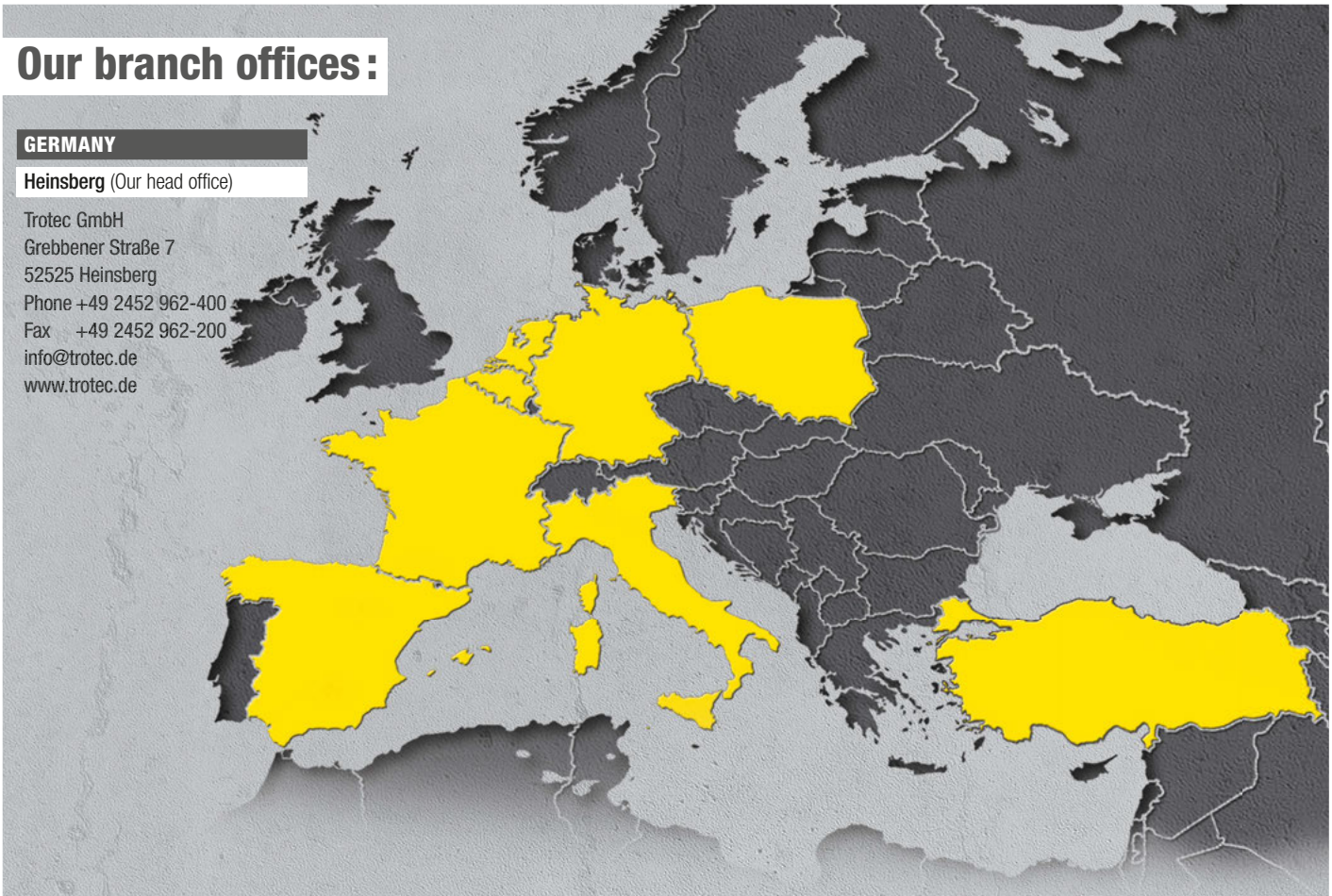
TROTEC
AT WORK.

CONDITION MONITORING

TEST AND MEASUREMENT INSTRUMENTS

INNOVATIONS 2|2022

Our branch offices:



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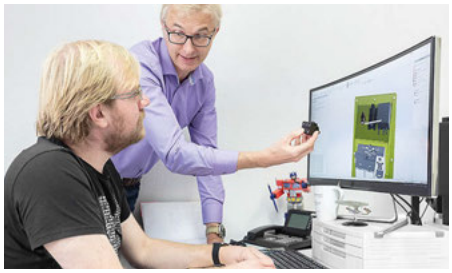
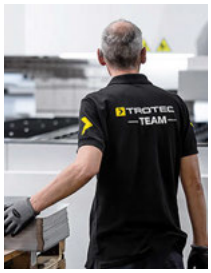
TRT-KAT-MEIV-WM-20-EN

Contents

Trotec: Innovations made in Germany.
We establish best conditions for your success.






Success has a story. And trust has a name. Trotec.

We have been an owner-managed company from the time we started. We work efficiently thanks to short decision-making paths. Our roots are deeply anchored in the craft sector and on the construction site where our company history began almost three decades ago. In the craft sector and on the construction site, solidity and reliability are just as important as speed and endurance. The practical experience we have gained there taught us that a project will only be perfectly successful if good team players are on board. Coordinating all trades and seeing which machines, which materials, which climatic conditions lead to which result is something Trotec has in its DNA. We simply know what works because our knowledge is based on experience from real life.

Experience and competence “at work”

We place great emphasis on experience-based product development. Our experience is based on life practice, and we know that every product has to solve a problem that has been an obstacle for a smooth workflow. Innovative technology with real relevance for everyday life that has to prove successful again and again – under the toughest conditions and in very different situations. Only when we get positive feedback from the working world that everything is alright, we are sure that we have kept our Trotec promise: Selling solutions, not just products.

International, German quality and technology.

Nowadays, Trotec and its subsidiaries on different continents supply industry, tradesmen and craft enterprises worldwide with professional product solutions for climate conditioning. The assortment of innovative solutions we offer ranges from machines for climate conditioning and measuring devices to special work tents and screen fences.

In the past decades our leitmotif of offering innovative technology at the best possible rates has not only made us one of the leading industrial equipment suppliers but by now also a successful provider of corresponding product solutions for private usage.

Our constant incentive? Being measurably better.

In the fields of portable measuring equipment, too, we are one of the global prime addresses. Trotec develops, produces and distributes innovative measuring devices for climate, building technology, quality and emission control, industrial maintenance as well as detection and localisation.

Trotec turn money into ideas: 10 % for research

We have become big as high-quality supplier – and would like to keep it that way. Therefore, we rely on qualified and motivated employees and invest in a future-proof development. 10 % of our turnover is principally reinvested in research and development. Employing this strategy, Trotec ensures its customers a brisk pace of product innovation as well as future-proof technology of tomorrow’s problem solvers.

More than 90 % in-house production – and always 100 % problem solving

As long as there are problems without solutions, we will continue to develop new products. Each of them must be uncompromisingly easy to use and always deliver consistent performance while withstanding a wide range of conditions. This is the Trotec standard: precision and effectiveness. That is why our focus is on the continuously growing number of products we develop and manufacture in-house – everything from a single source. Upon opening our Heinsberg production facility in 2013, 70 % of the machines of the professional range had already been developed and produced along the lines of “made in Germany”. Today’s rate is more than 90 %.

We like to share what we know

Our experts are not only here to advise you; as part of the Trotec Academy, they also offer you active know-how transfer for many tasks: In our training courses and seminars we convey theoretical and practical expertise.

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Because we are working hand in hand, your advantages with Trotec are not far to seek and can be counted on the fingers of two hands …

1 Field-tested engineering

Heinsberg accommodates the R&D department, prototype construction and state-of-the-art test rooms on 1,500 m² where more than 20 employees develop new products whilst closely working together with users and specialised suppliers. This allows us to offer you solutions that are field-tested to 100 %.

2 10 % for research – 100 % for you

With Trotec you have always cutting-edge technology, since 10 % of our turnover goes into research and development. Which means that every year you can benefit from clearly more product innovations than many a competitor has launched throughout his entire company history.

3 Manufactured in Germany

Think globally – act locally! In case of many measuring devices, too, we have deliberately decided in favour of manufacturing in Germany, because here we can rely on outstandingly qualified employees and a well-organised workflow. And only these factors guarantee the development of high-quality products!

4 German industrial design

Trotec solutions are impressive in every respect: They stand out from the crowd by the visually appealing clarity, practicality and functionality of German industrial designs and impress with technical superiority and outstanding quality.

5 Everything directly from the manufacturer

Because all of our devices, components and accessories are coming from a single source Trotec solutions are highly functional: They are exceedingly well-matched in terms of appearance and technology. These sophisticated products make an impression – on our users and also on your clients.

6 Permanent availability

It is normal for us to ship 15,000 parcels a day. That's why we basically have everything in stock all the time. Whatever you need from the Trotec range, quick delivery is no problem for us: 250,000 machines and measuring devices are permanently available for you.

7 Independent repair and maintenance service

You can rely on qualified service staff – no matter where you are. Trotec has their own service vehicle fleet and specialist workshops in Germany, the Netherlands, Belgium, Poland, France, Italy, Spain and Turkey.

8 Long-term availability of spare parts

We guarantee the value retention of your investments. Trotec can supply you now and in future with spare parts for all requirements. We have more than 100,000 spare parts constantly in stock. Count on it!

9 Optimum value-for-money ratio

For nearly 30 years now our customers have bought our products, which are giving a good return. What is more: Trotec also offers fiscal solutions when purchasing, renting or leasing. Benefit from solely Trotec financing – without involvement of a bank.

10 Comprehensive services

Along with our products you obtain important services, which ensure the functionality of your devices: Training, testers, trial operation, consultancy service and more. Furthermore available for you is the on-site service in all Trotec subsidiaries.

Solutions at the click of a mouse – twenty-four-seven …

Via our online portals (www.trotec.com) you can benefit from our various offers 24/7.

Make use of the convenient shopping opportunity in the Trotec shop: Here industrial customers, craftsmen and private users equally get their money's worth, for in the Trotec shops you'll find new equipment for all needs with an optimum value-for-money ratio, promotional offers at particularly favourable budget prices, attractive package combinations and inexpensive samples or remaining stock. Always worth a visit:

www.trotec.com

TRT-KAT-ITVC-WM-06-EN

Trotec's calibration service

Certified safety – calibration of measuring devices according to ISO standard

TROTEC CALIBRATION SERVICE

Being one of the leading full-range suppliers for building diagnostic and environmental measuring equipment, Trotec offers you the possibility to have all measuring devices calibrated, maintained and repaired by a single source.

Using a calibrated measuring device you can avoid inaccurate measurement results and reliably protect yourself from possible recourse claims.

Hence, play it safe and use our calibration service for your measuring devices:

in our own laboratory, we calibrate in compliance with the ISO standard based on strictly defined measuring ranges and points. Optionally, the calibration points can also be defined individually within the specified calibration range.

Minimizing the measurement risk – maximizing the testing equipment quality

The Trotec calibration laboratory is not only your first point of contact for a reliable calibration of thermal imaging cameras, infrared thermometers or climate measuring devices – besides the option of an ISO calibration of various measured values such as temperature and humidity, we are also able to offer calibration of other measured variables and DAkkS calibrations of your measuring equipment thanks to the cooperation with our partner G. Lufft Mess- und Regeltechnik GmbH.

ISO or DAkkS – differences between calibration types

The DIN EN ISO 9000 family of standards demands a traceable calibration of testing equipment. This is always fulfilled by a DAkkS calibration certificate, which is moreover internationally valid even without additional traceability proofs. However, DAkkS calibrations are usually only necessary if they are explicitly demanded by the customer.

The procedure does not have any influence on the traceability of the measured values:

the measured values can be presented equally both with the more cost-efficient ISO calibration and the DAkkS calibration, and the methods generally do not differ in terms of procedure or degree of diligence.

Whether ISO or DAkkS – only reliably calibrated measuring devices can provide truly reliable measurement results.

Hence, better rely on an efficient service and choose the Trotec calibration service for a tested certification of your measuring devices.

Your benefits of a calibration of your measuring devices carried out by Trotec:

- ✓ Reliable service due to our own calibration laboratory with manufacturer expertise
- ✓ Maximum security for your measurement results
- ✓ Avoidance of inaccurate results and possible rework
- ✓ Prevention of possible liability risks

You want to have your Trotec measuring device recalibrated?

Then send your measuring device together with the reference "Calibration service" and an indication of the desired calibration standard (ISO or DAkkS) to the following address:

Trotec GmbH
Trotec Calibration Service
Grebbener Straße 7
52525 Heinsberg
Germany

Many measuring devices are also available as pre-calibrated versions

Using pre-calibrated measuring devices you can from the advantages of our calibration service from the very beginning. Many of our measuring devices can be supplied both as standard models and with an ISO calibration certificate directly ex stock.

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Trotec's calibration service

Overview of calibrateable measuring devices from the latest Trotec product range:

TEMPERATURE

Thermal imaging cameras

XC300

XC600

Contact and IR thermometers

BP15

BP17

BP21

BP25

TP7

TP10

AIR FLOW

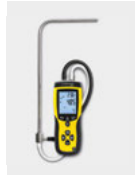
Anemometers

BA06

BA16

TA300

TA400



CLIMATE

Climate measuring instruments

BC06

BC21

BC25

BZ05

T210

T260

TC100

Climate data loggers

BL30

BZ25

BZ30

DL200D

DL200H

DL200L

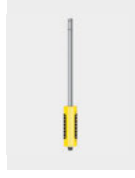
DL200P

MULTI-FUNCTION

T3000 sensors

TS 210 SDI

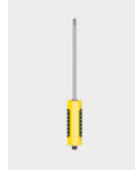
TS 230 SDI



TS 250 SDI

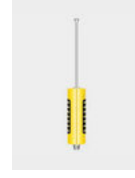
TS 410 SDI

TS 430 SDI



TS 470 SDI

TS 131 SDI



XC300 and XC600

High-resolution thermal imaging camera with PanoFold touchscreen

A FEW PRACTICAL BENEFITS:

- Fully radiometric IR camera manufactured in the EU
- 50-Hz real-time measurement and real-time image display ensure clear thermal images of high quality
- High thermal sensitivity
- High geometric resolution
- Precise temperature measurement in the entire picture
- Dual key touchscreen control
- 5 megapixel digital camera for brilliant real images
- Robust, shock-protected design in two-component construction with IP54 type of protection
- 3.5-inch PanoFold touchscreen
- DuoVision Plus function for combined display of infrared and real image as contour emphasizing detail-enhanced thermogram
- Integrated laser pointer
- Diverse measuring functions
- Optional Bluetooth voice recording
- Data transmission via USB
- High-quality analysis software included in the scope of delivery

- The unsurpassed PanoFold touchscreen can be tilted by 180° and swivelled by 270°, when closed it serves as monitor and keypad protection
- Advanced real-time thermal imaging camera with a native resolution of up to 640 x 480 pixels (307,200 measuring points)
- Quick and precise autofocus
- Integrated laser distance measuring device
- High-capacity Li-ion battery – lasts more than twice as long as a standard Li-ion battery
- Stepless 10x zoom – ideal to look at details even from afar
- Recording of IR videos – fully radiometric option as well

Price-conscious thermographers with professional needs definitely get their money's worth with the high-quality thermal imaging cameras of the XC series seeing as competition models with comparable equipment features easily cost twice as much.

A trend-setting detector in the latest design accommodates 307,200 independent temperature measuring points (XC600), every single one of which is able to capture the measuring object's current temperature values at a rate of almost sixty times per second and to display them on the large PanoFold touchscreen.

With these thermography systems you'll benefit from precise real-time measurements in high native resolution, a stepless 10x zoom, a quick autofocus with laser precision, an integrated distance measurement function, interval shooting, IR videos and numerous measuring functions, the thermal imaging cameras, further fitted with a high-capacity Li-ion battery for extremely long measuring operations, leave nothing to be desired and are supplied ready for use in a hard-shell transport case including high-quality analysis software.

All functions of the XC models were geared to meet the targets of user comfort and working efficiency. In case of the XC series, the setting options for the temperature range (span and level) that are customary for thermal imaging cameras of this class do not have to be set in the menu first to then be checked in the live image, but instead can be configured directly via cursor keys and you can watch the change live on screen.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Along with the ever-growing number of fully compatible Trotec measuring devices this software is also suited for use with the partially compatible XC series – you can even benefit from this software in case of isolated devices, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

Thermal imaging cameras of the XC series – The innovative combination of comfort an efficiency

Just swivel the monitor instead of twisting yourself into a pretzel:

The PanoFold touchscreen of the XC cameras is a top-shelf monitor unit. When closed it serves as reliable protection for monitor and operator keypad. Opened the highly luminous 3.5-inch display can both be inclined by 180° and pivoted by 270°.

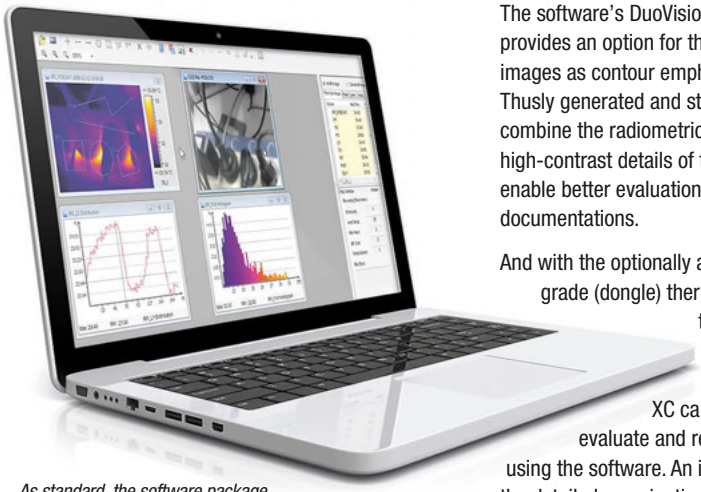
Consequently, using a camera of the XC series no user has to bend over or twist in any fashion just to inspect poorly accessible objects. This is the function of the PanoFold touchscreen which ensures that optimum thermal images are taken even of measuring objects that are not within easy reach.

High-quality analysis software included

The standard scope of delivery of each XC camera already includes a professional software package with numerous functions for the evaluation, organization and documentation of your measurement results.

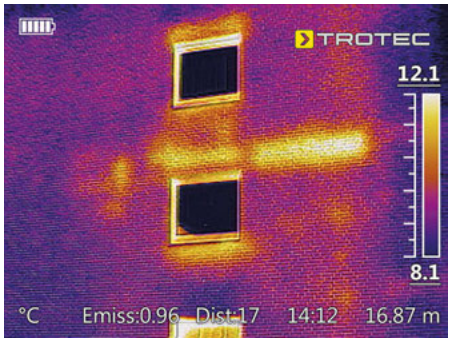
The software's DuoVision Plus function further provides an option for the fusion of infrared and real images as contour emphasizing thermal images. Thusly generated and stored DuoVision Plus images combine the radiometric image information with high-contrast details of the real image and hence enable better evaluations and still more professional documentations.

And with the optionally available professional upgrade (dongle) thermographs, synchronously to the measurement, can transfer fully radiometric infrared videos from their XC camera onto a PC and directly evaluate and record them there in real time using the software. An ideal analysis option f.i. for the detailed examination of the heat-up and cooling behaviour of electronic and mechanical components or other objects over a defined period of time.



As standard, the software package IR report is included in each XC camera's scope of delivery as download version. Not only a simple transmission and display tool but a full-fledged software for professional applications.

For a better orientation the on-demand DuoVision Plus display additionally renders important details such as lettering or object contours visible.



Other than for building diagnostics XC300 and XC600 are also ideally suited for electrical thermography or preventive maintenance in an industrial environment.

XC300 and XC600 can be flexibly controlled via buttons or touchscreen and its illuminated keypad facilitates the operation in dark surroundings.

Besides operation via keys and buttons all function entries and configurations can also be made quickly and easily via the touchscreen.

The robust cameras of the XC series are manufactured in a shock-protected, two-component construction with IP54 type of protection. At the front beside the standard lens (24° x 18°) they house a real image camera, a photo lamp, a laser pointer and an additional laser for distance measurements.

Equipment overview for the XC series

Always optimally prepared with these professional thermal imaging cameras

Thanks to many advanced equipment features these thermal imaging cameras not only quickly and effectively create transparency in thermographic measuring tasks, the model structure is also agreeably transparent:
Both models are delivered fully equipped, the only difference consists in the detector specifications!

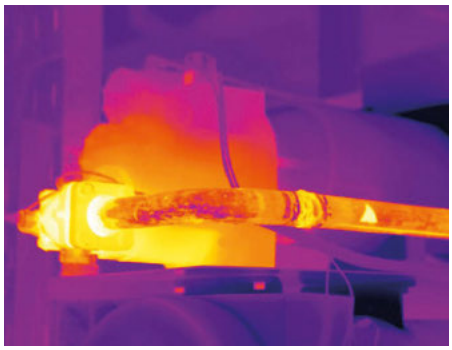
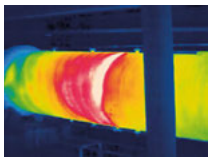
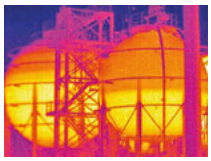
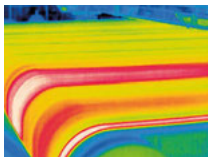
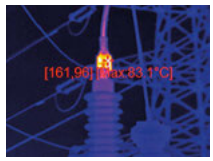
Equipment feature:	*Your practical benefit:*	XC300	XC600
Image sensor with 640 x 480 measuring points	Maximum resolution and clear thermal images are ensured by 307,200 independent temperature measuring points. This means four times more data than with a camera with 320 x 240 pixels resulting in a clearly higher measurement accuracy.	–	■
Image sensor with 384 x 288 measuring points	High measurement accuracy due to 110,592 independent temperature measuring points. With this detector you can be located more than twice as far away from the target than with a 160 x 120 detector and still measure with the same accuracy.	■	–
High geometric resolution of 0.65 mrad	Defines the solid angle measure for the smallest resolvable measuring point. The smaller this value, the more precisely can smaller problems be detected from a larger distance. At a camera-to-subject distance of one metre the individual measuring spot of each thermal pixel on principle has a diameter of 0.65 mm.	–	■
High geometric resolution of 1.1 mrad	Defines the solid angle measure for the smallest resolvable measuring point. The smaller this value, the more precise are the measurement results. At a camera-to-subject distance of one metre the individual measuring spot of each thermal pixel on principle has a diameter of 1.1 mm.	■	–
High refresh rate of 50/60 Hz	The high refresh rate ensures a permanent real-time thermal image reproduction. Not a single image and thus no important thermographic information is omitted in real-time presentations.	■[1]	■[1]
Fully radiometric thermal images	Precise temperature measurement in the entire picture, no interpolation interferences. For every single pixel the sensor has an individual measuring point, supplying accurate temperature values for this pixel only. The absolute temperature can be read pixel for pixel.	■	■
High thermal sensitivity	Reliable diagnoses even with the smallest changes in temperature. Even the smallest changes in temperature become apparent. A high sensitivity reduces thermal noise in the infrared image. The smaller the value, the better the quality of the image.	■	■
Uncooled microbolometer sensors	No movable sensor parts, extreme durability, clear and detailed images. Small size, light weight, low power consumption, completely maintenance-free.	■	■
Laser distance measuring function	An integrated distance meter permitting laser-supported distance measurements ranging up to 30 m eliminates the need for you to take an external distance measuring device with you. That way, accessibility and distance of the measuring objects can be easily determined.	■	■
Periodic image storage	Permits periodic recordings of thermal images with a preselectable recording frequency, e.g. every 30 minutes. With this recording interval you can easily document the thermal long-term behaviour of an object.	■	■
1x to 10x zoom via infinitely variable electronic regulation	An infinitely adjustable zoom with high magnification factor offers you more flexibility when looking at faraway details. This increases the number of possible applications for the inspection of poorly accessible or especially secured areas.	■	■
Autofocus system	Thanks to a motorized lens you can quickly zero in on the desired measuring object with high precision even in unclear environments.	■	■
PanoFold display – inclinable, swivel-mounted 3.5-inch folding LCD	The combined motion range of the folding display (inclinable by 180° and pivoting by 270°) provides you with an ergonomically optimized viewing position in every situation for looking at the test object from any angle. Fully folded it protects monitor and operator keypad from dirt.	■	■
Dual keypad-touchscreen control	Owing to the combination of control keys and capacitive touchscreen it has become still easier and more intuitive to use the thermal imaging camera. This way, you can meet your target faster and use your camera more effectively.	■	■
High-capacity Li-ion battery	More than double the operating time of a standard Li-ion battery. Less battery changes required, fewer charging intervals, longer non-stop measuring applications.	■	■

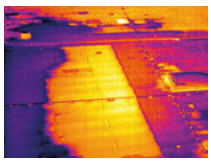
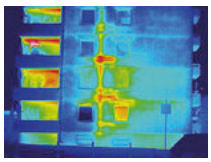
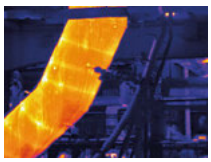
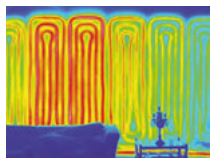
[1] except 9 Hz version

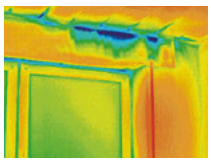
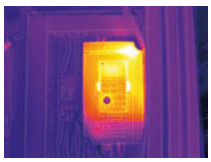
Thermal imaging cameras of the XC series – Further information … ➔

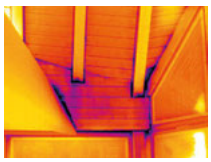
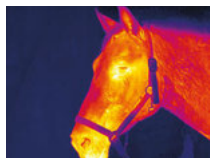
Equipment feature:	*Your practical benefit:*	XC300	XC600
Automatic temperature tracking (hot/cold spot)	Coldest or hottest spots on the measuring objects are detected in real time and displayed automatically.	■	■
Temperature alarm	Acoustic and visual alarm help you to faster detect critical areas. Also ideal for dew point detection at surfaces.	■	■
Robust two-component construction with IP54 type of protection	Robust housing, dust- and splash-proof – ideal for rough industrial applications and all kinds of weather when measuring outside. Thanks to two-component construction with integrated rubber protectors impact-proof to a drop height of 1.80 metres.	■	■
Integrated laser pointer	Simplifies the quick location of problematic areas and the visual targeting in poorly lit surroundings.	■	■
Diverse measuring and analysis functions	Reliable, quick and precise results due to dynamic eight-point measuring, automatic temperature tracking, differential measurements, line profile analysis, sector analysis, isotherm and alarm function.	■	■
Intelligent power management	High battery performance, longer non-stop measuring applications.	■	■
Correction of the reflected ambient temperature	When the surface of the object to be measured has a low degree of emission and the object temperature contrasts rather strongly with the surface temperature, the temperatures measured by the thermal imaging camera are being influenced. Such measurement errors can be compensated for by adapting the reflected ambient temperature.	■	■
Professional analysis software	No additional costs for expensive software: Full-fledged analysis and documentation program with numerous functions for evaluation, organization and documentation already included in the scope of delivery.	■	■
Bluetooth (optional)	Wireless connection facility for an optional headset.	■	■
Voice recording	Comment every image on site with valuable additional information (optionally available headset required).	■	■
Data memory already integrated	Uncomplicated storage management without separate memory card that needs to be carried along. Quick flash memory with a high data transfer rate and capacity for several thousand images.	■	■
Standard file format	Storage of the entire infrared image information in one fully radiometric JPEG format. No special software required for processing as with proprietary file formats. Advantage: More flexibility for analyses and evaluations, quicker report generation.	■	■
Picture-in-picture display function DuoVision	This display mode serves for the superimposition of infrared and real images in random intensities for a better orientation.	■	■
Picture-in-picture display function DuoVision Plus	Combines the infrared image information with high-contrast details of the visible light spectrum from the real image camera for the real-time indication of an extremely detailed thermal image fusion on the camera display. Advantage: Easier orientation, localization and assessment during the measurement.	■	■
Software function DuoVision	For a better evaluation and professional documentation, infrared and real image can be superimposed as desired and stored via the software as a new file.	■	■
Software function DuoVision Plus	Via the software, infrared and real image can be stored as contour emphasizing thermal image in which the radiometric image information is combined with the high-contrast details of the real image.	■	■
IR video function	Non-radiometric IR videos can be used to visualize processes such as the heating and cooling behaviour of electronic and mechanical components or other objects over a specified period of time.	■	■
Fully radiometric infrared videos in real time (with optional professional upgrade)	Fully radiometric real-time videos on your PC, connected to the thermal imaging camera via a fast USB 2.0 interface, enable the detailed examination of thermal processes. All temperature information of each individual image sensor are contained in the video for evaluation.	■	■
Integrated 5 megapixel digital camera	Quicker and easier object inspection thanks to simultaneous display and recording of fully radiometric infrared and high-resolution real images.	■	■
Integrated photo lamp	Improved photo results due to optimum illumination of dark target areas during real image recording.	■	■
Facility for optional connection of additional lenses via bayonet connection	In most situations the standard lens is the best solution, but with some applications a different field of view is required. In contrast to cameras with fixed lenses, when examining particularly small or large objects here you can simply connect telephoto or wide-angle lenses as required – simply use the bayonet coupling with automatic lens detection.	■	■

The professional thermal imaging cameras of the Trotec XC series provide you with manifold application options

Production control and equipment maintenance in the industry

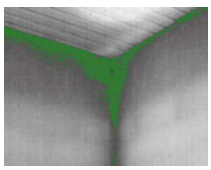
Use the thermal imaging cameras of our XC series for surveillance and maintenance tasks in industrial facilities, e.g. to monitor combustion or temperature-controlled processes.

The inspection of heat insulation at machines and installations are also typical fields of application of these cameras, as is preventive maintenance. “Hot spots”in drive systems f.i. can indicate a beginning bearing failure.

Building thermography

Whether you have only a building envelope or the entire construction – by means of thermography measurements using cameras of the XC series both the examination for missing heat insulation and the detection of structural-physical defects or hidden construction elements can already be achieved during the building phase. This way, warranty claims can be put forward at an early stage and so energy costs can be saved.

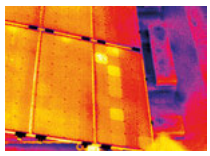
Prior to modernisations thermographic measurements also constitute a reliable basis for planning reconstruction work to eliminate energy loss.



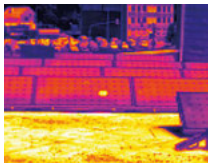
A survey regarding the indoor climate can also be carried out. Dew-point endangered areas of a building, where without appropriate structural countermeasures potentially toxic and allergenic mould would grow, can be quickly and easily localized using our professional thermal imaging cameras.

Functional check of photovoltaic power plants

Using a thermal imaging camera of the XC series, defective modules or connections can easily be localized.



Right after installation, solar installers and electricians can cover their back with a significant inspection by thermographically documenting the functionality of their system.



Homeowners benefit from the possibility of periodically checking the perfect functioning and full performance of their photovoltaic installation and detecting possible damages caused by stone-chipping, dirt, humidity or short circuits early on.

Energy consulting

Professional thermal imaging cameras from Trotec are excellently suited to capture and document energy losses at outer windows, external doors, roller shutter casings, heater recesses, the roof construction and the entire building envelope, e.g. due to missing or defective insulation. Use these ideal measuring tools for comprehensive diagnosis or maintenance applications relating to energy consulting.

Leak detection

The infrared cameras of the XC series enable a quick and exact reduction of leaks, barely perceivable by the human eye, in inaccessible or concealed pipes, e.g. floor heating systems. Therefore, maintenance work can be performed while minimizing damage and reducing costs.

Electrical thermography

Whether control cabinets, electric motors or other live systems, with professional thermal imaging cameras from Trotec dilapidated components or faulty connections can be detected early on, so that expensive production downtime can be prevented and fire risks reduced.

Many more fields of application

Thanks to the undisputed process advantages, thermographic measurements have for a considerable time now been firmly established in many fields of application.

Based on the convincing value-for-money ratio of our professional thermal imaging cameras their use now appeals to highly diverse crafts, users and application scenarios, which so far could not benefit from the advantages of non-contact and non-destructive thermography for financial reasons.

Do you have questions regarding the possible use of our professional thermal imaging cameras in your specific case of application? Don’t hesitate to contact us – we’re happy to be of service!

Technical data		XC300 (9 Hz)	XC300 (50 Hz)	XC600 (9 Hz)	XC600 (50 Hz)
Article number		3.110.003.051	3.110.003.043	3.110.003.052	3.110.003.044
Measurement	Temperature range	-20 °C to +600 °C (optionally even up to +1,500 °C)			
	Accuracy	± 2 °C, ± 2 % from the measured value			
Radiometric image performance	Detector type	Uncooled microbolometer (UFPA)			
	Detector resolution	384 x 288 pixels		640 x 480 pixels	
	Spectral range	8 to 14 µm			
	Field of vision (FOV)	24° x 18°			
	Geometric resolution	1.1 mrad		0.65 mrad	
	Thermal sensitivity	0,05 °C at 30 °C		0,06 °C at 30 °C	
	Refresh rate	9 Hz	50 Hz	9 Hz	50 Hz
	Focus / min. focus distance	Automatic and manual / 0.15 m		Automatic and manual / 0.35 m	
Visual image performance	Digital photo camera	5 megapixels, integrated photo lamp			
	Video norm	PAL/NTSC			
Image representation	Display	Tiltable, swivel-mounted 3.5-inch LCD touchscreen, capacitive			
	Zoom	1x to 10x via infinitely variable electronic regulation			
	Image display	Pseudo colours, 6 colour palettes			
	Image display options	IR image, real image, DuoVision Plus display (overlay of infrared and real images in random intensities), DuoVision Plus display (fusion of infrared and real image as contour emphasizing detail-enhanced thermogram)			
Measurement and analysis	Measuring spots	8 movable temperature measuring spots (can be freely configured)			
	Measuring functions	Isotherm, line profile analysis, sector analysis (rectangle), various alarm functions, Min/Max temperature tracking (hot/cold spot), differential measurements at up to 8 dynamic temperature measuring spots			
	Area measurement	2 areas			
	Emissivity	User-defined variably adjustable from 0.01 to 1.0			
	Measurement correction	Correction of the reflected object temperature; automatic correction based on user-defined specifications for ambient temperature, distance and relative humidity			
Data storage	Memory	16 GB internal flash memory			
	File format	Radiometric image: 16 bit JPEG; visual image: JPEG; non-radiometric thermographic video: MPEG-4; fully radiometric infrared video: 14 bit IR format			
	Data storage / transmission	Storage of non-radiometric IR videos (MPEG-4) as well as radiometric and real images on internal memory; periodic image storage (3 / 5 / 10 / 30 / 60 min can be adjusted); storage of fully radiometric IR videos* on PC via USB			
	Voice recording	Comments can be stored along with every IR image (optionally available Bluetooth headset required)			
	Interfaces	USB type C, analogue video (PAL/NTSC)			
Laser	Type	Semiconductor AlGaInP diode laser class 2, 1 mW / 635 nm red			
	Distance measurement	0.05 to 30 m			
Power supply	Battery type	High-capacity Li-ion battery (9,210 mAh); rechargeable, exchangeable			
	Operating time	≈ 8 h			
	Mains power	5 V, 2 A			
	Energy saving mode	User-defined			
Surrounding conditions	Temperature	-20 °C to +50 °C (operation), -40 °C to +70 °C (storage)			
	Humidity	10 % to 95 % RH (non-condensing)			
	Type of protection / shock / vibration	IP54 / 25G / 2G			
	Impact resistance (falling from)	2 m			
Physical characteristics	Dimensions / weight	130 x 125 x 250 mm / 850 g			
	Tripod connection	¼ inch			
Scope of delivery	Standard lens	24° x 18°			
	Standard equipment	Camera with standard lens 24° x 18°, LCD touchscreen and laser, battery charger, high-capacity Li-ion battery, video cable, type C USB cable, operating manual, transport case, software package, temperature test certificate			
	Optional interchangeable lens	7°-, 12°-, 48° lens			
	Optional accessories	Bluetooth interface, Bluetooth headset, professional software upgrade (dongle) for thermographic video recordings and evaluations in real time, 3D heat distribution, export of measurement data, panoramic image creation from several individual thermal images and much more; universal tripod (Art. no. 6.300.000.200)			

** Saving fully radiometric IR videos requires the optionally available professional upgrade (software dongle)*

Precision pyrometers employing multi-point laser technology

Professional infrared thermometers TP7 and TP10 for demanding measuring applications

Exclusively at Trotec!

A FEW PRACTICAL BENEFITS:

- Development, design, production: 100 % Trotec
- Highly accurate – rapid response time
- Wide temperature measuring range from -50 °C to +1,850 °C
- Multi-point laser aiming aid for simultaneous indication of measuring point and measuring spot
- Degree of emission freely adjustable from 0.1 to 1.0
- High/low alarms indicated by a change of display colour and an additional alarm sound
- Backlit display
- Bar graph indicator*
- Data logger function to capture and save up to 30 measuring points*
- Combined infrared and contact sensor temperature measurements*
- Battery-saving power supply via the USB connection of your computer* – ideal for long-term measurements
- Option for software-supported recording of measurement series*

** depending on the model*

Unique appearance – high optical resolution

With their distinctive German industrial design these exclusive professional pyrometers are not only in peak form when it comes to appearances, the technical performance data is equally impressive in every respect:

TP7 and TP10 combine precise measuring technology, flexible application possibilities and a multitude of sophisticated measuring functions in easy-to-handle premium-quality high-end pyrometers with an excellent value-for-money ratio.

Due to their wide temperature measuring range, high optical resolution and many advanced functions, these measuring devices are not only first choice for a safe diagnosis and maintenance of heating, air-conditioning and ventilation installations or extensive maintenance tasks in the industrial and craft sector.

Both infrared thermometers are also ideally suited for complex and demanding measuring tasks during maintenance, inspection, analysis or documentation. For this purpose the TP10 comes equipped with an integrated data logger function to capture and save up to 30 measuring points.

Combined infrared and contact temperature measurement

The miniature contact pin of the TP10 enhances the possible applications by additional contact temperature measurements with the type K contact sensor included in the scope of delivery or all third-party temperature probes of the same construction type.

