TROTEC®

MultiMeasure Professional measuring instruments for industry, trade and the building trade

MultiMeasure PROFESSIONAL

BENEFITS IN PRACTICE:

- Highly accurate – quick reaction time
- Extensive measuring range from -50 °C to +1,600 °C (depending on the model)
- Measuring spot diameter information thanks to dual-laser technology
- Degree of emission freely adjustable from 0.1 to 1.0
- Alarm function as well as a variety of additional functions
- Backlit display
- Maximum value indicator for quick and exact determination of the hottest spot in the target area (TP9)
- Data-logging function for the determination and storage of as many as 100 measuring spots (TP9)
- Combined infrared and contact sensor temperature measurements (TP9)
- Battery-saving power supply via the USB port of your PC – ideal for long-term measurements (TP9)
- Software-supported series of measurement optional possible (TP9)

Laser pyrometer

For contact-free surface temperature measurement

Pyrometer TP6

The universal infrared thermometer for a variety of applications

Impressive technical data, for example a temperature range from -50 °C to +1,000 °C, a high optical resolution of 30:1 or the innovative dual laser – this all combined with a truly remarkable price/performance ratio make the TP6 universal professional pyrometer the ideal measuring device for a multitude of applications.

The emission degree can be set according to the specific type of material; the TP6 can present all values on a brilliant, backlit display for fatigue-free reading which is also possible in poor lighting conditions.

The TP6 has much more to offer: professional details like the alarm function with freely definable threshold values for example, a non-stop measuring mode, a hold function which freezes the last reading and a maximum value function to determine and display the maximum measuring value.

The TP6's innovative dual-laser technology, which is able to visualize the measuring spot size automatically, offers the user yet more comfort. The distance between the laser beams equals the diameter of the measuring spot size.

MultiMeasure PROFESSIONAL TP6

The TP6's high temperature range and the contact-free measuring principle make it ideal for temperature measuring in inaccessible, dangerous or hot places and the measuring of moving objects. The improved optical characteristics mean that even smaller targets can now be measured from even greater distances.

Despite a plethora of professional features, the compact TP6 is undoubtedly designed to suit the user's needs and it is immediately ready to use.

Simply point the TP6 at the object, pull the trigger, and read the surface temperature from the backlit display.

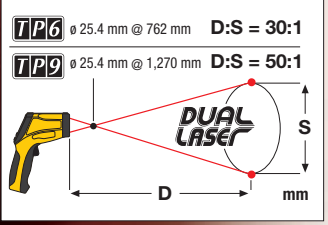
Features and functions in a quick comparison	*TP6*	*TP9*
Separately activatable dual laser	●	●
Optional temperature display °C or °F	●	●
Display resolution 0.1 °C	●	●
Non-stop measuring function	●	●
Minimum value display	–	●
Maximum value display	●	●
Differential value display	–	●
Average value display	–	●
Hold displayed value	●	●
Alarm function with user-defined threshold values	●	●
Emissivity - Variable, 0.1 to 1.00	●	●
Backlit LCD display	●	●
Automatic switch off	●	●
Maximum value indicator	–	●
Open target eyepiece	–	●
Saveable measuring values	–	100
Additional temperature measurements with type K sensor	–	●
Can be used for software-supported measurement series	–	●
USB port	–	●
Tripod thread 1/4-20 UNC	–	●

A note regarding the optical resolution specification:

The optical resolution (D:S) means the ratio of the measuring distance to the diameter of the measuring spot (distance-to-spot ratio).

The greater the distance to the measured object, the larger the measuring spot detected by the device.

Contrary to appliances with only one laser spot which simply specify the middle of the measuring spot, the TP6 and TP9 are both equipped with a dual-laser which automatically visualises the size of the measuring spot. The distance between the laser beams corresponds to the size of the measuring spot.



The TP9 pyrometer

The versatile precision infrared thermometer for professional applications

MultiMeasure PROFESSIONAL TP9

The TP9 professional pyrometer combines precision measurement technology, flexible application possibilities and a variety of superior measuring functions with easy handling, unbeatable value for money and premium quality, thus putting it a cut above the rest.

Whether it is used for diagnostics or maintenance work on heating, climate or ventilation installations or extensive servicing tasks in the fields of industry and crafts – an extensive measuring range from -50 °C to +1600 °C, an optical resolution of 50:1, a freely-adjustable degree of emission and an abundance of technical features mean that the TP9 precision infrared thermometer is ideally-suited to deal with a whole catalogue of complex and demanding measurement tasks in the field of maintenance, inspection, analysis and documentation.

The integrated data-logging function for the determination and storage of as many as 100 measuring spots enables inspection paths to be retraced with the utmost of ease. Each time a measurement is carried out, the TP9 determines the maximum, minimum, difference and average value in addition to the current value displayed on the monitor.

The measurement values are easy to read on the backlit display; this makes the TP9 highly suited to operations in conditions with poor or insufficient lighting.

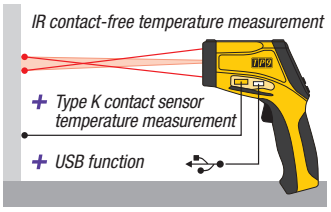
Furthermore the infrared thermometer is equipped with an alarm function that can be set to respond to individually configured upper and lower alarm thresholds. The acoustic alarm signal and the visual alarm are both activated when the measured value exceeds the set thresholds. The two dual laser spots which automatically visualise the size of the measuring spot and the TP9's improved optical characteristics mean that surface temperature measurements can be carried out on extremely small components and faraway objects with the utmost precision.

The TP9 can also be easily mounted on a tripod for long-term measuring.

Technical data	TP6 pyrometer	TP9 pyrometer
Article no.	3.510.003.010	3.510.003.040
Optical resolution (D:S)	30:1	50:1
Temperature range	-50 °C to +1,000 °C	-50 °C to +1,600 °C
Resolution	0.1 °C	≤ 1,000 °C: 0.1 °C; > 1,000 °C: 1 °C
Target display	Laser cass 2 (II), 630 ~ 670 nm, < 1 mW	Laser cass 2 (II), 630 ~ 670 nm, < 1 mW
Accuracy (surrounding temperature from 23 to 25 °C)	± 2.5 °C at -50 °C to 20 °C; ±1 % of measured value at 21 °C to 300 °C; ±1.5 % of measured value at 301 °C to 1,000 °C	± 2.5 °C at -50 °C to 20 °C; ± 1 % ± 1 °C at 21 °C to 400 °C; ± 1.5 % ± 2 °C at 401 °C to 800 °C; ± 2.5 % at 800 °C to 1,600 °C
Reproducibility	± 1.3 °C at -50 °C to 20 °C; ± 0.8 % or ± 0.5 °C at 21 °C to 1,000 °C	± 1.3 °C at -50 °C to 20 °C; ± 0.8 % ± 0.5 °C at 21 °C to 1,200 °C; ± 1.2 % ± 1.0 °C at 1,201 °C to 1,600 °C
Smallest measurement spot ø	25.4 mm @ 762 mm	25.4 mm @ 1,270 mm
Reaction time	< 150 ms	150 ms
Degree of emission	Adjustable from 0.10 to 1.0	Adjustable from 0.10 to 1.0
Spectral sensitivity	8 ~14 µm	8 ~14 µm
Operating conditions	0 °C to 50 °C, 10 % to 90 % r.h.	0 °C to 50 °C, 10 % to 90 % r.h.
Storage conditions	-10 °C to 60 °C, < 80 % r.h.	-10 °C to 60 °C, < 80 % r.h.
Power supply	9 V block battery	9 V block battery
Dimensions	104 x 43 x 146 mm	220 x 120 x 56 mm
Weight	163 g	290 g
Scope of supply	TP6 pyrometer, storage bag, 9 V battery, user manual	TP9 pyrometer, hard case, contact sensor type K, USB connection cable, 9 V battery, user manual

Combined infrared and contact temperature measurement

The TP9's miniature contact pin widens the application possibilities for additional contact temperature measurements using the type K sensor, as included in the scope of delivery, or any other third-party temperature sensor that is identical in construction.



The TP9 can also be connected directly to the USB port of a computer via the cable included in the scope of delivery in order to save battery power. The USB function also offers the possibility to carry out software-supported measurement series in the scope of long-term measurements of temperature developments during mechanical or climatic processes.

Technical data	Contact sensor type K
Temperature range	-50 °C to +300 °C
Resolution	0.1 °C
Accuracy	± 1.5 % ± 3°C
Reproducibility	± 1.5 %
Operating conditions	0 °C to 50 °C, 10 % to 90 % r.h.
Storage conditions	-10 °C to 60 °C, < 80 % r.h.

You require a pyrometer with a plant inspection certificate or calibration certificate for specific measuring spots?

Then feel free to take advantage of the Trotec calibration service!

Are you interested?
To find out more contact us on +49 2452 962-400.

BENEFITS IN PRACTICE:

- Fully radiometric IR cameras "Made in the EU"
- Real-time measurements guarantee high-quality thermal images
- High thermal sensitivity
- Maintenance-free operation using microbolometer technology
- Large, swivel-mounted colour LCD monitor
- Image recording with an image repetition frequency up to 50/60 Hz
- DuoVision function for Picture-in-Picture presentation
- Integrated laser pointer
- In-built digital camera for real-time images
- Built-in photo lamp
- Memory for infrared and real images
- Automatic temperature tracking (Hot/Cold Spot)
- Various measuring functions
- Ergonomic and featherlight
- Robust construction (IP 54)
- Docking station with USB 2.0 port*
- Bluetooth headset for audio recordings (EC 060 V+)

** only for real-time applications*

IR cameras in the EC-Series

First-Class Thermography – Economy-Class Price!

Ground-breaking technology, ground-breaking price

The cutting-edge EC-cameras in the MultiMeasure Professional Series set new standards as far as value for money is concerned.

The maintenance-free, uncooled image sensor has a detector resolution of 160 x 120 measuring spots and a thermal sensitivity of 0.1 ºC which enable you to create fully-radiometric thermal images within a temperature range of between -20 °C and +250 °C.

REAL TIME A high image repetition frequency guarantees continuous real-time thermal imaging.

And the mini-USB included in the scope of delivery can quite comfortably save thousands of thermal images.

A variety of integrated measuring functions and the automatic measured value correction function ensure optimum results every single time thus making the thermal imaging cameras in the EC-Series extremely reliable infrared measuring tools.

The interplay between the EC camera and the software included in the scope of delivery allow you to compile comprehensive and conclusive evaluations and reports.

Professional thermography made easy…

The featherweight cameras weigh in at a mere 500 g and fit snugly in the palm of your hand. Yet despite their compact size and low weight they are extremely tough: IP54-protected, 25G shock and 2.5G vibration tested and built to withstand the harshest of conditions.

The practical single-handed control, the ergonomically-arranged keys and the clearly-structured menu not only make the camera extremely user-friendly but also very effective and efficient.

The large 2.5-inch LCD colour display can also be pivoted through an angle of 270° making it possible to create thermal images in hard-to-reach or inaccessible places.

Mains and stress free…

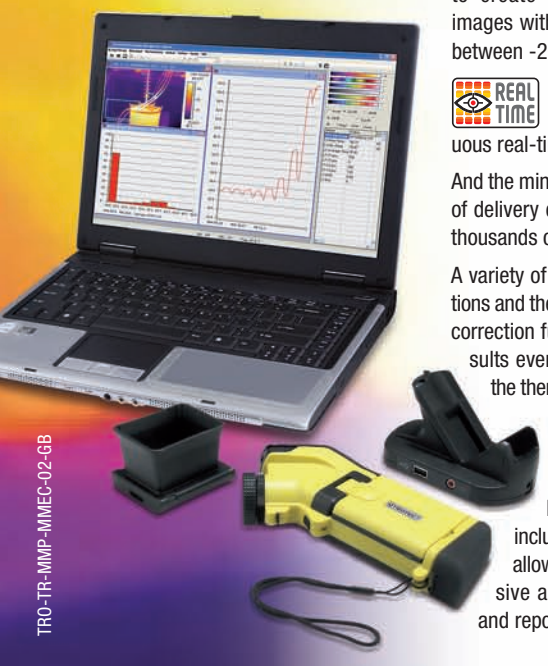
Ther's no need to hunt for a mains point when you want to carry out your measuring application when you've got one of the IR cameras in the EC-Series. The cameras in the EC-Series do not require an external power source because they all run on high-performance Li-ion batteries to guarantee you hours of unimpeded operation and because this type of rechargeable battery does not have a memory effect you can charge them as and when you see fit.

EC as in an "Extra Class" in the field of thermal imaging

Precise real-time measurements, a high thermal sensitivity and a high degree of accuracy, a swivel-mounted colour LCD monitor – this is what you get when you buy an infrared camera in the EC-Series. What you don't get are false promises. The cameras in the EC-Series all come standard-equipped with a variety of functions and features which you would normally only expect to find in a high-end model – with a price tag to match. Should you, however, be looking for something a little more specific: the EC-Series also encompasses two special models - the EC060V and the EC060V+ - for more individual and specialized applications.

A brief overview of the most important differences of models	EC 060	EC 060 V	EC 060 V+
Measuring spots	2	5	10
Isotherm		■	■
Digital camera		■	■
Photo lamp		■	■
DuoVision		■	■
Laser pointer		■	■
Professional analysis			■
Area measurements			■
Bluetooth headset			■
Voice annotations			■
IR real-time via USB 2.0*			■

** in connection with the optionally available software expansion pack*

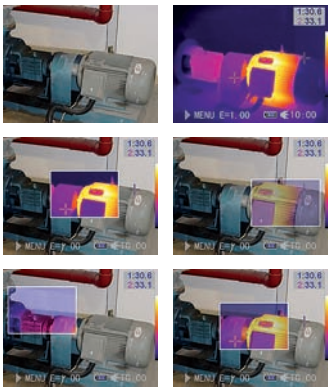


TRO-TR-MMP-MMEC-02-GB

Technical data		EC060	EC060 V	EC060 V+
Article number		3.110.003.003	3.110.003.004	3.110.003.005
Measuring	Temperature range	-20 °C to +250 °C		
	Accuracy	±2 °C, ± 2% of the measured value		
Image radiometric	Detector type	Focal Plane Array (FPA), uncooled microbolometer		
	Detector resolution	160 x 120 pixels		
	Spectral range	8 to 14 µm		
	Field of Vision (FOV)	20° x 15°		
	Geometric resolution	2.2 mrad		
	Thermal sensitivity	0.1 °C at 30 °C		
	Image repetition frequency	50/60 Hz		
	Focus	manual		
	Min. Focus Distance	0.10 m		
Image visual	Digital photo camera	–	Colour representation 680 x 480 pixels, integrated photo lamp	
	Video norm	PAL/NTSC		
Image representation	Display	2.5-inch TFT LCD		
	Image display	Pseudo colours, 6 colour palettes		
	Image display options	IR image	IR image, real image, different DuoVision options for combined display of IR and real images	
Measuring functions	Measuring spots	Two movable measuring points (1 x manual, 1 x autom. temperature tracking)	Five movable measuring points (1 x manual, 1 x autom. temperature tracking)	Ten movable measuring points (9 x manual, 1 x autom. temperature tracking)
	Isotherm	–	Yes	
	Professional analysis	–		Yes
	Area measurement	–		5 areas
	Degree of emission	User-defined variably adjustable from 0.01 to 1.0		
	Measurement correction	Automatically on the basis of user-defined input with regard to the surrounding temperature, distance, rel. humidity		
Data storage	Memory medium	Mini-SD card slot		
	Data format radio metric	14 bit radiometric IR format		
	Data format visual	–	CCD	
	Voice recording	–		Voice annotations can be saved with each IR image
Laser	Type	–	Semi-conductor AlGaInP diode laser, 1 mw/635 nm red	
	Classification	–	Class 2	
Power supply	Battery type	Standard, Li-ion; rechargeable, replaceable		
	Operating time	≈ 3.0 h		
	Mains power	8 - 11V DC		
	Energy saving mode	user defined		
Environmental conditions	Operating temperature	-15 °C to +50 °C		
	Storage temperature	-40 °C to +70 °C		
	Relative humidity	10 % to 95 % RH (non-condensing)		
	Protection class	IP 54 IEC 529		
	Shock	25G IEC 68-2-29		
	Vibration	2G IEC 68-2-6		
Physical characteristics	Dimensions	175 x 55 x 160 mm		
	Weight	500 g		
	Tripod mount	1/4-inch - 20		
Interface	PC	–		USB 2.0, Bluetooth
	Video	composite video		
Scope of delivery	Standard lens	20° x 15°		
	Standard equipment	IR camera with standard lens, standard software package, operating instructions, 2GB mini-SD card slot, Li-ion battery, docking station, battery charger, video cable, temperature test certificate; EC060V+ additionally with Bluetooth headset and USB cable for thermographic video recordings in real-time		
	Optional interchangeable lens	38°, 12°, 6.4°, 3.8° lens		
	Optional accessories	Software expansion for real-time IR video recordings (EC060V+), carry case, mains adapter for battery-independent mains supply, further accessories and software packages on request.		

