

RADIATEUR D'HUILE OIL COOLER オイルクーラー RADIATORE DELL'OLIO ÖLKÜHLER REFRIGERADOR DE ÓLEO 油冷却器 OLIE KOELER
OLIE KOELER REFRIGERADOR DE ACEITE OLJE-KYLARE RADIATEUR D'HUILE OIL COOLER RADIATORE DELL'OLIO OLJE-KYLARE
REFRIGERADOR DE ÓLEO OLIE KOELER RADIATEUR D'HUILE OIL COOLER RADIATORE DELL'OLIO ÖLKÜHLER REFRIGERADOR DE ÓLEO 油冷却器
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OLJE-KYLARE RADIATEUR D'HUILE OIL COOLER RADIATORE DELL'OLIO ÖLKÜHLER REFRIGERADOR DE ÓLEO 油冷却器

P-BAR

Standard Hydraulic Oil Coolers for Mobile & Industrial Applications
Aluminum Plate & Bar Core Construction

SERIES

METRIC

Mobile MA



Industrial BOL



Industrial AOL



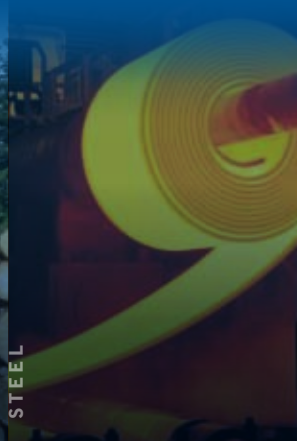
MINING



PACKAGING



FORESTRY/LUMBER



STEEL

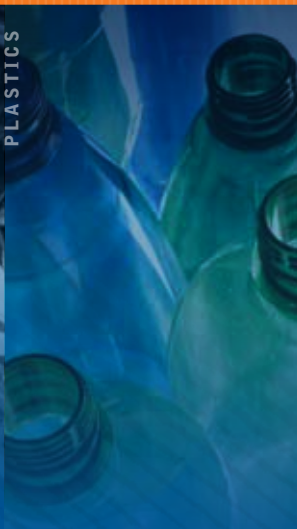


AGRICULTURE

COOL POWER SOLUTIONS FOR ALL FLUID POWER INDUSTRIES



METALS



PLASTICS



CHEMICAL



PAPER



MARINE/OFFSHORE

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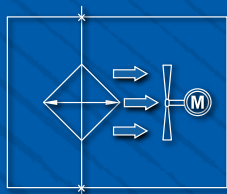


MA heat transfer units provide rugged high performance for demanding mobile equipment oil cooling applications. Select from our broad line of standard units to satisfy your specific requirements. All feature proven brazed aluminum **P-BAR** plate and bar core technology, engineered with an aggressive turbulator that produces ultra-high heat transfer.

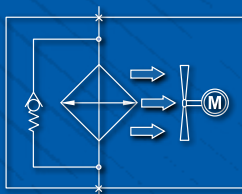
Choose **MA** standard units with flow rates ranging from 8 lpm to 568 lpm for extreme oil cooling performance.

Features

- Plate and Bar brazed aluminum core
- Rugged, lightweight, and compact
- Provides the best heat transfer per given envelope size while minimizing pressure drop



Without Bypass



With Bypass

- Air-side fin design minimizes fouling and static pressure ensuring long-term, reliable performance
- Fan motor assembly has an **IP68** with AMP-#180908 connection
- 2.1/4.1 BAR Bypass option
- Welded Aluminum fittings/ports and manifolds ensure structural integrity
- Customized units are available to meet your specific performance requirements



Materials

- Core – Brazed Aluminum Bar and Plate
 - Tanks – 5052 Aluminum
 - Nose Bar & Little Bar – 3003-H Aluminum
 - Air Fin, Plate, Turbulator & End Plate – 3003-O Aluminum
- Connections – Aluminum
- Core Mounting Brackets – Brazed Aluminum

Rating

- Maximum Operating Pressure 17 BAR
- Maximum Operating Temperature 150° C

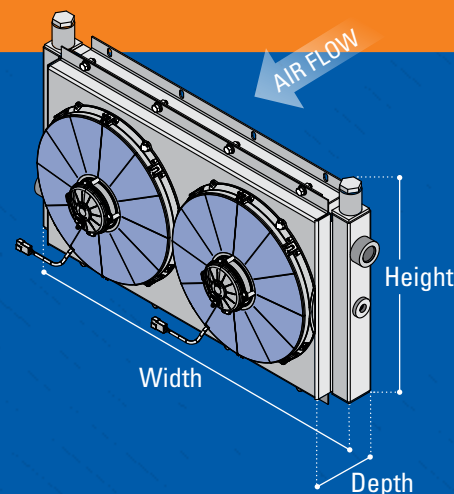
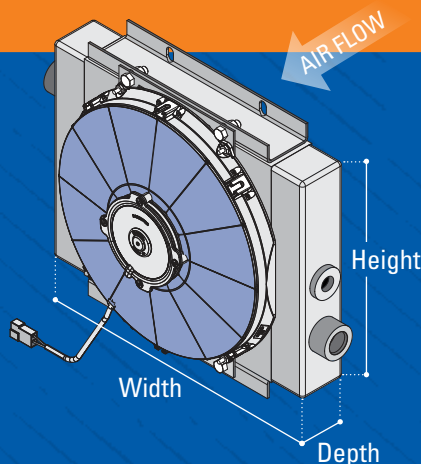
Fluid Compatibility

- Petroleum/mineral oils
- Oil/water emulsion
- Water/ethylene glycol

Dimension Range

Model	HEIGHT	WIDTH	DEPTH
MA-3	156	229	97
MA-3.5	205	210	96
MA-4	269	313	197
MA-12	276	401	159
MA-18	325	451	128
MA-32	440	558	151
MA-48	562	405	190
MA-232	530	901	191
MA-248	623	951	191

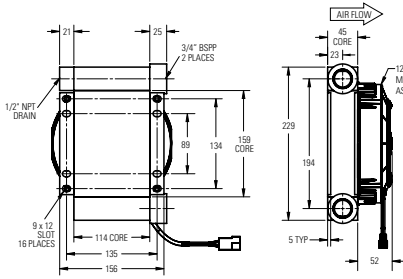
Dimensions are in millimeters.



