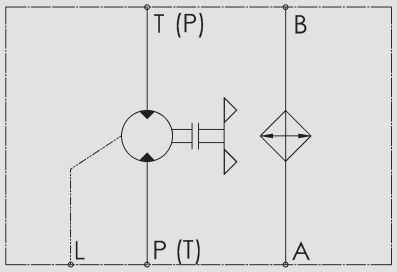
HYDAC INTERNATIONAL

# Air Cooler Mobile
## AC-LNH 8-14
## with hydraulic motor

## Symbol




## General

The AC-LNH air cooler series is designed specifically for mobile hydraulic systems where high performance and efficiency are required and physical size must be minimized to allow easy installation.

## Product Features

AC-LNH coolers use a combination of high performance, pressure-resistant cooling elements and hydraulic drive motors in order to ensure long, trouble-free operation of hydraulic systems in the mobile sector.

- Compact, efficient, high performance
- Cooling range 20 – 290 kW
- Hydraulic motors from 6.3 to 22 cm³/rev

## Application Field

Gearbox cooling and hydraulic systems in all mobile machines and vehicles, such as

- Mobile cranes
- Concrete mixers and pump trucks
- Road paving machines
- Construction machines (excavators, wheel loaders)
- Agricultural machines
- Municipal machines

## Operation data

| | |
|---|---|
| Fluids | ● Oils (mineral oils, synthetic oils, high viscosity oils, biological oils, phosphate ester)<br>● Water glycol (cooling fluid) |
| Viscosity | 2,000 mm²/s (standard) |
| Temperature range | ● Minimum / maximum ambient temperature: -20 °C to +40 °C (standard)<br>● Maximum temperature of the medium: +130 °C<br>Please contact the technical sales department in the event of deviating temperatures.<br>**Notice!**<br>Fan switching frequency at max. fan speed (max. volume of air) must be avoided when operating a cooler at which the temperature difference between the medium inlet at the cooler and the ambient temperature can be greater than +50 °C. Quick changes in the temperature of the cooling element material can lead to a significant reduction in service life or to direct damage of the cooling element due to thermal shock.<br>Please contact the technical sales department to receive information about controlled fan drives. |
| Pressure resistance of the cooling element | ● Dynamic operating pressure: 16 bar<br>● Static operating pressure: 21 bar |
| Fan | Axial fan in suction version (standard)<br>Axial fan in blowing version on request<br>(note: approx. 10 % less cooling capacity) |
| Motor* | ● Hydraulic motor<br>Reversible direction of rotation<br>● max. outlet side pressure: 150 bar<br>● max. drain pressure: 5 bar<br>● max. operating pressure:<br>6.3 / 14 cm³/rev = 300 bar, 22 cm³/rev = 240 bar<br>● Operating fluid: Mineral oil to DIN 51524/25; DIN51511<br>Viscosity range: 12 – 750 mm²/s (recommended 12 – 100 mm²/s)<br>Temperature range: up to +80 °C<br>Filtration: ISO/DIS 4406, Class 19/17/14, $\beta_{10} \geq 200$ bar,<br>Class 21/19/16, $\beta_{25} < 140$ bar |
| Noise levels | See Technical Data.<br>The noise levels are only reference values as the acoustic properties of a room, connections and reflection have an effect on the noise level. |
| Accessories | ● Integrated pressure bypass valve (IBP) or integrated thermal pressure bypass valve (IBT) (cannot be retrofitted, also see Options)<br>● Thermostats<br>● Air filter grid or air filter mat<br>● Vibration damper |

* Calculation of the required oil volume:

$$Q = \frac{V_g \times n}{10^3 \times \eta_{vol}} \text{ [l/min]}$$

$V_g$ = motor displacement [cm³/rev]
$n$ = fan speed [rpm]
$\eta_{vol}$ = volumetric efficiency = 90 % at operating pressure of 150 bar

(Calculation also possible in simulation software KULI)

## Options

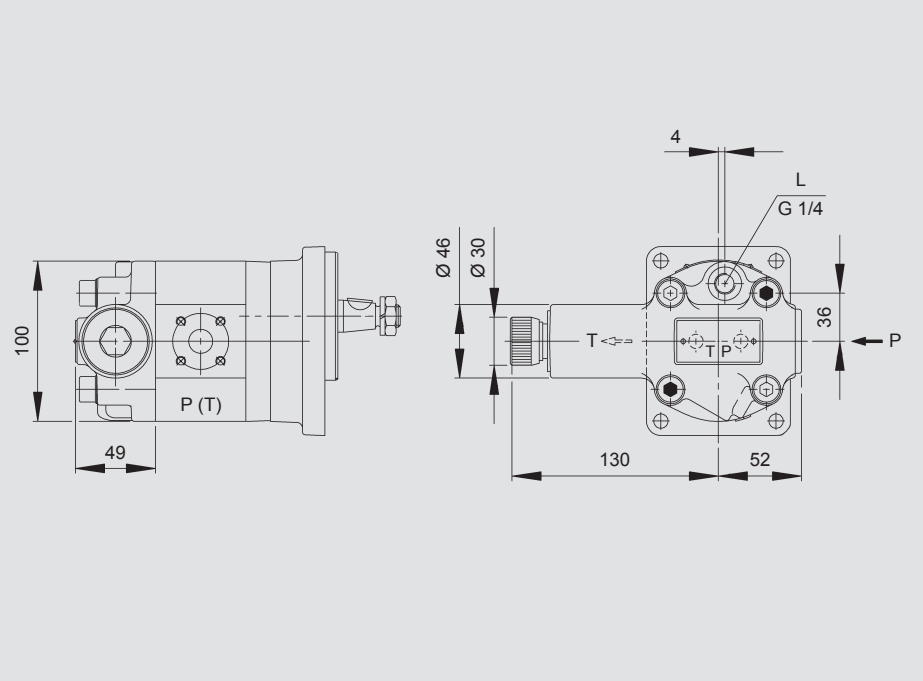
**Integrated pressure bypass valve (IBP) / Integrated thermal pressure bypass valve (IBT)**
The bypass channel is integrated in the cooling element. If a particular pressure is exceeded, the IBP opens the bypass channel, thereby protecting the cooling element from too high a pressure. Furthermore, the IBT only opens the cooling element path once a particular temperature has been reached.

