

# Get in *touch* with High-Class qPCR qTOWER<sup>3</sup>

Real-Time PCR



## qTOWER<sup>3</sup>

**Vision, Amazement, Simplicity:**  
the new qTOWER<sup>3</sup> real-time PCR  
thermal cycler from Analytik Jena.

The patented fiber optic shuttle system with unique light source powered by 4 high-performance LEDs guarantees ideal excitation and detection of known fluorescent dyes up to the dark red. In addition, the system's highly sensitive detection module can be equipped with up to 6 different filter modules. Filter modules are upgradeable, allowing the system to benefit from future Analytik Jena developments. And, enjoy peace of mind knowing that the qTOWER<sup>3</sup>'s optical components are backed by an industry-leading 10-year warranty.

Silver block technology is at the heart of the qTOWER<sup>3</sup>, offering outstanding control accuracy of only  $\pm 0.1$  °C over the entire 96 well block. Optionally, the linear gradient function is the optimal tool to easily adjust the instrument to new assays. The qTOWER<sup>3</sup> is available either as stand-alone device with integrated 10" tablet or as PC-based system. The software comes with a broad spectrum of optimized analysis algorithms including absolute and relative quantification, ddCt method, PCR efficiency, allelic discrimination, endpoint detection as well as melt point and protein analysis.

## qTOWER<sup>3</sup>

Get in *touch* with High-Class qPCR



### qPCRsoft package



### Maximum flexibility



### Ideal real-time PCR signals



### Maximum thermal conductivity



#### qPCRsoft package for convenient operation and control

- **Hands-on:** Stand-alone operation via integrated tablet control (10") and/or enhanced PC control
- **Transparent:** No costs for license or updates (license-free)
- **Universal:** Covering a broad range of analysis tools from a simple overview of Ct values to ddCT method and multi plate analysis
- **Multilingual:** Available in multiple different languages

#### Extendable Filter Module System for maximum flexibility

- **Convenient:** 12 available Color, FRET and Protein Modules can be installed or exchanged within a few minutes
- **Future-proof:** Adaptable to new applications at any time by adding filter modules
- **Robust:** Patented high performance optical system with an outstanding long-term warranty of 10 years!

#### Patented Fiber Optic System for ideal real-time PCR signals

- **Efficient:** Short scan times of 6 seconds for the entire plate, irrespective of the number of dyes detected
- **Innovative:** Novel light source with 4 robust LEDs (RGBW) – no preheating time, long life-time
- **Brilliant:** Ideal illumination and detection of all 96 wells individually without edge effect due to fiber optic shuttle

#### High quality silver block for maximum thermal conductivity

- **Fast:** Heating rates of 8 °C/sec and cooling rates of 6 °C/sec
- **Unrivaled:** Ideal temperature homogeneity and unmatched control accuracy ( $\pm 0.1$  °C)
- **Precise:** The temperature difference from lane to lane is the same; simple programming of even gradient temperatures is possible with our unique **Linear Gradient Tool (LGT)**



## Patented Fiber Optic Shuttle System

For ideal reproducibility and maximum data integrity of all real-time PCR results, a homogeneous excitation and reliable detection of emitted fluorescence signals is guaranteed by the integrated high-performance optics.



In the field of quantitative real-time PCR a wide variety of fluorescent dyes with different characteristics are applicable. In order to optimally excite each of these dyes over a wide spectral range, a novel light source with four long-life LEDs in red, green, blue and white (**RGBW**) is used in qTOWER<sup>3</sup>. The RGBW-LED ensures best possible quantum yield of each dye in real-time PCR experiments. Highly sophisticated multiplex applications with up to 6 fluorescent-labeled probes from the blue to the near-infrared range are no challenge anymore.



