## Overview

### Cabinets

#### Wall mounted cases

#### Accessories for cabinets and wall mounted cases

#### Climate control

#### Desk-top cases

#### Subracks/19" chassis

#### Front panels, plug-in units

#### Systems

#### Power supply units

#### Backplanes

#### Connectors, front panel component system

#### Appendix

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**Applications**

The heat exchanger LHX 20/40 is especially suitable for the use in the following sectors:

- Data centres
- 19" and blade server applications
- Systems with extremely high dissipation losses

**A future for data centres**

VARISTAR LHX, the space-independent complete cabinet system for removing dissipated heat up to 40 kW. The air/water heat exchanger is inserted laterally into the cabinet as complete unit, to the left or right. The horizontal airflow ensures a uniform air distribution over the entire cabinet height.

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**Downloads and further important information can be found on the Internet under www.schroff.biz**

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**Main Catalogue**

E 10/2012
Cabinets – VARISTAR LHX 20/40

VARISTAR LHX 20/40 with air/water heat exchanger for data centres

- Cooling capacity up to 40 kW
- Cabinet complete solution, static load-carrying capacity up to 1000 kg, protection class IP 55
- Space-independent heat dissipation, high energy efficiency
- Water and air loops are temperature controlled
- Low noise level
- Fans may be exchanged individually during operation

With single door

- Cooling capacity up to 20/40 kW (heat exchanger to left or right)
- Hand operated door opening

With double door

- Cooling capacity up to 20 kW (heat exchanger to left or right)
- Hand operated or automatic door opening

Accessories

- AC mains switch
- Management system for monitoring LHX 20/40 and other cabinet parameters

ServicePLUS

- e.g. other cabinet dimensions
- e.g. side-by-side mounting solutions
- e.g. containment (cold or warm aisle)
- e.g. custom solutions (special sizes)

www.schroff.biz/ServicePLUS
Cabinets – VARISTAR LHX 20/40

Space-saving, low-noise and energy-efficient

Highly efficient and noise-optimised

The VARISTAR heat exchanger range wins with its high energy efficiency and cooling capacity. The LHX 20, operating at 80 % fan speed, is very efficient with a total power consumption of only some 530 W. In the water circuit also, the device proves very efficient thanks to its low pressure losses. Control is thus primarily through the water circuit; only in emergencies or at full load do the fans run at 100 % speed. The low fan speed also contributes to the reduced noise level. Moreover the VARISTAR LHX 20 operates behind the tightly closed glass door and with 80 % fan speed creates a noise level of only 50.7 dB(A).

Persuasive in its use of space

Thanks to its 1200 mm depth not only can you install all current server types in the VARISTAR LHX but there is also sufficient room for the cabling. Since the heat exchanger is inserted laterally as a complete module into the 800 mm wide cabinet only, the 19” plane can be used to its full height of 42 U (max. even 47 U). This saves valuable space in the data centre!

Can be mounted side-by-side and redundant

One heat exchanger for several cabinets

Since the cooler unit can be mounted either left or right of the 19” plane, highly variable or redundant cooling systems can be built from multiple cabinets without problems. If the full cooling capacity is not required at first, one device can supply several cabinets mounted side-by-side with cold air. Here the unused spaces for cooling units in the row of cabinets are closed off with an air divider. Should the requirement for cooling capacity rise, the divider is removed and an additional cooling unit inserted.

Redundancy through side-by-side positioning

Redundant systems can also be realised very simply. If two cabinets are placed together with a heat exchanger each, one device can perform the cooling of both cabinets up to a maximum of half the maximum cooling per cabinet.
Cabinets – VARISTAR LHX 20/40

Scaleable, upgradeable to 40 kW

The VARISTAR LHX heat exchanger range lets you move into water cooling step by step. Individually cooled cabinets that first neutralise hot-spots in the computer room can be gradually expanded to redundant systems and positioned side by side. Upgrades are also possible at any time in the selection of the heat exchanger: By initially installing only a maximum dissipation loss of 20 kW per cabinet and using the LHX 20 for cooling, it is possible to exchange this device later for an LHX 40 and thus obtain a cooling capacity of 40 kW.