The EC-duo with DuoVision: the EC 060 V and the EC 060 V+

Both the EC 060 V and the EC 060 V+ are equipped with an additional digital camera with a built-in photo lamp designed to shed light on poorly-illuminated and dark areas in order to provide you with crisp, clear photos and an ideal combination consisting of real and thermal images so that you can identify and analyse different problems more quickly and efficiently and find a solution to them.



DUO VISION The infrared camera's patented DuoVision technology enables either infrared or real images to be displayed exclusively or a combination of overlapping images in varying degrees of transparency in freely-selectable areas. This allows any damage or defects to be detected much more easily.

In addition the software DuoVision function allows you to display the overlapped images in varying degrees of intensity. Or to put more bluntly: you decide what you would like to see.

The DuoVision images created using this method provide a far more sophisticated means of analysis and a much more graphic form of documentation.

The Crem de la Crem in the EC-Series: the EC 060 V+

The EC 060 V+ is the flagship product in the EC-Series: it offers the most comprehensive functions and features of all our models and provides you the user with a professional measuring device designed to deliver extremely precise and reliable measuring results in a variety of different applications.

You can voice over videos and attach voice annotations to your thermal images for future reference using the Bluetooth headset included in the scope of delivery.

And the EC 060 V+'s USB 2.0 port allows you to hook your infrared camera up to your computer and use the optionally available software expansion pack to create video recordings and analyses quickly and efficiently.

IR cameras in the IC Series

The compact MultiMeasure infrared cameras in the Trotec IC Series deliver a convincing performance with precise thermographic measurements in real-time, an expansive temperature range and a variety of functions – combined with an amazingly low price which offers unbeatable value for money.

BENEFITS IN PRACTICE:

- Fully radiometric IR camera made in the EU
- Real-time measurement and real-time image display guarantee clear, high-quality thermal images
- Precise temperature measurement over the whole image
- High thermal sensitivity
- High geometric resolution
- Digital camera for real images
- Ergonomic and robust (IP 54)
- Maintenance-free operation due to uncooled microbolometer technology
- Pivotable 3.5" LCD colour monitor
- Image recording with a refresh rate of up to 50/60 Hz
- DuoVision function for picture-in-picture display
- Integrated laser pointer
- Large memory
- A variety of measuring functions
- Data transmission via USB
- Easy handling
- Intelligent power management
- Highly-sophisticated analysis software included in the scope of delivery

The construction basis of the IC Series is one of the most widely sold camera platforms in the world. Benefit during your daily measuring operations from a series of instruments which leaves nothing to be desired.

Features like fully-radiometric temperature measurements with real-time image repetition frequency, a high geometric resolution of 1.1mrad, a large, generously-sized image sensor with 110,592 individual measuring spots, a built-in digital camera for combined real images and patented picture-in-picture DuoVision images, uncooled microbolometer technology for maintenance-free operation, dynamic four-point measurements, automatic temperature tracking… the list goes on. Seven different cameras and three application-specific series guarantee that your infrared thermal imaging camera matches your own individual applications and needs.

Independent tests once again confirm what we already know: Trotec will not be beaten on prices for infrared thermal imaging cameras!

Infrared cameras with the same features and the same wide variety of functions as the infrared cameras in the IC-Series often cost twice the price, whereas other infrared cameras in the same price bracket as the IR cameras in the IC-Series have nowhere near the technology and far fewer features than the IC-models!

The IC090 Ex is also suitable for ***operation in areas where there is a high risk of explosion!*** (on request)

The infrared cameras are designed to meet the requirements you would put first: comprehensive standard equipment or numerous expandable options - the infrared cameras in the IC-Series leave nothing to be desired!

Do you need thermal imaging cameras with a works test certificate or with a calibration certificate for specific measuring points?

Then use the Trotec calibration service!

calibration and service centre

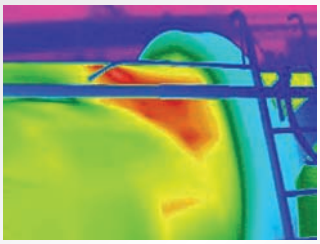
We can guarantee you the shortest reaction times in any service case with our own calibration and service centre in Germany.

Sounds interesting? More information on +49 2452 962-400.

IC – Intelligent and Clever…

IC cameras have everything that you would expect from a professional thermal imaging camera whilst at the same time being surprisingly inexpensive to buy. Clever electronics and functions, intelligent power management and mobility concept:

High precision even at high temperatures…



A geometric resolution of up to 1.1 mrad, the high thermal sensitivity and an image repetition frequency of 50/60 Hz enable precise thermograms to be made in real-time in every possible measuring situation – in a measuring range between -20 °C and +1,500 °C depending on the type of model.

We don't do things by halves: Always in the picture thanks to real-time display…

REAL TIME The IC thermal imaging camera's highly developed sensor system constantly determines even the smallest temperature changes.

As many as 110,592 autarkic temperature measuring points measure the current values close to 60 times a second and transfer this information to an LCD display. The high image repetition frequency guarantees that not a single image – i.e. valuable thermographic information - is left out and that the infrared image is displayed in real-time.

Without real-time, half is missing…

Only a high image refresh rate of 50/60 Hz guarantees working without fatigue and exact measurements, even in the case of moving objects.

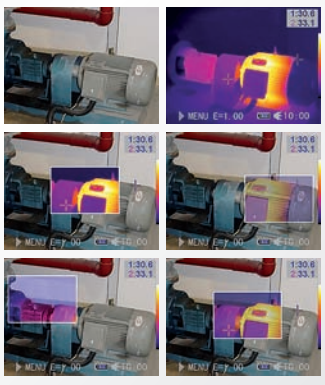
You won't miss a thing – with DuoVision…

DUO VISION The IC cameras in the V and LV Series are equipped with an additional digital camera for real images and an integrated photo lamp to light up dark areas.

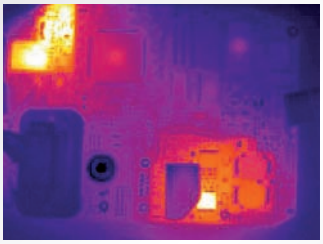
The infrared camera's patented DuoVision technology enables either infrared or real images to be displayed exclusively or a combination of overlapping images in varying degrees of transparency in freely-selectable areas.

This allows any damage or defects to be detected much more easily.

Regardless which of the display options you use, both the real image and the infrared image information is stored separately so that the measuring data can be fully retrieved when needed.



The IC gets to the point…



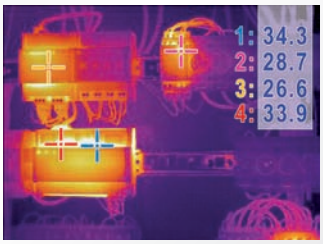
The integrated laser pointer makes it easy to locate problem areas quickly and the integrated hot spot/cold spot detection saves you having to search for the hottest or coldest point in the image.

Due to the short minimum focusing distance of just 10 cm, even close-up objects can be examined with pinpoint accuracy.

A clear target in view,…

…or two, or three, or four?

The powerful camera technology allows differential measurements at up to four movable temperature measurement points, of which three can be individually configured.



In addition, temperature limits that you set yourself via an alarm or isotherm function can be displayed by a special colour or by an alarm signal – ideal for **dew point detection** on surfaces!

The IC shows everything as clear as daylight…

The infrared cameras are designed to meet the requirements you would put first: comprehensive standard equipment or numerous expandable options - the infrared cameras in the IC-Series leave nothing to be desired!

The tilting monitor element can be ergonomically adjusted to suit the observer in every recording situation.

Thanks to the folding mechanism, the monitor element can be folded down fully after measurements are completed, thus protecting the LCD display and the operating keypad against dirt.

Rough shell, clever core…

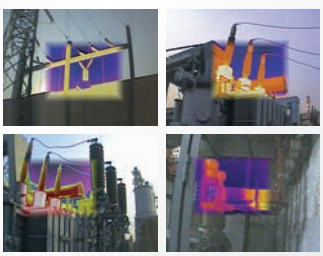
All interfaces are located centrally and well protected in the base of the sturdy IP54 housing, which is also suitable for use under the harshest environmental conditions.

Thanks to the intelligent power management, the cameras are ready for use quickly at all times – the advanced camera circuitry places numerous measurement functions at the user's disposal just a few seconds after switching on.

Quality is standard…

The software included in the package is not just a simple data transfer or display tool – with each IC camera you get a professional, full-value analysis and documentation program with numerous functions for evaluation, organisation and documentation of your measurement results.

DUO VISION The software's DuoVision function also offers the option to overlap infrared and real images in varying degrees of intensity.



These DuoVision images can also be stored and they are then not only easier to evaluate but also provide a more professional means of documentation.

MultiMeasure IR-cameras – further information… ➔

Thermography for all…

The objective of developing the IC camera Series was to reply to the strongly increasing demand for thermographic measurement methods in many areas of application with a series that allows the use of high-quality cameras even on a tight budget.

Thanks to their full range of features, all IC cameras not only provide for transparency quickly and effectively when used for thermographic measuring tasks; the pricing structure is also refreshingly transparent, enabling you to select the optimum model for your needs, quickly and simply.

Benefits in practice come as standard – this is something all the IC models offer:

Functions and features:	*Your benefit in practice:*	IC 080 V	IC 120 V	IC 080 L	IC 120 L	IC 080 LV	IC 120 LV
REAL TIME **A high image repetition fequency of 50/60 Hz**	The high image repetition frequency guarantees a non-top image representation of the infrared images. Not a single image - which equates into valuable thermographic information - is left out when the images are depicted in real-time.	■	■	■	■	■	■
Fully radiometric infrared images	Precise temperature measurements over the entire image, no interpolation interference. The sensor has an autarkic measuring point for each individual pixel which delivers exact temperature values exclusively for this individual pixel. The absolute temperature can be read pixel by pixel.	■	■	■	■	■	■
High thermal sensitivity	Reliable diagnoses even with the smallest of temperature differences. Even the smallest of temperature differences become visible. High sensitivity reduces thermal noise in the infrared image. The smaller the value, the better the quality of the image.	■	■	■	■	■	■
Uncooled microbolometer sensors	No moving sensor parts, extremely resilient, crisp, clear and detailed images. Compact size, low weight, low power consumption, completely maintenance-free.	■	■	■	■	■	■
Pivotable 3.5" LCD colour monitor	Always affords the best possible ergonomic view – no matter what the angle. And when you don't need it you can fold it together to protect both the keypad and the monitor against dirt and grime.	■	■	■	■	■	■
Automatic temperature tracking (Hot-/Cold-Spot)	Cold and hot spots on the measured object are measured in real-time and displayed automatically.	■	■	■	■	■	■
Temperature alarm	Acoustic and optical alarm help you to detect critical areas quickly and more easily. Ideal for dew point detection on surfaces.	■	■	■	■	■	■
Protection class IP 54	Robust housing, dust and splashproof – ideal for rough operations in industry and all kinds of weather in case of outdoor measuring.	■	■	■	■	■	■
Integrated laserpointer	Facilitates quick localisation of problematic areas and visual targeting in poorly illuminated areas.	■	■	■	■	■	■
Intelligent power management	High rechargeble battery performance, longer non-stop measuring operations.	■	■	■	■	■	■
A variety of measuring and analysis functions	Quick, reliable and accurate results due to dynamic four-point measuring, automatic temperature tracking, difference measurements, isotherm and alarm function.	■	■	■	■	■	■
Professional analysis software	No additional costs for expensive software: Full analysis and documentation program with numerous functions for assessment, organisation and documentation already included in the scope of delivery.	■	■	■	■	■	■
Bluetooth (optional)	Wireless connectabilty for an optional headset.	■	■	■	■	■	■
Voice recording (optional)	Add on-scene comments and valuable additional information to your recorded images.	■	■	■	■	■	■
miniSD **mini-SD interchangeable memory card slot**	Quick and easy memory management; room for thousands of images on the mini-SD card included in scope of delivery. Practically endless memory capacity by simply changing cards.	■	■	■	■	■	■
REALTIME IR-VIDEO **Real-time IR video recordings and USB 2.0 transfer** (optional)	Thermographic real-time video recordings and evaluations on your PC via the speedy USB 2.0 interface connected to your IR camera.	■	■	■	■	■	■

Not all users always need all the features and functions or the most expansive temperature range they can get. That's why the IC Series offers the optimal camera for each individual type of user.

The higher the model number, the bigger the temperature range: Additional model designations stand for further features and a higher degree of precision – it's as simple as that.

Exactly the right equipment for each individual requirement – model-specific differences:

Functions and features:	*Your benefit in practice:*	IC 080 V	IC 120 V	IC 080 L	IC 120 L	IC 080 LV	IC 120 LV
Image sensor with 160 x 120 measuring points	**19,200 autarkic temperature measuring** points measure even the smallest of temperature differences in real-time. Optimal resolution for a whole host of applications.	■	■				
Image sensor with 384 x 288 measuring points	Highest precision in measuring due to **110,592 autarkic temperature measuring points**. You can be twice as far from the target with this detector than with a 160 x 120 detector and still carry out measurements with the same accuracy.			■	■	■	■
High geometric resolution of 2.2 mrad	Defines the solid angle measurement for the smallest detectable measuring point. The smaller the value, the more accurate the measuring results. The measuring point of each thermal pixel principally has a diameter of 2.2 mm when measured from a distance of 1m from the object.	■	■				
Very high geometric resolution of 1.1 mrad	Defines the solid angle measurement for the smallest detectable measuring point. The smaller the value, the more accurate the measuring results. The measuring point of each thermal pixel principally has a diameter of 1.1 mm when measured from a distance of 1m from the object.			■	■	■	■
Integrated digital camera	Quicker and easier object inspection due to simultaneous display and recording of infrared and real images.	■	■			■	■
Integrated photo lamp	Better photo results due to improved illumination of darker target regions when performing real image recording.	■	■			■	■
DuoVision picture-in-picture display	Real time depiction of overlapping infrared and real images with different depiction options. For easier orientation and localisation during measuring.	■	■			■	■
DuoVision software function	The software not only stores both the infrared and the real image but allows an overlapping depiction of both images in varying degrees of intensity for better assessment and more professional documentation.	■	■			■	■

Two camera models, three different versions, an infinite number of possibilities…

Each of our IC models comes standard-equipped with a variety of different extras.
Two individual measuring ranges and three individual versions guarantee that your infrared thermal imaging camera is equipped with exactly the functions and features that you need to meet your individual requirements.

V for more Variety…

The V-models in the IC-Series are well-equipped to take on any one of your measuring tasks. In addition to the standard equipment extras, the extremely versatile IC080V and the equally flexible IC120V are also equipped with a built-in camera for real images, a photo lamp, optional DuoVision display mode and matching DuoVision software functions.

IC080V IC120V

L for… lots more to see!

160 x 120 384 x 288

The models in the L-Series are all equipped with a 384 x 288 infrared sensor with 110,592 autarkic temperature measuring spots which, when combined with an extremely high geometric resolution of 1.1 mrad, provides the highest level of precision for the highest of demands.

IC080L IC120L

LV – complete and extremely precise…

The IC080LV and the IC120LV unite the benefits of the L-Series with the benefits of the V-Series. The result is a camera with real image and DuoVision options plus an extra-large 384 x 288 infrared sensor and a very high geometric resolution. These combined benefits make the LV models just the right cameras for the job.

IC080LV IC120LV

For all those who like just that little bit more…

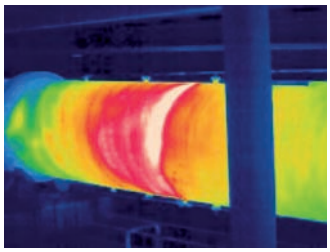
More flexibilty? More mobility?
The standard scope of accessories leaves nothing to be desired. But should you want just that little bit more, then we have an extensive range of accessories designed to suit your needs: Tele lenses, wide-angle lenses – a total of eight different interchangeable lenses are optionally available. And besides that a car charger cable, further software packages and even more!