- Patented high-performance optics with 8 fibers and 4 different LEDs
- Optimal homogeneous excitation and detection in each of the 96 wells
- Read-out of 96 wells in only 6 seconds - independent of the number of dyes
- No edge effects – no passive reference dye required

**Fiber Optic System (FOS):** The integrated shuttle system with 8 optical fibers ensures an extremely fast read-out of the entire 96 well plate in only 6 seconds - irrespective of the number of dyes to be measured.

In addition, all components of the high-performance optics come with a 10-year long-term guarantee.



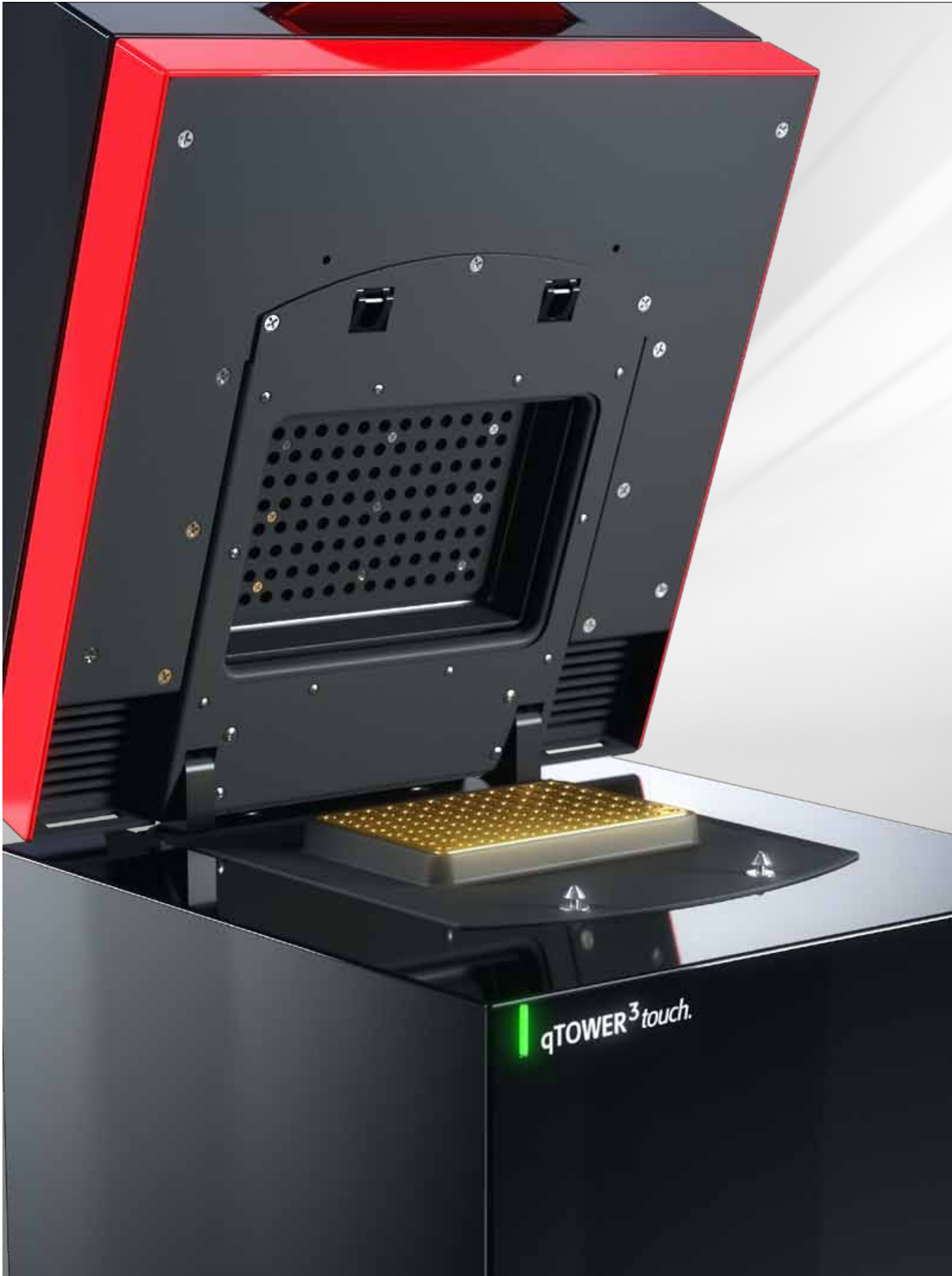
### Maximum flexibility

Depending on the application qTOWER<sup>3</sup>'s Filter Module System can be freely configured and upgraded, to both intercalating and protein-binding dyes, as well as to hydrolysis (e.g. Taqman<sup>®</sup>) and hybridization (FRET) probes.

The system is future-proof, being easily retrofitted on-site with additional Color, FRET or Protein Modules, and can thus be adapted to other fields of application at any time.

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

- Freely configurable Filter Module System
- Can be equipped with up to 6 different Color, FRET or Protein Modules
- Use of intercalating dyes, hydrolysis or hybridization probes and protein-binding dyes

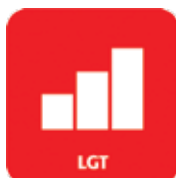


qTOWER<sup>3</sup> touch.

## Innovative Silver Block Technology

Besides the optical components for detection of real-time signals, amplification plays a central role in real-time PCR. More than 25 years experience in thermal cyclers promise top quality for qTOWER<sup>3</sup>.

