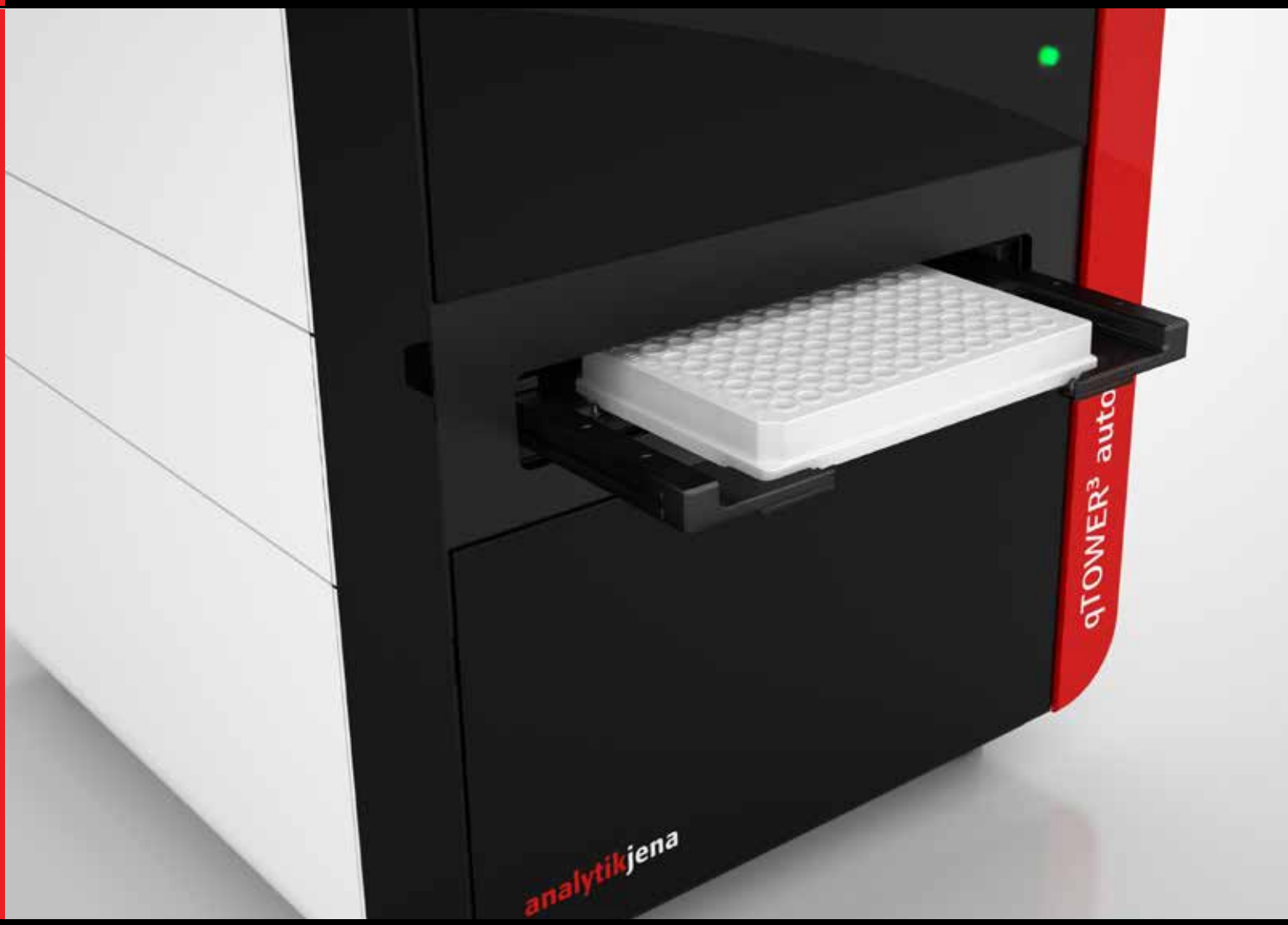
# Real-Time PCR Meets Automation

## qTOWER$^3$ auto

Real-Time PCR




analytikjena
An Endress+Hauser Company

# qTOWER³ auto

The qTOWER³ auto is ideally suited to connect quantitative real-time PCR with robotic systems.

