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QIAvac 24 Plus Handbook

For vacuum processing of QIAGEN[®] spin columns

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Kit Contents

Catalog no. QIAvac 24 Plus	19413 Qty.
QIAvac 24 Plus Vacuum Manifold	1
Luer Plugs	24
Screw Cap	1
Quick-Coupling Female Connector	1
Vacuum Adapter	1
Cleaning Adapter	1

Catalog no. QIAvac Connecting System	19419 Qty.
Tray (preassembled with: sterile filter, vacuum gauge, vacuum regulator, and regulator connecting tube)	1
Waste Bottles	24
Vacuum Pump Connecting Tube	1
Waste Bottle Connecting Tube	1
Manifold Connecting Tube	1
Connecting Accessories Box (screw cap valve, 24 VacValves, pump adapter set, and main vacuum valve)	1

Catalog no. Vacuum Pump	9003250 Qty.
Vacuum Pump	100–240 V; 50/60 Hz
Exhaust Filter	1

Shipping and Storage

The QIAvac 24 Plus is shipped at room temperature (15–25°C), and should be stored dry and clean at room temperature. Refer to "Appendix C: Cleaning and Decontaminating the QIAvac 24 Plus" on page 30 for details on cleaning the QIAvac 24 Plus.

Intended Use

The QIAvac 24 Plus is designed for vacuum processing of QIAGEN spin columns in parallel.

All due care and attention should be exercised in the handling of many of the materials described in this text. 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.

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).

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 molecular biology and the use of QIAGEN products. If you have any questions or experience any difficulties regarding the QIAvac 24 Plus 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 contact our QIAGEN Technical Service Department at support.qiagen.com or your local distributor.

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, 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, the performance of the QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump is monitored routinely. All components are tested separately to ensure highest performance and reliability.

Introduction

The QIAvac 24 Plus is designed for fast and efficient vacuum processing of up to 24 QIAGEN spin columns in parallel (Table 1 and Table 2). Samples and wash solutions are drawn through the column membranes by vacuum instead of centrifugation, providing greater speed and reduced hands-on time in purification procedures.

QIAprep®, QIAquick®, MinElute®, and RNeasy® spin columns are inserted directly into the luer slots of the QIAvac 24 Plus manifold, while QIAamp® spin columns are processed on the QIAvac 24 Plus using VacConnectors to avoid cross contamination and VacValves to handle different sample flow rates. VacConnectors and VacValves can also be used with QIAprep, QIAquick, and MinElute spin columns, if desired. For maintenance of the QIAvac 24 Plus, please refer to the handling guidelines on "Appendix D: Handling and Maintenance of the QIAvac 24 Plus" on page 33.

In clinical diagnostic laboratories it is essential to use the QIAvac 24 Plus manifold in combination with the QIAvac Connecting System (cat. no. 19419) and QIAGEN CE-certified Kits (e.g., QIAamp DSP DNA Blood Mini Kit and QIAamp DSP Virus Kit).

QIAamp Midi and Maxi spin columns can also be processed using the QIAvac 24 Plus. However, due to the large solution volumes used, the QIAvac Connecting System is required.

To set up and operate the QIAvac 24 Plus for a particular application, refer to the instructions given on:

- "Protocol: Processing QIAprep, QIAquick, MinElute, and RNeasy Spin Columns on the QIAvac 24 Plus" on page 11;
- "Protocol: Processing Non-DSP QIAamp Mini and QIAamp MinElute Spin Columns on the QIAvac 24 Plus" on page 13;

- "Protocol: Processing QIAamp DSP, QIAamp Midi, and QIAamp Maxi Spin Columns on the QIAvac 24 Plus" on page 16;
- as well as the detailed vacuum protocols provided in the individual kit handbooks.

Table 1. QIAGEN Research Kits Compatible with the QIAvac 24 Plus

Application	Kit	Accessories
Plasmid minipreps	QIAprep Spin Miniprep Kits QIAwave Plasmid Miniprep Kit	–
DNA cleanup	QIAquick PCR Purification Kits QIAquick Gel Extraction Kits QIAquick Nucleotide Removal Kits MinElute PCR Purification Kits MinElute Gel Extraction Kits MinElute Reaction Cleanup Kits	–
Total RNA purification	RNeasy Mini Kits	VacConnectors*
Total RNA isolation	RNeasy Midi Kit RNeasy Maxi Kit	–
Genomic and viral DNA purification from blood and body fluids	QIAamp DNA Blood Kits QIAamp DNA Mini Kit	VacConnectors and VacValves VacConnectors and VacValves
Viral RNA purification from plasma, serum, and cell-free body fluids	QIAamp Viral RNA Mini Kit	VacConnectors and VacValves
Viral DNA and RNA purification from plasma, serum, and cell-free body fluids	QIAamp MinElute Virus Vacuum Kit	VacConnectors and VacValves
Genomic DNA purification from human whole blood for in vitro diagnostic purposes	QIAamp DSP DNA Blood Mini Kit	VacConnectors* and VacValves
Viral DNA and RNA purification from human plasma or serum samples for in vitro diagnostic purposes	QIAamp DSP Virus Kit	VacConnectors and VacValves

*Optional accessory to prevent cross-contamination.

Equipment to Be Supplied by User

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, consult the appropriate safety data sheets (SDSs), available from the product supplier.

- VacConnectors^{*}, cat. no. 19407
- VacValves (24)[†], cat. no. 19408

^{*}Supplied with QIAamp DSP Kits.

[†]Supplied with the QIAvac Connecting System.

Protocol: Processing QIAprep, QIAquick, MinElute, and RNeasy Spin Columns on the QIAvac 24 Plus

Procedure

1. Insert up to 24 spin columns into the luer slots of the QIAvac 24 Plus. Close unused luer slots with luer plugs.
2. Connect the upper threaded hole of the QIAvac 24 Plus manifold to a vacuum source. For nucleic acid purification follow the vacuum protocol in the relevant kit handbook.

