

DF Series – Mobile Air Cooled Copper Tube/Steel Fin with DC or Hydraulic Fan Drive Cooler

The Mobile DF Series offers the same features as the DH Series with the addition of a low amp draw DC motor or long life hydraulic motor. The robust and rugged design includes steel manifolds, copper tubes, and steel fins. Other features include an optional built-in internal pressure bypass for cold start-up protection and the use of high-low turbulators for optimal heat rejection at lower flow rates. This series is ideal for higher pressure applications. Common applications include oil, fuel and transmission cooling.

For additional sizing information consider using TTP's XSelector® online sizing Program.*

- Based off DH Series with DC fan or hydraulic motor
- Heavy duty construction
- Rugged steel manifolds
- 3/4" copper tube size
- Steel fins
- Low amp draw 12 or 24 volt DC motor
- Long life hydraulic motors
- SAE, NPT, or BSPP connections
- Mounting brackets included



Options
Fan control switch
Serviceable internal pressure bypass

How to Order

Model Series	DF DFR - With Bypass
Model Size Selected	11, 12, 22 (See Performance Curve Chart on page 2 for sizes)
Connection Type	1 - NPT 2 - SAE 3 - BSPP
Motor Specification	4A - 12 VDC 4B - 24 VDC 9 - Hydraulic Motor NM - No Motor
Bypass	Blank - No Bypass 30 - 30 PSI 60 - PSI DFR series only. This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

Ratings

Maximum Operating Pressure
300 PSI

Maximum Operating Temperature
350°F

Heat Removal
to 35,000 BTU/HR (10 kW)

Oil Flows
to 110 GPM (240 lpm)

Hydraulic Motor:

Hydraulic Motor Displacement .22in³/Rev.

Maximum Hydraulic Motor Pressure 2000 PSI

Maximum Allowable Hydraulic Motor Back Pressure 1000 PSI

Materials

Tubes Copper

Fins Steel

Turbulators Steel

Manifolds Steel

Fan Assembly High Impact Plastic

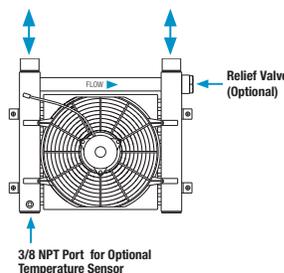
Internal Pressure Bypass Options

Available in either 30 PSI or 60 PSI settings. Removable for Service

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

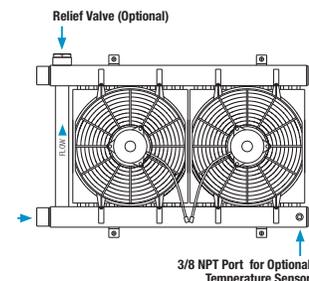
DFR-11

3/4" external, all steel valve



DFR-12, DFR-22

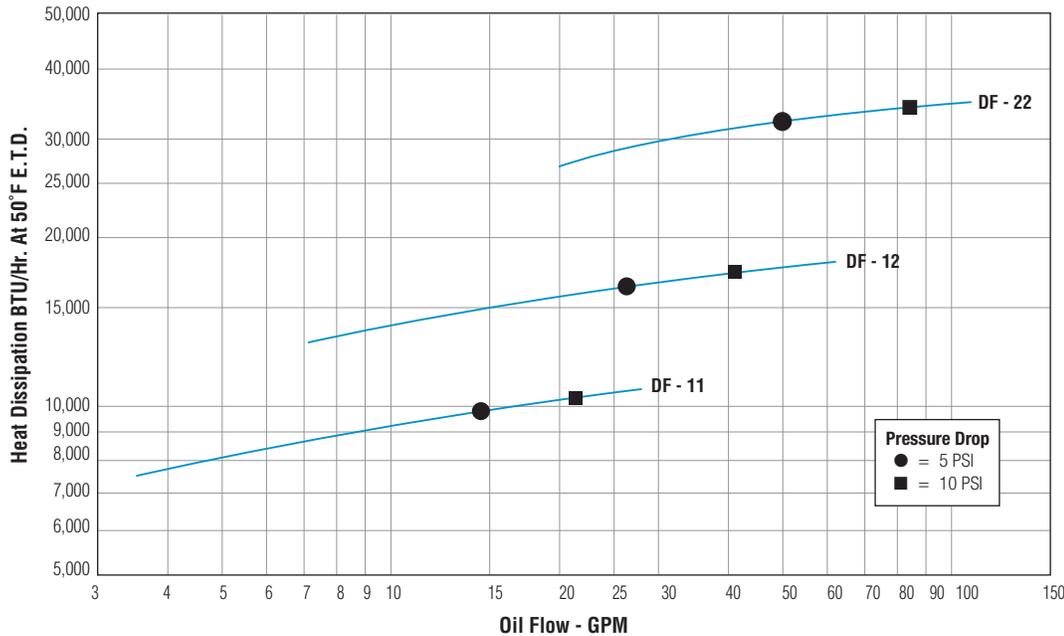
1 1/2" external, all steel valve



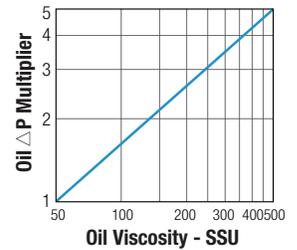
*To register for XSelector® please go to www.thermaltransfer.com/get-in-touch/ and complete the XSelector® Inquiry form and submit. Download the XSelector® for both Apple and Android formats by searching for XSelector® in their App Stores. You must first register for XSelector® before using it on mobile devices.

