



## **ZEISS TEMPOR**

Consistent measuring lab certification



# All-round monitoring of the measuring environment.

ZEISS TEMPAR



## Measuring environment.

Comprehensive monitoring so that you enjoy peace of mind.

Exact measurements require a precise measuring system, but coordinate measuring machines (CMMs) only achieve maximum precision if the temperature, temperature gradients and humidity are within the set limit values. With TEMPAR® from ZEISS, monitoring the measuring environment is a breeze because ZEISS TEMPAR automatically captures and records values necessary for precision. If these values are not met, ZEISS TEMPAR provides a warning on the console using a color-coded error message and/or a signal lamp. This way you can be absolutely certain that your measuring results are reliable.

ZEISS TEMPAR uses up to nine sensors to monitor the temperature in the measuring lab and the area immediately around the CMM. You also have the option of recording humidity, barometric pressure and air flow.

ZEISS TEMPAR displays the current measuring values on the system's user-friendly console. Color-coded values inform you if the prescribed limit values have been exceeded. In addition, ZEISS TEMPAR offers you the option of using a signal lamp to alert you to warnings or errors. Of course you can also access ZEISS TEMPAR on a mobile device, making it possible to check the lab conditions when you are away from the workstation. The customizable display ensures that you always have a good overview of the values that you want to or need to monitor.

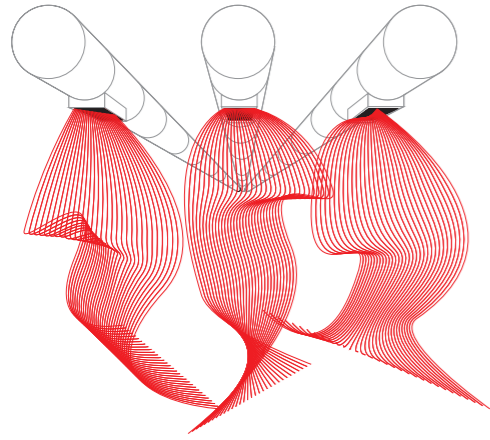
CMM manufacturers place demanding requirements on the measuring environment. They prescribe certain limit values for the ambient conditions, because the inspection and measuring tools as well as the test pieces change their properties as the temperature and air humidity fluctuate. Within these limits, coordinate measuring machines compensate for these environmental effects. Climatized measuring labs ensure a constant temperature and humidity level. The quality of the measuring lab class determines how much effort is required to maintain stable conditions.

The console gives you a complete overview of the ambient conditions from outside of the measuring lab.



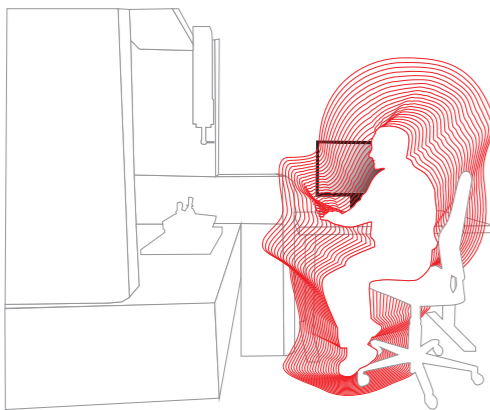
## A changing atmosphere in the measuring room.

What causes errors? And how can I prevent them?



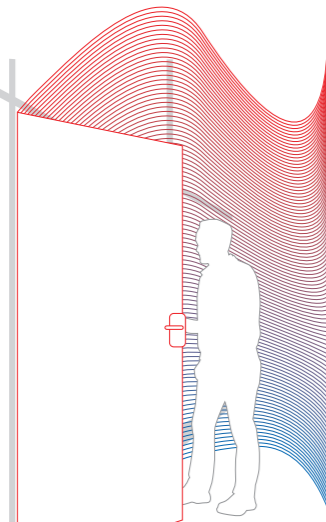
### Air-conditioning unit / heating

A sophisticated climate-control system is required to guarantee a stable temperature of 20°C plus/minus 0.2 Kelvin throughout the precision measuring lab. Yet in spite of all calculations, the limit values may still be exceeded because of the systems' inertia. Since just turning on an additional bulb can lead to temperature fluctuations, unwanted sources of heat such as controller cabinets or illumination systems must be turned off. Moreover, planning errors can compromise the measuring result, e.g. attaching the outlet of the air conditioner unit immediately next to the measuring system.



