Your Way of qPCR

qTOWER^3 Product Family

Real-Time PCR

analytikjena

An Endress+Hauser Company

qTOWER³ Product Family

Redefining excellence:
The qTOWER³ product family sets new standards of flexibility and precision – for all real-time PCR applications.

The quantitative polymerase chain reaction (qPCR) is an established method for the highly sensitive detection and quantification of DNA or RNA. The measuring principle is based on fluorescent signals, which, cycle by cycle, capture the presence of the existing target sequence in real time. The key features of this detection method are outstanding high-performance optics as well as excellent temperature uniformity over 96 or up to 384 samples.

The qTOWER³ product family guarantees well-founded real-time PCR results as it benefits from peerless temperature control precision in the sample block regardless of the number of samples used. The patented high-performance optics guarantee the outstanding homogeneous excitation and illumination of all individual samples. The qTOWER³ product family achieves unique flexibility with its proven filter module equipment, which can be freely configured and expanded at any time, and enables up to six-fold multiplexing.

qTOWER³ 84

qTOWER³ Product Family

Your Way of qPCR

qTOWER³

qTOWER³ *touch*

qTOWER³

See, marvel, experience:
The performance of the new real-time PCR thermal cycler qTOWER³ impresses across the board.

The patented fiber-optic shuttle system with its unique light source, composed of four high-performance LEDs, guarantees the ideal excitation of known fluorescent dyes up to the deep red range. In the process, the detection module can accept up to six different color filter modules. The retrofitting option ensures that users can also integrate future innovative developments from Analytik Jena.

The proven silver block technology of the qPCR cycler offers outstanding control precision of ± 0.1 °C over the entire 96 well block in 0.2 mL format. Thanks to the gradient function, the device can be optimally adapted to new assays. The qTOWER³ is available either as a stand-alone device with integrated touchscreen operation (10“) or as a computer-aided system. The software contains a broad spectrum of optimized analysis algorithms, including absolute and relative quantification, ddCt method, PCR efficiency, allelic discrimination, end-point detection, and melting curve and protein analysis.

qTOWER³

Get in *touch* with High-Class qPCR

qPCRsoft Package

Maximum Flexibility

Ideal Real-Time PCR Signals

Optimal Thermal Conductivity

qPCRsoft Package for Convenient Control and Operation

- **Convenient:** Stand-alone operation via integrated tablet control (10") and/or comprehensive PC control
- **Transparent:** No costs for software licenses or updates
- **Universal:** Covers the entire spectrum from a simple representation of Ct values to the ddCt method and multiplate analysis
- **Multilingual:** Available in multiple languages, including German

Expandable Filter Module System for Maximum Flexibility

- **Practical:** The twelve color, FRET, and protein modules can be retrofitted or exchanged within five minutes
- **Future-proof:** Thanks to new filter modules, adaptable to new applications at any time
- **Durable:** 10-year long-term guarantee for high-performance optical components

Patented Fiber-optic System for Ideal Real-Time PCR

- **Efficient:** Minimal scan times of 6 seconds for up to six-fold multiplexing
- **Innovative:** New light source with four long-stability LEDs (RGWB) with no preheating time and a long service life
- **Brilliant:** Ideal illumination and excitation of all 96 samples with no edge effects

High-Quality Silver Sample Block for Optimal Thermal Conductivity

- **Fast:** Heating rates of 8 °C/s, cooling rates of 6 °C/s
- **Unrivaled:** Ideal temperature homogeneity and unmatched control precision (± 0.1 °C)
- **Precise:** Programming of integer temperatures from column to column of the 96 well sample block using the Linear Gradient Tool (max. range 40 °C).

Patented Fiber-Optic Shuttle System

For the ideal reproducibility and maximum data security of all real-time PCR results, the integrated high-performance optics guarantee the homogeneous excitation of each individual sample and the reliable recording of the emitted fluorescent signals.

In the application area of quantitative real-time PCR, a wide range of fluorescent dyes with different characteristics are used. In order to optimally excite each of these dyes across a large spectrum, the qTOWER³ has a light source with four different-colored, long-life LEDs (RGBW). This ensures that each dye used in a real-time PCR experiment achieves the best possible quantum yield.

