

Sole Source Specifications

QIAcube[®] Forensic Applications

The QIAcube is designed to perform otherwise laborious pipetting and centrifugation tasks in a fully automated manner. The instrument controls integrated components including a centrifuge, heated shaker, pipetting system, and robotic gripper. The unique and fully automated centrifuge, equipped with 12 swing-out buckets, eliminates manual centrifugation steps allowing more time for other tasks. Innovative disposable rotor adapters hold spin columns and collection tubes in the centrifuge and collect wash buffers during centrifugation.

No external PC is required to operate the QIAcube, saving valuable laboratory space. An integrated touchscreen simplifies protocol selection and clear on-screen messages guide the user through worktable setup.

For increased ease of use and high process safety, labware and accessories fit onto the worktable only in the correct orientation. In addition, a fully automated load check helps to ensure that samples, reagents, and labware are correctly loaded.

QIAGEN is the sole manufacturer and distributor of the QIAcube and related consumables.

QIAcube[®] Forensic applications fall into two main categories:

1) Purification of nucleic acids for Forensic biology applications. Up to 12 samples can be processed per run using proven QIAGEN[®] spin-column technology.

The QIAcube is preinstalled with a range of protocols for purification of RNA, genomic DNA, plasmid DNA, viral nucleic acids, and proteins, plus DNA and RNA cleanup. The range of protocols available is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at www.qiagen.com/MyQIAcube.

2) Forensic DNA "Differential Wash" application. Designed to automate the manual procedure of separating lysed non-sperm cells from intact sperm cells by centrifugation and subsequent buffer washes, the QIAcube is the only automated platform that can perform this task in this manner.

QIAcube consumables include:

- 1) QIAGEN Spin Columns (various)
- 2) Rotor Adapters and elution tubes (cat#990394)
- 3) QIAcube Filter Tips
- 4) QIAcube Reagent bottles

The QIAcube System provides:

- Standardization – ensures reliable quality
- Hands-free processing – frees up valuable time
- Automation of laborious, low-tech manual tasks
- Ease of use – ensures simple training, lab integration and increased productivity

Sole Source requirements:

Walk away spin column processing including sample lysis: The instrument fully automates purification of DNA, RNA and proteins from a wide variety of sample types using proven QIAGEN spin-column technology.

Wide range of applications: The QIAcube is preinstalled with protocols for purification of plasmid DNA, genomic DNA, total RNA, viral nucleic acids, and proteins, plus DNA and RNA cleanup. The range of protocols available is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at www.qiagen.com/MyQIAcube. Our highly qualified Application Specialists can also develop customized protocols tailored to specific laboratory needs.

HID Differential Wash Protocol: The QIAcube performs an automated differential separation and wash procedure. A forensic sample (putatively) containing a mixture of sperm and non-sperm (epithelial) cells, with the epithelial cells lysed in QIAGEN lysis buffer, is loaded into QIAcube rotor adapters and placed in the QIAcube centrifuge. The QIAcube separates the lysed epithelial cells from the sperm cells. The sperm cells are washed four times with QIAGEN wash buffer. Finally, the washed sperm cells are resuspended in QIAGEN sperm lysis buffer.

Touchscreen operation: No external PC is required to operate the QIAcube, saving valuable laboratory space. An integrated touchscreen allows the user to select and run protocols, install or delete protocols, save data files, and operate the shaker and centrifuge individually. Messages displayed in the touchscreen guide the user through worktable setup after a protocol has been selected. During sample processing, the touchscreen shows the protocol status and remaining time. For convenience and ease of use, the names of the last 2 protocols performed are displayed in the main menu, enabling rapid selection of frequently used protocols.

Load check: A comprehensive load check is performed prior to sample processing to check worktable setup and to help to ensure correct loading of the QIAcube. An optical sensor automatically detects the number of samples in

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the shaker and checks that the shaker is correctly loaded. The number of rotor adapters in the centrifuge buckets is checked to make sure that it corresponds to the number of samples in the shaker and the optical sensor checks that the centrifuge is correctly loaded. The optical sensor also checks the type of filter-tips loaded on the worktable and that there are sufficient tips for the protocol run. An ultrasonic sensor checks the reagent bottle rack to make sure that it is correctly loaded and that there is sufficient buffer in the reagent bottles. During sample preparation, the tip sensor checks that the tip adapter has picked up a tip and checks whether it is a 200 µl or 1000 µl filter-tip.

□ **Shaker:** The heated orbital shaker enables fully automated lysis of up to 12 samples. Shaker adapters are available for 2 ml microcentrifuge tubes and 2 ml screw-cap tubes and, for ease of use, fit onto the shaker only in the correct orientation. Sample tubes are placed into a rack that fits onto the shaker adapter. The lid of each microcentrifuge tube or cap of each screw-cap tube is held in a slot at the edge of the shaker rack. This ensures that microcentrifuge tubes cannot be displaced during sample processing and allows shaker loading to be checked when using screw-cap tubes. The positions on the shaker rack are numbered to enable easy loading.

□ **Pipetting system and robotic gripper:** The robotic arm provides accurate and precise positioning of the robotic gripper and pipetting system on the QIAcube worktable and also includes the optical and ultrasonic sensor. The QIAcube is equipped with a single-channel pipetting system that moves in the X, Y, and Z directions. The dilutor, fitted with a tip adapter, is connected to a precision syringe pump that enables accurate transfer of liquids. The tip adapter allows aspiration and dispensing of liquid through an attached disposable tip. Disposable filter-tips (200 µl or 1000 µl/1000 µl wide-bore) are used for sample preparation to minimize the risk of cross-contamination. The robotic gripper transfers spin columns during sample preparation. During transfer of a spin column, a stabilizing rod holds the rotor adapter in place, ensuring it remains properly seated in the centrifuge bucket. The robotic gripper is behind the panel covering the robotic arm.