MultiMeasure IR-cameras – further information… ➔

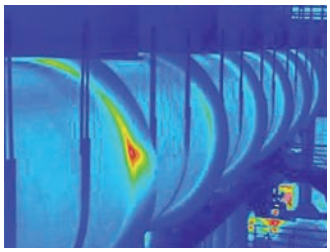
Possible applications…

The IC thermal imaging cameras are very easy to operate and are suitable for numerous areas of application, for example:

Production checking and plant maintenance in industry



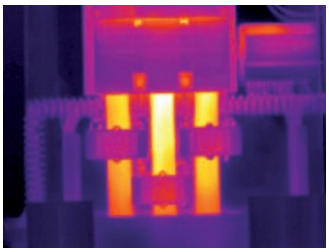
Use the thermal imaging cameras for monitoring and maintenance tasks in industrial plants; for example, for checking combustion processes or monitoring temperature-controlled processes.



The inspection of thermal insulation on machines and plants is also a typical area of use of the IC cameras, as is preventative maintenance.

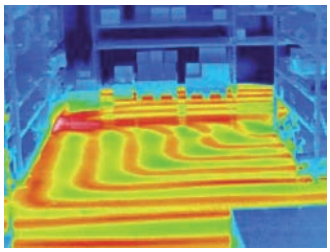
For example, “hot spots” in drive systems can point to the start of bearing damage.

Electrothermography



Whether control cabinets, electric motors or other current conducting systems - with IC cameras you can detect dilapidated components or damaged connections at an early stage and rectify faults, preventing costly interruptions in production and reducing the risks of fire.

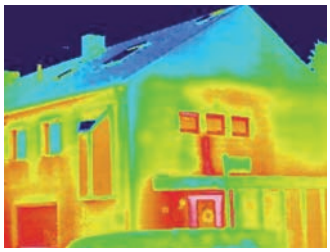
Leak detection



The infrared cameras from the IC Series enable fast, precise localisation of an actual leak, usually invisible to the human eye, in inaccessible or concealed piping, for example in under-floor heating.

The costs and damage incurred by repair work can thus be minimised.

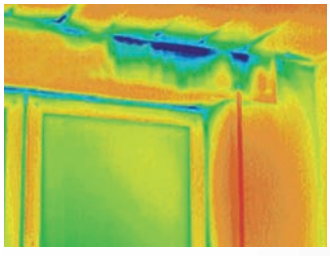
Building thermography

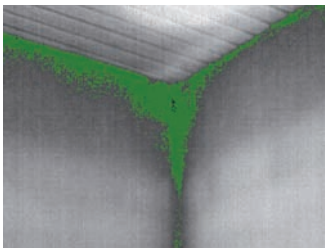


Whether the building shell or the entire structure – the examination for missing thermal insulation and the detection of physical building defects or concealed structural elements are all possible by means of thermographic measurements with IC cameras, even during the construction phase.

As a result, warranty claims can be asserted at an early stage and energy costs saved.

In the run-up to modernisations, thermographic measurements also represent a reliable basis for the planning of conversion work for the elimination of energy losses.

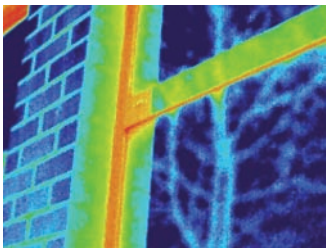




It is similarly possible to take stock of the interior climate with IC thermal imaging cameras.

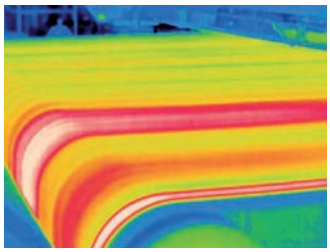
This is a quick, simple way to localise dew-point-endangered places in the building where mould, which may be toxic or cause allergies, could grow if structural countermeasures are not taken.

Energy consultation



The IC cameras are extremely well suited to the detection and documentation of energy losses through exterior windows, exterior doors, roller shutter boxes, radiator niches, the roof structure and the entire building shell, for example due to missing or faulty insulation, and are the optimum measuring tools for comprehensive diagnostic and maintenance use in connection with energy consultation.

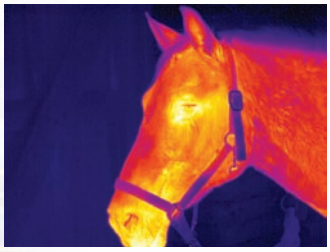
Many further areas of use



Due to the indisputable advantages of this method, thermographic measurements have been established in many areas of application for some time now.

The cameras in the innovative IC Series offer unbeatable value for money and make thermal imagery attractive for a whole variety of crafts and trades and application scenarios for which the use of contact-free and non-destructive thermography was too expensive and for a whole host of different users for whom such an acquisition was up to now quite simply unaffordable.

Do you have any questions on the possibilities of using the IC Series for your personal application case? Just call us, we will be pleased to advise you!



Technical data		IC090 EX	IC080 V	IC120 V	IC080 L	IC120 L	IC080 LV	IC120 LV
Article no.		3.110.003.016	3.110.003.011	3.110.003.019	3.110.003.013	3.110.003.017	3.110.003.012	3.110.003.020
Measure-ment	Temperature range	-20 °C to +250 °C	-20 °C to +600 °C	-20 °C to +1,500 °C	-20 °C to +600 °C	-20 °C to +1,500 °C	-20 °C to +600 °C	-20 °C to +1,500 °C
	Accuracy	±2 °C or 2 % of the measured value						
Image output radiometric	Detector type	Focal Plane Array (FPA), uncooled microbolometer						
	Detector resolution	160 x 120 pixels			384 x 288 pixels			
	Spectral range	7.5 to 14 µm	8 to 14 µm		7.5 to 14 µm			
	Field Of View (FOV)	38° x 28.5°	20° x 15°		24° x 21°			
	Geometric resolution	4.4 mrad	2.2 mrad		1.1 mrad			
	Thermal sensitivity	0.1 °C at 30 °C			0.08 °C at 30 °C			
	Image refresh rate	50/60 Hz						
	Focus	manuell						
	Min. focussing distance	0.10 m						
Image perfor-mance visual	Digital photo camera	–	Colour depiction 680 x 480 pixels, integrated photo lamp		–		Colour depiction 680 x 480 pixels, integrated photo lamp	
	Video norm	–	PAL/NTSC		–		PAL/NTSC	
Image repre-sentation	Display	2.5 inch LCD	3.5 inch LCD, 320 x 240 pixels					
	Image display	Pseudo colours, 6 colour palettes						
	Image display options	IR image	IR image, real image, different Duo-Vision options for combined display of IR and real imaged		–		IR image, real image, different Duo-Vision options for combined display of IR and real imaged	
Measuring functions	Measuring point	Up to four moveable measuring points (3x manual and 1x automatic)						
	Isotherm	Yes (between the upper and lower limit values)						
	Emission factor	Variably adjustable from 0.01 to 1.0						
	Measurement correction	Automatic on the basis of user-defined specifications for environmental temperature, distance, relative humidity						
Image storage	Storage medium	Integrated flash memory cardfor ap-prox. 1,000 images	Interchangeable memory card slot for mini-SD card					
	Data format	radiometric 14-bit radiometric IR format						
	Data format visual	–	CCD		–		CCD	
	Voice recording	–	Comments can be stored with each IR image (optional Bluetooth expansion kit and Bluetooth headset necessary)					
System sta-tus indicator	Status display	LCD display	–					
Laser	Type	Semiconductor AlGaInP Diode Laser, 1 mw/635 nm red						
	Classification	Class 2						
Power supply	Battery type	Rechargeable standard lithium-ion battery, replaceable						
	Operating time	≈ 2.5 h						
	Mains operation	8 - 11V DC						
	Energy saving mode	user-defined						
Ambient conditions	Operating temperature	0 °C to +40 °C	-15 °C to +50 °C					
	Storage temperature	-40 °C to +70 °C						
	Humidity	10 % to 95 % r.H. (non-condensing)						
	Protection class	IP 54 IEC 529						
	Shockproof to	25G IEC 68-2-29						
	Vibration-proof to	2G IEC 68-2-6						
Physical parameters	Dimensions	211 x 80 x 195 mm	230 x 80 x 195 mm		211 x 80 x 195 mm		230 x 80 x 195 mm	
	Weight	500 g	650 g		500 g		650 g	
	Stand mounting	1/4-inch - 20						
Interfaces	PC	USB 1.1	USB 2.0 (optional)					
	Video output	Composite Video						
Package contents	Standard lens	38° x 28,5°	20° x 15°		24° x 21°			
	Standard equipment	Camera with standard lens, LCD monitor and laser, 110/230 volt battery charger (IC090 Ex-protected) with charging status, Li-ion battery (IC090 two Ex-protected special rechargeable batteries), video cable, USB cable for image downloading to PC (only IC090Ex), user's manual, carry case, software package, temperature test certificate, mini SD memory card (not for IC090Ex)						
	Optional interchangeable lenses	–	38°-, 28°-, 14°-, 12°-, 9°-, 6.4°-, 4.8°-, 3.5°-lens		48°-, 12°-lens			
	Optional accessories	on request	Tripod attachment, power supply unit, 12V cigarette lighter adapter, additional battery, leather holster, Bluetooth expansion pack and Bluetooth headset, real-time upgrade for thermographic video recordings and evaluations in real-time, further software packages on request					

Compact measurement instruments

BENEFITS IN PRACTICE:

- Compact multi-functional measuring instruments – digital precision without the disadvantageous measured value drift of analogue instruments
- Developed, produced and quality-checked in Germany
- Simple one-handed operation using a thumbwheel
- Rugged, compact housing
- Attractive price/performance ratio

Which MultiMeasure Professional Thumbwheel Measuring Device for which measuring application?

A quick comparison of the measuring functions…

	T200	T250	T500	T600	T650	T700	T2000 E	T2000 S
Find more information in our catalogue on page…	*13*	*13*	*14*	*15*	*15*	*16*	*18*	*18*
Humidity	●	●	●	●	●		●	●
Air humidity	●	●					●	●
Wood moisture			●		①		②	●
Building moisture			●	●	①		②	●
Equilibrium moisture							●	●
Material moisture			●	●	①		②	●
Surface measurement up to 4 cm					●		●	●
Depth measurement up to 30 cm				●			●	●
Dew point	●	●					●	●
Temperature	●	●					●	●
Air temperature	●	●					●	●
Surface temperature		●					●	●
Material temperature							●	●
High temperature measurement							●	●
Trace gas measurement							●	●
Hydrogen concentration							●	●
Velocity measurement							●	●
Airflow speed							●	●
Ultrasound measurement						●		
Ultrasound signal strength						●		
Alarm function		●		●	●		●	●

① Moisture measurement according to the dielectric process

② All SDI- and Pt100 sensors from the MultiMeasure Series can be connected to the T2000 E as well as compatible sensors from other manufacturers. Passive electrodes for material, wood and building moisture measurements using the resistance measuring method cannot be used with this device.

MultiMeasure Professional Measuring Tools with Thumbwheel

The MultiMeasure Professional Series is a series designed to provide users in industry, small firms and businesses and the building trade with a complete range of measuring tools for a variety of different maintenance, damage detection and diagnostics applications.

Each of the models in the series centres a on different application – from the compact T200 thermohygrometer to the multipurpose T2000 with matching system modules.

The measuring tools are easy to use and because they are all based on a standardised operating concept they are all easy to work with – **"If you've worked with one, you can work with them all!"**

This means that you do not have to waste precious time trying to work out how another model in the series works should you want to switch to another measuring instrument.

Go to the table next to the text to compare models and find out which of the MultiMeasure professional measuring instruments with built-in thumbwheel is the right tool for you and your own individual application.

TRO-TR-MMP-MUME-12-GB

Thermohygrometer T200

Air humidity

Air temperature

The T200 is a quality, German-made, professional hand-held measuring instrument and is optimally suited for checking the climate in homes, offices, production buildings and warehouses.

The precision sensor module of this thermohygrometer is protected from dirt and dust in the robust measuring head of the unit by means of a metal grid filter, and enables rapid and accurate determination of air temperature and relative humidity.

Both parameters are displayed simultaneously in real time on the easy-to-read display. In addition to relative humidity, further climate parameters such as dew point, or absolute water content of the air, can be analysed with this instrument. The air temperature display can be switched between °C and °F.

For an immediate evaluation of the measured data, minimum, maximum and average functions are available. In addition the current measured value can be retained by means of the hold function.

All the measuring devices in the MultiMeasure professional thumbwheel series – including the T200 – have been optimized to ensure that they meet the demands different professionals put on them: the right ergonomic features make life and measuring infinitely easier, which is why we lowered the weight and downsized our measuring tools to make them more compact and easier to handle. Now you only need one hand to carry out all the functions you need, leaving your other hand free to do other things.

Infrared thermohygrometer T250

Air humidity

Air temperature

As a professional hand-held instrument in the MultiMeasure Series the T250 offers you the same precision, high quality and simplicity of operation as the T200. The fundamental difference is the particularly large range of functions provided, since **the T250 combines thermohygrometer, laser pyrometer and dew point alarm in just the one unit.**

Three operating modes and a large number of measuring functions, all selectable with one hand via the thumbwheel, make the entirely German-made T250 a mobile measuring station in pocket format:

In the **TH mode** the measuring instrument corresponds to the T200 and offers you all the functions of this thermohygrometer.

In the **IR mode** you can use the T250 as a laser pyrometer for surface temperature measurement with measurement location marking.

Surface temperature

Dew point alarm

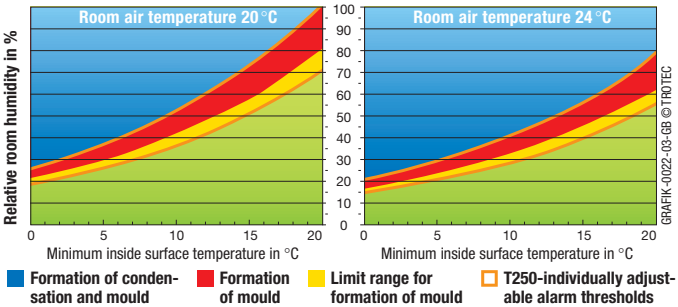
A particular practical advantage is the dew point alarm function:

In the **DP mode** the dew point temperature and the surface temperature are displayed simultaneously in the well visible display.

Wall surfaces can be examined in no time and weakpoints detected quickly with the alarm function. The alarm thresholds are individually configurable.

The adjacent figure shows limit ranges of formation of condensation or mould in buildings depending on the minimum inside surface temperatures in the area of heat bridges.

*Everyday working conditions often include dust and dirt which may falsify measuring results and shorten the sensor life. The **T200** and **T250** measuring devices are equipped with a metal grid filter as a standard!*



The adjacent diagram shows the border areas with regard to condensate water and mould formation in buildings in connection with the minimum inside surface temperature near thermal bridges.

With the T250 all the necessary measuring variables – room temperature, humidity, surface temperature, dew point – can be determined with just one measuring instrument!

Moisture measurement instrument T500

Wood moisture

Building moisture

Wood temperature *compensation function*

Integrated characteristic curves *for hundreds of types of wood*

- *Measurement of wood and material moisture with one device*
- *Temperature compensation function for wood moisture measurement*
- *Auto-calibration*
- *Integrated material characteristic curves for hundreds of different types of wood*
- *Very simple one-handed operation*
- *Includes comprehensive material characteristic curve compendium*
- *Expanded range of applications: all MultiMeasure electrodes can be connected to the T500 using the optional TS adaptor set*

The T500 is a professional hand-held measuring instrument for the precise determination of the moisture content of wood and materials using the resistance method.

Besides detecting the moisture content of soft building materials such as gypsum or plaster, the T500 is better suited than any other instrument in its class for measurement checks in forestry operations, sawmills and all wood processing works.

This is because the T500 features a menu option that allows the selection of hundreds of different types of wood, especially for detecting the moisture content of wooden materials.

This is made possible by a large number of validated material curves, which are stored in the instrument software and can be selected from the T500 wood-type table using the corresponding material number.

The wood-type index, which is included in the supply package and runs to 170 pages, is probably the most comprehensive material curve compendium on the market!

Made in Germany As one would expect from a quality, German-made, professional wood moisture measuring instrument, the T500 features a special function to compensate for the temperature of the material being measured.

The real-time measured wood moisture content and the predefined wood temperature are shown simultaneously on the easily readable display during measurement. The current measured value can be frozen with a hold function if required.

Combine the practical advantages of the T500 with the expanded possibilities of a flexible choice of electrodes:

Using the TS adaptor set and the corresponding connecting cable you can connect all MultiMeasure electrodes for measuring wood and building moisture to the T500 and benefit from a wide range of applications that no other compact moisture measuring instrument in this class can offer.

