The Genevac Rocket™ Evaporation System

User Manual

Original instructions

Part number 04-6276 Issue 3-2 June 2014

Contents

Introduction

Rotor with inner lid removed

1. ***Main lid:*** Unlocks automatically, only when safe to open. Manually lift to access the inner lid and vacuum chambers.

2. ***Inner lid:*** Turn thumbscrew and lift off to access the rotor and load / unload sample holders.

3. ***Sample viewing window:*** Monitor evaporation progress visually using the strobe light.

4. ***Outer lid seal:*** Seals between the outer vacuum chamber and atmosphere.

5. ***Sample holder:*** Choose from the range of Rocket sample holders to optimise the system for drying or for concentration.

6. ***Inner lid seal:*** Isolates the inner vacuum chamber from the outer vacuum chamber, allowing the system to control the pressure in each chamber independently.

7. ***Rotor:*** Accepts up to six 450 ml flasks or 18 ASE tubes at a time*.

8. ***Seal clamp:*** Automatically seals between sample holder and rotor when the rotor spins; releases to allow easy loading / unloading when the rotor is stationary.

9. ***Waste solvent drain outlet:*** Connect a waste solvent container for fully automatic waste solvent draining.

10. ***Waste container vent:*** Vapour from waste solvent is expelled via the system exhaust.

11. ***USB port:*** (Under control panel.) Data log files may be transferred to, method files may be transferred to or from, a USB data key.

12. ***Start, stop, pause buttons:*** Control the evaporation process using selected method.

13. ***LCD screen:*** Menus allow quick access to everyday functions and intuitive guidance to advanced features; at-a-glance system status information is shown during the evaporation process.

14. ***Select control:*** Twist to highlight menu options on the screen, press to select.

15. ***Stobe control:*** Press to activate. Sample holders may be viewed through the viewing window.

16. ***Condenser:*** Waste solvent is recovered by a highly efficient cold trap which is powered by coolant from a re-circulating chiller or external chilled water source. Solvent is drained from the cold trap automatically.

* ASE® is a registered trade mark of Dionex Coproration.

Safety

Warnings and cautions

This symbol is used within this manual to highlight ***Warnings*** and ***Cautions***.

Warning: highlights a risk of personal injury or material damage.

Caution: highlights a risk of material damage.

Risk assessment

Caution: Carry out a risk assessment for each solvent before use. Consider the possible consequences of applying vacuum to solvent mixtures, especially organic solvents. For example, H_2O_2 gives off O_2 under vacuum, creating an oxygen rich atmosphere.

Precautions

Observe the following safety precautions when using the evaporation system:

- Only operate the system in a ventilated space.
- Make sure exhaust / ventilation hoses are securely fitted and take solvent vapours away from the equipment and from the user.
- Only use sample holders that are approved for use by Genevac.
- Do not start or restart the system without checking it is correctly loaded; do not leave the system unevenly loaded (someone may start it).
- Do not place objects on top of the evaporator.
- Clean up any solvent spillage immediately.
- For solvent compatibility information, refer to the Genevac published list of acceptable solvents.
- Dispose of waste solvents in accordance with local environmental regulations.
- Do not use the strobe if any person in the vicinity is prone to photosensitive epileptic seizure.

Caution: Incorrect loading may result in damage to samples and to the system.

Only allow users who are familiar with all the issues outlined in this user manual to operate the equipment. If personnel lack the training or experience to comprehend the hazards that can arise when operating the system, do not allow them to use it; personnel without such training require thorough instruction. The information contained within this user manual may form the basis of such training.

Combustible solvents

Warning: Risk of vapour ignition. Only operate the system in a ventilated environment and consider safety when evaporating any combustible solvents. Genevac's position regarding the evaporation of such solvents, particularly with respect to the European ATEX directive, is available on our website, at www.genevac.com, or from your local Genevac representative.

Electrical earthing

Warning: Risk of electric shock. This equipment must be earthed. The evaporation system is a safety class I product according to IEC classification. It must never be used with any interruption to the safety earth conductor. It is an installation class II product and is intended to operate from a normal single-phase supply.

Emergency shutdown

To shutdown in an emergency, switch off the power socket at the wall and unplug (or simply unplug if there is no switch). All Genevac evaporators are designed to be safe, with respect to samples, when switched off in an emergency. The system will automatically vent and the rotor will spin down slowly when power is removed. Users should familiarise themselves with the location of the connection to the mains supply and make sure the power socket and plug is always accessible.

Strong acids

Caution: Do not attempt to evaporate, HCl, thionyl chloride, or other acid chlorides, in non-HCl compatible evaporators.

High boiling point solvents

Caution: Do not evaporate high boiling point solvents (170°C or above at atmospheric pressure). This includes DMSO, DMI and NMP. Attempting to evaporate these solvents is likely cause damage to the evaporator vacuum system.

Low auto-ignition point solvents

Warning: Risk of vapour ignition. Do not attempt to evaporate diethyl ether, pentane or other low auto-ignition solvents unless the evaporator is fitted with an inert gas purge system.

Basics

Power up

Before switching on, check that power is connected to the Rocket and re-circulating chiller and all other cables and hoses are connected as shown in: ***Service connections***. Switch on the Rocket power switch and switch on the chiller (for systems without a recirculating chiller, turn on the chilled water supply).

After a short boot-up sequence, the ***Method Select*** menu appears on the Rocket screen. If ***Commissioning*** or ***Sys use*** check lists appear, follow the instructions and press the select control to confirm each check is completed (check lists can be enabled or disabled in the ***Options*** menu).

Note: Repeatedly switching off and on should be avoided. After switching off, wait at least 10 seconds before powering up again.

Standby mode

While the Rocket is idle, press the stop button to put the Rocket into standby mode. The screen brightness reduces (the Rocket logo and software version are shown) and all other systems are powered down.

To restart, press any button.

Controls

Menu screens interact with the controls for programming, selecting methods and operating the evaporator.

1. ***Screen:*** Menus allow quick access to everyday functions for method selection and alteration, and an intuitive guide to advanced features. At-a-glance system status information is shown during the evaporation process.

2. ***Strobe control:*** Press to activate the strobe (observe samples through the sample viewing window). Twist the control to adjust the strobe timing and bring each sample holder into view in turn. The strobe deactivates after a short time, alternatively press the control again to manually deactivate.

3. ***Start button:*** Press to start the evaporator using the highlighted method.

4. ***USB port:*** (Below the control panel.) Plug in a USB mass storage device (data key) to copy methods to or from the Rocket or to transfer data log files from the Rocket. Software updates may also be transferred via data key.

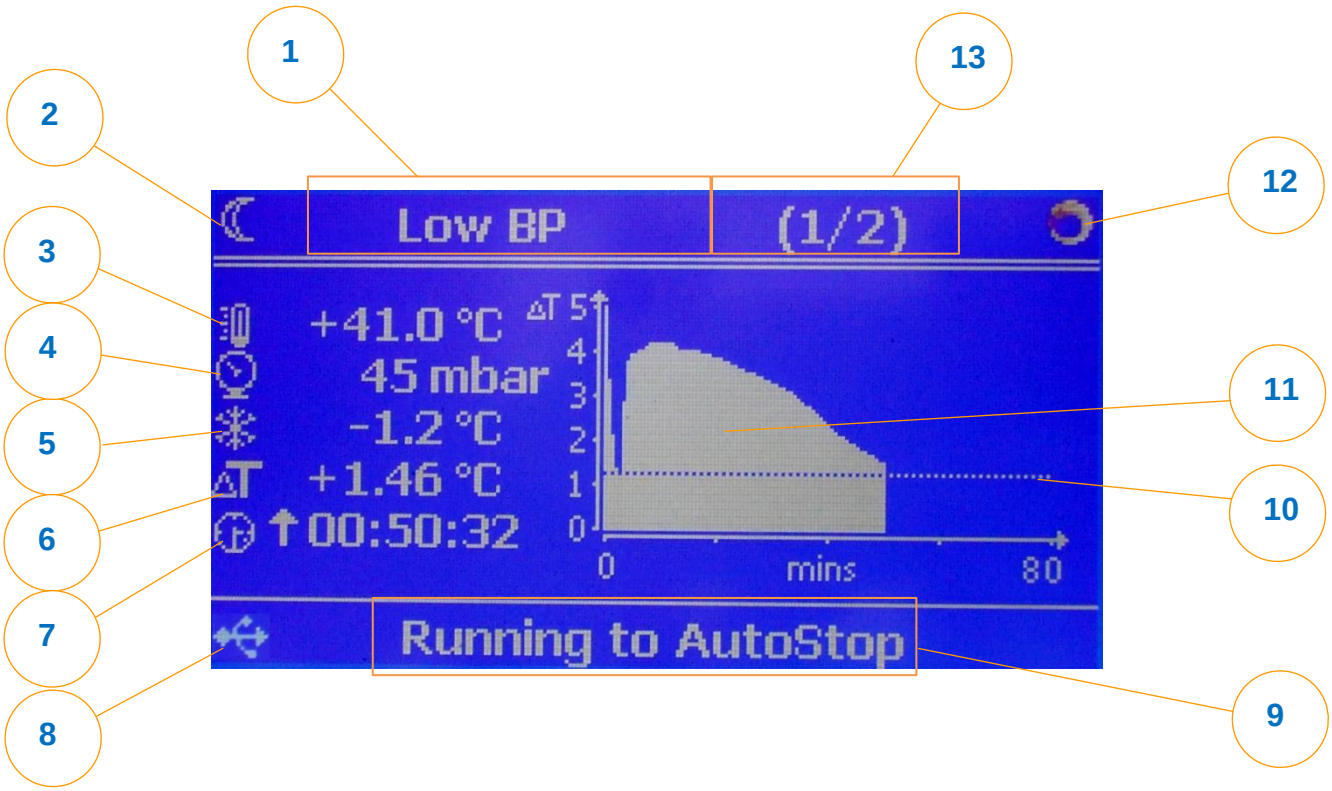
5. ***Pause button:*** Press to temporarily interrupt the evaporator, evaporation may be resumed later.

6. ***Stop button:*** Press to stop the evaporator.

7. ***Select control:*** Turn to highlight options in menus on the screen, press to select the highlighted option.

LCD screen

Graphical and numerical information relating to system status and evaporation progress is shown during evaporation.



1. Selected method
2. Power save function enabled
3. Sample temperature
4. Inner (rotor) chamber pressure
5. Coolant temperature
6. Delta T (ΔT)*
7. Elapsed time or time remaining
8. USB device connected
9. Current method stage
10. ΔT trigger point
11. ΔT graph
12. Rotor spinning
13. Current method stage

* See ***System Optimisation***, ***Delta T*** for details.

Opening the lid

Using the handle, manually lift the lid to the fully open position.

Note: The outer lid cannot be opened when the power is switched off or when the evaporator is operating.

Lift handle to open the lid

Turn the thumb screw counter clockwise and lift the inner lid away from the rotor.

Inner lid *thumb screw*

Warning: Risk of scalding. The inner lid and sample flasks can reach temperatures up to 60°C and may be wet and slippery after use. Take care when handling,

An optional lid stand provides safe storage for the lid while samples are being loaded or unloaded.

Lid stand

After loading sample holders into the Rocket (see the following section for details) place the inner lid on the rotor; make sure the lid screw lines up with the rotor centre support. Clamp the lid down using the thumb screw, tighten until light resistance is felt then tighten another ¾ of a turn. Do not over tighten.

Caution: Over tightening the inner lid thumb screw may caus damage to the lid and centre support.

Note: Should an error message relating to vacuum appear when the evaporator is started, check the outer lid and inner lid are properly fitted. Push down on the back of the outer lid to ensure it is fully seated all the way round (see: ***Troubleshooting***, ***Error messages***).

Getting Started

Loading sample holders

Before loading sample holders into the rotor, check to make sure they are not scratched, damaged or have labelling applied to them.

Also check the condition of the sample holder seals. Look for splits or tears, refer to: ***Maintenance*** and replace the seals at the first sign of wear.

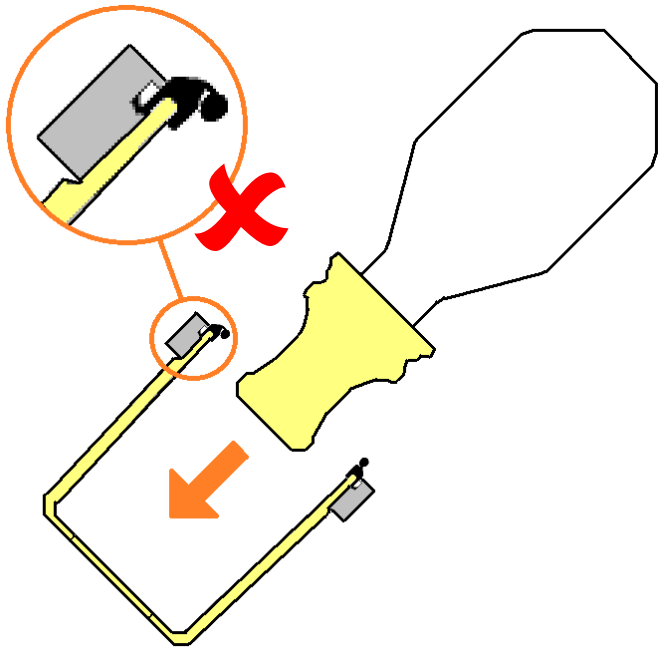
Make sure the sealing lip of each sample holder seal is upright (so it will not become trapped when the sample holder is inserted into the rotor). If necessary, manipulate the sealing lip into the correct position.