Special, highly sophisticated multiplex applications with up to six fluorescent-labeled probes from blue to the near-infrared range can be handled without difficulty. Fiber-optic system (FOS): The optical unit from a shuttle system with eight high-performance fibers ensures an extremely fast read-out from the 96 well plate in just 6 seconds – regardless of the number of dyes to be measured.
All components of the high-performance fiber optics have a 10-year long-term guarantee.

- Patented high-performance optics with eight optical fibers and four different-colored LEDs
- Optimal homogeneous excitation and detection in each of the 96 wells
- Special plus: Read-out of a 96 well microplate in just 6 seconds – regardless of the number of dyes
- No edge effects – no need for a passive reference

Maximum Flexibility

The color filter equipment of the qTOWER³ family can be freely configured and, depending on the application, can also be adapted to intercalating or protein-binding dyes and hydrolysis and hybridization probes (FRET probes).

The retrofitting option makes the device system particularly future-proof: Additional color, FRET, or protein modules can be integrated at any time to further expand the range of applications.

All the various filter modules contain an optimized combination of excitation and emission filters which, in combination with the light source, enables the ideal detection of a large number of commercially available fluorescent dyes.

- Freely configurable selection of color filters
- Can accept up to six different color, FRET, or protein modules
- Use of intercalating dyes, hydrolysis or hybridization probes, and protein-binding dyes

Innovative Silver Block Technology

Aside from the optical components for the detection of real-time signals, amplification plays a key role in real-time PCR. More than 25 years of experience in the field of thermal cyclers offer the promise of first-class quality with the qTOWER³.

The sample block forms the basis for the reliable performance of quantitative real-time PCR in the qTOWER³ and the qTOWER³ *touch*. To ensure the best-possible results and an outstanding transfer of energy to the sample, the thermal block is made of gold-coated silver. As a result, the qTOWER³ is distinguished by excellent temperature control precision of ± 0.1 °C (over 96 wells) and first-class heating rates of up to 8 °C/s. This combination makes the entire system absolutely ideal for any real-time PCR application.

- Quantitative real-time PCR in the proven 0.2 mL format with 96 wells
- Innovative silver block with outstanding ramping rates of up to 8 °C
- Excellent temperature control of ± 0.1 °C across the entire sample block
- Gradient function over 12 columns with a 40 °C spread using linear programming (Linear Gradient Tool)

To ensure the highest specificity for different assays, the device is equipped with a gradient function with a spread of up to 40 °C. Instead of simply setting lower and upper limits, the Linear Gradient Tool (**LGT**) allows different integer temperature levels to be entered in relation to the calculated annealing temperature of the primers – further evidence of the simple, intuitive operation of the qTOWER³.

To avoid condensation and the resulting loss of samples, the device system is fitted with a motorized heated lid. This can be variably set to up to 110 °C and guarantees optimal contact pressure on the sample vessels throughout the real-time PCR run, regardless of the consumable used.

The open platform makes it possible to use low profile (0.1 ml) and standard profile (0.2 mL) plastic. Non-, semi- and full-skirted qPCR plates can likewise be used.

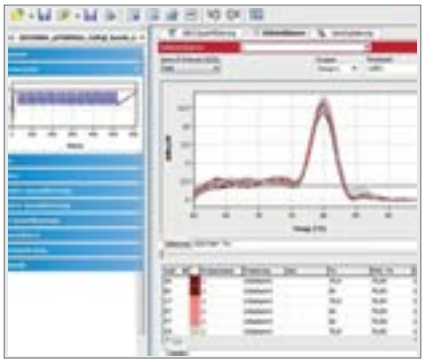
Intuitive Operation and Automatic Analysis

The qTOWER³ can be intuitively and easily controlled both through a desktop PC or laptop and by means of an integrated tablet. A comprehensive package of individual analysis methods and helpful additional functions complete the entire system.

The qPCRsoft control and analysis software proves itself to be flexible and user-friendly. The logical, clear arrangement of all the tools, the intuitive handling, and last but not least the parameter-oriented memory and programming concept make the software easier to use. During a live run, the data from previous experiments can be simultaneously analyzed without difficulty.

