Fluid Cooling Industrial AOC Series

Performance Notes

▪ AC motors
▪ Core filter
▪ 3/4" tubes
▪ Low cost
▪ Industrial duty
▪ Quiet operation
▪ For low flow rates
▪ Oil flows to 150 GPM
▪ Perfect for off-line recirculation loop
▪ Mounting brackets included
▪ SAE connections
▪ Single or three-phase 60/50 HZ motors
▪ Filter standard (not available on AOC-08)

Materials

Tubes Copper
Fins Aluminum
Turbulators Aluminum
Fan Blade Aluminum with steel hub
Fan Guard Steel with black baked enamel finish
Cabinet Steel with powder coat finish
Manifolds Copper: Model AOC-08
Steel: Models AOC-19 – AOC-70
Connections Brass: Model AOC-08
Steel: Models AOC-19 – AOC-70
Nameplate Aluminum
Filter Stainless frame with washable media

Ratings

Maximum Operating Pressure
300 PSI
Test Pressure
300 PSI
Maximum Operating Temperature
350°F

How to Order (AOC-08 models only)

<table>
<thead>
<tr>
<th>Model</th>
<th>Series</th>
<th>Model Size Selected</th>
<th>Number of Passes</th>
<th>Connection Type</th>
<th>Bypass*</th>
<th>Specify Motor Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOC</td>
<td>0</td>
<td>8</td>
<td>1 - One Pass</td>
<td>1 - NPT</td>
<td>Blank</td>
<td>115/230V Single Phase</td>
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<tr>
<td></td>
<td>0</td>
<td>8</td>
<td>2 - Two Pass</td>
<td>2 - SAE</td>
<td>30/30 PSI</td>
<td>No Motor</td>
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<tr>
<td></td>
<td>0</td>
<td>8</td>
<td>4 - Four Pass</td>
<td>3 - BSPP</td>
<td>60/60 PSI</td>
<td></td>
</tr>
</tbody>
</table>

*Bypass valve not available in Four Pass. 60 PSI only on Two Pass
This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

How to Order (Models AOC-19 through AOC-70)

<table>
<thead>
<tr>
<th>Model</th>
<th>Series</th>
<th>Model Size Selected</th>
<th>Connection Type</th>
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<td>AOC</td>
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<td></td>
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<tr>
<td></td>
<td>0</td>
<td>8</td>
<td>3 - BSPP</td>
<td>60/60 PSI</td>
<td></td>
</tr>
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</table>

*Available on One Pass only
This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

Internal Pressure Bypass Options

AOC-08
Available in one pass (30 and 60 PSI), two pass (60 PSI), designs only. Valves are built into tubes and do not affect external dimensions. All steel valves. Non-serviceable.

AOC-19 through AOC-33
Available in 30 PSI or 60 PSI settings. 3/4", external, all steel valve. May be removed for servicing.

AOC-37 through AOC-70
Available in 30 PSI or 60 PSI settings. 1½", external, all steel valve. May be removed for servicing.
Dimensions

Models AOC-19 through AOC-33

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor HP</th>
<th>No. of Motors</th>
<th>Frame Size</th>
<th>Single Phase</th>
<th>Three Phase</th>
<th>575 Volt</th>
<th>RPM</th>
<th>Type</th>
<th>Bearings</th>
<th>Thermal Overload</th>
<th>dB(A) 3 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOC-19</td>
<td>1/4</td>
<td>1 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>AOC-22</td>
<td>1/4</td>
<td>1 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
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<tr>
<td>AOC-24</td>
<td>1/4</td>
<td>1 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
<td></td>
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<tr>
<td>AOC-33</td>
<td>1/4</td>
<td>1 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
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<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
<td></td>
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<tr>
<td>AOC-37</td>
<td>1/4</td>
<td>2 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>AOC-50</td>
<td>1/4</td>
<td>2 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
<td></td>
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<tr>
<td>AOC-54</td>
<td>1/4</td>
<td>2 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
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<tr>
<td>AOC-70</td>
<td>1/4</td>
<td>2 Custom</td>
<td>Custom</td>
<td>115/230V/60/50 HZ 2.8/1.4 Amps Full Load 60 HZ</td>
<td>208-230/460V/60 HZ 190/380-415V/50 HZ 1.0/0.5 Amps Full Load</td>
<td>575/500V/60/50 HZ 65 Amps Full Load 60 HZ .60 Amps Full Load 50 HZ</td>
<td>1700 (60 HZ) 1350 (50 HZ)</td>
<td>TEAO B</td>
<td>Yes</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Amp ratings are per motor. Motors are CSA approved/marked.

