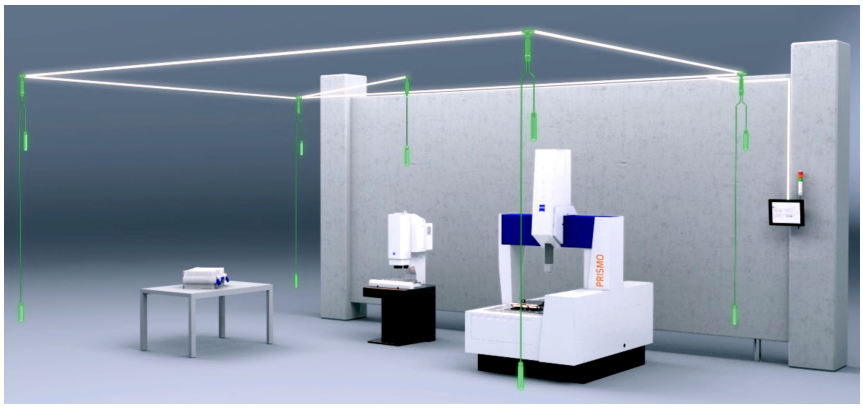
Operating manual

TEMPAR console
Automatic temperature monitoring for coordinate measuring machines



Article no.: 626140-9149-831

Product information

Designation	TEMPAR - Automatic temperature monitor for coordinate measuring machines
Product no.	626140-9149-831
Manufacturer	Carl Zeiss 3D Automation GmbH Carl-Zeiss-Straße 27 73431 Aalen Germany www.probes.zeiss.com

Document version

Article no. Document	Version	Date	Note
626140-9149-911	9.0	19.03.2019	valid

This document is only valid until a newer version is published. The most recent version should always be used. Invalid versions must no longer be used.

All rights reserved
© 2019 Carl Zeiss 3D Automation GmbH

This document, including all illustrations, is subject to copyright. Any use beyond the strict limits of copyright law permission without the permission of the manufacturer is strictly prohibited and punishable by law. This applies in particular to reproduction, translation, microfilming, and storing or processing by electronic means.
The replication of trade names and such in this document does not justify the assumption that such names should, in the sense of trademark and brand protection legislation, be regarded as unused and therefore usable by anyone.

Layout, illustration, photos and texts: Carl Zeiss 3D Automation GmbH
Printed in Germany 03/2019

Table of contents

1 Product description 7

2 Legal and safety 10

2.1 Warranty 10

2.2 Conformity 10

2.3 Intended use 12

2.4 Misuse 13

3 Operation 14

3.1 Switching on 14

3.2Operation as "Standard" user group 16

3.2.1 "Dashboard" menu 16

3.2.2 "Machines" menu 19

3.2.3 "Measuring Room" menu 20

3.2.4 "Sensors" menu 21

3.2.5 "History" menu 22

3.2.6 "System" menu 24

3.2.7 "CSV Export" menu 25

3.2.8 "Event Log" menu 26

3.2.9 "Configuration > System > General" menu 27

3.2.10 "Configuration > System > Network" menu 28

3.2.11 "Configuration > System > User" menu 29

3.2.12 "Configuration > System > Database" menu 30

3.2.13 "Configuration > System > Maintenance" menu 31

3.2.14 "Configuration > System > Backup" menu 33

3.2.15 "Configuration > System > External DB" menu 34

3.2.16 "Configuration > System > Connections" menu 39

3.2.17 "Configuration > Measuring Room > Machines" menu 40

3.2.18 "Configuration > Measuring Room > Sensors" menu 42

3.2.19 "Configuration > Measuring Room > Calibration" menu . . . 45

3.2.20 "Configuration > Measuring Room > Tolerance Values" menu. 46

3.2.21 "Configuration > Measuring Room > Profile" menu 47

3.2.22 "Configuration > Measuring Room > Classification" menu . . 48

3.2.23 "Configuration > Measuring Room > Event Log" menu 49

3.3 Operation as "Viewer" user 51

Table of contents

3.4 Switching off 51

4 Maintenance 52

4.1 Calibration cycle 52

4.2 Maintenance 52

4.3 Spare parts 52

4.4 Disposal and recycling 53

5 Technical data 54

5.1 Scope of supply and expansions 56

Abbreviations

The abbreviated terms in this document have the following meanings:

CMM	Coordinate measuring machine
DAkkS	German Accreditation Body
DKD	German Calibration Service
DHCP	Dynamic Host Configuration Protocol

1 Product description

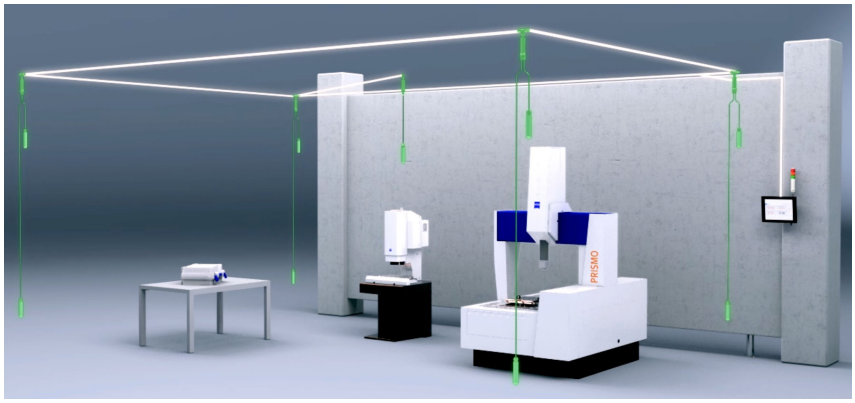


Fig. 1: Temperature monitor

The tasks of the "TEMPAR - Automatic Temperature Monitor" are:

– To classify measuring rooms in accordance with VDI/VDE 2627.

– To monitor and trace compliance with the machine specification.

This is necessary to obtain correct measuring results in co-ordinate measurement systems. During calibration it must be possible to document that the temperature does not deviate from the temperature during measurement, as well as demonstrating that the measuring machines are operated within the limits specified by the manufacturer. Monitoring the temperatures of the workpiece and measuring room is not only useful from a technical standpoint, but also mandatory in terms of traceability requirements (e.g. ISO 10012-1, QS 9000, VDA 6.1, ISO TS 16949, FDA, HACCP/LMHV).

The VDI/VDE guideline 2627 requires at least nine temperature sensors for this task. These sensors are positioned at least 0.5 m away from the walls in the measuring room - one sensor in the centre of the room and two sensors in each of the four corners of the room at two different heights. Additional temperature sensors can be added to these nine, which is particularly useful for larger measuring rooms.

Alongside the temperature, other physical quantities can also be measured.

The sensors can be attached to the ceiling or to the wall. Alternatively, they can also be erected with the mobile measuring stand.

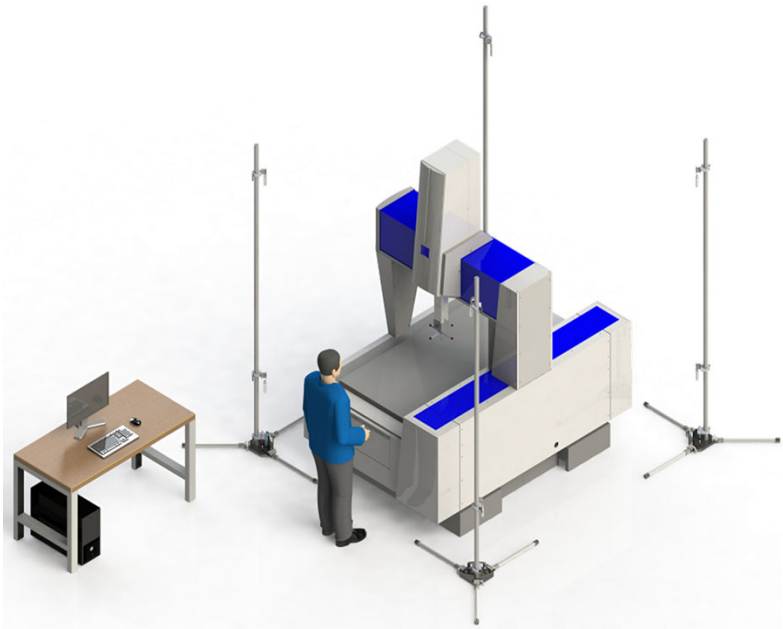


Fig. 2: Temperature monitor with mobile measuring stand

The electronic sensor control saves the calibration data and adjustment values of the sensor and converts the measured value from analogue to digital. The console reads the measured value from the sensor and processes it.

The default configuration envisages 9 temperature sensors. However this can be supplemented with additional temperature sensors but also sensors for other physical quantities.

The display of measured values makes it quick and easy to see whether the environmental conditions lie within or outside of the valid range for the measurement. The console is operated via the touchscreen monitor. Alternative the system can be operated with any web-enabled terminal device.

Note that, while the TEMPAR system displays valid values for the measuring room, the conditions in the measuring range of the coordinate measuring machine and the workpiece temperature are not taken into account. These conditions must be recorded and evaluated separately.

The calibration requires that one of the temperature sensors is calibrated by a certified DAkkS laboratory. The other eight sensors are factory-calibrated, with the DAkkS-calibrated sensor serving as a reference. The optional sensors for air pressure, humidity and airflow can also be calibrated at the factory or by DAkkS. All sensors are shipped with a calibration certificate.

The TEMPAR console enables measured values from the sensors to be recorded, displayed and saved depending on the configuration level. It displays the history of the measured valves and indicates when they exceed or fall below the limit values.

Article numbers are available for individual components and function modules (See chapter "5.1 Scopy of supply and expansions")

2 Legal and safety

2.1 Warranty

Our General Terms and Conditions of Sale and Delivery always apply. These are available online at www.probes.zeiss.com. No warranty or liability claims for personal injury or material damage can be accepted if they relate to one or more of the causes given below:

- Improper use of the product.
- Incorrect installation, startup, operation, maintenance or repair of the product.
- Failure to observe the instructions in this manual in regard to all service lifecycles of the product.
- Unauthorised structural modifications made to the product.
- Use of replacement parts which are not approved by the manufacturer.
- Situations due to the impact of foreign bodies and force majeure.

Parts subject to wear are excluded from the warranty.

2.2 Conformity

The listed articles (See chapter "5.1 Scopy of supply and expansions")correspond to the requirements of the directives and standards listed below due to their concept and design.

If any unauthorised changes are made to the product, this declaration of conformity will lose its validity.

Designation of the product:	TEMPAR Automatic temperature monitoring for coordinate measuring machines
Product type:	Automatic measurement of the ambient conditions of a measuring room with display and evaluation of the measured values using a console.

EC directives and standards:	– EMC Directive (2014/30/EU)
	– Low Voltage Directive (2014/35/EU)
	– DIN EN 61010-1
TEMPAR wireless:	– EN 300 220 V3.1.1
	– EN 301 489-1 V2.1.1
	– EN 61010-1:2010
	– FCC part 15C
	– FCC part 15B
	– IEC 62133

FCC warning:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

– Reorient or relocate the receiving antenna.
– Increase the separation between the equipment and receiver.
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
– Consult the dealer or an experienced radio/ TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

2.3 Intended use

The "TEMPAR - Automatic Temperature Monitor" is intended solely for the recording of measured values of interior spaces.

A feasible arrangement and number of sensor units must be selected. To comply with standards, nine temperature sensors must be installed in a measuring room so that they are at least 0.5 m away from the walls/machine. One sensor is located in the centre of the space and the remaining eight sensors are installed in the corners of the room at two levels.

Technical specifications (See chapter "5 Technical data").

Proper usage also includes:

- Observing all notes in the manual.
- Maintenance of the calibration interval.

The following points must be complied when using TEMPAR wireless:

- Sensor units must not be exposed to heat or fire.
- Sensor units must not be exposed to mechanical impacts.
- If a battery leaks inside a sensor unit, do not allow the liquid to come into contact with the skin or get into the eyes. If the battery fluid touches the skin, wash the affected area with plenty of water and see a doctor.
- No other chargers should be used other than those provided with the devices specifically for their charging.
- Store sensor units in clean and dry conditions.

2.4 Misuse

All types of use that are not described under intended use, are considered reasonably foreseeable misuse (See chapter "2.3 Intended use"). Use of any other kind or outside of this scope is regarded as improper. The manufacturer cannot accept any liability for damage arising from such use.

The TEMPAR system is intended for use in closed, dry and oil-free spaces.

The sensors may not be installed directly next to an air conditioning system or on the ground. Doors and windows must be kept shut. Select practical positions that are representative of the room (also see VDI/VDE 2627).

Avoid having heat sources, such as lamps or heating pipes, near sensor units. Several people in a space can cause the ambient temperature and gradient values to increase. The measured values can also be affected by direct sunlight, windows, heating systems, draughts or season changes.

A soft, dry cloth should be used for cleaning. Avoid using fluids or aggressive cleaning agents.

Prevent shocks to or tensile forces acting on the sensor units when a sensor has to be moved to the side when manoeuvring machines, workpieces or similar objects in a room.