□ **Centrifuge:** The fully integrated centrifuge is equipped with 12 swing-out buckets, each of which can hold a disposable rotor adapter. Up to 12 samples can be processed per run.

□ **Rotor adapters:** A specially developed disposable rotor adapter holds a QIAGEN spin column and a collection tube in the centrifuge bucket during sample processing. If required by the protocol, an additional column (e.g., QIAshredder column) can be placed into the middle position of the rotor adapter. For ease of use and high process safety, the rotor adapters are designed so that they fit into a centrifuge bucket only in the correct orientation. Spin column and collection tube lids are held securely in slots at the edge of the rotor adapter. The wash position of the rotor adapter is open at the bottom, enabling wash buffers to flow through and collect at the bottom of the rotor adapter during centrifugation. The other 2 positions in the rotor adapter are closed.

□ **Small footprint:** The QIAcube fits on a bench-top space of 26x25 inches. The height of the QIAcube is 23 inches, and 32 inches with the lid open.

QIAcube® Forensic Protocols:

QIAamp® DNA Investigator Blood or Saliva Standard

QIAamp® DNA Investigator Forensic Casework Samples – Lysis and Purification

QIAamp® DNA Investigator FTA and Guthrie cards – Blood Spot Lysis and Purification

QIAamp® DNA Investigator Surface and Buccal Swabs – Swab Lysis and Purification

QIAcube® HID Differential Wash Protocol

Technical Specifications:

Operating conditions

Power 100–120 V AC, 50/60 Hz, 650 VA (North America and Japan)

220–240 V AC, 50/60 Hz, 650 VA (Europe)

Mains supply voltage fluctuations are not to exceed 10% of nominal supply voltages.

Overvoltage category II

Air temperature: 18 to 28°C (64.4 to 82.4°F)

Relative humidity: 15–75% (noncondensing)

Altitude: Up to 2000 m (6500 ft.)

Place of operation: For indoor use only

Pollution level 2

Environmental class 3K2 (IEC 60721-3-3)

Transportation conditions

Air temperature –25°C to 60°C (–13°F to 140°F) in manufacturer's package

Relative humidity Max. 75% (noncondensing)

Environmental class 2K2 & 2M2 (IEC 60721-3-2)

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Storage conditions

Air temperature 15°C to 30°C (59°F to 86°F) in manufacturer's package
Relative humidity Max. 75% (noncondensing)
Environmental class 1K2 (IEC 60721-3-1)

Mechanical data and hardware features

Dimensions (door closed)
Width: 65 cm (25.6 in.), Height: 57 cm (22.4 in.), Depth: 62 cm (24.4 in.)
Dimensions (door open)
Width: 65 cm (25.6 in.), Height: 81 cm (32 in.), Depth: 62 cm (24.4 in.)
Mass QIAcube: 71.5 kg (157.6 lb.)
Accessories: 3 kg (6.6 lb.)
Centrifuge: 12,000 x g maximum, Swing-out rotor, maximum 45°, 12 rotor positions
Shaker:
Speed 100–2000 rpm
Amplitude 2 mm
Heating range of ambient temperature to 70°C (158°F)
Ramp-up time of <5 minutes from ambient temperature to 55°C (±3°C)
Difference in the temperature detected by the internal sensor and the temperature of the sample liquid is approx -2°C
Pipetting system: Syringe size 1 ml, Pipetting range 5–900 µl
Capacity Up to 12 samples per run
Touchscreen Transmissive TFT, 64 x 86 x 6.5 mm, white LED backlight, high brightness

Specifications of QIAGEN Instrument Service

- QIAGEN Field Service is the only organization certified by QIAGEN to Repair, Calibrate, Maintain and Move QIAGEN BioRobots including the QIAcube.
 - Attempts to perform any Repairs, Calibration, Preventive Maintenances or Moves by organizations or individuals other than QIAGEN Field Service or those directed by QIAGEN Field Service, immediately and irrevocably void any QIAGEN Warranties or QIAGEN Support Agreements.
 - QIAGEN manufactures, calibrates, certifies and stocks all parts necessary for the Repair, Calibration and Maintenance of QIAGEN BioRobots. These are proprietary parts and as such are not available from any other source or vendor.
 - Limitations as specified in QIAGEN's BioRobot Warranty Policy apply.
- This limited warranty does not extend to any Product or part thereof that:
- (a) Has been subjected to misuse, neglect, accident, fire, flood or other abnormal conditions,
 - (b) Has been produced, modified or repaired by anyone other than QIAGEN,
 - (c) Has been damaged in the course of being moved by anyone other than QIAGEN,
- Or
- (d) Has not been used and maintained in accordance with the instructions contained in the Product operator's manual.

Warranty: 1 year warranty on parts and labor

Manufacture: The QIAcube is manufactured only by QIAGEN and is available only from QIAGEN.



Signed
Mark Guillianio, Ph.D.
Applied Testing, QIAGEN, Inc.

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 or can be requested from QIAGEN Technical Services or your local distributor.

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Sample & Assay Technologies



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