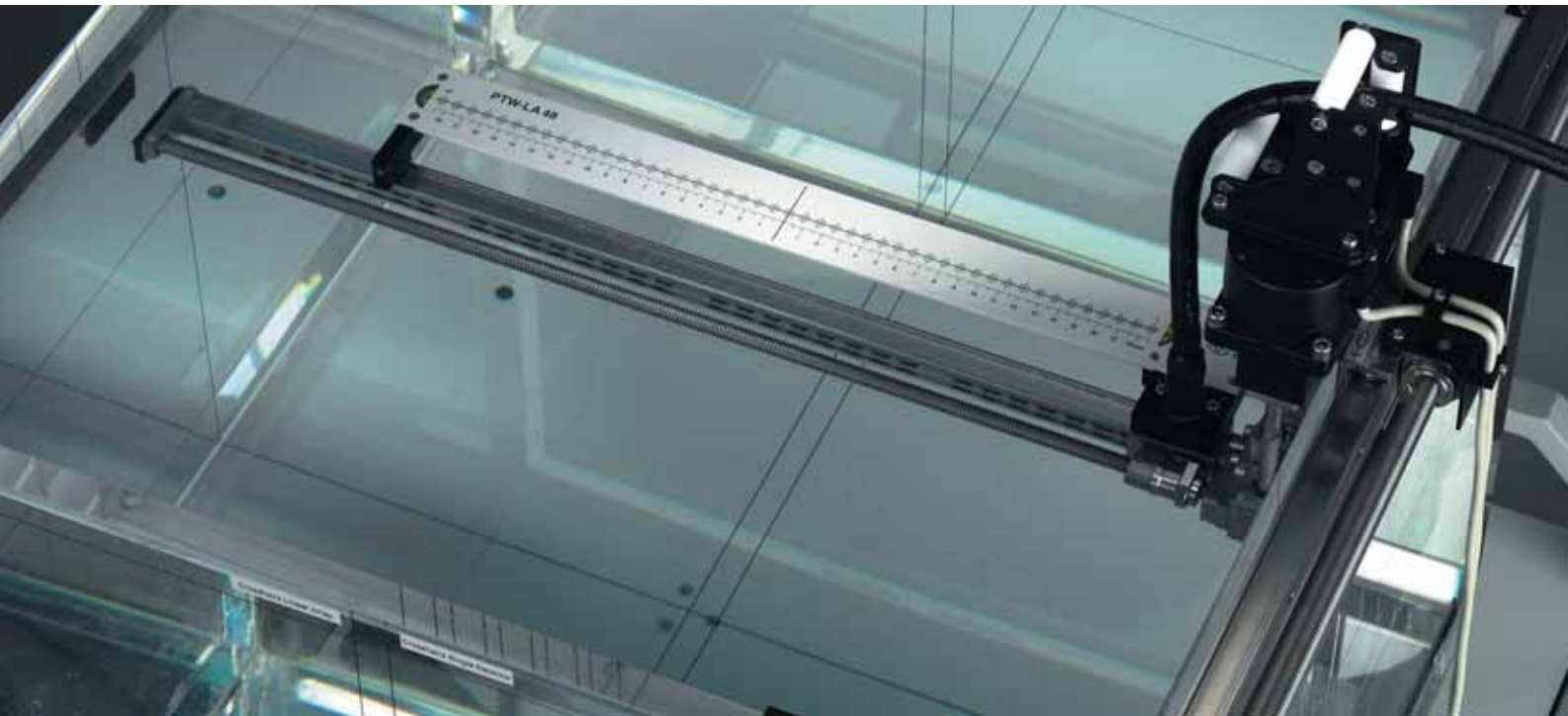


Precise, Fast, Reliable – the Standard for Therapy Beam Analyzers



TBA Systems

Computer assisted scanning devices
for beam data acquisition and analysis
in radiation therapy

Knowing what responsibility means:



From the very beginning PTW products have been optimized for practicability, quality and highest precision. You can only achieve optimum result with precision.