To ensure that operation is as simple as possible, many of the steps occur automatically – such as threshold calculation for determining Ct values or possible standard curves and PCR efficiencies. Further analyses can likewise be conducted automatically, such as absolute or relative quantifications, or the ddCt method (with or without reference to PCR efficiency). qPCRsoft also includes analysis methods for probe-based, allelic discrimination, e.g. for the identification of point mutations and the use of a positive/negative analysis via the end-point detection of samples.

- qPCRsoft: User-friendly and clearly structured
- Integrated analysis algorithms: Absolute and relative quantification, ddCt method, genotyping, end-point detection, and melting curve, protein, and multiplate analysis.
- User administration with three authorization levels
- MIQE-compliant documentation
- License-free, free updates



qPCRsoft

qPCRsoft *touch*.

Get in *touch* with qTOWER³

The strong performance of the qTOWER³ can optionally be supplemented by a highly innovative operation concept. The qTOWER³ *touch* is a modern stand-alone system that does not require any external control. The integrated 10" tablet leaves nothing to be desired when it comes to planning and conducting experiments.

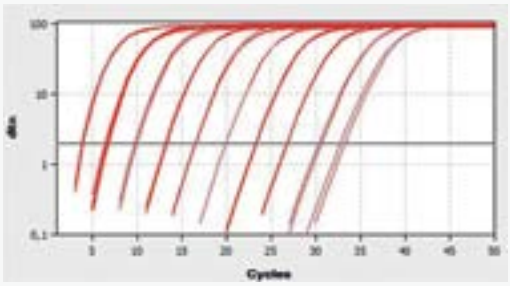
The touchscreen operation impresses with its simple, intuitive menu navigation which enables cycler programming, online monitoring, and the final determination of Ct values. The data files are compatible with the comprehensive PC software at all times and allow subsequent analyses to be conducted without difficulty.

Regardless of whether it is the qTOWER³ or the qTOWER³ *touch* – the real-time PCR thermal cyclers from Analytik Jena are ideal and reliable tools for everyday laboratory work.

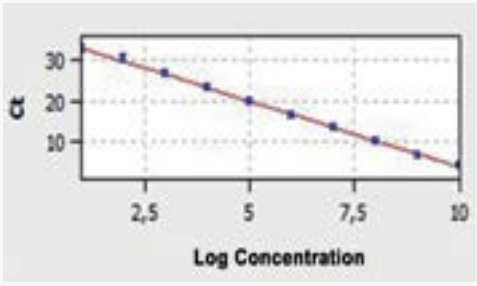
Impressive Performance – qTOWER³

The combination of unique optics and a high-quality silver block with incomparably precise temperature control ensures ideal amplification results. This makes the qTOWER³ an unbeatable partner for quantitative real-time PCR applications.

Fig. 1:
Amplification of 10 orders of magnitude with automatical determination of the standard curve including important parameters like R^2 and PCR efficiency.



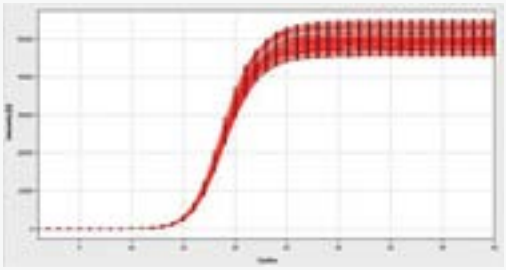
Logarithmic view



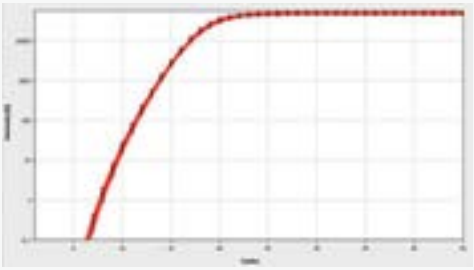
Standard curve

The example of human genomic DNA amplification shows an optimal linearity over 10 orders of magnitude from 10^9 to 10^0 copies. Accordant PCR efficiency of 100 % with $R^2 > 0.999$ was automatically determined by qPCRsoft.

Fig. 2:
Amplification of an E.*coli* specific target sequence in 96 wells. The main ct value of 12.99 with a standard deviation of 0.07 was determined automatically.



