INSTRUCTION MANUAL
Holten LaminAir
HC 24 HC 36
ID: 807142

Important user information

Please read this entire manual to fully understand the safe and effective use of this product.

In case you have any comments about this manual we will appreciate receiving them at:

Warranty and Liability

HETO-HOLTEN A/S guaranties that the product delivered has been thoroughly tested to ensure that it meets its published specifications. The warranty included in the conditions of delivery is valid only if the product has been installed and used in accordance with the instructions supplied by HETO-HOLTEN A/S.

HETO-HOLTEN shall in no event be liable for incidental or consequential damages, including without limitation, lost profits, loss of income, loss of business opportunities, loss of use, and other related exposures, caused by e.g. incorrect use of the product.

Symbols used in this manual

☞	**NOTE** Used to direct attention to a special item.

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1. Introduction

The Holten LAMINAIR HC-series are thoroughly tested products designed to provide protection of the operator, the surroundings, and the work process itself against particle or micro-biological contamination.

The HC is specially useful when handling antibiotics and cytostatic drugs in hospital departments.

The HC-series is constructed according to the following standard: GS - GES - 04.

In order to avoid unintended wrong attendance, please read this instruction manual carefully before starting any work.

2. Description

2.1. Principle of operation

A confined workspace where a stable air-curtain at the front of the unit provides protection for the handled product against particles from the surrounding room and the operator.

Sub-pressure in the work opening sucks air from the room through the work opening. This inward going air, together with the air-curtain is sucked down through the holes in the front of the tabletop.

In this way the operator is protected against harmful substances from the handled product.

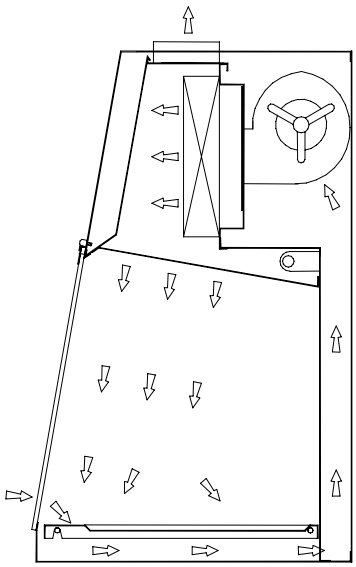

Figure 1. Flow patterns of the HC.

3. Description

A perforated area is situated in the top of the working chamber at the front. From this perforated area HEPA filtered air is blown down to the working chamber. Part of the air will move down towards the suction holes and the back wall and will by mixing clean the part of the working chamber that is situated behind the air-curtain.

The air that is sucked in through the work opening is led down through the suction holes in the front of the box.

The air from the surrounding room and the work chamber is mixed underneath the tabletop.

The total air volume is lead to the fan positioned in the top of the box.

- **Fan:** The air is led to the fan in the top of the bench where the air is pressurised. The fan is of a self-compensating type and has only an insignificant drop in supplied air volume by an increase in back pressure. By means of a built-in transformer the fan can be made to operate with increased power.

  From the pressure plenum the air passes the HEPA filter.

- **HEPA filter:** The filter efficiency of the main filter is 99.999% of particles 0.3 µm (DOP test). From the main filter part of the air is exhausted the rest is re-circulated through the perforated area in the top of the work chamber.

4. Technical data

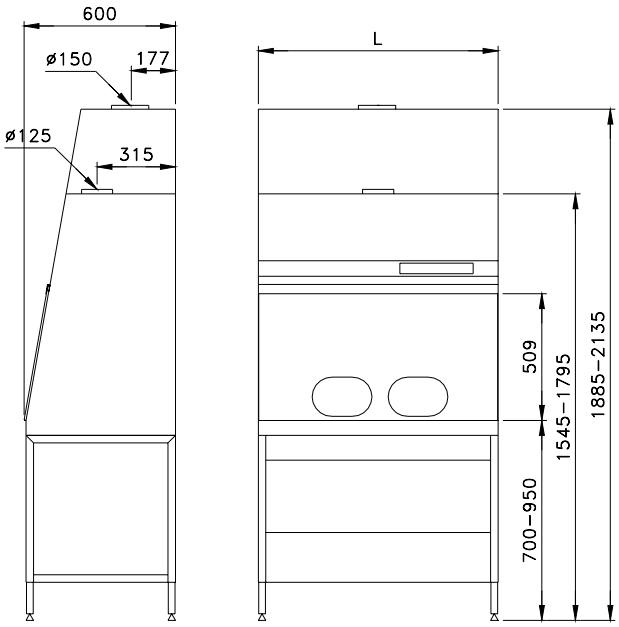

Figure 2. Dimensions of the HC.

