

OPERATING MANUAL

VARISTAR LHX 3

Air/Water Heat Exchanger



V A R I S T A R

Schroff GmbH

Climate Control

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Signs and Symbols

Throughout this operating manual, the notices below are identified by the following symbols (pictographs):



Danger!

Warning of imminent danger. Failure to observe this warning may result in serious bodily injury and even death.



Caution!

Warning of a potentially hazardous situation. Failure to observe this warning may result in minor bodily injury or damage to the equipment.



Information

Identifies important information or user tips.

To be completed by the user :

Inventory number: _____

Installation site: _____

Schroff serial number: _____

Contact Address:

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1. Description of the Air/Water Heat Exchanger (LHX 3)

This unit is designed to remove the high levels of dissipated heat generated by electronic racks and components used in electronics and industry from the electronics or server cabinets in which they are installed. The LHX 3 is based on the VARISTAR series and contains a space-independent cooling system.

The system comprises a top fan, air channels in both side panels and a removable air/water heat exchanger in the base of the cabinet.

The LHX 3 is designed for maintenance-free operation.

1.1 Principle of Operation

Warm air in the cabinet is sucked upward by a top fan into air channels which are integrated into side panels.

Cooling water enters the heat exchanger, is warmed by extracting heat from the air, and flows back to the cooling-water circuit. Meanwhile the air, now cooled, is reintroduced into the cabinet from below.

General Remarks for Effective Cooling

An effective usable cooling capacity of the LHX 3 is achieved by:

- optimal positioning of the electronic components housed in the cabinet
- suitable guiding of the airflow
- air baffles fitted to increase functional effectiveness

1.2 Controls

The LHX 3 is not adjustable.

1.3 Benefits

The LHX 3 is based on a space-independent thermal concept and does not affect its surroundings.

At full load the LHX 3 generates a noise level of no more than 45.2dB (A) and can thus be used in an office environment.

Since the air/water heat exchanger is situated in the base, the LHX 3 does not pose a danger to the installed systems from water leakage. Nor is there any danger of air short-circuits since the fan (in the top panel) is spatially separated from the heat exchanger (in the base).

2. Regulations / Safety Notices

The design and construction of the LHX 3 are in compliance with all applicable EC guidelines.
(See section 12, EC Declaration of Conformity)

In the installation and operation of the LHX 3 the following regulations and safety notices must be observed:



ANY WORK ON THE LHX 3 MAY ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL

ACCIDENT PREVENTION REGULATIONS MUST BE OBSERVED

**DO NOT STAND UNDER THE LOAD DURING RAISING AND LOWERING OF THE LHX 3.
KEEP OUT OF THE DANGER AREA.**

THE LHX 3 MUST BE PROPERLY SECURED TO AVOID RISK OF TIPPING.

NO SAFETY FEATURE MAY BE DISABLED OR BYPASSED.

**THE APPLICABLE VDE, EN AND IEC STANDARDS MUST BE OBSERVED IN THE
ELECTRICAL FITTING AND CONNECTION OF THE LHX 3. IN ADDITION, THE TECHNICAL
SPECIFICATIONS FOR CONNECTION TO THE ELECTRICAL SUPPLY UTILITY COMPANY
MUST BE OBSERVED**

**BEFORE COMMENCING ANY WORK ON THE LHX 3, THE UNIT MUST BE ISOLATED
FROM THE POWER SUPPLY**



The national regulations of the country in which the unit is installed must be observed