The integration of real-time PCR thermal cyclers into automated liquid handling systems enables high sample throughput with continuous operation of the real-time PCR system and true walk-away capabilities. Incooperating the unique features of the qTOWER³ product family, the qTOWER³ auto sets the standard for high-performance and high-throughput real-time PCR.

The qTOWER³ auto guarantees reliable results regardless of the number of analyzed samples. Its unsurpassed temperature control accuracy of the sample block offers excellent temperature uniformity for either 96 or up to 384 samples. The patented high-performance optics guarantee excellent homogeneous excitation and illumination of all individual wells. With its proven, freely configurable, and expandable filter module equipment, the qTOWER³ product family achieves unique flexibility and enables up to six-fold multiplexing.

Depending on your choice of available filter modules, the system can detect all common dyes used in quantitative real-time PCR. Like data acquisition, data analysis is also automatic, and encompasses an exceptionally wide range of methods from absolute quantification to multi-plate analyses. A variety of export functions and a LIMS transfer file make all relevant data available for reliable sample tracking and documentation.

qTOWER³ auto

Real-Time PCR Meets Automation

## Simple integration into robotic systems

- **Secure:** Labware detection guarantees security in plate handling
- **Convenient:** Automated plate handling via moving microplate tray possible
- **Intelligent:** Decoupled electronic module with 3 m (or optional 10 m) cable for peripheral positioning

## Patented fiber-optic system for ideal real-time PCR signals

- **Efficient:** Short scan times for the entire plate, regardless of the number of measured
- **Innovative:** Novel light source with 4 robust LEDs – no preheating
- **Brilliant:** Ideal illumination and excitation of all 96 or 384 samples without any edge effects

## High-quality sample block for maximum thermal conductivity

- **Prepared:** High-performance sample block, either 96 well or 384 well
- **Unrivaled:** Ideal homogeneity and temperature control accuracy over the entire block
- **Precise:** Highest experimental accuracy

## qPCRsoft package for convenient control and operation

- **Transparent:** Reliable data management based on different export functions
- **Multilingual:** Available in multiple languages
- **Safe:** Optional 21 CFR part 11 compliance available for optimal data security

# Sophisticated, Automation-Friendly Design

The qTOWER³ auto offers numerous functions and features for easy, straightforward integration into various robotic systems or simple connection to liquid handling platforms.

## Suitable for all lab spaces

Laboratory space is always in short supply, while the demand for high throughput analyses is increasing.
The qTOWER³ auto offers a high level of flexibility and saves valuable space with its reduced footprint (31 × 48 × 36.5 cm).

## Flexible deck location

In combination with the free accessibility of the microplate tray and the compatibility with various plate handlers, it is enormously versatile and allows customers to build a system that best meets their needs for automation. The thermal cycler unit can be positioned in different ways. Either next to the liquid handling system so that the microplate (96 well or 384 well) can be positioned precisely on the sample tray by an external robotic arm (as used with the CyBio Carry), or the sample tray can be connected directly to the liquid handling system for plate loading.

- Modular design with small footprint
- Movable sample tray for automated plate transport
- Compatible with common plate handlers

