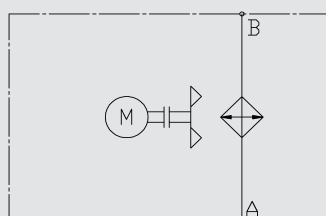


HYDAC INTERNATIONAL



Symbol



General

The AC-LN 1-7 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

Air Cooler Industry AC-LN 1-7 / ACA-LN 2-7 / ACAF-LN 2-7

Operation Data

Fluids	Oils (mineral oils, synthetic oils, high viscosity oils, biological oils, phosphate ester) Water-glycol (cooling fluid) HFC pressure fluids
Viscosity	AC-LN: 2,000 mm ² /s (standard) ACA-LN / ACAF-LN: see technical data
Temperature range	Minimum / maximum ambient temperature: -20 °C to +40 °C (standard) Minimum / maximum temperature of the medium: +130 °C Please contact the technical sales department in the event of deviating temperatures for applications with water-glycol. Notice! 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. Please contact the technical sales department to receive information about controlled fan drives.
Pressure resistance of the cooling element	Dynamic operating pressure: 16 bar Static operating pressure: 21 bar
Fan	Axial fan in suction version (standard) Axial fan in pushing version on request (note: approx. 10 % less cooling capacity)
Motor	Three-phase motor Efficiency class IE2 (only ≥0.75 kW) Protection class IP55 Insulation class F 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 (only ACA-LN/ACAF-LN)	ACA-LN / ACAF-LN 2-3: screw pump ACA-LN / ACAF-LN 4-5-6: vane pump ACA-LN / ACAF-LN 7: screw pump with separate motor Operating pressure: max. 10 bar (screw pump) max. 6 bar (vane pump) Negative suction pressure of the pump: max. -0.4 bar Pump motor speed: 3,000 rpm
Noise levels	See technical data AC-LN and ACA-LN / ACAF-LN 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) Thermostats Air filter grid or air filter mat Vibration damper

Application Field

Systems with small and medium cooling requirements, such as:

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

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-LN (without pump and filter) is also available for operation in gas and dust explosive areas. The ATEX certification applies for a frequency of 50 Hz and 60 Hz.

Marine

The MAR version is 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.

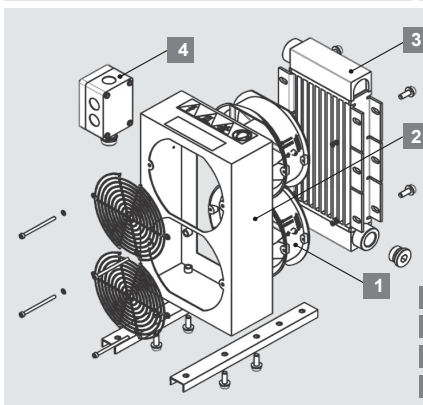
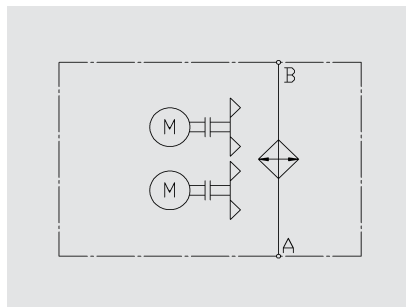
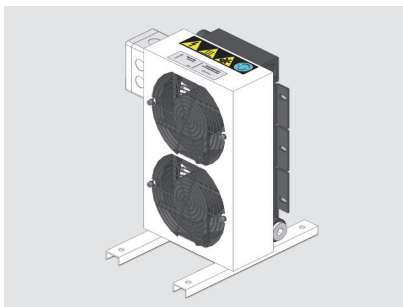
Cold Climate/Hot Climate

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.

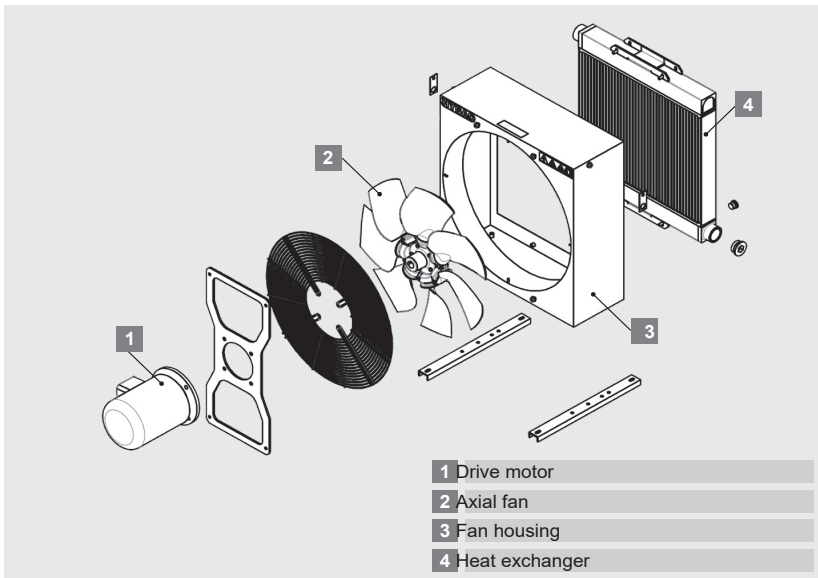
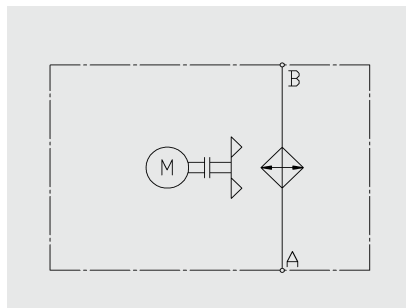
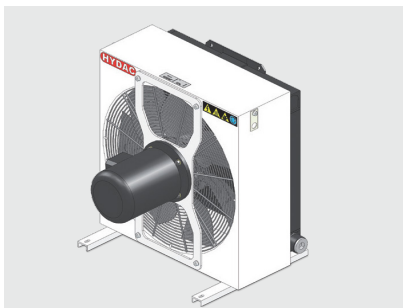
Design

