LabTech

MultiVap 10

AUTOMATIC EVAPORATION SYSTEM

USER MANUAL

Thank you for selecting our MultiVap 10 system.

We are sure that you will be completely satisfied with the performance of this new unit entering your laboratory. We invite you to read carefully this user manual and to keep it close to the instrument for convenient and fast consulting. For any possible clarification or any request for assistance please contact either our local Representative or:

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1. INTRODUCTION

MultiVap 10 is a multi-function parallel concentrator designed by LabTech that increases capacity and sample throughput in laboratories and combines quality and low cost.

With this system, you can evaporate to solid state or concentrate into a fixed end-point volume.

Condition of use

Power: 220 VAC, 50 Hz, 10 A

Gas requirement: Nitrogen, gas in pressure: 30 PSI, Nitrogen consumption is about 60 L/min at the pressure of 15 psi (1 bar)

Relative Humidity: 20-80%

Dimension: 70(W)x63(H)x45(D) cm

Weight: 38 kg

Features

Ten sample positions that can work individually or simultaneously. Flexible, convenient and easy to use system

Designed for fast replacement of different concentration cups and adapters

Variety of concentration modes in order to meet your requirements

Automatic volume setting

Window and light allow to monitor constantly the whole concentration process

Vortex nitrogen purge generates the highest concentration efficiency. The location and the direction of nitrogen purge can be adjusted according to concentration cup size and sample volume

Sealed concentration chamber including high efficient vapor exhaust system

Automatic detection of liquid endpoint

10 positions supporting 50 and 200 mL concentration cups

Touch screen control interface

2. SAFETY RULES

General Information

Please read carefully this user manual before starting to use the instrument and follow its prescriptions with the utmost care. This user manual is part of the delivery, hence must be always kept together with the instrument on its working place.

It is imperative that every person operating with this system has read and fully understood this manual. The non-observance of the instructions contained herein or improper use may involve damages/injuries that are not covered by product liability.

The MultiVap 10 is a high-power instrument and it is necessary to use a single power supply which supports over 10 A. Please don't share a 10 A socket with other instruments otherwise damages may be caused.

The higher limit of the water is the edge of the front window. The water level must always be above the lower limit. The unit is provided by an audible and visible alarm in case of low water level. If the water level is too low, it may damage the instrument. If the water level is too high, hot water may spill out and cause an electric shock

Use distilled water for the water bath to avoid bubbles formation and incrustation that can impact the normal instrument use.

Electrical safety

The instrument has to be used within the rated voltage. Prior to use, please check if the wire is aged. In case of aged wires, please contact the after-sales service for inspection.

It is forbidden to disassemble the instrument and to connect internal circuit parts, in order to avoid a short circuit or open circuit.

Fire safety

Numerous reagents are flammable and explosive. When the solvent vapor concentration

reaches a certain level, it would be flammable and could cause fire. The instrument should be kept away from the sources of ignition and high temperature places. If there

is solvent pungent smell, carefully check whether there is gas or liquid leakage, and turn off the power.

Chemical safety

The instrument is an instrument for organic chemical sample pretreatment. The involved

chemical solvents have harmful effects on the human health. Despite the instrument is fully closed and features full vent design, it is recommended to pay attention to the personal safety during the use. Regular check of liquid waste barrels as well as working conditions of the vent fan are required to avoid the risk of leakage caused by corrosion and to avoid the formation of organic solvent vapors affecting operators' health. If there is a fault, please contact the Labtech Service Team.

3. INSTALLATION

Setting up your LabTech MultiVap 10 is simple. Just follow the following instructions. Once completed the setup, take some time to explore the features of your system. The user manual provides tips and instructions to help you learn the basics of your MultiVap 10

MultiVap 10 Overview

STEP	DESCRIPTION	PICTURE
1	Put the instrument on the bench top	

2	Front view	
3	Side view	
4	Back view	
5	Fix the exhaust pipe to the exhaust port of the instrument on the back side Connect the other end of the pipe to the exhaust laboratory line	

		
6	Connect the nitrogen source with a 6x4 gas pipe (30-100 psi) to the gas inlet on the back of the instrument	
7	Use a screwdriver to tight the "drain knob" clockwise	
8	Open the water bath and pour approximately 10 L of distillated water (to avoid corrosion problems). The instrument is provided with a water level sensor that alerts the operator if the liquid is insufficient	

Operation of Water Bath

Open the water bath: As shown below, put the hands on the front edge and lift up the water bath (10 L volume) cover until a "click" is heard.