**The entire water circuit must be monitored for any incompatibility or intolerance of
materials**

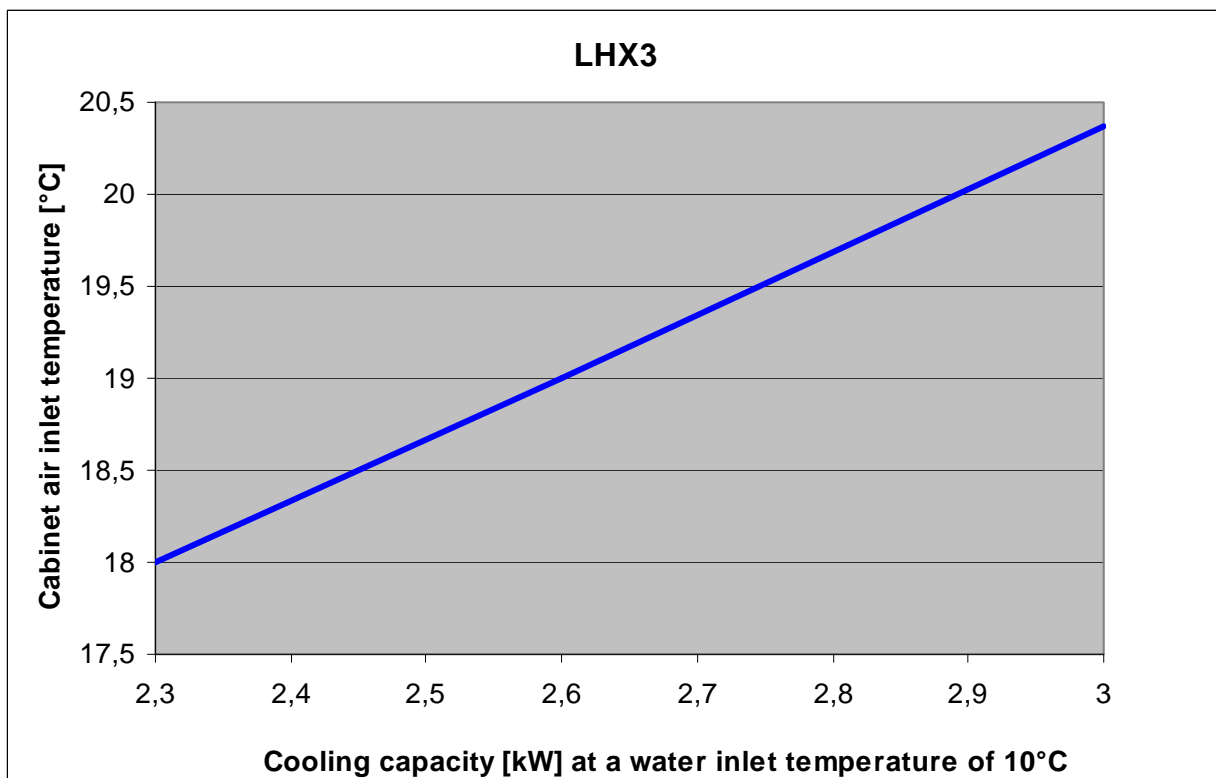
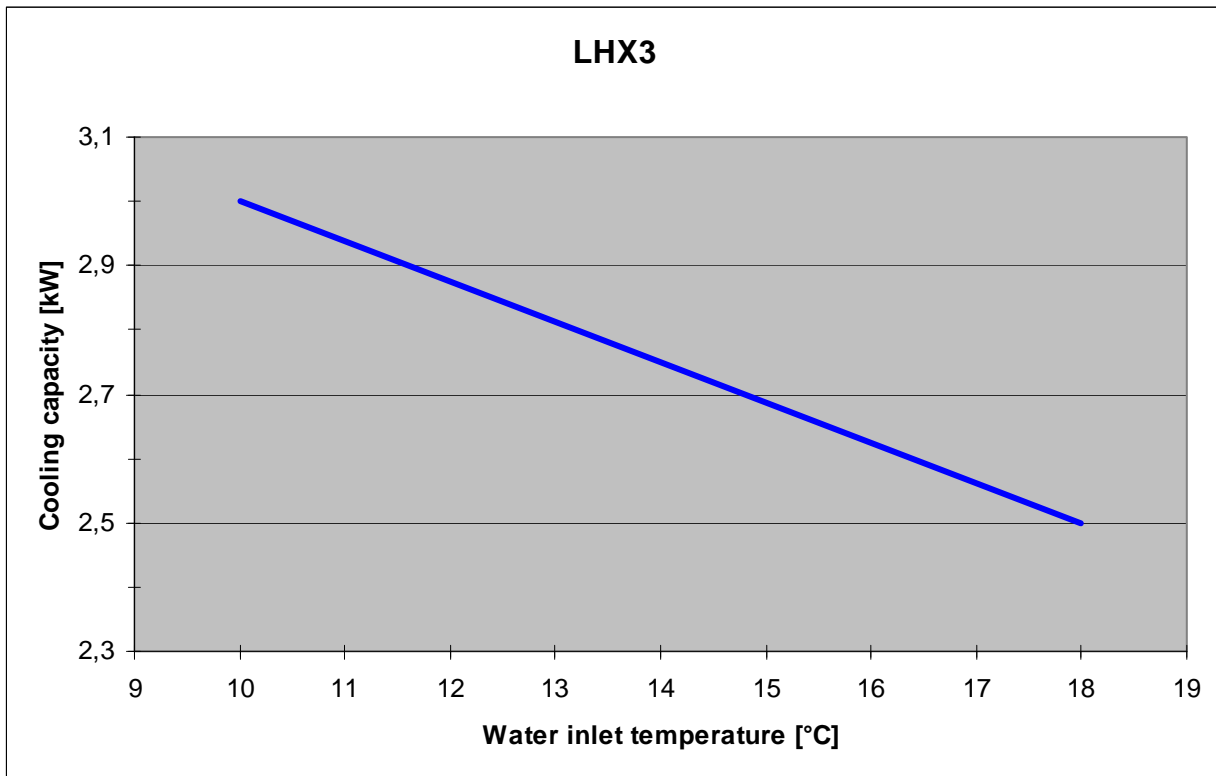
**The cooling water must be free of any substances that may cause mineral deposits or
corrosion!**