Thanks to the long cable connection, moisture measurements can be performed conveniently and simply even in poorly accessible places. In addition you can enlarge the range of applications of your T500 in a unique way:

Would you like to perform moisture measurements on concealed building components?

In hard building materials such as concrete?

On wooden beam ceilings? In the damp course above the edge joints?

On multi-skinned wall or ceiling structures?

On the widest variety of wood types of different hardnesses?

No problem with the TS adaptor set:

Whether ram electrodes, layer-depth, round or flat electrodes, in all available lengths and diameters, with insulated or non-insulated electrode tips – the complete range of MultiMeasure electrodes can be connected easily to the T500!

Even your existing electrodes made by other manufacturers can be used on the T500 with the TS adaptor set, if connection is possible.

The standard scope of supply includes, besides the T500 measuring instrument, two cap nuts, ten measuring spikes (length 20 mm, ø 1.5 mm), protective cap for the electrodes, battery, operating manual and a comprehensive 170-page index of wood types.

Using the optionally available TS adaptor set (1) and the TC 25 connecting cable (2) you can widen the T500's range of applications considerably by connecting any electrodes from the MultiMeasure range to the T500.

The installation is child's play:

The TS adaptor set consists of two special adaptor heads that can be screwed quickly and easily to the top of the T500 in place of the standard cap nuts and serve as plug connectors for the optionally available TC 25 connecting cable. Using this connecting cable you can then connect the desired electrodes to the T500.

Moisture measurement instrument T600

The T600 is a professional hand-held instrument for rapid non-destructive measurement of sub-surface moisture content.

By means of microwave technology it is possible to detect distributions of moisture content at a depth of up to 300 mm.

Another advantage of the method, in addition to the great measuring depth, is its independence from the level of salt content present in the material. It therefore makes no difference to the microwave technique whether an older or a new building is being measured.

Moisture measurement instrument T650

The T650 is a professional hand-held instrument for fast, non-destructive determination of moisture content distributions in areas up to a depth of 4 cm from the surface. The T650 is yet another in our long line of products which carries the seal of quality "made in Germany". It can be used to perform measurements with digital precision – but without the measuring drift which you often get when you carry out measurements analogue measuring devices.

Damp and dry wall and floor areas can be detected by permanent real time display of the measured values. In addition, the device is suitable for preliminary inspection of the maturity of building materials in CM measurements.

Sub-surface moisture	Surface moisture
Material moisture *Sub-surface moisture*	**Material moisture** *near to surface*
Moisture alarm	**Moisture alarm**

Both the T600 and the T650 are equipped with a minimum and a maximum function which provides the user with an immediate analysis of the relevant measuring data. There's also an equally valuable "Hold" function which "freezes" the reading you have just taken thereby taking your mind off the arduous task of having to concentrate on remembering the different measuring values. It's as if we had thought of everything: there's enough room on the large, easy-to-read, crisp and clear display, so now you can see not one but two measuring results – the current reading and the second value you need.

The T600 and T650 moisture meter alarm – another added advantage

And here's another added benefit: you can configure your own individual thresholds, which allows you to measure the precise moisture content in the walls and floors you are inspecting both quickly and effectively.

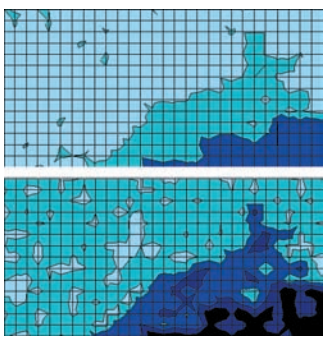
Thanks to the meter's acoustic alarm, there's also no need for you to monitor the display constantly: the meter's alarm warns you automatically as soon as the measured value exceeds the threshold you have set leaving you are free to focus entirely on the object or surface you wish to examine! The exquisitely simple yet wonderfully effective thumbwheel on both the T600 and the T650 is another innovative feature which also allows you to concentrate on the job at hand.

The thumbwheel enables you to carry out all the functions with only one hand leaving your other hand free for other things!

Non-destructive, construction diagnostic combined measurements in practice

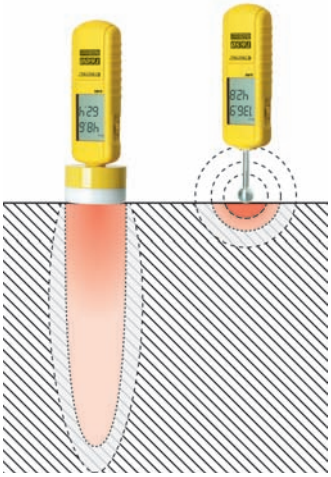
The T600 and T650 moisture meters are not only excellently suited for non-destructive measuring of building materials, walls, ceilings and floors, when combined they also enable the user to perform a variety of additional applications.

This combination of surface and depth measurements allows you to characterize, narrow down and classify complex connections, for example hygroscopic moisture distributions due to salinization or the detection of leaks. The T650 can measure the moisture in the first 2-4 cm of the building material whereas the T600 can measure moisture volumes up to a depth of 30cm.



Conclusive results can be obtained by carrying out grid measurements and using the surface and depth measurement values to achieve a multidimensional representation of the moisture distribution.

Past experience has shown that the best way to process the readings is to enter them into a table. The values can then be converted into a diagram which incorporates surface and depth measurement data and transforms it into a graphic representation which allows you to visualize the extent of the moisture distribution.



The T700 ultrasound measuring device

Finds any leak in systems using compressed air – quickly and economically!

Ultrasound leak detection

The T700 is a high-quality digital measuring device designed for the contact-free detection of leaks in systems carrying compressed air. And because the meter, which is able to locate leaks over a distance of several metres, carries the label "made in Germany" you can be sure of the precision and quality.

When gas leaks through worn out components or even the smallest leaks in compressed air lines there is an increase in friction. This phenomenon generates ultrasonic sound which is so high that it is inaudible to the human ear.

Semi-flexible, supple ultrasound probe

The T700's ultrasound probe can pick up the sound oscillations caused by this increase in friction and transform them into audible sound which can be heard over the soundproof headset included in the scope of delivery or presented as a value on the crisp and clear display.

The T700's compact form and semi-flexible, supple ultrasound probe make it ideal for carrying out inspections of virtually inaccessible areas. In combination with the optionally available T710 ultrasound transmitter it is ideal for performing checks on pressureless systems like tanks or the hatches, flaps and other sealing components of containers, housings or climate chambers and ventilation systems.

The transmitter – designed especially for use with the T700 and made in Germany – has four selectable frequency modulations whose signals can pass through even the smallest of openings.

T700 measuring device with soundproof headset

Optionally available T710 ultrasound transmitter

T700 application example: ultrasound leak detection in compressed air systems helps cut costs

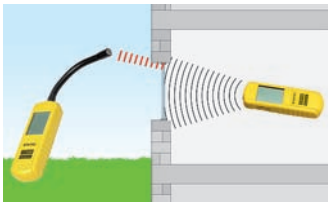
Leaks in systems carrying compressed air can quickly lead to significantly higher operational costs.

Much of the precious compressed air generated by costly equipment leaks out through defective flange or leaky hose connections, worn out cut-off valves or corrosive pipes on its way from the compressor to the place where it is needed.

The commonly used method of checking networks carrying compressed air by listening out for leaks during operational downtimes without the use of special leak detection equipment still fails to detect a leak rate of approx. 20-30% in most cases because the human ear can only detect leaks that are bigger than one square millimetre when the pressure used is 7 bar or greater.

The annual loss incurred through such leaks and faulty systems can run into tens of thousands of euros a year depending on the size of the facility and the scale of the operation.

The T700 ultrasound meter can detect such losses in pressure quickly and effectively and locate leaks wherever they occur. Measuring can also be carried out during operational times, because the T700 is designed to ignore production noise and other audible sounds in the vicinity which could affect the result.



Ideal for testing building or sealing components for leaks

The T700 can also be used in combination with the T710 to carry out quick and easy, low-cost leak checks such as those carried out in the scope of final building inspections or to determine the cause of energetic defects at fire doors, the doors of buildings or windows for example.

This method can also be used to check rubber profile and magnetic seals of tanks and containers for leaks.

The ultrasound transmitter is simply placed inside the object you wish to check before the T700 is run over the outside of the object. Any ultrasound leaking from the test object is then picked up by the T700 which can identify and locate the exact source of the leak.

Technical data

Compact measurement instrument		T200	T250	T500	T600	T650	T700
Article no.		ZB9110004	ZB9110007	3.510.207.500	ZB9110012	ZB9110014	3.510.207.700
Sensor display 1	Measured value	Air temperature	Air temperature, Surface temperature[1)]	Wood moisture, Material moisture	Material moisture, Sub-surface moisture	Material moisture, Surface moisture	Ultrasound
	Units	°C, °F		%, digit	digit		digit
Sensor display 2	Measured value	Relative humidity, absolute humidity, dew point [2)]		Compensation value for wood temperature [3)]			
	Units	% r.H., dp °C, dp °F, g/m³		°C, °F			
Air and dew point temperature	Measuring principle	NTC					
	Measuring range	-20 °C…+50 °C					
	Resolution / Accuracy	0.1 °C / ± 0.4 °C *					
Air humidity	Measuring principle	Capacitive					
	Measuring range	5…95 % r.H.					
	Resolution / Accuracy	0.1 % r.H. / ± 3 % r.H.					
Surface temperature	Measuring principle		Thermopile				
	Measuring range		-20 °C…+60 °C				
	Optical resolution		8:1				
	Resolution / Accuracy		0.1 °C / ± 2 °C				
Material moisture	Measuring principle			Resistance method	Microwave	Dielectric	
	Measuring range			15…100 digit	0…200 digit		
	Resolution / Accuracy			0.1 digit / 0.1 digit			
	Depth of penetration			Approx. 10 mm [4)] (connection)	Max. 300 mm (non-destructive)	Max. 40 mm (non-destructive)	
Wood moisture	Measuring principle			Resistance method			
	Measuring range			5 %…50 %			
	Resolution / Accuracy			0.1 % / 1 % **			
	Temperature compensation			0 °C…50 °C			
	Electrodes length / ø			20 mm / 1.5 mm			
	Max. depth of penetration			Approx. 10 mm [4)]			
Ultrasound	Measuring range						0…100 digit
	Resolution						1 digit
	Leak indication						Acoustically via headphones, digit display
	Transmitter/receiver frequency						40 kHz ± 2 kHz
Functions	Alarm signal		Audible / optical		Audible		
	Menu functions	Max., Min., Hold, Avg., Unit 1, Unit 2, Cal 1, Cal 2	Max., Min., Hold, Avg., TH, IR, DP, CFG, Unit 1, Unit 2, Cal 1, Cal 2	Hold, Sens, Mat., Temp., Unit 2	Max., Min., Hold, Alarm		Volume control
General tech. data	Dimensions approx.	175 x 48 x 25 mm	178 x 48 x 39 mm	168 x 48 x 25 mm	180 x 65 x 65 mm	190 x 48 x 25 mm	360 x 48 x 25 mm
	Weight approx.	200 g	250 g	220 g	320 g	250 g	320 g
	Operation conditions***	0…50 °C, < 95 % r.H.		0…50 °C, < 90 % r.H.	0…50 °C, < 95 % r.H.		0…40 °C, < 95 % r.H.
	Storage conditions***	-30…60 °C, < 95 % r.H.		-10…60 °C, < 95 % r.H.		-30…60 °C, < 95 % r.H.	-20…50 °C, < 95 % r.H.

[1)] in IR-mode; [2)] T250: not in IR-mode; [3)] only in the wood moisture measuring mode; [4)] with standard electrodes
** at 0…40 °C, otherwise ± 0.7 °C ; ** in the range of 6 %…30 % wood moisture; *** not condensing*

Multifunctional measuring instrument T2000

BENEFITS IN PRACTICE:

- Multifunctional measuring instruments with digital precision without the measured value drift disadvantage of analogue instruments.
- SDI input for serial sensors such as temperature, relative humidity, flow speed and destruction-free humidity measurement.
- Input for Pt100 sensors for temperature measurement
- BNC electrode input for precision material moisture measurement (only T2000 S)
- Downward-compatible with analogue OEM sensors
- Large back-lit display
- Thumbwheel enables simple one-handed operation
- Rugged housing
- Excellent price/performance ratio

** Information available on enquiry*

The T2000 unites the expectations of industry, contractors, surveyors and architects from a "genuine" multi-functional measuring instrument for material and building diagnostics:

- **reliability**
- **flexibility**
- **security of investment**

Using the T2000 you can assemble a made-to-measure measuring instrument solution, individually tailored, that is always suitable and nonetheless grows with you when the tasks change!

Whether you are analysing supply and exhaust air currents, condensate formation, poor machine cooling, porous seals, heat accumulation, humidity fluctuations, materials that are too dry or too moist, or locating leaks using trace gas – you can accomplish the widest range of tasks in the fields of preventative maintenance, building diagnostics and damage analysis with just one measuring instrument!

On the following ten pages you will find all the information on the possible applications and system components of the T2000:

One measuring instrument for MANY applications:

- Air humidity
- Wood moisture
- Building moisture
- Moisture-Alarm
- Material moisture
- Equilibrium moisture
- Dew point
- Air temperature
- Material temperature
- Wood temperature
- Surface temperature
- Food temperature
- Gases temperature
- Bulk material temperature
- Liquids temperature
- Airflow speed
- Leak detection *Trace gas measurement*

TRO-TR-MMP-T2000-14-GB

T2000 Technical advantages | Quality, flexibility, security of investment…

A quality, German-made product

Made in Germany

Developed, manufactured and quality-checked in Germany, the T2000 stands out due to its digital precision, sturdy workmanship, ergonomic design, easy one-handed operation and value for money alike.

T2000 – built for practical use…

The rugged housing can withstand rough operating environments and the one-handed operation with the thumbwheel allows the user to concentrate on the measurement.

The large, illuminated display is well legible even in poor light conditions and the numeric values can easily be recorded photographically – an advantage for stocktaking or damage assessment.

And of course the T2000 displays either date or time for every measurement: Practical for photographic documentation.

Digital precision...

The heart of the T2000 is a 24-bit analogue/digital converter which supplies longterm stable, precision results which analogue instruments cannot achieve even in a rough environment.

The digital technology of the "Serial-Digital-Interface" (SDI) opens up a new dimension in flexibility in measuring missions for the user.

With the T2000 you have one single measuring instrument for many tasks instead of many instruments for one task!

A development from practice for practice…

Extensive tests with experienced users, research institutes and trade associations have proven the high practical capabilities of the T2000.

Due to its comprehensive assortment of sensors and electrodes, the T2000 measuring instrument is suitable both for classic applications in industrial and building diagnostics and for many building tradesmen such as screed layers, tile layers, painters and joiners, who have to check the moisture content of walls, floors or timber.

Temperature compensation with and without an external sensor is possible in wood moisture measurement.

The T2000 has a menu option which allows selection of hundreds of different kinds of wood specially for measuring the moisture content of wood materials!

It is backed up by many validated material curves stored in the software which can be selected from the T2000 wood type table with the appropriate material number.

A detailed list containing more than 5,000 trade names of approx. 500 types of wood including botanical names and family classifications is available on request.

In our wood classification database (**www.trotec.com**) all material numbers can be determined in an individual search – even using international nomenclature.

Full range of sensors and electrodes...

Another decisive practical advantages is the flexibility of the T2000.

The new concept of a universal basic unit supplemented by interchangeable sensors means that the user no longer needs to carry around a whole assortment of measuring instruments.

About 30 sensors and electrodes are available and allow many different parameters to be measured.

Besides the innovative SDI sensors, the T2000 range also includes various Pt100 sensors for temperature measurement as well as round, flat and layer-depth electrodes for measuring the moisture content of materials, timber and buildings.

A secure investment – now and in the future…

The T2000 unites digital technology, high quality equipment and numerous advantages not only in a very attractive price/performance ratio but also enables reasonable use of previous investments.

Because the T2000 is open to many sides and builds a bridge between analogue and digital technology.

In addition to the Trotec sensors you can not only connect electrodes from other manufacturers to the device with adapter cables but will also be able to combine future sensor developments with the T2000.

This is a decisive advantage: the T2000 forms the heart of the successful MultiMeasure series, which is constantly under development.

Due to the innovative interaction of the universal basic measuring instrument and intelligent sensor technology, many additional measured variables – and also new measurement techniques – can be integrated in future sensor developments.

In this way you can continue to use your existing sensors and at the same time profit from the additional advantages of the SDI sensors and future sensor solutions!

As opposed to the unavoidable technical aging process associated with solutions that use individual devices, technical progress is built permanently into the T2000 and your investment is therefore secure!

