



*The Professional Choice*

# **EHV/EHVF**

*Bladder Accumulators*



OLAER EHV/EHVF | High pressure bladder type conforming to EC regulations



## Increasing the safety of your systems !

The accumulators installed in energy storage make your systems safe in case of failure to one of the components.

Examples :

- Emergency braking of special vehicles
- Pitching the blades on wind turbines

## Preserving the environment !

- By using renewable energy : The transformation of wave energy into electricity is done via storing hydraulic energy in high and low pressure accumulators.
- By recovering the energy from the braking vehicle : The energy stored allows restarting the vehicle, thus lowering its fuel consumption.

# Increasing the production capacity !

The installation of accumulators on the hydro-electric power station allows reduced pump power, thus lowering the electric consumption.

# Lowering production costs !

Without changing the installed power, the installation of accumulators on a production machine can allow an increased frequency, for example, by accelerating the movement of displacement without hydraulic press stress.

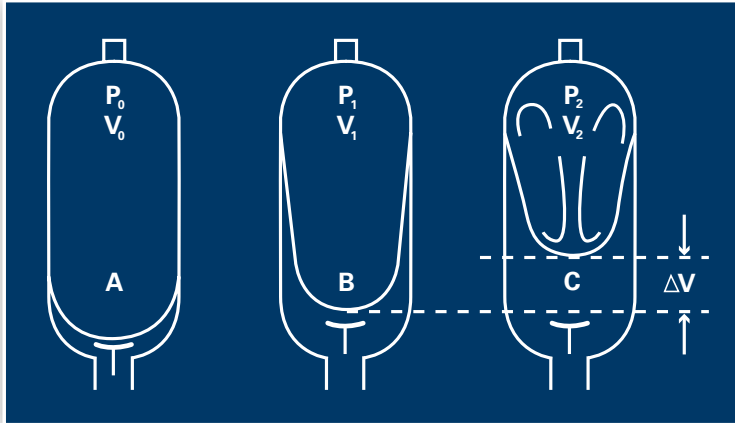


# Main Features

## Operating principle

Operation of the OLAER gas loaded bladder accumulator is based on the considerable difference in compressibility between a gas and a liquid, enabling a large quantity of energy to be stored in an extremely compact form. This enables a liquid under pressure to be accumulated, stored and recovered at any time.

Its special design allows the bladder (the strategic component) to compress the gas and usually form into three lobes in order for the accumulator to store, then to deliver the fluid under pressure, as required.



**V<sub>0</sub>** = Nitrogen capacity of the accumulator  
**V<sub>1</sub>** = Gas volume at the minimum hydraulic pressure  
**V<sub>2</sub>** = Gas volume at the maximum hydraulic pressure  
 **$\Delta V$**  = Returned and/or stored volume between P<sub>1</sub> and P<sub>2</sub>  
**P<sub>0</sub>** = Initial preload of the accumulator  
**P<sub>1</sub>** = Gas pressure at the minimum hydraulic pressure  
**P<sub>2</sub>** = Gas pressure at the maximum hydraulic pressure

**A** - Bladder in the precharge position, which means that it is only filled with nitrogen. The anti-extrusion system closes the hydraulic orifice and prevents the destruction of the bladder.

**B** - Position at the minimum operating pressure ; there must be a certain amount of fluid between the bladder and the hydraulic orifice, such that the anti-extrusion system does not close the hydraulic orifice. Thus, P<sub>0</sub> must always be < P<sub>1</sub>.

**C** - Position at the maximum operating pressure. The volume difference  $\Delta V$  between the minimum and maximum positions of the operating pressures represents the working fluid quantity.

**Maximum pressure differential : 4:1**

## Your Benefits

- To increase your production rates thanks to large instantaneous flow rates that only accumulators can provide.
- Some spare power available at any time.  
 Example : EHV 50-330/90  
 Average flow : 650 L/min  
 Maximum pressure available: 320 Bar  
 Minimum pressure available: 250 Bar  
 Average power = Average flow x  
 Average pressure/600 = 308 kW
- The accumulator's ability to run independently reduces the installation cost while reducing your equipment running cost.
- With an accumulator in compliance with the European standard, your OLAER accumulator is suitable for use in more than 35 countries making it boundary friendly.



## Technical Characteristics

The accumulator comprises a forged steel shell, a rubber bladder and a fluid port assembly.

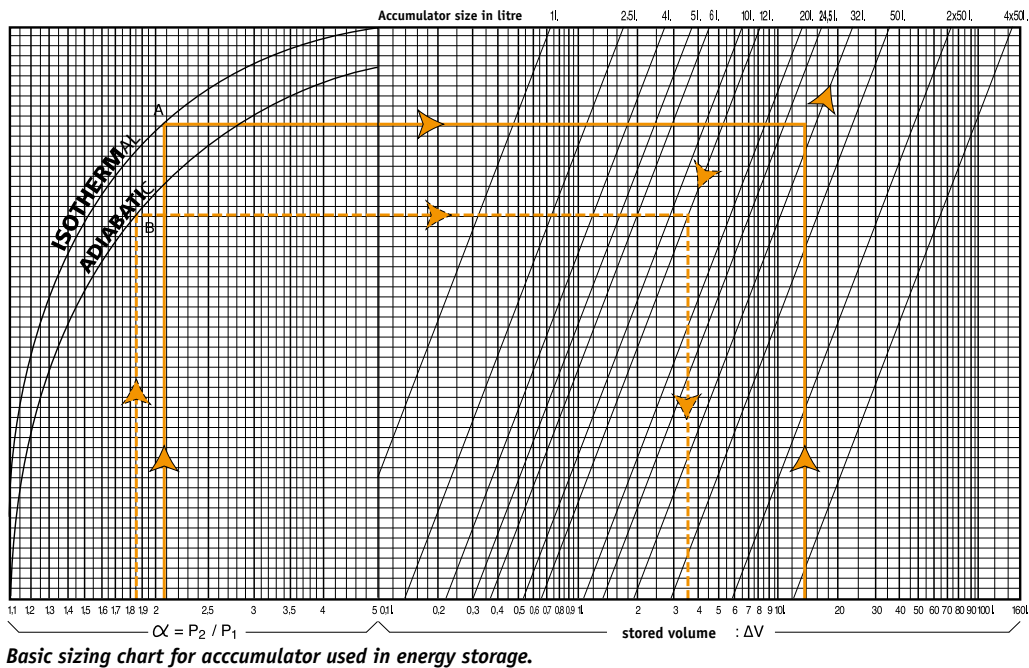
- Shell material options include alloyed steel, stainless steel, aluminium, titanium and composites.
- Various bladder materials available which are compatible with a range of fluids and temperatures.
- Anti-extrusion system; fluidport assembly for high pressure.

Taking into account the different needs of various applications, Olaer offers different protections external and/or internal: Bare metal, nickel plating, epoxy paint, PTFE, Rilsan® and phenolic coating.

This extensive range enables us to offer accumulators operating from – 50 to +150°C with pressures of up to 690 Bar and capacities of up to 57 litres.

As the market leader in bladder type accumulators, Olaer has participated in the development of the EN 14359:2006 standard, which specifies the material, design, manufacturing, tests, safety devices and documentation (including the instruction manual), for pressure accumulators and gas bottles for hydraulic applications.

# How to size?



Olaer has developed very sophisticated simulation software to optimize accumulator sizing recommendations. The behaviour of accumulators used in applications such as pulsation dampening, surge alleviation, thermal expansion and energy storage can be simulated. Our software is available on CD-Rom and can be downloaded from our website. You may also contact your local Olaer office for sizing assistance.



The above graph is useful to estimate the size of an accumulator used to store or deliver a specific volume of liquid within a given pressure range. These curves are the graphic representation of an adiabatic cycle (fast cycling rate -  $N = 1.4$  perfect gas assumption) or isothermal cycle for an accumulator working at 20°C with a precharge  $P_0 = 0,9 P_1$ .

They do not take into consideration the real gas compression correction factor, the real adiabatic coefficient and the polytropic rate of the application. Depending on the application data, the influence of these factors may be significant, and require that some calculations adjustments be made. The Olaer simulation software takes all these factors into account.

**Sizing of an accumulator** to be installed in the following example conditions:

$P_2$  : Maximum available pressure : 210 Bar  
 $P_1$  : Minimum working pressure : 100 Bar

$P_0$  : Nitrogen precharge : 90 Bar

$\Delta V$  : Volume to be stored : 14L

Condition : Isothermal (No temperature variation)

**A/Compression ratio  $\alpha = P_2/P_1 = 210/100 = 2,1$**

**B/From the value 2,1** on the  $\alpha$  axis, draw a vertical line that intersects the isothermal reference curve in A.  
**C/From the value 14** on the  $\Delta V$  axis, draw a vertical line. The intersection point of this line with the horizontal line meeting A indicates a required accumulator size of 32 L.

**Calculation of the volume drawn off from an accumulator.**

Accumulator size = 12 L

$P_2 = 185$  Bar;  $P_1 = 100$  Bar;

$P_0 = 90$  Bar; Adiabatic condition

$\alpha = P_2/P_1 = 185/100 = 1,85$

$\Delta V$  : 3,5 litres

## \*Reminder

**Isothermal:** The transformation is said to be isothermal when the compression or expansion of the gas occurs at a rate slow enough to allow a good thermal exchange, allowing the gas to remain at constant temperature.

**Adiabatic:** The transformation is said to be adiabatic when the cycle is quick and does not allow a temperature exchange with the ambient media.

# Technical Characteristics

## EHV RANGE FROM 0.2 TO 10 LITRES

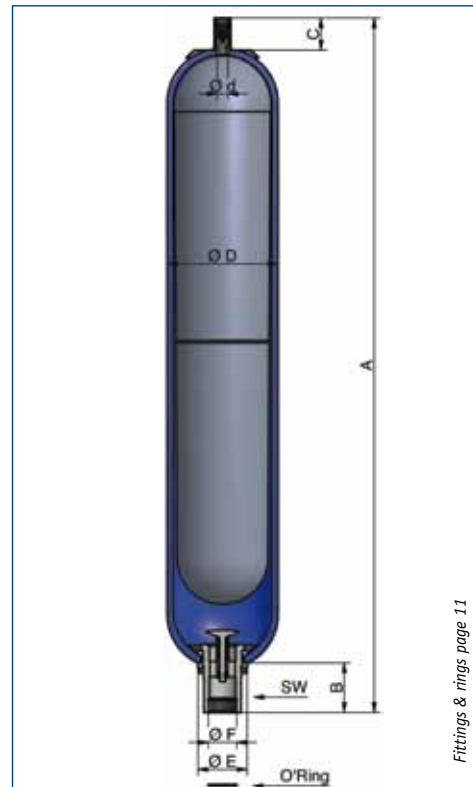
### Range 350 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	O-ring + anti-extrusion ring	Support bracket	Fixation assembly	Dimensions in mm							
									A max height	B	C	øD max	ød	øE	F connection	SW <sub>1</sub> on flats
EHV 0,2 - 350/90	0.17	350	120	2.1	A 56x1	consult page 11	-	-	266	38	29	58	16	38	G 1/2"	24
EHV 0,5 - 350/90	0.60	350	240	2.5	E 95x1		-	-	258	54	28	91	16	50	G 3/4"	32
EHV 1 - 350/90	1	350	240	6	E 114x1		CE 89	EF4	328	54	66	115	22.5	50	G 3/4"	32
EHV 1,6 - 350/90	1.6	350	240	8	E 114x1		CE 89	EF4	396	54	27	115	16	50	G 3/4"	32
EHV 2,5 - 350/90	2.4	350	450	11	E 114x2		CE 89	EF4	548	66	66	115	22.5	68	G 1 1/4"	50
EHV 4 - 350/90	3.7	350	450	15	E 168x1		CE 108	EF1	433	65	66	170	22.5	68	G 1 1/4"	50
EHV 5 - 350/90	5	350	450	19	E 114x2		CE 89	EF4	897	66	66	115	22.5	68	G 1 1/4"	50
EHV 6 - 350/90	6	350	450	20	E 168x1		CE 108	EF1	559	65	66	170	22.5	68	G 1 1/4"	50
EHV 10 - 350/90	10	350	450	31	E 168x2		CE 108	EF1	824	65	66	170	22.5	68	G 1 1/4"	50

### Range 690 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	O-ring + anti-extrusion ring	Support bracket	Fixation assembly	Dimensions in mm							
									A max height	B	C	øD max	ød	øE	F connection*	SW <sub>1</sub> on flats
EHV 1 - 690/90	1.1	690	360	8,6	E 114x1	consult page 11	CE 89	EF4	376	68	69	122	22.5	68	G 1"	45
EHV 2,5 - 690/90	2.4	690	360	15	E 114x2		CE 89	EF4	551	68	69	122	22.5	68	G 1"	45
EHV 5 - 690/90	5	690	360	29	E 114x2		CE 89	EF4	900	68	69	122	22.5	68	G 1"	45

\* Requires a special adapter



Fittings & rings page 11

Above dimensions are in mm and are subject to manufacturing tolerances.

## EHV RANGE FROM 10 TO 50 LITRES

### Range 330 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	O-ring + anti-extrusion ring	Support bracket	Fixation assembly	Dimensions in mm							
									A max height	B	C	øD max	ød	øE	F connection	SW <sub>1</sub> on flats
EHV 10 - 330/90	9.2	330	900	39	D 226x2	consult page 11	CE 159A	EF2	585	103	66	226	22.5	101	G 2"	70
EHV 12 - 330/90	11	330	900	48	D 226x2		CE 159A	EF2	685	103	66	226	22.5	101	G 2"	70
EHV 20 - 330/90	17.8	330	900	63	D 226x2		CE 159A	EF2	895	103	66	226	22.5	101	G 2"	70
EHV 24.5 - 330/90	22.5	330	900	74	D 226x2		CE 159A	EF2	1030	103	66	226	22.5	101	G 2"	70
EHV 32 - 330/90	32	330	900	103	D 226x2		CE 159A	EF3	1420	103	66	226	22.5	101	G 2"	70
EHV 50 - 330/90	48.5	330	900	142	D 226x2		CE 159A	EF3	1934	103	66	226	22.5	101	G 2"	70

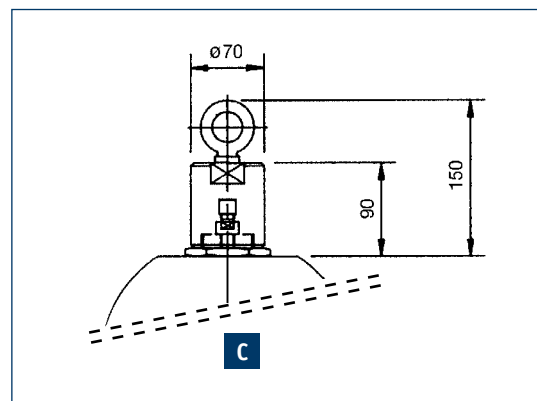
### Range 480 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	O-ring + anti-extrusion ring	Support bracket	Fixation assembly	Dimensions in mm							
									A max height	B	C	øD max	ød	øE	F connection	SW <sub>1</sub> on flats
EHV 10 - 480/90	9.2	480	900	40	D 226x2	consult page 11	CE 159A	EF2	592	103	74	228	22.5	101	G 2"	70
EHV 12 - 480/90	11	480	900	48	D 226x2		CE 159A	EF2	692	103	74	228	22.5	101	G 2"	70
EHV 20 - 480/90	17.8	480	900	66	D 226x2		CE 159A	EF2	902	103	74	228	22.5	101	G 2"	70
EHV 32 - 480/90	32	480	900	109	D 226x2		CE 159A	EF3	1427	103	74	228	22.5	101	G 2"	70
EHV 50 - 480/90	48.5	480	900	150	D 226x2		CE 159A	EF3	1965	103	97	228	50.8	101	G 2"	70

### Range 690 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Clamps x (quantity)	O-ring + anti-extrusion ring	Support bracket	Dimensions in mm							
							A max height	B	C included ring	øD max	ød	øE	F connection *	SW <sub>1</sub> on flats
EHV 12 - 690/90	11	690	900	11060x2	consult page 11	11061	755	100	169	262	50	110	2"	77
EHV 20 - 690/90	16.5	690	900	11060x2		11061	965	100	169	262	50	110	2"	77
EHV 37 - 690/90	33.4	690	900	11060x2		11061	1490	100	169	262	50	110	2"	77
EHV 54 - 690/90	48	690	900	11060x2		11061	2004	100	169	262	50	110	2"	77

\* Requires a special adapter



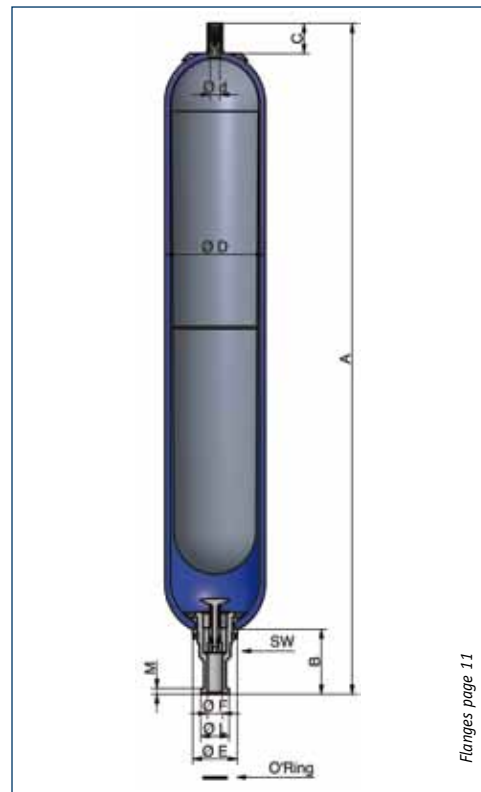
Above dimensions are in mm and are subject to manufacturing tolerances.

# Technical Characteristics

## EHVF RANGE FROM 2.5 TO 10 LITRES FLANGED

### Range 350 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	Connection (norme NFE 48055)	Support bracket	Fixation assembly	Kit of flange (page 11)	Dimensions in mm									
										A max height	B	C	øD max	ød	øE	øF	SW <sub>1</sub> on flats	øL	M
EHVF 2,5 - 350/90	2.4	350	450	11	E 114x2	PN 400DN 25 or 1" SAE 6000 PSI	CE 89	EF4	BR 400-25	593	111	66	115	22.5	68	22	50	47.9	9.5
EHVF 4 - 350/90	3.7	350	450	15	E 168x2		CE 108	EF1	BR 400-25	478	110	66	170	22.5	68	22	50	47.9	9.5
EHVF 5 - 350/90	5	350	450	19	E 114x2		CE 89	EF4	BR 400-25	942	111	66	115	22.5	68	22	50	47.9	9.5
EHVF 6 - 350/90	6	350	450	20	E 168x2		CE 108	EF1	BR 400-25	604	110	66	170	22.5	68	22	50	47.9	9.5
EHVF 10 - 350/90	10	350	450	31	E 168x2		CE 108	EF1	BR 400-25	869	110	66	170	22.5	68	22	50	47.9	9.5



Above dimensions are in mm and are subject to manufacturing tolerances.

## EHVF RANGE FROM 10 TO 50 LITRES FLANGED

### Range 250 bar

Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	Connection (norme NFE 48055)	Support bracket	Fixation assembly	Kit of flange (page 11)	Dimensions in mm									
										A max height	B	C	øD max	ød	øE	øF	SW <sub>1</sub> on flats	øL	M
EHVF 10 - 250/90	9.2	250	900	39	D 226x2	PN 250DN 51 or 2" SAE 3000 PSI	CE 159A	EF2	BR 250-51	600	118	66	226	22.5	101	47	70	71.4	9.5
EHVF 12 - 250/90	11	250	900	48	D 226x2		CE 159A	EF2	BR 250-51	700	118	66	226	22.5	101	47	70	71.4	9.5
EHVF 20 - 250/90	17.8	250	900	63	D 226x2		CE 159A	EF2	BR 250-51	910	118	66	226	22.5	101	47	70	71.4	9.5
EHVF 24.5 - 250/90	22.5	250	900	74	D 226x2		CE 159A	EF2	BR 250-51	1045	118	66	226	22.5	101	47	70	71.4	9.5
EHVF 32 - 250/90	32	250	900	103	D 226x2		CE 159A	EF3	BR 250-51	1435	118	66	226	22.5	101	47	70	71.4	9.5
EHVF 50 - 250/90	48.5	250	900	142	D 226x2		CE 159A	EF3	BR 250-51	1949	118	66	226	22.5	101	47	70	71.4	9.5

### Range 330 bar

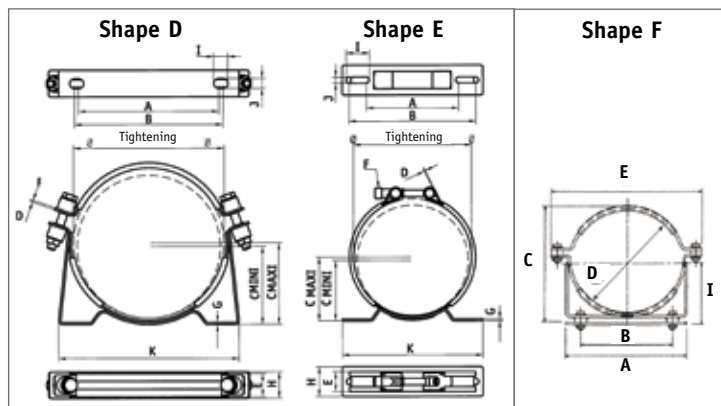
Type	Effective Gas vol. Litres	Work pressure bar	Max Flow Rate lt/min	Max Weight in Kg	Clamps x (quantity)	Connection (norme NFE 48055)	Support bracket	Fixation assembly	Kit of flange (page 11)	Dimensions in mm									
										A max height	B	C	øD max	ød	øE	øF	SW <sub>1</sub> on flats	øL	M
EHVF 10 - 330/90	9.2	330	900	39	D 226x2	PN 400DN 38 or 1 1/2" SAE 6000 PSI	CE 159A	EF2	BR 400-38	625	143	66	226	22.5	101	34	70	63.8	12.5
EHVF 12 - 330/90	11	330	900	48	D 226x2		CE 159A	EF2	BR 400-38	725	143	66	226	22.5	101	34	70	63.8	12.5
EHVF 20 - 330/90	17.8	330	900	63	D 226x2		CE 159A	EF2	BR 400-38	935	143	66	226	22.5	101	34	70	63.8	12.5
EHVF 24.5 - 330/90	22.5	330	900	74	D 226x2		CE 159A	EF2	BR 400-38	1070	143	66	226	22.5	101	34	70	63.8	12.5
EHVF 32 - 330/90	32	330	900	103	D 226x2		CE 159A	EF3	BR 400-38	1460	143	66	226	22.5	101	34	70	63.8	12.5
EHVF 50 - 330/90	48.5	330	900	142	D 226x2		CE 159A	EF3	BR 400-38	1974	143	66	226	22.5	101	34	70	63.8	12.5

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# Accessories

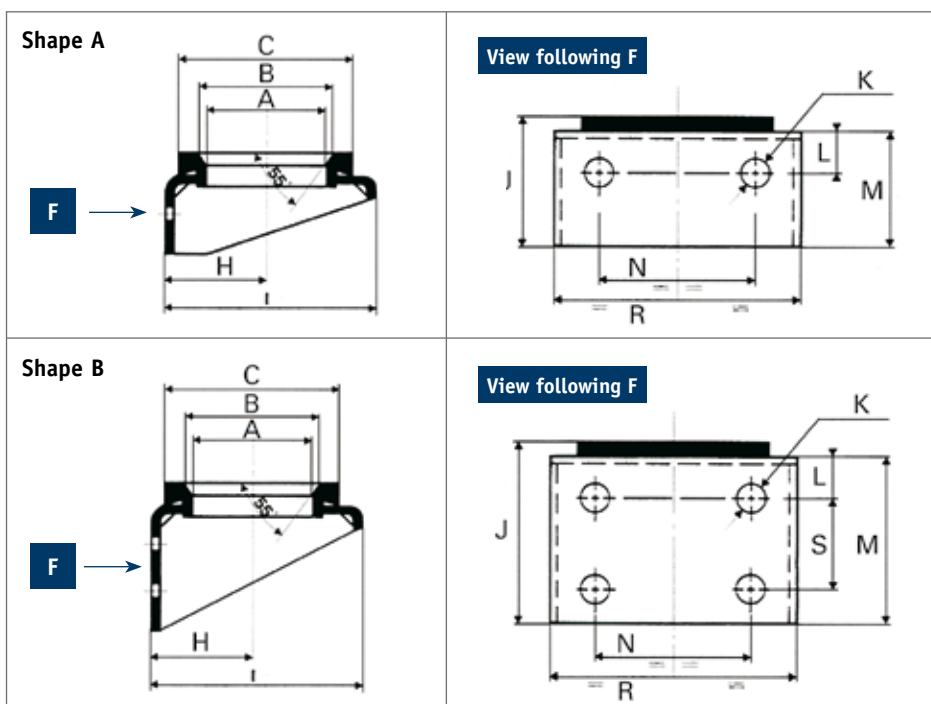
## CLAMPS

Type	Form	Recommended min/max diameter	Dimensions in mm											Recommended tightening torque N.m.	
			A	B	C		D	E	F	G	H	I	J		K
					Min	Max									
A 56	E	54/56	92	102	36	36	3	37	M10x80	3	31	14	9	134	7
E 95	E	87/97	88	140	61.5	66.5	1.5	28	M8x75	3	40	35	9	155	7
E 114	E	112/124	88	140	73	78	1.5	28	M8x75	3	40	35	9	155	7
E 168	E	166/176	137	189	92	96	1.7	30	M10x80	3	45	35	9	210	10.5
D226	D	219/226	210	222	119	122.5	3	35	M12x80	3	40	21	15	270	11
F260	F	260	260	195	263	-	260	295	-	-	-	-	-	295	-



