

The miVac Modular Concentrator Series



User Manual

DNA/DUO/QUATTRO CONCENTRATORS, SPEEDTRAP & DUO/QUATTRO PUMPS

Issue 1-15- June 2008

Part Number 04-5057

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These operating instructions should be read fully before you use the miVac system. Keep them near the system for easy reference. Your attention is drawn in particular to Safety and Maintenance Notes.

GENERAL

1 Introduction

Drawing on extensive experience in the drug discovery field, the miVac Series is designed to provide very high performance coupled with ease of use, occupying the minimum of laboratory space

Simple to use controls enable the run type, run time and temperatures to be set in an instant.

This manual will guide you through the start up requirements, set up needs and operation of the system to facilitate the most efficient procedure to protect your product's integrity and to ensure optimum performance at all times.

Details

The miVac Series is supplied as three modular units that can be combined to suit your needs and requirements, examples below:



CONCENTRATOR

SPEEDTRAP

PUMP

Models available are:

- DNA Concentrator (Combined Concentrator and Pump)
- Duo Concentrator (Concentrator)
- Quatro Concentrator (Concentrator)
- SpeedTrap (Condenser)
- Duo Pump (Low Vacuum Pump)
- Quatro Pump (High Vacuum Pump)

The simple control panel provides easy access to all run settings and also provides you with the current status of the concentrator, details are provided on page 7.



CONCENTRATOR CONTROL PANEL

The LCD display is also used to advise you of any problems that may occur either with the run settings or the concentrator. These messages are defined later on in this manual (Page 13).

2 Safety and Maintenance Notes

2.1 Symbols

The following safety symbols are used throughout this manual and can be found on the equipment. The definitions and scope of each symbol is as described below.

WARNING



THIS SYMBOL INDICATES HAZARDS THAT CAN LEAD TO SERIOUS MATERIAL DAMAGE OR POTENTIAL SERIOUS INJURY.



THIS SYMBOL MEANS THAT YOU SHOULD NOT TOUCH SURFACES IN THESE AREAS. THESE SURFACES CAN BE VERY HOT AND MAY LEAD TO BURNS.



This symbol indicates that you should refer to the relevant part of the User Manual for additional information.



THESE 2 SYMBOLS COMBINED INDICATES HAZARDS THAT CAN LEAD TO SERIOUS MATERIAL DAMAGE OR POTENTIAL SERIOUS INJURY AND THAT YOU SHOULD READ THE RELEVANT PART OF THE USER MANUAL.

2.2 Safety



BEFORE OPERATING THE SYSTEM, IT IS IMPORTANT THAT THE FOLLOWING NOTES ARE READ TO ENSURE THAT THE IMPLICATIONS TO THE SAFETY OF PERSONNEL OPERATING THE SYSTEM AND FOR THE PROTECTION OF SAMPLE INTEGRITY ARE UNDERSTOOD.

Samples in the concentrator chamber are subjected to accelerations of up to 250G.

The following precautions should therefore **always** be observed.

2.3 Safe loading of concentrator

- Always balance the rotor within 10g for the DNA, Duo and Quattro.
- Only use miVac rotors with your system.
- Only load tubes or vials into the rotors that are specified on the rotor.
- Always locate tubes/vials correctly in the rotor.
- Only use a maximum of THREE Shallow Well Microplates (with Stackers) or ONE Deepwell microplate per location on the Duo 2 Position Swing Rotor.
- Only use a maximum of FIVE Shallow Well Microplates (with Stackers) or TWO Deepwell microplates per location on the Quattro 4 Position Swing Rotor.
- Only fill wells of Microplates to 66% of their maximum fill level.
- Always load opposite swings with the same or similar type of plates.
- Always rotate a swing rotor by hand after loading to check that all plates are correctly located before starting a run and before re-starting an interrupted run.

2.4 Limitations of use

Your concentrator system is **unsuitable** for use under the following circumstances:

- With strong acids such as HCl, TFA and HBr at all concentrations – See page 6 for approved list.
- For use as a pressure vessel.

Rotary vane oil vacuum pumps are not recommended for use with miVac systems because vapours from the system may cause damage to the pump. However, for users wishing to use their miVac system with rotary vane oil pumps we recommend that the pump is run with the gas ballast set to position 1 to help prevent vapour damage to the pump. Oil pumps should then be run for 1 hour after the end of the concentration process (with ballast still engaged) to ensure that there is no condensed vapour in the pump. Ultimately, it is the responsibility of the user to check with the pump manufacturer as to how the pump should be operated.

3 System Description and Options

3.1 Scope of delivery and installation

On delivery, it is advisable to unpack your system at the point of receipt, to ease the movement of the component parts to the point of use. It would be advisable to retain the packaging as Genevac and its Distributors will only accept returns in the original packaging.

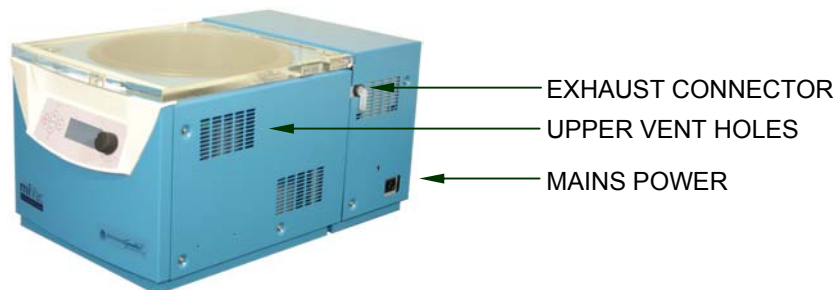
3.2 Checking the delivery

Check the contents of the delivery as soon as possible against the delivery note and notify your Distributor immediately of any missing or damaged parts. Refer to our web site for up to date contact details.

3.3 Installing the system

DNA

The DNA Concentrator with its built in Pump can be easily positioned on most benches. Fit the Catchpot to the upper vent holes on the Concentrator; connect the short tube between the exhaust connector on the pump and the Catchpot. Fit the mains power cable that was supplied.



