Fluid Cooling Mobile AOHM / AOVHM Series

Performance Notes

- AO/AOVH Series with hydraulic motor
- Adjustable louvers (manual)
- High heat removal
- Heavy duty construction
- Wide flow range
- Heat removal up to 210,000 BTU/HR
- Long life hydraulic motor
- NPT connections

Options
Internal pressure bypass
SAE or BSPP connections
Corrosion resistant coating

Ratings

Maximum Operating Pressure
300 PSI

Test Pressure
300 PSI

Maximum Operating Temperature
400°F

Materials

Tubes Copper

Fins Aluminum

Turbulators Steel

Manifolds Steel

Connections Steel

Cabinet Steel with powder coat finish

Fan Blade Aluminum with steel hub

Fan Guard Zinc plated steel

Fan Adapter Steel

How to Order

[ ] - [ ][ ] - [ ] - [ ] - [ ] - [ ]

Model Series	Model Size Selected	Number of Passes*	Connection Type	Bypass*	Foot Mounting Brackets
AOHM AOHMR AOVHM AOVHMR		Blank - No Bypass 1 - One Pass 2 - Two Pass	Blank - NPT S - SAE	Blank - No Bypass 30 - 30 PSI 60 - 60 PSI	Blank - No Brackets FB - Foot Brackets ADD FOR AOHM & AOHMR MODELS ONLY

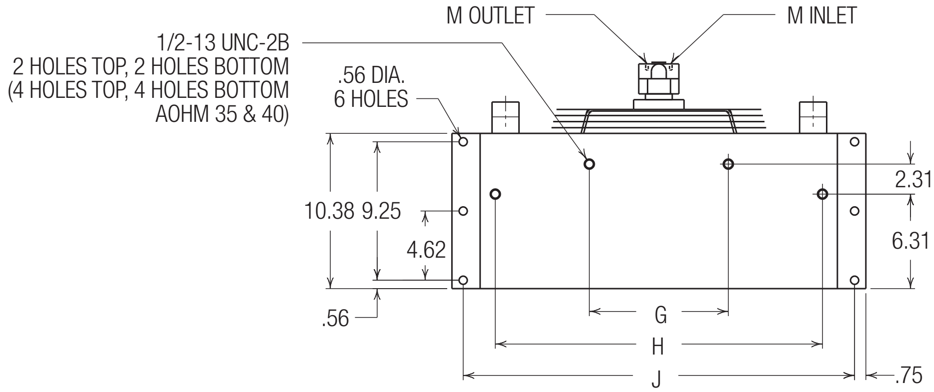
AOHMR - Internal pressure bypass included
AOVHMR - Internal pressure bypass included (available in Two Pass only)
This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

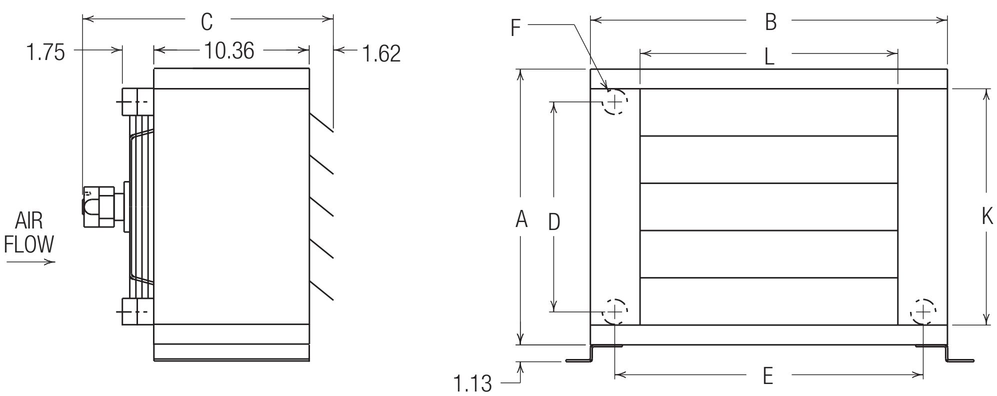
Other connection types available. Please consult factory for assistance.