The water quality must conform to the values stated in section 4

3. LHX 3 Technical Data

Technical Details		
Usable cooling capacity (cooling water inlet temperature 10° C, air exit temperature 20° C)	kW	3
Cooling medium		Water
Water flow volume	m ³ /h	Up to max. 2.0
Pressure loss – system, measured at flow rate 0.5 m ³ /h	bar	0.1
Water circuit		
Water inlet temperature (recommended)	°C	6 to 16
Air circuit		
Airflow volume	m ³ /h	900
Electrical data AC		
Supply voltage	1 / N PE	230 V; 50/60 Hz
Current consumption	A	0.38
Power consumption	W	85
Apparent power consumption at full load	VA	120
Protection fuse	A	2
General Data		
Type of protection of cabinet	IP	55
Ambient temperature during transport	°C	-25 to 70
Ambient temperature range outside cabinet during operation	°C	5 to 70
Relative humidity level	%	5 to 95
Noise level at 100% fan capacity	dB(A)	45,2
Weight	kg	150
Air/Water Heat Exchanger Dimensions		
Height	mm	199
Width	mm	464
Depth	mm	425 (465 mm with handles)

3.1 Performance Curves



To ensure trouble-free operation of the heat exchanger the water quality requirements must be met (VDE 3803).

See also point 4.

If the water temperature falls below 16 °C the formation of condensation should be anticipated

4. Water Quality

To ensure trouble-free operation of the LHX 3 the following requirements for the water must be observed (see also VDE 3803):

- Electrical conductivity:	25 mS/m < 220 mS/m at 25 °C
- Hydrogen concentration:	7.5 ... 8.5 (pH value) at 20 °C
- Chloride:	< 200 g/m ³
- Total hardness:	< 60°dH
- Colonial units:	< 10.000 KBE/ml
- Appearance:	clear, sediment-free
- Colour:	clear

5. Transport and Storage

Any damage found on unpacking should be communicated to the carrier and the transport insurer immediately.

During transport, ambient temperatures of between -25 °C and 70 °C and a relative humidity of between 5 and 95 % are generally permissible.



After storage at temperatures below 10 °C, sufficient time should be allowed for acclimatisation before switching on, as condensation water may have formed.

The LHX 3 must only be transported without water.

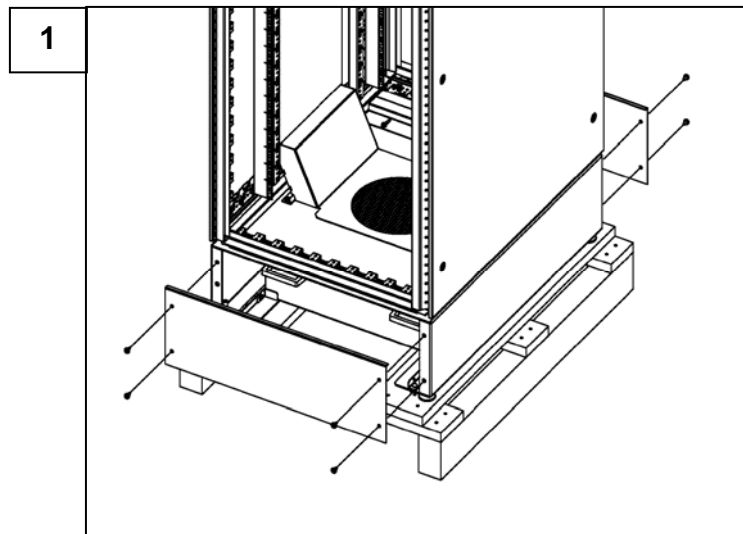
If the unit is to be stored or transported in ambient temperatures of less than 0 °C, special measures must be taken to prevent damage caused by freezing.

