



Air blast cooler type HVDC

General

The cooler is used for cooling glycol/pure water with air. The cooling fans are separated from one another by partitions. This enables the cooler capacity to be controlled in steps by switching each fan on or off, as the cooling demands changes.

EN

Installation instruction

Translation of the original instructions

About Luvata

Luvata is the leading international metals supplier of solutions, services, components and materials for manufacturing and construction. Luvata's solutions are used in industries such as power generation, architecture, automotive, transport, medicine, air-conditioning, industrial refrigeration, consumer products and construction. The company's continued success is attributed to its longevity, technological excellence and strategy of building partnerships beyond metals. Employing over 7500 staff in 18 countries, Luvata works in partnership with customers such as Siemens, Toyota, CERN, Shaaz, and DWD International.

Introduction

Safety regulations & warnings

This manual contains the installation of factory preassembled coolers.

Site works consists of:

- Unpacking and checking material
- Assembling of the cooler and support if ordered, installation of the coolers to the foundation
- Final checks.

Labelling

The rating plate is placed on the connection side of the cooler and indicates the following:

- Manufacturer
- Max permissible operating pressure
- Test pressure
- Motor data
- Order number
- Year of manufacture
- Dry weight
- Internal liquid volume
- Max working temp (heat exchanger)

Assembly

The cooler shall be installed at a location where it is out of reach of the general public. It shall be firmly anchored in a foundation intended for the cooler. The foundation must be adequately stable for supporting the weight of the air blast cooler as well as the weight of the liquid to be filled in the cooler.

Operating Pressure

The cooler must only be used in a system that is rated for the max. working pressure MWP (MPa) and the maximum working temperature MWT (°C) specified on the rating plate on the cooler.

Connections

Connect the cooler to the pipe-work in such a manner that the expansion forces or the deadweight of the pipe-work will not be applied to the liquid connections. We recommend the use of compensators. Protect the connections against impacts, external stress and strain.

NOTE! Loading and impacts can damage the tubes of the cooler.



Warning! The cooler must not be installed in environments where there is a risk of explosions.

Preparation and installation

At delivery

- Unpack equipment.
- Check that the cooler hasn't been damaged during transport or unloading. It is especially important to check the condition of the fins on the coil surface and the lifting lugs. If transport damage is discovered, this must be reported to the Transport Company and to Luvata Söderköping AB. The consignment note must also be marked accordingly.
- Provide a crane and a lifting beam with a load capacity of the weight of the cooler. Weight can be found on the rating plate on the cooler or on the dimension drawing.

Lifting

Particulars of the dry weight of the cooler are specified on the rating plate located on the connection side of the cooler. Before lifting the coil:

- Check that the lifting lugs are well tightened and are not damaged.
- Check that correct lifting equipment is used and that the lifting hooks are of the right size to fit the lifting lugs.

NOTE! To avoid damage to the cooler when lifting with a crane the lifting angle must not exceed the angles in figure 2. When lifting with lifting beam all lifting lugs must be used.



Figure 1. Lifting with forklift, max 6 m.

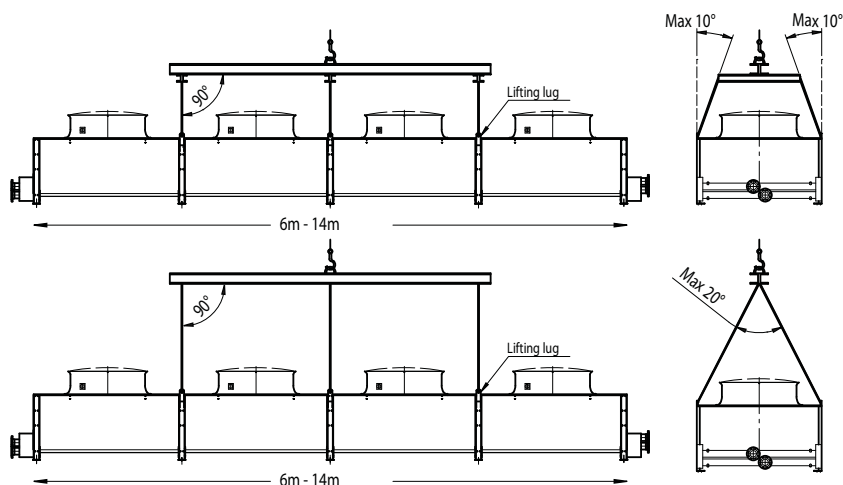


Figure 2. Lifting with a crane.