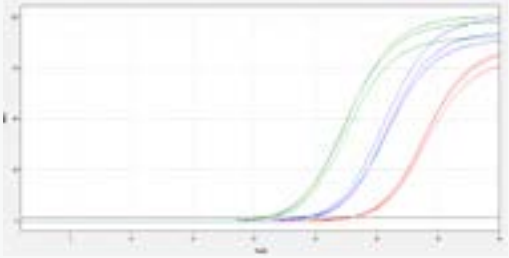
Linar view



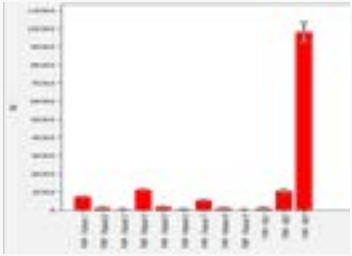
Logarithmic view

The single excitation and detection of each well avoids the often observed edge effects and allows excellent, homogeneous amplification plots over the entire 96 well block with a standard deviation below 0.07.

Fig. 3:
Examination of 9 patients with the FTD ACE diagnostic kit. The calculation of the viral load is performed automatically by generating a standard curve.



Linar view



Melting curve analysis

The flexible filter configuration of qTOWER³ ensures verifications of a broad spectra of application fields, e.g. the Fast-Track ACE Kit for detection of adenovirus, cytomegalovirus, Epstein-Barr virus and internal control.


qTOWER³
analytikjena

qTOWER³ 84

Enhance Your Throughput – A New Standard for Speed and Precision in High-throughput qPCR

With steadily growing sample volumes and new options for molecular biology experiments, the requirements for quantitative real-time PCR are changing. The transition to the multiwell format with 384 samples opens up new application areas in gene expression, mutation analysis, and diagnostics.

The qTOWER³ 84 includes all of the strengths of the qTOWER³ product family and transfers its precise performance to the 384 well high-throughput format. The proven high-performance optics have been expanded to 16 fibers and enable an ultra-fast read-out time of just 6 seconds for a complete 348 well plate – regardless of the number of filters used. Here, too, the system benefits from the complete flexibility of freely configurable filter equipment, allowing it to be adapted to any application. The innovative light source with four different-colored LEDs also enables read-outs of very small sample volumes, which play an increasingly important role in the high-throughput format along with existing factors like speed and experimental precision.

The high-quality aluminum block guarantees precise, accurate conductivity combined with unmatched temperature uniformity across the entire sample set. A peerless feature of the qTOWER³ 84 G is the gradient over a total of 24 columns, which can be programmed using the proven Linear Gradient Tool. The license-free, comprehensive qPCRsoft package completes the system, and a detailed analysis can be easily obtained even in the 384 well format thanks to analysis algorithms which are already integrated.

qTOWER³ 84

The next Level of qPCR

qPCRsoft Package for Convenient Control and Operation

- **Convenient:** Comprehensive PC control
- **Transparent:** No costs for software licenses or updates
- **Universal:** Covers the entire spectrum from a simple representation of Ct values to the ddCt method and multiplate analysis
- **Multilingual:** Available in multiple languages, including German

Expandable Filter Module System for Maximum Flexibility

- **Practical:** The twelve color, FRET, and protein modules can be retrofitted or exchanged within five minutes
- **Future-proof:** Thanks to new filter modules, adaptable to new applications at any time
- **Durable:** 10-year long-term guarantee for high-performance optical components

Patented Fiber-optic System for Ideal Real-Time PCR

- **Efficient:** Minimal scan times of 6 seconds for up to six-fold multiplexing
- **Innovative:** New light source with four long-stability LEDs (RGWB) with no preheating time and a long service life
- **Brilliant:** Ideal illumination and excitation of all 384 samples with no edge effects

High-Quality Aluminium Sample Block for Optimal Thermal Conductivity

- **State-of-the-Art:** Heating rates of 4 °C/s, cooling rates of 2 °C/s
- **Unrivaled:** Ideal temperature homogeneity and unmatched control precision (± 0.1 °C)
- **Precise:** Programming of integer temperatures for 24 columns of the 384-well sample block using the Linear Gradient Tool (max. range 24 °C).

High-Performance System for High Throughput

The qTOWER³ 84 achieves the next level of a powerful DNA detection system by increasing qPCR throughput while simultaneously miniaturizing individual reactions.

The centerpiece of the device is extremely precise and reliable temperature control, together with optical signal recognition for all 384 samples that are used for qualitative and quantitative DNA characterization.