## SUPPORT BRACKETS

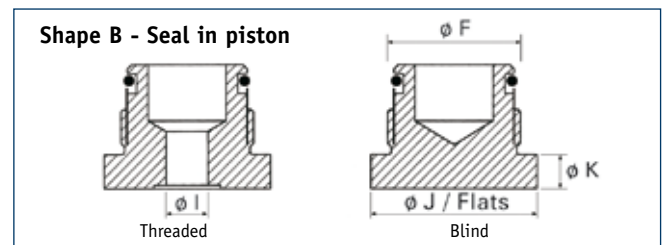
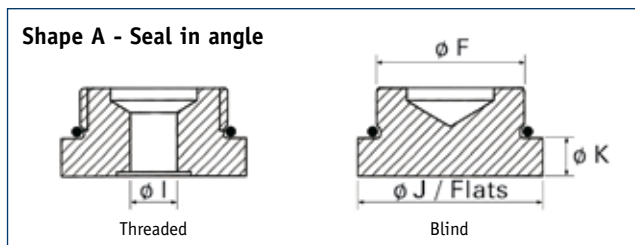
Type	Shape	A	B	C	H	I	J	K	L	M	N	R	S	Weight
CE 89	A	89	101	125	73	140	75	13	25	60	75	130	-	0.8
CE 108	A	108	120	150	92	175	95	17	25	80	160	210	-	1.5
CE 159A	B	159	170	200	123	235	115	17	25	100	200	260	40	2.5
CE 11061	B	-	-	-	137	250	206	17	45	191	108	216	111	6



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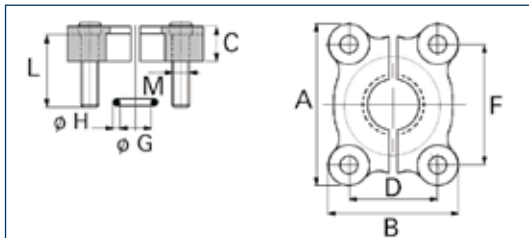
## FITTINGS EHV

Accumulator model	Connection of accumulator $\phi$ F gas cyl.	Connection of fitting $\phi$ I gas cyl.	Shape	J/Flats	K	O-Ring & Back-up ring
EHV 0.5 & 1 & 1.6 Liters 350 Bar	3/4"	3/8"	A	-	8	O-Ring 21.3 x 2.4
		Blind	A	32		
EHV 2.5 to 10 Liters 350 Bar	1 1/4"	3/4"	A	50	10	O-Ring 36.2 x 3
		Blind	A			
EHV 0.2 Liter 350 Bar	1/2"	1/4"	A	27	8	O-Ring 18 x 2
		Blind	A			
EHV 1 to 5 Liters 690 Bar	1"	1/2"	B	41	10	O-Ring 21.3 x 3.6 BU R 22 x 28 x 2.69*2
		Blind	B			
EHV 10 to 50 Liters 330/480 Bar	2"	1"	A	65	13	O-Ring 54 x 3
		Blind	A			
EHV 10 to 50 Liters 690 Bar	2"	1"	B	65	15	O-Ring 43.82 X 5.33 BU R 45 x 54 x 0.85
		Blind	B			



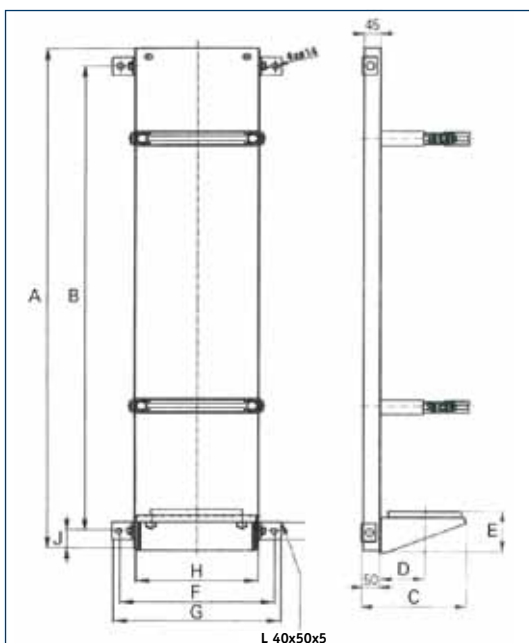
These accessories are designed to perfectly fit OLAER accumulators. They meet the latest regulations and are compliant with the CETOP standard.

## FLANGES KITS EHV



Type	A	B	C	D	F	$\phi$ G	$\phi$ H	L	M
BR 250-51	102	97	16	42.9	77.75	56.74	3.53	35	M14
BR 400-25	81	70	24	27.75	57.15	32.92	3.53	40	M12
BR 400-38	113	95	30	36.5	79.4	47.22	3.53	50	M16

## FIXATION MOUNTING FRAMES



Type	A	B	C	D	E	F	G	H	J
EF1	670	570	225	92	96	340	370	270	50
EF2	670	570	285	123	115	340	370	270	50
EF3	1405	1300	285	123	115	340	370	270	55
EF4	750	600	190	73	85	208	238	138	50

### Installed accumulator rack

Olaer design and manufactures modulare compact assemblies. For any request, please refer to Olaer technical services.



Above dimensions are in mm and are subject to manufacturing tolerances.

# Accessories

Charging sets are used to inflate, check, top-up or vent the nitrogen gas precharge in all accumulators. They are to be screwed to the gas valve or bladder stem and connected to the gas regulator that fits the Nitrogen bottles. They are supplied in a plastic case.

## MODEL VG3

For OLAER accumulators.

The standard set is delivered in a storage case containing the following:

- VG3 tester and pressurizer
- Pressure gauge kit from 0 to 250 bar
- 3 connection adapters for inflation valves (7/8"-14 UNF/5/8"-18 UNF/8 V1)
- High pressure hose, 2 m long, for connecting to a nitrogen source. The flexible tube is fitted with a female connector at both ends (60° BSP 1/4" connector for connection to the pressurizing port and connector dia 21,7 x 1,814 SI) with gasket for connection to a pressure source (commercial nitrogen cylinder, portable nitrogen station, superpressurizer, etc.).



### Note:

The following options are available on request: Pressure gauge kits with different scale divisions. Scale divisions 0-6, 0-10, 0-60, 0-100, 0-160, 0-250, 0-400.

High pressure hose TS2 for maximum pressure 400 Bar.

**Ordering code** - Example: VG3 250 1 TS2 1

250 = Gauges, possible choice between pressure ranges

6/10/25/60/100/160/250/400

TS2 = Flexible hose for maximum working pressure 400 Bar

## MODEL VGU

Universal charging set fits most of the hydraulic accumulators available on the market.

Maximum working pressure: limited by the maximum operating pressure of the installed pressure limited to 400 bar in any case.

The standard set is delivered in a storage case containing the following:

VGU universal tester and pressurizer (end M28x1.50)

- Pressure gauge kit from 0 to 25 bar
- Pressure gauge kit from 0 to 250 bar
- Connection adapters for inflation valves (7/8" – 5/8" – 8V1 - M28x1.50)
- High pressure hose, 2.5 m long, for connecting to a nitrogen source
- Hexagon socket screw key 6mm
- Seal Kit
- Operating instruction in French, English, German

### Note:

The following options are available on request: Pressure gauge kits with different scale divisions: 63mm with glycerol filled back end G1/4" cyl. equipped with coupling for Minimes connection. Scale divisions 0-10, 0-60, 0-100, 0-400, with accuracy class 1.6%.

High pressure hose of different length with adapters for nitrogen bottles from various countries (specify country), at each end with a female swivel coupling G1/4" for connecting to the inflation port

**Ordering code** - Example: VGU/F 25/250 7 TS2 3

25/250 = Gauges, possible choice between pressure ranges 6/10/25/60/100/160/250/400



## SAFETY BLOCKS

Are designed to incorporate in a single compact block a variety of functions necessary for the correct operation of a hydraulic system fitted with accumulators. This includes manual and/or electrical drain, isolation, flow control and pressure relief.

Channel cross section : 10 mm (DI 10 block), 16 mm (DI 16 block), 20 mm (DI 20 block), 24 mm (DI 24 block), 32 mm (DI 32 block).  
Maximum working pressure : 330 to 690 Bar depending on models.  
According with the fluids of group 2 (PED). Options for ATEX compliant blocks construction carbon steel or stainless steel.



A specific data sheet is available on request, please contact OLAER.

# How to order?

## ORDERING AN ACCUMULATOR

**EHV 50 - 330/90 01125 Po=90b G1" cyl.**

### Accumulator Range

EHV : European High pressure bladder  
EHVF : European High pressure bladder Flanged

### Volume

in liters

### Maximum working pressure

in Bar

### Regulation code

90 : regulation EC

### Construction

to be specified as per following recommendations table

Fluid	Working Temperature °C*	Construction
Mineral oils	-15 + 80	01125*
Water	0 + 50	01025
Water	0 + 80	01225
Ester phosphate	- 15 + 80	01140
Other fluids	Other temperatures	Please contact Olaer

\* standard construction

### Nitrogen gas precharge

in Bar at 20 °C (please refer to the predetermination curves table on page 5 or consult OLAER technical departments)

### Adaptor to be specified

blind: with blank adaptor or without adaptor (refer to dimension I in table on page 11 and specify reduction size).

## ORDERING AN ACCUMULATOR

Please indicate type for accessories as per tables on page 6 to 9, and for peripheral materials as per table on pages 10 and 11.

# Installation

**Position:** Preferably vertical (liquid connection downwards) to horizontal, depending upon application. If the accumulator is installed in any position other than vertical with fluid port down, contact Olaer. The accumulator could have reduced volumetric efficiency and Olaer can help you to take these factors into account.

**Mounting:** A 200mm clearance is required above the accumulator to allow for gas charging. Each accumulator is delivered with a user instructions leaflet. Ensure that the pipes connected directly or indirectly to the accumulator are not subjected to any abnormal force, Ensure that the accumulator cannot move, or minimize any movement that may occur as a result of broken connections. Olaer clamps and brackets are designed for this purpose (and can be supplied as optional extras). The accumulator must not be subjected to any stress or load, in particular from the structure with which it is associated. Contact Olaer in case of mounting on the movable structures.

## IT IS STRICTLY FORBIDDEN TO

- Weld, screw or rivet anything onto the accumulator body.
- Operate in any way that may alter the mechanical properties of the accumulator.
- Use the accumulator for construction purposes. (No stress or loading)
- To modify the accumulator without prior approval from the manufacturer.

## GAS FILLING

For safety reasons, use only pure nitrogen, minimum 99.8% volume. In most of the cases the pre-charge pressure is between 0,9 P1 and 0,25 P2. Your local Olaer office can calculate the correct pre-charge pressure for your application. Olaer offers a range of devices for checking nitrogen pressure as well as pre-charging accumulators. *Please note that various adaptors are required to interface with different accumulator filling valves and nitrogen (N2) cylinder connections throughout the world.*

The part number defines the accumulator and the material construction. Information contained on the labeling/manufacturer's plate:

- Olaer logo
- Product description
- Date or year of manufacture
- Reference information of the accumulator
- Allowable temperature range of the accumulator

Additional information on certain models:

- Warning messages and safety instructions ("Danger", "Use nitrogen only" or similar message)
- Maximum inflation pressure P0 max in bar
- Allowable pressure amplitude P max in bar
- Fluid group (1 or 2 according to the Directive 97/23/EC)
- Total dry mass in kilogram

## Maximum allowable operating pressure

The maximum pressure (PS) is indicated on the accumulator. Check that the maximum allowable pressure is greater than that of the hydraulic system. For any other pressure, you will have to contact Olaer.

## Maximum allowable operating temperature

The temperature range (TS) is indicated on the accumulator. Check that the allowable temperature range covers the operating temperatures (environment and hydraulic fluid temperatures). For any other temperature, you will have to contact Olaer.

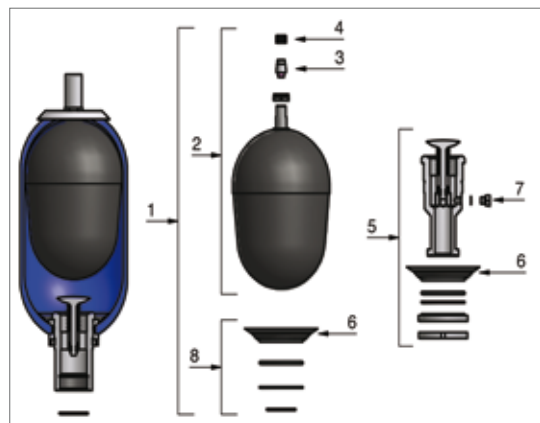
## Maintenance

Any intervention, maintenance, repair must be carried out by a qualified and trained personnel.

Item	Spare parts
1	Bladder kit
2*	Bladder assembly
3*	Gas valve assembly
4	Gas valve cap
5	Fluid port assembly
6*	Anti extrusion ring
7*	Drain plug with seal <sup>(1)</sup>
8*	Seal kit

<sup>(1)</sup> For accumulators 10 to 50 liters before May 2009

\* These parts are supplied as a kit with instructions.



## HOW TO ORDER THE BLADDER KIT

Example: For an accumulator EHV 50-330/90 01125  
**KIT EHV 50-330/90 01125**

# EC Regulation

The Regulation 97/23/CE has been applicable since 29/11/99 on a voluntary base, and has been mandatory since 29/05/2002.

EC type accumulators are delivered with instructions for operation and a declaration of conformity. Olaer designs and manufactures hydro-pneumatic accumulators for use in all countries and which comply with national regulations in force as ASME / selo...

## WHAT YOU NEED TO KNOW

Directive 97/23/ EC is applicable from 29-11-1999 and mandatory from 29-05-2002.

Decree 99-1046, which applies to new machinery and the ministerial order of 15-03-2000, which applies to the operation of all machinery, transposed the directive into French domestic legislation.

- Free movement of machinery within the European Union.

- Group 2 fluid accumulators whose  $V \leq 1$  L and  $PS \leq 1000$  bar are not entitled to stamp EC marking.

- The EC marking should be accompanied by the identification number of the notified authority.

The Council Directive of 9 December 1986 (1) on the approximation of the laws, regulations, administrative provisions and directives of the Member States relating to pressure equipment.

Having regard to the Treaty establishing the European Community, and in particular Article 100a thereof,

Having regard to the proposal from the Commission (2),

Having regard to the Opinion of the Economic and Social Committee (3),

Acting in accordance with Article 189b of the Treaty, approved by the Council on 17 April 1997,

1. Whereas the internal market is an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured;
2. Whereas there are differences in the content and scope of the laws, regulations and administrative provisions in force in the Member States with regard to the safety and protection of health of persons and, where appropriate, domestic animals or property, where pressure equipment not covered by present Community legislation is concerned; whereas the certification and inspection procedures for such equipment differ from one Member State to another; whereas such disparities may well constitute barriers to trade within the Community;
3. Whereas the harmonization of national legislation is the only means of removing these barriers to free

(1) OJ No C 246, 9. 9. 1991, p. 1 and OJ No C 207, 27. 7. 1994, p. 1.

(2) OJ No C 32, 19. 2. 1994, p. 10.

(3) Opinion of the European Parliament of 19 April 1994 (OJ No C 128, 9. 5. 1994, p. 61), common position of the Council of 29 March 1994 (OJ No C 147, 21. 5. 1994, p. 1), Decision of the European Parliament of 17 July 1994 (OJ No C 261, 9. 9. 1994, p. 68), Council Decision of 17 April 1997.

whereas, however, the objective cannot be achieved satisfactorily by the individual Member States; whereas the Directive sets legal and technical requirements for the free circulation of the equipment to which it is applicable;

4. Whereas pressure equipment subject to a pressure of not more than 0,3 bar does not pose a significant hazard to persons, property or the environment and is not therefore covered by this Directive; whereas this Directive applies to equipment subject to a maximum allowable pressure (PS) exceeding 0,3 bar;
5. Whereas the scope of this Directive is limited to assemblies consisting of one or more parts of pressure equipment which constitute an integrated and functional whole, whereas these assemblies may range from simple assemblies such as pressure cookers to complex assemblies such as watertube boilers; whereas, if the manufacturer of an assembly intends it to be placed on the market and put into service as an assembly — and not in the form of its constituent non-assembled elements — that assembly must conform to this Directive; whereas, on the other hand, this Directive does not cover the assembly of pressure equipment on the site and under the responsibility of the user, as in the case of industrial installations;
6. Whereas this Directive harmonizes national provisions on hazards due to pressure; whereas the other hazards which this equipment may present accordingly may fall within the scope of other Directives dealing with such hazards; whereas, however, pressure equipment may be included among products covered by other Directives based on Article 100a of the Treaty; whereas the provisions laid down in some of these Directives deal with the hazard due to pressure; whereas those provisions are considered adequate to provide appropriate protection where the hazard due to pressure associated with such equipment remains



- in Fluid Energy Management

# Global perspective

*and local entrepreneurial flair*



Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage. Olaer develops, manufactures and markets products and systems for a number of different sectors, e.g. the aircraft, engineering, steel and mining industries, as well as for sectors such as oil and gas, contracting and transport, farming and forestry, renewable energy, etc.

All over the world, our products operate in the most diverse environments and applications. One constantly

repeated demand in the market is for optimal energy storage and temperature optimisation. We work at a local level with a whole world as our workplace – local entrepreneurial flair and a global perspective go hand in hand.

Our local presence, long experience and a wealth of knowledge combine with our cutting-edge expertise to give you the best possible conditions for making a professional choice.



aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
**hydraulics**  
pneumatics  
process control  
sealing & shielding



# DA Series Diaphragm Accumulators

Previously known as ELM Series



ENGINEERING YOUR SUCCESS.

## Description

Diaphragm accumulators are inexpensive, compact and lightweight and are ideally suited where weight and space is an important consideration. Ideally suited to Mobile -Agricultural and Construction markets (140 to 350 bar/ 0.075 to 3.5L).

The DA diaphragm accumulator offers a reliable and efficient solution for storing energy under pressure and as an hydraulic spring. Utilizing comprehensive tools and resources including an applications database, CAD/CAM we offer an optimized design and performance membrane accumulator. (all hydraulic accumulators are compliant to 2014/68/EU regulation)

DA diaphragm accumulators (also referred to as membrane accumulators) are gas-loaded accumulators in which separation between the liquid and gas sides is achieved by a flexible diaphragm. They have a compact and lightweight design are available in 2 elastomer mixes; Nitrile and Hydrin (for low temperature working conditions) with a maximum pressure of 350bar (up to 2,8 liters) and volume of 3.5 Litres (up to 250 Bar).

DA accumulator range comes with a bonded seal (BS) fluid port with female or male and female fluid connection and M28x1,5 gas connection.

Accumulator accessories such as Safety Blocks, Clamps, Lock nut, Charging Sets (VGU), can aid the safe installation and operation of the accumulators in any hydraulic system.

Parker Olaer have developed very sophisticated simulation software to optimize sizing recommendations for hydraulic accumulators. You can download the accumulator sizing software from [www.Parker.com/acde](http://www.Parker.com/acde).

## Markets

- **Mobile**
- **Industrial**
- **Defense**
- **Energy**
- **Renewable**
- **Marine**
- **Mining**
- **Oil and Gas**
- **Rail**

## Features/Benefits

- **The adaption of a hydraulic shock absorber made up of a diaphragm accumulator improves driver comfort and offers immediate response times when driving over obstacles or rough terrain.**
- **The DA diaphragm accumulator offers a cost effective solution for hydraulic systems.**
- **The DA diaphragm accumulators are PED compliant and can be used in over 35 countries.**
- **The DA diaphragm accumulators offer high compression ratio (up to 8 – according to type)**
- **Low maintenance product**
- **We offer a wealth of product knowledge and experience thus enabling us to provide first class technical support and customer service.**

**E-configurable product**  
visit [Parker.com/acde](http://Parker.com/acde)

## Applications

- **Agricultural equipment**
- **Construction equipment**
- **Forestry**
- **Handling/Cranes**
- **Truck**
- **Wind Energy**
- **Hydraulic Power Units**
- **Lubrication Systems**
- **Power Generation**
- **Energy Transmission & Distribution**
- **Defence**
- **Air & Gas Compressors**
- **Entertainment Automation**
- **Moulding**
- **Plastic Presses**
- **Die Casting**
- **Vehicle Assembly Facilities**
- **Machine Tools**

# DA Series Technical Characteristics

The technical characteristics are as follows:

**Minimum/maximum temperature allowable (° Celsius) :**

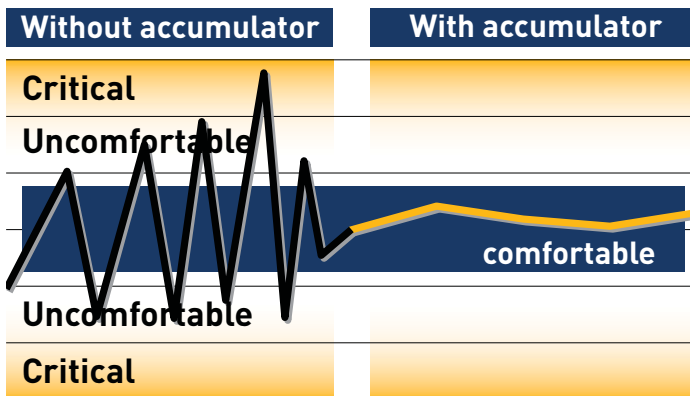
- 20/+80 for standard nitrile elastomers for models between 0.5 < V < 1.4 Litre
- 10/+80 for standard nitrile elastomers for models ≥ 2 Litres and < 0.32 Litre
- 35/+80 for hydrin elastomers

**Materials :** carbon steel or stainless steel, nitrile or hydrin diaphragm, for other constructions: please consult Parker.

This non-repairable accumulator comprises a shell electron beam welded in carbon steel or stainless steel, nitrile or hydrin diaphragm, for other constructions please consult Parker Olaer.



