Fluid Cooling  Industrial COLW Series

COPPER & STEEL CONSTRUCTION

Performance Notes

- Ideal for independent cooling and filtering of system oils
- Utilizes a high efficient EK series shell & tube (finned bundle) heat exchanger
- Wall or floor mount
- Low to medium pressure applications utilizing low noise screw pump technology
- Pump flows ranging 9.5 GPM to 45 GPM
- Standard SAE ports, NPT and BSP port adapters available

Materials

All Models
- Pump Positive displacement (screw)
- Pump Motor Nema frame
- Shell Steel
- Tubes Copper
- Frame Powder-coated carbon steel
- Gaskets Nitrile rubber/cellulose fiber
- Mounting Brackets Steel
- Nameplate Aluminum foil

COLW-20, 20W, 40, 40W, 80
- Tube Sheets Steel
- Fins Aluminum
- End Caps Grey iron

COLW-100
- Baffles Brass
- Headers Steel
- Shell Connections Steel
- End Bonnets Grey iron

Screw Pump Technology

Offers significant maintenance and performance advantages.

- Reliable, high performance, low noise
- Run without pulsation, providing long life to your application
- Positive displacement rotary pump with axial flow design
- Only three moving parts
- Rolling action eliminates noise and vibration

Micron Filtration

Utilizes a modern in-line filter housing and cartridge

- Standard cartridge element
- Filter Options:
  - 10 micron fiberglass, standard
  - 3, 6, and 25 micron fiberglass, optional
  - Consult factory for high viscosity fluids
- β 1000 filtration efficiency
- Filtration indicator
  - Visual, visual/electrical or electrical

How to Order

| Model Series COLW | Model Size Selected | Ports 1 - NPT 2 - SAE 3 - BSPP | Motor 0 - No Motor 3 - SpH (60 Hz NEMA) | Filter Blank - None 3 - 5μ 6 - 6μ 10 - 10μ 25 - 25μ | Indicator Blank - None V - Visual E - Electrical EV - Electrical/Visual |
Dimensions

Wall Mount

Specifications

Pump Motor Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Actual Displacement CUN (CC)</th>
<th>Operating Pressure PSI (BAR)</th>
<th>Motor HP</th>
<th>RPM</th>
<th>Voltage</th>
<th>Full Load Amps 208-230/460</th>
<th>Motor Frame Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLW-20</td>
<td>1.22 (20)</td>
<td>130 (9)</td>
<td>1.5</td>
<td>1800</td>
<td>208-230/460</td>
<td>4.5-4.4/2.2</td>
<td>145TC</td>
</tr>
<tr>
<td>COLW-40</td>
<td>2.44 (40)</td>
<td>130 (9)</td>
<td>3</td>
<td>1800</td>
<td>208-230/460</td>
<td>9.8-8.4/4.2</td>
<td>182TC</td>
</tr>
<tr>
<td>COLW-80</td>
<td>4.52 (74)</td>
<td>218 (15)</td>
<td>7.5</td>
<td>1800</td>
<td>208-230/460</td>
<td>21-18.8/9.4</td>
<td>213TC</td>
</tr>
<tr>
<td>COLW-100</td>
<td>5.68 (93)</td>
<td>203 (14)</td>
<td>7.5</td>
<td>1800</td>
<td>208-230/460</td>
<td>21-18.8/9.4</td>
<td>213TC</td>
</tr>
</tbody>
</table>
Dimensions

Floor Mount (COLW-20 – COLW-80)

Floor Mount (COLW-100)
Selection Procedure

**STEP 1** Determine Heat Load. Most applications can have a cooler sized for 1/3 of the input HP (KW).

**STEP 2** Determine Entering Temperature Difference. (Actual E.T.D.)
E.T.D. = Entering oil temperature °F (°C) – Entering water temperature °F (°C)
The entering oil temperature is generally the maximum desired system oil temperature.
Entering water temperature is the highest water temperature the application will see.

**STEP 3** Select Model From Curves. Enter the Performance Curves at the bottom with the GPM (LPM) oil flow and proceed upward to the adjusted Heat Rejection from Step 3. Any Model or Curve on or above this point will meet these conditions.

Listed Performance Curves are based on 46 cSt oil.
*If your application conditions are different, consult factory for assistance.*

**Desired Reservoir Temperature**

**Oil Temperature:** Oil coolers can be selected using entering or leaving oil temperatures.

**Off-Line Recirculation Cooling Loop:** Desired reservoir temperature is the oil temperature entering the cooler.

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

\[
\text{Oil } \Delta T \ °F (°C) = \left( \frac{\text{BTU/HR}}{\text{[GPM oil flow x 210]}} \right) \div \left( \frac{\text{[KW} \div \text{LPM Oil Flow x .029]} }{\text{}} \right)
\]

To calculate the oil entering temperature to the cooler, use this formula:

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

**Oil Pressure Drop**: Most systems can tolerate a pressure drop through the heat exchanger of 19 to 30 PSI (1.3 to 2.1 BAR). Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI (.35 BAR) or less for case drain applications where high back pressure may damage the pump shaft seals.

