Operating manual

Multitron Pro

Incubation Shaker

Extract humidification and water quality

CE Dok-ID: V.02.001 - Original

INFORS HT

Technical data

Heating bi-metal control	Approx. at 80 °C
Overheat protection	84 °C, fuse

Temperature range

No cooling	
	6 °C over ambient temperature up to 65 °C

With cooling	
Side cooling	20 °C under ambient temperature up to 65 °C
Top cooling	12 °C under ambient temperature up to 65 °C
External cooling	Depending on temperature of cooling liquid and ambient temperature

Direct steam humidification	
	Up to 40 °C in incubation chamber

CO_2 gassing	
	Up to 60 °C in incubation chamber

ShakerBag Option gassing	
	Up to 40 °C in incubation chamber

Technical data

Direct steam humidification

Description	Value
Inlet pressure	Max. 0.3 bars
Supply	constant
Hose nozzle	8 mm
Control range	20 – 85% rH
Accuracy	± 0.3% rH at 20 °C and 54% rH
Measuring method	capacitive
Control method	Inlet valve
Hose	8 mm Legris-connection
Water consumption reference value	10 g/h at 37 °C, 80% rH per unit
Water quality	Hardness < 0.01 mmol/L $CaCO_3$, equivalent
	Conductivity < 20 µS/cm
	Dissolved solids < 10 mg/L

Approachable values of humidity

Temperature	Maximum humidity
27 °C	85 %rH
33 °C	85 %rH
37 °C	85 %rH

Path through

Description	Value
Unit	Roxtec EzEntry 4 Mini
Diameter pass through	4 x 3.5 – 16.5 mm
Torque screws	3 – 5 Nm

3.7 Utilities

CAUTION!
Risk of loss of property due using of inappropriate utilities!
Using wrong utilities may cause loss of property.
Therefore:
– Only use manufacturer prescribed utilities, listed in the following table.

Technical data

Description	Valid substances
Cooling liquid Secondary circuit Top cooling External cooling	Permitted for food and pharmaceutical fields Freezing < -40 °C Corrosion copper: < -0.6 g/m² Temperature range: -40 °C up to 150 °C
Water quality direct steam humidification	Distilled water Deionized water Demineralized water Reverse-osmosis water (for details see appendix)
Cleaning agents generally	Mild cleaning agents
Disinfectants generally	Quaternary ammonium compounds
Disinfectants door pane polycarbonate	Quaternary ammonium compounds
Cleaning agents adhesive matting	Mild cleaning agents
Disinfectants adhesive matting	Quaternary ammonium compounds

Note: “Ulta Pure Water” or „Water for Injection“ (WFI) is very aggressive and will damage the stainless steel parts of the humidification system.

Therefore: the use of “Ulta Pure Water” or „Water for Injection“ (WFI) is not permitted.

The addition of cleaning agents or disinfectants is not permitted.

4.10 Option Direct Steam Humidification

The incubator shaker is equipped with a Direct Steam Humidification.

The Direct Steam Humidification is switched on or off via the operating panel.

A humidity sensor, located on the rear wall of the incubation chamber, measures the humidity.

Please note the following points:

- The Direct Steam Humidification operates in one direction only. It increases the humidity, but does not decrease it.
- The Direct Steam Humidification only operates correctly at temperatures up to 40 °C.
- The temperature parameter must be switched on.
- The cooling system switches off automatically when the Direct Steam Humidification is switched on.

NOTICE!

An optional control program is available for simultaneous operation of the humidification and the cooling system.

- If the illumination is switched on, the maximum humidity may not reach 85% rH under all conditions.

Fig. 36

The Direct Steam Humidification is mounted on the rear of the housing.

A controlled pump feeds water dropwise into an evaporator chamber via a feed hose. The steam is then fed directly into the incubation chamber.

There are two types of water supply:

- unpressurised from a water tank
- pressurised to max. 0.3 bars from a pressurised pipeline

6.12 Connecting the Direct Steam Humidification

CAUTION!
Risk of material damage due to build up of lime scale through use of tap water.

Lime scale may build up in the evaporator and the incubation chamber through the use of tap water.

Therefore:

– Use only the recommended types of water for humidification.

Before starting initial operation the Direct Steam Humidification, it must be connected to an unpressurised water tank or to a pressurized water supply.

The inlet pressure must not exceed 0.3 bars.

NOTICE!

Place the water tank on the floor to avoid damaging the equipment and the electronics.

The water tank must fulfill the following conditions:

- closed
- *capable of being sterilized*
- *equipped with a filter for pressure compensation*
- *sufficient filling for one cycle*
- *located <2 m away from the incubator shaker*
- *Altitude <1.60 m above floor, if not placeable on the floor.*

Approved types of water (see Appendix):

- Distilled water
- Deionized water
- Demineralized water
- Reverse osmosis water

The Direct Steam Humidification is equipped with a Schott quickfit connector.

The feed hoses must be mounted on the Schott connectors as follows:

Direct mounting of hoses

Procedure

1. Cut the end of the hose cleanly.
2. Insert the hose as far as it will go into the quickfit connector.

Fig. 81

Mounting the hose nozzle plus hose

Instead of mounting the hose, a hose plus a male nozzle can be inserted into the Schott quickfit connector.

Procedure

1. Insert the male hose nozzle into the Schott quickfit connector.
2. Push the hose onto the hose nozzle.
3. Secure the hose with a hose clamp.

8.3 Maintenance plan

The required maintenance for reliable operation is described in the following chapters.

Reduce the maintenance intervals in case increased abrasion is detected during regular checks.

Contact the manufacturer for questions concerning maintenance. For contact details, see page 2.