Basis for a reliable performance of quantitative real-time PCR in qTOWER<sup>3</sup> is the sample block. To ensure best possible results and outstanding energy transfer into the sample, the thermal block is made of gold-coated silver serving much better physical properties than aluminum. As a result, the qTOWER<sup>3</sup> is characterized by excellent temperature control accuracy of  $\pm 0.1$  °C (over 96 wells) and first-class heating rates of up to 8 °C/sec. This combination makes the overall system the ultimate for any real-time PCR application.



- Quantitative real time PCR in the proven 0.2 ml format with 96 wells
- Novel silver block with outstanding ramping rates of up to 8 °C/s
- Excellent temperature control of  $\pm 0.1$  °C over the entire probe block
- Gradient function over 12 columns with 40 °C span with linear programming (Linear Gradient Tool)

To guarantee the highest specificities for different assays, the device is available with a gradient function of up to 40 °C span over 12 columns. Rather than defining upper and lower temperatures as limits, the **Linear Gradient Tool (LGT)** allows to define simply the temperature increments as integer around the calculated annealing temperature of primers in a linear fashion thus making operation of the qTOWER<sup>3</sup> simple and intuitive.

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

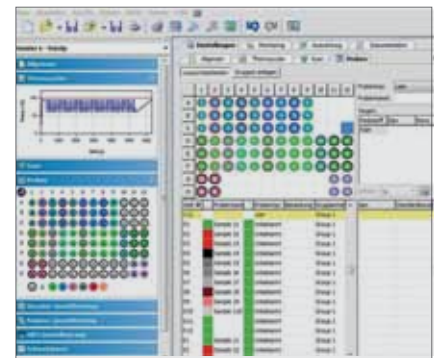
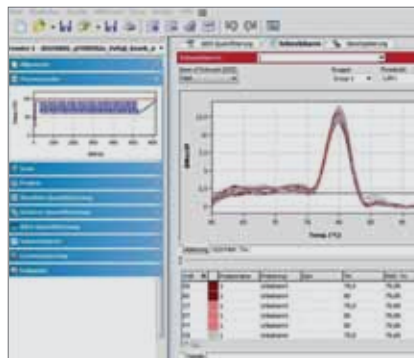
# Intuitive Operation and Automatic Evaluation

qTOWER<sup>3</sup> control is clearly arranged and intuitive by either desktop PC/ Laptop or by integrated tablet PC (optional). The system is completed with a comprehensive package of individual analysis tools and assistant features.