DUO/QUATTRO CONCENTRATOR, SPEEDTRAP and PUMP

Below is an example of the Duo Concentrator, SpeedTrap and Duo Pump as positioned on a bench.

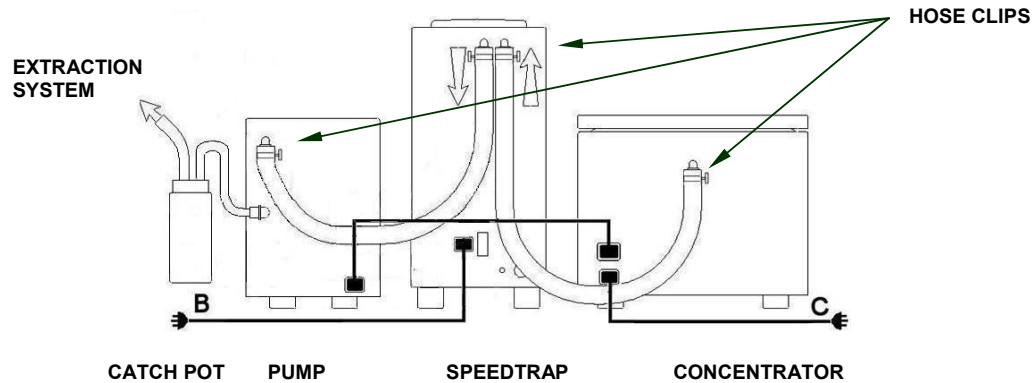


If you have purchased the Cart from your Distributor, and are using the Concentrator, SpeedTrap and Pump, then the Pump should be positioned on the lower shelf with the hose from the SpeedTrap to the Pump routed accordingly.

NOTE: The system is to be positioned so that there is a 50mm air gap between each unit and the next object; wall, fume hood etc.

After installation leave the SpeedTrap in the upright position for 24hrs before connecting power.

HOSES



NOTE: Ensure that the Catchpot is fitted to the upper row of vent holes on the Pump;

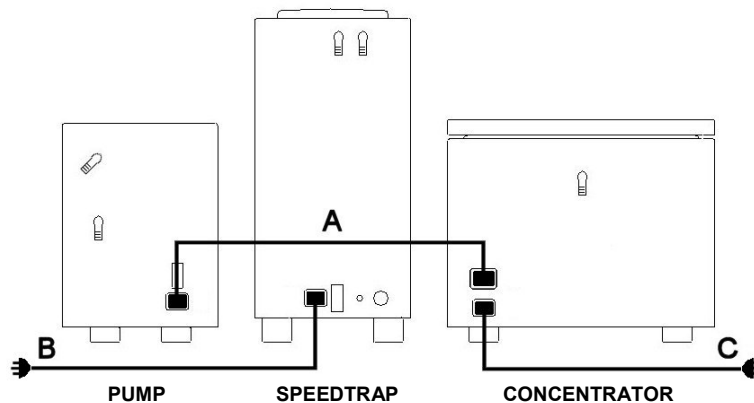
Follow the diagram above to connect the units together using ½" Vac hose cut to length using the hose cutter. Secure hose with hose clips as indicated. The hose, hose clips and the hose cutter are available in the miVac Connection Kit – Part Number: MCK-00000-Y00. Extra lengths of hose are available separately – Vacuum hose Part Number: 04-4783 – Exhaust hose Part Number: 04-5016, specify length when ordering.

If you do not have the SpeedTrap, just connect the hose between the concentrator and the pump.

The arrows on the diagram indicate the direction of vapour flow.

CABLES

Once you have fitted the hoses, you then need to connect the electrical supply cables. There are only 3 cables required. Just follow the diagram below:



Connect the interconnecting cable **A** (supplied in Connection Kit) between the connector on the Concentrator and the connector on the Pump. Do not use the Mains Power Cable supplied with the pump, this is supplied for standalone use of the pump only.

Connect Mains Power Cable **B** supplied with the SpeedTrap to the connector on the SpeedTrap and your Mains Supply.

Connect Mains Power Cable **C** supplied with the Concentrator to the connector on the Concentrator and your Mains Supply.

NOTE: The interconnecting cable is only to be used between the Concentrator and the Pump.

3.4 Good procedural practice

A few general rules for safe operation of a system:

- Ensure only users familiar with all the issues outlined in this document are permitted to operate the equipment.
- Only load rotors that have been approved by Genevac or your Distributor.
- The System should be loaded and started by the same person.
- Never leave system unevenly loaded with the lid closed. Someone may start it.
- Never start, or restart a system without checking it is evenly loaded and all swings swing freely.
- Do not place any objects on top of any of the system components during a run

Misloading may result in damage to samples and the machine, and could void the warranty.

3.5 Routine Checks:

- Check all hose joints on a regular basis to ensure that they are secure.
- Always ensure that the condenser jar is emptied before every run.
- Clean the condenser jar at regular intervals.
- Check the catch pot connected to the pump exhaust on a regular basis and drain as necessary.
- Clean the lid, lid seal, exterior paintwork and inside of the chamber with a soft, lint free cloth using one of the following:

Detergent solution - e.g. fairy liquid
Bleach solution (if using biological agents)
Methanol
Ethanol

3.6 List of acceptable solvents

Acetic Acid
Acetonitrile (ACN)
Acetone
Ammonium Hydroxide (NH₃OH)
Butan-1-ol
Butan-2-ol
Butyl Acetate
Chloroform (TCM)

1,2-Dichloroethane
Dioxane
Ethanol (EtOH)
Ethyl Acetate
Formic Acid
Heptane
Hexane (Hex)
Methanol (MeOH)

Methyl Tertiary Butyl Ether
Methylene Chloride (DCM)
Propan-1-ol or Propanol
Propan-2-ol or isopropyl
alcohol (IPA)
THF
Toluene
Water



SOLVENTS IN RED CAN ONLY BE USED IN COMPLETE SYSTEMS WHERE ALL UNITS (CONCENTRATOR, SPEEDTRAP AND PUMP) HAVE A DATE OF APRIL 2007 OR LATER ON THE SERIAL PLATE.

miVac Systems and Combustible Solvents:

Please note it remains the responsibility of the user to consider safety when evaporating any combustible solvents and ensure the system is placed in a well ventilated environment.