6. Assembly

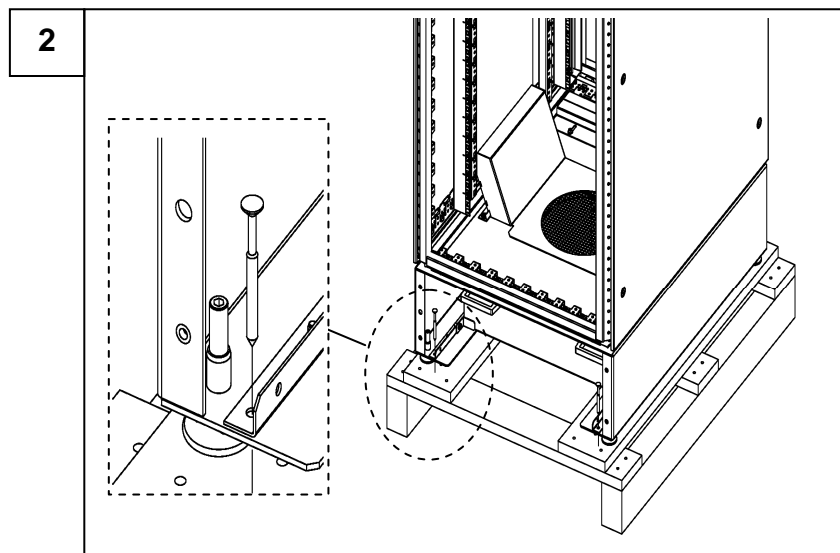


**WORK ON THE LHX 3 MAY ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL.
ACCIDENT PREVENTION REGULATIONS MUST BE OBSERVED.**

6.1 Removing the LHX 3 from the wooden pallet

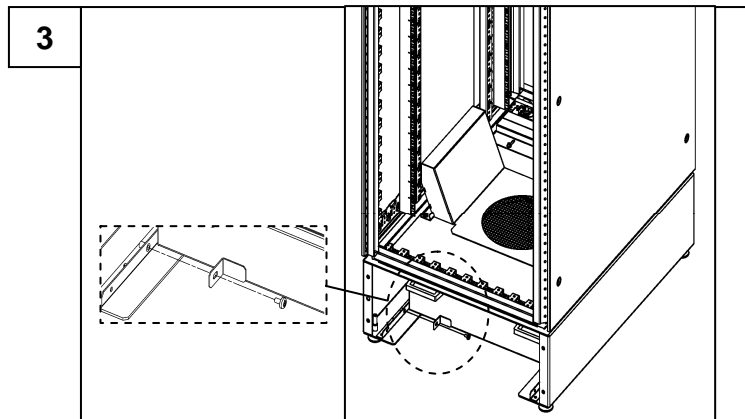


At delivery the base of the LHX 3 is secured to a wooden pallet. To remove this, first unscrew the covers to front and rear of the LHX 3 (Fig. 1).

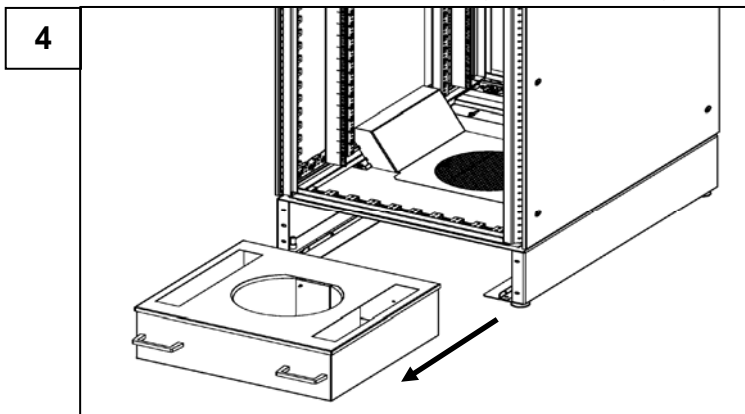


Now simply unscrew the retention screws between the cabinet base and pallet (Fig. 2).

