

January 2015

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# Rotor-Disc™ OTV Handbook

For verification of thermal accuracy of  
Rotor-Gene® real-time cyclers



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Sample & Assay Technologies

## **QIAGEN Sample and Assay Technologies**

QIAGEN is the leading provider of innovative sample and assay technologies, enabling the isolation and detection of contents of any biological sample. Our advanced, high-quality products and services ensure success from sample to result.

### **QIAGEN sets standards in:**

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- Nucleic acid and protein assays
- microRNA research and RNAi
- Automation of sample and assay technologies

Our mission is to enable you to achieve outstanding success and breakthroughs. For more information, visit [www.qiagen.com](http://www.qiagen.com).

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## Kit Contents

<b>Rotor-Disc OTV Kit</b>	
<b>Catalog no.</b>	<b>981400</b>
OTV Rotor-Disc (sealed Rotor-Disc 72 containing thermochromatic liquid crystals)	1
Fluorescent Insert "RG 3000" (small, green fluorescent insert for use with the Rotor-Gene 3000)	1
Fluorescent Insert "RG Q/6000" (large, green fluorescent insert for use with the Rotor-Gene 6000 and the Rotor-Gene Q)	1
CD with the following files: OTV test template file (*.ret); Handbook (*.pdf); Factory calibration file (*.rex); OTV calibration file (*.otv); Certificate of Conformity (*.pdf)	1
Handbook	1

## Storage

Correct storage of the Rotor-Disc OTV Kit is important to ensure accurate results. Exposure of the OTV Rotor-Disc to light should be minimized. Store the OTV Rotor-Disc in a dark, dry location at room temperature (15–25°C). Keep the OTV Rotor-Disc away from sunlight and do not expose it to artificial light for lengthy periods. Do not freeze the OTV Rotor-Disc.

Fluorescent inserts should be stored in a dark location at room temperature, with the OTV Rotor-Disc. Avoid exposure to UV and strong visible light sources which will eventually photo-bleach the fluorescent inserts.

When stored correctly, the OTV Rotor-Disc can be used a maximum of 30 times, up to the expiry date of the kit. The OTV Rotor-Disc cannot be used after the expiration date.

The kit is disposable. Disposal should be in accordance with all national, state, and local health and safety regulations and laws.

## Product Use Limitations

The Rotor-Disc OTV Kit is an accessory for use with the Rotor-Gene thermal cyclers.

Optical Temperature verification (OTV) is a method that verifies the in-tube temperature in a Rotor-Gene instrument. While performing an OTV is not required for the Rotor-Gene, calibration of in-tube temperature can be a

laboratory requirement. The OTV method provides a means for users to comply with this requirement, including any site-specific calibration intervals.

All due care and attention should be exercised in the handling of the products. We recommend all users of QIAGEN® products to adhere to the NIH guidelines that have been developed for recombinant DNA experiments, or to other applicable guidelines.

## **Product Warranty and Satisfaction Guarantee**

QIAGEN guarantees the performance of all products in the manner described in our product literature. The purchaser must determine the suitability of the product for its particular use. Should any product fail to perform satisfactorily due to any reason other than misuse, QIAGEN will replace it free of charge or refund the purchase price. We reserve the right to change, alter, or modify any product to enhance its performance and design. If a QIAGEN product does not meet your expectations, simply call your local Technical Service Department or distributor. We will credit your account or exchange the product — as you wish. Separate conditions apply to QIAGEN scientific instruments, service products, and to products shipped on dry ice. Please inquire for more information.

A copy of QIAGEN terms and conditions can be obtained on request, and is also provided on the back of our invoices. If you have questions about product specifications or performance, please call QIAGEN Technical Services or your local distributor (see back cover or visit [www.qiagen.com](http://www.qiagen.com)).

## **Technical Assistance**

At QIAGEN, we pride ourselves on the quality and availability of our technical support. Our Technical Service Departments are staffed by experienced scientists with extensive practical and theoretical expertise in sample and assay technologies and the use of QIAGEN products. If you have any questions or experience any difficulties regarding the Rotor-Disc OTV Kit or QIAGEN products in general, please do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance and more information, please see our Technical Support Center at [www.qiagen.com/Support](http://www.qiagen.com/Support) or call one of the QIAGEN Technical Service Departments or local distributors (see back cover or visit [www.qiagen.com](http://www.qiagen.com)).