AC-LN 1



- 1 Axial fan with integrated motor 2
- Fan housing 3 Heat exchanger 4
- Electrical box

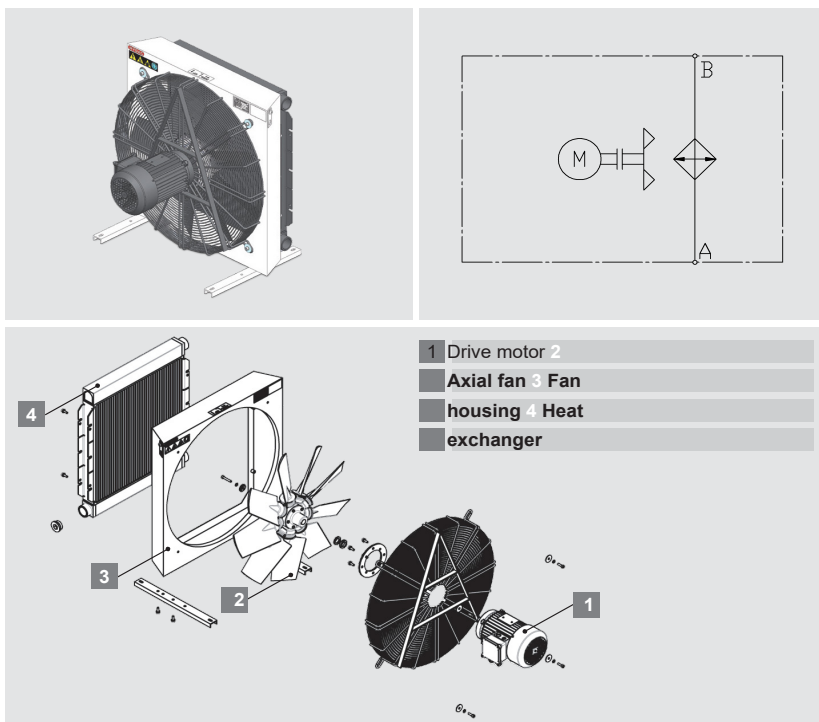
AC-LN 2-3-4-5-6



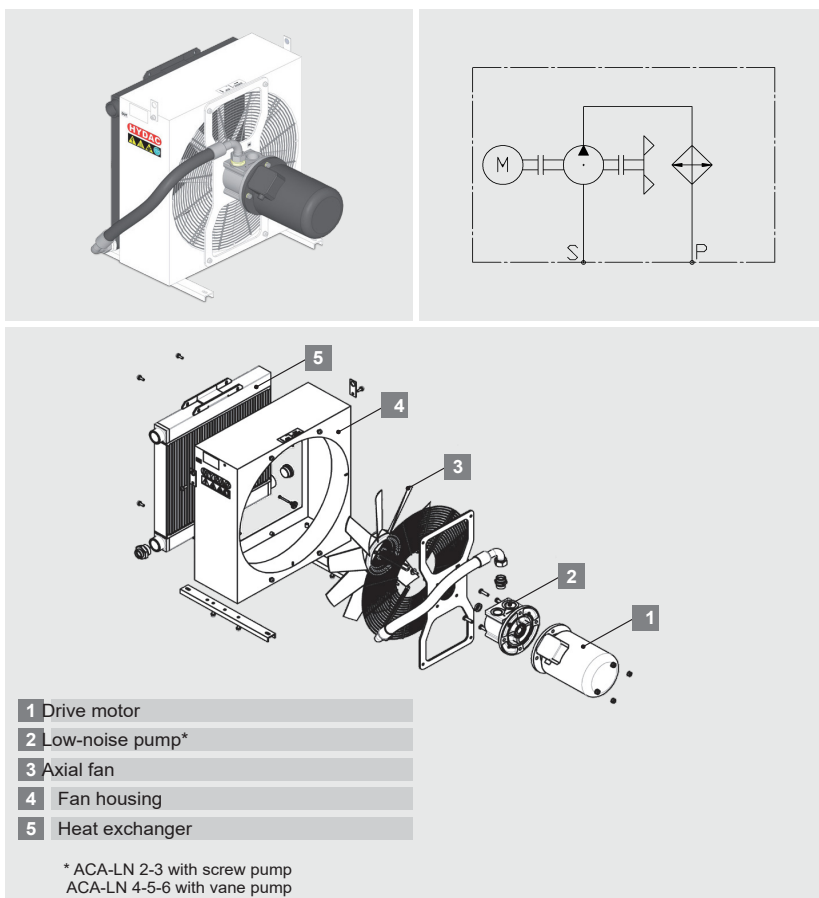
- 1 Drive motor
- 2 Axial fan
- 3 Fan housing
- 4 Heat exchanger

Design

AC-LN 7

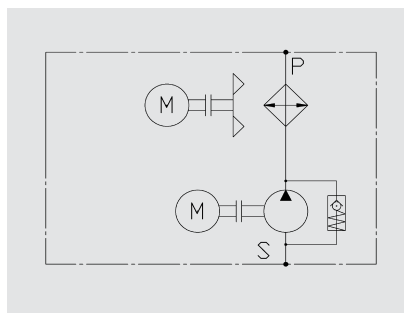


ACA-LN 2-6



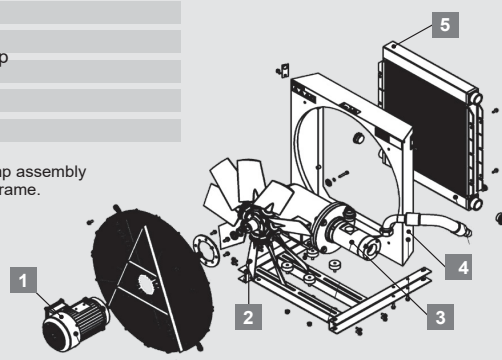
Design

ACA-LN 7

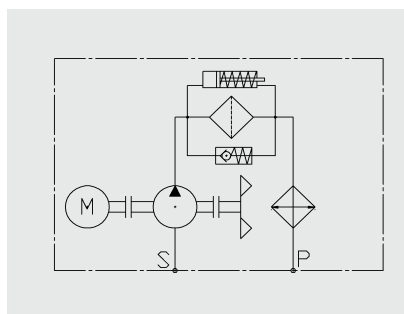
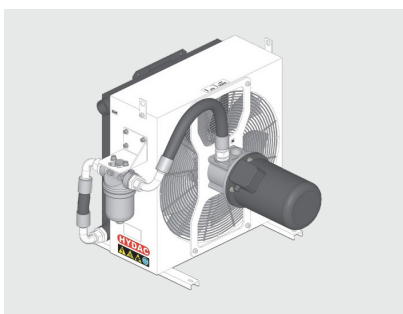


- 1 Drive motor
- 2 Axial fan
- 3 Low-noise screw pump
- 4 Fan housing
- 5 Heat exchanger

With external motor-pump assembly attached onto the base frame.

