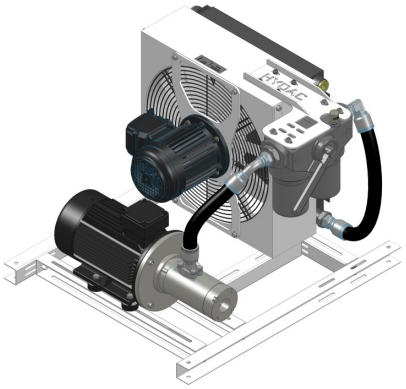
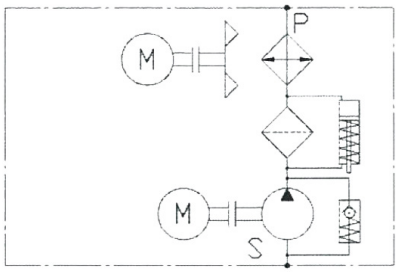
HYDAC INTERNATIONAL



# Australian Air Cooler - Lubrication Systems

## ACAF-LN 2-7

### Symbol




### General

The ACAF-LN 2-7 air cooler series can be used in all areas where either oil or water-glycol is to be cooled with air. The coolers with an axial fan can be used in the return line as well as in the bypass flow.
The wide range of accessories and optional versions mean that the coolers can be adapted flexibly to various applications.

### Product Features

The cooler can also be used in the bypass flow by attaching a pump.
An additional filter enables continuous filtration of the medium.

- Large product range
- Large cooling performance range
- Modular design

### Operation Data

| | |
|---|---|
| Fluids | Oils (mineral oils, synthetic oils, high viscosity oils, biological oils, phosphate ester)<br>Water-glycol (cooling fluid)<br>HFC pressure fluids |
| Viscosity | 3,000 mm²/s (standard) |
| Temperature range | Minimum / maximum ambient temperature:<br>-20˚C to +50˚C (standard)<br>Mininum / maximum temperature of the medium: +130˚C<br>Please contact the technical sales department in the event of deviating temperatures for applications with water-glycol.<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 pushing version on request<br>(note: approx. 10% less cooling capacity) |
| Motor | Three-phase motor<br>Efficiency class IE3 (only ≥ 0.75 kW)<br>Protection class IP55<br>Insulation class F<br>Other versions on request. |
| ErP | The fan unit of the AC-LN corresponds to the minimum efficiency levels specified in the Ecodesign directive or ErP directive (Energy-related Products) 2009/125/EC. |
| Pump | Screw pump with separate motor<br>Operating pressure:<br>max. 10 bar<br>Negative suction pressure of the pump: max. -0.7 bar<br>Pump motor speed: 3,000 & 1,500 rpm |
| Noise levels | See technical data ACAF-LN<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 thermal pressure bypass valve (IBT) (cannot be retrofitted, also see options).<br>Thermostats<br>Air filter grid or air filter mat<br>Vibration damper |

## Application Field

Systems with small and medium cooling requirements, such as:

- Hydraulic systems
- Lubrication systems
- Gears
- Motors
- Generators
- Converters
- Machine tools

## Integrated thermal pressure bypass valve (IBT)

The bypass channel is integrated in the cooling element. If a particular pressure is exceeded, the IBT 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 and pressure have been reached.

## CPL (Corrosion Protection Level)

The CPL version is for agressive 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.