In particular, misuse refers to:

- Operating or maintenance to the system by unauthorised personnel.
- Use in rooms not permitted for the TEMPAR system.
- Changing or modifying the system without authorisation.
- Failure to comply with valid laws, regulations, safety instructions or the manual.

3 Operation

For set-up, settings and commissioning, see the TEMPAR installation instructions.

3.1 Switching on

The TEMPAR system is always on and not switched off at the end of the work day. Sensors can also be replaced during ongoing operation. The calibration and sensor data are regularly read out.

Fig. 3: Button on the underside of the console

To switch on the system, press the pushbutton on the bottom of the console (see fig. 3). The system starts up by itself. The sensors must be correctly connected to the system via the sensor bus (see TEMPAR installation instructions).

There may not be any per-hour and per-day measured values present directly after switching the system on. They must first be collected for the corresponding time frame, before valid gradients can be displayed.

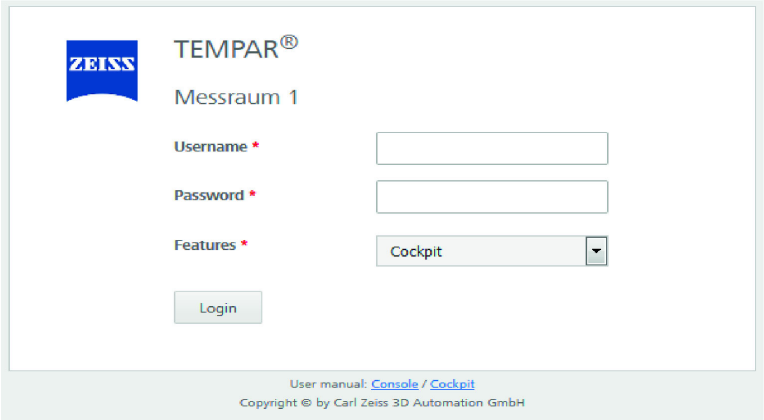


Fig. 4: Login screen

Once the system starts, a login window appears that allows you to access the system. The system recognises two users as standard.

"**Standard**" - The standard user has access to functions and settings. Password: iMeM1eF6Ah

"**Viewer**"- The viewer user can see information, but does not have the right to make changes.

When accessing directly via the touchscreen, logging in without a password is possible by clicking on “Login as viewer” below the login window.

When accessing via the web browser, the password must always be entered for security reasons.

Password: viewer

Further users can be created and managed in the "Configuration > System > Network" menu (See chapter "3.2.11 "Configuration > System > User" menu").

All users can set the language of the console using the country flags on the top right:

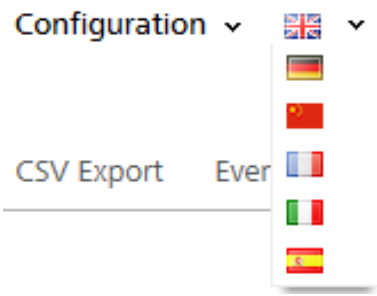


Fig. 5: Selecting the language

The IP address and the console ID are shown under the login window (on left in the corner).

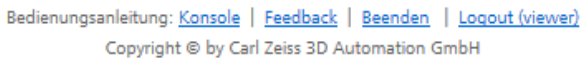


Fig. 6: Feedback - Shutdown - Logout

To be able to download the instructions, you must connect to the console via the network. Click "Console" to start downloading the instructions.

An email can be sent to the manufacturer via the "Feedback" button in the footer. "Shutdown" shuts down the console and the operating system. "Logout (user)" enables users to log out of the console so that another user can log in:

3.2 Operation as “Standard” user group

The console interface is used to monitor the measured values. Various information can be displayed and influenced by adjustable parameters. You can view different data by navigating between tabs.

3.2.1 "Dashboard" menu

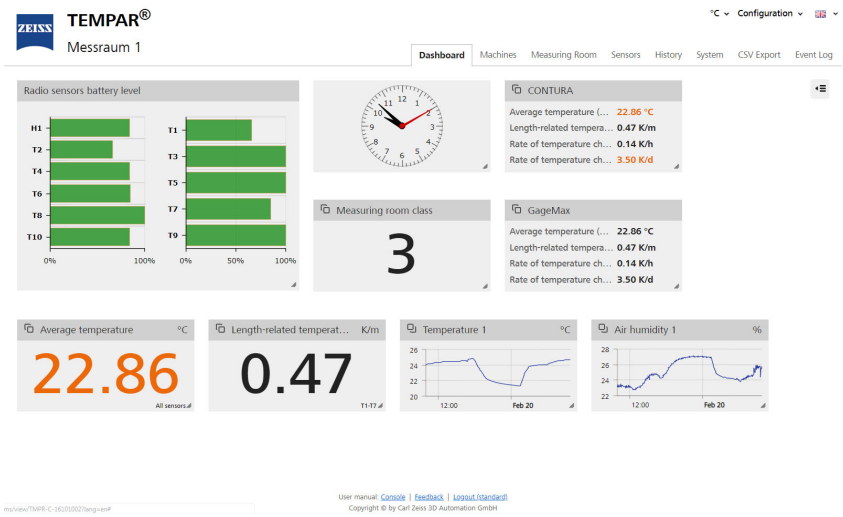


Fig. 7: "Dashboard" menu

Information about the measuring room is displayed in the "Dashboard" tab by means of widgets. The dashboard user interface can be configured according to the user's requirements using widgets. The dashboard can be individually configured for each user.

Fig. 8: Widget selection menu

The widget selection menu at top right accesses widget selection (fig. 9).

The following widgets are available:

- Picture overview
- Limit deviation relative to the target temperature
- Air pressure
- Air humidity
- Rate of air humidity change per day
- Airflow
- Measuring room class
- Average temperature
- Length-related temperature difference
- Temperature 1, 2, 3, ...
- Rate of temperature change per hour
- Rate of temperature change per day
- Time
- Machine
- Battery level of sensors that are wirelessly connected

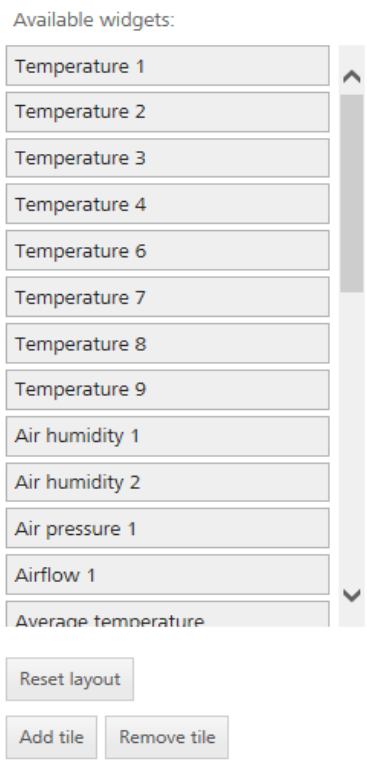


Fig. 9: Widget selection

The data of the selected measuring room is linked with the widgets. "Reset layout" arranges the widgets according to the default layout.

To incorporate a widget into the "Dashboard" menu, select the widget and drag and drop it onto an empty window. By default, the widget is displayed as a number, the value relates to the current status. The unit of the value (e.g. °C) is shown at the top right; the sensor (e.g. T5) that is supplying this value is shown at the bottom right. The window size can be increased or decreased using the triangle at the bottom right. With some widget types it is possible to select another view via the dark-grey area (top). For example, with a temperature widget it is possible to switch between the current value (fig. 9) and the chart view (fig. 10). The chart view relates to the previous 24 hours.

Fig. 10: Widget: Display of the current value of “Temperature 5”

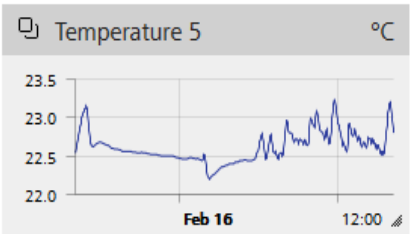


Fig. 11: Widget: Display of the temperature history as a chart

To remove a widget from the window, select it and drag it to any vacant area.

3.2.2 "Machines" menu

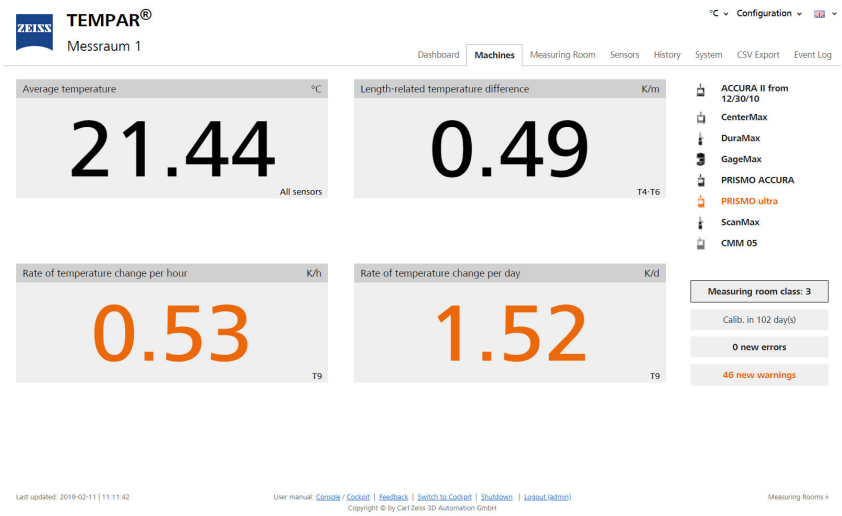


Fig. 12: "Machines" menu

The four tiles show the current measured values relevant for machine monitoring. Values lying within the active machine specification, are shown in black. Value that exceed one or more machine specifications are shown in orange.

The measuring machines listed on the right are configurable under "Configuration > Measuring Room > Machines”. Upon selecting a machine description, data for the respective measuring machine are displayed.

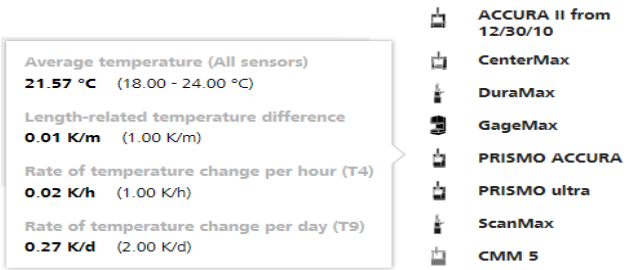


Fig. 13: Data of measuring machines via mouse-over effect

At the bottom right there are info buttons for:

- The actual calculated measuring room class
- The time until the next calibration in
- The number of unacknowledged errors
- The number of unacknowledged warnings

By clicking on the errors or warnings buttons, the "Event Log” menu is opened with the listed warnings and errors.

3.2.3 "Measuring Room" menu

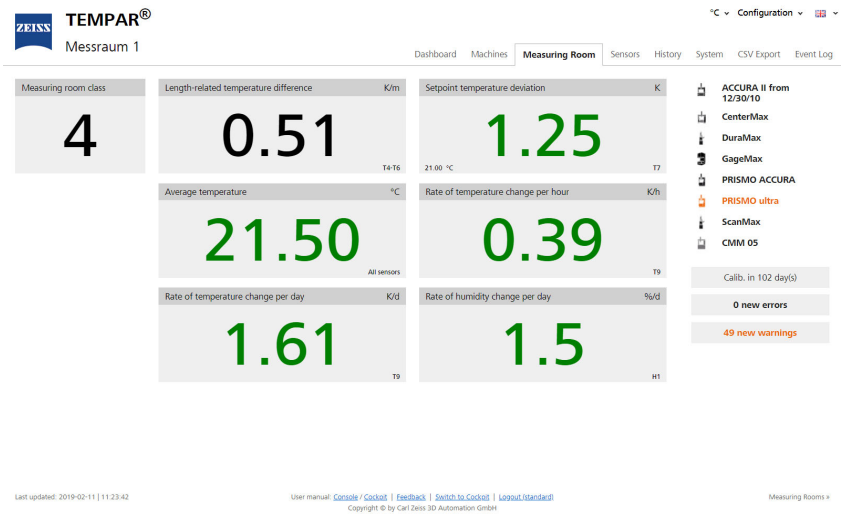


Fig. 14: "Measuring Room" menu

The tiles in the "Measuring Room" menu show the current parameters that are required for calculating the measuring room quality class. The corresponding class is determined for each parameter. The associated limit values can be displayed by clicking the measured value. From these classes is derived the measuring room quality class for measuring rooms for dimension measurement technology (see also "Configuration/Measuring Room/Classification"). Values in black belong to the displayed measuring room quality class. Values in green comply with a better measuring room quality class.