qTOWER³ auto real-time PCR cycler and the power module

# Smart Solution for Integration

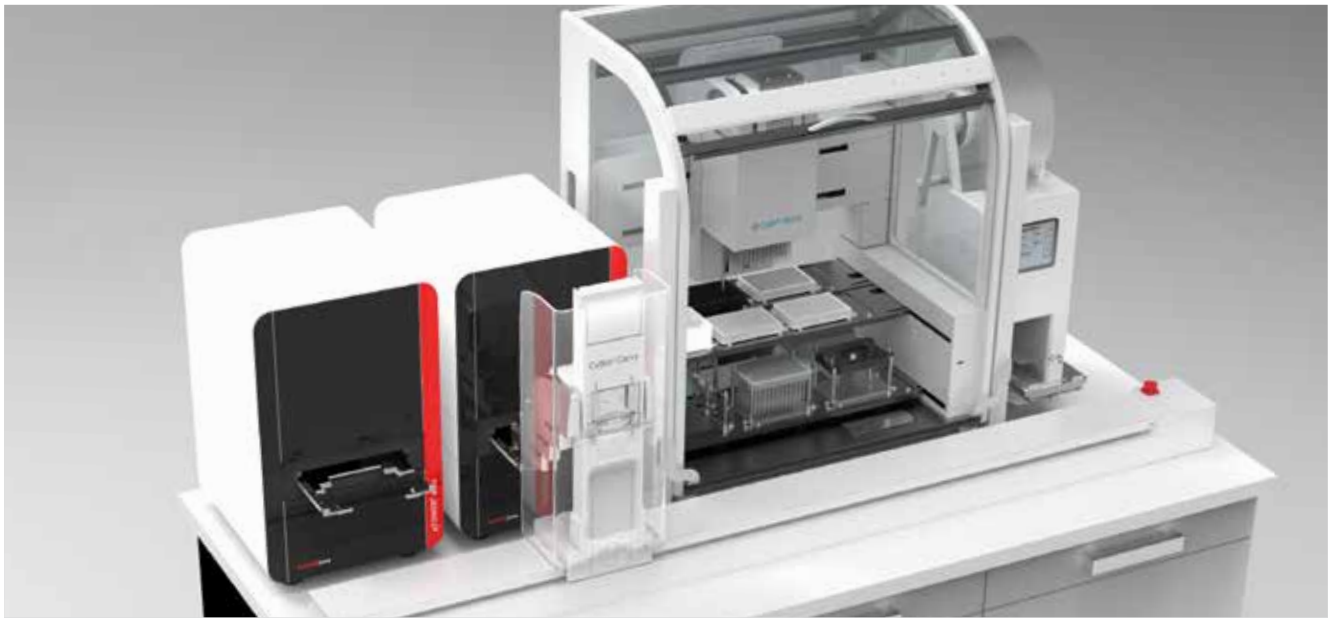
The qTOWER³ auto provides an intelligent solution for rapid integration into fully automated liquid handling systems while maintaining the flexibility to expand the system to future throughput needs.

### Convenient integration solutions

There are two software options for the implementation of the qTOWER³ auto in liquid handling systems: CyBio Composer or .dll.
The comprehensive integration guides the user through instrument integration and reduces the need for specific training.

### Multiply the throughput of your existing workflow

Thanks to this intelligent integration strategy, it is incredibly easy to expand the system to up to 4 instruments. Multiple real-time PCR systems can be loaded simultaneously empowering researchers to easily manage the ever-increasing number of samples.



Representation of the fully automated qPCR workflow with 2 x qTOWER³ auto real-time PCR cycler, including enhanced sample preparation (CyBio FeliX), transportation unit (CyBio Carry) and automated sealing (Agilent PlateLoc).

### Ensuring workflow security is of utmost priority

The system is equipped with a unique labware detection function. The sensory-based monitoring of the sample chamber reliably detects any improperly loaded sample plate.

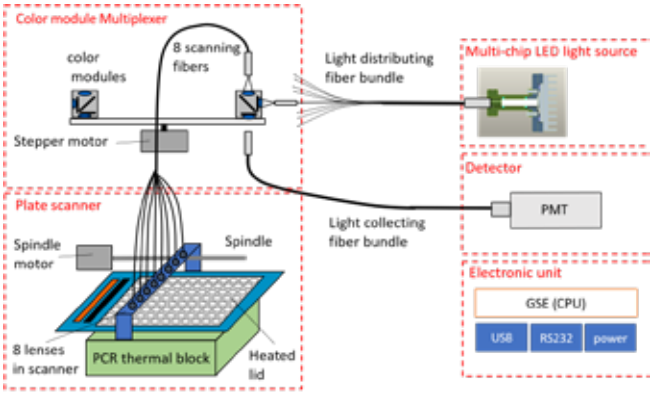
After the qPCR run, the motorized plate lifter ensures gentle lifting of the sample plate to release it safely from the sample block. This accelerates maximum security for a smooth and trouble-free workflow and increases operator walk-away time.

# Advanced Data Generation

The impressive combination of Biometra's proven block technology and the patented optical detection system accelerates existing qPCR workflows while maintaining excellent data quality.

## Advanced, highly-sensitive optical system

The automated cycler is just as powerful as the comparable stand-alone version of the qTOWER³. The heart of the high-performance optical system (FOS – fiber-optic system) is the patented optical shuttle with 8 or 16 optical fibers. It enables homogeneous illumination and read-out of each individual well for exact, meaningful results. Powered by a novel (RGBW) light source and a Photo-multiplier tube (PMT) detector, it provides optimized excitation for each individual sample while detecting the emitted fluorescent signals with extraordinary homogeneity.
The qTOWER³ auto is equipped with supporting filter modules that include a finely tuned set of excitation and emission filters. This allows the system to carry out highly sophisticated multiplex applications, from the blue to near infrared range and makes the system ideal for a variety of different applications.