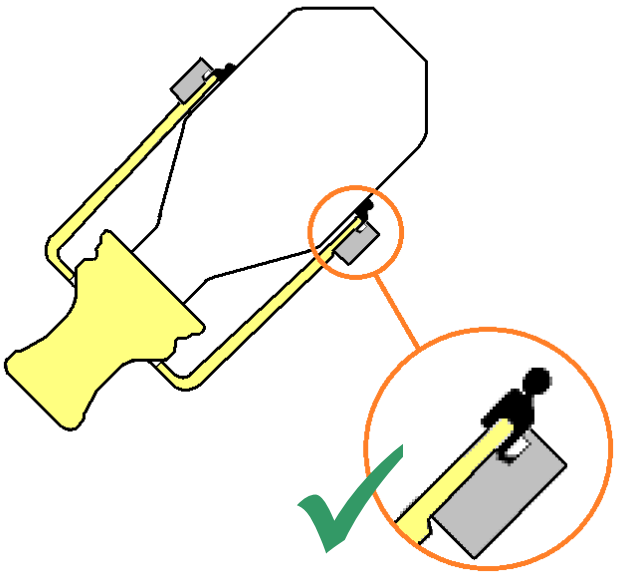
When loading sample holders into the rotor, use a twisting action to ease holders into place; there should be minimal resistance. Avoid pressing down on the rotor (any pressure on the centrifugal clamp will cause the sample holder to jam).

The use of a diffusing sprayer to wet the seals with deionised water, may assist sealing.

Note: Any leakage around the sample holders will slow down the evaporation process and may cause errors to appear on the screen.

Avoid trapping the lip when inserting sample holders





Sealing lip in correct "upright" position

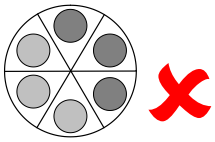
Caution: Damaged flasks may break causing unrecoverable sample loss and damage to the evaporator. Check the sample holders before every use, do not use flasks that are damaged or scratched.

Balancing the rotor

Balance all sample holder assemblies within 10 g and avoid cumulative imbalance by distributing small weight variations evenly around the rotor.

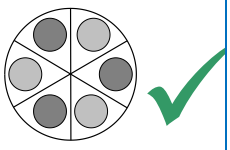
Rotor imbalanced

Although all sample holders are within 10 g, heavier holders are clustered causing a cumulative imbalance.



Rotor balanced

All samples holders within 10 g and minor variances are distributed evenly around the rotor.



Blanking plugs

Use blanking plugs to seal any unused rotor positions (alternatively empty sample holders can be used).

Starting the evaporator

In the ***Method Select*** menu, twist the select control to highlight the required method; then press the start button. The screen displays the method settings momentarily whilst the rotor spins up.

Note: If ***Pre Run Checks*** appear on the Screen, complete the checks as prompted and press the start button to confirm each check has been performed. ***Pre Run Checks*** can be enabled or disabled from the ***Options*** menu.

Evaporation methods consist of multiple stages which follow on automatically. Whilst evaporation is in progress, the screen shows the current status; for example:

Stage 1: system safety check
Stage 2: controlled vacuum ramp
Stage 3: evaporation stage
Stage 4: final drying stage.

Method settings may be changed whilst evaporation is in progress

Stopping

The evaporator stops automatically when the evaporation process is complete.

To stop manually, press the stop button. The evaporator vents to atmospheric pressure and rotor slows down and stops.

Pausing

Press the pause button to stop the evaporator temporarily. Once the rotor comes to a stop, samples may be inspected. The evaporation process may then be resumed if required.

Unloading

If resistance is felt when removing the sample holders (certain solvents may cause the sample holders to stick to the rotor) twist the holders to break the seal; then continue twisting while pulling the holder out of the rotor.

Warning: Risk of scalding. Sample holders may reach temperatures up to 60°C and may be wet and slippery. Take care when handling.

Draining the condenser

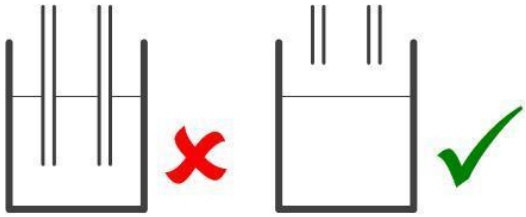
Draining is fully automatic and normally requires no user intervention. If manual draining is required, go to the ***Method Select*** menu, select the ***Drain Condenser*** option then press the start button .

Observe the condenser to make sure all solvent has drained, then press any button to close the drain valve (after six minutes the condenser drain valve closes automatically).

Waste solvent container

Make sure the waste solvent container is empty before starting the evaporator. Do not disconnect the waste solvent container while the evaporator is operating (the drain valve may open without warning).

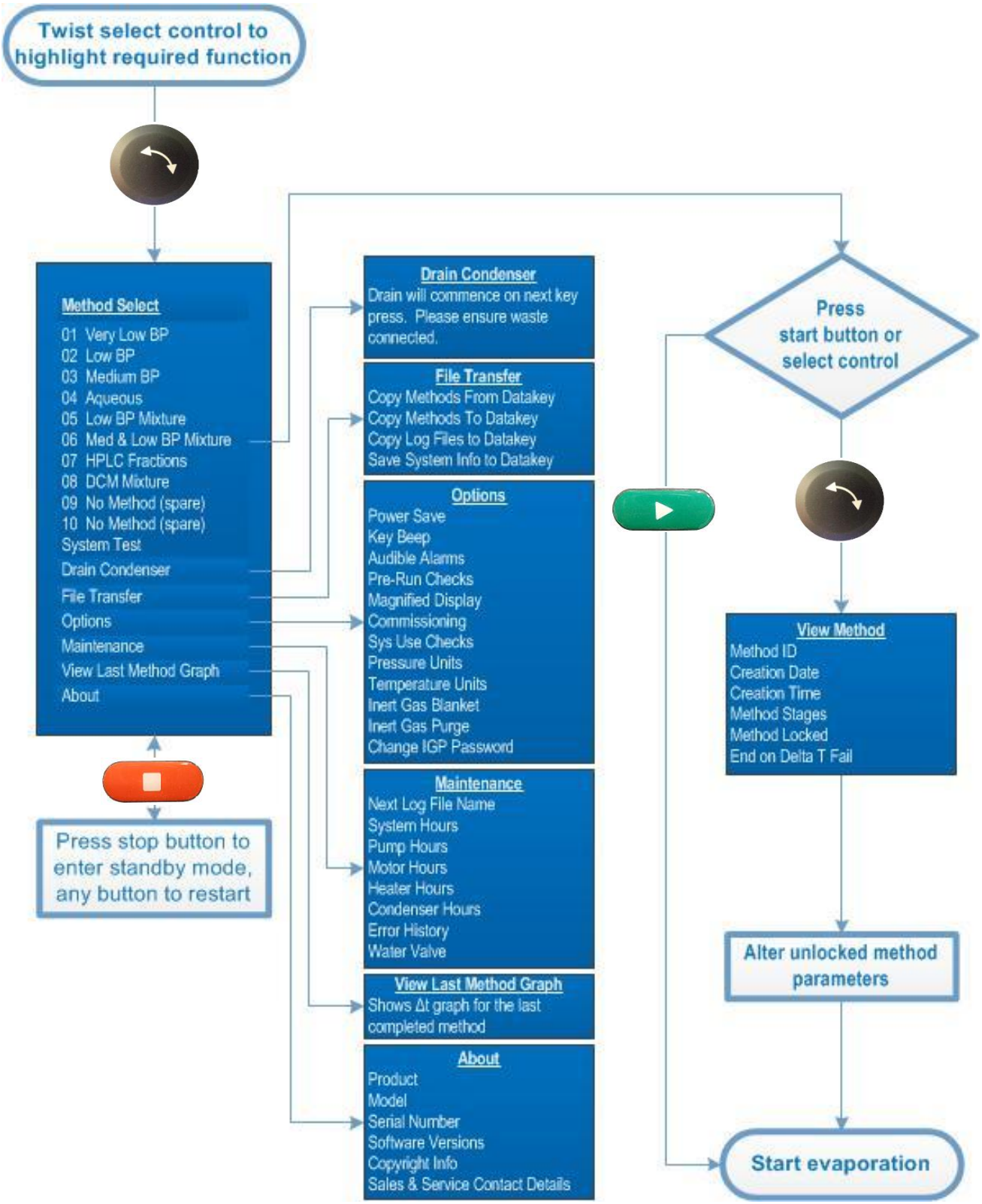
To prevent the risk of waste solvent being drawn back up the drain hose, make sure the end of waste solvent drain hose is above the maximum waste solvent level.



Make sure the hose connections to the waste solvent container are sealed to prevent leakage of exhaust vapour into the laboratory environment.

Menu overview

Use the select control to navigate intuitively through options that appear on the screen. To return to a previous menu, select <BACK> or press the stop button. Some menus revert automatically after a short period.



Method guide

The Rocket can store up to ten individual methods which can be accessed from the ***Method Select*** menu. Factory loaded methods are described below (methods on your Rocket may differ if they have been over-written).

Method select

In the ***Method Select*** menu, turn the select control to highlight the desired method on the screen. Press the control to select it.

Factory loaded methods

Number	Method	Solvent group	
01	*Very Low BP*	A very volatile solvent where bumping is not expected	<40°C
02	*Low Boiling Point*	A volatile solvent where boiling is not expected	<90°C
03	*Medium BP*	Less volatile solvents, generally bumping is not expected	90°C to 155°C
04	*Aqueous*	Water based where freezing at 0ºC is anticipated but bumping is not expected	N/A
05	*Low BP Mixture*	Mixtures of volatile solvents, bumping can be expected	<90°C
06	*Med & Low BP Mixture*	Mixtures with a volatile solvent that is prone to bumping with a less volatile solvent that requires low pressure to evaporate	40°C to 155°C
07	*HPLC Fractions* (Water / organic mixture)	Water / acetonitrile or Water / methanol fractions	N/A
08	*DCM mixture*	Mixtures of volatile and less volatile solvents	N/A

The table under: ***Acceptable solvents*** shows a suggested method to use for each solvent.

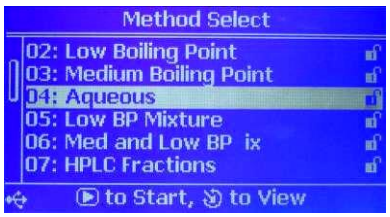
Method edit

Certain method parameters are fixed (they define the method) while others may be adjusted to optimise the evaporator for specific applications.

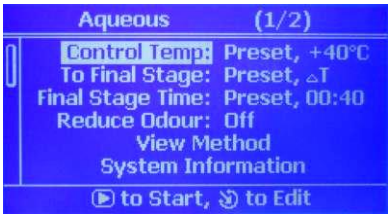
Adjustable method parameters may be changed (or edited) at any time, including when the evaporator is operating. Method parameter changes are stored and will apply to future use of the method.

To edit method settings:

1. Go to the ***Method Select*** menu and turn the select control to highlight the desired method.
2. Press the select control to enter the ***Method Edit*** menu.



3. Select the parameter to be edited.



4. Use the select control to scroll through the available setting options and select the required value.

   Note: The word "***Preset***" changes to a value if the setting has been altered.

5. Select ***<Back>*** to return to the ***Method Select*** menu.

Acceptable solvents

The solvents listed in the following table will not damage the evaporator, providing appropriate methods are used. Contact your local Genevac representative for advice before using any solvent which is not listed.