3.2.4 "Sensors" menu

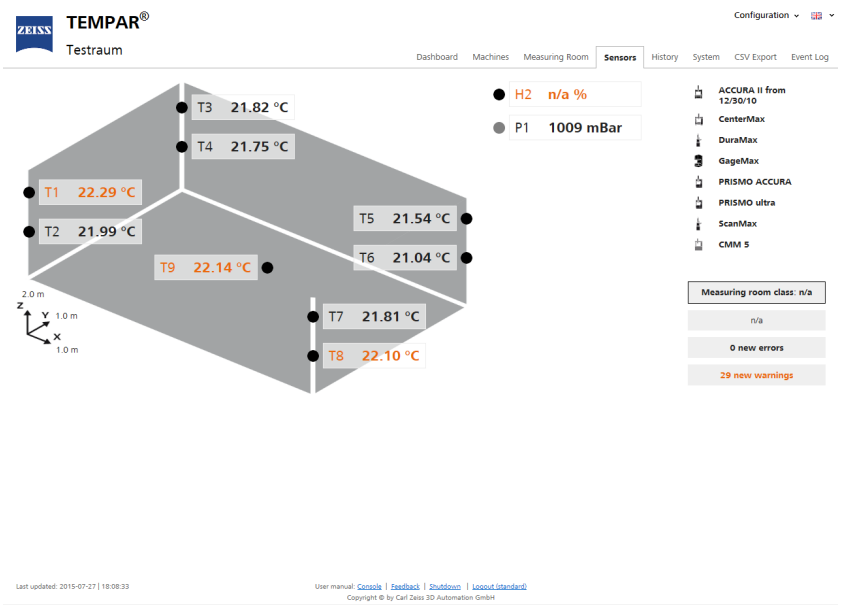


Fig. 15: "Sensors" menu

This menu displays the measuring room and the sensors in a simplified way. Sensors with a DAkkS calibration have a black frame around the field with the measured value.

By hovering with the cursor or clicking on a value, you receive more information about a sensor. The sensor description and the limit values can be edited in the configuration. The other information is defined by the sensor or during commissioning.

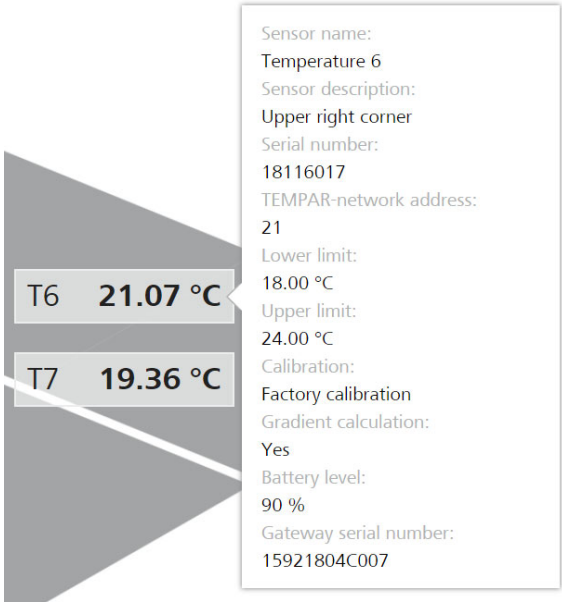


Fig. 16: Additional information about the sensors

If changes have been made to the sensors or settings in the system, it can take a while for these to be fully incorporated in the calculations.

3.2.5 "History" menu

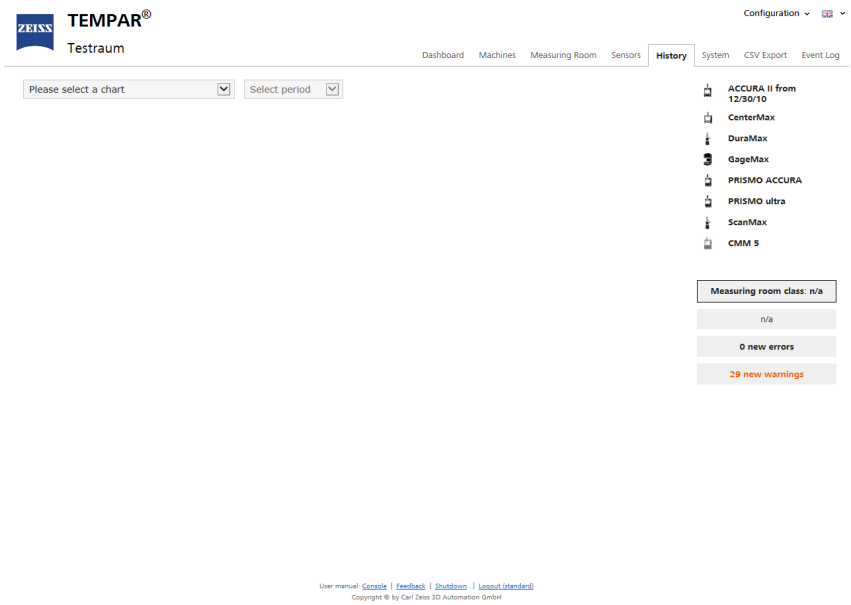


Fig. 17: "History" menu

In the "History" menu, recorded measured values such as the temperature, gradient, barometric pressure or air humidity can be graphically displayed. For this, a value must be selected in the left drop-down menu. To the right, a predefined or freely definable period is selected. The two settings are used to generate a chart. Provided a selection has already been made, the values of the last selection are immediately displayed.

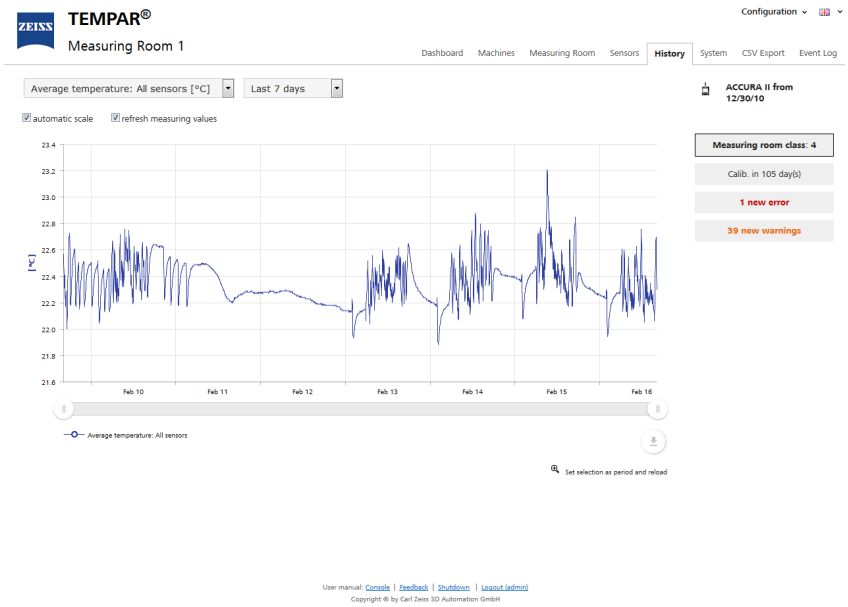


Fig. 18: History - chart

By touching a certain point or by moving over with the mouse, a vertical line is drawn over the chart. In doing so, a precise point in time with the respective measured values is displayed.

If the "Automatic Scaling" checkbox is activated, the view is automatically scaled in the Y-direction. Otherwise, the scale corresponding to the settings under "Configuration > Measuring Room > History" is displayed.

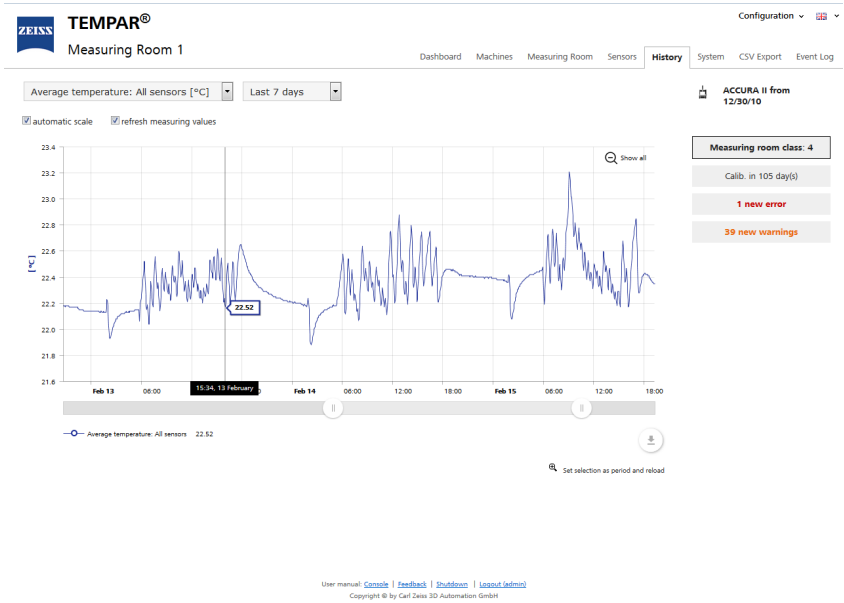


Fig. 19: Chart zoom function

If you hold down the left mouse button and at the same time move it over the chart or move the finger horizontally over a defined area, the area will be highlighted in grey. Upon letting go, the highlighted areas of the chart is shown magnified (zoom function). The area can be expanded or reduced using the bar below the chart. With the right button "Display all" you go back to the entire chart view according to the time interval specified above.

3.2.6 "System" menu

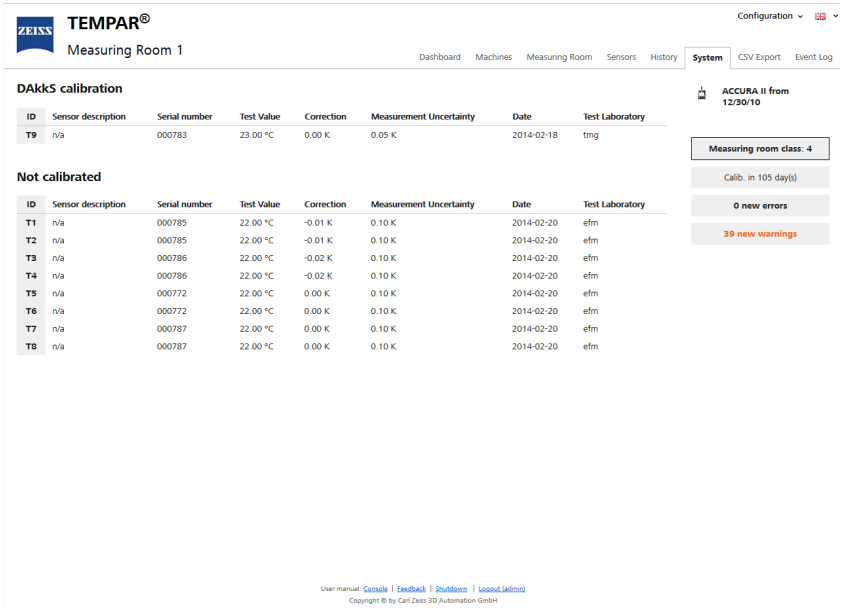


Fig. 20: "System" menu

The sensor calibration data are displayed in the "System" menu. The sensors are displayed in different groups dependent on the calibration.

The name of the sensors, which can be specified under Configuration > Measuring room > Sensors, is shown under the sensor name column. (See chapter "3.2.18 "Configuration > Measuring Room > Sensors" menu")

For DAkkS-calibrated sensors, the value under "Correction" refers to the deviation from the standard temperature of the calibration laboratory. For the factory-calibrated sensors, the value represents the deviation from the DAkkS-calibrated sensors.

The "Test Laboratory" column shows the identification code of the test laboratory.

3.2.7 "CSV Export" menu

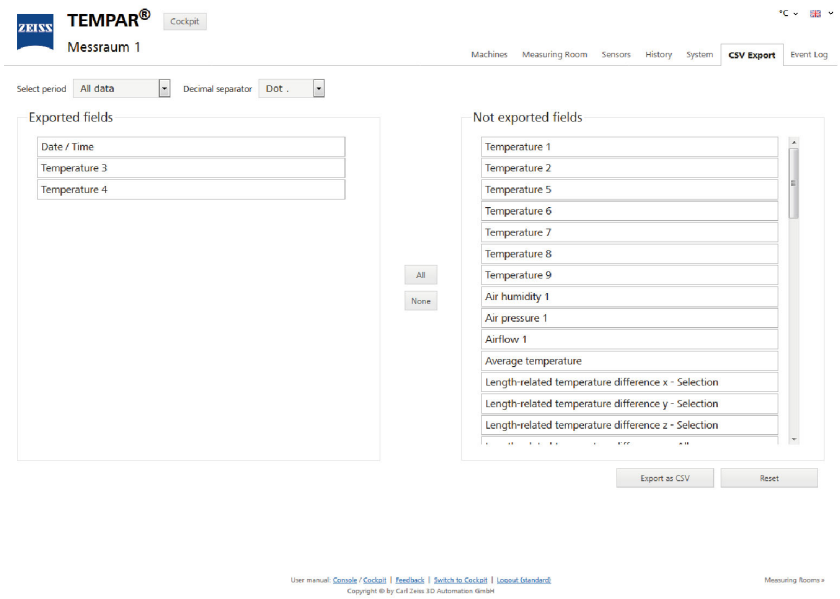


Fig. 21: "CSV Export" menu

In the "CSV Export" menu, freely selectable data can be exported as a CSV file. Data that should not be exported must be dragged into the right column ("Do not export"). Clicking on "Export as CSV" saves all the data of the left column ("Exported fields”) to a CSV file.

If incorrect data was selected, the original arrangement can be restored by clicking "Reset".