***ADD FOR AOHMR & AOVHMR MODELS ONLY**

Dimensions

Fan Rotating Clockwise/Facing Motor Shaft





Foot Brackets:
Optional for AOHM
Standard with AOVHM

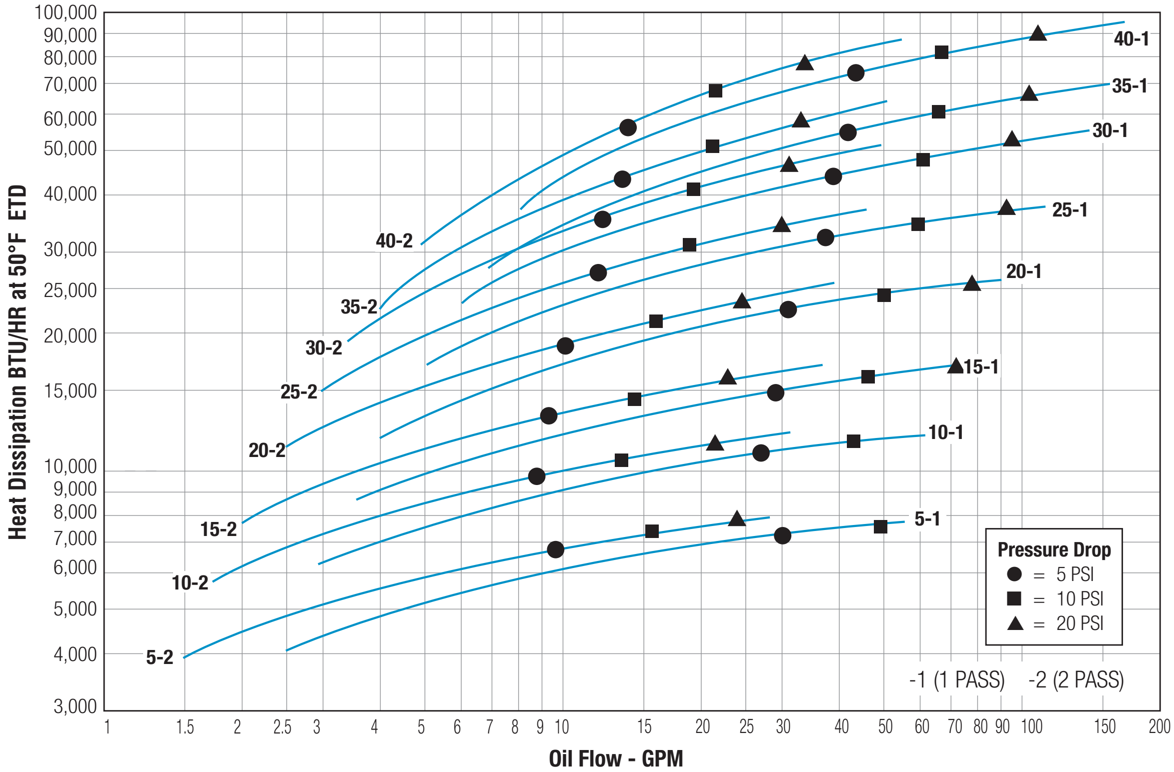
See dimensional chart for external NPT or optional internal SAE connection size.