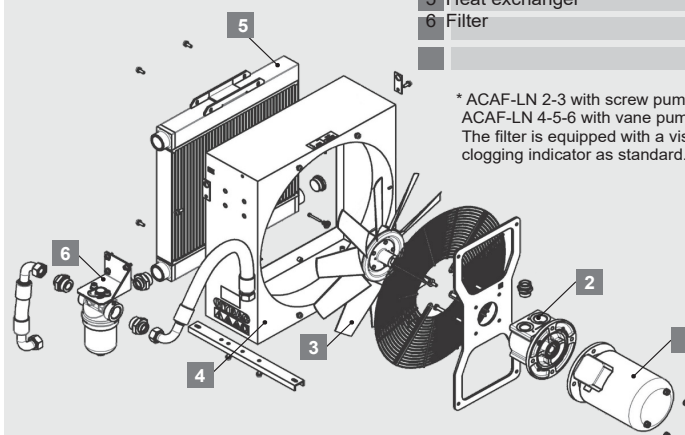


ACAF-LN 2-6



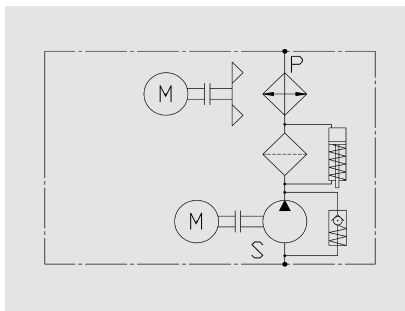
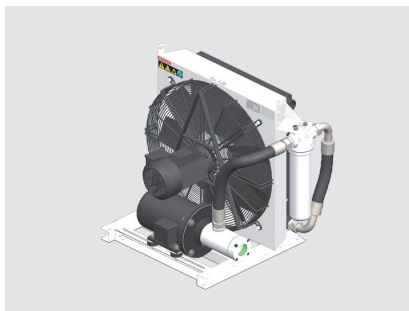
- 1 Drive motor
- 2 Low-noise pump*
- 3 Axial fan
- 4 Fan housing
- 5 Heat exchanger
- 6 Filter

* ACAF-LN 2-3 with screw pump
ACAF-LN 4-5-6 with vane pump
The filter is equipped with a visual clogging indicator as standard.



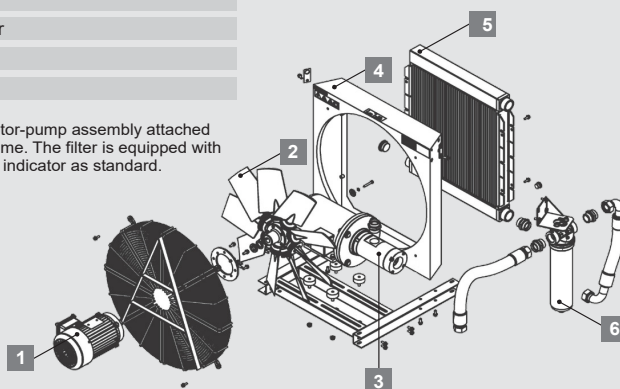
Design

ACAF-LN 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

AC-LN

Type of cooler	P/N	Fluid [-] ¹⁾	Fluid flow [l/min] ²⁾	Air flow [m³/h] ³⁾	Pressure / flange	Fan motor 50 Hz:[kW Power / current absorption / A] ⁴⁾		Fan motor 60 Hz:[kW Power / current absorption/ A] ⁴⁾		Noise level (at 1m distance, 50 Hz) [dB(A)]	Volume [l] ⁵⁾	Weight [kg] ⁶⁾		
AC-LN1H	3849085	F 120	650		-	0.03	0.23	0.03	0.21	60	0.3	7		
AC-LN2S	3860765	F	180	900	4/63/B5	0.18	0.66	0.20	0.75	64	0.7	14		
AC-LN2H	3860702	F	180	1,850	2/63/B5	0.25	0.76	0.30	0.76	80	0.7	14		
AC-LN3S	3860382	F	180	1,400	4/63/B5	0.18	0.66	0.20	0.66	1.21	0.66	1.50	1.0	20
AC-LN3H	3860308	F								85				
AC-LN4L	3859982	F	200	1,600	6/71/B5	0.25	0.90	0.28	0.80	63	2.3	32		
AC-LN4S	3860090	F	200	2,250	4/71/B5	0.37	1.20	0.40	1.10	72	1.15	2.3	32	
AC-LN5L	3860913	F	250	2,050	6/80/B5	0.37	1.25	0.41	0.65		2.8	42		
AC-LN5S	3860907	F	250	3,200	4/90/B5	1.10	2.60	1.30	2.20	75	2.8	45		
AC-LN6L	3856579	F	250	2,800	6/80/B5	0.37	1.25	0.41	1.15	67	4.6	52		
AC-LN6S	3859080	F	250	4,250	4/90/B5	1.10	2.60	1.30	2.20	77	4.6	52		
AC-LN7L	3909026	F	300	4,800	6/90/B14	1.10	2.70	1.30	2.70	76	5.2	58		
AC-LN7S	3909027	F	300	8,200	4/100/B14	3.00	6.00	3.60	7.20	84	5.2	63		