If an export is made from the console, an empty USB stick must be connected beforehand. The system saves the file to the USB stick.

When exporting from e.g. a PC, the storage location can be freely selected.

Under Configuration > System > General > CSV Export, the decimal separating character (".” or ",”) can be set as the decimal separator for the file to be exported.

3.2.8 "Event Log” menu

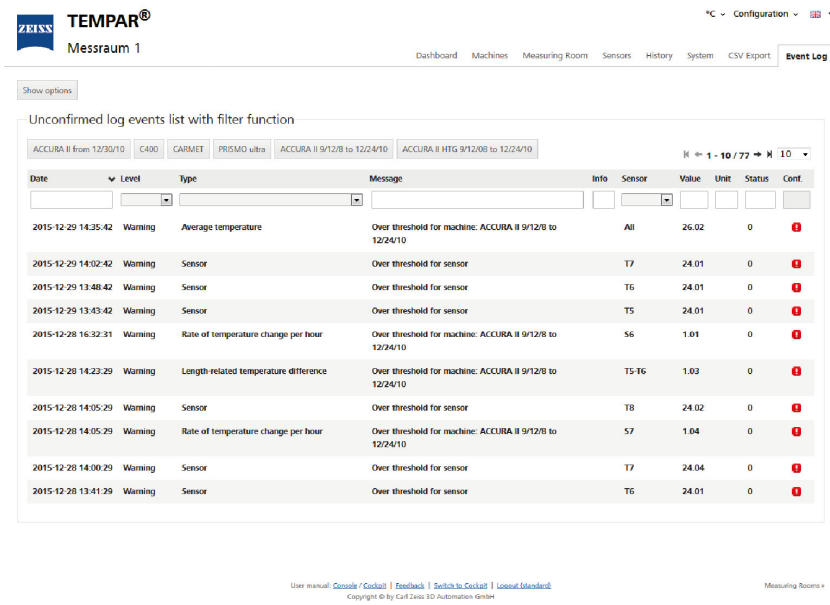


Fig. 22: "Event Log” menu

System events are classified as warnings, errors and information.

- Information items are system messages
- Warnings are of informative nature, e.g. exceeding of limit values
- Errors indicate malfunctions

A targeted search of messages can be performed using the filter and search function.

3.2.9 "Configuration > System > General" menu

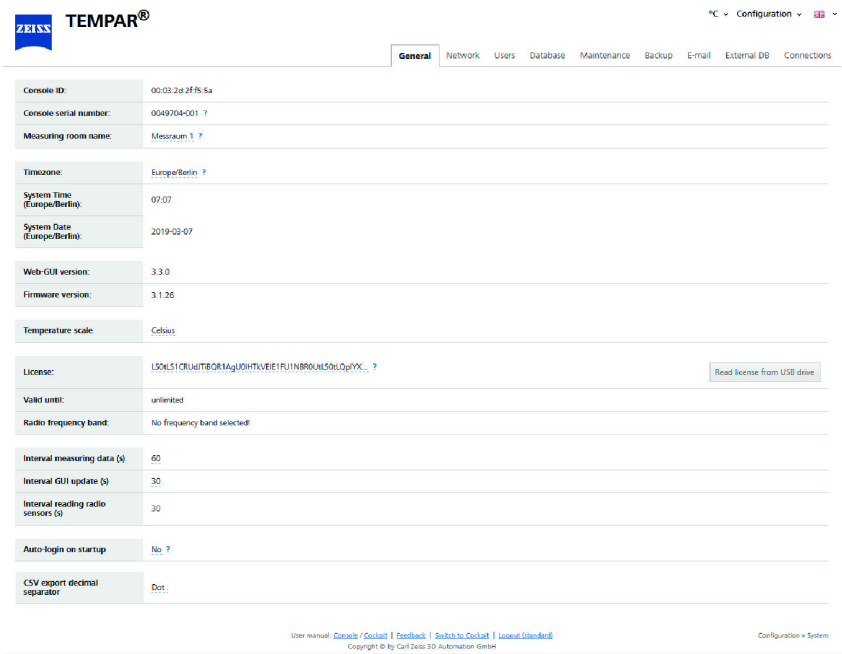


Fig. 23: "General" menu

Via the "Configuration" menu at the top right, the "System" sub-menu, which is subdivided into several tabs, can be accessed. You can return to the standard view by clicking on the ZEISS logo.

The "General" tab displays general information and allows settings to be made.

Under "Timezone" you can set the time zone valid for your location. The corresponding system time and date are displayed.
The current time and date can be loaded from an NTP time server. (See chapter "3.2.10 "Configuration > System > Network" menu")

Under "Temperature scale" you can select whether values are displayed in "Fahrenheit" or "Celsius".

If a new license is to be entered under "License", there are two options available: You can either copy the license key directly into the web interface from a PC, for example, or you can connect a USB stick containing the license file to the console and click on the "Read license from USB drive" button.

The frequency of storage of measuring data in the database is specified under "Interval measuring data (ms)". The update frequency of the GUI and the measuring data is set under "Interval GUI update (ms)". Under "Interval reading radio sensor(s)" a minimum interval of 30 seconds should be allowed for to increase the operating time of the sensor units.

Under "Auto-login on startup" it is specified whether the Viewer user should be automatically logged in after startup.

Whether a decimal point or decimal comma is used as the decimal separator is specified under "CSV export decimal separator”.

3.2.10 "Configuration > System > Network" menu

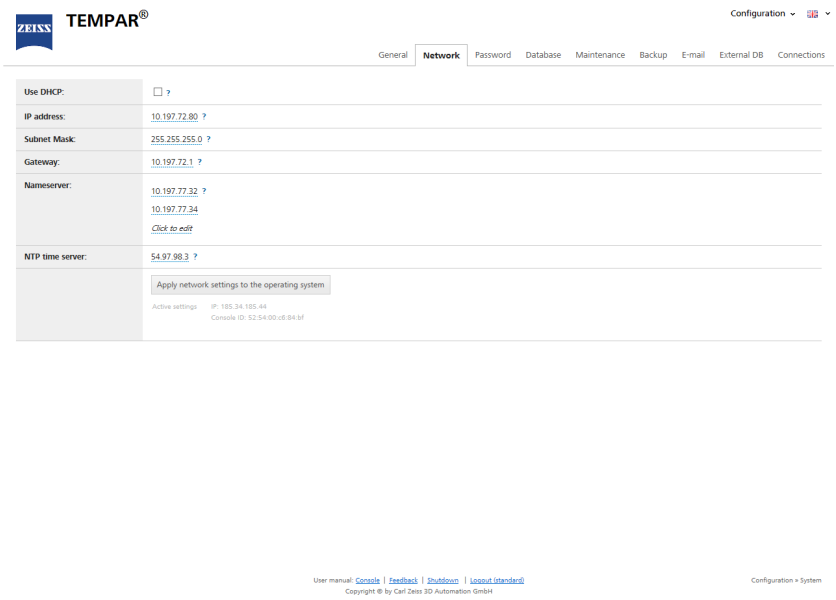


Fig. 24: "Network" menu

In the "Network" tab, settings can be configured to address the console in the network. If you have any questions about the specification of network settings, please contact your responsible IT administrator.

Under "NTP time server", a time server can be specified for time synchronisation.

The current network settings are displayed under the "Apply network settings to the operating system" button. This is useful if the "Use DHCP" setting is checked. After changing the settings, activate the button “Apply network settings to the operating system”.

If the network connection is to be made via a proxy server, this can be configured by selecting the option “Use HTTP(S) Proxy Server”.

3.2.11 "Configuration > System > User" menu

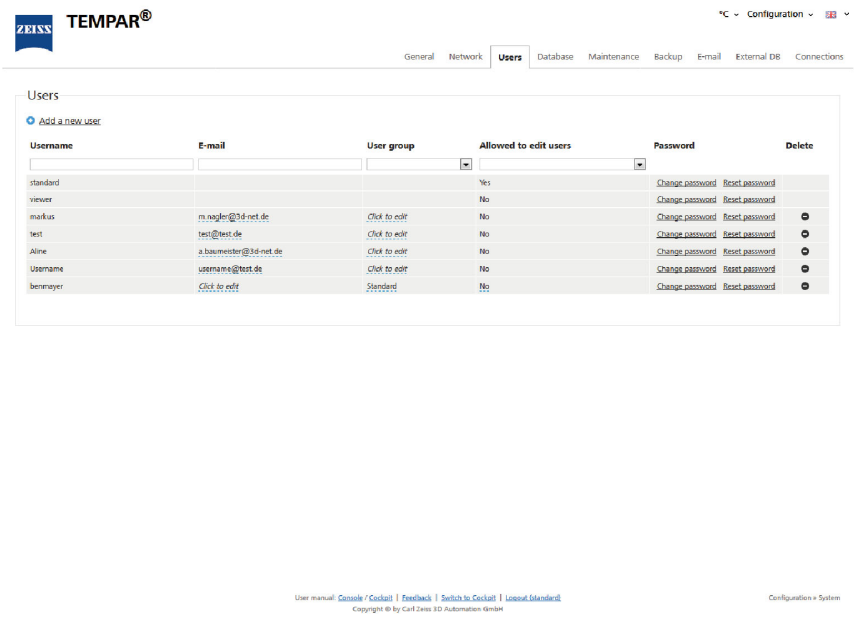


Fig. 25: "User" menu

New users can be added and existing users administered via the "Users" tab.

Additional users are added under "Add a new user". The following settings are necessary for this:

- User name: the name must be unique and can only be assigned once.
- E-mail: is required if the user is to receive email messages (only with Cockpit).
- User group: governs the rights of the user. They are identical with those of previously defined users (see 3.1).
- May change users: requires standard user group and allows the user themselves to create or modify other users. If this option is not activated, then only the individual user can be edited.

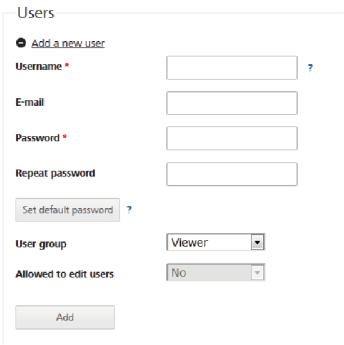


Fig. 26: Creating a user

If the logged in user is allowed to edit other users, the editable fields are underlined.

The password can be changed or reset. The password must be at least eight characters in length and contain at least one upper and lower case letter, as well as one digit. Enter the new password and then click "Save". It is reset to the default password for the particular user group via “Reset password”.

3.2.12 "Configuration > System > Database" menu

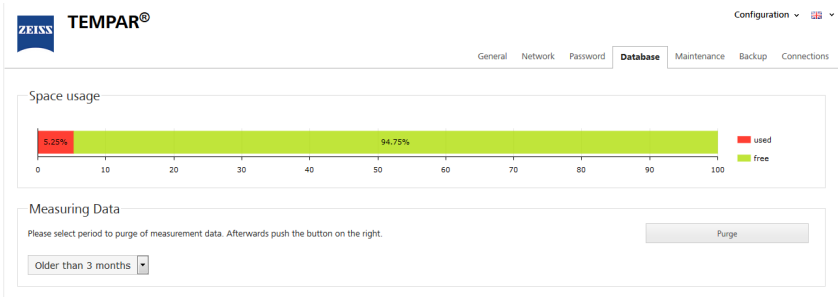


Fig. 27: "Database" menu

"Database" graphically shows the amount of space the system still has available.

To purge measuring data, select the desired time period and click on "Purge”.

3.2.13 "Configuration > System > Maintenance" menu

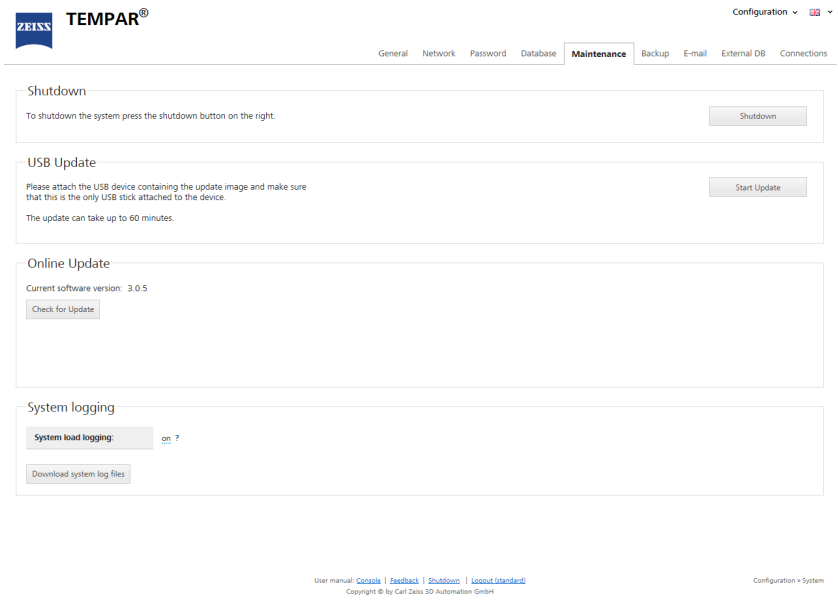


Fig. 28: "Maintenance" menu

The "Maintenance” tab contains the following functions:

- Shut the system down using the "Shutdown" button
- Perform a "USB Update" via the "Start Update" button
- Perform "Online update"
- Switch logging of system characteristics on / off under "System load logging:".