Typical operating temperature ranges are:
- **Hydraulic Motor Oil**: 120 - 180°F (49 - 82°C)
- **Hydrostatic Drive Oil**: 160 - 180°F (71 - 82°C)
- **Engine Lube Oil**: 180 - 199°F (82 - 93°C)
- **Automatic Transmission Fluid**: 199 - 300°F (93 - 149°C)

**System Pressure Drop**

<table>
<thead>
<tr>
<th>Model</th>
<th>Oil Flow Rate GPM (LPM)</th>
<th>Dp Less Filter PSI (BAR)</th>
<th>Dp With Filter PSI (BAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLW-20 (60hz)</td>
<td>9.5 (36)</td>
<td>6 (0.4)</td>
<td>13 (0.9)</td>
</tr>
<tr>
<td>COLW-40 (60hz)</td>
<td>21 (79)</td>
<td>21 (1.5)</td>
<td>37 (2.6)</td>
</tr>
<tr>
<td>COLW-80 (60hz)</td>
<td>35 (133)</td>
<td>20 (1.4)</td>
<td>30 (2.1)</td>
</tr>
<tr>
<td>COLW-100 (60hz)</td>
<td>45 (169)</td>
<td>7 (0.5)</td>
<td>17 (1.2)</td>
</tr>
<tr>
<td>COLW-20 (50hz)</td>
<td>8 (30)</td>
<td>5 (0.3)</td>
<td>12 (0.8)</td>
</tr>
<tr>
<td>COLW-40 (50hz)</td>
<td>16 (61)</td>
<td>15 (1.0)</td>
<td>26 (1.9)</td>
</tr>
<tr>
<td>COLW-80 (50hz)</td>
<td>29.5 (112)</td>
<td>16 (1.1)</td>
<td>26 (1.8)</td>
</tr>
<tr>
<td>COLW-100 (50hz)</td>
<td>37 (140)</td>
<td>6 (0.4)</td>
<td>16 (1.1)</td>
</tr>
</tbody>
</table>

Total pressure drop is estimate using 46 cSt oil. 10 micron mesh filter is used in calculating the pressure drop. Filter bypass rating is 45 PSI (3.1BAR)

**Oil Pressure Drop Correction**

<table>
<thead>
<tr>
<th>Kinematic Viscosity SUS (cSt)</th>
<th>Correction Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>(43)</td>
<td>(88)</td>
</tr>
</tbody>
</table>

**Pump Flow Rates**

<table>
<thead>
<tr>
<th>Model</th>
<th>60 Hz, 1800 RPM Pump Oil Flow Rate GPM (LPM)</th>
<th>50Hz, 1500 RPM Pump Oil Flow Rate GPM (LPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLW-20</td>
<td>9.5 (36)</td>
<td>8 (30)</td>
</tr>
<tr>
<td>COLW-40</td>
<td>21 (79)</td>
<td>16 (61)</td>
</tr>
<tr>
<td>COLW-80</td>
<td>35 (133)</td>
<td>29.5 (112)</td>
</tr>
<tr>
<td>COLW-100</td>
<td>45 (169)</td>
<td>37 (140)</td>
</tr>
</tbody>
</table>
Performance Curves

60hz (1800 RPM) Pump 46 cSt Oil

Performance curves are a 2:1 oil to water ratio.
Performance Curves

50hz (1500 RPM) Pump 46 cSt Oil

Performance curves are a 2:1 oil to water ratio.
Micron Filter Specifications

**COLW-29(W) – COLW-40(W)**

![Image of Micron Filter COLW-29(W) – COLW-40(W)]

**COLW-80 – COLW-100**

![Image of Micron Filter COLW-80 – COLW-100]

*Other bowl lengths available. Consult factory for details.*

All dimensions in inches (millimeters), unless noted otherwise.