Service-friendly, secure and monitored

Failure safety and ease of servicing play a special role with the VARISTAR LHX. The unit itself is designed for long life. Sensitive components with short MTBF are consistently avoided and all necessary expendable parts are used so as to maximise their life. Thus in normal operation fans run at only 80 % of full speed and are positioned in the cold section of the cabinet, which considerably increases the lifetime of the bearings over that of their use in the warm section. Additionally, the heat exchanger is equipped as standard with a droplet separator and a condensate management system to prevent the formation of water droplets in the air entry area to the server.

The VARISTAR LHX 20 and LHX 40 series of devices are designed for ease of installation and maintenance. The water connections are easily accessible in the bottom front cabinet area (in the LHX 40 optionally from the front or rear). Fans can be changed individually and very quickly while the unit is operating. However, should a fault develop either in the cabinet or in the unit itself, each heat exchanger provides valuable information for maintenance and service works. Fan speeds and temperatures at various positions in the cooling circuit are measured via integrated communications interfaces and can be shown on a display. All information (measured values, thresholds etc) can also be monitored via an EMC box and passed directly to the network management system.

Water connection and condensate management

Temperature display and RS 232 interface for an Ethernet gateway or an external cabinet monitoring device

An AC switching module can switch over to an alternative mains (e.g. emergency power) in case of mains supply failure. The module detects a power failure and changes over so quickly that no break in the supply occurs for the consumer. With the AC conversion module, supply-side redundancy can be achieved for this application.

Worldwide monitoring with EMX technology

The water connections are easily accessible in the bottom front cabinet area (in the LHX 40 optionally from the front or rear). Fans can be changed individually and very quickly while the unit is operating. However, should a fault develop either in the cabinet or in the unit itself, each heat exchanger provides valuable information for maintenance and service works. Fan speeds and temperatures at various positions in the cooling circuit are measured via integrated communications interfaces and can be shown on a display. All information (measured values, thresholds etc) can also be monitored via an EMC box and passed directly to the network management system.
Cabinets – VARISTAR LHX 20/40

VARISTAR LHX 20, single door

- Cabinet to ingress protection class IP 55 with air/water heat exchanger up to 20 kW for voltage supply 230 VAC
- Fans individually exchangeable during operation
- Droplet separator and condensate management
- Max. static load-carrying capacity 1000 kg

Delivery comprises (completely assembled and earthed)

<table>
<thead>
<tr>
<th>Item</th>
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<td>Flat top cover, St, RAL 7021</td>
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<td>Front door, glazed, RAL 7021, security glass, 6 mm, 180° hinge, 3-point locking, lever handle for optional DIN profile half cylinder</td>
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<td>Base/plinth 100 mm, with additional centre cross member, St, RAL 7021, removable covers, integrated feet</td>
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<td>19” panel/slide mount with EIA cut-outs, St, RAL 7021, 225 mm recessed at front, 740 mm distance between front and rear 19” plane</td>
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<td>Air deflector for optimised airflow, St, RAL 7021</td>
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<td>Air/water heat exchanger, 20 kW, 230 VAC, RAL 7021; mounting to left or right, see Order information</td>
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<td>13</td>
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<td>User Manual; mains cable, length 1.5 m</td>
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Order Information

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DIN profile half cylinder, common locking for lever handle (1 key fits all locks) incl. 2 keys

Lifting eye for top cover PU 4 pieces

AC mains switch-over for LHX 20

Note
- Other dimensions and versions (e.g. 115 VAC or 48 VDC) available on request
- Technical data air/water heat exchanger see page 1.231
- Cabinet management to monitor LHX 20/40 temperatures, fan speed . . . see page 1.235

For further information www.schroff.biz/oneclick
oneClick search code = Part no.
Cabinets – VARISTAR LHX 20/40

VARISTAR LHX 20, double door

- Cabinet to ingress protection class IP 55 with air/water heat exchanger up to 20 kW for voltage supply 230 VAC.
- Separate access doors front and rear for air/water heat exchanger.
- Fans individually exchangeable during operation.
- Droplet separator and condensate management.
- Max. static load-carrying capacity 1000 kg.

