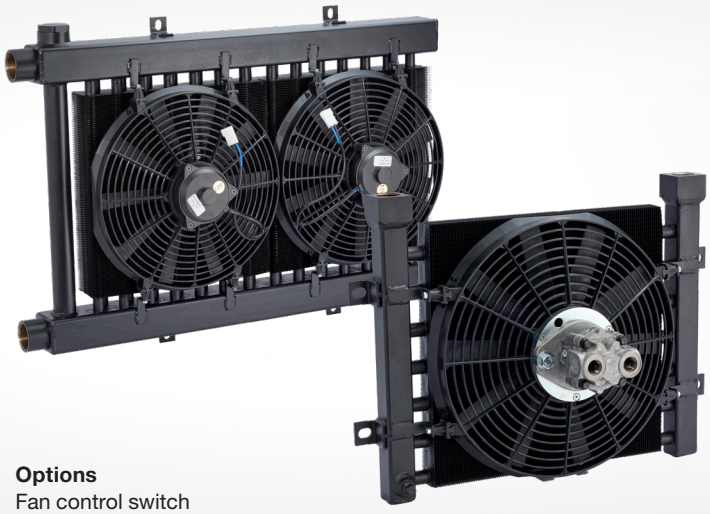
DF Series – Mobile Air Cooled Copper Tube/Steel Fin with DC or Hydraulic Fan Drive Cooler

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.

MAGHEX 2 Temp Controller

MH - MAGHEX 2 DC Fan Controller

MH - MAGHEX 2 Temp Controller

- 12 or 24 VDC
- All in one sensor and switch
- Programmable temp setting
- Low voltage protection
- Can run 1 or 2 fans
- PN: 600181
- See pages 4 and 5 for more details

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

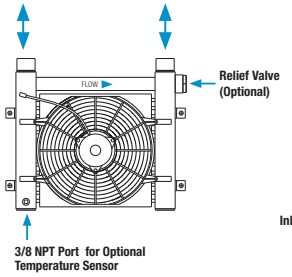
Materials

Tubes Copper
Fins Steel
Turbulators Steel
Manifolds Steel
Fan Assembly High Impact Plastic

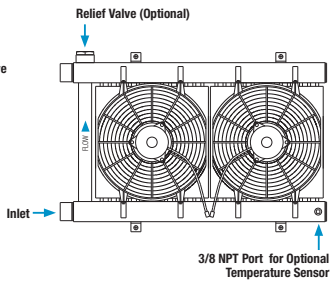
Internal Pressure Bypass Options

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



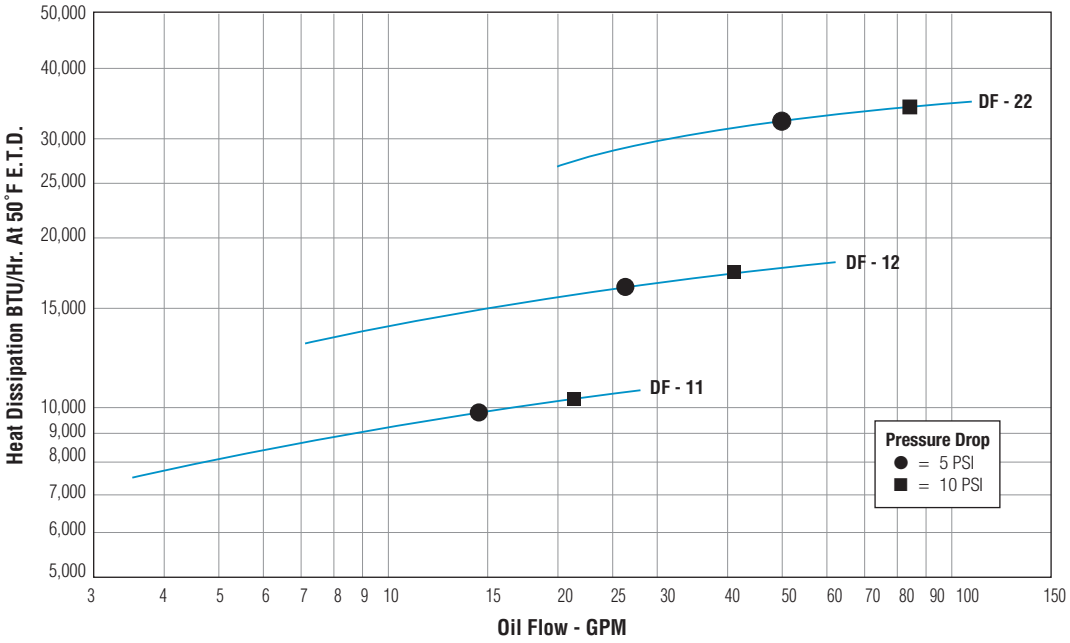
DFR-12, DFR-22
1½" external, all steel valve