**ATEX**
The AC-LNH is also available for operation in gas and dust explosive areas.

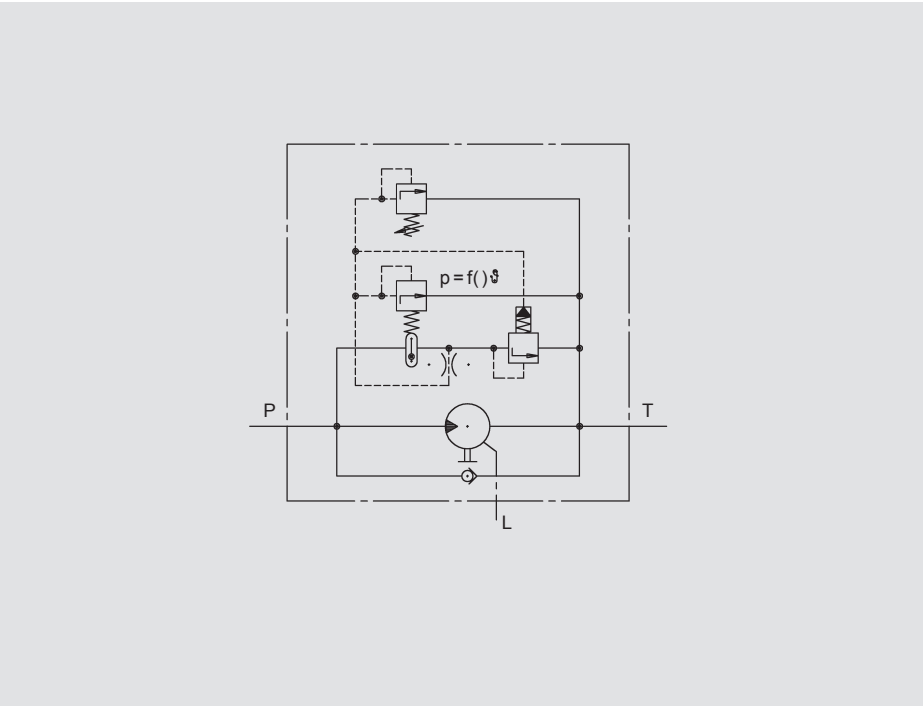
**Corrosion protection CPL**
The CPL version (Corrosion Protection Level) is suitable for aggressive ambient conditions, such as industrial atmospheres, high humidity or high salt content, which place great demands on the corrosion resistance and robustness of the materials used.

**Thermal bypass hydraulic motor / variable speed**
The thermal valve is a pilot-operated pressure relief valve with temperature-dependent pressure control and is mounted on the hydraulic motor instead of the provided end cap. The pressure setting of the valve automatically changes depending on the temperature and thus controls the motor speed.
In addition to the actual temperature-controlled pressure setting, maximum pressure relief and a recharging valve are fitted as a bypass check valve. The setting temperature values can be from +40 °C to +70 °C and the pressure can be controlled up to +100 °C. Please contact us for the designing of the thermal valve. All hydraulic motors can be equipped with thermal bypass. The minimum oil pressure at which the valve starts to work is 8 bar, i.e. this must be taken into consideration for the rest of the operating pressure range of the motor.

