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Oil Coolers For Temperature Optimization In Hydraulic Systems

Catalog HY10-1700/Americas

ss.

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If you have questions about the products contained in this catalog, or their applications, please contact:

Accumulator & Cooler Division - Americas
phone **815 636 4100**
fax **815 636 4111**
parker.com/accumulator

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Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions in the **"Offer of Sale."**

NOTE: Failure or improper selection or improper use of coolers or related items can cause death, personal injury and property damage. Parker Hannifin shall not be liable for any incidental, consequential or special damages that result from use of the information contained in this publication.

⚠WARNING

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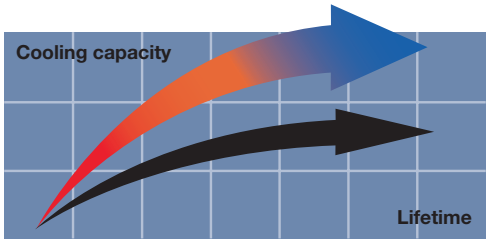
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its related companies at any time without notice.

Table of Contents

Parker is a global player specializing in innovative, efficient system solutions for temperature optimization and energy storage. All over the world, our products are working in the most diverse environments and applications.

Oil Coolers

Choosing the right cooler requires precise system sizing. The most reliable way to size a cooler 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 underestimated cooling capacity produces a temperature that is too high. The consequences are poor lubricating properties, higher internal leakage, a higher risk of cavitation, damaged components, etc. Overheating leads to a significant drop in efficiency which can be detrimental to our environment.

Temperature optimization – 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 **(Ploss = Pcool = Pin – Pused)**.

Temperature optimization occurs at the temperature at which the oil viscosity is maintained at 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.**

ULAC with AC Motor
For industrial use – maximum cooling capacity 400 HP*

Optimized design with the right choice of materials and components ensures reliable and long lasting cooling with low service and maintenance costs.

Compact design results in a lighter weight unit with higher cooling capacity and lower pressure drop.

Easy to maintain and easy to retrofit into many applications.

Quiet fan design due to optimization of material and blade.

AC motor – NEMA three phase motors are standard. A wide range of operating voltages and frequencies available.

Cooler core with low pressure drop and high cooling capacity.

ULOC Cooling System
For industrial use – maximum cooling capacity 60 HP

Optimized 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 an even flow with low pressure pulsations.

Easy to maintain and easy to retrofit in many applications.

Compact design and low weight.

Quiet fan and pump.

Cooler core with low pressure drop and high cooling capacity.

ULDC with DC Motor
For mobile use – maximum cooling capacity 40 HP

Optimized design with the right choice of materials and components ensures reliable and long lasting cooling with low service and maintenance costs.

Compact design results in a lighter weight unit with higher cooling capacity and lower pressure drop.

Easy to maintain and easy to retrofit into many applications.

DC motor 12V/24V

Quiet fan and fan motor.

ULHC with Hydraulic Motor
For mobile and industrial use – maximum cooling capacity 215 HP

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

Compact design results in a lighter weight unit with higher cooling capacity and lower pressure drop.

Easy to maintain and easy to retrofit into many applications.

Hydraulic motor with displacement from 8.4 cc/rev to 25.2 cc/rev.

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

Quiet fan design due to optimization of material and blade.

Cooler core with low pressure drop and high cooling capacity.

OAW Cooling System
For mobile and industrial use – maximum cooling capacity 274 HP

Optimized design and the right choice of materials and components ensures reliable and long lasting cooling with low service and maintenance costs.

Compact design for easy installation.

Turbulent water flow prevents clogging and reduces maintenance.

Low water consumption for economical operation.

SAE O-ring connections for ease of assembly and leak-proof operation.

Maximum material efficiency with no “Dead Zone” outside gaskets.

*At 250 gpm and 70 °F ITD

More Cooling Per $

with precise calculations and our engineers' support

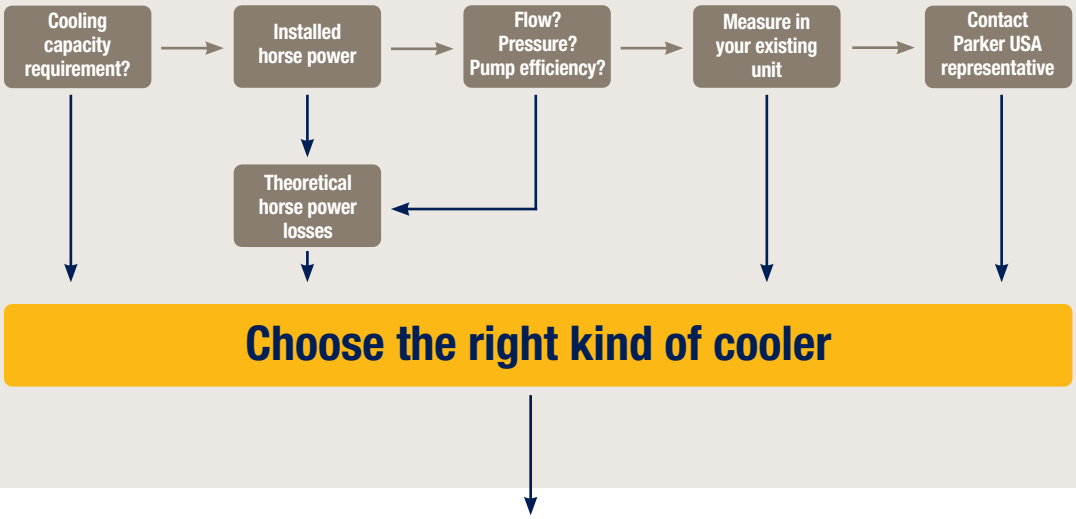
Optimal sizing produces efficient cooling.
Correct sizing requires knowledge and experience. Our calculation program, combined with our engineers' support, gives you access to this very knowledge and experience. The result is more cooling per $ invested.

In-depth system review as an added value.
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.

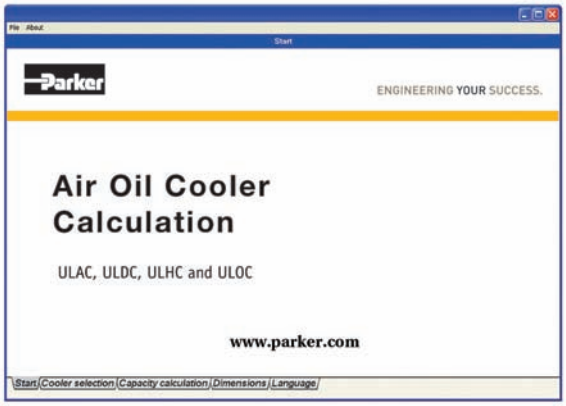
Parker's quality and performance guarantee assures you of maximum system performance and reliability.
A continual desire for more cost efficient and environmentally friendly hydraulic systems requires continuous development. Areas where we are continuously seeking to improve performance include cooling 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 standardized 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 standardized tests, ask for "Parker's blue book – a manual for more reliable cooler purchasing."

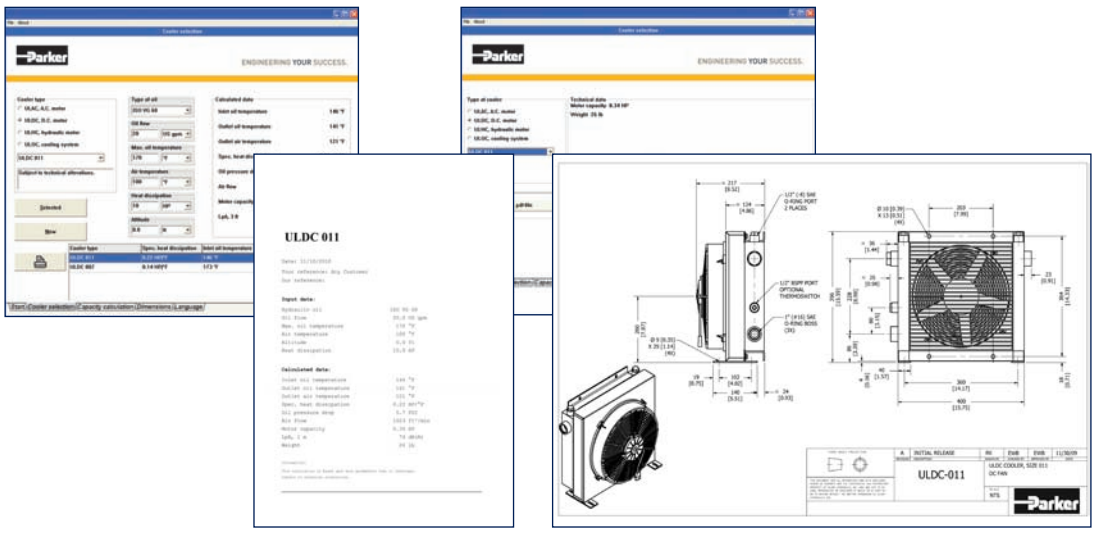
Calculate the cooling capacity requirement



Choose the right kind of cooler



Enter your values ...



... get suggested solution

Notes

ULAC with AC Motor

For industrial use – cooling capacity up to 400 HP

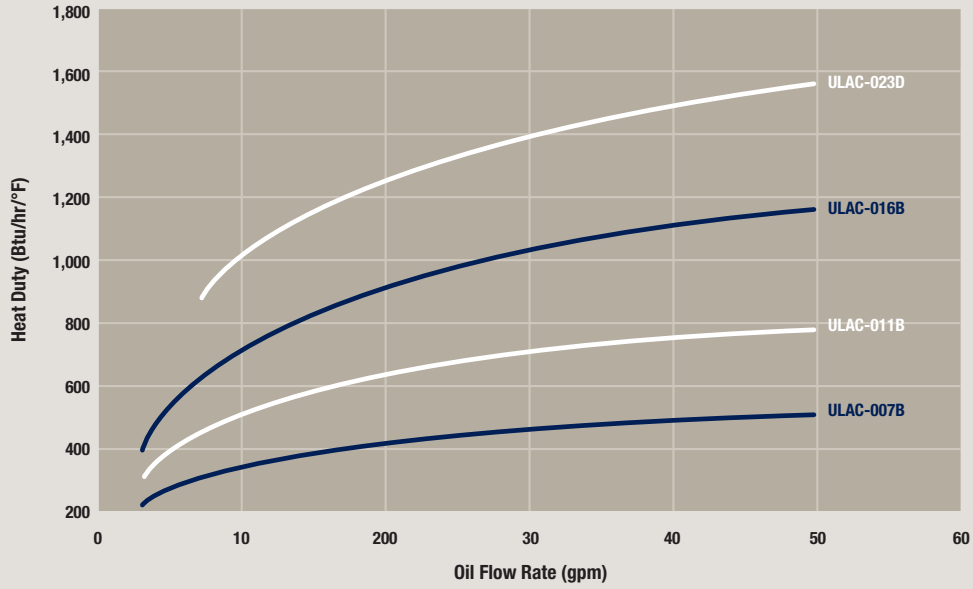
The ULAC oil cooler with AC motor is optimized for use in the industrial sector. Together with a wide range of accessories, the ULAC cooler is suitable for installation in most applications and environments.