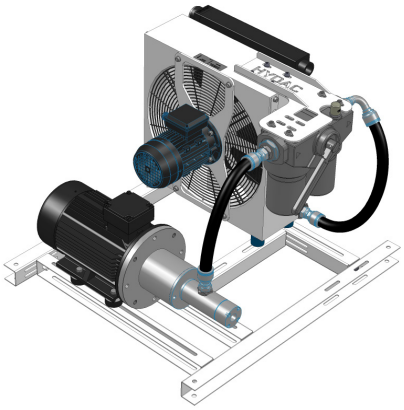
## Cold Climate / Hot Climate

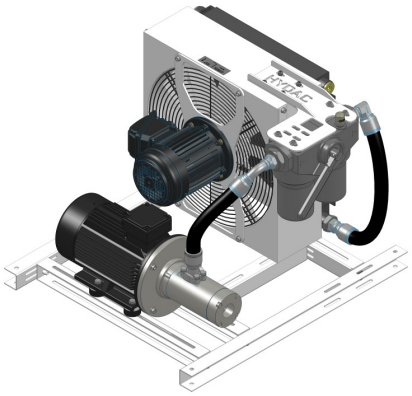
Use in extreme ambient conditions:
Cold Climate to -40˚C,
Hot Climate to +60˚C

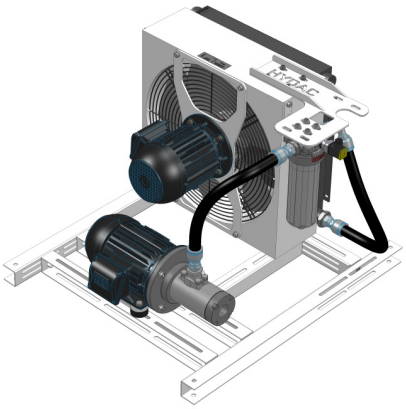
The various versions can also be combined. Our technical sales department will be happy to assist you further.

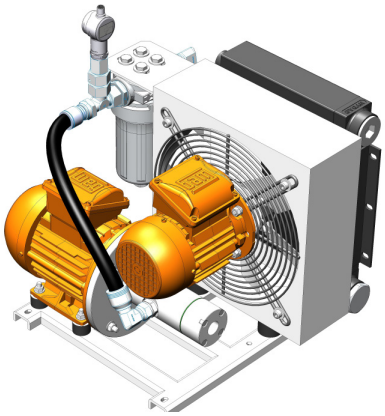
# Design

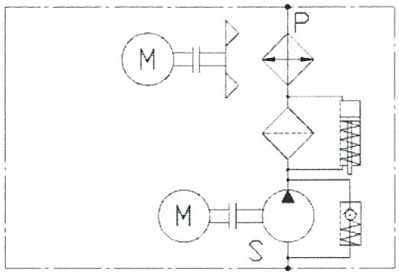
## ACAF-LN 2-7





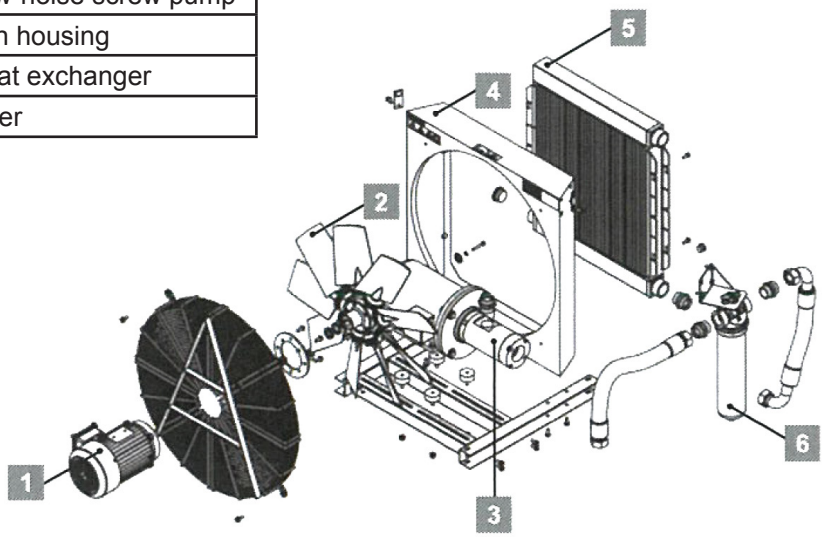







| | |
|---|---|
| 1 | Drive motor |
| 2 | Axial fan |
| 3 | Low-noise screw pump |
| 4 | Fan housing |
| 5 | Heat exchanger |
| 6 | Filter |

With external motor-pump assembly attached onto the base frame. The filter is equipped with a visual clogging indicator as standard.