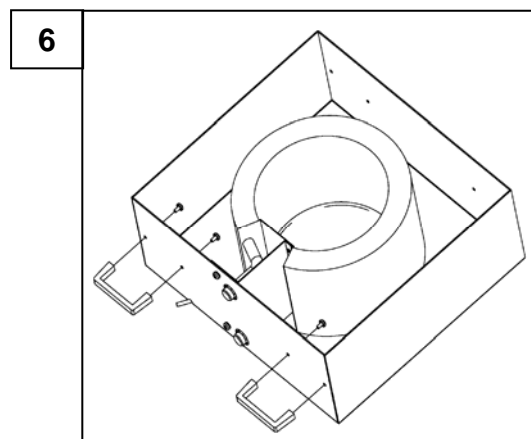
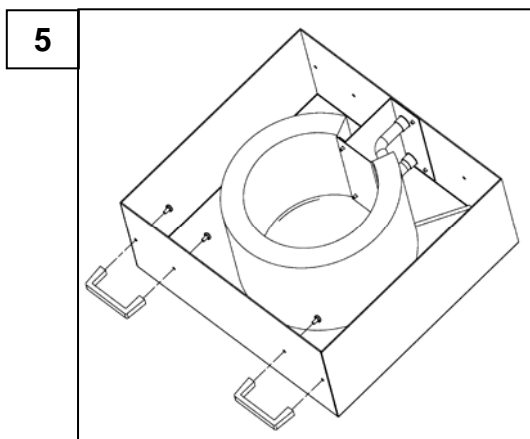
6.2 Removing and rotating the LHX 3 heat-exchanger cassette to accept water supply from the front instead of the rear (At delivery, water connections are normally configured for supply from the rear)



In order to change the water connection points from the rear to the front, first remove the heat exchanger cassette. Also remove the transport securing bracket (Fig. 3)

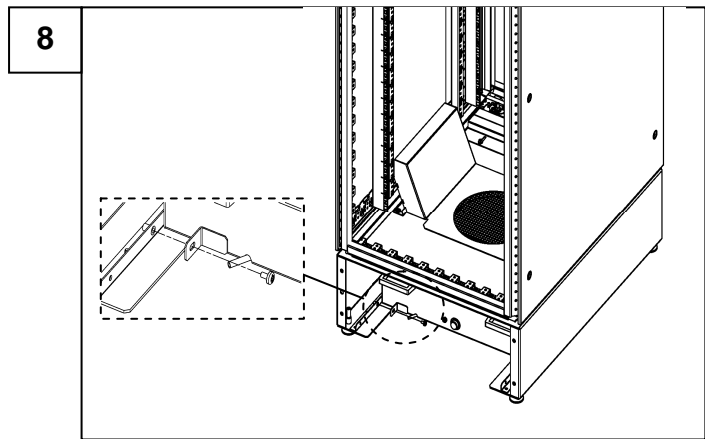
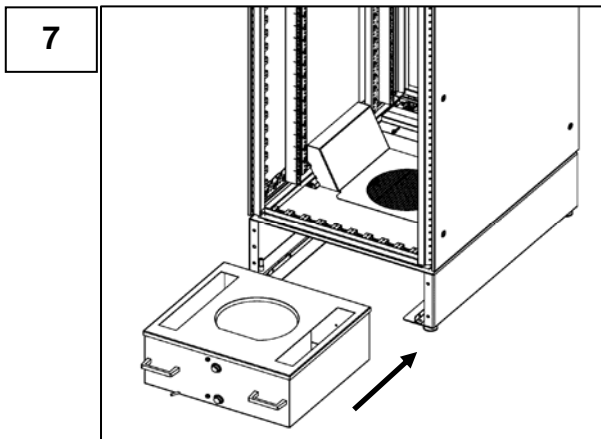


Now you can pull the heat-exchanger cassette out of the base unit (Fig. 4) and change the direction of water connection (select either from in front or from the rear).



Next, loosen the screws on both handles and fit them to the opposite side of the heat exchanger facing outward (Figs. 5 and 6).