- **Optimized design with right choice of materials and components ensures a reliable and long lasting cooler with low service and maintenance costs.**
- **Compact design resulting in lighter weight unit yet with higher cooling capacity and lower pressure drop.**
- **Easy to maintain and easy to retrofit into many applications.**
- **Quiet fan design due to optimization of material and blade design.**
- **AC motor – NEMA three phase motors are standard. Wide range of operating voltages and frequencies available.**
- **Cooler core with low pressure drop and high cooling capacity.**

ULAC Cooling Performance

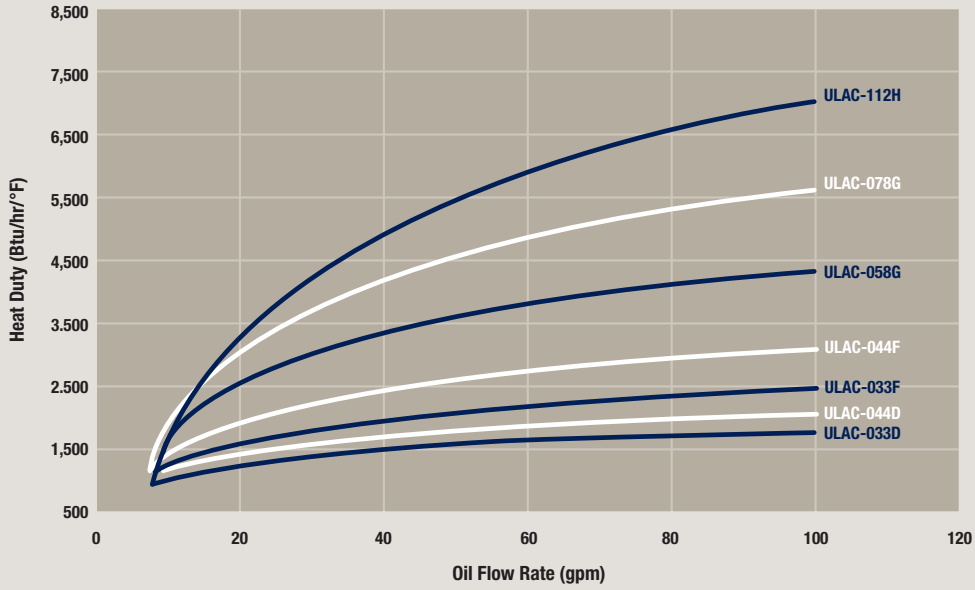
The cooling capacity curves are based on an ETD (Entering Temperature Difference) of 1 °F. For example, oil temperature of 140 °F and air temperature of 70 °F yields a temperature difference of 70 °F. Multiply the number from the cooling graphs corresponding to the specific flow rate by the ETD for the particular application to get the total heat duty.

COOLING PERFORMANCE ULAC 007 - ULAC 023

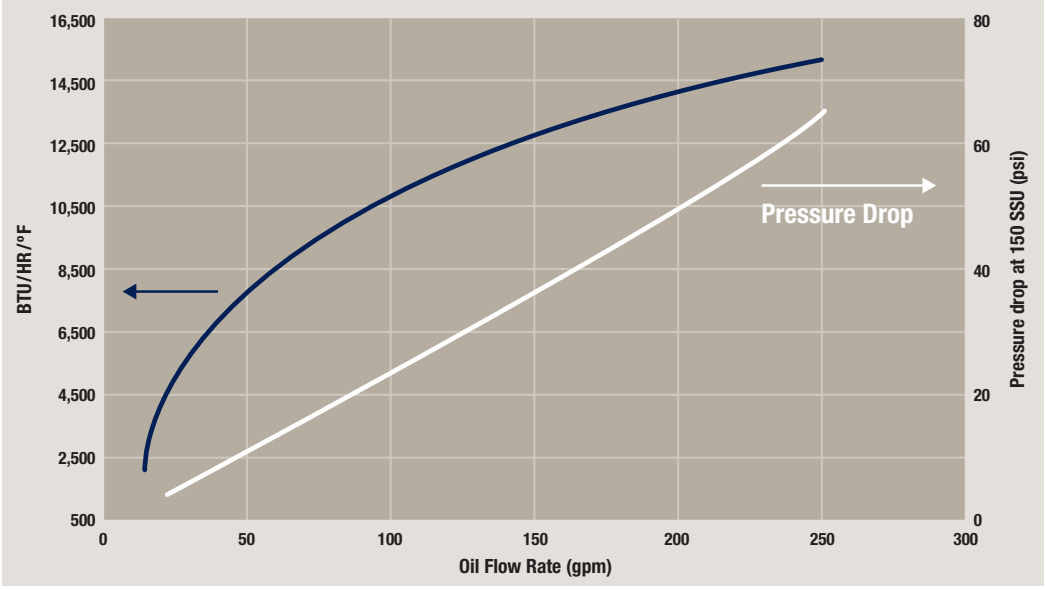


Cooling capacity tolerance ± 10%.

COOLING PERFORMANCE ULAC 033 - ULAC 112

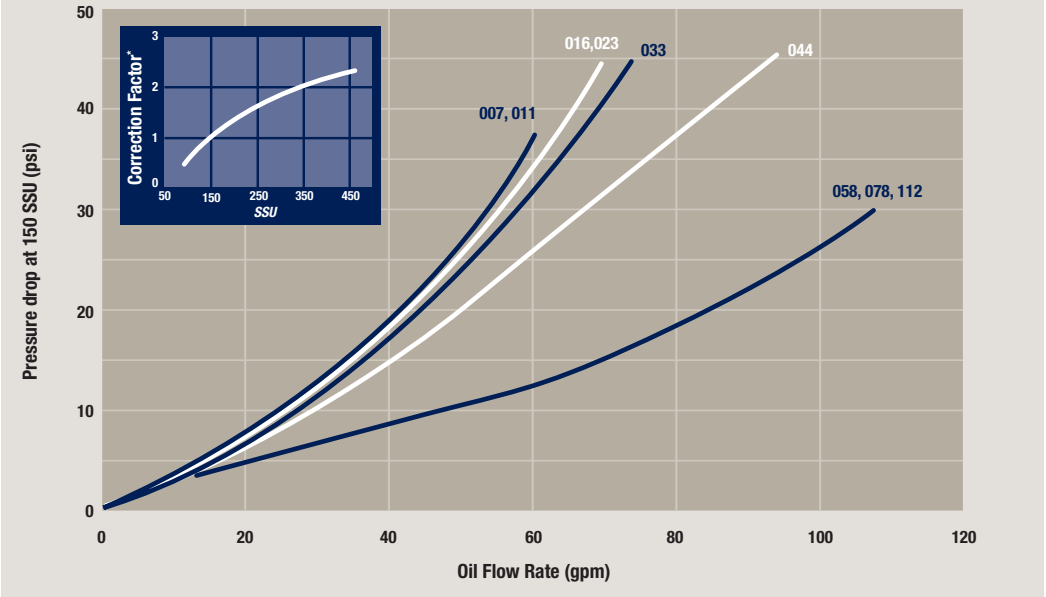


COOLING PERFORMANCE & PRESSURE DROP ULAC 200 K

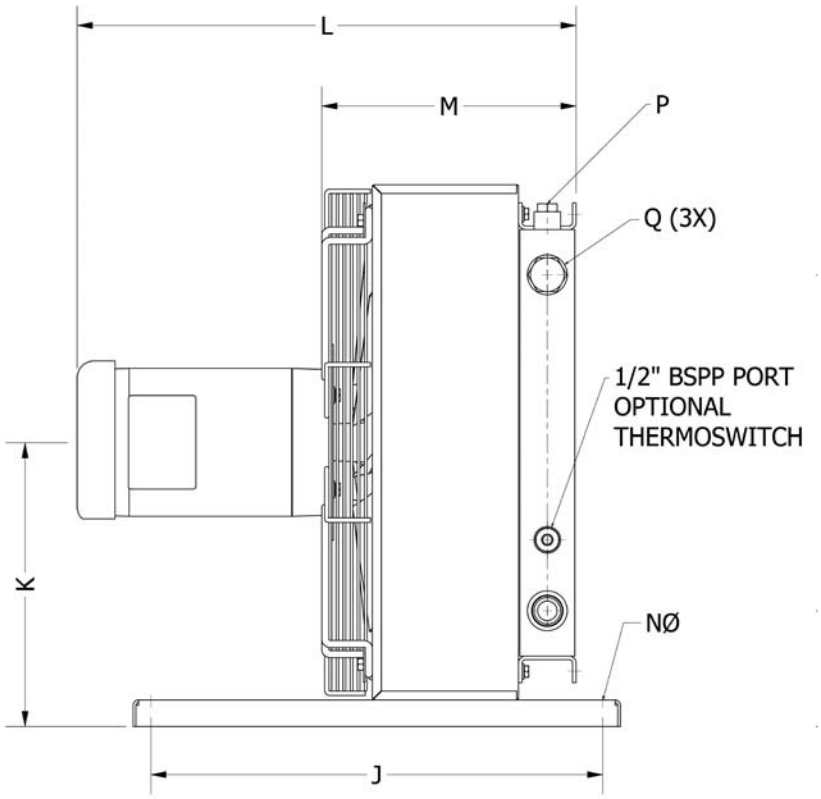


Cooling capacity tolerance ± 10%.

PRESSURE DROP ULAC 007-ULAC 112

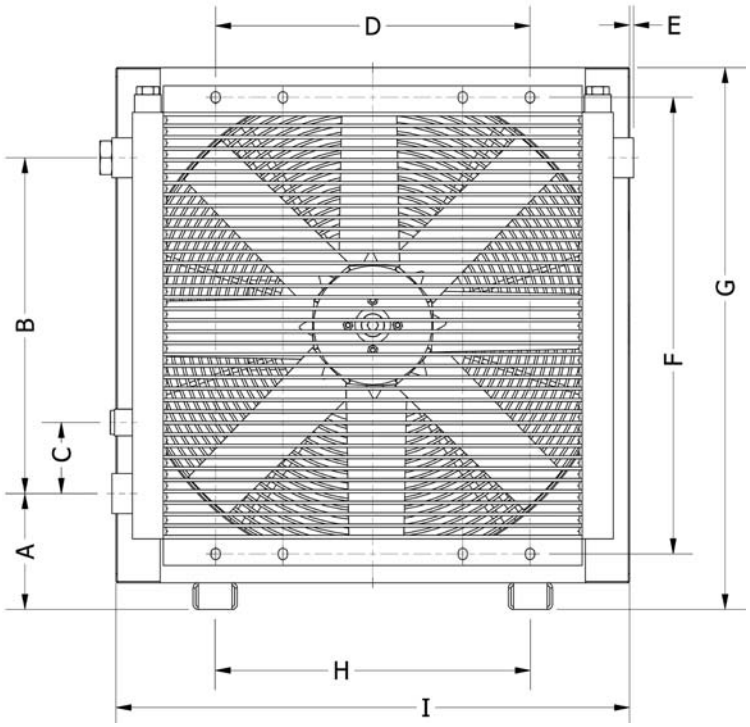


** Pressure Drop Correction Factor for other viscosities.*



TYPE	Acoustic Pressure Level *LpA dB(A) 3 Ft.**	No. Of Poles/ Capacity *HP*	Weight *Lbs. (Approx.)*	P *SAE O-Ring*	Q *SAE O-Ring Boss*
ULAC 007B	69	4/0.5	33	½" (#8)	1" (#16)
ULAC 011B	71	4/0.5	44	½" (#8)	1" (#16)
ULAC 016B	74	4/0.5	53	½" (#8)	1" (#16)
ULAC 023D	81	4/1	79	½" (#8)	1" (#16)
ULAC 033D	82	4/1	115	½" (#8)	1¼" (#20)
ULAC 033F	86	4/3	170	½" (#8)	1¼" (#20)
ULAC 044D	83	4/1	143	½" (#8)	1¼" (#20)
ULAC 044F	87	4/3	197	½" (#8)	1¼" (#20)
ULAC 058G	90	4/5	264	¾" (#12)	1½" (#24)
ULAC 078G	92	4/5	434	¾" (#12)	1½" (#24)
ULAC 112H	96	4/7.5	542	¾" (#12)	1½" (#24)
ULAC 200K	93	6/15	1,030	NA	CODE 61 SAE 2" FLANGE

**Noise level tolerance ± 3 dB(A).*



TYPE	A	B	C	D	E	F	G	H	I	J	K	L	M	Nø
ULAC 007B	5.2	6.3	3.2	8.0	0.24	11.7	15.6	8.0	14.4	20.1	8.4	19.8	8.8	0.35
ULAC 011B	5.4	9.0	3.2	8.0	0.12	14.3	18.5	8.0	17.3	20.1	9.8	20.8	9.8	0.35
ULAC 016B	5.2	11.7	3.2	8.0	0.28	17.0	20.7	8.0	19.5	20.1	10.9	21.6	10.7	0.35
ULAC 023D	5.2	14.9	3.2	14.0	0.20	20.2	24.0	14.0	22.8	20.1	12.6	22.2	11.3	0.35
ULAC 033D	5.2	19.1	3.2	14.0	NA	24.5	28.4	14.0	27.2	20.1	14.8	23.1	12.5	0.35
ULAC 033F	5.2	19.1	3.2	14.0	NA	24.5	28.4	14.0	27.2	24.0	14.8	25.6	12.5	0.55
ULAC 044D	4.6	26.1	3.2	14.0	NA	31.5	34.1	14.0	27.2	20.1	17.6	24.1	13.3	0.35
ULAC 044F	4.6	26.1	3.2	14.0	NA	31.5	34.1	14.0	27.2	24.0	18.3	26.6	13.5	0.55
ULAC 058G	5.2	26.1	3.2	20.0	NA	31.5	35.4	20.0	34.2	24.0	18.3	29.9	15.2	0.55
ULAC 078G	5.2	32.3	3.9	26.8	NA	38.9	41.4	20.4	40.2	35.4	21.1	30.9	16.2	0.55
ULAC 112H	5.1	38.8	3.9	31.1	0.14	45.4	47.8	23.6	46.7	35.4	24.4	31.9	17.2	0.55
ULAC 200K	7.2	50.9	5.0	49.6	1.2	61.0	64.2	55.9	59.4	35.4	32.7	41.5	18.7	0.71

All dimensions listed above are in inches.