Klaus Bleich, Hardware Design Engineer

precise



The intuitive user interface of the MEPHYSTO mc² Control Center ensures quick and comprehensible results, vital to any business needing to deliver results on time and on target.

Dietmar Nitsche, Software Design Engineer

fast



PTW products are well known for their outstanding reliability. The fact that PTW systems are still being used, which were installed more than 30 years ago, testifies to this reliability and the high quality of our products.

Axel Hoffmann, International Sales Manager

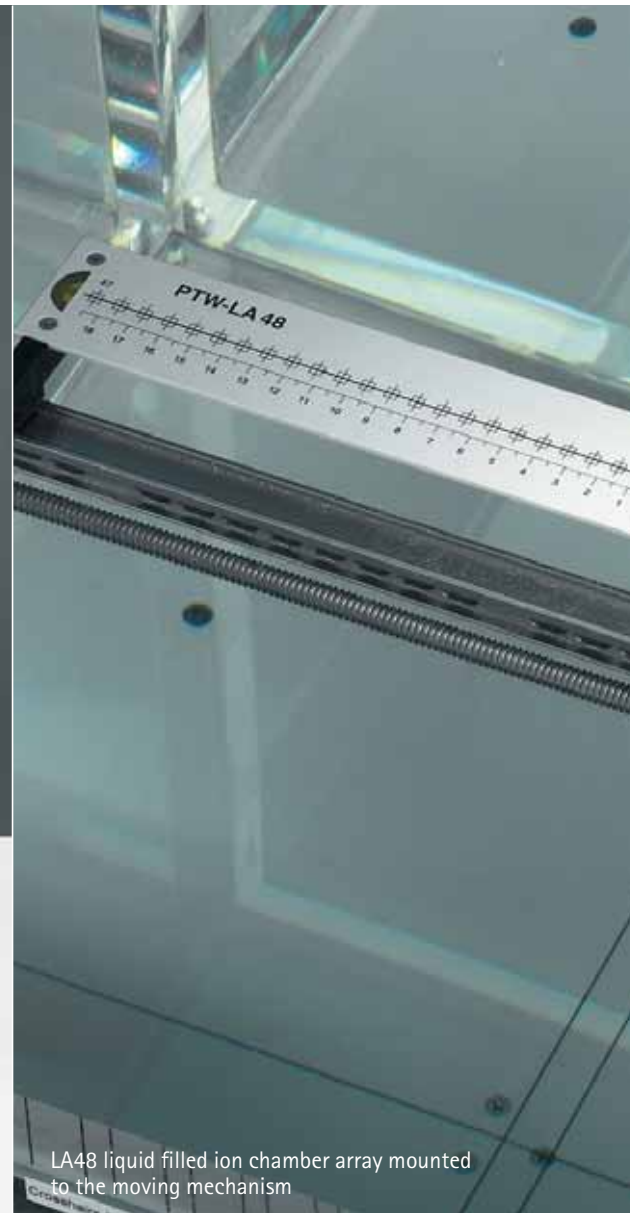
reliable

A convincing concept...