### People

To error is human, and this phenomenon can never be prevented entirely. Even if a code is required to access the measuring lab, it does not prevent authorized personnel from frequently entering or leaving the measuring lab, thereby introducing untempered fresh air into the measuring area. The same holds true when unauthorized colleagues come by, because these additional sources of warmth – a person emits 120 W of heat – cause the temperature to be unstable. Even if someone just touches the granite table for the measuring machine, the table conserves this warmth and releases it into the measuring lab even after the visitor has long since gone.



### Windows / doors

Windows and doors are an ongoing risk for the temperature in the measuring lab. Of course metrology engineers do not just open up the windows to let in some fresh air, but sunlight entering the room often increases the temperature in the measuring lab imperceptibly. Since the amount of sunlight is hardly consistent over the course of the year – or even over the course of the day – the climate control system cannot be programmed to automatically compensate for all these changes in sunlight.

## Data for detecting defects.

Tracking down errors

### Spatial temperature profiles

ZEISS TEMPAR can do a lot more than a data logger because it shows more than just an individual temperature: ZEISS TEMPAR provides you with a spatial temperature profile. This way you can track down sources of error quickly and easily. With this profile, you will know immediately if, for example, the outlet of the air conditioning unit or an open window is responsible for exceeded temperature limit values. And since ZEISS TEMPAR identifies humidity, barometric pressure and air flow with great precision, you can also determine and eliminate additional causes of measuring uncertainty.

In spite of the numerous data captured, you will not get lost in the details with ZEISS TEMPAR because we do not determine how many values should be displayed on the dashboard – you do. You decide if you want to see current values or history data. Moreover, you can check at a glance if a particular machine meets the manufacturer's specifications, while integrating various widgets enables you to customize the settings.

### Error detection analyses

Would you like to not only see the data in real time, but also be able to perform retrospective analyses? No problem. We offer different data exports you can use to safely store the data and document the calculated values. This helps you analyze and fix causes of error, e.g. in the event of recurring fluctuations. The evaluations can also be output directly on the console or via the PC.

Moreover, you can link ZEISS TEMPAR with ZEISS PiWeb software. This way you can match your temperature values with the measurement results and verify that you performed your measurement correctly – giving you and your customers peace of mind.



# How does ZEISS TEMPAR work?

## Nine sensors in the measuring lab

A standard sensor network for monitoring measuring labs in accordance with VDI/VDE 2627 consists of nine temperature sensors. Two sensors are mounted at different heights in the corners and one for the center of the measuring lab.