**Comparative cycle** for a tractor and its accessories in working conditions !



# DA Series: How to order a diaphragm accumulator

**DA - 140 - 140 90 A F 11 25 P000**

**Product Type**

DA Diaphragm Accumulators

**Volume**

007 0,075L  
 016 0.16L  
 032 0.32L  
 050 0.5L  
 075 0.75L  
 100 1L  
 140 1.4L  
 200 2L  
 280 2.8L  
 350 3.5L

**Working Pressure**

100 100 bar  
 140 140 bar  
 210 210 bar  
 250 250 bar  
 350 350 bar

**Approval**

00 PED 2014/68/EU Art. 4.3  
 90 EC (according to PED 2014/68/EU)

**Fluid connection**

A G 1/2"  
 B G 3/4"  
 C G 1/2" + External thread M33x1,5  
 D G 3/4" + External thread M45x1,5

**Gas connection**

F M28x1,5

**Construction**

11 Carbon steel shell

**Membrane rubber compound**

25 NBR  
 02 ECO

**Precharge**

000 No-precharge  
 XXX 005 to 130bar (Step 5 by 5)



# DA Series 140 - 350 BAR, 0.075 to 0.75 Litres

**NBR rubber mix (previous known as ELM range)**

Standard Version (Carbon steel /mix NBR) compatible with mineral oils (2)

According to PED 2014/68/EU

Product, Part numbers, Accessories

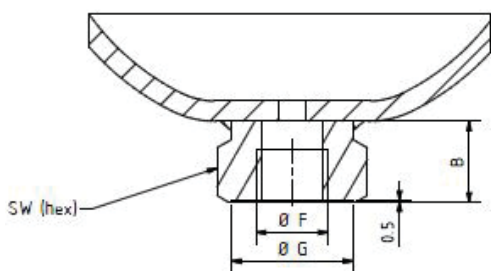
**E-configurable product**  
 visit [Parker.com/acde](http://Parker.com/acde)

Type Part number	Clamps Model (quantity) Part number	Lock nut Model (quantity) Part number	Cross Reference OLAER	Cross Reference ADE
DA-0.075L-250BAR-10849201125 DA-007-25000AF1125PXXX*	-	-	ELM 0.075-250/00/AF* 10849201125	ADE007-25R1A2
DA-0.16L-250BAR-10849301125 DA-016-25000AF1125PXXX*	-	-	ELM 0.16-250/00/AF* 10849301125	ADE016-25R1A2
DA-0.32L-210BAR-10986601125 DA-032-21000AF1125PXXX*	E95 (1) 20250803648	-	ELM 0.32-210/00/AF* 10986601125	ADE032-21R1A2
DA-0.50L-210BAR-10849501125 DA-050-21000AF1125PXXX*	E106 (1) 20250903648	-	ELM 0.5-210/00/AF* 10849501125	ADE050-21R1A2
DA-0.50L-210BAR-10849601125 DA-050-21000CF1125PXXX*	E106 (1) 20250903648	M33x1.5 10945700100	ELM 0.5-210/00/CF* 10849601125	
DA-0.75L-210BAR-10849701125 DA-075-21000AF1125PXXX*	E114 (1) 20251003648	-	ELM 0.75-210/00/AF* 10849701125	ADE075-21R1A2
DA-0.75L-210BAR-10849801125 DA-075-21000CF1125PXXX*	E114 (1) 20251003648	M33x1.5 10945700100	ELM 0.75-210/00/CF* 10849801125	
DA-0.75L-350BAR-10931801125 DA-075-35000AF1125PXXX*	E136 (1) 20251103648	-	ELM 0.75-350/00/AF* 10931801125	
DA-0.75L-350BAR-10931901125 DA-075-35000CF1125PXXX*	E136 (1) 20251103648	M33x1.5 10945700100	ELM 0.75-350/00/CF* 10931901125	

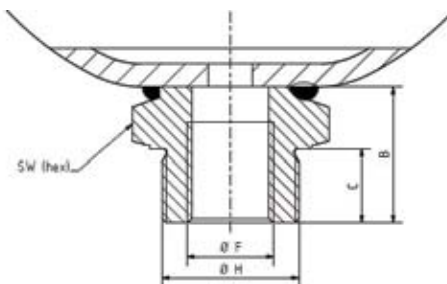
(2) For other fluids consult Parker

\* According to Article 4.3 PED 2014/68/EU

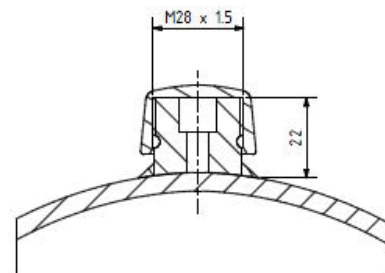
Form A/ Form B



Form C/ Form D

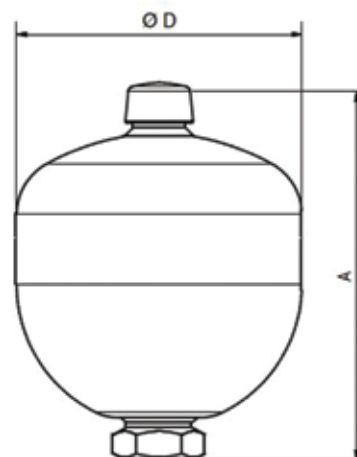
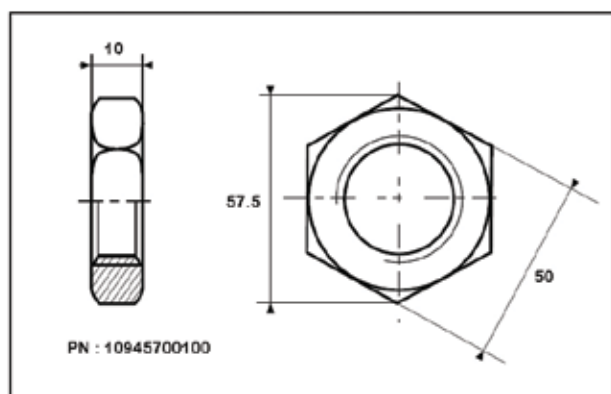


Gas Valve



Type	Effective Gas vol. Litres	Max. Working pressure (PS) bar	Temp. Min/ Max (°C)	Max. Pre-charge bar	Max compression in bar ratio P2/P0	Max Pressure amplitude P2-P1	Weight kg	Dimensions in mm							Oilport	
								A max Height	B	C	SW	D	G	F	H	
DA-0.075L-250BAR-10849201125	0.075	250	-10/+80	130	8	210	0.7	112	20		32	64	29	G½	-	
DA-0.16L-250BAR-10849301125	0.16	250	-10/+80	130	6	210	1	120	20		32	75	29	G½	-	
DA-0.32L-210BAR-10986601125	0.32	210	-10/+80	130	8	140	1.4	135	20		32	92	29	G½	-	
DA-0.50L-210BAR-10849501125	0.5	210	-20/+80	130	8	175	2	153	22		41	107	34	G½	-	
DA-0.50L-210BAR-10849601125	0.5	210	-20/+80	130	8	175	2	164	33	18	41	107	-	G½	M33x1.5	
DA-0.75L-210BAR-10849701125	0.75	210	-20/+80	130	8	175	2.6	167	22		41	122	34	G½	-	
DA-0.75L-210BAR-10849801125	0.75	210	-20/+80	130	8	175	2.6	178	33	18	41	122	-	G½	M33x1.5	
DA-0.75L-350BAR-10931801125	0.75	350	-20/+80	130	8	150	4	174	22		41	128	34	G½	-	
DA-0.75L-350BAR-10931901125	0.75	350	-20/+80	130	8	150	4	185	33	18	41	128	-	G½	M33x1.5	

Lock-nut



# DA Series 140 - 350 BAR, 1 to 1.4 Litres

**NBR rubber mix (previous known as ELM range)**

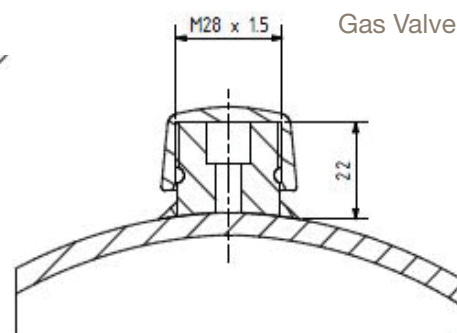
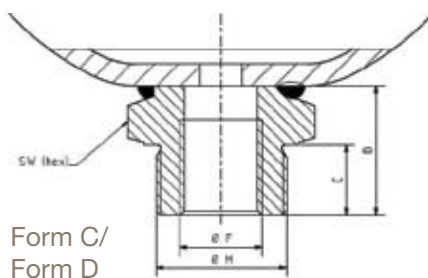
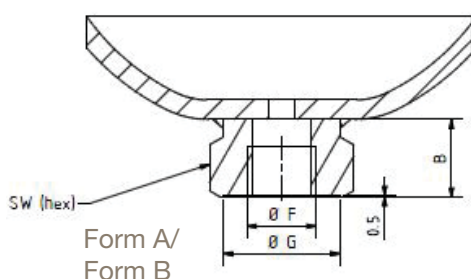
Standard Version (Carbon steel /mix NBR) compatible with mineral oils (2)  
 According to PED 2014/68/EU

**E-configurable product**  
 visit [Parker.com/acde](http://Parker.com/acde)

Type Part number	Clamps Model (quantity) Part number	Lock nut Model (quantity) Part number	Cross Reference OLAER	Cross Reference ADE
DA-1.00L-210BAR-10984701125 DA-100-21000AF1125PXXX*	E136 (1) 20251103648	-	ELM 1-210/00/AF* 10984701125	ADE100-21R1A2
DA-1.00L-210BAR-10984801125 DA-100-21000CF1125PXXX*	E136 (1) 20251103648	M33x1.5 10945700100	ELM 1-210/00/CF* 10984801125	
DA-1.00L-350BAR-11110901125 DA-100-35000AF1125PXXX*	E136 (1) 20251103648	-	ELM 1-350/00/AF* 11110901125	
DA-1.00L-350BAR-11111001125 DA-100-35000CF1125PXXX*	E136 (1) 20251103648	M33x1.5 10945700100	ELM 1-350/00/CF* 1111101125	
DA-1.40L-140BAR-10850201125 DA-140-14090AF1125PXXX	E155 (1) 20251203648	-	ELM 1.4-140/90/AF 10850201125	ADE140-14R1C2
DA-1.40L-140BAR-10850301125 DA-140-14090CF1125PXXX	E155 (1) 20251203648	M33x1.5 10945700100	ELM 1.4-140/90/CF 10850301125	
DA-1.40L-210BAR-10996501125 DA-140-21090AF1125PXXX	E155 (1) 20251203648	-	ELM 1.4-210/90/AF 10996501125	
DA-1.40L-210BAR-10996601125 DA-140-21090CF1125PXXX	E155 (1) 20251203648	M33x1.5 10945700100	ELM 1.4-210/90/CF 10996601125	
DA-1.40L-250BAR-11013201125 DA-140-25090AF1125PXXX	E155 (1) 20251203648	-	ELM 1.4-250/90/AF 11013201125	ADE140-25R1C2
DA-1.40L-250BAR-11013301125 DA-140-25090CF1125PXXX	E155 (1) 20251203648	M33x1.5 10945700100	ELM 1.4-250/90/CF 11013301125	
DA-1.40L-350BAR-10932101125 DA-140-35090AF1125PXXX	E160 (1) 20259003648	-	ELM 1.4-350/90/AF 10932101125	
DA-1.40L-350BAR-10932201125 DA-140-35090CF1125PXXX	E160 (1) 20259003648	M33x1.5 10945700100	ELM 1.4-350/90/CF 10932201125	

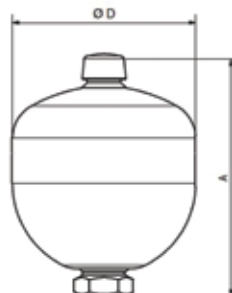
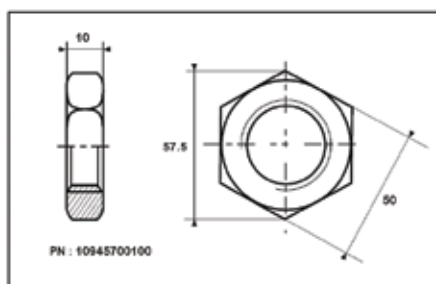
(2) For other fluids consult Parker

\* According to Article 4.3 PED 2014/68/EU



Type	Effective Gas vol. Litres	Max. Working pressure (PS) bar	Temp. Min/Max (°C)	Max. Pre-charge bar	Max compression in bar ratio P2/P0	Max Pressure amplitude P2-P1	Weight kg	Dimensions in mm						Oilport	
								A max Height	B	C	SW	D	G	F	H
DA-1.00L-210BAR-10984701125	1	210	-20/+80	130	8	170	3.5	182	22		41	136	34	G½	-
DA-1.00L-210BAR-10984801125	1	210	-20/+80	130	8	170	3.5	192	33	18	41	136	-	G½	M33x1.5
DA-1.00L-350BAR-11110901125	1	350	-10/+80	130	8	150	5	200	22		41	129	34	G½	-
DA-1.00L-350BAR-1111001125	1	350	-10/+80	130	8	150	5	211	33	18	41	129		G½	M33x2
DA-1.40L-140BAR-10850201125	1.4	140	-20/+80	130	8	120	4.2	192	22		41	147	34	G½	-
DA-1.40L-140BAR-10850301125	1.4	140	-20/+80	130	8	120	4.2	203	33	18	41	147	-	G½	M33x1.5
DA-1.40L-210BAR-10996501125	1.4	210	-20/+80	130	8	120	4.2	192	22		41	148	34	G½	-
DA-1.40L-210BAR-10996601125	1.4	210	-20/+80	130	8	120	4.2	203	33	18	41	148	-	G½	M33x1.5
DA-1.40L-250BAR-11013201125	1.4	250	-20/+80	130	8	140	5.4	196	22		41	152	34	G½	
DA-1.40L-250BAR-11013301125	1.4	250	-20/+80	130	8	140	6	207	33	18	41	152	-	G½	M33x1.5
DA-1.40L-350BAR-10932101125	1.4	350	-20/+80	130	8	150	7	199	22		41	156	34	G½	
DA-1.40L-350BAR-10932201125	1.4	350	-20/+80	130	8	150	7	221	44	18	44	156	-	G½	M33x1.5

Lock-nut



# DA Series 140 - 350 BAR, 2 to 3.5 Litres

**NBR rubber mix (previous known as ELM range)**

Standard Version (Carbon steel /mix NBR) compatible with mineral oils (2)

According to PED 2014/68/EU

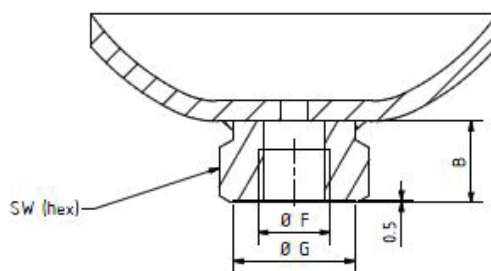
Product, Part numbers, Accessories

**E-configurable product**  
 visit [Parker.com/acde](http://Parker.com/acde)

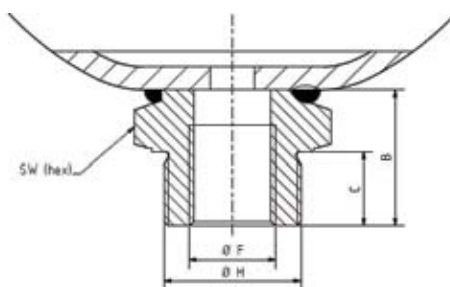
Type Part number	Clamps Model (quantity) Part number	Lock nut Model (quantity) Part number	Cross Reference OLAER	Cross Reference ADE
DA-2.00L-100BAR-10850401125 DA-200-10090AF1125PXXX	E155 (1) 20251203648	-	ELM 2-100/90/AF 10850401125	
DA-2.00L-250BAR-11013401125 DA-200-25090BF1125PXXX	E155 (1) 20251203648	-	ELM 2-250/90/AF 11013401125	
DA-2.00L-350BAR-11006001125 DA-200-35090BF1125PXXX	E160 (1) 20259003648	-	ELM 2-350/90/AF 11006001125	
DA-2.00L-350BAR-11006101125 DA-200-35090DF1125PXXX	E160 (1) 20259003648	M45X1.5	ELM 2-350/90/CF 11006101125	
DA-2.80L-250BAR-10887901125 DA-280-25090BF1125PXXX	E168 (1) 20251303648	-	ELM 2.8-250/90/AF 10887901125	ADE280-25R1C2
DA-2.80L-350BAR-10975801125 DA-280-35090BF1125PXXX	E180 (1) 20243203625	-	ELM 2.8-350/90/AF 10975801125	
DA-2.80L-350BAR-10975901125 DA-280-35090DF1125PXXX	E180 (1) 20243203625	M45X1.5	ELM 2.8-350/90/CF 10975901125	
DA-3.00L-250BAR-10850501125 DA-350-25090BF1125PXXX	E168 (1) 20251303648	-	ELM 3.5-250/90/AF 10850501125	ADE350-25R1C2
MBSP 3,5-350 350-1315-032-711	E180 (1) 20243203625	-	ELM 3.5-350/90/AF 10984901125	
MBSP 3,5-350 350-1315-022-711	E180 (1) 20243203625	M45X1.5	ELM 3.5-350/90/CF 10985001125	

(2) For other fluids consult Parker

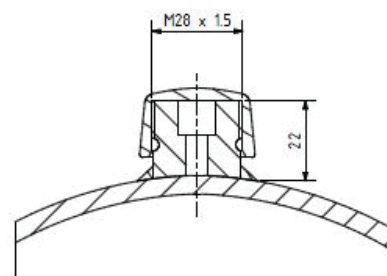
Form A/ Form B



Form C/ Form D

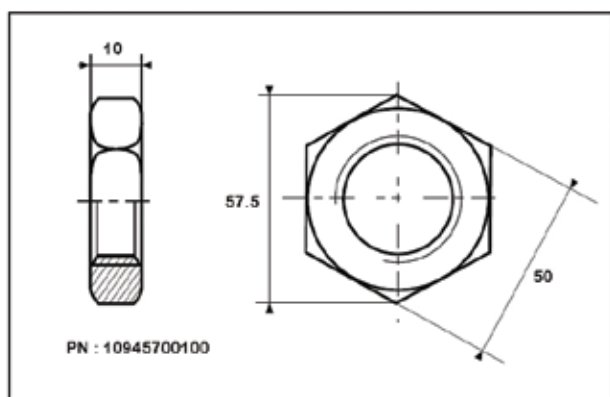


Gas Valve

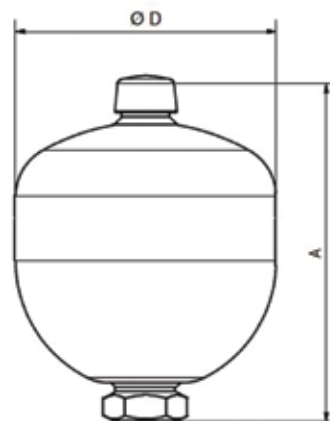


Type Part number	Effective Gas vol. Litres	Max. Working pressure (PS) bar	Temp. Min/ Max (°C)	Max. Pre-charge bar	Max compres- sion in bar ratio P2/P0	Max Pressure amplitude P2-P1	Weight kg	Dimensions in mm						Oilport	
								A max Height	B	C	SW	D	G	F	H
DA-2.00L-100BAR-10850401125	2	100	-10/+80	100	8	80	3.5	241	22		41	145	34	G½	
DA-2.00L-250BAR-11013401125	2	250	-10/+80	130	8	150	9.5	252	22		41	156	33	G3/4	
DA-2.00L-350BAR-11006001125	2	350	-10/+80	130	8	150	9.5	252	22		41	156	33	G3/4	
DA-2.00L-350BAR-11006101125	2	350	-10/+80	130	8	150	9.5	270	40	20	50	156	-	G3/4	M45x1.5
DA-2.80L-250BAR-10887901125	2.8	250	-10/+80	130	6	140	8.5	269	20		41	168	33	G3/4	
DA-2.80L-350BAR-10975801125	2.8	350	-10/+80	130	6	200	14.3	265	23		55	180	34	G3/4	
DA-2.80L-350BAR-10975901125	2.8	350	-10/+80	130	6	200	14.5	286	21	20	55	180	-	G3/4	M45x1.5
DA-3.00L-250BAR-10850501125	3.5	250	-10/+80	130	4	100	10.2	314	20		41	168	33	G3/4	
MBSP 3,5-350	3.5	350	-10/+80	130	4	200	16	305	23		55	180	34	G3/4	
MBSP 3,5-350	3.5	350	-10/+80	130	4	200	16.5	326	26	20	55	180	-	G3/4	M45x1.5

Lock-nut



Above



# DA Series 140 - 350 BAR, 0.075 to 0.75 Litres

**ECO rubber mix (previous known as ELM range)**

Standard Version (Carbon steel /mix **ECO**) compatible with mineral oils (2)  
 According to PED 2014/68/EU.

**E-configurable product**  
 visit [Parker.com/acde](http://Parker.com/acde)

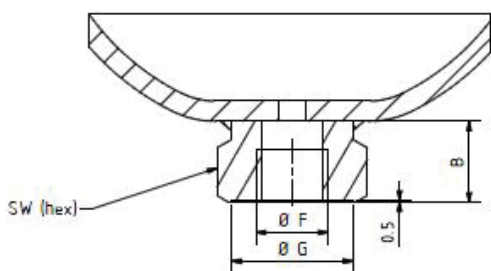
*Product, Part numbers, Accessories*

Type Part number	Clamps Model (quantity) Part number	Lock nut Model (quantity) Part number	Cross Reference OLAER	Cross Reference ADE
DA-0.075L-250BAR-10849201102 DA-007-25000AF1102PXXX*	-	-	ELM 0.075-250/00/AF* 10849201102	ADE007-25R9A2
DA-0.16L-250BAR-10849301102 DA-016-25000AF1102PXXX*	-	-	ELM 0.16-250/00/AF* 10849301102	ADE016-25R9A2
DA-0.32L-210BAR-10986601102 DA-032-21000AF1102PXXX*	E95 (1) 20250803648	-	ELM 0.32-210/00/AF* 10986601102	ADE032-21R9A2
DA-0.50L-210BAR-10849501102 DA-050-21000AF1102PXXX*	E106 (1) 20250903648	-	ELM 0.5-210/00/AF* 10849501102	ADE050-21R9A2
DA-0.50L-210BAR-10849601102 DA-050-21000CF1102PXXX*	E106 (1) 20250903648	M33x1.5 10945700100	ELM 0.5-210/00/CF* 10849601102	
DA-0.75L-210BAR-10849701102 DA-075-21000AF1102PXXX*	E114 (1) 20251003648	-	ELM 0.75-210/00/AF* 10849701102	ADE075-21R9A2
DA-0.75L-210BAR-10849801102 DA-075-21000CF1102PXXX*	E114 (1) 20251003648	M33x1.5 10945700100	ELM 0.75-210/00/CF* 10849801102	
DA-0.75L-350BAR-10931801102 DA-075-35000AF1102PXXX*	E136 (1) 20251103648	-	ELM 0.75-350/00/AF* 10931801102	
DA-0.75L-350BAR-10931901102 DA-075-35000CF1102PXXX*	E136 (1) 20251103648	M33x1.5 10945700100	ELM 0.75-350/00/CF* 10931901102	

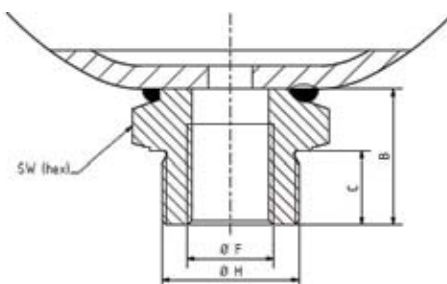
(2) For other fluids consult Parker

\* According to Article 4.3 PED 2014/68/EU

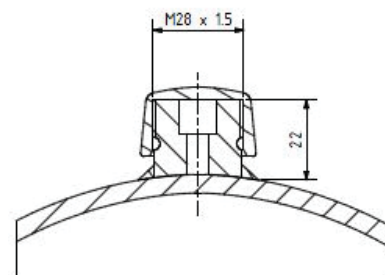
Form A/ Form B



Form C/ Form D

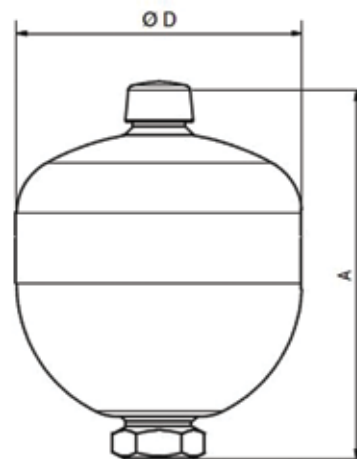
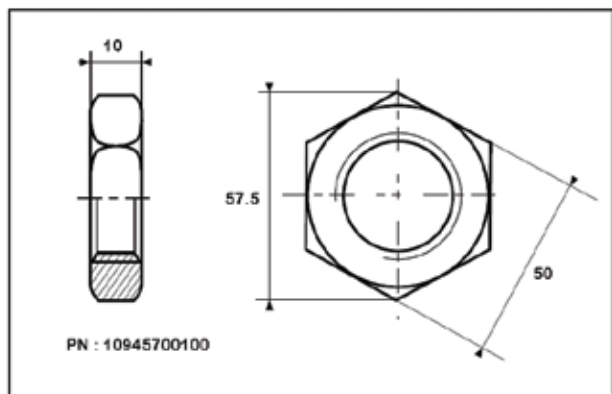


Gas Valve



Type Part number	Effective Gas vol. Litres	Max. Working pressure (PS) bar	Temp. Min/ Max (°C)	Max. Pre-charge bar	Max compres- sion in bar ratio P2/P0	Max Pressure amplitude P2-P1	Weight kg	Dimensions in mm						Oilport	
								A max Height	B	C	SW	D	G	F	H
DA-0.075L-250BAR-10849201102	0.075	250	-10/+80	130	8	210	0.7	112	20		32	64	29	G½	-
DA-0.16L-250BAR-10849301102	0.16	250	-10/+80	130	6	210	1	120	20		32	75	29	G½	-
DA-0.32L-210BAR-10986601102	0.32	210	-10/+80	130	8	140	1.4	135	20		32	92	29	G½	-
DA-0.50L-210BAR-10849501102	0.5	210	-20/+80	130	8	175	2	153	22		41	107	34	G½	-
DA-0.50L-210BAR-10849601102	0.5	210	-20/+80	130	8	175	2	164	33	18	41	107	-	G½	M33x1.5
DA-0.75L-210BAR-10849701102	0.75	210	-20/+80	130	8	175	2.6	167	22		41	122	34	G½	-
DA-0.75L-210BAR-10849801102	0.75	210	-20/+80	130	8	175	2.6	178	33	18	41	122	-	G½	M33x1.5
DA-0.75L-350BAR-10931801102	0.75	350	-20/+80	130	8	150	4	174	22		41	128	34	G½	-
DA-0.75L-350BAR-10931901102	0.75	350	-20/+80	130	8	150	4	185	33	18	41	128	-	G½	M33x1.5

Lock-nut



# DA Series 140 - 350 BAR, 1 to 1.4 Litres

**ECO rubber mix (previous known as ELM range)**

Standard Version (Carbon steel /mix **ECO**) compatible with mineral oils (2)

According to PED 2014/68/EU.