## **Safety Information**

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, please consult the appropriate safety data sheets (SDSs). These are available online in convenient and compact PDF format at [www.qiagen.com/safety](http://www.qiagen.com/safety) where you can find, view, and print the SDS for each QIAGEN kit and kit component.

## **Quality Control**

In accordance with QIAGEN's ISO-certified Quality Management System, each lot of Rotor-Disc OTV Kit is tested against predetermined specifications to ensure consistent product quality.

## Introduction

Optical Temperature Verification is a method that verifies the in-tube temperature in a Rotor-Gene instrument. The Rotor-Disc OTV (Optical Temperature Verification) Kit enables optical temperature verification of Rotor-Gene real-time cyclers. We recommend performing optical temperature verification using the Rotor-Disc OTV Kit every 6 months. Temperature verification using the kit requires a Rotor-Disc 72 Rotor and Locking Ring or a Rotor-Disc 72 Starter Kit.

While performing an OTV is not required for the Rotor-Gene, calibration of in-tube temperature can be a laboratory requirement. The OTV method provides a means for users to comply with this requirement, including any site-specific calibration intervals. For most cyclers, this requires interaction with a service engineer. With Rotor-Gene cyclers, this is not necessary. Instead, the easy-to-use, cost-effective Rotor-Disc OTV Kit automates accuracy testing. The kit includes a specialized Rotor-Disc filled with temperature-sensitive liquid crystals and dedicated analysis software.

## Principle and procedure

The Rotor-Disc OTV Kit uses the optical properties of 3 thermochromic liquid crystals (TLCs) as absolute temperature references. When heated, TLCs change from opaque to transparent at very precise temperatures (50°C, 75°C, and 90°C). TLCs do not themselves fluoresce. Therefore, it is necessary to cover the excitation source with a fluorescent scatter plate so that the TLC transition points can be detected by the Rotor-Gene optical system. TLCs that are below their transition temperature are opaque, and reflect light. Some of the reflected light scatters toward the detector, increasing fluorescence. When the in-tube temperature reaches the TLC transition point, the TLC becomes transparent, and light passes through the sample rather than being reflected towards the detector, resulting in a decrease in fluorescence. The change in fluorescence is used to determine the precise transition temperature of each TLC. The transition temperature reported by the Rotor-Gene cycler is compared to the temperature encoded in the OTV Rotor-Disc serial number, to verify whether the instrument is within temperature specification. If the instrument is not within temperature specification, automatic readjustment of the Rotor-Gene can be performed by simply clicking the “Apply Adjustment” button in the “OTV Temperature Verification Results” window.

Every batch of TLC crystals has a slightly different specific melting temperature. To allow for this, the absolute melting temperature of the TLC batches used in each Rotor-Disc OTV Kit is encoded in the OTV Rotor-Disc serial number. To ensure accuracy, it is important to specify the correct OTV Rotor-Disc serial number in the software Wizard. The OTV Rotor-Disc serial number for each kit is provided on the CD or can be read from the OTV Rotor-Disc.

## **Equipment to Be Supplied by User**

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles.

- Rotor-Disc 72 Rotor and Rotor-Disc 72 Locking Ring or a Rotor-Disc 72 Starter Kit (see ordering information, page 18)



# Protocol: Optical Temperature Verification

This protocol enables temperature verification of Rotor-Gene cyclers using the Rotor-Disc OTV Kit.

## Important points before starting

- The OTV Rotor-Disc serial number for each kit is provided on the CD and can be read from the OTV Rotor-Disc. Verify that the serial number on the CD label matches the serial number on the OTV Rotor-Disc used in the verification run.

## Procedure

1. **Place the fluorescent insert over the excitation lens in the bottom of the Rotor-Gene cycler chamber.**

**Note:** Use the small, green fluorescent insert labeled with “RG 3000” if working with the Rotor-Gene 3000 and the large, green fluorescent insert labeled with “RG Q/6000” if working with the Rotor-Gene Q or the Rotor-Gene 6000.



