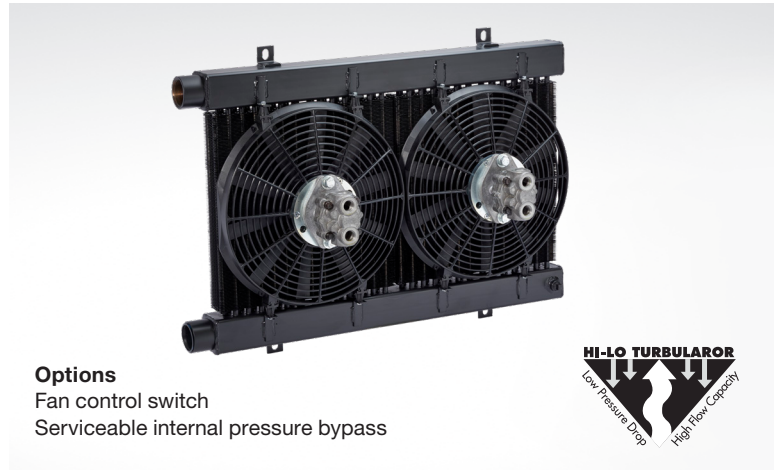


MF Series - Mobile Air Cooled Copper Tube/ Aluminum Fin with DC or Hydraulic Fan Drive Cooler

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

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

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.

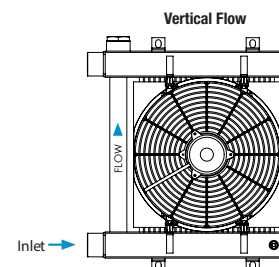
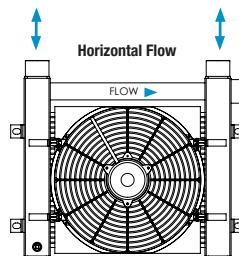
MFR-15

3/4" external, all steel valve.

MFR-30, MFR-60

1½" external, all steel valve

Recommended Port Orientation

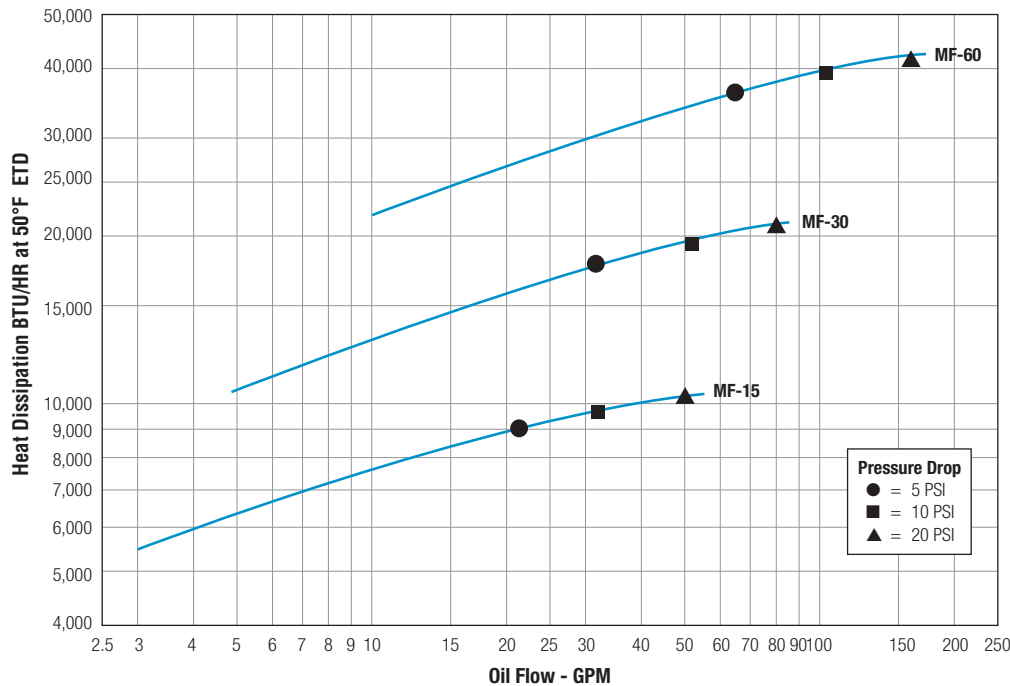


* To register for XSelector® please go to www.thermaltransfer.com/get-in-touch/ and complete the XSelector® Inquiry form and submit.