The control and evaluation software qPCRsoft follows the concept that it should be flexible and user friendly. The logical arrangement of all tools, the intuitive handling and, last but not least, the parameter-oriented memory and programming design make the use of the software simple and clear. During an current run, the data from previous experiments can be evaluated in parallel without complication.

In order to facilitate operation, a variety of steps, such as threshold calculation for determination of Ct-values or possible standard curves and PCR efficiencies are done automatically. Further evaluations such as absolute or relative quantifications as well as the ddCt-method (with or without relation to the PCR efficiency) can likewise be carried out automatically. qPCRsoft also includes algorithms for probe-based assays, allelic discrimination for e.g. determination of point mutations and the use of a positive/negative analysis by endpoint analysis of the amplification plots.

- qPCRsoft: User-friendly and clearly structured
- Integrated evaluation algorithms: Absolute and relative quantification, ddCt-method, genotyping, endpoint detection as well as melting curve and protein analysis and multi-gene/ multi-plate analyses
- User administration with 3 authorization levels
- MIQE-compliant documentation
- License-free, updates free of charge



qPCRsoft





qPCRsoft touch.

### Get in touch with qTOWER<sup>3</sup>



The outstanding performance of the qTOWER<sup>3</sup> can be optionally expanded with the aid of a through-and-through innovative operation concept. The qTOWER<sup>3</sup> touch is a modern stand-alone system which renders the need of an external control system unnecessary.

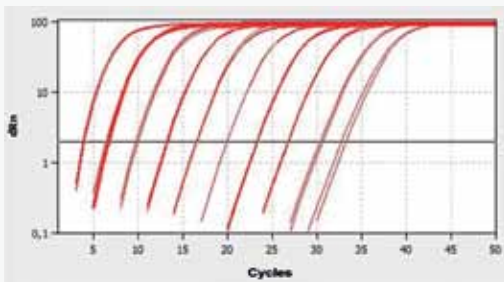
The integrated 10" tablet leaves nothing to be desired with regard to experiment planning and implementation.

The touch operation provides the user with a simple, intuitive menu navigation and both cycle programming as well as online monitoring and final Ct-value determination. The data files are compatible at all times with the comprehensive PC software and easily allow following evaluations.

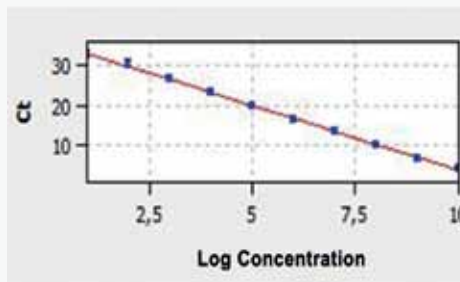
Regardless of whether it is qTOWER<sup>3</sup> or qTOWER<sup>3</sup> touch - the real-time PCR thermal cyclers from Analytik Jena are the ideal and reliable tool for everyday lab work.

## Convincing Performance

Ideal amplification results are guaranteed due to the combination of a unique optics and a high-quality silver sample block with matchless temperature control accuracy. Resultant qTOWER<sup>3</sup> is an unbeatable partner in each real-time qPCR application.



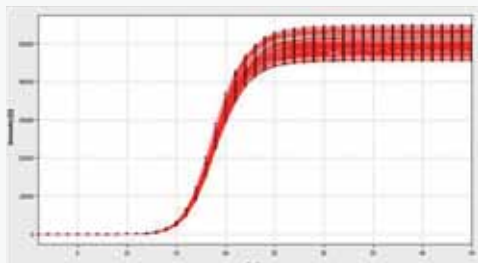
Logarithmic view



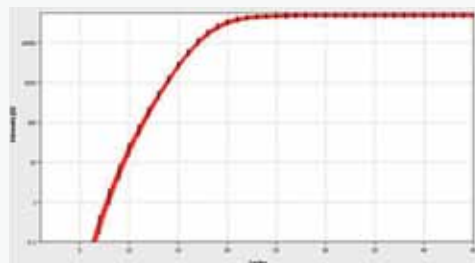
Standard curve

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

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.