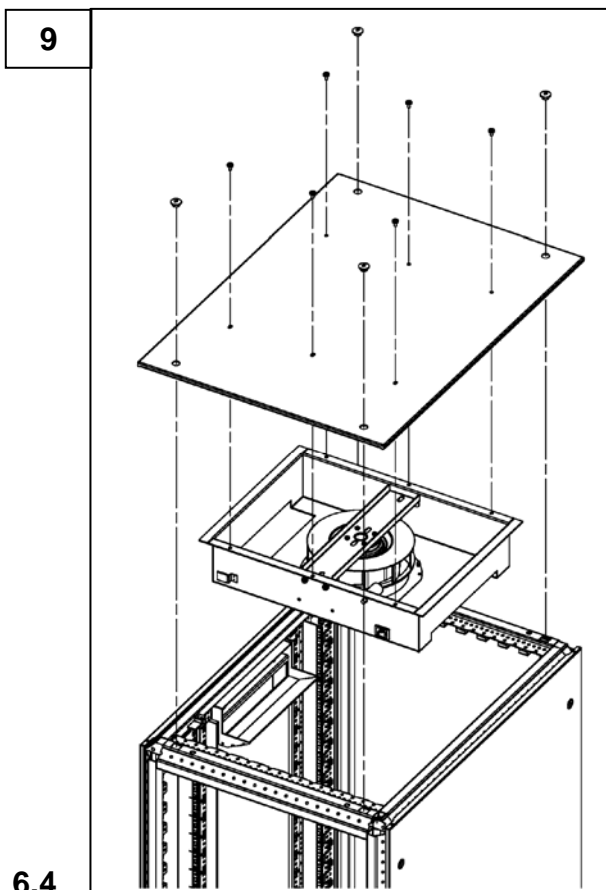
Note: Please use the plastic studs to close the drilled holes.



Finally, reinsert the now reversed heat exchanger into the base unit of the LHX 3 and screw the transport securing bracket back in place (Figs. 7 and 8).

Should problems arise from the repositioning of the handles on the heat exchanger, please consult the Schroff service department for assistance.
For contact information see page 2.

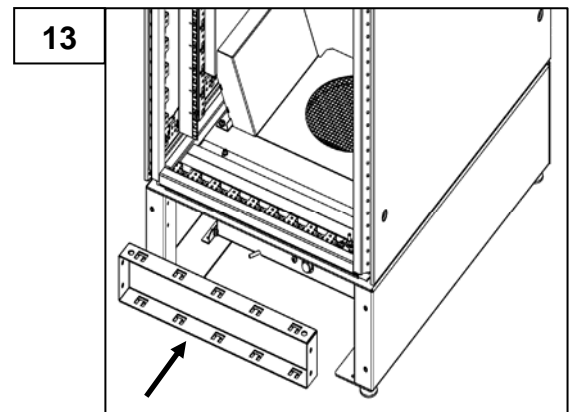
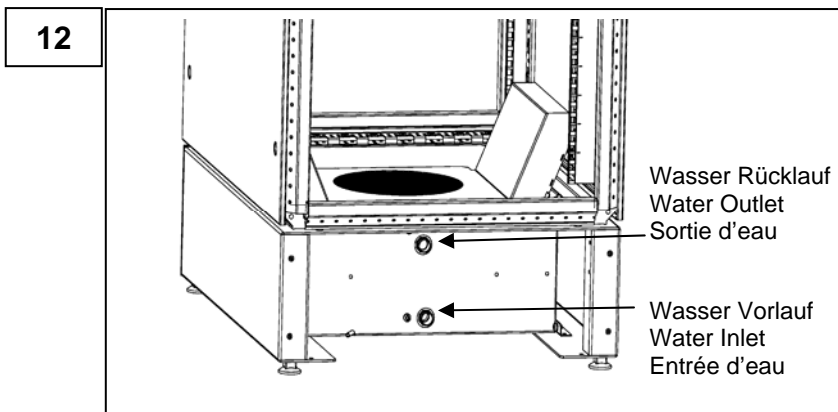
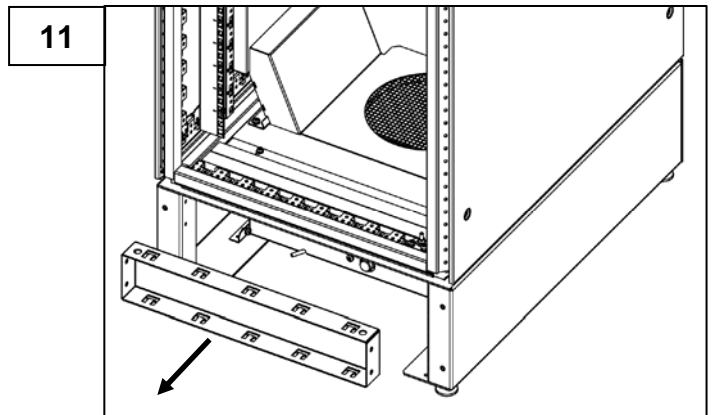
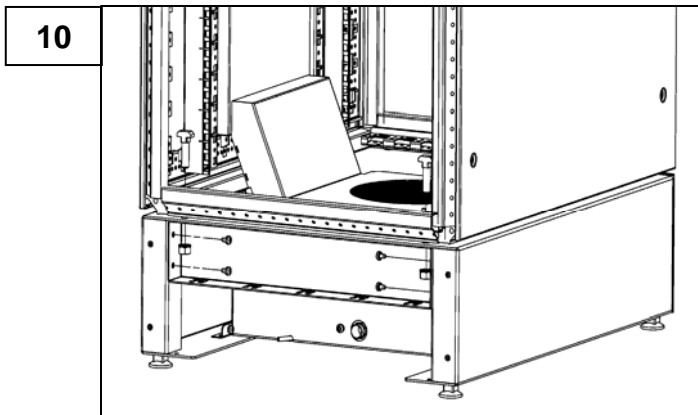
6.3 Removing the Fan Unit