1) Medium: F = mineral oil or water-glycol, M = mineral oil

2) Max. flow rate

3) Air flow data at 50 Hz

4) AC-LN1: each motor

5) Fluid in cooling element

6) Unfilled

Technical Data

ACA-LN / ACAF-LN

Type of cooler	Fluid [-] ¹⁾	Fluid flow [l/min] ²⁾	Air flow [m ³ /h] ²⁾	Pump displacement [cm ³ /U]	Max. Viscosity [mm ² /s] continuous working ³⁾	Fan motor: Poles / size / flange	Fan motor 50 Hz: power / current absorption [kW / A] ⁴⁾		Fan motor 60 Hz: power / current absorption [kW / A] ⁴⁾		Filter size [-]	Noise level (at 1m distance, 50 Hz) [dB(A)]	Volume [l] ⁵⁾	Weight [kg] ⁶⁾
ACA-LN2S	M	13	900	10	500	4/71/B5	0.37	1.20	0.40	1.10	-	64	0.7	21
ACA-LN2H	M	27	1,850	10	500	2/80/B5	1.50	3.10	1.80	3.10	-	80	0.7	21
ACAF-LN2S	M	13	900	10	500	4/71/B5	0.37	1.20	0.40	1.10	LPF160	64	0.7	22
ACAF-LN2H	M	27	1,850	10	500	2/80/B5	1.50	3.10	1.80	3.10	LPF160	80	0.7	22
ACA-LN3S	M	36	1,400	28	500	4/90/B5	1.10	2.60	1.30	2.60	-	66	1.0	35
ACA-LN3H	M	72	2,700	28	500	2/90/B5	2.20	4.50	2.6	4.5	-	85	1.0	35
ACAF-LN3S	M	36	1,400	28	500	4/90/B5	1.10	2.60	1.30	2.60	LPF160	66	1.0	36
ACAF-LN3H	M	72	2,700	28	500	2/90/B5	2.20	4.50	2.6	4.5	LPF160	85	1.0	36
ACA-LN4L	M	24/34	1,600	28/40	350	6/90/B5	1.10	2.65	1.30	2.25	-	63	2.3	35
ACA-LN4S	M	36/52	2,250	28/40	350	4/90/B5	1.80	3.70	2.10	3.60	-	72	2.3	35
ACAF-LN4L	M	24/34	1,600	28/40	350	6/90/B5	1.10	2.65	1.30	2.25	LPF160	67	2.3	41
ACAF-LN4S	M	36/52	2,250	28/40	350	4/90/B5	1.80	3.70	2.10	3.60	LPF160	72	2.3	41
ACA-LN5L	M	24/34	2,050	28/40	350	6/90/B5	1.10	2.65	1.30	2.25	-	65	2.8	45
ACA-LN5S	M	36/52	3,200	28/40	350	4/90/B5	1.80	3.70	2.10	3.60	-	75	2.8	45
ACAF-LN5L	M	24/34	2,050	28/40	350	6/90/B5	1.10	2.65	1.30	2.25	LPF160	65	2.8	52
ACAF-LN5S	M	36/52	3,200	28/40	350	4/90/B5	1.80	3.70	2.10	3.60	LPF160	77	2.8	52
ACA-LN6L	M	24/34	2,800	28/40	350	6/90/B5	1.10	2.65	1.30	2.25	-	67	4.6	55
ACA-LN6S	M	36/52	4,250	28/40	350	4/90/B5	1.80	3.70	2.10	3.60	-	77	4.6	55
ACAF-LN6L	M	24/34	2,800	28/40	350	6/80/B5	1.10	2.65	1.30	2.25	LPF160	67	4.6	62
ACAF-LN6S	M	36/52	4,250	28/40	350	4/90/B5	1.80	3.70	2.10	3.60	LPF160	77	4.6	62
ACA-LN7L	M	100/150/180	4,800	40/58/69	320/130/240	6/90/B14	1.10	2.70	1.30	2.70	-	76	5.2	74
ACA-LN7S	M	100/150/180	8,200	40/58/69	320/130/240	4/100/B14	3.00	6.00	3.60	7.20	-	84	5.2	74
ACAF-LN7L	M	100/150/180	4,800	40/58/69	320/130/240	6/90/B14	1.10	2.70	1.30	2.70	LPF280	76	5.2	82
ACAF-LN7S	M	100/150/180	8,200	40/58/69	320/130/240	4/100/B14	3.00	6.00	3.60	7.20	LPF280	84	5.2	82

1) Medium: F = mineral oil or water-glycol, M = mineral oil

2) Fluid and air flow data at 50 Hz

3) Depends on pump displacement

4) For the size 7 the power / current absorption data are those of the fan motor.

For the pump motor on feet refer to the following data:

40/58 cm³/U → 3 [kW] / 6.7 [A] 69

cm³/U → 5.5 [kW] / 10.4 [A]

5) Fluid in cooling element

6) Unfilled

Cooling in bypass flow: ACA-LN / ACAF-LN

The ACA-LN with integrated boost pump is a complete bypass flow cooling system; the ACAF-LN is equipped with a high-quality HYDAC filter for additional filtration.

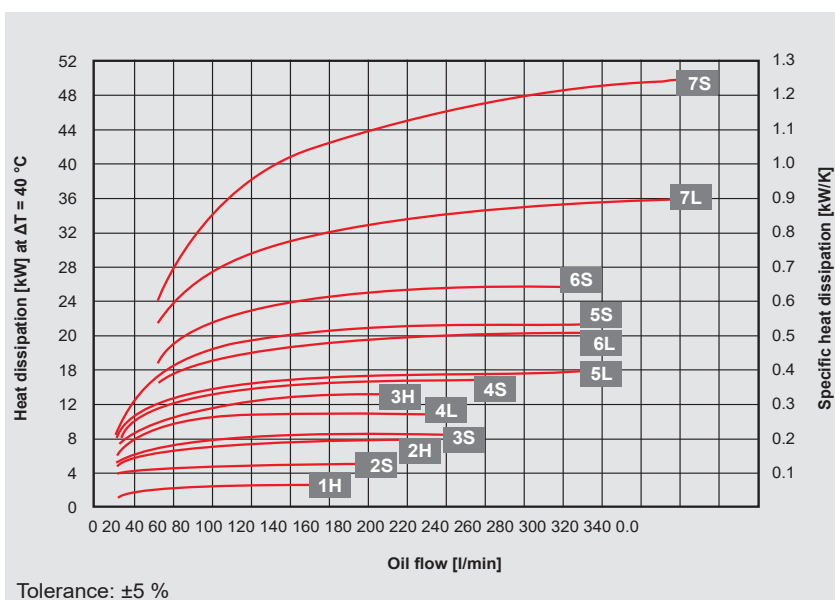
Advantages:

- 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 and Pressure Difference Δp

Mineral oil

AC-LN / ACA-LN / ACAF-LN



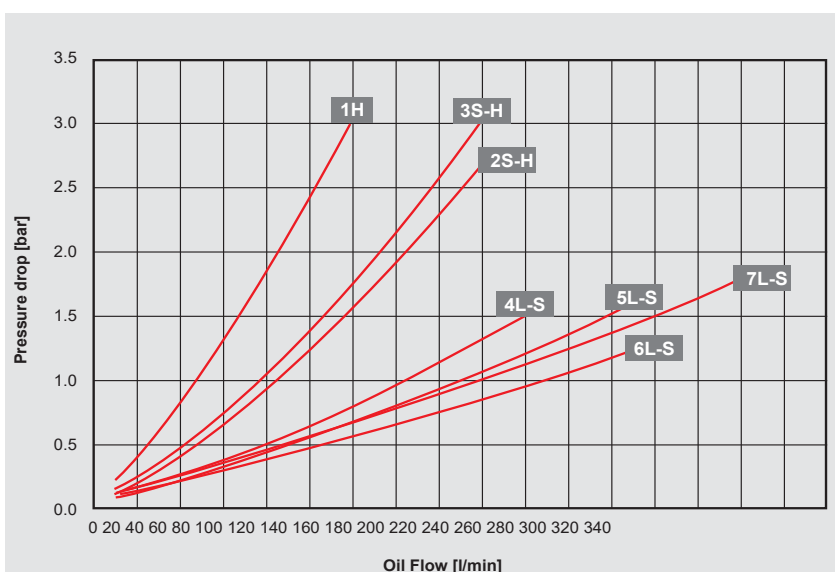
Tolerance: $\pm 5\%$

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 $\Delta T = 40^\circ\text{C}$. 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 $30\text{ mm}^2/\text{s}$

Tolerance: $\pm 5\%$

Pressure difference Δp

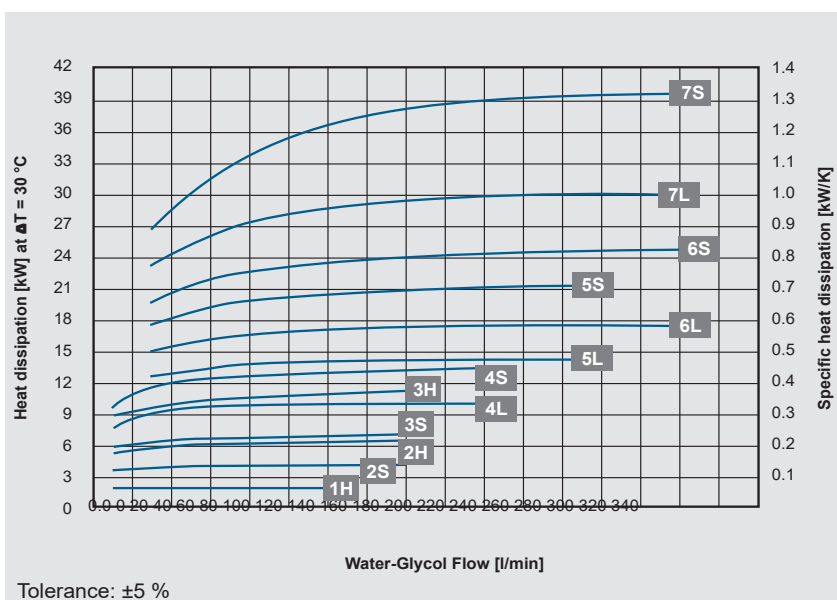
For other viscosities, the pressure loss must be multiplied by the conversion factor K:

Viscosity (mm^2/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 and Pressure Difference Δp

Water-glycol (60/40)

AC-LN



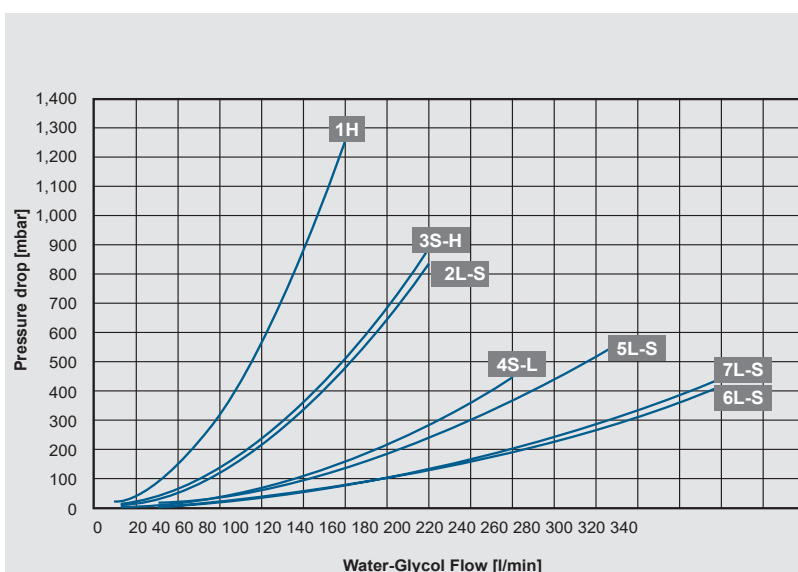
Tolerance: $\pm 5\%$

Cooling capacity:

Dependant on the water-glycol flow rate and the temperature difference ΔT between w/g inlet and air inlet.

