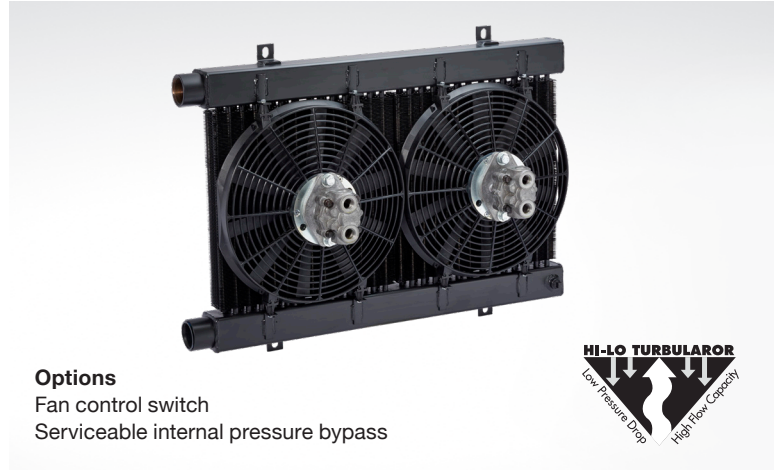


MF Series - Mobile Air Cooled Copper Tube/ Aluminum Fin with DC or Hydraulic Fan Drive Cooler

The Mobile MF Cooler is based off of the M Series cores with the addition of a low amp draw DC motor or long-life hydraulic motor. The robust and rugged design includes steel manifold, copper tubes, and aluminum fins. Other features include an optional serviceable 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. *



Options
 Fan control switch
 Serviceable internal pressure bypass

How to Order

Model Series

MF
MFR - Internal pressure bypass included

Model Size Selected

15, 30, 60

Connection Type

1 - NPT
2 - SAE
3 - BSPP

Motor Specification

NM - No Motor
4A - 12 Volt DC
4B - 24 Volt DC
9 - Hydraulic Motor

Bypass Setting (MFR only)

Blank - No Bypass
30 - 30 PSI Pressure Bypass
60 - 60 PSI Pressure Bypass

Features

Heavy duty construction
Eliminate piping, reduce cost with optional internal pressure bypass
SAE or NPT connections
Mounting brackets included

Rugged steel manifolds
3/8" copper tube size
Aluminum fins
Low ampdraw 12 or 24 volt DC motor
Long life hydraulic motors

Ratings

Maximum Operating Pressure
 300 PSI
Maximum Operating Temperature
 350°F
Heat Rejection up to 20 HP (15 KW)
Oil Flow up to 150 GPM (330 LPM)

Hydraulic Motor:
Hydraulic Motor Displacement
 .22in³/Rev.
Maximum Hydraulic Motor Pressure
 2000 PSI
Maximum Allowable Hydraulic Motor Back Pressure
 1000 PSI

Internal Pressure Bypass Options

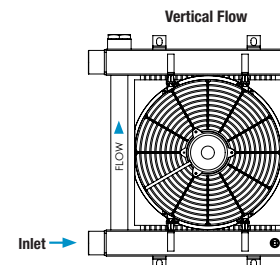
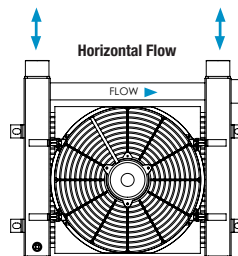
Available in either 30 PSI or 60 PSI settings. Removable for Service

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

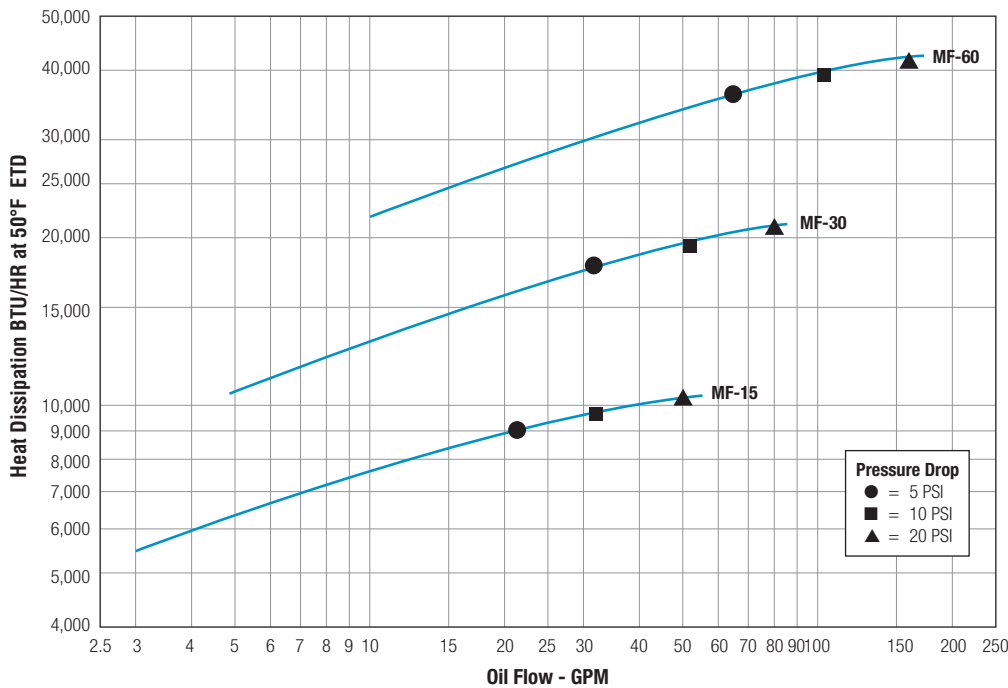
MFR-15
 3/4" external, all steel valve.

