbol, text “Holding area running”):

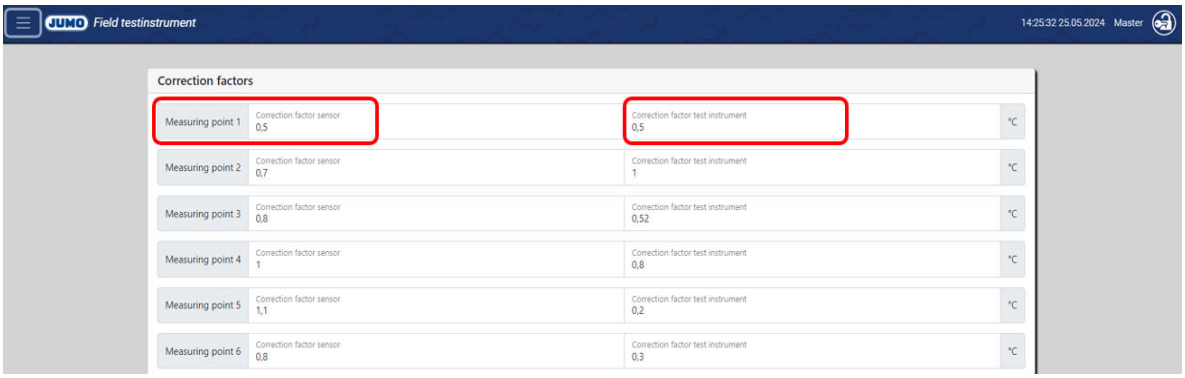


The holding phase remains active until it is terminated by the user. During the holding phase, the temperature at every measuring point must remain consistently between 75 °C and 85 °C (test set-point 80°C, tolerance +/- 5 °C) to pass the test.

Displaying the measuring points

Example based on measuring point 1: The corrected temperature 79.47 °C, which is decisive for the test evaluation, is displayed at the top. The measured temperature 78.47 °C is displayed underneath this.

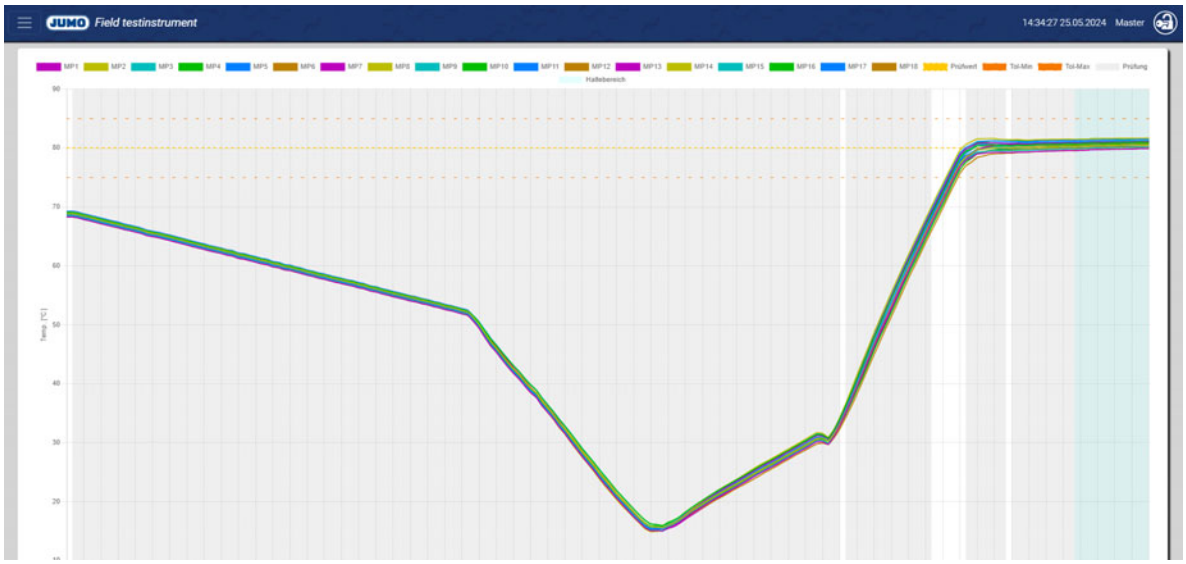
The measured temperature is automatically corrected by taking into account the configured correction factors.



Example based on measuring point 1: The correction factors (correction values to be added together) for the sensor and test device are +0.5 °C in each case. The measured value of 78.47 °C is thus corrected by adding 1.0 °C and amounts to 79.47 °C.

Curve presentation of the temperature curve

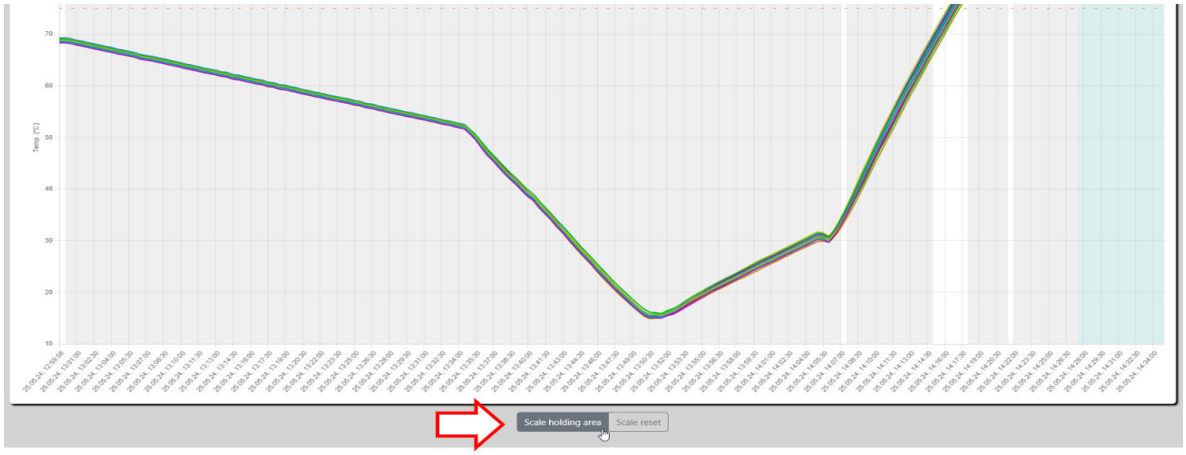
Underneath the measuring points, the temperature curve (corrected measured values) are presented as a curve diagram:



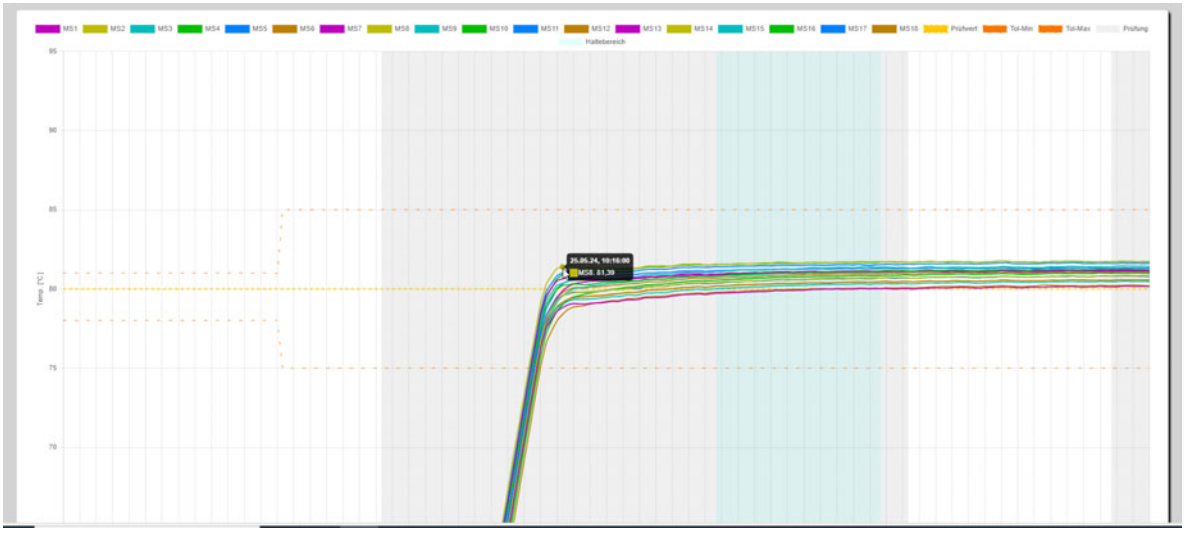
All 18 channels are displayed together in one diagram using different colors (see legend at the top of the screen). The setpoint value and tolerance limits are displayed as dotted lines so that the user can check at a glance whether the temperature values are within the tolerance limits.

Individual channels can be displayed and hidden by clicking on the respective channel in the legend in the diagram.

The “Scale holding area” button enables the process-relevant holding phase to be increased during the measurement:



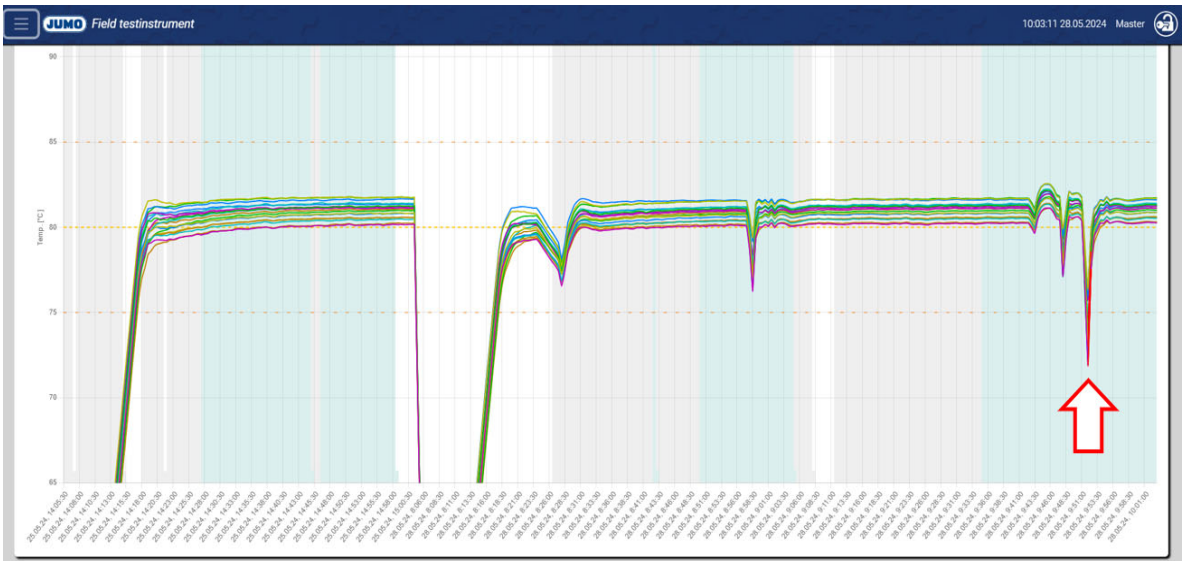
Increased display of the holding phase:



Activating the test causes the temperature curve to be highlighted in light gray. The holding phase appears in a mint color. Before the test is activated and after it has ended, the background is white.

If the user moves the mouse over the curve progression, information about the channel in question will be displayed (measuring point, corrected temperature value, time stamp for the measurement).

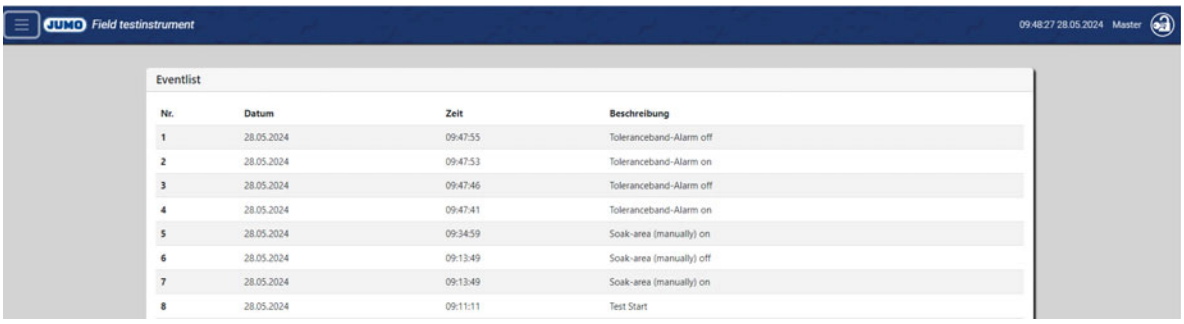
If the tolerance range is breached during the holding phase (e.g., temperature drops because the furnace door is opened), the channel in question is shown in red:



NOTE!

While short-term limit breaches (peaks) are acquired by the test device, they are not always clear in the curve diagram. For this reason, the event list must always be checked for any tolerance band alarms before the test is completed.

Tolerance band alarms caused by limit breaches are listed in the event list:



Nr.	Datum	Zeit	Beschreibung
1	28.05.2024	09:47:55	Toleranceband-Alarm off
2	28.05.2024	09:47:53	Toleranceband-Alarm on
3	28.05.2024	09:47:46	Toleranceband-Alarm off
4	28.05.2024	09:47:41	Toleranceband-Alarm on
5	28.05.2024	09:34:59	Soak-area (manually) on
6	28.05.2024	09:13:49	Soak-area (manually) off
7	28.05.2024	09:13:49	Soak-area (manually) on
8	28.05.2024	09:11:11	Test Start

Example: The test started at 09:11:11 a.m. At around 09:47:41, a tolerance band alarm was triggered because at least one measured value breached a limit value. At around 09:47:46, i.e., after 5 seconds, the tolerance band alarm was over. This means that all measured values were back within the tolerance limits at that point.

7 TUS test

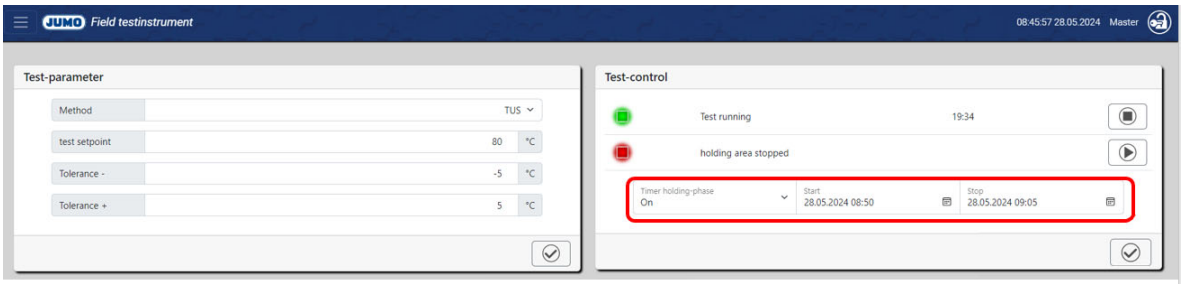
7.2 Time-controlled holding phase

In addition to manual activation and deactivation of the holding phase, there is also an option to control the holding phase with a timer. This function can be used for processes with a long, time-defined warm-up phase, for instance, which means that the user does not have to wait for the time to start and stop the holding phase.

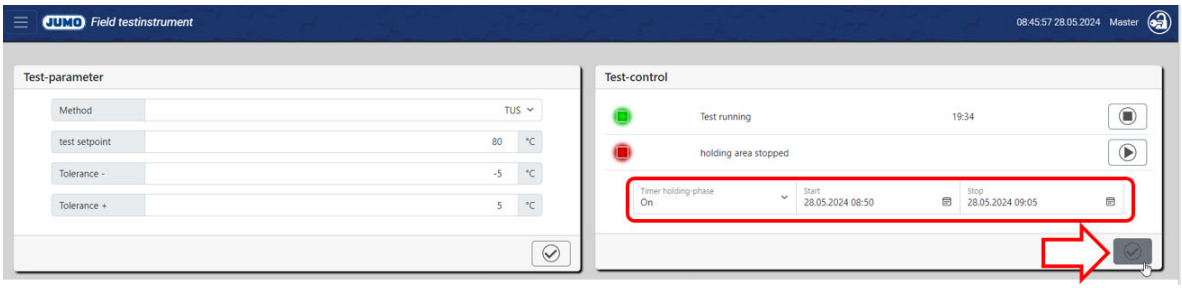
Activating the timer

Process:

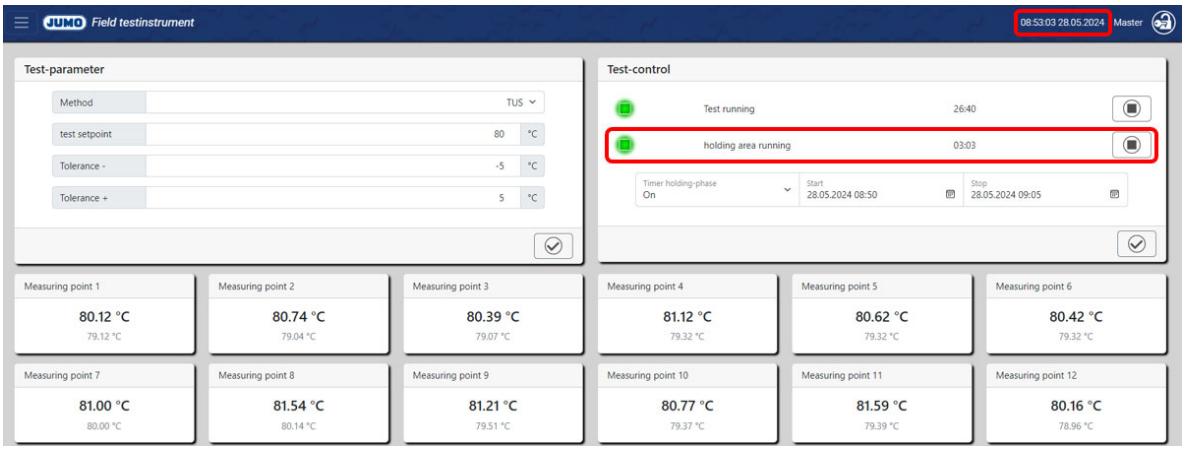
1. After activating the test (see earlier in this document), set the “Timer holding-phase” function to ON and enter the times for starting and stopping the holding phase:



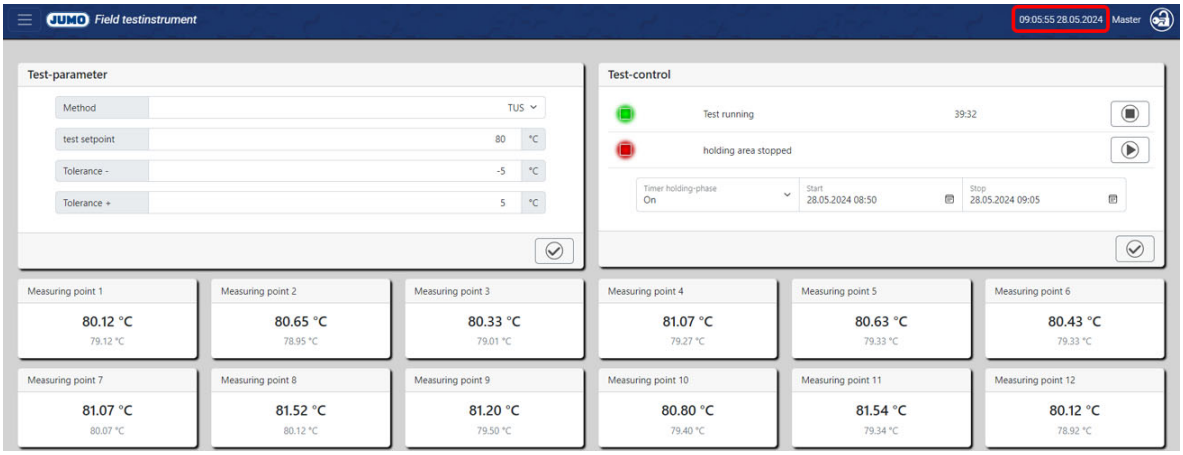
2. Save all settings with the “Tick” button (this is important as otherwise the timer function will not be activated):



Once the set time (here: 08:50 a.m.) is reached, the holding phase will start automatically (holding phase active):



The holding phase is automatically ended at the set time (here: 09:05 a.m.):



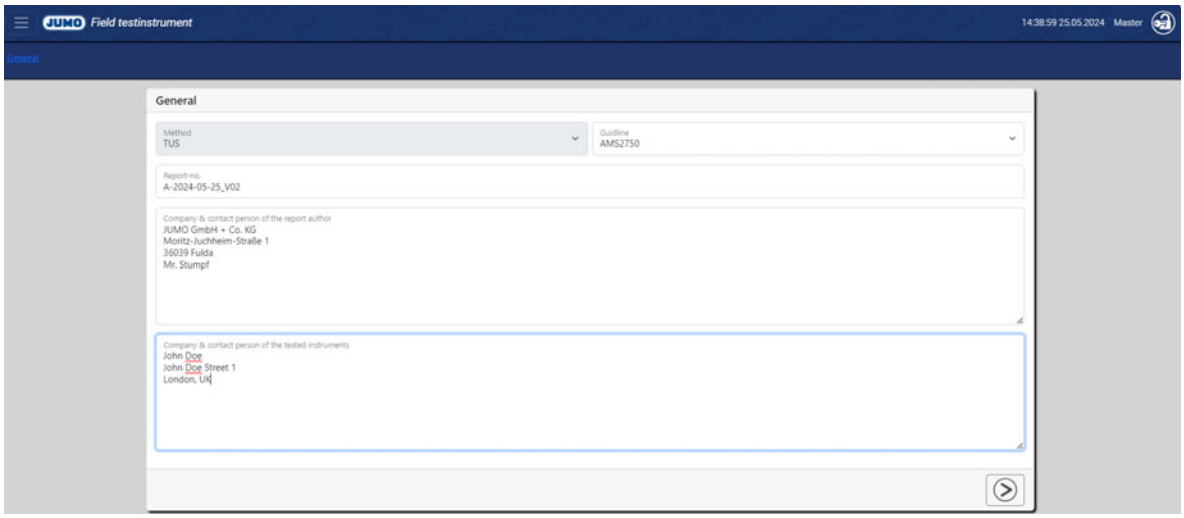
7.3 Preparing the test report

Some specifications must be entered for the test report created once the test has finished.

The preparations for the test report can be completed while the test is active. However, they must be finished before the test is completed (deactivated).