**Thermal bypass dimensions**

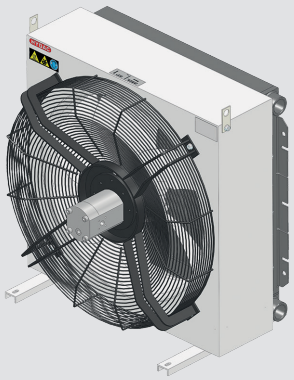


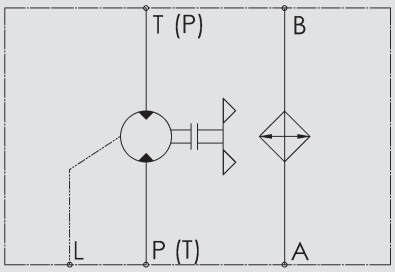

**Thermal bypass symbol**



# Design

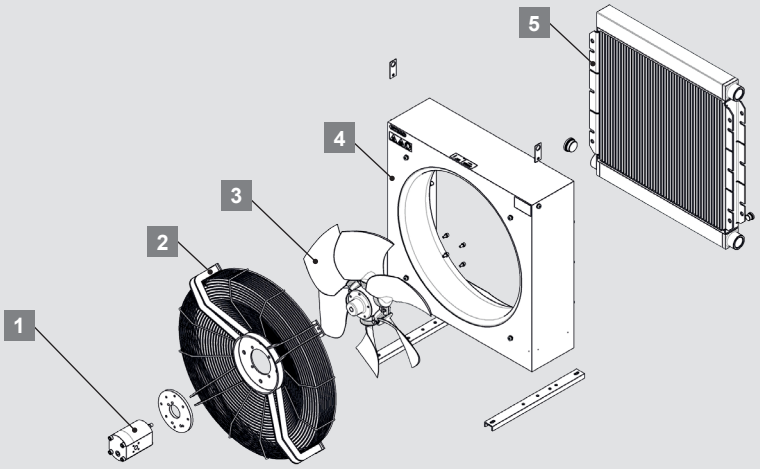
## AC-LNH 8-9



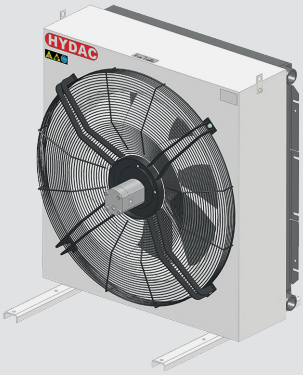


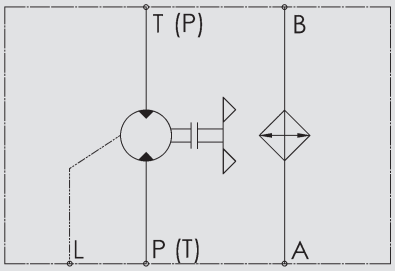

Air cooler with

1. Hydraulic motor
2. Finger guard
3. Axial fan
4. Fan housing
5. Heat exchanger



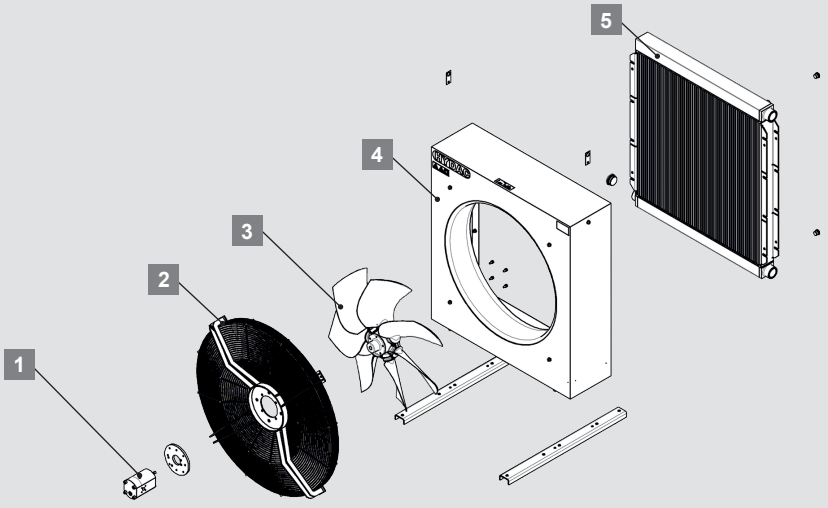

## AC-LNH 10-11





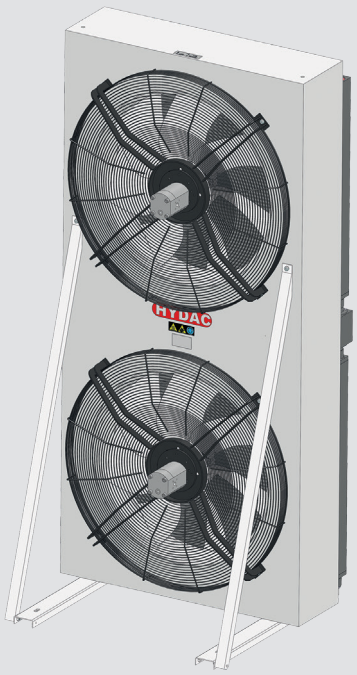

Air cooler with

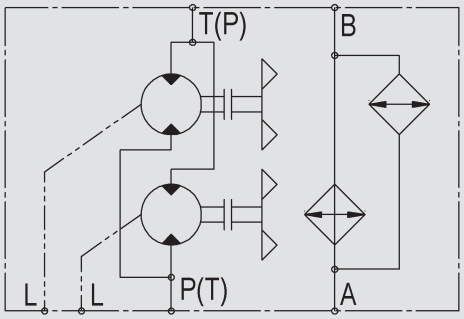
1. Hydraulic motor
2. Finger guard
3. Axial fan
4. Fan housing
5. Heat exchanger