Then leave hands from the cover slowly and make sure the cover is automatically supported.

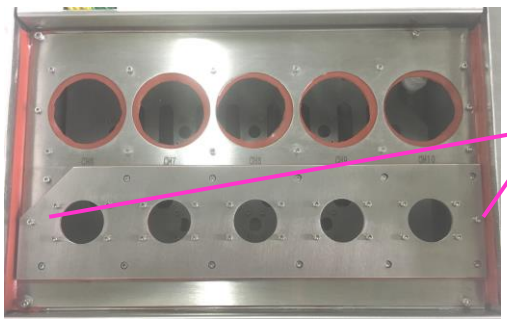
Close the water bath:

When the water bath cover is open, push the cover up slowly until a "click" is heard. Then push down the cover slowly until it is completely closed.

Installation of the Glass Cup Adapter

The instrument can support up to two concentration vials volume: 200 mL and 50 mL.

The instrument is designed as a fast assembly and disassembly structure.



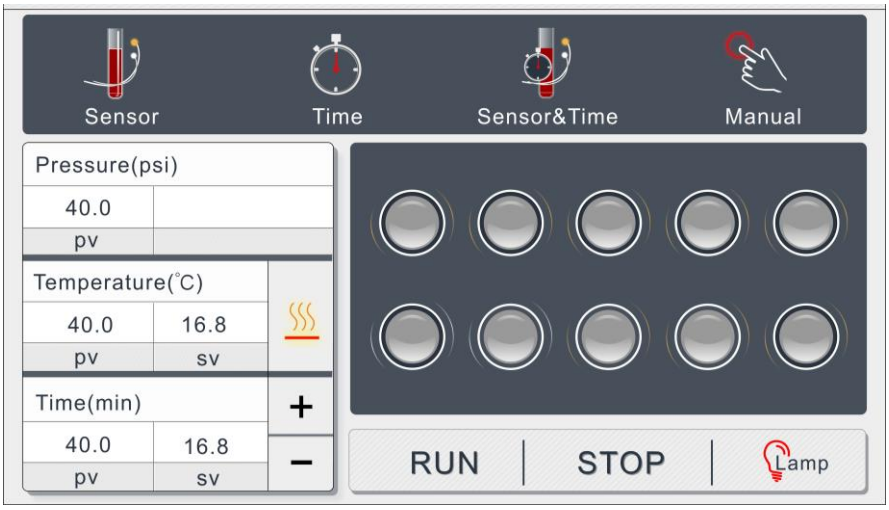
Use A 2,5 mm diameter Allen wrench to uninstall the small concentration cups. They are set just above the big concentration cups, therefore at this time only big cup adapter are used.

MultiVap 10 accessories

200 mL concentration vial, end point: 1 mL, (0,5 mL and dry type spare parts)
50 mL concentration vial, end point: 1 mL, (0,5 mL and dry type spare parts)
External rack for 50 mL or 200 mL vials

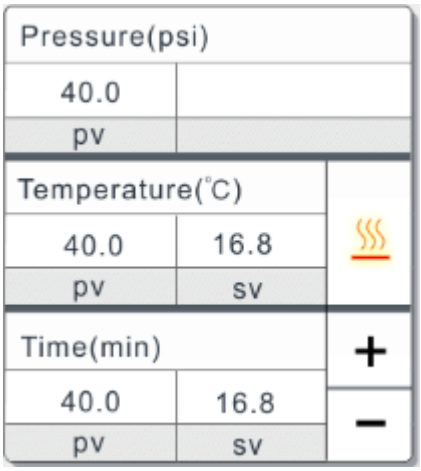
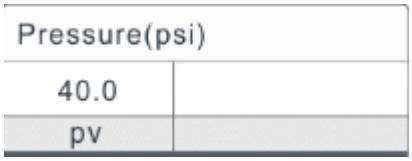
4. SYSTEM SETTING