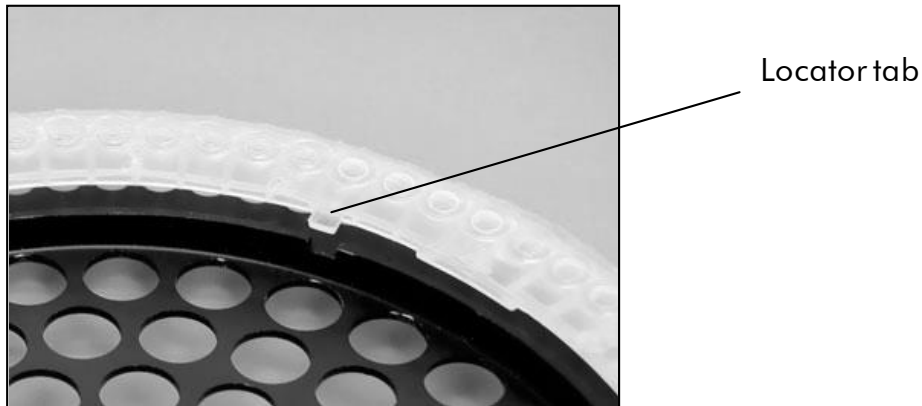
Small, green  
fluorescent insert



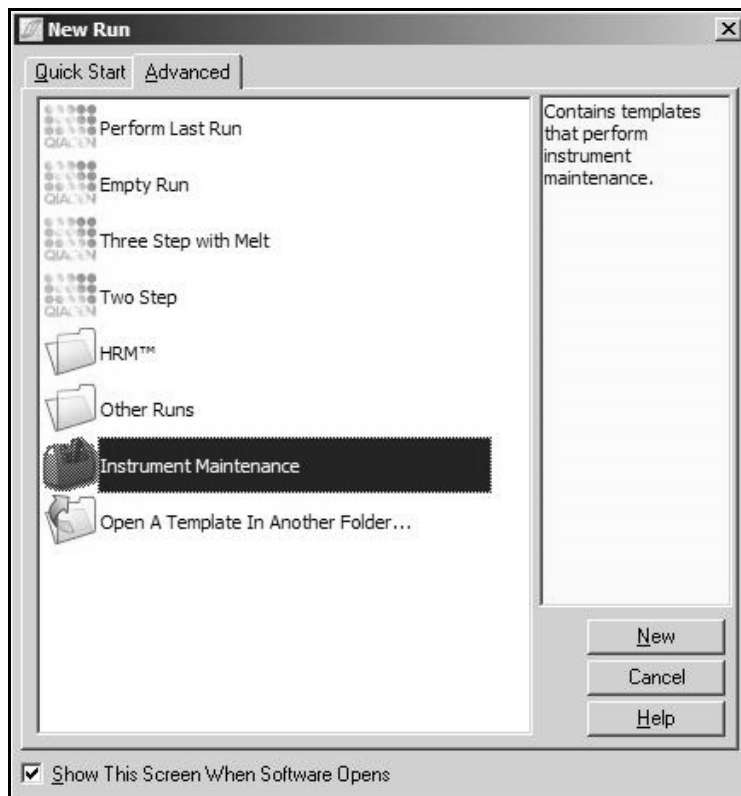
Large, green  
fluorescent insert

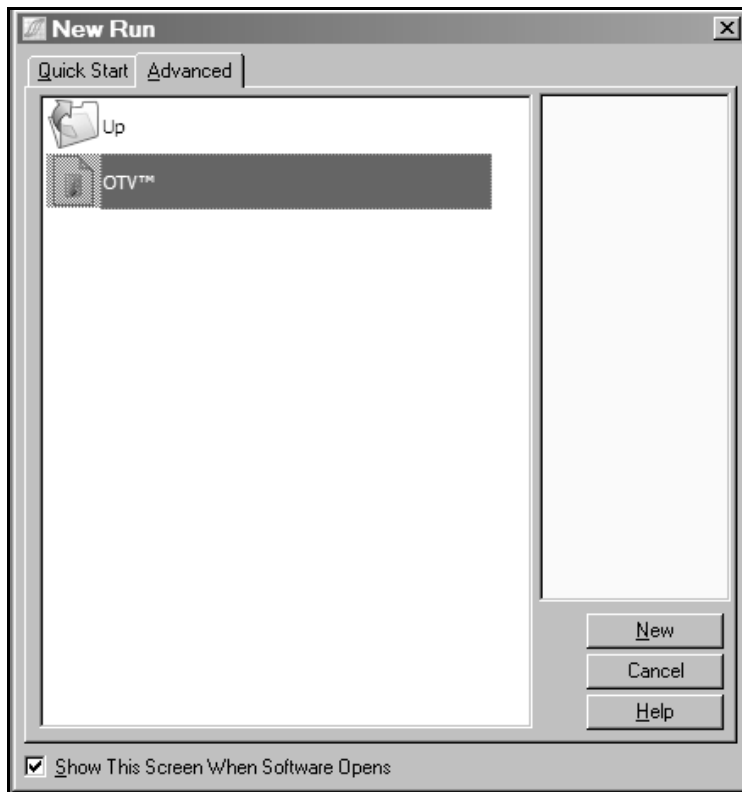
2. **Place the OTV Rotor-Disc into a Rotor-Disc 72 Rotor. Secure using a Rotor-Disc 72 Locking Ring. Place the assembly into the Rotor-Gene cyclor and click into place. Close the Rotor-Gene cyclor lid.**

Ensure that the OTV Rotor-Disc is correctly aligned with the Rotor-Disc 72 Rotor by placing the locator tab of the OTV Rotor-Disc into the slot of the Rotor-Disc 72 Rotor.



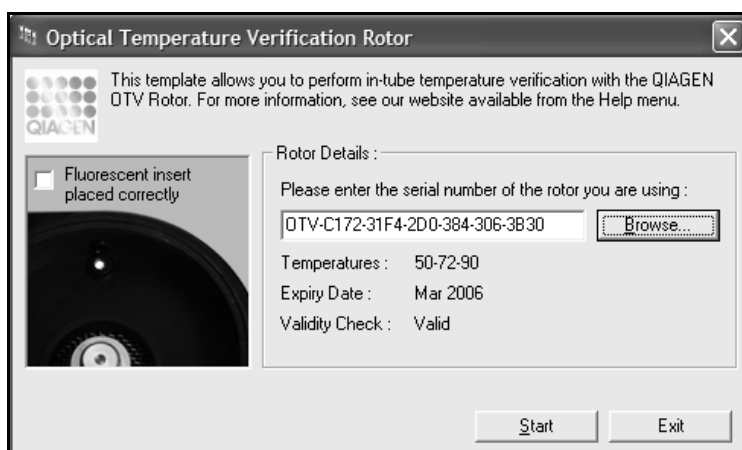
