Oil Coolers For Temperature Optimization In Hydraulic Systems

Catalog HY10-1700/Americas
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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 ($P_{\text{loss}} = P_{\text{cool}} = P_{\text{in}} - P_{\text{used}}$).

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 right choice of materials and components ensures 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.

**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 right choice of materials and components ensures 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.

**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** 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.

*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.  
The user-friendly calculation program can be downloaded from www.olaerusa.com

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

- Cooling capacity requirement?
- Installed horse power
- Flow? Pressure? Pump efficiency?
- Measure in your existing unit
- Contact Olaer USA representative

Theoretical horse power losses

Choose the right kind of cooler

Enter your values ....

Air Oil Cooler Calculation
ULAC, ULBC, ULHC and ULDC

www.parker.com

... get suggested solution
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 capacity tolerance ± 10%.
**Cooling Performance & Pressure Drop ULAC 200 K**

- **BTU/HR/ºF**
  - 16,500
  - 14,500
  - 12,500
  - 10,500
  - 8,500
  - 6,500
  - 4,500
  - 2,500
  - 500

- **Pressure Drop at 150 SSU (psi)**

- **Oil Flow Rate (gpm)**
  - 0
  - 50
  - 100
  - 150
  - 200
  - 250
  - 300

*Cooling capacity tolerance ± 10%.*

**Pressure Drop ULAC 007-ULAC 112**

- **Pressure drop at 150 SSU (psi)**
  - 0
  - 20
  - 40
  - 60
  - 80
  - 100

- **Oil Flow Rate (gpm)**
  - 0
  - 20
  - 40
  - 60
  - 80

*Pressure Drop Correction Factor for other viscosities.*
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<th>Q SAE O-Ring Boss</th>
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*Noise level tolerance ± 3 dB(A).*
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</table>

All dimensions listed above are in inches.
## 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

## Order Key for ULAC Oil Coolers

All positions must be filled in when ordering.

**EXAMPLE:**

<table>
<thead>
<tr>
<th>ULAC</th>
<th>007B</th>
<th>M</th>
<th>100</th>
<th>SA</th>
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<tbody>
<tr>
<td>Series</td>
<td>Model</td>
<td>Motor Type</td>
<td>Thermostat</td>
<td>Core Bypass</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</table>

### 1. OIL COOLER SERIES WITH AC MOTOR; ULAC

#### 2. COOLER SIZE/MODEL

### 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 Olaer USA = 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. THERMOSTWITCH
- No thermostat = 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.

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The information in this brochure is subject to change without prior notice.
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 and 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.
<table>
<thead>
<tr>
<th>TYPE</th>
<th>Nom. Oil Flow Rate (gpm)</th>
<th>Cooling Capacity at 50 °F ETD (Btu/hr)</th>
<th>Cooling Capacity Btu/hr/°F</th>
<th>Acoustic Pressure Level LpA dB(A) 3 Ft.*</th>
<th>Motor Capacity / No. Of Poles HP</th>
<th>Motor</th>
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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).
### Table

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<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<tr>
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<td>20.7</td>
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<td>19.1</td>
<td>14.0</td>
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<td>28.4</td>
<td>-</td>
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<td>34.1</td>
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<tr>
<td>ULOC 044G - D</td>
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<td>27.2</td>
<td>34.1</td>
<td>-</td>
<td>2.0</td>
<td>24.0</td>
<td>17.4</td>
<td>33.9</td>
<td>13.5</td>
<td>0.55</td>
<td>1¼&quot; (#20)</td>
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</tbody>
</table>

*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:

<table>
<thead>
<tr>
<th>ULOC</th>
<th>007D</th>
<th>M</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Model</td>
<td>Motor Type</td>
<td>Pump Flow Rate</td>
<td>Core Bypass</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
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</table>

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

<table>
<thead>
<tr>
<th>COOLER CORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum static working pressure</td>
</tr>
<tr>
<td>Dynamic working pressure</td>
</tr>
<tr>
<td>Heat transfer tolerance</td>
</tr>
<tr>
<td>Maximum oil inlet temperature</td>
</tr>
</tbody>
</table>

* 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

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 capacity tolerance ± 10%.