Specifications

Electric Motor Data
Selection Procedure

Performance Curves are based on 50SSU oil leaving the cooler 40°F higher than the ambient air temperature used for cooling. This is also referred to as a 40°F approach temperature.

**STEP 1** Determine the Heat Load. This will vary with different systems, but typically cooler are sized to remove 25 to 50% of the input nameplate horsepower.

(Example: 100 HP Power Unit x .33 = 33 HP Heat load.)
If BTU/HR is known: \( HP = \frac{BTU/HR}{2545} \)

**STEP 2** Determine Approach Temperature. Desired oil leaving cooler \( ^\circ F \) – Ambient air temp. \( ^\circ F \) = Actual Approach

**STEP 3** Determine Curve Horsepower Heat Load. Enter the information from above:

\[
\text{Horsepower heat load} \times \frac{40 \times \text{Cv}}{\text{Actual Approach}} = \text{Curve Horsepower}
\]

**STEP 4** Enter curves at oil flow through cooler and curve horsepower. Any curve above the intersecting point will work.

**STEP 5** Determine Oil Pressure Drop from Curves:

\( \bullet = 5 \text{ PSI} \)
\( \blacksquare = 10 \text{ PSI} \)
\( \triangle = 20 \text{ PSI} \)
\( \bigcirc = 40 \text{ PSI} \)

Multiply pressure drop from curve by correction factor found in oil \( \Delta P \) correction curve.

Desired Reservoir Temperature

**Return Line Cooling:** Desired temperature is the oil temperature leaving the cooler. This will be the same temperature that will be found in the reservoir.

**Off-Line Recirculation Cooling Loop:** Desired temperature is the oil temperature entering the cooler. In this case, the oil temperature change must be determined so that the actual oil leaving temperature can be found. Calculate the oil temperature change (oil \( \Delta T \)) with this formula:

\[
\text{Oil } \Delta T = \frac{\text{BTU's/HR}}{(\text{GPM Oil Flow x 210})}
\]

To calculate the oil leaving temperature from the cooler, use this formula:

\[
\text{Oil Leaving Temp.} = \text{Oil Entering Temp} - \Delta T
\]

This formula may also be used in any application where the only temperature available is the entering oil temperature.

**Oil Pressure Drop:** Most systems can tolerate a pressure drop through the heat exchanger of 20 to 30 PSI. Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI or less for case drain applications where high back pressure may damage the pump shaft seals.

Oil Temperature

Typical operating temperature ranges are:

- Hydraulic Motor Oil: 110° - 130°F
- Hydrostatic Drive Oil: 130° - 180°F
- Bearing Lube Oil: 120° - 160°F
- Lube Oil Circuits: 110° - 130°F

De-rate cooler performance by 10% when used in 50 HZ service.

Performance Curves

![Performance Curves Diagram](image-url)
## AOC-08 Model Only

### One Pass

- Horsepower Removed in Cooler vs. Oil Flow - GPM

### Two Pass

- Horsepower Removed in Cooler vs. Oil Flow - GPM

### Four Pass

- Horsepower Removed in Cooler vs. Oil Flow - GPM

## Specifications

### Electric Motor Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor Power</th>
<th>50/60 HZ</th>
<th>Type</th>
<th>RPM</th>
<th>Bearings S-Sleeve</th>
<th>Thermal Overload</th>
<th>Shipping Weight LBS</th>
<th>dB(A) 3 FT</th>
<th>CFM 260 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOC-08</td>
<td>1/30</td>
<td>115 V</td>
<td>50/60 HZ</td>
<td>1.1 Amperes Full Load</td>
<td>TEAO</td>
<td>3000</td>
<td>S</td>
<td>Yes</td>
<td>12</td>
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## Cv Viscosity Correction

<table>
<thead>
<tr>
<th>Average Oil Temp °F</th>
<th>SAE 5</th>
<th>SAE 10</th>
<th>SAE 20</th>
<th>SAE 30</th>
<th>SAE 40</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>110 SSU at 100°F</td>
<td>150 SSU at 210°F</td>
<td>275 SSU at 100°F</td>
<td>500 SSU at 210°F</td>
<td>750 SSU at 100°F</td>
</tr>
<tr>
<td>100</td>
<td>1.14</td>
<td>1.22</td>
<td>1.35</td>
<td>1.58</td>
<td>1.77</td>
</tr>
<tr>
<td>150</td>
<td>1.01</td>
<td>1.05</td>
<td>1.11</td>
<td>1.21</td>
<td>1.31</td>
</tr>
<tr>
<td>200</td>
<td>0.99</td>
<td>1.00</td>
<td>1.01</td>
<td>1.08</td>
<td>1.10</td>
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<tr>
<td>250</td>
<td>0.96</td>
<td>0.98</td>
<td>0.99</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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