**Filter Housing Materials**
- Head – Aluminum
- Housing – Phosphated Steel
- Pressure bypass valve – Brass/Aluminum

**Maximum Temperature**
- 230°F (110°C)

**Pressure Bypass Valve**
- Opening pressure – 51 PSI (3.5 BAR) ±10%
- Other opening pressures on request

**Connection In/Out**
- #12 SAE

**Seals**
- Standard NBR
- Optional FPM

**Weight**
- 4.0 LBS (1.8 KG)

**Volume**
- 0.21 gallons (0.81 liters)

**Filter Housing Materials**
- Head – Anodized Aluminum
- Housing – Anodized Aluminum
- Pressure bypass valve – Nylon

**Maximum Temperature**
- 230°F (110°C)

**Pressure Bypass Valve**
- Opening pressure – 51 PSI (3.5 BAR) ±10%
- Other opening pressures on request

**Connection In/Out**
- #24 SAE

**Seals**
- Standard NBR
- Optional FPM

**Weight**
- 7.7 LBS (3.5 KG)

**Volume**
- 0.40 gallons (1.5 liters)
Micron Filter Specifications

Filtration Media Composition
- Internal support mesh
- Filter media support
- Filtration media
- Prefilter media
- External support mesh

Compatibility with Fluids
The filter elements are compatible with:
- Mineral oils to ISO 2943-4
- Aqueous emulsions
- Synthetic fluids, water glycol

Seals, standard in NBR compatible with:
- Mineral oils to ISO 2943-4
- Aqueous emulsions
- Synthetic fluids, water glycol

FPM seals compatible with:
- Synthetic fluids type HS-HFDR-HFDS-HFDU to ISO 6743-4

Filtration Indicators
Visual "V"
- Cover and lens: nylon
- Visual indicator green: cartridge clean
- Visual indicator red: cartridge clogged
- Weight: 4.8 oz (136 g)
- Tightening torque: 70 FT-LBS (95 Nm)

Electrical/Visual "EV"
Connector EN 175301-803 A/ISO4400
- Protection rating: IP 65
- Maximum contact rating: 5 A/250V~
- Voltage: 230 V~
- Connector: DIN 43650 Microswitch contact
- Cable gland: PG 9
- Cover and lens: nylon
- Visual indicator green: cartridge clean
- Visual indicator red: cartridge clogged
- Weight: 6.6 oz (187 g)
- Tightening torque: 70 FT-LBS (95 Nm)

Electric "E"
Connector EN 175301-803 A/ISO4400
- Protection rating: IP 65
- Maximum contact rating: 5 A/250V~
- Voltage: 230 V~
- Connector: DIN 43650 Microswitch contact
- Cable gland: PG 9
- Weight: 6.5 oz (184 g)
- Tightening torque: 48 FT-LBS (65 Nm)

International Standards for Fluid Contamination Control

<table>
<thead>
<tr>
<th>Components</th>
<th>Recommended Filtration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servo valves</td>
<td>●</td>
</tr>
<tr>
<td>Proportional valves</td>
<td>● ●</td>
</tr>
<tr>
<td>Variable displacement pumps</td>
<td>● ● ●</td>
</tr>
<tr>
<td>Cartridge valves</td>
<td>●</td>
</tr>
<tr>
<td>Piston pumps</td>
<td>●</td>
</tr>
<tr>
<td>Vane pumps</td>
<td>●</td>
</tr>
<tr>
<td>Pressure/flow rate control valves</td>
<td>● ● ●</td>
</tr>
<tr>
<td>Solenoid valves</td>
<td>●</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ISO code</th>
<th>12/10/7</th>
<th>13/11/8</th>
<th>14/12/9</th>
<th>15/13/10</th>
<th>16/14/11</th>
<th>17/15/12</th>
<th>18/16/13</th>
<th>19/17/14</th>
<th>20/18/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAS code</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Absolute filtration recommended: 3 micron
6 micron
10 micron*
>10 micron

*TTP Standard

Multipass Test
In compliance with new ISO 16889 Standard
Contaminant ISO MTD

<table>
<thead>
<tr>
<th>Value</th>
<th>2</th>
<th>10</th>
<th>75</th>
<th>100</th>
<th>200</th>
<th>1000*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>50%</td>
<td>90%</td>
<td>98.70%</td>
<td>99%</td>
<td>99.50%</td>
<td>99.90%</td>
</tr>
</tbody>
</table>

* TTP Standard

Inorganic Microfiber

Prefilter media
Outer support mesh
Microfiber filtration media
Internal support mesh
Support tube

Multipass Test
In accordance with new ISO 16889 Standard
Contaminant ISO MTD

<table>
<thead>
<tr>
<th>Value</th>
<th>2</th>
<th>10</th>
<th>75</th>
<th>100</th>
<th>200</th>
<th>1000*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>50%</td>
<td>90%</td>
<td>98.70%</td>
<td>99%</td>
<td>99.50%</td>
<td>99.90%</td>
</tr>
</tbody>
</table>

* TTP Standard