Note:

The values are measured at $\Delta T = 30^\circ\text{C}$. 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 $2\text{ mm}^2/\text{s}$

Tolerance: $\pm 5\%$

Pressure difference Δp

Model Type

ACAF-LN 4S - 40 - 1.0 - B - M - A - LPF160 - 10 - 1 - IBT

Cooler type

AC-LN = Air cooler (oil / water-glycol mix)
ACA-LN = Air cooler (oil) with integrated pump
ACAF-LN = Air cooler (oil) with integrated pump and filter

Size / motor speed

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

Displacement cm³/rev

10 = Screw pump (ACA-LN / ACAF-LN2)
28 = Screw pump (ACA-LN / ACAF-LN3)
28 = Vane pump (ACA-LN / ACAF-LN4-6)
40 = Vane pump (ACA-LN / ACAF-LN4-6)
40/58/69 = Screw pump (ACA-LN / ACAF-LN 7)

Revision

Clogging indicators (only ACAF-LN)

A = Without clogging indicator
B = With visual indicator (Standard)
D = With electrical and optical indicator

Fluids

F = Mineral oil or water glycol mix (AC-LN)
M = Mineral oil (ACA-LN and ACAF-LN)

Motor voltage

Standard voltages and frequencies for 3 phase motor
A = 230/400 V – 50 Hz / 265/460 V – 60 Hz
B = 230/ 400 V – 50 Hz
C = 265/460 V – 60 Hz
AC-LN1 = 220 - 240 V – 50/60 Hz, single phase (Standard)
(tolerance voltage $\pm 10\%$)
Other voltages on request.

Size of filter (only ACAF-LN)

LPF160 = ACAF-LN2-6
LPF280 = ACAF-LN7

Filtration rating in micron (only ACAF)

5 = 5 μ m Betamicon®-4-N (5 BN4HC)
10 = 10 μ m Betamicon®-4-N (10 BN4HC) (Standard)
20 = 20 μ m Betamicon®-4-N (20 BN4HC)

Color

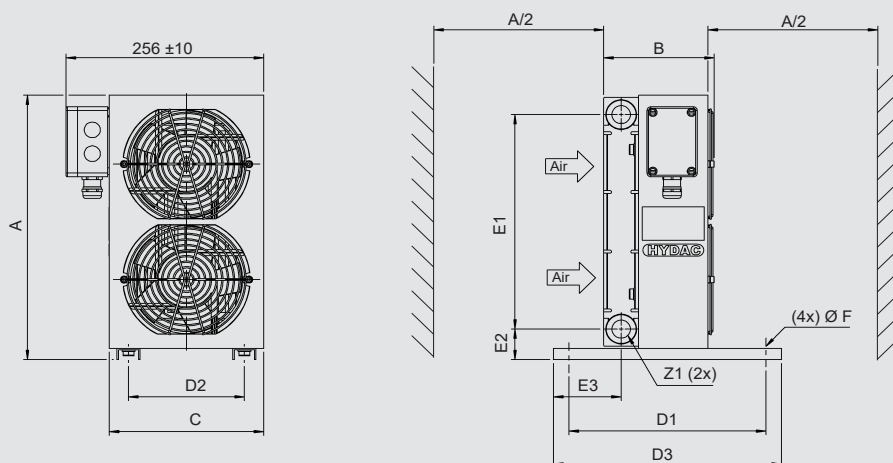
1 = RAL 9002 (Standard) Other
colors on request.

Accessories

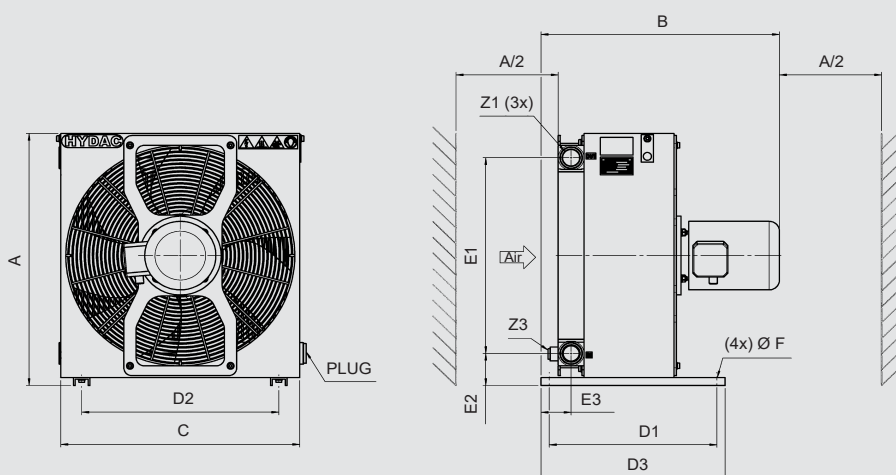
IBP = Heat exchanger with integrated bypass valve
IBT = Heat exchanger with integrated thermo-bypass valve
AITF = Thermostat (fixed)
For all possible accessories, like vibration absorber, air filter grid or
air filter mat please refer to brochure "Accessories for air coolers".