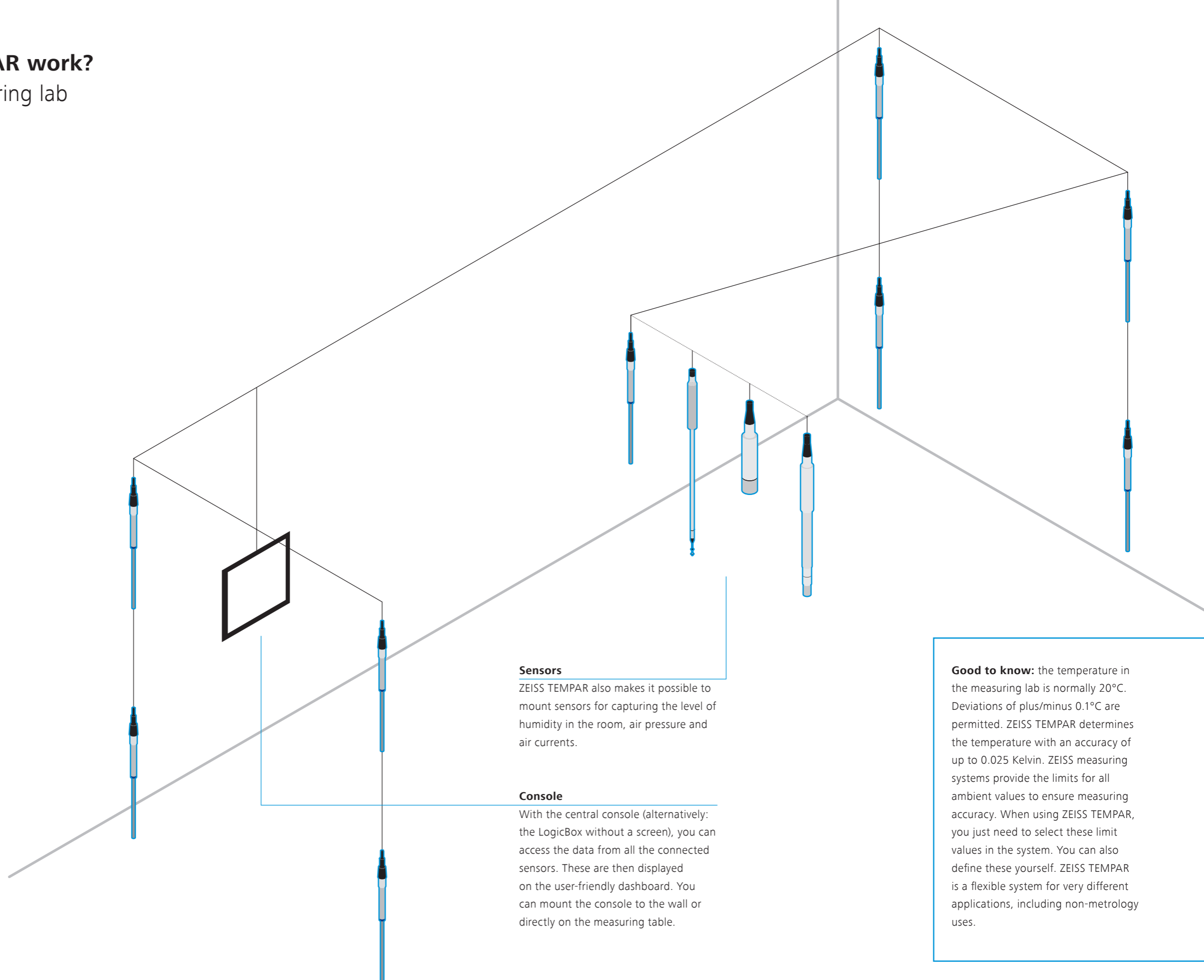
### Temperature sensor

A temperature sensor calibrated by the Deutsche Akkreditierungsstelle GmbH (abbr. DAkkS = German Accreditation Body) comes standard. This sensor measures with a precision of 0.05 Kelvin. The other sensors are factory-calibrated and measure with a precision of 0.1 Kelvin. The temperature sensors in the precision package measure with an accuracy of up to 0.025 Kelvin and are calibrated by the DAkkS.

When monitoring ambient temperatures, the focus is on the coordinate measuring machine (CMM), which is why the positions of the nine sensors ensure that the entire area around the CMM is covered. It is important that the installed sensors are affixed in a cuboid formation since this is the only way to reliably calculate the spatial gradients.

### Mounting the sensors

The sensors are easy to install using ceiling or wall mounts. Mobile stands are also available for flexible use. These can be quickly set up and taken down without any difficulty.



### Sensors

ZEISS TEMPAR also makes it possible to mount sensors for capturing the level of humidity in the room, air pressure and air currents.

### Console

With the central console (alternatively: the LogicBox without a screen), you can access the data from all the connected sensors. These are then displayed on the user-friendly dashboard. You can mount the console to the wall or directly on the measuring table.

**Good to know:** the temperature in the measuring lab is normally 20°C. Deviations of plus/minus 0.1°C are permitted. ZEISS TEMPAR determines the temperature with an accuracy of up to 0.025 Kelvin. ZEISS measuring systems provide the limits for all ambient values to ensure measuring accuracy. When using ZEISS TEMPAR, you just need to select these limit values in the system. You can also define these yourself. ZEISS TEMPAR is a flexible system for very different applications, including non-metrology uses.