## Technical Data

### ACAF-LN

| Type of cooler | Fluid[-][1] | Fluid flow [l/min][2] | Air flow [m³/h][2] | Max. Viscosity [mm²/S] Cold start | Fan motor: Poles / size / flange | Fan motor 50Hz: power / current absorption [kW / A] | | Pump motor: power / current absorption [kW / A][3] | | Filter size [-] | Filter option | Noise level (at 1m distance, 50 Hz) [dB(A)] | Volume [l][4] | Weight [kg][5] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | kW | A | kW | A | | | | | |
| ACAF-LN2S | M | 4-20 | 900 | 3000 | 4/71/B5 | 0.37 | 1.20 | Contact HYDAC | | MFX100 | FLND 160 | 64 | 0.7 | 30 |
| ACAF-LN2H | M | 4-20 | 1850 | 3000 | 2/80/B5 | 1.50 | 3.10 | | | MFX100 | FLND 160 | 80 | 0.7 | 30 |
| ACAF-LN4L | M | 10/28/40 | 1600 | 3000 | 6/90/B5 | 1.10 | 2.65 | | | MFX200 | FLND 250 | 67 | 2.3 | 90 |
| ACAF-LN4S | M | 10/28/40 | 2250 | 3000 | 4/90/B5 | 1.80 | 3.70 | | | MFX200 | FLND 250 | 72 | 2.3 | 90 |
| ACAF-LN5L | M | 10/28/40 | 2050 | 3000 | 6/90/B5 | 1.10 | 2.65 | | | MFX200 | FLND 250 | 65 | 2.8 | 120 |
| ACAF-LN5S | M | 10/28/40 | 3200 | 3000 | 4/90/B5 | 1.80 | 3.70 | | | MFX200 | FLND 250 | 77 | 2.8 | 120 |
| ACAF-LN6L | M | 10/28/40 | 2800 | 3000 | 6/80/B5 | 1.10 | 2.65 | | | MFX200 | FLND 250 | 67 | 4.6 | 150 |
| ACAF-LN6S | M | 10/28/40 | 4250 | 3000 | 4/90/B5 | 1.80 | 3.70 | | | MFX200 | FLND 250 | 77 | 4.6 | 150 |
| ACAF-LN7L | M | 28/40/60/100 | 4800 | 3000 | 6/90/B14 | 1.10 | 2.70 | | | LPF280 | FLND 400 | 76 | 5.2 | 180 |
| ACAF-LN7S | M | 28/40/60/100 | 8200 | 3000 | 4/100/B14 | 3.00 | 6.00 | | | LPF280 | FLND 400 | 84 | 5.2 | 180 |

[1]) Medium: W = water-glycol, M = mineral oil.
[2]) Fluid and air flow data at 50 Hz.
[3]) Depends on pump flowrate.
[4]) Fluid in cooling element.
[5]) Unfilled.

### Triple Redundancy System: ACAF-LN

Each component in the ACAF-LN (pump, filter and cooling elements) are fully equipped with bypass valves to prevent mechanical damage in the event of a pressure surge.

### Advantages:

- Stable cooling and filtration (independent of the cycle times of the system)
- Continuous filtration is possible, cooling as required
- Avoidance of pressure surges in the cooling element
- Design of the cooler is in accordance with the cooling capacity required (not according to the maximum possible return flow volume).

## Cooling capacity

Dependent on the oil flow rate and the temperature difference Δ T between oil inlet and air inlet.