Note: Ensure that the vacuum source is connected to the upper threaded hole of the QIAvac 24 Plus and the lower threaded hole is tightly sealed using the screw cap. To prevent liquid entering the vacuum source, connection of the vacuum source to the lower threaded hole should only be undertaken when using the QIAvac Connecting System.

For the correct setup of the QIAvac 24 Plus see "Setting up the QIAvac 24 Plus vacuum manifold" on page 19.

3. After sample processing, discard the liquid waste in the QIAvac 24 Plus and clean the QIAvac 24 Plus (see "Appendix C: Cleaning and Decontaminating the QIAvac 24 Plus" on page 30).

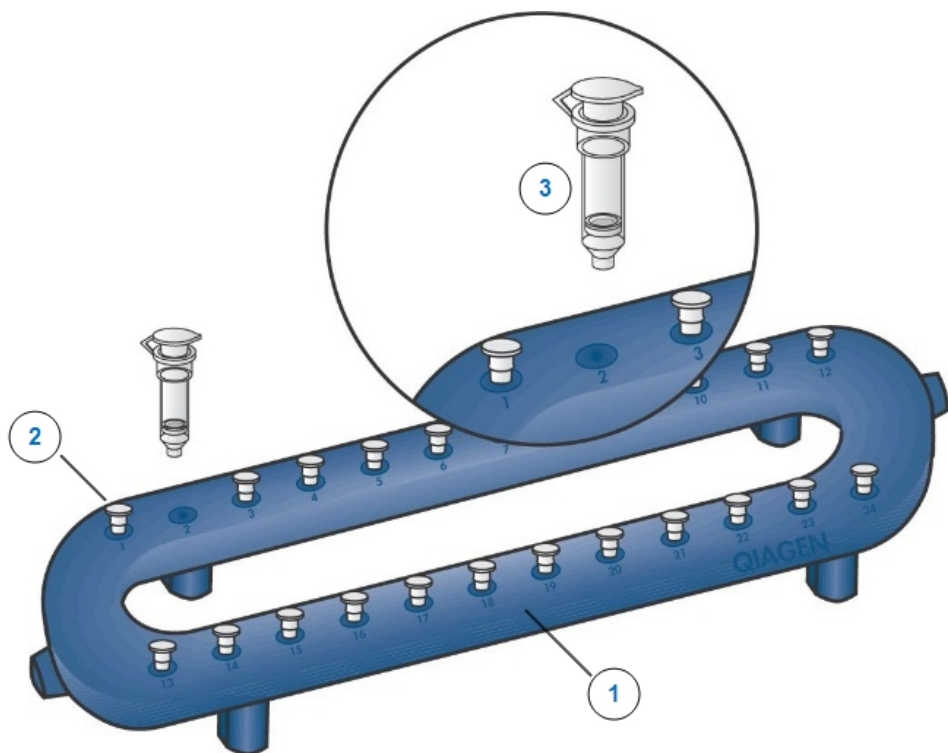


Figure 1. Setting up the QIAvac 24 Plus with QIAprep, QIAquick, MiSnElute, or RNeasy Mini Spin Columns.

1. QIAvac 24 Plus vacuum manifold.
2. Luer slot closed with luer plug.
3. Spin column (Not included with the QIAvac 24 Plus. Included in appropriate purification kits.)

Protocol: Processing Non-DSP QIAamp Mini and QIAamp MinElute Spin Columns on the QIAvac 24 Plus

A vacuum pump capable of producing a vacuum of at least –900 mbar (e.g., QIAGEN Vacuum Pump, see "Ordering Information " on page 37) is required.

QIAamp Mini and QIAamp MinElute spin columns are processed on the QIAvac 24 Plus using VacConnectors and VacValves. VacValves are inserted directly into the luer slots of the QIAvac 24 Plus manifold and ensure a steady flow rate, facilitating parallel processing of samples of different natures (e.g., whole blood and plasma), volumes, or viscosities. They should be used if sample flow rates differ significantly in order to ensure consistent vacuum.

VacConnectors are disposable connectors that fit between QIAamp Mini or QIAamp MinElute spin columns and VacValves. They prevent direct contact between the spin column and VacValve during purification, thereby avoiding any cross-contamination between samples. VacConnectors are discarded after a single use.

Procedure

1. Connect the QIAvac 24 Plus to a vacuum source. If using the QIAvac Connecting System, connect the system to the manifold and vacuum source as described in "Appendix A: Assembling the Vacuum System (QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump)" on page 19.
2. Insert a VacValve into each luer slot of the QIAvac 24 Plus that is to be used. Close unused luer slots with luer plugs or close the inserted VacValve.

Note: VacValves should be used if flow rates of samples differ significantly to ensure consistent vacuum.

3. Insert a VacConnector into each VacValve. Perform this step directly before starting the purification to avoid exposure of VacConnectors to potential contaminants in the air.
4. Place the QIAamp Mini or QIAamp MinElute spin columns into the VacConnectors on the manifold.
5. For the QIAamp MinElute Virus Vacuum Kit: Insert an Extension tube into each QIAamp MinElute column.
6. For nucleic acid purification, follow the vacuum protocol in the appropriate QIAamp handbook. Discard the VacConnectors appropriately after use.

Note: Each VacValve can be closed individually when the sample is completely drawn through the spin column, allowing parallel processing of samples of different volumes or viscosities.

7. After processing samples, clean the QIAvac 24 Plus (see "Appendix C: Cleaning and Decontaminating the QIAvac 24 Plus" on page 30).

Note: Buffers AL, AVL, and AW1 used in QIAamp procedures are not compatible with disinfecting agents containing bleach. See the appropriate QIAamp handbook for safety information.