Model	A	B	C	D	E	F NPT	F SAE	G	H	J	K	L	M (SAE)	Net Weight. (LBS)
AOHM-5	11.81	14.81	16.70	7.69	11.69	1"	#16	—	12.94	16.81	9.19	8.31	#8	35
AOVHM-5	11.81	14.81	16.70	7.69	11.69	1½"	#24	—	12.94	16.81	9.19	8.31	#8	59
AOHM-10	13.12	19.00	16.70	8.88	15.88	1"	#16	—	17.12	21.00	10.50	12.50	#8	50
AOVHM-10	13.12	19.00	16.70	8.88	15.88	1½"	#24	—	17.12	21.00	10.50	12.50	#8	76
AOHM-15	15.75	20.38	17.09	11.50	17.25	1"	#16	—	18.50	22.38	13.12	13.88	#8	60
AOVHM-15	15.75	20.38	17.09	11.50	17.25	1½"	#24	—	18.50	22.38	13.12	13.88	#8	89
AOHM-20	18.38	23.81	17.09	14.00	20.56	1¼"	#20	—	21.81	25.81	15.75	17.19	#8	75
AOVHM-20	18.38	23.81	17.09	14.00	20.56	2"	#32	—	21.81	25.81	15.75	17.19	#8	108
AOHM-25	23.62	26.68	17.09	19.25	23.56	1¼"	#20	—	24.81	28.68	21.00	20.19	#8	110
AOVHM-25	23.62	26.68	17.25	19.25	23.56	2"	#32	—	24.81	28.68	21.00	20.19	#8	143
AOHM-30	27.56	31.62	16.70	23.19	28.50	1¼"	#20	11.00	29.75	33.62	24.94	25.12	#8	120
AOVHM-30	27.56	31.62	16.95	23.19	28.50	2"	#32	11.00	29.75	33.62	24.94	25.12	#8	178
AOHM-35	30.19	33.81	16.70	25.81	30.69	1¼"	#20	11.00	31.94	35.81	27.56	27.31	#8	135
AOVHM-35	30.19	33.81	17.22	25.81	30.69	2"	#32	11.00	31.94	35.81	27.56	27.31	#10	220
AOHM-40	36.75	41.62	16.70	32.38	38.50	1¼"	#20	13.25	39.75	43.62	34.12	35.12	#8	160
AOVHM-40	36.75	41.62	17.22	32.38	38.50	2"	#32	13.25	39.75	43.62	34.12	35.12	#10	286

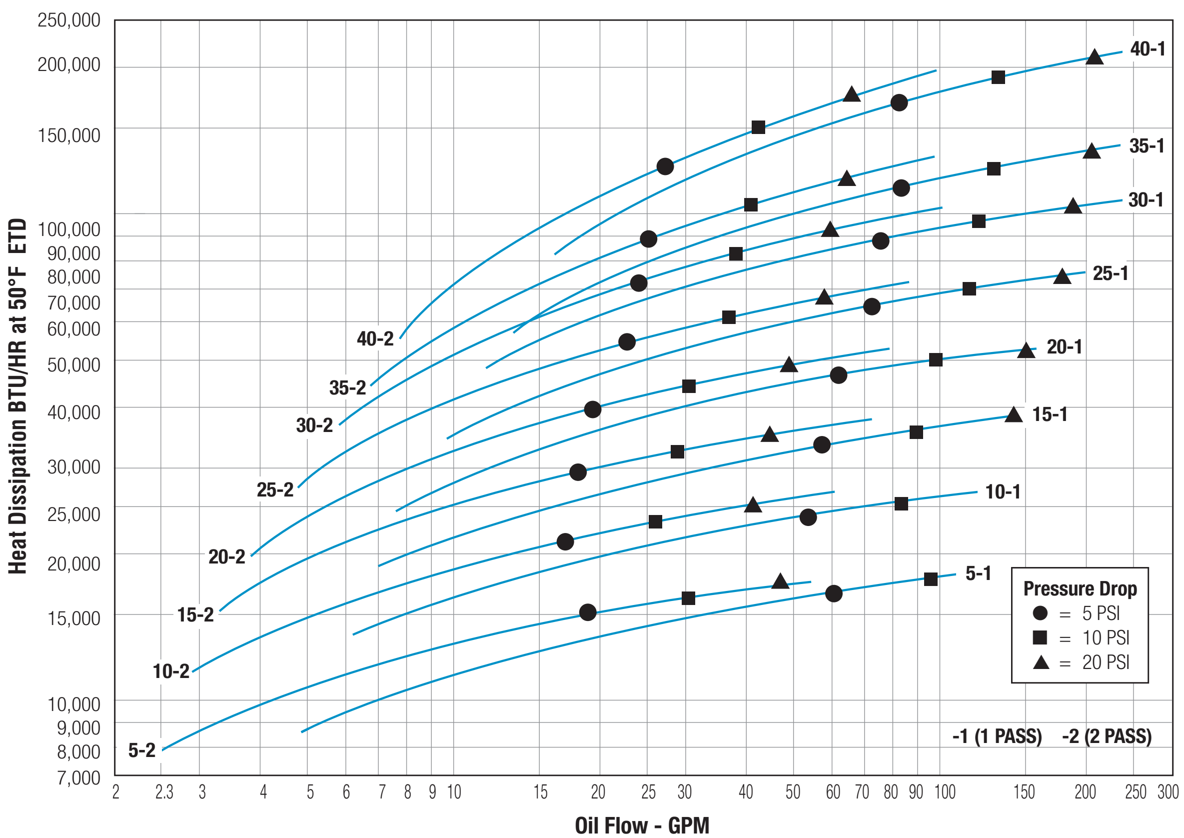
NOTE: We reserve the right to make reasonable design changes without notice. All dimensions are in inches.