MultiMeasure T2000 – further information… ➔

T2000 Practical advantages | Numerous areas of application…

The right model for every requirement…

There are two different models available…

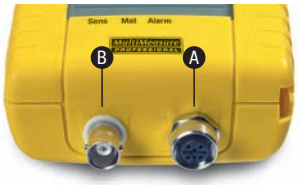
The **T2000 S** will equip you optimally for the most diverse measurement applications because you can attach to it all sensors and electrodes in the MultiMeasure programme and compatible non-Trotec sensors and electrodes.

The **T2000 E** is the inexpensive solution for all users who do not require a BNC connector for the use of passive electrodes when measuring.

Connection options for T2000 E and T2000 S models:

The T2000 E and T2000 S are fitted with a 5 pin plug connector to which you can attach Trotec SDI- and Pt100 sensors and is also compatible with non-Trotec sensors*.

The T2000 S also has a BNC input which supports the connection of electrodes for building and wood moisture measurement according to the resistance principle (Ohm's Law).



T2000 S

Connection to the 5 pin plug (A):

- Trotec SDI sensors with TC 30 SDI connecting cable
- Trotec Pt100 sensors (5-pin plug connector usually integrated)
- Non-Trotec sensors* with TC 10 adapter cable

Connection to BNC input (B):

- Passive Trotec wood and building moisture electrodes with TC 20 connecting cable
- Non-Trotec electrodes* with TC 20 adapter cable

T2000 E

** Info available on request*

Process optimisation, preventive maintenance, damage analysis…

The T2000 with its combined sensors can be used for many jobs in industry and craft.

From analysis of air inlet and outlet flows, build-up of condensation, insufficient cooling of machinery, porous seals, heat build-up, air humidity fluctuations, to materials that are too dry or too wet for both preventive maintenance, and also for structural diagnostics and damage analysis, you can undertake a very wide variety of tasks with just one instrument!

Ideal for joinery workshops, timber processing, forestry companies, the timber trade…

Whether forestry management, timber transport, wholesale trade, furniture joinery or building carpentry – with the possibility of rapid combination of various measurement techniques with only one instrument the T2000 S is suitable for many companies in timber production and processing, for example for…

- **monitoring of drying processes**
- **quality control of timber deliveries**
- **documentation of the processing quality**
- **analysis of environmental conditions in shop fitting or furniture construction**
- **damage assessment and causal analysis in the event of claims**

Precise moisture measurements of a very wide range of types of woods are no problem with the T2000.

For temperature compensation – e.g. for cold wood or measurements taken during wood drying – you can attach a Pt100 sensor to the instrument in addition to the moisture measurement electrode. The T2000 recognises the temperature sensor and compensates automatically for temperature differences.

Research work carried out by the Institute for Building Research at the RWTH Aachen, Germany, showing the accuracy of resistance measurement using the T2000 in a comparison of kiln drying, is thoroughly documented in the T2000 manual of best practice.

As an example of the results of the comprehensive series of trials the following chart shows the measurement results determined on a piece of oak.

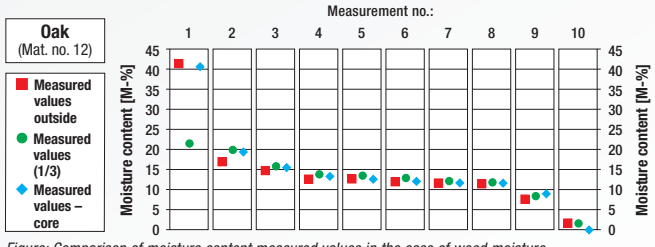
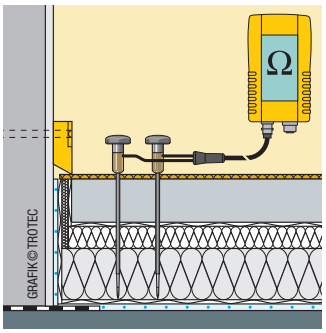


Figure: Comparison of moisture content measured values in the case of wood moisture measurements according to the resistance principle on a piece of oak, series of measurements taken on ten different dates.

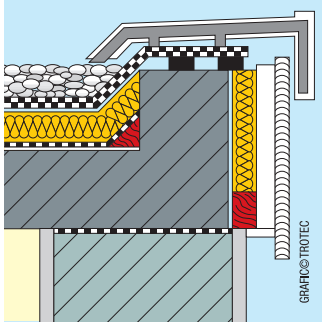
Of interest to architects, building services managers, renovators, craftsmen…

… when measuring building materials moisture levels, for example.

Use the T2000 to determine hidden humidity distributions, for example in finished floors with sound-proofed covering, multilayer insulated brickwork, insulated flat roofs or hidden beams in timbered houses.



In the T2000 practice handbook you will find many tips and descriptions of practical procedures when faced with different types of moisture damage.



T2000 Practical advantages | Combine cleverly – combination measurements and more...

Causal analysis of fungal growth due to condensation humidity…

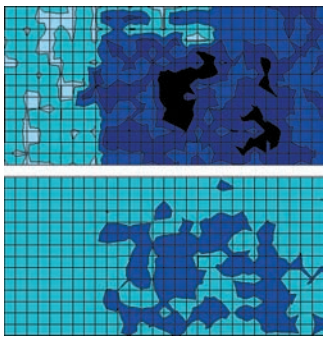
Diagnosing condensation humidity problems in homes is usually simple and reliable using combined TS 300 SDI and TS 350 SDI sensors.

Condensation humidity is manifested in many cases in increased humidity content in near-surface areas while deeper inside the brickwork it remains dry.

If additional room climate measurements using the TS 200 SDI (rel. humidity, room temperature and dew point temperature) can verify that the temperature and air conditions in the affected areas confirm the results of the measurements, for example, in the wall area, one can conclude that the ventilation is defective.

However, if the sub-surface measurement using the TS 350 SDI also indicates increased humidity values, this may suggest further causes for the humidity problem (e.g. leaking risers, gutters or drains etc.).

For this kind of problem you need just one device, the T2000, to carry out all the measurements!



Application example *(figure*)*

The humidity raster determined by combined measurement using surface and sub-surface sensors indicates condensation humidity:

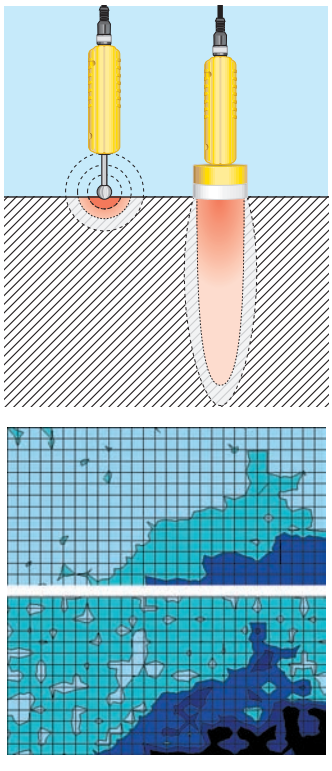
While the figure above shows strong humidity at the surface (dark areas), the lower figure shows that the internal mortar is largely dry (light areas).

Combination measurements in building diagnostics…

The combined use of surface and sub-surface moisture sensors allows you to map, limit and classify complex relationships, e.g. hygroscopic humidity occurrences due to salt build-up or to locate seal breaches and leaks.

The TS 300 SDI dielectric moisture sensor detects the top 2 to 4 cm of the building material while the TS 350 SDI microwave moisture sensor measures the volumetric humidity values up to depths of 30 cm. High humidity values in surface areas are barely considered by this sensor.

Carrying out raster measurement using both measurement processes on the basis of surface and sub-surface measured values will give reliable results about multi-dimensional moisture distribution.

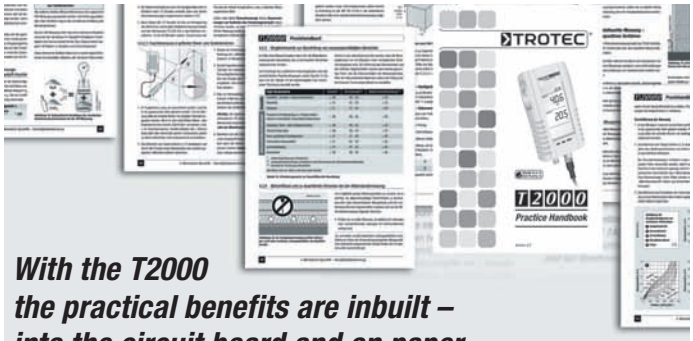


Application example *(figure*)*

Rising humidity can also be diagnosed with the combined use of both sensors.

The sub-surface moisture measurement (lower figure) in the brickwork yielded significantly higher values than the surface moisture measurement (upper figure).

* *The illustrations show area diagrams created using MS-Excel™*



With the T2000 the practical benefits are inbuilt – into the circuit board and on paper…

The T2000 not only allows you to determine the most diverse of measured variables simply and accurately, the focused combination of the different sensors and measurement processes but also enables time-saving investigation and sound analysis even of complex problems.

To ensure that you profit directly from the most effective process methodologies in different application areas we offer a comprehensive practice handbook for the T2000 user.

Along with current research results, physical principles with respect to the different measurement processes and actual descriptions of particular measurement applications, the T2000 practice handbook contains almost 70 pages of practical tips, examples of uses for combination measurements and actual procedural instructions for typical problems.

A well-written technical book with valuable practical expertise which you can put into practice in your measurement jobs.

Further information on the possible applications of combination measurements using the different T2000 SDI sensors can also be obtained in our online eltraining service zone at www.trotec.de.

There, you can get information about handling, all the device functions and the practical use of the different sensors and electrodes at any time.

Furthermore you will find diverse tips on the handling and possible applications of your Trotec measuring instrument, clearly worded and interactively illustrated, as well as answers to frequently asked questions in our eltraining zone. It's always worth a visit!

Practical accessories: Extension handle for ease of measurement in locations that are difficult to access. Can be used with all SDI sensors.
The telescopic rod and additional T2000 accessories can be found on page 27.

MultiMeasure T2000 – further information… ➔

T2000 SDI sensors | Overview of models

Simply operation, intelligent technology

SDI sensors are sensors with a “Serial digital interface”. Both T2000 models have a 5-pin plug connector to which various SDI sensors can be attached to allow the display of a vast range of measured values on the device itself.

In this case values such as air temperature, relative humidity, absolute humidity, dew point, material moisture and airflow speed are independently calculated by the SDI sensor and transmitted to the device.

The digital technology avoids the drifting that occurs with analogue devices!

All calibration settings are also saved directly in the SDI sensor. A works certificate enclosed with every T2000 documents the accuracy of the measurements.

If it is necessary to determine other measured variables on site, for example, in order to determine correlation or because new aspects have arisen during measurements which need to be checked, simply change the sensor: a thermohygrometer quickly becomes a microwave moisture sensor, a dielectric moisture sensor becomes an anemometer, or a high temperature sensor becomes a hydrogen leak locator.

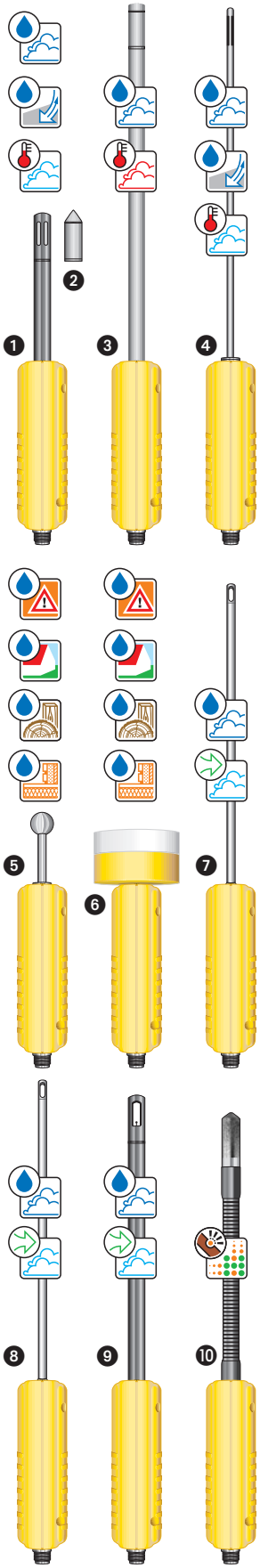
You do not need to adjust any device settings when exchanging sensors:

Thanks to its intelligent technology the T2000 automatically detects which sensor is attached when the SDI sensors are changed.

Simple operation continues throughout the measurement. Not only the minimum and maximum values but also average and “hold” values can be displayed – all in a split second and by one-handed operation with the thumbwheel.

The T2000 also has a side locking slit in which the sensors can be held.

In this way, measurements and device settings can be carried out single-handedly, leaving your other hand free for other activities!



T2000 SDI sensors | Overview of models

Climate measurement

Air temperature and air humidity

TS 200/220/240 SDI – climate sensors

For measuring **air temperature** and **humidity**. **Relative humidity** (r.h.), **absolute humidity** (g/m³), air temperature (°C, °F) and **dew point temperature** (dp °C, dp °F) are determined.

Temperature and humidity measured values are shown simultaneously in real time on the display of the T2000. **Minimum, maximum, average and "hold" values** can be displayed optionally in addition to the measured value.

Since there is frequently a heavy accumulation of dust and dirt under practical conditions which can lead to falsification of the measuring results and shortening of the sensor life, the TS 200 SDI ❶ **is already equipped with a metal grid filter as a standard**.

A high grade steel sinter filter ❷ is optionally available for environments with heavy soiling.

The 250 mm long stainless steel TS 220 SDI ❸ sensor fitted with a Teflon filter enables **high temperature measurements**, e.g. of drying processes up to 140 °C, and up to **180 °C** in the short-term.

The TS 240 SDI ❹ climate sensor is 250 mm long with a diameter of just 4 mm. It is therefore ideal for temperature and moisture measurements in confined places and for hygrometric comparative measurement in drilled holes > 4 mm.

Moisture measurement

Surface moisture

TS 300 SDI – dielectric moisture sensor

The area of application of the TS 300 SDI ❺ is in the **non-destructive determination of moisture distributions in areas up to 4 cm away from the surface.**

The TS 300 SDI can display **average, minimum, maximum and "hold" values**.

Sub-surface moisture

TS 350 SDI – microwave moisture sensor

With its microwave technology, the TS 350 SDI ❻ is suitable for **non-destructive moisture measurement up to a material depth of 30 cm.**

Another advantage is the **independence from the degree of salination of the material.** It therefore makes no difference to the microwave technique whether an older or a new building (hygroscopic signs of moisture) is measured.

Alarm function

Additionally an individual alarm limit can be defined with both moisture sensors.

Advantage of the alarm function:

Large areas can also be measured quickly and effectively. The user can concentrate on the target without having to watch the measuring results on the display the whole time. **As soon as the selected limit is exceeded, the sensor alerts the user with an acoustic signal!**

Velocity measurement

Airflow speed

TS 400/420/460 SDI – anemometer sensors

With these sensors it is possible to measure **airflow speed and temperature** simultaneously. **Minimum, maximum, average and "hold" values** can be displayed optionally in addition to the measured value.

The anemometer sensor TS 400 SDI ❼ is not only suitable for checking the distribution of flow and temperature in air conditioning and climate control systems but also for pinpointing weakness when demonstrating the air density of buildings (Blower Door).

Reconstruction companies also use it to check the capacity of their drying installations in insulation layer drying because this sensor allows them to determine quickly and exactly whether there is sufficient flow of air at the relief openings to dry out the insulation layer!

For measurement jobs requiring particularly precise results, particularly with small flow values up to 2 m/s, the TS 420 SDI ❽ anemometer sensor can offer a degree of accuracy of 0.04 m/s.

As a cost-effective standard anemometer sensor the TS 460 SDI ❾ is also available. Almost precise as the TS 400 SDI, but fitted with a polycarbonate tip (ø 12 mm) rather than one of stainless steel.

Trace gas measurement

Hydrogen concentration

TS 800 SDI – trace gas sensor

This sensor ❿ enables **non-destructive location of the highest concentration of hydrogen** in the measurement area, for example for locating cracks and leaks in pressure vessels, pipes, tanks etc.

The size of the test object is irrelevant here, since the sensor system's **high resolution** accuracy and **measurement range from 0 to 1000 ppm H_2** allow it to detect even the smallest concentrations of hydrogen from 1 ppm H_2.

Rising and falling hydrogen concentrations are indicated during the measurement by an acoustic indicator in the sensor handle and also by the numerical display of the measured value on the display of the T2000.

In this manner, the user can orientate himself, with regard to the highest H_2 concentration, either to the interval of the acoustic signal or to the displayed measured value and thus systematically isolate the leak.