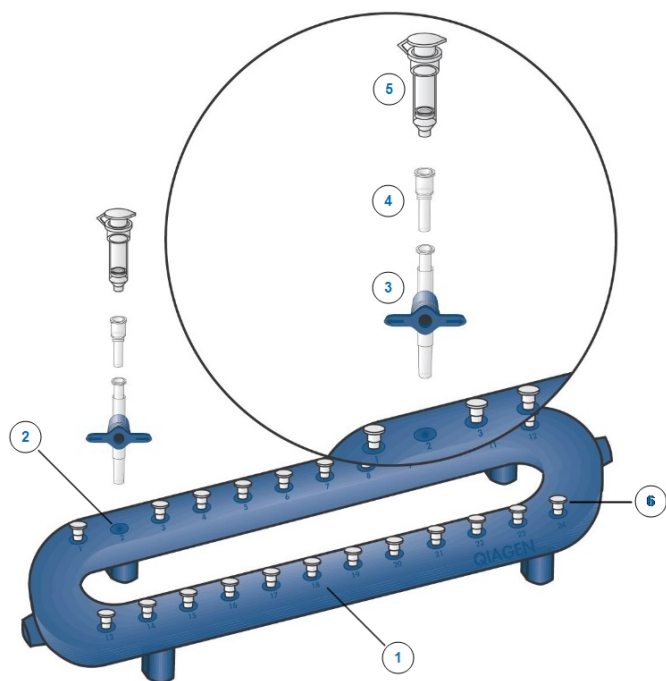


Figure 2. Setting up the QIAvac 24 Plus with QIAamp spin columns using VacValves and VacConnectors.

1. QIAvac 24 Plus vacuum manifold
2. Luer slot of the QIAvac 24 Plus
3. VacValve^{*}
4. VacConnector^{*}
5. QIAamp Mini spin column[†]
6. Luer slot closed with luer plug

^{*}Not included with the QIAvac 24 Plus. Must be purchased separately.

[†]Not included with the QIAvac 24 Plus. Included in appropriate purification kits.

Protocol: Processing QIAamp DSP, QIAamp Midi, and QIAamp Maxi Spin Columns on the QIAvac 24 Plus

QIAamp DSP, QIAamp Midi, and QIAamp Maxi spin columns are processed on the QIAvac 24 Plus using VacConnectors and VacValves. VacValves are inserted directly into the luer slots of the QIAvac 24 Plus manifold (Figure 2) and ensure a steady flow rate, facilitating parallel processing of samples of different natures, volumes, or viscosities. VacConnectors are disposable connectors that fit between QIAamp spin columns and VacValves. They prevent direct contact between the spin column and VacValve during purification, thereby avoiding any cross-contamination between samples. VacConnectors are supplied with the respective diagnostic kit and should be discarded after use. Once used, VacConnectors are potentially contaminated and should be disposed of as biohazard waste.

Procedure

1. Connect the QIAvac 24 Plus to the vacuum source using the QIAvac Connecting System (for more details see "Appendix A: Assembling the Vacuum System (QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump)" on page 19).
2. Insert a VacValve into each luer slot of the QIAvac 24 Plus that is to be used. Close unused luer slots with luer plugs or close the inserted VacValve.
3. Insert a VacConnector into each VacValve. Perform this step directly before starting the purification to avoid exposure of VacConnectors to potential contaminants in the air.
4. Place a QIAamp spin column into each VacConnector on the manifold.
5. For the QIAamp DSP Virus Kit: Insert a Column Extender into each QIAamp MinElute column.

6. For nucleic acid purification, follow the vacuum protocol in the appropriate QIAamp handbook. Discard the VacConnectors appropriately after use.

Note: After use the VacConnectors are potentially contaminated and should be disposed of as biohazard waste. Each VacValve can be closed individually when the sample is completely drawn through the spin column, allowing parallel processing of samples of different volumes or viscosities.

7. After processing of samples, clean and decontaminate the QIAvac 24 Plus (see "Appendix C: Cleaning and Decontaminating the QIAvac 24 Plus" on page 30).

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 in our Technical Support Center: 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 (for contact information, visit support.qiagen.com).

Appendix A: Assembling the Vacuum System (QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump)

Setting up the QIAvac 24 Plus vacuum manifold

To use the QIAvac 24 Plus without the QIAvac Connecting System, set up the manifold as follows.

Procedure

1. Place the manifold (1) on a flat, planar surface, ensuring that the lower threaded hole is on the left side.
2. Attach the quick-coupling female connector (3) to the upper threaded hole of the manifold by turning clockwise. Carefully tighten the quick-coupling female using a wrench.

Note: Over-tightening of the quick-coupling female connector may damage the manifold.

Important: Do not connect the vacuum source to the lower threaded hole on the QIAvac 24 Plus, as this will cause liquid to enter the vacuum source.

3. Connect the vacuum source to the quick-coupling female connector (3) using the vacuum adapter (5).
4. Close the lower threaded hole of the manifold using the screw cap (4).

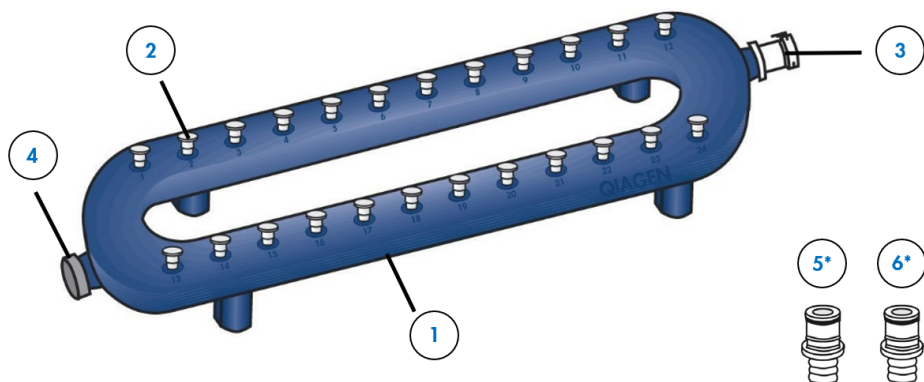


Figure 3. Setting up the QIAvac 24 Plus vacuum manifold for use without the QIAvac Connecting System.