Genevac and the ATEX Directive:

This Statement is applicable only to Member Countries of the EU.

Please note that it remains the responsibility of the user to consider any solvents being evaporated within the context of the ATEX directive. The presence of solvents on the list above indicates only that they will not damage the system. If further information is required, please contact your Sales Representative or visit <http://www.miVac.co.uk>

DNA/DUO/QUATTRO CONCENTRATOR

4 Getting Started



1. Refer to “Safety and Maintenance Notes” and “Installation Instructions”.
2. Open Lid. (For Quattro Concentrator ensure that the latch engages).
3. Fit rotor by carefully sliding it on to shaft.
4. Load the rotor with your samples, ensure evenly balanced.
5. Close Lid. (For Quattro Concentrator lift lid to disengage latch)
6. Set Chamber Temperature, refer to Para 5.1 (if no temperature is selected, the unit will run at the current chamber temperature).
7. Set Run Type, refer to Para 5.2 (if no type is set, the unit will use the current settings).
8. Set Total Run Time, refer to Para 5.3 (if no time is set, the unit will use the current settings).
9. Set Heat Time, refer to Para 5.4 (if no time is set, the unit will use the current settings).
10. Press MANUAL or AUTO button to start the run.
11. If the MANUAL button was pressed, the STOP button will need to be pressed to stop the run.
12. If the AUTO button was pressed, the run will stop after the TOTAL time has passed.
13. The end of run is confirmed by the system emitting 4 long beeps and unlocking the lid.

NOTE: The rotor may continue to spin slowly after the run has ended.

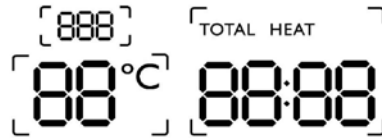


WHEN REMOVING YOUR SAMPLES CARE SHOULD BE TAKEN AS THE CHAMBER AND SAMPLE HOLDERS WILL BE AT THE SAME TEMPERATURE THAT WAS SET FOR THE RUN.

5 Controls

Let's take a closer look at the controls and what they do:

Switch the unit on and the LCD screen will temporarily illuminate to display:



This is a test to ensure that all LCD segments are functioning correctly; it will then revert to the ready mode: The display will indicate the current run settings. For example, with a current chamber temperature of 24°C and a TOTAL run time of 1 hour, the display will indicate:



There are 4 buttons and a rotary selector.

PRE-HEAT

When pressed this allows you to pre-heat the chamber to 40°C prior to starting the run, when selected the LED is illuminated. Pre-heat is cancelled when you press either of the start buttons, the STOP button or the PRE-HEAT button again.

MANUAL – Runs until you push STOP.

When pressed this emits a single beep and starts the run and will continue to run until the STOP button is pressed. When this mode is selected the LED is illuminated and the time counts UP to indicate the time accumulated.

AUTO – Runs for the time set and then stops

When pressed this emits a single beep and starts the run. The system will shut down when the TOTAL time set has elapsed. When this mode is selected the LED is illuminated and the time counts DOWN to indicate the time remaining.

STOP

When pressed this emits a single beep and stops the run. The STOP button can be pressed at any time and the system will safely shutdown. If the STOP button is pressed again when the system is idle it will cause the system to enter standby. Pressing any button will bring the system out of standby.

SELECT

This is a rotary selector and switch unit that is used to set and adjust the various run parameters to suit your needs. These are: Maximum Temperature, Run Type, Run Time and Heat Time.

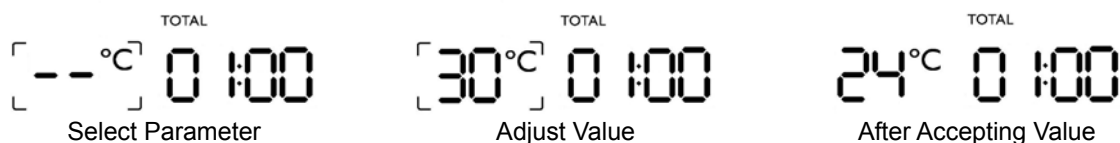
To adjust and set the required parameters rotate the knob to move to the desired position, the display changes with [] appearing at each position in turn. To adjust the value, press the knob to select it (the [] will flash), then turn the knob to increase or decrease the value. Once the correct value is attained, press the knob to accept it.

NOTE: The selected value will be accepted automatically after 30 seconds if you do not press the knob.

Repeat the procedure for all parameters.

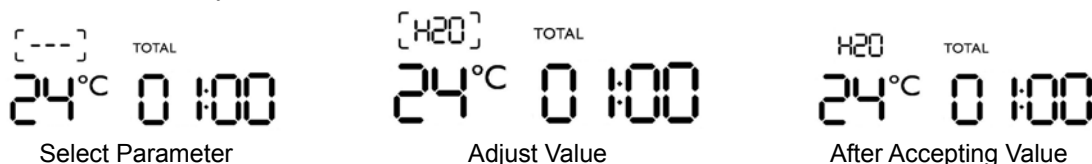
5.1 Setting Chamber Temperature

Note: Once you press the selector to accept the new value, the display reverts back to displaying the current chamber temperature (We have used 24°C as the current temperature for all examples).