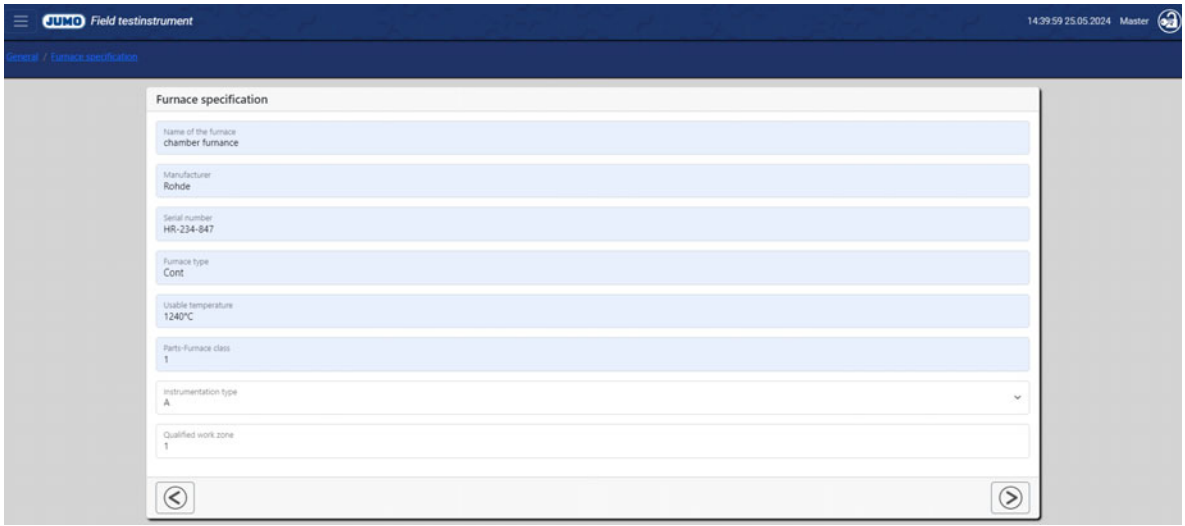
Process:

1. Open the menu with the menu button (top left) and select “Test report”.
   The form for the test report opens (first page: “General”).
2. **General**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:

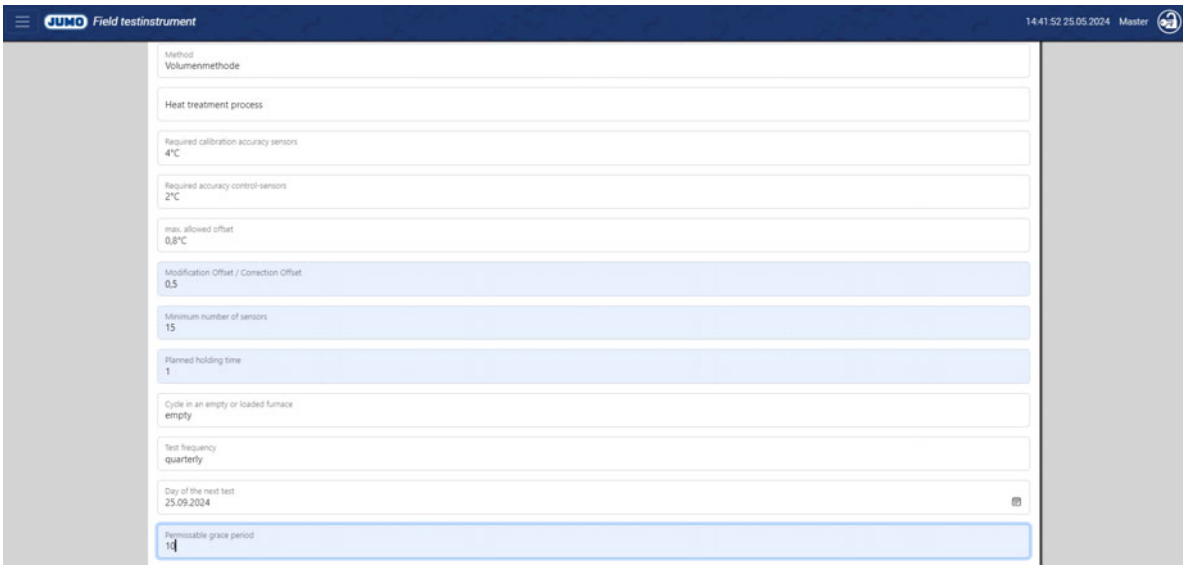


   Important: Always select AMS2750 or CGI-9.

3. **Furnace specification**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:

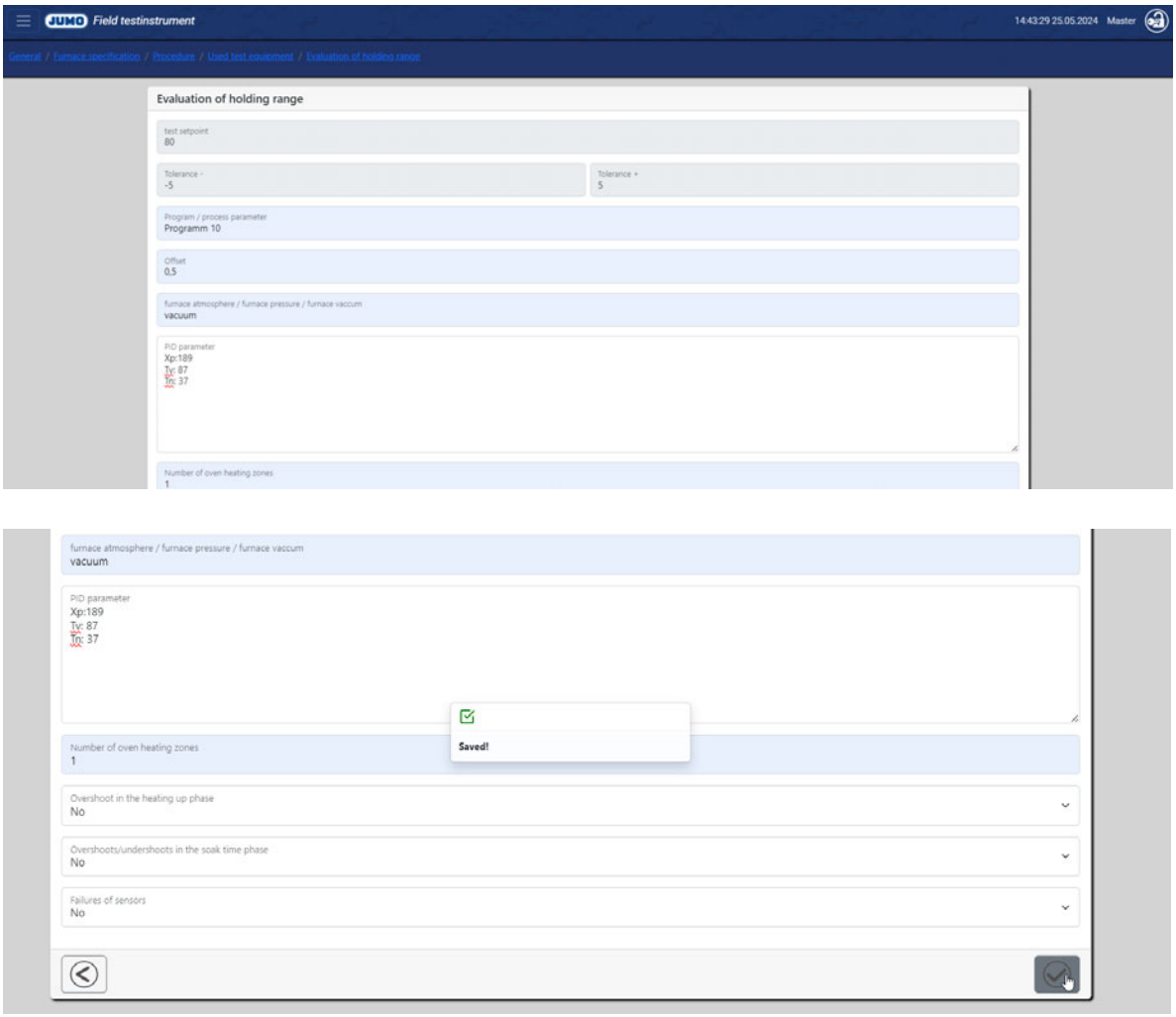


4. **Procedure**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:



5. **Used test equipment**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:

6. **Evaluation of holding range**: Fill out the fields and save all inputs with the “Tick” button. Example:



The test report has now been fully prepared.

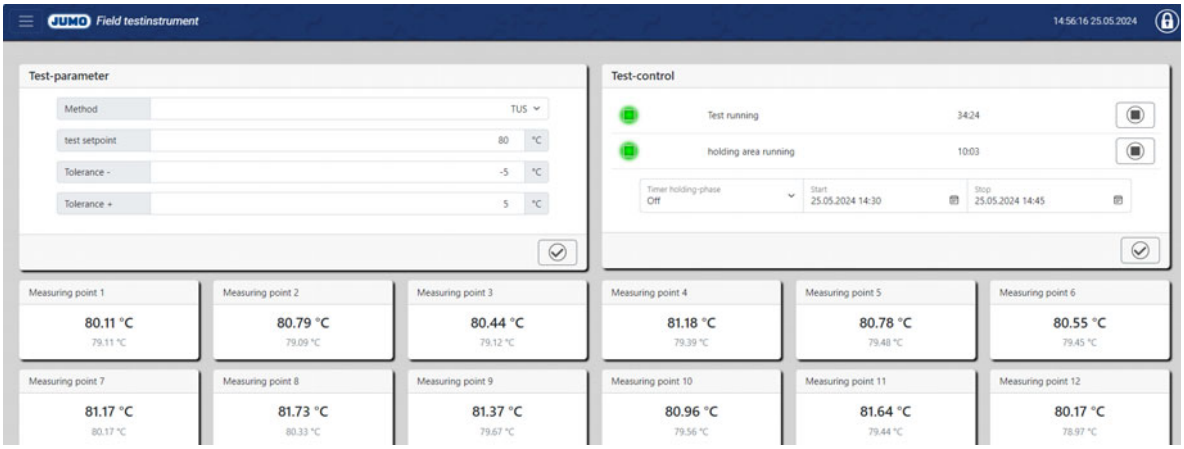
7.4 Ending the test

Once the required holding period has passed and the test report has been prepared, the holding phase and then the test can be ended.

Ending the holding phase and ending the test

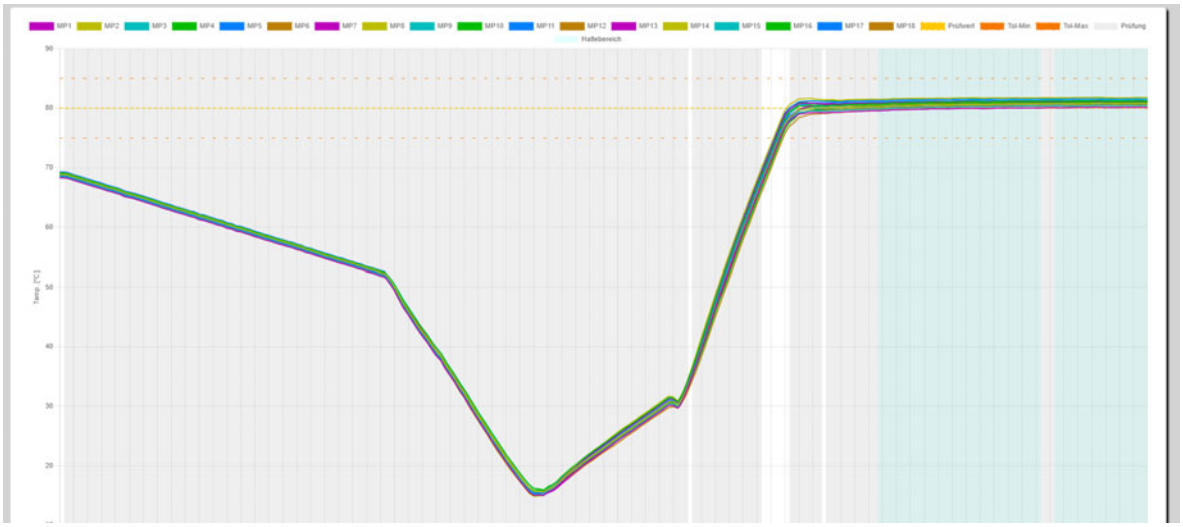
Process:

1. End the holding phase. To do this, press the “Stop” button in the respective line and confirm the query (not shown here) as to whether the holding phase should be stopped:



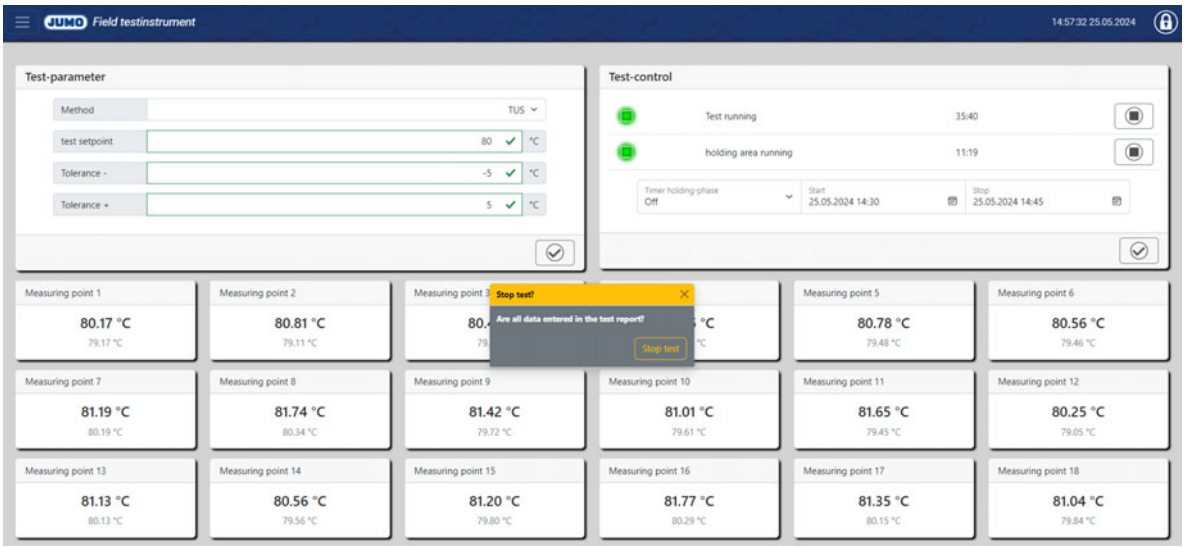
The holding phase is stopped (red symbol, text “Holding area stopped”).

2. Optional: Check the measured values in the curve diagram:



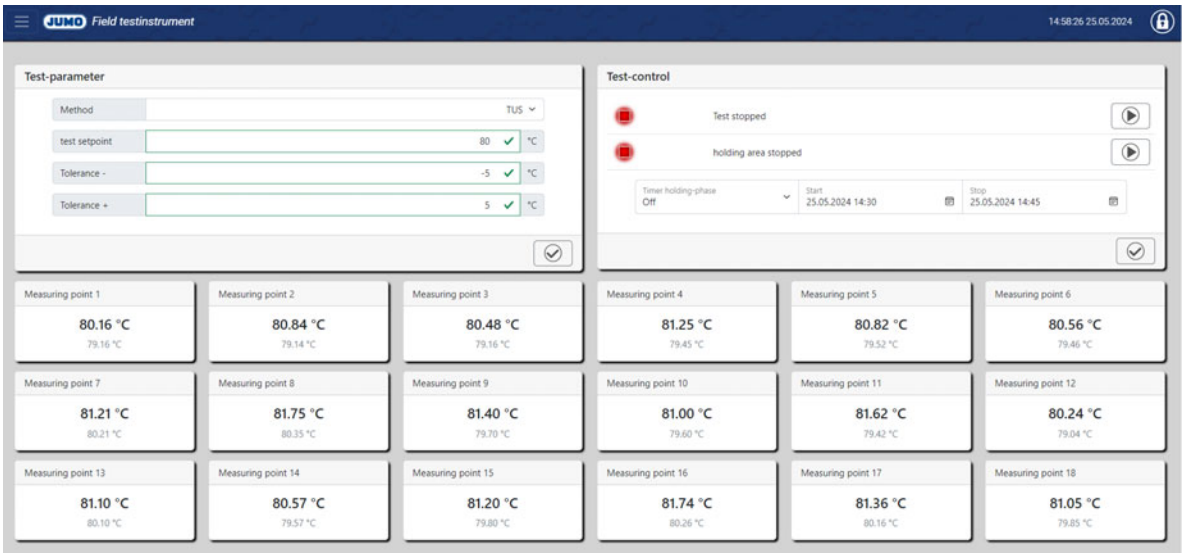
No limits were breached (example).

3. Optional: Check the event list.
   No tolerance band alarms occurred (example).
4. End the test. To do this, press the “Stop“ button in the respective line:



5. Confirm the query (see figure under step 4) as to whether all data has been entered into the test report. To do this, press the “Stop test” button (in the small window).

   The test has ended:



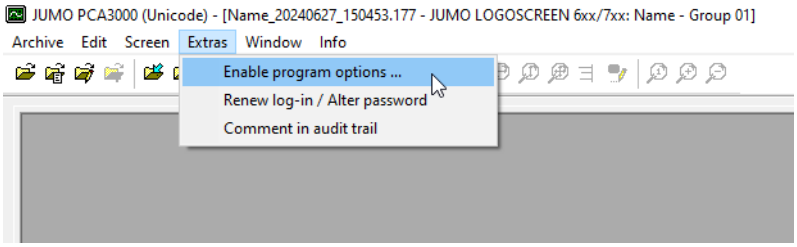
7.5 Create the test report

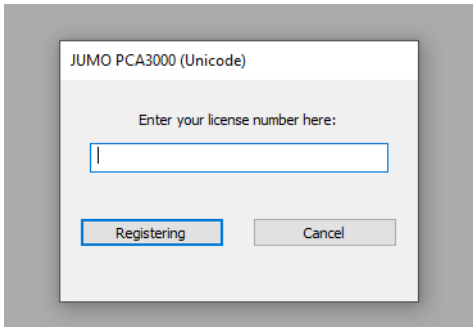
A PC with the PCA Communication Software PCC and the PC Evaluation Software PCA3000 is needed to evaluate the measurements.

The PCA Communication Software PCC sets up the connection between the PC and the TUS/SAT field testing device so that the recorded measurement data, the test parameters, and the specifications for the test report can be transferred to the PC. The test report can then be created automatically with PCC.

The PC evaluation software PCA3000 is normally used to archive and evaluate the data transferred to the PC. In conjunction with the TUS/SAT field testing device, it is only needed to activate the option “Automatic print-out”. This option is needed to be able to create the test report with PCC.

The relevant license number must be entered to activate the option “Automatic printout” in PCA3000:



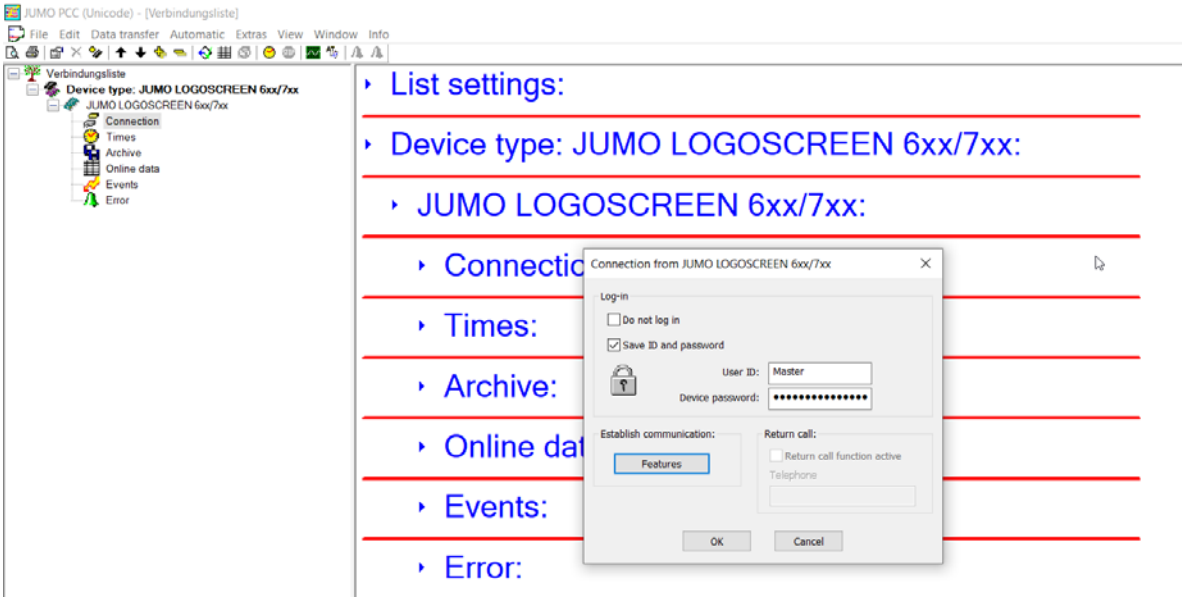


Further information on installing and using the software can be found in the PCC operating manual (70970200T90Z...) and the PCA3000 operating manual (70970100T90Z...). The operating manuals are available to download from the JUMO website.