Patented fiber optic system - schematics for 96 well format

- Low-maintenance and long-lasting patented fiber-optics with 4-color LED light source
- Multiplex capabilities for up to six target dyes
- Read out time: 6 seconds regardless of the number of measured dyes
- Filter modules can be upgraded to meet future needs
- No periodic calibration required

## Modern sample block enhances performance

Amplification of PCR products plays a central role in real-time experiments, as precise temperature control is critical for the efficiency of PCR and highly specific results. The qTOWER³ auto meets these objectives perfectly in both device types. The high-quality block materials utilize maximal thermal conductivity to allow the rapid heating and cooling for shorter run times. Optimized block technology guarantees accurate and efficient control of the target temperatures. High temperature accuracy and uniformity across the entire sample block ensures equal and reproducible experiment conditions in every well and makes the thermocycler the ideal system for quantitative and qualitative real-time PCR applications.
In addition, the qTOWER³ auto is equipped with a motorized heated lid that can be set to temperatures of up to 110 °C. The optimum, automatic contact pressure of the heated lid perfectly seals the PCR plates used.

- Automated real-time PCR in either 96 or 384 wells
- Modern sample block with outstanding ramping rates of up to 8 °C/s
- Excellent temperature uniformity: ± 0.15 °C after 15 seconds

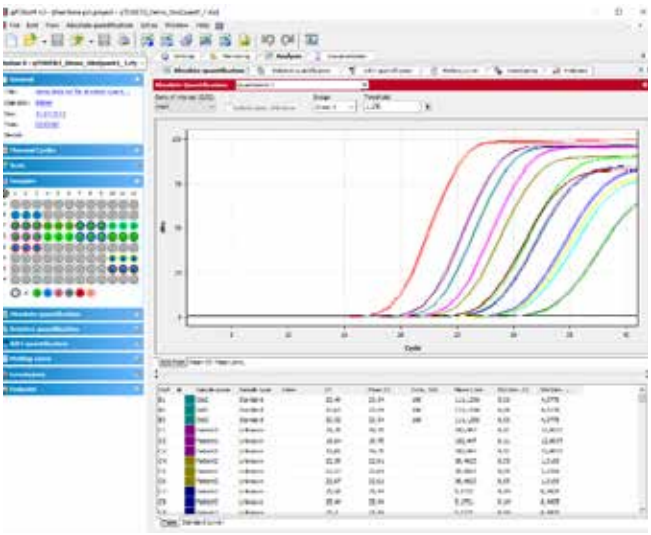
# Optimum Data Handling

Proper data management is just as critical as technical performance. The qPCRsoft auto provides a wide range of relevant software tools for a secure and intuitive data management.

### Powerful data analysis

The qPCRsoft auto features a user-friendly interface and offers the full range of functions to control the cycler, creating programs, acquisition and managing of fluorescence data. An exceptionally wide range of methods from absolute quantification to multi-plate analyses are available while settings like threshold and Ct determination on each sample, standard curve generation, and determination of PCR efficiency are carried out automatically.

- Absolute or relative quantification
- ddCt method with or without efficiency
- Determination of point mutations using probe based, allelic discrimination (genotyping)
- POS/NEG analysis by endpoint determination
- Melting curves and protein analysis
- Multi-gene or multi-plate analysis respectively



qPCRsoft auto – 96 well interface

### Optimize your productivity

With the plate layout import function, routine analyses can be carried out even more efficiently. The layout can be easily adapted remotely and imported after the run, allowing users to save valuable time while the instrument is running.

### Various data export options

A variety of export formats and a LIMS transfer file supports users' external databases to ensure that each individual sample can be tracked reliably and precisely.

### Secure data at all times

User management with three authorization levels offers customizable security. Access to defined software functions can be restricted to exclusively authorized persons, ensuring fully controlled protection of the measured data.