MFR-30, MFR-60
 1½" external, all steel valve

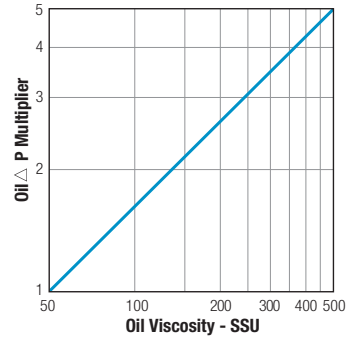
Recommended Port Orientation



Performance Curves



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 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.
 Corrected Heat Dissipation = $\text{BTU/HR heat load} \times \frac{50^\circ\text{F} \times C_v}{\text{ETD}}$

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:
 I = 5 PSI n = 10 PSI s = 20 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

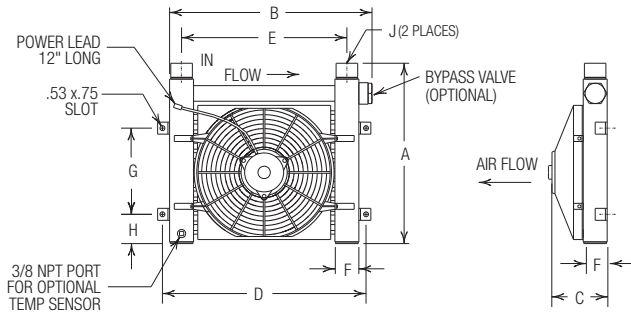
C_v Viscosity Correction

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

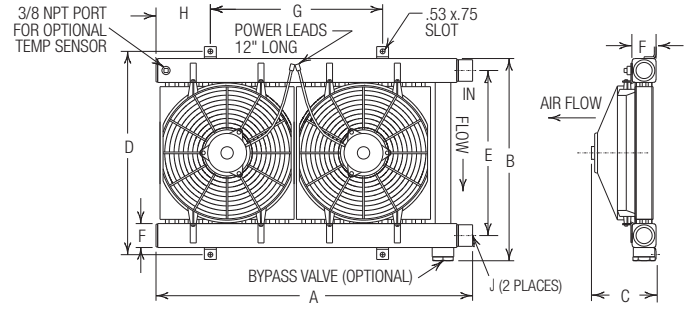
For 3D models and spec sheets visit the MF product page on our website.
<https://www.thermaltransfer.com/product/mf-series>

Dimensions - 12 & 24 Volt DC Motors

Models MF-15 and MF-30



Model MF-60



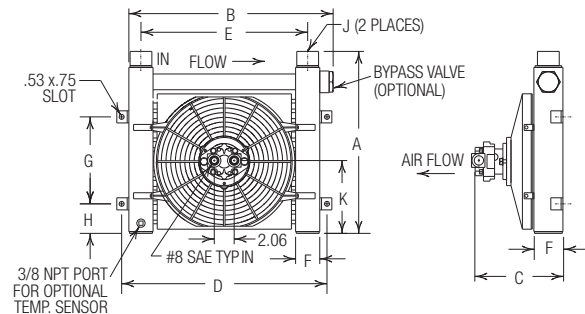
Units shown with optional internal pressure bypass

Model	A		B		C	D	E	F	G	H	J		Shipping Weight (LBS)
	MF	MFR	MF	MFR							NPT/BSPP	SAE	
MF-15	13.88	15.88	15.85	17.60	5.02	17.14	14.22	1.50	9.00	1.88	1"	-16 1 ⁵ / ₁₆ -12	27
MF-30	16.58	18.83	19.75	21.12	6.61	21.17	17.25	2.50	9.00	3.06	1 1/2"	-24 1 ⁷ / ₈ -12	41
MF-60	30.83	33.08	19.75	21.12	6.61	21.17	17.25	2.50	18.00	5.68	1 1/2"	-24 1 ⁷ / ₈ -12	78

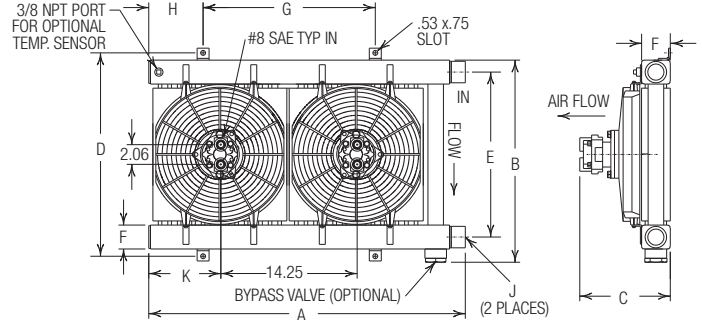
Note: All dimensions are in inches. We reserve the right to make reasonable design changes without notice. *Inlet and Outlet connections can be reversed when the internal bypass is not used.