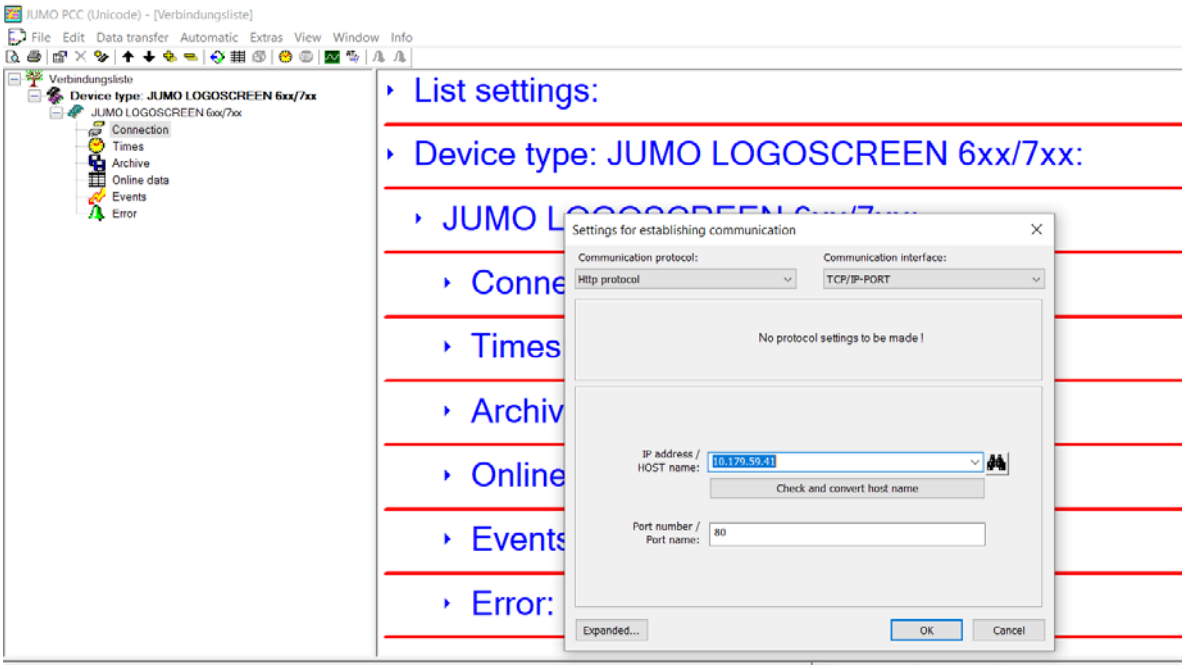
Extracting data and creating a test report

Process:

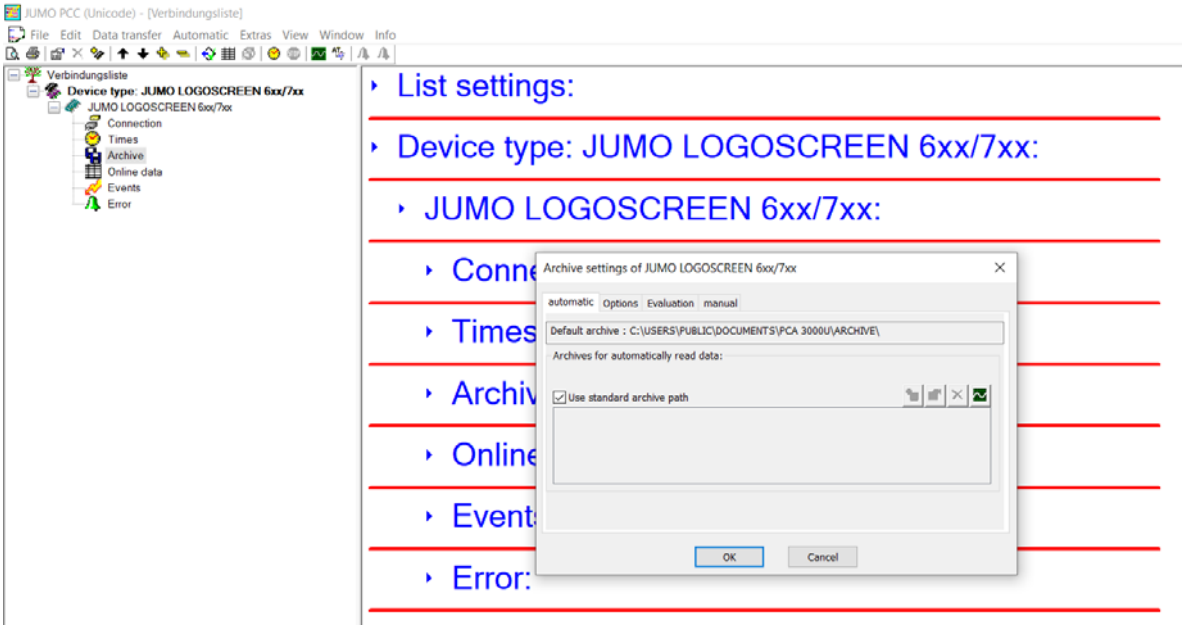
1. Start the PCA Communication Software PCC.
2. In the menu, select the “Connection” option. Then, in the “Connection from ...“ window, enter the user name (Master) and password (9200) and click on the “Features“ button:



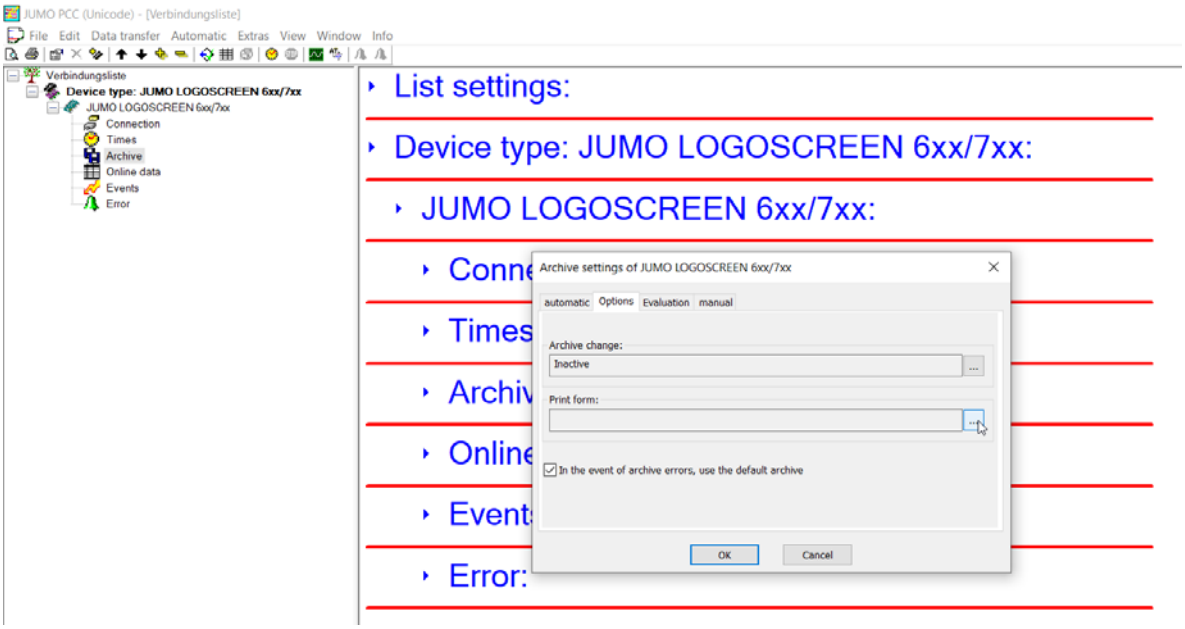
3. Enter the TUS/SAT field testing device's IP address. Then close the window with “OK”. Example:



4. In the menu, select the “Archive” option. Then, in the “Archive settings of ...” window, click on the “Options” tab:

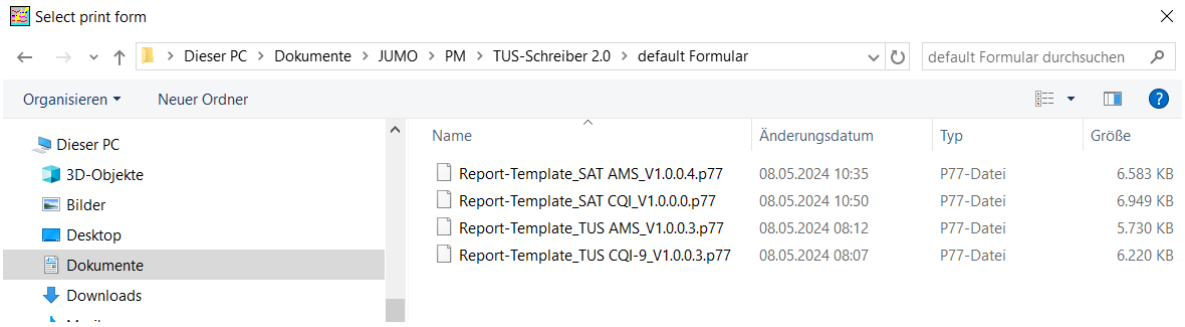


5. In the “Print form:” line, click on the “...” button:



The “Select print form“ window (file directory) opens.

6. Switch to the folder containing the form templates and select the form template needed for the test report. Example:

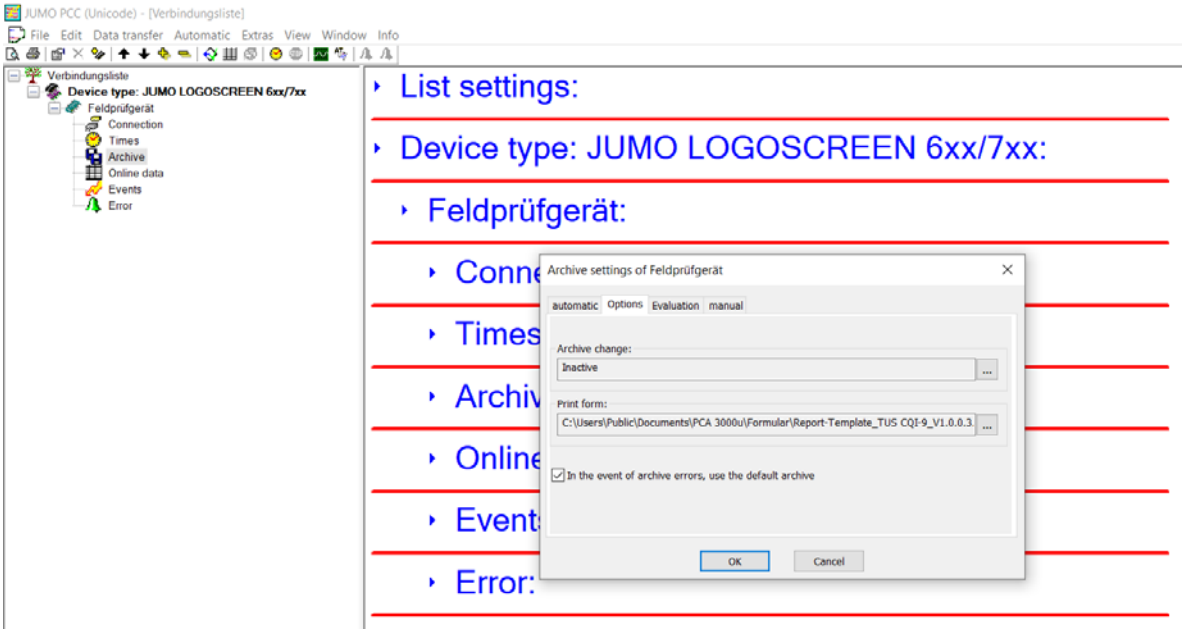


Because a TUS test is performed according to the CQI-9 standard, the “Report-Template_TUS CQI-9...“ file is needed in this example.

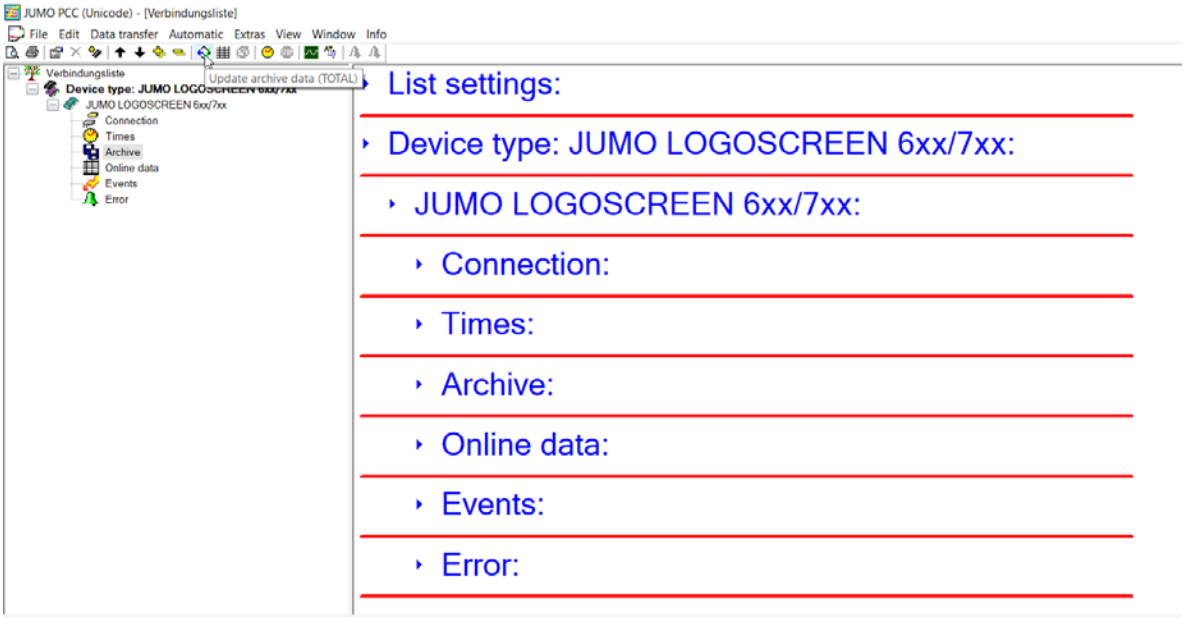
The user does not need to select the “Header ...” files (not shown here), which contain the form headings.

JUMO provides the form templates on a USB flash drive, which is included in the scope of delivery for the TUS/SAT field testing device.

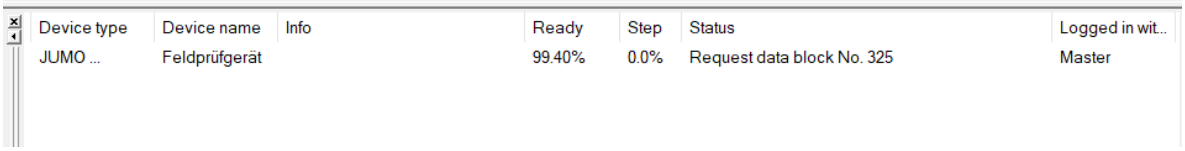
7. Then close the “Archive settings of ...” window with “OK”:



8. In the toolbar, select the function “Update archive data (TOTAL)”:

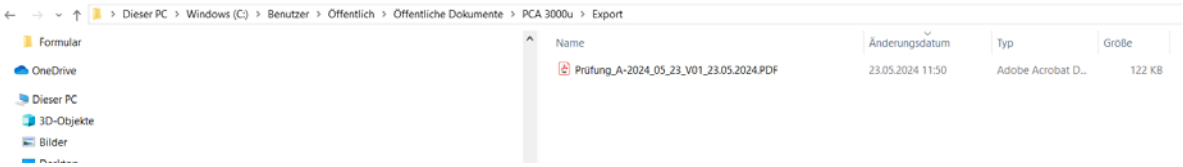


The measurement data acquired by the TUS/SAT field testing device is collected:



Device type	Device name	Info	Ready	Step	Status	Logged in wit...
JUMO ...	Feldprüfgerät		99.40%	0.0%	Request data block No. 325	Master

Then the test report is automatically created using the form template, before being filed in the standard folder:



The file name uses the following structure:
Test designation + Report no. + Test date

NOTE!

With the PC Evaluation Software PCA3000, a test report can also be created retrospectively by using the archive file and form template.

7 TUS test

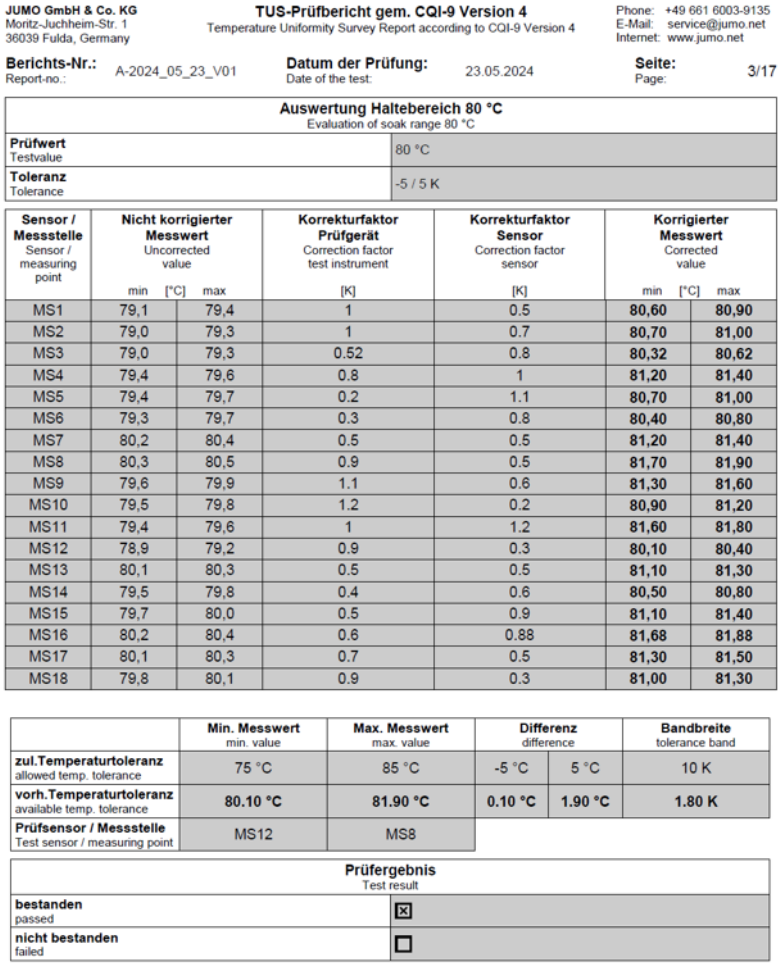
7.6 Evaluating the test results

Below, you will find two examples for evaluating test results, where one test was passed and one test was failed.

TUS test (CQI-9) passed

In this example, no limits were breached during the holding phase (no red measured value curve in the curve diagram, no tolerance band alarm in the event list).

The results are documented in the test report:



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TUS-Prüfbericht gem. CQI-9 Version 4
Temperature Uniformity Survey Report according to CQI-9 Version 4

Phone: +49 661 6003-9135
E-Mail: service@jumo.net
Internet: www.jumo.net

Berichts-Nr.: Report-no.: A-2024_05_23_V01
Datum der Prüfung: Date of the test: 23.05.2024
Seite: Page: 3/17

Auswertung Haltebereich 80 °C
Evaluation of soak range 80 °C

Prüfwert Testvalue	80 °C
Toleranz Tolerance	-5 / 5 K

Sensor / Messstelle Sensor / measuring point	**Nicht korrigierter Messwert** Uncorrected value min	[°C]	max	**Korrekturfaktor Prüfgerät** Correction factor test instrument [K]	**Korrekturfaktor Sensor** Correction factor sensor [K]	**Korrigierter Messwert** Corrected value min	[°C]	max
MS1	79,1		79,4	1	0.5	**80,60**		**80,90**
MS2	79,0		79,3	1	0.7	**80,70**		**81,00**
MS3	79,0		79,3	0.52	0.8	**80,32**		**80,62**
MS4	79,4		79,6	0.8	1	**81,20**		**81,40**
MS5	79,4		79,7	0.2	1.1	**80,70**		**81,00**
MS6	79,3		79,7	0.3	0.8	**80,40**		**80,80**
MS7	80,2		80,4	0.5	0.5	**81,20**		**81,40**
MS8	80,3		80,5	0.9	0.5	**81,70**		**81,90**
MS9	79,6		79,9	1.1	0.6	**81,30**		**81,60**
MS10	79,5		79,8	1.2	0.2	**80,90**		**81,20**
MS11	79,4		79,6	1	1.2	**81,60**		**81,80**
MS12	78,9		79,2	0.9	0.3	**80,10**		**80,40**
MS13	80,1		80,3	0.5	0.5	**81,10**		**81,30**
MS14	79,5		79,8	0.4	0.6	**80,50**		**80,80**
MS15	79,7		80,0	0.5	0.9	**81,10**		**81,40**
MS16	80,2		80,4	0.6	0.88	**81,68**		**81,88**
MS17	80,1		80,3	0.7	0.5	**81,30**		**81,50**
MS18	79,8		80,1	0.9	0.3	**81,00**		**81,30**

	Min. Messwert min. value	**Max. Messwert** max. value	**Differenz** difference		**Bandbreite** tolerance band
zul.Temperaturtoleranz allowed temp. tolerance	75 °C	85 °C	-5 °C	5 °C	10 K
vorh.Temperaturtoleranz available temp. tolerance	**80.10 °C**	**81.90 °C**	**0.10 °C**	**1.90 °C**	**1.80 K**
Prüfsensor / Messstelle Test sensor / measuring point	MS12	MS8			

Prüfergebnis Test result	
bestanden passed	☒
nicht bestanden failed	☐

The evaluation shows the test setpoint value (here: test value) and tolerance range specified by the user. Then the values for the individual measuring points are listed with their respective correction factors. The corrected measured values are decisive for the evaluation.

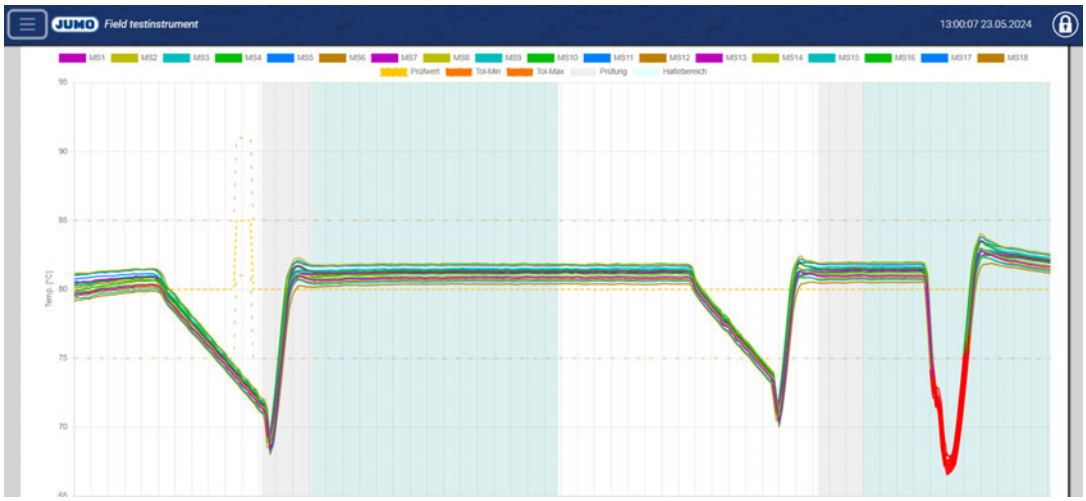
The measuring points (here: MS12, MS8) with the smallest and largest measured values are presented in an overview, in which the measured values (existing temperature tolerance) are compared to the limit values (admissible temperature tolerance).

Since all of the corrected measured values were within the tolerance range during the holding phase, the test was passed.

TUS test (AMS2750) failed

In this example, limit values were breached during the holding phase. This could be caused, for example, by the furnace door being opened.

In the curve diagram, the measured value curves are displayed in red:



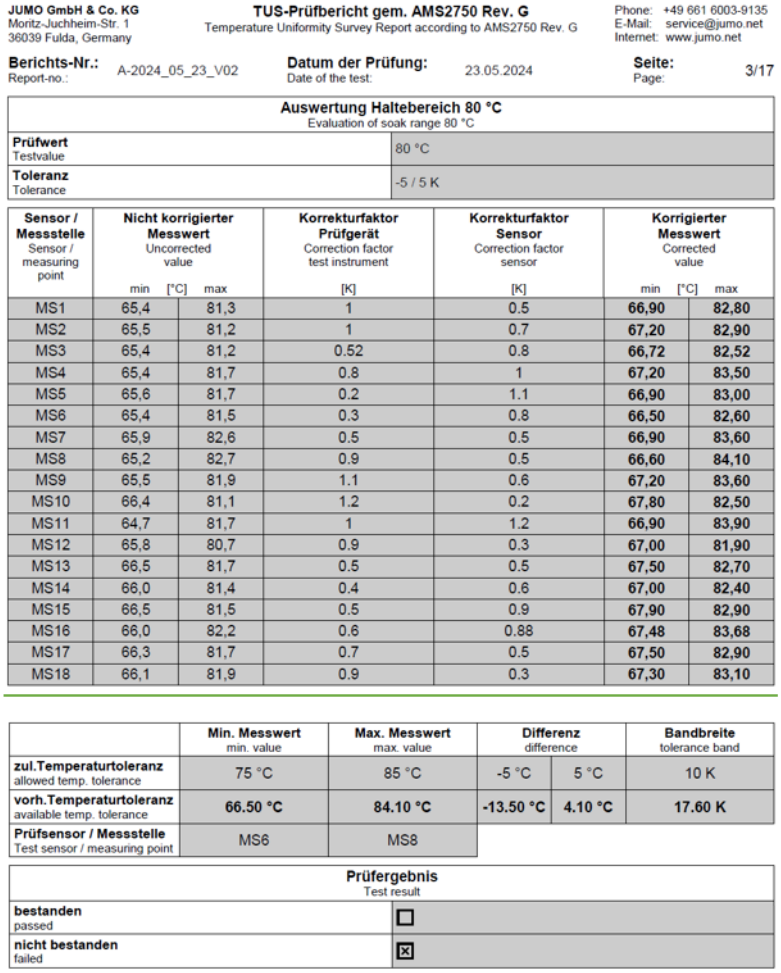
A tolerance band alarm is displayed in the event list:

NOTE!