Dimensions

AC-LN 1

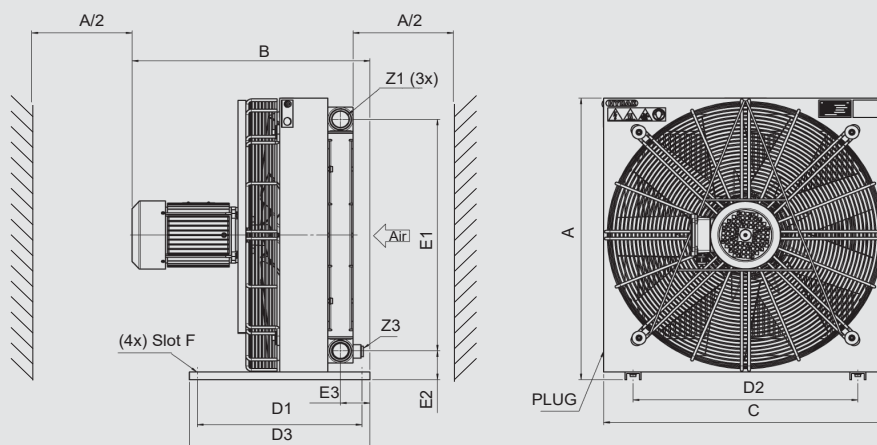


AC-LN 2-6



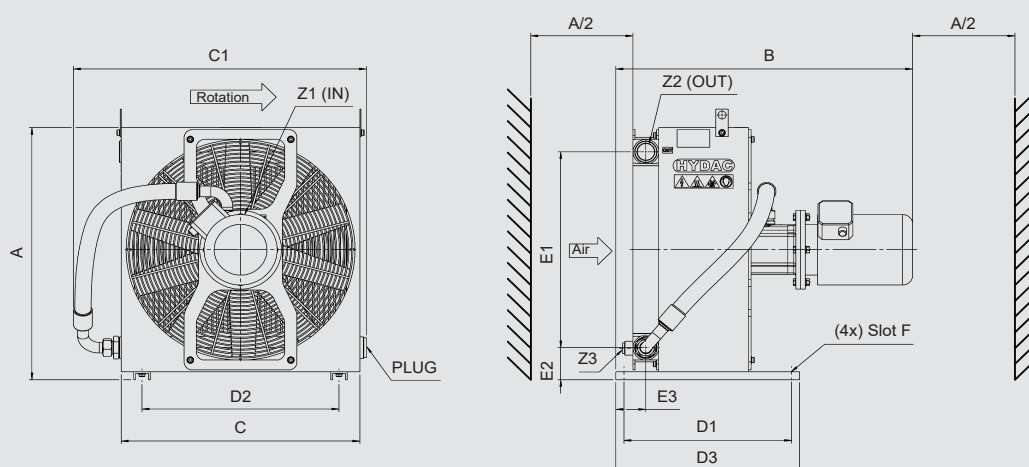
	A ±10	B ±25	C ±10	D1 ±2	D2 ±2	D3 ±2	E1 ±5	E2 ±5	E3 ±5	F Ø Slot	Z1	Z3
AC-LN1H	355	143	200	255	150	295	288	41	88	9	G3/4"	-
AC-LN2H	355	401	330	255	160	295	289	41	58	9	G3/4"	-
AC-LN2S	355	396	330	255	160	295	289	41	58	9	G3/4"	-
AC-LN3H	455	438	380	255	290	295	388	41	58	9	G3/4"	-
AC-LN3S	455	404	380	255	290	295	388	41	58	9	G3/4"	-
AC-LN4L	520	517	485	410	425	485	410				G1"	-
AC-LN4S	520	517	425				439	51	104	9x20	G1"	-
AC-LN5L	562	547	542	410	482	450						
AC-LN5S	562	563	542	410	482	450	439	72	94	9x20	G1"	-
AC-LN6L	640	567	584	410	482	450	497	82	74	9x20	G1 1/4"	M22x1.5
AC-LN6S	640	583	584	410	482	450	497	82	74	9x20	G1 1/4"	M22x1.5

AC-LN 7



	A ±10	B ±25	C ±10	D1 ±2	D2 ±2	D3 ±2	E1 ±5	E2 ±5	E3 ±5	F Ø Slot	Z1	Z3
AC-LN7L	726	593	706	410	560	450	597	75	74	9x20 G	1/4"	M22x1.5
AC-LN7S	726	613	706	410	560	450	597	75	74	9x20	G1 1/4"	M22x1.5

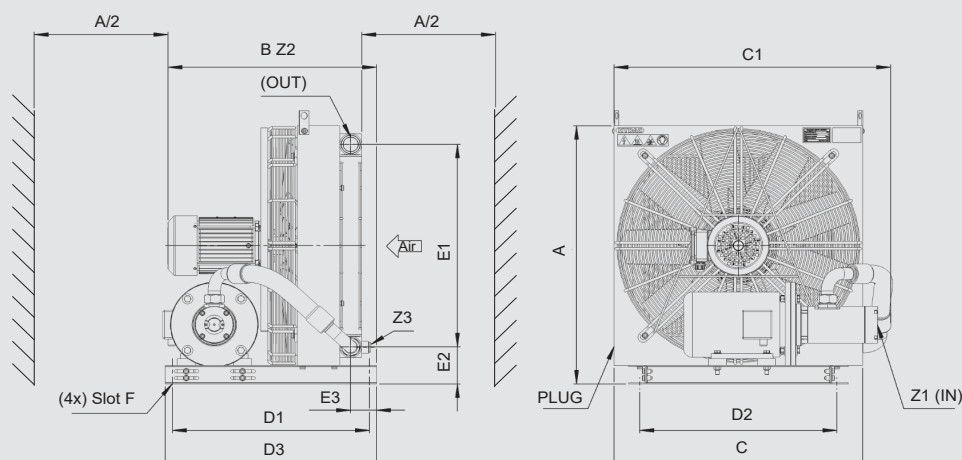
ACA-LN 2-6



	A ±10	B ±30	C ±10	C1 ±25	D1 ±2	D2 ±2	D3 ±2	E1 ±5	E2 ±5	E3 ±5	F ØSlot	Z1 (1N)	Z2 (3x)	Z3
ACA-LN2S	355	567	330	414	370	160	410	289	41	58	9	G 1"	G 3/4"	-
ACA-LN2H	355	596	330	414	370	160	410	289	41	58	9	G 1"	G 3/4"	-
ACA-LN3S	455	620	380	462	370	290	410	388	41	58	9	G 1"	G 3/4"	-
ACA-LN3H	455	620	380	462	370	290	410	388	41	58	9	G 1"	G 3/4"	-
ACA-LN4L	520 697	520	485	574	410	425	450	439 51	104 9x20	G1 1/4"	439 51	104 9x20	G1"	-
ACA-LN4S	699 562	707	485	574	410	425 450	G1 1/4"						G1"	-
ACA-LN5L			542	641	410	482	450	439	71.5 94	9x20	G1 1/4"		G1"	-
ACA-LN5S	562	709	542	641	410	482 450	439	71.5	94	9x20	G1 1/4"	G1"	G1"	-
ACA-LN6L	640	727	584	717	410	482 450	497	81.5	74	9x20	G1 1/4"	G1 1/4"	M22x1.5	
ACA-LN6S	640	729	584	717	410 482	450	497	81.5	74	9x20	G1 1/4"	G1 1/4"	M22x1.5	