The proven fiber-optic shuttle system in the qTOWER³ has been perfectly adapted to the 384 well format and expanded to 16 scanning fibers. In combination with an outstanding, long-life source of light from four different LEDs, an extremely fast read-out of the fluorescences in just six seconds is guaranteed for a complete 384 well plate with up to six-fold multiplexing.

- Patented high-performance optics with 16 optical fibers and four different-colored LEDs
- Optimal homogeneous excitation and detection in each of the 384 wells
- Special plus: Read-out of a 384 well microplate in just 6 seconds – regardless of the number of dyes
- No edge effects – no need for a passive reference

The 384 well aluminum block with its excellent temperature uniformity is the foundation of the qTOWER³ 84 and is indispensable for the extremely precise and reliable amplification of PCR products. These reaction parameters guarantee the high specificity and yield of the reaction and are directly related to the speed and precision of the result. The excellent control precision of the sample block ensures homogeneous heat distribution across all the wells of a plate, which ultimately means the highest possible reproducibility from well to well and from cycle to cycle.

- Quantitative real-time PCR in the high-throughput format with 384 wells
- Proven aluminum block with outstanding ramping rates of up to 4 °C
- Excellent temperature uniformity of ± 0.15 °C across the entire sample block
- Gradient function over 24 columns with a 24 °C spread using linear programming (Linear Gradient Tool)


qTOWER³ 84

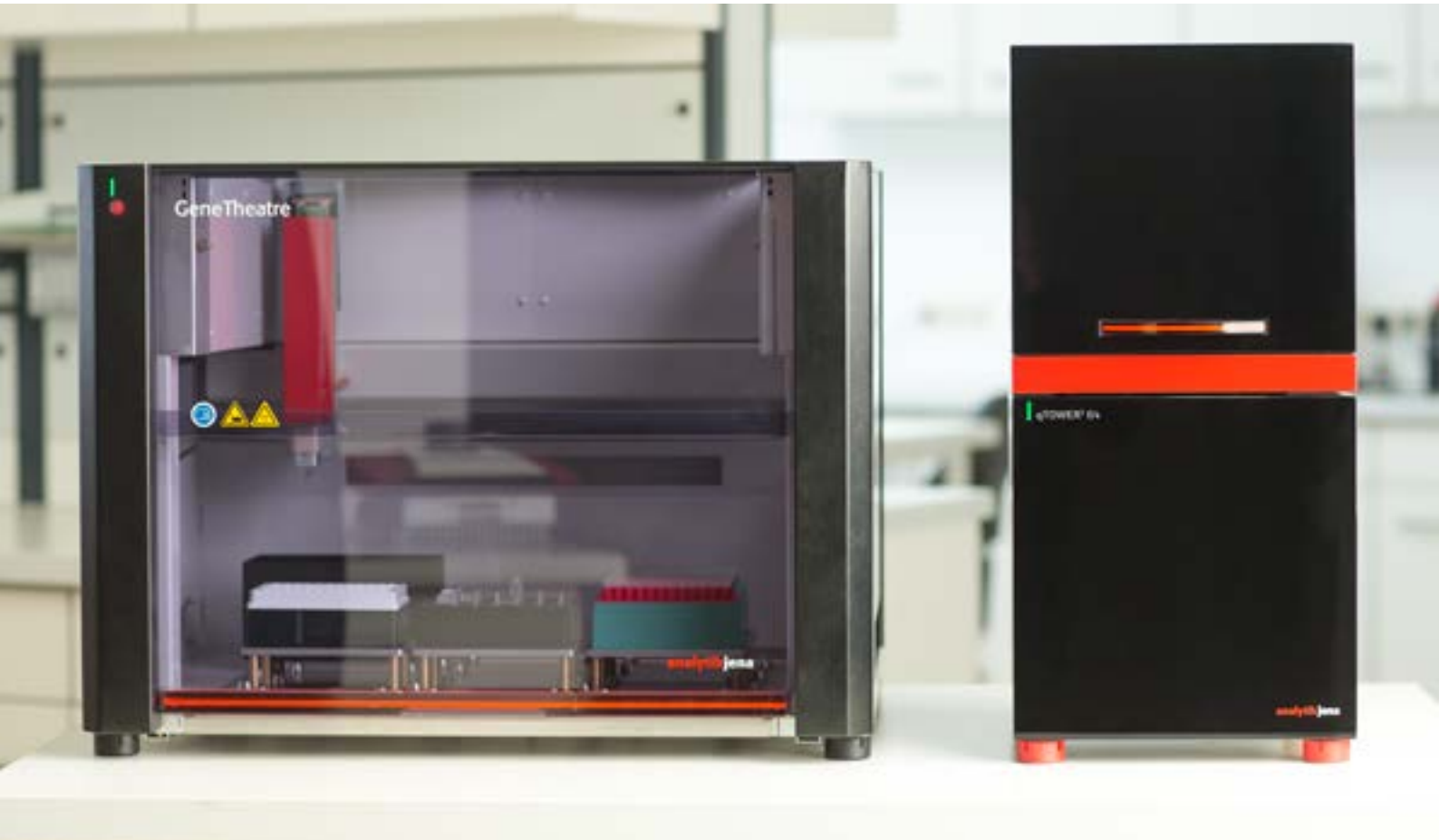
Complete System – Everything from a Single Source – Sample Processing at the Highest Level