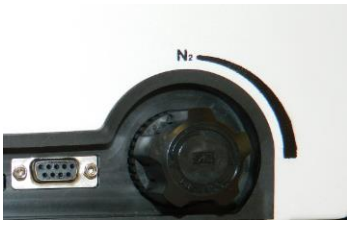
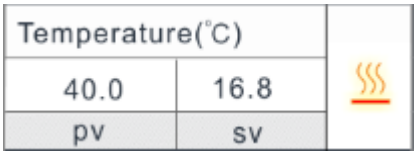
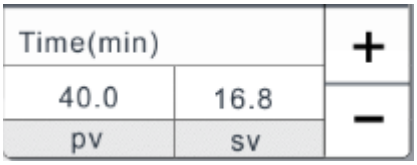
Setting the display interface

1	**System main interface** 
2	**Concentration modes interface**  There are four concentration modes on the top of the interface (the default is "Sensor mode interface"). You can switch the mode by click the icon above before concentration starts. The chosen mode will become blue. Once the concentration is in process it is not possible to switch mode
3	**"Sensor mode" process**  The process is under control of IR sensor. Once the IR sensors detect meniscus of sample, concentration will automatically stop
4	**"Time mode" process**  The process is under control of time. After a certain period of time, set by the user, the concentration will automatically stop

5	**"Sensor and time"**  The process is under control of sensor and time. Once IR sensors detect meniscus of sample, after a certain period of time, set by the user, the concentration will automatically stop
6	**"Manual mode"**  The process is fully manually controlled

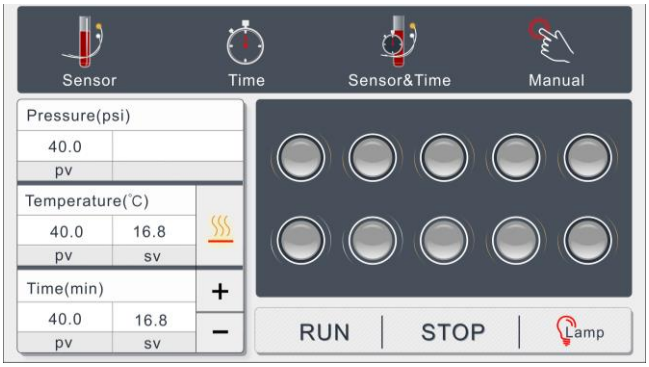
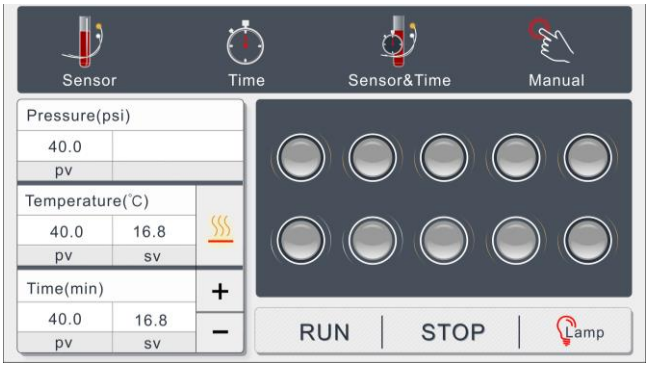
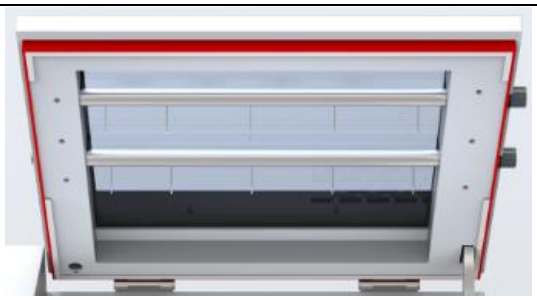
Pressure, temperature and time module

7	**System interface**  The setting and display area are at the bottom left of the interface. "sv" stands for set values, "pv" stands for present value	
8	**Pressure (psi)** stands for present gas pressure. The pressure can be adjusted by the knob located on the left side of the instrument ***(normal pressure value during evaporation is from 1 to 5 PSI)***	

9	**Nitrogen function:** turn the knob to adjust the nitrogen concentration pressure	
10	**Temperature (°C)** shows the set and present temperature. Temperature setting is only available when the bath is off.  indicates the water bath is off (water bath will start to heat once this button is clicked)  indicates that the water bath is reaching the selected temperature	
11	**Time (min)** shows the concentration setting time and current time remaining. (this function can be used only when the instrument is in "time" and "sensor time" mode) Click + to add one minute, so the concentration time is extended Click − to decrease one minute the selected time. The concentration can stop earlier	