Performance Curves

AOHM Series



AOVHM Series



Dimensions

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 =

$$\text{BTU/HR heat load} \times \frac{50°F}{ETD} \times \text{viscosity correction A.}$$

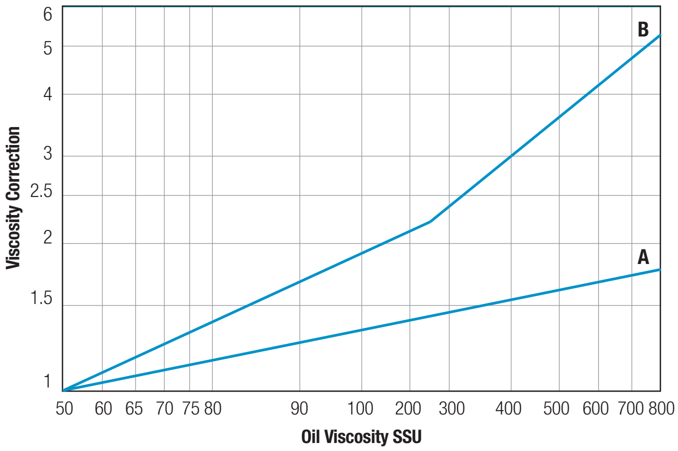
STEP 4 **Enter curves** at oil flow through cooler and curve heat dissipation. Any curve above the intersecting point will work.

NOTE: *Performance curves shown are for 1 and 2 pass configuration.*

EXAMPLE: *35 - 2 is AOHM or AOVHM - 35 in 2 pass*

STEP 5 **Determine Oil Pressure Drop from Curves:**
● = 5 PSI ■ = 10 PSI ▲ = 20 PSI Multiply pressure drop from curve by correction factor B found in oil viscosity correction curve.

Oil Viscosity Correction Multipliers



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 △T) with this formula:
Oil △T = (BTU's/HR) / (GPM Oil Flow x 210).

To calculate the oil entering temperature to the cooler, use this formula:
Oil Entering Temp. = Oil Leaving Temp + Oil △T.

Oil Pressure Drop: Most systems can tolerate a pressure drop through the heat exchanger of 20 to 30 PSI. Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI or less for case drain applications where high back pressure may damage the pump shaft seals.