	HC 24	**HC 36**
Length	663 mm	963 mm
Capacity of trough	4,5 l.	6,0 l.
Weight	50 kg.	60 kg.
Exhaust volume	120 - 150 m^3/h	
Total air volume	350 m^3/h	400 m^3/h
Air velocity in work openings	0.5 m/sec	
Emitted dry heat to surroundings	130 W	180 W
Temperature rise in the work chamber	maximum 4 °C	
Mains	220 V	
Mains frequency	50 Hz	
Current	1 A	
Noise level according to ISO 6081.2	55 dB(A)	

Table 1. Technical data.

Subject	**Material**	**Treatment**
Front window	Clear polycarbonate	
Bench	Mild steel ST 1203 DIN 16023	60 µm polyester coating pre-treated to corrosion class 1
Stand	Iron pipe	60 µm polyester coating pre-treated to corrosion class 1
Tabletop	Stainless steel, AISI 304	Polished

Table 2. Technical data.

5. Functional parts

1. UV-light*

2. Light fixture

3. Electrical parts

4. Fan

5. Fan exhaust*

6. Activated carbon filters, exhaust*

7. HEPA-filter

8. Control panel

9. Front window

10. Tabletop

The points marked with * are optional equipment.

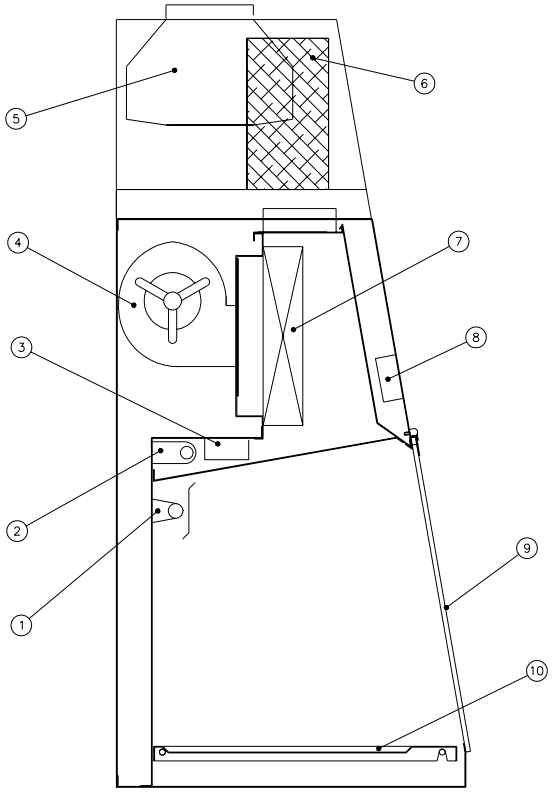

Figure 3. Functional parts of the HC.

The electronic control panel is built in the front of the bench. The control panel is accessible from the work chamber. Connection for transformer, fan and light fixtures is placed underneath the hinged cover in the top of the work chamber.

All control buttons are placed on the control panel on the front of the box.

6. Installation

- Check that the dimensions of the bench (see figure 2, page 6) make free access to the desired site possible.
- The place of installation should be a place without draught and where passing-by of persons is avoided.
- On existing tabletop: Before placing the bench, make sure that the existing tabletop is able to carry the load of the bench.
- Floor stand: Place the table stand on the desired position of installation. Lift the bench onto the floor stand. Adjust the levelling screws on the stand so that the tabletop is horizontal.
- The stainless steel tabletop is positioned in the work chamber.

Prior to electric connection it must be checked that the mains supply corresponds to that stated on the type plate. For increased safety the connection maybe carried out as a fixed installation.