USB Update:
Updates can be downloaded via the following options from any workstation so that they can subsequently be transferred to the console using a USB stick.

https://updates.tempar.net/

A login window appears.

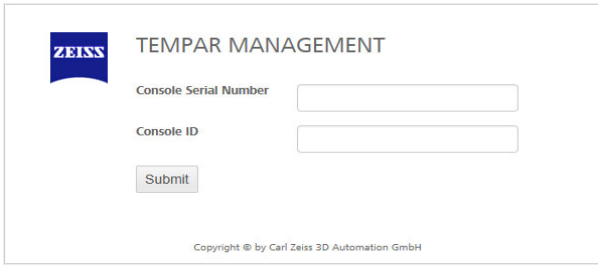


Fig. 29: TEMPAR Update login

The following data is required for login. The data can be taken from "Configuration > System > General" menu. (See chapter "3.2.9 "Configuration > System > General" menu") For example:

Console Serial Number:	TMPR-C-12345678
Console ID:	00:aa:11:bb:22:cc

Click "Download" to download the current TEMPAR version.

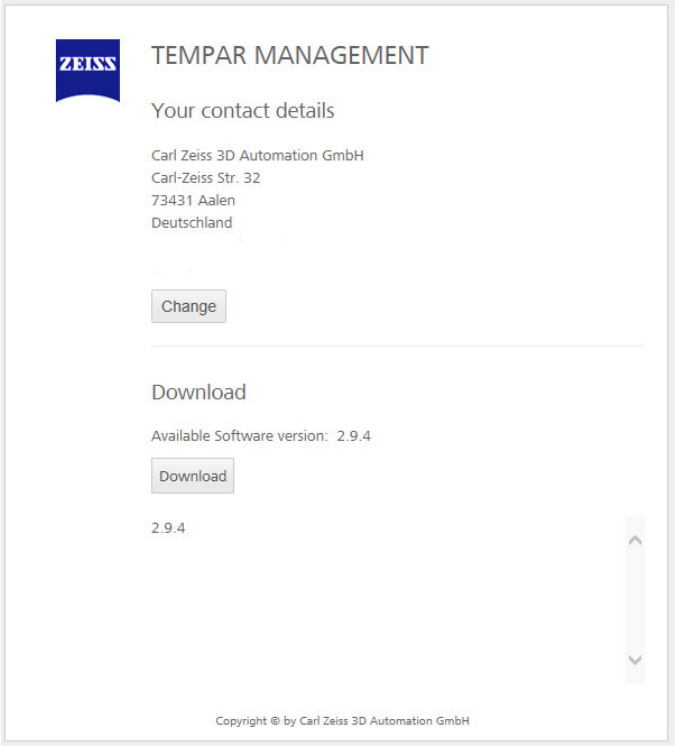


Fig. 30: TEMPAR Update download

After completion of the download, copy the update file to a USB stick (at least 4 GB). The downloaded file may not be renamed. Then plug the USB stick into a USB port of the TEMPAR system and start the update process via the "Start update" button.

Online update:
To perform an online update the console must have internet access. Query for new updates via the "Check for Update" button. Download the new update via the "Start download to console" button. The update process must be started after the download finishes.

3.2.14 "Configuration > System > Backup" menu

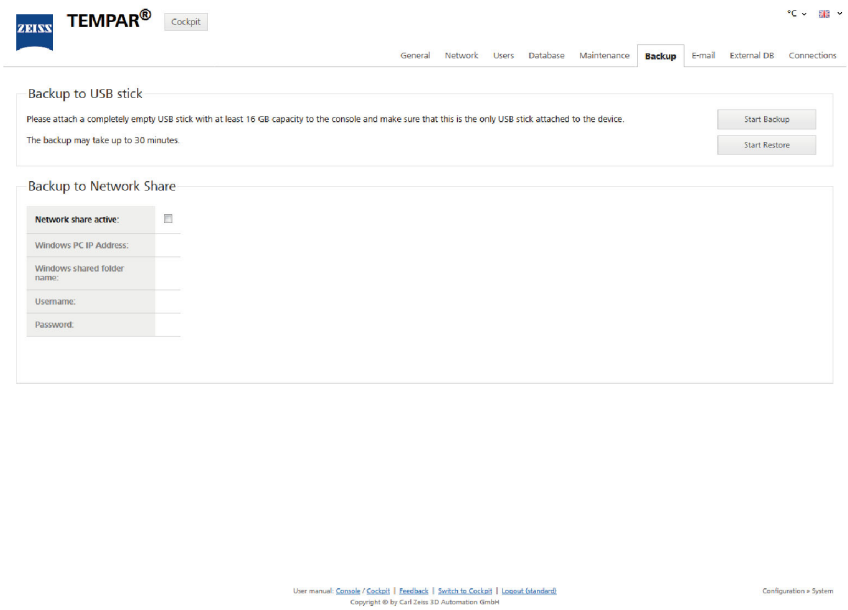


Fig. 31: "Backup" menu

The current system is backed up using the "Start Backup" button. For this, a USB stick with a minimum size of 16 GB must be connected to the console. The USB stick should be empty, as otherwise any data on the stick will be overwritten.

Alternatively a backup can be stored to a shared network resource (Network Share) which can be accessed from the TEMPAR console. To do so first create a folder on a Windows system and enable for network (shared) access. Then enter the corresponding information in the area "Backup to Network Share”. Click "Connect to network share" to create the connection. To start the backup click on "Start network backup”.

3.2.15 "Configuration > System > External DB” menu

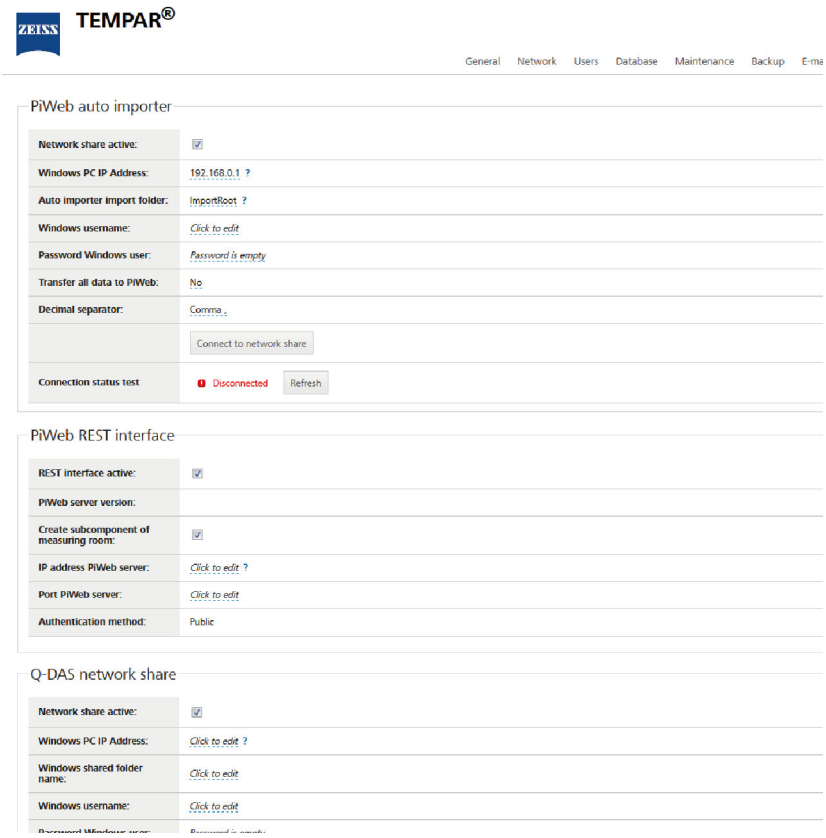


Fig. 32: "External DB” menu

The TEMPAR system can be linked to PiWeb in the "External DB” step. There are two possibilities for linking to PiWeb. The first possibility is a data exchange by transferring the file to a network share and an import into PiWeb using PiWeb auto importer. The second possibility is direct communication with the PiWeb server via a REST interface.

PiWeb Auto Importer:

PiWeb network share must be used in combination with the PiWeb auto importer. Follow the following steps to create the connection between TEMPAR and PiWeb:

- Ensure that the PiWeb PC can be reached from the TEMPAR system via the network. If a firewall exists between the PiWeb PC and the TEMPAR system, it must be ensured that the necessary ports are open (amongst others Port 445).
- Create a folder on the PiWeb PC or select an existing folder, e.g. C:\Temp\ImportRoot.
- Enable access to this folder for all users (alternatively only for those users that have access to the PiWeb PC). After the folder has been enabled, this must be checked under Control Panel/Administrative Tools/Computer Management/Shared Folders/Shares (alternatively via Start/Run/ enter "compmgmt.msc" and press OK).

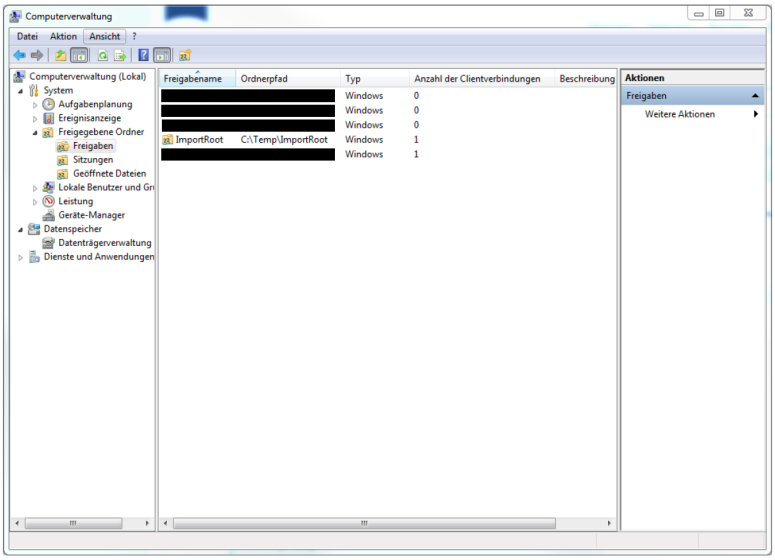


Fig. 33: Windows enable

- Check “Network share active” on the TEMPAR user interface.
- Enter the IP address of the PC on which the enabled folder was created (e.g. 192.168.0.1).
- Enter the name of the folder that was enabled. Do not enter a file path here, rather just the folder name. The folder name entered here must match that in the Computer Management of the PiWeb PC.

  However, you can create subfolders in the enabled folder, the path of which, relating to the enabled folder, is entered here.

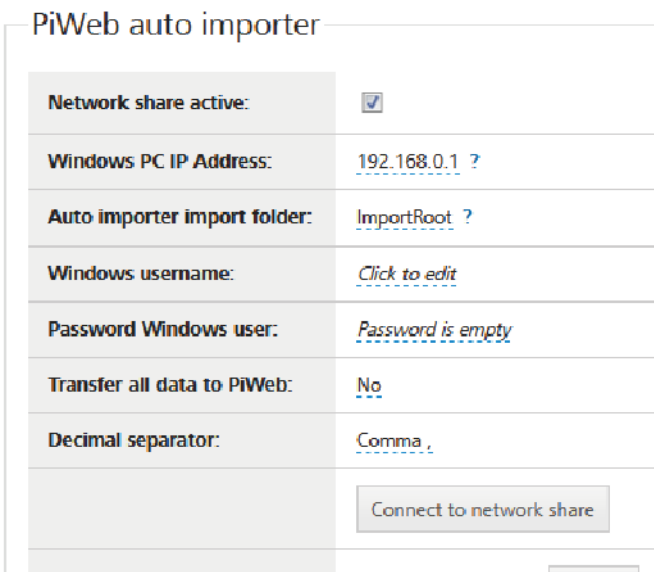


Fig. 34: Auto Importer

- Enter the Windows user who has access to the PiWeb PC / enabled folder.
- Enter the password of the Windows user.
- Set decimal separators appropriately for PiWeb, so that PiWeb Auto Importer can correctly interpret the zcsv files.
- Click on "Connect to network share".
- The enable folder must be configured in the PiWeb auto importer so that files can be imported from there into PiWeb.
- PiWeb Auto Importer: In the folder structure, set "Inspection plan parts as subfolders" so that the TEMPAR data are not created in the root of PiWeb.
- After starting of the import by the PiWeb Auto Importer, the complete part structure of PiWeb is created in the specified folder.

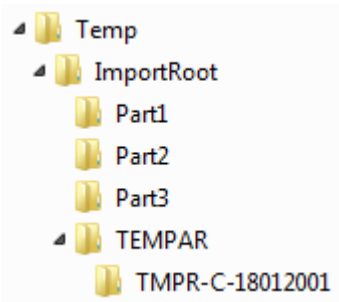


Fig. 35: Folder structure (example)

- Then the “TEMPAR” folder and its subfolder, which is automatically created by TEMPAR, must still be manually created in the PiWeb Planner as components and subcomponents.

