



## **MAC & MACH Air-Cooled Chillers**

(Cooling only and heat Pump Models)  
Air-Cooled Chillers for Global Residential  
and Light Commercial MicroClimates

# MAC Product Specifications

Model Number	Physical Data									
	Coil				Chiller				Weight	
	Height In [mm]	Length In [mm]	Copper Diameter In [mm]	No. Rows	Height In [mm]	Length In [mm]	Width In [mm]	R22 Oz. [G]	Net Lbs. [kg]	Shipping Lbs. [kg]
MAC-036	38 [965.2]	48 [1219.2]	3/8 [9.5]	1	49.75 [1263.65]	39.75 [1009.65]	16.25 [412.75]	88 [2494]	280 [127]	283 [128]
MAC-048	38 [965.2]	48 [1219.2]	3/8 [9.5]	2	49.75 [1263.65]	39.75 [1009.65]	16.25 [412.75]	96 [2736]	292 [132]	295 [134]
MAC-060	38 [965.2]	48 [1219.2]	3/8 [9.5]	2	49.75 [1263.65]	39.75 [1009.65]	16.25 [412.75]	96 [2736]	313 [142]	316 [143]
MAC-120	52.5 [1330]	48 [1220]	3/8 [9.5]	3	60 [1520]	58.25 [1480]	25.25 [640]	96 [2736]	650 [295.5]	700 [318]
MACH-060	38 [965.2]	48 [1219.2]	3/8 [9.5]	2	49.75 [1263.65]	39.75 [1009.65]	16.25 [412.75]	96 [2736]	323 [147]	326 [148]

## Electrical Data

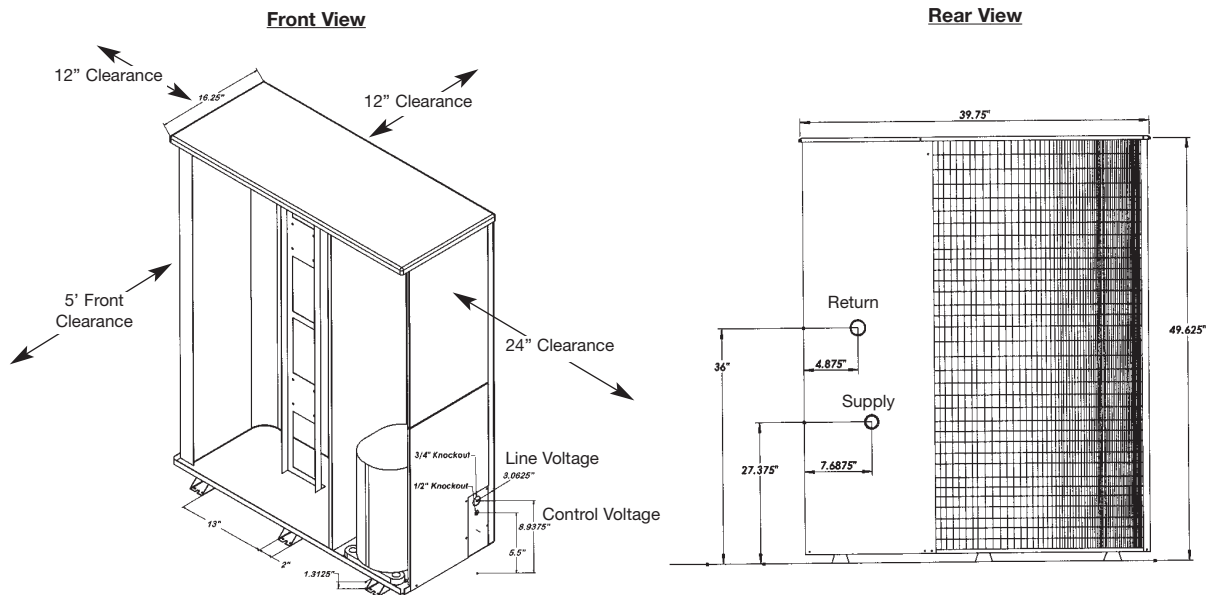
Model Number	Volts Phase Hertz	Per Compressor		Fan Motor x 2		Pump Motor Min. Circuit		Ampacity (Amperes) Per Circuit	Fuse or HACR Circuit Breaker Per Circuit	
		(RLA)	(LRA)	(FLA)	(RPM)	(FLA)	(RPM)		Min. Amps	Max. Amps
MAC-036-01	208/230-1-50/60	18.4	95	1.05	1050	3.7	3450	28.80	30	40
MAC-048-01	208/230-1-50/60	22.1	137	1.05	1050	3.7	3450	33.43	40	50
MAC-060-01	208/230-1-50/60	32.1	169	1.05	1050	3.7	3450	45.93	50	70
MAC-120-01	208/230-1-50/60	32.1	169	2.0	900	-	-	42.23	50	70
MAC-120-02	208/230-3-50/60	19.3	137	2.0	900	-	-	26.2	30	40
MAC-120-03	380/415/460-3-50/60	10	75	2.0	900	-	-	13.7	20	20
MAC-036-02	208/230-3-50/60	11.4	77	1.05	1050	3.7	3450	20.05	20	30
MAC-048-02	208/230-3-50/60	16.4	91	1.05	1050	3.7	3450	26.30	30	40
MAC-060-02	208/230-3-50/60	19.3	137	1.05	1050	3.7	3450	29.93	30	40
MACH-060-01	208/230-1-50/60	32.1	169	1.05	1050	3.7	3450	45.93	50	70
MAC-036-03	380/460-3-60	7.85	50	0.6	1050	2.85	3500	13.86	15	20
MAC-048-03	380/460-3-60	10	62	0.6	1050	2.85	3500	16.55	20	20
MAC-060-03	380/460-3-60	10	75	0.6	1050	2.85	3500	16.55	20	20