E 5.816.1.1/08.16

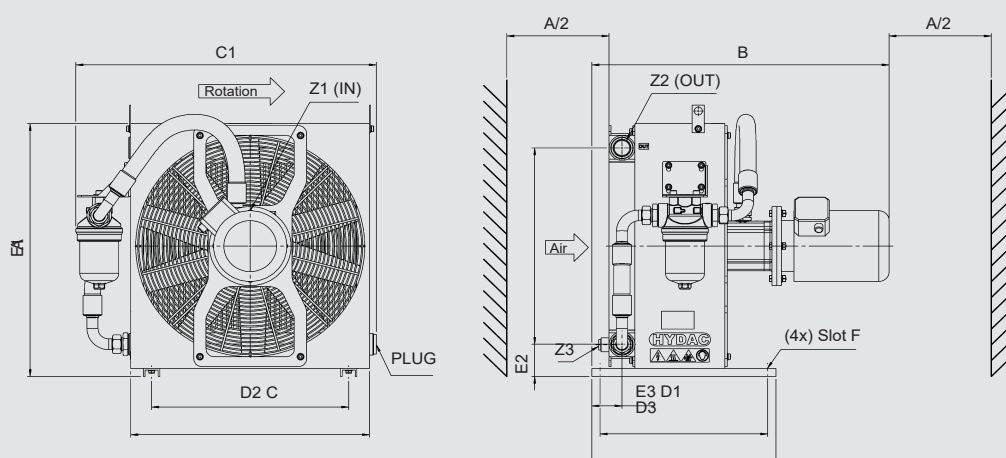
ACA-LN 7



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

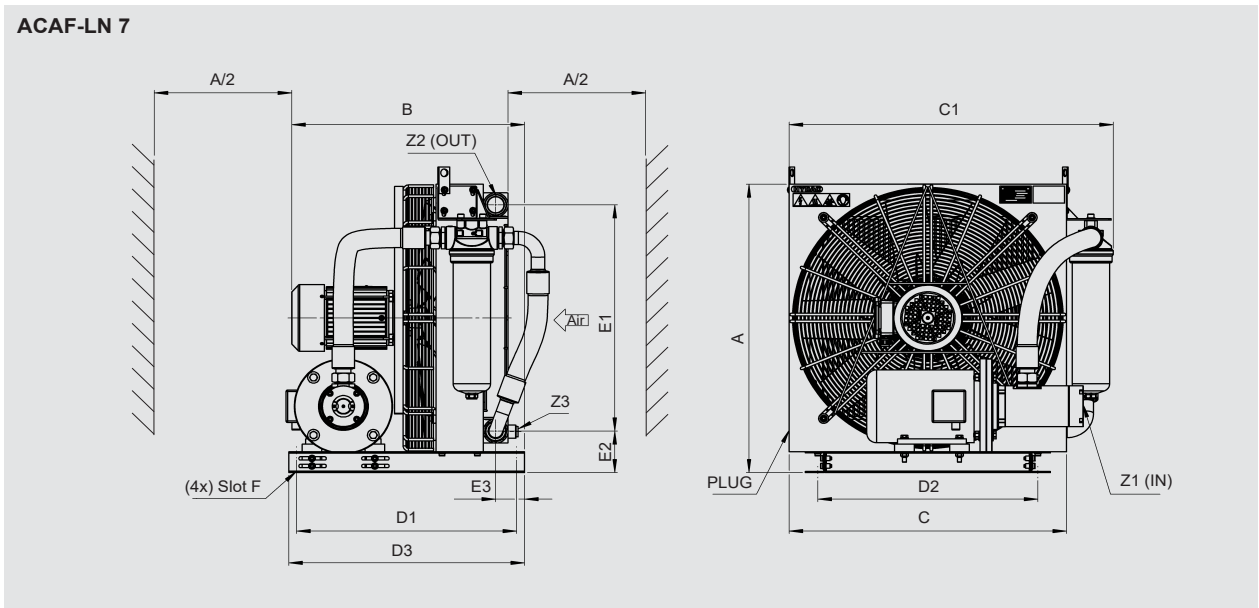
1) Version with pump displacement 69 [cm³/U]: D1 = 830, D3 = 870

ACAF-LN 2-6



	A ±10	B ±30	C ±10	C1 ±25	D1 ±2	D2 ±2	D3 ±2	E1 ±5	E2 ±5	E3 ±5	F ØSlot	Z1 (IN)	Z2 (3x)	Z3
ACAF-LN2S	355	567	330	467	370	160	410	289	41	58	9	G 1"	G 3/4"	-
ACAF-LN2H	355	596	330	467	370	160	410	289	41	58	9	G 1"	G 3/4"	-
ACAF-LN3S	455	620	380	517	370	290	410	388	41	58	9	G 1"	G 3/4"	-
ACAF-LN3H	455	596	380	517	370	290	410	388	41	58	9	G 1"	G 3/4"	-
ACAF-LN4L	520	697	485	619	410	425	450	439 51	104 9x20	G1 1/4"	G1" 439 51	104 9x20	G1	-
ACAF-LN4S	520	699	485	619	410	425	450	1/4" G1"	439 71.5	94 9x20	G1 1/4"	G1"	-	-
ACAF-LN5L	562	707	542	676	410	482	450							-
ACAF-LN5S	562	709	542	676	410	482	450	439	71.5	94	9x20	G1 1/4"	G1"	-
ACAF-LN6L	640	727	584	734	410	482	450	497	81.5	74	9x20	G1 1/4"	G1 1/4"	M22x1.5
ACAF-LN6S	640	729	584	734	410	482	450	497	81.5	74	9x20	G1 1/4"	G1 1/4"	M22x1.5

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	A ±10	B ±30	C ±10	C1 ±25	D1 ±2	D2 ±2	D3 ±2	E1 ±5	E2 ±5	E3 ±5	F ØSlot	Z1 (IN)	Z2 (3x)	Z3
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

¹⁾ Version with pump displacement 69 [cm³/U]: D1 = 830, D3 = 870

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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