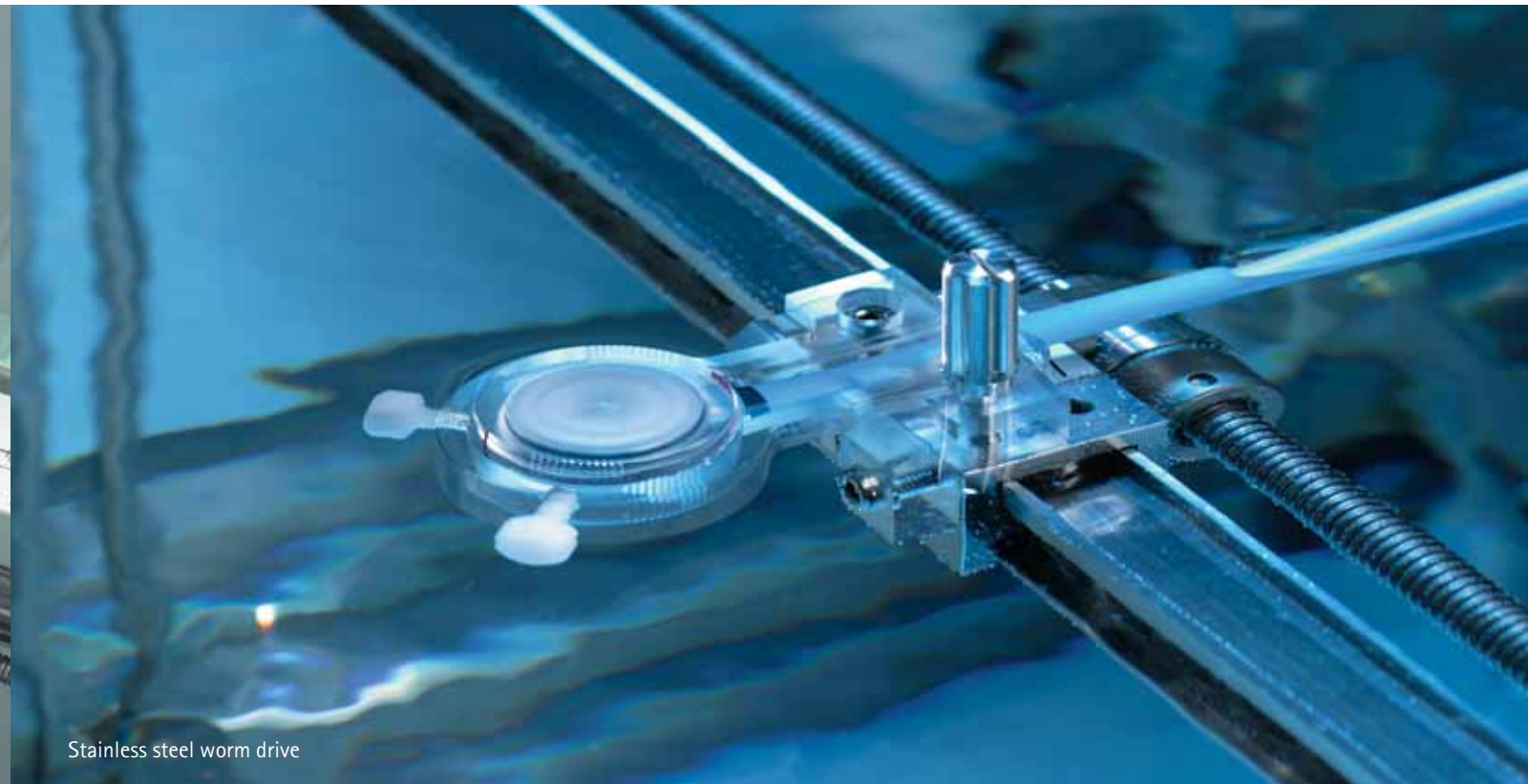
for highest precision



TBA Therapy Beam Analyzer MP3-M with SCANLIFT carriage and reservoir



LA48 liquid filled ion chamber array mounted to the moving mechanism



Stainless steel worm drive



Movement control pendant



Stepper motors



SCANLIFT control pendant



Tank adjustment

TBA Systems More than 1000 PTW Therapy Beam Analyzers TBA have already been delivered to users worldwide. They enjoy the precise, fast and reliable work with the automatic phantoms for data acquisition and analyses of therapeutic radiation beams. The measuring systems from PTW represent the latest technology because the large PTW R&D department is developing the systems in a steady process. The basic detector positioning concept of step-by-step movement and the dose integration mode ensures optimum dosimetry quality. The very short integration time and the fast detector movement make the TBA systems the fastest and most accurate remote controlled water phantoms on the market.