5.2 Setting Run Type

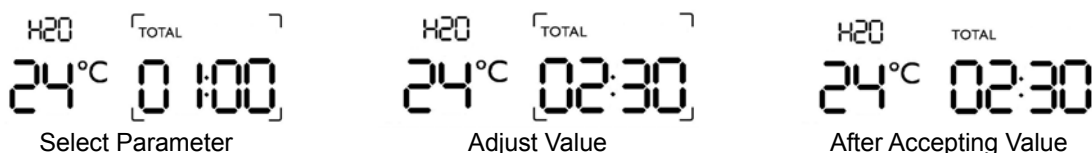
Choose **H2O** for water only, **-OH** for alcohols and alcohol mixes and **---** for all other solvents.



The run types are designed to vent air through the concentrator at a rate optimised for the solvent group selected: **---** No venting, **H2O** Low vent rate *and* **-OH** High vent rate.

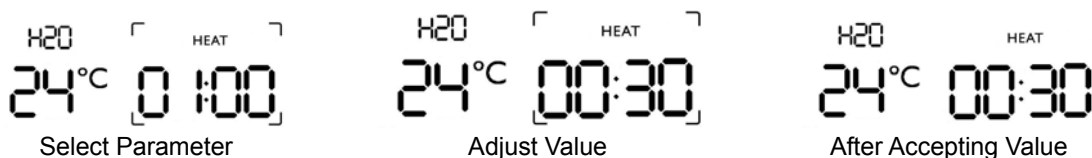
5.3 Setting Total Run Time

Allows you to set the duration of the run.



5.4 Setting Heat Time

Allows you to control the amount of time that chamber heating is applied, this is only available if Chamber Temperature is set to 30°C or above.

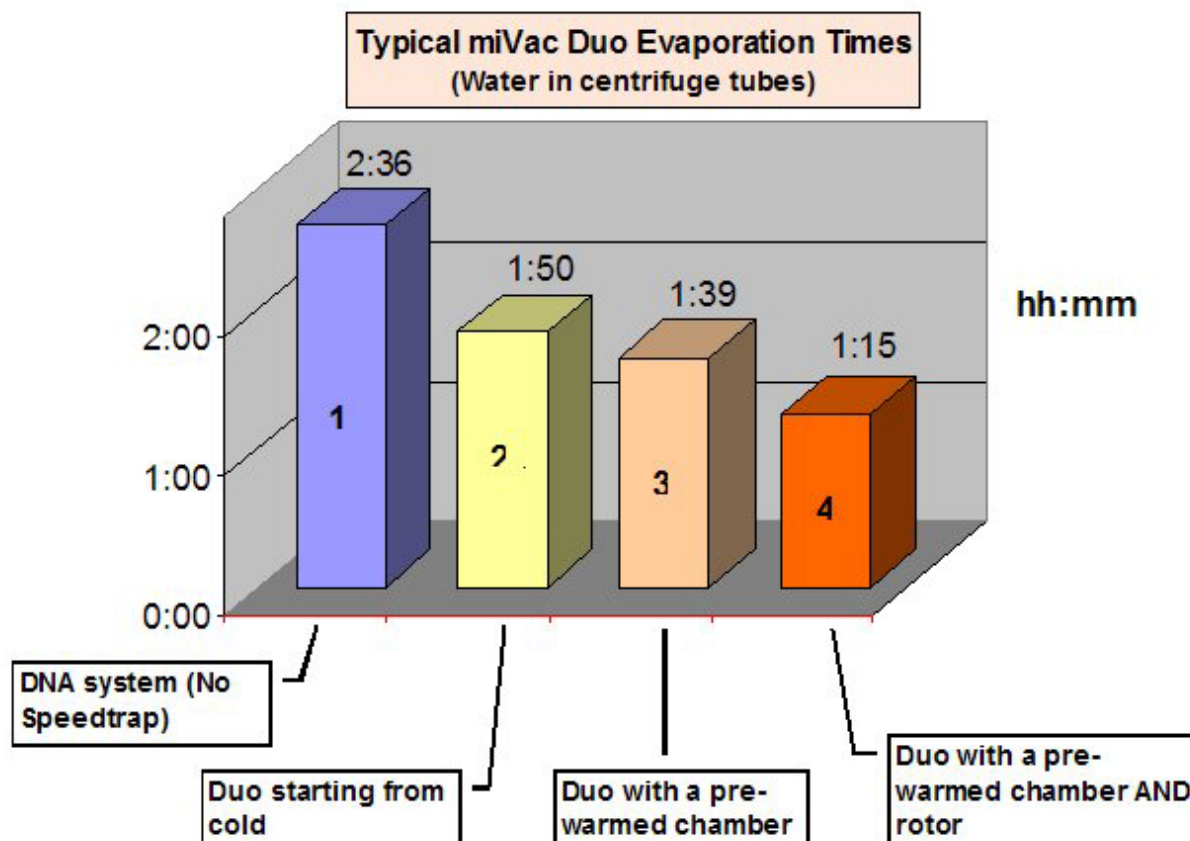


5.5 Display mode in AUTO run.

The display is factory set to show TOTAL TIME, but it can be changed to display HEAT TIME when using the AUTO run function. To change the factory setting; whilst in the Heat Time setting, hold down the selector for 5 seconds until a single beep is heard. The display will now indicate HEAT TIME until it has counted down to 00:00, it will then revert to display the remaining TOTAL TIME. To revert back, carry out the same, but for TOTAL TIME.

5.6 Getting the best from miVac solid aluminium rotors.

Aluminium rotors are fast because, compared to your tubes, they're better at collecting heat from the concentrator. This heat is then transferred to your tubes so speeding evaporation. If you can start a run with the system pre-heated it will be faster still. Have a look at the graph to see typical differences depending on how the system is used.