Besides 6-step sensitivity adjustment, the control unit (BatteryPack) features a special function for differentiated indication measurement by means of two real-time measured values based on different positional coordinates.

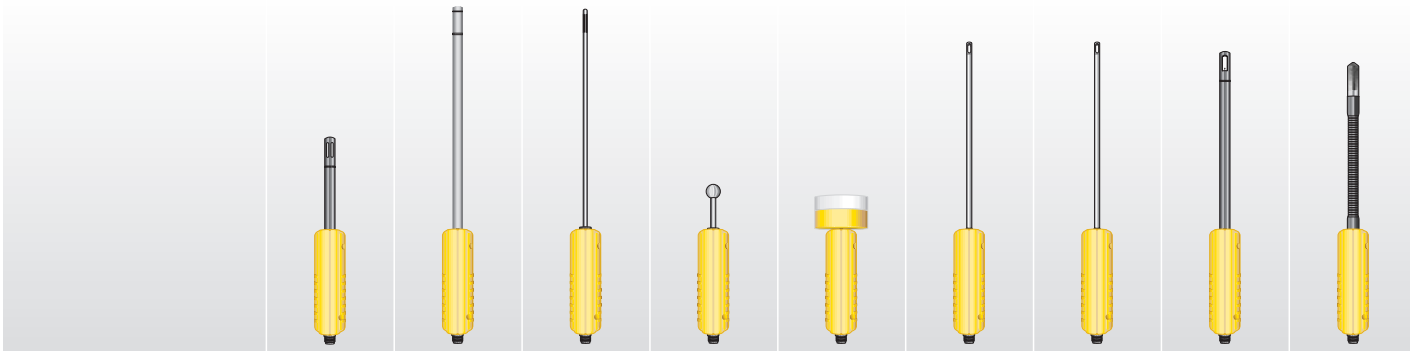
The high performance rechargeable battery integrated in the BatteryPack enables continuous mobile use of the sensor system for approx. 4 hours.

Detailed information on the possible applications of this trace gas sensor system can be found in the chapter "Leak detection" from page 34…

Made in Germany

Developed, manufactured and quality-checked in Germany, these measuring instruments, which have been awarded the quality seal, stand out due to their digital precision, sturdy workmanship, ergonomic design, easy one-handed operation and value for money.

T2000 SDI sensors | Technical data



SDI sensor		TS 200 SDI	TS 220 SDI	TS 240 SDI	TS 300 SDI	TS 350 SDI	TS 400 SDI	TS 420 SDI	TS 460 SDI	TS 800 SDI
Article no.		*ZB9112001*	*ZB9112006*	*ZB9112004*	*ZB9112002*	*ZB9112005*	*ZB9112003*	*ZB9112007*	*ZB9112008*	*3.510.220.211*
Sensor type		**Climate**			**Material moisture**		**Anemometer**			**Trace gas**
Sensor display 1	Measured value	Air temperature			Close to surface	Depth measurement	Air temperature			Hydrogen concentration
	Units	°C, °F			Digit		°C, °F			Digit
Sensor display 2	Measured value	Relative humidity, absolute humidity, dew point					Airflow speed			Hydrogen concentration
	Units	% r.H., dp °C, dp °F, g/m³					m/s			Digit
Air temperature	Measuring range	-20.0 °C ... +50.0 °C	-40.0 °C ... +140.0 °C, temporary +180 °C	-40.0 °C ... +100.0 °C			0.0 °C ... +50.0 °C			
	Resolution	0.1 °C					0.1 °C			
	Accuracy	±0.4 °C (at -10 °C at +50 °C), otherwise ±0.5 °C	±0.2 °C (at 20 °C), ±0.7 °C (at -40 ... +140 °C)	±0.2 °C (at 20 °C), ±0.7 °C (at -40 °C ... +100 °C)			+ 0.7 °C (at v > 0.5 m/s)		+ 1.0 °C (at v > 0.5 m/s)	
Air humidity	Measuring range	0,0 ... 95.0 % r.H.	0,0 ... 100.0 % r.H.	0,0 ... 95.0 % r.H.						
	Resolution	0.1 % r.H.								
	Accuracy	± 2 % r.H.	± 2 % *	± 2 % r.H.						
Material moisture	Measuring principle				Dielectric	Microwave				
	Measuring range				0.0 ... 200.0 digit					
	Resolution				0.1 digit					
	Accuracy				0.1 digit					
	Depth of penetration				max. 40 mm	max. 300 mm				
Airflow speed	Measuring range						0.00 ... 20.00 m/s	0.00 ... 2.00 m/s	0.00 ... 20.00 m/s	
	Resolution						0,01 m/s			
	Accuracy						± (0.2 m/s + 2 % of the measured value)	± (0.04 m/s + 1 % of the measured value)	± (0.2 m/s + 3 % of the measured value)	
Hydrogen concentration	Measuring range									0 ... 1,000 ppm H_2
	Response sensitivity									1 ppm H_2
Menu options		Max., Min., Hold, Avg., Sens, Unit 1, Unit 2, Time, Date, Auto Off, Cal 1, Cal 2			Max., Min., Hold, Avg., Sens, Alarm, Time, Date, Auto Off		Max., Min., Hold, Avg., Sens, Unit 2, Time, Date, Auto Off			*See detailed description of the TS 800 SDI sensor system on page 34 of the catalogue*
Sensor pins	Material	Polycarbonate	Stainless steel		Stainless steel	Several	Stainless steel		Polycarbonate	
	Length / Diameter	108 mm / 12 mm	250 mm / 12 mm	250 mm / 4 mm	55 mm	45 mm / 32 mm	210 mm / 6 mm		200 mm / 12 mm	
Sensor handle		Operating conditions 0 °C ... +50 °C (Measurement electronics in the sensor handle)								

** at 0 ... 90 % r.H., ± 3 % at 90 ... 100 % r.H.*

T2000 Pt100 sensors for temperature measurement

With the Pt100 sensors, **minimum, maximum, average and "hold" values** can be displayed in the second display in addition to the real time temperature values of solids, bulk goods, liquids, gases or foodstuffs in T2000 measuring applications.

❶ TS 110/150 – insertion temperature sensors

The class B sensor with a 150 mm long measuring tip (ø 4 mm) is particularly suitable for temperature measurement in liquids (e.g. water) or bulk goods (e.g. sand).

Measuring range -40 °C … +400 °C.
Article no.: ZB9111501

❷ TS 120/150 and ❺ TS 120/300 – immersion and flue gas temperature sensor

The robust TS 120 sensor is available with a tip length of 150 mm (ø 3 mm) and 300 mm (ø 3 mm).

The precision class A sensor is particularly suitable for temperature measurement in liquids (e.g. water) or flue and exhaust gases of burner units.

Measuring range -40 °C … +400 °C.
TS 120/150:
Article no.: ZB9111505
TS 120/300:
Article no.: ZB9111507

❸ TS 130/150 – surface temperature sensor

The head of the 150 mm long measuring tip (ø 4.5 mm) carries a spring-loaded sensor which picks up the surface temperature.

The class B sensor is particularly suitable for use of temperature compensation in determining moisture content of wood.

The shape allows accurate determination of the surface temperature.

Measuring range -50 °C … +400 °C.
Article no.: ZB9111510

❹ TS 125/300 – high-precision insertion temperature sensor

The class 1/10 DIN B sensor with a 300 mm long measuring tip (ø 4 mm) is particularly suitable for high-precision temperature measurement in liquids (e.g. water) or bulk goods (e.g. sand).

Measuring range -40 °C … +400 °C.
Article no.: ZB9111508

❻ TS 140/150 – insertion temperature sensors

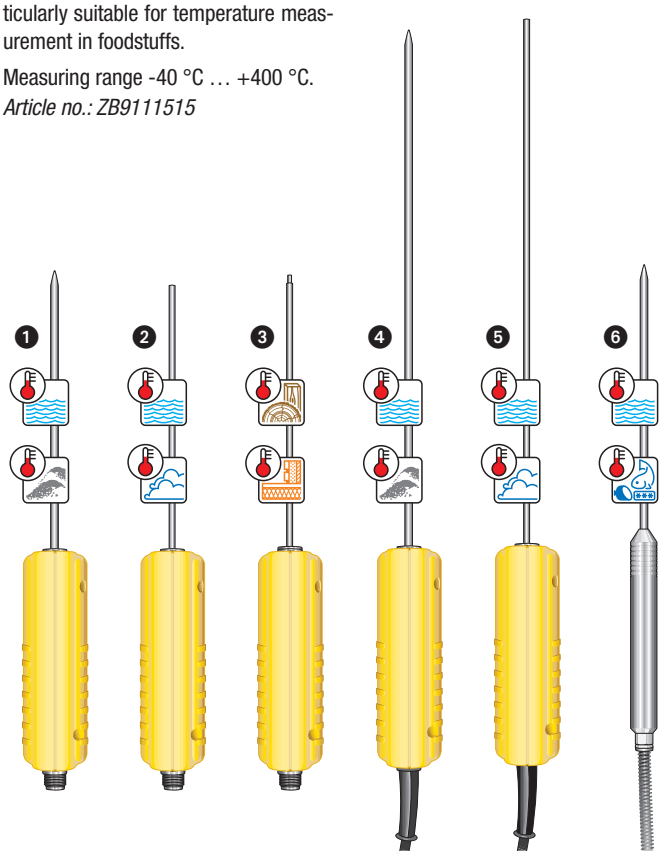
This class B sensor has a high grade steel handle and measuring tip (ø 4 mm) as a special feature and is therefore particularly suitable for temperature measurement in foodstuffs.

Measuring range -40 °C … +400 °C.
Article no.: ZB9111515

When carrying out wood moisture measurement using the T2000 S it is possible to connect a Pt100 sensor to the measuring device for temperature compensation – e.g. for cold wood or measurements taken while wood is drying – in addition to the moisture measurement electrode.

Further adjustments at the T2000 are not necessary.

The measurement device automatically detects the connected temperature sensor and compensates the tem perature difference accordingly.



Why Pt100?

Electrical temperature measurements can be performed in accordance with various measurement principles, for example on the basis of the resistance principle or using thermo-elements.

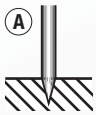
Thermo-elements (such as those integrated in the TS 200 SDI sensor, for example) offer a large measurement range in conjunction with a fast reaction time.

The T2000 temperature sensors measure surface temperature in accordance with the resistance principle. Although such resistive sensors are slower than thermo-elements, their advantage lies in the precise temperature indication.

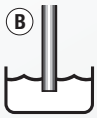
The measuring probes of the MultiMeasure temperature sensors are made of the corrosion-resistant precious metal platinum (Pt), since this exhibits the best characteristics.

These temperature sensors are called Pt100 resistance thermometers on account of their nominal resistance of 100 Ω at 0 °C.

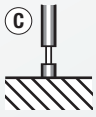
Designs and possible applications



Sensor with probe tip (A) for measuring in plastic and soft media.



Immersion sensor (B) for measuring in liquids, powdery media, air and gases.



Surface sensor with flat measuring tip (C) for measuring effective heat conductors and on flat and planar surfaces.

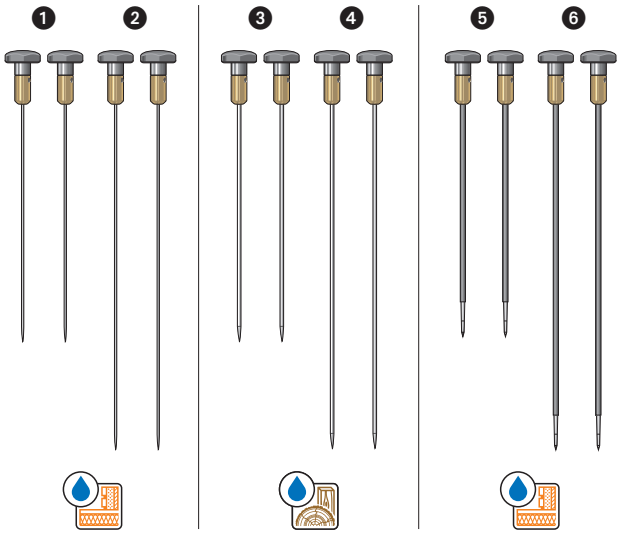
Sensors with heatresistant measuring tip (D) for measurements in extremely high temperatures.

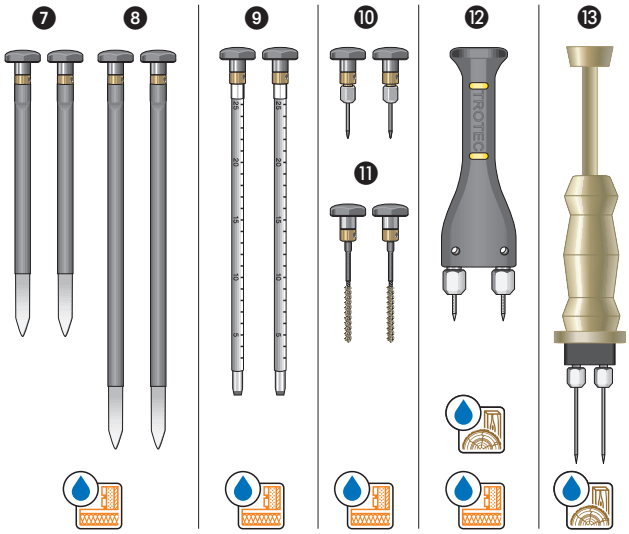
MultiMeasure T2000 – further information… ➔

T2000 Electrodes for wood and building moisture measurement

Different types of passive electrodes are used for determining the material or wood moisture and the humidity of mineral or porous building materials such as plaster or screed according to the resistance measuring method.

The **minimum, maximum, average and "hold" values** can be displayed with these electrodes in addition to the real time values when measuring with the T2000 *(S model only)*.





❶ TS 4/200 and
❷ TS 4/300 round electrodes

Very thin insertion electrodes (uninsulated, ø 2 mm) for moisture measurement in building and insulating materials through joints or cross joints.

TS 4/200 (length 200 mm),
Article no.: ZB9111010

TS 4/300 (length 300 mm),
Article no.: ZB9111015

❸ TS 8/200 and
❹ TS 8/300 round electrodes

Uninsulated insertion electrodes (ø 4 mm) for measuring moisture on loose mounds such as wood wool or shavings.

TS 8/200 (length 200 mm),
Article no.: ZB9111020

TS 8/300 (length 300 mm),
Article no.: ZB9111025

❺ TS 12/200 and
❻ TS 12/300 round electrodes

Insulated electrodes (ø 4 mm) for specific moisture measurement in concealed component levels where the electrode shaft needs to be insulated.

Absence of insulation would falsify the measuring result.

The most frequent use is the determination of moisture distribution of multilayered wall or ceiling structures such as floating screeds, multilayered walls, wooden beam ceilings, hot roofs etc.

TS 12/200 (length 200 mm),
Article no.: ZB9111030

TS 12/300 (length 300 mm),
Article no.: ZB9111035

❼ TS 16/200 and
❽ TS 16/300 flat electrodes

The area of application corresponds to the area of application of the insulated round electrodes TS 12/200 and TS 12/300. The advantage of the flat electrodes (1 mm flat) is that there are no holes in the surface and the electrodes can be inserted through the edging strip after removing the base.

Available in the lengths 200 mm (TS 16/200) and 300 mm (TS 16/300).

TS 16/200 (length 200 mm),
Article no.: ZB9111040

TS 16/300 (length 300 mm),
Article no.: ZB9111045

❾ Layer depth electrodes
TS 24/250

The area of application is the specific layer moisture measurement in homogeneous building materials using the contact mass. The material humidity can be determined according to the length up to a maximum depth of approx. 250 mm. The electrode is made up of the electrode tube and the electrode rod.

The electrode tubes (ø 8 mm) are insulated and equipped with a depth scale so that the measured value can be measured at the desired measuring depth.

Article no.: ZB9111055

❿ TS 50 insertion electrodes

The two-part insertion electrode TS 50 enables the variable distance when positioning the electrode pins. The area of application is the measurement of moisture in hard building materials such as concrete or screeds.

The two hexagon union nuts also allow replacement of the following available electrode pins:

- 20 mm *(max. penetration depth 14 mm)*
- 30 mm *(max. penetration depth 24 mm)*
- 40 mm *(max. penetration depth 34 mm)*
- 60 mm *(max. penetration depth 54 mm)*

Article no.: ZB9111100

⓫ TS 20/110 brush electrode

With 110 mm long brush head (ø 7 mm) and insulated shaft.

The area of application is the specific measurement of moisture in a homogeneous building material without using a contact mass. The connection to the goods to be measured is made by the brush head.