Performance Curves

For additional sizing information consider using TTP's **XSelector®** online sizing Program.*



Oil Pressure Correction



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:
 $BTU/HR = Horsepower \times 2545$

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

STEP 3 Determine the Corrected Heat Dissipation to use the curves.
 $Corrected\ Heat\ Dissipation = BTU/HR\ heat\ load \times \frac{50°F \times Cv}{ETD}$

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 Δ 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

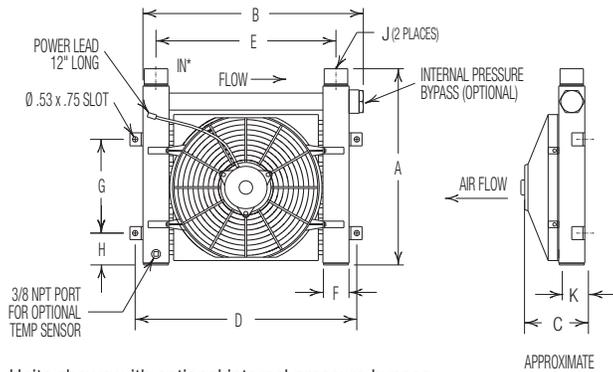
Average Oil Temp °F	OIL				
	SAE 5 110 SSU at 100°F 40 SSU at 210°F	SAE 10 150 SSU at 100°F 43 SSU at 210°F	SAE 20 275 SSU at 100°F 50 SSU at 210°F	SAE 30 500 SSU at 100°F 65 SSU at 210°F	SAE 40 750 SSU at 100°F 75 SSU at 210°F
100	1.14	1.22	1.35	1.58	1.77
150	1.01	1.05	1.11	1.21	1.31
200	.99	1.00	1.01	1.08	1.10
250	.95	.98	.99	1.00	1.00

*To register for **XSelector®** please go to www.thermaltransfer.com/get-in-touch/ and complete the **XSelector®** Inquiry form and submit. Download the **XSelector®** for both Apple and Android formats by searching for **XSelector®** in their App Stores. You must first register for **XSelector®** before using it on mobile devices.

Dimensions - 12 & 24 Volt DC Motors

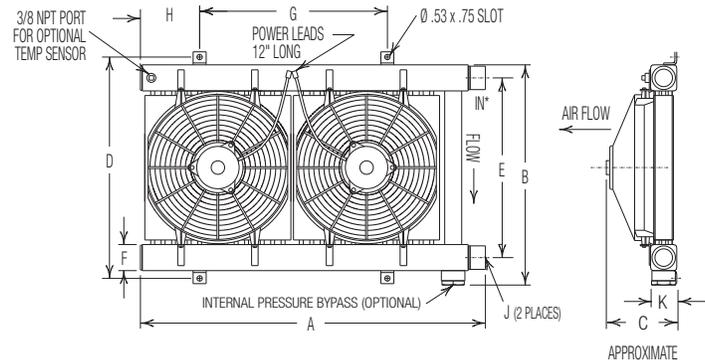
For 3D models and spec sheets visit the DF product page on our website.
<https://www.thermaltransfer.com/product/df-series>

Models DF-11 and DF-12



Units shown with optional internal pressure bypass

Model DF-22

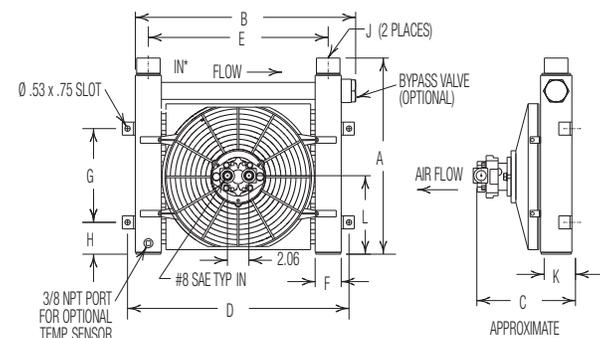


Model	A		B		C	D	E	F	G	H	J		K	Shipping Weight (LBS)
	DF	DFR	DF	DFR							NPT	SAE		
DF-11	16.12	18.00	19.63	21.12	5.61	20.67	17.75	1.50	7.50	3.69	1.00	#16	1.50	38
DF-12	17.00	18.25	21.25	22.91	7.11	22.67	18.75	2.50	7.50	3.69	1.00	#16	3.00	57
DF-22	31.47	33.73	21.25	22.62	7.11	22.67	18.75	2.50	14.25	7.69	1.50	#24	3.00	110

Note: All dimensions are in inches. We reserve the right to make reasonable design changes without notice.
 *Inlet and Outlet connections can be reversed when the internal pressure bypass is not used.