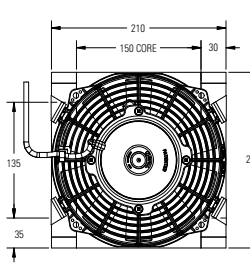
Dimensions - Fan/Core

MA

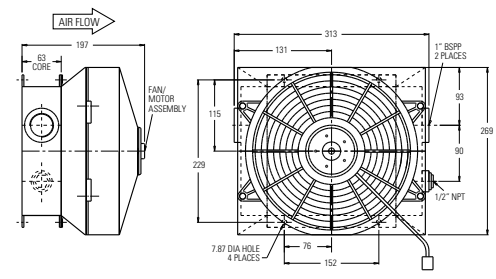
MA-3-4



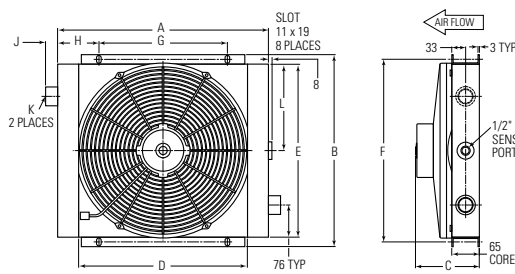
MA-3.5-4



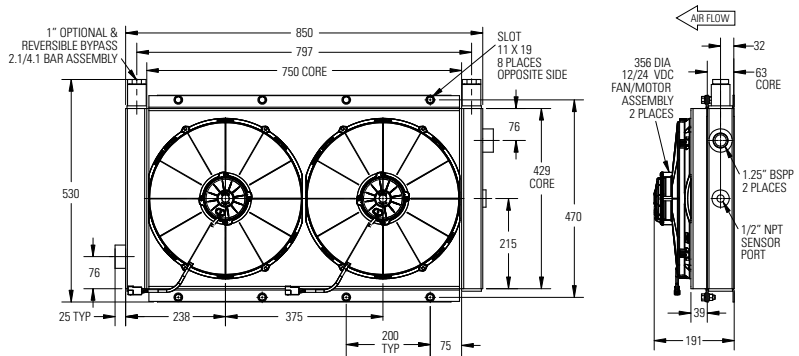
MA-4-4



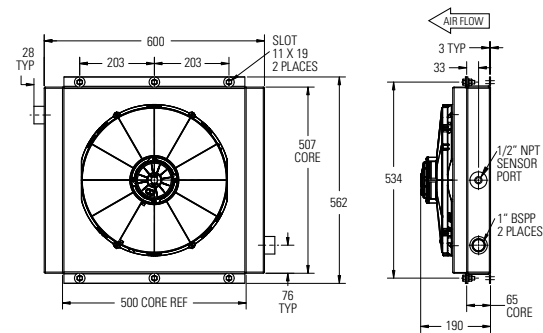
MA-12-4, MA-18-4, MA-32-4



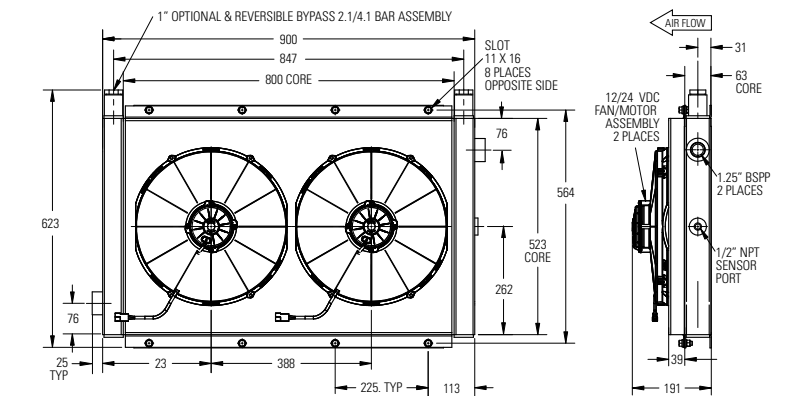
MA-232-4



MA-48-4



MA-248-4



Model	A	B	C	D	E	F	G	H	J	K BSPP	L	IP68 DC Amp Draw		CMM	Approx. Shipping Weight Kg
												12V	24V		
MA-3-4	See diagram above			—	—	—	—	—	—	—	—	5.7	3.6	8.50	3
MA-3.5-4	See diagram above			—	—	—	—	—	—	—	—	12.5	6.3	10.48	4
MA-4-4	See diagram above			—	—	—	—	—	—	—	—	12.5	6.3	10.28	7
MA-12-4	350	297	159	250	253	276	145	112	25	3/4"	126	12.5	6.3	14.75	9
MA-18-4	400	345	128	300	300	325	149	126	25	3/4"	150	10.6	5.3	22.17	10
MA-32-4	500	468	151	400	410	440	305	98	29	1"	205	22.2	11.1	38.74	13
MA-48-4	See diagram above			—	—	—	—	—	—	—	—	22.2	11.1	46.40	20
MA-232-4	See diagram above			—	—	—	—	—	—	—	—	19.3*	9.7*	63.26	29
MA-248-4	See diagram above			—	—	—	—	—	—	—	—	19.3*	9.7*	82.24	41

Note: We reserve the right to make reasonable design changes without notice. All dimensions in millimeters, unless noted otherwise.

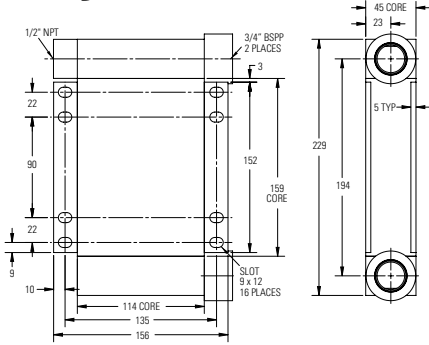
*AMP draw listed as per FAN.

Coolers to have BSPP adapters in addition to drawings. Some envelope sizes subject to change.