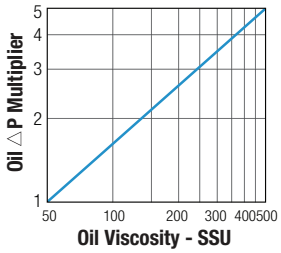
*To register for **XSelector®** please go to **www.thermaltransfer.com/get-in-touch/** and complete the **XSelector®** Inquiry form and submit.
Download the **XSelector®** for both Apple and Android formats by searching for **XSelector®** in their App Stores. You must first register for **XSelector®**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

Performance Curves

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



Oil Pressure Correction



Number of Fans	DC Current Required		Hydraulic Motor Data		
	12 V	24 V	Oil Flow Required (GPM)	Minimum Operating Pressure (PSI)	Maximum Fan Speed (RPM)
1	12.5 amps	6.3 amps	2.1	300	2200
2	25 amps	12.6 amps	4.2	300	2200

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 x 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.**

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

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 △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

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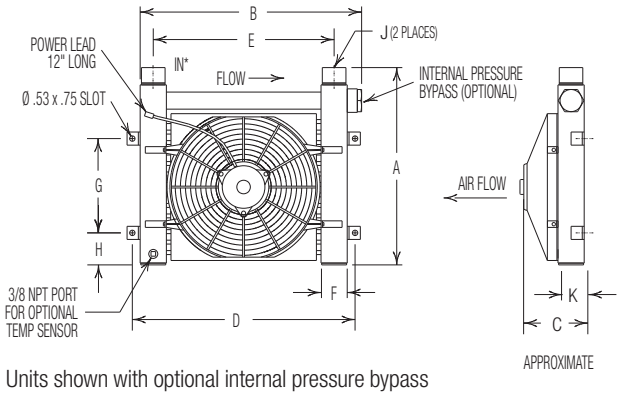
Dimensions - 12 & 24 Volt DC Motors

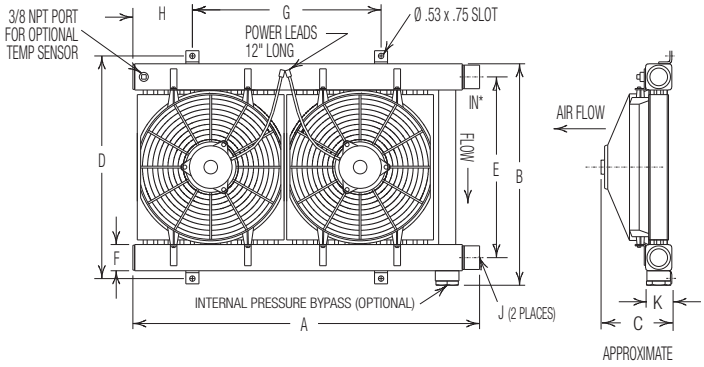
For 3D models and spec sheets visit the DF product page on our website.
https://www.thermaltransfer.com/product/df-series

Models DF-11 and DF-12



Units shown with optional internal pressure bypass

Model DF-22

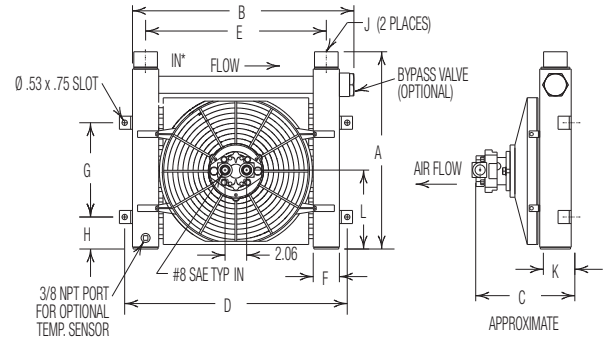


Model	A		B		C	D	E	F	G	H	J		K	Shipping Weight (LBS)
	DF	DFR	DF	DFR							NPT	SAE		
DF-11	16.12	18.00	19.63	21.12	5.61	20.67	17.75	1.50	7.50	3.69	1.00	#16	1.50	38
DF-12	17.00	18.25	21.25	22.91	7.11	22.67	18.75	2.50	7.50	3.69	1.00	#16	3.00	57
DF-22	31.47	33.73	21.25	22.62	7.11	22.67	18.75	2.50	14.25	7.69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

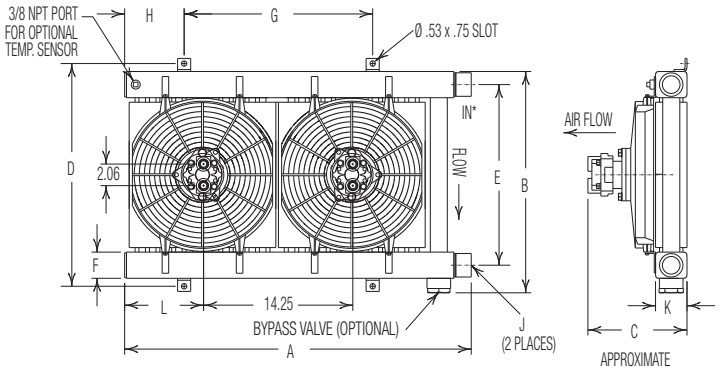
Dimensions - Hydraulic Motors

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

Note: All dimensions are in inches. We reserve the right to make reasonable design changes without notice.
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MAGHEX 2
FAN CONTROLLER