For battery-saving application, the TP10 can also be operated directly at the USB port of your computer. With the USB function it further provides the possibility for software-supported recording of measurement series in case of long-term temperature profile measurements of mechanical or climatic processes. For non-stop measuring the TP10 can further be fixed to the supplied mini tripod.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

In addition to the steadily growing number of fully compatible Trotec meters, this software is also suitable for the partially compatible TP10 – even with the TP7 interfaceless or third-party devices, you can benefit from this software, as it enables cross-device analysis and management of all measurement projects and customer data in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

TRT-KAT-PYRO-WM-12-EN

Technical data		Pyrometer TP7	Pyrometer TP10
Article number		3.510.003.012	3.510.003.046
Optical resolution (D:S)		40:1	75:1
Smallest measuring spot		25.4 mm	18 mm
Measuring range		-50 °C to +1,000 °C (-58 °F to 1,832 °F)	-50 °C to +1,850 °C (-58 °F to 2,912 °F)
Resolution		0.1 °C	0.1 °C ≤ 1,000 °C, 1 °C > 1,000 °C
Accuracy*		± 2.5 °C at -50 to 20 °C; ± 1 % at 21 to 300 °C; ± 1.5 % at 301 to 1,000 °C	± 3 °C at -50 to 20 °C; ± 1 % ± 1 °C at 20 to 500 °C; ± 1.5 % at 500 to 1,000 °C; ± 2 % at 1,001 to 1,850 °C
Repeatability		± 1.3 °C at -50 to 20 °C; ± 0.8 % or ± 0.5 °C at 21 to 1,000 °C	± 1.5 °C at -50 to 20 °C; ± 0.5 % or ± 0.5 °C at 20 to 1,000 °C; ± 1 % at 1,000 to 1,850 °C
Response time		< 150 ms	< 150 ms
Spectral sensitivity		8 ~14 µm	8 ~14 µm
Target display		laser class 2 (II), 630 ~ 670 nm, < 1 mW	laser class 2 (II), 630 ~ 670 nm, < 1 mW
Contact temperature sensor		–	measuring range -50 °C to +300 °C, accuracy ± 1.5 % or ± 3 °C, repeatability ± 1.5 %
Ambient conditions		0 °C to 50 °C, 10 % to 90 % RH	0 °C to 50 °C, 10 % to 90 % RH
Power supply		9 V IEC 6LR61	9 V IEC 6LR61 (and externally via USB)
Dimensions (L x W x H mm)		160 x 49 x 122 mm	168 x 56 x 225 mm
Weight		224 g	300 g
Scope of delivery	Standard	pyrometer TP7, storage bag, 9 V battery, operating manual	pyrometer TP10, carrying case, type K contact sensor, mini tripod, USB connecting cable, 9 V battery, software, operating manual
	optional	–	Universal tripod (Article number 6.300.000.200)

■ *Standard equipment; * at ambient temperatures of 23 to 25 °C*

Comparison of functions and equipment features	TP7	TP10
Selectable multi-point laser	■	■
Switching function °C / °F	■	■
Display resolution 0.1 °C (0.1 °F)	■	■
Non-stop measuring function	■	■
Minimum value display	–	■
Maximum value display	■	■
Differential and average value display	–	■
Display value hold function	■	■
User-defines alarm thresholds	■	■
High/low alarms indicated by a change of display colour and an additional alarm sound	■	■
Degree of emission adjustable from 0.1 to 1.0	■	■
Backlit LCD display	■	■
Automatic switch-off function	■	■
Time display	–	■
Date function	–	■
Adjustment function for touch tone, alarm sound and display contrast	–	■
Bar graph indicator	–	■
Open targeting sights	–	■
Storable measured values	–	30
Additional contact temperature measurement (with external type K sensor)	–	■
Software-supported recording of measurement series	–	■
USB connection	–	■
¼ inch tripod connection	–	■

High optical resolution and precise measuring spot display thanks to multi-point laser

The optical resolution (D:S) defines the ratio of measuring distance and measuring spot diameter. With increasing distance to the measuring object the measuring spot also increases. The device calculates an average temperature from all the temperatures in the measuring spot. The larger the measuring spot, the less precise is the measured result. And vice versa: the higher the optical resolution of the pyrometer, the smaller the measuring spot and the more precise the measurement.

Precise measurements straight to the multi-point

Standard devices are often merely equipped with a single laser which shows nothing more than the centre of the measuring spot. But the actual dimensions of the measuring surface are not immediately apparent for the user. Double laser devices on the other hand visualize at least the diameter, though not the overall measuring surface.

The multi-point laser aiming aid of TP7 and TP10 combines these two technologies allowing you to capture the measuring object both easily and precisely. Whilst one targeting laser in the centre indicates the measuring point, further eight lasers show you the boundary points encircling the measuring surface – thus permitting precise measurements in a minimum of time.

Convenient alarm indication via change of display colour

The on-demand display illumination is usually green; with activated alarm function the display will be flashing in blue whenever falling below the user-defined limit value (Lo). Exceeding the set threshold (Hi), the display flashes red. In both cases an acoustic alarm will be emitted in addition.

T3000 multifunction measuring meter

Exclusively at Trotec!

The T3000 combines trendsetting measuring technology with advanced functions and user comfort of still unknown dimensions.

A FEW PRACTICAL BENEFITS:

- Designed and produced according to the highest quality standards in Germany
- A great variety of connectable sensors and electrodes for measuring temperature, air humidity, material moisture, air flow and trace gas
- Integrated graphic grid measurement function
- Robust 2K housing with touchscreen made of highly scratch-resistant “Blanview” special glass for a high contrast colour display even in sunlight
- Integrated logger function for 5, 10, 30 or 60 minute non-stop measuring
- Dual key touchscreen control
- Intuitive menu navigation with many special functions
- Storage for up to 2,160,000 measured values
- Display zoom function for photo documentation
- MultiMeasure Studio measured data management software (standard version) included
- Downward compatible – all existing previous models of our SDI sensors and MultiMeasure electrodes can be used with the T3000

Whether you need to conduct analyses of supply and exhaust air flows, condensation, poor machine cooling, porous seals, climate fluctuations, heat build-up, excessively dry or damp materials or carry out leak detection on pressure tanks or line systems – both for preventive maintenance and building diagnostics and damage analysis – you can handle the most diverse tasks with a single measuring device!

T3000 – one device for (almost) all measuring tasks:

- Humidity
- Wood moisture
- Building moisture
- Material moisture
- Surface temperature
- Wood temperature
- Material temperature
- Air temperature
- Dew point
- Critical dew point
- Absolutfeuchte
- Mixing ratio
- Gas temperature
- Air flow rate
- Trace gas leak detection

TRT-KAT-T3000-WM-14-EN

The T3000 features an incomparable variety of functions and equipment

Multifunctionality at its best

The comprehensive range of sensors, electrodes and accessories makes the T3000 an ideal tool for conventional applications in industry and building diagnostics as well as for many areas of the building trade such as composition floor layers, tilers, painters or carpenters who need to check the moisture content of floors, walls or wood.

Due to the innovative concept of a universal basic device which works in combination with flexibly exchangeable sensors, users no longer need to have a complete collection of measuring devices with them.

Simply change the sensor and your T3000 becomes exactly the special measuring device you currently need. No further settings are required on the device. The intelligent technology of the T3000 automatically recognises the connected sensor.

More than twenty different measured value sensors are available for the T3000 to measure the most different parameters – apart from the innovative SDI sensors there are also many round, flat and layer depth electrodes to measure material, wood and building moisture.

Moreover, an integrated logger function with adjustable recording intervals for non-stop measurements can be used for all sensors. The T3000 comes with a memory capacity for more than 2,000,000 measured values.

The T3000 is equipped with a dual key touchscreen control with innovative user guidance, a feature so far unique to modern smartphones.

Practical detail: The integrated display zoom function for photo documentations. Further information can be found on page 21…

Time-saving integrated graphic grid measurement function…

The integrated graphic grid measurement function of the T3000 allows incredibly easy detection, visualisation and assessment of moisture distribution:

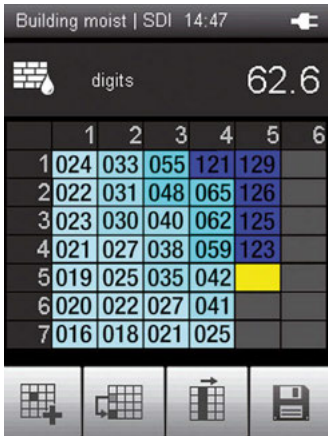
Simply define the matrix to be evaluated directly at the measuring device and the configured grid will be shown on the display.

Now you just have to "work through" the grid by initiating measurement (supported by the T3000) at the desired measuring points.

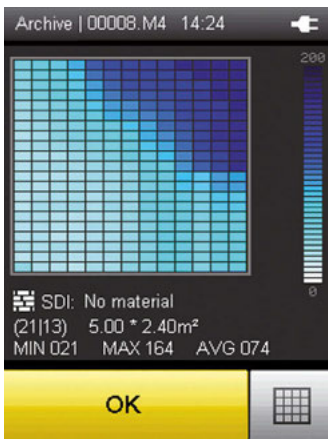
All measured data is automatically saved in the T3000 in the correct sequence.

A single grid matrix allows saving, preparing and graphically representing up to 2,000 measured values. In the MultiMeasure Studio software, the grid can later be automatically implemented true to scale by simply entering the edge lengths of the entire grid.

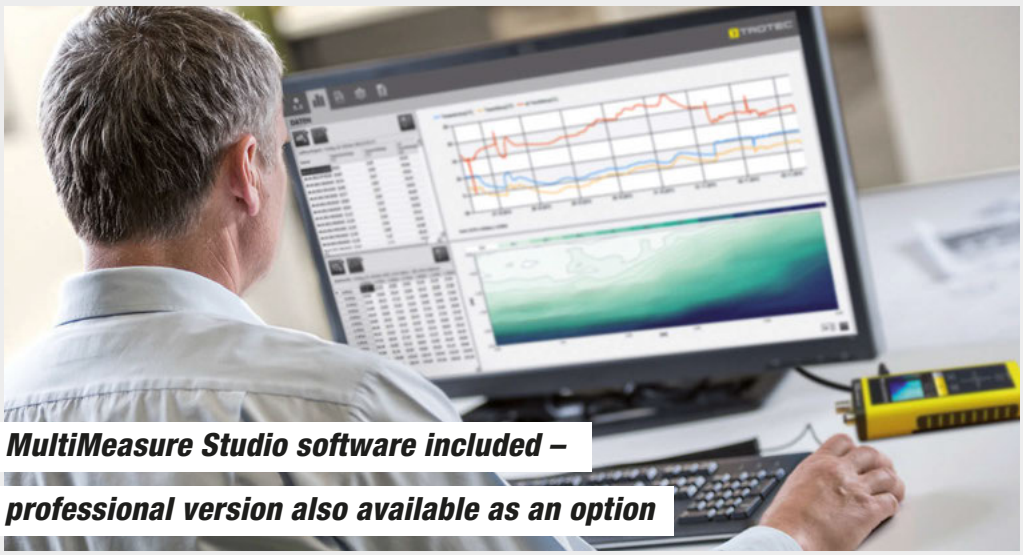
The entire data record can be exported from the T3000 to a PC so that the time-consuming manual transfer measuring point by measuring point into a spreadsheet program or another analysis program is no longer necessary.



Convenient: During grid measurement the yellow field indicates the current measuring spot and automatically moves on to the next grid upon confirmation of the measured value.



The T3000 already graphically prepares the moisture distribution of the entire area surveyed with a differentiated grid colouring.

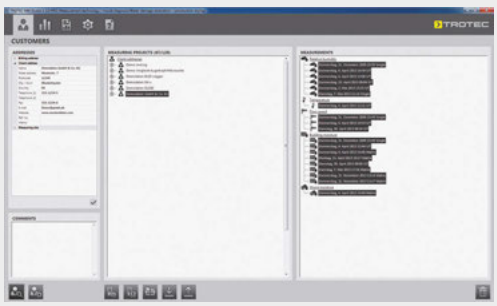


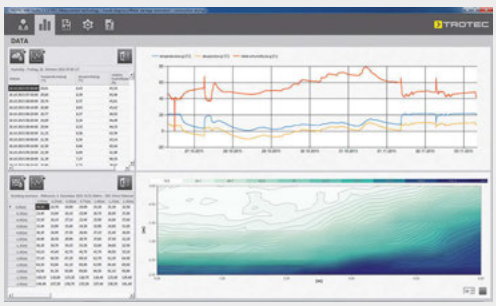
MultiMeasure Studio software included – professional version also available as an option

The standard version of the MultiMeasure Studio software is already included in the T3000's scope of delivery. With it, all measurement data can be read in an uncomplicated manner, you can manage projects and evaluate them using the chart function. Thanks to automatic software and firmware updates you will always be using the latest state of technology.

The optional professional version also has a complex database structure for professional administration and archiving of all required customer and measured data with backup function and can save an unlimited number of measurements. Furthermore, it boasts a unique automated report generating function including many completely predefined and at the same time completely editable boilerplate texts for building diagnostics, moisture measurement, leak detection and thermography.

Further information regarding the professional version can be found on pages 48 and following …





T3000 SDI sensors – easy to use, intelligent technology …

The T3000 has a 5-pin plug connector to connect most diverse SDI sensors with integrated measuring electronics. Measured values are automatically calculated and transmitted to the T3000 – with digital precision and no drifting such as it sometimes occurs with analogue measuring devices. All calibration settings are saved directly in the SDI sensor. A factory test certificate enclosed with every multifunction measuring meter documents the tested quality.

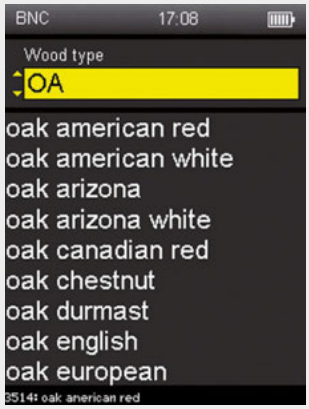
If other measured values need to be determined on site to identify correlations or because new aspects have arisen during measurements which need to be checked, for example, simply change the sensor: a thermohygrometer quickly becomes a microwave moisture sensor, while a dielectric moisture sensor becomes an anemometer or a temperature sensor becomes a hydrogen leak detection system.

Thanks to its intelligent technology, the T3000 automatically detects which sensor is attached when SDI sensors are changed.

Technical data		T3000 multifunction measuring meter
Article number		3.510.207.010
Functions and equipment	Operation	via touchscreen or keys
	Display	2.7 inch colour TFT, 240 x 320 pixels
	Display and front glass	highly scratch-resistant “Blanview” special glass for high-contrast colour display even in sunlight; chemically hardened, degree of hardness 7
	Interfaces	5-pin plug connector for SDI sensors, BNC connector for electrodes, USB port
	Menu languages	German, English, French, Turkish, Italian, Spanish, Polish, Dutch, Danish, Swedish, Finnish, Norwegian
	Functions	different measuring modes for wood moisture, building moisture, air flow, air humidity, temperature and hydrogen (trace gas leak detection), grid measurement, data logger function, alarm function, material selection for anhydrite and cementitious screed, integrated material characteristics for hundreds of types of wood for wood moisture measurement, data archiving and archive display, CAL-Function, language and unit system selection, real-time clock with calendar programmed until 2099, backlit display with brightness control
	Grid measurement	50 x 40 grids max. can be configured in a measurement
Data storage	Measurement data	2,160,000 measured values; for approximately 200 measuring projects consisting of 3 x 3,600 (= 10,800) measured values maximum
Power supply	Battery	4 x Alkaline LR6 AA batteries, 1.5 V
	Optional power supply	5 V USB
	Power input, active	approx. 400 mW
	Battery lifespan, passive	approx. 1 year
	Battery lifespan, active	24 h minimum
	Sensor supply	5.5 V ±10 % DC, 200 mA max.
Physical characteristics	Dimensions approx.	L 34 x W 62 x H 170 mm
	Weight	approx. 300 g
Scope of delivery	Standard	Measuring device, USB connection cable, batteries, screen protective film, silicone cover, Getting started guide, factory test certificate, MultiMeasure Studio Standard PC software (download)
	optional	MultiMeasure Studio Standard PC software (detailed description on pages 48 and following), SDI sensors, electrodes and further accessories (see the following pages)

Ideal possibilities of use also for carpenter’s workshops, forest enterprises and wood processing and trade …

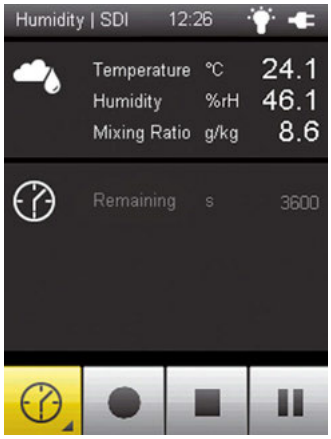
The T3000 features a special menu option for moisture measurement in wood materials with a selection of hundreds of different types of wood. Their validated material characteristics are directly stored in the T3000 and can be selected from there.



For temperature compensation – e.g. cold wood or measurements during wood drying processes – you can either enter a previously determined value as fixed value in the T3000 or use the internal temperature sensor of the measuring device.

The influence of the determined temperature on the wood moisture is automatically taken into account for moisture calculation.

T3000 sensors for climate measuring



All climate sensors allow to accurately measure air temperature, dew point temperature, mixing ratio as well as relative and absolute humidity.

During measurement, air temperature, humidity and dew point temperature values can be simultaneously shown in real time on the T3000 display.

Minimum, maximum, average and "hold" values can be displayed optionally in addition to these three measured values at the bottom of the display.

Thanks to the integrated logger function of the T3000 you can also conduct 5-, 10-, 30- or 60-minute non-stop measurements while recording all climate values.

TS 210 SDI climate sensor

Universal sensor for almost all measuring requirements in the climate field. Everyday working conditions often include dust and dirt which may falsify the measuring results and shorten the sensor life. Therefore, the TS 210 SDI ❶ is equipped with a metal grid filter (gauze filter) as a standard.

A stainless steel sintered filter is optionally available for this sensor for environments with heavy soiling (see accessories, page 25).

TS 230 SDI high-temperature climate sensor

The 250 mm long stainless steel sensor fitted with a teflon sintered filter ❷ allows high-temperature measurements, e.g. of drying processes, up to 140 °C, and up to 180 °C for short measurements.

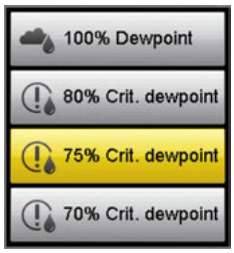
TS 250 SDI climate sensor

At 250 mm long and a diameter of just 5 mm this sophisticated climate sensor ❸ is ideal for temperature and moisture measurements at locations which are difficult to access as well as for hygrometric equilibrium moisture content measurement in drill holes with a diameter from 5 mm.

Critical dew point – practice-oriented measurement parameter to contain damages caused by moisture or mould

Condensation of air moisture on objects with surface temperatures close to or below dew point encourages mould growth in the extreme.

Yet, critical climate conditions conducive to the formation of mould already prevail long before reaching the dew point. Hence the T3000 comes equipped with not only a dew point recognition but also with a measuring function to determine the "critical dew point".



It defines the temperature which with respect to a specific humidity level (70, 75 and 80 % RH preselectable) is to be regarded as critical for mould formation.

Especially for the damage analysis in environments with otherwise inconspicuous room climate values it is important to know the critical dew point, e.g. for measurements behind picture frames, closets or wardrobes.

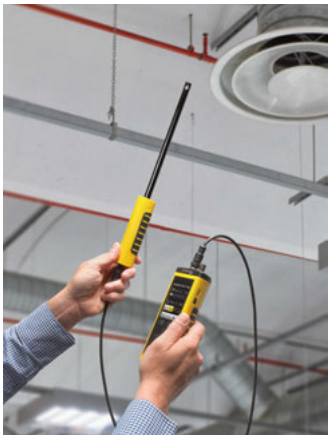
T3000 sensors for air flow measurements

These anemometer sensors can simultaneously measure air flow rate and temperature and show them on the display of the T3000.

Minimum, maximum, average and "hold" values can be displayed optionally in addition to both measured values at the bottom of the display of the T3000.

The logger function of the T3000 also allows time-defined non-stop measuring and records all measured values for the selected time interval.

To obtain optimal volumetric flow measurement results, the menu of the T3000 also allows selecting a type of channel area (square or round) for all anemometer sensors if required.



TS 410 SDI anemometer sensor

This sensor ❹ is not only suitable for checking the distribution of flow and temperature in ventilation and air conditioning systems but also for finding weak points when certifying the air tightness of buildings (blower door).

Reconstruction companies also use it to check the capacity of their drying installations in insulation layer drying after water damage as the TS 410 SDI allows them to quickly and precisely determine whether there is sufficient flow of air at the relief openings to dry out the insulation layer.

TS 430 SDI anemometer sensor

The TS 430 SDI ❺ anemometer sensor is ideal for measurements requiring highly accurate results, particularly with low flow values up to 2 m/s with an accuracy of 0.04 m/s.

TS 470 SDI anemometer sensor

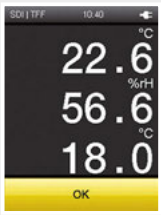
Another option is the cost-effective TS 470 SDI ❻ standard anemometer sensor fitted with a plastic tip.

Convenient: Integrated display zoom function for photo documentations

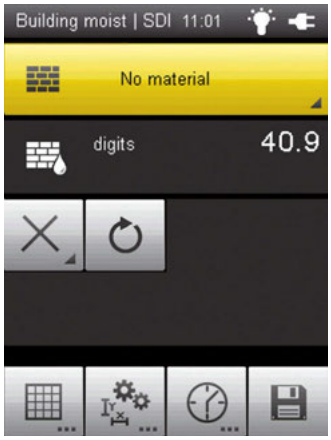
For documentation purposes, experts often take photos of the measurement showing the measured values directly on site.

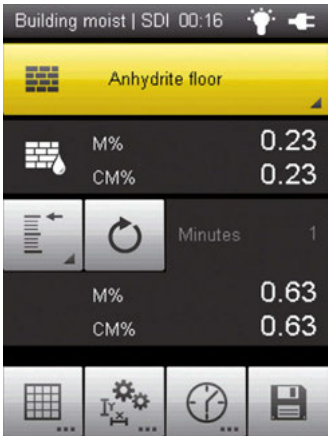
To ensure that the measured values can be easily and unambiguously read even from quick snapshots taken by hand, the T3000 comes with a helpful feature allowing to temporarily switch over to large digit display.

Briefly press the power button, and the measured value display will switch over to large digits and maintain this type of indication until the next input is confirmed. This way you can keep an informative photographic record of every situation!

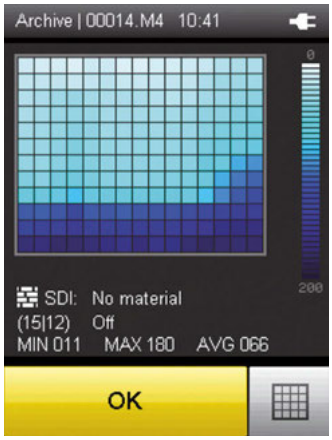


T3000 sensors for non-destructive material moisture measurements

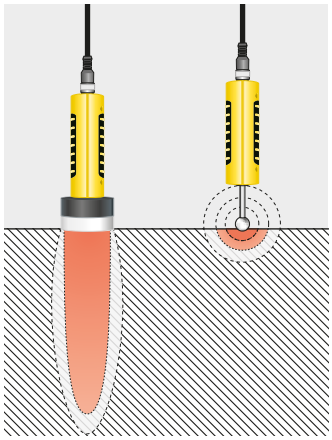




When carrying out material moisture measurements with the T3000, you can either choose measuring an unspecific material, or directly select anhydrite or cementitious screed and have the measurement results displayed indicatively in mass % and CM %



Moisture distributions can be recorded in a grid measurement and graphically visualized directly in the measuring device.



TS 610 SDI and TS 660 SDI are ideally suited for combined measurements of multidimensional moisture distributions.

Apart from measurements without a specific material pre-selection where dimensionless digit values are displayed to indicate moisture, these sensors additionally offer the possibility to select anhydrite or cementitious screed.

When pre-selecting screed, the indicative measuring results are directly shown in mass and CM % on the display of the T3000. The integrated conversion of measured values is a practical tool, in particular for floor layers to quickly check the readiness for covering.

With the graphic grid measurement function integrated in the T3000, near-surface or subsurface moisture distribution can be detected, visualised and assessed as easily as never before!

Alarm function

For all material moisture sensors an individual alarm limit value can be set.

Thanks to this function large areas can be measured fast and effectively without continuously watching the display: Once the selected limit value is exceeded, the SDI sensor alerts the user emitting an acoustic signal!

TS 610 SDI microwave humidity sensor

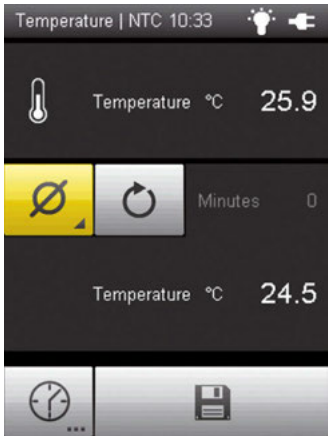
Thanks to microwave technology the TS 610 SDI ❶ is ideal for non-destructive subsurface moisture measurement for material depths up to 30 cm.

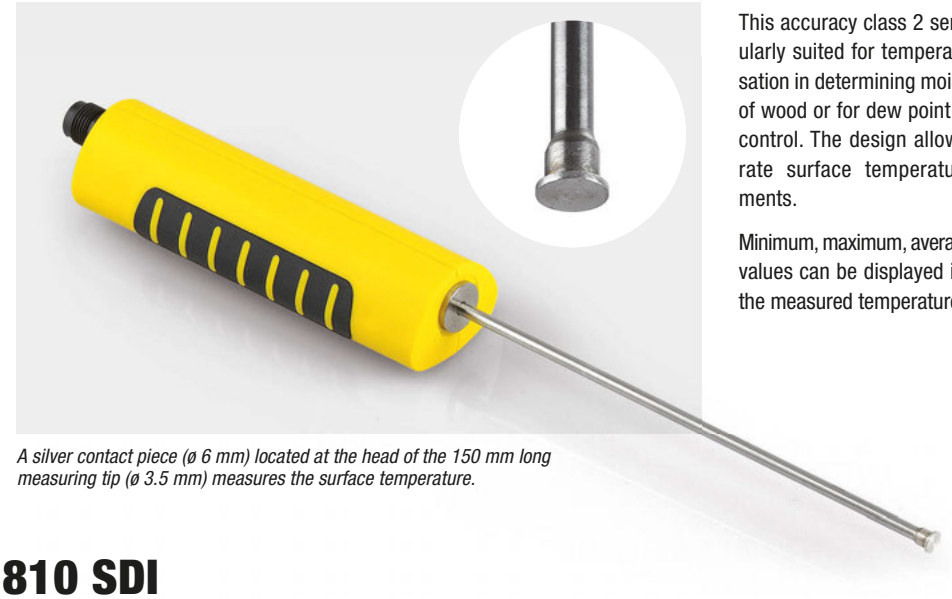
Another advantage of this method is the independence of the salinity degree of the material. For the microwave method it is irrelevant whether an older or a new building (hygroscopic humidity occurrences) is measured.

TS 660 SDI material moisture sensor

The field of application of this dielectric humidity sensor ❷ is non-destructive detection of moisture distribution in near-surface areas up to 4 cm.

T3000 sensor TS 131 SDI for measuring surface temperatures



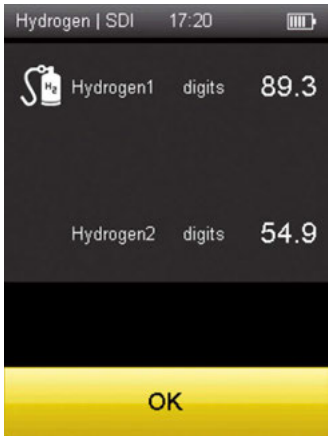


A silver contact piece (ø 6 mm) located at the head of the 150 mm long measuring tip (ø 3.5 mm) measures the surface temperature.

This accuracy class 2 sensor is particularly suited for temperature compensation in determining moisture content of wood or for dew point temperature control. The design allows very accurate surface temperature measurements.

Minimum, maximum, average and "hold" values can be displayed in addition to the measured temperature values.

T3000 sensor TS 810 SDI for measuring trace gas concentrations



For measurements at distant or poorly accessible locations, a telescopic rod and a matching sensor holder for the TS 810 SDI are optionally available. These and further accessories can be found on the following pages.

This sensor detects even the lowest hydrogen concentration starting from 1 ppm H_2 and allows accurate non-destructive location, e.g. of cracks and leaks in pressure tanks, pipes, tanks etc.

During measurement, rising and falling hydrogen concentrations are indicated acoustically at the handle of the sensor as well as by the numeric display of an indicative measured value on the display of the T3000.

Detailed information about the possibilities of use of this trace gas sensor system can be found in the "Leak detection" chapter on pages 90 and following…

T3000 – further information …

All SDI sensors at one glance

SDI sensor		TS 131 SDI	TS 210 SDI	TS 230 SDI	TS 250 SDI	TS 410 SDI	TS 430 SDI	TS 470 SDI	TS 610 SDI	TS 660 SDI	TS 810 SDI
Article number		3.510.225.110	3.510.220.210	3.510.220.220	3.510.220.235	3.510.220.250	3.510.220.260	3.510.220.265	3.510.220.270	3.510.220.275	3.510.220.290
Sensor type		**Temperature**	**Climate**			**Anemometer**			**Material moisture**		**Trace gas**
Determinable measured values [measuring unit]		Surface temperature [°C, °F]	Air temperature [°C, °F], relative humidity [% RH], absolute humidity [g/m³], dew point [dp °C, dp °F], critical dew point [°C, °F], mixing ratio [g/kg dry air]			Air temperature [°C, °F], air flow rate [m/s]			Subsurface moisture [digits]	Near-surface moisture [digits]	Hydrogen concentration [digits]
Surface temperature	Measuring principle	NTC									
	Measuring range	-50.0 °C to +150.0 °C									
	Resolution	0.1 °C									
	Accuracy	±0.1 °C[1]									
Air temperature	Measuring range		-20.0 °C to +50.0 °C	-40.0 °C to +140.0 °C / temporarily up to +180 °C	-40.0 °C to +100.0 °C	0.0 °C to +50.0 °C					
	Resolution		0.1 °C			0.1 °C					
	Accuracy		±0.4 °C (at -10 °C to +50 °C), otherwise ±0.5 °C	±0.2 °C (at 20 °C), ±0.7 °C (at -40 to +140 °C)	±0.2 °C (at 20 °C), ±0.7 °C (at -40 °C to +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 to 95.0 % RH	0.0 to 100.0 % RH	0.0 to 95.0 % RH						
	Resolution		0.1 % RH								
	Accuracy		±2 % RH	±2 %[2]	±2 % RH						
Material moisture	Measuring principle								Microwave	dielectric	
	Measuring range								0.0 to 200.0 digits		
	Resolution								0.1 digit		
	Accuracy								0.1 digit		
	Penetration depth								up to 300 mm	up to 40 mm	
Air current	Measuring range					0.00 to 20.00 m/s	0.00 to 2.00 m/s	0.00 to 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 to 1,000 ppm H_2
	Response sensitivity										1 ppm H_2
Sensor element	Material	Stainless steel	Poly-carbonate	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Poly-carbonate	Composite	Aluminium	*detailed description in the "Leak detection" chapter on pages 90 and following.*
	Length / ø	150 mm / 3.5 mm	108 mm / 12 mm	250 mm / 12 mm	250 mm / 5 mm	210 mm / 6 mm	210 mm / 6 mm	200 mm / 12 mm	45 mm / 32 mm	55 mm	
Sensor handle		Ambient conditions 0 °C to +50 °C (measuring electronics in the handle)									

** at 0 °C to +70 °C; [2] at 0 to 90 % RH, ±3 % at 90 to 100 % RH*

MultiMeasure accessories

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12


1 MultiMeasure transport case 2
Standard case for T3000 and accessories.

Article number: 3.510.200.920

2 Holster 3 MM series
Bag with belt loop for T3000 and T210, T260, T510, T610 and T660 compact hand-held measuring devices.

Article number: 3.510.200.228

3 Screen protective film for T3000
Precisely tailored for the T3000 display, optimal adhesive properties, easy and fast installation, full display presentation.

Article number: 3.510.200.220

4 Telescopic rod
To connect SDI sensors. Rod length and sensor lock adjustable. Convenient measurement at deep or high, hard-to-reach locations.

Article number: 3.510.200.221

5 Universal sensor holder
Telescopic rod attachment for fastening SDI sensors (except TS 810 SDI).

Article number: 3.510.200.229

6 Sensor holder TS 810 SDI
Attachment for securing the trace gas sensor TS 810 SDI during measurements with telescopic rod.

Article number: 3.510.200.230

7 TC 30 SDI connection cable
To connect SDI sensors to the T3000.

Article number: 3.510.200.027

8 Stainless steel sintered filter for T210, T260, TS 210 SDI
Replaceable protective cap for areas of application with heavy soiling.

Article number: 3.510.200.211

9 Calibration block
For single-point calibration (RH) of the T210, T260, TS 210 SDI and TS 230 SDI using optionally available calibration ampoules.

Article number: 3.510.200.234

10 Calibration ampoules for T210, T260, TS 210 SDI and TS 230 SDI
Set with 5 ampoules and textile inserts each. Available for the following humidity values:

0 % RH: Art. no. 3.510.200.235
5 % RH: Art. no. 3.510.200.236
10 % RH: Art. no. 3.510.200.237
20 % RH: Art. no. 3.510.200.238
35 % RH: Art. no. 3.510.200.215
50 % RH: Art. no. 3.510.200.232
65 % RH: Art. no. 3.510.200.239
80 % RH: Art. no. 3.510.200.233
95 % RH: Art. no. 3.510.200.240

11 Silicone cover
Suitable for T3000 and compact hand-held instruments T210, T260, T510, T610 and T660.

Ideal device protection against dirt, scratches and danger of slipping out of hand. USB port of the meter remains accessible even when used with a protective cover.

Article number: 7.330.000.065

12 Measuring point stickers
Comparative measurements to the point.

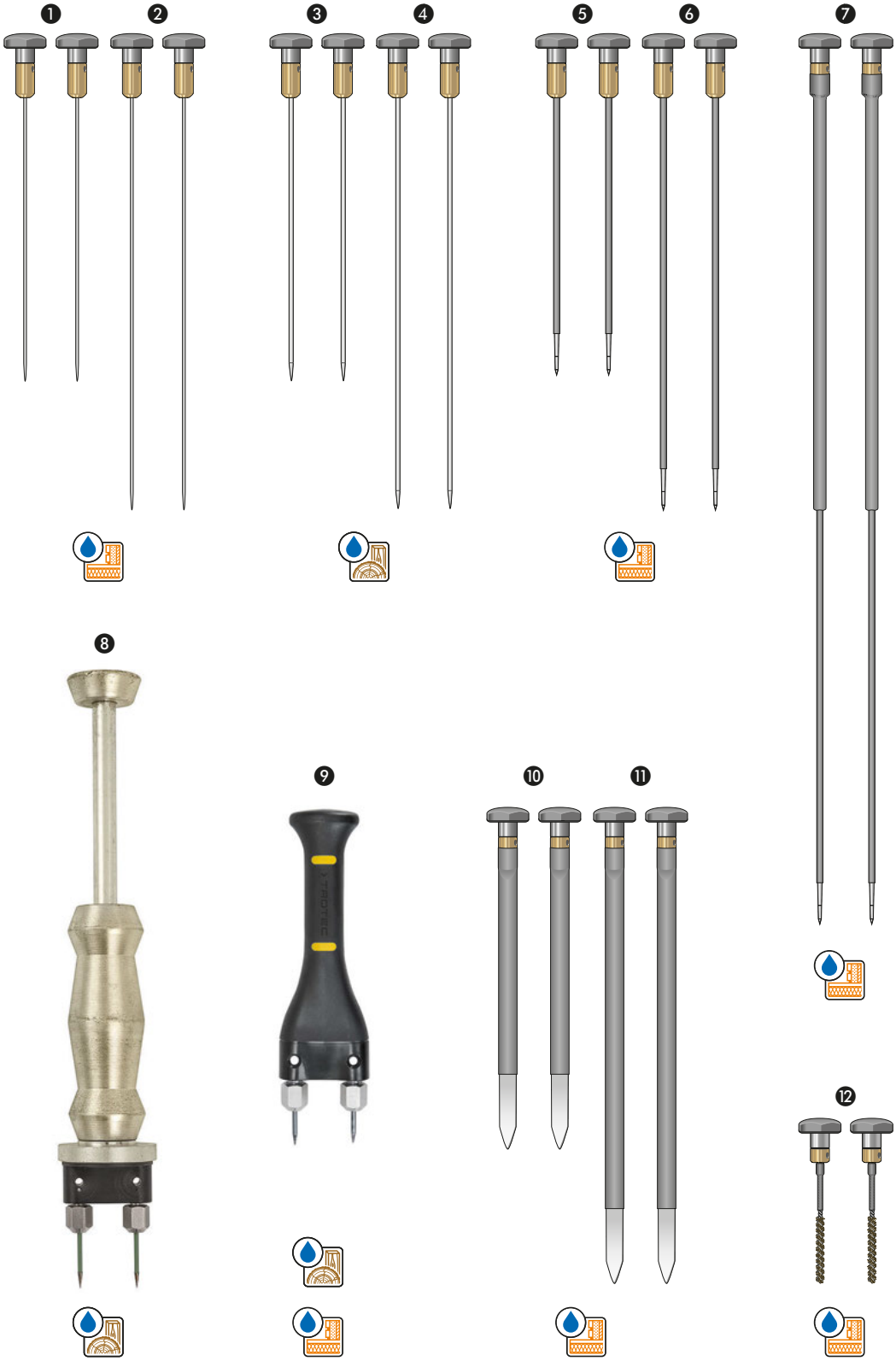
Stickers for temporary attachment to the measuring point – residue-free removal after use – with two note fields for the measured value and date.

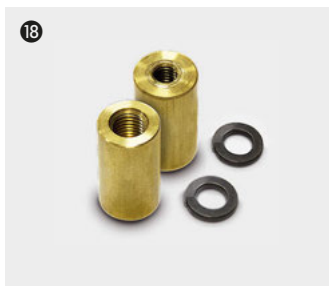
Precise comparison of previous and current measured values allows fast and easy analysis of drying processes or the examination of thermal bridges.

Roll with 100 stickers,
Article number: 9.110.000.100

Electrodes and accessories for wood and building moisture measurements using the T3000

Different types of passive electrodes are used for determining material and wood moisture as well as the humidity of mineral or porous building materials such as plaster and screed material according to the resistance measuring method. When measuring with the T3000, in addition to real time values, minimum, maximum, average and “hold” values can be displayed using these electrodes.





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 number: 3.510.226.110

TS 4/300 (length 300 mm),
Article number: 3.510.226.115

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

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

TS 8/200 (length 200 mm),
Article number: 3.510.226.120

TS 8/300 (length 300 mm),
Article number: 3.510.226.125

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

Insulated electrodes (ø 4 mm) for targeted moisture measurement in concealed component layers where the electrode shaft needs to be insulated. An 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, warm roofs etc.

TS 12/200 (length 200 mm),
Article number: 3.510.226.130

TS 12/300 (length 300 mm),
Article number: 3.510.226.135

❼ TS 12/600 round electrodes

Insulated electrodes with a length of 600 mm (ø 8 mm / ø 4 mm), ideally suited for use on flat roofs or for moisture measurements in very thick walls.

TS 12/600 (length 600 mm),
Article number: 3.510.226.136

❽ TS 70 ram electrode

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

Article number: 3.510.226.105

❾ TS 60 hand electrode

Unbreakable plastic handle with two hexagon union nuts in which electrode tips 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 number: 3.510.226.101

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

❿ TS 16/200 and
⓫ TS 16/300 flat electrodes

The area of application corresponds to the area of use of the insulated round electrodes TS 12/200 and TS 12/300.

The advantage of 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.

TS 16/200 (length 200 mm),
Article number: 3.510.226.140

TS 16/300 (length 300 mm),
Article number: 3.510.226.145

With the TS 60 adapter set (19) all MultiMeasure electrodes can be directly attached to the hand electrode TS 60 (9). For this purpose, the adapters are threaded on both sides and are simply screwed in between the electrode head and the retainer tip of the hand electrode by means of a clamping ring.

⓬ TS 20/110 brush electrodes

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

These electrodes are used for targeted moisture measurement in homogeneous building materials without using a contact mass. The brush head establishes the connection to the goods to measure.

Article number: 3.510.226.150

⓭ Teflon-coated electrode tips

Available in lengths of 45 and 60 mm, ø 1.5 - 2 mm approx.

TS 070/45 mm,
Article number: 3.510.200.212

TS 070/60 mm,
Article number: 3.510.200.213

⓮ Spare electrode tips
Uninsulated.

Article number: 3.510.200.214

⓯ TC 20 connection cable

To connect MultiMeasure electrodes for building and wood moisture measurement as well as sensors from other manufacturers to the BNC connector of the T3000.

Article number: 3.510.200.024

⓰ Contact mass

Article number: 3.510.200.217

⓱ Test block V1

For checking measurement deviations and accuracy when using resistance electrodes for measuring wood or building moisture with the T510 or T3000 MultiMeasure measuring devices.

Article number: 3.510.200.226

⓲ TS 60 adapter set

The set consists of two special adapters with thread and clamping ring enabling a direct connection of all round and flat electrodes to the TS 60 hand electrode.

Using this combination ensures that the electrodes are inserted into the measured material in parallel and at an optimal distance.