- The files with the measured values are created in the enabled folder according to the "Interval measuring data (ms)" (See chapter "3.2 Operation as “Standard” user group") in the enabled folder. Naming takes place according to the following template: “PiWebData_YYYYMMDD-hhmmss_<Seriennummer Konsole/ Messzone>_ABCD.zcsv”.
- The PiWeb Auto Importer reads the measuring data files automatically according to the set test interval from the specified folder. Subsequently, these files are deleted or moved to the folder for import backup.

To export all data from the TEMPAR system, activate “Transfer all data to PiWeb”. Consequently all data are sequentially exported in large zcsv files. Dependent on the number of data sets, this can take several hours.

PiWeb REST interface:

For direct communication with the PiWeb server, it must be ensured that TEMPAR can reach the PiWeb PC/PiWeb server via the network. If a firewall exists between the PiWeb PC and the TEMPAR system, it must be ensured that the port that was configured in PiWeb server is open (e.g. port 8080). To establish the connection, the necessary information must be entered in the "PiWeb REST interface”. Run the connection status test if there are connection problems. If a sub-folder is to be created in PiWeb for the corresponding console / cockpit, this can be set under "Create subcomponent of measuring room”.

The PiWeb REST interface can be used with a PiWeb servers of version >= 6.2.
To do so, follow the following steps:

- Activate PiWeb REST interface on the PiWeb server.
- Select Activate PiWeb REST interface.
- Enter the IP address of the PiWeb server.
- Enter the port of the PiWeb server (default: 8080).
- If TEMPAR is successfully connected to the PiWeb server, then after a short time the PiWeb server version must be displayed in TEMPAR (if necessary, the TEMPAR page must be reloaded, e.g. by switching between tabs).
- After a brief period, data are created in the PiWeb database.

Q-DAS network share:

To export TEMPAR data to a Q-DAS system, proceed as follows:

- Ensure that the Q-DAS PC can be reached from the TEMPAR system via the network. If a firewall exists between the Q-DAS PC and the TEMPAR system, it must be ensured that the necessary ports are open.
- Create a folder on the Q-DAS PC or select an existing folder. After the folder has been enabled, this must be checked under Control Panel/Administrative Tools/Computer Management/Shared Folders/Shares (alternatively via Start/Run/ enter "compmgmt.msc" and press OK).
- Enable access to this folder for all users (alternatively only for those users that have access to the Q-DAS PC).
- Activate connection to network share.
- Enter the Windows user who has access to the Q-DAS PC / enabled folder.
- Enter the password of the Windows user.
- Enter the IP address of the PC on which the enabled folder was created (e.g. 192.168.0.1).
- The files with the measured values are created in the enabled folder according to the "Interval measuring data (ms)" (See chapter "3.2 Operation as “Standard” user group") in the enabled folder. Naming takes place according to the following template: “Q-DAS_<Seriennummer Konsole/Messzone>_YYYYMMDD-hhmmss.DFQ”.

3.2.16 "Configuration > System > Connections" menu

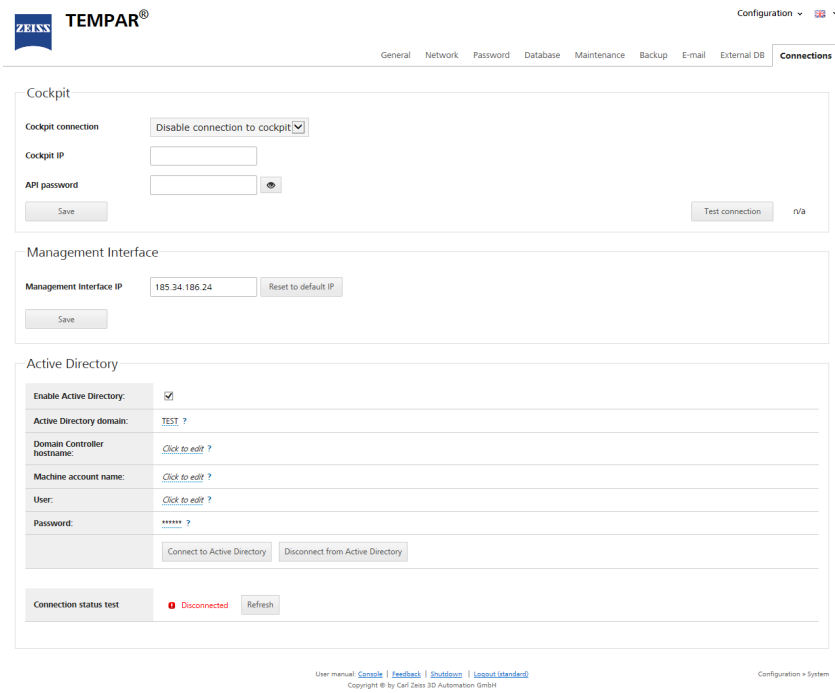


Fig. 36: "Connections" step

A connection to a TEMPAR cockpit can be made under "**Cockpit**".

- Enter the IP address of the TEMPAR cockpit with which the connection is to be made, under "Cockpit IP".
- Enter the API password of the TEMPAR cockpit with which the connection is to be made, under "API password". The API Password can be read off in the TEMPAR cockpit under Configuration > Cockpit > Linked Consoles > Consoles > API.
- Press the "Save" key.
- Press "Test connection" to determine whether connection to the cockpit is possible.

A connection from a client cockpit to a master cockpit is also possible. If TEMPAR systems that are connected to the client cockpit are also connected to the master cockpit, then each of the TEMPAR systems of the client cockpit must be created again on the master cockpit (see TEMPAR cockpit operating instructions).

There is normally no need to make any settings in the "**Management Interface**" area unless you are instructed to do so by a ZEISS employee. Clicking on "Test connection" causes a test to be performed on whether the Management Interface can be reached with the current settings. If this is the case, online updates can also be used.

The logging in of TEMPAR to an active directory server can be configured in the area"**Active Directory**". After entry of the connection data, click on "Connect to Active Directory". If necessary a "Connection status test" can be performed. Please note that to function reliably, "Active Directory" requires an NTP time server (see Operating manual, Network chapter).

3.2.17 "Configuration > Measuring Room > Machines" menu

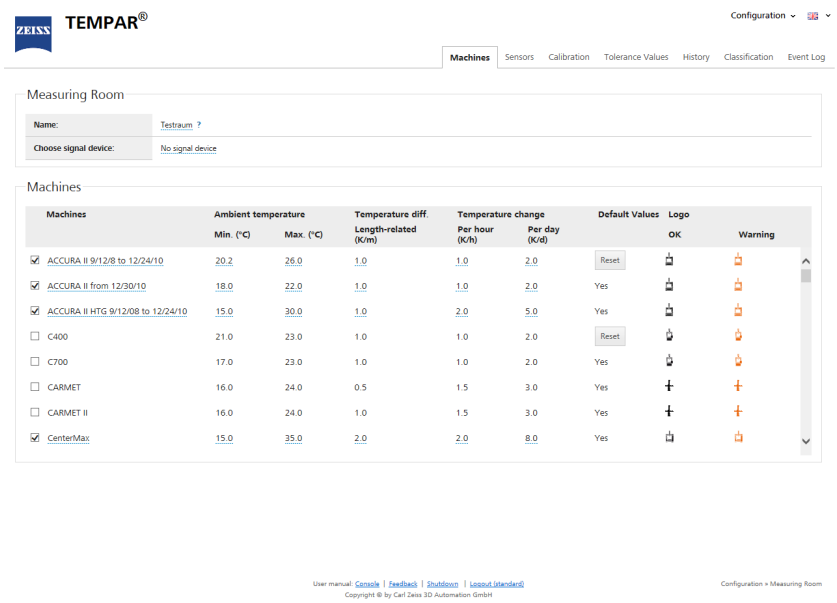


Fig. 37: "Machines" menu

Via the "Configuration" menu on the top right, the sub-menu "Measuring Room" can be accessed and this is subdivided into several tabs. The "Machines" tab contains the following information.

The name of the local measuring room is displayed in the "**Measuring Room**" area. The name "Measuring Room 1" is activated by a click and can be renamed.

If signal devices are connected to the console, they can be selected and activated or deactivated. Signal devices are automatically detected on the sensor bus and listed under "Choose signal device". To activate a signal device, select it and confirm.

In the "**Machines**" area, up to ten test and measuring machines can be selected that are to be monitored from the console. The specification values can be set for each machine. In addition to the Carl ZEISS machines listed, ten freely configurable entries are available (CMM 1 to CMM 10).

Clicking the "Reset" button restores the original values.

Images can be uploaded for each machine in the "Logo” column. These images are displayed as the machine logo in the main tabs. If only one image is uploaded for the machine, it is shown framed in orange in a warning.

3.2.18 "Configuration > Measuring Room > Sensors" menu

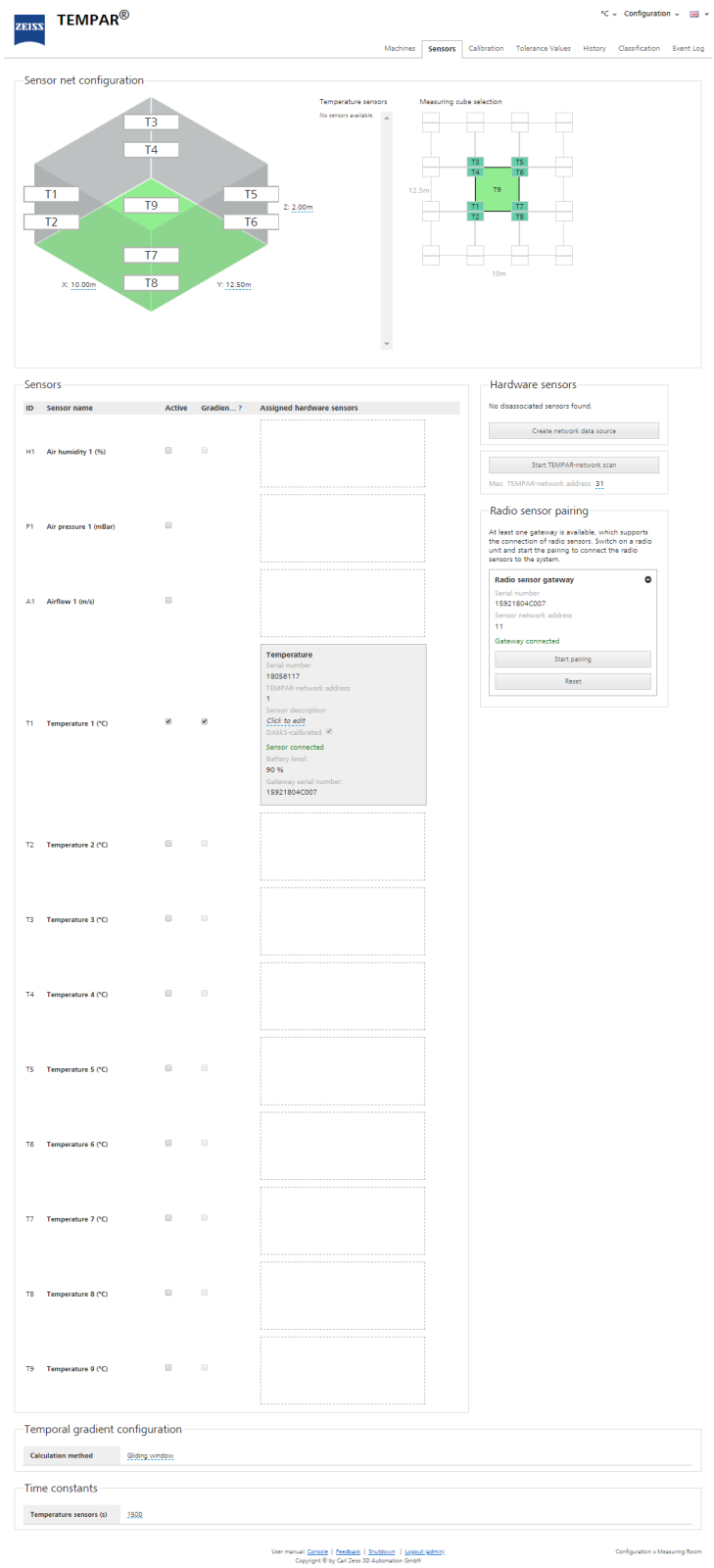


Fig. 38: "Sensors" menu

In the step "**Sensors**", the sensors of a console or measuring zone can be selected, shifted, activated or deactivated.

A measuring zone is the area that is monitored using spatially arranged and grouped sensors.

- Temperature sensors can be selected by clicking in the area "**Sensor net configuration**" and then moved to another position in the room. The change is displayed in parallel to this in the "Measuring cube selection” area. The dimensions of the room can be entered in metres (m) by clicking on "X”, "Y” or "Z”.
- All measuring zones and assigned sensors are displayed in the area "**Measuring cube selection**". The currently selected measuring zone is displayed in green. By selecting another measuring zone, its configuration is displayed in the area "Sensor net configuration” and changes can be made.