MP3-M with SCANLIFT

- ▶ The TBA product line is based on a general concept with respect to the design and the specification, which provides full compatibility between all system components. 20 mm PMMA tank walls and bottom, perfectly worked up, will not bulge after prolonged periods of use. Etched lines provide precise tank alignment.

LA48 Linear Array

- ▶ State-of-the-art detector array with 47 liquid filled ion chambers. A wide range of proven cylindrical and parallel plate ion chambers as well as solid-state detectors are available.

Stainless Steel Worm Drive

- ▶ No corrosion. Ensures high stability and precise detector positioning even after years of use. The moving mechanism is fixed only on one side to avoid mechanical over definition.

Movement Control Pendant

- ▶ Hand-held device to conveniently control the 3D movement for positioning directly at the tank. Includes three independent digital displays for the detector position on three axes.

Stepper Motors

- ▶ Stepper motors are mounted above the tank and are not immersed in water during measurement. Water level is retained exactly for all movement conditions. Highest positioning speed (50 mm/s) and positioning accuracy (0.1 mm). No recalibration of lengths necessary.

SCANLIFT Control Pendant

- ▶ Fast and easy to use lifting and water pump control. Automatic switch off when pump runs dry.

Tank Adjustment

- ▶ Simple and precise tank adjustment by rotatable positioning devices with three-point bearing and etched alignment lines at the water tank walls for precise leveling.

Outstanding Measurement Features

- ▶ TBA systems are optimized for measurement with standard and small-sized ion chambers as well as solid state detectors
- ▶ The signal to noise ratio and consequently the accuracy are high
- ▶ Electrometer time constant is 10 ms for fast scanning
- ▶ Provides precise and smooth measuring curves at highest speed regardless of beam modality, energy and dose rate.

Best possible speed...

for highest precision

MEPHYSTO mc² Control Center

The MEPHYSTO mc² Medical Physics Control Center is the most advanced, comprehensive and self-explaining user interface for TBA control and data evaluation. It is the basic medical physics tool for very convenient therapy beam data acquisition and analysis. Specific dosimetry tasks are implemented with an optimized workflow in modules. Starting beam data acquisition requires less parameter input due to a preselection of the scanning device in the Control Center. The function groups "Analysis", "Quality Control", "Absolute Dosimetry", "Formatting", "Calibration" and "Tools" contain modules to analyze and modify data or to control hardware. Any link can be stored in the function group "Favorites".

Medical Physics Control Center

- ▶ Includes software solutions for all dosimetry tasks
- ▶ Easy to use modules optimized for specific functions
- ▶ Customizable for available equipment
- ▶ Additional software applications, documents and measurement tasks can be included

General

- ▶ Graphical user guidance ensures simple navigation
- ▶ mc² ASCII file format with measuring information and curve data
- ▶ Automatic range setting of electrometer
- ▶ Export and import of data with copy and paste

Measurement

- ▶ LINAC parameters are available as user defined lists
- ▶ Preview of phantom orientation and field position with gantry and collimator angle
- ▶ Predefined measurement programs simplify use
- ▶ Measurement progress preview
- ▶ All parameters are visible during measurement

RTPS Measurement with TaskList

- ▶ Simple input of complex RTPS measurement tasks
- ▶ Multiple functions for varying energies, wedges, applicators, blocks, field sizes, SSDs and depths
- ▶ Multiple queues allow to create a structured TaskList
- ▶ Easy to use with drag and drop

Data Analysis and Process

- ▶ Parameter description of analysis protocols on the screen available
- ▶ All established protocols including LINAC vendor protocols are available
- ▶ Parameters and views of protocols can be modified
- ▶ Multiple tools to process and convert curve data