Article number: 7.200.001.280

Thermohygrometers T210 and T260

Precision measuring devices with excellent measurement accuracy – T260 additionally with pyrometer and dew point alarm function

A FEW PRACTICAL BENEFITS:

- Measuring devices designed and produced according to the highest quality standards in Germany
- German industrial design in robust, premium two-component construction with IP54 type of protection
- Continuous easy-to-clean glass surface made of highly scratch-resistant Blanview special glass for a high-contrast display of measured values even in the sunlight
- Capacitive touchscreen control panel
- High-resolution colour display for simultaneous indication of two measured values
- Precise measurement of air temperature and humidity – site height or pressure can be configured
- Pyrometer function for precise surface temperature measurements (T260 only)
- Dew point alarm function (T260 only)
- Integrated calibration function (user offset) enables long-term usage without quality losses in terms of measurement accuracy
- Measured value storage via USB with active software connection
- Incl. MultiMeasure Studio measurement data management software (standard download version)

T210 and T260 come with a continuous surface made of highly scratch-resistant Blanview special glass and capacitive touchscreen control panel.

Thermohygrometer T210

This measuring device of German high-quality manufacturing is ideally suited for climate control in living, office, production and storage spaces.

The precision sensors of the T210 are protected against dust and dirt by a metal grid filter inside the measuring head of the device and enable the quick and accurate determination of air and dew point temperature as well as of the relative, absolute and specific air humidity.

Temperature and humidity values are simultaneously indicated on the T210's clearly legible colour display behind Blanview special glass enabling a high-contrast display of measured values even in the sunlight.

A minimum, maximum and average function is available for the direct analysis of the measured data. Besides, the currently measured value can be recorded via the hold function.

IR thermohygrometer T260

The T260 offers all advantages and measurement options of the T210, yet enhances its thermohygrometer function by an integrated laser pyrometer incl. dew point alarm signal generator – all in only one device.

Thus, you can not only flexibly apply the T260 for surface temperature measurements with marking of the measuring site, but thanks to the dew point alarm function it is also possible to quickly and easily locate potential drops below dew point on material surfaces and positions where mould can form or insulation is poor.

Saving, analysing and evaluating measured values

With an active USB connection to the measuring device the MultiMeasure Studio software included in the scope of delivery also allows for online logging of measured values incl. analysis function.

Finally one software for basically all measuring devices

As optionally available Professional version MultiMeasure Studio is not only perfectly suitable for fully compatible devices like the T210 and the T260.

Owners of partially compatible or isolated measuring instruments can also benefit from this software, since it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Using the unique report generating function you can create professional measurement reports in a trice:

Numerous boilerplate texts for building diagnostics, moisture measurement, leak detection and thermography are already included completely formulated.

Further information regarding the professional version can be found starting on page 48…

TRT-KAT-THHY-WM-05-EN

Technical data		Thermohygrometer T210	IR thermohygrometer T260
Article no.		3.510.207.200	3.510.207.250
Air temperature	Measuring principle	NTC	NTC
	Measuring range	-20 to +50 °C	-20 to +50 °C
	Accuracy	±0.2 °C (0 to 40 °C), otherwise ±0.4 °C	±0.2 °C (0 to 40 °C), otherwise ±0.4 °C
	Resolution	0.1 °C	0.1 °C
	Ascertainable measured values	°C, °F	°C, °F
Air humidity	Measuring principle	capacitive	capacitive
	Measuring range	0 to 100 % RH	0 to 100 % RH
	Accuracy	±2 % RH	±2 % RH
	Resolution	0.1 % RH	0.1 % RH
	Ascertainable measured values	relative humidity (% RH), absolute humidity (g/m³), specific humidity [1] (g/kg, gr/lb), dew point temperature (dp °C, dp °F)	relative humidity (% RH), absolute humidity (g/m³), specific humidity [1] (g/kg, gr/lb), dew point temperature (dp °C, dp °F)
Surface temperature	Measuring principle	–	Pyrosensor
	Measuring range	–	-70 to +380 °C
	Accuracy	–	±0.5 °C (0 to +50 °C), otherwise ±4 °C
	Resolution	–	0.1 °C
	Ascertainable measured values	–	°C, °F
	Optical resolution (D:S)	–	12:1
	Laser	–	Class 2, < 1 mW
Functions	Measuring functions	Measurement of real value, minimum, maximum and average value; display value hold function	
	Adjustment functions	Offset adjustment for temperature and relative humidity, variable display illumination with dimmer function, specification of absolute pressure and local altitude for measuring the specific humidity, automatic switch-off, key lock, measured value storage [2]	
	Dew point alarm	–	■
Power supply	Internal	4 x 1.5 V, type AA, IEC LR06; or comparable NIMH rechargeable batteries (>2500 mAh)	
	External	USB	
General technical specifications	Display	High-resolution colour display for simultaneous indication of two measured values	
	Control	Capacitive touchscreen with cross control	
	Front glass (display and touchscreen)	Highly scratch-resistant “Blanview” special glass for high-contrast display even in the sunlight; chemically hardened, degree of hardness 7	
	Housing protection type	IP54	
	Interfaces	USB	
	Operating conditions	-20 to +50 °C, < 85 % RH [3]	
	Storage conditions	-20 to +60 °C, < 85 % RH [3]	
	Dimensions (L x W x H)	202 x 63 x 35 mm	202 x 63 x 35 mm
	Weight (incl. batteries)	270 g	295 g
Scope of delivery	Standard	Measuring device incl. metal grid filter protective cover, screen protective film, silicone cover, USB cable, batteries, Getting started guide, factory test certificate, MultiMeasure Studio Standard PC software (download)	
	Optional	Screen protective film (Art. no. 3.510.200.220), Silicone cover (Art. no. 7.330.000.065), holster 3 bag (Art. no. 3.510.200.228), sinter filter protection cap (Art. no. 3.510.200.211), calibration block for the single-point calibration (Art. no. 3.510.200.234), calibration ampoules (see page 25), PC software MultiMeasure Studio Professional (Art. no. 3.510.204.010)	

■ *Standard equipment; [1] indicates the mass of water in the air in g per kg of dry air;*
[2] only in combination with the “MultiMeasure Studio” software; [3] non-condensing

Infrared thermohygrometer T260 with dew point alarm function

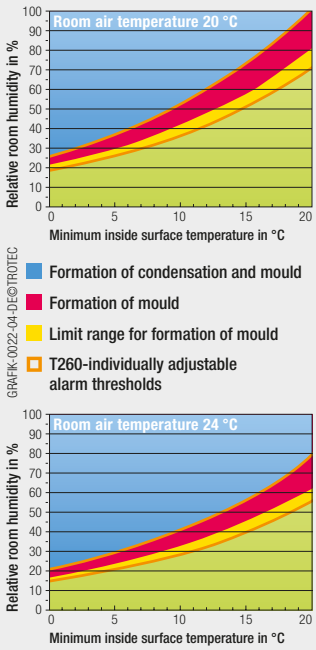
During IR measurement the T260 simultaneously indicates the surface temperature of the measuring object and the dew point temperature within the measurement environment.

As soon as the surface temperature falls below the dew point temperature, the T260 notifies you by means of a visual signal and an additional acoustic alarm.

Owing to the alarm function, wall areas can be examined in next to no time and weak points can quickly be detected. The alarm thresholds can be configured individually.

The following illustration depicts thresholds regarding the condensation formation or mould growth in buildings depending on the minimum inner surface temperatures in the region of thermal bridges.

Using the T260, all required measured variables – room temperature, humidity, surface temperature, dew point – can be determined with only one measuring device!



Heat stress measuring device TC100

No other stand-alone hand-held WBGT measuring device on the market can detect a greater number of different measured variables:

- Climate index (WBGT) for indoor and outdoor areas
- Radiant heat (black globe)
- Heat index (HI)
- Air temperature
- Relative humidity
- Dew point temperature
- Wet-bulb temperature
- Air pressure

A FEW PRACTICAL BENEFITS:

- For the assessment of heat stress or standardized thermal comfort measurements at the workplace according to ISO 7243, ISO 7726 and DIN 33403
- Fast response time
- Zero adjustment function
- Offset adjustment for radiant heat, air temperature and humidity
- Data hold, MAX/MIN and alarm function
- Data memory for 99 measured values
- Display illumination
- ¼ inch tripod connection
- In addition to battery operation also permits mains operation for non-stop measurements
- Energy-saving automatic switch-off
- Incl. calibration certificate

The TC100 comes equipped with a tripod thread and houses both a mini USB port as well as a barrel-type 9 V coaxial power socket. These ports permit a continuous mains operation as alternative to the battery-powered application.

**Climatic workplace assessments made easy:
quick, precise and conforming to standards – all in just one wieldy measuring device**

The TC100 is a multifunctional diagnostic device for professional climate checks and quickly determines the WBGT index, e.g. for the assessment of thermally stressed workplaces.

By means of a special function direct sunlight can either be disregarded or taken into account for adjusted measurements in interior spaces or outdoor areas. You can also define an individual WBGT alarm threshold. There will be an immediate acoustic indication when this value is exceeded.

Moreover, the TC100 is able to determine virtually any measured variable relevant for climatic comfort.

Be it air temperature, humidity, radiant heat, wet-bulb and dew point temperature or air pressure – all these parameters can be called up in real time, indicated on the backlit display as held, minimum, maximum or average value and up to a capacity of 99 measured values saved directly on the TC100.

TRT-KAT-TC10-WM-02-EN

Standard-compliant measurement of the WBGT index

Persons working at installations or in environments with a high energy output or thermal radiation are greatly exposed to the risk of heat stress.

Amongst other measures exposure and rest periods adapted to the respective load level have been stipulated for the health protection of these employees. The thermal load intensity is calculated from various climatic factors. The internationally standardized term for this climate index is WBGT (Wet Bulb Globe Temperature).

This index, originally developed by the US military for boot camps, is now defined in DIN EN 27243 and i.a. serves for the development of guidelines regarding work breaks and restrictions for thermally stressed workplaces.

Other than for the WBGT, the TC100 can also be used to determine the heat index – also referred to as humidex – which describes the combined effect of humidity, temperature and radiant heat on the human body.

Since the physical performance decreases at increasingly high temperatures, WBGT and heat index are more and more often used to aid the decision-making process of professional athletes or on sports events.

The backlit LCD display of the TC100 simultaneously indicates four parameters that can also be read in poorly illuminated surroundings.

Technical data		Heat stress measuring device TC100
Article number		3.510.007.010
Air temperature	Measuring range	0°C to 50 °C (32 °F to 122 °F)
	Accuracy	±0.6 °C
	Resolution	0.1 °C
Humidity	Measuring range	0 to 99.9 % RH
	Accuracy	±3 % at 25 °C and 10 to 70 % RH, otherwise ±5 %
	Resolution	0.1 % RH
Radiant heat (black globe)	Measuring range	0 °C to 80 °C (32 °F to 176 °F)
	Accuracy	±0.6 °C at 20 to 50 °C, otherwise ±1 °C
	Resolution	0.1 °C
Climate index (WBGT)	Indoor/outdoor measuring range	15 °C to 59 °C / 15 °C to 56 °C
	Accuracy indoors/outdoors	±1 °C at 15 to 59 °C, otherwise ±1.5 °C / ±1.5 °C at 15 to 56 °C, otherwise ±2 °C
	Resolution	0.1 °C
Air pressure	Measuring range	300 to 1,100 hPa
	Accuracy	±1.5 hPa
	Resolution	0.1 hPa at 300 to 999.9 hPa, 1 hPa at 1,000 to 1,100 hPa
Functions	Minimum, maximum and average value display	■
	Hold function	■
	Display illumination	■
	Adjustable measurement units	Temperature: °C, °F; air pressure: hPa, inHg, mmHg
	WBGT selection	Indoors / outdoors
	WBGT alarm function	Acoustic (limit value can be configured individually)
	Heat index calculation	■
	Dew point calculation	■
	Wet-bulb temperature calculation	■
	Zero adjustment function (Zero-Reset)	■
	Memory	99 measured values
Equipment	Display	Backlit monochrome LCD (48 x 33 cm) for the simultaneous indication of four parameters
	Tripod connection	¼ inch
	Ports	Mini USB, barrel-type 9 V coaxial power socket
Power supply	Internal	4 x LR03 AAA (operating time >250 h)
	External	Via mini USB or 9 V power adaptor (not included in the scope of delivery)
Physical characteristics	Dimensions	162 x 58 x 32 mm (ø hollow sphere / globe 50 mm)
	Weight	215 g (incl. batteries)
Scope of delivery	Standard	Measuring device, batteries, operating manual, calibration certificate
	optional	Universal tripod (Article number 6.300.000.200)

A FEW PRACTICAL BENEFITS:

- Ideal measuring equipment for testing the readiness for covering for every requirement
- CM complete sets in different versions
- CRH measuring chambers for time-saving moisture measurements according to the CRH method
- Trotec quality with an attractive value-for-money ratio

Material moisture measuring devices

for testing the readiness for covering mineral screeds according to the CRH or CM method

CM measuring devices
can be found starting from catalogue page 34 …

The measuring chamber CRH100 is ideally suited for use with the multifunction measuring meter T3000 and connected climate sensor TS 230 SDI.

This device combination has been included into the TKB list of recommendations for suitable measuring devices for CRH measurement.

More information regarding the T3000 and its sensor programme can be found starting from catalogue page 16 …

Mineral screeds as subsoils for laying textile and elastic flooring as well as parquet must only be covered if they are ready for covering. Whereas in German-speaking countries the moisture condition for testing the readiness for covering is still mostly determined using the CM method that identifies the free water percentage in the material as CM-%, floor layers in other countries often already use the “corresponding relative humidity” (CRH) for testing the readiness for covering.

One of the reasons why these areas use different processes is that no standard, measuring specification or limit values have been available for the German-speaking region for a long time, specifying in which way the “corresponding relative humidity” (CRH) is to be measured and evaluated on the screeds that are commonly used in this scope.

With the publication of their information sheet 18, the TKB (Technical Commission on Construction Adhesives of the German Adhesives Industry Association) for the first time has provided floor layers with CRH limit values for testing the readiness for covering:mineral screeds, thus making it possible to use the CRH method in German-speaking countries as well.

The ideal measuring equipment for every approach of testing the readiness for covering

Whether you use the conventional CM method or the time- and material-saving CRH method – with our CM complete sets and the CRH measuring chamber with CRH100 measuring devices you’re 100 % sure to benefit from practice-optimised quality solutions with an attractive value-for-money ratio!

TRT-KAT-CMSE-WM-11-EN

The CRH measuring chamber CRH100 provides quick and easy measurement operations for testing the readiness for covering:

Step 1: *As usual, a sample is taken of the entire cross-section of the screed and then placed in a bag.*

Step 2: *Comminution of the sample material so that the entire test material has a grain size not larger than 8 mm.*

Step 3: *Filling the measuring chamber with the material sample*

Step 4: *Close the chamber, insert the sensor and carry out the measurement. As soon as the measured value has stabilized and no longer changes, but after 30 minutes at the latest, the T3000 displays a meaningful measurement result for the readiness for covering.*

CRH measuring chamber CRH100

For quick and safe testing of the readiness for covering according to the CRH method

The CRH100 measuring chamber enables both a simple and informative residual moisture measurement in mineral screeds for testing the readiness for covering according to the CRH method – **certified by the TKB** (Technical Commission on Construction Adhesives of the German Adhesives Industry Association).

The CRH100 was designed specially to be used in combination with the T3000 multifunction measuring meter and the connected climate sensor TS 230 SDI, but is in general also suitable for sensors of any other brand, provided their diameter is 12 mm.

Optimal device combination for CRH measurements

The CHR method is a simplified and user-friendly alternative method for testing the readiness of mineral-bound screeds for covering. By means of the CRH method, the corresponding relative humidity (CRH) of a mortar sample can be determined and serve as a reliable indicator for the moisture condition of screeds before covering.

Compared to other measuring methods for testing the readiness for covering, the CRH method via T3000 with TS 230 SDI and the measuring chamber CRH100 offers numerous advantages. For example, meaningful results can be obtained even if the material type of the screed is unknown.

Besides, no exact material weights are required for the CRH method which is why measurement errors due to weighing errors cannot occur. Furthermore, using additional chemical substances such as calcium carbide ampoules is not necessary.

A FEW PRACTICAL BENEFITS:

- Optimal solution for quick testing of the readiness for covering according to the CRH method
- Completely ready-to-use test chamber – robust and easy to handle
- All device requirements for the CRH measurement are met according to TKB in combination with the multi-function measuring meter T3000 and the climate sensor TS 230 SDI
- Reliable assessment of readiness for covering even for rapid screed
- Informative method, even if the material type of the screed is unknown
- No calcium carbide ampoules, no hazardous waste, no stench
- No fault-prone, exhausting shaking of the test material required
- Professional quality "made in Germany" – originally produced by Trotec

Scope of delivery of CRH100:
Rubber-sealed test chamber with integrated measuring tube, screw-on lid and sealing plug
Article number 3.510.200.250

TROTEC 100% MADE IN GERMANY

By using multiple CRH100 devices, users can benefit from a significant advantage in time when testing the readiness for covering. If, for example, three samples need to be taken, they can each be filled separately into one of three CRH100 devices, which can then be sealed climate-proof by means of the sealing plug supplied. The corresponding relative humidity of all samples can then be measured one after the other.

Time-saving test procedure for determining the readiness for covering with the CRH measuring chamber CRH100

Alternatively, taking samples and measurements can be performed in one go, i.e. take the sample and fill the CRH100, start the measurement, start the second sample at the same time and so on.

In any case, there is a significant gain in time compared to other methods!

A FEW PRACTICAL BENEFITS:

- Robust design as complete set in the metal carrying case
- For weighed portions of 100 g (calcium sulphate flow screed)
- Direct indication of CM moisture with an accuracy class to 0.1 % (Business)
- Log printer documentation protects against damages and follow-up costs (Business)

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

In addition to the ever growing number of fully compatible Trotec meters, you can benefit from using this software even for partially compatible or interfaceless instruments such as CM devices, as it enables cross-device analysis and management of all measurement projects and customer data in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

CM material moisture measuring devices

For a quick and reliable moisture determination in building materials

CM measurements provide protection against expensive complaints later on.

Professionals already know: Structural damages are often attributable to excessive residual moisture in the ground.

With Trotec's CM Complete sets you can carry out your measurements quickly and reliably. In this way, the residual moisture content in processed construction materials such as floor beddings etc. can be precisely determined directly on site and without the need for additional aids or tools and documented with the optional log printer (CM Set Business).

Multiple print-outs simplify the administration and in case of a dispute provide proof that the mandatory testing requirements have been met.

Thanks to the accurate measuring technology, you can do without time-consuming laboratory tests. The value displayed on the pressure gauge corresponds to the actual residual moisture in per cent – no laborious conversion required.

Surface thermometer to avoid measurement errors …

The conversion tables of all CM devices that are usually available on the market are based on a constant ambient temperature of 20 °C. In the best case, this temperature is present at the beginning and also at the end of a measurement.

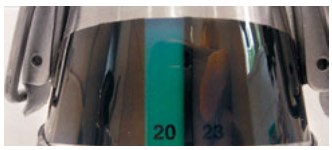
If this reference temperature is deviated at the beginning or end of a measurement and not observed, this will result in a more or less relevant error depending on the degree of deviation:

For every 3 °C deviation, the error is 1 % of the pressure (the temperature is the same at the beginning and end of the measurement).

For this reason, all Trotec CM devices are equipped with a surface thermometer which indicates the cylinder temperature. This way, any temperature errors can be detected.

If, for example, a measurement was performed at a constant temperature of 35 °C and a pressure of 0.8 bar was indicated, the CM % moisture content for a sample of 50 g according to the table or scale is 1.57 CM %.

The same measurement carried out at a constant temperature of 20 °C would have resulted in a pressure of 0.76 bar (5 % less) and thus in a moisture value of 1.49 CM %.



Hint: Combined moisture measurement – increased safety based on combined check of the readiness for covering

CM measuring is a generally accepted test method for the evaluation of the readiness for covering of screeds. As with all methods of measurement, however, the use of only one procedure can always lead to misinterpretation.

Recently craftsmen and building owners have had to deal in court with the problem that in individual cases CM measurement results indicated the readiness for covering, even though the screed just wasn't ready!

Therefore, play it safe and combine the floor moisture content measurement method approved in continental Europe (CM measurement) with the equilibrium moisture content measurement which has become established as standard method for many a year in e.g. Northern Europe.

In case of the combined moisture measurement, first the equilibrium moisture content and then the moisture content of the sample is determined by use of the very same sample.

The combined moisture measurement method affords users of CM measuring devices more security when assessing the readiness for covering of screeds without causing significant additional expenses. Moreover, the familiar CM measuring device can be used for this additional measurement.

The determination of both values – **equilibrium moisture content and moisture content of the sample** allows for a more reliable assessment of the readiness for covering than just one of the two measurement methods.

Since both measuring results have been determined using the same sample, combined moisture measurement results in yet more security for the floor layer!

Required equipment for combined moisture measurement: Other than the already available CM device, only the CM hygro combination cap (Article number 3.510.007.020) and a T210 thermohygrometer or, if the T3000 measuring device is available, a TS 210 SDI climate sensor are required.

CM Complete Set Classic

Comprising a CM basic case and CM measuring device Classic.
Article number ZB9100100

Contents of the CM basic case:

1. **Digital scales**
   - Weighing capacity 150 g
   - Minimum partition 0.1 g
   - Display stabilization within 3 seconds
   - Mechanical protection by means of weighing plate cover
   - Overload and low voltage indication
   - Automatic switch-off function
   - incl. Calibration weight (100 g) and batteries (3 x 1.5 V of type AAA)
2. **Weighing beakers (2 pc.)**
   Weighed portion can be filled directly into the cylinder – no more spilling, how convenient
3. **Full tool kit for sample preparation**
4. **Ball set with 4 steel balls**
   (starting, blending and grinding effect)
5. **20 pieces of carbide ampoules**
6. **Three test ampoules**
   with 1.00 g water for cylinder leak test/pressure gauge test
7. **Three spare seals each**
   for pressure gauge and pressure cylinder, spoon and cleaning brush
8. **Timer / Stopwatch**
   for measuring the reaction time.
   (Only available in the CM complete set Classic, since recording of the measuring time for the pressure gauge Business automatically starts at the beginning of the chemical reaction.)
9. **Lucid operating instructions**
   and quick start guide
10. **Metal carrying case –**
    everything stays in its place, protected for transport

CM Complete Set Business

Comprising a CM basic case and CM measuring device Business.
Article number ZB9100106

Equipment variants and description of pressure gauge models …		 Classic	 Business
Equipment differences	Pressure measurement principle	depending on ambient conditions	regardless of ambient conditions
	Interdependence of indicated pressure	correlated	none
	Splash water protection / dust protection	Standard	excellent (steel membrane)
	Online check	no	yes
	Measuring time display	no	yes
	Logging option on site	no	yes
	Storage of measured values	no	yes
	Individual log printing	no	yes
	Maintenance effort	check regularly	Very low
Technical properties	Accuracy class pressure gauge	1.0	0.1
	Measuring range	max. 2.5 bar	-1 to 2 bar
	Pressure overload protection	decent	decent
	max. fault (mbar)	± 25	± 2
	Attenuation pressure gauge cover	DIN-EN 837-2	DIN-EN 837-2
	Serial interface	–	RS485
Direct reading of CM % moisture	10 g	–	■
	20 g	■	■
	50 g	■	■
	100 g	■	■
	Other	bar	yes
	Power supply	–	Durable battery (approx. 3,000 h)

The Business set is optionally also available with a CM log printer to document your measurement data:

Comes fully equipped with protective cover, charger and spare roll of paper (*Article number ZB9100043)*. Prints the measuring result directly as log. It is possible to create several print-outs with log numbers during one measurement only.

The log comprises:

- Adjustable log heading for company data and information on the measuring point
- Selection list for test material measured
- Pressure curve during measurement
- Overall measurement duration in minutes and seconds
- Autom. calculation of the CM % moisture for 10, 20, 50 and 100 g weighed portions
- Adjustable log footer for documentation, location, user and building owner

Material moisture measuring devices T610 and T660

A FEW PRACTICAL BENEFITS:

- Measuring devices designed and produced according to the highest quality standards in Germany
- German industrial design in robust, premium two-component construction with IP54 type of protection
- Continuous easy-to-clean glass surface made of highly scratch-resistant Blanview special glass for a high-contrast display of measured values even in the sunlight
- Capacitive touchscreen control panel
- High-resolution colour display for simultaneous indication of two measured values
- Moisture alarm function
- Material pre-selection for anhydrite and cementitious screed (T660 only)
- Direct display of measured values possible in mass % or CM % (T660 only)
- Grid measurement function via USB with active software connection
- Incl. MultiMeasure Studio measurement data management software (standard download version)

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Not only ideally suited for fully compatible measuring devices such as the T610 or the T660, but also usable with many partially compatible devices – even owners of isolated external devices can benefit from this software, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Using the unique report generating function you can create professional reports in a trice: Numerous boilerplate texts for building diagnostics, moisture measurement, leak detection and thermography are already included completely formulated.

Further information regarding the professional version can be found starting on catalogue page 48 …

Material moisture measuring device T660

Ideal for the quick and non-destructive determination of near-surface moisture distributions to up to 4 cm.

Based on the T660's integrated material pre-selection function for anhydrite and cementitious screed the measurement results (indicative) can on demand be shown directly in mass % or CM % on the colour display of the T660.

The integrated conversion of measured values is a practical tool, in particular for floor layers to quickly check the readiness for covering.

In addition to the preliminary check of the building materials' readiness for covering for CM measurements the T660 is also suited for non-destructive wood moisture measurements according to the dielectric measurement method (indicative).

Brilliant large-digit display

Both measuring devices come equipped with particular display glass ensuring high-contrast presentation even in bright sunlight as well as enabling the quick and reliable detection of the moisture distribution in wall or floor areas when combined with the large-digit, real-time measurement value display.

Integrated alarm function

Handy and time-saving: Prior to measuring, an individual limit value can be defined for both devices. Should this alarm limit value be exceeded in the course of measuring, an acoustic warning signal is emitted automatically!

This way, large wall and floor areas can be measured quickly and effectively.

During measuring, the user can focus exclusively on the measuring object without the need to permanently keep an eye on the displayed measuring results.

Material moisture measuring device T610

Specifically designed for quick, non-destructive sub-surface measurements.

Using the T610, the microwave technology not only allows the detection of moisture distributions to a depth of up to 300 mm, moreover, the method works regardless of the salinity degree of the material. For the microwave method it is, therefore, irrelevant whether an older or a new building is inspected.

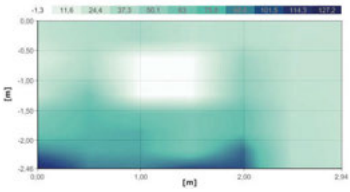
T610 and T660 come with a continuous surface made of highly scratch-resistant Blanview special glass and capacitive touchscreen control panel.

TRT-KAT-MAFE-WM-05-EN

Also ideally suited for combined building diagnostics measurements

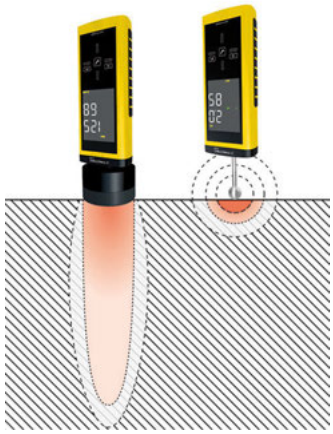
The material moisture measuring devices T610 and T660 individually can not only splendidly be used for the non-destructive moisture measurement in building materials, walls, ceilings or floors, but in joint application also facilitate additional examination options:

Through combined surface and sub-surface moisture measurement complex correlations can be distinguished, narrowed down and classified as well, e.g. hygroscopic humidity occurrences resulting from salinization or leak detection. In the course of this the T660 captures the topmost two to four cm of the construction material and the T610 measures the volume moisture values to a depth of 30 cm.



Significant results regarding a multi-dimensional moisture distribution can be obtained via grid measurement based on surface and sub-surface moisture measurement values. With an active USB connection to the measuring device the Multi-Measure Studio software included in the scope of delivery provides a convenient assistance function for the creation and visualization of grid measurements.

Further information – also regarding this software's professional version – can be found starting on page 48…



Technical data		T610	T660
Article no.		3.510.207.600	3.510.207.650
Material moisture	Ascertainable measured values	Sub-surface moisture (digits)	Near-surface moisture (digits, mass %, CM %)
	Measuring principle	Microwave	Dielectric
	Measuring range	0 to 200 digits	0 to 200 digits, anhydrite screed: 0 to 7.3 mass %, 0 to 7.3 CM %; cementitious screed: 0 to 7.6 mass %, 0 to 5.5 CM %
	Accuracy	0.1 digits	0.1 digits
	Resolution	0.1 digits	0.1 digits
	Penetration depth	up to 300 mm	up to 40 mm
Functions	Measuring functions	Measurement of real value, minimum, maximum and average value; display value hold function	
	Adjustment functions	Offset adjustment for digit measurements, variable display illumination with dimmer function, automatic switch-off, key lock, measured value storage [1]; T660 only: material pre-selection for anhydrite and cementitious screed	
	Alarm function	■	■
Power supply	Internal	4 x 1.5 V, type AA, IEC LR06; or comparable NIMH rechargeable batteries (> 2500 mAh)	
	External	USB	
General technical specifications	Display	High-resolution colour display for simultaneous indication of two measured values	
	Control	Capacitive touchscreen with cross control	
	Front glass (display and touchscreen)	Highly scratch-resistant "Blanview" special glass for high-contrast display even in the sunlight; chemically hardened, degree of hardness 7	
	Housing protection type	IP54	
	Interfaces	USB	
	Operating conditions	0 to +50 °C, < 90 % RH [2]	
	Storage conditions	-10 to +60 °C, < 95 % RH [2]	
	Dimensions (L x W x H)	191 x 65 x 65 mm	209 x 63 x 35 mm
	Weight (incl. batteries)	425 g	285 g
Scope of delivery	Standard	Measuring device, screen protective film, silicone cover, USB cable, batteries, Getting started guide, factory test certificate, MultiMeasure Studio Standard PC software (download)	
	Optional	Screen protective film (Art. no. 3.510.200.220), Silicone cover (Art. no. 7.330.000.065), holster 3 bag (Art. no. 3.510.200.228), PC software MultiMeasure Studio Professional (Art. no. 3.510.204.010)	

■ *Standard equipment; [1] only in combination with the "MultiMeasure Studio" software; [2] non-condensing*

Wood and building moisture measuring device T510

Professional hand-held measuring device for the exact determination of wood and material moisture content according to the resistance measuring method

A FEW PRACTICAL BENEFITS:

- Measuring device designed and produced according to the highest quality standards in Germany
- German industrial design in robust, premium two-component construction with IP54 type of protection
- Continuous easy-to-clean glass surface made of highly scratch-resistant Blanview special glass for a high-contrast display of measured values even at intense incidence of light
- Capacitive touchscreen control panel
- High-resolution colour display for simultaneous indication of two measured values
- Temperature compensation function during wood moisture measurement
- Integrated material characteristics for hundreds of different types of wood
- Extensive compendium of material curves included
- Expanded range of applications thanks to connection facility for various moisture electrodes with optional TS adapter set
- Incl. MultiMeasure Studio measurement data management software (standard download version)

In addition to the measurement of moisture in soft building materials such as gypsum or plaster, the T510 is suited like no other device of its class for inspections in forest enterprises, saw mills and wood processing companies.

Especially for the moisture measurement of wood-based materials, the T510 is in fact provided with a menu option allowing the selection of hundreds of different types of wood.

This is enabled by numerous validated material curves, which are stored in the device software and can be selected from the Trotec table of wood types by means of a corresponding material number.

The wood type directory comprising 170 pages included in the scope of delivery is probably the most extensive compendium of material curves on the market.

As can be expected from a professional wood moisture measuring device of German high-quality manufacturing, the T510 is equipped with a special function for the temperature compensation of the goods to measure.

During measurement, the wood moisture value determined in real time and the defined wood temperature are simultaneously indicated on the clearly legible colour display behind Blanview special glass, ensuring a high-contrast display of measured values even in the sunlight.

The T510 comes with a continuous surface made of highly scratch-resistant Blanview special glass and capacitive touchscreen control panel.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Not only ideally suited for the fully compatible T510, but also for many partially compatible measuring devices – even owners of isolated external devices benefit from this software, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

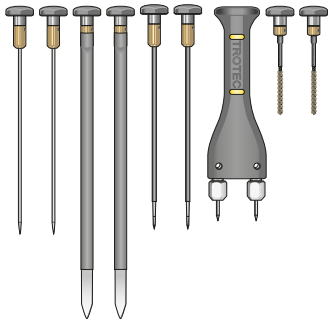
Using the unique report generating function you can create professional reports in a trice: Numerous boilerplate texts for building diagnostics, moisture measurement, leak detection and thermography are already included completely formulated.

Further information regarding the professional version can be found starting on catalogue page 48…

Combine the practical benefits of the T510 with the enhanced possibilities of a flexible electrode selection:

The optionally available TS adapter set allows for the connection of all Multi-Measure electrodes for wood and building moisture measurement to the T510.

This way you can benefit from an application range only very few compact moisture measuring devices of this class have to offer.



Technical data		T510
Article no.		3.510.207.505
Building moisture	Ascertainable measured values	Digits
	Measuring principle	Resistance measuring method (indicative)
	Measuring range	0 to 100 digits
	Resolution	0.1 digits
Wood moisture	Ascertainable measured values	Mass % (M %)
	Measuring principle	Resistance measuring method
	Measuring range	0 to 100 %
	Accuracy [1]	±0.8 M% (at 0 to 5 M%), ±0.2 M% (at 5 to 30 M%), ±0.1 M% (at 30 to 100 M%)
	Resolution	0.1 M%
	Temperature compensation	Adjustable from -20 to +60 °C
Electrodes	Length / ø	20 mm / 1.5 mm
	Penetration depth	Approx. 10 mm (with standard electrodes)
Functions	Measuring functions	Measurement of real value, minimum, maximum and average value; display value hold function
	Adjustment functions	Mode selection for wood or building moisture measurement, temperature adjustment for wood moisture measurement, wood material code, offset adjustment for digit or mass % measurements, automatic switch-off, variable display illumination with dimmer function, key lock, measured value storage [2]
	Wood type selection	Integrated material characteristics for hundreds of different types of wood
	Alarm function	■
Power supply	Internal	4 x 1.5 V, type AA, IEC LR06; or comparable NIMH rechargeable batteries (>2500 mAh)
	External	USB
General technical specifications	Display	High-resolution colour display for simultaneous indication of two measured values
	Control	Capacitive touchscreen with cross control
	Front glass (display and touchscreen)	Highly scratch-resistant “Blanview” special glass for high-contrast display even in the sunlight; chemically hardened, degree of hardness 7
	Housing protection type	IP54
	Interfaces	USB
	Operating conditions	0 to +50 °C, < 90 % RH [3]
	Storage conditions	-10 to +60 °C, < 95 % RH [3]
	Dimensions (L x W x H)	187 x 63 x 35 mm
	Weight (incl. batteries)	280 g
Scope of delivery	Standard	Measuring device, protective cap for measuring tips, 10 spare measuring tips, screen protective film, silicone cover, USB cable, batteries, Getting started guide, factory test certificate, MultiMeasure Studio Standard PC software (download)
	Optional	Screen protective film (Art. no. 3.510.200.220), Silicone cover (Art. no. 7.330.000.065), holster 3 bag (Art. no. 3.510.200.228), TS adapter (Art. no. 3.510.200.224), TC25 connecting cable (Art. no. 3.510.200.025), PC software MultiMeasure Studio Professional (Art. no. 3.510.204.010)

■ *Standard equipment; [1] depending on the measuring principle; [2] only in combination with the “MultiMeasure Studio” software; [3] non-condensing*

You would like to perform moisture measurements on concealed components? In solid building materials like concrete? In timber beam ceiling constructions? In the insulation layer along the border joints? In multi-layered wall or ceiling constructions? On wood types of different degrees of hardness?

No problem at all with the TS adapter set:

Whether ram electrode, round, flat or layer depth electrodes in all available lengths and diameters with insulated or uninsulated electrode tips – the complete range of MultiMeasure electrodes can be connected to the T510 without difficulty!

The set consists of two special adapter heads (Article no. 3.510.200.224) which can quickly and easily be screwed onto the top of the T510 in exchange for the standard cap nuts and serve as connectors for the TC 25 connecting cable (Article no. 3.510.200.025).

Owing to the long cable connection, moisture measurements can be performed easily and conveniently even in poorly accessible locations.

DL200 data loggers

For tamper-proof measured value monitoring, recording and documentation of environmental data and many other measured values …

A FEW PRACTICAL BENEFITS:

- Maintenance free made-in-Germany quality measuring devices
- Tamper-proof measured value detection and documentation
- Perfect for measuring over a long period
- Storage for up to 3,200,000 measured values
- Simultaneous recording of up to 20 separate measuring channels
- Network function
- Low energy consumption
- Flexible power supply via batteries or USB
- Timer function, variable measured intervals, alarm function for each measuring channel
- Three row LCD for displaying measured values
- Including pro software
- Practically optimised German industrial design

All data loggers are available as an option in addition to the standard colour anthracite, with white or yellow housing.

The universal industrial data logger DL200X with flexible connection option for many external sensors can be found starting on catalogue page 44 …

Tamper-proof logging – perfect for measuring over a long period

Whether internal precision sensors for recording various environmental values or additional connection options for external sensors and electrodes – with the data loggers of the DL series, produced in Germany, industrial, craft and construction users are provided with a range of applications for tamper-proof long-term measurements.

The dataloggers can optionally be used while running on batteries for flexible, location-independent applications – ideal for surveyors and real estate agents, for example – or else the measurement data collector can be used in stationary network applications with the option of "Power over Ethernet".

Many measuring channels – many possibilities …

The data logger can detect up to 32 measuring channel groups of the most varied sensor signals. Then, it can record an individually configurable composition of measured values from up to 20 separate measuring channels in freely selected intervals.

Due to the wide range of possible applications, the instruments are perfectly suited for monitoring the environment of buildings, controlling climate sensitive production processes and storage conditions or even providing evidence when required.

The devices are fitted with LAN and USB interfaces by default to offer a quick transfer of data.

Data loggers of the DL series – further information …

Data loggers of the DL series are the perfect solution for monitoring environmental and process data for industry, administration, logistics, agriculture and construction.

Real time data compilation over a network

All data loggers of the DL series can be assigned an individual IP address – even in decentralised measuring networks with many various data loggers – allowing both the transmission of measured data and also device configuration via LAN.

DL200H – the ideal solution for monitoring environmental factors

With its two internal sensors, the DL200H is able to simultaneously detect and record air temperature, dew point and both relative and absolute humidity.

That is why this data logger is so well suited for monitoring the environment in buildings, computer centres, museums or storerooms and for controlling climate-sensitive processes during industrial production.

DL200D – indoor air pressure checks

In addition to environmental data the DL200D also captures the current air pressure values. Due to real-time indication, long-term detection and logging of all measured values the DL200D is not only the perfect meteorological station for calibration laboratories.

Differences in air pressures can also be completely documented in all surroundings requiring permanent vacuum or overpressure conditions, e.g. in biology laboratories or isolation areas during restoration work.

DL200L – monitoring indoor air quality

As well as offering all sensor functionality and equipment of the DL200H, the DL200L also provides an additional NDIR sensor for detecting concentrations of CO_2 in the room air.

For long term logging of environmental data and carbon dioxide values, the DL200L, with its alarm function, is the ideal air controlling instrument for workspaces, for example, in schools, public authorities and businesses.

Pro software for configuring and managing measured data

Using the software included in the scope of delivery, all DL data loggers can conveniently be set up or configured for network operation. The measured data can simultaneously be read, analysed and exported by all data loggers – using LAN also from remote installation sites.

Now upgrade the standard software with the options MultiMeasure Studio Professional has to offer.

Since all DL models are fully compatible with this, the software is not only perfectly suited for the analysis of all measured data, but can also be used to calculate the dew point temperature or absolute humidity in retrospect, if it wasn't recorded already.