3. **In the Rotor-Gene software, access the Advanced wizard by selecting the "Advanced" tab in the "New Run" window. In the Advanced wizard, click on "Instrument Maintenance" and then "OTV".**





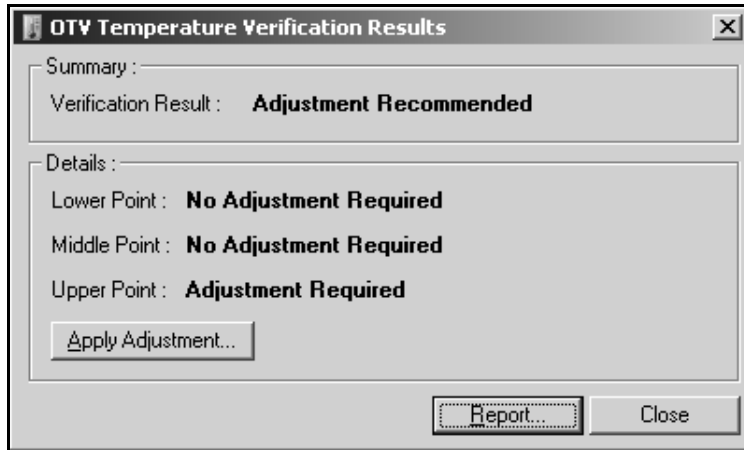
4. The wizard prompts for the OTV Rotor-Disc serial number. This number can be read from the label on the OTV Rotor-Disc. Alternatively, insert the CD provided with the Rotor-Disc OTV Kit and then click on "Browse" and choose the OTV calibration file provided on the CD (\*.otv file). The serial number will be imported from the CD. Check the "Fluorescent insert placed correctly" checkbox and then click "Start".