1. QIAvac 24 Plus vacuum manifold
2. Luer slot with luer plug
3. Quick-coupling female connector
4. Screw cap
5. Vacuum adapter*
6. Cleaning adapter*

*Identical components.

Setting up the QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump

In combination with the QIAvac Connecting System, the QIAvac 24 Plus can be used as a flow-through system. The sample flow-through is collected in a separate waste bottle. Set up the QIAvac 24 Plus manifold, Connecting System, and Vacuum Pump as follows.

Setting up the QIAvac 24 Plus

Procedure

1. Place the manifold (1) on a flat, planar surface, ensuring that the lower outlet is on the left side.
2. Attach the quick-coupling female connector (3) to the lower threaded hole of the manifold by turning clockwise. Carefully tighten the quick-coupling female connector (3) using a wrench.

Important: Over-tightening of the quick-coupling female connector may damage the manifold.

3. Close the upper threaded hole of the manifold using the closed screw cap valve (4; supplied with the QIAvac Connecting System). Note: The screw cap valve is closed when the lever is flush with the top of the valve. The screw cap valve is open (venting the manifold) when the lever sticks out of the valve.

Important: Do not use the screw cap supplied with the manifold when using the QIAvac Connecting System.

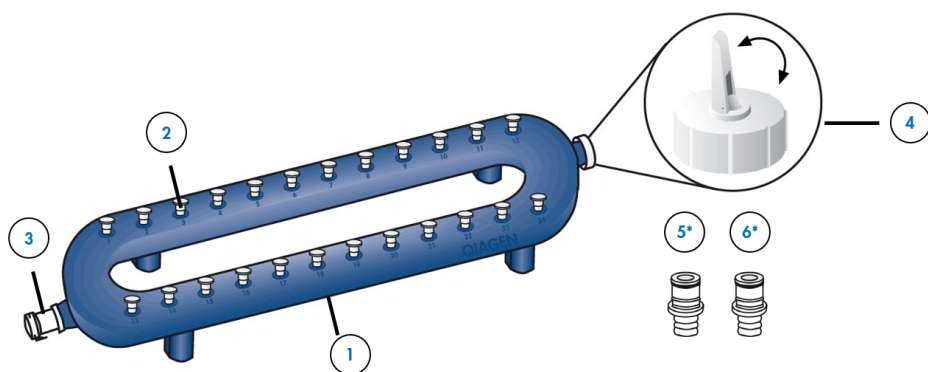


Figure 4. Setting up the QIAvac 24 Plus vacuum manifold for use with the QIAvac Connecting System.

1. QIAvac 24 Plus vacuum manifold
2. Luer slot with luer plug
3. Quick-coupling female connector
4. Screw cap valve*
5. Vacuum adapter†
6. Cleaning adapter†

*Supplied with QIAvac Connecting System.

†Identical components.

Setting up the QIAGEN Vacuum Pump

Procedure

1. Remove the red cap and the pre-fitted inlet and outlet adaptors from the vacuum pump by turning them counterclockwise using the included grey screwing aid.
2. Open the pump accessories pack (supplied with the QIAGEN Vacuum pump) containing the black adapter piece with the white screwed in quick coupling (10), the black adapter for the exhaust filter and the exhaust filter.
3. Screw the black adapter including the white quick coupling into the inlet on the left-hand side. The position of the white quick coupling should be in a 45 degree angle (see Figure 6).
4. Screw the other black adapter into the right-handed exhaust outlet of the vacuum pump. Ensure that the adapter piece (8) sits tightly and the threaded outlet hole, on the adapter piece, faces upwards. Screw the exhaust filter (7) clockwise into the threaded outlet hole of the black adapter piece.

WARNING



Ensure that the pump quick coupling is fixed to the left-hand inlet of the vacuum pump and the pump filter with its adapter is fixed in the right-hand exhaust outlet. Exchanging these connections will lead to a sudden increase in pressure within the manifold and possible destruction.

5. Switch on the vacuum pump by pressing the power switch on the left side of the pump. The round power button on the top of the pump turns green. To start the vacuum, push the green button, which then turns blue. The vacuum can be regulated by turning the blue button, but it is recommended to open the vacuum completely and use the vacuum regulator (11c) to change the vacuum pressure.

Note: Each time that the vacuum pump is disconnected, ensure that all connections are correctly replaced and that the pump generates a vacuum after reconnection.

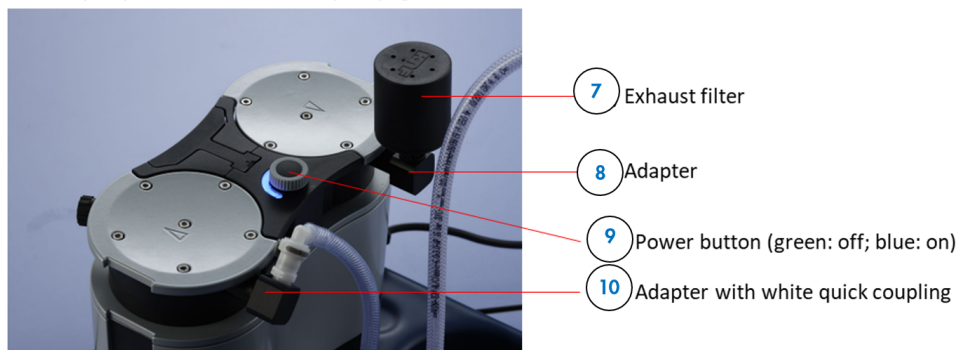


Figure 5. Setting up the QIAGEN Vacuum Pump.

7. Exhaust filter
8. Adapter
9. Power button (green: off; blue: on)
10. Adapter with white quick coupling



Figure 6. The position of the white quick coupling in a 45 degree angle.