Delivery comprises (completely assembled and earthed):

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<tr>
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<td>Flat top cover, St, RAL 7021</td>
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<td>Right front door, glazed, width 600 mm, RAL 7021, single pane safety glass 6 mm; left front door, St, 1.5 mm, width 200 mm, RAL 7021; inspection window, single pane safety glass 6 mm; doors with 180° hinge, 3-point locking, lever handle for optional DIN profile half cylinder</td>
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<tr>
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<td>Base/plinth 100 mm, with additional centre cross member, St, RAL 7021, removable covers, integrated feet</td>
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<td>6</td>
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<td>19&quot; panel/slide mount with EIA cut-outs, St, RAL 7021, 225 mm recessed from front, 740 mm distance between front and rear 19&quot; plane</td>
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<td>Support rail for assembly of air/water heat exchanger and 19&quot; panel/slide mounts, St, RAL 7021</td>
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<td>Air/water heat exchanger 20 kW, 230 VAC, RAL 7021, mounting to left or right, see Order information</td>
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<tr>
<td>11</td>
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<td>User Manual; mains cable, length 1.5 m</td>
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DIN profile half cylinder, common locking for lever handle (1 key fits all locks) incl. 2 keys 25127-995

Lifting eye for top cover PU 4 pieces 23130-072

AC mains switch-over for LHX 20 1 piece 23207-115

Note
- Other dimensions and versions (e.g. 115 VAC or 48 VDC) available on request.
- 40 kW version available on request.
- Technical data air/water heat exchanger see page 1.231.
- Cabinet management to monitor LHX 20/40 temperatures, fan speed . . . see page 1.235.
Cabinets – VARISTAR LHX 20/40

VARISTAR LHX 20, double door, automatic door opener

- Cabinet to ingress protection class IP 55 with air/water heat exchanger up to 20 kW for voltage supply 230 VAC
- Automatic opening of the 600 mm wide front and rear door at failure of cooling unit
- Droplet separator and condensate management
- Max. static load-carrying capacity 1000 kg

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<td>User Manual; mains cable, length 1.5 m</td>
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- Other dimensions and versions (e.g. 115 VAC or 48 VDC) available on request
- 40 kW version available on request
- Technical data air/water heat exchanger see page 1.231
- Cabinet management to monitor LHX 20/40 temperatures, fan speed . . . see page 1.235
**Cabinets – VARIOSTAR LHX 20/40**

### Technical data LHX 20

#### Cooling capacity
- Useable cooling capacity: Up to 20 kW
- Adjustment range: 18 ... 30 °C (in 0.1 °C increments)
- Air temperature outlet
- Max. offset: ± 2 K

#### Water circuit
- Cooling medium: Water
- Water inlet temperature: 6 ... 15 °C
- Water flow volume: Up to 2.8 m³/h
- Pressure loss in device at 1.55 m³/h: 0.5 bar
- Max. permissible differential pressure: 2 bar
- Water conduit: Copper
- Water connection inlet/outlet: Rp 1"
- Condensate overflow connection: Rp 1/2"

#### Air loop
- Max. airflow volume, temperature-dependent control: 3000 m³/h
- Air outlet LHX 20: 18 ... 30 °C

#### Electrical data AC
- Supply voltage (single phase mains): 230 VAC (50/60 Hz)
- Max. current consumption: 4.3 A
- Power consumption max load/normal load (fan speed 80%): 920 W/530 W
- Apparent power at full load: 990 VA
- Pre-fuse (on building side): D10 A