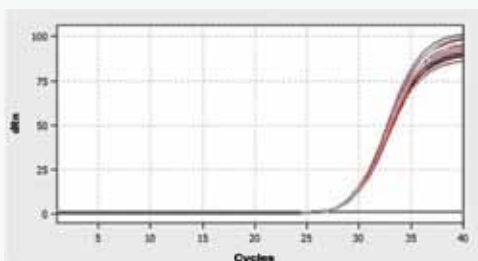
Linear view



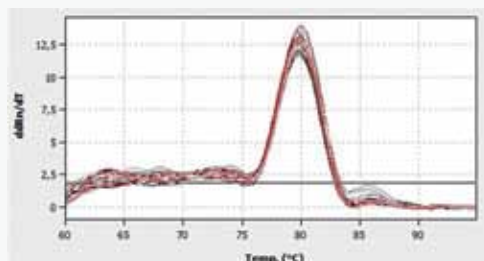
Logarithmic view

**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.

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.



Linear view



Melting curve analysis

**Fig. 3:** Amplification of 5  $\mu$ l, 10  $\mu$ l, 20  $\mu$ l, 30  $\mu$ l, 40  $\mu$ l, 50  $\mu$ l, 60  $\mu$ l, 70  $\mu$ l and 80  $\mu$ l PCR reaction volume. By using qPCRsoft a main Ct value of  $26.22 \pm 0.07$  and a main melting point of  $79.88^\circ\text{C} \pm 0.08^\circ\text{C}$  was determined.

Also regarding to the used PCR reaction volume the qTOWER<sup>3</sup> shows an enormous capacity. In a range from 5  $\mu$ l to 80  $\mu$ l a standard deviation of 0.07 for Ct values and 0.08 °C for melting points can be achieved.

# Technical Data

Thermal block			
Sample block	Silver sample block with gold-coating	Adjustable temperature range	4 °C to 99 °C
Block capacity	96 Well á 0.2 ml for 96 x 0.2 ml	Temperature uniformity	55 °C ± 0.15 °C after 15 sec
Sample size	10 – 80 µl	Temperature control accuracy	± 0.1 °C
Heating	Up to 8 °C/sec (max.)	Gradient	Linear Gradient Tool
Cooling	Up to 6 °C/sec (max.)	Max./Min. Gradient	40 °C / 0.1 °C
Heated lid		qPCR application	
Lid temperature	30 °C to 110 °C	Sensitivity	Detects 1 copy of target sequence in human genomic DNA
Contact pressure	30 kg, automated	Dynamic range	10 orders of magnitude
Optics			
Measuring principle	Fiber optic shuttle system with 8-fold scanner and filter modules for excitation and emission filters	Color modules	<ul style="list-style-type: none"> <li>▪ 12 Color-, FRET- and Protein Modules</li> <li>▪ 6 positions inside device</li> </ul>
Light source	4 longlife, high-power LED's (RGBW)	Read out time	6 sec for 96 wells independent of the number of dyes
Detector	High sensitive PMT (Photo Multiplier Tube)		
Control			
Control	PC or stand-alone (optional)	Time inc/dec	± 1 to 240 sec/cycle
Display	Only qTOWER <sup>3</sup> touch: 10" tablet, colored, touch, WIN 8.1	Temperature inc/dec	± 0.1 to 20 °C/cycle
Dimensions			
Weight	Approx. 30 kg		
Dimension (W x H x L)	275 mm x 585 mm x 275 mm		
Additional technical data			
Interface	<ul style="list-style-type: none"> <li>▪ PC connection: USB, RS232</li> <li>▪ Tablet: USB for data transfer, barcode reader</li> </ul>		
Noise emission	45 db		
Warranty	<ul style="list-style-type: none"> <li>▪ 2 years warranty on device system</li> <li>▪ 10 years long-term warranty of high performance optics</li> </ul>		