Supply Wire Length Feet	Copper Wire Size (1% Voltage Drop)								
	200	6	4	4	4	3	3	2	2
	150	8	6	6	4	4	4	3	3
	100	10	8	8	6	6	6	4	4
	50	14	12	10	10	8	8	6	6
	15	20	25	30	35	40	45	50	
	Supply Circuit Ampacity								

## Chiller Dimensions

Clearance data relates to serviceability. Please check Local Building Department Regulations and Electrical Code Requirements.

MAC 036, 048, 060

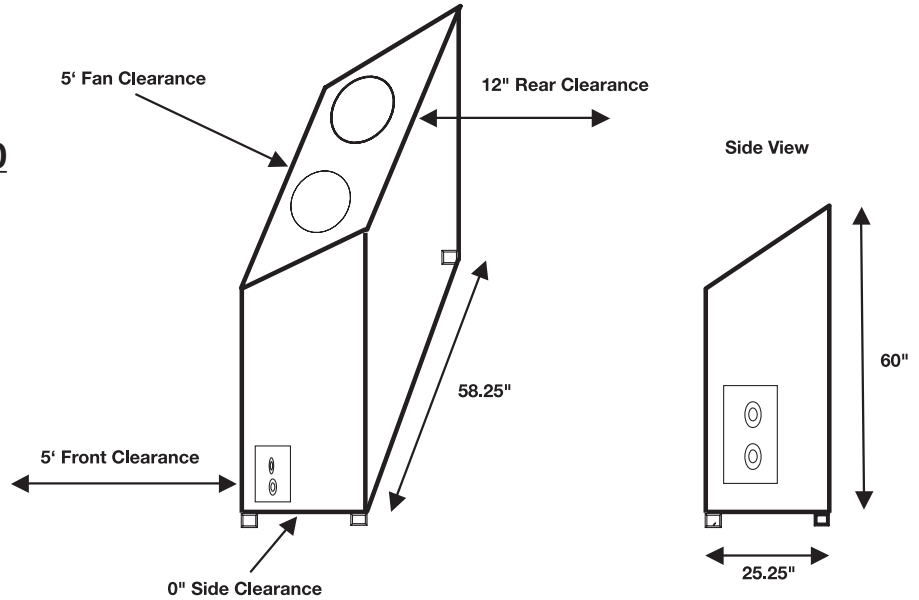


**These Models are designed to operate exclusively with R-22 in a self-contained, pre-charged refrigerant system. Do not access the closed refrigerant system for any reason other than after-sale, after installation component replacement. Such service is to be conducted by qualified service personnel only.**