For as long as the tolerance band alarm exists, it will be displayed in the alarm list.

In addition, the alarm LED on the device lights up (red) and the alarm text is displayed in the status bar at the top of the screen.

The results are documented in the test report:



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TUS-Prüfbericht gem. AMS2750 Rev. G
Temperature Uniformity Survey Report according to AMS2750 Rev. G

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Berichts-Nr.: Report-no.: A-2024_05_23_V02 **Datum der Prüfung:** Date of the test: 23.05.2024 **Seite:** Page: 3/17

Auswertung Haltebereich 80 °C
Evaluation of soak range 80 °C

Prüfwert Testvalue	80 °C
Toleranz Tolerance	-5 / 5 K

Sensor / Messstelle Sensor / measuring point	Nicht korrigierter Messwert Uncorrected value min [°C] max		Korrekturfaktor Prüfgerät Correction factor test instrument [K]	Korrekturfaktor Sensor Correction factor sensor [K]	Korrigierter Messwert Corrected value min [°C] max	
MS1	65,4	81,3	1	0.5	**66,90**	**82,80**
MS2	65,5	81,2	1	0.7	**67,20**	**82,90**
MS3	65,4	81,2	0.52	0.8	**66,72**	**82,52**
MS4	65,4	81,7	0.8	1	**67,20**	**83,50**
MS5	65,6	81,7	0.2	1.1	**66,90**	**83,00**
MS6	65,4	81,5	0.3	0.8	**66,50**	**82,60**
MS7	65,9	82,6	0.5	0.5	**66,90**	**83,60**
MS8	65,2	82,7	0.9	0.5	**66,60**	**84,10**
MS9	65,5	81,9	1.1	0.6	**67,20**	**83,60**
MS10	66,4	81,1	1.2	0.2	**67,80**	**82,50**
MS11	64,7	81,7	1	1.2	**66,90**	**83,90**
MS12	65,8	80,7	0.9	0.3	**67,00**	**81,90**
MS13	66,5	81,7	0.5	0.5	**67,50**	**82,70**
MS14	66,0	81,4	0.4	0.6	**67,00**	**82,40**
MS15	66,5	81,5	0.5	0.9	**67,90**	**82,90**
MS16	66,0	82,2	0.6	0.88	**67,48**	**83,68**
MS17	66,3	81,7	0.7	0.5	**67,50**	**82,90**
MS18	66,1	81,9	0.9	0.3	**67,30**	**83,10**

	Min. Messwert min. value	Max. Messwert max. value	Differenz difference		Bandbreite tolerance band
zul.Temperaturtoleranz allowed temp. tolerance	75 °C	85 °C	-5 °C	5 °C	10 K
vorh.Temperaturtoleranz available temp. tolerance	**66.50 °C**	**84.10 °C**	**-13.50 °C**	**4.10 °C**	**17.60 K**
Prüfsensor / Messstelle Test sensor / measuring point	MS6	MS8			

Prüfergebnis
Test result

bestanden passed	☐
nicht bestanden failed	☒

Since at least one corrected measured value was outside of the tolerance range during the holding phase, the test was failed.

In this example, the corrected minimum measured values of all the measuring points were outside of the tolerance range.

Test reports (examples)

At the end of this documentation, two complete TUS test reports are provided as an example.

In addition to the evaluation (holding phase evaluation, test report) and the test specifications (system description, TUS process, test equipment used, measured values, correction factors), the test reports also contain some form fields that can be used for additional specifications (text, graphics).

All values and the test result were automatically documented (tamper-proof).

The purpose of a SAT test is to check the temperature accuracy of a measuring point using a reference measuring device. In this case, the reference measuring device is the Logoscreen 700 as a SAT test device. The temperature at the measuring point is determined by the device to be tested, for example a temperature controller.

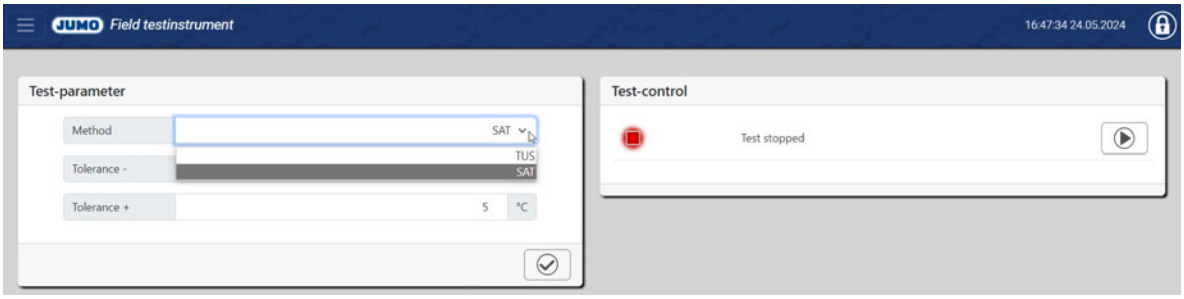
Up to 18 measuring points can be tested, with the measuring points being evaluated in succession.

8.1 Starting the test

Starting the test

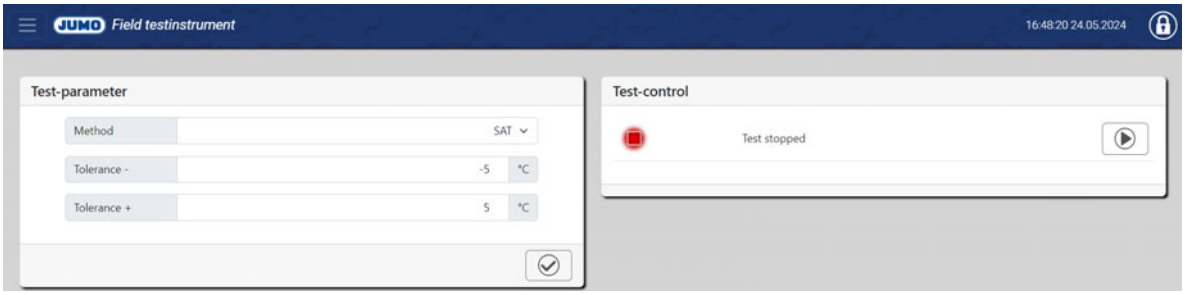
Process:

1. Select the SAT method and save with the “Tick” button:



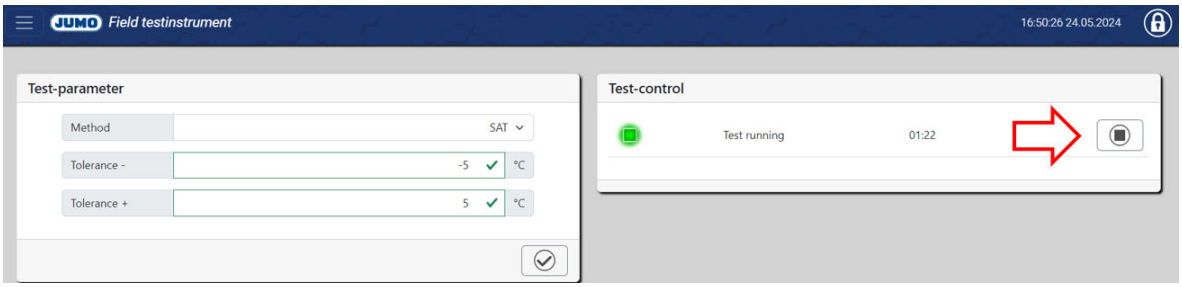
Important: the “Tick” button must be pressed for the amended settings to be effective.

2. Enter the tolerance values according to the AMS or CQI process table, and then save with the “Tick” button:



Important: the “Tick” button must be pressed for the amended settings to be effective.

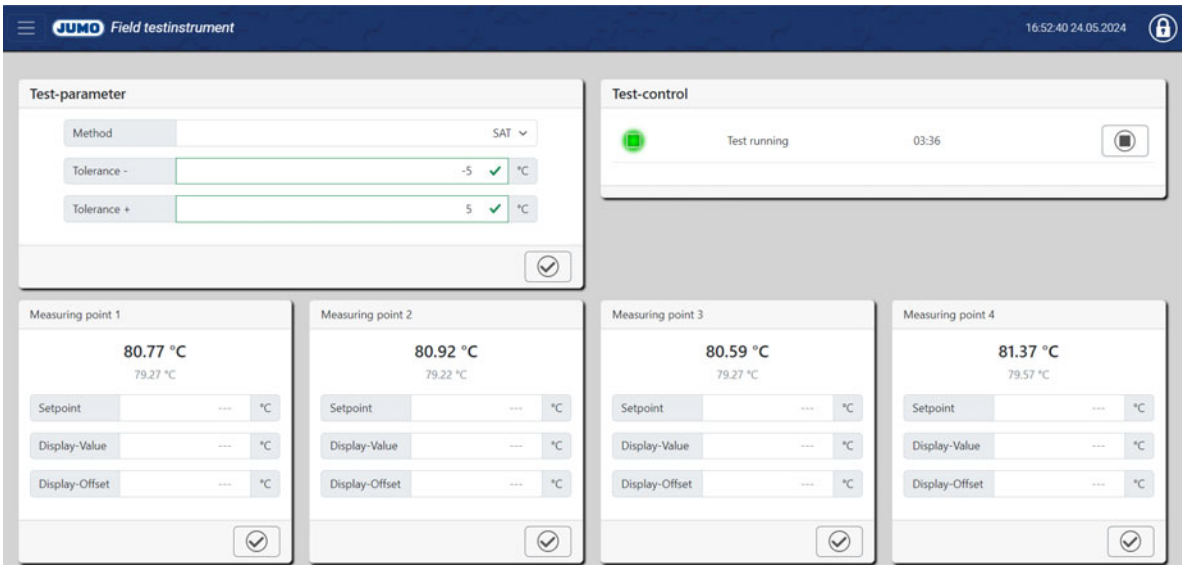
3. Starting the test:



The test is running (green symbol, text “Test running”). Now the values for the measuring points can be entered (see further down).

8 SAT test

Displaying the measuring points



After activating the test, the corrected temperature is displayed first, and below this is the temperature measured for the individual measuring points.

Like in a TUS measurement, the measured temperature is automatically corrected by taking into account the configured correction factors.

The other values (setpoint value, display value, display offset) must be determined successively by the user and entered for each measuring point, as described below.

Principle behind a SAT test

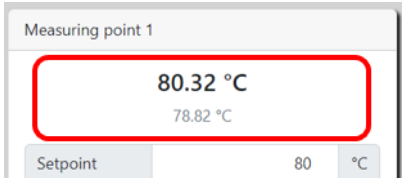
Each measuring point must be looked at separately. The test device's sensor measures the temperature at the measuring point; it is then automatically corrected by the test device, taking into account the entered correction factors (sensor and test device). The corrected temperature represents the reference temperature.

The corrected display value from the device to be tested is needed as a comparison. For this purpose, the user must read the value displayed on the device to be tested and the offset value must be determined for the display using the device settings. The device's setpoint value also needs to be determined. The user must enter all three values for the respective measuring point.

Entering values for the measuring points

In this example, the values for measuring point 1 need to be entered. The temperature at the measuring point is determined by a temperature controller.

The temperature (78.82 °C) measured by the test device (Logoscreen 700) and the corrected temperature (80.32 °C) are displayed:



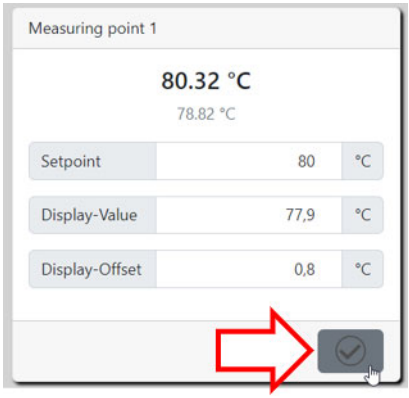
1. Enter the following values one after another:

Setpoint value (80 °C): The setpoint configured on the temperature controller.

Display value (77.9 °C): The value displayed on the temperature controller at the time of the measurement.

Display offset (0.8 °C): The offset value configured on the temperature controller for the display.

2. Accept the values entered by pressing the “Tick” button:



The measured values for measuring point 1 have been saved successfully (including time stamp):

If a certificate is needed for measuring point 1 only, the test can be ended here (deactivated) (if the test report has already been prepared).

3. If necessary, enter the values for the other measuring points, as demonstrated in steps 1 and 2.

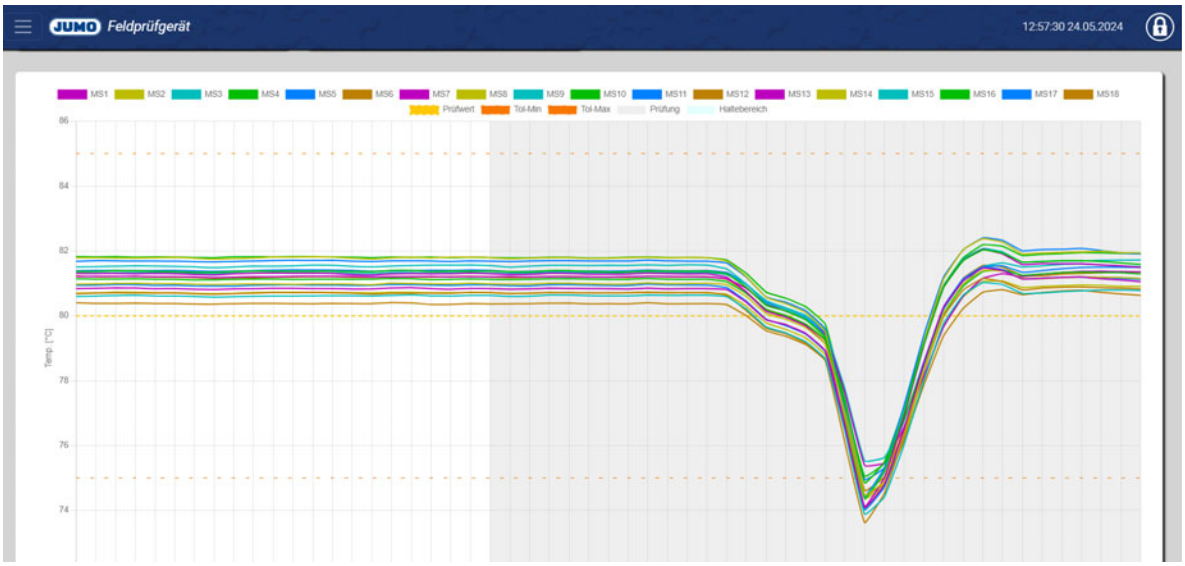
NOTE!

Each time the “Tick” button is pressed, the current values for the respective measuring point will be saved again. Any values saved previously will be overwritten. As such, the measurements can be repeated provided that the test has not already been ended. The test report always lists the most recently saved values.

Curve presentation of the temperature curve

Underneath the measuring points, the temperature curve (corrected measured values) is presented as a curve diagram (details: see TUS test):

8 SAT test


Feldprüfgerät
12:57:30 24.05.2024
MS1 MS2 MS3 MS4 MS5 MS6 MS7 MS8 MS9 MS10 MS11 MS12 MS13 MS14 MS15 MS16 MS17 MS18
Prüfwert Tol-Min Tol-Max Prüfung Haltebereich
86
84
82
80
78
76
74
Temp [°C]

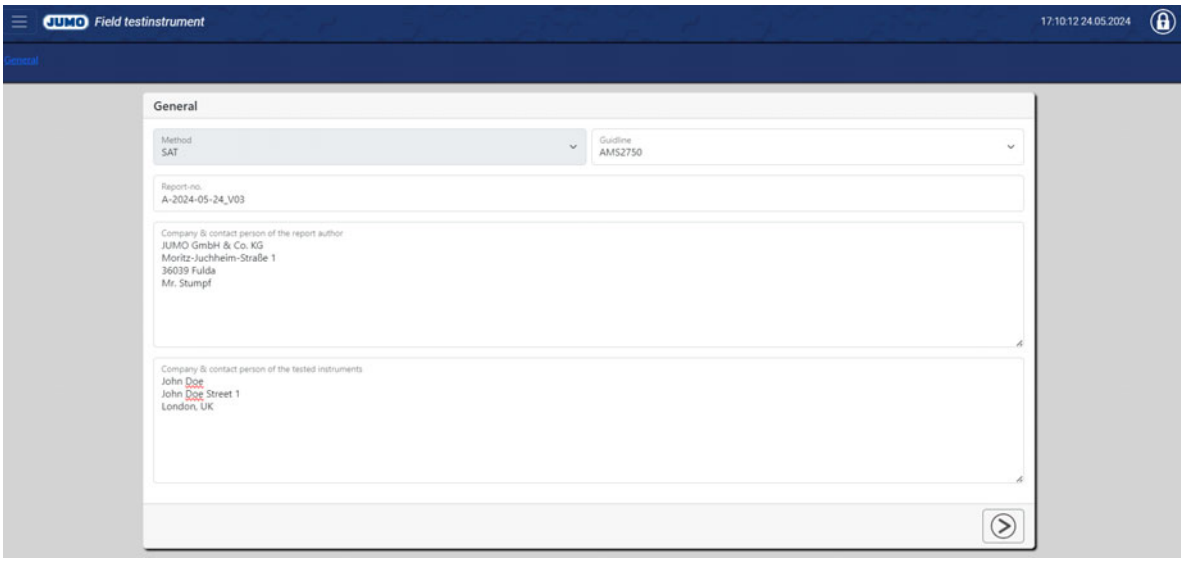
8.2 Preparing the test report

Some specifications must be entered for the test report created once the test has finished.

The preparations for the test report can be completed while the test is active. However, they must be finished before the test is completed (deactivated).

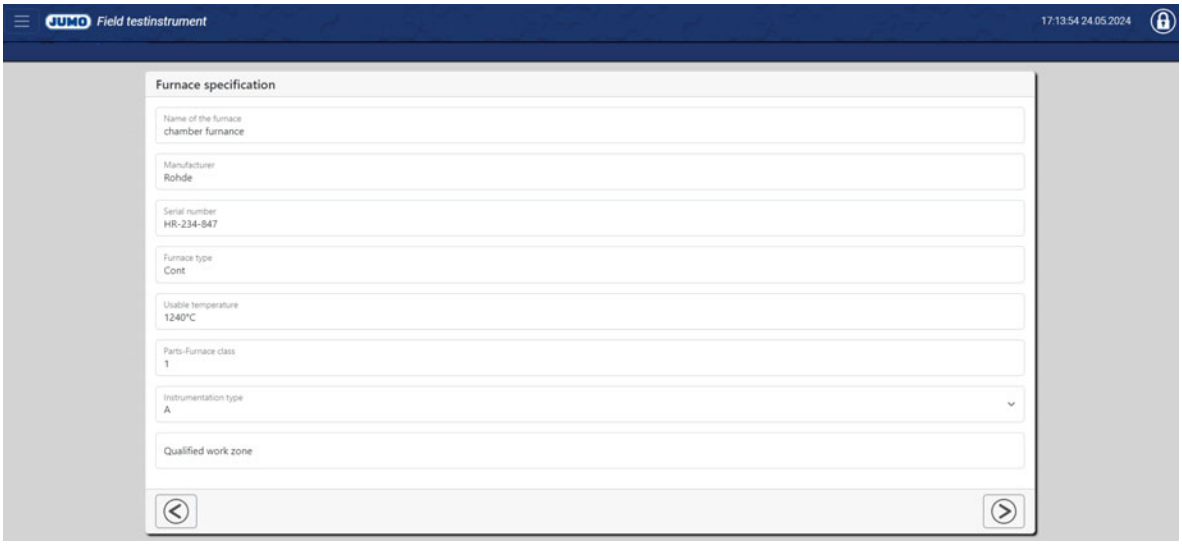
Process:

1. **General**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:



Important: Always select AMS2750 or CGI-9.

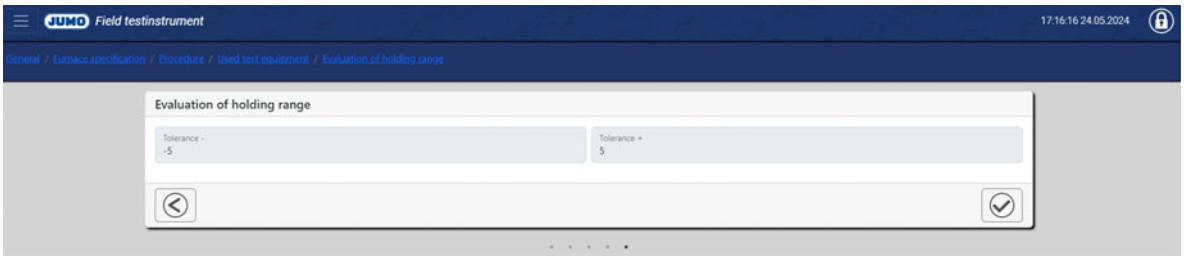
2. **Furnace specification**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:

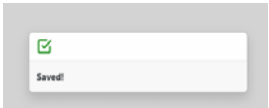


3. **Procedure**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:

4. **Used test equipment**: Complete the fields and use the “Right arrow” button to switch to the next page. Example:

5. **Evaluation of holding range**: No inputs required here (the tolerance values are only displayed here). Save all previous inputs with the “Tick” button. Example:





The test report has now been fully prepared.

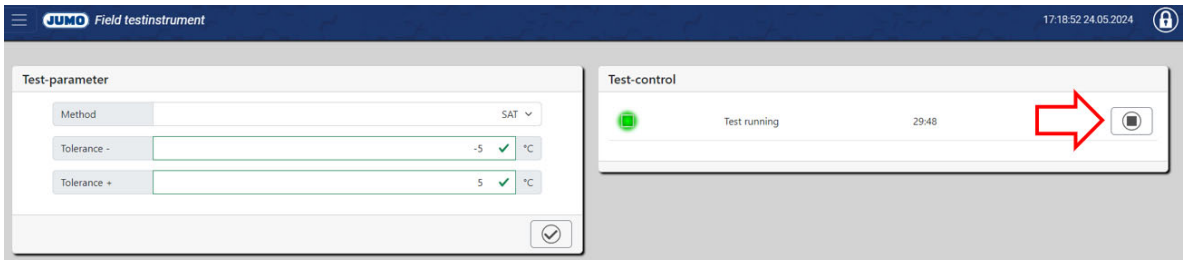
8.3 Ending the test

The test can be finished after the values for all measuring points have been entered and after the test report has been prepared.