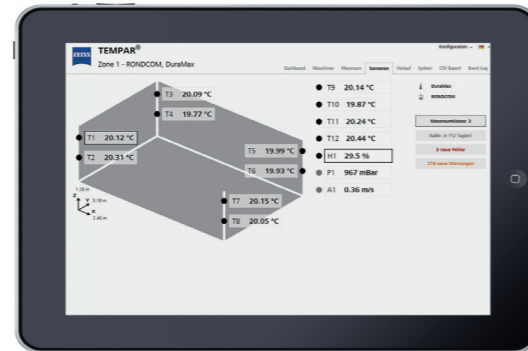
## Many features, one goal.

ZEISS TEMPAR adjusts to your circumstances



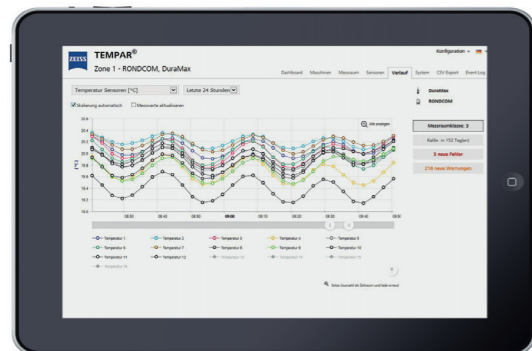
### MEASURING LAB

With the ZEISS TEMPAR console, you not only have a clear overview of the values, but the measuring room class is also displayed in accordance with VDE/VDI 2627. Green figures indicate that a value meets the requirements for a higher class of measuring lab.



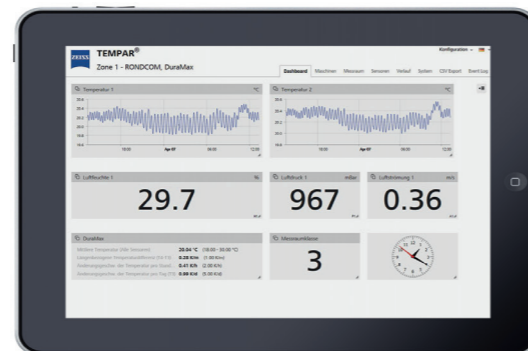
### SENSORS

A schematic drawing shows the spatial arrangement of the sensors along with the current values for each sensor. Color-coded warnings mean that you know immediately if a CMM limit value has exceeded tolerance.



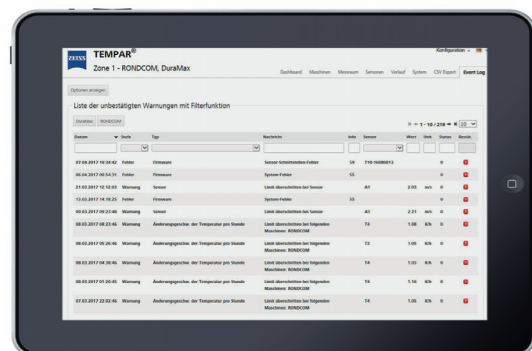
### HISTORY

You can create an easy-to-use historical graph to assess how values and gradients have developed within a select time period. You can also hide those values you do not need. Thanks to the download function, you can further process the data in other systems.



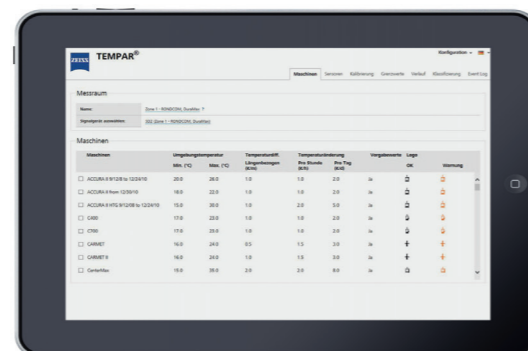
### DASHBOARD

You can arrange the dashboard to meet your particular requirements, ensuring that you see the most important, relevant values quickly and easily – either as an absolute value or a historical graph.



### EVENTS

A table records all results, such as exceeded limit values or malfunctions. The individual entries can specify the reasons for a previous disruption, i.e. a tour through the measuring lab that caused temperature fluctuations.