7. Connection to exhaust system

If connection to an external ventilation system is established the alarm system may be converted: This is done by the use of a special kit that will transform the alarm system supervising the exhaust air volume and thus the personal protection factor. Please contact your HOLTEN LAMINAIR agent for details.

It is of utmost importance that the exhausted air volumes are regulated to the values given in the table below.

The regulation is done with the help of regulation valves positioned just after the exhaust pipe of the box.

There should be no active exhaust through the bench when the internal fan is stopped.

The bench should thus either always be running or there should be some logical connection to the external ventilation system.

The bench may be delivered with the kit with installed activated carbon filters.

With this kit a separate exhaust fan is installed to compensate for the pressure loss in the exhaust ducting.

The fan may be dismounted and positioned closer to the point of exhaust. This will establish sub-pressure in a longer portion of the ducting system avoiding escape of harmful substances from the ducting system.

The power of the built-in exhaust fan may be adjusted by changing the voltage supply. This may be done on the terminal point underneath the hinged cover in the top of the work chamber. See enclosed wiring diagram, or contact your local HOLTEN LAMINAIR agent for details.

8. Operation

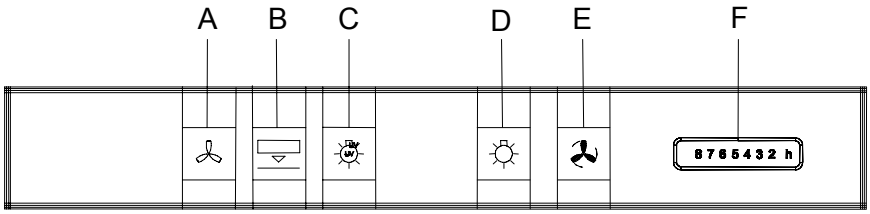

Figure 4. Control panel on HC.

A. Optional: Pilot lamp (red) with reset push-button for silencing of the acoustic alarm. Alarm condition: Insufficient flow.

B. Pilot lamp (red) with reset push-button for silencing of the acoustic alarm. Alarm condition: Window not in proper working position.

C. (Optional) Push-button with signal light (yellow) for UV-light. The UV-light is only enabled with the internal light turned off.

D. Push-button with signal light (blue) for turning on/off internal lighting. Activation of internal lighting disables UV-light.

E. Push-button for start/stop of fan, activation of alarm circuit and starting of hour counter. Green pilot lamp for indication of safe operation. The green pilot lamp turns off if any alarm condition appears (A) or (B) is activated.

F. Hour counter.

Re A: A red signal light and an acoustic signal indicate insufficient quantity of exhaust air after approximately 1 second. Activation of the alarm for insufficient airflow at normal speed indicates that the unit is defective. It is normally only possible to set the unit right by service (see paragraph concerning trouble-shooting).

Re B: If the front window is not placed in its working position, ie. if the hinged window is not completely closed or - if mounted the sash window or the push up window is above the horizontal green marking, this will be indicated by a signal light and by an acoustic signal after approx. 1 second. When pressing the push-button the acoustic signals will be silenced. The signal light does not turn off until the front window is placed in its working position again.

Re C: The UV-light is switched on independently of the state of the fan, however, only with the internal lighting switched off.

Re D: The work chamber lighting can be switched on and off independently of the working state of the fan.

Re E: The internal fan of the safety cabinet is started and stopped by means of this switch. When the cabinet is working under safe conditions the green pilot light will light. At any alarm condition the green light will switch off.

Re F: The hour counter is always in operation when the unit is operating.

9. Working rules

9.1. Working rules before work is started

- About 15 minutes before work is started, the fan of the unit is switched on for operation at normal speed. A green control lamp indicates proper operation.
- The work chamber is to be carefully cleaned and disinfected. Use 70% ethanol or similar.
- It is recommended to use special lint-free wipes.
- Use preferably aqueous disinfectants on the front and side windows - never use disinfectants containing chloroform. Use soft cloths in order not to scratch the windows.
- Objects, tools etc. must be carefully cleaned or - if necessary - disinfected before being brought into the work chamber.
- Necessary equipment for use during work must be positioned within reach.

9.2. During work

- Put on necessary personal clothes for protection of the operator as well as the product (e.g.. gloves, masks, visors, and general clean room clothing).
- Work with tranquil movements.
- Never overload the work chamber.
- Reduce the number of transports in and out of the work chamber.
- Avoid products or equipment with strong emission of heat.