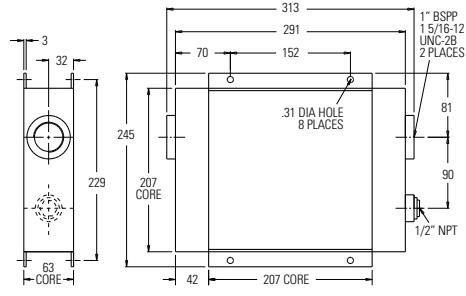
Dimensions - Core Only

MA

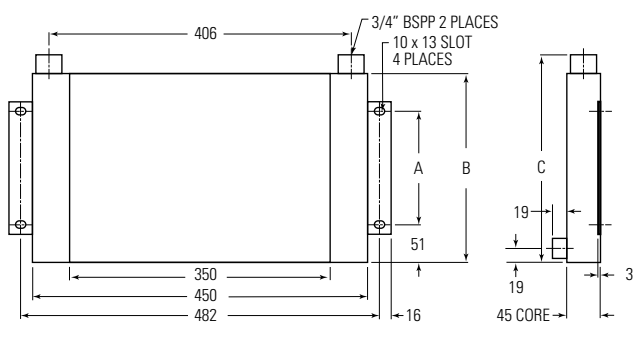
MA-3



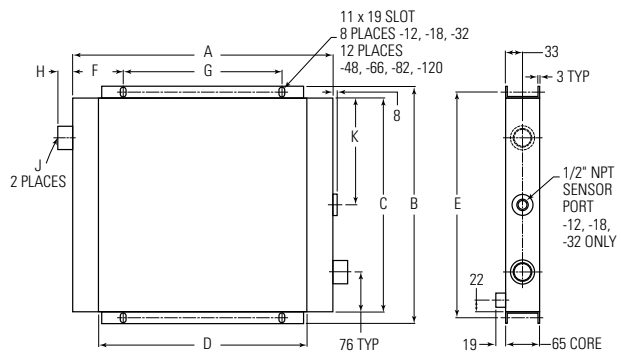
MA-4



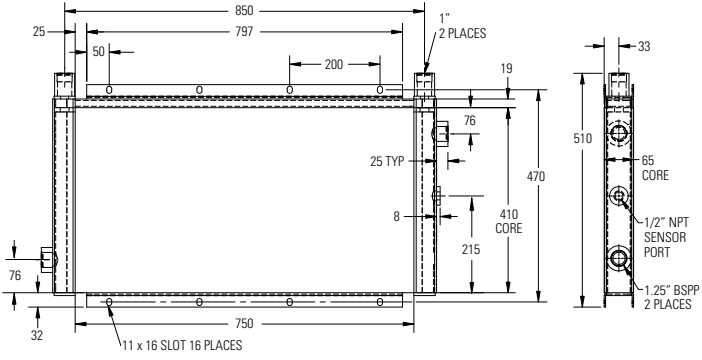
MA-8, MA-14, MA-20



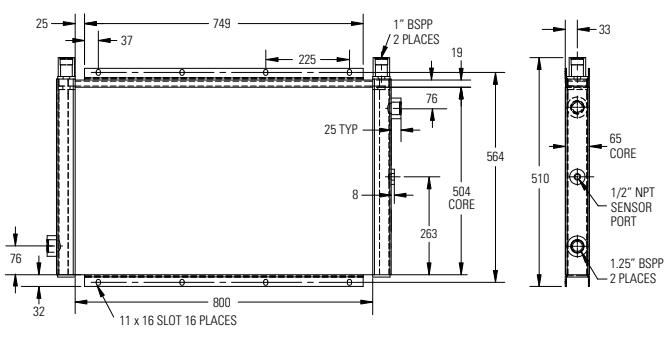
MA-12 thru MA-120



MA-232



MA-248



Model	A	B	C	D	E	F	G	H	J BSPP	K	Approx. Ship Weight Kg
MA-3	See diagram above			-	-	-	-	-	-	-	2
MA-4	See diagram above			-	-	-	-	-	-	-	3
MA-8	76	144	169	-	-	-	-	-	-	-	5
MA-12	350	298	253	295	276	112	126	25	.75"	126	7
MA-14	152	254	279	-	-	-	-	-	-	-	6
MA-18	400	345	300	300	325	126	149	25	.75"	150	8
MA-20	254	364	389	-	-	-	-	-	-	-	8
MA-32	500	468	410	400	440	98	305	29	1"	205	13
MA-48	600	562	501	500	534	97	203	29	1"	-	19
MA-66	700	656	598	600	628	96	254	40	1.25"	-	23
MA-82	800	703	645	700	675	146	254	40	1.5"	-	29
MA-120	800	1003	945	700	975	146	254	40	1.5"	-	40
MA-232	See diagram above			-	-	-	-	-	-	-	25
MA-248	See diagram above			-	-	-	-	-	-	-	37

Note: We reserve the right to make reasonable design changes without notice. All dimensions in millimeters, unless noted otherwise. Coolers to have BSPP adapters in addition to drawings. Some envelope sizes subject to change.

Selection Procedure

Step 1 Determine Heat Load. Typical Rule of Thumb, size cooler for 1/3 of the input KW.

Step 2 Determine Entering Temperature Difference. (Actual E.T.D.)

$$\text{E.T.D.} = \frac{\text{Entering oil temperature } (^\circ\text{C})}{\text{Entering Ambient air temperature } (^\circ\text{C})}$$

The entering oil temperature is generally the maximum desired system oil temperature.

Entering air temperature is the highest Ambient Air temperature the application will see, plus – add any pre-heating of the air prior to its entering the cooler. Pay special attention if air is drawn from the engine compartment for cooling.

Step 3 Find Air Velocity Correction Factor.

(Skip to Step 4 if using our DC Fan Assembly)

Calculate actual SMPM or SCMM (Standard Cubic Meter per Minute) for selection.

$$\text{SMPM} = \frac{\text{SCMM}}{\text{Square Meter Cooler Face Area}}$$

(SCMM Air Flow = SMPM Air Velocity x Square Feet Cooler Face Area)

* If the Air Velocity calculated is different than the value in Step 4, then recheck Corrected oil Pressure drop.

Step 4 Determine the Corrected Heat Dissipation to use the Curves.

$$\text{Corrected Heat Rejection } \left[\frac{\text{KW}}{^\circ\text{C}} \right] = \frac{\text{Heatload (KW)}}{\text{E.T.D } (^\circ\text{C}) \times \text{Air Velocity Correction Factor}}$$

Step 5 Select Model From Curves. Enter the Performance Curves at the bottom with the LPM oil flow and proceed upward to the adjusted Heat Rejection from Step 4. Any Model or Curve on or above this point will meet these conditions.

Step 6 Calculate Oil Pressure Drop. Find the oil pressure drop correction factor and multiply it by the Oil Pressure Drop found on performance curve.

Listed Performance Curves are based on:

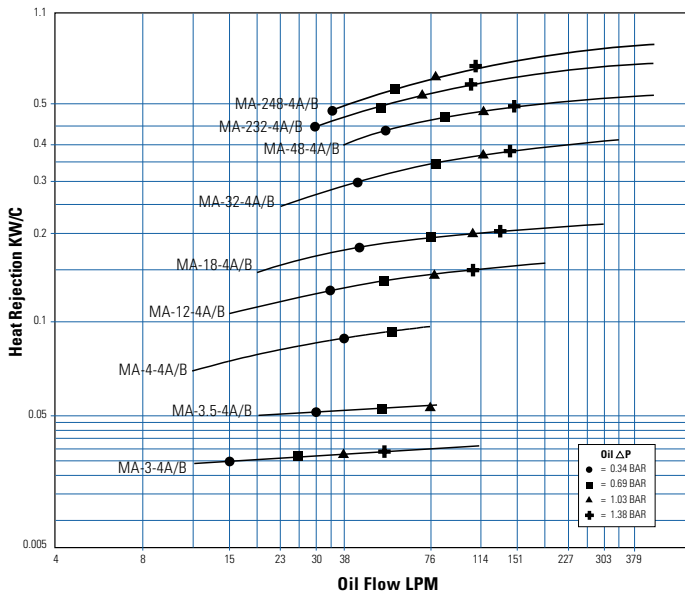
- 32 cSt oil
- 304.8 Standard Meters per Minute (SMPM) Air Velocity

If your application conditions are different, then continue with the selection procedure.

Performance Curves

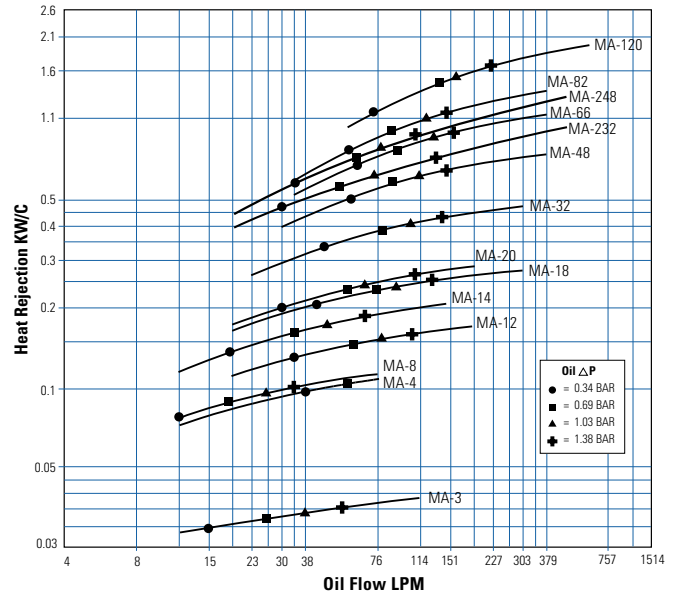
MA Models with DC Fan Assemblies

Performance Data Curve

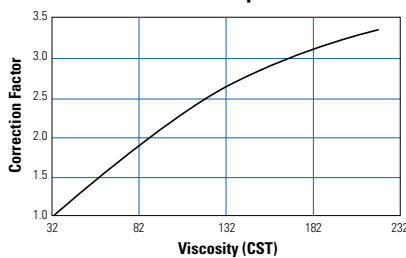


MA Models (No Fan, Core Only)