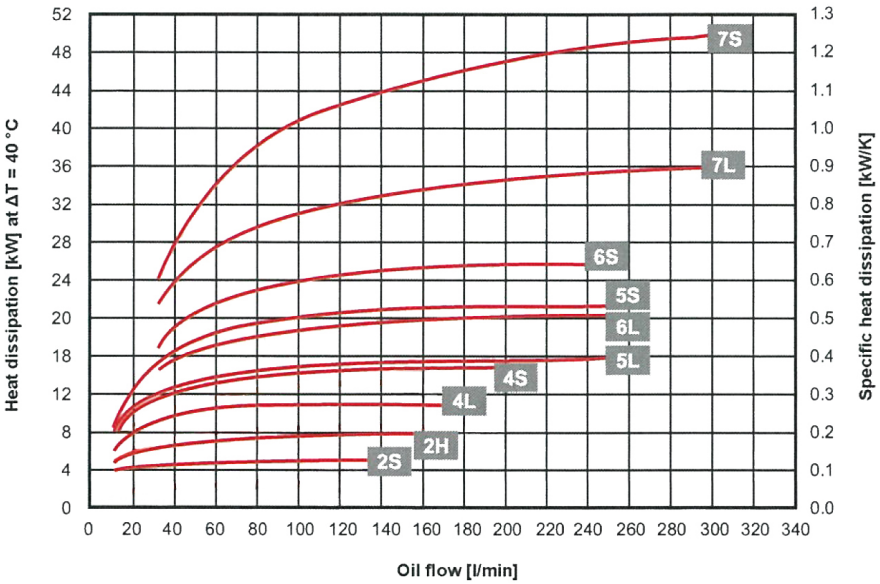
## Note

The values are measured at Δ T = 40˚C. For smaller Δ T values, the values can change. You can also use our cooler calculation software for designing. Please contact our technical sales department.

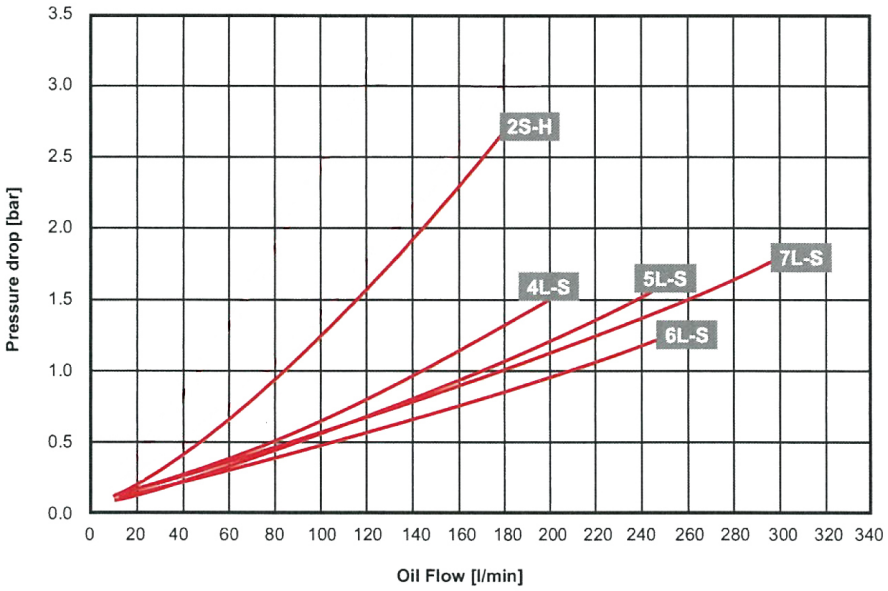
## Pressue difference Δ p

# Cooling Capacity and Pressure Difference Δ p

## Mineral oil / ACAF-LN




Tolerance: ±5 %




Measured at 30 mm²/s
Tolerance: ±5 %

For other viscosities, the pressure loss 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 | 1.4 | 1.9 | 2.5 | 3.5 |