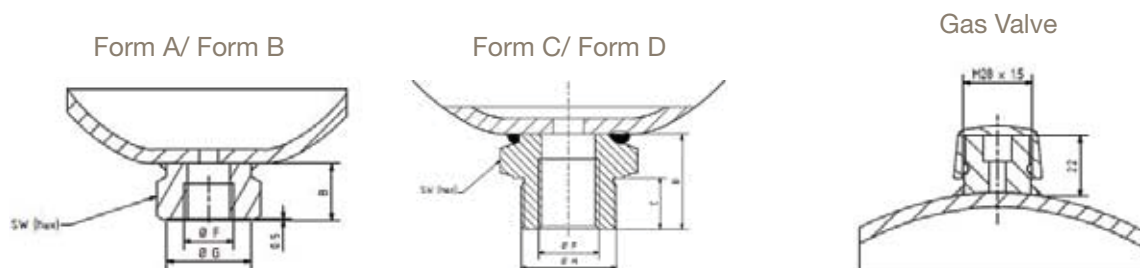
Product, Part numbers, Accessories

**E-configurable product**  
 visit [Parker.com/acde](http://Parker.com/acde)

Type Part number	Clamps Model (quantity) Part number	Lock nut Model (quantity) Part number	Cross Reference OLAER	Cross Reference ADE
DA-1.00L-210BAR-10984701102 DA-100-21000AF1102PXXX*	E136 (1) 20251103648	-	ELM 1-210/00/AF* 10984701102	ADE100-21R9A2
DA-1.00L-210BAR-10984801102 DA-100-21000CF1102PXXX*	E136 (1) 20251103648	M33x1.5 10945700100	ELM 1-210/00/CF* 10984801102	
DA-1.00L-350BAR-11110901102 DA-100-35000AF1102PXXX*	E136 (1) 20251103648	-	ELM 1-350/00/AF* 11110901102	
DA-1.00L-350BAR-11111001102 DA-100-35000CF1102PXXX*	E136 (1) 20251103648	M33x1.5 10945700100	ELM 1-350/00/CF* 1111101102	
DA-1.40L-140BAR-10850201102 DA-140-14090AF1102PXXX	E155 (1) 20251203648	-	ELM 1.4-140/90/AF 10850201102	ADE140-14R9C2
DA-1.40L-140BAR-10850301102 DA-140-14090CF1102PXXX	E155 (1) 20251203648	M33x1.5 10945700100	ELM 1.4-140/90/CF 10850301102	
DA-1.40L-210BAR-10996501102 DA-140-21090AF1102PXXX	E155 (1) 20251203648	-	ELM 1.4-210/90/AF 10996501102	
DA-1.40L-210BAR-10996601102 DA-140-21090CF1102PXXX	E155 (1) 20251203648	M33x1.5 10945700100	ELM 1.4-210/90/CF 10996601102	
DA-1.40L-250BAR-11013201102 DA-140-25090AF1102PXXX	E155 (1) 20251203648	-	ELM 1.4-250/90/AF 11013201102	ADE140-25R9C2
DA-1.40L-250BAR-11013301102 DA-140-25090CF1102PXXX	E155 (1) 20251203648	M33x1.5 10945700100	ELM 1.4-250/90/CF 11013301102	
DA-1.40L-350BAR-10932101102 DA-140-35090AF1102PXXX	E160 (1) 20259003648	-	ELM 1.4-350/90/AF 10932101102	
DA-1.40L-350BAR-10932201102 DA-140-35090CF1102PXXX	E160 (1) 20259003648	M33x1.5 10945700100	ELM 1.4-350/90/CF 10932201102	

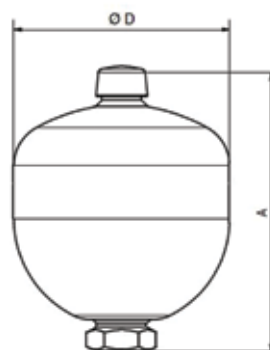
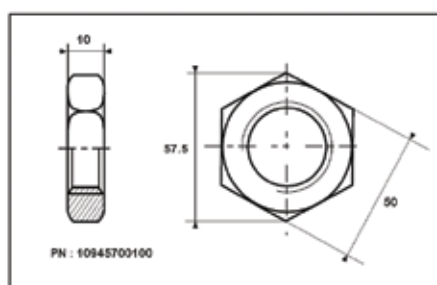
(2) For other fluids consult Parker

\* According to Article 4.3 PED 2014/68/EU



Type Part number	Effective Gas vol. Litres	Max. Working pressure (PS) bar	Temp. Min/ Max (°C)	Max. Pre-charge bar	Max compression in bar ratio P2/P0	Max Pressure amplitude P2-P1	Weight kg	Dimensions in mm						Oilport	
								A max Height	B	C	SW	D	G	F	H
DA-1.00L-210BAR-10984701102	1	210	-20/+80	130	8	170	4	182	22		41	136	34	G½	-
DA-1.00L-210BAR-10984801102	1	210	-20/+80	130	8	170	4	192	33	18	41	136	-	G½	M33x1.5
DA-1.00L-350BAR-11110901102	1	350	-10/+80	130	8	150	5	200	22		41	129	34	G½	-
DA-1.00L-350BAR-11111001102	1	350	-10/+80	130	8	150	5	211	33	18	41	129		G½	M33x2
DA-1.40L-140BAR-10850201102	1	140	-20/+80	130	8	120	4	192	22		41	147	34	G½	-
DA-1.40L-140BAR-10850301102	1	140	-20/+80	130	8	120	4	203	33	18	41	147	-	G½	M33x1.5
DA-1.40L-210BAR-10996501102	1	210	-20/+80	130	8	120	4	192	22		41	148	34	G½	-
DA-1.40L-210BAR-10996601102	1	210	-20/+80	130	8	120	4	203	33	18	41	148	-	G½	M33x1.5
DA-1.40L-250BAR-11013201102	1	250	-20/+80	130	8	140	5	196	22		41	152	34	G½	
DA-1.40L-250BAR-11013301102	1	250	-20/+80	130	8	140	6	207	33	18	41	152	-	G½	M33x1.5
DA-1.40L-350BAR-10932101102	1	350	-20/+80	130	8	150	7	199	22		41	156	34	G½	
DA-1.40L-350BAR-10932201102	1	350	-20/+80	130	8	150	7	221	44	18	44	156	-	G½	M33x1.5

Lock-nut



# DA Series 140 - 350 BAR, 2 to 3.5 Litres

**ECO rubber mix (previous known as ELM range)**

Standard Version (Carbon steel /mix **ECO**) compatible with mineral oils (2)  
 According to PED 2014/68/EU.

**E-configurable product**  
 visit [Parker.com/acde](http://Parker.com/acde)

Product, Part numbers, Accessories

Type Part number	Clamps Model (quantity) Part number	Lock nut Model (quantity) Part number	Cross Reference OLAER	Cross Reference ADE
DA-2.00L-100BAR-10850401102 DA-200-10090AF1102PXXX	E155 (1) 20251203648	-	ELM 2-100/90/AF 10850401102	
DA-2.00L-250BAR-11013401102 DA-200-25090BF1102PXXX	E155 (1) 20251203648	-	ELM 2-250/90/AF 11013401102	
DA-2.00L-350BAR-11006001102 DA-200-35090BF1102PXXX	E160 (1) 20259003648	-	ELM 2-350/90/AF 11006001102	
DA-2.00L-350BAR-11006101102 DA-200-35090DF1102PXXX	E160 (1) 20259003648	M45X1.5	ELM 2-350/90/CF 11006101102	
DA-2.80L-250BAR-10887901102 DA-280-25090BF1102PXXX	E168 (1) 20251303648	-	ELM 2.8-250/90/AF 10887901102	ADE280-25R9C2
DA-2.80L-350BAR-10975801102 DA-280-35090BF1102PXXX	E180 (1) 20243203625	-	ELM 2.8-350/90/AF 10975801102	
DA-2.80L-350BAR-10975901102 DA-280-35090DF1102PXXX	E180 (1) 20243203625	M45X1.5	ELM 2.8-350/90/CF 10975901102	
DA-3.00L-250BAR-10850501102 DA-350-25090BF1102PXXX	E168 (1) 20251303648	-	ELM 3.5-250/90/AF 10850501102	ADE350-25R9C2
MBSP 3,5-350 350-1315-032-741	E180 (1) 20243203625	-	ELM 3.5-350/90/AF 10984901102	
MBSP 3,5-350 350-1315-022-741	E180 (1) 20243203625	M45X1.5	ELM 3.5-350/90/CF 10985001102	

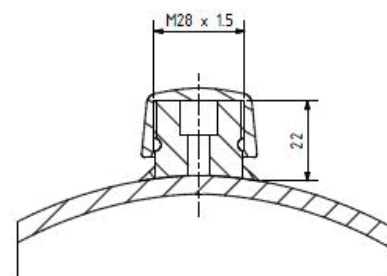
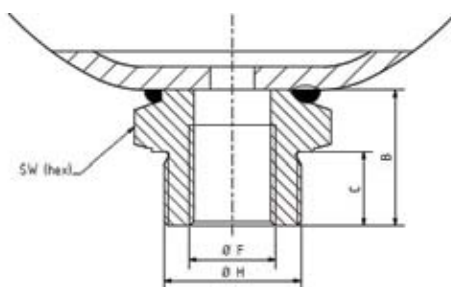
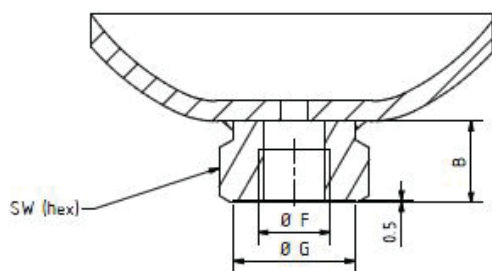
(2) For other fluids consult Parker

\* According to Article 4.3 PED 2014/68/EU

Form A/ Form B

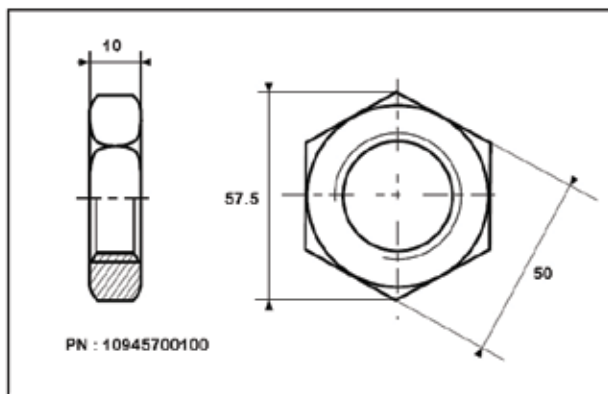
Form C/ Form D

Gas Valve

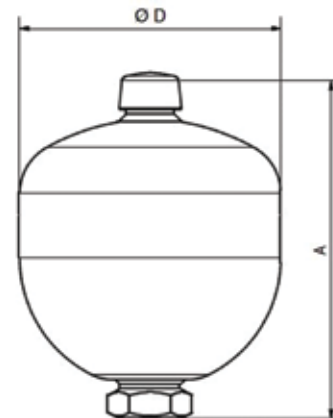


Type Part number	Effective Gas vol. Litres	Max. Working pressure (PS) bar	Temp. Min/ Max (°C)	Max. Pre-charge bar	Max compression in bar ratio P2/P0	Max Pressure amplitude P2-P1	Weight kg	Dimensions in mm						Oilport	
								A max Height	B	C	SW	D	G	F	H
DA-2.00L-100BAR-10850401102	2.0	100	-10/+80	100	8	80	3.50	241	22		41	145	34	G½	
DA-2.00L-250BAR-11013401102	2.0	250	-10/+80	130	8	150	9.50	252	22		41	156	33	G3/4	
DA-2.00L-350BAR-11006001102	2.0	350	-10/+80	130	8	150	9.50	252	22		41	156	33	G3/4	
DA-2.00L-350BAR-11006101102	2.0	350	-10/+80	130	8	150	9.50	270	40	20	50	156	-	G3/4	M45x1.5
DA-2.80L-250BAR-10887901102	2.8	250	-10/+80	130	6	140	8.50	269	20		41	168	33	G3/4	
DA-2.80L-350BAR-10975801102	2.8	350	-10/+80	130	6	200	14.30	265	23		55	180	34	G3/4	
DA-2.80L-350BAR-10975901102	2.8	350	-10/+80	130	6	200	14.50	286	21	20	55	180	-	G3/4	M45x1.5
DA-3.00L-250BAR-10850501102	3.5	250	-10/+80	130	4	100	10.20	314	20		41	168	33	G3/4	
MBSP 3,5-350	3.5	350	-10/+80	130	4	200	16.00	305	23		55	180	34	G3/4	
MBSP 3,5-350	3.5	350	-10/+80	130	4	200	16.50	326	26	20	55	180	-	G3/4	M45x1.5

Lock-nut



Above





# LAC

*With AC motor*





Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage.

All over the world, our products are working in the most diverse environments and applications.

# LAC Air Oil Coolers

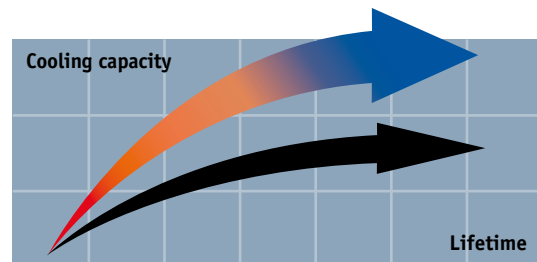
*For industrial use – maximum cooling capacity 300 kW*

The LAC air oil cooler with single-phase or three-phase AC motor is optimized for use in the industrial sector. Together with a wide range of accessories, the LAC cooler is suitable for installation in most applications and environments. The maximum cooling capacity is 300 kW at ETD 40 °C. Choosing the right cooler requires precise system sizing. The most reliable way to size is with the aid of our calculation program. This program, together with precise evaluations from our experienced, skilled engineers, gives you the opportunity for more cooling per € invested.



## Overheating - an expensive problem

An under-sized cooling capacity produces a temperature balance that is too high. The consequences are poor lubricating properties, internal leakage, a higher risk of cavitation, damaged components, etc. Overheating leads to a significant drop in cost-efficiency and environmental consideration.



## Temperature optimisation - a basic prerequisite for cost-efficient operation

Temperature balance in a hydraulic system occurs when the cooler can cool down the energy input that the system does not consume - the system's lost energy ( $P_{loss} = P_{cool} = P_{in} - P_{used}$ ).

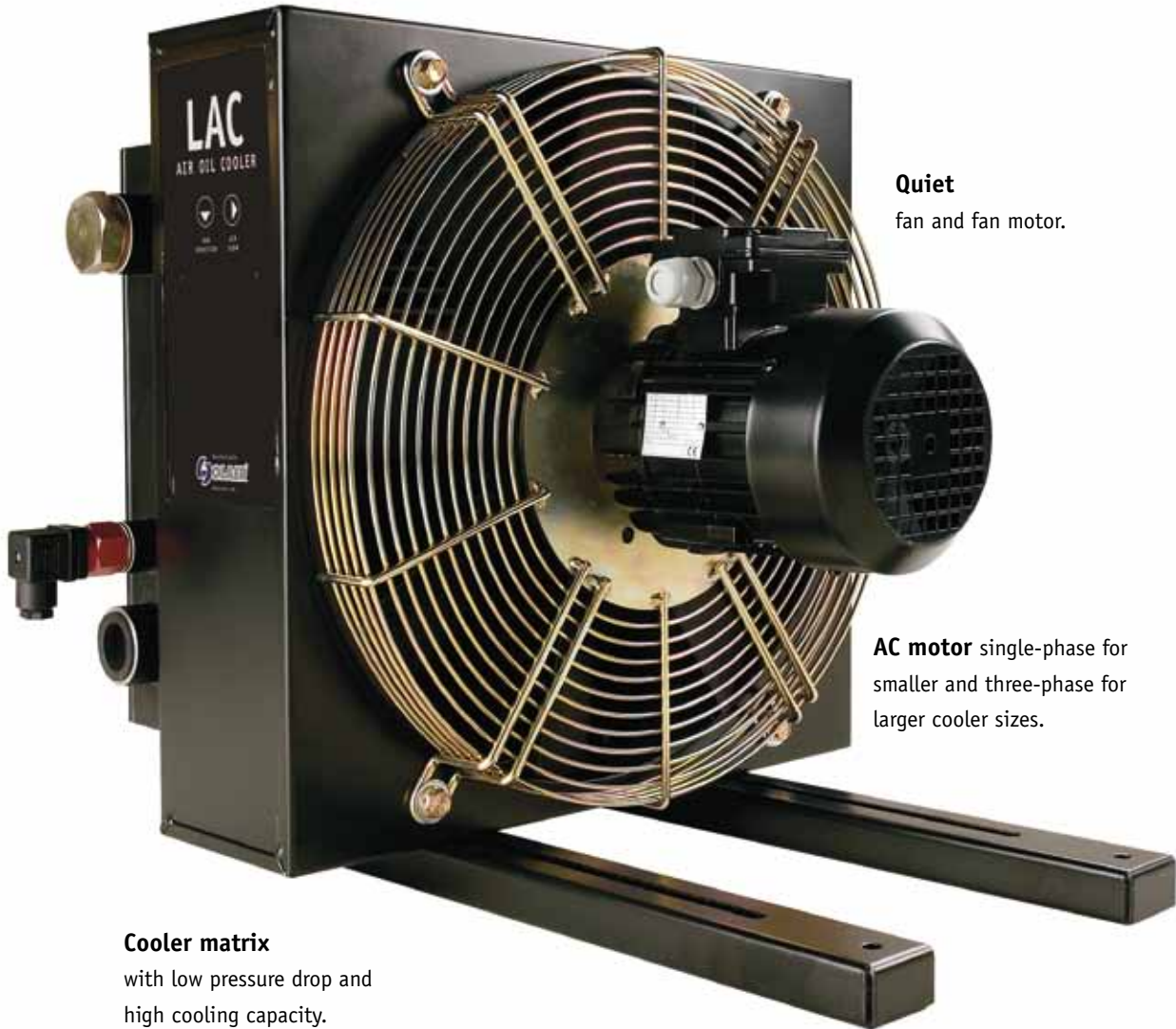
Temperature optimisation means that temperature balance occurs at the system's ideal working temperature - the temperature at which the oil's viscosity and the air content comply with recommended values. The correct working temperature produces a number of economic and environmental benefits:

- The hydraulic system's useful life is extended.
- The oil's useful life is extended.
- The hydraulic system's availability increases - more operating time and fewer shutdowns.
- Service and repair costs are reduced.
- High efficiency level maintained in continuous operation - the system's efficiency falls if the temperature exceeds the ideal working temperature.

**Clever design** and the right choice of materials and components produce a long useful life, high availability and low service and maintenance costs.

**Compact design** and low weight.

**Easy to maintain** and easy to retrofit in many applications.



**Quiet** fan and fan motor.

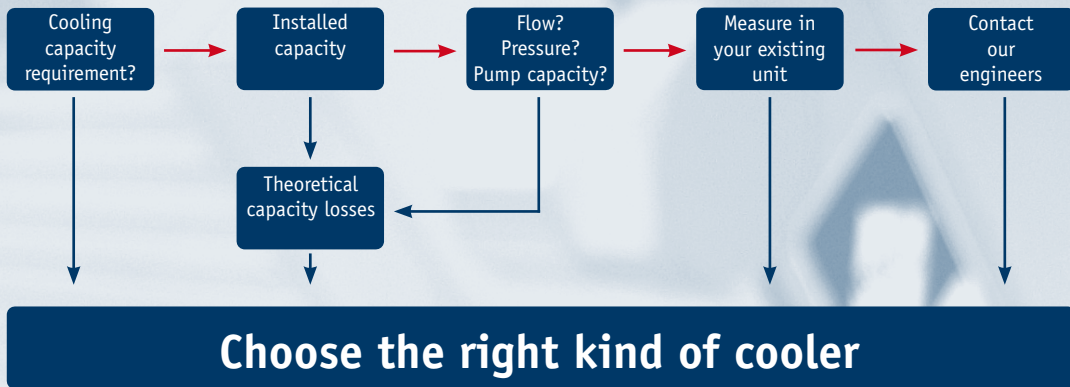
**AC motor** single-phase for smaller and three-phase for larger cooler sizes.

**Cooler matrix** with low pressure drop and high cooling capacity.

### LAC-M and LAC-X

LAC air oil coolers are also available in two special versions, LAC-X (ATEX version), approved for applications where there may be an explosive environment above ground, and LAC-M, adapted to be able better to deal with corrosion attacks, for example in marine environments.

# Calculate the cooling capacity requirement



Enter your values ....

This block contains a collage of images related to the software's output. On the left, there are two screenshots of the software's input and output screens. In the center, there is a technical drawing of the LAC2 011-4-D cooler, showing a side view and a top view with various dimensions. Below the drawing is a small photograph of the physical cooler unit. At the bottom right, there is a small image of the product's identification label.

... suggested solution



Better energy consumption means not only less environmental impact, but also reduces operating costs, i.e. more cooling per € invested.

# More cooling per €

*with precise calculations and our engineers' support*

Optimal sizing produces efficient cooling. Correct sizing requires knowledge and experience. Our calculation program, combined with our engineers' support, gives you access to this very knowledge and experience. The result is more cooling per € invested.

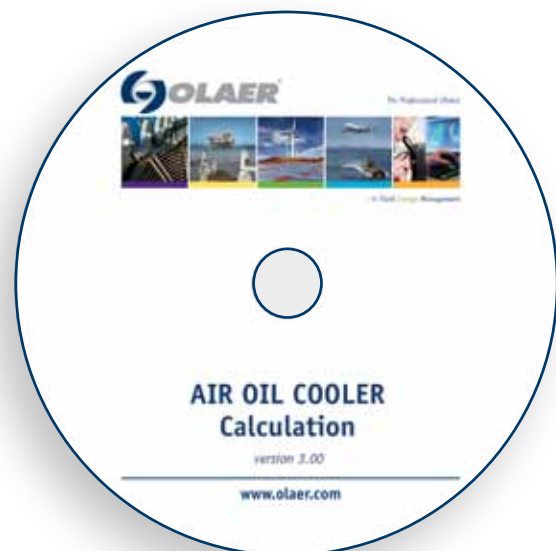
**The user-friendly calculation program can be downloaded from [www.olaer.se](http://www.olaer.se)**

## Valuable system review into the bargain

A more wide-ranging review of the hydraulic system is often a natural element of cooling calculations. Other potential system improvements can then be discussed – e.g. filtering, offline or online cooling, etc. Contact us for further guidance and information.

## OLAER's quality and performance guarantee insurance for your operations and systems

A constant striving towards more cost-efficient and environment friendly hydraulic systems requires continuous development. Areas where we are continuously seeking to improve performance include cooling capacity, noise level, pressure drop and fatigue.