Order Key for ULAC Oil Coolers

All positions must be filled in when ordering.

EXAMPLE:

ULAC -	007B	- M	- 100	- SA
Series	*Model*	*Motor Type*	*Thermoswitch*	*Core Bypass*
1	*2*	*3*	*4*	*5*

1. OIL COOLER SERIES WITH AC MOTOR; ULAC

2. COOLER SIZE/MODEL

007B, 011B, 016B, 023D, 033F, 033D, 044F, 044D, 058G, 078G, 112H and 200K.

3. MOTOR TYPE

No motor	= W
Three-phase 190/380V 50 Hz, 208-230/460V 60 Hz	= M*
Three-phase 208-230/460V 60 Hz	= N
Three-phase 230/460V 60 Hz	= P
Three-phase 575V 60 Hz	= Q
Single-phase 115/230V 60 Hz	= R
Single-phase 230 V 60 Hz	= S
Explosion proof, Division 1, Class 1 Group D, Class II Group F & G, T3C	= X
Not listed, consult Accumulator and Cooler Division	= Z

**The M-motor is our standard motor sizes 1 HP and lower. The performance at 50 HZ will be reduced by approximately 10%*

4. THERMOSWITCH

No thermoswitch	= 000
100 °F	= 100
120 °F	= 120
140 °F	= 140
160 °F	= 160
175 °F	= 175
195 °F	= 195
Not listed, consult Accumulator and Cooler Division	= ZZZ

5. CORE BYPASS*

No Bypass	= SW
20 psi External Hose Bypass *(standard option)*	= SA
65 psi External Hose Bypass *(standard option)*	= SB
30 psi External Tube Bypass	= SG
75 psi External Tube Bypass	= SH
120 psi External Tube Bypass	= SJ
120 °F External Thermo-Bypass	= SM
140 °F External Thermo-Bypass	= SN
160 °F External Thermo-Bypass	= SP
195 °F External Thermo-Bypass	= SQ
Full Flow External Bypass	= SF

**The standard cores are single pass. Two pass cores and other options available upon request, please consult Accumulator and Cooler Division.*

Technical Specifications

FLUID COMBINATIONS	
Mineral oil	
Oil/water emulsion	
Water glycol	
Phosphate ester	
MATERIAL	
Cooler core	Aluminum
Fan blades/hub	Glass fiber reinforced polypropylene/ Aluminum
Fan housing	Steel
Fan guard	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated
COOLER CORE	
Maximum static working pressure	300 psi
Dynamic working pressure	200 psi*
Heat transfer tolerance	± 6 %
Maximum oil inlet temperature	250 °F

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

COOLING CAPACITY CURVES

Cooling capacity curves are based on testing in accordance with EN1048 with ISO VG 46.

CONTACT PARKER FOR ADVICE ON

- Oil temperatures > 250 °F
- Oil viscosity > 100 cSt / 500 SSU
- Aggressive environments
- Environments with heavy airborne particulates
- High-altitude locations

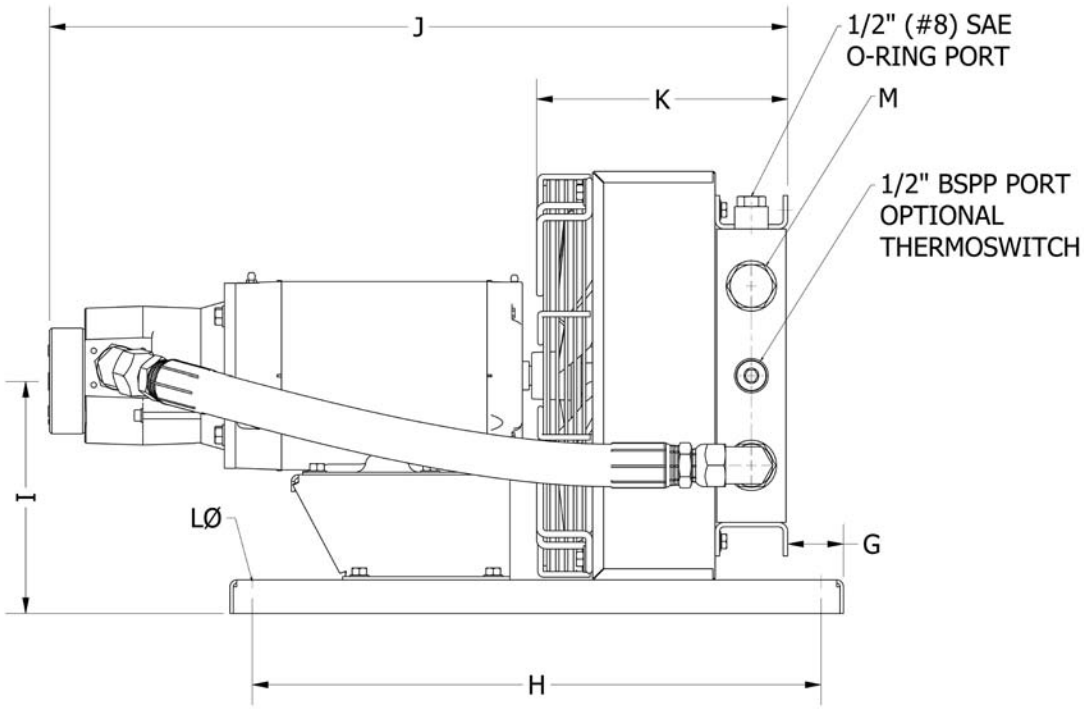
The information in this brochure is subject to change without prior notice.

ULOC Cooling System

For industrial use – cooling capacity up to 60 HP

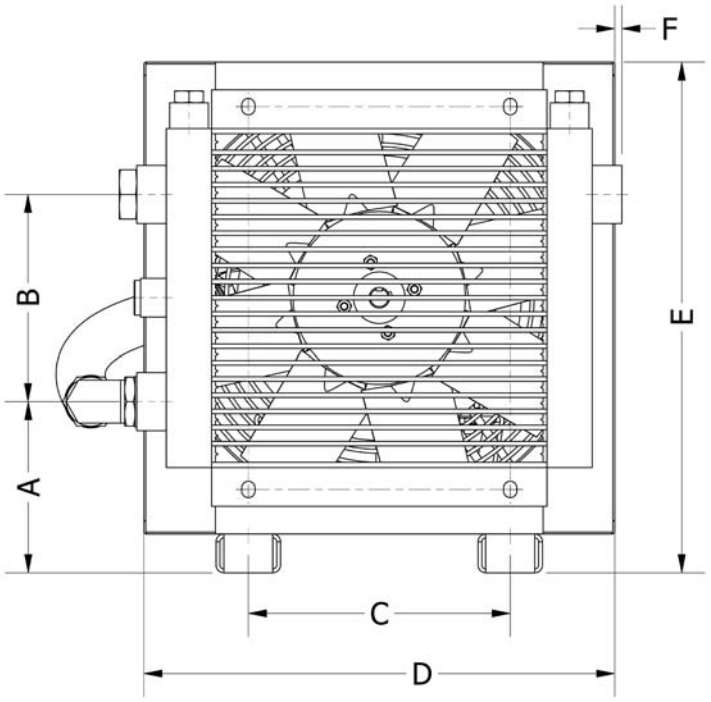
The ULOC cooling system with three-phase AC motor is optimized for use in the industrial sector. The system is supplied ready for installation. An integrated circulation pump makes it possible to cool and treat the oil in a separate circuit – offline cooling. Together with a wide range of accessories, the ULOC cooling system is suitable for installation in most applications and environments.

- **Optimized design with right choice of materials and components ensures a reliable and long lasting cooler with low service and maintenance costs.**
- **Integrated circulation pump produces an even flow with low pressure pulsations.**
- **Easy to maintain and easy to retrofit in many applications.**
- **Compact design and low weight.**
- **Quiet fan and fan motor.**
- **Cooler core with low pressure drop and high cooling capacity.**



TYPE	Nom. Oil Flow Rate *(gpm)*	Cooling Capacity *at 50 °F ETD (Btu/hr)*	Cooling Capacity *Btu/hr/°F*	Acoustic Pressure Level *LpA dB(A) 3 Ft.**	Motor Capacity / No. Of Poles *HP*	Motor
ULOC 007D - A	6.3	15,500	310	71	1/4	1-4-143TC
ULOC 007D - B	12.7	19,000	380	71	1/4	1-4-143TC
ULOC 007E - C	19.0	21,000	420	72	2/4	2-4-145TC
ULOC 007E - D	25.4	22,500	450	72	2/4	2-4-145TC
ULOC 011D - A	6.3	24,000	480	74	1/4	1-4-143TC
ULOC 011D - B	12.7	28,500	570	74	1/4	1-4-143TC
ULOC 011E - C	19.0	32,000	640	74	2/4	2-4-145TC
ULOC 011E - D	25.4	34,500	690	74	2/4	2-4-145TC
ULOC 016E - A	6.3	33,500	670	78	2/4	2-4-145TC
ULOC 016E - B	12.7	41,000	820	78	2/4	2-4-145TC
ULOC 016E - C	19.0	47,000	940	78	2/4	2-4-145TC
ULOC 016E - D	25.4	50,000	1,000	78	2/4	2-4-145TC
ULOC 023F - B	12.7	60,000	1,200	82	3/4	3-4-182TC
ULOC 023F - C	19.0	65,000	1,300	82	3/4	3-4-182TC
ULOC 023F - D	25.4	70,000	1,400	82	3/4	3-4-182TC
ULOC 033G - C	19.0	80,000	1,600	87	5/4	5-4-182TC
ULOC 033G - D	25.4	90,000	1,800	87	5/4	5-4-184TC
ULOC 044G - C	19.0	95,000	1,900	88	5/4	5-4-182TC
ULOC 044G - D	25.4	105,000	2,100	88	5/4	5-4-182TC

Electric motors specified are calculated for max. Working pressure 90 psi at 125 cSt and 50 Hz, 60 psi 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 ± 3 dB(A).*



TYPE	A	B	C	D	E	F	G	H	I	J	K	Lø	M *SAE O-Ring Boss**
ULOC 007D - A	5.2	6.3	8.0	14.4	15.6	0.2	2.0	20.1	8.5	26.1	8.9	0.35	1" (#16)
ULOC 007D - B	5.2	6.3	8.0	14.4	15.6	0.2	2.0	20.1	8.5	26.6	8.9	0.35	1" (#16)
ULOC 007E - C	5.2	6.3	8.0	14.4	15.6	0.2	2.0	20.1	8.5	27.1	8.9	0.35	1" (#16)
ULOC 007E - D	5.2	6.3	8.0	14.4	15.6	0.2	2.0	20.1	8.5	27.6	8.9	0.35	1" (#16)
ULOC 011D - A	5.3	9.0	8.0	17.3	18.5	0.1	2.0	20.1	9.9	27.0	9.9	0.35	1" (#16)
ULOC 011D - B	5.3	9.0	8.0	17.3	18.5	0.1	2.0	20.1	9.6	27.4	9.8	0.35	1" (#16)
ULOC 011E - C	5.4	9.0	8.0	17.3	18.5	0.1	2.0	20.1	9.9	28.0	9.8	0.35	1" (#16)
ULOC 011E - D	5.4	9.0	8.0	17.3	18.5	0.1	2.0	20.1	9.6	28.5	9.8	0.35	1" (#16)
ULOC 016E - A	5.1	11.7	8.0	19.5	20.7	0.3	2.0	20.1	11.0	27.7	10.7	0.35	1" (#16)
ULOC 016E - B	5.1	11.7	8.0	19.5	20.7	0.3	2.0	20.1	11.0	28.2	10.7	0.35	1" (#16)
ULOC 016E - C	5.1	11.7	8.0	19.5	20.7	0.3	2.0	20.1	11.0	28.8	10.7	0.35	1" (#16)
ULOC 016E - D	5.1	11.7	8.0	19.5	20.7	0.3	2.0	20.1	10.7	29.3	10.7	0.35	1" (#16)
ULOC 023F - B	5.2	14.9	14.0	22.8	24.0	0.2	2.0	24.0	12.4	30.7	11.3	0.55	1" (#16)
ULOC 023F - C	5.1	14.9	14.0	22.8	24.0	0.2	2.0	24.0	12.4	31.2	11.3	0.55	1" (#16)
ULOC 023F - D	5.1	14.9	14.0	22.8	24.0	0.2	2.0	24.0	12.4	31.7	11.3	0.55	1" (#16)
ULOC 033G - C	5.2	19.1	14.0	27.2	28.4	-	2.4	24.0	14.6	32.7	12.5	0.55	1¼" (#20)
ULOC 033G - D	5.2	19.1	14.0	27.2	28.4	-	2.4	24.0	14.9	33.2	12.5	0.55	1¼" (#20)
ULOC 044G - C	4.5	26.1	14.0	27.2	34.1	-	2.0	24.0	17.4	33.6	13.5	0.55	1¼" (#20)
ULOC 044G - D	4.5	26.1	14.0	27.2	34.1	-	2.0	24.0	17.4	33.9	13.5	0.55	1¼" (#20)

** Port on the inlet side of the pump is 1½" (#24) SAE O-ring Boss for all models.*
All dimensions listed above are in inches.