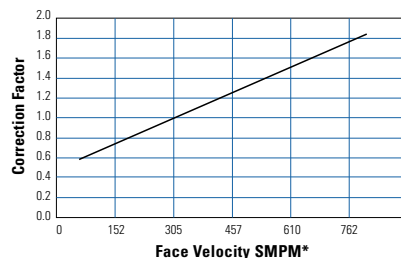
Performance Data Curve



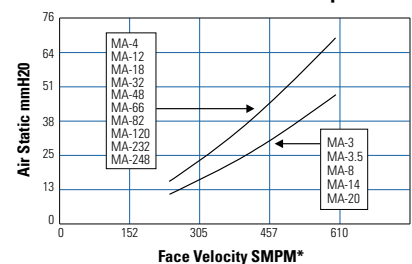
Oil Pressure Drop Correction



Air Static Correction



Air Static Pressure Drop



*Standard Meters Per Minute

Industrial BOL



BOL exchanger units provide outstanding heat dissipation in industrial oil cooling applications. Select from our broad line of standard units that lead the industry as the most rugged, light weight and compact solution for extreme heat loads. Available with AC or hydraulic fan motors, all feature proven brazed aluminum **P-BAR** plate and bar core technology engineered with an aggressive turbulator that produces ultra high heat transfer.

Choose **BOL** standard units with flow rates ranging from 8 lpm to 757 lpm.

Features

- Bar and Plate Brazed Aluminum Core
- Rugged, lightweight, and compact
- Provides the best heat transfer per given envelope size while minimizing pressure drop
- Air-side fin design minimizes fouling and static pressure ensuring long-term, reliable performance
- Welded fittings/ports and manifolds ensure structural integrity
- BSPP ports
- Customized units are available to meet your specific performance requirements
- Additional capabilities for radiators, charge-air-coolers, condensers, and multi-circuit units
- T-BAR core optional for high viscosity oils or other highly fouling fluids. *See T-Bar Performance Curve
- T-BAR zinc/aluminum core (flame sprayed extruded tubes/zinc alloy coated fins)

Materials

- Mounting Feet – Steel
- Standard Core – Brazed Aluminum Plate and Bar (T-Bar is optional)
 - Tanks – 5052 Aluminum
 - Nose Bar & Little Bar – 3003-H Aluminum
 - Air Fin, Plate, Turbulator & End Plate – 3003-O Aluminum
- Fanguard & Shroud – Steel
- Connectors – Aluminum
- Fan – Aluminum Hub, Plastic Blades
- Motor – IEC

Rating

- Maximum Operating Pressure
17 BAR
- Maximum Operating Temperature
150° C

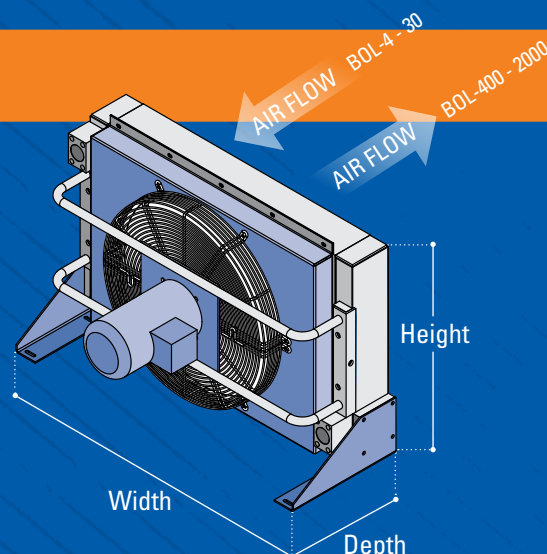
Fluid Compatibility

- Petroleum/mineral oils
- Oil/water emulsion
- Water/ethylene glycol

Dimension Range

Model	HEIGHT	WIDTH	DEPTH
BOL-4	272	340	145
BOL-8	316	400	380
BOL-16	413	500	389
BOL-30	526	670	412
BOL-400	504	570	440
BOL-725	619	770	445
BOL-950	732	941	541
BOL-1200	732	1040	593
BOL-1600	937	1040	593
BOL-2000	1004	1290	651

Dimensions are in millimeters.



Electric Motor Information (50 Hz IEC Frame)

Model	CMM	KW	Voltage	Phase	Frequency	Nominal RPM	Frame	Sound dB(A) at 1 meter
BOL-4	28.4	.20	230	1	50 Hz	3000	—	73
BOL-8	18.9	.25	220/240/380/415	3	50 Hz	3000	63	71
BOL-16	33.7	.37	220/240/380/415	3	50 Hz	3000	71	77
BOL-30	52.4	.37	220/240/380/415	3	50 Hz	1500	71	73
BOL-400	52.4	.75	220/240/380/415	3	50 Hz	3000	80	81
BOL-725	85.0	1.10	220/240/380/415	3	50 Hz	3000	80	80
BOL-950	108.2	1.50	220/240/380/415	3	50 Hz	1500	90	78
BOL-1200	165.1	2.20	220/240/380/415	3	50 Hz	1500	100	83
BOL-1600	186.4	3.00	220/240/380/415	3	50 Hz	1500	100	85
BOL-2000	331.3	4.00	220/240/380/415	3	50 Hz	1500	112	88

All IEC frame motors have CE mark.

Hydraulic Motor Information

Model	Oil Flow Required LPM	RPM	Min. Pressure Required BAR	Motor CM ³ /REV Displacement	Sound dB(A) at 1 meter
BOL-8	11	3000	5	3.6	71
BOL-16	11	3000	15	3.6	77
BOL-30	11	1500	17	7.3	73
BOL-400	11	3000	30	3.6	81
BOL-725	11	3000	32	3.6	80
BOL-950	35	1500	10	22.9	78
BOL-1200	35	1500	24	22.9	83
BOL-1600	35	1500	26	22.9	85
BOL-2000	35	1500	54	22.9	88

Notes: Maximum Pressure is 138 BAR. Stated Minimum Operating Pressure is at Inlet Port of Motor. 69 BAR Allowable Back Pressure.



Oil Temperature

Typical operating temperature ranges are:

Hydraulic Motor Oil	49°C - 82°C
Hydrostatic Drive Oil	71°C - 82°C
Engine Lube Oil	82°C - 93°C
Automatic Transmission Fluid	93°C - 149°C

Desired Reservoir Temperature

Oil Temperature: Oil coolers can be selected using entering or leaving oil temperatures.

Off-Line Recirculation Cooling Loop: Desired reservoir temperature is the oil temperature entering the cooler.

Return Line Cooling: Desired reservoir temperature is the oil temperature leaving the cooler. In this case, the oil temperature change must be determined so that the actual oil entering temperature can be found.

