

qTOWER³

Get in *touch* with high-class qPCR

- Patented fiber optic system for ideal real-time PCR signals
- Extendable filter module system for maximum flexibility
- qPCRsoft package for convenient operation and control



qTOWER³

Get in touch with high-class qPCR

Vision, Amazement, Simplicity: the new qTOWER³ real-time PCR thermal cycler from Analytik Jena.

The patented fiber optic shuttle system with unique light source powered by 4 high-performance LED's 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 color modules. Color modules are upgradeable, allowing the system to benefit from future Analytik Jena developments. And, enjoy peace of mind knowing that the qTOWER³'s optical components are backed by an industry-leading

10-year warranty. Silver block technology is at the heart of the qTOWER³, offering outstanding control accuracy of only ± 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 qTOWER³ 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, melt point analysis, ddCt method, PCR efficiency, allelic discrimination, endpoint and protein determination.



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 software 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!



High quality silver block for maximum thermal conductivity

- **Fast:** Heating rates of 8 °C/sec and cooling rates of 6 °C/sec
- **Unrivalled:** Ideal temperature homogeneity and unmatched control accuracy (± 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 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



qTOWER³

Patented fiber optic shuttle system



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 qTOWER³. The RGBW-LED ensures best possible quantum yield of each dye in real-time PCR experiment. Highly sophisticated multiplex applications with up to 6 fluorescent-labeled probes from the blue to the near-infrared range are no challenge anymore.



Maximum flexibility

Depending on the application qTOWER³'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[®]) 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.

Fiber Optic System: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.

- 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

- Freely configurable Color Filter 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

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.



qTOWER³

Innovative silver block technology

Basis for a reliable performance of quantitative real-time PCR in qTOWER³ 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 qTOWER³ is characterized by excellent temperature control accuracy of ± 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 ± 0.1 °C over the entire probe block
- Gradient function over 12 columns with 40 °C spread 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 spread 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 qTOWER³ 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.



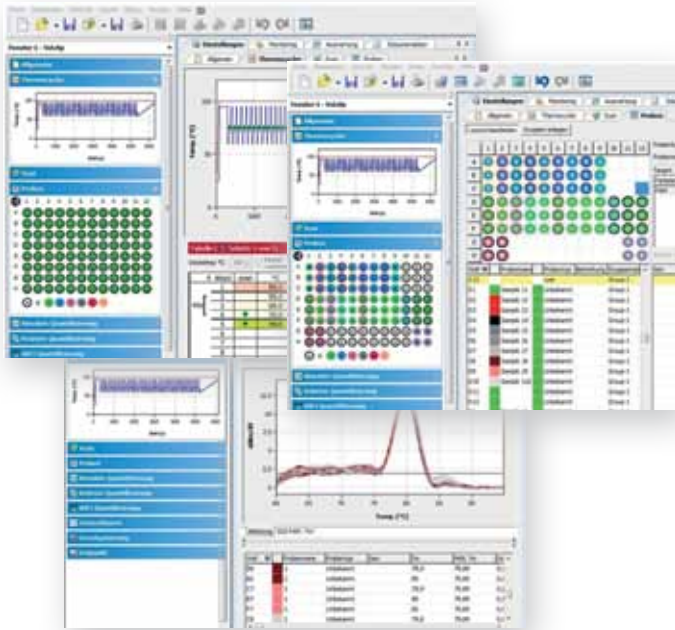
- ◆ The open platform is capable to be operated with low profile (0.1 mL) and with standard (0.2 mL) plastic ware. Non-, semi- as well as full-skirted plastic can be used.

qTOWER³

Intuitive operation and automatic evaluation

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 actual run, the data from previous experiments can be evaluated in parallel without complication.



qPCRsoft

Get in touch with qTOWER³

The outstanding performance of the qTOWER³ can be optionally expanded with the aid of a through-and-through innovative operation concept. The qTOWER³ 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 qTOWER³ or qTOWER³ touch - the real-time PCR thermal cyclers from Analytik Jena are the ideal and reliable tool for everyday lab work.