Mounting

Position the cooler as shown in Figure 3 to ensure an adequate air supply. The supporting structure is supplied in kit form. The height of the support must be so high that the free area around the coolers multiplied by the support high ($2 \times (A + B) \times C$) at least will be equivalent with the total area of the finarea ($A \times B$). The coolers should be close together to prevent recirculation of warm air. The distance to the wall must be at least the same as the height of the support ($D \geq C$). If more information is needed please contact Luvata Söderköping AB.

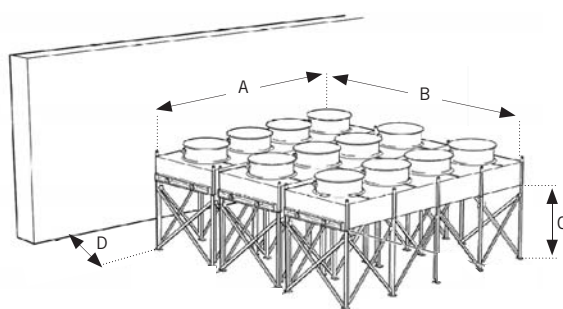


Figure 3. Installation

Anchoring

The cooler shall be firmly anchored in its foundation. The legs of the cooler are provided with holes for this purpose.

Installation

Venting/Draining

The headers of the cooler are equipped with venting and draining connections. The system must be adequately vented to operate effectively. In that the heat exchanger cannot be completely emptied, appropriate measures must be taken to prevent it from freezing and bursting.

Electrical connections

Every fan motor is connected to a lockable safety-isolating switch. The safety-isolating switch may not be used for starting and stopping the unit. On and off switching must always be carried out by means of a remote selector switch. The system shall include provision for emergency stop that has priority over all other equipment. The connecting electric cable leads L1, L2, L3 and earth shall be connected to the safety switch. After connecting the motor to the power supply, check that the fan impeller rotates in the direction indicated by the direction arrow. This is labelled on the outside of the fan ring.

Cable racks



If cable racks are fitted to the unit, be careful so the heat exchanger not will be damaged.

Instructions for pipework connections

The pipes are to be installed that the free expansion of the heat exchanger remains ensured and that no forces of the pipe systems get transmitted onto the collector connections. Make sure that the medium to be cooled in the heat exchanger is flowing against air flow.

! Our products can be ordered with a variety of accessories as well as with other dimensions and materials than the standard.
■ Contact us for more information.

For more information, please contact:

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Maintenance instruction

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Quality System

Luvata Söderköping AB is certificated in accordance with the provisions of Quality Assurance System ISO 9001:2008 and Environmental Management System ISO 14001:2004.

Handling and Maintenance

- Read all the instructions carefully before you use, install or do any maintenance work on the product.
- Permit only trained persons who have knowledge of the product and appropriate safety precautions to carry out any work on the cooler.

Operating Pressure

The cooler must only be used in a system that is rated for the maximum working pressure MWP (MPa) and the maximum working temperature MWT (°C) specified on the rating plate on the cooler.

High Temperatures

The various components of the coil, such as headers and casing can become hot while the cooler is in use. Even air discharged from the cooler may be hot.

Dismantling

All the liquid in the cooler coil must be emptied before it is dismantled from a system.

NOTE! The cooler must not be lifted until the liquid has been properly drained.

NOTE! Environment hazardous liquids should be collected in a container and left for disposal/recycling.



Both the cooler and exhaust air can be hot when in use, which can cause personal injury.

Maintenance introductions

Maintenance or inspection to be carried out after the following time intervals.

No.	Activity / Task	Aid	Time interval
1	General visual inspection	set of spanners	monthly
2	Fan drive; abnormal noise increased vibration	visual	monthly
3	Motor; Replacement of bearings	See motor instruction	13 000 h – 40 000 h due to site conditions
4	Motor; Replacement of shaftsealing	See motor instruction	When the bearings are replaced, replace also the shaftsealing
5	Fan; check on impeller	visual	monthly
6	Heat exchanger; cleaning	See cleaning, page 8	6 – 24 months due to site conditions

Maintenance work

In general, the coolers are maintenance-free.