Solvent	Abbreviation	Recommended method	Sample holder seals	IGP
Acetic acid	$MeCO_2H$	*Aqueous*	P	
Acetic anhydride		*Medium BP*	P	
Acetonitrile	MeCN, ACN	*Low BP*	P	
1-Butanol		*Medium BP*		
2-Butanol		*Medium BP*		
Butanone	MEK	*Low BP*	P	
tert-Butyl alcohol	*tert*-butanol	*Aqueous*		
Chlorobenzene		*Medium BP*		
Chloroform	$CHCl_3$	*Very Low BP*		
Cyclohexane		*Low BP*		
1,2-Dichloroethane	DCE	*Low BP*	P	
Dichloromethane	DCM	*Very Low BP*	P	
Diethyl ether		*Very Low BP*	P	✓
Diisopropyl ether	DIPE	*Low BP*	P	
N,N-Dimethyl formamide	DMF	*Medium BP*	P	
1,4-Dioxane		*Aqueous*	P	
Ethanol	EtOH	*Low BP*	P	
Ethyl acetate	EtOAc	*Low BP*	P	
Formic acid	HCO_2H	*Aqueous*	P	
Heptane		*Low BP*		
Hexane		*Low BP*		
Methanol	MeOH	*Low BP*	P	
Methyl teriary butyl ether	MTBE	*Low BP*	P	
Pentane		*Very Low BP*		✓
1-Pentanol		*Medium BP*	P	
Petroleum ether	pet ether	*Low BP*		
1-Propanol		*Low BP*		
2-Propanal	IPA, *iso*-propanol	*Low BP*		
Propanone	Acetone	*Low BP*	P	
Pyridine		*Medium BP*	P	
Sodium hydroxide (aqeous)	NaOH	*Aqueous*	P	
Toluene		*Low BP*	P	
Triethylamine	Et_3N	*Low BP*	P	
Trifluroacetic acid	TFA	*Low BP*	P	
2,2,2-Trifluoroethanol	TFE	*Low BP*	P	
Water	H_2O	*Aqueous*		
Water & Acetonitrile		*HPLC*	P	
Water & Methanol		*HPLC*	P	
Water & Ammonia		*Requires custom method*	P	
TFA & DCM		*Low BP Mix*	P	

P With the exception of standard flasks, all sample holders used with these solvents must have perfluoroelastomer seals. For further details, refer to the ***Rocket Sample Holders User Manual***.

✓ Only evaporate these solvents in evaporators fitted with an inert gas purge option.

Advanced Features

Strobe

The strobe light allows individual sample holders to be observed through the viewing window during the evaporation process. A simple push and twist controller activates the strobe adjusts the strobe timing to bring each sample holder into view in turn.

The strobe does not function during spin up, spin down or when the rotor is stationary.

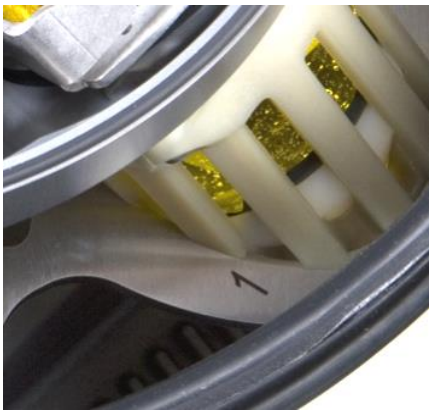
Sample viewing window

Strobe control

Warning: Risk of photosensitive epileptic seizure. The strobe emits light which flashes in the frequency range: 5 Hz to 30 Hz. Do not operate the strobe if any person in the vicinity may be prone to adverse effects due to strobe lighting.

To view samples using the strobe:

1. While the evaporator is operating, press the strobe control; press again to acknowledge the warning message that appears on the screen.
2. A strobe icon appears on the screen and the flashing strobe light activates.
3. Look through the sample viewing window to observe the samples.
4. Turn the strobe control to adjust the timing and bring each sample holder into view in turn. The rotor positions are numbered so each sample can be identified.
5. To switch the strobe off, press the strobe control again (if there is no user intervention for two minutes, the strobe powers off automatically).



File transfer

The file transfer function allows method files to be transferred between Rocket and a USB mass storage device (data key).

Using the file transfer function, custom methods may be installed, existing methods may be transferred from one Rocket to another and log files or system information can be downloaded. Once files have been transferred to a data key, they may then be transferred between data key and personal computer.

Note: For reliable operation, use a small data key (4 GB or less) that does not have protection, encryption or drive partitioning. The data key should be kept relatively empty and defragmented. If errors occur, clear the data key and reformat using FAT32 standard (do not use quick format).

Insert the data key into the USB port (under the left hand side of the control panel). The Rocket acknowledges the presence of the data key by emitting three short beeps and displaying a USB icon on the screen.

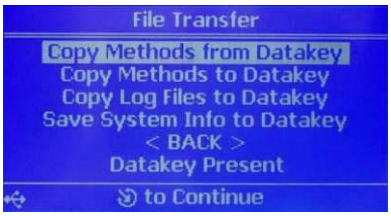
USB Data key

When a data key is used for the first time, Rocket creates a root folder called ***\ROCKET***, with sub-folders: ***\ROCKET\ARCHIVE*** and ***\ROCKET\DATALOG***.

Files transferred from Rocket to the data key, are automatically filed in the appropriate folder. To transfer files from a data key to Rocket, they must be in the root of the ***\ROCKET*** folder.

To Copy methods from a USB data key to the evaporator:

1. Using a PC, ensure there is a root folder called ***\ROCKET*** on the data key and copy the new method(s) to it.
2. Insert the data key into the evaporator USB socket (under the left hand side of the control panel).
3. On the Rocket, go to the ***Method Select*** menu and select ***File Transfer***.



4. Select ***Copy Methods from Datakey***.
5. Select the required file or ***Copy all*** to commence the file transfer. For individual methods, chose a desired method location when prompted: ***Select Method to Overwrite***.
6. After completion, select ***<BACK>*** to exit the ***File Transfer*** menu.
7. Remove the data key.

To copy methods from the evaporator to a USB data key:

1. Insert a USB data key into the USB port.
2. Go to the ***Method Select*** menu and select:
   File Transfer
   Copy Methods to Datakey
   Select the method to be copied (if required, repeat the process to copy more methods).
3. Select ***<BACK>*** to exit the ***File Transfer*** menu.
4. Remove the data key.

Note: The evaporator creates a directory: ***\ROCKET\ARCHIVE*** in which to store the methods. Once files have been transferred to the data key, they may than be transferred to another Rocket.

Log files

A log file is created for each evaporation process; it is assigned a unique eight digit reference number which is derived from the evaporator serial number followed by an incremental identifier. The evaporator can hold approximately four log files in internal memory (the oldest file is overwritten once the memory is full). Files that are held may be transferred to a USB data key.

To transfer log files to a USB data key:

1. Insert a data key into the USB port
2. Go to the ***Method Select*** menu and select:
   File Transfer
   Copy Log Files to Datakey
   Select the log file to be copied (if required, repeat the process to copy more log files).
3. Select ***<BACK>*** to exit the ***File Transfer*** menu.

The log files may be transferred from the data key to a PC.

Note: Rocket does not have a real-time clock. When log files are viewed on a computer, they display a fixed time and date that does not reflect the actual time and date.

To store a larger number of log files without being over-written, connect a USB data key to the evaporator USB port before starting the evaporator; the evaporator will log files directly to the data key.

Note: Log files record temperature in °C and pressure in mbar, regardless of the pressure and temperature unit options selected in the ***Options*** menu.

Reduce odour

The ***Reduce Odour*** function adds a repeated vent and vacuum cycle to the end of a method to purge the evaporation chamber of residual solvent vapours.

In the ***Method Select*** menu, highlight the required method, press the select control; then select ***Reduce Odour***. Chose from the available options: ↑ ***20 mbar*** for low boiling point solvents,↑ ***50 mbar*** or ↑ ***100 mbar*** for higher boiling point solvents. Experimentation will find the most effective settings for specific solvents.

For further information, visit www.genvac.com to download a copy of the applications note: ***Eliminating Odours***.

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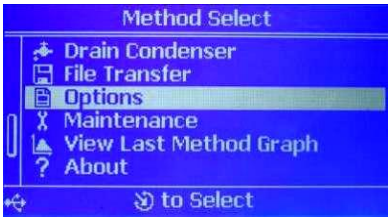
Options menu



Go to the ***Method Select*** menu and select ***Options***. Settings are offered which affect the way information is presented on the Screen.

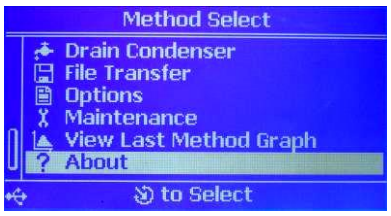
Options

Parameter	Setting	Effect
Power Save	On / Off	Switches off power after 30 minutes (if no user intervention)
Key Beep	On / Off	Disables key beep
Audible Alarms	On / Off	Disables audible alarms
Pre Run Checks	On / Off	Displays safety check list before allowing the evaporation process to start
Magnified Display	On / Off	Graphic / numeric display replaced by timer count up (or count down if end time is defined) after five minutes with no intervention from user
Commissioning	On / Off	Displays information useful during installation. The option to disable this function is offered at subsequent start-ups
Sys Use Checks	On / Off	Displays extended check list at start of every 10th run
Pressure Units	M / t	Displays pressure in millibar or Torr
Temperature Units	C / F	Displays temperature in Celsius or Fahrenheit
Inert Gas Blanket		Enables function (if option is fitted)
Inert Gas Purge		Enables function (if option is fitted)
Change IGP Password		Prevents unauthorised over-ride of Inert Gas Purge (if option is fitted)

View last method graph

Go to the ***Method Select*** menu and select ***View Last Method Graph***. The Screen shows the graph (ΔT against time) for the last completed method, refer to ***Condenser***, ***DeltaT***.

About menu



Go to the ***Method Select*** menu and select ***About***. The evaporator type and serial number are shown, along with software versions, copyright and contact information.

System info

System info includes calibration settings, error history and method settings and can be used for method validation purposes or for troubleshooting.

1. Insert a USB data key into the USB port (under left hand side of the control panel).
2. Go to the ***Method Select*** menu and select the ***File Transfer*** option.
3. Select ***Save System Info to Datakey***.

Open the downloaded file on a computer to view.

Note: Where method parameter settings have been changed using ***Method Edit***, the new value is shown. Where method settings are unchanged, this is indicated by the word ***Preset***.

Inert Gas Purge

The inert gas purge system (if fitted) can be used to displace air in the evaporator with inert gas prior to starting an evaporation process and to vent with inert gas at the end. Oxygen levels within the evaporator are maintained safely below the minimum level required for the combustion of solvents.

When enabled, ***Inert Gas Purge*** activates before every evaporation process, regardless of which method is selected.

Purging takes approximately 15 minutes, during which time a count-down appears on the screen.

After the evaporation process has ended, an inert gas blanket can be maintained to prevent samples reacting with elements in the air.

Warning: Risk of suffocation. Inert gas may leak from the evaporator during operation. Only operate the evaporator in a ventilated environment.

When using inert gas purge, seal any unused rotor positions using empty flasks; do not use blanking plugs.

If inert gas is supplied from a bottle, make sure there is sufficient gas to maintain the specified pressure and flow rate for the duration of the evaporation.

Do not switch off the inert gas supply until the evaporator has stopped, the condenser has been drained and samples have been removed from the evaporator.

Inert gases

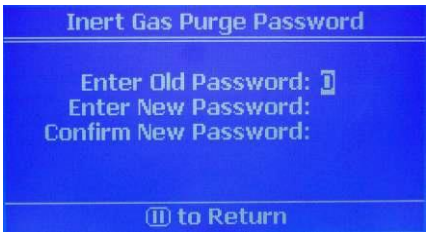
Nitrogen or argon (which must be dry) are suitable for use with the inert gas purge system. Consult your Genevac representative for advice before using alternative gasses.

IGP password

An ***Inert Gas Purge Password*** can be set to prevent unauthorised or unintended switching off of the inert gas purge system. The default factory setting is “0000” but can be changed to any combination of digits number.

To change the IGP password:

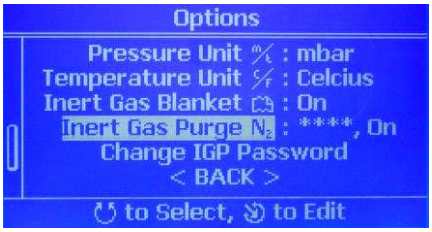
1. Go to the ***Method Select*** menu and select ***Options***.
2. Select ***Change IGP Password***.
3. Enter the old IGP password (number) using the select control, then enter and confirm the new password.



IGP enable

Inert Gas Purge can be enabled or disabled if the ***IGP Password*** is known:

1. Go to the ***Method Select*** menu and select ***Options***.
2. Select ***Inert Gas Purge***.
3. Enter the ***IGP Password***. Enter one digit at a time using the select control, digits are not displayed once entered (The password is actually a four digit number).
4. In the field to the right of ***Inert Gas Purge***, select ***On***.



Inert gas blanket

Inert gas is flushed into the evaporator to prevent samples reacting with elements in the air after the evaporator stops; an additional benefit is that the inert gas is dry.

When enabled, ***Inert Gas Blanket*** activates at the end of every evaporation, regardless of which method is selected.