*These specifications are subject to change without notice.*

## MAC-120

Stated clearances for serviceability. Check local building department regulations and electrical code requirements.



	MAC-036-1	MAC-048-1	MAC-060-1	MAC-120	MACH 060-1
Compressor	Copeland Scroll K3	Copeland Scroll K3	Copeland Scroll K3	2 Copeland Scroll K3	Copeland Scroll K3
Heat Exchanger	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Electrical Data	1-50/60-208/230 Volts	1-50/60-208/230 Volts	1-50/60-208/230 Volts	208/230/1/50/60 Volts	1-50/60-208/230 Volts
Max. Head Pressure	50 ft.	50 ft.	50 ft.	-	50 ft.
Max. Flow Rate	8.6 GPM	11.5 GPM	14.4 GPM	28.8 GPM	14.4 GPM
Min. Flow Rate	5.5 GPM1	6.5 GPM	9.0 GPM	18 GPM	9.0 GPM
Supply Water Temp.	44° F	44° F	44° F	45° F	44° F/130° F
Return Water Temp.	54° F	54° F	54° F	55° F	54° F/120° F
Min. System Water Content	25.0 Gals.	25.0 Gals.	25.0 Gals.	50 Gals.	25.0 Gals
Expansion Tank Size*	2.0 Gals.	2.0 Gals.	2.0 Gals.	3% of System Total	2.0 Gals
Pump	1/2 Hp Centrifugal Stainless Steel Pump Head Silicon Carbide/Viton Seals	1/2 Hp Centrifugal Stainless Steel Pump Head Silicon Carbide/Viton Seals	1/2 Hp Centrifugal Stainless Steel Pump Head Silicon Carbide/Viton Seals	Not Included	1/2 Hp Centrifugal Stainless Steel Pump Head Silicon Carbide/Viton Seals
Water Connections	1" Supply, 1 1/4" Return	1" Supply, 1 1/4" Return	1" Supply, 1 1/4" Return	1.5" Supply, 1.5" Return	Supply, 1 1/4" Return

\* Field Installed

Capacity / Watts / EER*												
OD Temp. F	MAC-036-1			MAC-048-1			MAC-060-1			MAC-120		
	BTUH	Watts	EER	BTUH	Watts	EER	BTUH	Watts	EER	BTUH	Watts	EER
82	36433	3170	11.5	48577	4147	11.71	63381	5182	12.23	119,911	11,200	10.71
95	35062	3586	9.78	45210	4424	10.22	60712	5701	10.65	114,840	11,358	10.11
100	33763	3782	8.93	44248	4624	9.57	59658	5945	10.02	112,543	11,846	9.5
105	33186	3940	8.42	43286	4824	8.97	58653	6262	9.32	110,629	12,480	8.86
110	32429	4180	7.76	41844	5305	7.89	58607	6582	8.9	110,517	12,811	8.62

\* Refrigerant system performance only, pump data not included.

The Multiaqua chiller is a self-contained air-cooled condenser, coupled with an insulated brazed plate heat exchanger (evaporator). The system utilizes a scroll compressor to circulate refrigerant between the condenser and heat exchanger. The refrigerant is metered into the heat exchanger with a thermostatic expansion valve. Protecting the system are high and low pressure switches, as well as a pump flow switch.