Visually the following points are to be observed when a general inspection is carried out:

- Tight fit of all screwed connections.
- Smooth running of the fans.
- General condition of the cooler such as contamination, corrosion etc.
- Electrical installation. Check that the wiring and components aren't damaged.

Fan motors

The fan motors are permanently lubricated. At changing of bearings, consideration must be taken to the motor ambient temperature, for the right choice of grease. The motors and fan impellers can be accessed by first removing the protective screen (guard). If the refrigeration unit is switched off for a longer period there is a danger of motor damage owing to condensation and static load on bearings causing the film of lubrication to be penetrated. If the refrigeration unit is to be periodically switched off (more than one month), the motors must be fitted with heating inside the motor windings in order to prevent condensation. The motors must be rotated manually or given a warm-up run at least once a month in order to prevent the film of lubrication covering the bearings from being penetrated. An alternative to electrical heating is to connect two series DC phases from a source providing a total output as per table 1. This method is for motors of less than 10 kW only.

To calculate DC, use the Ohms law formula:

$$U_{(v)} = \sqrt{P_{(w)} \times R_{(\Omega)}}$$

where R is the resistance in the series windings. Resistance should be measured using a precision ohmmeter.

Another alternative is to use single-phase AC (between 10 and 15% of rated voltage) between the two series-connected phases. The windings heating shall be disconnected when the motors are running.

Draining

The motors are equipped with open drain holes in the lowest part of the motor. At maintenance of the motors, the drain holes shall be checked and cleaned from clogging.

Repair work

Parts and materials suggested by Luvata Söderköping AB must be used; otherwise the warranty will become void.

Spare parts

We recommend that one motor and one fan impeller are kept as spare parts when an installation is subject to very high demands of availability. Electric motors kept as spare parts must be checked after a period of storage and some parts replaced, follow the motor manufacturer's recommendations.

NOTE! Motors and fan impellers kept as spare parts should be stored indoors in dry and dust-free conditions.

NOTE! Only parts and material proposed by Luvata may be used in order for the stated guarantee according to the orderconfirmation to apply.

Lubrication list

No lubrication.


Item	Quantity/Interval	Type of grease
Fan drive motor	Lifetime greasing	-

Cleaning

Cleaning of heat exchanger

The cleaning of the heat exchanger is very important in order to achieve a long and troublefree service life. Frequency and extent of cleaning depend on operating conditions and atmospheric conditions, and are to be stipulated by the operators. As a suggestion the fin side of the heat exchanger should be checked every three months. If contamination (dirt accumulation) is visible the heat exchangers have to be cleaned by applying one of the following methods.

Outside (airside) cleaning

 The outside surface of the heat exchanger shall not be cleaned during operation. The method of cleaning depends on the degree/kind of contamination.

First remove the protective screen in the fan outlet to enable cleaning against the airflow in the finned heat exchanger.

Cleaning is normally done from the air outlet side.

For special cooler configurations special procedures will be delivered.

Cleaning with compressed air

This method is suitable only for dry, dustlike contamination. When cleaning with a compressed air jet, make sure that the jet is applied in a way not to hurt or bend the fin plates (exactly in direction of the heat exchanger fin plates).

Cleaning with water

When cleaning with a pressure water jet it is also important that the jet is applied in direction of the heat exchanger fin plates and the fins are not hurt or bent by the jet.

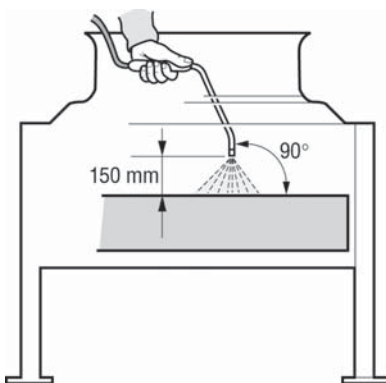


Figure 3. Cleaning with air or water.

For more severe deposits fin plates can be cleaned with a brush of natural/synthetic fibres. Do not use wire brushes. Brushing can be applied together with water washing by using a device like a "car wash brush". Guide brush also in direction of the edges of the fin plates.