If you really care about getting the fastest speed then try to get into the habit of leaving your empty rotor in the concentrator with the lid shut and pre-heat enabled. Short runs particularly, benefit from this. The software has also been modified to optimise the benefits from the new rotors (V1.09 on). See below:



DO NOT PRE-HEAT WITH YOUR SAMPLES LOADED

- Rather than the pre-heat function being fixed at 40°C, pre-heat now heats to your control temperature.
- You can choose to latch on pre-heat by holding down the pre-heat button for 5 seconds. The system then automatically remains warm between runs. (You can cancel this as usual with a short press of the pre-heat button).
- The [H2O] function for Duo and Quattro concentrators has been optimised for aluminium rotors. Always use this function when you have more than a few tubes of water. However you might find full vacuum, [--], faster with just a few tubes.

Always use the [H2O] function on DNA system when evaporating water or solvents with similar boiling points.

Note for existing users:

- Existing systems will still benefit from the new aluminium rotors, even without the new software you'll still get 80%-90% of the improvement shown on the graphs.

SPEEDTRAP



6 Introduction.

The miVac SpeedTrap offers you the following features:

- Unique frost free cold trap.
- No defrosting required, all solvents (including water) collect as liquids.
- Easy to empty - collection jar is removed by quarter turn.
- Ideal for use on all concentrators, except freeze driers.

6.1 Safety.

NOTE: After installation leave the SpeedTrap in the upright position for 24hrs before connecting power.

Please be assured that sudden boiling of solvent within the jar is normal and it will re-condense. You may also see ice forming in the jar, this is normal under certain conditions.

The collection jar is only to be emptied at the end of a run when the Concentrator has stopped.

If ice forms in the Condenser jar, allow it to thaw naturally. Do not use implements to try and break the ice as this may damage the jar. Cold water may be added to the jar to accelerate the thawing process.



THE DRIP TRAY IS TO BE EMPTIED REGULARLY TO AVOID THE RISK OF SPLASHING.

CARE IS TO BE TAKEN WHEN REMOVING THE COLLECTION JAR, AS IT IS HEAVY, ESPECIALLY WHEN FULL OF SOLVENT.

INSPECT THE COLLECTION JAR BEFORE EVERY USE FOR DAMAGE, CRACKS ETC.

DO NOT ALLOW TO FILL ABOVE "MAX" LINE AS IT MAY CAUSE DAMAGE TO THE PUMP AND STOP CONCENTRATION.

EMPTY THE COLLECTION JAR AFTER EVERY RUN.

REFER TO LIST OF ACCEPTABLE SOLVENTS BEFORE USE

6.2 Cleaning.

Exterior surfaces can be cleaned using a lint free cloth, the following also apply:

- Do not use abrasives.
- Collection jar is Dishwasher safe.
- Collection jar is not suitable for an Autoclave.

6.3 Setting up.

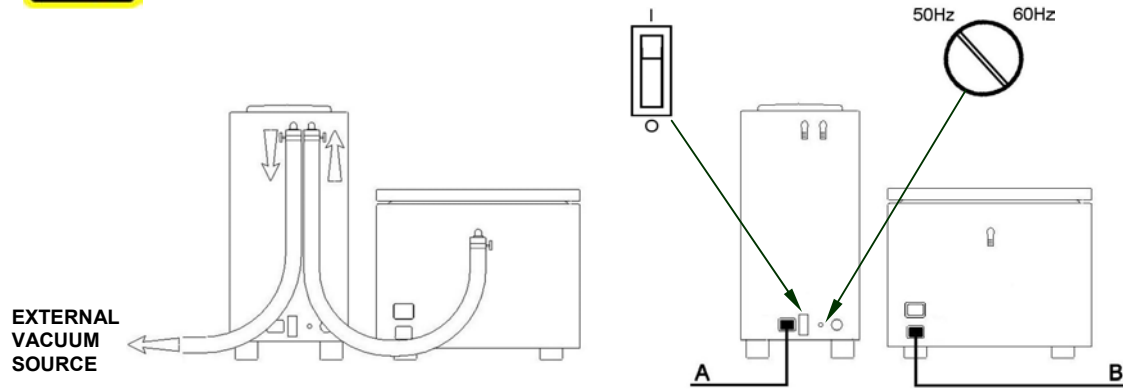
If you are using the SpeedTrap as part of a miVac system, refer to Pages 3 to 6 inclusive.

If you are using the SpeedTrap as a “Stand Alone” miVac unit in conjunction with other equipment please refer to Safety and Maintenance notes on Page 3 of this manual.

Connect the SpeedTrap to your existing equipment as detailed below:



FOR USE IN JAPAN, BEFORE CONNECTING TO MAINS POWER SUPPLY, ENSURE THAT THE FREQUENCY ADJUSTER ON THE REAR OF THE SPEEDTRAP IS SET TO THE CORRECT POSITION FOR YOUR MAINS SUPPLY, REFER TO DIAGRAM BELOW:

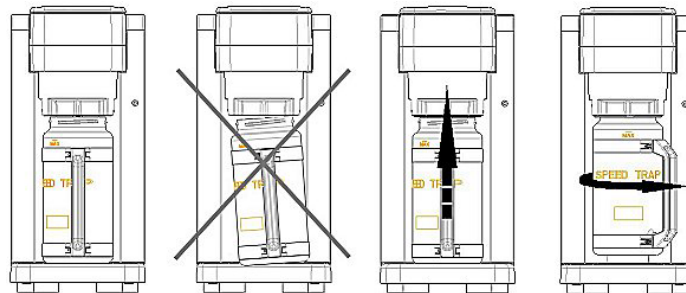


Connect Mains Power Cable **A** supplied with the SpeedTrap to the connector on the SpeedTrap and your Mains Supply.

Connect existing equipment’s Mains Power Cable **B** to your Mains Supply.

Switch the SpeedTrap ON.

6.4 Collection jar – fitting and removing.



To fit the jar, position so that the handle is to the front, lift the jar and rotate to the right a quarter turn until resistance is felt.

The collection jar is removed by rotating the jar to the left a quarter turn, refer to Paragraph 6.1 Safety before attempting.

6.5 LED – indication of condition.

The blue LED on the front of the SpeedTrap indicates the current condition.