  The grey highlighted area in "Measuring cube selection” marks the local measuring room. This measuring cube is monitored from the console. All sensors outside the local cube are recorded, but not however monitored. They are used to define measuring zones in a cockpit. By selecting a cube (which is not a local measuring cube) and then clicking on the button "Define as local cube”, this cube becomes the local measuring cube.
- In the "**Sensors**" area, sensors from the Hardware sensors area can be assigned a sensor name (e.g. T1). The measured values recorded by the sensor are then saved and displayed under this name. Such an assignment should only take place in exceptional cases, e.g. during a recalibration.
- Each sensor is represented as a tile and can be deleted via the top right minus sign.
- Sensors can be selected or deselected in the column "**Gradient calculation**". Deselected sensors are ignored in the calculation of key quantities (e.g. mean temperature, measuring room class, etc.). This option influences machine monitoring, but not measuring room monitoring.
- All sensors connected to the sensor network are listed in the column "**Assigned hardware sensors**". Sensors that are connected using wireless components, must first be coupled to the system as described in chapter 1.7 of the installation instructions. Each sensor is displayed as a tile that contains the following information:
  - Display: Sensor reachable or not reachable.
    Sensors that cannot be reached can be deleted by clicking the top right minus sign.
  - Sensor serial number
  - Sensor network address

  - Identification number of the sensor in the sensor network
  - Sensor description: Editable sensor description (e.g. Sensor top door)
  - DAkkS-calibrated (the information is saved in the sensor and automatically transferred)
  - Serial number of the gateway with which the corresponding sensor unit has been paired (only when using TEMPAR wireless).
- The TEMPAR system is searched for connected components via **“Sensor network scan”**. If connected components are not listed, increase the maximum network address.
- Clicking on **“Automatic sensor assignment”** causes the sensor with the serial number to be assigned to the next free sensor name by increasing number. All connected sensors can be easily assigned in this way.
- The area **“Radio sensor pairing”** can only be seen if the TEMPAR wireless gateway is present. Here, the gateway settings and pairing of the sensor units with the gateway is undertaken. The following is displayed for each connected gateway:
  - Gateway serial number
  - Start of pairing mode
- The type of measured value determination can be selected in the area "**Temporal gradient configuration**".

  Gliding window: The highest and lowest measured value in a time window are used in the calculation.

  Fixed interval measuring points: Only the current measured values and the measured values recorded at the beginning of the interval are used in the calculation.
- A time delay can be set in the area "**Time constants**" after which a temperature change in the sensor is indicated. In this way a time constant can be set in the sensors, that corresponds to a measuring or testing instrument (e.g. coordinate measuring machine 25 minutes = 1500 seconds). If for example a time constant of 1500 seconds is set, a temperature change of 1 K would only cause a change to the measuring result of 1 K after 1500 seconds.

3.2.19 "Configuration > Measuring Room > Calibration" menu

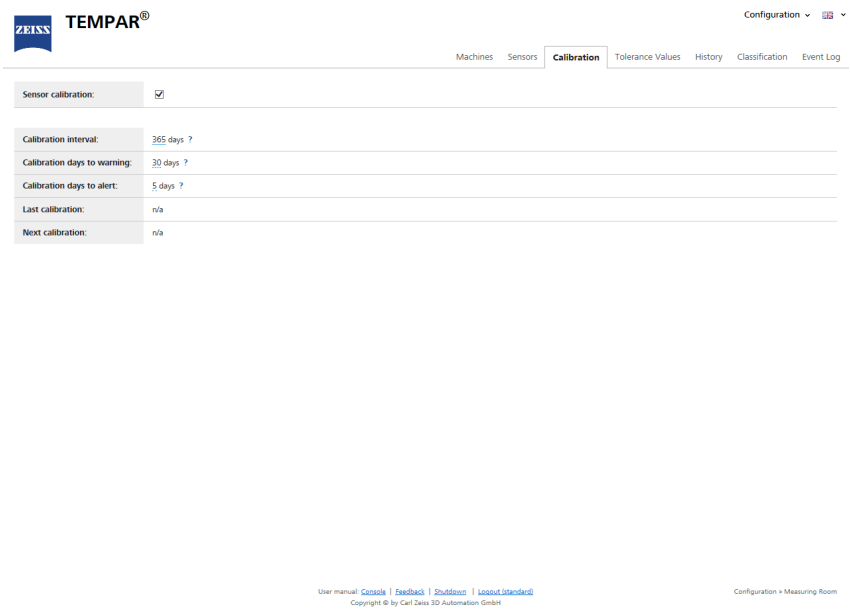


Fig. 39: "Calibration" menu

The calibration data shown here refers to the calibration date saved in the sensors.

The number of days until the next calibration can be entered under "Calibration interval”. The number of days until the next calibration of sensors is shown on the gradient, measuring room, sensor, history and system page.

Also the number of days before the calibration runs out at which point a warning and an alarm are issued can be specified here.

3.2.20 "Configuration > Measuring Room > Tolerance Values" menu

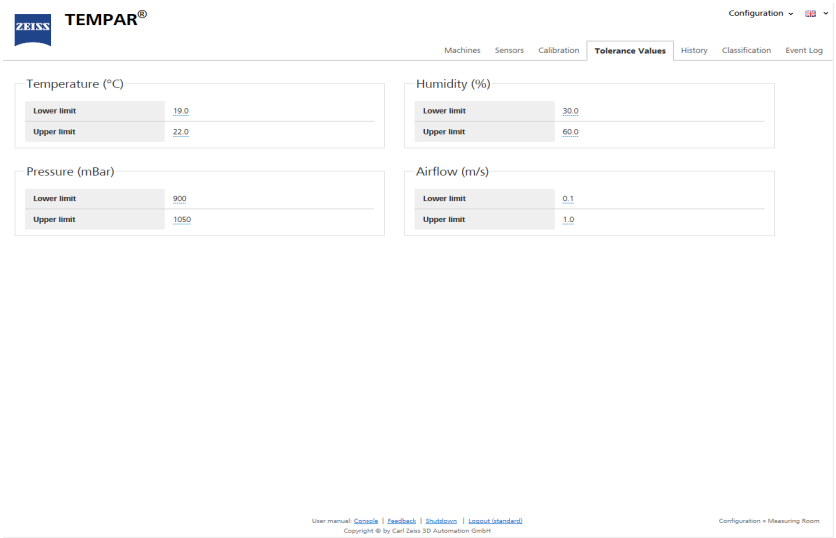


Fig. 40: "Tolerance Values" menu

For the values temperature, air humidity, air pressure and airflow the respective upper and lower limits can be entered here. If these tolerance values are exceeded or undershot, the font colour of the displayed values changes from black to orange and a warning is generated and displayed in the EventLog.

3.2.21 "Configuration > Measuring Room > History" menu

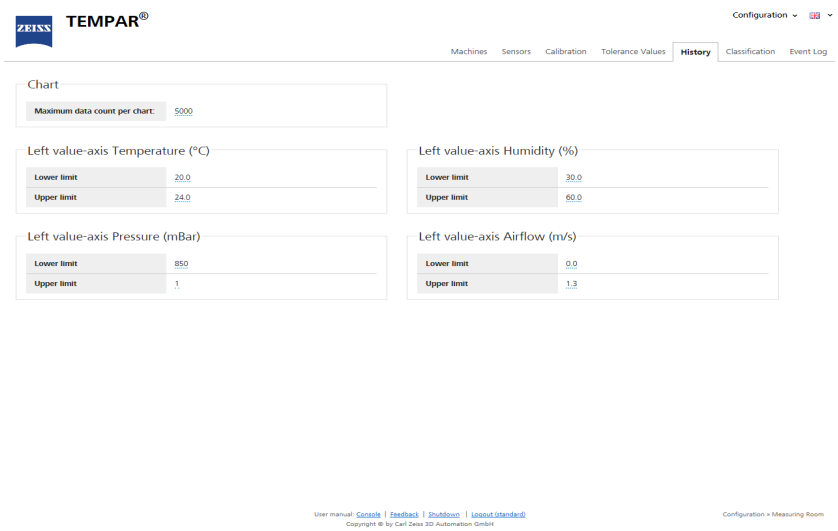
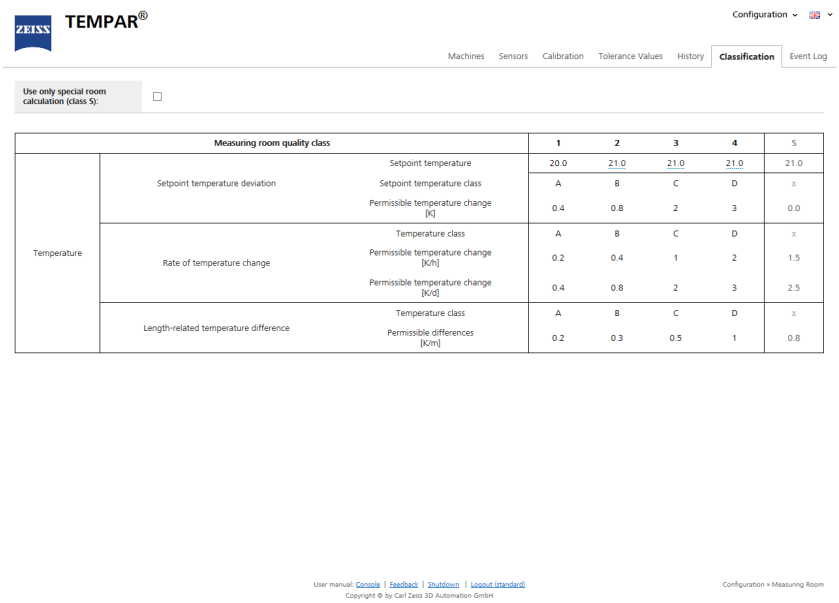


Fig. 41: "History" menu

Here, the Y-axis sections of the charts in the main "History" tab are set for chart, temperature, air humidity, air pressure and air flow. The Y-axis sections or all other charts are fixed or can be defined automatically by the system using "Automatic Scaling".

3.2.22 "Configuration > Measuring Room > Classification" menu



Measuring room quality class			1	2	3	4	S
Temperature	Setpoint temperature deviation	Setpoint temperature	20.0	21.0	21.0	21.0	21.0
		Setpoint temperature class	A	B	C	D	x
		Permissible temperature change [K]	0.4	0.8	2	3	0.0
	Rate of temperature change	Temperature class	A	B	C	D	x
		Permissible temperature change [K/h]	0.2	0.4	1	2	1.5
		Permissible temperature change [K/d]	0.4	0.8	2	3	2.5
	Length-related temperature difference	Temperature class	A	B	C	D	x
		Permissible differences [K/m]	0.2	0.3	0.5	1	0.8

Fig. 42: "Classification" menu

The "Classification" tab specifies the limit values for measuring room monitoring (acc. to VDI/VDE guideline 2627). Here, it is only possible to set the basic temperature for measuring room quality classes 2 to 4. In measuring room quality class 1, the basic temperature is defined in the guideline. All other values are available only for overview.

To use the special measuring room, it is first necessary to activate the checkbox at the top left for "Use only special room calculation (Class S):". This activates the special measuring room area. The values underlined in blue can now be changed. While the special measuring room is active, a check is only performed as to whether the measuring room is within the specification for the special measuring room or not. Measuring room classes 1 to 4 are not considered.

3.2.23 "Configuration > Measuring Room > Event Log" menu

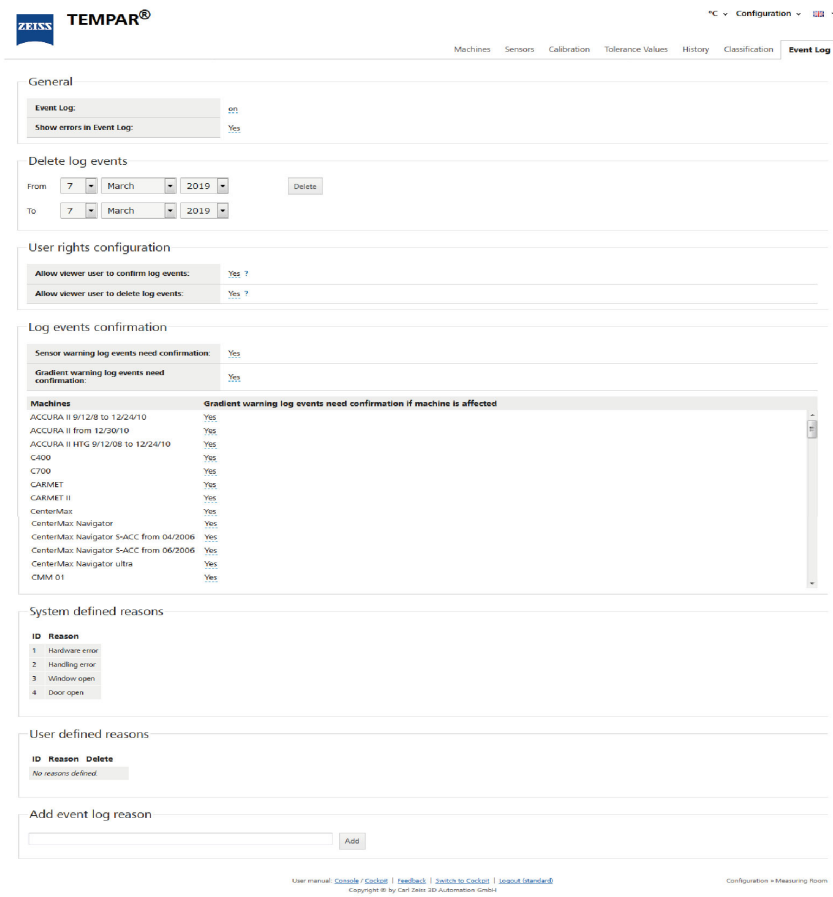


Fig. 43: "Event Log" menu

The "Event Log" tab is divided into six areas:

- General
- Delete log entries
- User rights configuration
- Log events confirmation
- System defined reasons
- User defined reasons
- Add event log reason

General

"Event Log" can be switched on and off here.