* Pressure Drop Correction Factor for other viscosities.
ULDC

<table>
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<th>TYPE</th>
<th>Weight lbs (Approx.)</th>
<th>Acoustic Pressure LpA dB(A) 3 Ft.</th>
<th>Max. Current (Amps.)**</th>
<th>Q SAE O-Ring Boss</th>
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<td>66</td>
<td>75</td>
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<td>1⅛&quot; (#20)</td>
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* 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.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
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<td>0.35 x 1.1</td>
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<td>4.9</td>
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<td>7.9/18.0</td>
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All dimensions listed above are in inches.
Order Key for ULDC Oil Coolers

All positions must be filled in when ordering.

**EXAMPLE:**

<table>
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<tr>
<th>ULDC</th>
<th>007</th>
<th>A</th>
<th>000</th>
<th>SA</th>
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<tbody>
<tr>
<td>Series</td>
<td>Model</td>
<td>Motor Type</td>
<td>Thermostwitch</td>
<td>Core Bypass</td>
</tr>
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</table>

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 thermostwitch = 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

The information in this brochure is subject to change without prior notice.
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.
Pressure drop at 150 SSU (psi)

Oil Flow Rate (gpm)

Correction Factor

0 50 150 250 350 450

0 20 40 60 80 100 120

007, 011

016, 023

033

044

058, 078, 112
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<thead>
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<th>TYPE</th>
<th>Fan Speed (rpm)</th>
<th>Fan Power (HP)</th>
<th>Weight (lbs. Approx.)</th>
<th>Max Speed (rpm)</th>
<th>Acoustic Pressure Level LpA dB(A) 3 Ft*</th>
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* Noise level tolerance ± 3 dB(A).
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<td>-</td>
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All dimensions listed above are in inches.

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<tr>
<th>TYPE</th>
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<th>M</th>
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<th>Q SAE O-ring Boss</th>
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<td>1&quot; (#16)</td>
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<td>1&quot; (#16)</td>
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<td>1&quot; (#16)</td>
<td>A - F</td>
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<tr>
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<td>1&quot; (#16)</td>
<td>A - F</td>
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<tr>
<td>ULHC 033</td>
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<td>1¼&quot; (#20)</td>
<td>A - F</td>
</tr>
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<td>½&quot; (#8)</td>
<td>1¼&quot; (#20)</td>
<td>A - F</td>
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<td>15.3</td>
<td>¾&quot; (#12)</td>
<td>1½&quot; (#24)</td>
<td>A - F</td>
</tr>
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<td>¾&quot; (#12)</td>
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<tr>
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<td>17.2</td>
<td>¾&quot; (#12)</td>
<td>1½&quot; (#24)</td>
<td>D - F</td>
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Order Key for ULHC Oil Coolers

All positions must be filled in when ordering.

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<tr>
<td>Series</td>
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<td>1</td>
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</table>

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

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<th></th>
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<th></th>
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<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
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Not listed, consult Accumulator and Cooler Division = Z

4. THERMO CONTACT

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<td>140</td>
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<td>195</td>
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Not listed, consult Accumulator and Cooler Division = ZZZ

5. CORE BYPASS*

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<th>Bypass Type</th>
<th>20 psi External Hose Bypass (standard option)</th>
<th>65 psi External Hose Bypass (standard option)</th>
<th>30 psi External Tube Bypass</th>
<th>75 psi External Tube Bypass</th>
<th>120 psi External Tube Bypass</th>
<th>120 °F External Thermo-Bypass</th>
<th>140 °F External Thermo-Bypass</th>
<th>160 °F External Thermo-Bypass</th>
<th>195 °F External Thermo-Bypass</th>
<th>Full Flow External Bypass</th>
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</thead>
<tbody>
<tr>
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<td>SB</td>
<td>SG</td>
<td>SH</td>
<td>SJ</td>
<td>SM</td>
<td>SN</td>
<td>SP</td>
<td>SQ</td>
<td>SF</td>
</tr>
</tbody>
</table>

*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

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- 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

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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.

**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 core design.

**Stone guard/Dust guard**
Protects components and systems from tough conditions.

**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.

**Temperature-controlled 3-way valve** *External*
Same function as the temperature-controlled bypass valve, but positioned externally.