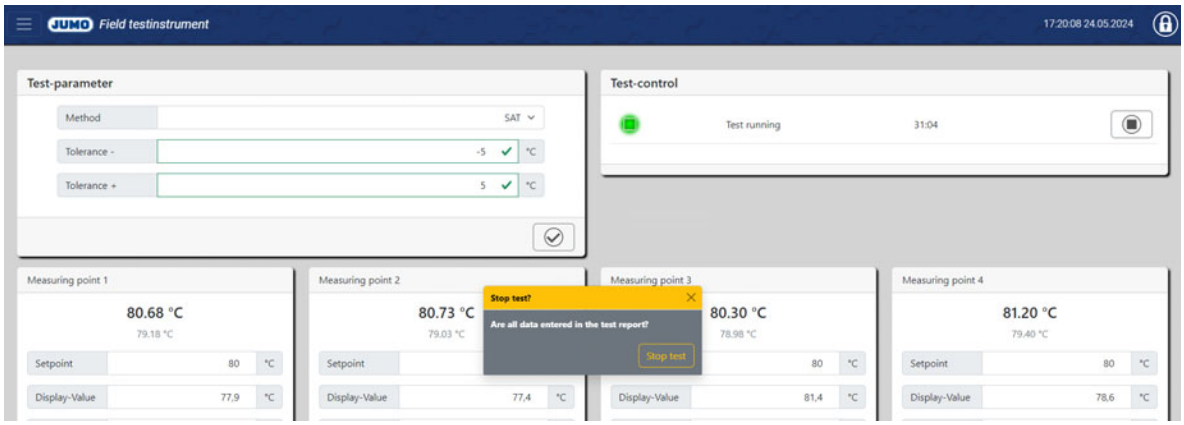
Ending the test

Process:

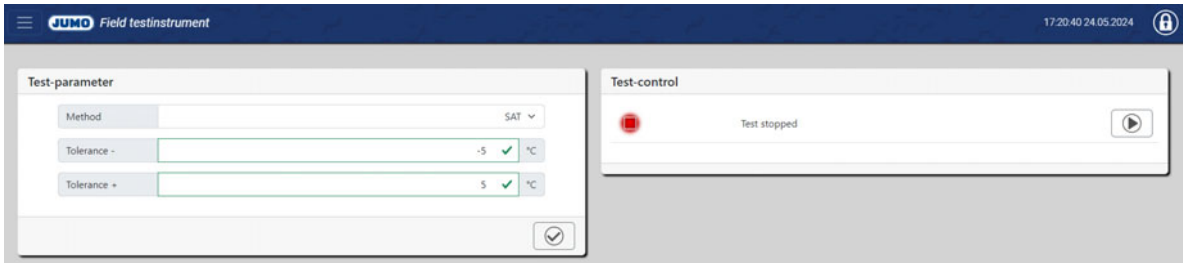
1. Press the “Stop“ button:



2. Confirm the query as to whether all data has been entered into the test report. To do this, press the “Stop test” button (in the small window):



The test has ended:



8 SAT test

8.4 Create the test report

The process for creating an SAT test report is the same as the process for the TUS test report:

chapter 7.5 "Create the test report", Page 29

The only difference relates to the selection of the form templates (step 6).

Name	Änderungsdatum	Typ	Größe
Header SAT AMS_V1.0.0.0.lst	18.04.2024 09:53	LST-Datei	15 KB
Header SAT CQI-9_V1.0.0.0.lst	08.05.2024 10:43	LST-Datei	15 KB
Header TUS AMS_V1.0.0.1.lst	25.07.2023 12:36	LST-Datei	15 KB
Header TUS CQI-9_V1.0.0.1.lst	27.07.2023 14:44	LST-Datei	15 KB
Report-Template_SAT AMS_V1.0.0.4.p77	08.05.2024 10:35	P77-Datei	6.583 KB
Report-Template_SAT CQI_V1.0.0.0.p77	08.05.2024 10:50	P77-Datei	6.949 KB
Report-Template_TUS AMS_V1.0.0.3.p77	08.05.2024 08:12	P77-Datei	5.730 KB
Report-Template_TUS CQI-9_V1.0.0.3.p77	08.05.2024 08:07	P77-Datei	6.220 KB

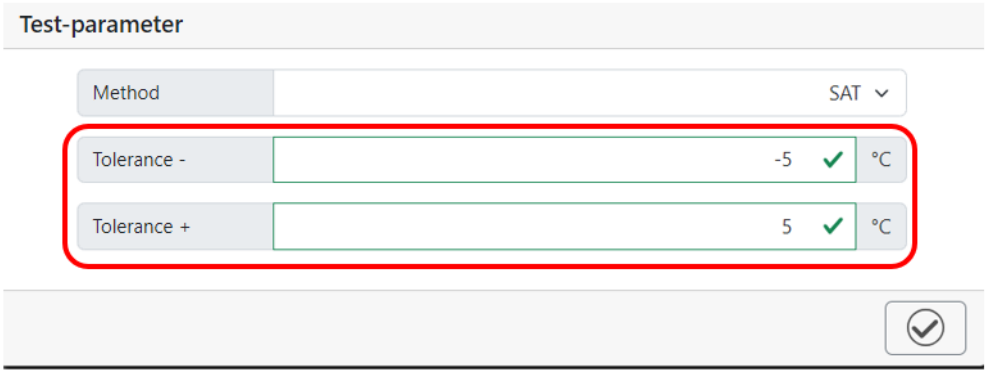
Because a SAT test is performed according to the CQI-9 standard, the “Report-Template_SAT CQI-9...“ file is needed in this example.

The user does not need to select the “Header ...” files (form headings) here.

8.5 Evaluating the test results

Below, you will find two examples for evaluating test results, where one test was passed and one test was failed. The results relate to the respective measuring point.

The tolerance values (according to CQI-9) entered by the user at the start of the test are:



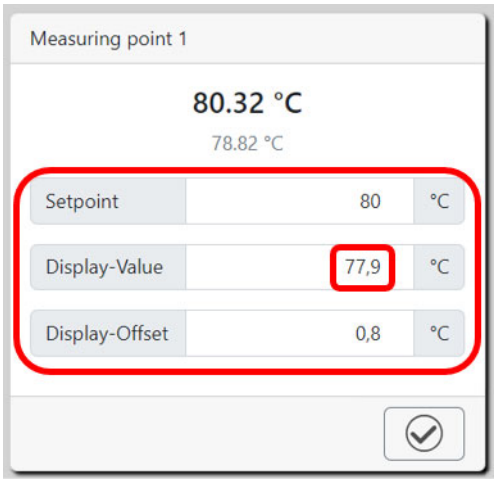
The tolerance values define the tolerance range on each side of the reference value. The reference value is the corrected measured value from the test device (Logoscreen 700, referred to as “Recorder” in the test report).

SAT test (CQI-9) passed

Here, we are looking at measuring point 1, which passed the test.

The reference value is 80.32°C:

The display value entered and saved by the user is 77.9 °C:



The individual values and the test result are listed in the test report:

Messstelle Measuring point					Measuring point 1				
Sollwert Setpoint					80 °C				
Toleranz Tolerance					-5 / 5 K				
Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
77,90	0,80	**78,70**	78,82	0,50	1	**80,32**	-1,62	16:59:38	bestanden / passed

The following values are relevant for the automatic evaluation:

- Corrected display value: 78.70 °C
- Corrected measured value of recorder: 80.32
- Tolerance range: 75.32 °C to 85.32 °C (80.32 °C +/- 5 °C)

The test was passed since the corrected display value is within the tolerance range.

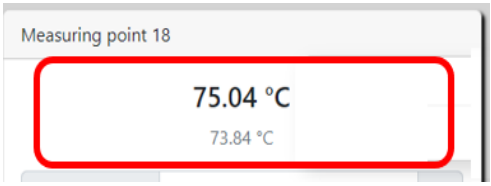
The “Difference” column shows how much the corrected display value deviates from the corrected value.

The “System time” column contains the time at which the user saved the display value.

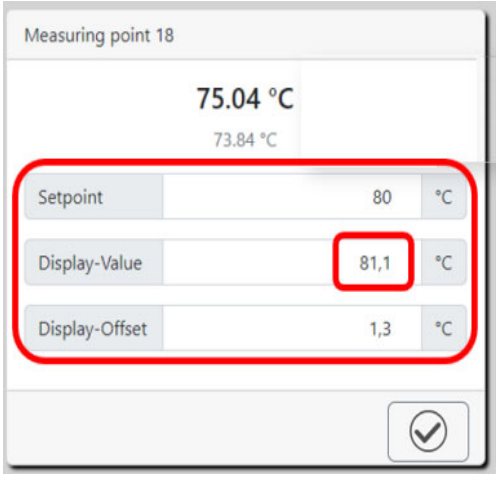
SAT test (CQI-9) failed

Here, we are looking at measuring point 18, which did not pass the test.

The reference value is 75.04 °C:



The display value entered and saved by the user is 81.1 °C:



The individual values and the test result are listed in the test report:

Messstelle Measuring point					Measuring point 18				
Sollwert Setpoint					80 °C				
Toleranz Tolerance					-5 / 5 K				
Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
81,10	1,30	**82,40**	73,84	0,30	0,90	**75,04**	7,36	17:18:00	nicht bestanden / failed

The following values are relevant for the automatic evaluation:

- Corrected display value: 82.40 °C
- Corrected measured value of recorder: 75.04
- Tolerance range: 70.04 °C to 80.04 °C (75.04 °C +/- 5 °C)

The test was failed since the corrected display value is outside of the tolerance range.

The “System time” column contains the time at which the user saved the display value.

Test report (example)

At the end of this documentation, a full SAT test report is provided as an example.

In addition to the evaluation (test report) and the test specifications (furnace specification, calibration method, used test equipment, measured values, correction factors), the test report also contains some form fields that can be used for additional specifications (text, graphics).

All values and the test result were automatically documented (tamper-proof).

9 Example: TUS test report – passed

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TUS-Prüfbericht gem. AMS2750 Rev. G
Temperature Uniformity Survey Report according to AMS2750 Rev. G

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E-Mail: service@jumo.net
Internet: www.jumo.net

Berichts-Nr.: Report-no.: A-2024-05-25_V02 **Datum der Prüfung:** Date of the test: 25.05.2024 **Seite:** Page: 1/16

JUMO DAkkS-Registrierungsnummer: D-K-15129-01-00 JUMO DAkkS-Registration number: D-K-15129-01-00	
Unternehmen und Ansprechpartner des Berichterstellers Company & contact person of the report author	JUMO GmbH + Co. KG Moritz-Juchheim-Straße 1 36039 Fulda Mr. Stumpf
Unternehmen und Ansprechpartner der geprüften Geräte Company & contact person of the tested instruments	John Doe John Doe Street 1 London, UK

Anlagenbeschreibung Furnace specification	
Name der Anlage Name of the furnace	chamber furnance
Hersteller Manufacturer	Rohde
Seriennummer Serial number	HR-234-847
Ofenart Furnace type	Cont
Nutztemperatur Usable temperature	1240°C
Teile-Ofenklasse Parts-Furnace class	1
Instrumentierungstyp Instrumentation type	A
Qualifizierte Arbeitszone Qualified work zone	1

TUS-Verfahren TUS procedure	
Flächenmethode oder Volumenmethode Area method or volume method	Volumenmethode
Wärmebehandlungsverfahren Heat treatment process	
Geforderte Kalibriergenauigkeit TUS-Sensoren Required calibration accuracy TUS sensors	4°C
Geforderte Genauigkeit Regel-Sensoren Required accuracy control-sensors	2°C
Max. erlaubtes Offset max. allowed offset	0,8°C
Modifikation Offset / Korrektur Offset Modification Offset / Correction Offset	0,5
Mindestanzahl TUS-Sensoren Minimum number of TUS sensors	15
Geplante Haltezeit Planned soak time	1
TUS-Fahrt im leeren oder beladenen Ofen TUS cycle in an empty or loaded furnace	empty
Tag der Prüfung Date of test	25.05.2024
Prüfintervall Test frequency	quarterly
Tag der nächsten Prüfung Day of the next test	2024-09-25
Zulässige Karenzzeit Permissable grace period	10

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Verwendetes Prüfequipment Used test equipment	
Datenrekorder Datarecorder	Field testinstrument
Typ des Datenrekorders Type of datarecorder	JUMO LOGOSCREEN 700
Seriennummer des Datenrekorders Serialnumber of the datarecorder	00000000000000000003
Kalibriernummer des Datenrekorders Calibration ident of the datarecorder	7412 D-K-15129-01-00 2023-01
Kalibrierung gültig bis Calibration valid until	
TUS-Sensor TUS sensor	Sheath thermocouple
Sensor Typ Sensor type	N
Kalibriernummer der Sensoren Calibration ident of sensors	466453 357332 912311 665895

9 Example: TUS test report – passed

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Auswertung Haltebereich 80 °C Evaluation of soak range 80 °C	
Prüfwert Testvalue	80 °C
Toleranz Tolerance	-5 / 5 K

Sensor / Messstelle Sensor / measuring point	**Nicht korrigierter Messwert** Uncorrected value min [°C] max		**Korrekturfaktor Prüfgerät** Correction factor test instrument [K]	**Korrekturfaktor Sensor** Correction factor sensor [K]	**Korrigierter Messwert** Corrected value min [°C] max	
MP1	79,0	79,2	0.5	0.5	**80,00**	**80,20**
MP2	79,0	79,2	1	0.7	**80,70**	**80,90**
MP3	79,0	79,2	0.52	0.8	**80,32**	**80,52**
MP4	79,3	79,5	0.8	1	**81,10**	**81,30**
MP5	79,4	79,6	0.2	1.1	**80,70**	**80,90**
MP6	79,4	79,5	0.3	0.8	**80,50**	**80,60**
MP7	80,1	80,3	0.5	0.5	**81,10**	**81,30**
MP8	80,3	80,4	0.9	0.5	**81,70**	**81,80**
MP9	79,6	79,8	1.1	0.6	**81,30**	**81,50**
MP10	79,5	79,6	1.2	0.2	**80,90**	**81,00**
MP11	79,3	79,5	1	1.2	**81,50**	**81,70**
MP12	78,9	79,1	0.9	0.3	**80,10**	**80,30**
MP13	80,1	80,2	0.5	0.5	**81,10**	**81,20**
MP14	79,4	79,6	0.4	0.6	**80,40**	**80,60**
MP15	79,7	79,8	0.5	0.9	**81,10**	**81,20**
MP16	80,2	80,3	0.6	0.88	**81,68**	**81,78**
MP17	80,1	80,2	0.7	0.5	**81,30**	**81,40**
MP18	79,7	79,9	0.9	0.3	**80,90**	**81,10**

	Min. Messwert min. value	**Max. Messwert** max. value	**Differenz** difference		**Bandbreite** tolerance band
zul.Temperaturtoleranz allowed temp. tolerance	75 °C	85 °C	-5 °C	5 °C	10 K
vorh.Temperaturtoleranz available temp. tolerance	**80.00 °C**	**81.80 °C**	**0 °C**	**1.80 °C**	**1.80 K**
Prüfsensor / Messstelle Test sensor / measuring point	MP1	MP8			

Prüfergebnis Test result	
bestanden passed	☒
nicht bestanden failed	☐

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TUS-Programm / Prozessparameter TUS program / process parameter	Programm 10
TUS-Offset TUS offset	0,5
Ofenatmosphäre / Ofendruck / Ofenvakuum furnace atmosphere / furnace pressure / furnace vaccum	vacuum
PID-Parameter PID parameter	Xp:189 Tv: 87 Tn: 37
Anzahl der Ofen Heizzonen Number of oven heating zones	1
Start der TUS Start of the TUS	25.05.2024 / 14:21:51
Ende der TUS End of the TUS	25.05.2024 / 14:58:22
Überschwinger in der Aufheizphase Overshoot in the heating up phase	nein / no
Überschwinger/Unterschwinger in der Haltephase Overshoots/undershoots in the soak time phase	nein / no
Start Haltebereich Start soak area	25.05.2024 / 14:46:13
Ende Haltebereich End soak area	25.05.2024 / 14:58:22
Ist-Haltezeit Actual soak time	12min / 9s
Ausfälle TUS-Sensoren Failures of TUS sensors	nein / no

9 Example: TUS test report – passed

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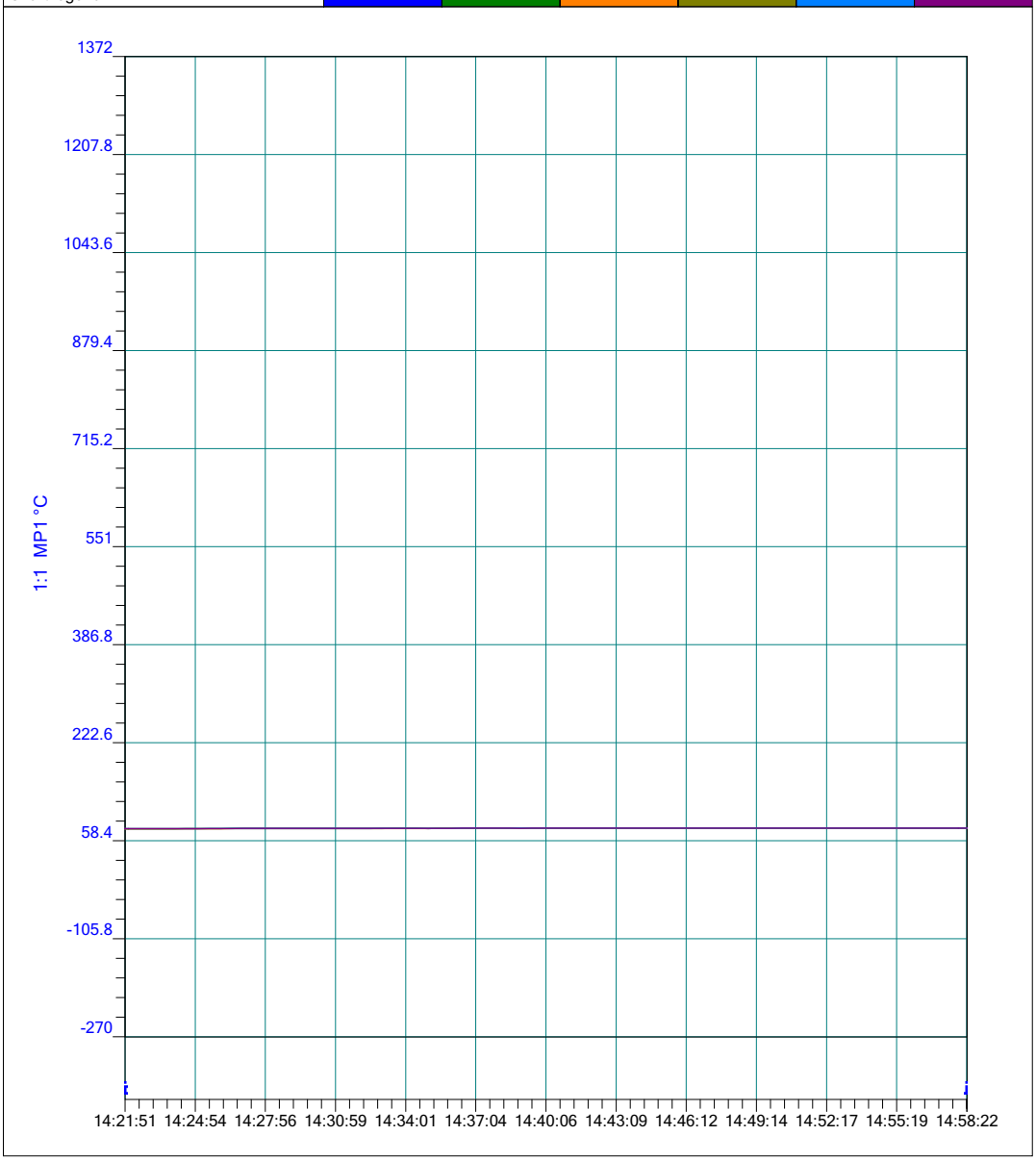
Datum der Prüfung: 25.05.2024
Date of the test:

Temperatur-Zeit-Profil TUS-Sensoren
Temperature-time-profile TUS-sensors

Diagramm Legende
Chart legend

MP1 | MP2 | MP3 | MP4 | MP5 | MP6



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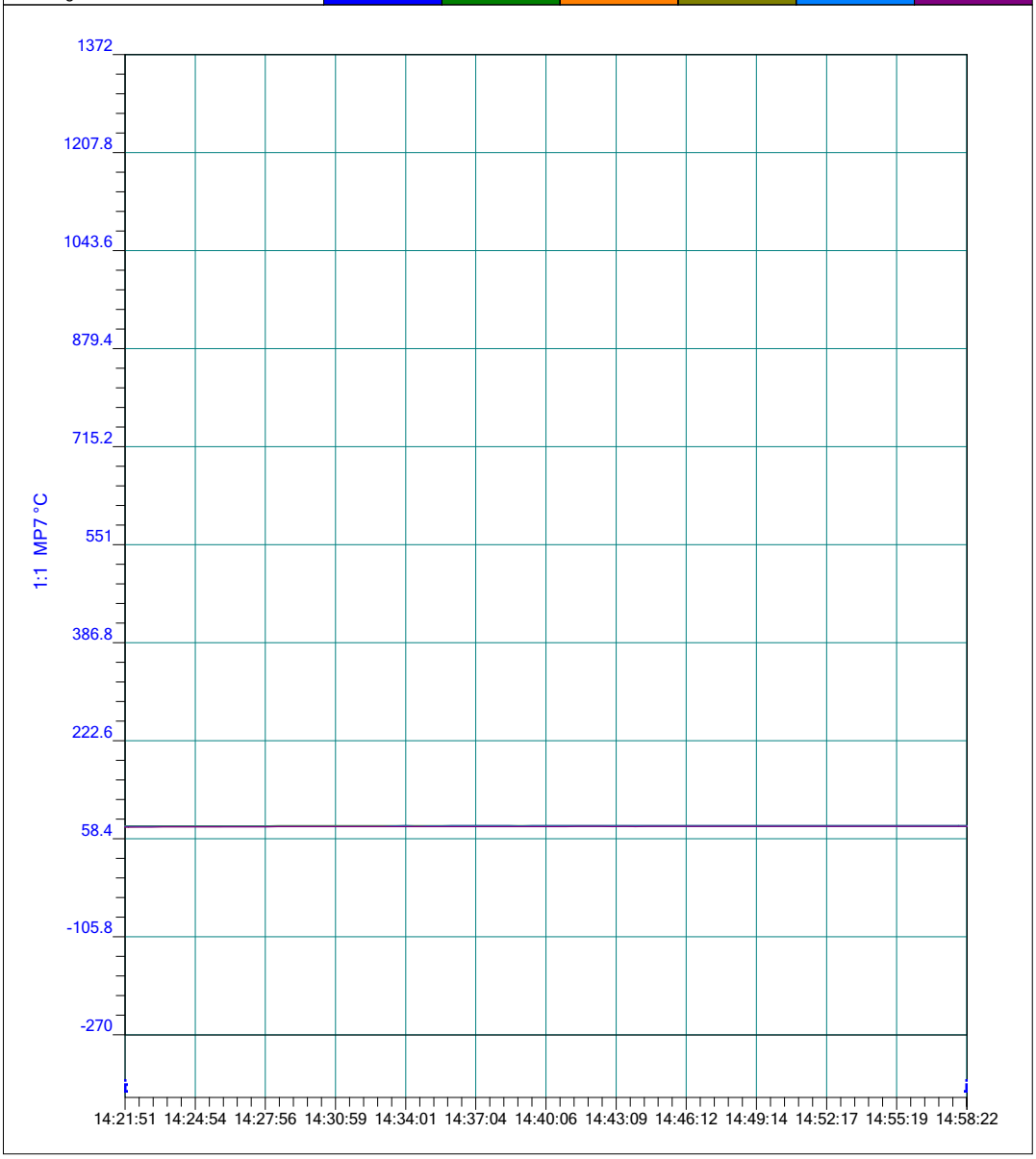
Datum der Prüfung: 25.05.2024
Date of the test:

Temperatur-Zeit-Profil TUS-Sensoren
Temperature-time-profile TUS-sensors

Diagramm Legende
Chart legend

MP7 | MP8 | MP9 | MP10 | MP11 | MP12



9 Example: TUS test report – passed

JUMO GmbH & Co. KG
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36039 Fulda, Germany

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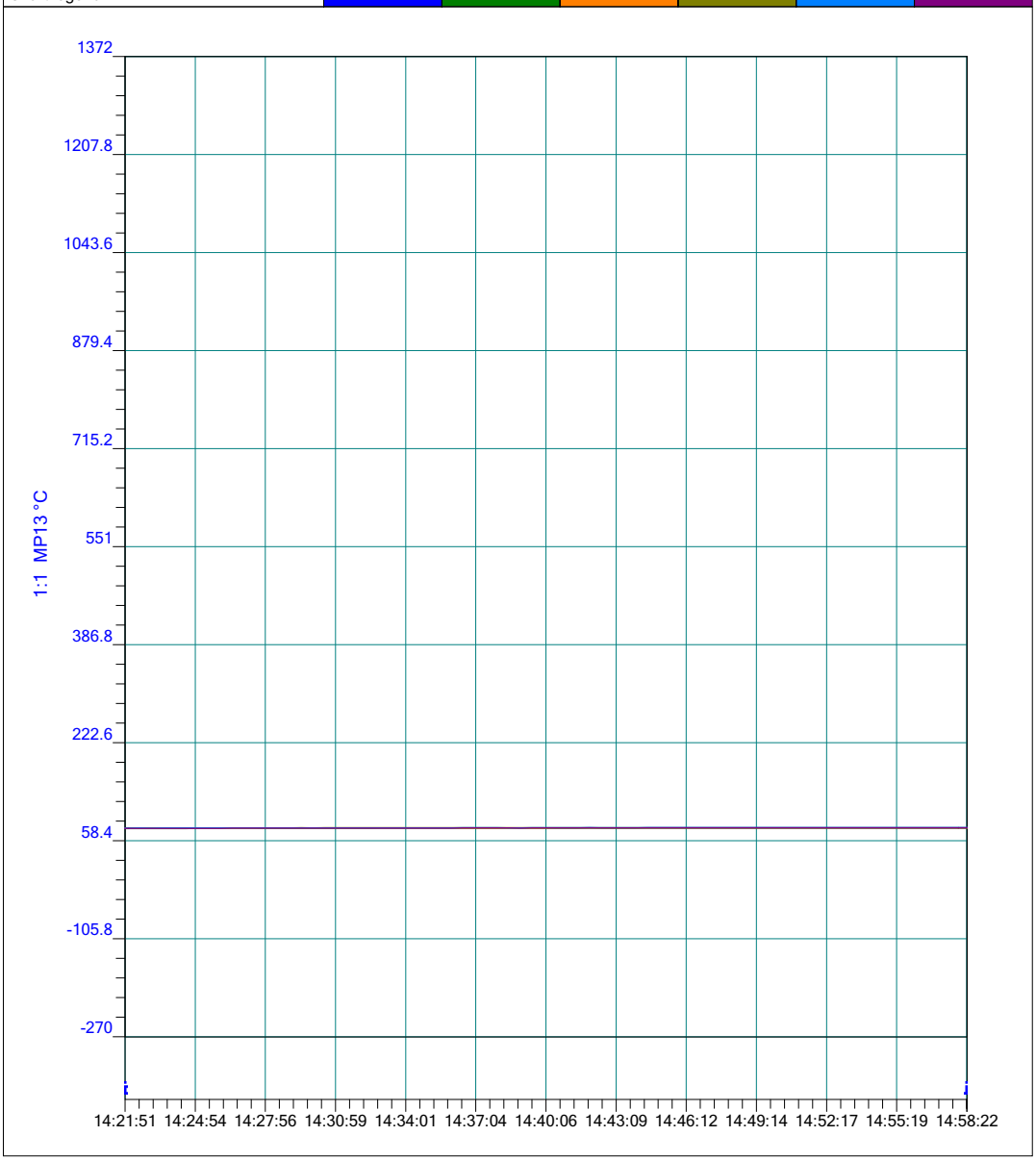
Temperatur-Zeit-Profil TUS-Sensoren
Temperature-time-profile TUS-sensors

Diagramm Legende
Chart legend

MP13 | MP14 | MP15 | MP16 | MP17 | MP18



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Temperatur-Zeit-Profil Regel-Sensoren
Temperature-time-profile control-sensors

Sollwert Setpoint	80 °C
Überschwinger in der Aufheizphase Overshoot in the heating up phase	nein / no
Überschwinger/Unterschwinger in der Haltephase Overshoots/undershoots in the soak time phase	nein / no

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Korrekturfaktoren TUS-Sensoren / Datenrekorder
Correction factors for TUS sensors / datarecorder

Sensor / Messstelle Sensor / measuring point	**Korrekturfaktor Prüfgerät** Correction factor test instrument	**Korrekturfaktor Sensor** Correction factor sensor
MP1	0.5 K	0.5 K
MP2	1 K	0.7 K
MP3	0.52 K	0.8 K
MP4	0.8 K	1 K
MP5	0.2 K	1.1 K
MP6	0.3 K	0.8 K
MP7	0.5 K	0.5 K
MP8	0.9 K	0.5 K
MP9	1.1 K	0.6 K
MP10	1.2 K	0.2 K
MP11	1 K	1.2 K
MP12	0.9 K	0.3 K
MP13	0.5 K	0.5 K
MP14	0.4 K	0.6 K
MP15	0.5 K	0.9 K
MP16	0.6 K	0.88 K
MP17	0.7 K	0.5 K
MP18	0.9 K	0.3 K

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Bilder Chargenaufbau / Platzierung TUS-Sensoren
Pictures of batch build-up / placement of TUS-sensors

Zuordnung der einzelnen TUS-Sensoren zum Kalibrierzertifikat / Assignment of the individual TUS sensors to the calibration certificate

Foto Chargenaufbau / Photo batch build-up

Grundroste / Base gratings

Körbe / Baskets

Abstandshülsen / Spacer sleeves

Tragestangen / Carrying bars

Artikel / Items

Anzahl Bauteile pro Korb / Number of parts per basket

stehend / liegend / hängend / Abstände etc. / standing / lying / hanging / distances etc.

Anzahl Körbe / Number of baskets

Gewicht der Charge / Weight of the batch

Anzahl der Bauteile pro Charge etc. / Number of parts per batch etc.

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Einschränkungen Limitations
Bemerkung Comment
Maßnahme Action

	Datum Date	**Name** Name	**Unterschrift** Signature
Techniker **(der den Test durchgeführt hat)** Technician (who carried out the test)	25.05.2024 15:02:40		
Prozesseigner Process owner	25.05.2024 15:02:40		

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MP1 °C	MP2 °C	MP3 °C	MP4 °C	MP5 °C	MP6 °C
14:27:05	78,5	78,5	78,5	78,9	78,9	78,9
14:27:30	78,6	78,6	78,5	78,9	78,9	78,9
14:28:00	78,6	78,6	78,6	78,9	79,0	78,9
14:28:30	78,6	78,6	78,6	79,0	79,0	79,0
14:29:00	78,7	78,7	78,7	79,1	79,1	79,0
14:29:30	78,7	78,7	78,7	79,1	79,1	79,1
14:30:00	78,7	78,7	78,7	79,0	79,1	79,1
14:30:30	78,8	78,8	78,7	79,1	79,1	79,1
14:31:00	78,8	78,8	78,8	79,1	79,1	79,1
14:31:30	78,8	78,8	78,8	79,1	79,2	79,1
14:32:00	78,8	78,8	78,8	79,1	79,2	79,1
14:32:30	78,8	78,8	78,8	79,1	79,2	79,1
14:33:00	78,9	78,9	78,8	79,2	79,2	79,2
14:33:30	78,9	78,9	78,9	79,2	79,3	79,2
14:34:00	78,9	78,9	78,9	79,2	79,3	79,2
14:34:30	78,9	78,9	78,9	79,2	79,2	79,2
14:35:00	78,9	78,9	78,8	79,2	79,2	79,2
14:35:30	78,9	78,9	78,9	79,2	79,3	79,2
14:36:00	78,9	78,9	78,9	79,2	79,3	79,2
14:36:30	79,0	78,9	78,9	79,3	79,3	79,3
14:37:00	79,0	78,9	78,9	79,3	79,3	79,3
14:37:30	79,0	79,0	79,0	79,3	79,4	79,3
14:38:00	79,0	79,0	79,0	79,3	79,4	79,3
14:38:30	79,0	78,9	78,9	79,2	79,3	79,3
14:39:00	78,9	78,9	78,9	79,2	79,3	79,3
14:39:30	79,0	78,9	78,9	79,2	79,3	79,3
14:40:00	79,0	79,0	79,0	79,3	79,3	79,3
14:40:30	79,0	79,0	79,0	79,3	79,4	79,3
14:41:00	79,0	79,0	79,0	79,3	79,4	79,3
14:41:30	79,1	79,0	79,0	79,3	79,4	79,4
14:42:00	79,1	79,0	79,0	79,3	79,4	79,4
14:42:30	79,0	79,0	79,0	79,3	79,4	79,4
14:43:00	79,0	79,0	79,0	79,3	79,4	79,4
14:43:30	79,1	79,0	79,0	79,4	79,4	79,4
14:44:00	79,1	79,0	79,0	79,3	79,4	79,4
14:44:30	79,0	79,0	79,0	79,4	79,4	79,4
14:46:13	79,1	79,0	79,1	79,4	79,4	79,4
14:46:30	79,1	79,1	79,1	79,4	79,4	79,4
14:47:00	79,1	79,1	79,1	79,4	79,4	79,4
14:47:30	79,1	79,1	79,1	79,4	79,4	79,4
14:48:00	79,1	79,1	79,1	79,4	79,4	79,4
14:48:30	79,1	79,1	79,1	79,4	79,4	79,4
14:49:00	79,1	79,1	79,1	79,4	79,5	79,4
14:49:30	79,1	79,1	79,1	79,4	79,5	79,4
14:50:00	79,1	79,1	79,1	79,4	79,5	79,4
14:50:30	79,1	79,1	79,1	79,4	79,5	79,4
14:51:00	79,2	79,1	79,2	79,5	79,5	79,5
14:51:30	79,2	79,1	79,1	79,4	79,5	79,5
14:52:00	79,1	79,1	79,1	79,4	79,4	79,4
14:52:30	79,1	79,1	79,1	79,4	79,4	79,4

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MP1 °C	MP2 °C	MP3 °C	MP4 °C	MP5 °C	MP6 °C
14:53:00	79,1	79,1	79,1	79,4	79,5	79,4
14:53:30	79,1	79,1	79,1	79,4	79,5	79,4
14:54:00	79,1	79,1	79,1	79,4	79,5	79,4
14:54:30	79,1	79,1	79,1	79,4	79,5	79,4
14:55:00	79,1	79,1	79,1	79,4	79,5	79,4
14:55:30	79,2	79,1	79,1	79,5	79,5	79,5
14:56:00	79,2	79,1	79,2	79,4	79,5	79,5
14:56:30	79,1	79,1	79,1	79,4	79,5	79,4
14:57:00	79,1	79,1	79,1	79,4	79,5	79,5
14:57:30	79,1	79,1	79,1	79,4	79,5	79,5
14:58:00	79,2	79,1	79,1	79,4	79,5	79,5

Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MP7 °C	MP8 °C	MP9 °C	MP10 °C	MP11 °C	MP12 °C
14:27:05	79,9	80,1	79,2	78,9	79,1	78,4
14:27:30	79,9	80,1	79,2	79,0	79,1	78,4
14:28:00	79,9	80,1	79,3	79,0	79,1	78,5
14:28:30	79,9	80,1	79,3	79,0	79,1	78,5
14:29:00	80,0	80,2	79,4	79,1	79,2	78,6
14:29:30	80,0	80,2	79,4	79,1	79,2	78,6
14:30:00	80,0	80,2	79,4	79,1	79,2	78,6
14:30:30	80,0	80,2	79,4	79,2	79,2	78,6
14:31:00	80,0	80,2	79,5	79,2	79,2	78,6
14:31:30	80,0	80,2	79,5	79,2	79,2	78,6
14:32:00	80,0	80,2	79,5	79,2	79,2	78,6
14:32:30	80,0	80,2	79,5	79,2	79,2	78,7
14:33:00	80,1	80,3	79,5	79,3	79,3	78,7
14:33:30	80,1	80,3	79,5	79,3	79,3	78,7
14:34:00	80,1	80,3	79,5	79,3	79,3	78,7
14:34:30	80,1	80,3	79,5	79,3	79,3	78,7
14:35:00	80,0	80,2	79,5	79,3	79,3	78,7
14:35:30	80,1	80,3	79,5	79,3	79,3	78,7
14:36:00	80,1	80,3	79,6	79,3	79,3	78,8
14:36:30	80,1	80,3	79,6	79,4	79,4	78,8
14:37:00	80,1	80,3	79,6	79,4	79,4	78,8
14:37:30	80,2	80,3	79,7	79,4	79,3	78,8
14:38:00	80,2	80,4	79,7	79,4	79,3	78,8
14:38:30	80,1	80,3	79,6	79,4	79,3	78,8
14:39:00	80,1	80,3	79,6	79,3	79,3	78,8
14:39:30	80,1	80,3	79,6	79,4	79,3	78,8
14:40:00	80,1	80,3	79,6	79,4	79,4	78,8
14:40:30	80,1	80,3	79,6	79,4	79,4	78,9
14:41:00	80,1	80,3	79,6	79,4	79,3	78,9
14:41:30	80,2	80,3	79,6	79,5	79,4	78,9
14:42:00	80,2	80,3	79,7	79,5	79,4	78,9
14:42:30	80,2	80,4	79,6	79,5	79,4	78,9
14:43:00	80,2	80,3	79,7	79,4	79,4	78,9
14:43:30	80,2	80,3	79,7	79,5	79,4	78,9

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MP7 °C	MP8 °C	MP9 °C	MP10 °C	MP11 °C	MP12 °C
14:44:00	80,1	80,3	79,7	79,4	79,4	78,9
14:44:30	80,2	80,3	79,6	79,5	79,4	78,9
14:46:13	80,2	80,3	79,7	79,5	79,4	78,9
14:46:30	80,2	80,3	79,7	79,5	79,4	78,9
14:47:00	80,2	80,4	79,7	79,5	79,4	78,9
14:47:30	80,2	80,3	79,7	79,5	79,4	78,9
14:48:00	80,2	80,4	79,7	79,5	79,4	78,9
14:48:30	80,2	80,4	79,7	79,5	79,4	79,0
14:49:00	80,2	80,4	79,7	79,5	79,4	79,0
14:49:30	80,2	80,4	79,7	79,5	79,4	79,0
14:50:00	80,2	80,4	79,7	79,5	79,4	79,0
14:50:30	80,2	80,4	79,7	79,5	79,4	79,0
14:51:00	80,2	80,4	79,7	79,6	79,5	79,0
14:51:30	80,2	80,4	79,8	79,6	79,4	79,0
14:52:00	80,2	80,4	79,7	79,5	79,4	78,9
14:52:30	80,2	80,3	79,7	79,5	79,4	78,9
14:53:00	80,2	80,3	79,7	79,5	79,4	79,0
14:53:30	80,2	80,3	79,7	79,5	79,4	79,0
14:54:00	80,2	80,3	79,7	79,5	79,4	79,0
14:54:30	80,2	80,3	79,7	79,6	79,4	79,0
14:55:00	80,2	80,4	79,7	79,5	79,4	79,0
14:55:30	80,2	80,4	79,7	79,6	79,4	79,0
14:56:00	80,2	80,4	79,7	79,6	79,4	79,0
14:56:30	80,2	80,3	79,7	79,5	79,4	79,0
14:57:00	80,2	80,3	79,7	79,6	79,4	79,0
14:57:30	80,2	80,3	79,7	79,6	79,4	79,0
14:58:00	80,2	80,4	79,7	79,6	79,4	79,0

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MP13 °C	MP14 °C	MP15 °C	MP16 °C	MP17 °C	MP18 °C
14:27:05	79,8	79,0	79,2	79,9	79,9	79,3
14:27:30	79,8	79,0	79,3	79,9	79,9	79,3
14:28:00	79,8	79,0	79,3	80,0	79,9	79,4
14:28:30	79,8	79,1	79,3	80,0	79,9	79,4
14:29:00	79,9	79,1	79,4	80,1	80,0	79,5
14:29:30	79,9	79,2	79,4	80,1	80,0	79,5
14:30:00	79,9	79,2	79,4	80,1	80,0	79,5
14:30:30	79,9	79,2	79,4	80,1	80,0	79,5
14:31:00	80,0	79,2	79,4	80,1	80,0	79,5
14:31:30	79,9	79,2	79,5	80,1	80,0	79,5
14:32:00	80,0	79,2	79,5	80,1	80,0	79,6
14:32:30	80,0	79,2	79,5	80,1	80,0	79,6
14:33:00	80,0	79,3	79,6	80,1	80,0	79,6
14:33:30	80,0	79,3	79,6	80,2	80,1	79,6
14:34:00	80,0	79,3	79,6	80,2	80,0	79,7
14:34:30	80,0	79,3	79,6	80,1	80,0	79,6
14:35:00	80,0	79,3	79,6	80,1	80,0	79,6
14:35:30	80,0	79,3	79,6	80,2	80,1	79,6
14:36:00	80,0	79,4	79,6	80,2	80,1	79,7
14:36:30	80,1	79,4	79,6	80,2	80,1	79,7
14:37:00	80,1	79,4	79,6	80,2	80,1	79,7
14:37:30	80,1	79,4	79,7	80,2	80,1	79,7
14:38:00	80,1	79,4	79,7	80,2	80,1	79,7
14:38:30	80,0	79,4	79,6	80,2	80,1	79,7
14:39:00	80,0	79,4	79,6	80,2	80,1	79,7
14:39:30	80,0	79,4	79,6	80,2	80,1	79,7
14:40:00	80,1	79,4	79,7	80,2	80,1	79,7
14:40:30	80,1	79,4	79,7	80,2	80,1	79,8
14:41:00	80,1	79,4	79,7	80,2	80,1	79,8
14:41:30	80,1	79,5	79,7	80,2	80,1	79,8
14:42:00	80,1	79,5	79,7	80,3	80,1	79,8
14:42:30	80,1	79,5	79,7	80,2	80,1	79,8
14:43:00	80,1	79,5	79,7	80,2	80,1	79,8
14:43:30	80,1	79,5	79,7	80,2	80,1	79,8
14:44:00	80,1	79,5	79,7	80,2	80,1	79,8
14:44:30	80,1	79,5	79,7	80,2	80,1	79,8
14:46:13	80,1	79,5	79,7	80,2	80,1	79,8
14:46:30	80,1	79,5	79,7	80,3	80,1	79,8
14:47:00	80,1	79,5	79,7	80,2	80,1	79,8
14:47:30	80,1	79,5	79,7	80,2	80,1	79,8
14:48:00	80,1	79,5	79,7	80,3	80,1	79,8
14:48:30	80,1	79,5	79,8	80,3	80,1	79,8
14:49:00	80,1	79,5	79,8	80,3	80,2	79,8
14:49:30	80,1	79,5	79,8	80,3	80,1	79,8
14:50:00	80,1	79,5	79,8	80,3	80,2	79,8
14:50:30	80,1	79,6	79,8	80,3	80,2	79,8
14:51:00	80,2	79,6	79,8	80,3	80,2	79,9
14:51:30	80,1	79,6	79,8	80,3	80,2	79,9
14:52:00	80,1	79,5	79,7	80,3	80,1	79,8
14:52:30	80,1	79,5	79,8	80,2	80,1	79,8

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TUS-Prüfbericht gem. AMS2750 Rev. G
Temperature Uniformity Survey Report according to AMS2750 Rev. G

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Berichts-Nr.: Report-no.: A-2024-05-25_V02 **Datum der Prüfung:** Date of the test: 25.05.2024 **Seite:** Page: 16/16

Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MP13 °C	MP14 °C	MP15 °C	MP16 °C	MP17 °C	MP18 °C
14:53:00	80,1	79,5	79,8	80,2	80,1	79,8
14:53:30	80,1	79,5	79,8	80,2	80,1	79,8
14:54:00	80,1	79,5	79,8	80,2	80,1	79,8
14:54:30	80,1	79,5	79,8	80,3	80,1	79,9
14:55:00	80,1	79,5	79,8	80,3	80,1	79,8
14:55:30	80,1	79,6	79,8	80,3	80,1	79,9
14:56:00	80,1	79,6	79,8	80,3	80,1	79,8
14:56:30	80,1	79,5	79,8	80,3	80,1	79,8
14:57:00	80,1	79,6	79,8	80,3	80,1	79,9
14:57:30	80,1	79,5	79,8	80,3	80,1	79,8
14:58:00	80,1	79,6	79,8	80,3	80,1	79,9

10 Example: TUS test report – failed

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JUMO DAkkS-Registrierungsnummer: D-K-15129-01-00 JUMO DAkkS-Registration number: D-K-15129-01-00	
Unternehmen und Ansprechpartner des Berichterstellers Company & contact person of the report author	Max Mustermann Musterstraße 17 12345 Musterstadt
Unternehmen und Ansprechpartner der geprüften Geräte Company & contact person of the tested instruments	JUMO GmbH + Co. KG Moritz-Juchheim-Straße 1 36039 Fulda Hr. Stumpf

Anlagenbeschreibung Furnace specification	
Name der Anlage Name of the furnace	Kammerofen 34
Hersteller Manufacturer	Rohde
Seriennummer Serial number	1562777
Ofenart Furnace type	Kammerofen
Nutztemperatur Usable temperature	1240°C
Teile-Ofenklasse Parts-Furnace class	
Instrumentierungstyp Instrumentation type	B
Qualifizierte Arbeitszone Qualified work zone	1