## Cooling capacity

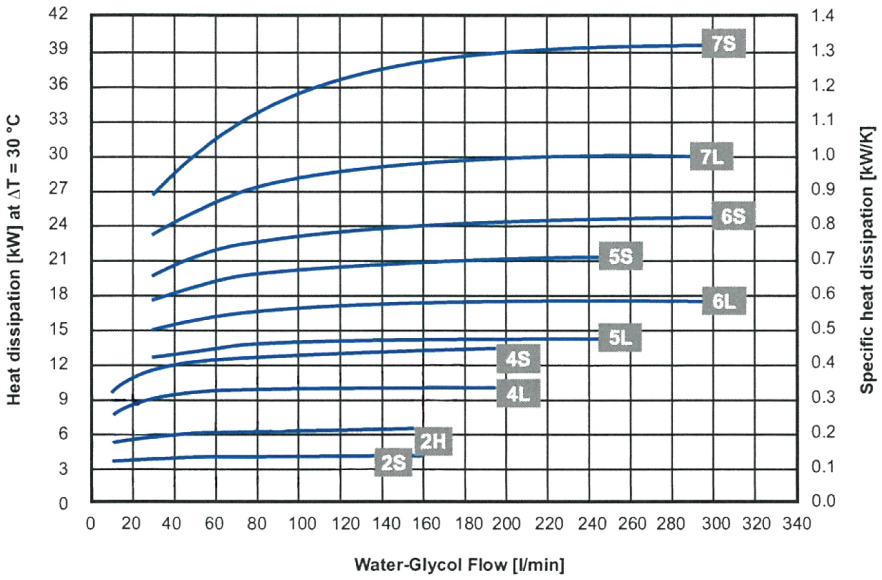
Dependent on the water-glycol flow rate and the temperature difference Δ T between w/g inlet and air inlet.

## Note

The values are measured at Δ T = 30˚C. For smaller Δ T values, the values can change. You can also use our cooler calculation software for designing. Please contact our technical sales department.

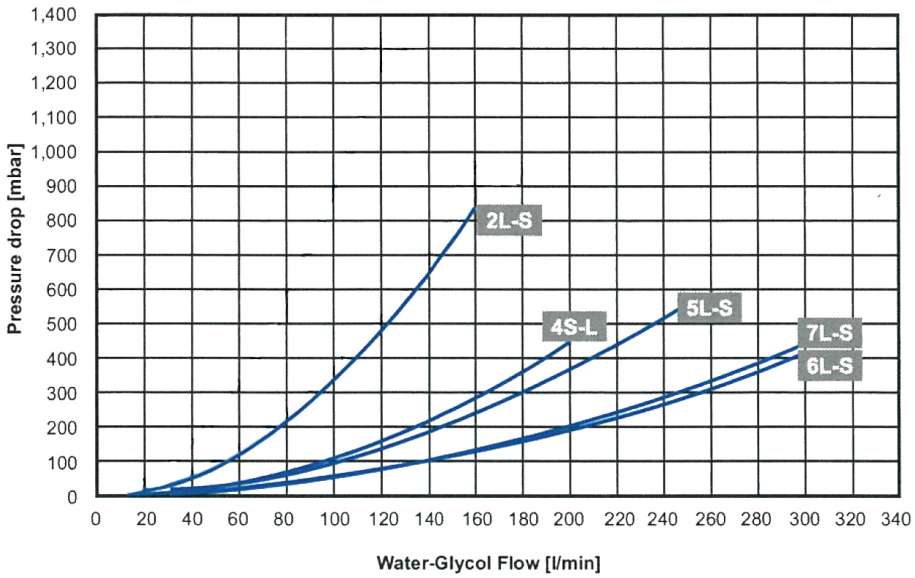
## Cooling Capacity and Pressure Difference Δ p

### Water-glycol (60/40) / ACAF-LN




Tolerance: ±5 %

## Pressue difference Δ p




Measured at 2 mm²/s
Tolerance: ±5 %

## Model Type

| ACAF-LN | 4S | 28 | 1.0 | B | M | A | MFX200 | 10 | 1 | IBT45-3 bar |
|---|---|---|---|---|---|---|---|---|---|---|

**Cooler Type**

ACAF-LN = Air cooler (oil) with integrated pump and filter

**Size / fan motor speed**

2-7 = Size
L = 6 poles (1,000 rpm)
S = 4 poles (1,500 rpm)
H = 2 poles (3,000 rpm)