Precise results for quantitative real-time PCR in high-throughput format with 384 samples require an accurate sample setup, which involves substantial time and effort.

Meet Your Throughput Needs

To standardize and improve the precision and reproducibility of real-time PCR reactions, the use of a pipetting robot is recommended. With its large number of liquid-handling systems, Analytik Jena offers the perfect solution for daily pipetting routines.

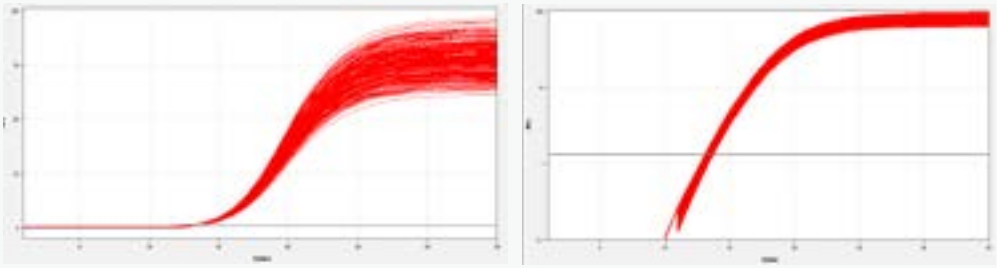
For example, GeneTheatre greatly simplifies all pending pipetting tasks in the laboratory and allows for full automation. The standardization of processes significantly reduces errors with reactions involving 10 or 5 microliter batch volumes – regardless of the experience and skill of the user. In combination with its qTOWER³ 84, as well as its diverse reagent portfolio as a further option, Analytik Jena offers a customized complete system here that can be tailored to individual application, throughput, and capacity requirements.



Impressive Performance - qTOWER³ 84

The reliable device technology ensures a convincing demonstration of real-time PCR results in 384 well format. In addition to the lightning read-out speed the qTOWER³ 84 represents the right choice for high-troughput real-time PCR application.

Fig. 1:
Amplification of an *E. coli* specific target gene sequence in 384 wells. The main Ct value of 13.37 with a standard deviation of 0.18 was determined automatically

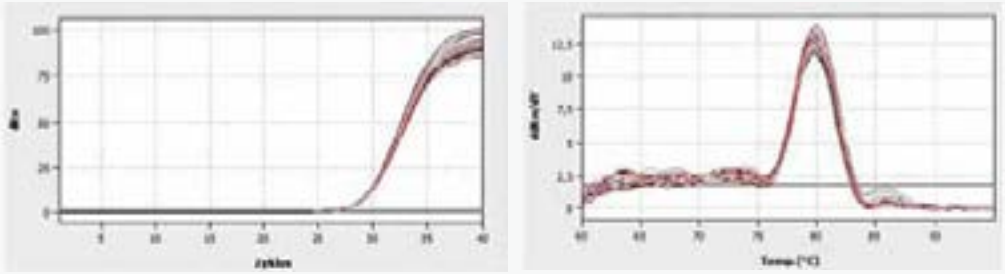


Linear view

Logarithmic view

The single excitation and detection of each well avoids the often observed edge effects and allows excellent, homogeneous amplification plots over the entire 384 well block.