The inert gas blanket is maintained by a two second inert gas “puff” which occurs once every minute.

Do not switch off ***Inert Gas Blanket*** until condenser draining is complete.

If both ***Inert Gas Blanket*** and ***Reduce Odour*** are enabled, ***Inert Gas Blanket*** overrides ***Reduce Odour***.

To enable inert gas blanket:

1. Go to the ***Method Select*** menu and select ***Options***.
2. Select ***Inert Gas Blanket***: ***On***

Note: ***Inert Gas Blanket*** is automatically enabled when ***Inert Gas Purge*** is switched on, but may also be enabled independently.

System Optimisation

Condenser

Condensing power is provided by coolant from either a re-circulating chiller or an external chilled water supply.

For chilled water supply systems, an optional water valve shuts off when the system is not in use.

For re-circulating systems, Genevac supply a Julabo chiller and connection kit that allows the evaporator to control the coolant temperature. To ensure optimum efficiency, keep the coolant level topped up. Use a mixture (50% water, 50% mono ethylene glycol) and make sure the chiller is set to remote control mode. Refer to the chiller operating manual for details.

For efficient operation, waste solvent must be drained from the condenser before every use.

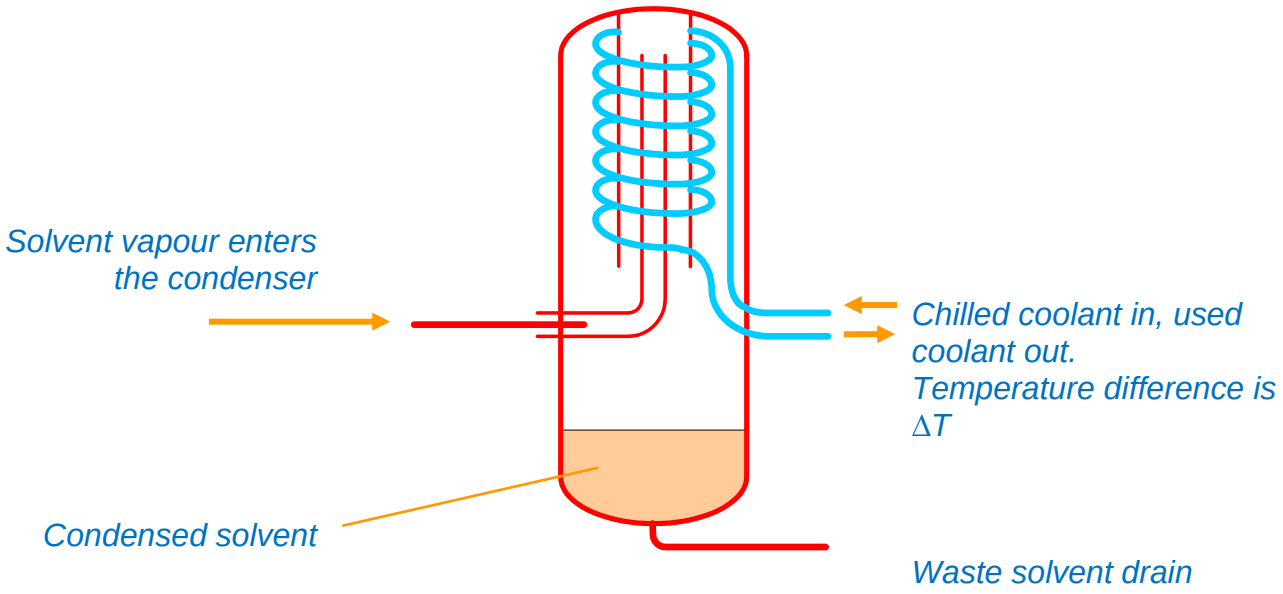
Delta T

The Rocket software monitors the temperature of coolant entering the condenser and compares it to the temperature of coolant leaving the condenser.

The difference (ΔT) equates to the heat energy transferred from the evaporated solvent to the condenser and is proportional to the flow rate of solvent vapour entering the condenser. As samples approach dryness, the reduction in ΔT is used to determine the auto stop trigger point.

Coolant stabilisation

External effects are likely to cause uneven heat distribution within the coolant circuit when the system is not in use, this can affect ΔT stability for a period after the evaporator is switched on. To allow time for stabilisation, the system does not attempt to set the end of stage trigger point during the first five minutes of operation.

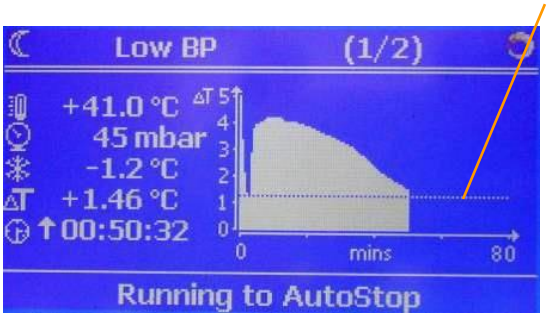


End of stage trigger point

Once the evaporation process is under way, the ΔT value peaks when solvent evaporation is most rapid. The system sets an end of stage trigger point at a percentage value of the ΔT peak (the percentage value is defined within the method). The screen shows the end of stage trigger point as a horizontal dotted line and displays ***Running to AutoStop***.

When the ΔT value drops to the end of stage trigger point, the evaporator proceeds to the next stage. This may be a new stage (in a multi stage method) or it may be the final drying stage.

End of stage trigger point



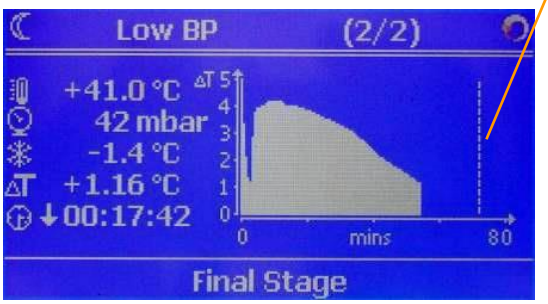
ΔT trip point set, evaporator running to AutoStop

Final stage

Once in the final drying stage, the screen shows a vertical dashed line at the projected end of run time (defined within the method) and displays ***Final Stage***.

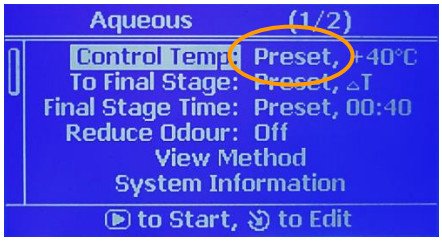
The system continues to operate for the defined period and then stops automatically.

End of run time



Final drying stage, evaporator running to time

Method optimisation



To optimise the Rocket for specific applications, certain parameters can be adjusted. See ***Method Edit*** for instructions.

Default parameter settings are indicated in the ***Method Edit*** menu by the word ***Preset*** on the right hand side of the screen. If a parameter has been altered, the word ***Preset*** disappears and the new setting is shown in the relevant line of text.

Adjustable method parameters

Parameter	Setting options	Effect
Control Temp	Preset (as method), no heat, or range 30°C to 60°C	Sets the maximum temperature that the samples will reach.
To Final Stage	Preset (as method) or range: 0.00 to 99:30 hours	Sets duration of method stages. **Auto:** system detects optimum time to stop or proceed to next stage. **Timed:** system allocates time proportionately depending on method stages
Final Stage Time	Preset (as method) or range: 0.00 to 99:30 hours	Sets duration of the final drying stage
Reduce Odour	Off, 50 mbar, 100 mbar or 200 mbar	Enables vent and vacuum cycle at end of method to purge vacuum chamber of residual vapours. **Note:** Higher boiling point solvents require lower vacuum levels

Custom methods

To further optimise the evaporator for specific applications, your local Genevac representative is able to provide custom methods; these can easily be installed via a USB storage device (data key). When custom methods are installed, they replace some or all of the factory pre-loaded methods. For instructions, refer to ***File Transfer***.

If required, custom methods can be locked to prevent alteration of the parameter settings. In the ***Method Select*** menu, locked methods are indicated by a locked padlock icon.

Note: Locked methods cannot be altered but can be overwritten.

Maintenance

Any maintenance or repair of this product, other than that which is specified within this user manual, must be carried out by Genevac or an approved representative of Genevac, using Genevac approved spare parts.

Recommended practice

Clean up solvent or sample spills immediately; exterior paintwork may be cleaned using a cloth or paper towel dampened with detergent solution. Ethanol or methanol may be used sparingly as a cleaning solvent; do not use acetone (it will attack the seals).

When the system is not in use, switch off the evaporator and chiller (if installed) and leave the outer lid in the open position. Do not leave sample holders containing solvent in the evaporator before or after use; only load samples when ready to begin evaporating.

A kit of spare parts may be ordered with new systems. To avoid unnecessary down-time due to parts shortage, the spare parts kit should be replenished if parts are used.

These checks should be performed routinely:

Before use

check:

- The waste solvent container is connected
- The drain hose allows unimpeded drainage
- The vacuum chamber reservoir water level is correct, top it up as necessary
- The exhaust hose connections are secure
- The coolant hose connections are secure
- All flasks are clean and undamaged.

After use

- Empty the waste solvent container and dispose of waste solvents in accordance with local environmental regulations
- Wipe moisture or condensed solvent from the following parts using clean paper towel.
  - Inner lid sealing O-ring
  - Outer lid seal
  - Rotor sample holder seals
  - Underside of chamber (sample viewing) window
  - Inner lid
  - Inside of main lid.

For general cleaning, apply ethanol or methanol to a paper towel for use as a cleaning solvent.

System test

The Rocket evaporator features a ***System Test*** mode which can be used to check the integrity of the vacuum system.

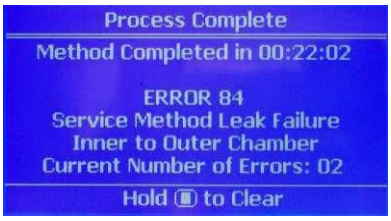
A ***System Test*** takes approximately two hours to complete (including an hour of preparation time which is required to thoroughly dry the vacuum system). On completion, the screen shows any problems encountered during the test in the form error numbers followed by short descriptive messages.

To gain meaningful results from tests, the vacuum system must be dry (the condenser drained and water removed from the vacuum chamber reservoir) as the presence of any liquid in the evaporator may adversely affect the test.

To perform a System Test:

1. For systems with a Julabo chiller, set the coolant supply temperature to -10°C (setting is automatic with display software V2.01 onwards).
2. Drain the condenser.
3. Remove the water from the vacuum chamber reservoir and dry the chamber and rotor using paper towel.
4. Fit empty flasks to all rotor positions (do not use blanking plugs).
5. Fit the Inner lid.
6. Go to the ***Method Select Menu*** and select the ***Medium BP*** method (or closest equivalent).
7. Press the start button and allow the method to operate for one hour (this is to fully dry the vacuum system prior to running the test) then press stop.
8. Go to the ***Method Select*** menu, select ***System Test***.
9. Press the start button.

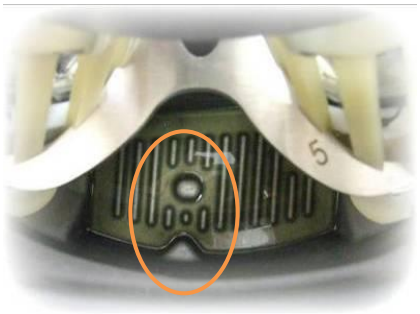
For information about errors, refer to ***Troubleshooting***. For further information about errors that are not described in this user manual, contact your local Genevac representative.



Note: The Rocket ***System Test*** is a convenient method of checking the integrity of the vacuum system; it is not an alternative to carrying out periodic maintenance and servicing.

Vacuum chamber reservoir water

Maintain the chamber water reservoir between the high and low level markers (volume 250 ml). Top up with distilled water, refer to ***Specifications***.



High / low Water level indicators

For maintenance purposes, the chamber reservoir water may be removed using a pipette and the reservoir dried using paper towels.

During extended periods of disuse, remove the water from the reservoir and dry the chamber and rotor to prevent microbial growth.

Periodic maintenance

Inspect the following weekly and clean or replace defective parts as necessary:

- Sample viewing window
- Outer lid seal
- Inner lid seal
- Sample holder seals.

To prevent microbial growth, remove the chamber reservoir water periodically and replenish it.

Planned maintenance & servicing

Whilst every effort is made to design and manufacture evaporation systems to the highest possible standard, there will be some degree of degradation due to wear and ageing of parts (such as seals and bearings) within the evaporator, condenser and pump. The extent of wear and ageing depends on the use of the system, the severity of temperature cycling and the nature of the solvents used.

In order to maintain peak performance and avoid costly and unscheduled down-time, Genevac strongly recommend implementing a schedule of planned maintenance. Changing parts in the field is complex and requires a high level of skill. Genevac offers a range of preventive maintenance, service and breakdown contracts designed to keep the equipment in good working order.