5. OPERATION PROCEDURE

STEP	DESCRIPTION	PICTURE
1	Turn on the power of the unit on the back side of the instrument and wait until operation interface is on	
2	Fill the water bath with distilled water	
3	It is necessary to boil/degas the water inside the bath before starting the analysis to avoid air bubbles formation that can affect the IR sensor	
4	Open the water bath cover and put the concentration cup with samples in the right position If some positions are not in use put the (red) caps on the top of the vial	

5	Choose a concentration mode on the operation interface and set the parameters	
6	Choose the concentration position and the selected status becomes colored 	
7	After having selected the concentration positions, click "RUN" to start the concentration method	
8	By clicking "RUN" the nitrogen blowing function starts in the desired position. Check that nitrogen needles are correctly positioned inside the sample vials	
9	By clicking "STOP" the system will turn off the nitrogen blowing function	
10	 The right bottom indicates the water bath light.	

	By clicking  the baths lights up. During the concentration process, the icon turns to  that indicates the light cannot be switched on.
	After the concentration process, click  to change it to  to stop heating; open the cover to avoid residual vapor condensation, then switch off the unit.

6. SOLVENTS TABLE

Solvent	Formula	Molar mass in g/mol	Evaporation energy in J/g	Boiling point at 1013 mbar	Density in g/cm³	Vacuum in mbar for boiling point at 40 °C
Acetone	CH_3H_6O	58.1	553	56	0.790	556
n-amylalcohol, n-pentanol	C_5H1_2O	88.1	595	37	0.814	11
Benzene	C_6H_6	78.1	548	80	0.877	236
n-butanol	$C_4H_{10}O$	74.1	620	118	0.810	25
tert. butanol (2-methyl-2-propanol)	$C_4H_{10}O$	74.1	590	82	0.789	130
Chlorobenzene	C_6H_5Cl	112.6	377	132	1.106	36
Chloroform	$CHCl_3$	119.4	264	62	1.483	474
Cyclohexane	C_6H_{12}	84.0	389	81	0.779	235
Diethylether	$C_4H_{10}O$	74.0	389	35	0.714	850
1,2-dichloroethane	$C_2H_4Cl_2$	99.0	335	84	1.235	210
1,2-dichloroethylene (cis)	$C_2H_2Cl_2$	97.0	322	60	1.284	479
1,2-dichloroethylene (trans)	$C_2H_2Cl_2$	97.0	314	48	1.257	751
Diisopropyl ether	$C_6H_{14}O$	102.0	318	68	0.724	375
Dioxane	$C_4H_8O_2$	88.1	406	101	1.034	107
DMF (dimethyl-formamide)	C_3H_7NO	73.1		153	0.949	11
Acetic acid	$C_2H_4O_2$	60.0	695	118	1.049	44
Ethanol	C_2H_6O	46.0	879	79	0.789	175
Ethylacetate	$C_4H_8O_2$	88.1	394	77	0.900	240
Heptane	C_7H_{16}	100.2	373	98	0.684	120
Hexane	C_6H_{14}	86.2	368	69	0.660	360
Isopropylalcohol	C_3H_8O	60.1	699	82	0.786	137
Isoamylalcohol (3-methyl-1-butanol)	$C_5H_{12}O$	88.1	595	129	0.809	14
Methylethylketone	C_4H_8O	72.1	473	80	0.805	243
Methanol	CH_4O	32.0	1227	65	0.791	337
Methylene chloride, dichloromethane	CH_2Cl_2	84.9	373	40	1.327	850
Pentane	C_5H_{12}	72.1	381	36	06.26	850
n-propylalcohol	C_3H_8O	60.1	787	97	0.804	67
Pentachloroethane	C_2HCl_5	202.3	201	162	1.680	13
1,1,2,2-tetra-chloroethane	$C_2H_2Cl_4$	167.9	247	146	1.595	20
Tetrachlorocarbon	CCl_4	153.8	226	77	1.594	271
1,1,1-trichloroethane	$C_2H_3Cl_3$	133.4	251	74	1.339	300
Tetra-chloro-ethylene	C_2Cl_4	165.8	234	121	1.623	53
THF (tetrahydrofurane)	C_4H_8O	72.1		67	0.889	374
Toluene	C_7H_8	92.2	427	111	0.867	77
Trichloroethylene	C_2HCl_3	131.3	264	87	1.464	183
Water	H_2O	18.0	2261	100	1.000	72
Xylene (mixture)	C_8H_{10}	106.2	389			25
o-xylene	C_8H_{10}	106.2		144	0.880	
m-xylene	C_8H_{10}	106.2		139	0.864	
p-xylene	C_8H_{10}	106.2		138	0.861	