Fig. 2:
Amplification of 5 µL 10 µL, 15 µL and 20 µL qPCR reactions volume. By using qPCRsoft a main Ct value of 26.22 + 0,07 and a main melting point of 79.88 + 0,08 °C was determined.



Linear view

Melting curve analysis

Also regarding to the used PCR reaction volume the qTOWER³ shows an enourmous capacity. In a range of 5 µL to 20 µL a standard deviation of only 0.07 for Ct values and 0.08 °C for melting temperature can be achieved.

Technical Data

	qTOWER³/qTOWER³ *touch*	qTOWER³ 84
Thermal block	Silver sample block with gold coating	Aluminum, special alloy
Block capacity	96 wells in 0.2 mL format	384 wells
Sample volume	5 - 100 µL	2 - 30 µL (5 - 20 µL recommended)
Heating	8 °C/s	4 °C/s
Cooling	6 °C/s	2 °C/s
Temperature setting range	4 - 99 °C	
Temperature control precision	± 0.1 °C	
Temperature uniformity	55 °C ± 0.15 °C after 15 sec	
Max. / min. gradient	qTOWER³ G and qTOWER³ G *touch*: 40 °C/0.1 °C	qTOWER³ 84 G: 24 °C/0.1 °C
Heated lid		
Lid temperature	30 °C to 110 °C	
Contact pressure	30 kg, automated	
qPCR application		
Sensitivity	1 copy of the target sequence	
Dynamic range	10 log levels	
Optics		
Measuring principle	Fiber-optic shuttle system with 8-fold scanner and filter modules	Fiber-optic shuttle system with 16-fold scanner and filter modules
Light source	4 long-life, high-performance LEDs (RGBW)	
Detector	Highly sensitive PMT (photo multiplier tube)	
Color modules	12 color, FRET, and protein modules 6 positions in the device	
Read-out time	6 seconds for 96 wells regardless of the number of filters	6 seconds for 384 wells regardless of the number of filters
Operation		
Software	Choice between PC or stand-alone version qTOWER³ *touch*: 10" tablet, color	PC software
Dimensions		
Weight	30 kg	
Size (width x height x depth)	275 mm x 585 mm x 275 mm	
Additional technical data		
Interfaces	PC connection: USB Tablet: USB for data transfer, barcode reader	PC connection: USB
Noise emission	Max. 45 db	
Warranty	2 years warranty on device system 10 years long-term warranty on high performance optics	

Order Information

Parameters color module

Description/Order number	Example fluorescent dyes*
Color module 1, Order number: 844-00520-0	FAM™, SYBR®Green, Alexa488®
Color module 2, Order number: 844-00521-0	JOE™, HEX™, VIC®, YakimaYellow®
Color module 3, Order number: 844-00522-0	TAMRA™, DFO™, Alexa546®, NED™
Color module 4, Order number: 844-00523-0	ROX™, TexasRed®, Cy3.5®
Color module 5, Order number: 844-00524-0	Cy5®, Alexa633®, Quasar670™
Color module 6, Order number: 844-00525-0	Cy5.5®, LightCycler Red®
FRET module 1, Order number: 844-00526-0	FAM™ (donor) / TAMRA™ (acceptor)
FRET module 2, Order number: 844-00527-0	FAM™ (donor) / Cy5® (acceptor)
FRET module 3, Order number: 844-00528-0	FAM™ (donor) / Cy5.5® (acceptor)
FRET module 4, Order number: 844-00529-0	JOE™ (donor) / Cy5® (acceptor)
FRET module 5, Order number: 844-00531-0	FAM™ (donor) / ROX™ (acceptor)
Color modul Protein 1, Order number: 844-00530-0	SYPRO® Orange

* The Color or FRET modules can be ordered separately. The qTOWER³/84 can be equipped with up to 6 modules.