Liquid solution (water and propylene glycol) is circulated through the heat exchanger by a chiller-mounted pump (the pump liquid side is manufactured of stainless steel, with silicon carbide/Viton seals). The liquid solution flows through the heat exchanger to the system supply piping, and on to the air handlers.

**\* Low ambient kit - IC M 325H(+)/ICM175  
Added upon request**

*These specifications are subject to change without notice.*

# MAC Glycol Solution Data

*The MAC Chiller must have a minimum of 10% Propylene Glycol mix for water treatment and freeze protection.*

MAC Glycol Solution Data				
Propylene Glycol %	Water Flow	Capacity	Min. Ambient Temperature	GPM Adjustment = 100% Capacity
10%	x 1.020	x 0.99	26° F	x 1.01
20%	x 1.028	x 0.98	18° F	x 1.03
30%	x 1.036	x 0.98	8° F	x 1.07
40%	x 1.048	x 0.97	-7° F	x 1.11
50%	x 1.057	x 0.96	-29° F	x 1.16

Example: 30% glycol solution in MAC060-1

Maximum Flow Rate 12GPM x 1.036

System Capacity x 0.96

Use Propylene Glycol

## **Important**

If the outside temperature is expected to fall below freezing (32F) in the area the MAC is to be installed; the installer must take the following precautions. Failure to do so will void the warranty.

**To not engage in cold ambient mitigation will result in the failure of components such as the heat exchanger, piping, pump, etc., and property damage.**

- Keep the system pump in a constant energized mode to keep constant circulation of fluid
- Use a propylene glycol/water mix. The percentage amount of glycol recommended is dependent on the expected ambient temperatures and the solution makeup recommendation of the glycol manufacturer. Refer to Glycol Solution Data Chart.
- A minimum of 10% Glycol is to be used at all times. Even in areas where there is no danger of freezing.

*These specifications are subject to change without notice.*

***Warranty: One Year Parts, 5 Year Compressor, 5 Year Heat Exchanger, for North American installations only. See Warranty Statement included with each Chiller for Specifics and Exclusions.***

## **Please Note:**

For low ambient kit installed - Please add the suffix (L) after each MAC (Chiller part number).

## Guide Specifications

Air-Cooled Liquid Chiller  
HVAC Guide Specifications  
Size Range: 3, 4, and 5 Tons

Multiaqua Model Number: MAC036, MAC048,  
MAC060

### Part 1- General

#### 1.01 SYSTEM DESCRIPTION

Air-cooled liquid chiller utilizing scroll compressor, low sound fans, and hydronic pump system.

#### 1.02 QUALITY ASSURANCE

- A. Unit shall be certified in accordance with U.L. Standard 95, latest revision (U.S.A.).
- B. Unit construction shall comply with ASHRAE 15 Safety Code, NEC, and ASME applicable codes (U.S.A. codes).
- C. Unit shall be manufactured in a facility registered to ISO 9002, Manufacturing Quality Standard.
- D. Unit shall be full load run tested at the factory.

#### 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Unit controls shall be capable of withstanding 150 F storage temperatures in the control compartment.
- B. Unit shall be stored and handled per unit manufacturer's recommendations.

### Part 2- Products

#### 2.01 EQUIPMENT

- A. General:  
Factory assembled, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping controls, refrigerant charge (R-22), and special accessories required prior to field start-up.
- B. Unit Cabinet:
  1. Cabinet shall be galvanized steel casing with a baked polyester powder.
  2. Cabinet shall be capable of withstanding 500-hour salt spray test in accordance with the ASTM (U.S.A.) standard.

#### C. Fans:

1. Condenser fans shall be direct-driven, 4-blade, aluminum construction, and shall be statically and dynamically balanced with inherent corrosion resistance.

2. Air shall be discharged horizontally.
3. Fans shall be protected by coated steel wire safety guards.

#### D. Compressors:

1. Fully hermetic scroll type compressors.
2. Direct Drive, 3500 rpm (60Hz) protected by either line break device or discharge gas thermostat, depending on motor, suction gas cooled motor.
3. External vibration isolation- rubber in sheat.