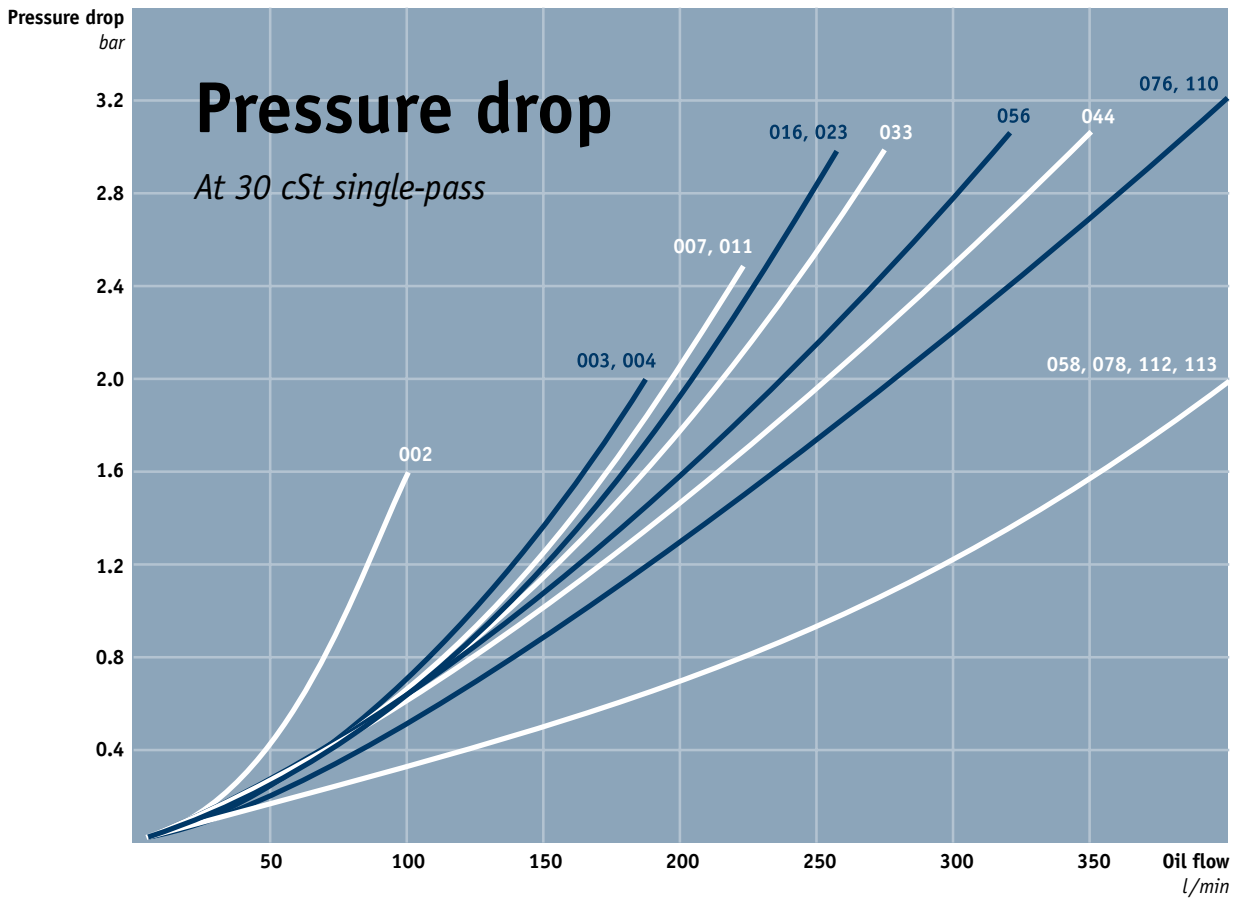


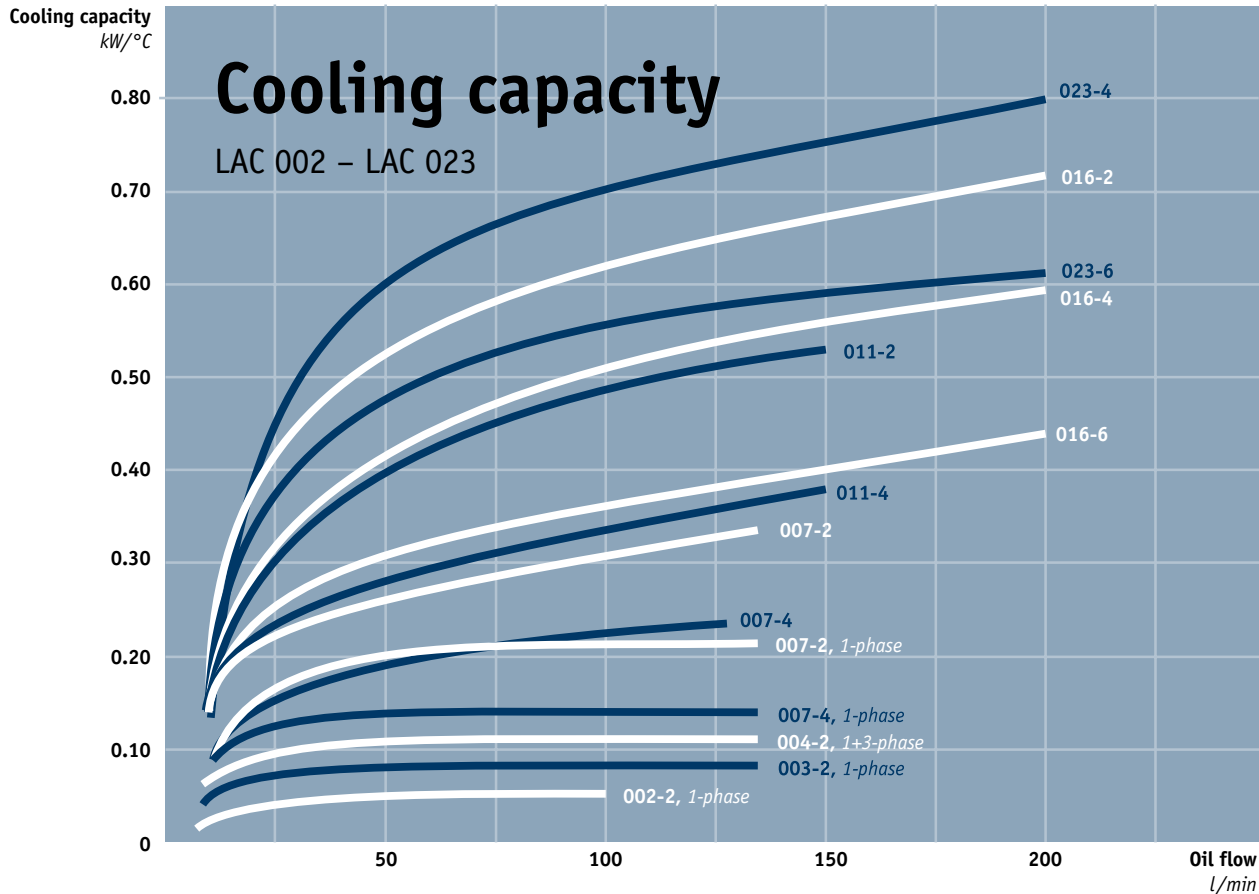
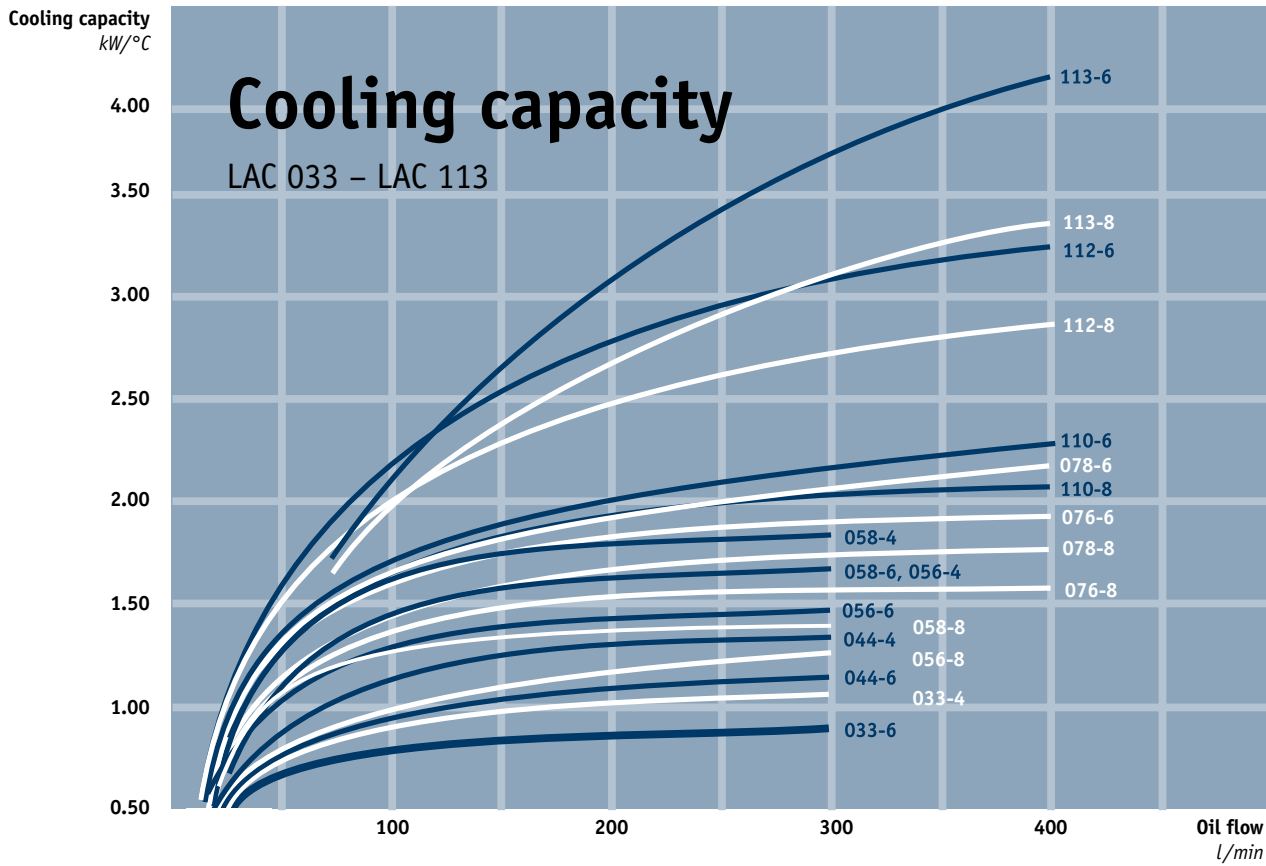
Meticulous quality and performance tests are conducted in our laboratory. All tests and measurements take place in accordance with standardised methods - cooling capacity in accordance with EN1048, noise level ISO 3743, pressure drop EN 1048 and fatigue ISO 10771-1.

For more information about our standardised tests, ask for "OLAER's blue book – a manual for more reliable cooler purchasing".

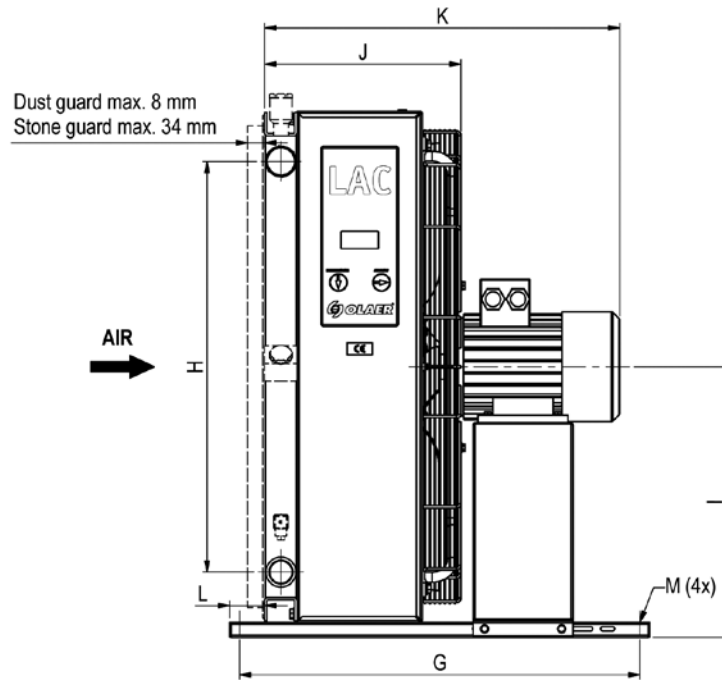


The cooling capacity curves are based on the inlet oil temperature and the ambient air temperature. An oil temperature of 60 °C and an air temperature of 20 °C produce a temperature difference of 40 °C. Multiply by kW/°C for total cooling capacity.

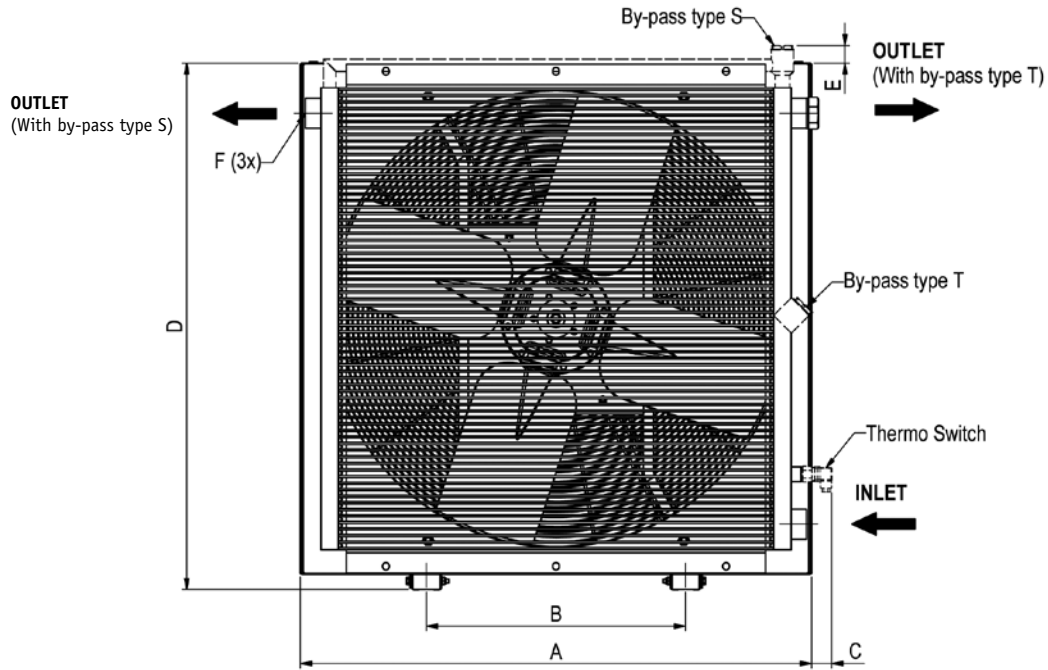




Cooling capacity tolerance  $\pm 10\%$  kW.



TYPE	Acoustic pressure level $L_pA$ dB(A) 1m*	No. of poles/ Capacity kW	Weight kg (approx)
LAC 002-2-single-phase	50	2-0.05	4
LAC 003-2-single-phase	61	2-0.05	5
LAC 004-2-single-phase	63	2-0.07	6
LAC 002-2-three-phase	63	2-0.07	6
LAC 007-4-single-phase	65	2-0.08	9
LAC 007-2-single-phase	79	2-0.24	10
LAC2 007-4-three-phase	62	4-0.25	15
LAC2 007-2-three-phase	79	2-0.55	16
LAC2 011-4-three-phase	67	4-0.25	20
LAC2 011-2-three-phase	82	2-1.10	25
LAC2 016-6-three-phase	60	6-0.18	23
LAC2 016-4-three-phase	70	4-0.37	24
LAC2 016-2-three-phase	86	2-1.10	27
LAC2 023-6-three-phase	64	6-0.18	35
LAC2 023-4-three-phase	76	4-0.75	36
LAC 033-6-three-phase	74	6-0.55	45
LAC 033-4-three-phase	84	4-2.20	52
LAC 044-6-three-phase	76	6-0.55	63
LAC 044-4-three-phase	85	4-2.20	65
LAC 056-8-three-phase	73	8-0.55	73
LAC 056-6-three-phase	81	6-1.50	75
LAC 056-4-three-phase	84	4-2.20	75
LAC 058-8-three-phase	74	8-0.55	80
LAC 058-6-three-phase	82	6-1.50	82
LAC 058-4-three-phase	85	4-2.20	82
LAC 076-8-three-phase	79	8-1.10	130
LAC 076-6-three-phase	86	6-2.20	140
LAC 078-8-three-phase	80	8-1.10	136
LAC 078-6-three-phase	87	6-2.20	146
LAC 110-8-three-phase	84	8-2.20	160
LAC 110-6-three-phase	90	6-5.50	170
LAC 112-8-three-phase	85	8-2.20	168
LAC 112-6-three-phase	91	6-5.50	178
LAC 113-8-three-phase	80	8-2.20	218
LAC 113-6-three-phase	88	6-5.50	237
LAC 200-8-three-phase	86	8-4.00	365
LAC 200-6-three-phase	92	6-11.00	405



TYPE	A	B	C	D	E	F	G	H	I	J	K	L	MØ
LAC 002-2-single-phase	155	74	68	186	-	G½	186	72	99	92	153	37	9
LAC 003-2-single-phase	210	134	68	223	73	G1	145	90	118	112	225	27	9
LAC 004-2-single-phase	250	134	68	259	66	G1	145	90	131	117	230	27	9
LAC 002-2-three-phase	250	134	68	259	66	G1	145	90	131	117	230	27	9
LAC 007-4-single-phase	340	203	64	343	52	G1	267	160	213	135	252	56	9
LAC 007-2-single-phase	340	203	64	343	52	G1	267	160	213	135	252	56	9
LAC2 007-4-three-phase	365	203	64	395	42	G1	510	160	213	225	429	50	9
LAC2 007-2-three-phase	365	203	64	395	42	G1	510	160	213	225	434	50	9
LAC2 011-4-three-phase	440	203	62	470	41	G1	510	230	250	249	453	50	9
LAC2 011-2-three-phase	440	203	62	470	41	G1	510	230	250	249	475	50	9
LAC2 016-6-three-phase	496	203	66	526	46	G1	510	230	278	272	474	50	9
LAC2 016-4-three-phase	496	203	66	526	46	G1	510	230	278	272	479	50	9
LAC2 016-2-three-phase	496	203	66	526	46	G1	510	230	278	272	496	50	9
LAC2 023-6-three-phase	580	356	63	610	44	G1	510	305	320	287	489	50	9
LAC2 023-4-three-phase	580	356	63	610	44	G1	510	305	320	287	511	50	9
LAC 033-6-three-phase	692	356	53	722	42	G1¼	510	406	376	318	534	50	9
LAC 033-4-three-phase	692	356	53	722	42	G1¼	510	406	376	318	618	50	9
LAC 044-6-three-phase	692	356	53	866	59	G1¼	510	584	448	343	559	50	9
LAC 044-4-three-phase	692	356	53	866	59	G1¼	510	584	448	343	643	50	9
LAC 056-8-three-phase	868	508	49	898	43	G1¼	510	584	448	343	643	50	9
LAC 056-6-three-phase	868	508	49	898	43	G1¼	510	584	464	368	668	50	9
LAC 056-4-three-phase	868	508	49	898	43	G1¼	510	584	464	368	668	50	9
LAC 058-8-three-phase	868	508	49	898	43	G2	510	584	464	388	652	30	9
LAC 058-6-three-phase	868	508	49	898	43	G2	510	584	464	388	682	30	9
LAC 058-4-three-phase	868	508	49	898	43	G2	510	584	464	388	688	30	9
LAC 076-8-three-phase	1022	518	41	1052	45	G1½	800	821	541	393	693	70	14
LAC 076-6-three-phase	1022	518	41	1052	45	G1½	800	821	541	393	710	70	14
LAC 078-8-three-phase	1022	518	41	1052	45	G2	800	821	541	413	713	50	14
LAC 078-6-three-phase	1022	518	41	1052	45	G2	800	821	541	413	730	50	14
LAC 110-8-three-phase	1185	600	54	1215	45	G2	800	985	623	418	785	70	14
LAC 110-6-three-phase	1185	600	54	1215	45	G2	800	985	623	418	785	70	14
LAC 112-8-three-phase	1185	600	54	1215	45	G2	800	985	623	438	805	50	14
LAC 112-6-three-phase	1185	600	54	1215	45	G2	800	985	623	438	805	50	14
LAC 113-8-three-phase	1200	600	82	1215	45	G2	860	985	623	465	833	82	14
LAC 113-6-three-phase	1200	600	82	1215	45	G2	860	985	623	465	871	82	14
LAC 200-8-three-phase													
LAC 200-6-three-phase													

Please contact Olaer for more information

# Key for LAC and LAC2 air oil coolers

All positions must be filled in when ordering

## EXAMPLE:

LAC2 - 016 - 6 - A - 50 - T20 - D - 0

1 2 3 4 5 6 7 8

### 1. AIR OIL COOLER

WITH AC MOTOR = LAC / LAC2

### 2. COOLER SIZE

002, 003, 004, 007, 011, 016, 023, 033, 044,  
056, 058, 076, 078, 110, 112, 113 and 200.

### 3. NUMBER OF POLES, MOTOR

2 - pole	= 2
4 - pole	= 4
6 - pole	= 6
8 - pole	= 8

### 4. VOLTAGE AND FREQUENCY

No motor	= 0
Three-phase 220-240/380-420 V 50 Hz*	= A
Three-phase 440-480 V 60 Hz*	= B
Single-phase 230 V 50/60 Hz**	= C
Three-phase 220-240/380-420 V 50 Hz 440/480 V 60 Hz***	= D
Three-phase 500 V 50 Hz	= E
Three-phase 400/690 V 50 Hz 440-480 V 60 Hz	= F
Three-phase 525 V 50 Hz	= G
Motor for special voltage (stated in plain language)	= X

\* = for LAC 033 to LAC 113, \*\* = contact Olaer for frequency 60 Hz

\*\*\* = for LAC 007 to LAC 023

### 5. THERMO CONTACT

No thermo contact	= 00
40 °C	= 40
50 °C	= 50
60 °C	= 60
70 °C	= 70
80 °C	= 80
90 °C	= 90

### 6. COOLER MATRIX

Standard	= 000
Two-pass	= T00

#### Built-in, pressure-controlled bypass, single-pass

2 bar	= S20
5 bar	= S50
8 bar	= S80

#### Built-in, pressure-controlled bypass, two-pass\*

2 bar	= T20
5 bar	= T50
8 bar	= T80

#### Built-in temperature and pressure-controlled bypass, single-pass

50 °C, 2.2 bar	= S25
60 °C, 2.2 bar	= S26
70 °C, 2.2 bar	= S27
90 °C, 2.2 bar	= S29

#### Built-in temperature and pressure-controlled bypass, two-pass\*

50 °C, 2.2 bar	= T25
60 °C, 2.2 bar	= T26
70 °C, 2.2 bar	= T27
90 °C, 2.2 bar	= T29

\* = not for LAC 002 - LAC 004

### 7. MATRIX GUARD

No guard	= 0
Stone guard	= S
Dust guard	= D
Dust and stone guard	= P

### 8. STANDARD/SPECIAL

Standard	= 0
Special	= Z

## Technical specification

### FLUID COMBINATIONS

Mineral oil	HL/HLP in accordance with DIN 51524
Oil/water emulsion	HFA, HFB in accordance with CETOP RP 77H
Water glycol	HFC in accordance with CETOP RP 77H
Phosphate ester	HFD-R in accordance with CETOP RP 77H

### MATERIAL

Cooler matrix	Aluminum
Fan blades/hub	Glass fibre reinforced polypropylene/ Aluminum
Fan housing	Steel
Fan guard	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated

### TECHNICAL DATA, COOLER MATRIX

Maximum static operating pressure	21 bar
Dynamic operating pressure	14 bar*
Heat transfer limit	± 6 %
Maximum oil inlet temperature	120 °C

\* Tested in accordance with ISO/DIS 10771-1

### TECHNICAL DATA FOR 3-PHASE MOTOR

3-phase asynchronous motors in accordance with IEC 34-1 and IEC 72 in accordance with DIN 57530/VDE 0530	
Insulation class	F
Rise of temperature	B
Protection class	IP 55

### TECHNICAL DATA FOR 1-PHASE MOTOR

Insulation class	B
Rise of temperature	B
Protection class	IP 44

### TECHNICAL DATA FOR 3-PHASE MOTOR LAC 004

Rated voltage	230/400V 50/60 Hz
Insulation class	B
Rise of temperature	B
Protection class	IP 44

### COOLING CAPACITY CURVES

The cooling capacity curves in this technical data sheet are based on tests in accordance with EN 1048 and have been produced using oil type ISO VG 46 at 60 °C.

### CONTACT OLAER FOR ADVICE ON

Oil temperatures > 120 °C
Oil viscosity > 100 cSt
Aggressive environments
Ambient air rich in particles
High-altitude locations

The information in this brochure is subject to change without prior notice.



With our specialist expertise, industry knowledge and advanced technology, we can offer a range of different solutions for coolers and accessories to meet your requirements.

# Take the next step

- choose the right accessories

Supplementing a hydraulic system with a cooler, cooler accessories and an accumulator gives you increased availability and a longer useful life, as well as lower service and repair costs. All applications and operating environments are unique. A well-planned choice of the following accessories can thus further improve your hydraulic system. Please contact Olaer for guidance and information.



### Pressure-controlled bypass valve *Integrated*

Allows the oil to bypass the cooler matrix if the pressure drop is too high. Reduces the risk of the cooler bursting, e.g. in connection with cold starts and temporary peaks in pressure or flow. Available for single-pass or two-pass matrix design.



### Stone guard/Dust guard

Protects components and systems from tough conditions.



### Temperature-controlled bypass valve *Integrated*

Same function as the pressure-controlled by-pass valve, but with a temperature-controlled opening pressure - the hotter the oil, the higher the opening pressure. Available for single-pass or two-pass matrix design.



### Lifting eyes

For simple installation and relocation.



### Thermo contact

Sensor with fixed set point. For temperature warnings, and for more cost-efficient operation and better environmental consideration through the automatic switching on and off of the fan motor.



### Temperature-controlled 3-way valve *External*

Same function as the temperature-controlled bypass valve, but positioned externally. Note: must be ordered separately.



- in Fluid Energy Management

# Global perspective

*and local entrepreneurial flair*



Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage. Olaer develops, manufactures and markets products and systems for a number of different sectors, e.g. the aircraft, engineering, steel and mining industries, as well as for sectors such as oil and gas, contracting and transport, farming and forestry, renewable energy, etc.

All over the world, our products operate in the most diverse environments and applications. One constantly

repeated demand in the market is for optimal energy storage and temperature optimisation. We work at a local level with a whole world as our workplace – local entrepreneurial flair and a global perspective go hand in hand.

Our local presence, long experience and a wealth of knowledge combine with our cutting-edge expertise to give you the best possible conditions for making a professional choice.

# LDC

*With DC motor*





Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage.

All over the world, our products are working in the most diverse environments and applications.

# LDC Air Oil Coolers

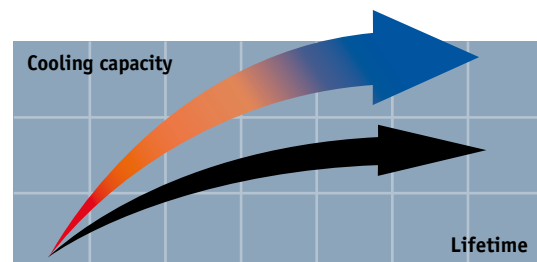
*For mobile use - maximum cooling capacity 30 kW*

The LDC air oil cooler with 12 or 24 V DC motor is optimized for use in the mobile industry. Together with a wide range of accessories, the LDC cooler is suitable for installation in most applications and environments. The maximum cooling capacity is 30 kW at ETD 40°C. Choosing the right cooler requires precise system sizing. The most reliable way to size is with the aid of our calculation program. This program, together with precise evaluations from our experienced, skilled engineers, gives you the opportunity for more cooling per € invested.



## Overheating - an expensive problem

An under-sized cooling capacity produces a temperature balance that is too high. The consequences are poor lubricating properties, internal leakage, a higher risk of cavitation, damaged components, etc. Overheating leads to a significant drop in cost-efficiency and environmental consideration.



## Temperature optimisation - a basic prerequisite for cost-efficient operation

Temperature balance in a hydraulic system occurs when the cooler can cool down the energy input that the system does not consume - the system's lost energy ( $P_{loss} = P_{cool} = P_{in} - P_{used}$ ).

Temperature optimisation means that temperature balance occurs at the system's ideal working temperature - the temperature at which the oil's viscosity and the air content comply with recommended values. The correct working temperature produces a number of economic and environmental benefits:

- The hydraulic system's useful life is extended.
- The oil's useful life is extended.
- The hydraulic system's availability increases - more operating time and fewer shutdowns.
- Service and repair costs are reduced.
- High efficiency level maintained in continuous operation - the system's efficiency falls if the temperature exceeds the ideal working temperature.

**Clever design** and the right choice of materials and components produce a long useful life, high availability and low service and maintenance costs.

**Compact design** and low pressure drop and high cooling capacity.

**Easy to maintain** and easy to retrofit in many applications.



**DC motor**  
12V/24V

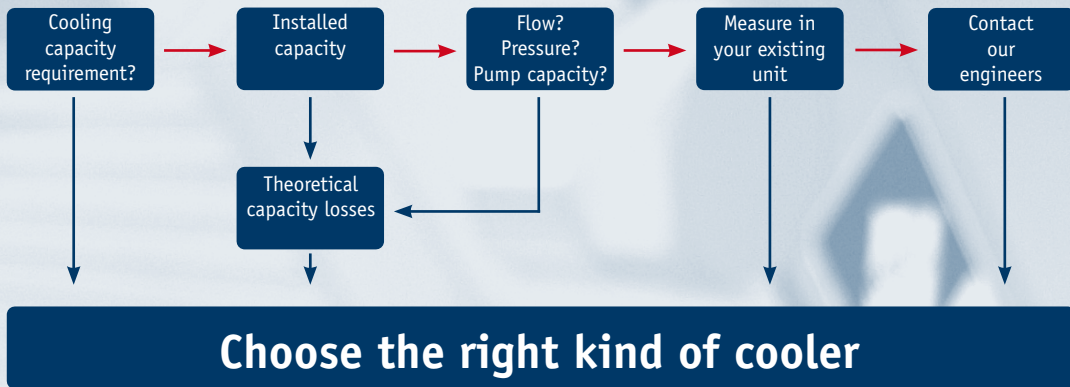
**Quiet**  
fan and fan motor.