# Design

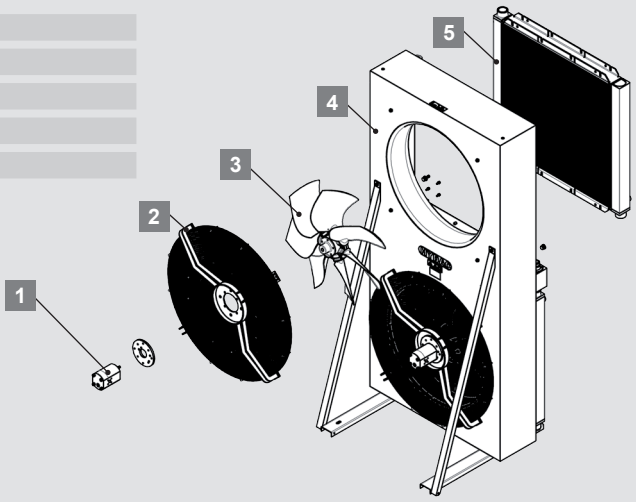
**AC-LNH 12-14**






Air cooler with

1. Hydraulic motor
2. Finger guard
3. Axial fan
4. Fan housing
5. Heat exchanger



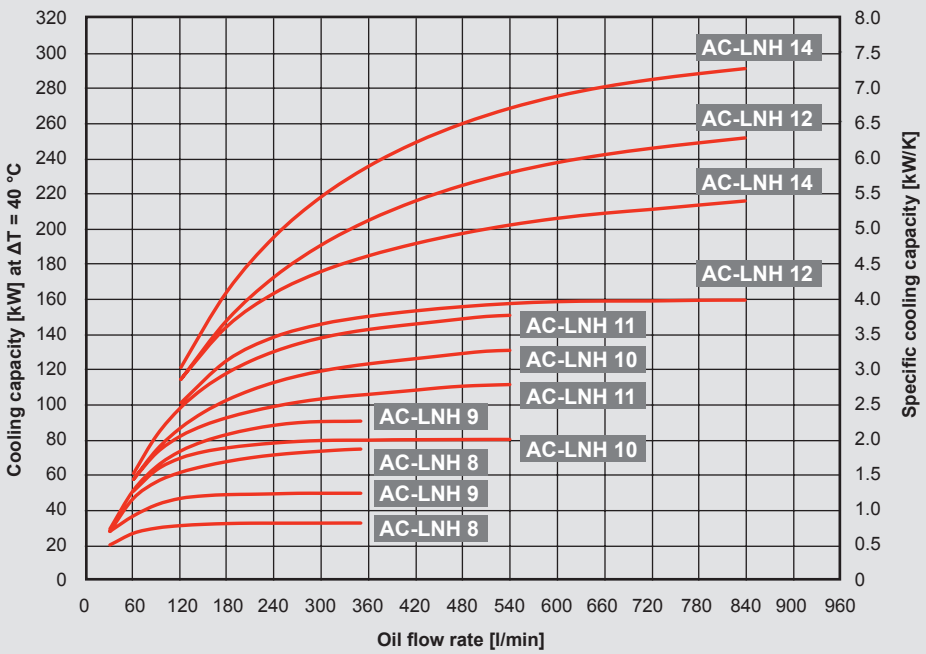
## Technical Data

| Type of cooler | P/N | Motor displacement [cm³/rev] | Operating speed range [rpm] | Fluid flow rate [l/min] [1] | Air flow rate [m³/h] [1] | Continuous motor operating pressure [bar] | Required pressure for max. speed [bar] [2] | Required motor oil flow at 1,500 rpm [l/min] | Noise level (at 1 m distance) [dB(A)] | Volume [l] [3] | Weight [kg] [4] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **AC-LNH8** | 3903313 | 6.3 | 1,000 – 2,800 | 350 | 7,900 | 250 | 270 | 10.5 | 69 | 6 | 64 |
| | 3904781 | 14.0 | 1,000 – 2,800 | 350 | 7,900 | 250 | 120 | 23.0 | 69 | 6 | 64 |
| | 3904783 | 22.0 | 1,000 – 2,800 | 350 | 7,900 | 150 | 80 | 36.6 | 69 | 6 | 64 |
| **AC-LNH9** | 3903356 | 14.0 | 1,000 – 2,200 | 350 | 11,500 | 250 | 120 | 23.0 | 71 | 11 | 90 |
| | 3904830 | 22.0 | 1,000 – 2,200 | 350 | 11,500 | 150 | 80 | 36.6 | 71 | 11 | 90 |
| **AC-LNH10** | 3903358 | 14.0 | 1,000 – 1,800 | 540 | 18,600 | 250 | 210 | 23.0 | 77 | 14 | 120 |
| | 3904831 | 22.0 | 1,000 – 1,800 | 540 | 18,600 | 150 | 140 | 36.6 | 77 | 14 | 120 |
| **AC-LNH11** | 3903359 | 14.0 | 1,000 – 1,500 | 540 | 24,500 | 250 | 270 | 23.0 | 81 | 18 | 143 |
| | 3904832 | 22.0 | 1,000 – 1,500 | 540 | 24,500 | 150 | 180 | 36.6 | 81 | 18 | 143 |
| **AC-LNH12** | 3975153 | 14.0 | 1,000 – 1,800 | 840 | 18,600 | 250 | 210 | 23.0 | 77 | 28 | 270 |
| | 3975154 | 22.0 | 1,000 – 1,800 | 840 | 18,600 | 150 | 140 | 36.6 | 77 | 28 | 270 |
| **AC-LNH14** | 3975235 | 14.0 | 1,000 – 1,500 | 840 | 24,500 | 250 | 270 | 23.0 | 81 | 35 | 265 |
| | 3975236 | 22.0 | 1,000 – 1,500 | 840 | 24,500 | 150 | 180 | 36.6 | 81 | 35 | 265 |