**Note:** To ensure the accuracy of the optical temperature verification, verify that the serial number entered matches the serial number printed on the label of the OTV Rotor-Disc placed in the instrument.



5. The software then prompts for a filename and location to save the run file. Then the run begins. The run performs a series of melts that determine the thermal characteristics of the Rotor-Gene cycler.

6. When the run is finished, the software indicates whether the Rotor-Gene cyclers are within specification. If adjustment is required, click "Apply Adjustment". This prompts the user to perform a verification run. After the verification run is complete, no further adjustment should be required. If further adjustment is required, contact QIAGEN Technical Services or your local distributor.



7. When the Rotor-Gene cycler is within specification, a report of the run can be reviewed and printed by clicking on "Report".

# Troubleshooting Guide

This troubleshooting guide may be helpful in solving any problems that may arise. For more information, see also the Frequently Asked Questions page at our Technical Support Center: [www.qiagen.com/FAQ/FAQList.aspx](http://www.qiagen.com/FAQ/FAQList.aspx). The scientists in QIAGEN Technical Services are always happy to answer any questions you may have about either the information or protocols in this handbook, or sample and assay technologies (for contact information, see back cover or visit [www.qiagen.com](http://www.qiagen.com)).

## Comments and suggestions

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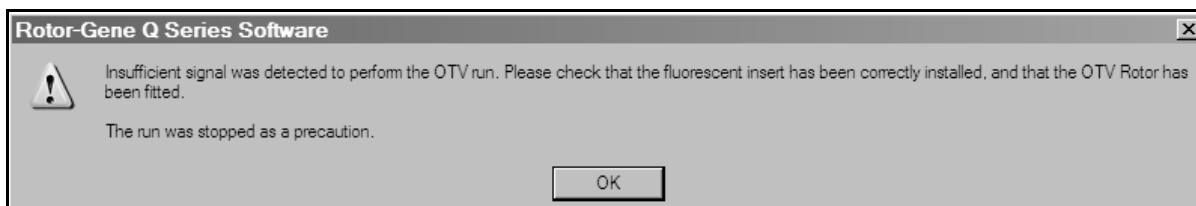
### Error message that the rotor has expired appears



The OTV Rotor-Disc has passed its expiry date

Order a new Rotor-Disc OTV Kit.

### Error message indicating insufficient signal appears



- |   |   |
|---|---|
| a) Fluorescent insert is incorrectly positioned | Check that the fluorescent insert is correctly placed over the excitation lens (see page 9).  |
| b) Lenses are dirty                             | Clean the lenses by gently wiping them with a cotton tip dampened with ethanol.   |
| c) OTV Rotor-Disc is incorrectly positioned     | Ensure that the OTV Rotor-Disc is correctly aligned in the Rotor-Disc 72 Rotor using the locator tab for orientation.                                     |
| d) TLCs in OTV Rotor-Disc have been bleached    | Incorrect storage can lead to bleaching of TLCs in the OTV Rotor-Disc. If the OTV Rotor-Disc has been incorrectly stored, order a new Rotor-Disc OTV Kit. |