#### Interface
- ST-bus (RJ 45): Connection possibility for external operation and digital display
- RS 232 (SUB-D 9-pin): ASCII protocol, all operational values and status reports, such as temperature, humidity levels, fan operation times
- Digital input/output (SUB-D 25-pin): External on/off, alarm outputs and warning signals

#### General data
- Cabinet type of protection: IP 55
- Ambient temperature during transport: –25 ... 70 °C
- Ambient temperature outside of cabinet (during operation): 5 ... 70 °C
- Noise level (closed cabinet) at 80 % fan speed: 50.7 dB(A)
- Relative humidity level: 5 ... 95 %
- Dimensions of heat exchanger LHX 20: Height 1849 mm, width 189.5 mm, depth 667 mm
- Weight of heat exchanger LHX 20: 78.5 kg (82 kg with water)
- Weight of cabinet with LHX 20: approx. 340 kg

1) Temperature of cooling air
2) Cooling capacity at various water temperatures
3) Adjustment range of water flow valve (fan speed constant at 80 %)
4) Max. water flow volume: 2.8 m³/h

*) For smooth operation of the air/water heat exchanger it is important to adhere to the quality requirements of the water used (VDI 3803, see also user manual)

**) Standard settings
**Cabinets – VARISTAR LHX 20/40**

**VARISTAR LHX 40**

- Cabinet to protection class IP 55 with air/water heat exchanger up to 40 kW for voltage supply 230 VAC
- Fans individually exchangeable during operation
- Droplet separator and condensate management
- Max. static load-carrying capacity 1000 kg

**Delivery comprises** (completely assembled and earthed)

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Description</th>
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**DIN profile half cylinder, common locking for lever handle (1 key fits all locks) incl. 2 keys**

| Lifting eye for top cover PU 4 pieces | 25127-995 |

**Note**

- Other dimensions and versions (e.g. 115 VAC or 48 VDC) available on request
- Ethernet gateway possible on request
- Technical data air/water heat exchanger see page 1.233
- Cabinet management to monitor LHX 20/40 temperatures, fan speed . . . see page 1.235

For further information [www.schroff.biz/oneclick](http://www.schroff.biz/oneclick)

oneClick search code = Part no.
Technical data LHX 40

### Cooling capacity
- **Useable cooling capacity**: Up to 40 kW
- **Adjustment range**: 18 ... 30 °C (in 0.1 °C increments)
- **Max. offset**: ± 2 K

### Water circuit
- **Cooling medium**: Water
- **Water inlet temperature**: 6 ... 15 °C
- **Water flow volume**: Up to 4.3 m³/h
- **Pressure loss in device**: 3.0 m³/h, max. 0.6 bar (4.3 m³/h, max. 1.5 bar)
- **Max. permissible differential pressure**: 2 bar
- **Water conduit**: Copper
- **Water connection inlet/outlet**: Rp 1"
- **Condensate overflow connection**: Rp 1/2"

### Air loop
- **Max. airflow volume**: 4500 m³/h
- **Temperature-dependent control**: 18 ... 30 °C

### Electrical data AC
- **Supply voltage (single phase mains)**: 230 V AC (50/60 Hz)
- **Max. current consumption**: 7 A
- **Power consumption max load/normal load (fan speed 80%)**: 1200 W / 835 W
- **Apparent power at full load**: 1610 VA
- **Pre-fuse (on building side)**: D 10 A

### Interface
- **ST-bus (RJ 45)**: Connection possibility for external operation and digital display
- **RS 232 (SUB-D 9-pin)**: ASCII protocol, all operational values and status reports, such as temperature, humidity levels, fan operation times
- **Digital input/output (SUB-D 25-pin)**: External on/off, alarm outputs and warning signals