Order Key for ULOC Cooling Systems

All positions must be filled in when ordering.

EXAMPLE:				
ULOC -	**007D**	**- M**	**- A**	**- SA**
Series	*Model*	*Motor Type*	*Pump Flow Rate*	*Core Bypass*
1	*2*	*3*	*4*	*5*

1. OIL COOLER SERIES OFFLINE, WITH PUMP; ULOC

2. COOLER SIZE/MODEL

007D, 007E, 011D, 011E, 016E, 023F, 033G, 044G

3. MOTOR TYPE

No motor	= W
Three phase, 190/380V 50 Hz, 208-230/460V 60Hz	= M
Three phase, 575V 60Hz	= Q
Not listed, consult Accumulator and Cooler Division	= Z

Performance at 50 Hz will be reduced by approximately 10%

4. PUMP FLOW RATE (GPM)

6	= A
12	= B
19	= C
25	= D

5. CORE BYPASS*

No Bypass	= SW
20 psi External Hose Bypass *(standard option)*	= SA
65 psi External Hose Bypass *(standard option)*	= SB
30 psi External Tube Bypass	= SG
75 psi External Tube Bypass	= SH
120 psi External Tube Bypass	= SJ
120 °F External Thermo-Bypass	= SM
140 °F External Thermo-Bypass	= SN
160 °F External Thermo-Bypass	= SP
195 °F External Thermo-Bypass	= SQ

**The standard cores are single pass. Two pass cores and other options available upon request, please consult Accumulator and Cooler Division.*

Technical Specifications

COOLER CORE

Maximum static working pressure	300 psi
Dynamic working pressure	200 psi*
Heat transfer tolerance	± 6 %
Maximum oil inlet temperature	250 °F

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

- ULOC is designed primarily for synthetic oils, vegetable oils and mineral oil type HL/HLP in accordance with DIN 51524. Maximum oil temperature 210 °F.
- Maximum negative pressure in the inlet line is 6 psi with an oil-filled pump. Maximum pressure on the pump's suction side is 8 psi.
- Maximum working pressure for the pump is 150 psi.

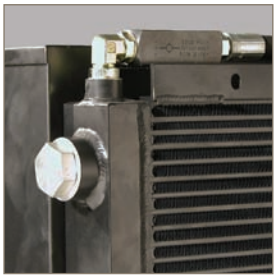
Heat transfer tolerance	± 6 %

MATERIAL

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

CONTACT PARKER FOR ADVICE ON

- Oil temperatures > 250 °F
- Oil viscosity > 100 cSt / 500 SSU
- Aggressive environments
- Environments with heavy airborne particulates
- High-altitude locations



Bypass Valve

Stone Guard

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

ULDC With DC Motor

For mobile use – cooling capacity up to 40 HP

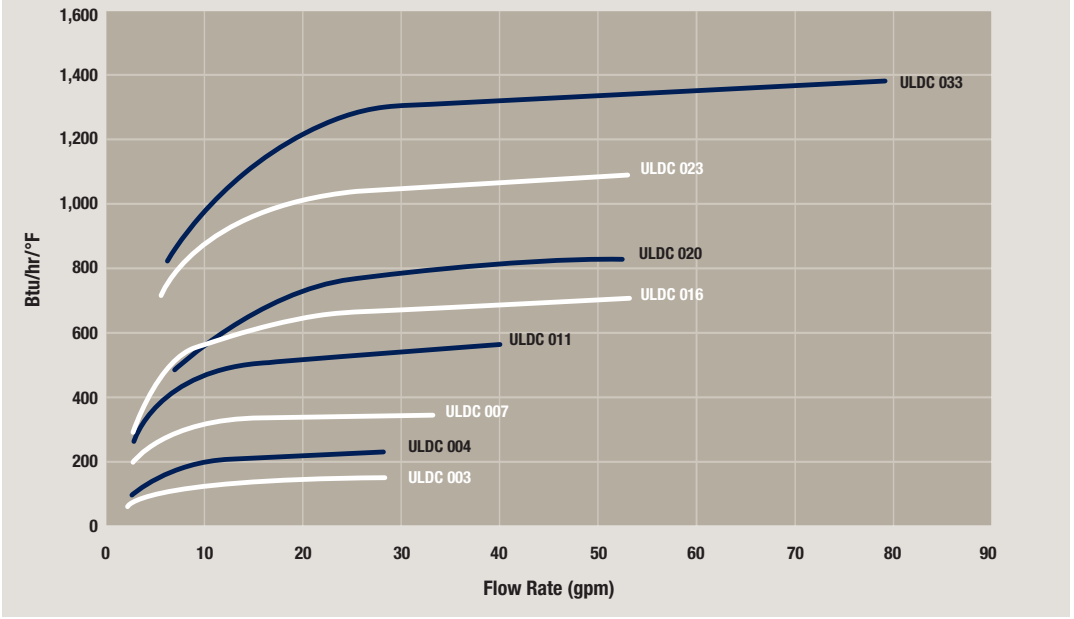
The ULDC oil cooler with 12 or 24V DC motor is optimized for use in the mobile industry. Together with a wide range of accessories, the ULDC cooler is suitable for installation in most applications and environments.

- **Optimized design with right choice of materials and components ensures a reliable and long lasting cooler with low service and maintenance costs.**
- **Compact design resulting in lighter weight unit yet with higher cooling capacity and lower pressure drop.**
- **Easy to maintain and easy to retrofit into many applications.**
- **DC motor 12V/24V.**
- **Quiet fan and fan motor.**

ULDC Cooling Performance

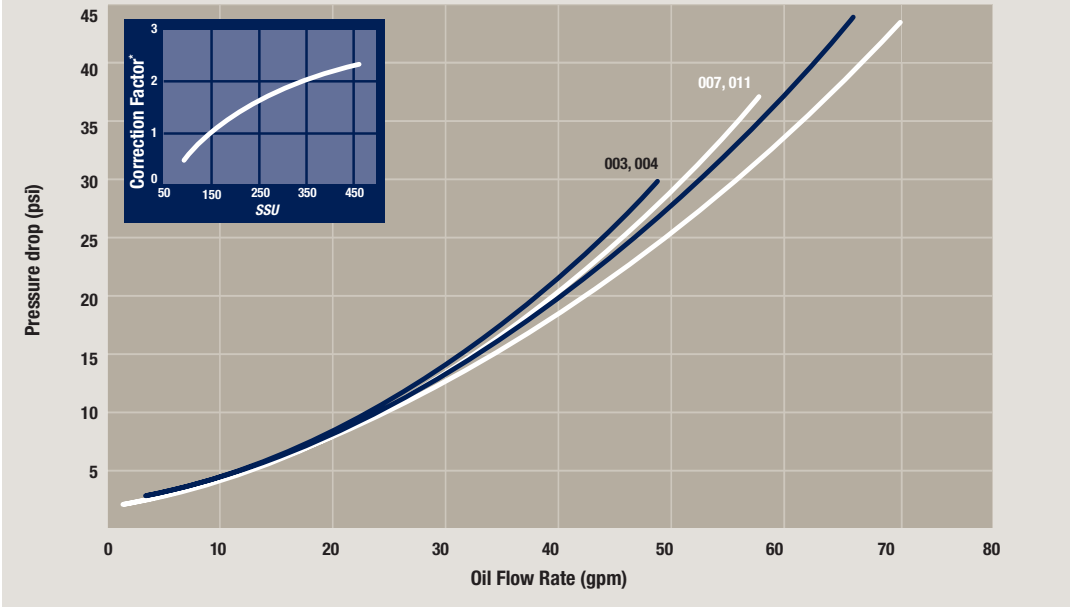
The cooling capacity curves are based on an ETD (Entering Temperature Difference) of 1 °F. For example, oil temperature of 140 °F and air temperature of 70 °F yields a temperature difference of 70 °F. Multiply the number from the cooling graphs corresponding to the specific flow rate by the ETD for the particular application to get the total heat duty.

COOLING PERFORMANCE ULDC 003 - ULDC 033

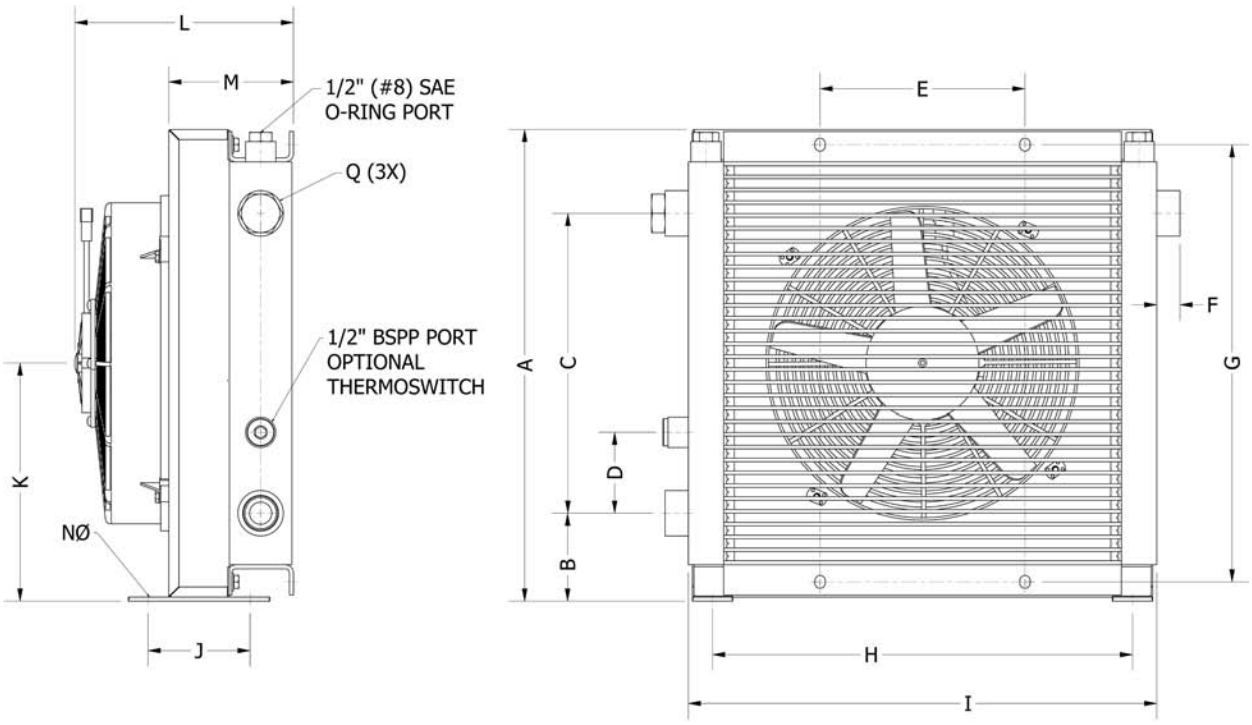


Cooling capacity tolerance ± 10%.