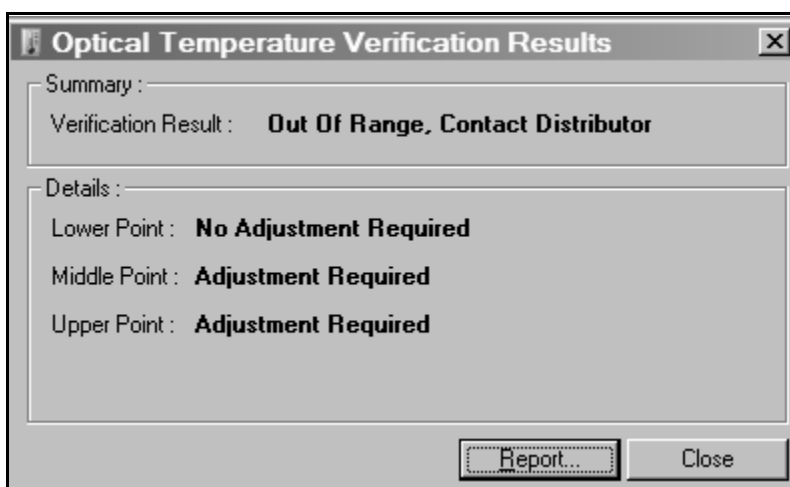
## Comments and suggestions

### Error message that some readings could not be taken appears



- |   |  |
|---|--|
| a) Software is out of date                      | Ensure that you are running correct, up-to-date Rotor-Gene software.   |
| b) Fluorescent insert is incorrectly positioned | Check that the fluorescent insert is correctly placed over the excitation lens (see page 9).   |
| c) Technical support required                   | If software is up to date and the fluorescent insert is correctly positioned but the error message still appears, contact QIAGEN Technical Services. |

### Verification result is out of range



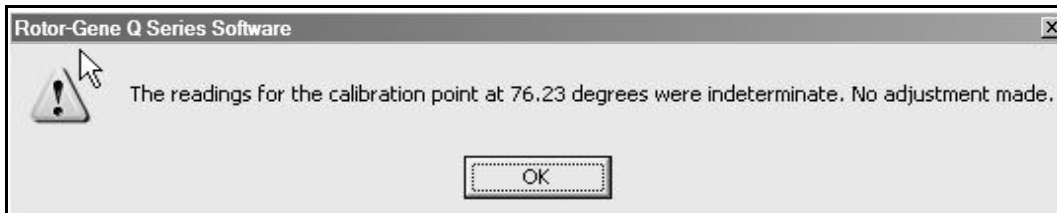
The values required to correct the temperature are out of the normal permitted range.

Check the expiration date on the Rotor-Disc OTV Kit. If the kit has not passed its expiration date, contact QIAGEN Technical Services. If the kit has passed its expiration date, order a new Rotor-Disc OTV Kit.

## Comments and suggestions

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### Error message that readings were indeterminate appears



- |   |   |
|---|---|
| a) OTV Rotor-Disc is incorrectly positioned               | Ensure that the OTV Rotor-Disc is correctly aligned in the Rotor-Disc 72 Rotor using the locator tab for orientation.   |
| b) One or more of the TLCs is giving an incorrect reading | Check the expiry date on the Rotor-Disc OTV Kit. If the kit has not passed its expiration date, contact QIAGEN Technical Services. If the kit has passed its expiration date, order a new Rotor-Disc OTV Kit. |

# Appendix

When stored correctly, the OTV Rotor-Disc can be used a maximum of 30 times, up to the expiration date of the kit. The OTV Rotor-Disc must not be used after the expiration date.

In order to monitor the number of runs performed with this particular OTV Rotor-Disc, please enter the required information into the table below each time you perform an optical temperature verification run with this OTV Rotor-Disc. This is independent of the Rotor-Gene real-time PCR cyclers that is being verified.

Run number	Run date	Instrument serial number
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Table continued on next page.



Table continued from previous page.

<b>Run number</b>	<b>Run date</b>	<b>Instrument serial number</b>
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

## References

QIAGEN maintains a large, up-to-date online database of scientific publications utilizing QIAGEN products. Comprehensive search options allow you to find the articles you need, either by a simple keyword search or by specifying the application, research area, title, etc.

For a complete list of references, visit the QIAGEN Reference Database online at [www.qiagen.com/RefDB/search.asp](http://www.qiagen.com/RefDB/search.asp) or contact QIAGEN Technical Services or your local distributor.