Calculate the oil temperature change (oil ΔT) with this formula:

$$\text{Oil } \Delta T (\text{°C}) = \text{KW/LPM Oil Flow} \times .029.$$

To calculate the oil entering temperature to the cooler, use this formula:

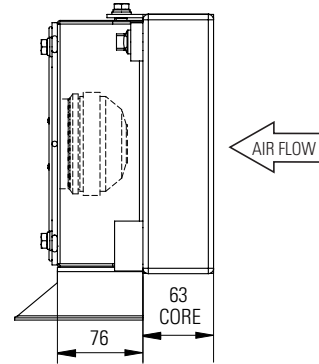
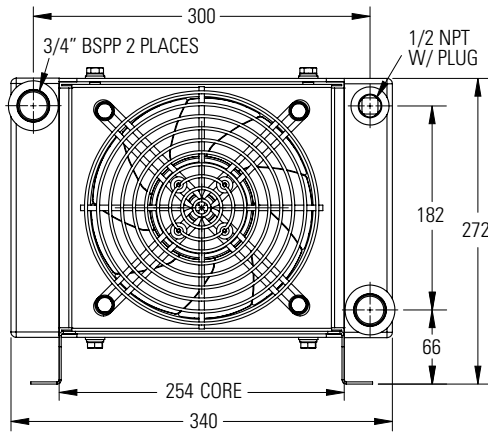
$$\text{Oil Entering Temp.} = \text{Oil Leaving Temp.} + \text{Oil } \Delta T.$$

Oil Pressure Drop: Most systems can tolerate a pressure drop through the heat exchanger of 1.3 to 2.1 BAR. Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to .35 BAR or less for case drain applications where high back pressure may damage the pump shaft seals.

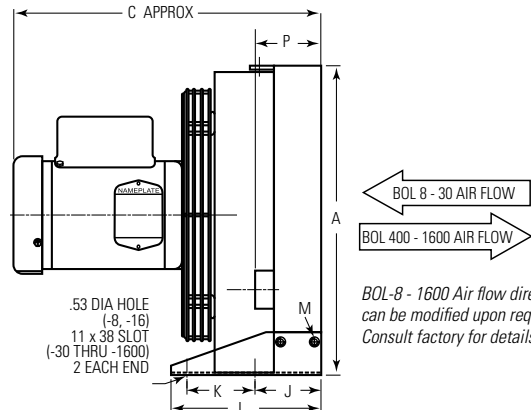
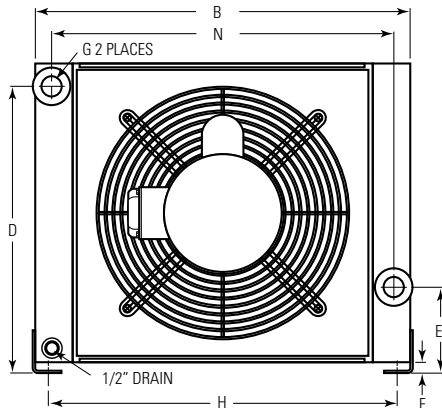


Dimensions

BOL-4

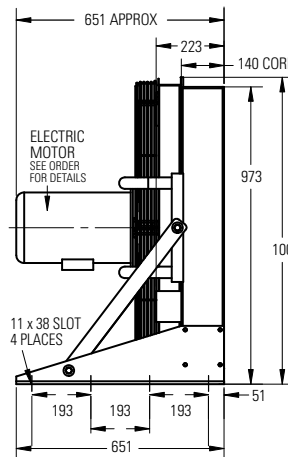
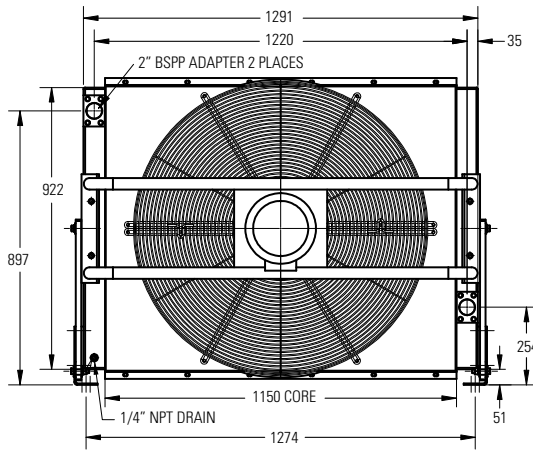


BOL-8 through BOL-1600



BOL-8 - 1600 Air flow direction can be modified upon request. Consult factory for details.

BOL-2000



BOL-2000 Air flow direction can be modified upon request. Consult factory for details.

Model	A	B	C Approx.	D	E	F	BSPP* G	H	J	K	L	M	N	P	Approx. Shipping Weight Kg
BOL-4	See diagram above			—	—	—	—	—	—	—	—	—	—	—	8
BOL-8	316	400	380	288	83	14	.75"	369	78	89	187	M8 Bolt (2PL)	256	88	20
BOL-16	413	500	389	383	115	14	.75"	465	85	95	200	M8 Bolt (2PL)	456	88	25
BOL-30	526	670	412	495	134	34	1.25"	628	108	127	254	M10 Bolt (4PL)	618	134	57
BOL-400	504	570	440	440	165	51	1.25"	566	108	127	254	M10 Bolt (4PL)	510	132	67
BOL-725	619	770	445	549	165	51	1.25"	766	108	127	254	M10 Bolt (4PL)	710	132	77
BOL-950	732	941	541	624	241	51	2"	912	154	234	406	M10 Bolt (4PL)	870	178	136
BOL-1200	732	1040	593	624	140	51	2"	1024	154	234	406	M10 Bolt (4PL)	970	178	195
BOL-1600	937	1040	593	829	241	51	2"	1024	154	234	406	M10 Bolt (4PL)	970	178	234
BOL-2000	See diagram above			—	—	—	—	—	—	—	—	—	—	—	264

Note: We reserve the right to make reasonable design changes without notice. All dimensions in millimeters, unless noted otherwise. Coolers to have BSPP adapters not shown above.

Selection Procedure

- Step 1 Determine Heat Load.** Typical Rule of Thumb, size cooler for 1/3 of the input KW.
- Step 2 Determine Entering Temperature Difference.** (Actual E.T.D.)

$$\text{E.T.D.} = \text{Entering oil temperature (°C)} - \text{Entering Ambient air temperature (°C)}$$

The entering oil temperature is generally the maximum desired system oil temperature.

Entering air temperature is the highest Ambient Air temperature the application will see.

- Step 3 Determine Heat Dissipation to use the Curves.**

$$\text{Corrected Heat Rejection} \frac{\text{KW}}{\text{°C}} = \frac{\text{Heatload (KW)}}{\text{Desired E.T.D. (°C)}}$$

- Step 4 Select Model From Curves.** Enter the Performance Curves at the bottom with the LPM oil flow and proceed upward to the adjusted Heat Rejection from Step 3. Any Model or Curve on or above this point will meet these conditions.

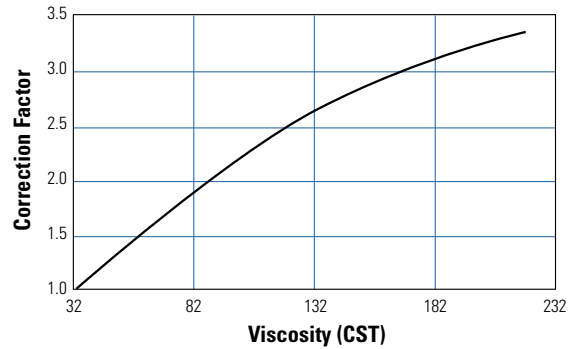
- Step 5 Calculate Oil Pressure Drop.** Find the oil pressure drop correction factor and multiply it by the Oil Pressure Drop found on performance curve.