**Flowrate L/min**

4-20 = Screw pump (ACAF-LN2)
10-60 = Screw pump (ACAF-LN4-6)
28-150 = Screw pump (ACAF-LN7)

**Revision**

**Clogging indicators**

B = With visual indicator (Standard)
D = With electrical and optical indicator

**Fluids**

M = Mineral oil
W = Water glycol mix

**Motor voltage**

Standard voltages and frequencies for 3 phase motor
A = 415 V - 50 Hz
B = 230/415 V - 50 Hz / 265 / 460V - 60 Hz
C = Special*
AC-LN2 = 220-240 V - 50/60 Hz, single phase (*available on request)
(tolerance voltage ±10 %)
*Other voltages on request.

**Size of filter**

| | | |
|---|---|---|
| MFX100 | = ACAF-LN2 | MFX = Ecomicron (ECON2) |
| MFX200 - FLND 250 | = ACAF-LN4-6 | FLND = Betamicron (BN4HC) |
| LPF280 - FLND 400 | = ACAF-LN7 | LPF = Optimicron (ON) |

**Filtration rating in micron**

10 = 10 µm
20 = 20 µm

**Color**

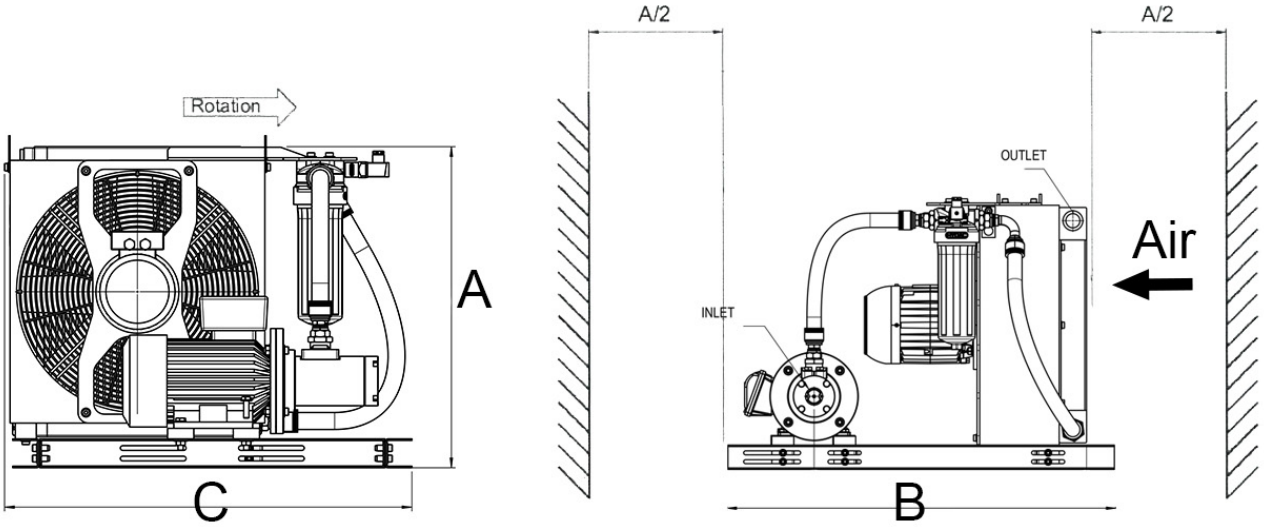
1 = RAL 9002 (Standard)
Other colors on request.