PRESSURE DROP



** Pressure Drop Correction Factor for other viscosities.*



TYPE	Weight *lbs (Approx.)*	Acoustic Pressure *LpA dB(A) 3 Ft.**	Max. Current (Amps.)** *12 Volts*	*24 Volts*	Q *SAE O-Ring Boss*
ULDC 003	11	68	9	3	1" (#16)
ULDC 004	13	63	7	4	1" (#16)
ULDC 007	20	71	13	6	1" (#16)
ULDC 011	26	75	20	12	1" (#16)
ULDC 016	33	75	20	12	1" (#16)
ULDC 020	40	82	20	10	1" (#16)
ULDC 023	55	75	20	12	1" (#16)
ULDC 033	66	75	20	12	1¼" (#20)

** Noise level tolerance ± 3 dB(A).*
*** ULDC-023 & ULDC-033 Cooler assemblies come with two fans each. The indicated max. current is for one fan only.*

TYPE	A	B	C	D	E	F	G	H	I	J	K	L	M	Nø *dia./oblong*
ULDC 003	8.9	2.5	3.5	-	5.2	0.9	7.8	5.3	9.6	5.8	4.6	5.9	4.1	0.35 x 0.55
ULDC 004	10.0	3.5	3.5	-	6.0	0.9	9.0	5.3	10.5	5.8	5.2	6.0	4.3	0.35 x 0.55
ULDC 007	13.3	3.7	6.3	3.2	8.0	0.9	11.7	8.0	13.0	10.5	6.8	6.8	4.3	0.35
ULDC 011	15.6	3.4	9.0	3.2	8.0	0.9	14.3	14.2	15.7	4.0	7.9	8.5	4.9	0.35 x 1.1
ULDC 016	18.3	3.4	11.7	3.2	8.0	0.9	17.0	16.4	18.3	4.0	9.3	8.3	4.8	0.35 x 1.1
ULDC 020	20.1	3.0	13.8	2.8	8.0	0.9	18.7	18.5	20.1	4.0	10.1	8.3	4.9	0.35 x 0.55
ULDC 023	25.0	5.4	14.9	3.2	14.0	-	20.2	-	24.2	11.4	7.9/18.0	8.6	4.9	0.51
ULDC 033	26.7	3.4	19.1	3.2	14.0	1.0	24.5	-	25.0	11.4	7.9/18.0	10.1	6.5	0.51

All dimensions listed above are in inches.

Order Key for ULDC Oil Coolers

All positions must be filled in when ordering.

EXAMPLE:				
ULDC -	**007**	**- A**	**- 000**	**- SA**
Series	*Model*	*Motor Type*	*Thermoswitch*	*Core Bypass*
1	*2*	*3*	*4*	*5*

1. OIL COOLER SERIES WITH DC MOTOR; ULDC

2. COOLER SIZE/MODEL

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

3. MOTOR VOLTAGE

12 V	= A
24 V	= B

4. THERMOSWITCH

No thermoswitch	= 000
100 °F	= 100
120 °F	= 120
140 °F	= 140
160 °F	= 160
175 °F	= 175
195 °F	= 195
Not listed, consult Accumulator and Cooler Division	= ZZZ

5. CORE BYPASS*

No Bypass	= SW
20 psi External Hose Bypass *(standard option)*	= SA
65 psi External Hose Bypass *(standard option)*	= SB
30 psi External Tube Bypass	= SG
75 psi External Tube Bypass	= SH
120 psi External Tube Bypass	= SJ
120 °F External Thermo-Bypass	= SM
140 °F External Thermo-Bypass	= SN
160 °F External Thermo-Bypass	= SP
195 °F External Thermo-Bypass	= SQ
Full Flow External Bypass	= SF

** The standard cores are single pass. Two pass cores and other options available upon request, please consult Accumulator and Cooler Division.*

Technical Specifications

FLUID COMBINATIONS

- Mineral oil
- Oil/water emulsion
- Water glycol
- Phosphate ester

MATERIAL

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

COOLER CORE

Maximum static working pressure	300 psi
Dynamic working pressure	200 psi*
Heat transfer tolerance	± 6 %
Maximum oil inlet temperature	250 °F

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

COOLING CAPACITY CURVES

The cooling capacity curves in this catalogue are created using oil type ISO VG 46 at 250 °F.

CONTACT PARKER FOR ADVICE ON

- Oil temperatures > 250 °F
- Oil viscosity > 100 cSt / 500 SSU
- Aggressive environments
- Environments with heavy airborne particulates
- High-altitude locations

ULHC With Hydraulic Motor

For mobile and industrial use – maximum cooling capacity 215 HP

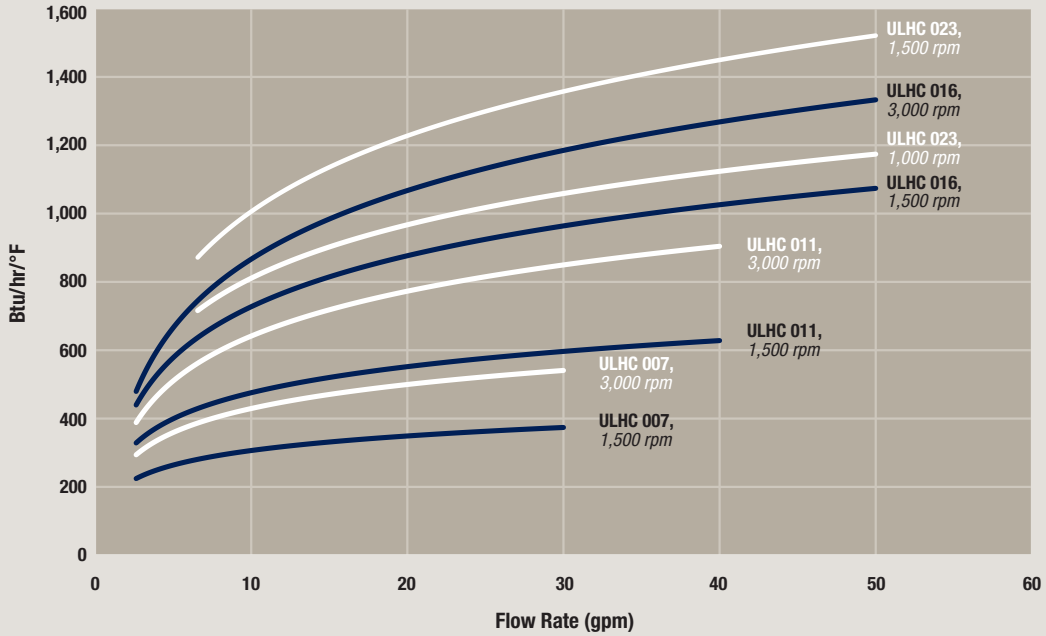
The ULHC oil cooler with hydraulic motor is optimized for use in the mobile and industrial sector. Together with a wide range of accessories, the ULHC cooler is suitable for installation in most applications and environments.

- **Optimized design with right choice of materials and components ensures a reliable and long lasting cooler with low service and maintenance costs.**
- **Compact design resulting in lighter weight unit yet with higher cooling capacity and lower pressure drop.**
- **Easy to maintain and easy to retrofit into many applications.**
- **Hydraulic motor with displacement from 8.4 cc/rev to 25.2 cc/rev.**
- **Collar bearing for fan motor on larger models provides longer operating life.**
- **Quiet fan design due to optimization of material and blade design.**
- **Cooler core with low pressure drop and high cooling capacity.**

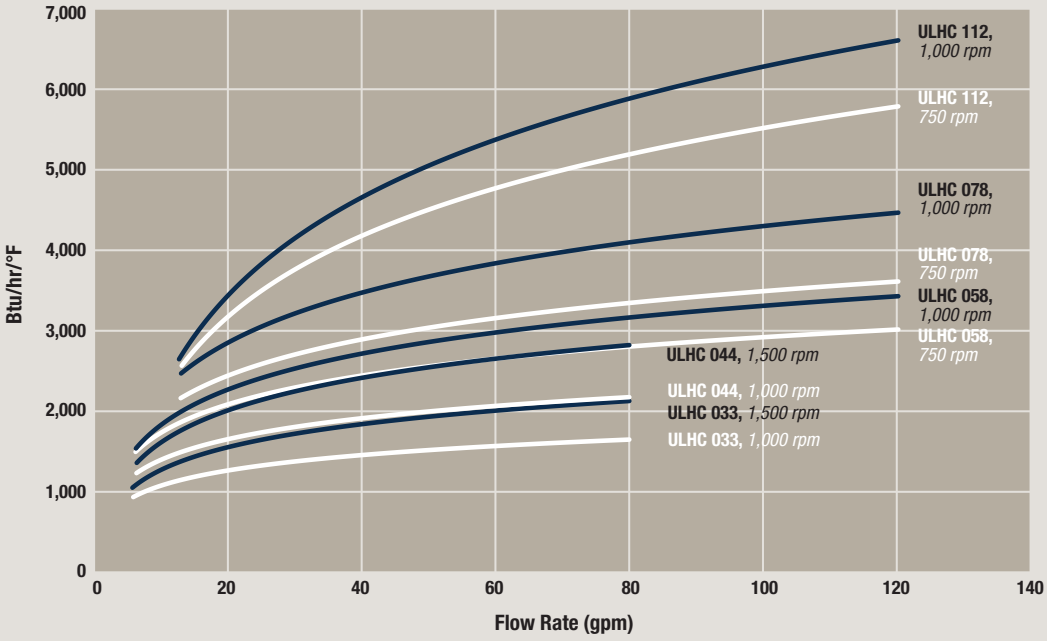
ULHC Cooling Performance

The cooling capacity curves are based on an ETD (Entering Temperature Difference) of 1 °F. For example, oil temperature of 140 °F and air temperature of 70 °F yields a temperature difference of 70 °F. Multiply the number from the cooling graphs corresponding to the specific flow rate by the ETD for the particular application to get the total heat duty.