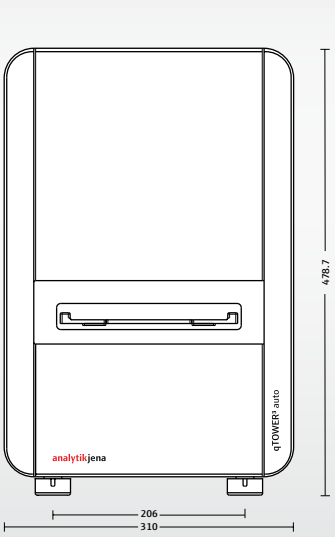
### 21 CFR part 11 compliant

Operating the qTOWER³ auto in a GMP-regulated environment, the optional 21 CFR part 11 module provides all required features for data integrity to comply with regulatory directives. This includes electronic signature, audit trail function and file a time and date stamp.

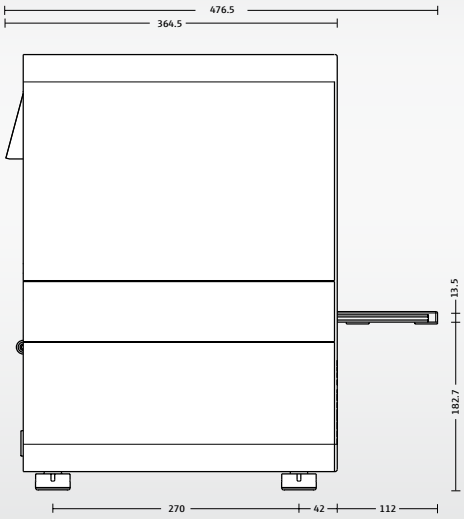
qTOWER³ auto
analytikjena

# The Size Makes the Difference

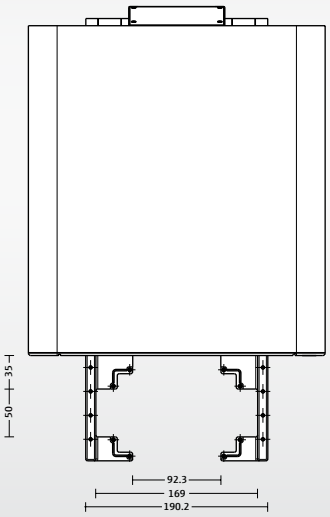
## Dimensions of qTOWER³ auto and qTOWER³ 84 auto base unit




▲ qTOWER³ auto front view

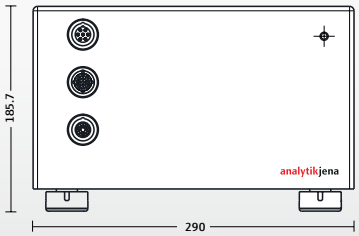



▲ qTOWER³ auto side view

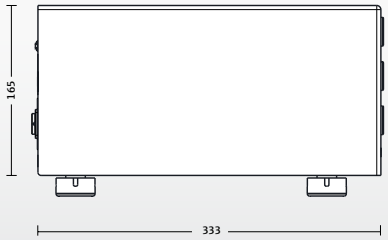



▲ qTOWER³ auto top view

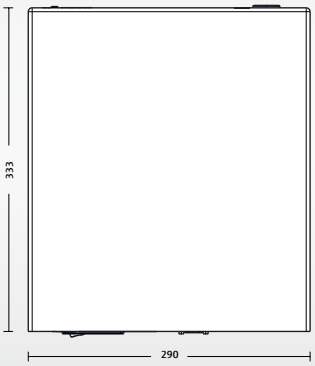
## Dimensions of external power module




▲ Power module front view




▲ Power module side view




▲ Power module top view

# qTOWER³ auto – to fit your laboratory needs

Whatever your application, the flexible set-up and different block types will enable your hassle-free workflow.