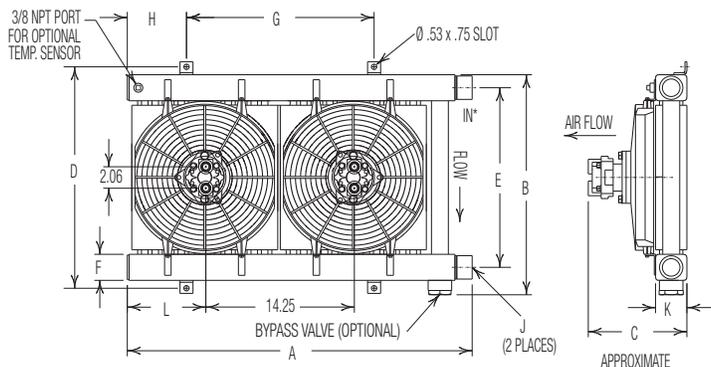
Dimensions - Hydraulic Motors

Models DF-11 and DF-12



Units shown with optional internal pressure bypass

Model DF-22



Model	A		B		C	D	E	F	G	H	J		K	L	Shipping Weight (LBS)
	DF	DFR	DF	DFR							NPT	SAE			
DF-11	16.12	18.00	19.63	21.12	8.14	20.67	17.75	1.50	7.50	3.69	1.00	#16	1.50	7.51	38
DF-12	17.00	18.25	21.25	22.91	9.42	22.67	18.75	2.50	7.50	3.69	1.00	#16	3.00	7.56	57
DF-22	31.47	33.73	21.25	22.62	9.42	22.67	18.75	2.50	14.25	7.69	1.50	#24	3.00	7.58	110

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Thermostatic Temperature Control Option (DC)

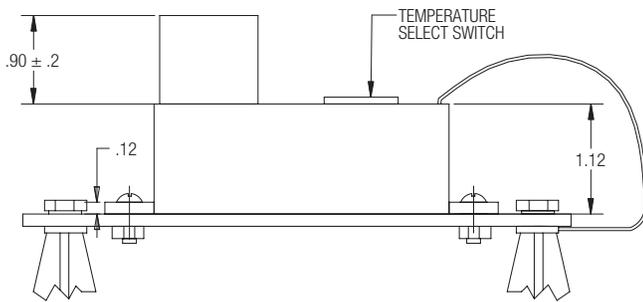
This controller was designed to mount on the cooler without requiring extensive wiring or plumbing. It provides accurate temperature control by cycling the cooling fan(s) to maintain desired oil temperature.

- 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

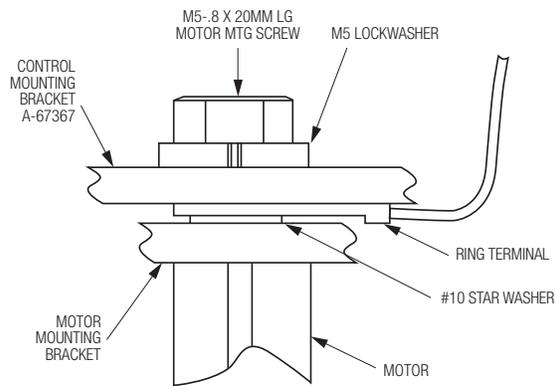
Part Number	Description
96171	Electronic Fan Control Kit
68790	Replacement Control Only
67699	Replacement Sensor Only



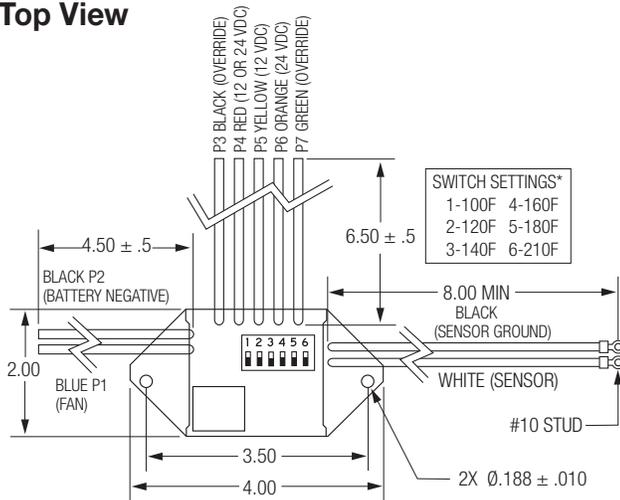
Side View



Connection Assembly



Top View



*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.

Electrical Schematic