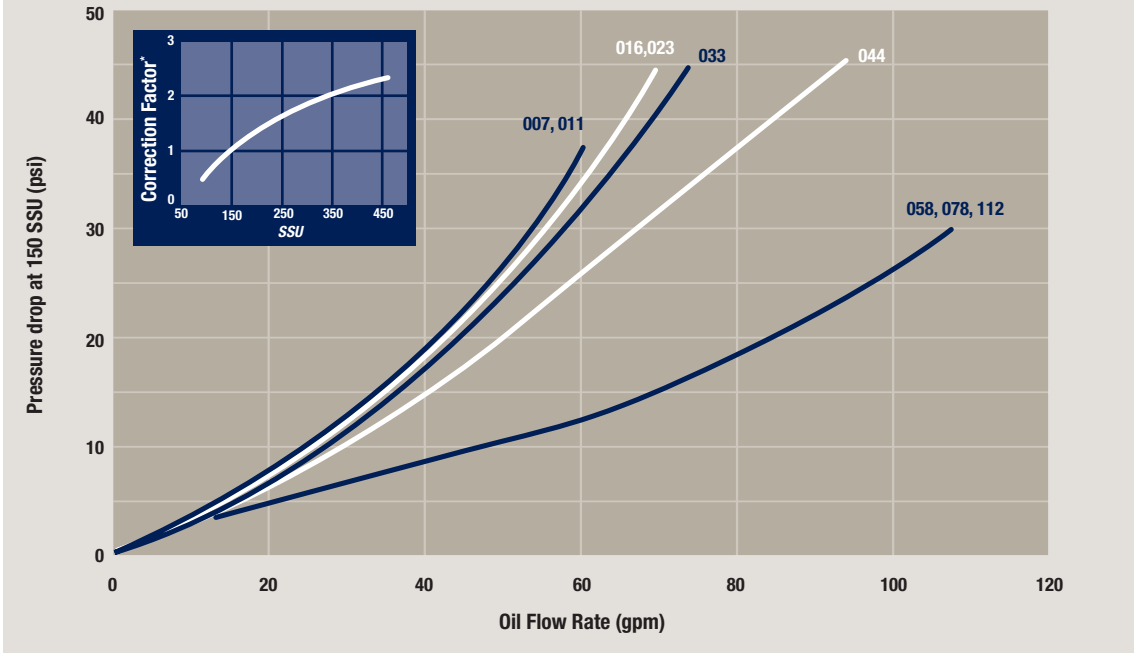
COOLING PERFORMANCE ULHC 007 - ULHC 023



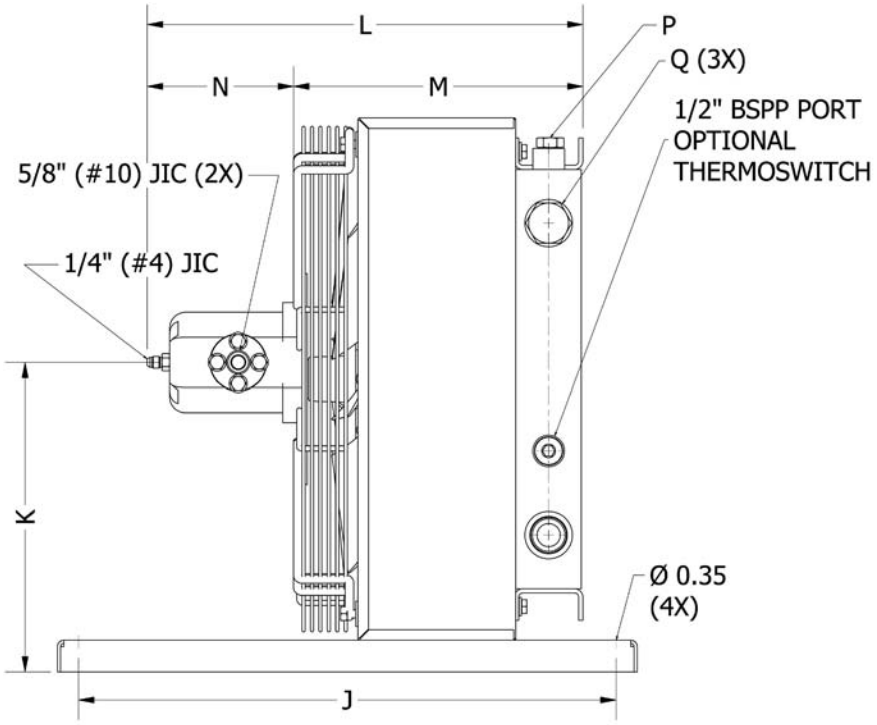
COOLING PERFORMANCE ULHC 033 - ULHC 112



PRESSURE DROP



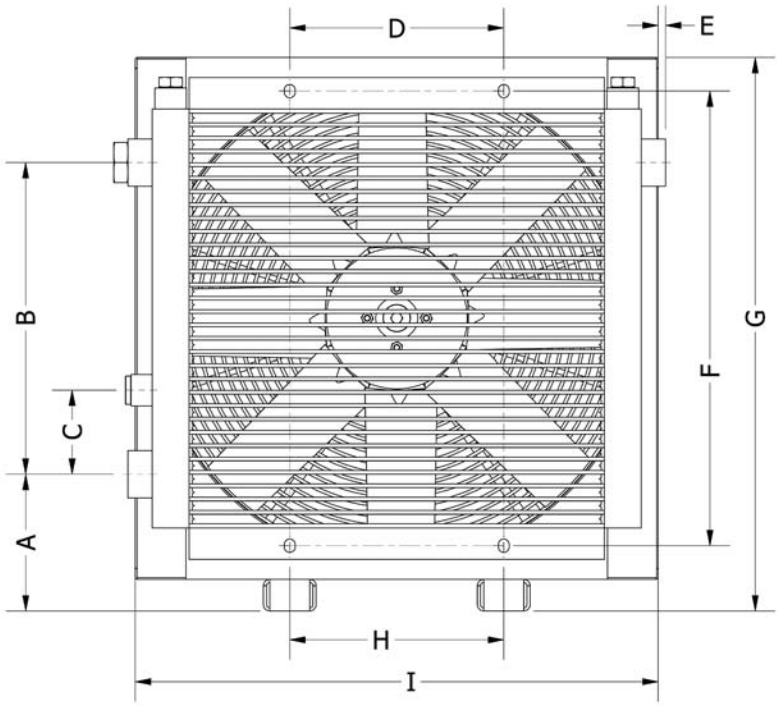
** Pressure Drop Correction Factor for other viscosities.*



TYPE	Fan Speed *rpm*	Fan Power *HP*	Weight *lbs. (Approx.)*	Max Speed *rpm*	Acoustic Pressure Level *LpA dB(A) 3 Ft**
ULHC 007	1,500	0.13	22	3,500	62
	3,000	0.87	22	3,500	79
ULHC 011	1,500	0.27	33	3,500	67
	3,000	2.01	33	3,500	82
ULHC 016	1,500	0.13	40	3,500	60
	3,000	0.47	40	3,500	70
ULHC 023	1,000	0.20	66	2,840	64
	1,500	0.67	66	2,840	76
ULHC 033	1,000	0.87	88	2,350	75
	1,500	2.68	88	2,350	85
ULHC 044	1,000	0.94	123	2,350	77
	1,500	2.68	123	2,350	86
ULHC 058	750	1.01	170	1,850	75
	1,000	2.41	170	1,850	83
ULHC 078	750	0.94	245	1,690	81
	1,000	2.15	245	1,690	88
ULHC 112	750	2.28	276	1,440	86
	1,000	5.36	276	1,440	92

** Noise level tolerance ± 3 dB(A).*

MOTOR	Displacement *cm^3/r*	N *ULHC 007 - ULHC 023*	N *ULHC 033 - ULHC 112*	Max. Working Pressure *psi*
A	8.4	4.5	6.1	3,000
B	10.8	4.8	6.3	3,000
C	14.4	4.9	6.6	3,000
D	16.8	5.0	6.7	3,000
E	19.2	5.2	6.9	3,000
F	25.2	5.6	7.4	2,330



TYPE	A	B	C	D	E	F	G	H	I	J	K
ULHC 007	5.2	6.3	3.2	8.0	0.2	11.7	15.6	8.0	14.4	20.1	7.8
ULHC 011	5.4	9.0	3.2	8.0	0.1	14.3	18.5	8.0	17.3	20.1	9.2
ULHC 016	5.1	11.7	3.2	8.0	0.3	17.0	20.7	8.0	19.5	20.1	11.6
ULHC 023	5.2	14.9	3.2	14.0	0.2	20.2	24.0	14.0	22.8	20.1	12.0
ULHC 033	5.2	19.1	3.2	14.0	-	24.5	28.4	14.0	27.2	20.1	14.2
ULHC 044	4.6	26.1	3.2	14.0	-	31.5	34.1	14.0	27.2	20.1	17.0
ULHC 058	5.2	26.1	3.2	20.0	-	31.5	35.4	20.0	34.2	20.1	17.6
ULHC 078	5.2	32.3	3.9	26.8	-	38.9	41.4	20.4	40.2	24.0	20.7
ULHC 112	5.1	38.8	3.9	31.1	0.2	45.4	47.8	23.6	46.7	24.0	23.9

All dimensions listed above are in inches.

TYPE	L *(Max)*	M	P *SAE O-ring*	Q *SAE O-ring Boss*	Motor Selection
ULHC 007	14.4	8.9	½" (#8)	1" (#16)	A - F
ULHC 011	15.3	9.8	½" (#8)	1" (#16)	A - F
ULHC 016	16.3	10.8	½" (#8)	1" (#16)	A - F
ULHC 023	16.6	11.1	½" (#8)	1" (#16)	A - F
ULHC 033	19.7	12.5	½" (#8)	1¼" (#20)	A - F
ULHC 044	20.7	13.5	½" (#8)	1¼" (#20)	A - F
ULHC 058	22.4	15.3	¾" (#12)	1½" (#24)	A - F
ULHC 078	21.4	16.3	¾" (#12)	1½" (#24)	B - F
ULHC 112	24.4	17.2	¾" (#12)	1½" (#24)	D - F

Order Key for ULHC Oil Coolers

All positions must be filled in when ordering.

EXAMPLE:

ULHC -	007	- A	- 120	- SA
Series	*Model*	*Hydraulic motor displacement*	*Thermoswitch*	*Core Bypass*
1	*2*	*3*	*4*	*5*

1. OIL COOLER SERIES WITH HYDRAULIC MOTOR; ULHC

2. COOLER SIZE/MODEL

007, 011, 016, 023, 033, 044, 058, 078 and 112.

3. HYDRAULIC MOTOR, DISPLACEMENT

No hydraulic motor	=W
Displacement 8.4 cm^3/rev.	= A
Displacement 10.8 cm^3/rev.	= B
Displacement 14.4 cm^3/rev.	= C
Displacement 16.8 cm^3/rev.	= D
Displacement 19.2 cm^3/rev.	= E
Displacement 25.2 cm^3/rev.	= F
Not listed, consult Accumulator and Cooler Division	= Z

4. THERMO CONTACT

No thermoswitch	= 000
100 °F	= 100
120 °F	= 120
140 °F	= 140
160 °F	= 160
175 °F	= 175
195 °F	= 195
Not listed, consult Accumulator and Cooler Division	= ZZZ

5. CORE BYPASS*

No Bypass	= SW
20 psi External Hose Bypass *(standard option)*	= SA
65 psi External Hose Bypass *(standard option)*	= SB
30 psi External Tube Bypass	= SG
75 psi External Tube Bypass	= SH
120 psi External Tube Bypass	= SJ
120 °F External Thermo-Bypass	= SM
140 °F External Thermo-Bypass	= SN
160 °F External Thermo-Bypass	= SP
195 °F External Thermo-Bypass	= SQ
Full Flow External Bypass	= SF

**The standard cores are single pass. Two pass cores and other options available upon request, please consult Accumulator and Cooler Division.*

Technical Specifications

FLUID COMBINATIONS	
Mineral oil	
Oil/water emulsion	
Water glycol	
Phosphate ester	
MATERIAL	
Cooler core	Aluminum
Fan blades/Housing	Glass fiber reinforced polypropylene/ Aluminum
Fan housing	Steel
Fan guard	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated
COOLER CORE	
Maximum static operating pressure	300 psi
Dynamic operating pressure	200 psi*
Heat transfer tolerance	± 6 %
Maximum oil inlet temperature	250 °F

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

COOLING CAPACITY CURVES

The cooling capacity curves in this catalog are being created using oil type ISO VG 46 at 140 °F.

CONTACT PARKER FOR ADVICE ON

- Oil temperatures > 250 °F
- Oil viscosity > 100 cSt / 500 SSU
- Aggressive environments
- Environments with heavy airborne particulates
- High-altitude locations

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

OAW Water Oil Cooler

For mobile and industrial use

The OAW oil cooler is optimized for use in mobile and industrial sectors. Together with a wide range of accessories, the OAW cooler is suitable for installation in most applications and environments.

- **Optimized design and the right choice of materials and components ensure reliable and long-lasting cooling with low service and maintenance costs.**
- **Compact design for easy installation.**
- **Turbulent water flow prevents clogging and reduces maintenance.**
- **Low water consumption for economical operation.**
- **SAE O-ring connections for ease of assembly and leak-proof operation.**
- **Maximum material efficiency with no "Dead Zone."**

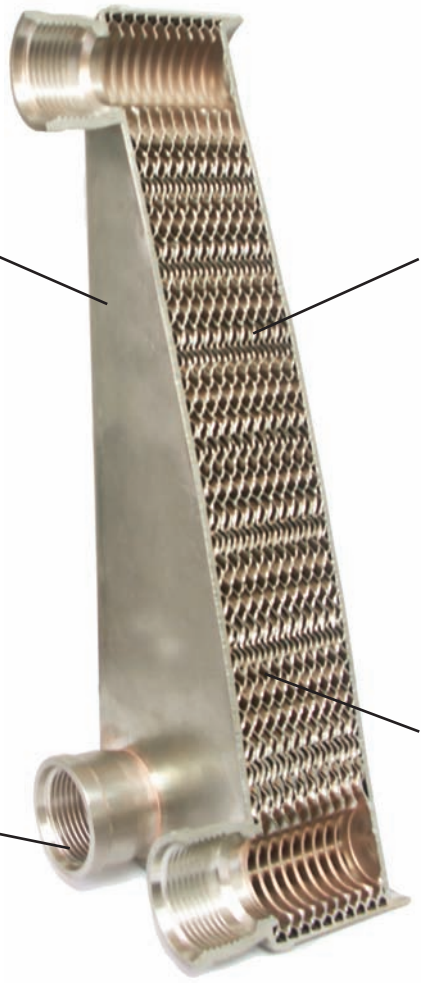
General

Our OAW coolers are designed for a maximum working pressure of 450 psi. The most standard application for the OAW cooler involves a cold water circuit and a hot oil circuit. Fluids are not limited to oil and water however; see the Fluid Compatibility section in the OAW product literature for more information. Inlets and outlets are clearly identified by the Accumulator and Cooler Division sticker affixed to the front of the unit. When in doubt, pour a liquid in one of the connections and note which connection it comes out of. This will be the inlet and outlet for one circuit (either oil or water). The other inlet should be located on the diagonal from the first inlet. Maximum cooling efficiency is achieved by cross flowing through the plates, the oil inlet and water inlet being located on a diagonal.