## Ordering Information

Product	Contents	Cat. no.
Rotor-Disc OTV Kit	Kit for optical temperature verification of Rotor-Gene systems, which includes a Rotor-Disc preloaded with thermochromatic liquid crystals, fluorescent inserts, CD with calibration files; requires Rotor-Disc 72 Rotor and Locking Ring or Rotor-Disc 72 Starter Kit	981400
<b>Accessories</b>		
Rotor-Disc 72 Starter Kit	3 Rotor-Disc 72 packs, Rotor-Disc Heat Sealer, Rotor-Disc Heat Sealing Film, Rotor-Disc 72 Rotor and Locking Ring, Rotor-Disc 72 Loading Block, Rotor-Disc Pipetting Aid	Varies
Rotor-Disc 72 Rotor	For holding Rotor-Disc 72 discs in the Rotor-Gene Q; requires Rotor-Disc 72 Locking Ring	9018899
Rotor-Disc 72 Locking Ring	For locking a Rotor-Disc 72 in the Rotor-Disc 72 Rotor	9018900

For up-to-date licensing information and product-specific disclaimers, see the respective QIAGEN kit handbook or user manual. QIAGEN kit handbooks and user manuals are available at [www.qiagen.com](http://www.qiagen.com) or can be requested from QIAGEN Technical Services or your local distributor.

Trademarks: QIAGEN®, Rotor-Gene®, Rotor-Disc™ (QIAGEN Group).

For applicable countries:

The purchase of this product (Rotor-Gene Q) includes a limited, non-transferable license to one or more of US Patents Nos 6,787,338; 7,238,321; 7,081,226; 6,174,670; 6,245,514; 6,569,627; 6,303,305; 6,503,720; 5,871,908; 6,691,041; 7,387,887; and U.S. Patent Applications Nos. 2003-0224434 and 2006-0019253 and all continuations and divisionals, and corresponding claims in patents and patent applications outside the United States, owned by the University of Utah Research Foundation, Idaho Technology, Inc., and/or Roche Diagnostics GmbH, for internal research use or for non-in vitro diagnostics applications. No right is conveyed, expressly, by implication or estoppel, for any reagent or kit, or under any other patent or patent claims owned by the University of Utah Research Foundation, Idaho Technology, Inc., and/or Roche Diagnostics GmbH, or by any other Party. For information on purchasing licenses for in-vitro diagnostics applications or reagents, contact Roche Molecular Systems, 4300 Hacienda Drive, Pleasanton, CA 94588, USA.

For applicable countries:

This real-time thermal cycler is licensed under pending U.S. Patent rights for an apparatus or system covering automated thermal cyclers with fluorescence detectors and seeking priority to U.S. Serial No. 07/695,201 and corresponding claims in any foreign counterpart patent thereof owned by Applied Biosystems LLC, in all fields, including research and development, all applied fields, and human and animal in-vitro diagnostics. No rights are conveyed expressly, by implication or estoppel to any patents on real-time methods, including but not limited to 5' nuclease assays, or to any patent claiming a reagent or kit. For further information on purchasing additional rights, contact the Director of Licensing at Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California, 94404, USA.

#### **Limited License Agreement**

Use of this product signifies the agreement of any purchaser or user of the Rotor-Disc OTV Kit to the following terms:

1. The Rotor-Disc OTV Kit may be used solely in accordance with the *Rotor-Disc OTV Handbook* and for use with components contained in the Kit only. QIAGEN grants no license under any of its intellectual property to use or incorporate the enclosed components of this Kit with any components not included within this Kit except as described in the *Rotor-Disc OTV Handbook* and additional protocols available at [www.qiagen.com](http://www.qiagen.com).
2. Other than expressly stated licenses, QIAGEN makes no warranty that this Kit and/or its use(s) do not infringe the rights of third-parties.
3. This Kit and its components are licensed for multiple uses under the provisions stated in the "Storage" section of this handbook, and may not be refurbished or resold.
4. QIAGEN specifically disclaims any other licenses, expressed or implied other than those expressly stated.
5. The purchaser and user of the Kit agree not to take or permit anyone else to take any steps that could lead to or facilitate any acts prohibited above. QIAGEN may enforce the prohibitions of this Limited License Agreement in any Court, and shall recover all its investigative and Court costs, including attorney fees, in any action to enforce this Limited License Agreement or any of its intellectual property rights relating to the Kit and/or its components.

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