LED	CONDITION
FAST FLASH	DEFROSTING
SLOW FLASH	CHILLING
STEADY	CONDENSING

The system will defrost for 3 minutes every hour; this is perfectly normal and requires no user intervention.

DUO/QUATTRO PUMP

UPPER VENT HOLES
(SAME BOTH SIDES)



7 Introduction.

The miVac Duo and Quattro pumps offer you the following features:

- Oil free operation.
- Low maintenance.
- Low vacuum (DuoPump).
- High Vacuum (QuattroPump).

7.1 Safety.

Refer to Page 3 Safety and Maintenance Notes.

7.2 Cleaning.

Exterior surfaces can be cleaned using a lint free cloth.

- **Do not use abrasives.**
- **Catch Pot is Dishwasher safe.**
- **Catch Pot is not suitable for an Autoclave.**

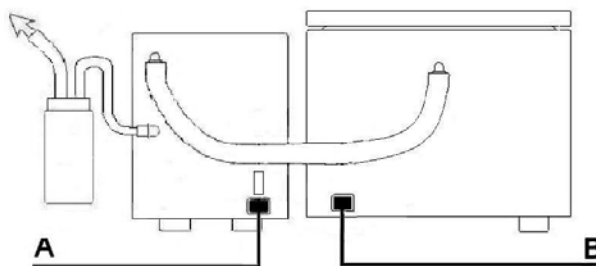
7.3 Setting up.

If you are using the pump as part of a miVac system, refer to Pages 3 to 6 (of this manual) inclusive.

If you are using the pump as a “Stand Alone” miVac unit in conjunction with other equipment please refer to Safety and Maintenance notes on Page 3 of this manual.

Irrespective of what model miVac pump you have, the connections and function are the same. When used with the miVac series of concentrators the electrical power is controlled and supplied by the concentrator using the interconnecting lead. When used with non miVac concentrators the power lead is connected to your mains power supply.

Connect the pump to your existing equipment as detailed below:



If using a Catch Pot, ensure that the Catch Pot is fitted to the lower row of opening of the upper vent and empty after every run. If you are not using a Catch Pot connect a length of suitable hose from the pump exhaust to a waste container.

8 Error messages & Troubleshooting

Errors may be displayed on the LCD display when problems are detected by the internal self check routine; see example below:

Er:03

Error codes will not be displayed during a run

NOTE: If you experience any of the Errors listed below, always switch the system power OFF, wait 5 seconds and then switch the power back ON and try again. If the problem is still apparent contact your Distributor or Genevac Service.

Er CODE	CAUSE OF ERROR	RECTIFICATION
01	Software Error – Memory failure	See NOTE above
02	Lid not closed during run	Ensure lid is closed and engaged with latch Check lid seal is fully seated
03	Lid not locked during run	Ensure lid is closed and engaged with latch Check lid seal is fully seated
04	Motor drive error	See NOTE above
05	Rotor failed to spin	Ensure Rotor spins freely
06	Rotor failed to reach speed	Ensure Rotor spins freely Check mains power supply within tolerance
07	Rotor stops unexpectedly	Ensure Rotor spins freely Check mains power supply within tolerance
08	Lid failed to lock	Ensure lid is closed and engaged with latch Check lid seal is fully seated
09	Lid failed to unlock	Ensure lid is closed and engaged with latch Ensure user not lifting lid against latch Check lid seal is fully seated
10	Software Error – Sensor read error	See NOTE above
11	Software Error – Chamber temperature low	See NOTE above
12	Software Error – Chamber temperature high	See NOTE above

The following tables list some possible symptoms and their corrective actions:

Concentrator/Pump

SYMPTOM	CAUSE	CORRECTIVE ACTION
Display blank	No power	Check power supply/lead
Lid will not open/difficult to open	Dirty lid seal	Clean lid and seal
		External control valve (if fitted) wrong way round
Rotor will not spin/double beep	Lid not fully closed	Open and close lid
		Check lid seal fully seated
		Check for obstructions
Excessive vibration/noise	Rotor jammed	Check for freedom of rotor
	Rotor imbalanced	Check and rebalance rotor
	Missing exhaust silencer/muffler	Replace exhaust silencer/muffler
	Uneven work surface	Take corrective action
Chamber fails to reach programmed temperature	Heat time not set or insufficient	Adjust
Solvent splashes/condensation	SpeedTrap not operating correctly	See "SpeedTrap"
	Poor vacuum	See "Vacuum problem"
	Overfull plates	See loading limits

Concentrator/Pump (continued)

SYMPTOM	CAUSE	CORRECTIVE ACTION	
Vacuum problems	Pump not running	Check connections/mains power supply	
	Lid seal leaks	Check for damage/dirt. Clean if required.	
	Hoses		Check for leaks
			Check for blockages
			Check connections
	Control valve (if fitted) not opening		Check connected to concentrator "pump outlet"
			Check vapour flow direction
	Condenser jar not sealed		Remove jar and check seal for damage/debris.
			Replace
	Pump inefficient		Run system without samples for 5 minutes. Repeat 3 times then reload samples
	Exhaust silencer/muffler blocked		Replace exhaust silencer/muffler
SpeedTrap		See "SpeedTrap"	
Condenser jar full		Empty jar	
Pump needs servicing		Contact your distributor	
Excessive concentration times	Poor vacuum	See "Vacuum problem"	
	SpeedTrap not operating correctly	See "SpeedTrap"	
	Insufficient Chamber heat	Adjust Heat time	
Excessive solvent in pump	SpeedTrap not operating correctly	See "SpeedTrap"	
	Incorrect run settings	Select run settings suitable for your solvent	
miVac pump runs continuously	Connected directly to mains power	Connect to concentrator using interconnecting lead	
Excessive sample odour	Solvent vapour exhausting in to lab	Check connections	
		Check pump/system exhaust ducted to suitable fume extraction point	