OAW to the max.

Extremely Compact:
85-90% Reduction in volume and weight of a shell-and-tube heat exchanger of the same capacity.

LOW WATER CONSUMPTION. ECONOMICAL OPERATION COMPACT.



Corrugated:
Plates made of 316 stainless steel brazed with pure copper.

TURBULENT WATER FLOW PREVENTS CLOGGING AND REDUCES MAINTENANCE. SMALLER SIZE MAKES IT EASY TO INSTALL.

BROAD RANGE: SEVERAL MODELS IN-STOCK FOR IMMEDIATE DELIVERY.

SAE O-Ring Connections:
Good for ease of assembly and leak proof operation.

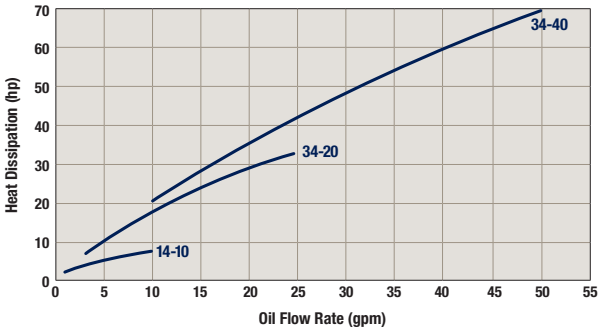
Maximum Efficiency:
Maximum material efficiency. No “Dead Zone” because there is no need for gaskets. Up to 25% more capacity utilization.

OAW 14 & OAW 34

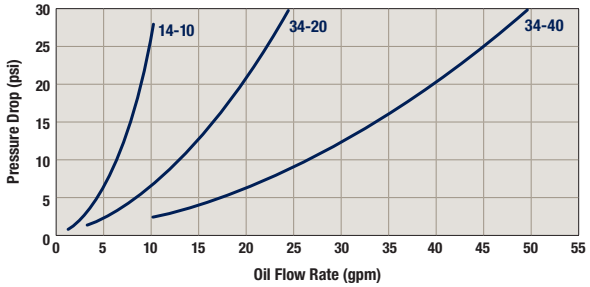
MODEL	Cooling Capacity *(*hp)*	Connection	A *(inches)*	Weight *(lbs.)*	Volume *(in^3)*
OAW 14-10-SG	2-7	5/8" SAE O-ring	1.4	1.4	15
OAW 34-20	6-33	1" SAE O-ring	2.3	9	74
OAW 34-40	20-69	1" SAE O-ring	4.1	15	149

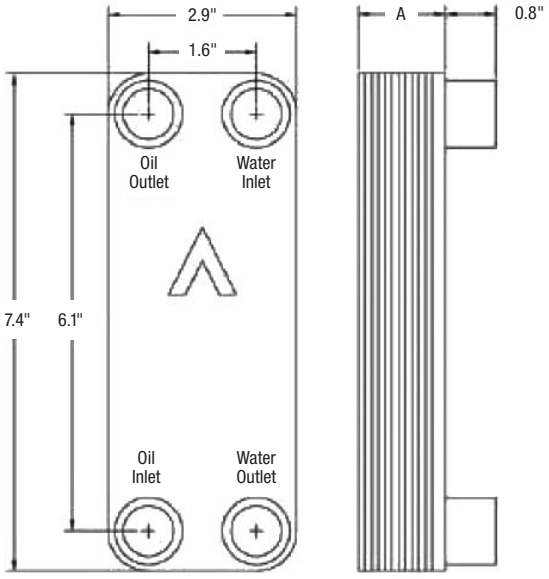
**Cooling capacity is calculated with the following conditions. For other flow conditions, type of fluids or temperatures, please see page 35 or consult Accumulator and Cooler Division. Oil type – ISO VG 32 – Oil/water flow ratio – 2:1 – Oil inlet temperature – 140°F – Water inlet temperature – 80°F*

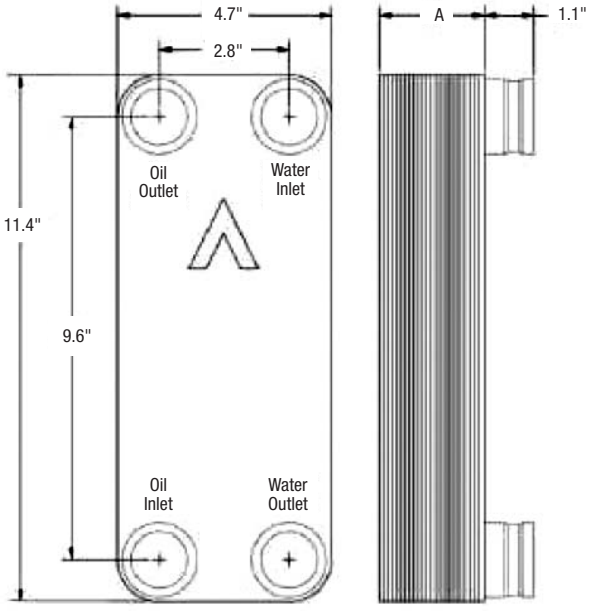
OAW 14 & 34 **COOLING CAPACITY**



OAW 14 & 34 **PRESSURE DROP**





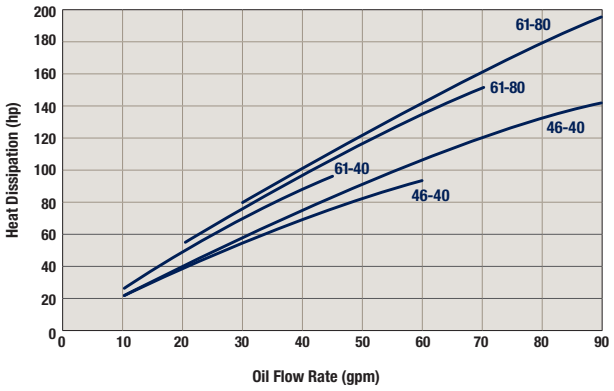


OAW 46 & OAW 61

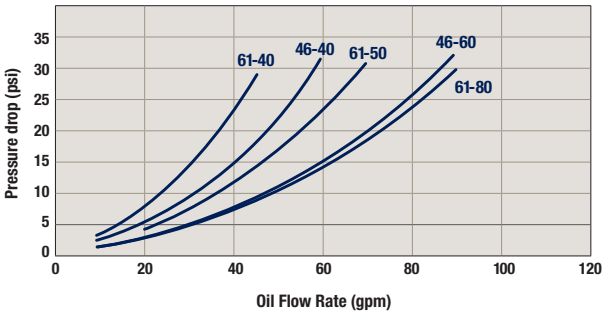
MODEL	Cooling Capacity *(*hp)*	Connection	A *(inches)*	Weight *(lbs.)*	Volume *(in^3)*
OAW 46-40	21-94	1¼" SAE O-ring	3.9	13	200
OAW 46-60	23-142	1¼" SAE O-ring	5.7	18	300
OAW 61-40	27-98	1¼" SAE O-ring	3.9	19	271
OAW 61-60	53-152	1¼" SAE O-ring	5.7	27	406
OAW 61-80	79-198	1¼" SAE O-ring	7.4	34	542

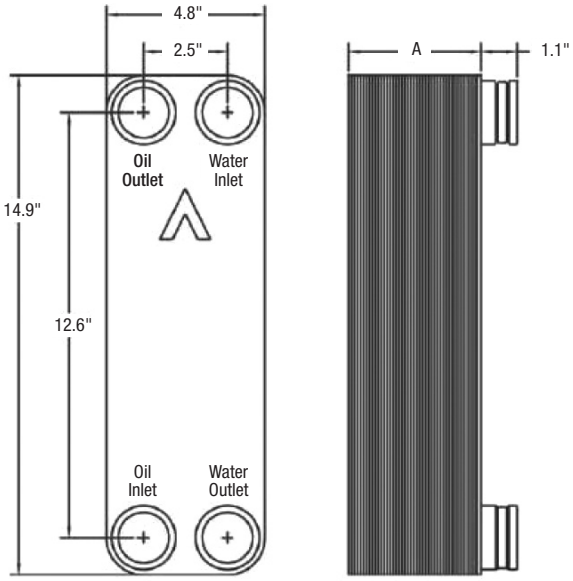
**Cooling capacity is calculated with the following conditions. For other flow conditions, type of fluids or temperatures, please see page 35 or consult Accumulator and Cooler Division. Oil type – ISO VG 32 – Oil/water flow ratio – 2:1 – Oil inlet temperature – 140°F – Water inlet temperature – 80°F*

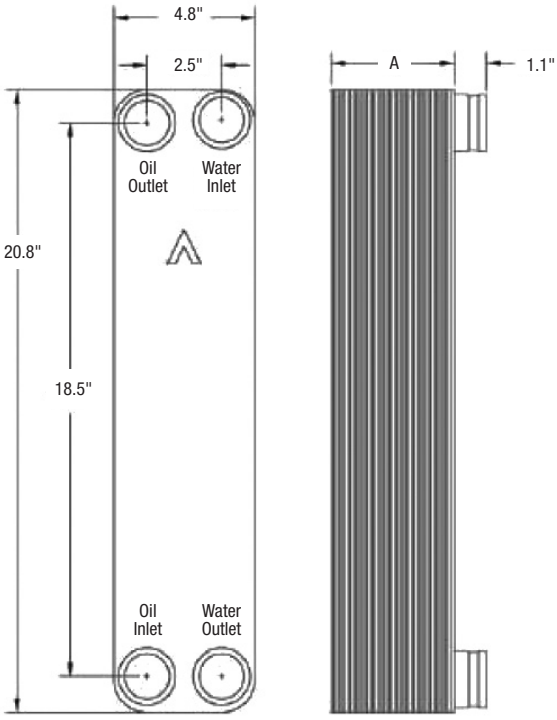
OAW 46 & 61 **COOLING CAPACITY**



OAW 46 & 61 **PRESSURE DROP**





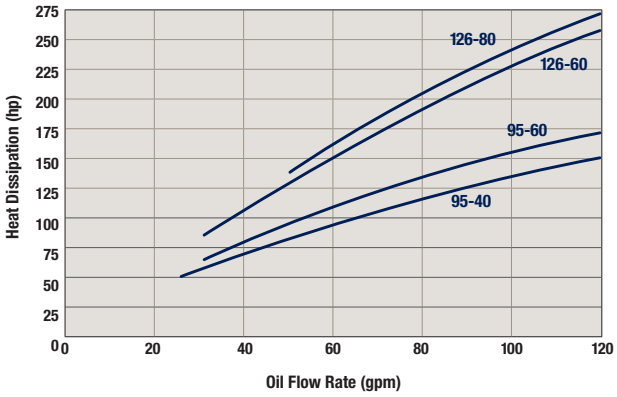


OAW 95 & OAW 126

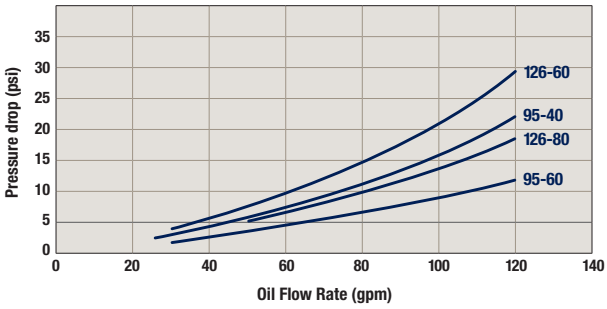
MODEL	Cooling Capacity *(*hp)*	Connection	A *(inches)*	Weight *(lbs.)*	Volume *(in^3)*
OAW 95-40	50-150	1½" SAE O-ring	4.1	44	427
OAW 95-60	63-171	1½" SAE O-ring	6.0	59	641
OAW 126-60	84-259	1½" SAE O-ring	6.1	79	856
OAW 126-80	138-274	1½" SAE O-ring	7.9	97	1142