Caution! While removing or working on the fan unit please first remove the mains plug from the power supply (see safety regulations, page 5).

To remove the LHX 3 fan unit, first loosen the four large top bolts and six smaller bolts for the fan unit (Fig. 9).

Remove earthing cables from the top plate and fan unit.

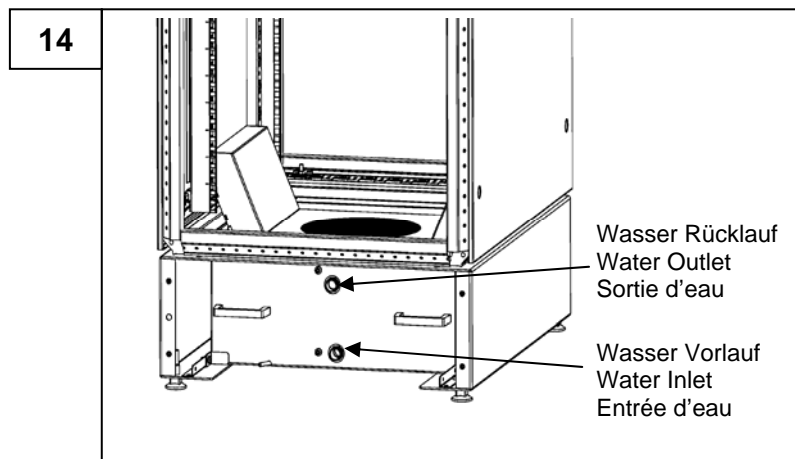


6.4.1 Water supply from rear

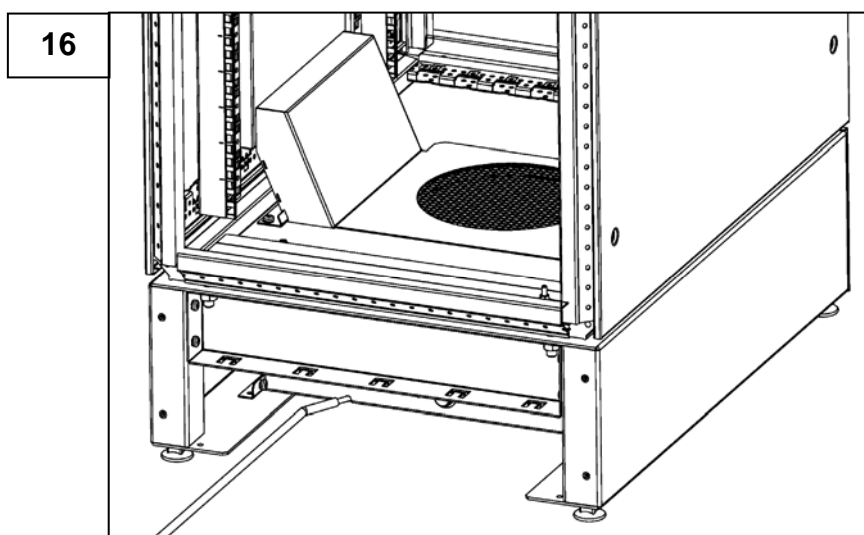
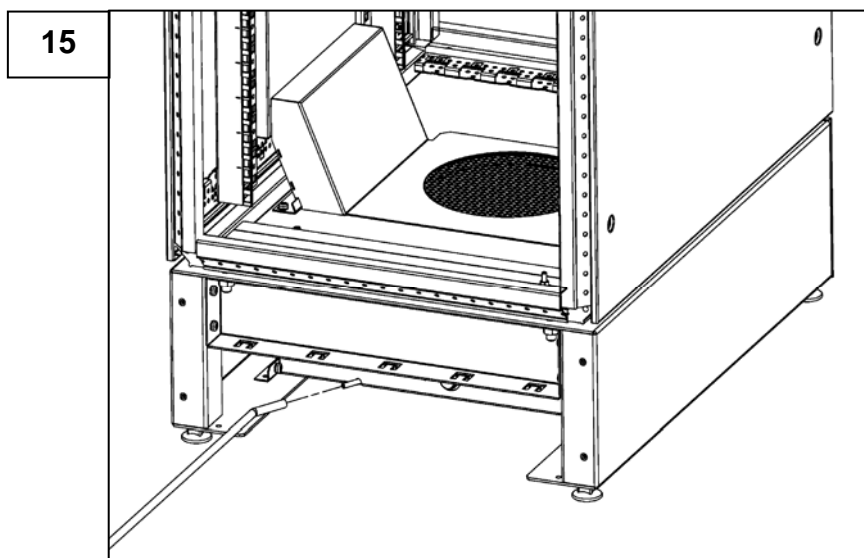
If you have configured the heat exchanger cassette such that the water is supplied to the rear section of the base, you must remove the stiffening truss in order to reach the two water connections (Figs. 10-13).