[1] Max. flow rate at fan speed of 1,500 rpm
[2] At viscosity 34 mm²/s
[3] Fluid in cooling element, AC-LNH 12-14: depending on cooling element
[4] Unfilled

# Cooling Capacity and Pressure Difference Δp

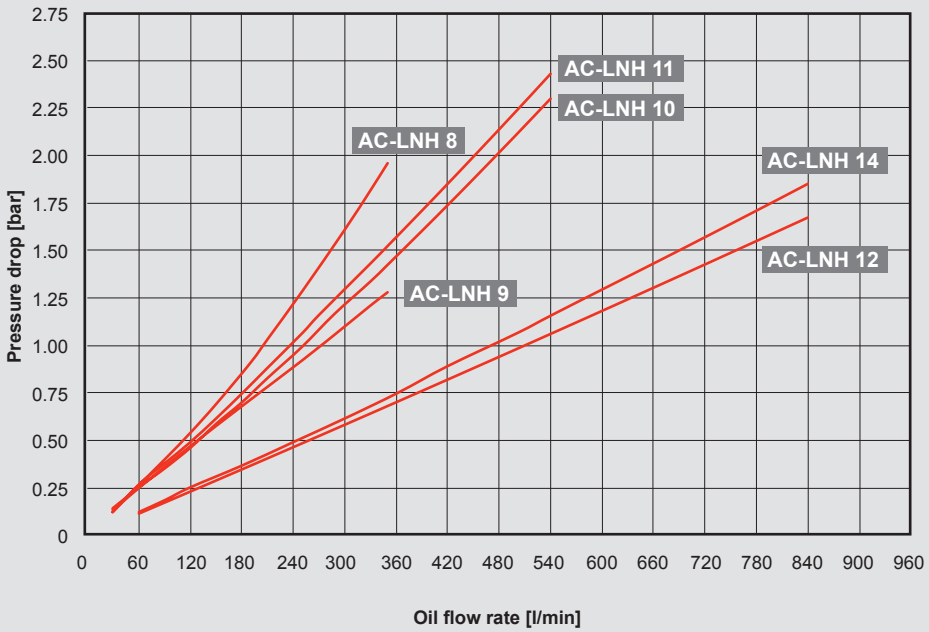
**Mineral oil**




Tolerance: ±5 %

**Cooling capacity:**
Dependent on the oil flow rate and the temperature difference ΔT between oil inlet and air inlet.

**Note:**
The values are measured at ΔT = +40 °C. For smaller ΔT values, the values can change.
You can also use our cooler calculation software for designing. Please contact our technical sales department.




Measured at 30 mm²/s
Tolerance: ±5 %

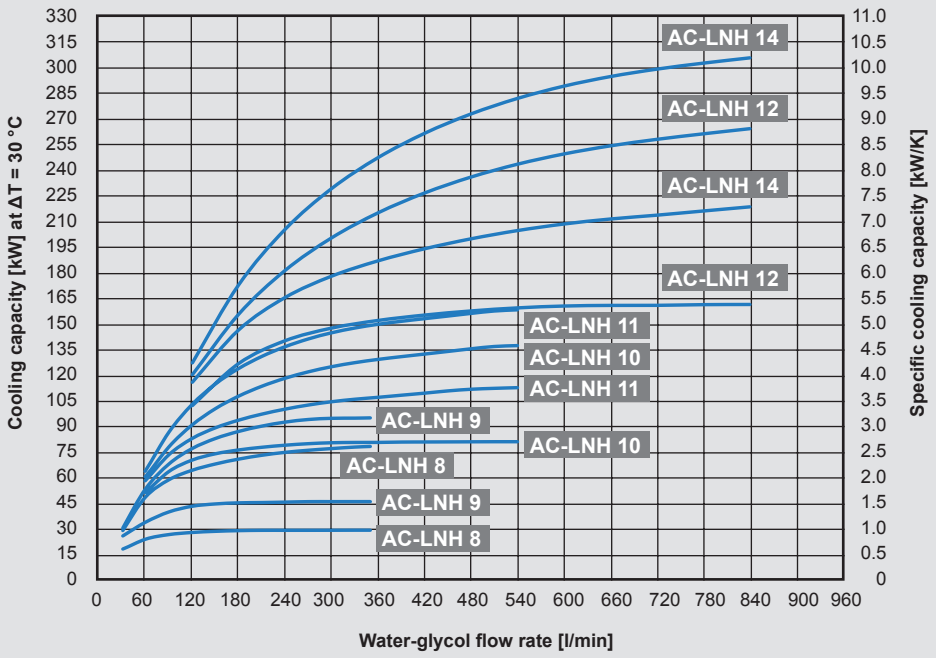
**Pressure difference Δp**

For other viscosities, the pressure drop must be multiplied by the conversion factor K:

| Viscosity (mm²/s) | 10 | 15 | 22 | 30 | 46 | 68 | 100 | 150 |
|---|---|---|---|---|---|---|---|---|
| Factor K | 0.35 | 0.5 | 0.75 | 1.0 | 1.4 | 1.9 | 2.5 | 3.5 |