Finally one software for basically all measuring devices

Even owners of partially compatible or isolated measuring instruments can benefit from MultiMeasure Studio Professional: This software enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Using the unique report generating function you can create professional measurement reports in a trice:

Numerous boilerplate texts for building diagnostics, moisture measurement, leak detection and thermography are already included completely formulated.

All information regarding MultiMeasure Studio Professional from page 48 onwards …

DL200P – Environmental data logger with an expandable sensor system

Just like the DL200H this data logger, too, comes equipped with two internal sensors for the detection and documentation of air temperature, dew point and both relative and absolute humidity.

Moreover, the DL200P has additional connection options for up to four external measured value sensors, thus offering its users considerably enhanced fields of application.

The DL200P can be simultaneously fitted with two electrode pairs for measuring resistance dampness, as well as two TS910 contact temperature sensors.

Therefore, the DL200P can be used for the most varied monitoring tasks – also via LAN in the network using further DL data loggers – for example for silo surveillance and control of bulk goods, or for checking the temperature of water-based fluids.

Furthermore, all documentation can be completely collated for insurance or regress resistance for construction drying and water damage clearance. The practical alarm function also makes it possible to detect and avoid potential damages to buildings or inventory before they occur.

Up to four external measured value sensors can be connected:

One to two TS910 contact temperature sensors ① can be connected to the data logger via plug sockets ②.

Moreover, one electrode pair for measuring resistance dampness can be attached to each of the two BNC connectors ③ at the DL200P.

①

Technical data of the external TS910 temperature sensor		
Article no.		3.510.260.301
for use with data logger model		DL200P
Temperature	Measuring range	-20 °C to +80 °C
	Accuracy	0.2 °C (0…40 °C), otherwise, 0.8 °C
Configuration and dimensions	Dimensions	Cable length 6 m, sensor length 20 mm, sensor diameter 5 mm
	Weight	85 g
	Type of protection	IP65
	Connection	3.5 mm plug socket

Definition of measurement channel – How many measured values can be recorded using DL data loggers?

All devices from the DL series are powerful multi-channel data loggers with which you can not only detect, but also record all of the compatible measured values *(see technical specifications)*.

The term “measurement channel” is not used to mean the same as it is by some of our competitors – meaning the available sensors, but instead – the same as in analysis software – it means one individually selectable “recording track”, i.e. the value which should be logged.

In combination each measured value and measured unit constitute a channel group – for instance temperature with the unit Celsius.

For any such channel group, one or more of the four following types of measured values can be recorded: current, minimum, maximum or average. Each of these four values represents an individual measurement channel.

The maximum amount of available measurement channels for each data logger is thus the amount of detectable channel groups (e.g. temperature in °C) multiplied by the four types of measured values.

With all DL data loggers, 20 of the available measurement channels each can be freely selected for recording and always three for display purposes.

Data loggers of the DL series – further information … ➔

Technical data of the data loggers		DL200D	DL200H	DL200L	DL200P
Article no.	Housing colour anthracite (standard)	3.510.260.040	3.510.260.020	3.510.260.050	3.510.260.030
	Housing colour yellow (optional)	3.510.260.041	3.510.260.021	3.510.260.051	3.510.260.031
	Housing colour white (optional)	3.510.260.042	3.510.260.022	3.510.260.052	3.510.260.032
Detectable measured values (channel groups)[5] with internal measured sensors	Air temperature (°C/°F)	yes	yes	yes	yes
	Dew point temperature (°C/°F)	yes	yes	yes	yes
	relative humidity % RH	yes	yes	yes	yes
	absolute humidity g/m³	yes	yes	yes	yes
	relative air pressure (hPa)	yes	–	–	–
	absolute air pressure (hPa abs.)	yes	–	–	–
	CO_2-Concentration	–	–	yes	–
Detectable measured values (channel groups)[5] with external measured value sensors	Surface temperature (°C/°F)	–	–	–	(see technical data for the TS910 sensor)
	Material temperature (°C/°F)	–	–	–	
	Air temperature (°C/°F)	–	–	–	
	Wood dampness (digits)	–	–	–	yes
	Construction dampness (digits)	–	–	–	yes
Wood and construction dampness (external electrodes)[4]	Operating principle	–	–	–	resistance
	Measuring range	–	–	–	15 … 100 digits
	Accuracy[1]	–	–	–	± 3 digits
	Screen resolution[1]	–	–	–	1 digit
Air temperature	Operating principle	NTC			
	Measuring range	-20 °C … + 50 °C			
	Accuracy	± 0.3 °C (0 … 40 °C), otherwise, 0.5 °C			
	Screen resolution	0.1 °C			
Relative humidity	Operating principle	capacitive			
	Measuring range	10 to 95 % RH			
	Accuracy	± 2 % RH			
	Screen resolution	0.1 % RH			
Air pressure	Measuring range	300 … 1,300 hPa abs.	–	–	–
	Accuracy[2]	± 0.5 hPa	–	–	–
	Screen resolution	0.1 hPa	–	–	–
CO_2-Concentration	Operating principle	–	–	NDIR	–
	Measuring range	–	–	0 … 5,000 ppm	–
	Accuracy[3]	–	–	± 50 ppm +3 % of measured value	–
	Screen resolution	–	–	1 ppm	–
	Long term stability	–	–	20 ppm / a	–
Memory organisation	Sensing / saving interval	Sensing interval: 10/30 s, 1/10/12/15/30 min, 1/3/6/12/24 h; Saving interval: 1/10/12/15/30 min, 1/3/6/12/24 h			
	Data storage	Data storage: 16 MB, 3,200,000 measured values; data recording: up to 20 measuring channels[5] parallel			
	available measuring channels / channel groups	32 / 8	24 / 6	28 / 7	max. 48 / max. 12
Configuration and dimensions	Design	Plastic housing material, LCD screen dimensions: W 90 x H 64 mm			
	Dimensions / weight	L 166 x W 32 x H 78 mm / approx. 250 g			
Interfaces	USB and LAN	yes	yes	yes	yes
	3.5 mm plug socket	–	–	–	yes, 2 x
	BNC connector	–	–	–	yes, 2 x
Power supply	internal	4 x LR6 AA batteries, battery life > 1 year (depending on sensor and configuration)			
	external via USB	yes	yes	yes	yes
Scope of supply	Standard	Measuring device, CD-ROM with SmartGraph PC software for representing the evaluation of measured values graphically and numerically and operating manual, USB connection cable, batteries, factory certificate			
	Software optional	MultiMeasure Studio Professional PC software (Art. no. 3.510.204.010)			

[1] in the range 20 … 80 digits; [2] in the range 700 … 1,100 mbar at 25 °C; [3] at 20 °C and 1,013 mbar;
[4] external measuring electrodes with BNC connector for measuring resistance of wood and construction dampness; an additional TC 20 connecting cable is necessary for connecting.
[5] see info box "Definition of measuring channel – How many measured values can be recorded?" on catalogue page 42…

Data loggers of the DL series – further information …

DL200X – universal industrial data logger

The DL200X is the perfect data collector for various monitoring tasks in automation, control and feedback control systems.

Whether particle concentration, pressure, conveyor speed or flow rate, the DL200X can be configured for any requirement you may have, because instead of relying on internal sensors, it uses external connections for digital and analogue sensors.

Up to four intelligent bus sensors can be built in, for example, particle counters or temperature-dampness sensors for cleanrooms.

Additionally, two other analogue sensors can be attached, for example, Pt100 temperature sensors, thermal elements (K, J, S type) or voltage and current sensors with the standardised signal for individual measurement transducer in various physical sizes and units.

At maximum configuration, you can simultaneously use six different sensors at the DL200X, manage 128 measurement channels and, due to the device's LAN capability, realize universal measuring networks in real time.

Up to six external measured value sensors can be connected:

One to four digital bus sensors can be connected to the data logger via the 5-pin round connector M12 ① – e.g. sensor type TS920 ② – and installed in a long line of up to 150 metres using Y-connectors ③ and extension cables ④.
One or two analogue sensors with current and voltage output, Pt100 temperature sensors in 3- and 4-cable technology or thermal elements can be connected to the 10-pin terminal ⑤ with two independent input channels.

Technical data of the external TS920 temperature and dampness sensor		
Article no.		3.510.260.302
for use with data logger model		DL200X
Air temperature	Measuring range	-40 °C to +80 °C
	Accuracy	± 0.1 °C (20 °C), ± 0.3 °C (-10 °C … +50 °C) otherwise, < 0.5 °C
Dew point temperature	Measuring range	-40 °C to +80 °C
Relative humidity	Measuring range	0 … 100 %
	Accuracy	± 2 % RH (0 … 90 % RH), ± 3 % RH (0 … 100 % RH)
Absolute humidity	Measuring range	0 … 300 g/m³
Mix ratio	Measuring range	0 … 550 g/kg
Optional accessories		Stainless steel sinter cap (Article no. 3.510.200.211), Y-connector (Article no. 3.510.260.310), extension cable in either 2 m, 10 m or 25 m lengths

Technical data		DL200X data logger
Article no.	Housing colour anthracite (standard)	3.510.260.060
	Housing colour yellow (optional)	3.510.260.061
	Housing colour white (optional)	3.510.260.062
Detectable measured values groups with external sensors	Measured units associated with the sensor	counts, logic, digits, °C, °F, K, °Cdp, °Fdp, %rH, g/kg, g/m³, µm, mm, cm, dm, m, km, in, mil, ft, mi, m/s, km/h, kts, ppm, mV, V, mA, A, Hz, kHz, bar, mbar, Pa, mPa, hPa, kPa, m³, l, s, ms, µs, %, °, mm/h, m³/h, l/m², in/h, mil/h, g, kg
	Measured values associated with the sensor	temperature, relative humidity, absolute humidity, dew point, battery voltage, voltage, current, absolute air pressure, relative air pressure, construction dampness, flow rate, mix ratio, CO_2-concentration, particles 0.1 µm, particles 0.2 µm, particles 0.3 µm, particles 0.5 µm, particles 1 µm, particles 5 µm, particles 10 µm, particles x µm, particles y µm, particles z µm, unknown, inactive, wet-bulb temperature, global radiation, daylight, amount of rain, wind speed, wind direction, analogue/digital input, ground dampness, leaf wetness
Voltage input 0 - 1 V	Measuring range	0 … 1 V
	Accuracy	± 200 µV ± 0.1 % of measured value
	Resolution	< 500 µV
Voltage measurement	Measuring range	2-cable operation: 4 … 20 mA, 3-cable operation: 0 … 20 mA
	Accuracy	± 4 µA ± 0.1 % of measured value
	Resolution	< 5 µA
	Total load	approx. 50 Ω
Thermal element K	Measuring range	-200 °C … 1,200 °C
	Accuracy	± 1 °C ± 0.5 % of the measured value at -200 °C … 0 °C, ± 1 °C ± 0.2 % of the measured value at 0 °C … 1,200 °C
	Resolution	< 0.2 °C
Thermal element J	Measuring range	-200 °C … 1,200 °C
	Accuracy	± 1 °C ± 0.5 % of the measured value at -200 °C … 0 °C, ± 1 °C ± 0.2 % of the measured value at 0 °C … 1,200 °C
	Resolution	< 0.2 °C
Thermal element S	Measuring range	-50 °C … 1,700 °C
	Accuracy	± 1 °C ± 0.5 % of the measured value at -50 °C … 0 °C, ± 1 °C ± 0.2 % of the measured value at 0 °C … 1,700 °C
	Resolution	< 0.2 °C
Pt100	Measuring range	-200 °C … 500 °C
	Accuracy	± 0.2 °C ± 0.1 % of the measured value
	Resolution	< 0.02 °C
Memory organisation	Sensing / saving interval	Sensing interval: 10/30 s, 1/10/12/15/30 min, 1/3/6/12/24 h; Saving interval: 1/10/12/15/30 min, 1/3/6/12/24 h
	Data storage	Data storage: 16 MB, 3,200,000 measured values; data recording: up to 20 measuring channels[1)] parallel
	available measuring channels / channel groups	max. 128 / max. 32
Configuration and dimensions	Design	Plastic housing material, LCD screen dimensions: W 90 x H 64 mm
	Dimensions / weight	L 166 x W 32 x H 78 mm / approx. 250 g
Interfaces	USB and LAN	yes
	RS485 (sensor BUS)	yes
	10 pin terminal	yes
Power supply	internal	4 x LR6 AA batteries, battery life > 1 year (depending on sensor and configuration)
	external via USB	yes
	Terminal for external power supply to supply the sensor	yes
Scope of supply	Standard	Measuring device, CD-ROM with SmartGraph PC software for representing the evaluation of measured values graphically and numerically and operating manual, USB connection cable, batteries, factory certificate
	Software optional	MultiMeasure Studio Professional PC software (Art. no. 3.510.204.010)

[1)] see info box “Definition of measuring channel – How many measured values can be recorded?” on catalogue page 42…

One app, plenty of measuring devices, countless possibilities

MultiMeasure Mobile for appSensors

A FEW PRACTICAL BENEFITS:

- Development, design, production: 100 % Trotec
- Professional measuring system consisting of individual appSensors centrally controlled via app
- MultiMeasure Mobile – free app for the operation, evaluation and measured value indication of all connected measuring devices
- appSensors – compact, professional measuring devices without display but with high-quality measuring sensors and smartphone control
- The appSensor product range comprises various measuring devices for different measuring applications and is permanently enhanced
- Analysis tools, report generating function and customer management are already integrated in the app ready for use
- Simple data export option, also convenient measurement data synchronization via cloud to a PC with installed MultiMeasure Studio Professional

Trotec appSensors are compact precision measuring devices with high-quality sensors. Designed in a way to save space and energy, they have neither display unit nor evaluation electronics – data analysis and operation are realized almost entirely by means of the smartphone.

Combined with the free app MultiMeasure Mobile this measuring device concept offers many compelling advantages.

All appSensors are automatically identified by the app and can be connected quickly and easily to a mobile terminal device using wireless technology.

For individual or non-stop measuring operations, MultiMeasure Mobile provides manifold display options for the indication of measured values: numerical, in form of a chart or as a combination of several measurement parameters.

Using the integrated customer management function all of the measured data can be assigned to projects and clients via the app. The built-in report function further facilitates a quick on-site documentation. All data can be shared with customers or colleagues and even be synchronized via the MultiMeasure Cloud using an existing PC installation of MultiMeasure Studio Professional.

In addition to typical professional analysis options and the smart measurement data linkage of the parallel-connected appSensors the app MultiMeasure Mobile offers a still greater number of innovative functions such as matrix measurements that are linked to photos: Just take a photo, mark the position of the measuring point on it, carry out the measurement and then save it all.

All measuring points and data remain linked to the photo for later analysis and can also be prepared as matrix representation e.g. to indicate the distribution of moisture or heat.

MultiMeasure Mobile – free download

The Trotec app MultiMeasure Mobile turns your mobile terminal device into a multifunctional measurement data management tool.

The operation is as simple and intuitive as the installation: Simply download MultiMeasure Mobile for free onto your mobile device – it is available for iOS and Android.

GET IT ON Google Play | Download on the App Store

You would like to find out more?

Detailed information regarding MultiMeasure Mobile and the combinable appSensors can be found in our online catalogue or directly via the QR code.

TRT-KAT-MMM0-WM-04-EN

MultiMeasure Mobile and appSensors turn your smartphone into a multifunctional measuring station

All appSensors at a glance:

BM31WP
Moisture indicator controlled via smartphone

Measuring range 0 to 100 digits

For capacitive building moisture measurements, max. penetration depth 40 mm

Article no. 3.510.206.031

BS30WP
Sound level measuring device controlled via smartphone

Measuring range 35 to 130 dB(A)

Article no. 3.510.206.051

BM22WP
Material moisture measuring device controlled via smartphone

Measuring range 6 to 99 %

For the measurement of wood and building moisture according to the resistance measuring method

Article no. 3.510.206.025

BA30WP
Hot-wire anemometer controlled via smartphone

Measuring range 0 to 30 m/s, 0 to 99.9 % RH, -20 to +70 °C

Extendable telescopic probe, flow rate indication in m/s, km/h, m³/min, ft/min, ft³/min, mph, kn

Article no. 3.510.206.043

Bluetooth®

BC21WP
Thermohygrometer controlled via smartphone

Measuring range -20 to 60 °C, 0 to 100 % RH

Indication of dew point, absolute humidity (g/m³) and specific humidity (g/kg)

Article no. 3.510.206.006

BA16WP
Vane anemometer controlled via smartphone

Measuring range 0.6 to 30 m/s, 0 to 100 % RH, -20 to +60 °C

Flow rate indication in m/s, km/h, m³/min, ft/min, ft³/min, mph, kn

Article no. 3.510.206.042

BP21WP
Pyrometer controlled via smartphone

Measuring range -30 to 250 °C

With 10:1 measuring optic, multi-point laser and dew point alarm function

Article no. 3.510.006.031

BT22WP
Thermometer with smartphone operation

Measuring range -50 to 150 °C

Measurement of air and Liquid temperature

Article no. 3.510.205.009

BV15WP
Differential pressure Measuring device with smartphone operation

Measuring range 0 to 150 hPa

Measuring range 0 to 50 m/s

Article no. 3.510.206.061

BF06WP
Luxmeter with smartphone operation

Measuring range 0 to 40,000 lx

Measurement of illuminance and incidence of light

Article no. 3.510.205.085

MultiMeasure Mobile app advantages:

- Automatic identification of appSensors
- Simultaneous operation of several appSensors
- Numerical measured value indication or else in form of a chart / matrix
- Integrated report function for the documentation directly on site
- Organizer function and customer management
- Manifold analysis options directly in the app
- Storage of measured values linked to photos
- Matrix measurements, also linked to photos
- Complete data synchronization with MultiMeasure Professional via cloud

Function for the automatic synchronization via the MultiMeasure Cloud

or CSV export

"MultiMeasure" through and through:
All data can be imported from the app to MultiMeasure Studio Professional (catalog page 48), where it can be further processed and archived!

appSensor advantages:

- Professional sensors for precise measuring results
- Simple app connection via Bluetooth
- Wireless control of the measuring devices and display of data via app
- Simple recording of measured values, even at remote locations, as they can be read via the app
- Additional determination and indication of minimum, maximum and average values
- Hold, logging and alarm functions
- Practice-optimized German industrial design – protected design patent

A FEW PRACTICAL BENEFITS:

Analysis software developed entirely by Trotec

Enables universal measurement data management for various measuring devices with one central tool

Unique to the construction sector for the supported device classes: automated report generating function including many completely predefined and at the same time fully editable boilerplate texts

MultiMeasure Studio Professional is the ideal software solution for everyday practice of all specialists dealing with building damage and construction drying:

- **Leak detection**
- **Building diagnostics**
- **Examination and restoration of mould damage**
- **Climate and moisture measurement**
- **Water damage restoration**
- **Construction drying**

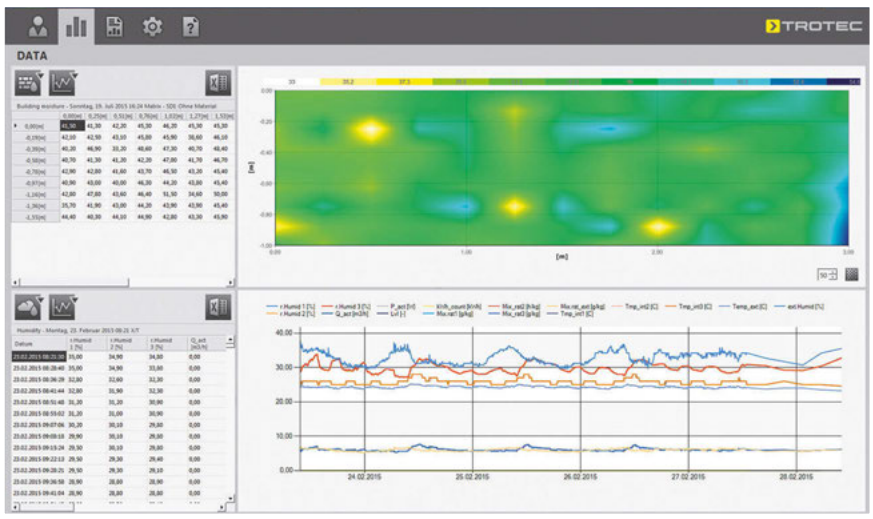
Measurement data management software MultiMeasure Studio Professional

Based on the practice – made for the practice

Benefit from a unique software for the administration, analysis and report generation of your measuring projects across multiple devices.

Many measuring devices are supplied with a software nowadays. But what is almost always missing is a comprehensive and effective synchronization to your practical requirements. After all, the work is not finished after measuring and data reading – it only starts.

Therefore, MultiMeasure Studio Professional supports you perfectly during all work steps – because this software was optimally programmed to your processes and can be applied in combination with virtually all measuring devices used in daily practice.



Reading out measurement data and evaluating them graphically, managing measuring projects and generating reports: all in one and easier than ever before, with MultiMeasure Studio Professional.

With each edition of MultiMeasure Studio Professional, you have three specialists at your disposal:

A brilliant data analyst organises the read-out and graphic evaluation of the measured data of all compatible measuring devices.

A versatile project manager simultaneously ensures a flexible administration of your data regarding customers, measuring sites and invoice recipients with a variable assignment of the individual measuring and restoration projects.

And with the unique report generating function, you also have **a gifted writer** at your side who can produce professional measuring reports of outstanding quality almost independently thanks to a large number of predefined boilerplate texts and entire templates.

TRT-KAT-MMSTP-WM-08-EN

Why make things complicated when they can be easy?

Data read-out and graphic evaluation

MultiMeasure Studio Professional allows you to automatically read out the measurement data of all compatible devices and further enables manual data collection for measuring devices from third-party suppliers. All measured data can be displayed conclusively as a graphic representation with freely definable sections which can be taken over into a report immediately.
Export to Excel is also available.

Project management for customer data and measuring operations

MultiMeasure Studio Professional offers you an option for central administration of all measuring sites and customer data with separate customer and invoice addresses. If required, measuring projects can be assigned to another customer by simple drag and drop, and they can also be exported and imported as a whole – very convenient for projects across multiple branches. And thanks to the integrated backup function, you are reliably protected against data loss.

Automated report generating function

MultiMeasure Studio Professional offers an automated function for report generation – an unprecedented feature in the construction sector! Writing brilliant reports has never been that easy: with just one click, you cannot only paste entire fields from your customer or measurement data into the report, but also numerous entirely pre-formulated boilerplate texts for virtually every application.

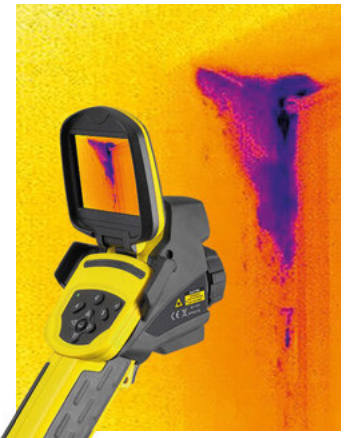
Thanks to this “integrated reporting system”, in combination with the option of including your own company logo as well as individual headers and footers, you can generate impressively professional reports in next to no time, leaving a lasting, favourable impression on your customers!

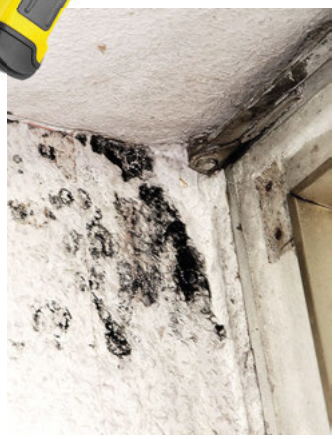
Further details regarding the report generating function can be found on page 52

MultiMeasure Studio Professional has a modular design, is easy to learn and available in two editions optimally tailored to the respective requirements:

as a **Pro Module 1** for leak detection, building and mould diagnostics – and as a **Pro Module 2** for water damage restoration companies and the building trade.

The **LiveLog function** of MultiMeasure Studio enables an automatic collection of measurement data from compatible device directly during the measurement. This comes in handy for on-site matrix measurements with a Windows tablet or laptop, for instance.





Pro Module 1 – Your number 1 for all measurements

Everything included from building diagnostics to leak detection

Using the Pro Module 1 of MultiMeasure Studio Professional, experts do not only benefit from the possibility of direct measurement data read-out and graphic evaluation of all compatible measuring devices, they can also manually record and evaluate data from other devices – and all of that, plus customer data administration, included in one application.

Even the results of purely imaging methods can be integrated effectively – after all, it is the final result that counts. Here, the Pro Module 1 can score with its unique report generating function: it contains pre-formulated boilerplate texts for all methods used in the area of building diagnostics, which makes professional report generation faster and easier than ever before.

Measuring projects, customer data, documentations – everything centrally organised in one application.

Plus extra modules for documentation of mould damage

As the number of mould damages in buildings does not only increase in the public perception, more and more experts offer professional damage analysis as part of their standard scope of services. At the same time, however, a uniform standard for assessment and documentation was missing. Now, MultiMeasure Studio Professional can finally close this gap.

Working in close dialogue with many experts, we have elaborated systematically comprehensive boilerplate texts for mould diagnostic examinations and integrated them into the Pro Module 1.

This way, you have a universally usable standard reference for the assessment and documentation of mould damage at your disposal. Ranging from contact sampling to disclaimer, the Pro Module 1 contains basically all boilerplate texts required for a fast and professional generation of your mould reports.

The Pro Module 1 offers comprehensive boilerplate texts for all measurement methods:

- Capacitive moisture measurement
- Resistance measurement method
- Microwave measurement
- Hygrometric examinations
- Endoscopy and pipe camera inspection
- Dye analysis
- Gas detection method
- Audio frequency and correlation analysis
- Thermography and IR thermometers
- Potential difference measurements
- Flue gas method
- Anemometer
- CM measurement method
- Contact sampling (mould diagnosis)

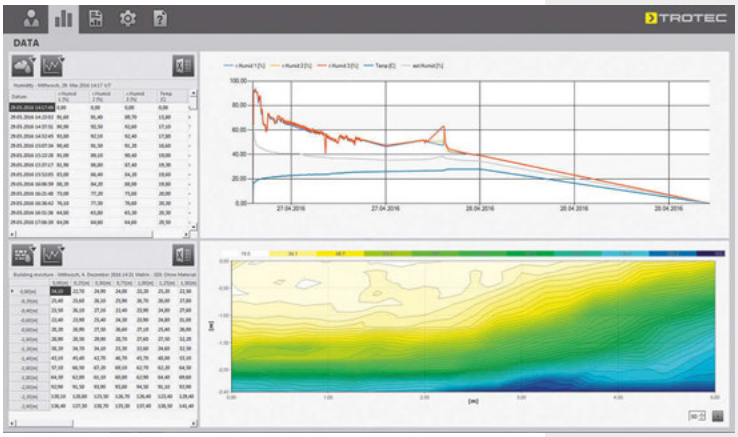
Pro Module 2 – Double benefit for water damage restoration companies and the building trade

Faster results – perfectly synchronized

Using the Pro Module 2 of MultiMeasure Studio Professional, water damage restoration and construction companies can save a great deal of time and thus money.

Carry out and administer your moisture and climate measurements for determining the damage and results and assign the data to different customers with only one application.

What damage was found, when was the building dry, on what day were the devices de-installed? The Pro Module 2 of MultiMeasure Studio provides the answers to all of these questions, and thanks to its automated report generating function it can be used for creating professional measurement reports, drying documentation and even offers with just a few clicks.



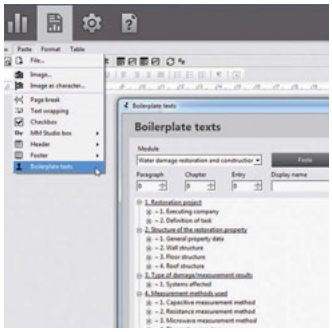
From humidity matrix to climate series measurement – using the Pro Module 2, all measured data can be read out centrally, evaluated graphically and also exported to Excel if required.

And thanks to the integrated data synchronization with MQ-Datamonitor, you can also read out the measured data of any currently used drying control units at all times, and you are ideally prepared to create detailed final reports, which are increasingly demanded by insurance companies for instance.

All project data can be exported and imported as needed. This allows for a simple measurement data exchange between several branches of a company.

Pro Module 2 – Your benefits

- Measurement, assessment, drying progress, final report – all measured data included in one application
- Automated report generating function with specific boilerplate texts for climate and moisture measurement, water damage restoration and construction drying
- MQDatamonitor synchronization for directly reading out the measurement data of all active drying control units



Automated report generating function with completely pre-formulated and entirely editable boilerplate texts* for

- Leak detection and building diagnostics
- Mould diagnostics
- Climate and moisture measurement
- Water damage restoration
- Construction drying
- Plus complementary function for individual boilerplate texts

Including complete templates* for

- Measurement report Building diagnostics / thermography
- Measurement report Non-destructive leak detection
- Measurement report Mould diagnosis
- Measurement report General moisture measurement
- Offer Water damage restoration / construction drying
- Final report Water damage restoration / construction drying

Automated reports – ingeniously easy to manage for simply brilliant reports

Report? Completed!

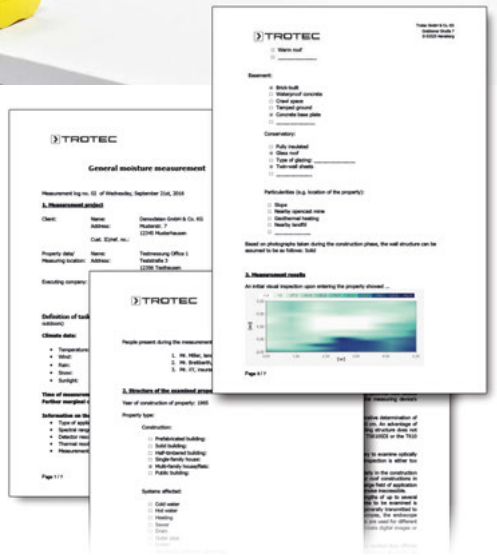
A proverb says: He who writes, remains. Our reply is: He who writes, primarily spends longer office hours.

Better save this time and leave both, the office and a lasting impression: create outstanding measurement reports in next to no time using the ingenious automated report generating function of MultiMeasure Studio Professional.

This software function is unique in the building sector: with just one click, you cannot only paste entire fields from your customer or measurement data into the report, but also numerous entirely predefined boilerplate texts and templates for virtually every application.

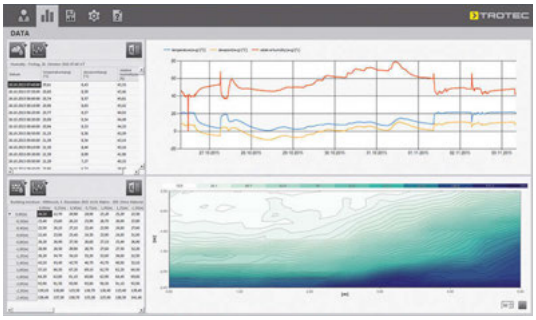
All text elements can be readily adopted for your operation report, adapted and, if necessary, completely edited. Moreover, for quick access, you can store your own boilerplate texts permanently in the software database. These texts will always be retained despite software updates.

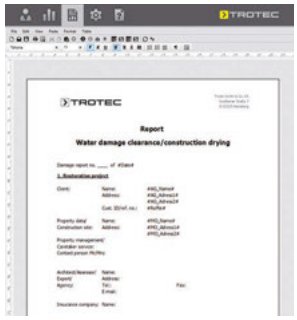
Thanks to this "integrated reporting system", in combination with the option of including your own company logo as well as individual headers and footers, you can generate impressively professional reports in next to no time, leaving a lasting, favourable impression on your customers!



Always up-to-date

The range of boilerplate texts available is constantly extended by us, and new texts will automatically be added to your software via the update function. This way, your reports will always be the state of the art.





* *Depending on the Pro Module, see overview table on page 53*

Measurement data management, graphic evaluation and report generation become faster and easier than ever before using MultiMeasure Studio Professional: read out measured data of different devices and assign them to the respective projects and customers. Data series and graphic evaluations can be directly included in reports, which practically write themselves thanks to a report generating function with a large number of predefined boilerplate texts and templates.

Functions of the MultiMeasure Studio editions by way of comparison		Standard	Professional	
			Pro Module 1 MT/SCHIM	Pro Module 2 WSB/BT
Software update function (online)		■	■	■
Firmware update function (online) for compatible devices		■	■	■
Data read-out of compatible devices		■	■	■
Number of storable measurements		30	unlimited	unlimited
Evaluation of measuring projects with chart function		■	■	■
Combined customer and measurement data administration		■	■	■
Backup function		–	■	■
Export function for entire measuring projects		–	■	■
Import function for entire measuring projects		–	■	■
Export function to Excel		–	■	■
Automated report generation		–	■	■
Boilerplate text update function (online)*		–	■	■
Included boilerplate texts for report generation, completely pre-formulated and entirely editable	Boilerplate text package Leak detection and building diagnostics	–	■	–
	Boilerplate text package Mould diagnosis	–	■	–
	Boilerplate text package Climate and moisture measurement	–	■	■
	Boilerplate text package Water damage restoration	–	–	■
	Boilerplate text package Construction drying	–	–	■
Complementary function for individual boilerplate texts		–	■	■
Data synchronization with MQDatamonitor		–	–	■
LiveLog function for compatible devices		■	■	■
Matrix evaluation for compatible devices	Surface representation	■	■	■
	Optional contour representation	–	■	■
	Available colour schemes	1	unlimited	unlimited
	Freely definable colours	–	■	■
Manual input of measured values	Matrix	max. 5 x 5	unlimited	unlimited
	X-Y diagram	max. 5	unlimited	unlimited
Device compatibility	T3000 multifunction measuring meter with all SDI sensors	□	■	■
	T210 hygrometer	□	■	■
	T260 IR thermohygrometer	□	■	■
	T510 wood and building moisture measuring device	□	■	■
	T610 material moisture measuring device	□	■	■
	T660 material moisture measuring device	□	■	■
	DL200 (H, D, L, P, X) data loggers	–	■	■
	BL30 data logger	–	■	–
	Trotec measuring devices to be launched*	–	■	–
Delivery		download	download plus dongle	

■ Entire function available for this edition
□ Without report generating function, max. 30 storable measurements
* All updates included for 12 months, afterwards only with optional maintenance licence

Pro Module 1 Article no. 3.510.204.011	Pro Module 2 Article no. 3.510.204.012
Pro Module 1 plus Pro Module 2 Article no. 3.510.204.013	

Required operating system: Windows XP or higher;
Available languages: German, English, French, Italian, Dutch, Danish, Finnish, Swedish, Polish and Turkish

By the way: Even in between large version updates, we provide MultiMeasure Studio Professional with new appealing features on a regular basis – fully automatically through software updates. Hence, you will be able to always use the cutting-edge version of this software. And in case you are still missing a particular function, simply contact us. After all, one of the strong points of MultiMeasure Studio Professional is the fact that it was designed in close dialogue with users for their specific working practice. We will be pleased to examine your suggestion and try to integrate it.

OZ-ONE

Professional ozone meter with enhanced climate measuring functions

A FEW PRACTICAL BENEFITS:

- Quick and precise determination even of low ozone concentrations
- Indication of the measured ozone value in ppm or µg/m³
- Fast response time
- Minor cross-sensitivity to VOCs
- Ozone zero adjustment function
- Ozone reference value measurement (STEL/TWA)
- Measuring air temperature and humidity
- Calculating dew point and wet-bulb temperature
- Offset adjustment for air temperature and humidity
- Data hold, MAX/MIN and alarm function
- Display illumination
- ¼ inch tripod connection
- In addition to battery operation also permits mains operation for non-stop measurements
- Energy-saving automatic switch-off
- Incl. calibration certificate

Diverse application possibilities:

- workplace measurements in trade and industry
- environmental analyses
- examination of production environments
- limit monitoring after having used ozone generators for odour neutralization or disinfection, e.g. in the hotel trade and for fire and water damage restoration

The OZ-ONE comes equipped with a tripod thread and features both a mini USB port and a barrel-type 9 V coaxial power socket. These ports permit a continuous mains operation as alternative to the battery-powered application.

OZ-ONE – the name says it all: The first ozone meter that makes mobile professional ozone measurement technology affordable.

Whether naturally generated near the ground or created by technology, even low ozone concentrations in the ambient air have a high damage potential. The compliance with uncritical ozone limit values is therefore not only imperative for health protection, but in many countries clearly regulated and required by law.

With the ozone meter OZ-ONE you have the ideal testing instrument for a quick and precise check or the long-term detection of ozone concentrations in the ambient air.

The OZ-ONE is characterized by a minor cross-sensitivity to other gases or VOCs and impresses with quick, highly accurate measurement results even at very low ozone concentrations.

Many integrated functions such as the ozone zero adjustment, the reference value measuring option for short-term exposure limit (STEL) and time-weighted average (TWA) or the value display switchable from ppm to µg/m³ and vice versa make the quickly responding OZ-ONE an indispensable tool for precise ozone exposure measurements.

Moreover, this device is a compact portable environmental measuring device for the determination of air temperature and humidity or the calculation of dew point and wet-bulb temperature.

High precision and manageable size rolled into one: the ozone meter OZ-ONE

Facts worth knowing about ozone

Ozone is not only an important gas for industrial applications, but at the same time also an oxidative irritant gas with harmful effects on eyes, nose, pharynx and lungs even at low concentrations.

In our environment ground-level ozone is formed by photochemical reactions of nitrogen oxides and VOCs when exposed to intense sunlight.

By international standards the MAC thresholds for handling ozone vary between 0.05 and 0.1 ppm (STEL [1]).

In outdoor areas the typical exposure limit (TWA [2]) for ground-level ozone amounts to 120 µg/m³.

Using the ozone meter OZ-ONE both parameters can quickly be determined. If required, the measurement value display can simply be adjusted at the push of a button from ppm to micrograms per cubic metre or vice versa.

The sensor of the OZ-ONE is characterized by a high accuracy especially at low ozone levels, as a result even minor concentrations beneath the risk threshold can be detected reliably.

The backlit LCD display of the OZ-ONE simultaneously indicates two parameters that can also be read in poorly illuminated surroundings.

Technical data		Ozone meter OZ-ONE
Article number		3.510.006.110
Ozone (O_3)	Measuring principle	Electrochemical sensor
	Measuring range	0.00 to 1.00 ppm (0 to 1,996 µg/m³ [at 20 °C and 1,013 hPa])
	Accuracy	< 0.1 ppm (< 200 µg/m³): ±0.02 ppm (±40 µg/m³) at 25 °C and 1,013 hPa; otherwise ±10 %
	Resolution	0.01 ppm (1 µg/m³)
	Drift*	±2 % / month
Air temperature	Measuring range	0.0 °C to 50.0 °C (32 to 122 °F)
	Accuracy	±0.6 °C
	Resolution	0.1 °C
Humidity	Measuring range	0.0 to 99.9 % RH
	Accuracy	±3 % at 25 °C and 10 to 70 % RH, otherwise ±5 %
	Resolution	0.1 %
Functions	Minimum/maximum value display	■
	Hold function	■
	Reference value measurement	Short-term exposure limit (STEL [1], 15 min), time-weighted average (TWA [2], 8 h)
	Display illumination	■
	Ozone alarm function	Acoustic (limit value can be configured individually)
	Adjustable measurement units	°C, °F, ppm, µg/m³
	Dew point calculation	■
	Wet-bulb temperature calculation	■
	Zero adjustment function (Zero-Reset)	Ozone
	Offset adjustment	Air temperature, humidity level
Equipment	Display	Backlit monochrome LCD (44 x 33 cm) for the simultaneous indication of two parameters
	Tripod connection	¼ inch
	Ports	Mini USB, barrel-type 9 V coaxial power socket
Power supply	Internal	4 x LR03 AAA
	External	via mini USB or 9 V power adaptor (not included in the scope of delivery)
Physical characteristics	Dimensions	210 x 60 x 40 mm
	Weight	185 g
Scope of delivery	Standard	Measuring device, batteries, storage bag, operating manual, calibration certificate
	optional	Universal tripod (Article number 6.300.000.200)

* This systematic measurement deviation are attributable to the characteristics of the required O_3 sensor technology. Electrochemical sensors are wear products and subject to a continuous aging process from the date of manufacture. For this reason Trotec uses particularly durable sensors with a typical lifetime of two years and with a one-year warranty from the date of purchase throughout Europe.