For proper operation the incubation shaker temporarily needs following maintenance work:

Interval	Maintenance work	To be carried out by
Before each use	Check that the chamber lights are working Replace light bulbs if necessary	Operator
	Option Direct Steam Humidification Check integrity of hoses Replace if necessary Check water level in the tank Top up if necessary	Operator

8.8 Replacing the feed hose of the Direct Steam Humidification

Replacing the feed hose

Replace a damaged feed hose of the Direct Steam Humidification as follows:

Procedure

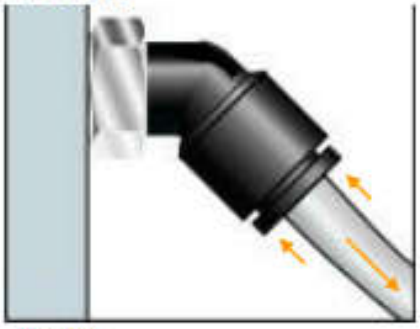

Fig. 107

1. Keeping the O-ring pressed down, pull the hose out of the connector.

2. Push the new hose into the connector (the O-ring does not need to be pressed).

Interferences

Humidity interference

Interference	Possible causes	Trouble shooting	By
Water supply to the Direct Steam Humidification is interrupted; humidity parameter has been automatically deactivated.  	Water reservoir is empty	Fill water reservoir	Operator
	Air pocket between wet filter and reservoir	Replace wet filter with a dry one	Operator
	Valve is defect	Contact Infors representative	Qualified technician
 	Transmission error of the humidity sensor or the temperature sensor	Restart software (switch unit OFF and then ON)	Operator
	Steam generator is defect	Contact Infors representative	Qualified technician
	Inlet pressure is too high	Reduce inlet pressure (max. 0.3 bars)	Operator

12.2 Additional information of the use of sterile filters

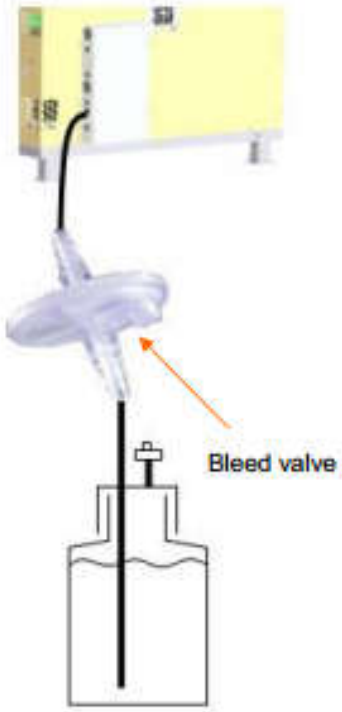

Fig. 111

A steam system is sterile by definition. Nevertheless, in case that non-sterile water is used, we recommend integration of a sterile filter as an additional precaution (not included):

- PALL AcroPackTM 20 with SUPOR membrane 0,2 µm pore size (0,8 µm pre-filter), sterile

The filter may be integrated into the water supply tube at any point between the reservoir and the water inlet, preferably close to the water inlet.

The bleed valve of the filter must be oriented towards the water reservoir.

The transparent plastic bell installed on the filter can be discarded.

Operation of the system with sterile filter is identical as described before.

The supplier's specification of 5 L of liquid volume is valid for processing of particle-laden biological liquids. If used for distilled water that is practically particle-free, the life-time of the filter is much higher, depending on the quality of the water. It is not possible, however, to specify the lifetime exactly, please refer to the supplier's specification for information about integrity testing.

NOTICE!

A new PALL AcroPack™ 20 filter will let air pass easily. Once the filter is wet, air cannot pass anymore. This means that if the reservoir has run empty, the filter will prevent self-priming of the system. In this case, the filter must be removed and placed in a drying oven (max temp. 131 °C for 30 min, lower temperature recommended) until the membrane is dry again or the filter should be replaced by a new filter.

12.3 Purifying Methods

Method	Description
Distillation	Distilled water is often defined as bottled water that has been produced by a process of distillation. This water is practically free of salts, organic compounds and microorganisms (electrical conductivity of not more than 10 µS/cm and total dissolved solids of less than 10 mg/L). Distillation involves boiling the water and then condensing the steam into a clean container, leaving most solid contaminants behind. Because this process is **energy-consuming** and ecologically questionable, demineralized water is preferred for most applications.
Deionization / Demineralization	Deionized water, also known as demineralized water (DI water, DIW or de-ionized water), is water that has had its mineral ions removed, such as cations from sodium, calcium, iron, copper and anions such as chloride and bromide. Deionization is a physical process which uses specially-manufactured ion exchange resins which bind to and filter out the mineral salts from water. Because the majority of water impurities are dissolved salts, deionization produces a high purity water that is generally similar to distilled water, and this process is quick and without scale buildup. However, deionization does not significantly remove uncharged organic molecules, viruses or bacteria, except by incidental trapping in the resin. Additionally sterilized demineralized water is often sold as equivalent to distilled water.
Water softening	Water softening is the act of reducing the dissolved calcium, magnesium, and to some degree manganese and ferrous iron ion concentration in hard water. A common water softener is sodium carbonate (Na_2CO_3).

Appendix

Reverse Osmosis	Reverse Osmosis is a process that is used to remove a wide range of salts to give water of high purity. Osmosis is a natural process involving fluid flow across a semi-permeable membrane barrier. Reverse osmosis changes the direction of the water flow due to application of pressure on one side of the membrane. The rejection rate of contaminants/salts from the water is generally in the region of 90 to 99.5% depending upon the type of membrane used and water to be treated. This means that a typical mains water supply of around 500 to 700 µS/cm conductivity, when passed through a Reverse Osmosis plant will give water of a conductivity of around 10 µS/cm. Greater purity can be achieved with a final "polishing" of the water if required.