# Cooling Capacity and Pressure Difference Δp

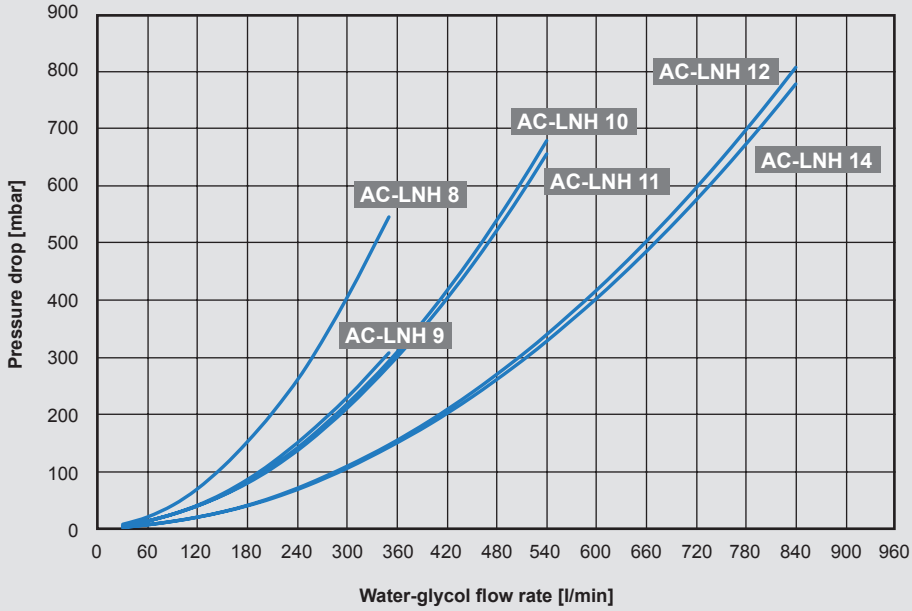
**Water glycol (60/40)**




Tolerance: ±5 %

**Cooling capacity:**
Dependent on the water-glycol flow rate and the temperature difference ΔT between w/g inlet and air inlet.

**Note:**
The values are measured at ΔT = +30 °C. For smaller ΔT values, the values can change. Please contact the technical sales department for designs with a temperature difference ΔT under +10 °C.




Measured at 2 mm²/s
Tolerance: ±5 %

**Pressure difference Δp**

## Model Code

**AC-LNH 8 - 1.0 - H6.3TB - 1 - S - AITF60**

**Cooler type**
AC-LNH = Air cooler (oil/water-glycol mix)

**Size**
8 – 14 = Size

**Revision**

**Motor voltage**
H6.3 = 6.3 $cm^3/r$
H14 = 14 $cm^3/r$
H22 = 22 $cm^3/r$
H..TB = Hydraulic motor with thermal bypass

**Colour**

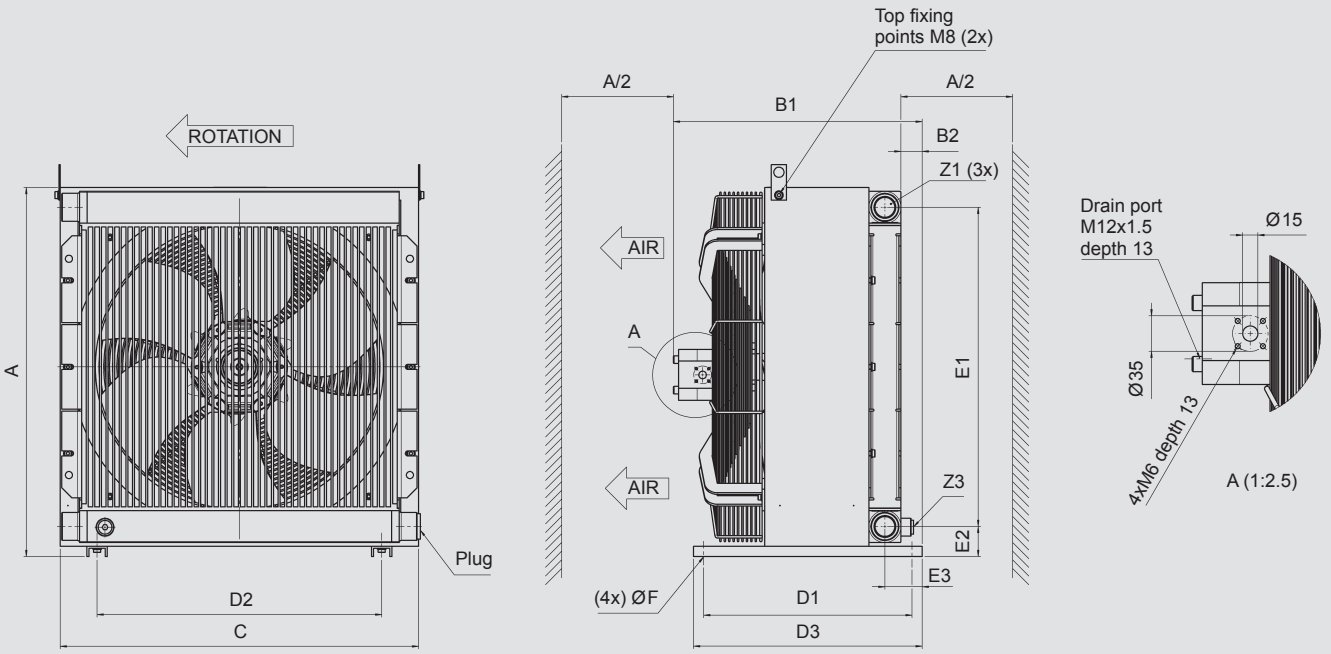
1 = RAL 9002 (standard)
Other colours on request.