### General data
- **Cabinet type of protection**: IP 55
- **Ambient temperature during transport/ambient**: -25 ... 70 °C/5 ... 70 °C
- **outside cabinet (during operation)**
- **Relative humidity level**: 5 ... 95 %
- **Noise level (closed cabinet) at 80 %/100 % fan speed**: 58 dB(A)/61 dB(A)
- **Dimensions of heat exchanger LHX 40**: Height 1849 mm, width 189.5 mm, depth 955 mm
- **Weight of heat exchanger LHX 40**: 102 kg (110 kg with water)
- **Weight of cabinet with LHX 40 approx.**: 370 kg

*) For smooth operation of the air/water heat exchanger it is important to adhere to the quality requirements of the water used; the necessary corrosion and/or frost protection is dependent on the location and on the external chiller (VDI 3803, see also user manual).

***) At a water inlet temperature below 6 °C and above 15 °C the control accuracy can no longer be guaranteed. There is also a risk of condensation if the water temperature falls short of the given limits.
Cabinets – VARISTAR LHX 20/40

AC mains switchover for LHX 20/40

- AC mains switchover for secure (redundant) supply with 2 voltages
- Automatic switching between two AC mains supplies (normal mains, emergency mains)
- Input 2 x 100 … 240 V<sub>AC</sub>
- At failure of one mains, switching to the other mains within 20 ms, so that a consumer (e.g. air conditioning) will be supplied uninterruptedly
- Signalling: Mains 1/Mains 2 existent
- Designed to mount in the cabinet, fixing on upright

Delivery comprises

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<td>1</td>
<td>AC switchover, mains input 1 and 2: 2 x IEC plug</td>
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<tr>
<td></td>
<td></td>
<td>mains outlet: 1 x SCHUKO socket</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>User manual</td>
</tr>
</tbody>
</table>

Order Information

- Description: AC mains switchover for LHX 20
  - Part no.: 23207-115
- Equipment cable SCHUKO/UTE SCHUKO/UTE plug, IEC 320 C13 female socket, 2.5 m, 1 piece
  - Part no.: 60103-131
- Equipment cable, BS British Standard plug, IEC 60320 C13 socket, 2.5 m, 1 piece
  - Part no.: 60103-137
- Equipment cable, USA USA plug, IEC 320 plug, 2 m, 1 piece
  - Part no.: 60103-141
- Mains cable, IEC IEC 60320 C14 plug, IEC 60320 C13 female socket, 2.5 m, 1 piece
  - Part no.: 60197-053

Dimensions

- Mains voltage input/output: 100 ... 240 V<sub>AC</sub>
- Mains current: Max. 8 A
- Switchover time at failure in mains1: < 20 ms
- Signalling mains 1/mains 2: Galvanically separated via optocoupler
- Dimensions: Height 333 mm, width 62 mm, depth 120 mm

For further information www.schroff.biz/oneclick

oneClick search code = Part no.
Cabinets – VARISTAR LHX 20/40

Management for LHX 20/40

- Connection of cabinet management basic unit with RJ 45 interface
- Automatic detection of the connected LHX 20/40 air/water heat exchangers
- Monitored parameters:
  - Inlet temperature of servers (parameter can be set via web interface
  - Air temperature front (2 parameters)
  - Air temperature rear (2 parameters)
  - Fan speed
    (6 parameters for LHX 20, 7 parameters for LHX 40)
  - Water inflow temperature (1 parameter)

Note
- For cabinet management base unit see page 3.47
- Sensors (temperature, humidity, differential pressure, airflow...) and hub for connecting multiple sensors see from page 3.48

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<td>Real-time monitoring of web graphical user interface (GUI)</td>
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<td>2</td>
<td>EMX</td>
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<td>3</td>
<td>LHX 20/40</td>
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<tr>
<td>4</td>
<td>Telemonitored temperature and humidity sensors</td>
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<td>5</td>
<td>Cabinet management base unit</td>
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