- Do not position the cabinet at a position with direct draught towards the work opening.

- Avoid to position the cabinet where many persons pass by.

For reliable operation it is important that the flow during work conditions is as undisturbed as possible. Therefore, never overload the work chamber - only that required for the actual work should be placed in the work chamber.

9.3. Description

- All work in the cabinet must be performed with tranquil movements. Quick arm movements in the work chamber may cause slip streams which draw contaminated air out of or into the work chamber.

- The number of transports in and out of the work opening should be minimised. Transport of possibly contaminated material to or from the work chamber may in addition to the mechanical transport also cause formation of air flows which create connection between the products and the contaminated surroundings.

- Draught towards the work opening may destroy the protective effect of the stable parallel flow.

- Passing-by of persons in front of the work opening should be minimised. An onward movement will create a pressure wave in front of the object and a suction behind it. Passing in front of the work opening will therefore in the first place cause room air to be pressed into the work chamber and in the second place cause that air is sucked out of the chamber. The effect is intensified the faster the person is moving and the closer to the opening the passing takes place.

10. Maintenance

Daily: The work area is cleaned. Be especially careful when cleaning the work surface.

Weekly: Wipe the exterior of the bench with a mild detergent of household type. Anti-static spray can be used for cleaning of the front window.

Regularly: Reliable operation of the bench is based on the following conditions:

1. Correct air velocities.

2. Efficiency of the installed HEPA-filter.

These parameters should be tested by a qualified technician after approximately 5000 hours of operation or at least once a year. On the right gable of the lamp cover there is a label stating the time for the next service check-up.

- Testing of air velocities involves measurement of the air velocity in the vertical flow (see also the enclosed test report).

- Testing of the efficiency of the installed HEPA-filters. By means of a special measuring device a particle counter or a photometer the effectiveness of the filter is tested (see also the enclosed test report).

☞	**NOTE** Contact your local supplier for further information on test procedures.

- Light tubes incl. starter, control panel, and terminals are placed behind the cover in the top of the working chamber. When changing these parts the three screws holding the cover should be removed, and let the cover hang down.

- If UV-light is mounted, this is placed on the back wall of the chamber. Be sure that the UV-light is turned off before trying to replace it.

- Change of main filter:

  Unscrewing the screws near the front window loosens the cover in the top of the work chamber.

  Loosen the special filter fasteners.

  Remove the filter.

  Carefully install the new filter, please be particularly careful with the filter gaskets.

  Fasten the filter using the special filter fasteners.

- Fasten the filter so there is about 3 mm between the aluminium frame of the filter and the filter mounting frame of the bench.

  Refit the cover and refasten.

- Test:

  Correct air velocities.

Efficiency of installed HEPA-filter.

11. Trouble shooting

☞	**NOTE** If none of the following attempts will bring the box to operate satisfactorily. A qualified technician should be called.

- **Problem:** The bench will not start, and the light does not come on.
- **Possible remedy:** Check that the bench is connected to the wall socket. Is it switched on? If necessary try other equipment to see check normal voltage on the wall socket. The bench is equipped with a fuse positioned on the electrical plate underneath the pre-filter cover. Try replacing the fuse.
- **Problem:** The bench starts but the light does not come on.
- **Possible remedy:** Change starter and/or light fixture.

12. Recommended spare parts for HC 24

Description	Amount	Mark	Specifications	Holten no.
HEPA filter	1	Luftfilterbau	ULPA 305-610-69	
Light tubes	1	Phillips		
Starter	1	Osram	ST 111,220-240 V-4-80W	844053
If mounted				
UV-tube	1	Phillips	TUV 30 W	9400000
Starter	1	Osram	ST111, 220-240V 4-80W	844053

13. Recommended spare parts for HC 36

Description	Amount	Mark	Specification	Holten no.
HEPA-filter	1	Luftfilterbau	ULPA 305-910-69	
Light tubes	1	Phillips		
Starter	1	Osram	ST 111, 220-240 V-4-80W	844053
If mounted				
UV-tube	1	Phillips		9400000
Starter	1	Osram	ST111, 220-240V 4-80W	844053