Options

- ▶ Scanning of dynamic wedges with LA48 linear array
- ▶ MLC verification
- ▶ Film dosimetry
- ▶ Absolute dosimetry

A complete line...

for highest precision



MP3 phantom tank



MP3-XS phantom tank



MP2 phantom tank



MP3-M phantom tank



SCANLIFT carriage with positioning device



MP3 lifting carriage



MP3 water reservoir



Variety of radiation therapy detectors



TBA control unit, TANDEM electrometer and control pendant

TBA Systems The TBA product family includes solutions for any therapy physics measurement task based on remote controlled beam scanning devices. The basic equipment contains one of five phantom tanks, affiliated tank adjustment and water reservoir equipment, a selection of suitable radiation detectors and the standard electronic equipment, consisting of the control unit, the control pendant and the TANDEM electrometer. Persons responsible for radiation therapy departments can select the appropriate configuration to fulfill the requirements for high quality medical physics and for the best possible patient treatment. The system reliability and the modular design of the TBA systems keep after sales expenses low.

Phantom Tanks

- ▶ MP3 – Large size motorized 3D water phantom with up to 600 mm detector moving range
- ▶ MP3-M – Medium sized motorized 3D water phantom, compact design
- ▶ MP3-XS – Small size motorized 3D water phantom for stereotactic or IORT dose distribution measurement
- ▶ MP2 – Economy motorized 2D water phantom
- ▶ MP1 – TG51 motorized 1D water phantom for depth dose measurement

Lifting and Water Reservoir Carriages

- ▶ SCANLIFT – Electro-mechanical lifting carriage for MP3-M and MP2 tank including water reservoir and pump. Features a control pendant for easy control of the lifting and pumping functions. It takes only five minutes to fill the MP3-M water tank.
- ▶ MP3 Lifting Carriage – Electro-mechanical lifting carriage for MP3 tank. The shear-joint lifting device guarantees long-term positioning stability even for the heavy MP3 tank.

- ▶ MP3 Water Reservoir – Mobile water reservoir carriage (220 l) for MP3. Includes self-suction stainless steel centrifugal pump and electromagnetic valves.

Electronic Devices

- ▶ TANDEM – Precision dual channel electrometer for TBA systems. Therapy dosimeter in accordance with IEC 60731, resolution 10 fA. Absolute dose measurement with TanSoft software. Time constant 10 ms allows fast measurement.
- ▶ Control unit – Fast and precise stepper motor control.
- ▶ Control pendant – Includes independent displays for all three axes, resolution 0.1 mm. It may be connected to the phantom tank or the control unit.

Therapy Detectors

- ▶ Cylindrical and parallel plate ionization chambers as well as diamond and diode solid-state detectors for measuring high-energy photon, electron and heavy ion radiation as well as light beams. The variety of detectors covers all applications from absolute dosimetry to stereotactic dose distribution measurement with highest quality.

Versatile applications...

for highest precision



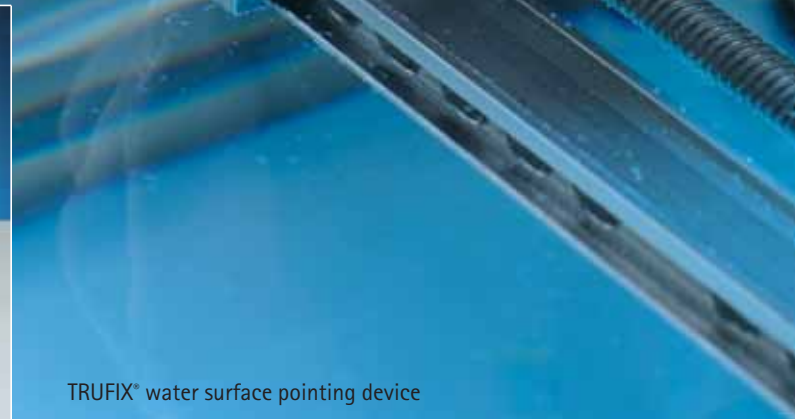
LA48 Linear array with MULTIDOS® multichannel dosimeter