**Compact design** and  
low weight.

## Smart DC Drive

Smart DC Drive for soft start of fan, as well as lower power consumption and sound level by means of temperature-controlled speed regulation. Smart DC Drive also eliminates voltage peaks, thus contributing towards a longer useful life for the fan motor.

# Calculate the cooling capacity requirement



Enter your values ....

This block contains a collage of images related to the software's output. On the left, there are two screenshots of the software's input and output screens. In the center, there is a technical drawing of the LAC2 011-4-D cooler, showing side and front views with dimensions. Below the drawing is a small photograph of the physical cooler unit. To the right of the drawing is a small table with technical specifications for the LAC2011-4-00-000-00 model.

... suggested solution



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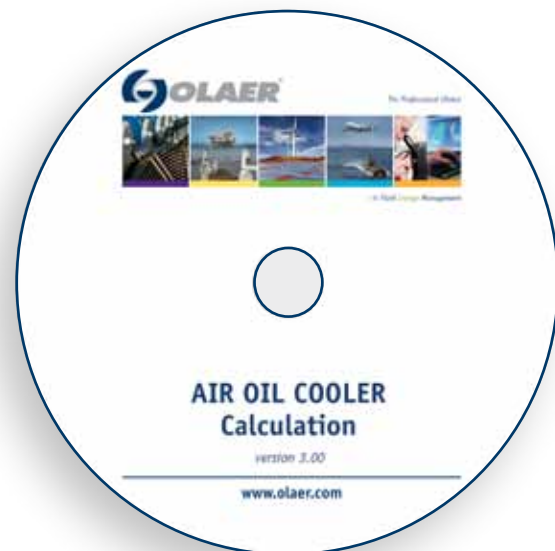
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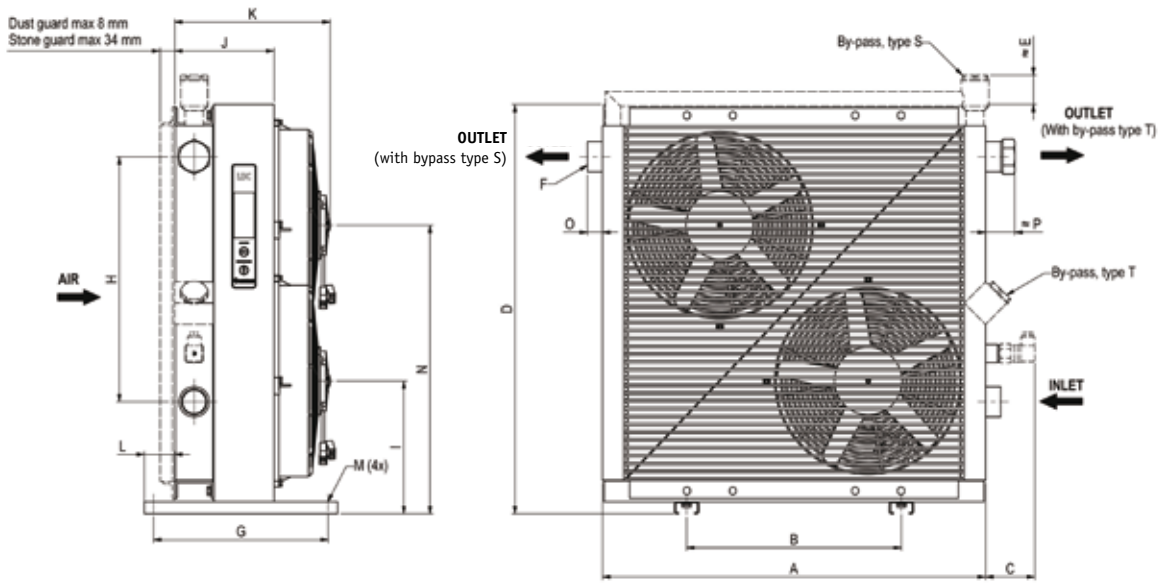
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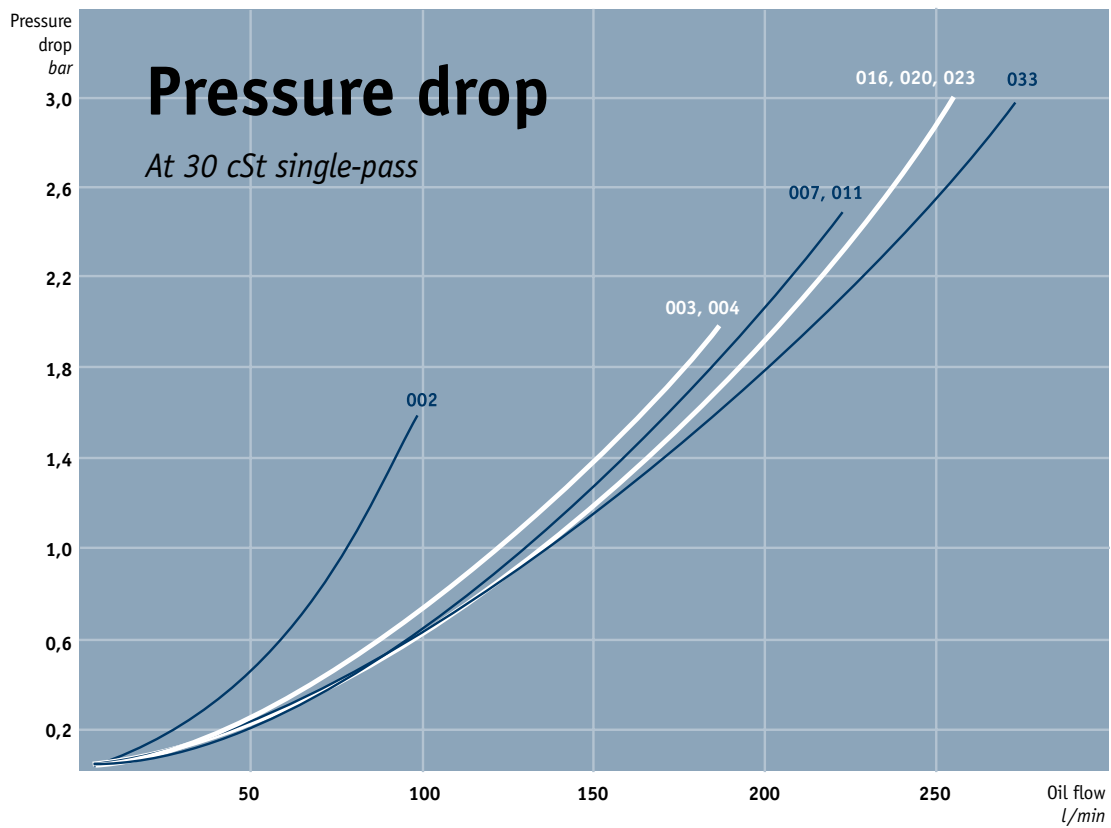
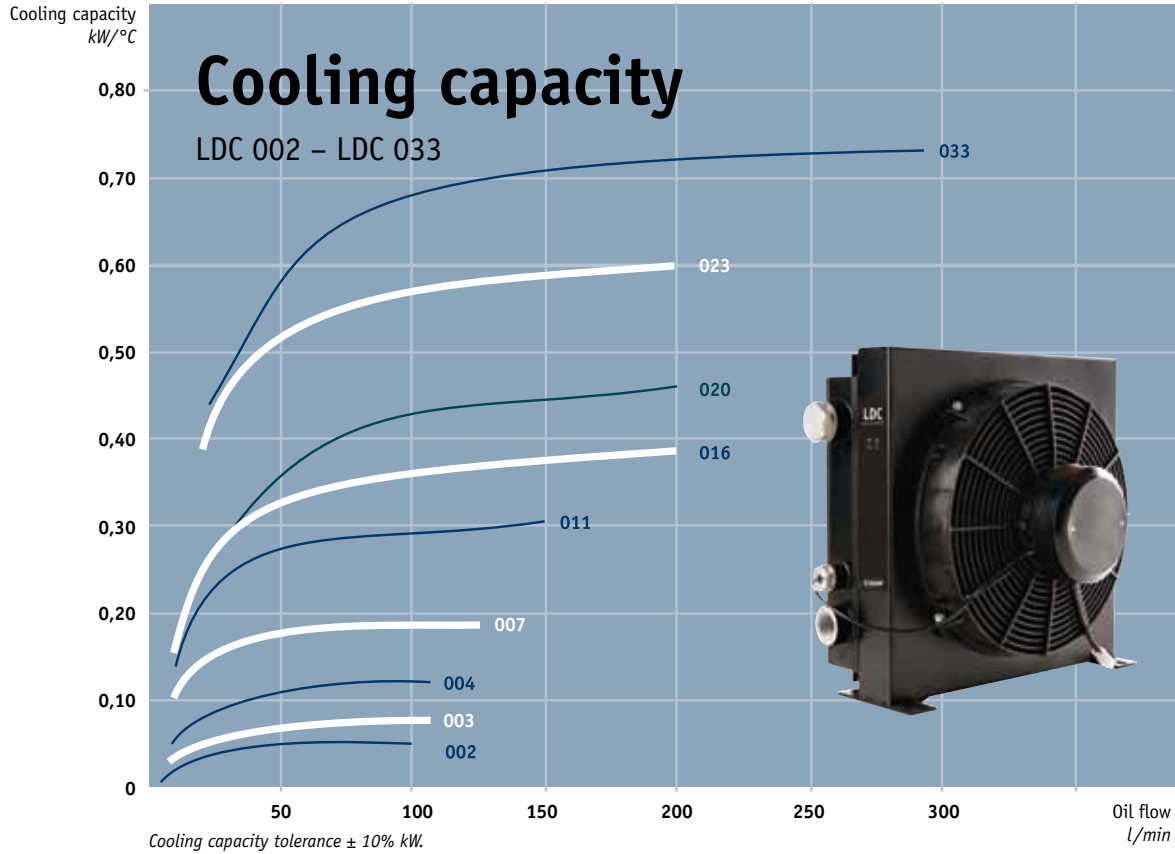
For more information about our standardised tests, ask for "OLAER's blue book – a manual for more reliable cooler purchasing".



The cooling capacity curves are based on the inlet oil temperature and the ambient air temperature. An oil temperature of 60°C and an air temperature of 20 °C produce a temperature difference of 40 °C. Multiply by kW/°C for total cooling capacity.

TYPE	A	B	C	D	E	F	G	H	I	J	K	L	Mø	N	O	P	Weight kg (approx)	Acoustic Pressure LpA dB(A) 1m*
LDC 002	184	74	72	189	94	G½	187	72	100	107	157	36	9	-	11	25	4	66
LDC 003	244	134	82	227	71	G1	146	90	118	102	147	26	9x14	-	23	35	5	68
LDC 004	267	134	82	253	72	G1	146	90	131	107	152	26	9x14	-	23	35	6	68
LDC 007	330	203	82	338	59	G1	267	160	173	105	170	57	9	-	23	44	9	71
LDC 011	400	360	82	396	65	G1	101	230	200	125	218	-	9x29	-	23	44	12	74
LDC 016	464	416	82	466	63	G1	101	300	235	125	128	-	9x29	-	23	44	15	74
LDC 020	510	470	82	510	61	G1	101	280	257	125	211	-	9x29	-	23	44	18	77
LDC 023	615	356	46	635	26	G1	290	305	200	125	218	50	13	455	-	8	25	77
LDC 033	635	356	82	678	59	G1¼	290	406	220	165	258	50	13	478	25	49	30	77

\* = Noise level tolerance ± 3 dB(A)



# Key for LDC air oil coolers

All positions must be filled in when ordering

## EXAMPLE:

LDC - 016 - A - S - 00 - S20 - S - 0

1 2 3 4 5 6 7 8

### 1. AIR OIL COOLER

WITH DC MOTOR = LDC

### 2. COOLER SIZE

002, 003, 004, 007, 011, 016, 020, 023, 033

### 3. MOTOR VOLTAGE

12 V = A

24 V = B

### 4. ACCESSORIES FOR DC MOTOR

No motor accessories = 0

Smart DC Drive, incl. temperature indicator 50°C = S

Relay box = C

### 5. THERMO CONTACT

No thermo contact = 00

40 °C = 40

50 °C = 50

60 °C = 60

70 °C = 70

80 °C = 80

90 °C = 90

### 6. COOLER MATRIX

Standard = 000

Two-pass = T00

#### Built-in, pressure-controlled bypass, single-pass

2 bar = S20

5 bar = S50

8 bar = S80

#### Built-in, pressure-controlled bypass, two-pass\*

2 bar = T20

5 bar = T50

8 bar = T80

#### Built-in temperature and pressure-controlled bypass, single-pass

50 °C, 2.2 bar = S25

60 °C, 2.2 bar = S26

70 °C, 2.2 bar = S27

90 °C, 2.2 bar = S29

#### Built-in temperature and pressure-controlled bypass, two-pass\*

50 °C, 2.2 bar = T25

60 °C, 2.2 bar = T26

70 °C, 2.2 bar = T27

90 °C, 2.2 bar = T29

\* = not for LDC 002 - LDC 004

### 7. MATRIX GUARD

No guard = 0

Stone guard = S

Dust guard = D

Dust and stone guard = P

### 8. STANDARD/SPECIAL

Standard = 0

Special = Z

# Technical specification

## FLUID COMBINATIONS

Mineral oil	HL/HLP in accordance with DIN 51524
Oil/water emulsion	HFA, HFB in accordance with CETOP RP 77H
Water glycol	HFC in accordance with CETOP RP 77H
Phosphate ester	HFD-R in accordance with CETOP RP 77H

## MATERIAL

Cooler matrix	Aluminum
Fan blades/guard	Glass fibre reinforced polypropylene
Fan housing	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated

## COOLER MATRIX

Maximum static working pressure	21 bar
Dynamic working pressure	14 bar*
Heat transfer tolerance	± 6 %
Maximum oil inlet temperature	120 °C

\* Tested in accordance with ISO/DIS 10771-1

## ELECTRIC MOTOR

LDC	002	003	004	007-020	023-033
Speed (rpm)	3 700	3 670	3 350	3 060	3 060
Protection std.	IP 68	IP 68	IP 68	IP 68	IP 68
Insulation class	H	H	H	H	H
Ambient temp.	-30°C - +80°C				
Power consump. (A) 12V	6.5	8	8	20	2x20*
(A) 24V	3.5	4	4	10	2x10*

\* = LDC 023 and LDC 033 have two motors

Use a relay if the current load is superior to: 8 A at 12V and 6 A 24V

## COOLING CAPACITY CURVES

The cooling capacity curves in this technical data sheet are based on tests in accordance with EN 1048 and have been produced using oil type ISO VG 46 at 60 °C.

## CONTACT OLAER FOR ADVICE ON

Oil temperatures > 120 °C

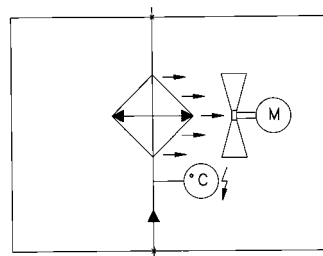
Oil viscosity > 100 cSt

Aggressive environments

Ambient air rich in particles

High-altitude locations

## CONNECTION CHART



Connection chart for LDC air oil cooler.

The information in this brochure is subject to change without prior notice.



With our specialist expertise, industry knowledge and advanced technology, we can offer a range of different solutions for coolers and accessories to meet your requirements.

# Take the next step

- choose the right accessories

Supplementing a hydraulic system with a cooler, cooler accessories and an accumulator gives you increased availability and a longer useful life, as well as lower service and repair costs. All applications and operating environments are unique. A well-planned choice of the following accessories can thus further improve your hydraulic system. Please contact Olaer for guidance and information.



### Pressure-controlled bypass valve *Integrated*

Allows the oil to bypass the cooler matrix if the pressure drop is too high. Reduces the risk of the cooler bursting, e.g. in connection with cold starts and temporary peaks in pressure or flow. Available for single-pass or two-pass matrix design.



### Smart DC Drive speed regulation

For cost-efficient operation and better environmental consideration through speed-regulated fan control – the higher the temperature, the higher the fan speed.



### Temperature-controlled bypass valve *Integrated*

Same function as the pressure-controlled by-pass valve, but with a temperature-controlled opening pressure - the hotter the oil, the higher the opening pressure. Available for single-pass or two-pass matrix design.



### Stone guard/Dust guard

Protects components and systems from tough conditions.



### Thermo contact

Sensor with preset fix point. For temperature warnings, and for more cost-efficient operation and better environmental consideration through the automatic switching on and off of the fan motor.



### Temperature-controlled 3-way valve *External*

Same function as the temperature-controlled bypass valve, but positioned externally. Note: must be ordered separately.



Professional competence as well as advanced technology and extensive knowledge from the industry, allow us to provide many cooler combinations, which meet your unique needs.

# Combinations

*providing optimal solutions*

A close collaboration between our application engineers, designers and you as customer during the whole project will result in a high-quality product. The final product will be a tailor-made cooler, which always meet your unique needs.

## Extensive choices

Long-term experience from the mobile field has provided us with a unique ability to deliver the ideal combination cooler solution. Depending on the conditions, the cooler fan can be operated by the diesel engine on the machine or by a hydraulic motor or a DC motor. We can also supply many different cooler combination options. A frequent combination is the "side-by-side"-cooler, where the coolers are placed side-by-side, no matter the media, such as a water cooler, an oil cooler and an intercooler. Another solution is the "sandwich"-cooler, where the coolers are placed in front of each other. The solution could also be a combination of these two. No matter which combination will be used, the pressure drop and the heat dissipation across the matrix will always be optimal.







- in Fluid Energy Management

# Global perspective

*and local entrepreneurial flair*



Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage. Olaer develops, manufactures and markets products and systems for a number of different sectors, e.g. the aircraft, engineering, steel and mining industries, as well as for sectors such as oil and gas, contracting and transport, farming and forestry, renewable energy, etc.

All over the world, our products operate in the most diverse environments and applications. One constantly

repeated demand in the market is for optimal energy storage and temperature optimisation. We work at a local level with a whole world as our workplace – local entrepreneurial flair and a global perspective go hand in hand.

Our local presence, long experience and a wealth of knowledge combine with our cutting-edge expertise to give you the best possible conditions for making a professional choice.

# LHC

*With hydraulic motor*





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All over the world, our products are working in the most diverse environments and applications.

# LHC Air Oil Coolers

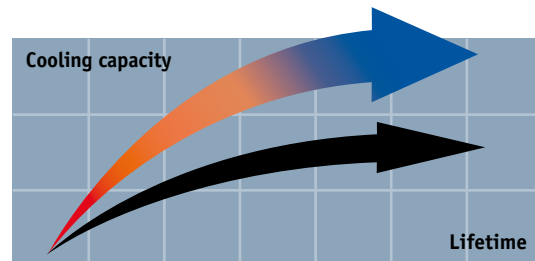
*For mobile and industrial use - maximum cooling capacity 160 kW*

The LHC air oil cooler with hydraulic motor is optimized for use in the mobile and industrial sector. Together with a wide range of accessories, the LHC cooler is suitable for installation in most applications and environments. The maximum cooling capacity is 160 kW at ETD 40 °C. Choosing the right cooler requires precise sizing. The most reliable way to size is with the aid of our calculation program. This program, together with precise evaluations from our experienced, skilled engineers, gives you the opportunity for more cooling per € invested.



## Overheating - an expensive problem

An under-sized cooling capacity produces a temperature balance that is too high. The consequences are poor lubricating properties, internal leakage, a higher risk of cavitation, damaged components, etc. Overheating leads to a significant drop in cost-efficiency and environmental consideration.



## Temperature optimisation - a basic prerequisite for cost-efficient operation

Temperature balance in a hydraulic system occurs when the cooler can cool down the energy input that the system does not consume - the system's lost energy ( $P_{loss} = P_{cool} = P_{in} - P_{used}$ ).

Temperature optimisation means that temperature balance occurs at the system's ideal working temperature - the temperature at which the oil's viscosity and the air content comply with recommended values. The correct working temperature produces a number of economic and environmental benefits:

- The hydraulic system's useful life is extended.
- The oil's useful life is extended.
- The hydraulic system's availability increases - more operating time and fewer shutdowns.
- Service and repair costs are reduced.
- High efficiency level maintained in continuous operation - the system's efficiency falls if the temperature exceeds the ideal working temperature.

**Clever design** and the right choice of materials and components produce a long useful life, high availability and low service and maintenance costs.

**Compact design** and low weight.

**Easy to maintain** and easy to retrofit in many applications.



**Hydraulic motor** with displacement from 8.4 cm<sup>3</sup>/r to 25.2 cm<sup>3</sup>/r.

**Collar bearing for fan motor** on larger models provides longer useful life.

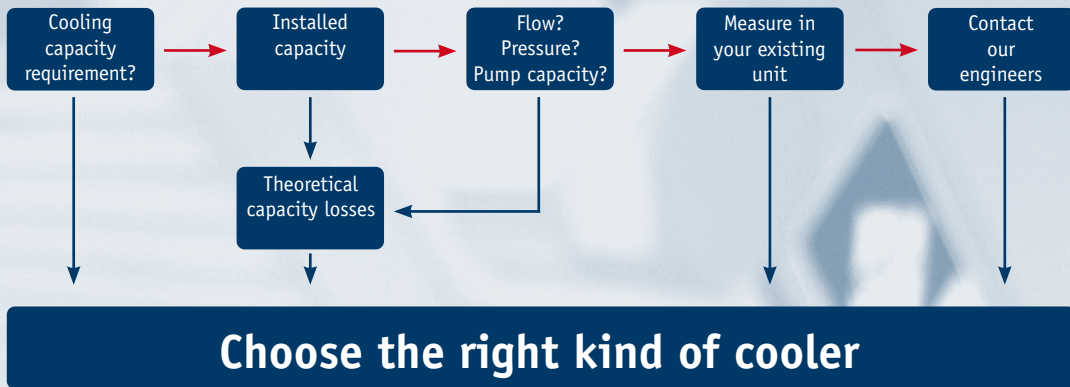
**Quiet** fan and fan motor.

**Cooler matrix** with low pressure drop and high cooling capacity.

### LHC-M and LHC-X

LHC air oil coolers are also available in two special versions, LHC-X (ATEX version), approved for applications where there may be an explosive environment above ground, and LHC-M, adapted to be able better to deal with corrosion attacks, for example in marine environments.

# Calculate the cooling capacity requirement



Enter your values ....

This block contains a collage of images related to the software's output. On the left, there are two screenshots of the software's input and output screens. In the center, there is a technical drawing of the LAC2 011-4-D cooler, showing side and top views with dimensions. To the right, there is a photograph of the physical LAC2 011-4-D cooler unit.

... suggested solution



Better energy consumption means not only less environmental impact, but also reduces operating costs, i.e. more cooling per € invested.

# More cooling per €

*with precise calculations and our engineers' support*

Optimal sizing produces efficient cooling. Correct sizing requires knowledge and experience. Our calculation program, combined with our engineers' support, gives you access to this very knowledge and experience. The result is more cooling per € invested.

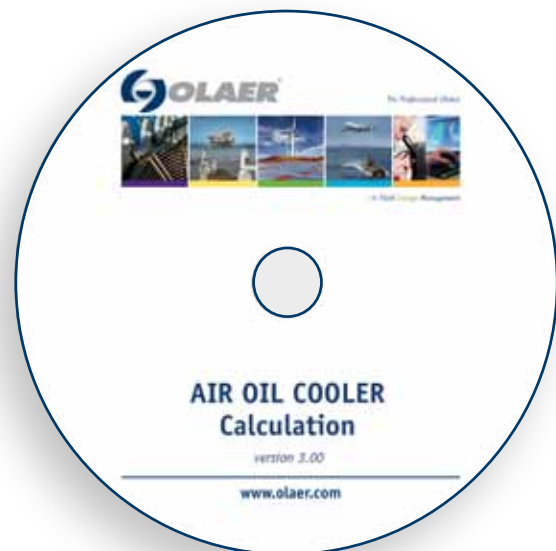
**The user-friendly calculation program can be downloaded from [www.olaer.se](http://www.olaer.se)**

## Valuable system review into the bargain

A more wide-ranging review of the hydraulic system is often a natural element of cooling calculations. Other potential system improvements can then be discussed – e.g. filtering, offline or online cooling, etc. Contact us for further guidance and information.

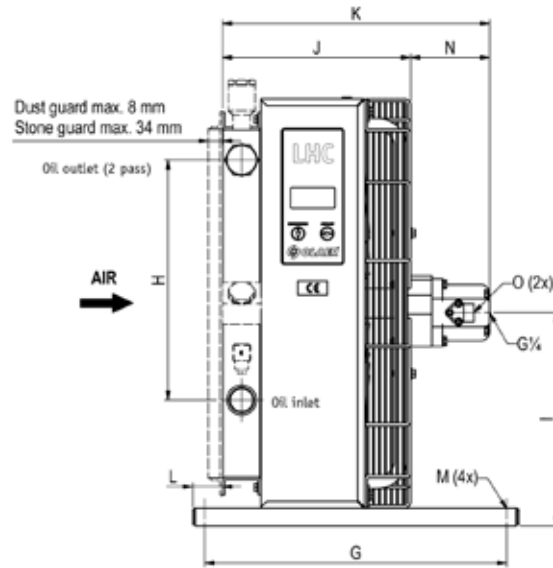
## OLAER's quality and performance guarantee insurance for your operations and systems

A constant striving towards more cost-efficient and environment friendly hydraulic systems requires continuous development. Areas where we are continuously seeking to improve performance include cooling capacity, noise level, pressure drop and fatigue.