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

Hydraulic Motor

Model Size	Maximum Fan Speed (RPM)		Oil Flow Required (GPM)		Minimum Operating Pressure (PSI)		Sound dB(A)*		Motor (IN^3/REV.) Displacement		CFM	
	AOHM	AOVHM	AOHM	AOVHM	AOHM	AOVHM	AOHM	AOVHM	AOHM	AOVHM	AOHM	AOVHM
5	1725	3450	1.6	3.3	300	300	68	85	.22	.22	465	780
10	1725	3450	1.6	3.3	300	300	68	85	.22	.22	669	1110
15	1725	3450	1.6	3.3	300	300	69	91	.22	.22	956	1590
20	1725	3450	1.6	3.3	300	300	70	91	.22	.22	1460	2168
25	1140	1725	1.1	3.4	400	500	72	81	.22	.45	2160	3000
30	1140	1725	1.1	3.4	400	500	75	84	.22	.45	2990	4095
35	1140	1725	1.1	5.2	900	1000	76	89	.22	.70	4370	5921
40	1140	1725	1.1	5.2	900	1000	78	91	.22	.70	5450	9609

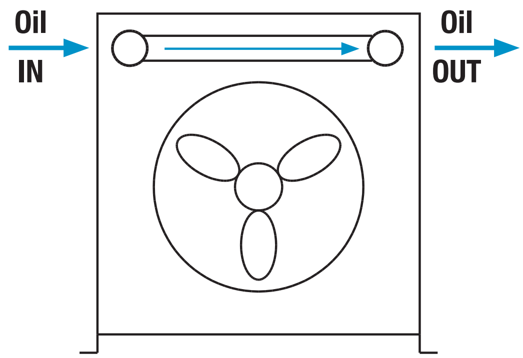
Notes: Maximum pressure is 2000 PSI. Stated minimum operating pressure is at inlet port of motor. 1000 PSI allowable back pressure.
**Catalog db(A) sound levels are at seven (7) feet. dB(A) sound levels increase by six (6) dB(A) for halving this distance and decrease by (6) dB(A) for doubling this distance.*

Internal Pressure Bypass

AOHMR Series

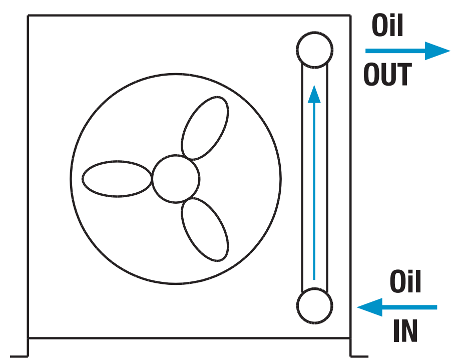
One Pass (Medium to High Oil Flows)

Model Number	Flow Range GPM (USA)
AOHMR - 5-1	2 - 80
AOHMR - 10-1	3 - 80
AOHMR - 15-1	4 - 80
AOHMR - 20-1	5 - 80
AOHMR - 25-1	6 - 100
AOHMR - 30-1	7 - 100
AOHMR - 35-1	8 - 112
AOHMR - 40-1	9 - 118



Two Pass (Low to Medium Oil Flows)

Model Number	Flow Range GPM (USA)
AOHMR - 5-2	2 - 25
AOHMR - 10-2	2 - 30
AOHMR - 15-2	2 - 40
AOHMR - 20-2	2 - 30
AOHMR - 25-2	2 - 40
AOHMR - 30-2	2 - 40
AOHMR - 35-2	3 - 40
AOHMR - 40-2	4 - 40

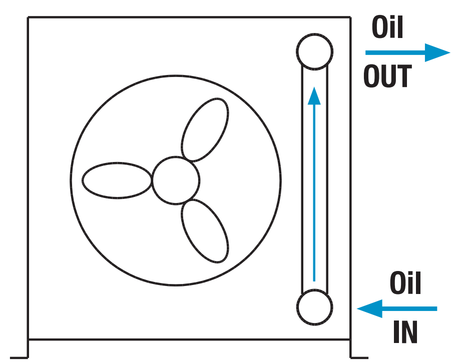


AOVHMR Series

Two Pass (Low to Medium Oil Flows)

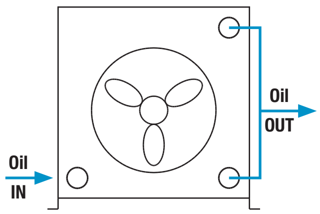
Model Number	Flow Range GPM (USA)
AOVHMR - 5-2	4 - 50
AOVHMR - 10-2	4 - 60
AOVHMR - 15-2	4 - 60
AOVHMR - 20-2	4 - 80
AOVHMR - 25-2	4 - 80
AOVHMR - 30-2	4 - 80
AOVHMR - 35-2	6 - 80
AOVHMR - 40-2	8 - 80

Bypass valve is available for 2 pass AOVHMR models only.