### MACHINES

With ZEISS TEMPAR, ZEISS measuring machines are available for pre-selection, providing you with the relevant system specifications automatically. This way you can optimally monitor the ambient conditions in your measuring lab.

## Cockpit.

Everything in view

To ensure that you are not comparing apples and oranges, the measuring strategy should be the same at all your measuring labs, and ideally the on-site measuring conditions should be identical. With ZEISS TEMPAR Cockpit, you can compare different measured variables. This way you can identify temperature influences more quickly – and across all sites. Put another way: with the Cockpit function, you optimize your measuring processes throughout the company.

The system offers you many different features to choose from. If you want, you can monitor multiple measuring labs simultaneously using ZEISS TEMPAR Cockpit, no matter if these locations are separated by just a few meters or thousands of kilometers. You can access the data from all measuring labs using the particular ZEISS TEMPAR consoles and customize the data display on the dashboard to meet your requirements. All the information relevant to a particular site or multiple sites is bundled together.

This way you know if the measuring results from the individual measuring labs are comparable. You also see immediately if there are problems anywhere, e.g. if a measurement was not performed in line with the specifications. ZEISS TEMPAR Cockpit provides you with the relevant information directly at your workstation, including a function which informs you if value limits have been exceeded. And of course you can access the data using a mobile device, making it convenient to check from home if all the values in your measuring labs are correct.



# Tailor-made monitoring solutions.

## Four packages – for all your requirements

With the ZEISS TEMPAR packages, the choice is yours: you not only select the sensors' level of measuring precision, but you also decide how these will be mounted. That is why, upon request, we provide you with wall and ceiling mounts or mobile stands which you can position wherever you require the measuring system. You decide where to mount the console at your site so that it best meets your requirements.



	<b>ZEISS TEMPAR starter</b> The entry-level solution	<b>ZEISS TEMPAR basic</b> The standard package	<b>ZEISS TEMPAR mobile</b> The mobile solution	<b>ZEISS TEMPAR precision</b> The precision solution
<b>Setup schematic</b>				
<b>System</b>	Logic Box	Console	Console	Console
<b>Console</b>	No wall mount	Wall mount	Table stand	Wall mount
<b>Temperature sensors</b>	4x factory calibrated 0.1 K	1x DAkkS 0.05 K 8x factory calibrated 0.1 K	1x DAkkS 0.05 K 7x factory calibrated 0.1 K	9x DAkkS 0.025 K
<b>Humidity sensor</b>	Not included	Included	Included	Included
<b>Cables</b>	1x 10 m 2x 5 m	2x 10 m 3x 5 m 2x 3 m 1x 0.3 m	2x 10 m 3x 5 m 2x 3 m 1x 1 m	2x 10 m 3x 5 m 2x 3 m 1x 0.3 m
<b>Mounting</b>	Ceiling mount	Ceiling mount	4 mobile stands	Ceiling mount

With the ZEISS TEMPAR packages, we make the decision-making process easier. Just select the package that best meets your requirements, ensuring that you have the right solution for monitoring your measuring lab.

Of course, we do not know the dimensions of your measuring lab, so think about your particular setup to ensure that the cables are long enough before ordering.

**■ ZEISS TEMPAR starter:**

Just the essentials! Use the entry-level solution if you want to get a feel for the ambient conditions. Does not conform with VDI/VDE 2627!

**■ ZEISS TEMPAR basic:**

The standard package for the measuring lab! With the nine temperature sensors and a humidity sensor, this package provides the basics for measuring reliability. The measuring lab class is also displayed.

**■ ZEISS TEMPAR mobile:**

When you need to be flexible! Use this solution for flexible applications. Attaching the sensors to mobile stands gives you the freedom to position them as needed. The package includes eight temperature sensors and one humidity sensor. The measuring lab class is also displayed.

**■ ZEISS TEMPAR precision:**

For high-precision measuring machines! Temperature fluctuations can cause materials to expand or contract. The more precise a coordinate measuring machine needs to be, the more significant these temperature influences become. With the ZEISS TEMPAR package, you perform measurements with a precision of 0.025 Kelvin and can ensure that you meet the limit values for high-precision measuring machines such as the ZEISS PRISMO ultra or the ZEISS XENOS.



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