Setting up the QIAvac Connecting System

Install the vacuum system on a flat, planar surface. Avoid direct sunlight, heat and humidity. The complete installed system is shown in Figure 8 ("QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump." on page 27).

Procedure

1. Place the tray (11) in the desired location. Place the vacuum pump (7) in the large rectangular recess of the tray.
2. Attach the vacuum pump connecting tube (12; with nut and angled quick coupling) to the sterile filter (11a) by rotating the nut clockwise. Attach the angled quick connector (12) to the pump quick coupling (10).
3. Place the waste bottles (16) into the round recesses of the tray.
4. Attach the unconnected end of the regulator connecting tube (11d; coming from the tray) to the female port on the left-hand waste bottle.
5. Connect the waste bottles (16) together using the waste bottle connecting tube (13).
6. Attach one end of the manifold connecting tube (14) to the male quick coupling on the right-hand side waste bottle (16). Attach the other end to the main vacuum valve (15). Connect the tubing from the main vacuum valve (15) to the quick coupling on the QIAvac 24 Plus vacuum manifold (3).

Note: The quick coupling adapter should be attached to the lower threaded hole of the vacuum manifold (see "'Setting up the QIAvac 24 Plus" on page 21"). Use of the upper threaded hole would cause liquid to collect in the manifold.

Note: The operation of the vacuum system should be checked each time it is assembled (see "Appendix B: Testing the QIAvac 24 Plus and the QIAvac Connecting System" on page 28).

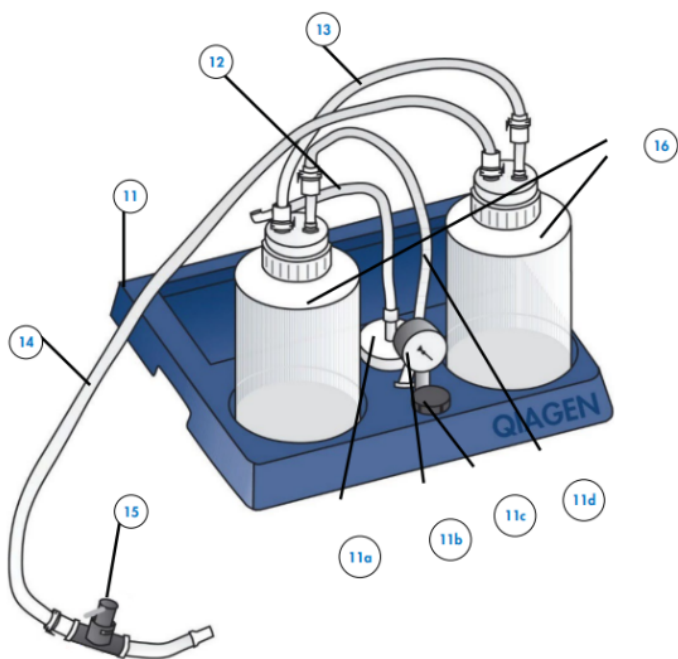


Figure 7. Setting up the QIAvac Connecting System.

11. Tray, pre-assembled with:
 - a. Sterile filter
 - b. Vacuum gauge
 - c. Vacuum regulator
 - d. Regulator connecting tube
12. Vacuum pump connecting tube (with nut and angled quick coupling)
13. Waste bottle connecting tube
14. Manifold connecting tube
15. Main vacuum valve
16. Waste bottles

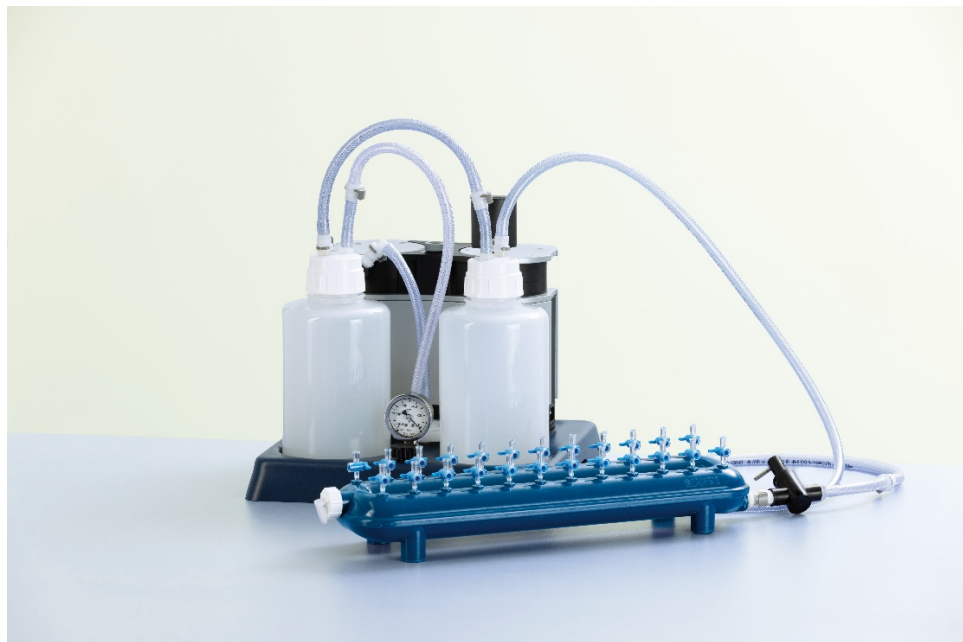


Figure 8. QIAvac 24 Plus, QIAvac Connecting System, and Vacuum Pump.

Appendix B: Testing the QIAvac 24 Plus and the QIAvac Connecting System

The QIAvac 24 Plus and the QIAvac Connecting System should be tested before performing a nucleic acid purification procedure.

WARNING



Ensure that the pump quick coupling is fixed to the left-hand inlet of the vacuum pump and the pump filter with its adapter is fixed in the right-hand exhaust outlet. Exchanging these connections will lead to a sudden increase in pressure within the manifold and possible destruction.