Dimensions - Hydraulic Motors

Models MF-15 and MF-30



Model MF-60



Units shown with optional internal pressure bypass

Model	A		B		C	D	E	F	G	H	J		Shipping Weight (LBS)
	MF	MFR	MF	MFR							NPT/BSPP	SAE	
MF-15	13.88	15.88	15.85	17.60	7.92	17.14	14.22	1.50	9.00	1.88	1"	-16 1 ⁵ / ₁₆ -12	27
MF-30	16.58	18.83	19.75	21.12	8.91	21.17	17.25	2.50	9.00	3.06	1 1/2"	-24 1 ⁷ / ₈ -12	41
MF-60	30.83	33.08	19.75	21.12	8.96	21.17	17.25	2.50	18.00	5.68	1 1/2"	-24 1 ⁷ / ₈ -12	78

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 bypass is not used.

Thermostatic Temperature Control Option (DC)

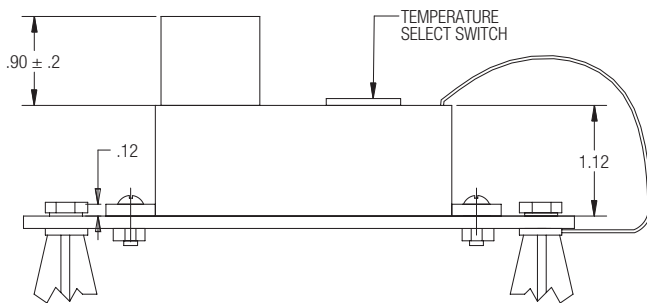
This controller was designed to mount on the cooler without requiring extensive wiring or plumbing. It provides accurate temperature control by cycling the cooling fan(s) to maintain desired oil temperature.

- 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

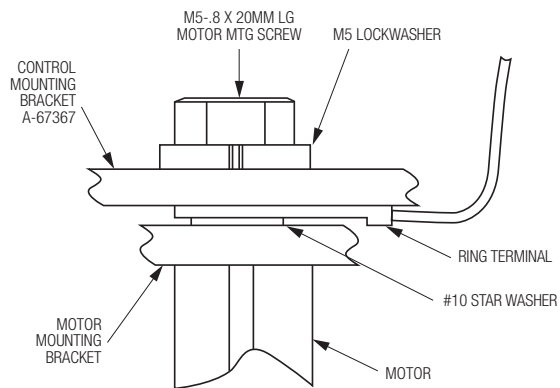
Part Number	Description
96171	Electronic Fan Control Kit
68790	Replacement Control Only
67699	Replacement Sensor Only



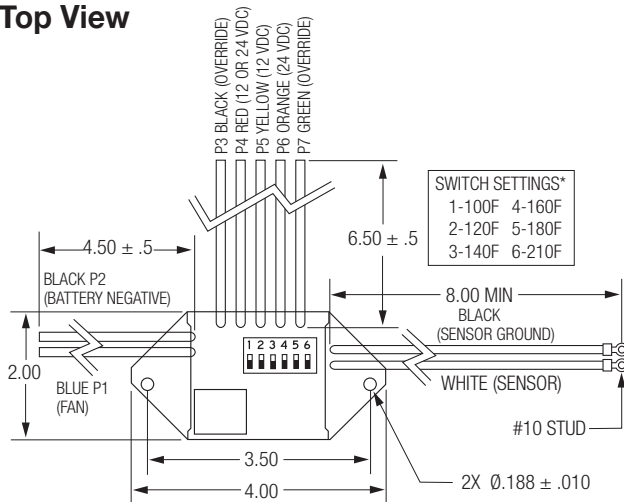
Side View



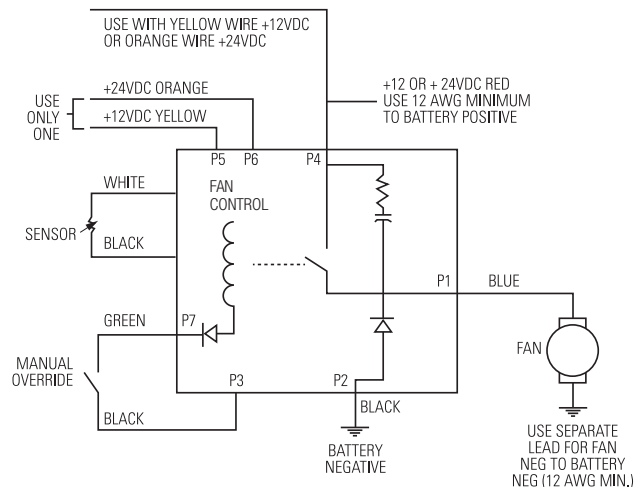
Connection Assembly



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.