**Air flow direction**
S = Suction (standard)
D = Blowing (on request)

**Accessories**
IBP = Heat exchanger with integrated pressure bypass valve (cannot be retrofitted)
IBT = Heat exchanger with integrated thermal pressure bypass valve (cannot be retrofitted)
AITF = Thermostat (fixed)
For other accessories, e.g. rubber buffer as vibration absorber, air filter grid or air filter mat, please see Air Cooler Accessories brochure.

# Dimensions

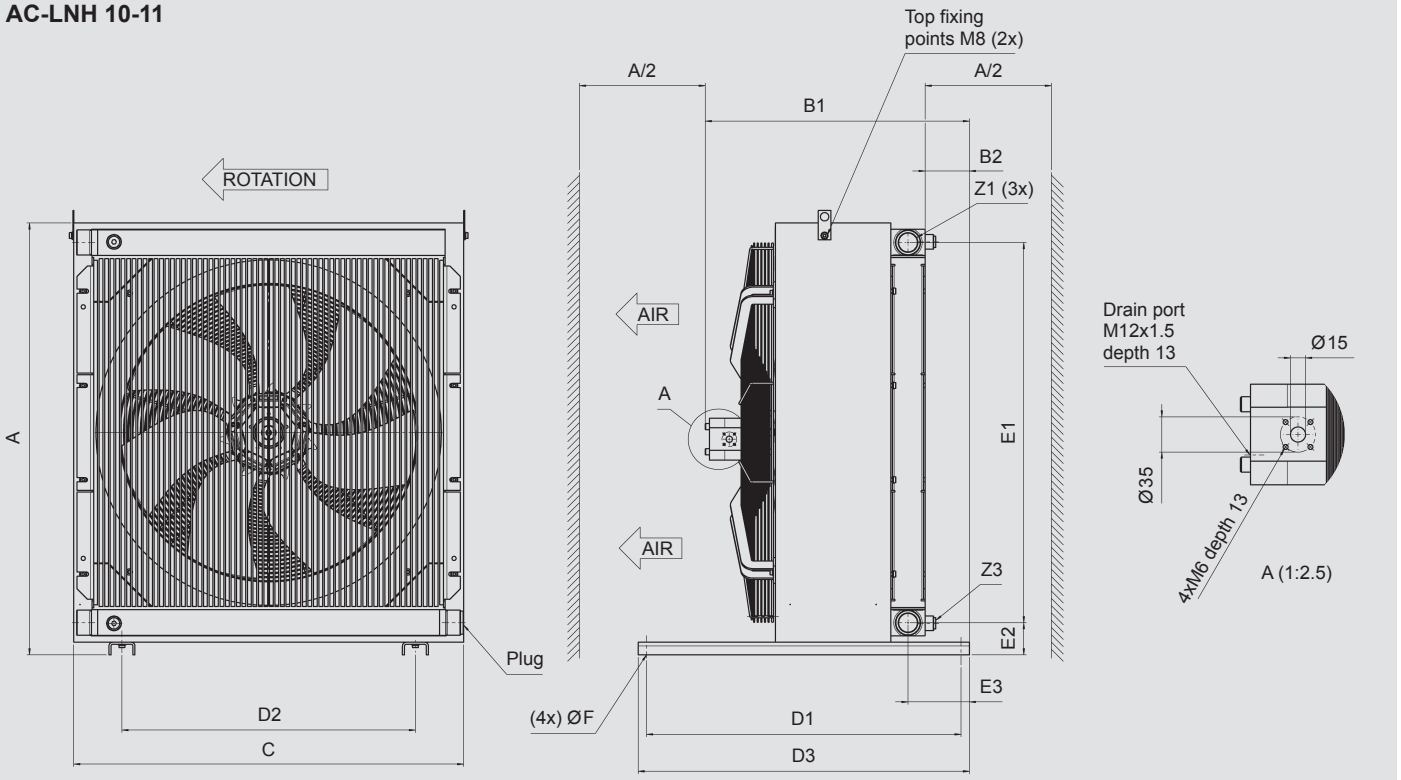
**AC-LNH 8-9**




| [mm] | A ±5 | B1 ±10 6.3 cc | B1 ±10 14 cc | B1 ±10 22 cc | B2 ±5 | C ±5 | D1 ±5 | D2 ±5 | D3 ±5 | E1 ±5 | E2 ±5 | E3 ±5 | F Ø/hole | Z1 | Z3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AC-LNH8** | 725 | 471 | 485 | 495 | 42 | 705 | 410 | 560 | 450 | 627 | 59 | 74 | 9x20 | G1 1/4" | M22x1.5 |
| **AC-LNH9** | 880 | - | 639 | 649 | 107 | 790 | 750 | 700 | 790 | 757 | 77 | 148 | Ø12 | G1 1/2" | M22x1.5 |