Note: Each time that the vacuum pump is disconnected, ensure that all connections are correctly replaced and that the pump generates a vacuum after reconnection.

Procedure

1. Plug the power cord of the vacuum pump into a grounded power outlet.

Note: Do not use a three-to-two plug adapter.

2. Ensure that the caps on the waste bottles are tightly closed.
3. Ensure that all quick couplings are seated properly.
4. Insert a VacValve or luer plug into each of the 24 positions on the vacuum manifold. Ensure the VacValves are closed.
5. Close the main vacuum valve as shown in Figure 9.
6. Switch on the vacuum pump by pressing the power switch on the side, then the power button on top of the vacuum pump, and then turning the button to the right. Vacuum is now applied to the QIAvac Connecting System.

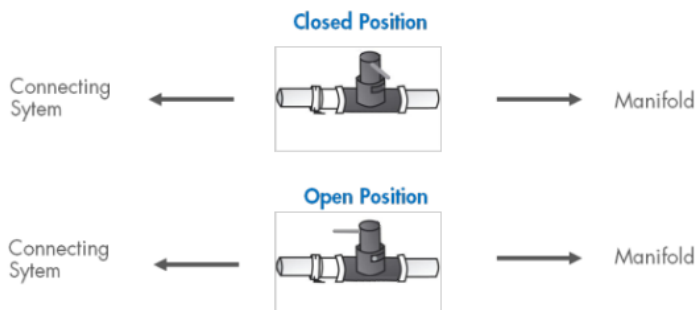


Figure 9. Main vacuum valve in the closed and open position.

7. Wait for the needle of the vacuum meter to stabilize. If the needle indicates the vacuum is below -800 mbar, the QIAvac Connecting System is connected correctly and ready to use. If the needle takes a long time to stabilize, the in-line sterile filter may need to be replaced (see "Replacement of worn parts" on page 34). If the needle does not reach -800 mbar, check the connections of the QIAvac Connecting System.
8. Open the main vacuum valve to apply the vacuum to the QIAvac 24 Plus manifold. Wait approximately 1 minute for the needle of the vacuum meter to stabilize. If the vacuum is below -600 mbar, the manifold is ready to use. If the vacuum does not reach -600 mbar, check that the luer plugs or VacValves are seated properly, the VacValves are closed, and the screw cap valve is closed tight.
9. Once the vacuum pressure has been determined, release the vacuum by using the screw cap valve (see "Setting up the QIAvac 24 Plus vacuum manifold for use with the QIAvac Connecting System." on page 22), opening a VacValve, or removing a luer plug from the manifold.
10. Switch off the vacuum pump and proceed to nucleic acid vacuum purification protocol. For nucleic acid purification follow the QIAvac 24 Plus vacuum protocol in the relevant handbook.

Appendix C: Cleaning and Decontaminating the QIAvac 24 Plus

The QIAvac 24 Plus should be regularly cleaned to maintain optimum performance. The QIAvac 24 Plus must also be decontaminated before removal from the laboratory. Two cleaning protocols are described in this section. The cleaning protocol chosen depends upon whether the QIAvac 24 Plus is used as a stand-alone waste reservoir, or as a flow-through device in combination with the QIAvac Connecting System. Perform the cleaning procedure after each use to avoid sample contamination.

Important points before starting

- When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, consult the appropriate material safety data sheets (MSDSs), available from the product supplier.
- Do not use cleaning materials that contain abrasives.
- If the vacuum manifold is still not clean after following the procedures below, soak the vacuum manifold in warm detergent solution for at least 4 hours. Then repeat the procedure.
- Sample-preparation waste and some buffers contain guanidine hydrochloride and/or guanidine thiocyanate (for details, see the handbook of the QIAGEN kit being used). Mixing of these solutions with sodium hypochlorite (bleach) can form highly reactive compounds. See the kit handbook for safety information.
- If liquid containing guanidine salt is spilt, clean with suitable laboratory detergent and water. If the spilt liquid contains potentially infectious agents, clean the affected area first with laboratory detergent and water, and then with 1% (w/v) sodium hypochlorite.

- Check regularly the liquid level of the right waste bottle and empty the bottle before it is completely filled. Only the right waste bottle should contain waste liquid. The left waste bottle is an overflow trap only. A full waste bottle and overflow trap facilitates the entry of liquid waste into the pump, causing damage or loss of performance.

Reagents to be supplied by user

For cleaning the QIAvac 24 Plus after stand-alone use:

- Standard laboratory detergent

For cleaning the QIAvac 24 Plus and QIAvac Connecting System after combined use:

- Standard laboratory detergent
- Standard laboratory disinfectant
- Ethanol (70%)
- **Optional:** 1% w/v, Sodium hypochlorite (bleach)

Cleaning the QIAvac 24 Plus after standalone use

Procedure

- Disconnect the manifold from the vacuum source.
- Remove the vacuum adapter (5) from the quick-coupling female connector (3) on the manifold and insert the cleaning adapter (6).
- Allow liquid waste to drain out of the manifold.
- Rinse the inside and outside of the QIAvac 24 Plus vacuum manifold and associated components with laboratory detergent solution and distilled water.
- Allow the manifold to air-dry.

Cleaning the QIAvac 24 Plus and QIAvac Connecting System after combined use

Procedure

- Disconnect the vacuum manifold from the QIAvac Connecting System.
- Remove the VacValves and soak in laboratory detergent solution. Rinse thoroughly using water, then in 70% (v/v) ethanol. Wipe dry or allow to air-dry.
- Spray the QIAvac 24 Plus manifold with standard laboratory disinfectant and allow to soak for at least 10 minutes.
- Thoroughly rinse outside of the manifold in 70% (v/v) ethanol then water.