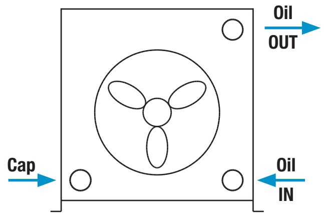


Piping Diagram Without Bypass

One Pass



Two Pass



AO / AOVH / AOHM / AOVHM / AOF Series

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General Information

1. Air cooled oil coolers are built for operation with maximum oil pressures of 300 PSI and temperatures of 400°F.
2. The motors furnished are specially built for fan duty. They are guaranteed by the manufacturer for operation in a maximum ambient temperature of 104°F. Consideration should be given to installation location so motors are not subjected to temperatures above this level.
3. Air/oil coolers that are to be installed for utilization of waste heat for the space heating should be mounted 7 to 14 feet above the floor depending on the structure, for proper heat distribution.

Installation

1. "AO" and "AOF" coolers are designed for suspension by eye bolts or threaded hangar rods screwed into the upper and lower covers in 1/2"-13 threaded holes; "AOVH" coolers have 6 to 12 holes (0.56" diameter) in the base for mounting. Refer to product page for location and quantity.
2. Units should not be located in corrosive atmospheres as rapid deterioration of casing, cooling coil, fan and motor may take place resulting in reduced life.
3. For proper air flow, a minimum of 12" should be allowed between the oil cooler fan and any walls or obstructions.
4. Piping should be sized based on oil flow and pressure drop requirements and not on the oil coolers supply and return connection size. Piping should also be properly supported to prevent excessive strain to connection, manifolds, etc.
5. Filter located ahead of the cooler should be installed to trap scale, dirt or sludge that may be present in piping and equipment, or that may accumulate with use. A thermostatic or spring loaded by-pass relief valve installed ahead of the cooler may be helpful to speed warm-up and relieve the system of excessive pressure. All accessories should be considered in the original heat rejection and piping calculations.
6. Electric Motors: CAUTION To prevent possible electrical shock, it is important to make sure this unit is grounded properly. Connect motor only to a power supply of the same characteristics as shown on the motor nameplate. Voltage may vary 10% of nameplate voltage. Be sure to provide proper fusing to prevent possible motor burnout. Follow wiring diagram printed on motor nameplate or in terminal box. Before starting motor, follow motor manufacturer recommendations. Turn fan manually to eliminate possible motor burn out in the event the fan has become damaged in shipment. Observe operation carefully after motor is started for the first time.
7. Hydraulic Motors: Connect motor, port B, to inlet oil line and return line to port A for correct rotation. A filter is highly recommended upstream of the motor rated at 25 micron nominal. Controlling oil flow rate as specified on motor data sheet with cooler is very important. Maximum oil pressure to motor is 2000 PSI, minimum pressure is shown on motor data sheet. Do not allow dirty oil to enter the motor. Excessive flows will cause fan blade failure. Insufficient flows to motor will reduce cooling capacity.

Maintenance

Inspect the unit regularly for loose bolts and connections, rust and corrosion, and dirty or clogged heat transfer surfaces (cooling coil).

Heat Transfer Surface

Dirt and dust should be removed by brushing the fins and tubes and blowing loose dirt off with an air hose. Should the surface be greasy, the motor should be removed and the fins and tubes brushed or sprayed with a mild alkaline solution, or a non-flammable degreasing fluid. Follow with a hot water rinse and dry thoroughly. A steam hose may also be used effectively.

Casing, Fan and Motor: Dirt and grease should be removed from these parts. Rusty or corroded surfaces should be sanded clean and repainted.