SLA48 2D air scanner for gantry mount



Selection of TRUFIX® holders for detector positioning



TRUFIX® water surface pointing device



PLEXITOM® 2D detector positioning device



TPR sensor with 0.125 cm² chamber

TBA Options The optional devices improve and simplify procedures for dose distribution measurements in radiotherapy. They complete the basic equipment by additional features for perfect and comprehensive therapy dosimetry. The options are compatible to the entire TBA product line. By using the TRUFIX holders, the effective point of measurement of various detectors can be positioned to the water surface very easily and quickly. The LA48 liquid chamber array with MULTIDOS dosimeter is required for IMRT and dynamic wedge field measurement. The array can be combined with the gantry-mounted SLA48 device for 2D measurement in air. Further options are the TPR option for tissue phantom ratio measurement and the PLEXITOM for profile and depth dose measurement in an acrylic phantom.

TRUFIX®

- ▶ TRUFIX finds the water surface within ± 0.1 mm and positions detectors at the effective point of measurement.

LA48 Linear Array

- ▶ Linear Array with 47 fluid filled ionization chambers, used for quality assurance and dose verification of IMRT fields and of dynamic wedges. Designed for use in water, in solid phantoms or free in air.
- ▶ Excellent spatial resolution because of small chamber size ($4 \times 4 \times 0.5$ mm³) and only 8 mm center-to-center spacing.
- ▶ Water equivalence due to liquid ion chamber technology, resulting in a detector response independent of field size.
- ▶ No perturbation of radiation field since there are no air volumes at adjacent ion chambers.

SLA48

- ▶ Gantry-mounted motorized moving mechanism for dose distribution measurement without water phantom using the LA48 linear array.

PLEXITOM®

- ▶ Motor-driven acrylic phantom for profile and depth dose measurement in a solid-state phantom. The ion chamber can be positioned in 1 mm steps automatically by remote control.

TPR Option

- ▶ The TPR sensor mounted on the moving mechanism locates the water surface with a positioning accuracy of 0.1 mm. The whole automatic TPR measuring process is fully controlled by the MEFHYSTO mc² Control Center.

Air Scanners

- ▶ 1D air scanners, table-top and gantry mount versions for various LINAC types
- ▶ LA48 air scanners, table-top and gantry mount versions for various LINAC types

Film Densitometry

- ▶ Commercial 16 bit LASER and HD-CCD film scanners
- ▶ PTW Film scanning and evaluation software module

Knowing what responsibility means



The Directors Dr. Christian Pychlau and Dr. Edmund Schüle together with Günter Hein, Director of Sales and Marketing (from left), discussing new TBA features.



In 1922, twenty-seven years after Röntgen discovered X-rays, Professor Hammer from the Physics Institute of Freiburg University founded PTW to produce and market his development of an X-ray dosimeter based on an electrostatic relay, a revolutionary new electromechanical component for measuring very small electrical charges. In 1927, Dr. Herbert Pychlau took over the company and developed it during four decades into an internationally recognized manufacturer of quality dosimeters for medical radiology.

During the second half of the 20th Century, the business grew into an acknowledged international company, acquiring a good reputation as a pioneer with both scientists and users.

PTW Freiburg's production area, which in the very beginning was located in Professor Hammer's garden shed, covers a total area of 4000 m² today. PTW employs a staff of 200 all over the world. The company, which scores steadily growth, is the recognized market leader in therapy dosimetry today.

We at PTW constantly strive to be competent and reliable partners for our customers all over the world, which includes maintaining demanding quality standards as well as comprehensive service and support standards. We will continue our efforts to develop the most reliable and highest quality dosimetry products in the future as we have in the past, products in which users and patients put their trust.

We are committed to upholding this trust, because we know what responsibility means.