# Order Information

Order number	Description
844-00503-2	qTOWER <sup>3</sup> Instrument system, without PC, including qPCRsoft, thermal block and detection module* for quantitative real-time PCR
844-00504-2	qTOWER <sup>3</sup> G Instrument system, without PC, including qPCRsoft, thermal block and detection module* for quantitative real-time PCR, including gradient function
844-00505-2	qTOWER <sup>3</sup> touch Instrument system, without PC, including qPCRsoft, 10" tablet, thermal block and detection module* for quantitative real-time PCR
844-00506-2	qTOWER <sup>3</sup> G touch Instrument system, without PC, including qPCRsoft, 10" tablet, thermal block and detection module* for quantitative real-time PCR, including gradient function

## Parameters color module

Name	Excitation	Emission	Example fluorescent dyes*
<b>Color module 1</b> , Order number: 844-00520-0	470 nm	520 nm	FAM <sup>TM</sup> , Sybr <sup>®</sup> Green, Alexa488 <sup>®</sup>
<b>Color module 2</b> , Order number: 844-00521-0	515 nm	545 nm	JOE <sup>TM</sup> , HEX <sup>TM</sup> , VIC <sup>®</sup> , YakimaYellow <sup>®</sup>
<b>Color module 3</b> , Order number: 844-00522-0	535 nm	580 nm	TAMRA <sup>TM</sup> , DFO <sup>TM</sup> , Alexa546 <sup>®</sup> , NED <sup>TM</sup>
<b>Color module 4</b> , Order number: 844-00523-0	565 nm	605 nm	ROX <sup>TM</sup> , TexasRed <sup>®</sup> , Cy3.5 <sup>®</sup>
<b>Color module 5</b> , Order number: 844-00524-0	630 nm	670 nm	Cy5 <sup>®</sup> , Alexa633 <sup>®</sup> , Quasar670 <sup>TM</sup>
<b>Color module 6</b> , Order number: 844-00525-0	660 nm	705 nm	Cy5.5 <sup>®</sup> , LightCycler Red <sup>®</sup>
<b>FRET module 1</b> , Order number: 844-00526-0	470 nm	580 nm	FAM <sup>TM</sup> (Donor) / TAMRA <sup>TM</sup> (acceptor)
<b>FRET module 2</b> , Order number: 844-00527-0	470 nm	670 nm	FAM <sup>TM</sup> (Donor) / Cy5 <sup>®</sup> (acceptor)
<b>FRET module 3</b> , Order number: 844-00528-0	470 nm	705 nm	FAM <sup>TM</sup> (Donor) / Cy5.5 <sup>®</sup> (acceptor)
<b>FRET module 4</b> , Order number: 844-00529-0	515 nm	670 nm	JOE <sup>TM</sup> (Donor) / Cy5 <sup>®</sup> (acceptor)
<b>FRET module 5</b> , Order number: 844-00531-0	470 nm	605 nm	FAM <sup>TM</sup> (Donor) / ROX <sup>TM</sup> (acceptor)
<b>Color modul Protein 1</b> , Order number: 844-00530-0	490 nm	580 nm	SYPRO <sup>®</sup> Orange

\* The Color or FRET modules can be ordered separately. The qTOWER<sup>3</sup> can be equipped with up to 6 modules.

\* Yakima Yellow is registered trademark of Epoch Bioscience, Inc. Cy5 is trademark of GE Healthcare. FAM, HEX, VIC, TAMRA, NED and ROX are trademarks of Applied Biosystems or its subsidiaries in the US and/or certain other countries. SYBR, Alexa Fluor, SYPRO and Texas Red are registered trademarks of Molecular Probes, Inc. TaqMan and LightCycler are registered trademarks of Roche Group, Inc. Quasar Dye are trademarks of Biosearch Technologies Inc. DFO is a trademark of Eurogentec SA. Windows and Excel are trademarks of Microsoft Corporation.

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