Note: If desired, the interior and exterior of the vacuum manifold and VacValves can be cleaned with 1% (w/v) sodium hypochlorite. This cleaning step will require all waste and buffers to be completely drained from the manifold as they contain chaotropic salts, which can react with sodium hypochlorite. This cleaning procedure may reduce the operating life of the QIAvac 24 Plus manifold due to the aggressive nature of sodium hypochlorite.

- Disconnect the manifold connecting tube (14) and the waste bottle connecting tube (13) from the right-hand waste bottle (16). Open the waste bottle and dispose of liquid waste.
- Clean the waste bottle, waste bottle cap, and manifold connecting tube with standard laboratory disinfectant and water.
- Unplug the vacuum pump.
- Wipe the surface of the vacuum pump and tray using standard laboratory disinfectant, and then with water. Wipe dry the surface of the vacuum pump.

Appendix D: Handling and Maintenance of the QIAvac 24 Plus

The following guidelines should be followed when working with the QIAvac 24 Plus.

- Always place the QIAvac 24 Plus on a secure bench top or work area. If dropped, the QIAvac 24 Plus manifold may crack.
- Always store the QIAvac 24 Plus clean and dry. For cleaning procedures see "Appendix C: Cleaning and Decontaminating the QIAvac 24 Plus" on page 30.
- The components of the QIAvac 24 Plus are not resistant to certain solvents (Table 2). If these solvents are spilt on the unit, rinse it thoroughly with water.
- To ensure consistent performance, do not apply silicone or vacuum grease to any part of the QIAvac 24 Plus manifold.
- Always use caution and wear safety glasses when working near a vacuum manifold under pressure.
- Contact QIAGEN Technical Services or your local distributor for information concerning spare or replacement parts.

Table 2. Chemical resistance properties of the QIAvac 24 Plus

Resistant to:

Acetic acid	Chaotropic salts	Chlorine bleach
Chromic acid	Concentrated alcohols	Hydrochloric acid
SDS	Sodium chloride	Sodium hydroxide
Tween® 20	Urea	

Not resistant to:

Benzene	Chloroform	Ethers
Phenol	Toluene	

Replacement of worn parts

Note: Replace the screw filter if it becomes blocked or damp.

1. To replace the filter (1 1 a), disconnect the angled quick coupling from the vacuum pump.
2. Remove the filter tube by rotating the nut counterclockwise.
3. Unscrew the used filter by turning the filter counterclockwise.
4. Reverse this procedure to insert a new filter.
5. Screw filters are available from Sartorius™ Midisart™ 2000 PTFE Air Filter (cat. no. 10109660, pack of 12).

Note: Tubing should be replaced if discolored or cracked.

Appendix E: Vacuum Regulator

The Vacuum Regulator measures the pressure difference between the inside and outside of a vacuum system in millibars* (Figure 10). Use of the Vacuum Regulator makes it easy to monitor the pressure generated by the vacuum source, ensuring that it is sufficient for the appropriate QIAGEN purification chemistry.

The design of the scale is subject to change. The vacuum pressure may be indicated in millibars or in bars (as seen in the figure).

Vacuum Regulator

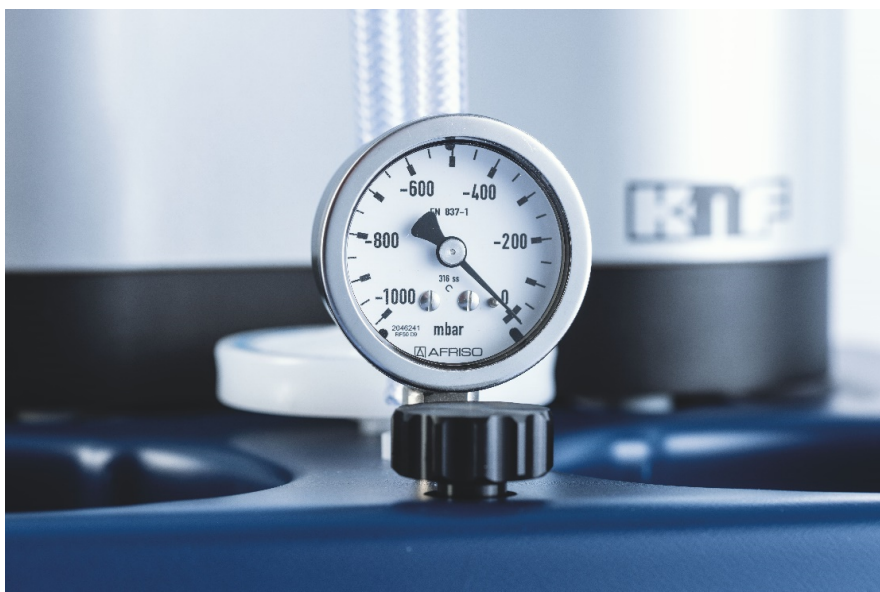


Figure 10. Close-up look of pressure clock.

*The design of the scale is subject to change. The vacuum pressure may be indicated in millibars or in bars (as seen in the figure).

To convert from millibars (mbar) to:	Multiply by:
Millimeters of mercury (mmHg)	0.75
Kilopascals (kPa)	0.1
Inches of mercury (inch Hg)	0.0295
Torrs (Torr)	0.75
Atmospheres (atm)	0.000987
Pounds per square inch (psi)	0.0145