Technical Data

Tanks

3D Tanks	Wall thickness 20 mm Moving ranges		
	horizontal	horizontal	vertical
MP3	600 mm	500 mm	408 mm
MP3-M	500 mm	500 mm	408 mm
MP3-XS	200 mm	200 mm	300 mm

2D Tank	Wall thickness 10 mm Moving ranges		
	horizontal	horizontal (manual movement)	vertical
MP2	500 mm	400 mm	408 mm

1D Tank	Wall thickness 10 mm Moving ranges	
	horizontal (manual movement)	vertical (automatic movement)
MP1	240 mm	254 mm

Outer tank dimensions

	length	width	height
MP3	734 mm	636 mm	523 mm
MP3-M	636 mm	634 mm	523 mm
MP3-XS	334 mm	336 mm	423 mm
MP2	522 mm	636 mm	534 mm
MP1	320 mm	320 mm	370 mm

Weight

MP3	54 kg
MP3-M	50 kg
MP3-XS	23 kg
MP2	30 kg
MP1	11 kg

Moving Mechanism

Moving Mechanism

Material	Stainless steel
Motor	Stepper motor
Driving mechanism	Worm drive
Backlash	No
Minimum step size	0.1 mm
Maximum speed	50 mm/s

Positioning devices for water tanks

Travel	± 10 mm in any vertical and horizontal direction
Pivoting around vertical axis	± 1°
Swiveling to positions	0°, ± 45° and ± 90°

Reservoir/Lifting Carriages

Reservoir/Lifting Carriages

SCANLIFT for MP3-M and MP2			
Power supply	Integrated multirange power supply (100 ... 240) VAC/ (50 ... 60) Hz ± 3 Hz		
Current consumption	3.5 A		
Height above floor	to platform	to water surface	
Maximum	1233 mm	1735 mm	
Minimum	733 mm	1235 mm	
Moving range	500 mm		
Time for full lift	45 s		
Minimum step size	< 1 mm		
Draw down under load	No, self locking		
Pump	Centrifugal pump with 35 l/min		
Pumping/Draining time MP3-M	filling	draining	
	5 min	7min	
Dimensions with rollers	Length 1137 mm Width 784 mm Height 900 mm		
Ground clearance	83 mm		
Weight	132 kg without water		

MP3 Lifting carriage

Power supply	230 V / (50 ... 60) Hz or 115 V / (50 ... 60) Hz		
Current consumption	230 V, 4 A; 115 V, 8 A		
Height above floor	to platform	to water surface	
Maximum	869 mm	1489 mm	
Minimum	454 mm	1074 mm	
Moving range	415 mm		
Time for full lift	45 s		
Minimum step size	< 1 mm		
Draw down under load	No, self locking		
Dimensions with rollers	Length 1120 mm Width 780 mm Height 454 mm		
Weight	150 kg		

MP3 Water reservoir

Pump	Centrifugal pump with 30 l/min, self suction		
Pumping/Draining time MP3	Filling/draining 7 min		
Dimensions with rollers	Length 870 mm Width 675 mm Height 915 mm		
Ground clearance	83 mm		
Weight	105 kg without water		

Electrometer

Electrometer TANDEM

Resolution	10 fA
Dynamic range	5 pA ... 100 nA in three ranges
Time constant	10 ms in all ranges
Reproducibility	≤ ± 0.5 % acc. to IEC 60731
Zero drift	≤ ± 10 fA acc. to IEC 60731
Non-linearity	≤ ± 0.5 % acc. to IEC 60731
Long term stability	≤ ± 0.5 % p. a. acc. to IEC 60731
Chamber voltage	± 400 V programmable in 50 V increments
Connecting system	BNT, TNC and M
Power supply	Separate 12 V DC ± 5 % or power supply from MP3 control unit
Power consumption	4.5 W
Dimensions	Length 257 mm Width 324 mm Height 81 mm
Weight	2.9 kg