Consumable items

The following parts are consumable items and can be replaced by the user:

- Outer lid seal
- Inner lid seal
- Blanking caps
- Sample holder seals
- Exhaust and waste solvent hoses

Instructions for replacement of these parts can be found on the following pages.

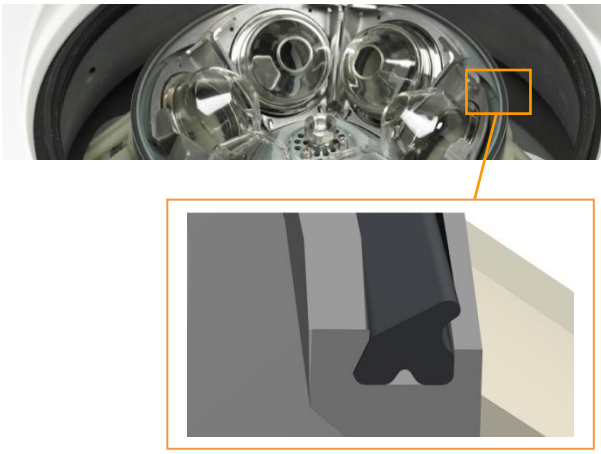
Sample holder parts, including Puck seals, SampleGenie seals, Flip-Flop seals and all glassware (including SampleGenie and Flip-Flop) are also consumable items. For further information, see the ***Rocket Sample Holders User Manual***.

Inner lid seal

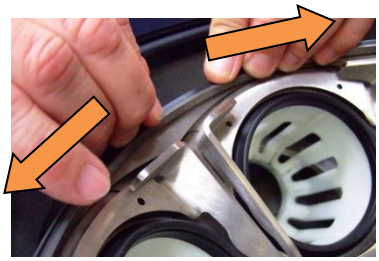
An inner lid seal is included in seal kit:

Description	Part number	Quantity
Seal kit	70-1179	1

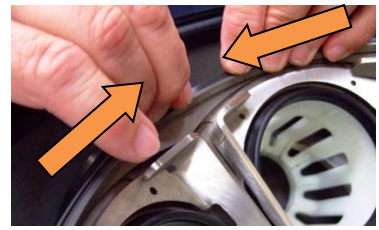
The inner lid seal must be fitted with the sealing lip facing outwards.



Using fingers and thumbs only (no tools) stretch a short section of the seal and press it into the groove in the rotor.

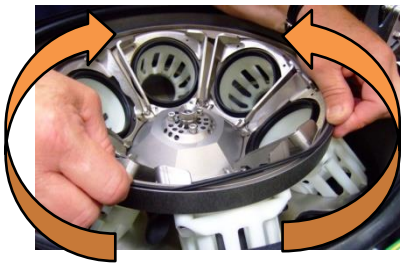


Compress the seal in the groove by pushing the inserted section together.



Continue inserting the seal around the rotor.
.

The seal must be fully compressed as it is inserted, slight slackness at the final stage may be removed by gripping the seal with fingers and thumbs and sliding the seal around the groove.

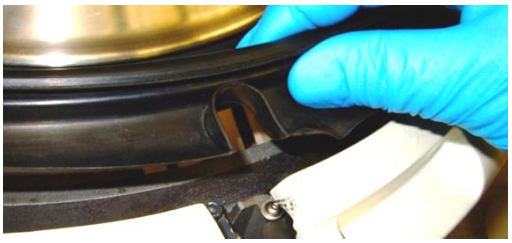


The inner edge of the seal must be inserted fully into the retaining groove and must be evenly inserted all the way round.

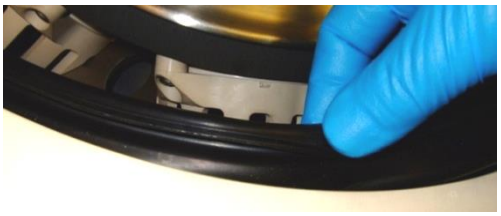
Outer lid seal

The seal kit also includes an outer lid seal.

Align the two small notches (in the lid seal) with the hinge mechanism and the large notch with the latch assembly.



Using fingers, manipulate the seal onto the rim of the vacuum chamber, push it down evenly all the way round.



Make sure the skirt of the lid seal is tucked under the outer cladding all the way round.

Sample holder seals

If the sample holder seals become damaged or worn, they must be replaced; always renew sample holder seals as a complete set.

Sample holder seals are included in the seal kit.

Description	Part number	Quantity
Seal kit	70-1179	1
Set of blanking plugs	70-1265	1

1. Remove the sample holders from the rotor.
2. Lift a seal clamp and remove the clamping ring.

3. Pull the sample holder seal away from the rotor.

4. Repeat to remove the sample holder seals from the the remaining rotor positions.
5. Place a new sample holder seal in position and press it into the slot in the rotor basket.

6. Start at one point, move to the point at 180° (opposite) then the points at 90° and 270°. Then work around the seal until the seal lip is flush with the basket all the way round.

Note: If the seal is difficult to insert, soapy water may be used to lubricate it.

5. Replace the clamping ring and lower the seal clamp.
6. Repeat for the remaining rotor positions.

To test the system after replacing the seals, see ***Maintenance***, ***System test***.

Rotor removal / refitting

The rotor may be removed for cleaning or to facilitate removal of debris from the outer chamber.

1. Open the main lid and remove the inner lid.
2. Switch off the evaporator and isolate from the mains power supply.
3. Using a 4 mm Allen key, remove three rotor screws.

4. Grasp either side of the rotor and, using a rocking motion, loosen it from the hub. Lift the rotor assembly free of the hub then carefully out of the evaporator.
5. Place the rotor assembly on a flat work surface.

6. If required, remove the rotor shaft O-ring.

The rotor assembly and main vacuum chamber are now accessible for cleaning. Use a stiff brush, or paper towels soaked with ethanol or methanol. Rinse with water and dry before reassembling.

Reverse the process to refit the rotor. Once the rotor is refitted, check the sample holder seals are correctly seated.

Sample viewing window

Caution: The sample viewing window has a heating element which is fragile and may be hot. Before cleaning the samople viewing window, switch off the evaporator and wait for the heating element to cool.

Description	Part number	Quantity
Window and gasket	70-1182	1

The sample viewing window consists of two parts: cladding window and chamber window.

1. Open the main lid
2. To remove the cladding window, press in the lower edge (the top pops out and the window can be removed from the aperture).
3. Wipe the cladding window clean using a non-abrasive paper towel or lint free cloth.
4. From inside the evaporator chamber, wipe the underside of the chamber window using a non-abrasive paper towel or lint free cloth.
5. Wipe clean the upper side of the chamber window, avoid damaging the window heating element (if fitted).
6. Refit the cladding window.

Software upgrade

Software upgrades may be sent by Email. Contact your local Genevac representative for further information. To upload software:

1. Create a root folder called ***ROCKET*** on a USB data key and copy the software upgrade files to it.
2. Switch off the evaporator.
3. Insert the datakey into the evaporator USB socket (under the left side of the control panel).
4. Switch on the evaporator, when the system has validated the upgrade, press the start button.
5. Remove the datakey.

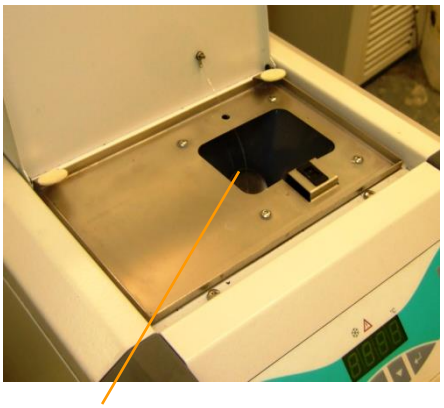
For further details, see: ***File transfer***.

USB data key

Re-circulating coolant

For systems supplied with a Julabo re-circulating chiller, use the sight gauge to check the coolant level. If necessary, open the top cover and top up the coolant using a mixture of 50% water and 50% mono ethylene glycol.

Coolant level sight gauge



Coolant filler

Note: To avoid coolant freezing in the chiller (and subsequent loss of evaporator performance) make sure the correct coolant mixture ratio is maintained when topping up the chiller.

For further instructions, refer to the chiller user manual.

Inert gas purge systems

Internal flame arrestor components should be replaced annually (this can be done by you Genevac distributor as part of a planned maintenance schedule). The operator's risk assessment should consider the use of low auto ignition point solvents and should include provision for maintenance and testing.

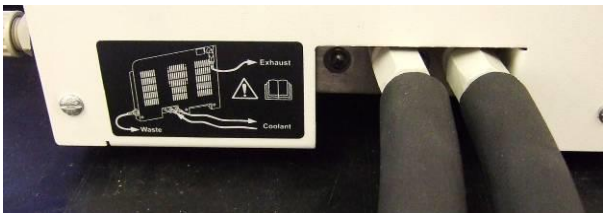
In the unlikely event of solvent detonation occurring, internal components of the flame arrester must be replaced before continuing to use the evaporator. Contact Genevac Service for assistance.

Continually monitor the performance of the evaporator and, if in doubt, perform a ***System Test***. If an increase in evaporation time is noticed, it may be due to impurities in the flame arrester elements.

Draining the re-circulating coolant

Identify the coolant hose connections to the evaporator and (if applicable) to the chiller.

Evaporator



Feed Return

Re-circulating chiller

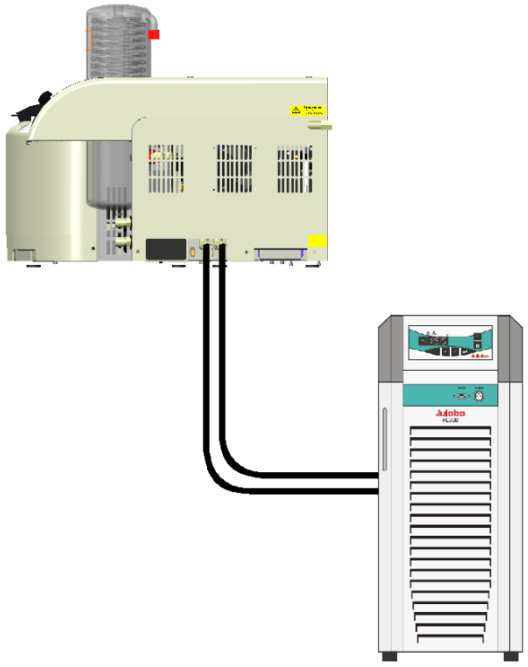
Feed Return

Note: A small amount of coolant may drip from the hose connectors during the following procedures, use paper towel to clean up any spilt coolant.

Refer to the illustrations A B and C. Select the one that most closely resembles the system layout and follow the associated instructions.

Note: Evaporators specified for use with an external chilled water supply, may have a water valve fitted in the cooling circuit. Should an evaporator with this option be connected to a chiller (due to change of use or upgrade) the water valve must be opened. Follow: ***Extra step for evaporators with water valve option***.

A *The evaporator is positioned above the chiller:*

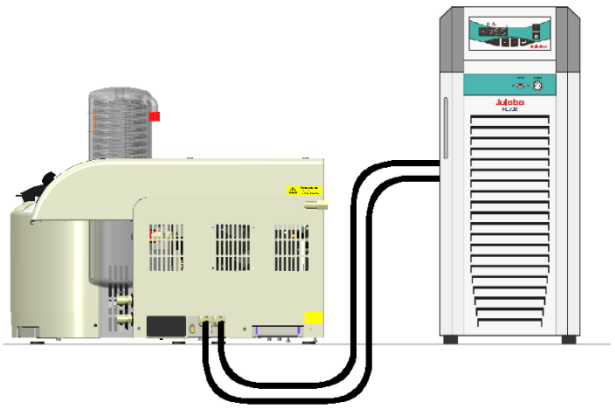


1. Switch off the chiller.
2. Loosen the evaporator coolant feed connector (if necessary, use a 19 mm spanner).
3. Hold the hose connector tightly in position (to minimise coolant leakage) whilst continuing to loosen the connector by hand.
4. As soon as the coolant feed hose is disconnected from the evaporator, elevate the end so the coolant in the hose drains into the chiller reservoir.

   Extra step for evaporators with water valve option: Go to the ***Maintenance*** menu and select ***water valve***. The water valve will open allowing coolant to drain from the condenser.