Article no.: ZB9111050

⓬ TS 60 hand electrode

Unbreakable plastic handle with two hexagon union nuts in which electrode pins of the following lengths can be inserted.

- 20 mm *(max. penetration depth 14 mm)*
- 30 mm *(max. penetration depth 24 mm)*
- 40 mm *(max. penetration depth 34 mm)*
- 60 mm *(max. penetration depth 54 mm)*

Article no.: ZB9111105

Areas of application are measurement of moisture in cut timber or wooden board materials (e.g. chipboard or fibre boards) and measurement of moisture in soft building materials such as plaster or roughcast mortar.

⓭ TS 70 hammer electrode

With moving hammer handle for precision zone and depth measurement especially in woods with different moisture distribution, e.g. liquid nests using teflon-coated electrode pins. These are available in lengths of 45 and 60 mm.

Article no.: ZB9111110

T2000 MultiMeasure accessories

MultiMeasure case 2
Standard case for T2000 and accessories.
Article no.: ZB9119017

MultiMeasure case 5
Large, sturdy case with sufficient storage space for all MultiMeasure equipment.
Article no.: 3.510.200.921

Holster 2 MM series
Bag with belt loop for T200, T250, T500 and T650 compact hand-held measuring instruments.
Article no.: 3.510.200.223

Holster 5 MM series
Bag for T2000. With shoulder strap and belt loop, clip for sensor and additional compartment for BatteryPack.
Article no.: 3.510.200.219
(T2000 and BatteryPack are not contained in the scope of supply)

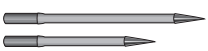
BatteryPack for TS 800 SDI
Article no.: 3.510.200.209

Charger for BatteryPack
Article no.: 3.510.200.208

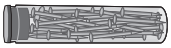
Extension handle
For the connection of SDI sensors. Ease of measurement for locations that are deep down or high up, and difficult to access.
Article no.: ZB9119018

High grade steel sinter filter for T200, T250 and TS 200 SDI
Replaceable protective cap for areas of application with heavy soiling.
Article no.: ZB9119003

Tefloncoated electrode pins
Available in lengths of 45 and 60 mm, ø 1.5 - 2 mm.
Article no.:
ZB9119001 (length 45 mm),
ZB9119002 (length 60 mm)



Spare electrode pins
Uninsulated.
Article no.: ZB9119015



Contact mass
Article no.: ZB9119013

TC 10 SDI adapter cable
For connecting OEM sensors to the 5-pin connector of the T2000
Article no.: ZB9119010

TC 20 connecting cable
For connecting Trotec electrodes for building and wood moisture measurement as well as other makes of sensors to the BNC connection of the T2000 (only T2000S).
Article no.: ZB9119011

TC 30 SDI connecting cable
For connecting the SDI sensors to the T2000
Article no.: ZB9119012

Calibration block
For single point calibration (r.h.) of the T200, T250, TS 200 SDI and TS 220 SDI using the appropriate calibration ampoules (supplied without sensor and ampoules).
Article no.: ZB9119004

Calibration ampoules for T200, T250, TS 200 SDI and TS 220 SDI
Available for 35, 50 and 80 % moisture.
Article no.: ZB9119005

Test Block V1
For checking measurement deviations and measurement accuracy when using resistance electrodes for the measurement of moisture in wood or buildings using the T500 or T2000 S MultiMeasure measuring instruments.
Article no.: 3.510.200.226

BENEFITS IN PRACTICE:

- Maintenance-free and ultra-compact
- Ideal for long-term measurements
- Memory for up to 240,000 values
- Tamperproof recording and documentation
- Up to four separate measurement channels
- Low energy consumption
- Variable measurement intervals, timer function, continuous measurement
- Alarm function for each measurement channel
- incl. SmartGraph professional software

MultiMeasure PROFESSIONAL

With the MultiMeasure instruments in the DL Series the term data logger has been redefined.

Alongside the traditional fields of application the additional options for connecting and combining various sensors and electrodes open up a greatly expanded range of applications!

- **Tamperproof recording**
- **Air temperature**
- **Surface temperature**
- **Material temperature**
  - *Bulk materials*
  - *Liquids*
  - *Solids*
- **Temperature alarm**
- **Air humidity**
- **Wood moisture**
- **Building moisture**
- **Material moisture**
  - *Bulk materials*
  - *Solids*
- **Moisture alarm**

Data loggers

For manipulation-proof logging and documentation of climate data and other measuring variables

From the ultra-compact DL 100 C, without display, for the unobtrusive recording of room climate, up to the versatile DL 100 P with four different measurement channels and the option of connection an external temperature sensor and electrodes for measurement of material moisture – the instruments in the MultiMeasure Series provide you with the optimum data logger for any type of application.

Made in Germany

With or without display – thanks to the large memory and the low current consumption these instruments are ideally suitable for long-term, tamperproof measurements in both mobile and stationary applications.

All the data loggers in the DL Series are maintenance-free and easy to use and can be operated in environments between -30 °C and +60 °C.

All models are equipped with a USB interface to facilitate speedy transfer of data. There is also a USB connecting lead included in the scope of delivery, which means that the data loggers are fully ready for operation.

Ideal for long-term measurements

Depending upon the particular model the data loggers are fitted with either two or four measurement channels, permitting a very wide variety of measured parameters to be determined.

In each channel it is possible to store 60,000 measured values, in the case of the four channel models up to 240,000 individual values, therefore, while the time intervals for recording the measured values can be individually adjusted.

For each item of measured data the date and time of recording are automatically stored with the item.

Wide range of sensors

With their internal sensors these data loggers are reliable measuring devices for autonomous monitoring, logging and tamperproof documentation of temperature and moisture in industrial and construction applications. Moreover the models with additional options for connecting external sensors and electrodes open up a wide range of other applications, for example the simultaneous measurement of material moisture and temperature or the logging of the moisture content of screed, wood, plaster, bulk solids or other such materials.

But these aren't the only reasons why MultiMeasure data loggers are an indispensable part of the programme when it comes to verifying one's obligation to provide due diligence and in questions of warranty and liability.

Which data logger is the right one for me?

A guide to the areas of application…

Application	DL 100 C	DL 100 E	DL 100 F	DL 100 H	DL 100 M	DL 100 P
Manipulation-proof long-term measurement and logging of climate data	●	●	●	●	●	●
Logging of measuring data without displaying the readings	●	●	●	●	●	●
Data assessment and export; Determination of dewpoint and absolute humidity	●	●	●	●	●	●
Application as a measurement station with direct display of the readings, alternatively with logging function				●	●	●
Especially low-key climate data documentation, for example for use in rented accommodation		●	●	●		
Climate cabinet monitoring, climate monitoring in adjoining rooms or inaccessible measuring spots					●	
Collection and logging of surface temperatures		●	●		●	●
Temperature monitoring of liquids		●	●		●	●
Collection and logging of building material and wood moisture with MultiMeasure resistance electrodes			●			●
Moisture and temperature measurement of bulk materials			●		●	●

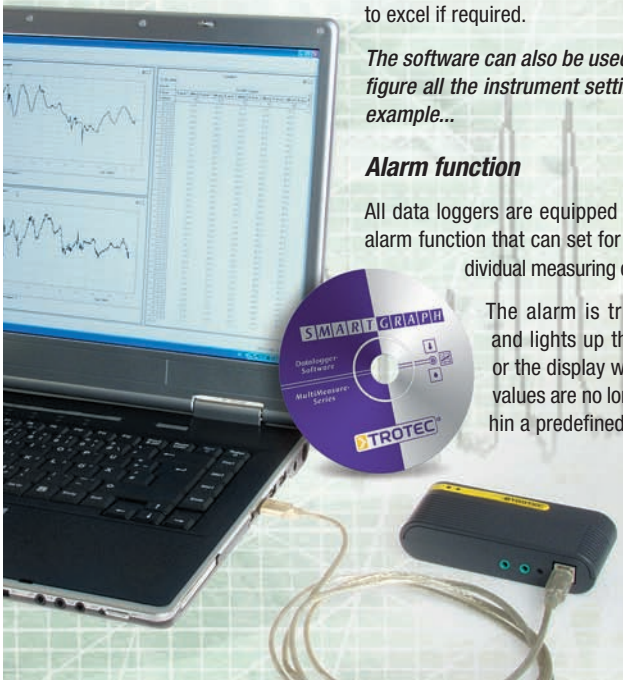
Professional software for configuring and assessment

There is a professional version of SmartGraph software included in the scope of delivery of each of the data loggers in the DL Series.

As well as providing a clear and lucid graphic and numeric representation of the readings, the software also enables the user to carry out a dewpoint analysis in both °C and °F.

The software also enables the user to calculate and depict the absolute humidity in g/m³. The measuring data can be filed automatically and exported to excel if required.

The software can also be used to configure all the instrument settings, for example...



Alarm function

All data loggers are equipped with an alarm function that can set for each individual measuring channel:

The alarm is triggered and lights up the LEDs or the display when the values are no longer within a predefined range.

Variable measurement intervals

The starting time of data logging, measurement intervals and the duration of logging can all be configured separately. This means that logging can commence whenever the user sees fit.

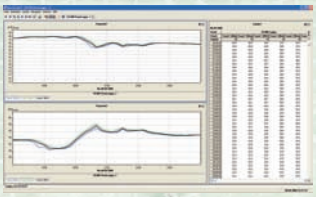
Uninterrupted measuring is also alternatively possible: the user is then able to decide whether the logger should be set to switch itself off when the memory capacity is full or to resume logging again automatically.

A variety of configuration possibilities...

The software can be used to adjust the type of logging values and the memory rates to suit each individual requirement.

By being able to adjust the measuring intervals, the user can significantly control the duration of the period in which logging is to take place.

If you intend to compile a sweeping report and wish to utilise all the options that this software has to offer, then the software can be set to log the mean maximum and minimum value of each measuring channel.



When set to a memory rate of 10 minutes, the logger is able to continue logging for as long as approximately 183 days.

The memory rate can be reduced to intervals of one minute when logging is intended at shorter intervals. This, however, reduces the maximum time in which logging can be carried out.

The logger can also be set to log just a single value, the mean value for example, if long-term documentation is intended.

When set to a memory rate of 10 minutes, the logger is able to continue logging in this configuration for as long as 416 days!

MultiMeasure data loggers – further information… ➔

Precision and reliability "made in Germany" – the data loggers in the MultiMeasure Series are especially well-suited for a whole host of different applications

Application possibilities in industry:

- manipulation-proof logging of climate data during the processing, storage and transport of sensitive goods
- moisture and temperature measurement of bulk materials
- temperature monitoring of liquids
- climate control in archives

…examples of use for property management, trade and crafts and building and construction:

- construction damage analysis
- verification of due diligence during building and construction
- refrigeration engineering, air conditioner and heater construction, climate monitoring
- climate control in archives, museums and exhibitions
- logging of climate data in problematic areas (mould or damage caused by damp)
- low-key climate data documentation in rented accommodation (proper airing)
- logging of screed heating protocols
- documentation of the room climate to ascertain the correct laying point for parquet flooring, PVC etc.

Application benefits for construction drying and water damage restoration:

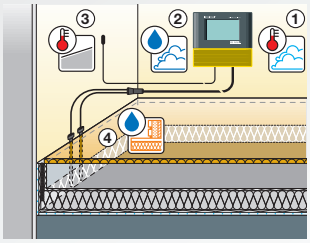
Profit from the benefits of these data loggers during the different stages of the drying process by being able to take simultaneous material moisture and temperature measurements, as well as being able to log the moisture content in insulation layers, screed, wood and plaster and other materials:

The alarm function allows potential damage to the structure to be identified prematurely and for the situation to be corrected in time. Uninterrupted documentation of all work that has been carried out provides an effective means to ward off any claims for recourse!

The manipulation-proof documentation of all measuring data means that you are already in a position to fulfil any demands that your insurance company is likely to make in the near future!

Examples in practice:

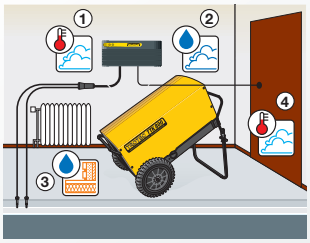
Example 1 – monitoring of insulation drying



The DL 100 P's internal sensor allows the data logger to record both the room temperature (1) and the relative humidity (2). The TS910's external sensor monitors the surface temperature of the wall (3) while the flat electrodes placed at the outer edge of the insulating layer log the moisture content (4).

The optical alarm is triggered as soon as the values are no longer within a predefined range.

Example 2 – documenting the drying process



The DL 100 F data logger logs the room temperature (1) and relative humidity (2) as well as the moisture content in plaster and screed (3) during the entire drying period.

By additionally monitoring the temperature of the adjoining rooms (4), it is also possible to determine if windows or doors were opened during the user's absence.

Numerous measuring channels – innumerable possibilities

The data loggers are all serially equipped with two independent measuring channels to log the air temperature and relative humidity

The sensors are integrated in the sturdy ultra-compact casing. The DL 100 M is the only model that needs to be configured externally.

The twin-channel DL data loggers' solid construction makes them reliable standalone measuring devices designed to monitor and register the temperature and humidity while delivering manipulation-proof documentation of the whole process.

The data logger models with four measuring channels offer even greater possibilities:

in addition to the two internal sensors designed to measure air temperature and air humidity, the four-channel loggers are also equipped with two external ports.

Because they are able to determine and log four different measuring variables simultaneously, the data loggers are ideal for a variety of applications in industry, trade and crafts and building and construction: they can be used, for example, to measure material moistness and temperature simultaneously, or to log the moisture content of screed, wood, plaster, bulk materials and other materials.

The generous 6 m extension lead provides the external sensor TS910 with a big action radius, while the IP 65 protection class means that the TS910 is also able to monitor the temperature of liquids.

The entire MultiMeasure range can be used in connection with moist electrodes (see catalogue p. 26)

	Measurement channels	DL 100 C	DL 100 H	DL 100 E	DL 100 F	DL 100 P	DL 100 M
INTERNAL	Air temperature	1x	1x	1x	1x	1x	–
	Air humidity	1x	1x	1x	1x	1x	–
EXTERNAL	Temperature measurement… • TS930 sensor for measuring the air temperature • TS910 sensor for the internal and external measuring of the surface, material or surrounding temperature			2x TS910 TS910	1x TS910	1x TS910	2x TS930
EXTERNAL	Moisture measurement… • MM-TS… All MultiMeasure electrodes for the measuring of moisture in screed, plaster, wood and other materials (connectable with TC 20 connecting lead) • TS940 sensor for measuring the relative humidity				TC20 1x MM-TS…	1x TC20 MM-TS…	or 1x TS940

All the specifications for the DL range for rapid comparison...

MultiMeasure Data logger		DL 100 C	DL 100 H	DL 100 E	DL 100 F	DL 100 P	DL 100 M
Article number		ZB9100112	ZB9100115	ZB9100113	ZB9100114	ZB9100118	ZB9100117
Function and alarm display		LED	Display	LED		Display	
Measurement channels		2		4			2
Data memory max. measured values		120,000		240,000			120,000
Start / stop button		•	•	•	•	•	•
PC interface		USB Typ B					
Measurement channel 1		Internal temperature sensor; NTC					[1] 5-pole
Measurement channel 2		Internal relative humidity sensor; capacitive, HC Series					[1] 5-pole
Measurement channel 3		–	–	[2] 3.5 mm	[3] BNC	[2] 3.5 mm	–
Measurement channel 4		–	–	[2] 3.5 mm	[2] 3.5 mm	[3] BNC	–
Temperature (internal sensors)	Measurement range	-20 °C … +50 °C					–
	Resolution	0.1 °C for T: 0 … 40 °C, otherwise 0.2 °C					–
	Accuracy	0.3 °C for T: 0 … 40 °C, otherwise 0.5 °C					–
Temperature (external sensors)		–	–	see sensor [4]			
Rel. humidity (internal sensors)	Measurement range	0 … 95 % r.h. or < 30 g/m³ (the lower value applies), non-condensing					–
	Resolution	0.5 % r.h.					–
	Accuracy	3.0 % r.h.					–
Rel. humidity (external sensors)		–					see sensor [4]
Material moisture [3] (external sensors)	Measurement range	–	–	–	15 … 100 digit		–
	Resolution	–	–	–	1 digit (range 20 … 80 digit)		–
	Accuracy	–	–	–	± 3 digit (range 20 … 80 digit)		–
Power supply / battery		3.0 … 3.7 V / LS14500C (Saft), service life approx. 1 year with an interrogation interval ≥ 1 min.					
Dimensions		25 x 110 x 54 mm	25 x 110 x 115 mm	25 x 110 x 54 mm	25 x 110 x 54 mm	25 x 110 x 115 mm	25 x 110 x 115 mm
Supply package - standard		Measurement instrument, 1 m USB cable, software CD with instructions, Mounting kit for wall installation, Trotec factory certificate					

[1] 5-pole plug connector (M12) for connection of the external sensors, TS930 (temperature) or TS940 (temperature/humidity combined sensor)

[2] 3.5 mm jack bush for connection of the TS910 external surface temperature sensor

[3] BNC plug connector for connection of an external electrode for wood and building moisture measurement

[4] dependent on the sensor connected. See technical data for the sensor.