#### E. Cooler:

1. Cooler shall be rated for a refrigerant working-side pressure of 450 psig and shall be tested for a maximum fluid-side pressure of 150 psig.
2. Shall be single-pass, ANSI type 316 stainless steel, brazed plate construction.
3. Shell shall be insulated with " closed cell, elastomeric foam (ASTM518).
4. Shall incorporate one independent refrigerant circuit.

#### F. Condenser:

1. Coil shall be air-cooled with integral subcooler, and shall be constructed of aluminum fins mechanically bonded to welded copper tubes.
2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be leak tested and pressure tested at 450 psig (3103 kPa).

#### G. Refrigeration Components:

Refrigerant circuit components shall include moisture indicating sight glass, thermal expansion device, and complete operating charge of both refrigerant R-22 and compressor oil.

#### H. Controls and Safeties:

1. Controls:
  - a. Unit controls shall include the following minimum components:
  - b. Control transformer to serve all controllers, relays, and control components.
  - c. Pump bypass timer.
  - d. Compressor recycle timer.
  - e. Optional low pressure bypass timer for low ambient operation.
  - f. Optional fan cycling control for low ambient operation.
  - g. Flow switch.

- h. Leaving water temperature thermostat with thermistor installed to measure cooler leaving fluid temperatures.
- 2. Unit controls shall include the following functions.
  - a. Capacity control based on leaving chilled fluid temperature. Temperature set point accuracy + - 1.0 F.
  - b. Chilled water pump start/stop control.
- 3. Safeties:
  - a. Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protectants:
    - 1) Low refrigerant pressure.
    - 2) Low chilled fluid temperature.
    - 3) Thermal overload.
    - 4) High refrigerant pressure.
  - b. Condenser fan and factory pump motors shall have internal thermal protection.

**I. Operating Characteristics:**

- 1. Unit shall be capable of starting and running at outdoor ambient temperatures from 0 F to 120 F.
- 2. Unit shall be capable of starting up with 95 F (35 C) entering fluid temperature to the cooler.

**J. Motors:**

Condenser fan motors shall be totally enclosed single speed, with permanently lubricated sleeve bearings and Class F insulation.

**K. Electrical Requirements:**

- 1. Unit primary electrical power supply shall enter the unit at a single location.
- 2. Primary electrical power supply shall be rated to withstand 120 F (50 C) operating ambient.
- 3. Unit shall operate on 1-phase or 3-phase power at the voltage shown in the equipment schedule.
- 4. Control points shall be accessed through terminal block.
- 5. Unit shall be shipped with factory control and power wiring installed.

**L. Hydronic System:**

- 1. Field pipe connections shall be brass NPT and shall be extended to the outside of the unit chassis.
- 2. Pumps shall be single stage design, for installation in horizontal position and capable of

being serviced without disturbing piping connections.

- a. Pump casing shall be of stainless steel.
- b. The impeller shall be of stainless steel type, dynamically balanced and screwed onto the shaft.
- c. The liquid cavity shall be sealed off at the motor shaft by an internally flushed mechanical seal with silicon carbide face and viton seal ring.
- d. Pump shall be rated for 80 psig working pressure.
- e. The pump case shall have drain ports.
- f. Motors shall be totally enclosed 1-phase type with permanently lubricated sleeve bearings. Each pump shall be factory tested per Hydraulic Institute Standards.
- g. Please note that 1/2 HP pump is included only on our 3, 4 and 5 ton models. 10 ton model does not included pump.
- 3. Brass body strainer with 20 mesh screen and blow down supplied in cabinet as field installable accessory.

**M. Special Features:**

- 1. Low-Ambient Operation:
  - a. Unit shall be capable of starting and running at outdoor ambient temperatures down to -20 F (-29 C) with the addition of antifreeze in the cooler circuit and field or factory-installed low ambient kit.