5. Repeat the process for the coolant return hose.
6. If required, disconnect the coolant hoses from the chiller.

B *The evaporator and chiller are positioned at the same height:*



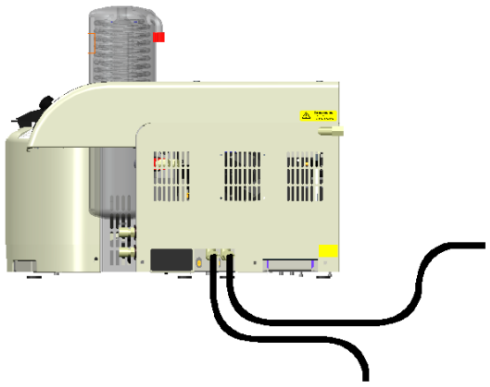
1. Switch off the chiller.
2. Loosen the chiller coolant return connector.
3. Hold the end of the coolant return hose over a suitable container and lower it so the coolant in the hose and Rocket condenser coil drains into the container.
4. Open the coolant filler on the chiller and tip the coolant into the chiller reservoir.

   Extra step for evaporators with water valve option: Go to the ***Maintenance*** menu and select ***water valve***. The water valve will open allowing coolant to drain from the condenser.

5. Repeat the process for the coolant feed hose.
6. Disconnect the coolant hoses from evaporator (if required, use a 19 mm spanner).

Retain the coolant collected in the container and tip back into the chiller reservoir, see the cooler Operating Manual for details.

C *No chiller. Running cold water is supplied from an external source.*



1. Turn off the water supply.
2. Disconnect the water feed hose from the supply tap.
3. Hold the end of the disconnected hose above the height of the Rocket (keep it held up during the next step).
4. Go to the ***Maintenance*** menu and select ***water valve***. The water valve will open allowing coolant to drain from the condenser.

Unpacking and Setting Up

Upon receipt of the equipment, please check the packaging for damage before signing for it. If there is any damage, contact the Genevac Service department or your local representative immediately. Refer to the Genevac website: www.genevac.com for contact details of Genevac representatives.

Read this user manual (and, where applicable, the chiller operating manual) before operating the system.

Packaging

Follow the instructions provided on the ***Receiving and Unpacking Instructions*** leaflet that is attached to the outside of the Rocket evaporator packing case.

Lifting

Make sure enough people are present to share the lifting safely. Carefully lift the evaporator slightly at first to feel the weight and centre of gravity, then lift into position using the lifting hand-holds in the base.

Lifting hand-holds

Note: The Rocket has high friction rubber feet for anti-vibration and to prevent movement on the bench. To manoeuvre the Rocket into position, lift the front and slide on the back skid plate.

Installation site

The Rocket evaporator must be placed on a level and sturdy work surface. There must be provision for:

- A 75 mm air gap between the evaporator cooling-vents and any other object
- A connecting hose from the evaporator exhaust to an appropriate laboratory fume-extraction system
- Connection of the mains cable(s) to a mains power-supply outlet
- Hoses to and from the chiller or external chilled water supply
- Access for maintenance and general operational requirements.

Waste solvent container

Place the waste solvent container in a convenient location (normally on the floor, in front of the evaporator). It must be located so there are no sharp bends and no upward incline of the hose between the evaporator and the waste solvent container and there is suitable access for emptying.

Caution: The evaporator is supplied with a polypropylene waste solvent container. Before evaporating any solvent that attacks polypropylene, it is advisable to replace this with a glass container (not supplied). The replacement container must have a capacity of at least 2.5 litres and have a GL45 connector.

Chiller

For systems supplied with a re-circulating chiller, place the chiller within two metres of the evaporator, either on the bench or on the floor. Instructions for connecting and setting up the chiller are provided on the following pages. If required, refer to the chiller operating manual for additional installation instructions.

Warning: Risk of bursting glass. Before connecting an alternative chiller, make sure the maximum coolant inlet pressure will not be exceeded. See: ***Specifications***.

Installing inert gas purge systems

Evaporators with inert gas purge are supplied with a 2.5 m hose, which has a $^{3}/_{8}$" BSP female connector, for connection to a pressure regulated inert gas supply (refer to: ***Specifications*** for inert gas supply requirements).

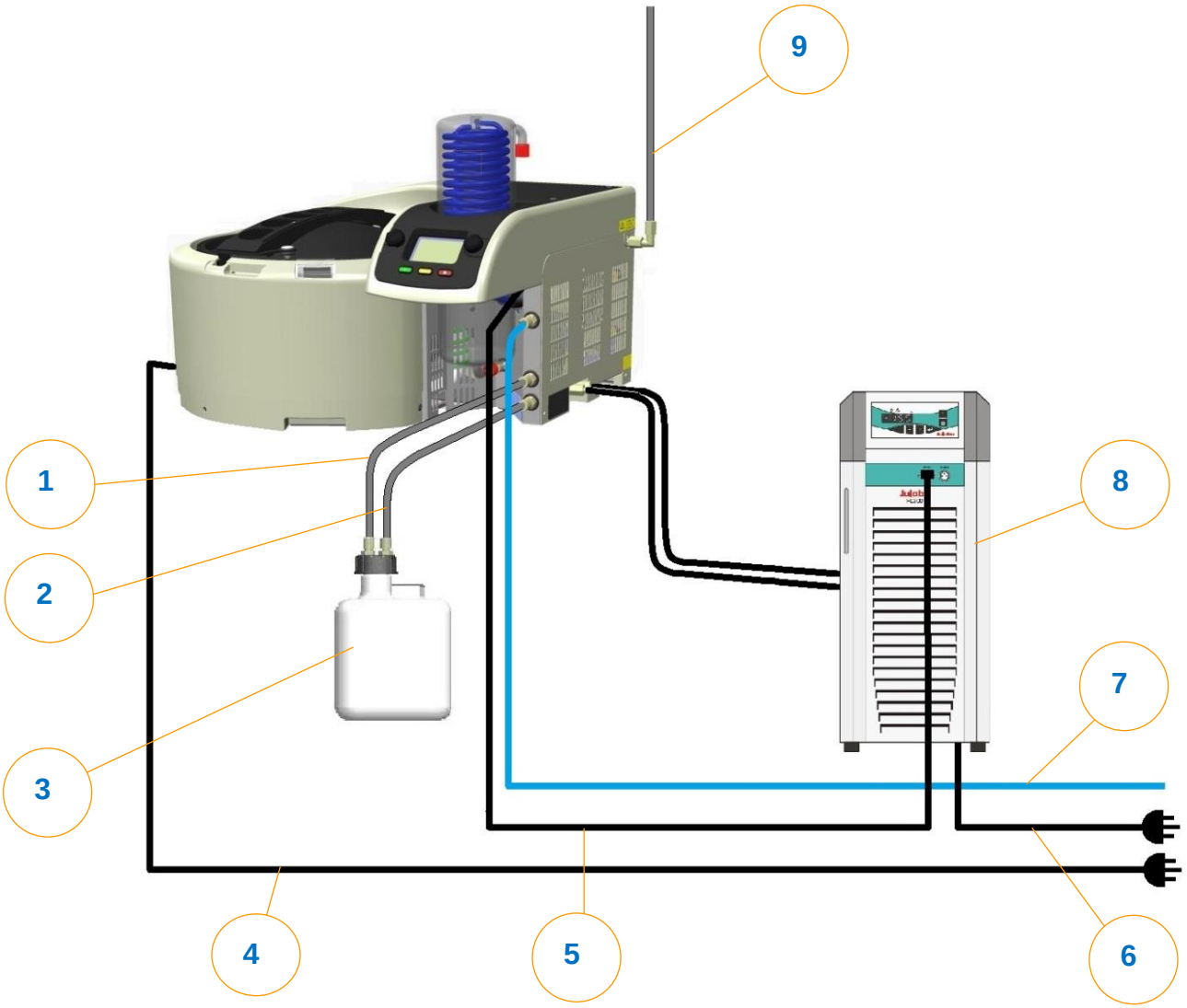
The evaporator must only be operated in a ventilated environment. Genevac strongly recommend installing evaporators with inert gas purge in a fume cupboard.

Warning: Risk of solvent ignition. Backpressure in the exhaust line can prevent the condenser draining. If more than one evaporator is installed, each one must be connected to a suitable laboratory fume extraction system by a separate exhaust hose.

Genevac recommend that evaporators, equipped with inert gas purge, are installed by an authorised Genevac representative.

Service connections

The hose connections for a Rocket evaporator with a re-circulating chiller are shown. For systems without a re-circulating chiller, adapters are supplied to connect feed and return hoses (not supplied) to a chilled water supply.



1. Waste solvent vent hose
2. Waste container drain hose
3. Waste solvent container
4. Mains power to Rocket
5. Chiller control cable
6. Mains power to chiller
7. Inert gas supply (Inert Gas Purge systems only)
8. Re-circulating chiller
9. Exhaust hose

Waste solvent drain and exhaust hoses

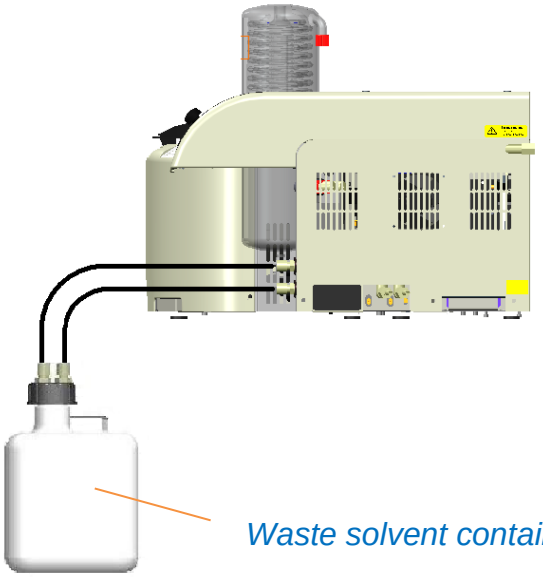
PTFE hose (6 mm ID, 8 mm OD) is supplied to form the waste solvent drain and waste container vent hoses.

Slide a finger-nut and shouldered compression ring over the end of a PTFE hose.

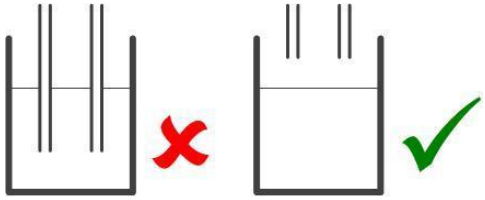
Push the hose firmly onto the Rocket waste vent connector and hold it, screw the finger-nut onto the spigot until finger tight.

Connect a second hose to the Rocket waste solvent drain outlet.

Cut the hoses to the required length and connect them to the waste solvent container.



Make sure the ends of the hoses are above the maximum waste solvent level (this will prevent the possibility of waste solvent being drawn up the hose.

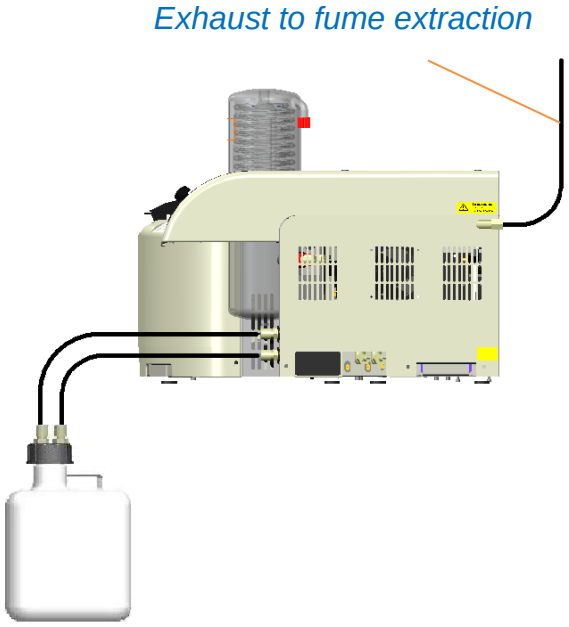


Note: The drain hose must allow unimpeded drainage of the condenser by gravity. There must be no sharp bends or upward inclination of the drain hose, the waste container must be below the waste outlet and have sufficient capacity to handle solvent throughput.

Exhaust hose

Connect a PTFE hose to the exhaust outlet.

Connect the other end of the hose to the laboratory fume extraction system.



Make sure the exhaust hose is free from kinks, constrictions and U-bends (U-bends could cause condensed solvent to gather and block the exhaust line).

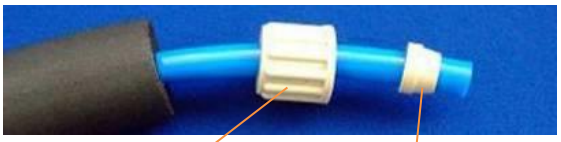
Chiller hoses

Blue hoses with black foam insulation are supplied to connect the Rocket to the re-circulating chiller.