Corresponding Products

Order number	Description	Order number	Description
qPCR reagents			
845-AS-1310100	innuMIX qPCR SyGreen Sensitive - 100 reactions	845-AS-1900100	innuDRY qPCR MasterMix Probe - 100 reactions
845-AS-1310200	innuMIX qPCR SyGreen Sensitive - 200 reactions	845-AS-1900200	innuDRY qPCR MasterMix Probe - 200 reactions
845-AS-1310500	innuMIX qPCR SyGreen Sensitive - 500 reactions	845-AS-1901000	innuDRY qPCR MasterMix Probe - 1000 reactions
845-AS-1320100	innuMIX qPCR DSGreen Standard - 100 reactions	845-AS-1200100	innuMIX qPCR MasterMix Probe - 100 reactions
845-AS-1320200	innuMIX qPCR DSGreen Standard - 200 reactions	845-AS-1200200	innuMIX qPCR MasterMix Probe - 200 reactions
845-AS-1320500	innuMIX qPCR DSGreen Standard - 500 reactions		
Plastics and Accessories			
844-70036-0	96 Well PCR Plate (0.2 mL; HP), non-skirted, white - 100 pieces		
844-70037-0	96 Well PCR Plate (0.2 mL; HP), half-skirted, white - 100 pieces		
844-70038-0	96 Well PCR Plate (0.2 mL; LP), full-skirted, white- 100 pieces		
844-70045-0	Optical sealing foil (77 x 140 mm), transparent, peeling - 100 pieces		
844-70086-0	Optical sealing foil (77 x 140 mm), adhesive, transparent, peeling able - 100 pieces		
844-70087-0	8 Well Strip (0.2 mL; HP), white without lid - 120 pieces		
847-0501001102	RoboStrip 8 well strip low profile (0.1 mL) polypropylene white incl. sealing foil - 125 Strips		

qTOWER³ Product Family

To Fit Your Laboratory Needs

qTOWER³ Product Family	qTOWER³	qTOWER³ G	qTOWER³ *touch*	qTOWER³ G *touch*	qTOWER³ 84	qTOWER³ 84 G
						
Order number	**844-00553-x** Base unit incl. Color module 1	**844-00554-x** Base unit incl. Color module 1	**844-00555-x** Base unit incl. Color module 1	**844-00556-x** Base unit incl. Color module 1	**844-00558-x** Base unit incl. Color module 1	**844-00559-x** Base unit incl. Color module 1
Sample block	Silver sample block with gold coating	Silver sample block with gold coating	Silver sample block with gold coating	Silver sample block with gold coating	Aluminum sample block special alloy	Aluminum sample block special alloy
Block capacity	96 wells in 0.2 ml format	96 wells in 0.2 ml format	96 wells in 0.2 ml format	96 wells in 0.2 ml format	384 wells	384 wells
Reaction volume	5 - 100 µl	5 - 100 µl	5 - 100 µl	5 - 100 µl	2 - 30 µl (5 - 20 µl recommended)	2 - 30 µl (5 - 20 µl recommended)
Heating	Max. 8 °C/s	Max. 8 °C/s	Max. 8 °C/s	Max. 8 °C/s	Max. 4 °C/s	Max. 4 °C/s
Cooling	Max. 6 °C/s	Max. 6 °C/s	Max. 6 °C/s	Max. 6 °C/s	Max. 2 °C/s	Max. 2 °C/s
Temperature uniformity	55 °C ± 0.15 °C after 15 s	55 °C ± 0.15 °C after 15 s	55 °C ± 0.15 °C after 15 s	55 °C ± 0.15 °C after 15 s	55°C ± 0.15 °C after 15 s	55 °C ± 0.15 °C after 15 s
Gradient	-	0.1 °C - 40 °C over 12 columns Linear Gradient Tool	-	0.1 °C - 40 °C over 12 columns Linear Gradient Tool	-	0.1 °C - 24 °C over 24 columns Linear Gradient Tool
Control	qPCRsoft package for PC	qPCRsoft package for PC	Stand-alone version with 10" touchscreen display incl. qPCRsoft package for PC	Stand-alone version with 10" touchscreen display incl. qPCRsoft package for PC	qPCRsoft package for PC	qPCRsoft package for PC
Filter configuration	Flexible filter configuration: 6 positions in the device	Flexible filter configuration: 6 positions in the device	Flexible filter configuration: 6 positions in the device	Flexible filter configuration: 6 positions in the device	Flexible filter configuration: 6 positions in the device	Flexible filter configuration: 6 positions in the device

x = 2 for 230 V, 4 for 115 V and 5 for 100 V

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