Listed Performance Curves are based on:

- 32 cSt oil

If your application conditions are different, then continue with the selection procedure.

Oil Pressure Drop Correction

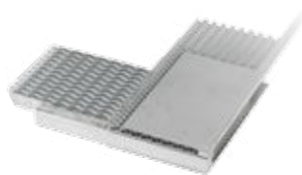
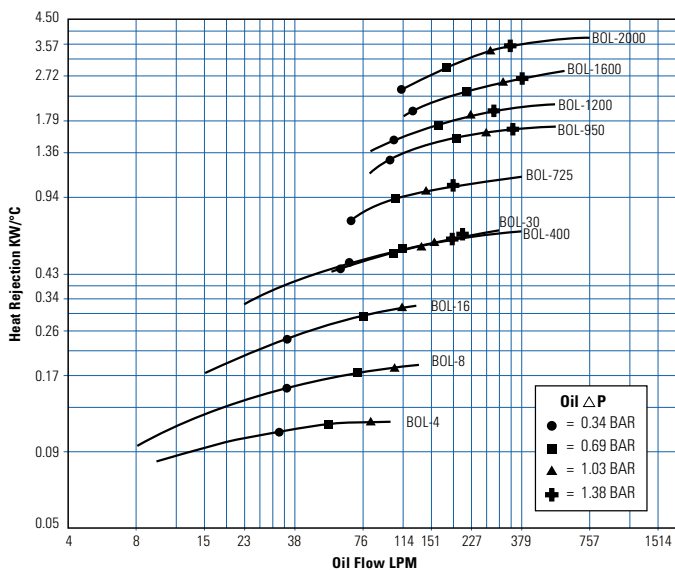


Performance Curves

BOL Models with Standard P-BAR Core



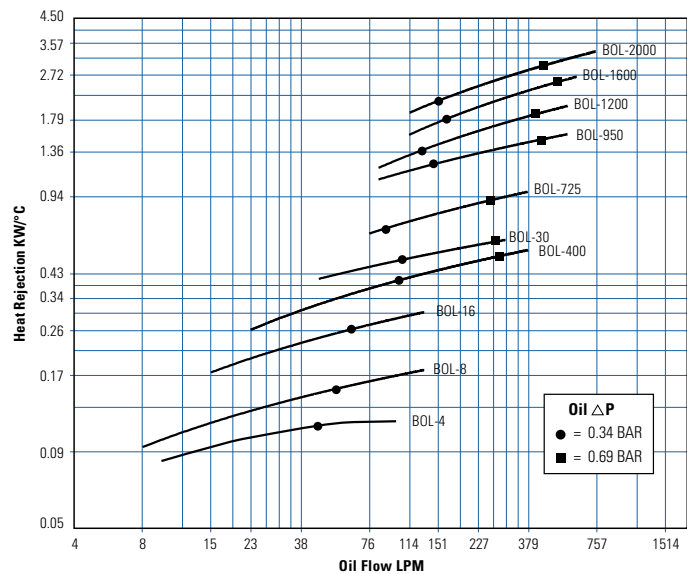
Performance Data Curve



BOL Models with Optional T-BAR Core



Performance Data Curve



Note: Performance derated 15% for 50hz motors.

Industrial AOL



AOL exchanger units provide outstanding heat dissipation in industrial oil cooling applications. Select from our broad line of standard units that lead the industry as the most rugged, light weight and compact solution for extreme heat loads. Available with AC or hydraulic fan motors, all feature proven brazed aluminum **P-BAR** plate and bar core technology engineered with an aggressive turbulator that produces ultra high heat transfer.

Choose **AOL** standard units with flow rates ranging from 57 lpm to 1,325 lpm.

Features

- Large oil flow
- High performance
- Industrial duty
- Brazed aluminum bar and plate core
- Compact all aluminum core assembly
- Ideal for converting water cooled equipment to air cooled
- Eliminates high water and sewer costs
- Eliminates corrosion problems associated with water cooled units
- Vertical air flow works well for heat recovery
- State-of-the-art heat transfer technology
- Hydraulic motors available
- Marine corrosion control coatings available
- High performance air side fin design
- Detachable legs

Materials

- Legs – Steel with Baked Enamel Finish
- Standard Core – Brazed Aluminum Plate & Bar
 - Tanks – 5052 Aluminum
 - Nose Bar & Little Bar – 3003-H Aluminum
 - Air Fin, Plate, Turbulator & End Plate – 3003-O Aluminum
- Fan – Aluminum Hub, Plastic Blades
- Motor – IEC

Rating

- Maximum Operating Pressure
17 BAR
- Maximum Operating Temperature
150° C

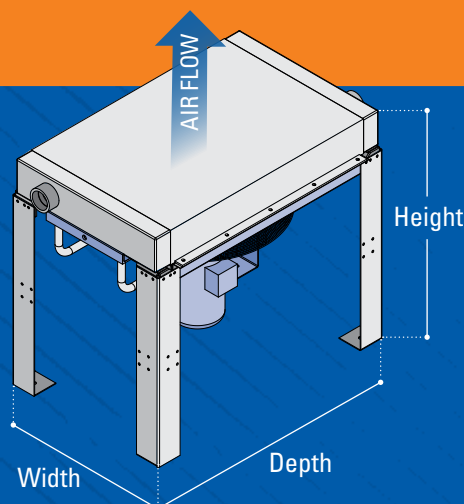
Fluid Compatibility

- Petroleum/mineral oils
- Oil/water emulsion
- Water/ethylene glycol

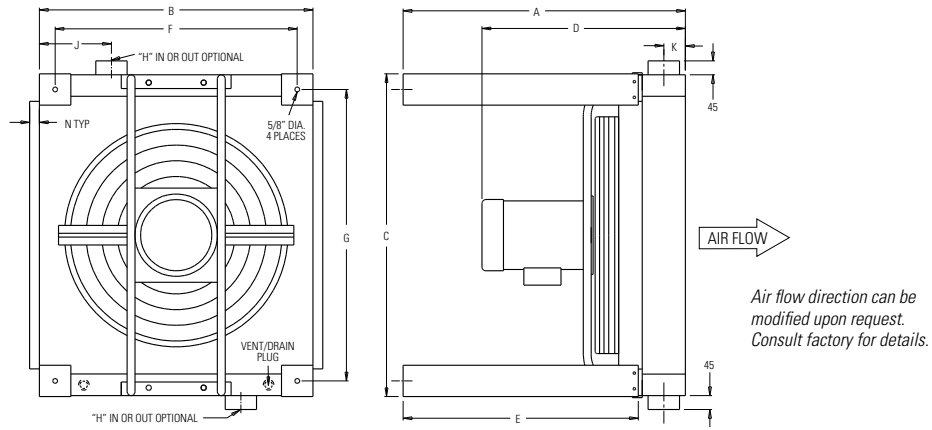
Dimension Range

Model	HEIGHT	WIDTH	DEPTH
AOL-400	869	507	666
AOL-725	869	619	866
AOL-950	915	731	1036
AOL-1200	915	731	1136
AOL-1600	915	937	1136
AOL-2000	915	1013	1387
AOL-2500	915	1161	1337
AOL-3000	915	1385	1387
AOL-3500	915	1481	1387

Dimensions are in millimeters.