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 delta-delta Ct-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, delta-delta Ct-method, genotyping, endpoint analysis and protein determination, melting curve analysis and multi-gene/multi-plate analyses
- User administration with 3 authorization levels
- MIQE-compliant documentation
- Licence free, Updates free of charge



qPCRsoft touch. ▶

qTOWER³

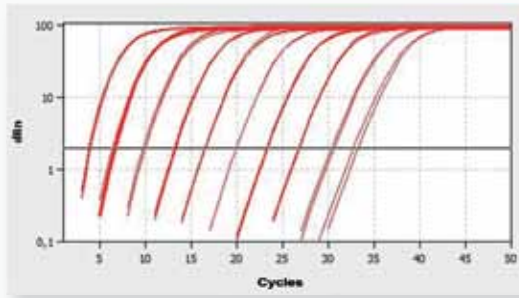
Convincing performance

Ideal amplification results are guaranteed due to the combination of a unique optics and a high-quality silver sample block with match-less temperature control accuracy.

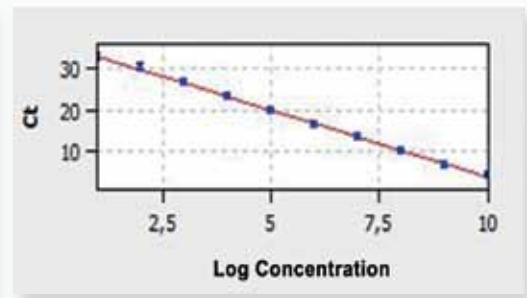
The example of human genomic DNA amplification shows an optimal linearity over 10 orders of magnitude from 10^{10} to 10^1 copies. Accordant PCR efficiency of 100 % with $R^2 > 0.999$ was automatically determined by qPCRsoft.

Fig. 1:

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



▲ Logarithmic view

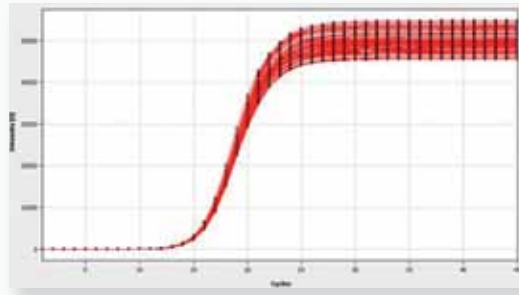


▲ Standard line

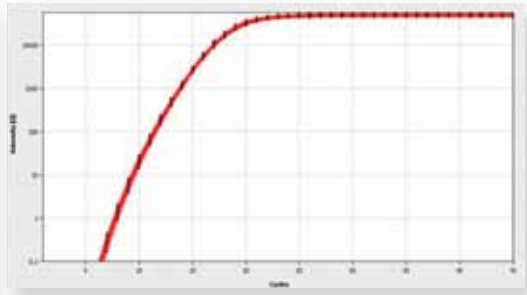
The single excitation and detection of each well avoids the often observed edge effects and allows excellent, homogeneous amplification plots over the entire 96 well block with a standard deviation below 0.07.

Fig. 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.



▲ Linear view

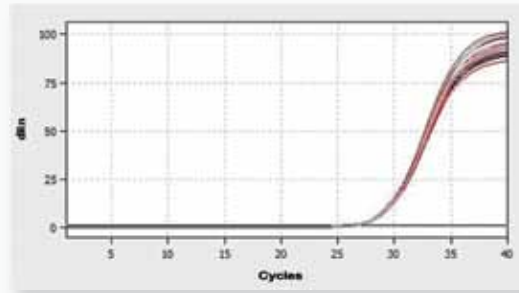


▲ Logarithmic view

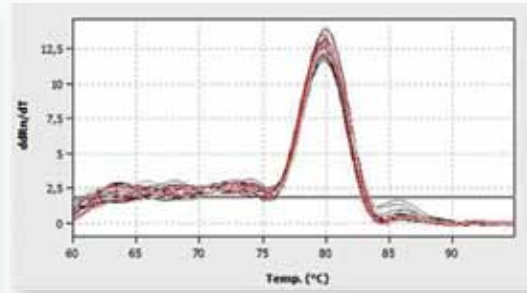
Also regarding to the used PCR reaction volume the qTOWER³ shows an enormous capacity. In a range from 5 μ l to 80 μ l a standard deviation of 0.07 for ct values and 0.08 for melting points can be achieved.