Delete log entries

Existing log entries can be deleted in this area. Select the period for this and click the "Delete" button.

User rights configuration

This area is used for setting and managing the user rights of the viewer.

Log events confirmation

This is where it is specified whether sensor and gradient log entries must be displayed and confirmed or not.

Yes	Log entries are displayed and must be confirmed.
No	Log entries are generated but not displayed and need not be confirmed. The generated log entries can be listed under "Configuration/Event Log” with the selection "Display options/Display all”.

If gradient warning "Yes” was selected, the selection for each individual machine can be made in the Machines window.

System defined reasons

Here, you can see set reasons for event logs that are always available.

- Hardware error
- Handling error
- Window open
- Door open

User defined reasons

User defined reasons can be viewed, edited or deleted here.

Add event log reason

Your own reasons can be entered and added here. Afterwards, they can be found under "User-defined reasons".

3.3 Operation as "Viewer" user

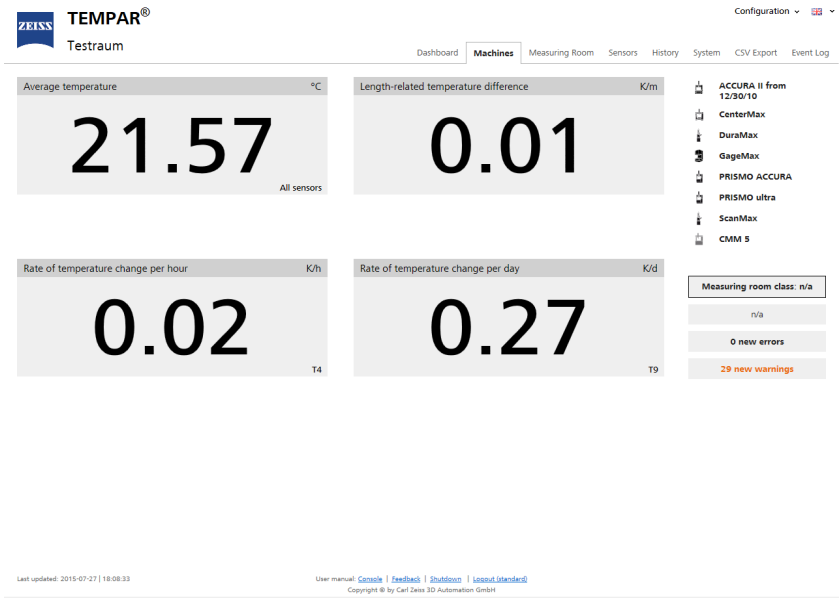


Fig. 44: Standard view as "Viewer" user

For the "Viewer" user or “Viewer” user group, the scope of the console is limited so that settings cannot be configured. Consequently the “Configuration” menu item is not available. The console only shows values and information.

The description of the existing views can be taken from the Operation as "Standard” user section.

3.4 Switching off

To switch the console off, use the "Shutdown" button at the bottom of the console, which causes the console to switch off automatically. This button is only displayed for operation via the touchscreen. For security reasons, the “End” button is not displayed for the “Viewer” user/user group.

Alternatively the console can also be switched off by pressing the “On/Off button” (See chapter "3.1 Switching on").

Note:
The console must be switched off and disconnected from the power source for installation or maintenance work.

4 Maintenance

4.1 Calibration cycle

The temperature sensor calibration cycle must be followed. The recommended service life for the calibrated temperature sensors is one year. After a calibration cycle ends, the temperature sensors should be removed and replaced with newly calibrated ones:

1. Deactivate sensor in Configuration > Measuring Room > Sensors.
2. Unscrew the sensor or the sensor electronics from the sensor network.
3. Place the removed temperature sensors individually in shock-proof packaging and send them back to the manufacturer for calibration.
4. Screw the newly calibrated sensors into the sensor network.
5. Activate sensor in Configuration > Measuring Room > Sensors.

The removed temperature sensors can be sent back to the manufacturer for re-calibration. Calibration takes approximately three to six weeks dependent on the sensor type (plus shipping time). Alternatively the calibration-exchange service can be used (See chapter "5.1 Scopy of supply and expansions"). In this way, you receive a newly calibrated sensor network sent to you before the calibration elapses. All sensors can be replaced and consequently the measuring process can be recommenced within a very shot time period. Then the sensors with the lapsed calibration must be sent back to Carl Zeiss 3D Automation. Contact:

Carl Zeiss 3D Automation GmbH
Phone: +49 7361 6336 0
in mailto: accessories.metrology.de@zeiss.com

4.2 Maintenance

The system does not require any maintenance.

4.3 Spare parts

(See chapter "5.1 Scopy of supply and expansions").

4.4 Disposal and recycling

Disassembly and disposal must only be carried out by specialist personnel from the manufacturer or owner, observing the relevant accident prevention regulations. When disposing of the system or its components, different elements must be disposed of separately in accordance with relevant national and regional waste disposal regulations.

5 Technical data

Condition	Value
Weight single temperature sensor	approx. 25 g
Weight single air humidity sensor	approx. 160 g
Weight single barometric pressure sensor	approx. 115 g
Weight single airflow sensor	approx. 220 g
Weight of sensor unit	approx. 550 g
Mains voltage	100 - 230 V AC
Electrical power	approx. 35 W
Supply voltage for sensor network	12 V DC
Sensor bus power consumption	max. 6 W
Ambient temperature	+5°C to +40°C
Air humidity	30 - 80 % (non-condensing)
Distance between wall and temperature sensor	at least 0.5 m
Room walls and ceiling	The composition of walls and the ceiling must be sufficient for being able to fasten the TEMPAR system. Fastening materials like cable ducts, screws and plugs must be selected by the operator depending on the composition.

TEMPAR wireless

Condition	Value
Measuring interval	Dependent on the settings on the TEMPAR console, at least 30 seconds
Service life	With lighting of at least 300 Lux: > 10 years
Battery type	LiFePO (lithium iron phosphate)
Number of loading cycles	3000
Maximum number of sensor units per gateway	50
Maximum number of sensors per sensor unit	2
Storage temperature	-20°C to +45°C
Operating temperature	0°C to +45°C
Weight	Gateway: 110 g Sensor unit: 550 g
Dimensions	Gateway: 100 x 85 x 34 mm Sensor unit: 218,5 x 120 x 52 mm
Max. range in the open	30 m
Transmission signal	Radio 868.3 MHz (Europe); 915,0 MHz (USA)

5.1 Scopy of supply and expansions

Cloud Cockpit	
626140-9149-891	**TEMPAR access Cloud Cockpit**
Item no.	**Designation**
626140-9149-891	TEMPAR access Cloud Cockpit 1 month
626140-9149-892	TEMPAR access Cloud Cockpit 3 months
626140-9149-893	TEMPAR access Cloud Cockpit 6 months
626140-9149-894	TEMPAR access Cloud Cockpit 12 months
626140-9149-895	TEMPAR access Cloud Cockpit 24 months

Components	
Item no.	**Designation**
626140-9140-205	TEMPAR Logic Box
626140-9140-213	TEMPAR console
626140-9140-214	TEMPAR console cockpit
626140-9140-062	Signal device set for TEMPAR console v3
626140-9141-042	TEMPAR single temperature sensor, DAkkS calibrated
626140-9141-043	TEMPAR single temperature sensor, factory calibrated
626140-9141-052	TEMPAR precision single temperature sensor, DAkkS calibrated
626140-9142-012	TEMPAR single air humidity sensor, DAkkS calibrated
626140-9142-013	TEMPAR single air humidity sensor, factory calibrated
626140-9142-022	TEMPAR single airflow sensor, DAkkS calibrated
626140-9142-023	TEMPAR single airflow sensor, factory calibrated
626140-9143-012	TEMPAR single barometric pressure sensor, DAkkS calibrated
626140-9143-013	TEMPAR single barometric pressure sensor, factory calibrated
626140-9140-067	TEMPAR wall bracket for console
626140-9140-078	TEMPAR mobile stand extension 0.5 m
626140-9140-075	Mobile stands

Components	
Item no.	**Designation**
626140-9140-107	TEMPAR sensor bus M12 for 2 sensors
626140-9140-098	Adapter cable Modbus - USB

Accessories for cable-connected systems	
Item no.	**Designation**
626140-9140-137	TEMPAR ceiling bracket for 1 sensor
626140-9140-138	TEMPAR ceiling bracket for 2 sensors
626140-9140-152	TEMPAR wall bracket for sensors
626140-9140-135	TEMPAR universal holder for temperature sensors
626140-9140-136	TEMPAR universal holder for sensors
626140-9140-145	TEMPAR clamp for 1 temperature sensor
626140-9140-146	TEMPAR clamp for 1 sensor (not temperature)
626140-9140-905	TEMPAR flight case for standard packages
626140-9140-906	TEMPAR flight case for 2 mobile stands
626140-9147-103	Network cable - 3.0m
626140-9147-105	Network cable - 5.0m
626140-9147-110	Network cable - 10m
626140-9149-003	Sensor bus cable M12 - 0.3m
626140-9149-004	Sensor bus cable M12 - 0.3m, plenum rated (CMP)
626140-9149-012	Sensor bus cable M12 - 1.0 m, PVC
626140-9149-011	Sensor bus cable M12 - 1.0m, plenum rated (CMP)
626140-9149-030	Sensor bus cable M12 - 3.0m
626140-9149-031	Sensor bus cable M12 - 3.0m, plenum rated (CMP)
626140-9149-050	Sensor bus cable M12 - 5.0m
626140-9149-051	Sensor bus cable M12 - 5.0m, plenum rated (CMP)
626140-9149-100	Sensor bus cable M12 - 10m
626140-9149-101	Sensor bus cable M12 - 10m, plenum rated (CMP)

TEMPAR wireless components	
Item no.	**Designation**
626140-9149-300	TEMPAR wireless gateway, EU
626140-9149-301	TEMPAR wireless gateway, USA
626140-9149-330	TEMPAR wireless sensor unit, EU
626140-9149-331	TEMPAR wireless sensor unit, USA
626140-9149-340	Micro-USB charger
626140-9140-160	Wall bracket 150 mm
626140-9140-161	Wall bracket 500 mm
626140-9140-162	Ceiling bracket for solid ceiling
626140-9140-163	Ceiling bracket, add-on for panelled ceiling
626140-9140-164	Clamping bracket for sensor unit

Services	
Item no.	**Designation**
626140-8141-042	Recalibration temperature sensor, DAkkS
626140-8141-043	Recalibration temperature sensor, factory
626140-8141-052	Recalibration precision temperature sensor, DAkkS
626140-8142-002	Recalibration humidity sensor, DAkkS - old
626140-8142-003	Recalibration humidity sensor, factory - alt
626140-8143-002	Recalibration air pressure sensor, DAkkS - old
626140-8143-003	Recalibration air pressure sensor, factory - alt
626140-8142-012	Recalibration humidity sensor, DAkkS
626140-8142-013	Recalibration humidity sensor, factory
626140-8143-012	Recalibration air pressure sensor, DAkkS
626140-8143-013	Recalibration air pressure sensor, factory
626140-8142-022	Recalibration air flow, DAkkS
626140-8142-023	Recalibration air flow, factory

Services	
Item no.	**Designation**
626140-8141-155	Calibration exchange service temperature sensor, DAkkS
626140-8141-156	Calibration exchange service temperature sensor, factory
626140-8141-157	Calibration exchange service precision temperature sensor, DAkkS
626140-8142-101	Calibration exchange service humidity sensor, DAkkS
626140-8142-102	Calibration exchange service humidity sensor, factory
626140-8143-101	Calibration exchange service air pressure sensor, DAkkS - old
626140-8143-102	Calibration exchange service air pressure sensor, factory - alt
626140-8142-103	Calibration exchange service humidity sensor, DAkkS
626140-8142-104	Calibration exchange service humidity sensor, factory
626140-8143-103	Calibration exchange service air pressure sensor, DAkkS
626140-8143-104	Calibration exchange service air pressure sensor, factory
626140-8142-115	Calibration exchange service airflow sensor, DAkkS
626140-8142-116	Calibration exchange service airflow sensor, factory

Spare parts	
Item no.	**Designation**
626140-9140-086	TEMPAR connection set for console
626140-9149-910	TEMPAR cockpit documentation
626140-9149-911	TEMPAR documentation
626140-9149-912	TEMPAR logic documentation
626140-9140-093	TEMPAR sensor bus terminal resistor