External sensors		TS910	TS930	TS940
Connection		3.5 mm jack plug	5-pole (M12)	5-pole (M12)
Cable lenght		6 m	2 m	2 m
Protection type		IP 65	IP 65	IP 54
Temperature	Measurement principle	NTC	NTC	NTC
	Measurement range	-20 °C … +50 °C	-40 °C… +100 °C	-30 … +70 °C
	Resolution	0 to 40 °C: 0,1 °C, otherwise 0.2 °C		
	Accuracy	0 to 40 °C: 0.3 °C, otherwise 0.5 °C	-20 to 50 °C: ± 0.2 °C, > 70 °C: ± 1 °C, otherwise 0.4 °C	-20 to 50 °C: ± 0.2 °C, otherwise ± 0.5 °C
rel. humidity	Measurement principle	–	–	capacitive
	Measurement range	–	–	0…100 % r.H.
	Resolution	–	–	0.5 %
	Accuracy	–	–	± 2 % r.H.

BENEFITS IN PRACTICE:

- Flexible endoscopic one-click photo or video documentation
- Light, easy-to-use compact device
- Mobile, power-source independent operation
- Robust, waterproof, oil und petrol resistant IP57 rated videoscope probe
- Small sensor diameter of only 5.5 mm
- 3 m sensor cable
- 3.5 inch TFT active matrix LCD colour display
- Bright 4-level LED illumination with brightness control
- Automatic exposure and white balance
- Automatic power-off

The ED-BU mini videoscope

This modestly-sized measuring device in the MultiMeasure Professional Series succeeds in convincingly combining the benefits of endoscopic inspections with the potential that only cutting-edge photo and video documentation can offer – and all this packed into an extremely light and highly mobile, yet robust and easy-to-use compact measuring device.

Benefit from a whole range of possibilities, like being able to simultaneously perform indirect optical sight inspections and compile static or dynamic image protocols with just one device.

Whether intended for the detection of problem areas or weak points, situation analyses, security checks (e.g. customs) or quality control – the ED-BU's compact form, its convincing technical performance parameters and its stunningly brilliant images mean that it is simply predestined for use in the trade and craft and the building industry and in industry in general.

Professional probing the easy way

Because of its small diameter, the extremely robust, oil and petrol resistant IP57 rated videoscope probe is ideal for professional applications in the smallest of cavities as well as in pipes and service and supply lines.

A closer examination of isolated or inaccessible inspection areas or the video documentation of longer inspection sections is now a problem of the past thanks to the comfortable length and heightened flexibility of the probes.

The optionally available side view adapters make a complete and comprehensive inspection of winding or twisting inspection zones possible, while the guide ball, which is also available as an additional accessory, prevents the probe from snagging or getting stuck in corners while providing a central field of vision.

Cableless und highly mobile

From the daily experience of experts, appraisers and maintenance technicians:

As is often the case, it is not only the inspection area itself which proves to be almost inaccessible, but even the location where the inspection is to take place. In such an event there is nothing like a measuring device which neither adds to the burden nor further restrains the user's mobility.

The ED-BU was designed and developed with exactly these points in mind:

The mini videoscope does not require any cables and is not dependent on an additional external power supply. The sensors, video and memory components as well as the high-performance Li-ion rechargeable batteries with a long operating life are all housed in a compact measuring meter weighing in at only 450 g!

And because the probe is not fixed to the meter, but connected via a plug it can be disconnected during transport and then attached again when the location has been reached.

This also means that the probe can be left in the object where the inspection is being carried out in order to facilitate further inspections. In such cases the probe is simply connected to the device again.

TRO-TR-MMP-EDBU-03-GB

A whole host of application possibilities…

A combination comprising easy handling, professional technology, flexible documentation and unbeatable value for money opens totally new horizons for users in industry, the trade and crafts industry and the building industry:

Maintenance departments

A video documentation of inspection intervals permits changes in the state or condition of the inspected area to be recorded over longer periods, allowing comparisons to be drawn and conclusions regarding replacement or repair cycles to be made, which in turn can all result in a fall in down times and a drop in maintenance costs.

The trade and craft industry and production

Preparatory inspections can save a number of unnecessary steps like the needless disassembly of certain parts, machines or sections, and a "before-and-after" video protocol can be presented as evidence to prove that a job has been carried out to the contractor's approval.

Experts and appraisers

Benefit from this non-destructive appraisal method to determine the state of inaccessible weak points or problem areas and document damage areas or bad workmanship by compiling an informative and instructive photo or video protocol.

…and a sheer limitless field of application

The ED-BU mini-endoscope is ideally suited for the detection, photo or video documentation and analysis of problem or weak areas, and can prove indispensable in the line of quality control, condition analysis or as a means of verifying that work has been carried out as agreed upon.

The ideal measuring device for planners, experts and appraisers, craft enterprises in the construction business, production and maintenance departments with their main focus on automotive, machine and turbine technology as well as countless other fields of application.

You're always in the picture

The mini videoscope provides stunningly sharp and amazingly brilliant images which are presented in real-time on a large TFT active matrix LCD display.

You can focus fully on the inspection at hand while the ED-BU's intelligent sensors take care of the rest:

Expose settings, white balance, target focussing – the most important parameter are all preset or integrated as an automatic feature directly in the CMOS sensor of the measuring device.

The intensity control on ED-BU's bright 4-level LED illumination can be set individually to suit ensure that the inspection area is always illuminated just the way the user wants it.

Remarkably reliable recording…

One click only and your live inspection will be recorded as an individual photo or a video sequence and saved for documentation purposes – including the time and date if you wish.

And because the SD storage card is expandable to 2 GB you can make just about as many video sequences as you like.

You can then view the live images or any of the stored data on either the display of the measuring device or an external monitor and then transfer this information via an SD card reader or a USB cable to your PC for further analysis, processing or archiving.

Technical data		Video endoscope ED-BU 3000-5
Article number		3.510.009.414
Video probe	Length	3,000 mm
	Diameter	5.5 mm
	Line / range of vision	0° / 67°
	Depth of focus	15 - 100 mm
	Bending radius	90 mm
	Type of Illumination	4-level LED
	Protection class	IP57
System	Monitor	3.5 inch TFT active matrix LCD colour display
	Image sensor	CMOS
	Exposure	automatic
	White balance	automatic
	Image repetition frequency	30 fps (frames per second)
	Photo resolution	640 x 480 pixels
	Photo data format	JPEG
	Video resolution	320 x 240 pixels
	Video data format	ASF
	Video compression format	MPEG-4
	Video norm	NTSC or PAL
	Video out	composite video / FBAS
	Interface	USB, mini 5-pin
	Memory	512 MB SD storage card (expandable to 2 GB)
	Power supply	3.7 V Li-ion battery; rechargeable
	Weight	approx. 450 g
Scope of delivery	standard	ED-BU 3000-5 video endoscope with video probe, power supply cable, USB cable, video adapter cable, 512 MB SD storage card, operating instructions, carry case
	optional	45° side view adapter, 60° side view adapter, probe guide ball, probe magnet attachment; Video probes can be supplied in lengths of 1 m, 2 m, 5 m, 10 m, 20 m, 30 m

BENEFITS IN PRACTICE:

- Professional trace gas sensor system
- Quickly ready for use
- Economical checking of the sealing integrity of pressure vessels, pressure pipes or welded seams
- Pinpoint location of even the smallest leakages in piping networks
- Low maintenance requirements
- No regular calibration necessary
- High flexibility due to flexible swan neck
- Inexpensive system on the basis of the T2000 multi-function measuring instrument with optimum expansion options for many different measured variables and areas of application by means of the simple purchase of additional sensors

More than "just" a trace gas detector…

The T2000 is a high-precision digital multi-functional measuring instrument from the MultiMeasure series to which the widest variety of SDI sensors can be connected.

Due to the innovative concept of a universal basic device that can be supplemented by exchangeable sensors, you can convert your hydrogen leak detector into, for example, a thermo-hygrometer, a capacitive material moisture measuring device, an anemometer or a microwave deep moisture sensor by simply exchanging the sensor.

The T2000 recognises the newly connected SDI sensor automatically. If need be, you can extend the range of applications of your T2000 by simply purchasing additional inexpensive SDI sensors of your choice!

You can find further information on the T2000 and all available sensors from page 18…

TS 800 SDI trace gas sensor system

Trotec H_2 sensor technology offers you many user advantages

Benefit from the innovative combination of high precision sensor technology and a high degree of economy…

The unique properties of hydrogen open up many advantages to the users when it is used as a trace gas for locating leaks or checking the integrity of seals.

The TS 800 SDI hydrogen sensor system unites these advantages with the high flexibility of the T2000 multi-function measuring instrument in an economical fashion.

The result: a quality, German-made product, whose development combined the manufacturer's miniaturisation know-how, derived from space technology, and the latest production techniques with sensational value for money.

Compare yourself: adequate competitors' solutions are five to ten times more expensive to purchase!

Unequalled flexibility

The T2000 is a universal measuring instrument for capturing the widest variety of measured variables such as wood, building or equilibrium moisture content, dew point, or air, material and surface temperature.

The T2000's range of applications can be expanded again by the TS 800 SDI hydrogen sensor.

Like all MultiMeasure sensors, the TS 800 SDI is connected simply to the T2000 via the SDI interface.

All of the options offered by the sensor can then be entered or called up conveniently via the intuitively operated T2000 – with one hand, using thumbwheel operation.

Effective measurement methods

The TS 800 SDI sensor detects hydrogen, which is used, for example, in the usual 95/5 % forming gas as a tracer gas for the location of leaks, with a sensitivity of less than 1 ppm.

The sensor can naturally be set to a lower sensitivity for optimum adaptation to the widest variety of usage conditions.

The level of the H_2 concentration is indicated not only on the display but also by a changing audible tone interval.

The zero reset function even allows the subsequent measurement of an increased concentration in ambient air already "saturated" with tracer gas.

In combination with the very high sensitivity, even the smallest leakages can be located with pinpoint accuracy by means of multiple zero resets.

TRO-TR-MMP-WSSS-04-GB

Economical industrial testing processes

The TS 800 SDI sensor creates the prerequisites for fast testing processes, because the hydrogen measurement method is an effective alternative to conventional methods of testing sealing integrity and locating leaks that are either relatively labour-intensive and tedious, such as the bubble test after applying a soap solution to work pieces or the pressure drop test, or require high expenditure on apparatus, such as the helium sealing test.

Using the combination of TS 800 SDI sensor system and T2000, production works have an ideal measuring instrument for testing the sealing integrity of welded seams, pressure vessels or pressure pipes.

The examination of pump housings for leaks can also be performed simply and very economically using hydrogen leak detection and the T2000.

Faster location of leaks for contractors

Leak detection made easy – companies in the sanitary industry in particular, who have to detect leaks in piping networks, have the optimum and inexpensive extension to their T2000 multi-function measuring instrument in the TS 800 SDI sensor.

Besides the advantage of locating even the smallest leaks with pinpoint accuracy, contracting companies benefit from the T2000's flexibly exchangeable SDI sensors for comprehensive building diagnostics.

Whether measuring air currents, air temperature and humidity or the moisture content of materials, many technical measurement tasks can be implemented on-site using just one measuring instrument – the T2000.

TS 800 SDI trace gas sensor system

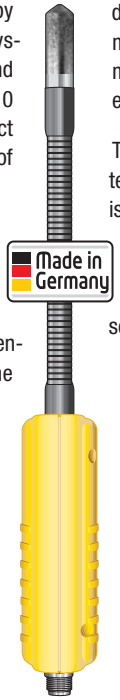
This sensor enables non-destructive location of the highest concentration of hydrogen in the measurement area, for example for locating cracks and leaks in pressure vessels, pipes, tanks etc.

The size of the test object is thereby irrelevant, since the sensor system's high resolution accuracy and large measurement range from 0 to 1,000 ppm H_2 allow it to detect even the smallest concentrations of hydrogen from 1 ppm H_2.

The sensor system has an acoustic and numerical measured value display:

Rising and falling hydrogen concentrations are indicated during the measurement by an acoustic indicator in the sensor handle and also by the numerical display of the measured value on the display of the T2000.

In this manner, the user can orientate himself with regard to the highest H_2 concentration either to the interval of the acoustic signal or to the displayed measured value and thus systematically isolate the leak.

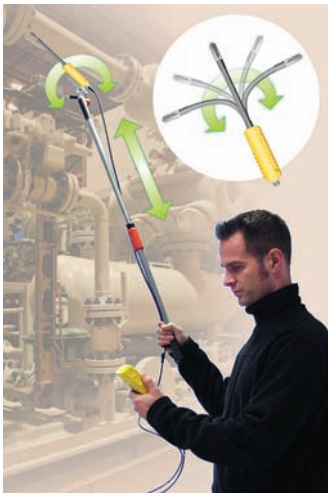


Besides 6-step sensitivity adjustment, the control unit (battery pack) additionally features a special function for differentiated indication measurement by means of two real-time measured values based on different positional coordinates.

The high power rechargeable battery integrated in the battery pack is primarily required for actively heating the sensor and enables mobile, cordless, continuous operation of the sensor system for up to four hours.

A MultiMeasure holster 5 is also available.

This useful carrying bag with shoulder strap and belt loop is fitted with a flap for storing a sensor and one pocket each for the T2000 and the battery pack.



The TS 800 SDI sensor has a flexible swan neck that can be individually adapted. This enables measurements to be made in locations that would be difficult or impossible to access using a rigid measuring head.

When used in combination with the optionally available telescopic rod it is even more effective. Due to the swivelling sensor holding tip and the variably adjustable length, the telescopic rod enables convenient measurements in low or high places that are difficult to reach.

Technical data in conjunction with the T2000	
SDI sensor code	200
Sensor 1 display	Hydrogen concentration, indicative
Measurement range	0.0 to 1,000.0 digits
Resolution	0.1 digits
Connection	TC 30 SDI connecting cable
Selectable menu options	Sens, AutoOff, Time, Date
Sensor-specific technical data	
Article no.	3.510.220.211
Response sensitivity	1 ppm H_2
Measurement range	0 to 1,000 ppm H_2
Response time	< 1 s
Pore size, sintered stainless steel filter	> 50 µm
Power supply	11 to 14 V
Battery	12 V / 2 Ah lead rechargeable battery
Current consumption active/passive	Approx. 400 mA / approx. 20 mA (sensor inactive)
Permissible ambient temperature	0 to 50 °C (operation), -20 to 50 °C (storage)
Permissible relative humidity (operation and storage)	0 to 95 R.H., non condensing

Scope of supply: the TS 800 SDI sensor and the system components are available individually or as a set.

Example TS 800 SDI sensor system set: one TS 800 SDI sensor, two TC 30 SDI connecting cables, one battery pack, one charger/adaptor, one device bag.

A T2000 multi-function measuring instrument is additionally required for operation.

MultiMeasure is our promise of service to you, to offer the ideal measuring instrument for every application in high quality, with features to suit your needs and optimum value for money.

MultiMeasure Professional combines precision with efficiency

This professional series of appliances offers users from industry, trade and the building trade a complete range of measuring instruments for maintenance and the detection and diagnosis of damage.

MultiMeasure Professional measuring instruments stand out not only due to their precise, reliable measurement results, robust workmanship or practice-optimised ergonomics and functions.

Besides that, high measuring instrument efficiency is decisive for faster validation, shortening of the duration of operation or reduction of service times without loss of quality, especially in commercial and industrial use. The MultiMeasure Professional series is committed to this standard.

A great many of these measuring instruments are developed, manufactured and quality checked in Germany, and are based on an efficiency-increasing platform and operating concept within the respective group of appliances.

In this way handling skills can be transferred from one device to another and time-consuming familiarisation when changing devices is dispensed with – for example, with the MultiMeasure hand-held appliances with uniform thumbwheel function or the various IC thermal imaging cameras.

Over and above that, many equipment extensions or accessories can be used for several devices on the same platform, thus saving on expense, and are also compatible with future innovations, making your investment safe.

MultiMeasure offers multiple possibilities and the optimum branded measuring instrument for all requirements!

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