6.4.2 Water supply from front

If you have arranged the cassette facing forward, this is unnecessary and you can reach both water connection points directly (Fig. 14).



6.5 Drainage of Condensate



The condensate drain of the LHX 3 is situated at the bottom of the cabinet, close to the water connection points. To allow drainage of condensed water, remove the rubber cap and fit a hose (connecting pipe diameter 6 mm) to the condensate drain outlet (Figs. 15 and 16).

The hose is not included with the unit.

The LHX 3 is normally supplied with the condensate drain closed. Where operating conditions are such that condensation occurs on the heat exchanger, the user should set up the condensate drain accordingly.

7. Decommissioning

Steps to be performed:

- Isolate LHX 3 from electrical supply - Disconnect LHX 3 from system case (connector)



A collecting vessel should be to hand to catch any leakage of water.

8. Environmental Requirements

During the commissioning and decommissioning of the LHX 3 the applicable environmental requirements should be observed with regard to recycling, reuse and disposal of process materials and components.

9. Malfunctions and Troubleshooting



WORK ON ELECTRICAL SYSTEMS MUST ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL.

ACCIDENT PREVENTION REGULATIONS MUST BE OBSERVED.

See page 2 for our current servicing addresses.

10. Maintenance and Servicing



WORK ON ELECTRICAL SYSTEMS MUST ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL.

ACCIDENT PREVENTION REGULATIONS MUST BE OBSERVED.

ISOLATE THE LHX 3 FROM THE MAINS SUPPLY BEFORE OPENING.



May only be carried out by qualified personnel

See page 2 for our current servicing addresses.

11. Conditions of Warranty

11.1 Warranty term

Schroff GmbH offers a two (2) year warranty for this equipment. The term commences on the day of delivery. Please retain the delivery note or invoice as proof.

11.2 Scope of fault correction under warranty

Except where the following exceptions apply, the warranty is valid for any defects in materials or manufacture.

Any further claims, particularly for consequential damages and the points below, are expressly excluded.

11.3 Exclusions from the warranty

- Units that have been opened or modified without authorisation, or whose serial number has been falsified, altered or removed.
- Damage or malfunctions caused by the non-observance of our operating manual, by being subjected to dropping or impacts, contamination or other incompetent handling.
- Damage of any kind sustained during transport (all liability for damage in transport is assumed by the carrier).
- Damage caused by incompetently performed repairs or attempted repairs by unauthorised, untrained personnel.

11.4 Making a claim under the warranty

Please contact your branch sales office.

For further information visit:

info@schroff.de
www.schroff.biz

12. EC Declaration of Conformity as defined in EC Guidelines

☐ EC Low-Voltage Guideline 2006/95/CEE

Type

Product	Air/Water Heat Exchanger
Type/description	Varistar LHX 3
Order No.	10130-193, -194
Operating voltage:	230 VAC 50/60 Hz

Developed, designed and manufactured in accordance with the above EC Guidelines by

Schroff GmbH
Langenalber Straße 96 - 100
D-75334 Straubenhardt, Germany

The following harmonised standards were applied:

- ☐ Safety requirements to EN 61010-1 (03-2001)
- ☐ Earthing connections to EN 60950-1
- ☐ External and internal dimensions to IEC 60297 Parts 1 and 2
- ☐ Type of protection IP 55 in accordance with IEC 60529

Technical documentation is provided in full.
This is the operating manual.

Straubenhardt, 12.01.2006

Volker Haag
Vice President Product Development



Karsten Lengnink
Head Product Development – Cabinets