Fig. 3:

Amplification of 5 μ l, 10 μ l, 20 μ l, 30 μ l, 40 μ l, 50 μ l, 60 μ l, 70 μ l and 80 μ l PCR reaction volume. By using qPCRsoft a main Ct value of 26.22 ± 0.07 and a main melting point of 79.88 ± 0.08 was determined.



▲ Linear view



▲ Melting curves

Resultant qTOWER³ is an unbeatable partner in each real-time qPCR application.

Technical data

Thermal block			
Sample block	Silver sample block with gold-coating	Adjustable temperature range	3 °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	10 kg, automated	Dynamic range	10 orders of magnitude
Optics			
Measuring principle	Fiber optic shuttle system with 8fold scanner and color modules for excitation and emission filters	Color modules	<ul style="list-style-type: none"> ▪ 12 Color-, FRET- and Protein Modules ▪ 6 positions inside device
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 CPM (Channel Photo Multiplier)		
Control			
Control	PC or stand-alone (optional)	Time inc/dec	±0.1 to 240 sec/cycle
Display	Only qTOWER ³ <i>touch</i> : 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"> ▪ PC connection: USB, RS232, Ethernet ▪ Tablet: USB for data transfer, barcode reader 		
Noise emission	45 db		
Warranty	<ul style="list-style-type: none"> ▪ 2 warranty on device system ▪ 10 years long-term warranty of high performance optics 		

Order number	Description
844-00503-2	qTOWER³ Instrument system, without PC, including qPCRsoft, thermal block and detection module* for quantitative real-time PCR
844-00504-2	qTOWER³ G Instrument system, without PC, including qPCRsoft, thermal block and detection module* for quantitative real-time PCR, including gradient function
844-00505-2	qTOWER³ touch Instrument system, without PC, including qPCRsoft, 10" tablet, thermal block and detection module* for quantitative real-time PCR
844-00506-2	qTOWER³ 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*
Color module 1 Order number: 844-00520-0	470 nm	520 nm	FAM TM , Sybr [®] Green, Alexa488 [®]
Color module 2 Order number: 844-00521-0	515 nm	545 nm	JOE TM , HEX TM , VIC [®] , YakimaYellow [®]
Color module 3 Order number: 844-00522-0	535 nm	580 nm	TAMRA TM , DFO TM , Alexa546 [®] , NED TM
Color module 4 Order number: 844-00523-0	565 nm	605 nm	ROX TM , TexasRed [®] , Cy3.5 [®]
Color module 5 Order number: 844-00524-0	630 nm	670 nm	Cy5 [®] , Alexa633 [®] , Quasar670 TM
Color module 6 Order number: 844-00525-0	660 nm	705 nm	Cy5.5 [®] , LightCycler Red [®]
FRET module 1 Order number: 844-00526-0	470 nm	580 nm	FAM TM (Donor) / TAMRA TM (Akzeptor)
FRET module 2 Order number: 844-00527-0	470 nm	670 nm	FAM TM (Donor) / Cy5 [®] (Akzeptor)
FRET module 3 Order number: 844-00528-0	470 nm	705 nm	FAM TM (Donor) / Cy5.5 [®] (Akzeptor)
FRET module 4 Order number: 844-00529-0	515 nm	670 nm	JOE TM (Donor) / Cy5 [®] (Akzeptor)
FRET module 5 Order number: 844-00531-0	470 nm	605 nm	FAM TM (Donor) / ROX TM (Akzeptor)
Color modul Protein 1 Order number: 844-00530-0	490 nm	580 nm	SYPRO [®] Orange

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

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