Coolant hose connections	
Chiller	**Rocket**
Feed (or out)	Coolant in
Return (or in)	Coolant out

1. Screw hose adaptors onto the chiller ***feed*** (or ***out***) and ***return*** (or ***in***) connector.

2. Slide a finger-nut and shouldered compression ring onto the end of each coolant hose.



Finger-nut

Shouldered compression ring

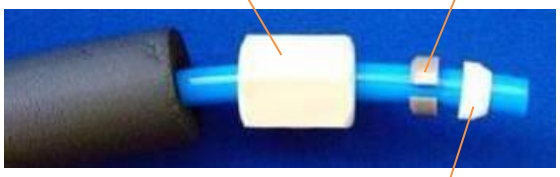
3. Connect a coolant hose to the chiller ***feed*** adapter. Hold the coolant hose against the adapter and screw the finger-nut onto the adapter until finger tight.

4. Repeat to connect the remaining coolant hose to the chiller ***return*** adapter.

Note: If the chiller hoses are supplied with finger nuts only, follow the method described in steps **1** to **4** to connect hoses to the Rocket. For systems supplied with compression nuts, flow steps **5** to **8** to connect the hoses to the Rocket.

5. Remove the transit sealing bungs from the Rocket's coolant-hose connectors (located below the evaporator right hand side cover panel).
6. Slide a compression nut, split ring and plain compression ring over one end of an insulated coolant hose (note the orientation of components).

Compression nut *Split ring*



Plain compression ring

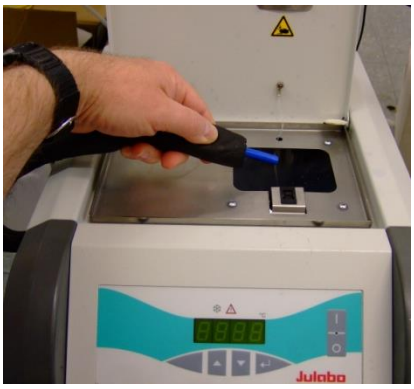
7. Connect the coolant hoses to the evaporator ***coolant in*** and ***coolant out*** connectors.
8. Hold the coolant hose against the connector and screw the compression nut onto the connector until finger tight. If necessary, use a 19 mm spanner to tighten the compression nut (no more than a quarter turn).

Priming the cooling system

To prime the cooling system, follow the instructions in the chiller operating manual.

Note: The following additional steps may be required if the Rocket is positioned a significant height above the chiller.

1. Switch off the chiller.
2. Open the reservoir filler on top of the chiller.
3. Disconnect the coolant hose from the evaporator ***coolant in*** connector; remove the finger nut and compression ring and place them aside for safe-keeping.
4. Hold the end of the hose over the chiller reservoir filler (so any coolant expelled from the hose drains back into the chillller) and perform the priming procedure as instructed in the chiller operating manual.



5. When coolant starts to flow from the hose, switch off the chiller.
6. Reconnect the hose to the evaporator ***coolant in*** connector and perform the priming procedure as instructed in the chiller operating manual.

Comms lead

1. Connect the comms lead female connector to the evaporator socket (located under the evaporator control panel).

2. Connect the comms lead male connector to the chiller socket (located under the chiller control panel).

3. Set the chiller ***remote control activate*** mode to: ***On***. Refer to chiller operating manual for details.

Note: To connect more than one evaporator to a single chiller, refer to the instructions that come with the connection kit.

Chilled water supply

If chilled water is supplied from an external source (i.e. not from a re-circulating chiller supplied by Genevac) the water supply must meet the requirements specified in: ***Technical Data***. The installation should comply with local regulations regarding the connection of equipment to a water supply.

1. Remove the transit sealing bungs from the evaporator coolant connectors (located below the evaporator right hand side cover panel).
2. Place a compression nut, split ring and plain compression ring over the straight section of one of the hose-tail connectors (note the orientation of the components).

3. Screw the hose-tail fitting onto the evaporator coolant feed connector until finger tight. Tighten, if necessary, no more than ¼ turn using a 19 mm spanner.
4. Repeat the process for the second hose-tail connector, screwing it onto the evaporator coolant-return connector.

5. Connect a suitable water hose ($^3/_8$" internal diameter) to the evaporator ***coolant in*** hose-tail.
6. Connect the other end of the water hose to the external chilled water supply.
7. Connect a suitable hose ($^3/_8$" internal diameter) to the evaporator ***coolant out*** spigot. Connect the other end to the water drain.

Note: Genevac recommend the use of a non-return valve to avoid the possibility of contaminating the water supply. Due to the variation of water supply outlets, this valve is not supplied

8. Turn on the chilled water supply.

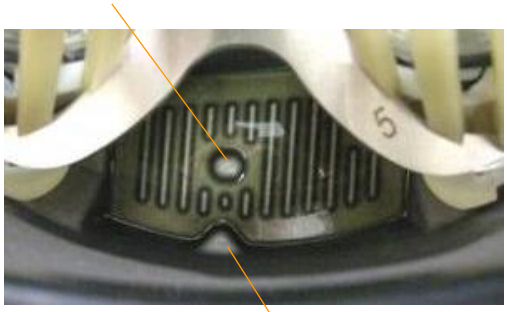
Note: An automatic water valve inside the evaporator (optional) closes to prevent coolant water flow when the evaporator is not operating.

9. Connect the mains power cable to the Evaporator and switch on the power.

Vacuum chamber water reservoir

Fill the vacuum chamber water reservoir with distilled water. The water level should cover the low level marker, but should not cover the high level marker.

Low level marker



High level marker

Final checks

Carry out a safety assessment before operating the Rocket. Make sure the exhaust hose takes solvent vapours away from personnel, and from the evaporator, safely.

If personnel lack the training or experience to comprehend the hazards that can arise when using the equipment, do not allow them to use it. Personnel without such training require thorough instruction. The information contained within the user manual may form the basis of such training.

Maintain a solvent vapour free environment around the evaporator. Do not use the free space around the instrument for the storage of vessels containing solvents or acids. This instruction applies, even if the Rocket is installed in a fume cupboard.

Connecting power

Caution: Make sure the evaporator is correctly specified for the regional mains power supply. Check the serial number plate, the mains voltage compatibility is encoded in the model number, refer to: ***Technical Data***, ***Model / Serial Number*** for details.

Commissioning instructions appear on the screen when the evaporator is switched on for the first time. Press the ***select control*** to confirm that each step of the commissioning instruction has been completed. The ***Commissioning*** screen offers the option to disable this feature upon completion or allow it to reappear at subsequent power ups.

Connect mains power to the evaporator and chiller using the power cables supplied. Switch on the power.

Troubleshooting

Opening the lid without power

In the event of power failure, the vacuum system vents automatically, the rotor may take up to two minutes to stop spinning.

When the rotor is stationary, insert a narrow tool into the hole near the lid latch mechanism and release the lock by pushing the latch, then lift the lid.

Glassware breakage

In the unlikely event of glassware breakage inside the evaporator, it is necessary to remove all traces of glass and solvent from the rotor assembly and vacuum chamber. Remove the rotor assembly to allow access.

Warning: Risk of cuts, abrasions and contamination from broken glass. Wear appropriate personal protective equipment, including anti-puncture and solvent proof safety gloves.

Inspect all parts of the rotor and vacuum chamber for glass fragments before placing hands on or near any part of the evaporator. Pay particular attention to parts of the rotor and vacuum chamber that are not normally visible, the use of an inspection mirror, inspection lamp and magnifying glass is recommended. Follow the instructions for ***Removing / Replacing the Rotor***.

Error messages

The system notifies the user of any errors that occur whilst the evaporator is operating by flashing the blue condenser illumination and showing a flashing error icon on the screen.

Safety critical errors will cause the evaporator to stop, non-critical errors will be flagged but the evaporator will continue. If more than one error is encountered, the display shows ***Rotate to View*** and errors can be viewed by turning the ***select control***; warning or advice information may also appear on the screen. In all cases, all errors are displayed on the screen after the evaporator stops. A log of the last ten errors encountered by the evaporator can be viewed via the ***Options*** Menu and an error log is included in the ***System Info*** which can be downloaded via the ***File Transfer*** menu.

Refer to the Error codes and causes table on the opposite page.

Error rectification

Code	Cause	Rectification
05-07	Lid safety errors.	Make sure lid is closed and engaged with latch.
08	No lid open detected between starts.	Open lid.
13	Fail vacuum start up test.	Check outer lid seal / close lid firmly / push down on the lid at the back.
14-15	Rotor does not reach full speed.	Check rotor is free to rotate Check chamber water reservoir is not overfull.
16	Motor overheat (may occur after excessive start / stop cycles).	Allow to cool.
17-20	Out of balance (critical).	Rebalance rotor.
21	Out of balance (warning).	Rebalance rotor.
24-25	Vacuum integrity failure.	Check shaft hub O-ring / refit inner lid.
27-29 *42*	Fail to reach control pressure.	Check appropriate method is selected / check feed hoses are correctly fitted / check pump ballast is set to position 1.
32	Condenser too cold for aqueous.	Reset condenser to remote or set coolant temperature to >+2°C.
34-37	Inert-gas-purge failure.	Check gas is turned on, pressure & flow rate OK.
50	Unexpected spin.	Wait for rotor to stop (can be triggered if rotor is spun by hand).
51	Lid-lock failure.	Push down main lid to ensure it is fully closed.
57	Condenser temperature too low.	Reset chiller supply temperature.
58	Low ΔT (insufficient solvent load).	Use larger solvent volume / check pump ballast is set to position 1.
59-60	Supply voltage out of range.	Check mains supply voltage.
61-66	Data transfer error.	Check data key route folder (see ***Advanced Features***, ***File transfer***).
67	Coolant temp too high.	Check coolant (level and mixture).
74	Vacuum leak - atm to outer.	Check outer lid seal.
75	Vacuum leak - atm to inner.	Check pump ballast is set to position 1 / check feed system / check rotary joint.
76	Vacuum leak - inner to outer.	Check rotor hub O-ring / check inner lid seal.
77	Vacuum leak - outer to inner.	
78	Re-circulating coolant level low (error only flagged if comms lead connected).	Check coolant.
79-86	Julabo system error.	Refer to Julabo user manual / contact Julabo Service.
87-88	Inert-gas-purge error.	Check gas is turned on, pressure & flow are OK.

Caution: the inner lid thumb screw can be damaged by over tightening; when checking the integrity of the vacuum system, do not over tighten. See: ***Opening the lid***.

Where rectification by the user may be possible, instructions are given. If error codes occur that are not listed, or if the suggested rectification does not resolve the problem, contact your Genevac distributor for further advice.

Non-critical errors clear automatically. To clear other error messages, once the cause has been established and rectified, press the stop button.

Fuses

Mains live and neutral fuses are located next to the evaporator power switch. Disconnect the mains cable to isolate the evaporator before removing fuses.

To remove a fuse, turn the holder counter-clockwise, using a flat blade screwdriver.

Fuses must be replaced with the same type.

Mains power	Fuse rating	Dimensions	Manufacturer's description	Part number
230 V 50 Hz	6.3 A	1¼" x ¼"	SIBA 70-065-65-6.3	04-3587
120 V 60 Hz	16 A	1¼" x ¼"	SIBA 70-065-65-16	04-3766
100 V 60 Hz	16 A	1¼" x ¼"	SIBA 70-065-65-16	04-3766
100 V 50 Hz	16 A	1¼" x ¼"	SIBA 70-065-65-16	04-3766

Caution: Fuses should only be replaced by suitably trained personnel. If a fuse blows repeatedly, contact Genevac service for assistance.

Other troubleshooting

Symptom	Cause	Rectification
Lid difficult to open.	Dirty or contaminated outer lid seal.	Clean or replace the outer lid seal. Clean the sealing face of the outer lid.
Excessive vibration / noise.	Rotor imbalance.	Rebalance samples.
No Vacuum .	Pump not running.	Check power connection inside pump bay.
Excessive evaporation times.	Poor vacuum or vacuum integrity failure.	Run the System Test. Contact your local Genevac representative or Genevac service department for advice and notify if the test produces an error code.
	Poor condenser performance.	Check the chiller is turned on and the temperature setting is correct, check the coolant supply pressure and temperature are correct.
Samples not dry, method runs to time, not to AutoStop.	Very low condenser solvent loading. ΔT too low to set auto-stop trip point.	Add more solvent / samples
Excessive solvent odour.	Method does not include ***Reduce Odour*** stage.	Go to the ***Method Edit*** screen and enable ***Reduce Odour***.
System Test not available.	Method(s) recently loaded.	Switch off evaporator, wait 10 seconds and switch on again.

Contact you local Genevac representative for details and availability of spare parts.

Options

Inert gas purge

The use of ***inert gas purge*** is mandatory for the safe evaporation of diethyl ether, pentane and other low auto-ignition point solvents. An inert gas blanket function protects samples from reaction with elements in the air at the end of the evaporation process.

