Fluid Cooling Mobile DF Series

Performance Notes
- Similar to DH with DC fan
- 3/4" tube size
- Low amp draw 12 or 24 V DC motors
- Heavy duty construction
- Long life hydraulic motors
- Rugged applications
- Steel manifolds
- Heat removal to 35,000 BTU/HR
- Oil flows to 110 GPM
- Mounting brackets included
- SAE, NPT or 37° flare oil connections
- Damage resistant steel fins

Materials
- Tubes: Copper
- Fins: Steel
- Turbulators: Steel
- Manifolds: Steel
- Fan Assembly: High Impact Plastic

Ratings
- Maximum Operating Pressure: 300 PSI
- Test Pressure: 300 PSI
- Maximum Operating Temperature: 350°F
- Maximum Hydraulic Motor Pressure: 2000 PSI
- Maximum Allowable Hydraulic Motor Back Pressure: 1000 PSI

Internal Pressure Bypass Option
- DFR-11: 3/4", external, all steel valve. Available in either 30 PSI or 60 PSI settings. May be removed for servicing.
- DFR-12, DFR-22: 1½", external, all steel valve. Available in either 30 PSI or 60 PSI settings. May be removed for servicing.

Options
- Fan control switch
- Serviceable internal pressure bypass

How to Order
- Model Series
  - DFR - Internal pressure bypass included
- Model Size Selected
- Connection Type*
  - 1 - NPT
  - 2 - SAE
  - 3 - BSPP
  - 7 - 37° Male Flare
- Motor Specification
  - NM - No Motor
  - 4A - 12 Volt DC
  - 4B - 24 Volt DC
  - 9 - Hydraulic Motor
- Bypass Blank
  - No Bypass
  - 30 - 30 PSI
  - 60 - 60 PSI

This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

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Dimensions - 12 & 24 Volt DC Motors

Models DF-11 and DF-12

Units shown with optional internal pressure bypass

<table>
<thead>
<tr>
<th>Model</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>J</th>
<th>NPT</th>
<th>SAE</th>
<th>K</th>
<th>Shipping Weight (LBS)</th>
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<td>7.69</td>
<td>1.50</td>
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Note: All dimensions are in inches. We reserve the right to make reasonable design changes without notice.

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Dimensions - Hydraulic Motors

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### Selection Procedure

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

**STEP 1** Determine the Heat Load. Heat load may be expressed as either horsepower or BTU/HR. To convert horsepower to BTU/HR:

\[
\text{BTU/HR} = \text{Horsepower} \times 2545
\]

**STEP 2** Determine Entering Temperature Difference. The entering oil temperature is generally the maximum desired oil temperature. Entering temperature − Ambient air temperature = ETD

**STEP 3** Determine the Corrected Heat Dissipation to use the curves.

\[
\text{Corrected Heat Dissipation} = \frac{\text{BTU/HR heat load} \times 50°F \times \text{Cv}}{\text{ETD}}
\]

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

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

- ○ = 5 PSI
- ■ = 10 PSI

Multiply pressure drop from curve by correction factor found in oil P correction curve.

### Oil Temperature

Typical operating temperature ranges are:
- Hydraulic Motor Oil 120°F - 180°F
- Hydrostatic Drive Oil 160°F - 180°F
- Engine Lube Oil 180°F - 200°F
- Automatic Transmission Fluid 200°F - 300°F

### $C_V$ 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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<tr>
<td></td>
<td>110 SSU at 100°F</td>
<td>150 SSU at 100°F</td>
<td>275 SSU at 100°F</td>
<td>500 SSU at 100°F</td>
<td>750 SSU at 100°F</td>
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<tr>
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<td>1.22</td>
<td>1.35</td>
<td>1.58</td>
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<tr>
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</table>
Thermostatic Temperature Control Option (DC)

This controller was designed to mount on the cooler without requiring extensive wiring or plumbing. It provides accurate temperature control by cycling the cooling fan(s) to maintain desired oil temperature.

- 12 or 24 volt operation
- Adjustable temperature settings range from 100°F thru 210°F
- For use with one or two fan models — two fans need additional relay
- Temperature sensor provided
- Wiring provided for remote manual override
- Mounting hardware included

### Part Number | Description
---|---
96171 | Electronic Fan Control Kit
68790 | Replacement Control Only
67699 | Replacement Sensor Only

**Side View**

**Connection Assembly**

**Top View**

**Electrical Schematic**

*Only one temperature setting can be activated at a time.*

NOTE: This switch should be fused to prevent damage if ground is lost. A 30 amp fuse is required in the power supply.