Dimensions



Model	A	B	C	D Approx.	E	F	G	H BSPP	J	K	L	Net Weight Kg	Shipping Weight Kg
AOL-400	869	456	576	440	762	355	475	2.00	151	47	32	49	67
AOL-725	869	568	776	445	762	467	675	2.00	149	47	32	69	77
AOL-950	915	680	946	541	762	579	845	2.00	173	70	32	100	136
AOL-1200	915	680	1046	593	762	579	945	2.00	152	70	32	134	195
AOL-1600	915	886	1046	593	762	785	945	2.50	203	70	32	161	234
AOL-2000	915	962	1297	651	762	861	1195	2.50	203	70	32	219	264
AOL-2500	915	1110	1247	651	762	1008	1145	3.00	203	70	32	252	297
AOL-3000	915	1334	1297	742	762	1232	1207	3.00	203	70	32	328	374
AOL-3500	915	1430	1297	742	762	1332	1207	3.00	203	70	32	345	390

Note: We reserve the right to make reasonable design changes without notice. **All dimensions in millimeters, unless noted otherwise.**
Coolers to have BSPP adapters not shown above.

Specifications

Electric Motor Information (50 Hz IEC Frame)

Model	CMM	KW	Voltage	Phase	Frequency	Nominal RPM	Frame	Sound dB(A) at 1 meter
AOL-400	52.4	.75	220/240/380/415	3	50 Hz	3000	80	81
AOL-725	85.0	1.10	220/240/380/415	3	50 Hz	3000	80	80
AOL-950	108.2	1.50	220/240/380/415	3	50 Hz	1500	90	78
AOL-1200	165.1	2.20	220/240/380/415	3	50 Hz	1500	100	83
AOL-1600	186.4	3.00	220/240/380/415	3	50 Hz	1500	100	85
AOL-2000	331.3	4.00	220/240/380/415	3	50 Hz	1500	112	88
AOL-2500	331.3	4.00	220/240/380/415	3	50 Hz	1500	112	88
AOL-3000	410.6	7.50	220/240/380/415	3	50 Hz	1500	132	90
AOL-3500	410.6	7.50	220/240/380/415	3	50 Hz	1500	132	90

All IEC frame motors have CE mark.

Hydraulic Motor Information

Model	Oil Flow Required LPM	RPM	Minimum Pressure Required BAR	Motor CM ³ /REV Displacement	Sound dB(A) at 1 meter
AOL-400	11	3000	30	3.6	81
AOL-725	11	3000	32	3.6	80
AOL-950	35	1500	10	22.9	78
AOL-1200	35	1500	24	22.9	83
AOL-1600	35	1500	26	22.9	85
AOL-2000	35	1500	54	22.9	88
AOL-2500	35	1500	54	22.9	88
AOL-3000	35	1500	82	22.9	90
AOL-3500	35	1500	82	22.9	90

Notes: Maximum Pressure is 138 BAR. Stated Minimum Operating Pressure is at Inlet Port of Motor. 69 BAR Allowable Back Pressure.

Selection Procedure

Performance curves based on 32 cSt oil.

Step 1 Determine Heat Load. Typical Rule of Thumb, size cooler for 1/3 of the input KW.

Step 2 Determine Entering Temperature Difference. (Actual E.T.D.)

$$\text{E.T.D.} = \begin{matrix} \text{Entering oil} \\ \text{temperature (}^\circ\text{C)} \end{matrix} - \begin{matrix} \text{Entering Ambient} \\ \text{air temperature (}^\circ\text{C)} \end{matrix}$$

The entering oil temperature is generally the maximum desired system oil temperature.

Entering air temperature is the highest Ambient Air temperature the application will see.

Step 3 Determine Heat Dissipation to use the Curves.

$$\text{Corrected Heat Rejection} \frac{\text{KW}}{^\circ\text{C}} = \frac{\text{Heatload (KW)}}{\text{Desired E.T.D. (}^\circ\text{C)}}$$

Step 4 Select Model From Curves. Enter the Performance Curves at the bottom with the LPM oil flow and proceed upward to the adjusted Heat Rejection from Step 3. Any Model or Curve on or above this point will meet these conditions.

Step 5 Calculate Oil Pressure Drop. Find the oil pressure drop correction factor and multiply it by the Oil Pressure Drop found on performance curve.

Maintenance

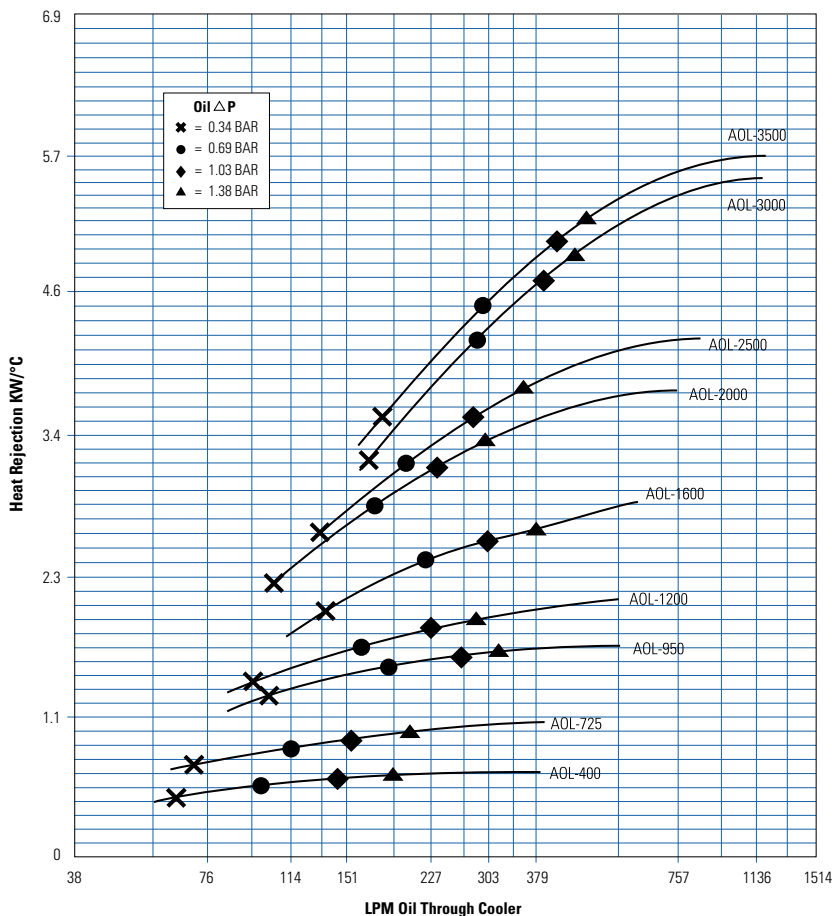
Periodic cleaning of the fins with compressed air is needed to remove the accumulation of dirt and dust. If the inside of the tubes need to be cleaned of oil and carbon, use a chlorinated solvent. Do not use strong solvents. Do not use acids or caustic cleaners.

Notes

1. A three-way thermostatic valve is recommended to bypass the cold oil around the heat exchanger during start up.
2. Support piping as needed. Flexible connectors must be properly installed to validate warranty.
3. Coolers should not operate in ambient temperatures below 1°C. Consult factory for recommendations.
4. The fan cannot be cycled.
5. AOL coolers operated outdoors must be protected from weather. Consult factory for recommendations.
6. If duct work or additional static resistance is added to the cooler airstream, an auxiliary air mover may be required.
7. Can be mounted for horizontal air flow, with oil in at bottom port.