Ordering Information

Product	Contents	Cat. no.
QIAvac 24 Plus	Vacuum Manifold for processing 1–24 spin columns: includes QIAvac 24 Plus Vacuum Manifold, Luer Plugs, Quick Couplings	19413
QIAvac Connecting System	System to connect vacuum manifold with vacuum pump: includes Tray, Waste Bottles, Tubing, Couplings, Valve, Gauge, 24 VacValves	19419
Vacuum Pump	100–240V; 50/60 Hz, 1 Exhaust Filter	9003250
VacValves (24)	24 valves for use with the QIAvac 24 Plus	19408
Vacuum Regulator	For use with QIAvac manifolds	19530
Related Products		
QIAprep Spin Miniprep Kits – for purification of up to 20 µg molecular biology grade plasmid DNA		
QIAprep Spin Miniprep Kit (250)	For 250 high-purity plasmid minipreps: 250 QIAprep 2.0 Spin Columns, Reagents, Buffers, Collection Tubes (2 mL)	27106
QIAquick PCR Purification Kit – for purification of PCR products, 100 bp to 10 kb		
QIAquick PCR Purification Kit (50)*	For purification of 50 PCR reactions: 50 QIAquick Spin Columns, Buffers, Collection Tubes (2 mL)	28104
QIAquick Nucleotide Removal Kit — for up to µg oligonucleotide (17–40mers) and DNA (40 bp to 10 kb) cleanup from enzymatic reactions		
QIAquick Nucleotide Removal Kit (250)*	250 QIAquick Spin Columns, Buffers, Collection Tubes (2 mL)	28306
QIAquick Gel Extraction Kit – For gel extraction/cleanup of up to 10 µg DNA (70 bp to 10 kb) from enzymatic reactions		
QIAquick Gel Extraction Kit (50)	For gel extraction cleanup of 50 reactions: 50 QIAquick Spin Columns, Buffers, Collection Tubes (2 mL)	28704

*For more kit sizes, go to www.qiagen.com

Product	Contents	Cat. no.
QIAamp DNA Blood Mini Kit – for purification of up to 12 µg genomic, mitochondrial, or viral DNA from blood and related body fluids		
QIAamp DNA Blood Mini Kit (50)*	For 50 DNA minipreps: 50 QIAamp Mini Spin Columns, QIAGEN Protease, Collection Tubes (2 mL), Reagents, Buffers	51104
QIAamp DNA Blood Midi Kit – for purification of up to 60 µg genomic, mitochondrial, or viral DNA from blood and related body fluids		
QIAamp DNA Blood Midi Kit (20)* ¹	For 20 DNA midipreps: 20 QIAamp Midi Spin Columns, QIAGEN Protease, Buffers, Collection Tubes (15 mL)	51183
QIAamp DNA Blood Maxi Kit – for purification of up to 600 µg genomic, mitochondrial, or viral DNA from blood and related body fluids		
QIAamp DNA Blood Maxi Kit (10)*	For 10 DNA maxipreps: 10 QIAamp Maxi Spin Columns, QIAGEN Protease, Buffers, Collection Tubes (50 mL)	51192
QIAamp DNA Mini Kit – for purification of genomic, mitochondrial, bacterial, parasite, or viral DNA		
QIAamp DNA Mini Kit (50)*	For 50 DNA preps: 50 QIAamp Mini Spin Columns, QIAGEN Proteinase K, Reagents, Buffers, Collection Tubes (2 mL)	51304
QIAamp Viral RNA Mini Kit – for purification of viral RNA from cell-free body fluids		
QIAamp Viral RNA Mini Kit (50)*	For 50 RNA preps: 50 QIAamp Mini Spin Columns, Carrier RNA, Collection Tubes (2 mL), RNase-free Buffers	52904
QIAamp MinElute Virus Vacuum Kit – for simultaneous purification of viral RNA and DNA from plasma, serum, and cell-free body fluids		
QIAamp MinElute Virus Vacuum Kit (50)	For 50 minipreps: 50 QIAamp MinElute Columns, QIAGEN Protease, Carrier RNA, Buffers, Extension Tubes (3 mL), Collection Tubes (1.5 mL)	57714
QIAamp DSP DNA Blood Mini Kit – for isolation and purification of genomic DNA from human whole blood for in vitro diagnostic purposes		

¹For more kit sizes, go to www.qiagen.com

Product	Contents	Cat. no.
QIAamp DSP DNA Blood Mini Kit	For 50 preps: QIAamp Mini Spin Columns, Buffers, Reagents, Tubes, VacConnectors, and Multi-Language Handbook	61104
QIAamp DSP Virus Kit – for purification of viral nucleic acids from human plasma and serum for in vitro diagnostic purposes		
QIAamp DSP Virus Kit	For 50 preps: QIAamp MinElute Columns, Buffers, Reagents, Tubes, Column Extenders, VacConnectors; includes Multi-language Handbook	60704
MinElute PCR Purification Kit – for purification of PCR products (70 bp to 4 kb) in low elution volumes		
MinElute PCR Purification Kit (50)*	50 MinElute Spin Columns, Buffers, Collection Tubes (2 mL)	28004
MinElute Gel Extraction Kit – for gel extraction of DNA fragments (70 bp to 4 kb) in low elution volumes		
MinElute Gel Extraction Kit (50)*	50 MinElute Spin Columns, Buffers, Collection Tubes (2 mL)	28604
MinElute Reaction Cleanup Kit – for cleanup of DNA (70 bp to 4 kb) from enzymatic reactions		
MinElute Reaction Cleanup Kit (50)*	50 MinElute Spin Columns, Buffers, Collection Tubes (2 mL)	28204
RNeasy Mini Kit – for purification of up to 100 µg total RNA from animal cells or tissues, yeast, or bacteria		
RNeasy Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes (1.5 mL and 2 mL), RNase-free Reagents and Buffers	74104
RNeasy Mini/Maxi Kit – For total RNA isolation from animal cells, animal tissues, bacteria, yeast, whole blood, and for RNA cleanup		
RNeasy Midi Kit (50)	50 RNeasy Midi Spin Columns, Collection Tubes (15 mL), RNase-free Reagents and Buffers	75144
RNeasy Maxi Kit (12)	12 RNeasy Maxi Spin Columns, Collection Tubes (50 mL), RNase-free Reagents and Buffers	75162

*For more kit sizes, go to www.qiagen.com

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Document Revision History

Date	Changes
10/2010	Initial release.
04/2025	Updated protocol in setting up the QIAGEN Vacuum Pump. Updated Ordering Information.
10/2025	Edited Kit Contents to remove "Handbook" as one of its contents.

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