Control Unit

Control Unit with Control Pendant

Control Unit	Controls movement of TBA moving mechanism and interacts with PTW dosimeters
Power consumption	115 W
Power supply	(100 ... 230) V ± 15 % / (50 ... 60) Hz
Dimensions	Length 326 mm Width 259 mm Height 115 mm
Weight	4.0 kg
Control Pendant	Control buttons for movement control of three stepper motors. Display of absolute detector position in three coordinates

Detectors

Scanning Detectors

0.125 cm ³ chamber, (thimble chamber)	
Volume	0.125 cm ³ , vented
Connector	BNT, TNC and M
Advanced Markus Chamber (plane parallel chamber)	
Volume	0.02 cm ³ , vented
Connector	BNT, TNC and M
Dosimetry Diode E 60012 (for photons and electrons)	
Volume	1 mm ³ circular, 2.5 μm thick
Connector	BNT, TNC and M
PinPoint 3D Chamber 31016	
Volume	0.016 cm ³ , vented
Connector	BNT, TNC and M
Diamond Detector	
Volume	(0.001... 0.006) cm ³
Connector	M
LA48 (liquid filled chamber array)	
Volume	4 mm x 4 mm x 0.5 mm
Number of detectors	47
Center spacing	8 mm
Field coverage	37 cm
Spatial resolution	1 mm (automatic shift)
Used in water phantoms	MP3, MP3-M, MP2
Used as airscanner	In SLA48 moving mechanism and stationary holders

Other detectors upon request

Ordering Information

PTW Dosimetry Equipment, Standard L981363

- ▶ MP3-M water phantom with rotatable positioning device, SCANLIFT, electronics, 2 pcs. 0.125 cm³ thimble chamber, Advanced Markus electron chamber, TRUFIX, MEPHYSTO software, PC and printer
- ▶ UNIDOS E high precision dosimeter with Farmer type ionization chamber and 20m extension cable
- ▶ Stationary dosimetry water phantom (fixed depth)
- ▶ IsoCheck isocenter check device

PTW Dosimetry Equipment, Advanced L981364

- ▶ MP3-M water phantom with rotatable positioning device, SCANLIFT, electronics, 2 pcs. 0.125 cm³ thimble chamber, Advanced Markus electron chamber, TRUFIX, MEPHYSTO software, PC and printer
- ▶ UNIDOS E high precision dosimeter with Farmer type ionization chamber and 20m extension cable, TanSoft software
- ▶ RW3 slab phantom
- ▶ IsoCheck isocenter check device
- ▶ LINACHECK monitor dose check device
- ▶ TPR option for tissue-phantom-ratio measurements

PTW Dosimetry Equipment, Expert L981365

- ▶ MP3-M water phantom with rotatable positioning device, SCANLIFT, electronics, 2 pcs. 0.125 cm³ thimble chamber, Advanced Markus electron chamber, TRUFIX, MEPHYSTO software, PC and printer
- ▶ UNIDOS reference class dosimeter with Farmer type ionization chamber and 20m extension cable, TanSoft
- ▶ RW3 slab phantom
- ▶ IsoCheck isocenter check device
- ▶ QC6plus QC device with MULTIDOS dosimeter
- ▶ TPR option for tissue-phantom-ratio measurements
- ▶ LA48 linear ion chamber array for dynamic field measurements

Other configurations upon request.
Please ask for a detailed offer according to your requirements.

Manuals are in English.



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Morocco
South Africa

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Argentina
Brazil
Canada
Chile

Colombia

Costa Rica
Ecuador
Mexico
Panama
Uruguay
USA
Venezuela

Asia

Bahrain
Bangladesh
China
Hong Kong
India
Indonesia
Iran
Israel
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Cyprus
Czech Republic

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Norway

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PTW reserves the right to modify the design and specifications contained herein without prior notice. Please contact PTW or your local representative for the most current information.

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