For sticky/sooty contamination it could be necessary to add some detergent to the wash water. Depending on the contamination this detergent can be a household washing powder or soft soap. After cleaning the heat exchanger has to be properly rinsed/neutralized.

Other detergents shall only be used after consulting Luvata Söderköping AB to make sure that the detergent does not attack the fin plates.

Long-term storage

If the cooler has to be stored for longer periods of time, the following rules apply:

- The cooler should be stored oriented in accordance with its working position. This ensures the draining holes for the motor to remain functional.
- If the cooler is stored in a damp place, the external coating must be examined to make sure there are no damaged spots. Damaged spots should be repainted.
- The fan exit should be covered with reinforced plastic sheets or some other mechanical protection against water and contaminants, which may harm the finned coil body and/or the motors. The free fin surface must be protected mechanically by a panel or the like.
- The connection couplings of the cooler should be closed by steel plate covers, which seal the connection header by means of rubber gaskets.
- During storage, the motor shafts should be turned by hand at least once every month.
- If the motor is fitted with space heaters, it is recommended to switch them on during storage period.

Changing the fan impeller and motor

Changing the fan impeller and motor

- Isolate the power supply to the motor in the electrical cubicle. Lock the safety-isolating switch in the OFF position.
- Back off the screws that secure the protective screen and remove them.
- Figure 4. Release the screw and washer in the fan hub and pull off the impeller wheel. It may be necessary to use a puller.
- Screw a lifting lug into the end of the motor shaft.
- Disconnect the electric cable from the safety switch.
- Anchor the motor in the lifting lug on the shaft end, or in a lifting device. If a lifting beam is used to lift out the motor, be careful not to deform the fan ring.
- Figure 5. Remove the bolts that secure the motor and the motor are loose.
- To install the fan and/or motor follow the items above in reverse order. Use a torque wrench for tightening supporting bolts.

NOTE! The drain holes in the lowest part shall be open.

Tightening torque:
M8 – 20 Nm
M10 – 40 Nm
M12 – 70 Nm
M16 – 160 Nm
M20 – 370 Nm

- When securing the fan impeller to the motor shaft, lubricate the motor shaft with grease eg, Molycote C. Put on an appropriate rust agent to the shaft and screws, eg CRC-3-36.
- Prior to starting the unit, check that the fan impeller is centred in the fan ring. At start up check that the impeller rotates in the direction indicated by the arrow.

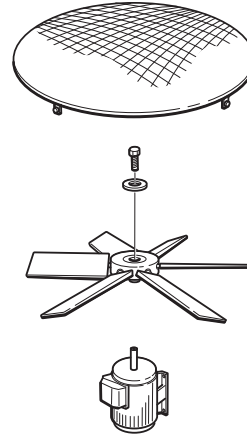


Figure 4. Fan impeller

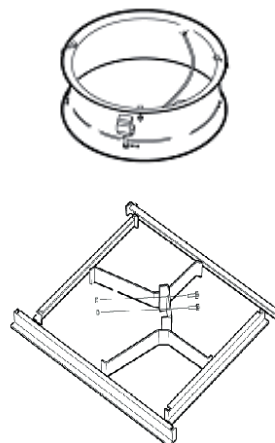


Figure 5. Motor suspension

Technical specifications

Performance Data

Max. permissible operating pressure: 0,6 MPa at 110°C
Test pressure: 0,8 MPa

Coil

The coil is made of stainless steel tubes and aluminium fins. The headers that distribute the liquid in the coil tube loops are made in stainless steel and equipped with 1/2" venting and drainage nipples.

Motor

The fan motor is a fully enclosed, squirrel-cage, three-phased motor.

Fan

The direct driven centrifugal fan is made of plastic blades with a painted aluminium taper-lock hub. The fan impeller is statically balanced to ISO 1940, Class G6.3. The fan outlet is equipped with a guard that can be removed for inspecting the fan and motor or for cleaning the coil body.

Enclosure Classes

The fan motor is enclosed to Degree of Protection IP55 but with open drainage holes at the lowest spot in the motor. The safety-isolating switch is enclosed to Degree of Protection IP65 with drain hole and auxiliary contact.

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