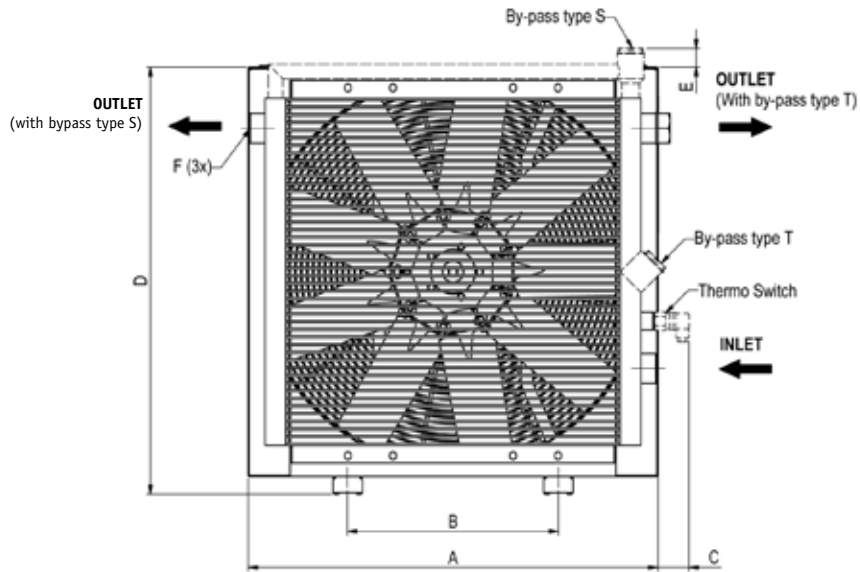
Meticulous quality and performance tests are conducted in our laboratory. All tests and measurements take place in accordance with standardised methods – cooling capacity in accordance with EN1048, noise level ISO 3743, pressure drop EN 1048 and fatigue ISO 10771-1.

For more information about our standardised tests, ask for "OLAER's blue book – a manual for more reliable cooler purchasing".



TYPE	Fan speed rpm	Fan capacity kW	Weight kg (approx)	Max speed rpm	Acoustic pressure level LpA dB(A) 1m*
LHC2 007	1500	0.10	10	3500	62
	3000	0.65	10	3500	79
LHC2 011	1500	0.20	15	3500	67
	3000	1.50	15	3500	82
LHC2 016	1000	0.10	18	3500	60
	1500	0.35	18	3500	70
	3000	2.50	18	3500	86
LHC2 023	1000	0.15	30	2840	64
	1500	0.50	30	2840	76
LHC 033	1000	0.65	40	2350	75
	1500	2.00	40	2350	85
LHC 044	1000	0.70	56	2350	77
	1500	2.00	56	2350	86
LHC 056	750	0.75	70	1850	74
	1000	1.80	70	1850	82
LHC 058	750	0.75	77	1850	75
	1000	1.80	77	1850	83
LHC 076	750	0.70	105	1690	80
	1000	1.60	105	1690	87
LHC 078	750	0.70	111	1690	81
	1000	1.60	111	1690	88
LHC 110	750	1.70	117	1440	85
	1000	4.00	117	1440	91
LHC 112	750	1.70	125	1440	86
	1000	4.00	125	1440	92
LHC 113	750	1.70	184	1440	87
	1000	4.00	184	1440	93

\* = Noise level tolerance  $\pm 3$  dB(A).

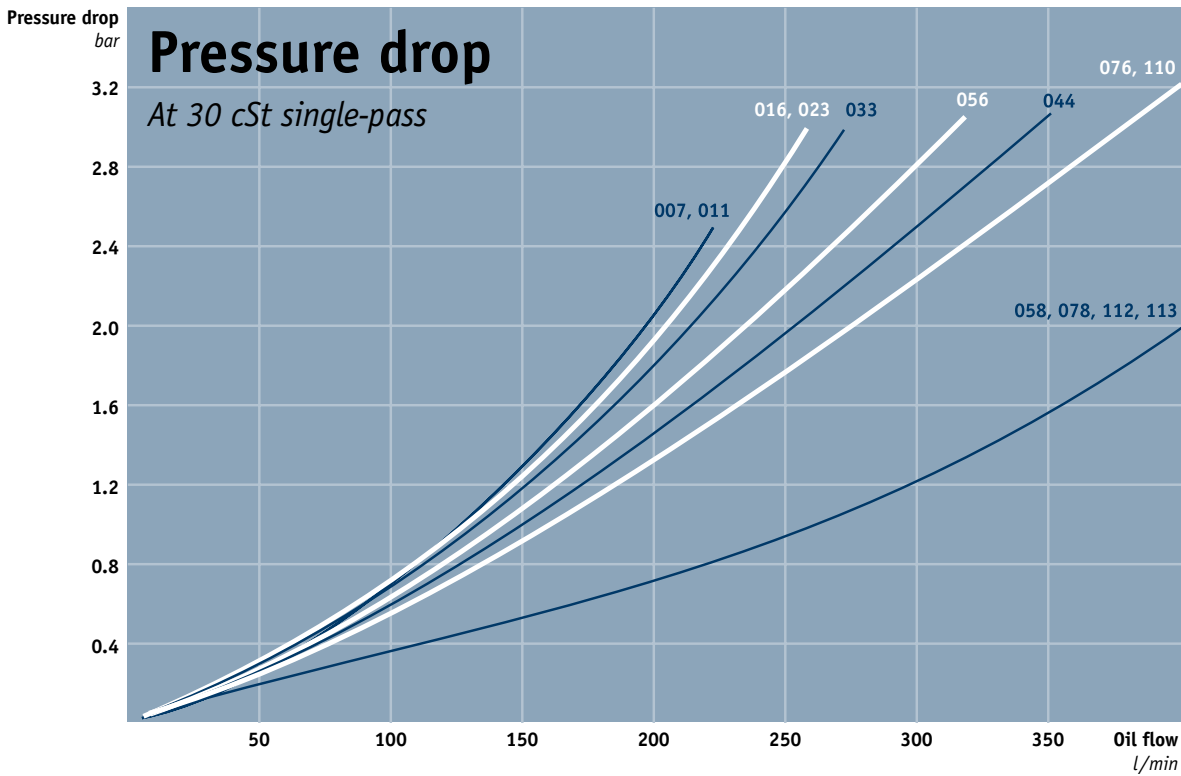


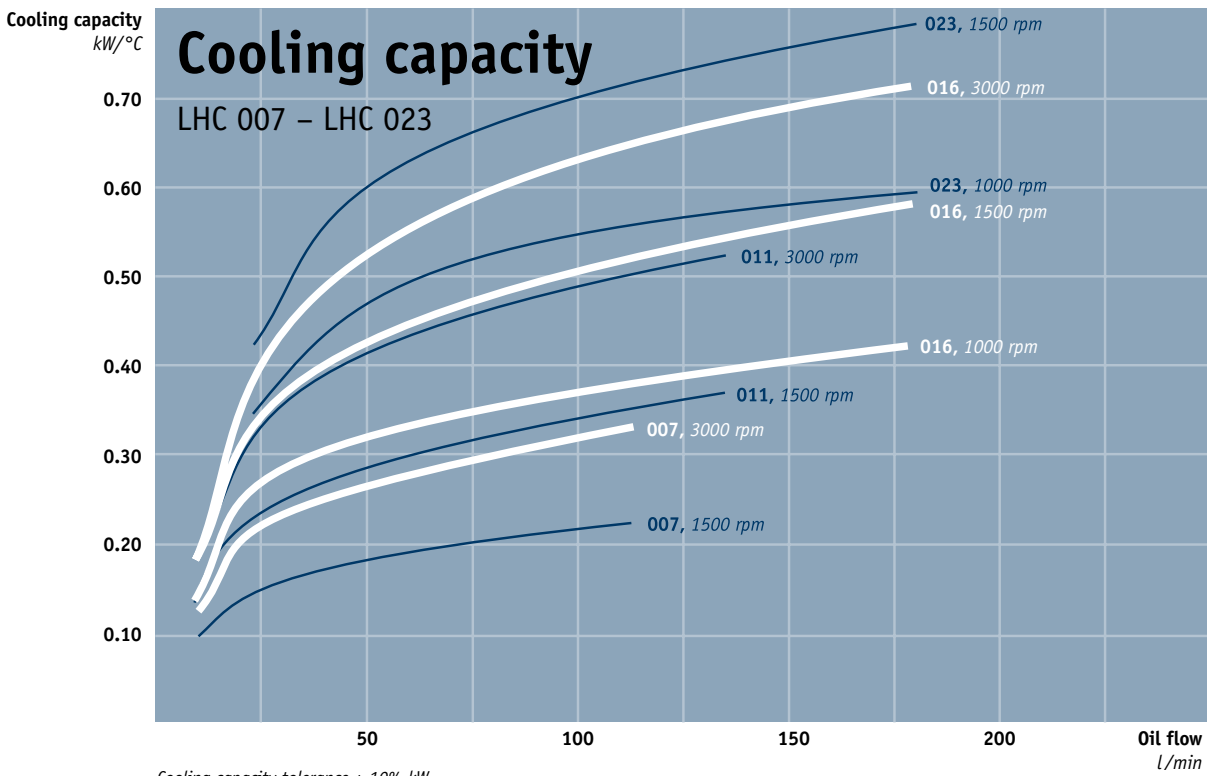
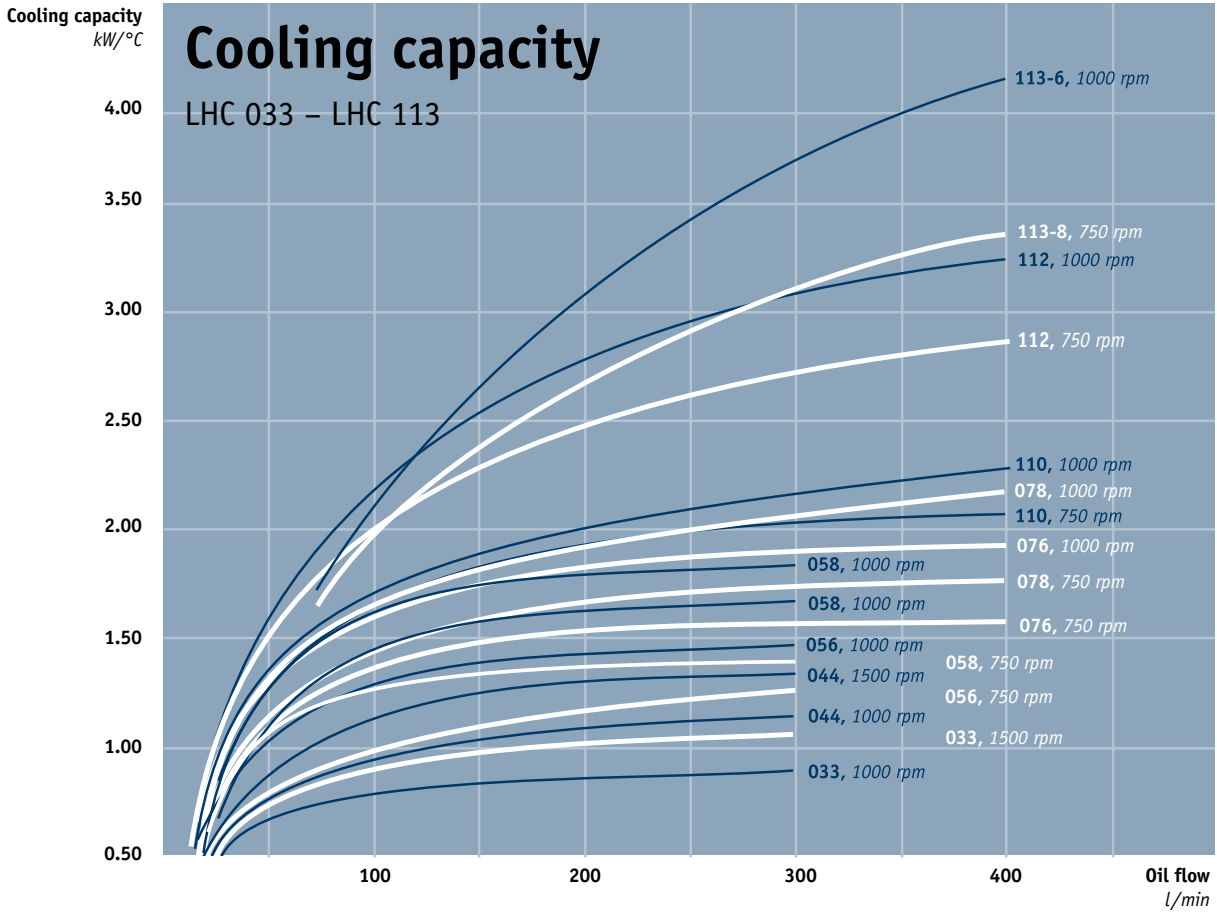
TYPE	A	B	C	D	E	F	G	H	I	J	K	L	M $\varnothing$
LHC2 007	365	203	64	395	42	G1	510	160	197	225	J+N	50	99
LHC2 011	440	203	62	470	41	G1	510	230	234	249	J+N	50	9
LHC2 016	496	203	66	526	46	G1	510	230	262	272	J+N	50	9
LHC2 023	580	356	44	610	44	G1	510	305	304	287	J+N	50	9
LHC 033	692	356	42	722	42	G1½	510	406	360	318	J+N	50	9
LHC 044	692	356	59	866	59	G1½	510	584	432	343	J+N	50	9
LHC 056	868	508	49	900	43	G1½	510	584	448	368	J+N	50	9
LHC 058	868	508	49	898	43	G2	510	584	448	388	J+N	30	9
LHC 076	1022	518	41	1052	45	G1½	610	821	525	393	J+N	70	14
LHC 078	1022	518	41	1052	45	G2	610	821	525	413	J+N	50	14
LHC 110	1185	600	54	1215	45	G2	610	985	607	418	J+N	70	14
LHC 112	1185	600	54	1215	45	G2	610	985	607	438	J+N	50	14
LHC 113	1200	600	82	1215	45	G2	610	985	607	485	J+N	132	14

MOTOR	Displacement cm <sup>3</sup> /r	N LHC2 007 -LHC2 023	N LHC 033 - LHC 112	O Angular connection	Max. working pressure bar
A	8.4	91	133	G½	210
B	10.8	98	138	G½	210
C	14.4	101	144	G½	210
D	16.8	105	148	G¾	210
E	19.2	110	151	G¾	210
F	25.2	120	165	G¾	160



The cooling capacity curves are based on the inlet oil temperature and the ambient air temperature. An oil temperature of 60 °C and an air temperature of 20 °C produce a temperature difference of 40 °C. Multiply by kW/°C for total cooling capacity.





# Key for LHC and LHC2 air oil coolers

All positions must be filled in when ordering

## EXAMPLE:

LHC2 - 016 - B - 50 - S20 - S - Z

1 2 3 4 5 6 7

### 1. AIR OIL COOLER

WITH HYDRAULIC MOTOR = LHC / LHC2

### 2. COOLER SIZE

007, 011, 016, 023, 033, 044, 056, 058, 076, 078, 110, 112 and 113.

### 3. HYDRAULIC MOTOR, DISPLACEMENT

No hydraulic motor	= 0
Displacement 8.4 cm <sup>3</sup> /r	= A
Displacement 10.8 cm <sup>3</sup> /r	= B
Displacement 14.4 cm <sup>3</sup> /r	= C
Displacement 16.8 cm <sup>3</sup> /r	= D
Displacement 19.2 cm <sup>3</sup> /r	= E
Displacement 25.2 cm <sup>3</sup> /r	= F
Special	= X

(X: pressure, displacement, installation sizes, etc. must be stated in plain language)

### 4. THERMO CONTACT

No thermo contact	= 00
40 °C	= 40
50 °C	= 50
60 °C	= 60
70 °C	= 70
80 °C	= 80
90 °C	= 90

### 5. COOLER MATRIX

Standard	= 000
Two-pass	= T00
<b>Built-in, pressure-controlled bypass, single-pass</b>	
2 bar	= S20
5 bar	= S50
8 bar	= S80
<b>Built-in, pressure-controlled bypass, two-pass*</b>	
2 bar	= T20
5 bar	= T50
8 bar	= T80
<b>Built-in temperature and pressure-controlled bypass, single-pass</b>	
50 °C, 2.2 bar	= S25
60 °C, 2.2 bar	= S26
70 °C, 2.2 bar	= S27
90 °C, 2.2 bar	= S29
<b>Built-in temperature and pressure-controlled bypass, two-pass*</b>	
50 °C, 2.2 bar	= T25
60 °C, 2.2 bar	= T26
70 °C, 2.2 bar	= T27
90 °C, 2.2 bar	= T29

### 6. MATRIX GUARD

No guard	= 0
Stone guard	= S
Dust guard	= D
Dust and stone guard	= P

### 7. STANDARD/SPECIAL

Standard	= 0
Special	= Z

## Technical specification

### FLUID COMBINATIONS

Mineral oil	HL/HLP in accordance with DIN 51524
Oil/water emulsion	HFA, HFB in accordance with CETOP RP 77H
Water glycol	HFC in accordance with CETOP RP 77H
Phosphate ester	HFD-R in accordance with CETOP RP 77H

### MATERIAL

Cooler matrix	Aluminum
Fan blades/hub	Glass fibre reinforced polypropylene/ Aluminum
Fan housing	Steel
Fan guard	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated

### COOLER MATRIX

Maximum static operating pressure	21 bar
Dynamic operating pressure	14 bar*
Heat transfer limit	± 6 %
Maximum oil inlet temperature	120 °C

\* Tested in accordance with ISO/DIS 10771-1

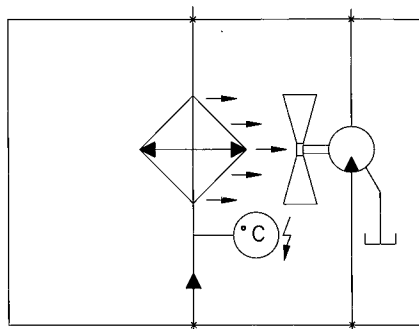
### COOLING CAPACITY CURVES

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- Oil temperatures > 120 °C
- Oil viscosity > 100 cSt
- Aggressive environments
- Ambient air rich in particles
- High-altitude locations

### CONNECTION CHART



Connection chart for LHC air oil cooler.

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### Pressure-controlled bypass valve *Integrated*

Allows the oil to bypass the cooler matrix if the pressure drop is too high. Reduces the risk of the cooler bursting, e.g. in connection with cold starts and temporary peaks in pressure or flow. Available for single-pass or two-pass matrix design.



### Stone guard/Dust guard

Protects components and systems from tough conditions.



### Temperature-controlled bypass valve *Integrated*

Same function as the pressure-controlled by-pass valve, but with a temperature-controlled opening pressure - the hotter the oil, the higher the opening pressure. Available for single-pass or two-pass matrix design.



### Lifting eyes

For simple installation and relocation.



### Thermo contact

Sensor with fixed set point. For temperature warnings, and for more cost-efficient operation and better environmental consideration through the automatic switching on and off of the fan motor.



### Temperature-controlled 3-way valve *External*

Same function as the temperature-controlled bypass valve, but positioned externally. Note: must be ordered separately.



- in Fluid Energy Management

# Global perspective

*and local entrepreneurial flair*



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# LOC

*Cooling system*





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All over the world, our products are working in the most diverse environments and applications.

# LOC Cooling System

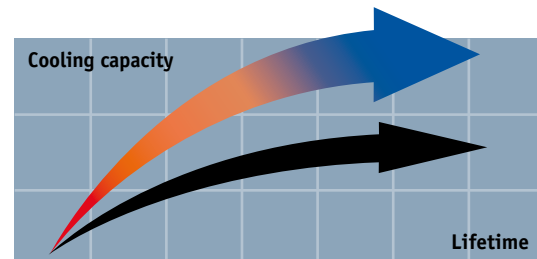
*For industrial use – maximum cooling capacity 45 kW*

The LOC cooling system with three-phase AC motor is optimized for use in the industrial sector. The system is supplied ready for installation. An integrated circulation pump makes it possible to cool and treat the oil in a separate circuit – offline cooling. The cooling system is also available with the FX3 filter unit. Together with a wide range of accessories, the LOC cooling system is suitable for installation in most applications and environments. The maximum cooling capacity is 45 kW at ETD 40 °C. Choosing the right cooler requires precise system sizing. The most reliable way to size is with the aid of our calculation program. This program, together with precise evaluations from our experienced, skilled engineers, gives you the opportunity for more cooling per € invested.



## Overheating - an expensive problem

An under-sized cooling capacity produces a temperature balance that is too high. The consequences are poor lubricating properties, internal leakage, a higher risk of cavitation, damaged components, etc. Overheating leads to a significant drop in cost-efficiency and environmental consideration.



## Temperature optimisation - a basic prerequisite for cost-efficient operation

Temperature balance in a hydraulic system occurs when the cooler can cool down the energy input that the system does not consume - the system's lost energy ( $P_{loss} = P_{cool} = P_{in} - P_{used}$ ).

Temperature optimisation means that temperature balance occurs at the system's ideal working temperature – the temperature at which the oil's viscosity and the air content comply with recommended values. The correct working temperature produces a number of economic and environmental benefits:

- Extended hydraulic system life.
- Extended oil life.
- Increased hydraulic system availability - more operating time and fewer shutdowns.
- Reduced service and repair costs.
- Maintained high efficiency in continuous operation – the system efficiency falls if the temperature exceeds the ideal working temperature.

**Clever design** and the right choice of materials and components produce a long useful life, high availability and low service and maintenance costs.

**Integrated circulation pump** produces even flow with low pressure pulsations.

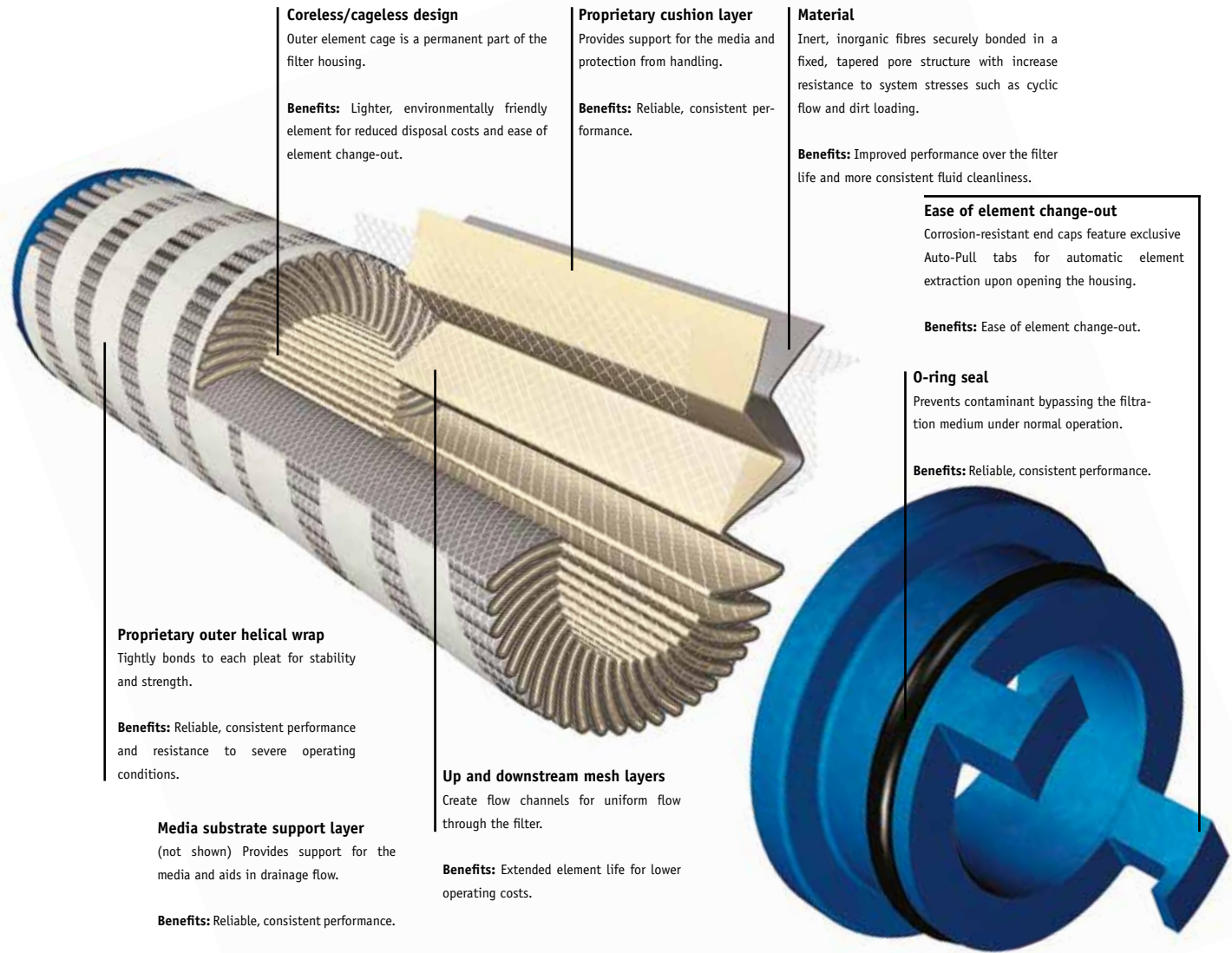
**Easy to maintain** and easy to retrofit in many applications.