TUS-Verfahren TUS procedure	
Flächenmethode oder Volumenmethode Area method or volume method	Volumenmethode
Wärmebehandlungsverfahren Heat treatment process	
Geforderte Kalibriergenauigkeit TUS-Sensoren Required calibration accuracy TUS sensors	0,9
Geforderte Genauigkeit Regel-Sensoren Required accuracy control-sensors	3,5
Max. erlaubtes Offset max. allowed offset	1,8
Modifikation Offset / Korrektur Offset Modification Offset / Correction Offset	0,5
Mindestanzahl TUS-Sensoren Minimum number of TUS sensors	15
Geplante Haltezeit Planned soak time	1
TUS-Fahrt im leeren oder beladenen Ofen TUS cycle in an empty or loaded furnace	leer
Tag der Prüfung Date of test	23.05.2024
Prüfintervall Test frequency	vierteljährlich
Tag der nächsten Prüfung Day of the next test	2024-09-25
Zulässige Karenzzeit Permissable grace period	10

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Verwendetes Prüfequipment Used test equipment	
Datenrekorder Datarecorder	Feldprüfgerät
Typ des Datenrekorders Type of datarecorder	JUMO LOGOSCREEN 700
Seriennummer des Datenrekorders Serialnumber of the datarecorder	00000000000000000003
Kalibriernummer des Datenrekorders Calibration ident of the datarecorder	7412 D-K-15129-01-00 2023-01
Kalibrierung gültig bis Calibration valid until	2025-05
TUS-Sensor TUS sensor	Mantelthermoelement
Sensor Typ Sensor type	N
Kalibriernummer der Sensoren Calibration ident of sensors	45646886 68464546 56677322 65599989 48786528 44877121

10 Example: TUS test report – failed

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Auswertung Haltebereich 80 °C Evaluation of soak range 80 °C	
Prüfwert Testvalue	80 °C
Toleranz Tolerance	-5 / 5 K

Sensor / Messstelle Sensor / measuring point	**Nicht korrigierter Messwert** Uncorrected value min [°C] max		**Korrekturfaktor Prüfgerät** Correction factor test instrument [K]	**Korrekturfaktor Sensor** Correction factor sensor [K]	**Korrigierter Messwert** Corrected value min [°C] max	
MS1	65,4	81,3	1	0.5	**66,90**	**82,80**
MS2	65,5	81,2	1	0.7	**67,20**	**82,90**
MS3	65,4	81,2	0.52	0.8	**66,72**	**82,52**
MS4	65,4	81,7	0.8	1	**67,20**	**83,50**
MS5	65,6	81,7	0.2	1.1	**66,90**	**83,00**
MS6	65,4	81,5	0.3	0.8	**66,50**	**82,60**
MS7	65,9	82,6	0.5	0.5	**66,90**	**83,60**
MS8	65,2	82,7	0.9	0.5	**66,60**	**84,10**
MS9	65,5	81,9	1.1	0.6	**67,20**	**83,60**
MS10	66,4	81,1	1.2	0.2	**67,80**	**82,50**
MS11	64,7	81,7	1	1.2	**66,90**	**83,90**
MS12	65,8	80,7	0.9	0.3	**67,00**	**81,90**
MS13	66,5	81,7	0.5	0.5	**67,50**	**82,70**
MS14	66,0	81,4	0.4	0.6	**67,00**	**82,40**
MS15	66,5	81,5	0.5	0.9	**67,90**	**82,90**
MS16	66,0	82,2	0.6	0.88	**67,48**	**83,68**
MS17	66,3	81,7	0.7	0.5	**67,50**	**82,90**
MS18	66,1	81,9	0.9	0.3	**67,30**	**83,10**

	Min. Messwert min. value	**Max. Messwert** max. value	**Differenz** difference		**Bandbreite** tolerance band
zul.Temperaturtoleranz allowed temp. tolerance	75 °C	85 °C	-5 °C	5 °C	10 K
vorh.Temperaturtoleranz available temp. tolerance	**66.50 °C**	**84.10 °C**	**-13.50 °C**	**4.10 °C**	**17.60 K**
Prüfsensor / Messstelle Test sensor / measuring point	MS6	MS8			

Prüfergebnis Test result	
bestanden passed	☐
nicht bestanden failed	☒

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TUS-Programm / Prozessparameter TUS program / process parameter	Programm10 JUMO variTRON 500 Touch
TUS-Offset TUS offset	0,5
Ofenatmosphäre / Ofendruck / Ofenvakuum furnace atmosphere / furnace pressure / furnace vaccum	
PID-Parameter PID parameter	
Anzahl der Ofen Heizzonen Number of oven heating zones	1
Start der TUS Start of the TUS	23.05.2024 / 12:18:00
Ende der TUS End of the TUS	23.05.2024 / 13:06:32
Überschwinger in der Aufheizphase Overshoot in the heating up phase	nein / no
Überschwinger/Unterschwinger in der Haltephase Overshoots/undershoots in the soak time phase	nein / no
Start Haltebereich Start soak area	23.05.2024 / 12:26:25
Ende Haltebereich End soak area	23.05.2024 / 13:06:32
Ist-Haltezeit Actual soak time	40min / 7s
Ausfälle TUS-Sensoren Failures of TUS sensors	nein / no

10 Example: TUS test report – failed

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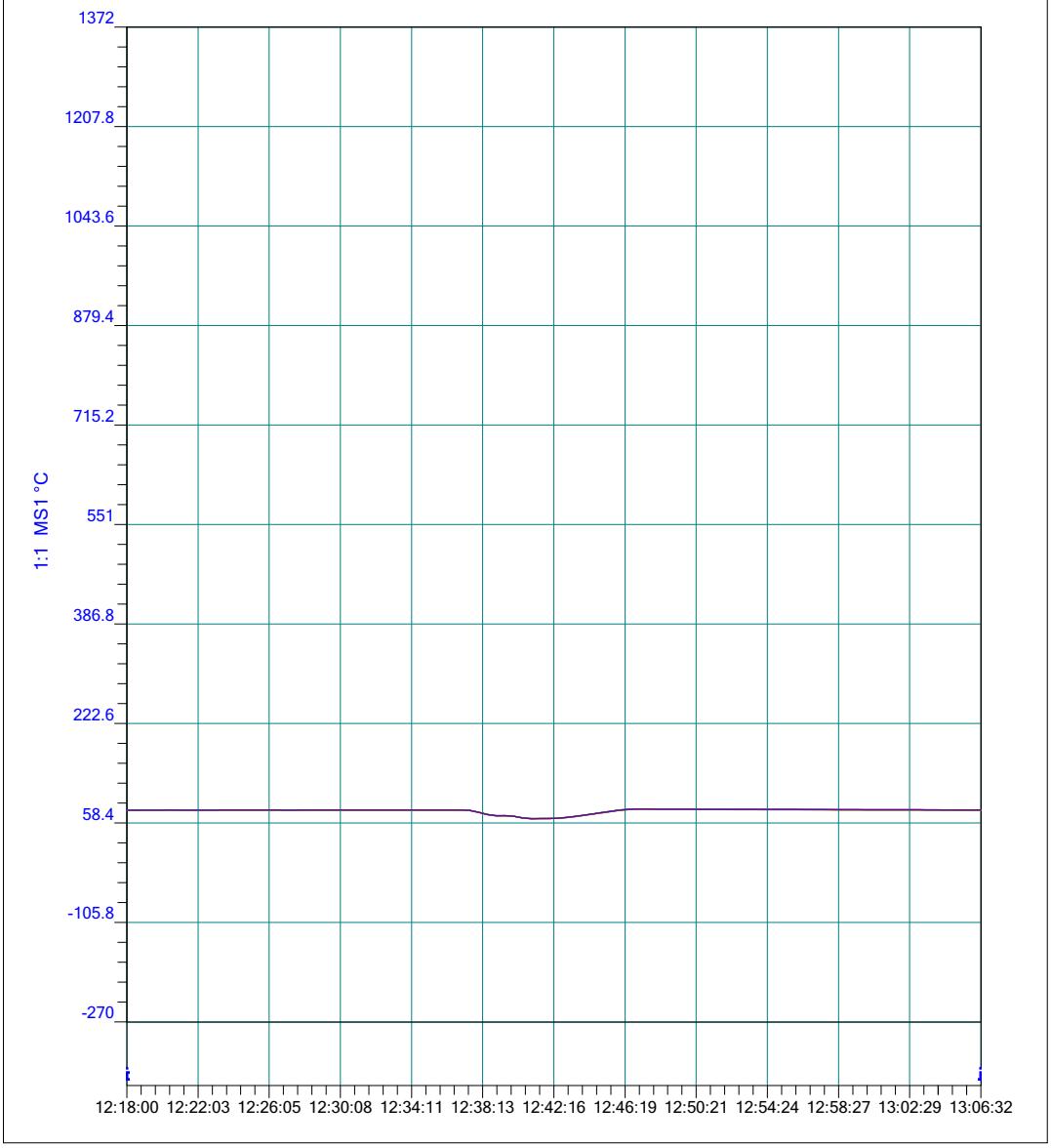
Temperatur-Zeit-Profil TUS-Sensoren
Temperature-time-profile TUS-sensors

Diagramm Legende
Chart legend

MS1 MS2 MS3 MS4 MS5 MS6



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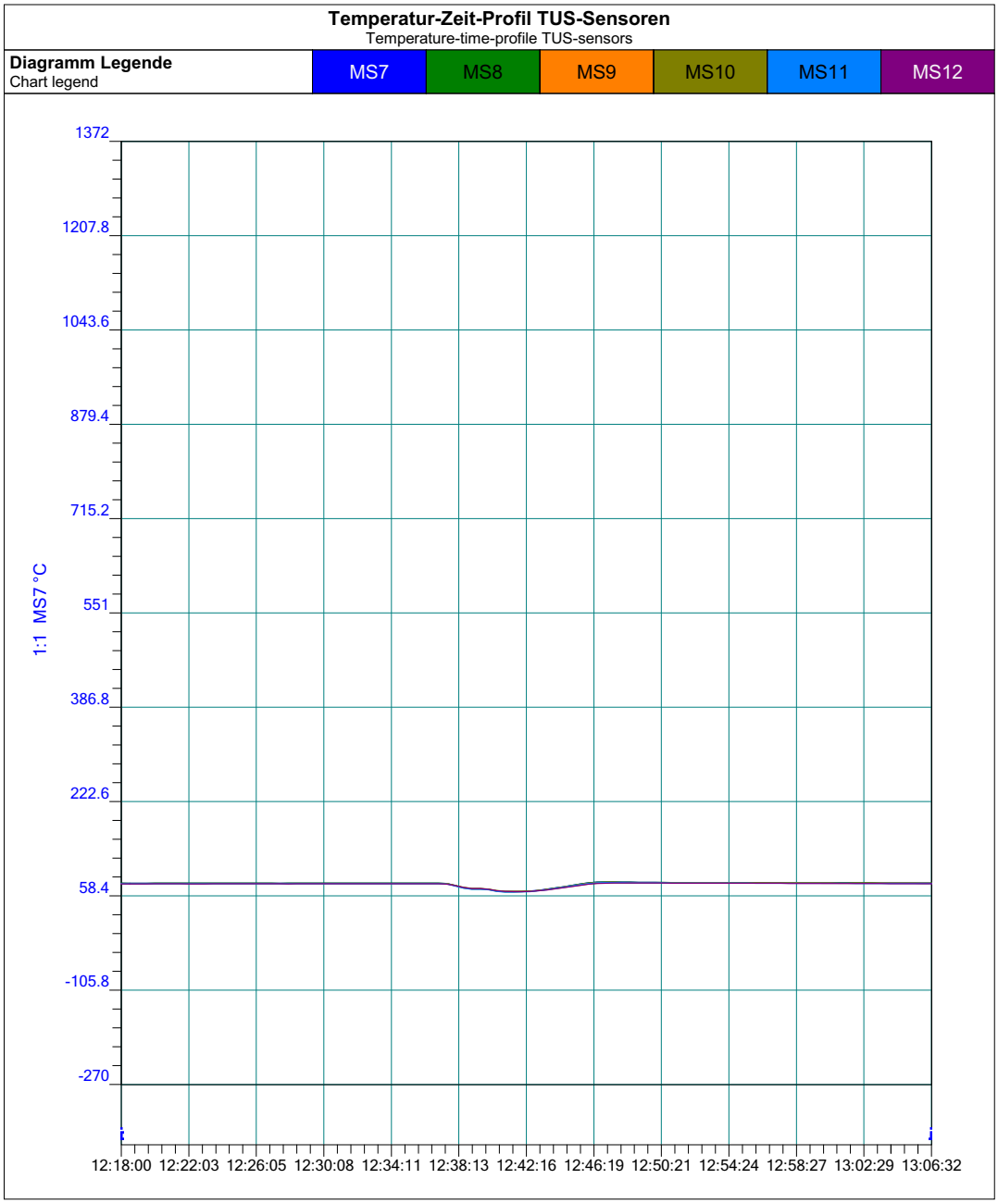
Temperatur-Zeit-Profil TUS-Sensoren
Temperature-time-profile TUS-sensors



10 Example: TUS test report – failed

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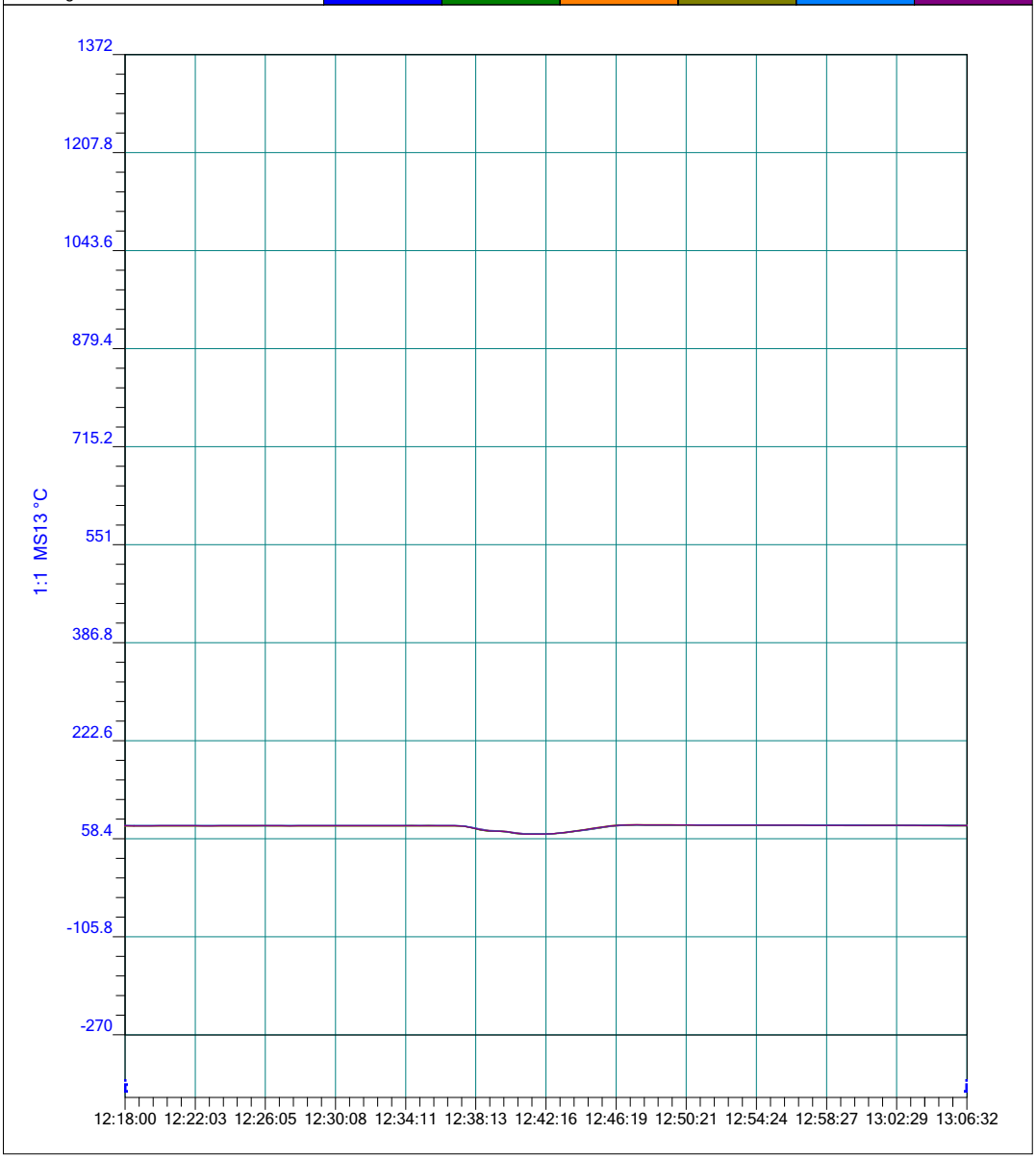
Temperatur-Zeit-Profil TUS-Sensoren
Temperature-time-profile TUS-sensors

Diagramm Legende
Chart legend

MS13 | MS14 | MS15 | MS16 | MS17 | MS18



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Temperatur-Zeit-Profil Regel-Sensoren
Temperature-time-profile control-sensors

Sollwert Setpoint	80 °C
Überschwinger in der Aufheizphase Overshoot in the heating up phase	nein / no
Überschwinger/Unterschwinger in der Haltephase Overshoots/undershoots in the soak time phase	nein / no

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Korrekturfaktoren TUS-Sensoren / Datenrekorder
Correction factors for TUS sensors / datarecorder

Sensor / Messstelle Sensor / measuring point	**Korrekturfaktor Prüfgerät** Correction factor test instrument	**Korrekturfaktor Sensor** Correction factor sensor
MS1	1 K	0.5 K
MS2	1 K	0.7 K
MS3	0.52 K	0.8 K
MS4	0.8 K	1 K
MS5	0.2 K	1.1 K
MS6	0.3 K	0.8 K
MS7	0.5 K	0.5 K
MS8	0.9 K	0.5 K
MS9	1.1 K	0.6 K
MS10	1.2 K	0.2 K
MS11	1 K	1.2 K
MS12	0.9 K	0.3 K
MS13	0.5 K	0.5 K
MS14	0.4 K	0.6 K
MS15	0.5 K	0.9 K
MS16	0.6 K	0.88 K
MS17	0.7 K	0.5 K
MS18	0.9 K	0.3 K

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Bilder Chargenaufbau / Platzierung TUS-Sensoren
Pictures of batch build-up / placement of TUS-sensors

Zuordnung der einzelnen TUS-Sensoren zum Kalibrierzertifikat / Assignment of the individual TUS sensors to the calibration certificate

Foto Chargenaufbau / Photo batch build-up

Grundroste / Base gratings

Körbe / Baskets

Abstandshülsen / Spacer sleeves

Tragestangen / Carrying bars

Artikel / Items

Anzahl Bauteile pro Korb / Number of parts per basket

stehend / liegend / hängend / Abstände etc. / standing / lying / hanging / distances etc.

Anzahl Körbe / Number of baskets

Gewicht der Charge / Weight of the batch

Anzahl der Bauteile pro Charge etc. / Number of parts per batch etc.

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Einschränkungen Limitations
Bemerkung Comment
Maßnahme Action

	Datum Date	**Name** Name	**Unterschrift** Signature
Techniker **(der den Test durchgeführt hat)** Technician (who carried out the test)	23.05.2024 13:08:51		
Prozesseigner Process owner	23.05.2024 13:08:51		

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MS1 °C	MS2 °C	MS3 °C	MS4 °C	MS5 °C	MS6 °C
12:26:25	79,5	79,4	79,4	79,7	79,8	79,7
12:26:30	79,5	79,4	79,4	79,7	79,8	79,7
12:27:00	79,4	79,4	79,4	79,7	79,7	79,7
12:27:30	79,4	79,4	79,4	79,7	79,7	79,7
12:28:00	79,4	79,4	79,4	79,7	79,8	79,7
12:28:30	79,5	79,4	79,4	79,7	79,8	79,7
12:29:00	79,5	79,4	79,4	79,7	79,8	79,7
12:29:30	79,4	79,4	79,4	79,7	79,8	79,7
12:30:00	79,5	79,4	79,4	79,7	79,8	79,7
12:30:30	79,5	79,4	79,4	79,7	79,8	79,7
12:31:00	79,5	79,4	79,4	79,7	79,8	79,7
12:31:30	79,5	79,4	79,4	79,7	79,8	79,7
12:32:00	79,5	79,4	79,4	79,7	79,8	79,7
12:32:30	79,5	79,4	79,4	79,7	79,8	79,7
12:33:00	79,5	79,4	79,4	79,7	79,8	79,7
12:33:30	79,4	79,4	79,4	79,7	79,8	79,7
12:34:00	79,5	79,4	79,4	79,7	79,8	79,7
12:34:30	79,5	79,4	79,4	79,7	79,8	79,7
12:35:00	79,5	79,4	79,4	79,7	79,8	79,7
12:35:30	79,5	79,4	79,4	79,7	79,8	79,7
12:36:00	79,5	79,4	79,4	79,7	79,8	79,7
12:36:30	79,5	79,4	79,4	79,7	79,8	79,7
12:37:00	79,5	79,4	79,4	79,7	79,8	79,7
12:37:30	78,9	78,9	78,8	79,1	79,2	79,0
12:38:00	75,8	76,1	75,9	75,9	76,0	75,7
12:38:30	72,1	72,5	72,3	72,1	72,3	72,1
12:39:00	70,2	70,5	70,3	70,2	70,4	70,4
12:39:30	70,3	70,4	70,3	70,3	70,4	70,4
12:40:00	69,3	69,4	69,3	69,3	69,4	69,3
12:40:30	66,7	66,9	66,8	66,6	66,8	66,6
12:41:00	65,5	65,6	65,5	65,4	65,6	65,5
12:41:30	65,5	65,5	65,5	65,5	65,7	65,6
12:42:00	65,7	65,7	65,6	65,7	65,9	65,8
12:42:30	66,1	66,0	66,0	66,2	66,3	66,2
12:43:00	67,4	67,2	67,2	67,5	67,6	67,5
12:43:30	69,1	68,8	68,9	69,4	69,4	69,3
12:44:00	71,1	70,8	70,9	71,4	71,4	71,2
12:44:30	73,2	72,9	73,0	73,6	73,5	73,4
12:45:00	75,4	75,1	75,2	75,8	75,7	75,6
12:45:30	77,6	77,2	77,3	78,0	77,9	77,7
12:46:00	79,6	79,2	79,3	80,0	79,9	79,7
12:46:30	80,7	80,4	80,5	81,2	81,1	80,8
12:47:00	81,2	81,0	81,0	81,7	81,6	81,3
12:47:30	81,2	81,1	81,1	81,6	81,6	81,3
12:48:00	81,1	81,0	81,0	81,4	81,4	81,2
12:48:30	81,0	81,0	80,9	81,3	81,3	81,1
12:49:00	81,0	80,9	80,9	81,2	81,3	81,1
12:49:30	80,9	80,8	80,8	81,1	81,2	81,0
12:50:00	80,8	80,7	80,7	81,0	81,0	80,9
12:50:30	80,7	80,6	80,6	81,0	81,0	80,9