Re-circulating chiller

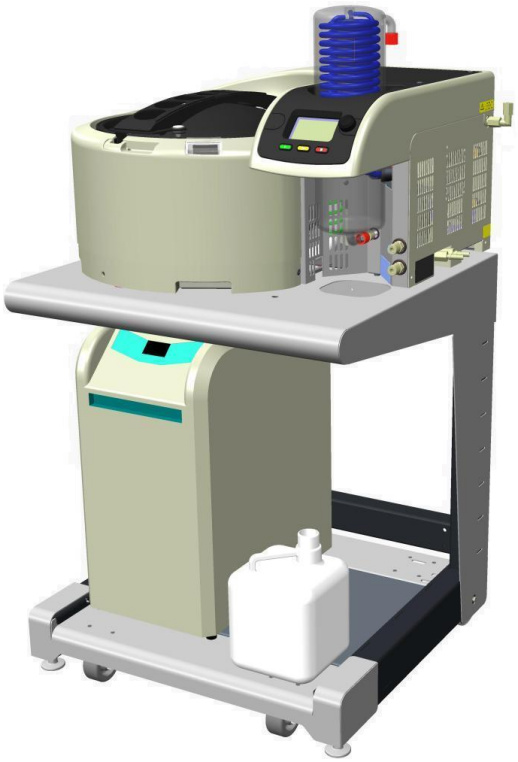
The Rocket controls the re-circulating chiller to optimise the supply of coolant to the condenser.

Water control valve

This option is recommended if coolant is to be supplied from and external chilled water source. A valve automatically switches off the coolant flow when the system is not operating.

Infinity trolley

Infinity Trolley is a modular trolley system, designed to be used with any Genevac evaporation system. The lower shelf can be pulled out to provide access for maintenance, any number of units can be bolted together side by side.



Sample holders

Sample holder systems and accessories are available to cover a variety of applications including general drying, general concentration and concentration or drying into vials.

Your local Genevac representative will be happy to offer advice or information on the full range of sample holders and accessories, for further information refer to the Genevac ***Rocket Sample Holders User Manual***.

Technical Data

Specifications

Evaporator

Max rotor speed	1760 rpm
Max sample load	6 x 400 ml (with std flasks)
Max operational imbalance	40 g
Dimensions (w x d x h)	735 x 640 x 752 mm*
Weight (approx' - varies with build options)	75 kg

* Dimensions include allowance for lid opening but not for hose and cable connections

Vacuum pump (integral)

Type	Four head diaphragm
Ultimate system vacuum	< 3 mbar

Condenser (integral)

Type	Dual glass coil, opotional remote chiller
Minimum coolant temperature	-15°C
Required coolant flow rate	1.5 ± 0.5 litres / min
Max coolant inlet pressure	30 psi (2 bar)

Re-circulating chiller (optional)

Coolant	50% mix: water/monoethylene glycol
Dimensions	320 x 500 x 600 mm
Weight	48 kg
Length of coolant hoses	2 m

Storage / transportation environment

Ambient temperature	0°C to 40°C
	(-10°C permissible during transportation)
Relative humidity	10% to 80% non-condensing
Store upright	

Operational environment

Ambient temperature	15°C to 30°C
Relative humidity	10% to 60% non-condensing
Altitude	Sea level to 1600 m
Ventilation air-gap	75 mm
Ingress protection rating	IP30

The evaporator is designed for use in a pollution degree 2 environment (normally only non-conductive pollution occurs)

Inert gas supply (IGP option only)

Max pressure	1.5 bar g (2.5 bar absolute)
Min pressure	1 bar g (2 bar absolute)
Flow rate (nominal)	30 litres per minute
Hose length	2.5 m
Connector type	$^{3}/_{8}$" BSP female

Emissions

Typical noise level is 57dB (A) at one metre from the evaporator during normal operation.

For the purpose of air conditioning requirement calculations, all power consumed by the system is dissipated as heat.

Electrical

	Power VA (W)				Current @ Unit Voltage (A rms)			
Supply	Standby	Idle	Peak	Nominal	Standby	Idle	Peak	Nominal
100 V 50 Hz	24	70	1260	1000	0.25	0.7	12.6	10
100 V 60 Hz	24	70	1260	1000	0.25	0.7	12.6	10
120 V 60 Hz	24	70	1620	1200	0.2	0.6	13.5	10
220 V 60 Hz	24	70	1150	1000	0.1	0.3	5	4.35
230 V 50 Hz	24	70	1150	1000	0.1	0.3	5	4.35

The power cable supplied is 2 m in length and appropriate to the region to which the unit is delivered.

Note: To prevent nuisance tripping, the mains power supply to the evaporator should be fitted with suitably rated type “D” (or equivalent) mains circuit breaker.

EC declaration of conformity

SP SCIENTIFIC
Making Time for Science

EC Declaration of Conformity: Rocket Evaporator

Manufacturer's Name:	Genevac Ltd
Manufacturer's Address:	Farthing Road Ipswich Suffolk IP1 5AP UK
Type of Equipment:	Laboratory Equipment

This is to certify that the following product(s):

Rocket Evaporator, all variants including:	RKCM-1005060-SPW* RKCM-12060- SPW RKCM-22060- SPW RKCM-23050- SPW
Serial Numbers from:	Individual declarations are available on request

Conform to the Essential Health and Safety requirements of European Directives:

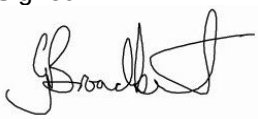
- Machinery Directive (2006/42/EC)
- EMC Directive (2004/108/EC) and
- Low Voltage Directive (2006/95/EC)

A technical construction file for this product is held at the above address

Conformity is demonstrated by compliance to the following standards:

- BS EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements.
- BS EN 60204-1:2006 + A1:2009 Safety of machinery. Electrical equipment of machines. General requirements.
- BS EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use. EMC requirements.
- BS EN 12100:2010 Safety of machinery. General principles for design. Risk assessment and risk reduction.

CE

Signed: 

Name: G Broadbent

Position: Research and Development Manager

Date: 18th December 2013

Being the person appointed by Genevac Ltd to sign on their behalf

*Where options S, P and W are Strobe, Purge and Water (control valve). N indicates option not fitted.

Warranty statement

This product is guaranteed for period of 12 months from the date of delivery. In the unlikely event of any defect arising due to faulty materials or construction, resulting in system failure, the unit will be repaired free of charge. This includes all labour and component costs incurred. This warranty is subject to the following provisions:

- The system must be sited, installed and operated in accordance with instructions in this user manual.
- Exhaust vapours must be ducted away from the system as described in the ***Unpacking and Setting Up*** section in this user manual.
- The system is only used for the purpose for which it was sold and in accordance with the Genevac published compatible solvents list.
- Preventive maintenance and cleaning must be carried out as detailed in the ***Maintenance*** section of this user manual.
- Power lead(s) supplied with the system, are for use with that system only.
- If items are replaced by the owner, only Genevac approved parts may be used.
- In the event of a vacuum pump failure, the pump may be exchanged for a refurbished unit.

Failure to adhere to the above will invalidate the warranty and result in a charge being made for the cost of repairs. This warranty does not cover accidental damage, modification, misuse or inappropriate repair by untrained personnel. Consumable items are covered against manufacturing defects only; for a for a list of these items, see ***Maintenance – Consumable items***.

Returning equipment to Genevac

The equipment is supplied in reusable packaging. Where possible, this should be retained for reuse in the unlikely event that system needs to be returned for repair. If the packaging is not retained, a charge will be made for replacement packaging and any shipping costs incurred.

Genevac will not accept any delivery of equipment which is not accompanied by appropriately completed Safety Declaration paperwork. This applies to all equipment and / or parts.

To obtain the necessary Safety Declaration paperwork, or for details of Returns Authorisation procedures, contact your local Genevac representative or Genevac Service Department. Contact details are shown on the back cover of this user manual.

Chiller warranty and service

If a Julabo chiller was purchased as part of the evaporation system, please read the Julabo Operating Manual fully and refer to it for details of warranty conditions. Your attention is drawn to the option to extend the product warranty period to two years.

Model / serial number

The model number is shown on the serial plate (located beneath the condenser). It contains information about build variant.

Model number: **RKCM-12060-SNW**

Rocket

N=Envi **CM**=Chemi
CP=Chemi Plus

Voltage and frequency

Water valve: **W**= fitted **N**=not fitted

Inert gas purge: **P**=fitted **N**=not fitted

Strobe: **S**=fitted **N**=not fitted

Ordering spares

The following consumable parts and accessories are not covered by the warranty. These parts can be ordered via your local Genevac agent and are user serviceable.

Part Number	Quantity per set	Description
70-1179	NA	Seal set (comprising one outer lid seal , one inner lid seal and six sample holder seals).
70-1247/S	NA	Waste Solvent Container Kit comprising polypropylene waste solvent container, two port cap and drain hose and fittings.
70-1651/S	NA	Hose fittings kit, comprising two type 1A fittings and two type 2N fittings for coolant, drain and exhaust hose connections.
70-1182	1	Sample viewing window and gasket assembly.
04-5672/S	1	Condenser (cold trap) replacement, plastic coated.
04-5865/S	NA	Blanking plugs, for unused rotor positions.
70-1287	18	Puck seal set (for details, see Rocket Sample Holders manual).

Accessories		
70-1187	1	Flask rack (coated steel, for transportation of flasks).
70-1186	1	Lid holder (stainless steel, for inner lid).
04-6381	1	Flask holder (for use as a balance nest).
70-1265	6	Flask splash caps (white Viton).

Patents

Genevac products are protected by the following patents or patent applications:

3948/KOLPN/2009	0702503.4	12/294,363
200780014821.9	PCT/GB2010/050523	6682631
2436075	2332865	PCT/GB2007/00886

Amendment control

Issue	Reason for change	Date Issued
2-2	Error 25 instruction added in Troubleshooting. System Test advice note added. Cover page revised.	20-Feb-12
2-3	Menu overview illustration revised. IGP password factory setting added. Acceptable Solvents updated. Error 25 reference removed following flask seal design change, consumable items revised.	28-Jun-12
2-4	Specification: pollution degree 2 environment amended.	25-Jul-12
2-5	Inner lid seal fitting instructions improved.	17-Aug-12
2-6	Error codes and causes 13, 24, 25 and 29 amended to reflect software change. Acceptable Solvents updated. Coolant temperature for running System Test instruction added. Locking special methods reference removed.	24-Sep-12
2-7	Waste solvent hose illustration amended. Consumable items list updated and moved to Technical Data. Part numbers for lid seals and Puck seals added.	12-Mar-13
2-8	Waste solvent drain hose and container installation specifications added. Infinity trolley option added. Specifications updated. Screen updated to reflect 4D. Seal kit part number added. Blanking plug part number correction.	29-May-13
2-9	Emergency shutdown instruction added. Storage / transportation environment specification revised. Pre-Run Checks added to Menu Overview. Layout revised to reflect Rocket 4D user manual. Additional instructions for vacuum integrity errors.	12 Jul-13
2-10	Acceptable solvents statement amended. Specifications updated: ultimate system vacuum, store upright, ventilation air gap, dimensions do not include allowance for hose and cable connections. Electrical specifications revised.	05-Aug-13
2-11	US contact address updated. Waste solvent container section added under Preparation for Use. Flask-adapters statement added: section does not apply to serial # aboveRK0134.	23-Oct-13
2-12	Hose connections and installation instructions revised to reflect drain vent design change. Waste solvent container kit added. Original instructions statement added. EC Declaration of Conformity updated. Spare parts kit option. Type “D” or equivalent, replaced type “D”.	09-Jan-14
2-13	Ingress protection rating specification added.	18-Feb-14
2-14	Coolant flow rate and max inlet pressure spec and warning added. Amended Sample holder seals heading in Acceptable Solvents table. Coolant hose connection instructions amended to accommodate Polyflon 1A connectors on Rocket.	25-Mar-14
2-15	Flask seal replacement reverted to manual method.	22-Apr-14
2-16	Requirement for PE seals removed from Aqueous method in Acceptable Solvents table.	25-Apr-14
2-17	Perfluoro seal requirement amended in Acceptable Solvents table.	01-May-14
3-1	Layout revised (to align with 4D).	03-Jun-14
3-2	Blanking Plugs not to be used when running System Test, instruction added.	12-Jun-14

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Useful information

Read these instructions before operating the Rocket evaporation system and keep them near the system for easy reference. Your attention is drawn in particular to the ***Safety*** section.

These instructions are correct at time of going to press and may be subject to change without notice. Some of the features and software functions described within this user manual may not apply to equipment manufactured before this manual's publication date; this includes systems that have been upgraded.

If you need to contact Genevac for assistance, use either the telephone or fax Hotlines shown. Please have the instrument serial number at hand. Alternatively, email or visit our web site.

The evaporator should not be discarded in your regular disposal stream. Contact your Representative or Genevac for proper disposal instructions.

Within the EU, it is Genevac's responsibility under the WEEE directive to provide for the recycling of Genevac products.