# Dimensions

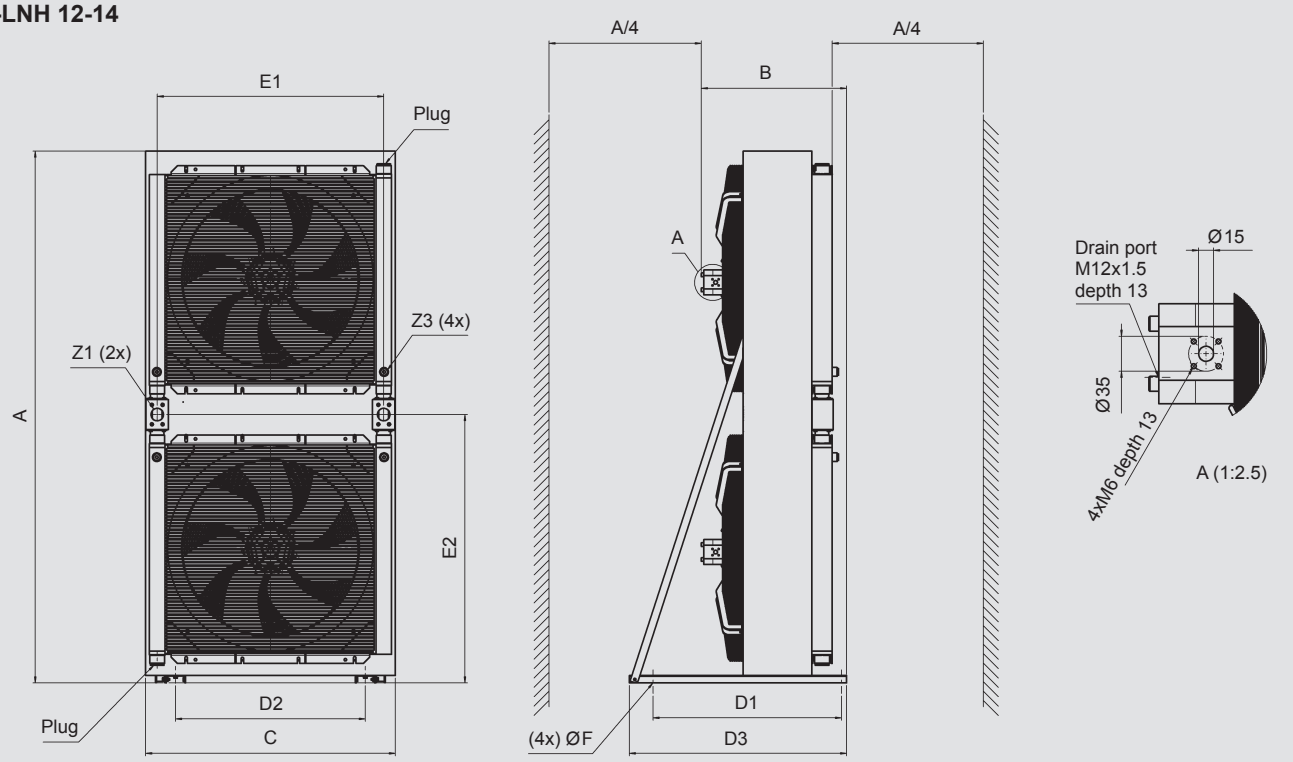
**AC-LNH 10-11**




| [mm] | A ±5 | B1 ±10 14 cc | B1 ±10 22 cc | B2 ±5 | C ±5 | D1 ±5 | D2 ±5 | D3 ±5 | E1 ±5 | E2 ±5 | E3 ±5 | F Ø / hole | Z1 | Z3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AC-LNH10** | 1,030 | 626 | 636 | 106 | 930 | 750 | 700 | 790 | 907 | 77 | 147 | Ø12 | G1 1/2" | M22x1.5 |
| **AC-LNH11** | 1,180 | 626 | 636 | 106 | 1,050 | 750 | 700 | 790 | 1,057 | 77 | 147 | Ø12 | G1 1/2" | M22x1.5 |

# Dimensions

**AC-LNH 12-14**




| [mm] | A ±5 | B ±10 14 cc | B ±10 22 cc | C ±5 | D1 ±2 | D2 ±2 | D3 ±2 | E1 ±5 | E2 ±5 | F Ø/hole | Z1 | Z3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AC-LNH12** | 2,130 | 577 | 587 | 1,000 | 750 | 760 | 870 | 907 | 1,075 | 13x30 | SAE G2" | M22x1.5 |
| **AC-LNH14** | 2,297 | 577 | 587 | 1,140 | 750 | 900 | 870 | 1,057 | 1,166 | 13x30 | SAE G2" | M22x1.5 |

**Note:**

We recommend maintaining a minimum distance to ensure an unimpeded air inlet and air outlet. For sizes 8-11 this is half the height of the cooling element (A/2); for sizes 12-14 it is a quarter of the element height (A/4). Anything below the minimum distance can affect cooling capacity and noise emissions.

## Note

The information in this brochure relates to the operating conditions and applications described.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.


HYDAC INTERNATIONAL

**HYDAC COOLING GMBH**

Industriegebiet
66280 Sulzbach/Saar
Germany

Tel.: +49 6897 509-01
Fax: +49 6897 509-454

E-mail: cooling@hydac.com
Internet: www.hydac.com

**HYDAC AG**
**Mezzovico Branch**

Via Sceresa, Zona Industriale 3
6805 Mezzovico
Switzerland

Tel.: +41 91 9355-700
Fax: +41 91 9355-701

E-mail: info@hydac.ch
Internet: www.hydac.com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