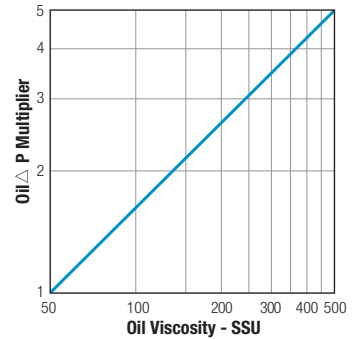
Download the XSelector® for both Apple and Android formats by searching for XSelector® in their App Stores. You must first register for XSelector® before using it on mobile devices.

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

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

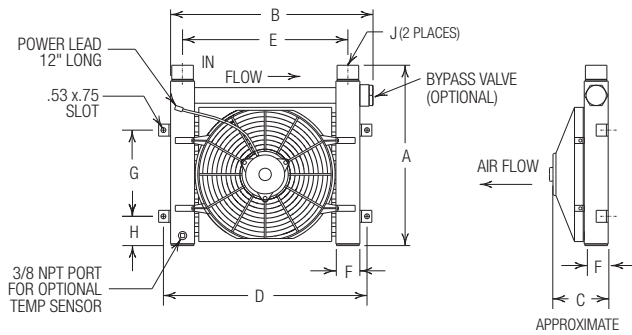
* To register for **XSelector®** please go to www.thermaltransfer.com/get-in-touch/ and complete the **XSelector®** Inquiry form and submit.

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.

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

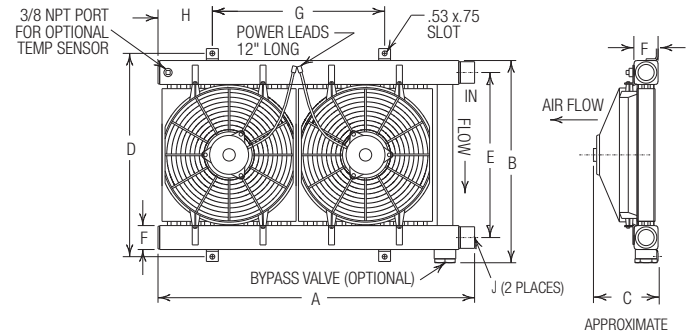
Dimensions - 12 & 24 Volt DC Motors

Models MF-15 and MF-30



Units shown with optional internal pressure bypass

Model MF-60

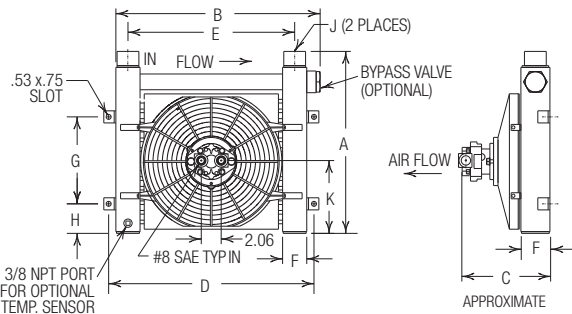


Model	A		B		C	D	E	F	G	H	J		Shipping Weight (LBS)
	MF	MFR	MF	MFR							NPT/ BSPP	SAE	
MF-15	13.88	15.88	15.85	17.60	5.02	17.17	14.25	1.50	9.00	1.88	1"	-16 1 5/16-12	27
MF-30	16.58	18.83	19.75	21.12	6.23	21.17	17.25	2.50	9.00	3.06	1 1/2"	-24 1 7/8-12	41
MF-60	30.83	33.08	19.75	21.12	6.23	21.17	17.25	2.50	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.