[1] Short-Term Exposure Limit; [2] Time-Weighted Average

A FEW PRACTICAL BENEFITS:

- Comply with accuracy class 2
- Frequency weighting as per characteristic curves A and C
- Maximum and minimum value display
- Storage space for up to 32,700 measured values
- Reversible time weighting (fast / slow)
- Display illumination
- Bargraph display
- ¼ inch tripod connection
- Data logger function (SL400)
- Analysis software (SL400)
- USB connection and 3.5 mm jack socket (SL400)
- Incl. calibration certificate (SL400)

The sound level measuring devices SL300 and SL400

Professional control and monitoring of workplace, industrial and environmental noise

SL400 with live logging function

Incl. calibration certificate

These easy-to-handle sound level measuring devices unite modern electrodynamic sound transducer technology and compact design.

SL300 and SL400 comply with accuracy class 2 and are optimally suited for the documentation of machine and environmental noise or workplace and noise hazard measurements.

The four-digit measuring value display of the two measuring devices with additional bargraph presentation can easily be read in every environment thanks to the LCD background illumination.

With type A and C frequency weighting, fast/slow time weighting and many more practice-oriented functions these measuring devices are the perfect solution for demanding sound level measurements.

Their handy design, the light weight and the arrangement of keys optimized for single-handed operation make SL300 and SL400 the ideal basic equipment for standard measurements in the fields of industry, work and environmental protection.

SL400 for yet more application possibilities

The SL400 is further equipped with a live logging function and enough data memory to record up to 32,700 measured values.
For a software-supported analysis the measured data can simply be transferred to a PC via USB.

For logging or non-stop measurements the SL400 can further be fixed to the supplied mini tripod.

Moreover, an integrated 3.5 mm jack socket provides the SL400 with connections facilities for frequency analysers or x-y plotters.

A calibration certificate is already included in the SL400's scope of delivery.

TRT-KAT-EMSL-WM-12-EN

Professional sound level measuring devices with manifold possible applications:

- Noise hazard measurements for occupational safety
- Environmental protection applications for the determination of ambient noise
- Determination of noise sectors for noise abatement measures in enterprises and public institutions
- Examination and selection of hearing protection devices
- Auditing the adherence to noise protection regulations
- Control measurements in air-conditioning and heating engineering

Technical data sound level measuring devices		SL300	SL400
Article number		3.510.005.010	3.510.005.020
Measuring range		30 - 130 dB	30 - 130 dB
Accuracy		Class 2	Class 2
Resolution		0.1 dB	0.1 dB
Frequency range		31.5 Hz - 8 kHz	31.5 Hz - 8 kHz
Dynamic range		50 dB	50 dB
Partial measuring ranges		30 … 80 dB (low), 50 … 100 dB (medium), 80 … 130 dB (high), 30 … 130 dB (auto)	30 … 80 dB (low), 50 … 100 dB (medium), 80 … 130 dB (high), 30 … 130 dB (auto)
Response time		500 ms	500 ms
Time weighting		Slow (S) 1 s, Fast (F) 125 ms	Slow (S) 1 s, Fast (F) 125 ms
Microphone		Electret condenser microphone	Electret condenser microphone
Power supply		9 V battery IEC 6LR61 / 6F22	9 V battery IEC 6LR61 / 6F22
Application period without battery change		> 30 h	> 30 h
Operating conditions		0 to 40 °C, 10 to 90 % RH	0 to 40 °C, 10 to 90 % RH
Dimensions		210 x 55 x 32 mm	255 x 63 x 45 mm
Weight		230 g	305 g
Scope of delivery	Standard	Measuring device with operating manual and transport bag	Measuring device incl. calibration certificate, power supply unit, mini tripod, USB cable, analysis software, operating manual and transport case
	optional	Universal tripod (Article number 6.300.000.200)	Universal tripod (Article number 6.300.000.200)
Equipment features and functions		**SL300**	**SL400**
Four-digit measuring value display		■	■
Bargraph display		■	■
Display illumination		■	■
¼ inch tripod connection		■	■
Plug-on wind shield for microphone		■	■
A/C frequency weighting		■	■
Max / Min / Hold function		■	■
Reversible time weighting		■	■
Alarm function		■	■
Storable measured values		50	32,700
Live logging function		–	■
USB interface		–	■
Jack socket (3.5 mm)		–	■
Mini tripod		–	■
Analysis software		–	■
Calibration certificate		–	■

A FEW PRACTICAL BENEFITS:

- Particle counter with durable laser diode
- Conforms with ISO 21501-4
- 6 particle size channels from 0.3 to 10 µm
- Filter efficiency measurement
- Detects size fractions and concentrations of air particles
- Integrated gas detector for formaldehyde and carbon monoxide concentrations (PC220 only)
- Direct conversion and display of the concentrations of inhalable and alveolar dust fractions contained in the room air stated in µg per m³ of air (PC220 only)
- Also measures environmental climate parameters such as air temperature, humidity, dew point and wet-bulb temperature
- Data logger for 5,000 measurements on the internal memory (can be expanded with a MicroSD card)
- Integrated digital camera for photo and video documentation of the measured environment
- Additional colour indicator display with automatic acoustic alarm for the quick detection of critical particle concentrations
- 2.8-inch colour LCD display with background illumination to simultaneously display all measured parameters
- Ergonomic single-handed operation
- ¼ inch tripod connection for non-stop measuring on a tripod
- PC measurement data export via USB interface
- Incl. calibration certificate (optional)

Particle counters PC200 and PC220

Portable environmental measuring devices for testing the indoor air quality, for efficiency and leak tests of HVAC and HEPA filters as well as for testing the technical cleanliness in the field of process engineering

Ideal for air particle monitoring and climate data logging – the ergonomic laser particle counters PC200 and PC220 with integrated environmental measuring device and and built-in photo and video function for documentation purposes.

Mobile measuring stations to determine the:

- particle purity of the air with 6 particle sizes at the same time ranging from 0.3 to 10 µm
- Filter efficiency
- relative humidity
- air temperature
- dew point temperature
- wet-bulb temperature

PC220 additionally with:

- gas detector for formaldehyde (HCHO)
- gas detector for carbon monoxide (CO)
- a quantitative concentration determination of E-dust (PM10) and A-dust (PM2.5) in the room air in µg per m³ of air
- Particulate mass conversion and indication of HCHO and CO in mg per m³ of air

TRT-KAT-PCPM-WM-09-EN

Ideal for monitoring, securing and assessing the air quality to ensure productivity, health and safety

The numerous measuring functions of our particle counters and their conformity to ISO 21501-4 provide users with flexible application possibilities – from testing cleanrooms and filter efficiency to monitoring the workplace exposure or measures for quality assurance.

All measured values of the 6 particle size channels can be easily read simultaneously on the 2.8-inch colour LCD of PC200 and PC220.

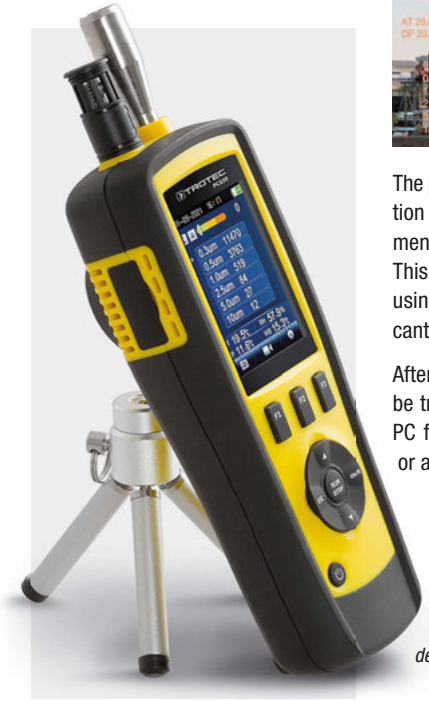
An additional colour indicator display with automatic acoustic alarm makes it easier to quickly detect critical particle concentrations.

In addition to the number and size fractions of air particles both measuring devices also determine environmental climate parameters such as air temperature, humidity, dew point and wet-bulb temperature.

Furthermore, a digital camera is integrated to document the measuring environment by means of photos and videos.

The particle counter's data logging function can store up to 5,000 measurement records on the internal memory. This can be expanded by up to 16 GB using a MicroSD card, which significantly raises the memory capacity.

After measuring, all detected data can be transmitted quickly and easily to a PC for the purpose of documentation or analysis via a USB interface.



A handy mini tripod for non-stop measurements is already included in the PC200's and PC220's scope of delivery.

PC220 with integrated HCHO detector – ideal to analyse the risk posed by formaldehyde

Methanal – also known as formaldehyde – is the chemical precursor for many industrial products ranging from varnishes or paints to adhesives and binding agents, even preservatives.

Many materials containing formaldehyde, e.g. wood-based materials, flooring or textiles, can contaminate the breathing air in closed rooms for a long time through outgassing.

Reclassified as carcinogenic

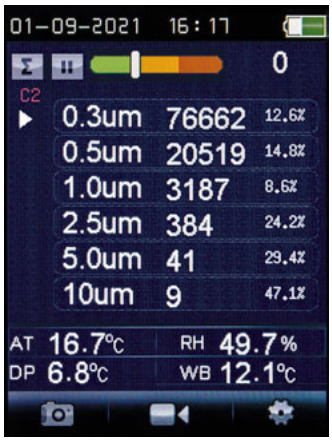
Owing to its particular toxicity the responsible organization in Germany adopted a new maximum allowable concentration (MAC) for formaldehyde; at the same time the substance was classified as carcinogenic in the European Chemicals Directive (CLP). This necessitates certain precautionary and protective measures.

The reclassification is effective as of 01/01/2016 and entails new duties of documentation and information for employers such as the obligation to keep an exposure register.

PC220 for the precise detection of formaldehyde

The particle counter PC220 comes with an integrated HCHO detector which reliably detects formaldehyde concentrations of as low as 0.01 ppm in the room air.

Combined with the additional CO detector, the quantitative particle mass display conforming to PM standard and many further measuring functions for particle purity and room climate data, the PC220 is the ideal solution for detecting and documenting formaldehyde concentrations in the room air.



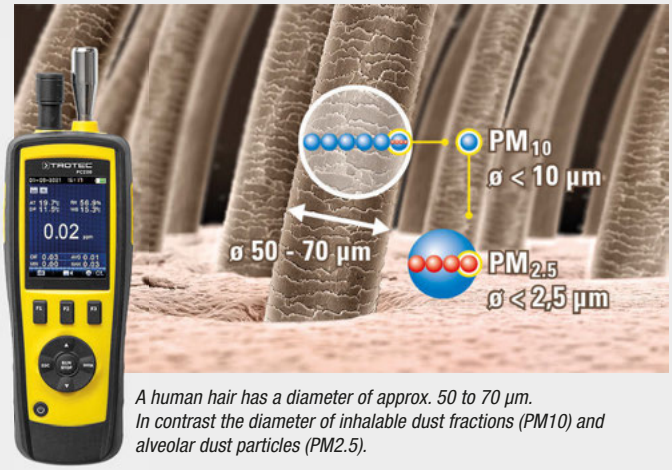
All particle counters determine the size fractions and concentrations of air particles on six different channels from 0.3 µm to 10 µm with additional colour indicator display. Perfect for contamination control for instance in isolation areas with vacuum or overpressure conditions. In addition, filter efficiency measurements with directional efficiency indicators are available size fraction possible.

With the PC220 it is also possible to detect carbon monoxide concentrations in the air.

The particle counters PC200 and PC220 – further information …

Quantitative detection of particulate emissions

PC220: digital display of particle masses



A human hair has a diameter of approx. 50 to 70 µm. In contrast the diameter of inhalable dust fractions (PM10) and alveolar dust particles (PM2.5).

Quantitative statements regarding the particulate emission ratio for the assessment of potential health risks at the workplace are not only required according to applicable legal protective regulations.

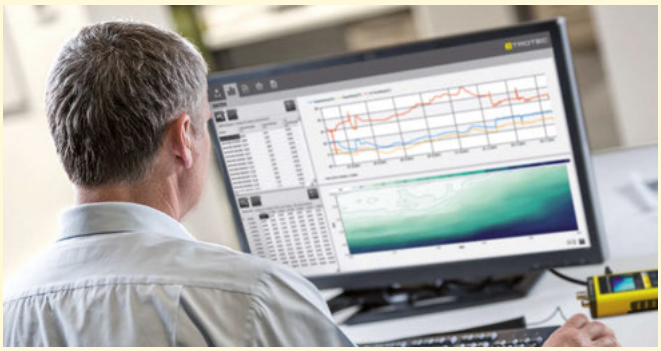
To be measured are not only inhalable dust fractions, i.e. all dust particles with an aerodynamic diameter of less than 10 µm, but especially ultrafine alveolar particles, which are so minute that they can reach the pulmonary alveoli.

With the PC220 these dust fractions can be registered as PM10 and PM2.5 according to the PM standard; their percentage per cubic metre room air is indicated numerically on the colour display of the PC220.

The process is based on the customary international PM classification in categories as per United States Environmental Protection Agency: air particles are differentiated by their aerodynamic diameter of less than 10 micrometres (PM10) and 2.5 micrometres (PM2.5).

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional



Along with the ever-growing number of fully compatible Trotec measuring devices this software is also suited for use with the partially compatible particle counters PC200 and PC220 – you can even benefit from this software in case of isolated devices, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

All information regarding MultiMeasure Studio Professional from page 48 onwards …

Both particle measuring devices are delivered in a carry case incl. mini tripod, zero filter and connection hose, power adapter, USB connection cable and software

Using PC200 and PC220 for inspecting the air quality in various fields of application:

Filter leak check

Suspended matter filters used in industrial processes must be regularly checked for correct functionality and tightness. These checks are particularly important during acceptance tests or when filters have been replaced in order to prevent possible leaks.

Owing to the high sensitivity and counting accuracy these ISO-21501-4 compliant particle counters are ideally suited for testing the efficiency and tight fit of industrial HEPA filters.

Technical facility management

Heating, ventilation and air-conditioning technicians regard the PC200 as an ideal measuring instrument for all maintenance and control operations at various ventilation systems. Faulty installations can quickly lead to noticeable air quality problems in connecting rooms.

The PC200 allows sources of hazardous contamination to be located, filter efficiency to be determined and particle concentrations in the indoor air to be evaluated.

Restoration companies can also use the PC200 to quickly and reliably detect partition leaks in areas of restoration.

Technical cleanliness in process engineering

In sensitive production environments, contaminations attributable to micro- and nanoparticles such as aerosols, dust, soot or bacteria can gather on products in such a consistent manner that both appearance and functionality will be impaired. In such a case, PC200 and PC220 represent the ideal means to rule out quality losses due to particle contaminations.

Indoor air quality measurements

The inhabitants of developed countries spend an average of 90 % of their time indoors. Thus, the quality of the room air is of particular importance for health and productivity.

Using the PC200 or PC220, problematic concentrations and sources of pollutant particles can be reliably determined and the compliance with statutory regulations can be documented.

Technical data		Particle counter PC200	Particle counter PC220
Article number		3.510.006.010	3.510.006.015
Particle counter	Channels	6	
	Channel sizes	0.3 µm, 0.5 µm, 1.0 µm, 2.5 µm, 5.0 µm, 10.0 µm	
	Counting modes	concentration, cumulative, differential	
	Counting efficiency	50 % at 0.3 µm; 100 % for particles > 0.45 µm	
	Flow rate	2.83 l/min (0.1 ft^3/min), controlled by internal pump	
	Zero check	< 1 particle / 5 min	
	Coincidence loss	5 %, 2 million particles per ft^3 (28.3 litres)	
	Light source	laser class 3B, wavelength 780 nm, 90 mW	
	Sample inlet	isokinetic probe	
Air temperature	Measuring range	0 °C to 50 °C (32 °F to 122 °F)	
	Accuracy	±0.5 °C (0.9 °F) at 10 °C to 40 °C (50 °F to 104 °F), ±1.0 °C (1.8 °F) at other temperature ranges	
Humidity	Measuring range	0 to 100 % RH	
	Accuracy	±3 % at 40 % to 60 %, ±3,5 % at 20 % to 40 % and 60 % to 80 %, ±5 % at 0 % to 20 % and 80 % to 100 %	
Dew point temperature	Measuring range	-30 °C to 100 °C (-22 °F to 199 °F)	
	Accuracy	±0.5 °C (0.9 °F) at 10 °C to 40 °C (50 °F to 104 °F), ±1.0 °C (1.8 °F) at other temperature ranges	
Wet-bulb temperature	Measuring range	0 °C to 80 °C (32 °F to 176 °F)	
	Accuracy	±1.0 °C (1.8 °F)	
Formaldehyde (HCHO)	Measuring range	–	0.01 to 5.00 ppm
	Accuracy	–	±5 % of terminal value
Carbon monoxide (CO)	Measuring range	–	10 to 1,000 ppm
	Accuracy	–	±5 % of terminal value
Particle mass conversion	PM2.5	–	0 to 2,000 µg/m^3
	PM10	–	0 to 2,000 µg/m^3
	HCHO	–	0 to 6.13 mg/m^3
	CO	–	0 to 1,145 mg/m^3
Functions	Filter efficiency measurement	■	■
	Minimum, maximum and average value display	■	■
	Hold function	■	■
	Alarm function	■	■
	Language selection	■	■
	°C/°F switching	■	■
	Photo or video recording	■	■
	Automatic display switch-off [1]	■	■
	Automatic device switch-off [2]	■	■
Data storage	Measurement data	5,000 data records on the internal flash memory (optional memory expansion via MicroSD card: max. 16 GB)	
	Photo / Video	JPEG format, resolution 640 x 480 pixels / 3GP format, resolution 320 x 240 pixels	
Equipment	Display	2.8-inch colour LCD, 320 x 240 pixels, with background illumination	
	Menu languages	German, English, French, Turkish, Italian, Spanish, Portuguese, Dutch, Danish, Swedish, Finnish, Norwegian	
	Memory expansion	slot for removable MicroSD memory card	
	Tripod connection	¼ inch	
	PC interfaces	USB connection	
Power supply	Battery type	Polymer LI-ION battery	
	Operating time	approx. 4 hours of continuous operation	
	Charging time	approx. 2 hours with an alternating current adapter	
Physical characteristics	Dimensions	L 57 x W 75 x H 240 mm	
	Weight	570 g	
Scope of delivery	Standard	measuring device, mini tripod, transport case, zero filter and connection hose, power adapter, USB connection cable, software, operating manual	
	optional	measuring device with calibration certificate (Article number 3.510.006.011), Universal tripod (Article number 6.300.000.200)	measuring device with calibration certificate (Article number 3.510.006.016), Universal tripod (Article number 6.300.000.200)

[1] variably adjustable to 90 seconds, 2 minutes or 4 minutes; [2] variably adjustable to 3 minutes, 15 minutes or 60 minutes

Anemometers TA300 and TA400

For the precise determination of flow rate, differential pressure, volume flow and air temperature

A FEW PRACTICAL BENEFITS:

- Professional anemometers for flow rate, differential pressure and volumetric flow measurements
- Suitable for high flow rates (up to 80 m/s)
- Large, easily legible LCD with background illumination and dual indication of measured values
- Diverse measuring functions
- USB port and software for real-time measurement series recording
- ¼ inch tripod connection
- Live Log function with connected PC
- Supplied with calibration certificate – completely stored in a carry case

Fields of application:

- *Checking heating, ventilation or air-conditioning systems*
- *Air current control in ventilation ducts*
- *Tightness tests at doors or windows*
- *Differential pressure measurements to check the filter condition*
- *Measuring air velocity and temperature at air passages and venting slots*
- *Pressure control in isolation areas with vacuum or overpressure conditions*

With professional anemometers from Trotec, installers, service technicians and experts have the ideal measuring device for flow rate measurements in air or gases.

A calibration certificate already included in the standard scope of delivery emphasizes the professional orientation of these precision anemometers.

Both measuring devices determine flow rate, air temperature and volumetric flow alike; the cross-sections of the measured air ducts – be they round or square – can be entered into the device in a differentiated way.

Hot-wire anemometer TA300

The combination of robust hot-wire sensor and steplessly extendable telescopic probe makes the TA300 an ideal flow meter even at distant locations or poorly accessible air outlets.

The TA300 impresses with a high spatial and temporal resolution and is particularly well suited for the precise determination even of low flow rates in all areas of air conditioning and ventilation.

Dynamic pressure anemometer TA400

In contrast to the TA300 with its thermal measurement principle, the measuring technique of the TA400 is based on the determination of the dynamic pressure as the difference between stagnation pressure and static pressure.

Hence it is possible to determine very high flow rates of up to 80 m/s even in particularly rough surroundings, for the dynamic pressure probe has virtually no mechanical or dirt-sensitive sensors.

Moreover, differential pressure measurements using the TA400 admit a wider field of application e.g. for determining the filter status in air conditioning systems or measuring the gas stagnation or flow pressure in heating systems.

For battery-saving power supply, both anemometers can be operated directly at the USB port of your computer using the connecting cable included in the scope of delivery. When connected via USB, the device can be used for software-supported measurement series recording of real-time flow rates.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Along with the ever-growing number of fully compatible Trotec measuring devices this software is also suited for use with the partially compatible anemometers TA300 and TA400 – you can even benefit from this software in case of isolated devices, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

TRT-KAT-THAN-WM-11-EN

Technical data		TA300	TA400
Article number		3.510.004.005	3.510.004.007
Probe	Type	hot wire probe	dynamic pressure probe
	Design	telescopic probe, straight	L-shaped Pitot tube
	Length	185 mm to 1,000 mm	335 mm
	ø probe tip/base	10 mm / 12 mm	8 mm
	Hose length	–	850 mm
Air / gas pressure	Measuring range	–	0 - 5,000 Pa
	Accuracy	–	± 0.3 % at +25 °C
	Resolution	–	1 Pa
	Selectable units	–	Pa, mbar, psi, inH_2O, mmH_2O
Air velocity	Measuring range	0.1 - 25.0 m/s, 0.3 - 90 km/h, 20 - 4,925 ft/min, 0.2 - 55.8 mph, 0.2 - 48.5 kn	2 - 80.0 m/s, 3.6 - 288 km/h, 200 - 15,733 ft/min, 2.24 - 178.66 mph, 2 - 154.6 kn
	Accuracy	± (5 % of the measured value + 1 measuring unit)	± 2.5 % at 10 m/s
	Resolution	0.01 m/s, 0.1 km/h, 1 ft/min, 0.1 mph, 0.1 kn	0.01 m/s, 0.1 km/h, 1 ft/min, 0.1 mph, 0.1 kn
Volumetric flow	Measuring range	0 - 99,999 m^3/min (CMM), 0 - 99,999 ft^3/min (CFM)	0 - 99,999 m^3/min (CMM), 0 - 99,999 ft^3/min (CFM)
	Resolution	0.001 to 100	0.001 to 100 (CMM), 0.0001 to 100 (CFM)
Temperature	Measuring range	0 to 50 °C (32 to 122 °F)	0 to 50 °C (32 to 122 °F)
	Accuracy	± 1 °C (± 1.8 °F)	± 1 °C (± 2 °F)
	Resolution	0.1 °C (0.1 °F)	0.1 °C (0.1 °F)
Functions and features	Minimum, maximum and average value display	■	■
	Hold function	■	■
	Flow channel setting	■	■
	Live Log function via PC	■	■
	Zero adjustment function (Zero-Reset)	■	■
	Display illumination	■	■
	Automatic switch-off	■	■
	Large LCD with dual measurement value display	■	■
	Storable measured values	–	99
	USB interface	■	■
	¼ inch tripod connection	■	■
Further characteristics	Operating conditions	0 °C to +50 °C, < 80 % RH *	0 °C to +50 °C, < 90 % RH *
	Dimensions	210 x 75 x 50 mm	210 x 70 x 50 mm
	Weight incl. probe	450 g **	540 g **
	Power supply	9 V IEC 6LR61	9 V IEC 6LR61
Scope of delivery	Standard	measuring device with instructions, calibration certificate, battery, USB cable, software, hard-shell case	
	optional	Universal tripod (Article no. 6.300.000.200)	Universal tripod (Article no. 6.300.000.200)
	Additionally device-specific	telescopic probe	Pitot tube, 2 silicone connection hoses (length 850 mm)

** non-condensing; ** incl. battery and probe*

Always to the point: Professional anemometers from Trotec

Hot-wire anemometer TA300

- High spatial and temporal resolution
- Precise determination even of low flow rates
- Extendable telescopic probe
- for maximum versatility

Dynamic pressure anemometer TA400

- For measuring high flow rates of up to 80 m/s
- Ambient and differential pressure measurements employing a Pitot tube
- Can also be used in very rough operating conditions

The slim telescopic probe of the TA300 can be variably extended to an effective length of 1 m, thus measuring applications can be carried out with more ease. Also convenient for flow rate measurements in remote or poorly accessible locations or inside air ducts and ventilation shafts.

Videoscopes of the VSC series

For indirect visual inspection and documentation

A FEW PRACTICAL BENEFITS:

- Development, design, production: 100 % Trotec
- Portable, light and robust compact systems
- Easy handling
- Recording photos and videos
- Camera head infinitely bendable to all directions
- LED technology – less power consumption and heat production than with conventional lighting systems
- Wide VGA LCD display for an outstanding image quality – VSC206 with VGA LCD
- Robust, multi-walled probe for maximum flexibility with simultaneously high torsional strength
- Fast USB connection and analogue video output

Exclusively at Trotec!

VSC206 VSC3008

TROTEC 100% DEVELOPMENT » DESIGN » PRODUCTION

Extremely portable, robust and visually impressive – the Trotec VSC series features some of the most versatile and handy video endoscopes for professional applications on the market

VSC206 and VSC3008 are consistently geared to prove themselves in tough everyday industrial applications and provide you with all the functions and system advantages required for quick and significant test results.

The robust and compact integral systems do not need any additional components and enable the easy accessibility of your test objects. Six dimmable high-performance LEDs ensure brilliantly illuminated image results on the large TFT LCD that can be recorded as video or individual images.

The hardwearing construction with robust workmanship and the extreme flexibility of the oil-resistant IP67 probes, rotatable by 360°, enable applications in all industry sectors ranging from routine inspections or quality-assurance reviews to the investigation of the causes of unexpected failures.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Along with the ever-growing number of fully compatible Trotec measuring devices this software is also suited for use with the partially compatible VSC videoscopes – you can even benefit from this software in case of isolated devices, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

TRT-KAT-VSCP-WM-10-EN

Videoscopes of the VSC series – further information …

VSC3008 – Visual inspection in perfection

This professional industrial videoscope makes indirect visual inspections become a simple finger exercise: No cables, no case – nothing but superb image quality in a robust and lightweight compact device.

With a weight of only 400 g, the hand-held control unit easily enables longer applications without tiring. Its probe, bendable to all sides, can be steplessly controlled via the joystick and with its titanium-coated camera head enables perfect panoramic views of the inspection area.

Extremely versatile probing

The VSC3008's multi-ply construction of tungsten wire mesh and PU on a flexible steel spiral ensures maximum range of motion with simultaneously high torsional strength of the push probe.

The powerful multiple LED light source with variable brightness control yields exactly the sharp, detailed images you need for meticulous working.

Excellent image quality

The inspection images and videos can be viewed on the brilliant Wide VGA LCD display of the VSC3008 and, in the optional WLAN configuration, also via live synchronization on a connected smartphone or tablet.

Thanks to the robust ABS housing the VSC3008 withstands even the harshest of conditions in industrial surroundings, and cushioning materials at critical spots prevent impact damages as well as the infiltration of dust and splashing water – ideal prerequisites for reliable everyday usage.

The VSC3008 unites wireless operation with razor-sharp videos and digital images in a mobile, user-friendly compact system, providing simple access to the test object. Individual images or complete videos can be stored on an SD card in an uncomplicated manner.

Industrial videoscope VSC3008

- Hand-held, light and robust compact system
- Camera head infinitely bendable to all directions
- LED technology – less power consumption and heat production than with conventional lighting systems
- Recording photos and videos
- Wide VGA LCD display for an outstanding image quality
- Robust, multi-walled probe for maximum flexibility with simultaneously high torsional strength
- Fast USB connection and analogue video output
- Live video synchronisation onto a connected smartphone via WLAN
- Easy handling

The industrial videoscope VSC3008 is supplied ready for use in a robust hard-shell carry case including power adapter, batteries, battery charger, SD card and cleaning cloth.

With the VSC3008 photos and videos can optionally also be transmitted in real time via a wireless connection to your mobile device serving as second live screen.

Videoscopes of the VSC series – further information …

VSC206 – Always in the picture when it comes to indirect visual inspections

The industrial videoscope VSC206 unites wireless operation with razor-sharp videos and digital images in a mobile, user-friendly compact system, providing simple access to the test object.

The VSC206 features a robust, protector-equipped ABS housing providing equal protection from impact damage and the infiltration of dust or splashing water. Ideal prerequisites for the rough conditions of industrial applications.

Clear vision guaranteed – even in a tight corner

The probe of the VSC206, bendable to all sides, can be steplessly controlled via the joystick and with its titanium-coated camera head enables perfect panoramic views of the inspection area.

Its multi-ply construction of stainless steel wire mesh and PU on a flexible steel spiral ensures maximum range of motion with simultaneously high torsional strength of the push probe.

6 white LEDs with variable brightness control ensure sharp, detailed images that can be shown on the brilliant VGA display of the VSC206 and saved for documentation purposes either as video or individual image on an SD card.

Industrial videoscope VSC206

- Hand-held, light and robust compact system
- Camera head infinitely bendable to all directions
- LED technology – less power consumption and heat production than with conventional lighting systems
- Recording photos and videos
- VGA LCD display for an outstanding image quality
- Robust, multi-walled probe for maximum flexibility with simultaneously high torsional strength
- Fast USB connection and analogue video output
- Easy handling

The industrial videoscope VSC206 is supplied ready for use in a robust carry case including batteries, battery charger, SD card and cleaning cloth.

Technical data		VSC206	VSC3008
Article number		3.510.009.630	3.510.009.640
System	Type of lighting	6 white LEDs (colour temperature 5,000 to 6,500 K)	6 white LEDs (colour temperature 5,000 to 6,500 K)
	Luminous intensity	40,000 lux	50,000 lux
	White balance	Default setting ex works	4 setting options (automatic, sunlight, clouded, artificial light)
	Brightness control	Manually adjustable	Manually adjustable
	LCD display	3.5-inch TFT LCD (640 x 480 px [VGA])	4.3-inch TFT LCD (800 x 480 px [Wide VGA])
	Joystick control	Probe bending	Probe bending, menu access and navigation
	Keys	Access to user functions, illumination, video, camera head fixing	Access to user functions, illumination, video, camera head fixing
	Interfaces	USB, analogue video (PAL/NTSC)	USB, analogue video (HDTV)
	Memory	Slot for removable SD card (max. 32 GB)	Slot for removable SD card (max. 32 GB)
	File formats	JPEG image format, AVI video format	JPEG image format, AVI video format
	Power supply	4 x LR6 AA, 1.5 V batteries or power adaptor	5 V lithium polymer battery pack or power adaptor
	Operating time	≤ 2 h	> 4 h
Probe	Dimensions	Length 2 m, ø 6 mm	Length 3 m, ø 8 mm
	Design	Exterior: stainless steel wire mesh for high torsional strength, inner layer: polyurethane on steel spiral	Exterior: tungsten wire mesh for high torsional strength, inner layer: polyurethane on steel spiral
	Articulation	up / down / left / right ≈ 120°	up / down / left / right ≈ 120°
	Type of protection	IP67, oil-resistant	IP67, oil-resistant
Camera	Image sensor	CMOS	CMOS
	Resolution	350,000 pixels	440,000 pixels
	Field of vision	90°	130°
	Camera head	Stainless steel with titanium coating	Stainless steel with titanium coating
	Zoom	5x digital	3x digital
Control software	Operator guidance	Simple interactive menu control	Simple interactive menu control, menu navigation via joystick
	Available menu languages	German, English, French	German, English, French, Dutch, Italian, Turkish, Spanish, Russian, Danish
	Software functions	System settings, video settings, memory functions	System settings, video settings, display settings (brightness, contrast etc.), memory functions
	System functions	–	Live video synchronisation onto a connected smartphone via WLAN*
Surrounding conditions	Temperature	-10 °C to +50 °C	-10 °C to +50 °C
	Humidity	< 90 % RH	< 90 % RH
	Type of protection (housing)	IP54	IP54
Physical characteristics	Construction	ABS housing with integrated bumpers	ABS housing with integrated bumpers
	Dimensions	265 x 100 x 125 mm	410 x 154 x 80 mm
	Weight	590 g (incl. batteries)	960 g (incl. batteries)
Scope of delivery	Standard	Videoscope, carry case, batteries, battery charger, SD card, cleaning cloth	Videoscope, carry case, power adaptor, batteries, battery charger, SD card, cleaning cloth
	Optional	–	WLAN interface

** function only available for VSC3008 equipment with optionally available WLAN interface*

VSP inspection system

Equally mobile and modular – the VSP is an enormously versatile solution for flexible technical video endoscopy applications

A FEW PRACTICAL BENEFITS:

- Development, design, production: 100 % Trotec
- Perfect universal solution for many VT applications (virtual testing)
- Modular system – can be flexibly combined and extended
- Robust control unit with colour display and extremely powerful lithium polymer battery – universally applicable with all VSP system components
- Light-intense, bendable camera heads – rotatable and pivoting or super slim and water-proof in accordance with IP67
- Can be expanded with various video endoscopes and borescopes

The monitor control unit can be fastened securely to the push-cable drum by means of a snap-in locking mechanism.

Exclusively at Trotec!

To date, maintenance engineers and service technicians had to use all sorts of optical aides to carry out visual inspections. Many instruments, high investments and time-consume training measures for each individual device.

One system – countless options

The modular design of our VSP inspection system provides a smart alternative, for VSP can offer you maximum flexibility by combining one universal monitor control unit with several optional optical modules.

Simply piece together the ideal configuration for your application purpose and expand the system with additional components if required.

Be it for the inspection of industrial facilities, exhaust gas and air lines, house connections, ventilation systems or sewer pipes – the modular VSP inspection system offers flexible application possibilities.

For instance, you can use the VSP system as pipe camera with long push cable for the visual inspection of sewer or ventilation ducts and chimneys, as endoscope with flexible probe for the internal inspection of poorly accessible hollow spaces or as borescope with rigid probe and dual camera for visual inspections of machinery and plants.

Accumulated dirt, damages or defects can quickly be detected and documented in photo or video format on an SD card.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Along with the ever-growing number of fully compatible Trotec measuring devices this software is also suited for use with the partially compatible VSP inspection systems – you can even benefit from this software in case of isolated devices, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

VSP inspection system – further information …

Use the control unit VSP-Control for all VT inspections and know that everything is under control

① *Robust ABS housing with IP64 type of protection, rubberized operator keypad, lateral rubber protectors and wrist straps*
② *Wide, high-contrast VGA display*
③ *Attachable sun visor*
④ *Two standoffs for snap-in attachment to the push-cable drum VSP-R30 during transport and application*
⑤ *Battery level indication*
⑥ *Fold-out stand*
⑦ *Multi-connector socket with protective cap; for the connection of push-cable camera, borescope or videoscope*

Every good inspection camera comes with a smart head

Such as the camera head rotatable by 360° and pivoting by 180° fitted with 12 dimmable LEDs – giving you an immediate all-round view inside pipes, shafts or ventilation.

Cable drum camera set VSP3041 for sewer and pipe inspection

Cable drum camera set VSP3041 in order-ready configuration comprising the following system components:

- **Control unit VSP-Control with sun visor in transport case**
- **Cable drum VSP-R30 with 30 m push cable**
- **Camera head VSP-H41M**

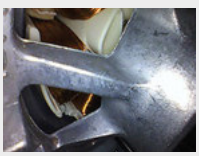
Article number 3.110.007.101

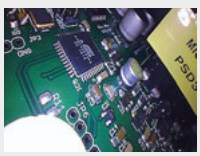
This set provides you with an ideal push-cable camera that allows the budget-friendly, on-demand multiplication of application possibilities by adding VSP components.

Only the VSP inspection system from Trotec can offer this kind of application flexibility!

The technical data of all individual components can be found on the following catalogue pages.

Low-budget upgrade option to inspect machinery, installations or building structures





Conventional video borescopes and endoscopes are independent measuring devices with integrated monitor unit, interfaces and control electronics. Which increases the cost for an individual device.

With the VSP system you can save that money as well as the time-consuming training period. In addition to the push-cable drum there are also a number of borescopes and endoscopes available for the VSP system that can simply be connected via the multi-connector at the control unit VSP-Control.

The image display is always coordinated via the VSP-Control whereas additional function buttons at the pistol grip of borescope and endoscope ensure the fast operation.

Video endoscopes VSP-VS
for the VSP inspection system on page 71 …

Video borescopes VSP-BS
for the VSP inspection system on page 71 …

All VSP system modules at one glance

Control unit VSP-Control

Push-cable drum VSP-R30

For the combined application with the control unit VSP-Control. Integrated push cable meter counter with partial distance measurement function.

Figure depicts push-cable drum VSP-R30 with mounted camera head VSP-H41M (separate item).

Camera heads VSP-H

For inspections using the push-cable drum VSP-R30. Both camera heads are equipped with a sealed threaded connector and either can be connected to the end of the push cable.

Technical data		Control unit VSP-Control
Article number		3.110.007.110
Display	Type / size	Colour LCD / 7 inch
	Resolution	800 x 480 pixels (wide VGA)
	Brightness	600 cd/m²
File formats	Snapshot	JPG (1,024 x 768)
	Video	AVI (640 x 480 [4:3] oder 800 x 480 [16:9])
Functions		Probe head motion control, photograph/video production, display brightness, zoom, system settings, memory management
Interfaces		USB, SD card slot, multi-connector socket for push-cable camera, borescope and videoscope, (analogue video NTSC/PAL optional)
Housing	Model	ABS with IP64 type of protection, rubberized operator keypad, lateral rubber protectors, wrist straps, fold-out stand, integrated battery capacity indication
	Dimensions	257 x 171 x 64 mm
	Weight	1.74 kg
Power supply		11.1 V lithium polymer battery pack (7,000 mAh, charging time 8 h) or power adapter
Scope of delivery		VSP Control, sun visor, battery charger, USB cable, transport case, SD card

Technical data		Push-cable drum VSP-R30
Article number		3.110.007.115
Push cable	Type	Fibreglass-reinforced
	Dimensions	Length 30 m, ø 5.4 mm
	90° bend flexibility	Lines ≥ 135 mm
	Type of protection	IP67 (connection camera head)
Drum	Model	Metal housing with carrying handle and un/reeling aid, can be used in vertical and horizontal position, snap-in system on the rear for attaching the control unit VSP-Control, digital meter counter, integrated coiled cord with multi-connector for VSP-Control
	Dimensions	515 x 405 x 200 mm
	Weight	6.5 kg

Technical data camera head	VSP-H41M	VSP-H25F
Article number	3.110.007.130	3.110.007.135
Diameter	ø 41 mm	ø 25 mm
Length	60 mm	49 mm
Resolution	300,000 pixels	300,000 pixels
Focus	Manual	Manual
Backlight	12 LEDs	12 LEDs
DOF	15 mm to ∞	25 to 100 mm
Field of vision	>75°	>120°
Pivoting radius	180°	–
Rotation	360°	–
Watertightness	Up to 1 m	Up to 1 m
Protection type	IP67	IP67
Material	Stainless steel probe with plastic dome	Stainless steel probe with lens made of sapphire glass
Supplied accessories	5 replacement plastic domes	–

Video endoscopes VSP-VS

For the combined application with the control unit VSP-Control. Camera head steplessly bendable to all sides and robust, multi-walled probe for maximum flexibility with simultaneously high torsional strength.