SpeedTrap

SYMPTOM	CAUSE	CORRECTIVE ACTION	
No LED illumination	No mains supply	Check SpeedTrap mains power supply lead	
Excessive boiling of solvent in jar	Warm solvent	Stop run and empty jar. Restart run.	
No solvent in jar	Excessive vacuum	Check vacuum appropriate to application	
	Incorrect run type	Select suitable run type	
	Poor cooling		Allow SpeedTrap to cool for 30 minutes with no concentration, then Restart run
			Check LED status
		Check air flow, ensure vents are clear from obstruction	
Poor recovery rate	Excessive vacuum	Check vacuum appropriate to application	
	Incorrect run type	Select suitable run type	
	Poor cooling		Allow SpeedTrap to cool for 30 minutes with no concentration, then restart run
			Check LED status
		Check air flow, ensure vents are clear from obstruction	

TECHNICAL DATA

9 General

Concentrator:

DNA

Max rotor speed	1465 RPM
Max Force	250G
Drive system	Permanent magnet electronic drive

Duo

Max rotor speed	1465 RPM
Max Force	250G
Drive system	Permanent magnet electronic drive

Quattro

Max rotor speed	1130 RPM
Max Force	250G
Drive system	Permanent magnet electronic drive

SpeedTrap:

Condenser temperature	
Minimum	-50°C
Maximum defrost	+60°C
Jar capacity	1 litres (2.0 litres Optional)
Rapid defrost	Yes
Condenser jar	Borosilicate Glass
Refrigerant	R404a

Vacuum pump:

Duo Pump	10.0 mbar (nominal) – (7.5 torr)
Flow rate	38 l/min (1.34 cf/m)
Quattro Pump	< 2.0 mbar (nominal) – (1.5 torr)
Flow rate	33 l/min (1.16 cf/m)

Dimensions: Including pipework at back

DNA Concentrator (W x D x H)	360 (501 with Catchpot) x 602 x 300 mm
Weight	37 Kg
Duo Concentrator (W x D x H)	360 x 424 x 300 mm
Weight	20 Kg
Quattro Concentrator (W x D x H)	480 x 594 x 300 mm
Weight	32.5 Kg
SpeedTrap (W x D x H)	212 x 563 x 450 mm
Weight	25.8 Kg
Duo Pump (W x D x H)	215 x 389 x 315 mm
Weight	17 Kg
Quattro Pump (W x D x H)	215 x 389 x 315 mm
Weight	17.5 Kg

Electrical:**Volts (V):**

120V (±10%)	60Hz	(USA)
230V (±10%)	50Hz	(UK + Europe)
100V (±10%)	50/60Hz	(Japan)
220V (±10%)	60Hz	(Saudi Arabia, Korea)

Power Consumption:

Amps (A):

	230V 50Hz	220V 60Hz	120V 60Hz	100V 50/60Hz
DNA Concentrator	2.6	2.6	4.7	4.5
Duo Concentrator	1.6	1.6	2.8	2.5
Quattro Concentrator	3.9	3.9	7.2	6.2
Duo Pump	1.1	1.1	2.1	2.5
Quattro Pump	0.60	0.60	1.2	1.5
SpeedTrap	1.8	2.3	4.1	4.8

Volt-Amperes (VA):

	230V 50Hz	220V 60Hz	120V 60Hz	100V 50/60Hz
DNA Concentrator	650	650	650	500
Duo Concentrator	400	400	400	250
Quattro Concentrator	950	950	720	720
Duo Pump	250	250	250	250
Quattro Pump	150	150	150	150
SpeedTrap	550	550	550	550

NOTE: The systems may momentarily take current in excess of the figures quoted above. Genevac therefore recommends the use of appropriately rated type C or D circuit breakers on the main supply.

Always assume that all power is dissipated as heat.

Environment:

The following figures apply:

	Operating	Storage
Ambient Temperature:	0°C to 30°C	-10°C to 55°C
Relative Humidity:	0 – 95%	0 – 95%
Altitude:	Sea Level to 1,600m	Sea Level to 12,000m

Emissions:

Noise levels do not exceed 70dBA at one metre from the concentrator.

10 EC Declaration of Conformity

EC Declaration of Conformity - miVac Products

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 miVac products:

DNA Concentrator, models: DNA-23050-x00 ¹

Duo Concentrator, models: DBP-23050-x00, DUC-23050-x00, DPP-23050-x00

Quattro Concentrator, models: QLP-23050-x00, QUC-23050-x00, QHP-23050-x00

SpeedTrap, models: MST-23050-x00

Duo Pump models: DUP-23050-x00

Quattro Pump models: QUP-23050-x00

Super Vacuum Pump model: SVP-23050-x00

Control Valve model: UOP-00000-Y00

Serial Numbers from/to: Individual declarations are available on request

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

- **Machinery Directive (98/37/EEC)**,
- **EMC Directive (2004/108/EEC)** and
- **Low Voltage Directive (73/23/EEC) as amended**

Conformity is demonstrated by compliance to the following standards:

- **BS EN ISO 12100 pts 1 & 2:2003**,
- **EN 60204-1: 1998**,
- **EN 294: 1992**, (Not Pump or SpeedTrap)
- **EN1088: 1996**, (Not Pump or SpeedTrap)
- **IEC 61326: 1997** and
- **BS EN 61010-1: 2001**

Signed:



Position: **Director of Technology and Business Development**

Name: **Bob Evans**

Date: **5th May 2005**

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

¹ Where 'x' = A, B, D, E or F and denotes power lead code appropriate to destination EC country

11 Safety



WARNING!

THIS SYSTEM MUST BE EARTHED

THIS SYSTEM IS A SAFETY CLASS 1 PRODUCT ACCORDING TO IEC CLASSIFICATION. IT MUST NEVER BE USED WITH ANY INTERRUPTION TO THE SAFETY EARTH CONDUCTOR. IT IS AN INSTALLATION CATEGORY II PRODUCT AND IS INTENDED TO OPERATE FROM A NORMAL SINGLE-PHASE SUPPLY.