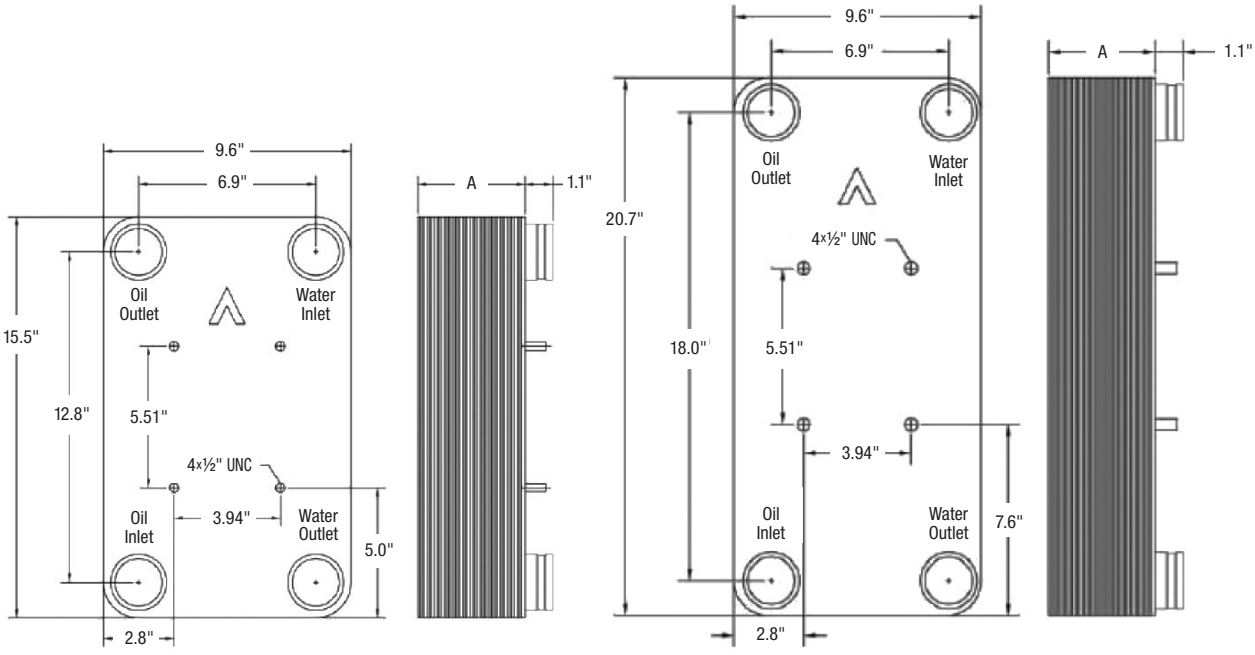
**Cooling capacity is calculated with the following conditions. For other flow conditions, type of fluids or temperatures, please see page 35 or consult Accumulator and Cooler Division. Oil type – ISO VG 32 – Oil/water flow ratio – 2:1 – Oil inlet temperature – 140°F – Water inlet temperature – 80°F*

OAW 95 & 126 **COOLING CAPACITY**



OAW 95 & 126 **PRESSURE DROP**



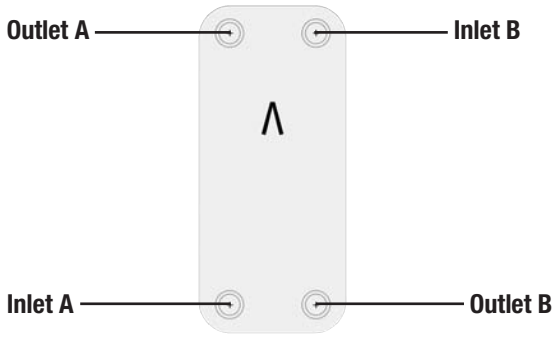


Installation

Installation Instructions for OAW Coolers

The OAW coolers are designed for a maximum working pressure of 450 psi. The most standard application for the OAW cooler involves a cold water circuit and a hot oil circuit. Fluids are not limited to oil and water however; for other types of fluid, please contact the factory.

Inlets and outlets are clearly identified by the Accumulator and Cooler Division sticker affixed to the front of the unit. When in doubt, pour a liquid in one of the connections and note which connection it comes out of. This will be the inlet and outlet for one circuit (either oil or water). The other inlet should be located on the diagonal from the first inlet.



Maximum cooling efficiency is achieved by cross flowing through the plates, the oil inlet and water inlet being located on a diagonal. Failure to have the cooler attached in this manner will lead to a decrease in efficiency.

The cooler may be mounted in any position. However, requirements for draining the circuits should be taken into consideration.

The OAW coolers must not be installed into a rigid frame. Use the Accumulator and Cooler Division purpose-made brackets (or “Armaflex” equivalent) to provide a “soft, elastic installation.” The OAW 95 and 126 series coolers come equipped with stud bolts to assist in mounting. However, these bolts alone should not be used to suspend the cooler. All tubing should be done in such a way as to minimize vibrations to the cooler. When installed on a return line, the cooler should be connected using flexible hoses.

When to Clean

Fouling occurs mainly on the water side of the cooler. Fouling can be detected by monitoring the inlet and outlet temperatures and/or the pressure drop across the cooler. Fouling will result in decreased heat transfer, producing temperature differences lower than specified.

Fouling also restricts the passages and thus causes an increase in velocity. This will produce an increase in the pressure drop across the cooler. When either the temperature difference or the pressure drop is significantly different from specified values, cleaning should be performed.

Methods of Cleaning

If cleaning the cooler is required, backflushing with water will remove most of the soft deposits. If fouling appears in the form of hard deposits, circulate a weak acid through the cooler in reverse direction to normal water flow. Use 5% phosphoric acid for infrequent cleanings. For more frequent cleaning, use 5% oxalic acid or similar weak organic acid. Afterwards flush with a large quantity of water to remove all acid from the cooler before starting up the system again. Never wait until the cooler is completely clogged before cleaning!

Filters or Strainers

When there are particles in the fluid that could clog the cooler, filters or strainers should be used. Particles up to 1mm diameter will not cause any problems.

Fluid Compatibility

On the oil side, most synthetic and petroleum based fluids may be used. For aggressive oils, please contact Accumulator and Cooler Division for compatibility. On the water side, de-mineralized and untreated water may be used without concern. When water is chemically treated please contact Accumulator and Cooler Division for suitability. Sea water cannot be used in OAW coolers. For sea water applications, please contact Accumulator and Cooler Division on information on titanium coolers. Do not use ammonia in the OAW coolers.

Correction Factors for Other Oil Types, Temperatures and Flow Rates

All of the cooling curves are based on very specific conditions. These include using an ISO VG 32 oil, having an oil/water ratio of 2:1, and having an oil/water inlet difference of 60 °F. For other conditions, the following correction factors should be used.

Correction Factors for Other Oil Types

Cooling Capacity: Multiply the requested cooling capacity with the correction factor Kv.

Oil Pressure Drop: Multiply the pressure drop with the correction factor Kp.

Viscocity Class	Cooling Capacity Factor, Kv	Pressure Drop Factor, Kp
ISO VG 22	0.95	0.9
ISO VG 32	1.0	1.0
ISO VG 46	1.05	1.3
ISO VG 68	1.2	1.7
ISO VG 100	1.35	2.2
ISO VG 150	1.6	3.0
ISO VG 220	1.9	4.3

Table 1

Correction Factors for Other Inlet Temperature Differences

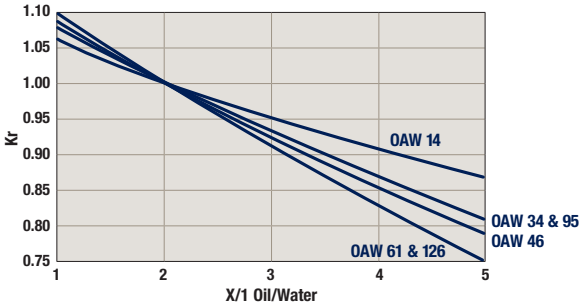
Cooling Capacity: For inlet temperature differences other than 60 °F, multiply the requested cooling capacity by the correction factor Kt.

ETD	30	40	50	60	70
Kt	1.87	1.43	1.17	1.0	0.88

Table 2

Correction Curves for Other Oil/Water Flow Ratios

Cooling Capacity: For all other oil/water flow ratios other than 2:1, divide the requested cooling capacity by the factor Kr obtained from the curves in *Graph 3*.



Graph 3

Sizing Example

Conditions:

Oil type:		ISO VG 68
Oil Flow:		40 gpm
Desired cooling capacity	Qr	40 hp
Oil temperature in	To	140 °F
Water temperature in	Tw	100 °F
Available water flow		10 gpm
Maximum Pressure Drop		30 psi

ETD = To - Tw = 140°F - 100°F = 40°F

The design cooling capacity (Qd) is the cooling capacity used when selecting a suitable cooler. Qd is calculated by multiplying Qr by the factors Kv and Kt (found in *Tables 1 and 2* respectively) and then dividing by the Kr factor found from *Graph 3*.

$$Qd = \frac{Qr \times Kv \times Kt}{Kr} = \frac{40\ hp \times 1.2 \times 1.43}{0.82} = 83\ hp$$

According to the cooling capacity curves on page 32, the minimum size cooler for these conditions is an OAW 61-40.

The oil pressure drop can be found from the pressure drop curve. It should be multiplied by the Pressure Drop Factor, Kp from *Table 1*.

DPoil = p x Kp = 23 psi x 1.7 = 39.1 psi.

In this case the pressure drop exceeds the maximum allowable. The next size cooler would be an: OAW 61-60

The pressure drop for this cooler would be:

DPoil = p x Kp = 12 psi x 1.7 = 20.4 psi.

Therefore the correct size cooler would be the OAW 61-60.

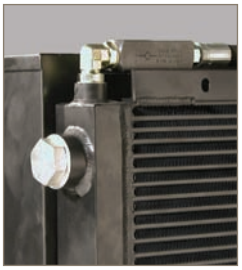
For assistance with calculations, please contact Accumulator and Cooler Division.

Notes

Take the next step

Choose the right accessories

Supplementing a hydraulic system with a cooler and proper accessories or an accumulator gives you increased system up time and a longer expected 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 Accumulator and Cooler Division for guidance and information.



Pressure-controlled bypass valve *Integrated*

Allows the oil to bypass the cooler core 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 core design.

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 core design.

Thermo contact

Sensor with fixed set point for temperature warnings and cost efficient operation with automatic switching on and off of the fan motor thereby reducing the energy usage.

Lifting eyes

For simple installation and relocation.

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.

Stone guard/Dust guard

Protects components and systems from tough conditions.

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.

Cooling Modules/ Combination Cooler

Providing optimal solutions

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

Parker's Motion & Control Product Groups

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 1 800 C-Parker (1 800 272 7537)

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Key Products

Control systems & actuation products
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Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

Automation

Key Markets

Renewable energy
Conveyor & material handling
Factory automation
Food & beverage
Life sciences & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery
Primary metals
Safety & security
Semiconductor & electronics
Transportation & automotive

Key Products

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Electric actuators, gantry robots & slides
Human machine interfaces
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Manifolds
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Pneumatic valves & controls
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Stepper motors, servo motors, drives & controls
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Vacuum generators, cups & sensors

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Advanced actuators
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Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermal management systems
Thermostatic expansion valves

Filtration

Key Markets

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Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation
Process
Transportation
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Key Products

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Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems

Fluid Connectors

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
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Power generation
Refuse vehicles
Renewable energy
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Hydraulic cylinders
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Hydraulic systems
Hydraulic valves & controls
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Integrated hydraulic circuits
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Power units
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Instrumentation

Key Markets

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Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

Key Products

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Analytical sample conditioning products & systems
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High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/ controllers
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Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves

Seal

Key Markets

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Key Products

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