Technical data		VSP-VS 4.5-1500	VSP-VS 6.2-1500	VSP-VS 6.2-3000
Article number		3.110.007.153	3.110.007.162	3.110.007.163
System	Design	Pistol grip with keypad and joystick control		
	Type of protection	IP64		
	Functions	Probe head bending, photograph and video production, lighting brightness		
	Dimensions	155 x 110 x 190 mm (without probe)		
	Weight	ca. 620 g		
	Interfaces	Connection cable with multi-connector for VSP-Control, length approx. 150 cm		
Probe	Diameter	4.5 mm	6.2 mm	6.2 mm
	Length	1.5 m	1.5 m	3 m
	Backlight	6 LEDs	6 LEDs	6 LEDs
	DOF	8 to 80 mm	15 mm to ∞	15 mm to ∞
	Resolution	300,000 pixels	300,000 pixels	300,000 pixels
	Field of vision	>90°	>120°	>120°
	Bending	Up / down / left / right		
	Design	Tungsten wire mesh with titanium alloy		
	Type of protection	IP67		

Video borescopes VSP-BS

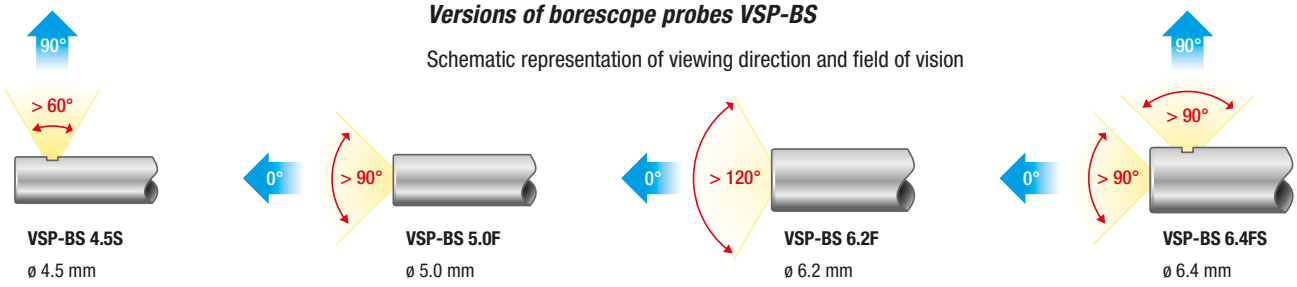
For the combined application with the control unit VSP-Control.

Borescopes with different probe diameters and front, side-view or dual camera available to meet any application requirement. To display and store images simply connect the borescope to the control unit VSP-Control.

Technical data		VSP-BS 4.5S	VSP-BS 5.0F	VSP-BS 6.2F	VSP-BS 6.4FS
Article number		3.110.007.183	3.110.007.186	3.110.007.192	3.110.007.193
System	Design	Pistol grip with keypad			
	Type of protection	IP64			
	Functions	Change-over switch for front/side view, photograph and video production, lighting brightness			
	Dimensions	175 x 67 x 50 mm (without probe)			
	Weight	ca. 200 g			
	Interfaces	Connection cable with multi-connector for VSP-Control, length approx. 150 cm			
Probe	Diameter	4.5 mm	5 mm	6.2 mm	6.4 mm
	Length	25 cm	25 cm	25 cm	25 cm
	Viewing direction	90°	0°	0°	0° / 90°
	Backlight	6 LEDs	6 LEDs	6 LEDs	6 LEDs / 1 LED
	DOF	5 to 25 mm	5 to 25 mm	5 to 50 mm	15 mm to ∞ / 10 to 50 mm
	Resolution	300,000 pixels	300,000 pixels	1,000,000 pixels	300,000 pixels
	Field of vision	>60°	>90°	>120°	>90°
	Design	Rigid, stainless steel 304			
	Type of protection	IP64			

Versions of borescope probes VSP-BS

Schematic representation of viewing direction and field of vision



Pipe camera Compact 2
with CS6x Versa monitor unit

Professional pipe inspection and video recording – simple, versatile and convenient

A FEW PRACTICAL BENEFITS:

- Easy-to-handle professional system for inspecting pipes with a diameter of 40 to 150 mm
- Self-levelling camera head
- Integrated 512 Hz transmitter and push cable metre counter
- Impact-proof plastic drum with quick-release docking system for the monitor unit
- Light-intense 5.7-inch colour LC display
- Direct recording of photos and videos on USB flash drive
- Integrated microphone and speakers
- SeeSnake HQ software for professional report generation
- PhotoTalk™ – Adding audio comments to individual images
- Waterproof up to 10 bar
- Versatile monitor unit – can also be used disconnected from the drum

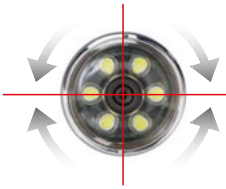
Small space requirements, great performance – the inspection camera Compact 2 with CS6x Versa monitor unit

The easy-to-transport SeeSnake inspection camera Compact 2 is perfectly suited for the professional inspection of pipelines with a diameter between 40 and 150 mm. The self-levelling camera head and adjustable LEDs enable the transmission of brightly lit, vivid and upright images. The compact and robust construction offers easy transport.

Versatile recording monitor with Wi-Fi

The convenient CS6x Versa monitor unit shows sharp images from inside the pipe on the 5.7-inch display and offers the option of saving photos and videos directly to a USB stick. Thanks to the special frame the monitor can always be tilted to the optimum viewing angle, and due to the quick-release bracket it can be moved to a high or low viewing position to meet all local conditions.

The Wi-Fi-enabled CS6x Versa is able to transmit the images and videos directly to a mobile device using the free RIDGIDView app. If required, the monitor can be detached from the drum and positioned separately.



Self-levelling camera head

Incl. SeeSnake HQ software (PC)

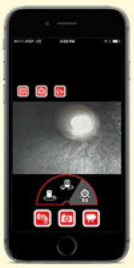
The HQ software is already installed on the USB flash drive supplied along with the CS6x Versa monitor unit.

Following the installation on a PC or laptop you can import the inspection files recorded on your USB flash drive using the HQ software, edit the images and saved videos or generate detailed reports.

Plus streaming software HQx Live

HQx Live is a free app for Android and iOS devices allowing you to stream the inspection carried out with the CS6x Versa monitor live on a mobile device.

The app further permits you to control the monitor functions remotely and to easily share photos or videos.



TRT-KAT-PICA-WM-03-EN

High-performance pipe camera in light, compact and stable design

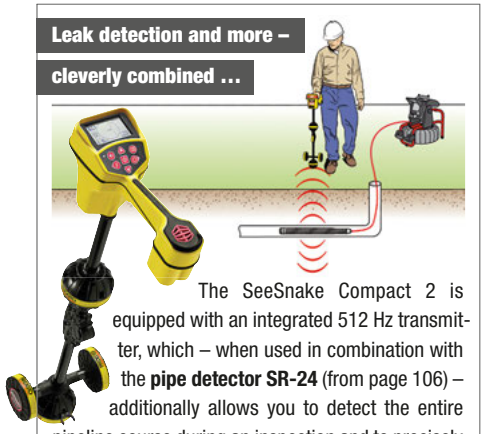
① *Durable drum housing with fibreglass-reinforced push cable, Ø 6 mm, length 30 m*
② *Docking system for quick and easy installation*
③ *Transport handle for carrying the entire camera in just one hand*
④ *Self-levelling camera head (Ø 25 mm) with integrated FleXmitter transmitter*
⑤ *Water-resistant keypad*
⑥ *Light-intense colour LCD for optimum image representation even in the daylight*

Technical data			SeeSnake Compact 2 with CS6x Versa
Article number			3.110.007.070
Camera drum	Push cable	Dimensions	length 30 m, Ø 6 mm (fibreglass core Ø 3.5 mm)
		Bending radius	at least 63.5 mm
		Pipe capacity	Ø 40 to 150 mm
	Camera head	Model	impact-proof cover with sapphire crystal lens, automatically levelling, water-proof up to 10 bar
		Diameter	25 mm
		Illumination	6 LEDs
		Probe	512 Hz
		Resolution	video: 656 x 492 pixels (NTSC), photo: 768 x 576 pixels (PAL)
	Ambient conditions		-10 °C to 50 °C, 5 % to 95 % RH
	Dimensions	Dimensions	L 625 x W 432 x H 360 mm, drum Ø 432 mm
		System cable	length 3 m
		Weight	7.5 kg
Monitor unit	Display	Type	colour LCD
		Size	5.7 inch
		Resolution	640 x 480 pixels (VGA)
		Brightness	460 cd/m²
	Power supply		18 V Li-ion battery or mains operation
	Storable file formats		standard video (MPEG4, H.264), Autolog video (highly compressed format, optimized for pipe inspections), photo (JPG), PhotoTalk™ (individual image with audio comment)
	Interfaces		USB, Bluetooth, WLAN
	Audio		integrated microphone and speakers
	Ambient conditions		-10 °C to 50 °C, 5 % to 95 % RH
	Dimensions	Dimensions	L 332 x W 233 x H 309 mm
		Weight	2.2 kg (without battery)
Scope of delivery	Standard		SeeSnake Compact 2, SeeSnake CS6x Versa, 18 V Li-ion battery, charger, 8 GB USB flash drive (HQ software pre-installed), pipe guide 45 mm, 36 mm and 60 mm, guide ball 85 mm and 125 mm
	Optionally available		spare battery

Convenient docking system
It takes no more than a half-turn of the quick-release knob to detach the monitor unit from the frame and position it separately.

The CS6x monitor unit is extremely versatile: thanks to the unique design you can adjust the viewing angle either when the device is positioned separately or inside the docking station of the Compact 2.

Leak detection and more – cleverly combined …



The SeeSnake Compact 2 is equipped with an integrated 512 Hz transmitter, which – when used in combination with the **pipe detector SR-24** (from page 106) – additionally allows you to detect the entire pipeline course during an inspection and to precisely locate the exact damaged spot.

By combining both measuring devices you can benefit from the possibility of performing restoration work at leakage points in a damage-reducing way and of non-destructively determining the unknown course of leak-free lines!

SeeSnake inspection systems

For quick, clean analysis and documentation of possible damages in industrial facilities, machinery components, piping networks or hollows

A FEW PRACTICAL BENEFITS:

- Professional systems easy to operate
- Light weight
- Scratch-proof sapphire crystal lens
- Adjustable multi-stage high-performance LEDs
- Camera head and push cable waterproof up to 8.1 bar
- Push cable metre counter (microReel)
- Integrated 512 Hz location transmitter
- Up to 30 m fibreglass-reinforced push cable
- In a set with a display unit that can be used autonomously as a hand-held inspection camera

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

Along with the ever-growing number of fully compatible Trotec measuring devices this software is also suited for use with the partially compatible micro CA-350/350x – you can even benefit from this software in case of isolated devices, for it enables the analysis and administration of all measuring projects and customer data across multiple devices in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

Complete, compact and easy-to-transport – immediately ready for use

Due to their light weight, the robust push cable drum, the battery-supplied operation and the ability to inspect pipes with a small diameter, these inspection systems are ideally suited for industrial maintenance services or applications in the installation or house connection sector.

Owing to the assembly on a robust stainless steel housing with transparent, impact-proof protective cover, the camera head with scratch-proof sapphire crystal lens and adjustable multi-stage high-performance LEDs is extremely practicable and provides brilliant inspection results.

Flexible probes for flexible applications

The combination of flexible and yet stable, fibreglass-reinforced push cable with an operating length of up to 30 metres and ultra-compact camera head enables inspections even in locations only poorly or entirely inaccessible for other cameras.

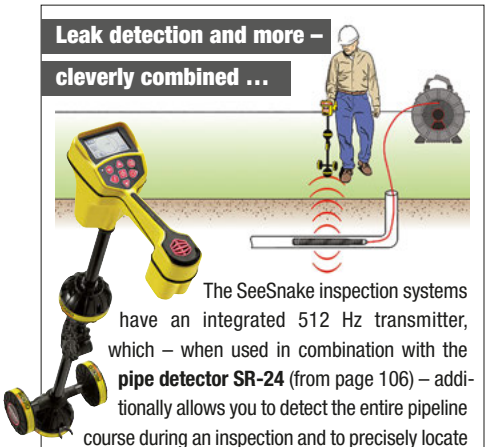
The SeeSnake inspection systems can cope with several 90° arcs from 30 mm upwards without difficulty even over long distances.

The guide balls included in the scope of delivery not only help to centre the camera head and to keep it away from contaminations on the tube sheet, but thanks to their smart design also enable a non-blocked passage of the probe tip in unwieldy pipe bends.

Using the SeeSnake inspection systems, causes of malfunctions in piping or hollows can be identified at first sight without the need to close down entire building infrastructures for extended periods of time by means of labour-intensive measures causing dirt.

For precise locating and measuring of the pipeline, SeeSnake inspection cameras, depending on the model, are additionally equipped with a push cable metre counter and a location transmitter integrated in the camera head.

Leak detection and more – cleverly combined …



The SeeSnake inspection systems have an integrated 512 Hz transmitter, which – when used in combination with the **pipe detector SR-24** (from page 106) – additionally allows you to detect the entire pipeline course during an inspection and to precisely locate the exact damaged spot.

By combining both measuring devices you can benefit from the possibility of performing restoration work at leakage points in a damage-reducing way and of non-destructively determining the unknown course of leak-free lines!

Full-featured hand-held inspection camera as a display unit

Instead of a permanently integrated monitor, all SeeSnake inspection systems are designed as display units that can be used in combination with a micro CA digital inspection camera. Both systems can be directly ordered as an inexpensive complete set. This way, you can cleverly extend the range of applications of your pipe camera, for the micro CA is not only a simple display unit, but a full-featured digital inspection camera that can also be used autonomously for video or photo documentation.

Further information on the different micro CA models can be found on the following catalogue pages …

Technical data		SeeSnake microDrain	SeeSnake microReel	SeeSnake nanoReel
Article number	SeeSnake only	3.110.007.022	3.110.007.031	3.110.007.040
	As a set with CA-350	KIT0002533	KIT0002534	KIT0002535
	As a set with CA-350x	KIT0003203	KIT0003204	KIT0003205
Probe	Type	Fibreglass-reinforced push cable		
	Dimensions	Length 20 m (ø 8.3 mm)	Length 30 m (ø 6.7 mm)	Length 25 m (ø 6.3 mm)
	90° bend flexibility	Lines ≥ ø 40 mm	Lines ≥ ø 50 mm	Lines ≥ ø 30 mm
Range of vision		10 mm to ∞		
Display		Via micro CA		
Camera head	Diameter	22 mm	25 mm	15.5 mm
	Model	Impact-proof cover with sapphire crystal lens		
	Protection	Waterproof up to 8.1 bar	Waterproof up to 7 bar	Waterproof up to 7 bar
Illumination		3 Luxeon LEDs	3 Luxeon LEDs	6 LEDs
Video / photo resolution		510 x 496 pixels (NTSC), 628 x 586 pixels (PAL)	510 x 496 pixels (NTSC), 628 x 586 pixels (PAL)	648 x 488 pixels (NTSC), 768 x 576 pixels (PAL)
Interfaces and memory		System interface for micro CA		
Equipment features and functions		Colour camera, integrated 512 Hz transmitter	Colour camera, integrated 512 Hz transmitter, push cable metre counter	Colour camera, integrated 512 Hz transmitter
Power supply		Via micro CA-350 / 350x (mains or battery operation)		
Surrounding conditions		5 °C to 46 °C, 5 % to 95 % RH	5 °C to 46 °C, 5 % to 95 % RH	0 °C to 46 °C, 5 % to 95 % RH
Dimensions	L x W x H	324 x 115 x 483 mm	324 x 114 x 483 mm	337 x 168 x 445 mm
	Weight	3.9 kg	4.7 kg	4.1 kg
Scope of delivery	Standard	SeeSnake microDrain, one guide ball, connection cable for micro CA, operating manual; incl. micro CA-350 / 350x (when ordered as a set)	SeeSnake microReel, two guide balls, connection cable for micro CA, operating manual; incl. micro CA-350 / 350x (when ordered as a set)	SeeSnake nanoReel, two guide balls, connection cable for micro CA, operating manual; incl. micro CA-350 / 350x (when ordered as a set)
	Optional	–	Without integrated push cable metre counter	–

SeeSnake inspection systems – further information …

A FEW PRACTICAL BENEFITS:

- Robust camera head made of anodized aluminium – waterproof up to 3 m
- High-intensity quad LED illumination with lighting control
- Flexible photo or video documentation incl. voice recording
- Bendable, semi-rigid probe – optionally extendable up to 9 m
- 4 x 90° image rotation function
- Brilliant 3.5-inch LCD colour display
- Wireless recording* of audio comments during video inspections with an optional Bluetooth headset
- Wireless real-time transmission* of pictures and videos to your mobile device, which can be used as a second live screen
- Free Ridgid View app* for iOS and Android

** micro CA-350x only*

Digital inspection cameras micro CA-350 and CA-350x

For combination with SeeSnake inspection systems and for autonomous documentation of visual inspections

The micro CA is a compact, professional IP65 videoscope for the inspection of poorly accessible diagnosis spots with narrow access path.

The anodized aluminium camera head with four super-bright LEDs supplies detailed inspection results, which are presented on the brilliant 3.5 inch TFT colour display and can be recorded in the form of photos or videos with additional voice comments.

When using the CA-350x, you can even transmit the images and videos to your tablet or smartphone in real time and share them with your colleagues thanks to integrated Wi-Fi and Bluetooth.

The standard scope of delivery of both cameras includes the identical accessories.

Optionally, the standard 17 mm camera head (top) of each model can be replaced by a slim 6 mm camera head (bottom) for narrow, poorly accessible inspection areas.

As standard, both micro CA come with a semi-rigid 0.9 m videoscope probe, which can optionally be extended to 9 metres or be replaced by a probe with an ultra-slim 6 mm camera head.

Not only the matching USB connection cable is already included in the standard scope of delivery – additionally, there are also auxiliary tools such as the side-view mirror, hook and magnet attachment, which can be used to optimally enhance your micro CA's range of applications.

The inspection cameras micro CA-350 and CA-350x in detail

The extremely easy-to-handle systems are provided with an intuitively usable, multilingual menu navigation and offer many innovative functions, e.g. 4x image rotation function, 2x digital zoom, and infinitely variable brightness control for inspections accurate in every detail.

In addition to the internal memory, there is an SD card slot available for flexible memory expansion.

Other than with the SD card, the data transfer to the PC can also quickly and easily be effected by means of the integrated USB interface.

Powerful battery

Both inspection cameras have a 12 V lithium-ion battery, which allows for longer, netless inspection operations.

micro CA-350x with Wi-Fi and Bluetooth

While offering otherwise identical features as the micro CA-350 camera, the micro CA-350x additionally comes equipped with Wi-Fi and Bluetooth.

Therefore, the micro CA-350x not only allows you to use a wireless Bluetooth headset, but also to transmit all images and videos to your tablet or smartphone in real time and share them with your colleagues thanks to the free app.

The real-time transmission to the external display facilitates visual inspections at poorly accessible locations where the camera display is difficult to see.

Technical data		micro CA-350	micro CA-350x
Article number		3.110.007.038	3.110.007.037
System	Type of lighting	4 LEDs	
	Brightness control	Manually adjustable	
	Display	3.5 inch TFT (320 x 240 px)	
	Keys	Access to menu functions, image rotation function, recording	
	Memory	235 MB internal, additional SD memory card slot (max. 32 GB)	
	Speaker	Integrated	
	Microphone	Integrated	
	Protection type	IP65	
	Functions	4 x 90° image rotation function, photo, video and audio recording, system and lighting settings	
Interfaces	Bluetooth	–	Integrated, max. range 5 m
	Wi-Fi	–	Integrated, max. range 10 m
	TV out	PAL/NTSC	
	USB	Mini-B	
	Audio	3.5 mm jack socket	
Probe	Type	Gooseneck, semi-rigid	
	Length	90 cm, expandable to max. 9 m with optional extensions	
	Bending radius	Min. 13 cm	
	Watertightness	Up to 3 m	
	Protection type	IP67	
Camera	Range of vision	10 mm to ∞	
	Camera head	ø 17 mm	
	Watertightness	Up to 3 m	
	Protection type	IP67	
	Image resolution (format)	640 x 480 (JPEG)	
	Frame rate	Max. 30 FPS	
	Video resolution (format)	320 x 240 (MP4)	
	Zoom	Dual digital	
Power supply	Battery	12 V Li-ion battery	
	Mains power	12 V mains adapter, 3 A	
Surrounding conditions	Operation	0 to 45 °C	
	Storage	-20 to 60 °C	
Dimensions	L x W x H	267 x 105 x 60 mm	
	Weight	2.5 kg	
Scope of delivery	Standard	Monitor unit, camera head, RCA cable with audio, USB cable, mirror, hook and magnet attachment, Li-ion battery and charger, mains adapter, headset with microphone, SD memory card, operating manual	
	Optional	Probe extension 90 cm or 180 cm, camera head ø 6 mm / length 100 or 400 cm	

LD6000 combi detector

Leak detection and acoustic pipe location

A FEW PRACTICAL BENEFITS:

- Acoustic and trace gas leak detection in only one device
- High-resolution colour graphic display with touchscreen functions
- **The only one of its kind in its class.** State-of-the-art smart function for even faster pinpoint leak detection (patent-protected)
- Numerous preprogrammed common applications for quick access
- All filters and parameters can be configured individually
- Pipe detection mode
- Complies with all guidelines governing according to VBG 121 (when used with original headphones) (VBG – trade association safety regulations)
- Highly-sensitive, high-quality, robust precision microphone made in Germany

The only one of its kind in the world - and only at Trotec:
LD6000 combi detector with smart mode for quick and reliable pinpoint leak detection

Made in Germany

ORIGINAL TROTEC PATENT-PROTECTED

TOUCH SCREEN

- ***Acoustic pinpoint leak detection***
- ***Pipe detection***
- ***Long-term measuring with logging function***
- ***Trace gas detection***
- ***All in only one device!***

The LD6000 has been programmed to include a wide range of typical applications which can be accessed quickly and easily. It is also equipped with a variety of filter settings and additional parameters which can be adapted to suit the user's individual demands and requirements, which can be configured either via touch screen or by using the keys and buttons on the control panel.

The LD6000 cutting-edge leak detection device sets new standards in the field of leak detection …

Whether you're planning on using it for routing pipes or for narrowing down the search for leaks or pinpointing their location, the highly-sophisticated LD6000 – which comes together with a high-quality microphone and new, cutting-edge electronic technology designed especially by us in order to fulfil the unique and special demands which state-of-the art acoustic leak detection puts on it – allows you to determine and process even the tiniest of leak sounds before displaying them on the easy-to-read, clear-cut display.

LD6000 – the optimum solution for trade and industry and supply companies

Users in industry are able to benefit from a state-of-the art measuring device which can be used universally to not only locate and pinpoint leaks and problem areas in sprawling and winding pipe networks, but also allow them to carry out effective and low cost inspections to determine if welded seams, valves, tanks, boilers, pressure lines and pump housings are leak proof or not.

The LD6000 provides supply companies with a whole host of application possibilities that allow them to carry out full and conclusive water loss analyses: acoustic pinpoint detection with highly-sensitive ground microphones, trace gas leak detection on drinking water networks, line detection on metallic and non-metallic pipes and leak checks on seals and pipe connections.

A comprehensive program of accessories including a ground microphone and a contact and stick microphone ensure that the LD6000 is excellently suited for use as a quick, reliable and universal means of locating leaks not in many different areas in the field of industry but also in the trade sector.

Finally one software for basically all measuring devices:

MultiMeasure Studio Professional

In addition to the ever growing number of fully compatible Trotec meters, this software is also suitable for the LD6000 semi-compatible combination detector – you can even benefit from this software for non-interface devices by enabling cross-device analysis and management of all measurement projects and customer data in a single application!

Create professional measurement reports in next to no time!

The unique report generating function of MultiMeasure Studio Professional already comes with completely formulated boilerplate texts for the fields of building diagnostics, moisture measurement, leak detection and thermography.

More information can be found starting on catalogue page 48 …

Whether it's for indoors or out. Or whether it's for industrial pipe or drinking water networks or for house installations. The easy-to-use LD6000 allows you to carry out quick and accurate – and therefore extremely reliable – leak detections, trace gas inspections and line routeing projects using one and the same device!

The principle of acoustic leak detection

Water which escapes from high-pressure pipes at high speed causes friction which in turn can be picked up in the form of sound waves.

The pipes themselves start to oscillate. The sound that is generated is transmitted through the pipes and can be transformed into audible sound with a **body sound microphone** at a distant contact point (valve, hydrant, armature).

In addition the water leaking out through the crack or hole in the pipe generates sound which is carried through the ground to the surface. This sound can be picked up by a **geophone** and transformed into audible sound.

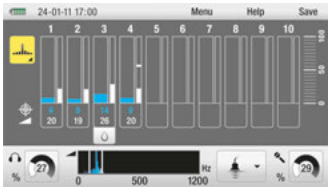
The innovative, state-of-the-art LD6000 combi detector is suitable for a variety of different application and allows you to detect leaks using both the acoustic and trace gas method with only a single device:

1. *Acoustic pinpoint leak detection with geophone.*
2. *Detection and pipe laying, also for plastic pipes.*
3. *Acoustic body sound measurement.*
4. *Trace gas leak detection in drinking water systems.*
5. *Leak detection and leak tightness inspection of pipe systems in houses and industrial pipe networks.*

Overview of the functions:

Smart mode

The state-of-the-art smart function is the only one of its kind in its class and has been filed for patent – the smarter way to find leaks.

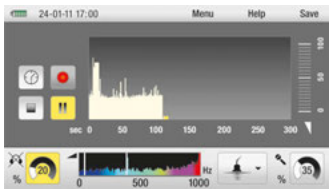


Complex algorithmic calculations carried out in the heart of the device which are based on factors like frequency, level and assessment provide you with a clear and precise view of what you want to see: the position of a potential leak which is shown by means of a bar indicator that displays the strongest signal where the leak is. Seeing is believing! And it doesn't get any easier than that!

Leaks that can be seen and heard – additional acoustic modes

In addition to the smart mode, the LD6000 is also equipped with other acoustic modes which allow the user to carry out automatic or individual amplitude analyses of potential leaks.

Long-term measurements



In order to be able to pinpoint the leak exactly, an onboard sound logger can be activated to log measurements carried out over a period of up to 60 minutes, which can then be used to determine or rule out any leaks with the help of the recorded measurement curve.

Pipe detection mode

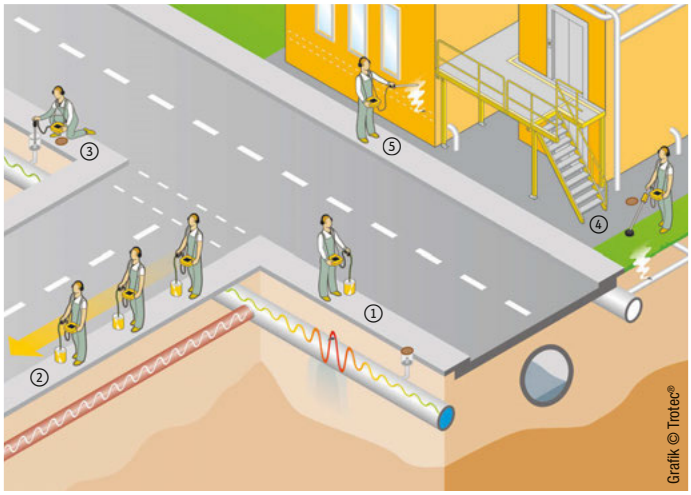
This mode is designed to allow you to locate pressure water lines made of synthetic material which are treated with ultrasound by the LD-PULS impulse generator.

To find out more about using the LD6000 and LD-PULS for pipe detection go to page 81.

Trace gas detection

Leak detection in pipe networks or house installations can be carried out quickly and rerliably using trace gas in combination with hydrogen sensors.

For more information on how to perform trace gas leak detection with the LD6000 go to page 80.



LD6000 H2 hydrogen sensor for trace gas detection

For carrying out extremely accurate leak detections and low cost leak inspections of sealing sheets, lines, containers and tanks

The LD6000 is excellently-suited for detecting leaks together with the optionally available LD6000 H2 hydrogen sensor and the formation gas type 95/5, which comprises 95 % nitrogen and 5% hydrogen.

Because of its specific structure, hydrogen is able to permeate almost all materials like earth, concrete or floor tiles.

It can easily be traced and pinpointed at the surface using the LD6000 and the connected hydrogen sensor.

Forming gas 95/5 is neither toxic nor flammable. This means that it can be considered harmless and even used in sensitive environments.

In addition to the compact hand sensor there is also a ground sensor with an integrated suction pump available which allows you to detect even the smallest concentrations of trace gas.

The ground sensor is excellently suited for carrying out leak inspections on green roofs or on pipes which are deep in the ground and which are covered with earth, asphalt etc.

LD6000 Delivery program

Standard scope of delivery:

- LD6000 measuring device ①
- LD K – sound blocking headphones ②
- LD6000 BM – Universal Microphone with magnetic adapter and tripod adapter LD6000 DA ③
- LD6000 VL – stick extension with tip ④
- LD6000 TG – shoulder strap ⑤
- PC connecting cable, USB
- LD6000 carry case ⑥

Optionally available accessories:

- LD6000 BMW – wind protected ground microphone (with dead-man's button) ⑦ *Article no. 3.110.008.013*
- LD6000 VK – connecting cable ⑧ *Article no. 3.110.008.021*
- LD6000 BMW DA – tripod adapter for LD6000 BMW ground microphone ⑨ *Article no. 3.110.008.014*
- LD6000 H2 – hydrogen hand sensor ⑩
- LD6000 H2 – hydrogen ground sensor with integrated pump ⑪
- LD6000 Transport case V ⑫

The optionally available **transport case V** with precisely fitting foam insert for the complete LD6000 program enables time-saving order and safe transport.

Article no. 3.510.200.928

Standard transport case and carrying case V in comparison, each with exemplary configuration (not included).

Technical data	LD6000
Article no.	3.110.008.010
Operating mode	Acoustic leak detection (F&V, Smart, long-term measuring), pipe detection and trace gas leak detection
Measuring and device functions	Measuring modes for minimum level, averaged level, pulse wave measurements, simultaneous F&V analysis, logging function, automatic functions for setting filter frequencies and sensor sensitivity, memory preference for manual filter settings, sound level overmodulation protection, trace gas detection with concentration-dependent signal (optic and acoustic)
Controls	Either via touchscreen, keys or control dial
Amplification	120 dB low noise factor
Input impedance	1MΩ
Filter	Up to 256 can be configured individually (for stick sensor and ground microphone)
Frequency spectrum	0 - 4,000 Hz
Display	Colour LCD (automatic illumination), 480 x 272 pixels
Battery check	Via micro-controller
Output impedance	≤ 10 Ω
Power supply	4 x batteries type LR14 C 1.5 V
Operating time	up to 14 h in non-stop operation, up to 40 h in normal operation
Connections	Bayonet nut connector (microphone / sensor), 6.3 mm jack plug (headphones), USB
Protection class	IP54
Housing	Aluminium, powder-coated
Dimensions approx.	L 210 x W 160 x H 60 mm
Weight approx.	1,050 g

Technical data	LD6000 H2 hydrogen hand sensor
Article no.	3.110.008.011
Response sensitivity	1 ppm H_2
Measuring range	10 ppm H_2 to 20,000 ppm H_2
Resolution	1 ppm H_2
Reaction time	0.5 s
Type	Hand sensor with flexible swan-neck (length 50 cm) and 160 cm connecting cable for LD6000

Technical data	LD6000 H2 hydrogen ground sensor incl. pump	
Article no.	3.110.008.020	
Response sensitivity	1 ppm H_2	
Measuring range	10 ppm H_2 to 20,000 ppm H_2	
Resolution	1 ppm H_2	
Reaction time	0.5 s	
Pump module	Pump performance	1.5 litres/minute
	Power supply	9 V block battery IEC 6LR61/6F22
	Power input	approx. 45 mA
Type	Ground sensor with active pump, two-part rod (length approx. 1 m) and rubber collar as well as approx. 2 m long connecting cable for LD6000. Weight 1.1 kg.	

LD-PULS pulse wave generator

This impulse generator is excellently-suited for use with the LD6000 measuring device.

The pulse wave generator generates a periodically recurring pressure wave which, under favourable conditions, can spread out over a distance of 600 m and which can then be picked up acoustically from the pipe using the LD6000 along with the connected microphone.

This is why the LD6000 is equipped with a special pulse mode which allows the volume and the frequency of the pulse to be displayed as optimally as possible.

And which is also why non-metallic water pipes up to a depth of 2 metres can be detected quickly and accurately without having to block off or take the pipe out of service first.

This means that this method can be used to compile, complete or check plans and pipe layouts or networks.

Standard scope of delivery:

- LD-PULS – pulse wave generator built into sturdy case with integrated rechargeable battery
- Separate power supply for LD-PULS

Optionally available accessories:

- LD-PULS repair set containing an Allen key and 4 valves

Technical data	LD-PULS
Article no.	3.110.008.012
Minimum pressure	2 bar (29 psi) (minimum pressure of the service pipes)
Operating time	Approx. 12 hours
Pulse sequence	Approx. 60 per minute
Connection	1-inch GEKA high pressure coupling
Power supply	Internal battery (rechargeable) or 230 V AC
Weight	4.2 kg

Acoustic tube probe LD6000 PTS

For acoustic leak detection directly in the pressurized water line – also on the house connection side

A FEW PRACTICAL BENEFITS:

- Pinpoint acoustic leak detection directly in the pressurized water line
- Enables the pinpoint location of the probe tip and route location of the push cable for plastic pipe course detection
- No manipulation by environmental sounds
- Wireless sound transmission via Bluetooth
- Integrated metre counter

Included in the standard scope of delivery of the LD6000 PTS is a practical case with Bluetooth headphones and comprehensive accessories.

The connection of the tube probe with the combination detector LD6000 is no problem and constitutes the perfect visual addition for acoustic leak detection. Furthermore, the LD6000 can be used to record long-term measurements.

More information regarding the LD6000 can be found starting on catalogue page 78 …

Sophisticated features:

1. *Powder-coated tubular steel frame*
2. *Polykat fibreglass with integrated stranded copper wires*
3. *Bluetooth transmitter with connection option for a frequency generator*
4. *Flexible sensor head with precision microphone*
5. *Pressure-resistant cable passage*
6. *Storage container for disinfectant*
7. *Transport holder for storage container*
8. *Mechanical metre counter for length measurement*

The LD6000 PTS provides a variety of mounting options of the push cable pressure lock for flexible insertion via:

- domestic water meter,
- free-flow valve,
- dismantled piping,
- tapping saddle,
- hydrants.

TR1-KAT-LD6P-WM-07-EN

LD6000 PTS for pinpoint acoustic leak detection – directly at the pressurized house connection.

The remediation of damage after pipe bursts requires a definite clarification of the responsible cost centre.

Has the damage occurred on the terrain of the building's proprietor or on the side of the water supply network?

If to this end one would like to carry out an above-ground acoustic leak detection to locate the damage, the pipeline course must be perfectly clear, which is hardly ever the case. And, so far, pinpoint locating directly in the house connection line has not been possible without further ado.

Finally, using the acoustic tube probe LD6000 PTS, pipe bursts can quickly and easily be detected on the side of the house connection, too!

The ingenious combination of compact, bendable pig probe with integrated precision microphone and contactable probe cable enables the acoustic detection of the point of leakage including locating function.

According to regulations, probe and push cable of the LD6000 PTS can be disinfected and directly channelled into the pressurized water line on the house connection side.

Accessories contained in scope of delivery:

① *Bluetooth headphones*
② *disinfectant*
③ *hose adapter*
④ *GEKA couplings 1 inch internal thread and 1 inch external thread*
⑤ *USB charging cable for headphones*
⑥ *car charging adapter*
- *1 pair of protective gloves*
- *Accessory case*

Optionally available accessories:

⑦ *LD6000 PTS Bluetooth receiver*

Bluetooth transmitter with connection option for a frequency generator and integrated noise level indication for auxiliary orientation during measurements.

Technical data		Acoustic tube probe LD6000 PTS
Article number		3.110.008.035
Frame	Material	Powder-coated tubular steel frame
	Dimensions / weight	570 x 400 x 160 mm / 6.5 kg
Pig	Type	Highly flexible sensor head for pinpoint and route detection (33 kHz)
	Bending radius / diameter	Min. 30 mm / guide head ø 10 mm, sensor head ø 12 mm
	Frequency range	100 to 10,000 Hz
	Detection depth	Up to 2.5 m
Push cable	Type	Polykat fibreglass with integrated stranded copper wires, breaking load 10.3 kN
	Length / diameter	L 50 m (further lengths are available upon request.) / ø 4.5 mm
Disinfection equipment	Type	Cable passage with storage container for continuous disinfection of the fibreglass when fed
	Pressure resistance	max. 16 bar
Transmitter	Type / range	Bluetooth 2.0 / 10 m
	Power supply	9 V IEC 6LR61
	Connections	2 x 9 mm banana socket to the frequency generator connection
Receiver	Audio	Bluetooth headphones
Type of protection		Electronics IP66, pig probe and push cable IP68 (up to 16 bar)
Operating conditions		0 to 80 °C
Scope of delivery	Standard	Acoustic tube probe LD6000 PTS: Frame with Polykat fibreglass and pig probe, disinfection equipment and Bluetooth transmitter. Moreover, an accessory case containing Bluetooth headphones, hose adapter, GEKA couplings 1 inch internal thread and 1 inch external thread, disinfectant aerosol can (250 ml), 1 pair of protective gloves
	Optional	LD6000 PTS Bluetooth receiver for connection to the combination detector LD6000 for an acoustic and visual analysis of measured data (Article no. 3.110.008.036)
Accessories	Consumable material	Disinfectant refill kit, 1,000 ml (Article no. 6.100.004.195); Disinfectant spray bottle, 250 ml (Article no. 6.100.004.190)

Flexible application and combination possibilities

Unaffected by ambient sounds, the precision microphone of the LD6000 PTS captures even extremely silent noises inside the pipe, which are wirelessly conveyed to the supplied headphones via the Bluetooth transmitter.

Experienced measurement engineers can thus unerringly identify the leaking sound and then determine the position of the leak by use of the metre counter.

Should further a combination detector LD6000 be available, frequencies can additionally be visualized and potential points of leakage can be indicated in form of a bar graph. Moreover, the application of an LD6000 enables the data recording of long-term measurements.

Required for wireless connection of the tube probe to the LD6000 is the optionally available Bluetooth receiver LD6000 PTS.

Simple pipe and pinpoint location

Furthermore, a frequency generator can be connected to the LD6000 PTS to contact the entire push cable or the probe tip.

Then the course of the pipeline or the point of leakage can be detected using a receiver.

A suitable combination of transmitter and receiver is f.i. the pipe detector SR-24 with transmitter ST-510. Both devices can be found starting on catalogue page 106.

Alternatively, other commercially available transmitters and receivers operating in the 33-kHz range can be used.

A FEW PRACTICAL BENEFITS:

- Compact pocket-sized sound locator
- Easy single-button operation
- Filter button for high and low frequencies
- 8-stage level indicator
- Wireless sound transmission to the Bluetooth headphones
- Always ready for use thanks to rechargeable battery

Sound locator LD6

The ultra-compact solution for leak detection and pre-location in water supply

Made in Germany

Original-size image of the LD6

Fully equipped with headphones in a transport case

Electro-acoustic leak detection made easy

Using the LD6, you can quickly and safely check lines or fittings to detect sounds of leakage. The combination of a highly sensitive vibration sensor and appropriate amplifier technology allows to detect even minimal structure-borne sound waves.

At the push of a button, you can filter either high or low frequencies, which enables you to carry out successful measurements on both metallic and non-metallic lines. The wireless Bluetooth transmission to the headphones facilitates the measurement process considerably.

To carry out a measurement, you can place either the measuring tip of the LD6 or one of the accessories included in the scope of delivery on the line, fitting or floor. If there is a pipe burst in the line being inspected, a leak sound will be emitted at the respective spot. The integrated level indicator additionally shows the intensity of the sound received.