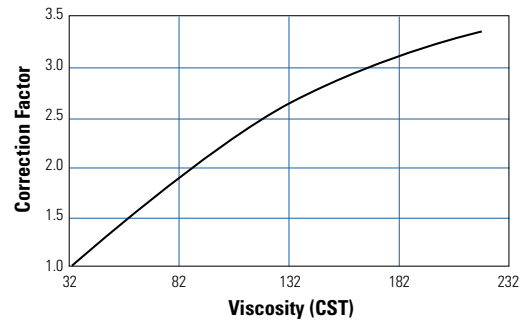
Performance Curves

AOL Standard Option



Note: Performance derated 15% for 50hz motors.

Oil Pressure Drop Correction



Temperature Sensors

(1/2" NPT connections)

- Temperature sensors are installed into port located on MA and BOL tanks.
- Temperature sensors are normally open (closed on temp rise).
- Temp sensors will automatically turn on the motor when the oil temperature rises past the set temperature rating.
- Five discrete temperature settings are available (see table below).
- Use for AC/DC voltages.

Specifications:

360 free machining Brass housing with 1/2" NPT connections
 Dual #18 gauge lead 203 mm long
 Packard connection #38043
 Set temperature tolerance +/- 6 deg C
 Temperature differential 11 deg C +/- 6 deg C

Maximum current:	
AC	15 Amps at 120 Vac
	10 Amps at 240 Vac
	7.2 Amps at 277 Vac
DC	25 Amps at 12 Vdc
	12.5 Amps at 24 Vdc



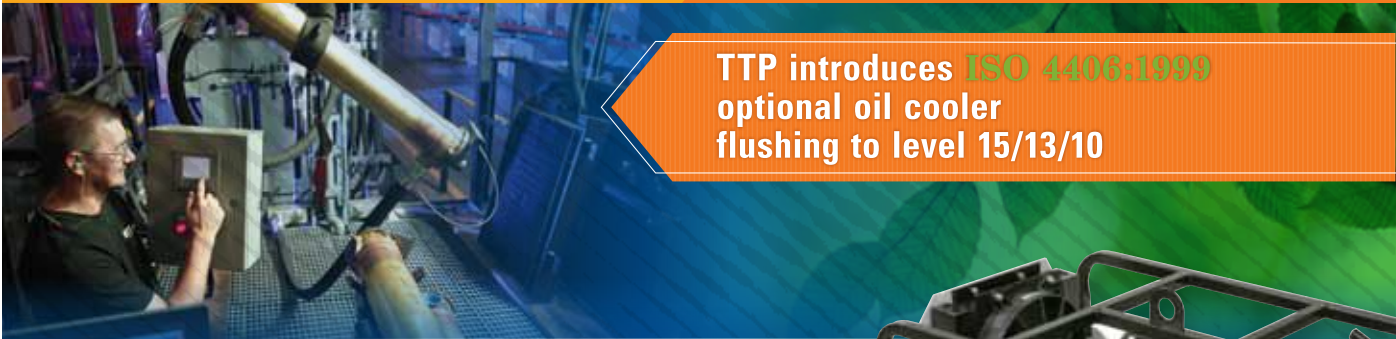
Part Number and Temperatures

Part #	Temp °C
64126	54
69491	60
69654	71
69593	82
69927	99

COOL CLEAN

ISO CLEANLINESS LEVEL

OIL COOLER FLUSHING



TTP introduces **ISO 4406:1999** optional oil cooler flushing to level 15/13/10



How to Order

MA – Fan/Core

Model	Model Size Selected	Connection Type	Specify Motor Required	Bypass*
MA (MAR)	3 · 3.5 · 4 · 12 · 18 32 · 48 · 232 · 248	3 - BSPP	4A - 12 VDC 4B - 24 VDC	30 - 2.1 BAR 60 - 4.1 BAR

*Bypass available on MA-12, MA-18, MA-32, MA-48, MA-232, MA-248 only.
MA-8, MA-14, MA-20, MA-66, MA-82, MA-120 do not have fan option.
MA-3.5 available with fan/motor only. (Not available as core only option.)

MA – Core Only

Model	Model Size Selected	Connection Type	Bypass*
MA (MAR)	3 · 4 · 8 · 12 · 14 · 18 · 20 · 32 48 · 66 · 82 · 120 · 232 · 248	3 - BSPP	30 - 2.1 BAR 60 - 4.1 BAR

*Bypass available on MA-12, MA-18, MA-32, MA-48, MA-232, MA-248 only.

BOL

Model	Model Size Selected	Connection Type	Specify Motor Required	Core
BOL	4* · 8 · 16 · 30 · 400 · 725 950 · 1200 · 1600 · 2000	3 - BSPP	0 - No Motor 9 - Hydraulic 18 - IEC Three Phase	TB - T-BAR Core** Blank - Standard P-BAR

*BOL-4 not offered with hydraulic motor.

**T-BAR Core option provides a T-BAR core in BOL frame. Used for high fouling or high viscosity fluids.

Performance is typically 15-25% less than the bar and plate core. Consult factory for details.

Standard air flow direction (BOL-4 - BOL-30 Sucker; BOL-400 - BOL-2000 Blower). Air flow direction for BOL-8 - BOL-2000 can be modified. Consult factory for details.

AOL

Model	Model Size Selected	Connection Type	Specify Motor Required
AOL - Standard	400 · 725 · 950 · 1200 · 1600 2000 · 2500 · 3000 · 3500	M - BSPP	0 - No Motor 9 - Hydraulic 18 - IEC Three Phase

Standard air flow direction (Blower) can be modified. Consult factory for details.

T-BAR



P-BAR

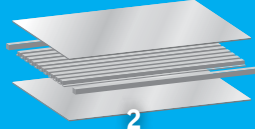
P-BAR CONSTRUCTION

Plate & Bar Key design element: Stack & Build construction offers rapid design change flexibility

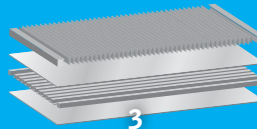
P-BAR Manufacturing Process



1
SELECT CORE DEPTH & POSITION PLATES
Cut top & bottom plate



2
CUT & ASSEMBLE HOT (OIL) SIDE
Position turbulator & hot side spacer bars between top and bottom plates



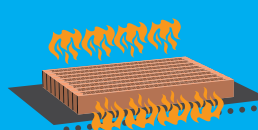
3
CUT & ASSEMBLE COLD (AIR) SIDE
Cut & position cold side spacer bar & cooling fin



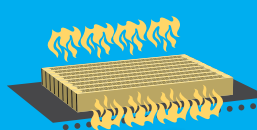
4
BUILD & STACK CORE LAYERS
Repeat sequence until core height is achieved, metal band core



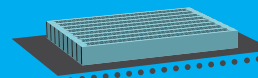
5
FLUX STATION
Flux core unit to prepare for brazing



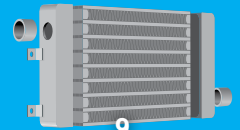
Pre-Heat



7
Braze
649° C



8
COOL-DOWN
Core Temperature reduction



9
WELDING CELL
Weld tank, ports & bracketry to core

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A ThermoSys® Company

We **COOL** what you **POWER**

5215 21st Street
Racine, Wisconsin 53406-5096
TEL: (262) 554-8330
FAX: (262) 554-8536
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WEBSITE: www.thermaltransfer.com