THIS SYSTEM HAS BEEN DESIGNED TO BE USED IN A POLLUTION DEGREE 1 ENVIRONMENT (NO POLLUTION, OR ONLY DRY NON-CONDUCTIVE POLLUTION).

ANY MAINTENANCE OR REPAIR OF THIS PRODUCT SHALL BE CARRIED OUT BY GENEVAC PERSONNEL (OR APPROVED REPRESENTATIVES OF GENEVAC) USING ONLY APPROVED SPARE PARTS.

12 Accessories

Part Number	Description	D of Q
General		
STJ-10000-000	1 litre jar for miVac SpeedTrap	1
STJ-20000-000	2 litre jar for miVac SpeedTrap	1
MCK-00000-Y00	System Connection kit for connection of pump and/or cold trap to concentrator, complete with 2.5m 1/2" tube, tube cutter, power lead to control pump & catch pot for pump	1
CRT-10000-200	Cart with two shelves suitable for all systems.	1
Vapour Traps		
VAP-TRAP0-100	Vapour trap for neutralisation of ammonia or acid vapours, complete with all connections. Requires neutralising solution	1
NH3-REF00-100	Ammonia neutralising solution, 4x 500ml	1
ACD-REF00-100	Acid neutralising solution, 4 x 500ml	1

Part Number	Description	D of Q
Rotors for miVac Duo and DNA		
DRC-15EPP-048 *	48 x 1.5ml Eppendorf tube rotor (supplied as std with DNA system)	1
DRC-15EPP-084	84 x 1.5ml Eppendorf tube rotor	1
DRC-05EPP-120	120 x 0.5ml Eppendorf tube rotor	1
DRC-MIXEP-048 *	24 x 0.5ml & 24 x 1.5ml & 24 x 2.0ml Eppendorf tube rotor	1
DRC-50CCT-008	8 x 50ml Conical Based Centrifuge tubes (28mm x 115mm)	1
DRC-15CCT-012	12 x 15ml Conical Based Centrifuge tubes (17mm x 120mm)	1
DRC-18150-006	6 x 18mm by 150mm tall glass tubes rotor	1
DRC-16100-028	28 x (16 x 100mm) tubes	1
DRC-13100-032	32 x (13 x 100ml) tubes	1
DRC-01275-040	40 x 12mm by 75mm tall glass tubes rotor	1
DRC-01075-068	68 x (10 x 75ml) tubes	1
DRC-15V45-048	48 x (15 x 45mm) vials	1
DRC-12V40-078	78 x (12 x 40mm) vials	1
DRC-28V60-014	14 x (28 x 60mm) scintillation vials (20ml)	1
DRS-00000-200	Swing rotor to accept 2 microtitre plates (deep or shallow well)	1
BRS-STK00-004	Qty 4 Stackers for swing rotor to allow stacking of up to 3 shallow well plates per swing, increasing rotor capacity to 6	1
* Can be double stacked if using 1.5ml tubes		
Rotors for miVac Quattro		
QRC-15EPP-200	200 x 1.5ml Eppendorf tube rotor	1
QRC-50CCT-036	36 x 50ml Conical Based Centrifuge tubes (28mm x 115mm)	1
QRC-15CCT-072	72 x 15ml Conical Based Centrifuge tubes (17mm x 120mm)	1
QRC-18150-040	40 x 18mm by 150mm tall glass tubes rotor	1
QRC-16100-100	100 x 16mm by 100mm tall glass tubes rotor	1
QRC-01275-200	200 x 12mm by 75mm tall glass tubes rotor	1
QRS-00000-400	Swing rotor to accept 4 microtitre plates (deep or shallow well)	1
BRS-STK00-016	Qty 16 Stackers for swing rotor to allow stacking of up to 5 shallow well plates per swing, increasing rotor capacity to 20	1
BRS-STK00-004	Qty 4 Stackers for swing rotor to allow stacking of up to 2 deep or shallow well plates per swing, increasing rotor capacity to 8	1

Contact your Distributor for pricing and availability.

NOTES



**Genevac Limited
The Sovereign Centre
Farthing Road
Ipswich
IP1 5AP
United Kingdom**

Sales and Service Hotlines

Service Hotline: +44 (0) 1473 243000

Sales Hotline: +44 (0) 1473 240000

Fax: +44 (0) 1473 461176

Email: salesinfo@genevac.co.uk

Web site: www.miVac.co.uk

**Genevac Inc
707 Executive Boulevard
Suite D
Valley Cottage
New York
10989
United States of America**

Sales and Service Hotline

(1) 845 267 2211

Fax (1) 845 267 2212

Email: salesinfo@genevacusa.com

For main Distributor listing, visit:

www.mivac.co.uk

13 Warranty Statement

This product is guaranteed for period of 12 months from the date of delivery to site. 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 to include all labour and component costs incurred.

This warranty is subject to the following provisions:

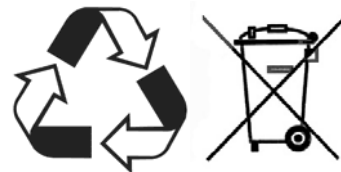
1. System must be sited, installed and operated in accordance with User Manual.
2. Unit only used for the purpose it was sold, and in accordance with Genevac published compatible solvent list.
3. Regular cleaning and preventative maintenance schedule to be adhered to as detailed in User Manual. See item 3.5 Routine Checks on Page 6.
4. Warranty does not cover accidental damage, misuse, modifications or inappropriate repair by untrained personnel.
5. Warranty does not cover consumable items.

Failure to adhere to the above would invalidate the warranty and result in the costs of repairs being charged.

14 Contact information

See opposite; please ensure that you have the serial numbers at hand for the components of your system.

15 Disposal and Recycling



The miVac product should not be discarded in your regular disposal stream. Contact your Distributor or Genevac for proper disposal instructions.

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