TRT-KAT-HLD6-WM-01-EN

Sound locator LD6 – easy-to-handle measuring device for quick detection of structure-borne sound to locate pipe bursts

Thanks to the pot magnet, the LD6 can quickly and easily be attached to objects made of ferrous metals, for instance hydrant wrenches.

Scope of delivery:

- ① *Measuring device LD6*
- ② *Bluetooth headphones*
- ③ *Tripod*
- ④ *Pot magnet*
- ⑤ *Double probe rod extension*
- ⑥ *230 V charger*
- ⑦ *12 V car charger*
- ⑧ *USB charging cable for measuring device*
- ⑨ *USB charging cable for headphones*
- ⑩ *Transport case*
- ■ *Operating manual*

Technical data		LD6
Article number		3.110.008.001
Leak status		LED indicator, acoustic sound reception
Indicator resolution		Sound levels 0 to 8
Functions		Filter setting high/low
Transmission	Standard	Bluetooth 2.0
	Range	approx. 10 m
Power supply	LD6	NiMH battery
	Headphones	Lithium-ion battery
Dimensions L x W x H / weight		25 x 35 x 114 mm / 300 g

How to find leaks using the LD6:

1. Place the measuring tip of the LD6 on the test object.
2. Watch the level on the LED indicator.
3. A stable level indicates a leak or water withdrawal.
4. If the sound level temporarily drops to zero, there is no leak.
5. Switch on the wireless headphones and adjust the signal modulation for an ideal sound transmission.
6. Measure at different points to track down the location of the leak.

Correlator LD20HC

Advanced 2-in-1 measuring device for leakage location by means of correlation or acoustic leak detection

A FEW PRACTICAL BENEFITS:

- Combination device for correlation measurements and acoustic leak detections
- Advanced measuring technology with ultra-fast hexa-core processor in a robust aluminium housing
- 64-bit three-point correlation
- Frequency analysis (FFT)
- Material and diameter of the pipe sections to be measured can be specified
- Time-saving correlation measurements of up to 20 pipe segments in one run
- Innovative smart function for a still quicker acoustic pinpoint leak detection (patent pending)
- User-friendly navigation with dual keypad touchscreen control
- Highly sensitive sound receivers and high-performance radio transmitters – amplified by more than 60,000 times
- Connection for structure-borne and ground-borne sound microphones

The LD20HC can be flexibly operated using either the touchscreen or the keys and control dial.

The LD20 HC combines high-quality engineering “made in Germany” with the latest leak detection technology in pipelines or drinking water systems and hence can be recommended as the ideal standard equipment for water suppliers and measurement engineering service providers.

At leakage points water escapes under pressure and in doing so creates a discharge sound that is transported through the pipelines in both directions where it is ultimately detected by highly sensitive sensors, which can be mounted at readily accessible locations such as hydrants or valves.

Seeing as the type of water pipe always influences the sound propagation, the material and diameter of all pipes can be specified in the LD20HC so as to examine up to 20 pipe sections in only one measuring process.

The signal received is amplified and transmitted to the correlator via radio. The correlator permits 256 freely selectable filters to be applied to the signal.

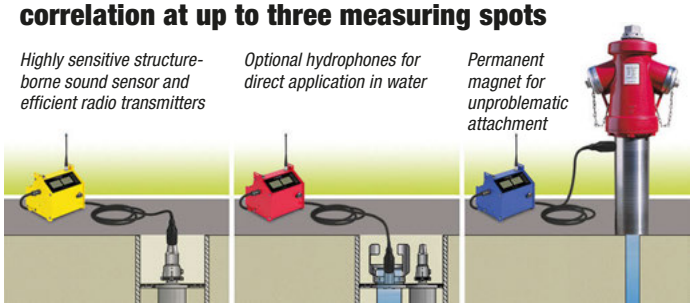
Can also be used for acoustic leak and pipe detection

Moreover, various structure-borne and ground-borne sound microphones can be connected to the LD20HC. So a leak determined by way of correlation can be verified using a ground-borne sound microphone, but every other type of acoustic leak detection and pipe location is also possible.

Thanks to the smart function (patent pending) the important aspects are immediately apparent: Potential points of leakage are displayed as bar indicator and the highest level denotes the leak. There is no quicker and easier way to detect leakages acoustically!

TRT-KAT-L20C-WM-02-EN

64-bit FFT high-performance correlation at up to three measuring spots



Correlation is a computer-aided procedure by use of which very precise leak detections can be performed.

A particular sound emanates from every point of leakage, which spreads over the pipe and to hydrants, fittings or valves. The sound is registered at up to three contact measuring spots by the highly sensitive signal pick-ups and transferred to the correlator via the LD radio transmitters. From the time difference of these signals, the LD20HC – in due consideration of material, pipe diameter and length of the measured section – calculates the exact position of the leak.

Whilst leak detection with other electro-acoustic procedures – especially on long pipe lines – can hardly be performed owing to interference factors such as weather, the pipe's laying depth or noisy surroundings, such cases often pose no problem for the leak detection by means of correlation.

Standard scope of delivery:

- Correlator LD20HC with two antennas and a shoulder strap
- LD K – sound-protected headphones
- Charger
- LD-TA – transmitter 1 incl. sound receiver, coloured red
- LD-TB – transmitter 2 incl. sound receiver, coloured yellow
- transport case for measuring device, LD-TA, LD-TB and accessories

Optionally available accessories:

- LD-TC – transmitter 3 incl. sound receiver, coloured blue
- LD20 MA – magnetic base antenna for correlator with amplification
- LD20 MA+ – magnetic base antenna for correlator with amplification (4 dB gain)
- LD20 Hydro – hydrophone without pressure gauge
- LD20 Hydro UF – hydrophone adapter on DIN hydrant claw with 1-inch internal thread for assemb using hydrant wrench
- LD6000 VK – connection cable for ground microphones
- LD6000 BMW – ground microphone (with dead man's button) sheltered from the wind
- LD6000 BM – universal microphone with magnetic adapter
- LD6000 DA – tripod adapter
- LD6000 VL – probe rod extension with tip

For acoustic leak detection with the LD20HC, it is also possible to use existing microphones of the LD6000, for example LD6000 BMW.

Technical data	LD20HC
Article number	3.110.008.205
Operating modes	correlation leakage location (automatic, manual); acoustic leak detection (F&L, Smart)
Measuring and device functions	automatic filter adjustment, automatic amplification, preference memory function for manual filter settings, sound level override protection
Measurement resolution	correlation: 5 cm for a measuring distance of 100 m; acoustic leak detection: 0-99 digits (equivalent to dB)
Control	optionally via touchscreen or keys and control dial
Amplification	120 dB with low noise figure
Input impedance	1 MΩ
Filter	256 high-pass and low-pass filters
Frequency range	0-5,000 Hz (correlation), 0-4,000 Hz (acoustic leak detection)
Display	colour LCD (5.7'') with background illumination
Battery check	via micro controller
Output impedance	< 10 Ω
Power supply	integrated NiMH battery, 8500 mAh
Operating time	over 10 h of continuous operation with one charge
Storage	up to 100 measurements per operating mode
Connections	2 x SMA antenna sockets, bayonet sensor connection (IP65), 4-pin charging socket with cover (IP65), 3-pin headphone connection with cover (IP65), USB cable connection with cover (IP65)
Menu languages	English, German, French, Italian, Portuguese, Polish, Swedish, Russian, Turkish, Croatian, Slovenian, Slovak, Chinese
Protection type	IP65
Housing	aluminium, powder-coated
Dimensions	L 380 x W 155 x H 67mm
Weight	2,300 g

Technical data	LD-TA transmitter	LD-TB transmitter
Article number	3.110.008.211	3.110.008.212
Colour	red	yellow
Indication	numeric and graphic sound level	
Background illumination	automatic	
Radio frequency	433 / 434 MHz *	
Transmission power	500 mW (approved) *	
Operating hours / charging time	approx. 9 h / 3 h	
Housing	aluminium, powder-coated	
Protection type	IP65	
Dimensions	225 x 165 x 100 mm	
Weight	2.9 kg	
Sound receiver	piezoceramic; sensitivity > 1,000 pC / g; IP68 type of protection	

* Radio frequency and transmitting capacity can be optionally adjusted to the specific country if requested at the time of order. Please indicate when placing your order.

The XRS 9012 hydrogen detection meter

Short reaction times, a high degree of reliability, low cross sensitivity to other gases – these customer wishes were among our top priorities which we put into practice while developing the new XRS System.

A FEW PRACTICAL BENEFITS:

- Variable response thresholds
- Never saturated – even in major leaks
- Rapid recovery
- Automatic zero point setting
- No cross-sensitivity with other gases
- Ergonomic housing
- Easy to handle, carrying strap leaves both hands free to work
- Zero-maintenance rechargeable battery with rapid charging time and long life – can even be charged in vehicle (12 V)
- Error display
- Min. / max. measured value display

Facts about tracer gas:

Hydrogen gas is used as a tracer gas in leak detection because it is the lightest of all gases. It rises faster than other media and reaches the surface after just a short time – even through asphalt, ice and concrete. This means that even the smallest leaks can be reliably located.

Pure hydrogen is combustible however and is not used alone. Instead a mixture of 5 % hydrogen and 95 % nitrogen is used.

This environmentally friendly gas mixture is non-flammable, non-toxic and non-corrosive. Hydrogen and nitrogen are present in all biological systems. Air naturally contains 0.5 ppm of hydrogen.

Many uses:

- *Pipe and line breach locating*
- *Long distance signalling and power cable*
- *Flat roof leak locating*
- *Hydraulic/pneumatic systems*
- *Valves, boilers, heat exchangers*
- *Building sites and boats*

and lots more…

The XRS 9012 represents the current state of the art in the technological development of hydrogen leakage detection equipment opti-mised for practical use.

Safety, efficiency and ease of use were key priorities in the design of the XRS 9012.

The leak detector is designed to be carried as close to the body as possible. It comes with a carrying strap leaving you with both hands free to work. A practical detail which means added safety.

TRT-KAT-GASD-WM-06-EN

An overview of the XRS System components:

The ***XRS 9012*** (Fig. 1) will detect all leaks fast and accurately, however small. The device response thresholds can be adjusted to suit any operating conditions.

The standard ***XRS P 12 grip*** (Fig. 4) is used as an extension for carrying out soil measurements. The sensor is integrated into the tip and operates without a pump, as does the XRS 8212 sensor:

This robust ***XRS 8212 soil probe*** (Fig. 5) detects hydrogen in both dry and wet ground and is ideal for detecting leaks in the most challenging conditions, e.g. in soft ground such as ploughed fields, loam, sand, gravel, snow or marshland.

The ***XRS 8612 sub-soil probe*** (Fig. 6) accurately locates even the smallest underground leaks in pipes or tanks with no digging or drilling.

The probe has a dust filter, by-pass valve and a two-speed vacuum pump (Fig. 7).

XRS system components: *① XRS 9012 hydrogen detection meter incl. carrier; ② XRS H 21 probe; ③ XRS C 21 S cables, 3 m; ④ XRS P 12 standard grip, ⑤ XRS 8212 soil sensor, ⑥ XRS 8612 sub-soil probe with ⑦ vacuum pump.* ***Further items are available on request.***

The XRS 9012 – how it works.

The response thresholds of the measuring device can be adjusted to suit any conditions.

Set the level of sensitivity you require at the press of a button. This is a new way of working – a safer and more efficient way:

First it means that even large areas can be tested quickly with no loss of responsiveness. As soon as a signal is received you can adjust the thresholds to fade out interference and obtain the precise location of the leak.

Another benefit is being able to reduce the sensitivity. Large leaks in small spaces no longer require full amplitude. For clearly defined location of large leaks you can simply reduce the sensitivity to a minimum.

Short reaction times mean that even the tiniest concentrations of trace gases can be detected with a strong signal, which then decreases rapidly to zero as the concentration lessens. The zero value can be reset by pressing the respective key.

In the redesign we focused a lot of attention on safety and comfort: The leak detector is designed to be carried as close to the body as possible. It comes with a carrying strap leaving you with both hands free. A practical detail which means added safety.

The XRS 9012 is primarily used for locating leaks and not for measuring gas concentrations. However, if it is possible to carry out a rough location by measuring at several measuring points, you can do so fast and simply by increasing the sensitivity threshold.

Helpful practical feature: the MAX function detects the maxi-mum concentration at the measuring point each time you press the button. That means you can make a direct comparison of gas concentrations at different points.

The XRS 9012 has an automatic battery charging function. If the battery runs down, 5 to 10 minutes charging time are usually sufficient to be able to complete your current measuring task. You can also charge the batteries using your vehicle's cigarette lighter.

You can find comprehensive product details for the XRS system and further information about hydrogen leak detection on the Internet at ***www.trotec.com****!*

Technical data	XRS 9012 hydrogen detection meter
Article no.	XRS009012
Sensitivity	0.7 ppm H_2 in air
Response time	< 1 sec.
Warm up time	6 sec.
Outputs	10 stage LED bar display, speaker: 5 - 1,600 Hz; earpiece: standard earpiece, 3.5 mm earplug, > 8 Ohm
Power supply	rechargeable lead batteries
Enclosure rating	IP 55
Battery capacity	13 hours at 20 °C, 6 hours at -20 °C
Charger	mains adapter (input 100 - 240 VAC) and vehicle charger cable (input 9 - 15 VDC) supplied as standard
Housing	aluminium
Dimensions/Weight	L 120 x W 250 x H 85 mm/1.9 kg; L 220 x W 260 x H 95 mm/2.5 kg *(including carrier)*

Technical data	XRS 8612 sub-soil probe
Article no.	XRS008612
Pump type	diaphragm pump
Pump capacity	0.5 (1.0*) l/min. 200 (450*) mbar
Battery capacity	20 (3*) hours over 0 °C
Battery	zero maintenance
Operating temperature	-20 °C to +50 °C
Storage temperature	-30 °C to +50 °C

** at max. vacuum pump speed*

Technical data	XRS 8212 soil sensor
Article no.	XRS008212
Sensitivity	1 ppm H_2 in air
Response time	< 1 sec.
Warm up time	< 10 sec.
Operating temperature	-20 °C to +50 °C
Diameter	24 mm
Dimensions/Weight	L 905 mm/540 g

A FEW PRACTICAL BENEFITS:

- Professional trace gas detector
- Quickly ready for use
- Economic tightness tests of pressure tanks, pressure lines or weld seams
- Pinpoint location of even the smallest leaks in supply networks
- Low maintenance effort
- No regular calibration required
- High degree of flexibility due to bendable gooseneck
- Inexpensive system based on the multifunction measuring meter T3000 with optimum upgrade options for many different measured variables and fields of application achieved by the simple additional purchase of sensors

Spot on measuring results!

Measuring spot sticker – practical help for spot-on documentation and chronological comparison measurements.

You will find this accessory item in the chapter "Multi-function" on page 25.

Trace gas sensor TS 810 SDI

An innovative combination of high-precision sensor technology and maximum efficiency …

The unique characteristics of hydrogen introduce manifold advantages when used as trace gas for leak detection or tightness tests to the user. The hydrogen sensor TS 810 SDI unites these benefits in an economical way with the high flexibility of the T3000 multifunction measuring meter.

The result: A quality product "made in Germany" during the development of which high-precision sensor technology and a sensational value-for-money ratio could be combined despite complex manufacturing processes.

Make your own comparisons: The acquisition of adequate competitive solutions is five to ten times more expensive!

The sensor element of the TS 810 SDI is protected by a high-quality stainless steel sinter filter.

TROTEC 100% MADE IN GERMANY

Effective measurement method

The TS 810 SDI sensor captures hydrogen, which e.g. in the usual 95/5 % forming gas is used as tracer gas for leakages, and thus in an easy way enables users to perform a non-destructive location of the highest concentration of hydrogen within the measuring area, e.g. for the location of cracks and leaks in pressure tanks, pipes, tanks etc.

The size of the test object is irrelevant, for due to its high resolution accuracy and the measuring range from 0 to 1,000 ppm of H_2, the sensor system also captures minor concentrations of hydrogen from about 1 ppm H_2.

To ensure an optimum adjustment to different operating conditions the sensor can naturally also be set to a lower sensitivity level.

Acoustic and numerical indication of measured values

During measurement, rising and falling hydrogen concentrations are indicated acoustically at the sensor housing as well as by the numeric display of an indicative measured value on the display of the T3000.

This way, with respect to the highest H_2 concentration the user can be guided optionally by the signal tone interval or the displayed measured value and so systematically narrow down the position of the leak to be detected.

TS 810 SDI – Effective trace gas detector for leak detection or tightness tests

Compact solution for wireless mobile application

The energy supply of the trace gas sensor TS 810 SDI is effected entirely via the multifunction measuring meter T3000, hence there is no need to carry along any additional rechargeable battery cells for sensor operation. These savings in terms of weight and space become particularly noticeable during longer measuring operations.

Owing to the bendable gooseneck, measurement results can also be determined in locations which are only poorly or inaccessible when using a rigid measuring head.

The sensor sensitivity can conveniently be adjusted in 5 steps directly at the hand-held housing. Moreover, the acoustic indicator can also quickly be switched on or off as needed.

Furthermore, the zero reset can be carried out at the push of a button – a special function for the differentiated indication measurement by means of two real-time measured values based on different position coordinates.

The zero reset function even allows the subsequent measuring of an increased concentration in ambient air already highly enriched with tracer gas. In combination with the very high sensitivity, even the smallest leakages can be located with pinpoint accuracy by means of a multiple zero reset.

All the selected settings are displayed by means of an LED bar graph integrated in the housing of the TS 810 SDI.

Enables more economical test processes in the industry

The TS 810 SDI sensor creates the conditions for faster test processes, since the hydrogen measurement method is an effective alternative to conventional methods for tightness tests or leak detection.

These are either relatively labour-intensive and time-consuming, such as e. g. the bubble test after soaping workpieces or the pressure drop test, or else require a considerable complexity of equipment needed, as is the case with the helium tightness test.

More than "just" a trace gas detector …

The multifunction measuring meter T3000 provides you with maximum flexibility for the performance of your measuring tasks.

Apart from the trace gas sensor TS 810 SDI, many other sensors can be connected to the T3000, e. g. for the non-destructive determination of air flow, temperature, relative humidity and material or building moisture.

The possibility to connect different measuring electrodes for the measurement of wood and building moisture according to the resistance measuring method further extends the possible applications of the T3000.

With the combination of TS 810 SDI trace gas sensor and T3000, production plants are provided with the ideal measuring equipment for tightness tests of weld seams, pressure tanks or pressure lines.

Checking pump bodies for leakages can easily and very economically be realized with the hydrogen leak detection and the T3000.

By simply exchanging the sensor you can, for instance, turn your trace gas detector into a thermohygrometer or anemometer, a capacitive material moisture measuring instrument, a surface thermometer or a microwave moisture sensor.

Enhance the application possibilities of your T3000 simply by buying an additional inexpensive sensor of your choice, if required.

More information regarding the T3000 and the available sensors can be found in chapter "Multifunction" starting on page 16.

Technical data		TS 810 SDI
Article number		3.510.220.290
Hydrogen measurement	Measuring range	0.0 to 1,000.0 ppm H_2
	Response sensitivity	1 ppm H_2
	Resolution	1 digits
	Response time	< 1 s
Sensor element	Type	gooseneck, semi-rigid
	Length	190 mm
	Diameter	13 mm
	Sensor tip	stainless steel sinter filter, pore size > 50 µm
Complete sensor (sensor element and hand-held housing)	Length	330 mm
	Weight	300 g
	Power supply	via multifunction measuring meter T3000 (5 - 5.5 VDC)
	Interfaces	integrated connection cable for the T3000*, length 2 m
Operating conditions	Air temperature	-10 to 60 °C
	Humidity	0 to 95 % RH, non-condensing
Available accessories		**TS 810 SDI**
Sensor bracket TS 810 SDI (details on page 25)		Article number 3.510.200.230

** Additionally required for the application of the TS 810 SDI is a T3000 multifunction measuring meter.*

A FEW PRACTICAL BENEFITS:

- Equally compact and robust IP54 testing device for ultrasonic measurements
- Simple detection of even the smallest leaks
- Pinpoint leak detection with powerful sound transducer technology
- Extremely soundproof stereo headphones allow for a safe detection even in noisy surroundings
- Extensive range of plug-on airborne and structure-borne sound probes for various fields of application
- Easy-to-read, backlit display with numeric and indicative display of measured values
- Intuitive softkey handling with an additional maximum value display function

Ultrasound measuring instrument SL3000

Compact ultrasonic testing device with a variety of accessories for professional leak detection in compressed-air, gas or vacuum systems and for an early detection of bearing damage on machines

A high-quality airborne sound probe – including a horn attachment and plug-on directional probe with tip – are already included in the scope of delivery of the SL3000 and can be complemented by additional airborne and structure-borne sound probes.

- Quick leak detection at compressed-air lines as well as steam, gas and vacuum systems
- Wear control of rotating machines during operation
- Tracing of electrical partial discharge and insulation damage
- Tightness testing in pressureless systems

Fully equipped with headphones in a carry case

Practical detail: The case inserts are already designed to accommodate further additional probes, e.g. the optionally available structure-borne sound probe (as shown).

Using ultrasound to find leaks and detect signs of wear at an early stage

Compressed air is one of the most expensive types of energy. However, 30 to 40 % of the consumption is often lost to leaks. Using the SL3000 you can detect such leaks in an extremely easy way, and thus immediately save energy with every leak that has been eliminated. Even pressurized gas lines can be quickly examined for leaks using ultrasound.

Moreover, the SL3000 effectively solves numerous tasks related to preventive maintenance. Without having to interrupt the ongoing operation, you can regularly test system parts and rotating machines for signs of wear using ultrasound, which allows you to detect potential damage at an early stage.

With the SL3000, measuring neither requires much time nor extensive training. By means of high-performance sound transducer technology and stereo headphones, ultrasonic signals are rendered audible and are at the same time displayed both numerically and indicatively.

The robust measuring device was specifically designed for continuous use in rough industrial surroundings while being compact enough to easily fit into every pocket. Depending on your needs, the SL3000 can be complemented with various airborne and structure-borne sound probes, which can be plugged onto the device in just one simple step.

TRT-KAT-SL3000-WM-01-EN

Using the directional sound probe, leaks at exposed lines can be located precisely.

The structure-borne sound probe with stainless steel tip is ideally suited for non-destructive testing, e.g. to check rotating machine components for bearing wear.

SL3000: Professional compact solution with a variety of accessories

Standard scope of delivery:

① *Ultrasound measuring instrument SL3000*
② *Airborne sound probe*
③ *Directional sound probe with plug-on tip*
④ *Acoustic horn for greater range*
⑤ *Stereo headphones with connection cable*
■ *Transport case and operating manual*

Technical data		SL3000 ultrasound measuring instrument
Article number		3.510.002.200
Connections	Signal input	Socket for ultrasound probes
	Signal output	Headphone connection (3.5 mm jack socket)
Display of the ultrasonic intensity		Numerically in dBµV and visually as a bar
Acoustic rendition		Soundproof stereo headphones, maximum attenuation of ambient sounds
Frequency range		Approx. 40 kHz
Protection type		IP54
Power supply		2 x 1.5 V AA (LR6)
Surrounding conditions		-10 °C to 60 °C (operation), -20 °C to 60 °C (storage)
Dimensions without probe (L x W x H)		30 x 130 x 85 mm
Weight (incl. battery, without probes)		300 g
Scope of delivery	Standard	SL3000, batteries, stereo headphones with connection cable, airborne sound probe, acoustic horn, shotgun with plug-on tip, transport case, operating manual
	Optional	SL3000 parabolic probe; SL3000 airborne sound probe, flexible; SL3000 structure-borne sound probe, long; SL3000 structure-borne sound probe, short; ultrasonic transmitter SL800T

Optional accessories:

⑥ ***Structure-borne sound probe, long***
Article number 3.510.002.210

Using the structure-borne sound probe, you can quickly carry out inspections to prevent damage on rotating machine components without disturbing the ongoing operation. If testing is performed regularly, changes in sounds can give valuable hints as to signs of wear in ball, roller or slide bearings, for instance.

⑦ ***Structure-borne sound probe, short***
Article number 3.510.002.211

Being an electronic stethoscope, this probe is particularly well suited for inspecting fittings, gate and globe valves.

⑧ ***Airborne sound probe, flexible***
Article number 3.510.002.215

This probe, which is equipped with a flexible gooseneck, enables leak detection even at concealed pipe lines.

⑨ ***Parabolic probe***
Article number 3.510.002.219

Due to its wide range of up to 20 m and an integrated red dot sight, this probe can be used to safely and precisely detect compressed air leaks even over large distances.

Thanks to the parabolic probe's high sensor sensitivity and very good directional effect, electrical partial discharge and insulation damage can also be traced, e.g. at medium voltage installations.

Ultrasonic transmitter
Article number 3.510.002.010

In order to trace faulty seals in pressureless systems such as doors or windows, cabins, heating cabinets, air conditioning units or fire doors, the SL3000 can be combined with an ultrasonic transmitter such as the SL800T. The ultrasonic signals generated by the transmitter escape at leaky spots and can be detected by the SL3000.

A FEW PRACTICAL BENEFITS:

- Development, design, production: 100 % Trotec
- Simple detection of even the smallest leaks
- Pinpoint leak detection with powerful sound transducer technology
- Cost-effective leak detection at compressed-air lines as well as at steam, gas and vacuum systems, boilers, liquid-bearing lines, valves, slides, steam traps
- Reliable early detection of damages at slide and roller bearings or other sounds indicating wear
- Airborne and structure-borne sound probe for various tasks
- Safe detection even in noisy surroundings thanks to high-quality, soundproof headphones
- Easy handling

Ultrasound measuring instrument SL800

Professional ultrasonic detector set for the quick and inexpensive leak detection, wear diagnosis or tightness test

Fully equipped with headphones in a carrying case

TROTEC 100% DEVELOPMENT » DESIGN » PRODUCTION

Detecting compressed air leaks quickly and economically

With this ultrasonic detector set you can locate leakages in compressed-air supply networks, plant systems and at concealed pipe lines quickly and without contact even from a distance of several metres.

In case of leaking gas even a tiny point of leakage in the compressed-air line is sufficient and leads to increased friction, generating a sound inaudible for humans in the ultrasonic frequency range.

Wear abrasion at movable machine parts becomes noticeable in the same way.

These sound vibrations caused by flow friction are received by the probe of the SL800R and transformed into audible sound by way of high-performance transducer technology, which can then be played over sound-proof headphones and additionally displayed as indicator value via a 10-piece LED bar graph.

The combined visual and audible detection with adjustable headphone volume permits focussed working even in poor lighting conditions and noisy surroundings.

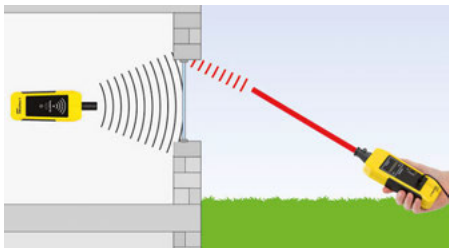
For testing the tightness of pressureless systems such as tanks, containers or climatic chambers and ventilation systems, these can be subjected to ultrasound using the SL800T transmitter which is also included in the set.

TRT-KAT-SL800-WM-01-EN

SL800: Effective leak detection and tightness tests using ultrasound

Signs of wear at pumps and other processing machines can be detected at an early stage using the structure-borne sound probe.

Combined with the ultrasonic transmitter SL800T, tightness tests of e.g. fire doors can be performed quickly and at low cost.



Quick tightness tests at parts of a building or other sealing components

For tightness tests at regular doors and fire doors or windows the ultrasonic transmitter SL800T can simply be installed behind the test object. Ultrasound emerging in front of the object then indicates the point of leakage.

Model calculation for leakage losses in compressed air systems

Large amounts of air permanently stream out at high speed even through the tiniest leaks in compressed-air systems, resulting in considerably higher operating costs:

Leak dimensions	Escaping air volume at 8 bar		Loss of energy**
[ø mm]	[l/min]	[l/annum]*	[kWh/a]
1	75	39,420,000	5,125
2	260	136,656,000	17,765
3	600	315,360,000	40,997
4	1,100	578,160,000	75,161

* if operated 24 hours a day throughout the year.
** owing to the additionally required motor power (0.13 kW per m³ of compressed air) for a higher volume flow to compensate the pressure loss.

This variety of potential applications is made possible by ultrasonic detection using the SL800:

SL800R with structure-borne sound probe

- Early detection of wear at ball, roller or slide bearings
- Checking centrifugal pumps for cavitation
- Tightness tests of fittings
- Continuity testing or functional check of steam traps

This probe utilizes structure-borne sound as bearer of inner states and processes. Hence, the device combination works like an electronic stethoscope.

SL800R with airborne sound probe

- Leak detection at exposed lines and pipes
- Proving the leakage-related loss at gas-filled supply networks also during operation
- Leak detection at high-pressure steam installations
- Localization of cracks, poor weld seams or worn flange connections
- Leak detection at all accessible fittings and connecting elements where processes take place in a vacuum or at high pressure

SL800R with airborne sound probe and ultrasonic transmitter SL800T

- Tightness testing to determine the cause of energetic defects, e.g. at doors or windows
- Checking containers, housings or climatic chambers for tightness
- Subjecting tanks or containers to ultrasound so as to test sealing components

Complete set with exchangeable probes and ultrasonic transmitter

Scope of delivery:

- ① *Receiver SL800R (Article no. 3.510.002.001)*
- ② *Transmitter SL800T (Article no. 3.510.002.010)*
- ③ *Airborne sound probe for SL800R*
- ④ *Structure-borne sound probe for SL800R*
- ⑤ *Soundproof headphones with volume control*
- ⑥ *Transport case*
- ■ *Two batteries and quick guide*

Technical data	SL800 ultrasonic detector set
Article number	3.510.002.000
Signal input connection	Airborne sound probe, structure-borne sound probe
Display of the ultrasonic intensity	LED bar graph, 10 levels
Acoustic rendition	Soundproof headphones, high attenuation of ambient sounds
Frequency range	36 kHz to 44 kHz
Power supply	9 V IEC 6F22
Operating conditions	0 to 40 °C, < 75 % RH
Dimensions (L x W x H)	197 x 73 x 33 mm (SL800R) / 203 x 73 x 33 mm (SL800T)
Weight (incl. battery, without probes)	180 g (SL800R), 160 g (SL800T)

Hand-held UV-A lamps

Advanced, reliable LED technology with impressive transmittance properties – ideal for longer inspections

A FEW PRACTICAL BENEFITS:

UV-TRACKMASTER WF AND NF

- Light and mobile system for an effective examination of large-scale and even poorly accessible locations
- With a special band-pass filter for maximum residual light suppression yet simultaneously maximum UV translucency
- High energy efficiency, therefore less current consumption and longer battery service life
- Pleasantly silent operation without cooling fan
- No warm-up phases – immediately ready for use
- Can be switched on/off at any time without precooling
- Extremely high UV-A radiation intensity makes even the smallest tracers visible in the daylight from afar
- Integrated high-performance LED orientation light

UV-TORCHLIGHT 15F

- Ultra-compact hand-held lamp with high spotlight radiation intensity
- Extremely versatile owing to infinitely focusable UV-A radiation cone from spotlight to floodlight

Exclusively at Trotec!

TROTEC 100% MADE IN GERMANY

With the compact long-wave LED lights UV-Torchlight 15F and the UV-Trackmaster models WF and NF you have the perfect hand-held UV-A lamps for a non-destructive tracer detection during material testing, leak detection or quality inspection and for safety applications.

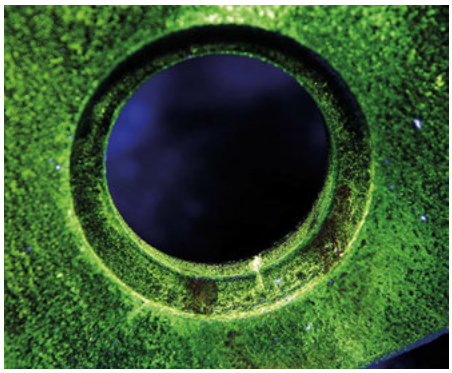
The UV-Trackmaster models WF and NF are supplied ready for use in a robust hard-shell case including batteries and charger/power adaptor. The product information for these hand-held UV lamps can be found on the following catalogue pages …

TRT-KAT-ULVP-WM-11-EN

Hand-held UV-A lamps from Trotec provide diverse application possibilities:

Leakage at the refrigerant line of a car's air conditioning system under UV light using a contrast medium.

Detection of a leaky water-carrying pipe in a building by passing in uranine and performing a subsequent UV inspection.



Crack in an aircraft brake component under UV light during a non-destructive magnetic particle inspection.

Leak detection at motors and aggregates

Using hand-held UV-A lamps, leaks in motor systems or cooling units can usually be detected as a luminous blotch of colour around the leaky spot in a matter of a few operating minutes by adding a contrast medium (tracer).

Whether for hydraulic system, refrigeration system, lubricant or fuel line – by use of multi-coloured tracers not only the point of leakage can be determined quickly and precisely, but also the cause for leaking.

Leak detection in buildings and supply networks

By using artificial marking agents (tracers) in complex, fluid-bearing lines, their two-dimensional tightness can be checked or leak-related liquid distributions and spills can be detected and analysed with the ultra-violet light of hand-held UV-A lamps.

Further typical fields of application are tightness tests at water-bearing layers of flat roofs or the inspection of drains and downpipes.

Non-destructive material testing in the industry

Employing UV-A radiation, in case of ferrous and non-ferrous metals, many plastic or ceramic materials, surface defects or cracks on components and machines can be detected quickly and without great effort using the fluorescence penetrant inspection (FPI) or the magnetic particle inspection (MPI) with fluorescent testing agents.

UV-Torchlight 15F

Hand-held UV-A lamp – infinitely focusable from spotlight to floodlight

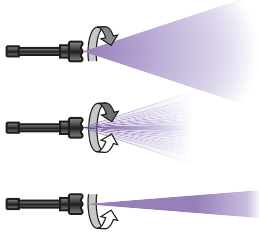
This lightweight LED torch provides maximum UV-A performance immediately after switch-on and is especially suited for quick inspections or checks of poorly accessible areas.

Thanks to the impressively high spotlight radiation intensity of the UV-Torchlight 15F, a very high fluorescence stimulation can be achieved – this way, even minor tracers are clearly visible in the daylight.

Unlike conventional UV torches, though, the UV-Torchlight 15F can not only be used in spotlight operation:

An integrated focus ring enables the infinitely variable regulation of the UV-A radiation cone from spotlight to floodlight.

This variable focal length setting permits a particularly wide range of applications for the UV-Torchlight 15F. Its high illumination flexibility makes the ultra-compact UV-Torchlight 15F a universally applicable tracer detector for various investigation tasks.



Focus ring set to floodlight

Variable focal length setting

Focus ring set to spotlight

Our accessory tip:

In addition to its maximum radiation of 365 nm, the UV-Torchlight 15F also emits a small quantity of visible light, which can be an advantage particularly for leak detection in poorly lit areas.

But since this white light component may cause over-exposure at short distances, particularly when used for material testing, the UV-Torchlight 15F can be equipped with a band-pass filter (355 - 375 nm) which filters out all visible light and thus makes sure that the test object is only hit by UV-light in the spectral range around 365 nm.

UV-Torchlight 15F filter attachment, Art. no. 3.510.011.050

Hand-held UV-A lamps – further information …

Hand-held high-performance lamps UV-Trackmaster WF and NF

Compact long-wave UV lamps “made in Germany” with a maximum transmittance of 365 nm for non-destructive material testing and fluorescent leak detection

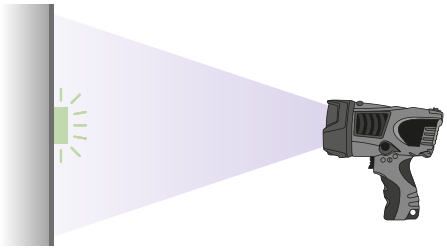
With their special band-pass filter lens the UV-Trackmaster models WF and NF can simultaneously achieve even higher transmittance levels ranging at about 365 nm and a significantly reduced white light component. This virtually eliminates the need for distance reduction or darkening measures.

The result: a very high fluorescence stimulation and thus a more apparent tracer detection with high contrasts and at great distances.

Both hand-held lamps with ergonomic pistol-shaped handle were designed for continuous operation and are ready for use at full capacity immediately upon switch-on.

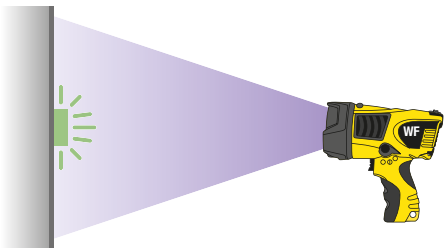
The **UV-Trackmaster NF** emits a more focused beam of UV light whereas the wider lens opening of the **UV-Trackmaster WF** permits the illumination of vast areas.

Particularly convenient in poorly lit areas is the individual on-demand LED orientation light of both hand-held lamps for the bright illumination of your working environment at the push of a button.



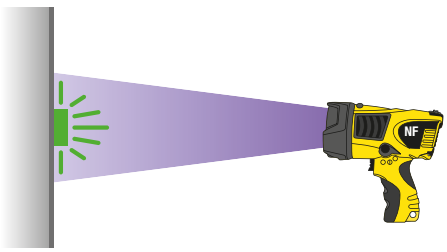
Previous UV-Trackmaster model

- aperture angle of LED lenses ≈ 11°
- white light component 25 to 30 lux
- fine fluorescence excitation on a large surface



UV-Trackmaster WF

- aperture angle of LED lenses ≈ 11°
- white light component 5 to 8 lux
- high fluorescence excitation on a large surface



UV-Trackmaster NF

- aperture angle of LED lenses ≈ 7°
- white light component 5 to 8 lux
- very high fluorescence excitation in a focussed radiation cone

Now available with a special band-pass filter for maximum residual light suppression yet simultaneously maximum UV translucency

The UV-Trackmaster models of the latest generation are equipped with a special band-pass filter lens. On the inside this scratch-proof filter has been elaborately coated 90 times in a high-vacuum atmosphere alternately using material with a high and a low refractive index.

The spectral distribution of the vapour-deposited layers is designed for one thing to reduce the share of residual light still further, for another to ensure a high transmittance in the wavelength range of 365 nm.

This way, tracers can be identified with substantially more contrast.

In addition, an anti-reflection coating for the UV range has been applied to the filter lens ①, as a result the obtainable transmittance values are yet higher than those of a conventional UV filter lens.

The otherwise in the visible light spectrum completely opaque filter is provided with a special laser etching ② in the orientation light outlet area to make sure the light can pass through there unchecked.

Compared to the previous model the white light content could be reduced by up to 80 % due to the integrated band-pass filter!