| Model | qTOWER³ auto | qTOWER³ 84 auto |
|---|---|---|
| Order number | 844-00603-X[a] | 844-00604-X[a] |
| Block capacity | 96 wells in 0.2 mL format | 384 wells |
| Sample block | Silver sample block with gold coating | Aluminum, special alloy |
| Sample volume | 5–100 µL | 2–30 µL (5–20 µL recommended) |
| Ramping rates[b] | max. 8 °C/s heating, 5.5 °C/s cooling | max. 4 °C/s heating, 2 °C/s cooling |
| Measuring principle | Fiber optic shuttle system with 8 optical fibers | Fiber optic shuttle system with 16 optical fibers |
| Readout time | 6 sec for 96 wells independent of the number of dyes | 6 sec for 384 wells independent of the number of dyes |
| Adjustable temperature range | 4–99 °C | |
| Temperature uniformity | 55 °C ± 0.15 °C after 15 seconds | |
| Temperature control accuracy | ± 0.1 °C | |
| Light source | 4 longlife, high-power LEDs (RGBW) | |
| Detector | High sensitive PMT (Photo Multiplier Tube) | |
| Color modules | 12 Color-, FRET- and Protein modules (6 positions inside device) | |
| Dimensions (W × H × L) | 310 × 479 × 365 mm (drawer closed)<br>310 × 479 × 477 mm (drawer open) | |
| Weight | approx. 27 kg | |
| **Power module** | | |
| Dimensions (W × H × L) | 290 × 186 × 335 mm | |
| Weight | approx. 12 kg | |
| Power consumption | 950 W | |
| **Operation** | | |
| Software Connection | ▪ PC control with qPCRsoft auto<br>▪ Via CyBio Composer and .dll | |
| Interfaces for the external power-controller unit | ▪ USB<br>▪ Ethernet | |
| File formats for data transfer | Excel, *.csv, LIMS, qBase+, GeneIO, GenEx | |
| Safety features | ▪ Sample chamber is monitored by sensors<br>▪ Overheating protection in the heated lid<br>▪ Interlock switch (drawer) | |

[a] X = 2 for 230 V, 4 for 115 V, 5 for 100 V ±10%, 50–60 Hz
[b] measured within the sample block

Further technical details and data can be found on our website: www.analytik-jena.com/qtower-auto

## Color module[c] parameters

| Name | Excitation | Emission | Example fluorescent dyes |
|---|---|---|---|
| Color module 1[d], Order number: 844-00520-0 | 465 ± 15 nm | 524 ± 12 nm | FAM™, SYBR®Green, Alexa488® |
| Color module 2[d], Order number: 844-00521-0 | 510 ± 15 nm | 565 ± 15 nm | JOE™, HEX™, VIC®, YakimaYellow® |
| Color module 3, Order number: 844-00522-0 | 530 ± 15 nm | 585 ± 15 nm | TAMRA™, DFO™, Alexa546®, NED™ |
| Color module 4[d], Order number: 844-00523-0 | 560 ± 15 nm | 610 ± 15 nm | ROX™, TexasRed®, Cy3.5® |
| Color module 5[d], Order number: 844-00524-0 | 625 ± 10 nm | 680 ± 15 nm | Cy5®, Alexa633®, Quasar670™ |
| Color module 6, Order number: 844-00525-0 | 625 ± 10 nm | 710 ± 20 nm | Cy5.5®, LightCycler Red® |
| FRET module 1, Order number: 844-00526-0 | 465 ± 15 nm | 585 ± 15 nm | FAM™ (donor) / TAMRA™ (acceptor) |
| FRET module 2, Order number: 844-00527-0 | 465 ± 15 nm | 680 ± 15 nm | FAM™ (donor) / Cy5® (acceptor) |
| FRET module 3, Order number: 844-00528-0 | 465 ± 15 nm | 710 ± 20 nm | FAM™ (donor) / Cy5.5® (acceptor) |
| FRET module 4, Order number: 844-00529-0 | 510 ± 15 nm | 680 ± 15 nm | JOE™ (donor) / Cy5® (acceptor) |
| FRET module 5, Order number: 844-00531-0 | 465 ± 15 nm | 610 ± 15 nm | FAM™ (donor) / ROX™ (acceptor) |
| Color module Protein 1, Order number: 844-00530-0 | 465 ± 15 nm | 585 ± 15 nm | SYPRO® Orange |

[c] The color and FRET modules can be ordered separately.
[d] This color module is included in the scope of delivery.

**Headquarters**

Analytik Jena AG
Konrad-Zuse-Str. 1
07745 Jena · Germany

Phone +49 3641 77 70
Fax +49 3641 77 9279
info@analytik-jena.com
www.analytik-jena.com

Pictures: Analytik Jena AG
Subject to changes in design and scope of delivery as well as further technical development.

en : 04/2020 · 844-MA147-2-B
Förster & Borries GmbH & Co. KG
© Analytik Jena AG

analytikjena
An Endress+Hauser Company