**Bypass options**

| | | Closing Temperature | Opening Pressure |
|---|---|---|---|
| IBT45-3 bar | = Integrated thermo-bypass valve (standard) | 45˚C | 3 bar |
| IBT50-3 bar | = Integrated thermo-bypass valve (optional) | 50˚C | 3 bar |
| IBT55-3 bar | = Integrated thermo-bypass valve (optional) | 55˚C | 3 bar |
| IBT60-3 bar | = Integrated thermo-bypass valve (optional) | 60˚C | 3 bar |

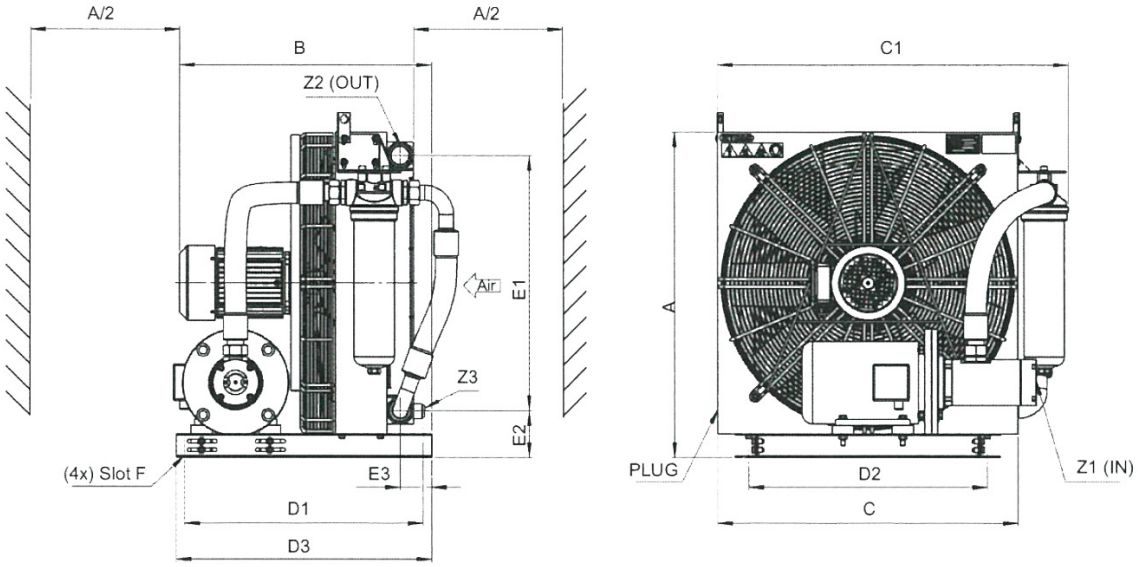
For all possible accessories, like vibration absorber, air filter grid or air filter mat please refer to brochure “Accessories for air coolers” [E57.000.1].

## ACAF-LN 2-6




| | A | B | C | Pump Inlet | Cooler Outlet |
|---|---|---|---|---|---|
| | ±10 | ±10 | ±20 | (IN) | (OUT) |
| ACAF-LN2S/H | 417 | 461 | 489 | G 1/2” | G 3/4” |
| ACAF-LN4L/S | 616 | 880 | 786 | G 1 1/4” | G 1” |
| ACAF-LN5L/S | 627 | 880 | 832 | G 1 1/4” | G 1” |
| ACAF-LN6L/S | 733 | 880 | 832 | G 1 1/4” | G 1 1/4” |

## ACAF-LN 7




| | A | B | C | C1 | D1 | D2 | D3 | E1 | E2 | E3 | F | Z1 | Z2 | Z3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ±10 | ±30 | ±10 | ±25 | ±2 | ±2 | ±2 | ±5 | ±5 | ±5 | Ø Slot | (IN) | (3x) | |
| ACAF-LN7L | 736 | 593 | 706 | 775 | 560(¹) | 560 | 600(¹) | 600 | 83 | 74 | 9x20 | G 2” | G1 1/4” | M22x1.5 |
| ACAF-LN7S | 736 | 607 | 706 | 775 | 560(¹) | 560 | 600(¹) | 600 | 83 | 74 | 9x20 | G 2” | G1 1/4” | M22x1.5 |

**Note**

We recommend maintaining a minimum distance to ensure an unimpeded air inlet and air outlet. This is half the height of the cooling element (A/2).
Anything below the minimum distance can influence the cooling capacity and the 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.

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