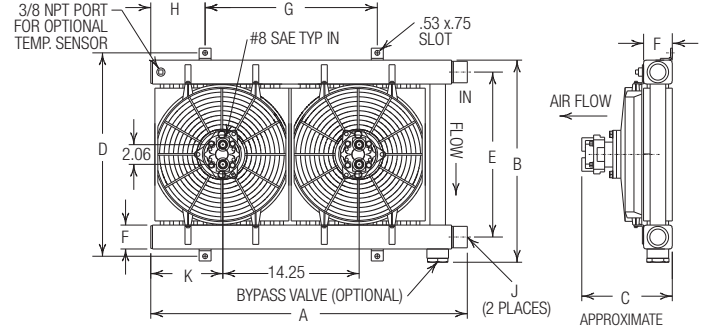
Dimensions - Hydraulic Motors

Models MF-15 and MF-30



Units shown with optional internal pressure bypass

Model MF-60



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	17.17	14.25	1.50	9.00	1.88	1"	-16 1 5/16-12	27
MF-30	16.58	18.83	19.75	21.12	8.54	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	8.54	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.

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

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

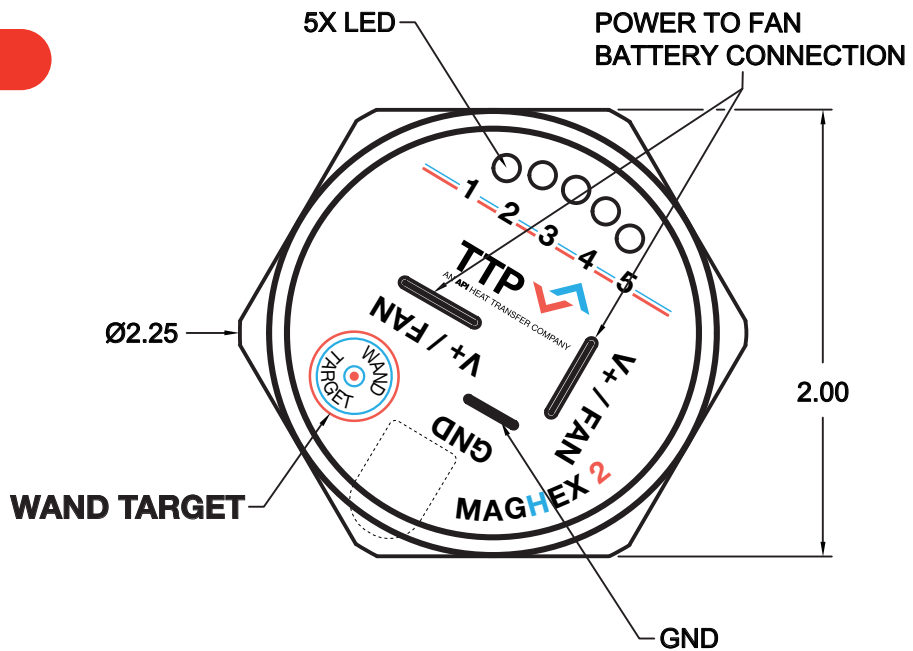
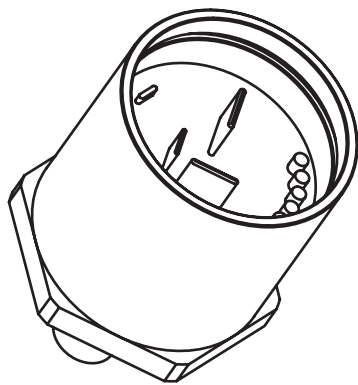


MAGHEX 2 Programming Wand

MAGHEX 2

FAN CONTROLLER

Top View



Side View