7. TROUBLESHOOTING

	TROUBLE	CAUSE	REMEDY
1	Software error messages		
1a	**Liquid level under minimum limit**	Low liquid level	Add liquid till reach the correct liquid level
		Liquid level floater blocked	Check and unlock liquid level floater
1b	**Pressure under minimum limit**	Gas supply problem	Check gas supply cylinder
			Check valve on gas supply cylinder
		Gas pressure regulating valve/pressure sensor problem	Check and adjust pressure regulating valve
			Check pressure sensor
1c	**Frozen pressure value on display**	Connector Com2/JRS2 detached	Reconnect connector Com2/JRS2
1d	**Wrong temperature on display or 905.1°C shown on temperature pv box**	Broken/miswired PT100 sensor	Check/replace PT100 sensor
		Water bath temperature shown on pv box different from real	Check/modify internal parameters of the thermo regulator
			Check PT100 connectors
		Water temperature doesn't increase	Check/replace heating elements
			Check/replace solid state relay/Check pin 13 – 14 on thermo regulator

	TROUBLE	CAUSE	REMEDY
1	Software error messages		
1e	**Frozen temperature value on temperature pv box**	Connector Com1 detached	Reconnect Com1 connector
		Wires 3 and/or 4 detached from thermo regulator	Reconnect wires 3 and/or 4 to thermo regulator
1f	**Failure to select buttons from touch screen**	Non calibrated touch screen	Calibrate touch screen
		Broken touch screen	Replace touch screen
1g	**Frozen touch screen while method is running**	Software bug	Switch off/on MultiVap10
			Check if software updates are available

	TROUBLE	CAUSE	REMEDY
2	Hardware error		

2f	**IR sensor detector missing the end point**	Presence of bubbles in water bath	Boil water in bath
		Dirty optical fibers	Clean optical fibers inside bath
			Check the presence of algae on optical fibers and clean them
		Connectors detached from electronic board	Check/reconnect connectors on electronic board
2g	**IR sensor detects the end point too early**	Presence of bubbles in water bath	Boil the water in bath
		Dirty optical fiber	Clean optical fiber inside bath
			Check the presence of algae on optical fiber and clean them
2h	**IR channel does not work or not more visible (red light switched off)**	Dirty optical fiber	Clean optical fibers inside water bath
		Interruption in optical fibers communication	Check/repair IR block transmitter - receiver
2i	**Boiling of solvent**	Water temperature too high for the solvent	Set a lower water temperature 5 – 8°C under solvent boiling point
2l	**Solvent splashes on glass of vials**	Too high N_2 flow	Set a lower N_2 flow
2m	**Buzzer does not work**	Broken/damaged buzzer	Replace the buzzer
		Jumper LS1 detached from electronic board	Reconnect jumper LS1 to electronic board

	TROUBLE	CAUSE	REMEDY
2	Hardware error		

2n	**No N_2 flow in the needles**	Clogged needle	Check/clean needle (very carefully because they are very fragile)
		Solenoid valves not powered	Reconnect solenoid valves with electronic board
		Burnt solenoid valves	Replace solenoid valves
		Internal pipes disconnected from cylinder or solenoid valves	Reconnect pipes to cylinder or solenoid valves
		Broken internal pipes	Replace broken pipes
2o	**Led lights do not work**	5V output connector detached from power pack	Reconnect 5V output connector to power pack
		Burnt led lights	Replace led lights

8. SERVICE

The LABTECH worldwide technical support network consists of highly trained Field Service Engineers, Technical Support Specialists and Service Coordinators who are ready to quickly assist customers with answers and solutions to service needs and application questions.

For any possible clarification or any request for assistance please contact either our local Representative or:

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