**Cooler matrix** with low pressure drop and high cooling capacity.

**Quiet** fan and fan motor.

**Compact design** and low weight.



**Coreless/cageless design**  
Outer element cage is a permanent part of the filter housing.  
**Benefits:** Lighter, environmentally friendly element for reduced disposal costs and ease of element change-out.

**Proprietary cushion layer**  
Provides support for the media and protection from handling.  
**Benefits:** Reliable, consistent performance.

**Material**  
Inert, inorganic fibres securely bonded in a fixed, tapered pore structure with increase resistance to system stresses such as cyclic flow and dirt loading.  
**Benefits:** Improved performance over the filter life and more consistent fluid cleanliness.

**Ease of element change-out**  
Corrosion-resistant end caps feature exclusive Auto-Pull tabs for automatic element extraction upon opening the housing.  
**Benefits:** Ease of element change-out.

**O-ring seal**  
Prevents contaminant bypassing the filtration medium under normal operation.  
**Benefits:** Reliable, consistent performance.

**Proprietary outer helical wrap**  
Tightly bonds to each pleat for stability and strength.  
**Benefits:** Reliable, consistent performance and resistance to severe operating conditions.

**Up and downstream mesh layers**  
Create flow channels for uniform flow through the filter.  
**Benefits:** Extended element life for lower operating costs.

**Media substrate support layer**  
(not shown) Provides support for the media and aids in drainage flow.  
**Benefits:** Reliable, consistent performance.

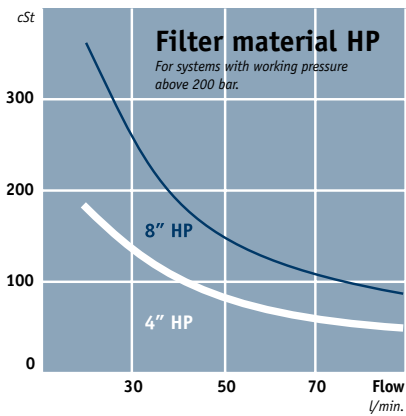
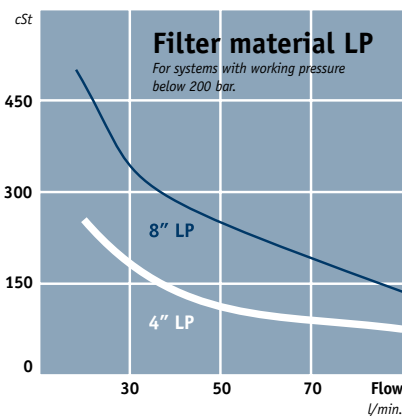
## Good things come in small packages...

### Characteristics

- Stress-resistant design
- Uniform pore size control layer
- Tapered pore structure
- Epoxy resin bonded fibre matrix with small fibre size
- Anti-static design

### Benefits

- Enhanced performance under cyclic flow and pressure conditions
- Maintained efficiency during the entire life
- Dirt captured throughout the media depth
- High particles removal efficiency
- Minimized static charge generation and electrostatic discharge



### Choose the right filter element:

1. **Filter material HP or LP** – depends on pressure level, i.e. the system's average pressure.
2. **The filter's flow capacity** – the oil flow is determined by the LOC cooler model, i.e. current cooling requirement.
3. **The length of the filter element** – depends on the operating viscosity. The pressure drop over the filter element is proportional to the viscosity, e.g. oil that is three times as thick produces a pressure drop that is three times as high.



The FX3 original filter gives you constantly cleaner oil, more lasting system protection and greater stability during operation at varying flow and pressure.

The FX3 captures dirt along the whole length of the filter material and retains efficiency throughout its useful life.

The element is easy to replace, it comes out when you unscrew the cover - it couldn't be simpler.

# FX3 Original Filter

*element makes difference*

Why not clean the oil while cooling it? Equipped with our filter unit FX3 the oil will be cleaned in a separate circuit, an ideal complement to the system filter. Our filter unit FX3 is available as option.

## Filter technique

Designing filter media has traditionally been a question of balance. By making the medium finer, more efficient and cleaner, pressure drop and/or servicable life is sacrificed. To get low clean pressure

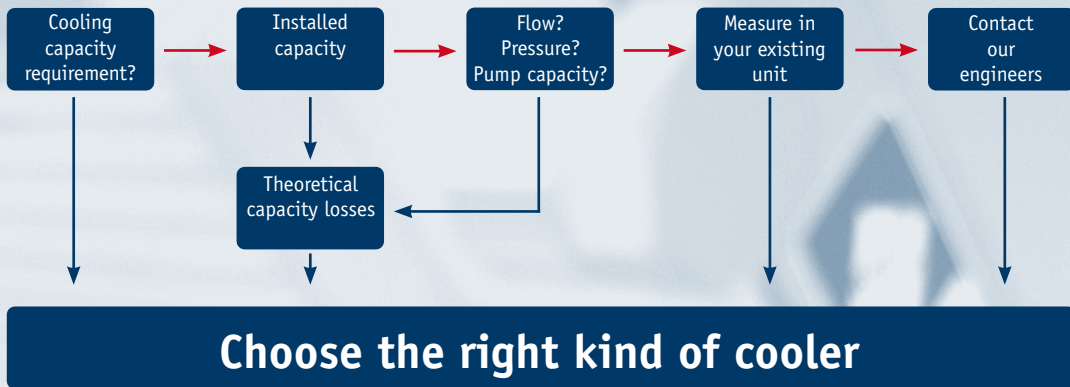
drop the removal efficiency is sacrificed. With FX3 filter media OLAER has improved the filter's ability to maintain fluid cleanliness, while at the same time increasing flow capacity (reducing pressure drop). The result is a better and more consistent system protection, i.e. high flow capacity in a small envelope size, optimum performance at stages of filter life, i.e. optimum performance under cyclic flow and pressure conditions for consistently cleaner fluid.

## FX3 FILTER UNIT

- Compact
- Environment friendly
- Highly efficient



# Calculate the cooling capacity requirement



Enter your values ....

This block contains three main elements: two screenshots of the software's input and output screens, and a technical drawing of a cooler. The left screenshot shows various input fields for parameters like flow rate, pressure, and pump capacity. The right screenshot shows the resulting output, including a table of calculated values and a list of suggested cooler models. The technical drawing shows a side view and a top view of the cooler, with dimensions and a small 3D perspective view of the unit.

... suggested solution



Better energy consumption means not only less environmental impact, but also reduces operating costs, i.e. more cooling per € invested.

# More cooling per €

*with precise calculations and our engineers' support*

Optimal sizing produces efficient cooling. Correct sizing requires knowledge and experience. Our calculation program, combined with our engineers' support, gives you access to this very knowledge and experience. The result is more cooling per € invested.

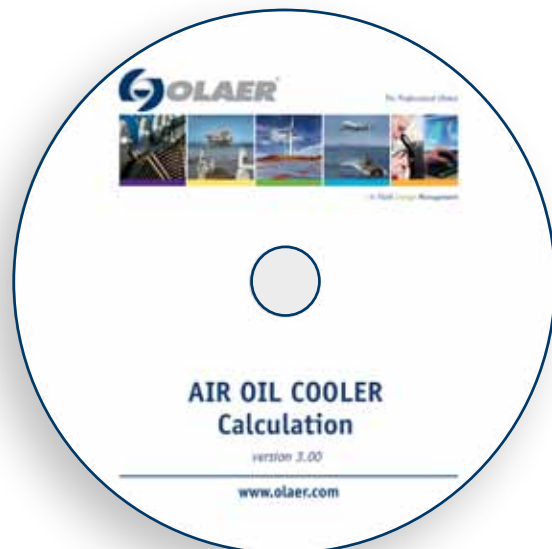
**The user-friendly calculation program can be downloaded from – [www.olaer.se](http://www.olaer.se)**

## Valuable system review into the bargain

A more wide-ranging review of the hydraulic system is often a natural element of cooling calculations. Other potential system improvements can then be discussed – e.g. filtering, offline or online cooling, etc. Contact us for further guidance and information.

## OLAER's quality and performance guarantee insurance for your operations and systems

A constant striving towards more cost-efficient and environment friendly hydraulic systems requires continuous development. Areas where we are continuously seeking to improve performance include cooling capacity, noise level, pressure drop and fatigue.



Meticulous quality and performance tests are conducted in our laboratory. All tests and measurements take place in accordance with standardised methods - cooling capacity in accordance with EN1048, noise level ISO 3743, pressure drop EN 1048 and fatigue ISO 10771-1.

For more information about our standardised tests, ask for "OLAER's blue book – a manual for more reliable cooler purchasing".

## Technical specification

- LOC is designed primarily for synthetic oils, vegetable oils and mineral oil type HL/HLP in accordance with DIN 51524. Maximum oil temperature 100 °C.
- Maximum negative pressure in the inlet line is 0.4 bar with an oil-filled pump. Maximum pressure on the pump's suction side is 0.5 bar.
- Maximum working pressure for the pump is 10 bar. For information about suction height, pressure, etc. see the QPM3 pump manual.

Heat transfer tolerance  $\pm 6 \%$

### 3-PHASE MOTOR

3-phase asynchronous motors in accordance with IEC 60034-1

Nominal voltage	*
Insulation class	F
Rise of temperature	B
Protection class	IP 55
Recommended ambient temperature	-20 °C - +40 °C

\* = See separate instructions for electric motor.

### MATERIAL

Pump housing/Cooler matrix	Aluminum
Fan blades/hub	Glass fibre reinforced polypropylene/Aluminum
Fan housing	Steel
Fan guard	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated

**FX3 FILTER UNIT (option)** Aluminum

The filter housing has a built-in bypass valve, pre-set pressure  $4.5 \pm 0.3$  bar.

### CONTACT OLAER FOR ADVICE ON

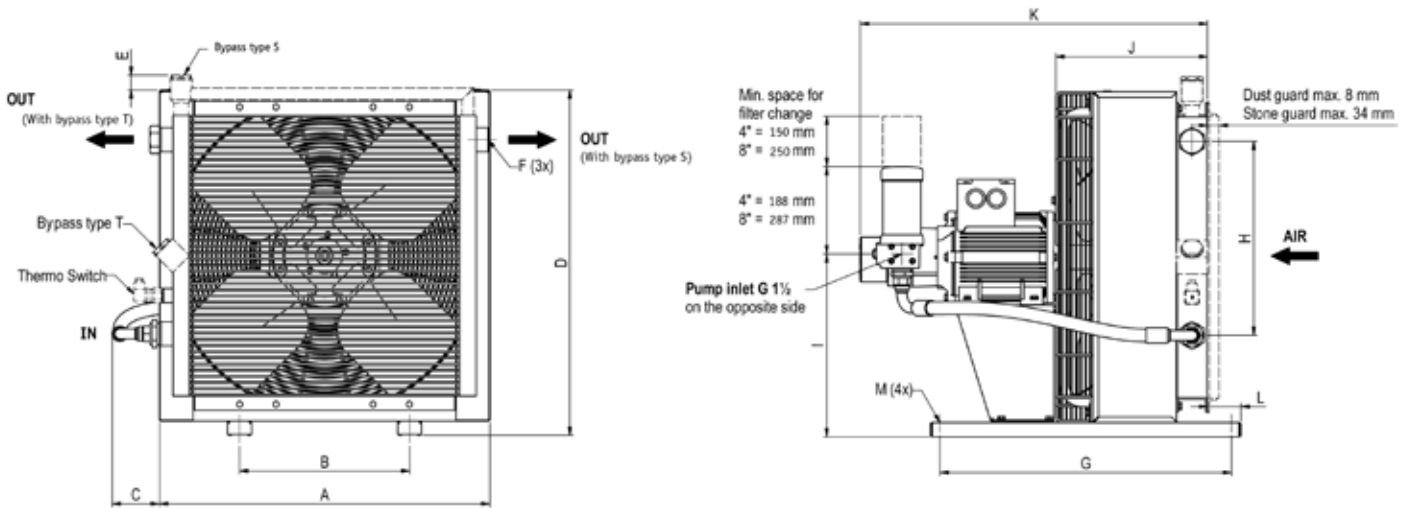
- Oil temperatures > 100 °C
- Oil viscosity > 100 cSt
- Aggressive environments
- Ambient air rich in particles
- High-altitude locations

TYPE	Nom. oil flow l/min	Cooling capacity in kW at EDT 40 °C	Cooling capacity kW/°C	Acoustic pressure level LpA dB(A) 1m*	No. of poles/ Capacity kW	Weight kg (approx)
LOC 004 - 4 - D - A	20	2.7	0.07	57	4-0.75	23
LOC2 007 - 4 - D - A	20	5.6	0.14	64	4-0.75	30
LOC2 007 - 4 - D - B	40	7.2	0.18	64	4-0.75	30
LOC2 007 - 4 - D - C	60	8.0	0.20	65	4-1.50	36
LOC2 007 - 4 - D - D	80	8.4	0.21	65	4-1.50	36
LOC2 011 - 4 - D - A	20	9.2	0.23	70	4-0.75	34
LOC2 011 - 4 - D - B	40	10.4	0.26	70	4-0.75	34
LOC2 011 - 6 - D - C	40	7.6	0.19	61	6-1.10	40
LOC2 011 - 6 - D - D	55	8.8	0.22	61	6-1.10	40
LOC2 011 - 4 - D - C	60	12.0	0.30	70	4-1.50	40
LOC2 011 - 4 - D - D	80	13.2	0.33	70	4-1.50	40
LOC2 016 - 4 - D - A	20	11.2	0.28	74	4-1.50	45
LOC2 016 - 4 - D - B	40	15.6	0.39	74	4-1.50	45
LOC2 016 - 6 - D - C	40	12.4	0.31	64	6-1.10	45
LOC2 016 - 6 - D - D	55	14.0	0.35	64	6-1.10	45
LOC2 016 - 4 - D - C	60	18.0	0.45	74	4-1.50	45
LOC2 016 - 4 - D - D	80	19.6	0.49	74	4-1.50	45
LOC2 023 - 4 - D - B	40	21.2	0.53	77	4-1.50	53
LOC2 023 - 6 - D - C	40	16.8	0.42	67	6-1.10	53
LOC2 023 - 6 - D - D	55	18.4	0.46	67	6-1.50	53
LOC2 023 - 4 - D - C	60	24.4	0.61	77	4-2.20	62
LOC2 023 - 4 - D - D	80	26.8	0.67	77	4-2.20	62
LOC 033 - 6 - A - D	55	26.0	0.65	74	6-2.20	92
LOC 033 - 4 - A - C	60	32.0	0.80	85	4-3.00	76
LOC 033 - 4 - A - D	80	34.8	0.87	85	4-3.00	76
LOC 044 - 6 - A - D	55	34.0	0.85	77	6-2.20	98
LOC 044 - 4 - A - C	60	40.0	1.00	86	4-3.00	85
LOC 044 - 4 - A - D	80	44.8	1.12	86	4-3.00	85

\* = Electric motors specified are calculated for max. working pressure 6 bar at 125 cSt and 50 Hz, 4 bar at 125 cSt and 60 Hz.

If you require higher pressure, please contact us for a choice of motors with a higher output.

\*\* = Noise level tolerance  $\pm 3$  dB(A).



TYPE	A	B	C	D	E	F	G	H	I	J	K	L	M <sub>0</sub>
LOC 004 - 4 - D - A	267	134	135	284	73	G1	420	90	164	163	488	58	9
LOC2 007 - 4 - D - A	365	203	105	395	42	G1	510	160	215	225	558	50	9
LOC2 007 - 4 - D - B	365	203	105	395	42	G1	510	160	215	225	571	50	9
LOC2 007 - 4 - D - C	365	203	105	395	42	G1	510	160	215	225	620	50	9
LOC2 007 - 4 - D - D	365	203	105	395	42	G1	510	160	215	225	633	50	9
LOC2 011 - 4 - D - A	440	203	103	470	41	G1	510	230	252	249	582	50	9
LOC2 011 - 4 - D - B	440	203	103	470	41	G1	510	230	252	249	595	50	9
LOC2 011 - 6 - D - C	440	203	103	470	41	G1	510	230	252	249	643	50	9
LOC2 011 - 6 - D - D	440	203	103	470	41	G1	510	230	252	249	657	50	9
LOC2 011 - 4 - D - C	440	203	103	470	41	G1	510	230	252	249	644	50	9
LOC2 011 - 4 - D - D	440	203	103	470	41	G1	510	230	252	249	657	50	9
LOC2 016 - 4 - D - A	496	203	107	526	46	G1	510	230	285	272	640	50	9
LOC2 016 - 4 - D - B	496	203	107	526	46	G1	510	230	285	272	653	50	9
LOC2 016 - 6 - D - C	496	203	107	526	46	G1	510	230	285	272	665	50	9
LOC2 016 - 6 - D - D	496	203	107	526	46	G1	510	230	285	272	678	50	9
LOC2 016 - 4 - D - C	496	203	107	526	46	G1	510	230	285	272	665	50	9
LOC2 016 - 4 - D - D	496	203	107	526	46	G1	510	230	285	272	678	50	9
LOC2 023 - 4 - D - B	580	356	104	610	40	G1	610	305	322	287	668	50	14
LOC2 023 - 6 - D - C	580	356	104	610	40	G1	610	305	322	287	722	50	14
LOC2 023 - 6 - D - D	580	356	104	610	40	G1	610	305	322	287	722	50	14
LOC2 023 - 4 - D - C	580	356	104	610	40	G1	610	305	322	287	709	50	14
LOC2 023 - 4 - D - D	580	356	104	610	40	G1	610	305	322	287	722	50	14
LOC 033 - 6 - A - D	692	356	99	722	32	G1 1/4	610	406	378	318	754	70	14
LOC 033 - 4 - A - C	692	356	99	722	32	G1 1/4	610	406	378	318	727	70	14
LOC 033 - 4 - A - D	692	356	99	722	32	G1 1/4	610	406	378	318	741	70	14
LOC 044 - 6 - A - D	692	356	99	866	49	G1 1/4	610	584	450	343	779	70	14
LOC 044 - 4 - A - C	692	356	99	866	49	G1 1/4	610	584	450	343	750	70	14
LOC 044 - 4 - A - D	692	356	99	866	49	G1 1/4	610	584	450	343	762	70	14

# Key for LOC and LOC2 cooling systems

All positions must be filled in when ordering

## EXAMPLE:

LOC2 - 011 - 6 - A - C - L - 50 - S20 - D - E0 - 0  
 1 2 3 4 5 6 7 8 9 10/11 12

### 1. TYPE OF COOLING SYSTEM = LOC / LOC2

### 2. COOLER SIZE

004, 007, 011, 016, 023, 033, 044

### 3. NUMBER OF POLES, MOTOR

4 - pole = 4  
 6 - pole = 6

### 4. VOLTAGE AND FREQUENCY

Three-phase 220-240/380-420 V 50 Hz\* = A  
 Three-phase 440-480 V 60 Hz\* = B  
 Three-phase 220-240/380-420 V 50 Hz 440/480 V 60 Hz\*\* = D  
 Three-phase 500 V 50 Hz = E  
 Three-phase 400/690 V 50 Hz 440-480 V 60 Hz = F  
 Three-phase 525 V 50 Hz = G  
 Motor for special voltage (stated in plain language) = X

\* = for LOC 033 to LOC 044

\*\* = for LOC 004 to LOC2 023

### 5. PUMP SIZE

Displacement 15 cm<sup>3</sup>/r = A  
 Displacement 30 cm<sup>3</sup>/r = B  
 Displacement 45 cm<sup>3</sup>/r = C  
 Displacement 60 cm<sup>3</sup>/r = D  
 Special = X

### 6. BYPASS VALVE, PUMP

No bypass valve = 0  
 Built-in bypass valve, 5 bar internal = L  
 Built-in bypass valve, 10 bar internal = H  
 Built-in bypass valve, 5 bar external = K  
 Built-in bypass valve, 10 bar external = M

### 7. THERMO CONTACT

For temperature alarm, not for direct control of electric motor.

No thermo contact = 00  
 40 °C = 40  
 50 °C = 50  
 60 °C = 60  
 70 °C = 70  
 80 °C = 80  
 90 °C = 90

### 8. COOLER MATRIX

Standard = 000  
 Two-pass = T00  
**Built-in, pressure-controlled bypass, single-pass**  
 2 bar = S20  
 5 bar = S50  
 8 bar = S80  
**Built-in, pressure-controlled bypass, two-pass\***  
 2 bar = T20  
 5 bar = T50  
 8 bar = T80

### Built-in temperature and pressure-controlled bypass, single-pass

50 °C, 2.2 bar = S25  
 60 °C, 2.2 bar = S26  
 70 °C, 2.2 bar = S27  
 90 °C, 2.2 bar = S29

### Built-in temperature and pressure-controlled bypass, two-pass\*

50 °C, 2.2 bar = T25  
 60 °C, 2.2 bar = T26  
 70 °C, 2.2 bar = T27  
 90 °C, 2.2 bar = T29

\* = not valid for LOC 004

### 9. MATRIX GUARD

No guard = 0  
 Stone guard = S  
 Dust guard = D  
 Dust and stone guard = P

### 10. FX3 FILTER UNIT (sizing, see page 4)

No filter unit = 0  
 Filter unit with 4" element HP = A  
 Filter unit with 4" element LP = B  
 Filter unit with 8" element HP = E  
 Filter unit with 8" element LP = F

### 11. PRESSURE DROP INDICATOR

No pressure drop indicator. = 0  
 Visual pressure drop indicator with manual reset. = D  
 Visual pressure drop indicator with thermo guard and manual reset. No signal below 0 °C, signal above +29 °C. = P  
 Electric pressure drop indicator with automatic reset. Connection in accordance with DIN 43650 ISO 4400 (Hirschmann) IP 65. = M  
 Electric pressure drop indicator with 2-pole AMP contact. = U

### 12. STANDARD/SPECIAL

Standard = 0  
 Special = Z

### SPARE PARTS

Part number	Description
58920102	Filter element 04" HP
58920103	Filter element 04" LP
58920302	Filter element 08" HP
58920303	Filter element 08" LP
589310	O-ring for filter housing cover

The information in this brochure is subject to change without prior notice.



With our specialist expertise, industry knowledge and advanced technology, we can offer a range of different solutions for coolers and accessories to meet your requirements.

# Take the next step

- choose the right accessories

Supplementing a hydraulic system with a cooler, cooler accessories and an accumulator gives you increased availability and a longer useful life, as well as lower service and repair costs. All applications and operating environments are unique. A well-planned choice of the following accessories can thus further improve your hydraulic system. Please contact Olaer for guidance and information.



### Pressure-controlled bypass valve *Integrated*

Allows the oil to bypass the cooler matrix if the pressure drop is too high. Reduces the risk of the cooler bursting, e.g. in connection with cold starts and temporary peaks in pressure or flow. Available for single-pass or two-pass matrix design.



### Stone guard/Dust guard

Protects components and systems from tough conditions.



### Temperature-controlled bypass valve *Integrated*

Same function as the pressure-controlled by-pass valve, but with a temperature-controlled opening pressure - the hotter the oil, the higher the opening pressure. Available for single-pass or two-pass matrix design.



### Lifting eyes

For simple installation and relocation.



### Thermo contact

Sensor with fixed set point. For temperature warnings, and for more cost-efficient operation and better environmental consideration through the automatic switching on and off of the fan motor.



### Temperature-controlled 3-way valve *External*

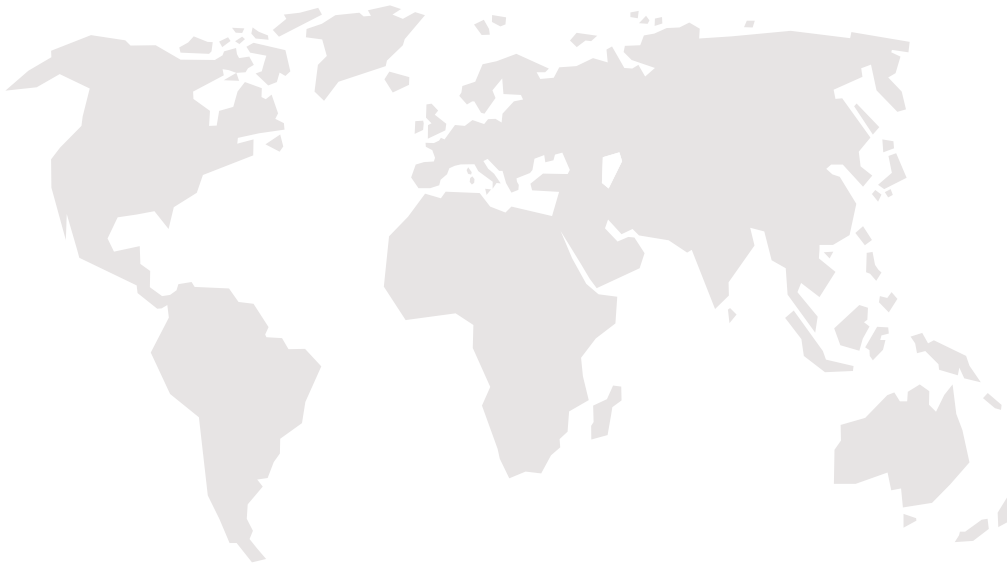
Same function as the temperature-controlled bypass valve, but positioned externally. Note: must be ordered separately.



- in Fluid Energy Management

# Global perspective

*and local entrepreneurial flair*



Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage. Olaer develops, manufactures and markets products and systems for a number of different sectors, e.g. the aircraft, engineering, steel and mining industries, as well as for sectors such as oil and gas, contracting and transport, farming and forestry, renewable energy, etc.

All over the world, our products operate in the most diverse environments and applications. One constantly

repeated demand in the market is for optimal energy storage and temperature optimisation. We work at a local level with a whole world as our workplace – local entrepreneurial flair and a global perspective go hand in hand.

Our local presence, long experience and a wealth of knowledge combine with our cutting-edge expertise to give you the best possible conditions for making a professional choice.