Internal Cleaning

At lease once a year piping should be disconnected and a degreasing agent or flushing oil circulated through the unit to remove sludge from turbulators and internal tube surfaces to return the unit to full capacity. A thorough cleaning of the entire system in the same manner is preferable to avoid carry-over from uncleaned piping, pump and accessories. The strainer of any filtering devices should be removed and serviced following this cleaning operation.

Electric Motor

Keep outside surface free of dirt and grease so motor will cool properly. Make sure cooling air over motor is not obstructed. Prelubricated ball bearing motors are normally furnished and require no grease for about 5 to 10 years. Sleeve bearing motors require oil after three years.

Hydraulic Motor

Change any oil filter(s) in the motor circuit as frequently as necessary to assure that good, clean oil is maintained.

Units with Replaceable Air Filters

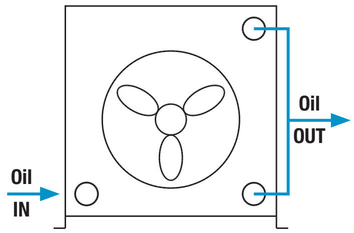
Examine filters for dirt and grease accumulation twice yearly, or more if operating conditions dictate. If disposable filters are used, replace as required. If the washable aluminum filters are used, wash with a warm water and soap solution that will remove dirt and cut grease build-up. Make sure that the aluminum filter is completely dry before replacing the unit. This filter can be made more effective if treated with a lightweight oil before placing in service. It is recommended that a spare aluminum filter be kept in stock to minimize downtime during the filter cleaning operation.

Repair or Replacement of Parts

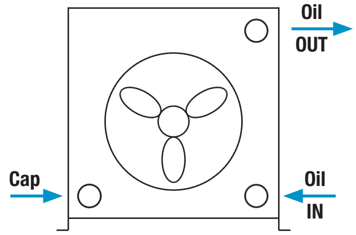
When ordering replacement parts or making inquiry regarding service, mention model number, serial number and the original purchase order number. Any reference to the motor must carry full nameplate data.

Air / Oil Heat Exchangers

One Pass



Two Pass



AO, AOF & AOHM Models	One Pass Flow (GPM)
5	2-80
10	3-80
15	4-80
20	5-80
25	6-100
30	7-100
35	8-112
40	9-118

AOVH & AOVHM Models	One Pass Flow (GPM)
5	4-160
10	6-160
15	8-160
20	10-160
25	12-200
30	14-200
35	16-220
40	18-230

AO, AOF & AOHM Models	Two Pass Flow (GPM)
5	2-25
10	2-30
15	2-30
20	2-40
25	2-40
30	2-40
35	3-40
40	4-40

AOVH & AOVHM Models	Two Pass Flow (GPM)
5	4-50
10	4-60
15	4-60
20	4-80
25	4-80
30	4-80
35	6-80
40	8-80

Gresen Hydraulic Motor Specifications

Model	Maximum Fan Speed (GPM)	Oil Flow Required (GMP)	Displacement (cu. in./rev)	Minimum Operating Pressure (PSI)
AOHM-5	1725	1.6	.22	300
AOHM-10	1725	1.6	.22	300
AOHM-15	1725	1.6	.22	300
AOHM-20	1725	1.6	.22	300
AOHM-25	1140	1.1	.22	400
AOHM-30	1140	1.1	.22	400
AOHM-35	1140	1.1	.22	900
AOHM-40	1140	1.1	.22	900
AOVHM-5	3450	3.3	.22	300
AOVHM-10	3450	3.3	.22	300
AOVHM-15	3450	3.3	.22	300
AOVHM-20	3450	3.3	.22	300
AOVHM-25	1725	3.4	.45	500
AOVHM-30	1725	3.4	.45	500
AOVHM-35	1725	5.2	.70	1000
AOVHM-40	1725	5.2	.70	1000

Maximum operating pressure 2000 PSI. Stated minimum operating pressure is at inlet port of motor. 1000 PSI allowable downstream back pressure.