Technical data		UV-Torchlight 15F	UV-Trackmaster WF	UV-Trackmaster NF
Article number		3.510.011.007	3.510.011.016	3.510.011.017
Lamp	Type	LED (1x)	LED (3x)	LED (3x)
	Wavelength	UV-A, peak at 365 nm	UV-A, peak at 365 nm	UV-A, peak at 365 nm
	Lifespan	Approx. 6,000 h	> 10,000 h	> 10,000 h
	White light component	n.s.	5 to 8 lux	5 to 8 lux
Radiation intensity (at a distance of 38 cm)	Radiation cone XL (ø 250 mm)	2,890 µW / cm²	–	–
	Radiation cone L (ø 150 mm)	10,030 µW / cm²	22,000 µW / cm²	–
	Radiation cone M (ø 100 mm)	22,560 µW / cm²	–	29,000 µW / cm²
	LED spotlight (ø 60 mm)	55,480 µW / cm²	–	–
Power supply	Battery type	3.7 V Li-ion battery	4 x 1.2 V 4,000 mAh NiMH (standard batteries)	4 x 1.2 V 4,000 mAh NiMH (standard batteries)
	Operating time	> 2h	≤ 1.5 h	≤ 1.5 h
	Charging time	≈ 3.5 h	≈ 6 h	≈ 6 h
Equipment and physical characteristics	Start-up time	< 1 s	< 1 s	< 1 s
	Additional functions	–	Integrated LED orientation light (torch)	Integrated LED orientation light (torch)
	Band-pass filter	□	■	■
	Handle type	Torch	Pistol grip	Pistol grip
	Housing	Anodized aluminium	Plastic (two-component construction, partially rubber)	Plastic (two-component construction, partially rubber)
	Protection	IPX7 type of protection	IP53 type of protection, integrated overheating protection with automatic switch-off at 70 °C	IP53 type of protection, integrated overheating protection with automatic switch-off at 70 °C
	Dimensions	L 155 x W 45 x H 45 mm	L 171 x W 90 x H 169 mm	L 171 x W 90 x H 169 mm
	Weight	Approx. 232 g (incl. battery)	780 g (incl. battery)	780 g (incl. battery)
Scope of delivery	Standard	UV-Torchlight 15F with rechargeable battery, charger, operating manual	UV-Trackmaster WF with rechargeable batteries, charger/power adapter, case, operating manual	UV-Trackmaster NF with rechargeable batteries, charger/power adapter, case, operating manual
	Optional	Filter attachment (Art. no. 3.510.011.050)	–	–
Further available accessories		UV protection glasses (Art. no. 3.510.011.100)		
		Uranine powder, 100 g (Art. no. 3.510.012.001)		
		Luminate, 1 l (Art. no. FLURO-L3)		

■ *Standard equipment;* □ *Optionally available equipment*

A FEW PRACTICAL BENEFITS:

- For a quick and simple route and leak detection
- Food-grade dyes – 100 % natural
- Does not affect the water quality
- No maximum dosage limits
- Water-soluble powder – easy to use

Marking dyes of the Pure series

Natural food-grade dyes

- ✓ Biodegradable to 100 %
- ✓ Harmless for the health of people and animals
- ✓ All ingredients in food-grade quality
- ✓ Neutral to the water quality

Showing your colours in an eco-friendly way – pure and simple

The 100 % biodegradable dyes of the Pure series are easily visible without technical aids and ideally suited for the direct inspection of the pipe run or connections when detecting faulty or leaking connections as well as incorrect discharge conduits of drainage systems.

Depending on the desired colour intensity, these rich marking dyes can be mixed with water as needed, for owing to their environmental compatibility the Pure powder blends have no maximum dosage limits.

Further possible applications can be found in the field of tracer hydrology, e.g. for verifying the flow path, visualising the mixing and run-off characteristics in flowing waters, lakes, dams or water treatment plants as well as for checking the flow rate in fish ladders.

Pure dyes are also ideal auxiliary means for HAZMAT simulations during fire brigade training exercises.

Dosage can be adjusted as needed

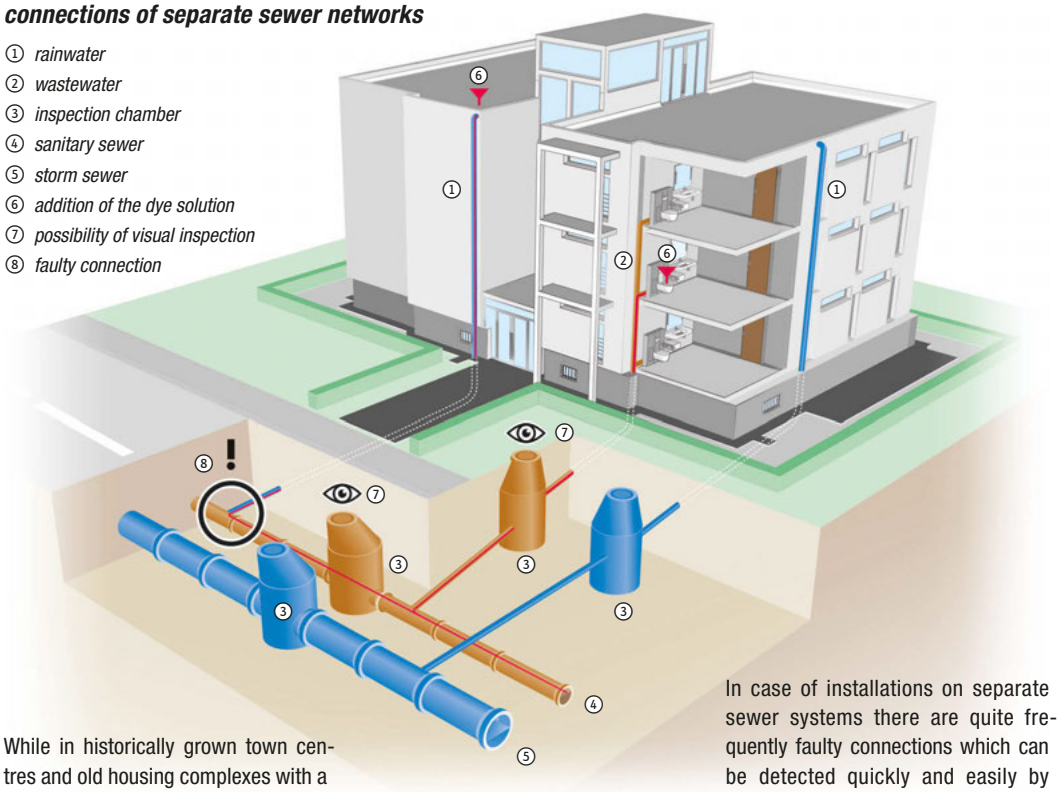
Because of the 100 % natural food-grade ingredients dyes of the Pure series can be dosed to meet every demand – overdosing is not possible.

Depending on the desired intensity 1 to 5 litres of water can be added to 2 g of Pure dye so as to produce between 100 and 500 litres of dye solution with only one plastic jar of Pure dye.

TRT-KAT-PURE-WM-01-EN

Application example: Checking the connections of separate sewer networks

① *rainwater*
② *wastewater*
③ *inspection chamber*
④ *sanitary sewer*
⑤ *storm sewer*
⑥ *addition of the dye solution*
⑦ *possibility of visual inspection*
⑧ *faulty connection*



While in historically grown town centres and old housing complexes with a high level of soil sealing you still often find predominantly combined sewer systems with a common drain, new residential areas are usually equipped with separate sewer networks, which will continue to spread over time – also due to changed Water Resources Laws.

In case of installations on separate sewer systems there are quite frequently faulty connections which can be detected quickly and easily by means of Pure dyes. Just flood the dyed water solution into the drain to be examined and check the route via the inspection chamber.

PureRubin Natural dye

Powder, 200 g, red,
Article no. 3.510.012.051.

Made from radish, apple and black currant. Manufactured with water, citric acid and maltodextrin.

PureMarin Natural dye

Powder, 200 g, blue,
Article no. 3.510.012.050.

Made from spirulina and apple. Manufactured with water, sucrose syrup, maltodextrin and citric acid.

Further available: fluorescent dyes

Uranine is the most intensely fluorescing tracer dye and easily visible to the naked eye, which is why it is often used for marking waters. Greatly diluted, the highly water-soluble uranine powder is toxicologically harmless and ideally suited for all leak detections and tightness tests requiring the dyed water to penetrate capillaries. Therefore the leak becomes apparent with a clear time lag to the dye addition. Even tiny leaks can be rendered visible using a UV lamp.

Uranine powder, 100 g, Article no. 3.510.012.001

Trotec luminate is an eleven per cent anionic aqueous pigment dispersion, which can be diluted with water, but does not metabolize. This is particularly advantageous in case of leak detections on green roofs or when locating concealed leaky water-bearing drains or pipes. Owing to its small pigments Trotec luminate can also cross capillaries and is extremely yielding; depending on the field of application, a dilution at the rate of 0.3 to 3 % should be sufficient. A UV lamp is required to render the exit points visible, e.g. UV-TrackMaster.

Luminate, 1 litre, Article no. FLURO-L3

Important: Chemical marking agents such as uranine or luminate must not be used as food colourant!

Which dye for which purpose?

Decision support for the selection of tracer dyes

	Pure series	Uranine	Luminate
100 % food-grade ingredients	■		
Biodegradable, natural metabolism	■		
Harmless for the health of people and animals	■		
Harmful in excessive doses		■	■
High yield	■	■	□
Movement through capillaries		■	□
Chemical long-term stability for long-term studies		■	■
Luminescence through UV light		■	■
Vividly coloured (also visible in dark, stagnant water)		■	
Transparent, colour-neutral application			■
Generally accepted for leak detection or verifying the flow path *		■	
Suitable for detecting pipe bursts *	■	■	■
Suitable for detecting leaky spots in the brickwork *		■	□

* Chemical tracers (marking agents) are potentially toxic – depending on the treatment duration and exposition – hence applications with drinking water or groundwater discharges could be problematic.

Based on the situation the natural colours of the Trotec Pure series can provide a deployment alternative that is 100 % organic. Otherwise uranine represents the means of choice, especially for verifying the flow path or leak testing in brickwork.

If the tracer should for instance not leave any colour traces on the item and at the same time needs to be chemically stable in the long run, we recommend using luminate, which is only visible when irradiated with UV light.

Fog and flue gas systems

A FEW PRACTICAL BENEFITS:

FS200 Fog and flue gas simulator

- Professional quality "Made in Germany" – originally produced by Trotec
- Robust aluminum lightweight construction
- Extremely powerful fan turbine – infinitely variable
- Ultra-compact integral solution with hinged canister holder
- Extra dense white smoke thanks to the infinitely variable fluid pump
- Easily transported – also through bottlenecks such as safety ladders
- Intelligent power coupling of turbine, heating and pump for a consistently dense fog conveyance lasting several minutes without postheating-related interruptions
- Service-friendly construction – simple filter change within seconds
- Tried and tested German industrial design

Possible applications:

- *Fire simulation, respiratory protection and disaster control exercises*
- *Tightness tests*
- *Flat roof leak detection*
- *Exercise for smoke extraction*
- *Checking of smoke outlets*
- *Checking of air discharge, air inlet and exhaust air openings*
- *Control of smoke extraction in escape routes*
- *Detection of faulty connections in piping networks, tank farms or wastewater systems*
- *Locating of undercuts in dams and dykes*

TROTEC 100% MADE IN GERMANY

Fog and flue gas simulator FS200

This professional fog and flue gas simulator of German high-quality manufacturing is the most compact and lightest device in its performance class.

Thanks to smart slim design in robust aluminium lightweight construction, the transport of the FS200 to any application site will be no problem at all and you can benefit from a high range of motion even through bottlenecks such as safety ladders.

The ingenious canister holder of the FS200 can be unlocked and folded out in a matter of seconds.

This way, the floor space is increased and provides more stability even on disadvantageous undergrounds like gravelled flat roofs.

The extremely powerful turbine as well as the fluid pump of the FS200 can be infinitely adjusted in their performance for fog conveyance, hence be attuned more precisely to individual operating conditions.

Moreover, the intelligent power coupling of turbine, heating and pump ensures a consistently dense fog flow lasting several minutes without postheating-related interruptions even during maximum turbine performance.

The FS200's fluid consumption is agreeably low and can amount to a maximum of no more than 100 ml per minute.

The optionally available carrying case with inner padding offers optimal storage space for FS200 and accessories and enables safe transport.

The suitcase includes a pull-out handle, wheels, carrying handles and a lockable lid.

Transport case optionally available

Scope of delivery: *FS200, 5 m fog hose (Tronect PV-A 38 with quick coupling), 5 litre fog fluid canister, filling hose with coupling plugs. The supplied branded fog concentrate FluiTect contains no hazardous working substances, is water-soluble, biodegradable and non-inflammable.*

Sophisticated in every detail – the FS200 impresses with many practice-oriented equipment features

① *Robust slim design for a high degree of mobility even in bottlenecks.*

② *In transport position the canister holder's feet serve as cable holder.*

③ *The integrated ergonomic recessed handle with an inner Grip-Clip affords the best hold while carrying.*

④ *A locking pin reliably fixes the transport position of the canister holder in place.*

⑤ *Thanks to an ingenious mechanism the holder can be unlocked and folded out in a matter of seconds.*

⑥ *Tilt-resistant fluid canister holder for befogging.*

⑦ *The FS200's control panel is located underneath a protective flap with magnetic lock for shock-protection.*

⑧ *Performance of fan turbine and fluid pump can be infinitely controlled independently.*

⑨ *Coloured indicator lights provide clear information about heating phase, heating status and operating status.*

⑩ *The handy filter compartment of the FS200 with quick-release cover enables time-saving filter change.*

Technical data	Fog and flue gas simulator FS200
Article number	3.510.010.021
Fogging time (min.)	At maximum level: approx. 270 s
	At medium level and less: Continuous fog output
Evaporator power	1,500 W
Fan turbine power	1,600 W
Outlet pressure	335 mbar
Power input max.	3,100 W
Type of protection	IP54
Air flow rate	Approx. 68 l/s
Fluid consumption	At maximum output: 100 ml/min
	At continuous output: 30 ml/min
Heating-up time	Approx. 7 min
Amount of fluid in the canister	5 l
Input voltage	230 V / 50 Hz
Dimensions (L x W x H)	310 x 253 x 465 mm
Weight (without 5 l fluid canister)	14 kg
Optionally available accessories	Combustion chamber and coloured smoke cartridges for fire simulations, 5 litre fog fluid canister (Article no. 3.510.010.025), Transport case (Article no. 6.100.000.004)

Tightness test and leak detection

By means of feeding fog into pipeline systems, tank facilities or sanitary domestic installations, leakages or faulty connections can be detected quickly and easily.

Using the flue gas method, insulated flat-roofed or terrace constructions can be effectively and inexpensively checked for leakages, since the especially dense white fog is visible from afar when emerging from the leak even on larger areas.

The flue gas detection is also ideally suited for intermediate measurements during the building phase of complex flat-roofed constructions.

Areas, which are later only poorly or completely inaccessible, can as a precaution be checked for leakages to avoid structural damages caused by leaks beforehand.

Control of smoke extraction and disaster control exercises

The flue gas simulator is ideally suited for disaster control exercises of the fire brigade – optionally, combustion chamber and coloured smoke cartridges are also available for the training exercise.

Furthermore, using the FS200, the functioning of smoke outlets or smoke extraction systems for escape routes even in larger or subterranean buildings can be tested and visualized realistically.

Fire simulation for a fire brigade training operation.

Evidence of defective sealing of the wall connection above an underground garage.

Defective sealing of a roof-top terrace.

Trotec flue gas chamber

With this inexpensive flue gas option, the special fumes are generated by a flue gas cartridge inserted in the chamber's cartridge container and then blown into the insulation layer by means of the optionally available insulation dryer.

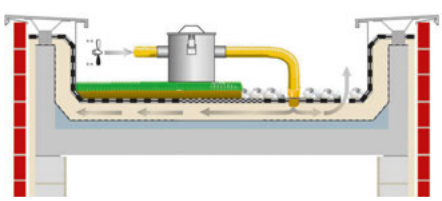
Benefits in practice:

- *Permanent chamber sealing through readjustable sealing cover*
- *Professional quality "Made in Germany"*

Flue gas chamber, stainless steel

Article no. 3.510.010.035

Dimensions L x W x H: 150 x 230 x 165 mm, Weight: 3 kg



Smoke cartridges (accessories)

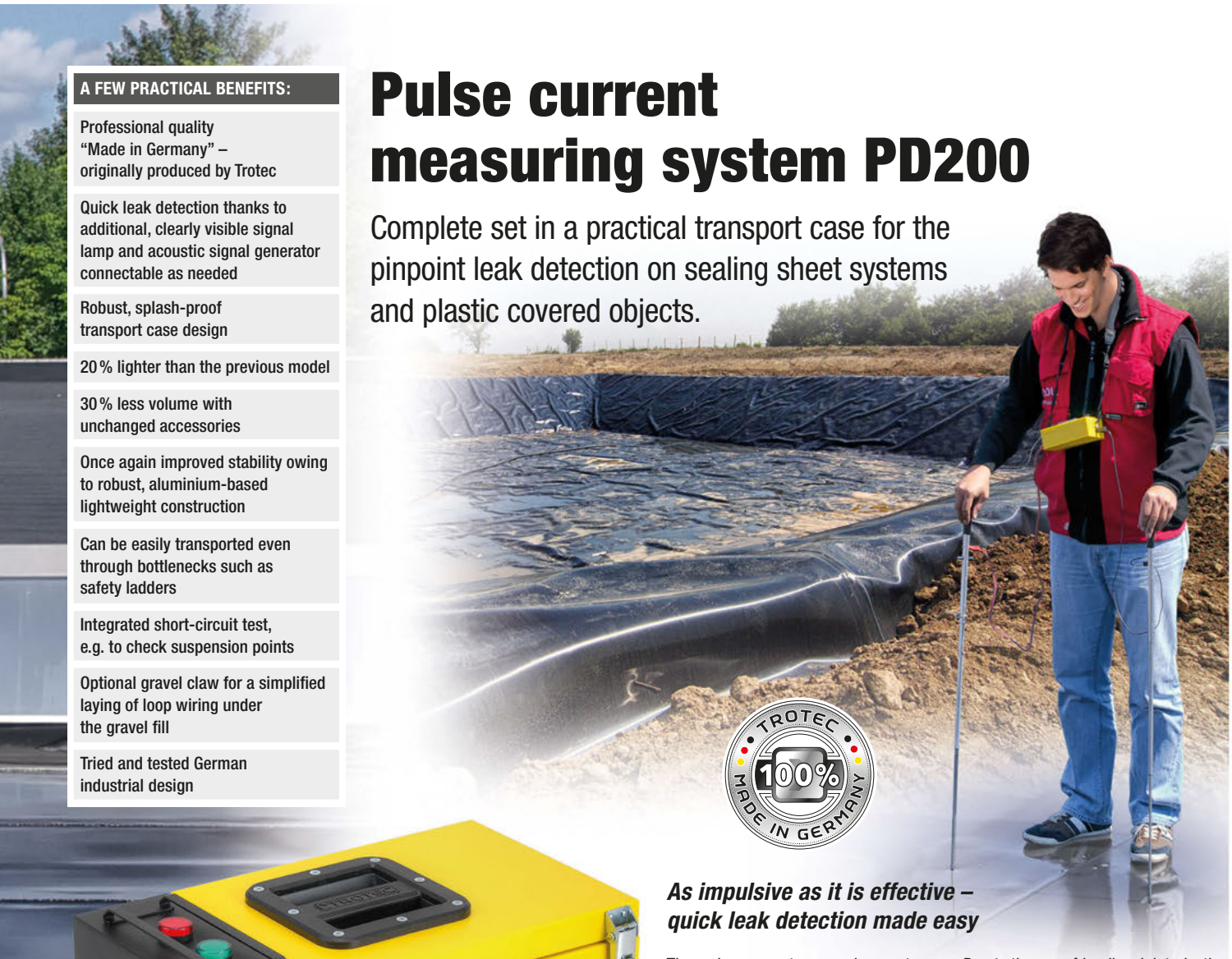
Class T1, smoking duration 80 s.

Smoke colour white
Article no. 3.510.010.030

Smoke colour red
Article no. 3.510.010.031

Pulse current measuring system PD200

Complete set in a practical transport case for the pinpoint leak detection on sealing sheet systems and plastic covered objects.



A FEW PRACTICAL BENEFITS:

- Professional quality "Made in Germany" – originally produced by Trotec
- Quick leak detection thanks to additional, clearly visible signal lamp and acoustic signal generator connectable as needed
- Robust, splash-proof transport case design
- 20 % lighter than the previous model
- 30 % less volume with unchanged accessories
- Once again improved stability owing to robust, aluminium-based lightweight construction
- Can be easily transported even through bottlenecks such as safety ladders
- Integrated short-circuit test, e.g. to check suspension points
- Optional gravel claw for a simplified laying of loop wiring under the gravel fill
- Tried and tested German industrial design

- *Ideal for pinpoint location of grounded leaks in non-conducting sealing systems*
- *Non-destructive inspection of foil and bitumen roofs*
- *Leak detection even in case of flat roofs with superimposed load (e.g. gravel fill, greening, paving etc.)*
- *Tightness test of hall floor sealing for LAU (storage, filling and handling of substances hazardous to water) and HBV (production, treatment and use of substances hazardous to water) systems (WHG – Water Resources Act)*

As impulsive as it is effective – quick leak detection made easy

The pulse current measuring system PD200 is the ideal solution for the pinpoint location of grounded leaks in non-conducting sealing systems – e.g. bitumen, elastomer, PE-HD or other plastic sheets.

The PD200's weight and dimensions could once again be clearly reduced as opposed to its previous model. Consequently, the PD200 is not only 20 % lighter, it also takes up 30 % less volume in the case, which still holds the full set of PD200 accessories!

In addition to the ergonomic recessed handle integrated in the cover with an inner Grip-Clip for the best hold while carrying the PD200 is also provided with a lateral bar handle for transport.

Due to the user-friendly miniaturization and the transport bar handle providing additional mounting options for instance for ropes, the device can easily be carried onto the roof area even through bottlenecks such as safety ladders.

Despite the reduction in weight, the stability of the PD200 could also be improved once again by manufacturing the housing as a robust, aluminium-based lightweight construction.

Connections and operating elements of the PD200 are accommodated and well protected inside the case construction, offering sufficient stowage space for further measuring equipment.

TRT-KAT-IMPD-WM-08-EN

Light, robust, versatile – the PD200 enables reliable leak detections of flat roofs, terraces, swimming pools, ponds or landfill liners …

With the compact pulse current measuring system PD200 one can carry out tightness tests and leak detections of various sealing sheet systems, e.g. in case of geotechnical applications such as landfill or tunnel construction and the construction of fire water and swimming ponds or retention reservoirs.

In the industrial construction sealing sheets of transfer sites, tank terminals or hall floor sealings for LAU and HBV systems with substances hazardous to water can be checked for tightness quickly and easily.

Easy handling

Whilst the needle on the pulse receiver's display points in the direction of the leak, an attenuator enables the adjustment of the signal strength – a low attenuation value at a great distance quickly leads to the leakage area and upon approach can be increased in several stages for a more precise positioning.

Furthermore, the pulse generator promotes the quick leak detection by means of a green signal lamp and if required an additionally connectable acoustic signal transmitter. Both can be widely perceived across the roof from almost every angle.

Ground faults during installation work are indicated by the PD200 by means of an acoustic warning signal and a red warning light, in case of a short circuit the output signal is switched off automatically.

A circumferential protective bar made of steel ensures that signal lamp and warning light are protected against damage.

PD200 standard package scope of delivery:

PD200 standard package;
Article no. 3.510.010.012

1 *Pulse generator in transport case design*

2 *Pulse receiver with shoulder strap, incl. batteries*

3 *Two measuring rods, in three parts, each consisting of handle part* 4 *with rubber grip, extension piece* 5 *and measuring tip* 6*;*
Article no. 3.510.010.007

All measuring rod elements are provided with screw connections for a quicker assembly.

One handle part is additionally equipped with an integrated clamping spring to be used for uncoiling.

7 *Connecting cable for loop*

8 *Reel with 200 m of loop wiring;*
Article no. 3.510.010.005

9 *Reel with 25 m of earth cable extension (red);*
Article no. 3.510.010.004

10 *One measuring rod connection cable each in red and black;*
Article no. 3.510.010.008

Optionally available:

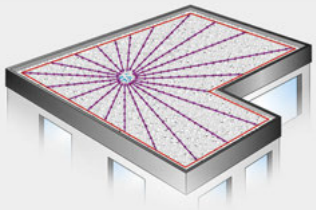
11 *Gravel claw for a simplified laying of loop wiring under the gravel fill;*
Article no. 3.510.010.003

Pulse current method

The PD200's functional principle is based on the pulse current method where voltage is applied to the foil to be tested: a ring main is installed with the negative pole on the sealing surface and a grounding cable with the positive pole on the bottom side of the respective sealing sheet.

Surface moisture serves as conductor for the electric current applied via the pulse generator, the flow direction of which is captured by use of the measuring rods and indicates the direction to the leak position on the pulse receiver.

For the application of the PD200 it is irrelevant whether the sealing is gravelled or greened, the only thing that needs to be ensured is a sufficient drenching of the sealing sheet.



Technical data	Pulse generator PD200 G	Pulse receiver PD200 E
Article number	3.510.010.010	3.510.010.011
Dimensions	L 470 x W 240 x H 250 mm	L 160 x W 80 x H 55 mm
Weight	8.6 kg (incl. accessories)	550 g (incl. batteries)
Input voltage	220 - 240 V, 50 - 60 Hz	9 V, 6 x LR6 AA batteries

Pipe detector SR-24

Easy-to-handle precise pipe detector with GPS and Bluetooth for the quick localization of underground or concealed supply lines.

A FEW PRACTICAL BENEFITS:

- Compact, light and easily operable professional system for quick and reliable pipe detection
- Integrated GPS for the evaluation of coordinates for mapping and GIS applications
- Bluetooth interface for wireless data transmission to mobile devices or high-precision GIS instruments as well as for the remote configuration of transmitter ST-33Q+
- Advanced 3D antenna technology
- All values at one glance – distance, position, signal strength
- Detects multiple lines
- High degree of flexibility due to several search modes
- Effective energy management enables long measuring operations
- User-defined frequencies – adjustable between 10 Hz and 35 kHz
- Including smartphone app for recording several tracks and waypoints as well as for exports for GIS applications

Convenient: The pipe detector SR-24 comes with a foldable antenna mast, so when not used for measuring applications it can be collapsed for space-saving storage in the supplied carry case.

Innovative technology for effective measuring operations

Even difficult pipe detections can be performed successfully using the SR-24. With multi-directional antennas, guiding arrows and an easily legible map display this pipe detector leads you precisely to the pipe in question in next to no time.

Be it water or gas pipes, power or telecommunications lines, thanks to the special 3D antenna technology inductive and passive pipe detections can be performed with the SR-24 from every position and direction – regardless of the user's location. This is an invaluable benefit especially in case of obstructions or on the road.

Even in case of a great number of subterranean supply lines in a confined space, the target line and its branch lines can be accurately distinguished from neighbouring lines by means of multiple active and advanced passive search modes with manifold predefined or individually adjustable search frequencies.

Including smartphone app for simple pipe mapping in real time

The pipes detected with the SR-24 can easily be mapped on your smartphone or tablet using RIDGIDtrax. The app is available free of charge for Android and iOS devices.

Once connected to the SR-24 via Bluetooth, your mobile device indicates the GPS position and depth of the respective line. It is possible to highlight the type of line (water, gas, power) or to display several pipes on the same map.

The completed map can be saved and viewed in the app or exported as KMZ file to be used with other GIS programmes.

Even without a connected Bluetooth device the detection data of the SR-24 is saved permanently as readable GPS log file on the removable SD card.

TRT-KAT-SR24-WM-01-EN

SeekTech Transmitter for active pipe and cable detection

Combine the SR-24 pipe and cable detector with our SeekTech Transmitters to get active pipe and cable detection.

The signals can be transferred via direct terminal connection, inductively via a transmission coil, or optionally with an inductive signal clamp on underground metal pipes or cables, as required. If required, the cables can be extended by two 15 metre long cables.

Both transmitters are equipped with an induction dependent acoustic signal transmitter, an energy savings mode with auto off function and an LCD display with automatic backlit status indicator display.

The ST-33Q+ impresses not only with its unsurpassed induction performance and high degree of flexibility due to freely selectable frequencies of up to 93 kHz with a direct connection, it can also be configured directly from the SR-24 via Bluetooth from afar.

All information quickly at one glance

Position, direction and depth of the line is displayed by the SR-24 in real time.

The intelligent technology of the SR-24 dynamically adapts all displayed information depending on the search mode and level of proximity to the line, for instance as zoom indication when approaching the target or to indicate the position of the transmitter in probe mode.

Without having to avert one's gaze from the display or to put the device down, settings can be adjusted during a measurement via single-handed operation on the clearly structured control panel.

ST-510 SeekTech Transmitter

Further features:

- 10 watts variable performance
- 27 frequencies (128 Hz, 1 kHz, 8 kHz, 33 kHz, 93 kHz and many more)
- LCD monitor provides immediate visual information on cable resistance, current and performance
- Ground stake included in scope of supply
- 4 m feed cable
- 8 D batteries
- can be connected to 230 V

Article no. 3.110.004.050

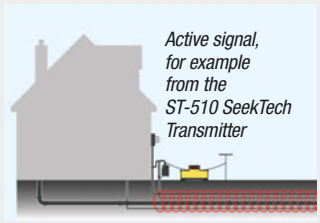
ST-33Q+ SeekTech Transmitter

Further features:

- 10 watts maximum
- extremely strong induction coil
- Bluetooth integrated – range of up to 183 m
- All frequency settings can be made directly on the SR-24 via Bluetooth
- programmable individual frequencies (max. 93 kHz) when connected directly
- 8 and 33 kHz induction frequencies
- LCD monitor shows relayed performance, frequency and battery status
- 6 D-cell batteries, Li-ion battery (18 V) or 230 V power adapter optionally also available

Article no. 3.110.004.055

Active and passive search modes



The SR-24 is a diagnostic device that detects the electromagnetic fields emitted by underground objects. To this end, the detector can be used in three different operating modes:

Passive pipe and cable localisation

In passive mode, the device looks for electromagnetic noise in subterranean supply lines. Electrical appliances radiate these signals to a certain degree off to power lines to which they are connected or else subterranean supply lines act as antennas for high-performance and low-frequency radio transmissions and reverberate these signals.

These current and radio frequencies can be passively received at an appropriate field strength an so enable the location of the corresponding supply line.

Active pipe and cable localisation

In this mode, energy is supplied for the supply line intended for routing and localization via a transmitter and the line is then actively located by use of the chosen frequency.

Probe mode

Used for the localisation of the signal from a probe in pipes, cables or tunnels that do not conduct current or cannot be localised by other means.

For example, the SeeSnake camera system for pipeline inspection can be used and the Flexmitter transmitter integrated in the camera head can be precisely located with the SR-24.

This combination is a particularly effective and precise method of locating leaks!

You can find detailed information on the SeeSnake inspection system with integrated Flexmitter transmitter from page 74 onwards…

Technical data		SeekTech SR-24 pipe and cable detector
Article number		3.110.004.002
Localisation frequencies	Active mode	128 Hz, 1 kHz, 8 kHz, 33 kHz
	Passive mode	Current: 50/60 Hz, Radio: 4 - 15 kHz and 15 - 36 kHz
	Probe mode	16 Hz, 512 Hz, 640 Hz, 16 kHz, 33 kHz
	all modes	individually selectable user-defined frequencies up to 35 kHz
Power supply		Four alkaline batteries or NiCad rechargeable batteries (type C)
Operating time		approx. 12 to 24 hours, depending on usage
Bluetooth range		max. 183 m
Weight without batteries / with batteries		1,500 g / 1,800 g
Dimensions L x W x H		284 x 1,300 x 790 mm
Standard equipment		Pipe detector SR-24, marker discs, batteries, USB cable (Mini-B), microSD card, operating manual, instructional DVD
Optional equipment		Additional special markings, ST-33Q+ transmitter, ST-510 transmitter, ST-305 transmitter, induction clip, offset transmitter, floating transmitter

Magnetometer MD200

Quick, reliable locating of underground hydrants, covered valve caps and rods or manhole covers

A FEW PRACTICAL BENEFITS:

- Quick detection of covered ferromagnetic metals to three metres deep
- Reliable measurement results – aluminium beverage cans, bottle tops or other non-magnetic metal objects are not detected
- Highly sensitive – either manually or automatically adjustable
- More than 24 hours continuous operation
- Easy-to-read backlit display with rotation function
- Ergonomic, robust ABS housing
- Extremely lightweight construction – only 830 g including batteries
- Water proof probe rod made of carbon fibre
- Dirt and water-resistant membrane buttons
- Dual field strength display – optical and acoustic
- Maximal value display of the magnetic signal
- Alarm signal for proximity to live cables
- Battery level display

The MD200 is perfectly suited for locating covered ferromagnetic metals – for example valve caps and rods, hydrants, metallic manhole and tank covers, as well as marker nails or magnets which have been covered by soil, road surface, snow or water.

With this easily held magnetometer of the MultiMeasure Professional series, after just a short familiarisation period, you will already be able to locate covered objects quickly and without tiring, without the need for complex measuring and excavation.

TRT-KAT-KSMD-WM-07-EN

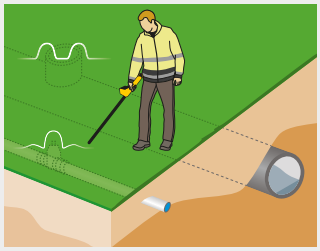
MD200 – The perfect detector for efficiently locating covered ferromagnetic objects in water and gas supply networks

Benefit from the robust workmanship, the ergonomic design, the high level of measuring precision and the many sophisticated functional details of this magnetometer from the MultiMeasure Professional series.

Within seconds after switching on the MD200 is ready to use. Thanks to the highly robust ABS construction, a dirt and water resistant membrane key pad as well as the water proof probe rod made of lightweight and extremely robust carbon fibre the measuring device is suitable for use under harshest conditions without any problems.

Blazing heat, freezing cold, probe application when it is raining or snowing – the MD200 has been specially designed for such operational environments and provides highly precise location results in every situation.

The MD200 can safely locate ferromagnetic objects to a depth of three metres and indicate the proximity on the easily read, backlit display as a number and a bar graph. In addition, a beep which gets louder as the signal strength increases is emitted from the built in speaker.



Locating objects through magnetic field measurements with the MD200

The MD200 is perfectly suited for measuring changes in magnetic fields due to its two excitation coils and four receiver coils. The measuring device reacts with high sensitivity to the smallest changes of the terrestrial magnetic field, as it is influenced by ferromagnetic objects under the ground.

As you approach such an object with the MD200, the device indicates the increased signal both visually and acoustically.

For larger objects – for example manhole covers – the maximum values are generated at the object edges. By swinging the magnetometer and comparing the signal, the exact location can thus be determined.

Technical data		Magnetometer MD200
Article number		3.110.010.010
Location depth max.		3 m (depending on the size of the object searched for)
Display		LCD with rotation function
Signal display	visual	numeric (0-99) and bar graph
	acoustic	increasing frequency of beeps reciprocal to the signal intensity
Power supply	Battery type	4 x LR6 AA batteries
	Operating time	> 24 h
Equipment		membrane keys, integrated speaker, battery status indicator
Functions		automatic or manually adjustable sensitivity, selectable display backlight, variable volume control
Ambient conditions	Temperature	-20 °C to +50 °C
Material	Handle display housing	ABS, IP64
	Probe rod	Carbon fibre, IP67
Physical characteristics	Weight	830 g
	Length of probe rod / entire device	720 mm (visible) / 1,050 mm
Scope of supply	Standard	measuring device, batteries, operating manual, carry bag

LTC and LTS positioning systems

For locating pinpoints and routes in non-metallic pipes

A FEW PRACTICAL BENEFITS:

LTS SYSTEMS

- Suitable for locating pinpoints and routes
- Locating can be carried out by just one person working alone
- Stable and flexible fibreglass push cable with a small bending radius
- End point detection coil
- Slip ring for feeding the fibreglass cable even when the transmitter is connected

LTC SYSTEMS

- Two in one: use for cable laying work and locating routes
- Targeted detection and tracking of empty conduit courses or obstructions
- Locating can be carried out by just one person working alone
- Stable and flexible fibreglass push cable with a small bending radius
- Robust housing with fibreglass-reinforced cable outlet and integrated crank for rewinding the cable
- Slip ring for feeding the fibreglass cable even when the transmitter is connected
- The fibreglass cable can be repaired in the event of breakage – it is not necessary to replace the entire coil

For underground construction work, the position and route of pipes and conduits is not always known or explicitly documented.

This often leads to significant damage to cables and pipes during excavation, which brings about considerable repair costs.

By using LTS positioning systems, finding non-metallic pipes is made much simpler.

The range of applications of LTS positioning devices includes all areas of underground construction work, for example, fresh and waste water piping, cable laying, drainage and landfill work.

And for indoor installations, the compact LTC systems are particularly valuable for determining pipe routes or locating defects.

Very stable pushing with small bending radii

The push cable profile of the LTC and LTS systems consists of a special combination of fibreglass cores with integrated copper wires and a protective polypropylene sleeve, which combines the pushing stability of a stiff rod with the flexibility and small bending radius needed from experience.

Thus, the cable can also be hand-fed in complex, laid pipe systems quickly, easily and precisely.

RT-KAT-KASU-WM-08-EN

LTC system for cable laying work and locating routes

The LTC system not only allows you to track routes or locate pipe blockages in indoor installations, but you can also pull in cables.

Even in places where other pull tools have failed, the LTC system surmounts angular routes without problems, even in pipe systems with cables and over long distances.

The robust housing has a practical accessory space and a built-in replaceable slip ring for connecting common transmitter units.

Because there are no moving external parts attached to the LTS housing, no dust or dirt particles can gather here to impair the function or durability.

The crank integrated at the rear renders rewinding the 20- or 30-metre push cable mere child's play and the fibreglass-reinforced cable outlet prevents the cable from being accidentally reeled all the way into the housing.

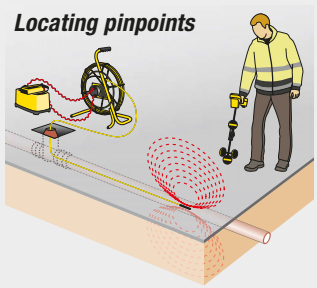
Accessories contained in the scope of delivery:

- One flexi-probe each with the following dimensions: ø 7 mm and ø 10 mm
- Five brass pulling heads with M5 thread (ø 6 mm) and eyelet
- One cable grip with swivel for ø 6-9 mm cables
- Three brass connection sleeves
- Two rod ends with external M5 thread
- One special fibreglass adhesive (3 g) for push cable repair

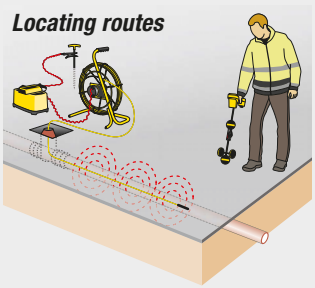
Additional accessories available on request.

LTC model: impact-proof compact solution suited for use on construction sites with a fibreglass push cable (ø 3 mm) lined with polypropylene, integrated copper wires and M5 threaded sleeve at the head of the probe, outer thread and screwed-on flexi-probe (ø 7 mm). 20 m and 30 m version with crank for rewinding the push cable integrated at the rear.

LTS systems for locating pinpoints and routes



A probe is attached to the push cable head of the LTS devices, which is easy to locate due to a particularly strong field. The transmitter is connected via two cables at the connection box of the LTS.



Copper conductors are built into the fibreglass cable of the locating systems, which, when connected to the transmitter, emit a locatable signal along the entire length of the cable. For this purpose, one transmitter cable is connected to the LTC or LTS and the second one is grounded.

The illustrations show an ST-510 transmitter and SR-24 receiver by way of example.
Both locating systems allow the use of common transmitters and receivers in the 33 kHz range.

With the universal LTS locating systems, it is possible to locate pinpoints – e.g. for localising defective points in pipe systems or obstructions, drops of pipe pieces etc. – and also routes for determining pipe plans.

All LTS models are fitted with a slip ring so that it is even possible to feed the probe cable when the transmitter is connected.

LTS model: Compact carrying frame suited for use on construction sites. Fibreglass cable lined with polypropylene with integrated copper wires, ø 4.5 mm. End point detection coil, connection box with sleeves and pins for connecting two transmitters, protective coated steel pipe frame and ø 400 mm reel.

Technical data	LTC system			LTS system		
Model	**LTC3020**	**LTC3030**	**LTC3050**	**LTS4530S**	**LTS4550S**	**LTS4580S**
Article number	3.110.005.002	3.110.005.011	3.110.005.021	3.110.005.075	3.110.005.085	3.110.005.105
ø Push cable / probe head	3 mm / 7-10 mm			4.5 mm / 12 mm		
Bending radius push cable	30 mm			100 mm		
Push cable length	20 m	30 m	50 m	30 m	50 m	80 m
Maximum detection depth	approx. 4 m (depending on the composition of the covering material)					
Dimensions	330 x 260 x 80 mm			210 x 440 x 490 mm		
Weight	1.15 kg	1.25 kg	1.5 kg	3 kg	3.25 kg	3.5 kg

Other lengths and diameters available on request.

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