This combined sensor and controller is designed to mount directly to the heat exchanger. It provides accurate temperature control by cycling the electric cooling fan to maintain desired oil temperature. A single housing reduces wiring and mechanical installation. The MAGHEX 2 magnetic wand is used to set up and program the sensor. Not needed for operation. LEDs indicate the oil temperature setting.

PN 600181 - 3/8" NPT (M) Connection Thread

M/MF or DH/DF series cooler or any 3/8" NPT port or cavity

Features

- Easy installation and integration into any NPT port or cavity
- Creates a simple drive circuit with minimal programming
- Low cost alternative to complex control systems
- Utilize built-in temperature sensor to activate the fan based upon current set point
- Oil temperature status shown with LED indicator
- 12 or 24 volt DC operation controlling up to 40 amps
- Temperature sensor and operation controller in single aluminum housing
- Select from 10 temperature settings from 100° to 200°F (38° to 93°C)
- Solid-state design, fully sealed microprocessor
- Manual override feature built-in
- Shuts off 7 degrees below set point
- Improved circuitry to accommodate higher amperage applications
- Housing is used as a heat sink for internal components
- Automatic low voltage shut down

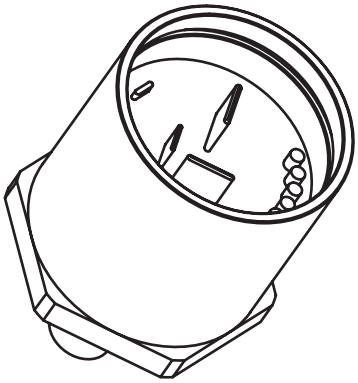
MAGHEX 2 Programming Wand

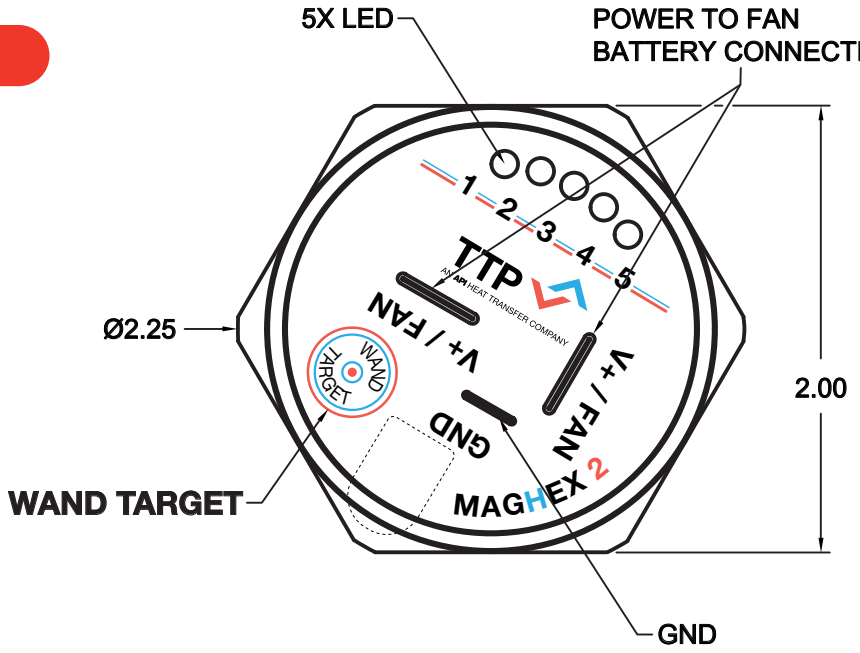
Specifications

Operating Voltage	12 or 24 VDC Systems
Min/Max Voltage	9 VDC / 32 VDC
Current Rating	40 AMPS
Switch Type	Normally open
Ambient Operating Temperature	-40° to +185°F (-40° to +85°C)
Measurement Temperature Range	100°F to 200°F (38 to 93°C)
Current Draw MAGHEX	20 mA
Set point Selections	10 set points in 10 degree increments from 100°F to 200°F (38 to 93°C)
Selection Method	Magnetic programming wand
Enclosure Rating	IP69K
Sealed Housing	High-grade automotive potting compound
Housing Material	Anodized aluminum
Weight	Approx 8 oz. (.23 kg) incl. wire
Mounting	#8 SAE Thread
Fan Connector	3 Conductor receptacle

MAGHEX 2
FAN CONTROLLER

Top View





Side View