*Note: Must be ordered separately.*

**Lifting eyes**
For simple installation and relocation.
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.
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).

**Aerospace**
Key Markets
- Aftermarket services
- Commercial transports
- Engines
- General & business aviation
- Helicopters
- Launch vehicles
- Military aircraft
- Missiles
- Power generation
- Regional transports
- Unmanned aerial vehicles

**Key Products**
- Control systems & actuation products
- Engine systems & components
- Fluid conveyance systems & components
- Fluid metering, delivery & atomization devices
- Fuel systems & components
- Fuel tanking systems
- Hydraulics systems & components
- Thermal management
- Wheels & brakes

**Automation**
Key Markets
- Renewable energy
- Conveyance & material handling
- Factory automation
- Food & beverage
- Life sciences & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastic machinery
- Primary metals
- Safety & security
- Semiconductor & electronics
- Transportation & automotive

**Key Products**
- AG/DC drives & systems
- Air preparation
- Electric actuators, pony robots & skids
- Human machine interfaces
- Inverters
- Manifolds
- Miniature fluids
- Pneumatic actuators & grippers
- Pneumatic valves & controls
- Rotary actuators
- Stepper motors, servo motors, drives & controls
- Structural extrusions
- Vacuum generators, cups & sensors

**Climate & Industrial Controls**
Key Markets
- Agriculture
- Air conditioning
- Construction Machinery
- Food & beverage
- Industrial machinery
- Life sciences
- Oil & gas
- Power Generation
- Process
- Refrigeration
- Transportation

**Key Products**
- Accumulators
- Advanced actuators
- CO2 controls
- Electronic controllers
- Filter drums
- Hand shutoff valves
- Heat exchangers
- Hose & fittings
- Pressure regulating valves
- Refrigerant distribution
- Safety relief valves
- Smart pumps
- Solenoid valves
- Thermal management systems
- Thermodynamic expansion valves

**Filtration**
Key Markets
- Aerospace
- Food & beverage
- Industrial plant & equipment
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation
- Water Purification

**Key Products**
- Analytical gas generators
- 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 & filter filters
- Microfiltration
- Sterile air filtration
- Water desalination & purification filters & systems

**Fluid Connectors**
Key Markets
- Aerial
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Life sciences
- Marine
- 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
- Misting systems & power cables
- PTFE hose & tubing
- Quick couplings
- Rubber & Thermoplastic hose
- Tube fittings & adapters
- Tubing & plastic fittings

**Hydraulics**
Key Markets
- Agricultural
- Alternative energy
- Construction machinery
- Forestry
- Industrial machinery
- Marine & shipping
- Material handling
- Mining
- Oil & gas
- Power generation
- Refuse vehicles
- Renewable energy
- Truck hydraulics
- Tuf equipment

**Key Products**
- Accumulators
- Cartridge valves
- Electrohydraulic actuators
- Human machine interfaces
- Hybrid drives
- Hydraulic cylinders
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Hydraulic steering
- Integrated hydraulic circuits
- Power take-offs
- Power units
- Rotary actuators
- Sensors

**Instrumentation**
Key Markets
- Analytical Instruments
- Analytical sample conditioning products & systems
- Chemical injection fittings & valves
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves, regulators & digital flow controllers
- Industrial mass flow meters/ controllers
- Permanent no weld take fittings
- Precision industrial regulators & flow controllers
- Process control double block & bleeds
- Process control fittings, valves, regulators, & manifold valves

**Seal**
Key Markets
- Aerospace
- Chemical processing
- Consumer
- Fluid power
- General industrial
- Information technology
- Life sciences
- Microelectronics
- Military
- Oil & gas
- Power generation
- Renewable energy
- Telecommunications
- Transportation

**Key Products**
- Dynamic seals
- Elastomer o-rings
- Electro-medical instrument design & assembly
- EMI shielding
- Exhausted & precision cut, fabricated elastomeric seals
- High temperature metal seals
- Homogeneous & inserted elastomeric shapes
- Medical device fabrication & assembly
- Metal & plastic retained composite seals
- Shaped optical windows
- Silicone tubing & extrusions
- Thermal management
- Vibration damping