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MS1 °C	MS2 °C	MS3 °C	MS4 °C	MS5 °C	MS6 °C
12:51:00	80,7	80,6	80,6	80,9	80,9	80,8
12:51:30	80,6	80,5	80,5	80,8	80,9	80,8
12:52:00	80,6	80,5	80,5	80,8	80,9	80,8
12:52:30	80,5	80,5	80,4	80,8	80,8	80,7
12:53:00	80,5	80,5	80,4	80,8	80,8	80,7
12:53:30	80,5	80,4	80,4	80,8	80,8	80,7
12:54:00	80,4	80,4	80,4	80,7	80,8	80,7
12:54:30	80,4	80,3	80,3	80,7	80,7	80,7
12:55:00	80,4	80,3	80,3	80,6	80,7	80,6
12:55:30	80,3	80,3	80,2	80,6	80,6	80,5
12:56:00	80,3	80,2	80,2	80,5	80,6	80,5
12:56:30	80,3	80,2	80,2	80,5	80,6	80,5
12:57:00	80,2	80,2	80,1	80,5	80,5	80,4
12:57:30	80,2	80,1	80,1	80,5	80,5	80,4
12:58:00	80,2	80,1	80,1	80,4	80,5	80,4
12:58:30	80,2	80,1	80,1	80,4	80,5	80,4
12:59:00	80,1	80,0	80,0	80,4	80,4	80,4
12:59:30	80,1	80,0	80,0	80,3	80,4	80,3
13:00:00	80,1	80,0	80,0	80,3	80,4	80,3
13:00:30	80,0	80,0	80,0	80,3	80,4	80,3
13:01:00	80,0	79,9	79,9	80,2	80,3	80,2
13:01:30	79,9	79,9	79,9	80,2	80,3	80,2
13:02:00	79,9	79,8	79,8	80,2	80,2	80,1
13:02:30	79,9	79,8	79,8	80,1	80,2	80,1
13:03:00	79,8	79,8	79,8	80,1	80,2	80,1
13:03:30	79,8	79,8	79,7	80,1	80,1	80,1
13:04:00	79,8	79,7	79,7	80,0	80,1	80,0
13:04:30	79,7	79,7	79,7	80,0	80,1	80,0
13:05:00	79,7	79,7	79,6	80,0	80,1	80,0
13:05:30	79,7	79,6	79,6	79,9	80,0	79,9
13:06:00	79,6	79,6	79,6	79,9	80,0	79,9
13:06:30	79,6	79,6	79,5	79,9	79,9	79,9

JUMO GmbH & Co. KG
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36039 Fulda, Germany

TUS-Prüfbericht gem. AMS2750 Rev. G
Temperature Uniformity Survey Report according to AMS2750 Rev. G

Phone: +49 661 6003-9135
E-Mail: service@jumo.net
Internet: www.jumo.net

Berichts-Nr.: Report-no.: A-2024_05_23_V02

Datum der Prüfung: Date of the test: 23.05.2024

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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MS7 °C	MS8 °C	MS9 °C	MS10 °C	MS11 °C	MS12 °C
12:26:25	80,4	80,5	80,0	79,9	79,6	79,3
12:26:30	80,4	80,5	80,0	79,9	79,6	79,3
12:27:00	80,4	80,5	79,9	79,8	79,6	79,3
12:27:30	80,4	80,5	79,9	79,8	79,6	79,3
12:28:00	80,4	80,5	79,9	79,8	79,6	79,3
12:28:30	80,5	80,5	80,0	79,9	79,6	79,3
12:29:00	80,4	80,5	80,0	79,9	79,6	79,3
12:29:30	80,4	80,5	79,9	79,8	79,6	79,3
12:30:00	80,5	80,6	80,0	79,9	79,6	79,3
12:30:30	80,5	80,5	80,0	79,9	79,6	79,3
12:31:00	80,4	80,5	80,0	79,9	79,6	79,3
12:31:30	80,4	80,5	80,0	79,9	79,6	79,3
12:32:00	80,5	80,5	80,0	79,9	79,6	79,3
12:32:30	80,4	80,5	80,0	79,9	79,6	79,3
12:33:00	80,4	80,5	79,9	79,8	79,6	79,3
12:33:30	80,4	80,5	79,9	79,8	79,6	79,3
12:34:00	80,4	80,5	80,0	79,9	79,6	79,3
12:34:30	80,4	80,5	80,0	79,9	79,6	79,3
12:35:00	80,4	80,5	80,0	79,9	79,6	79,3
12:35:30	80,5	80,5	80,0	79,9	79,6	79,3
12:36:00	80,4	80,5	79,9	79,9	79,6	79,3
12:36:30	80,4	80,5	79,9	79,9	79,6	79,3
12:37:00	80,4	80,5	79,9	79,9	79,6	79,3
12:37:30	79,8	79,8	79,3	79,4	79,0	78,8
12:38:00	76,5	76,3	76,1	76,7	75,6	76,2
12:38:30	72,8	72,3	72,3	73,4	71,8	73,0
12:39:00	70,8	70,1	70,4	71,6	69,8	71,1
12:39:30	70,9	70,3	70,5	71,4	69,8	70,8
12:40:00	69,9	69,3	69,5	70,3	68,8	69,7
12:40:30	67,1	66,4	66,7	67,9	66,0	67,3
12:41:00	65,9	65,2	65,6	66,7	64,8	66,1
12:41:30	66,0	65,5	65,7	66,4	65,0	65,9
12:42:00	66,3	65,8	65,9	66,5	65,3	65,9
12:42:30	66,7	66,4	66,3	66,7	65,8	66,1
12:43:00	68,1	67,8	67,6	67,7	67,2	67,2
12:43:30	70,0	69,8	69,5	69,2	69,1	68,7
12:44:00	72,1	72,0	71,5	71,0	71,2	70,5
12:44:30	74,4	74,3	73,7	73,0	73,4	72,5
12:45:00	76,7	76,6	75,9	75,1	75,7	74,5
12:45:30	78,9	78,9	78,1	77,1	77,9	76,6
12:46:00	81,0	81,1	80,2	79,0	80,0	78,5
12:46:30	82,1	82,2	81,3	80,1	81,1	79,7
12:47:00	82,5	82,6	81,8	80,8	81,6	80,4
12:47:30	82,5	82,5	81,8	81,0	81,6	80,6
12:48:00	82,2	82,3	81,6	81,0	81,4	80,6
12:48:30	82,1	82,2	81,5	81,1	81,3	80,7
12:49:00	82,0	82,1	81,5	81,1	81,2	80,7
12:49:30	81,9	82,0	81,4	81,1	81,1	80,6
12:50:00	81,8	81,9	81,2	81,0	81,0	80,6
12:50:30	81,7	81,8	81,2	81,0	80,9	80,5

10 Example: TUS test report – failed

JUMO GmbH & Co. KG
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TUS-Prüfbericht gem. AMS2750 Rev. G
Temperature Uniformity Survey Report according to AMS2750 Rev. G

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Internet: www.jumo.net

Berichts-Nr.: A-2024_05_23_V02
Report-no.:

Datum der Prüfung: 23.05.2024
Date of the test:

Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MS7 °C	MS8 °C	MS9 °C	MS10 °C	MS11 °C	MS12 °C
12:51:00	81,6	81,7	81,1	80,9	80,8	80,5
12:51:30	81,6	81,7	81,0	80,9	80,8	80,5
12:52:00	81,6	81,6	81,0	80,9	80,7	80,4
12:52:30	81,5	81,6	81,0	80,9	80,7	80,4
12:53:00	81,5	81,6	81,0	80,9	80,7	80,4
12:53:30	81,5	81,6	81,0	80,9	80,7	80,4
12:54:00	81,5	81,5	80,9	80,9	80,6	80,3
12:54:30	81,4	81,5	80,9	80,8	80,6	80,3
12:55:00	81,4	81,4	80,8	80,8	80,6	80,3
12:55:30	81,3	81,4	80,8	80,7	80,5	80,2
12:56:00	81,3	81,3	80,8	80,7	80,5	80,2
12:56:30	81,2	81,3	80,7	80,7	80,4	80,2
12:57:00	81,2	81,3	80,7	80,7	80,4	80,1
12:57:30	81,2	81,3	80,7	80,6	80,4	80,1
12:58:00	81,2	81,2	80,6	80,6	80,4	80,1
12:58:30	81,1	81,2	80,6	80,6	80,3	80,0
12:59:00	81,1	81,2	80,6	80,5	80,3	80,0
12:59:30	81,1	81,2	80,6	80,5	80,3	80,0
13:00:00	81,0	81,1	80,6	80,5	80,2	80,0
13:00:30	81,0	81,1	80,5	80,5	80,2	79,9
13:01:00	81,0	81,0	80,5	80,4	80,2	79,9
13:01:30	80,9	81,0	80,4	80,4	80,1	79,8
13:02:00	80,9	81,0	80,4	80,3	80,1	79,8
13:02:30	80,8	80,9	80,4	80,3	80,0	79,8
13:03:00	80,8	80,9	80,3	80,3	80,0	79,7
13:03:30	80,8	80,9	80,3	80,2	80,0	79,7
13:04:00	80,7	80,8	80,3	80,2	80,0	79,7
13:04:30	80,7	80,8	80,2	80,2	79,9	79,6
13:05:00	80,7	80,8	80,2	80,2	79,9	79,6
13:05:30	80,7	80,8	80,2	80,1	79,8	79,6
13:06:00	80,6	80,7	80,2	80,1	79,8	79,5
13:06:30	80,6	80,7	80,1	80,0	79,8	79,5

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Datum der Prüfung: 23.05.2024
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Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MS13 °C	MS14 °C	MS15 °C	MS16 °C	MS17 °C	MS18 °C
12:26:25	80,4	79,8	80,1	80,5	80,3	80,1
12:26:30	80,3	79,8	80,1	80,5	80,3	80,1
12:27:00	80,3	79,8	80,0	80,5	80,3	80,1
12:27:30	80,3	79,8	80,0	80,4	80,3	80,1
12:28:00	80,3	79,8	80,0	80,5	80,3	80,1
12:28:30	80,3	79,8	80,1	80,5	80,3	80,1
12:29:00	80,3	79,8	80,1	80,5	80,3	80,1
12:29:30	80,3	79,8	80,1	80,4	80,3	80,1
12:30:00	80,3	79,8	80,1	80,5	80,4	80,1
12:30:30	80,3	79,8	80,1	80,5	80,3	80,1
12:31:00	80,3	79,9	80,1	80,5	80,3	80,1
12:31:30	80,3	79,8	80,1	80,5	80,3	80,1
12:32:00	80,3	79,8	80,1	80,5	80,3	80,1
12:32:30	80,3	79,9	80,1	80,5	80,3	80,1
12:33:00	80,3	79,8	80,1	80,5	80,3	80,1
12:33:30	80,3	79,8	80,1	80,5	80,3	80,1
12:34:00	80,3	79,8	80,1	80,5	80,3	80,1
12:34:30	80,3	79,8	80,1	80,5	80,3	80,1
12:35:00	80,3	79,8	80,1	80,5	80,3	80,1
12:35:30	80,4	79,9	80,1	80,5	80,3	80,1
12:36:00	80,3	79,8	80,1	80,5	80,3	80,1
12:36:30	80,3	79,8	80,1	80,5	80,3	80,1
12:37:00	80,3	79,8	80,1	80,5	80,3	80,1
12:37:30	79,9	79,3	79,7	79,9	79,8	79,6
12:38:00	77,6	76,6	77,2	76,8	77,1	76,8
12:38:30	74,6	73,2	74,0	73,2	73,7	73,3
12:39:00	72,4	71,1	72,0	71,1	71,7	71,3
12:39:30	71,8	71,0	71,6	71,0	71,4	71,1
12:40:00	70,7	69,9	70,5	70,0	70,4	70,1
12:40:30	68,4	67,5	68,3	67,3	67,9	67,6
12:41:00	67,0	66,2	66,9	66,0	66,5	66,3
12:41:30	66,6	66,0	66,5	66,1	66,3	66,2
12:42:00	66,5	66,1	66,5	66,2	66,4	66,3
12:42:30	66,7	66,4	66,7	66,6	66,7	66,7
12:43:00	67,6	67,5	67,6	67,9	67,7	67,8
12:43:30	69,0	69,1	69,1	69,7	69,3	69,5
12:44:00	70,8	71,0	70,9	71,7	71,2	71,5
12:44:30	72,7	73,0	72,8	73,8	73,2	73,6
12:45:00	74,8	75,2	74,9	76,0	75,3	75,7
12:45:30	76,9	77,2	77,0	78,3	77,4	77,9
12:46:00	78,9	79,3	79,0	80,3	79,5	79,9
12:46:30	80,3	80,5	80,3	81,5	80,7	81,1
12:47:00	81,1	81,2	81,1	82,0	81,4	81,7
12:47:30	81,4	81,4	81,4	82,0	81,6	81,8
12:48:00	81,5	81,3	81,4	81,9	81,6	81,7
12:48:30	81,6	81,3	81,4	81,9	81,6	81,6
12:49:00	81,7	81,3	81,4	81,9	81,6	81,6
12:49:30	81,6	81,2	81,4	81,8	81,6	81,5
12:50:00	81,6	81,1	81,3	81,7	81,5	81,4
12:50:30	81,5	81,0	81,3	81,6	81,5	81,3

10 Example: TUS test report – failed

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TUS-Prüfbericht gem. AMS2750 Rev. G
Temperature Uniformity Survey Report according to AMS2750 Rev. G

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Berichts-Nr.: A-2024_05_23_V02
Report-no.:

Datum der Prüfung: 23.05.2024
Date of the test:

Unkorrigierte Messwerte / Haltezeitphase
Uncorrected measured values / soak time phase

Zeit / Time	MS13 °C	MS14 °C	MS15 °C	MS16 °C	MS17 °C	MS18 °C
12:51:00	81,5	81,0	81,2	81,6	81,5	81,3
12:51:30	81,5	80,9	81,2	81,6	81,4	81,2
12:52:00	81,4	80,9	81,2	81,6	81,4	81,2
12:52:30	81,4	80,9	81,1	81,5	81,4	81,2
12:53:00	81,4	80,9	81,1	81,6	81,4	81,2
12:53:30	81,4	80,9	81,1	81,5	81,4	81,2
12:54:00	81,4	80,8	81,1	81,5	81,4	81,1
12:54:30	81,3	80,8	81,0	81,5	81,3	81,1
12:55:00	81,3	80,8	81,0	81,4	81,3	81,0
12:55:30	81,2	80,7	81,0	81,4	81,2	81,0
12:56:00	81,2	80,7	80,9	81,3	81,2	81,0
12:56:30	81,2	80,7	80,9	81,3	81,2	80,9
12:57:00	81,1	80,6	80,9	81,3	81,1	80,9
12:57:30	81,1	80,6	80,8	81,2	81,1	80,9
12:58:00	81,1	80,6	80,8	81,2	81,1	80,9
12:58:30	81,1	80,5	80,8	81,2	81,0	80,8
12:59:00	81,0	80,5	80,7	81,1	81,0	80,8
12:59:30	81,0	80,5	80,7	81,1	81,0	80,8
13:00:00	81,0	80,5	80,7	81,1	81,0	80,7
13:00:30	80,9	80,4	80,7	81,1	80,9	80,7
13:01:00	80,9	80,4	80,6	81,0	80,9	80,7
13:01:30	80,8	80,3	80,6	81,0	80,9	80,6
13:02:00	80,8	80,3	80,6	80,9	80,8	80,6
13:02:30	80,8	80,3	80,5	80,9	80,8	80,6
13:03:00	80,7	80,2	80,5	80,9	80,7	80,5
13:03:30	80,7	80,2	80,5	80,8	80,7	80,5
13:04:00	80,7	80,2	80,4	80,8	80,7	80,5
13:04:30	80,7	80,2	80,4	80,8	80,6	80,4
13:05:00	80,6	80,1	80,4	80,7	80,6	80,4
13:05:30	80,6	80,1	80,3	80,7	80,6	80,4
13:06:00	80,5	80,0	80,3	80,7	80,5	80,3
13:06:30	80,5	80,0	80,3	80,6	80,5	80,3

JUMO GmbH & Co. KG
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SAT-Prüfbericht gem. AMS2750 Rev. G
System Accuracy Test Report according to AMS2750 Rev. G

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Internet: www.jumo.net

Berichts-Nr.: Report-no.: A-2024-05-24_V03 **Datum der Prüfung:** Date of the test: 24.05.2024 **Seite:** Page: 1/7

JUMO DAkkS-Registrierungsnummer: D-K-15129-01-00 JUMO DAkkS-Registration number: D-K-15129-01-00	
Unternehmen und Ansprechpartner des Berichterstellers Company & contact person of the report author	JUMO GmbH + Co. KG Moritz-Juchheim-Straße 1 36039 Fulda Mr. Stumpf
Unternehmen und Ansprechpartner der geprüften Geräte Company & contact person of the tested instruments	John Doe John Doe Street 1 London, UK

Anlagenbeschreibung Furnace specification	
Name der Anlage Name of the furnace	chamber furnance
Hersteller Manufacturer	Rohde
Seriennummer Serial number	HR-234-847
Ofenart Furnace type	Cont
Nutztemperatur Usable temperature	1240°C
Teile-Ofenklasse Parts-Furnace class	1
Instrumentierungstyp Instrumentation type	A
Qualifizierte Arbeitszone Qualified work zone	

Kalibriermethode Calibration method	
SAT Methode SAT method	volume method
Wärmebehandlungsverfahren Heat treatment process	
Geforderte Kalibriergenauigkeit Required calibration accuracy	4°C
Max. erlaubtes Offset max. allowed offset	2°C
Modifikation Offset / Korrektur Offset Modification Offset / Correction Offset	0,6°C
Tag der Prüfung Date of test	24.05.2024
Prüfintervall Test frequency	quarterly
Grund der SAT Reason for SAT	
Tag der nächsten Prüfung Day of the next test	2024-09-18
Zulässige Karenzzeit Permissable grace period	10

11 Example: SAT test report

JUMO GmbH & Co. KG
Moritz-Juchheim-Str. 1
36039 Fulda, Germany

SAT-Prüfbericht gem. AMS2750 Rev. G
System Accuracy Test Report according to AMS2750 Rev. G

Phone: +49 661 6003-9135
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Berichts-Nr.: Report-no.: A-2024-05-24_V03 **Datum der Prüfung:** Date of the test: 24.05.2024 **Seite:** Page: 2/7

Verwendetes Prüfequipment Used test equipment	
Datenrekorder Datarecorder	Field testinstrument
Typ des Datenrekorders Type of datarecorder	JUMO LOGOSCREEN 700
Seriennummer des Datenrekorders Serialnumber of the datarecorder	00000000000000000003
Kalibriernummer des Datenrekorders Calibration ident of the datarecorder	7412 D-K-15129-01-00 2023-01
Kalibrierung gültig bis Calibration valid until	
SAT-Thermoelement SAT thermocouple	Sheath thermocouple
Thermoelement Typ Thermocouple type	N
Kalibriernummer der Thermoelemente Calibration ident of thermocouples	466453 357332 912311 665895

Messstelle Measuring point	Measuring point 1
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
77,90	0,80	**78,70**	78,82	0,50	1	**80,32**	-1,62	16:59:38	bestanden / passed

Messstelle Measuring point	Measuring point 2
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
77,40	0,50	**77,90**	78,00	0,70	1	**79,70**	-1,80	17:01:02	bestanden / passed

Messstelle Measuring point	Measuring point 3
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
81,40	0,10	**81,50**	77,85	0,80	0,52	**79,17**	2,33	17:01:04	bestanden / passed

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SAT-Prüfbericht gem. AMS2750 Rev. G
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Messstelle Measuring point	Measuring point 4
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
78,60	1,20	**79,80**	78,16	1	0,80	**79,96**	-0,16	17:01:06	bestanden / passed

Messstelle Measuring point	Measuring point 5
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
80	0,40	**80,40**	78,20	1,10	0,20	**79,50**	0,90	17:01:06	bestanden / passed

Messstelle Measuring point	Measuring point 6
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
80,80	-0,70	**80,10**	78,09	0,80	0,30	**79,19**	0,91	17:01:10	bestanden / passed

Messstelle Measuring point	Measuring point 7
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
81,90	-0,60	**81,30**	78,79	0,50	0,50	**79,79**	1,51	17:01:10	bestanden / passed

11 Example: SAT test report

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Messstelle Measuring point	Measuring point 8
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
81	0	**81**	78,65	0,50	0,90	**80,05**	0,95	17:01:14	bestanden / passed

Messstelle Measuring point	Measuring point 9
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
76,70	1,40	**78,10**	78,05	0,60	1,10	**79,75**	-1,65	17:01:16	bestanden / passed

Messstelle Measuring point	Measuring point 10
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
79,80	0,20	**80,00**	78,28	0,20	1,20	**79,68**	0,32	17:01:16	bestanden / passed

Messstelle Measuring point	Measuring point 11
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
79,40	-0,85	**78,55**	77,87	1,20	1	**80,07**	-1,52	17:01:18	bestanden / passed

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Messstelle Measuring point	Measuring point 12
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
80,60	0,80	**81,40**	77,88	0,30	0,90	**79,08**	2,32	17:01:20	bestanden / passed

Messstelle Measuring point	Measuring point 13
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
77,70	1,35	**79,05**	78,67	0,50	0,50	**79,67**	-0,62	17:01:22	bestanden / passed

Messstelle Measuring point	Measuring point 14
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
80,60	-1,20	**79,40**	77,93	0,60	0,40	**78,93**	0,47	17:01:24	bestanden / passed

Messstelle Measuring point	Measuring point 15
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
79,50	0,60	**80,10**	78,26	0,90	0,50	**79,66**	0,44	17:01:24	bestanden / passed

11 Example: SAT test report

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Messstelle Measuring point	Measuring point 16
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
83,10	-0,60	**82,50**	78,45	0,88	0,60	**79,93**	2,57	17:01:26	bestanden / passed

Messstelle Measuring point	Measuring point 17
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
80,40	1,40	**81,80**	78,40	0,50	0,70	**79,60**	2,20	17:01:30	bestanden / passed

Messstelle Measuring point	Measuring point 18
Sollwert Setpoint	80 °C
Toleranz Tolerance	-5 / 5 K

Anzeige-Wert Display-value [°C]	**Anzeige-Offset** Display-offset [°C]	**Korrigierter Anzeige-Wert** Corrected Display-value [°C]	**Nicht korrigierter Messwert Rekorder** Uncorrected value recorder [°C]	**Korrektur-faktor Sensor** Correction factor sensor [K]	**Korrektur-faktor Rekorder** Correction factor recorder [K]	**Korrigierter Messwert Rekorder** Corrected value [°C]	**Differenz** difference [°C]	**Systemzeit** System time [hh:mm:ss]	**Prüf-ergebnis** Test result
81,10	1,30	**82,40**	73,84	0,30	0,90	**75,04**	7,36	17:18:00	nicht bestanden / failed

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Einschränkungen Limitations
Bemerkung Comment
Maßnahme Action

	Datum Date	**Name** Name	**Unterschrift** Signature
Techniker **(der den Test durchgeführt hat)** Technician (who carried out the test)	24.05.2024 17:28:45		
Prozesseigner Process owner	24.05.2024 17:28:45		

11 Example: SAT test report

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